REPORT NUMBER: SINCAP-MGA-2015-063

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

NISSAN MOTOR CO., LTD.
2015 Nissan Murano S 5-Dr SUV
NHTSA No.: O20155203

MGA RESEARCH CORPORATION
5000 Warren Road
Burlington, WI 53105

Test Date: March 30, 2015

Final Report Date: May 14, 2015

FINAL REPORT

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

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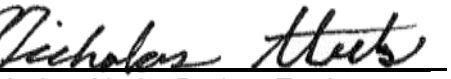
Prepared by: 
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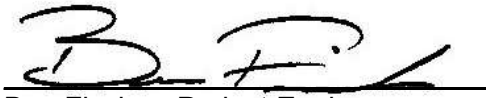
Approved by: 
Ben Fischer, Project Engineer

Approval Date: May 14, 2015

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

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 2015 Nissan Murano S 5-Dr SUV, NHTSA No.: O20155203		*5. Report Date* May 14, 2015 *6. Performing Organization Code* MGA
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15. Supplementary Notes

16. Abstract

A 55/28 km/h 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the 2015 Nissan Murano S 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 March 30, 2015.

The impact velocity of the Moving Deformable Barrier (MDB) was 62.4 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 22.1° C. The target vehicle post-test maximum crush was 278 mm at level 3. 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	97
Maximum Thorax Rib Deflection	mm	44	26
Total Abdominal Force	N	2500	722
Pubic Symphysis Force	N	6000	1573

		Passenger ATD (SID-IIs)	
Measurement Description	**Units**	**Threshold**	**Result**
Head Injury Criteria (HIC_{36})	N/A	1000	212
Resultant Lower Spine Acceleration	Gs	82	38
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	1466
Maximum Thoracic Rib Deflection	mm	38*	21
Maximum Abdomen Rib Deflection	mm	45*	22

*Proposed IARV

The doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.

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 Washington, DC 20590 e-mail: tis@nhtsa.dot.gov FAX: 202-493-2833	
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TABLE OF CONTENTS

Section		Page No.
1	Test Purpose and Procedure	1
2	Summary of Test Results	2
3	Occupant and Vehicle Information / Data Sheets	4

Data Sheet No.		Page No.
1	General Test and Vehicle Parameter Data	5
2	Seat, Seat Belt, Steering Wheel Adjustment and Fuel System Data	9
3	Dummy Longitudinal Clearance Dimensions	13
4	Dummy Lateral Clearance Dimensions	14
5	Camera and Instrumentation Data	15
6	Test Vehicle Accelerometer Locations	16
7	MDB Accelerometer Locations	17
8	Post-Test Observations	18
9	MDB Summary of Results	20
10	Test Vehicle Profile Measurements	21
11	Test Vehicle Exterior Crush Measurements	22
12	MDB Exterior Static Crush Measurements	25
13	Vehicle and MDB Damage Profile Distances	26
14	FMVSS No. 301 Static Rollover Results	27
15	Dummy/Vehicle Temperature Stabilization Data	28

Appendix		
A	Photographs	A
B	Dummy Response Data	B
C	Dummy Calibration and Performance Verification Data	C
D	Test Equipment and Instrumentation Calibration Data	D

SECTION 1
TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test is part of the MY 2015 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-14-D-00353. The purpose of this test is to generate comparative side impact performance in a 2015 Nissan Murano S 5-Dr SUV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Laboratory Test Procedure dated September 2013.

SECTION 2
SUMMARY OF TEST RESULTS

A 2015 Nissan Murano S 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 62.4 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 March 30, 2015. Pre-test and post-test photographs of the test vehicle, the MDB, and the dummies (ES-2re and SID-IIs) are included in this report.

Dummies were placed in the driver and left rear designated seating positions according to instructions specified in the OCWS NCAP Side Laboratory Test Procedure dated September 2013. The side impact event was documented by eleven (11) cameras. Camera locations are included in this report.

The dummies were instrumented in the following manner:

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

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

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

Dummy Injury readings were recorded as follows:

DUMMY INJURY VALUES

	Driver ATD (ES-2re)		
Measurement Description	**Units**	**Threshold**	**Result**
Head Injury Criteria (HIC_{36})	N/A	1000	97
Maximum Thorax Rib Deflection	mm	44	26
Total Abdominal Force	N	2500	722
Pubic Symphysis Force	N	6000	1573

	Passenger ATD (SID-IIs)		
Measurement Description	**Units**	**Threshold**	**Result**
Head Injury Criteria (HIC_{36})	N/A	1000	212
Resultant Lower Spine Acceleration	Gs	82	38
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	1466
Maximum Thoracic Rib Deflection	mm	38*	21
Maximum Abdomen Rib Deflection	mm	45*	22

*Proposed IARV

Supplemental restraint information is given below:

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Driver		Struck Side Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	Yes	No		
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	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

Left Mid B-Post Y has no valid data after 4 ms.

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

SECTION 3
OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 Nissan Murano S 5-Dr SUV
Test Program: NCAP Side MDB Impact Test
NHTSA No. O20155203
Test Date: 3/30/2015

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	O20155203
Model Year	2015
Make	Nissan
Model	Murano S
Body Style	SUV
VIN	5N1AZ2MG4FN203705
Body Color	Cayenne Red
Odometer Reading (km/mi)	105 / 65
Engine Displacement (L)	3.5
Type/No. Cylinders	6
Engine Placement	Lateral
Transmission Type	Automatic
Transmission Speeds	CVT
Overdrive	Yes
Final Drive	Front
Roof Rack	No
Sunroof/T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes

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

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Nissan Motor Co., LTD.
Date of Manufacture	12/14
Vehicle Type	MPV

GVWR (kg)	2318
GAWR Front (kg)	1272
GAWR Rear (kg)	1300

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3		5	
Capacity Weight (VCW) (kg)				408	(A)
DSC x 68.04 kg				340	(B)
Rated Cargo and Luggage Weight (RCLW)				68	(A-B)

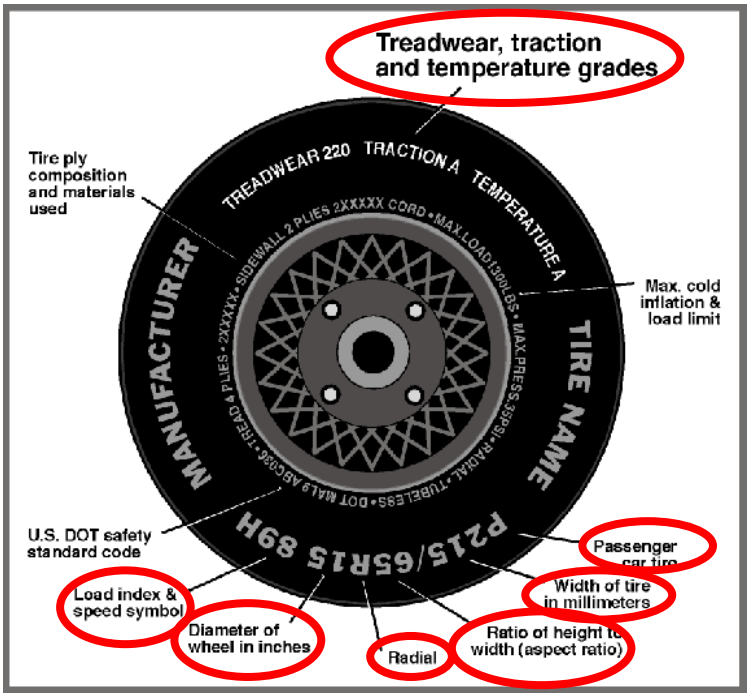
VEHICLE SEAT TYPE

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

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

Test Vehicle: 2015 Nissan Murano S 5-Dr SUV NHTSA No. O20155203
Test Program: NCAP Side MDB Impact Test Test Date: 3/30/2015

VEHICLE TIRE INFORMATION



Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	230	230
Recommended Tire Size	235/65R18	235/65R18
Tire Size on Vehicle	235/65R18	235/65R18
Tire Manufacturer	Continental	Continental
Tire Model	Cross Contact	Cross Contact
Treadwear	480	480
Traction	A	A
Temperature Grade	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel, 1 Polyamide	2 Polyester, 2 Steel, 1 Polyamide
Load Index/Speed Symbol	106T	106T
Tire Material	Rubber	Rubber
DOT Safety Code Left	A3LM WBTN 4614	A3LM WBTN 4614
DOT Safety Code Right	A3LM WBTN 4614	A3LM WBTN 4614

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

Test Vehicle: 2015 Nissan Murano S 5-Dr SUV NHTSA No. O20155203
Test Program: NCAP Side MDB Impact Test Test Date: 3/30/2015

TEST PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	280	273	280	280
Tire Placard	kPa	230	230	230	230
Owner's	kPa	230	230	230	230
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	200	200	200	200

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	515.5	350.0		558.5	434.5		549.5	444.5	
Right	kg	515.5	340.0		517.5	401.5		519.0	405.0	
Ratio	%	59.9	40.1		56.3	43.7		55.7	44.3	
Totals	kg	1031.0	690.0	1721.0	1076.0	836.0	1912.0	1068.5	849.5	1918.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1721.0	(A)
Sum of Actual Weight of 2 P572 ATDs Used	kg	129	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	68	(C)
Calculated Test Vehicle Target Weight (TVTW)	kg	1918.0	(A+B+C)

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

TEST VEHICLE ATTITUDES AND CG

	Units	Fully Loaded	As Tested	Meets Requirement***
Left Front	mm	830	823	Yes
Right Front	mm	835	837	Yes
Right Rear	mm	788	792	Yes
Left Rear	mm	798	803	Yes
Vehicle CG (Aft of Front Axle)	mm	1250	1234	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	5	32	

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

Test height adjustable suspension setting, if applicable:	Not Applicable

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

Test Vehicle: 2015 Nissan Murano S 5-Dr SUV NHTSA No. O20155203
Test Program: NCAP Side MDB Impact Test Test Date: 3/30/2015

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Weight of Ballast, if any	50.0
None	0.0

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

Test Vehicle: 2015 Nissan Murano S 5-Dr SUV NHTSA No. O20155203
Test Program: NCAP Side MDB Impact Test Test Date: 3/30/2015

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	16.4	12.4	14.4
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	14.4	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Front Passenger Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Front Center Seat			Max			
			Mid			
			Min			
Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed

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

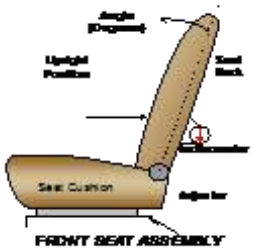
Test Vehicle: 2015 Nissan Murano S 5-Dr SUV NHTSA No. O20155203
Test Program: NCAP Side MDB Impact Test Test Date: 3/30/2015

SEAT FORE/AFT POSITIONS

Seat	Total Fore/Aft Travel		Test Position from Forward-most Position	
	mm	Detents	mm	Detent
Driver Seat	240	25 (1st as 1)	120	12th (1st as 0)
Front Passenger Seat	240	25 (1st as 1)	120	12th (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 adjusted following Appendix C, "Positioning Dummies in the Test Vehicle" in the NCAP Laboratory Test Procedure dated September 2013. The rear center and non-struck side rear outboard seat backs are positioned to match the struck side rear seat back.



Seat	Total Seat Back Angle Range		Test Position from Vertical	
	Degrees	Detents	Degrees	Detent
Driver Seat w/Seated Dummy	70.0	36 (1st as 1)	-0.7	8th (1st as 0)
Front Passenger Seat	68.2	34 (1st as 1)	-1.0	7th (1st as 0)
Front Center Seat				
Struck Side Rear Seat	23.8	13 (1st as 1)	-3.4	0th (1st as 0)
Non-Struck Side Rear Seat	23.8	13 (1st as 1)	-3.4	0th (1st as 0)
Rear Center Seat	23.8	13 (1st as 1)	-3.4	0th (1st as 0)

Seat back angles measured on headrest post.

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

Test Vehicle: 2015 Nissan Murano S 5-Dr SUV NHTSA No. O20155203
Test Program: NCAP Side MDB Impact Test Test Date: 3/30/2015

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)	0th (uppermost as 0)
Rear Seat	Fixed	Not Applicable

HEAD RESTRAINT ADJUSTMENT

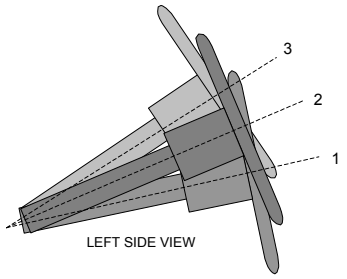
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

	Total # of Positions	Placed in Position #
Driver Seat	6	Highest
Rear Seat	4	Lowest

STEERING COLUMN ADJUSTMENT

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

	Degrees	Fore/Aft Position (mm)
Lowermost, Position 1	66.8	178
Geometric Center, Position 2	63.9	198
Uppermost, Position 3	61.0	218
Telescoping Steering Wheel Travel		40
Test Position	63.9	198

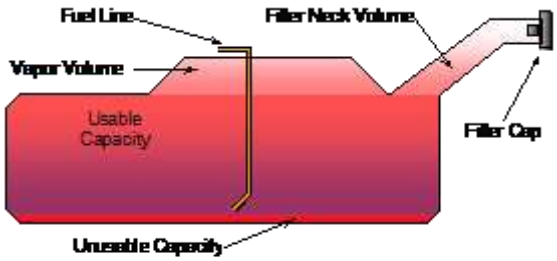


STEERING COLUMN ASSEMBLY

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. Will operate for 1.0s after the ignition is switched to "ON", while the engine is running, or for 1.5s after the engine stops running. 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: 2015 Nissan Murano S 5-Dr SUV NHTSA No. O20155203
Test Program: NCAP Side MDB Impact Test Test Date: 3/30/2015

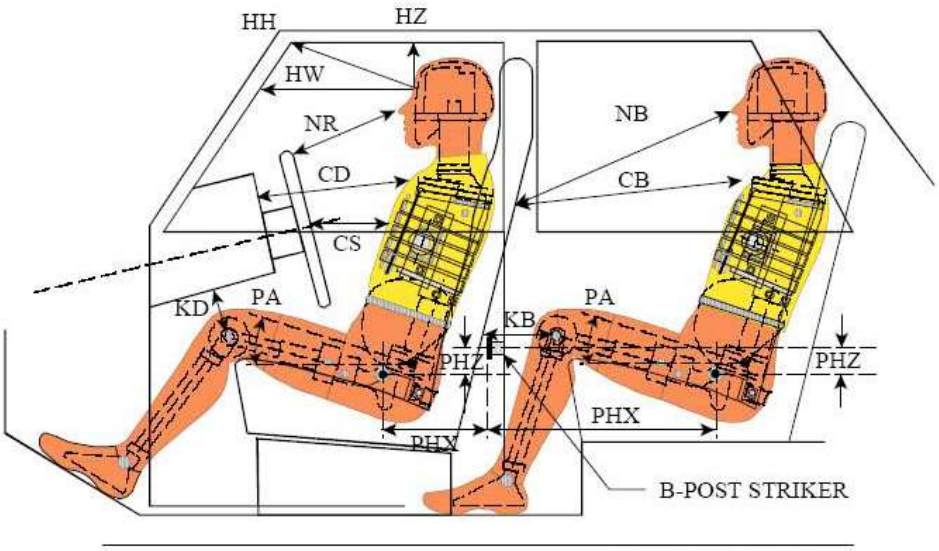
FUEL TANK CAPACITY DATA

	Liters
Usable Capacity of "Standard" Tank (see Form No. 1)	71.9
Usable Capacity of "Optional" Tank (see Form No. 1)	
Usable Capacity of Standard Tank as Specified in Owner's Manual	71.9
Usable Capacity of Optional Tank as Specified in Owner's Manual	
93% of Usable Capacity	66.9
Actual Amount of Solvent Used	67.0
1/3 of Usable Capacity	24.0

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

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2015 Nissan Murano S 5-Dr SUV NHTSA No. O20155203
Test Program: NCAP Side MDB Impact Test Test Date: 3/30/2015



LEFT SIDE VIEW

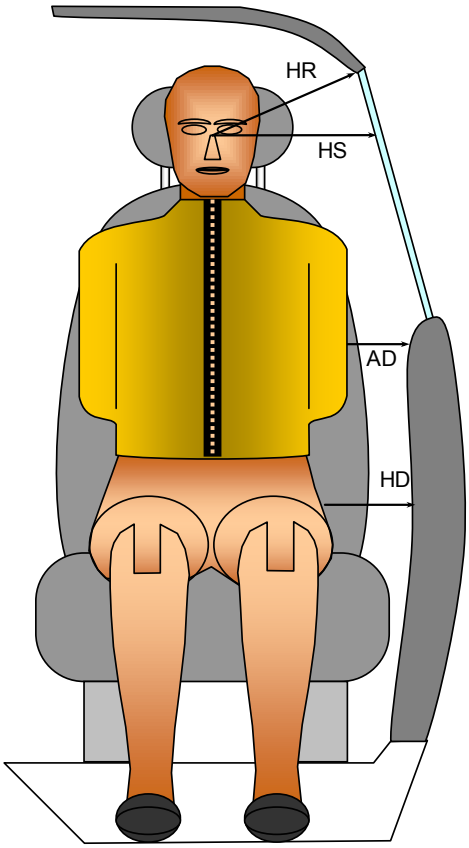
NOTE: 2-DOOR VEHICLE SHOWN. REAR DUMMY PHX & PHZ MEASUREMENTS FOR A 4-DOOR VEHICLE WOULD USE THE C-POST STRIKER AS A REFERENCE POINT

DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length (mm)	Angle(°)	Length (mm)	Angle(°)
HH		Head to Header	363	12.5		
HW		Head to Windshield	651			
HZ	HZ	Head to Roof Liner	160		312	
NR	NB	Nose to Rim/Seat Back	441	19.1	563	8
CD	CB	Chest to Dashboard/Seat Back	589	9.0	577	4.3
CS		Chest to Steering Wheel	379	8.6		
KDL	KBL	Left Knee to Dash/Seat Back	130	37.2	342	20.7
KDR	KBR	Right Knee to Dash/Seat Back	104	40.5	342	23.4
PAX	PAX	Pelvic Tilt Angle X		20.3		22.3
	PAY	Pelvic Tilt Angle Y		-0.1		-0.2
PHX	PHX	Hip Point to Striker (X-Axis)	251		257	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	78		262	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2015 Nissan Murano S 5-Dr SUV NHTSA No. O20155203
Test Program: NCAP Side MDB Impact Test Test Date: 3/30/2015



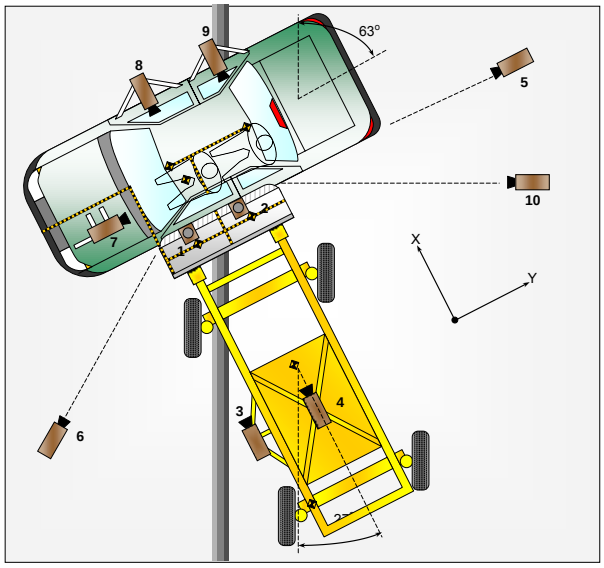
FRONT VIEW OF DUMMY

DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver	Passenger
HR	Head to Side Header	mm	196	282
HS	Head to Side Window	mm	333	395
AD	Arm to Door	mm	130	185
HD	Hip Point to Door	mm	149	180

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2015 Nissan Murano S 5-Dr SUV NHTSA No. O20155203
Test Program: NCAP Side MDB Impact Test Test Date: 3/30/2015



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X*	Y*	Z*		
1	Overhead Overall	110	780	-5040	14	1000
2	Overhead Close-Up	100	550	-5090	20	1000
3	Left Impact Point (MDB)				50	1000
4	Side Overall (MDB)				16	1000
5	Rear	60	5500	-1190	24	1000
6	Left Front	-1350	-4980	-1170	24	1000
7	Driver Front (OB)				16	1000
8	Driver Side (OB)				8	1000
9	Passenger Side (OB)				8	1000
10	Real Time Left Rear					30
11	Real Time Inrun					30

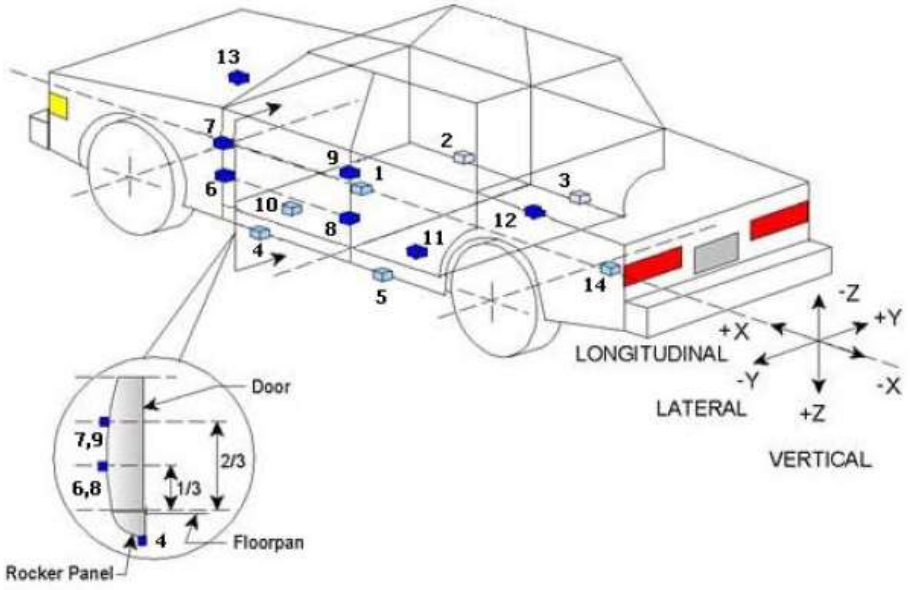
Reference: Impact Point projected to Ground; +X = To Front of MDB, + Y = To Right of MDB, +Z = Down
* All measurements accurate to ± 6 mm
Explain why camera(s) did not operate as intended: None

INSTRUMENTATION

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

DATA SHEET NO. 6
TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2015 Nissan Murano S 5-Dr SUV NHTSA No. O20155203
Test Program: NCAP Side MDB Impact Test Test Date: 3/30/2015



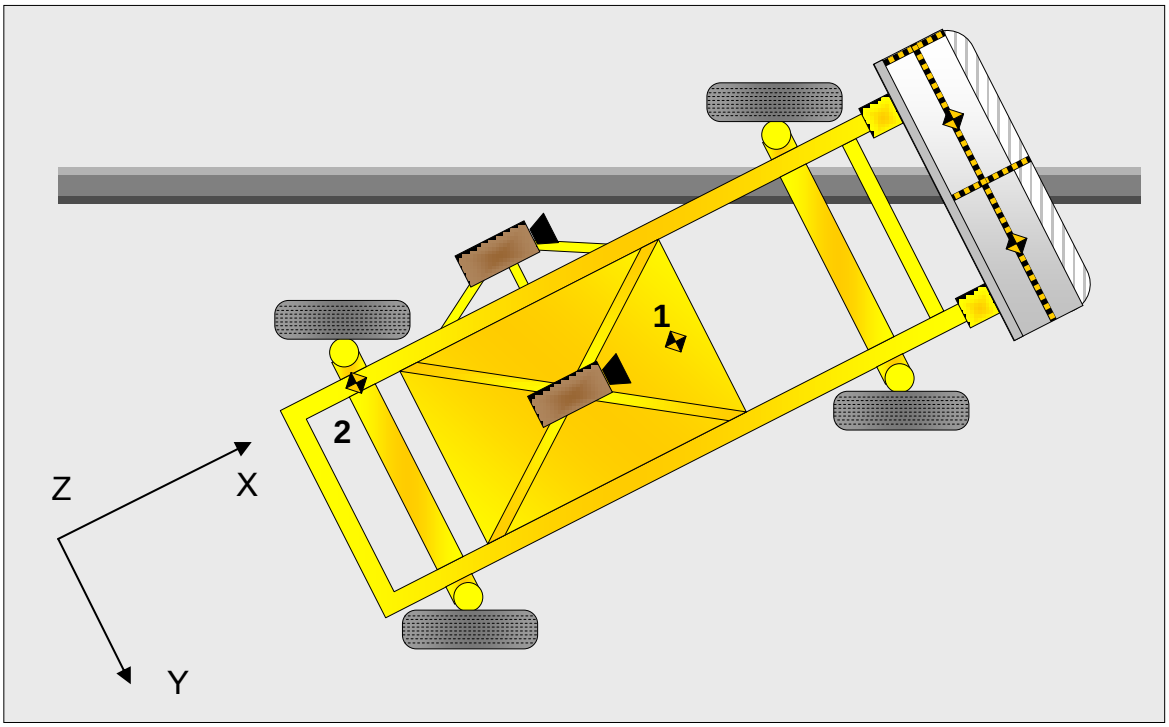
TEST VEHICLE ACCELEROMETER LOCATIONS

Accelerometer Location				
No.	ID	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2603	122	-320
2	Right Sill at Front Seat	2218	760	-310
3	Right Sill at Rear Seat	1468	762	-305
4	Left Sill at Front Door	2695	-760	-305
5	Left Sill at Rear Door	1680	-762	-300
6	Left Lower A-Post	3284	-861	-672
7	Left Middle A-Post	3262	-852	-898
8	Left Lower B-Post	2131	-757	-694
9	Left Middle B-Post	2123	-746	-903
10	Front Seat Track	2430	-722	-349
11	Rear Seat Structure	1815	-361	-408
12	Rt. Rear Occ. Compartment	1923	298	-372
13	Engine Block	4173	65	-853
14	Rear Above Axle	1121	115	-633

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

DATA SHEET NO. 7
MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2015 Nissan Murano S 5-Dr SUV NHTSA No. O20155203
Test Program: NCAP Side MDB Impact Test Test Date: 3/30/2015



MDB ACCELEROMETER LOCATIONS

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

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

DATA SHEET NO. 8
POST-TEST OBSERVATIONS

Test Vehicle: 2015 Nissan Murano S 5-Dr SUV NHTSA No. O20155203
Test Program: NCAP Side MDB Impact Test Test Date: 3/30/2015

TEST DUMMY INFORMATION AND CONTACT POINTS

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

POST-TEST DOOR PERFORMANCE

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

POST-TEST SEAT PERFORMANCE

	Struck Side		Non-Struck Side	
Description	Front	Rear	Front	Rear
Seat Movement Along Seat Track	No	Fixed	No	Fixed
Seat Disengagement from Floor Pan	No	Fixed	No	Fixed
Seat Back Movement from Initial Position	No	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: 2015 Nissan Murano S 5-Dr SUV NHTSA No. O20155203
Test Program: NCAP Side MDB Impact Test Test Date: 3/30/2015

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Driver		Struck Side Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	Yes	No		
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	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		2822
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		471
Actual Impact Point (Aft of Front Axle)	mm		462
Horizontal Offset (+forward / -rearward)	mm	+/- 50 of intended impact point	9
Vertical Offset (+down / -up)	mm	+/- 20 of intended impact point	-3

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2015 Nissan Murano S 5-Dr SUV NHTSA No. O20155203
Test Program: NCAP Side MDB Impact Test Test Date: 3/30/2015

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1251
Overall Length Including Honeycomb Face	4115
Wheelbase of Framework Carriage	2588
CG Location aft of Front Axle	1137

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	387.2	299.7	
Right	kg	375.5	298.0	
Ratio	%	56.1	43.9	
Totals	kg	762.7	597.7	1360.4

SPEED AND ANGLE AT IMPACT DATA

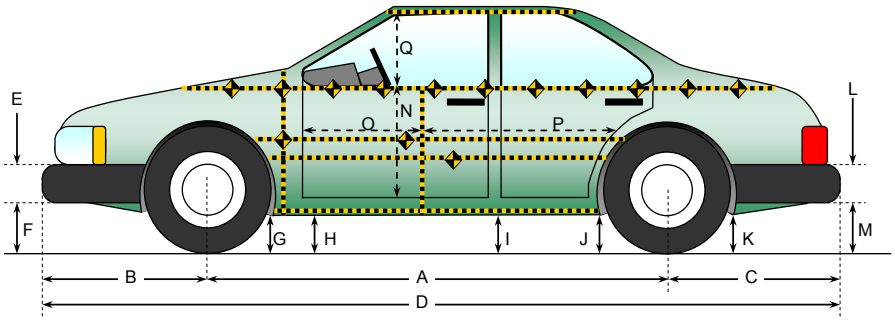
Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.35
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.28
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	89.8
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	63.0
MDB Crabbed Angle to MDB Forward Line of Motion	degrees	26 to 28	27.0

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	700	Left	212
B	Top of Bumper	533	800	Left	124
C	Mid-Level	686	800	Left	121
D	Top of Stack	813	800	Left	162

DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2015 Nissan Murano S 5-Dr SUV NHTSA No. O20155203
Test Program: NCAP Side MDB Impact Test Test Date: 3/30/2015



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

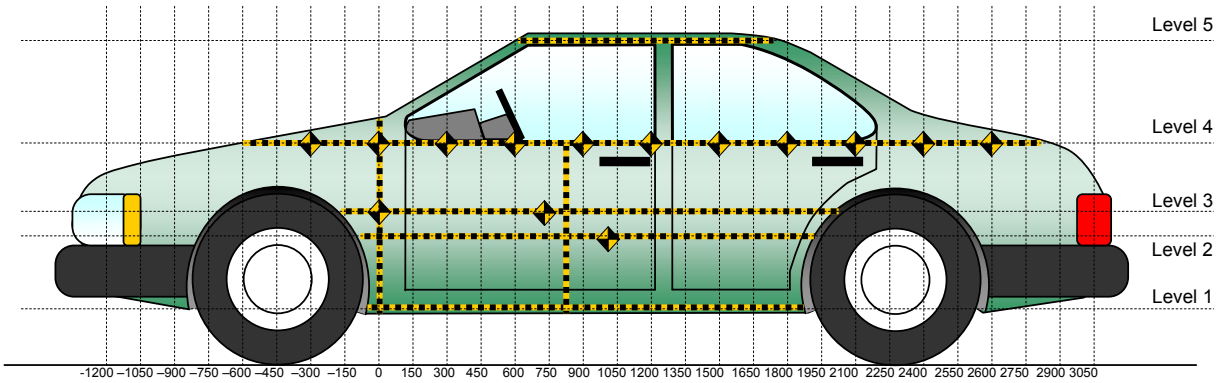
LEFT SIDE VIEW

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2822	2810	12
B	Front Axle to FSOV	1044	1053	-9
C	Rear Axle to RSOV	1018	1018	0
D	Total Length at Centerline	4884	4881	3
E	Front Bumper Thickness	130	130	0
F	Front Bumper Bottom to Ground	208	200	8
G	Sill Height at Front Wheel Well	291	296	-5
H	Sill Height at Front Door Leading Edge	290	293	-3
I	Sill Height at B Pillar	283	296	-13
J1	Sill Height at Rear Wheel Well	274	288	-14
J2	Pinch Weld Height at Rear Wheel Well	274	283	-9
K	Sill Height Aft of Rear Wheel Well	306	293	13
L	Rear Bumper Thickness	120	120	0
M	Rear Bumper Bottom to Ground	312	331	-19
N	Sill Height to Window Bottom Sill	882	762	120
O	Front Door Leading Edge to Impact CL	822	744	78
P	Rear Door Trailing Edge to Impact CL	1178	1094	84
Q	Front Window Opening	442	433	9
R	Right Side Length	3974	3978	-4
S	Left Side Length	3974	3959	15
T	Vehicle Width at B Post	1916	1686	230

DATA SHEET NO. 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2015 Nissan Murano S 5-Dr SUV NHTSA No. O20155203
Test Program: NCAP Side MDB Impact Test Test Date: 3/30/2015



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	423	182	1650
2	Mid Door	690	276	1500
3	Occupant Hip Point	714	278	1500
4	Window Sill	1081	98	1800
5	Window Top	1580	10	1200

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

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

Test Vehicle: 2015 Nissan Murano S 5-Dr SUV NHTSA No. O20155203
Test Program: NCAP Side MDB Impact Test Test Date: 3/30/2015

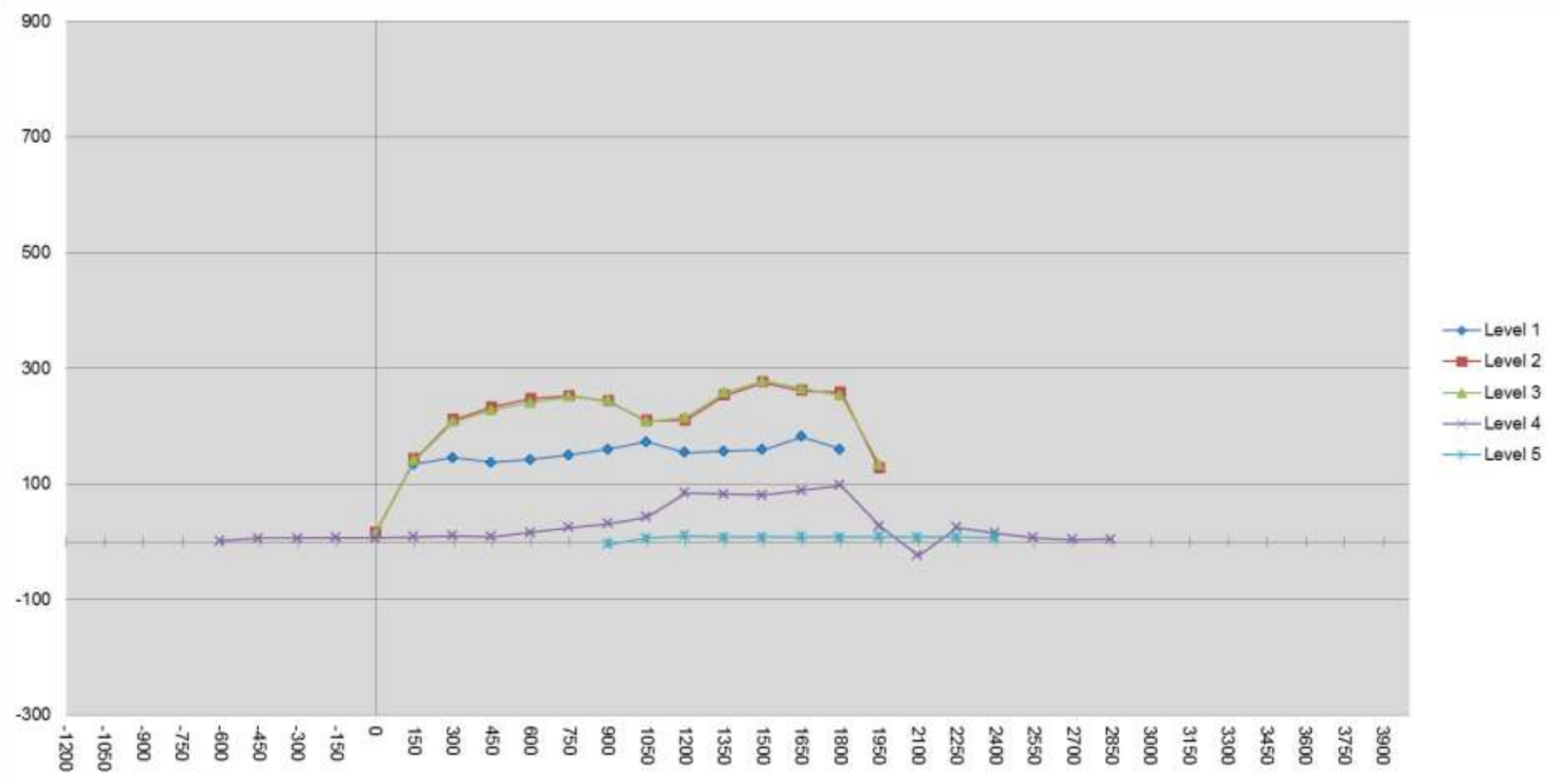
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-600				287					288					1	
-450				256					262					6	
-300				244					250					6	
-150				241					248					7	
0		145	145	239			161	159	245			16	14	6	
150	174	150	148	238		308	293	289	247		134	143	141	9	
300	188	154	153	235		333	365	361	245		145	211	208	10	
450	199	155	155	228		336	388	383	237		137	233	228	9	
600	200	153	154	218		342	400	395	234		142	247	241	16	
750	197	150	151	209		347	402	402	234		150	252	251	25	
900	195	148	147	204	468	355	391	392	235	464	160	243	245	31	-4
1050	193	146	145	198	463	366	355	353	241	469	173	209	208	43	6
1200	190	145	143	193	460	344	355	358	278	470	154	210	215	85	10
1350	188	145	142	190	462	345	398	400	272	470	157	253	258	82	8
1500	183	145	142	188	463	342	421	420	269	471	159	276	278	81	8
1650	192	145	142	190	463	374	406	407	279	472	182	261	265	89	9
1800	175	143	142	197	466	335	402	395	295	474	160	259	253	98	8
1950		147	145	206	469		274	279	233	478		127	134	27	9
2100				212	474				188	482				-24	8
2250				218	479				243	487				25	8
2400				225	488				240	495				15	7
2550				233					240					7	
2700				247					251					4	
2850				263					268					5	

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

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

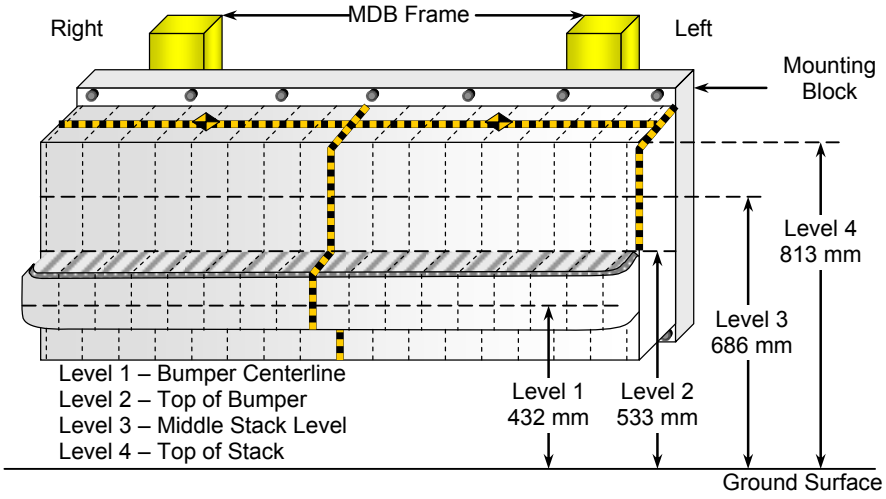
Test Vehicle: 2015 Nissan Murano S 5-Dr SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No. O20155203
Test Date: 3/30/2015



DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2015 Nissan Murano S 5-Dr SUV NHTSA No. O20155203
Test Program: NCAP Side MDB Impact Test Test Date: 3/30/2015



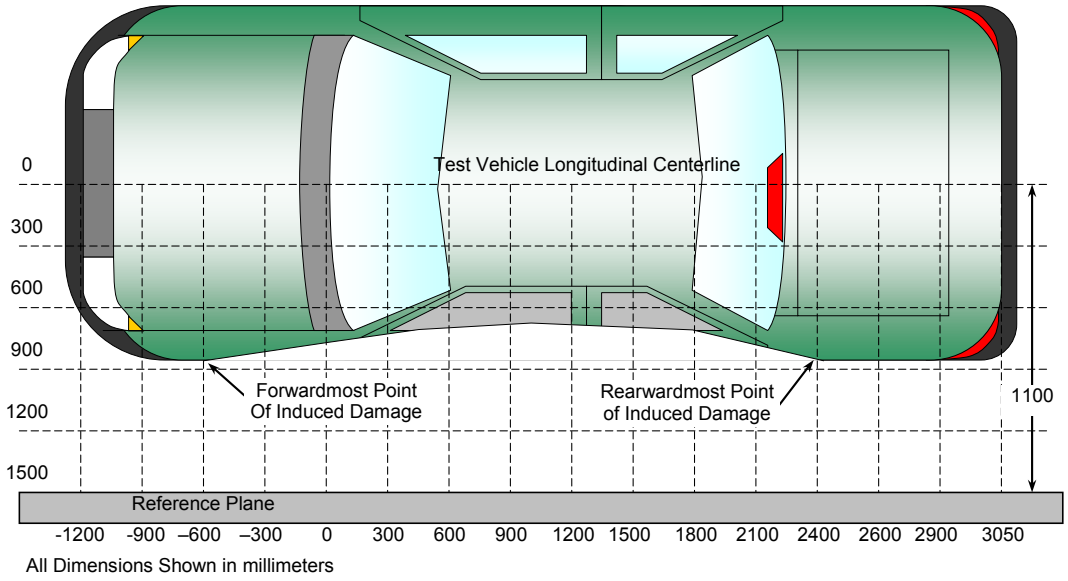
FRONT VIEW

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	44	30	29	40	65	84	79	65	70	78	69	80	86	96	122	162
3	28	30	25	27	36	68	86	91	60	40	34	32	39	48	63	81	121
2	83	76	74	66	65	73	80	73	73	81	90	101	105	110	113	116	124
1	172	164	167	170	172	176	178	181	183	185	189	192	197	202	204	212	209

DATA SHEET NO. 13
VEHICLE AND MDB DAMAGE PROFILE DISTANCES

Test Vehicle: 2015 Nissan Murano S 5-Dr SUV NHTSA No. O20155203
Test Program: NCAP Side MDB Impact Test Test Date: 3/30/2015



TOP VIEW

VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance from Impact Point (mm)	Level	Pre-Test (mm)	Post-Test (mm)	Max. Static Crush (mm)
1	2000	3	146	243	97
2	1600	3	142	410	268
3	1200	3	143	358	215
4	800	3	151	402	251
5	400	3	155	380	225
6	0	3	153	159	6

MDB DAMAGE PROFILE DISTANCES

DPD	Distance from Center of MDB	Level	Post-Test (mm)
1	800 mm right of center	1	172
2	480 mm right of center	1	170
3	160 mm right of center	1	178
4	160 mm left of center	1	189
5	480 mm left of center	1	202
6	800 mm left of center	1	209

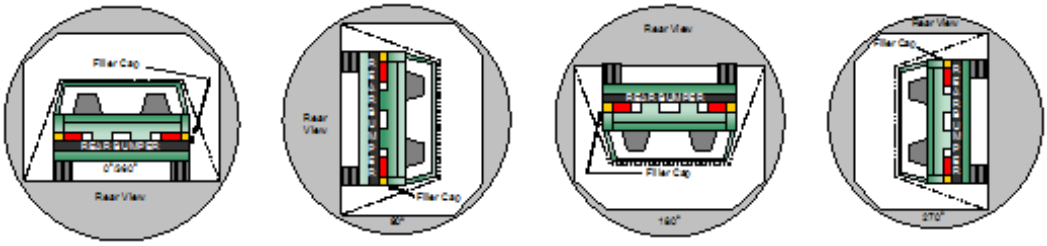
DATA SHEET NO. 14
FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2015 Nissan Murano S 5-Dr SUV NHTSA No. O20155203
Test Program: NCAP Side MDB Impact Test Test Date: 3/30/2015

Test Time: 2:53 p.m. Temperature: 22.1° 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°	108	300	408
90° to 180°	110	300	410
180° to 270°	106	300	406
270° to 360°	109	300	409

FMVSS 301 ROLLOVER SPILLAGE TABLE (units in ounces)

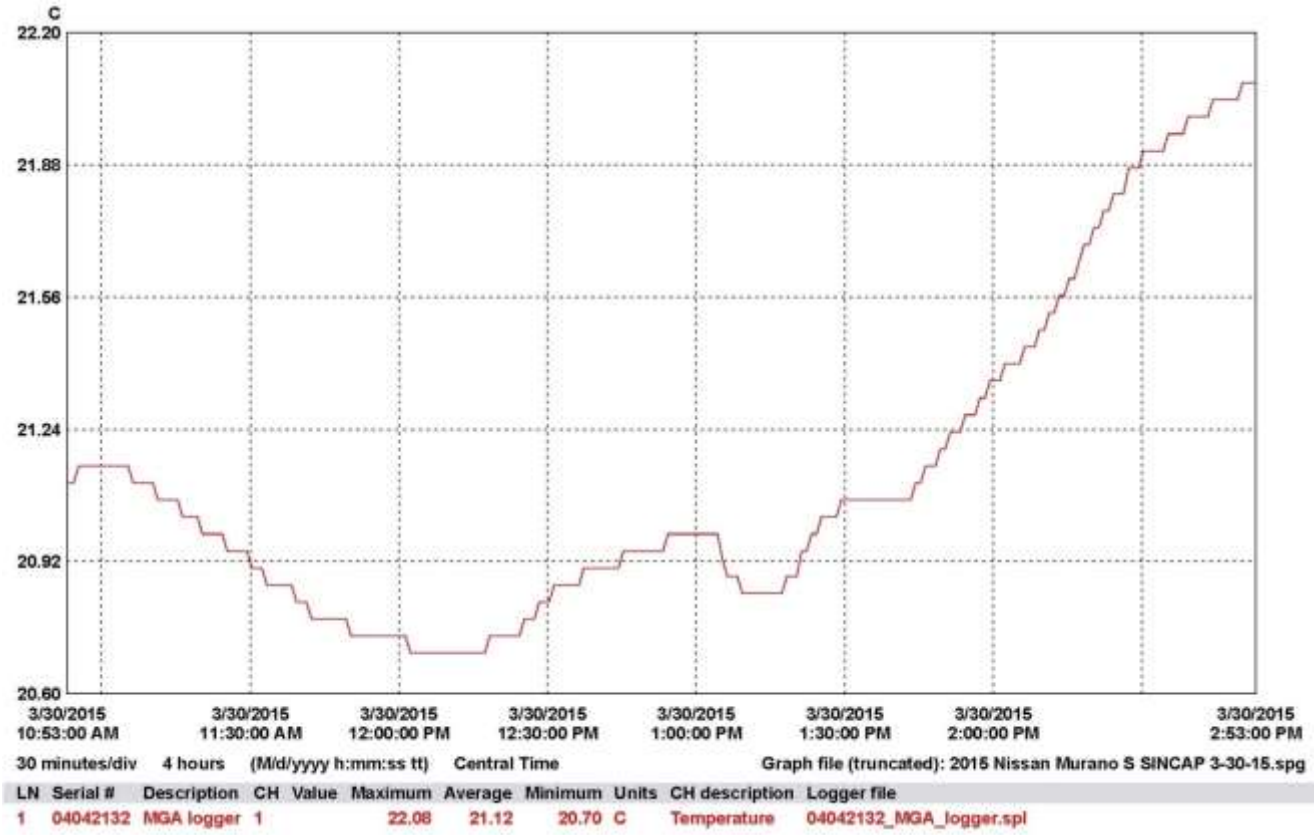
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eight Minute
0° to 90°	0	0	0	0
90° to 180°	0	0	0	0
180° to 270°	0	0	0	0
270° to 360°	0	0	0	0

ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 15
DUMMY/VEHICLE TEMPERATURE STABILIZATION DATA

Test Vehicle:	2015 Nissan Murano S 5-Dr SUV	NHTSA No.	O20155203
Test Program:	NCAP Side MDB Impact Test	Test Date:	3/30/2015



APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

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

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

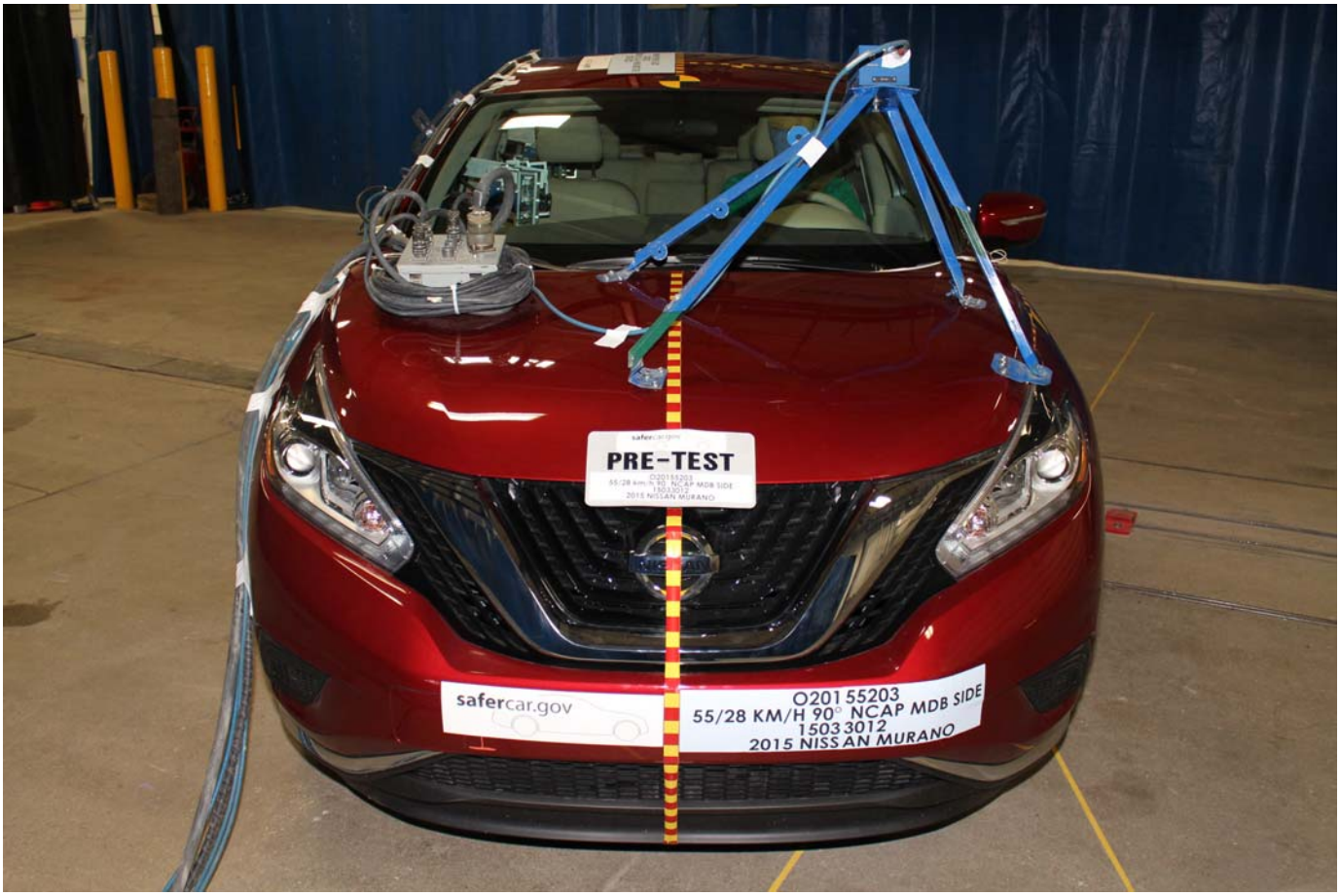
		Page No.
Photo No. 48.	Post-Test Driver Dummy Close-up Head Contact with Vehicle Interior View	A-24
Photo No. 49.	Post-Test Driver Dummy Close-up Head Contact with Side Airbag View	A-25
Photo No. 50.	Post-Test Driver Dummy Close-up Torso Contact with Vehicle Interior View	A-25
Photo No. 51.	Post-Test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

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

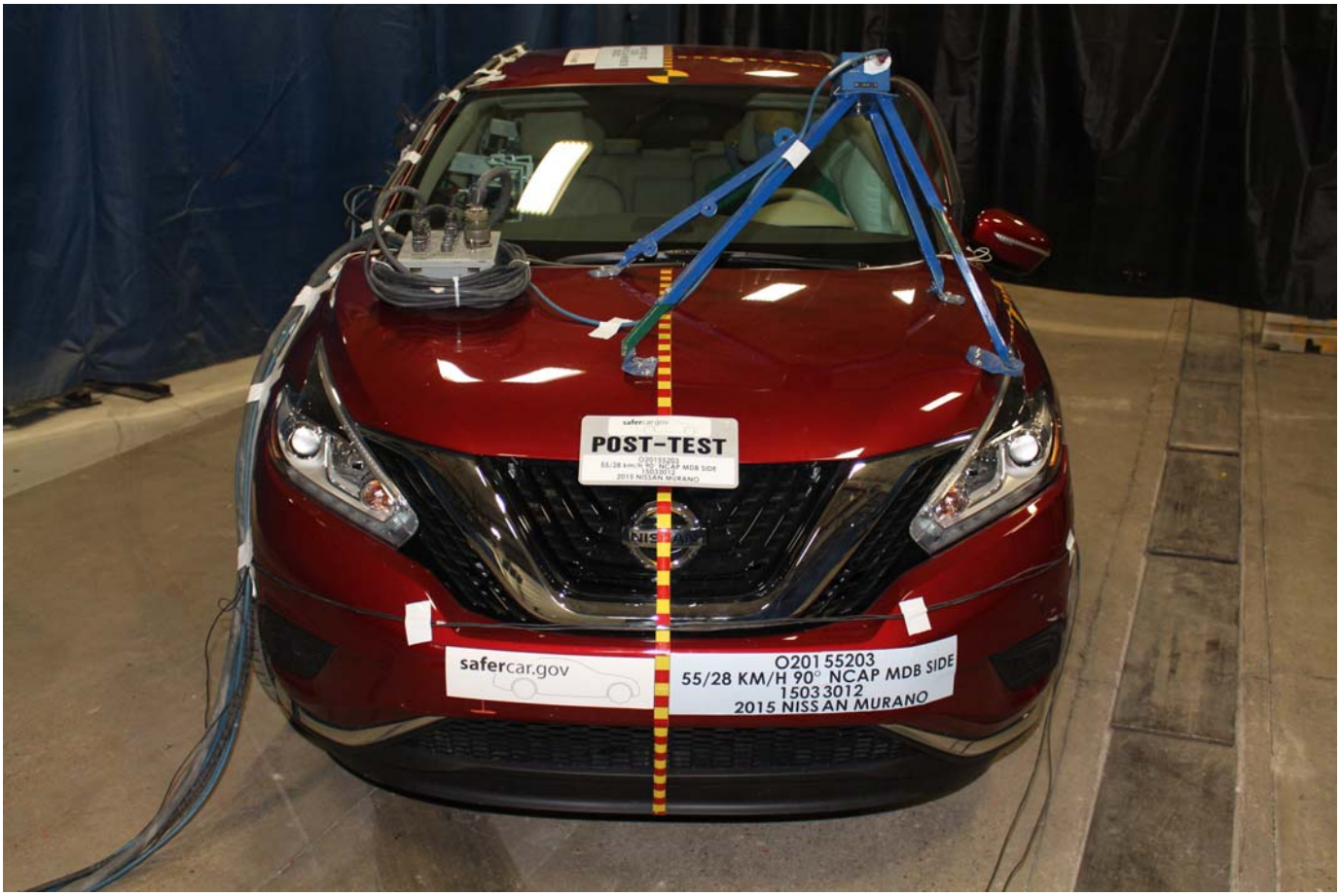
		Page No.
Photo No. 96.	FMVSS No. 301 Static Rollover 0 Degrees	A-48
Photo No. 97.	FMVSS No. 301 Static Rollover 90 Degrees	A-49
Photo No. 98.	FMVSS No. 301 Static Rollover 180 Degrees	A-49
Photo No. 99.	FMVSS No. 301 Static Rollover 270 Degrees	A-50
Photo No. 100.	FMVSS No. 301 Static Rollover 360 Degrees	A-50
Photo No. 101.	Impact Event	A-51
Photo No. 102.	Monroney Label	A-51
Photo No. 103.	Head Restraint Use and Adjustment Information from Vehicle Owner's Manual	A-52
Photo No. 104.	Head Restraint Use and Adjustment Information from Vehicle Owner's Manual	A-52

No. 001 - As Delivered Right Front Three-Quarter View of Test Vehicle

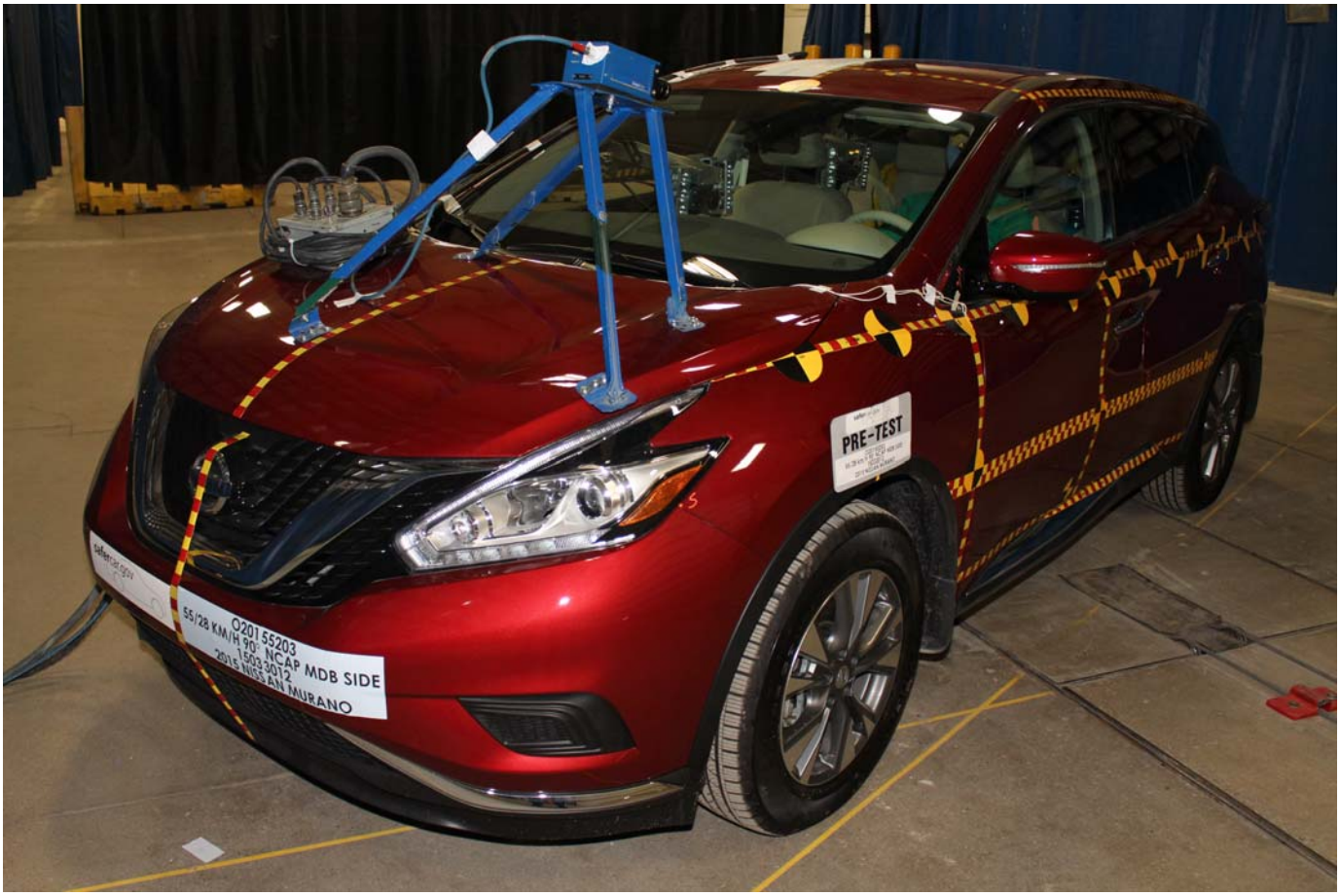
No. 002 - As Delivered Left Rear Three-Quarter View of Test Vehicle



No. 003 - Pre-Test Frontal View of Test Vehicle



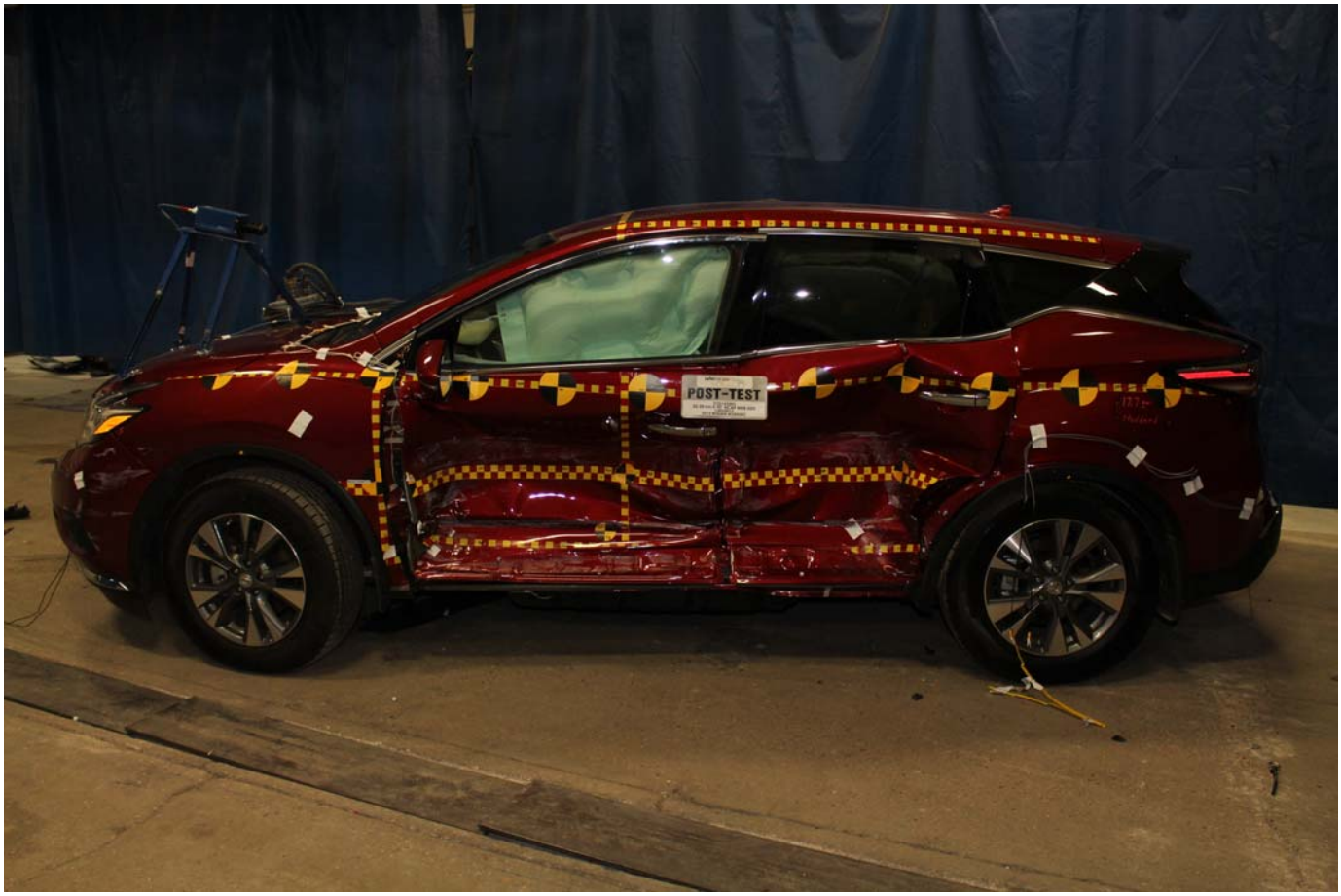
No. 004 - Post-Test Frontal View of Test Vehicle



No. 005 - Pre-Test Left Front Three-Quarter View of Test Vehicle

No. 006 - Post-Test Left Front Three-Quarter View of Test Vehicle

No. 007 - Pre-Test Left Side View of Test Vehicle



No. 008 - Post-Test Left Side View of Test Vehicle

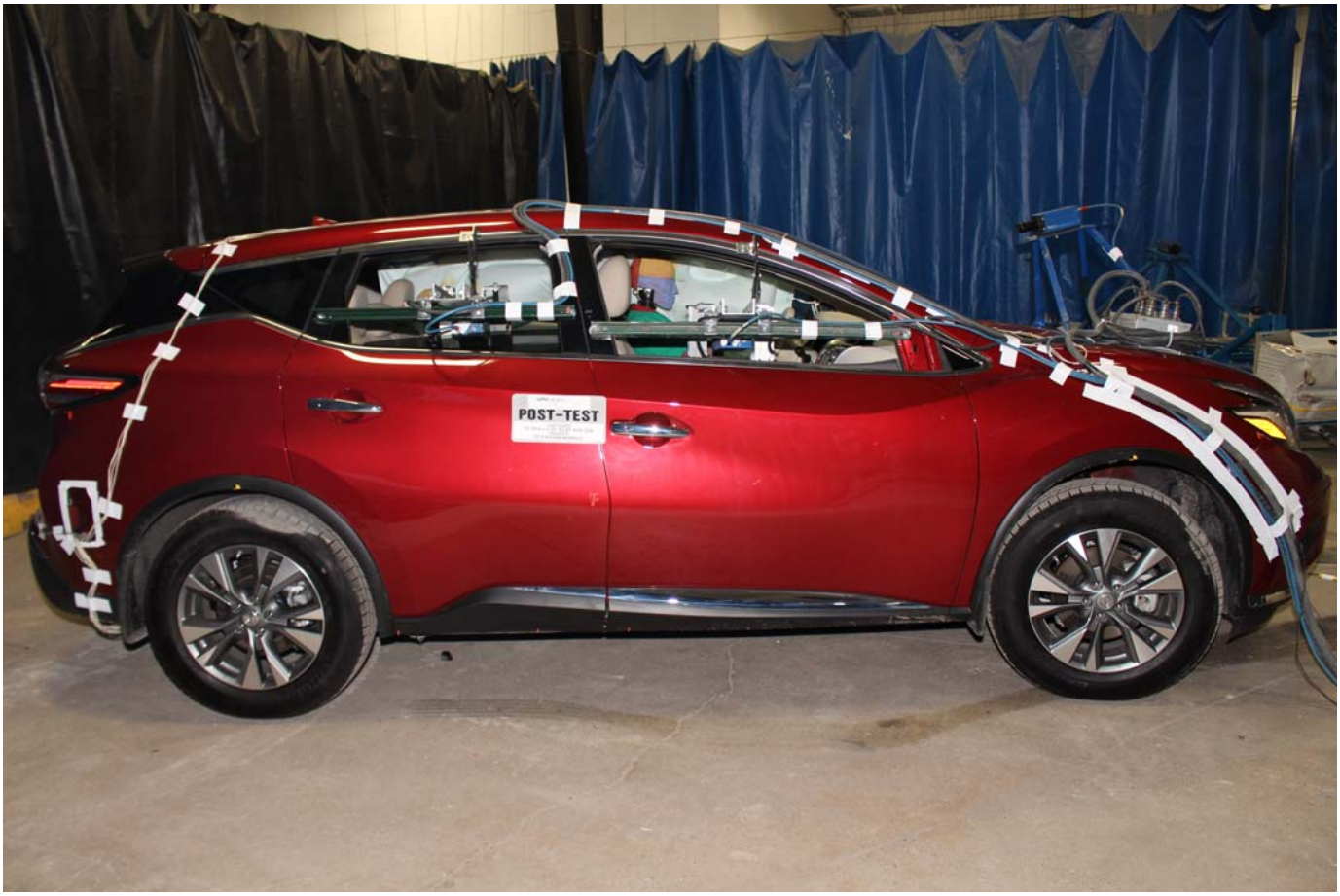
No. 009 - Pre-Test Left Three-Quarter Rear View of Test Vehicle

No. 010 - Post-Test Left Three-Quarter Rear View of Test Vehicle

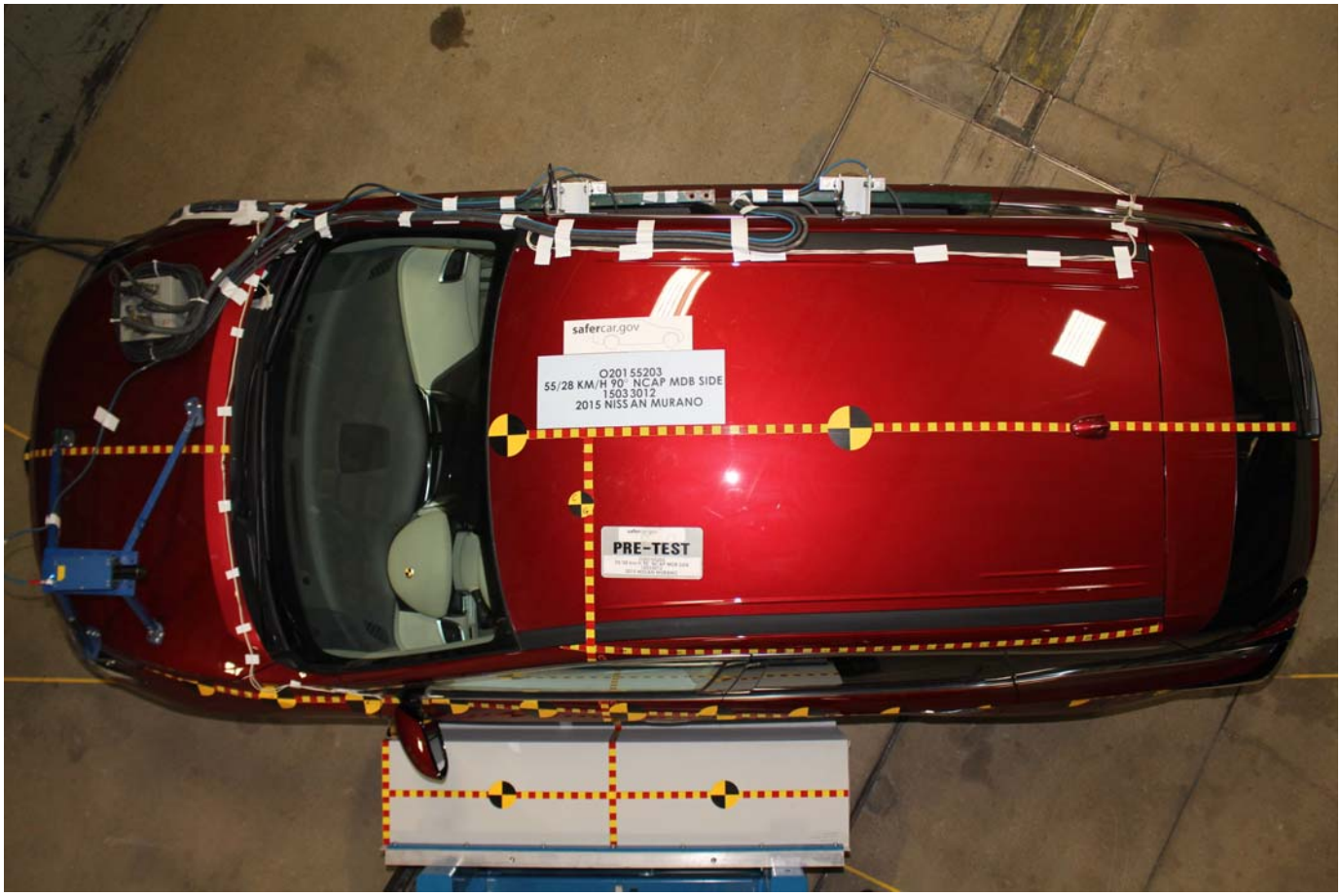
No. 011 - Pre-Test Rear View of Test Vehicle

No. 012 - Post-Test Rear View of Test Vehicle

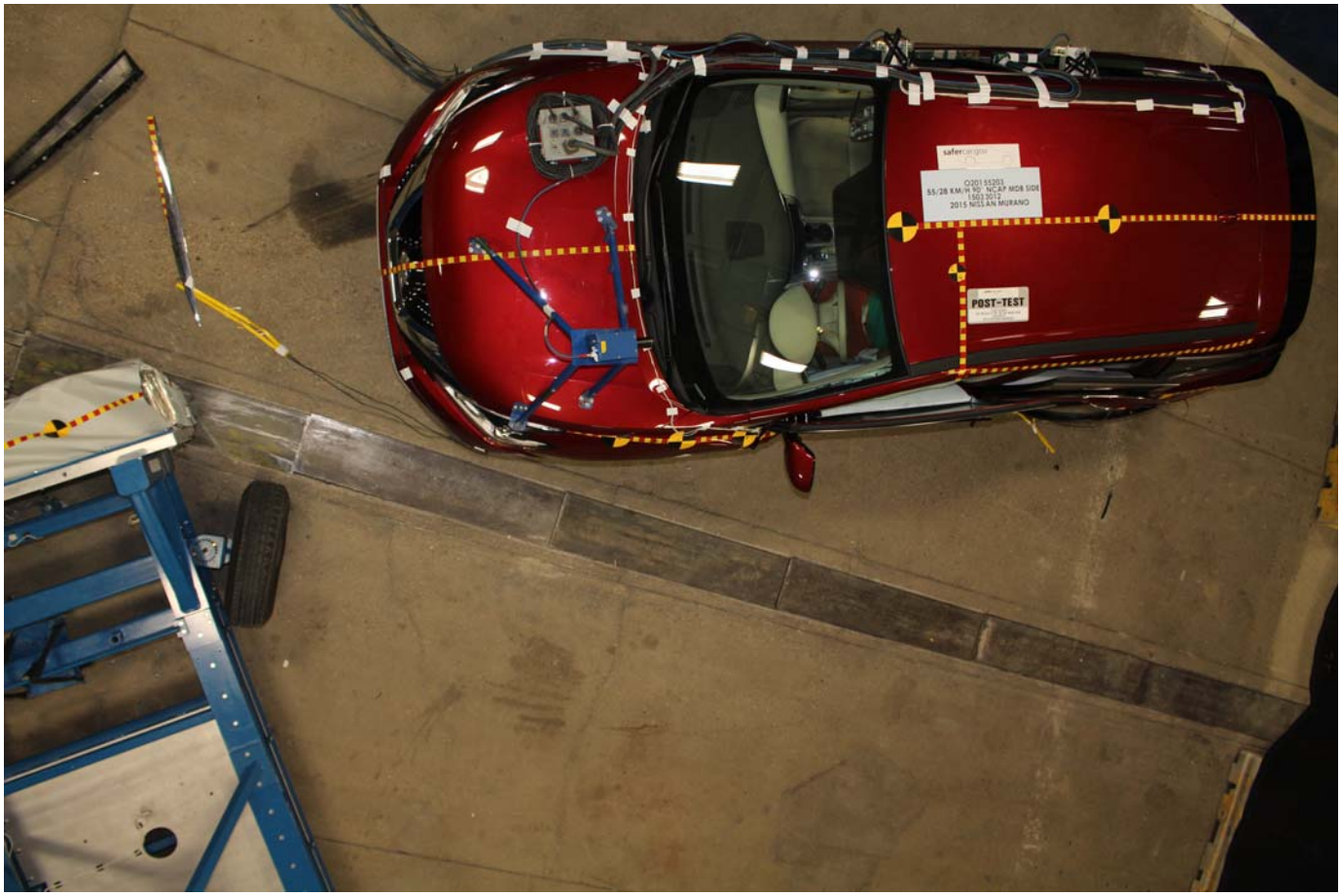
No. 013 - Pre-Test Right Side View of Test Vehicle



No. 014 - Post-Test Right Side View of Test Vehicle



No. 015 - Pre-Test Overhead View of Test Area



No. 016 - Post-Test Overhead View of Test Area

No. 017 - Pre-Test Left Side View of MDB Positioned Against Side of Test Vehicle

No. 018 - Pre-Test Right Side View of MDB Positioned Against Side of Test Vehicle

No. 019 - Pre-Test Close-Up View of Impact Point Target

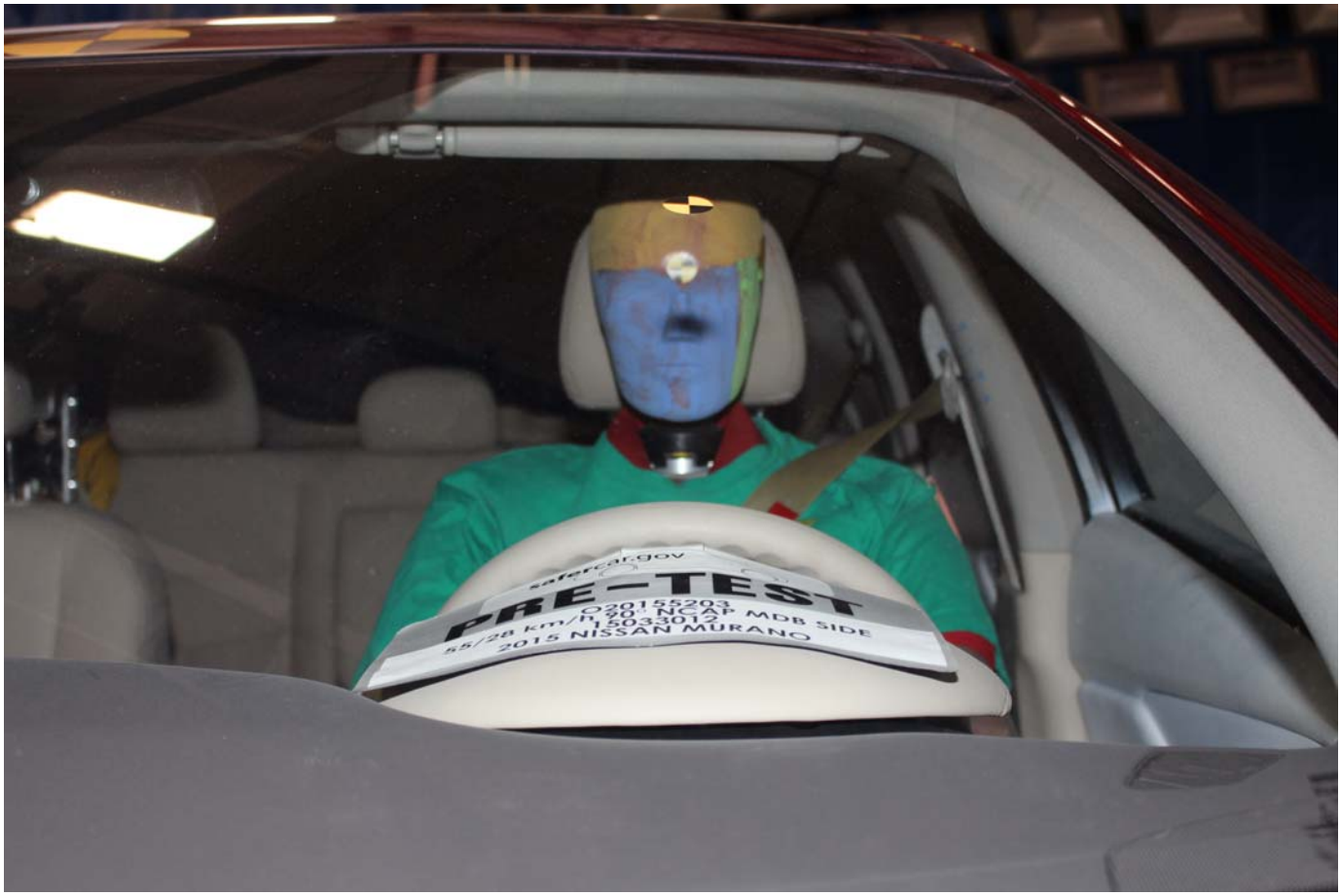
No. 020 - Post-Test Close-Up View of Impact Point Target

No. 021 - Pre-Test Left Front Door Latch Close-Up

No. 022 - Post-Test Left Front Door Latch Close-Up

No. 023 - Pre-Test Left Rear Door Latch Close-Up

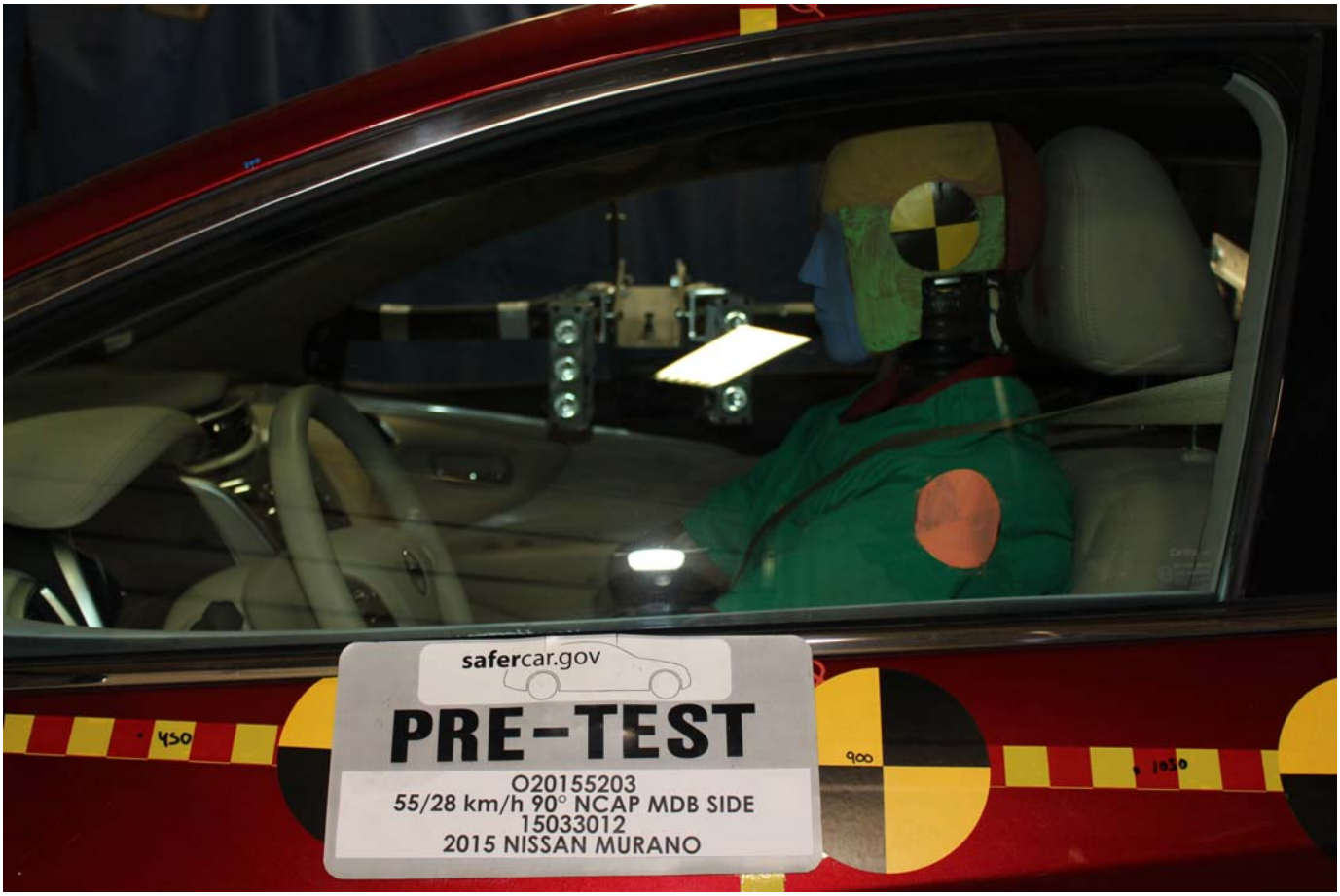
No. 024 - Post-Test Left Rear Door Latch Close-Up



