REPORT NUMBER: SINCAP-MGA-2013-003

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

MAZDA MOTOR CORPORATION
2013 Mazda CX-5 Sport Front Wheel Drive 5-Dr SUV
NHTSA No.: MD5401

MGA RESEARCH CORPORATION
5000 Warren Road
Burlington, WI 53105

Test Date: July 6, 2012

Final Report Date: August 2, 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: 
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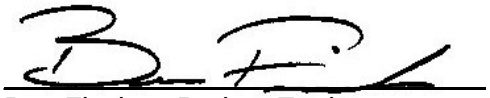
Approved by: 
Ben Fischer, Project Engineer

Approval Date: August 2, 2012

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

Date: _____

Technical Report Documentation Page

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4. Title and Subtitle Final Report of New Car Assessment Program Side Impact MDB Testing of a 2013 Mazda CX-5 Sport Front Wheel Drive 5-Dr SUV; NHTSA No.: MD5401		*5. Report Date* August 2, 2012 *6. Performing Organization Code* MGA
7. Author(s) Donna Janovicz, Project Manager Ben Fischer, Project Engineer		*8. Performing Organization Report No.* SINCAP-MGA-2013-003
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 U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards (NVS-111) 1200 New Jersey Ave, SE, Room W43-410 Washington, D.C. 20590		*13. Type of Report and Period Covered:* Final Test Report July 6, 2012 to August 2, 2012 *14. Sponsoring Agency Code* NVS-111
15. Supplementary Notes		

16. Abstract

A 55/28 km/h 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2013 Mazda CX-5 Sport Front Wheel Drive 5-Dr SUV in accordance with the specifications of the Office of Crashworthiness Standards NCAP Side Laboratory Test Procedure for the generation of consumer information on vehicle side crash protection. The test was conducted at MGA Research Corporation, in Burlington, Wisconsin, on July 6, 2012.

The impact velocity of the Moving Deformable Barrier (MDB) was 62.5 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 21.1°C. The target vehicle post-test maximum crush was 198 mm at level 2. The test vehicle's performance was as follows:

		Driver ATD (ES-2re)	
Measurement Description	**Units**	**Threshold**	**Result**
Head Injury Criteria (HIC_{36})	N/A	1000	85
Maximum Thorax Rib Deflection	mm	44	11
Total Abdominal Force	N	2500	500
Pubic Symphysis Force	N	6000	1781

		Passenger ATD (SID-IIs)	
Measurement Description	**Units**	**Threshold**	**Result**
Head Injury Criteria (HIC_{36})	N/A	1000	247
Resultant Lower Spine Acceleration	Gs	82	69
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2986
Maximum Thoracic Rib Deflection	mm	38*	18
Maximum Abdomen Rib Deflection	mm	45*	31

*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 MDB ES-2re 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, Room E12-100 Washington, DC 20590 Email: tis@nhtsa.dot.gov FAX: 202-493-2833

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SECTION 1
TEST PURPOSE AND PROCEDURE

This moving deformable barrier 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 Mazda CX-5 Sport Front Wheel Drive 5-Dr SUV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Laboratory Test Procedure dated May 2012.

SECTION 2
SUMMARY OF TEST RESULTS

A 2013 Mazda CX-5 Sport Front Wheel Drive 5-Dr SUV was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 62.5 km/h. The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by MGA Research Corporation in Burlington, Wisconsin, on July 6, 2012. Pretest and post test photographs of the test vehicle, the MDB, and the dummies (ES-2re and SID-IIs) are included in this report.

Dummies were placed in the driver and left rear designated seating positions according to instructions specified in the OCWS NCAP Side Laboratory Test Procedure dated May 2012. The side impact event was documented by eleven (11) cameras. Camera locations are included in this report.

The dummies were instrumented in the following manner:

DRIVER ATD (ES-2re)
Primary and Redundant Head CG Triaxial Accelerometers
Chest Upper Rib, Middle Rib, and Lower Rib Y-Axis Displacement Potentiometers
Abdomen Forward, Middle, and Rear Y-Axis Load Cells
Lower Spine (T12) Triaxial Accelerometers
Pubic Symphysis Y-Axis Load Cell

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

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

Dummy Injury readings were recorded as follows:

DUMMY INJURY VALUES

	Driver ATD (ES-2re)		
Measurement Description	**Units**	**Threshold**	**Result**
Head Injury Criteria (HIC_{36})	N/A	1000	85
Maximum Thorax Rib Deflection	mm	44	11
Total Abdominal Force	N	2500	500
Pubic Symphysis Force	N	6000	1781

	Passenger ATD (SID-IIs)		
Measurement Description	**Units**	**Threshold**	**Result**
Head Injury Criteria (HIC_{36})	N/A	1000	247
Resultant Lower Spine Acceleration	Gs	82	69
Total Pelvic Force	N	5525	2986
Maximum Thoracic Rib Deflection	mm	38*	18
Maximum Abdomen Rib Deflection	mm	45*	31

*Proposed IARV

Supplemental restraint information is given below:

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

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

GENERAL COMMENTS

There was no valid data collected for:
Left Lower A-Post Y
Left Mid B-Post Y after 5ms

Left Front Sill Y is questionable from 5-10ms
Left Lower B-Post Y is questionable from 3-15ms
Driver Seat Track Y is questionable from 10-15ms and 28-35ms

SECTION 3
OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2013 Mazda CX-5 Sport Front Wheel Drive 5-Dr SUV NHTSA No. MD5401
Test Program: NCAP Side MDB Impact Test Test Date: 7/06/2012

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	MD5401	Traction Control System (TCS)	Yes
Model Year	2013	Auto-Leveling System	No
Make	Mazda	Automatic Door Locks (ADL)	Yes
Model	CX-5 Sport	Power Window Auto-Reverse	Yes
Body Style	SUV	Other Optional Feature	N/A
VIN	JM3KE2BE4D0104373	Driver Front Airbag	Yes
Body Color	Metropolitan Gray Metallic	Driver Curtain Airbag	Yes
Odometer Reading (km/mi)	98 / 61	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 instruction to turn off automatic door locks?			Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Mazda Motor Corporation	GVWR (kg)	1927
Date of Manufacture	01/12	GAWR Front (kg)	964
Vehicle Type	MPV	GAWR Rear (kg)	966

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)				45	(A-B)

VEHICLE SEAT TYPE

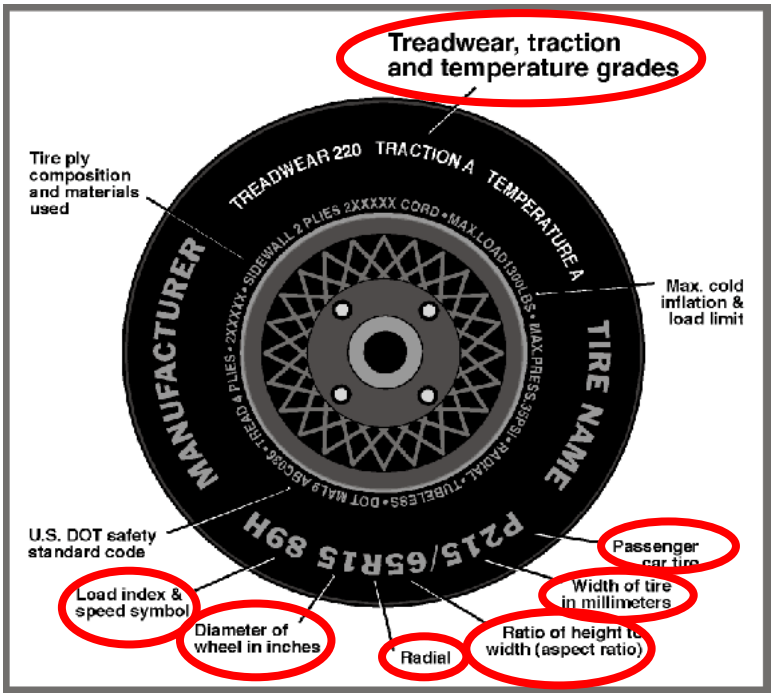
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						Manual	Power
Front Seat	X					w/lever	
Rear or Second Row			X		X		
Third Row Seat							

DATA SHEET NO. 1 (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2013 Mazda CX-5 Sport Front Wheel Drive 5-Dr SUV NHTSA No. MD5401
Test Program: NCAP Side MDB Impact Test Test Date: 7/06/2012

VEHICLE TIRE INFORMATION



TIRE PLACARD INFORMATION

Measured Parameter	Front	Rear
Recommended Cold Tire Pressure (kPa)	230	230
Recommended Tire Size	P225/65R17	P225/65R17

TIRE SIDEWALL INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Tire Size on Vehicle	P225/65R17	P225/65R17
Tire Manufacturer	Yokohama	Yokohama
Tire Name	Geolander	Geolander
Tire Type	Passenger	Passenger
Tire Width	225	225
Aspect Ratio	65	65
Radial	Yes	Yes
Wheel Diameter	17	17
Load Index/Speed Symbol	100H	100H
Treadwear	280	280
Traction Grade	B	B
Temperature Grade	A	A
Tire Material	Rubber	Rubber

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

Test Vehicle: 2013 Mazda CX-5 Sport Front Wheel Drive 5-Dr SUV NHTSA No. MD5401
Test Program: NCAP Side MDB Impact Test Test Date: 7/06/2012

TEST PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kpa	230	230	230	230
Tire Placard	kpa	230	230	230	230
Owner's Manual	kpa				
As Tested	kpa	230	230	230	230

MDB TIRE SPECIFICATIONS

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

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	418.2	302.6		460.0	366.1		455.9	383.3	
Right	kg	401.0	304.3		418.2	349.2		406.4	353.8	
Ratio	%	57.4	42.6		55.1	44.9		53.9	46.1	
Totals	kg	819.2	606.9	1426.1	878.2	715.3	1593.5	862.3	737.1	1599.4

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1426.1	(A)
Sum of Actual Weight of 2 P572 ATDs Used	kg	129.3	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	45	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1600.4	(A+B+C)

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

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Weight of Ballast, if any	6.8
Spare tire, jack & tools, cargo area carpet, right taillight.	23.1

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

Test Vehicle: 2013 Mazda CX-5 Sport Front Wheel Drive 5-Dr SUV NHTSA No. MD5401
Test Program: NCAP Side MDB Impact Test Test Date: 7/06/2012

TEST VEHICLE ATTITUDES AND CG

	Units	Fully Loaded	As Tested	Meets Requirement***
Left Front	mm	785	786	Yes
Right Front	mm	802	800	Yes
Right Rear	mm	795	803	Yes
Left Rear	mm	780	788	Yes
Vehicle CG (Aft of Front Axle)	mm	1243	1211	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	38	29	

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

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

Test Vehicle: 2013 Mazda CX-5 Sport Front Wheel Drive 5-Dr SUV NHTSA No. MD5401
Test Program: NCAP Side MDB Impact Test Test Date: 7/06/2012

SEAT POSITIONING

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

SCRL ANGLE RANGE

Seat	SCRL (°)		
	Max	Min	Mid
Driver Seat	14.0	9.2	11.6
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	11.6	Fixed	Max	Fixed	Fixed	Fixed
	11.6	Fixed	Mid	Fixed	Fixed	Fixed
	11.6	Fixed	Min	Fixed	Fixed	Fixed
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

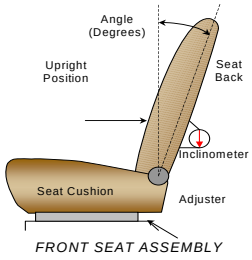
Test Vehicle: 2013 Mazda CX-5 Sport Front Wheel Drive 5-Dr SUV NHTSA No. MD5401
Test Program: NCAP Side MDB Impact Test Test Date: 7/06/2012

SEAT FORE/AFT POSITIONS

Seat	Total Fore/Aft Travel		Test Position from Forward-most Position	
	mm	Detents	mm	Detent
Driver Seat	260	26 (1st as 0)	130 mm	13th (1st as 0)
Front Passenger Seat	260	26 (1st as 0)	130 mm	13th (1st as 0)
Front Center Seat				
Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Non-Struck Side	Fixed	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed	Fixed

SEAT BACK ANGLE ADJUSTMENT

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



Seat	Total Seat Back Angle Range		Test Position from Vertical	
	Degrees	Detents	Degrees	Detent
Driver Seat w/Seated Dummy	70.5		6.5	7th (1st as 0)
Front Passenger Seat	70.3		6.2	7th (1st as 0)
Front Center Seat				
Struck Side Rear Seat	Fixed	Fixed	14.3*	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	14.3*	Fixed
Rear Center Seat	Fixed	Fixed	14.3*	Fixed

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

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

Test Vehicle: 2013 Mazda CX-5 Sport Front Wheel Drive 5-Dr SUV NHTSA No. MD5401
Test Program: NCAP Side MDB Impact Test Test Date: 7/06/2012

SEAT BELT ANCHORAGE ADJUSTMENT

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

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

HEAD RESTRAINT ADJUSTMENT

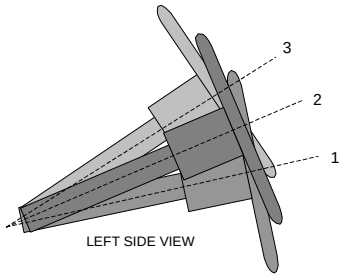
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

	Total # of Positions	Placed in Position #
Driver Seat	3	Highest
Rear Seat	2	Lowest

STEERING COLUMN ADJUSTMENT

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

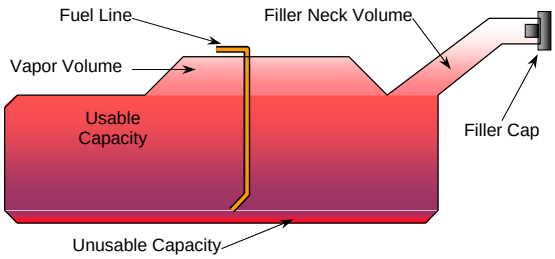
	Degrees	Fore/Aft Position (mm)
Lowermost, Position 1	67.7	192
Geometric Center, Position 2	65.3	167
Uppermost, Position 3	62.9	142
Telescoping Steering Wheel Travel		50
Test Position	65.3	167



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. The fuel pump operates when starter or engine is activated. The fuel pipe is on the left side.



VEHICLE FUEL TANK ASSEMBLY

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

Test Vehicle: 2013 Mazda CX-5 Sport Front Wheel Drive 5-Dr SUV NHTSA No. MD5401
Test Program: NCAP Side MDB Impact Test Test Date: 7/06/2012

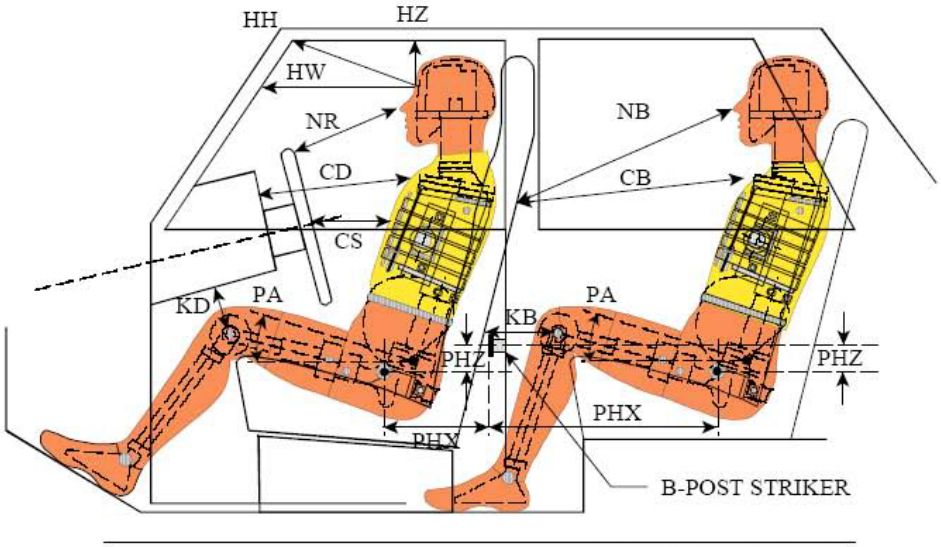
FUEL TANK CAPACITY DATA

	Liters
Usable Capacity of "Standard" Tank (see Form No. 1)	57.9
Usable Capacity of "Optional" Tank (see Form No. 1)	
Usable Capacity of Standard Tank as Specified in Owner's Manual	56.0
Usable Capacity of Optional Tank as Specified in Owner's Manual	
93% of Usable Capacity	53.8
Actual Amount of Solvent Used	53.7
1/3 of Usable Capacity	19.3

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 Mazda CX-5 Sport Front Wheel Drive 5-Dr SUV NHTSA No. MD5401
Test Program: NCAP Side MDB Impact Test Test Date: 7/06/2012



LEFT SIDE VIEW

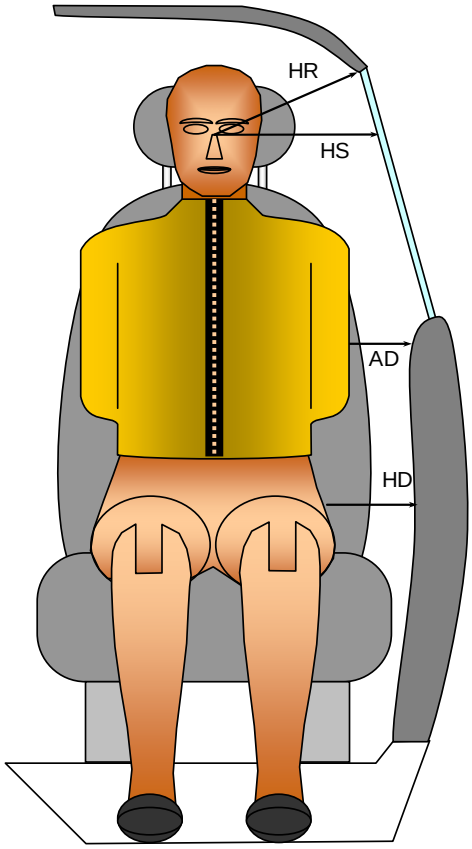
NOTE: 2-DOOR VEHICLE SHOWN. REAR DUMMY PHX & PHZ MEASUREMENTS FOR A 4-DOOR VEHICLE WOULD USE THE C-POST STRIKER AS A REFERENCE POINT

DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver S/N 032		Passenger S/N 296	
			Length (mm)	Angle(°)	Length (mm)	Angle(°)
HH		Head to Header	394	15.5		
HW		Head to Windshield	638			
HZ	HZ	Head to Roof Liner	190		305	
NR	NB	Nose to Rim/Seat Back	460	22.9	503	8.8
CD	CB	Chest to Dashboard/Seat Back	549	2.5	520	12.5
CS		Chest to Steering Wheel	333	14.6		
KDL	KBL	Left Knee to Dash/Seat Back	127	22.8	297	22.0
KDR	KBR	Right Knee to Dash/Seat Back	101	31.6	302	23.1
PAX	PAX	Pelvic Tilt Angle X		21.4		19.7
	PAY	Pelvic Tilt Angle Y		-0.6		-0.5
PHX	PHX	Hip Point to Striker (X-Axis)	226		259	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	151		272	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2013 Mazda CX-5 Sport Front Wheel Drive 5-Dr SUV NHTSA No. MD5401
Test Program: NCAP Side MDB Impact Test Test Date: 7/06/2012



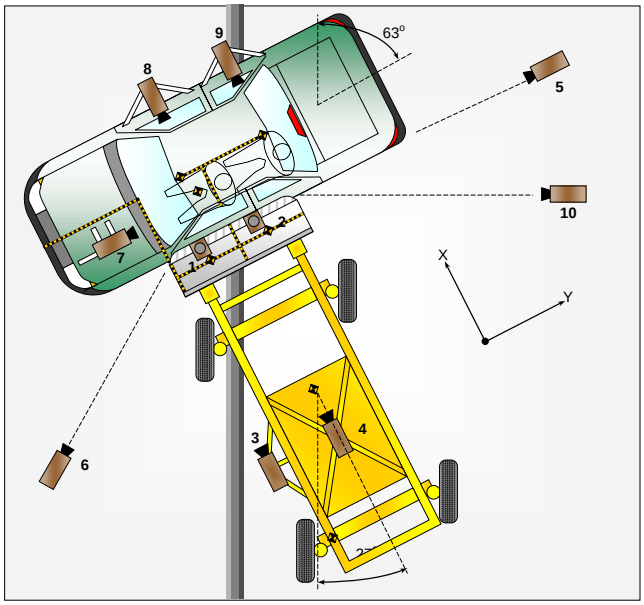
FRONT VIEW OF DUMMY

DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver S/N 032	Passenger S/N 296
HR	Head to Side Header	mm	210	285
HS	Head to Side Window	mm	312	375
AD	Arm to Door	mm	197	181
HD	Hip Point to Door	mm	151	178

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2013 Mazda CX-5 Sport Front Wheel Drive 5-Dr SUV NHTSA No. MD5401
Test Program: NCAP Side MDB Impact Test Test Date: 7/06/2012



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X*	Y*	Z*		
1	Overhead Overall	-100	180	-4920	14	1000
2	Overhead Close-Up	100	280	-4860	20	1000
3	Left Impact Point (MDB)				50	1000
4	Side Overall (MDB)				16	1000
5	Rear	140	4660	-1230	24	1000
6	Left Front	2170	-4210	-1180	24	1000
7	Driver Front (OB)				16	1000
8	Driver Side (OB)				8	1000
9	Passenger Side (OB)				8	1000
10	Real Time Left Rear					30
11	Real Time Inrun					30

Reference: Impact Point projected to Ground; +X = To Front of MDB, + Y = To Right of MDB, +Z = Down
* All measurements accurate to ± 6 mm

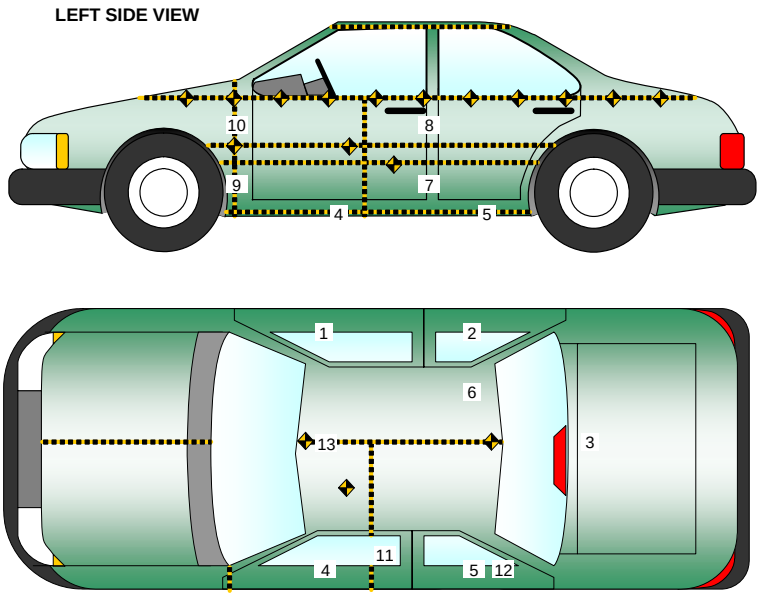
Explain why camera(s) did not operate as intended: None

INSTRUMENTATION

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

DATA SHEET NO. 6
TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2013 Mazda CX-5 Sport Front Wheel Drive 5-Dr SUV NHTSA No. MD5401
Test Program: NCAP Side MDB Impact Test Test Date: 7/06/2012



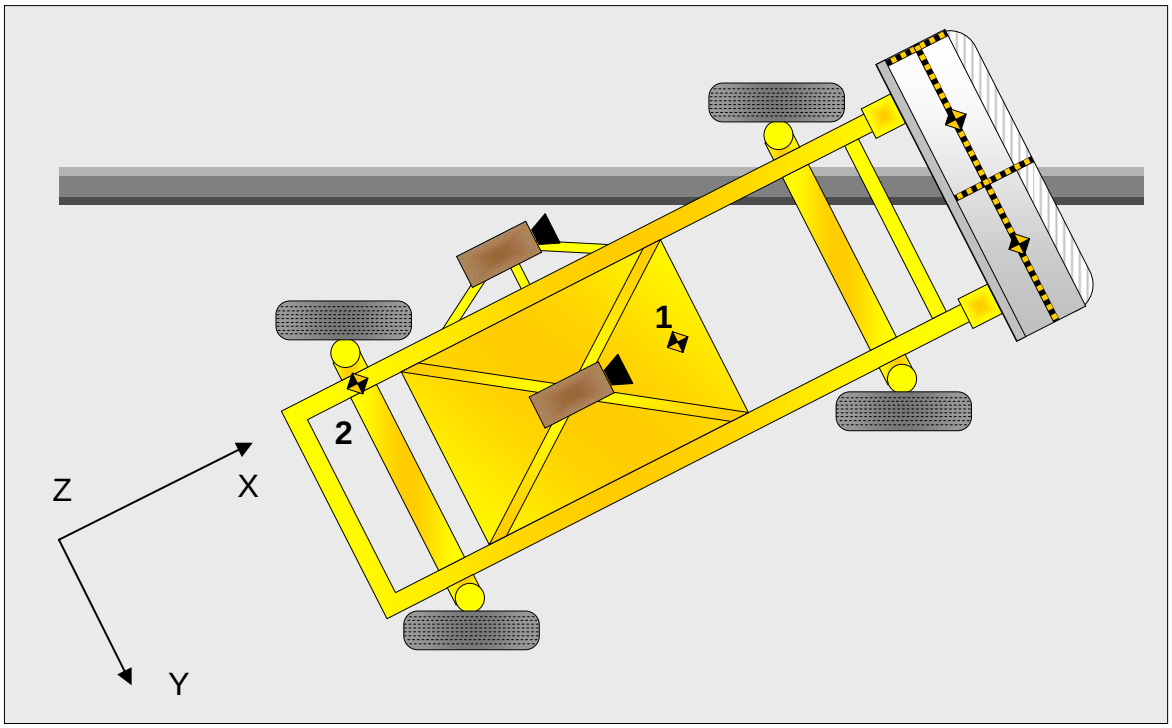
TEST VEHICLE ACCELEROMETER LOCATIONS

Accelerometer Location				
No.	ID	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2150	200	-280
2	Right Sill at Front Seat	2435	705	-272
3	Right Sill at Rear Seat	1690	703	-275
4	Left Sill at Front Door	2441	-705	-266
5	Left Sill at Rear Door	1716	-703	-280
6	Left Lower A-Post	3012	-848	-670
7	Left Middle A-Post	3020	-836	-862
8	Left Lower B-Post	1946	-749	-655
9	Left Middle B-Post	1965	-751	-919
10	Front Seat Track	2219	-624	-460
11	Rear Seat Structure	1684	-349	-421
12	Rt. Rear Occ. Compartment	1685	340	-340
13	Engine Block	3642	0	-883
14	Rear Above Axle	930	0	-572

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

DATA SHEET NO. 7
MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2013 Mazda CX-5 Sport Front Wheel Drive 5-Dr SUV NHTSA No. MD5401
Test Program: NCAP Side MDB Impact Test Test Date: 7/06/2012



MDB ACCELEROMETER LOCATIONS

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

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

DATA SHEET NO. 8
POST-TEST OBSERVATIONS

Test Vehicle: 2013 Mazda CX-5 Sport Front Wheel Drive 5-Dr SUV NHTSA No. MD5401
Test Program: NCAP Side MDB Impact Test Test Date: 7/06/2012

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Front Seat Dummy (ES-2re)	Rear Seat Dummy (SID-IIs)
Face	Curtain Airbag, Headrest	Curtain Airbag, Center Seatback
Top of Head	Curtain Airbag, Headrest	Curtain Airbag, Center Seatback
Left Side of Head	Curtain Airbag	Curtain Airbag
Back of Head	Curtain Airbag, Headrest	Curtain Airbag, Center Headrest, Center Seatback
Left Shoulder	Curtain Airbag	Door Panel
Upper Torso	Side Airbag, Seatback	Door Panel
Lower Torso	Side Airbag, Seatback	Door Panel, Seatback
Left Hip	Door Panel, Seat Cushion	Door Panel, Seat Cushion
Left Knee	None	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	None
Side Window Damage	None
Other Notable Effects	None

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

Test Vehicle: 2013 Mazda CX-5 Sport Front Wheel Drive 5-Dr SUV NHTSA No. MD5401
Test Program: NCAP Side MDB Impact Test Test Date: 7/06/2012

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		2698
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		409
Actual Impact Point (Aft of Front Axle)	mm		421
Horizontal Offset (+forward / -rearward)	mm	+/- 50 of intended impact point	-12
Vertical Offset (+down / -up)	mm	+/- 20 of intended impact point	-12

DATA SHEET NO. 9

MDB SUMMARY OF RESULTS

Test Vehicle: 2013 Mazda CX-5 Sport Front Wheel Drive 5-Dr SUV NHTSA No. MD5401
Test Program: NCAP Side MDB Impact Test Test Date: 7/06/2012

MDB SPECIFICATIONS

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

MDB WEIGHTS

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

SPEED AND ANGLE AT IMPACT DATA

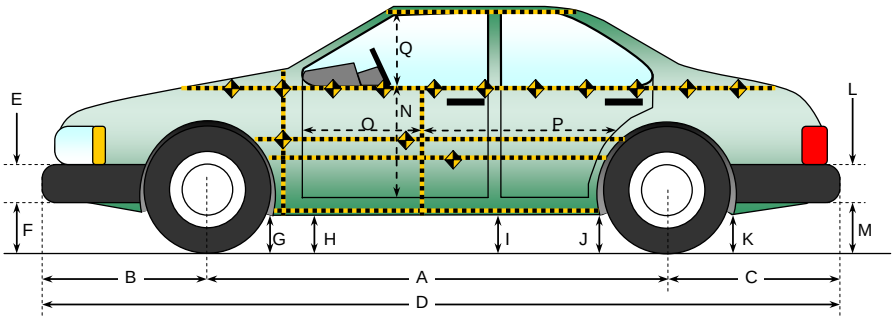
Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.5
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.5
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	89.9
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	63.4
MDB Crabbed Angle to MDB Forward Line of Motion	degrees	26 to 28	26.6

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	800	Left	224
B	Top of Bumper	533	800	Left	149
C	Mid-Level	686	800	Left	143
D	Top of Stack	813	800	Left	174

DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2013 Mazda CX-5 Sport Front Wheel Drive 5-Dr SUV NHTSA No. MD5401
Test Program: NCAP Side MDB Impact Test Test Date: 7/06/2012



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

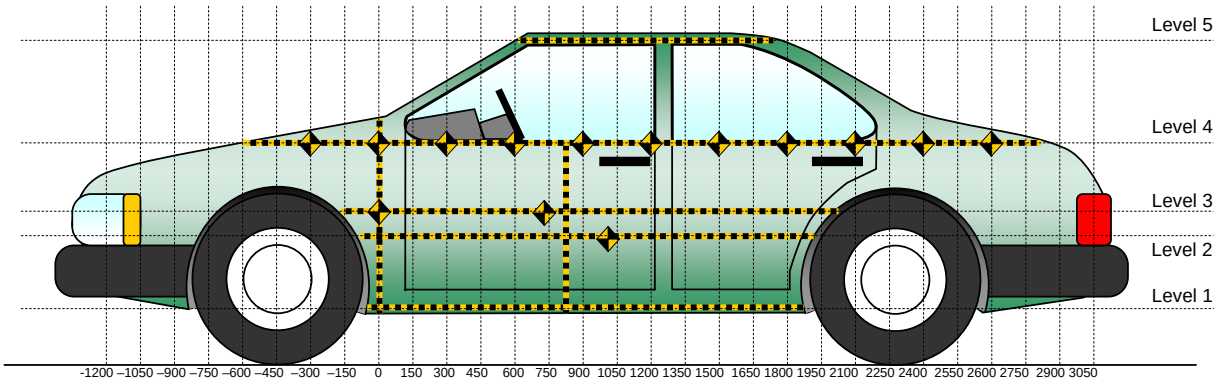
LEFT SIDE VIEW

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2698	2697	1
B	Front Axle to FSOV	936	918	18
C	Rear Axle to RSOV	911	885	26
D	Total Length at Centerline	4545	4500	45
E	Front Bumper Thickness	160	160	0
F	Front Bumper Bottom to Ground	288	298	-10
G	Sill Height at Front Wheel Well	243	250	-7
H	Sill Height at Front Door Leading Edge	245	253	-8
I	Sill Height at B Pillar	242	252	-10
J1	Sill Height at Rear Wheel Well	243	250	-7
J2	Pinch Weld Height at Rear Wheel Well	246	258	-12
K	Sill Height Aft of Rear Wheel Well	284	294	-10
L	Rear Bumper Thickness	170	170	0
M	Rear Bumper Bottom to Ground	341	375	-34
N	Sill Height to Window Bottom Sill	808	741	67
O	Front Door Leading Edge to Impact CL	839	798	41
P	Rear Door Trailing Edge to Impact CL	982	963	19
Q	Front Window Opening	432	423	9
R	Right Side Length	3263	3263	0
S	Left Side Length	3263	3243	20
T	Vehicle Width at B Post	1840	1710	130

DATA SHEET NO. 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2013 Mazda CX-5 Sport Front Wheel Drive 5-Dr SUV NHTSA No. MD5401
Test Program: NCAP Side MDB Impact Test Test Date: 7/06/2012



All Measurements Shown in mm

LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEAUREMENTS

Level	Measurement Description	Height Above Ground (mm)	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	355	99	1350
2	Mid Door	675	198	1350
3	Occupant Hip Point	705	194	1350
4	Window Sill	1070	99	1500
5	Window Top	1570	29	2100

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

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

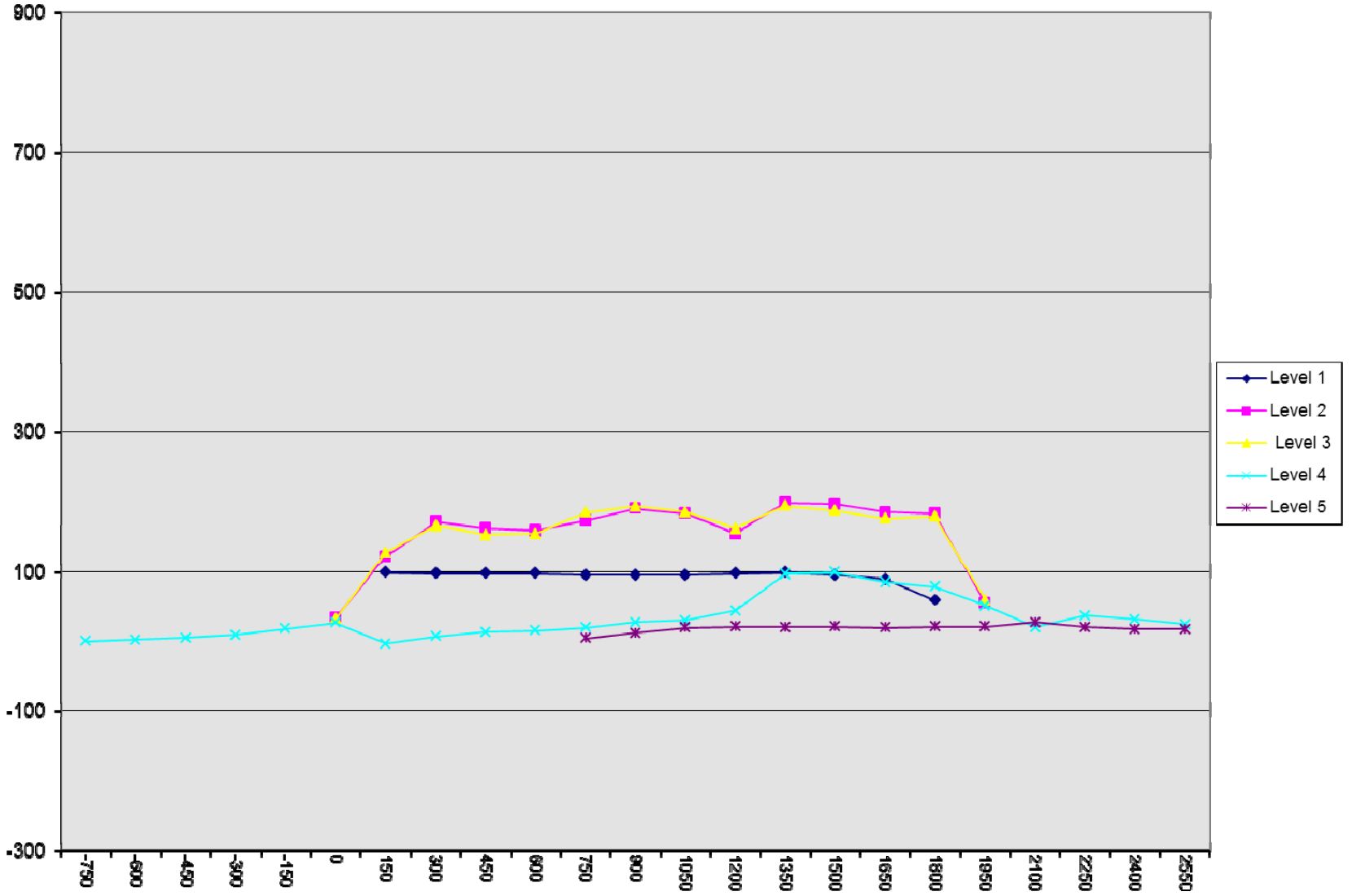
Test Vehicle: 2013 Mazda CX-5 Sport Front Wheel Drive 5-Dr SUV NHTSA No. MD5401
Test Program: NCAP Side MDB Impact Test Test Date: 7/06/2012

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-750				325					327					2	
-600				306					310					4	
-450				291					298					7	
-300				278					289					11	
-150				268					288					20	
0		177	177	260			212	211	288			35	34	28	
150	195	184	183	251		293	308	312	249		98	124	129	-2	
300	196	185	184	248		294	357	351	257		98	172	167	9	
450	196	184	183	245		294	347	337	260		98	163	154	15	
600	193	183	182	244		291	343	338	261		98	160	156	17	
750	189	182	181	237	474	285	355	365	258	480	96	173	184	21	6
900	184	182	180	231	463	280	372	373	260	477	96	190	193	29	14
1050	180	181	180	226	459	276	364	365	258	480	96	183	185	32	21
1200	176	182	181	222	458	274	338	344	268	481	98	156	163	46	23
1350	175	182	181	217	460	274	380	375	314	482	99	198	194	97	22
1500	172	182	181	213	461	268	378	368	312	484	96	196	187	99	23
1650	175	180	181	208	465	265	365	357	294	486	90	185	176	86	21
1800	180	170	170	209	467	240	353	349	289	490	60	183	179	80	23
1950		164	163	212	472		220	224	265	495		56	61	53	23
2100				215	479				237	508				22	29
2250				218	491				257	513				39	22
2400				225	500				258	519				33	19
2550				235	515				261	534				26	19

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

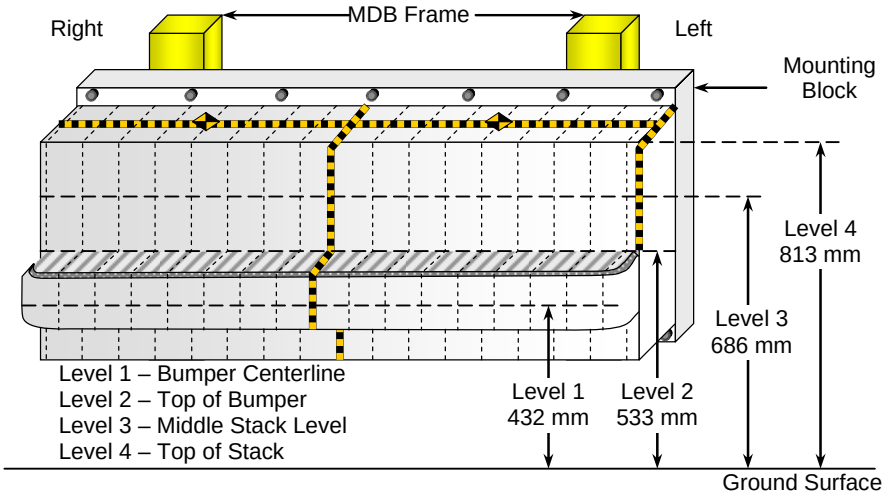
DATA SHEET NO. 11 (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2013 Mazda CX-5 Sport Front Wheel Drive 5-Dr SUV NHTSA No. MD5401
Test Program: NCAP Side MDB Impact Test Test Date: 7/06/2012



DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2013 Mazda CX-5 Sport Front Wheel Drive 5-Dr SUV NHTSA No. MD5401
Test Program: NCAP Side MDB Impact Test Test Date: 7/06/2012



FRONT VIEW

DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center (mm)								C_L	Distance Left of Center (mm)							
	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800
4	59	45	37	37	53	85	104	80	63	59	66	75	83	93	115	126	174
3	86	72	60	50	47	70	83	66	48	44	47	50	54	60	67	85	143
2	133	132	130	115	103	103	110	100	99	109	119	127	129	129	130	137	149
1	208	211	207	209	207	207	210	208	205	205	203	205	203	203	205	214	224

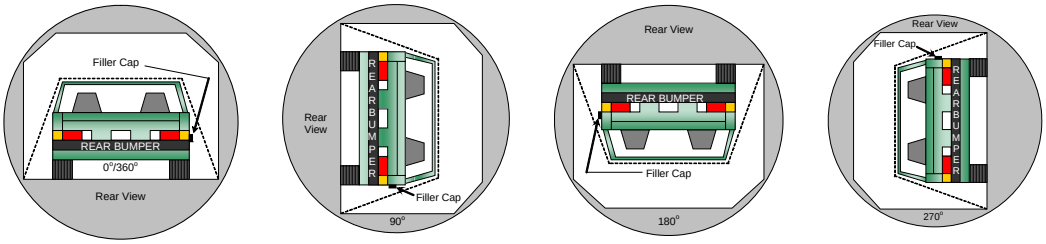
DATA SHEET NO. 13
FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2013 Mazda CX-5 Sport Front Wheel Drive 5-Dr SUV NHTSA No. MD5401
Test Program: NCAP Side MDB Impact Test Test Date: 7/06/2012

Test Time: 3:09 pm Temperature: 21.1° C

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

FMVSS 301 STATIC ROLLOVER DATA



0°/360° 90° 180° 270°

ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	113	300	413
90° to 180°	110	300	410
180° to 270°	105	300	405
270° to 360°	116	300	416

FMVSS 301 ROLLOVER SPILLAGE TABLE (units in ounces)

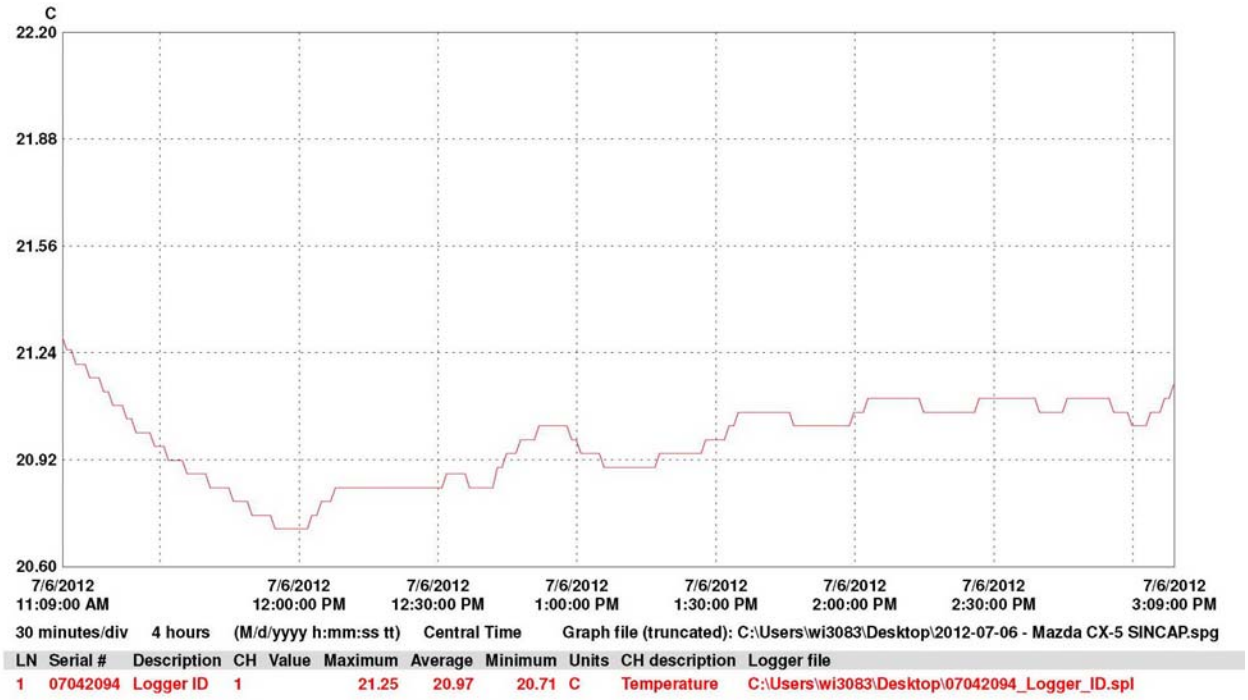
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eight Minute
0° to 90°	0	0	0	0
90° to 180°	0	0	0	0
180° to 270°	0	0	0	0
270° to 360°	0	0	0	0

ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 14
DUMMY/VEHICLE TEMPERATURE STABILIZATION DATA

Test Vehicle: 2013 Mazda CX-5 Sport Front Wheel Drive 5-Dr SUV NHTSA No. MD5401
Test Program: NCAP Side MDB Impact Test Test Date: 7/06/2012



LN	Serial #	Description	CH	Value	Maximum	Average	Minimum	Units	CH description	Logger file
1	07042094	Logger ID	1		21.25	20.97	20.71	C	Temperature	C:\Users\wi3083\Desktop\07042094_Logger_ID.spl

APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

As Delivered Right Front Three-Quarter View of Test Vehicle

As Delivered Left Rear Three-Quarter View of Test Vehicle

Pre-Test Frontal View of Test Vehicle

Post-Test Frontal View of Test Vehicle

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

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

Pre-Test Left Side View of Test Vehicle

Post-Test Left Side View of Test Vehicle

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

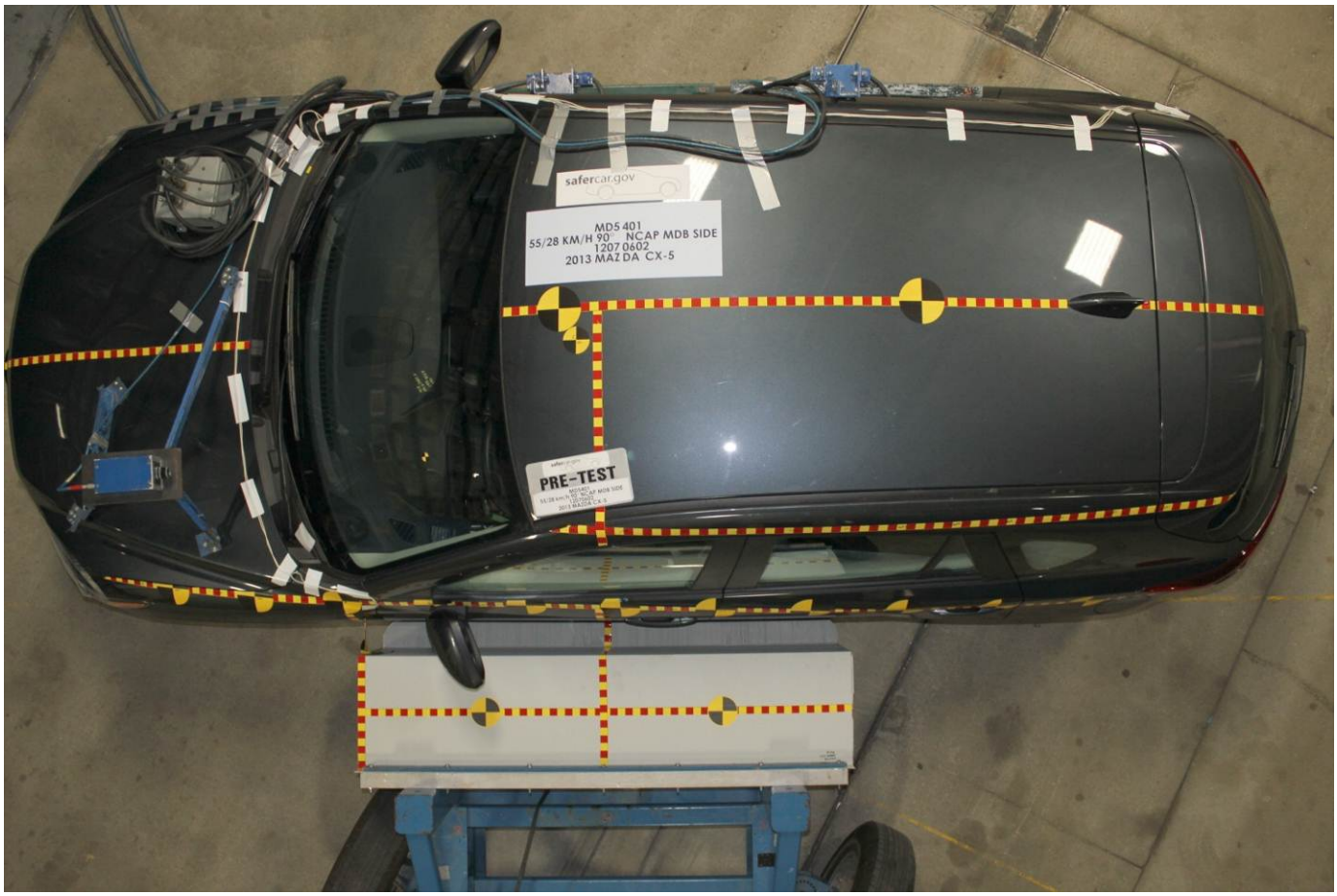
Post-Test Left Three-Quarter Rear View of Test Vehicle

Pre-Test Rear View of Test Vehicle

Post-Test Rear View of Test Vehicle

Pre-Test Right Side View of Test Vehicle

Post-Test Right Side View of Test Vehicle



Pre-Test Overhead View of Test Area

Post-Test Overhead View of Test Area

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

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

Pre-Test Close-Up View of Impact Point Target

Post-Test Close-Up View of Impact Point Target

Pre-Test Left Front Door Latch Close-Up

Post-Test Left Front Door Latch Close-Up

Pre-Test Left Rear Door Latch Close-Up

Post-Test Left Rear Door Latch Close-Up

Pre-Test Front Close-Up View of Driver Dummy

Post-Test Front Close-Up View of Driver Dummy

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

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

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

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

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

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

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

Pre-Test Placement of Driver Dummy's Feet

Pre-Test View of Belt Anchorage for Driver Dummy

Pre-Test Left Side View of Steering Wheel

Pre-Test View of Disengaged Parking Brake

Pre-Test View of Parking Brake

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

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

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

Pre-Test Driver Dummy and Door Clearance View

Post-Test Driver Dummy and Door Clearance View

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

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

PHOTOGRAPH NOT AVAILABLE

Pre-Test Driver Inner Door Panel View

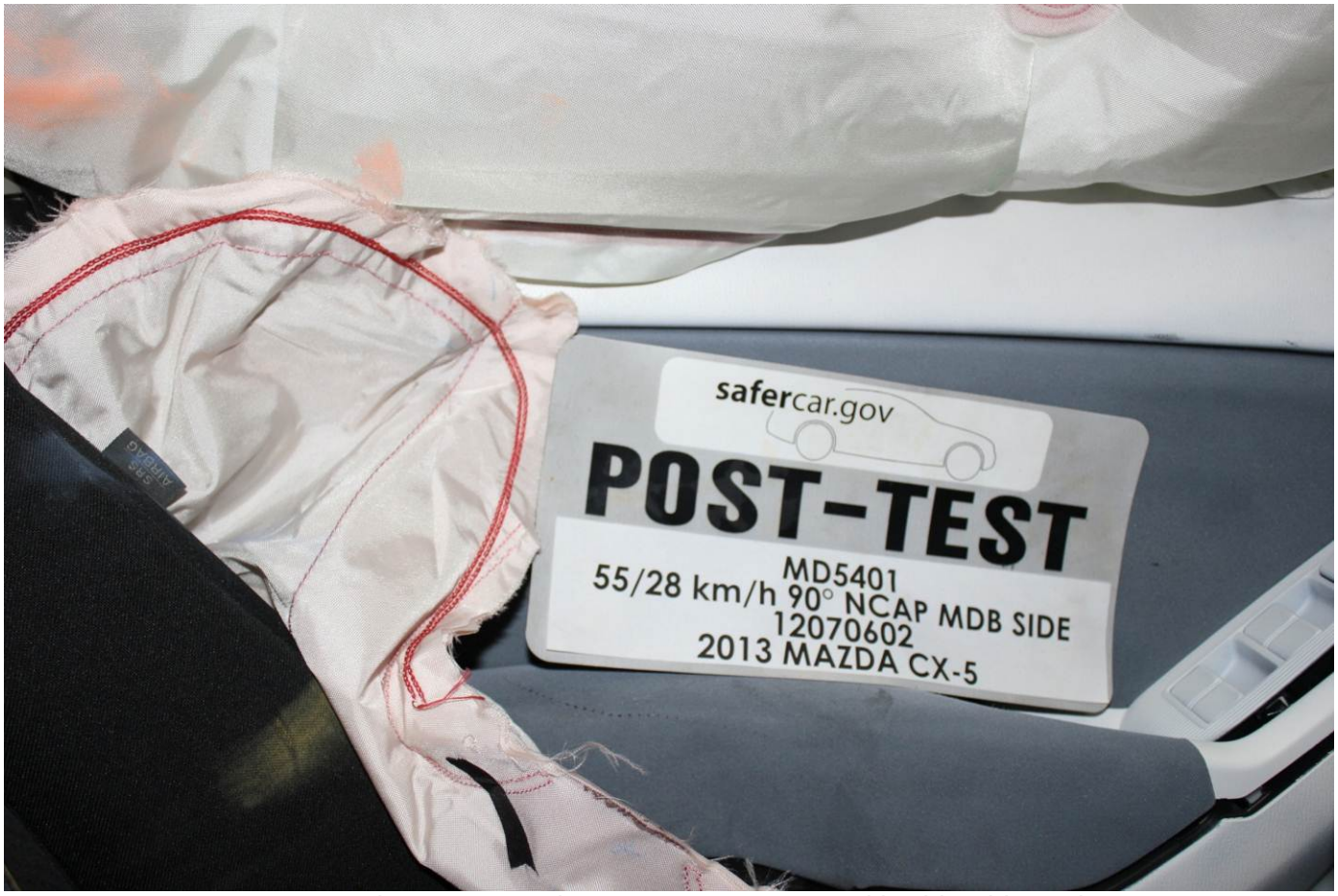
Post-Test Driver Inner Door Panel View

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

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

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

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



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

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

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

Post-Test Driver Dummy Close-up Knee Contact View

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

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

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

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

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

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

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

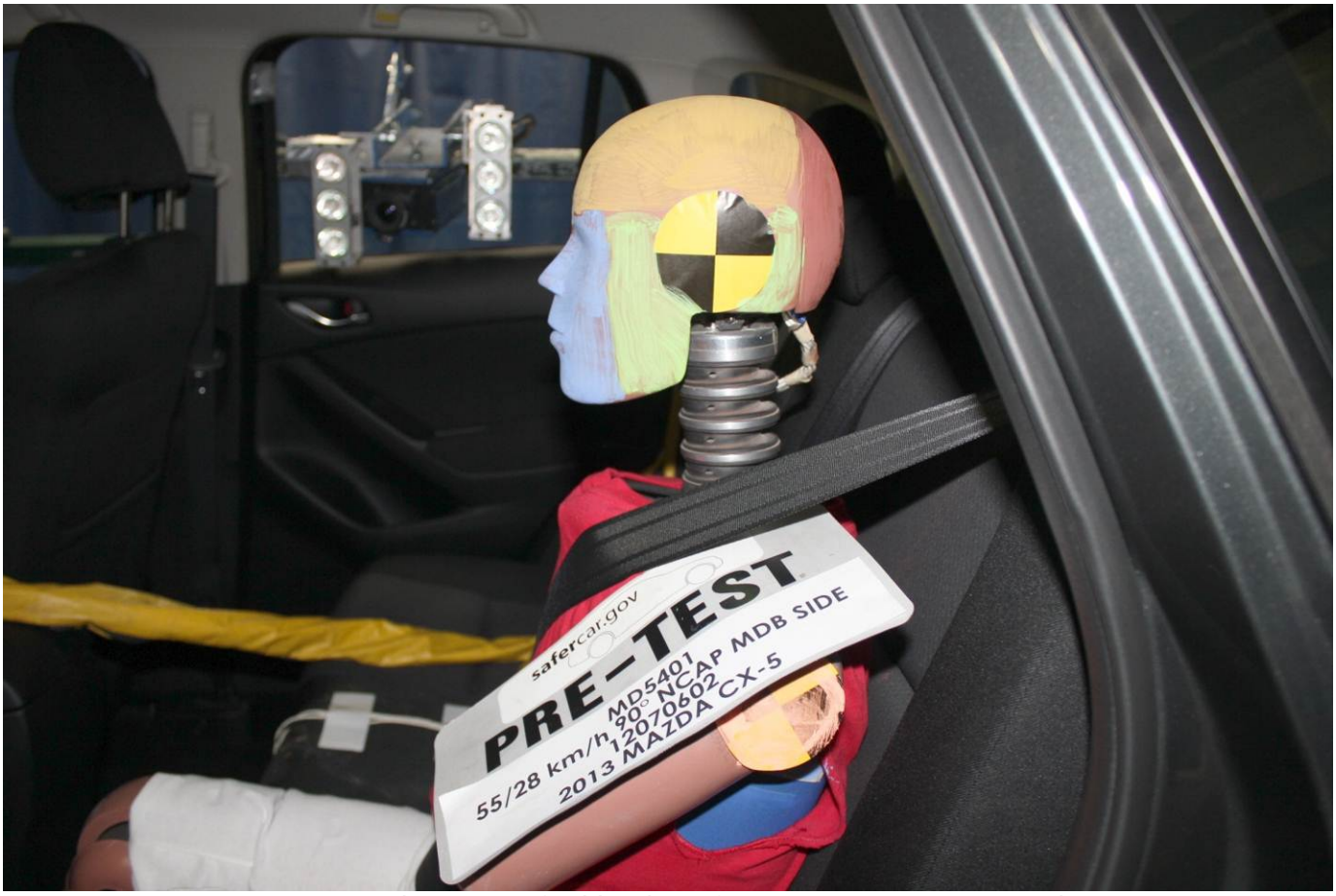
Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket

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

Pre-Test Placement of Rear Passenger Dummy's Feet

Pre-Test View of Belt Anchorage for Rear Passenger Dummy

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



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

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

Pre-Test Rear Passenger Dummy and Door Clearance View

Post-Test Rear Passenger Dummy and Door Clearance View

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

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

PHOTOGRAPH NOT AVAILABLE

Pre-Test Rear Passenger Inner Door Panel View

Post-Test Rear Passenger Inner Door Panel View

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

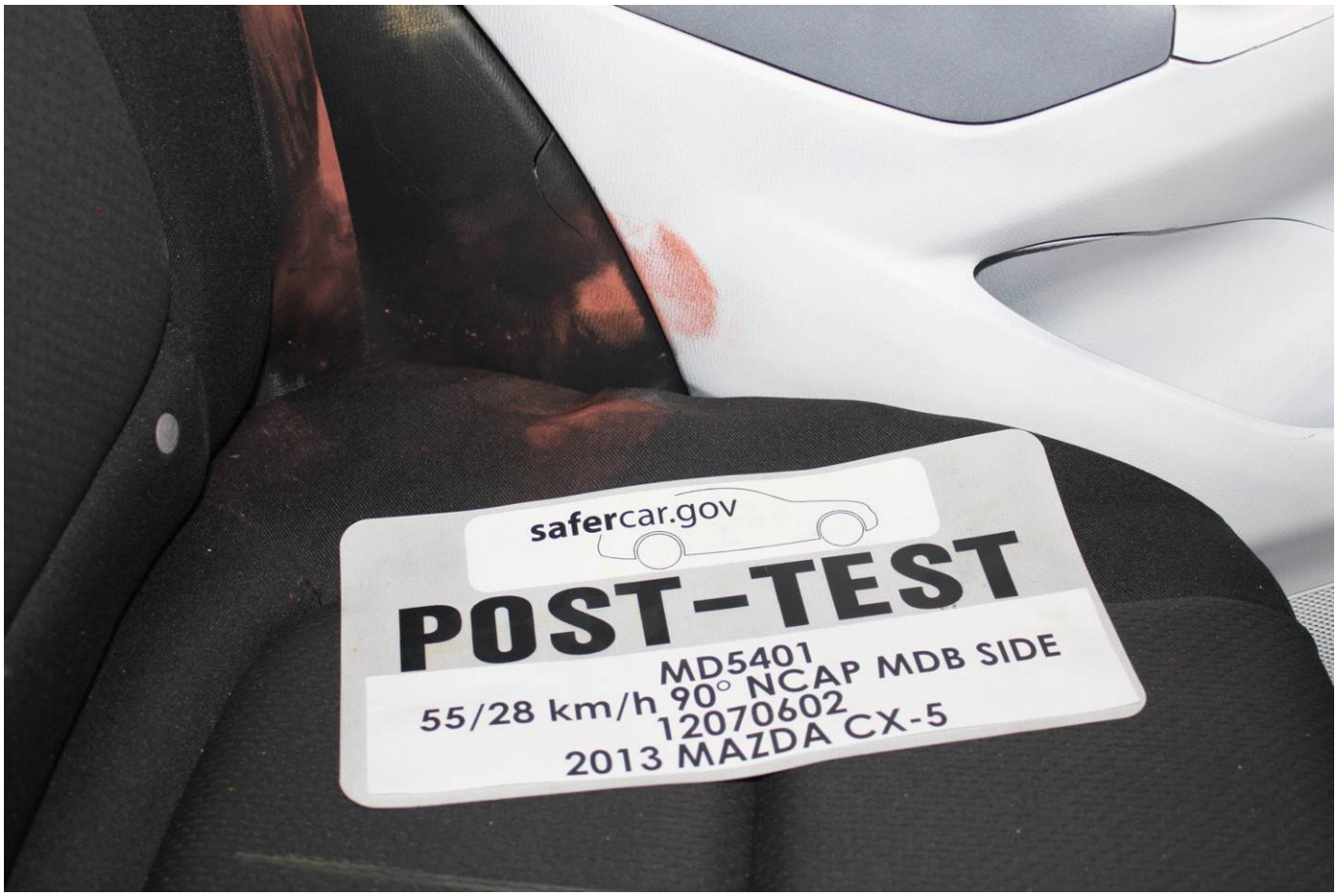
Post-Test Rear Passenger Dummy Close-up Head Contact with Side Airbag View

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

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

PHOTOGRAPH NOT APPLICABLE

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



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

PHOTOGRAPH NOT APPLICABLE

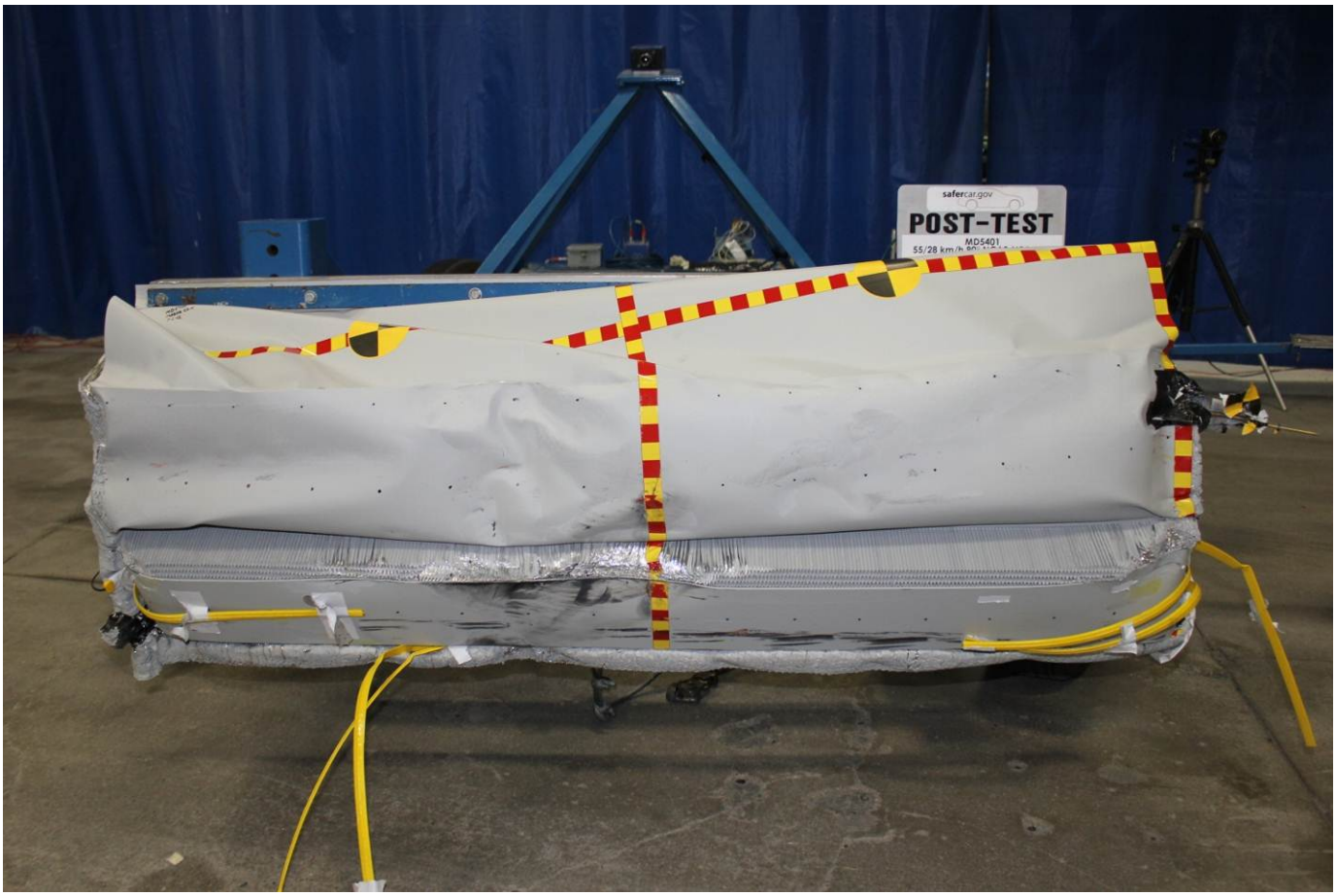
Post-Test Rear Passenger Dummy Close-up Pelvis Contact with Side Airbag View

Post-Test Rear Passenger Dummy Close-up Knee Contact View

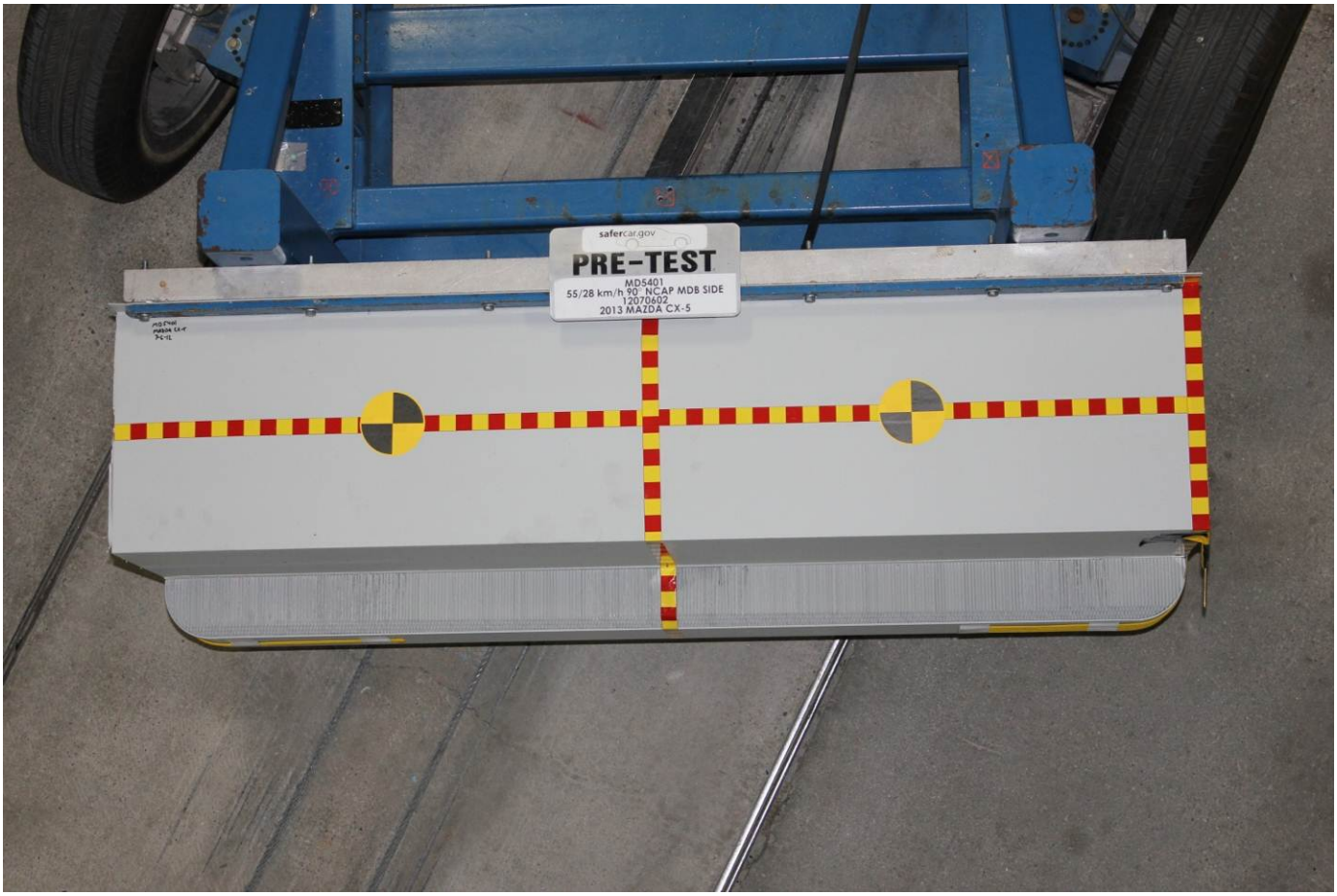
Pre-Test View of Fuel Filler Cap or Fuel Filler Neck

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

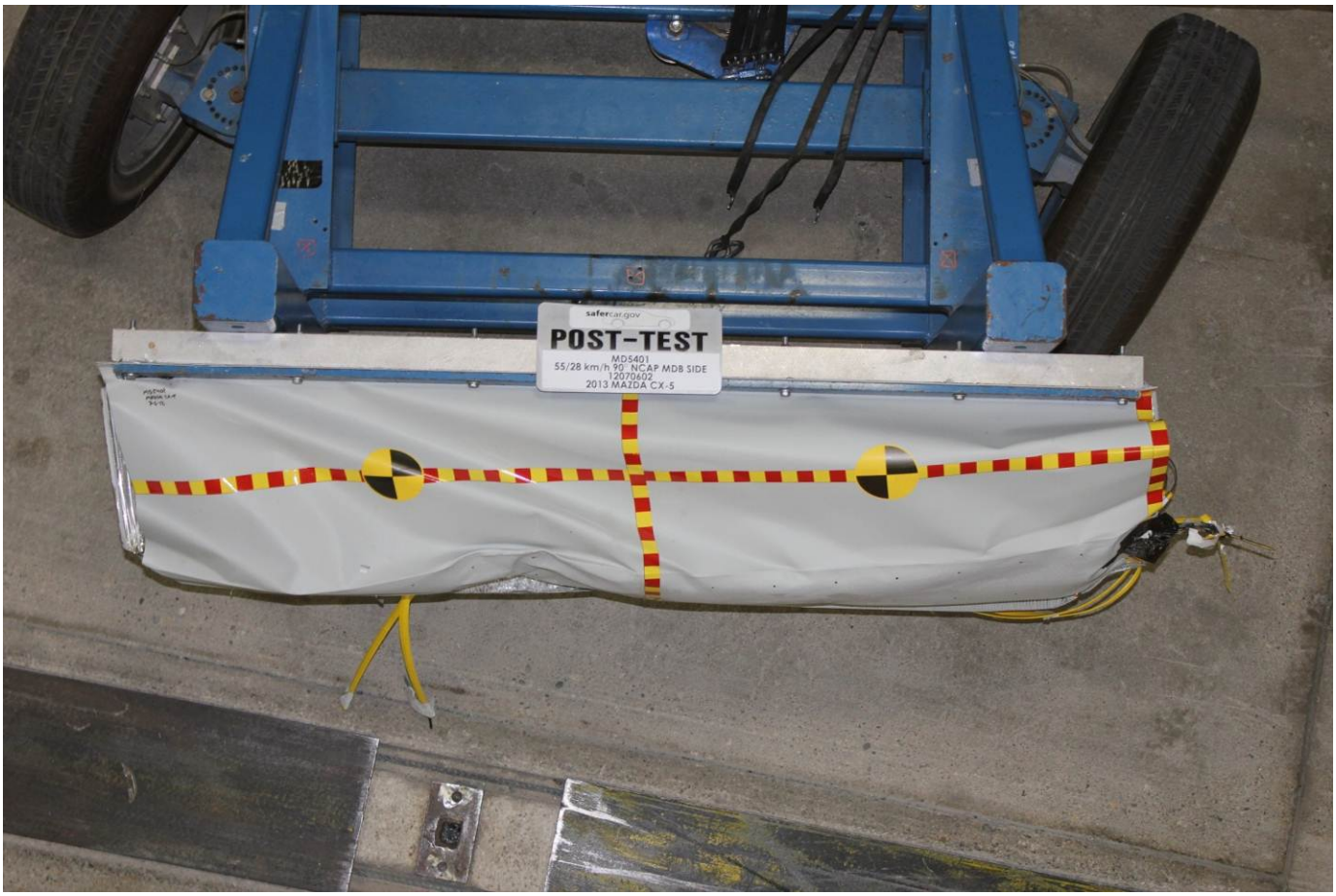
Pre-Test Front View of MDB Impactor Face



