REPORT NUMBER: SPNCAP-MGA-2013-040

NEW CAR ASSESSMENT PROGRAM (NCAP)
Side Impact Pole Test

FORD MOTOR COMPANY
2013 Ford Fusion SE Hybrid 4-Dr Sedan
NHTSA No.: MD0218

MGA RESEARCH CORPORATION
5000 Warren Road
Burlington, WI 53105

Test Date: December 11, 2012

Final Report Date: January 25, 2013

FINAL REPORT

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

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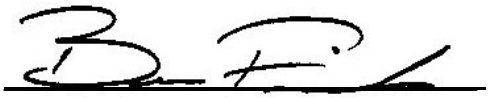
Approved by: 
Ben Fischer, Project Engineer

Approval Date: January 25, 2013

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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9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105		*10. Work Unit No.* *11. Contract or Grant No.* DTNH22-09-D-00124
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 December 11, 2012 to January 25, 2013 *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 Ford Fusion SE Hybrid 4-Dr Sedan in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP Pole Laboratory Test Procedure for the generation of consumer information on vehicle side pole crash protection. The test was conducted at MGA Research Corporation, in Burlington, Wisconsin, on December 11, 2012.

The impact velocity was 32.0 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 21.1°C. The test vehicle post-test maximum crush was 396 mm at level 3. The test vehicle's performance was as follows:

		Driver ATD (SID-IIs)	
Measurement Description	**Units**	**Threshold**	**Result**
Head Injury Criteria (HIC_{36})	N/A	1000	268
Resultant Lower Spine Acceleration	Gs	82	46
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2654
Maximum Thoracic Rib Deflection	mm	38*	19
Maximum Abdomen Rib Deflection	mm	45*	17

*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.

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 Ford Fusion SE Hybrid 4-Dr Sedan. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Pole Laboratory Test Procedure, dated September 2012.

SECTION 2
SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2013 Ford Fusion SE Hybrid 4-Dr Sedan. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.0 km/h. The test was conducted by MGA Research Corporation in Burlington, Wisconsin, on December 11, 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 September 2012. Camera locations and other pertinent camera information are included in this report.

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

Primary and Redundant Head CG Triaxial Accelerometers
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	268
Resultant Lower Spine Acceleration	Gs	82	46
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2654
Maximum Thoracic Rib Deflection	mm	38*	19
Maximum Abdominal Rib Deflection	mm	45*	17

*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	Yes	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	Yes	No	
Other				

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

GENERAL COMMENTS

There was no valid data collected for:

Left Floor Sill Y after 20ms
Left Lower A-Post Y after 17ms
Left B-Post @ Sill Y after 107ms
Left Mid B-Post Y after 81ms
Driver Seat Track Y after 40ms

Left Mid A-Post Y is questionable from 44-47ms and 55-59ms

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2013 Ford Fusion SE Hybrid 4-Dr Sedan NHTSA No. MD0218
Test Program: NCAP Side Pole Impact Test Test Date: 12/11/2012

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	MD0218
Model Year	2013
Make	Ford
Model	Fusion Hybrid
Body Style	Sedan
VIN	3FA6P0LU5DR160617
Body Color	Ice Storm
Odometer Reading (km/mi)	40 / 25
Engine Displacement (L)	2.0
Type/No. Cylinders	4
Engine Placement	Lateral
Transmission Type	Automatic
Transmission Speeds	CVT
Overdrive	NA
Final Drive	Front
Roof Rack	No
Sunroof/T-Top	Yes
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	Yes

Traction Control System (TCS)	Yes
Auto-Leveling System	No
Automatic Door Locks (ADL)	Yes
Power Window Auto-Reverse	Yes
Other Optional Feature	N/A
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	Yes
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head/Torso Airbag	No
Rear Pass. Torso Airbag	No
Rear Pass. Torso/Pelvis Airbag	No
Rear Pass. Pelvis Airbag	No
Driver Seat Belt Pretensioner	Yes
Rear Pass. Seat Belt Pretensioner	No
Driver Load Limiter	Yes
Rear Pass. Load Limiter	No
Other Safety Restraint	N/A

Does owner's manual provide instructions to turn off automatic door locks?	Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Ford Motor Company
Date of Manufacture	10/12
Vehicle Type	Passenger Car

GVWR (kg)	2123
GAWR Front (kg)	1107
GAWR Rear (kg)	1021

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3		5	
Capacity Weight (VCW) (kg)				385	(A)
DSC x 68.04 kg				340	(B)
Rated Cargo and Luggage Weight (RCLW) (kg)				45	(A-B)

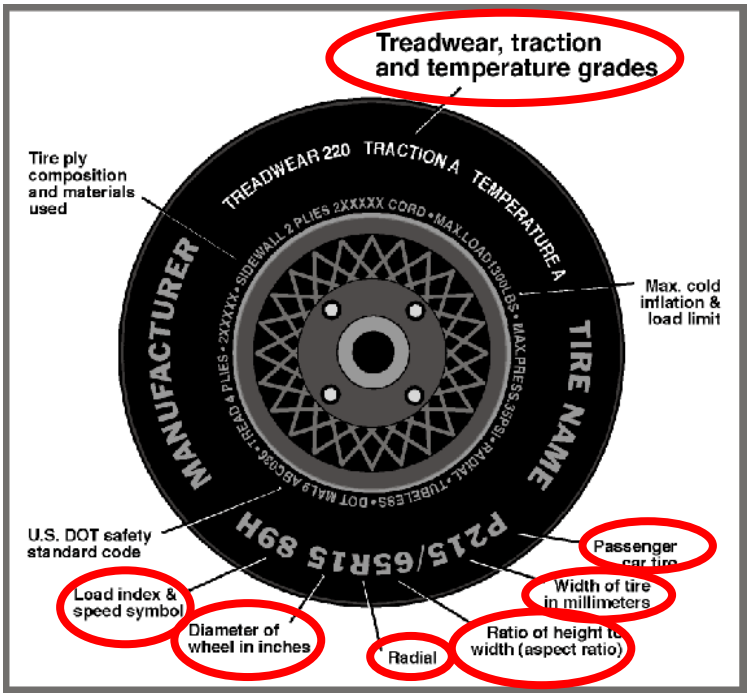
VEHICLE SEAT TYPE

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

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

Test Vehicle: 2013 Ford Fusion SE Hybrid 4-Dr Sedan NHTSA No. MD0218
Test Program: NCAP Side Pole Impact Test Test Date: 12/11/2012

VEHICLE TIRE INFORMATION



Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	240	240
Recommended Tire Size	P225/50R17	P225/50R17
Tire Size on Vehicle	P225/50R17	P225/50R17
Tire Manufacturer	Michelin	Michelin
Tire Model	Energy Saver	Energy Saver
Treadwear	480	480
Traction	A	A
Temperature Grade	A	A
Tire Plies Sidewall	1	1
Tire Plies Body	4	4
Load Index/Speed Symbol	93V	93V
Tire Material	Rubber	Rubber
DOT Safety Code Left	B90A 00NX	B90A 00NX
DOT Safety Code Right	B90A 00NX	B90A 00NX

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

Test Vehicle: 2013 Ford Fusion SE Hybrid 4-Dr Sedan NHTSA No. MD0218
Test Program: NCAP Side Pole Impact Test Test Date: 12/11/2012

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 WEIGHTS

		As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
	Units	Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	503.5	362.9		526.2	401.4		523.5	404.2	
Right	kg	469.5	344.2		473.1	368.8		474.9	374.6	
Ratio	%	57.9	42.1		56.5	43.5		56.2	43.8	
Totals	kg	973.0	707.1	1680.1	999.3	770.2	1769.5	998.4	778.8	1777.2

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1680.1	(A)
Actual Weight of 1 P572V ATD (SID-IIs) ATD Used	kg	52.2	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	45	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1777.3	(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	As Delivered	As Tested	Fully Loaded	Meets Requirement***
Driver Door Sill Angle (front-to-rear)*	deg	-0.1	-0.1	0.2	Yes
Front Pass. Sill Angle (front-to-rear)*	deg	0.0	0.0	0.1	Yes
Front Bumper Angle (left-to-right)**	deg	-0.1	-0.1	-0.2	Yes
Rear Bumper Angle (left-to-right)**	deg	0.0	0.0	-0.1	Yes
Vehicle CG (Aft of Front Axle)	mm	1195	1236	1245	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	24	38	34	

*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.

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Ballast (if any)	0.0
Taillights, right side mirror, right front headrest, trunk trim, trunk sub floor, jack & tools, air pump, right rear window and regulator/motor assembly/weather stripping, right rear door panel, rear headrests.	30.3

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

Test Vehicle: 2013 Ford Fusion SE Hybrid 4-Dr Sedan NHTSA No. MD0218
Test Program: NCAP Side Pole Impact Test Test Date: 12/11/2012

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	18.5	8.5	13.5
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 SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rear-most	Mid-Fore/Aft	Forward-Most
Driver Seat	13.5	28	Max	56	56	56
	13.5	28	Mid	28	28	28
	13.5	28	Min	0	0	0
Front Passenger Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
	Fixed	Fixed	Mid	Fixed	Fixed	Fixed
	Fixed	Fixed	Min	Fixed	Fixed	Fixed
Front Center Seat			Max			
			Mid			
			Min			
Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
	Fixed	Fixed	Mid	Fixed	Fixed	Fixed
	Fixed	Fixed	Min	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
	Fixed	Fixed	Mid	Fixed	Fixed	Fixed
	Fixed	Fixed	Min	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
	Fixed	Fixed	Mid	Fixed	Fixed	Fixed
	Fixed	Fixed	Min	Fixed	Fixed	Fixed

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

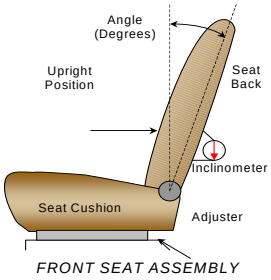
Test Vehicle: 2013 Ford Fusion SE Hybrid 4-Dr Sedan NHTSA No. MD0218
Test Program: NCAP Side Pole Impact Test Test Date: 12/11/2012

SEAT FORE/AFT POSITIONS

Seat	Total Fore/Aft Travel		Test Position from Forward-most Position	
	mm	Detents	mm	Detent
Driver Seat	267		0 (1st as 0)	
Front Passenger Seat	264		0 (1st as 0)	
Front Center Seat				
Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed	Fixed

SEAT BACK ANGLE ADJUSTMENT

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



Seat	Total Seat Back Angle Range		Test Position from Vertical	
	Degrees	Detents	Degree	Detent
Driver Seat w/Seated Dummy	57.1		-2.3	
Front Passenger Seat	57.7		-2.3	
Front Center Seat				
Struck Side Rear Seat	Fixed		Fixed	
Non-Struck Side Rear Seat	Fixed		Fixed	
Rear Center Seat	Fixed		Fixed	

SEAT BELT ANCHORAGE ADJUSTMENT

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

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

HEAD RESTRAINT ADJUSTMENT

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

	Total # of Positions	Placed in Position #
Driver Seat	3	Lowest/Full Forward

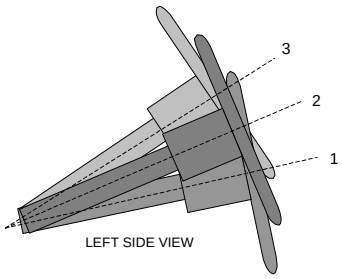
DATA SHEET NO. 2 (CONTINUED)
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT, AND FUEL SYSTEM DATA

Test Vehicle: 2013 Ford Fusion SE Hybrid 4-Dr Sedan NHTSA No. MD0218
Test Program: NCAP Side Pole Impact Test Test Date: 12/11/2012

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.

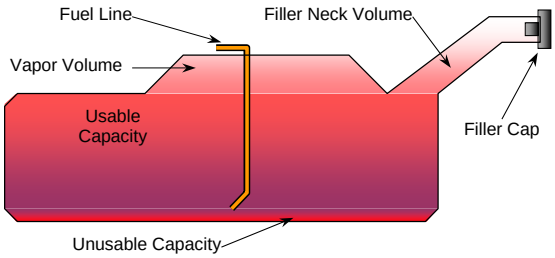
	Degrees	Fore/Aft Position (mm)
Lowermost, Position 1	69.0	235
Geometric Center, Position 2	66.1	210
Uppermost, Position 3	63.2	185
Telescoping Steering Wheel Travel		50
Test Position	66.1	210



STEERING COLUMN ASSEMBLY

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. Fuel pump cycles for a brief period when key is moved to the on position, but does not pump fuel unless engine is running. The fuel pipe is on the left side.



VEHICLE FUEL TANK ASSEMBLY

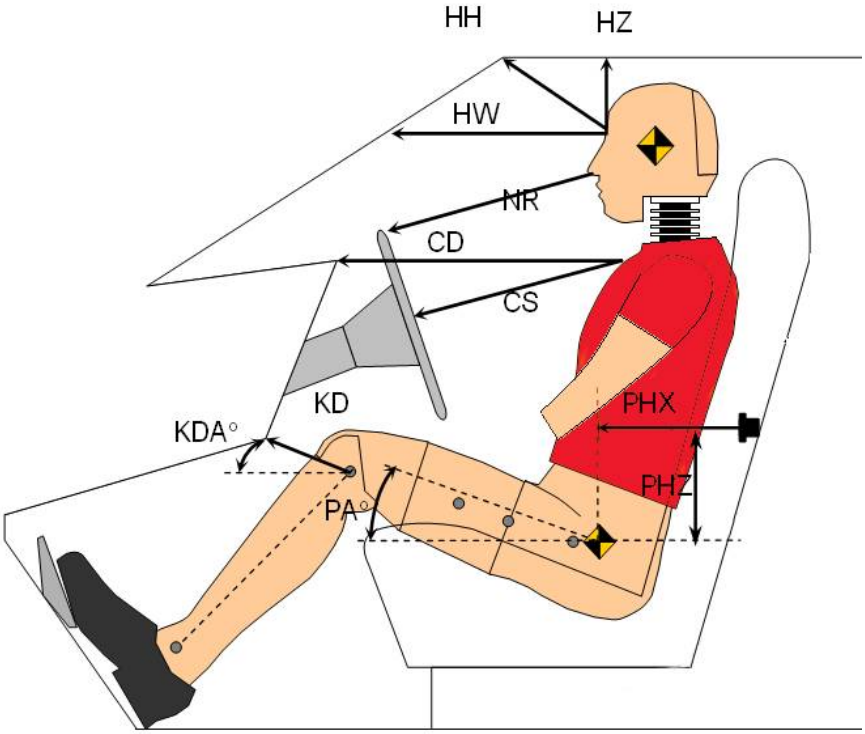
FUEL TANK CAPACITY DATA

	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	51.1
Usable Capacity of "Optional Tank" (see Form No. 1)	
Usable Capacity of Standard Tank as Specified in Owner's Manual	51.1
Usable Capacity of Optional Tank as Specified in Owner's Manual	
93% of Usable Capacity	47.5
Actual Amount of Solvent Used	47.5
1/3 of Usable Capacity	17.0

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

.DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2013 Ford Fusion SE Hybrid 4-Dr Sedan
Test Program: NCAP Side Pole Impact Test
NHTSA No. MD0218
Test Date: 12/11/2012



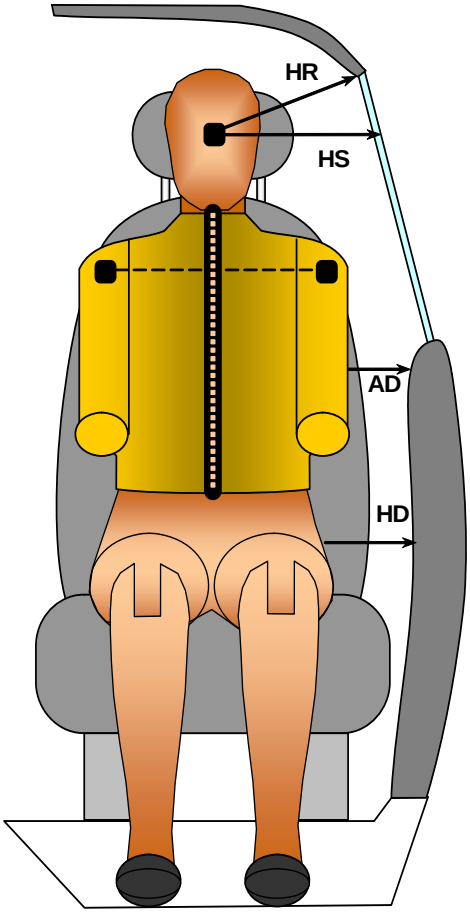
LEFT SIDE VIEW

Code	Measurement Description	Driver S/N 296	
		Length (mm)	Angle (°)
HH	Head to Header	239	
HW	Head to Windshield	606	
HZ	Head to Roof Liner	164	
NR	Nose to Rim	218	
CD	Chest to Dashboard	387	
CS	Chest to Steering Wheel	158	
KDL/KDAL°	Left Knee to Dash	143	28.1
KDR/KDAR°	Right Knee to Dash	138	30.2
PAX°	Pelvic Tilt Angle (X-Axis)		22.1
PAY°	Pelvic Tilt Angle (Y-Axis)		-0.8
PHX	Hip Point to Striker (X-Axis)	324	
PHZ	Hip Point to Striker (Z-Axis)	126	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2013 Ford Fusion SE Hybrid 4-Dr Sedan
Test Program: NCAP Side Pole Impact Test

NHTSA No. MD0218
Test Date: 12/11/2012

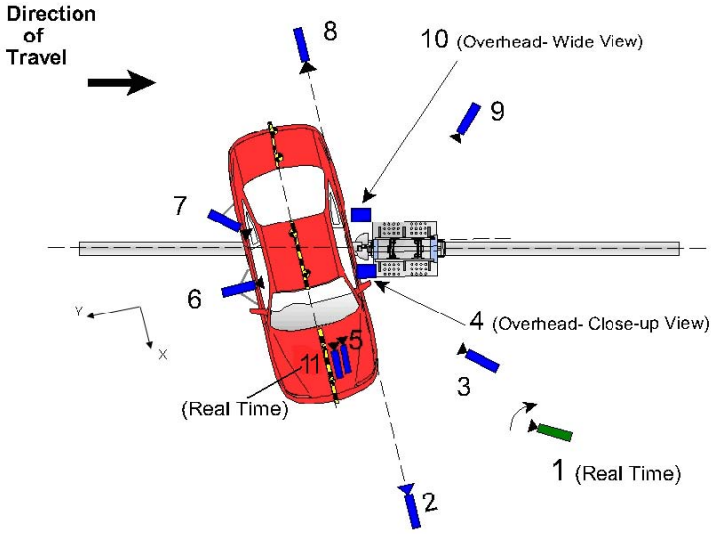


FRONT VIEW OF DUMMY

Code	Measurement Description	Driver S/N 296 Length (mm)
HR	Head to Side Header	218
HS	Head to Side Window	361
AD	Arm to Door	185
HD	Hip Point to Door	157

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2013 Ford Fusion SE Hybrid 4-Dr Sedan NHTSA No. MD0218
Test Program: NCAP Side Pole Impact Test Test Date: 12/11/2012



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	-100	6020	-1850	24	1000
3	Impact Side 45° Forward	-2460	5150	-1910	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	-70	-6670	-1820	24	1000
9	Impact Side 45° Rearward	-4420	-3920	-1980	20	1000
10	Overhead Wide View	270	0	-4610	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

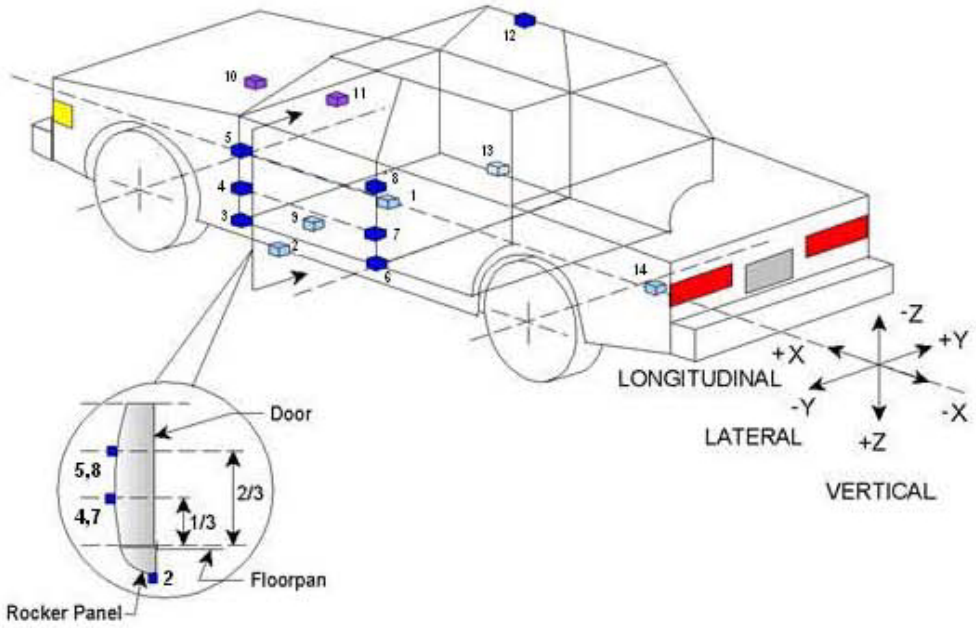
INSTRUMENTATION

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

DATA SHEET NO. 6

VEHICLE ACCELEROMETER DATA

Test Vehicle: 2013 Ford Fusion SE Hybrid 4-Dr Sedan NHTSA No. MD0218
Test Program: NCAP Side Pole Impact Test Test Date: 12/11/2012



	Accelerometer Location			
	ID	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2671	216	-198
2	Left Floor Sill	2963	-748	-207
3	A Pillar Sill	3391	-748	-196
4	A Pillar Low	3352	-810	-528
5	A Pillar Mid	3337	-812	-804
6	B Pillar Sill	2352	-748	-210
7	B Pillar Low	2231	-746	-571
8	B Pillar Mid	2231	-747	-857
9	Driver Seat Track	2567	-556	-441
10	Engine Top	3966	0	-799
11	Firewall	3719	0	-865
12	Right Roof	2166	572	-1467
13	Right Floor Sill	2963	748	-214
14	Rear Floorpan	294	0	-360

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 Ford Fusion SE Hybrid 4-Dr Sedan
Test Program: NCAP Side Pole Impact Test

NHTSA No. MD0218
Test Date: 12/11/2012

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 Ford Fusion SE Hybrid 4-Dr Sedan NHTSA No. MD0218
Test Program: NCAP Side Pole Impact Test Test Date: 12/11/2012

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Driver SID-IIs Dummy
Face	Curtain Airbag
Top of Head	Curtain Airbag
Left Side of Head	Curtain Airbag
Back of Head	Curtain Airbag, Headrest
Left Shoulder	Side Airbag, Seatback
Upper Torso	Side Airbag, Seatback
Lower Torso	Side Airbag, Seatback
Left Hip	Side Airbag, Seatpan
Left Knee	Door Panel

POST-TEST DOOR PERFORMANCE

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

POST-TEST SEAT PERFORMANCE

	Struck Side		Non-Struck Side	
Description	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 Broken
Other Notable Effects	None

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

Test Vehicle: 2013 Ford Fusion SE Hybrid 4-Dr Sedan NHTSA No. MD0218
Test Program: NCAP Side Pole Impact Test Test Date: 12/11/2012

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

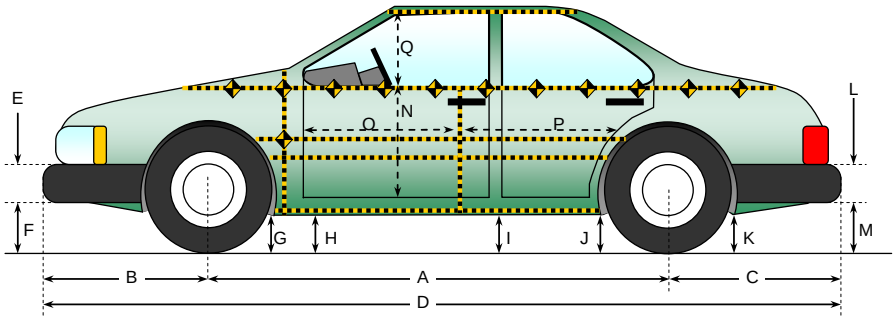
Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	Yes	No		
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Abdomen/Pelvis Airbag	Yes	Yes	No	
Seat Belt Pretensioner	Yes	Yes	No	
Seat Belt Load Limiter	Yes	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		1168
Actual Impact Point (Aft of Front Axle)	mm		1168
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	32.0
Trap No. 2 Velocity (Redundant)	km/h	31.4 to 33.0	32.1

DATA SHEET NO. 9
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2013 Ford Fusion SE Hybrid 4-Dr Sedan
Test Program: NCAP Side Pole Impact Test
NHTSA No. MD0218
Test Date: 12/11/2012



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

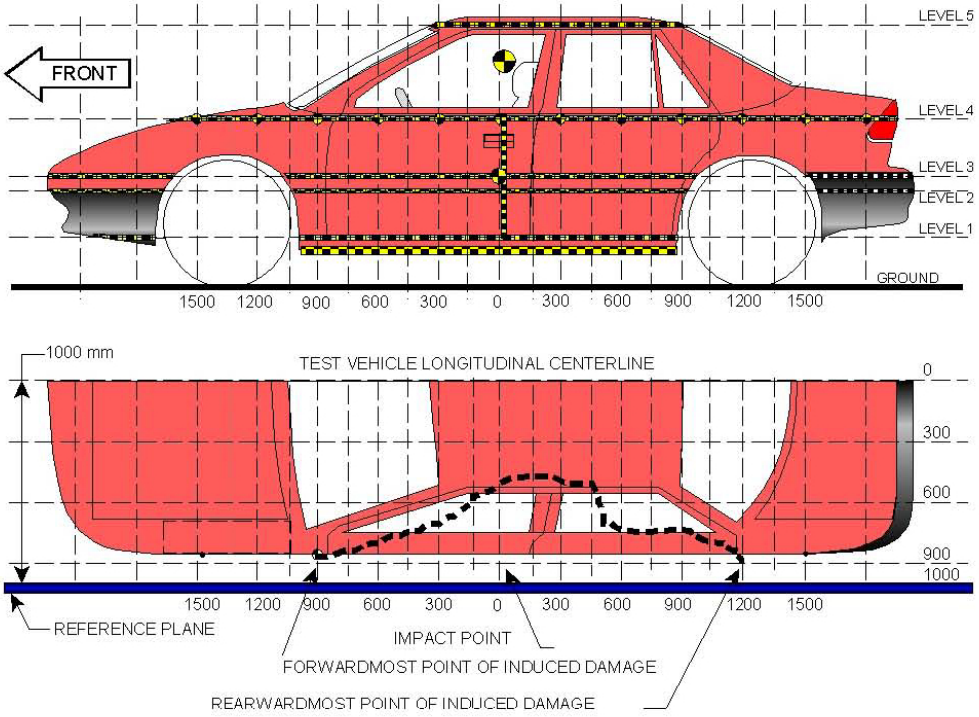
LEFT SIDE VIEW

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2840	2694	146
B	Front Axle to FSOV	935	935	0
C	Rear Axle to RSOV	1109	1109	0
D	Total Vehicle Length at Centerline	4884	4738	146
E	Front Bumper Thickness	100	100	0
F	Front Bumper Bottom to Ground	228	255	-27
G	Sill Height at Front Wheel Well	180	157	23
H	Sill Height at Front Door Leading Edge	181	172	9
I	Sill Height at B-Pillar	190	187	3
J1	Sill Height at Rear Wheel Well	186	208	-22
J2	Pinch Weld Height at Rear Wheel Well	186	207	-21
K	Sill Height Aft of Rear Wheel Well	206	241	-35
L	Rear Bumper Thickness	104	104	0
M	Rear Bumper Bottom to Ground	296	292	4
N	Sill Height to Bottom of Front Window Sill	772	803	-31
O	Front Door Leading Edge to Impact CL	643	670	-27
P	Rear Door Trailing Edge to Impact CL	1485	1540	-55
Q	Front Window Opening	362	313	49
R	Right Side Length	3645	3657	-12
S	Left Side Length	3645	3475	170
T	Vehicle Width at B-Pillars	1834	1744	90

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2013 Ford Fusion SE Hybrid 4-Dr Sedan NHTSA No. MD0218
Test Program: NCAP Side Pole Impact Test Test Date: 12/11/2012



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	230
2	Occupant Hip Point	534
3	Mid Door	632
4	Window Sill	969
5	Window Top	1400

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

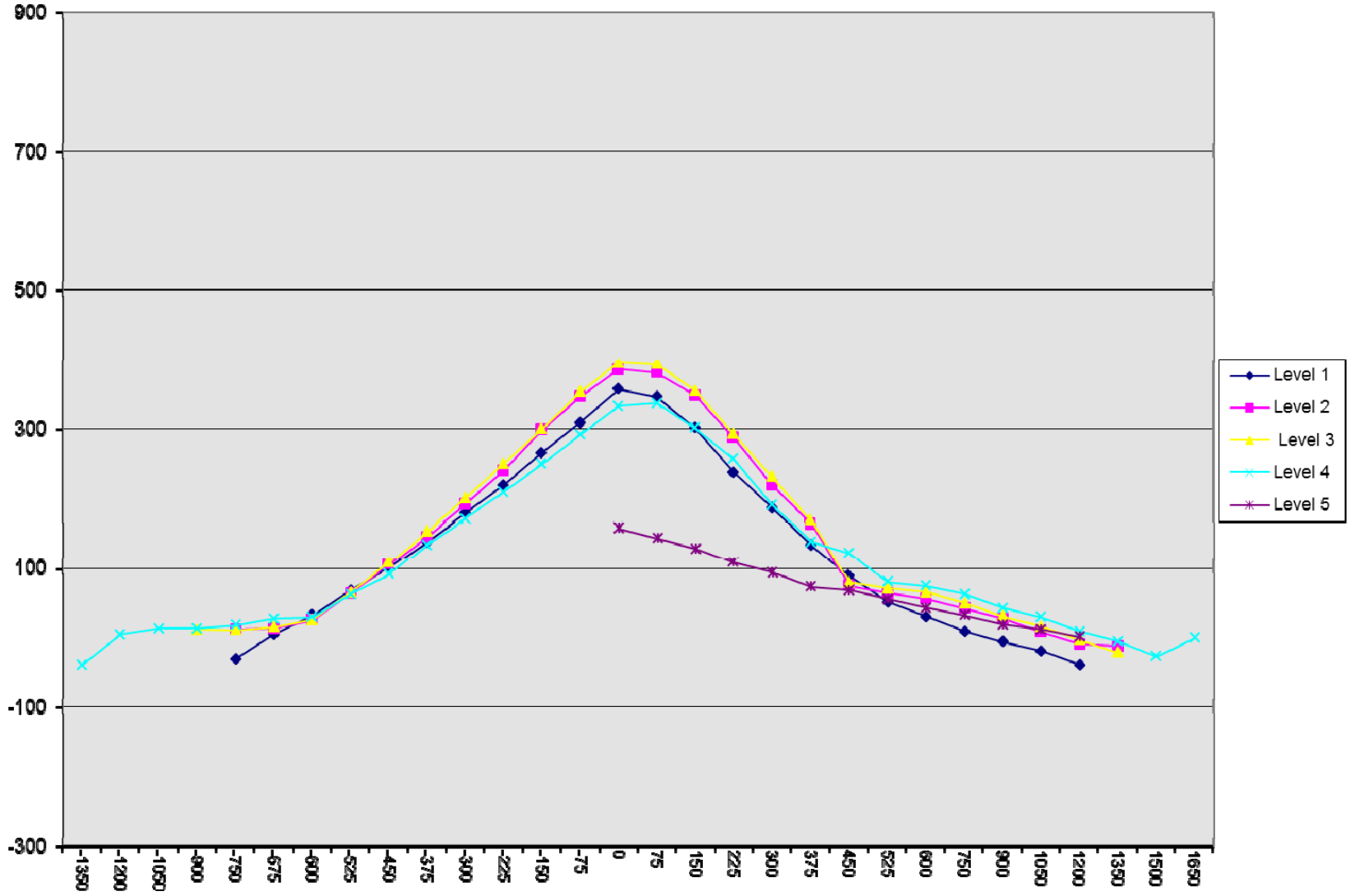
Test Vehicle: 2013 Ford Fusion SE Hybrid 4-Dr Sedan NHTSA No. MD0218
Test Program: NCAP Side Pole Impact Test Test Date: 12/11/2012

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1350				314					276					-38	
-1200				301					307					6	
-1050				293					307					14	
-900			173	286				186	300				13	14	
-750	212	183	185	280		183	196	197	299		-29	13	12	19	
-675	217	191	187	279		223	205	203	307		6	14	16	28	
-600	223	194	188	274		256	220	215	304		33	26	27	30	
-525	223	195	188	271		292	260	254	334		69	65	66	63	
-450	222	194	187	251		324	300	296	343		102	106	109	92	
-375	222	194	187	261		361	340	341	396		139	146	154	135	
-300	221	193	186	260		400	385	386	431		179	192	200	171	
-225	221	193	185	259		440	433	435	468		219	240	250	209	
-150	221	192	185	258		486	490	485	507		265	298	300	249	
-75	221	192	185	257		530	538	538	548		309	346	353	291	
0	220	193	185	255	486	577	579	581	588	644	357	386	396	333	158
75	220	193	185	252	483	566	574	579	589	627	346	381	394	337	144
150	220	193	185	250	479	521	541	540	551	608	301	348	355	301	129
225	220	193	185	247	476	457	480	478	503	585	237	287	293	256	109
300	219	192	184	243	475	406	411	415	434	569	187	219	231	191	94
375	219	192	184	240	472	353	356	353	379	546	134	164	169	139	74
450	219	193	186	237	472	308	268	266	360	541	89	75	80	123	69
525	220	194	187	238	473	272	259	259	319	529	52	65	72	81	56
600	220	194	188	236	474	251	251	254	311	518	31	57	66	75	44
750	222	196	190	234	476	232	239	241	297	509	10	43	51	63	33
900	222	196	191	234	480	217	224	223	278	500	-5	28	32	44	20
1050	224	198	193	234	486	206	207	210	264	499	-18	9	17	30	13
1200	225	195	193	236	501	187	187	191	246	503	-38	-8	-2	10	2
1350		184	181	241			173	161	237			-11	-20	-4	
1500				242					216					-26	
1650				249					250					1	

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 Ford Fusion SE Hybrid 4-Dr Sedan NHTSA No. MD0218
Test Program: NCAP Side Pole Impact Test Test Date: 12/11/2012



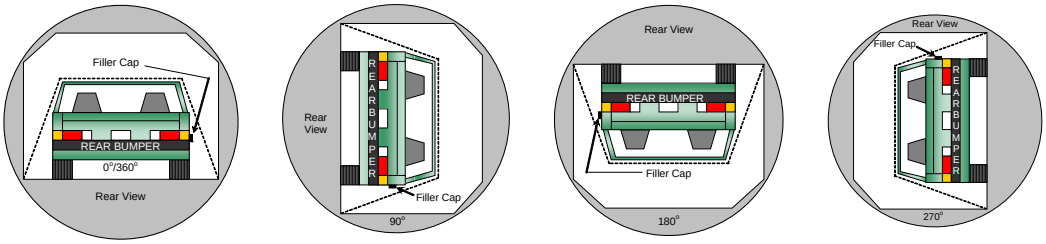
DATA SHEET NO. 11
FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2013 Ford Fusion SE Hybrid 4-Dr Sedan NHTSA No. MD0218
Test Program: NCAP Side Pole Impact Test Test Date: 12/11/2012

Test Time: 10:56 am Temperature: 21.1° C

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

FMVSS 301 STATIC ROLLOVER DATA



0°/360° 90° 180° 270°

ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	112	300	412
90° to 180°	112	300	412
180° to 270°	108	300	408
270° to 360°	113	300	413

FMVSS 301 ROLLOVER SPILLAGE TABLE (units in ounces)

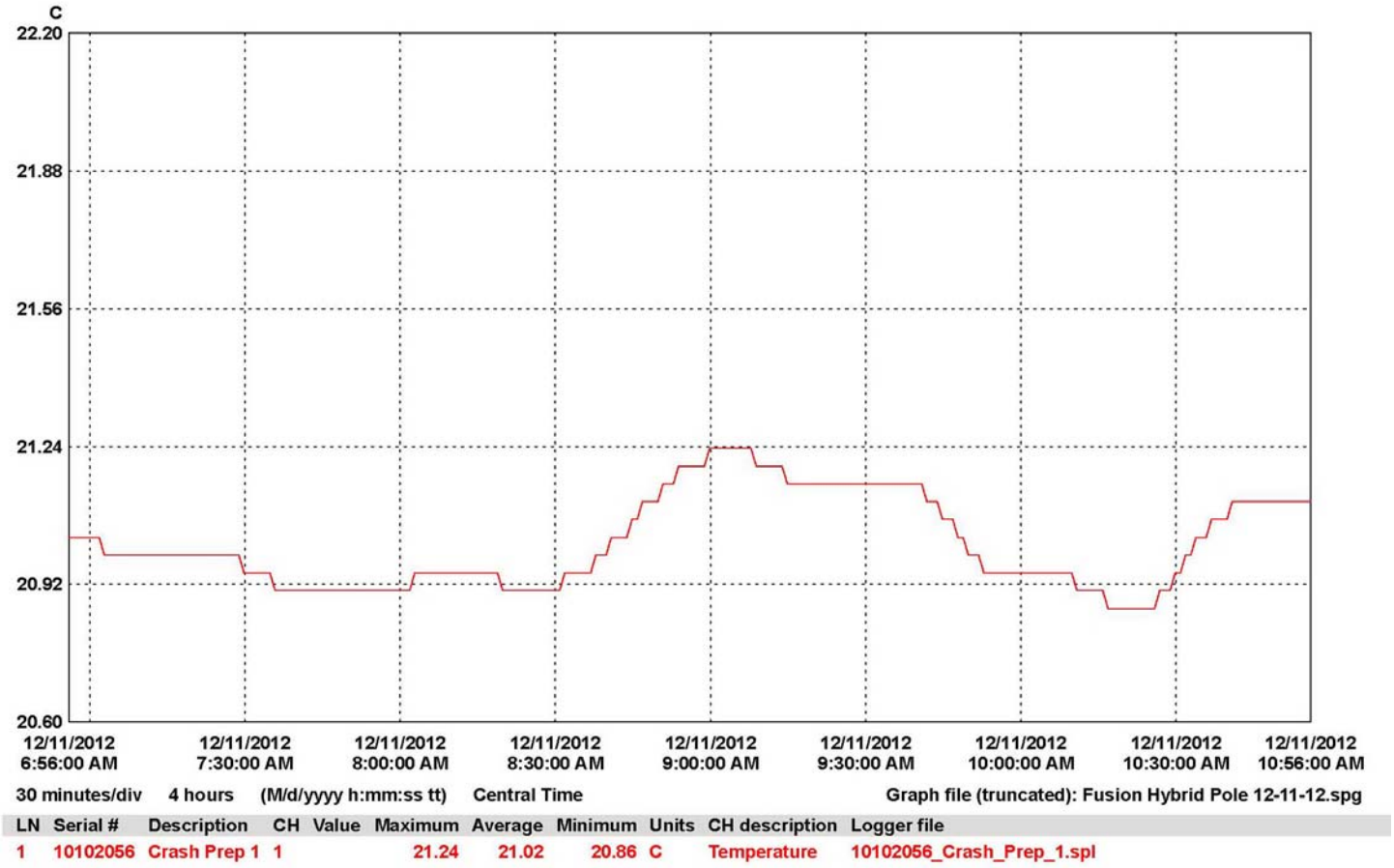
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eight Minute
0° to 90°	0	0	0	0
90° to 180°	0	0	0	0
180° to 270°	0	0	0	0
270° to 360°	0	0	0	0

ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 12
DUMMY/VEHICLE TEMPERATURE STABILIZATION DATA

Test Vehicle: 2013 Ford Fusion SE Hybrid 4-Dr Sedan NHTSA No. MD0218
Test Program: NCAP Side Pole Impact Test Test Date: 12/11/2012



LN	Serial #	Description	CH	Value	Maximum	Average	Minimum	Units	CH description	Logger file
1	10102056	Crash Prep 1	1		21.24	21.02	20.86	C	Temperature	10102056_Crash_Prep_1.spl