No. 025 - Pre-Test Front Close-Up View of Driver Dummy

No. 026 - Post-Test Front Close-Up View of Driver Dummy

No. 027 - Pre-Test Left Side View of Driver Dummy Showing Belt and Chalking



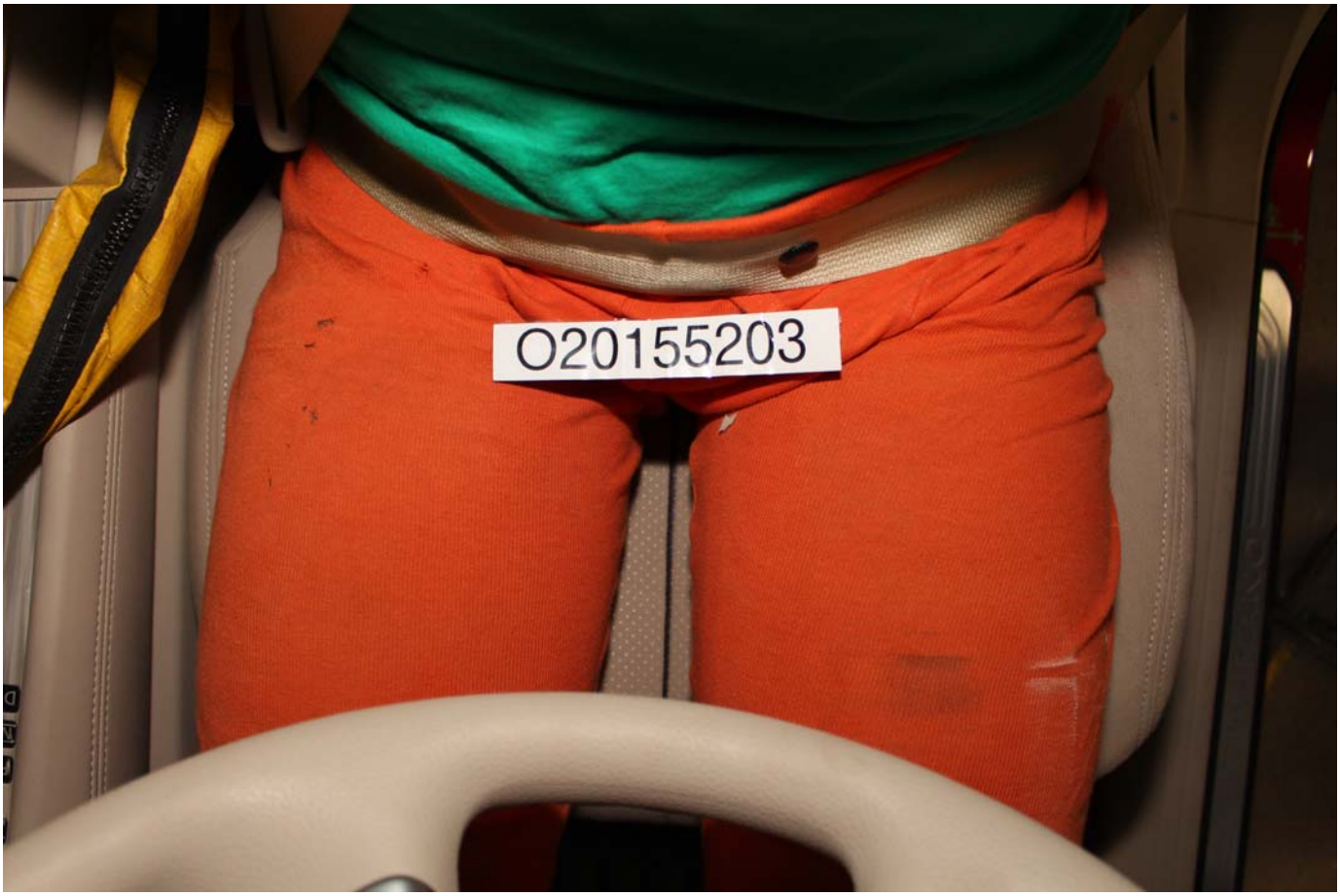
No. 028 - Pre-Test Left Side View of Driver Dummy Shoulder and Door Top View

No. 029 - Post-Test Left Side View of Driver Dummy Shoulder and Door Top View

No. 030 - Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning

No. 031 - Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint

No. 032 - Pre-Test Frontal View of Driver Seat Pan Prior to Dummy Positioning



No. 033 - Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan

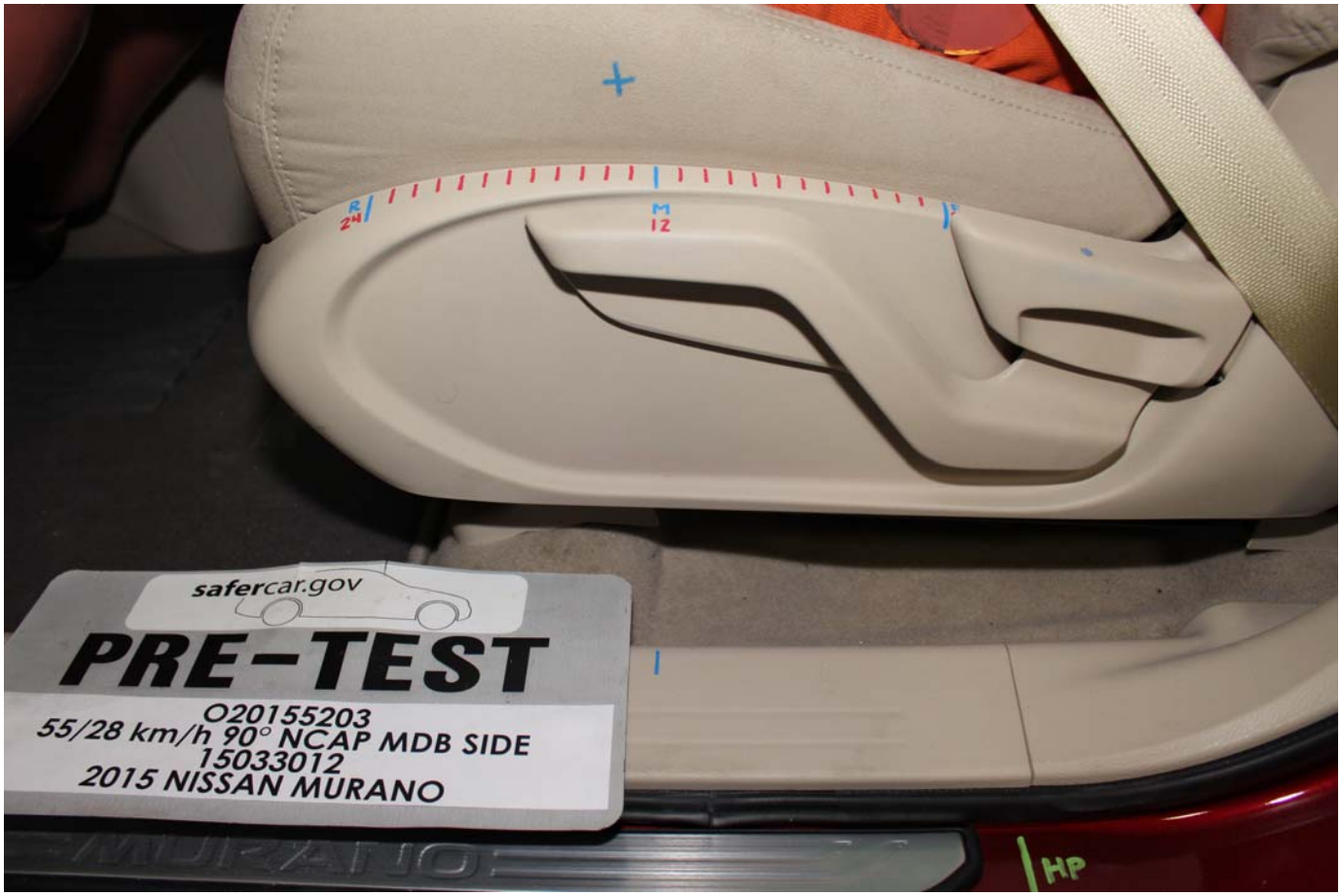
No. 034 - Pre-Test Placement of Driver Dummy's Feet

No. 035 - Pre-Test View of Belt Anchorage for Driver Dummy

No. 036 - Pre-Test Left Side View of Steering Wheel

No. 037 - Pre-Test View of Disengaged Parking Brake

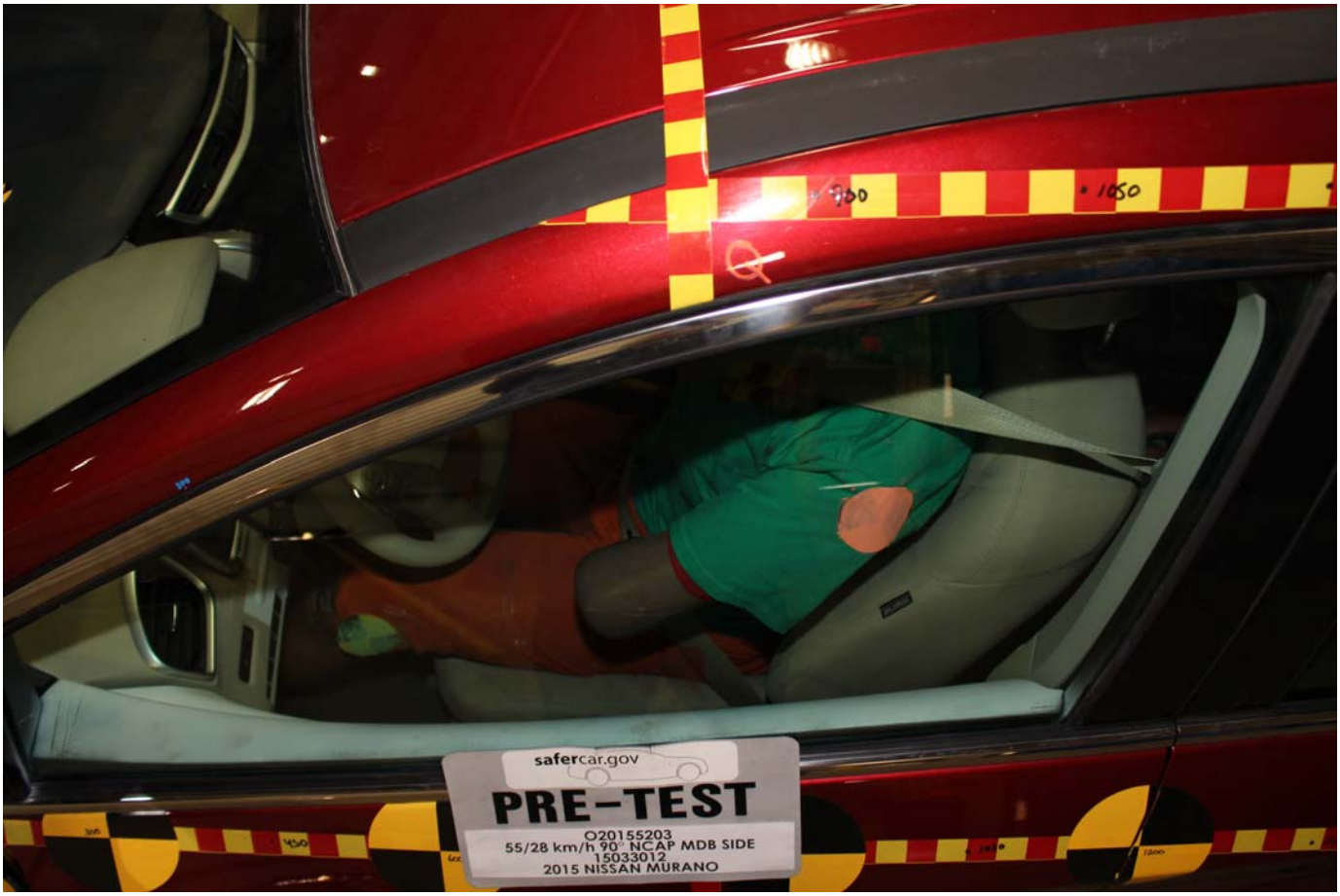
No. 038 - Pre-Test View of Parking Brake



No. 039 - Pre-Test Close-Up Left Side View of Driver Seat Track

No. 040 - Pre-Test Close-Up Left Side View of Driver Seat Back

No. 041 - Pre-Test Close-Up View of Driver Seat Back or Head Restraint



No. 042 - Pre-Test Driver Dummy and Door Clearance View

No. 043 - Post-Test Driver Dummy and Door Clearance View

No. 044 - Pre-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment

No. 045 - Post-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment

No. 046 - Pre-Test Driver Inner Door Panel View

No. 047 - Post-Test Driver Inner Door Panel View

No. 048 - Post-Test Driver Dummy Close-up Head Contact with Vehicle Interior View

No. 049 - Post-Test Driver Dummy Close-up Head Contact with Side Airbag View

No. 050 - Post-Test Driver Dummy Close-up Torso Contact with Vehicle Interior View

No. 051 - Post-Test Driver Dummy Close-up Torso Contact with Side Airbag View

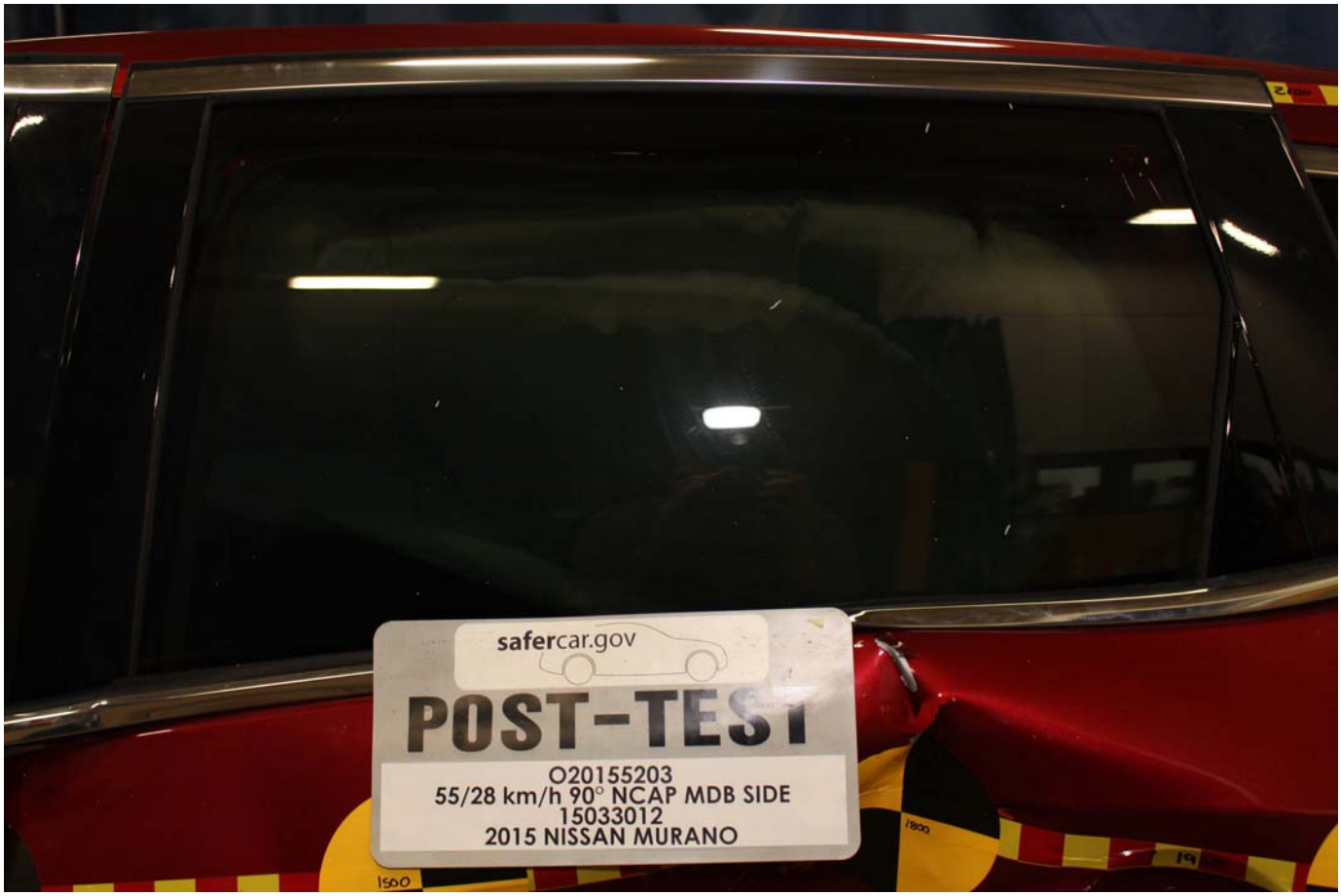
No. 052 - Post-Test Driver Dummy Close-up Pelvis Contact with Vehicle Interior View

No. 053 - Post-Test Driver Dummy Close-up Pelvis Contact with Side Airbag View

No. 054 - Post-Test Driver Dummy Close-up Knee Contact View

No. 055 - Pre-Test Left Side View of Rear Passenger Dummy Showing Belt and Chalking

No. 056 - Pre-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View



No. 057 - Post-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View

No. 058 - Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning

No. 059 - Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint

No. 060 - Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning

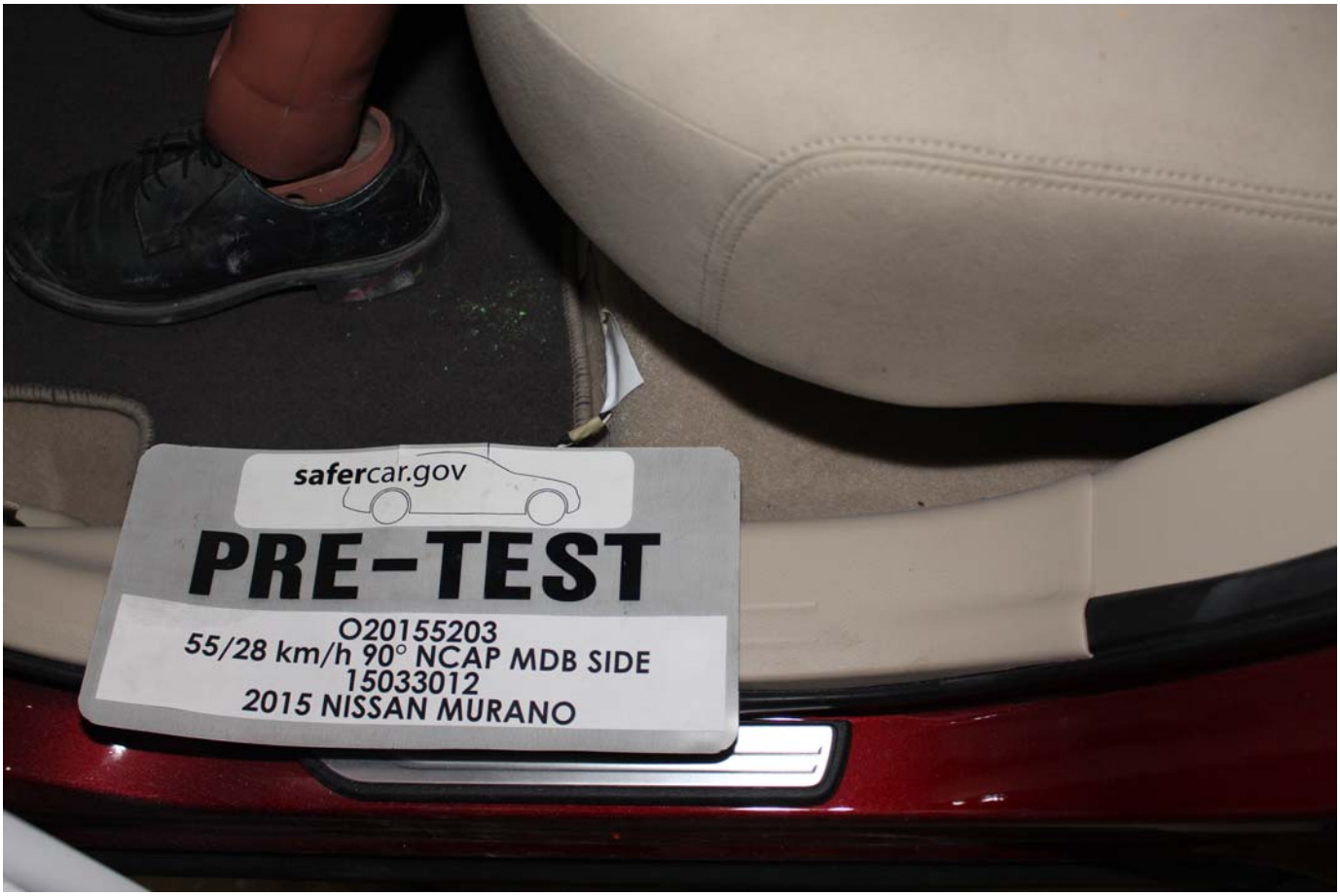
No. 061 - Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan

No. 062 - Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket

No. 063 - Pre-Test View of Rear Passenger Dummy's Head Showing Dummy's Head is Level

No. 064 - Pre-Test Placement of Rear Passenger Dummy's Feet

No. 065 - Pre-Test View of Belt Anchorage for Rear Passenger Dummy



No. 066 - Pre-Test Close-Up Left Side View of Rear Passenger Seat Track

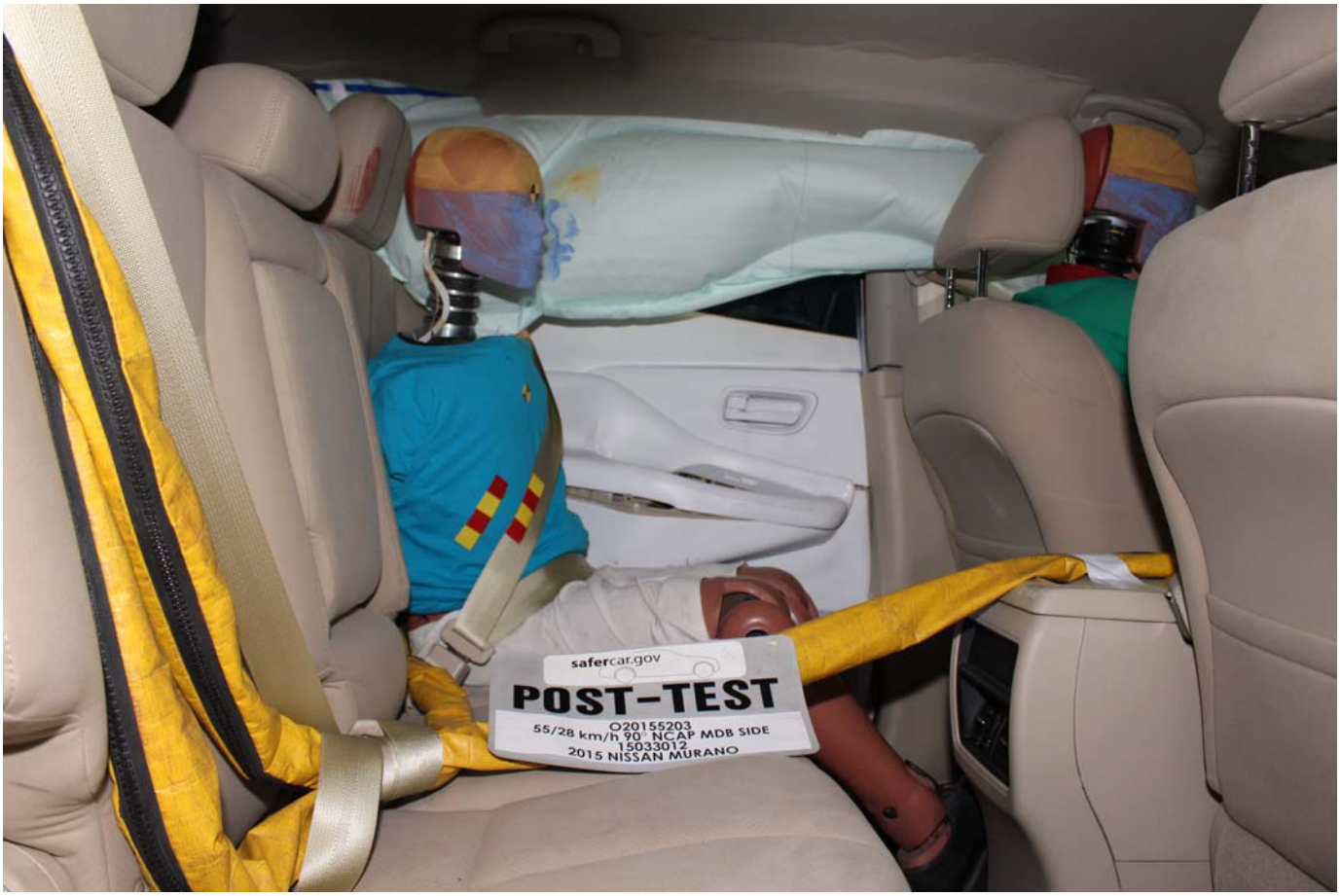
No. 067 - Pre-Test Close-Up Left Side View of Rear Passenger Seat Back

No. 068 - Pre-Test Close-up View of Rear Passenger Seat Back or Head Restraint

No. 069 - Pre-Test Rear Passenger Dummy and Door Clearance View

No. 070 - Post-Test Rear Passenger Dummy and Door Clearance View

No. 071 - Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



No. 072 - Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment

No. 073 - Pre-Test Rear Passenger Inner Door Panel View

No. 074 - Post-Test Rear Passenger Inner Door Panel View

No. 075 - Post-Test Rear Passenger Dummy Close-up Head Contact with Vehicle Interior View

No. 076 - Post-Test Rear Passenger Dummy Close-up Head Contact with Side Airbag View

No. 077 - Post-Test Rear Passenger Dummy Close-up Torso Contact with Vehicle Interior View

PHOTOGRAPH NOT APPLICABLE

No. 078 - Post-Test Rear Passenger Dummy Close-up Torso Contact with Side Airbag View

No. 079 - Post-Test Rear Passenger Dummy Close-up Pelvis Contact with Vehicle Interior View

PHOTOGRAPH NOT APPLICABLE

No. 080 - Post-Test Rear Passenger Dummy Close-up Pelvis Contact with Side Airbag View

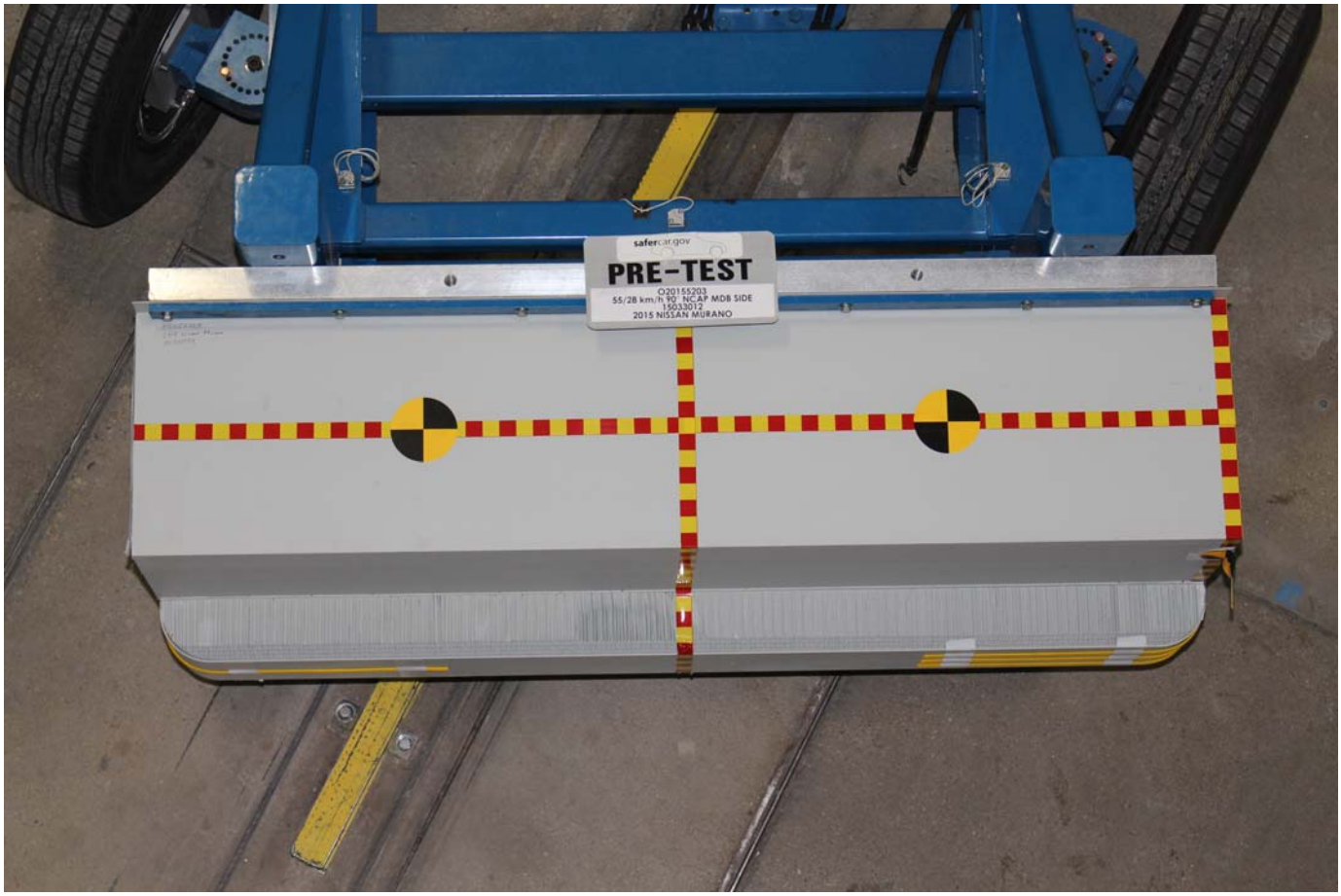
No. 081 - Post-Test Rear Passenger Dummy Close-up Knee Contact View

No. 082 - Pre-Test View of Fuel Filler Cap or Fuel Filler Neck

No. 083 - Post-Test View of Fuel Filler Cap or Fuel Filler Neck

No. 084 - Pre-Test Front View of MDB Impactor Face

No. 085 - Post-Test Front View of MDB Impactor Face



No. 086 - Pre-Test Top View of MDB Impactor Face

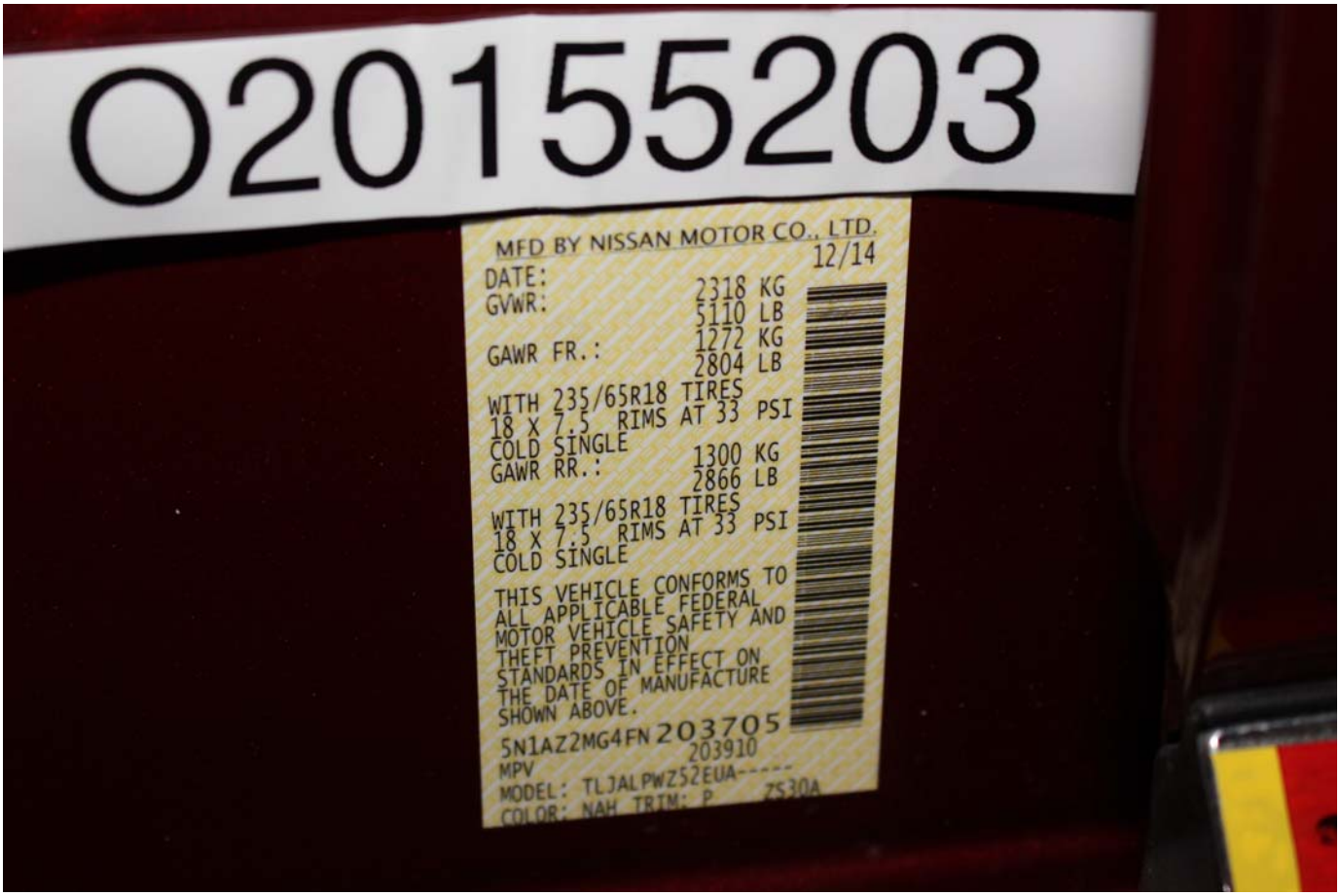
No. 087 - Post-Test Top View of MDB Impactor Face

No. 088 - Pre-Test Left Side View of MDB Impactor Face

No. 089 - Post-Test Left Side View of MDB Impactor Face

No. 090 - Pre-Test Right Side View of MDB Impactor Face

No. 091 - Post-Test Right Side View of MDB Impactor Face

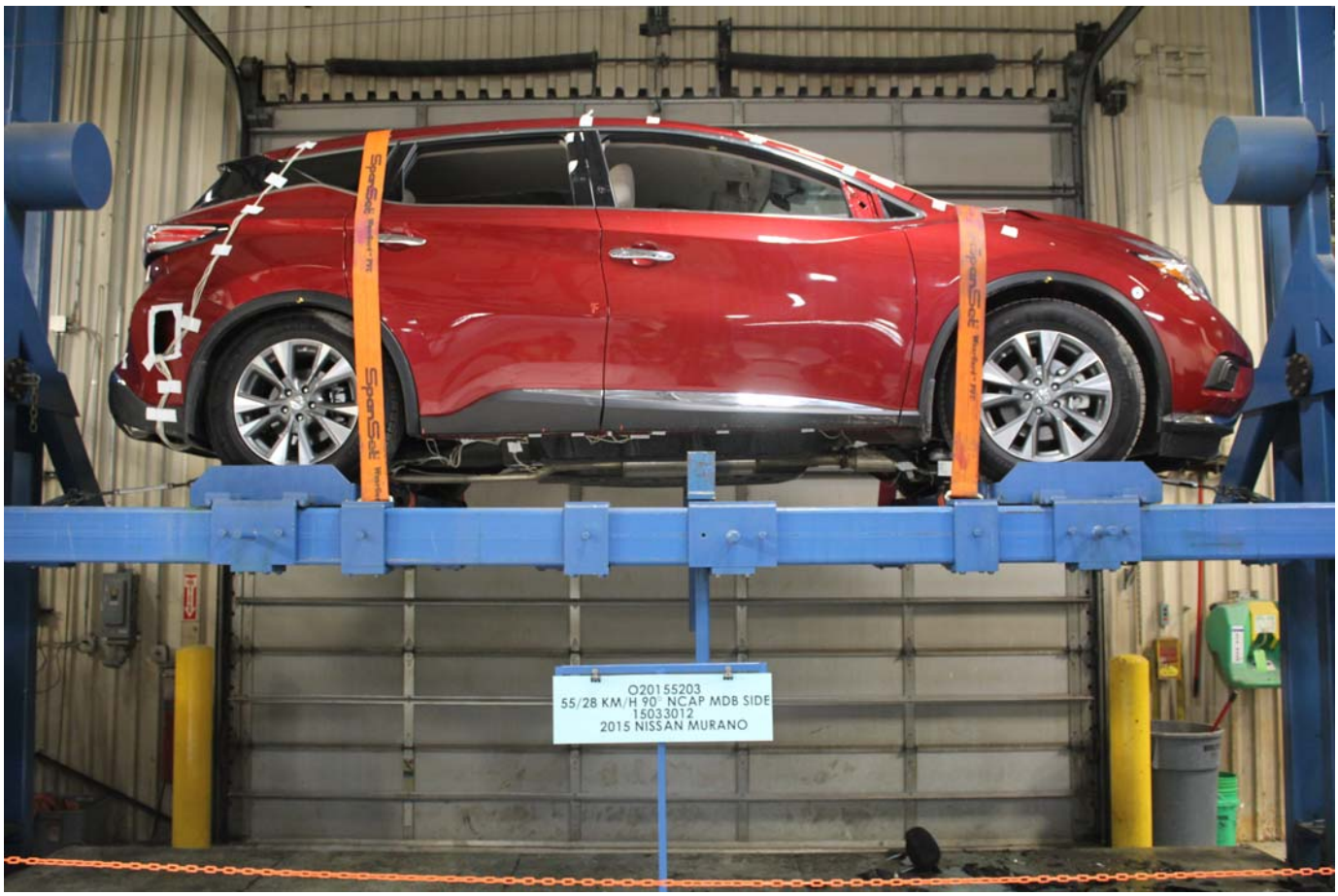


No. 092 - Close-Up View of Vehicle's Certification Label

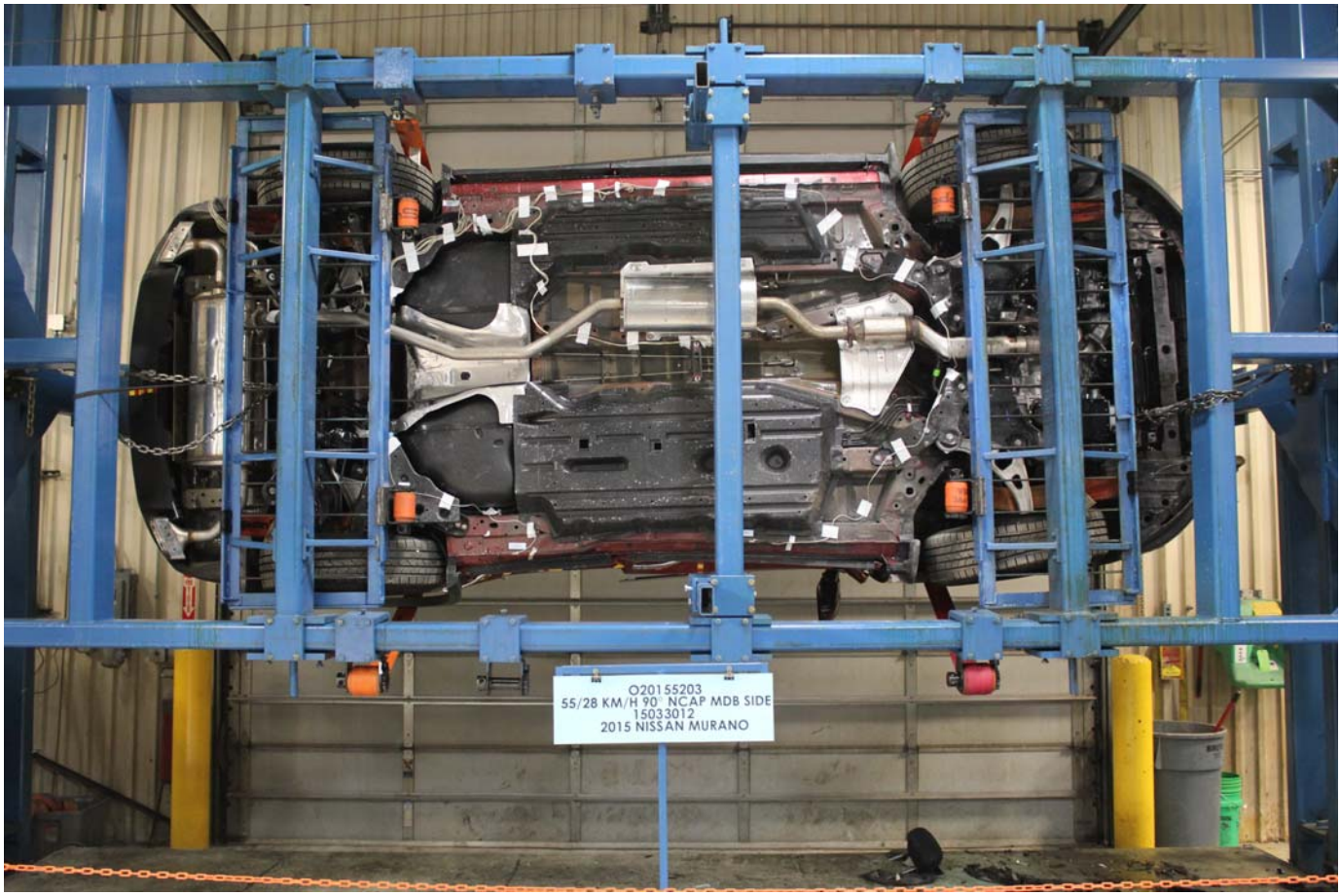
No. 093 - Close-Up View of Vehicle's Tire Information Placard or Label

No. 094 - Pre-Test Ballast View

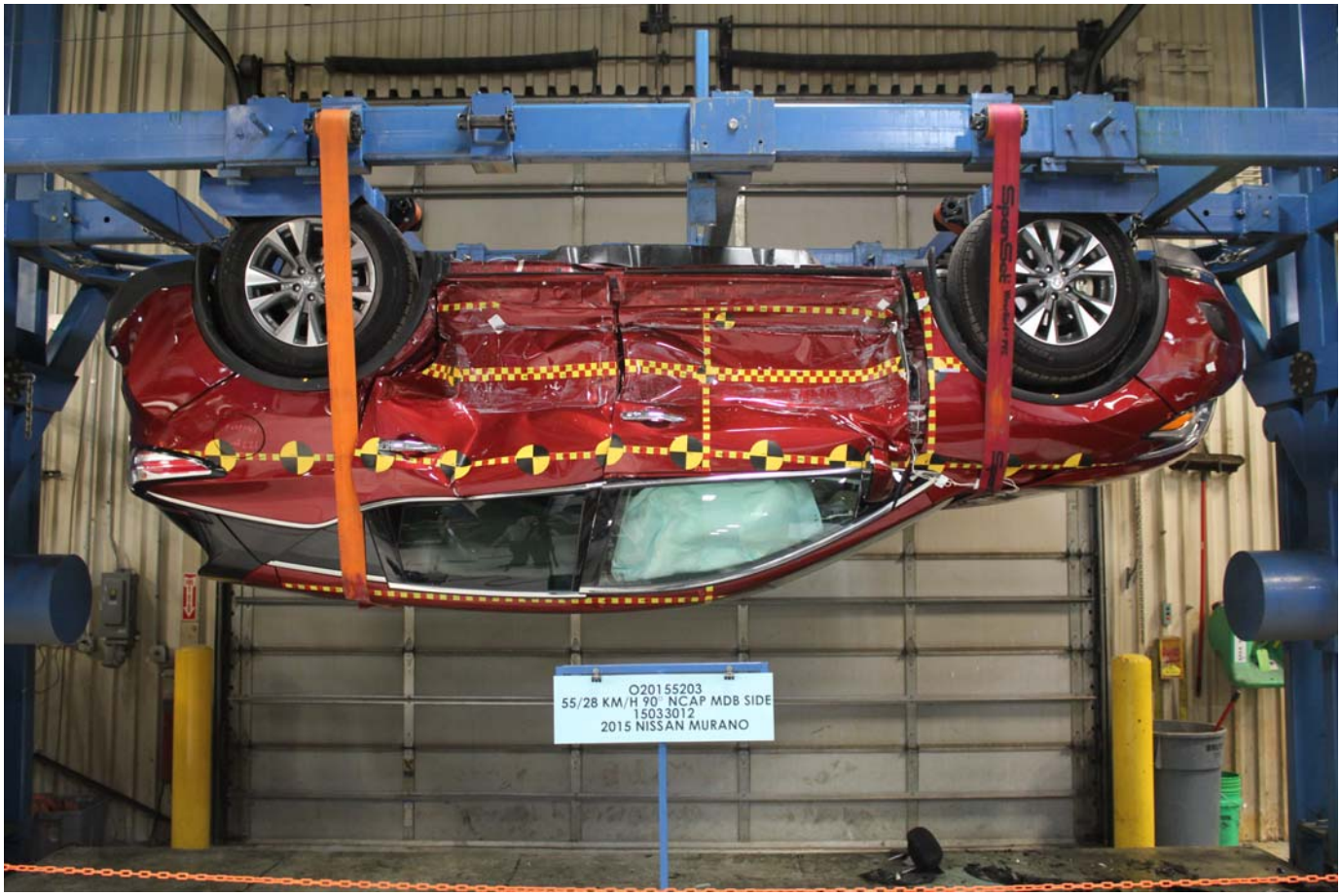
No. 095 - Post-Test Primary and Redundant Speed Trap Read-Out



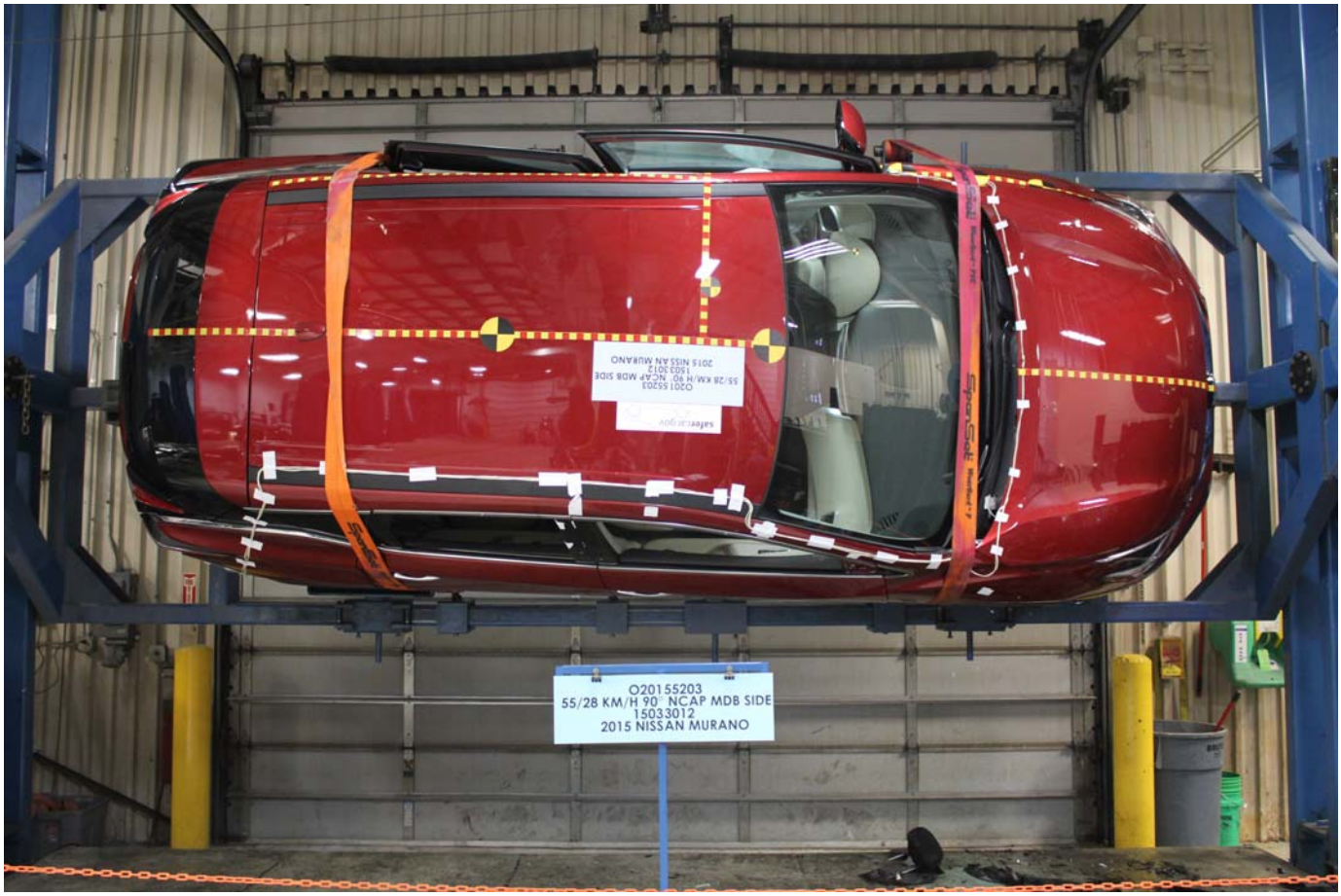
No. 096 - FMVSS No. 301 Static Rollover 0 Degrees



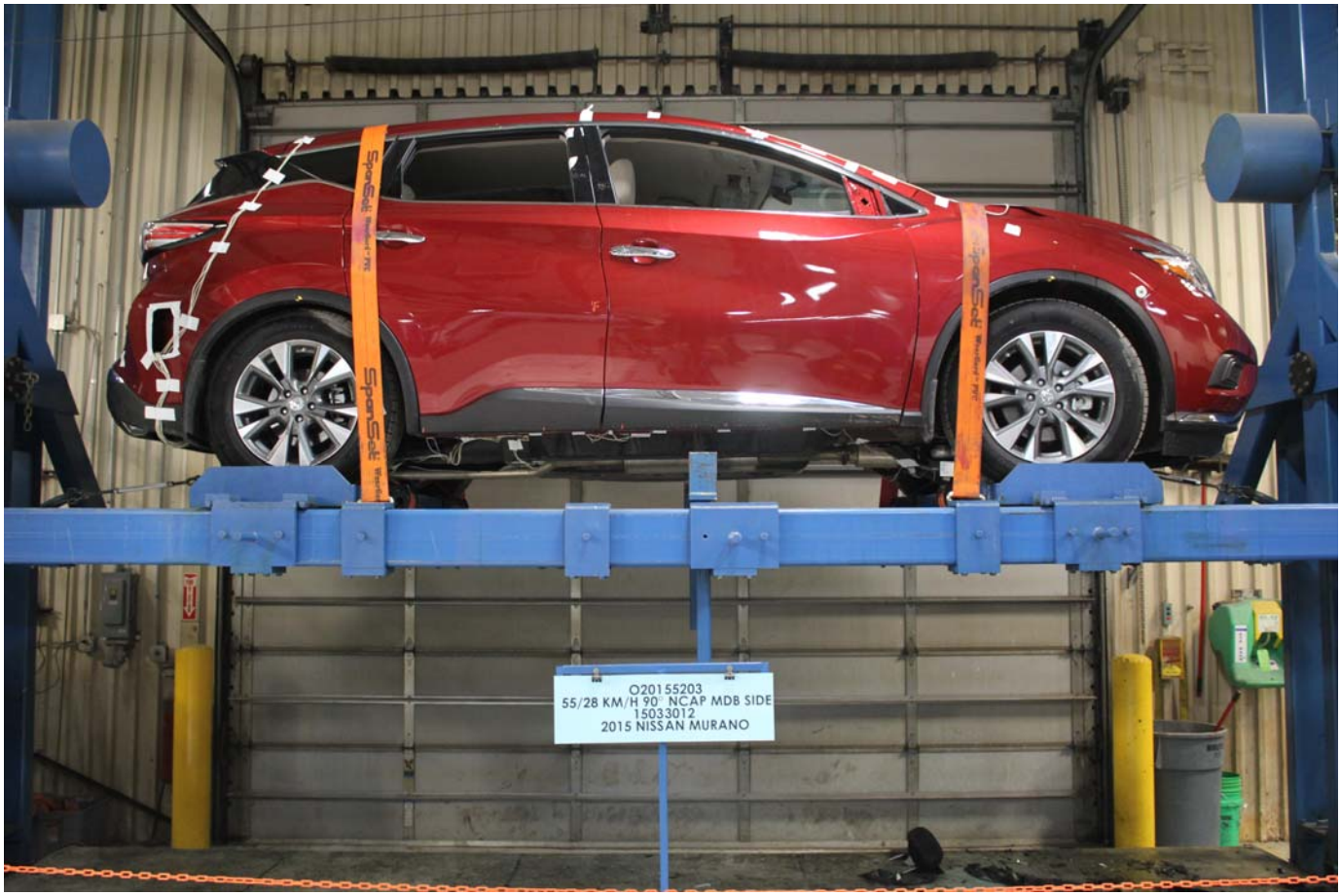
No. 097 - FMVSS No. 301 Static Rollover 90 Degrees



No. 098 - FMVSS No. 301 Static Rollover 180 Degrees



No. 099 - FMVSS No. 301 Static Rollover 270 Degrees



No. 100 - FMVSS No. 301 Static Rollover 360 Degrees

No. 101 - Impact Event

NISSAN

2015 MURANO S FWD

Scan QR code for general model information & options

Standard Equipment Included at No Extra Charge

MECHANICAL & PERFORMANCE
3.5 Liter V6 Engine
XTRONIC CVT®
(Continuously Variable Transmission)
Front-Wheel Drive
18" Machined Aluminum-Alloy Wheels

SAFETY & SECURITY
Driver & Front Passenger, Side-Impact, & Curtain Air Bags
Driver Knee Air Bag
Lower Anchors & Tethers for CHildren (LATCH)
4-Wheel Anti-lock Braking System (ABS)
Vehicle Dynamic Control (VDC)
Traction Control System (TCS)
Tire Pressure Monitoring System (TPMS) with Easy-Fill Tire Alert
Vehicle Security System (VSS)
Hill Start Assist

COMFORT & CONVENIENCE
NASA-inspired Zero Gravity Front and Rear Outboard Seats
6-Way Manual Driver's Seat
4-Way Manual Front Passenger's Seat
60/40 Split Fold-Down Rear Seats
Cloth Seats
Cruise Control
AM/FM/CD/MP3/WMA In-Dash Changer Audio System with 6 Speakers
NissanConnect™ with Mobile Apps****
7" Color Center Display
SiriusXM Satellite Radio**
Front USB Connection Port
Bluetooth® Hands-free Phone System
Streaming Audio via Bluetooth®
Auxiliary Audio Input Jack
Hands-Free Text Messaging Assistant
RearView Monitor
7" Advanced Drive-Assist® Display
Dual Zone Automatic Temperature Control (ATC) with Front & Rear Vents
Nissan Intelligent Key® with Push Button Ignition
Power Windows with Front Window One-Touch Auto-Up/Down and Auto-Reverse Feature
Three 12-Volt DC Power Outlets

EXTERIOR
LED Signature and Daytime Running Lights
Automatic On/Off Headlights
Outside Mirrors with LED Turn Indicators
LED Taillights
Rear Tinted Privacy Glass

**SiriusXM includes activation & 3 months of service only; subscription sold separately. SiriusXM services are not available in AK, HI and some markets.

***Optional Equipment Replaces Standard Where Applicable

****Only use NissanConnect™ services when safe to do so. Subscription Agreement required. Not all features available for all models. Some apps have late availability. Compatible smartphone required. Cellular network not available in all areas. Apps/services subject to change. May require dealer service visit or software upgrade to activate. Service provider may terminate/suspend service without notice. Nissan not responsible for equipment upgrades/replacements required due to service changes. Text and/or data rates may apply.

Manufacturer's Suggested Retail Base Price:	$29,560.00
Options Included by Manufacturer	
SPLASH GUARDS	160.00
FLOOR MATS & CARGO AREA PROTECTOR	210.00
DESTINATION CHARGES	885.00
Total*	$30,815.00

*Does not include dealer installed options and accessories, local taxes or license fees. This label has been applied pursuant to federal law. Do not remove prior to delivery to the ultimate purchaser.

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

Fuel Economy: **24** MPG combined city/hwy — 21 city — 28 highway
4.2 gallons per 100 miles

MID-SIZE STATION WAGON range from 17 to 42 MPG. The best vehicle rates 119 MPGe.

You spend **$0** more in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost **$2,200**

Fuel Economy & Greenhouse Gas Rating (tailpipe only) 6 (1–10, Best) — Smog Rating (tailpipe only) 5 (1–10, Best)

This vehicle emits 373 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 24 MPG and costs $31,000 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at $3.50 per gallon. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fueleconomy.gov
Calculate personalized estimates and compare vehicles

Smartphone QR Code

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score		**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

This Vehicle qualifies for Nissan's

Security+Plus Vehicle Protection Plan

The only service agreement backed by Nissan!
Ask your dealer for details, or call 1-800-NISSAN-1 for more information

DELIVERY

VEHICLE COLORS:
EXT: CAYENNE RED
INT: BEIGE

FINAL ASSEMBLY POINT:
CANTON

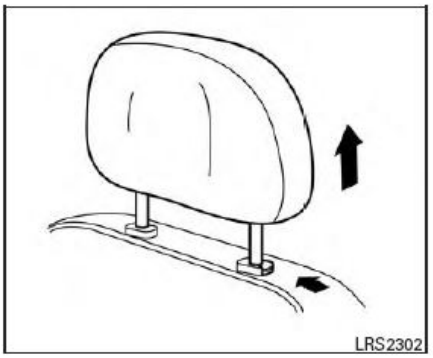
TRANSPORT METHOD:
TRUCK

DEALER:
WOODHOUSE NISSAN, INC.
7801 NEBRASKA DR
BELLEVUE NE
68005

VIN: 5N1AZ2MG4FN203705
EMS: 50 STATE EMISSIONS
MDL: 23115-203705 NAH-P
OPT: G-B92C03L92Z66

20141210000221AS3842

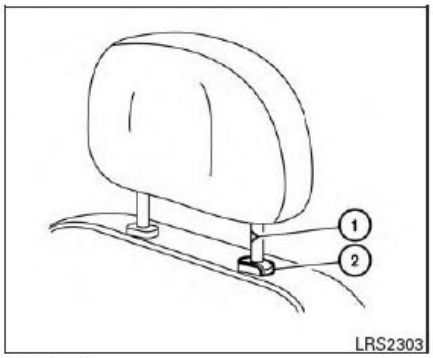
No. 102 - Monroney Label



REMOVE

Use the following procedure to remove the head restraint/headrest:

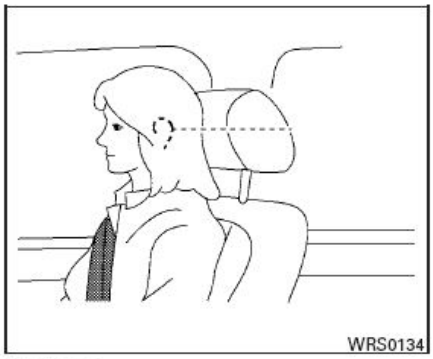
1. Pull the head restraint/headrest up to the highest position.
2. Push and hold the lock knob.
3. Remove the head restraint/headrest from the seat.
4. Store the head restraint/headrest properly in a secure place so it is not loose in the vehicle.
5. Reinstall and properly adjust the head restraint/headrest before an occupant uses the seating position.



INSTALL

1. Align the head restraint/headrest stalks with the holes in the seat. Make sure that the head restraint/headrest is facing the correct direction. The stalk with the notch (notches) ① must be installed in the hole with the lock knob ②.
2. Push and hold the lock knob and push the head restraint/headrest down.
3. Properly adjust the head restraint/headrest before an occupant uses the seating position.

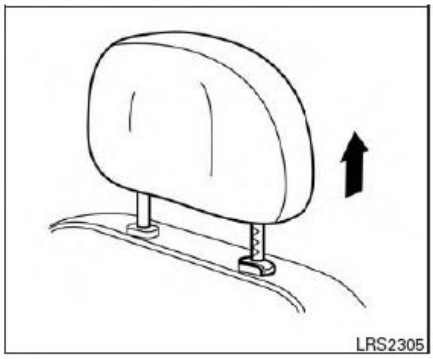
No. 103 - Head Restraint Use and Adjustment Information from Vehicle Owner's Manual



ADJUST

For adjustable head restraint/headrest

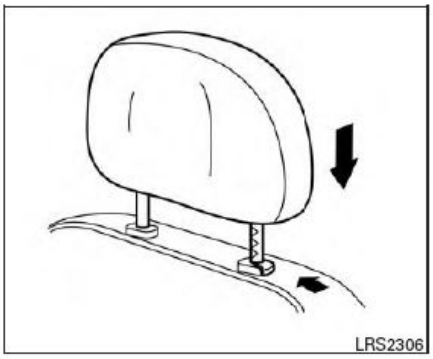
Adjust the head restraint/headrest so the center is level with the center of your ears. If your ear position is still higher than the recommended alignment, place the head restraint/headrest at the highest position.



Raise

To raise the head restraint/headrest, pull it up.

Make sure the head restraint/headrest is positioned so the lock knob is engaged in the notch before riding in that designated seating position.



Lower

To lower, push and hold the lock knob and push the head restraint/headrest down.

Make sure the head restraint/headrest is positioned so the lock knob is engaged in the notch before riding in that designated seating position.

No. 104 - 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

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

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

Additional Driver & Passenger Dummy Instrumentation Data

Driver Lower Spine T12 Acceleration (X)

Driver Lower Spine T12 Acceleration (Y)

Driver Lower Spine T12 Acceleration (Z)

Passenger Upper Thorax Rib Deflection (Y)

Passenger Middle Thorax Rib Deflection (Y)

Passenger Lower Thorax Rib Deflection (Y)

Passenger Upper Abdomen Rib Deflection (Y)

Passenger Lower Abdomen Rib Deflection (Y)

Driver Head Acceleration Redundant (X)

Driver Head Acceleration Redundant (Y)

Driver Head Acceleration Redundant (Z)

Passenger Head Acceleration Redundant (X)

Passenger Head Acceleration Redundant (Y)

Passenger Head Acceleration Redundant (Z)

Vehicle Instrumentation Data

Vehicle Center of Gravity Acceleration (X)

Vehicle Center of Gravity Acceleration (Y)

Vehicle Center of Gravity Acceleration (Z)

Right Side Sill at Front Seat Acceleration (X)

Right Side Sill at Front Seat Acceleration (Y)

Right Side Sill at Front Seat Acceleration (Z)

Right Side Sill at Rear Seat Acceleration (X)

Right Side Sill at Rear Seat Acceleration (Y)

Right Side Sill at Rear Seat Acceleration (Z)

Left Side Sill at Front Seat Acceleration (Y)

Left Side Sill at Rear Seat Acceleration (Y)

Lower A-Post Acceleration (Y)

Middle A-Post Acceleration (Y)

Lower B-Post Acceleration (Y)

Middle B-Post Acceleration (Y)

Front Seat Track Acceleration (Y)

Rear Seat Track Acceleration (Y)

Right Rear Occupant Compartment Acceleration (Y)

Engine Block (X)

Engine Block (Y)

Rear Floorpan Above Axle Acceleration (X)

Rear Floorpan Above Axle Acceleration (Y)

Rear Floorpan Above Axle Acceleration (Z)

MDB Instrumentation Data

MDB Center of Gravity Acceleration (X)

MDB Center of Gravity Acceleration (Y)

MDB Center of Gravity Acceleration (Z)

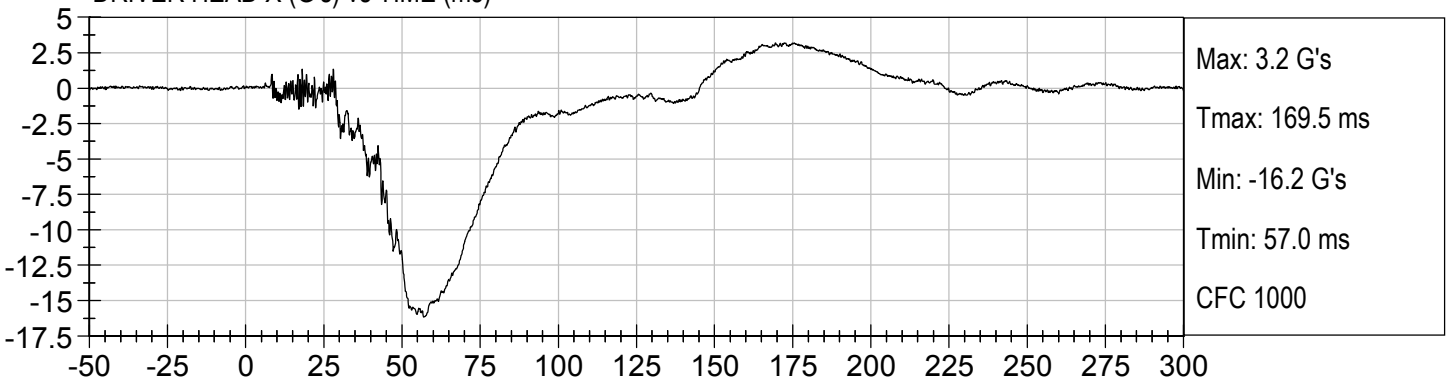
MDB Rear Acceleration (X)

MDB Rear Acceleration (Y)

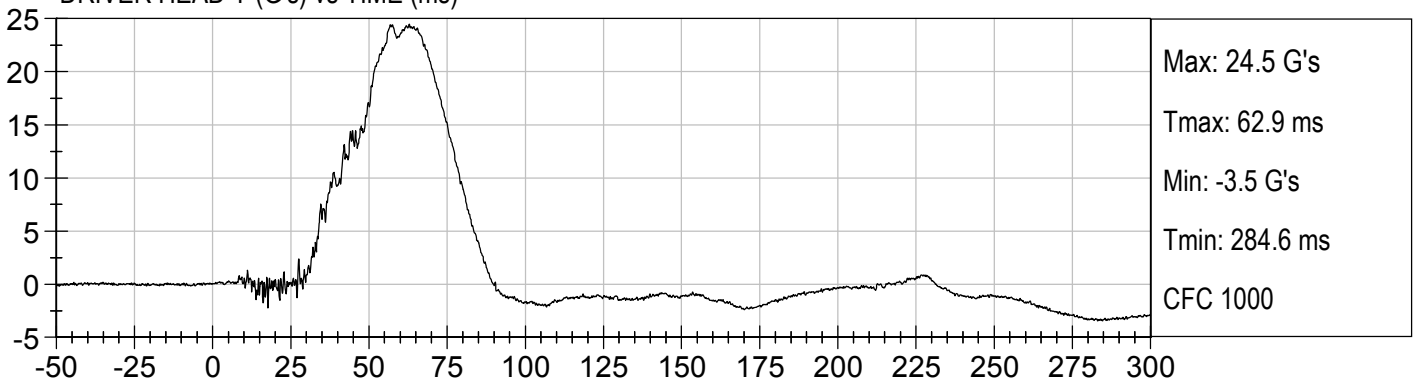
Left MDB Contact Switch

Right MDB Contact Switch

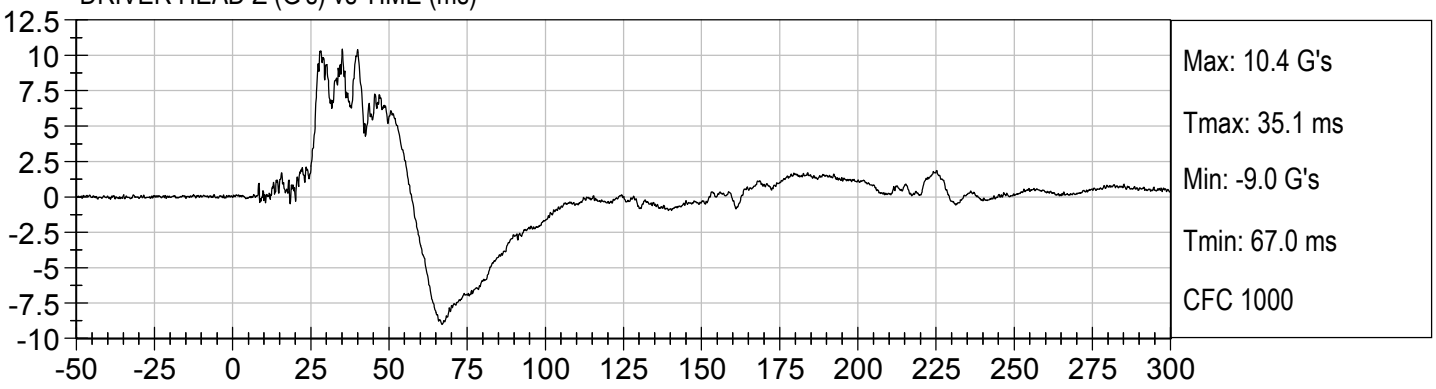
DRIVER HEAD X (G's) vs TIME (ms)



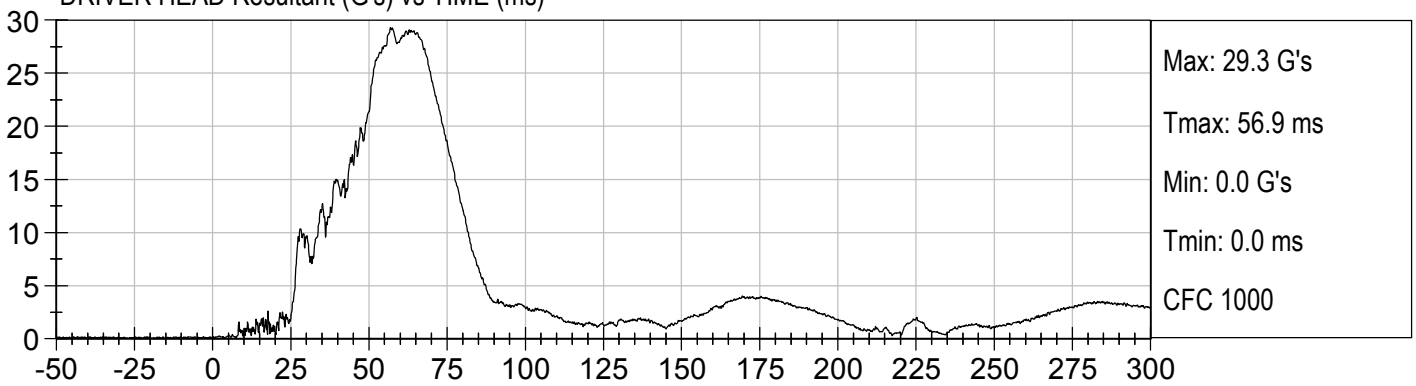
DRIVER HEAD Y (G's) vs TIME (ms)



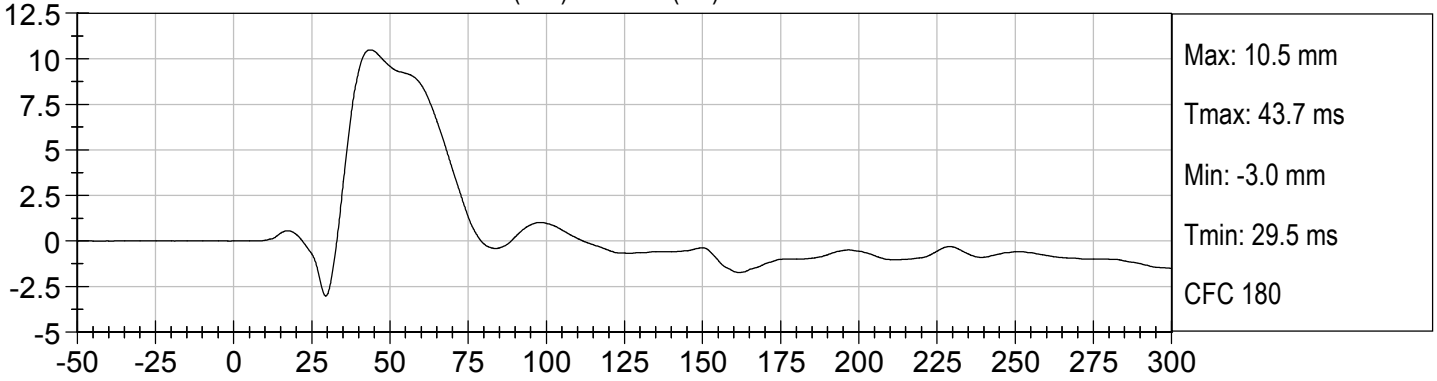
DRIVER HEAD Z (G's) vs TIME (ms)



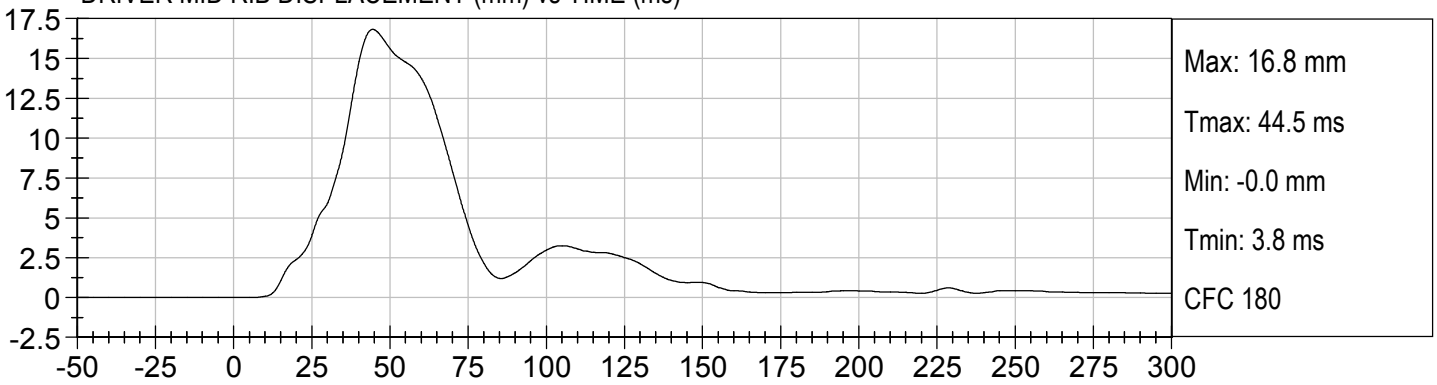
DRIVER HEAD Resultant (G's) vs TIME (ms)



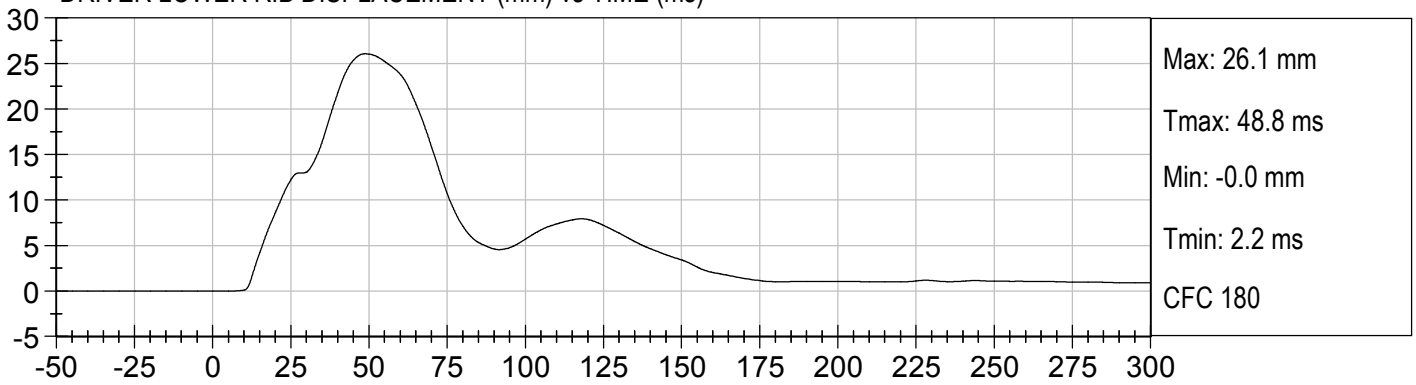
DRIVER UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



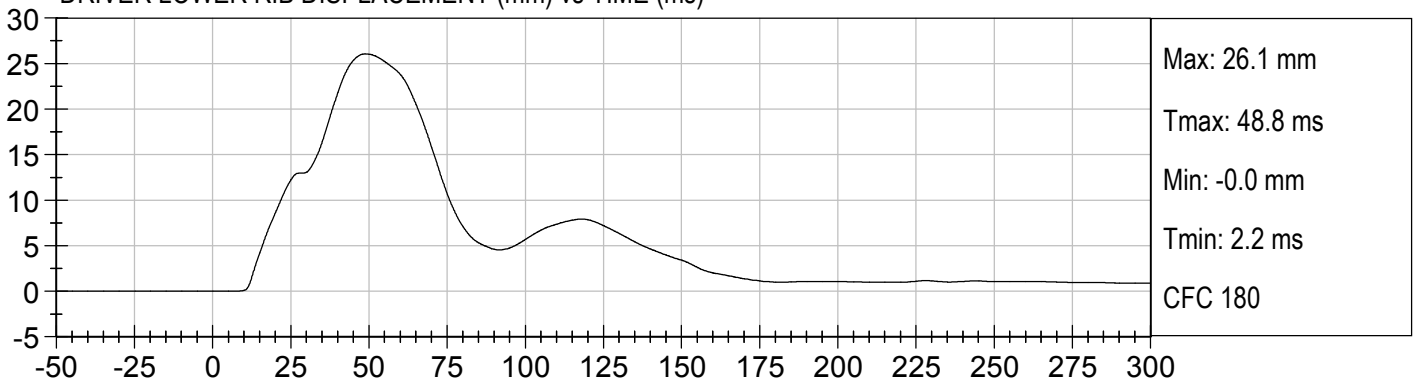
DRIVER MID RIB DISPLACEMENT (mm) vs TIME (ms)



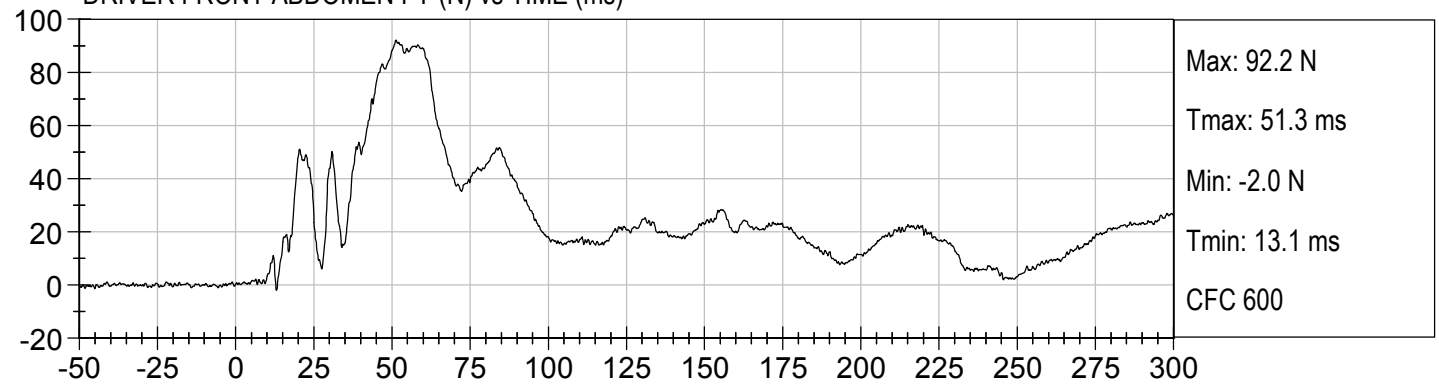
DRIVER LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



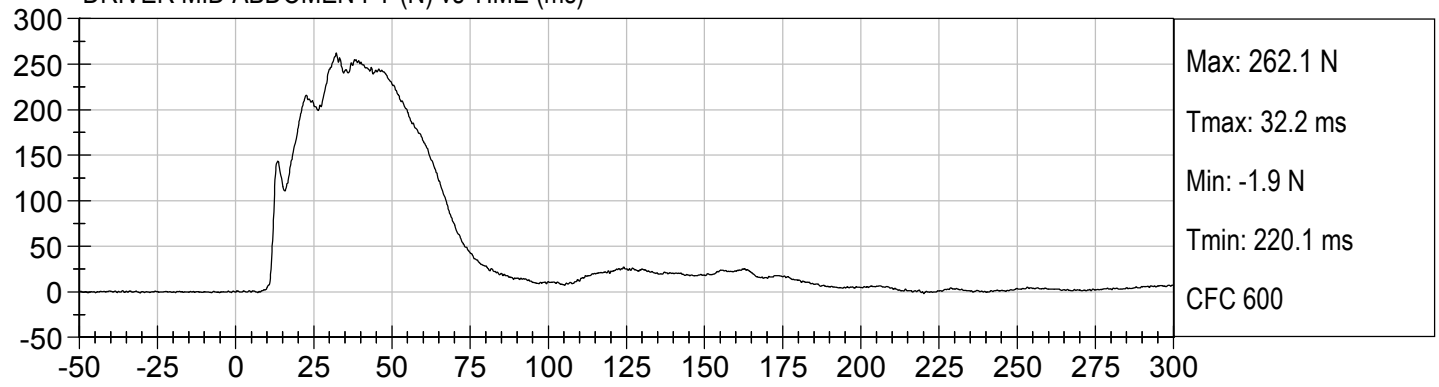
DRIVER LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



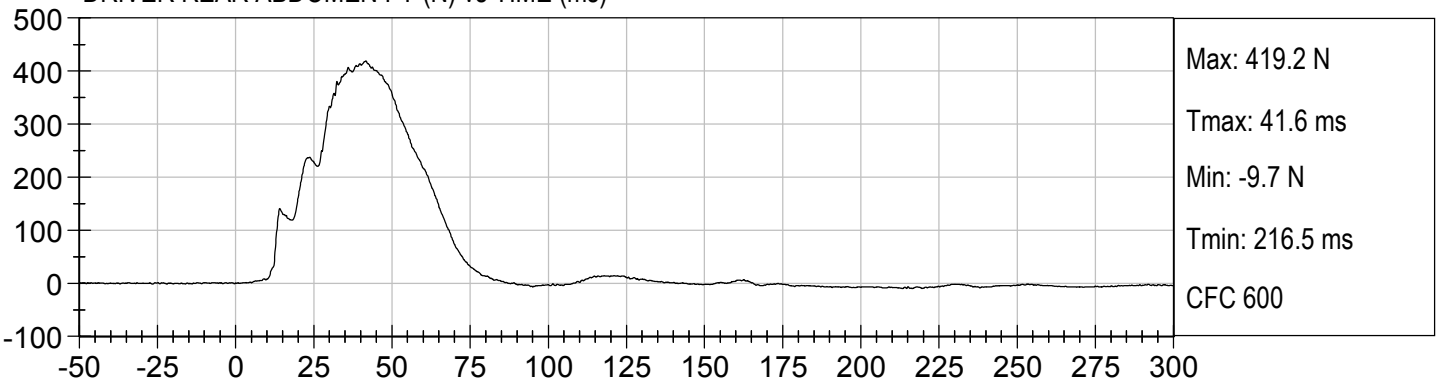
DRIVER FRONT ABDOMEN FY (N) vs TIME (ms)



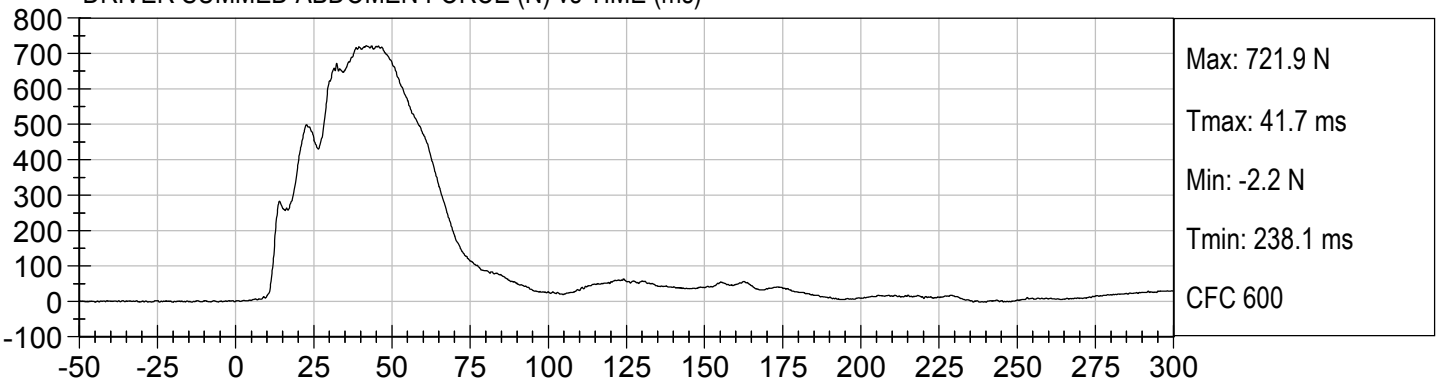
DRIVER MID ABDOMEN FY (N) vs TIME (ms)