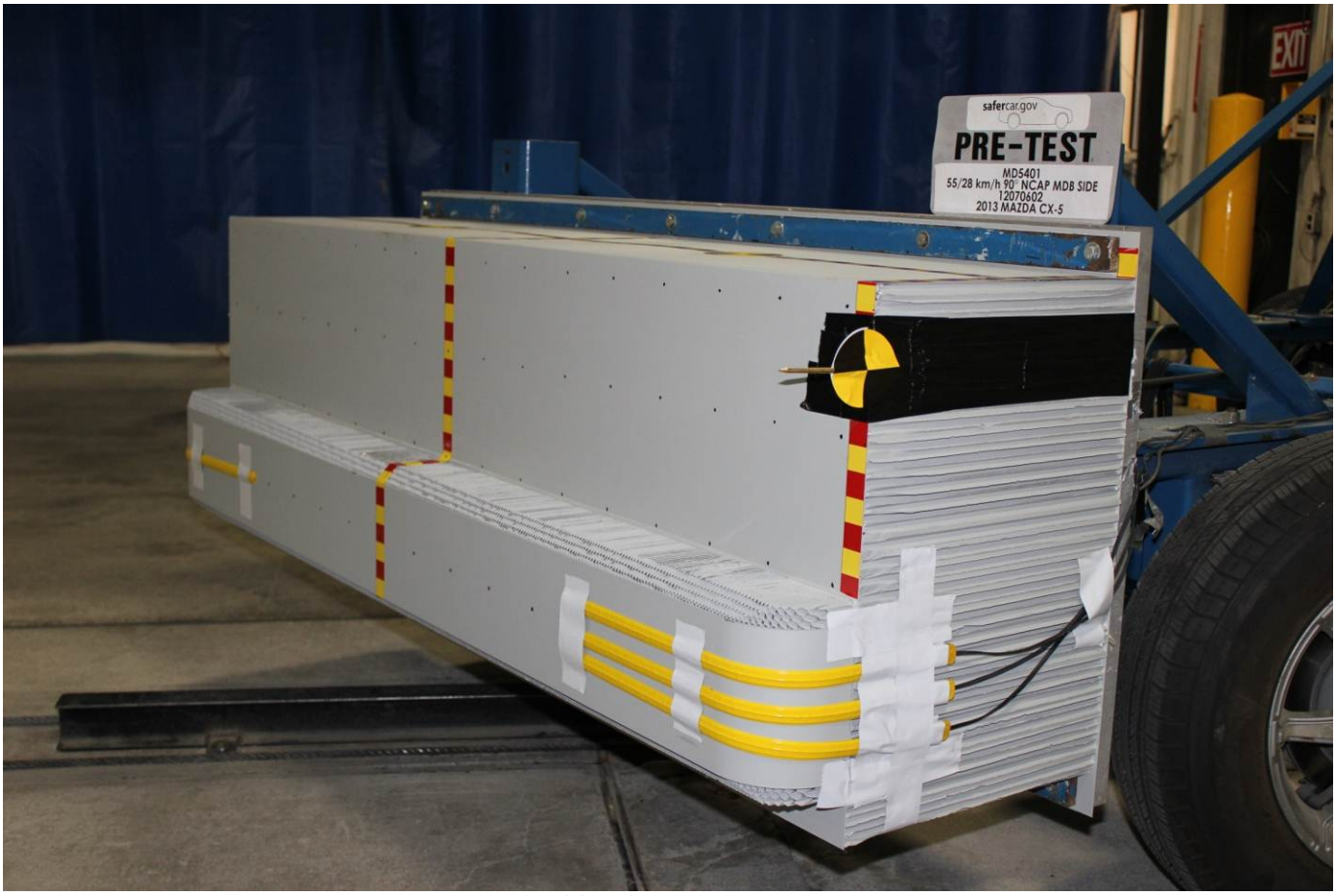
Post-Test Front View of MDB Impactor Face



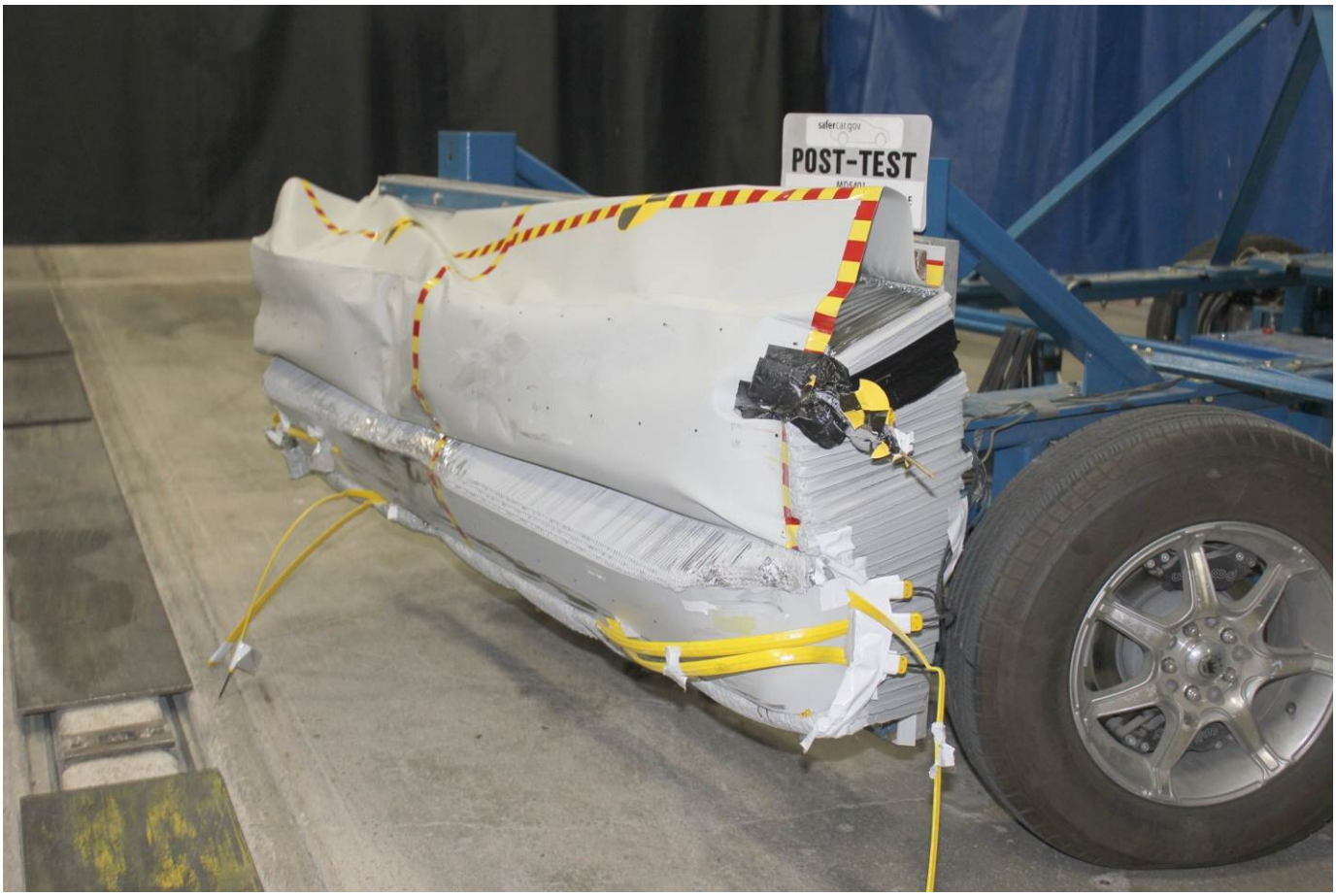
Pre-Test Top View of MDB Impactor Face



Post-Test Top View of MDB Impactor Face



Pre-Test Left Side View of MDB Impactor Face



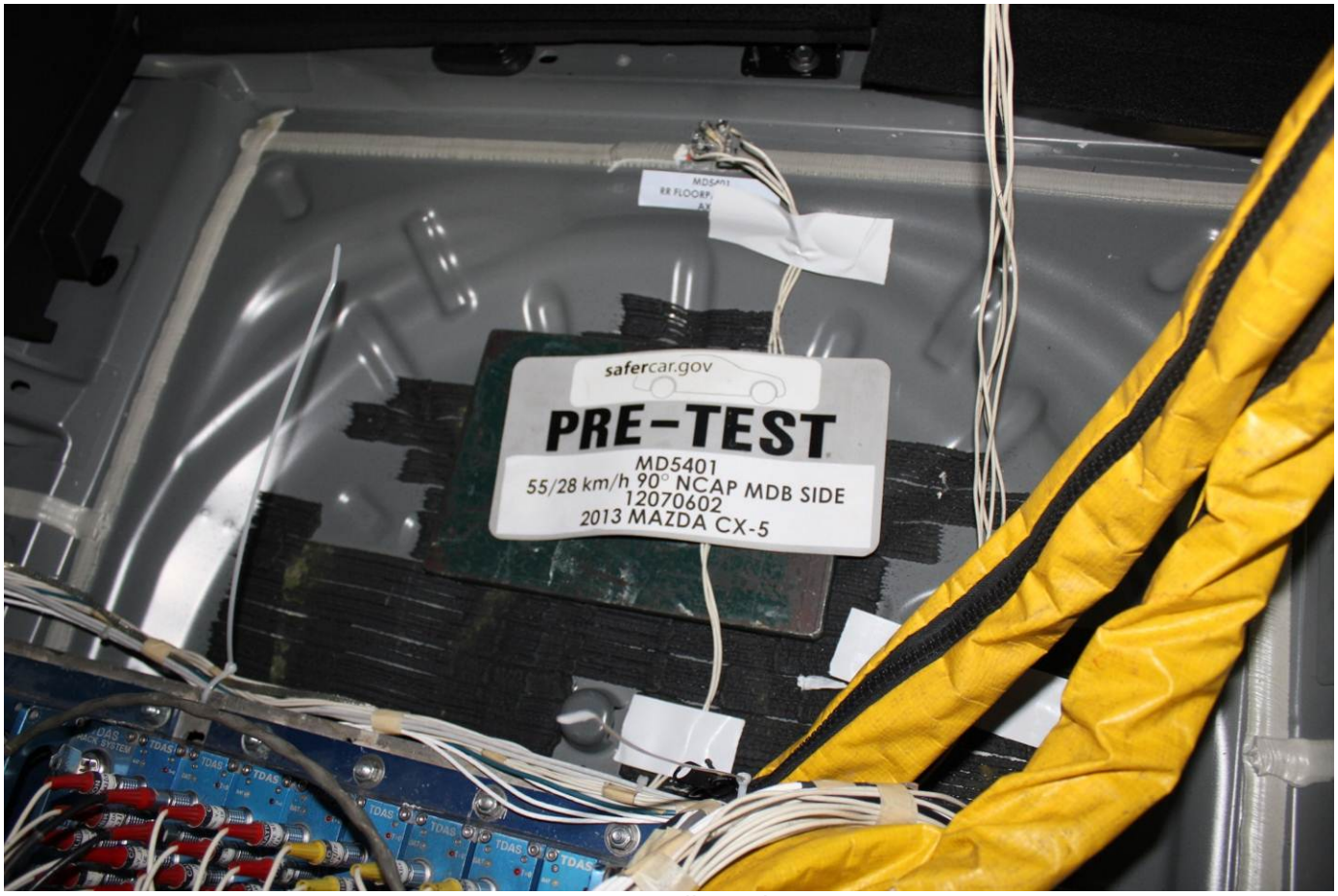
Post-Test Left Side View of MDB Impactor Face

Pre-Test Right Side View of MDB Impactor Face

Post-Test Right Side View of MDB Impactor Face

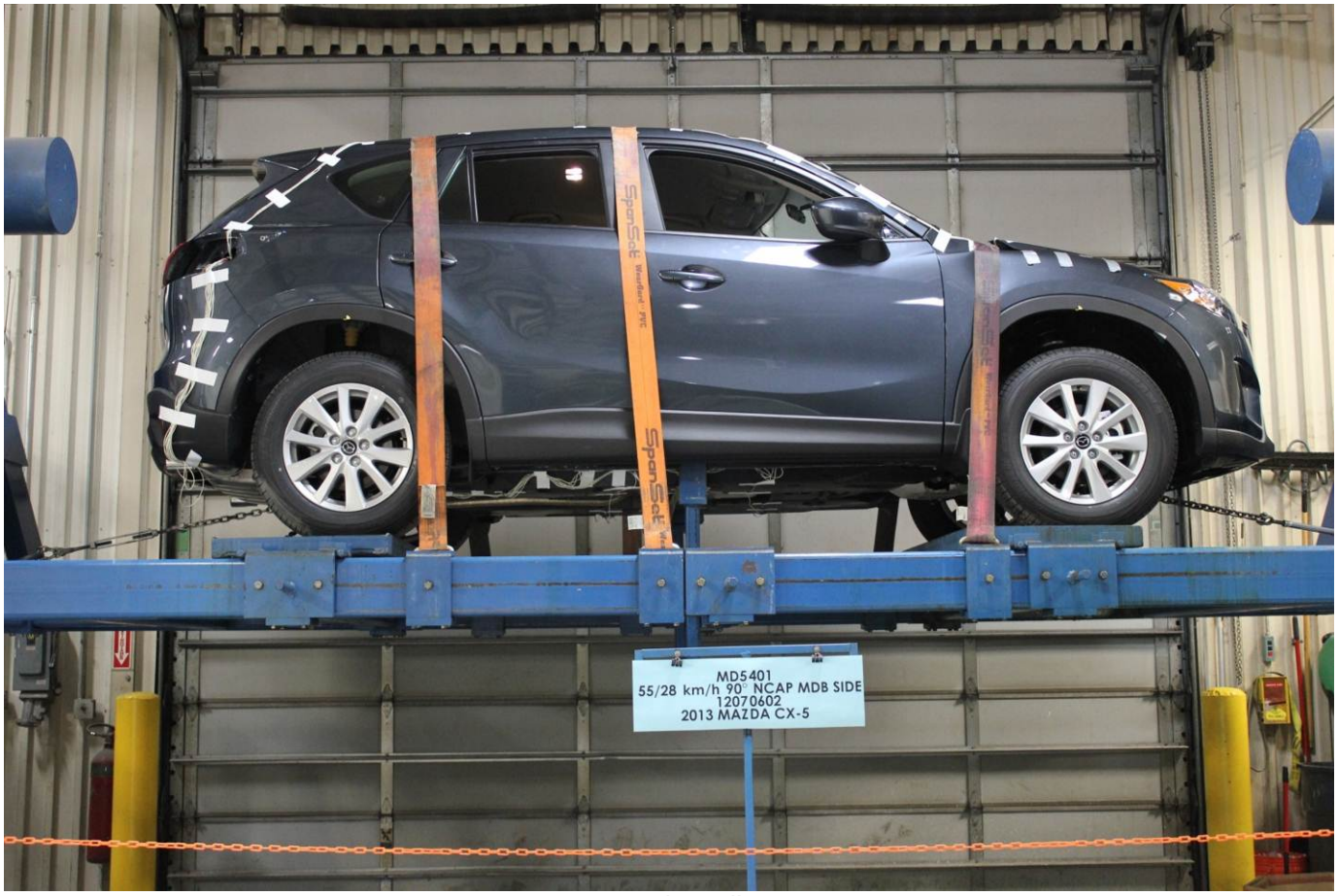
Close-Up View of Vehicle's Certification Label

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

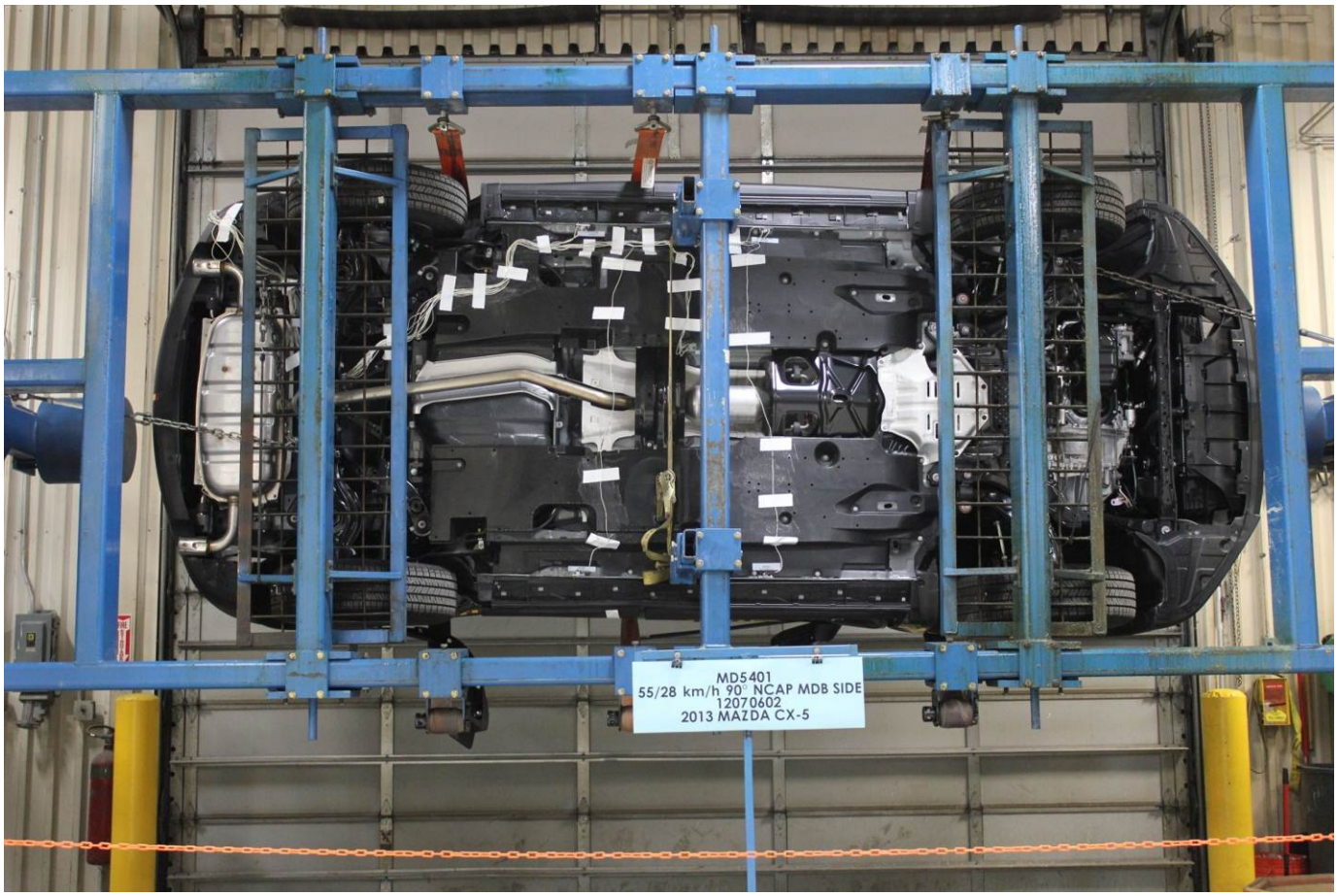


Pre-Test Ballast View

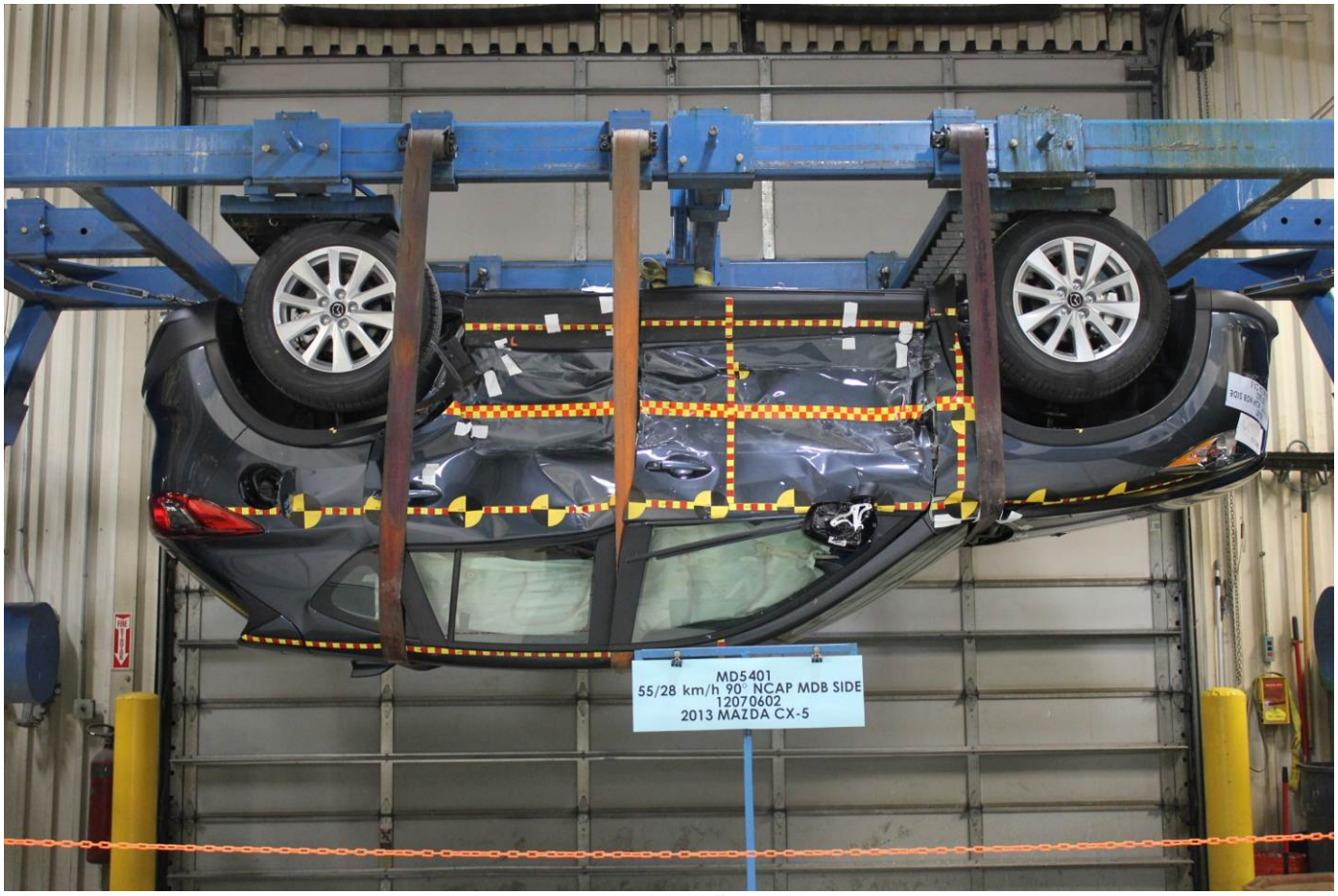
Post-Test Primary and Redundant Speed Trap Read-Out



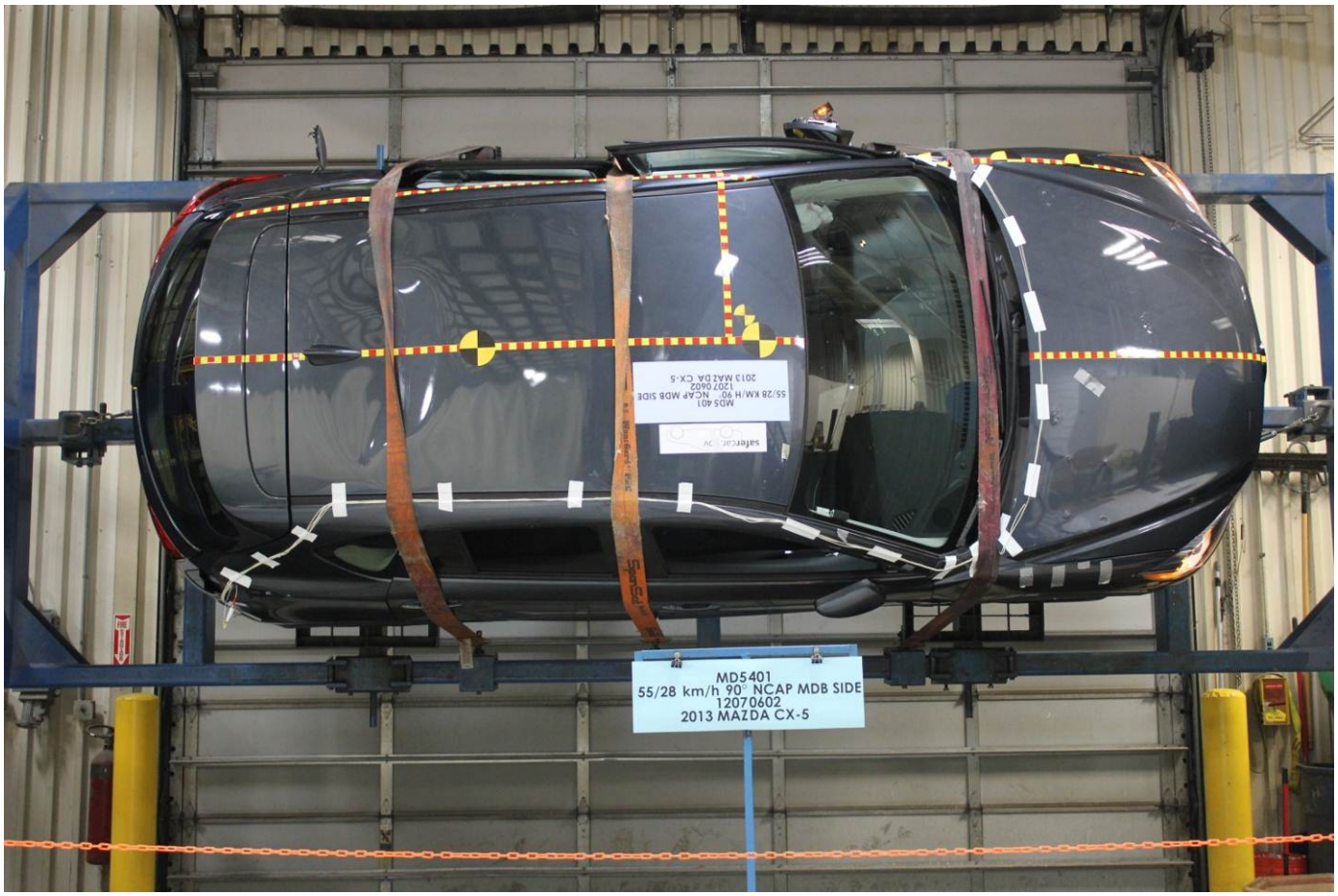
FMVSS No. 301 Static Rollover 0 Degrees



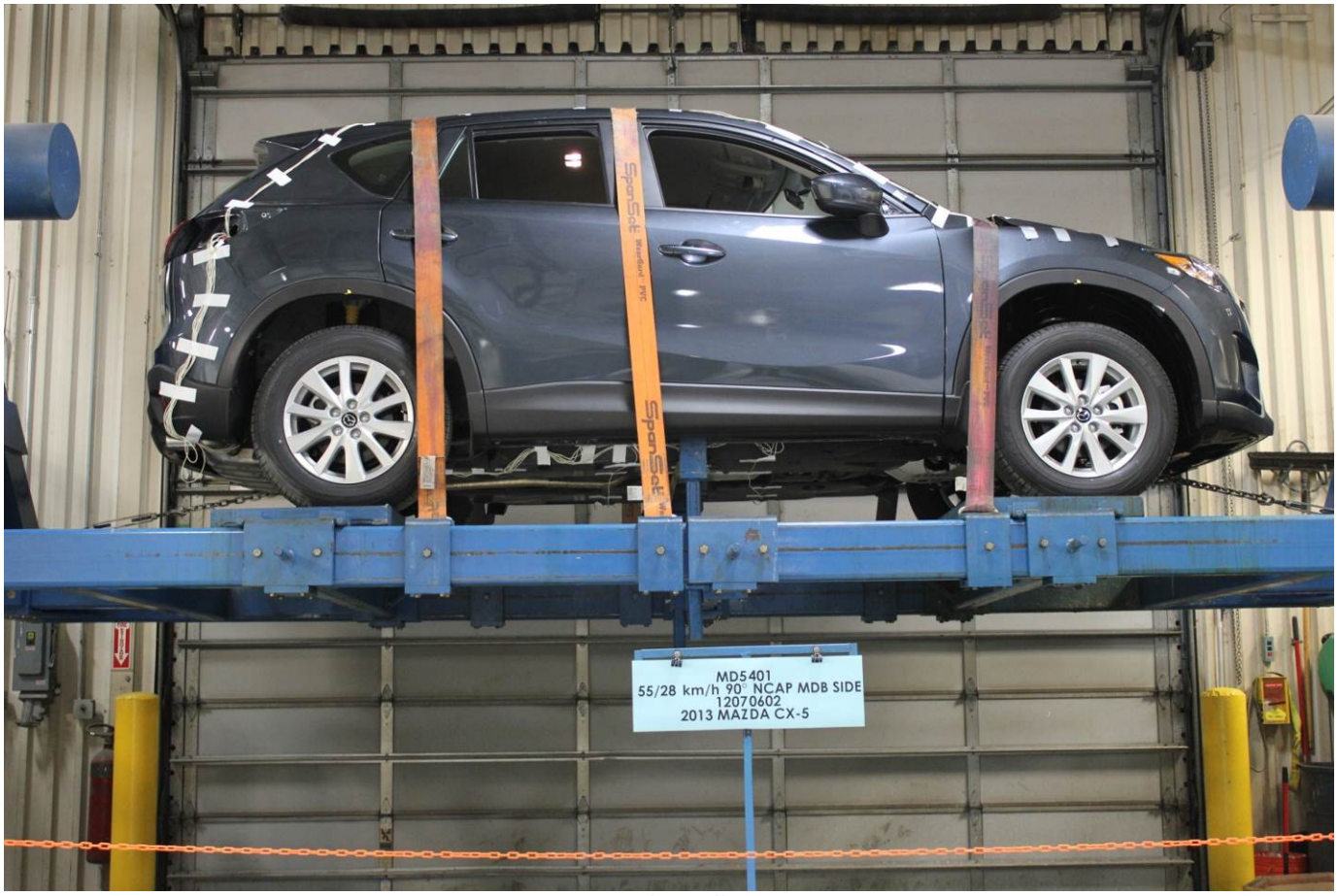
FMVSS No. 301 Static Rollover 90 Degrees



FMVSS No. 301 Static Rollover 180 Degrees



FMVSS No. 301 Static Rollover 270 Degrees



FMVSS No. 301 Static Rollover 360 Degrees

Impact Event

mazda®

Scan for Vehicle Info and offers

EPA DOT Fuel Economy and Environment — Gasoline Vehicle

Fuel Economy: **29** MPG combined city/hwy — 26 city — 35 highway — 3.4 gallons per 100 miles

Small SUVs range from 16 to 32 MPG. The best vehicle rates 112 MPGe.

You save **$2,400** in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost **$1,850**

Fuel Economy & Greenhouse Gas Rating (tailpipe only): 8 (1–10 Best)

Smog Rating (tailpipe only): 5 (1–10 Best)

This vehicle emits 302 grams CO₂ 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~

PARTS CONTENT INFORMATION:

FOR VEHICLES IN THIS CARLINE: U.S./CANADIAN PARTS CONTENT: 5%

MAJOR SOURCES OF FOREIGN PARTS CONTENT: JAPAN 90%

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

FOR THIS VEHICLE:
FINAL ASSEMBLY POINT: HIROSHIMA, JAPAN
COUNTRY OF ORIGIN:
ENGINE: JAPAN
TRANSMISSION: JAPAN

This label is affixed pursuant to the Federal Automobile Disclosure Act. Gasoline, License and Title fees, State and Local taxes, and Dealer installed options are not included.

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score		**Not 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	**Not Rated**
	Passenger	**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	**Not Rated**
	Rear seat	**Not Rated**
Based on the risk of injury in a side impact.		
Rollover		**Not 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

SOLD TO: 61570
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21111 ALLEN ROAD
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JM3KE2BE4D0104373

CX5–SP-2P—KE40NAD-TA—TA—20120504

MazdaUSA.COM

2013 CX-5 SKYACTIV® TECHNOLOGY

Model: 2013 CX-5 SPORT FRONT WHEEL DRIVE
Exterior Color: METROPOLITAN GRAY MC
Interior Color: BLACK

STANDARD EQUIPMENT

ENGINE/MECHANICAL FEATURES
- SKYACTIV-G 2.0L ENGINE
- SKYACTIV-MT 6-SP MANUAL TRANS
- 155 HORSEPOWER; 150 LB-FT TORQUE
- FRONT-WHEEL DRIVE
- 4-WHEEL DISC BRAKES
- ELECTRIC POWER ASSISTED STEERING
- INDEPENDENT FRONT/REAR SUSPENSION
- FRONT & REAR STABILIZER BARS

EXTERIOR FEATURES
- 17-INCH ALLOY WHEELS
- P225/65 R17 ALL-SEASON TIRES
- VARIABLE INTERMITTENT WIPERS
- FIXED-INTERMITTENT REAR WIPER
- POWER MIRRORS W/TURN LAMPS
- HALOGEN HEADLIGHTS
- DAYTIME RUNNING LIGHTS
- STAINLESS STEEL EXHAUST OUTLETS
- REAR ROOF SPOILER
- ROOF MOUNTED SHARK FIN ANTENNA

INTERIOR FEATURES
- 5-PASSENGER SEATING
- TILT & TELESCOPIC STEERING COLUMN
- STEERING WHEEL W/ AUDIO/CRUISE CONTROLS
- POWER AUTOMATIC DOOR LOCKS
- POWER WINDOWS W/DRIVER ONE-TOUCH
- CLOTH TRIMMED SPORT SEATS
- CARPETED FLOOR MATS
- REMOTE KEYLESS ENTRY
- AIR CONDITIONING W/ POLLEN FILTER
- DUAL VANITY MIRRORS
- 60/40 SPLIT FOLD-DOWN REAR SEAT
- AM/FM/CD/MP3 4-SPEAKER AUDIO
- AUXILIARY INPUT JACK & USB PORT
- CENTER ARMREST W/COVERED STORAGE
- 6-WAY MANUAL DRIVER'S SEAT

SAFETY AND SECURITY FEATURES
- 36-MONTH/36,000 MILE "BUMPER-TO-BUMPER" WARRANTY
- 60 MONTH/60,000 MILE POWERTRAIN WARRANTY
- 24-HOUR ROADSIDE ASSISTANCE
- ANTI-LOCK BRAKE SYSTEM (ABS) WITH EBD & BRAKE ASSIST)
- 5-PASSENGER 3-PT SAFETY BELTS
- LATCH CHILD SAFETY SEAT ANCHORS
- DYNAMIC STABILITY CONTROL (DSC)
- TRACTION CONTROL SYSTEM (TCS)
- HILL LAUNCH ASSIST
- ADVANCED DUAL FRONT AND FRONT SIDE-IMPACT AIR BAGS
- FRONT & REAR SIDE AIR CURTAINS
- SKYACTIV BODY - RING STRUCTURE
- TIRE PRESSURE MONITORING SYSTEM
- ANTI-THEFT ENGINE IMMOBILIZER

MSRP $20,695

OPTIONAL EQUIPMENT

WLK	WHEEL LOCKS	$55
	Total Vehicle and Options	$20,750
	Delivery, Processing and Handling Fee	$795
	Total MSRP	**$21,545**

Monroney Label

Removal/Installation

To remove the head restraint, pull it up while pressing the stop-catch.
To install the head restraint, insert the uprights into the holes while pressing the stop-catch.

⚠ WARNING

Always drive with the head restraints installed when seats are being used and make sure they are properly installed:

Driving with the head restraints not installed is dangerous. With no support behind your head, your neck could be seriously injured in a collision.

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

Head Restraints

Your vehicle is equipped with head restraints on all outboard seats and the rear center seat. The head restraints are intended to help protect you and the passengers from neck injury.

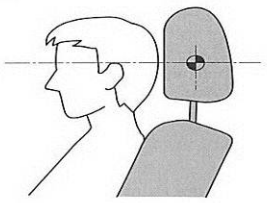
⚠ WARNING

Always drive with the head restraints installed when seats are being used and make sure they are properly adjusted.:

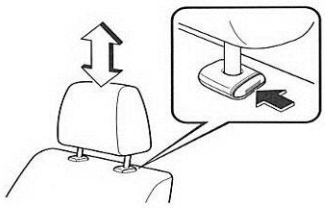
Driving with the head restraints adjusted too low or removed is dangerous. With no support behind your head, your neck could be seriously injured in a collision.

Height adjustment

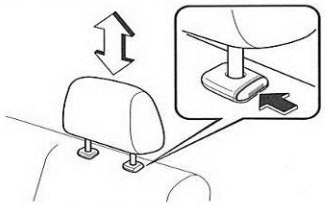
To raise a head restraint, pull it up to the desired position.
To lower the head restraint, press the stop-catch release, then push the head restraint down.
Adjust the head restraint so that the center is even with the top of the passenger's ears.



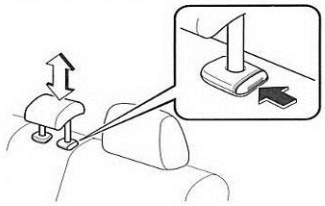
Front outboard seat



Rear outboard seat



Rear center seat



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

APPENDIX B

DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS
Driver Dummy Instrumentation Plots

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

Additional Driver & Passenger Dummy Instrumentation Data

Driver Lower Spine T12 Acceleration (X)

Driver Lower Spine T12 Acceleration (Y)

Driver Lower Spine T12 Acceleration (Z)

Passenger Upper Thorax Rib Deflection (Y)

Passenger Middle Thorax Rib Deflection (Y)

Passenger Lower Thorax Rib Deflection (Y)

Passenger Upper Abdomen Rib Deflection (Y)

Passenger Lower Abdomen Rib Deflection (Y)

Driver Head Acceleration Redundant (X)

Driver Head Acceleration Redundant (Y)

Driver Head Acceleration Redundant (Z)

Passenger Head Acceleration Redundant (X)

Passenger Head Acceleration Redundant (Y)

Passenger Head Acceleration Redundant (Z)

Vehicle Instrumentation Data

Vehicle Center of Gravity Acceleration (X)

Vehicle Center of Gravity Acceleration (Y)

Vehicle Center of Gravity Acceleration (Z)

Right Side Sill at Front Seat Acceleration (X)

Right Side Sill at Front Seat Acceleration (Y)

Right Side Sill at Front Seat Acceleration (Z)

Right Side Sill at Rear Seat Acceleration (X)

Right Side Sill at Rear Seat Acceleration (Y)

Right Side Sill at Rear Seat Acceleration (Z)

Left Side Sill at Front Seat Acceleration (Y)

Left Side Sill at Rear Seat Acceleration (Y)

Lower A-Post Acceleration (Y)

Middle A-Post Acceleration (Y)

Lower B-Post Acceleration (Y)

Middle B-Post Acceleration (Y)

Front Seat Track Acceleration (Y)

Rear Seat Track Acceleration (Y)

Right Rear Occupant Compartment Acceleration (Y)

Engine Block (X)

Engine Block (Y)

Rear Floorpan Above Axle Acceleration (X)

Rear Floorpan Above Axle Acceleration (Y)

Rear Floorpan Above Axle Acceleration (Z)

MDB Instrumentation Data

MDB Center of Gravity Acceleration (X)

MDB Center of Gravity Acceleration (Y)

MDB Center of Gravity Acceleration (Z)

MDB Rear Acceleration (X)

MDB Rear Acceleration (Y)

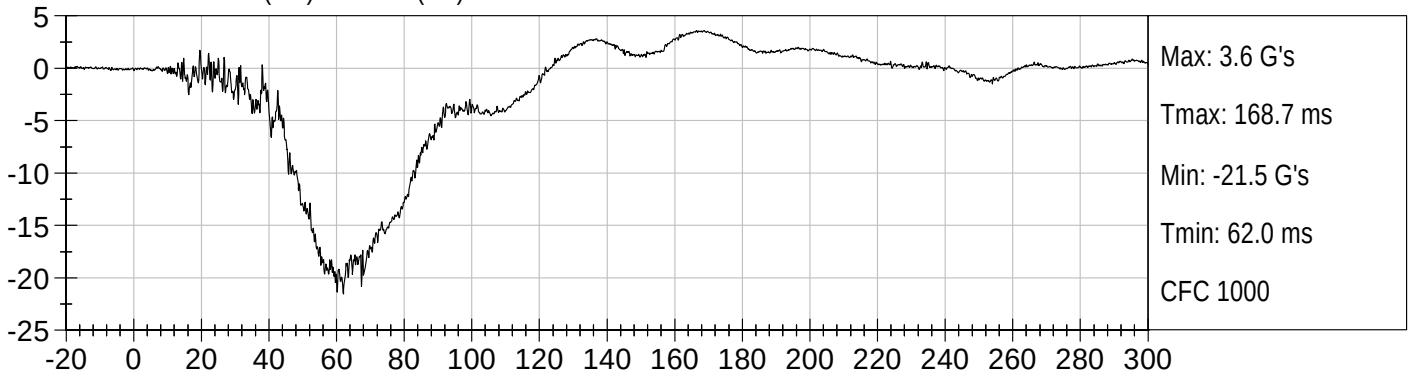
Left MDB Contact Switch

Right MDB Contact Switch

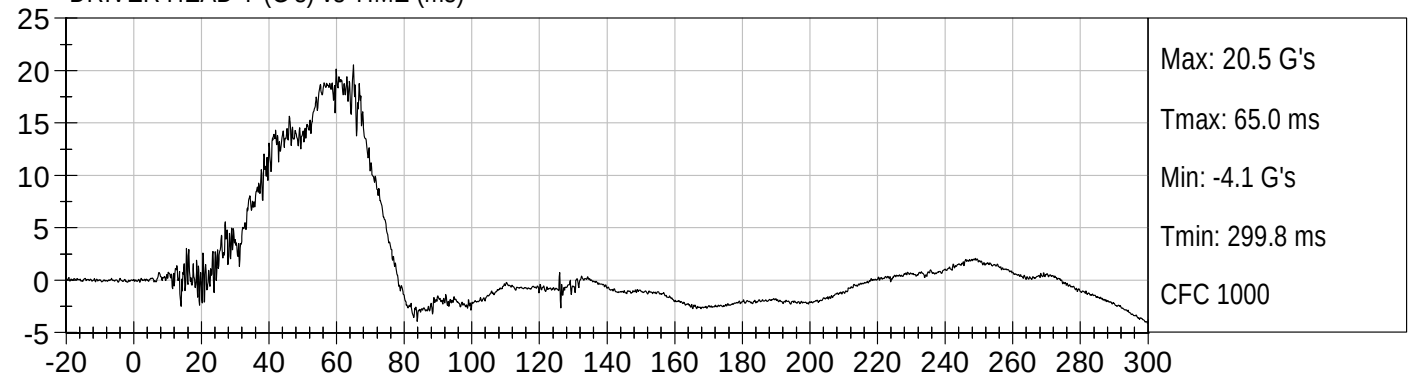
55/28 km/h 90° MDB Side Impact
2013 Mazda CX-5 Sport Front Wheel Drive - MD5401

Test Date: 07/06/2012
Speed: 38.8 mph (62.5 km/h)

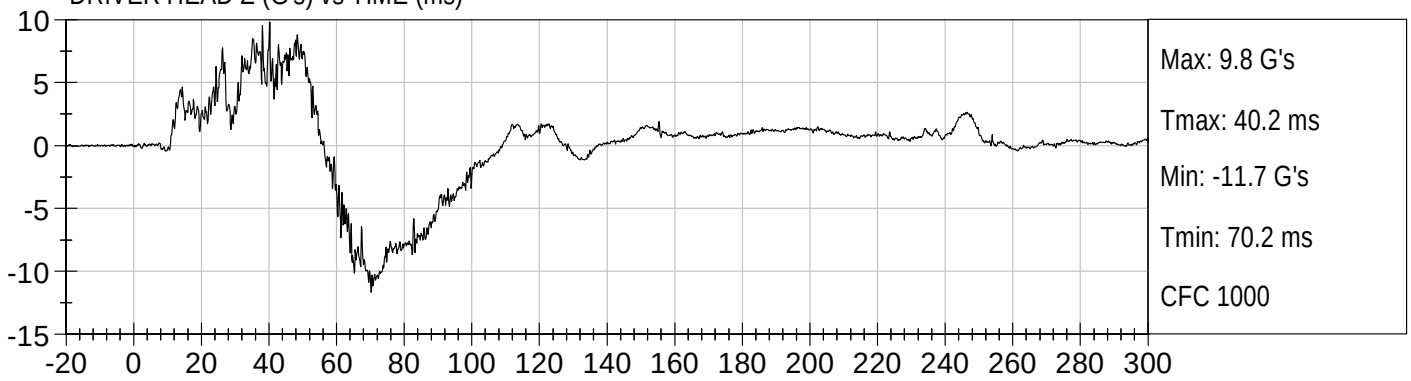
DRIVER HEAD X (G's) vs TIME (ms)



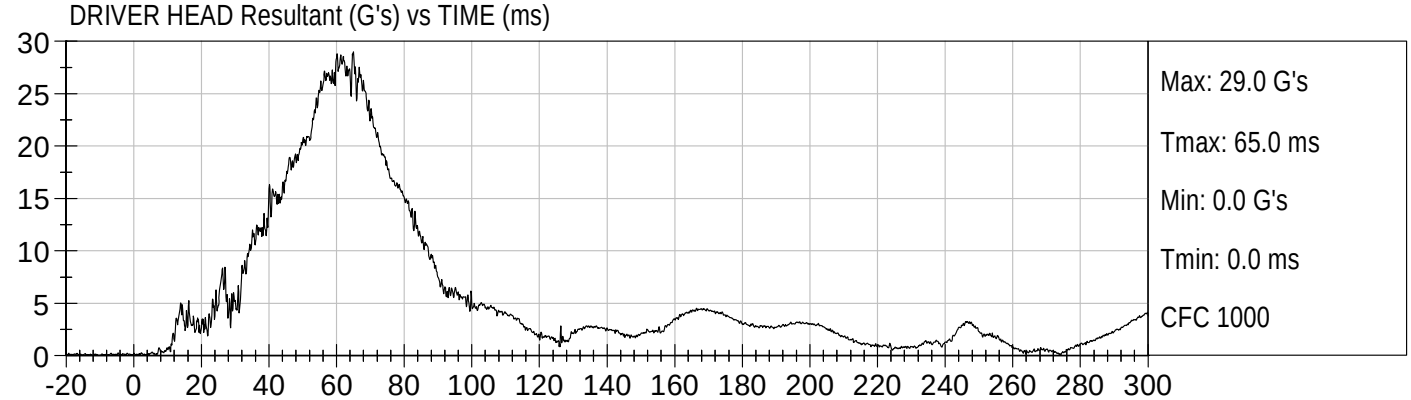
DRIVER HEAD Y (G's) vs TIME (ms)



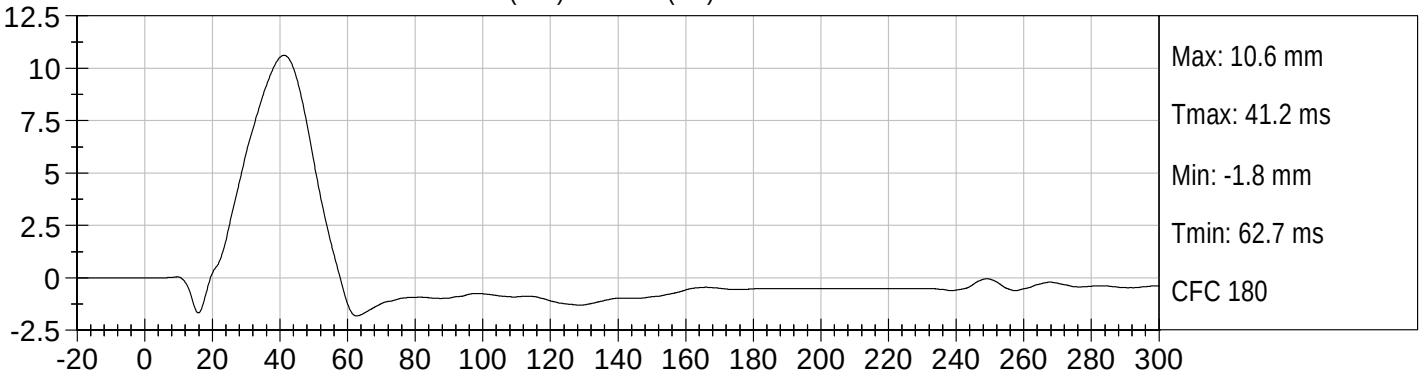
DRIVER HEAD Z (G's) vs TIME (ms)



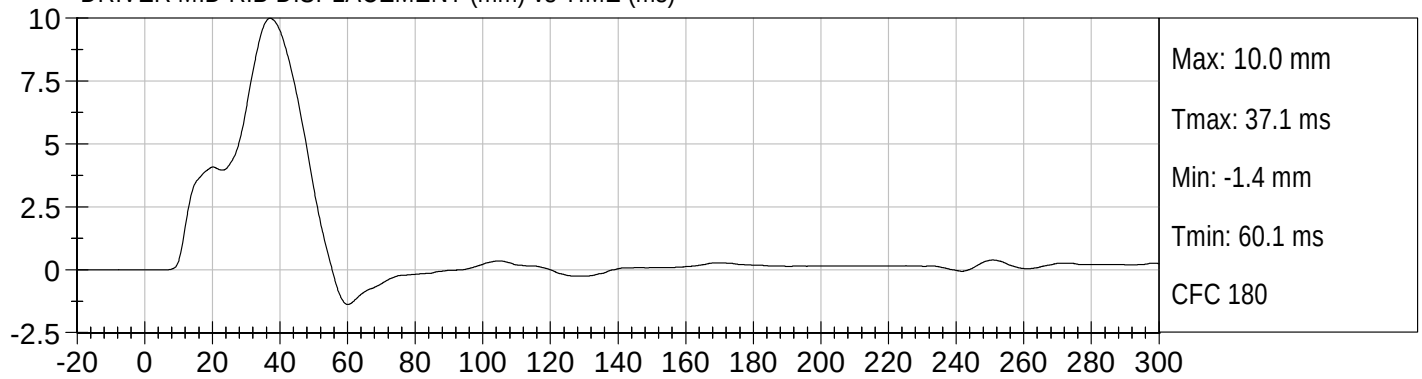
DRIVER HEAD Resultant (G's) vs TIME (ms)



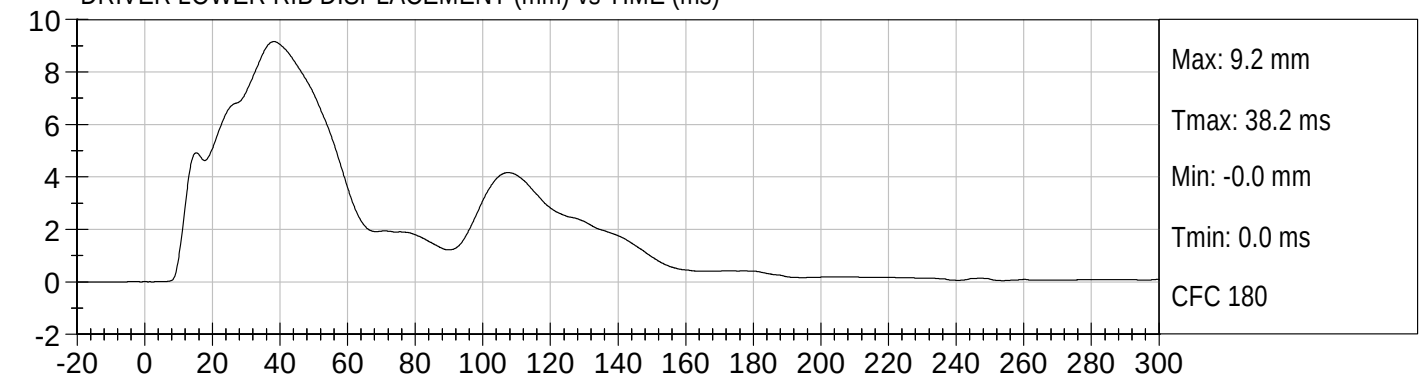
DRIVER UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



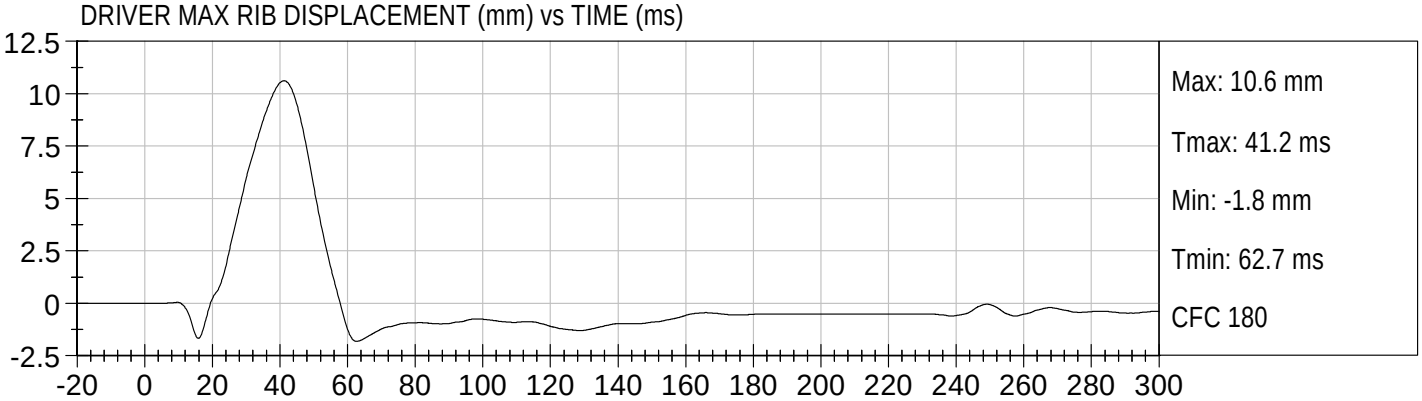
DRIVER MID RIB DISPLACEMENT (mm) vs TIME (ms)



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



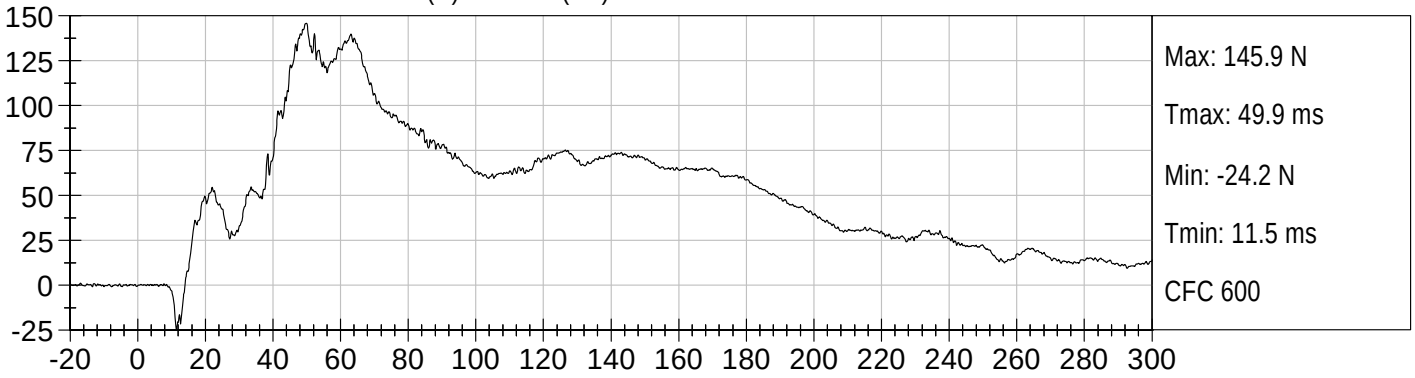
DRIVER MAX RIB DISPLACEMENT (mm) vs TIME (ms)



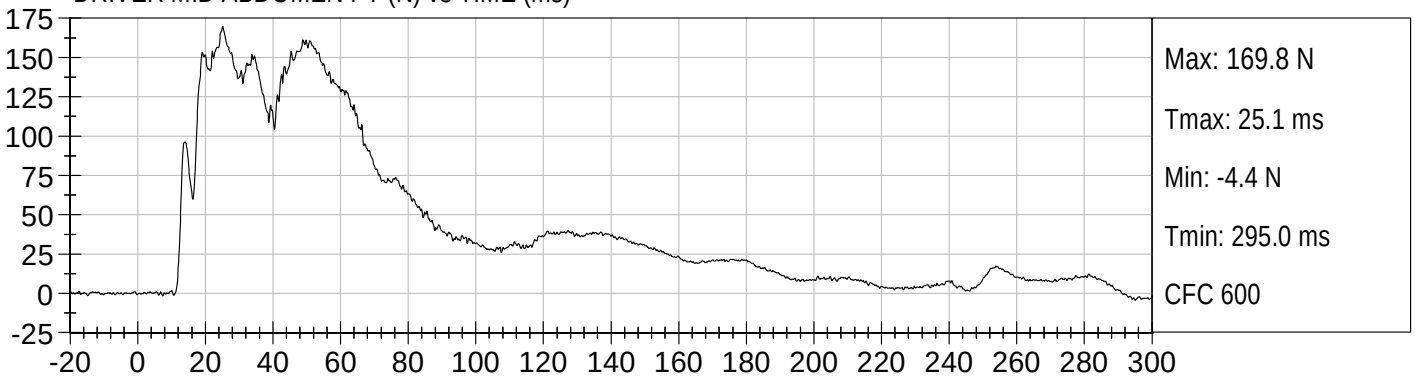
55/28 km/h 90° MDB Side Impact
2013 Mazda CX-5 Sport Front Wheel Drive - MD5401

Test Date: 07/06/2012
Speed: 38.8 mph (62.5 km/h)

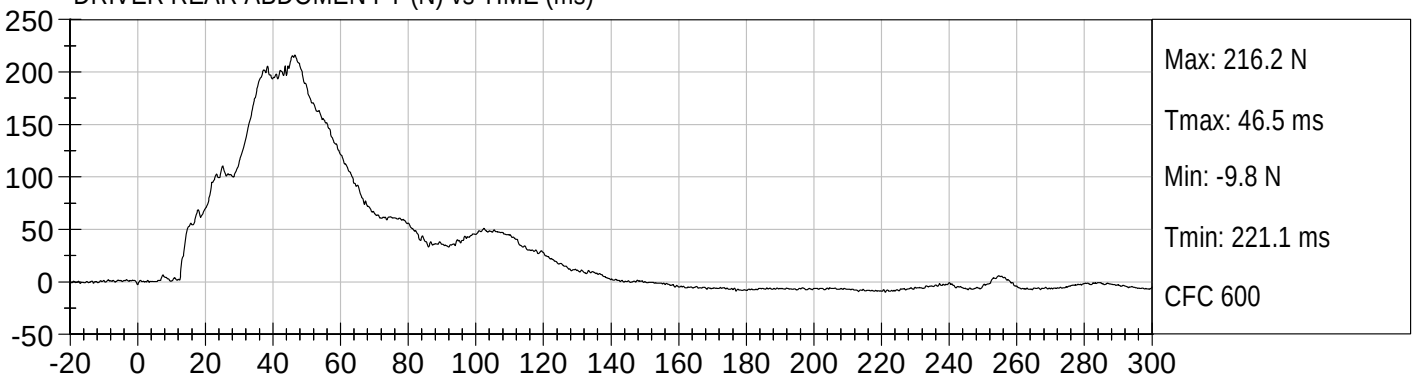
DRIVER FRONT ABDOMEN FY (N) vs TIME (ms)



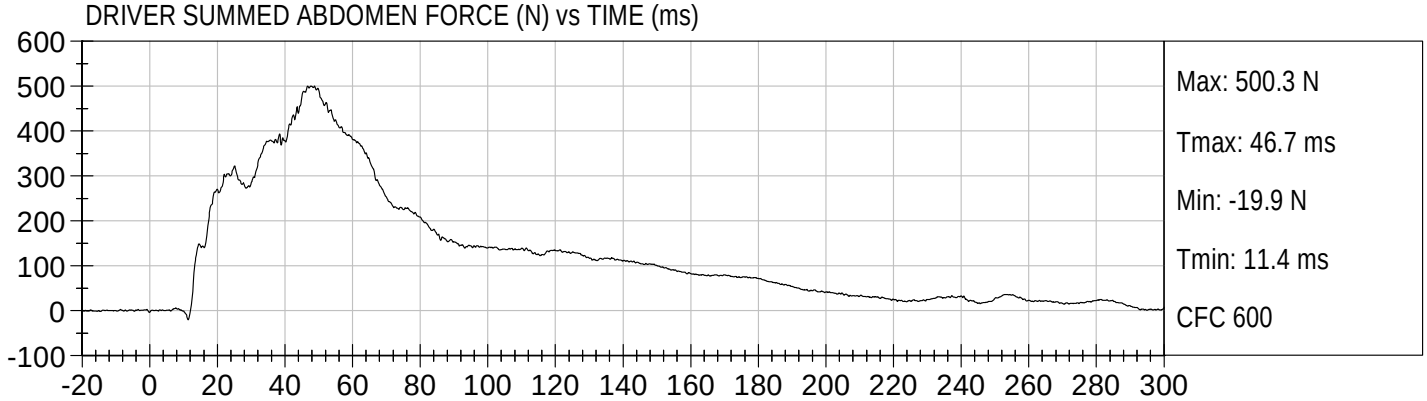
DRIVER MID ABDOMEN FY (N) vs TIME (ms)



DRIVER REAR ABDOMEN FY (N) vs TIME (ms)

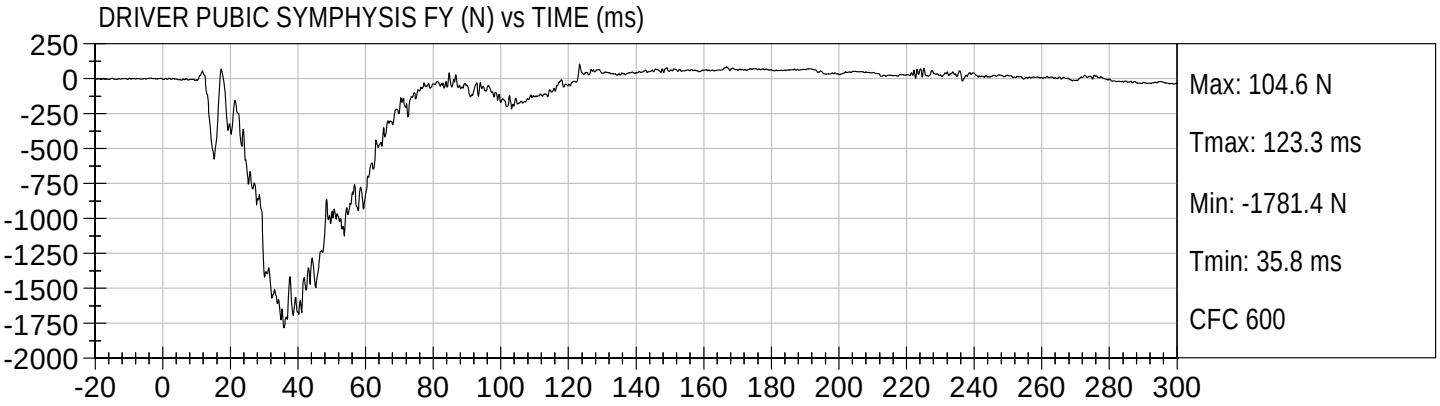


DRIVER SUMMED ABDOMEN FORCE (N) vs TIME (ms)



55/28 km/h 90° MDB Side Impact
2013 Mazda CX-5 Sport Front Wheel Drive - MD5401

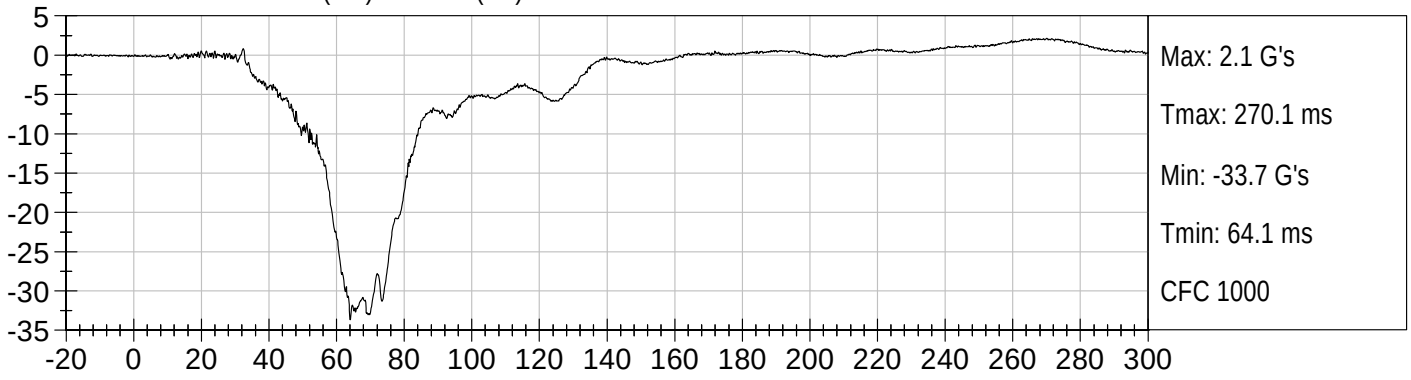
Test Date: 07/06/2012
Speed: 38.8 mph (62.5 km/h)



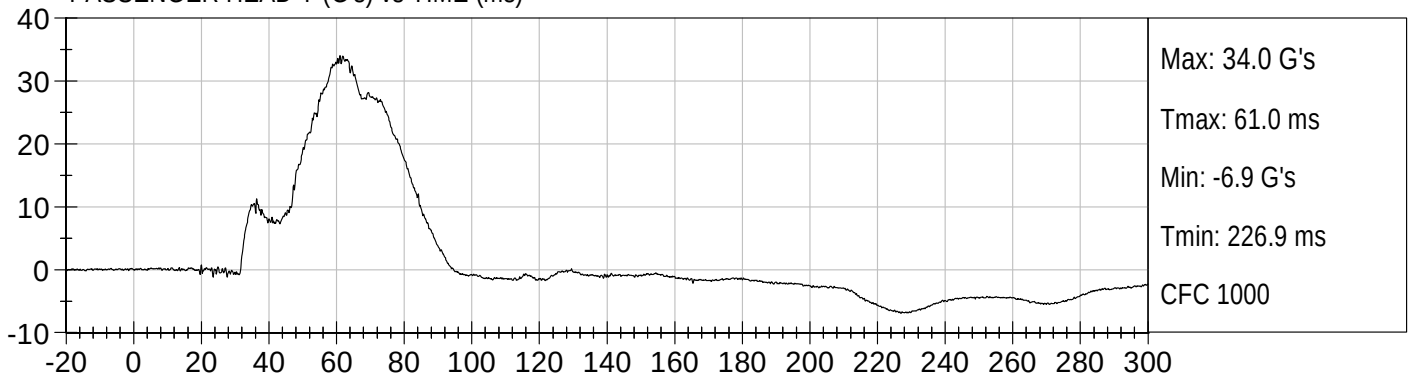
55/28 km/h 90° MDB Side Impact
2013 Mazda CX-5 Sport Front Wheel Drive - MD5401

Test Date: 07/06/2012
Speed: 38.8 mph (62.5 km/h)

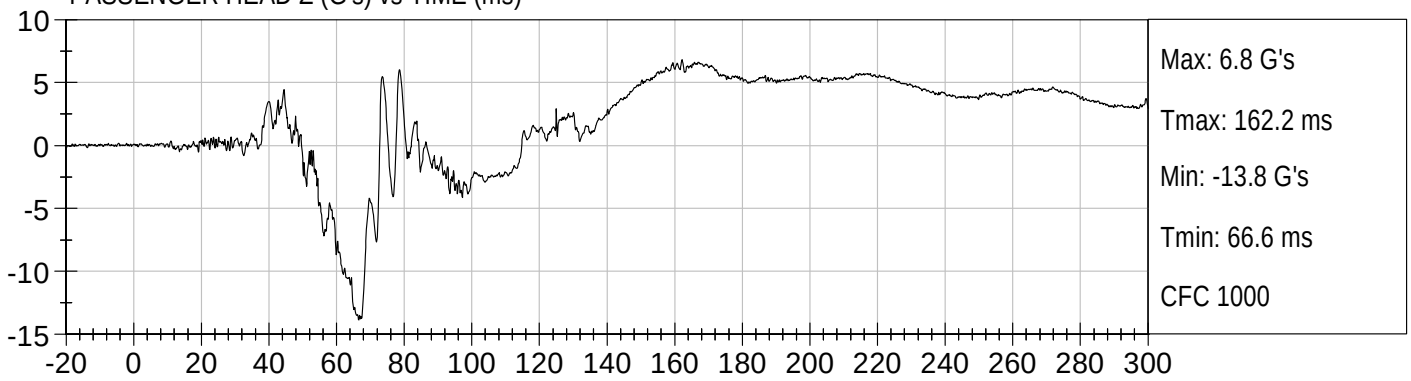
PASSENGER HEAD X (G's) vs TIME (ms)



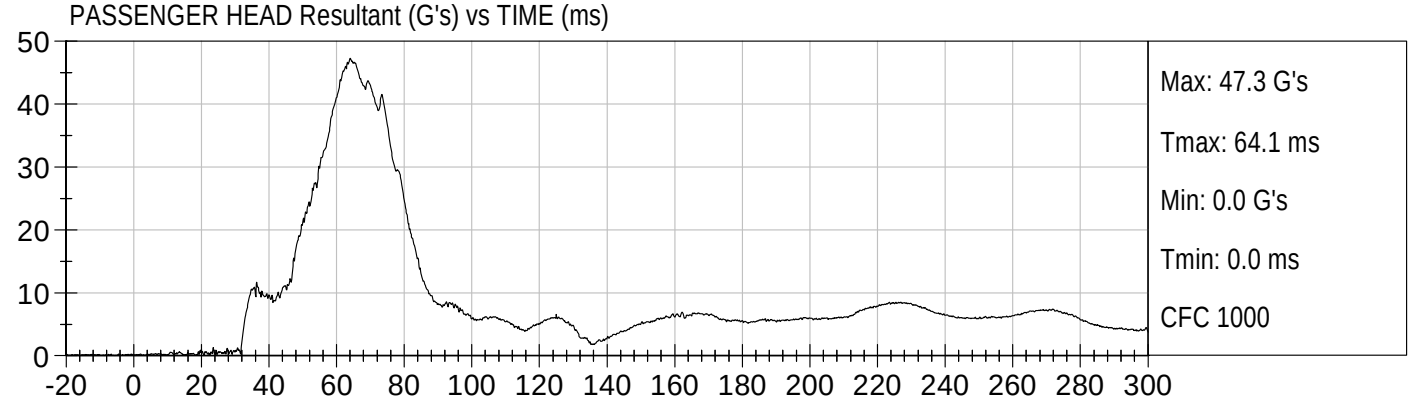
PASSENGER HEAD Y (G's) vs TIME (ms)



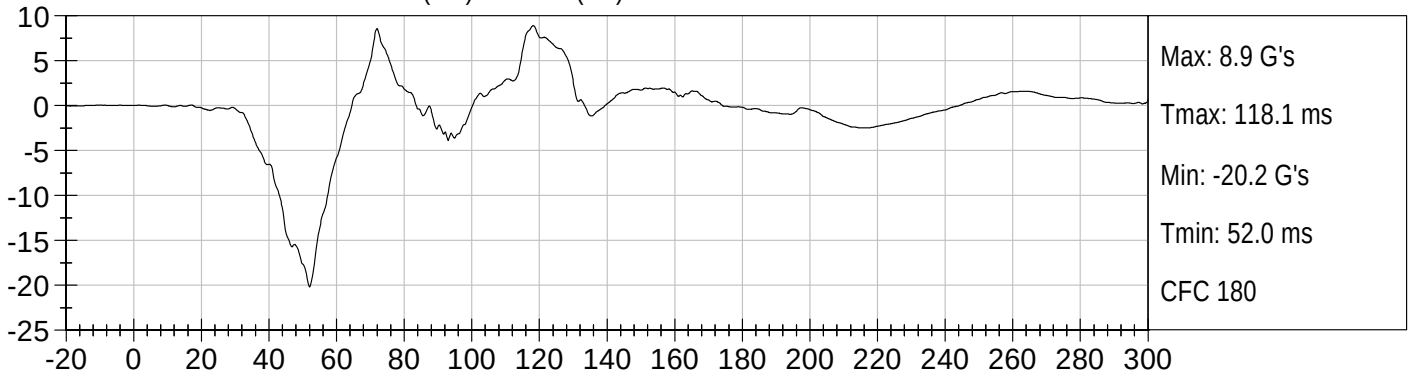
PASSENGER HEAD Z (G's) vs TIME (ms)



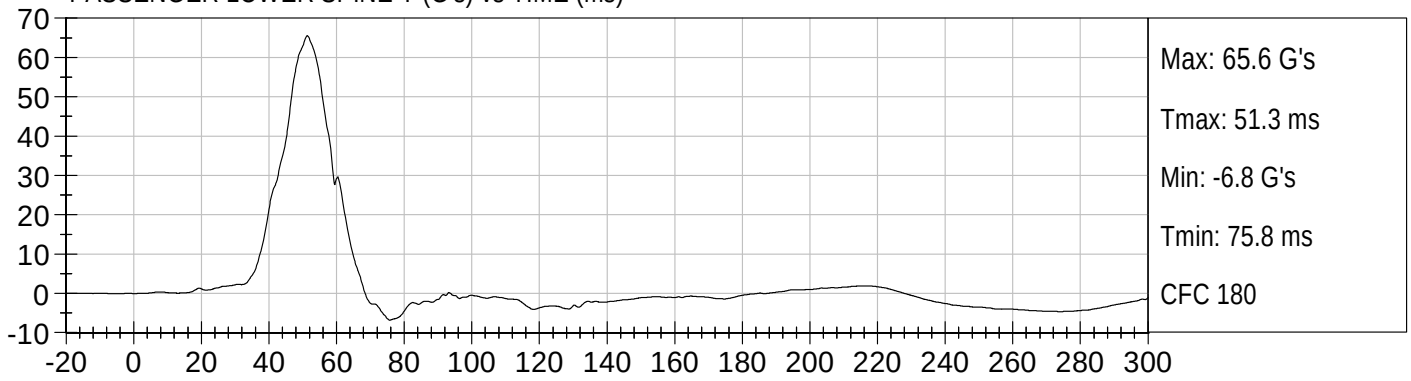
PASSENGER HEAD Resultant (G's) vs TIME (ms)