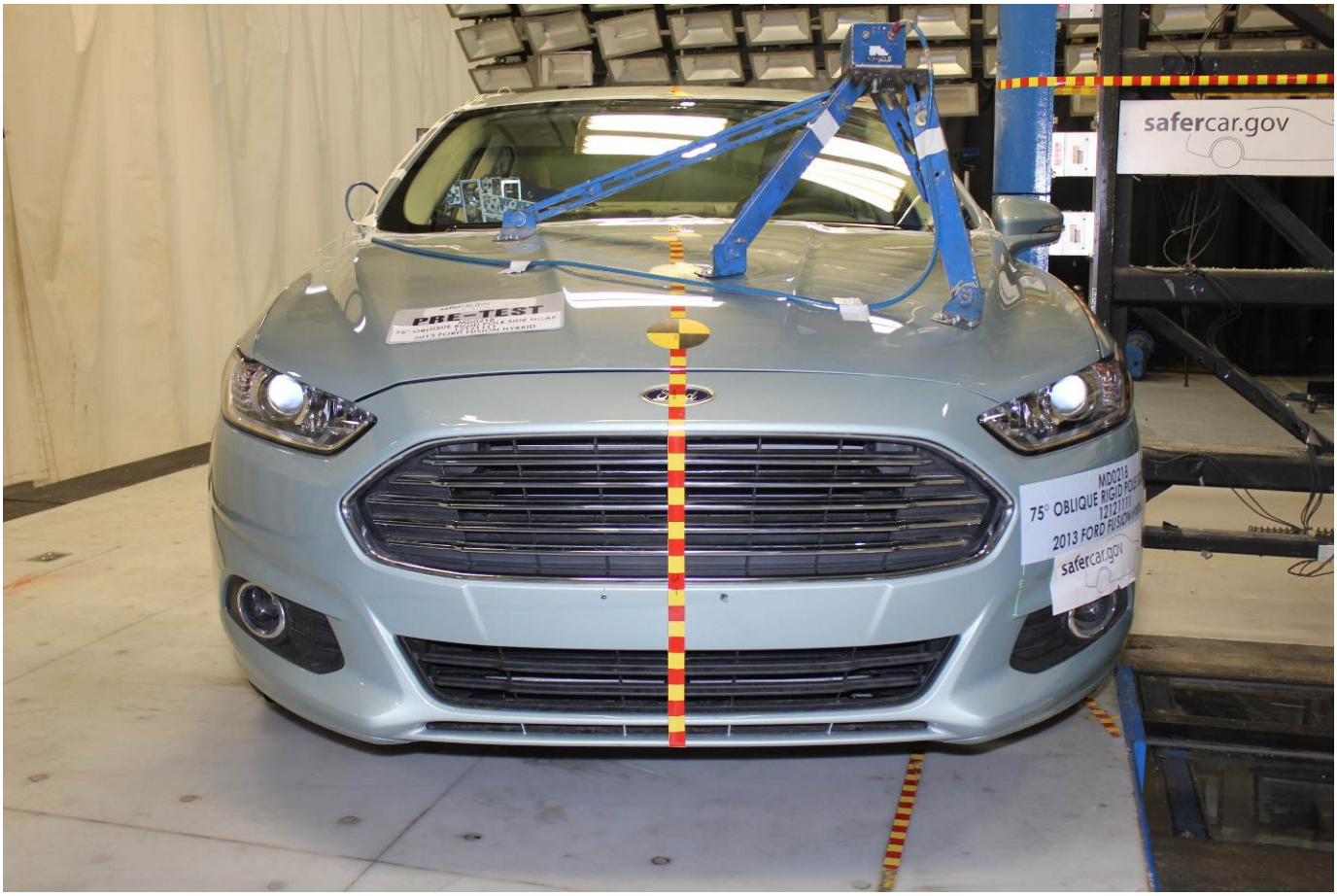
APPENDIX A

PHOTOGRAPHS

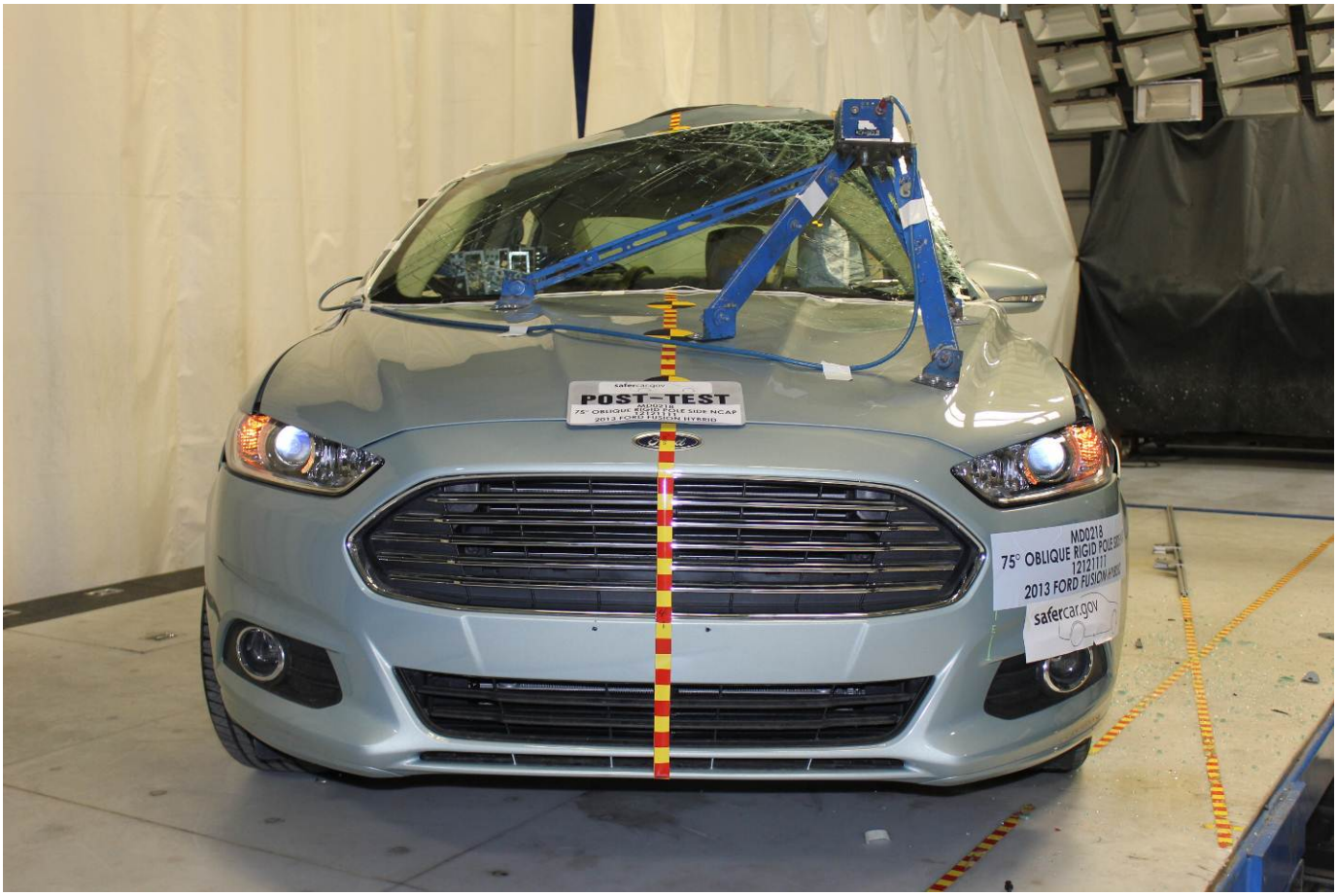
TABLE OF PHOTOGRAPHS

As Delivered Right Front ¾ View of Test Vehicle

As Delivered Left Rear ¾ View of Test Vehicle



Pre-Test Frontal View of Test Vehicle



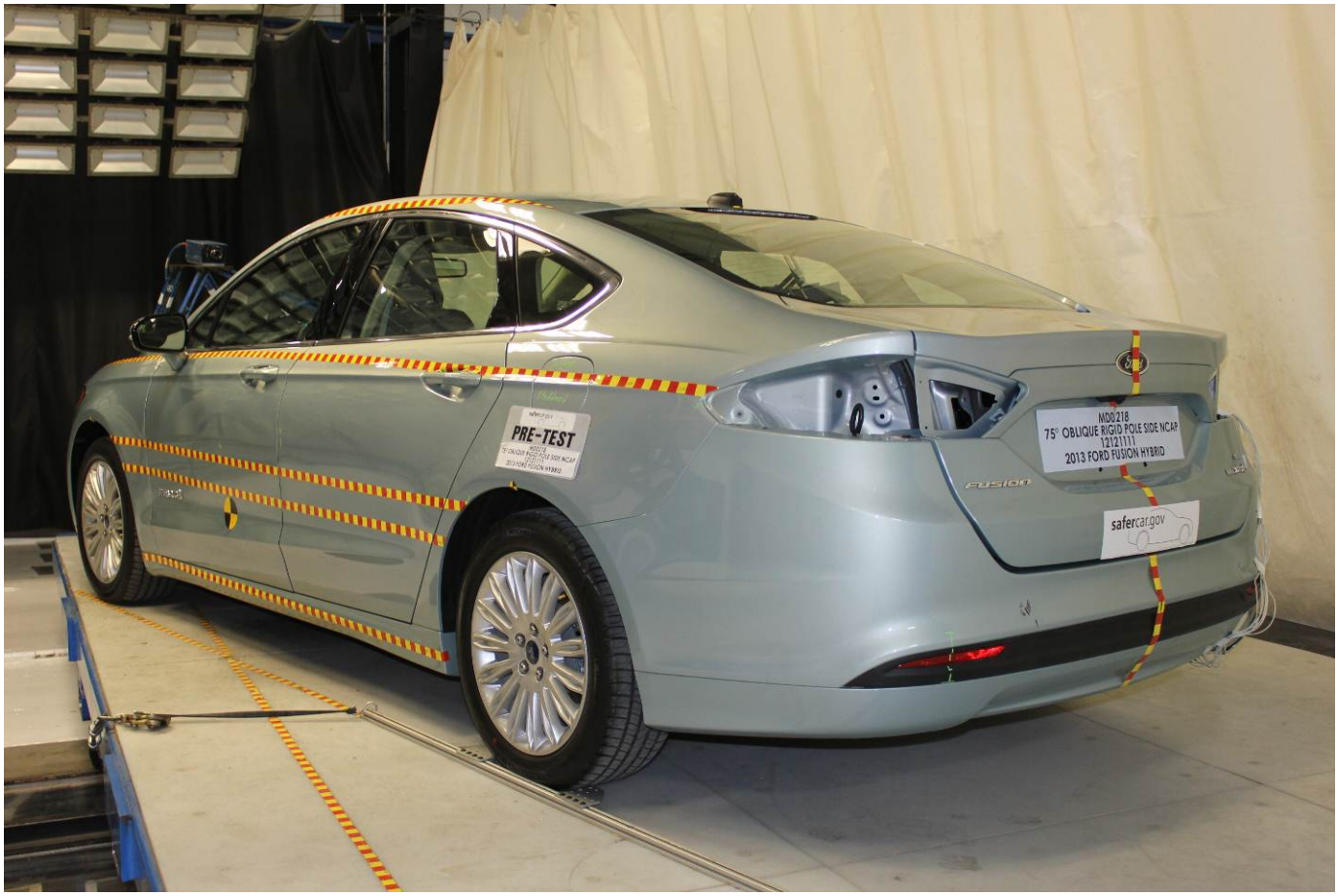
Post-Test Frontal View of Test Vehicle

Pre-Test Left Front ¾ View of Test Vehicle

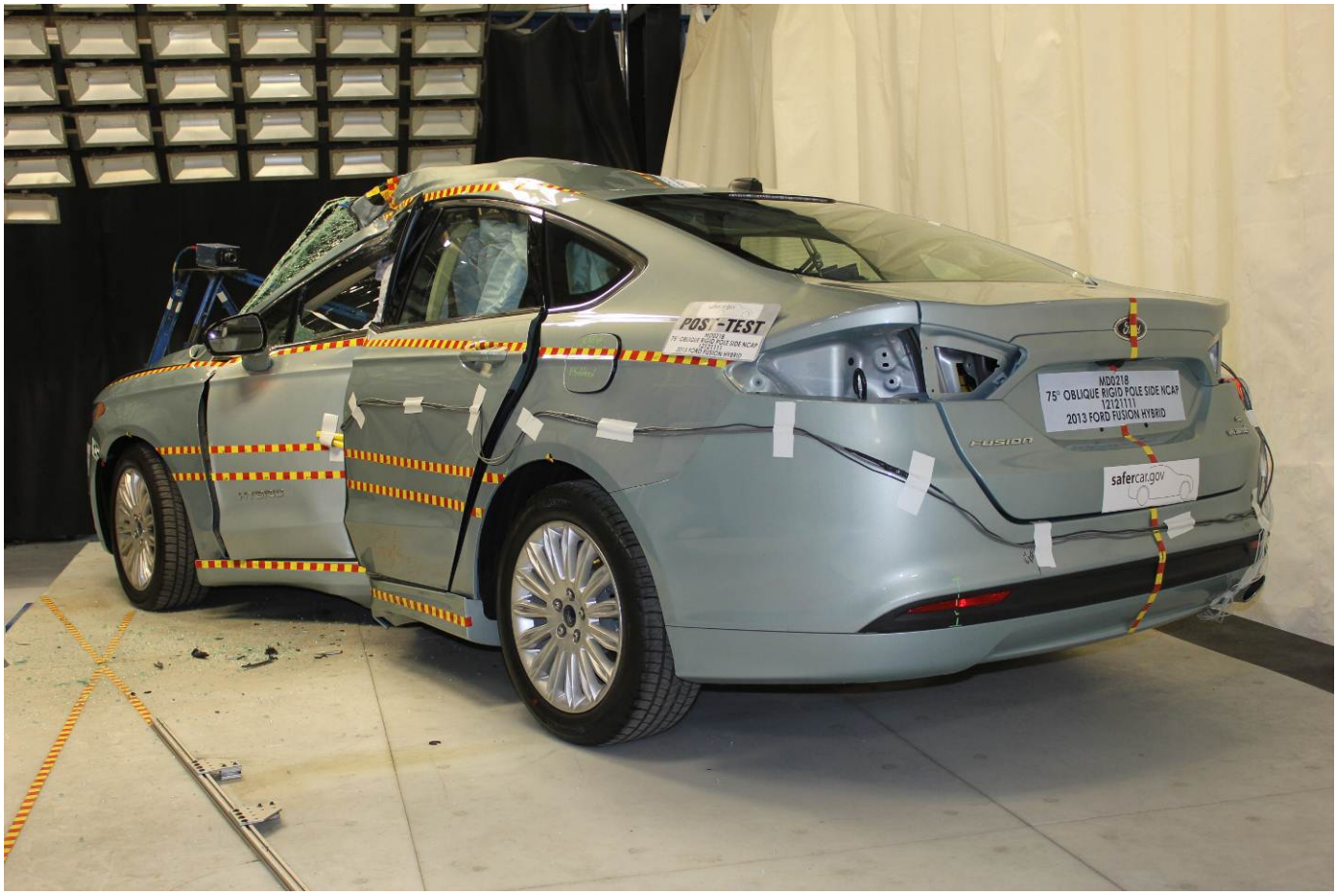
Post-Test Left Front ¾ View of Test Vehicle

Pre-Test Left Side View of Test Vehicle

Post-Test Left Side View of Test Vehicle



Pre-Test Left Rear ¾ View of Test Vehicle



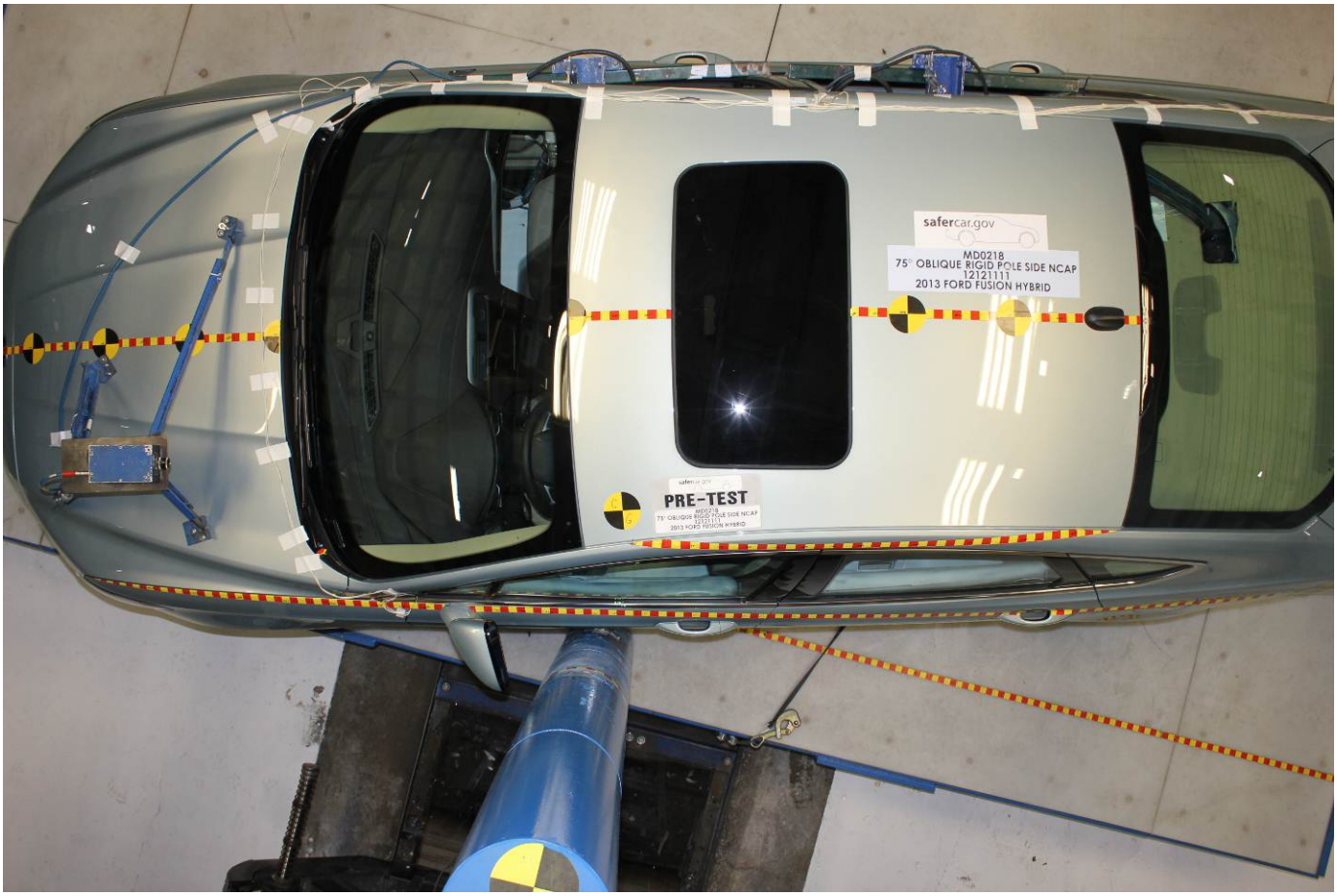
Post-Test Left Rear ¾ View of Test Vehicle

Pre-Test Rear View of Test Vehicle

Post-Test Rear View of Test Vehicle

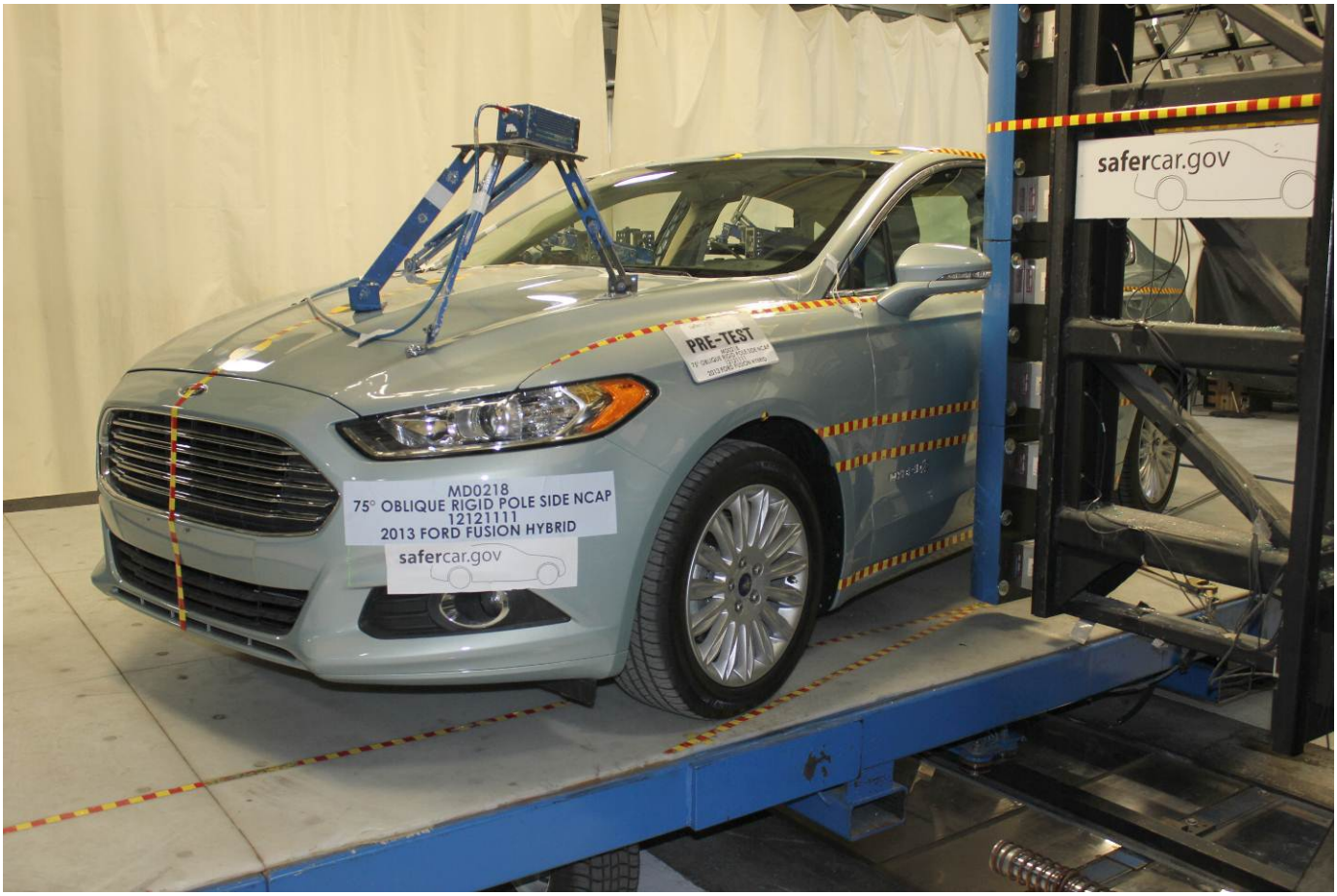
Pre-Test Right Side View of Test Vehicle

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

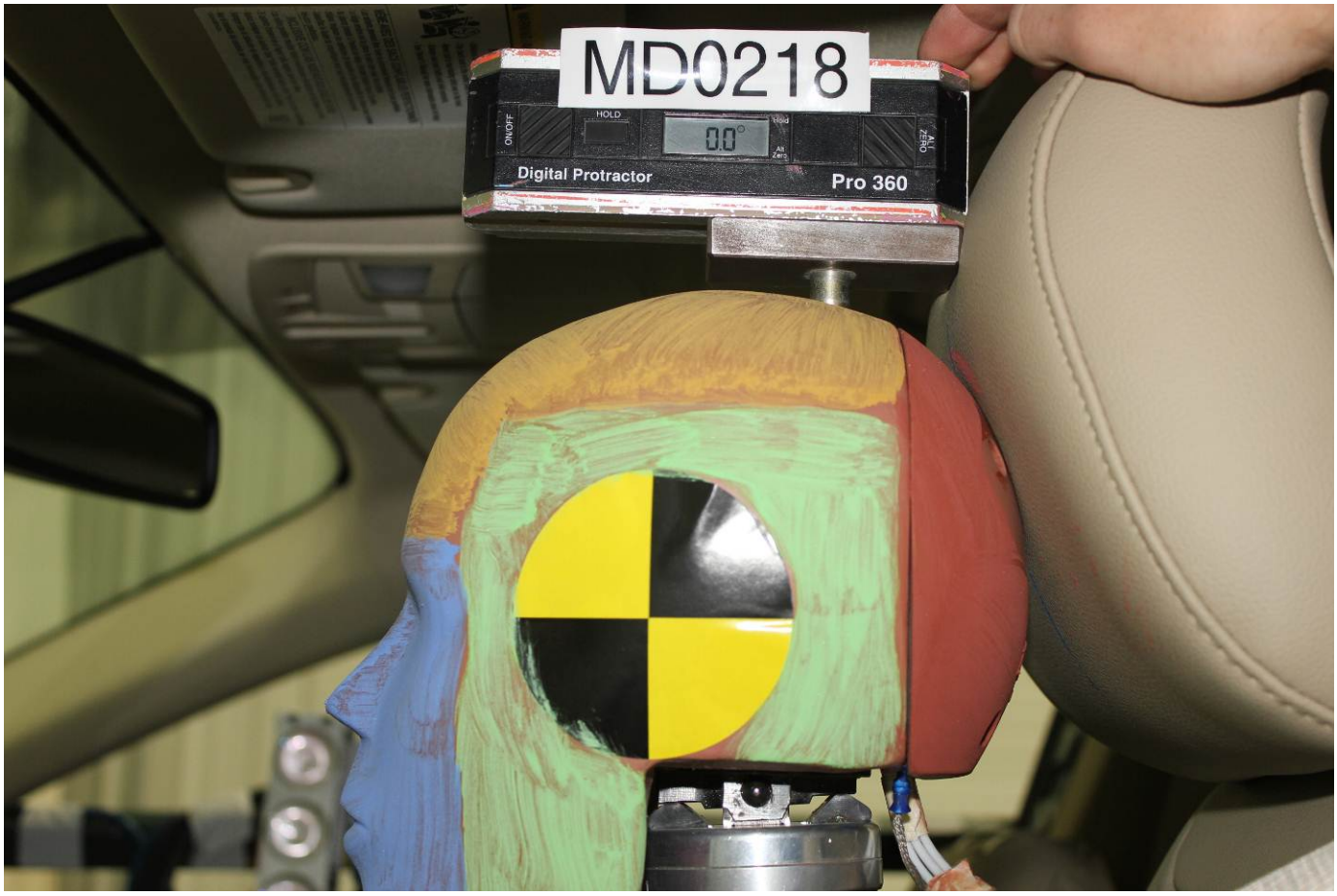
Pre-Test Front Close-Up View of Dummy Head and Shoulders in Relation to Head Restraint

Pre-Test Front 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 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 Pelvis Contact with Vehicle Interior View

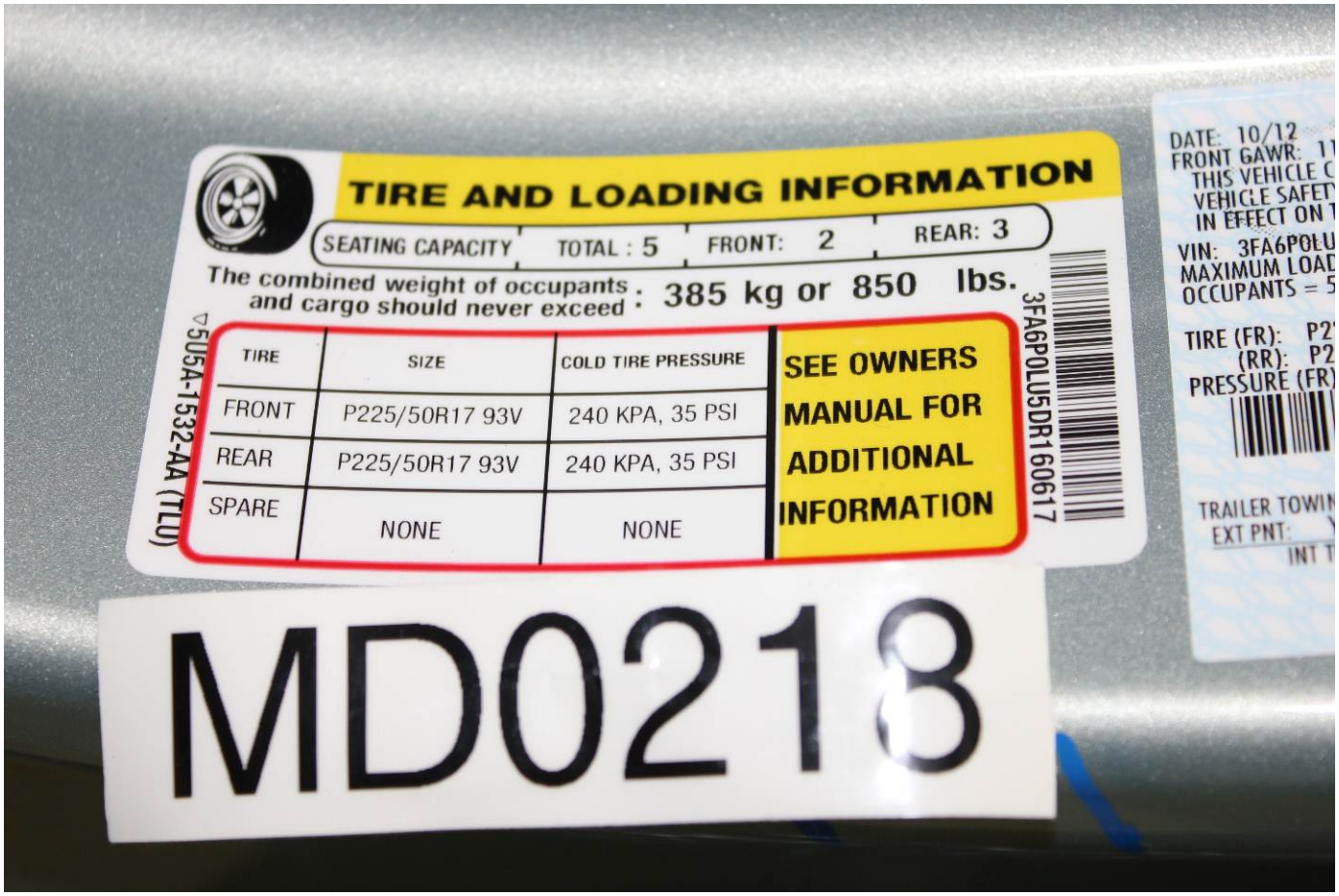
Post-Test Dummy Close-Up Pelvis Contact with Side Air Bag View

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

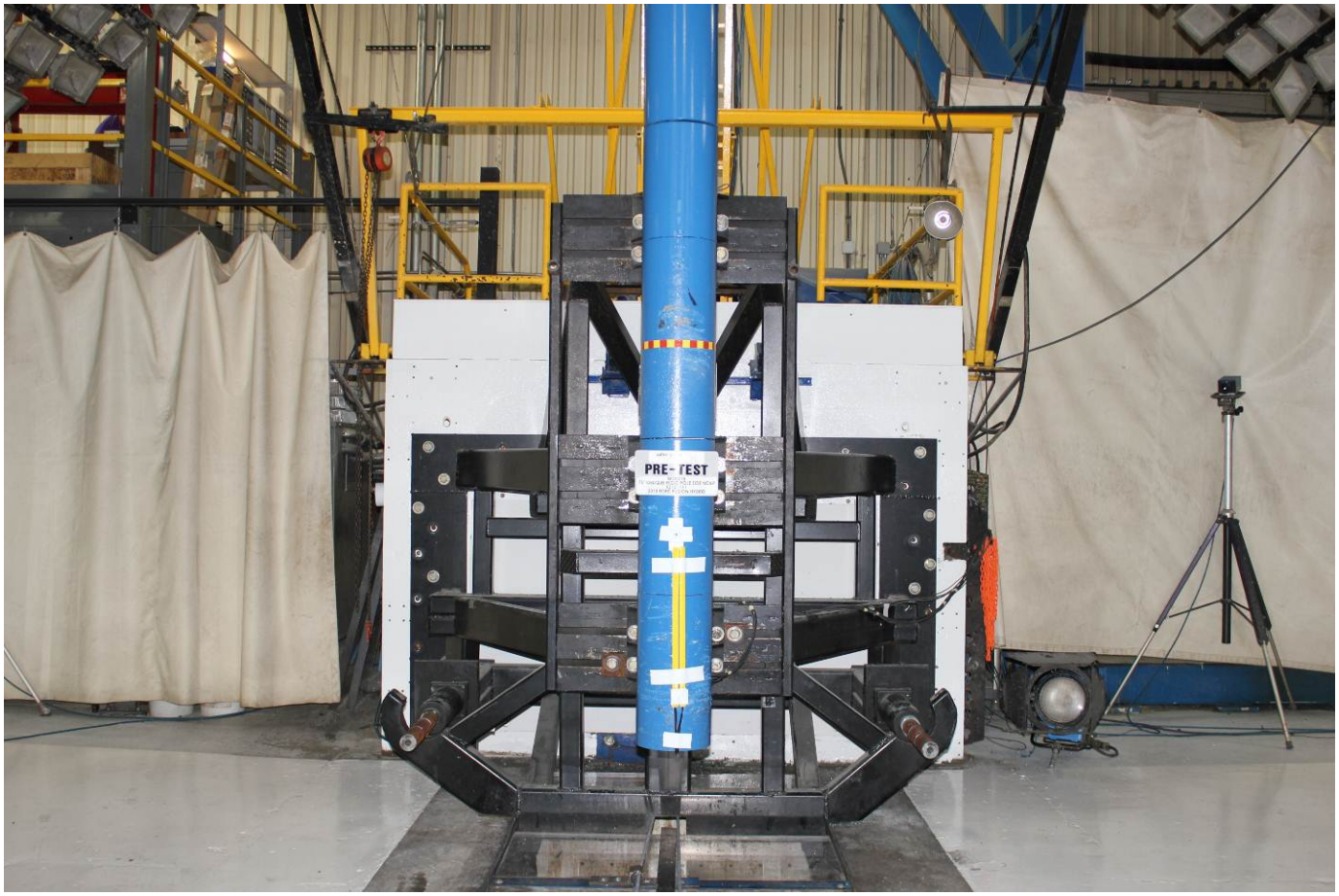
Pre-Test View of Fuel Filler Cap or Fuel Filler Neck

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

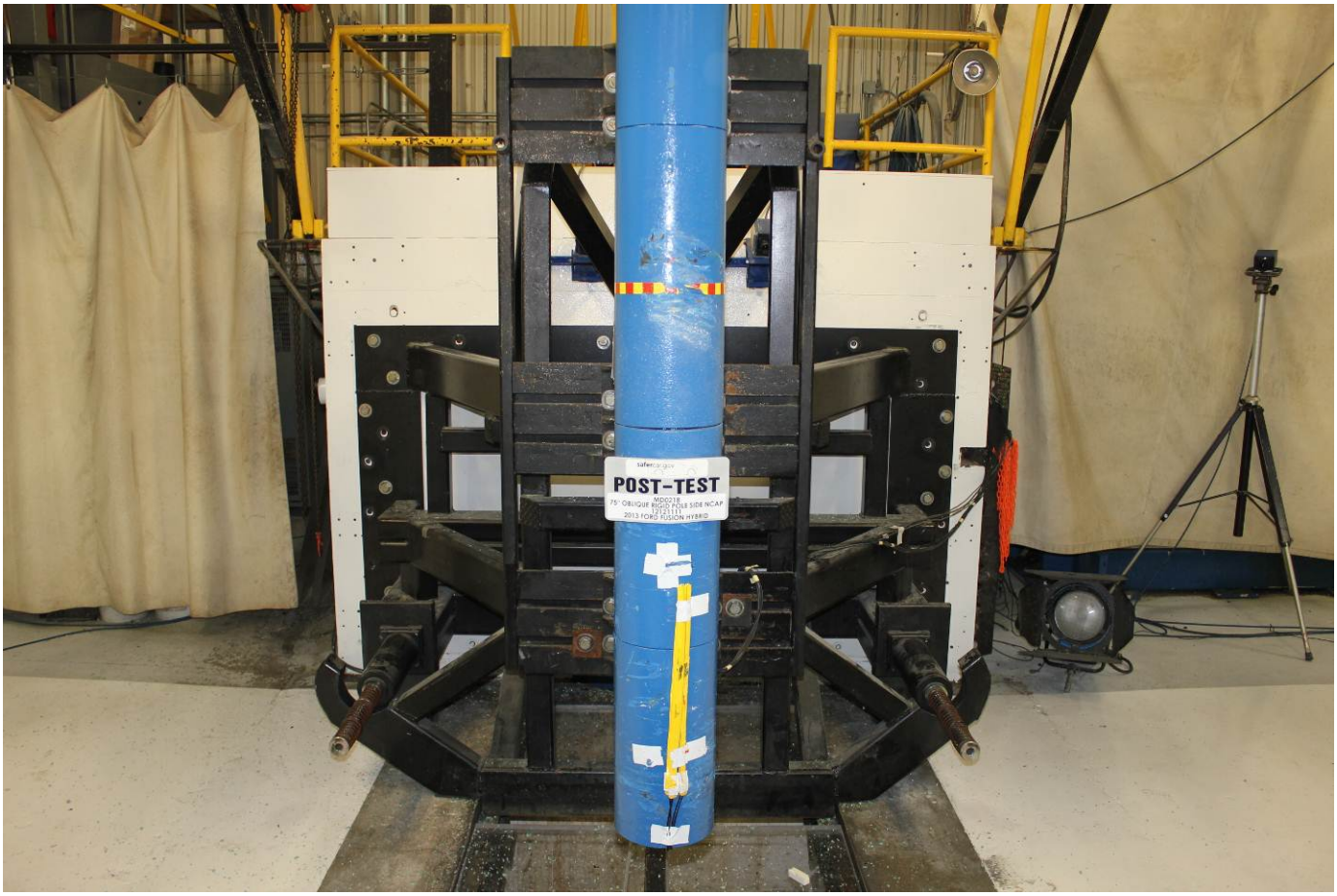
Close-Up View of Vehicle's Certification Label



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

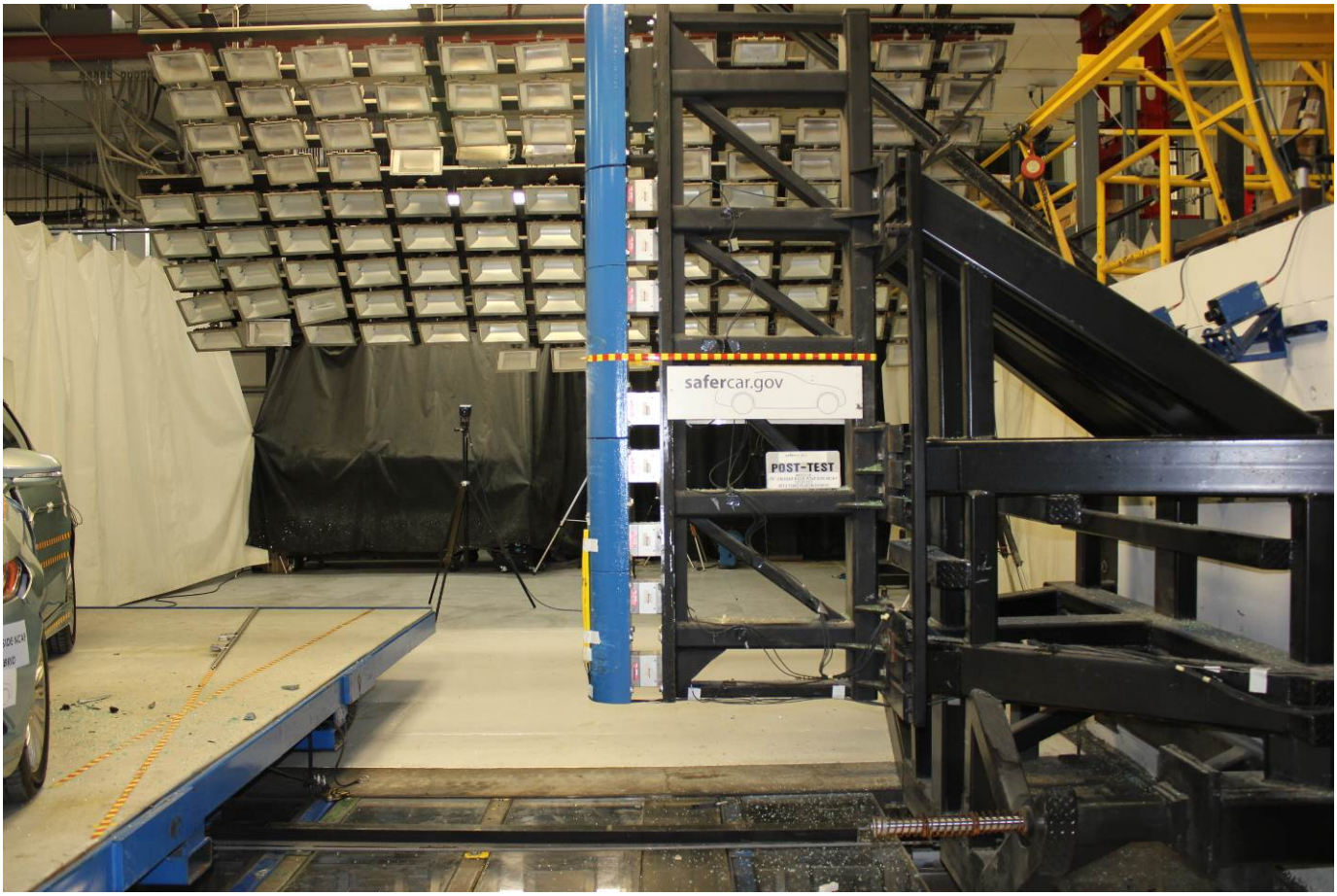


Pre-Test Pole Barrier Front View



Post-Test Pole Barrier Front View

Pre-Test Pole Barrier Side View



Post-Test Pole Barrier Side View

PHOTOGRAPH NOT APPLICABLE

Pre-Test Ballast View

Post-Test Primary and Redundant Speed Trap Read-Out

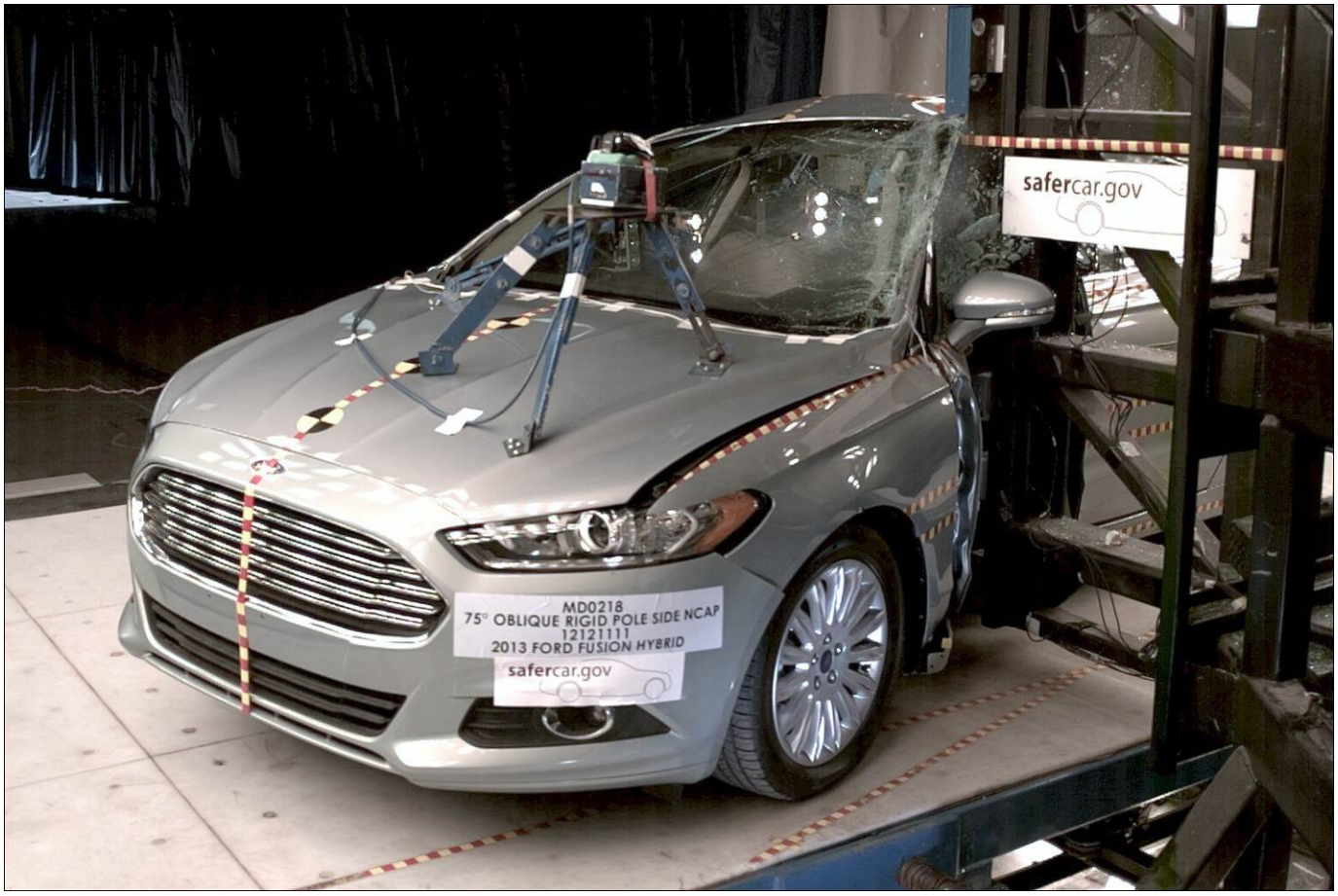
FMVSS No. 301 Static Rollover 0 Degrees

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

Ford
Go Further
ford.com

VEHICLE DESCRIPTION
FUSION HYBRID DR 160617
2013 FUSION SE HYBRID
5-PASSENGER
2.0L IVCT I4 HEV
ECVT AUTO TRNS POWERSPLIT
EXTERIOR ICE STORM
INTERIOR DUNE LEATHER TRIM SEATS

STANDARD EQUIPMENT INCLUDED AT NO EXTRA CHARGE

EXTERIOR
- 17" ALUMINUM WHEELS
- HALOGEN HEADLAMPS
- EXHAUST TIPS - CHROME
- INTEGRATED SPOTTER MIRRORS
- AUTO HEADLAMPS
- KEYLESS ENTRY KEYPAD
- MIRRORS-MAN FOLD DUAL PWR HEATED WITH APPROACH LAMP
- BODY SIDE MOLDINGS - BODY COLOR
- FOG LAMPS
- EASY FUEL CAPLESS FILLER

INTERIOR
- SEATS-LEATHER, HEATED, 10-WAY W/ DRIV MEMORY/ 2-WAY PWR PASS W/RECLINE
- 60/40 SPLIT FOLD REAR SEAT
- A/C CLIMATE CONTROL
- POWERPOINTS (3)
- 1TOUCH UP/DOWN DR/PASS WIN
- TILT STEERING WHL/ CRUISE & AUDIO CONTROLS
- CENTER CONSOLE W/ARMREST
- FRONT AND REAR FLOOR MATS
- DUAL ILLUM VANITY MIRRORS
- REAR A/C DUCTS
- LEATHER WRAPPED STR WHEEL

FUNCTIONAL
- REAR WINDOW DEFROSTER
- INTERMITTENT SPEED WIPERS
- AM/FM SINGLE CD W/MP3
- MESSAGE CENTER W/TRIP CPTR
- POWER LOCKS, WINDOWS AND MIRRORS
- MYKEY
- GLOBAL OPEN/CLOSE WINDOWS
- HILL START ASSIST
- SYNC W/ MYFORD
- SIRIUS SAT SVC N/A AK & HI
- REMOTE KEYLESS ENTRY
- 4-WHEEL DISC BRAKES W/ABS
- ELECTRONIC PWR ASST STEER

SAFETY/SECURITY
- ADVANCETRAC ESC
- SECURILOCK PASS ANTI THEFT
- AIRBAGS - DUAL STAGE FRONT
- AIRBAG - DRIVER KNEE
- AIRBAGS, FRONT SIDE SEAT AIRBAGS - SIDE CURTAIN
- TIRE PRESSURE MONITOR SYS
- PERIMETER ALARM
- TIRE MOBILITY KIT

WARRANTY
- 3YR/36,000 BUMPER / BUMPER
- 5YR/60,000 POWERTRAIN
- 5YR/60,000 ROADSIDE ASSIST
- 8YR/100,000 HYBRID UNIQUE COMPONENTS

INCLUDED ON THIS VEHICLE	(MSRP)
EQUIPMENT GROUP 505A	2,260.00
LUXURY PACKAGE	
HEATED FRONT SEATS	
OPTIONAL EQUIPMENT	
MOONROOF W/UNIV GAR DR OPENER	895.00
SE HYB TECH/MY FORD TOUCH PKG	895.00
REAR VIEW VIDEO CAMERA	
50 STATE EMISSIONS	NO CHARGE
NAVIGATION SYSTEM	795.00

PRICE INFORMATION	(MSRP)
BASE PRICE	$27,200.00
TOTAL OPTIONS	4,845.00
TOTAL VEHICLE & OPTIONS	32,045.00
DESTINATION & DELIVERY	795.00
TOTAL BEFORE DISCOUNTS	32,840.00
EQUIPMENT GROUP SAVINGS	- 260.00

SOLD TO 16A 027
Garnet Ford Inc
P.O. BOX 648
Chadds Ford PA 19317

SHIP TO (IF OTHER THAN SOLD TO)

SHIP THROUGH

RAMP ONE: RA5R
RAMP TWO:
METHOD OF TRANSP.: RAIL

DEALER NO.: 16A 027
FINAL ASSEMBLY PLANT: HERMOSILLO
ITEM #: 16-Z003 O/T 2
CK253 N RA 2X 320 002141 10 25 12

TOTAL MSRP $32,580.00

This label is affixed pursuant to the Federal Automobile Information Disclosure Act. Gasoline, License, and Title Fees, State and Local taxes are not included. Dealer installed options or accessories are not included unless listed above.

EPA DOT **Fuel Economy and Environment** — Gasoline Vehicle

Fuel Economy
47 MPG
47 city 47 highway
2.1 gallons per 100 miles
Midsize Cars range from 13 to 99 MPG. The best vehicle rates 112 MPGe.