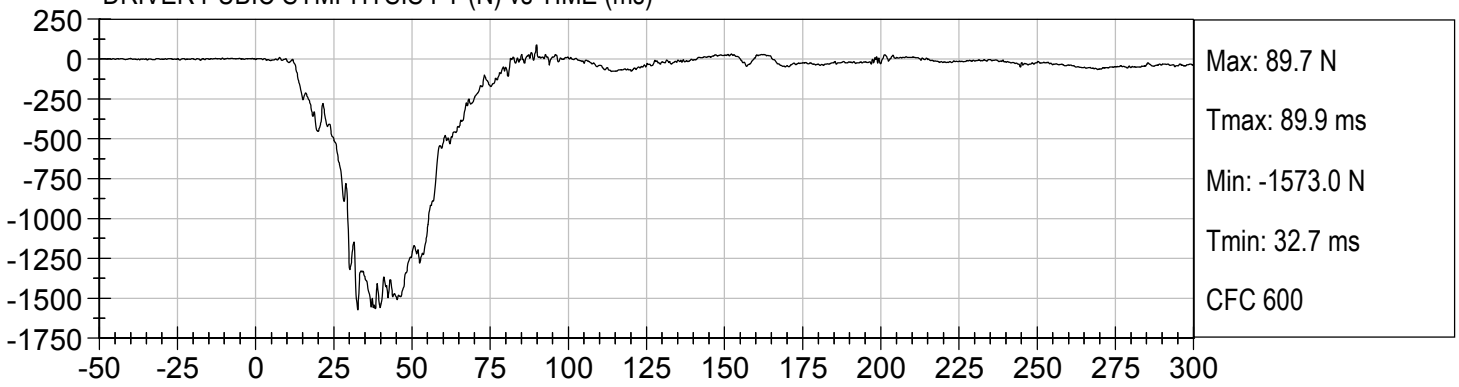
DRIVER REAR ABDOMEN FY (N) vs TIME (ms)



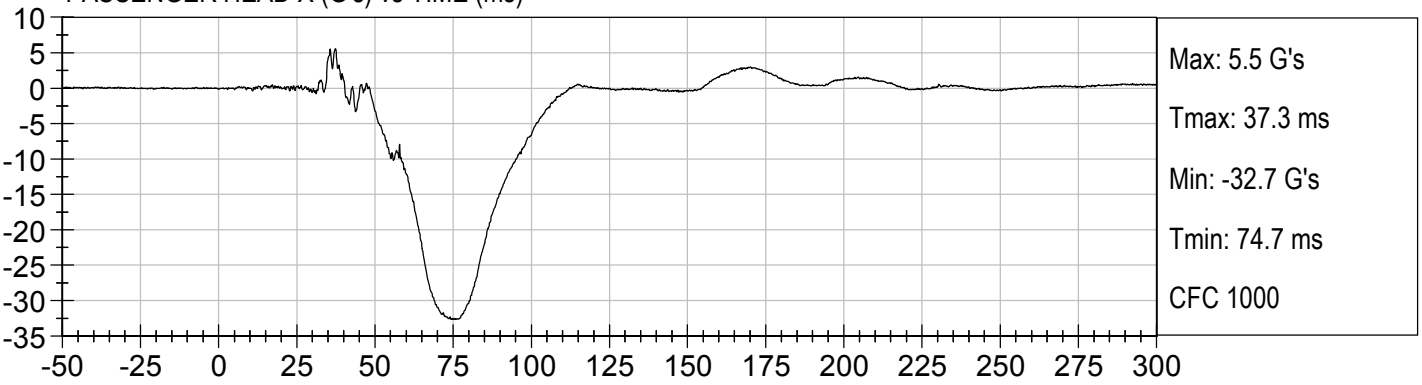
DRIVER SUMMED ABDOMEN FORCE (N) vs TIME (ms)



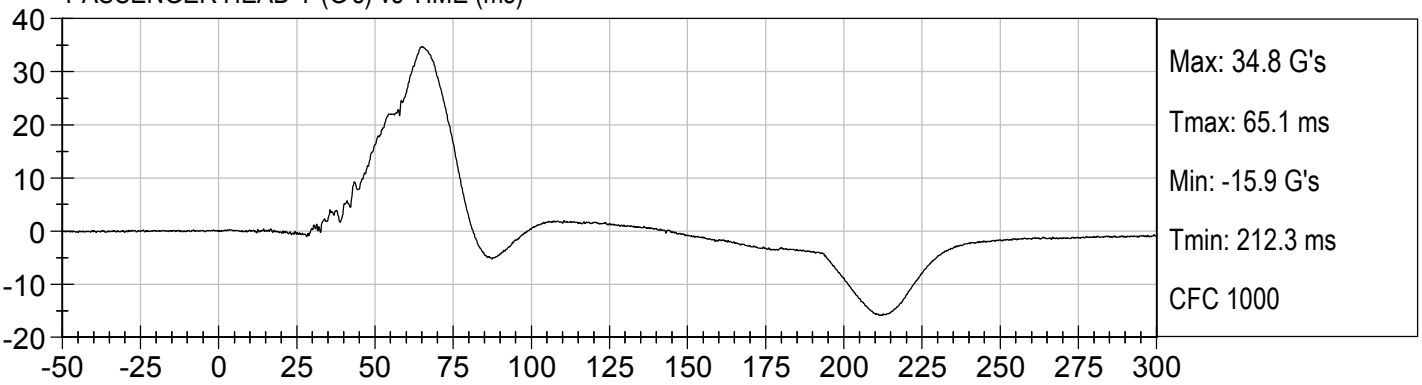
DRIVER PUBIC SYMPHYSIS FY (N) vs TIME (ms)



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

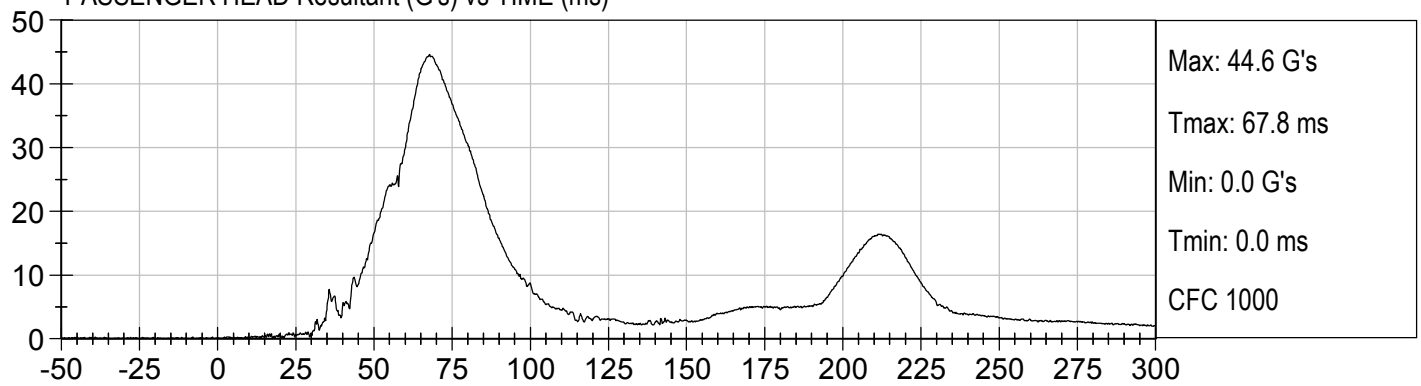


PASSENGER HEAD Y (G's) vs TIME (ms)

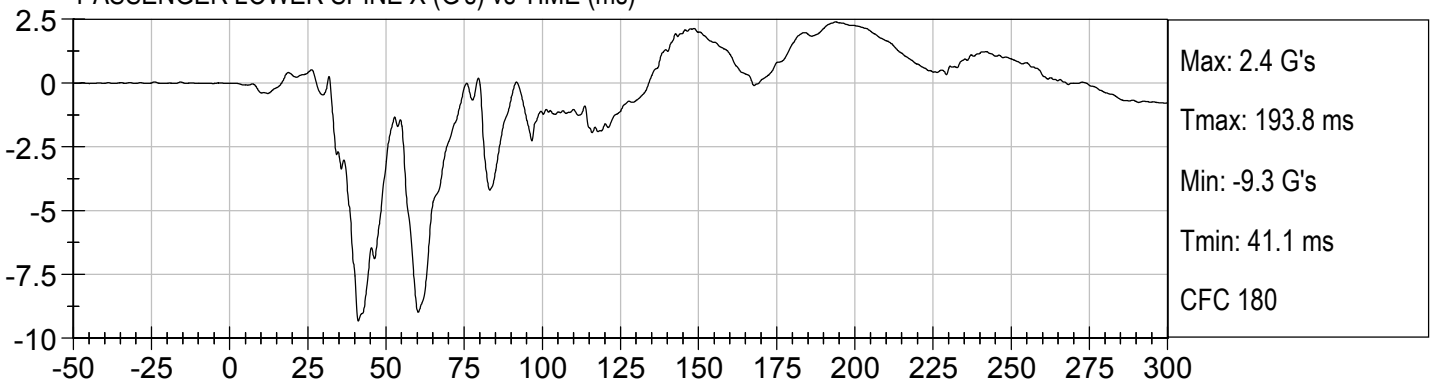


PASSENGER HEAD Z (G's) vs TIME (ms)

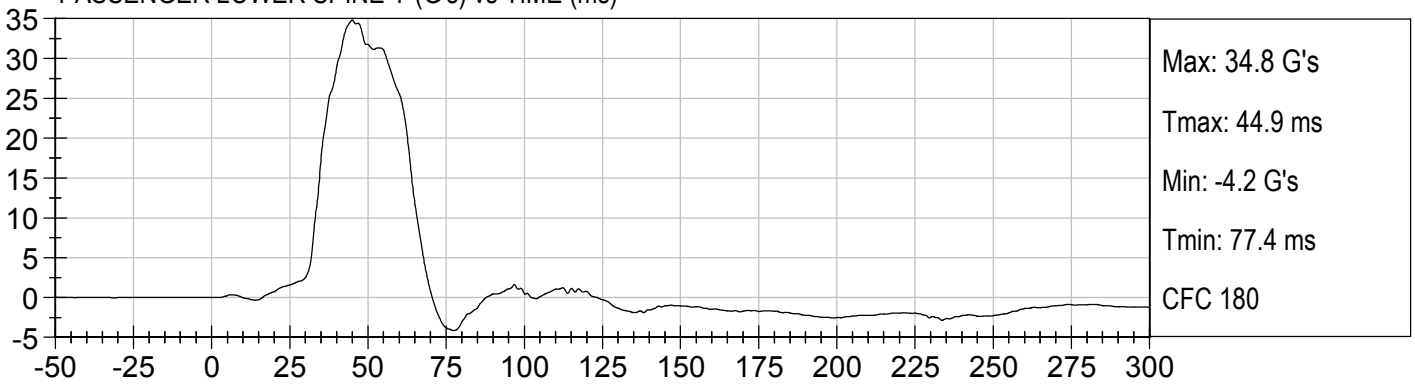
PASSENGER HEAD Resultant (G's) vs TIME (ms)



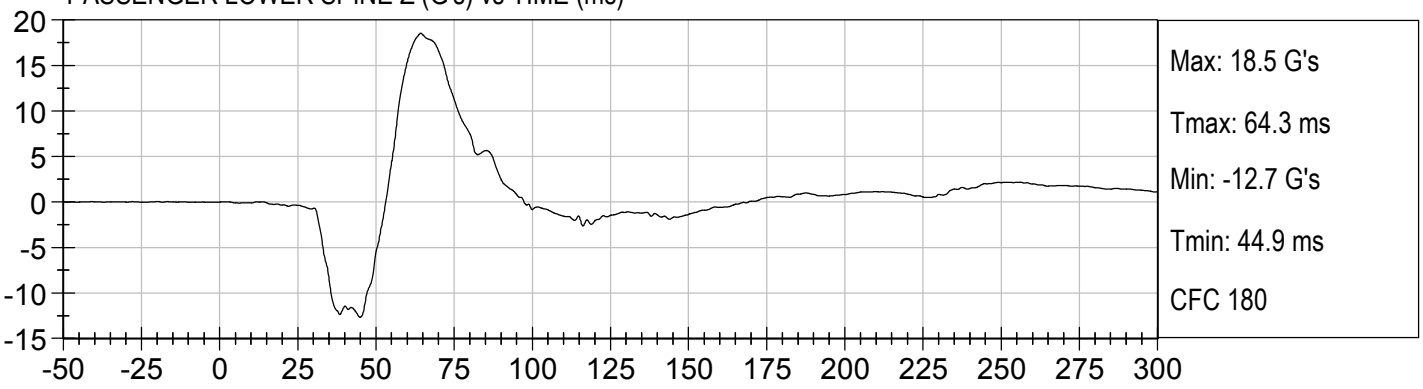
PASSENGER LOWER SPINE X (G's) vs TIME (ms)



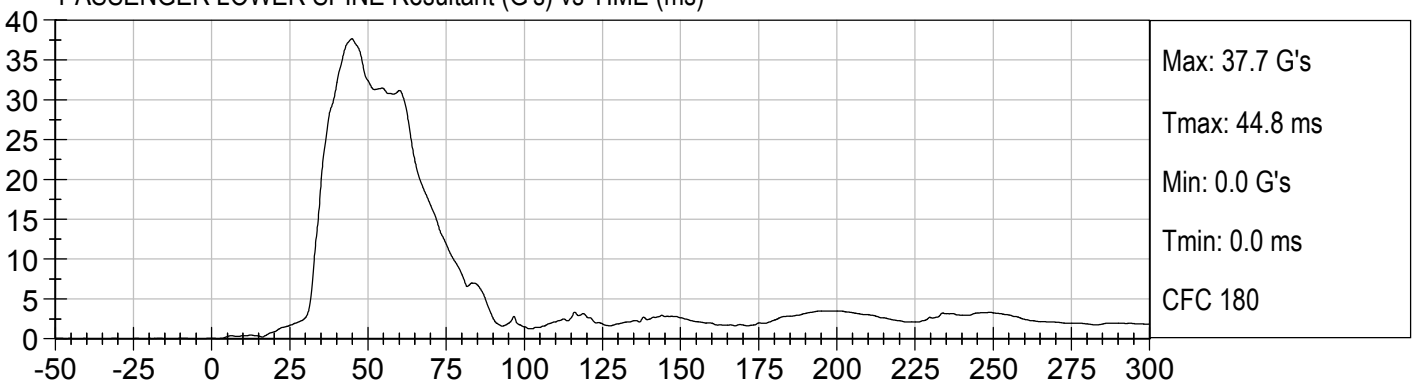
PASSENGER LOWER SPINE Y (G's) vs TIME (ms)



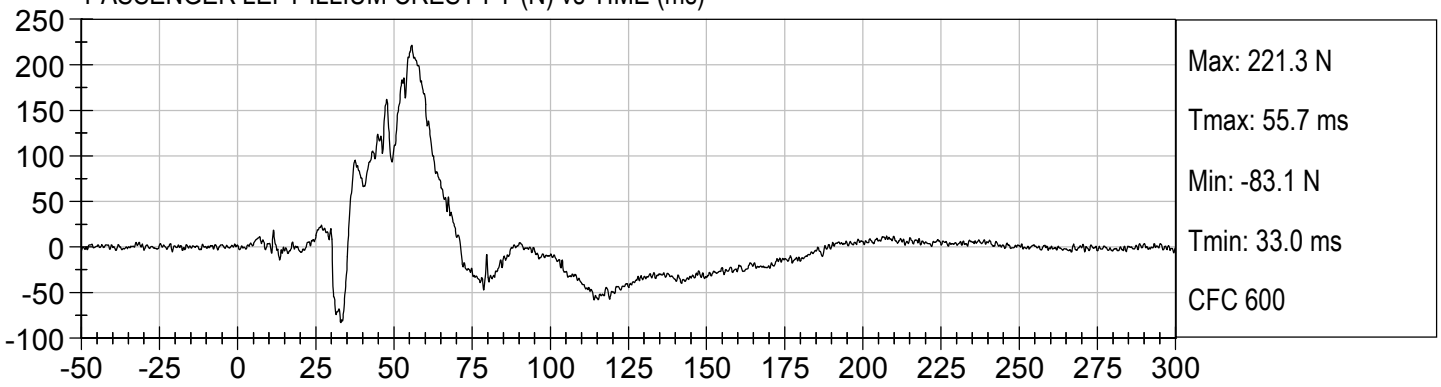
PASSENGER LOWER SPINE Z (G's) vs TIME (ms)



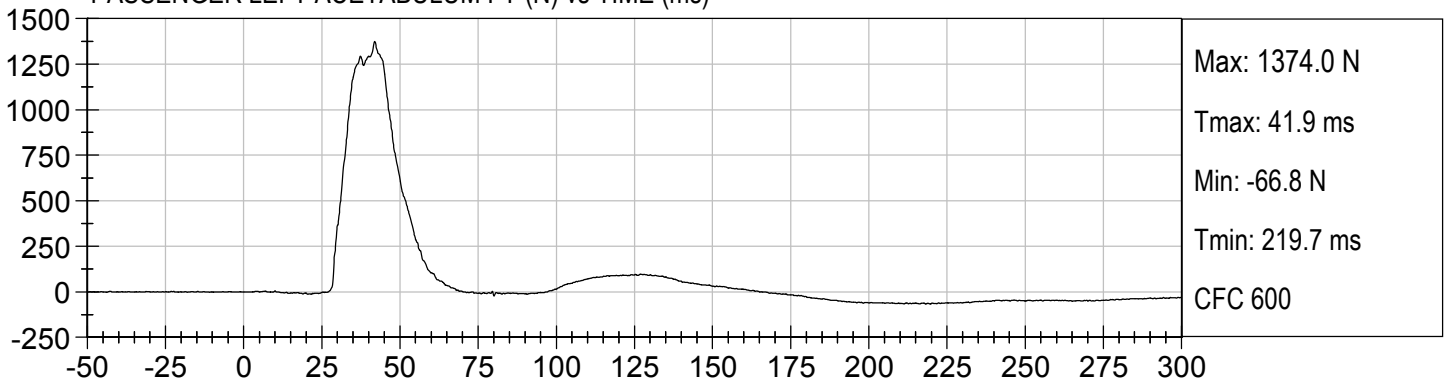
PASSENGER LOWER SPINE Resultant (G's) vs TIME (ms)



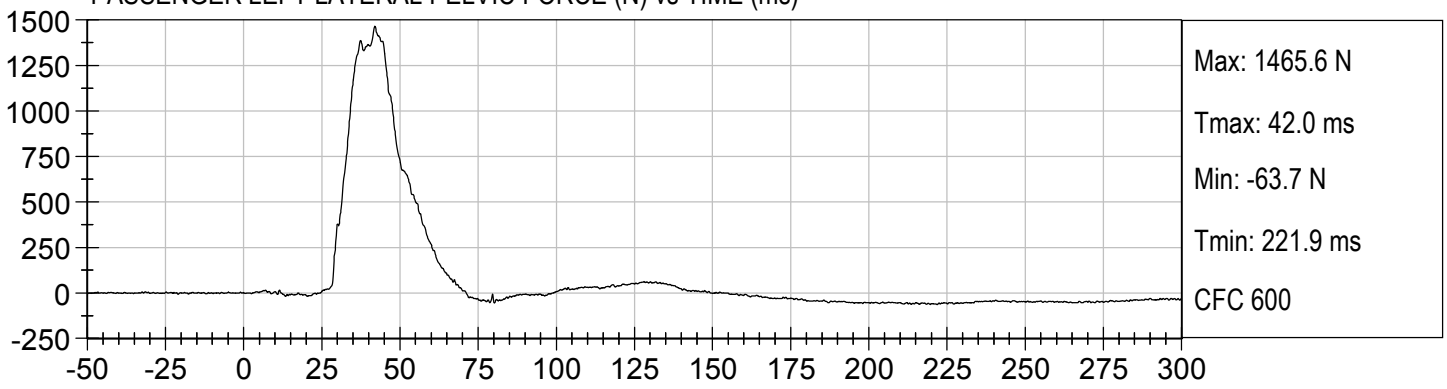
PASSENGER LEFT ILLIUM CREST FY (N) vs TIME (ms)



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:** D15821

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	125 to 155	131	Pass
Peak Longitudinal Acceleration	G's	<= +/- 15.0	-5.9	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 15% of peak	Yes	Pass
		Overall Test Results		Pass

David Schoedel
Laboratory Technician

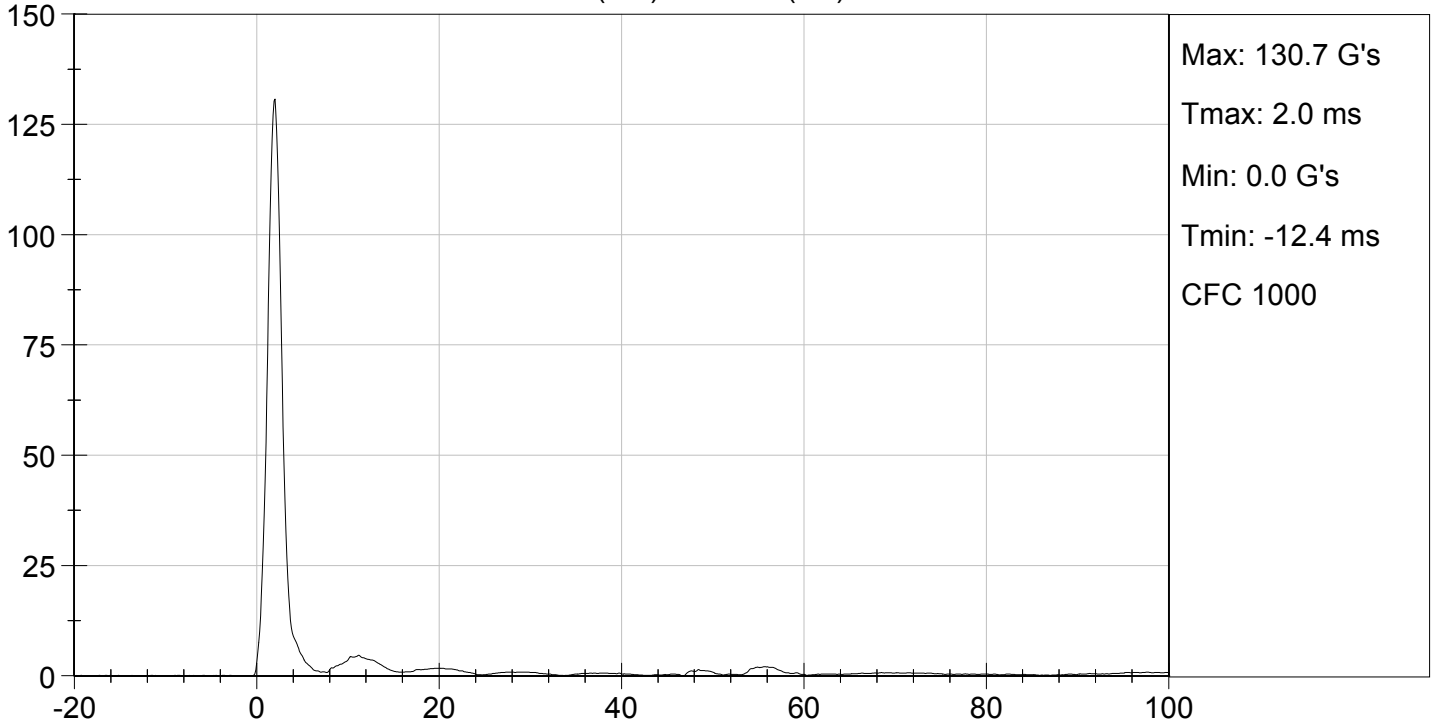
03/25/2015
Test Date

Jessica Hall
Approved By

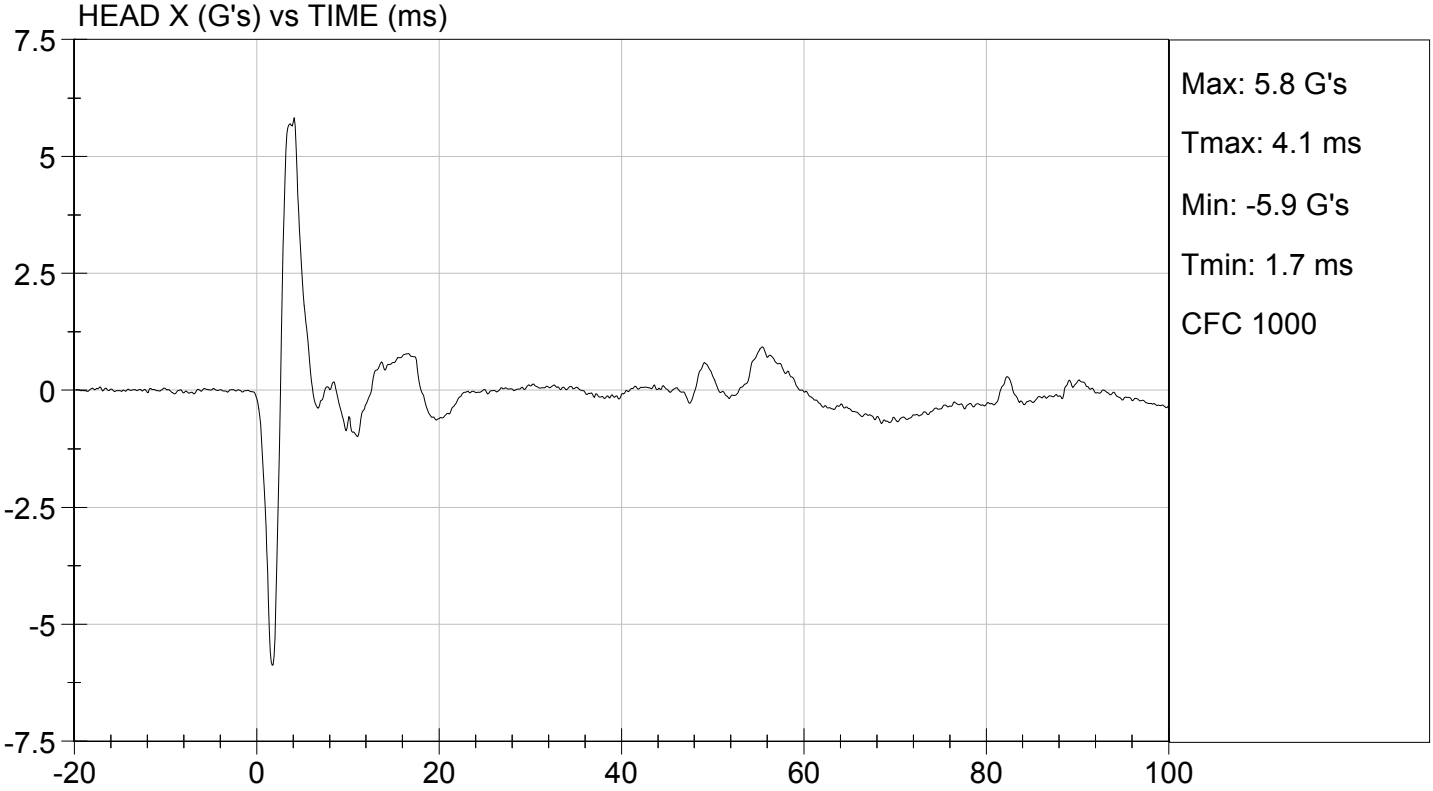
TEST DESC: HEAD DROP

TEST DATE: 03/25/2015
TEST #: D15821

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



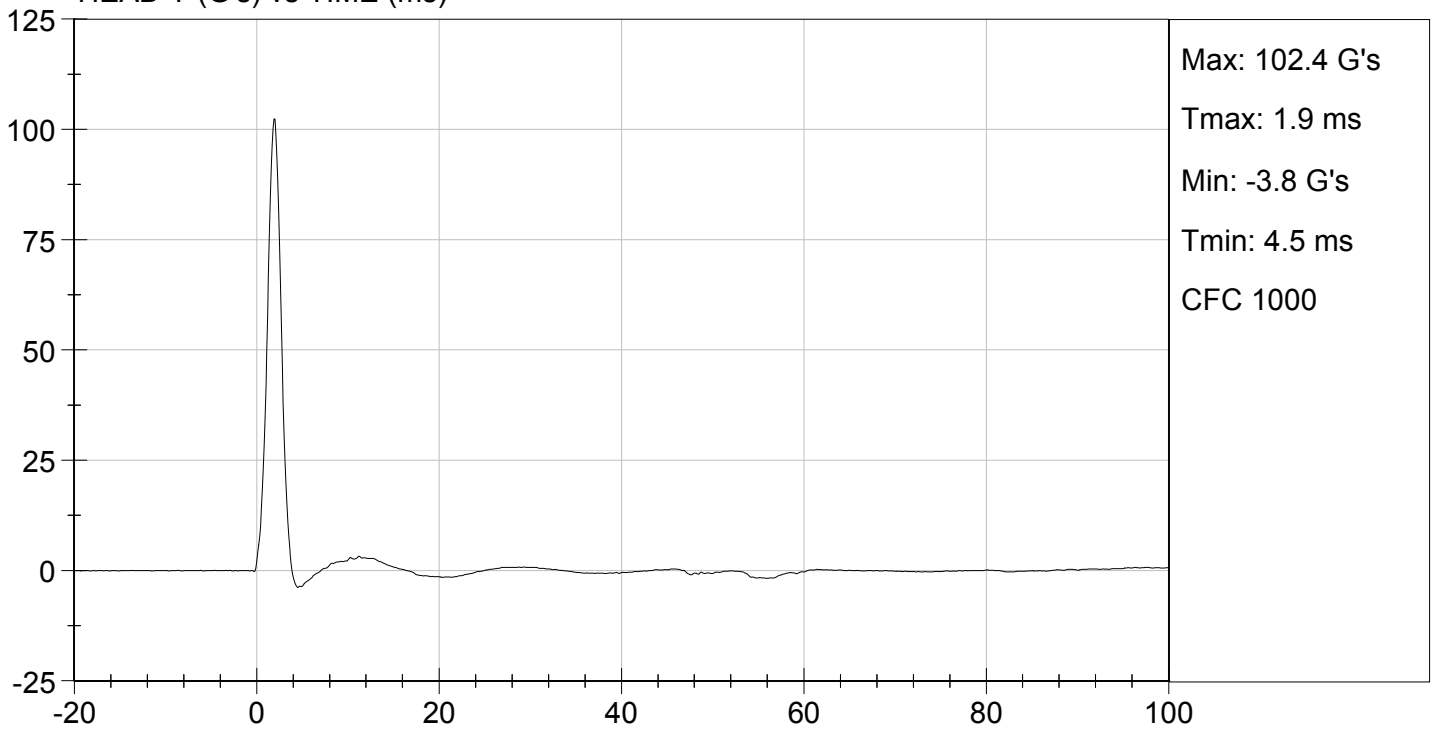
HEAD X (G's) vs TIME (ms)



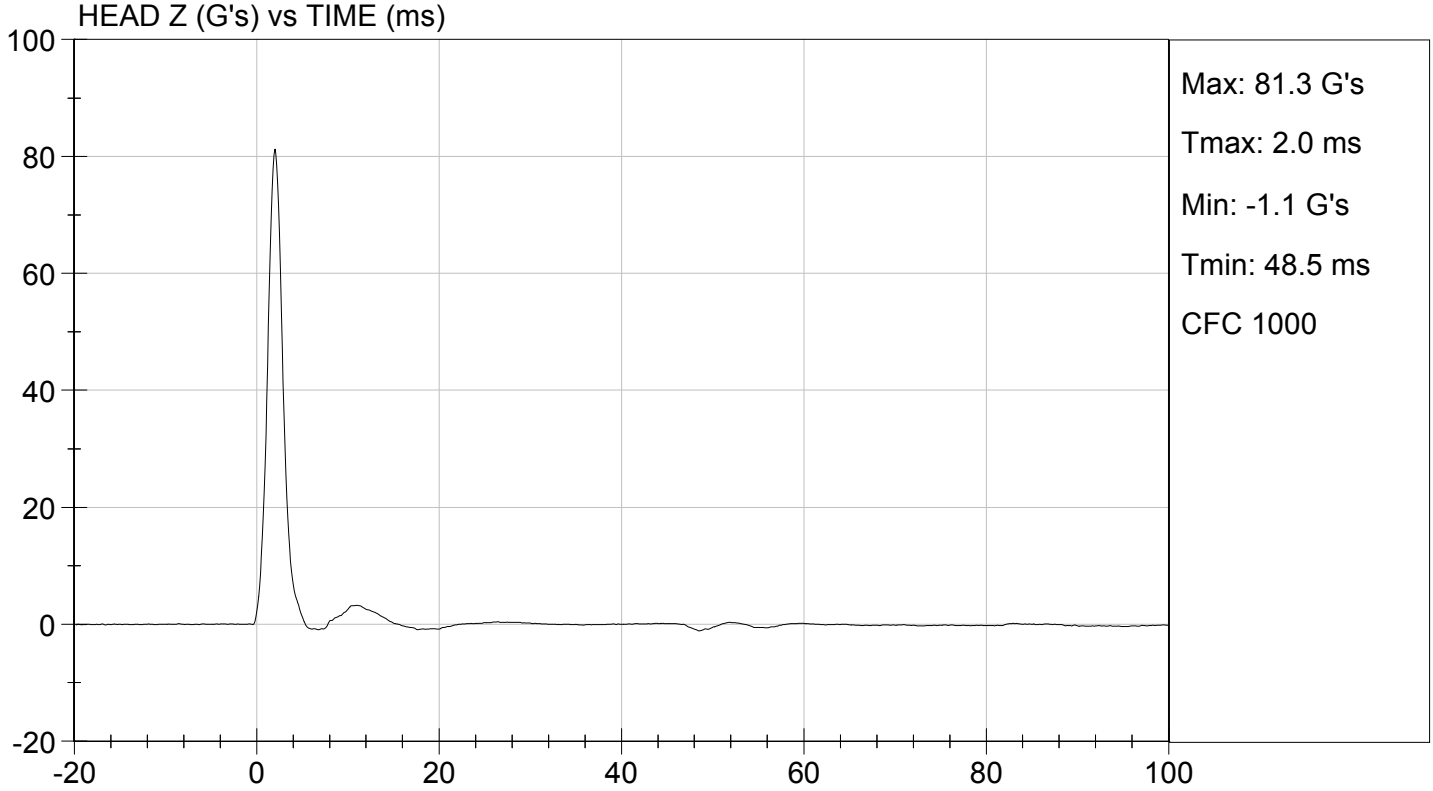
TEST DESC: HEAD DROP

TEST DATE: 03/25/2015
TEST #: D15821

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



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



MGA RESEARCH CORPORATION

NECK PENDULUM TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D15822

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Speed		m/s	3.30 to 3.50	3.39	Pass
Pendulum Velocity	1 ms	m/s	-0.05 to 0.00	-0.02	Pass
	3 ms	m/s	-0.25 to -0.375	-0.32	Pass
	14 ms	m/s	-3.20 to -3.70	-3.27	Pass
	17 ms	m/s	>= -3.70	-3.33	Pass
Maximum Flexion Angle		deg	49.0 to 59.0	52.5	Pass
Time of Maximum Flexion Angle		ms	54.0 to 66.0	60.7	Pass
Head Rotation Decay Time to 0 Degree		ms	53.0 to 88.0	59.6	Pass
			Overall Results		Pass

David Schoedel

Laboratory Technician

03/25/2015

Test Date

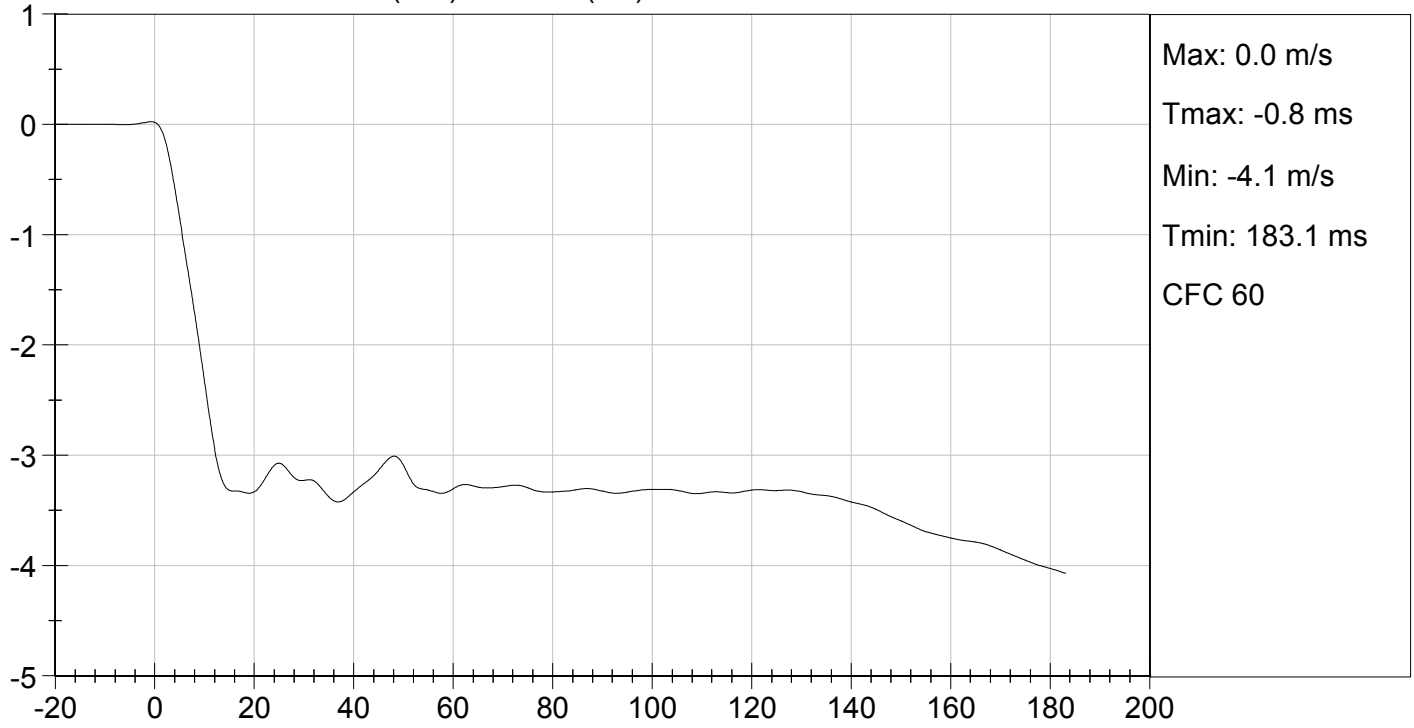
Jessica Hall

Approved By

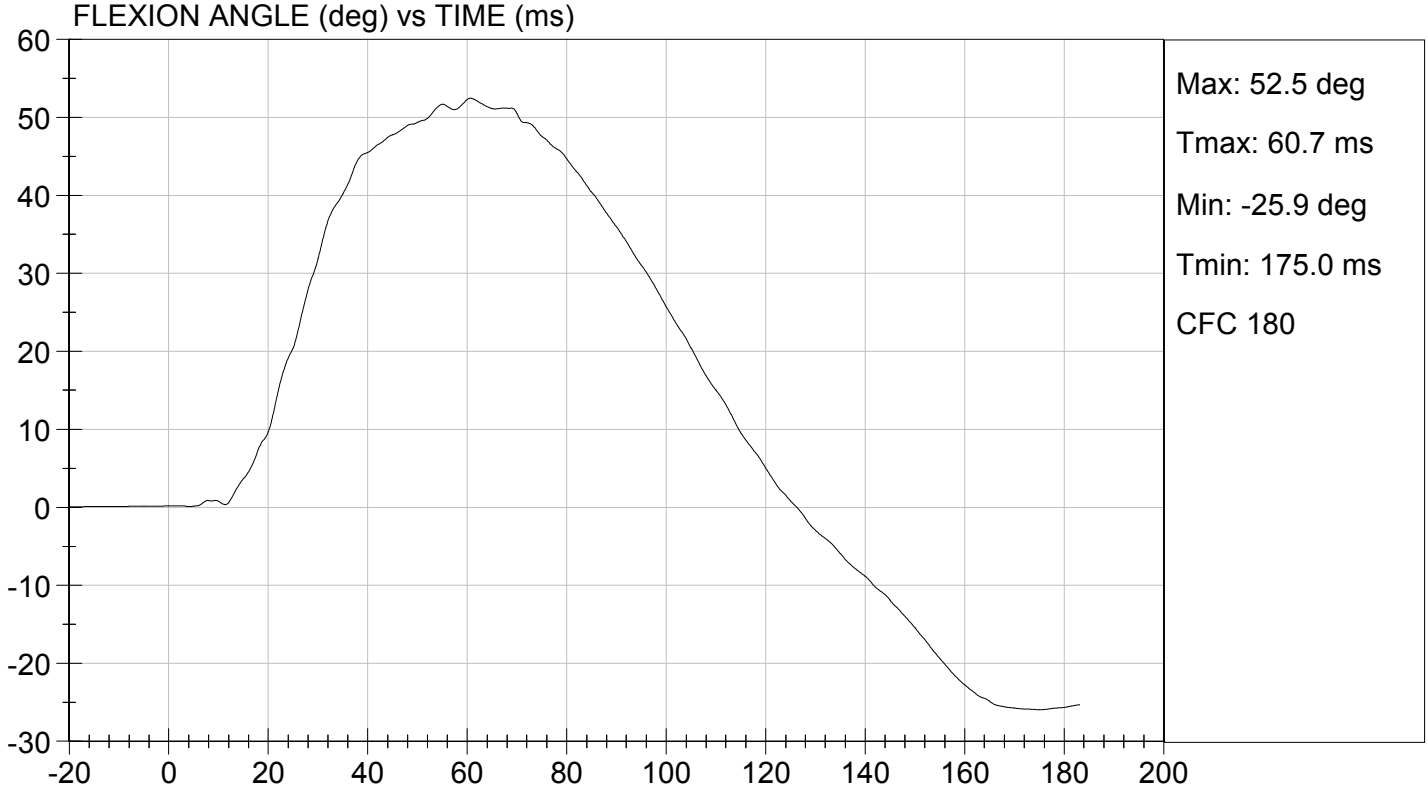
TEST DESC: NECK BENDING
VELOCITY: 11.11 ft/s, 3.39 m/s

TEST DATE: 03/25/2015
TEST #: D15822

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



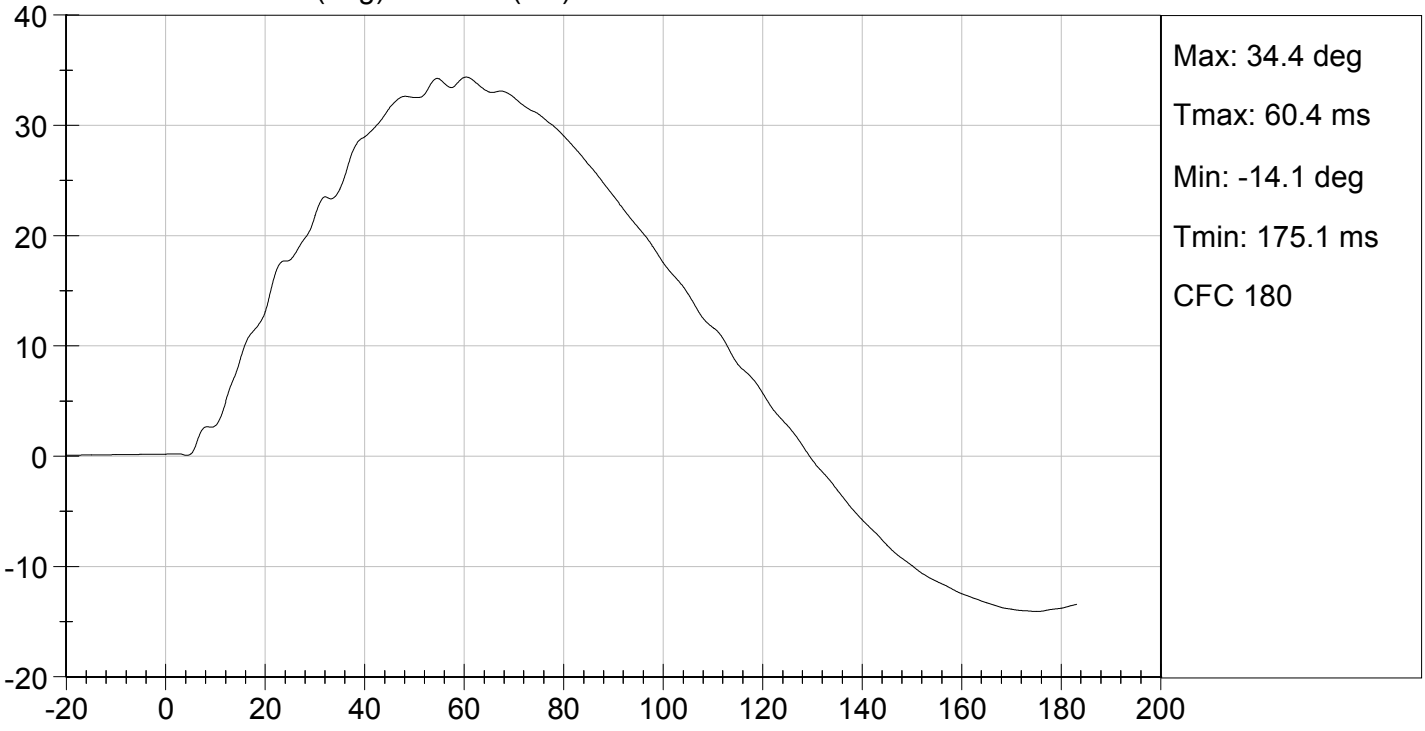
FLEXION ANGLE (deg) vs TIME (ms)



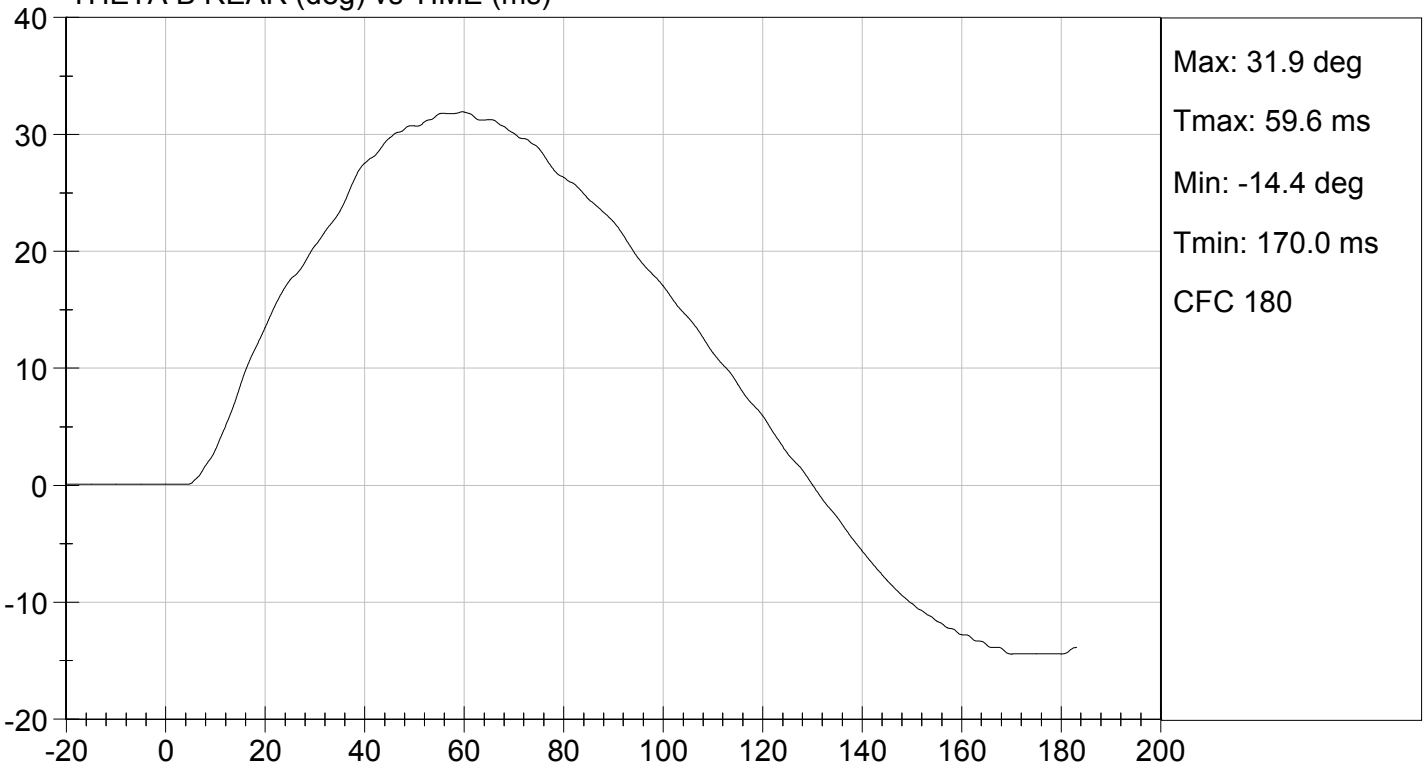
TEST DESC: NECK BENDING
VELOCITY: 11.11 ft/s, 3.39 m/s

TEST DATE: 03/25/2015
TEST #: D15822

THETA A FRONT (deg) vs TIME (ms)

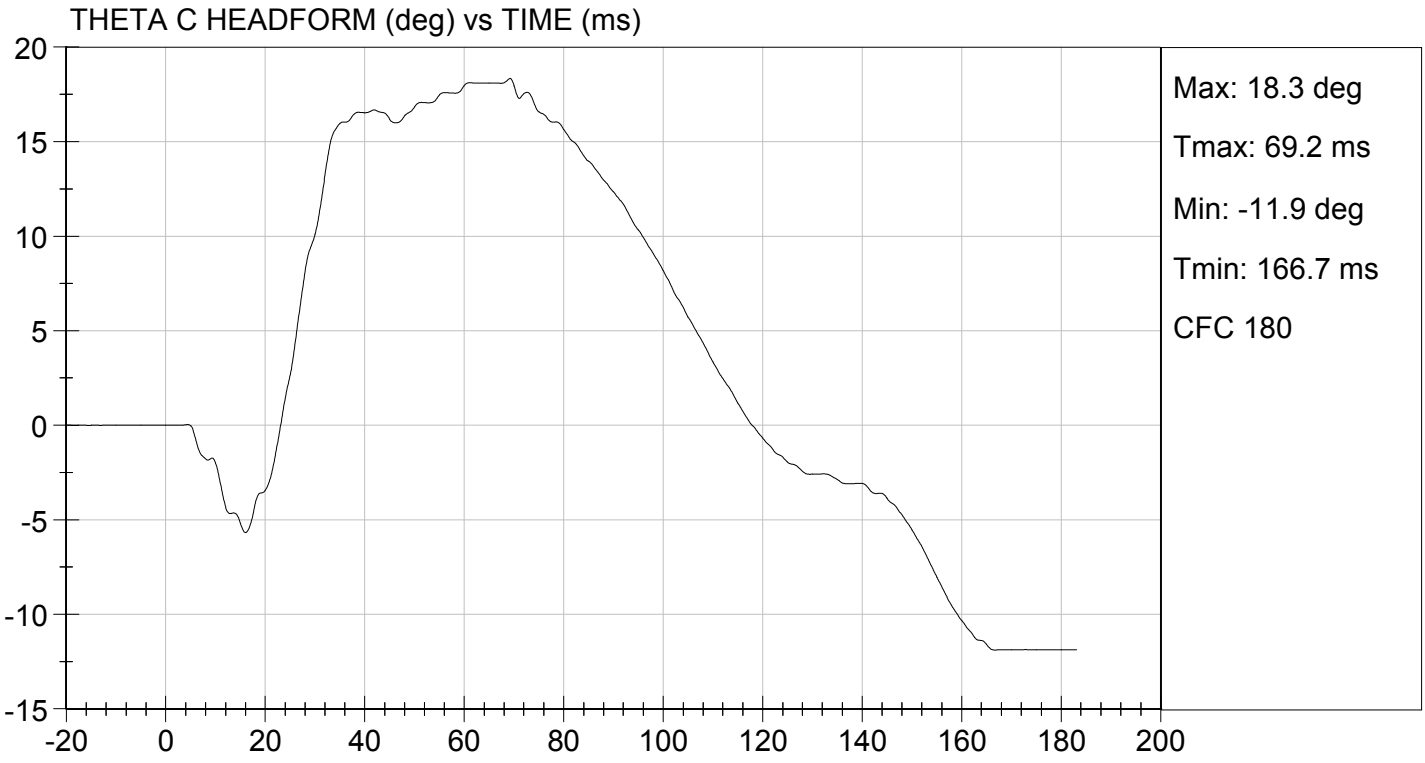


THETA B REAR (deg) vs TIME (ms)



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

TEST DATE: 03/25/2015
TEST #: D15822



MGA RESEARCH CORPORATION

SHOULDER IMPACT TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D15823

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	24	Pass
Pendulum Speed	m/s	4.20 to 4.40	4.38	Pass
Peak Impactor Acceleration	G's	7.5 to 10.5	9.6	Pass
		Overall Test Results		Pass

Maxime Chamberland
Laboratory Technician

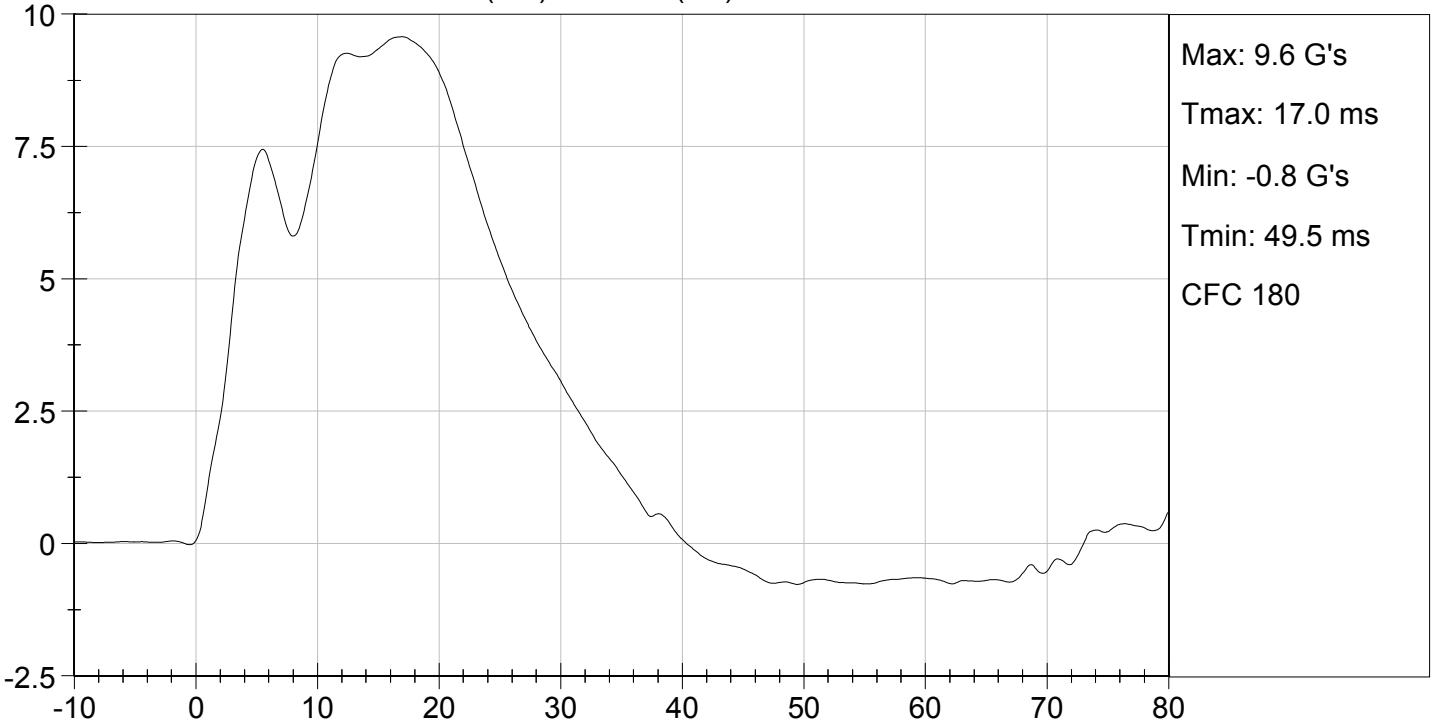
03/26/2015
Test Date

Jessica Gall
Approved By

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

TEST DATE: 03/26/2015
TEST #: D15823

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



MGA RESEARCH CORPORATION

UPPER RIB TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D15824

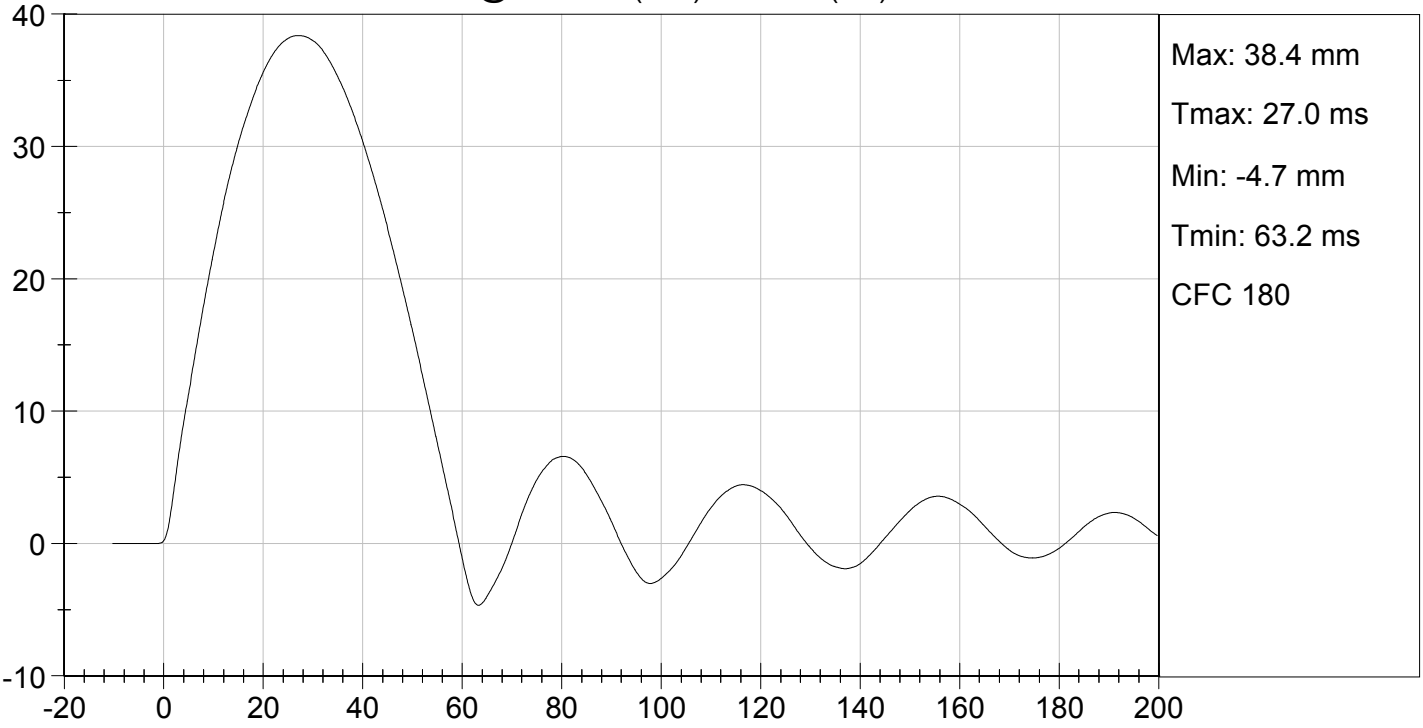
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Displacement at 459 mm	mm	36.0 to 40.0	38.4	Pass
Displacement at 815 mm	mm	46.0 to 51.0	48.9	Pass
		Overall Test Results		Pass

David Schoedel
Laboratory Technician

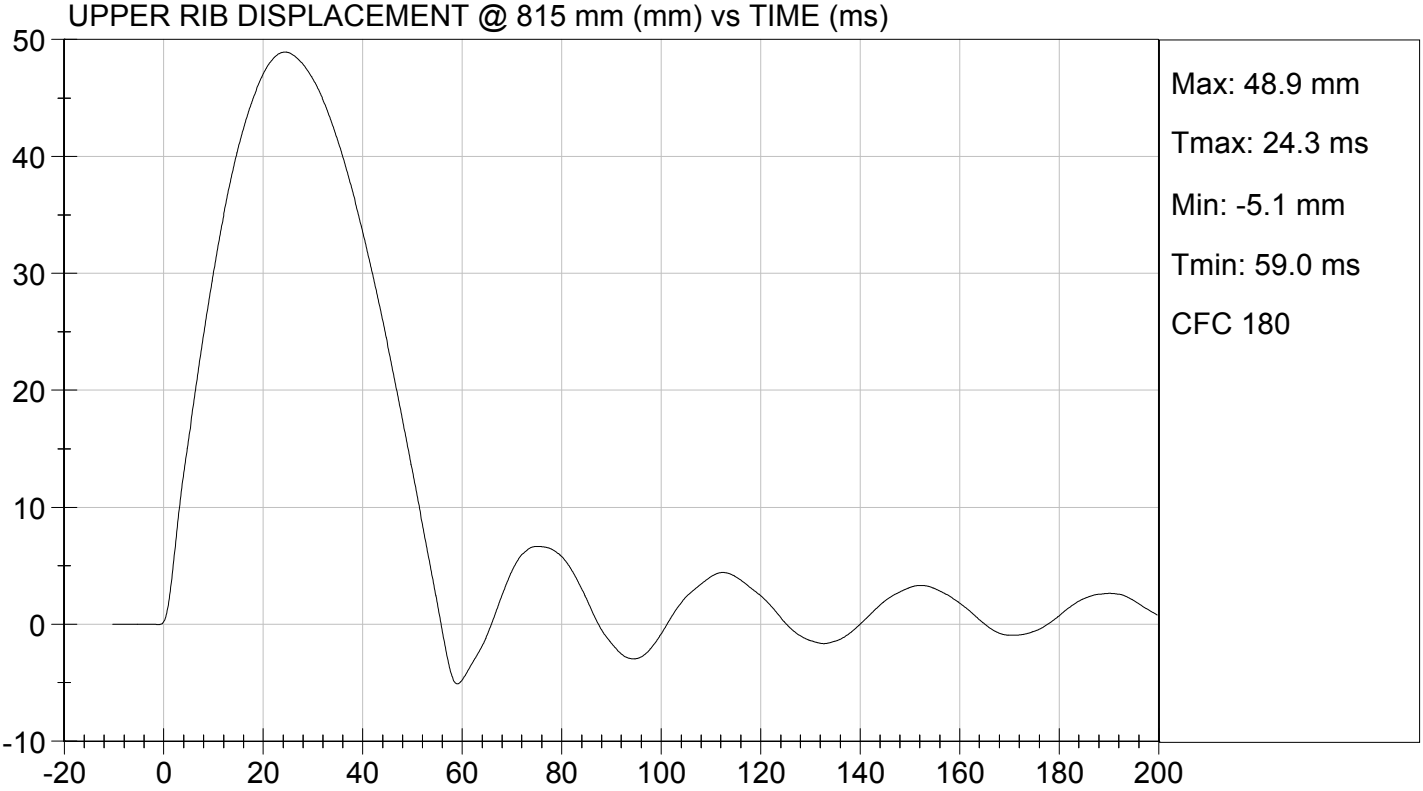
03/25/2015
Test Date

Jessica Hall
Approved By

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



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



MGA RESEARCH CORPORATION

MID RIB TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D15825

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Displacement at 459 mm	mm	36.0 to 40.0	36.7	Pass
Displacement at 815 mm	mm	46.0 to 51.0	47.3	Pass
		Overall Test Results		Pass

David Schoedel

Laboratory Technician

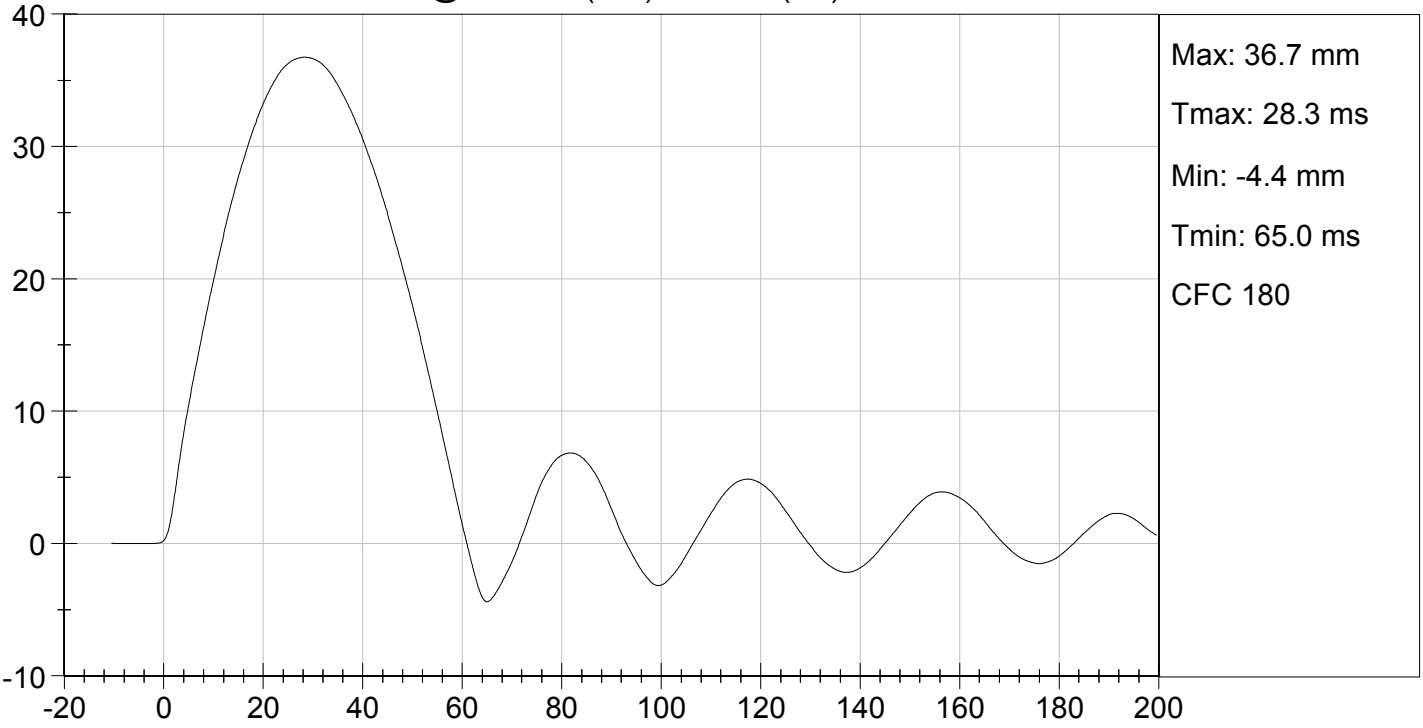
03/25/2015

Test Date

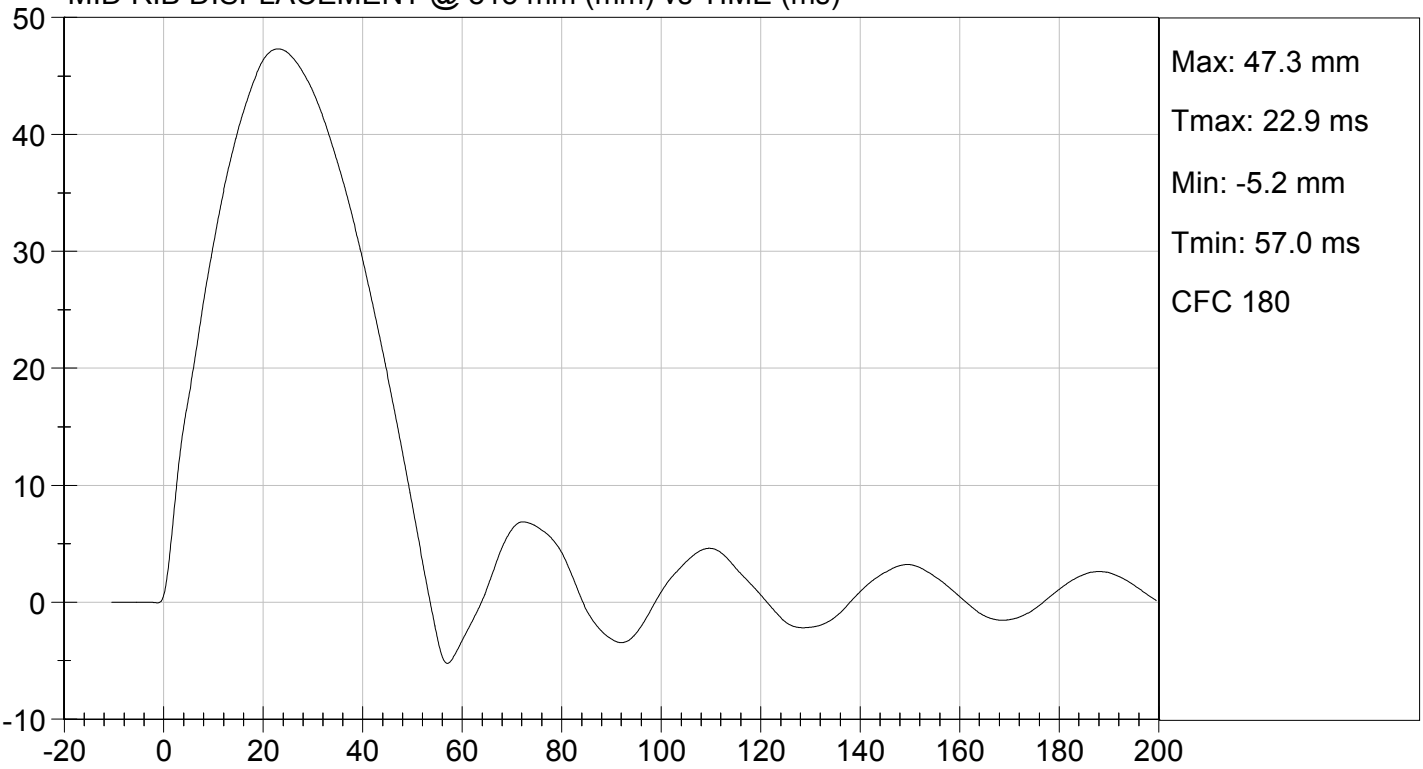
Jessica Hall

Approved By

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



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



MGA RESEARCH CORPORATION

LOWER RIB TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D15826

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Displacement at 459 mm	mm	36.0 to 40.0	37.5	Pass
Displacement at 815 mm	mm	46.0 to 51.0	50.0	Pass
		Overall Test Results		Pass

David Schoedel

Laboratory Technician

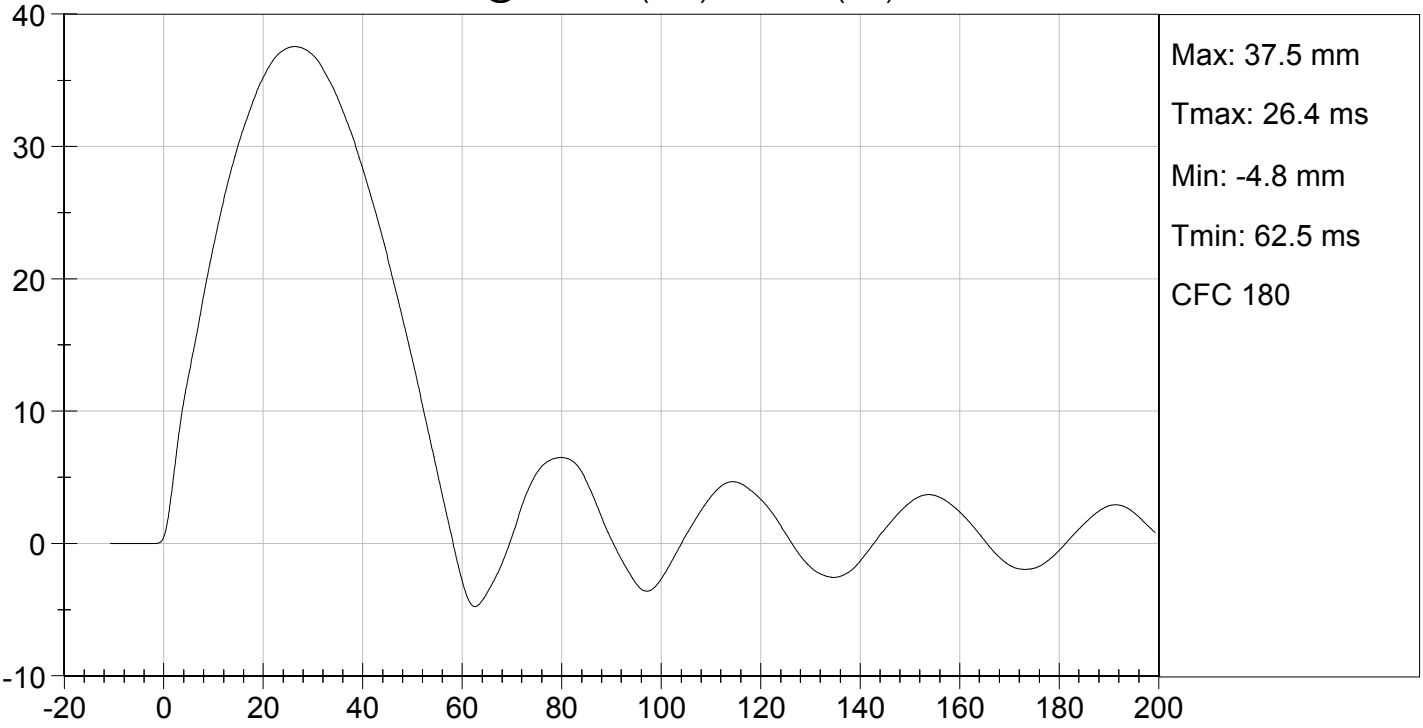
03/25/2015

Test Date

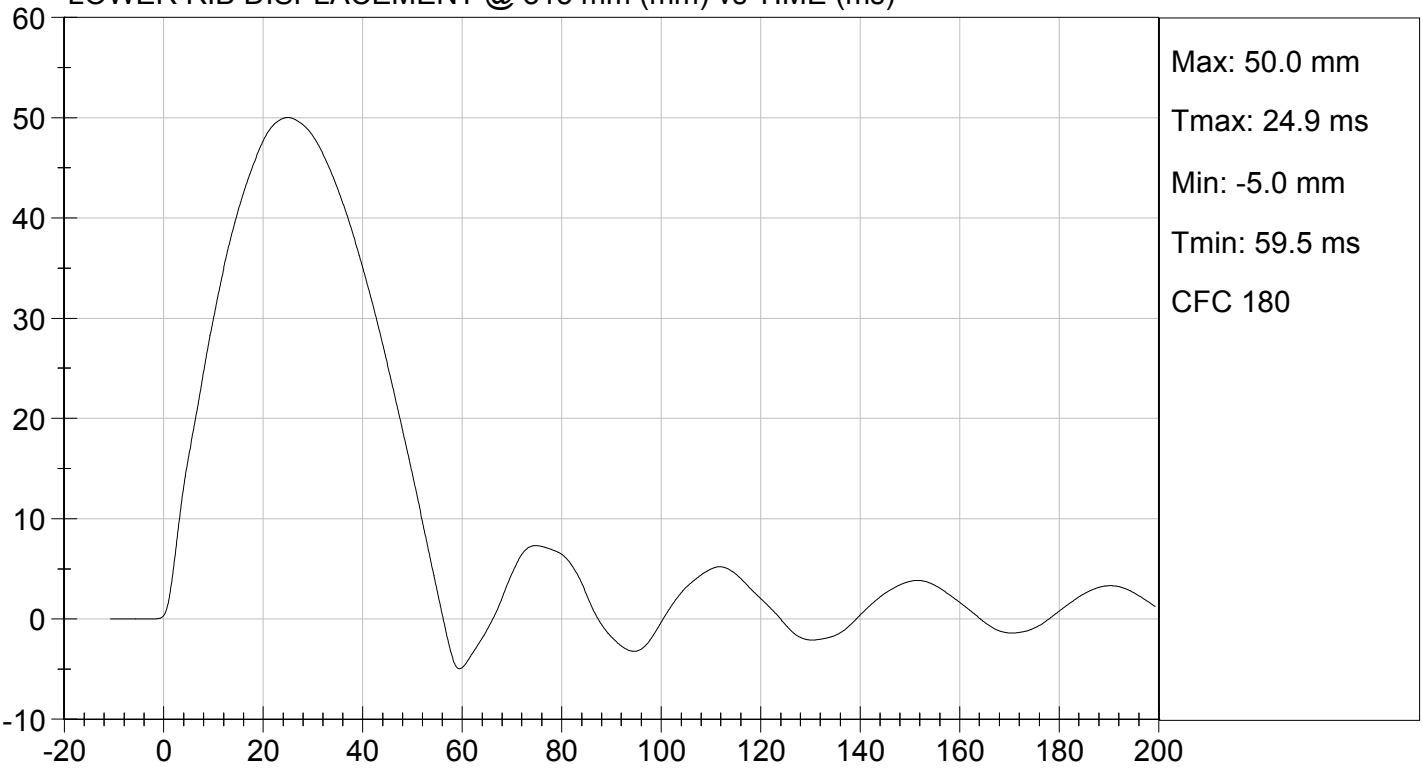
Jessica Hall

Approved By

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



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



MGA RESEARCH CORPORATION

THORAX IMPACT TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D15820

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.7	Pass
Humidity	%	10 to 70	24	Pass
Probe Speed	m/s	5.40 to 5.60	5.58	Pass
Maximum Impactor Force (after 6 ms)	N	5100 to 6200	6032	Pass
Upper Rib Displacement	mm	34.0 to 41.0	38.1	Pass
Middle Rib Displacement	mm	37.0 to 45.0	40.9	Pass
Lower Rib Displacement	mm	37.0 to 44.0	40.8	Pass
		Overall Test Results		Pass

Maxime Chamberland
Laboratory Technician

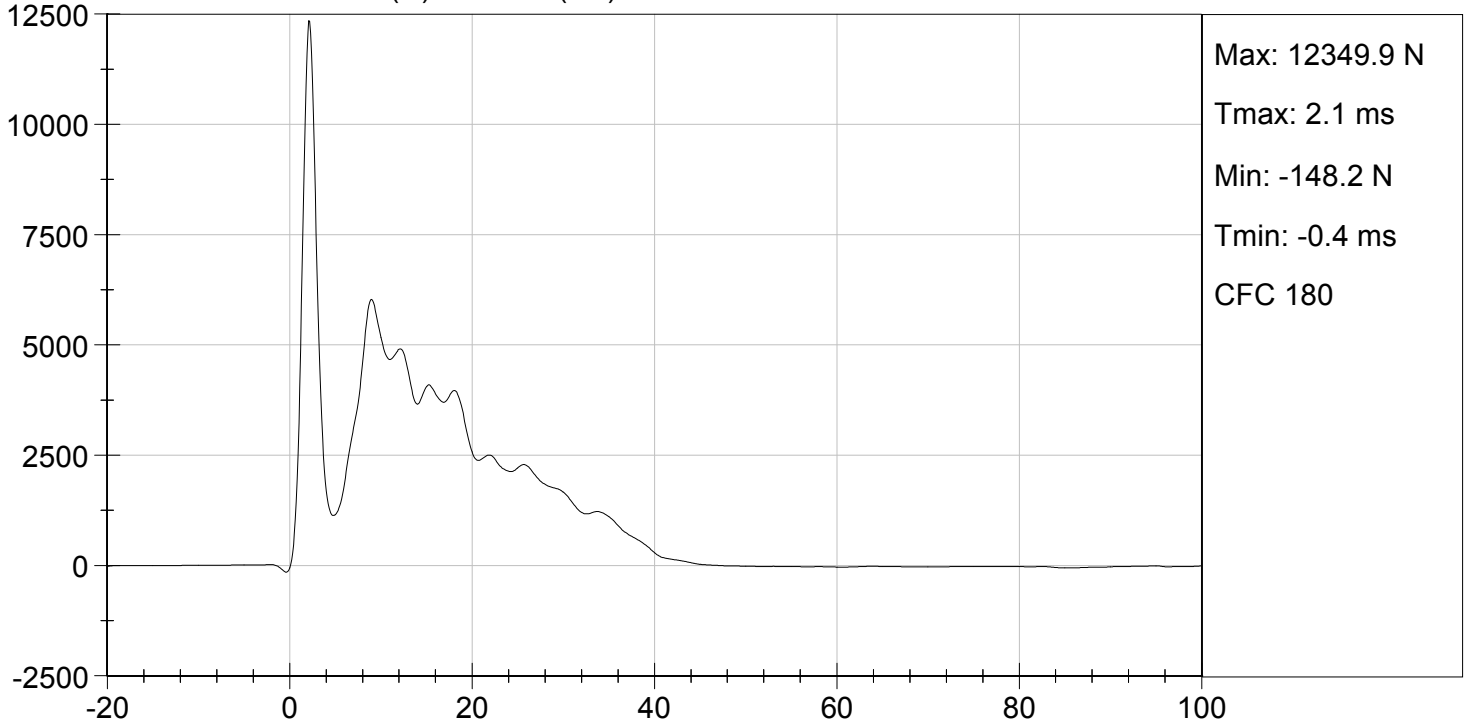
03/26/2015
Test Date

Jessica Hall
Approved By

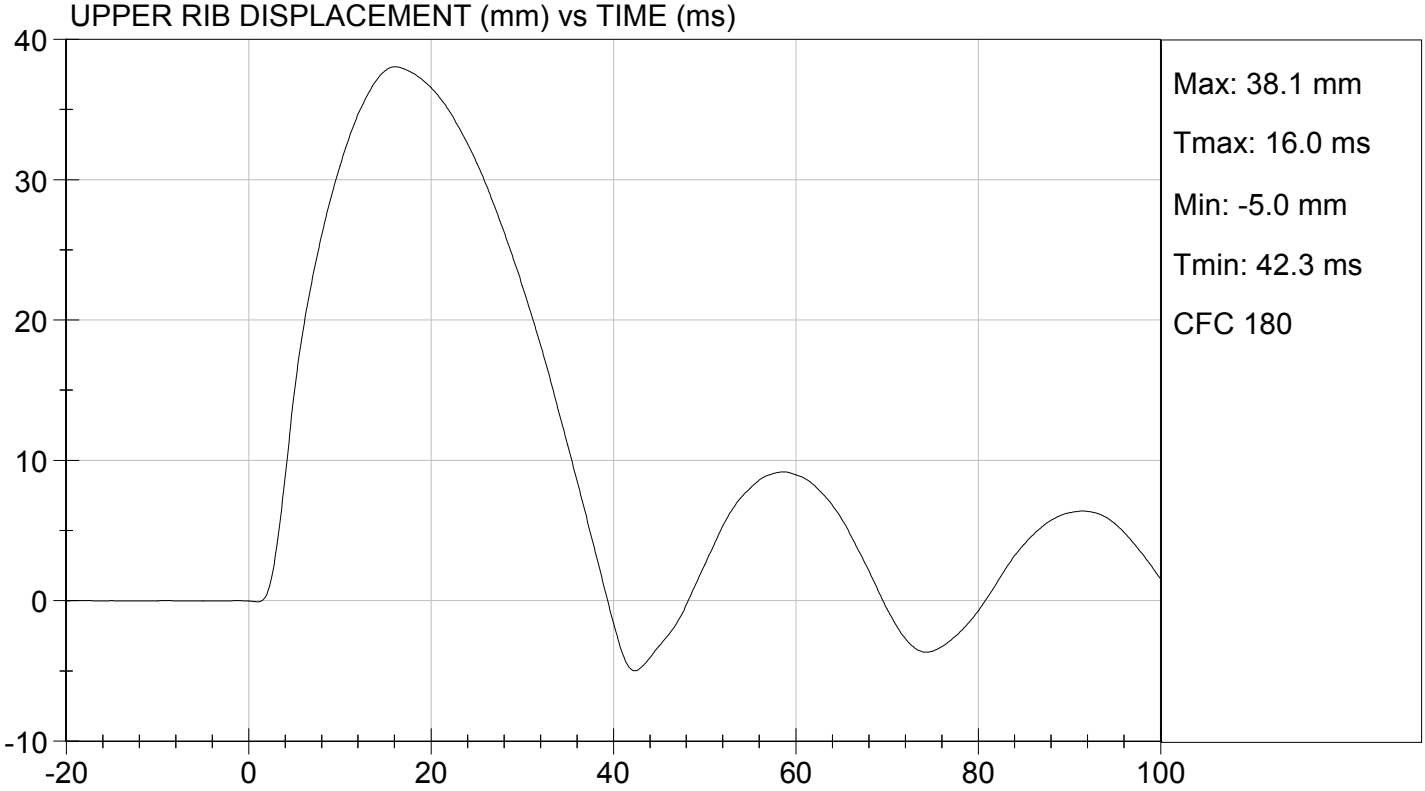
TEST DESC: THORAX IMPACT
VELOCITY: 18.32 ft/s, 5.58 m/s