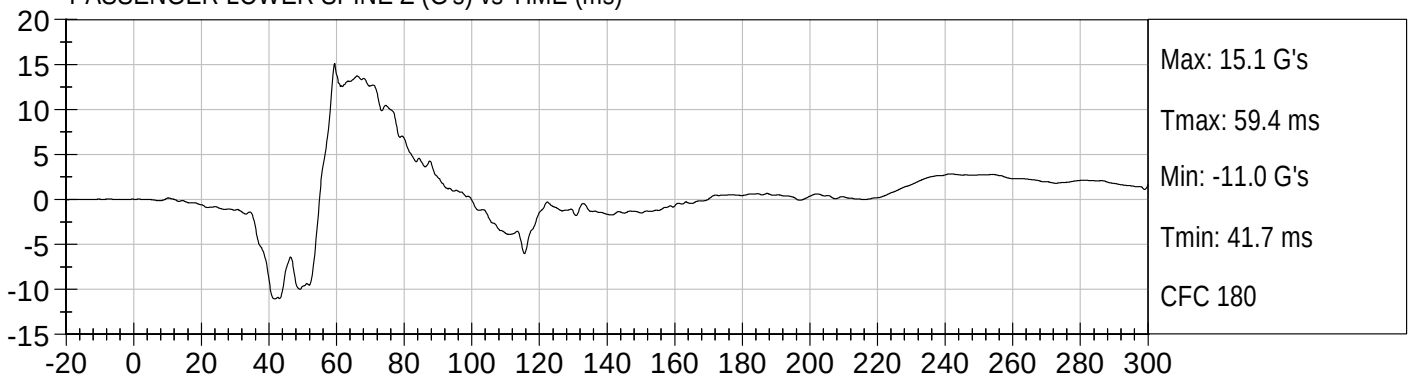
PASSENGER LOWER SPINE X (G's) vs TIME (ms)



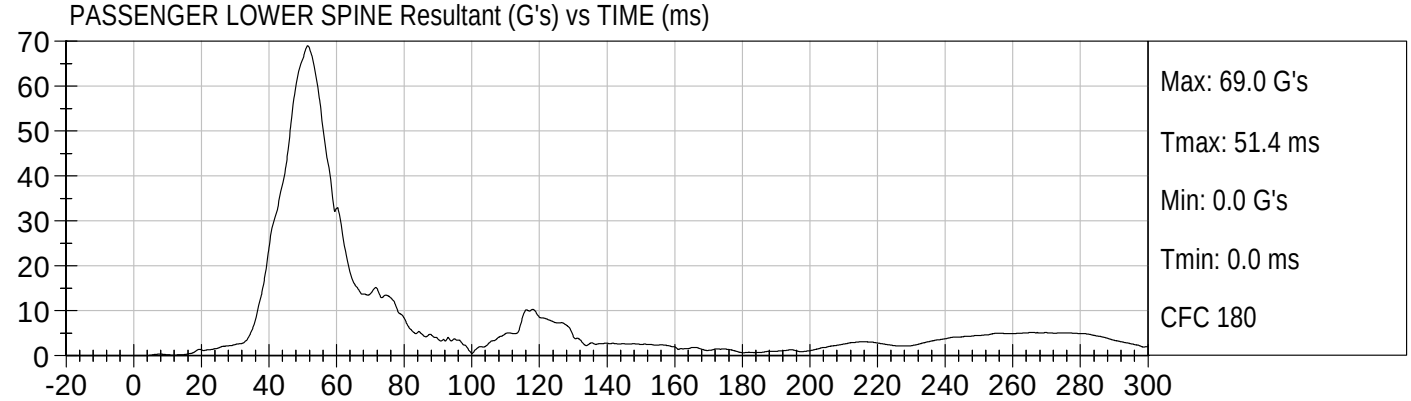
PASSENGER LOWER SPINE Y (G's) vs TIME (ms)



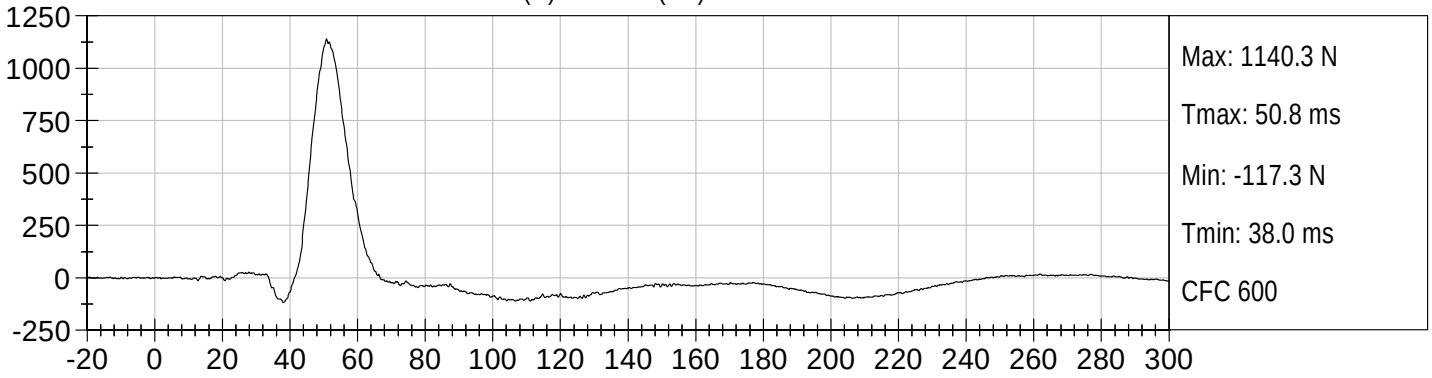
PASSENGER LOWER SPINE Z (G's) vs TIME (ms)



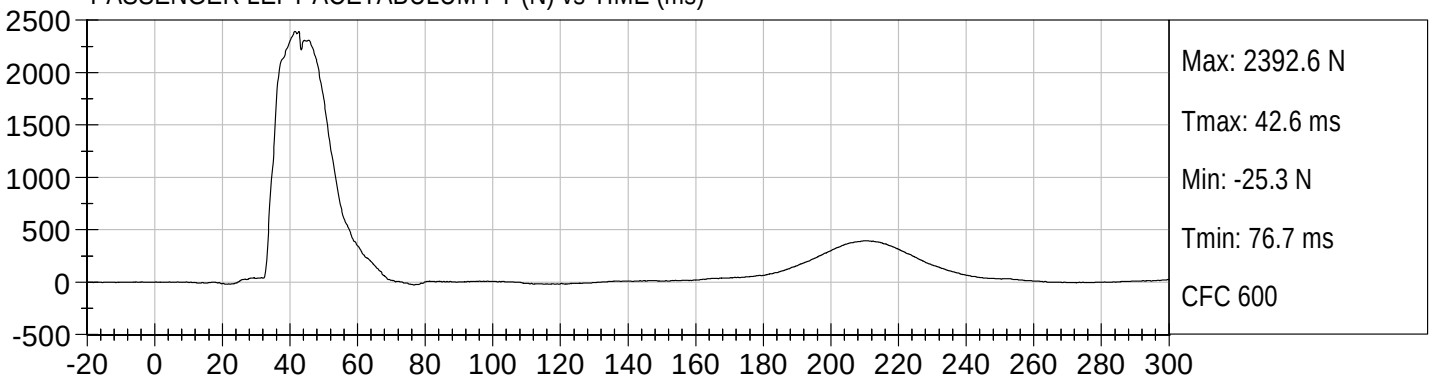
PASSENGER LOWER SPINE Resultant (G's) vs TIME (ms)



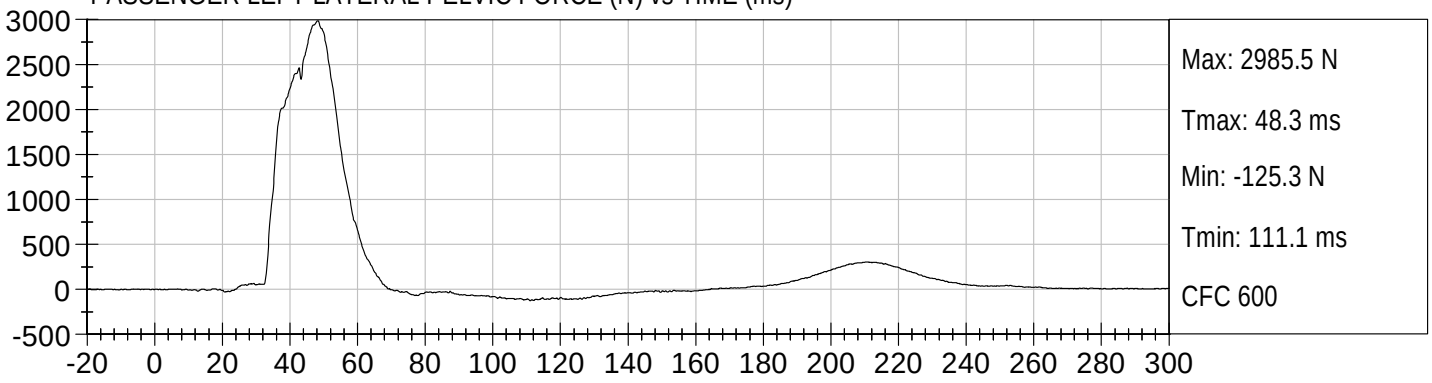
PASSENGER LEFT ILLIUM CREST FY (N) vs TIME (ms)



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



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



APPENDIX C

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

ES-2re External Measurements
SN: 032

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

MGA RESEARCH CORPORATION

HEAD DROP TEST

ES-2re DUMMY

ATD Serial No: 032 **Test ID:** D122291

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	48	Pass
Peak Resultant Acceleration	G's	125 to 155	152	Pass
Peak Longitudinal Acceleration	G's	+/- 15	-8.1	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 15% of peak	Yes	Pass
		Overall Test Results		Pass

Jessica Gall
Laboratory Technician

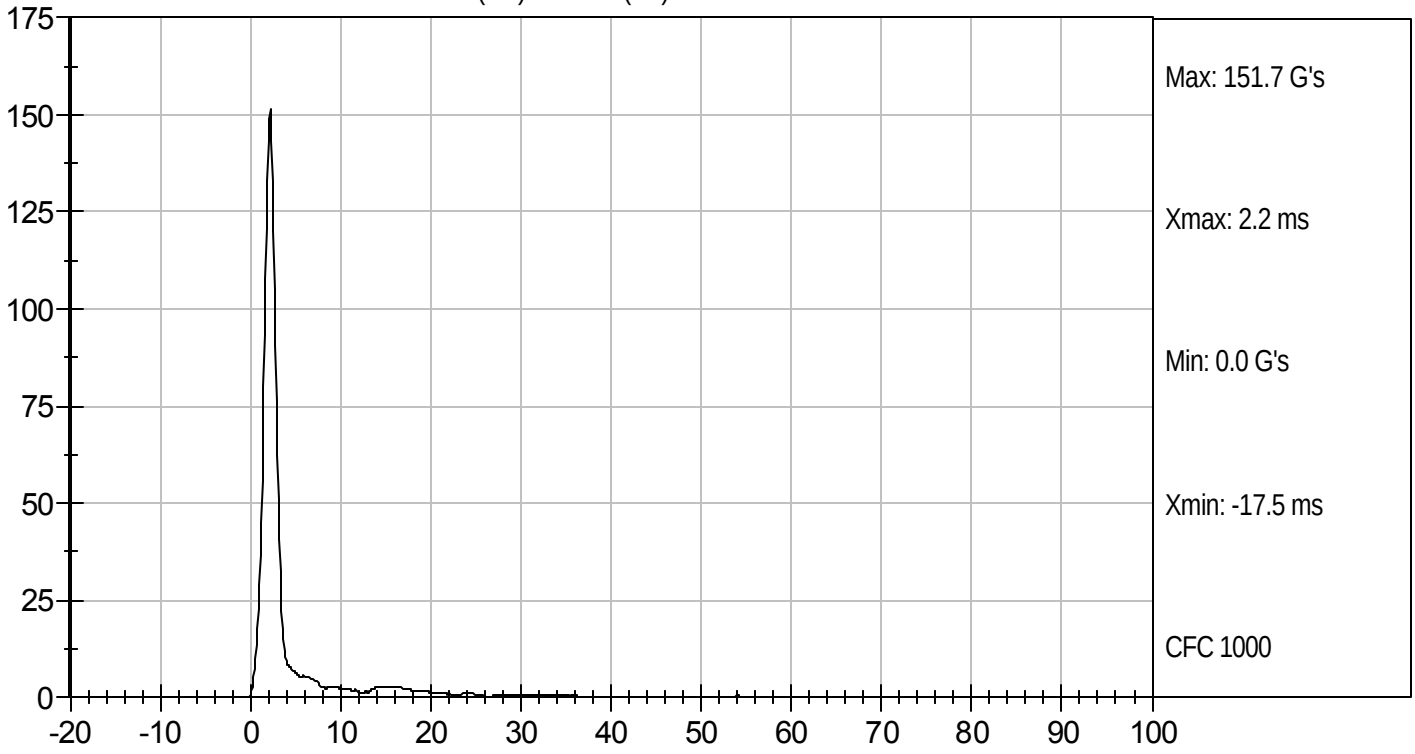
6/20/12
Test Date

David Winkelbauer
Approved By

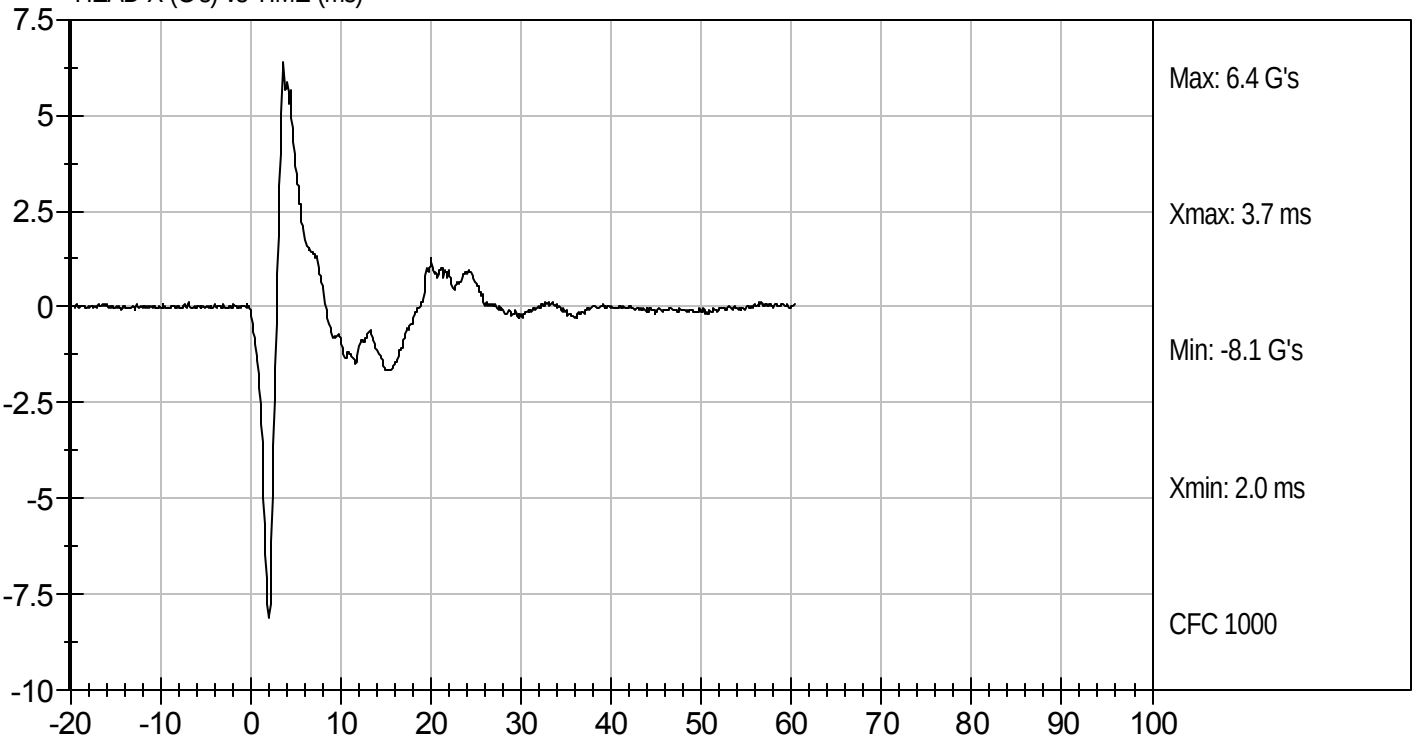
Test Desc: Head Drop
Component ID: D122291

Test Date: 6/20/12
Velocity: 0 ft/s, 0 m/s

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



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



MGA RESEARCH CORPORATION

NECK PENDULUM TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D122292

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	18.0 to 22.0	21.3	Pass
Laboratory Relative Humidity		%	10 to 70	49	Pass
Pendulum Speed		m/s	3.3 to 3.5	3.4	Pass
Pendulum Deceleration	1 ms	m/s	0.00 to -0.05	-0.02	Pass
	3 ms	m/s	-0.25 to -0.375	-0.32	Pass
	14 ms	m/s	-3.20 to -3.70	-3.24	Pass
Maximum Flexion Angle		deg	49.0 to 59.0	52.5	Pass
Time of Maximum Flexion Angle		ms	54.0 to 66.0	58.4	Pass
Head Rotation Decay Time to 0 degree		ms	53.0 to 88.0	55.9	Pass
			Overall Test Results		Pass

Jessica Hall
Laboratory Technician

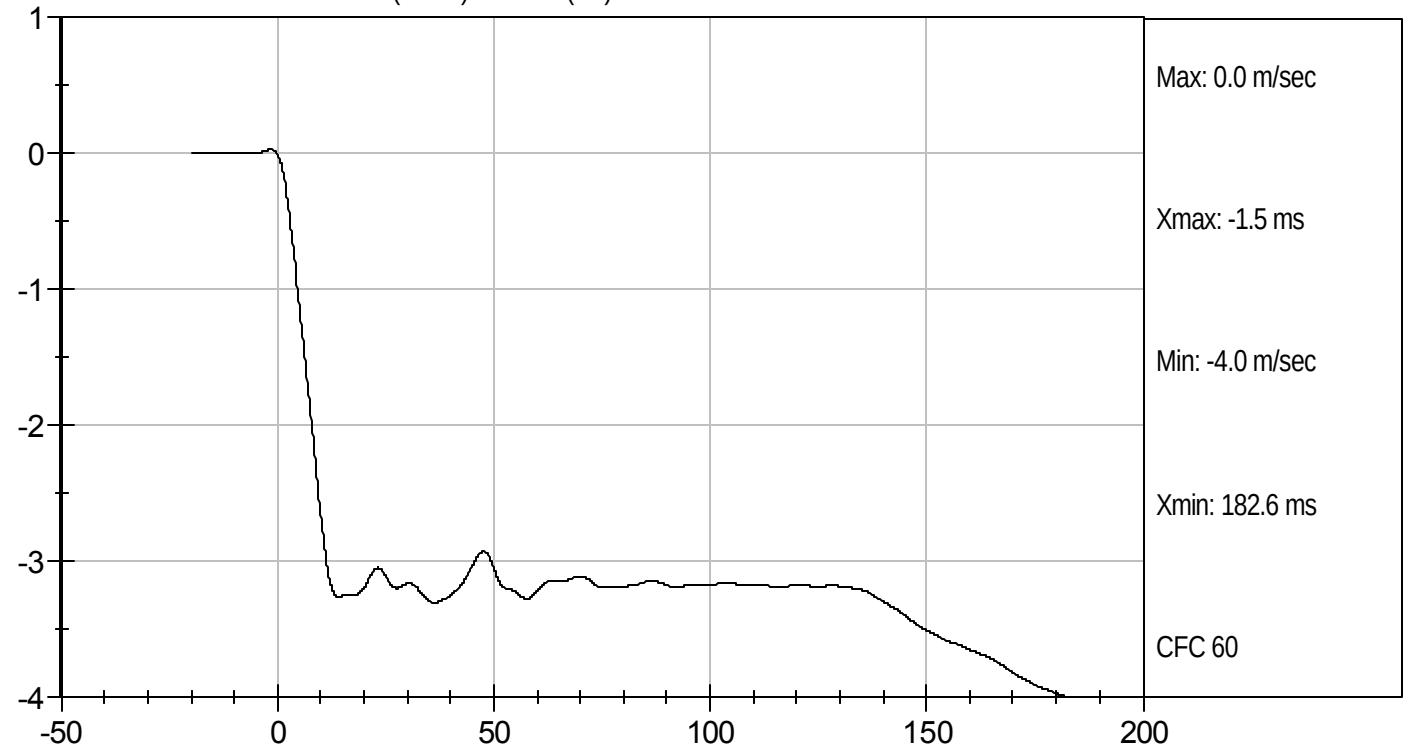
6/20/12
Test Date

David Winkelbauer
Approved By

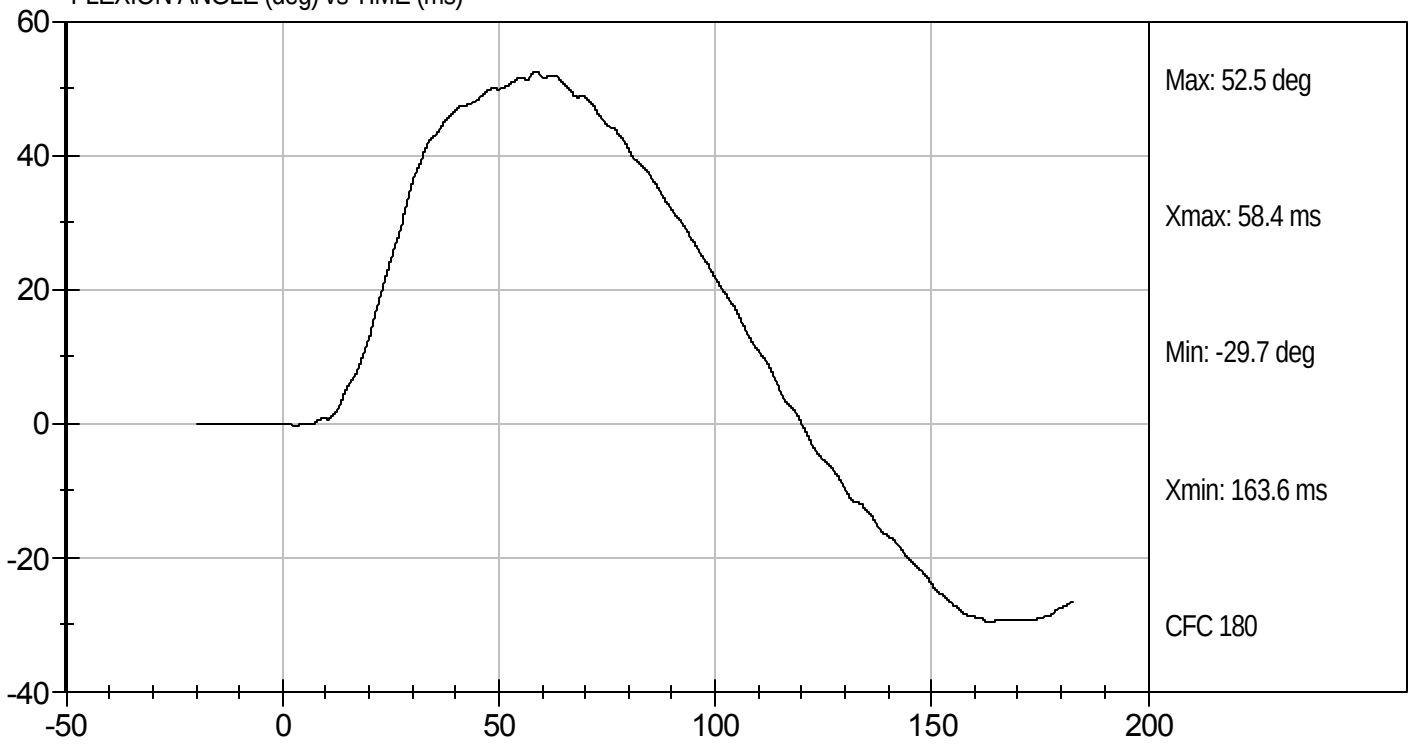
Test Desc: Neck Bending
Component ID: D122292

Test Date: 6/20/12
Velocity: 11.26 ft/s, 3.4 m/s

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

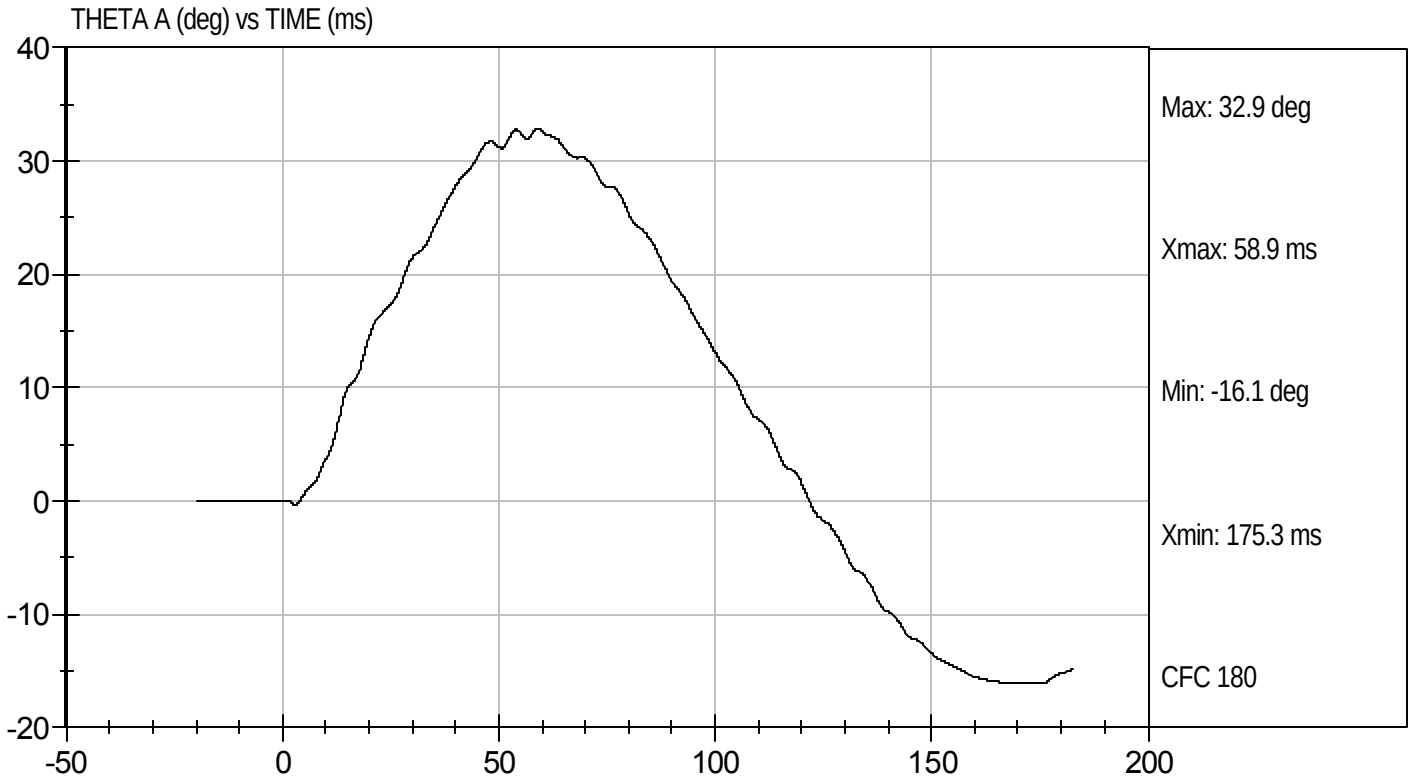


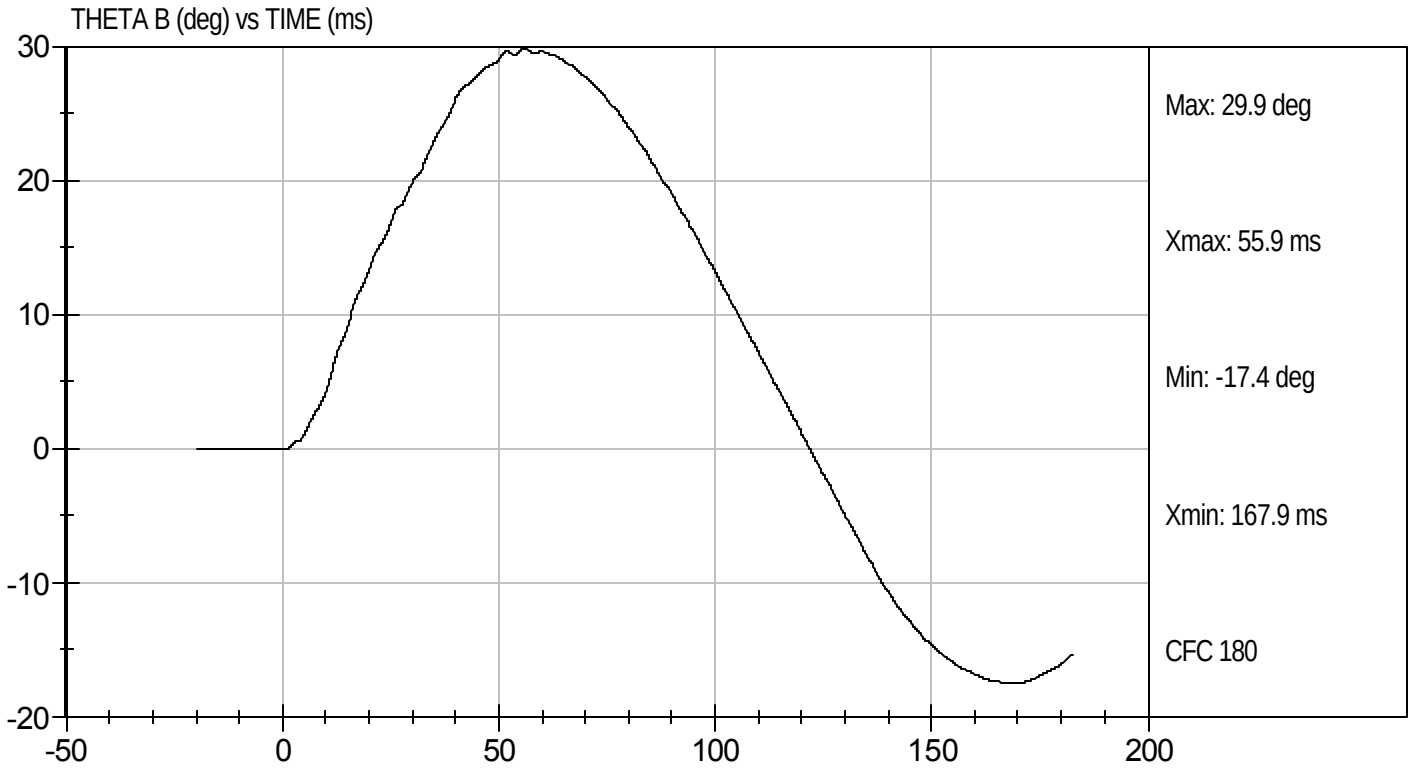
FLEXION ANGLE (deg) vs TIME (ms)



Test Desc: Neck Bending
Component ID: D122292

Test Date: 6/20/12
Velocity: 11.26 ft/s, 3.4 m/s





MGA RESEARCH CORPORATION

SHOULDER IMPACT TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D122293

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	20.8	Pass
Laboratory Relative Humidity	%	10 to 70	48	Pass
Pendulum Speed	m/s	4.2 to 4.4	4.3	Pass
Peak Shoulder Acceleration	G's	7.5 to 10.5	9.4	Pass
Time of Peak Shoulder Acceleration	ms	NA	13.5	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

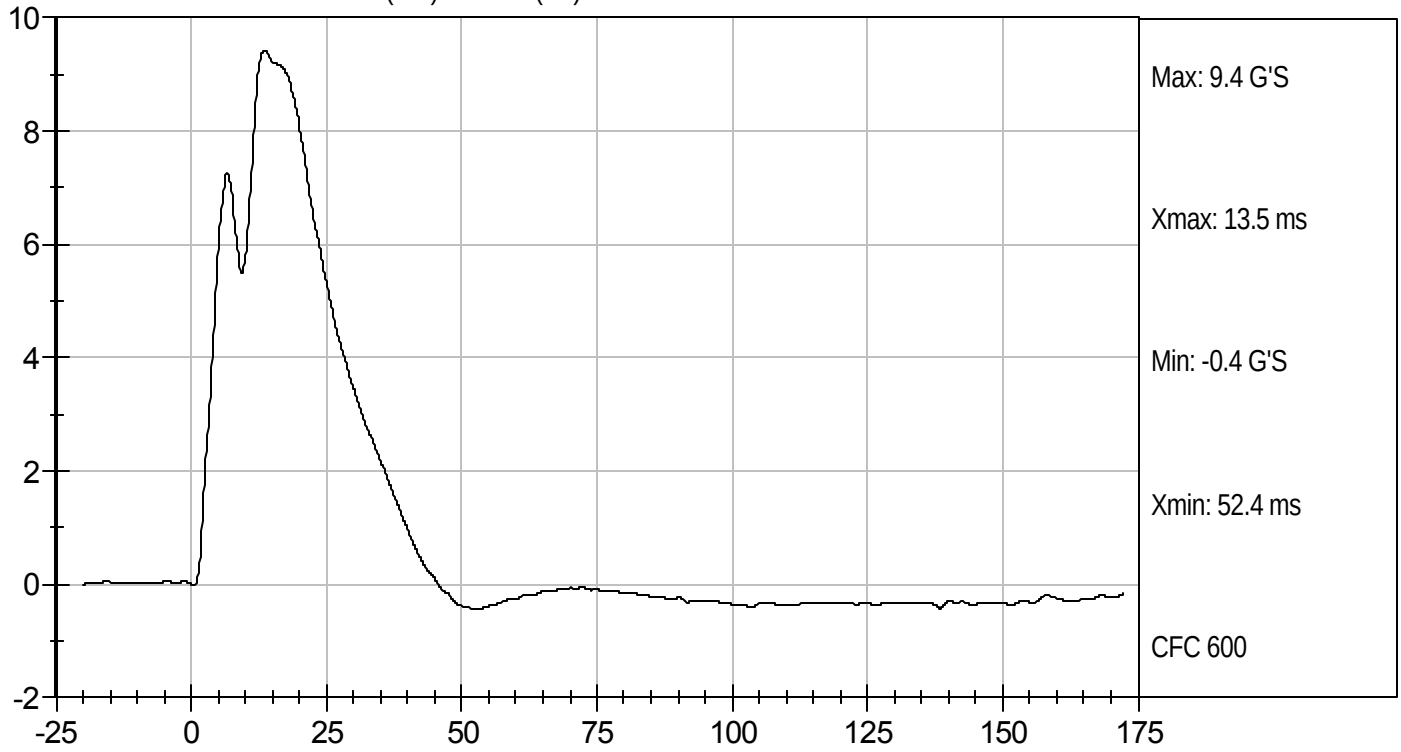
6/20/12
Test Date

David Winkelbauer
Approved By

Test Desc: Shoulder Impact
Component ID: D122293

Test Date: 6/20/12
Velocity: 14.24 ft/s, 4.3 m/s

SHOULDER ACCELERATION (G'S) vs TIME (ms)



MGA RESEARCH CORPORATION

UPPER RIB TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D122294

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	20.8	Pass
Laboratory Relative Humidity	%	10 to 70	47	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	38.3	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	48.7	Pass
		Overall Test Results		Pass

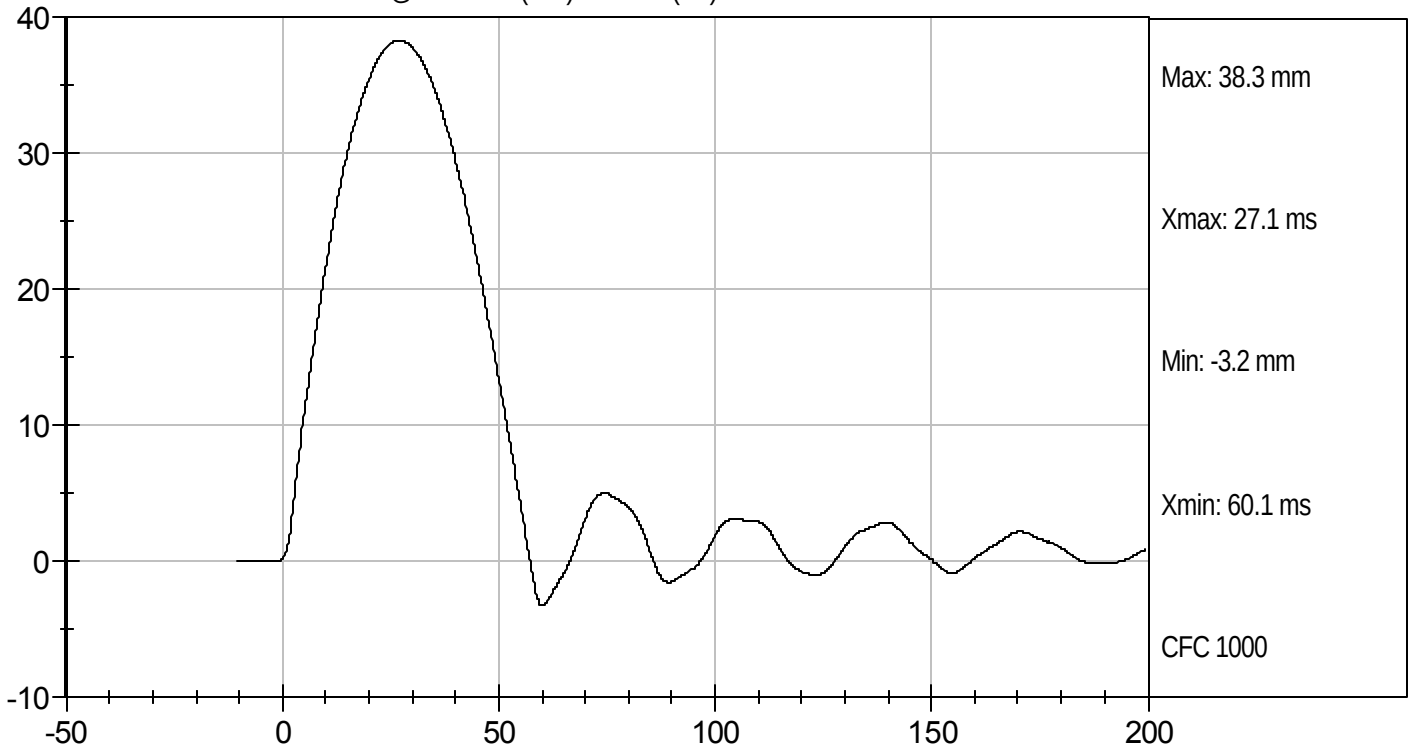
Jessica Hall
Laboratory Technician

6/20/12
Test Date

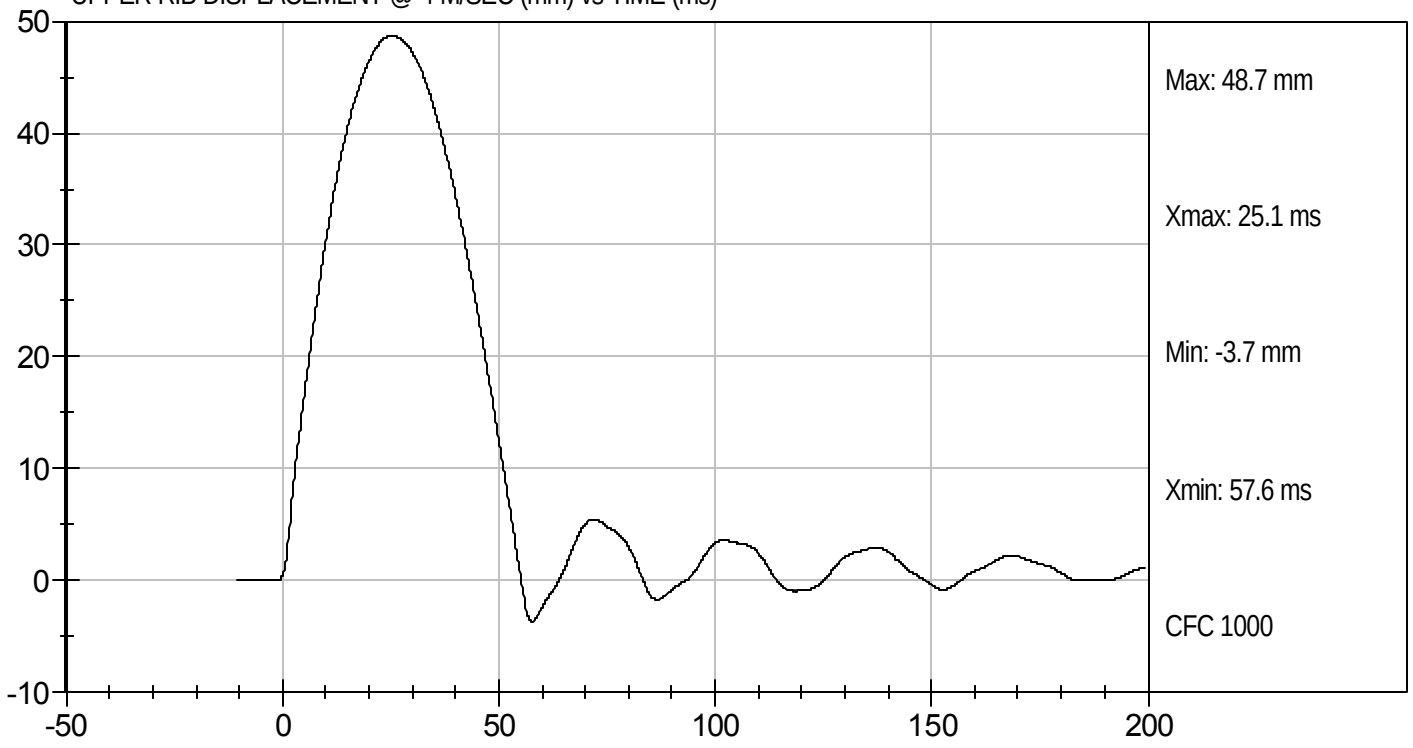
David Winkelbauer
Approved By

Test Desc: Rib Impact - Upper
Component ID: D122294
Test Date: 6/20/12

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



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



MGA RESEARCH CORPORATION

MID RIB TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D122295

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	20.8	Pass
Laboratory Relative Humidity	%	10 to 70	47	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	37.7	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	48.2	Pass
		Overall Test Results		Pass

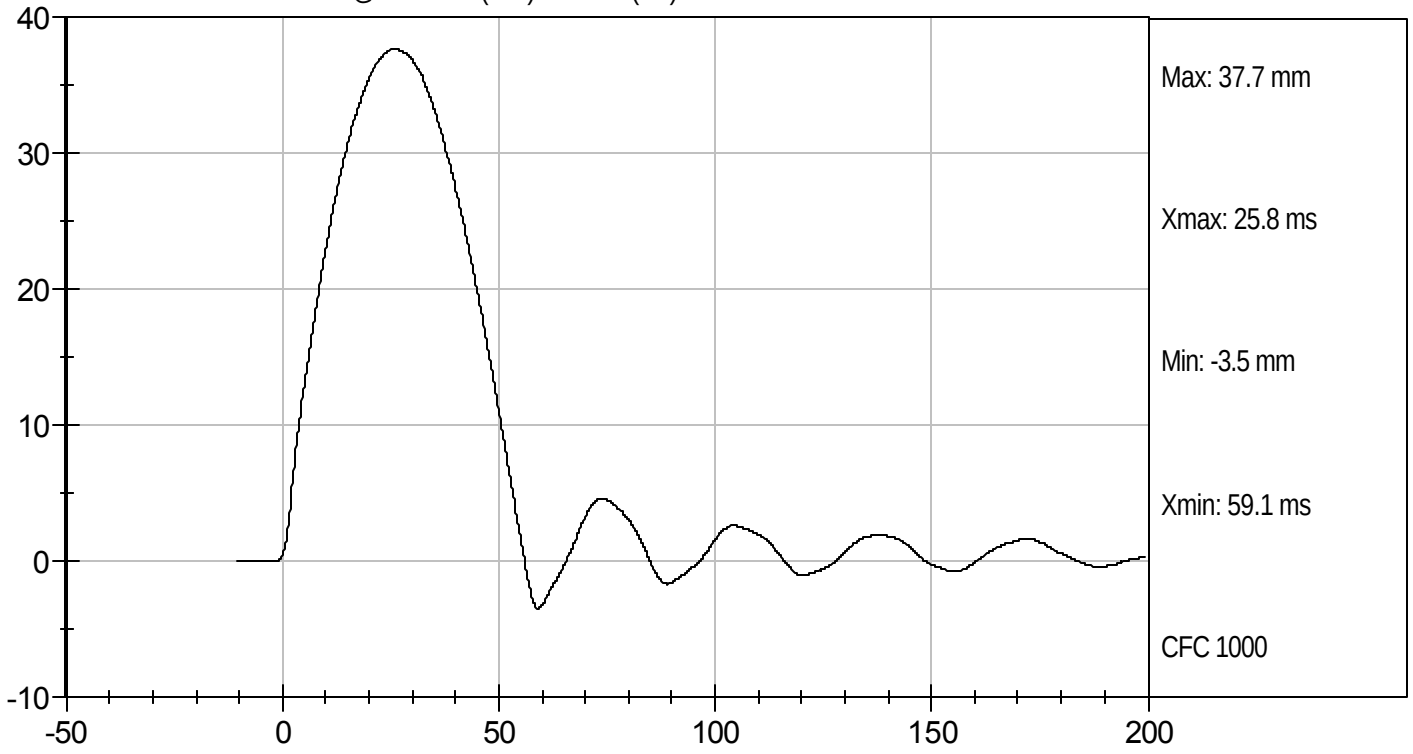
Jessica Hall
Laboratory Technician

6/20/12
Test Date

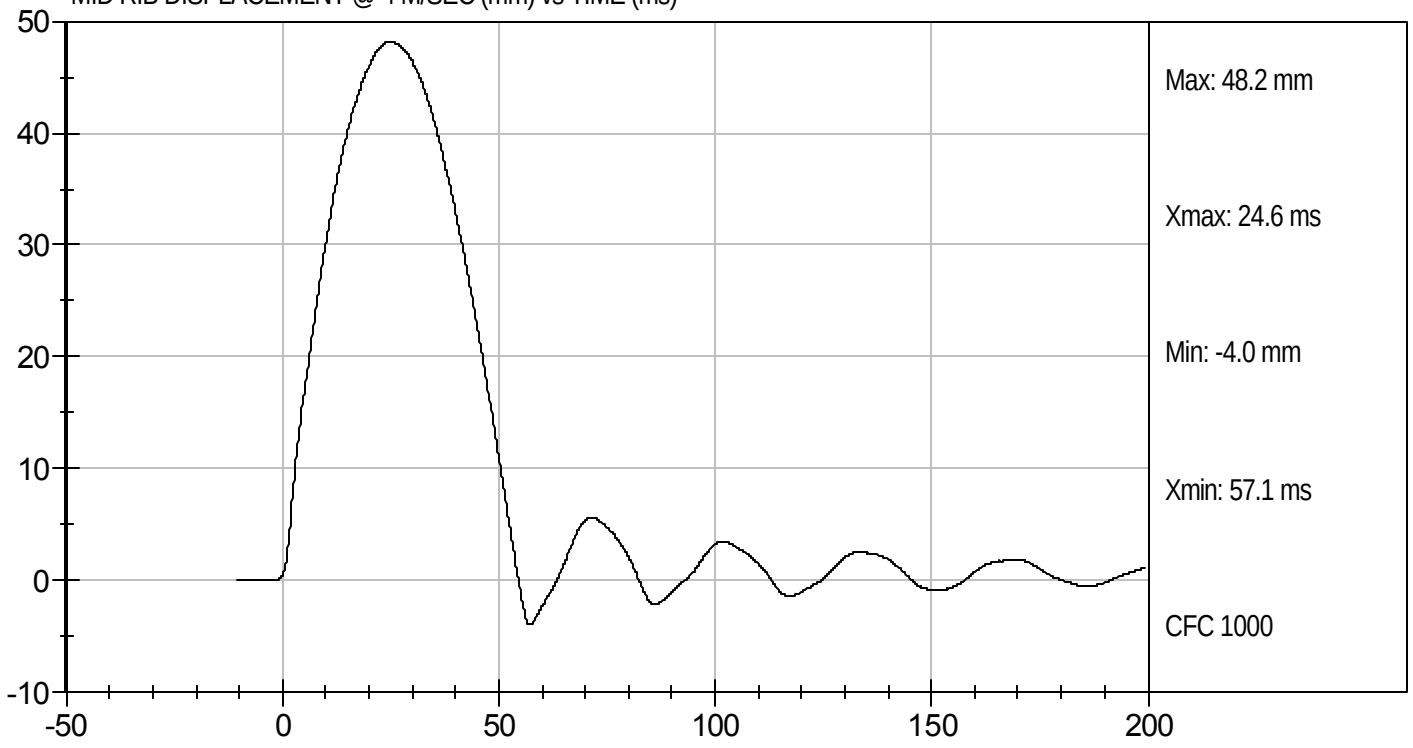
David Winkelbauer
Approved By

Test Desc: Rib Impact - Mid
Component ID: D122295
Test Date: 6/20/12

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



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



MGA RESEARCH CORPORATION

LOWER RIB TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D122296

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	20.8	Pass
Laboratory Relative Humidity	%	10 to 70	47	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	38.1	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	49.0	Pass
		Overall Test Results		Pass

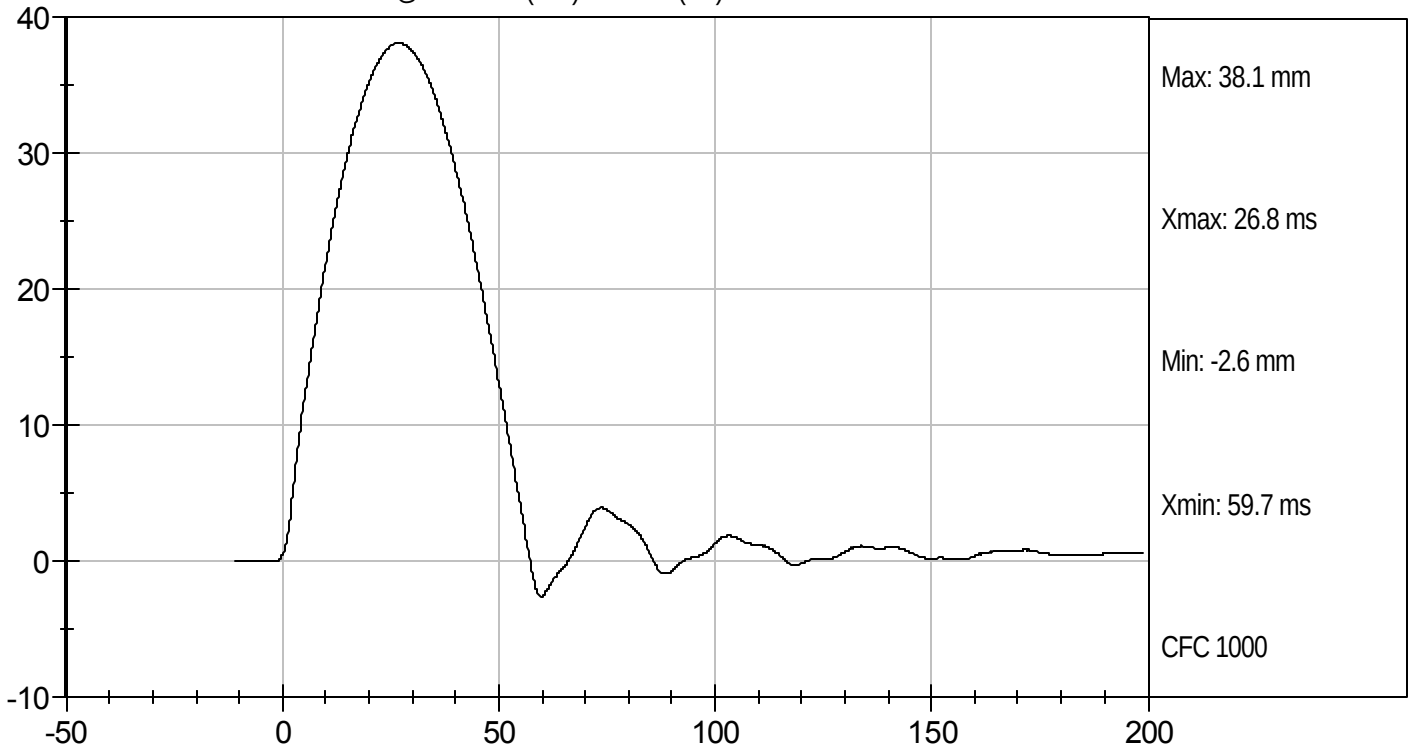
Jessica Gall
Laboratory Technician

6/20/12
Test Date

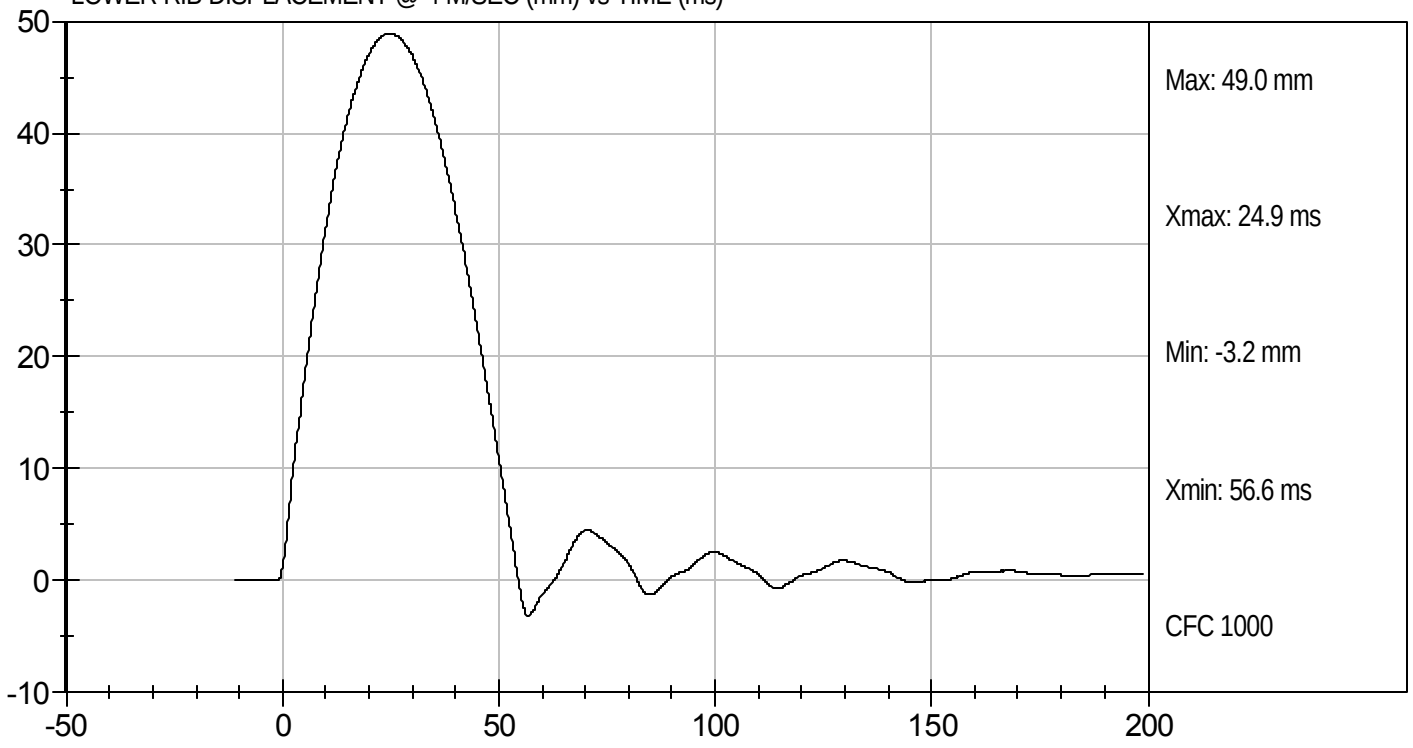
David Winkelbauer
Approved By

Test Desc: Rib Impact - Lower
Component ID: D122296
Test Date: 6/20/12

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



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



MGA RESEARCH CORPORATION

FULL BODY THORAX IMPACT TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D122290

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.8	Pass
Humidity	%	10 to 70	48	Pass
Probe Speed	m/s	5.40 to 5.60	5.58	Pass
Maximum Impactor Force (after 6 ms)	kN	5.10 to 6.20	5.12	Pass
Upper Rib Displacement	mm	34.0 to 41.0	36.6	Pass
Middle Rib Displacement	mm	37.0 to 45.0	39.6	Pass
Lower Rib Displacement	mm	37.0 to 44.0	39.2	Pass
		Overall Test Results		Pass

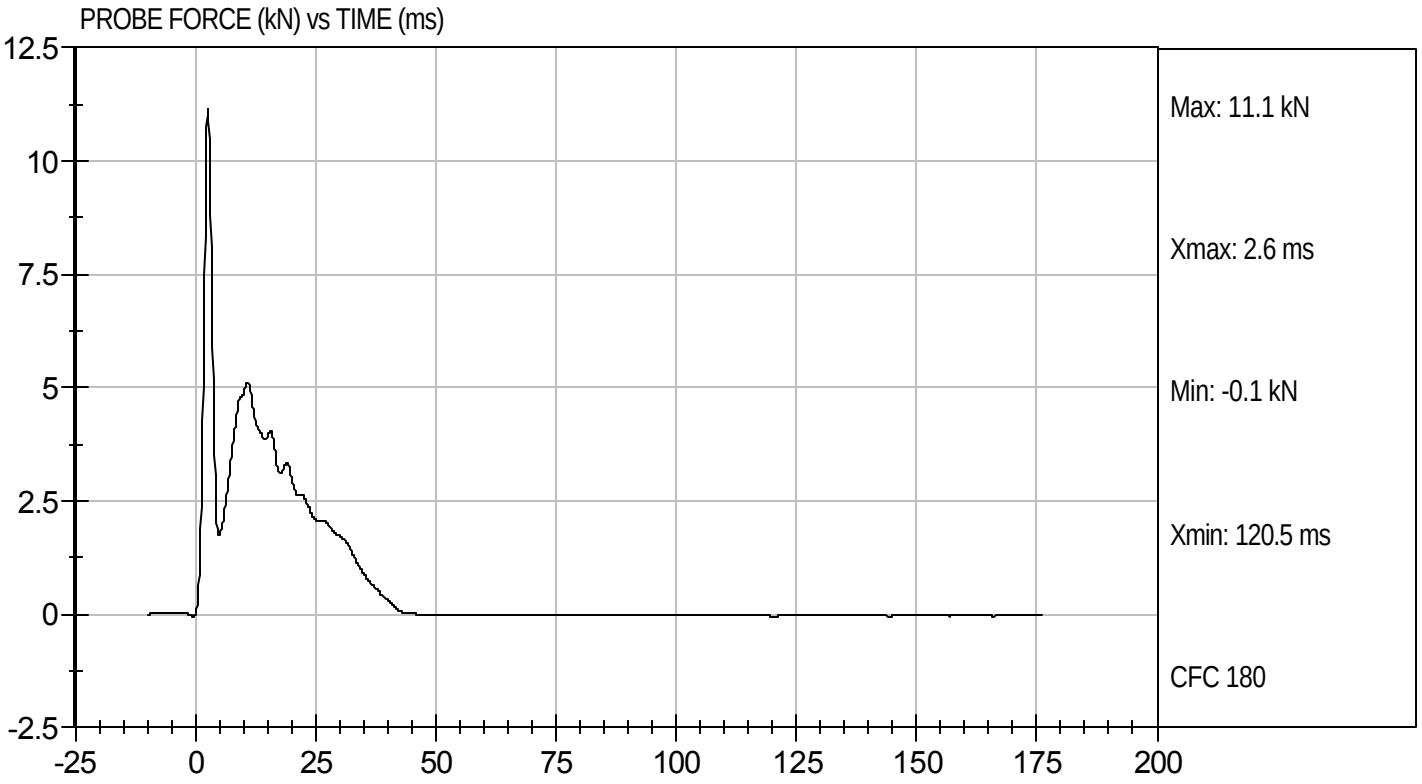
Jessica Gall
Laboratory Technician

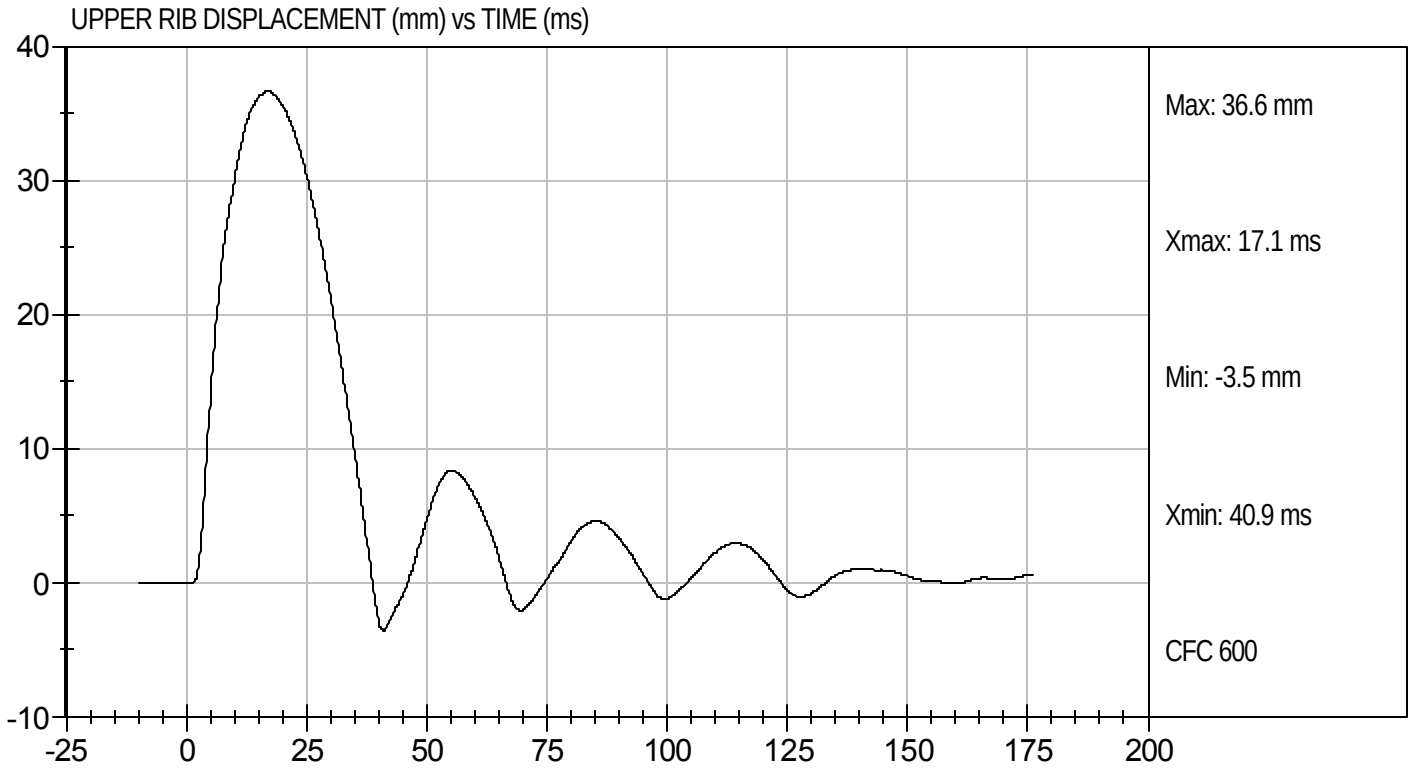
6/20/12
Test Date

David Winkelbauer
Approved By

Test Desc: Thorax Impact
Component ID: D122290

Test Date: 6/20/12
Velocity: 18.31 ft/s, 5.58 m/s

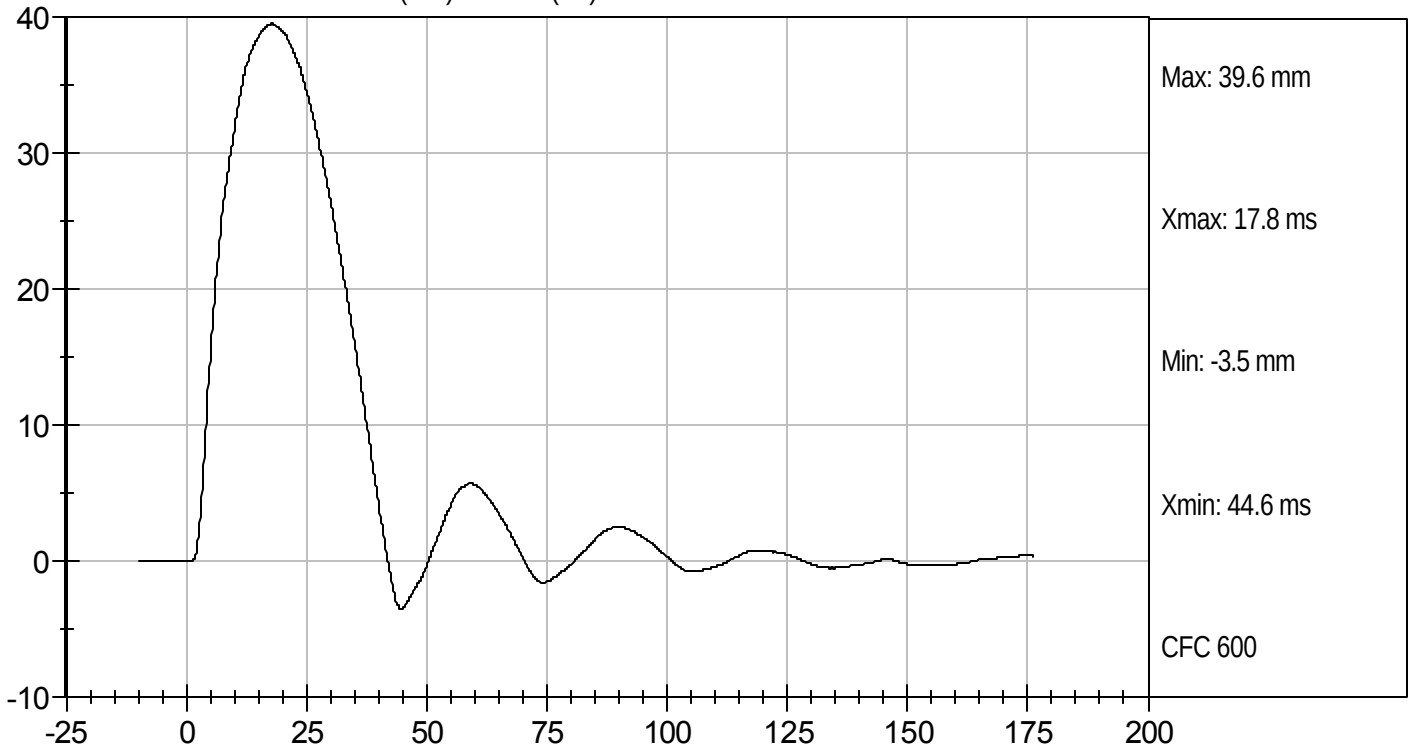




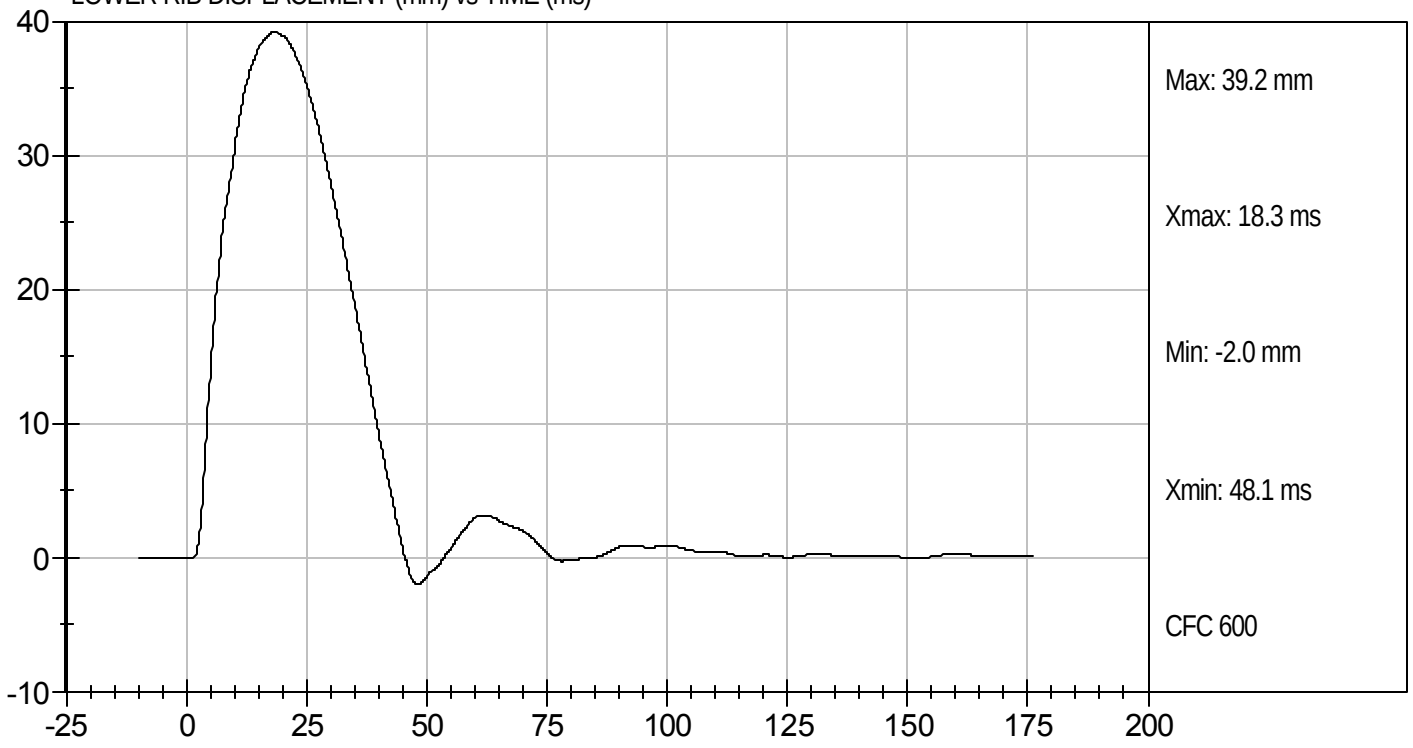
Test Desc: Thorax Impact
Component ID: D122290

Test Date: 6/20/12
Velocity: 18.31 ft/s, 5.58 m/s

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



MGA RESEARCH CORPORATION

ABDOMEN TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D122297

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	20.8	Pass
Laboratory Relative Humidity	%	10 to 70	48	Pass
Probe Speed	m/s	3.90 to 4.10	4.06	Pass
Maximum Impact Force	kN	4.00 to 4.80	4.34	Pass
Time of Maximum Impactor Force	ms	10.60 to 13.00	12.10	Pass
Maximum Total Abdomen Force	kN	2.20 to 2.70	2.48	Pass
Time of Maximum Abdomen Force	ms	10.00 to 12.30	11.20	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

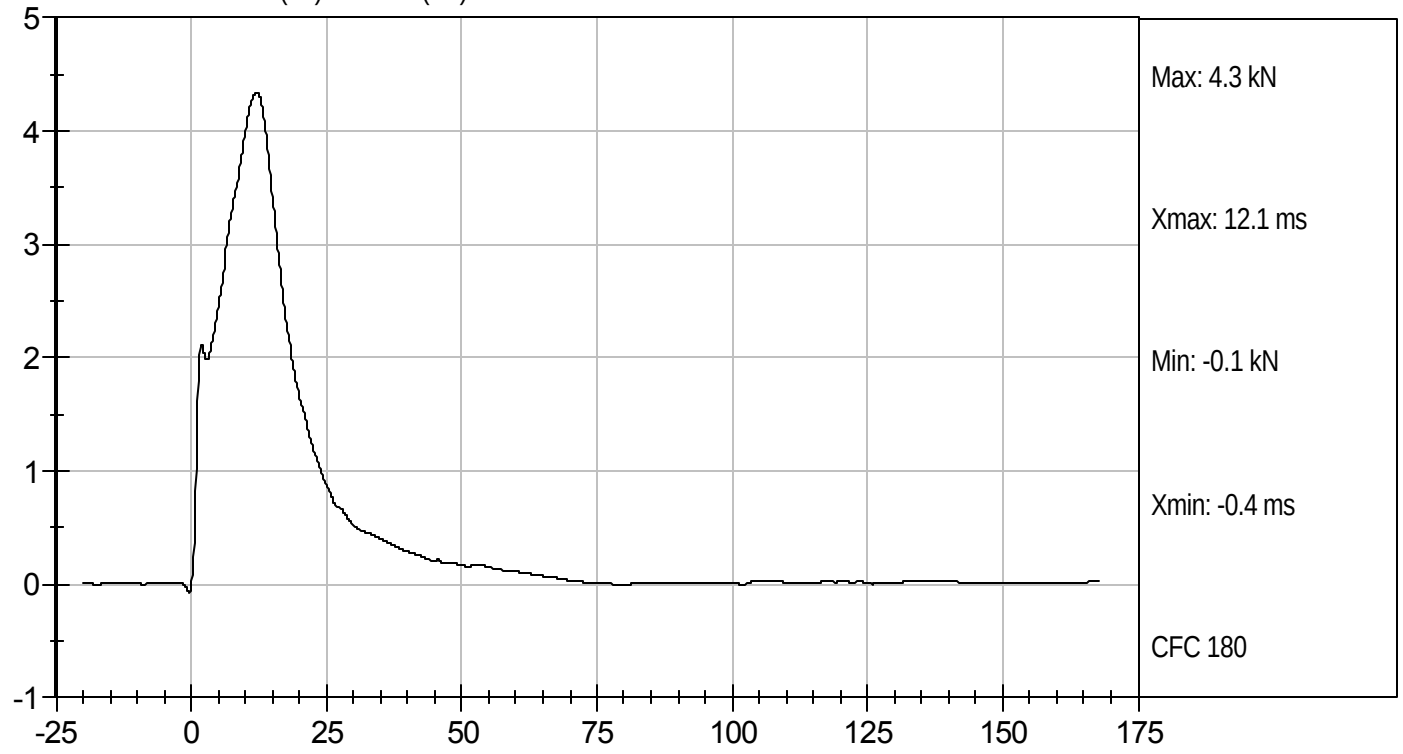
6/20/12
Test Date

David Winkelbauer
Approved By

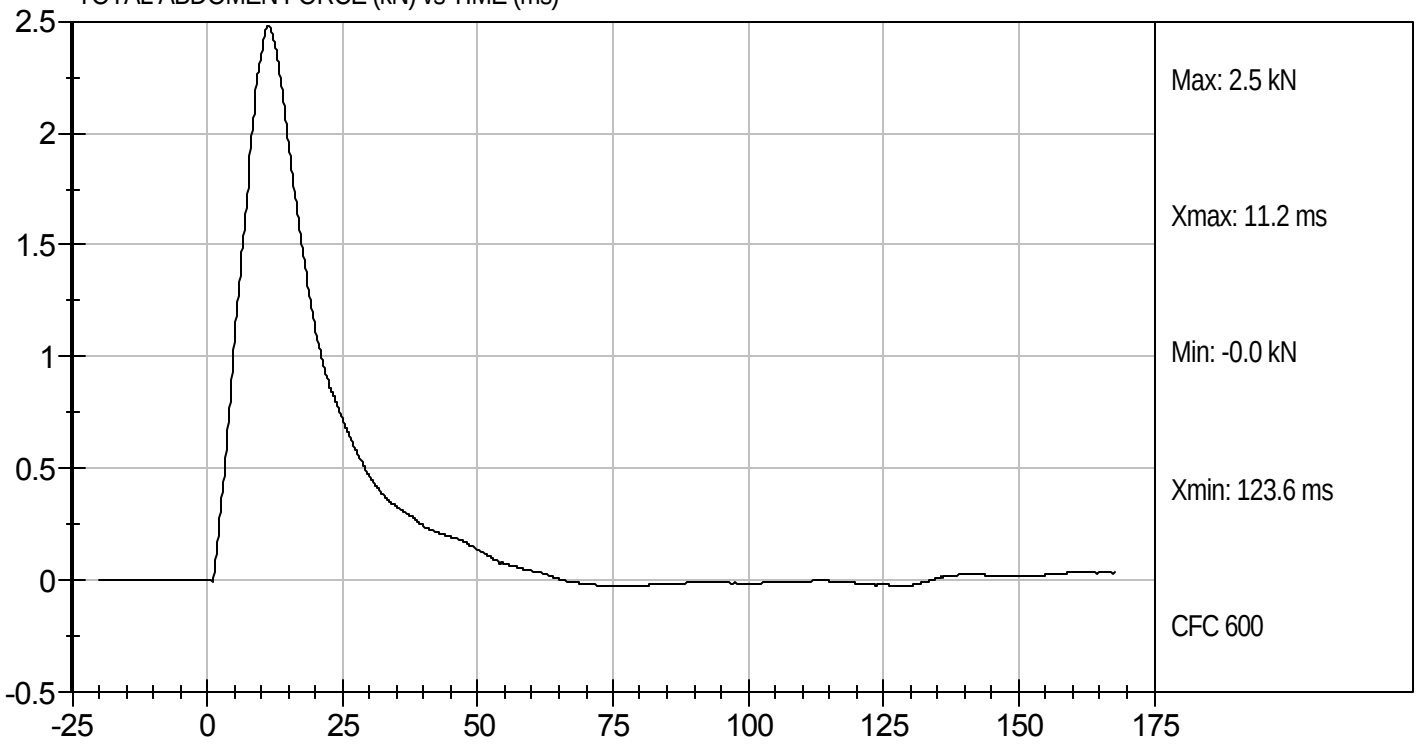
Test Desc: Abdomen Impact
Component ID: D122297