You save **$5,850** in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost **$1,150**

Fuel Economy & Greenhouse Gas Rating (tailpipe only): 10 (1 – 10, Best)
Smog Rating (tailpipe only): 7 (1 – 10, Best)
This vehicle emits 190 grams CO_2 per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions; learn more at fueleconomy.gov.

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 $3.55 per gallon. MPGe 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
Smartphone QR Code™

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score		To Be Rated
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	To Be Rated
	Passenger	To Be 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	To Be Rated
	Rear seat	To Be Rated
Based on the risk of injury in a side impact.		
Rollover		To Be Rated
Based on the risk of rollover in a single-vehicle crash.		

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

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Monroney Label

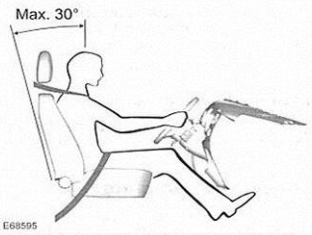
SITTING IN THE CORRECT POSITION

WARNINGS

Sitting improperly, out of position or with the seat back reclined too far can take weight off the seat cushion and affect the decision of the passenger sensing system, resulting in serious injury or death in the event of a collision. Always sit upright against your seat back, with your feet on the floor.

Do not recline the seat back as this can cause the occupant to slide under the safety belt, resulting in serious injury in the event of a collision.

Do not place objects higher than the seat back to reduce the risk of serious injury in the event of a collision or during heavy braking.



E68595

When you use them properly, the seat, head restraint, safety belt and air bags will provide optimum protection in the event of a collision.

We recommend that you follow these guidelines:

- Sit in an upright position with the base of your spine as far back as possible.
- Do not recline the seat back more than 30 degrees.
- Adjust the head restraint so that the top of it is level with the top of your head and as far forward as possible. Make sure that you remain comfortable.
- Keep sufficient distance between yourself and the steering wheel. We recommend a minimum of 10 inches (25 centimeters) between your breastbone and the air bag cover.
- Hold the steering wheel with your arms slightly bent.
- Bend your legs slightly so that you can press the pedals fully.
- Position the shoulder strap of the safety belt over the center of your shoulder and position the lap strap tightly across your hips.

Make sure that your driving position is comfortable and that you can maintain full control of your vehicle.

HEAD RESTRAINTS

WARNINGS

Fully adjust the head restraint before you sit in or operate your vehicle. This will help minimize the risk of neck injury in the event of a collision. Do not adjust the head restraint when your vehicle is moving.

The head restraint is a safety device. Whenever possible it should be installed and properly adjusted when the seat is occupied.

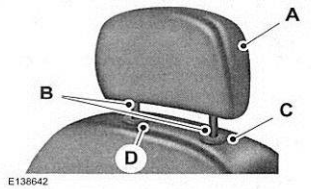
Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

WARNINGS

Install the head restraint properly to help minimize the risk of neck injury in the event of a collision.

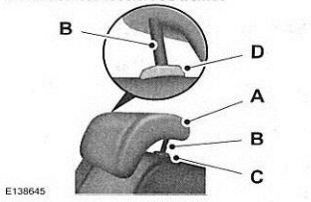
Note: *Adjust the seat back to an upright driving position before adjusting the head restraint. Adjust the head restraint so that the top of it is level with the top of your head and as far forward as possible. Make sure that you remain comfortable. If you are extremely tall, adjust the head restraint to its highest position.*

Front seat and rear seat outboard head restraints



E138642

Rear center head restraint



E138645

The head restraints consist of:

A	An energy absorbing head restraint
B	Two steel stems
C	Guide sleeve adjust and unlock button
D	Guide sleeve unlock and remove button

Adjusting the Head Restraint

Raising the Head Restraint

Pull the head restraint up.

Lowering the Head Restraint

1. Press and hold button C.
2. Push the head restraint down.

Removing the Head Restraint

1. Pull the head restraint up until it reaches its highest position.
2. Press and hold buttons C and D.
3. Pull the head restraint up.

Installing the Head Restraint

Align the steel stems into the guide sleeves and push the head restraint down until in locks.

Tilting Head Restraints

The front head restraints have a tilting feature for extra comfort. To tilt the head restraint, do the following:

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

E144727

1. Adjust the seat back to an upright driving or riding position.
2. Pivot the head restraint forward toward your head to the desired position.

After the head restraint reaches the forward-most tilt position, pivoting it forward again will then release it to the rearward, un-tilted position.

MANUAL SEATS

WARNINGS

- Do not adjust the driver's seat or seat back when your vehicle is moving.
- Rock the seat backward and forward after releasing the lever to make sure that it is fully engaged.
- Reclining the seat back can cause an occupant to slide under the seat's safety belt, resulting in severe personal injuries in the event of a collision.

The manual front seats consist of:

E157060

A	a bar to move the seat backward and forward
B	a lever to adjust the angle of the seat back.

POWER SEATS (IF EQUIPPED)

WARNINGS

- Do not adjust the driver's seat or seat back when your vehicle is moving.
- Do not place cargo or any objects behind the seat back before returning it to the original position.

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

Post-Test View of Shattered Vehicle Inner Door Panel

APPENDIX B

VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS
Driver Dummy Instrumentation Plots

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

Additional Driver Dummy Instrumentation Data

Driver Head CG Redundant Acceleration (X) vs. Time

Driver Head CG Redundant Acceleration (Y) vs. Time

Driver Head CG Redundant Acceleration (Z) vs. Time

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)

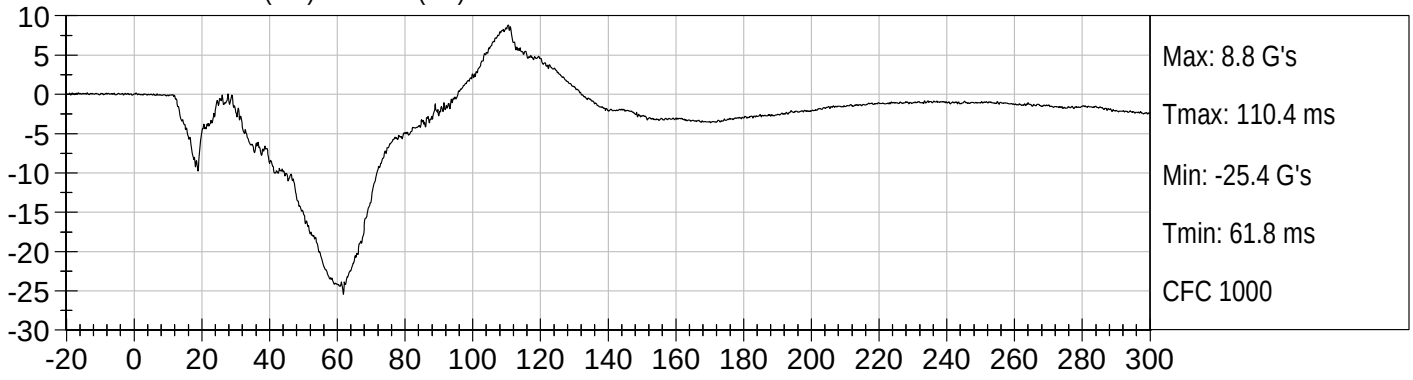
Load Cell Pole Barrier #7 Force (Y)

Load Cell Pole Barrier #8 Force (Y)

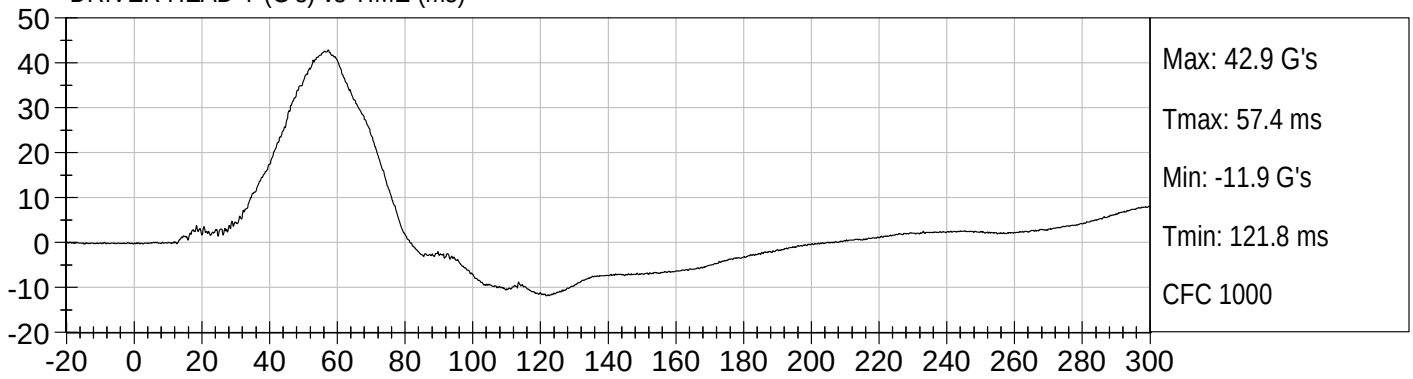
75° Oblique Rigid Pole Side NCAP
2013 Ford Fusion Hybrid - MD0218

Test Date: 12/11/2012
Speed: 19.9 mph (32.0 km/h)

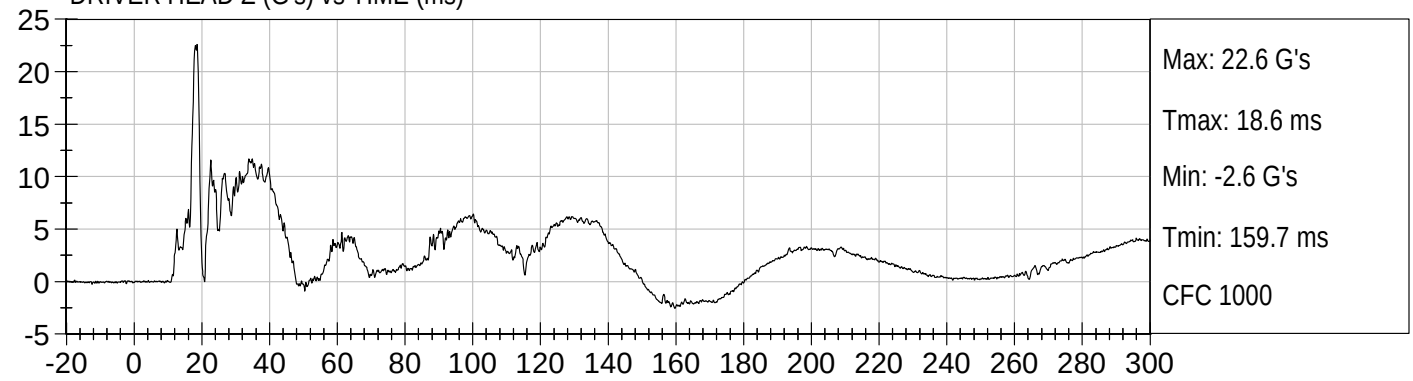
DRIVER HEAD X (G's) vs TIME (ms)



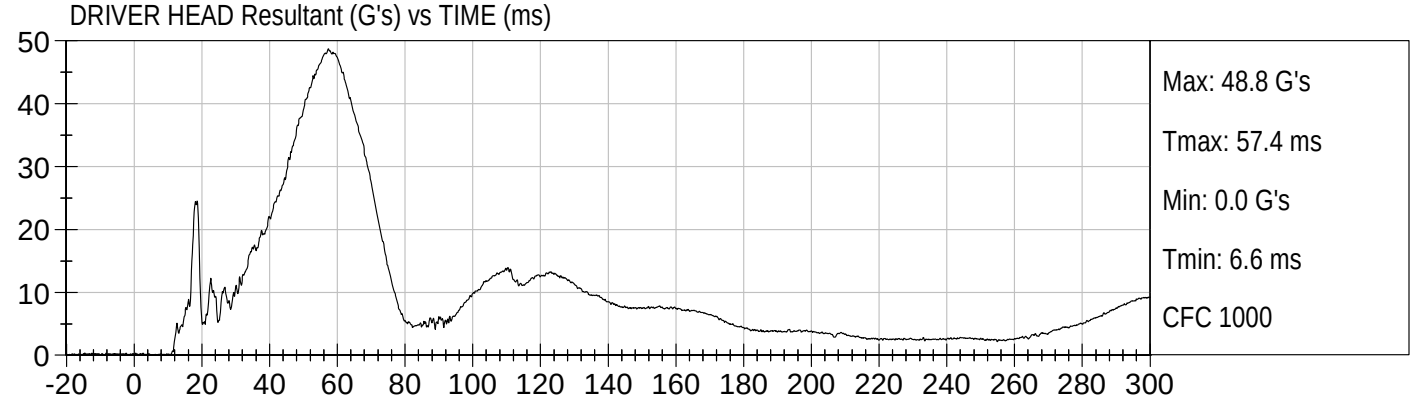
DRIVER HEAD Y (G's) vs TIME (ms)



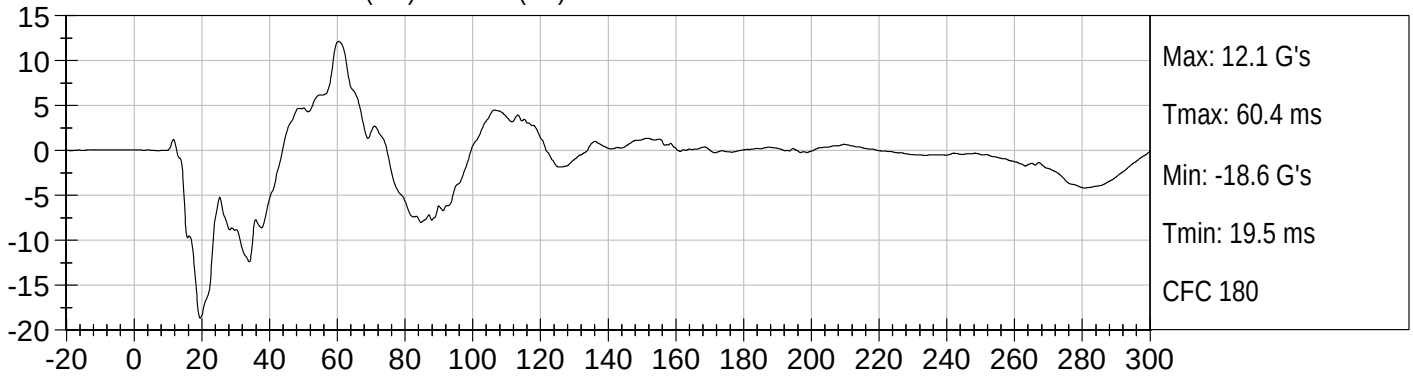
DRIVER HEAD Z (G's) vs TIME (ms)



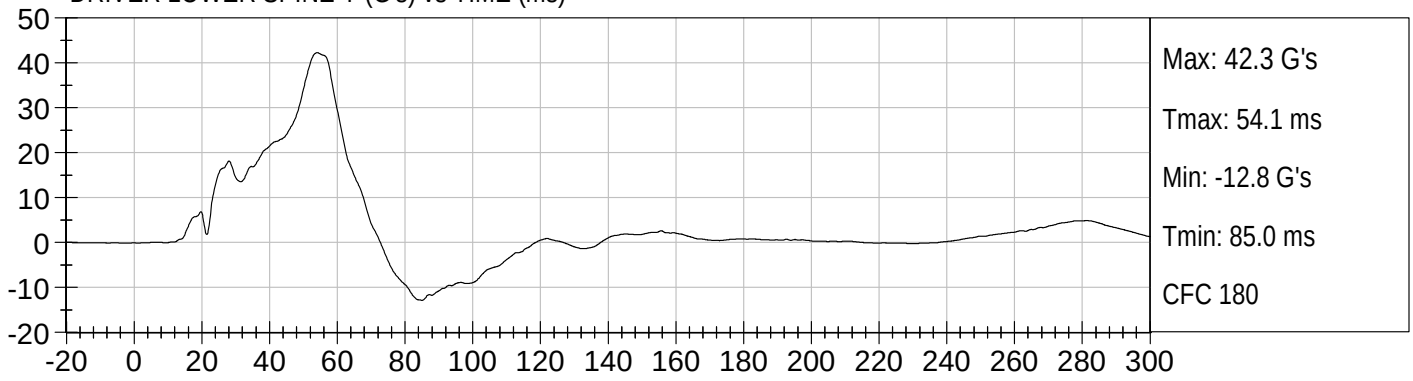
DRIVER HEAD Resultant (G's) vs TIME (ms)



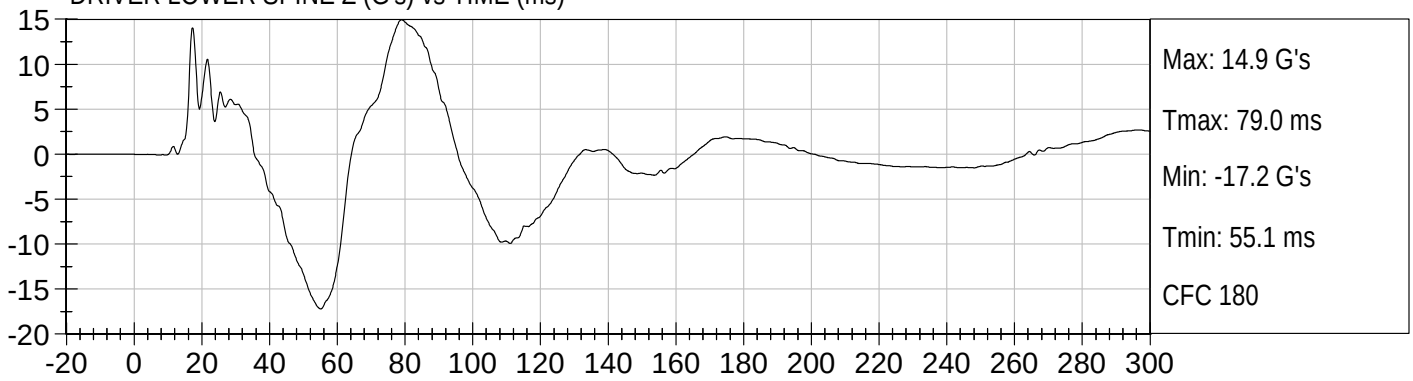
DRIVER LOWER SPINE X (G's) vs TIME (ms)



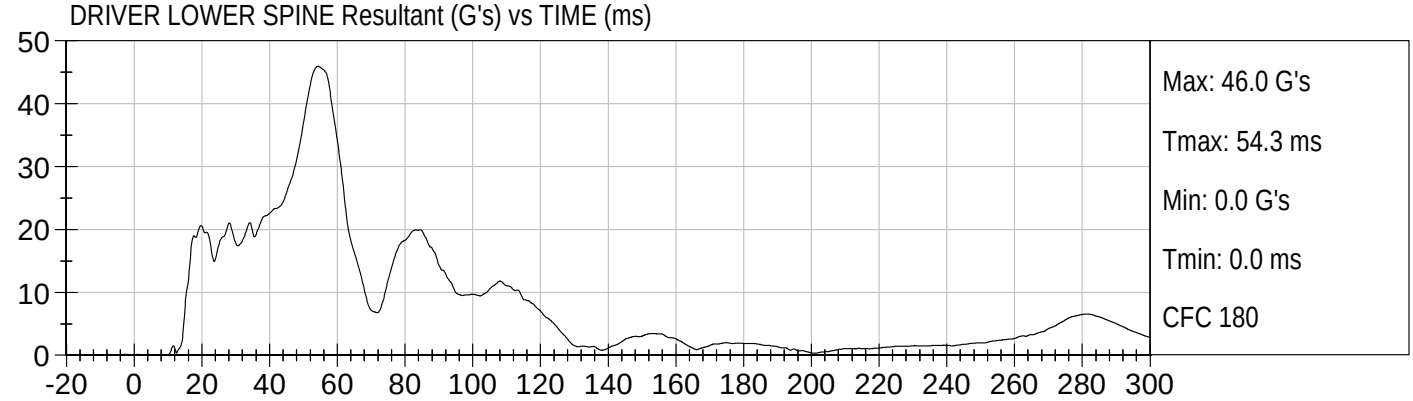
DRIVER LOWER SPINE Y (G's) vs TIME (ms)



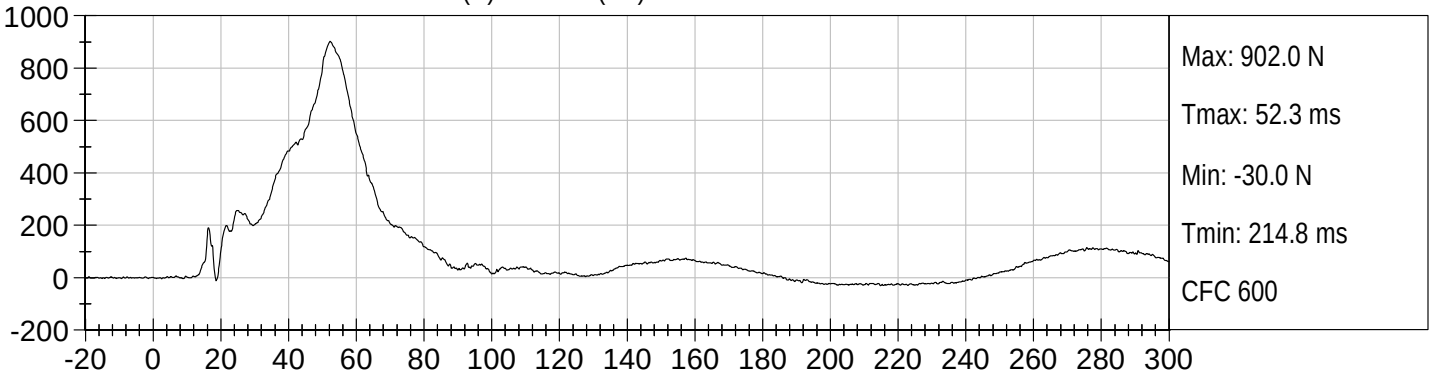
DRIVER LOWER SPINE Z (G's) vs TIME (ms)



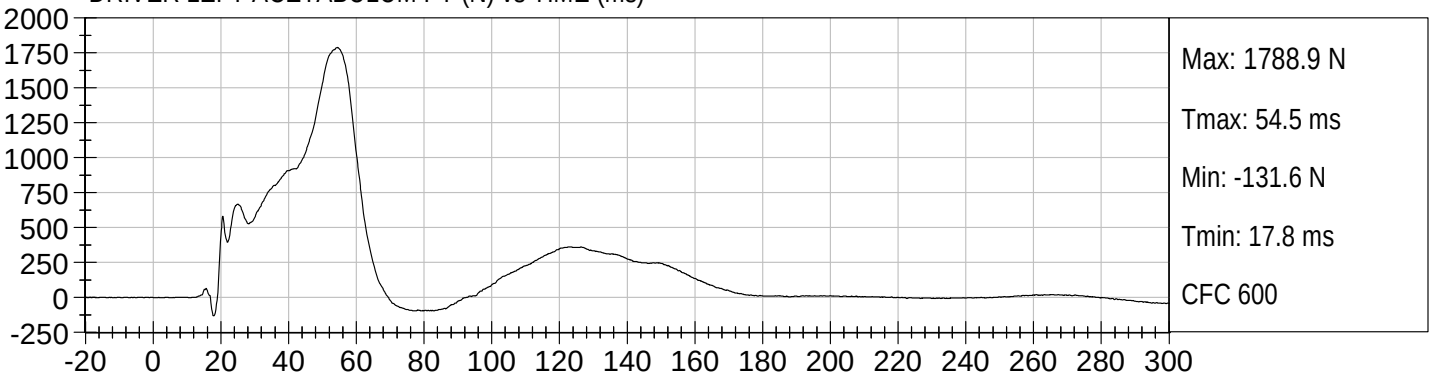
DRIVER LOWER SPINE Resultant (G's) vs TIME (ms)



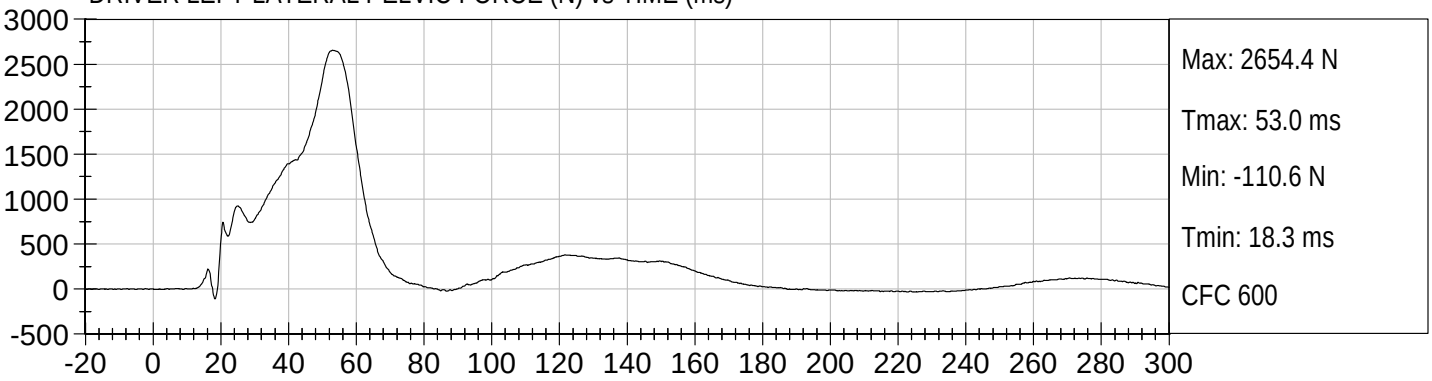
DRIVER LEFT ILLIUM CREST FY (N) vs TIME (ms)



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: 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:** D124631

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	24	Pass
Peak Resultant Acceleration	G's	115 to 137	124	Pass
Peak Longitudinal Acceleration	G's	+/- 15	2.9	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	<15%	Yes	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

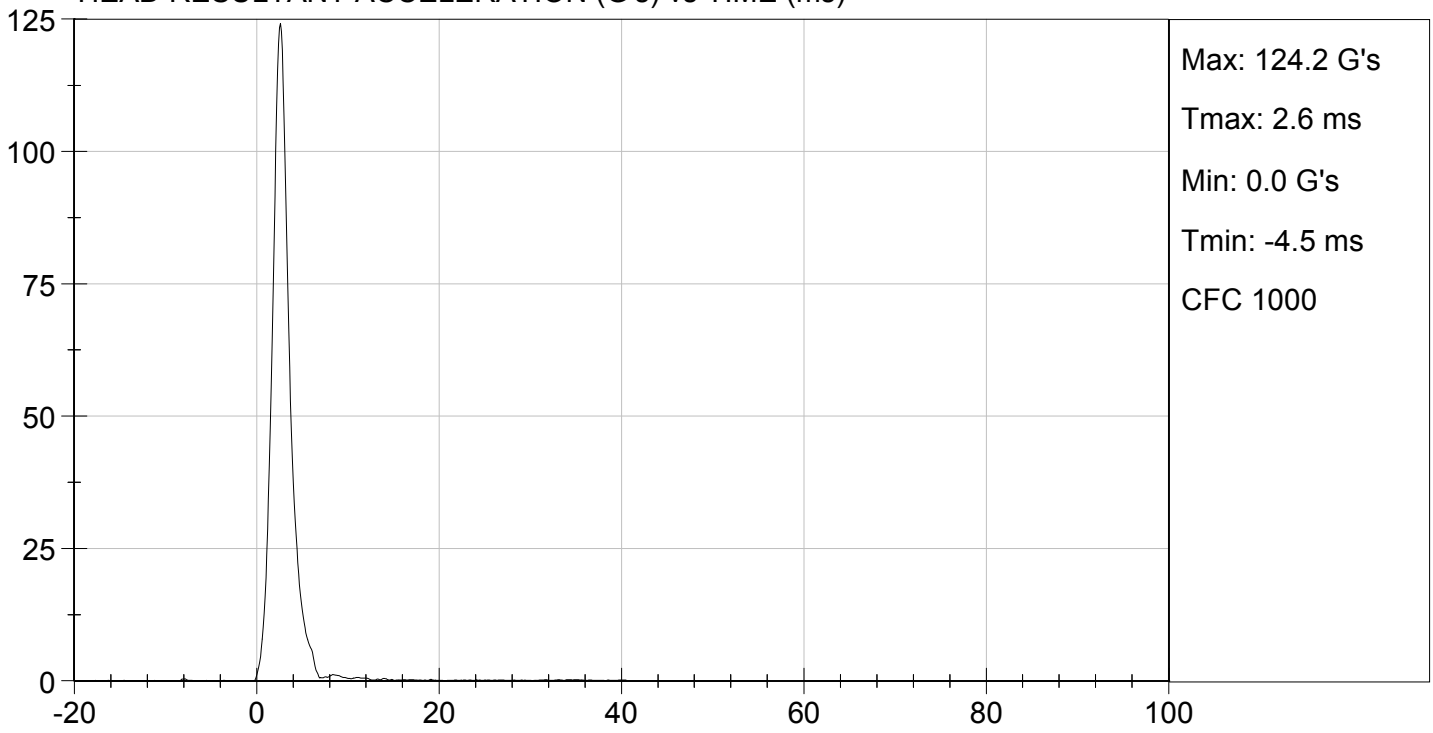
12/05/2012
Test Date

David Winkelbauer
Approved By

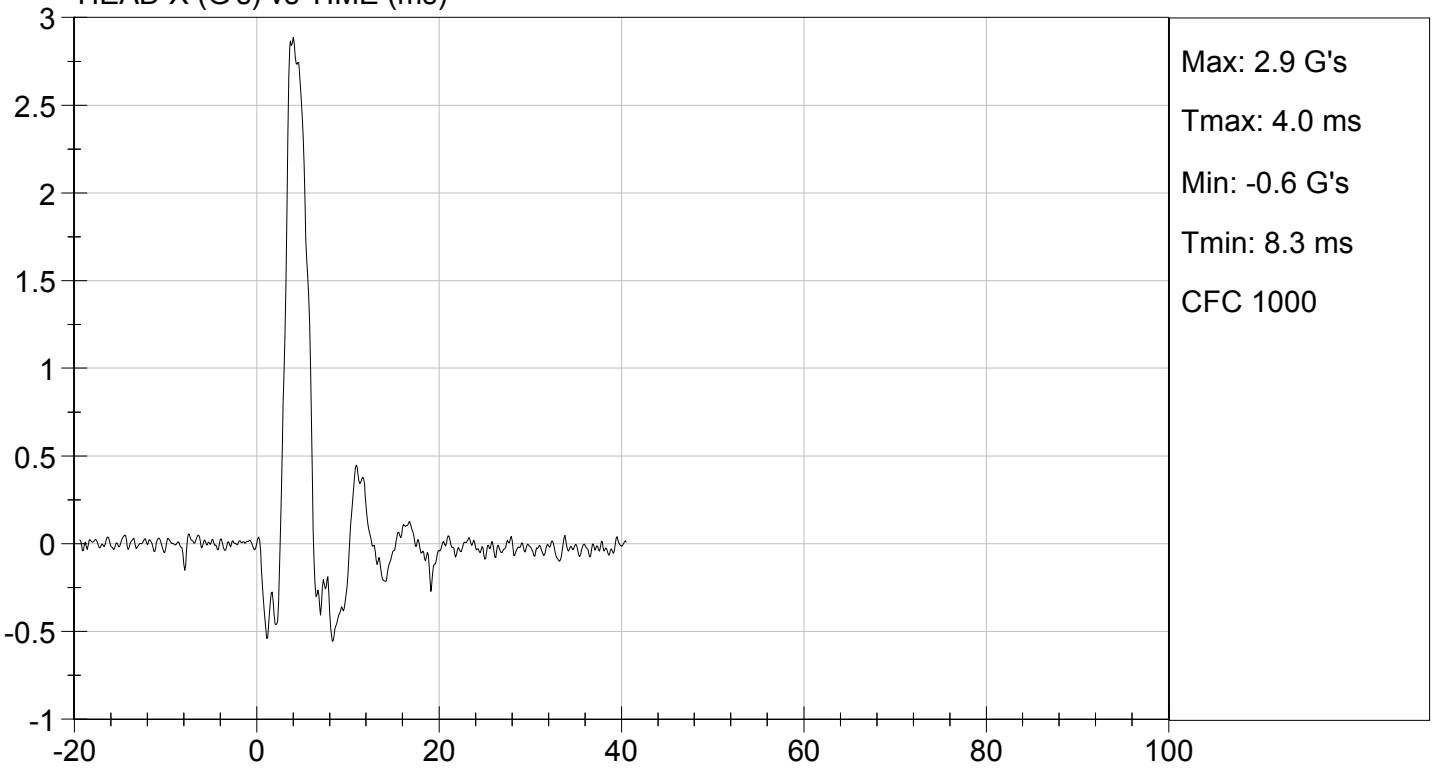
TEST DESC: HEAD DROP

TEST DATE: 12/05/2012
TEST #: D124631

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



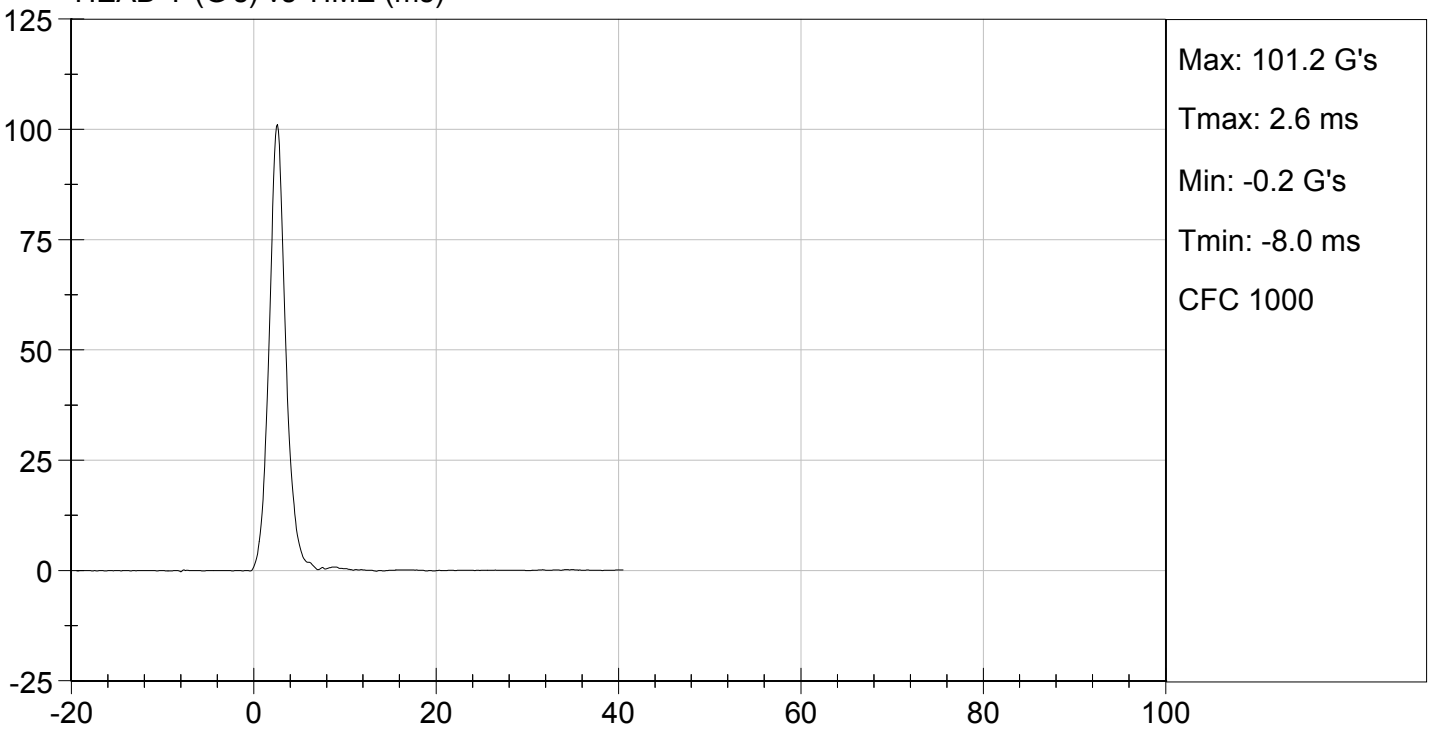
HEAD X (G's) vs TIME (ms)



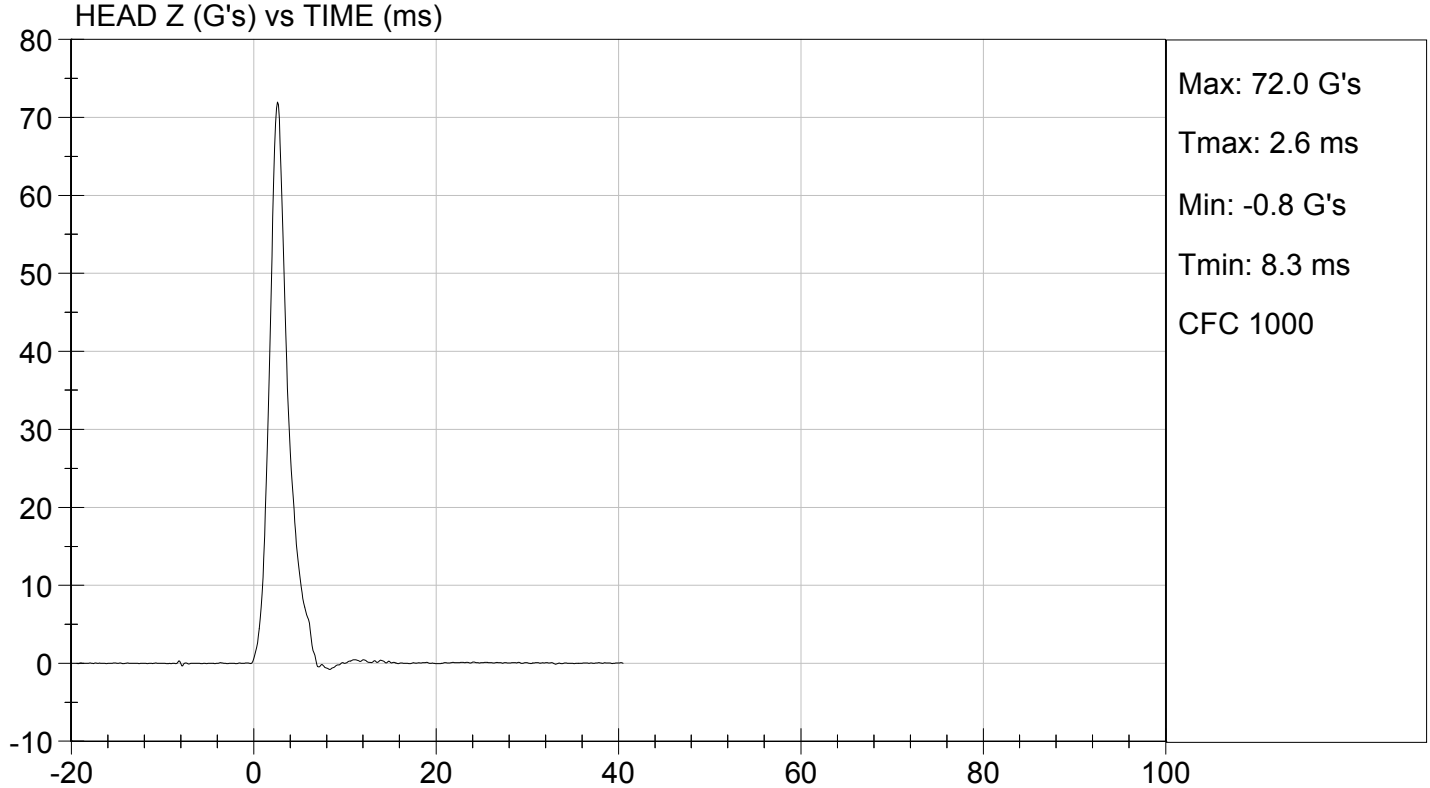
TEST DESC: HEAD DROP

TEST DATE: 12/05/2012
TEST #: D124631

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



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



MGA RESEARCH CORPORATION

LATERAL NECK PENDULUM TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test I.D:** D124632

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.5	Pass
Humidity		%	10 to 70	22	Pass
Impact Velocity		m/s	5.51 to 5.63	5.58	Pass
Pendulum Velocity	10 ms	m/s	2.20 to 2.80	2.69	Pass
	15 ms	m/s	3.30 to 4.10	3.89	Pass
	20 ms	m/s	4.40 to 5.40	5.09	Pass
	25 ms	m/s	5.40 to 6.10	5.42	Pass
	25-100 ms	m/s	5.50 to 6.20	5.57	Pass
Maximum D-Plane Rotation		deg	71 to 81	73	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	60	Pass
Maximum Occipital Condyle Moment		Nm	-44 to -36	-41	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	114	Pass
			Overall Test Results		Pass

Jessica Hall
Laboratory Technician

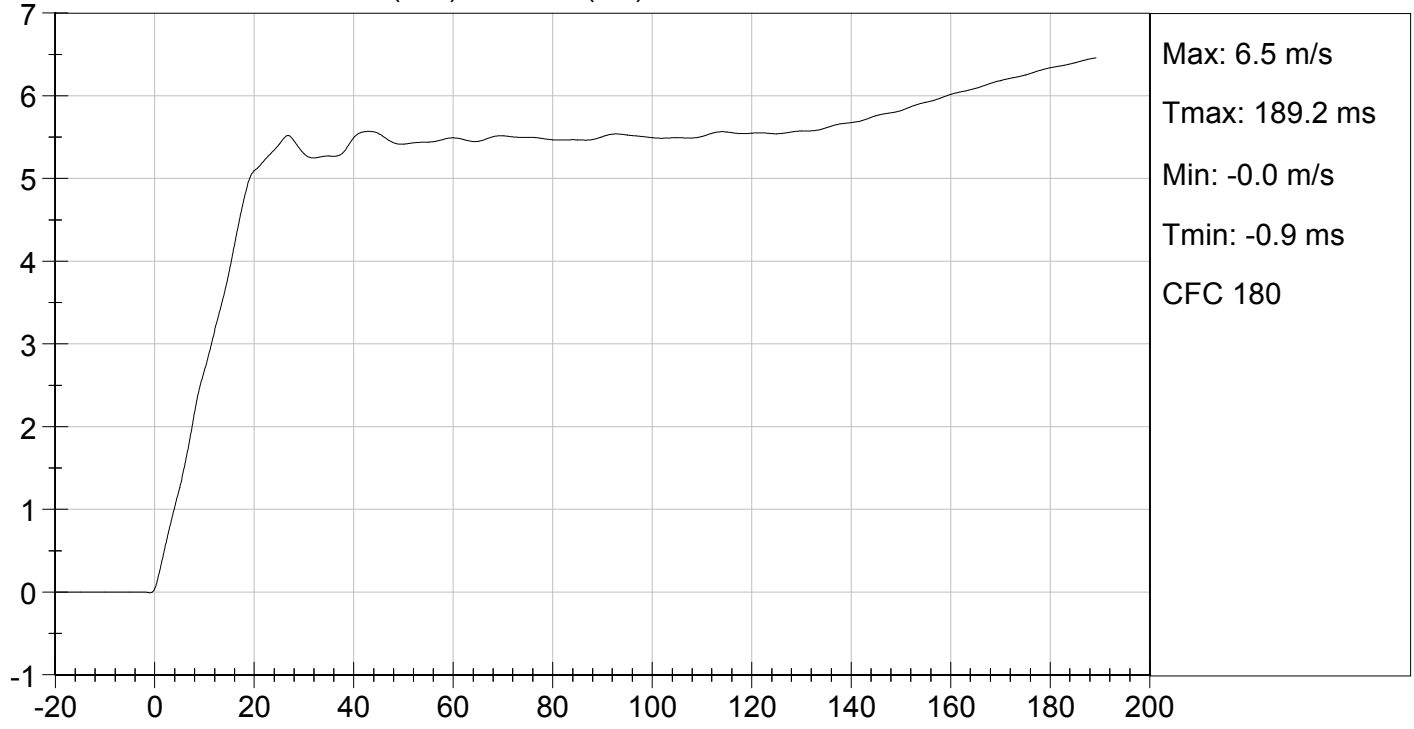
12/05/2012
Test Date

David Winkelbauer
Approved By

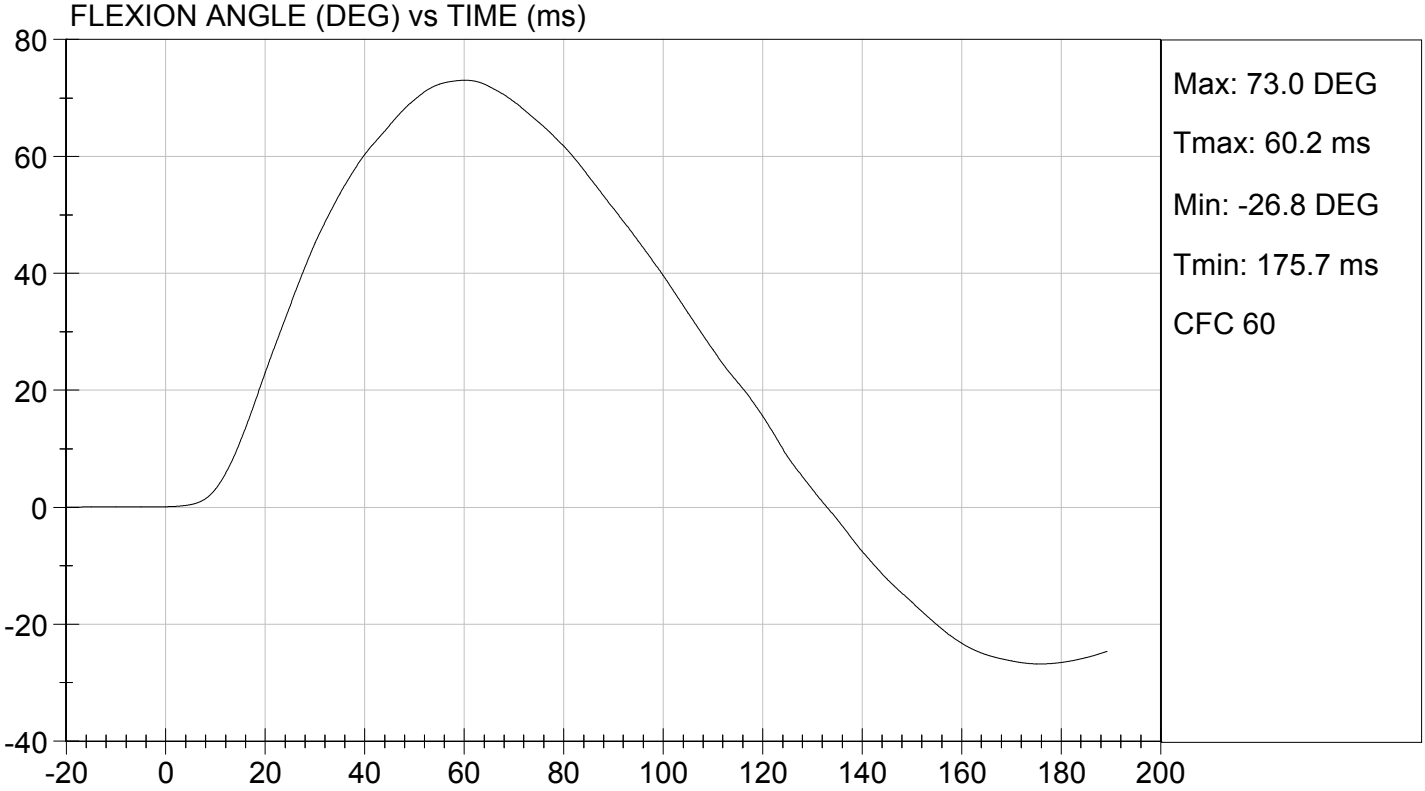
TEST DESC: NECK BENDING
VELOCITY: 18.31 ft/s, 5.58 m/s