TEST DATE: 03/26/2015
TEST #: D15820

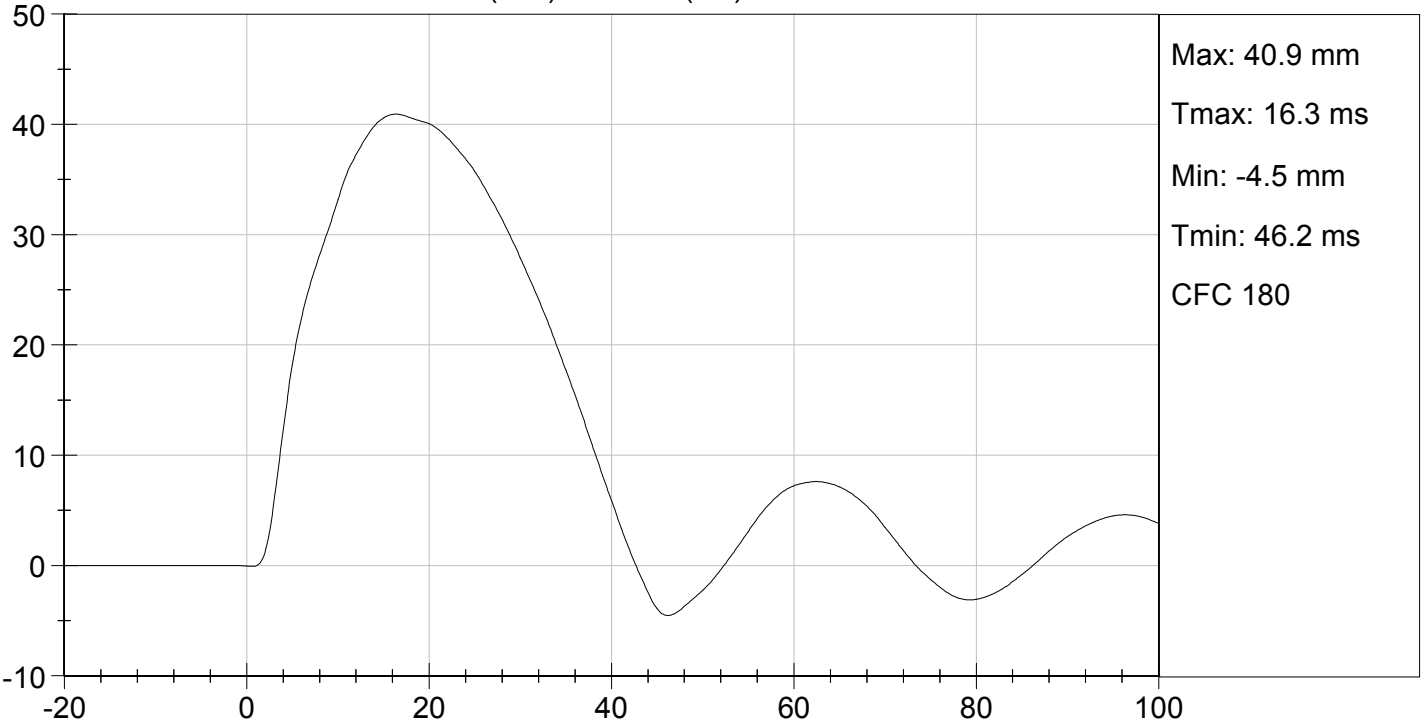
IMPACTOR FORCE (N) vs TIME (ms)



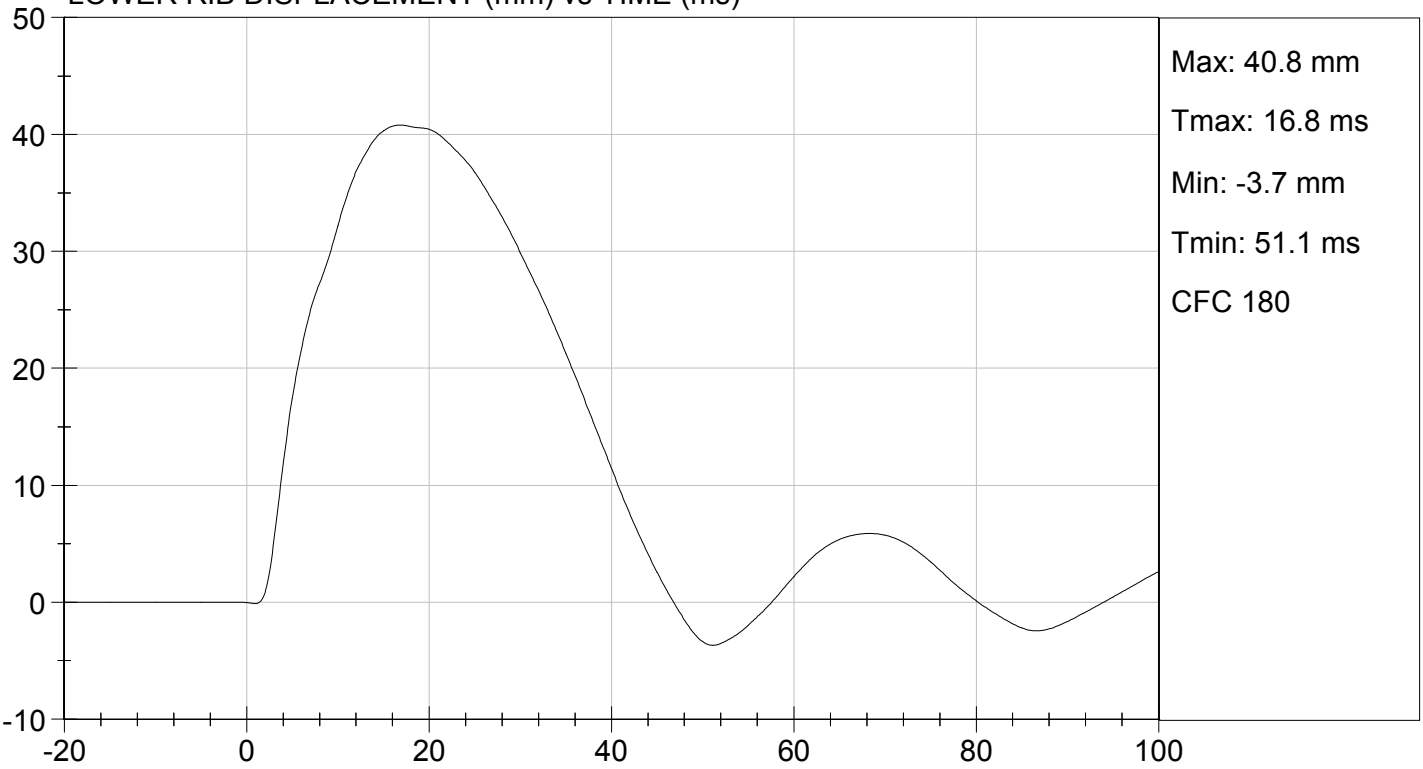
UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



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:** D15827

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	24	Pass
Probe Speed	m/s	3.90 to 4.10	4.10	Pass
Maximum Impactor Force	N	4000 to 4800	4054	Pass
Time of Maximum Impactor Force	ms	10.6 to 13.0	10.7	Pass
Maximum Total Abdomen Force	N	2200 to 2700	2227	Pass
Time of Maximum Abdomen Force	ms	10.0 to 12.3	10.5	Pass
		Overall Test Results		Pass

Maxime Chamberland
Laboratory Technician

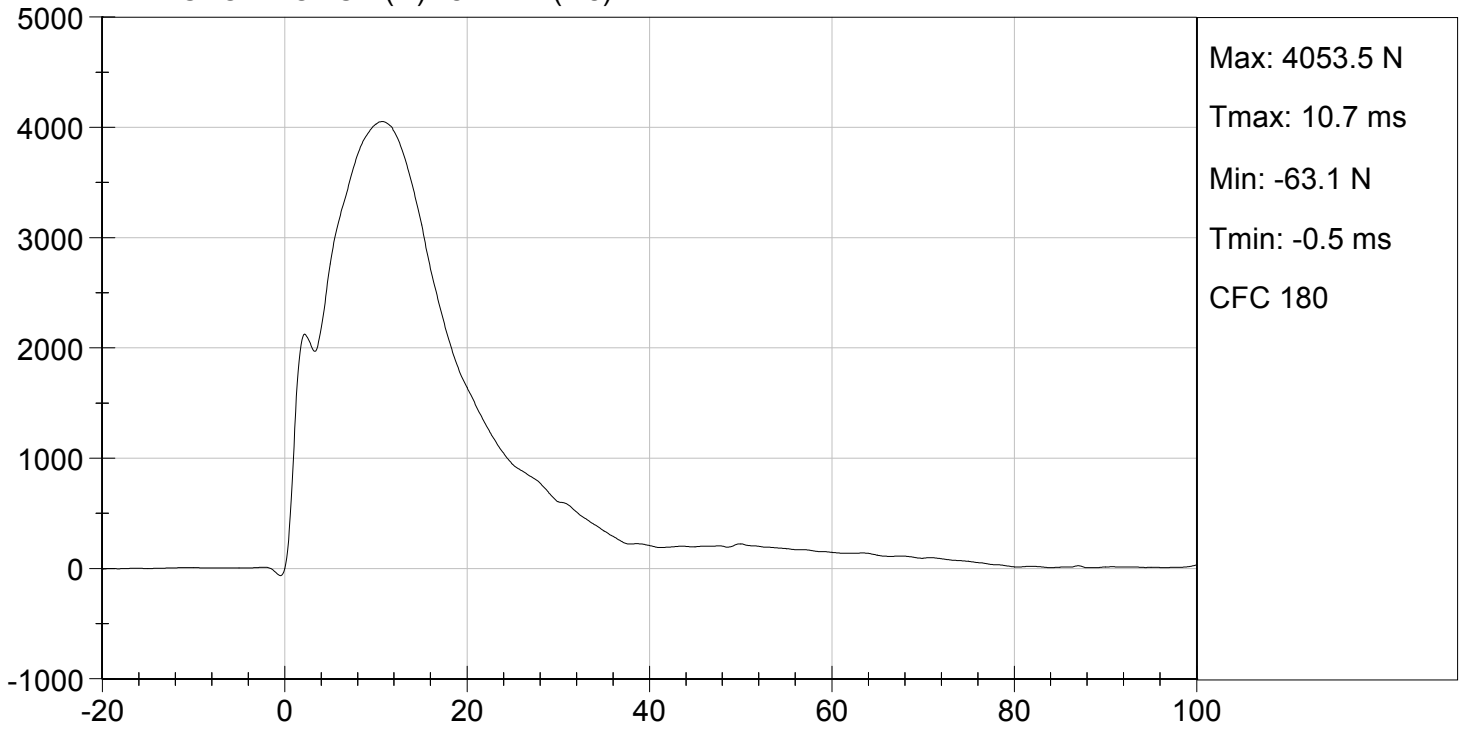
03/26/2015
Test Date

Jessica Gall
Approved By

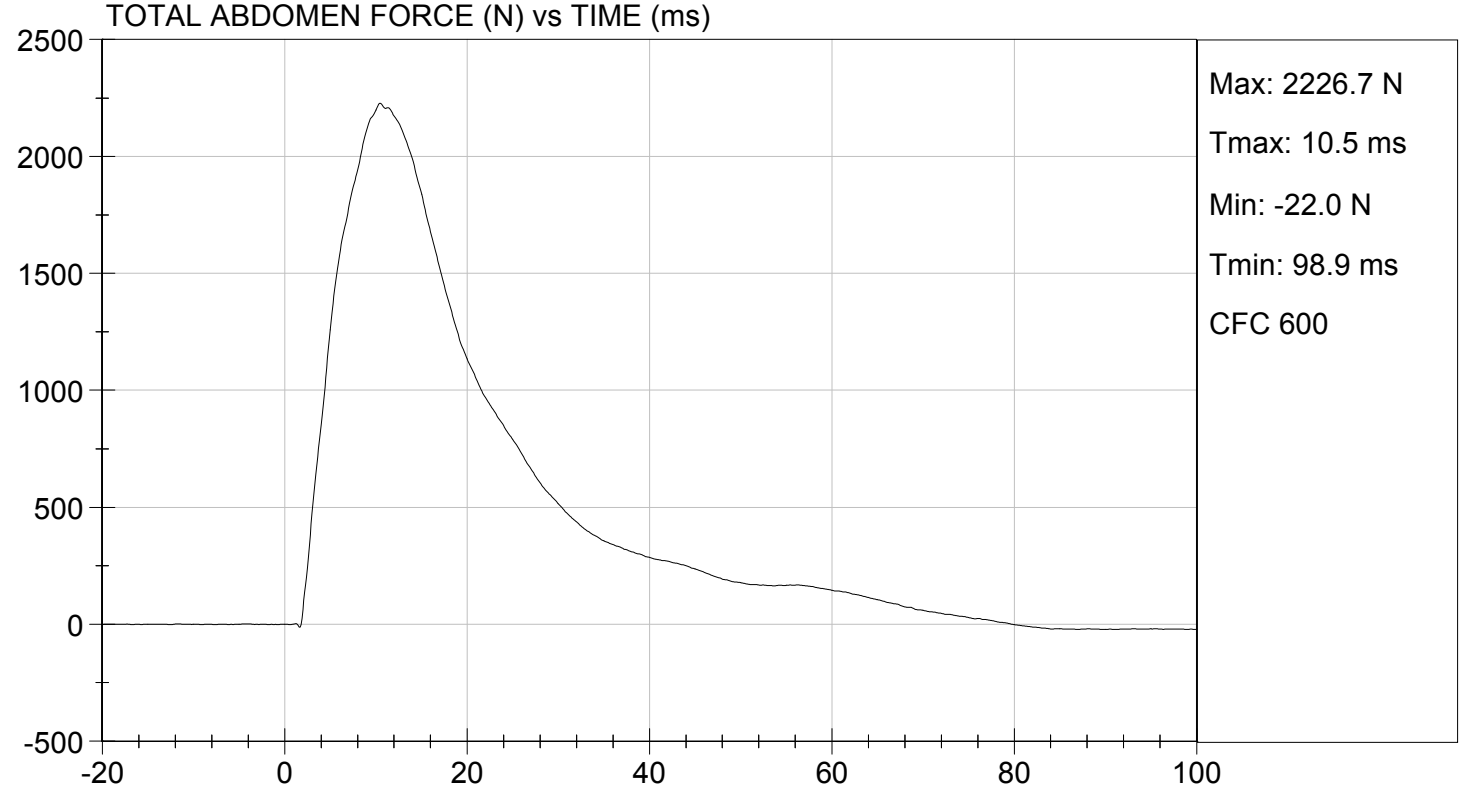
TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.44 ft/s, 4.10 m/s

TEST DATE: 03/26/2015
TEST #: D15827

IMPACTOR FORCE (N) vs TIME (ms)



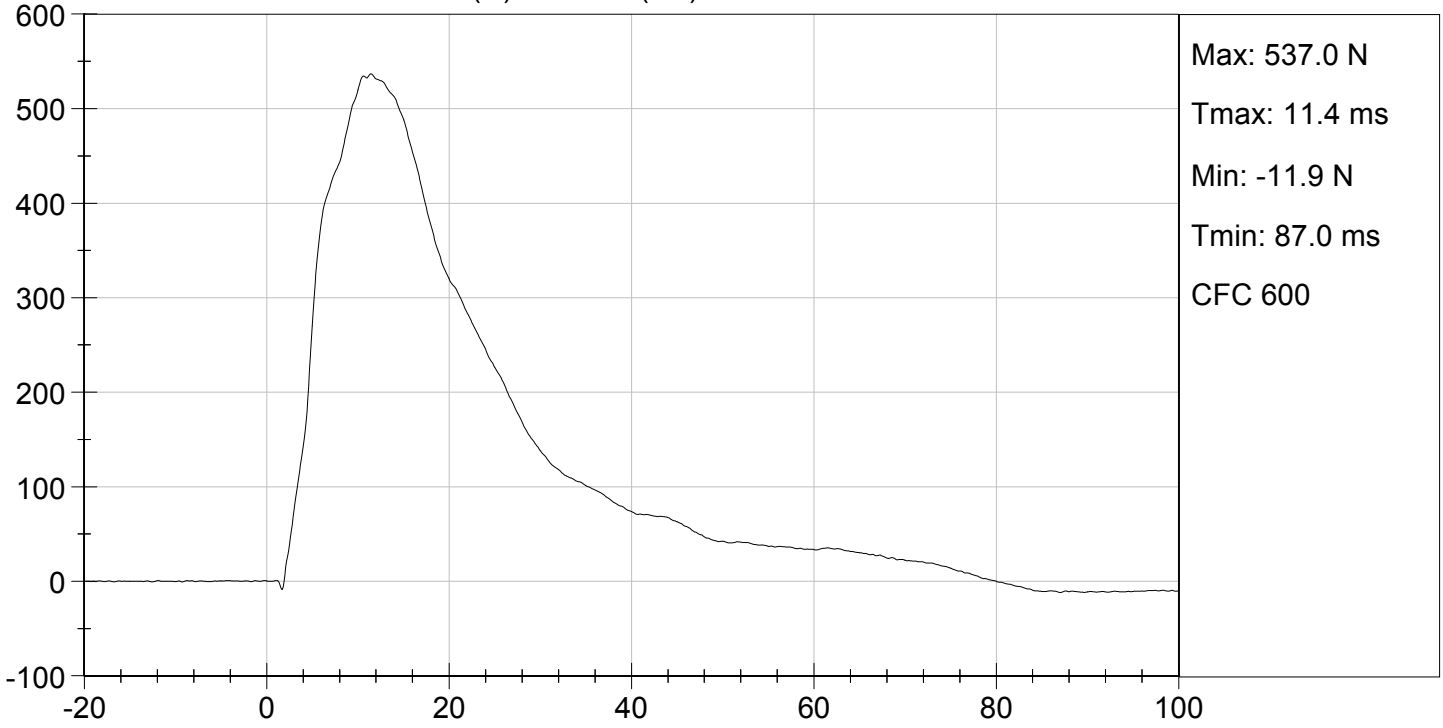
TOTAL ABDOMEN FORCE (N) vs TIME (ms)



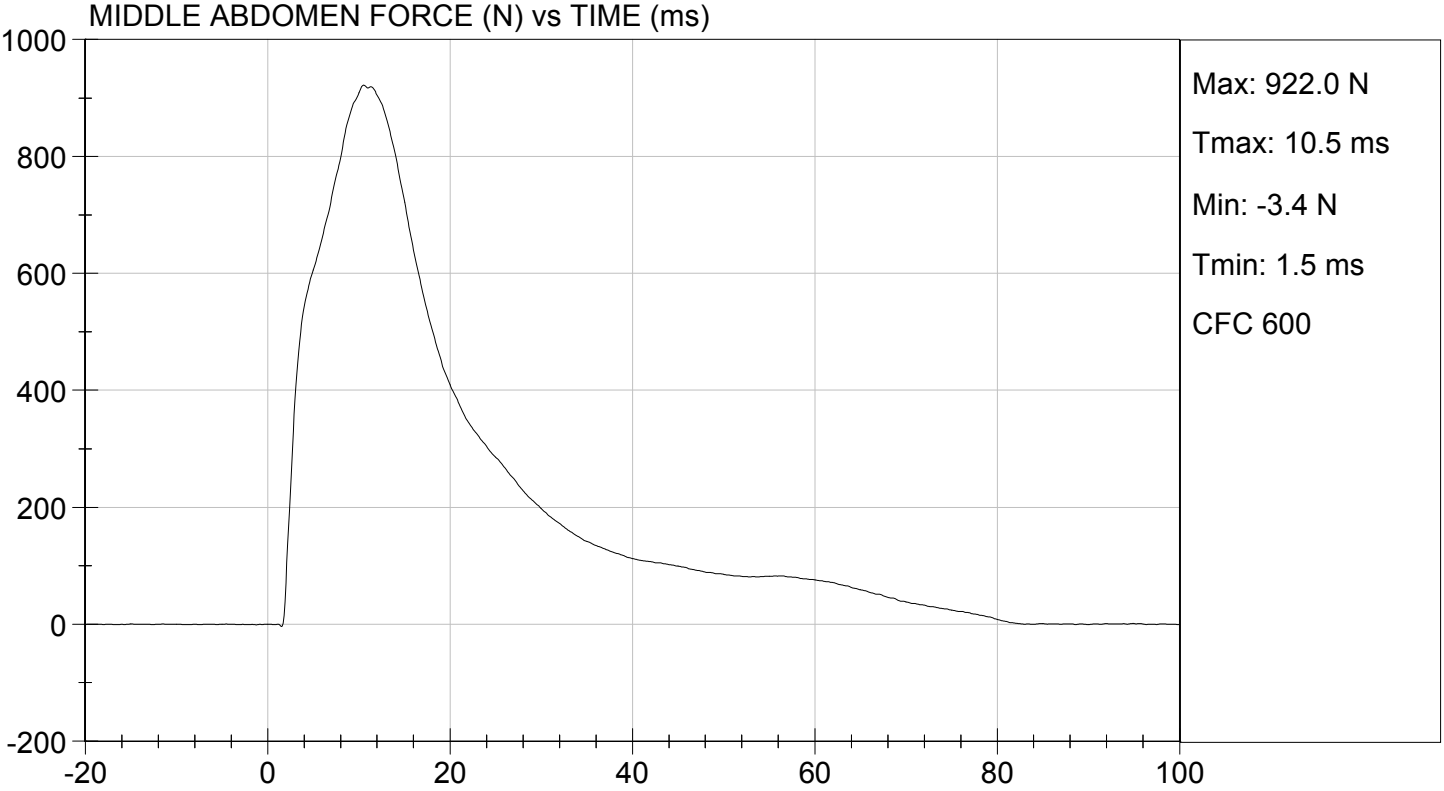
TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.44 ft/s, 4.10 m/s

TEST DATE: 03/26/2015
TEST #: D15827

FRONT ABDOMEN FORCE (N) vs TIME (ms)



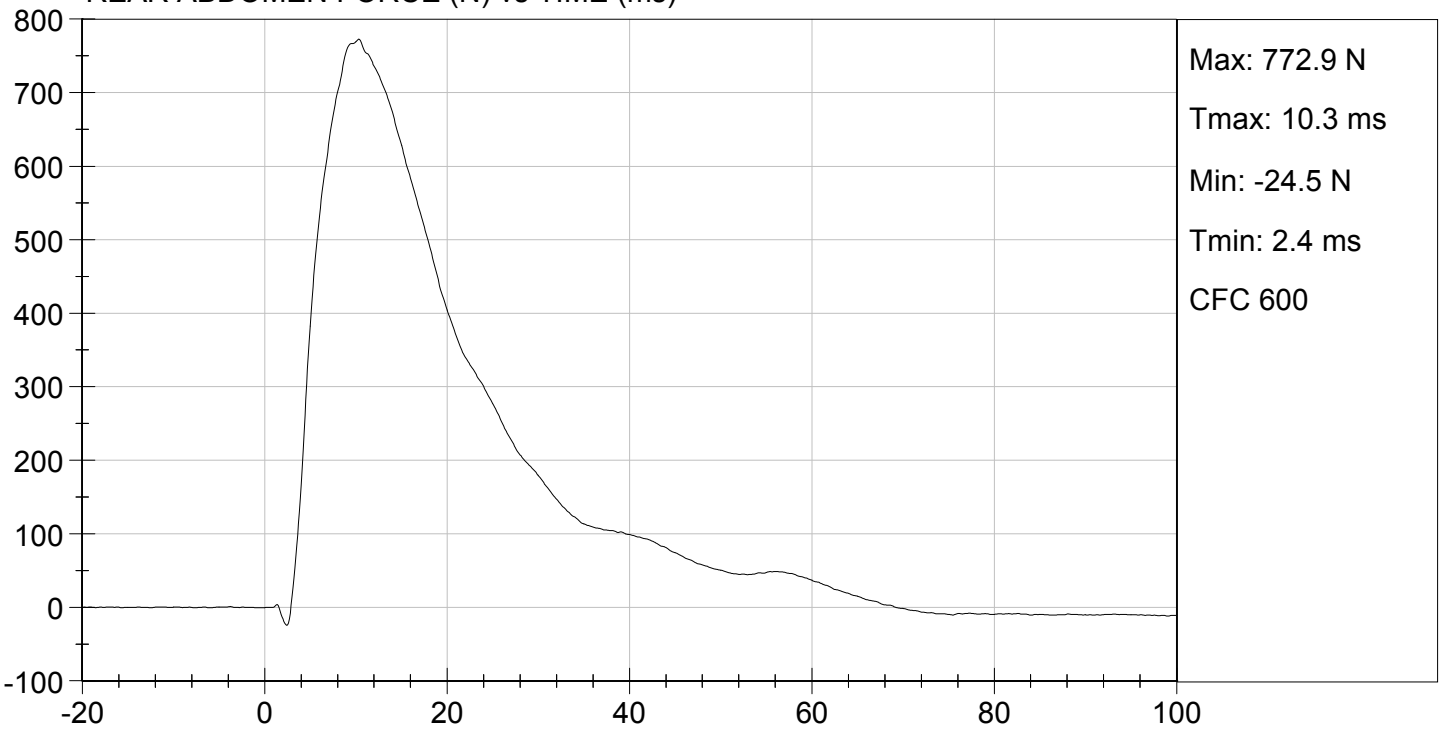
MIDDLE ABDOMEN FORCE (N) vs TIME (ms)



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

TEST DATE: 03/26/2015
TEST #: D15827

REAR ABDOMEN FORCE (N) vs TIME (ms)



MGA RESEARCH CORPORATION

LUMBAR SPINE TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D15828

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Speed		m/s	5.95 to 6.15	6.12	Pass
Pendulum Velocity	1 ms	m/s	-0.05 to 0.00	-0.00	Pass
	3.7 ms	m/s	-0.425 to -0.24	-0.393	Pass
	27 ms	m/s	-6.50 to -5.80	-5.86	Pass
	30 ms	m/s	>= -6.50	-6.19	Pass
Maximum Flexion Angle		deg	45.0 to 55.0	45.6	Pass
Time of Maximum Flexion Angle		ms	39.0 to 53.0	43.4	Pass
Headform Rotation Decay to Initial Position		ms	37 to 57	47	Pass
			Overall Results		Pass

Maxime Chamberland
Laboratory Technician

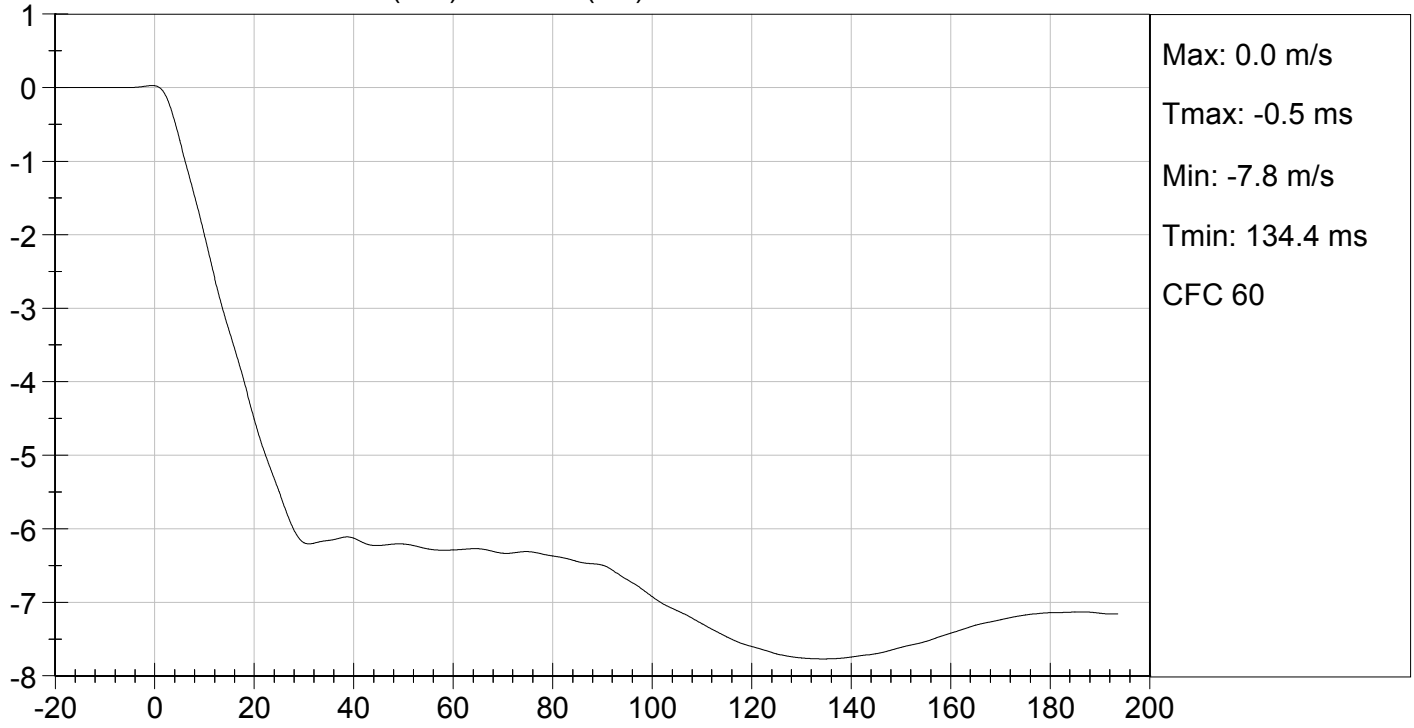
03/25/2015
Test Date

Jessica Gall
Approved By

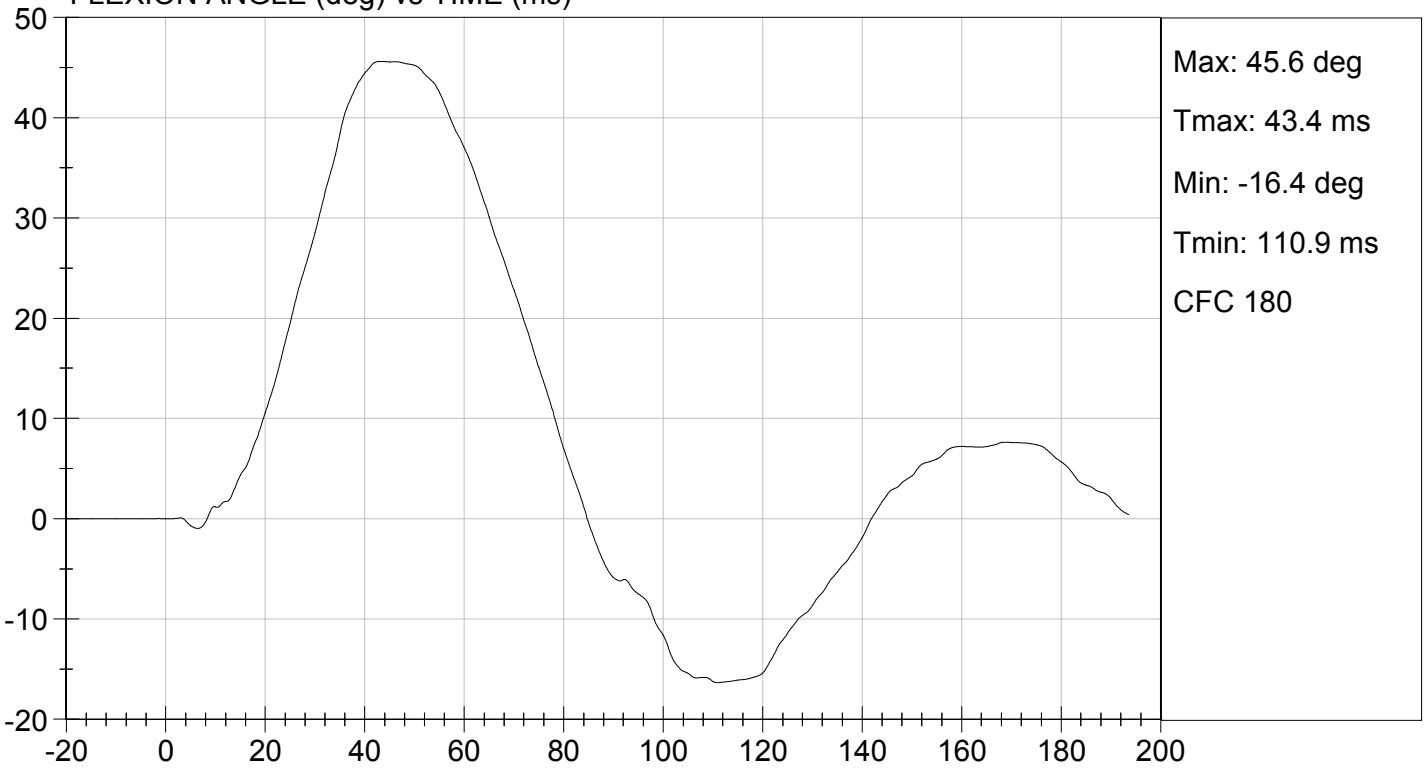
TEST DESC: LUMBAR BENDING
VELOCITY: 20.08 ft/s, 6.12 m/s

TEST DATE: 03/25/2015
TEST #: D15828

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



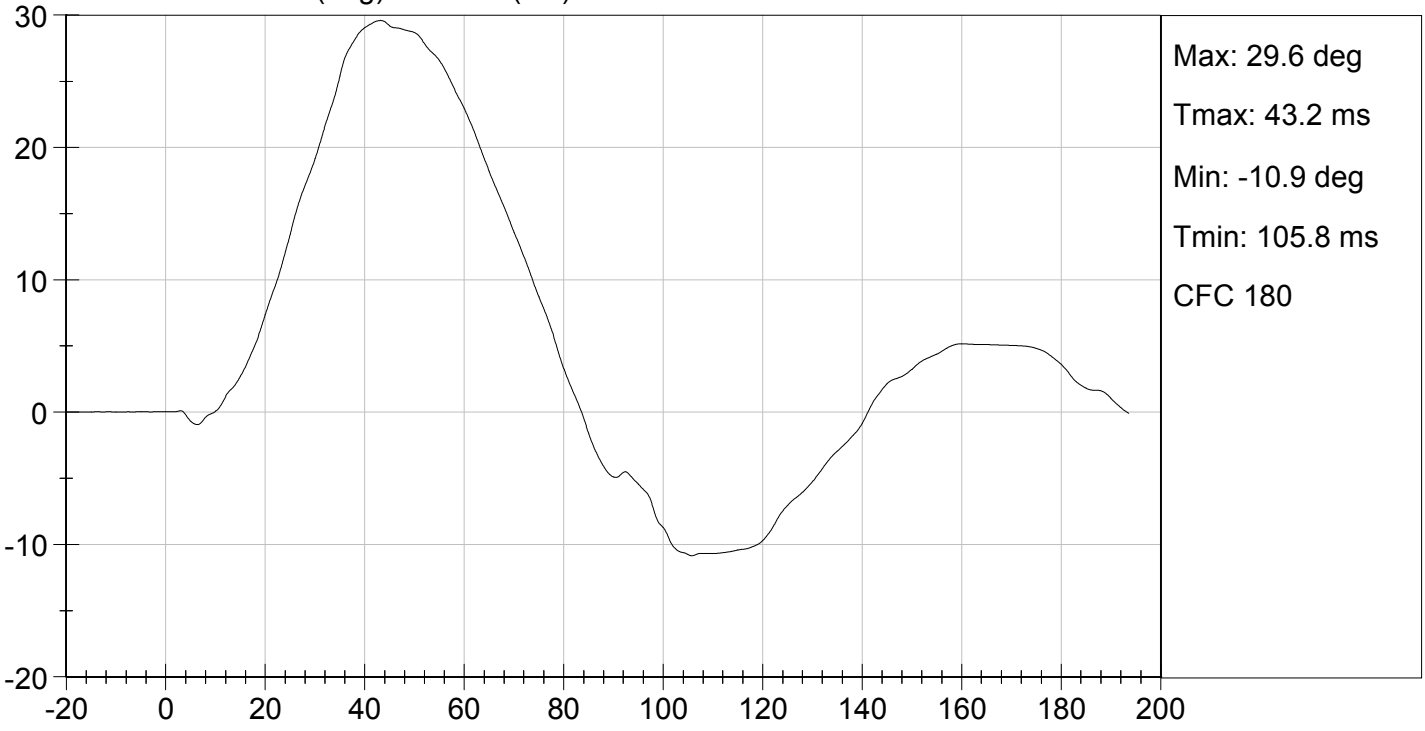
FLEXION ANGLE (deg) vs TIME (ms)



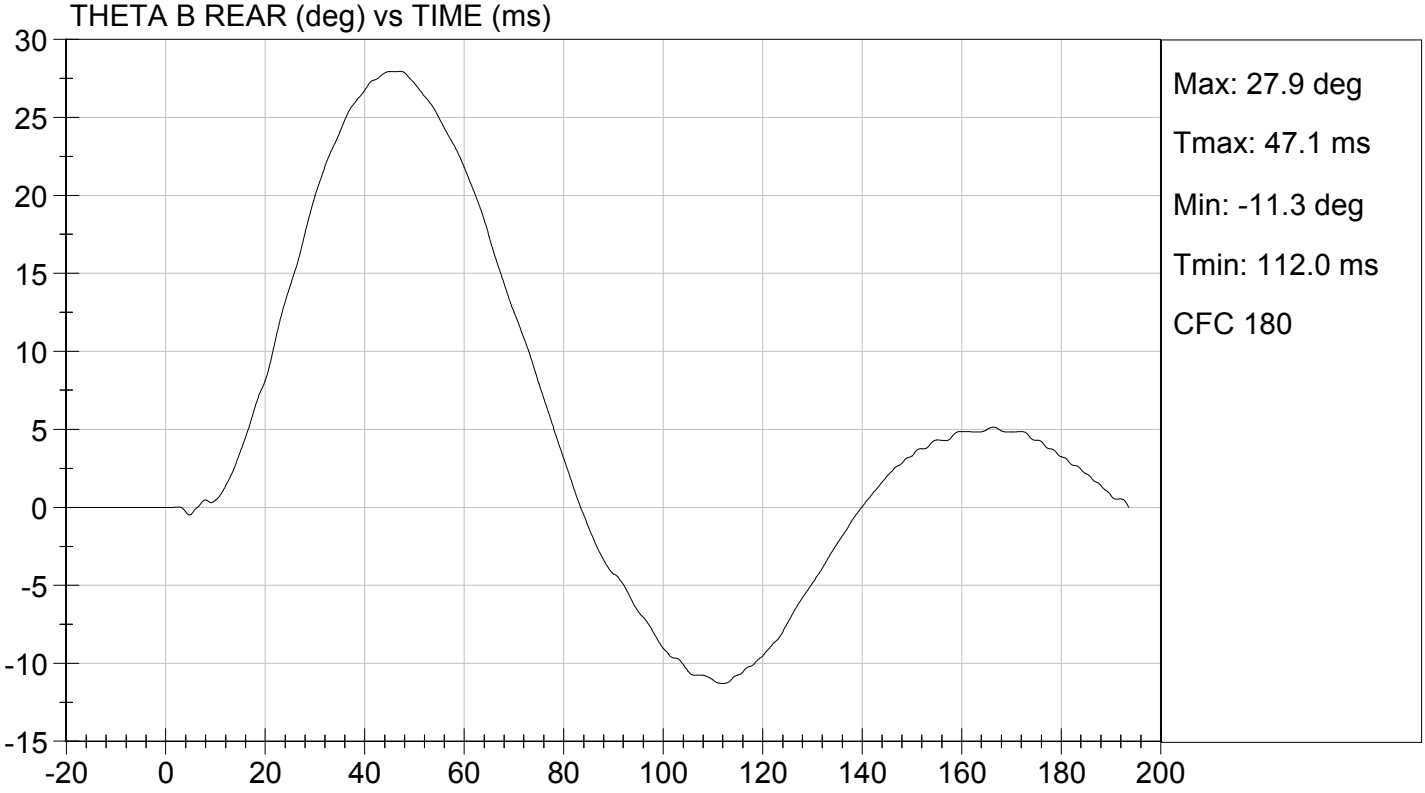
TEST DESC: LUMBAR BENDING
VELOCITY: 20.08 ft/s, 6.12 m/s

TEST DATE: 03/25/2015
TEST #: D15828

THETA A FRONT (deg) vs TIME (ms)

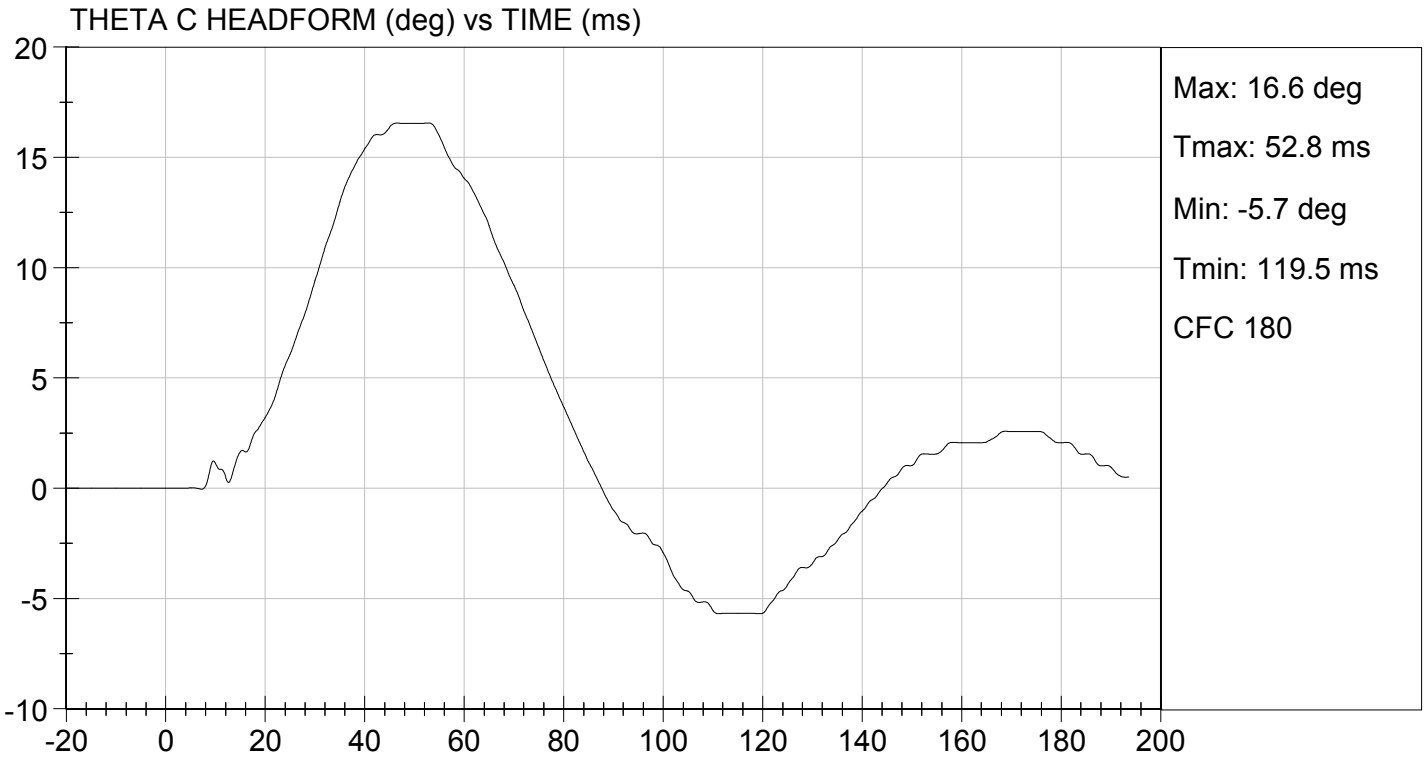


THETA B REAR (deg) vs TIME (ms)



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

TEST DATE: 03/25/2015
TEST #: D15828



MGA RESEARCH CORPORATION

PELVIS TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D15829

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	24	Pass
Probe Speed	m/s	4.20 to 4.40	4.23	Pass
Maximum Impactor Force	N	4700 to 5400	4974	Pass
Time of Maximum Impactor Force	ms	11.8 to 16.1	13.7	Pass
Maximum Pubic Force	N	1230 to 1590	1317	Pass
Time of Maximum Pubic Force	ms	12.2 to 17.0	13.6	Pass
		Overall Test Results		Pass

Maxime Chamberland
Laboratory Technician

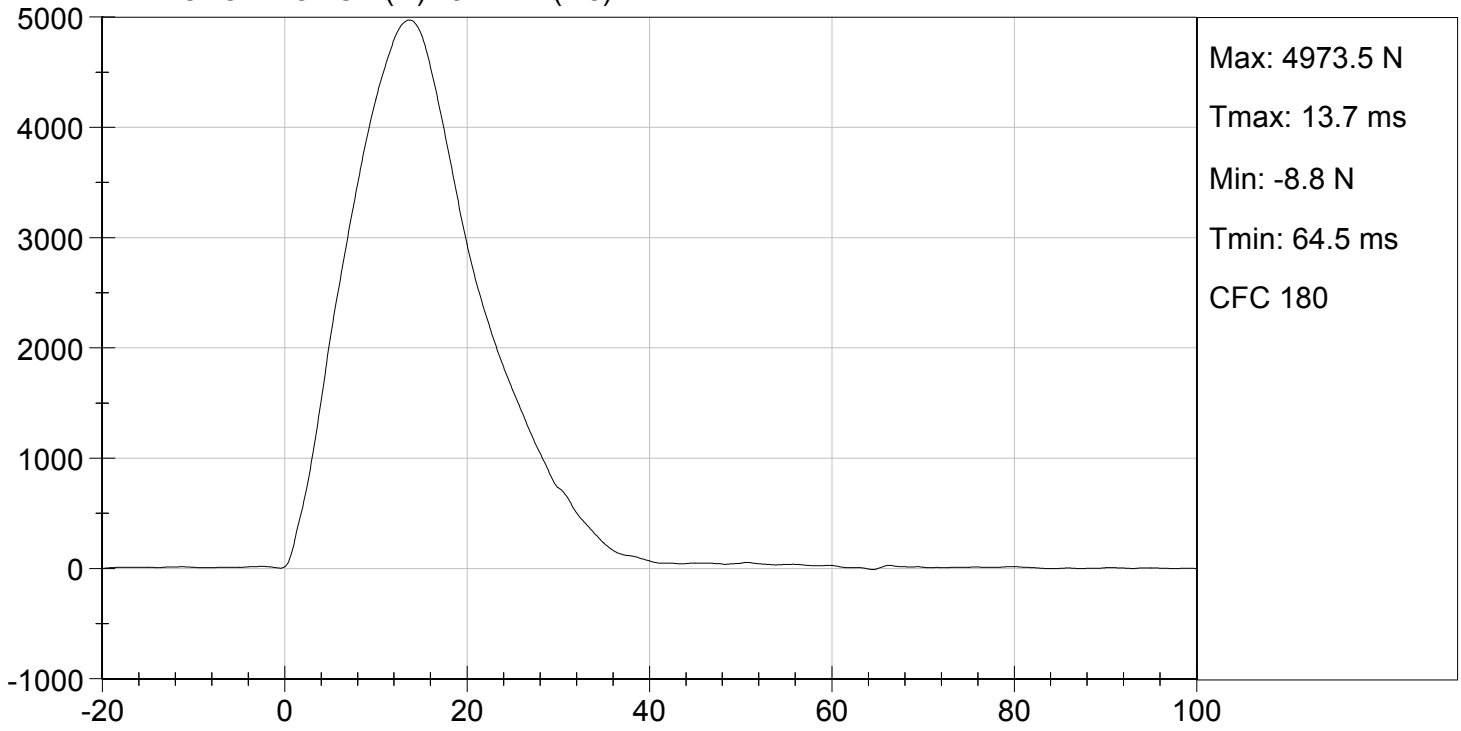
03/26/2015
Test Date

Jessica Gall
Approved By

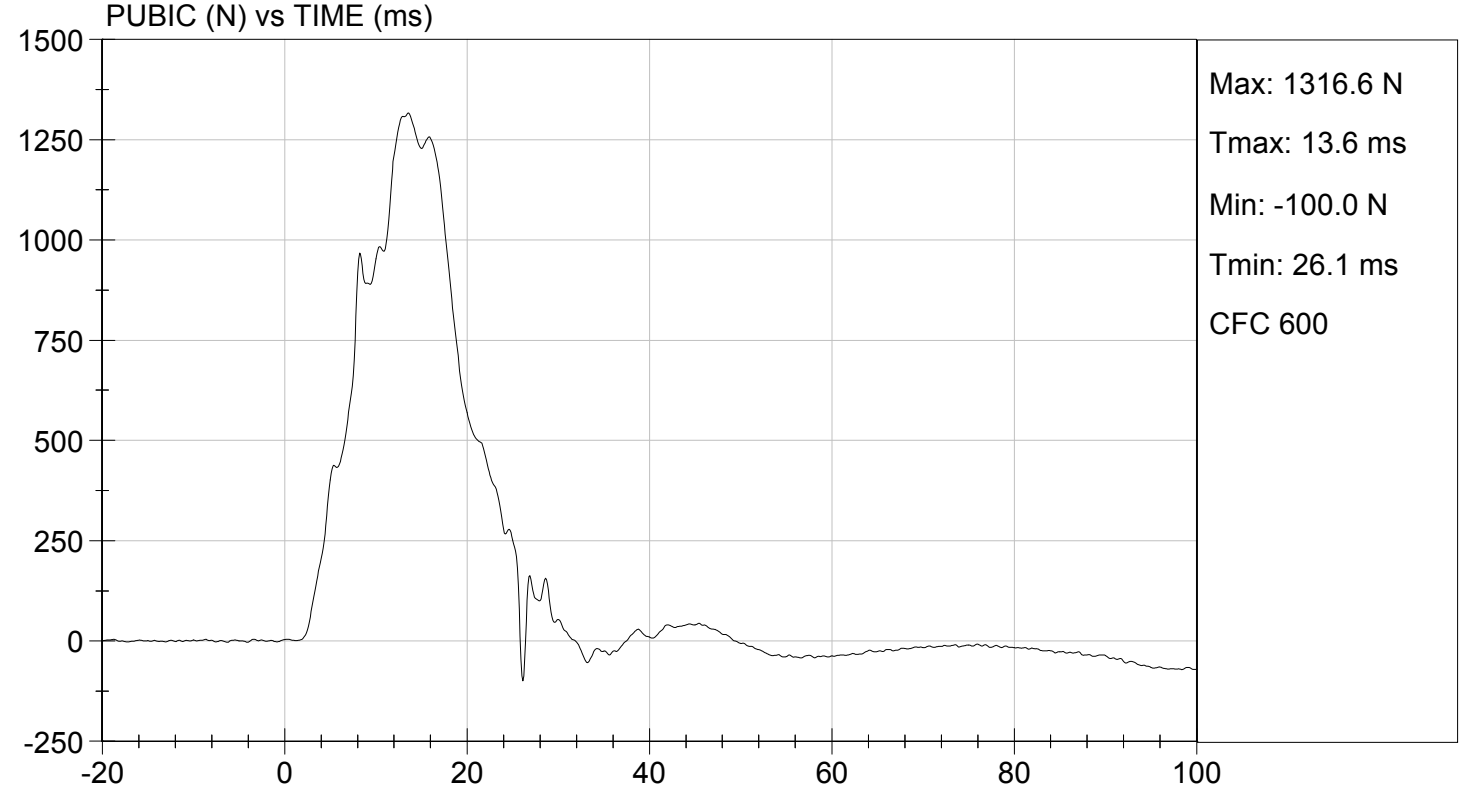
TEST DESC: PELVIS IMPACT
VELOCITY: 13.89 ft/s, 4.23 m/s

TEST DATE: 03/26/2015
TEST #: D15829

IMPACTOR FORCE (N) vs TIME (ms)



PUBIC (N) vs TIME (ms)



MGA RESEARCH CORPORATION

HEAD DROP TEST

ES-2re DUMMY

ATD Serial No: 032 **Test ID:** D15891

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	31	Pass
Peak Resultant Acceleration	G's	125 to 155	128	Pass
Peak Longitudinal Acceleration	G's	<= +/- 15.0	7.9	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 15% of peak	Yes	Pass
		Overall Test Results		Pass

David Schoedel
Laboratory Technician

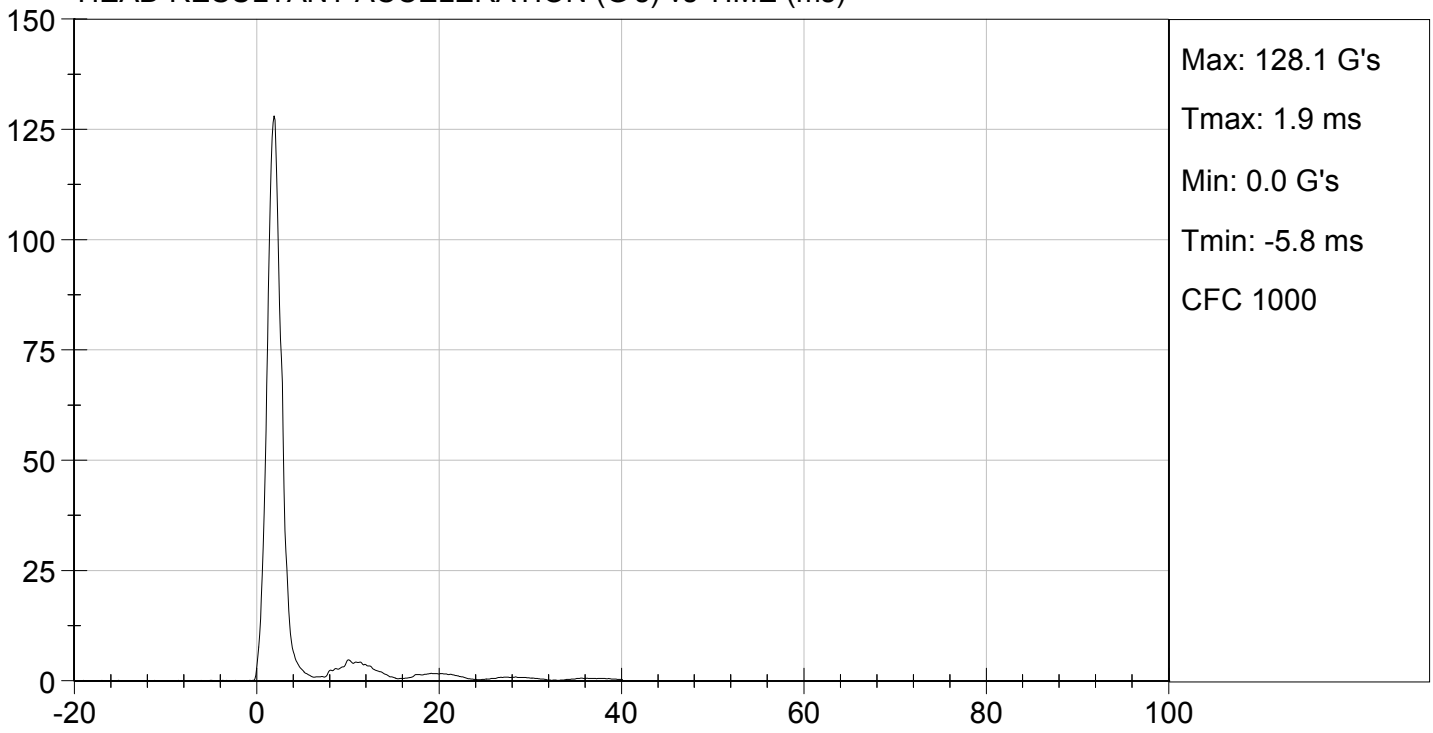
03/31/2015
Test Date

Jessica Hall
Approved By

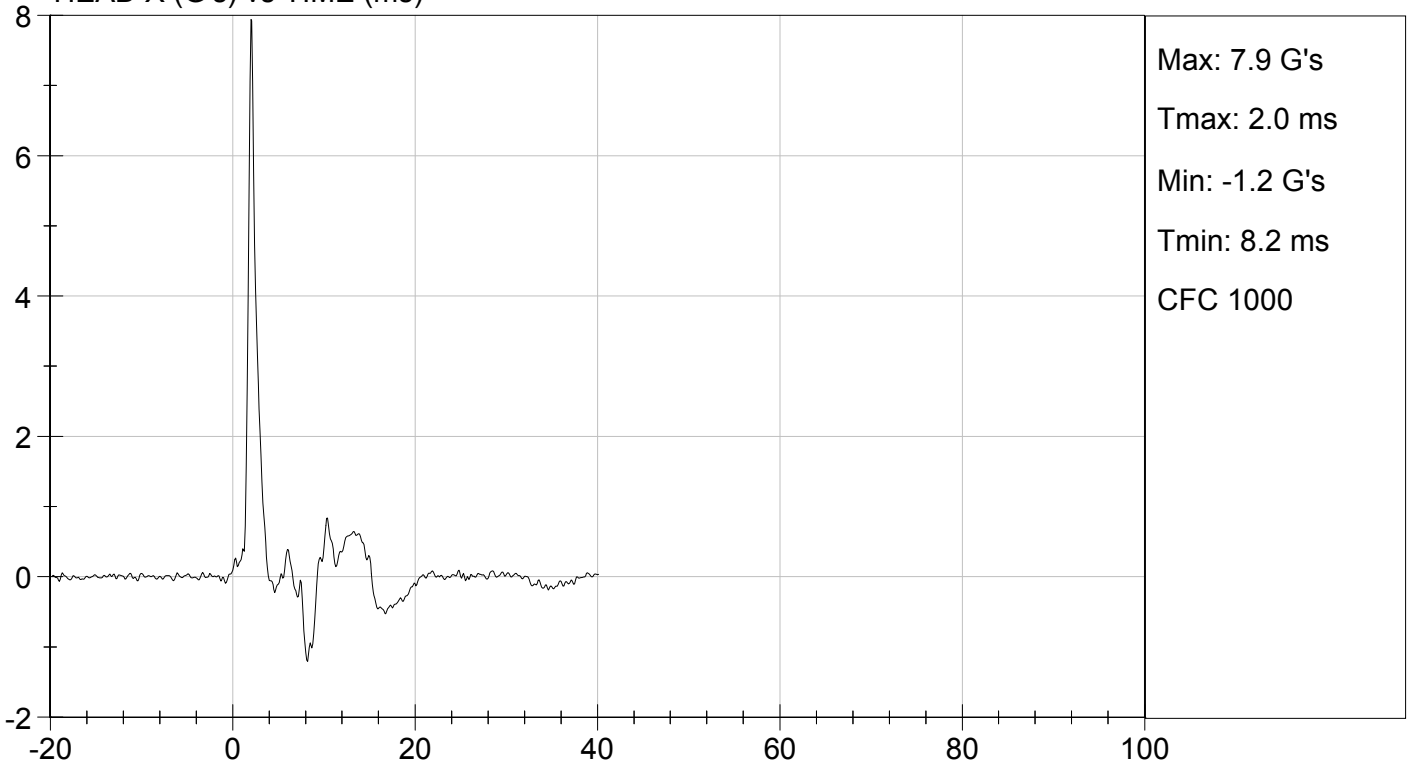
TEST DESC: HEAD DROP

TEST DATE: 03/31/2015
TEST #: D15891

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

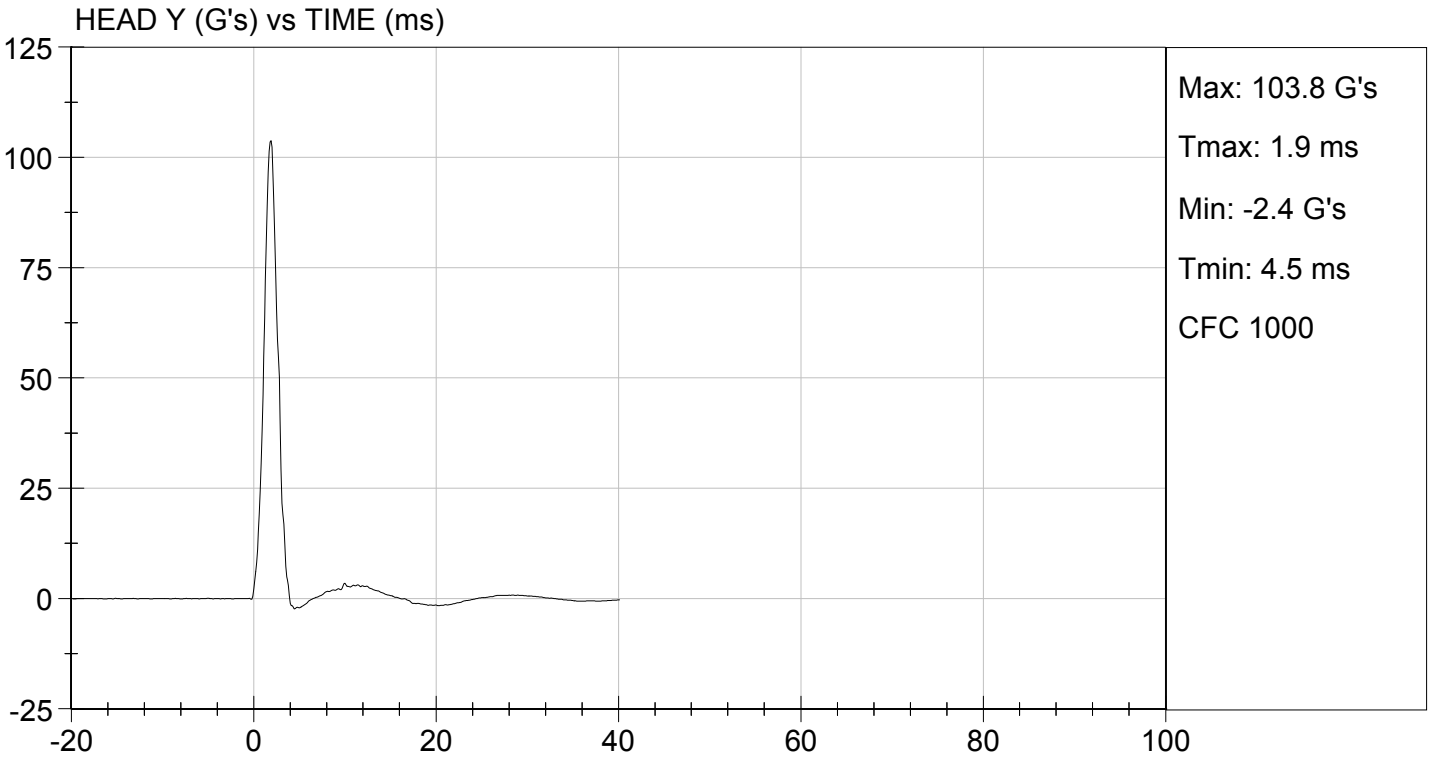


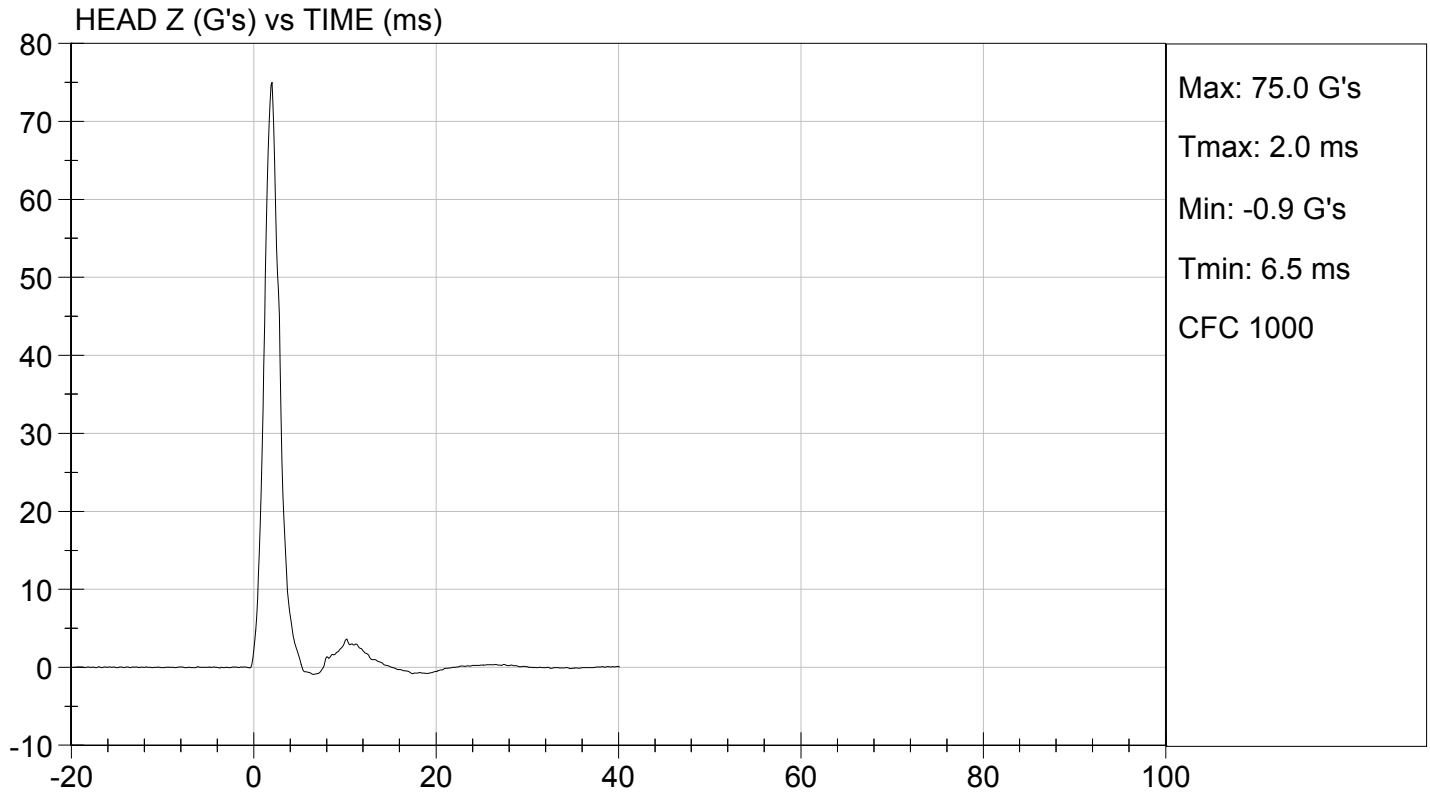
HEAD X (G's) vs TIME (ms)



TEST DESC: HEAD DROP

TEST DATE: 03/31/2015
TEST #: D15891





MGA RESEARCH CORPORATION

NECK PENDULUM TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D15892

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	31	Pass
Pendulum Speed		m/s	3.30 to 3.50	3.46	Pass
Pendulum Velocity	1 ms	m/s	-0.05 to 0.00	-0.03	Pass
	3 ms	m/s	-0.25 to -0.375	-0.33	Pass
	14 ms	m/s	-3.20 to -3.70	-3.22	Pass
	17 ms	m/s	>= -3.70	-3.42	Pass
Maximum Flexion Angle		deg	49.0 to 59.0	50.4	Pass
Time of Maximum Flexion Angle		ms	54.0 to 66.0	60.7	Pass
Head Rotation Decay Time to 0 Degree		ms	53.0 to 88.0	55.9	Pass
			Overall Results		Pass

David Schoedel

Laboratory Technician

03/31/2015

Test Date

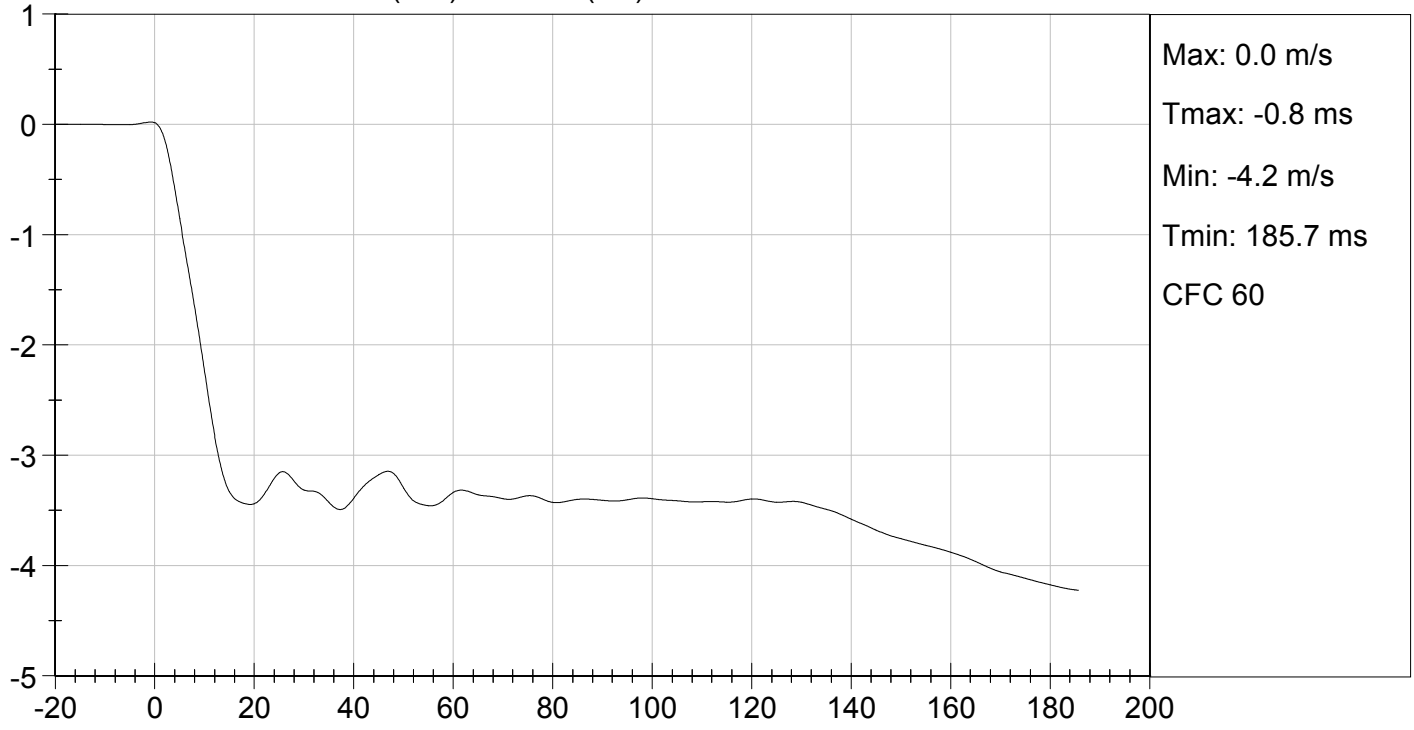
Jessica Hall

Approved By

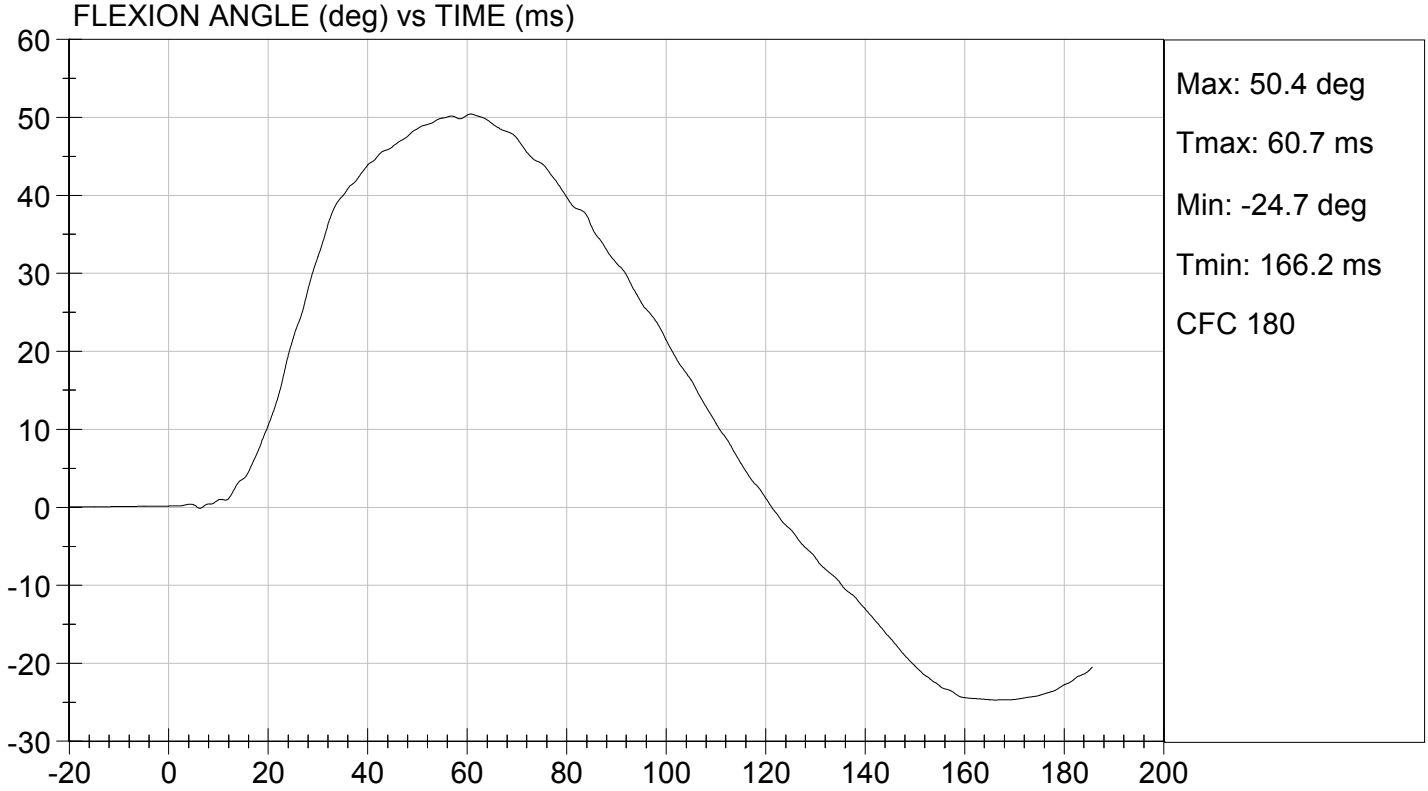
TEST DESC: NECK BENDING
VELOCITY: 11.34 ft/s, 3.46 m/s

TEST DATE: 03/31/2015
TEST #: D15892

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



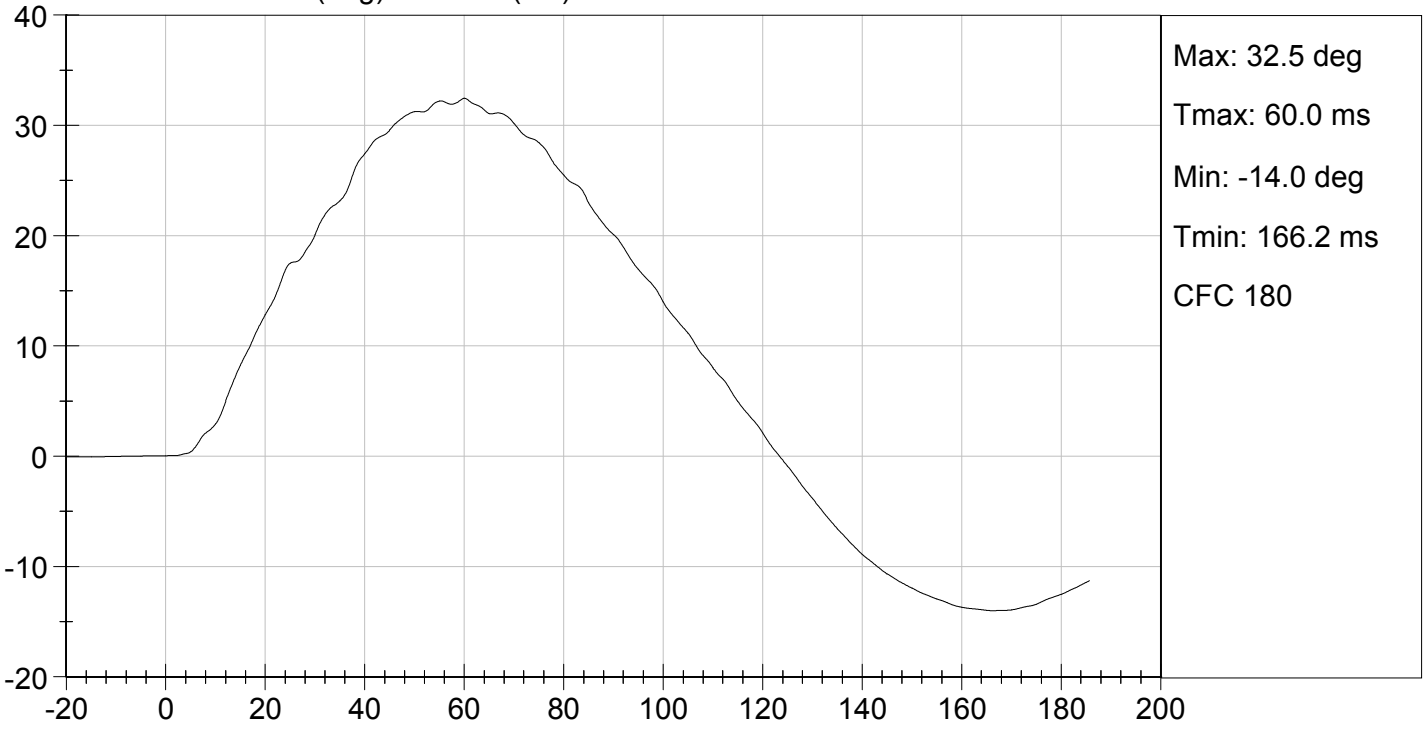
FLEXION ANGLE (deg) vs TIME (ms)



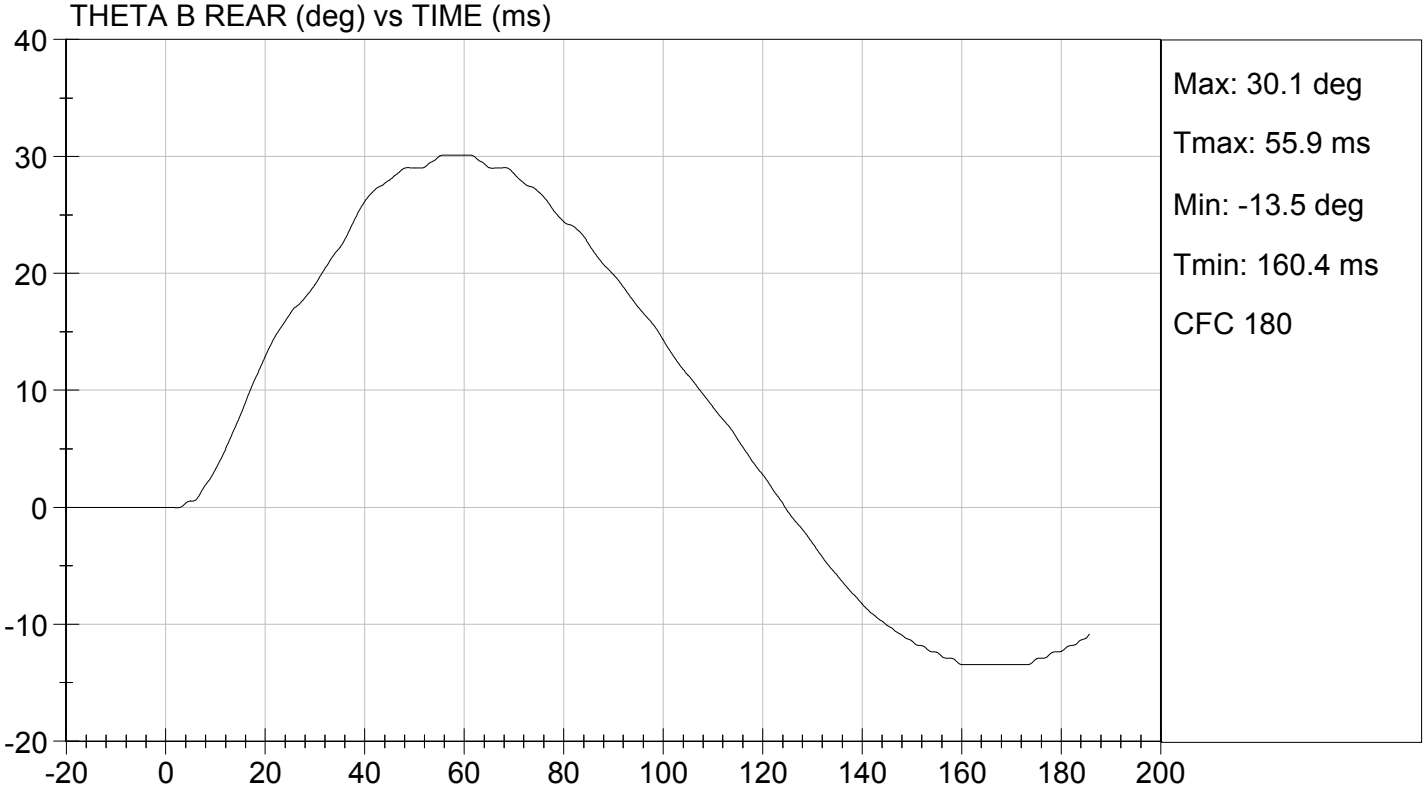
TEST DESC: NECK BENDING
VELOCITY: 11.34 ft/s, 3.46 m/s

TEST DATE: 03/31/2015
TEST #: D15892

THETA A FRONT (deg) vs TIME (ms)