Test Date: 6/20/12
Velocity: 13.33 ft/s, 4.06 m/s

IMPACTOR FORCE (kN) vs TIME (ms)



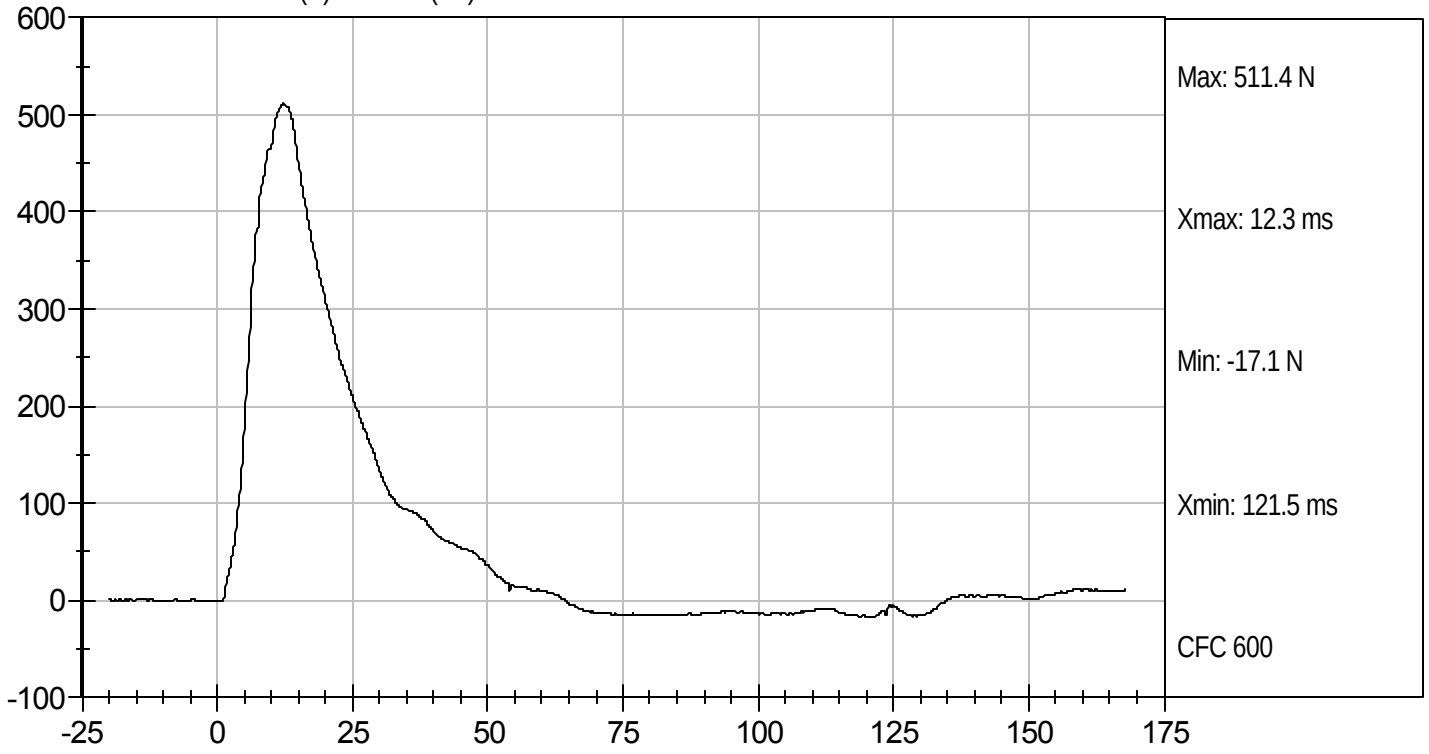
TOTAL ABDOMEN FORCE (kN) vs TIME (ms)



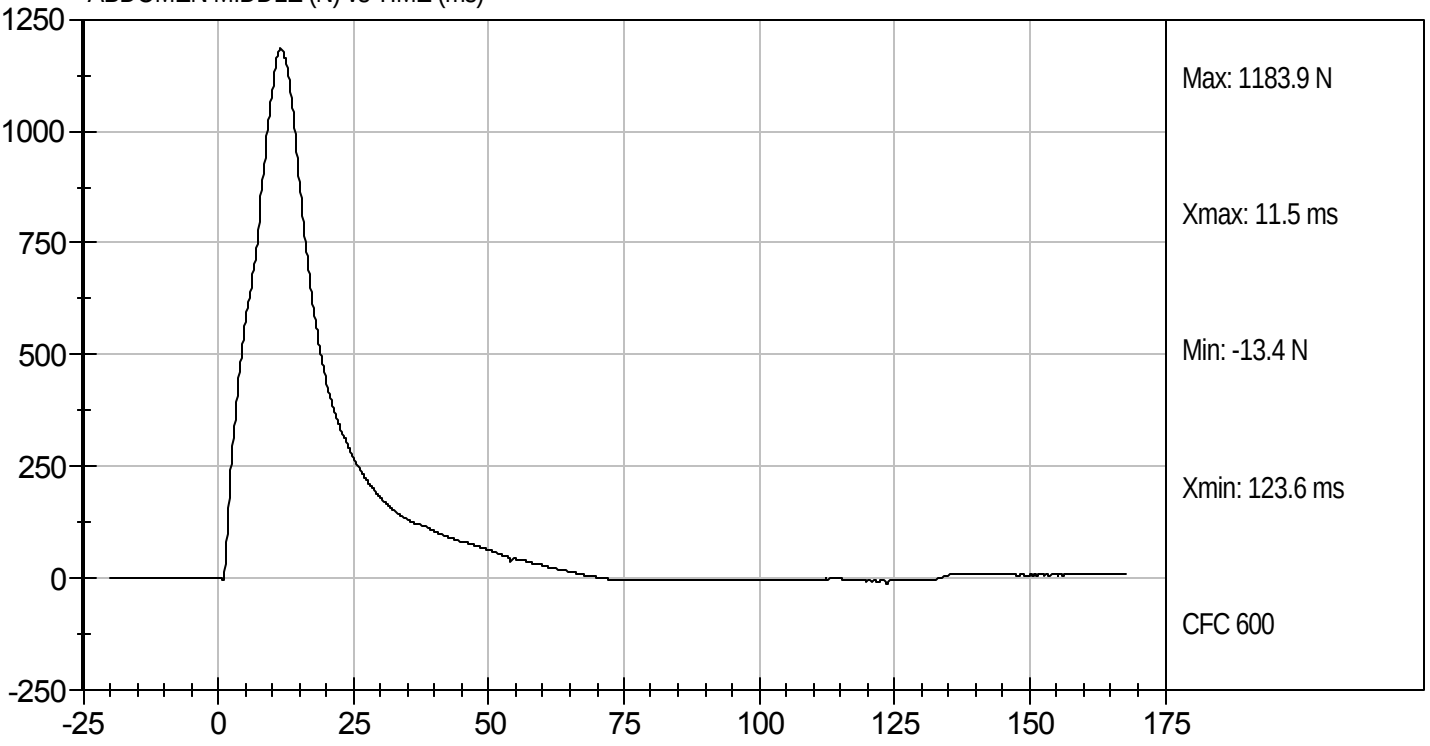
Test Desc: Abdomen Impact
Component ID: D122297

Test Date: 6/20/12
Velocity: 13.33 ft/s, 4.06 m/s

ABDOMEN FRONT (N) vs TIME (ms)

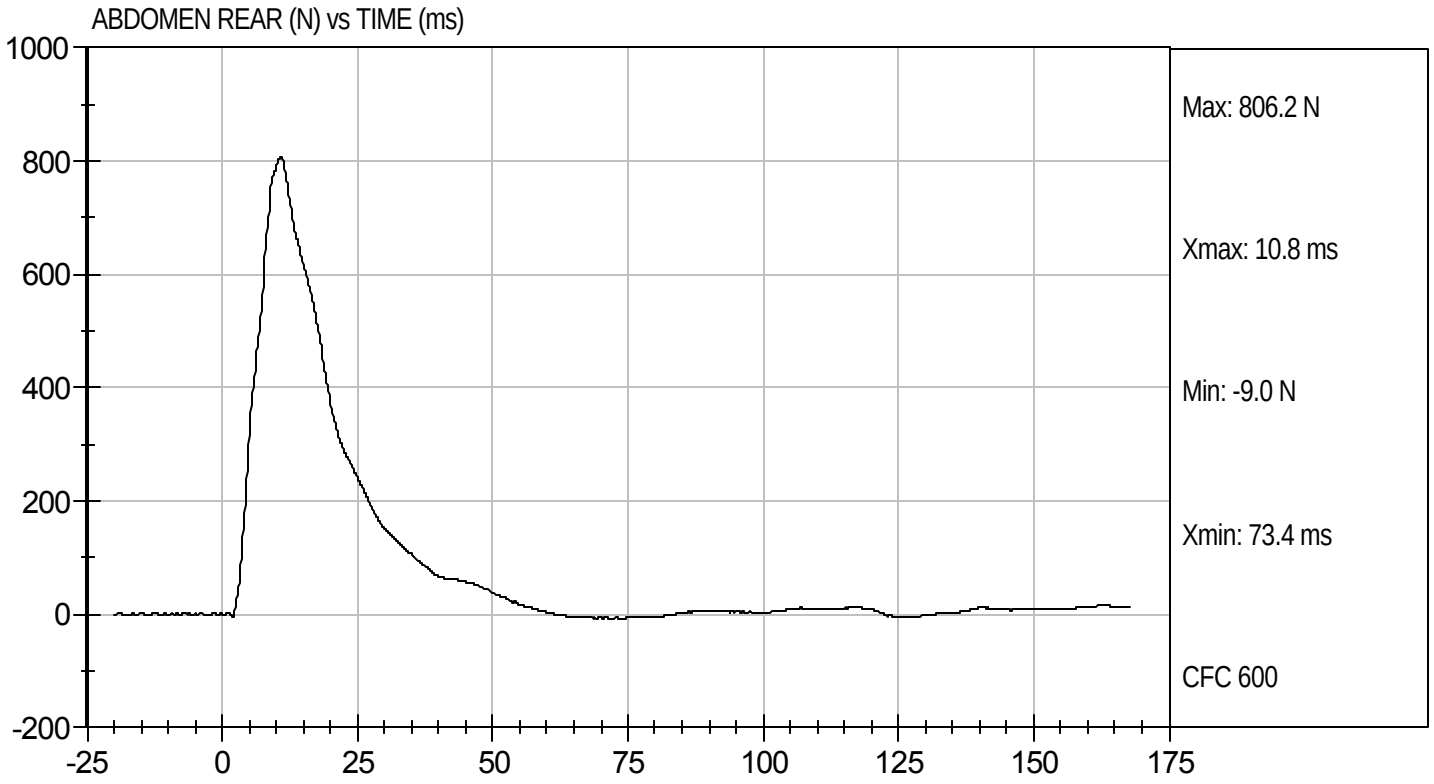


ABDOMEN MIDDLE (N) vs TIME (ms)



Test Desc: Abdomen Impact
Component ID: D122297

Test Date: 6/20/12
Velocity: 13.33 ft/s, 4.06 m/s



MGA RESEARCH CORPORATION

LUMBAR SPINE TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D122298

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity		%	10 to 70	49	Pass
Pendulum Speed		m/s	5.95 to 6.15	6.12	Pass
Pendulum Deceleration	1 ms	m/s	-0.05 to 0.00	-0.00	Pass
	3.7 ms	m/s	-0.425 to -0.24	-0.42	Pass
	27 ms	m/s	-6.50 to -5.80	-5.89	Pass
	30 ms	m/s	>= -6.5	-5.77	Pass
Maximum Flexion Angle		deg	45.0 to 55.0	50.1	Pass
Time of Maximum Flexion Angle		ms	39.0 to 53.0	45.7	Pass
Headform Rotation Decay to Initial Position		ms	37 to 57	43	Pass
			Overall Results		Pass

Jessica Gall
Laboratory Technician

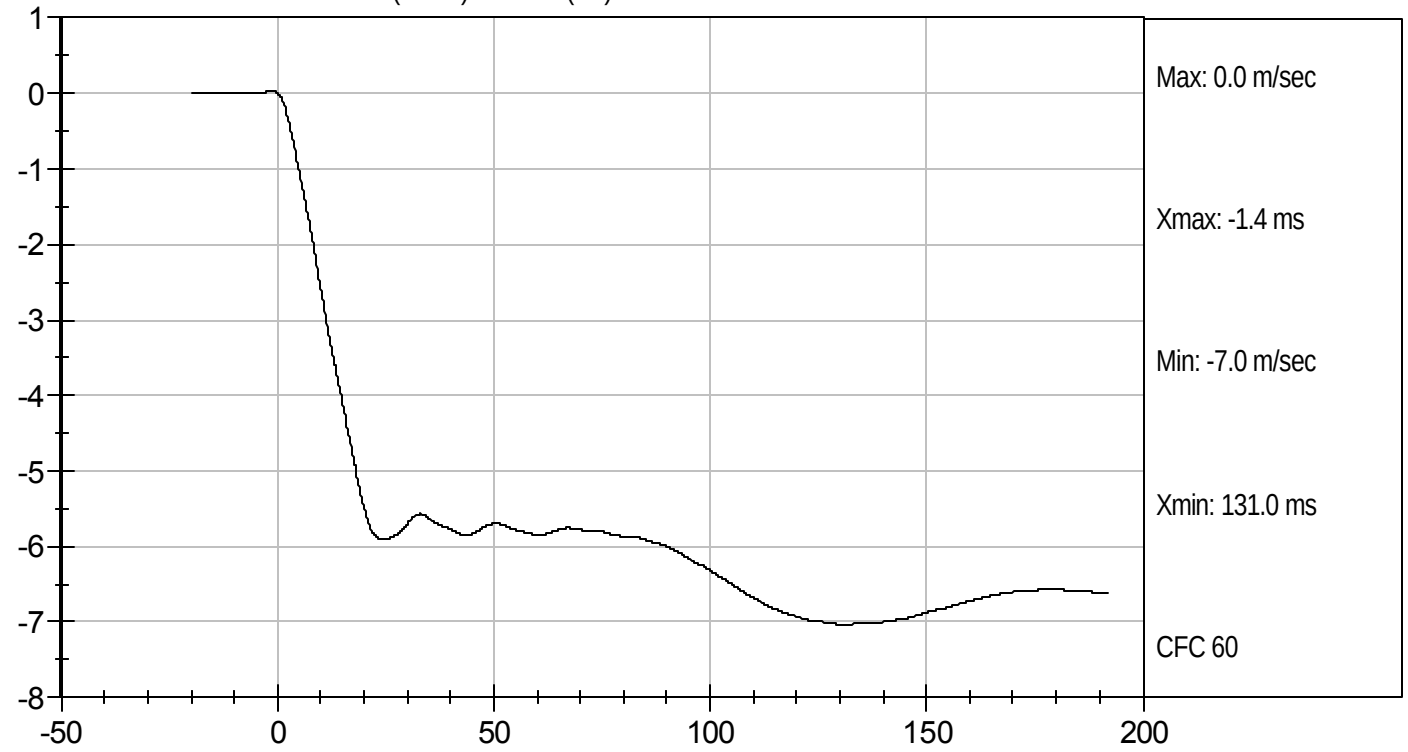
6/20/12
Test Date

David Winkelbauer
Approved By

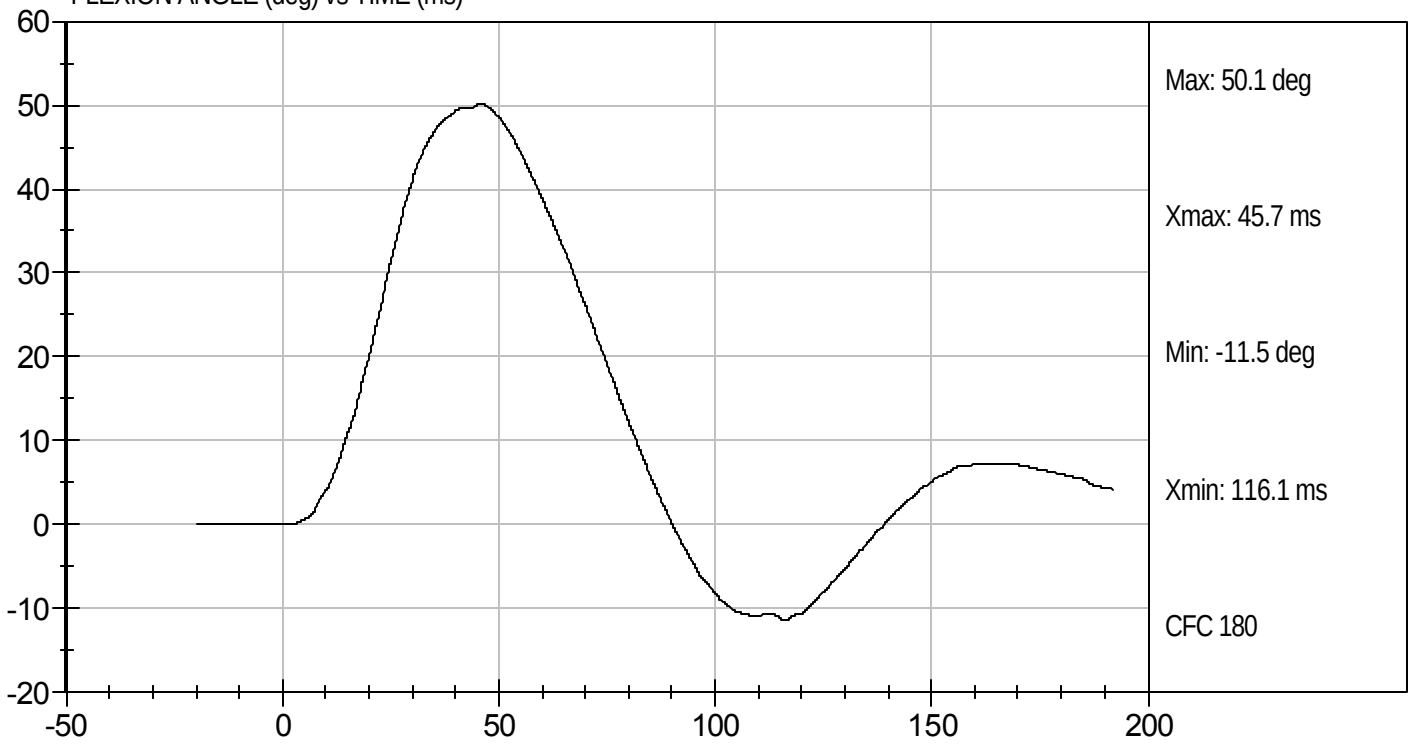
Test Desc: Lumbar Bending
Component ID: D122298

Test Date: 6/20/12
Velocity: 20.08 ft/s, 6.12 m/s

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

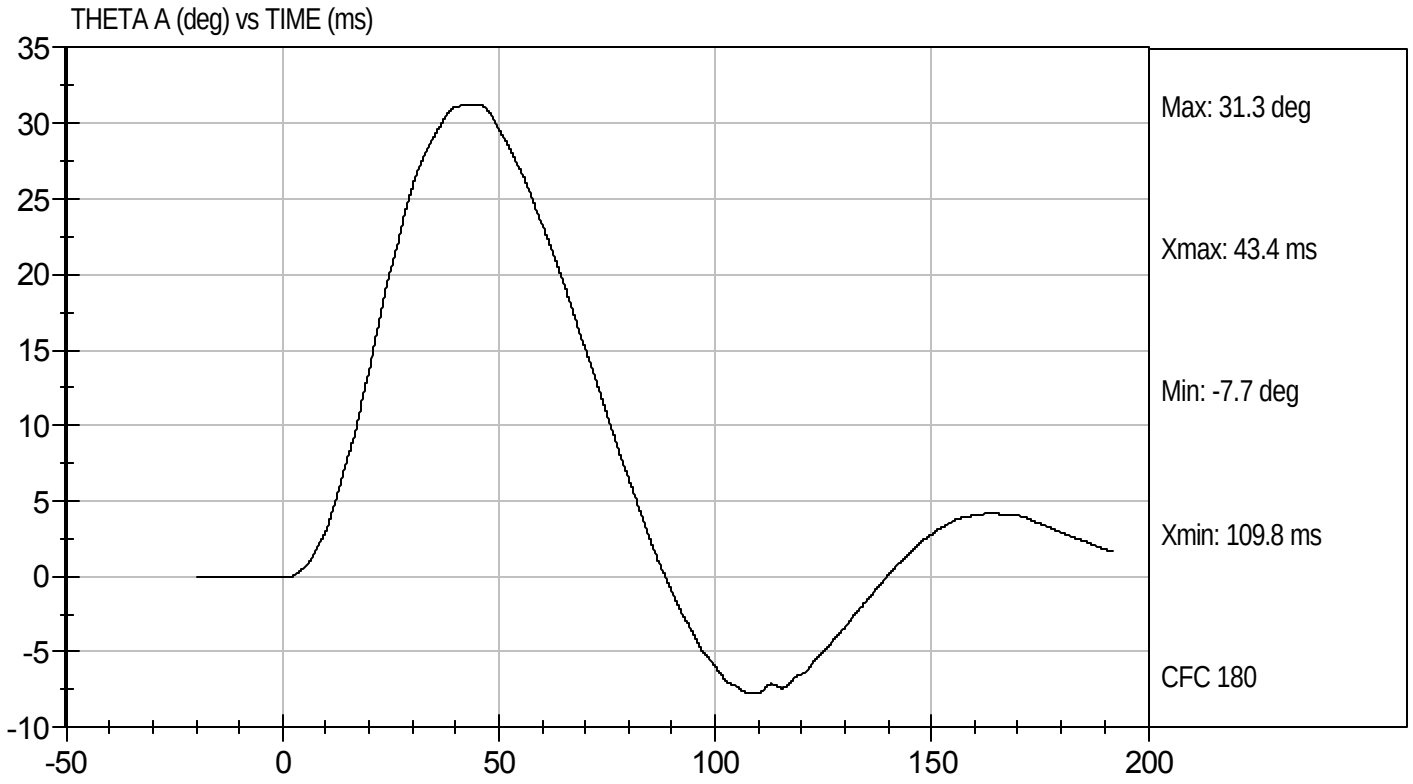


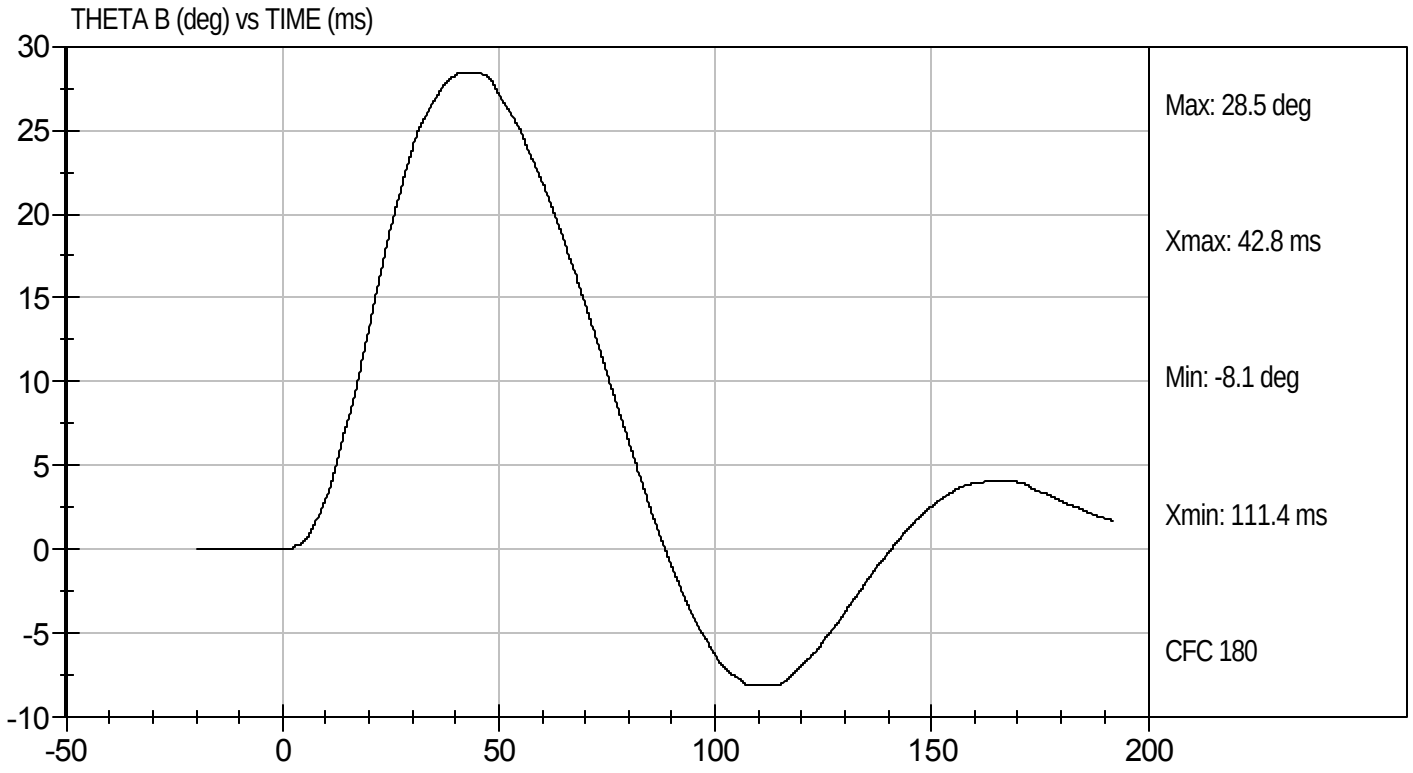
FLEXION ANGLE (deg) vs TIME (ms)



Test Desc: Lumbar Bending
Component ID: D122298

Test Date: 6/20/12
Velocity: 20.08 ft/s, 6.12 m/s





MGA RESEARCH CORPORATION

PELVIS TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D122299

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	20.8	Pass
Laboratory Relative Humidity	%	10 to 70	48	Pass
Probe Speed	m/s	4.20 to 4.40	4.27	Pass
Maximum Impactor Force	kN	4.70 to 5.40	4.72	Pass
Time of Maximum Impactor Force	ms	11.80 to 16.10	13.00	Pass
Maximum Pubic Force	kN	1.23 to 1.59	1.33	Pass
Time of Maximum Pubic Force	ms	12.20 to 17.00	13.70	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

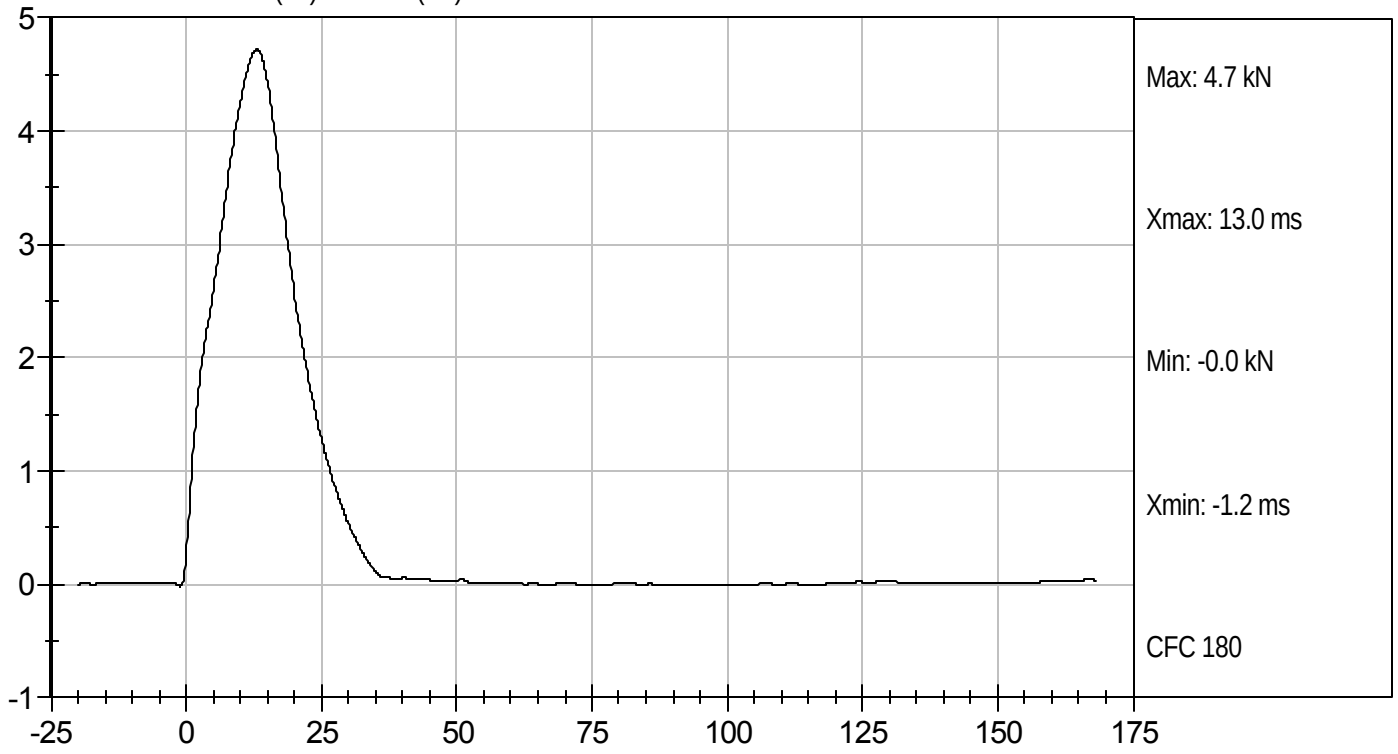
6/20/12
Test Date

David Winkelbauer
Approved By

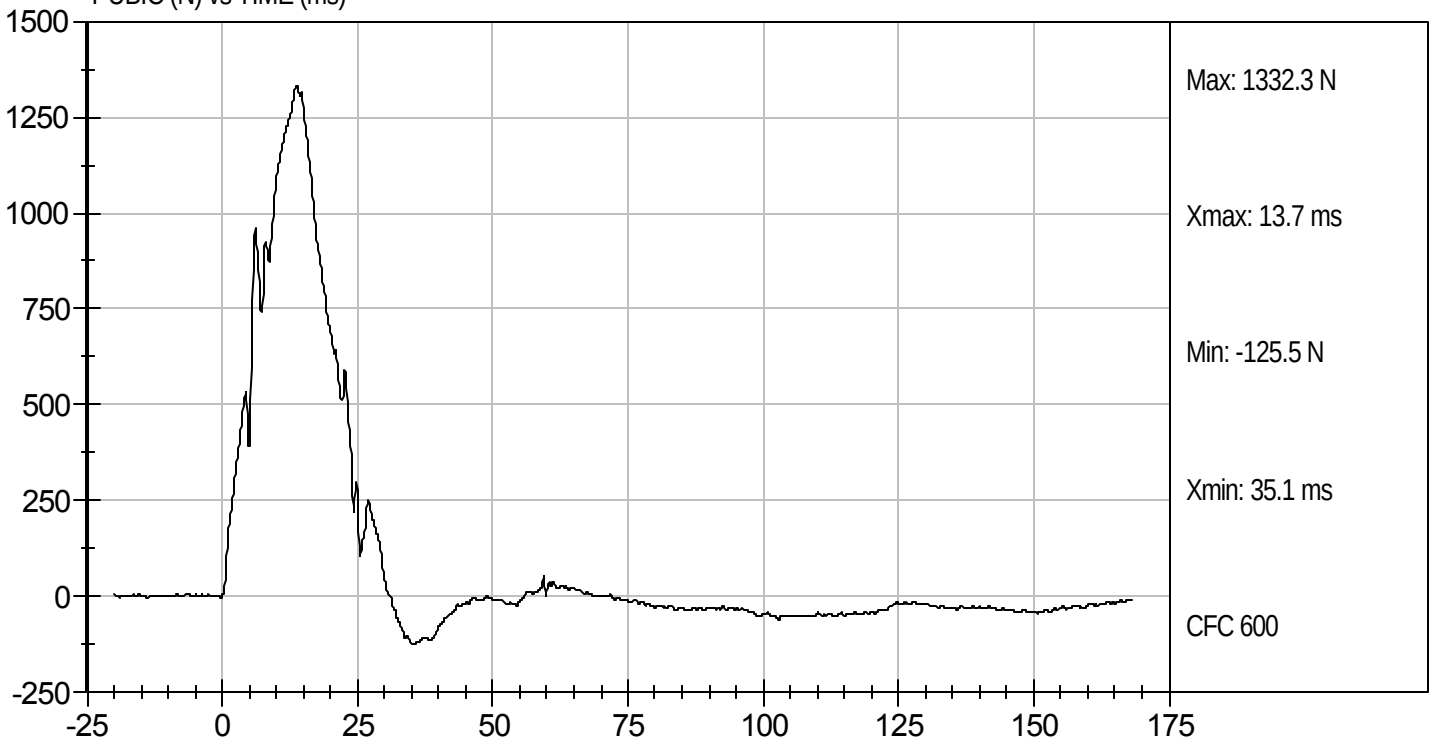
Test Desc: Pelvis Impact
Component ID: D122299

Test Date: 6/20/12
Velocity: 14.00 ft/s, 4.27 m/s

IMPACTOR FORCE (kN) vs TIME (ms)



PUBIC (N) vs TIME (ms)



MGA RESEARCH CORPORATION

HEAD DROP TEST

ES-2re DUMMY

ATD Serial No: 032 **Test ID:** D122521

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	45	Pass
Peak Resultant Acceleration	G's	125 to 155	152	Pass
Peak Longitudinal Acceleration	G's	+/- 15	-12.7	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 15% of peak	Yes	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

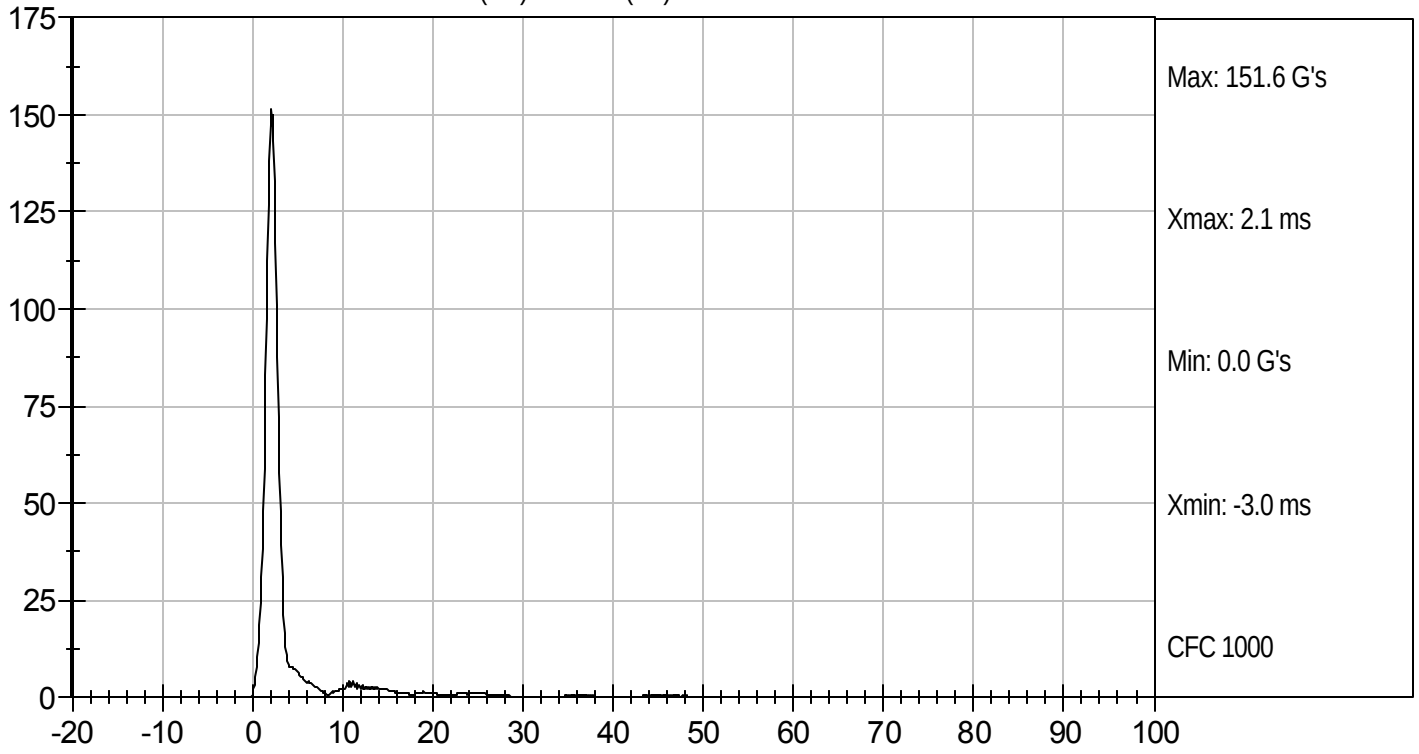
7/9/12
Test Date

David Winkelbauer
Approved By

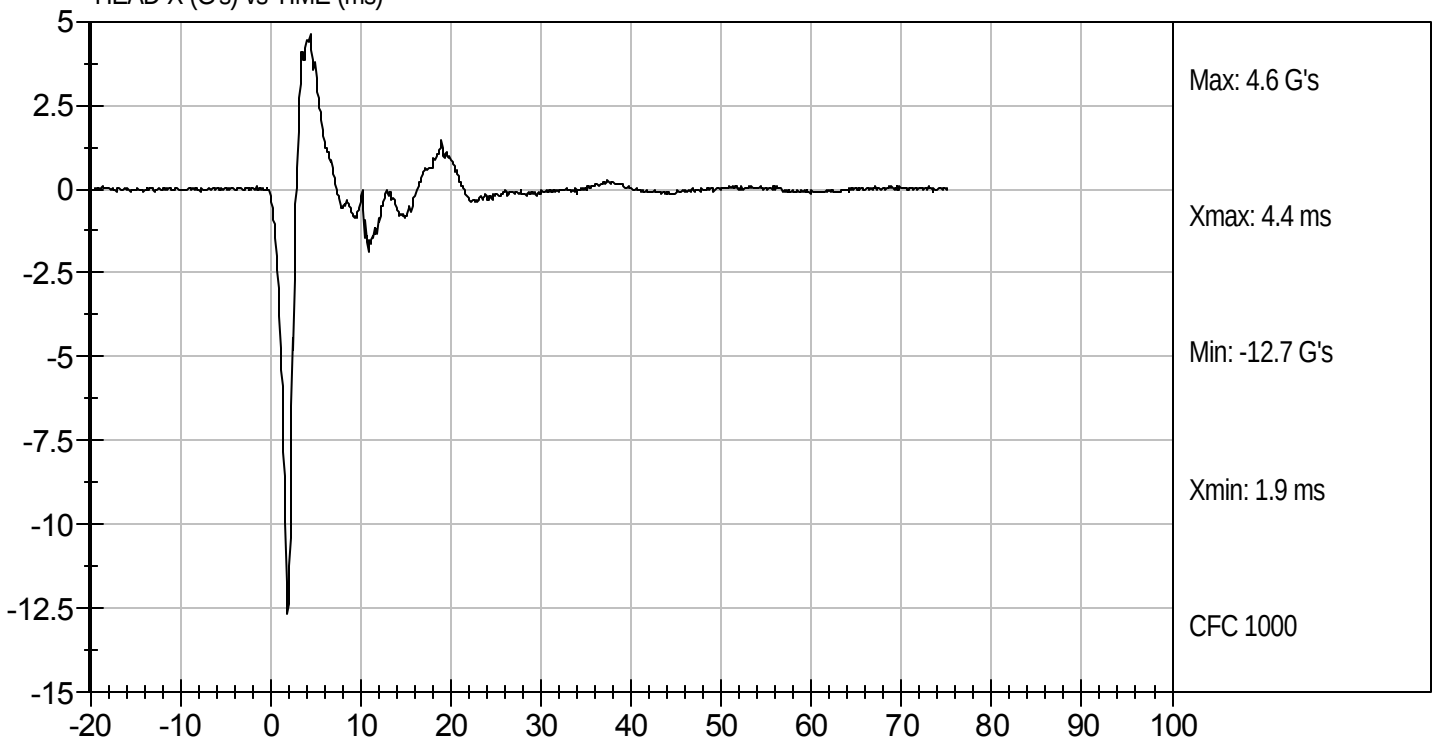
Test Desc: Head Drop
Component ID: D122521

Test Date: 7/9/12
Velocity: 0 ft/s, 0 m/s

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



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



MGA RESEARCH CORPORATION

NECK PENDULUM TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D122522

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	18.0 to 22.0	21.5	Pass
Laboratory Relative Humidity		%	10 to 70	45	Pass
Pendulum Speed		m/s	3.3 to 3.5	3.4	Pass
Pendulum Velocity	1 ms	m/s	0.00 to -0.05	-0.02	Pass
	3 ms	m/s	-0.25 to -0.375	-0.33	Pass
	14 ms	m/s	-3.20 to -3.70	-3.21	Pass
Maximum Flexion Angle		deg	49.0 to 59.0	51.5	Pass
Time of Maximum Flexion Angle		ms	54.0 to 66.0	62.0	Pass
Head Rotation Decay Time to 0 degree		ms	53.0 to 88.0	57.8	Pass
			Overall Test Results		Pass

Jessica Hall
Laboratory Technician

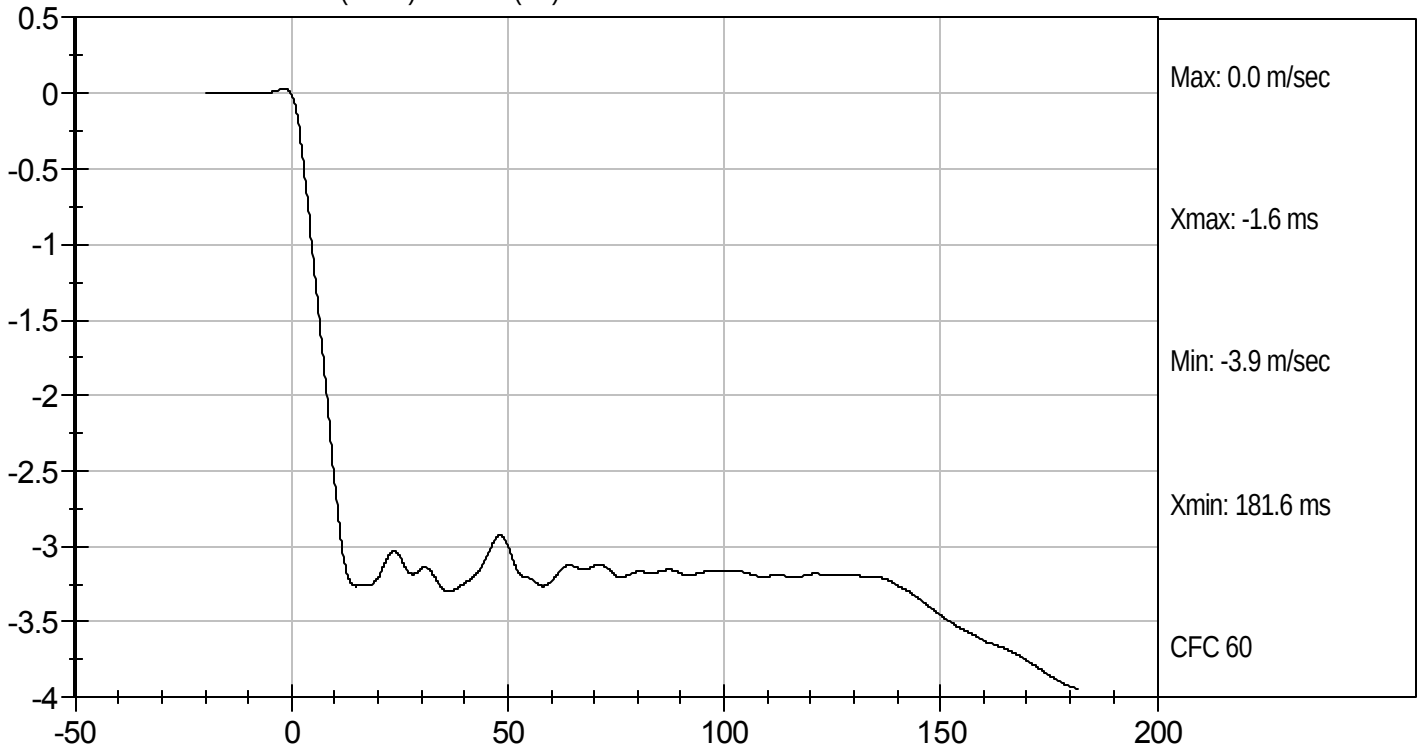
7/9/12
Test Date

David Winkelbauer
Approved By

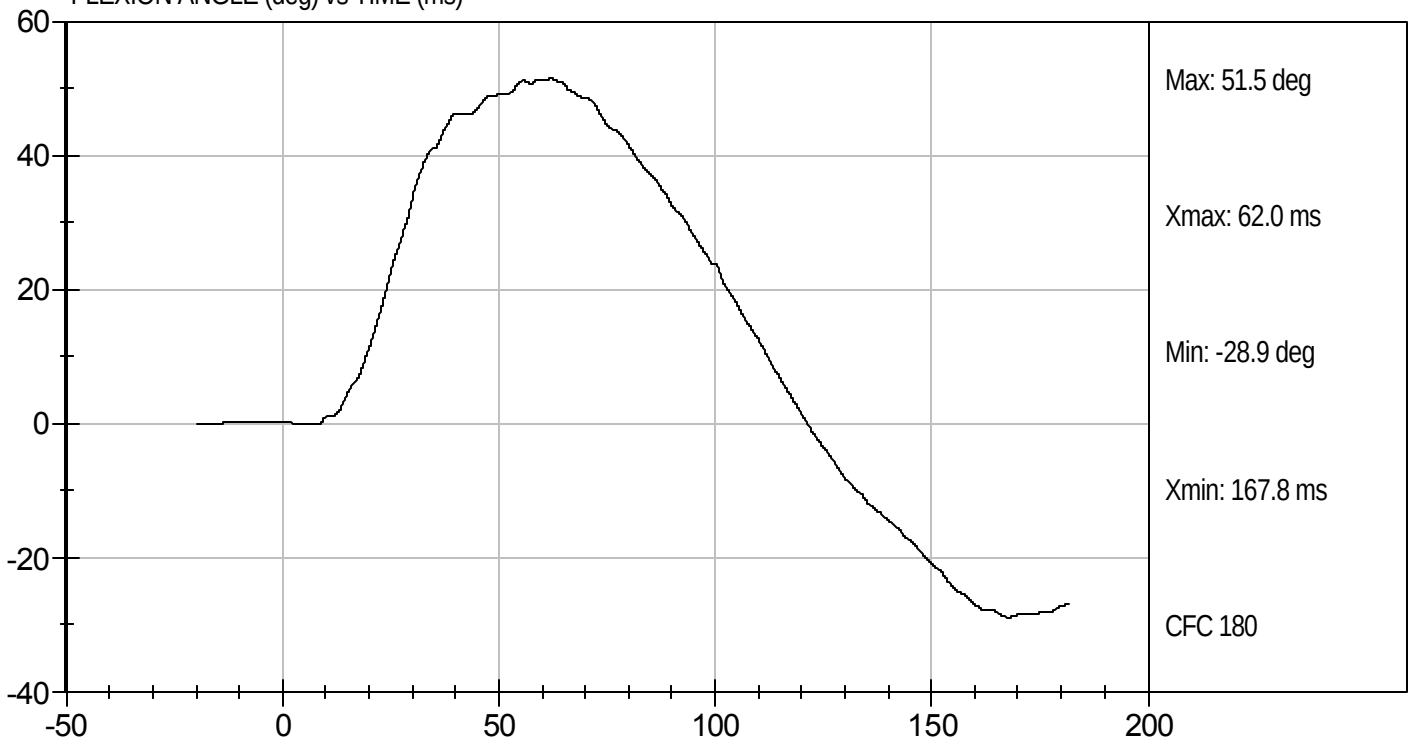
Test Desc: Neck Bending
Component ID: D122522

Test Date: 7/9/12
Velocity: 11.26 ft/s, 3.4 m/s

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

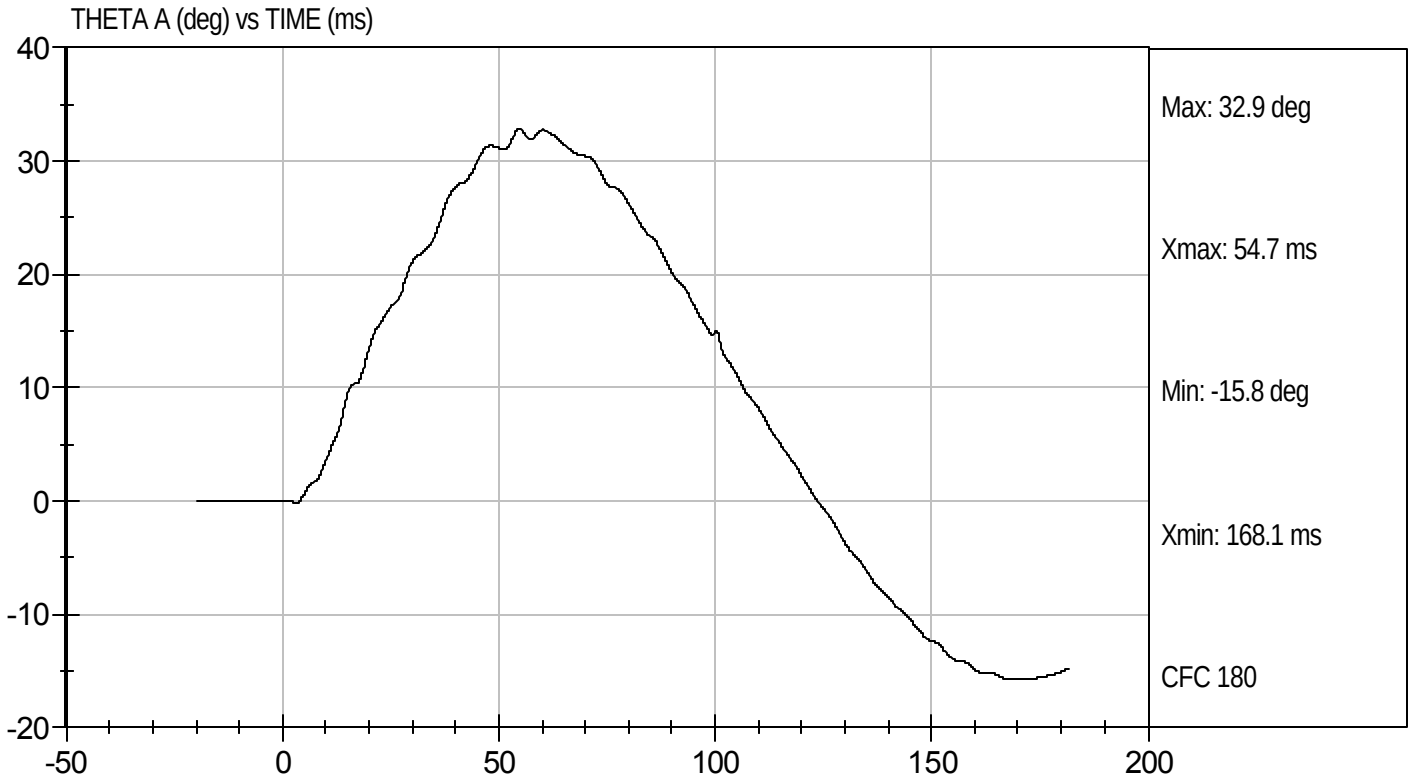


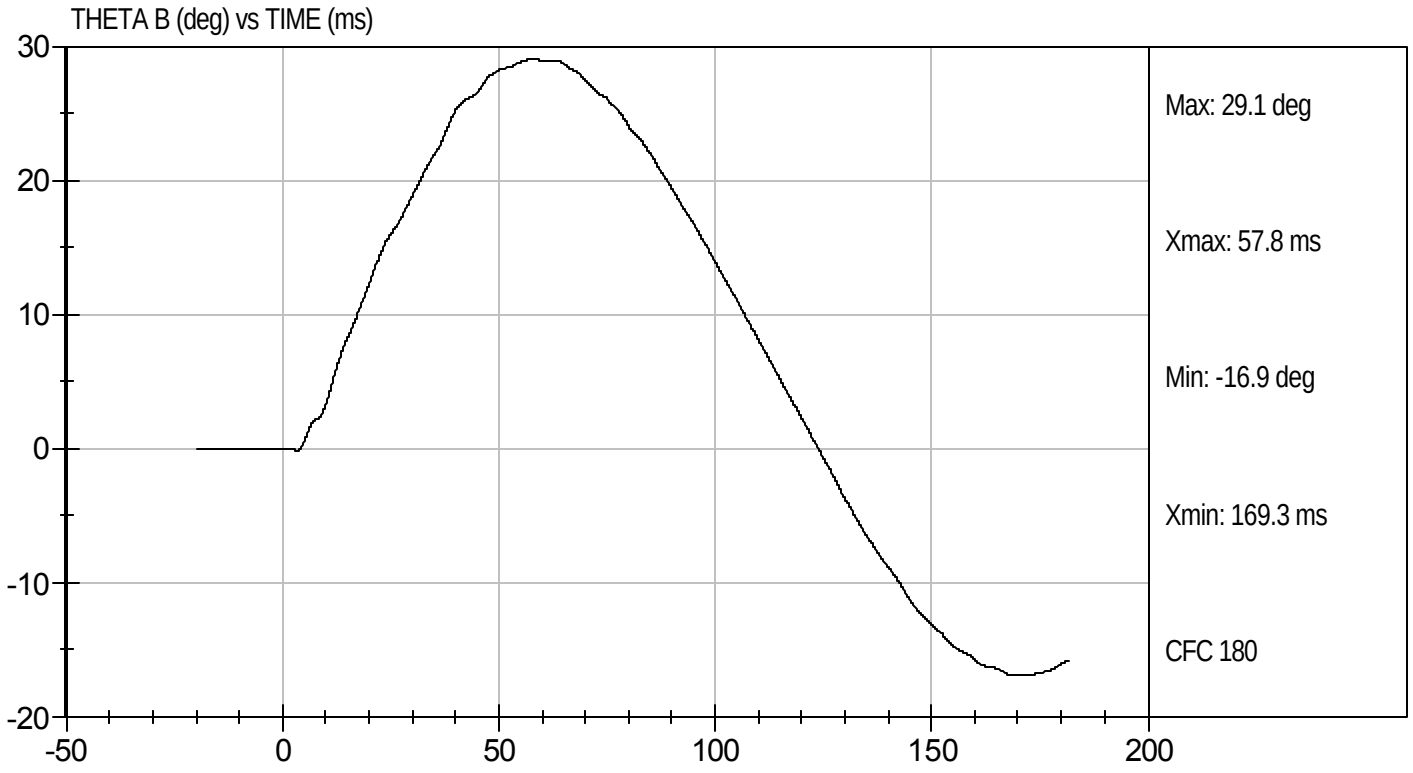
FLEXION ANGLE (deg) vs TIME (ms)



Test Desc: Neck Bending
Component ID: D122522

Test Date: 7/9/12
Velocity: 11.26 ft/s, 3.4 m/s





MGA RESEARCH CORPORATION

SHOULDER IMPACT TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D122523

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	46	Pass
Pendulum Speed	m/s	4.2 to 4.4	4.3	Pass
Peak Shoulder Acceleration	G's	7.5 to 10.5	9.2	Pass
Time of Peak Shoulder Acceleration	ms	NA	13.4	Pass
		Overall Test Results		Pass

Jessica Gall
Laboratory Technician

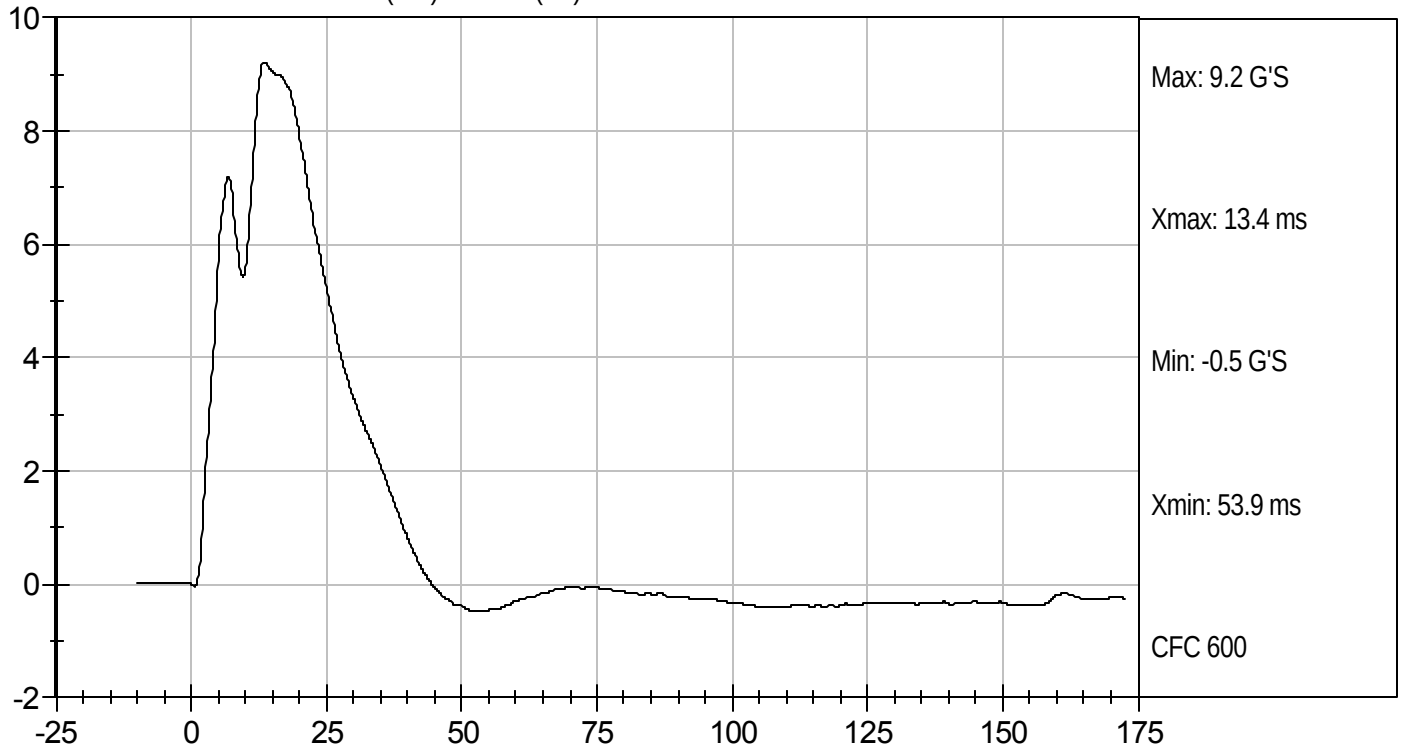
7/10/12
Test Date

David Winkelbauer
Approved By

Test Desc: Shoulder Impact
Component ID: D122523

Test Date: 7/10/12
Velocity: 14.00 ft/s, 4.3 m/s

SHOULDER ACCELERATION (G'S) vs TIME (ms)



MGA RESEARCH CORPORATION

UPPER RIB TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D122524

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	44	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	38.2	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	48.7	Pass
		Overall Test Results		Pass

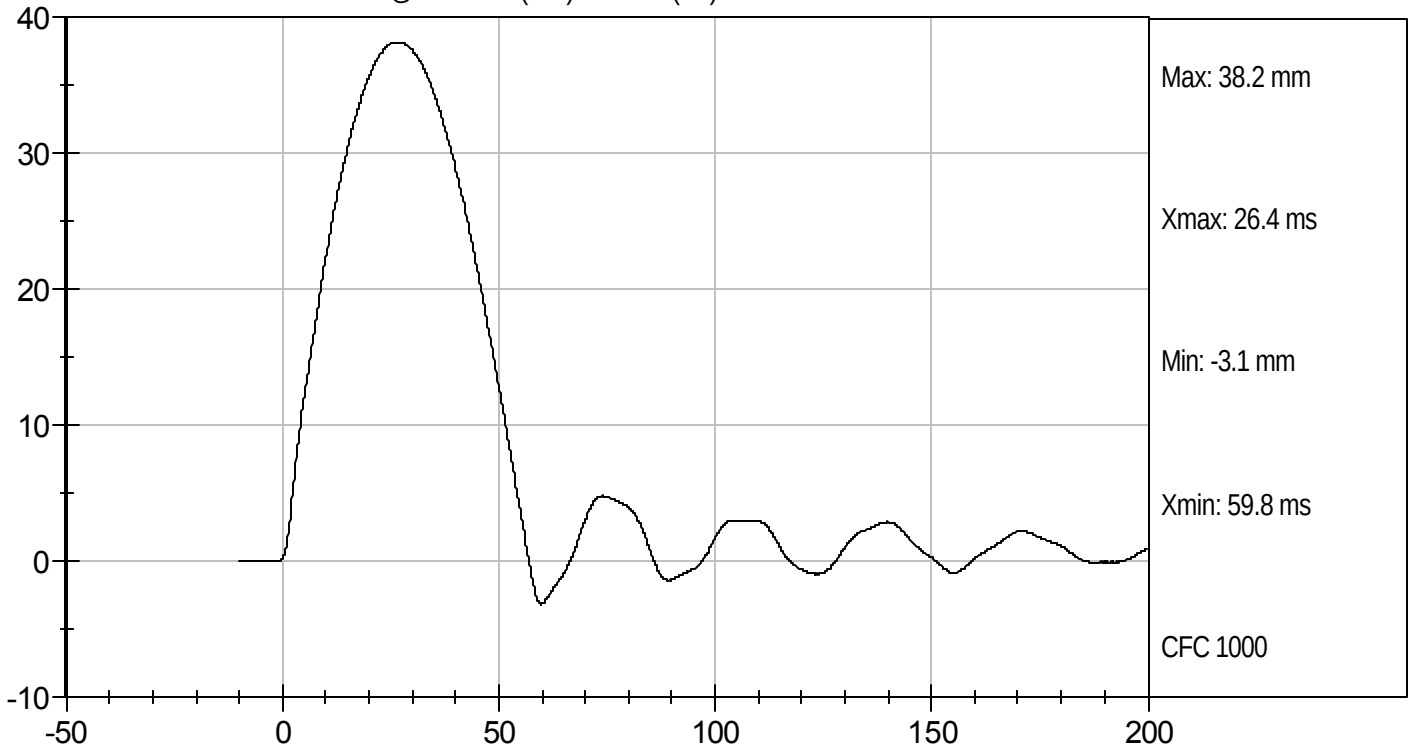
Jessica Gall
Laboratory Technician

7/9/12
Test Date

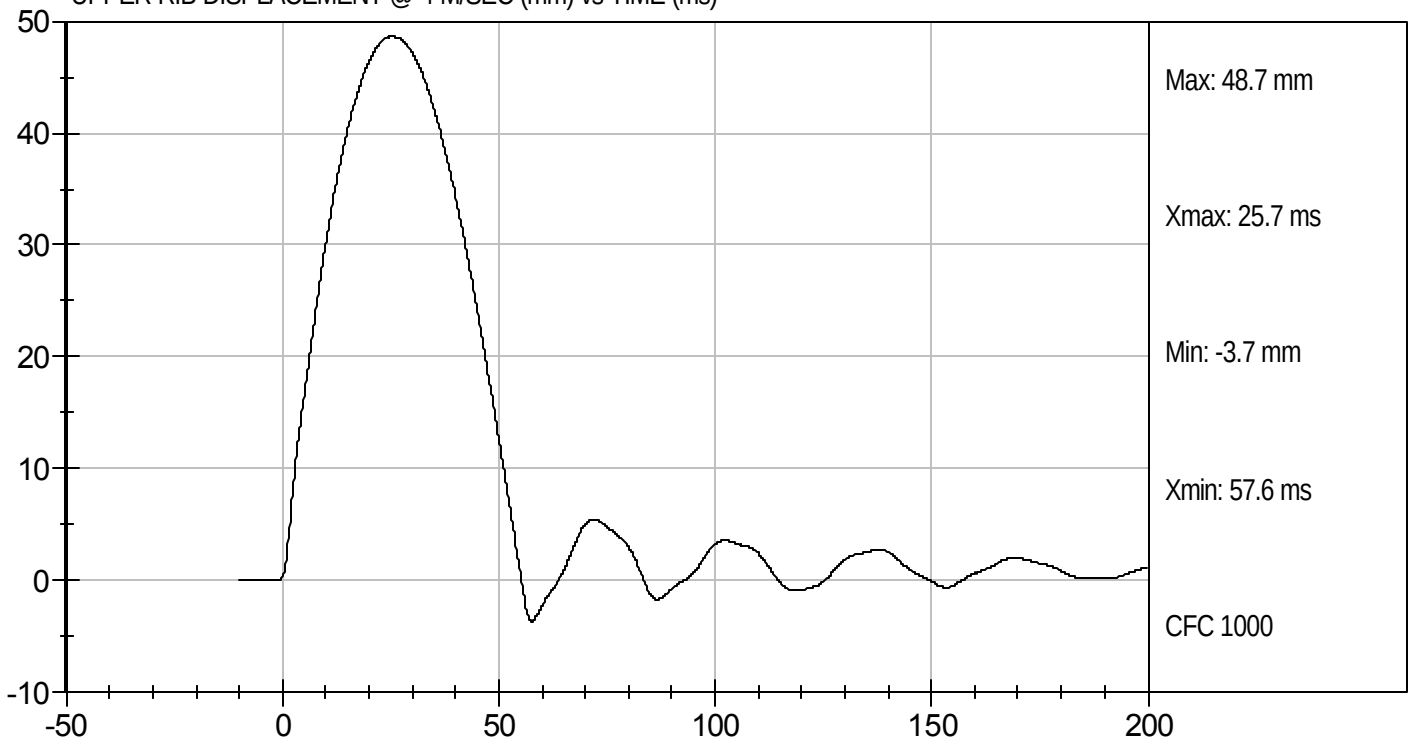
David Winkelbauer
Approved By

Test Desc: Rib Impact - Upper
Component ID: D122524
Test Date: 7/9/12

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



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



MGA RESEARCH CORPORATION

MID RIB TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D122525

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	44	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	38.3	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	48.5	Pass
		Overall Test Results		Pass

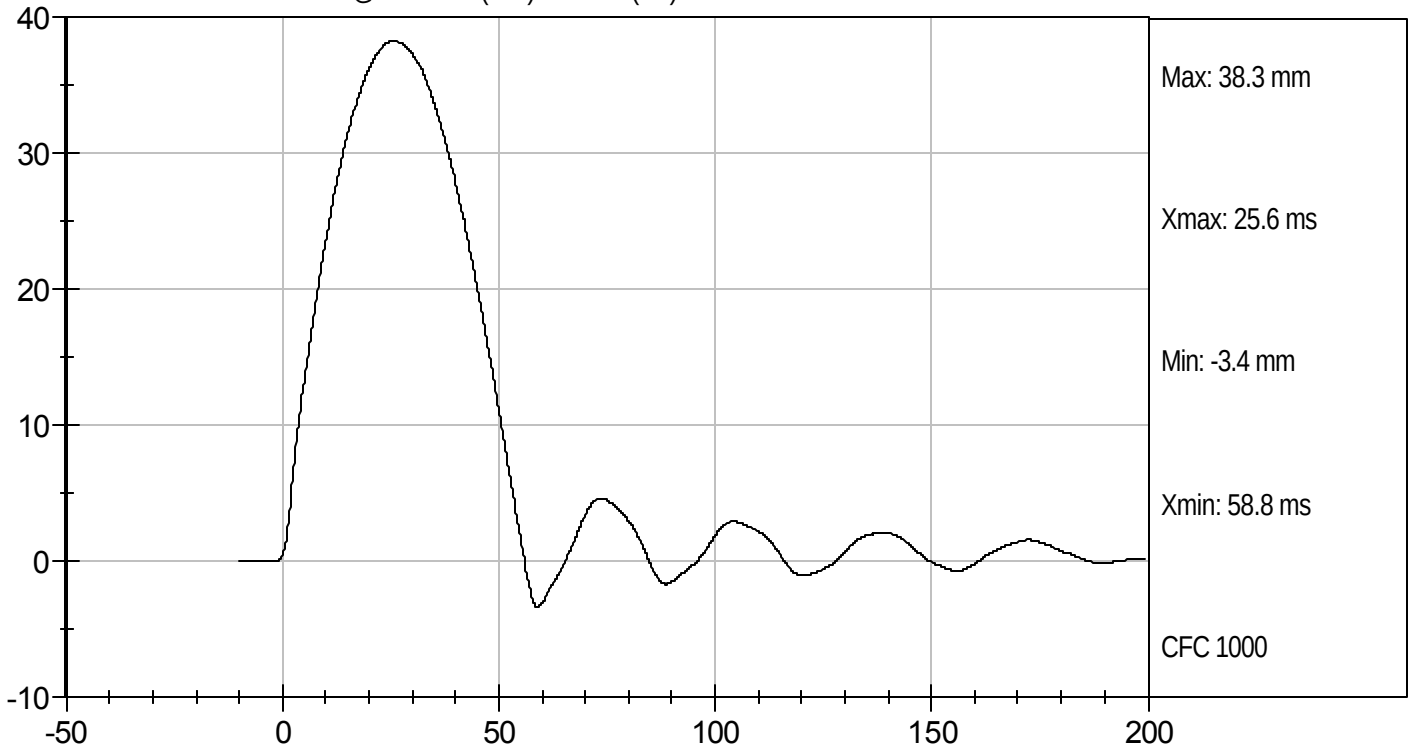
Jessica Hall
Laboratory Technician

7/9/12
Test Date

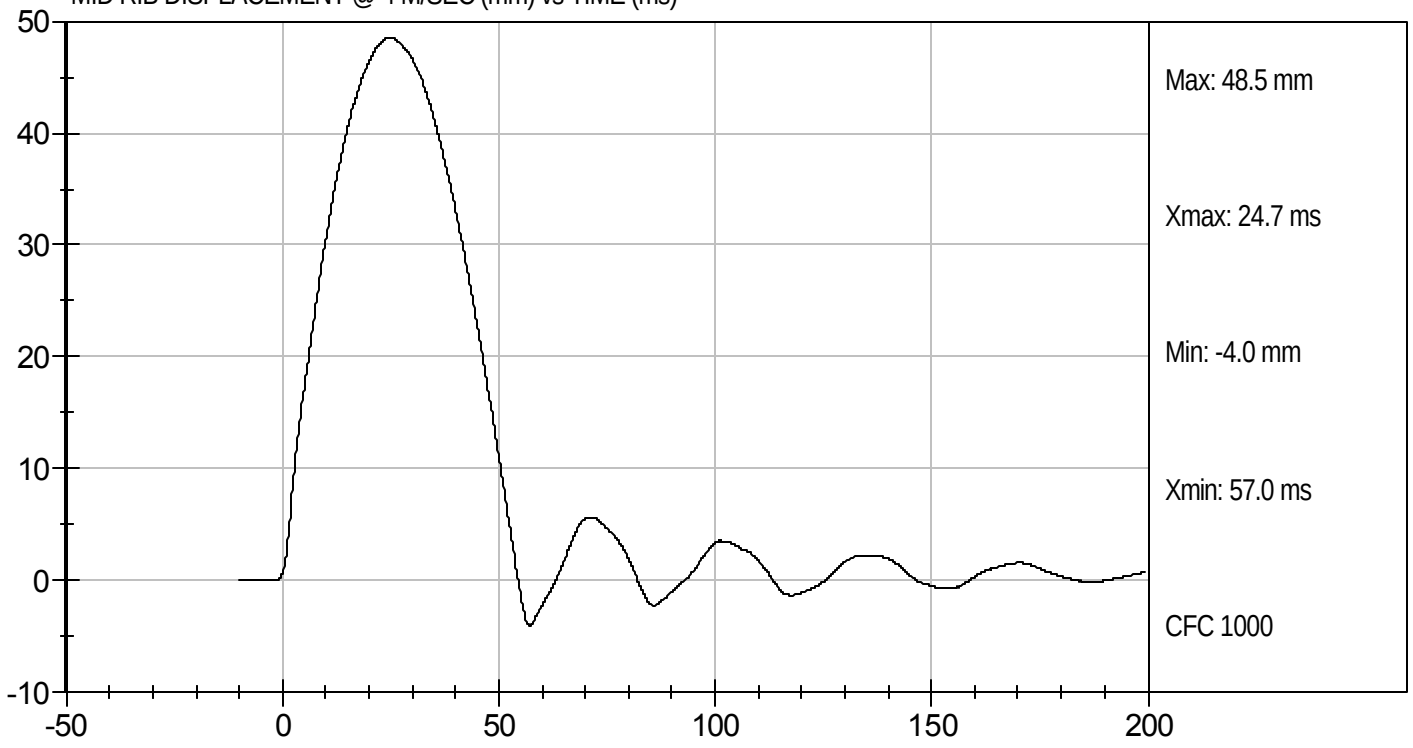
David Winkelbauer
Approved By

Test Desc: Rib Impact - Mid
Component ID: D122525
Test Date: 7/9/12

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



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



MGA RESEARCH CORPORATION

LOWER RIB TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D122526

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	44	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	38.3	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	48.3	Pass
		Overall Test Results		Pass