TEST DATE: 12/05/2012
TEST #: D124632

PENDULUM VELOCITY (m/s) vs TIME (ms)

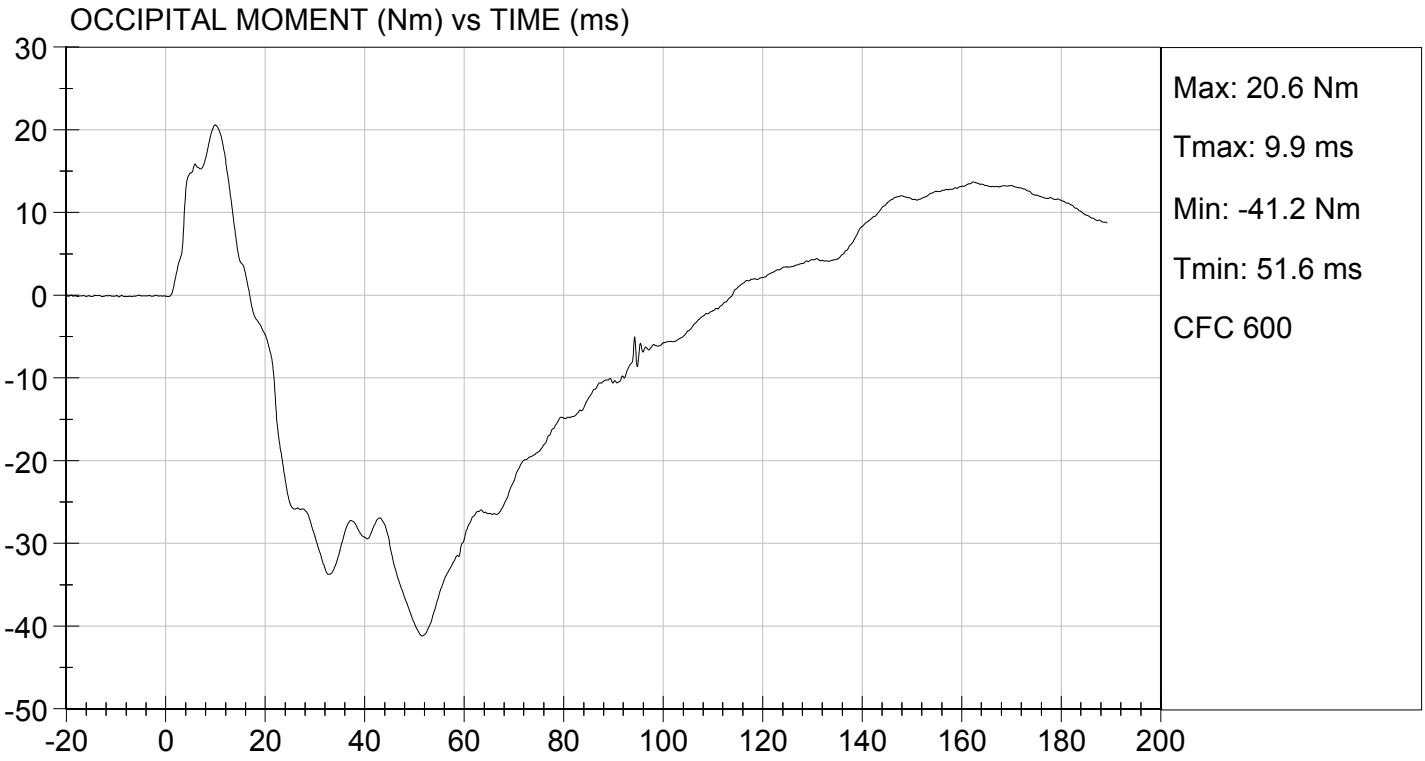


FLEXION ANGLE (DEG) vs TIME (ms)



TEST DESC: NECK BENDING
VELOCITY: 18.31 ft/s, 5.58 m/s

TEST DATE: 12/05/2012
TEST #: D124632



MGA RESEARCH CORPORATION

SHOULDER IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test ID:** D124633

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	23	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Maximum Probe Acceleration	G's	13 to 18	15	Pass
Shoulder Displacement	mm	28 to 37	32	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	18	Pass
		Overall Test Results		Pass

Jessica Gall
Laboratory Technician

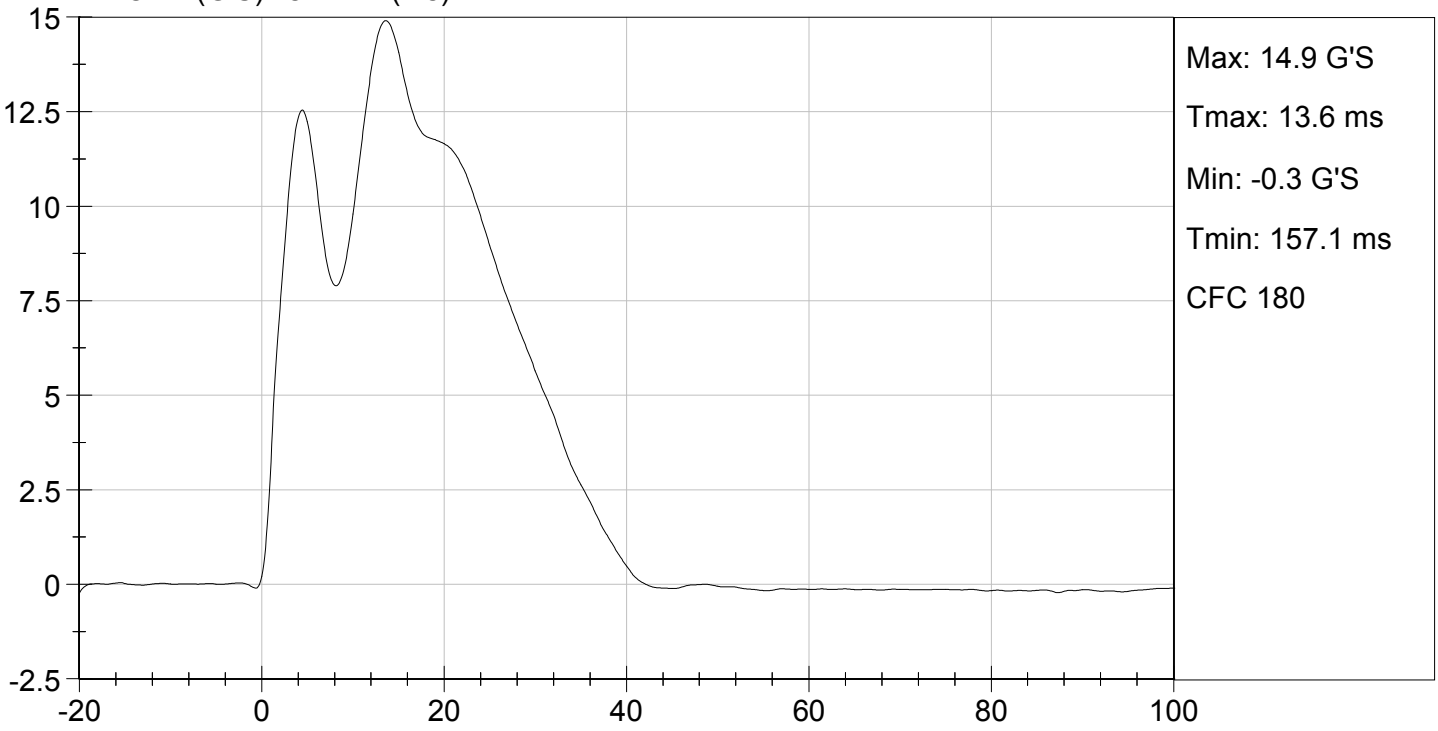
12/05/2012
Test Date

David Winkelbauer
Approved By

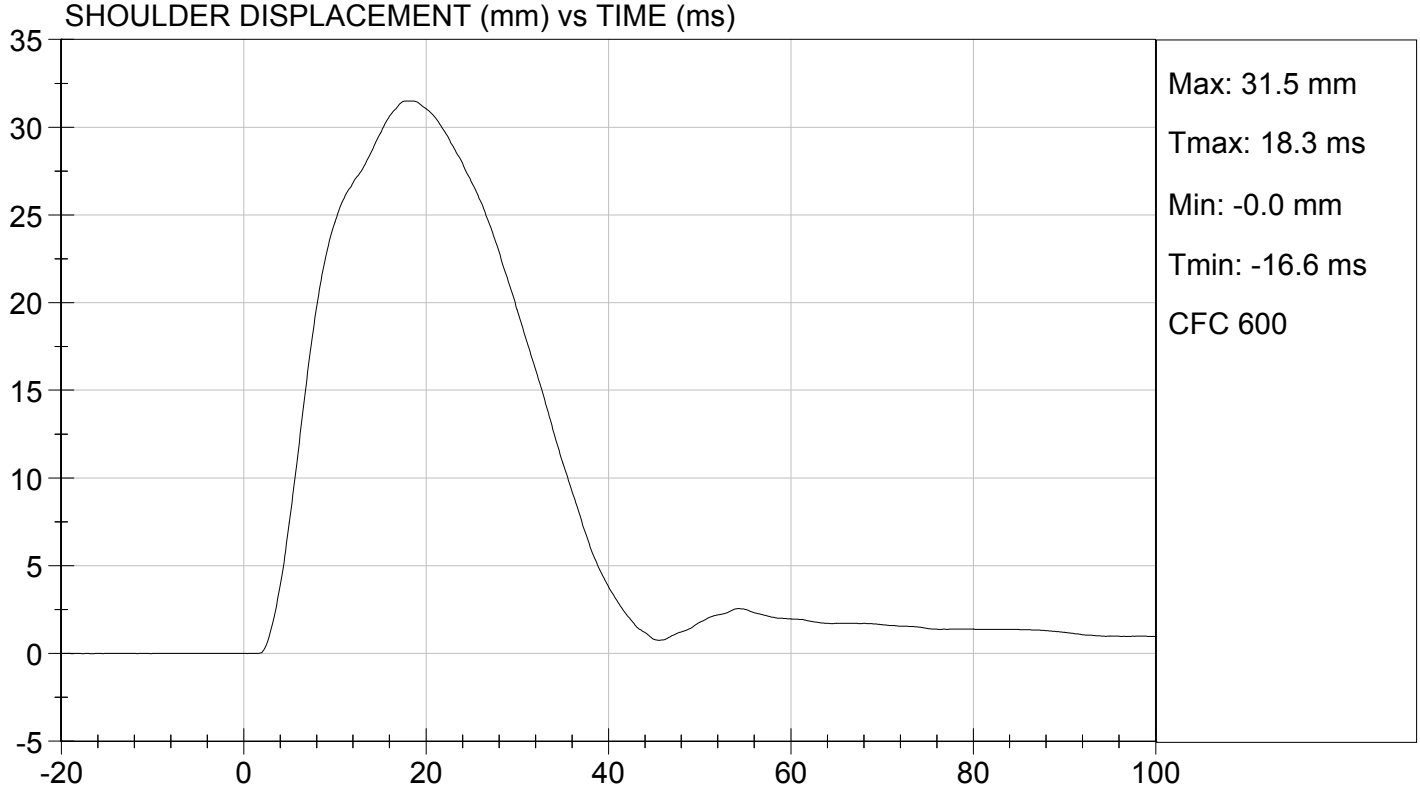
TEST DESC: SHOULDER IMPACT
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 12/05/2012
TEST #: D124633

PROBE (G'S) vs TIME (ms)



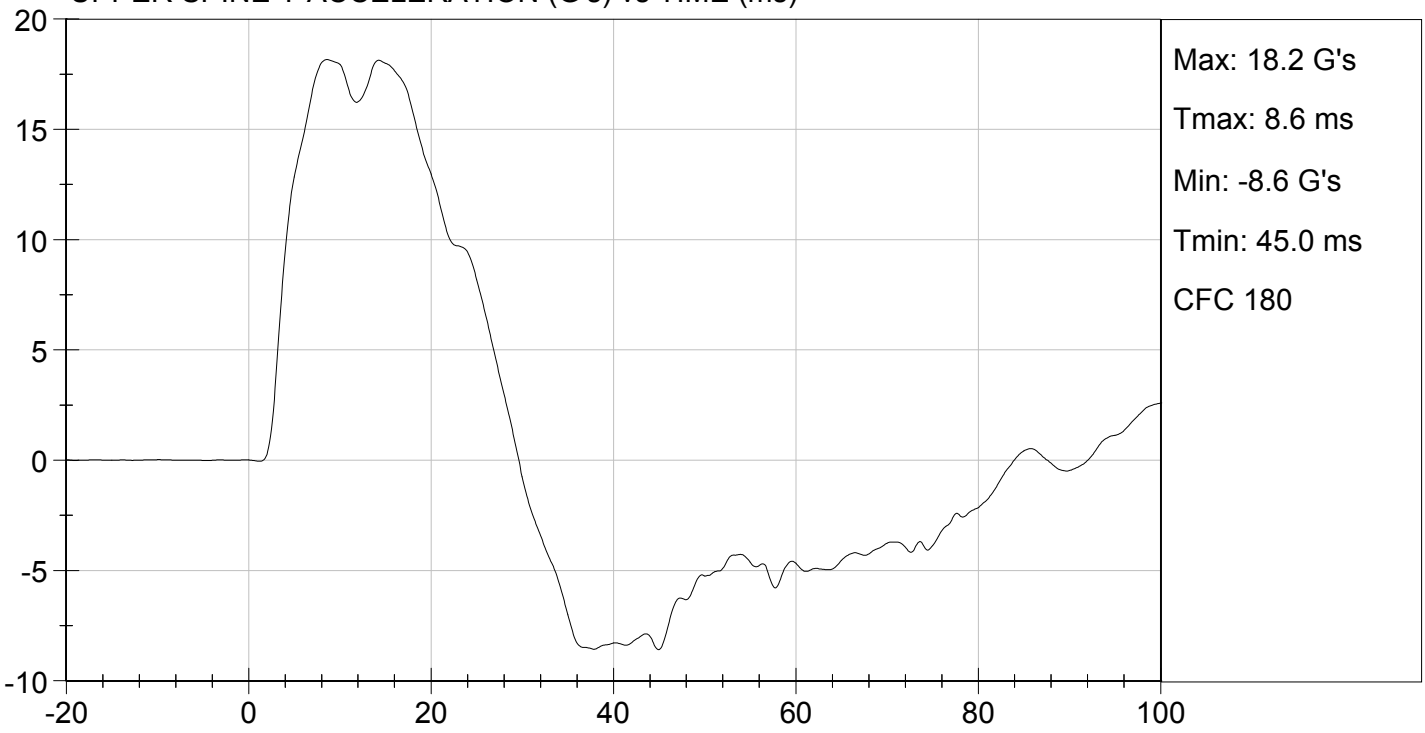
SHOULDER DISPLACEMENT (mm) vs TIME (ms)



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

TEST DATE: 12/05/2012
TEST #: D124633

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



MGA RESEARCH CORPORATION

THORAX (WITH ARM) IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test I.D:** D124634

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.9	Pass
Humidity	%	10 to 70	23	Pass
Impact Velocity	m/s	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	34	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	37	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	30	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

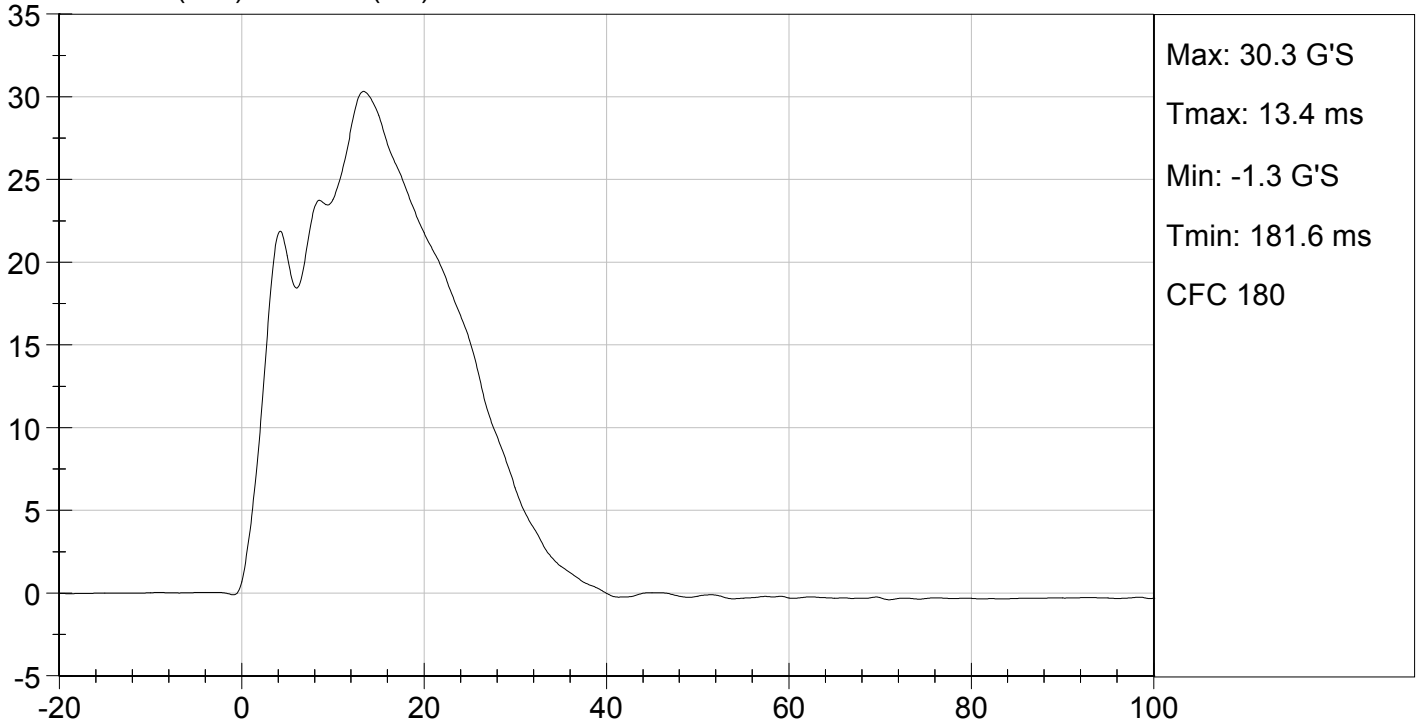
12/05/2012
Test Date

David Winkelbauer
Approved By

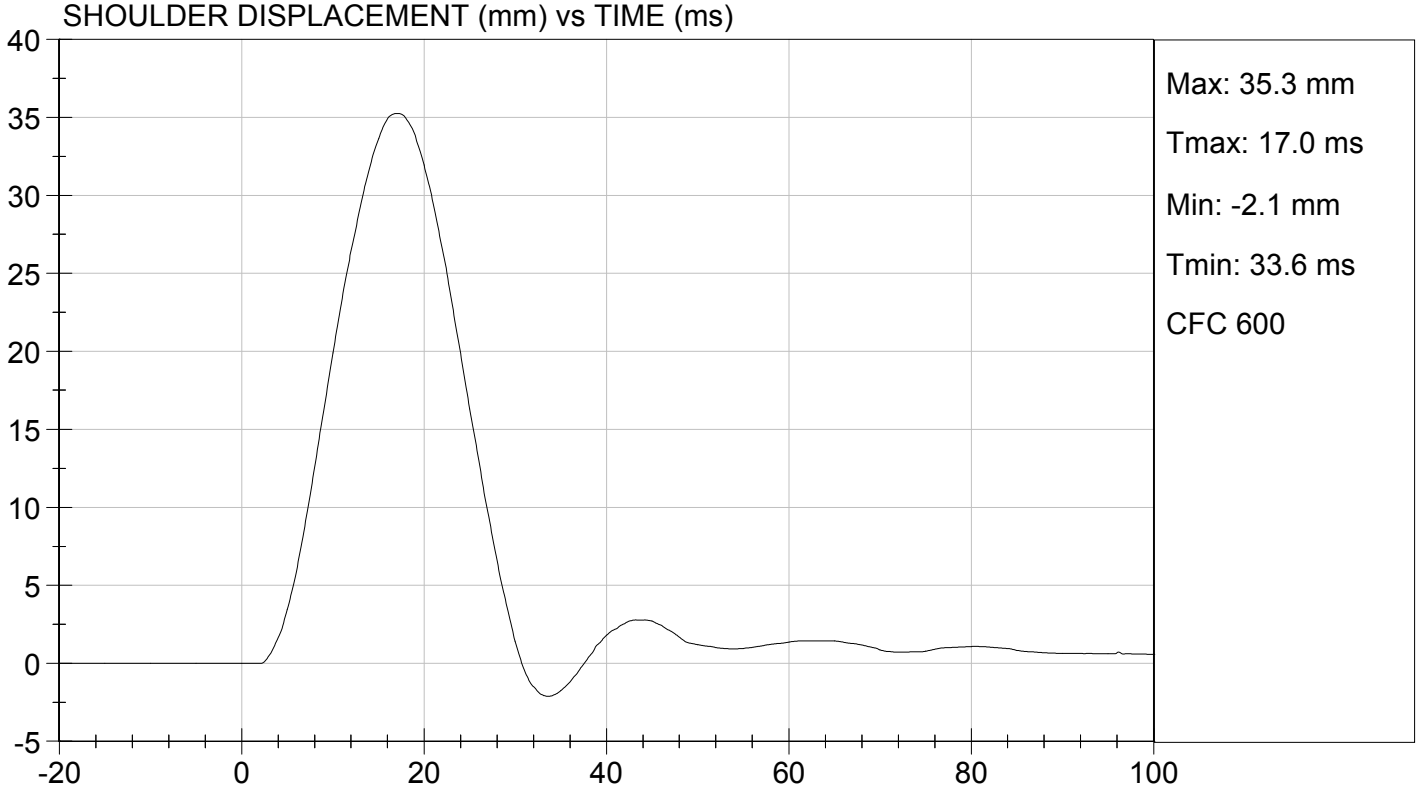
TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 21.93 ft/s, 6.68 m/s

TEST DATE: 12/05/2012
TEST #: D124634

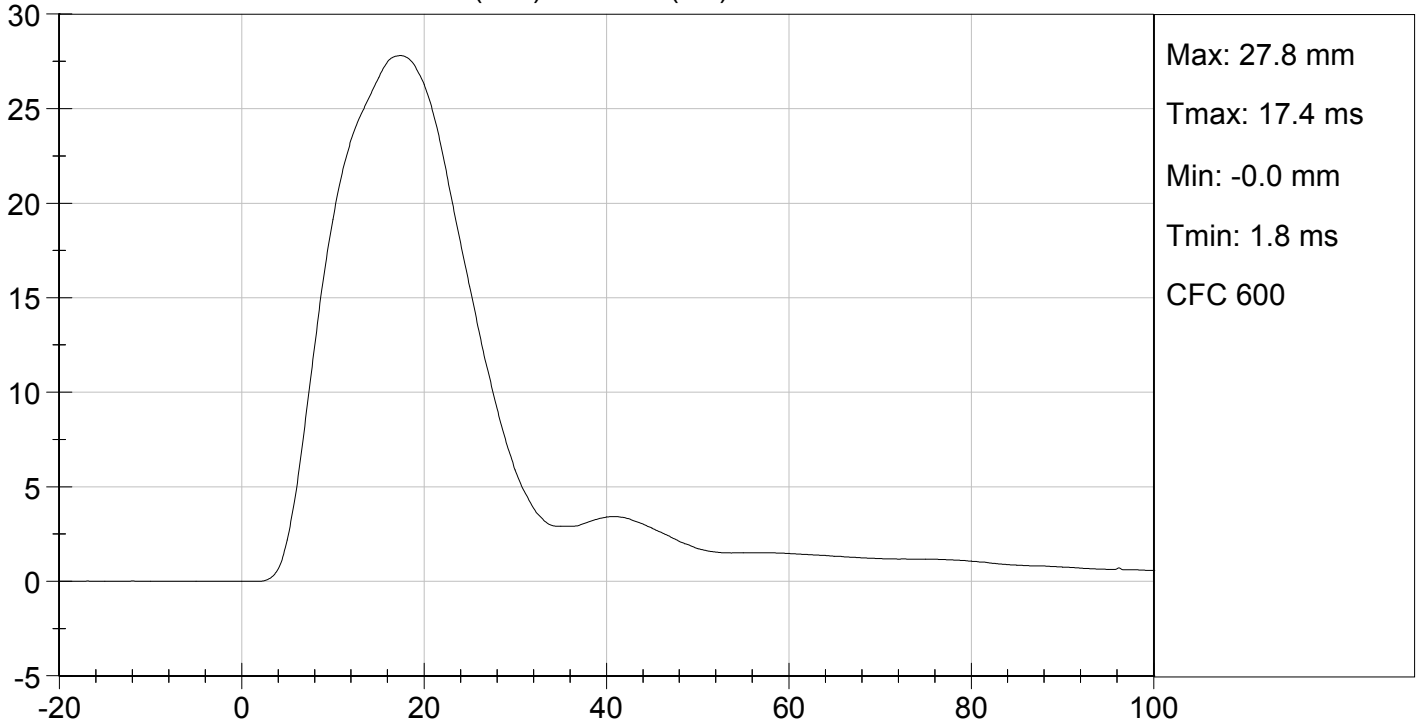
PROBE (G'S) vs TIME (ms)



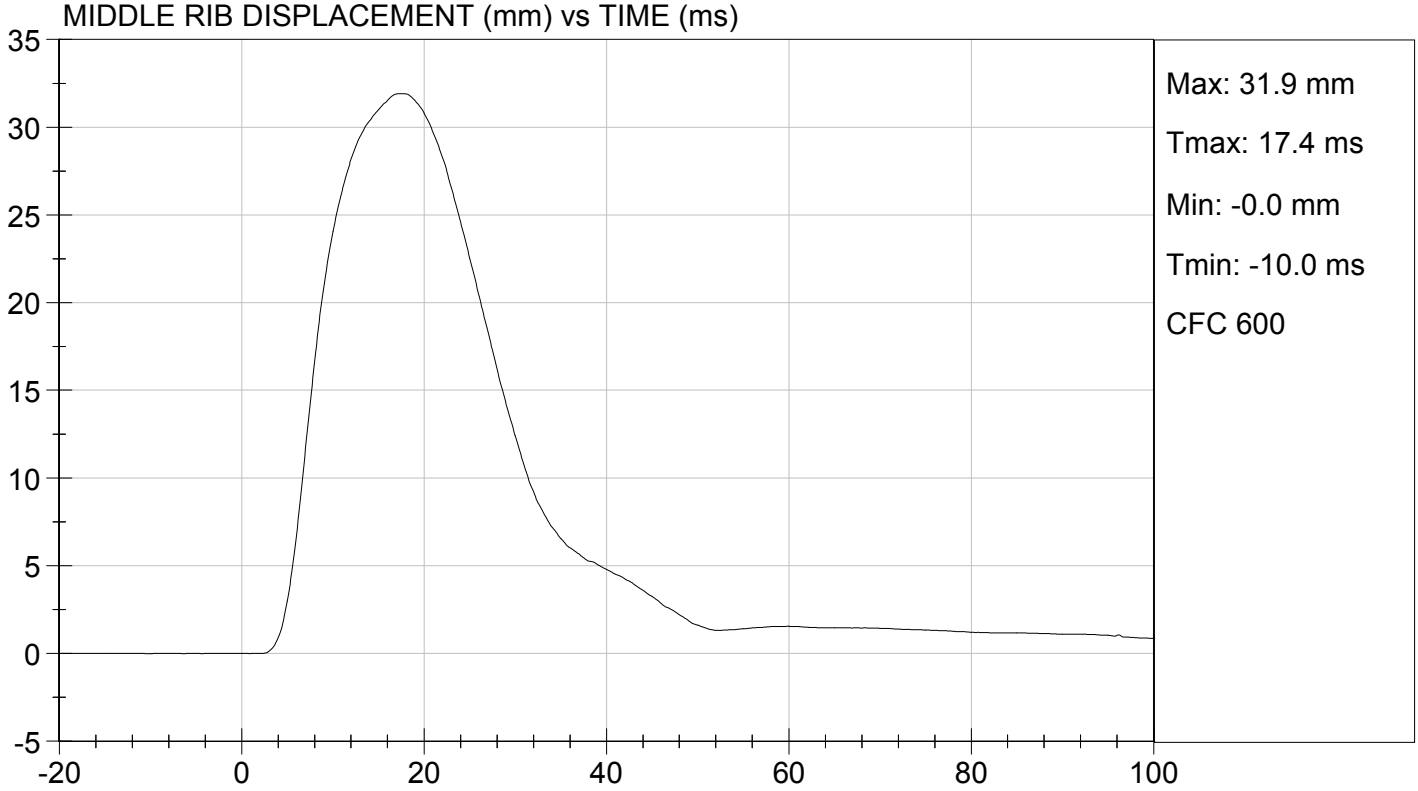
SHOULDER DISPLACEMENT (mm) vs TIME (ms)



UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



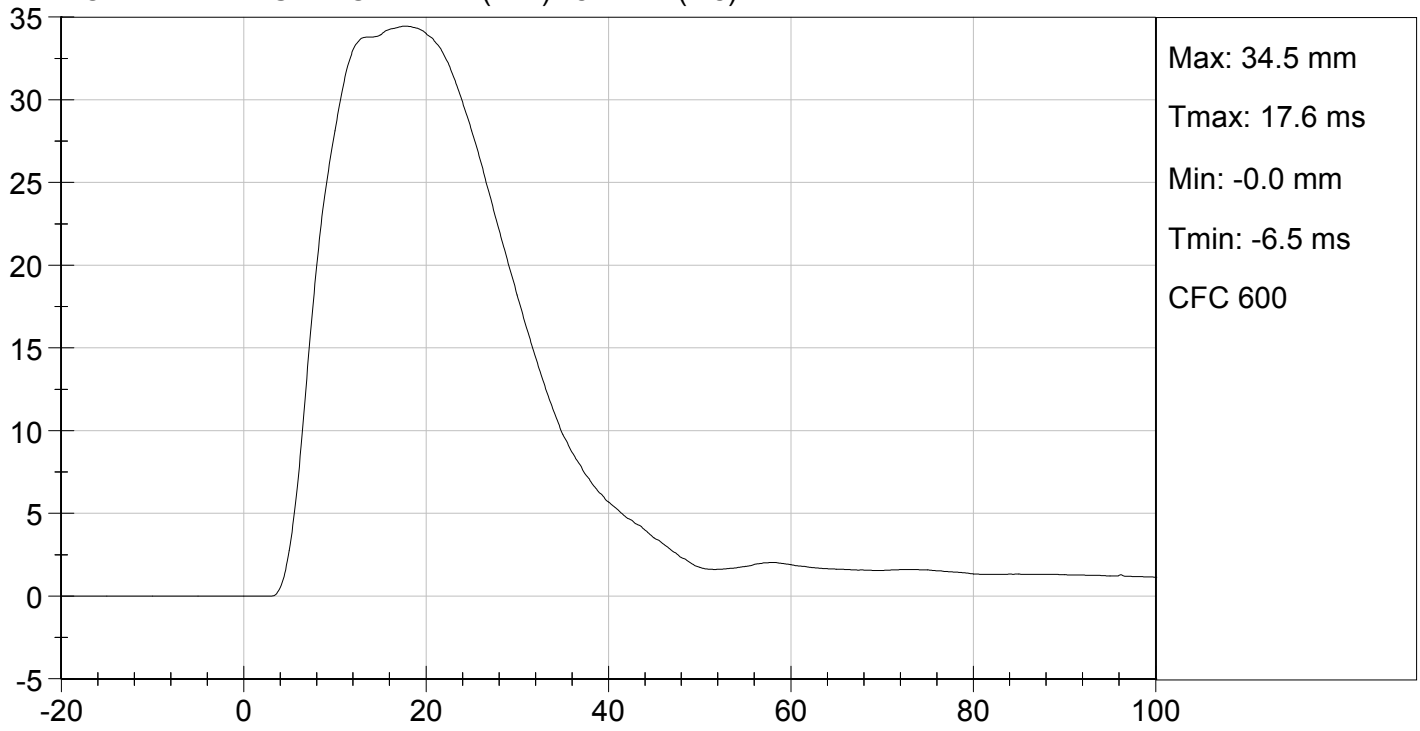
MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



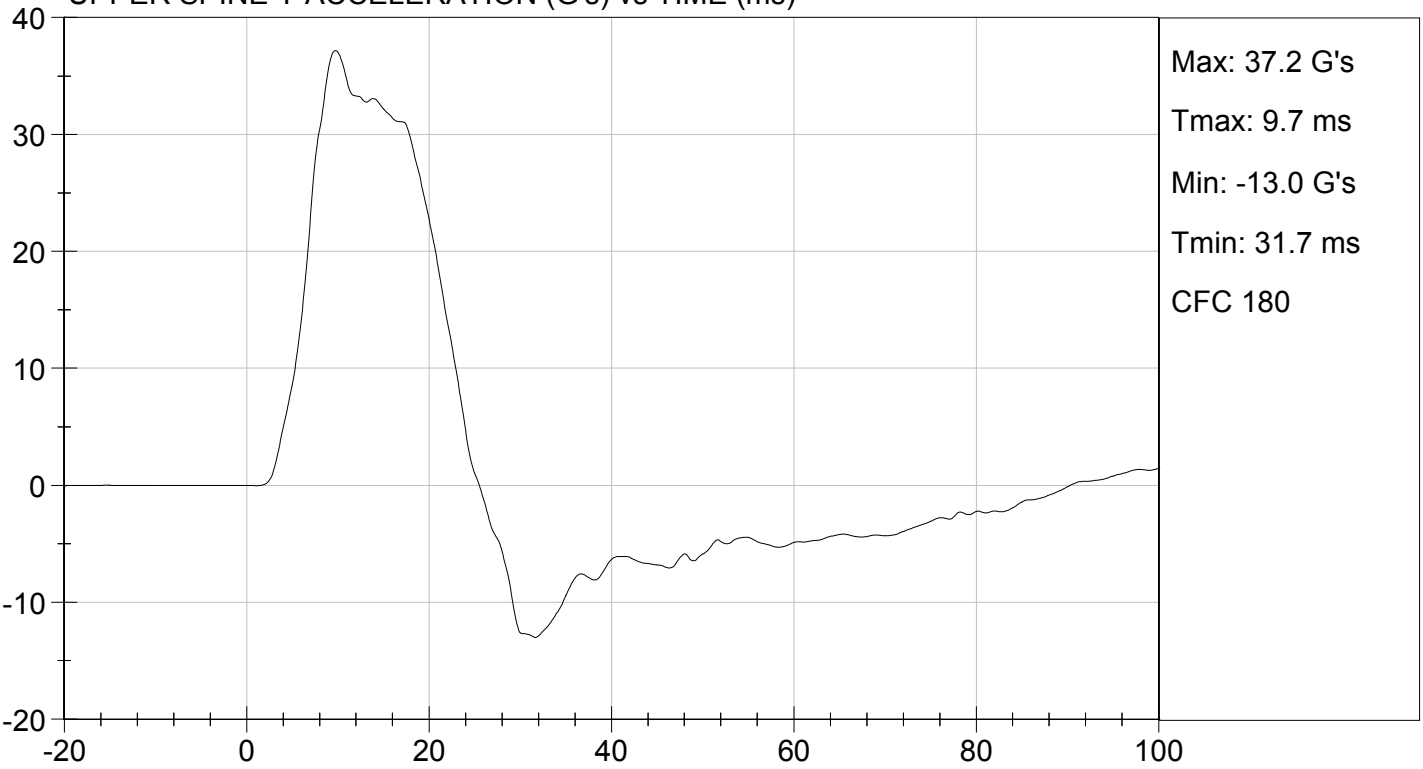
TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 21.93 ft/s, 6.68 m/s

TEST DATE: 12/05/2012
TEST #: D124634

LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



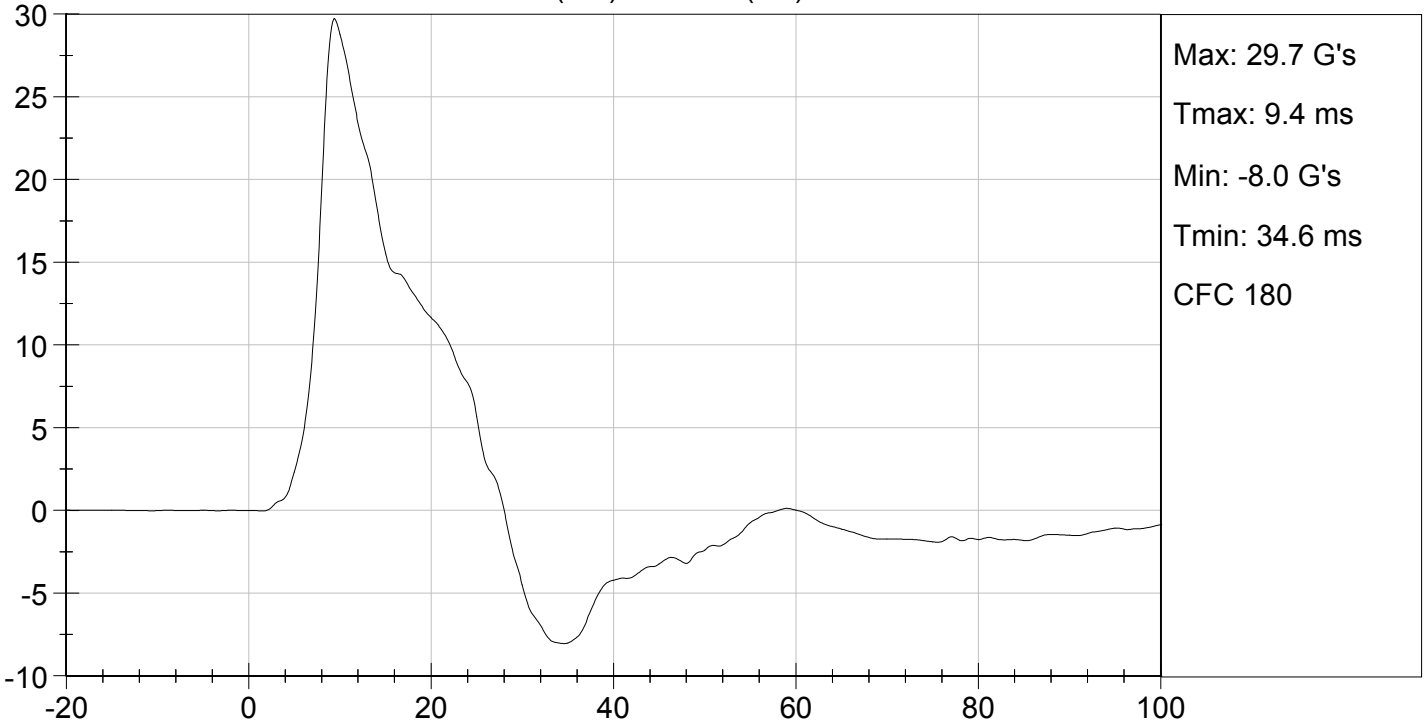
UPPER SPINE Y ACCELERATION (G's) vs TIME (ms)



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

TEST DATE: 12/05/2012
TEST #: D124634

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



MGA RESEARCH CORPORATION

THORAX (WITHOUT ARM) IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test I.D:** D124635

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.9	Pass
Humidity	%	10 to 70	23	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Maximum Probe Acceleration	G's	14 to 18	14	Pass
Upper Rib Displacement	mm	32 to 40	38	Pass
Middle Rib Displacement	mm	39 to 45	42	Pass
Lower Rib Displacement	mm	35 to 43	39	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	14	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	8	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