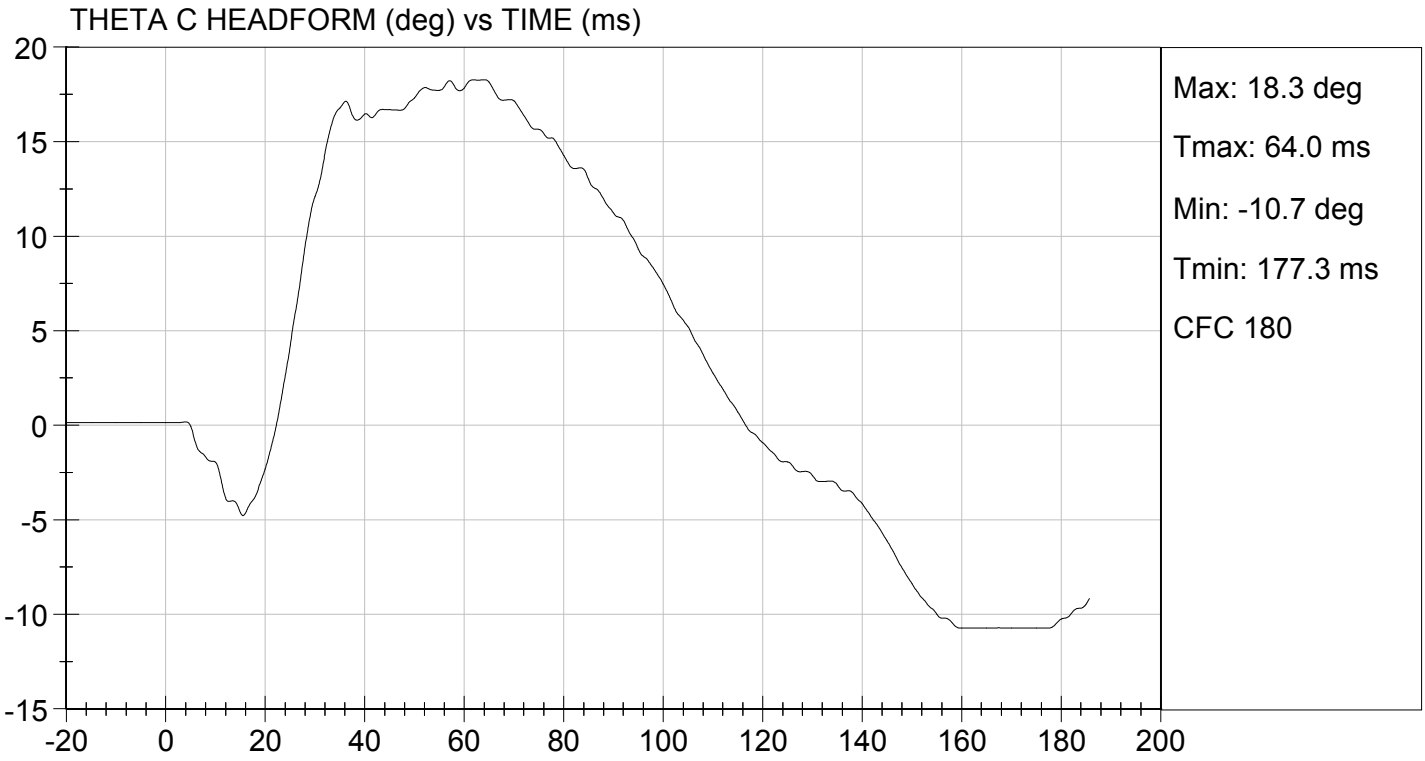


THETA B REAR (deg) vs TIME (ms)



TEST DESC: NECK BENDING
VELOCITY: 11.34 ft/s, 3.46 m/s

TEST DATE: 03/31/2015
TEST #: D15892



MGA RESEARCH CORPORATION

SHOULDER IMPACT TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D15893

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	32	Pass
Pendulum Speed	m/s	4.20 to 4.40	4.38	Pass
Peak Impactor Acceleration	G's	7.5 to 10.5	8.9	Pass
		Overall Test Results		Pass

Maxime Chamberland
Laboratory Technician

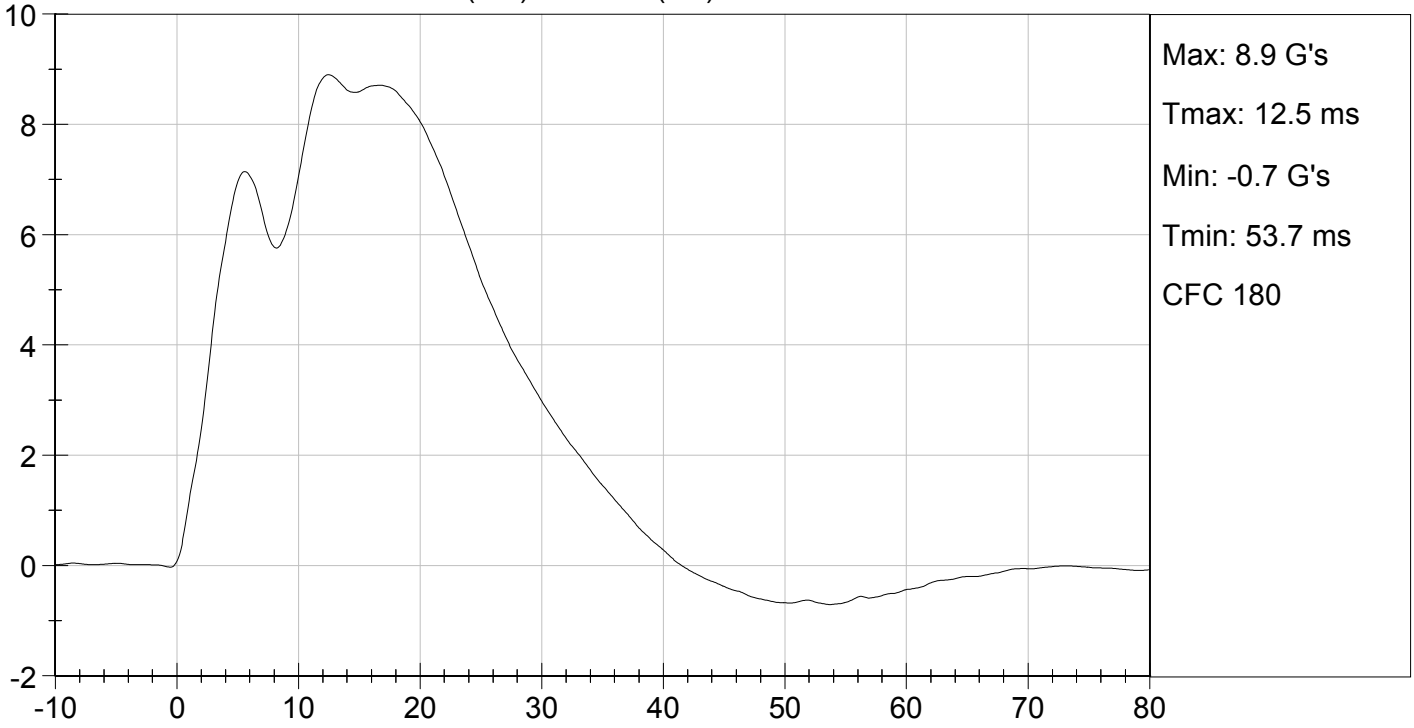
03/31/2015
Test Date

Jessica Gall
Approved By

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

TEST DATE: 03/31/2015
TEST #: D15893

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



MGA RESEARCH CORPORATION

UPPER RIB TEST

ES-2re DUMMY

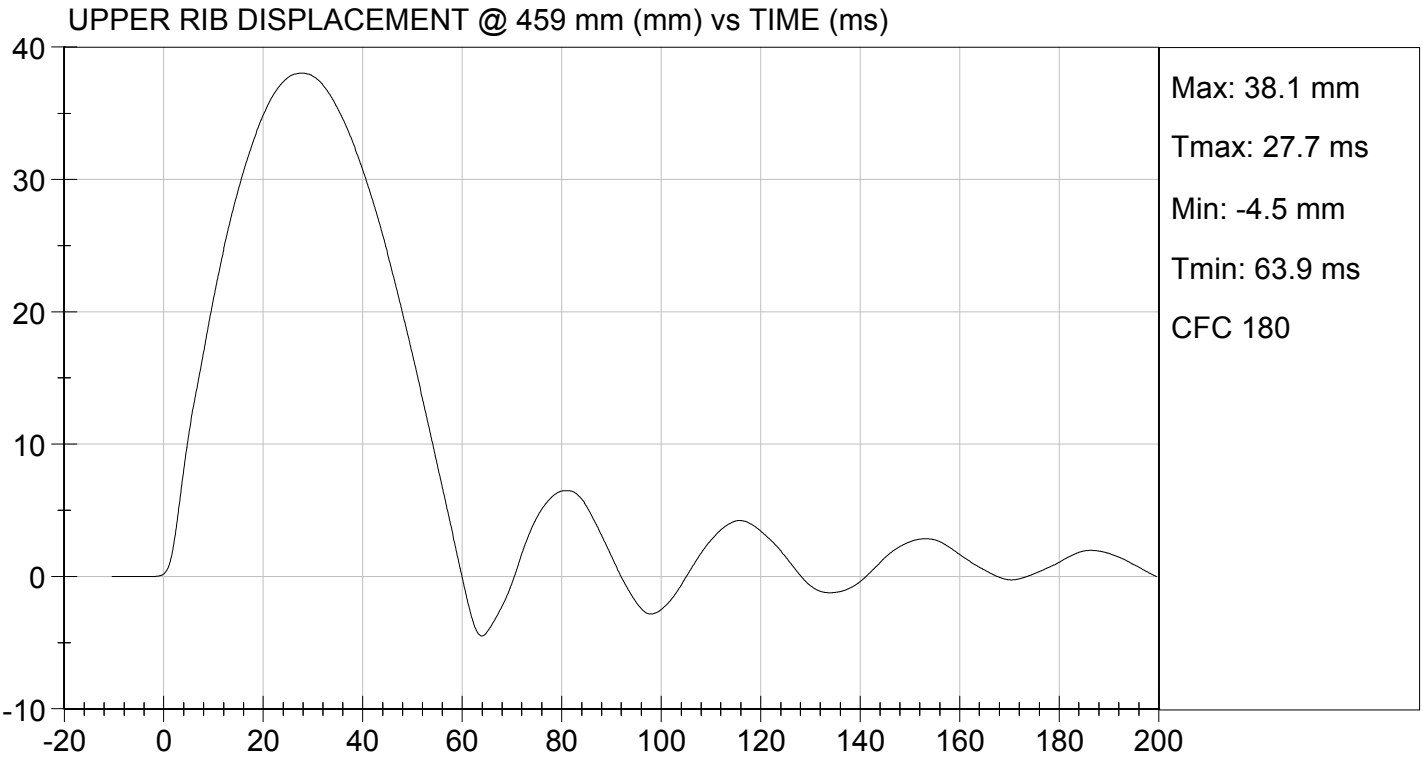
ATD Serial No: 032 **Test I.D:** D15894

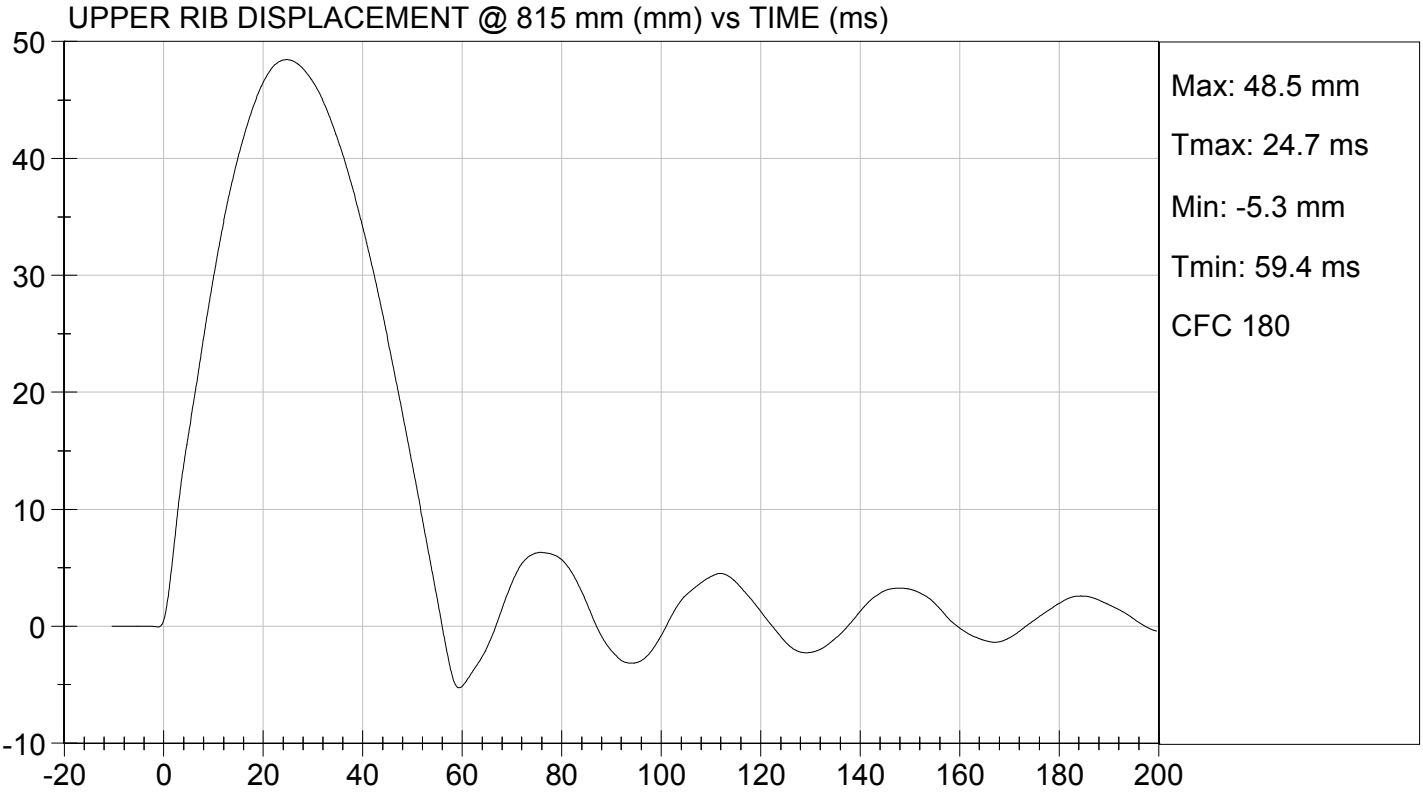
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	27	Pass
Displacement at 459 mm	mm	36.0 to 40.0	38.1	Pass
Displacement at 815 mm	mm	46.0 to 51.0	48.5	Pass
		Overall Test Results		Pass

David Schoedel
Laboratory Technician

03/31/2015
Test Date

Jessica Gall
Approved By


UPPER RIB DISPLACEMENT @ 459 mm (mm) vs TIME (ms)
40
30
20
10
0
-10
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 38.1 mm
Tmax: 27.7 ms
Min: -4.5 mm
Tmin: 63.9 ms
CFC 180


UPPER RIB DISPLACEMENT @ 815 mm (mm) vs TIME (ms)
50
40
30
20
10
0
-10
-20
0
20
40
60
80
100
120
140
160
180
200
Max: 48.5 mm
Tmax: 24.7 ms
Min: -5.3 mm
Tmin: 59.4 ms
CFC 180

MGA RESEARCH CORPORATION

MID RIB TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D15895

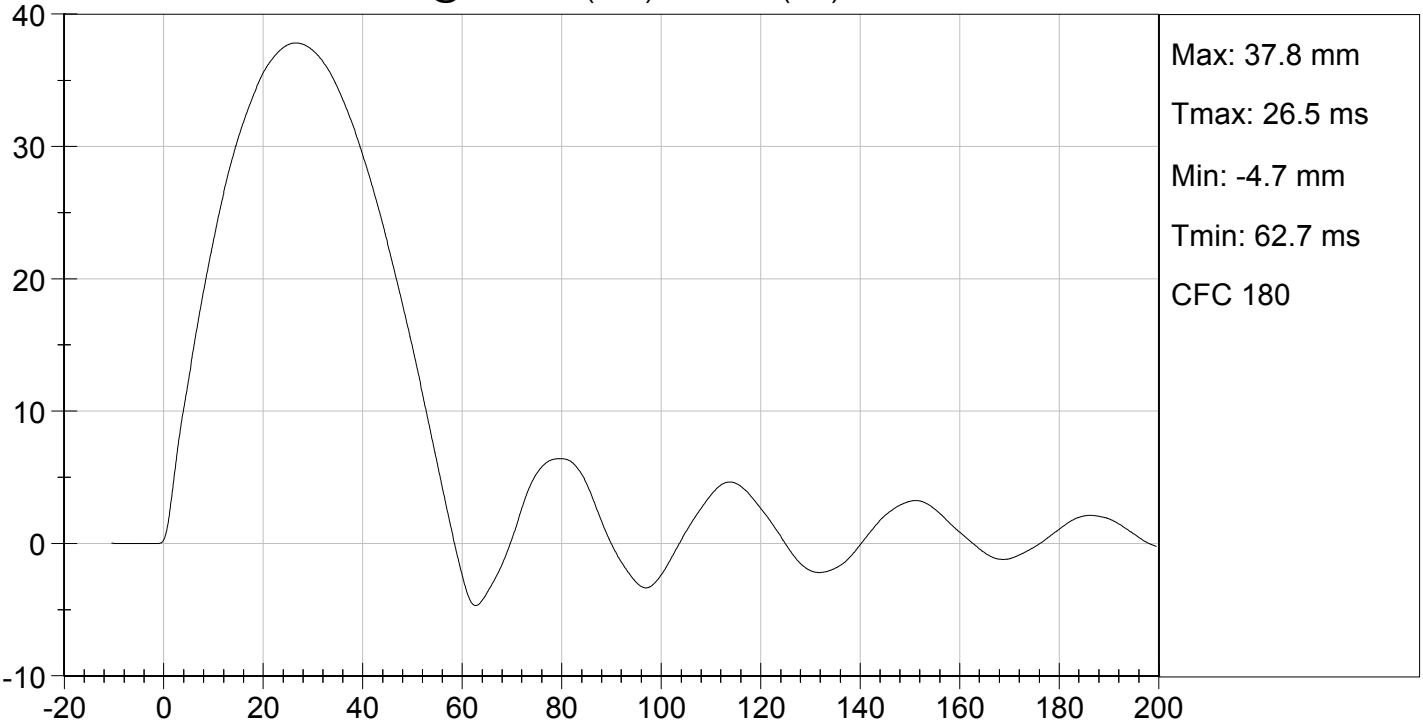
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	27	Pass
Displacement at 459 mm	mm	36.0 to 40.0	37.8	Pass
Displacement at 815 mm	mm	46.0 to 51.0	48.3	Pass
		Overall Test Results		Pass

David Schoedel
Laboratory Technician

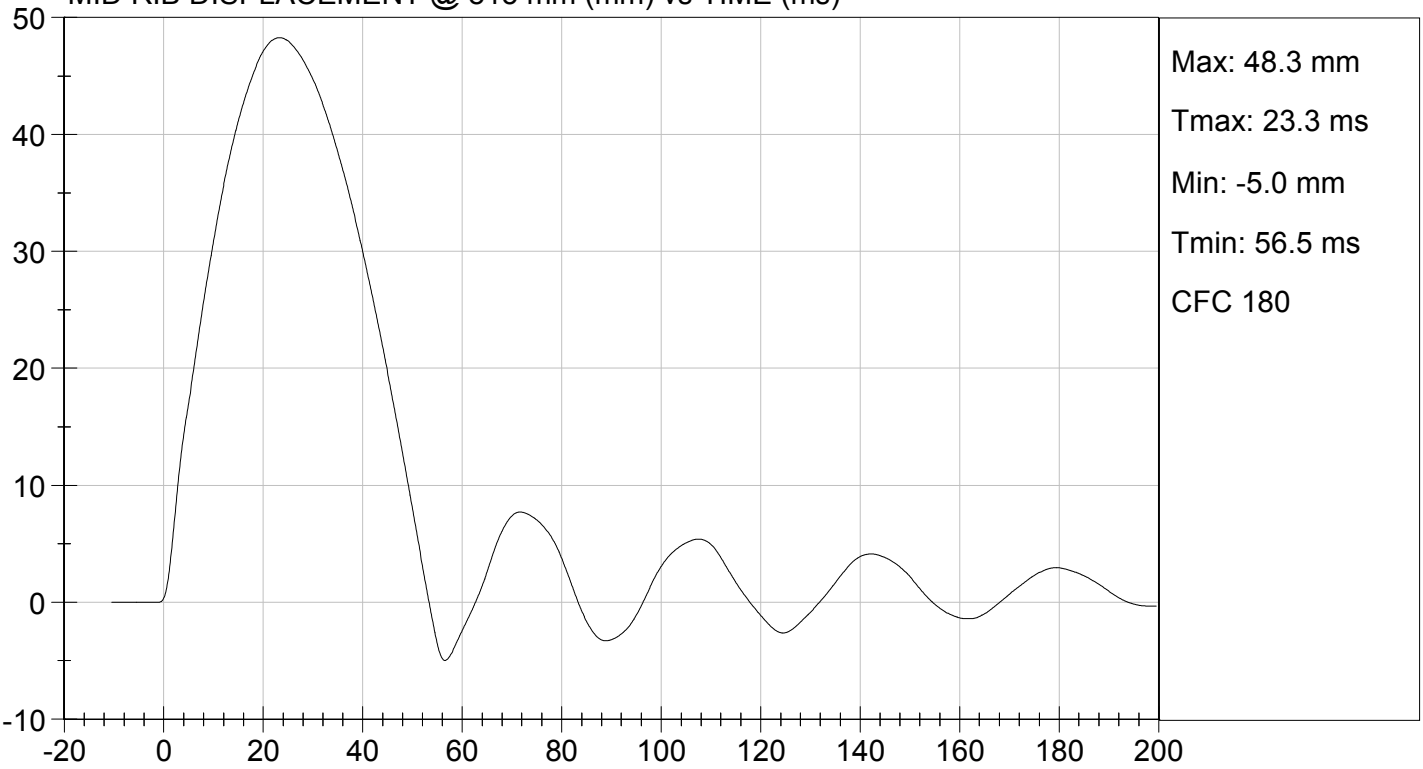
03/31/2015
Test Date

Jessica Hall
Approved By

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



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



MGA RESEARCH CORPORATION

LOWER RIB TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D15896

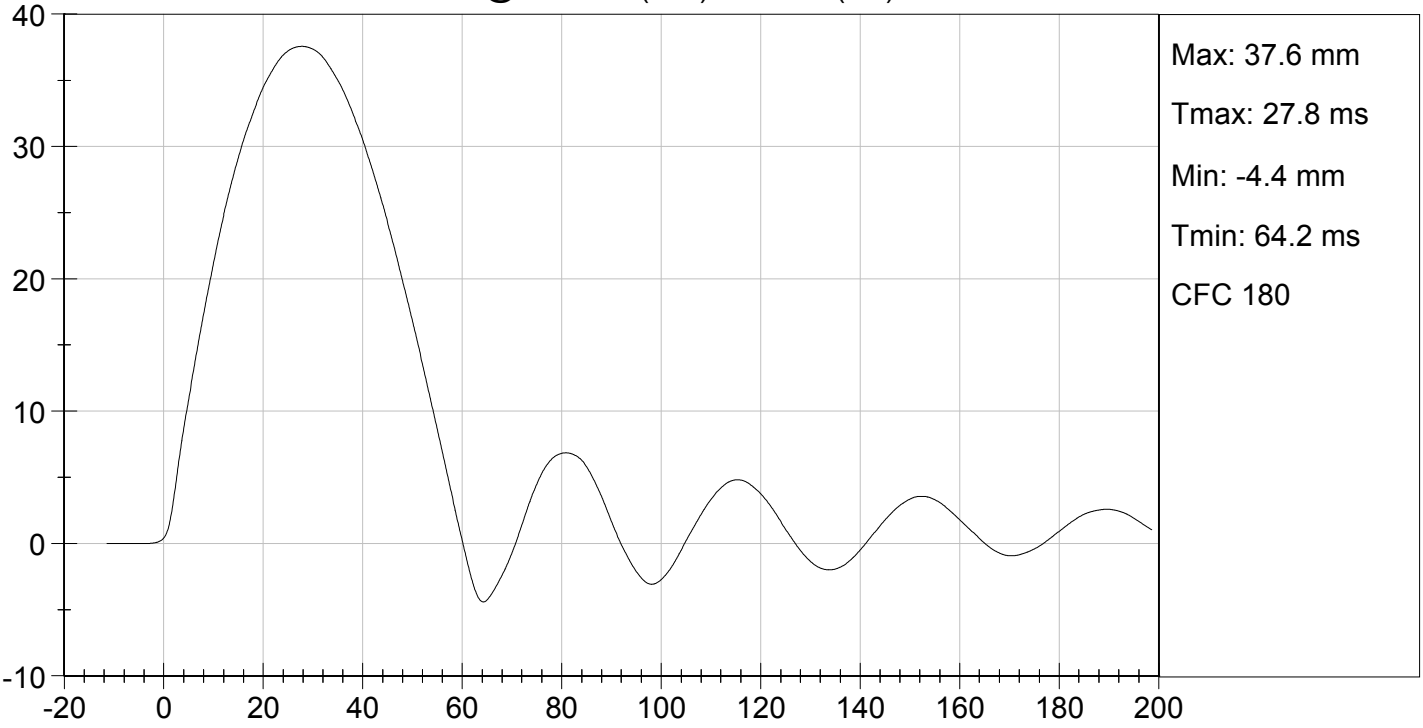
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	27	Pass
Displacement at 459 mm	mm	36.0 to 40.0	37.6	Pass
Displacement at 815 mm	mm	46.0 to 51.0	51.0	Pass
		Overall Test Results		Pass

David Schoedel
Laboratory Technician

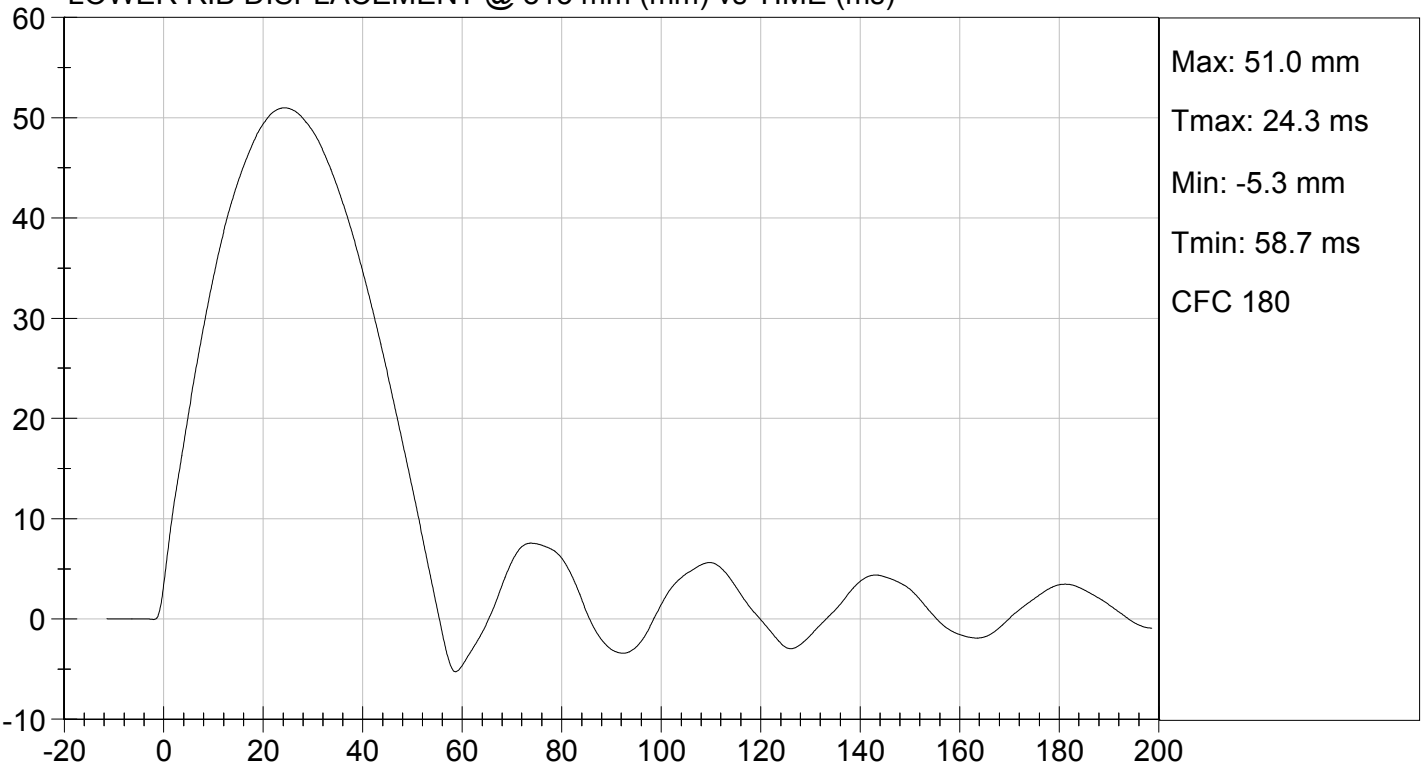
03/31/2015
Test Date

Jessica Gall
Approved By

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



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



MGA RESEARCH CORPORATION

THORAX IMPACT TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D15890

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.7	Pass
Humidity	%	10 to 70	32	Pass
Probe Speed	m/s	5.40 to 5.60	5.58	Pass
Maximum Impactor Force (after 6 ms)	N	5100 to 6200	5497	Pass
Upper Rib Displacement	mm	34.0 to 41.0	38.9	Pass
Middle Rib Displacement	mm	37.0 to 45.0	42.0	Pass
Lower Rib Displacement	mm	37.0 to 44.0	43.1	Pass
		Overall Test Results		Pass

Maxime Chamberland
Laboratory Technician

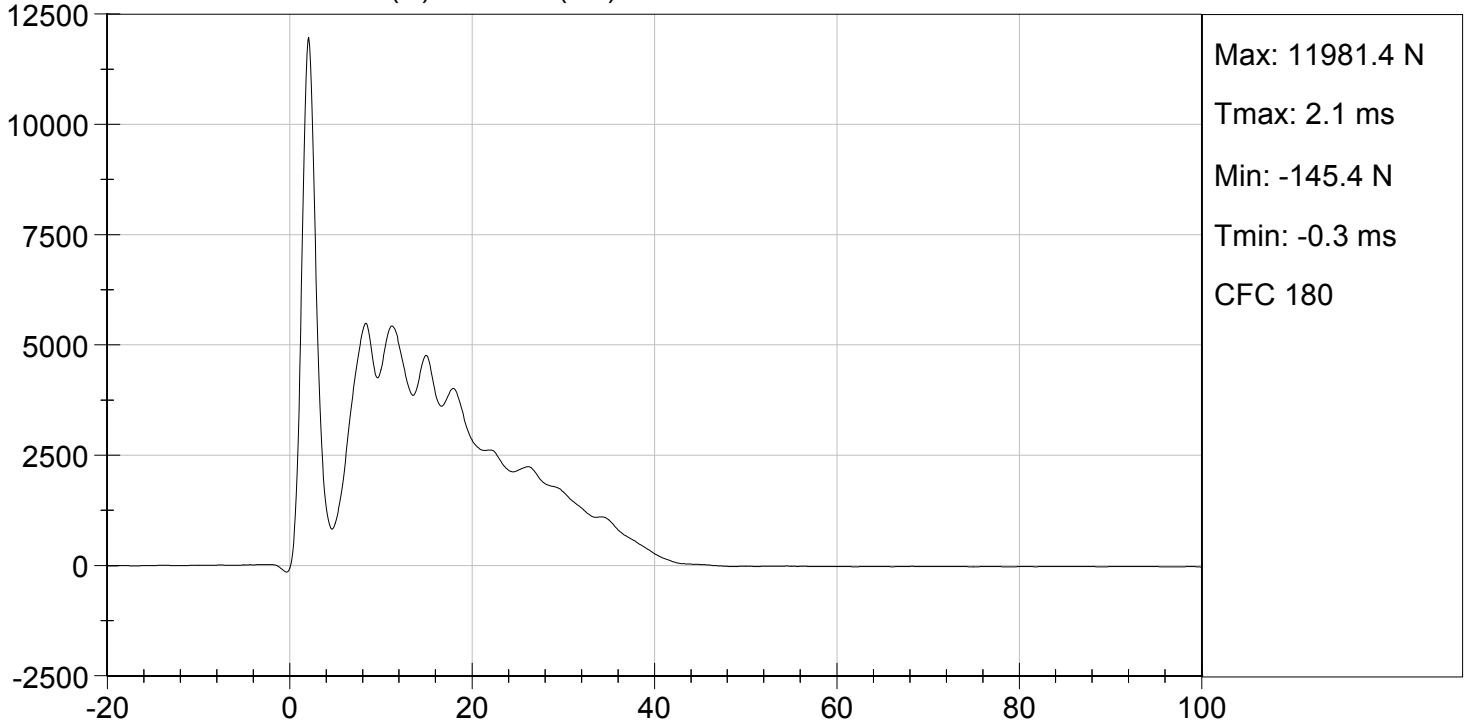
03/31/2015
Test Date

Jessica Hall
Approved By

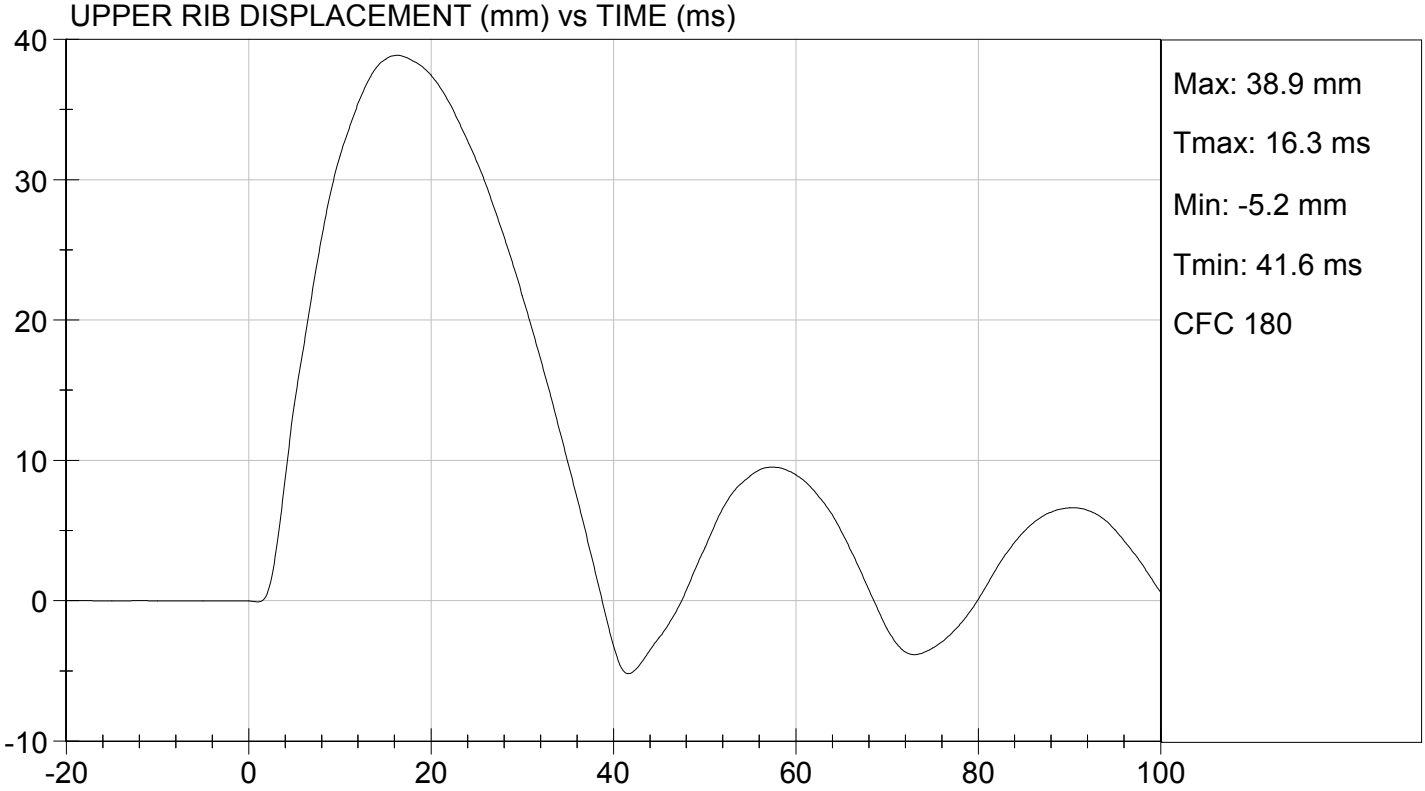
TEST DESC: THORAX IMPACT
VELOCITY: 18.32 ft/s, 5.58 m/s

TEST DATE: 03/31/2015
TEST #: D15890

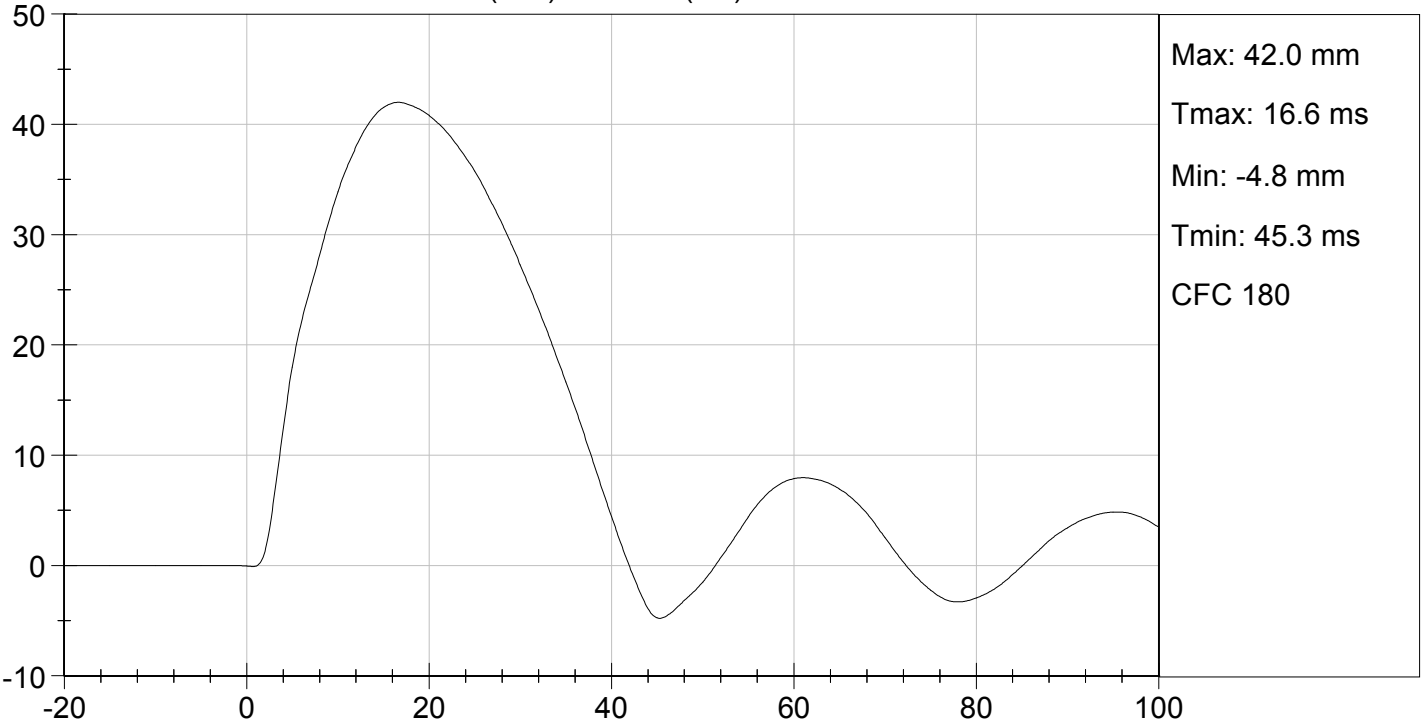
IMPACTOR FORCE (N) vs TIME (ms)



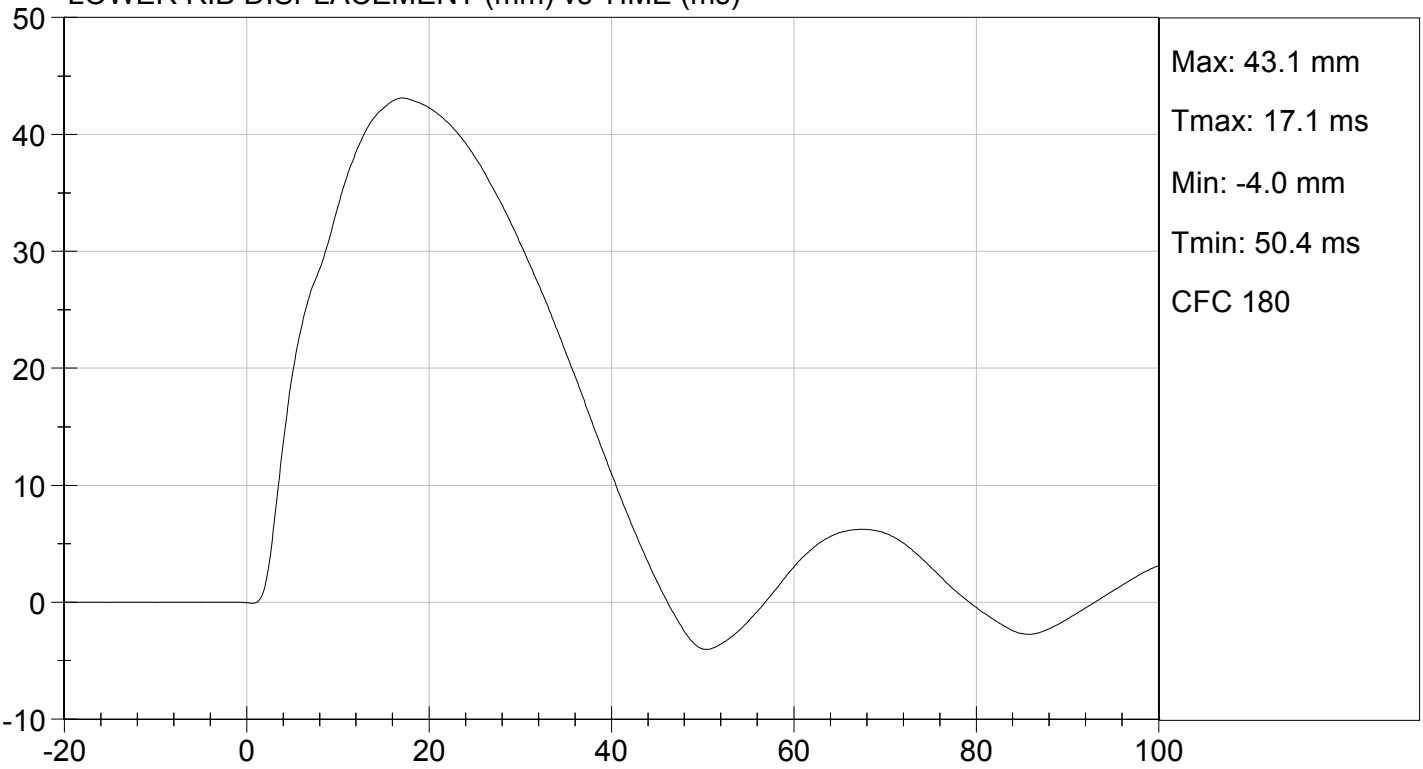
UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



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:** D15897

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	32	Pass
Probe Speed	m/s	3.90 to 4.10	4.06	Pass
Maximum Impactor Force	N	4000 to 4800	4102	Pass
Time of Maximum Impactor Force	ms	10.6 to 13.0	10.7	Pass
Maximum Total Abdomen Force	N	2200 to 2700	2208	Pass
Time of Maximum Abdomen Force	ms	10.0 to 12.3	10.7	Pass
		Overall Test Results		Pass

Maxime Chamberland
Laboratory Technician

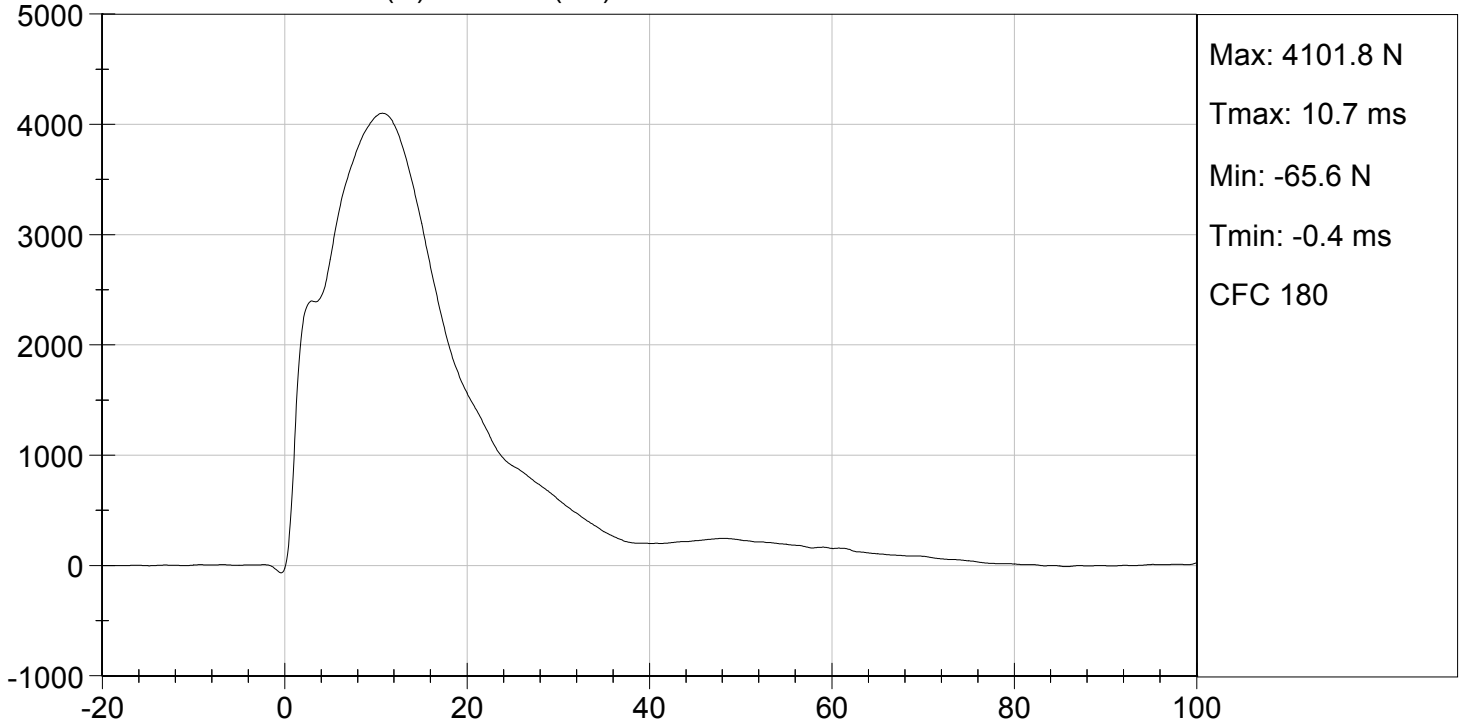
03/31/2015
Test Date

Jessica Gall
Approved By

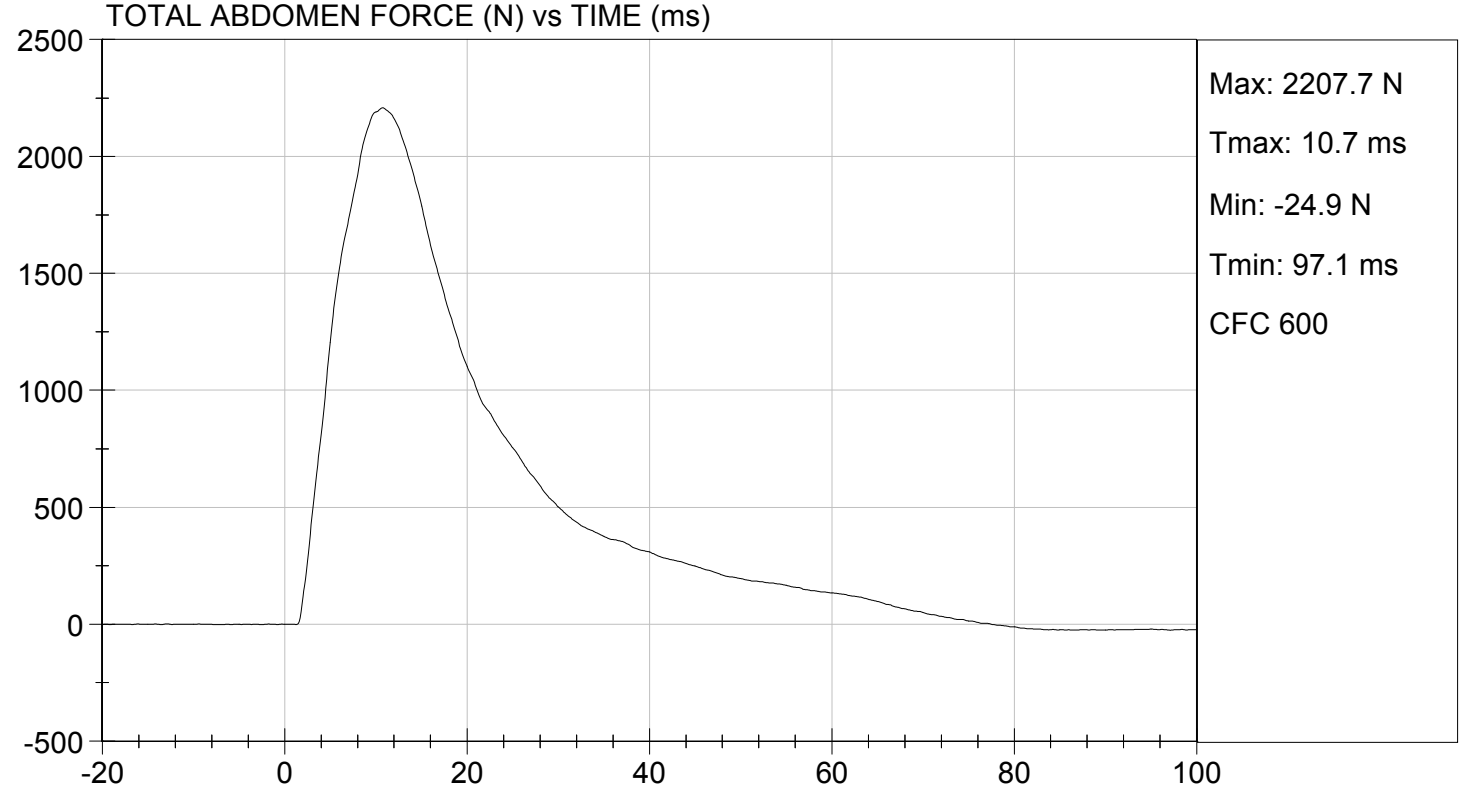
TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.33 ft/s, 4.06 m/s

TEST DATE: 03/31/2015
TEST #: D15897

IMPACTOR FORCE (N) vs TIME (ms)



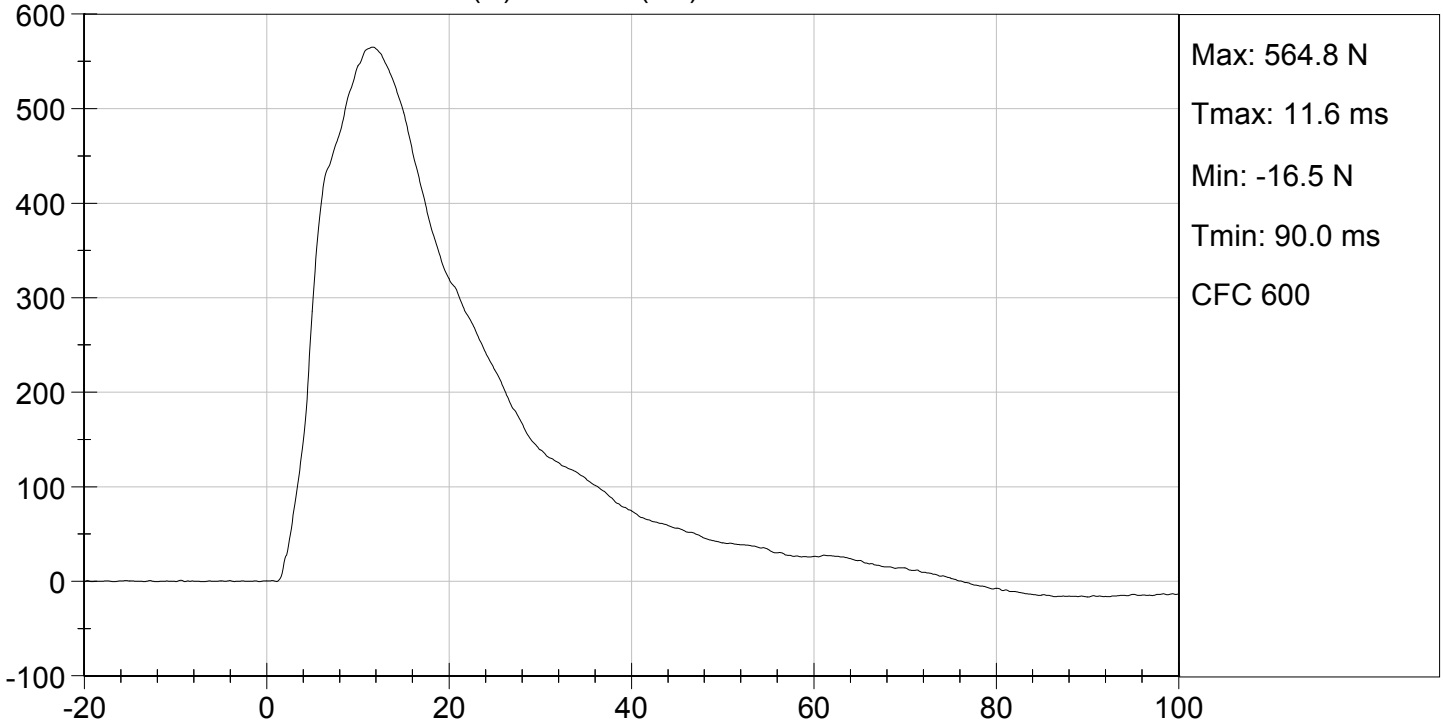
TOTAL ABDOMEN FORCE (N) vs TIME (ms)



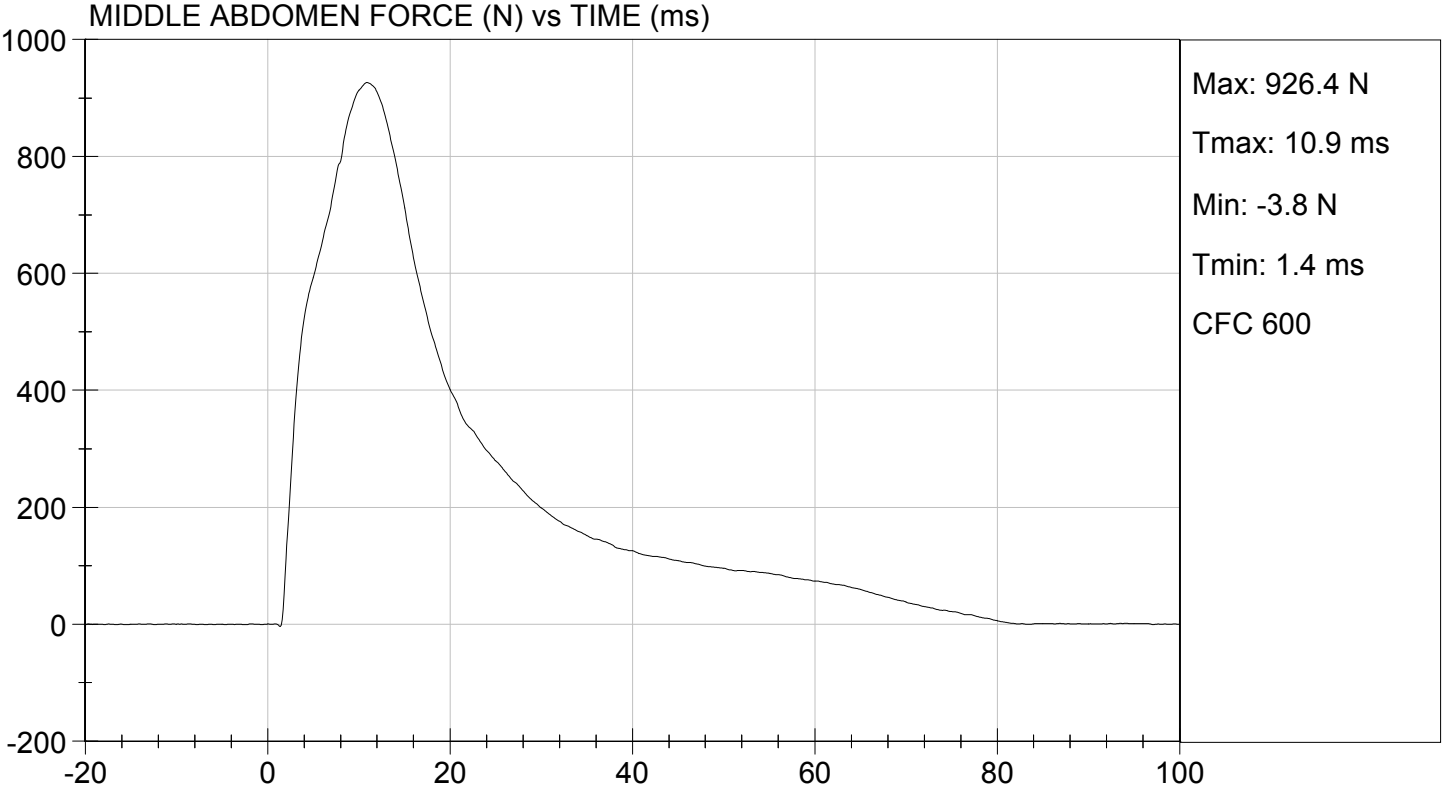
TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.33 ft/s, 4.06 m/s

TEST DATE: 03/31/2015
TEST #: D15897

FRONT ABDOMEN FORCE (N) vs TIME (ms)



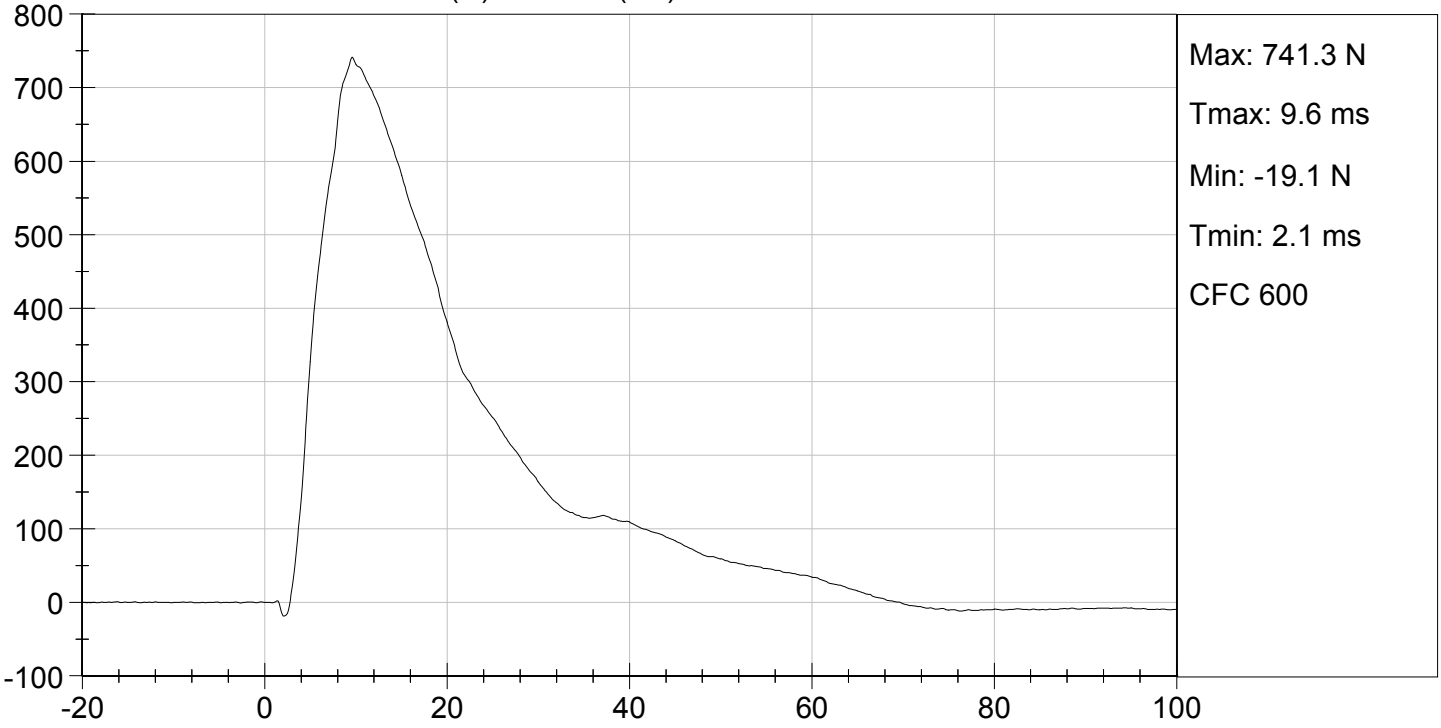
MIDDLE ABDOMEN FORCE (N) vs TIME (ms)



TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.33 ft/s, 4.06 m/s

TEST DATE: 03/31/2015
TEST #: D15897

REAR ABDOMEN FORCE (N) vs TIME (ms)



MGA RESEARCH CORPORATION

LUMBAR SPINE TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D15898

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	31	Pass
Pendulum Speed		m/s	5.95 to 6.15	6.12	Pass
Pendulum Velocity	1 ms	m/s	-0.05 to 0.00	-0.01	Pass
	3.7 ms	m/s	-0.425 to -0.24	-0.390	Pass
	27 ms	m/s	-6.50 to -5.80	-5.84	Pass
	30 ms	m/s	>= -6.50	-6.44	Pass
Maximum Flexion Angle		deg	45.0 to 55.0	49.0	Pass
Time of Maximum Flexion Angle		ms	39.0 to 53.0	47.7	Pass
Headform Rotation Decay to Initial Position		ms	37 to 57	46	Pass
			Overall Results		Pass

Maxime Chamberland
Laboratory Technician

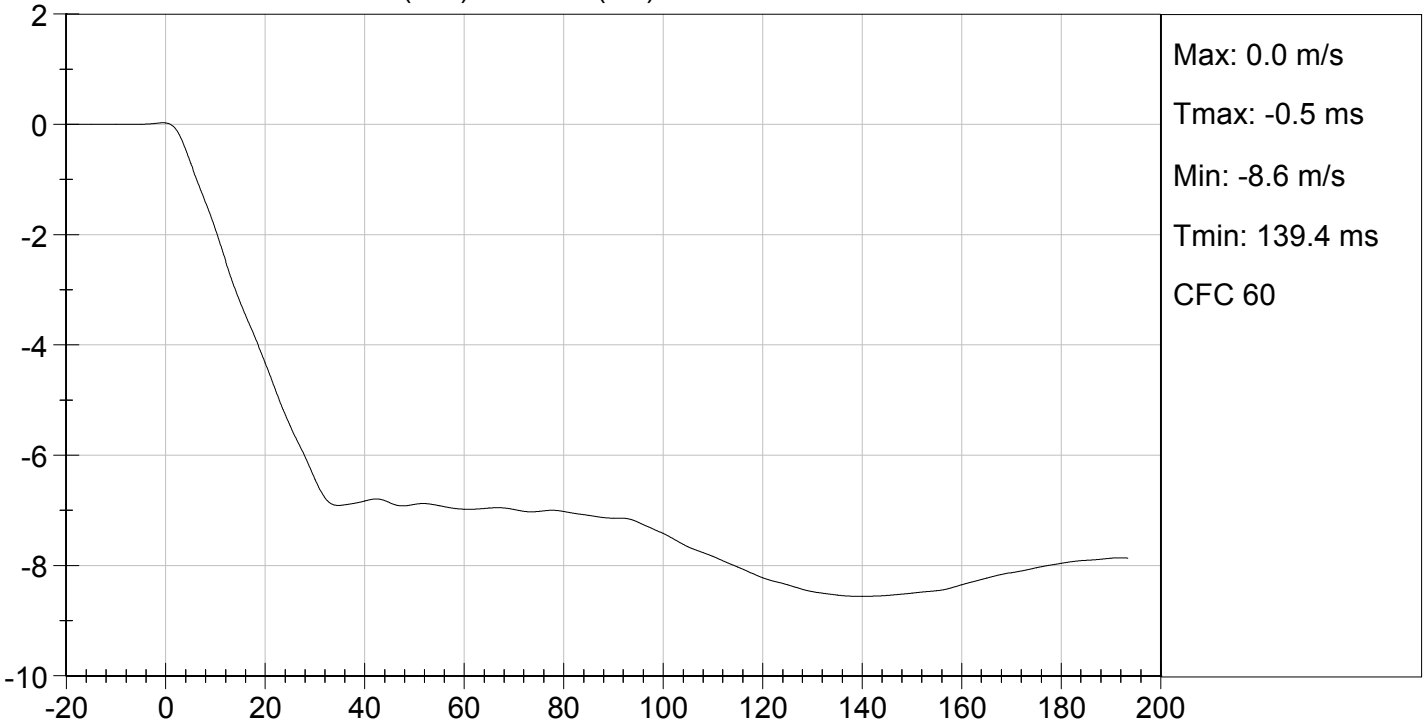
03/31/2015
Test Date

Jessica Hall
Approved By

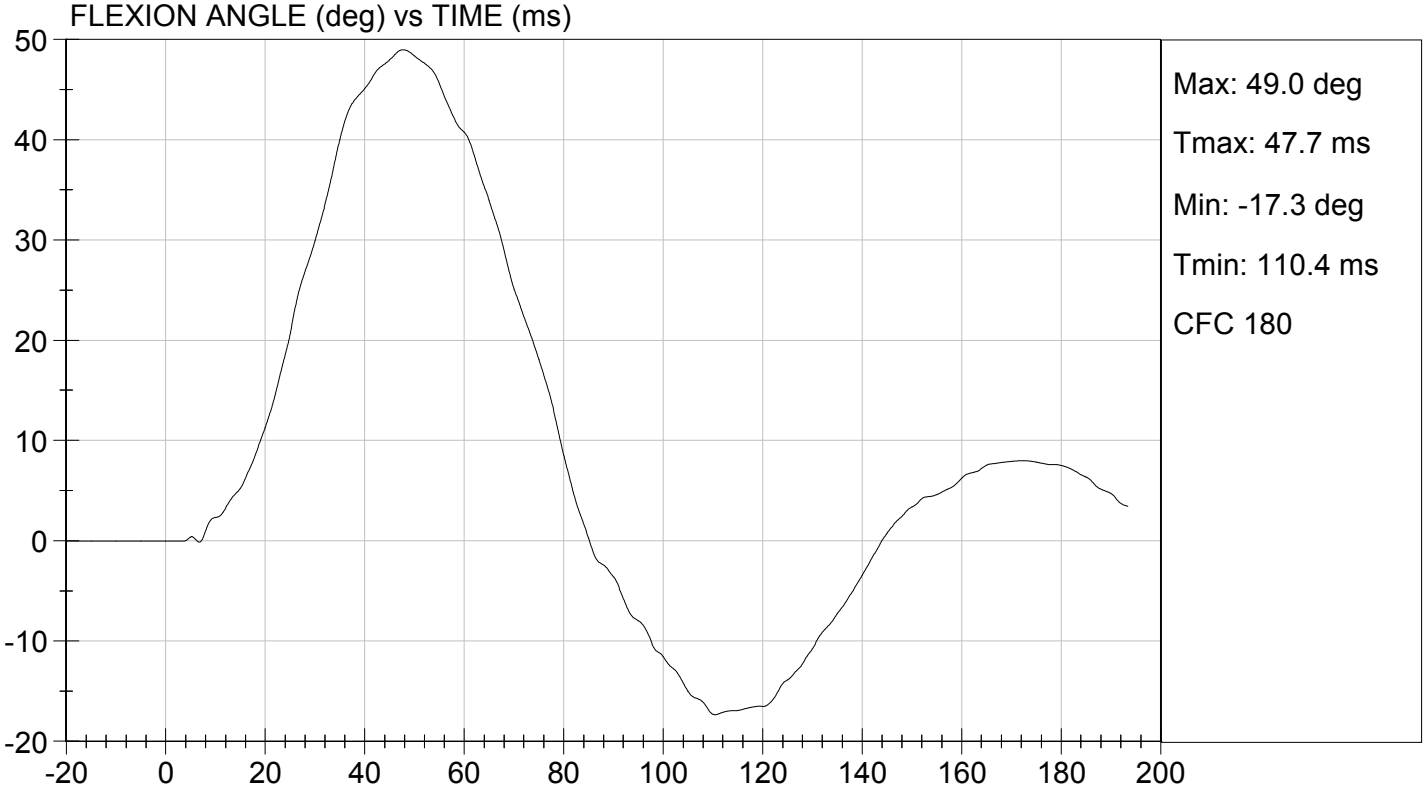
TEST DESC: LUMBAR BENDING
VELOCITY: 20.08 ft/s, 6.12 m/s

TEST DATE: 03/31/2015
TEST #: D15898

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



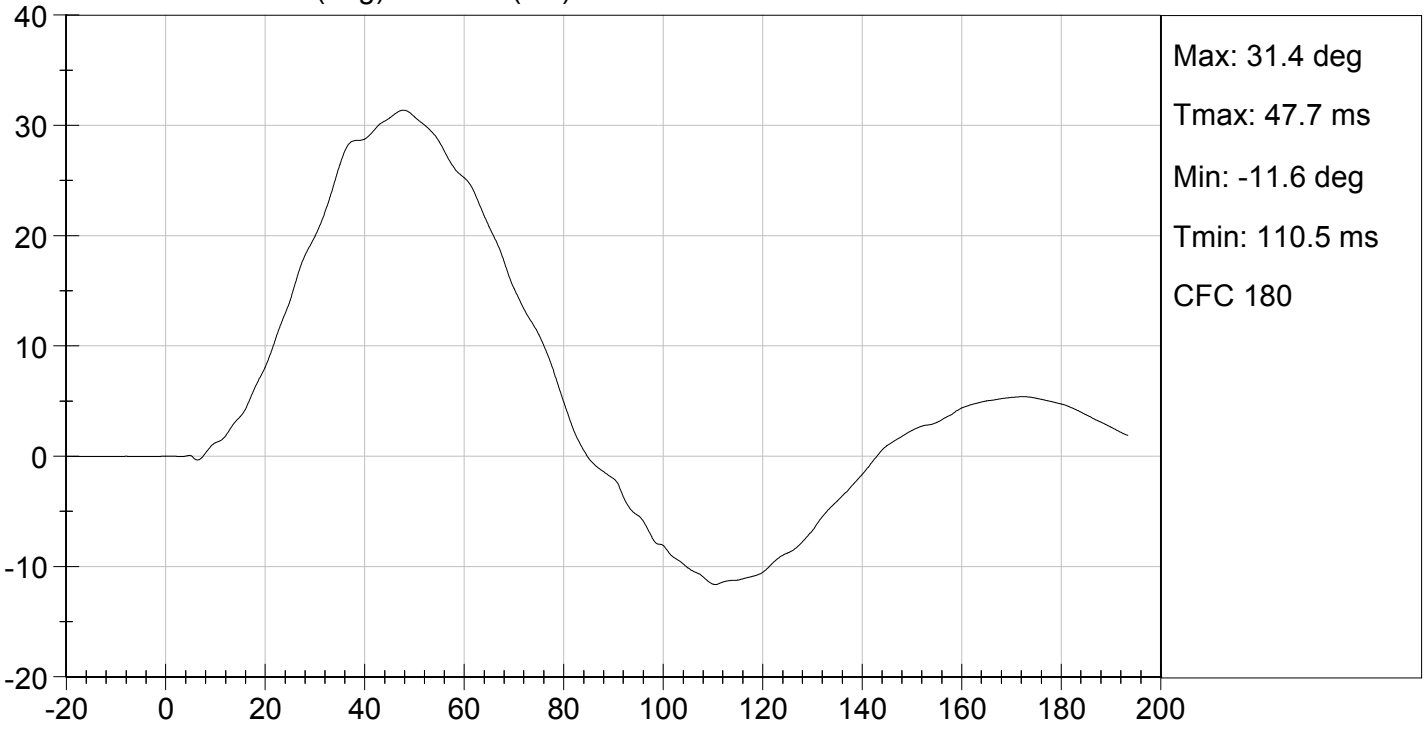
FLEXION ANGLE (deg) vs TIME (ms)



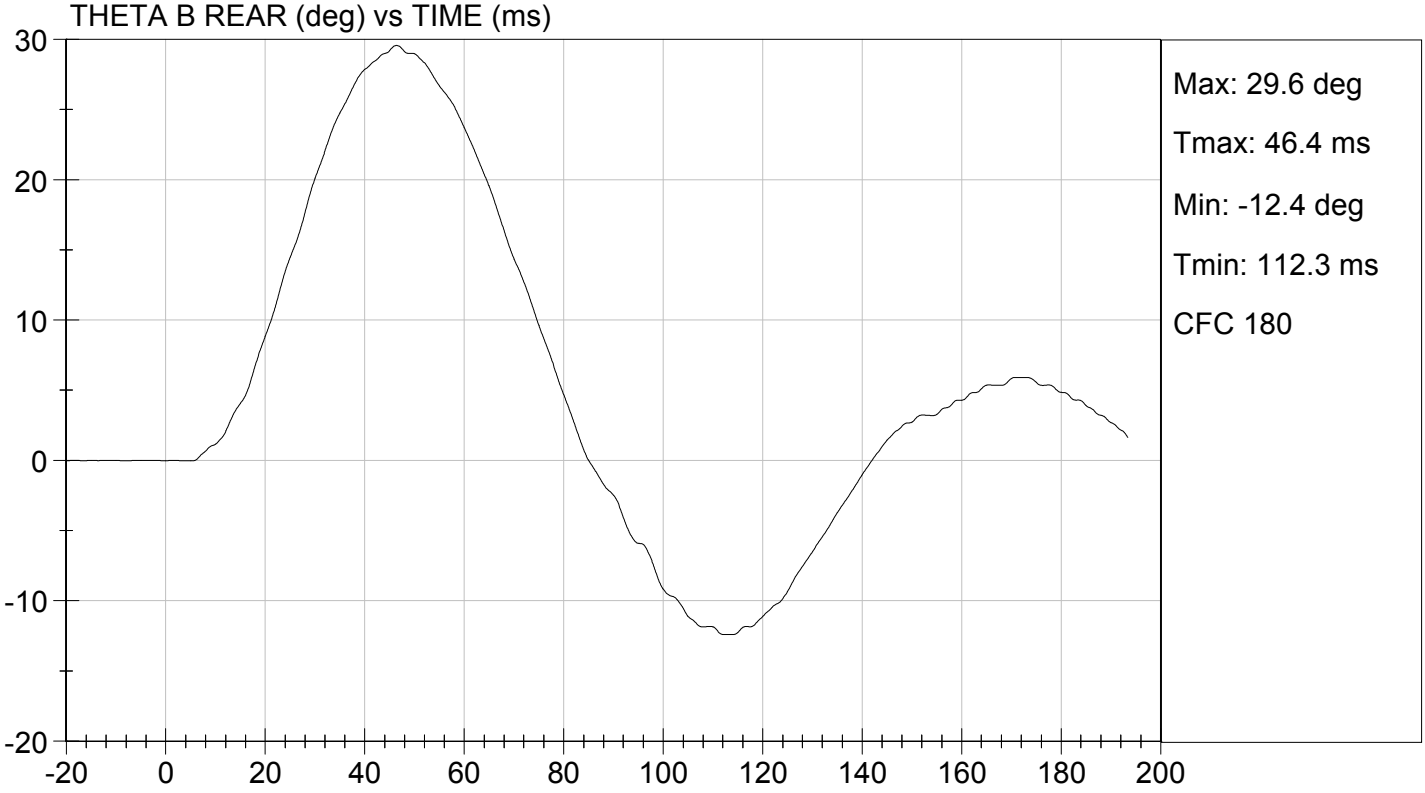
TEST DESC: LUMBAR BENDING
VELOCITY: 20.08 ft/s, 6.12 m/s

TEST DATE: 03/31/2015
TEST #: D15898

THETA A FRONT (deg) vs TIME (ms)

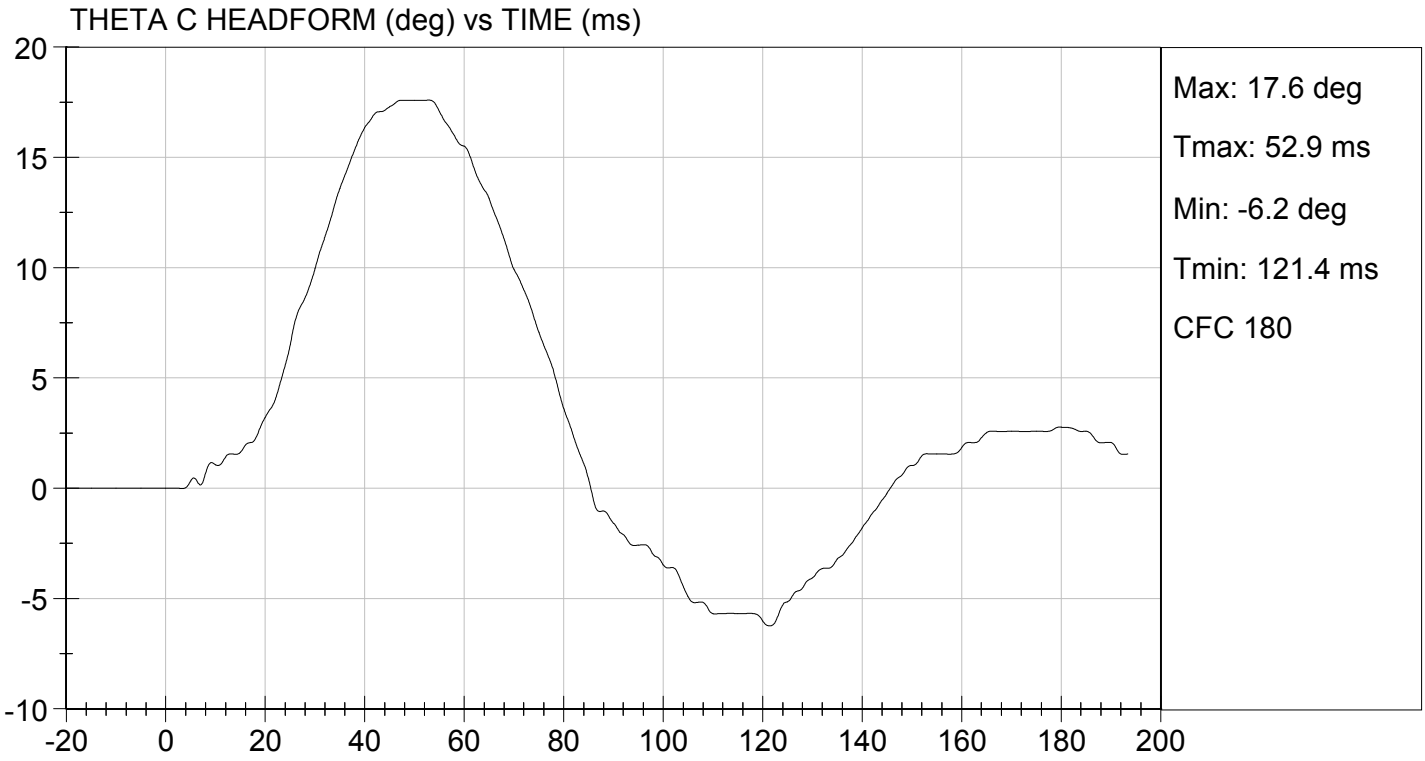


THETA B REAR (deg) vs TIME (ms)



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

TEST DATE: 03/31/2015
TEST #: D15898



MGA RESEARCH CORPORATION

PELVIS TEST

ES-2re DUMMY

ATD Serial No: 032 **Test I.D:** D15899

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	32	Pass
Probe Speed	m/s	4.20 to 4.40	4.30	Pass
Maximum Impactor Force	N	4700 to 5400	4852	Pass
Time of Maximum Impactor Force	ms	11.8 to 16.1	13.5	Pass
Maximum Pubic Force	N	1230 to 1590	1253	Pass
Time of Maximum Pubic Force	ms	12.2 to 17.0	15.6	Pass
		Overall Test Results		Pass