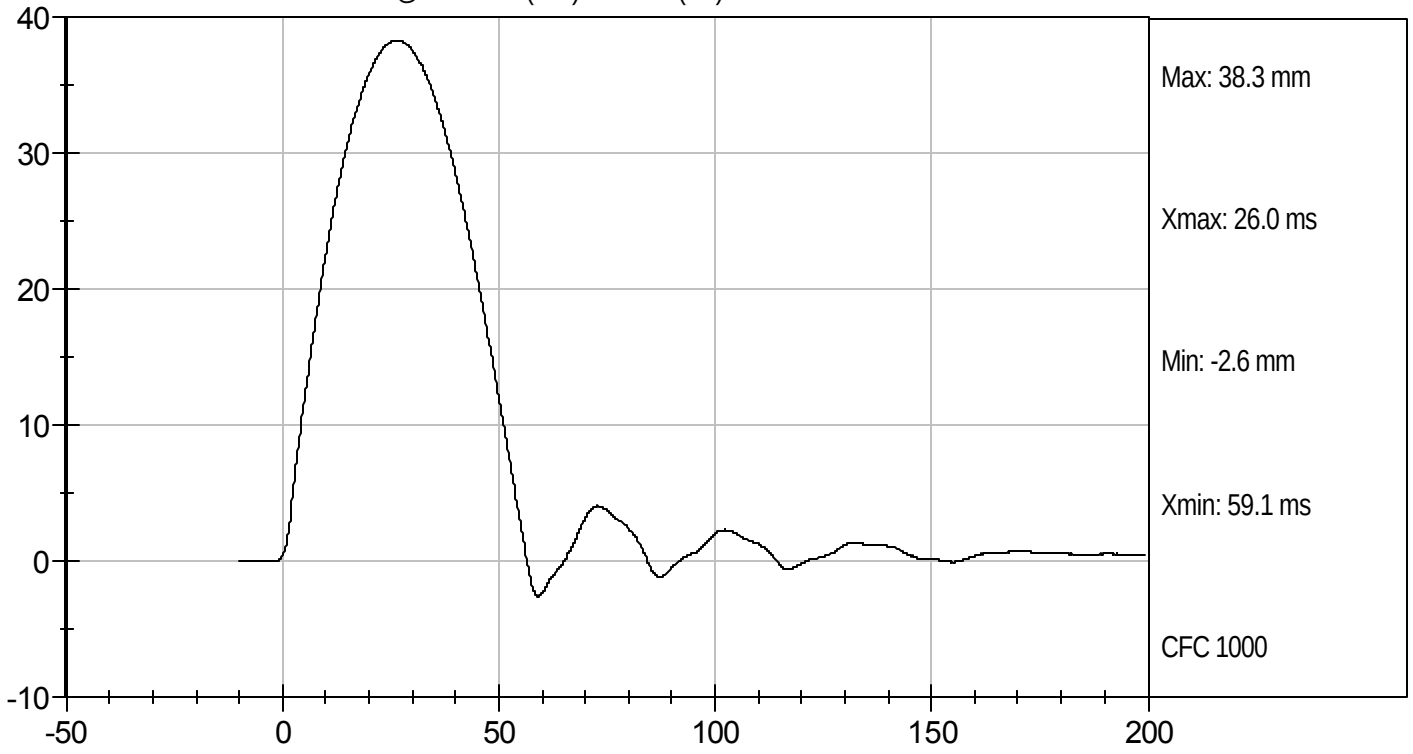
Jessica Hall
Laboratory Technician

7/9/12
Test Date

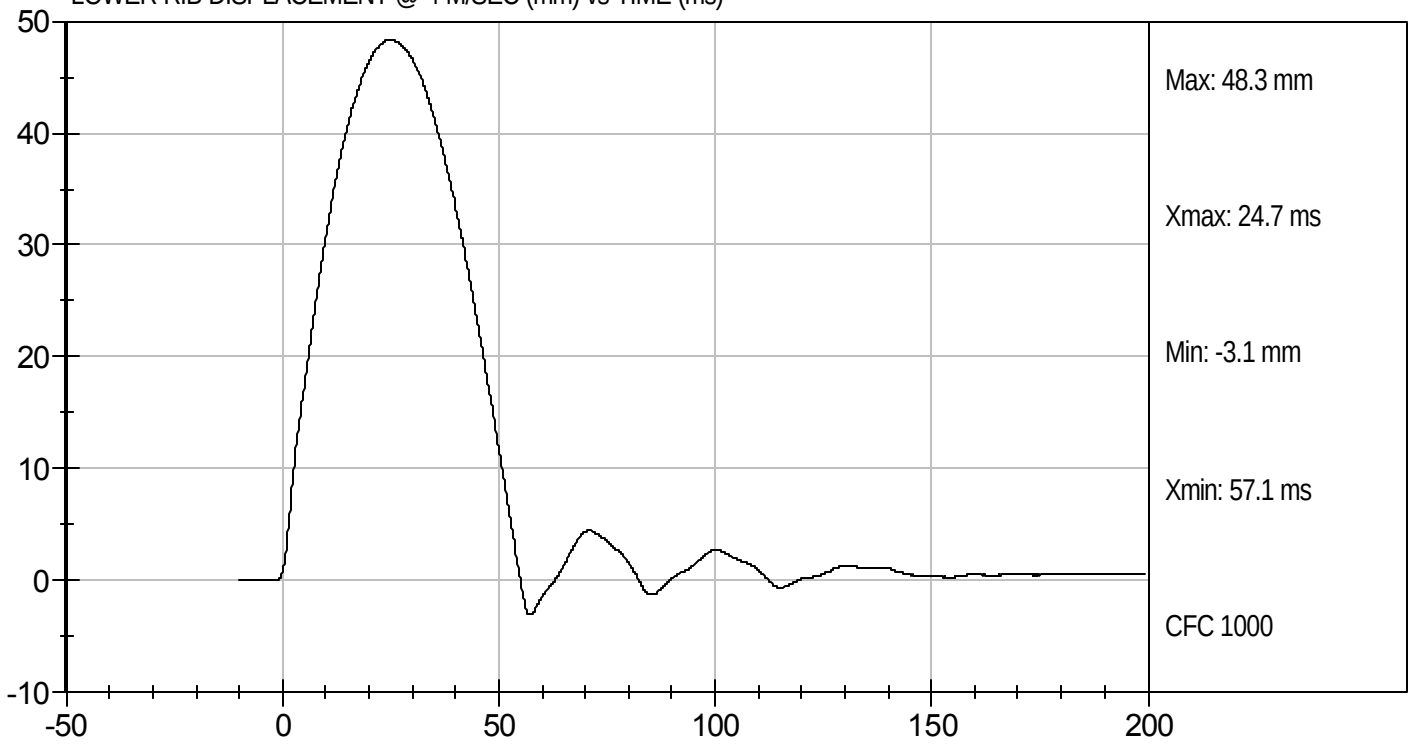
David Winkelbauer
Approved By

Test Desc: Rib Impact - Lower
Component ID: D122526
Test Date: 7/9/12

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



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



MGA RESEARCH CORPORATION

FULL BODY THORAX IMPACT TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D122520

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.7	Pass
Humidity	%	10 to 70	46	Pass
Probe Speed	m/s	5.40 to 5.60	5.58	Pass
Maximum Impactor Force (after 6 ms)	kN	5.10 to 6.20	5.17	Pass
Upper Rib Displacement	mm	34.0 to 41.0	37.5	Pass
Middle Rib Displacement	mm	37.0 to 45.0	40.2	Pass
Lower Rib Displacement	mm	37.0 to 44.0	39.2	Pass
		Overall Test Results		Pass

Jessica Gall
Laboratory Technician

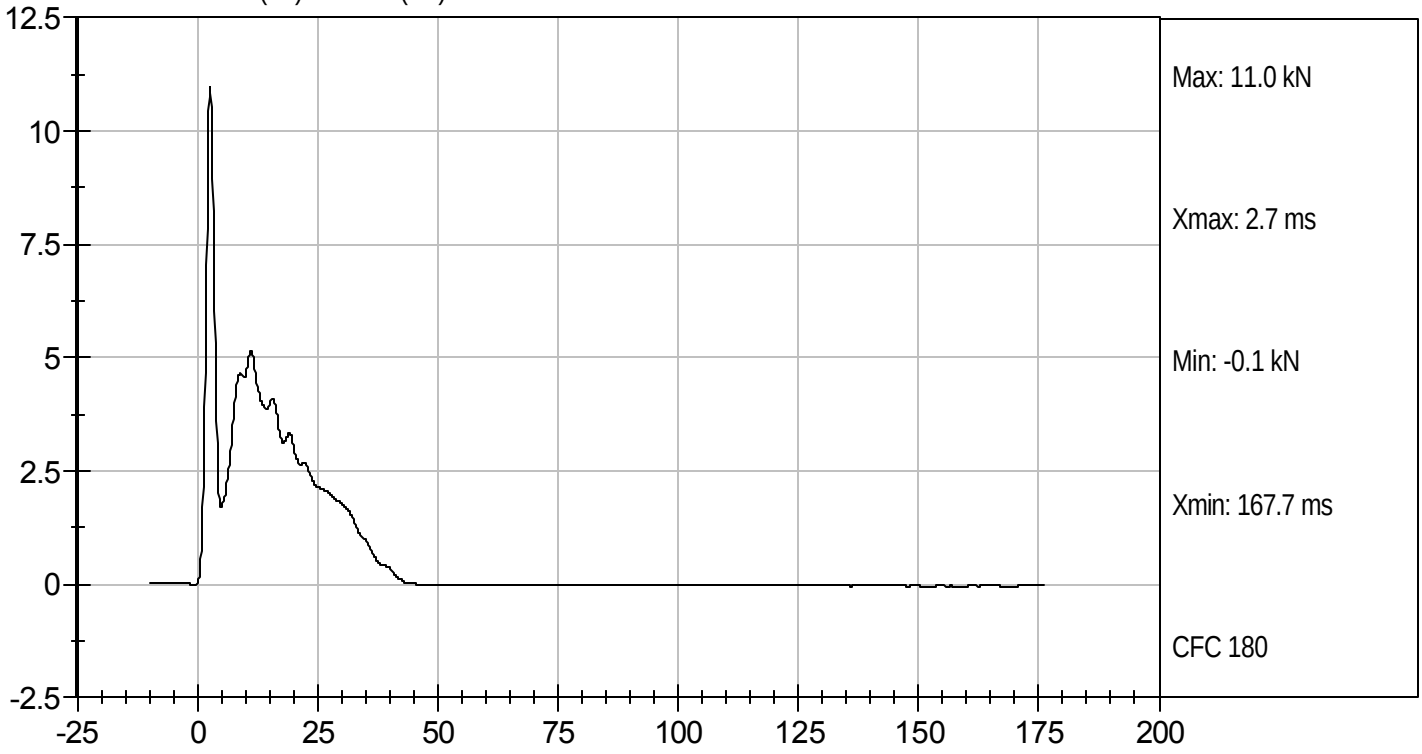
7/10/12
Test Date

David Winkelbauer
Approved By

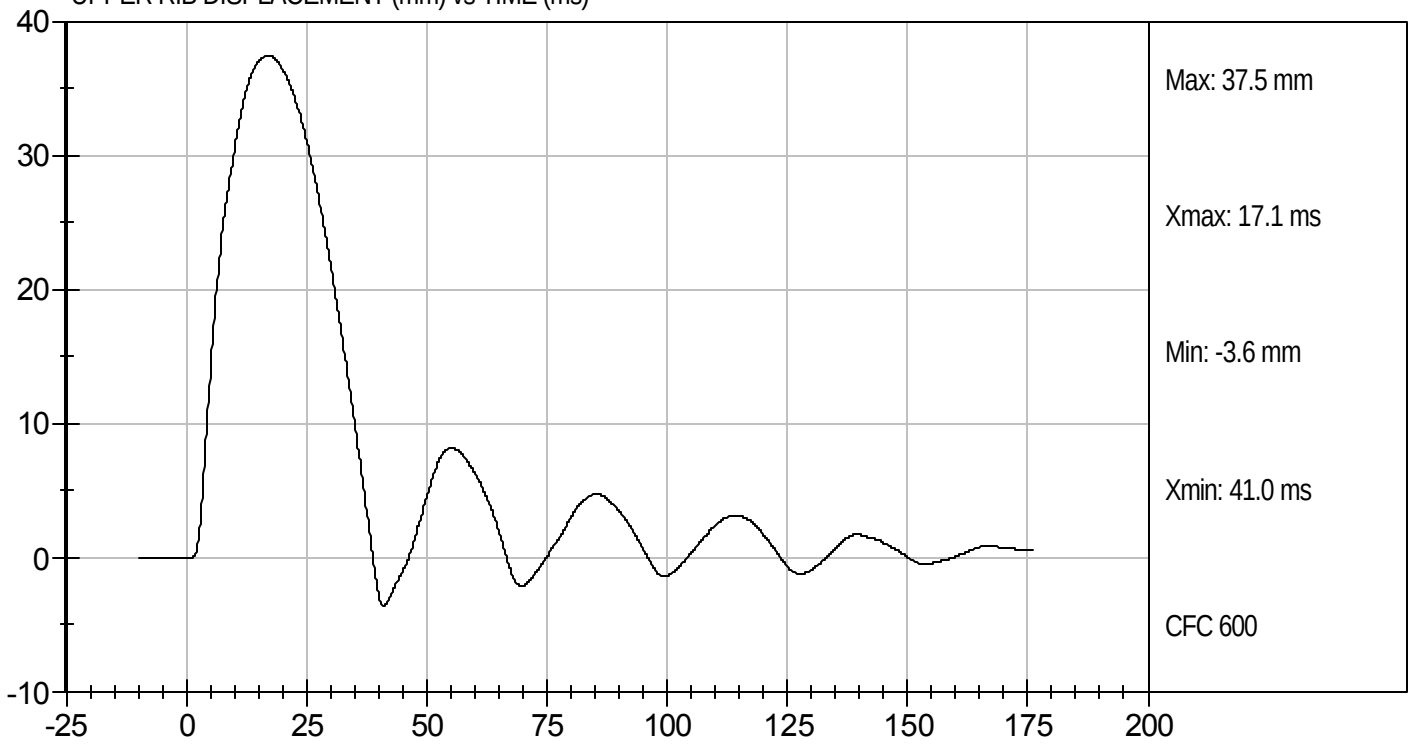
Test Desc: Thorax Impact
Component ID: D122520

Test Date: 7/10/12
Velocity: 18.31 ft/s, 5.58 m/s

PROBE FORCE (kN) vs TIME (ms)



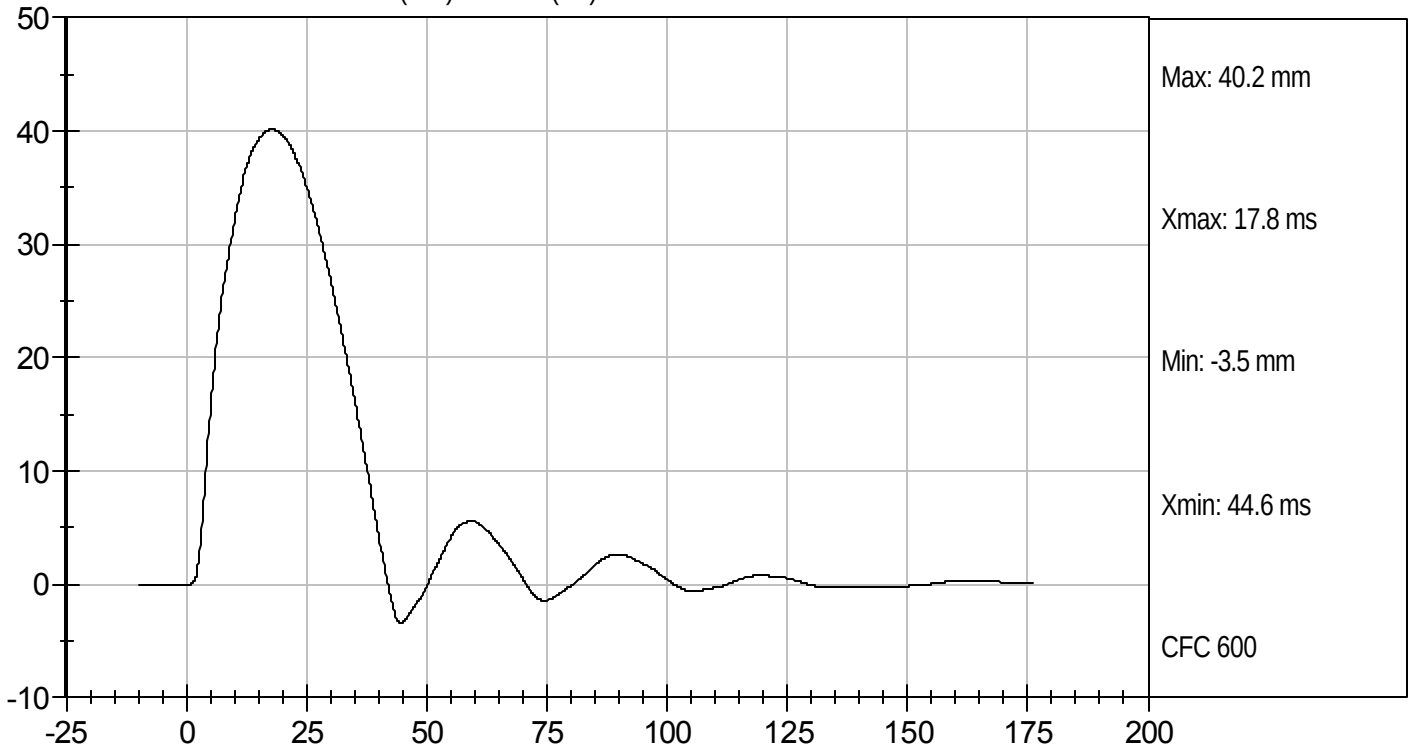
UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



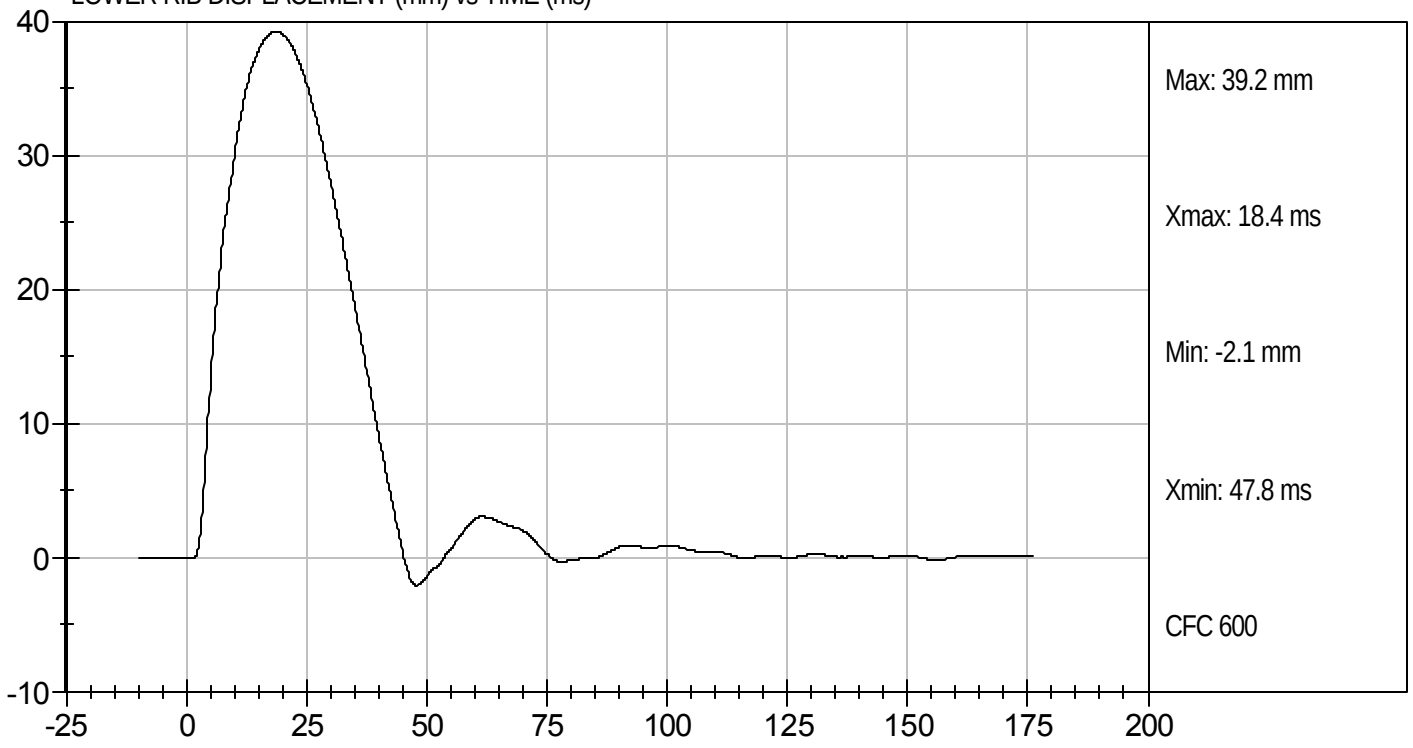
Test Desc: Thorax Impact
Component ID: D122520

Test Date: 7/10/12
Velocity: 18.31 ft/s, 5.58 m/s

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



MGA RESEARCH CORPORATION

ABDOMEN TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D122527

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	46	Pass
Probe Speed	m/s	3.90 to 4.10	4.06	Pass
Maximum Impact Force	kN	4.00 to 4.80	4.35	Pass
Time of Maximum Impactor Force	ms	10.60 to 13.00	12.00	Pass
Maximum Total Abdomen Force	kN	2.20 to 2.70	2.44	Pass
Time of Maximum Abdomen Force	ms	10.00 to 12.30	11.60	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

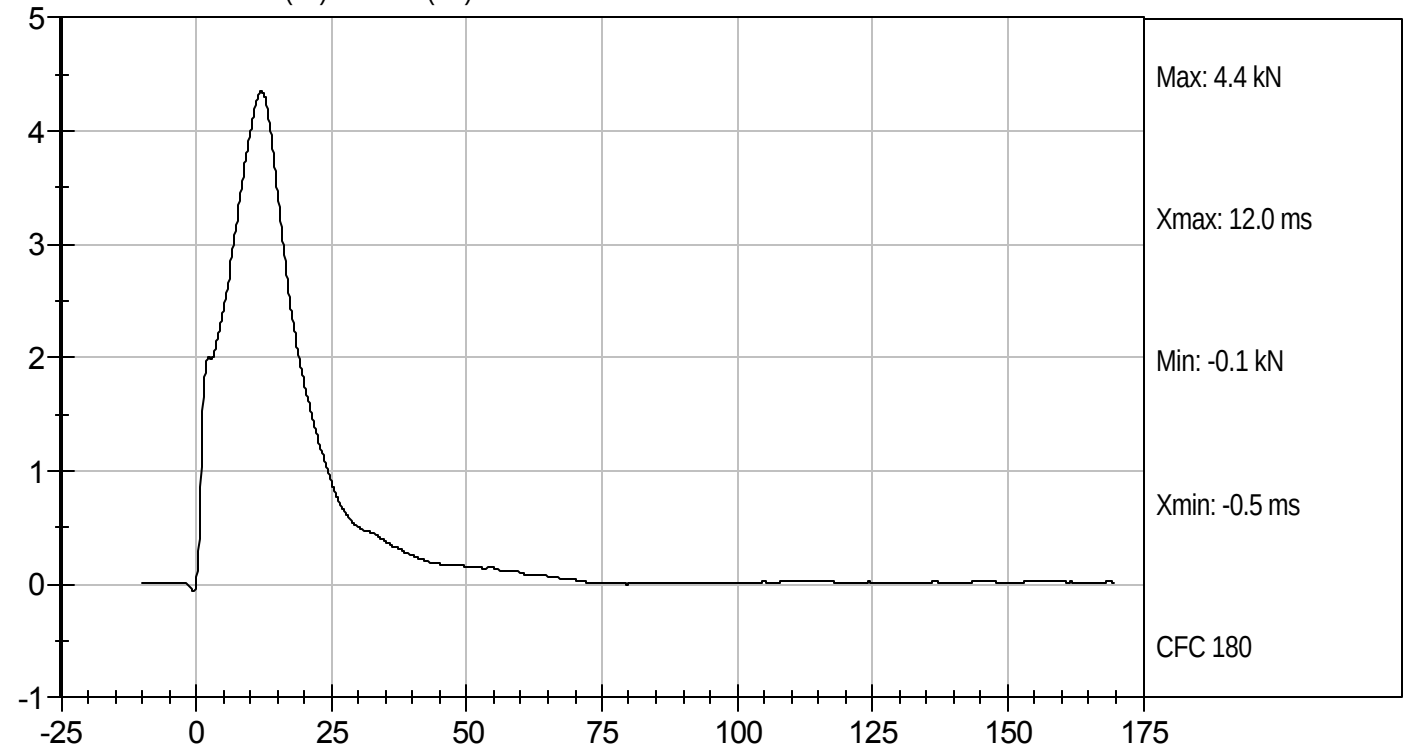
7/10/12
Test Date

David Winkelbauer
Approved By

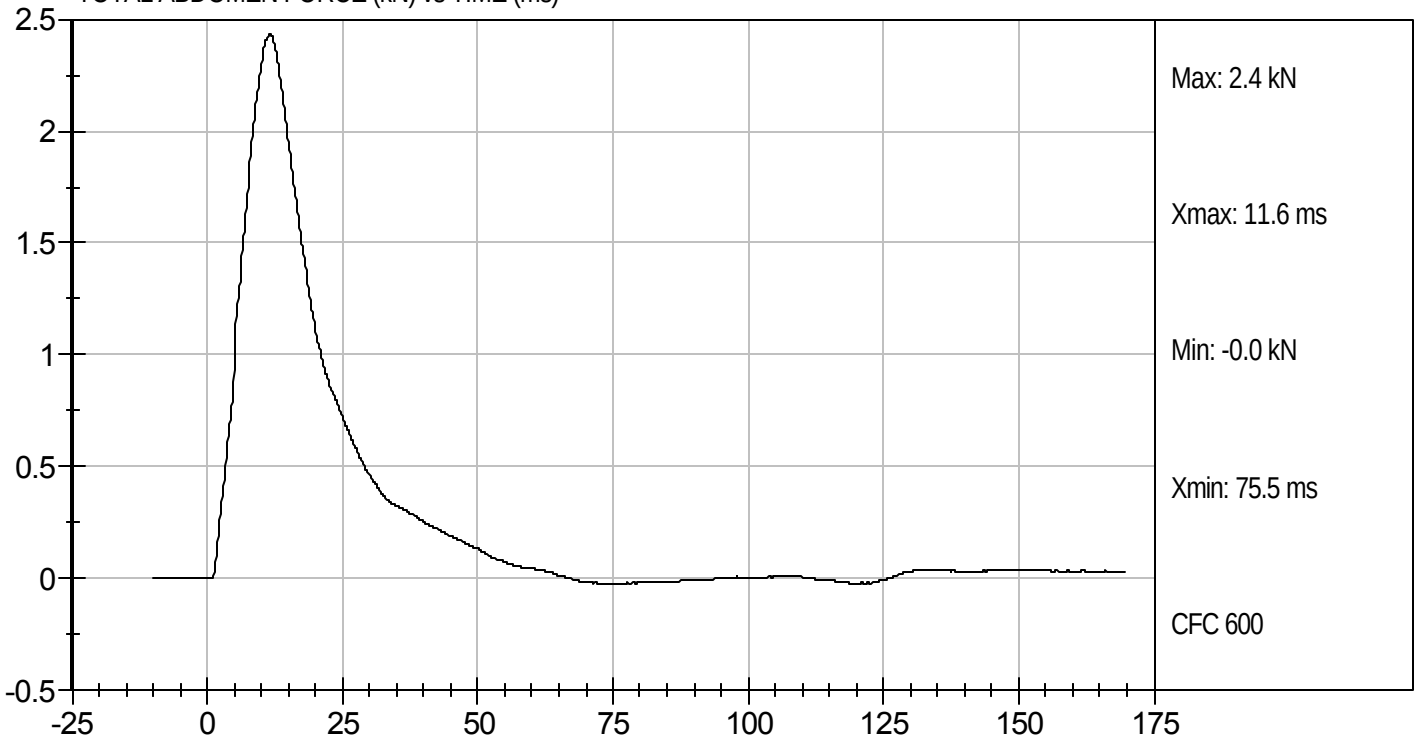
Test Desc: Abdomen Impact
Component ID: D122527

Test Date: 7/10/12
Velocity: 13.33 ft/s, 4.06 m/s

IMPACTOR FORCE (kN) vs TIME (ms)

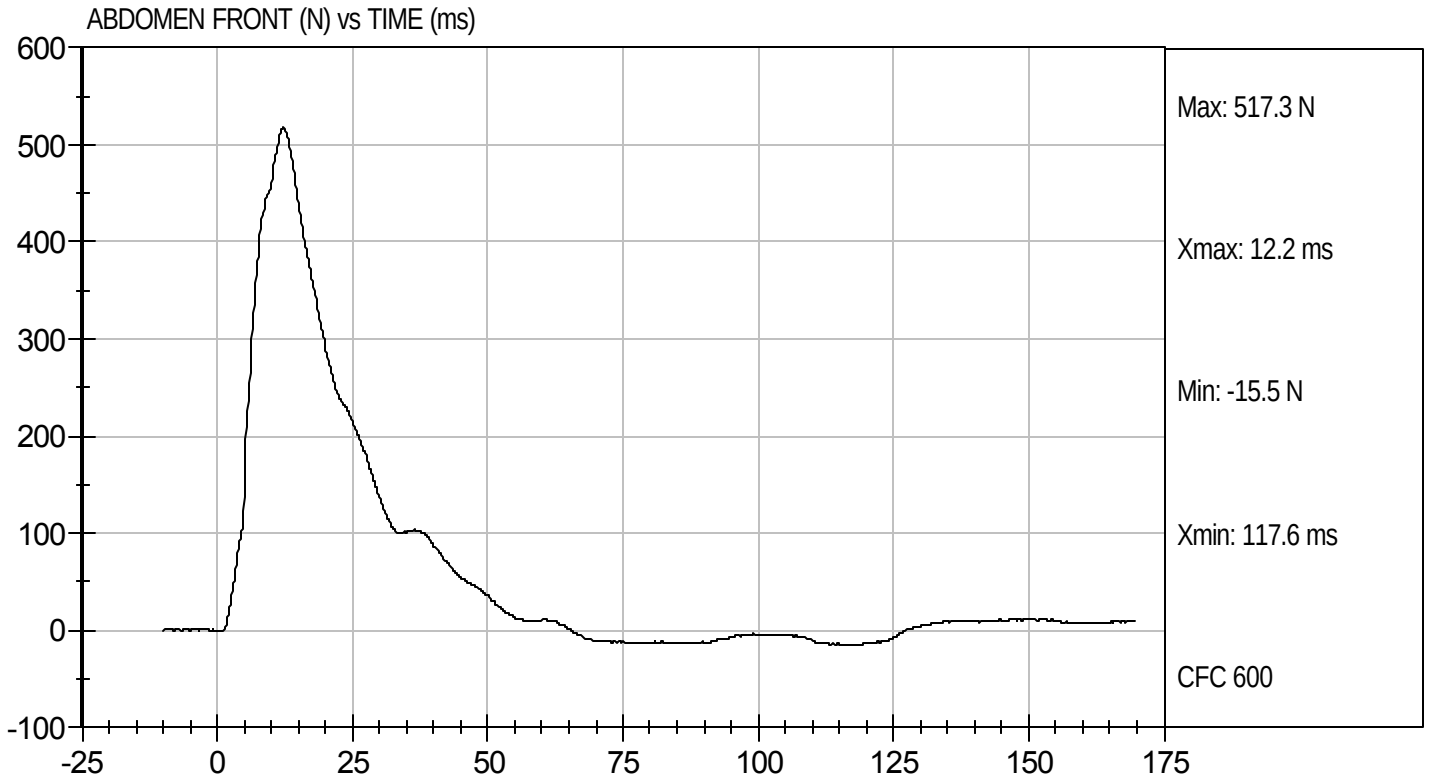


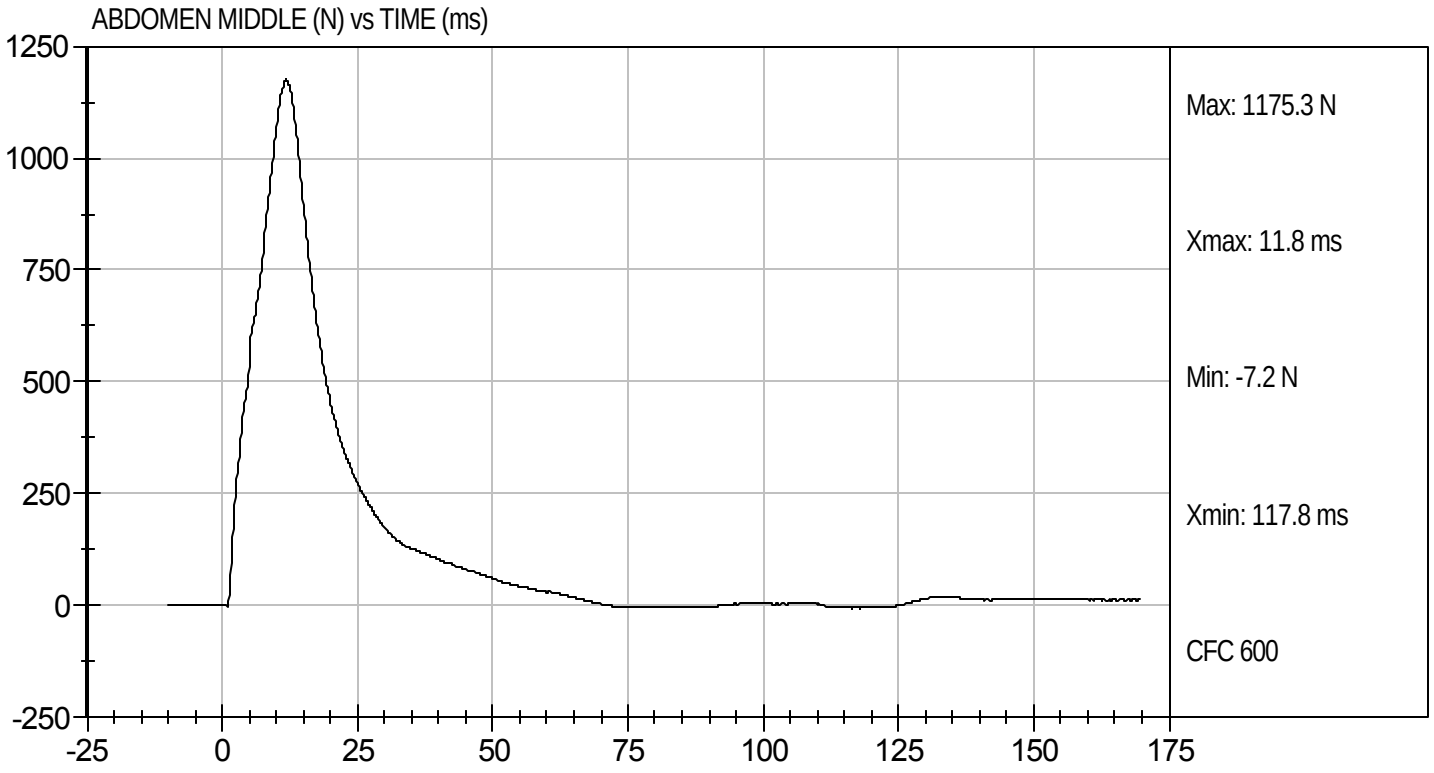
TOTAL ABDOMEN FORCE (kN) vs TIME (ms)



Test Desc: Abdomen Impact
Component ID: D122527

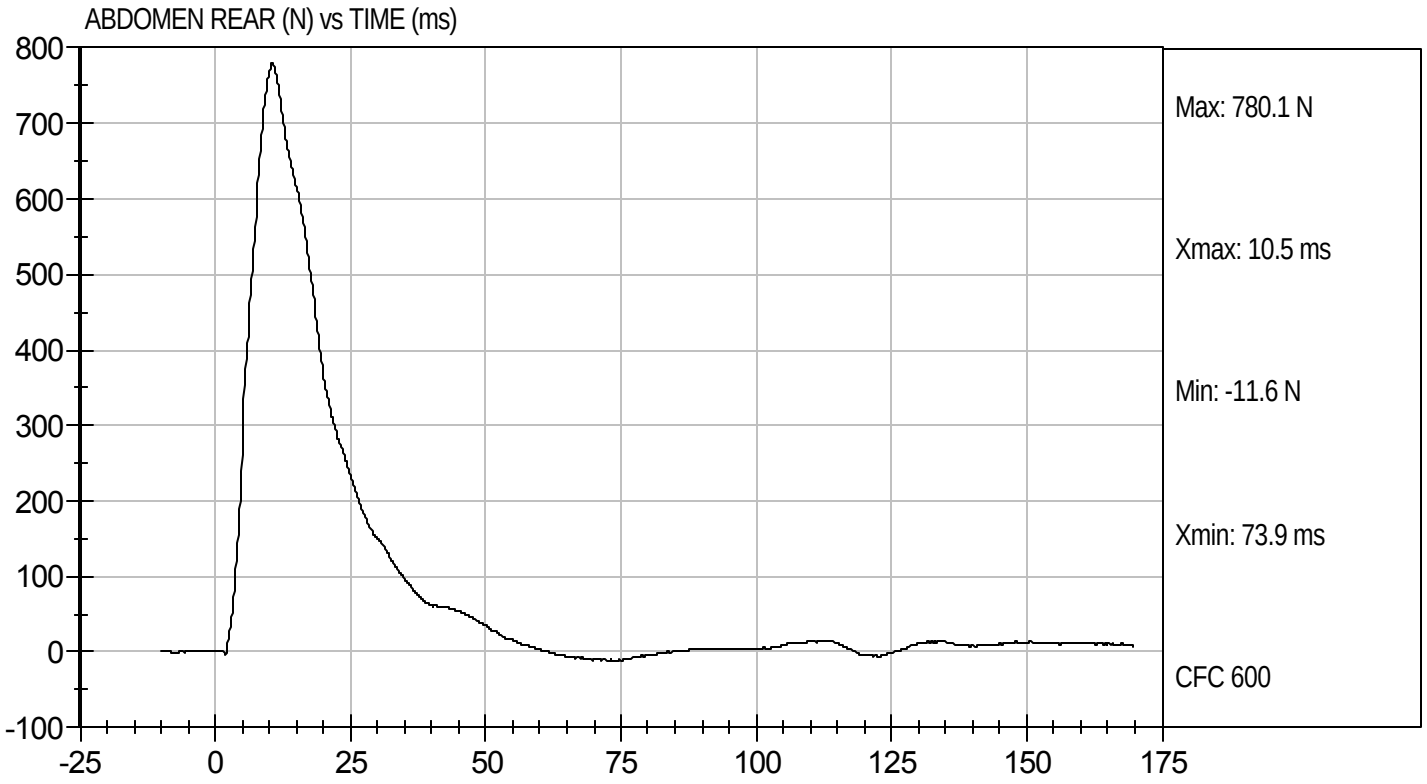
Test Date: 7/10/12
Velocity: 13.33 ft/s, 4.06 m/s





Test Desc: Abdomen Impact
Component ID: D122527

Test Date: 7/10/12
Velocity: 13.33 ft/s, 4.06 m/s



MGA RESEARCH CORPORATION

LUMBAR SPINE TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D122528

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	45	Pass
Pendulum Speed		m/s	5.95 to 6.15	6.12	Pass
Pendulum Velocity	1 ms	m/s	-0.05 to 0.00	0.00	Pass
	3.7 ms	m/s	-0.425 to -0.24	-0.41	Pass
	27 ms	m/s	-6.50 to -5.80	-5.99	Pass
	30 ms	m/s	>= -6.5	-5.87	Pass
Maximum Flexion Angle		deg	45.0 to 55.0	45.5	Pass
Time of Maximum Flexion Angle		ms	39.0 to 53.0	43.9	Pass
Headform Rotation Decay to Initial Position		ms	37 to 57	42	Pass
			Overall Results		Pass

Jessica Gall
Laboratory Technician

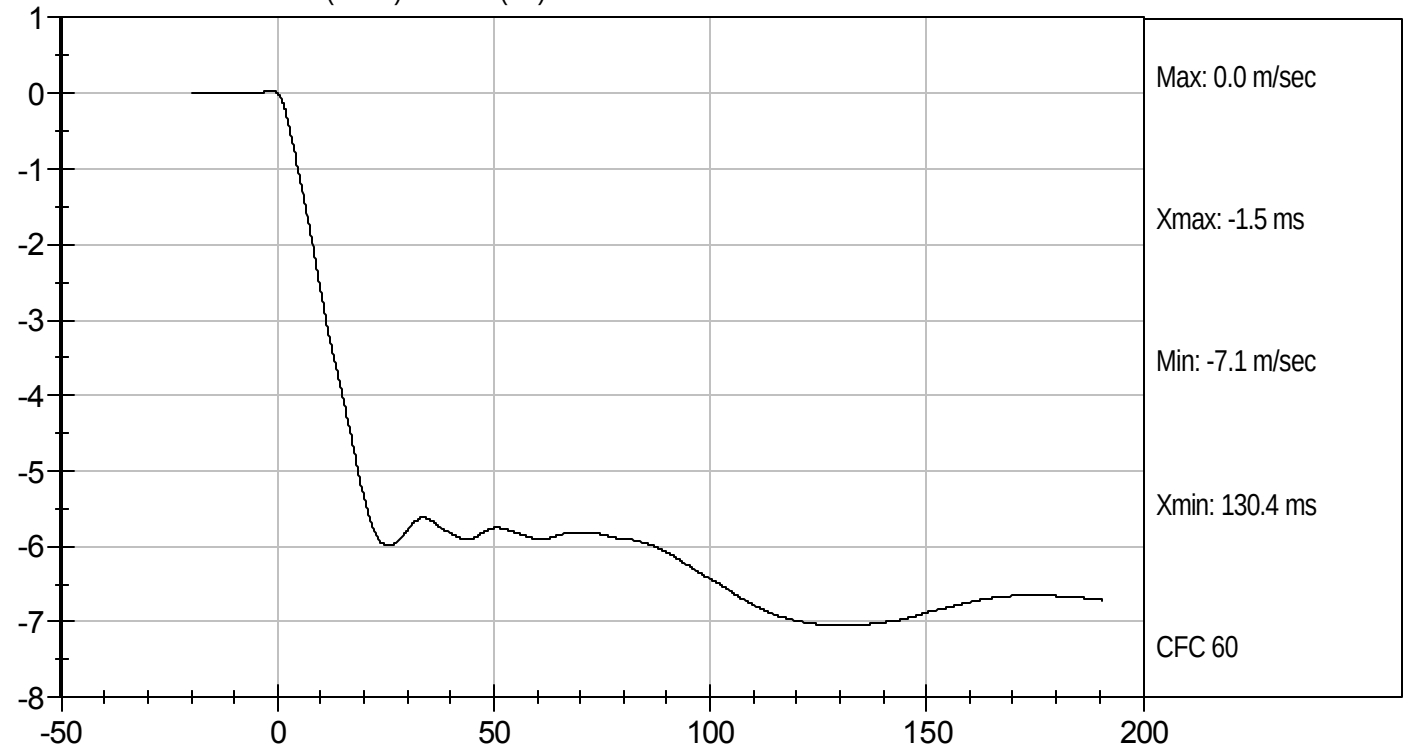
7/9/12
Test Date

David Winkelbauer
Approved By

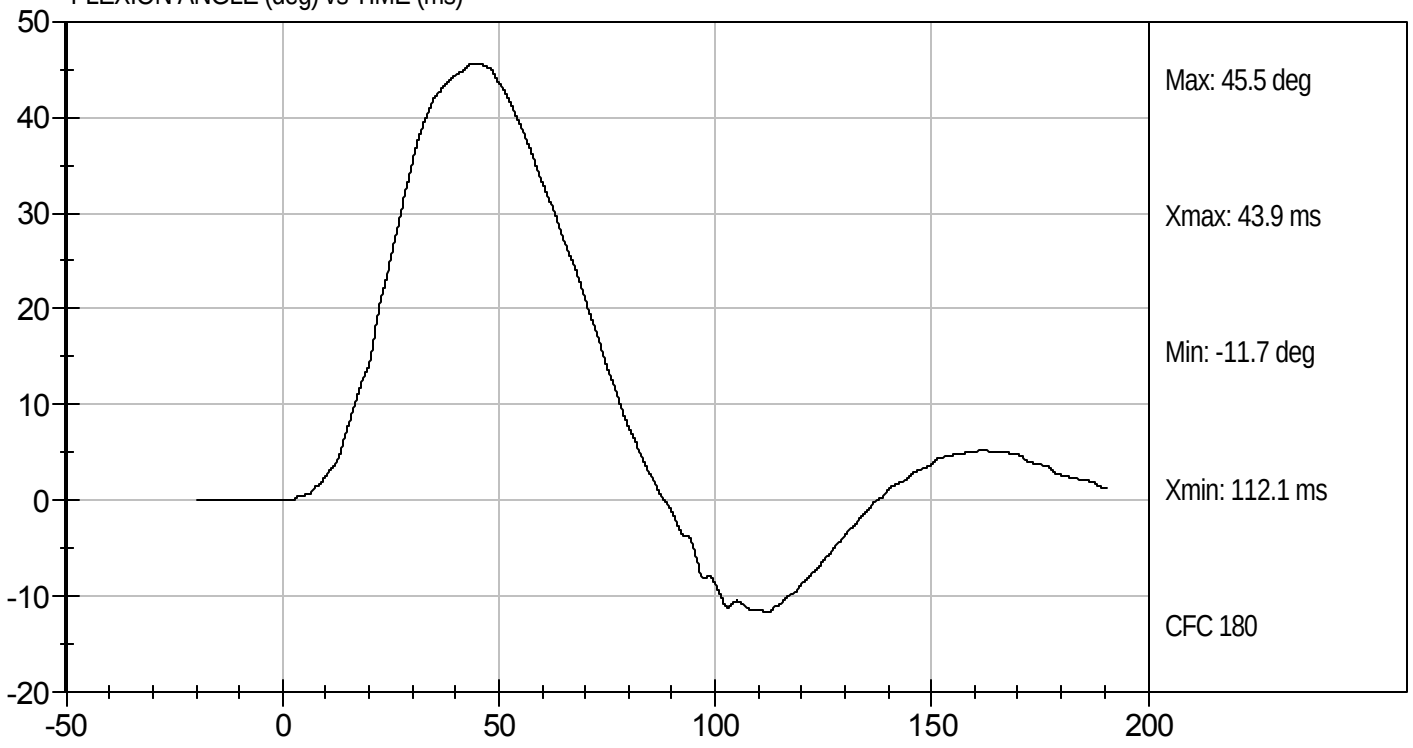
Test Desc: Lumbar Bending
Component ID: D122528

Test Date: 7/9/12
Velocity: 20.08 ft/s, 6.12 m/s

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

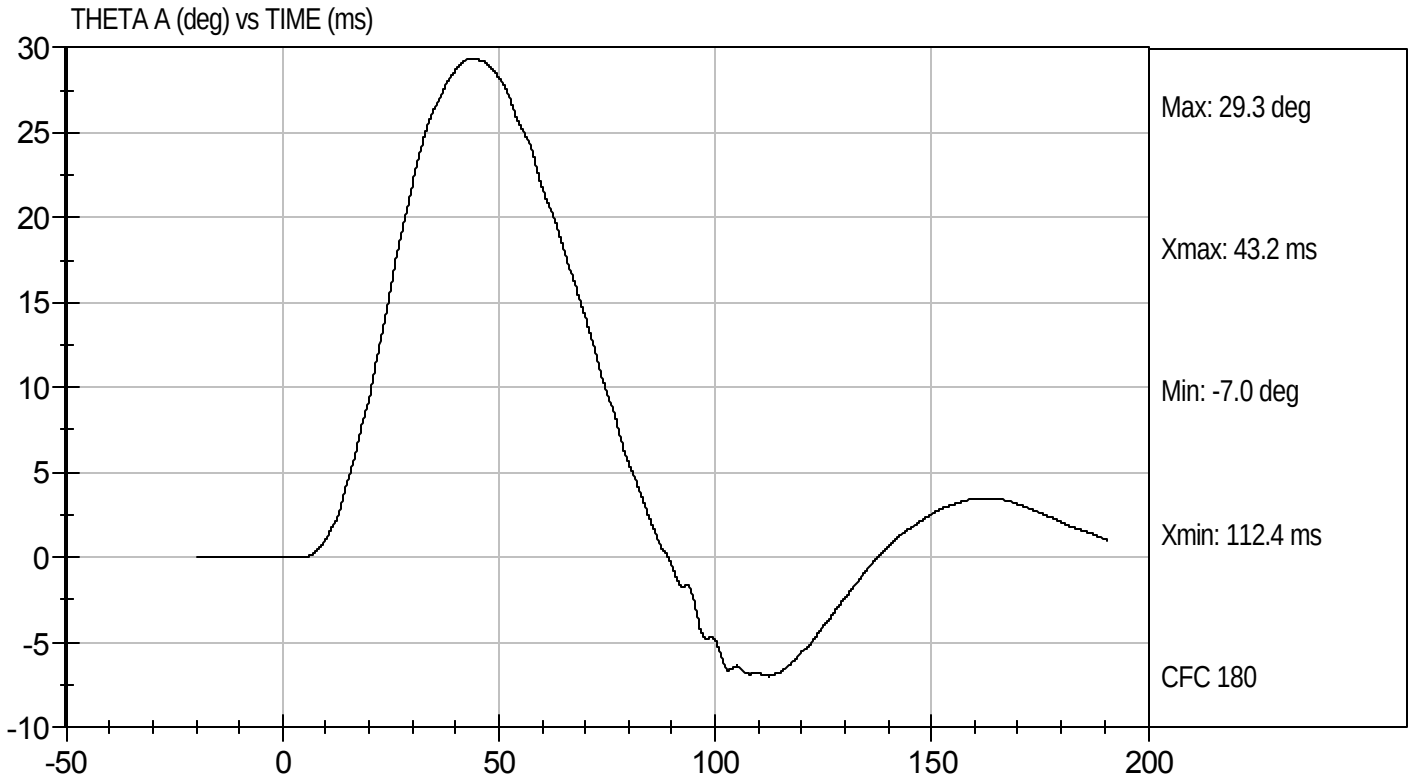


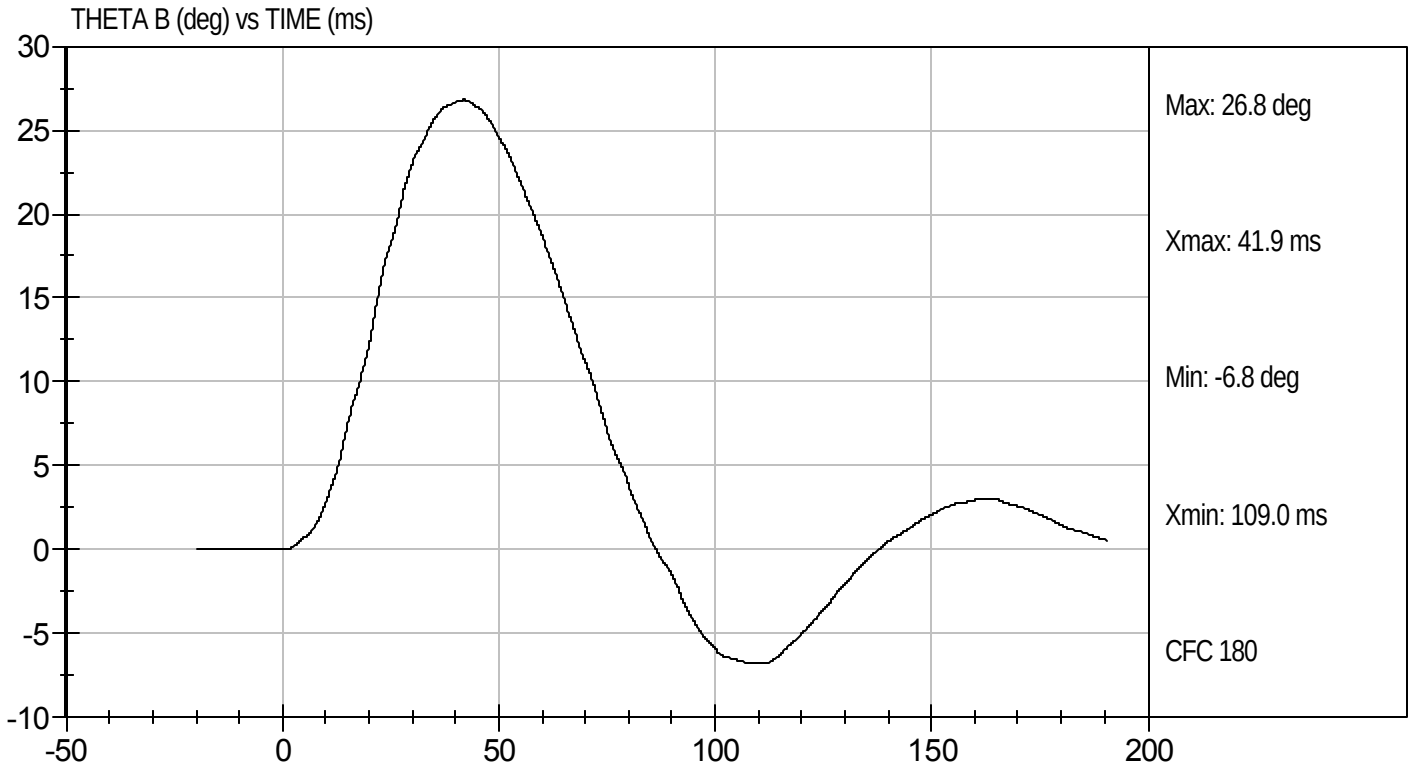
FLEXION ANGLE (deg) vs TIME (ms)



Test Desc: Lumbar Bending
Component ID: D122528

Test Date: 7/9/12
Velocity: 20.08 ft/s, 6.12 m/s





MGA RESEARCH CORPORATION

PELVIS TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D122529

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	46	Pass
Probe Speed	m/s	4.20 to 4.40	4.30	Pass
Maximum Impactor Force	kN	4.70 to 5.40	4.91	Pass
Time of Maximum Impactor Force	ms	11.80 to 16.10	12.90	Pass
Maximum Pubic Force	kN	1.23 to 1.59	1.40	Pass
Time of Maximum Pubic Force	ms	12.20 to 17.00	13.30	Pass
		Overall Test Results		Pass

Jessica Gall
Laboratory Technician

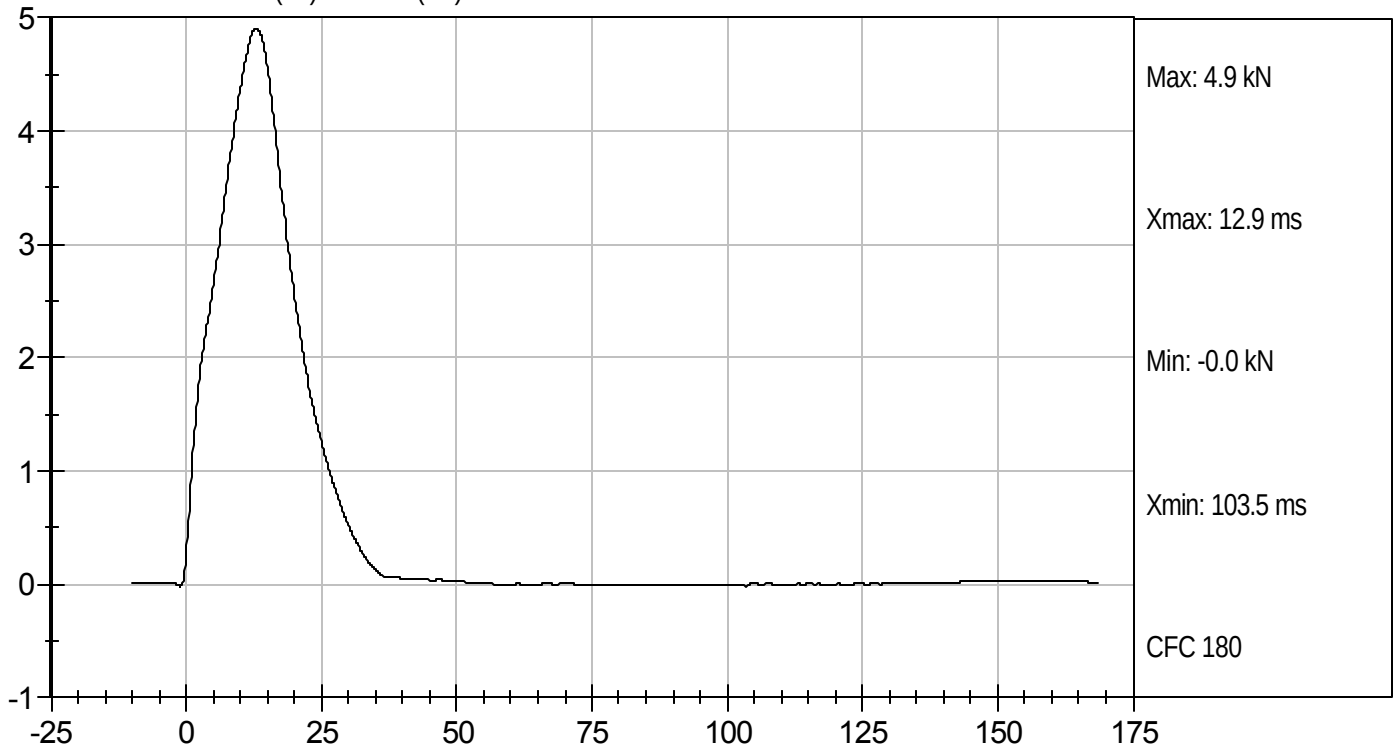
7/10/12
Test Date

David Winkelbauer
Approved By

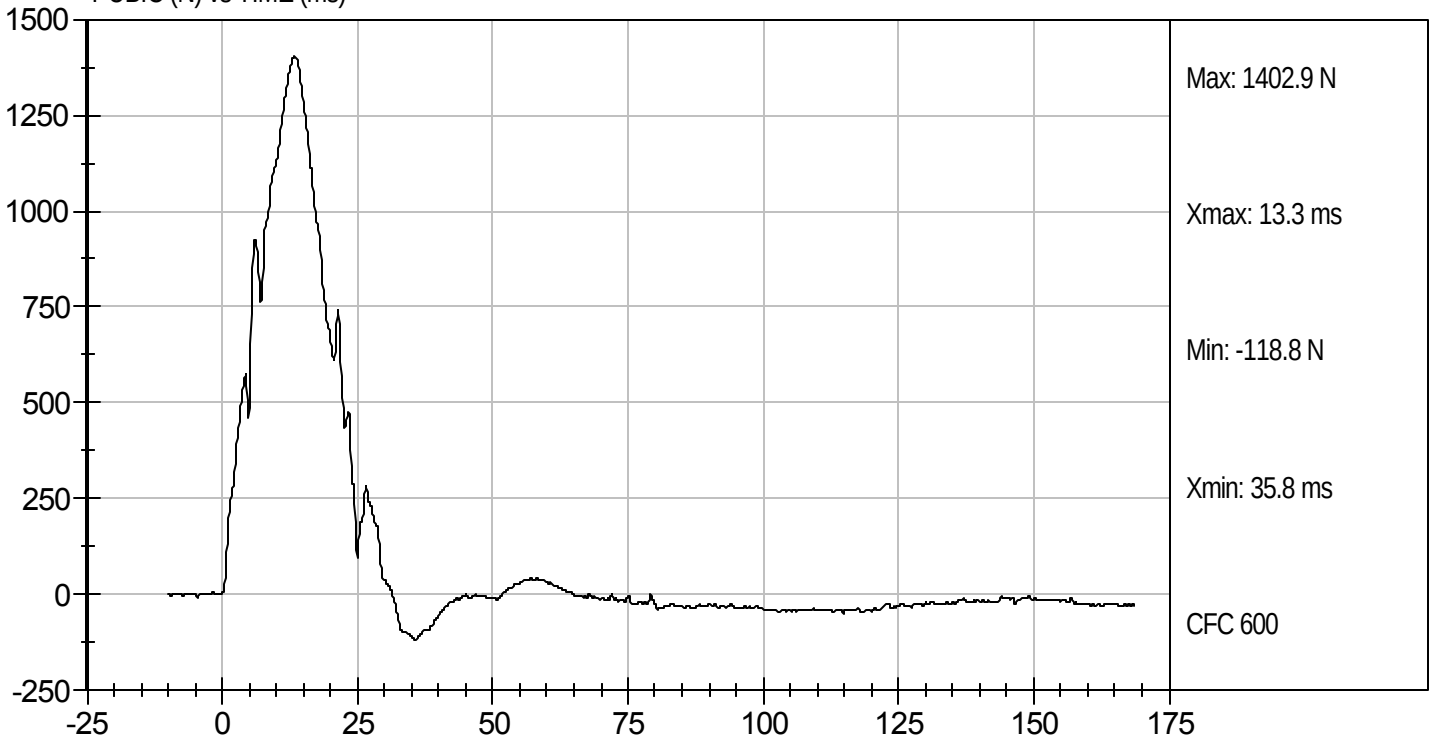
Test Desc: Pelvis Impact
Component ID: D122529

Test Date: 7/10/12
Velocity: 14.12 ft/s, 4.30 m/s

IMPACTOR FORCE (kN) vs TIME (ms)



PUBIC (N) vs TIME (ms)



SID-IIsD External Measurements
SN: 296

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

MGA RESEARCH CORPORATION

HEAD DROP TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test ID:** D122281

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	48	Pass
Peak Resultant Acceleration	G's	115 to 137	126	Pass
Peak Longitudinal Acceleration	G's	+/- 15	-2.9	Pass
Unimodal	N/A	<15%	Yes	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

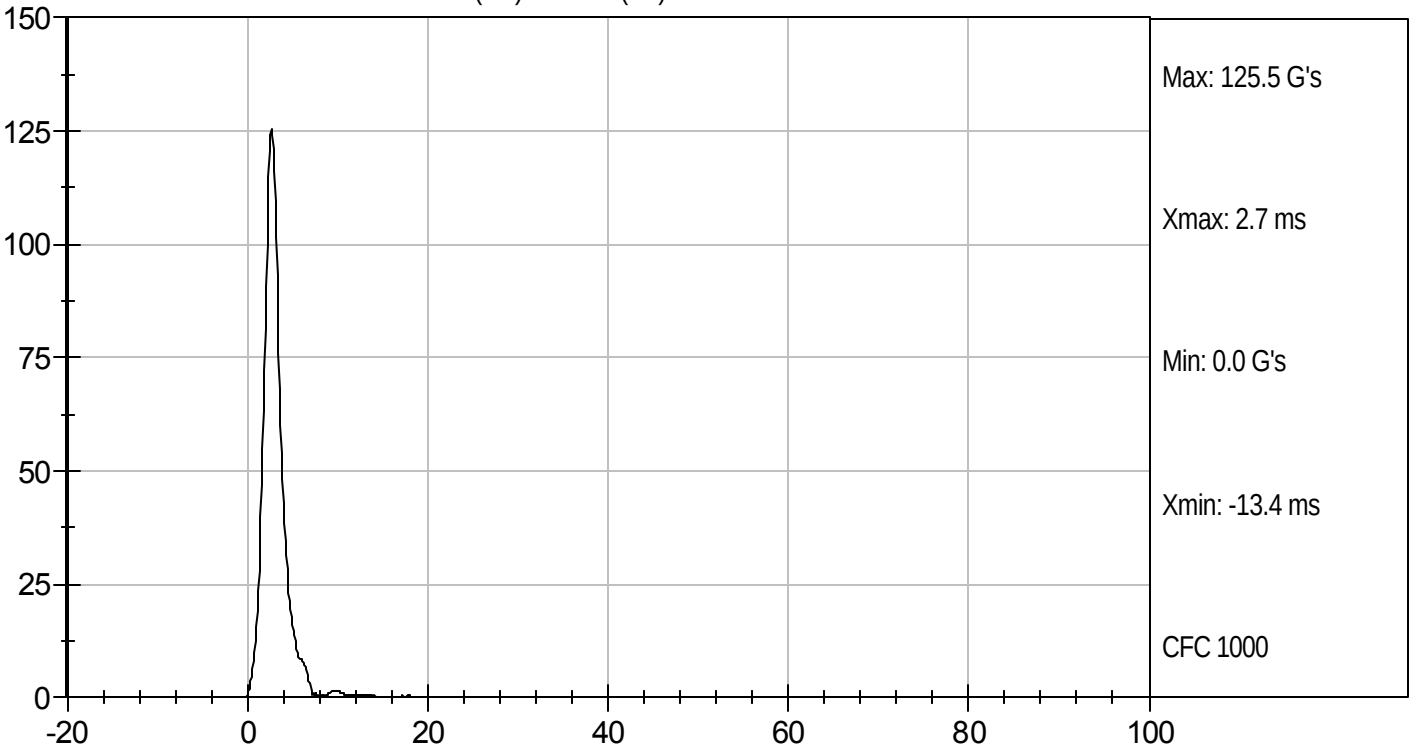
6/20/12
Test Date

David Winkelbauer
Approved By

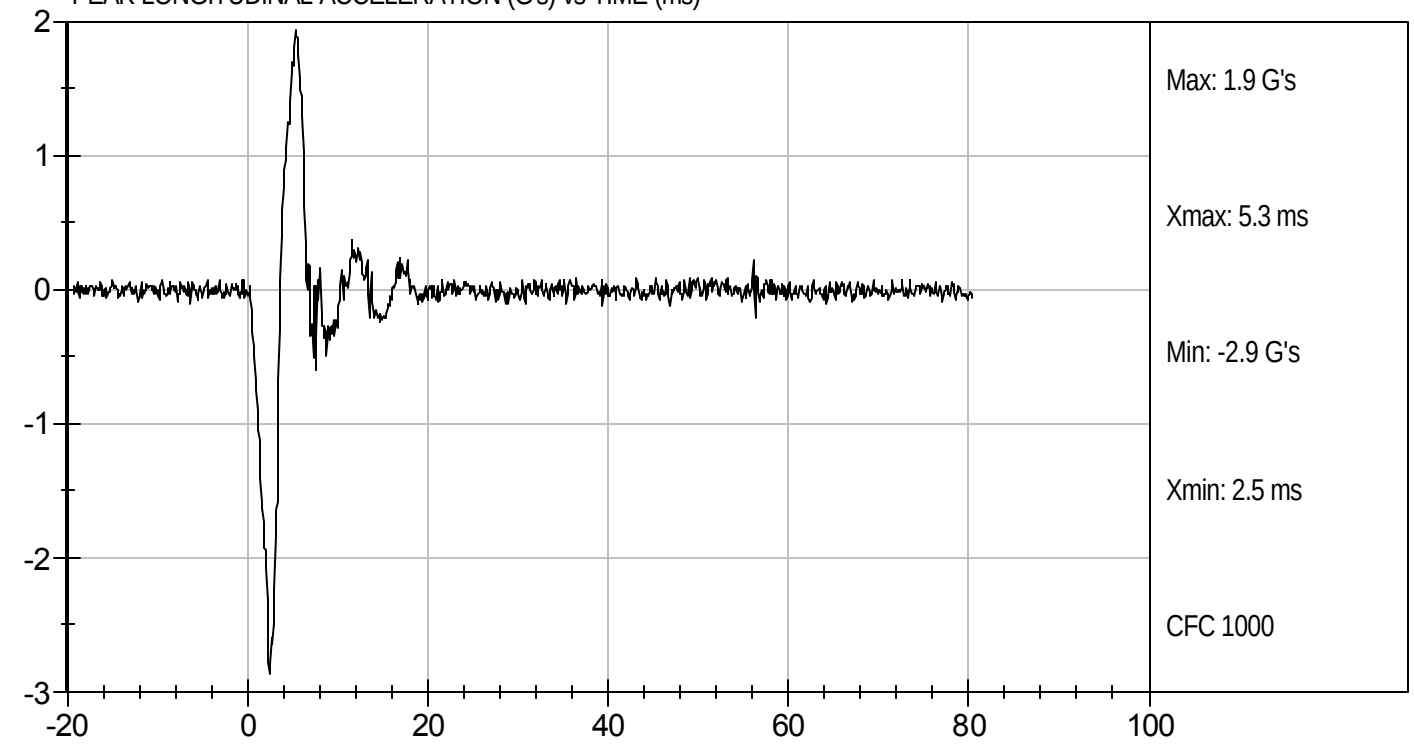
Test Desc: Head Drop
Component ID: D122281

Test Date: 6/20/12
Velocity: 0 ft/s, 0 m/s

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



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



MGA RESEARCH CORPORATION

LATERAL NECK PENDULUM TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test I.D:** D122282

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	20.9	Pass
Humidity		%	10 to 70	49	Pass
Impact Velocity		m/s	5.51 to 5.63	5.58	Pass
Delta Velocity	10 ms	m/s	2.20 to 2.80	2.61	Pass
	15 ms	m/s	3.30 to 4.10	3.64	Pass
	20 ms	m/s	4.40 to 5.40	4.83	Pass
	25 ms	m/s	5.40 to 6.10	5.51	Pass
	25-100 ms	m/s	5.50 to 6.20	5.53	Pass
Maximum D-Plane Rotation		deg	71 to 81	73	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	62	Pass
Maximum Occipital Condyle Moment during Rotation Interval		Nm	-44 to -36	-40	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	116	Pass
			Overall Test Results		Pass