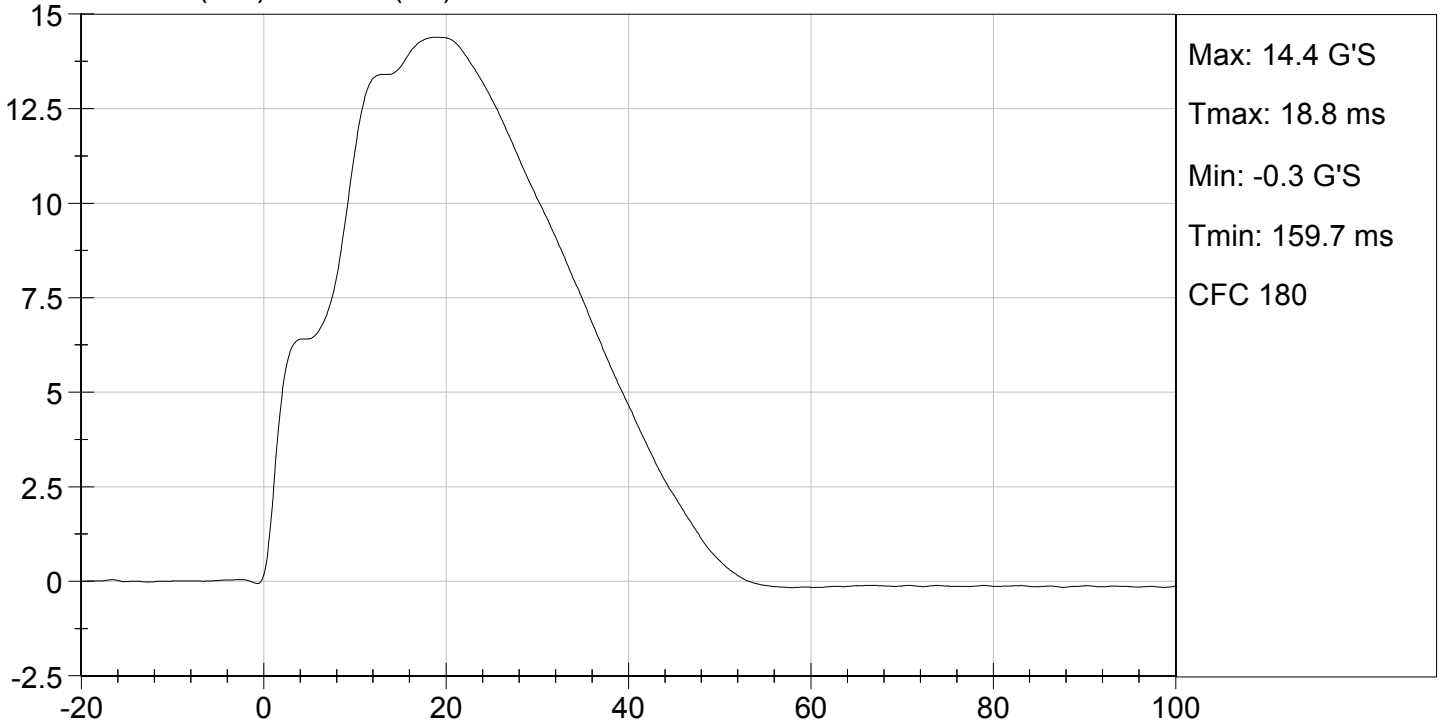
12/05/2012
Test Date

David Winkelbauer
Approved By

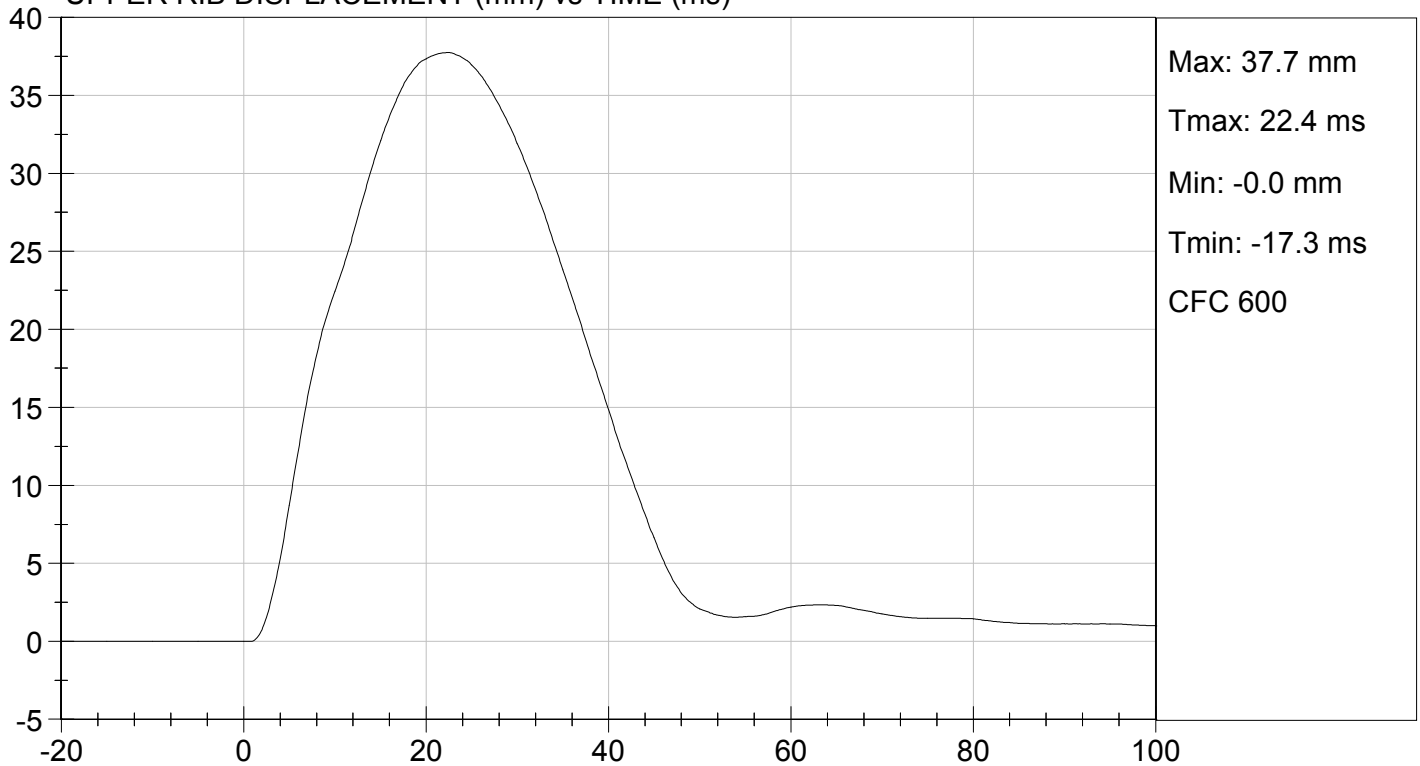
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 12/05/2012
TEST #: D124635

PROBE (G'S) vs TIME (ms)



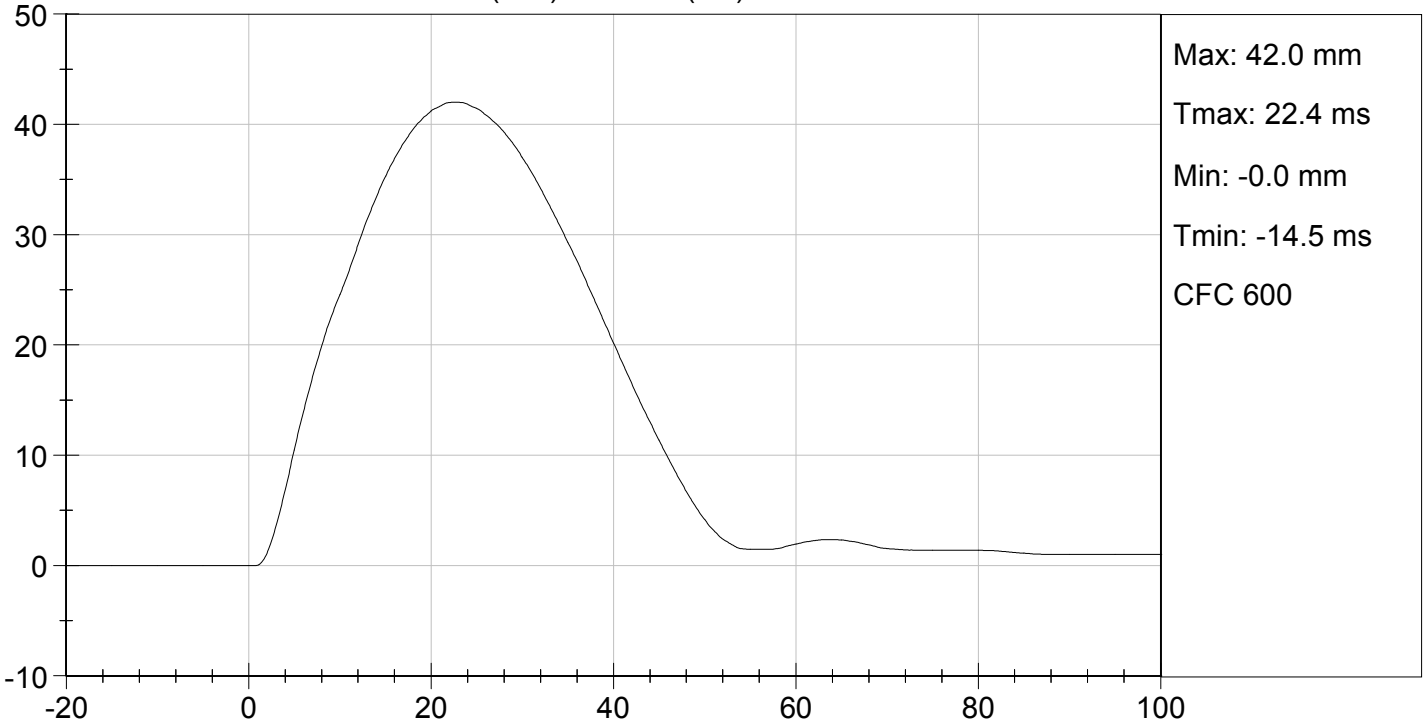
UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



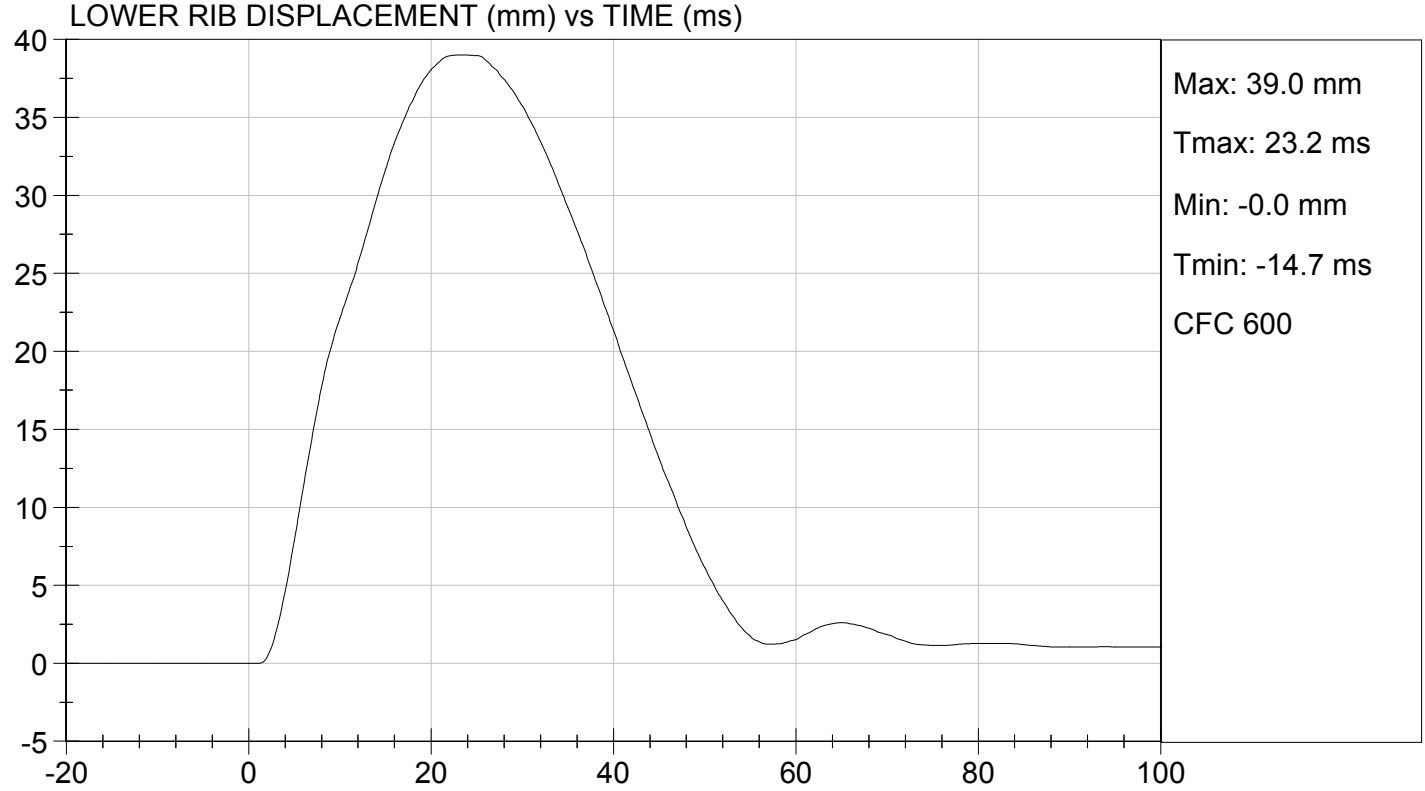
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 12/05/2012
TEST #: D124635

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



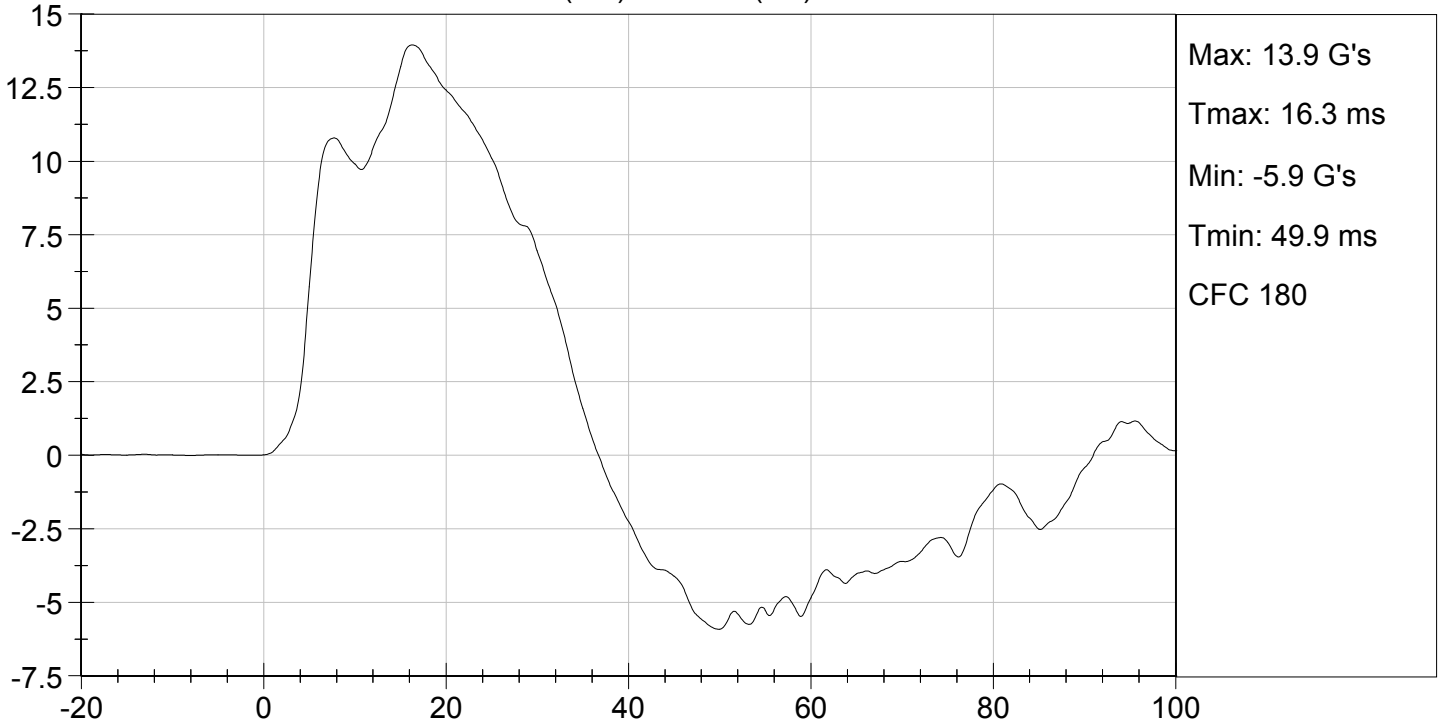
LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



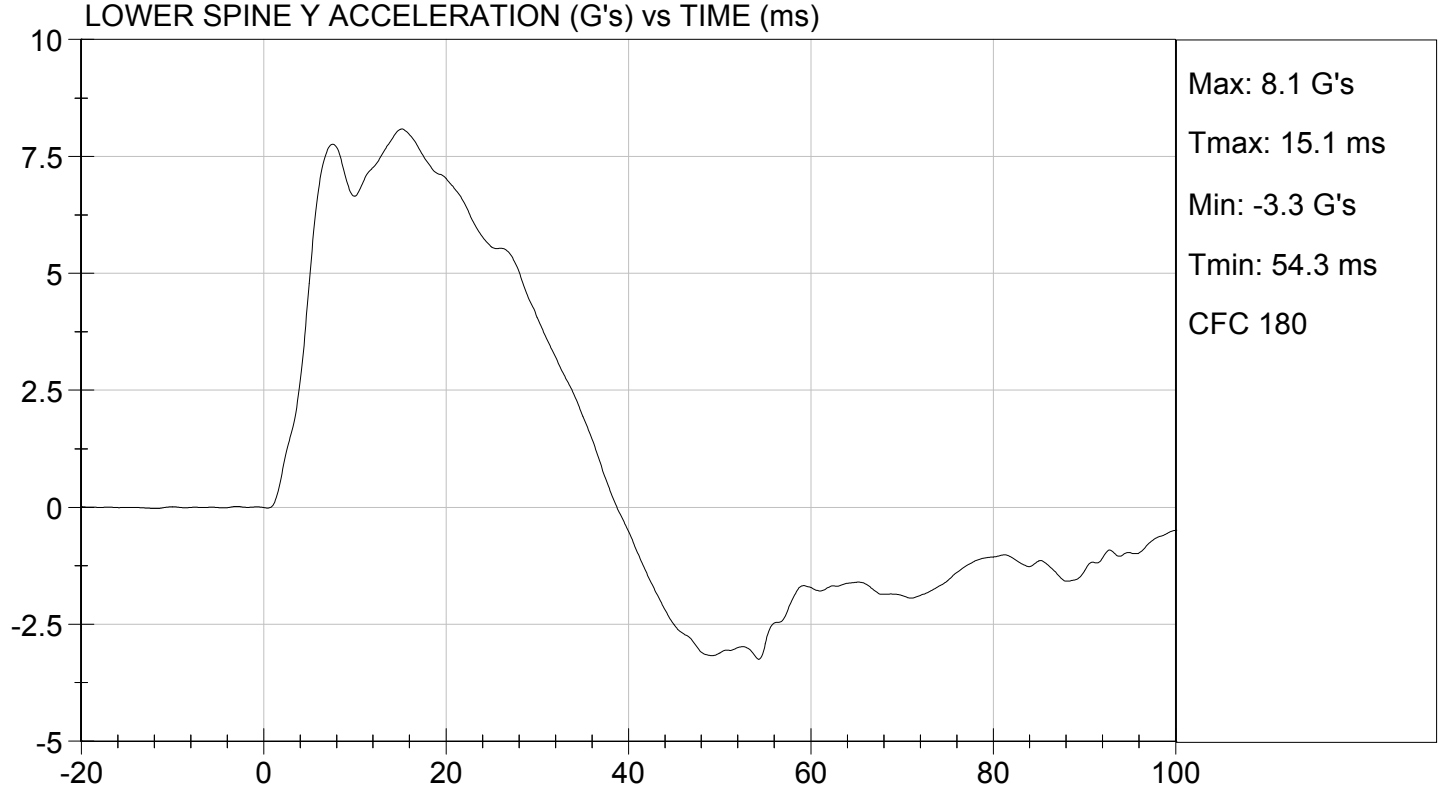
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 12/05/2012
TEST #: D124635

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:** D124636

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.9	Pass
Humidity	%	10 to 70	23	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Maximum Probe Acceleration	G's	12 to 16	13	Pass
Upper Abdomen Rib Displacement	mm	36 to 47	43	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

Jessica Hall
Laboratory Technician

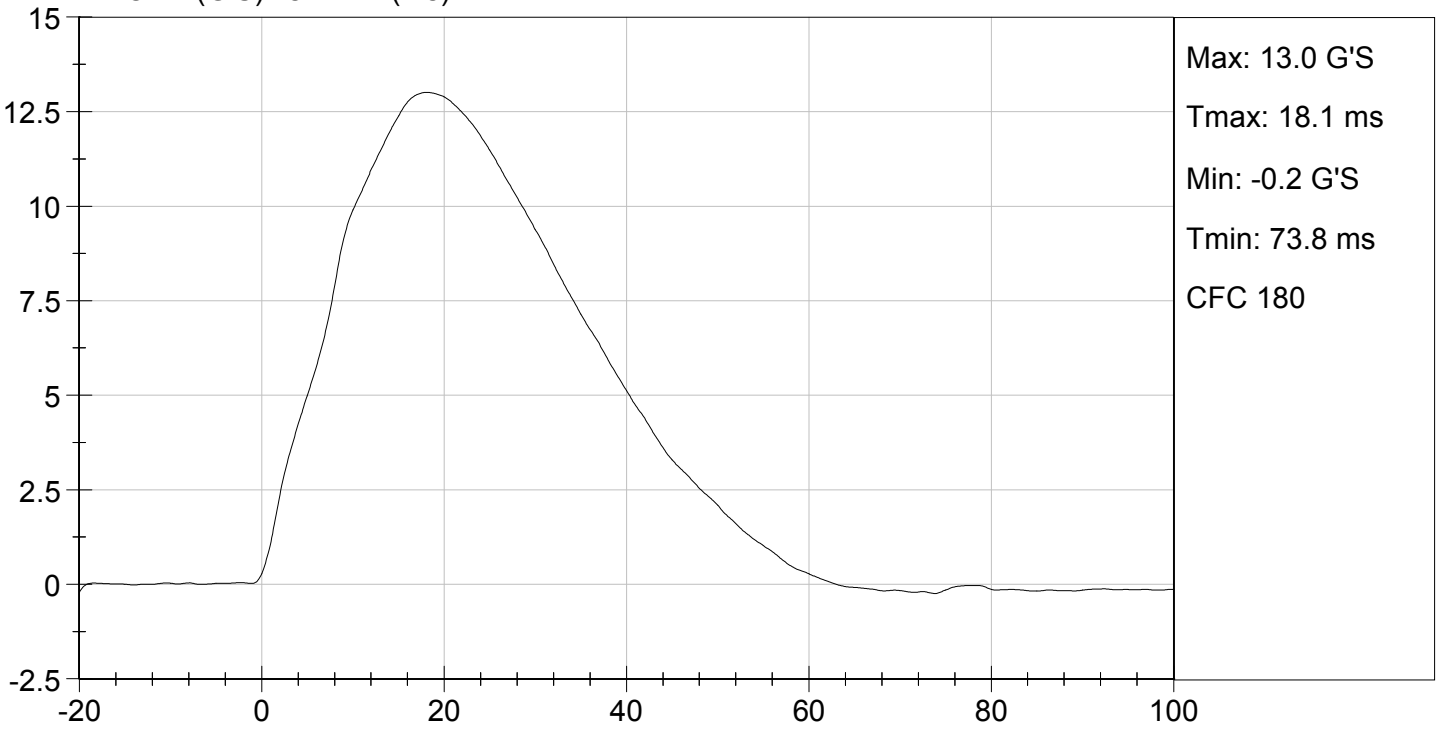
12/05/2012
Test Date

David Winkelbauer
Approved By

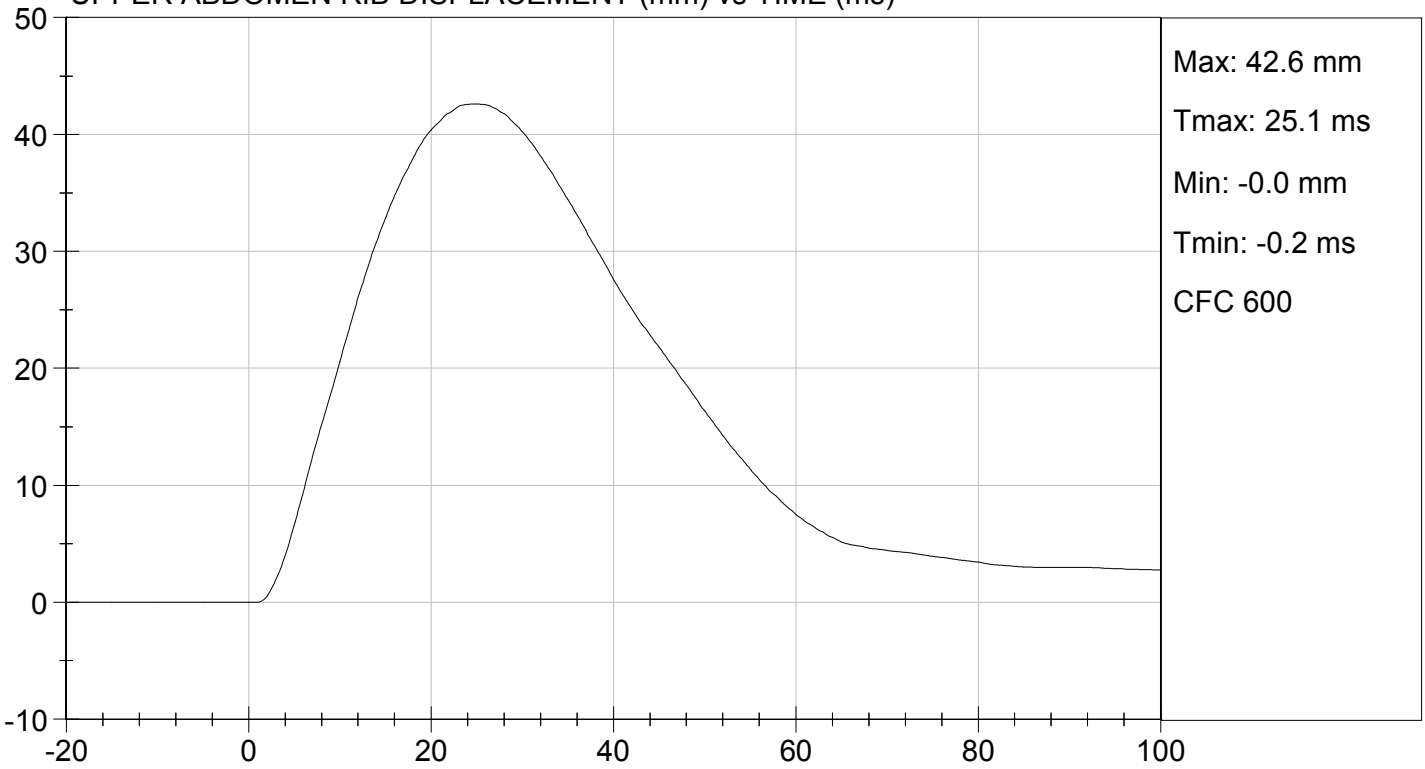
TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 12/05/2012
TEST #: D124636

PROBE (G'S) vs TIME (ms)



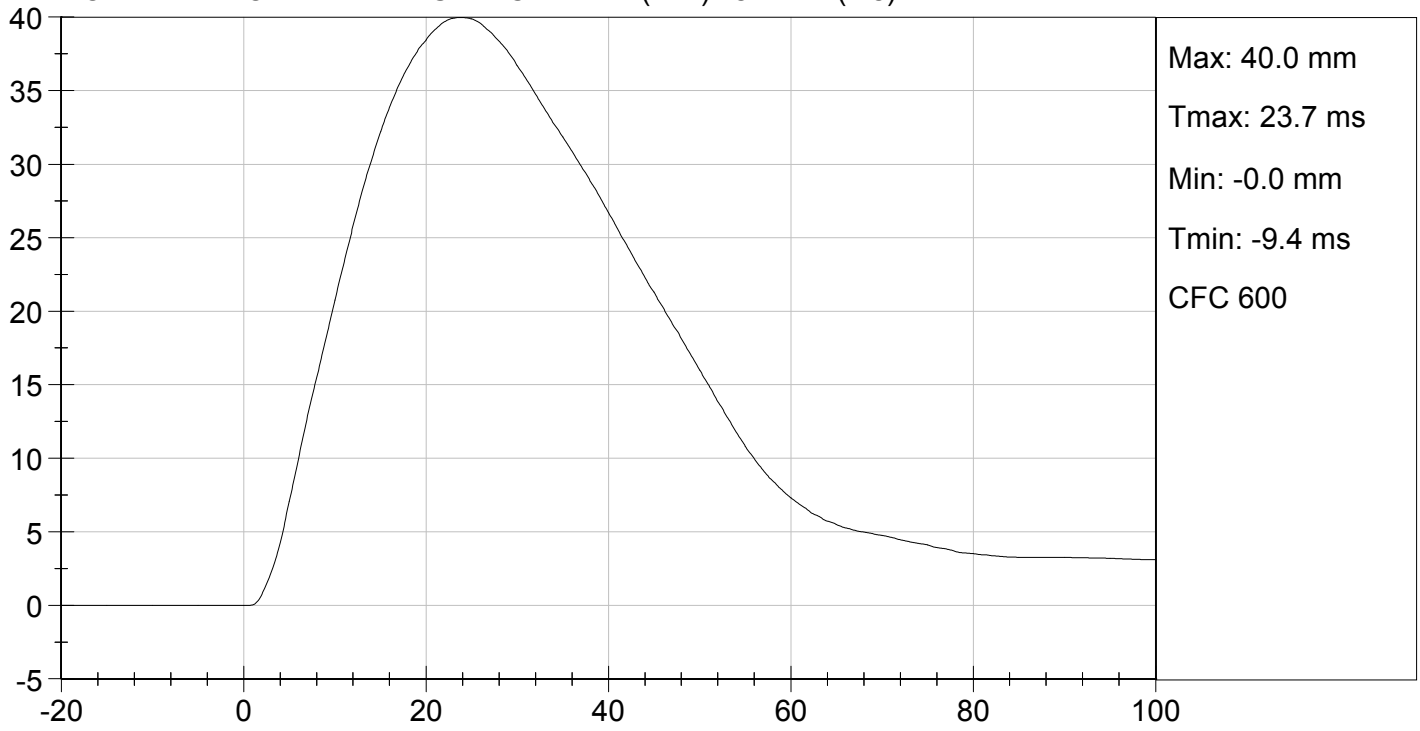
UPPER ABDOMEN RIB DISPLACEMENT (mm) vs TIME (ms)



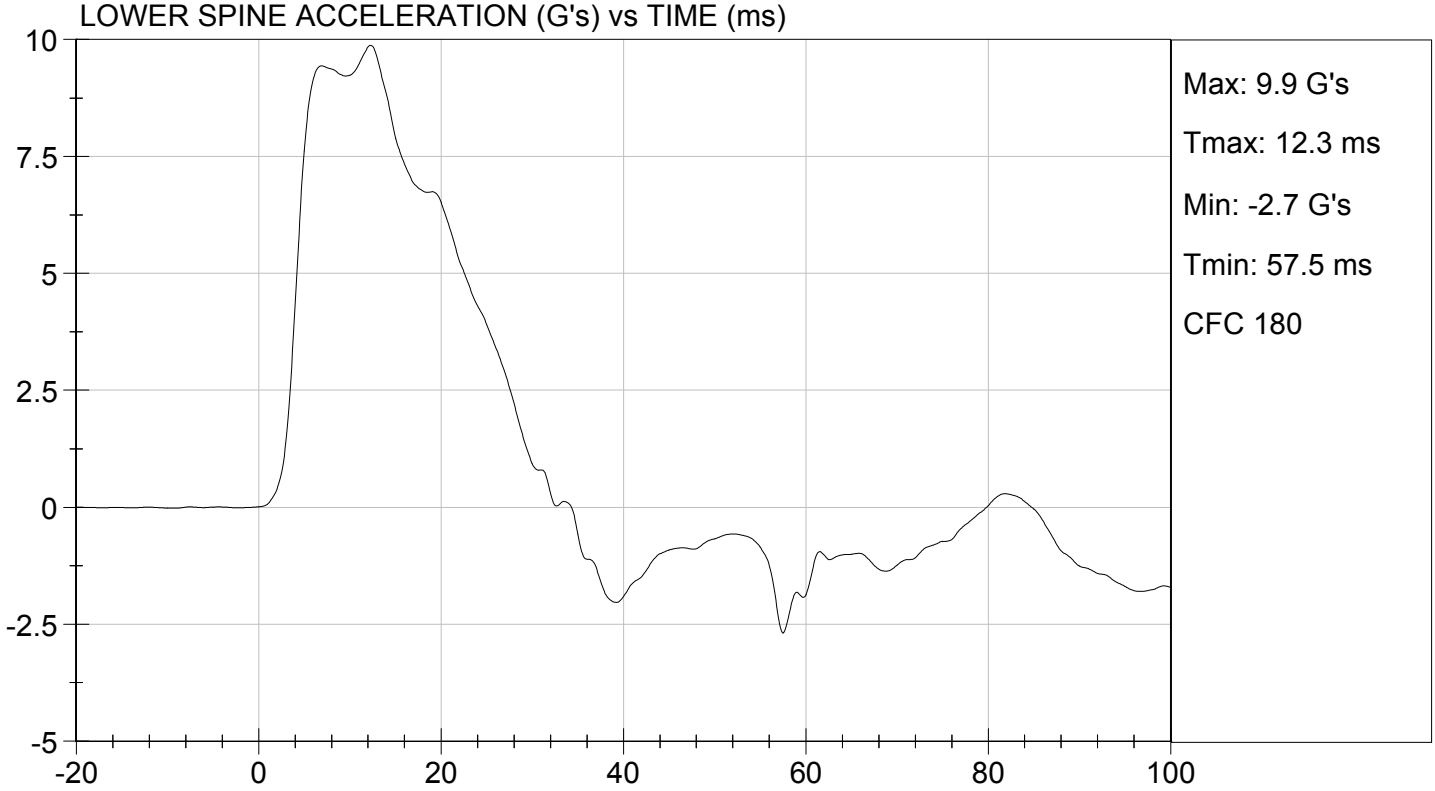
TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 12/05/2012
TEST #: D124636

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:** D124637

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.9	Pass
Humidity	%	10 to 70	23	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Maximum Probe Acceleration	G's	38 to 47	43	Pass
Pelvis Y Acceleration After 6 ms	G's	34 to 42	42	Pass
Peak Acetabulum Force	N	3600 to 4300	3,888	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

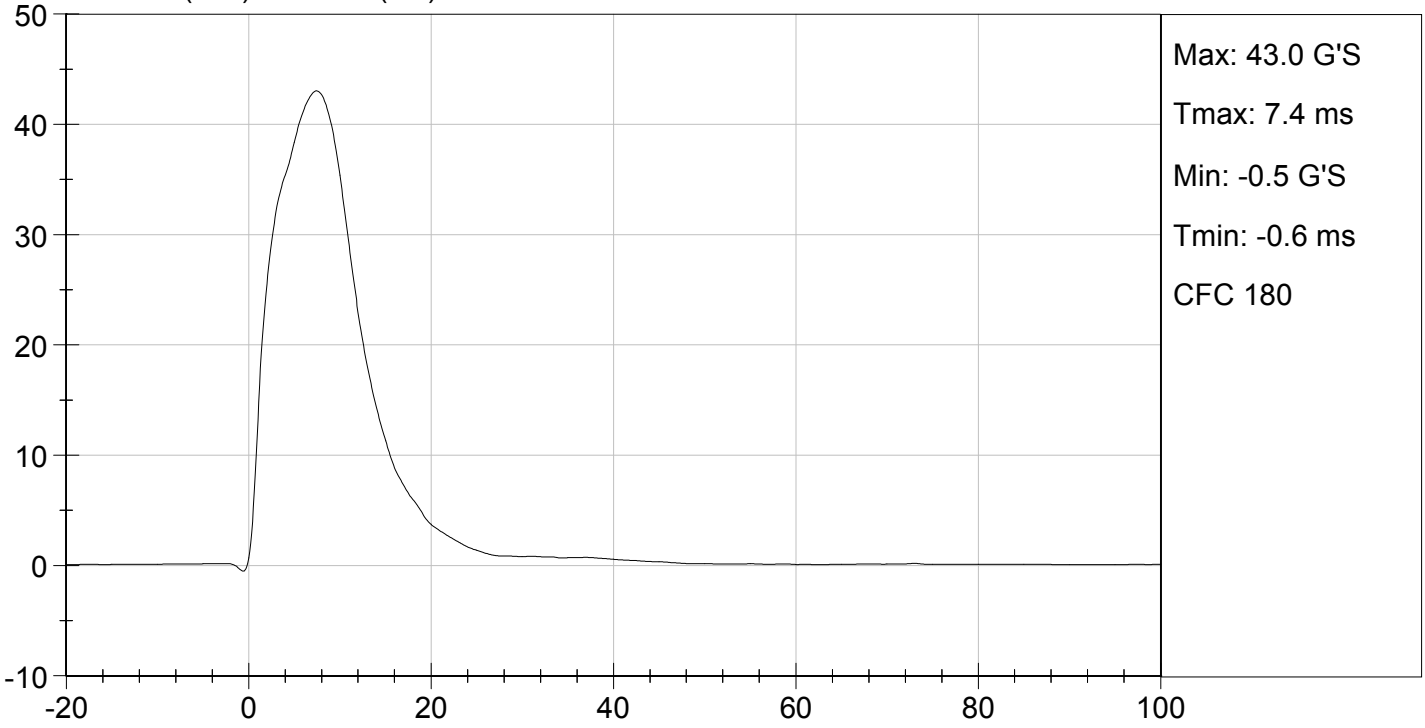
12/05/2012
Test Date

David Winkelbauer
Approved By

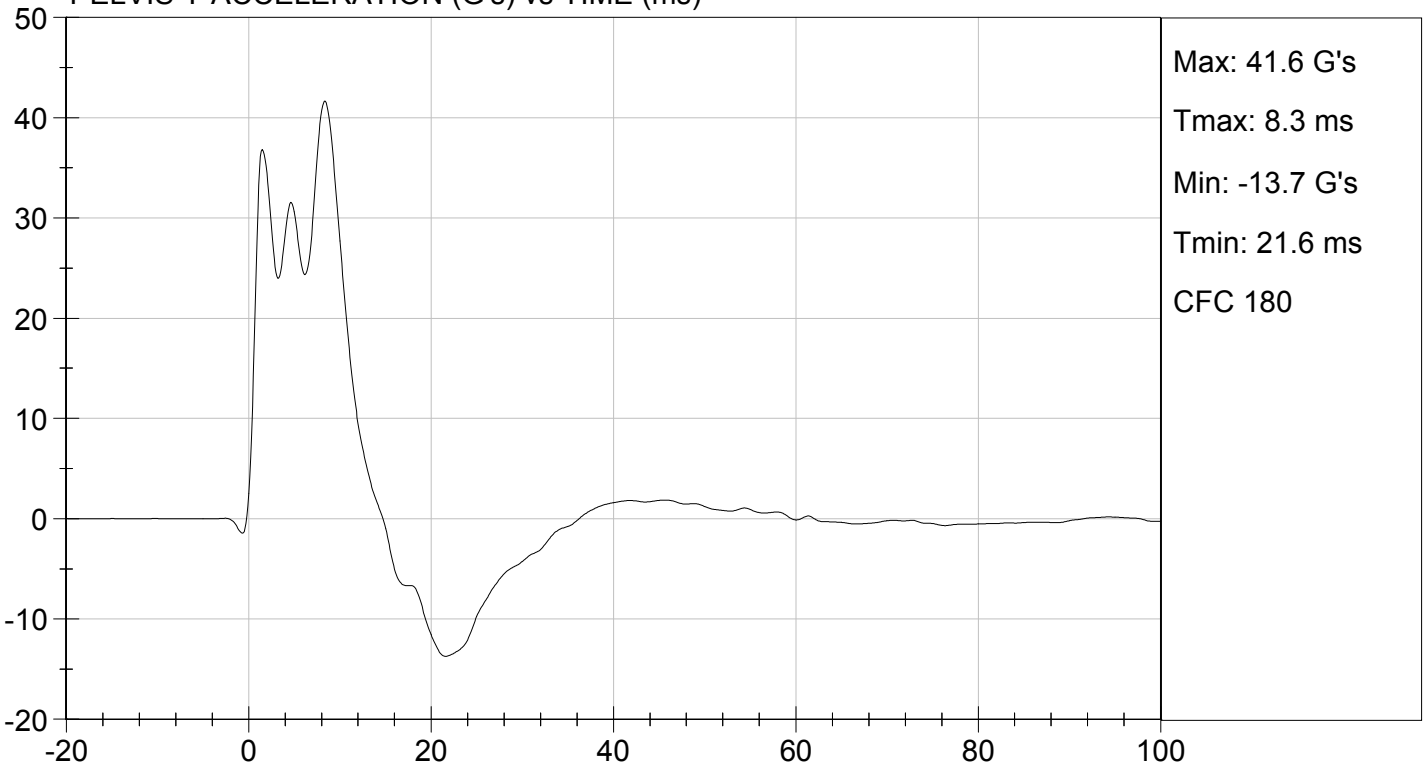
TEST DESC: PELVIS IMPACT
VELOCITY: 22.22 ft/s, 6.77 m/s

TEST DATE: 12/05/2012
TEST #: D124637

PROBE (G'S) vs TIME (ms)

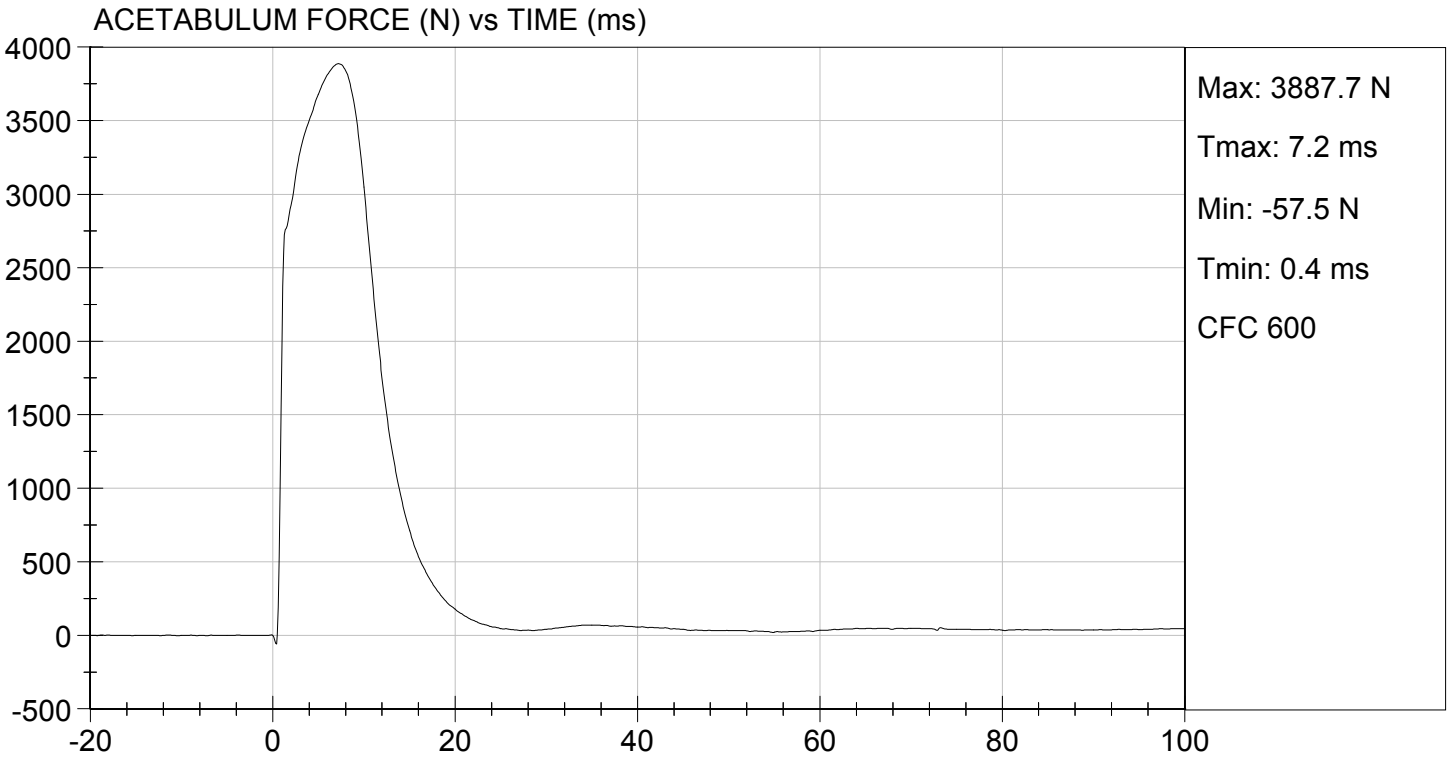


PELVIS Y ACCELERATION (G's) vs TIME (ms)



TEST DESC: PELVIS IMPACT
VELOCITY: 22.22 ft/s, 6.77 m/s

TEST DATE: 12/05/2012
TEST #: D124637



MGA RESEARCH CORPORATION

ILIAC IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test I.D:** D124638

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.9	Pass
Humidity	%	10 to 70	23	Pass
Impact Velocity	m/s	4.20 to 4.40	4.23	Pass
Maximum Probe Acceleration	G's	36 to 45	39	Pass
Pelvis Y Acceleration	G's	28 to 39	34	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4,679	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