Maxime Chamberland
Laboratory Technician

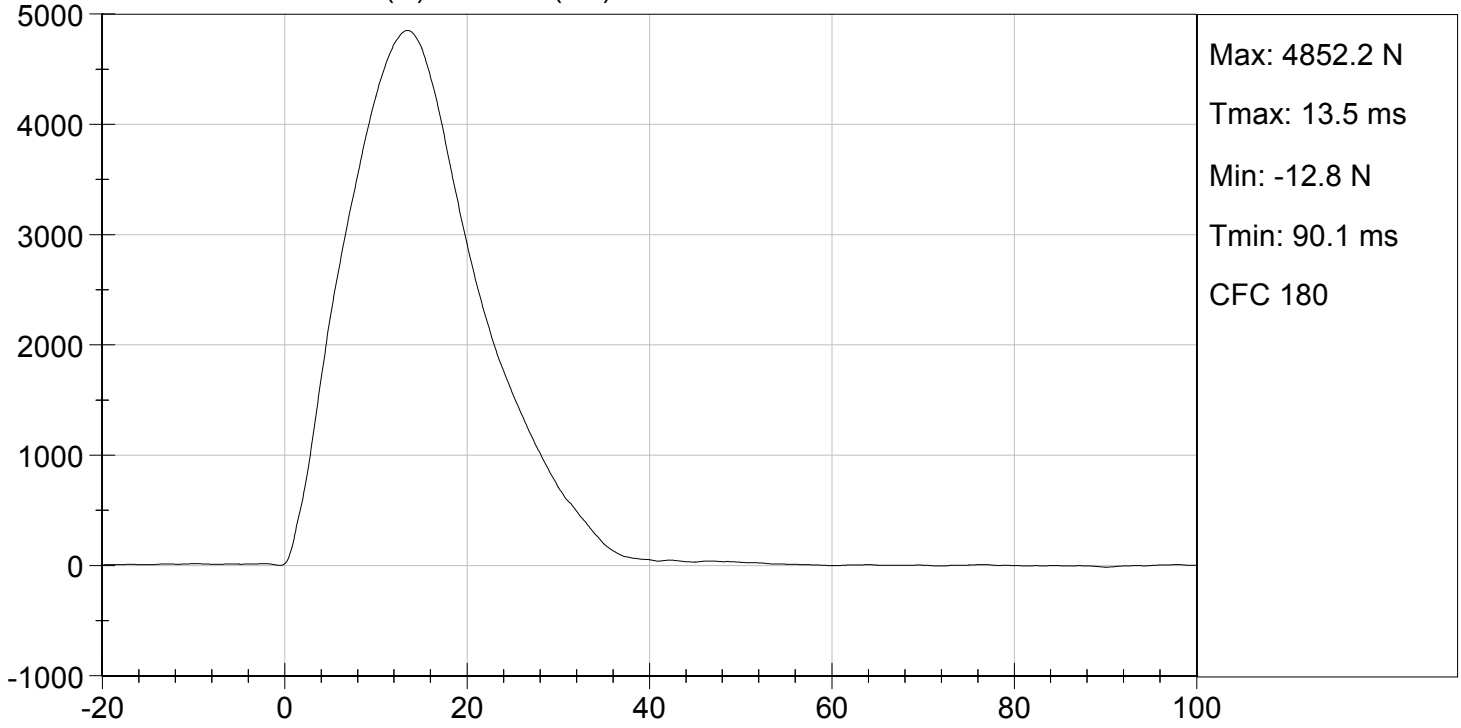
03/31/2015
Test Date

Jessica Hall
Approved By

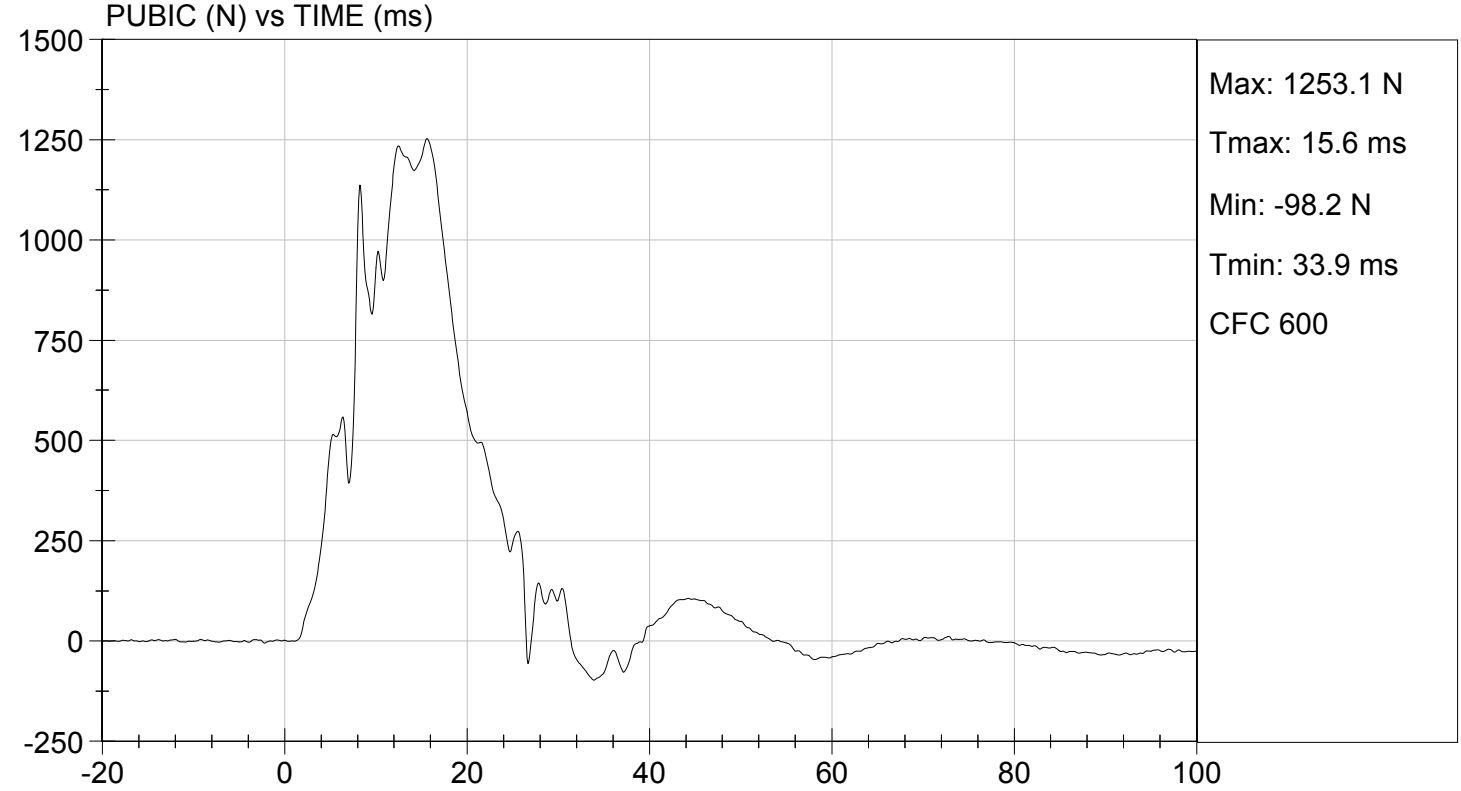
TEST DESC: PELVIS IMPACT
VELOCITY: 14.12 ft/s, 4.3 m/s

TEST DATE: 03/31/2015
TEST #: D15899

IMPACTOR FORCE (N) 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:** D15831

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	26	Pass
Peak Resultant Acceleration	G's	115 to 137	123	Pass
Peak Longitudinal Acceleration	G's	+/- 15	-7.6	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	<15%	Yes	Pass
		Overall Test Results		Pass

David Schoedel
Laboratory Technician

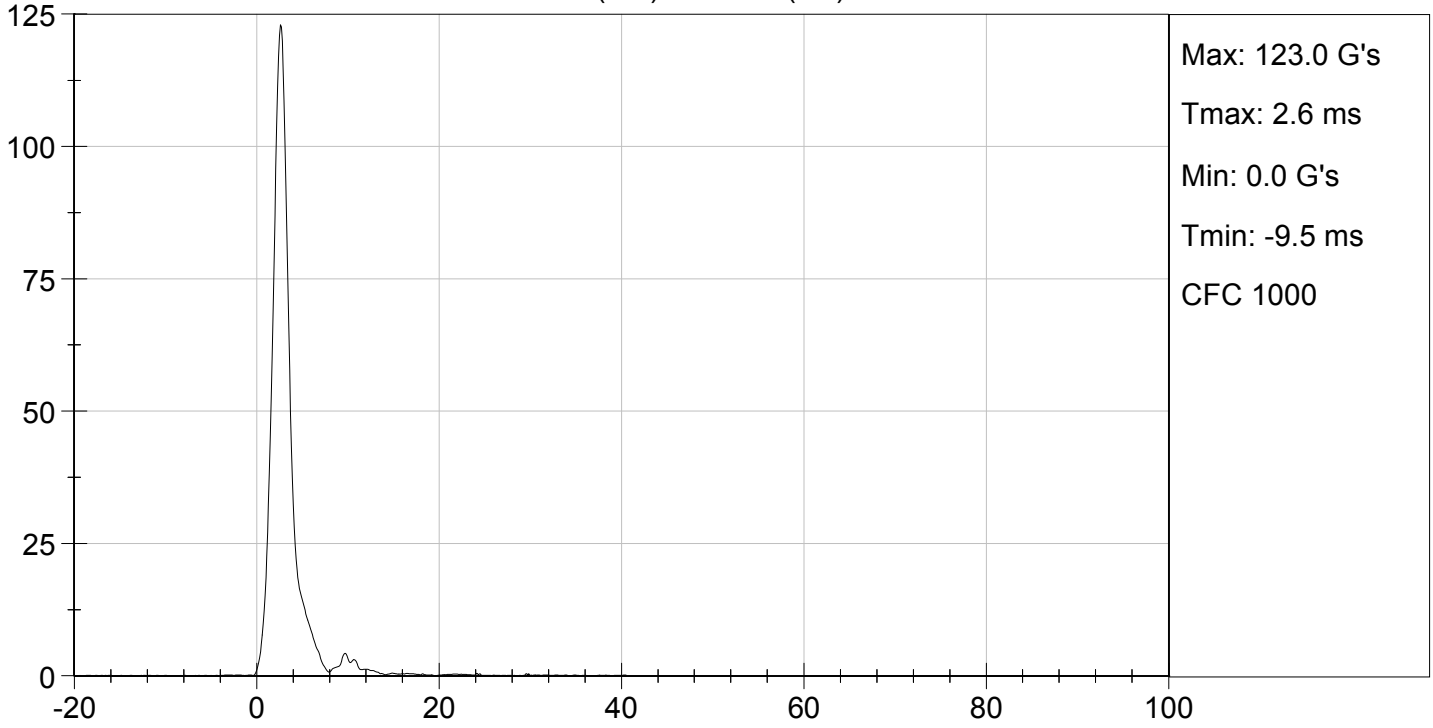
03/26/2015
Test Date

Jessica Hall
Approved By

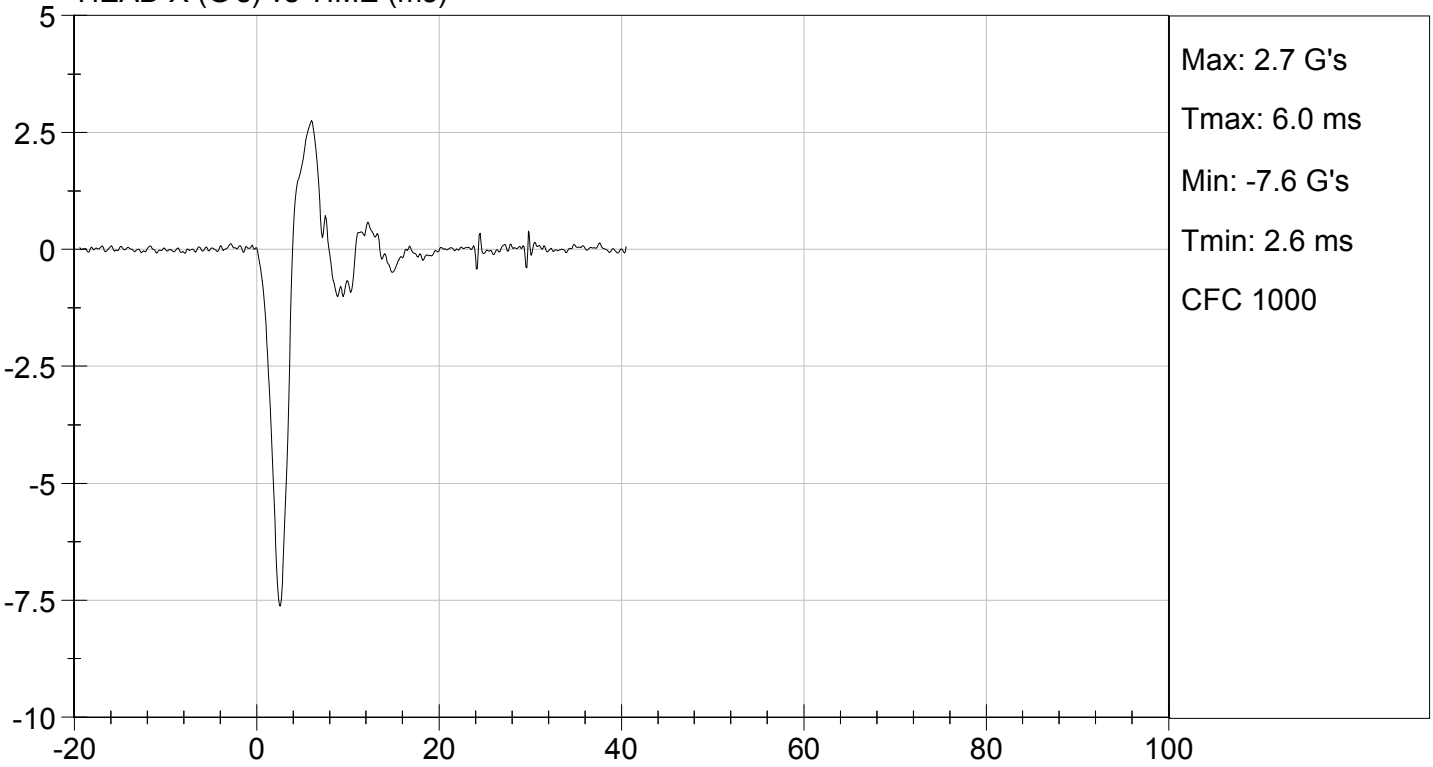
TEST DESC: HEAD DROP

TEST DATE: 03/26/2015
TEST #: D15831

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

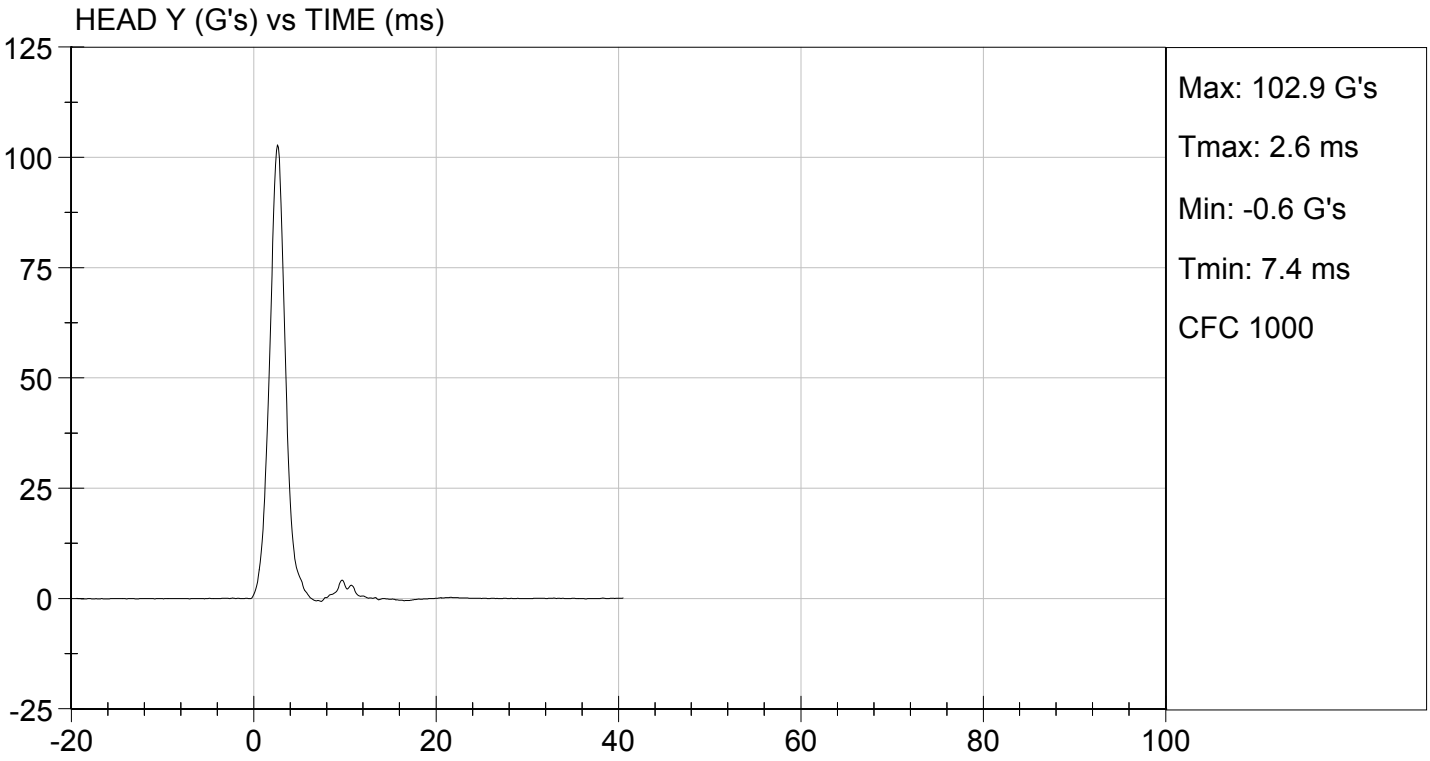


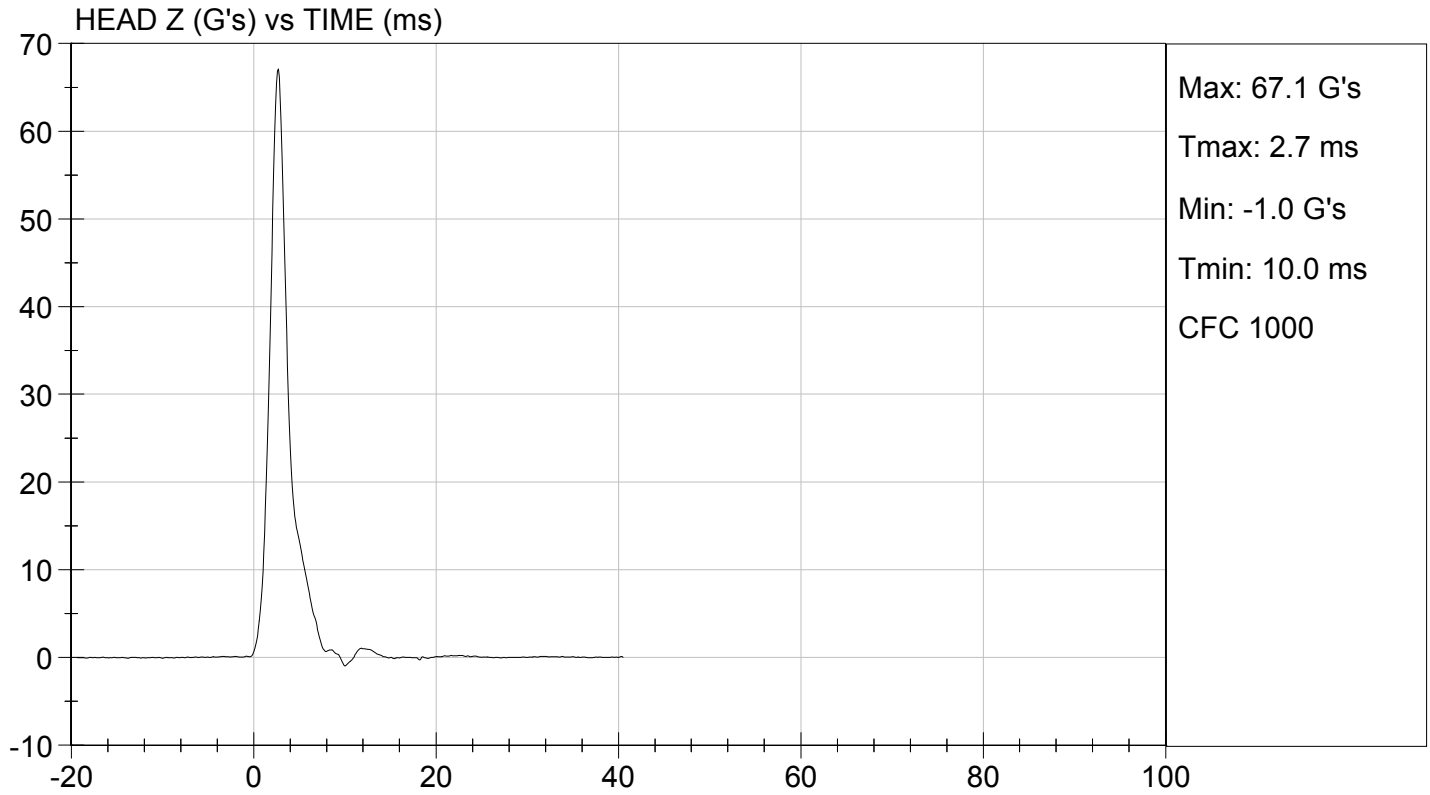
HEAD X (G's) vs TIME (ms)



TEST DESC: HEAD DROP

TEST DATE: 03/26/2015
TEST #: D15831





MGA RESEARCH CORPORATION

LATERAL NECK PENDULUM TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test I.D:** D15832

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.3	Pass
Humidity		%	10 to 70	26	Pass
Impact Velocity		m/s	5.51 to 5.63	5.63	Pass
Pendulum Velocity	10 ms	m/s	2.20 to 2.80	2.34	Pass
	15 ms	m/s	3.30 to 4.10	3.32	Pass
	20 ms	m/s	4.40 to 5.40	4.54	Pass
	25 ms	m/s	5.40 to 6.10	5.54	Pass
	25-100 ms	m/s	5.50 to 6.20	5.87	Pass
Maximum D-Plane Rotation		deg	71 to 81	74	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	61	Pass
Maximum Occipital Condyle Moment		Nm	-44 to -36	-38	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	120	Pass
			Overall Test Results		Pass

David Schoedel

Laboratory Technician

03/26/2015

Test Date

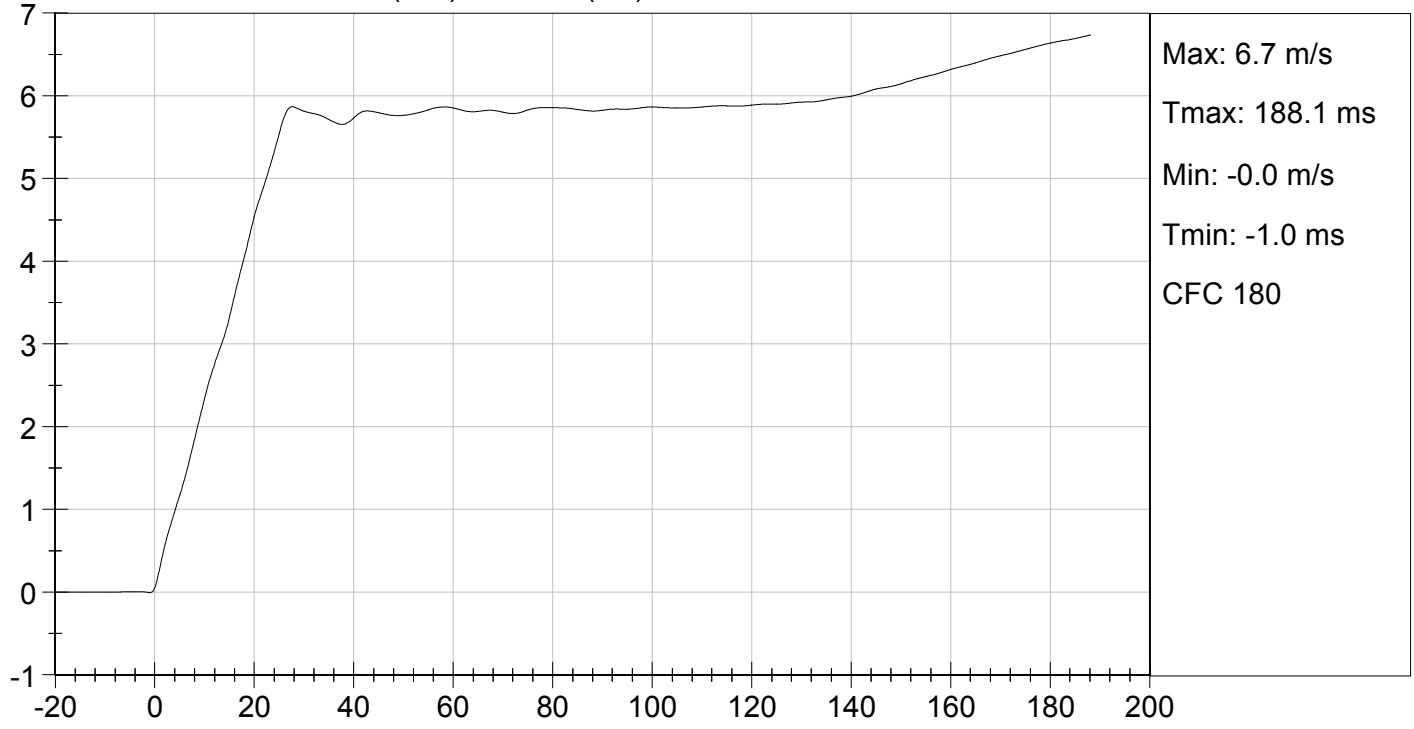
Jessica Hall

Approved By

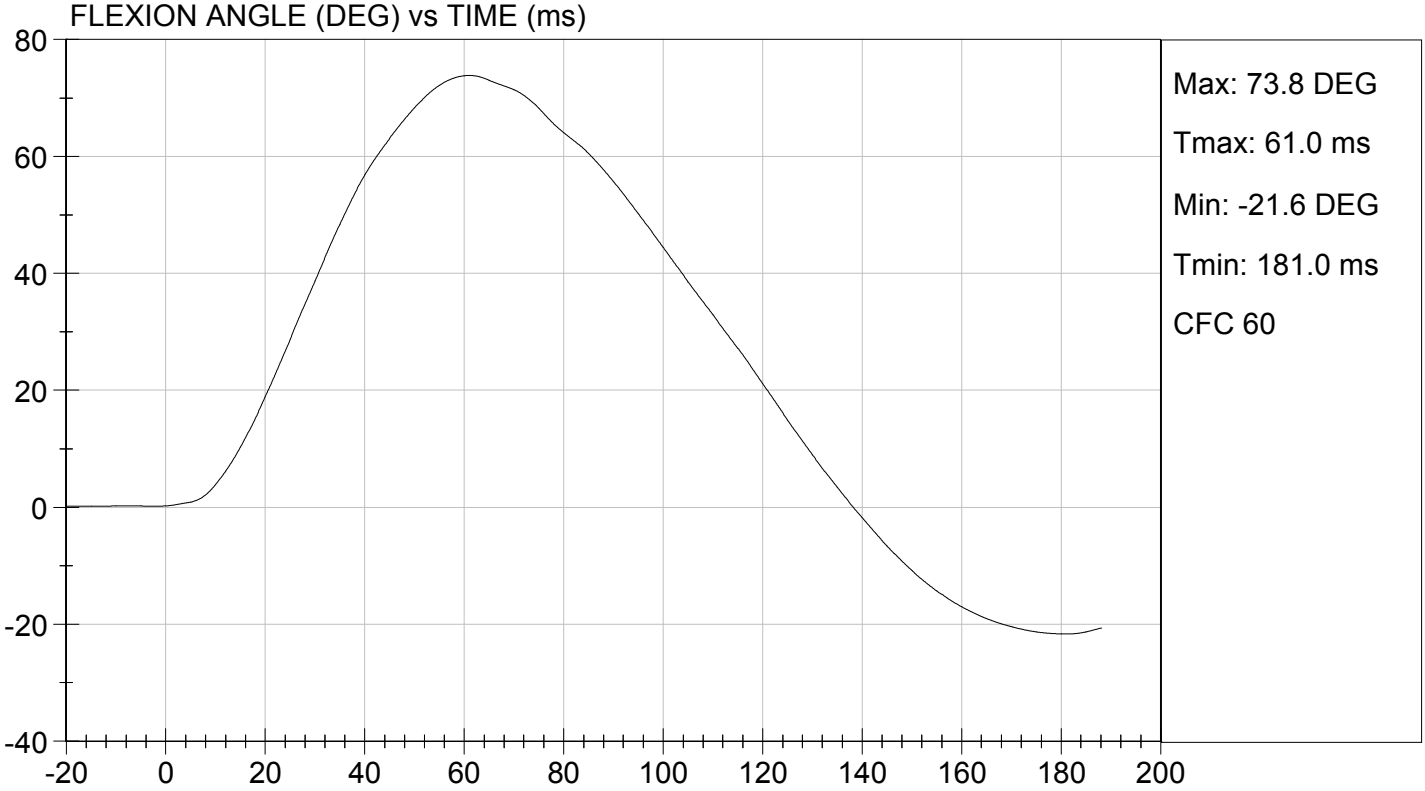
TEST DESC: NECK BENDING
VELOCITY: 18.47 ft/s, 5.63 m/s

TEST DATE: 03/26/2015
TEST #: D15832

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

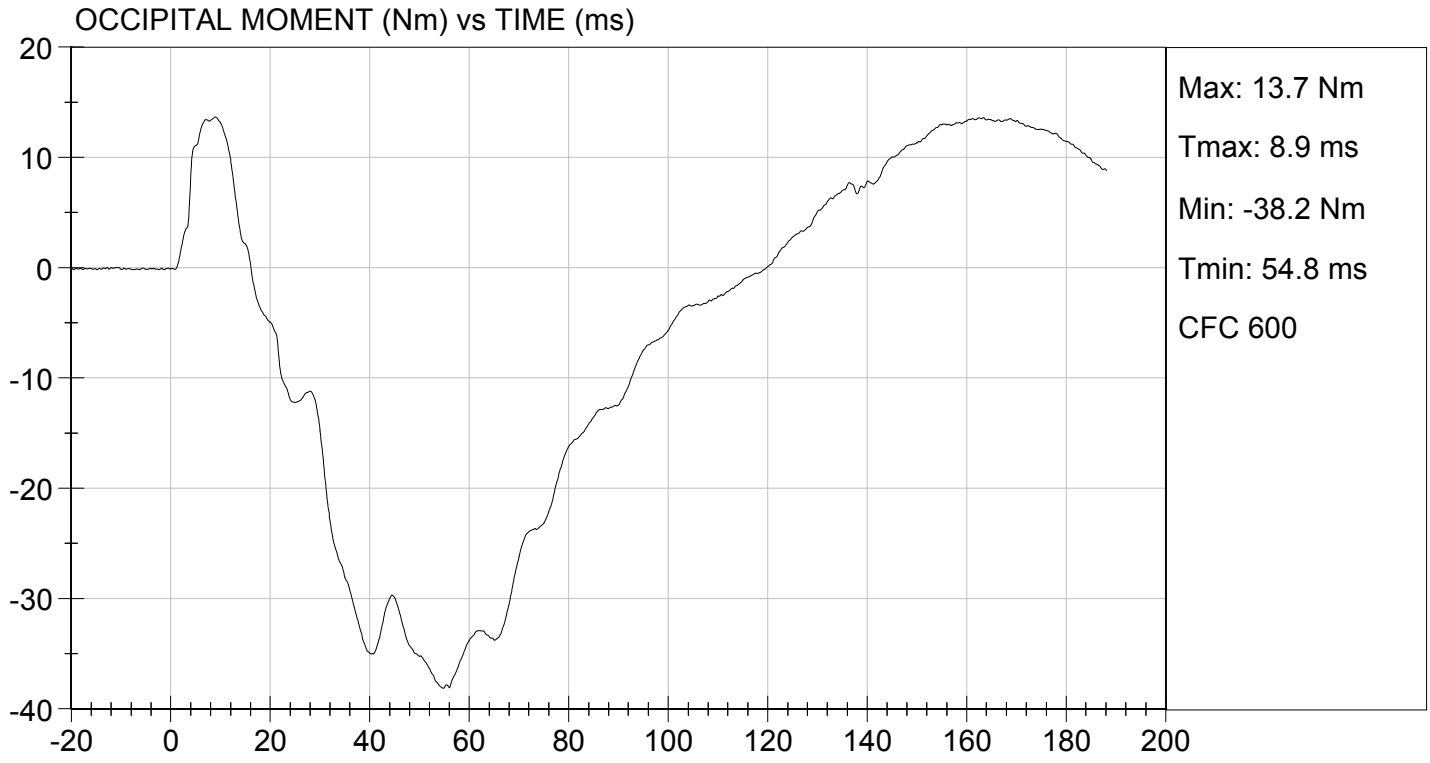


FLEXION ANGLE (DEG) vs TIME (ms)



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

TEST DATE: 03/26/2015
TEST #: D15832



MGA RESEARCH CORPORATION

SHOULDER IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test ID:** D15833

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

David Schoedel

Laboratory Technician

03/26/2015

Test Date

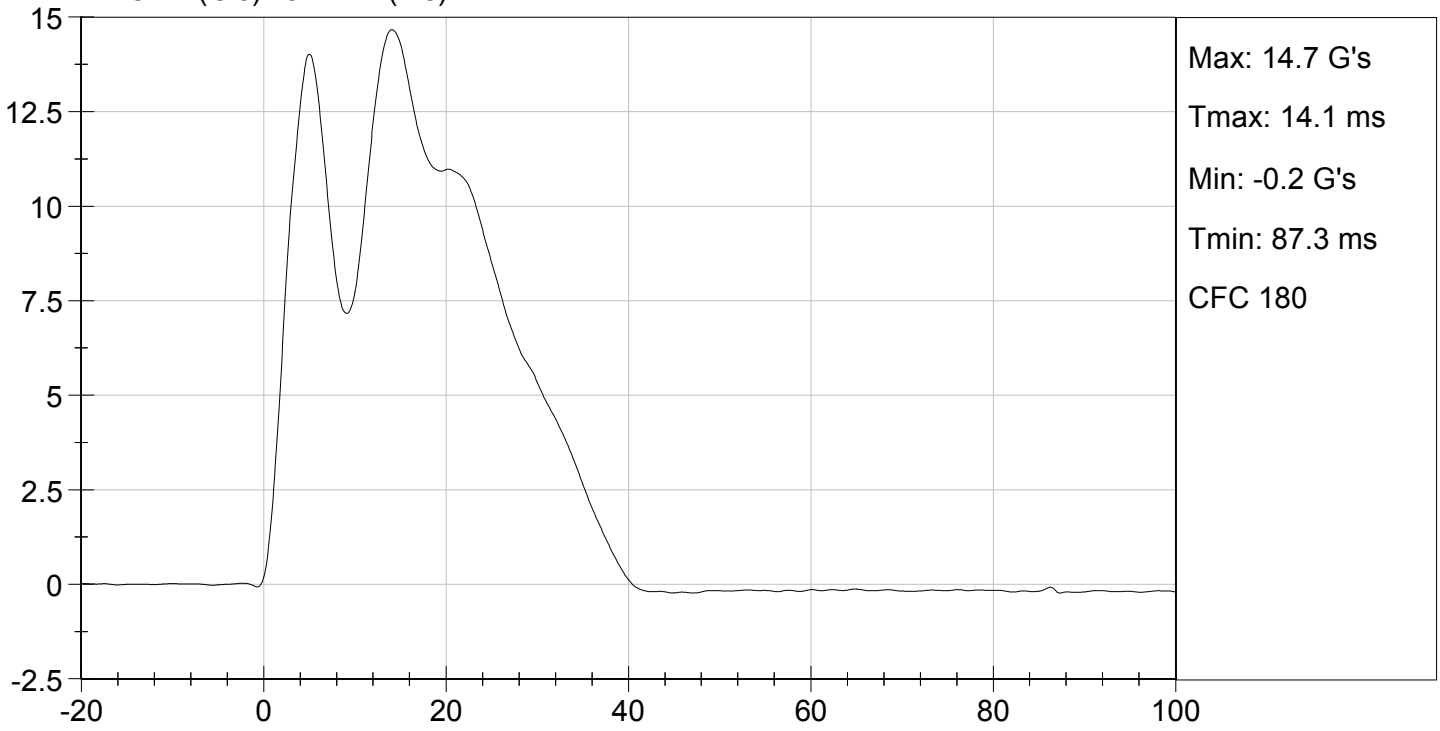
Jessica Hall

Approved By

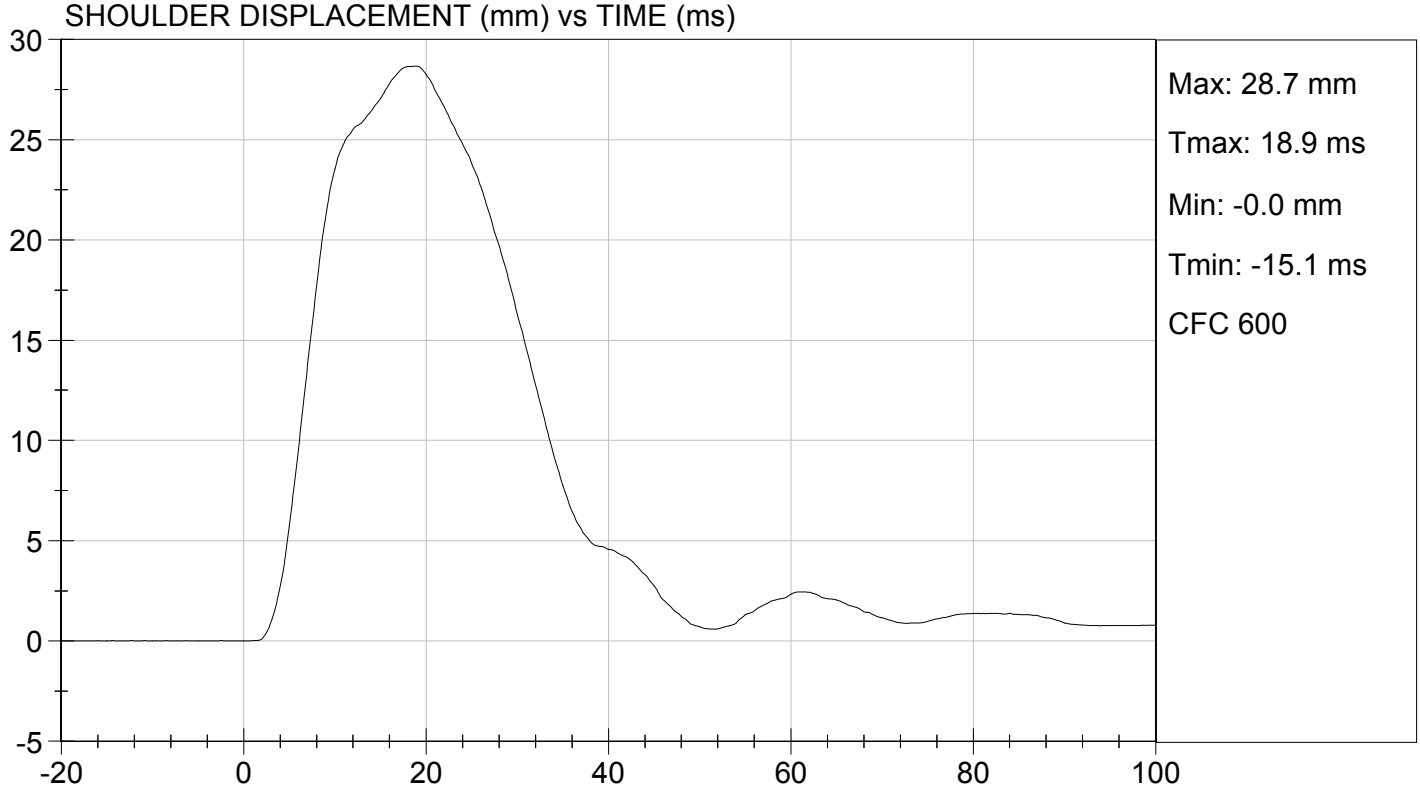
TEST DESC: SHOULDER IMPACT
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 03/26/2015
TEST #: D15833

PROBE (G's) vs TIME (ms)



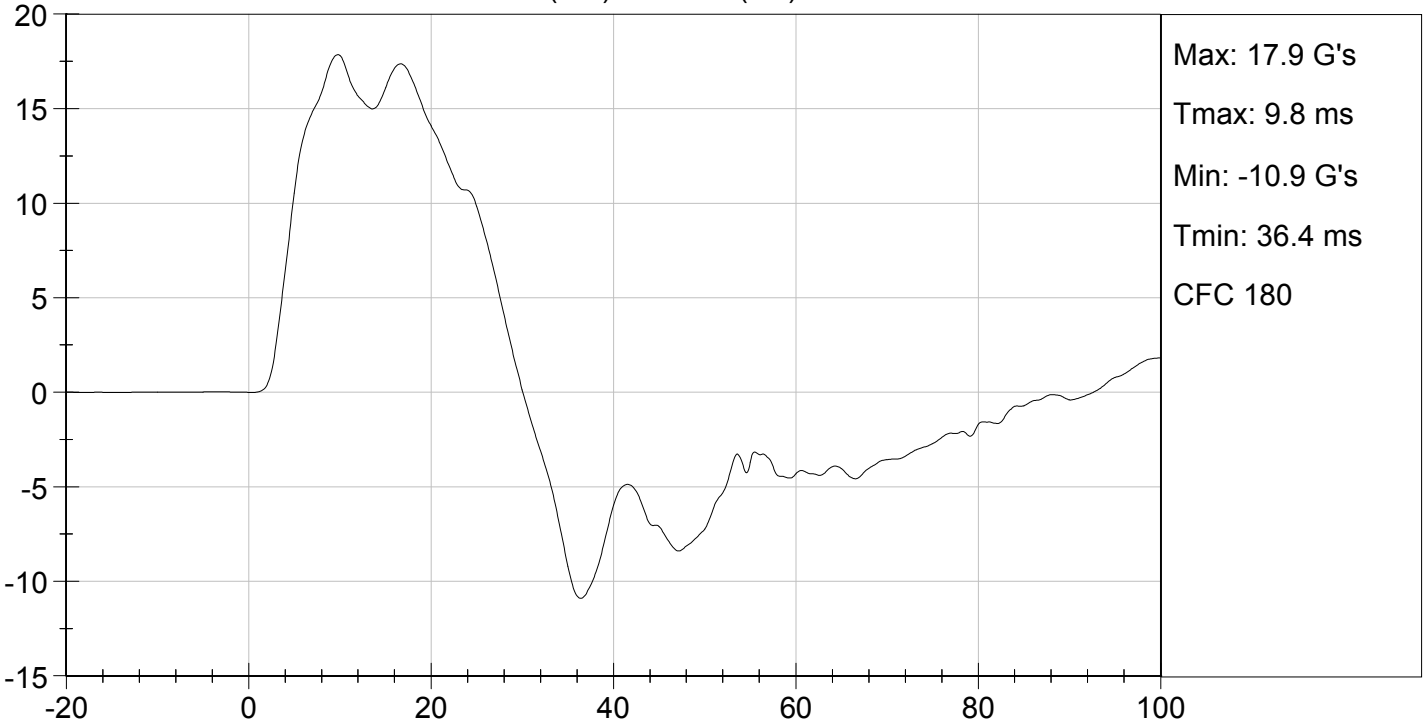
SHOULDER DISPLACEMENT (mm) vs TIME (ms)



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

TEST DATE: 03/26/2015
TEST #: D15833

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



MGA RESEARCH CORPORATION

THORAX (WITH ARM) IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test I.D:** D15834

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	21	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Maximum Probe Acceleration	G's	30 to 36	30	Pass
Shoulder Displacement	mm	31 to 40	34	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	35	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	30	Pass
		Overall Test Results		Pass

David Schoedel

Laboratory Technician

03/26/2015

Test Date

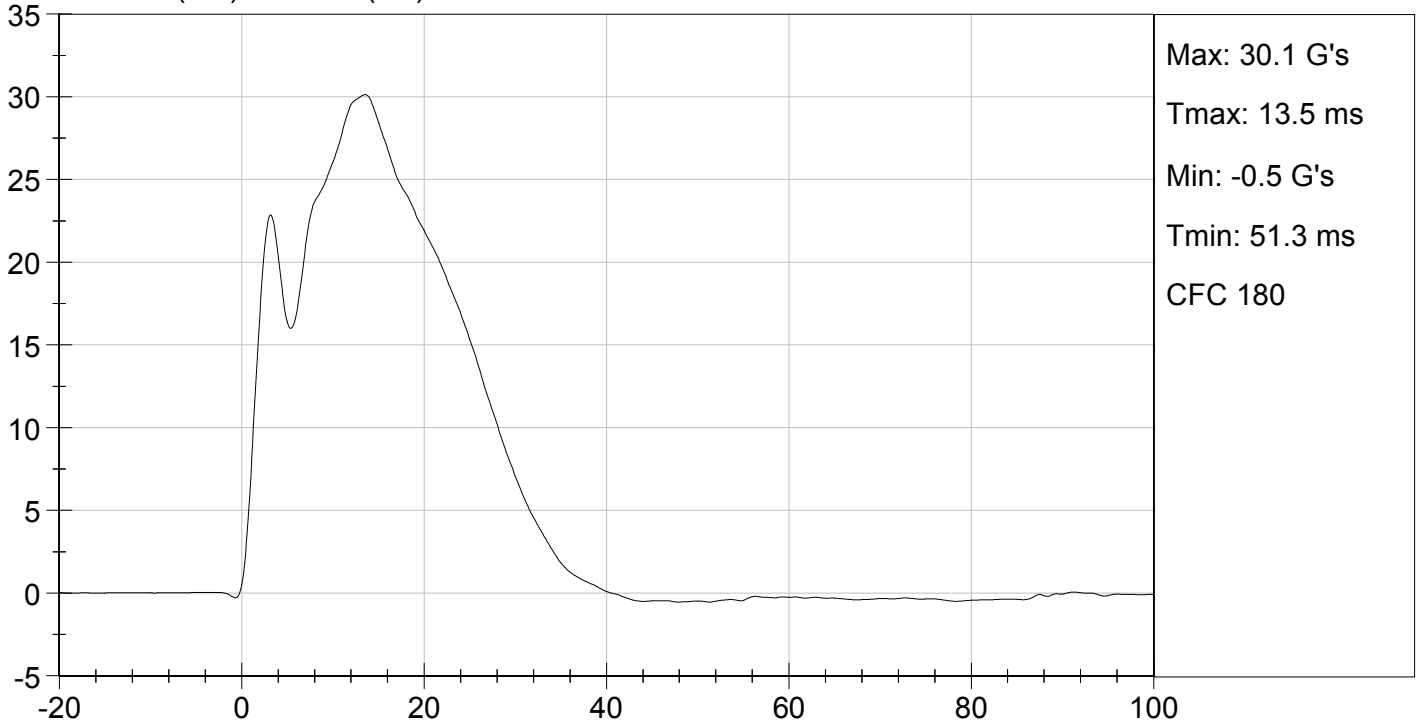
Jessica Hall

Approved By

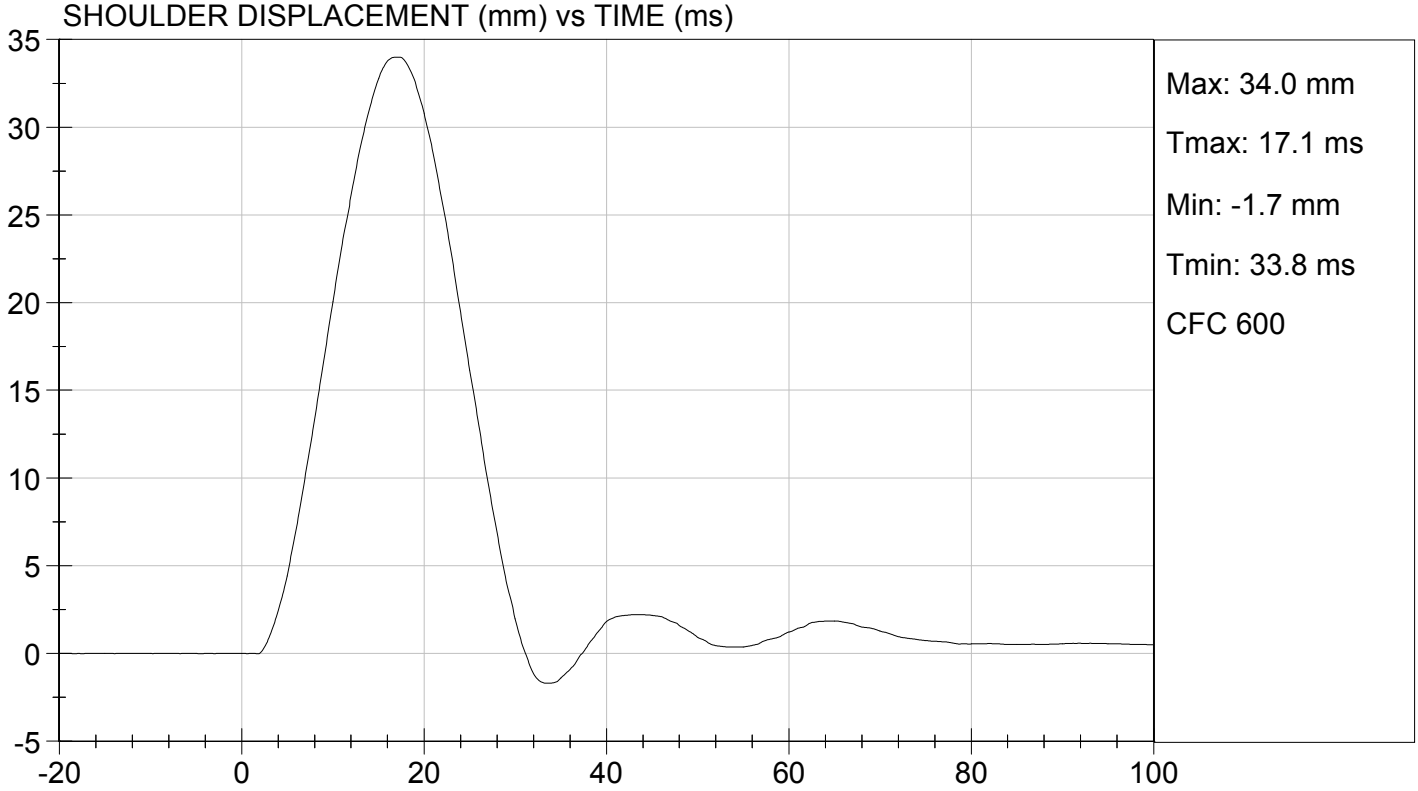
TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

TEST DATE: 03/26/2015
TEST #: D15834

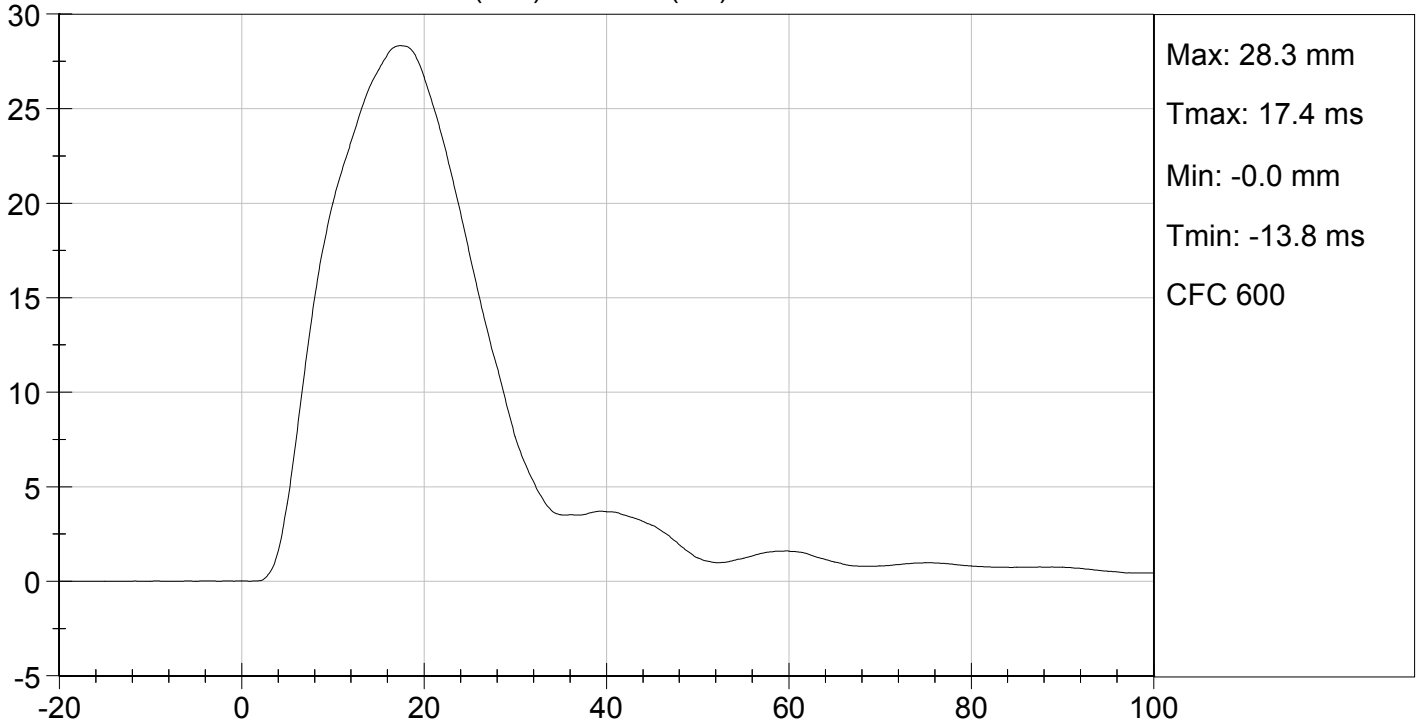
PROBE (G's) vs TIME (ms)



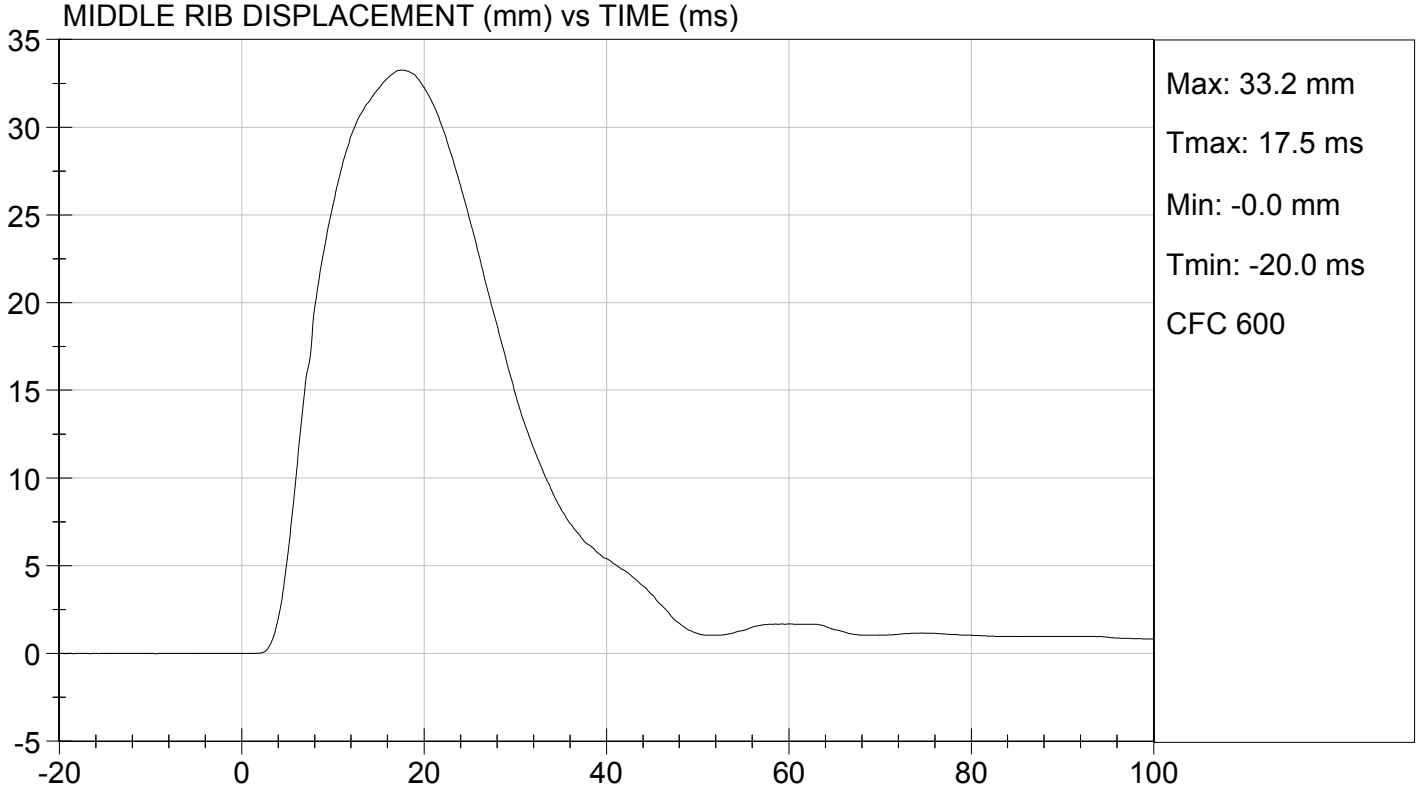
SHOULDER DISPLACEMENT (mm) vs TIME (ms)



UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



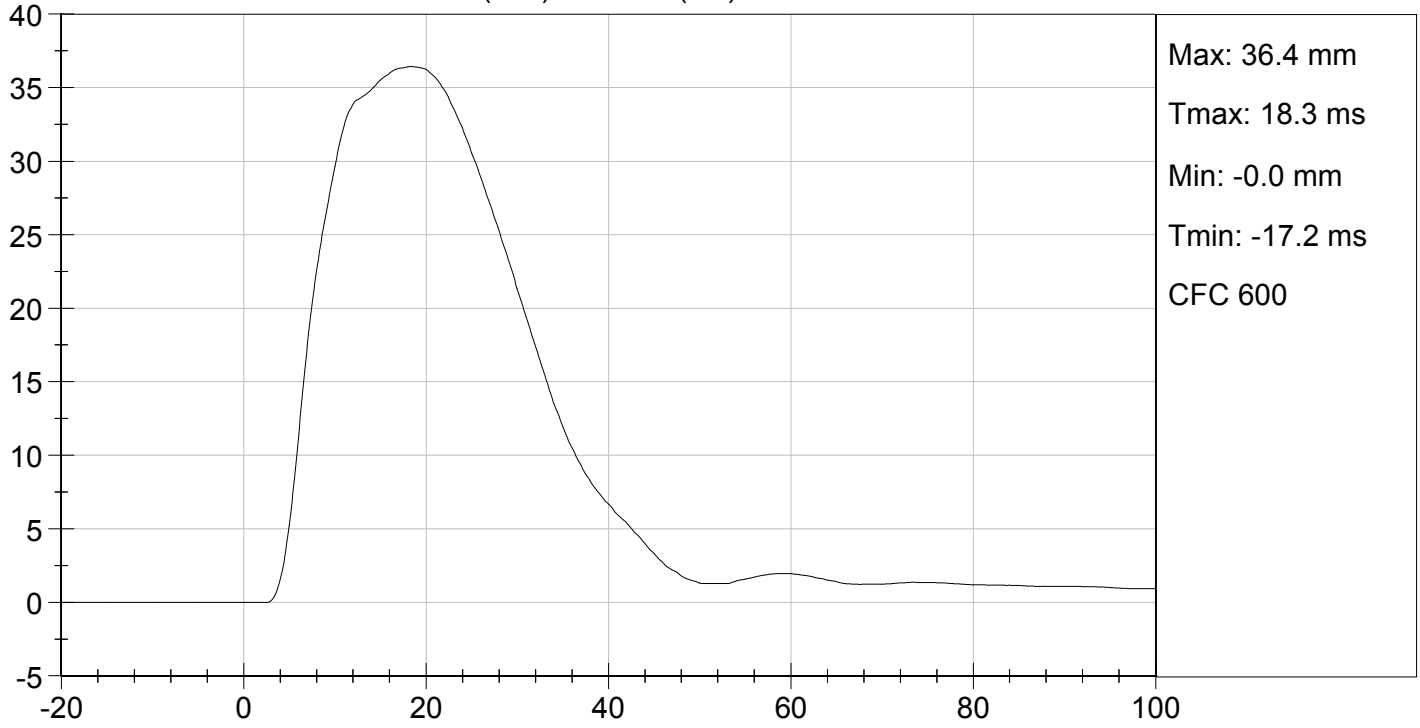
MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



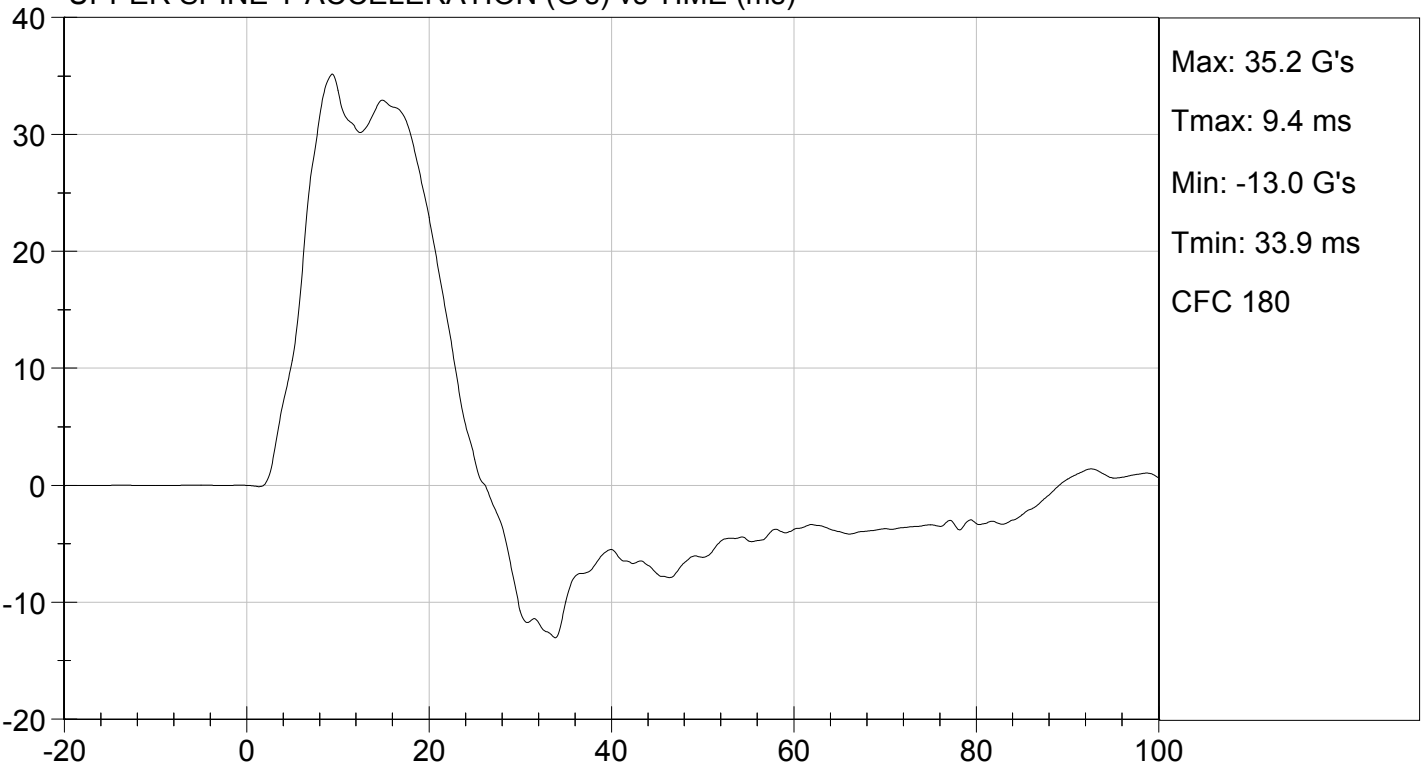
TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

TEST DATE: 03/26/2015
TEST #: D15834

LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



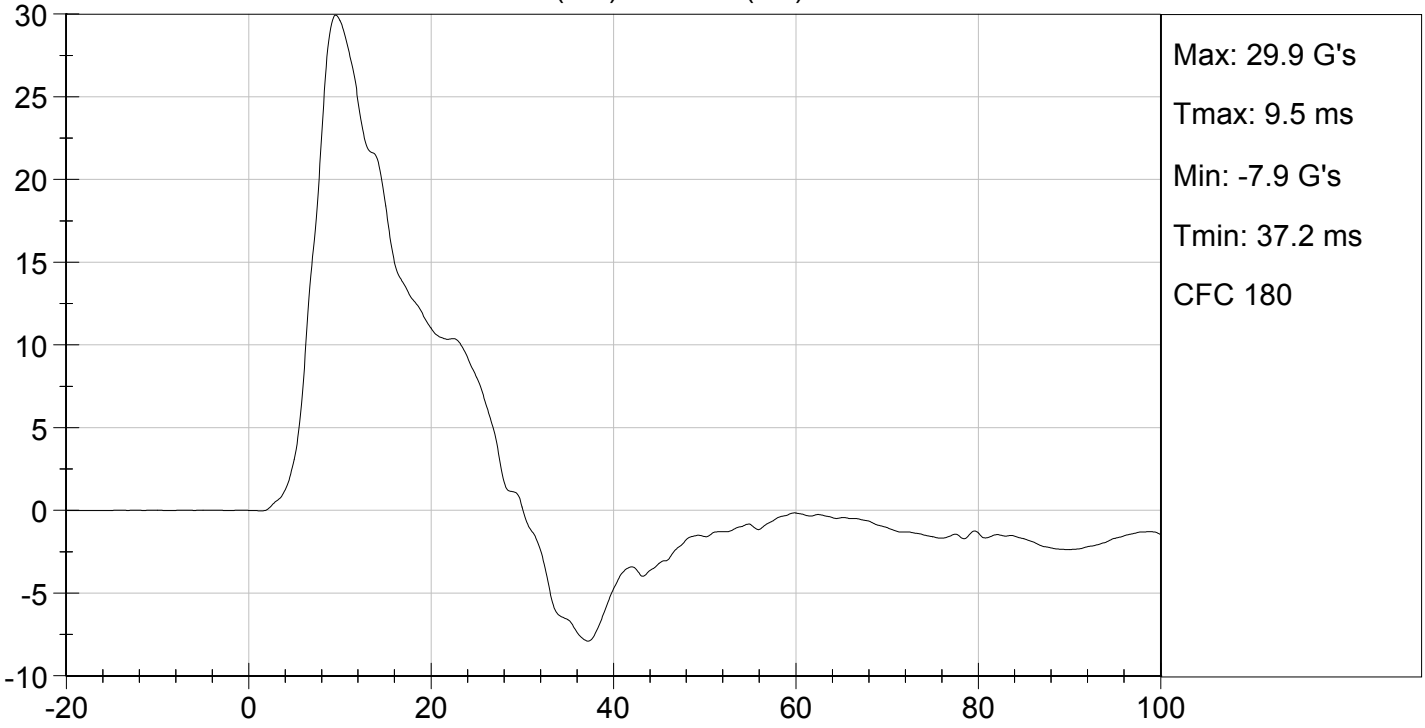
UPPER SPINE Y ACCELERATION (G's) vs TIME (ms)



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

TEST DATE: 03/26/2015
TEST #: D15834

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



MGA RESEARCH CORPORATION

THORAX (WITHOUT ARM) IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test I.D:** D15835

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	21	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Maximum Probe Acceleration	G's	14 to 18	15	Pass
Upper Rib Displacement	mm	32 to 40	33	Pass
Middle Rib Displacement	mm	39 to 45	41	Pass
Lower Rib Displacement	mm	35 to 43	39	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	14	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	10	Pass
		Overall Test Results		Pass

David Schoedel

Laboratory Technician

03/26/2015

Test Date

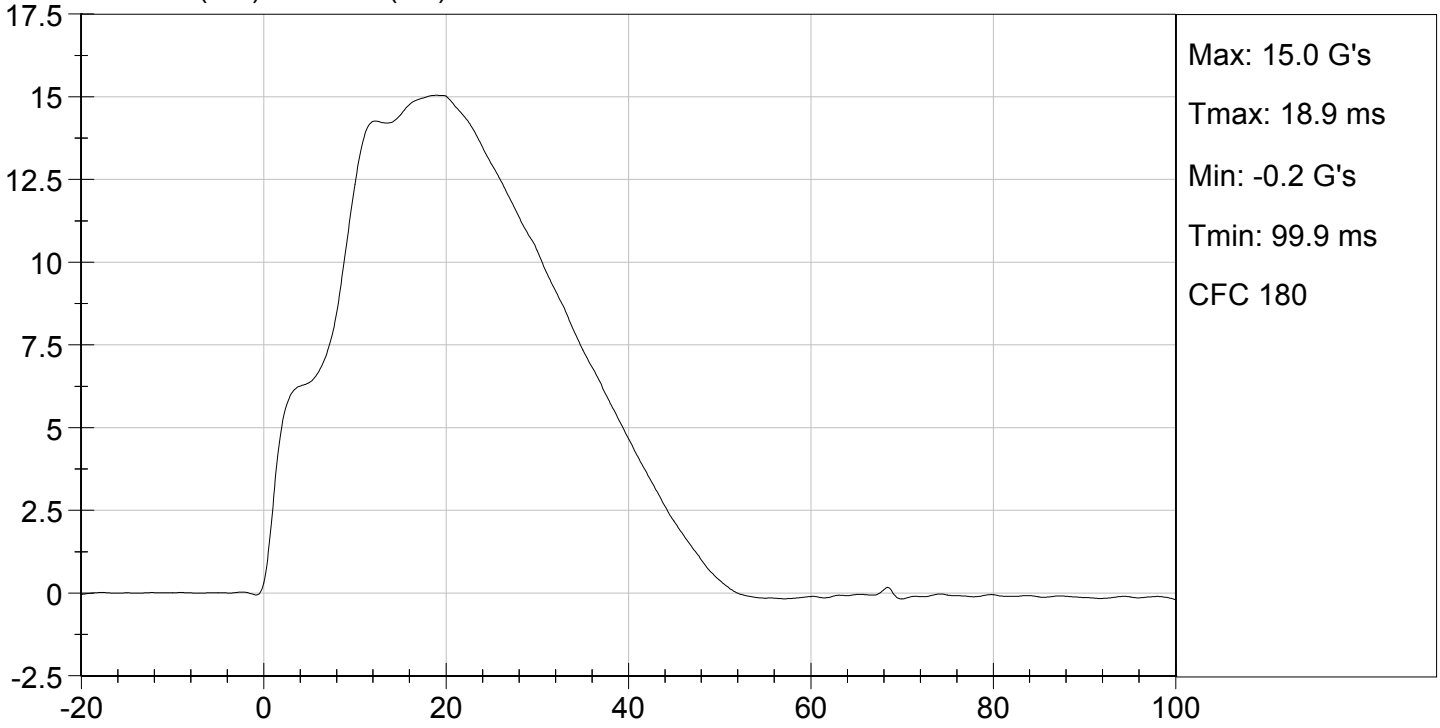
Jessica Gall

Approved By

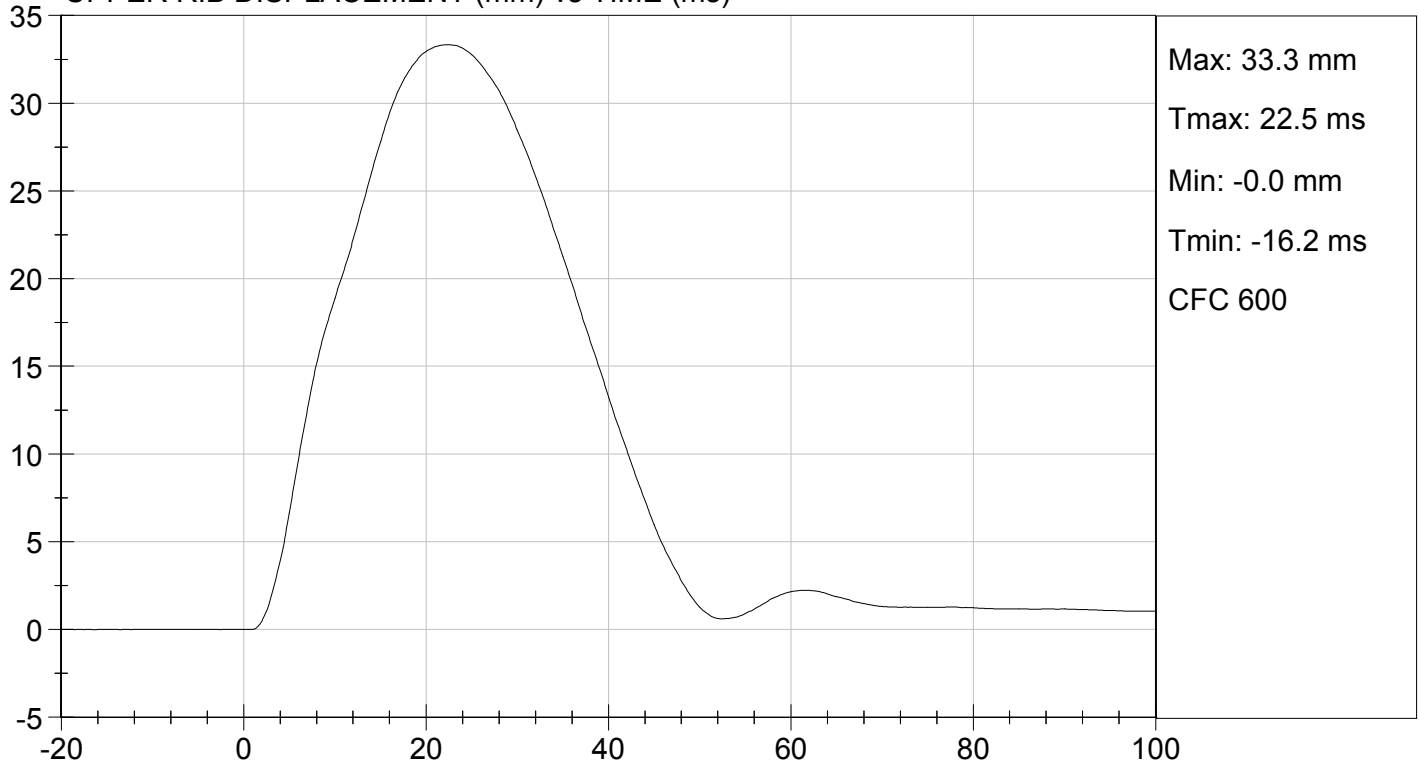
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 03/26/2015
TEST #: D15835

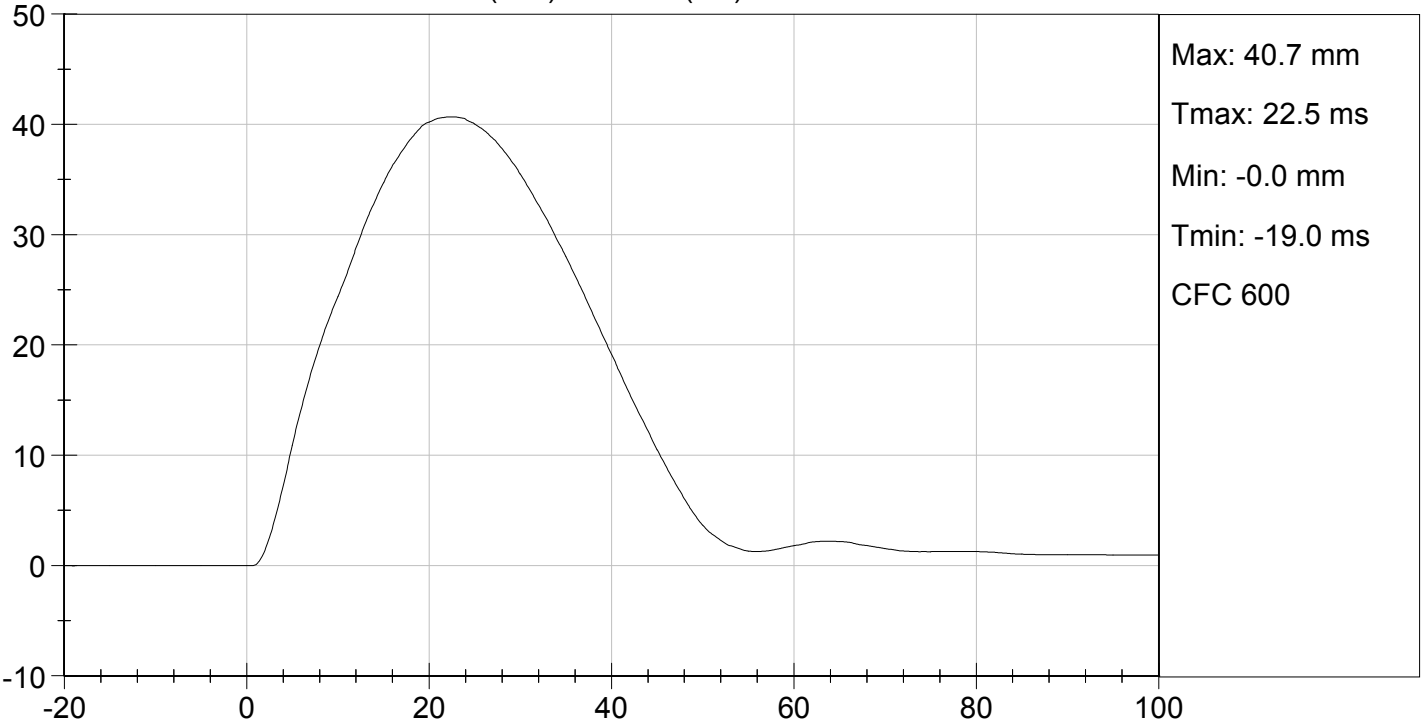
PROBE (G's) vs TIME (ms)



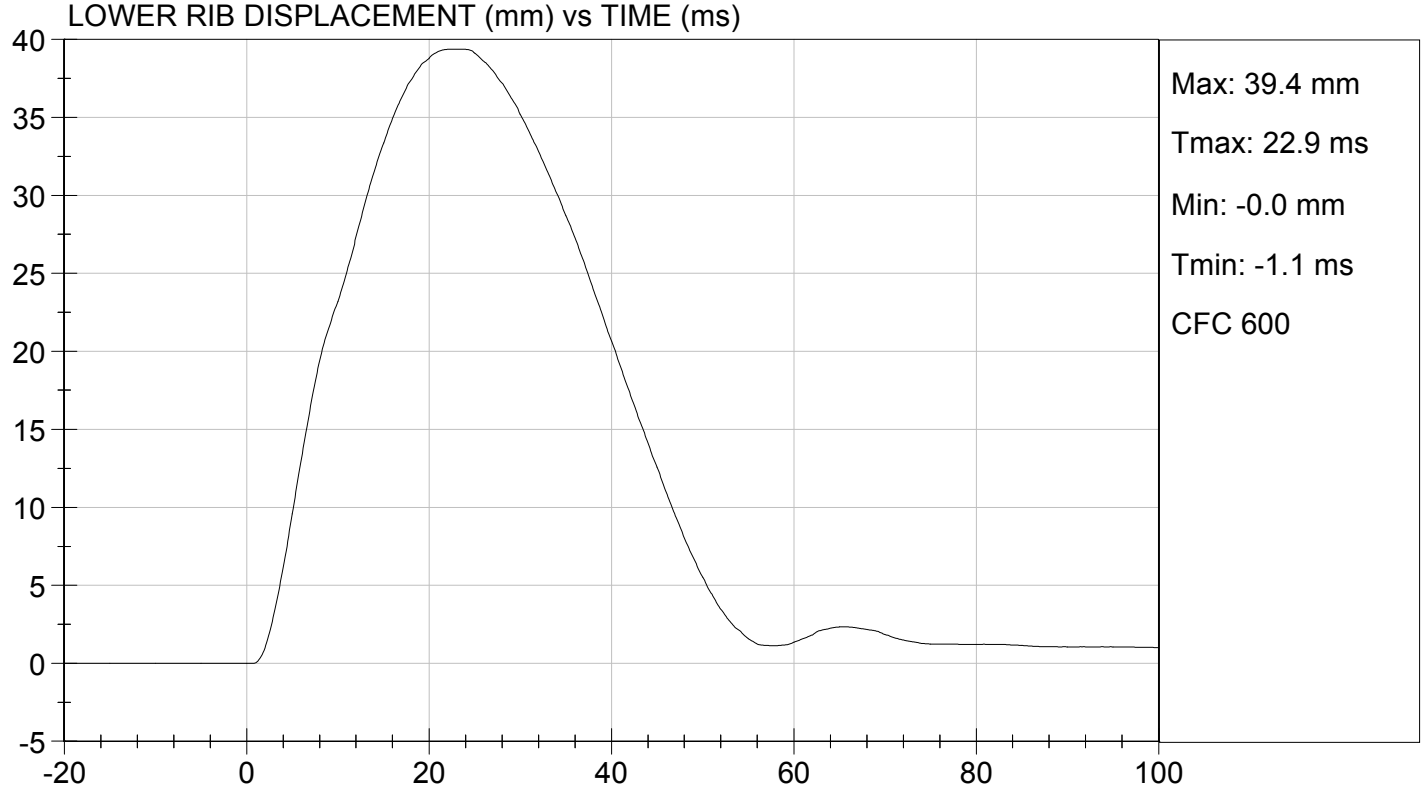
UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



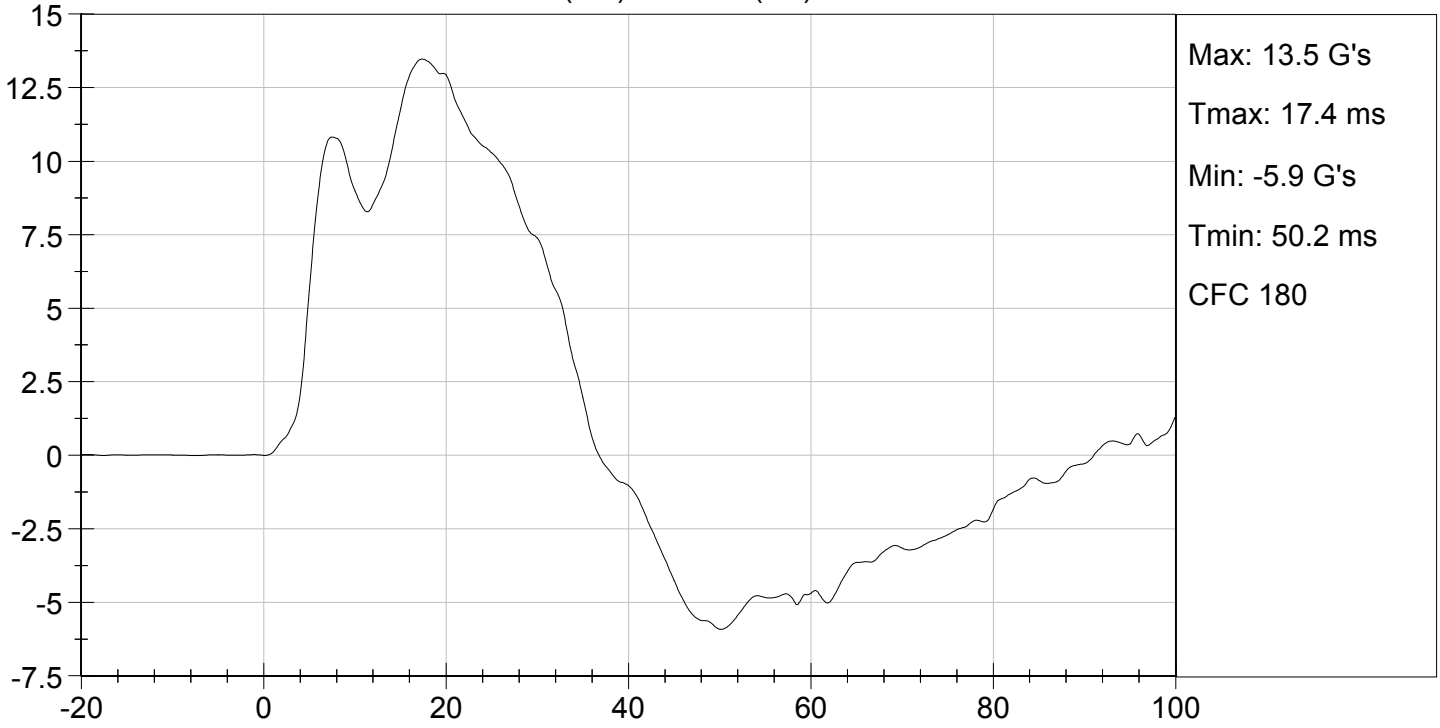
LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



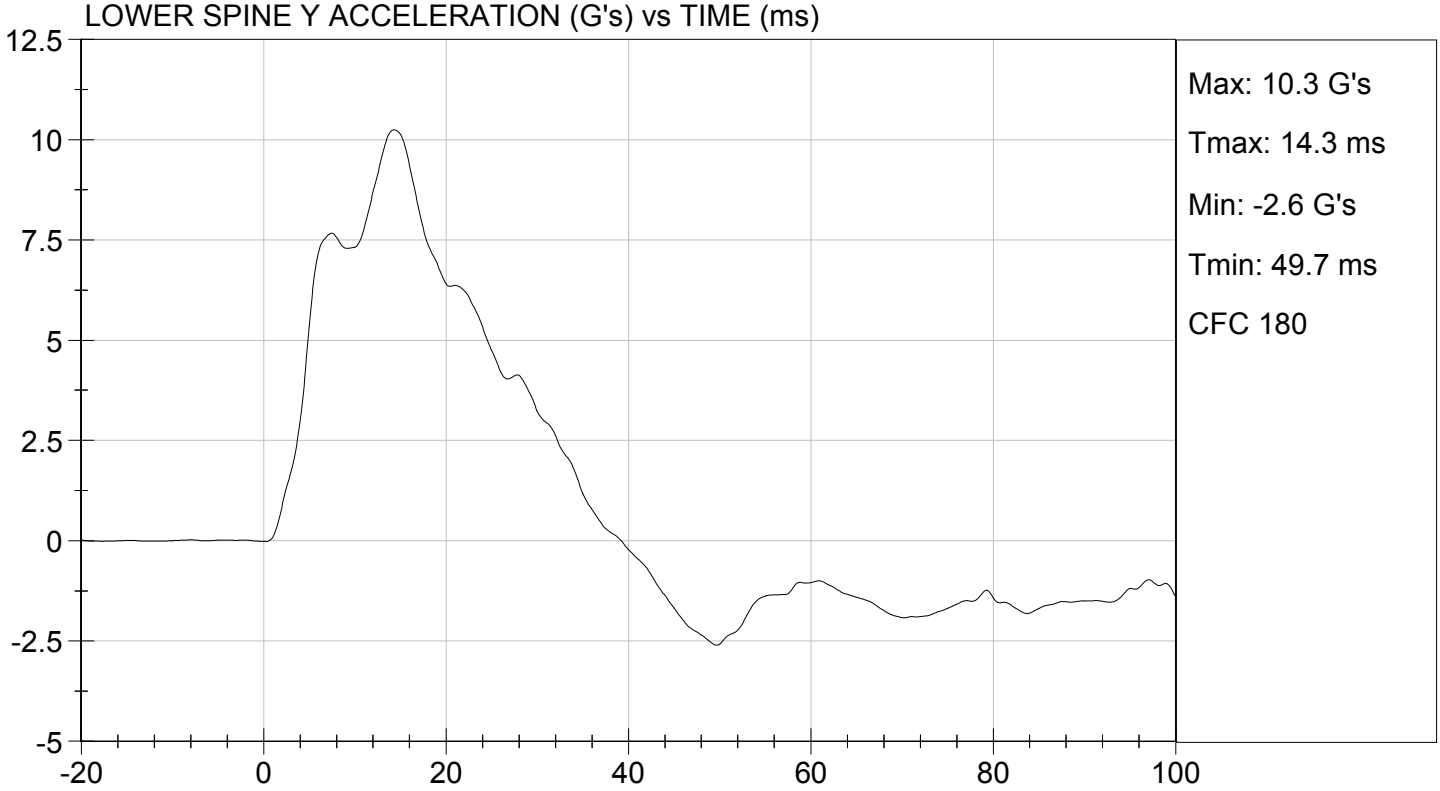
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 03/26/2015
TEST #: D15835