Jessica Gall
Laboratory Technician

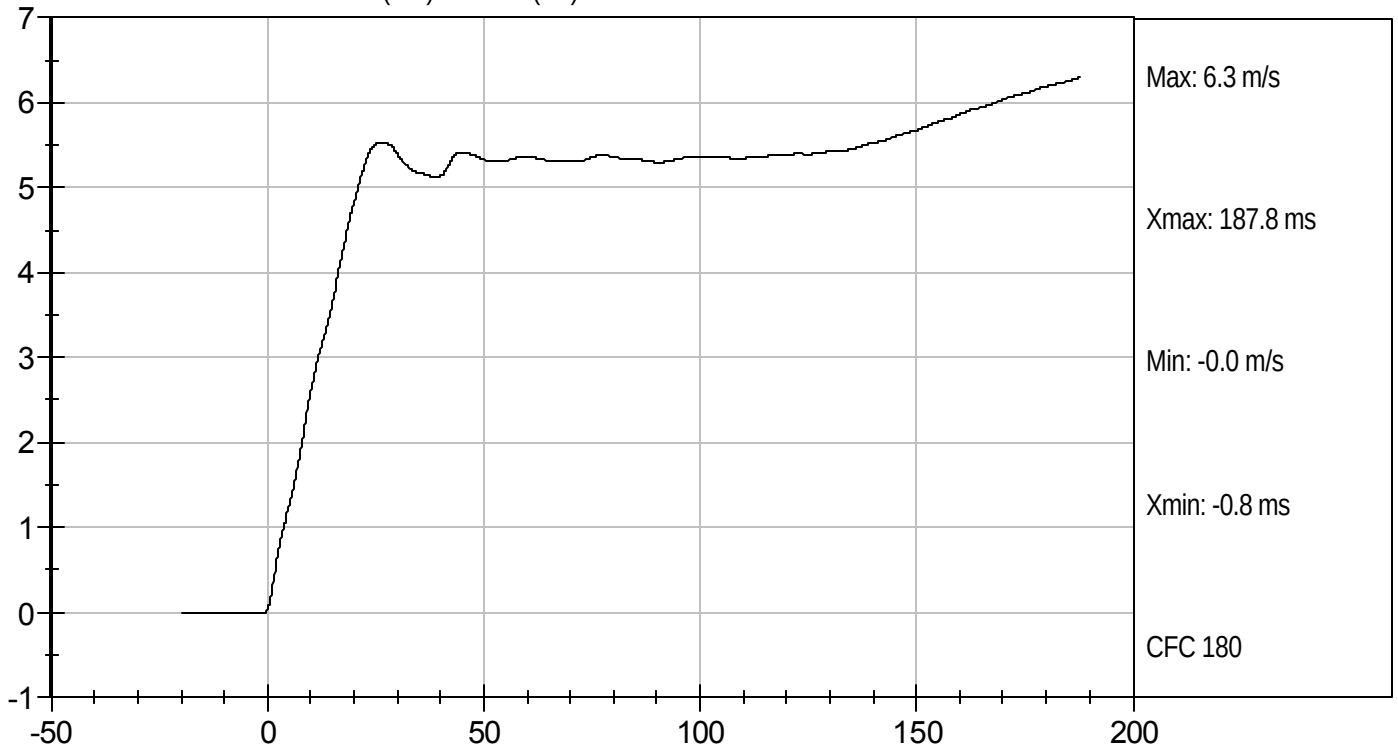
6/20/12
Test Date

David Winkelbauer
Approved By

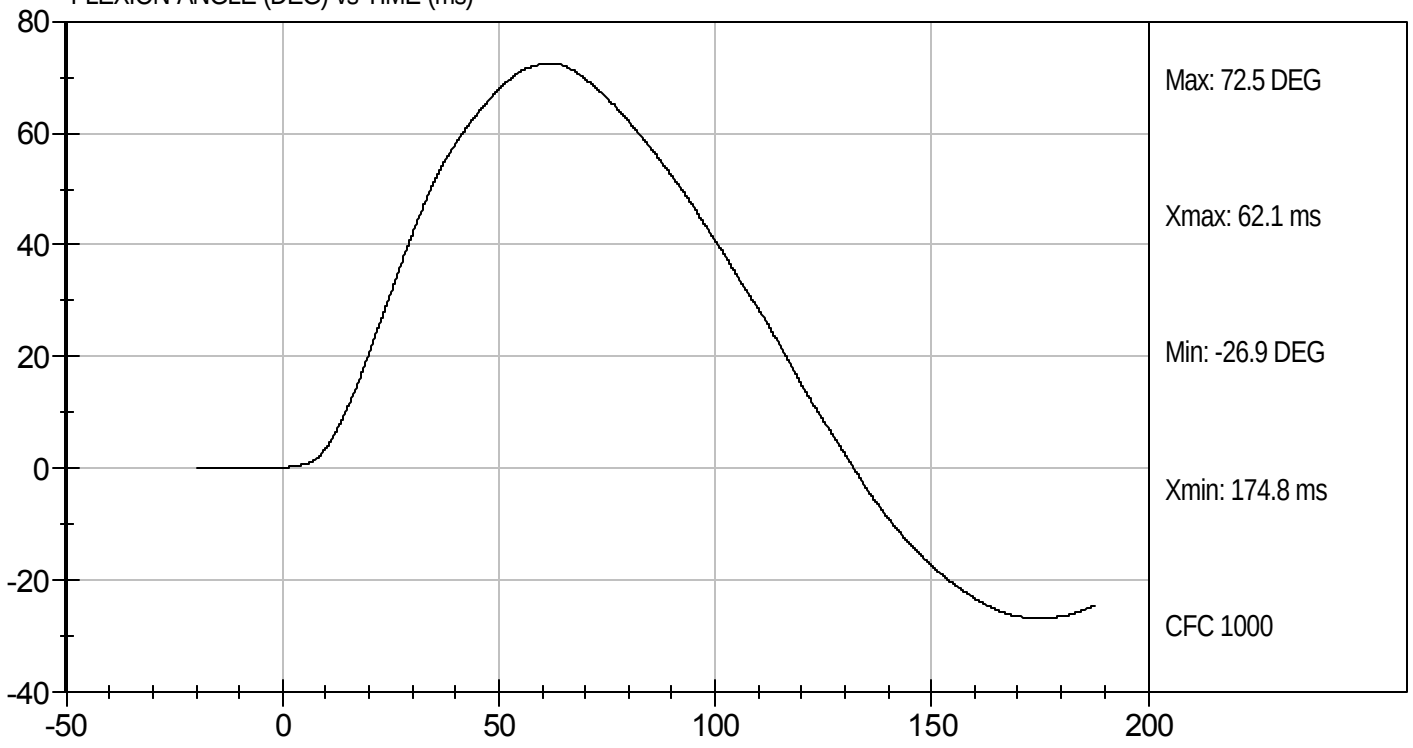
Test Desc: Neck Bending
Component ID: D122282

Test Date: 6/20/12
Velocity: 18.32 ft/s, 5.58 m/s

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

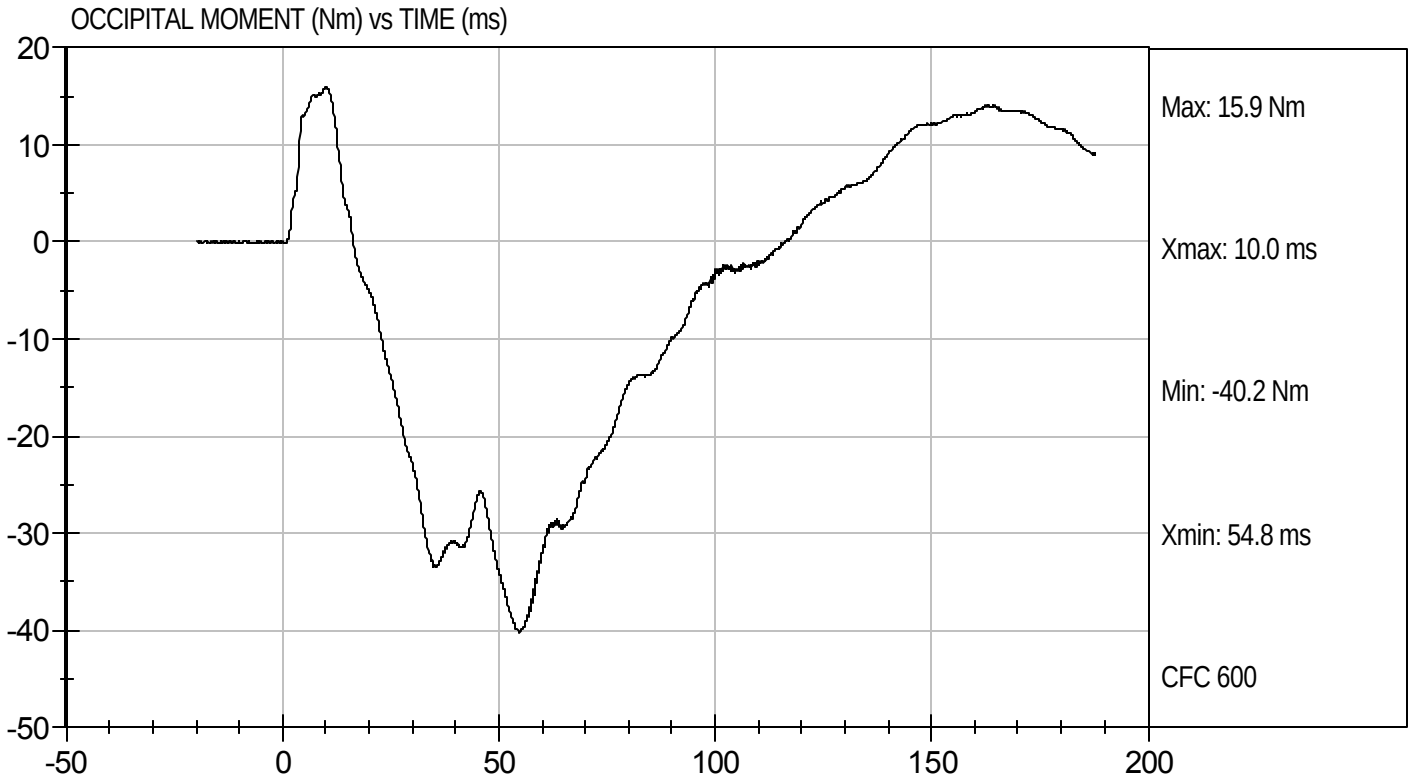


FLEXION ANGLE (DEG) vs TIME (ms)



Test Desc: Neck Bending
Component ID: D122282

Test Date: 6/20/12
Velocity: 18.32 ft/s, 5.58 m/s



MGA RESEARCH CORPORATION

SHOULDER IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test ID:** D122283

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	52	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Maximum Probe Acceleration	G's	13 to 18	15	Pass
Shoulder Displacement	mm	28 to 37	30	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	18	Pass
		Overall Test Results		Pass

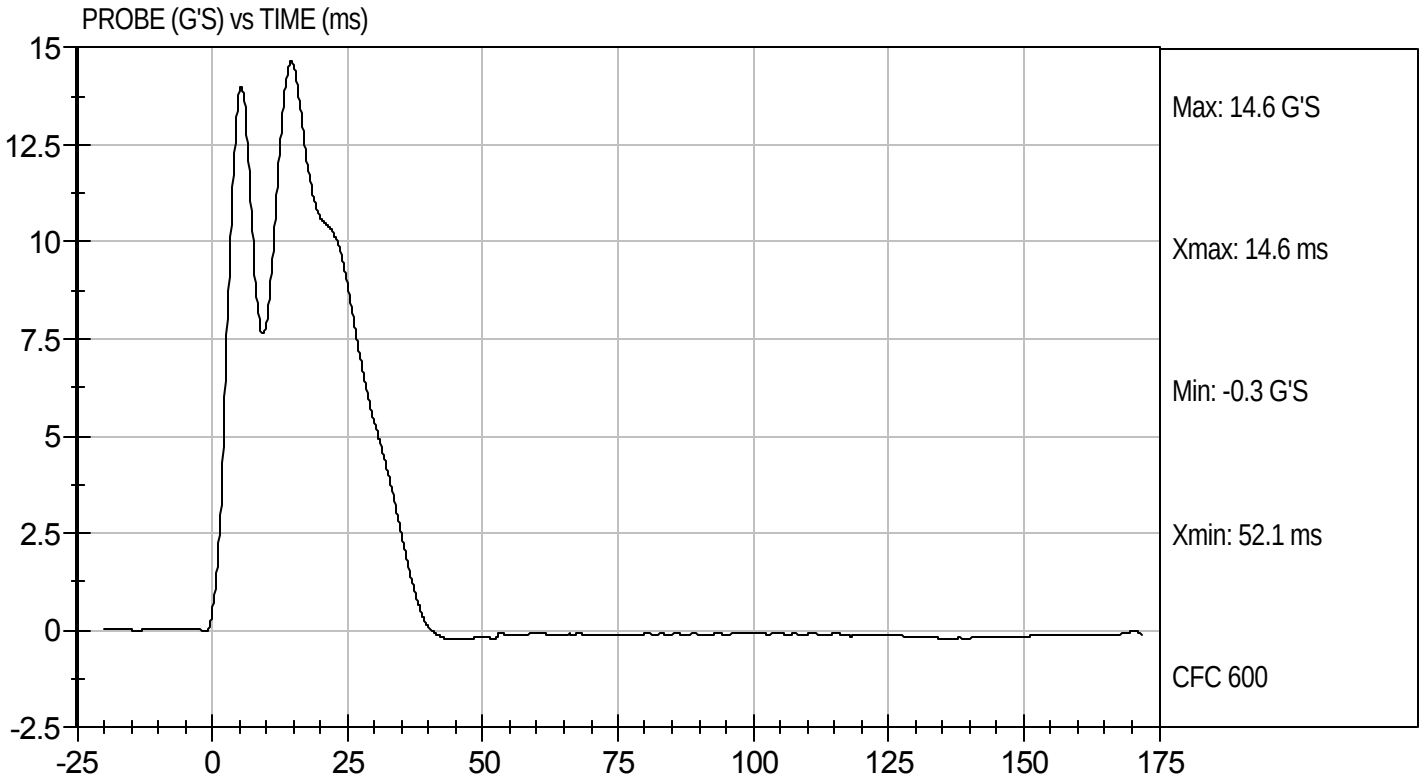
Jessica Hall
Laboratory Technician

6/19/12
Test Date

David Winkelbauer
Approved By

Test Desc: Shoulder Impact
Component ID: D122283

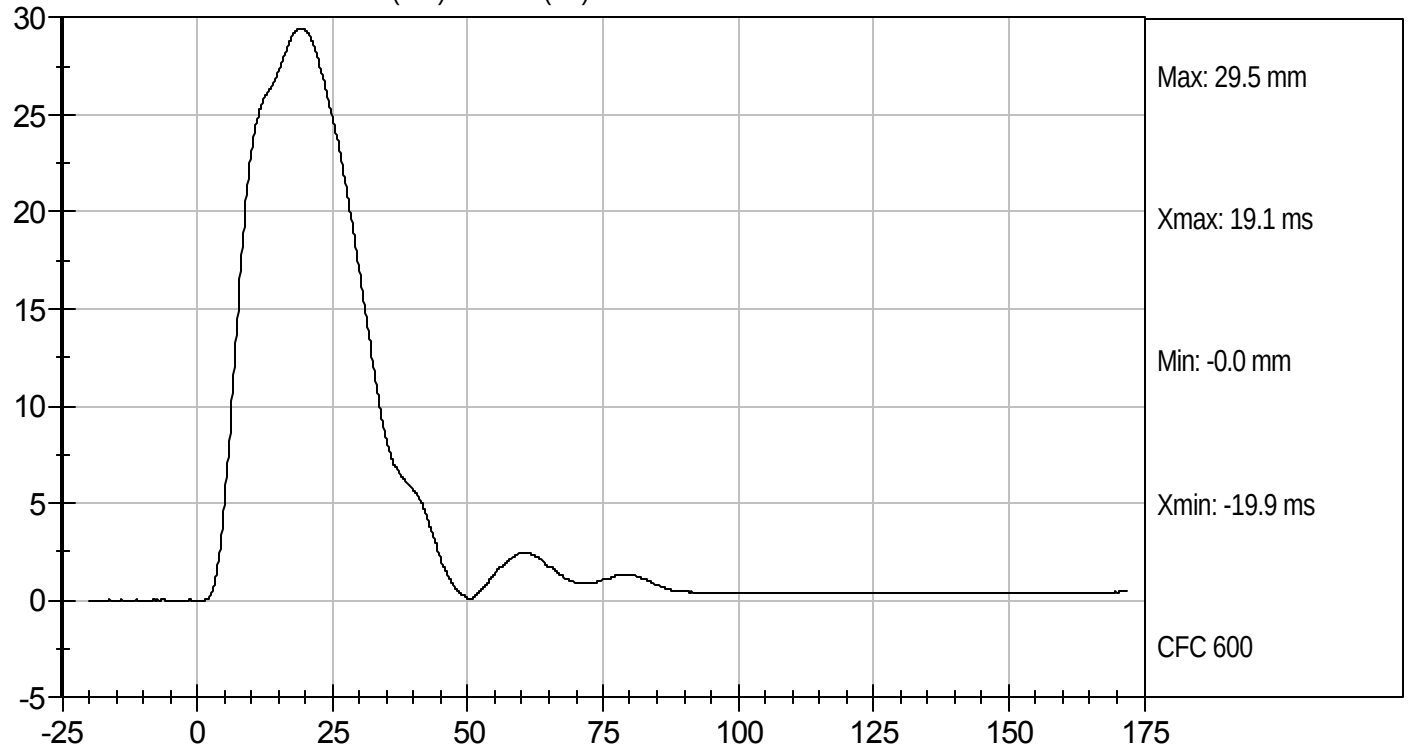
Test Date: 6/19/12
Velocity: 14.25 ft/s, 4.34 m/s



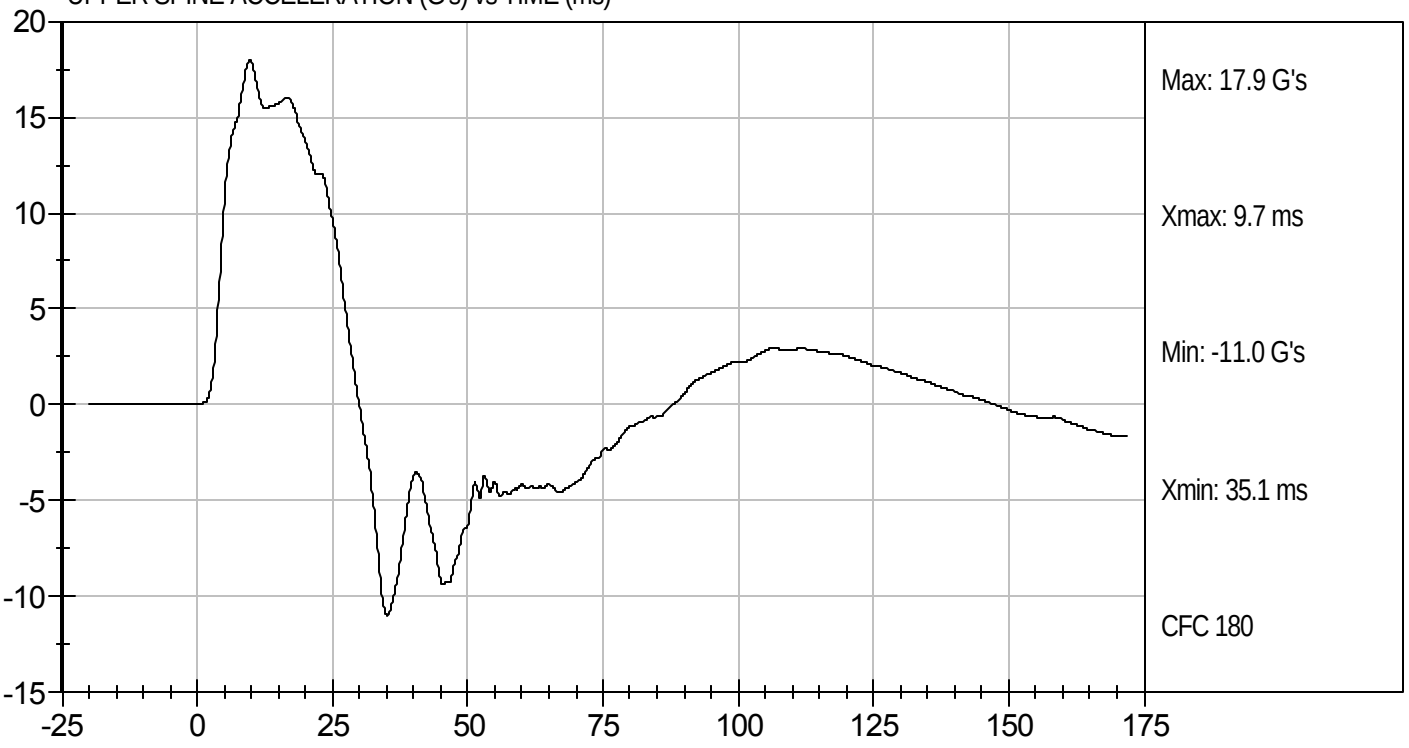
Test Desc: Shoulder Impact
Component ID: D122283

Test Date: 6/19/12
Velocity: 14.25 ft/s, 4.34 m/s

SHOULDER DISPLACEMENT (mm) vs TIME (ms)



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



MGA RESEARCH CORPORATION

THORAX (WITH ARM) IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test I.D:** D122284

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.2	Pass
Humidity	%	10 to 70	49	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Peak Impactor Acceleration	G's	30 to 36	31	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	33	Pass
Lower Rib Displacement	mm	32 to 38	36	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	36	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	30	Pass
		Overall Test Results		Pass

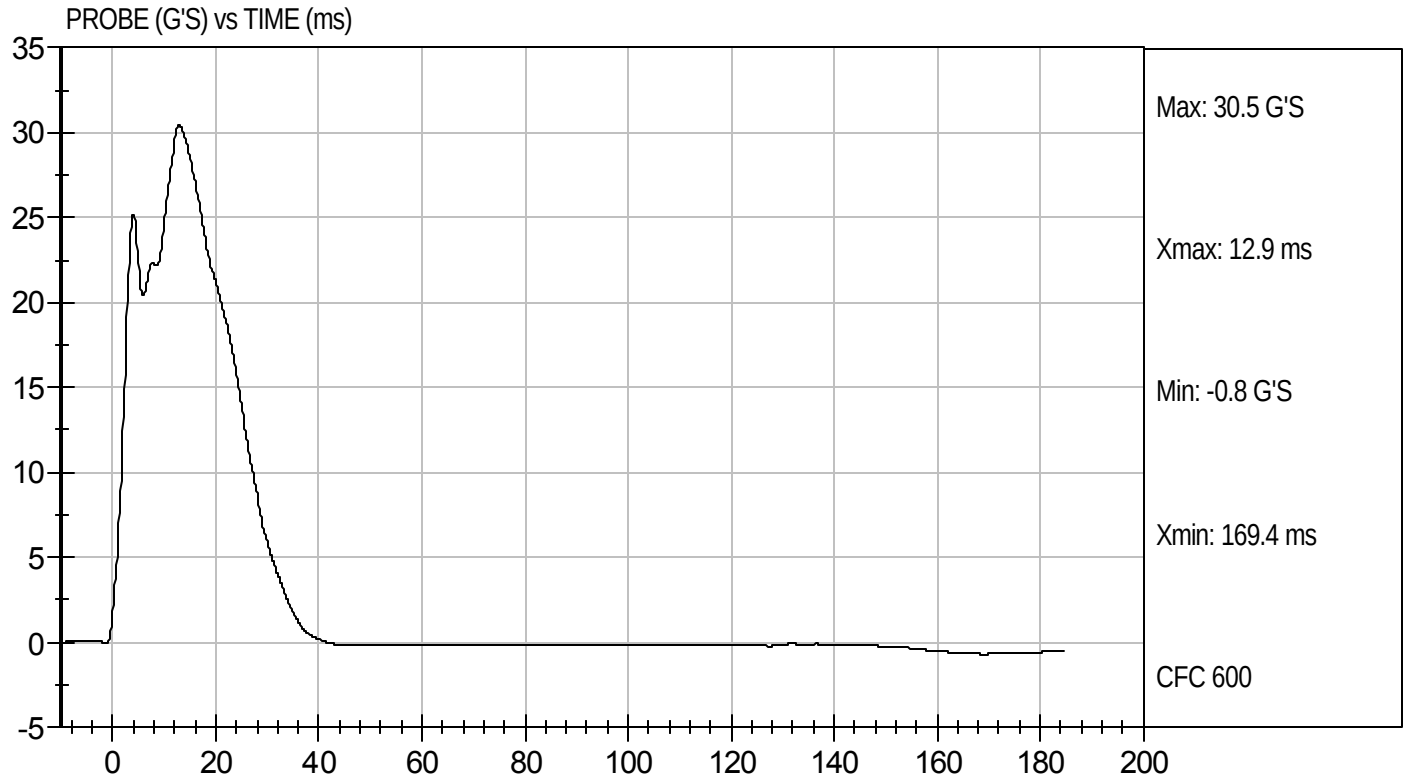
Jessica Gall
Laboratory Technician

6/20/12
Test Date

David Winkelbauer
Approved By

Test Desc: Thorax With Arm
Component ID: D122284

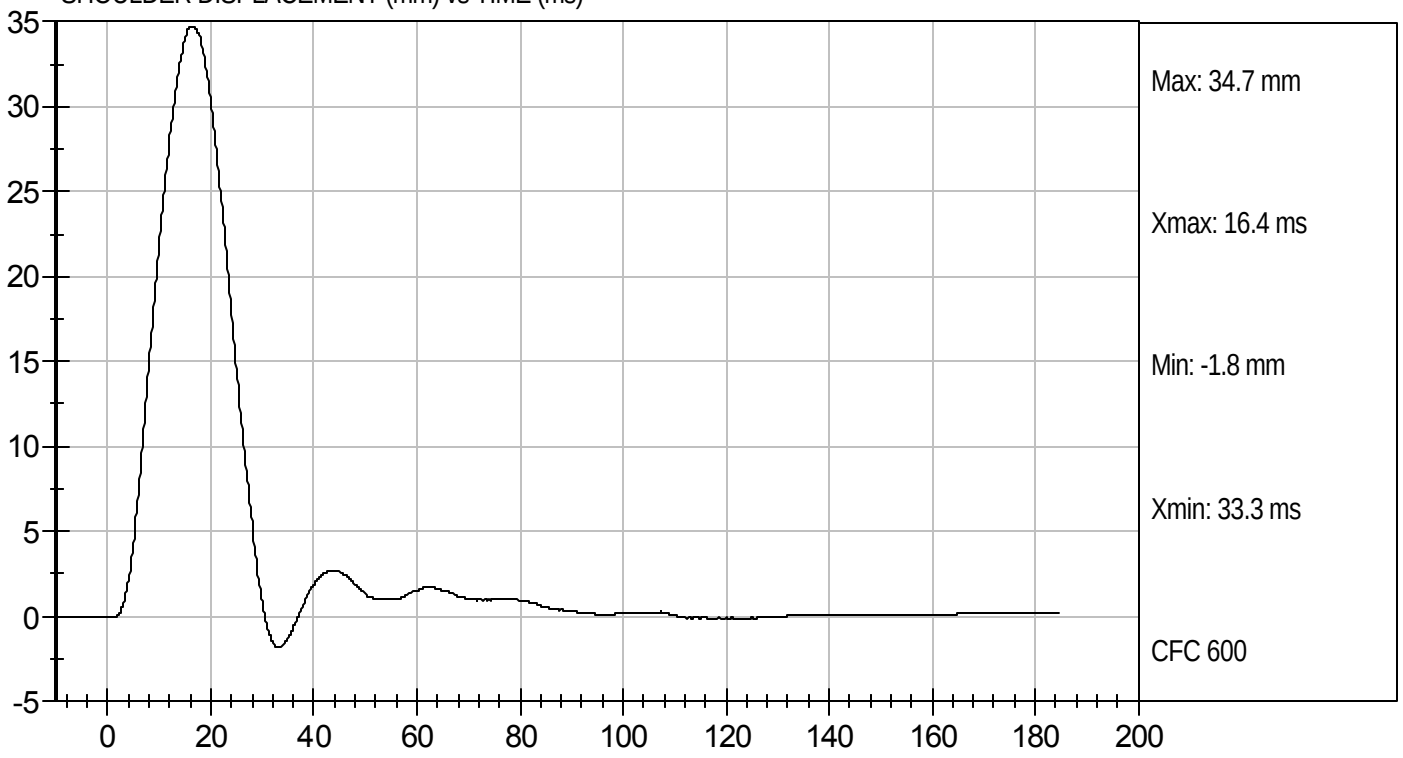
Test Date: 6/20/12
Velocity: 22.22 ft/s, 6.77 m/s



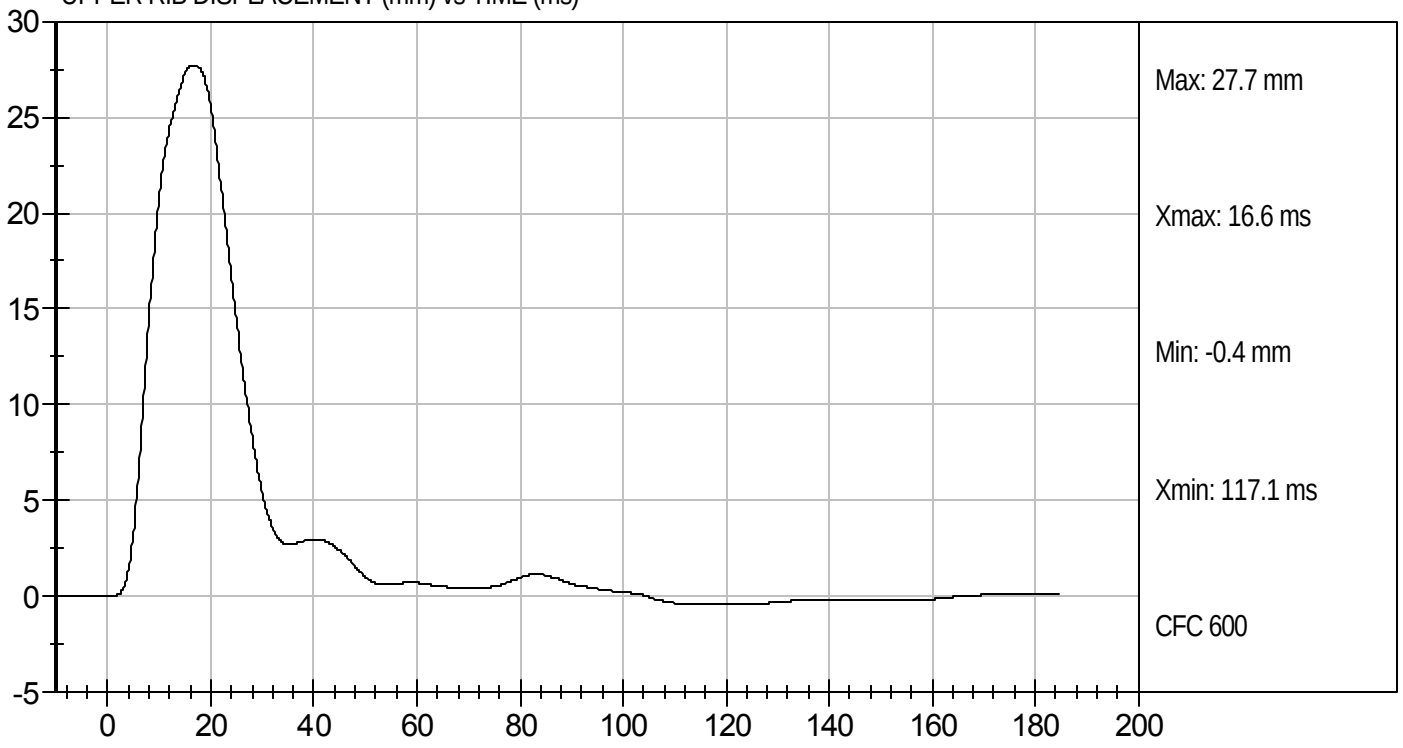
Test Desc: Thorax With Arm
Component ID: D122284

Test Date: 6/20/12
Velocity: 22.22 ft/s, 6.77 m/s

SHOULDER DISPLACEMENT (mm) vs TIME (ms)



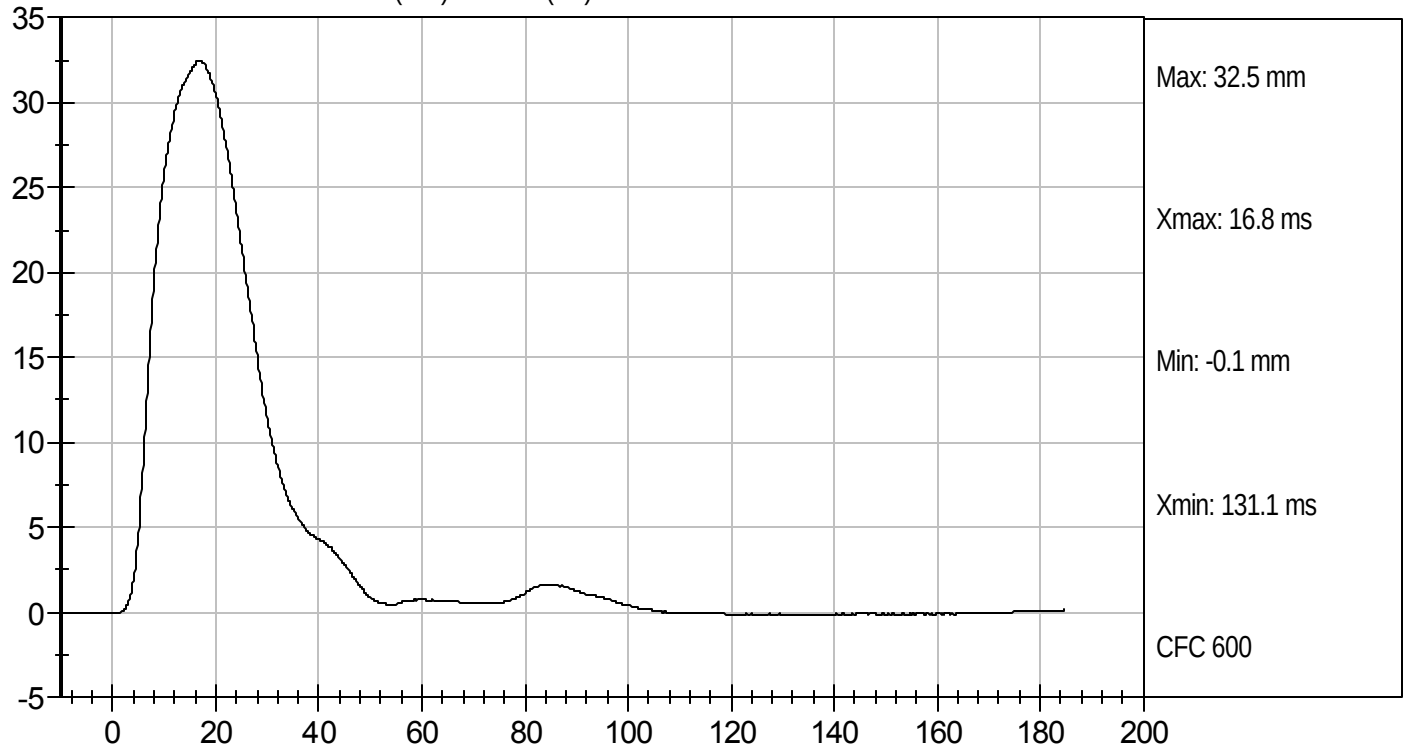
UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



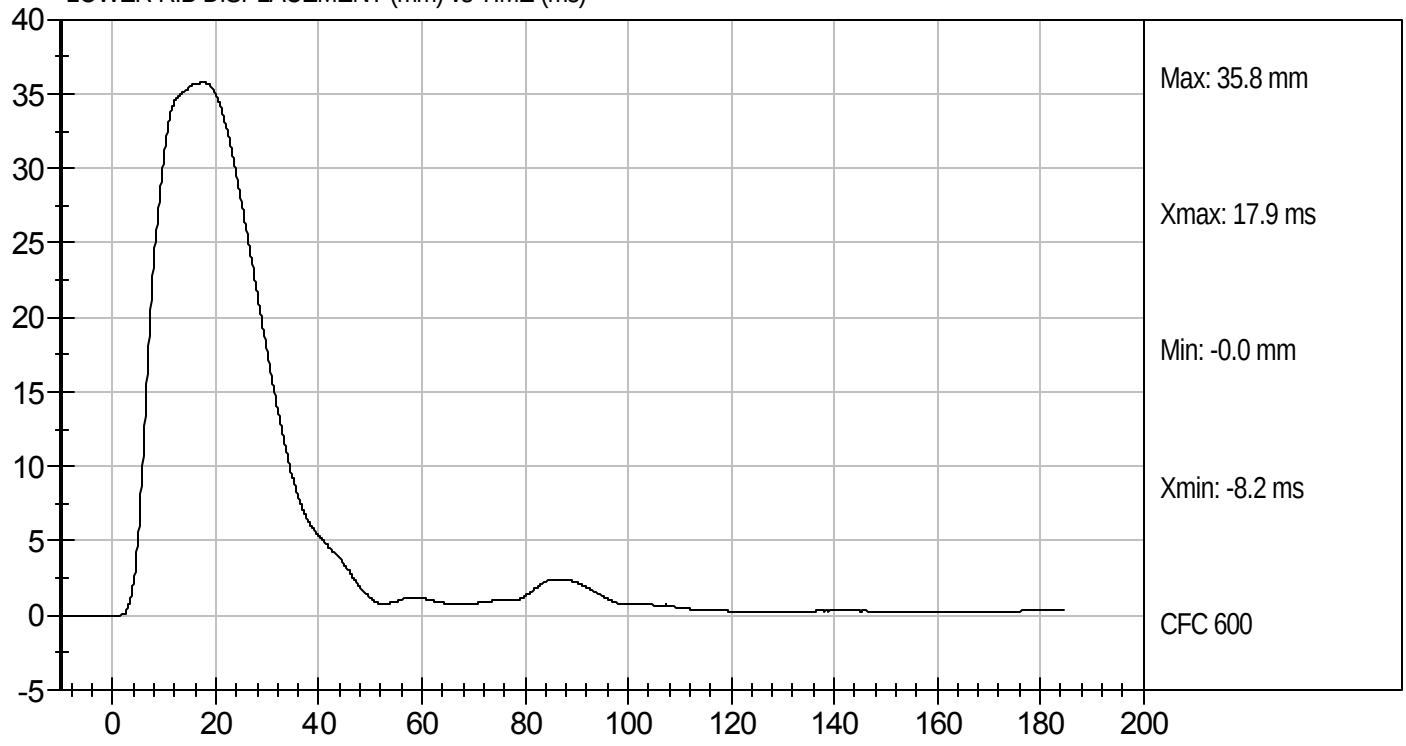
Test Desc: Thorax With Arm
Component ID: D122284

Test Date: 6/20/12
Velocity: 22.22 ft/s, 6.77 m/s

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



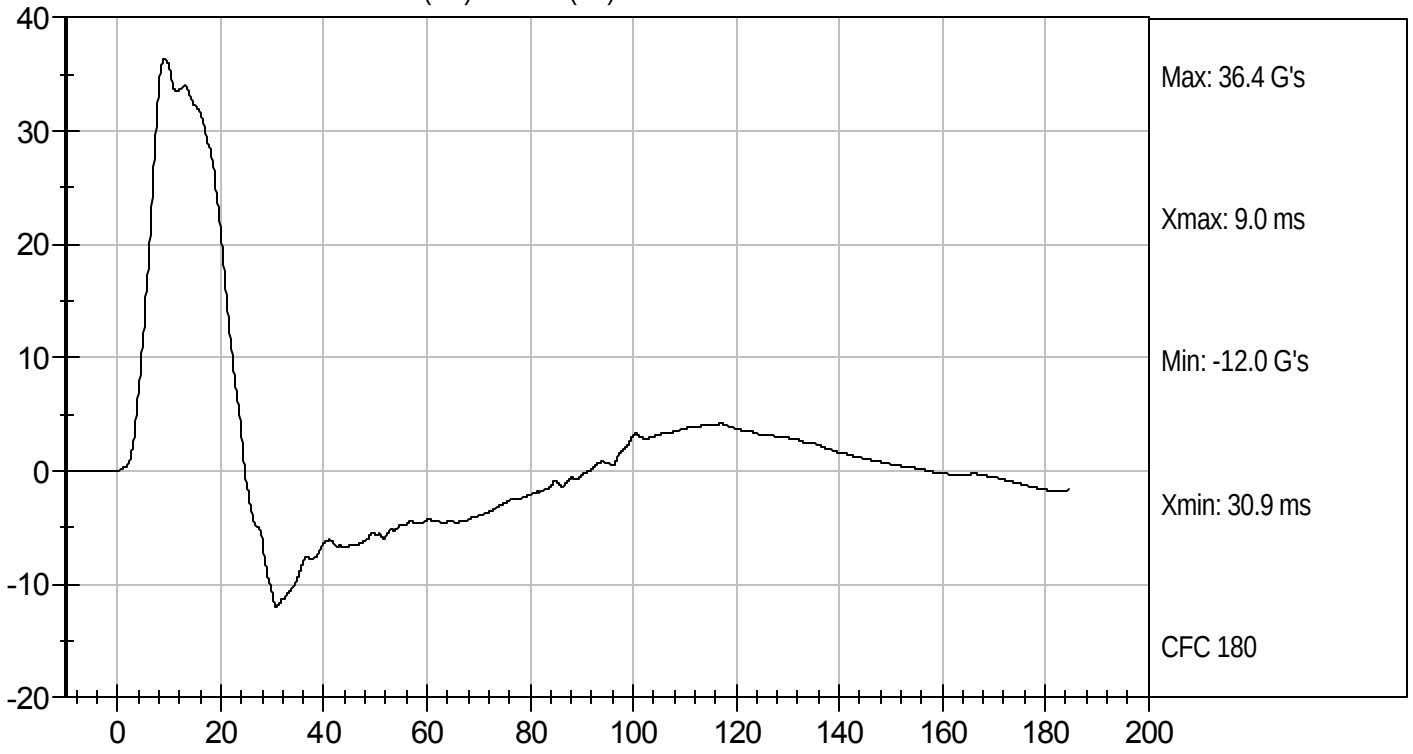
LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



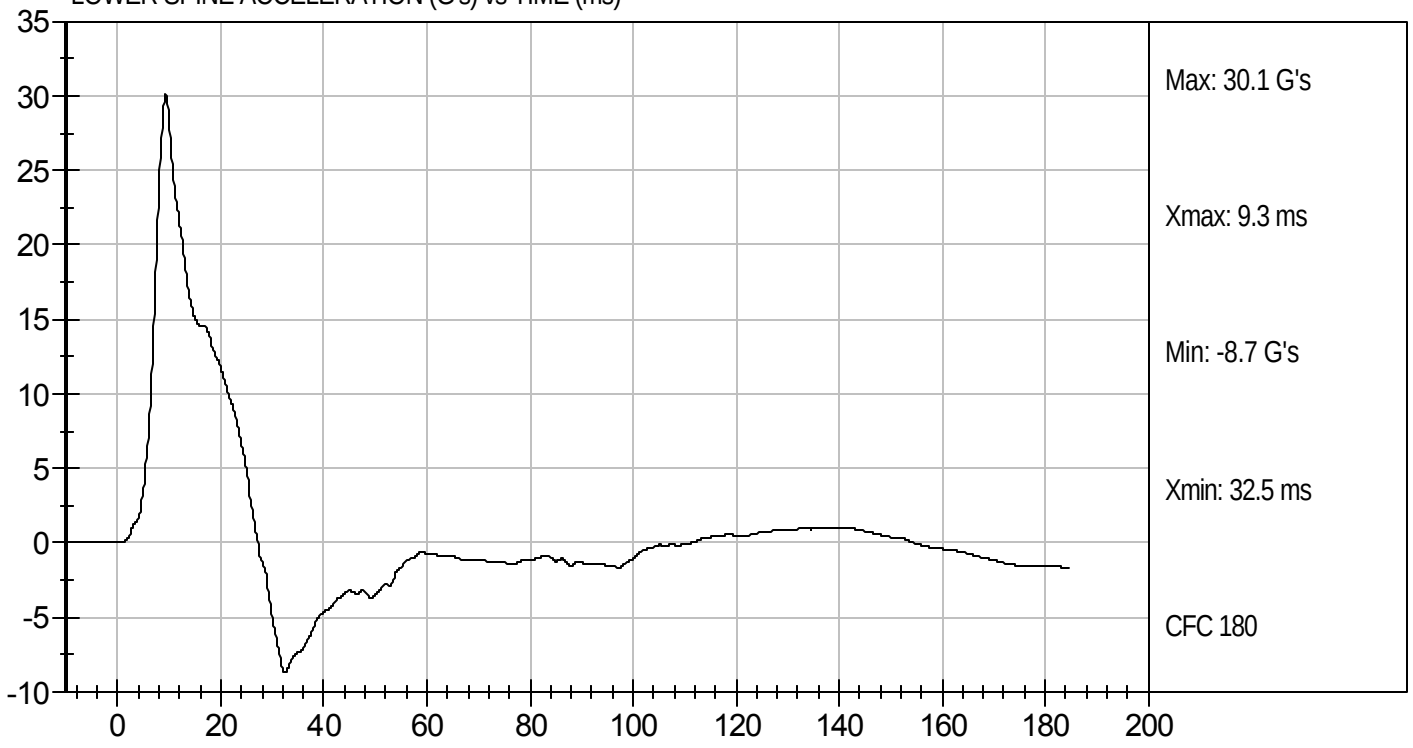
Test Desc: Thorax With Arm
Component ID: D122284

Test Date: 6/20/12
Velocity: 22.22 ft/s, 6.77 m/s

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



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



MGA RESEARCH CORPORATION

THORAX (WITHOUT ARM) IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test I.D:** D122285

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.2	Pass
Humidity	%	10 to 70	49	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Peak Impactor Force	G's	14 to 18	15	Pass
Upper Rib Displacement	mm	32 to 40	35	Pass
Middle Rib Displacement	mm	39 to 45	42	Pass
Lower Rib Displacement	mm	35 to 43	42	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	13	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	10	Pass
		Overall Test Results		Pass

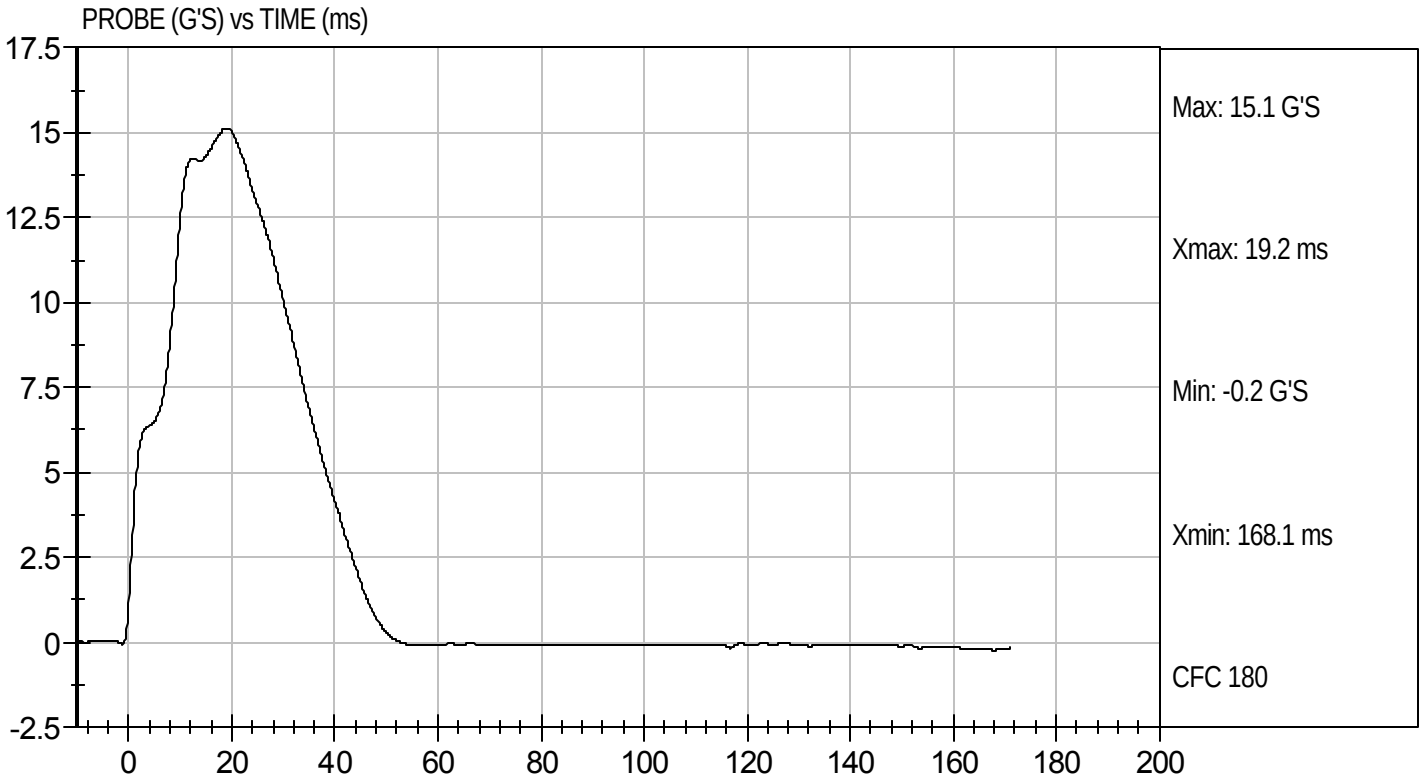
Jessica Gall
Laboratory Technician

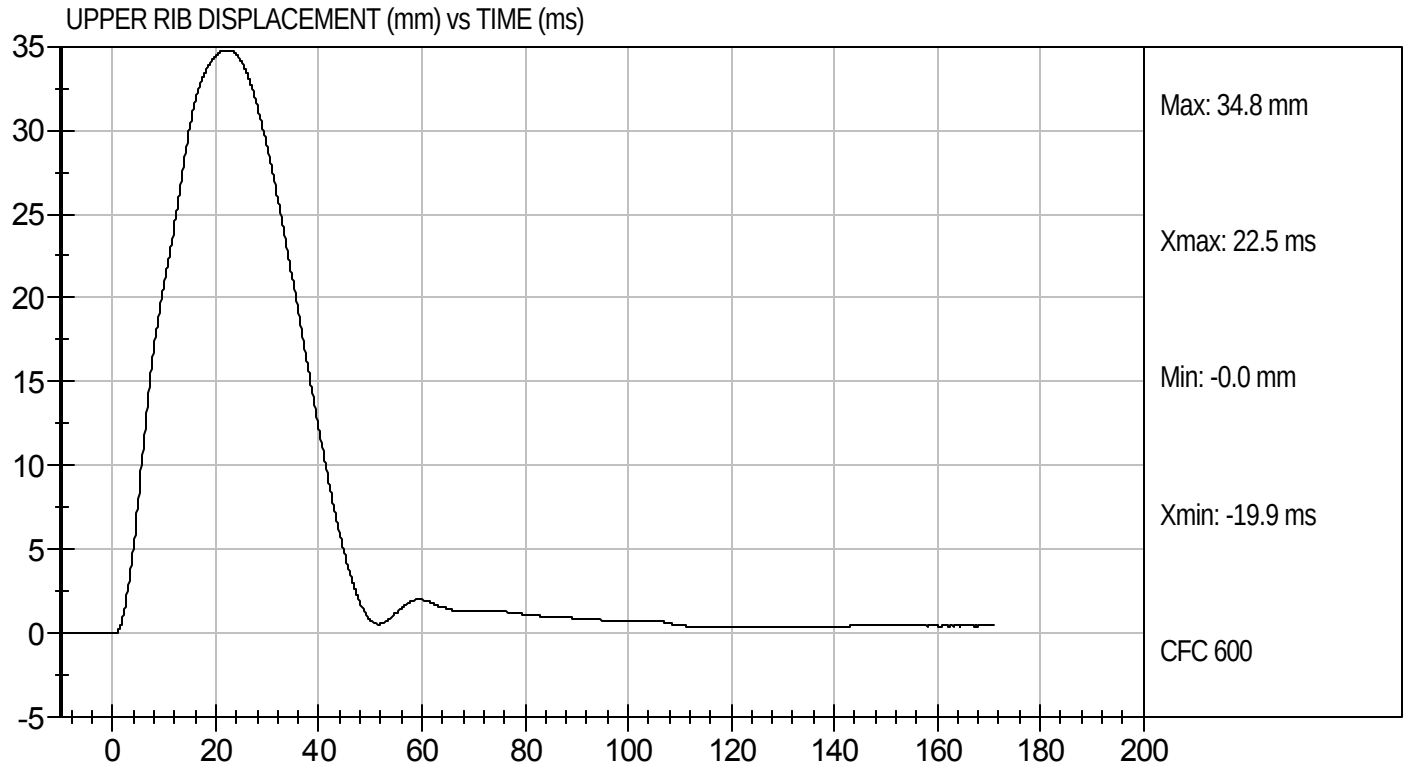
6/20/12
Test Date

David Winkelbauer
Approved By

Test Desc: Thorax Without Arm
Component ID: D122285

Test Date: 6/20/12
Velocity: 14.25 ft/s, 4.34 m/s

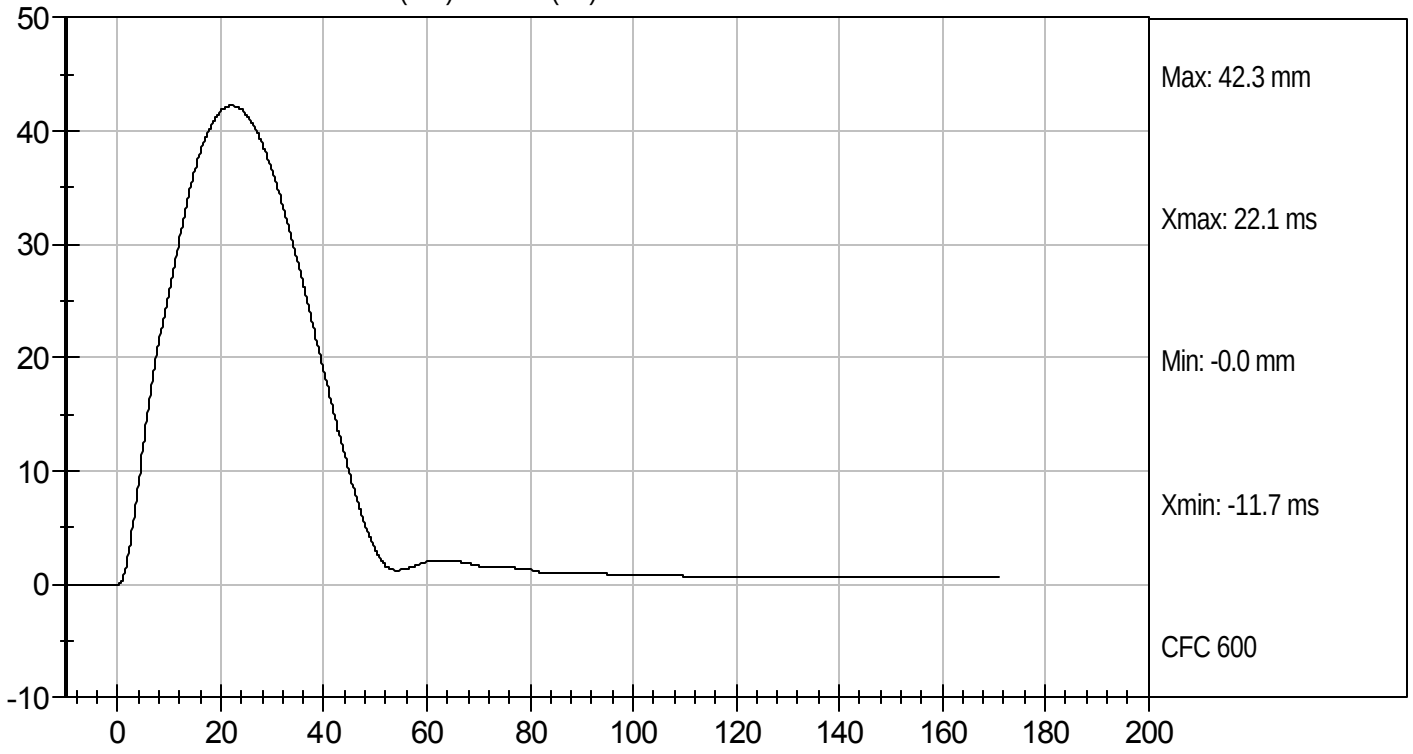




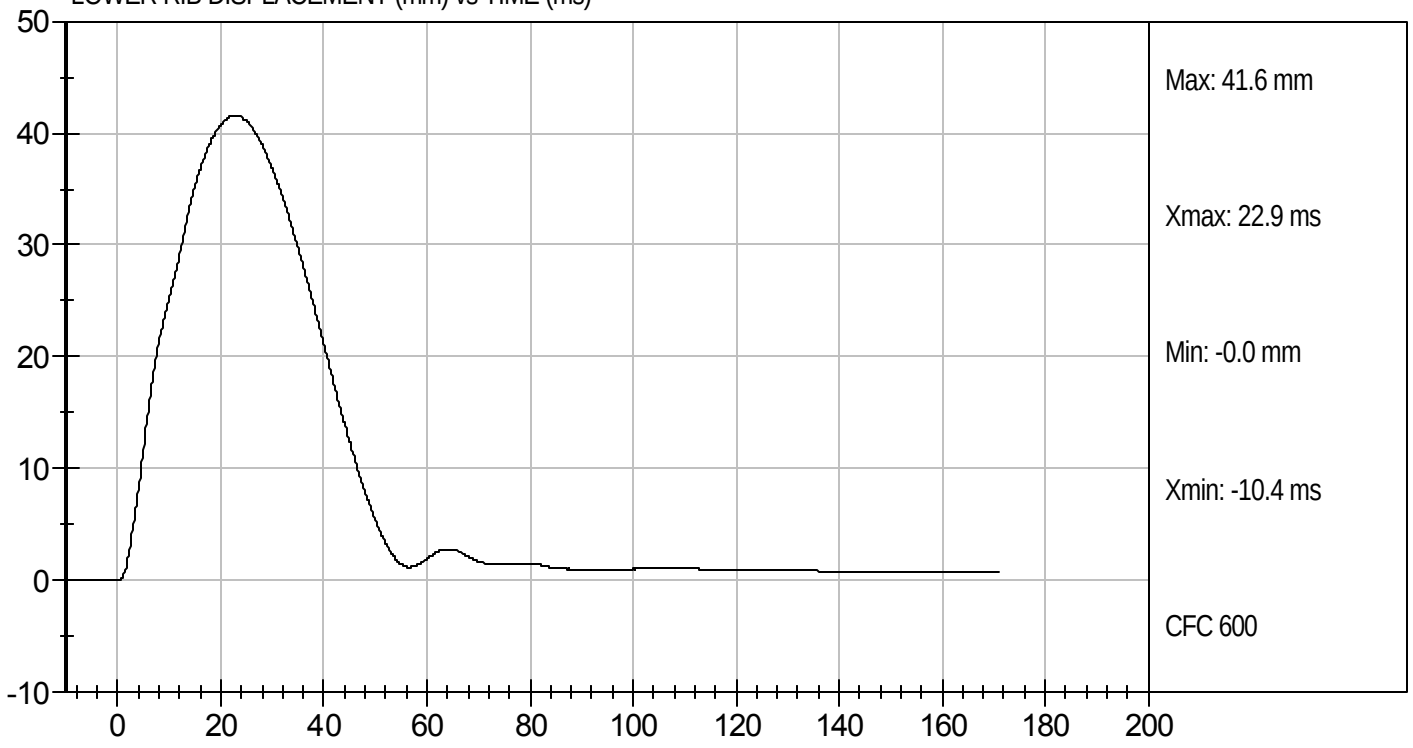
Test Desc: Thorax Without Arm
Component ID: D122285

Test Date: 6/20/12
Velocity: 14.25 ft/s, 4.34 m/s

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



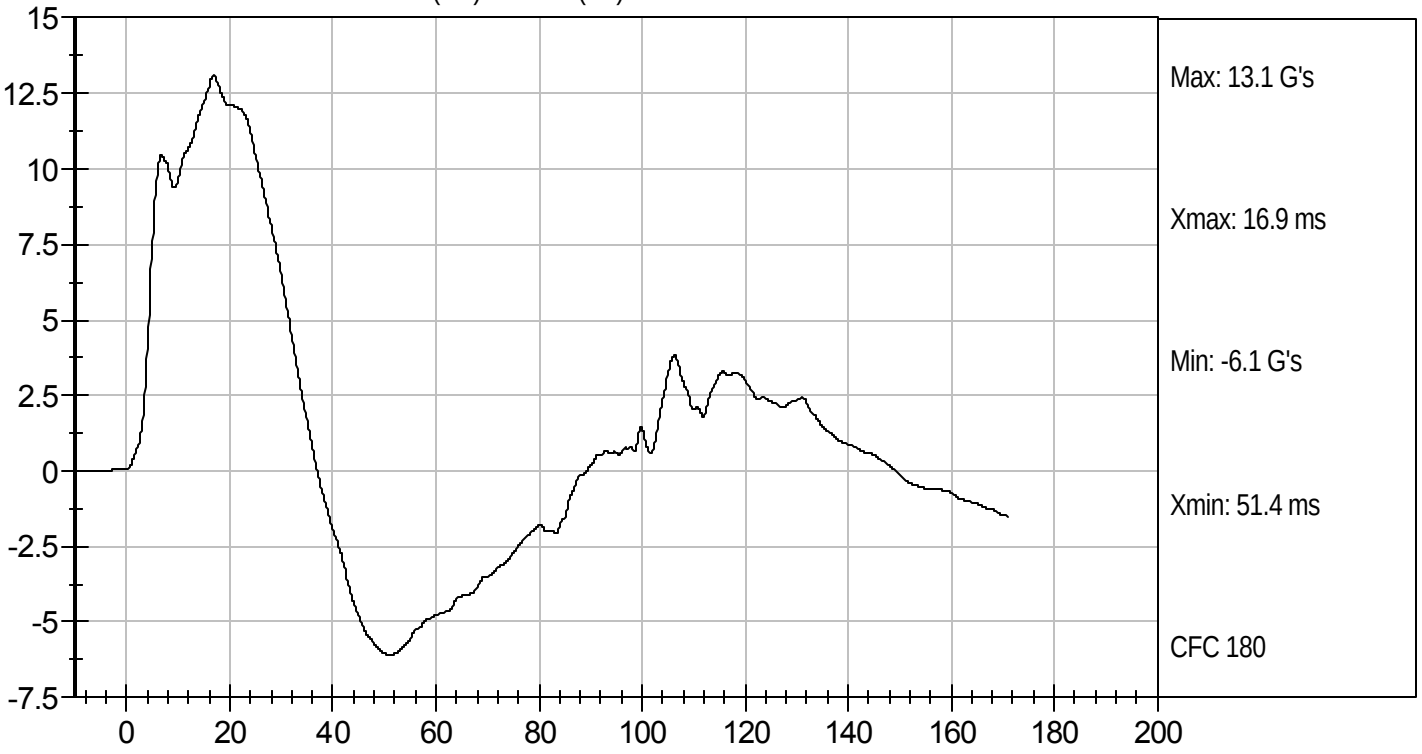
LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



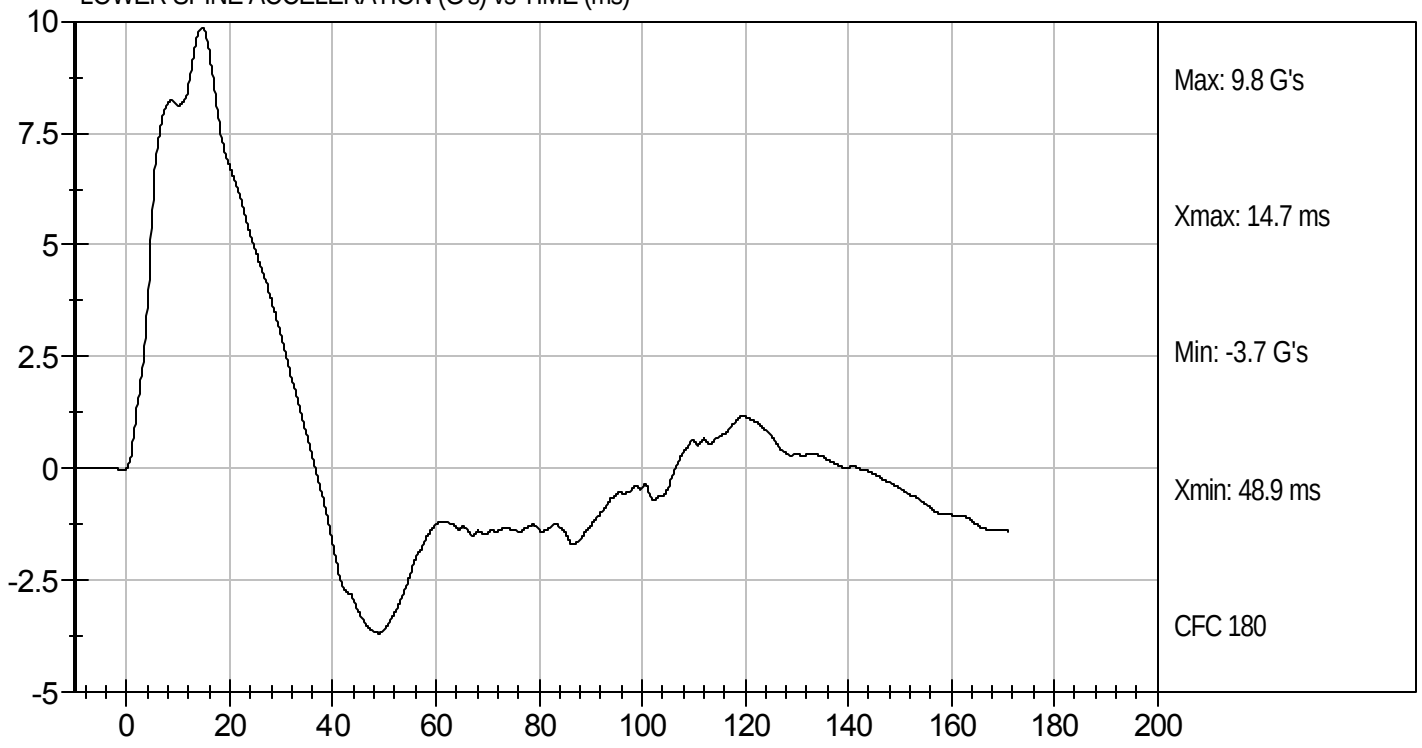
Test Desc: Thorax Without Arm
Component ID: D122285

Test Date: 6/20/12
Velocity: 14.25 ft/s, 4.34 m/s

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



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



MGA RESEARCH CORPORATION

ABDOMINAL IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test I.D:** D122286

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	50	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Peak Impactor Acceleration	G's	12 to 16	13	Pass
Upper Rib Displacement	mm	36 to 47	42	Pass
Lower 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

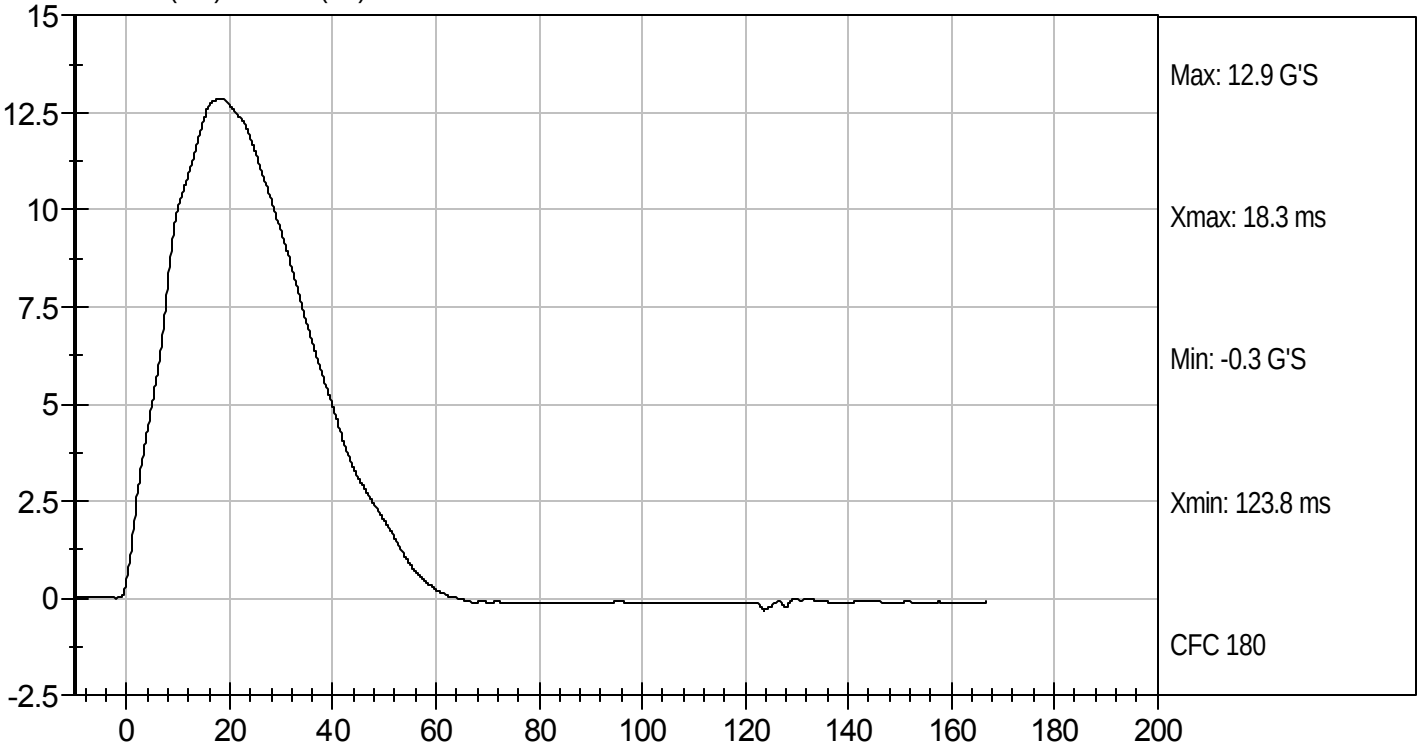
6/20/12
Test Date

David Winkelbauer
Approved By

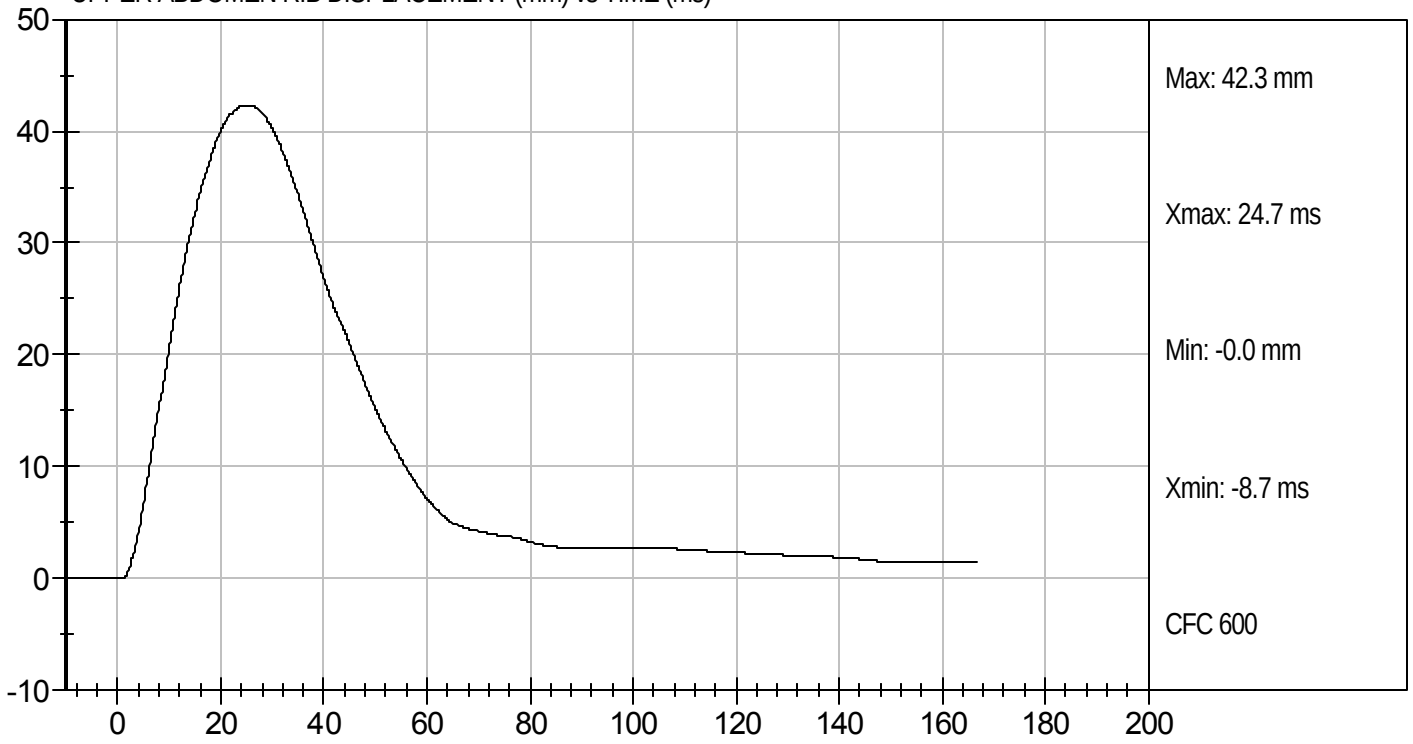
Test Desc: Abdomen Impact
Component ID: D122286

Test Date: 6/20/12
Velocity: 14.25 ft/s, 4.34 m/s

PROBE (G'S) vs TIME (ms)



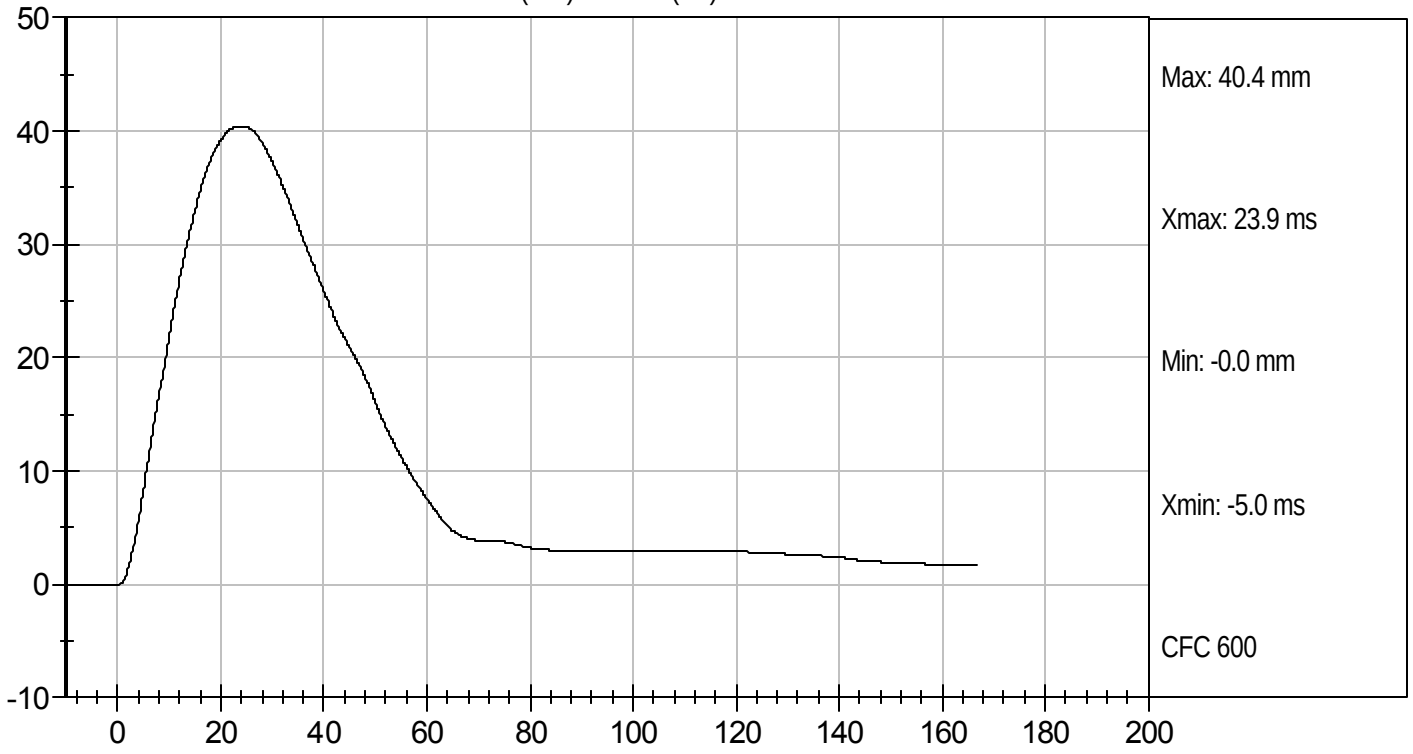
UPPER ABDOMEN RIB DISPLACEMENT (mm) vs TIME (ms)