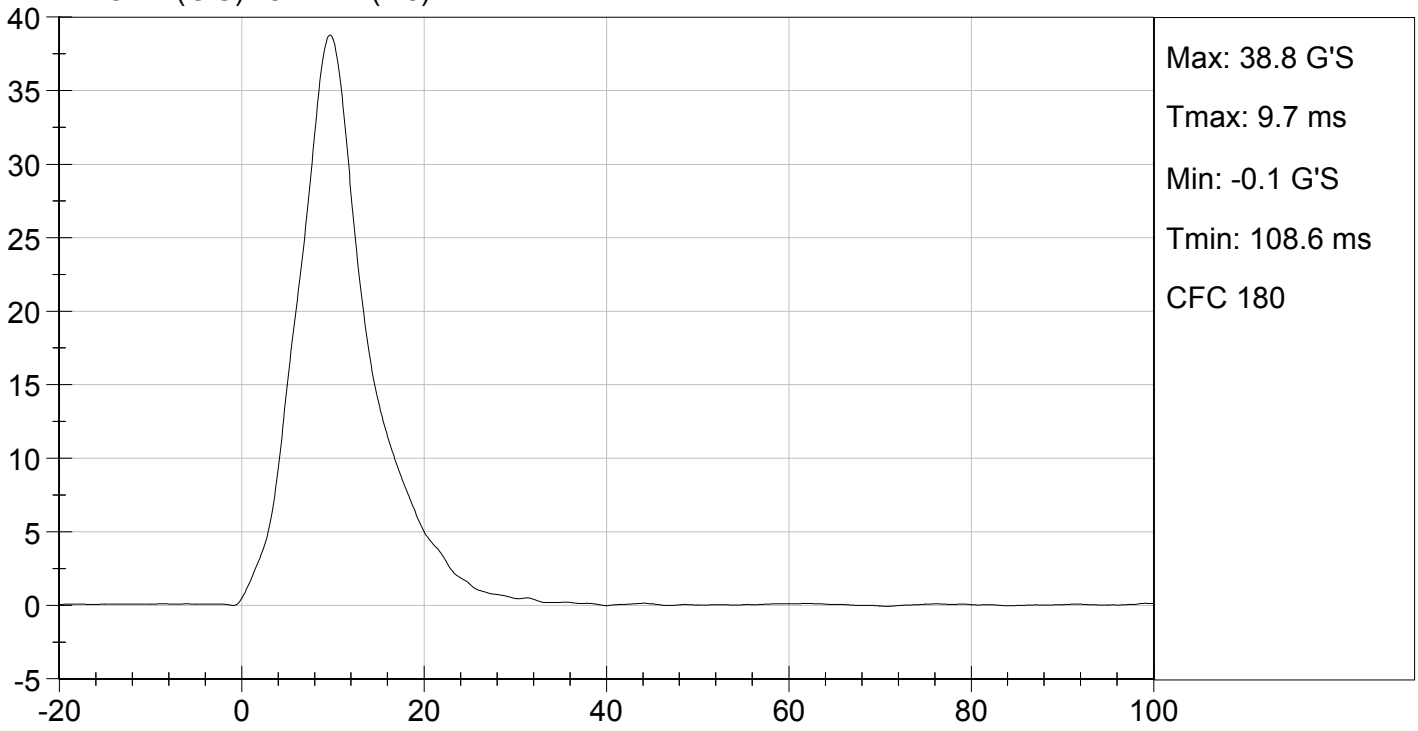
12/05/2012
Test Date

David Winkelbauer
Approved By

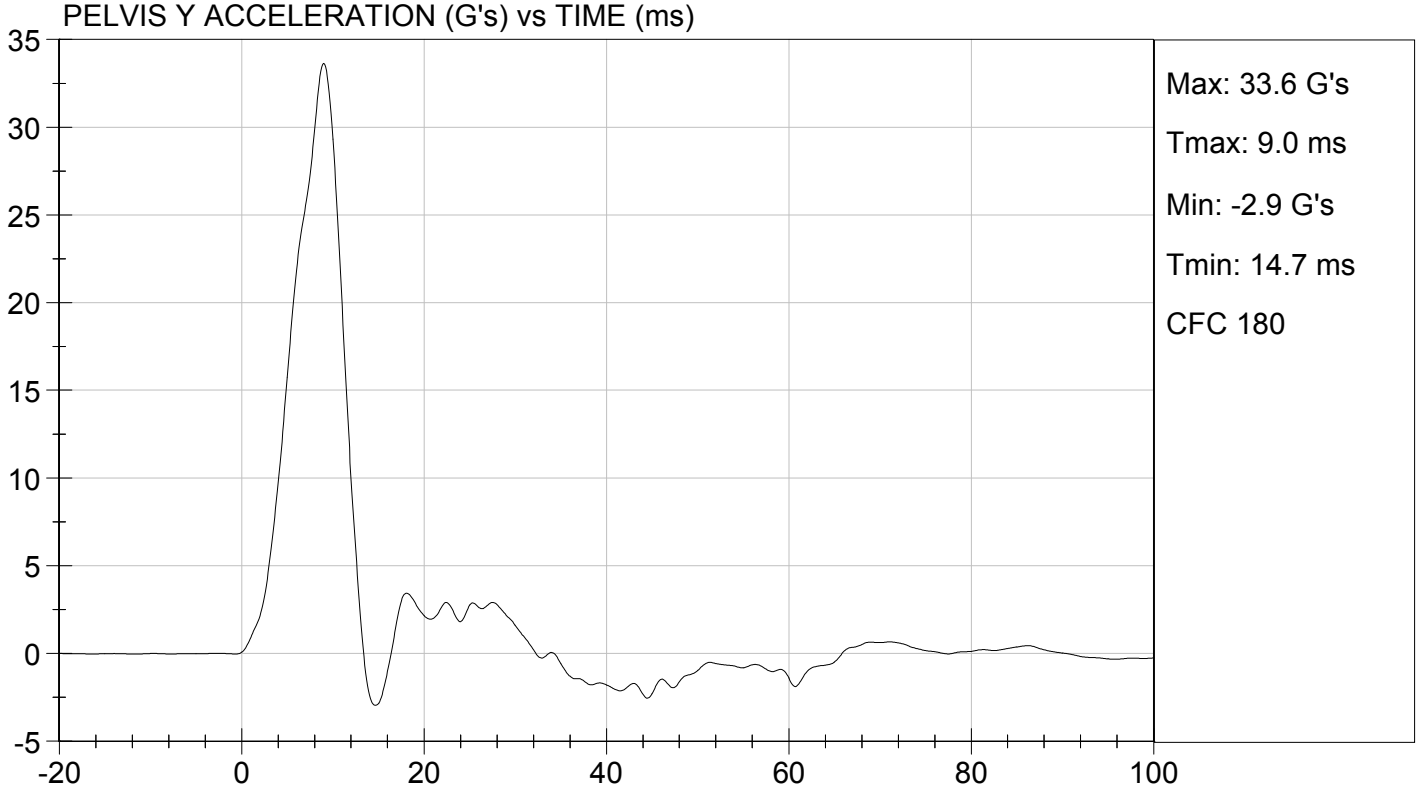
TEST DESC: ILLIAC
VELOCITY: 13.89 ft/s, 4.23 m/s

TEST DATE: 12/05/2012
TEST #: D124638

PROBE (G'S) vs TIME (ms)

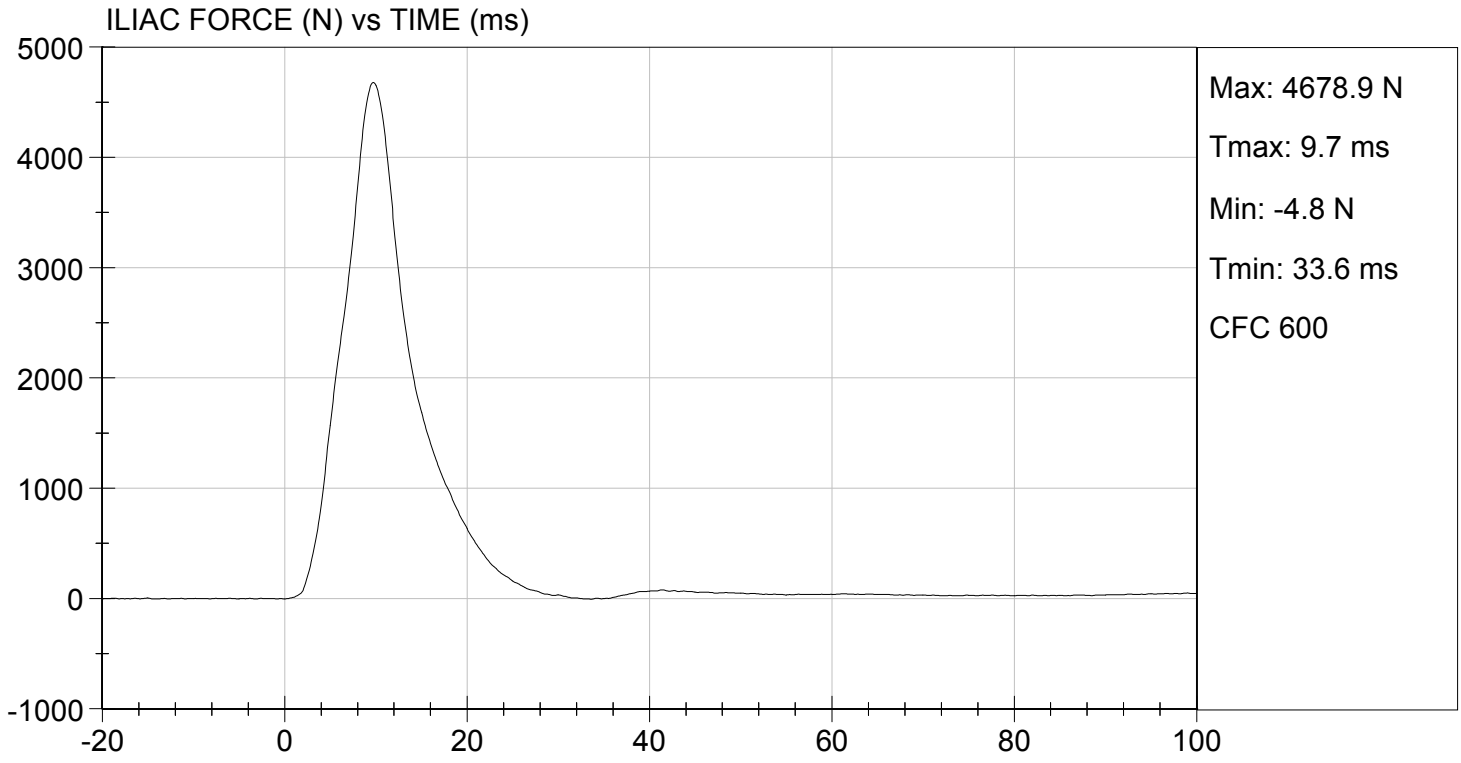


PELVIS Y ACCELERATION (G's) vs TIME (ms)



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

TEST DATE: 12/05/2012
TEST #: D124638



MGA RESEARCH CORPORATION

HEAD DROP TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test ID:** D124701

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	23	Pass
Peak Resultant Acceleration	G's	115 to 137	129	Pass
Peak Longitudinal Acceleration	G's	+/- 15	7.0	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	<15%	Yes	Pass
		Overall Test Results		Pass

Jessica Gall
Laboratory Technician

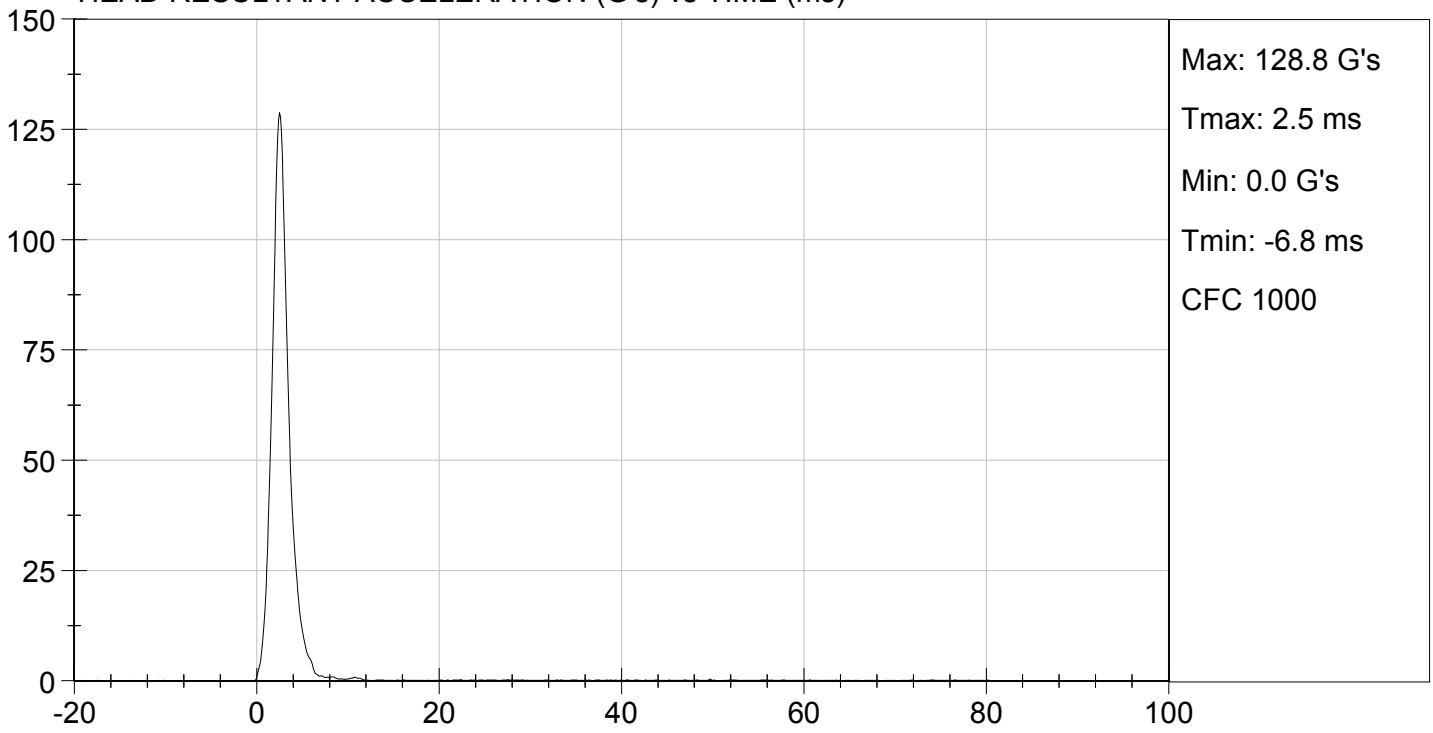
12/12/2012
Test Date

David Winkelbauer
Approved By

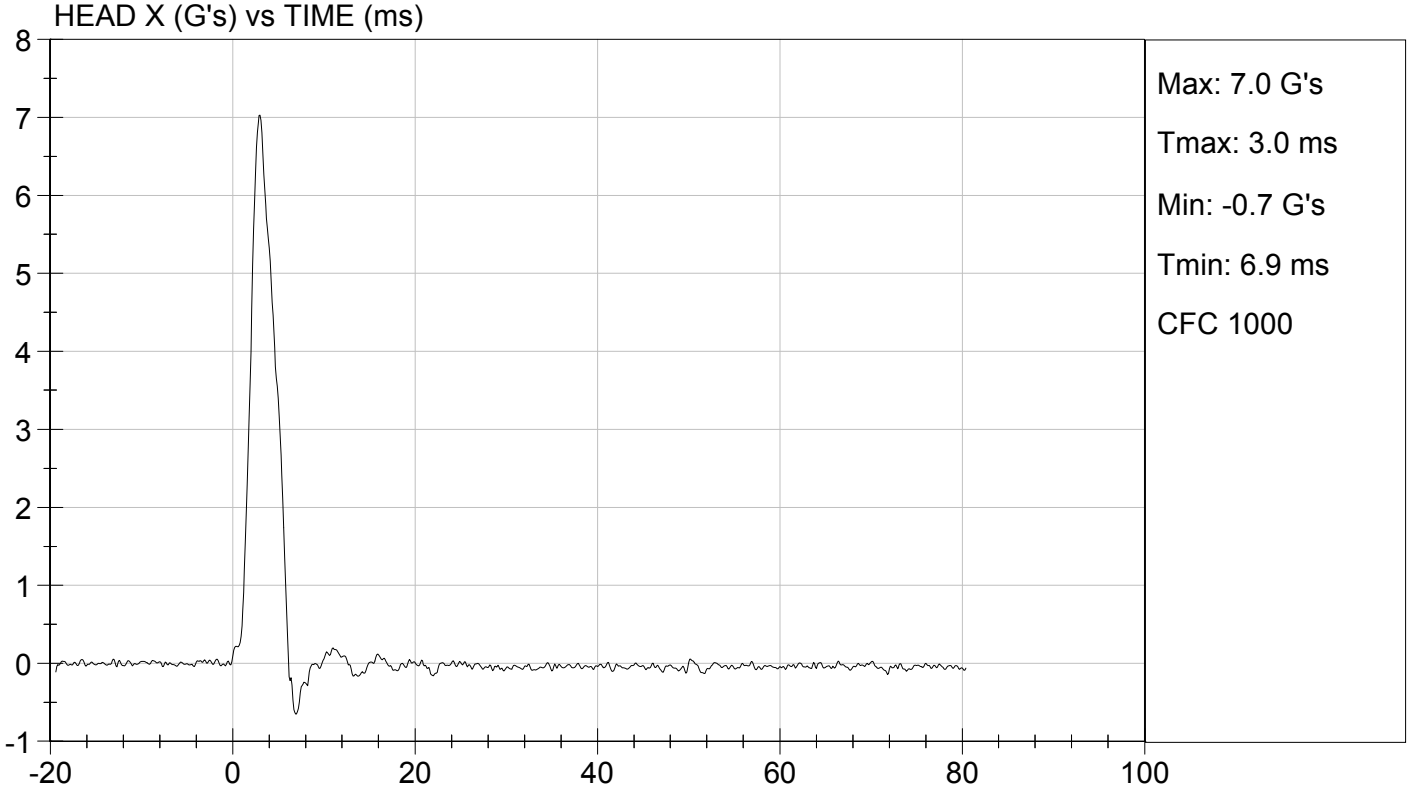
TEST DESC: HEAD DROP

TEST DATE: 12/12/2012
TEST #: D124701

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



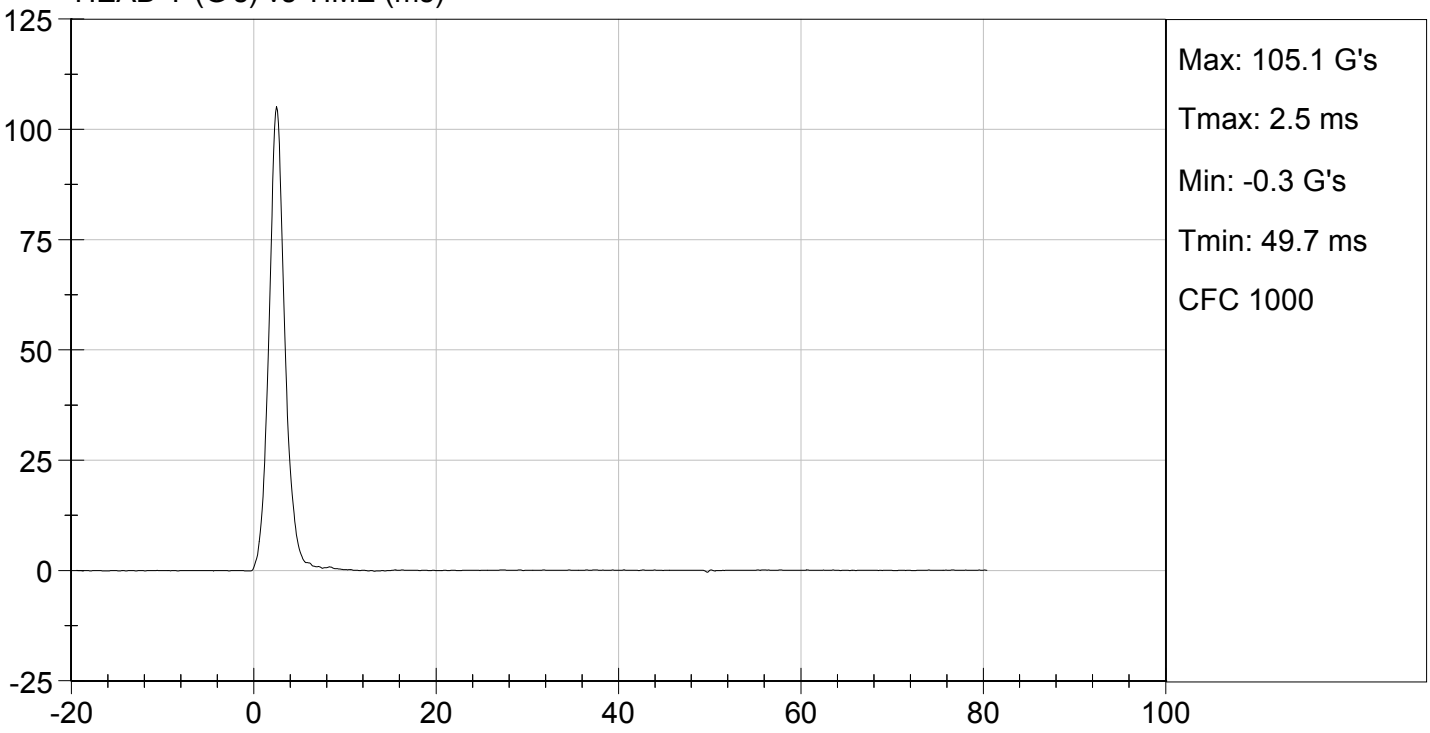
HEAD X (G's) vs TIME (ms)



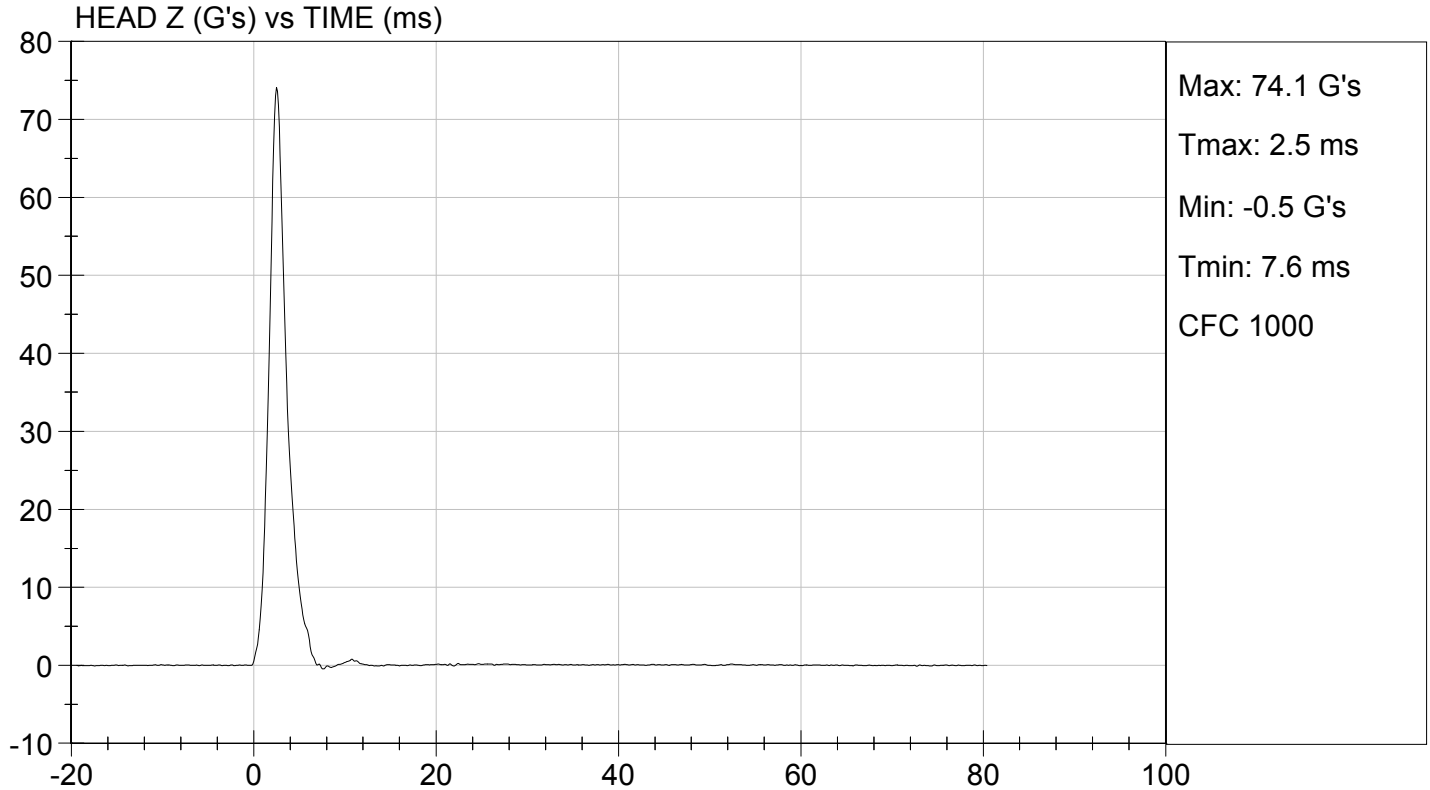
TEST DESC: HEAD DROP

TEST DATE: 12/12/2012
TEST #: D124701

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



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



MGA RESEARCH CORPORATION

LATERAL NECK PENDULUM TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test I.D:** D124702

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.6	Pass
Humidity		%	10 to 70	23	Pass
Impact Velocity		m/s	5.51 to 5.63	5.58	Pass
Pendulum Velocity	10 ms	m/s	2.20 to 2.80	2.60	Pass
	15 ms	m/s	3.30 to 4.10	3.69	Pass
	20 ms	m/s	4.40 to 5.40	4.84	Pass
	25 ms	m/s	5.40 to 6.10	5.46	Pass
	25-100 ms	m/s	5.50 to 6.20	5.56	Pass
Maximum D-Plane Rotation		deg	71 to 81	73	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	61	Pass
Maximum Occipital Condyle Moment		Nm	-44 to -36	-41	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	118	Pass
			Overall Test Results		Pass

Jessica Hall
Laboratory Technician

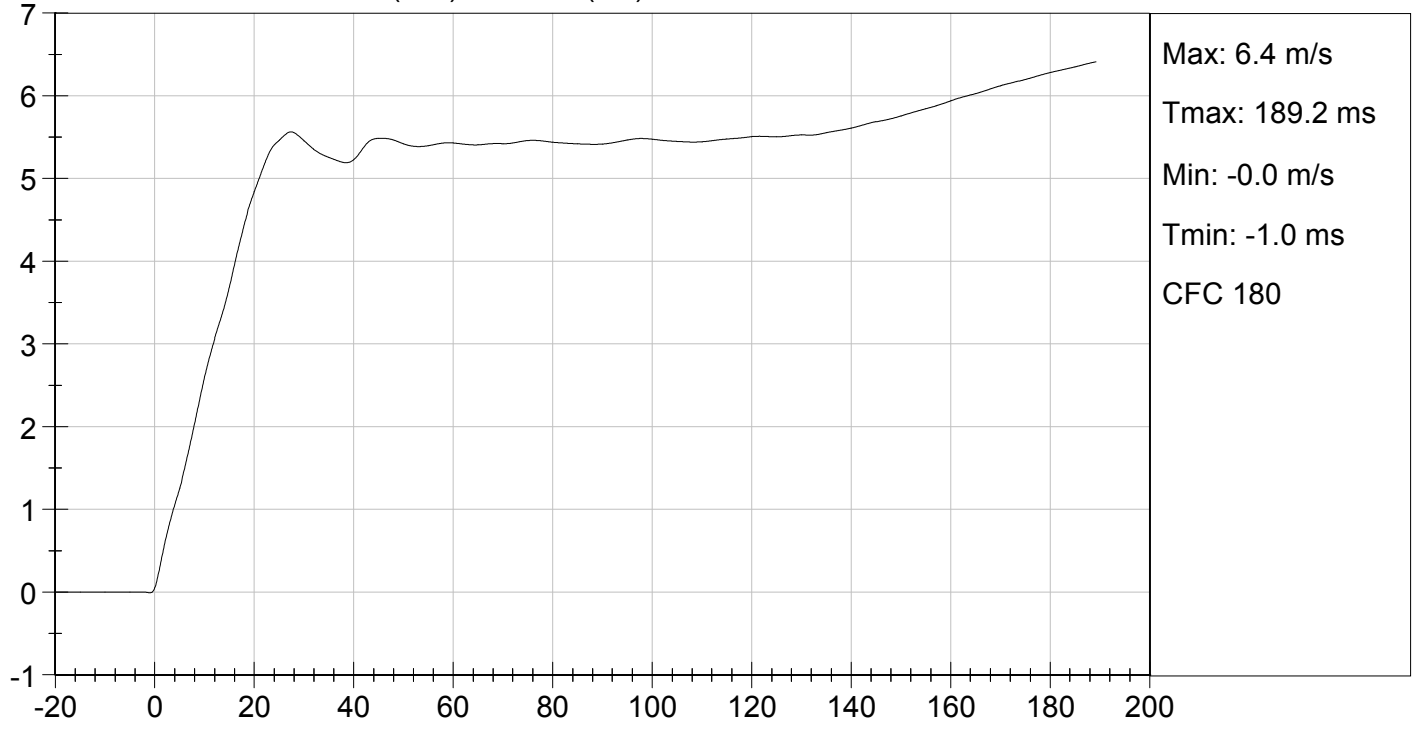
12/12/2012
Test Date

David Winkelbauer
Approved By

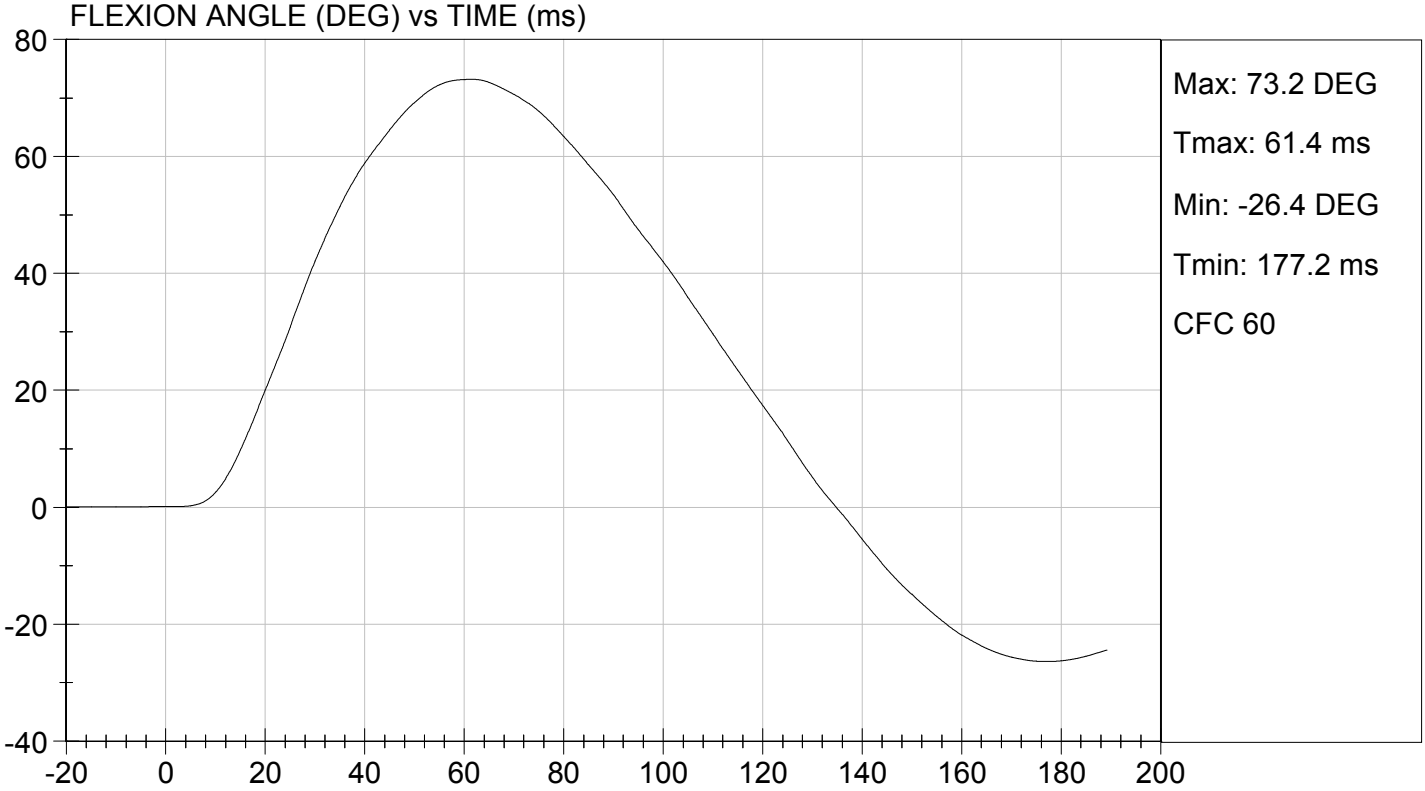
TEST DESC: NECK BENDING
VELOCITY: 18.32 ft/s, 5.58 m/s

TEST DATE: 12/12/2012
TEST #: D124702

PENDULUM VELOCITY (m/s) vs TIME (ms)

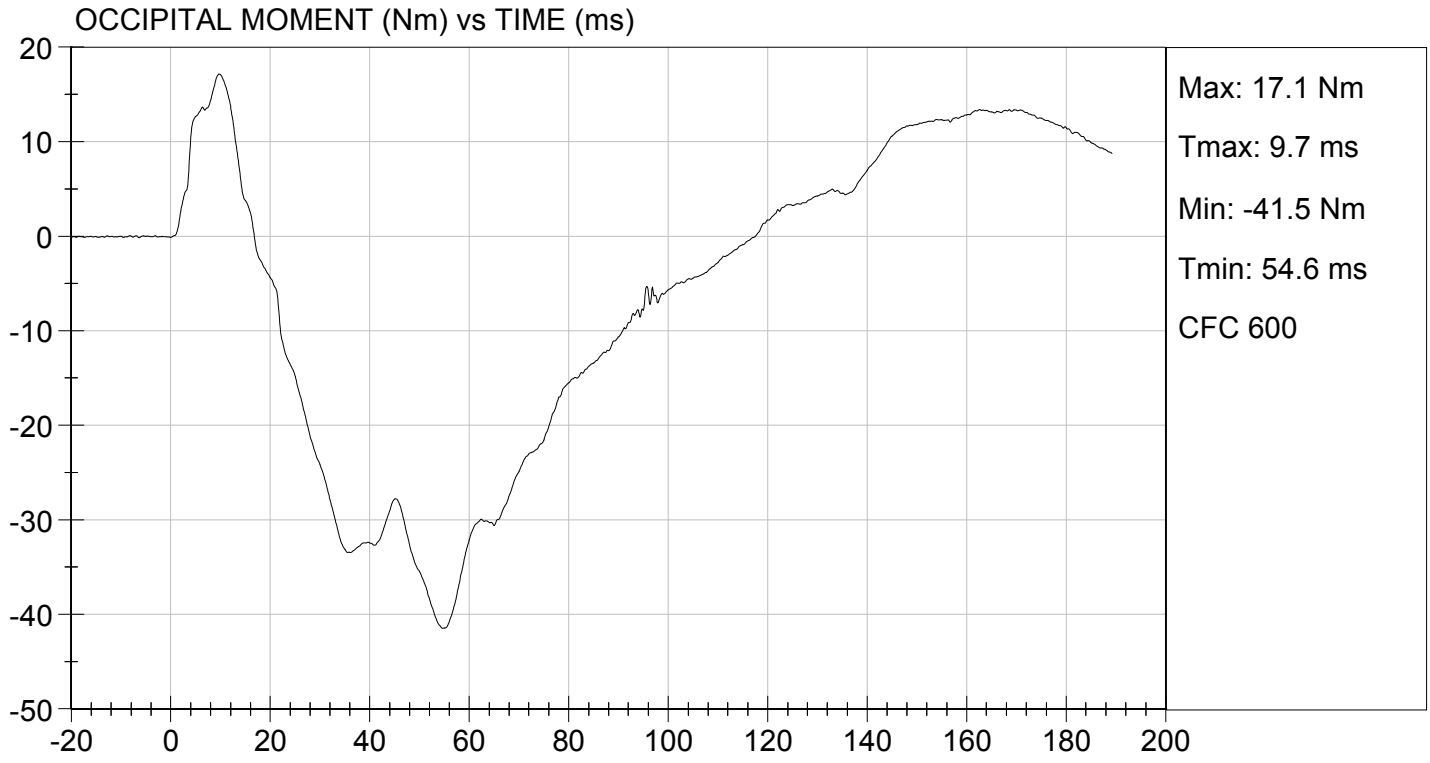


FLEXION ANGLE (DEG) vs TIME (ms)



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

TEST DATE: 12/12/2012
TEST #: D124702



MGA RESEARCH CORPORATION

SHOULDER IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test ID:** D124703

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	22	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	32	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	18	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

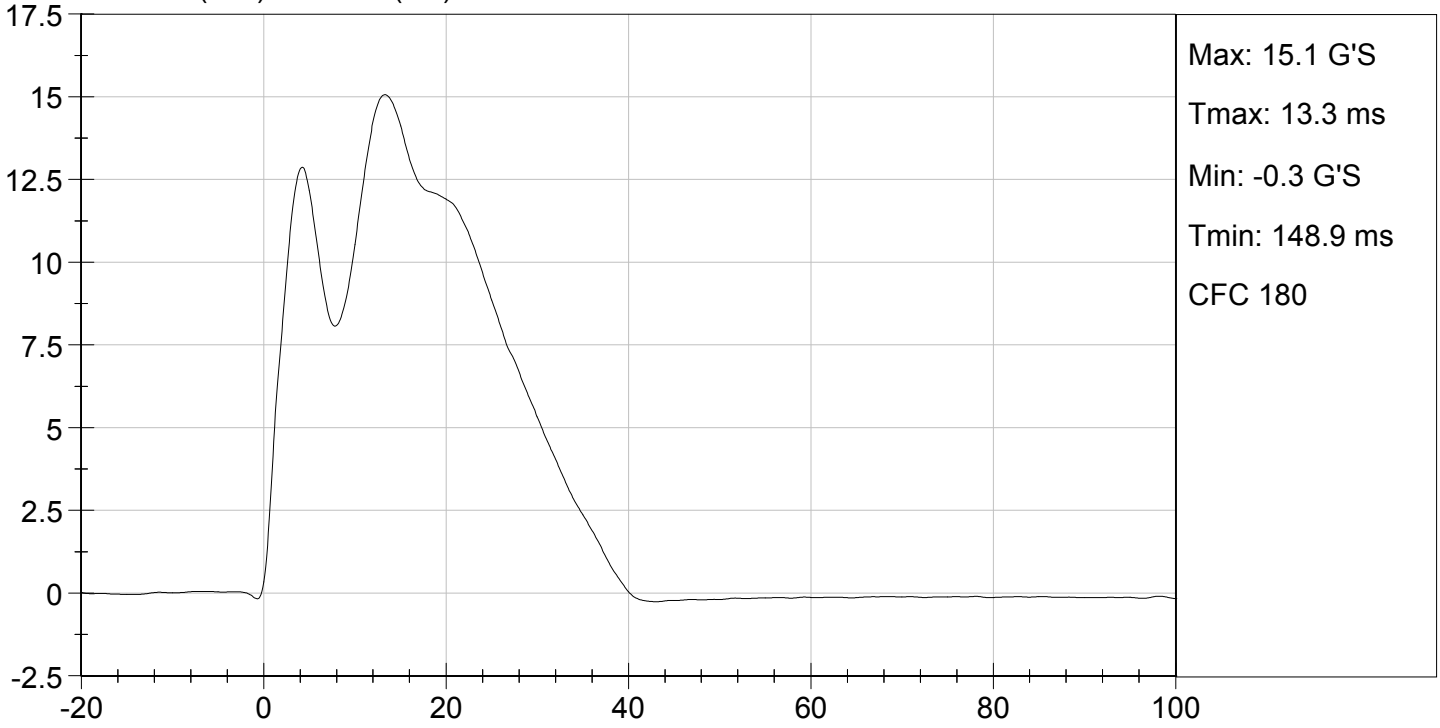
12/11/2012
Test Date

David Winkelbauer
Approved By

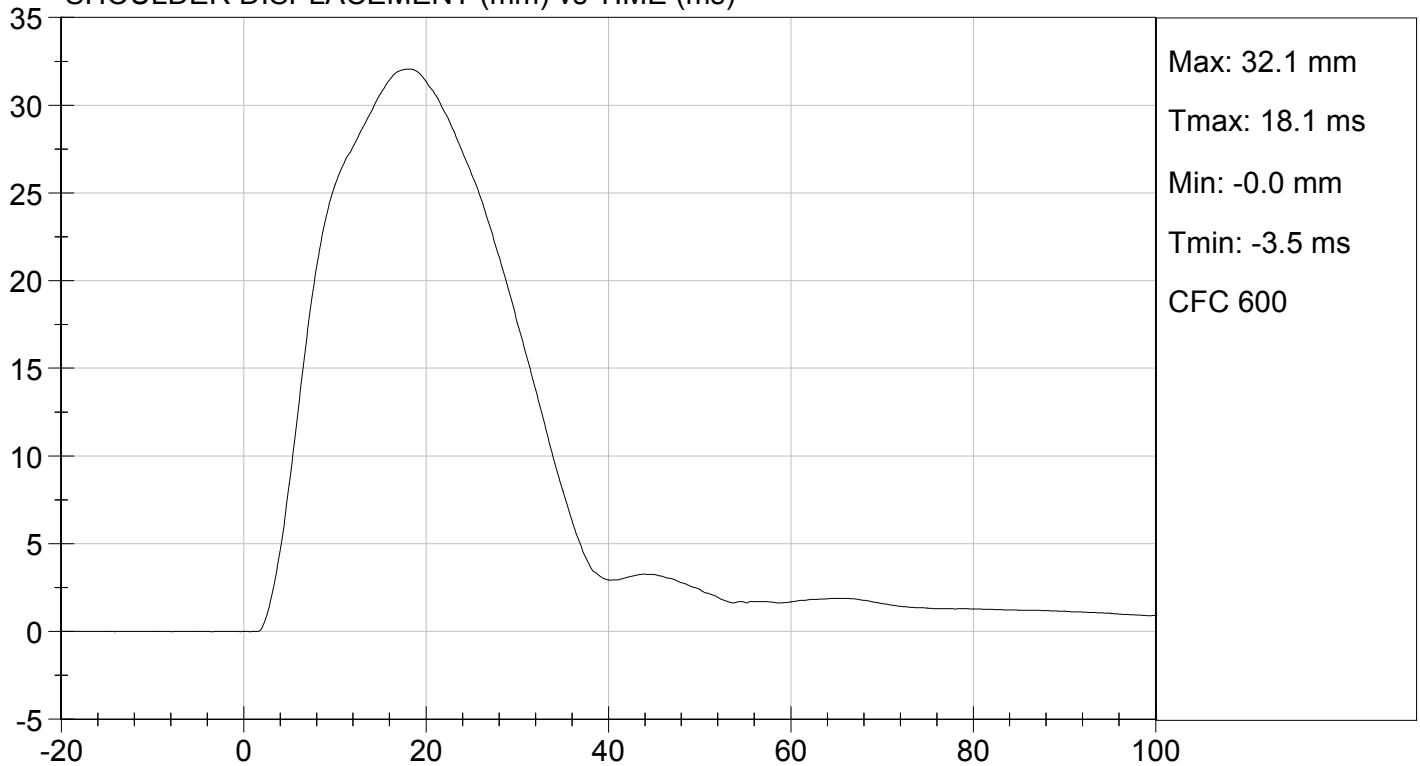
TEST DESC: SHOULDER IMPACT
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 12/11/2012
TEST #: D124703

PROBE (G'S) vs TIME (ms)

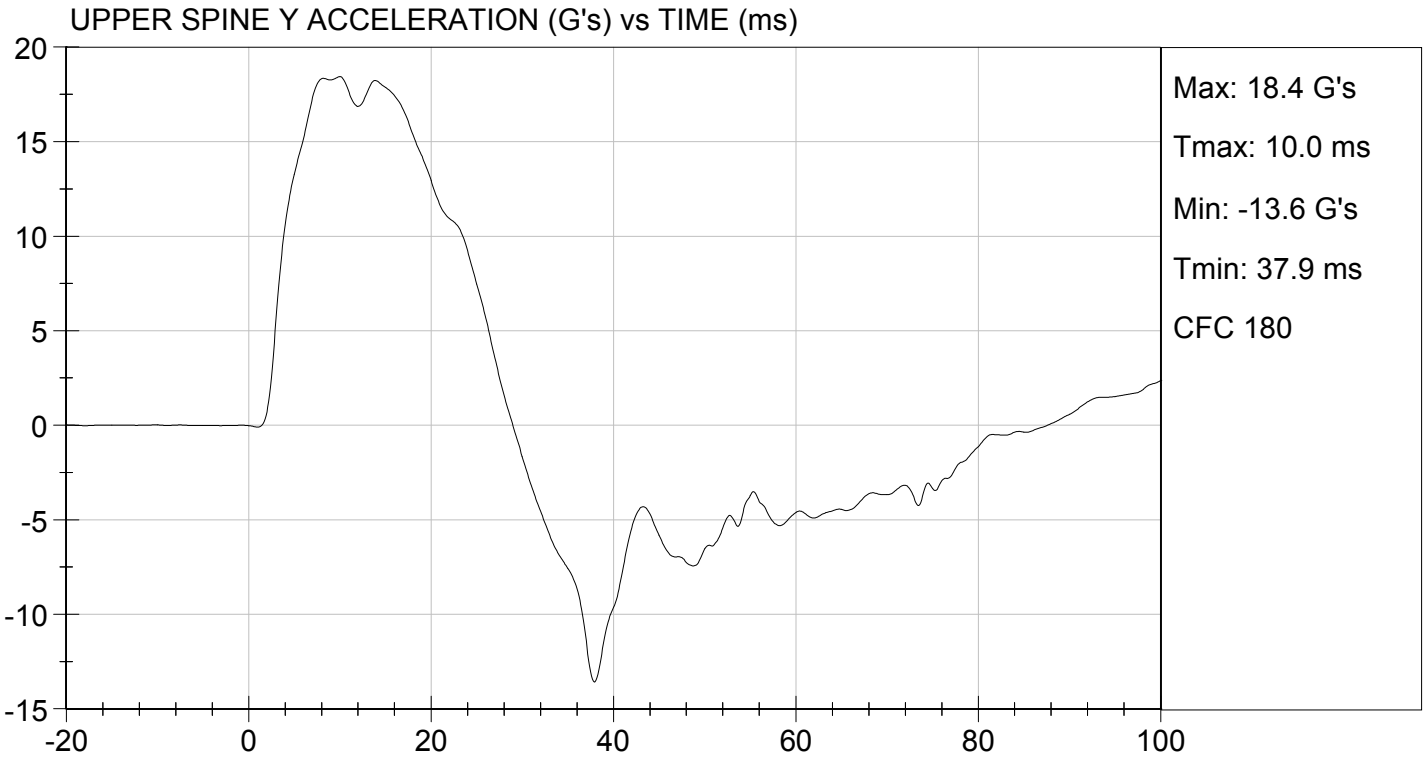


SHOULDER DISPLACEMENT (mm) vs TIME (ms)



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

TEST DATE: 12/11/2012
TEST #: D124703



MGA RESEARCH CORPORATION

THORAX (WITH ARM) IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test I.D:** D124704