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



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



MGA RESEARCH CORPORATION

ABDOMINAL IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test I.D:** D15836

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	21	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Maximum Probe Acceleration	G's	12 to 16	12	Pass
Upper Abdomen Rib Displacement	mm	36 to 47	43	Pass
Lower Abdomen Rib Displacement	mm	33 to 44	42	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	10	Pass
		Overall Test Results		Pass

David Schoedel

Laboratory Technician

03/26/2015

Test Date

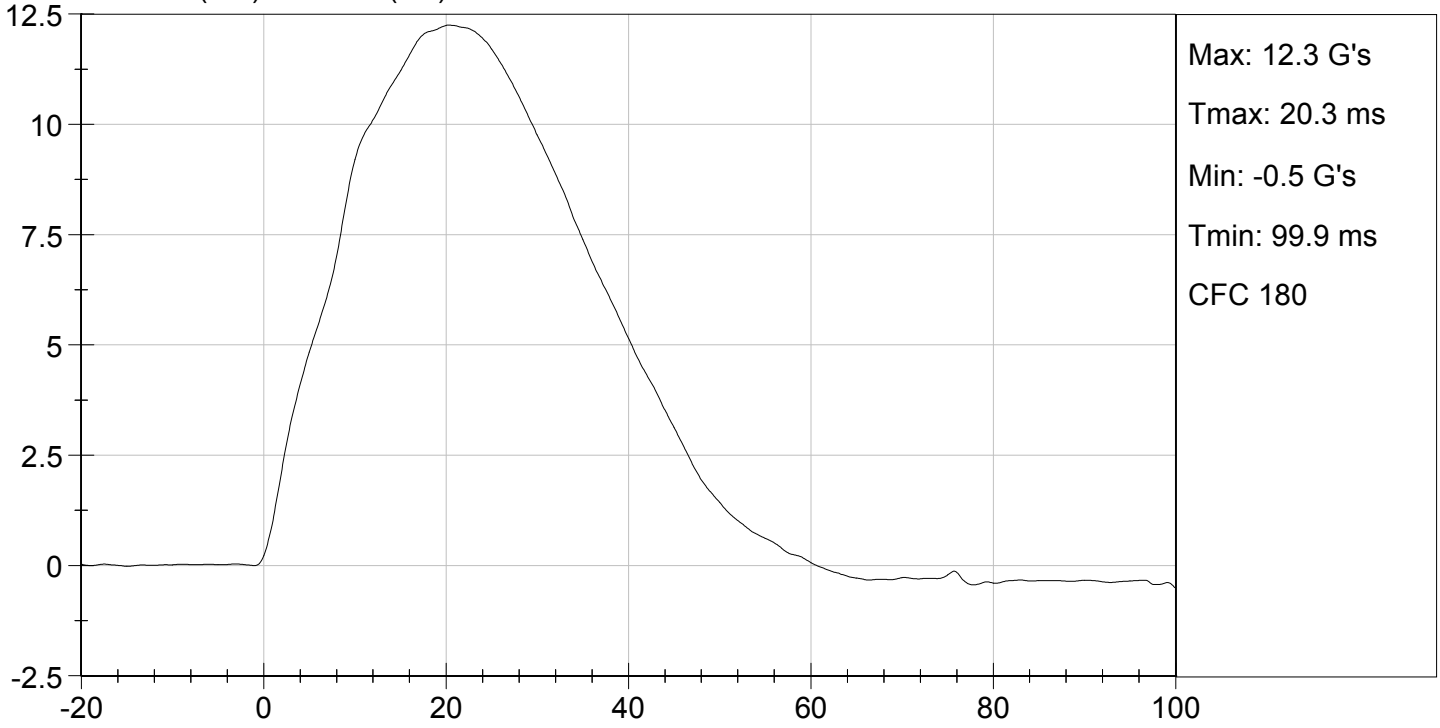
Jessica Hall

Approved By

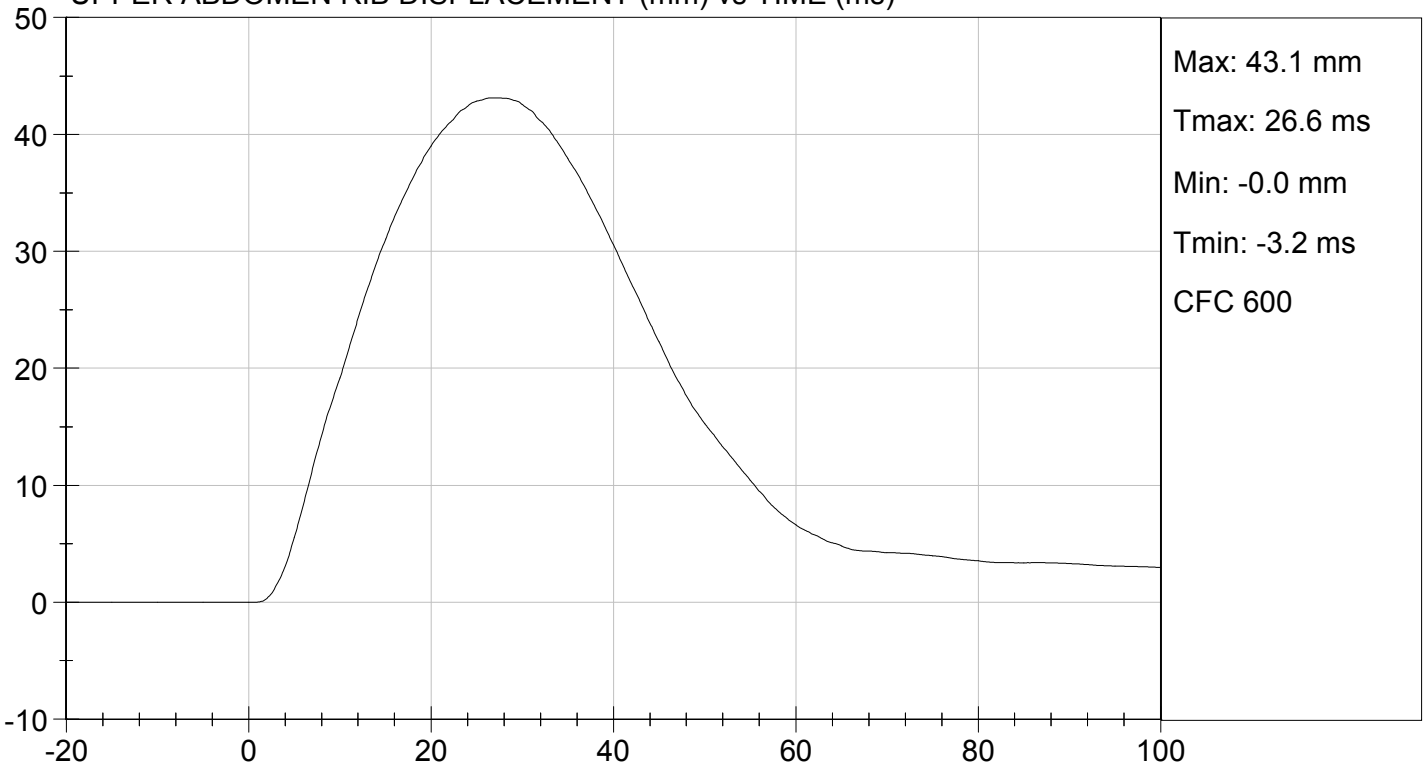
TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 03/26/2015
TEST #: D15836

PROBE (G's) vs TIME (ms)



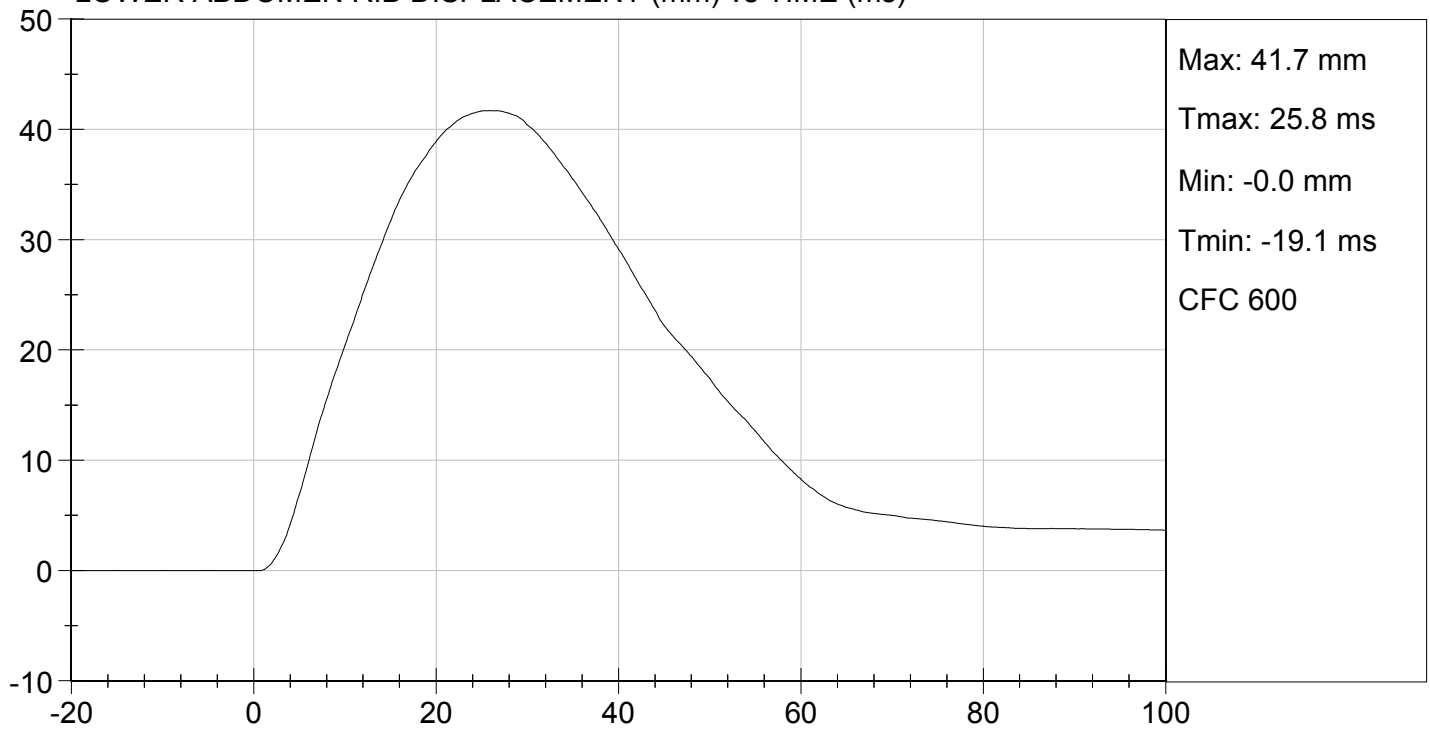
UPPER ABDOMEN RIB DISPLACEMENT (mm) vs TIME (ms)



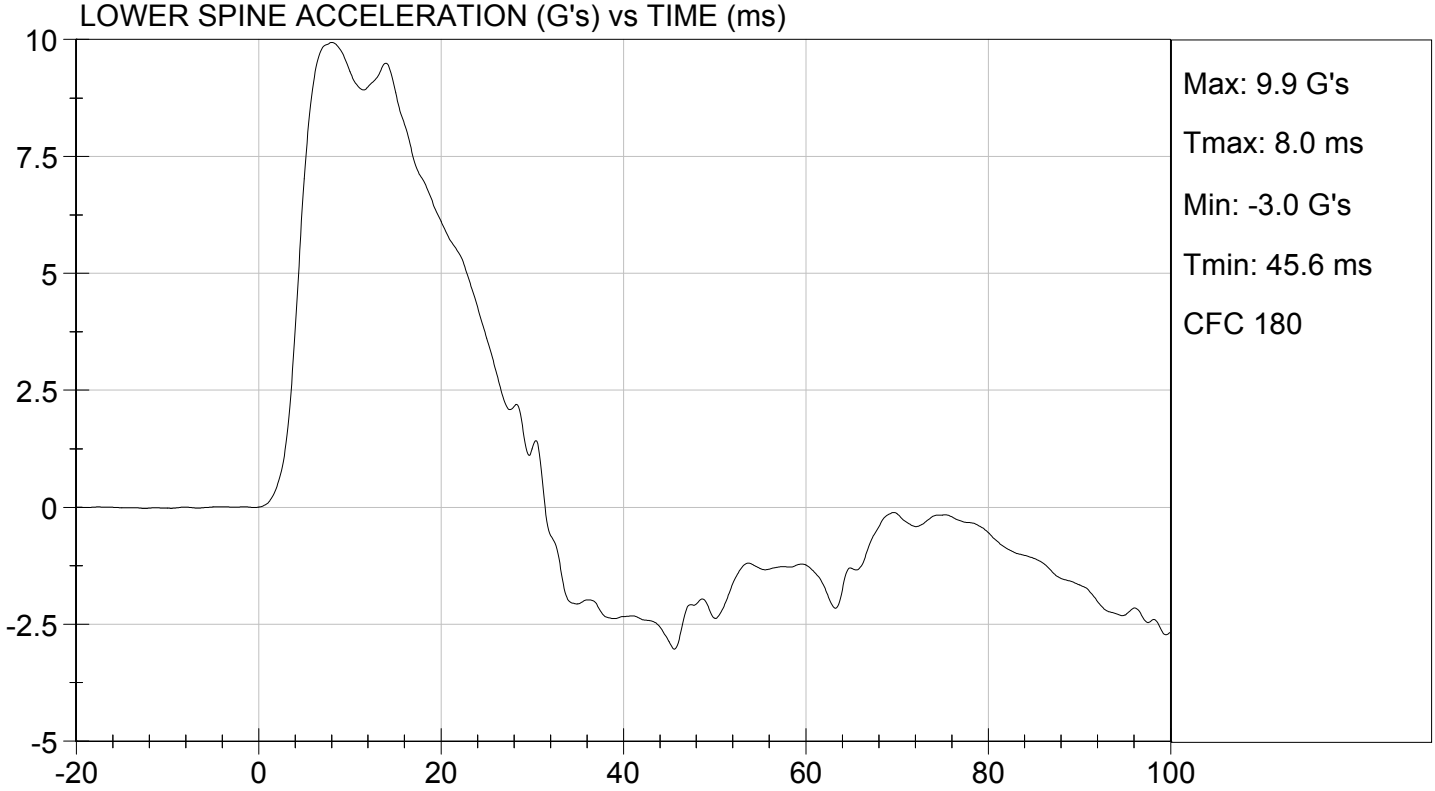
TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 03/26/2015
TEST #: D15836

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:** D15837

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	21	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	Pass
Maximum Probe Acceleration	G's	38 to 47	45	Pass
Pelvis Y Acceleration After 6 ms	G's	34 to 42	42	Pass
Peak Acetabulum Force	N	3600 to 4300	4,262	Pass
		Overall Test Results		Pass

David Schoedel

Laboratory Technician

03/26/2015

Test Date

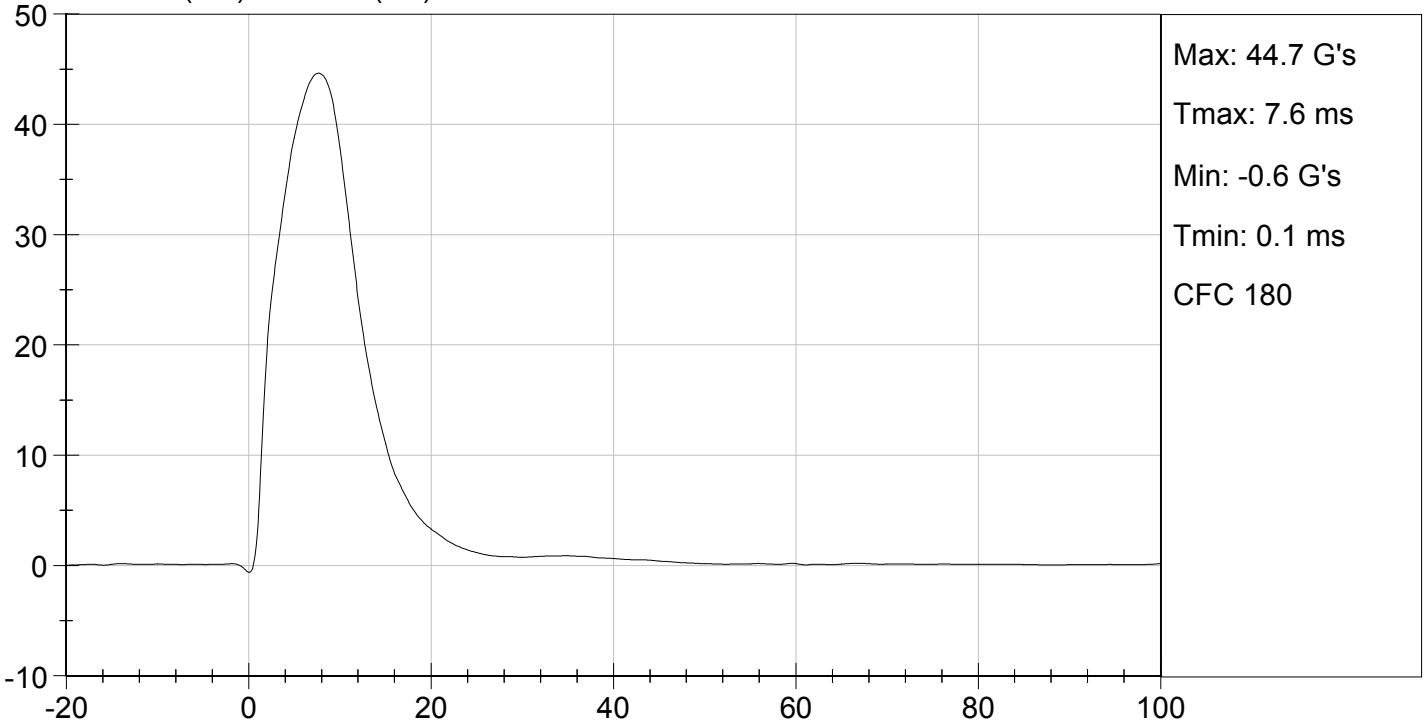
Jessica Gall

Approved By

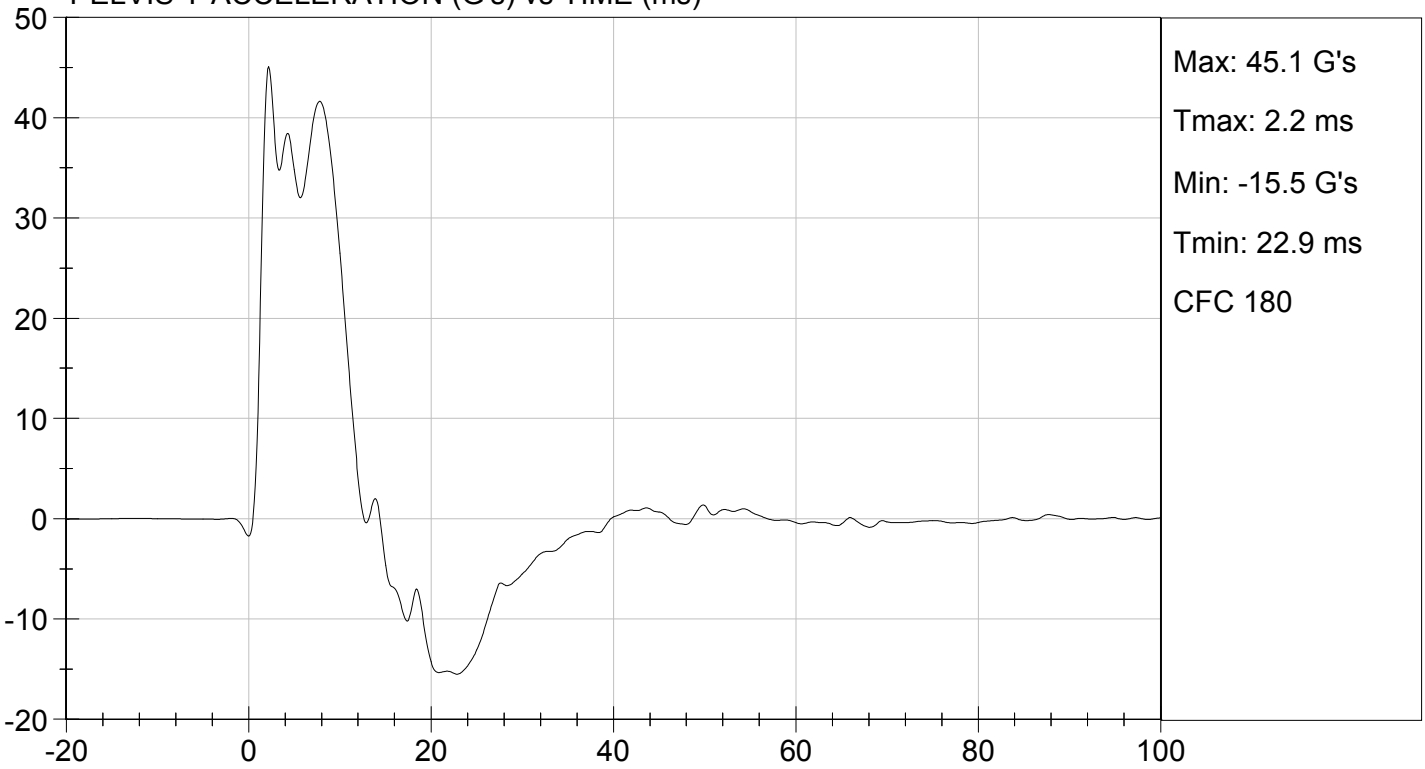
TEST DESC: PELVIS IMPACT
VELOCITY: 21.93 ft/s, 6.68 m/s

TEST DATE: 03/26/2015
TEST #: D15837

PROBE (G's) vs TIME (ms)

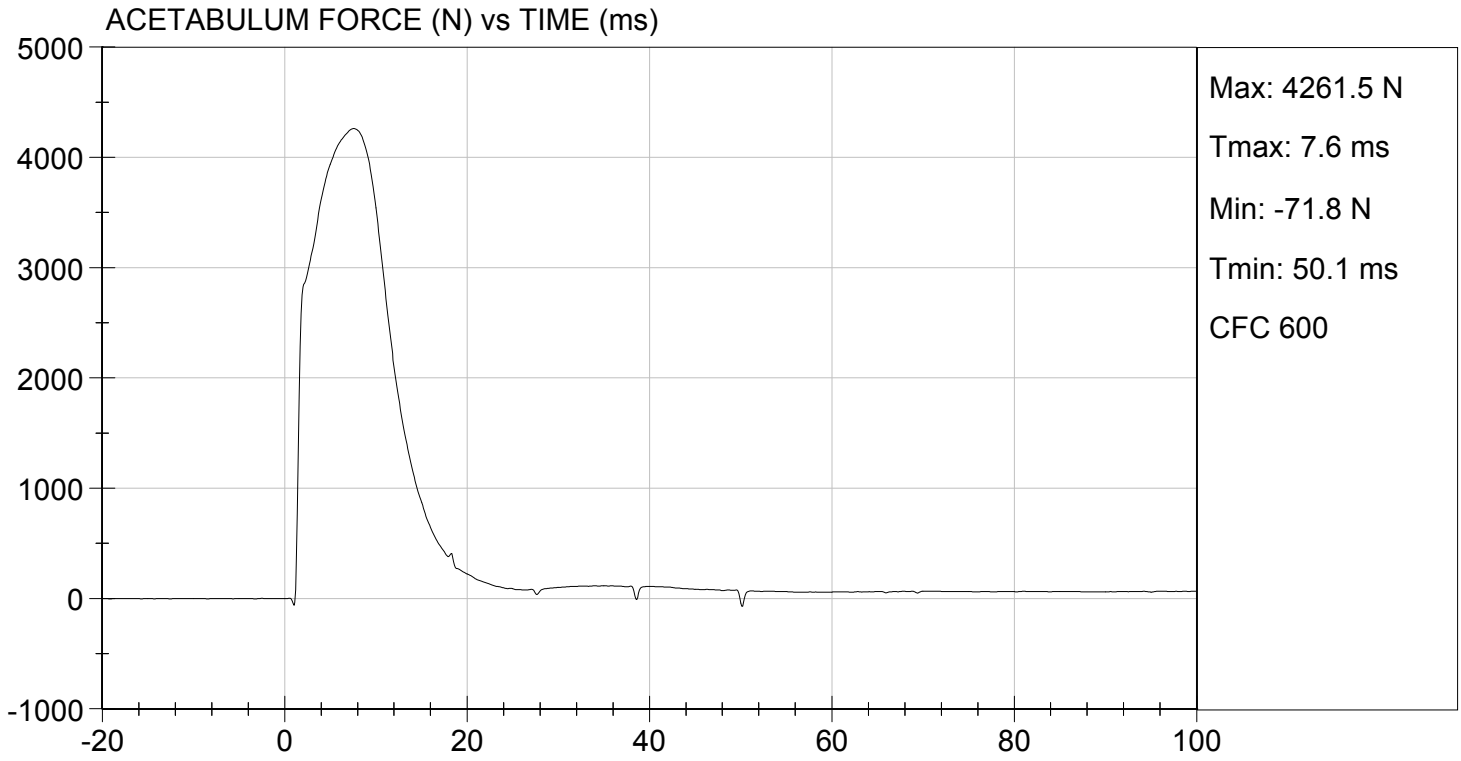


PELVIS Y ACCELERATION (G's) vs TIME (ms)



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

TEST DATE: 03/26/2015
TEST #: D15837



MGA RESEARCH CORPORATION

ILIAC IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test I.D:** D15838

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	21	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Maximum Probe Acceleration	G's	36 to 45	41	Pass
Pelvis Y Acceleration	G's	28 to 39	32	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4,809	Pass
		Overall Test Results		Pass

David Schoedel

Laboratory Technician

03/26/2015

Test Date

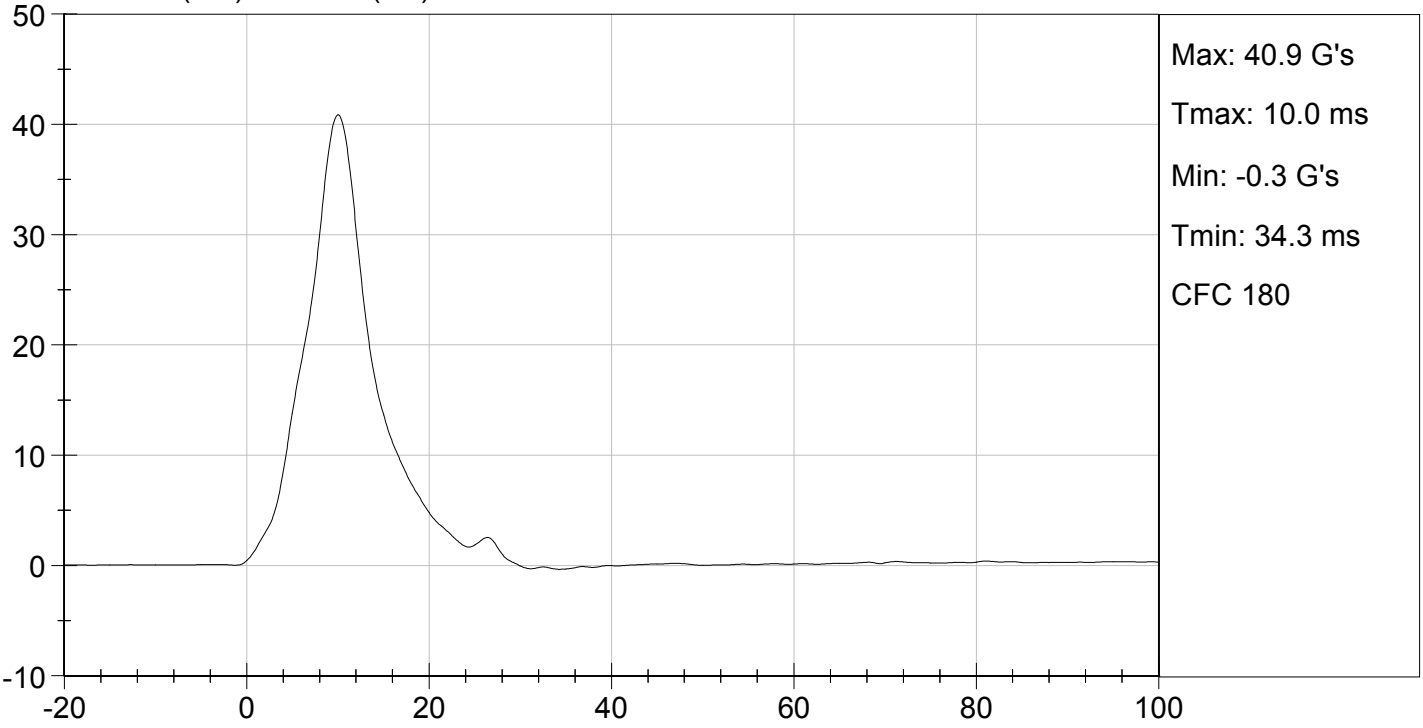
Jessica Gall

Approved By

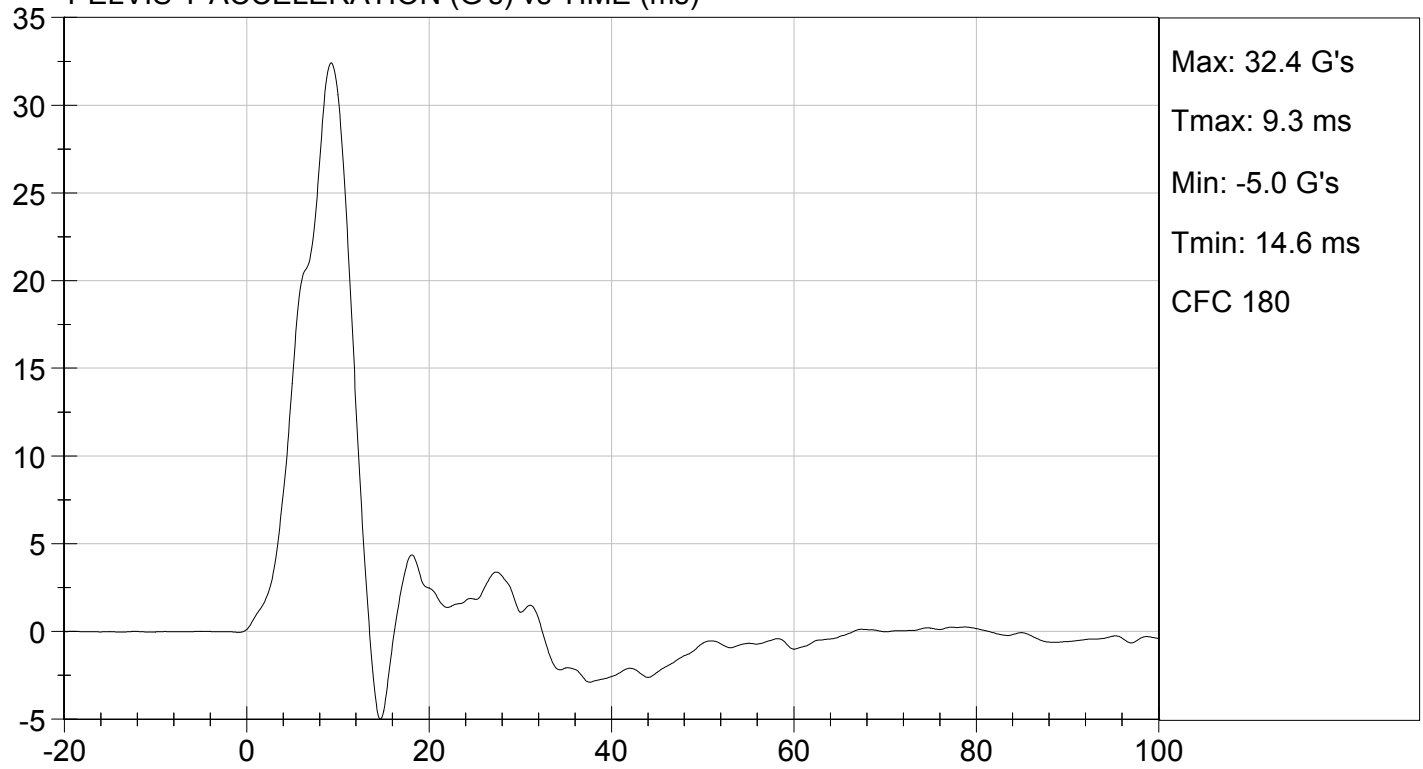
TEST DESC: ILLIAC
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 03/26/2015
TEST #: D15838

PROBE (G's) vs TIME (ms)

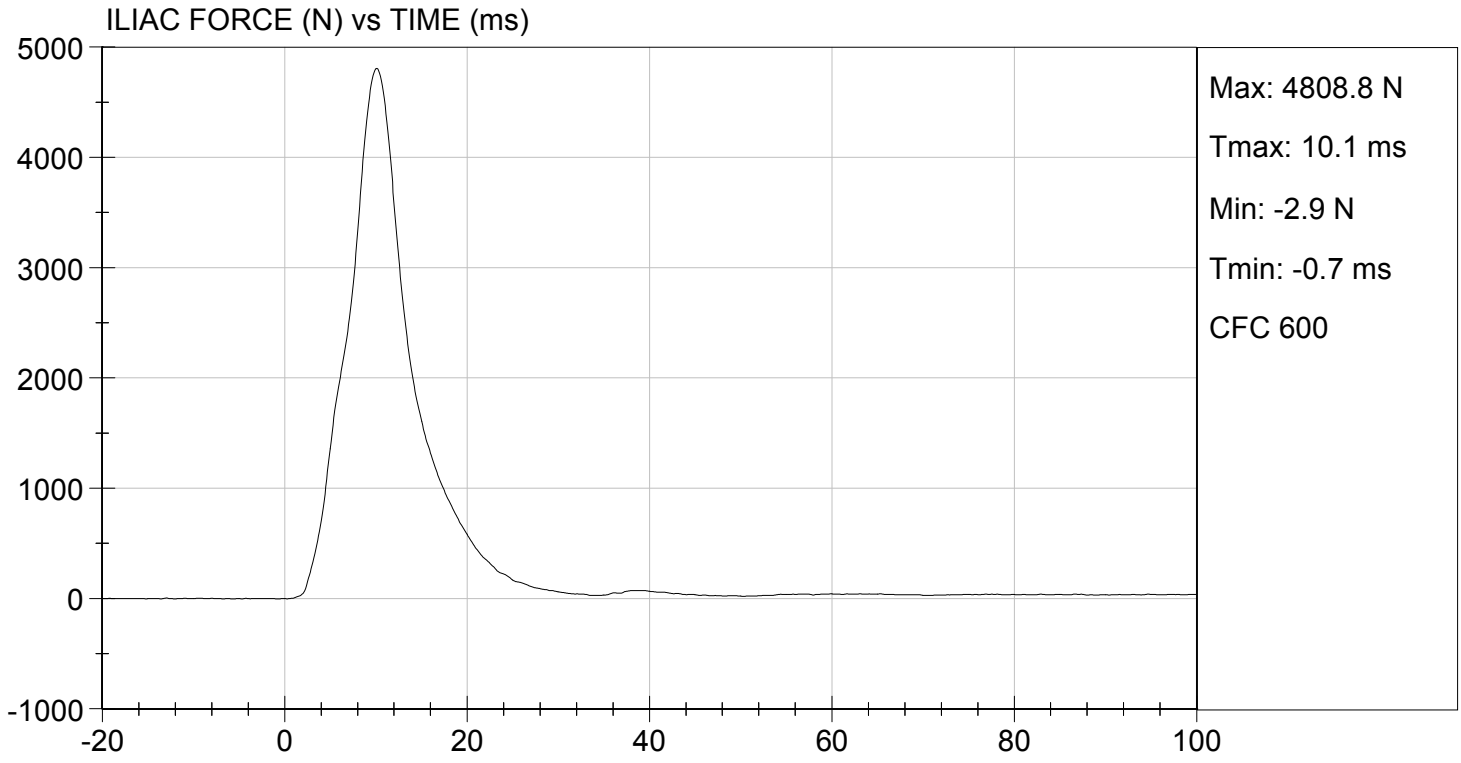


PELVIS Y ACCELERATION (G's) vs TIME (ms)



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

TEST DATE: 03/26/2015
TEST #: D15838



MGA RESEARCH CORPORATION

HEAD DROP TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test ID:** D15881

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	27	Pass
Peak Resultant Acceleration	G's	115 to 137	125	Pass
Peak Longitudinal Acceleration	G's	+/- 15	-5.9	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	<15%	Yes	Pass
		Overall Test Results		Pass

David Schoedel
Laboratory Technician

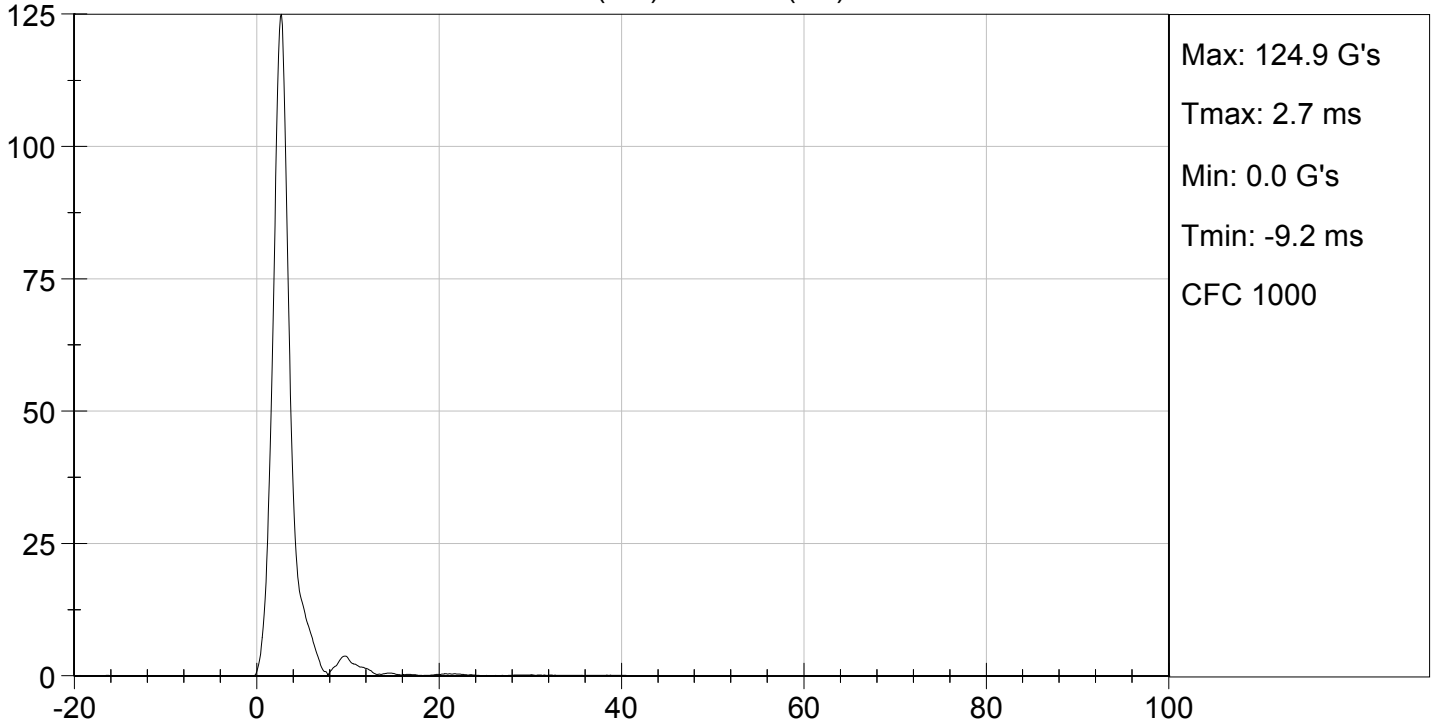
03/30/2015
Test Date

Jessica Gall
Approved By

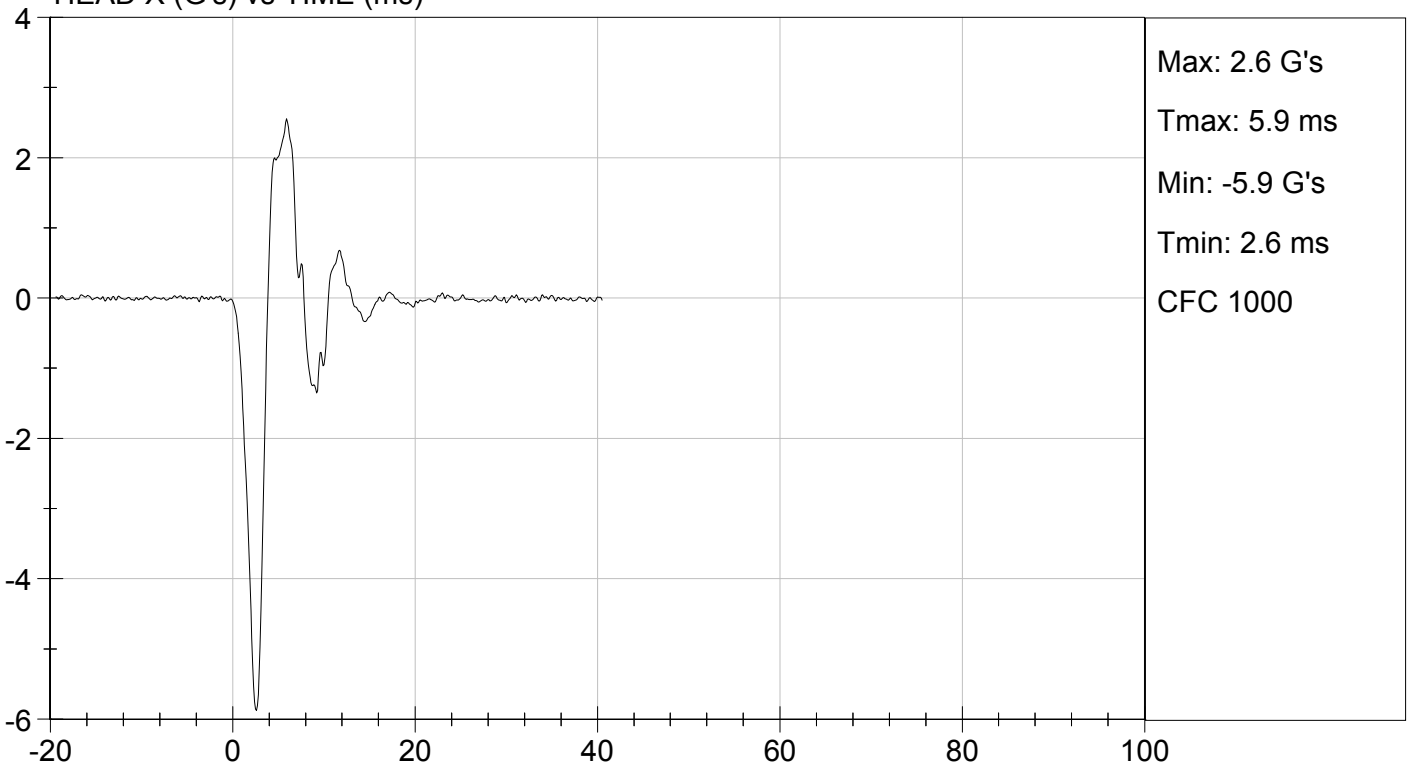
TEST DESC: HEAD DROP

TEST DATE: 03/30/2015
TEST #: D15881

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



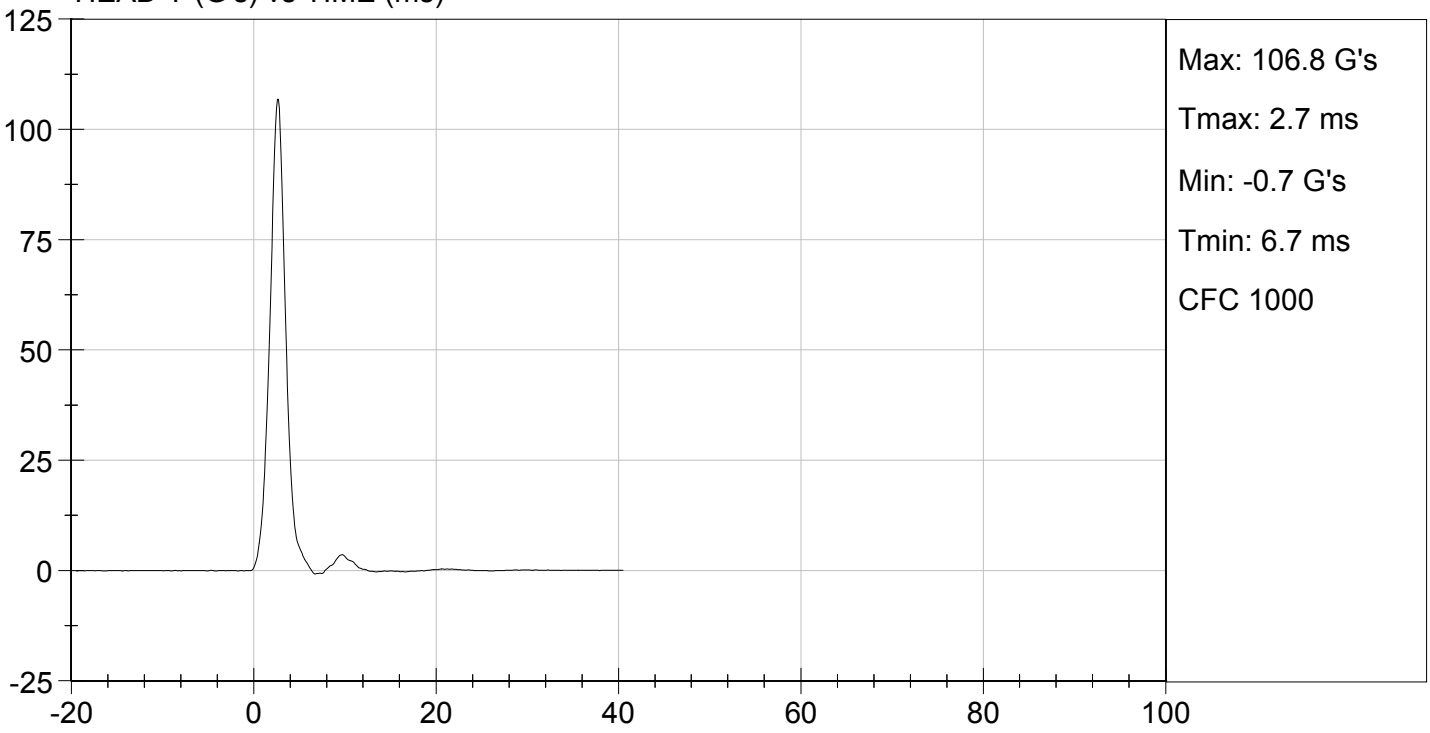
HEAD X (G's) vs TIME (ms)



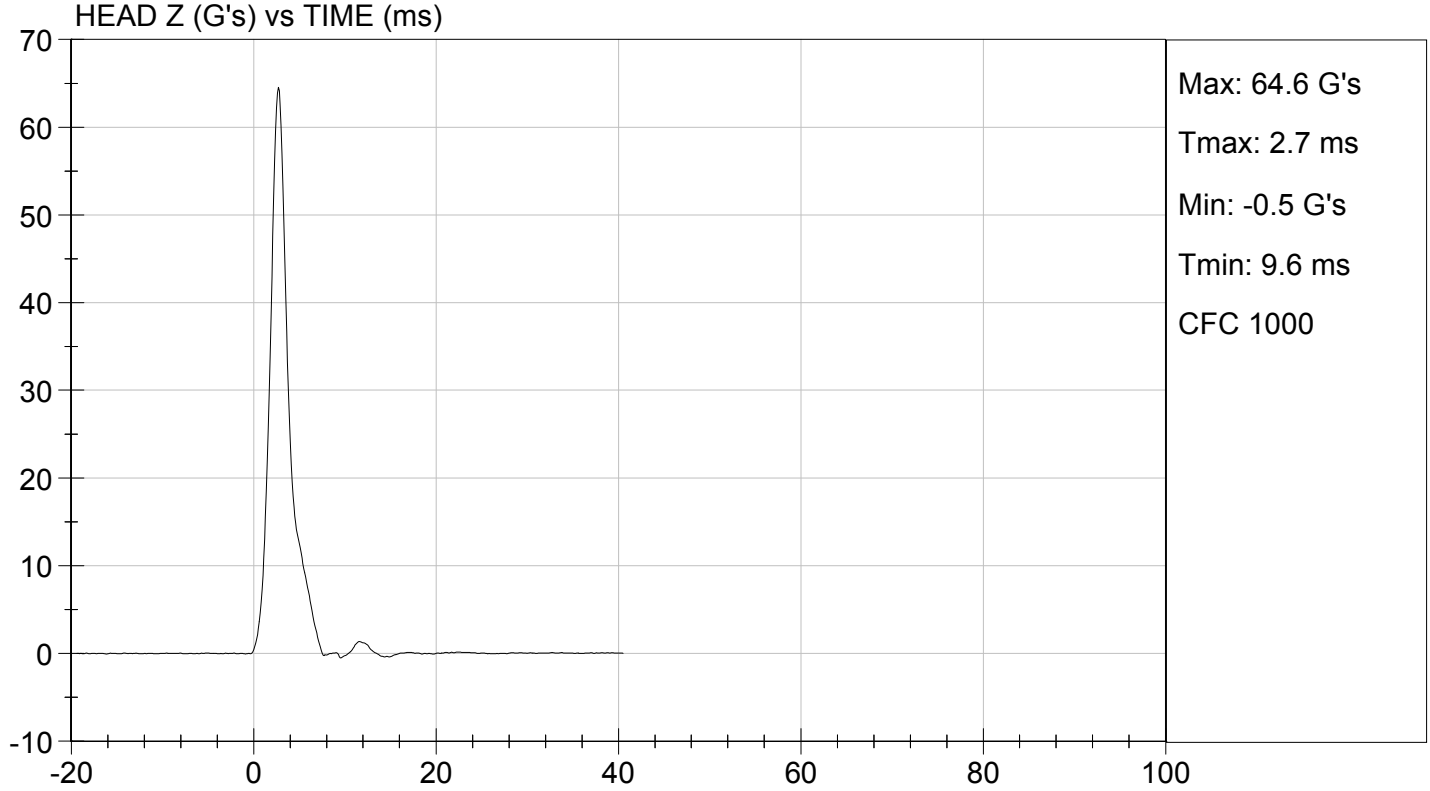
TEST DESC: HEAD DROP

TEST DATE: 03/30/2015
TEST #: D15881

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



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



MGA RESEARCH CORPORATION

LATERAL NECK PENDULUM TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test I.D:** D15882

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.5	Pass
Humidity		%	10 to 70	27	Pass
Impact Velocity		m/s	5.51 to 5.63	5.52	Pass
Pendulum Velocity	10 ms	m/s	2.20 to 2.80	2.34	Pass
	15 ms	m/s	3.30 to 4.10	3.32	Pass
	20 ms	m/s	4.40 to 5.40	4.42	Pass
	25 ms	m/s	5.40 to 6.10	5.48	Pass
	25-100 ms	m/s	5.50 to 6.20	5.90	Pass
Maximum D-Plane Rotation		deg	71 to 81	73	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	60	Pass
Maximum Occipital Condyle Moment		Nm	-44 to -36	-39	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	119	Pass
			Overall Test Results		Pass

David Schoedel

Laboratory Technician

03/30/2015

Test Date

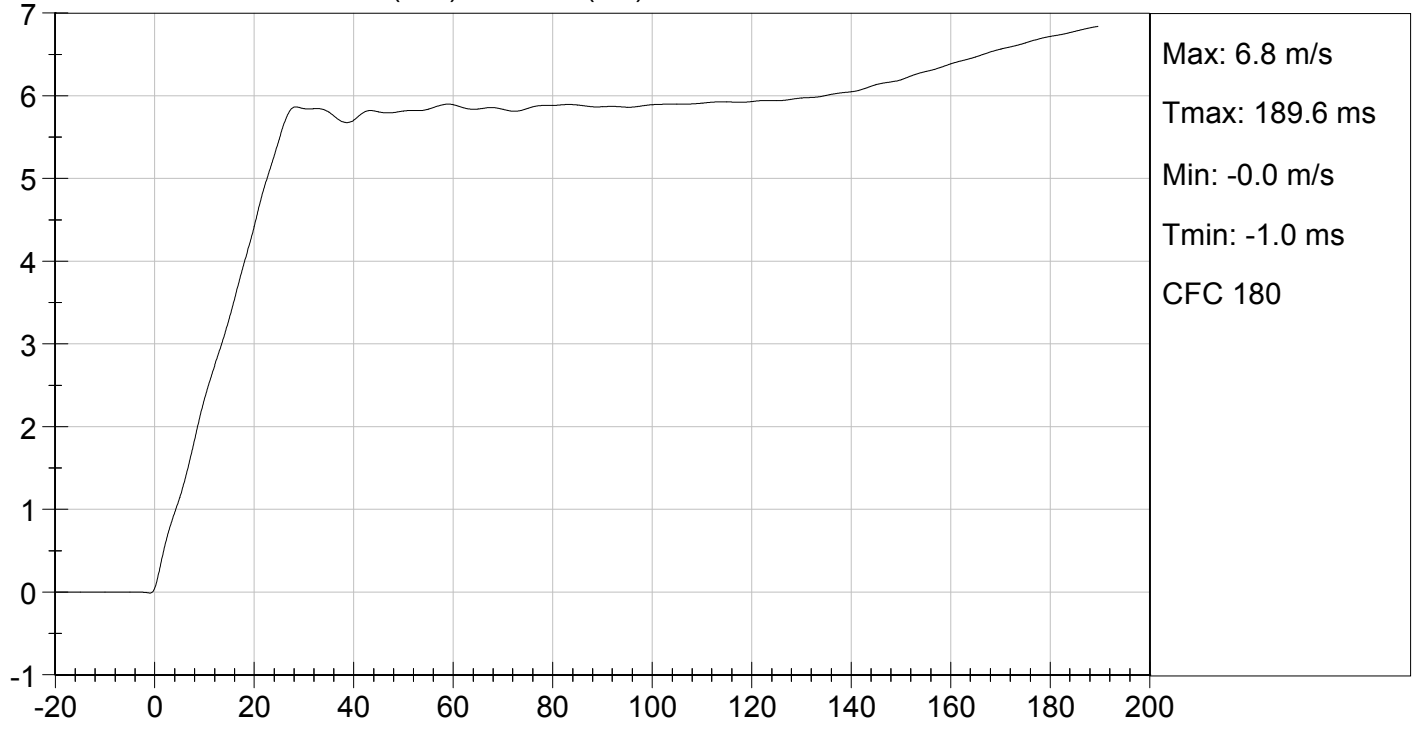
Jessica Hall

Approved By

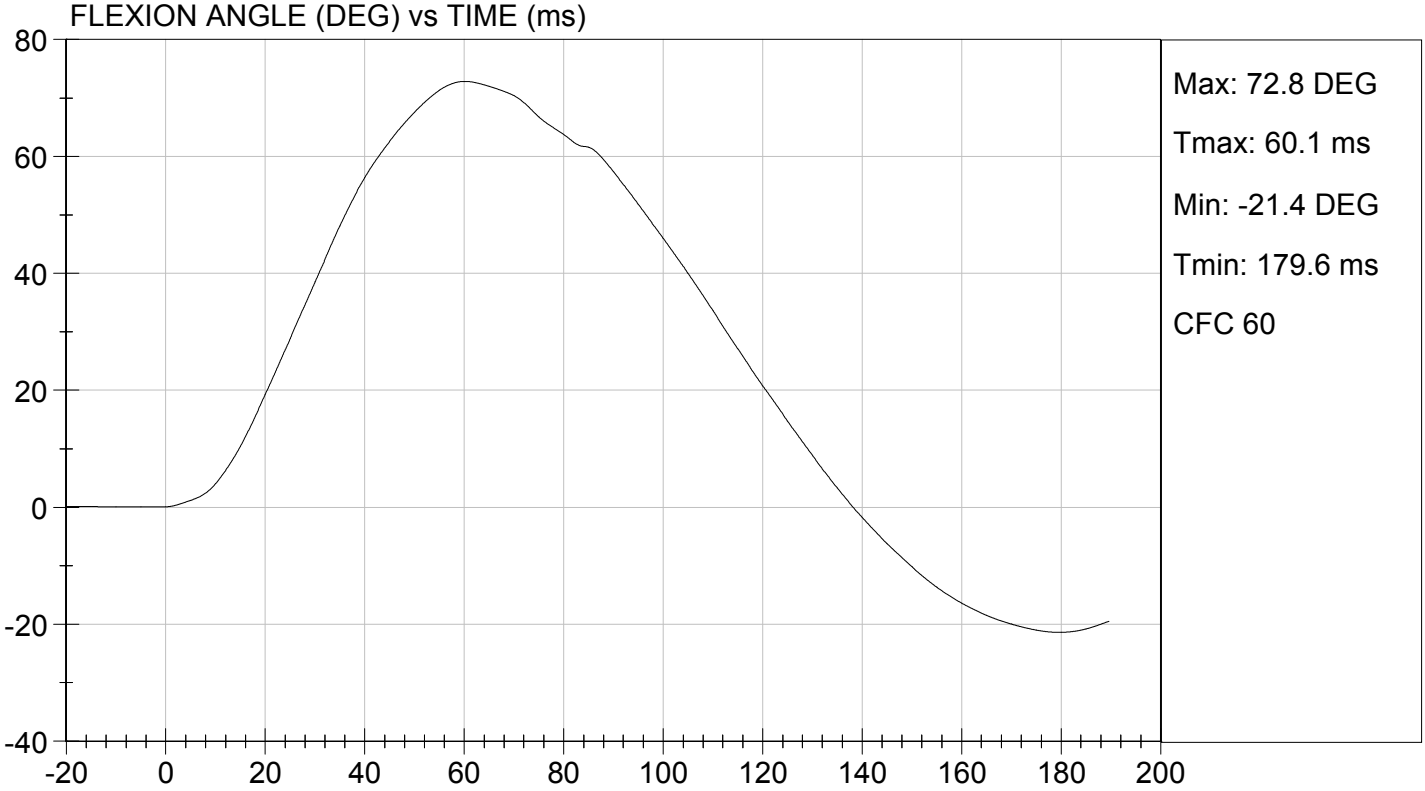
TEST DESC: NECK BENDING
VELOCITY: 18.12 ft/s, 5.52 m/s

TEST DATE: 03/30/2015
TEST #: D15882

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

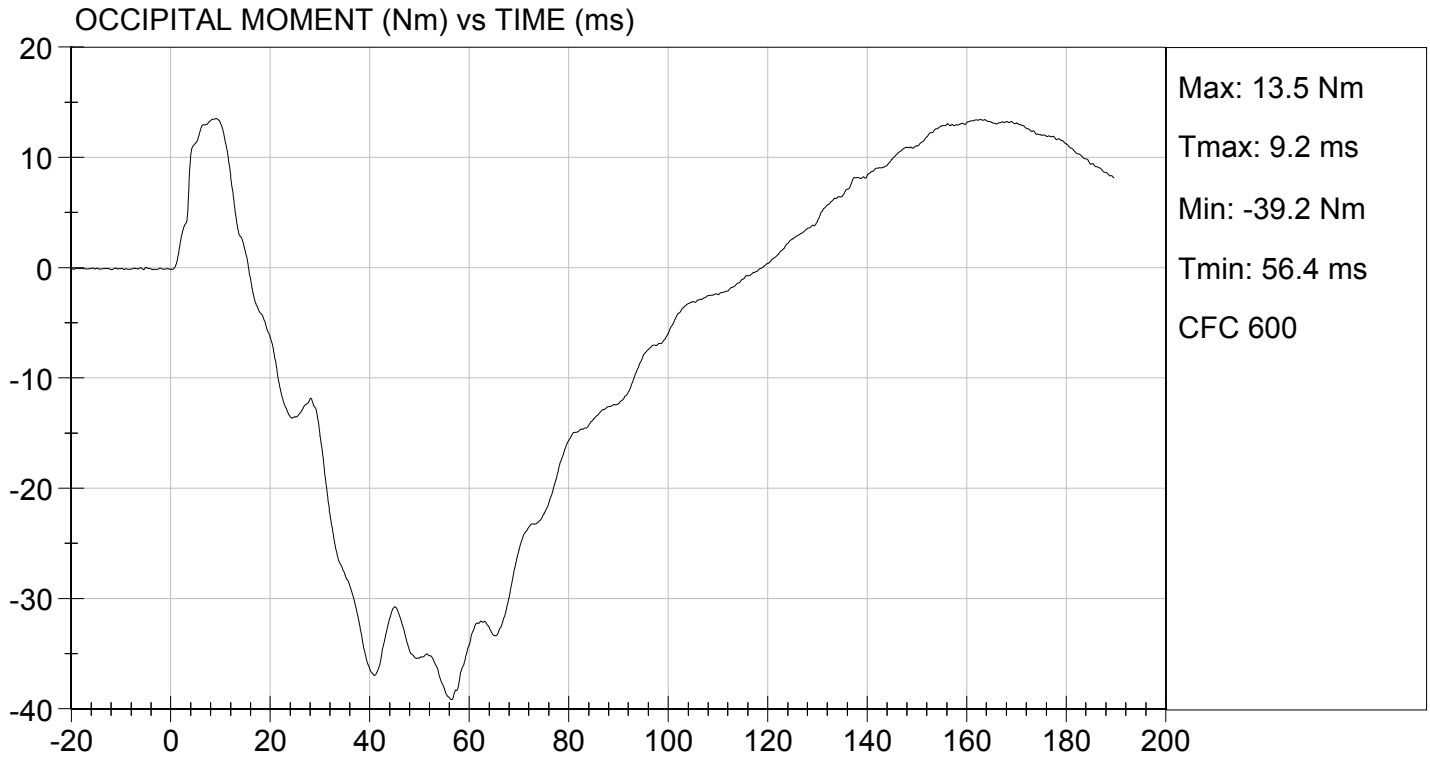


FLEXION ANGLE (DEG) vs TIME (ms)



TEST DESC: NECK BENDING
VELOCITY: 18.12 ft/s, 5.52 m/s

TEST DATE: 03/30/2015
TEST #: D15882



MGA RESEARCH CORPORATION

SHOULDER IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test ID:** D15883

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	27	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Maximum Probe Acceleration	G's	13 to 18	15	Pass
Shoulder Displacement	mm	28 to 37	32	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	19	Pass
		Overall Test Results		Pass

David Schoedel
Laboratory Technician

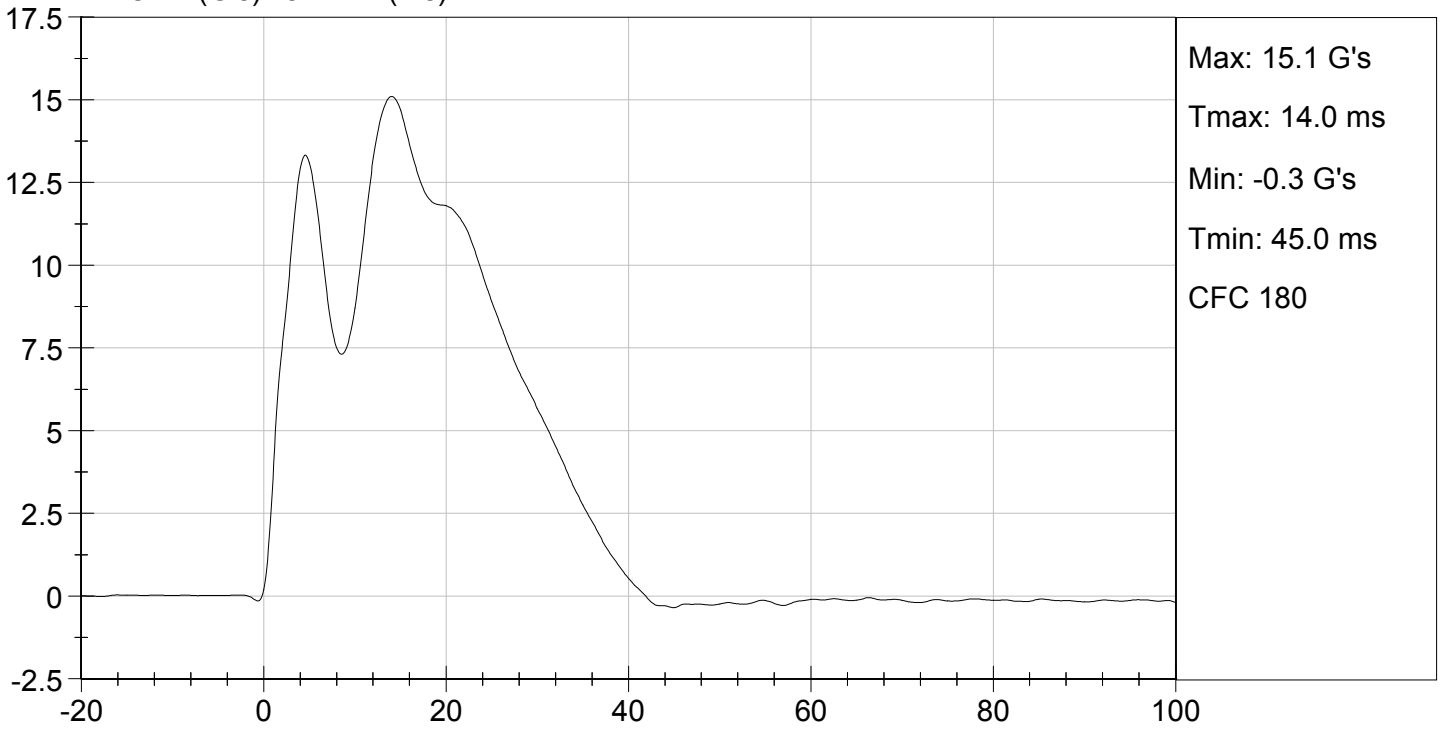
03/30/2015
Test Date

Jessica Hall
Approved By

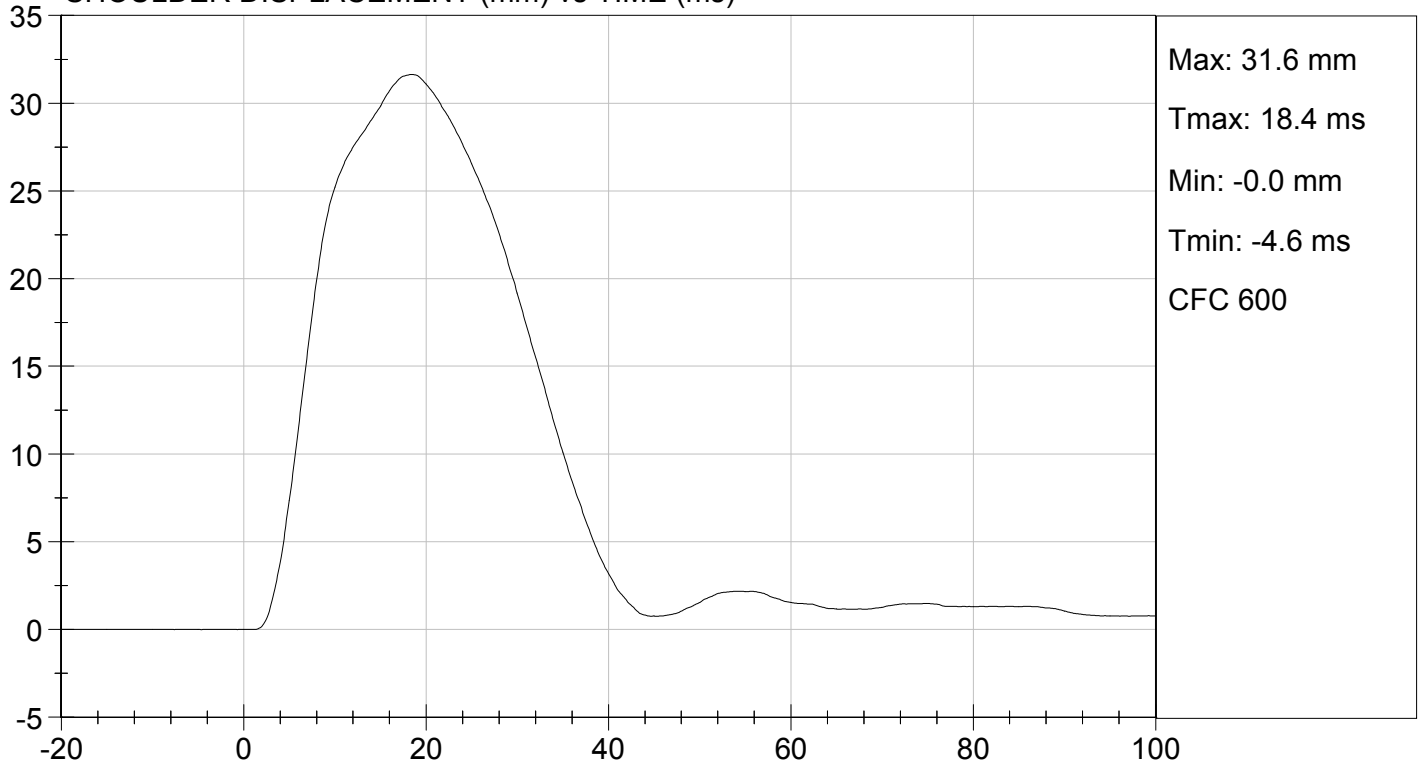
TEST DESC: SHOULDER IMPACT
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 03/30/2015
TEST #: D15883

PROBE (G's) vs TIME (ms)

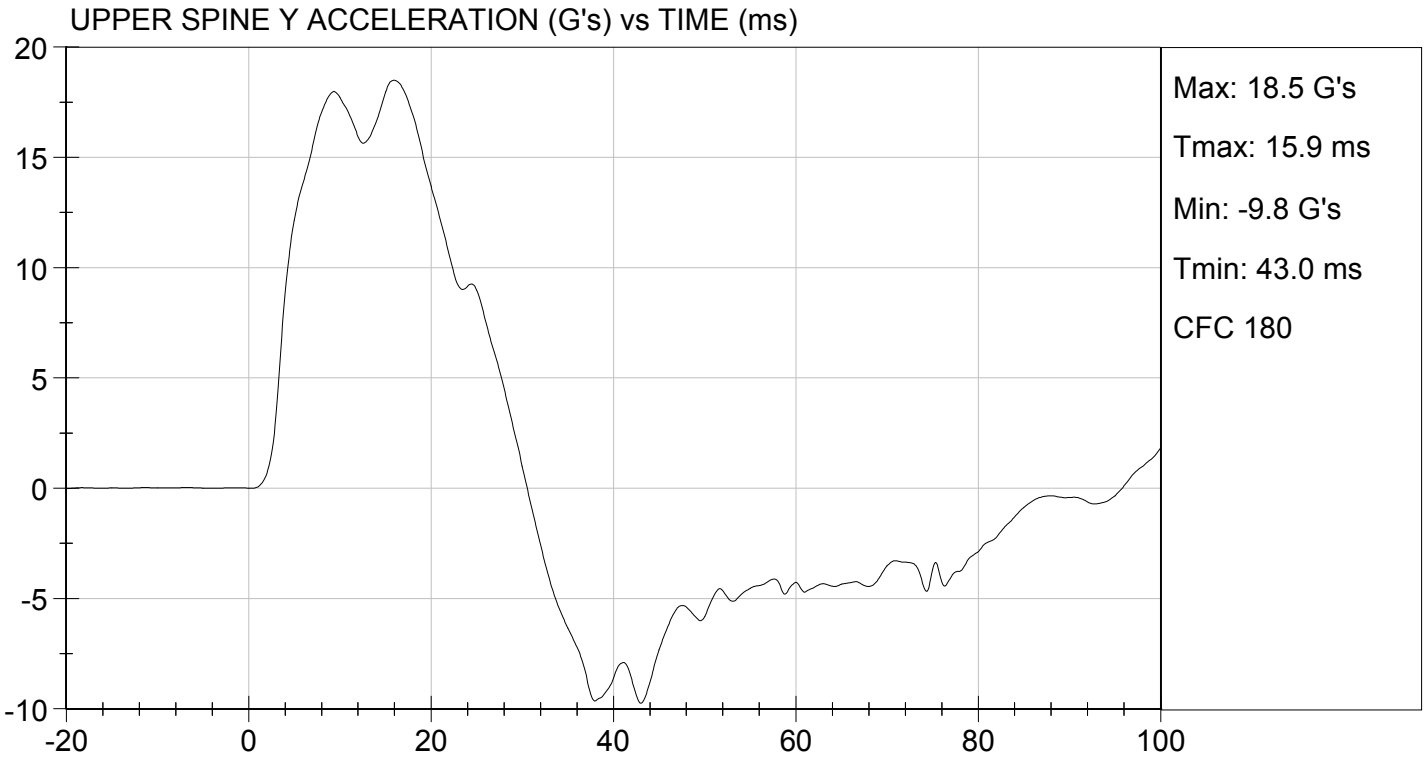


SHOULDER DISPLACEMENT (mm) vs TIME (ms)



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

TEST DATE: 03/30/2015
TEST #: D15883



MGA RESEARCH CORPORATION

THORAX (WITH ARM) IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test I.D:** D15884

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	27	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Maximum Probe Acceleration	G's	30 to 36	30	Pass
Shoulder Displacement	mm	31 to 40	33	Pass
Upper Rib Displacement	mm	25 to 32	27	Pass
Middle Rib Displacement	mm	30 to 36	32	Pass
Lower Rib Displacement	mm	32 to 38	36	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	35	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	30	Pass
		Overall Test Results		Pass

David Schoedel

Laboratory Technician

03/31/2015

Test Date

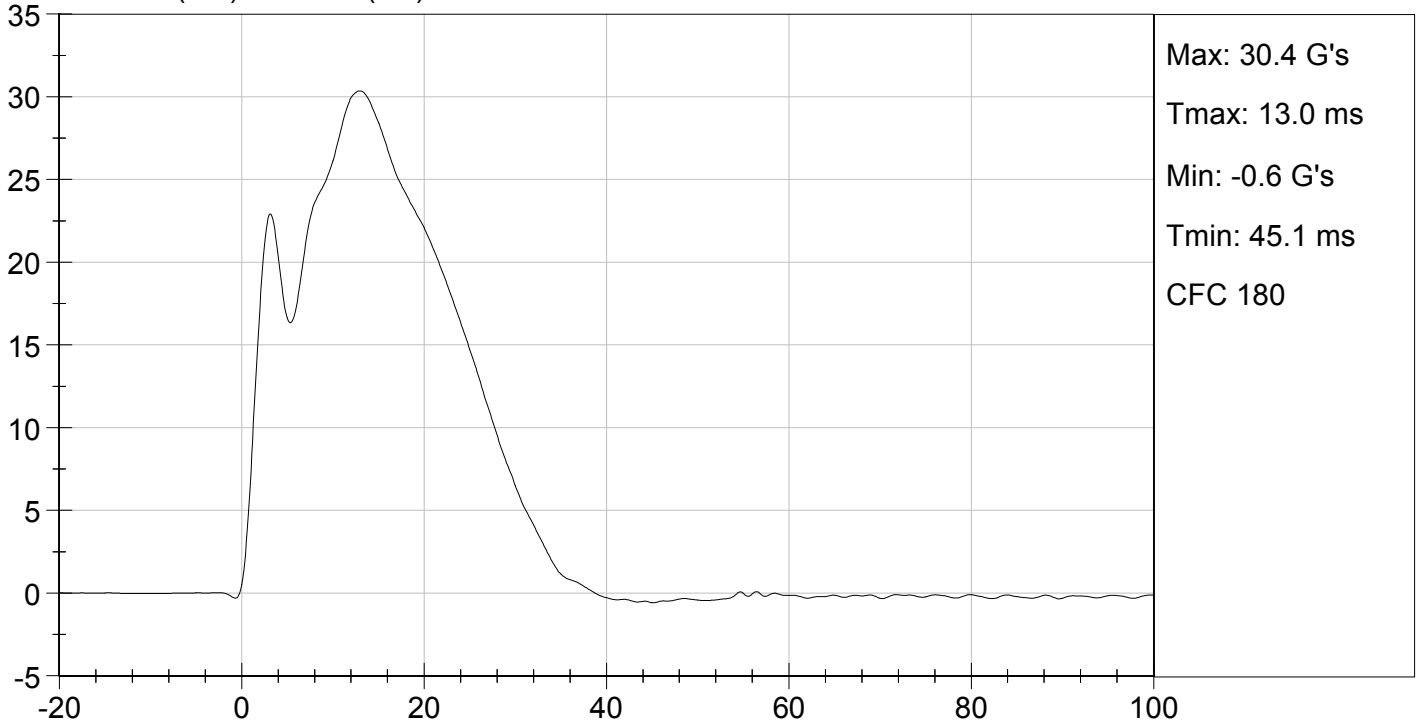
Jessica Gall

Approved By

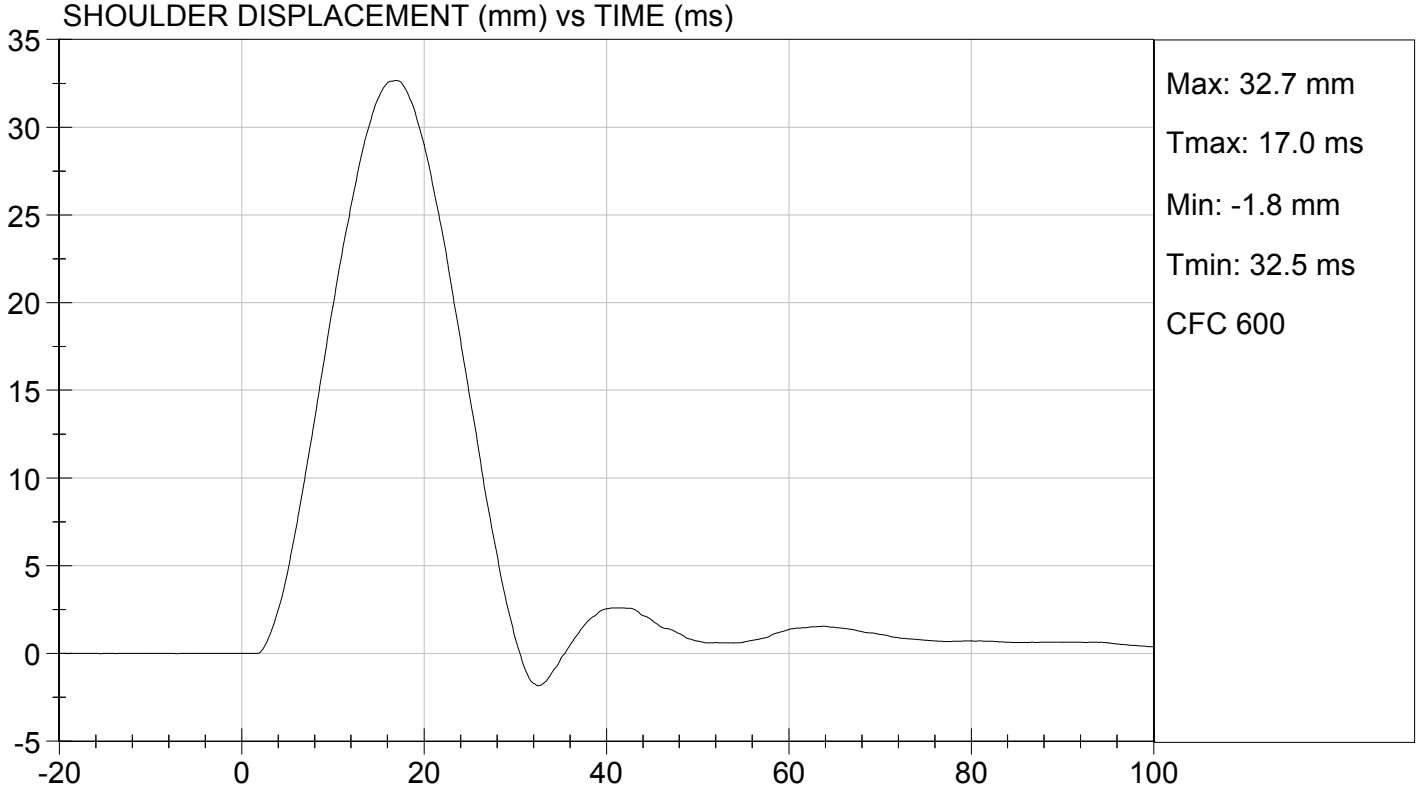
TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

TEST DATE: 03/31/2015
TEST #: D15884

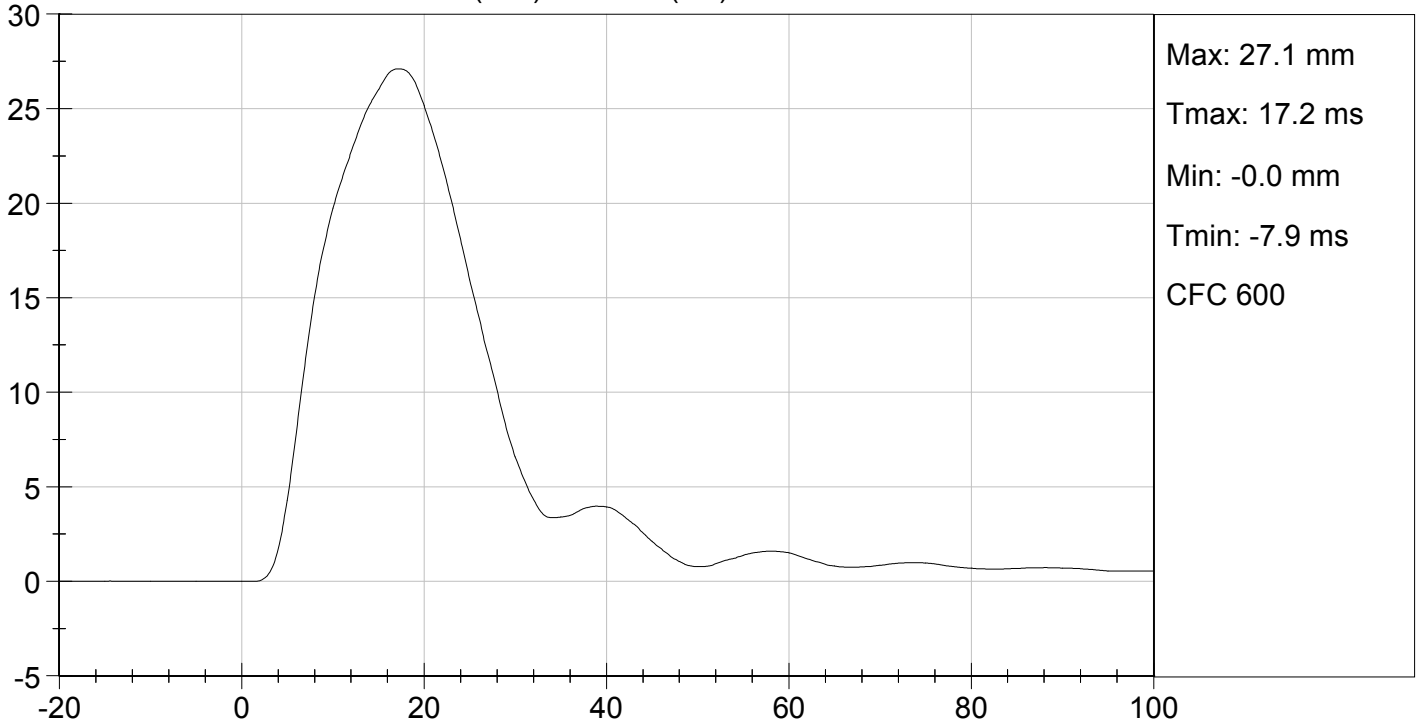
PROBE (G's) vs TIME (ms)