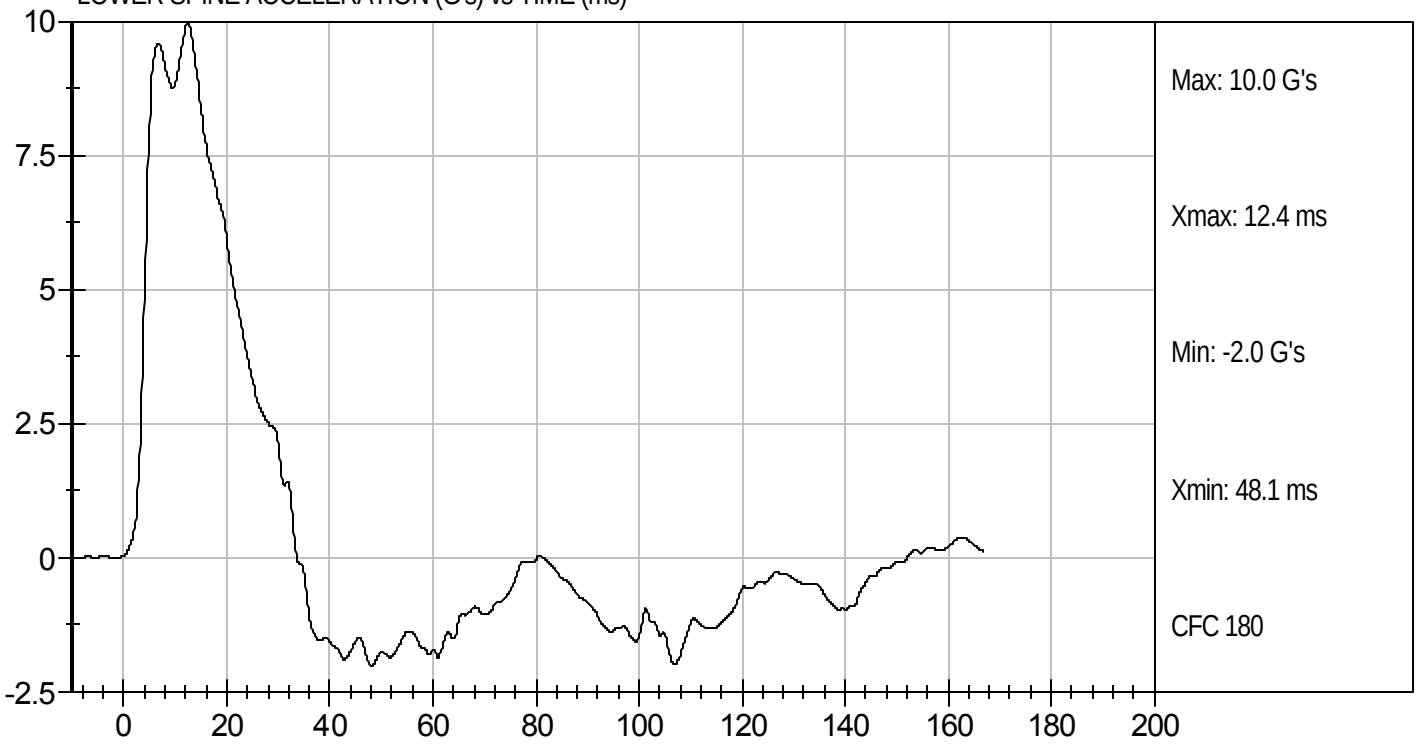
Test Desc: Abdomen Impact
Component ID: D122286

Test Date: 6/20/12
Velocity: 14.25 ft/s, 4.34 m/s

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



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



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test I.D:** D122287

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	50	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Peak Impactor Acceleration	G's	38 to 47	43	Pass
Pelvis Y Acceleration after 6 ms	G's	34 to 42	42	Pass
Peak Acetabulum Force	N	3600 to 4300	3983	Pass
		Overall Test Results		Pass

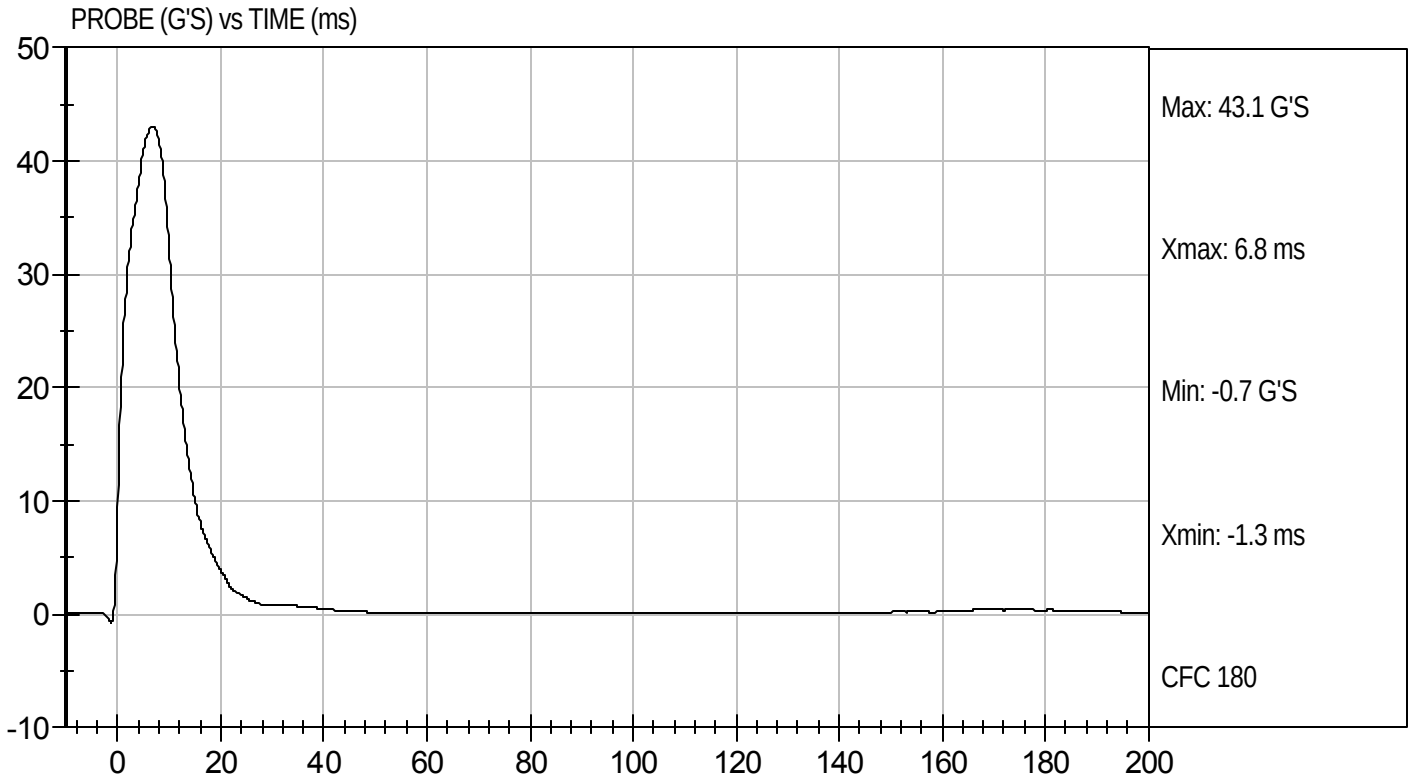
Jessica Hall
Laboratory Technician

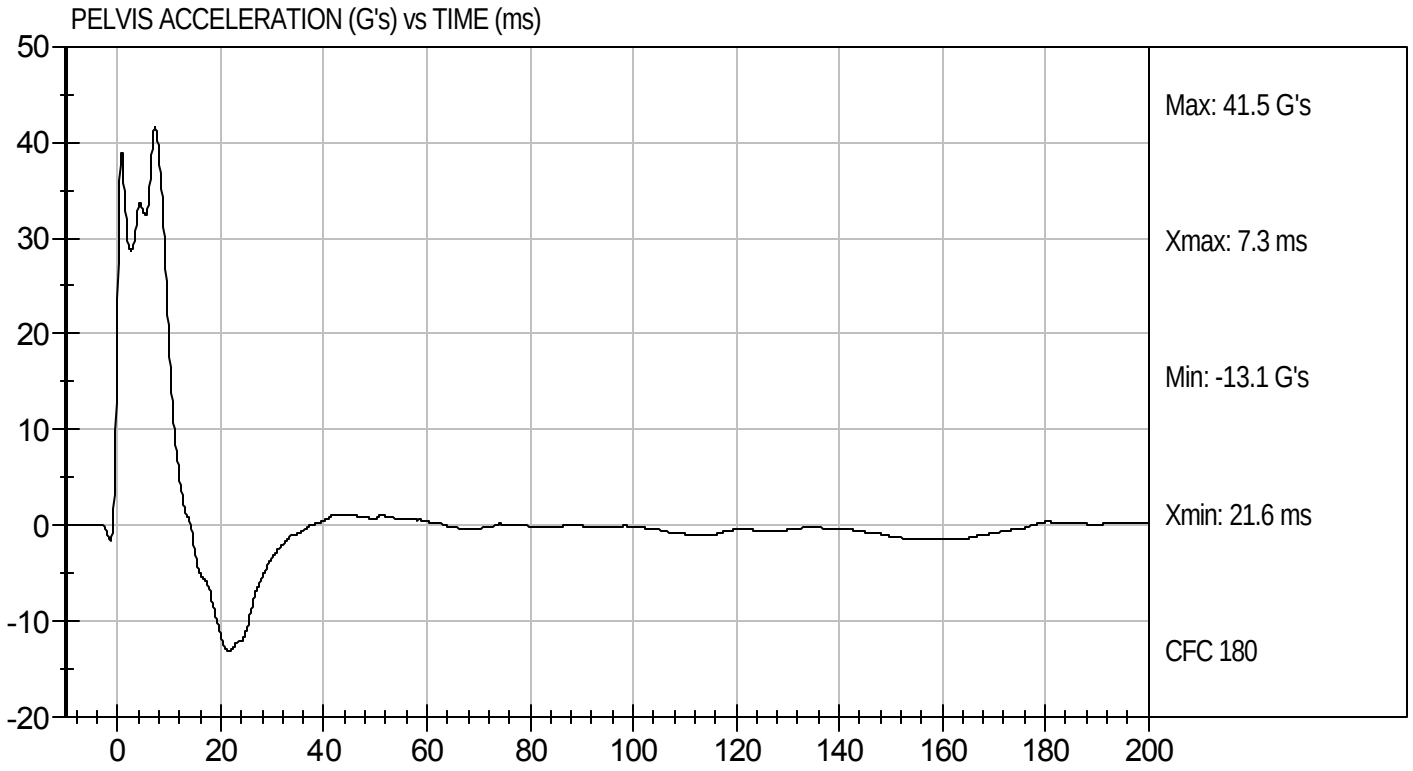
6/20/12
Test Date

David Winkelbauer
Approved By

Test Desc: Pelvis Impact
Component ID: D122287

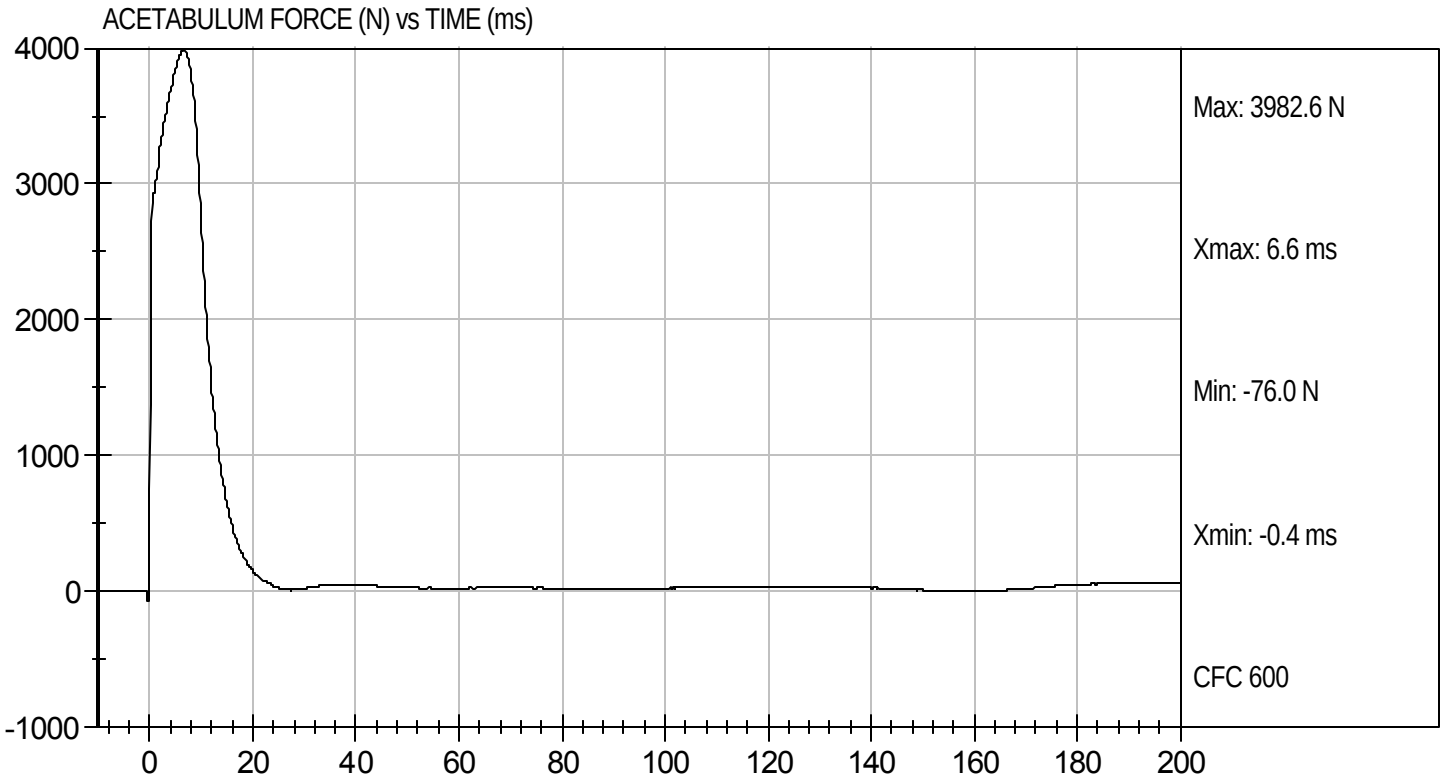
Test Date: 6/20/12
Velocity: 22.22 ft/s, 6.77 m/s





Test Desc: Pelvis Impact
Component ID: D122287

Test Date: 6/20/12
Velocity: 22.22 ft/s, 6.77 m/s



MGA RESEARCH CORPORATION

ILIAC IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test I.D:** D122288

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	50	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Peak Impactor Acceleration	G's	36 to 45	39	Pass
Pelvis Y Acceleration	G's	28 to 39	32	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4615	Pass
		Overall Test Results		Pass

Jessica Gall
Laboratory Technician

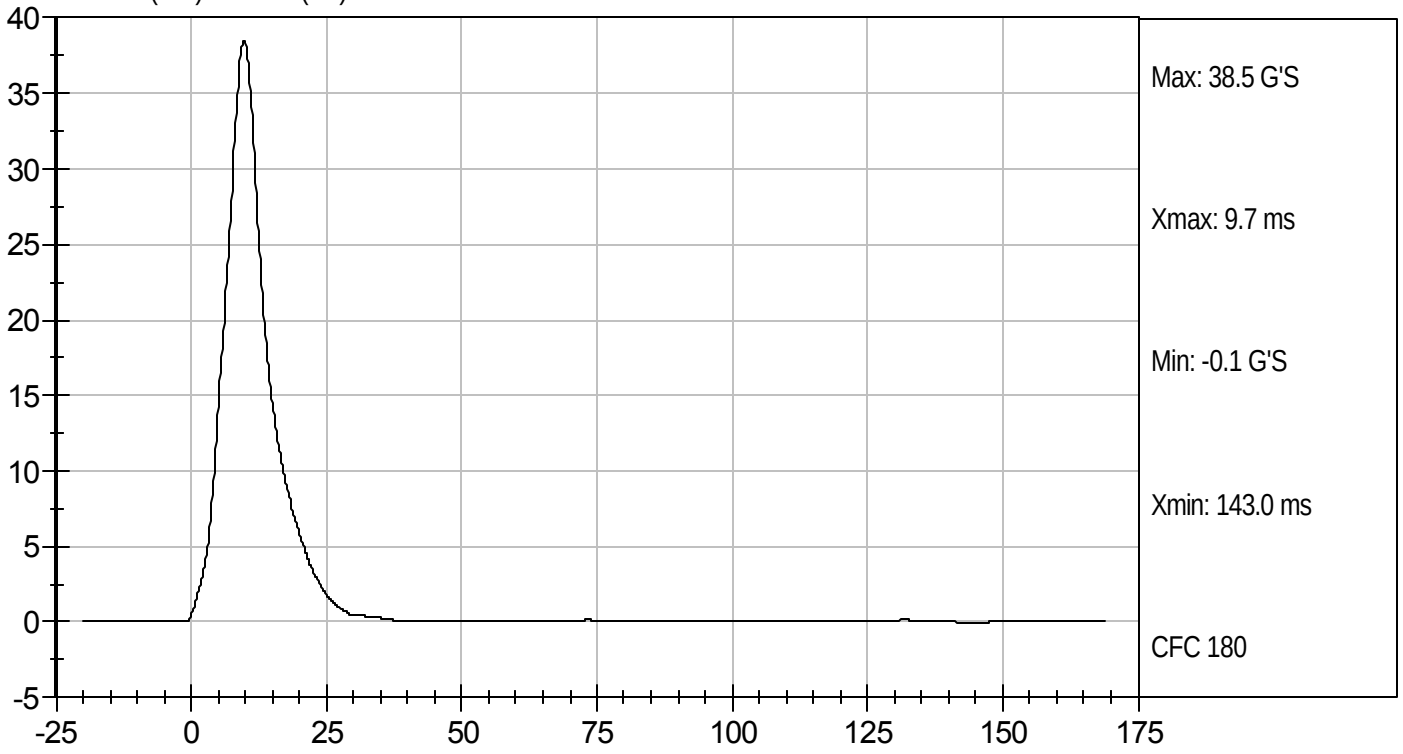
6/20/12
Test Date

David Winkelbauer
Approved By

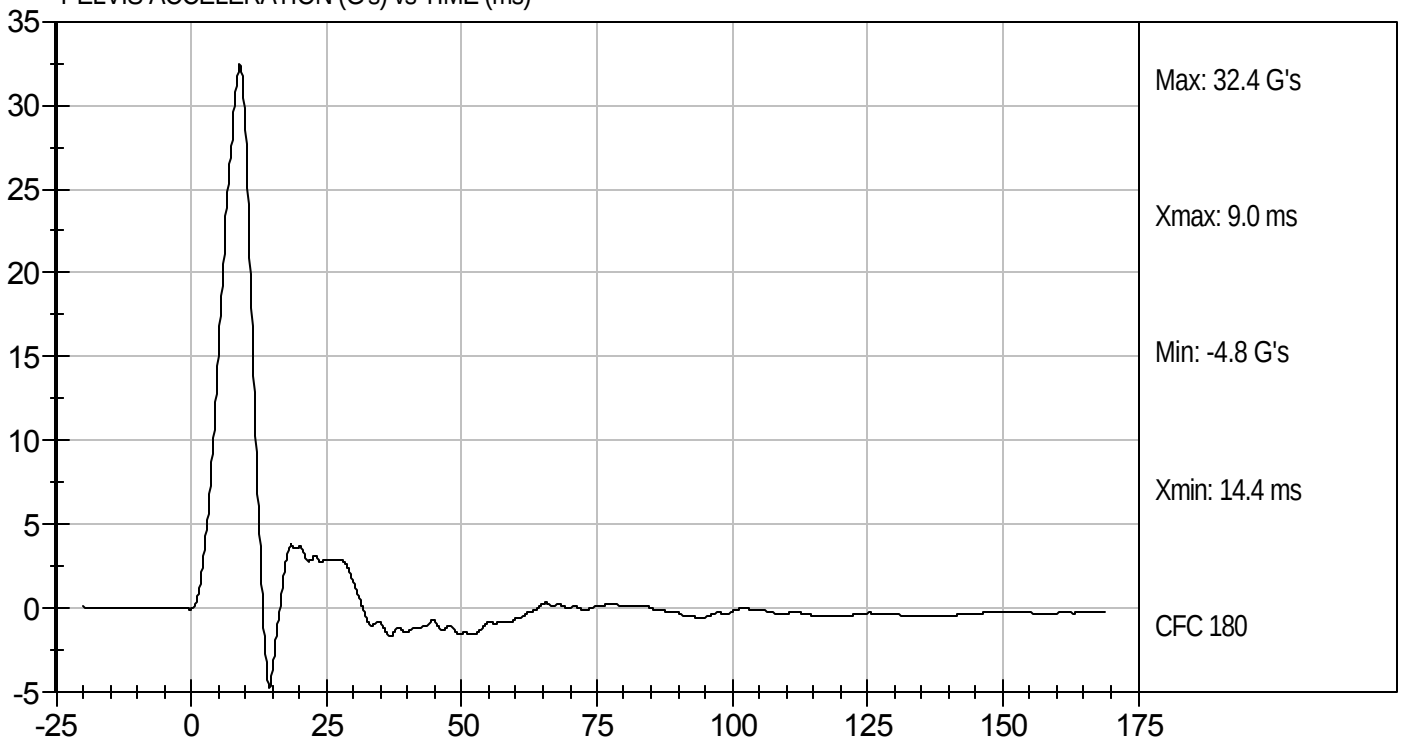
Test Desc: Iliac Impact
Component ID: D122288

Test Date: 6/20/12
Velocity: 14.25 ft/s, 4.34 m/s

PROBE (G'S) vs TIME (ms)

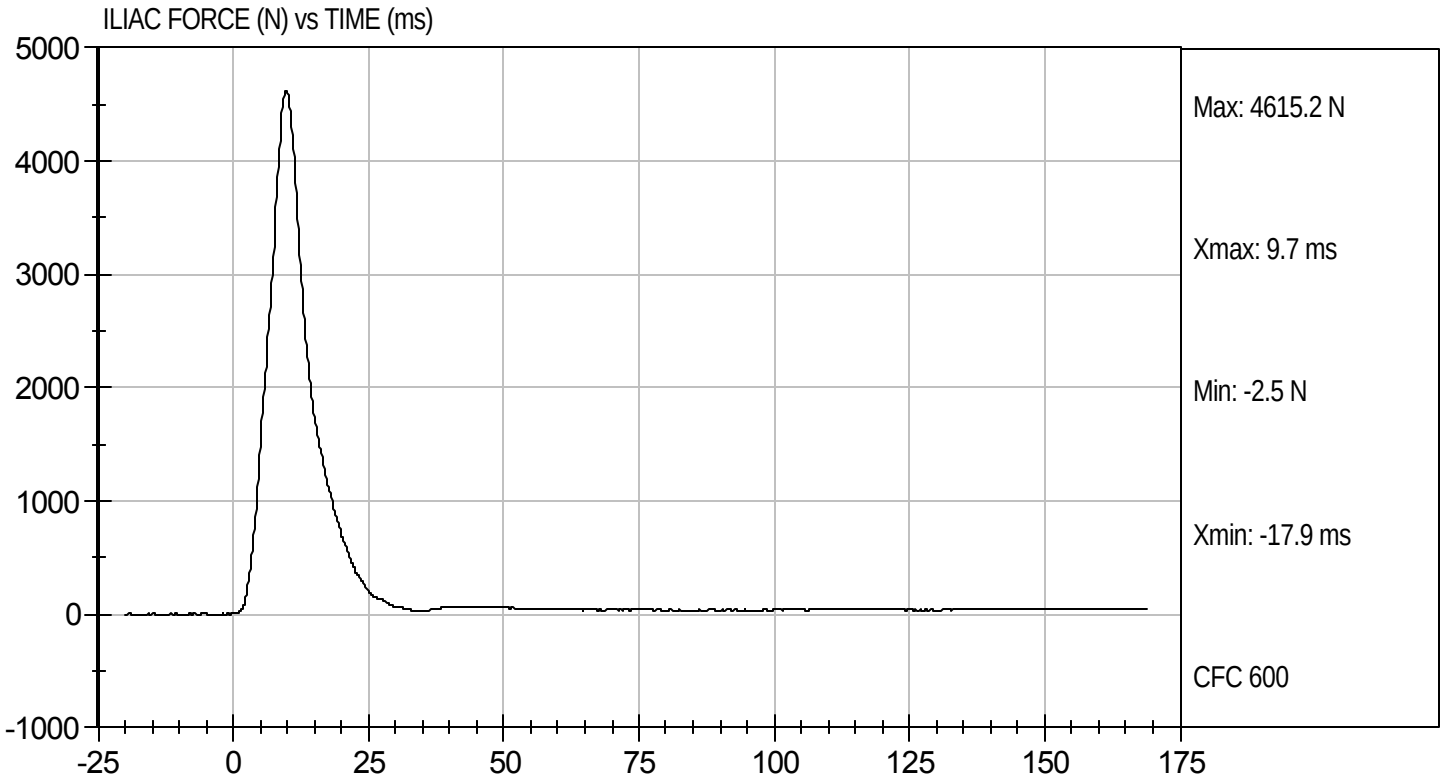


PELVIS ACCELERATION (G's) vs TIME (ms)



Test Desc: Iliac Impact
Component ID: D122288

Test Date: 6/20/12
Velocity: 14.25 ft/s, 4.34 m/s



MGA RESEARCH CORPORATION

HEAD DROP TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test ID:** D122531

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	42	Pass
Peak Resultant Acceleration	G's	115 to 137	124	Pass
Peak Longitudinal Acceleration	G's	+/- 15	2.7	Pass
Unimodal	N/A	<15%	Yes	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

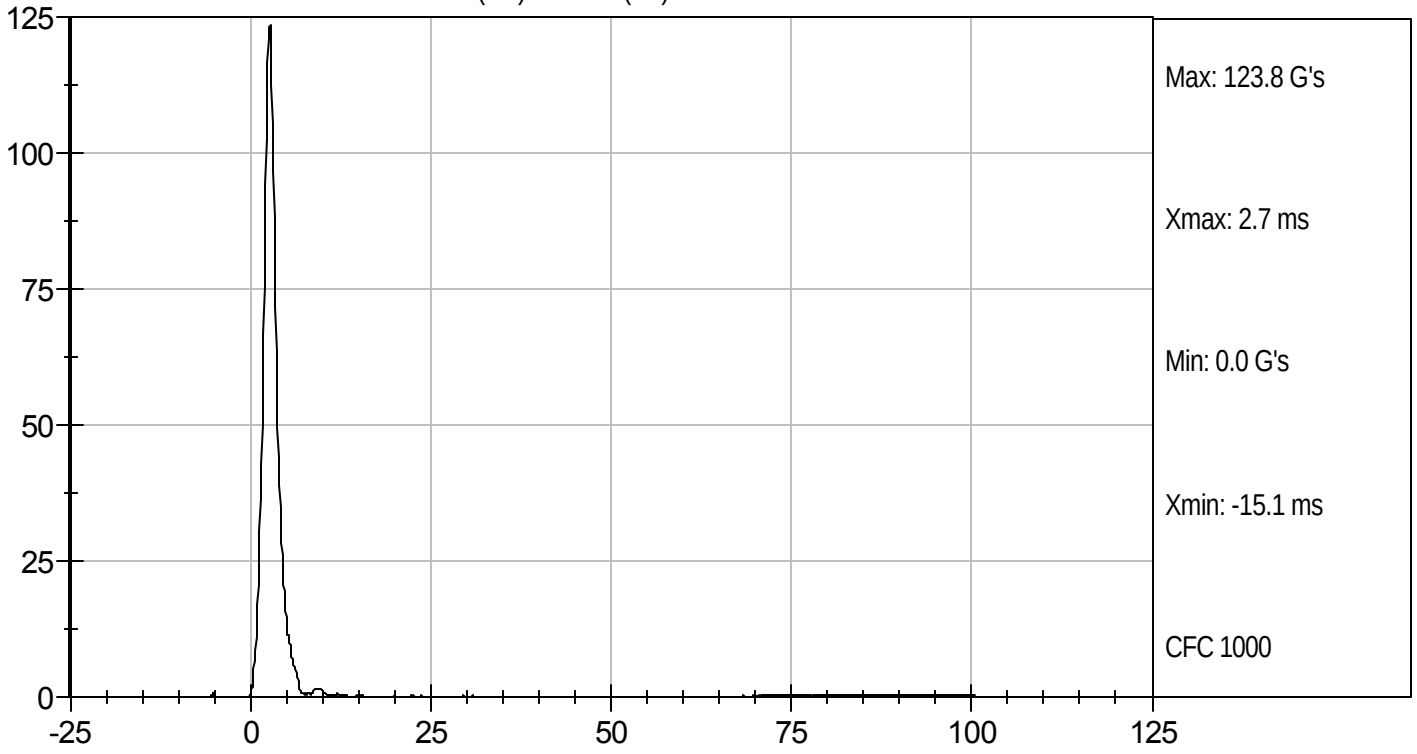
7/9/12
Test Date

David Winkelbauer
Approved By

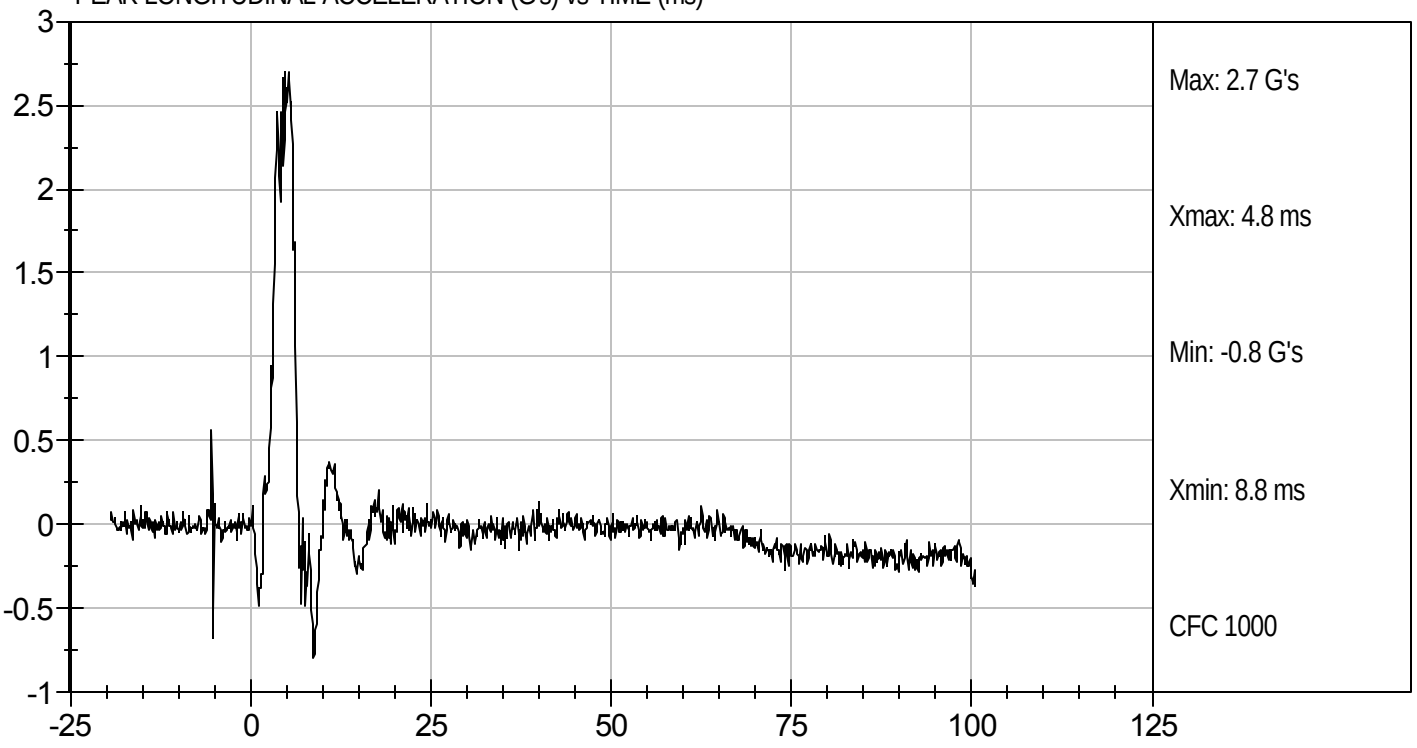
Test Desc: Head Drop
Component ID: D122531

Test Date: 7/9/12
Velocity: 0 ft/s, 0 m/s

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



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



MGA RESEARCH CORPORATION

LATERAL NECK PENDULUM TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test I.D:** D122532

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.9	Pass
Humidity		%	10 to 70	46	Pass
Impact Velocity		m/s	5.51 to 5.63	5.52	Pass
Delta Velocity	10 ms	m/s	2.20 to 2.80	2.77	Pass
	15 ms	m/s	3.30 to 4.10	3.92	Pass
	20 ms	m/s	4.40 to 5.40	5.12	Pass
	25 ms	m/s	5.40 to 6.10	5.51	Pass
	25-100 ms	m/s	5.50 to 6.20	5.53	Pass
Maximum D-Plane Rotation		deg	71 to 81	72	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	63	Pass
Maximum Occipital Condyle Moment during Rotation Interval		Nm	-44 to -36	-41	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	115	Pass
			Overall Test Results		Pass

Jessica Gall
Laboratory Technician

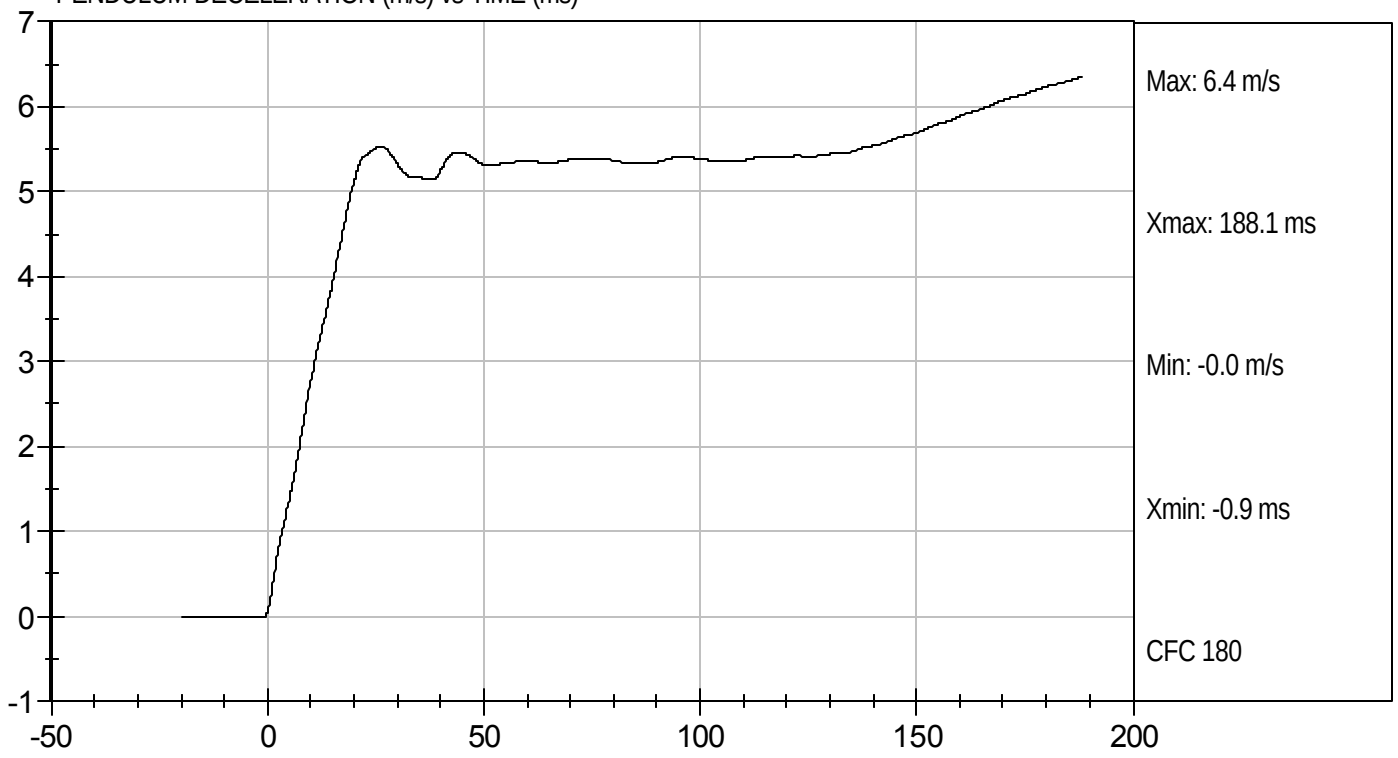
7/9/12
Test Date

David Winkelbauer
Approved By

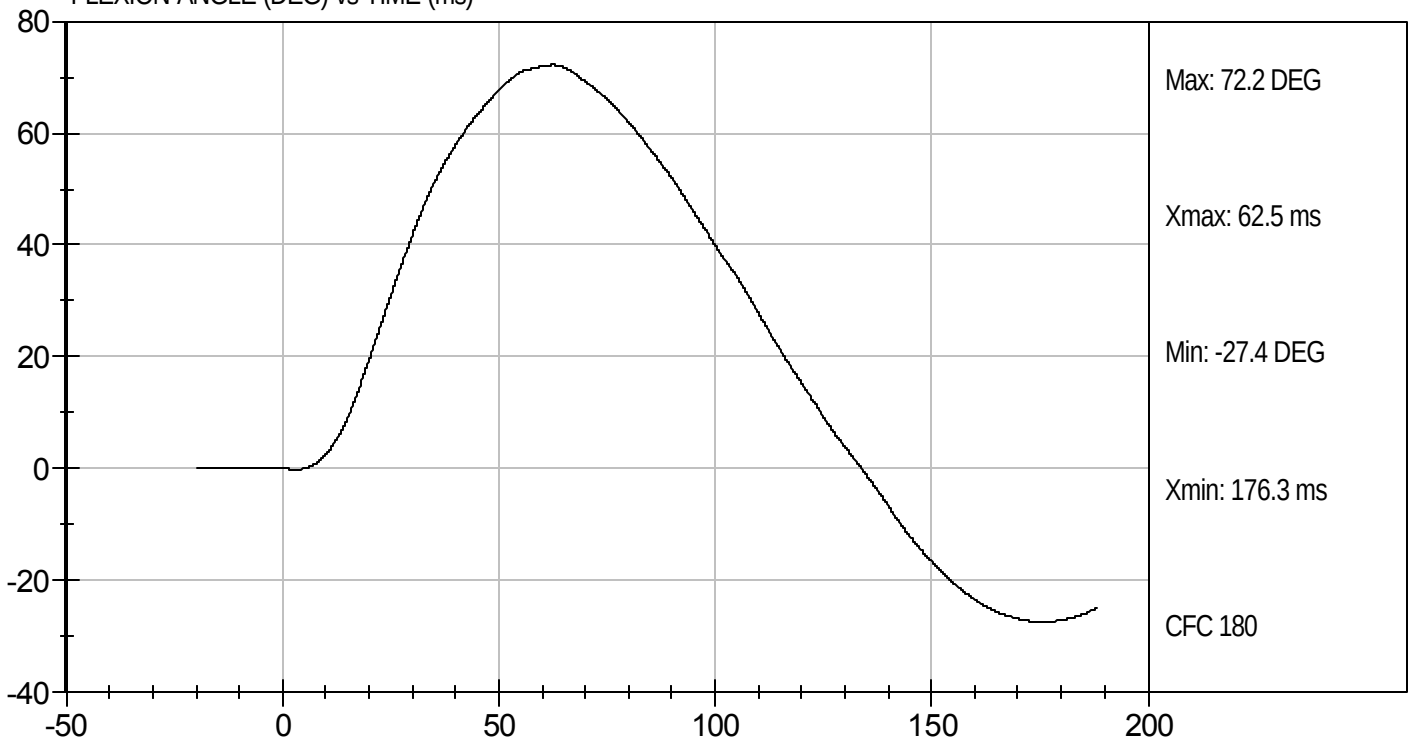
Test Desc: Neck Bending
Component ID: D122532

Test Date: 7/9/12
Velocity: 18.12 ft/s, 5.52 m/s

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

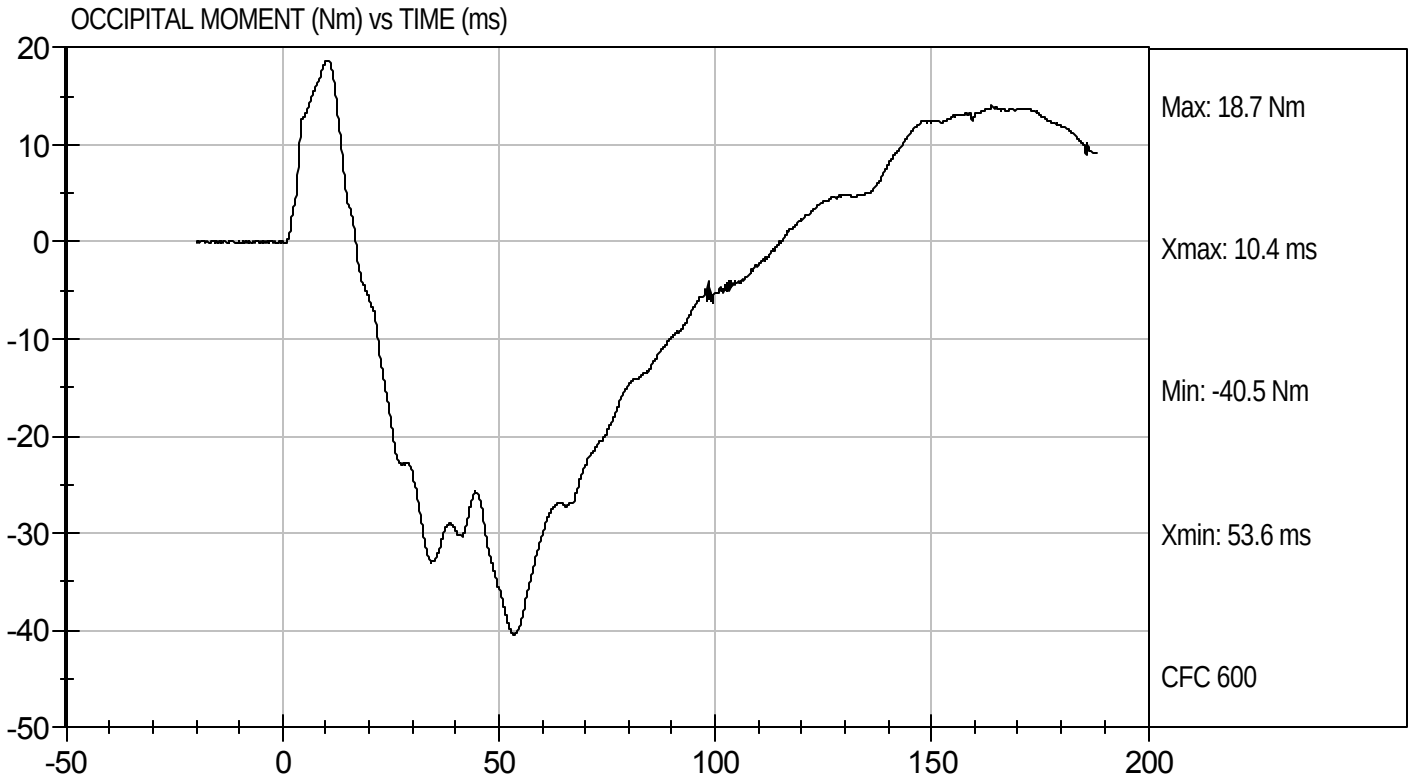


FLEXION ANGLE (DEG) vs TIME (ms)



Test Desc: Neck Bending
Component ID: D122532

Test Date: 7/9/12
Velocity: 18.12 ft/s, 5.52 m/s



MGA RESEARCH CORPORATION

SHOULDER IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test ID:** D122533

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	50	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Maximum Probe Acceleration	G's	13 to 18	15	Pass
Shoulder Displacement	mm	28 to 37	31	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	19	Pass
		Overall Test Results		Pass

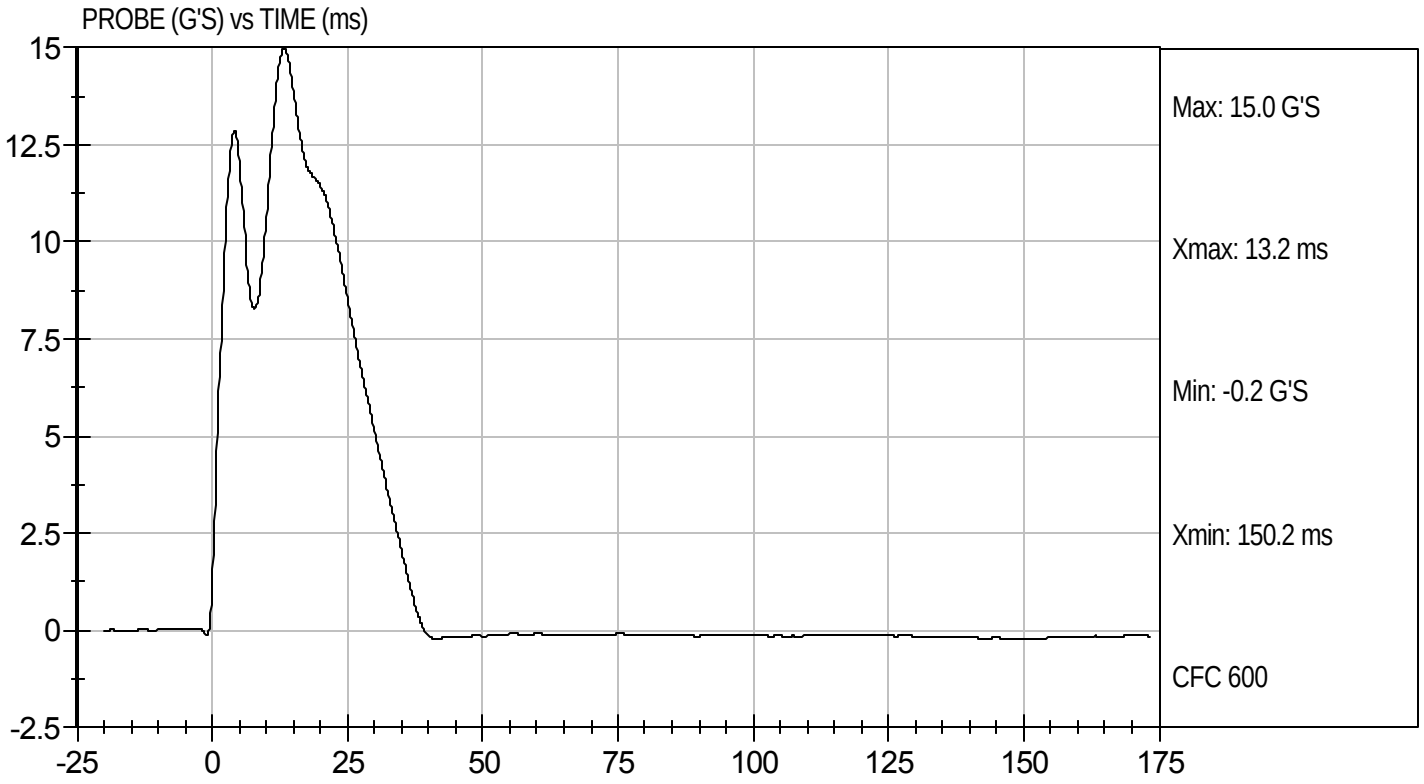
Jessica Gall
Laboratory Technician

7/6/12
Test Date

David Winkelbauer
Approved By

Test Desc: Shoulder Impact
Component ID: D122533

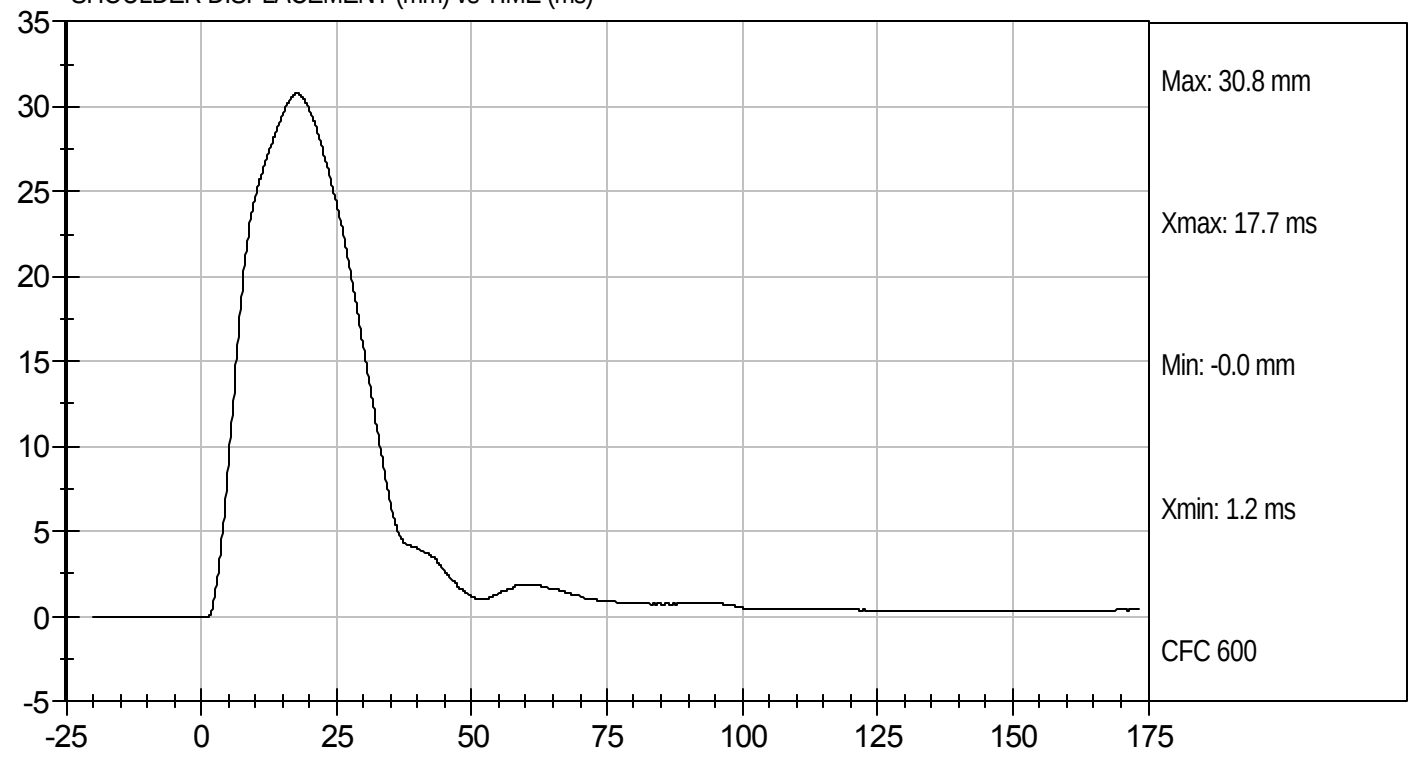
Test Date: 7/6/12
Velocity: 14.25 ft/s, 4.34 m/s



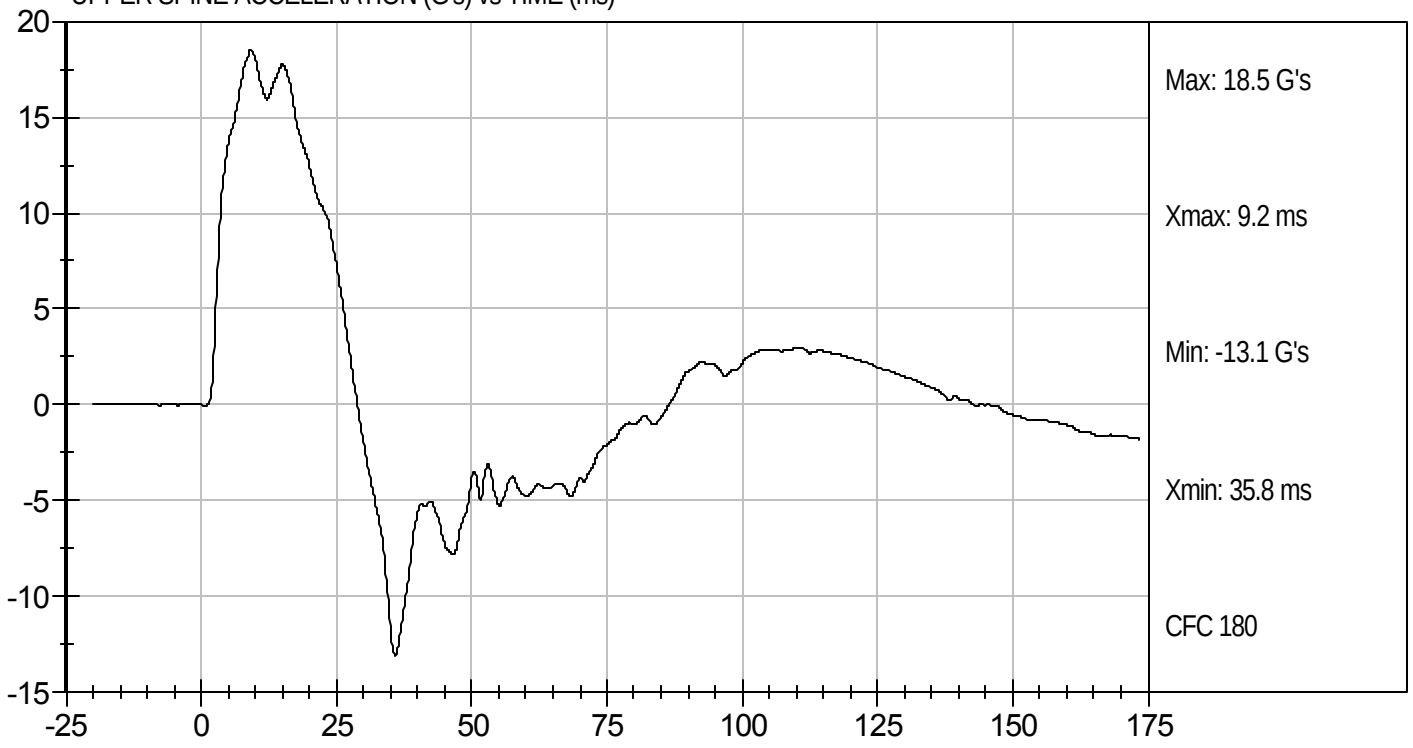
Test Desc: Shoulder Impact
Component ID: D122533

Test Date: 7/6/12
Velocity: 14.25 ft/s, 4.34 m/s

SHOULDER DISPLACEMENT (mm) vs TIME (ms)



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



MGA RESEARCH CORPORATION

THORAX (WITH ARM) IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test I.D:** D122534

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	22.0	Pass
Humidity	%	10 to 70	50	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Peak Impactor Acceleration	G's	30 to 36	31	Pass
Shoulder Displacement	mm	31 to 40	36	Pass
Upper Rib Displacement	mm	25 to 32	29	Pass
Middle Rib Displacement	mm	30 to 36	33	Pass
Lower Rib Displacement	mm	32 to 38	35	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	35	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	30	Pass
		Overall Test Results		Pass

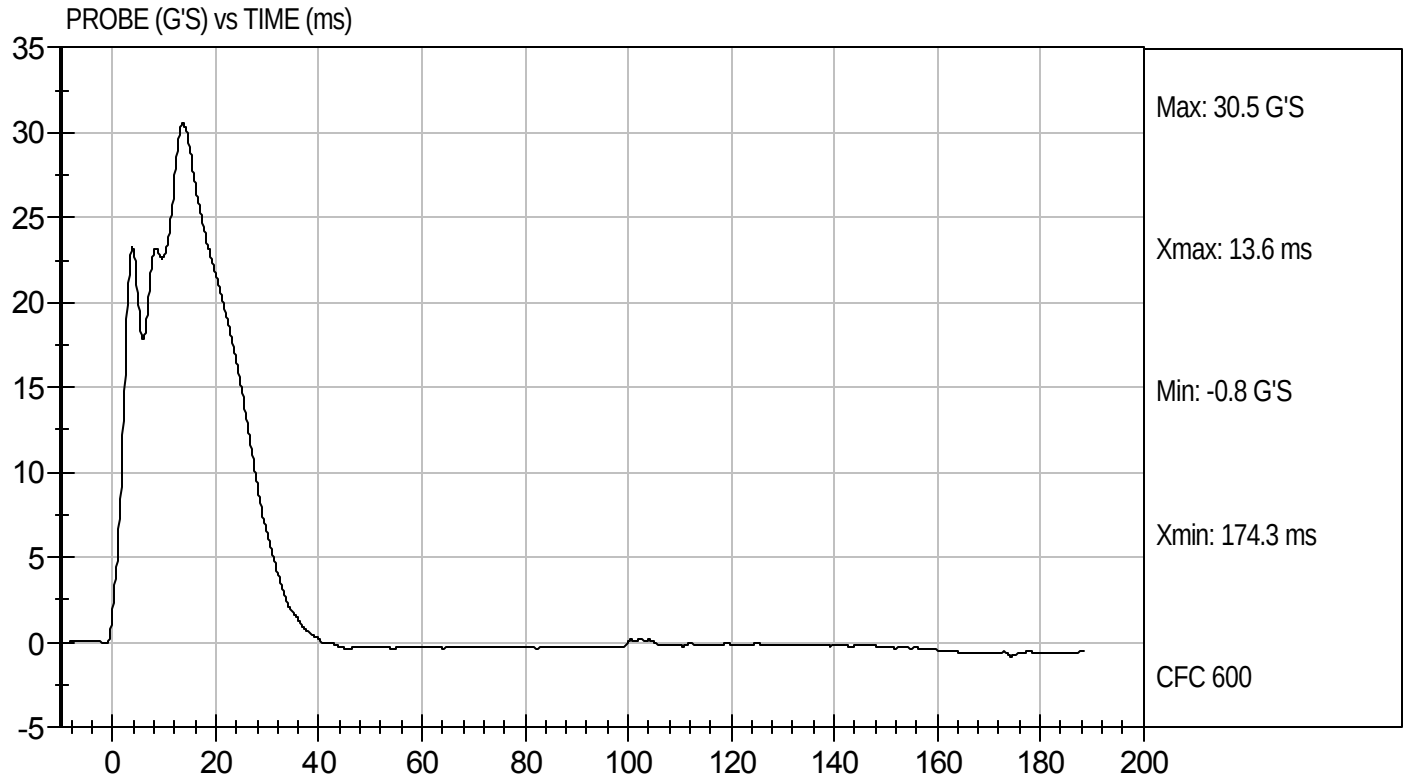
Jessica Hall
Laboratory Technician

7/6/12
Test Date

David Winkelbauer
Approved By

Test Desc: Thorax With Arm
Component ID: D122534

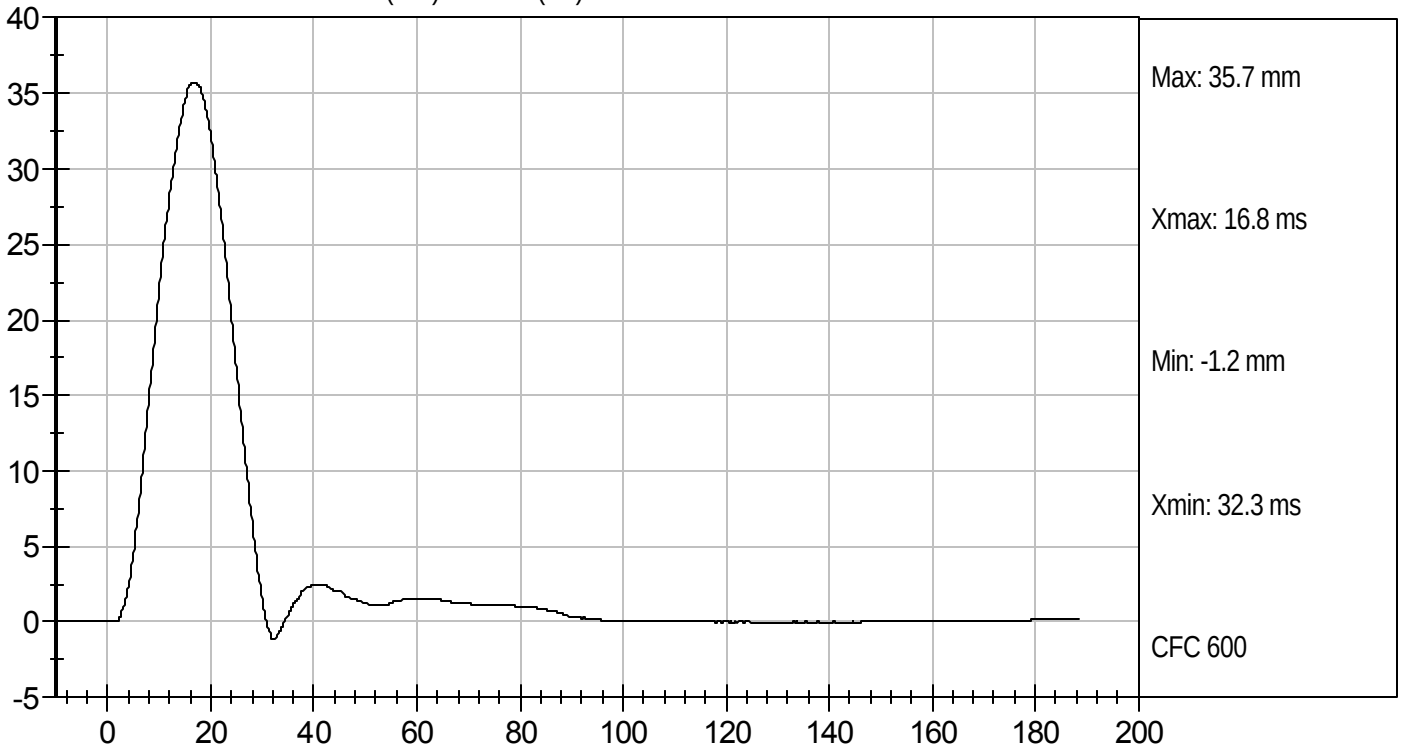
Test Date: 7/6/12
Velocity: 22.22 ft/s, 6.77 m/s



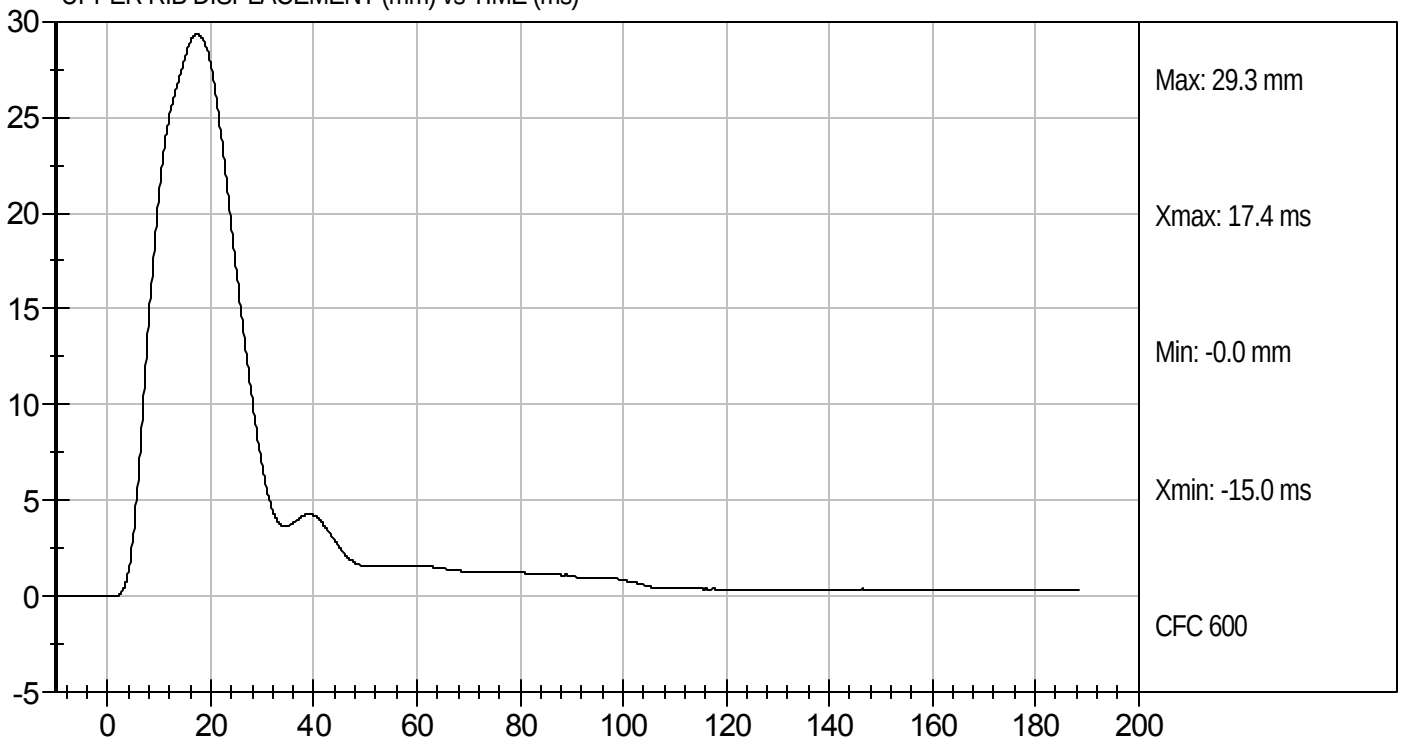
Test Desc: Thorax With Arm
Component ID: D122534

Test Date: 7/6/12
Velocity: 22.22 ft/s, 6.77 m/s

SHOULDER DISPLACEMENT (mm) vs TIME (ms)



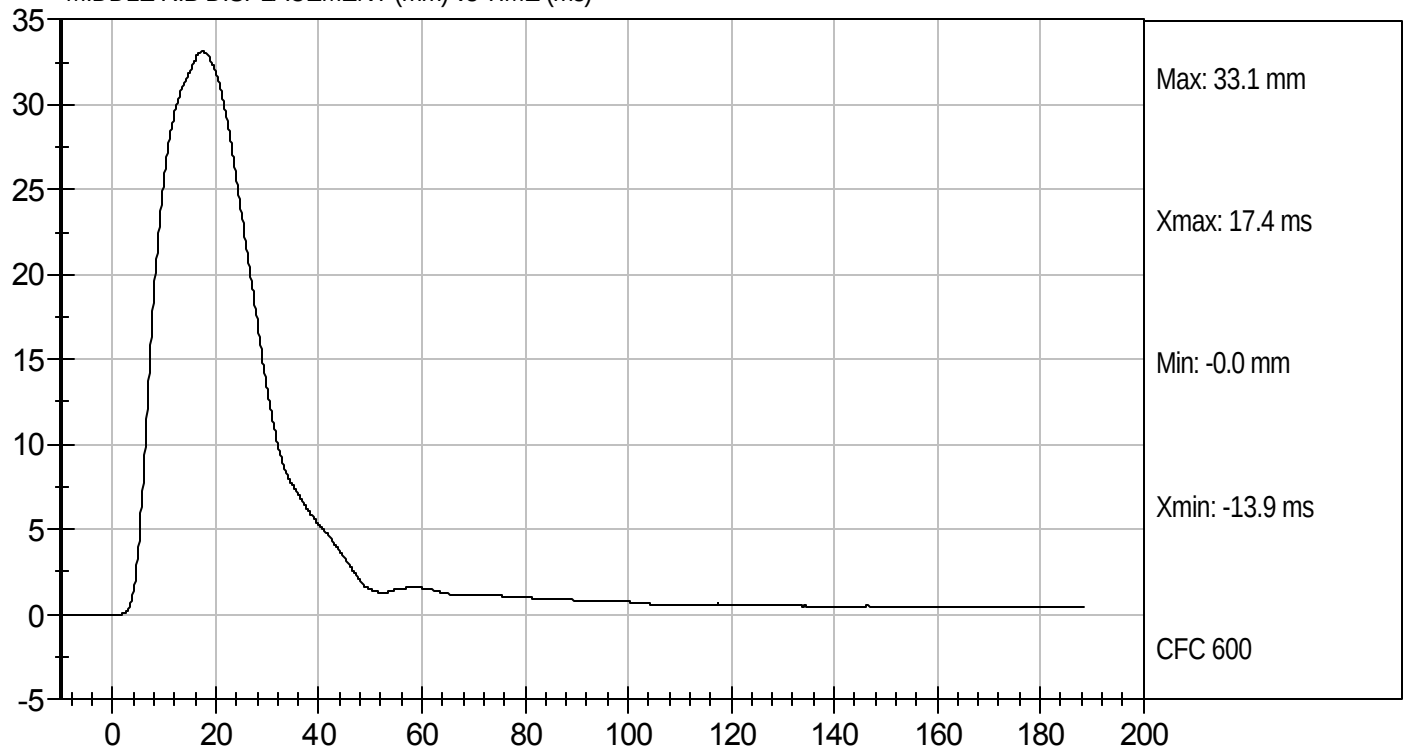
UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



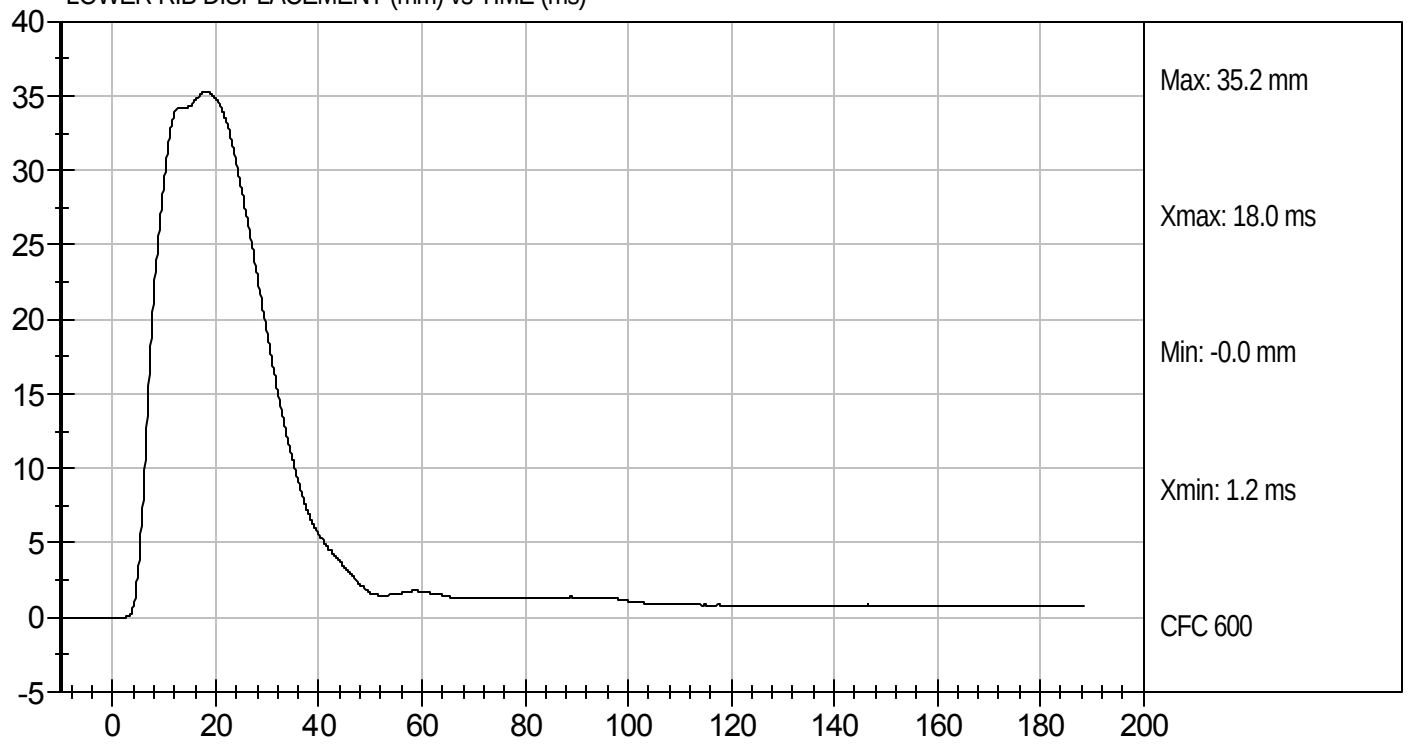
Test Desc: Thorax With Arm
Component ID: D122534

Test Date: 7/6/12
Velocity: 22.22 ft/s, 6.77 m/s

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)