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	22	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	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	36	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	29	Pass
		Overall Test Results		Pass

Jessica Gall
Laboratory Technician

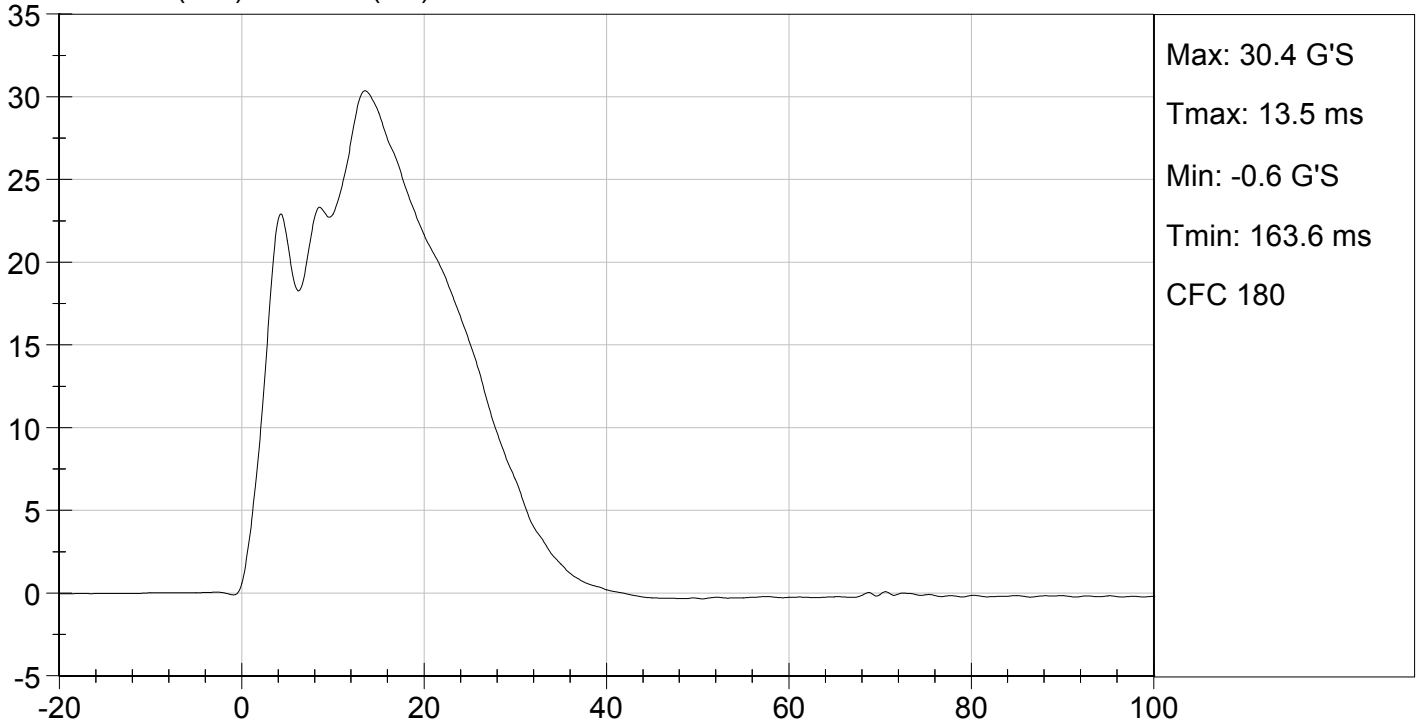
12/11/2012
Test Date

David Winkelbauer
Approved By

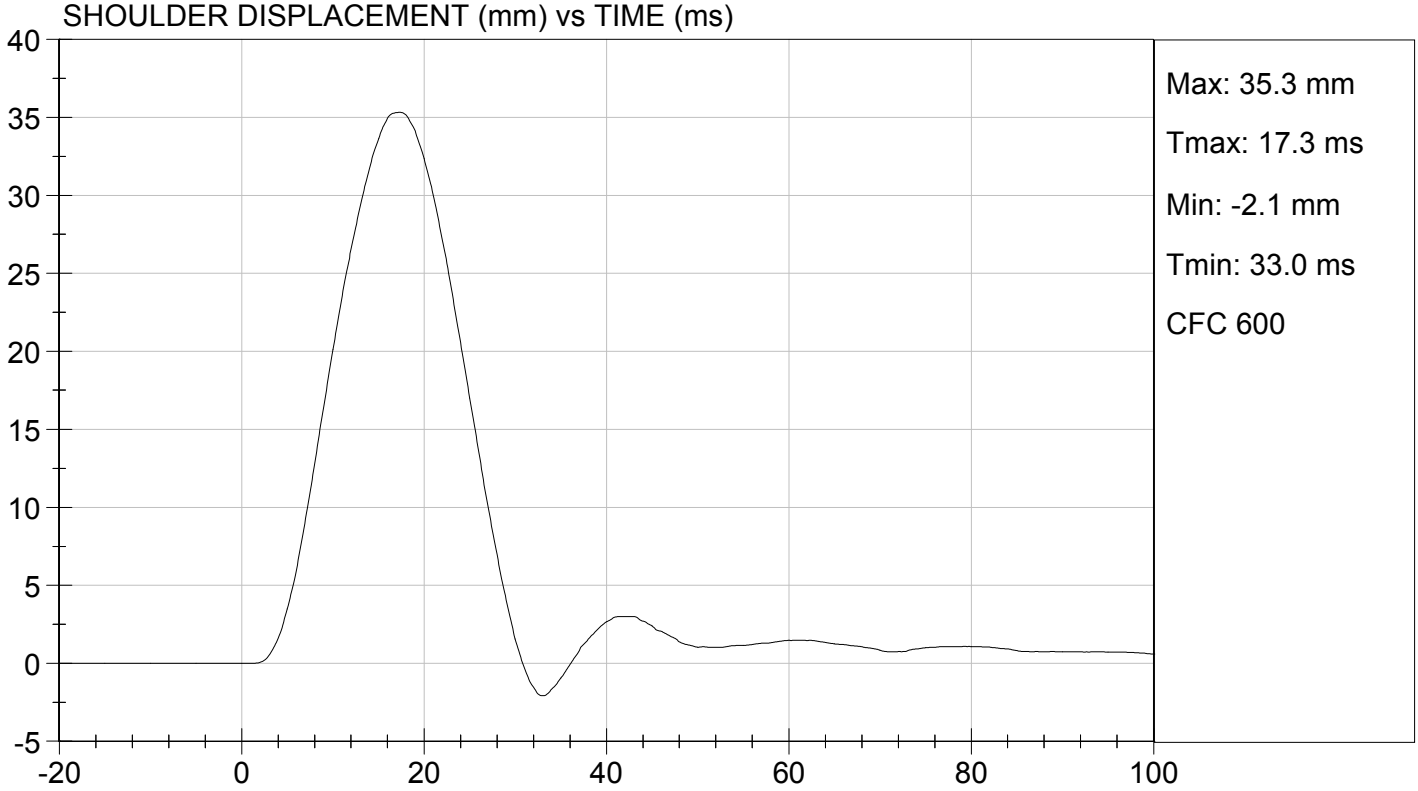
TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

TEST DATE: 12/11/2012
TEST #: D124704

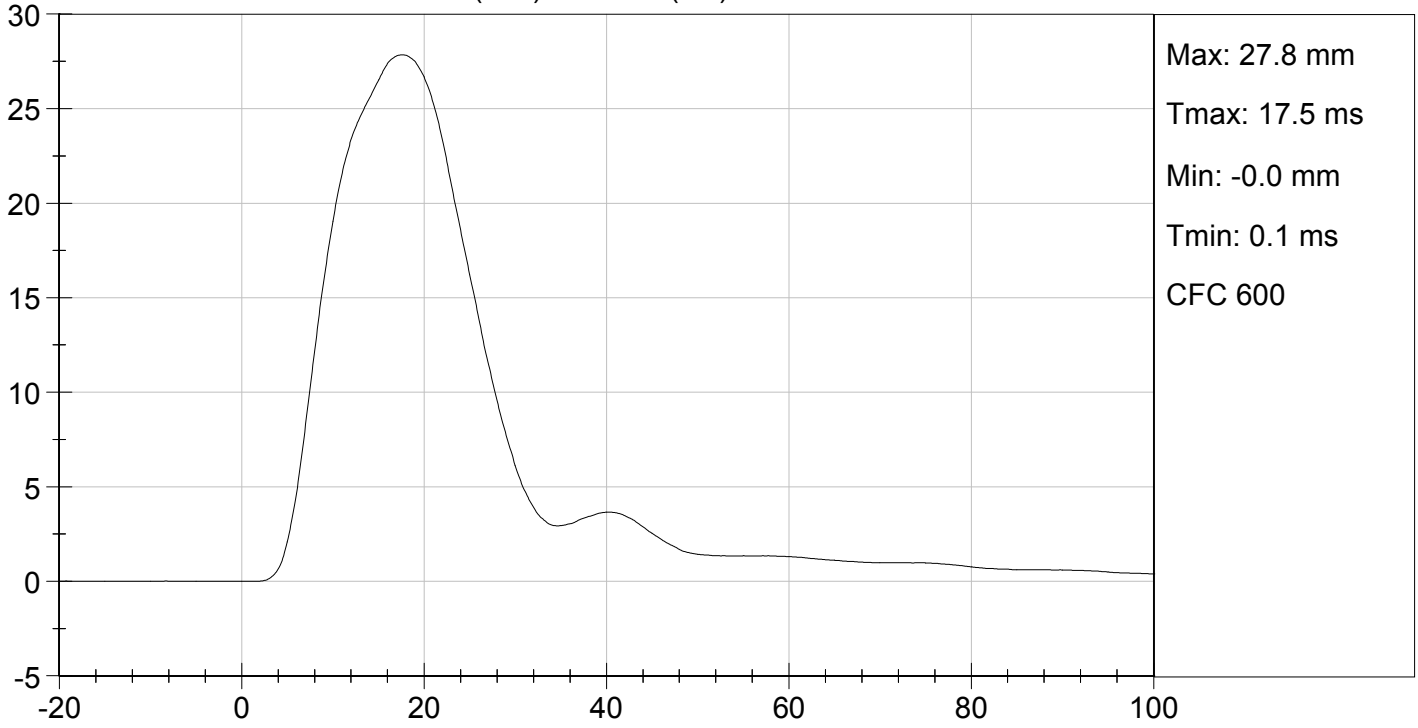
PROBE (G'S) vs TIME (ms)



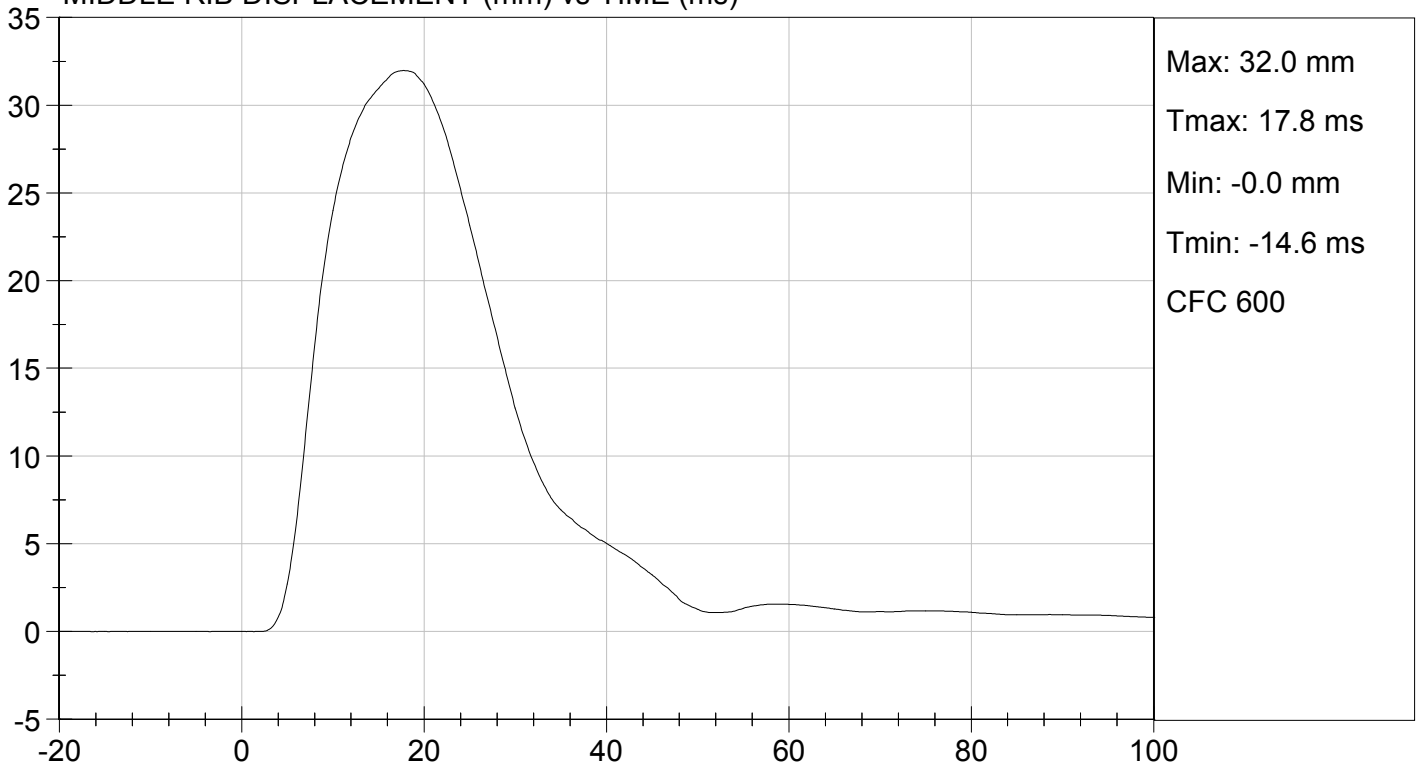
SHOULDER DISPLACEMENT (mm) vs TIME (ms)



UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



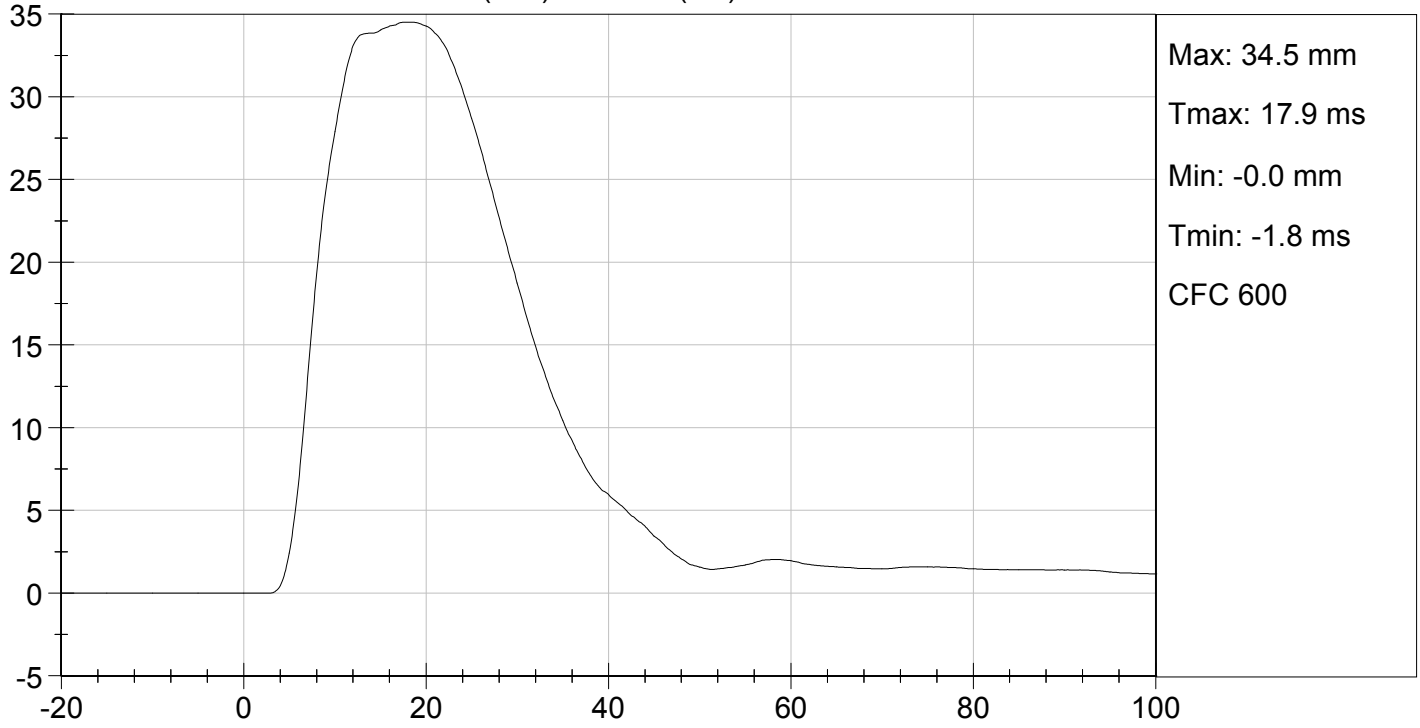
MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



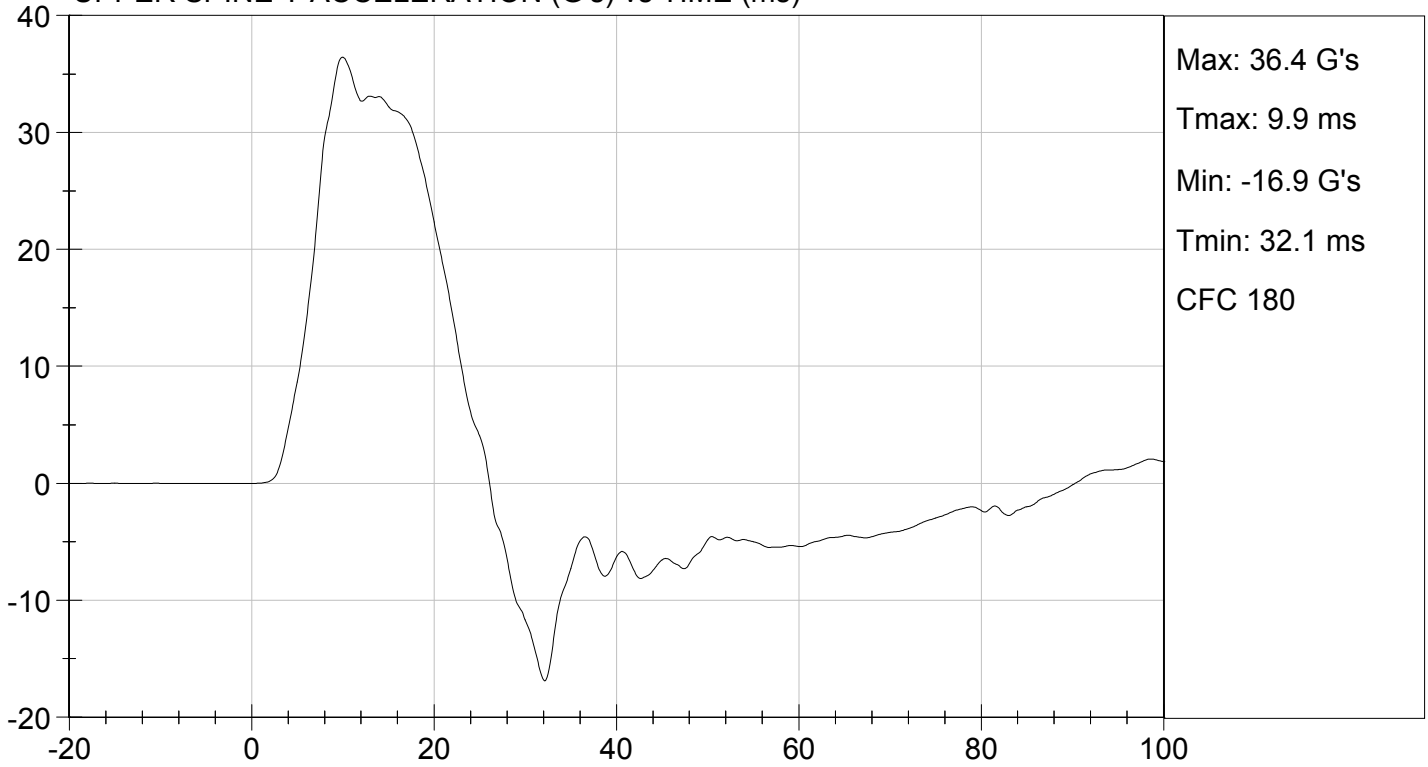
TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

TEST DATE: 12/11/2012
TEST #: D124704

LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



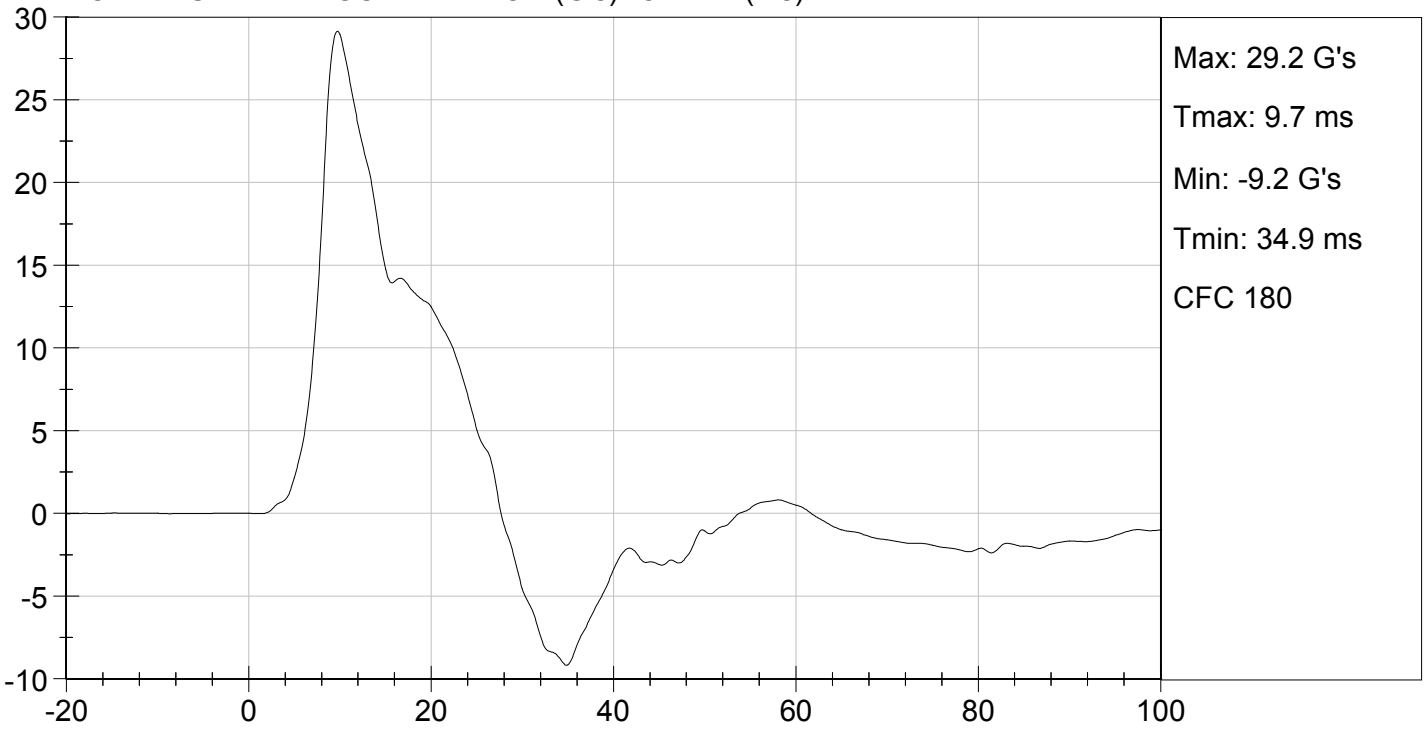
UPPER SPINE Y ACCELERATION (G's) vs TIME (ms)



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

TEST DATE: 12/11/2012
TEST #: D124704

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



MGA RESEARCH CORPORATION

THORAX (WITHOUT ARM) IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test I.D:** D124705

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	22	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	33	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	14	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	10	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

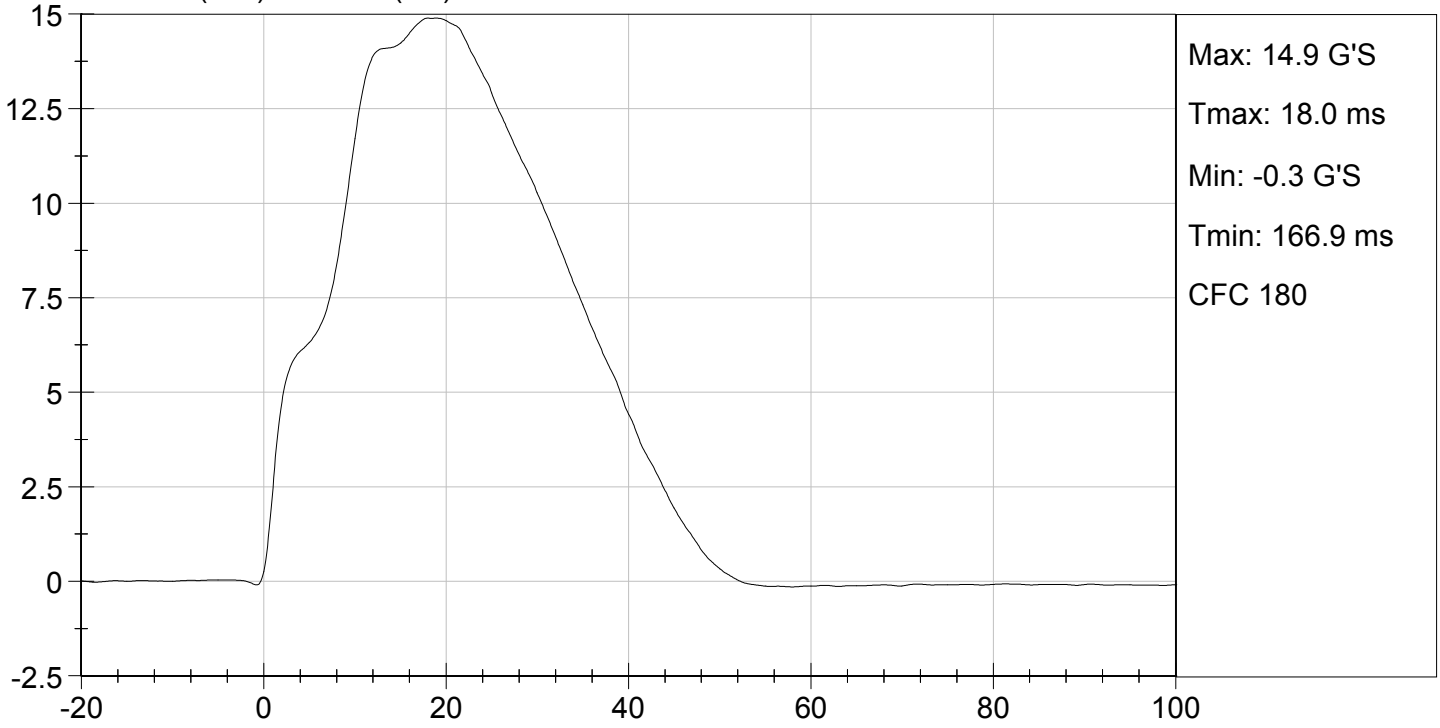
12/11/2012
Test Date

David Winkelbauer
Approved By

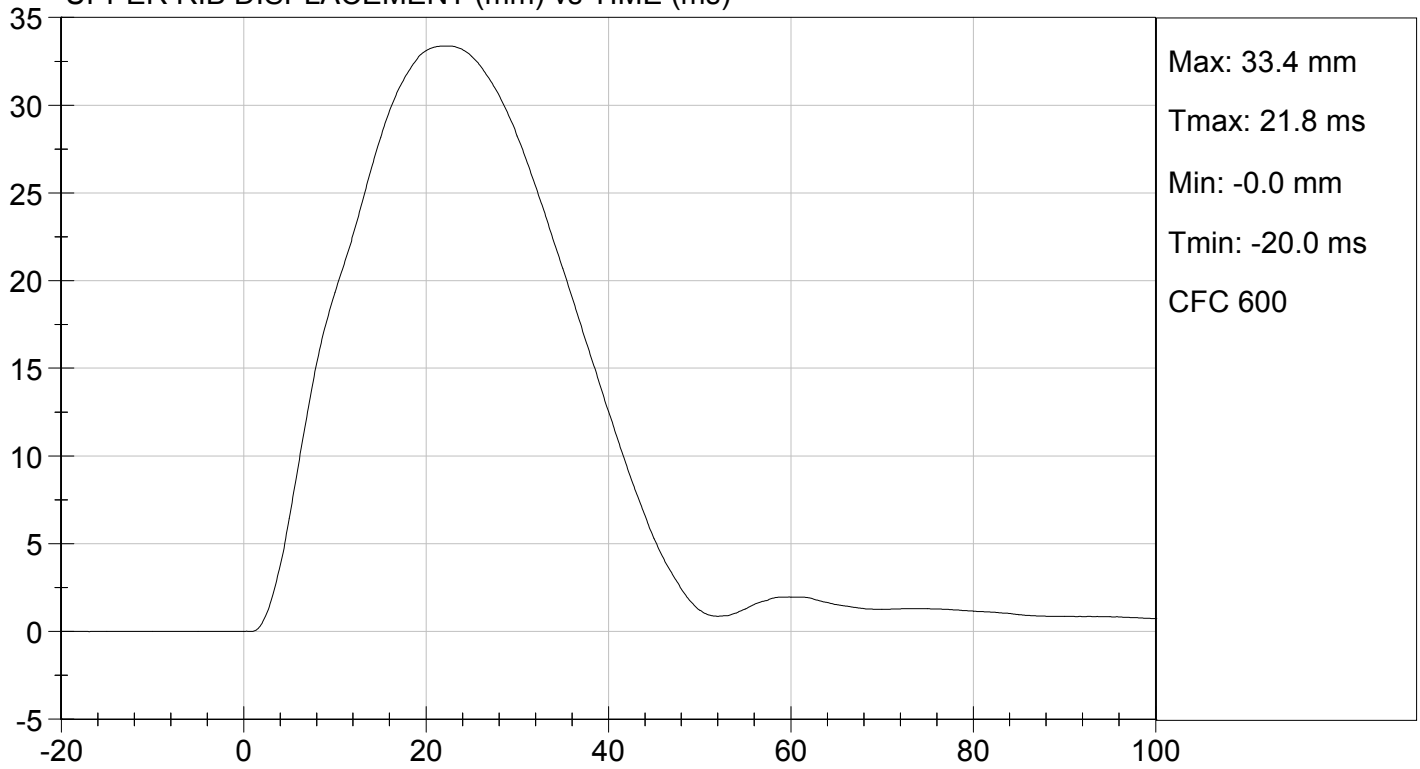
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 12/11/2012
TEST #: D124705

PROBE (G'S) vs TIME (ms)



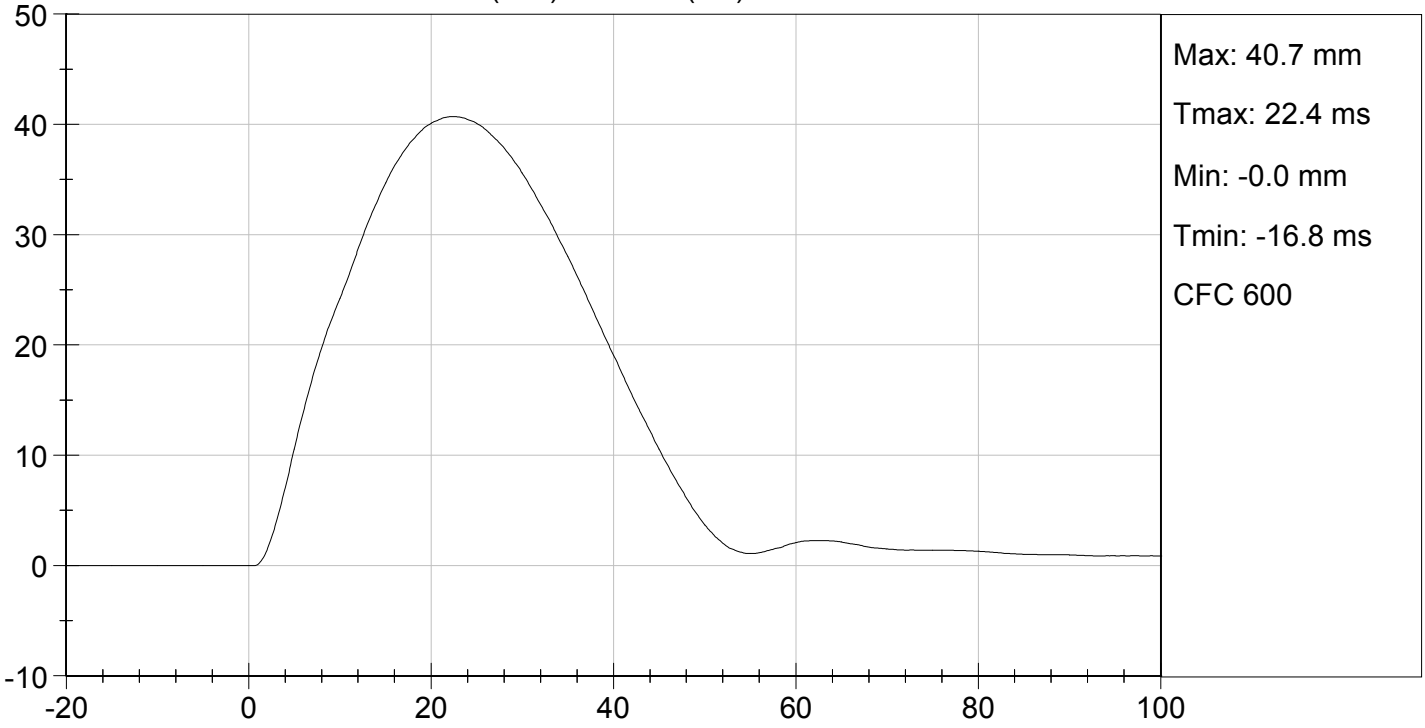
UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



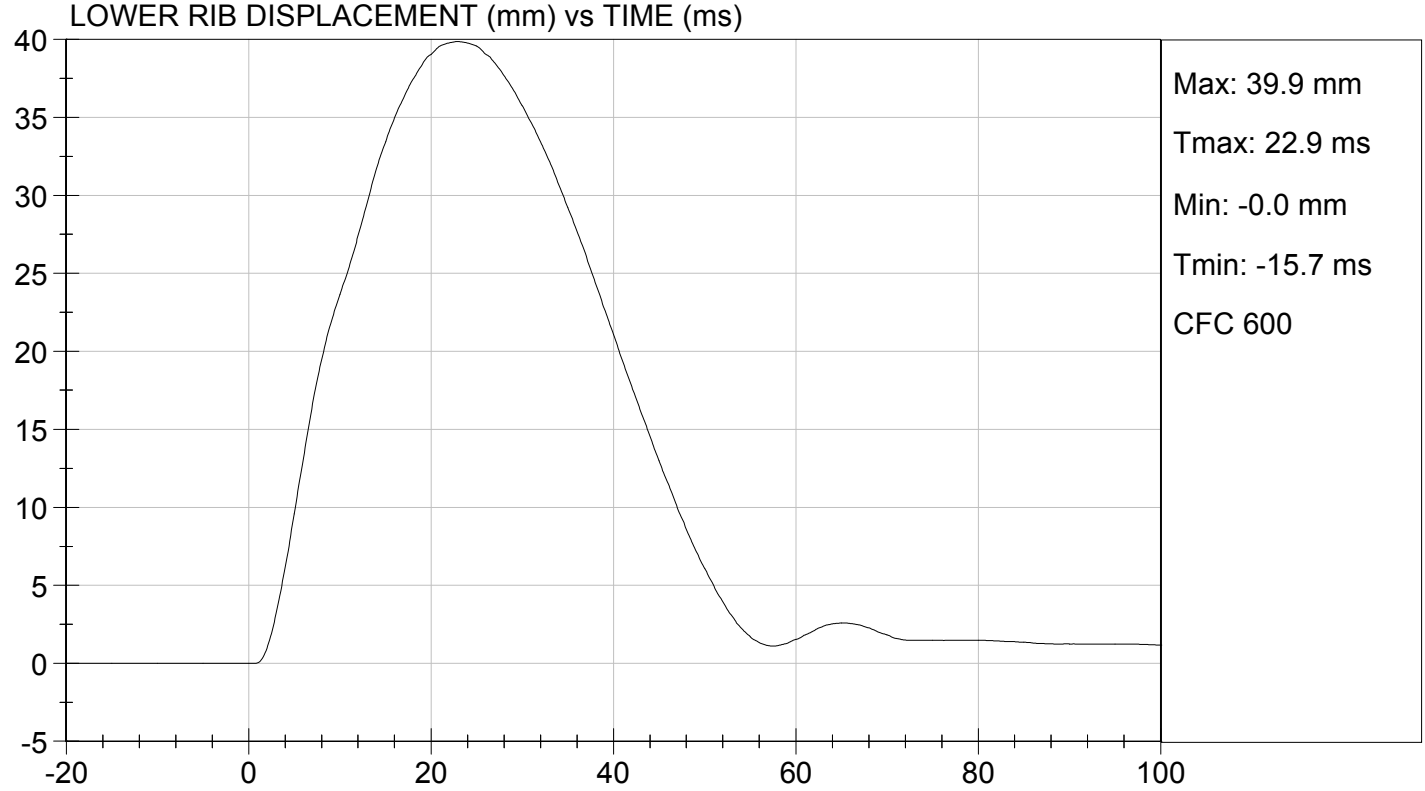
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 12/11/2012
TEST #: D124705

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



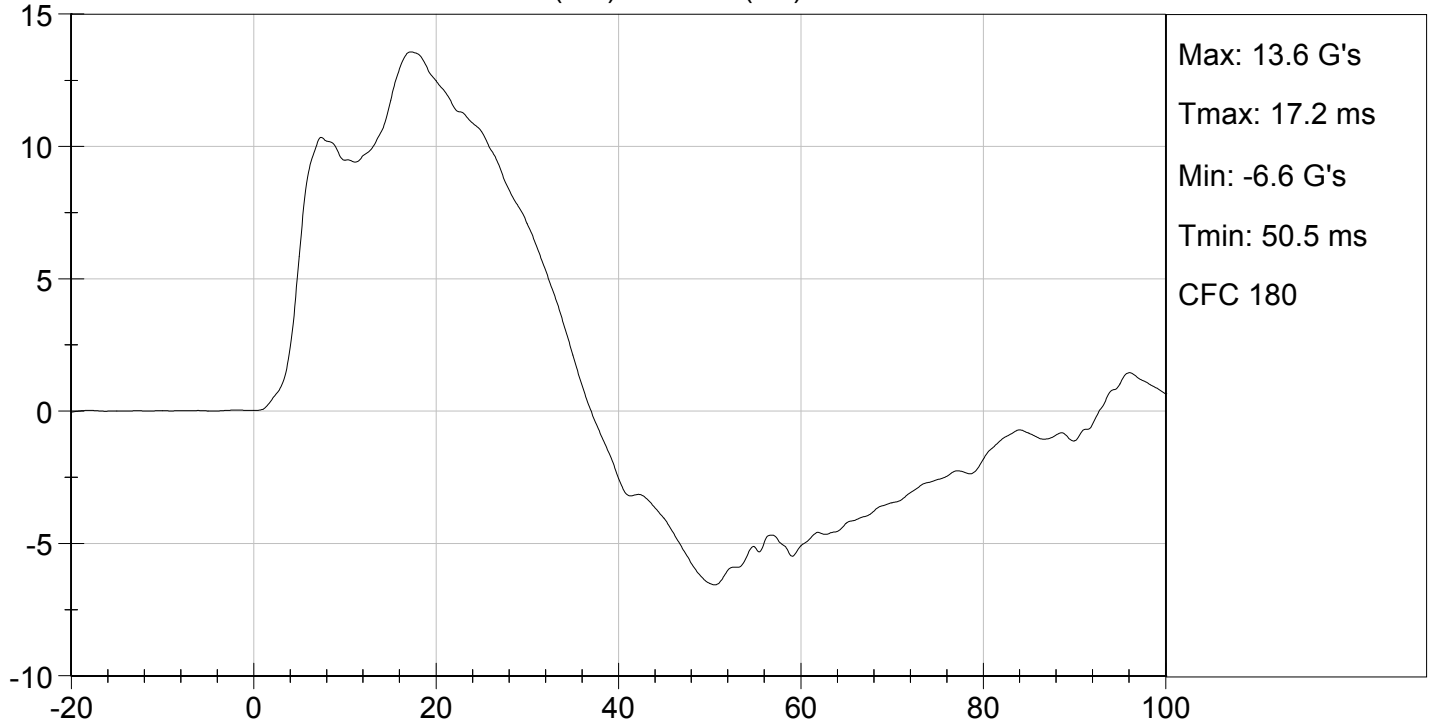
LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



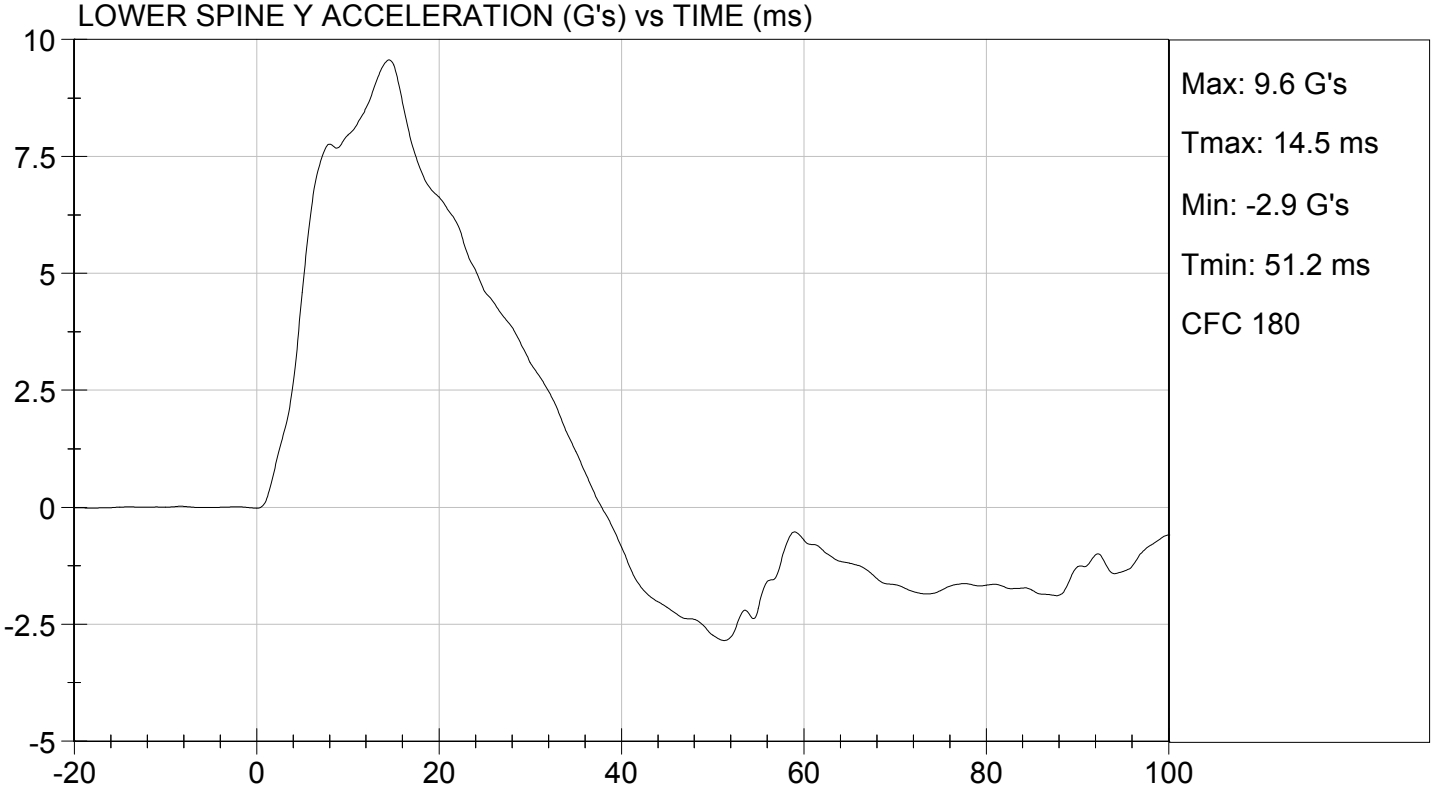
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 12/11/2012
TEST #: D124705

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:** D124706

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	22	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	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	38	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	10	Pass
		Overall Test Results		Pass