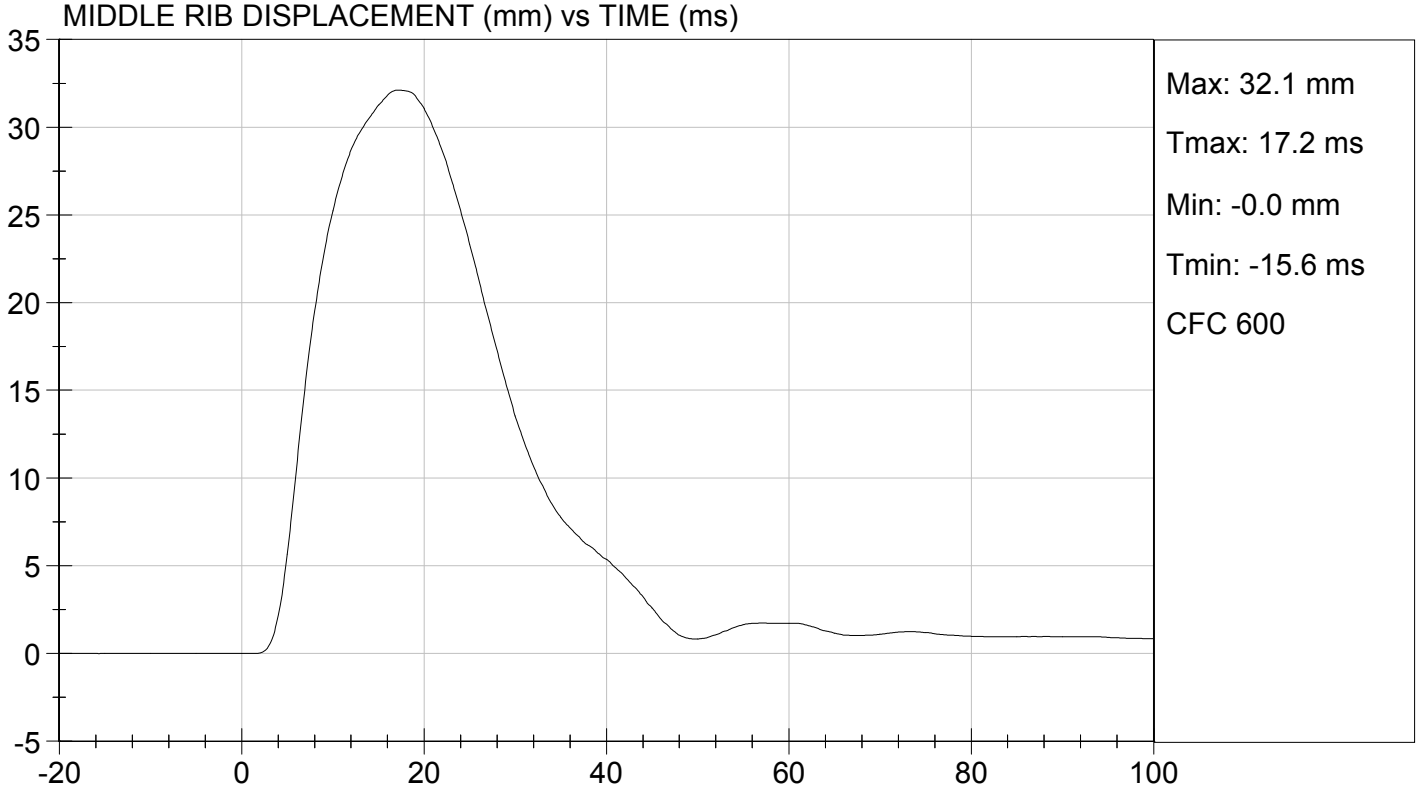
SHOULDER DISPLACEMENT (mm) vs TIME (ms)



UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



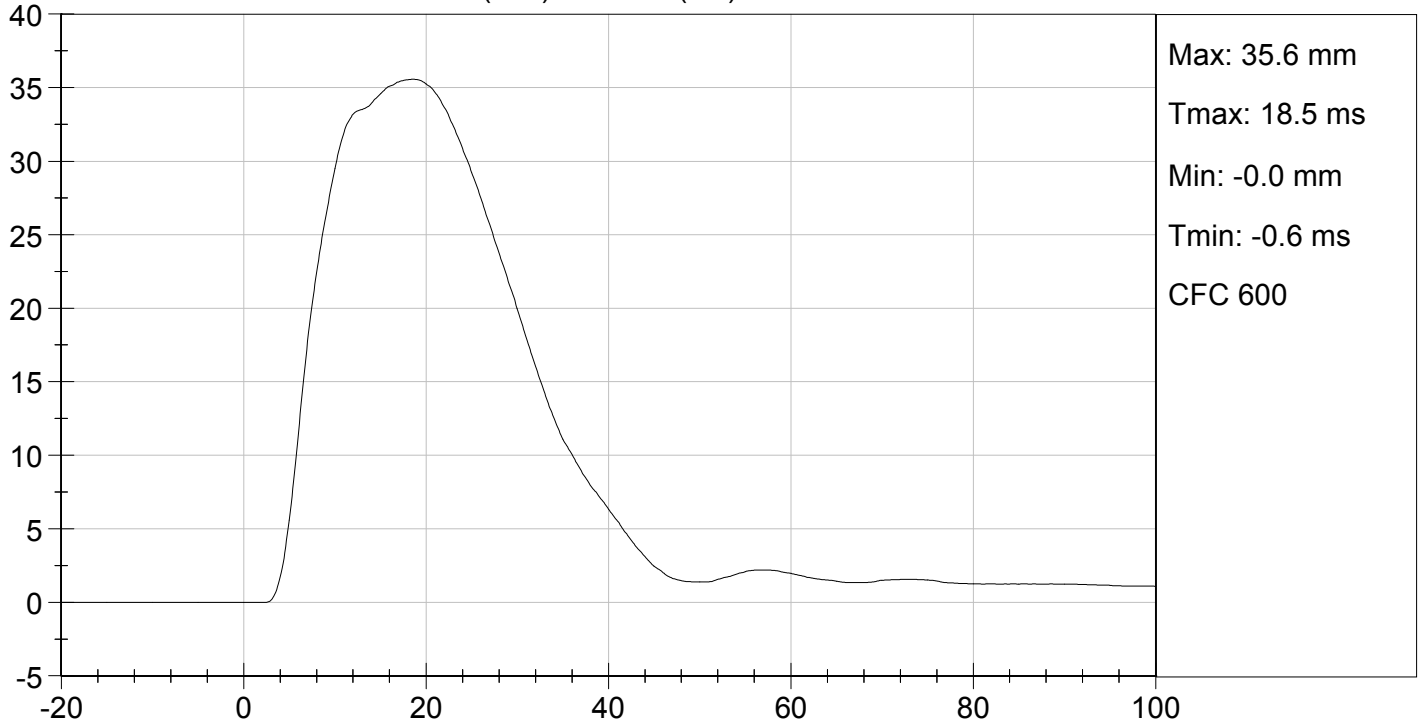
MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



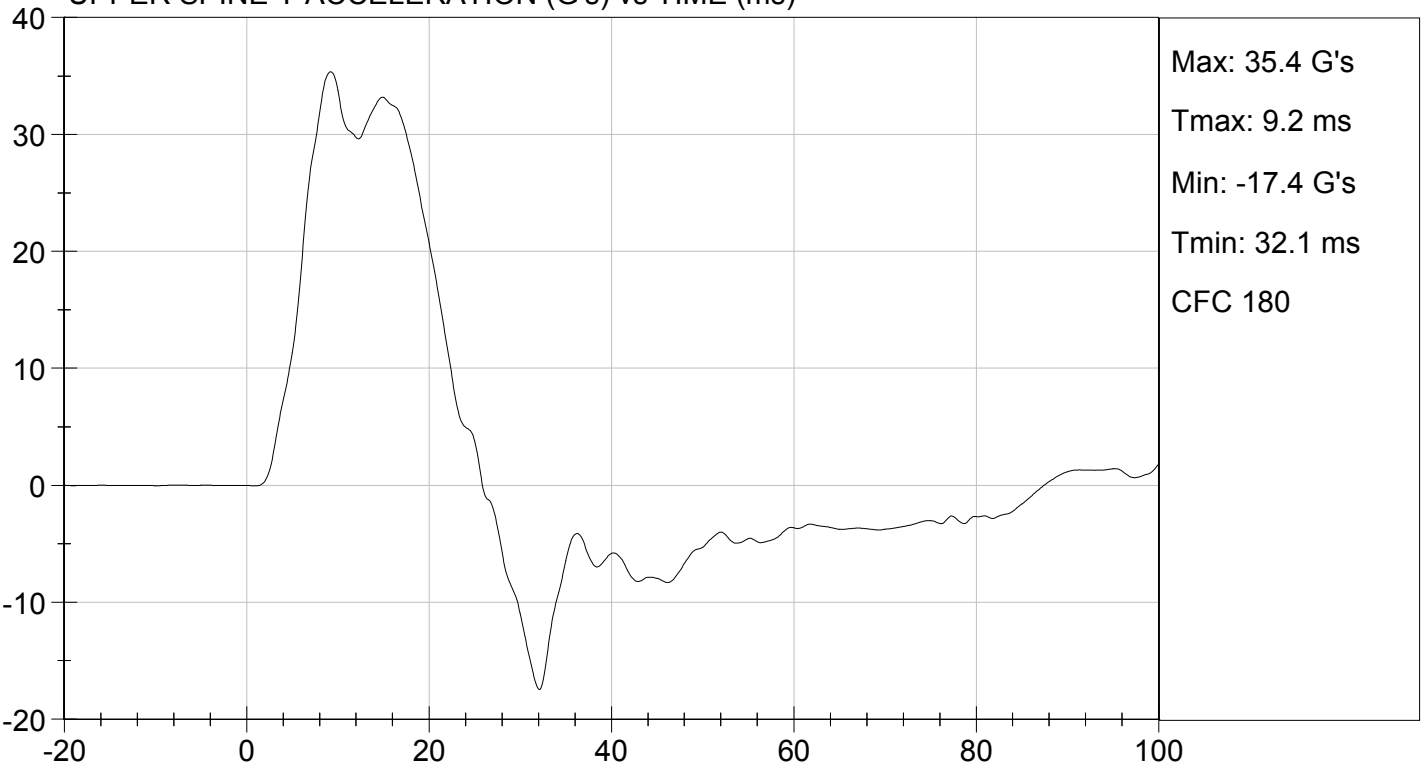
TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

TEST DATE: 03/31/2015
TEST #: D15884

LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



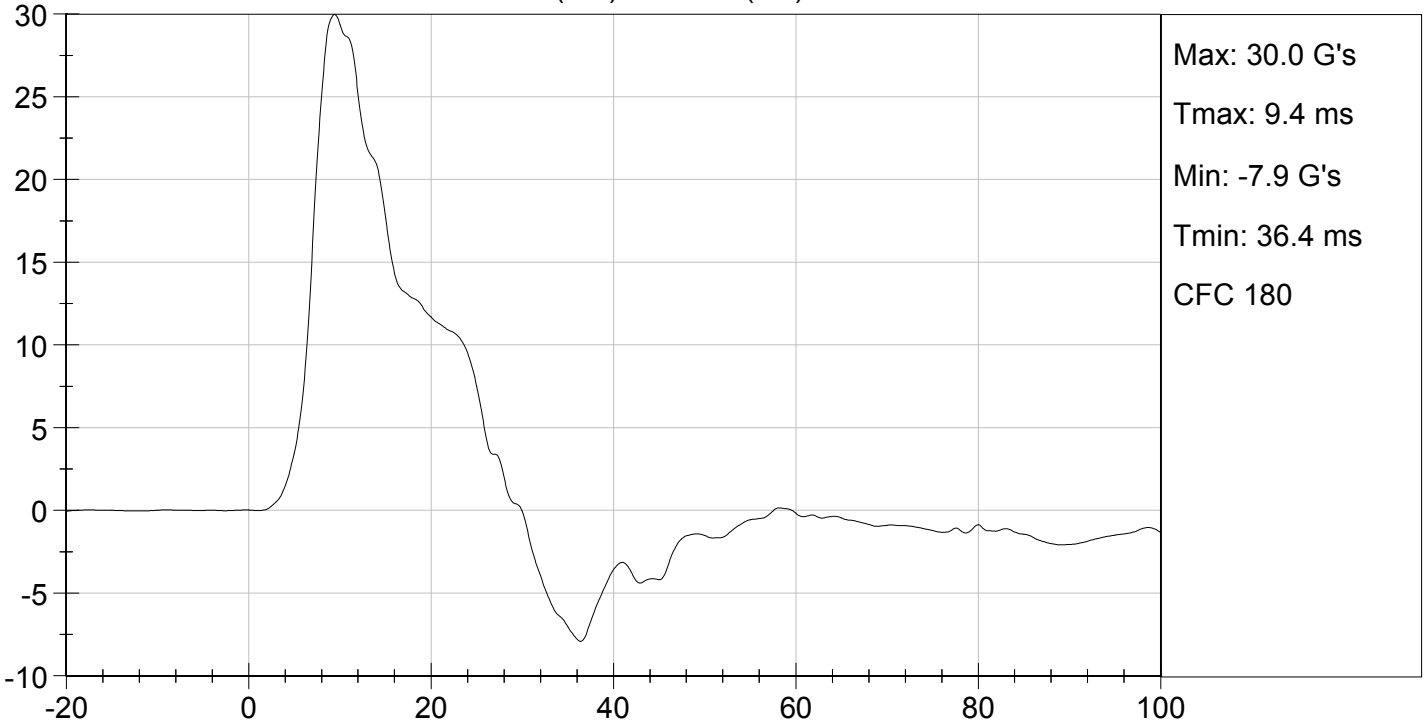
UPPER SPINE Y ACCELERATION (G's) vs TIME (ms)



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

TEST DATE: 03/31/2015
TEST #: D15884

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



MGA RESEARCH CORPORATION

THORAX (WITHOUT ARM) IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test I.D:** D15885

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	27	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Maximum Probe Acceleration	G's	14 to 18	15	Pass
Upper Rib Displacement	mm	32 to 40	37	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

David Schoedel
Laboratory Technician

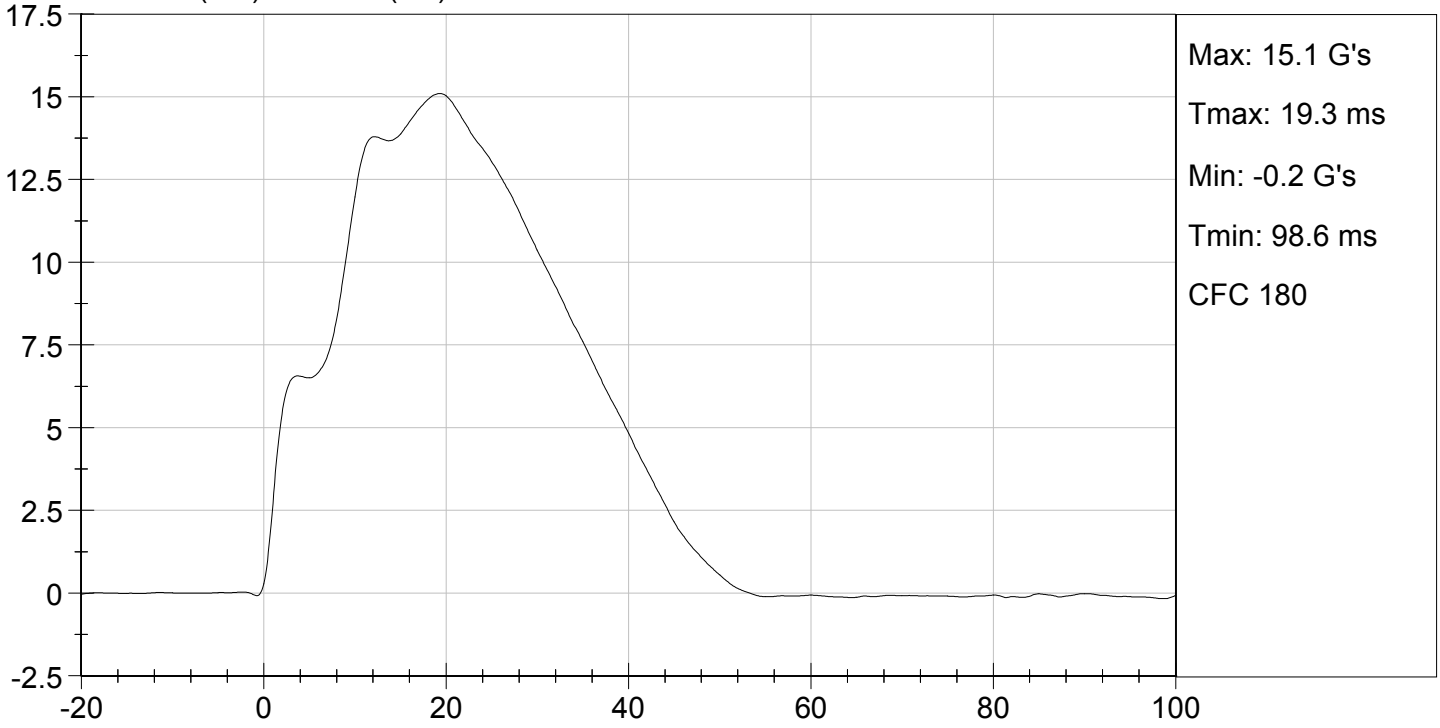
03/31/2015
Test Date

Jessica Hall
Approved By

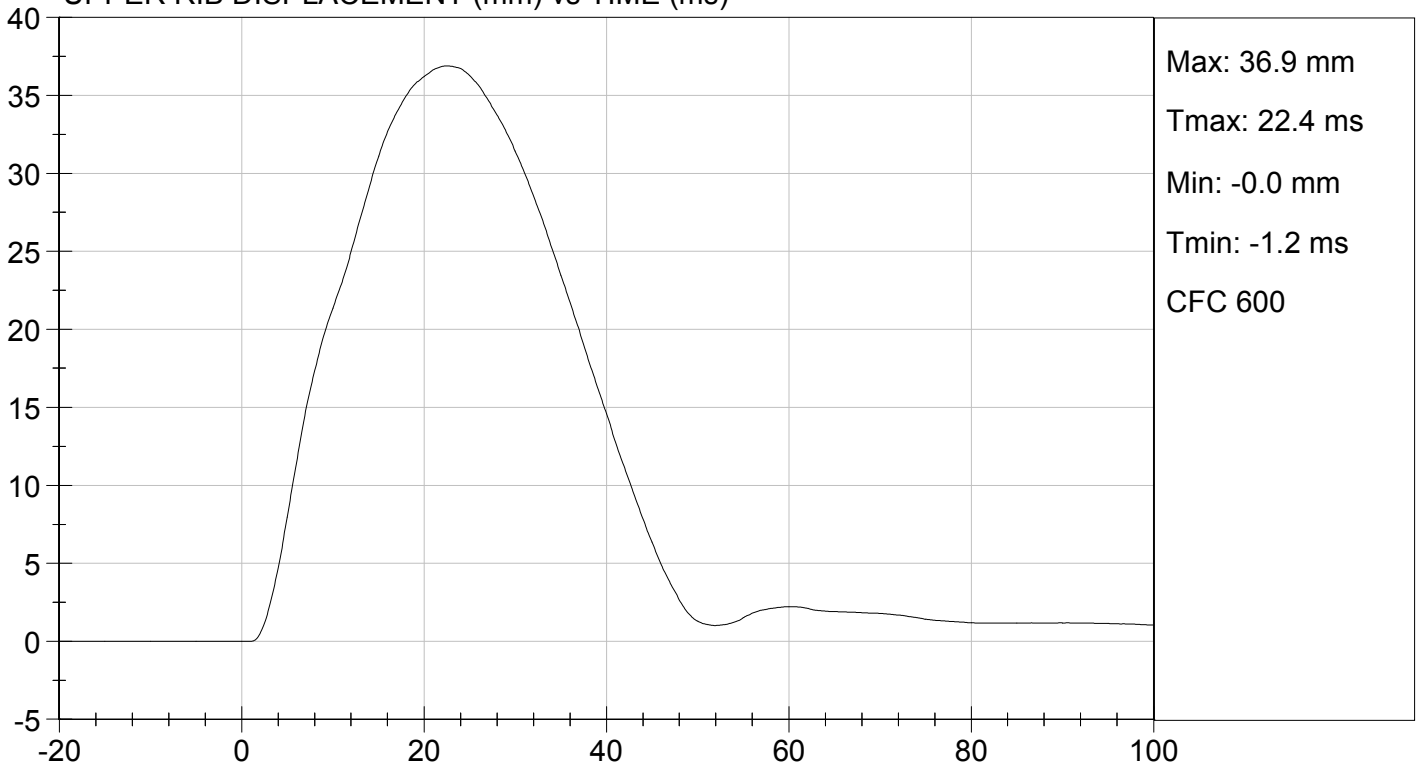
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.24 ft/s, 4.34 m/s

TEST DATE: 03/31/2015
TEST #: D15885

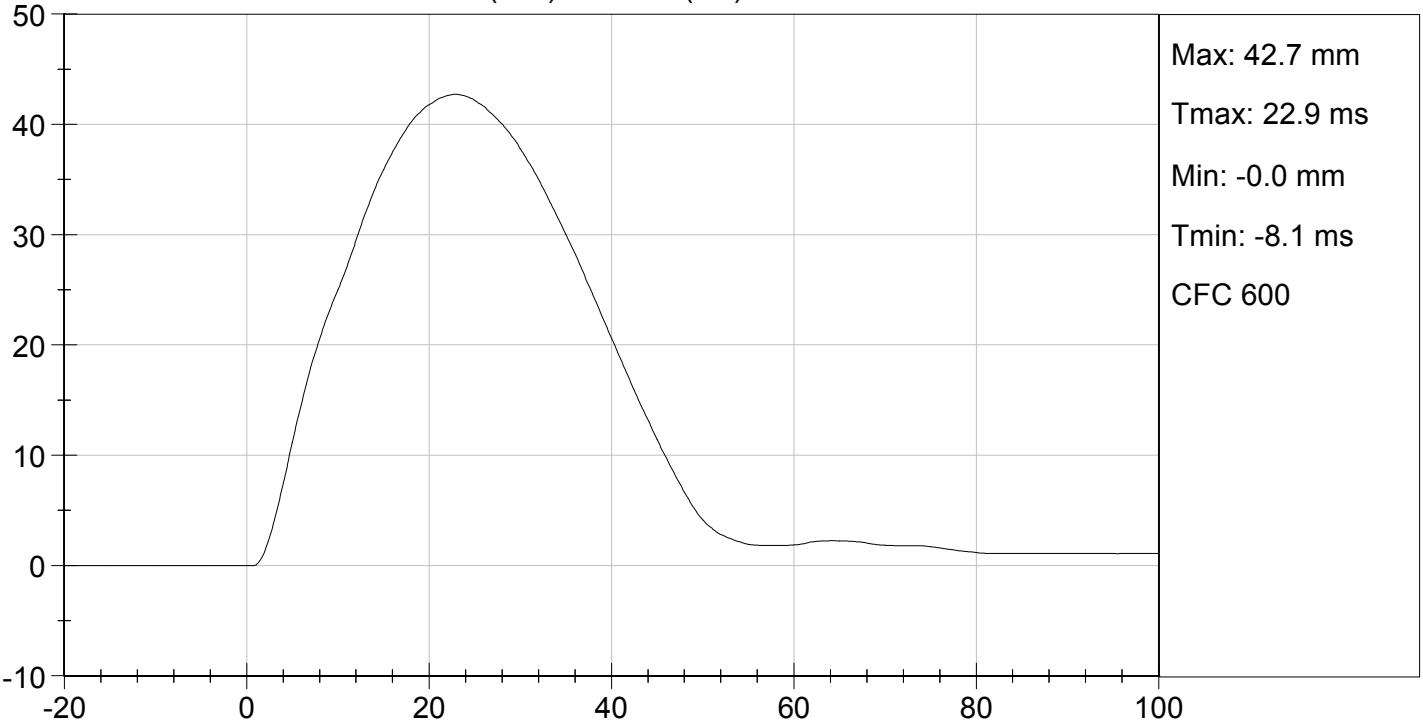
PROBE (G's) vs TIME (ms)



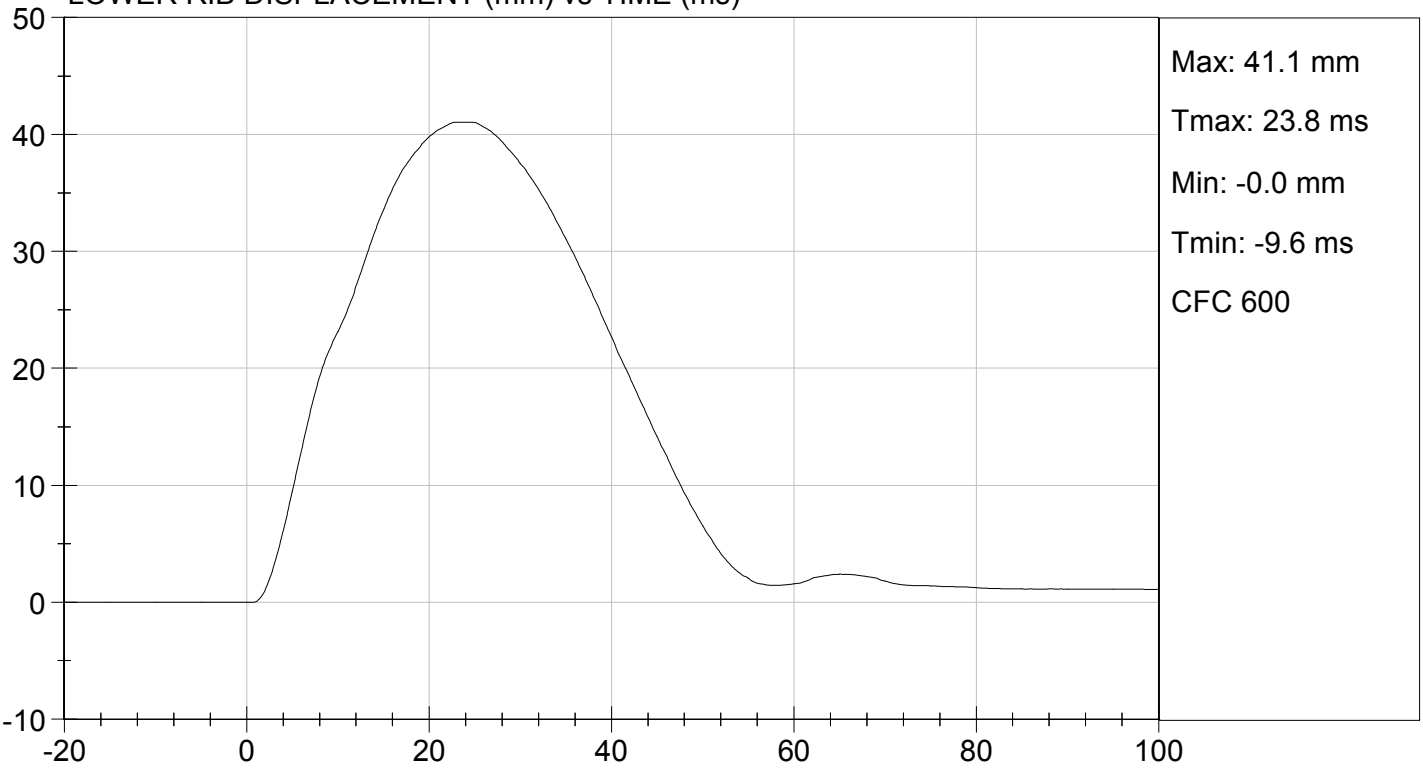
UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



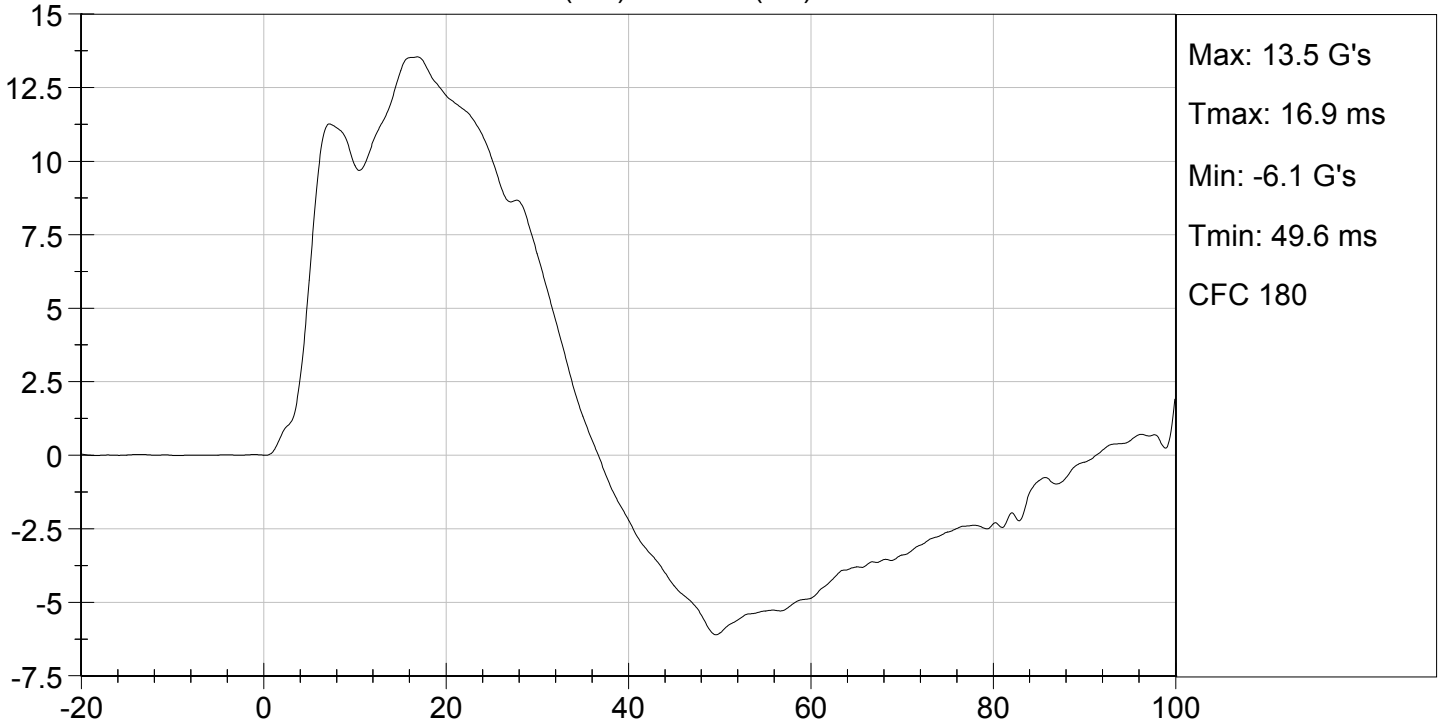
LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



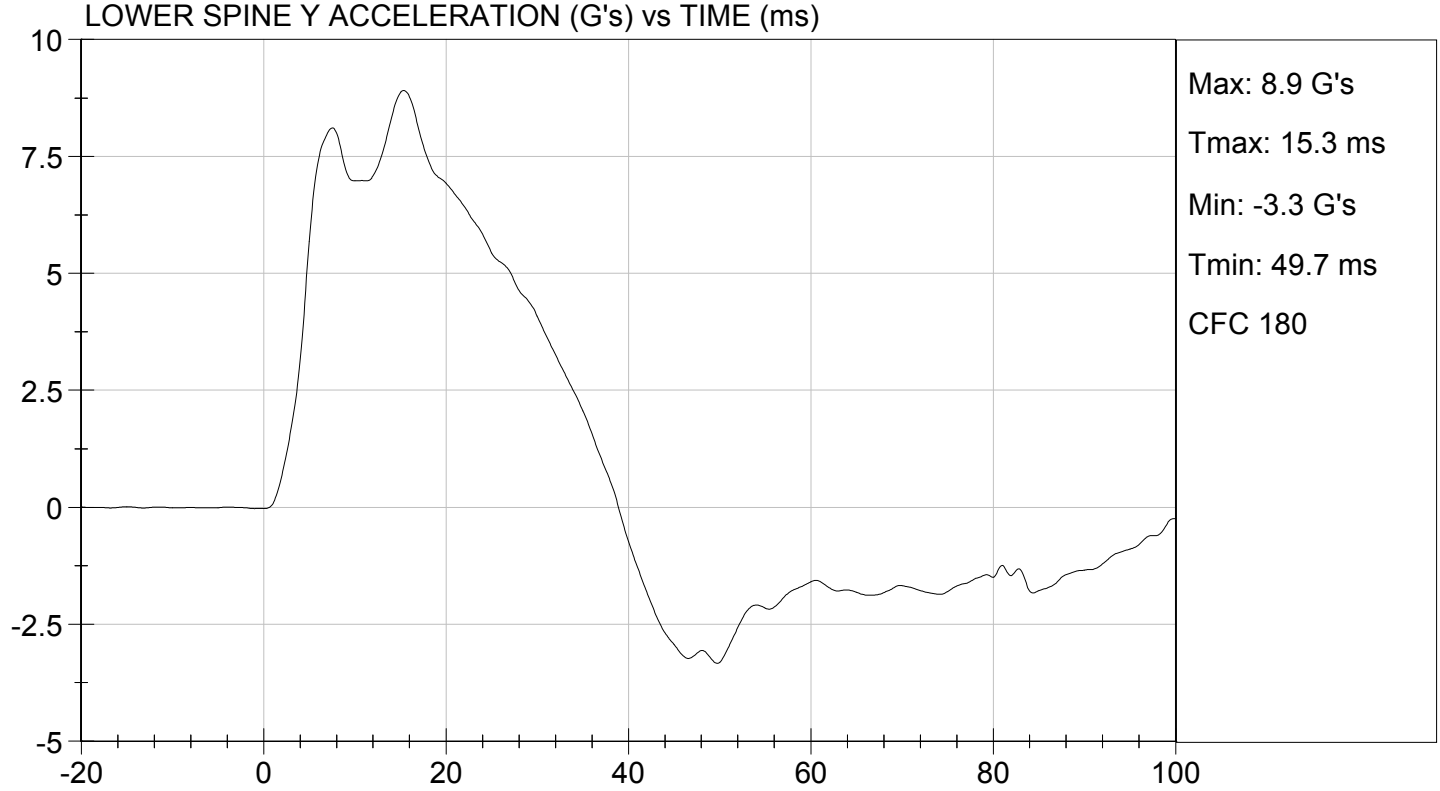
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.24 ft/s, 4.34 m/s

TEST DATE: 03/31/2015
TEST #: D15885

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



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



MGA RESEARCH CORPORATION

ABDOMINAL IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test I.D:** D15886

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	27	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Maximum Probe Acceleration	G's	12 to 16	13	Pass
Upper Abdomen Rib Displacement	mm	36 to 47	43	Pass
Lower Abdomen Rib Displacement	mm	33 to 44	41	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	10	Pass
		Overall Test Results		Pass

David Schoedel

Laboratory Technician

03/31/2015

Test Date

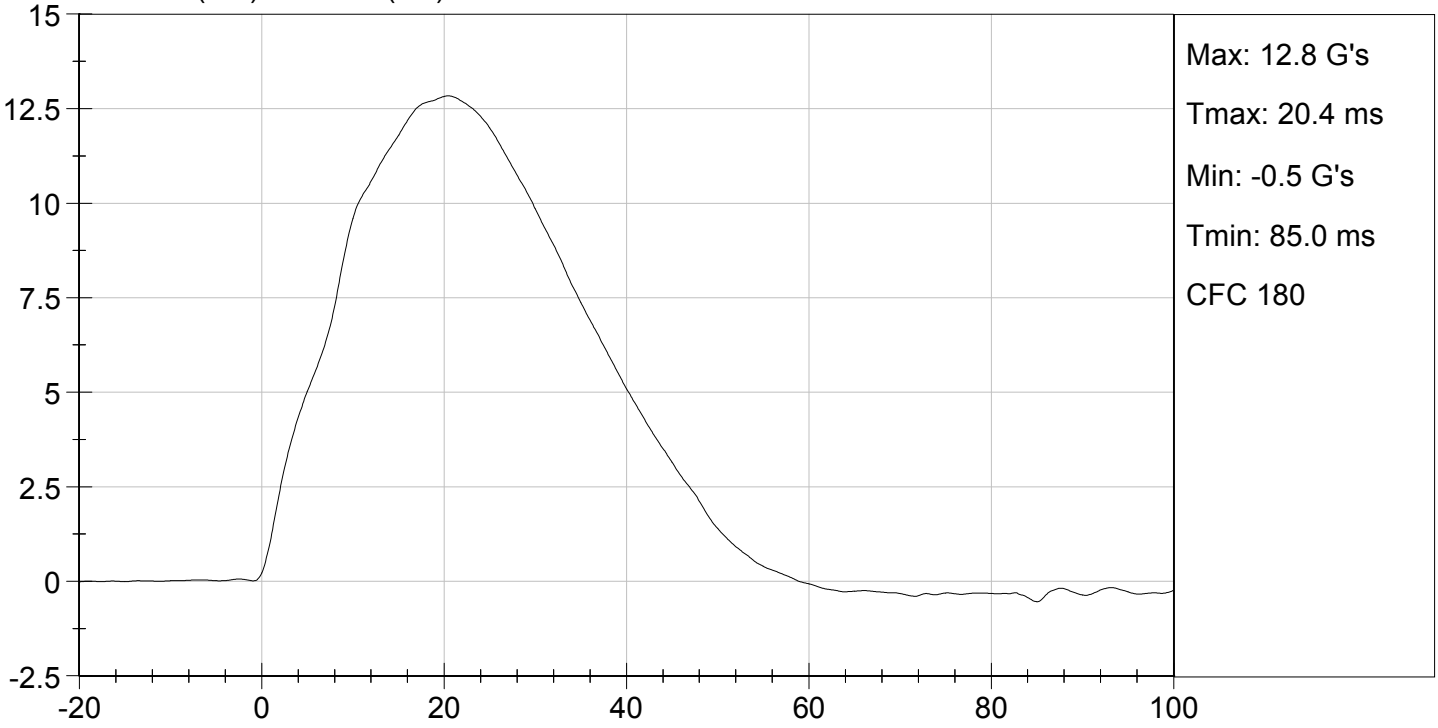
Jessica Gall

Approved By

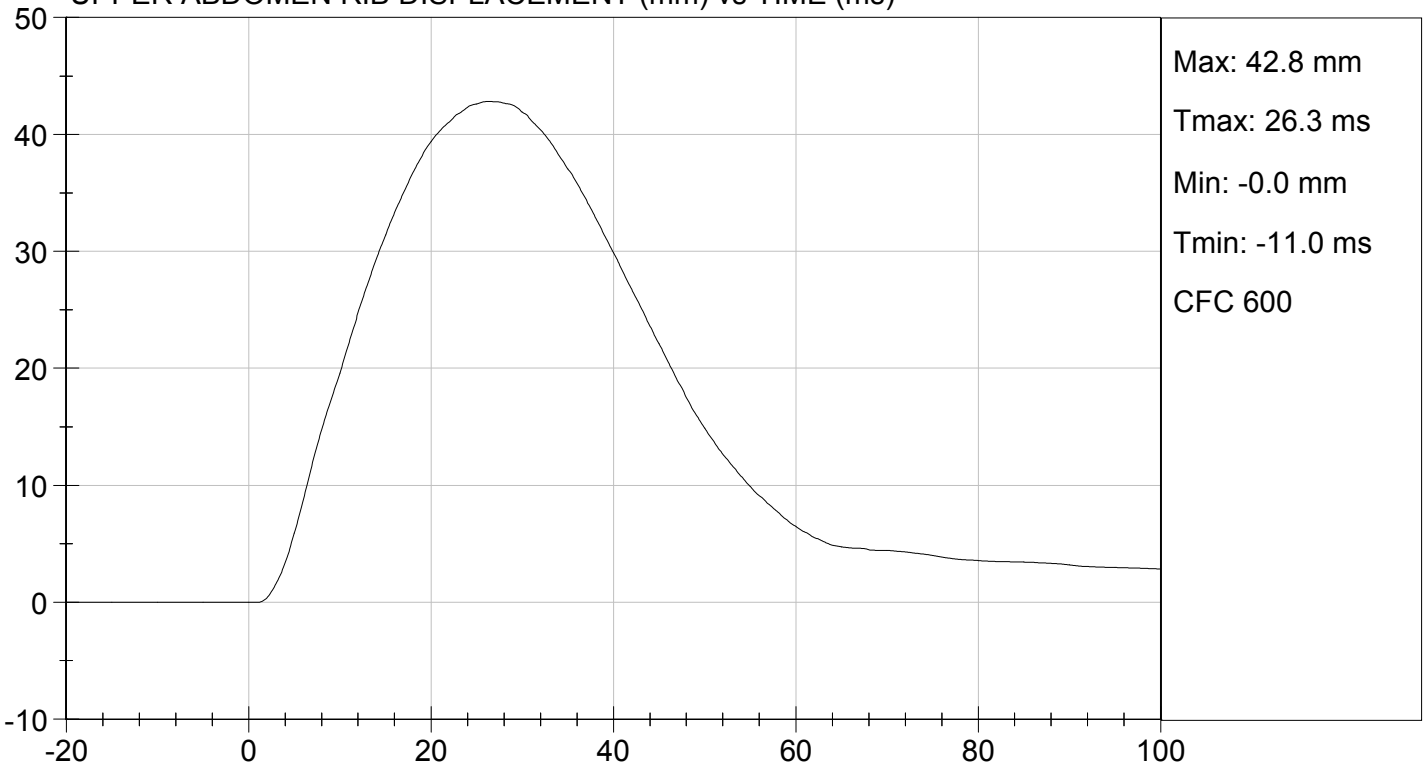
TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 03/31/2015
TEST #: D15886

PROBE (G's) vs TIME (ms)



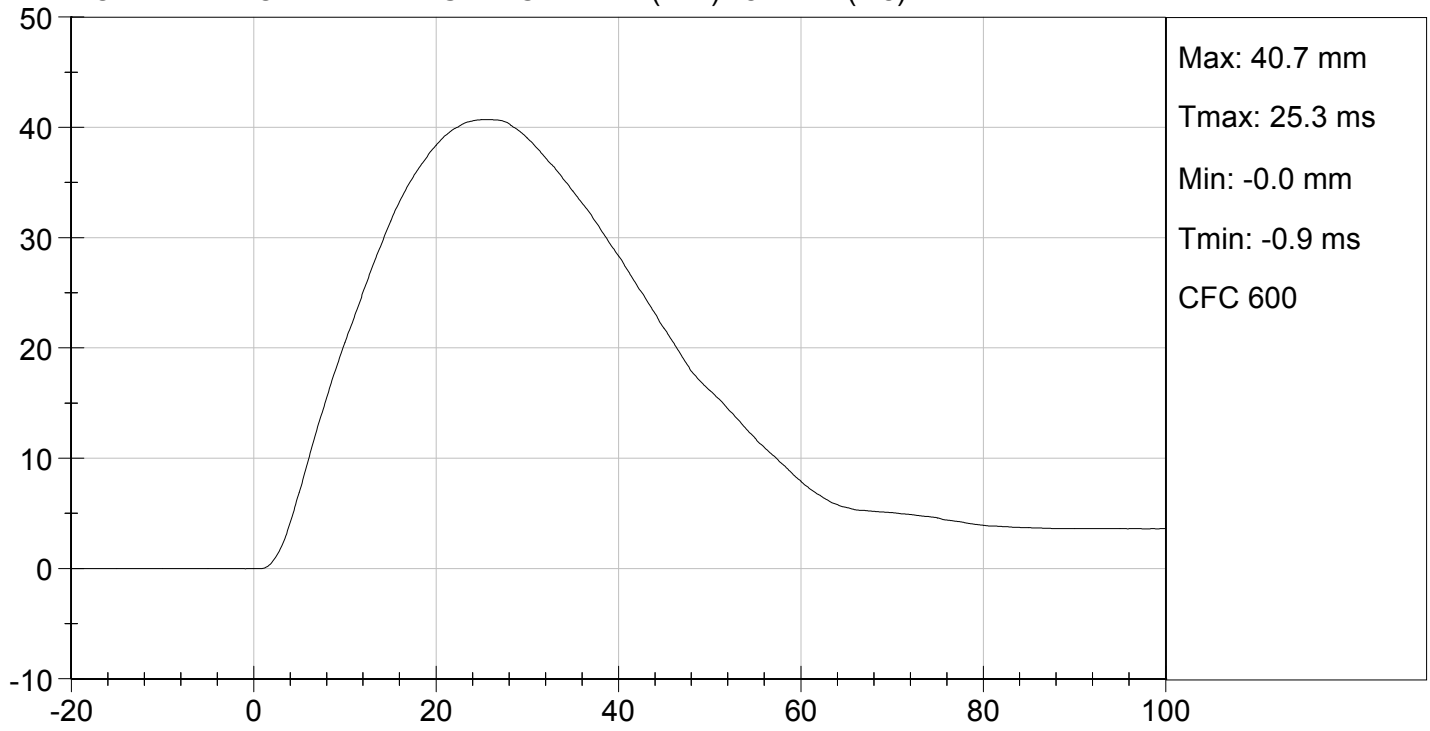
UPPER ABDOMEN RIB DISPLACEMENT (mm) vs TIME (ms)



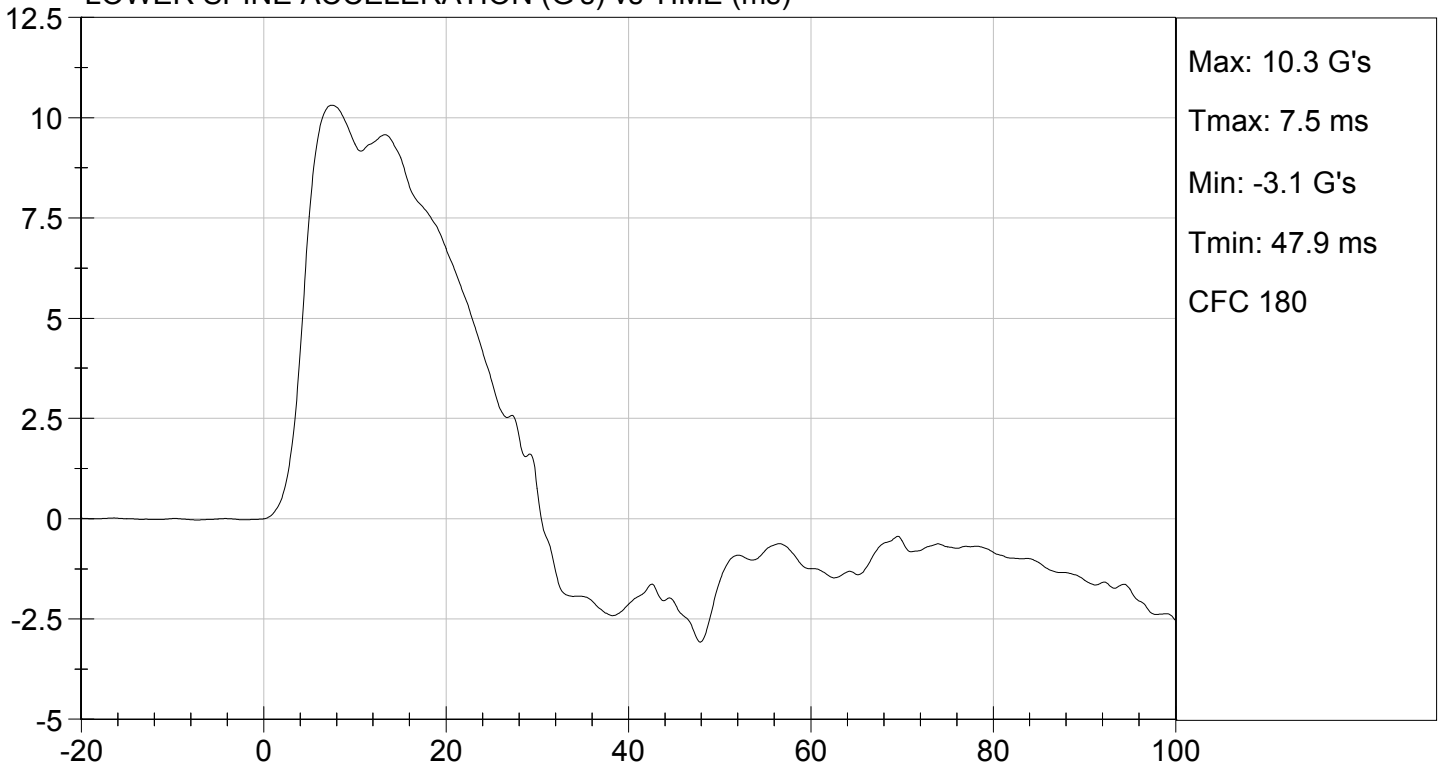
TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 03/31/2015
TEST #: D15886

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:** D15887

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	27	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	Pass
Maximum Probe Acceleration	G's	38 to 47	44	Pass
Pelvis Y Acceleration After 6 ms	G's	34 to 42	42	Pass
Peak Acetabulum Force	N	3600 to 4300	4,063	Pass
		Overall Test Results		Pass

David Schoedel
Laboratory Technician

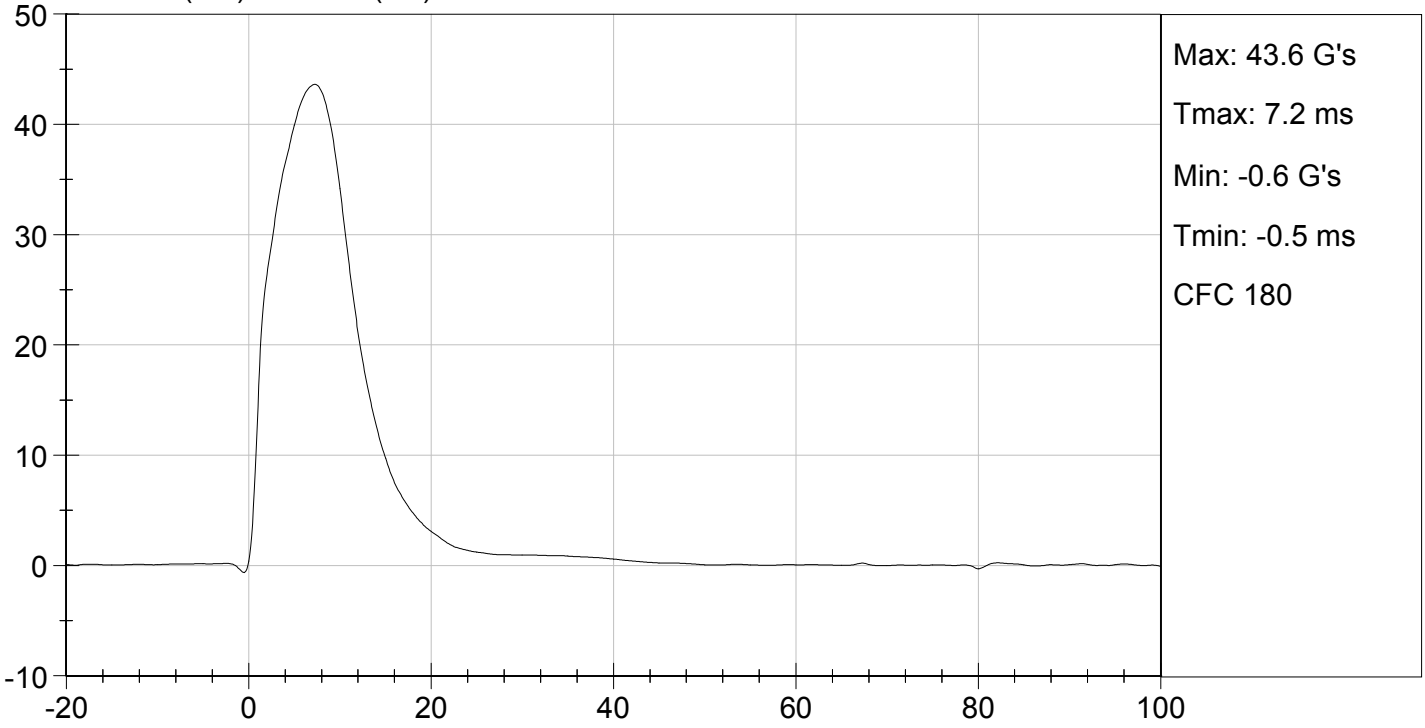
03/31/2015
Test Date

Jessica Hall
Approved By

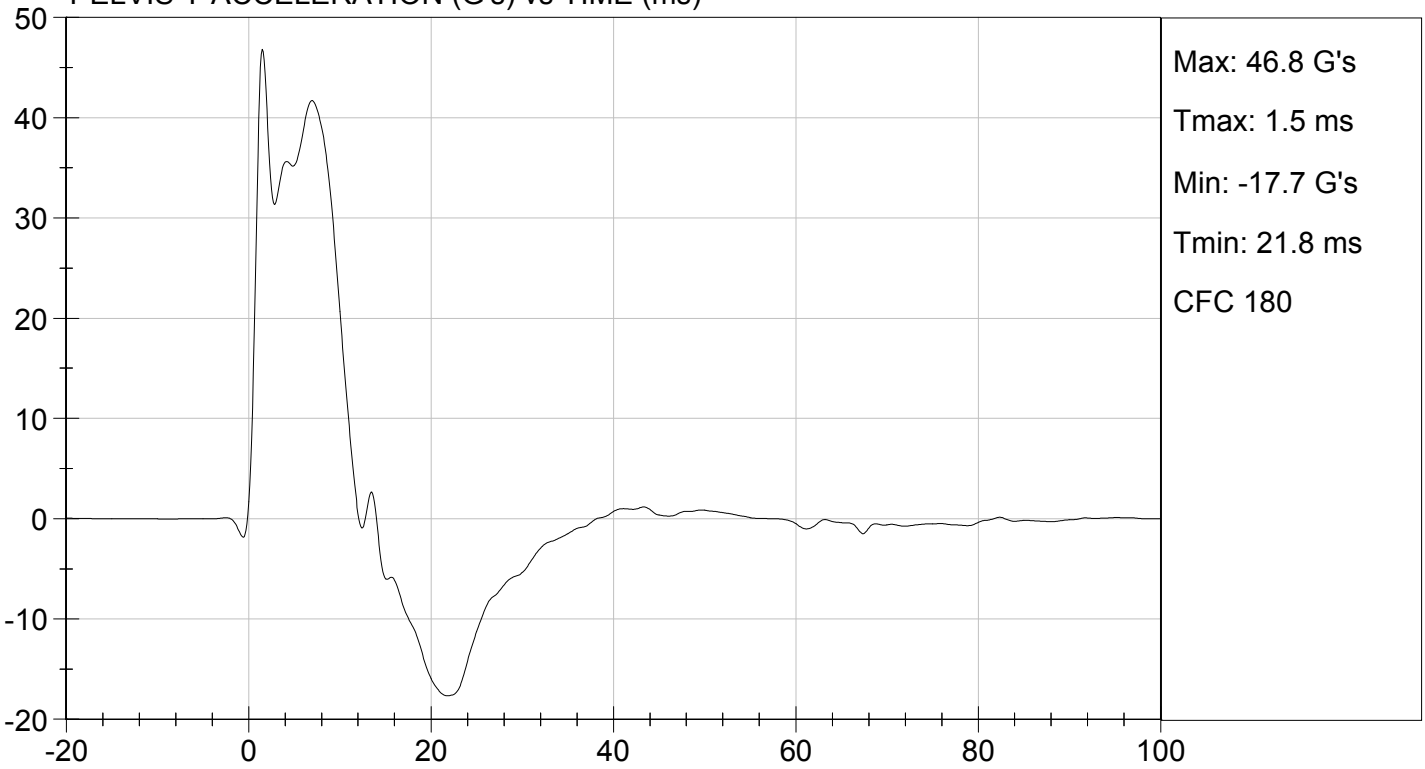
TEST DESC: PELVIS IMPACT
VELOCITY: 21.93 ft/s, 6.68 m/s

TEST DATE: 03/31/2015
TEST #: D15887

PROBE (G's) vs TIME (ms)

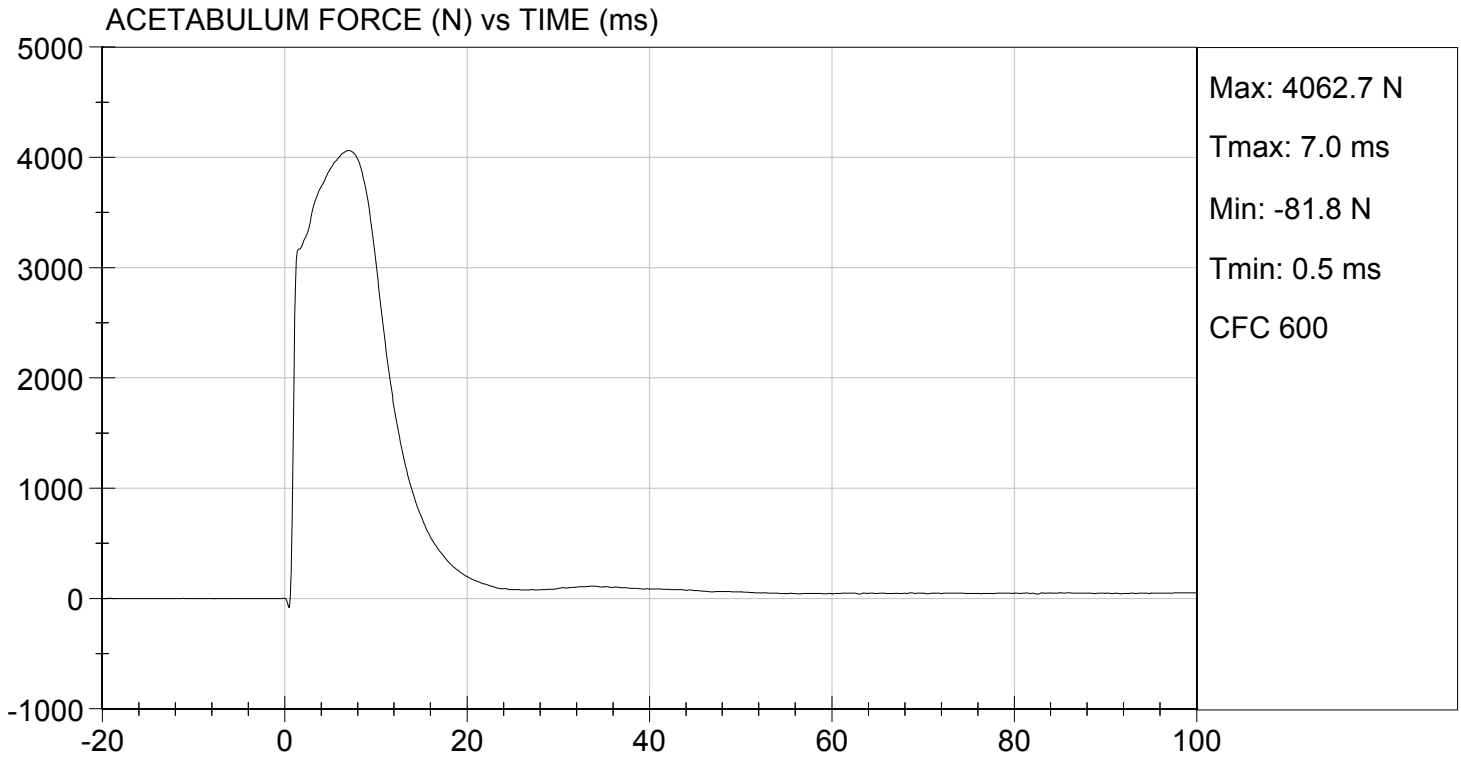


PELVIS Y ACCELERATION (G's) vs TIME (ms)



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

TEST DATE: 03/31/2015
TEST #: D15887



MGA RESEARCH CORPORATION

ILIAC IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296 **Test I.D:** D15888

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	27	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Maximum Probe Acceleration	G's	36 to 45	42	Pass
Pelvis Y Acceleration	G's	28 to 39	33	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4,993	Pass
		Overall Test Results		Pass

David Schoedel

Laboratory Technician

03/31/2015

Test Date

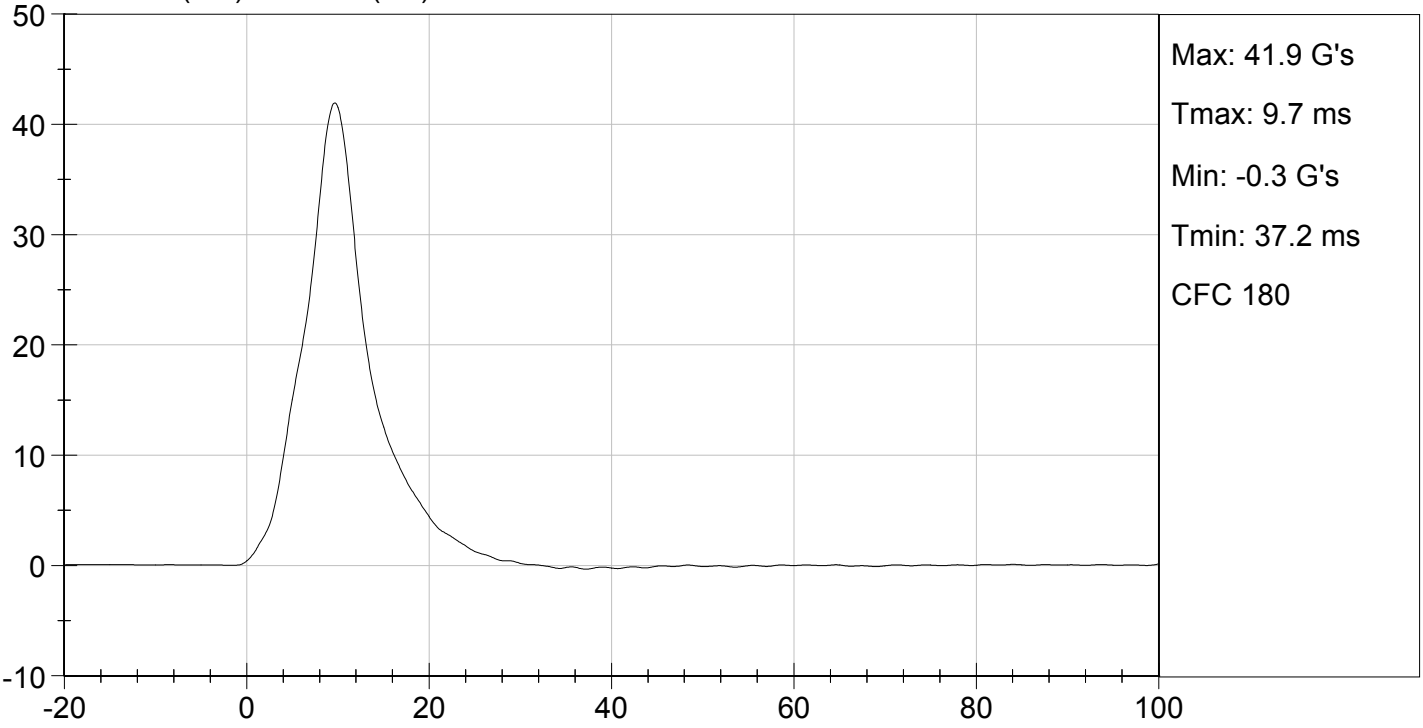
Jessica Hall

Approved By

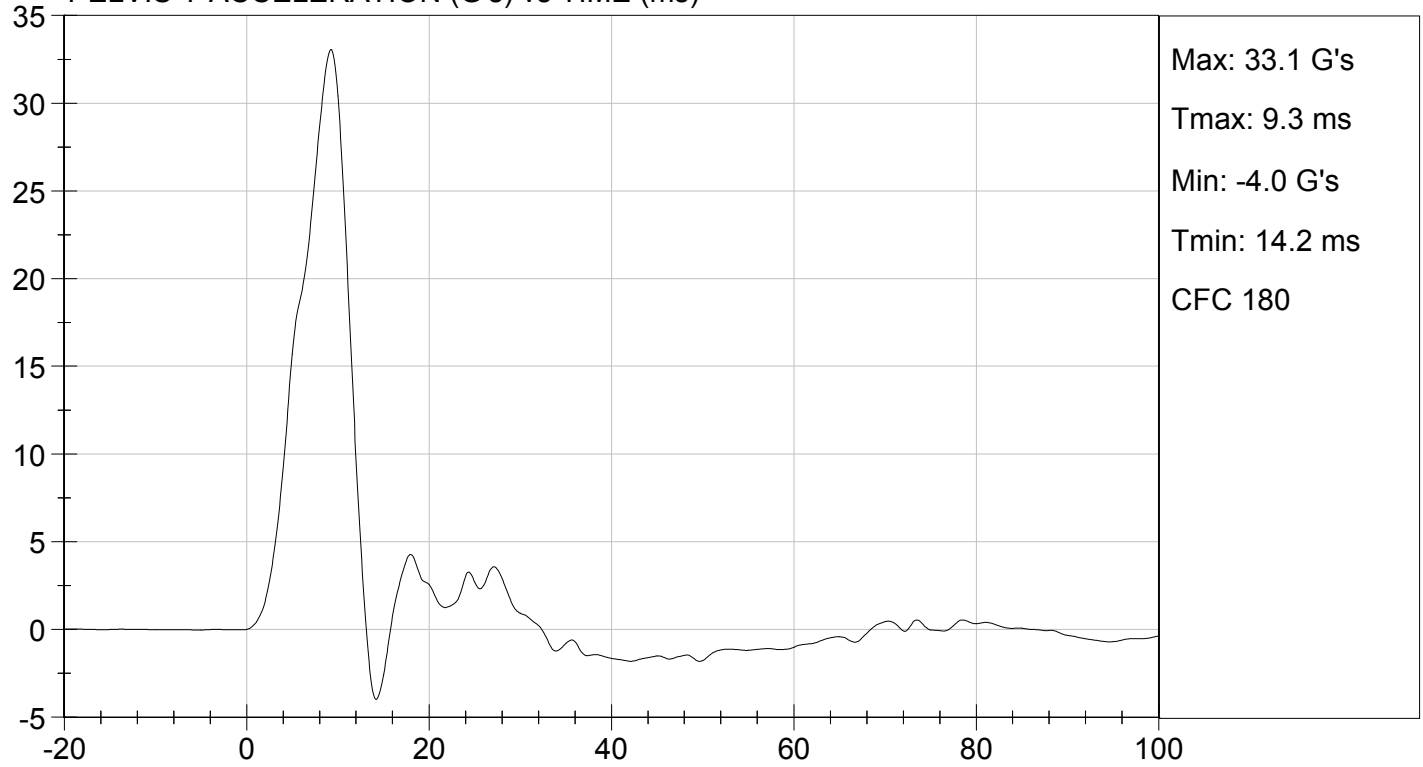
TEST DESC: ILLIAC
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 03/31/2015
TEST #: D15888

PROBE (G's) vs TIME (ms)

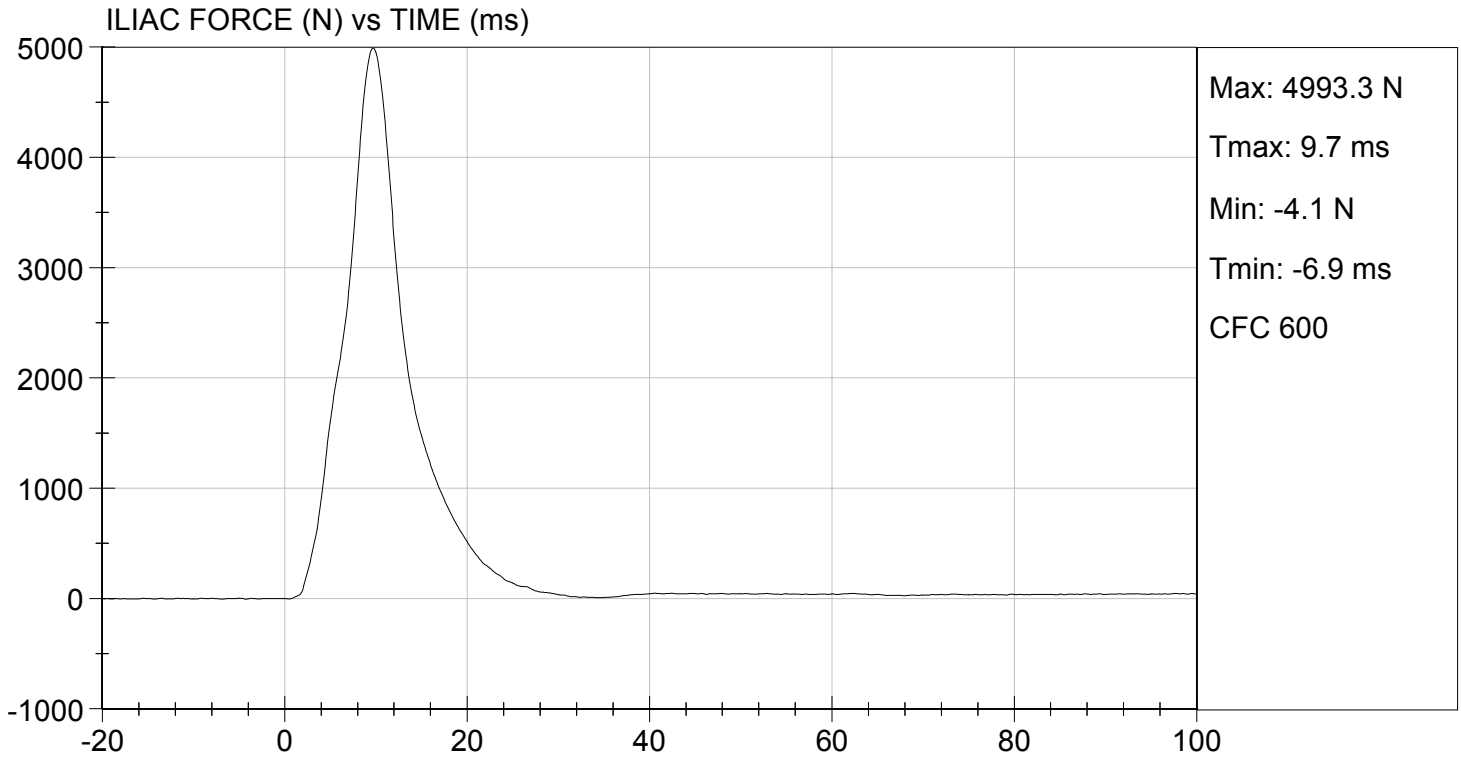


PELVIS Y ACCELERATION (G's) vs TIME (ms)

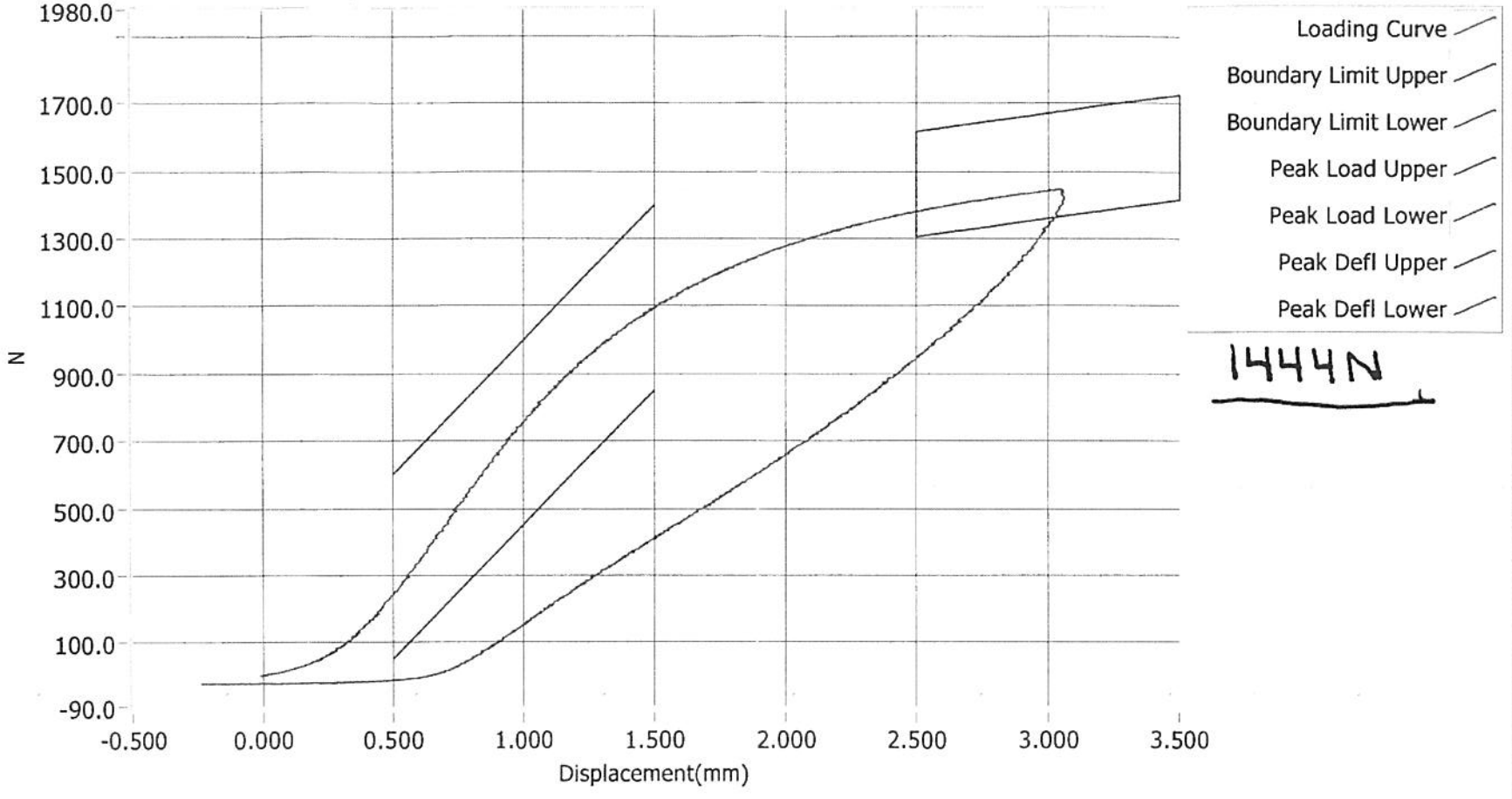


TEST DESC: ILLIAC
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 03/31/2015
TEST #: D15888



Resultant Data - SIDIIs Plug Compression



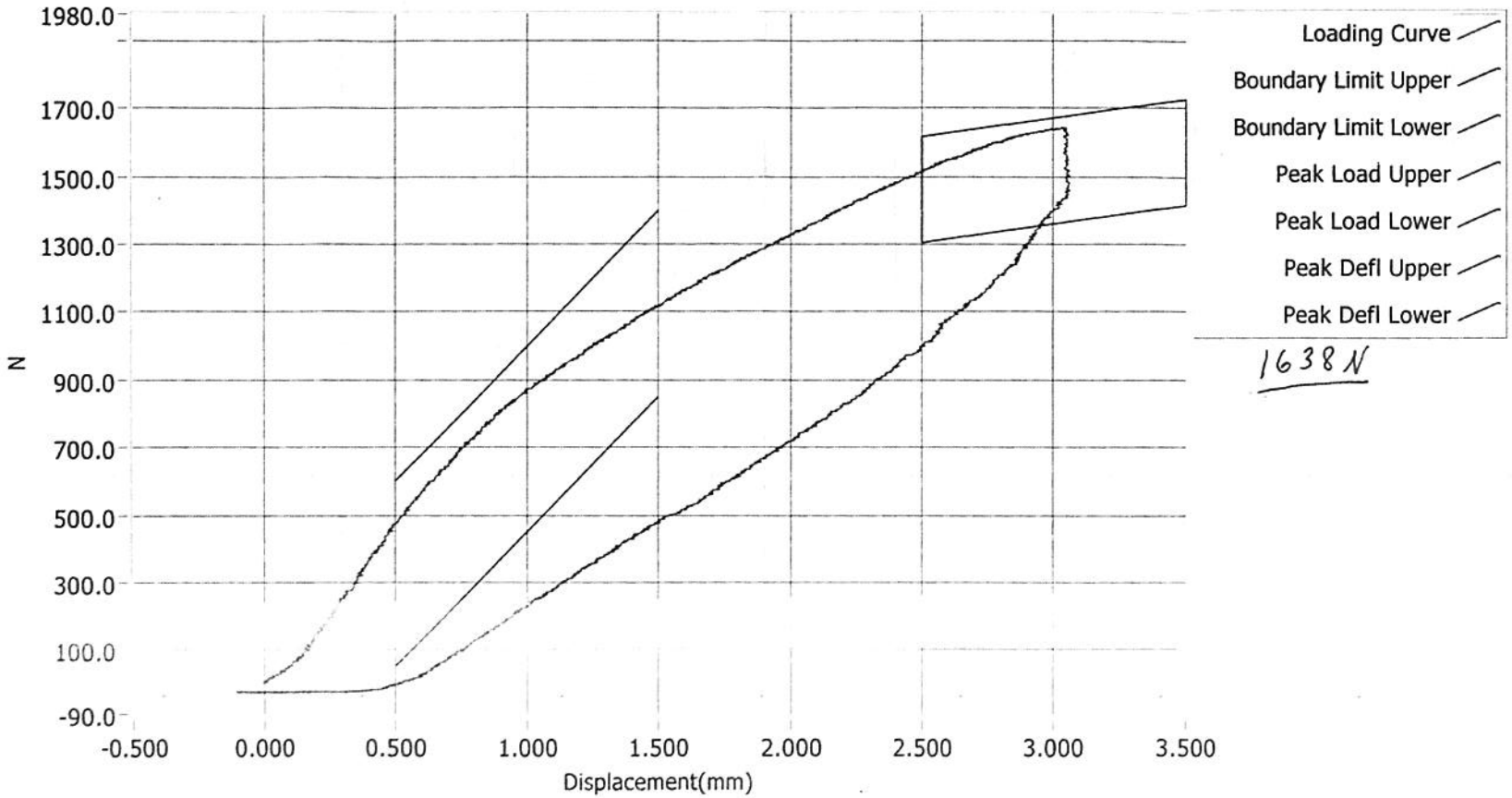
1444N

ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
	63046	1/19/2013	12:54 AM
Cert ID	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

Current Date : 1/19/2013 Current Time : 00:54:39

Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
	71385	12/19/2013	10:44 PM
Cert ID	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

Current Date : 12/19/2013 Current Time : 22:44:36

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation (ES-2re)

			ES-2re S/N 032		
			Serial Number	Manufacturer	Calibration Date
Head CG Accelerometers		X	P84436	Endevco	01/28/15
		Y	P84439	Endevco	01/28/15
		Z	P84440	Endevco	01/28/15
		Xr	P84450	Endevco	01/28/15
		Yr	P84456	Endevco	01/28/15
		Zr	P84457	Endevco	01/28/15
Thorax Rib Displacement Potentiometers	Upper	Y	G176	Honeywell	01/30/15
	Middle	Y	G169	Honeywell	01/30/15
	Lower	Y	G164	Honeywell	01/30/15
Abdomen Load Cells	Forward	Y	ABG1513	Denton	12/15/14
	Middle	Y	ABG1531	Denton	12/15/14
	Rear	Y	ABG1536	Denton	12/15/14
Lower Spine Accelerometers (T12)		X	P79783	Endevco	02/19/15
		Y	P79598	Endevco	01/07/15
		Z	P79600	Endevco	01/07/15
Public Symphysis Load Cell		Y	PG462	Denton	12/15/14

Table 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N 296		
				Serial Number	Manufacturer	Calibration Date
Head CG Accelerometers			X	P83220	Endevco	01/27/15
			Y	P83221	Endevco	01/27/15
			Z	P83222	Endevco	01/27/15
			Xr	P83223	Endevco	01/27/15
			Yr	P83224	Endevco	01/27/15
			Zr	P83225	Endevco	01/27/15
Displacement Potentiometers	Thoracic Rib	Upper	Y	G012	Servo	01/28/15
		Middle	Y	G1163	FTSS	01/28/15
		Lower	Y	G1158	FTSS	01/28/15
	Abdominal Rib	Upper	Y	G1146	FTSS	01/28/15
		Lower	Y	G1126	FTSS	01/28/15
Lower Spine Accelerometers (T12)			X	P86751	Endevco	01/22/15
			Y	P86752	Endevco	01/22/15
			Z	P86753	Endevco	01/22/15
Acetabulum Load Cell			Y	ACG268	Denton	01/06/15
Iliac Wing Load Cell			Y	IWG282	Denton	01/06/15
Pelvis Plug (struck side)				71385	FTSS	12/19/13
Pelvis Plug (non-struck side)				63046	FTSS	01/19/13

Table 3 – Vehicle Instrumentation

			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	P66780	Endevco	10/02/14
	Vehicle Center of Gravity	Y	P66779	Endevco	10/02/14
	Vehicle Center of Gravity	Z	P66778	Endevco	10/02/14
2	Right Sill at Front Seat	X	P66795	Endevco	03/06/15
	Right Sill at Front Seat	Y	P66796	Endevco	03/06/15
	Right Sill at Front Seat	Z	P66797	Endevco	03/06/15
3	Right Sill at Rear Seat	X	P78280	Endevco	10/08/14
	Right Sill at Rear Seat	Y	P79726	Endevco	02/05/15
	Right Sill at Rear Seat	Z	P78281	Endevco	10/08/14
4	Left Sill at Front Door	Y	P72802	Endevco	11/11/14
5	Left Sill at Rear Door	Y	P78945	Endevco	02/05/15
6	Left A-Post Lower	Y	P74591	Endevco	02/05/15
7	Left A-Post Middle	Y	P74592	Endevco	02/05/15
8	Left B-Post Lower	Y	P73141	Endevco	12/09/14
9	Left B-Post Middle	Y	P73142	Endevco	12/09/14
10	Front Seat Track	Y	P73709	Endevco	10/02/14
11	Rear Seat Track or Structure	Y	P66869	Endevco	10/31/14
12	Right Rear Occ. Compartment	Y	P78759	Endevco	10/31/14
13	Engine Block	X	P66753	Endevco	01/05/15
	Engine Block	Y	P66754	Endevco	01/05/15
14	Rear Floorpan Above Axle	X	P79863	Endevco	10/31/14
	Rear Floorpan Above Axle	Y	P66612	Endevco	11/11/14
	Rear Floorpan Above Axle	Z	P79862	Endevco	10/31/14

Table 4 – MDB Instrumentation

		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	P85036	Endevco	01/16/15
MDB Center of Gravity	Y	P85037	Endevco	01/16/15
MDB Center of Gravity	Z	P85038	Endevco	01/16/15
Left Frame at Rear Axle Centerline	X	P67517	Endevco	01/16/15
Left Frame at Rear Axle Centerline	Y	P67518	Endevco	01/16/15