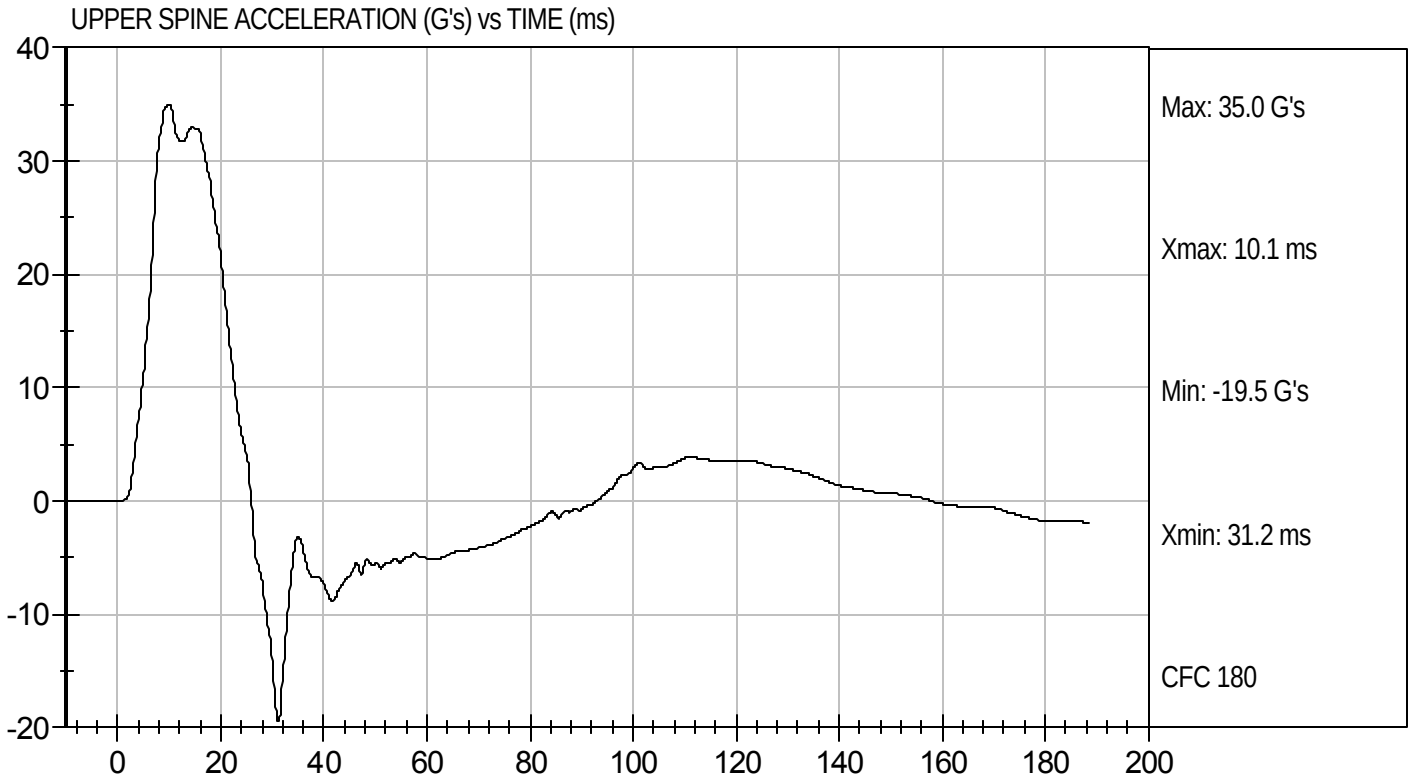


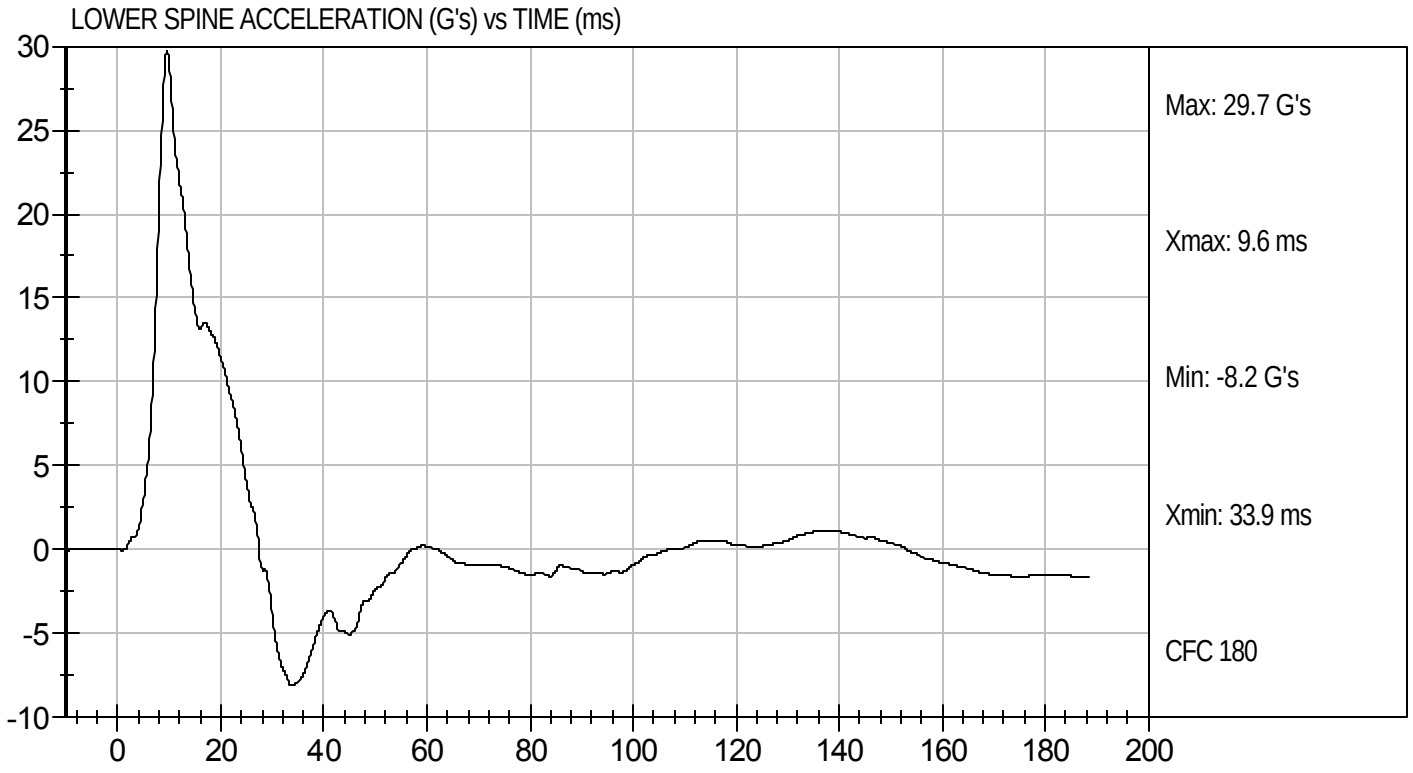
LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



Test Desc: Thorax With Arm
Component ID: D122534

Test Date: 7/6/12
Velocity: 22.22 ft/s, 6.77 m/s





MGA RESEARCH CORPORATION

THORAX (WITHOUT ARM) IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test I.D:** D122535

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.1	Pass
Humidity	%	10 to 70	44	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Peak Impactor Force	G's	14 to 18	15	Pass
Upper Rib Displacement	mm	32 to 40	38	Pass
Middle Rib Displacement	mm	39 to 45	43	Pass
Lower Rib Displacement	mm	35 to 43	41	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	14	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	9	Pass
		Overall Test Results		Pass

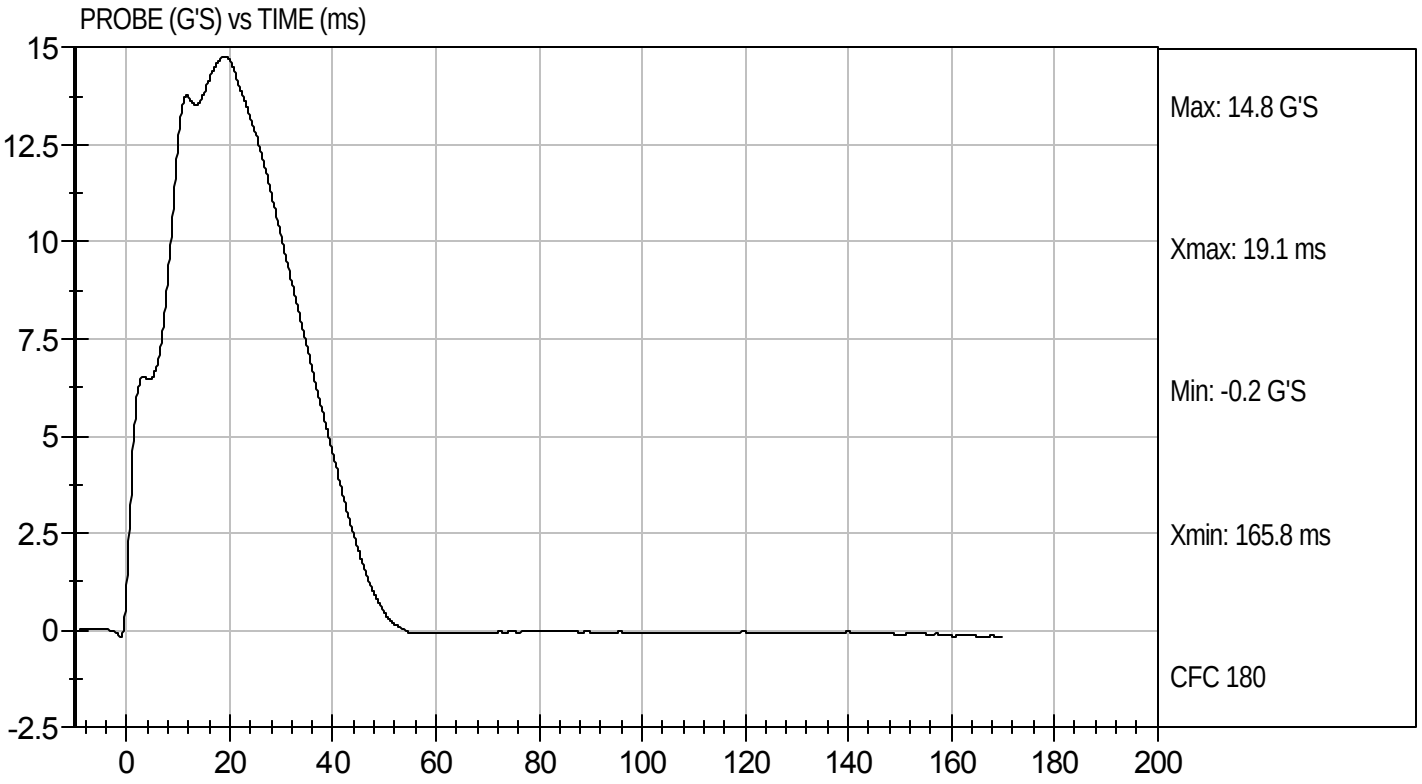
Jessica Hall
Laboratory Technician

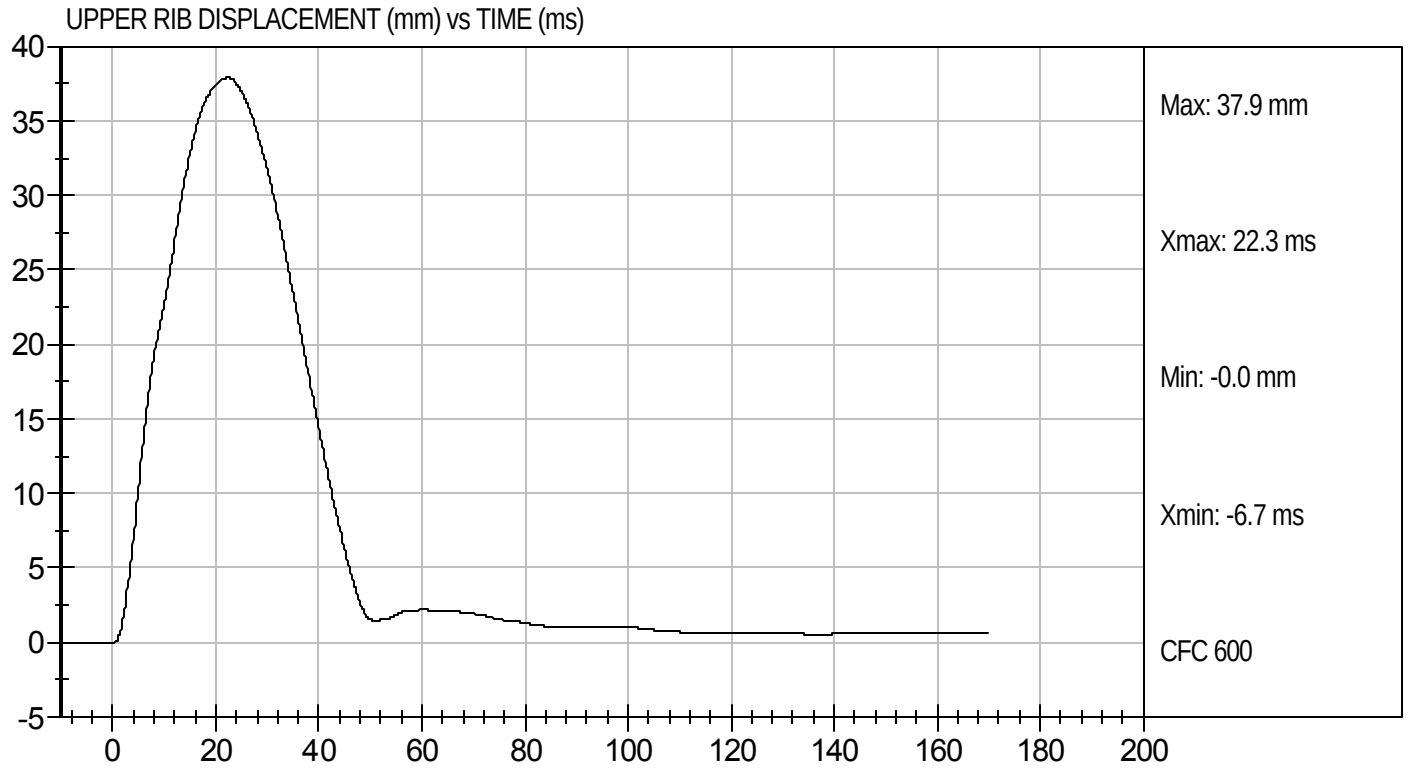
7/9/12
Test Date

David Winkelbauer
Approved By

Test Desc: Thorax Without Arm
Component ID: D122535

Test Date: 7/9/12
Velocity: 14.24 ft/s, 4.34 m/s

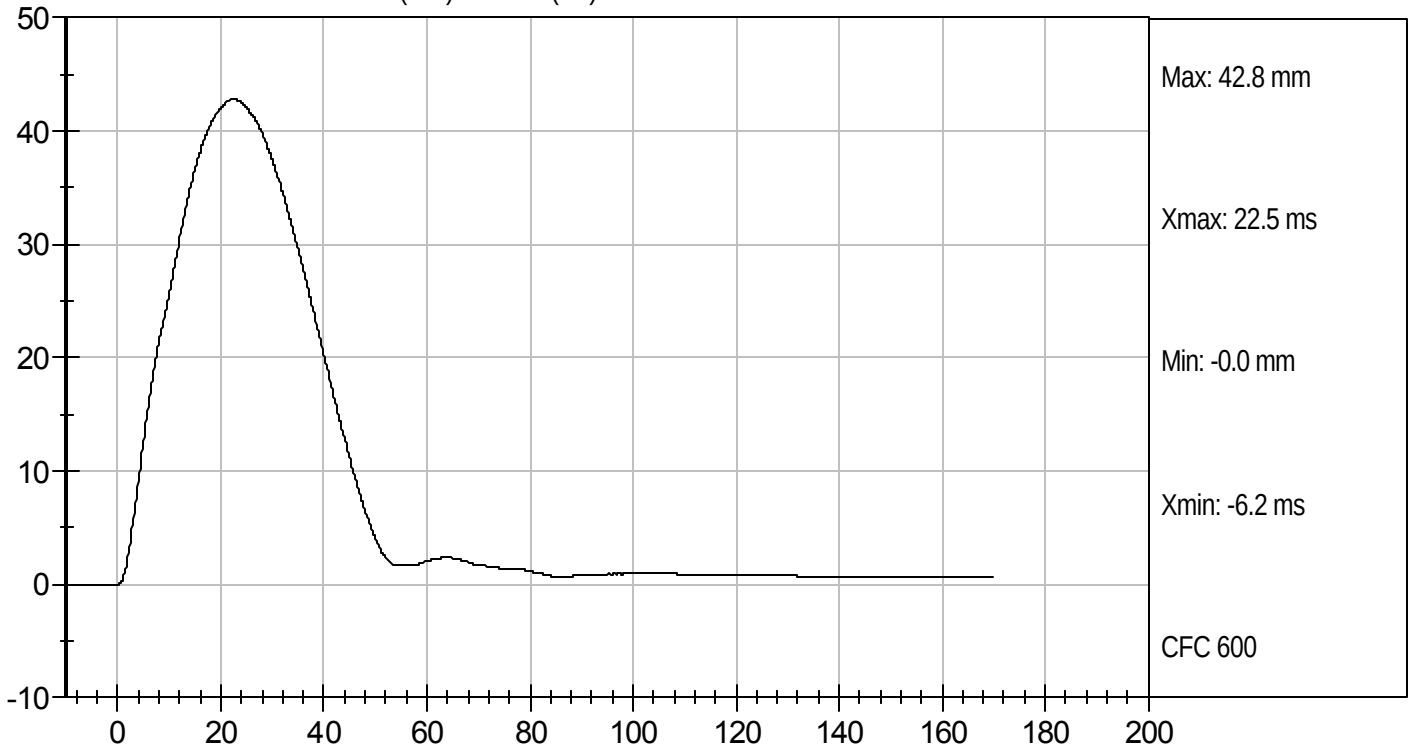




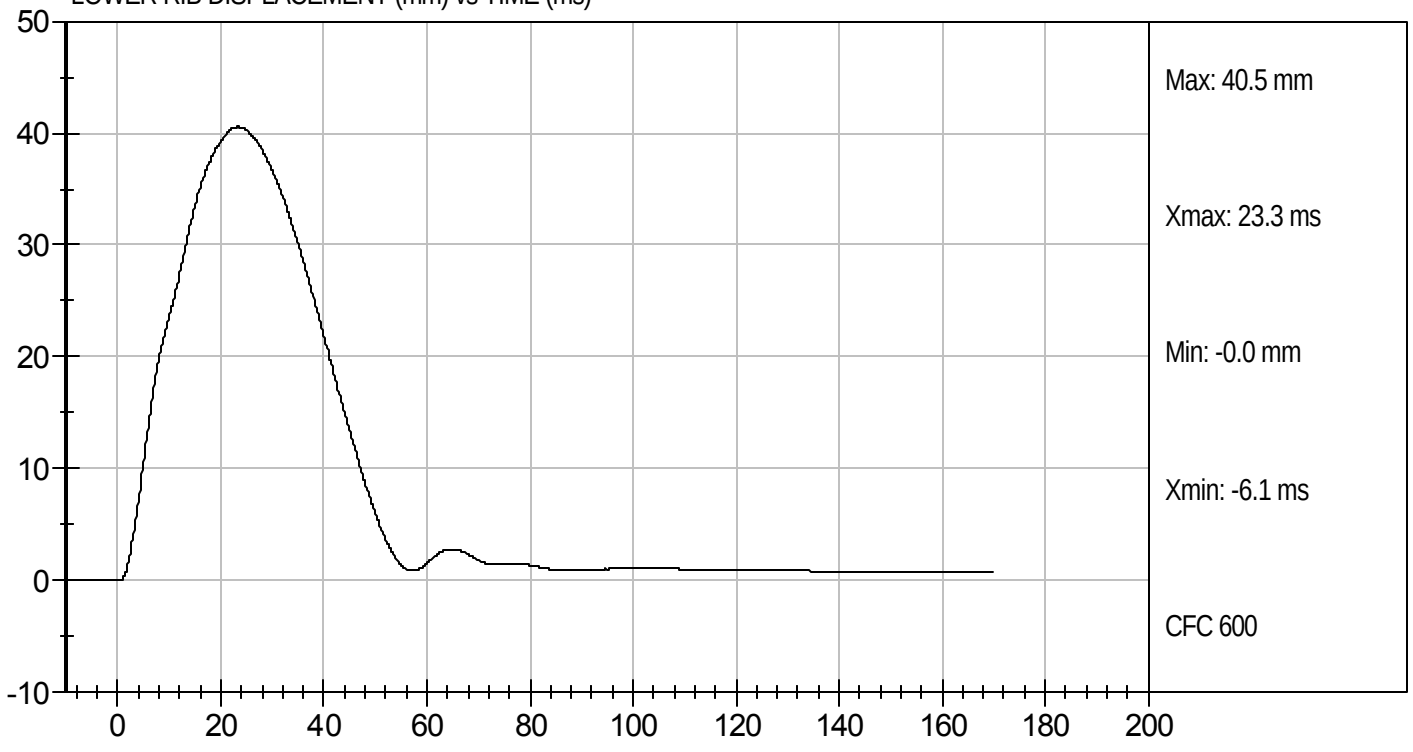
Test Desc: Thorax Without Arm
Component ID: D122535

Test Date: 7/9/12
Velocity: 14.24 ft/s, 4.34 m/s

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



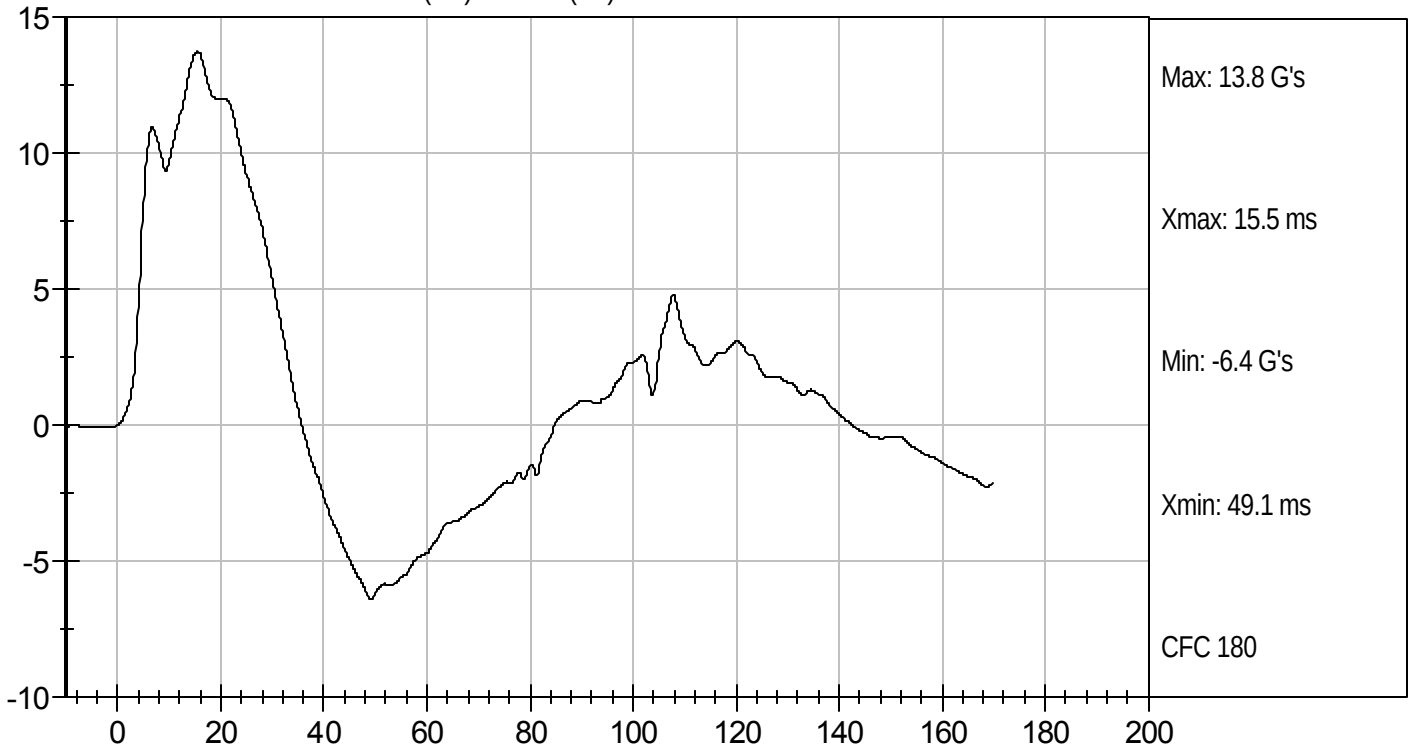
LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



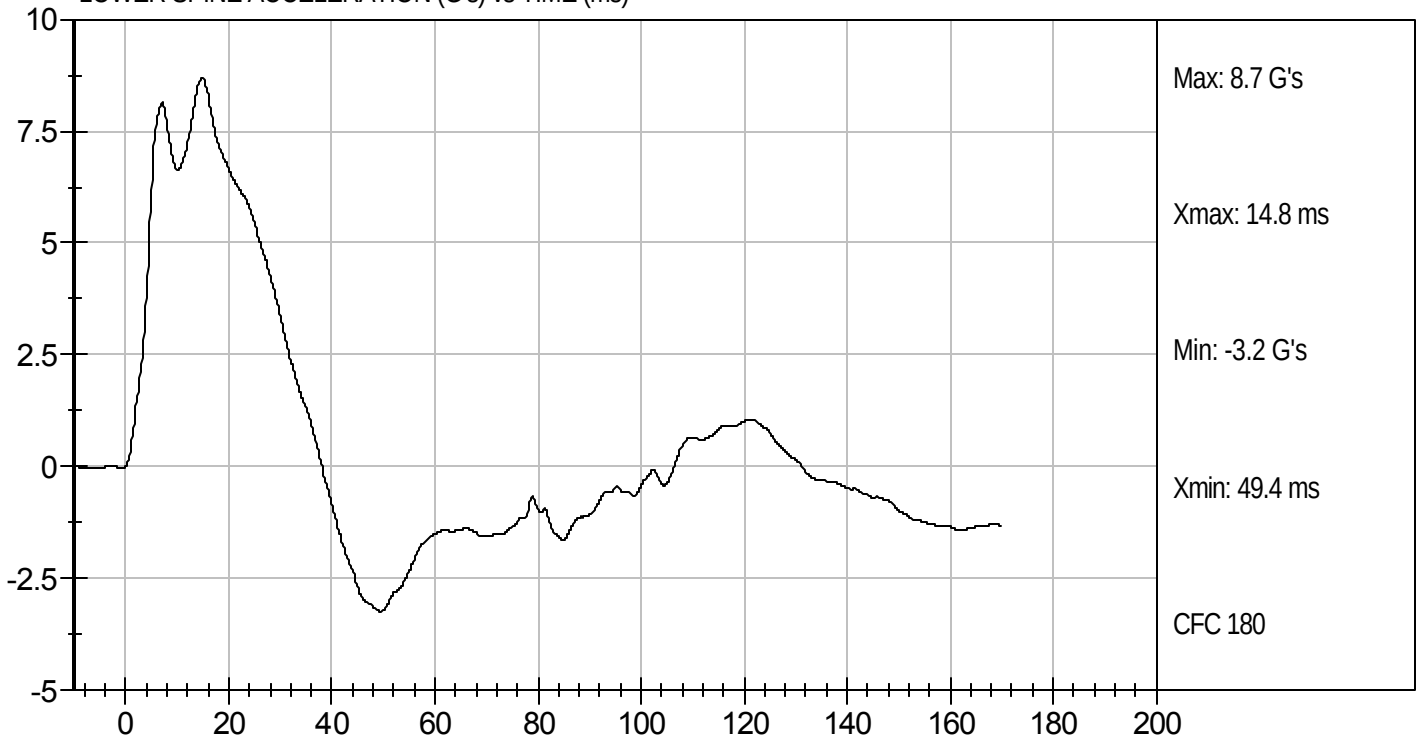
Test Desc: Thorax Without Arm
Component ID: D122535

Test Date: 7/9/12
Velocity: 14.24 ft/s, 4.34 m/s

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



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



MGA RESEARCH CORPORATION

ABDOMINAL IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test I.D:** D122536

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.1	Pass
Humidity	%	10 to 70	44	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Peak Impactor Acceleration	G's	12 to 16	13	Pass
Upper Rib Displacement	mm	36 to 47	44	Pass
Lower Rib Displacement	mm	33 to 44	41	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	10	Pass
		Overall Test Results		Pass

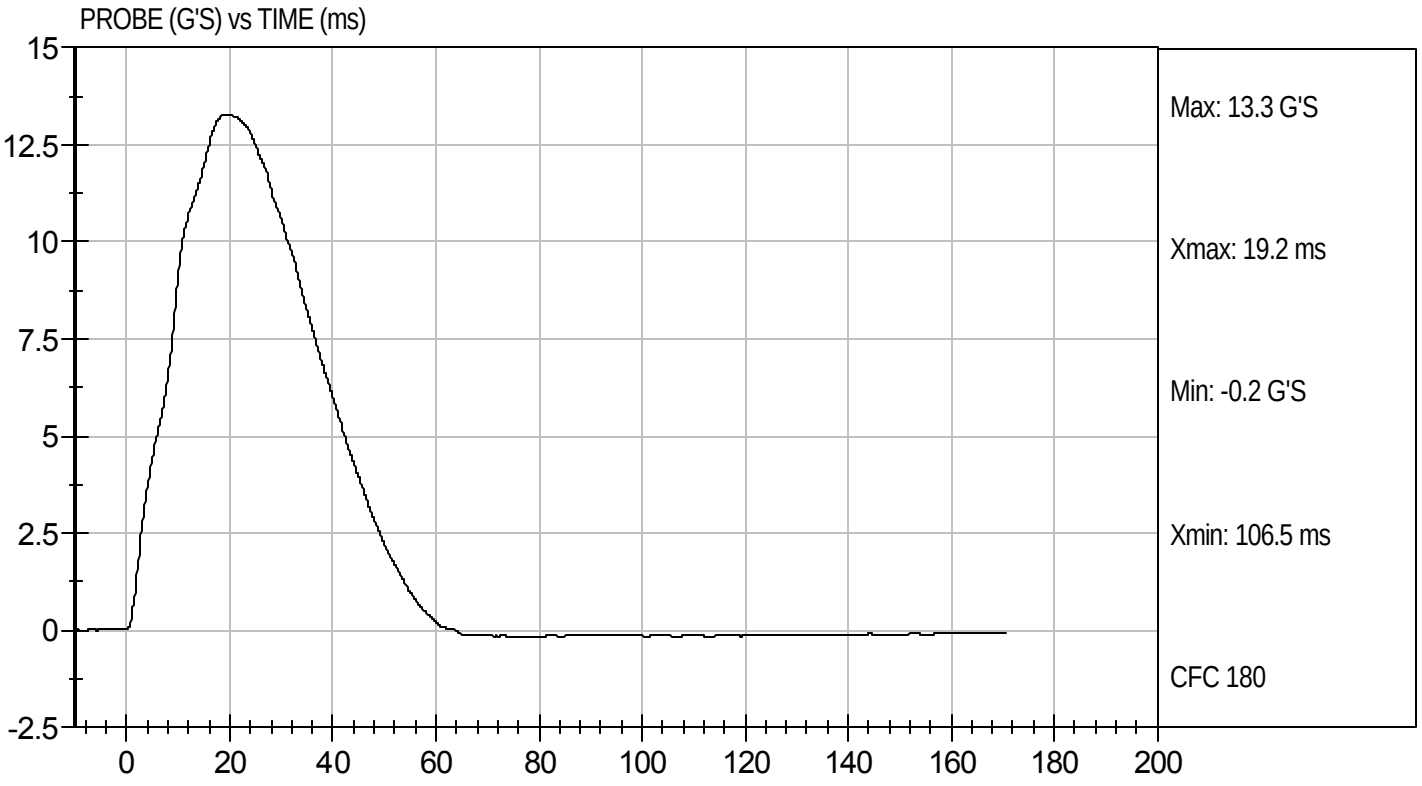
Jessica Gall
Laboratory Technician

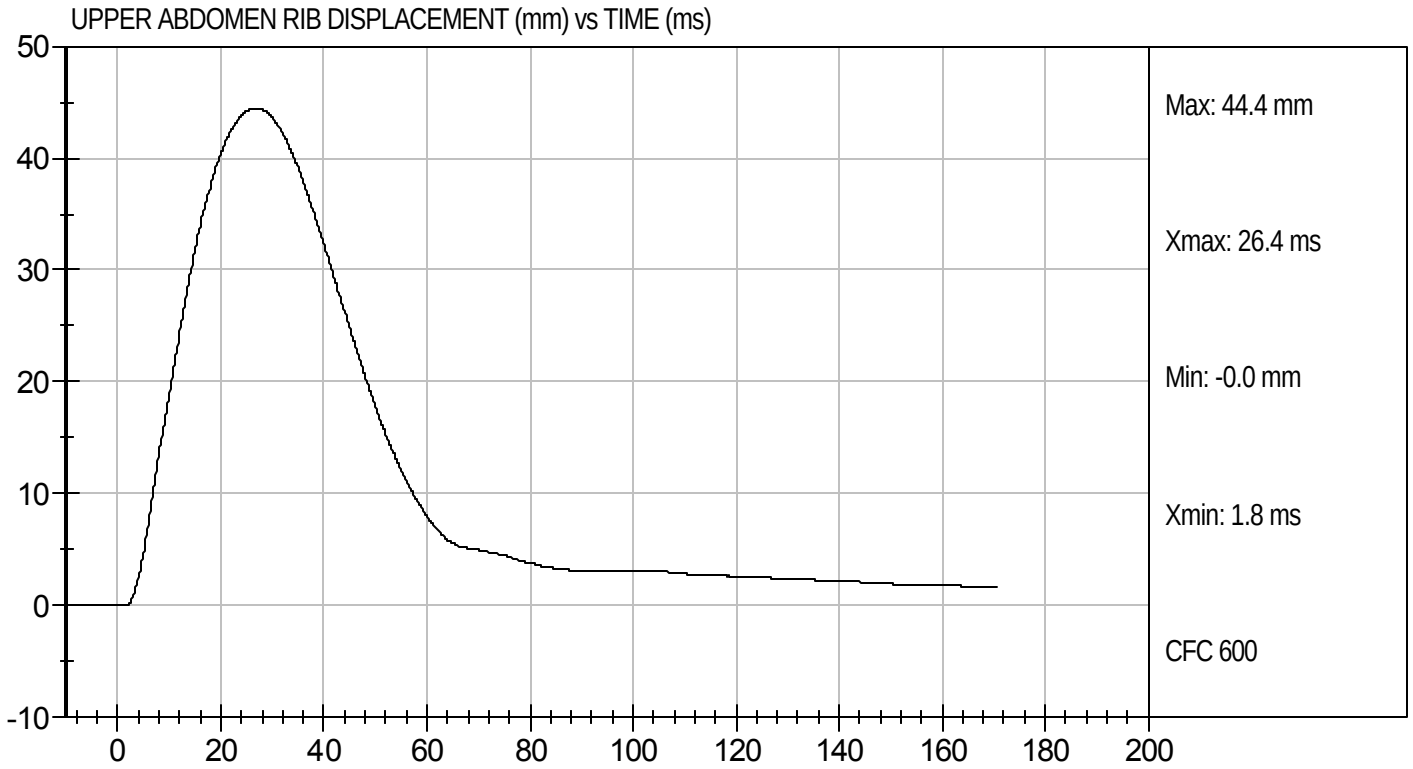
7/9/12
Test Date

David Winkelbauer
Approved By

Test Desc: Abdomen Impact
Component ID: D122536

Test Date: 7/9/12
Velocity: 14.12 ft/s, 4.30 m/s

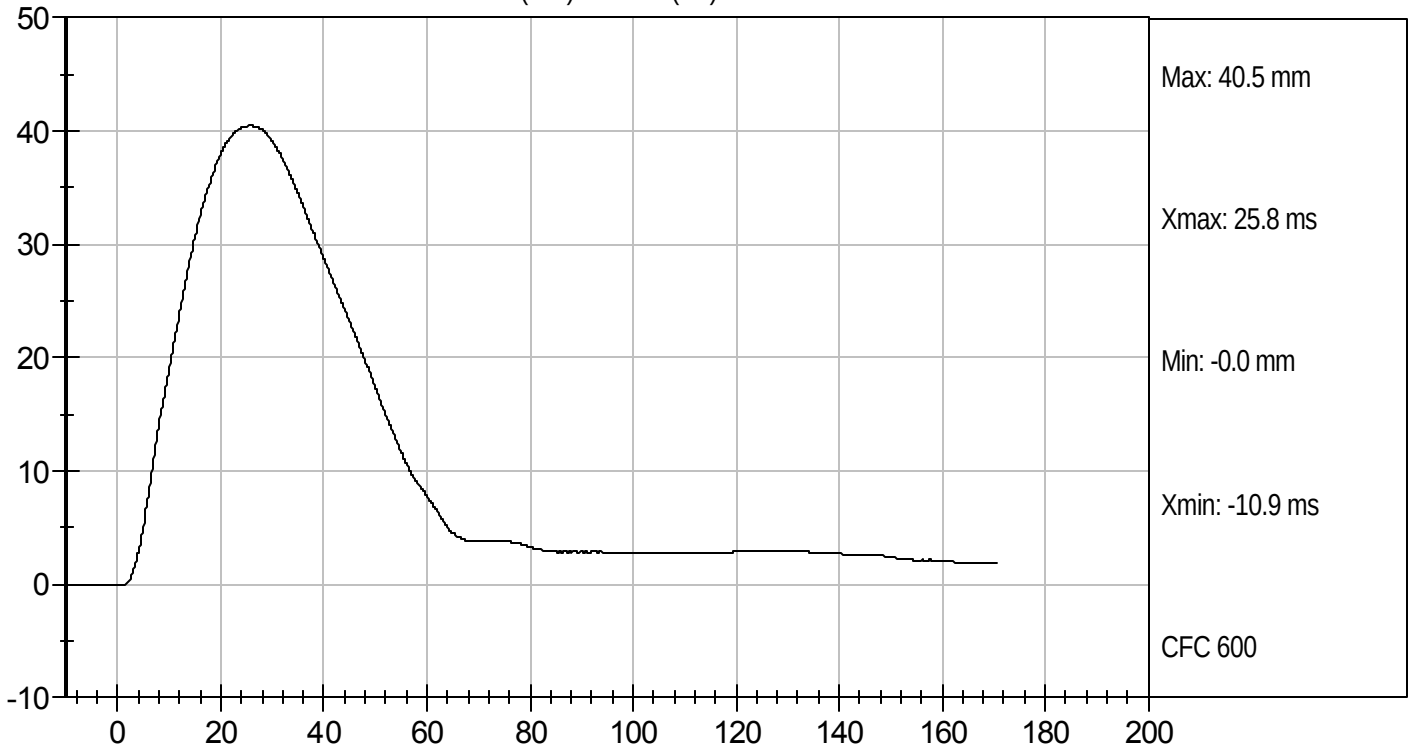




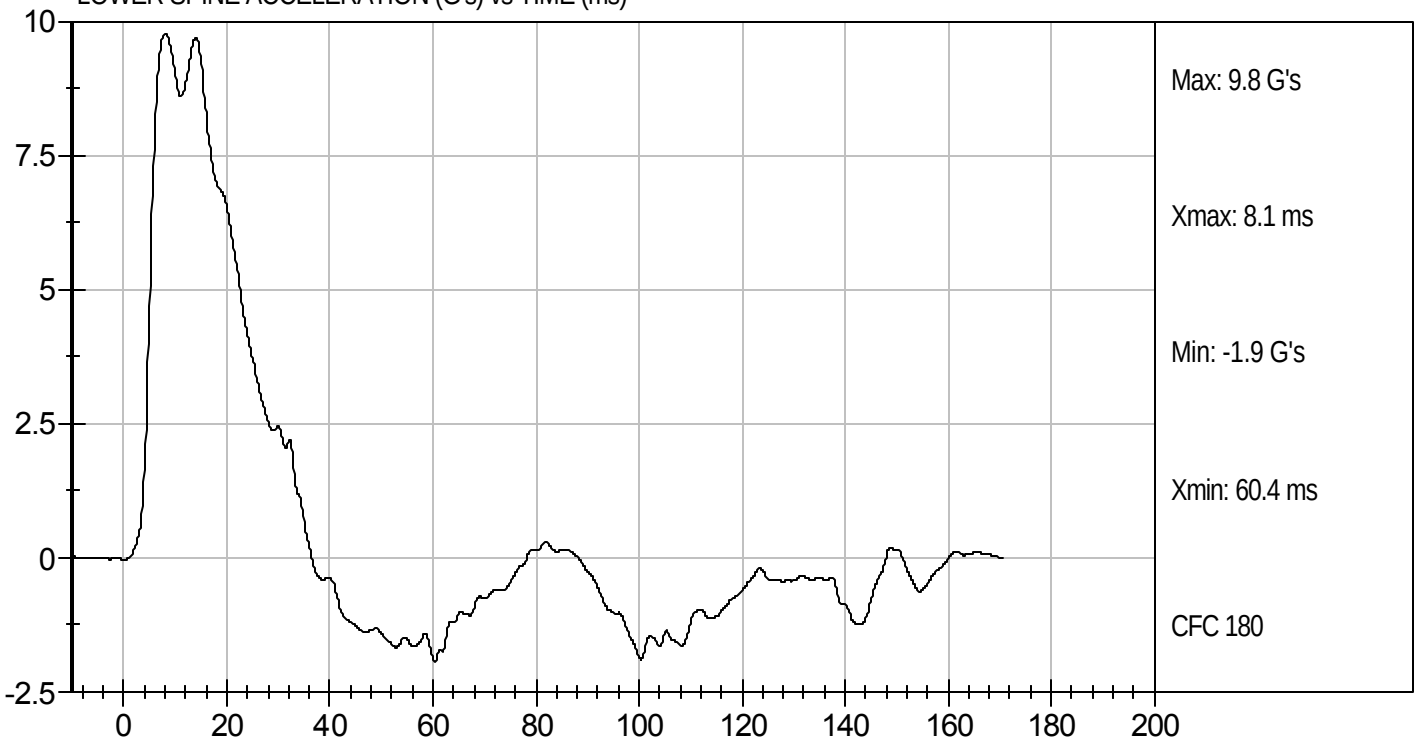
Test Desc: Abdomen Impact
Component ID: D122536

Test Date: 7/9/12
Velocity: 14.12 ft/s, 4.30 m/s

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



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



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test I.D:** D122537

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.1	Pass
Humidity	%	10 to 70	44	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	Pass
Peak Impactor Acceleration	G's	38 to 47	43	Pass
Pelvis Y Acceleration after 6 ms	G's	34 to 42	40	Pass
Peak Acetabulum Force	N	3600 to 4300	3916	Pass
		Overall Test Results		Pass

Jessica Gall
Laboratory Technician

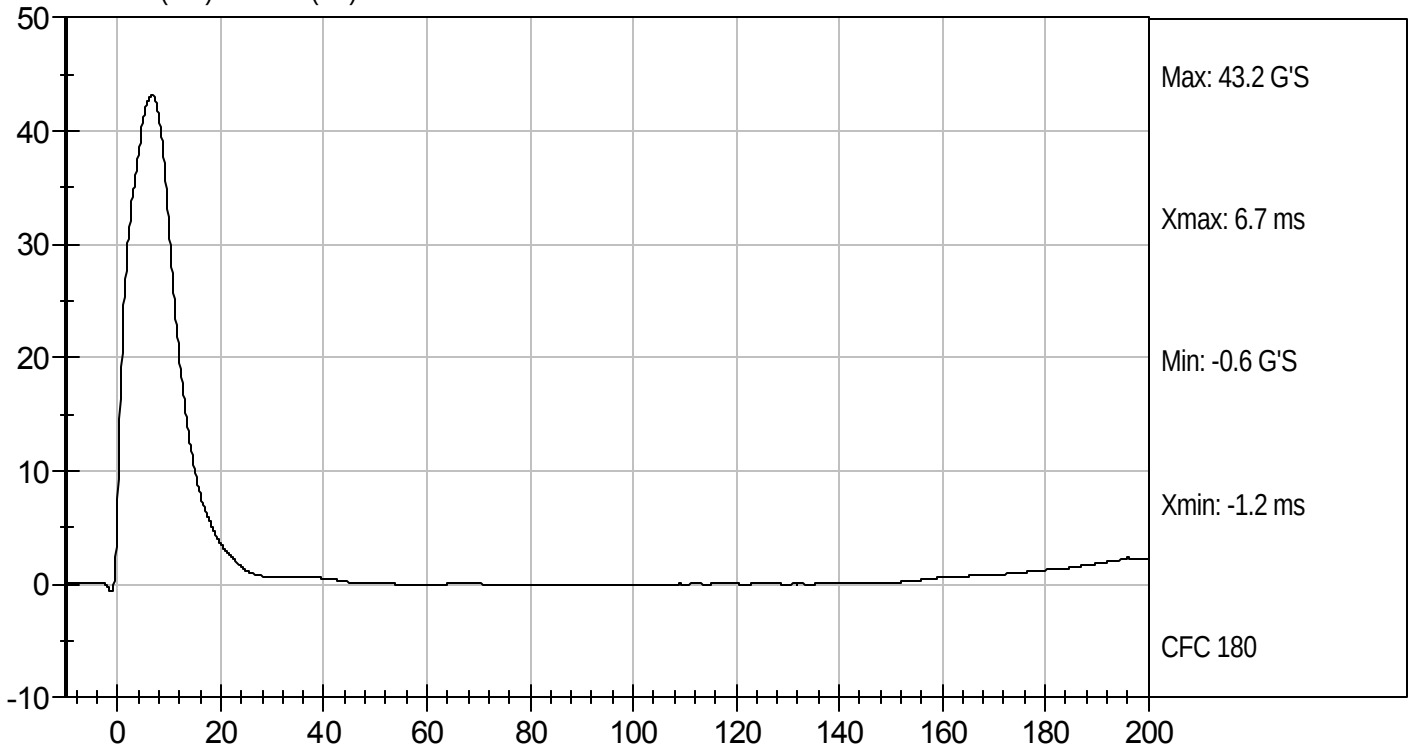
7/9/12
Test Date

David Winkelbauer
Approved By

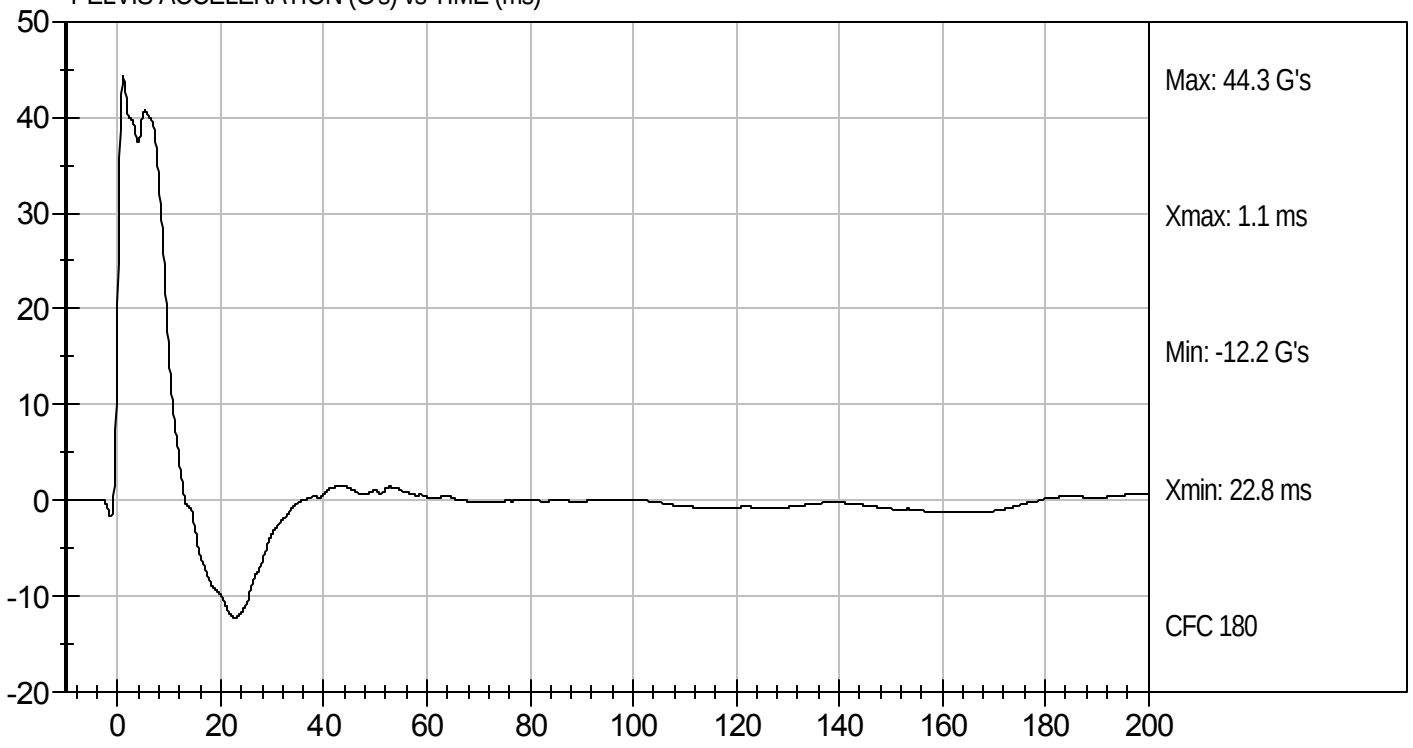
Test Desc: Pelvis Impact
Component ID: D122537

Test Date: 7/9/12
Velocity: 21.9 ft/s, 6.68 m/s

PROBE (G'S) vs TIME (ms)

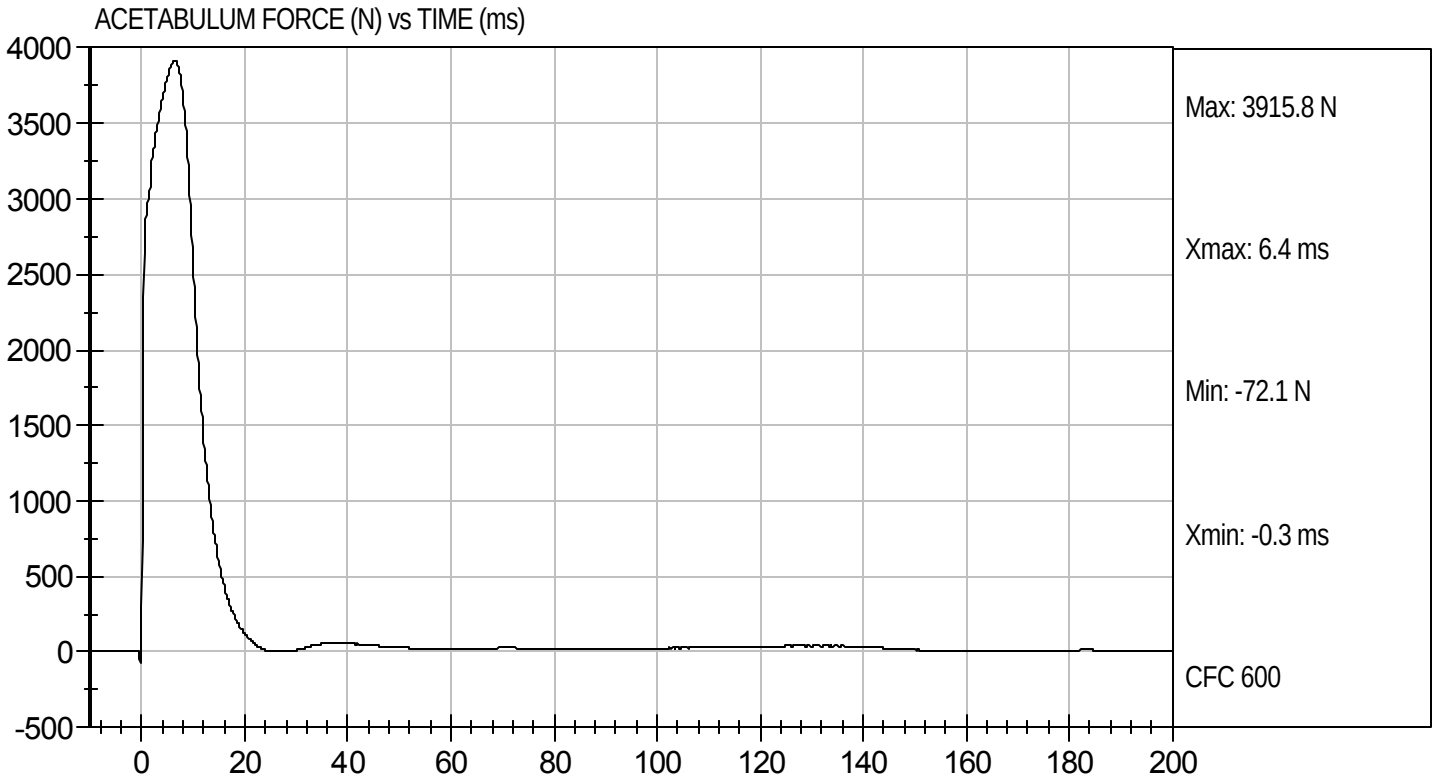


PELVIS ACCELERATION (G's) vs TIME (ms)



Test Desc: Pelvis Impact
Component ID: D122537

Test Date: 7/9/12
Velocity: 21.9 ft/s, 6.68 m/s



MGA RESEARCH CORPORATION

ILIAC IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test I.D:** D122538

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.1	Pass
Humidity	%	10 to 70	44	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Peak Impactor Acceleration	G's	36 to 45	39	Pass
Pelvis Y Acceleration	G's	28 to 39	33	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4695	Pass
		Overall Test Results		Pass

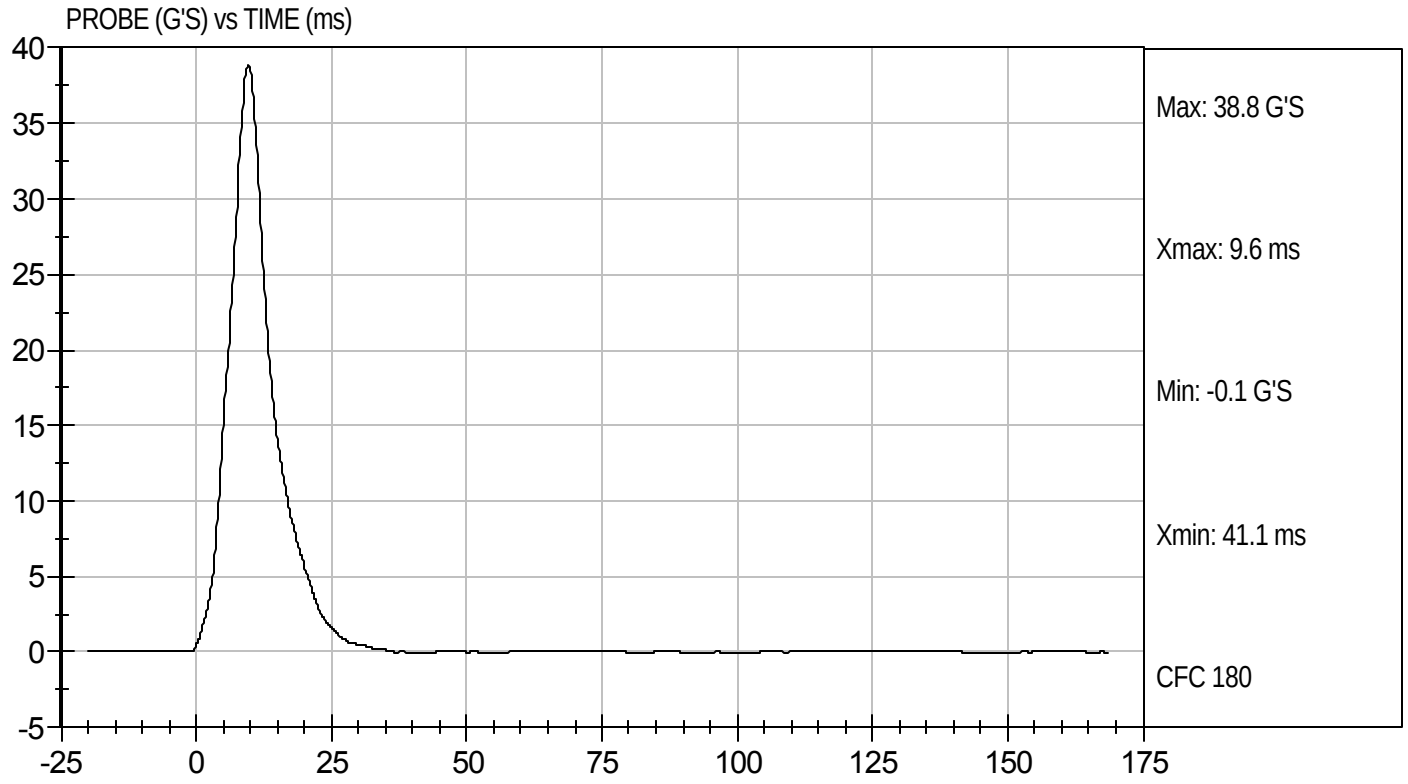
Jessica Hall
Laboratory Technician

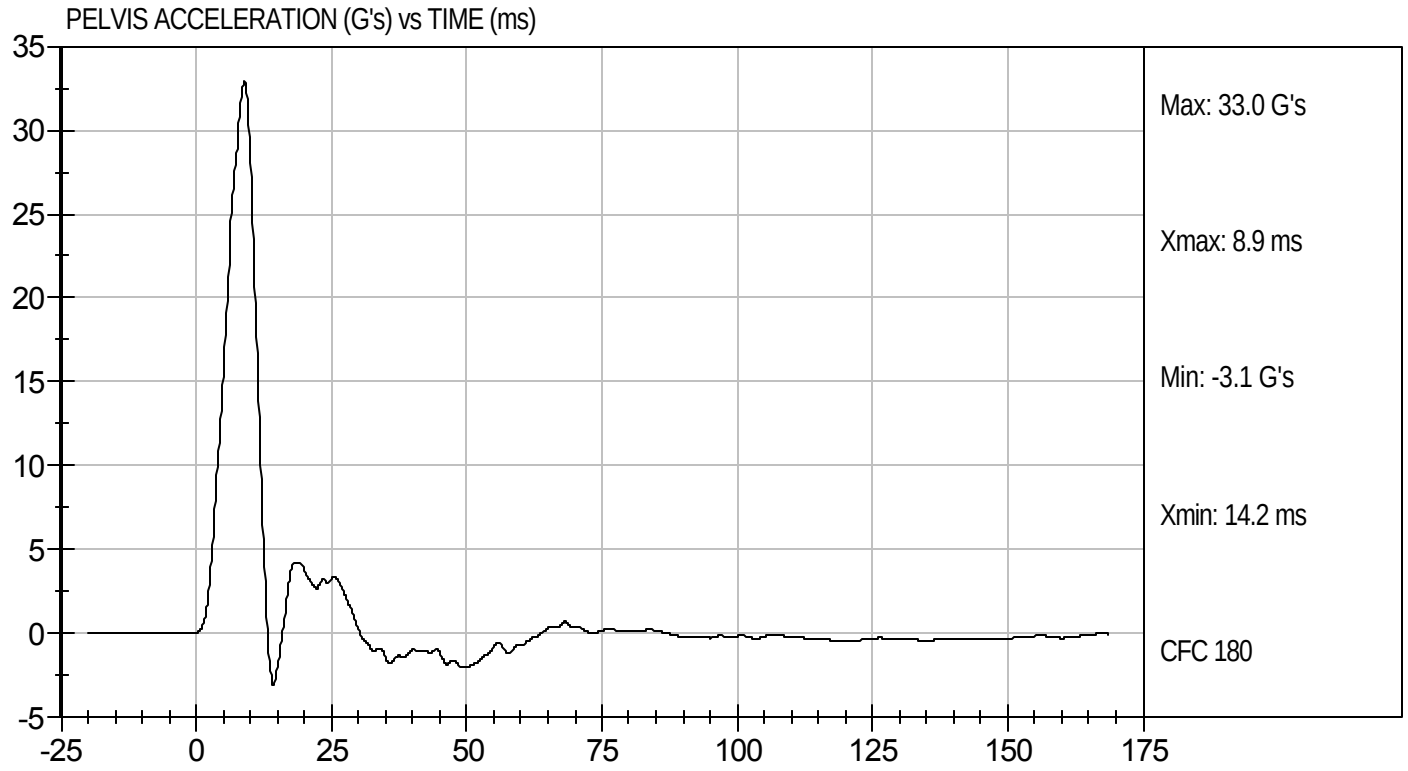
7/9/12
Test Date

David Winkelbauer
Approved By

Test Desc: Iliac Impact
Component ID: D122538

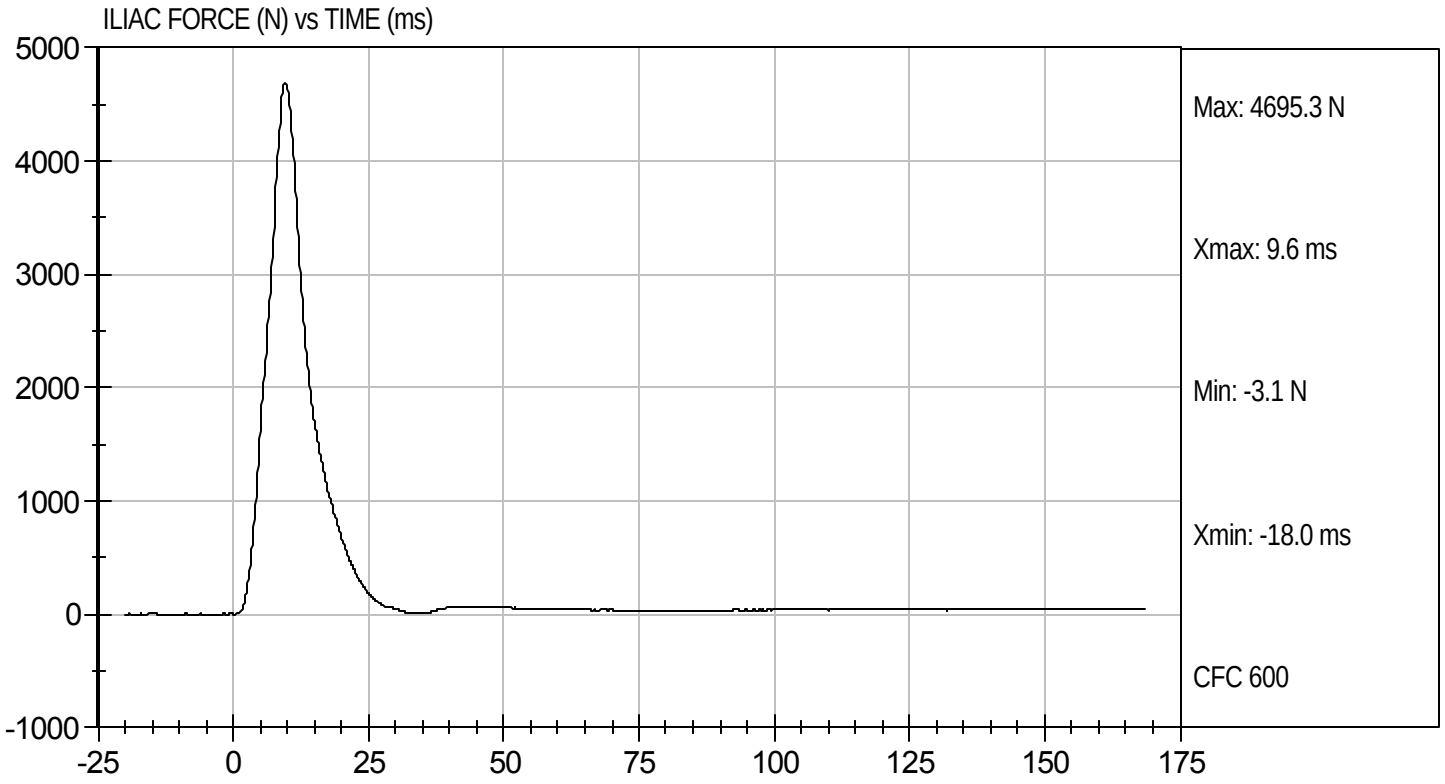
Test Date: 7/9/12
Velocity: 14.36 ft/s, 4.38 m/s



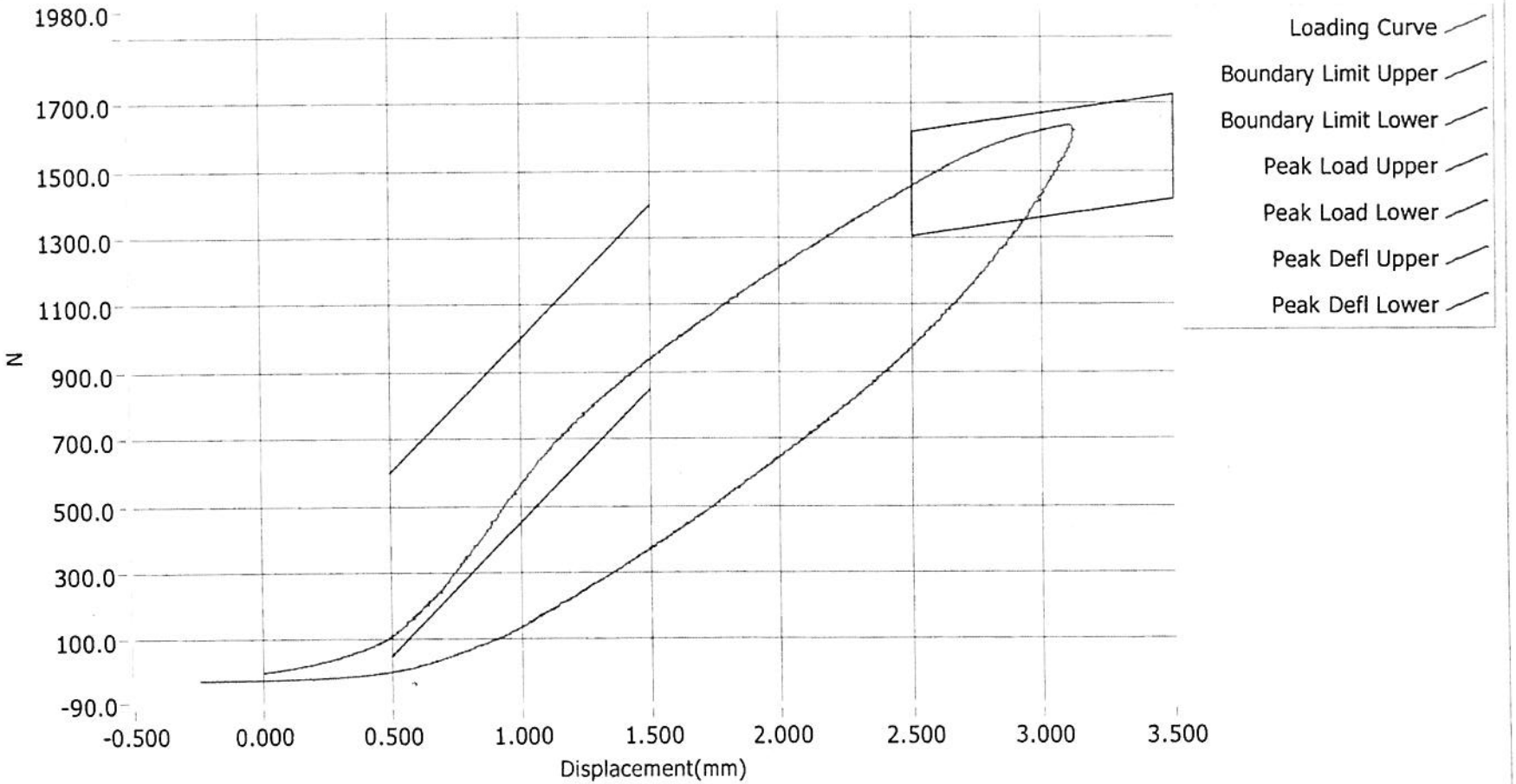


Test Desc: Iliac Impact
Component ID: D122538

Test Date: 7/9/12
Velocity: 14.36 ft/s, 4.38 m/s



Resultant Data - SIDIIs Plug Compression

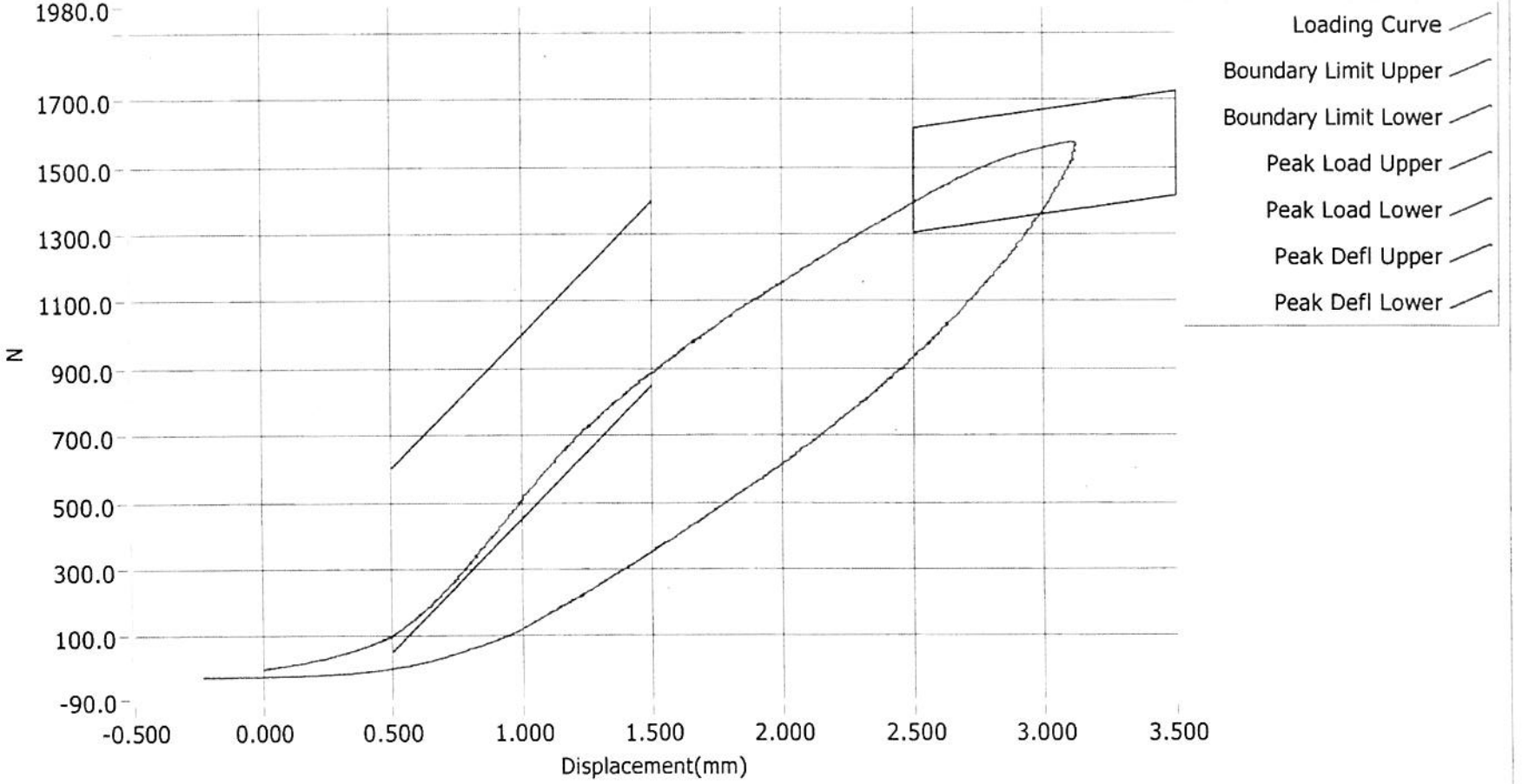


ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
	49061	12/7/2011	8:30 PM
Cert ID	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

Current Date : 12/7/2011 Current Time : 20:31:37

Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
	49109	12/7/2011	10:35 PM
Cert ID	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

Current Date : 12/7/2011 Current Time : 22:36:01

APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation (ES-2re)

			ES-2re S/N 032		
			Serial Number	Manufacturer	Calibration Date
Head Accelerometers		X	P66592	Endevco	04/23/12
		Y	P66593	Endevco	04/23/12
		Z	P66594	Endevco	04/23/12
Head Accelerometers		Xr	P66595	Endevco	04/23/12
		Yr	P66596	Endevco	04/23/12
		Zr	P66597	Endevco	04/23/12
Thorax Rib Displacement Potentiometers	Upper	Y	G176	Honeywell	04/25/12
	Middle	Y	G169	Honeywell	04/25/12
	Lower	Y	G164	Honeywell	04/25/12
Abdomen Load Cells	Forward	Y	ABG1532	Denton	01/03/12
	Middle	Y	ABG1534	Denton	01/03/12
	Rear	Y	ABG1535	Denton	01/03/12
Lower Spine Accelerometers (T12)		X	P73744	Endevco	04/23/12
		Y	P73747	Endevco	04/23/12
		Z	P73748	Endevco	04/23/12
Pubic Symphysis Load Cell		Y	PG461	Denton	01/03/12

Table 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N 296		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers			X	P66535	Endevco	04/12/12
			Y	P66536	Endevco	04/12/12
			Z	P66537	Endevco	04/12/12
Head Accelerometers			X	P66638	Endevco	04/12/12
			Y	P66640	Endevco	04/12/12
			Z	P66674	Endevco	04/12/12
Displacement Potentiometers	Thoracic Rib	Upper	Y	G012	Servo	04/27/12
		Middle	Y	G1163	FTSS	04/27/12
		Lower	Y	G1158	FTSS	04/27/12
	Abdominal Rib	Upper	Y	G1146	FTSS	04/27/12
		Lower	Y	G1126	FTSS	04/27/12
Lower Spine Accelerometers (T12)			X	P66668	Endevco	04/23/12
			Y	P66862	Endevco	04/23/12
			Z	P67590	Endevco	04/23/12
Acetabulum Load Cell			Y	ACG268	Denton	01/11/12
Iliac Wing Load Cell			Y	IWG282	Denton	12/23/11
Pelvis Plug (struck side)				49061	FTSS	12/07/11
Pelvis Plug (non-struck side)				49109	FTSS	12/07/11

Table 3 – Vehicle Instrumentation

		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	P63921	Endevco	03/14/12
Vehicle Center of Gravity	Y	P63920	Endevco	03/14/12
Vehicle Center of Gravity	Z	P63922	Endevco	03/14/12
Right Sill at Front Seat	X	P63256	Endevco	04/23/12
Right Sill at Front Seat	Y	P63257	Endevco	04/23/12
Right Sill at Front Seat	Z	P63258	Endevco	04/23/12
Right Sill at Rear Seat	X	P63534	Endevco	06/14/12
Right Sill at Rear Seat	Y	P63536	Endevco	06/14/12
Right Sill at Rear Seat	Z	P63535	Endevco	06/14/12
Left Sill at Front Door	Y	P47310	Endevco	03/13/12
Left Sill at Rear Door	Y	P48166	Endevco	06/12/12
Left A-Post Lower	Y	P55688	Endevco	06/12/12
Left A-Post Middle	Y	P59251	Endevco	06/12/12
Left B-Post Lower	Y	P63287	Endevco	01/13/12
Left B-Post Middle	Y	P48389	Endevco	03/13/12
Front Seat Track	Y	P38350	Endevco	01/12/12
Rear Seat Track or Structure	Y	P47083	Endevco	03/13/12
Right Rear Occ. Compartment	Y	P63533	Endevco	01/12/12
Engine Block	X	P59331	Endevco	04/23/12
Engine Block	Y	P59330	Endevco	04/23/12
Rear Floorpan Above Axle	X	P63555	Endevco	02/10/12
Rear Floorpan Above Axle	Y	P63556	Endevco	02/10/12
Rear Floorpan Above Axle	Z	P63554	Endevco	02/10/12

Table 4 – MDB Instrumentation

		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	P59379	Endevco	06/12/12
MDB Center of Gravity	Y	P59380	Endevco	06/12/12
MDB Center of Gravity	Z	P59381	Endevco	06/12/12
Left Frame at Rear Axle Centerline	X	P59279	Endevco	06/12/12
Left Frame at Rear Axle Centerline	Y	P59280	Endevco	06/12/12