Jessica Gall
Laboratory Technician

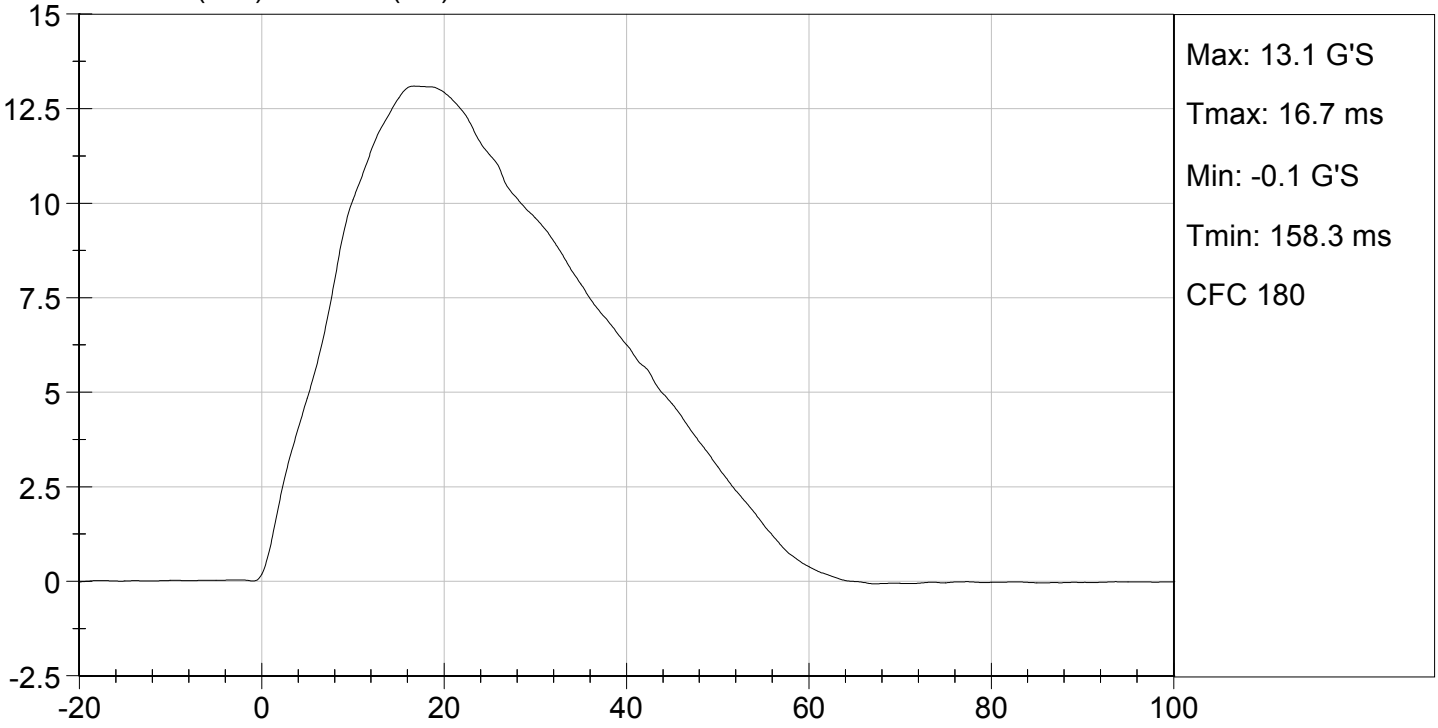
12/11/2012
Test Date

David Winkelbauer
Approved By

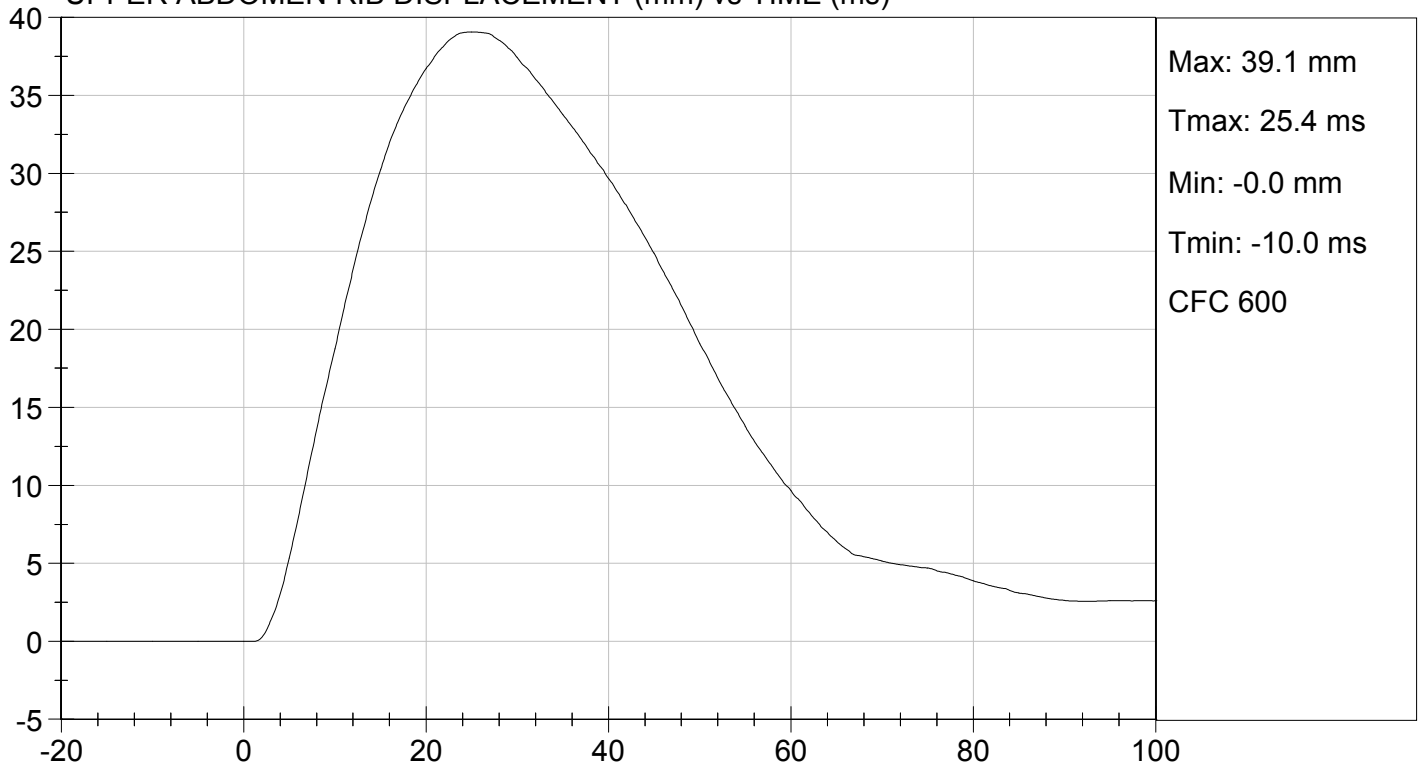
TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 12/11/2012
TEST #: D124706

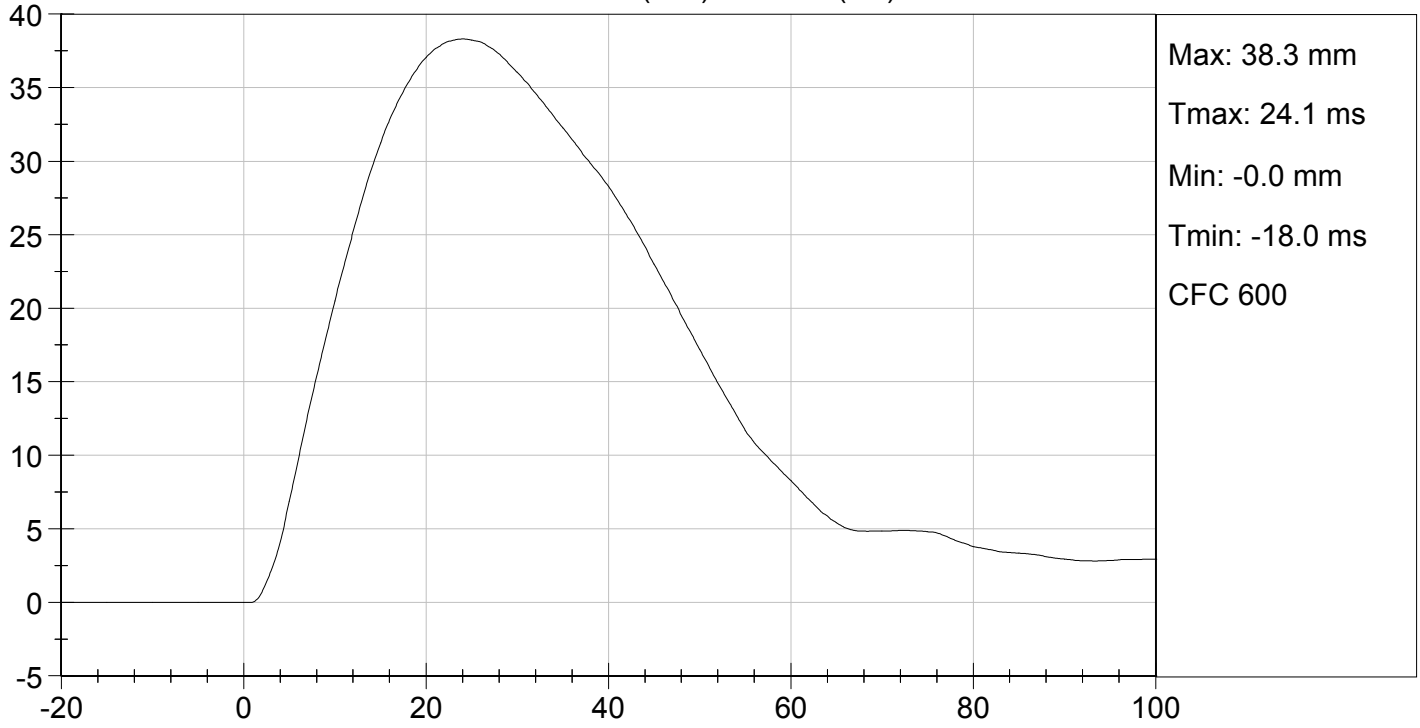
PROBE (G'S) vs TIME (ms)



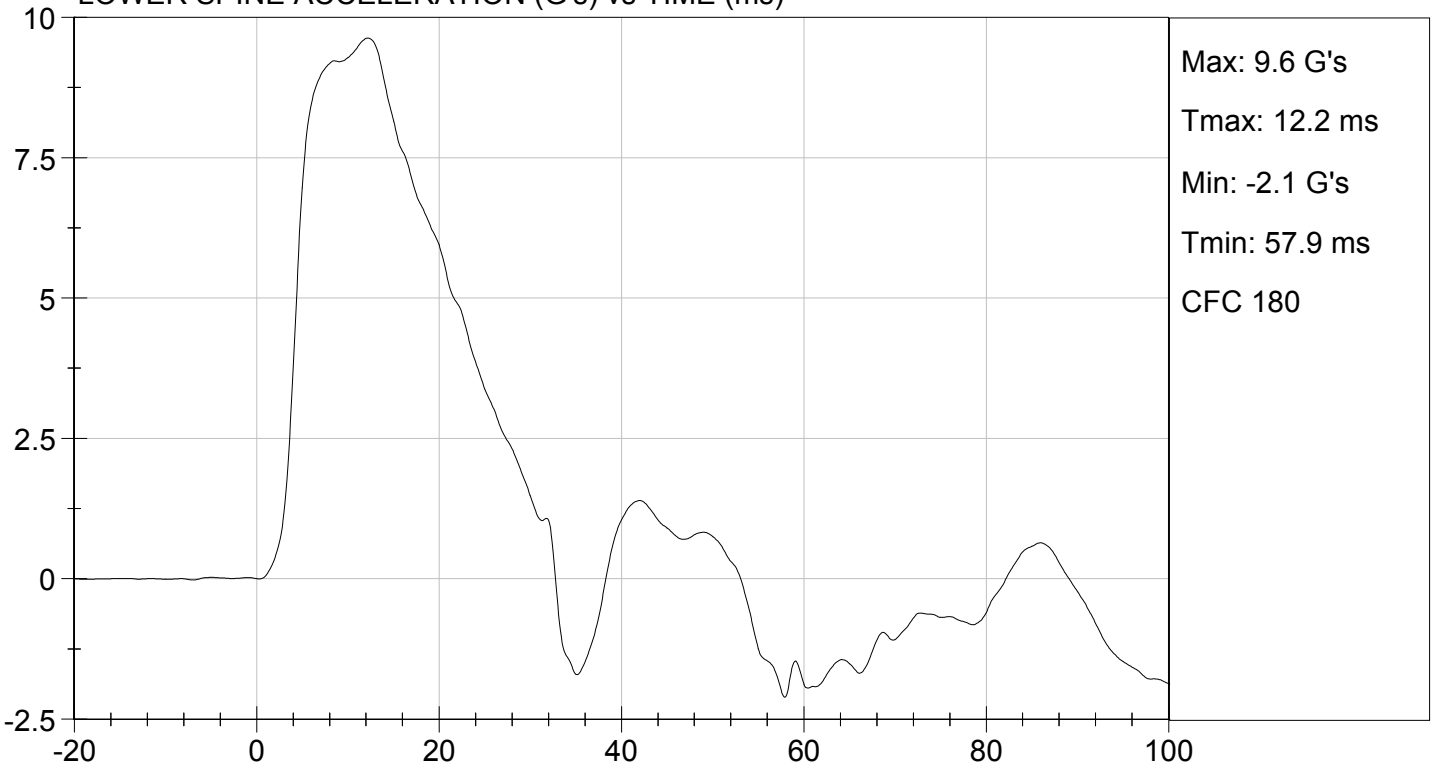
UPPER ABDOMEN RIB DISPLACEMENT (mm) vs TIME (ms)



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:** D124707

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.9	Pass
Humidity	%	10 to 70	24	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	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	3,898	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

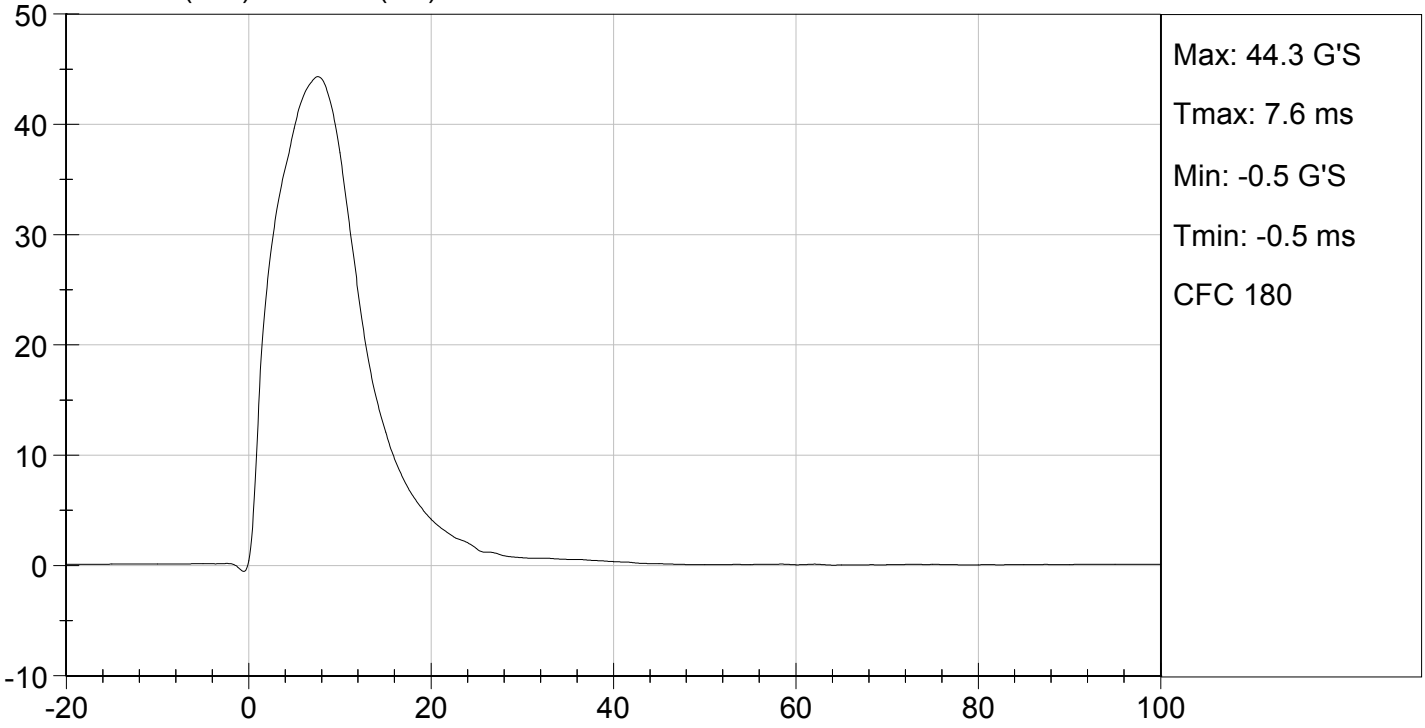
12/12/2012
Test Date

David Winkelbauer
Approved By

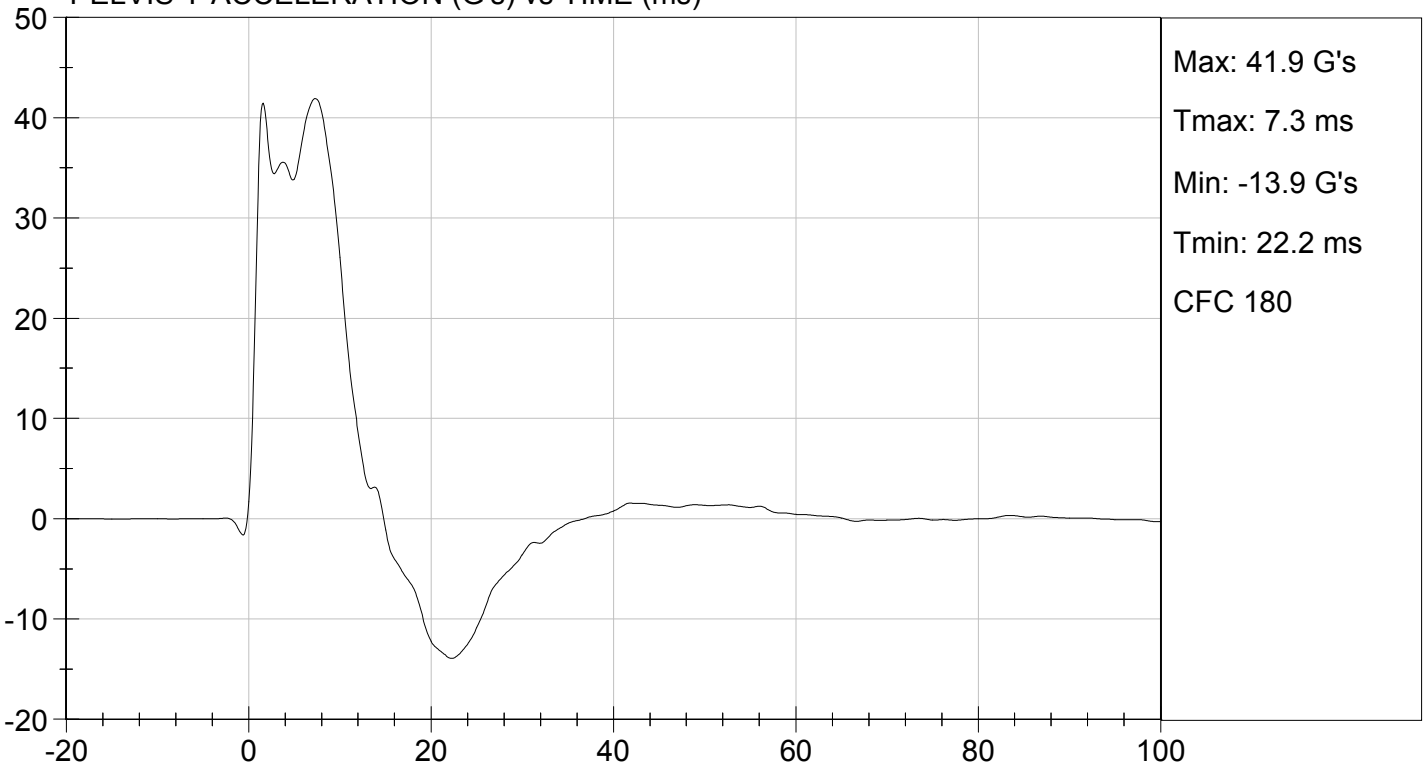
TEST DESC: PELVIS IMPACT
VELOCITY: 22.22 ft/s, 6.77 m/s

TEST DATE: 12/12/2012
TEST #: D124707

PROBE (G'S) vs TIME (ms)

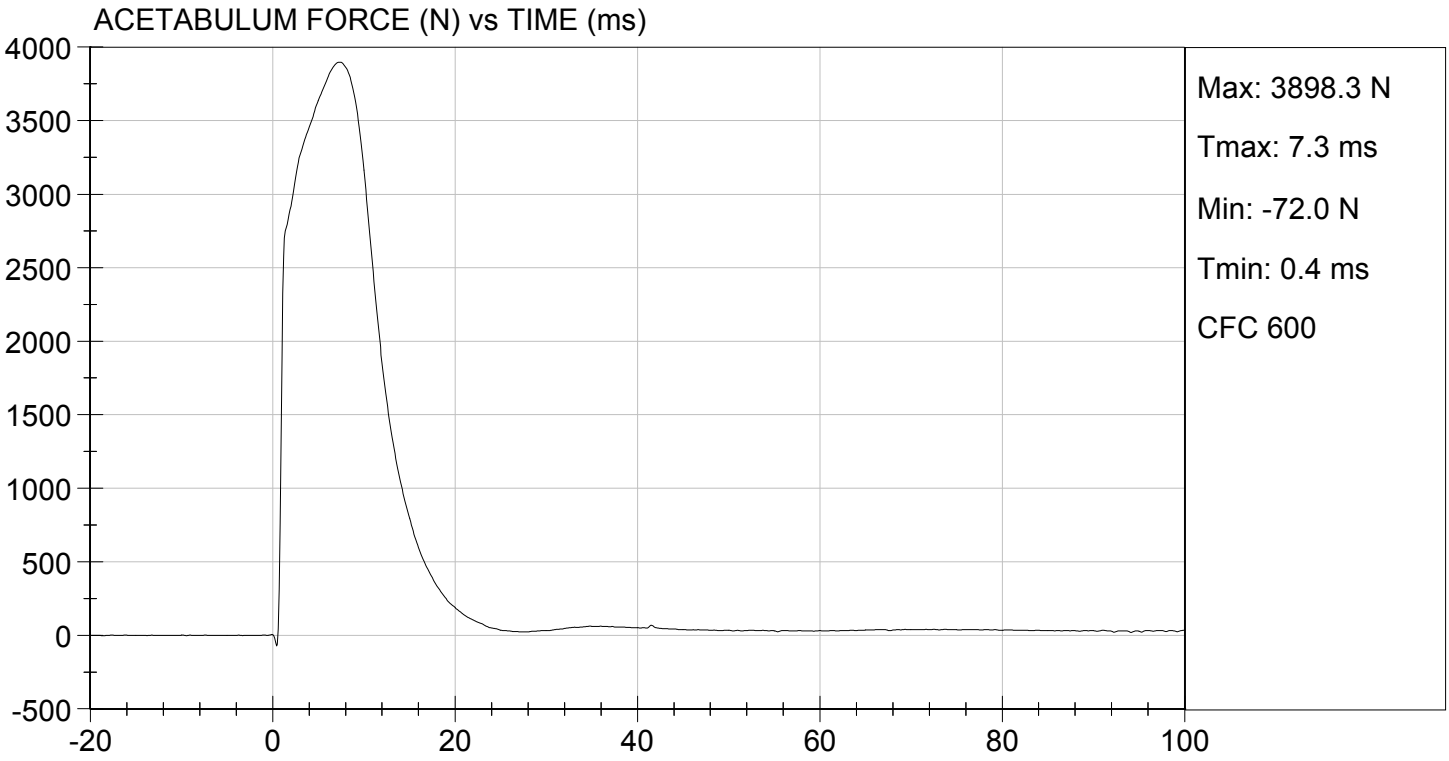


PELVIS Y ACCELERATION (G's) vs TIME (ms)



TEST DESC: PELVIS IMPACT
VELOCITY: 22.22 ft/s, 6.77 m/s

TEST DATE: 12/12/2012
TEST #: D124707



MGA RESEARCH CORPORATION

ILIAC IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test I.D:** D124708

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.9	Pass
Humidity	%	10 to 70	24	Pass
Impact Velocity	m/s	4.20 to 4.40	4.23	Pass
Maximum Probe Acceleration	G's	36 to 45	40	Pass
Pelvis Y Acceleration	G's	28 to 39	34	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4,792	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

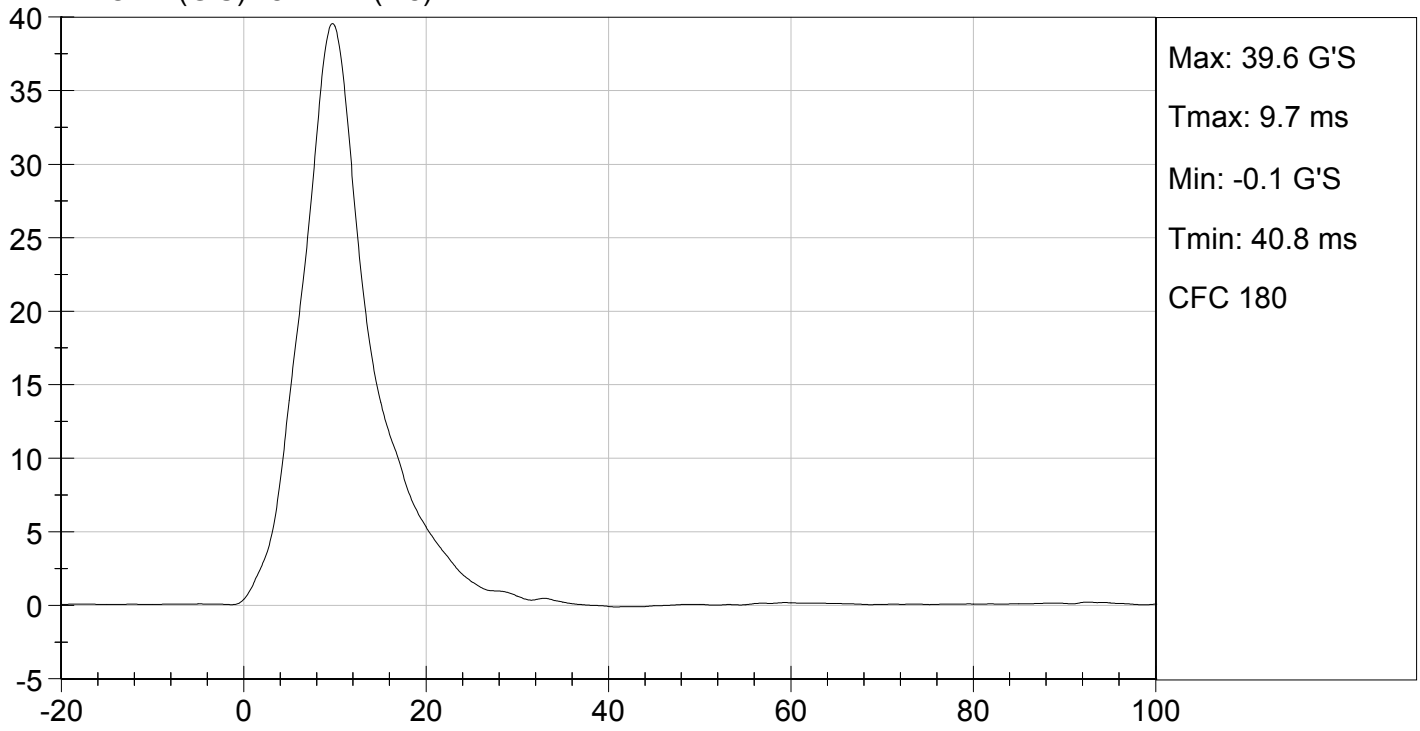
12/12/2012
Test Date

David Winkelbauer
Approved By

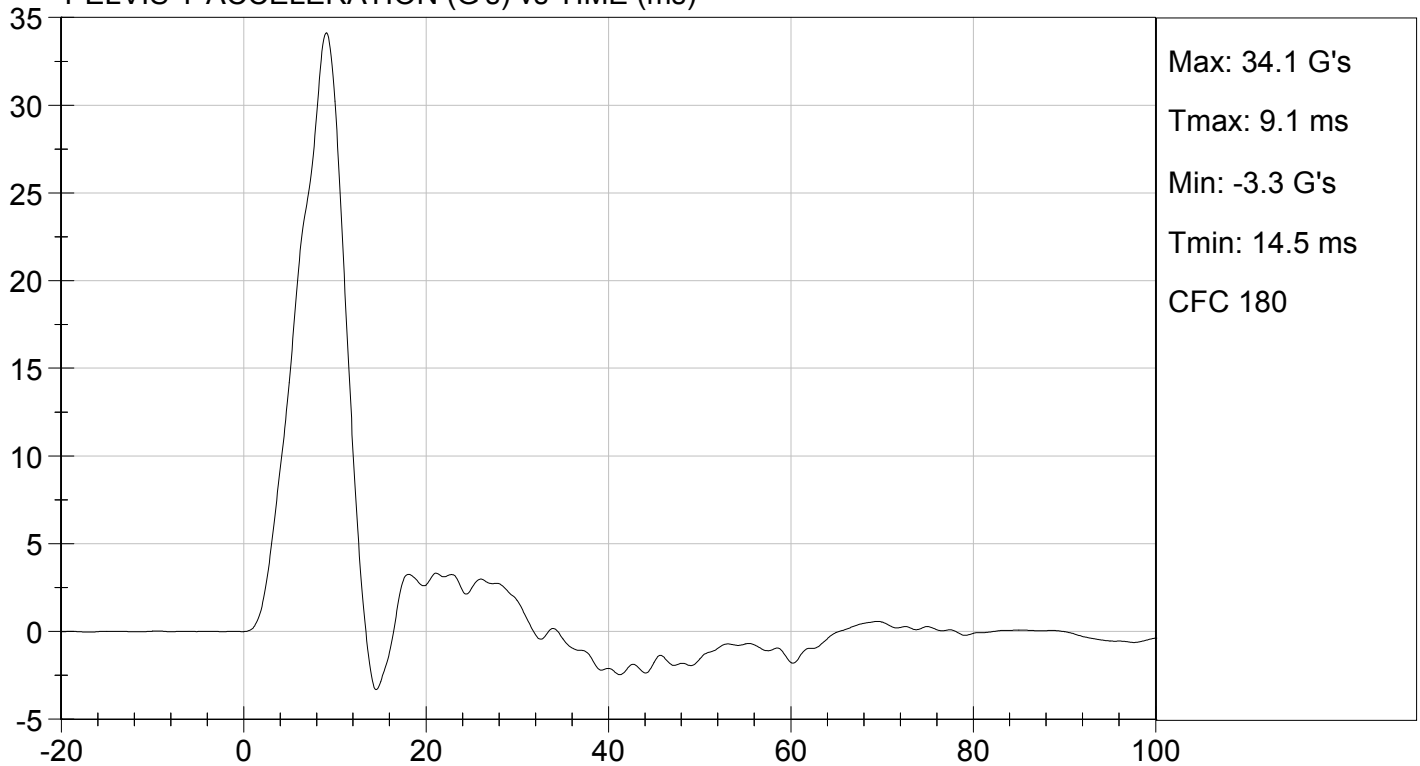
TEST DESC: ILLIAC
VELOCITY: 13.89 ft/s, 4.23 m/s

TEST DATE: 12/12/2012
TEST #: D124708

PROBE (G'S) vs TIME (ms)

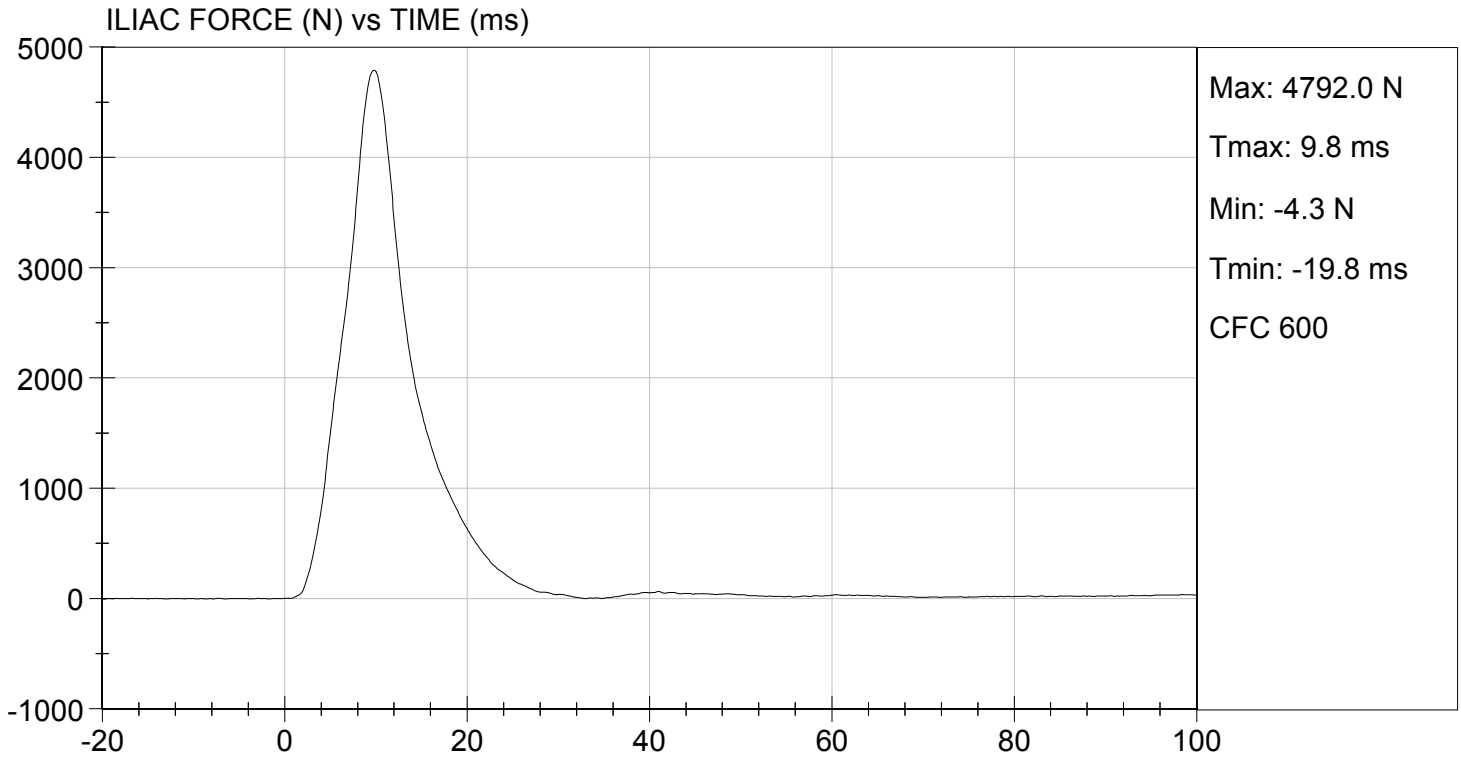


PELVIS Y ACCELERATION (G's) vs TIME (ms)

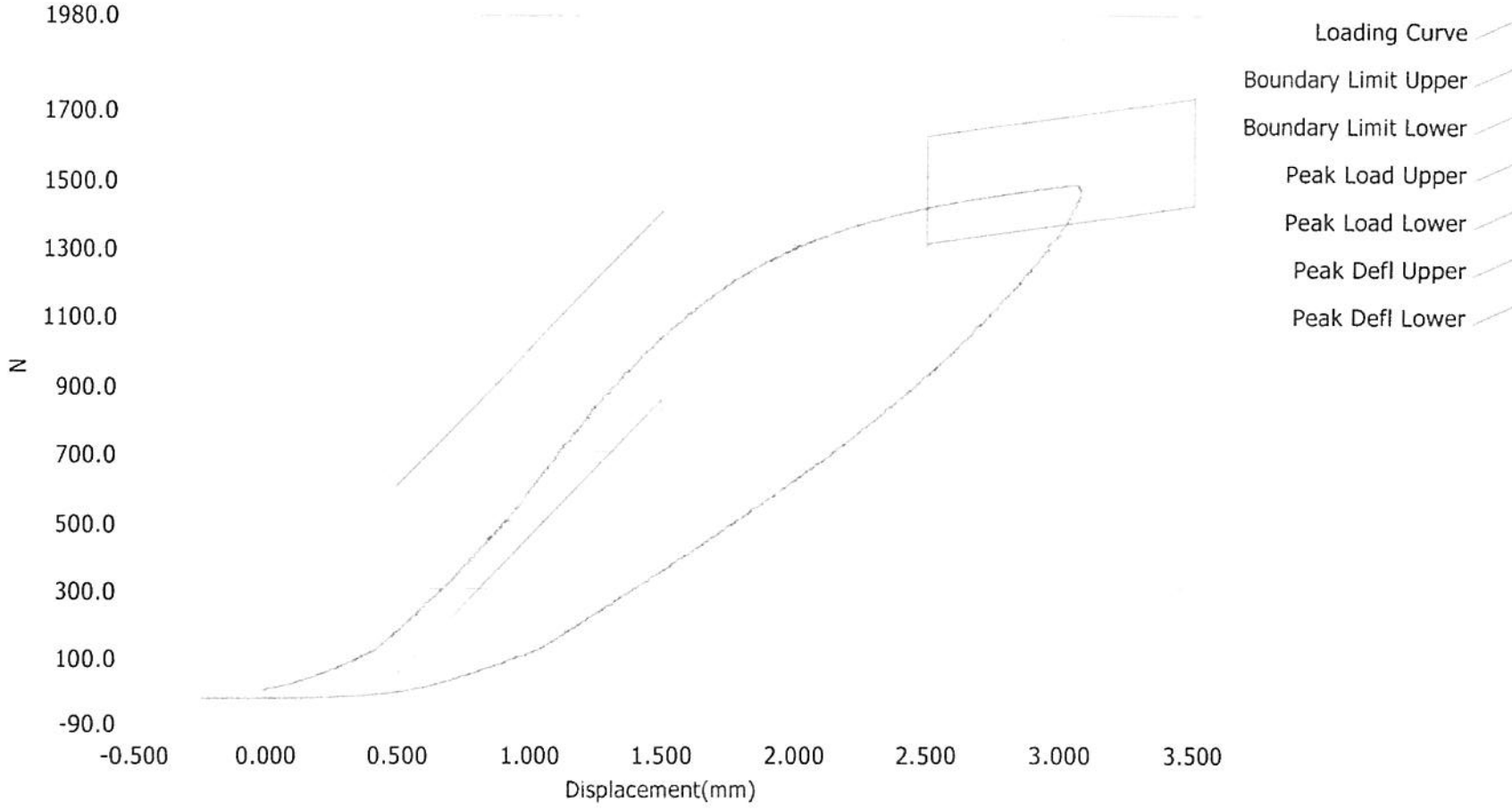


TEST DESC: ILLIAC
VELOCITY: 13.89 ft/s, 4.23 m/s

TEST DATE: 12/12/2012
TEST #: D124708



Resultant Data - SIDIIs Plug Compression

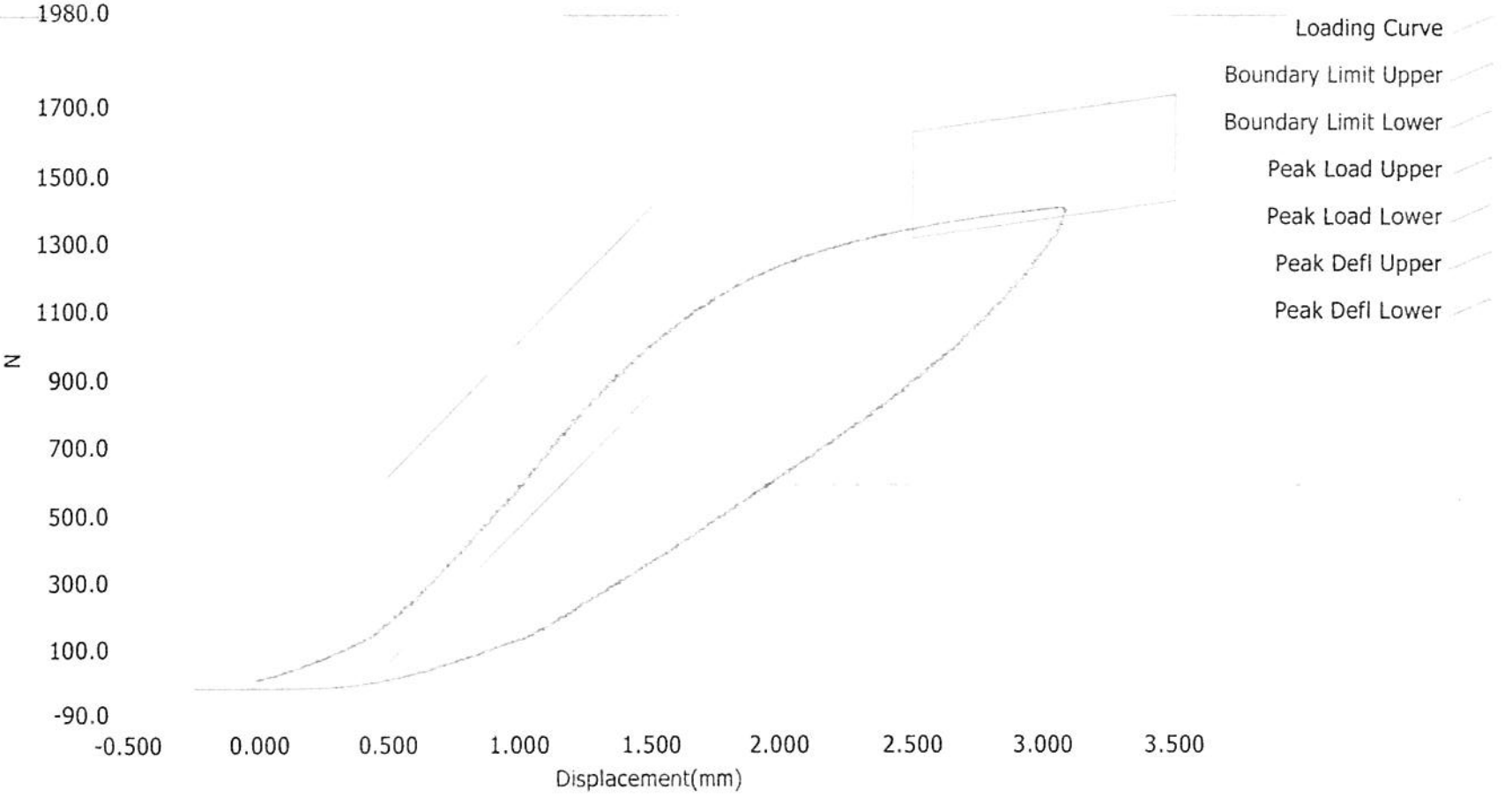


ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
	46572	9/26/2011	7:59 PM
Cert ID	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

Current Date : 9/26/2011 Current Time : 19:59:38

Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
	47951	10/31/2011	9:17 PM
Cert ID	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

Current Date : 10/31/2011 Current Time : 21:18:31

APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation

				SID-IIs S/N 296		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers			X	P78696	Endevco	10/12/12
			Y	P78698	Endevco	10/12/12
			Z	P78699	Endevco	10/12/12
Head Accelerometers			Xr	P78700	Endevco	10/12/12
			Yr	P78701	Endevco	10/12/12
			Zr	P78708	Endevco	10/12/12
Displacement Potentiometers	Thoracic Rib	Upper	Y	G012	Servo	10/15/12
		Middle	Y	G1163	FTSS	10/15/12
		Lower	Y	G1158	FTSS	10/15/12
	Abdominal Rib	Upper	Y	G1146	FTSS	10/15/12
		Lower	Y	G1126	FTSS	10/15/12
Lower Spine Accelerometers (T12)			X	P78690	Endevco	10/12/12
			Y	P78693	Endevco	10/12/12
			Z	P78694	Endevco	10/12/12
Acetabulum Load Cell			Y	ACG268	Denton	01/11/12
Iliac Wing Load Cell			Y	IWG282	Denton	12/23/11
Pelvis Plug (struck side)				46572	FTSS	09/26/11
Pelvis Plug (non-struck side)				47951	FTSS	10/31/11

Table 2 – Vehicle Instrumentation

		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	P66821	Endevco	10/03/12
Vehicle Center of Gravity	Y	P66820	Endevco	12/03/12
Vehicle Center of Gravity	Z	P66819	Endevco	12/03/12
Left Floor Sill	Y	P67447	Endevco	10/30/12
A-Pillar Sill	Y	P59273	Endevco	10/08/12
A-Pillar Low	Y	P67441	Endevco	10/30/12
A-Pillar Mid	Y	P66635	Endevco	10/22/12
B-Pillar Sill	Y	P63210	Endevco	07/12/12
B-Pillar Low	Y	P63503	Endevco	11/02/12
B-Pillar Mid	V	P77682	Endevco	07/30/12
Driver Seat	Y	P78889	Endevco	11/03/12
Engine Top	X	P66669	Endevco	11/02/12
Engine Top	Y	P66668	Endevco	11/02/12
Firewall	Y	P52191	Endevco	08/15/12
Right Roof	Y	P52186	Endevco	10/06/12
Right Floor Sill	Y	P66803	Endevco	07/21/12
Rear Floorpan	X	P63555	Endevco	08/15/12
Rear Floorpan	Y	P63556	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