REPORT NUMBER: SideNCAPMDB-MGA-22-001

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

HONDA DEVELOPMENT & MANUFACTURING OF AMERICA, LLC
2022 Acura MDX 5-Door SUV
NHTSA No.: O20225302

MGA RESEARCH CORPORATION
5000 Warren Road
Burlington, WI 53105

Test Date: October 6, 2021

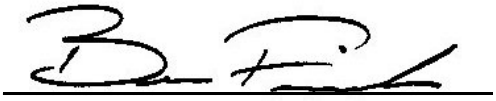
Final Report Date: December 1, 2021

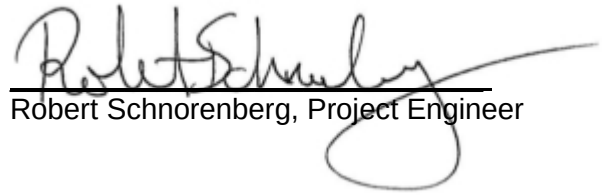
FINAL REPORT

U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Office of Crashworthiness Standards
Mail Code: NRM-100
1200 New Jersey Ave, SE
Room W43-410
Washington, DC 20590

This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof.

If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement.

Prepared by: 
Ben Fischer, Program Manager

Approved by: 
Robert Schnorenberg, Project Engineer

Approval Date: December 1, 2021

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

Date: _____

TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No. SideNCAPMDB-MGA-22-001	**2. Government Accession No.**	**3. Recipient's Catalog No.**
4. Title and Subtitle Final Report of New Car Assessment Program Side Impact MDB Testing of 2022 Acura MDX 5-Door SUV, NHTSA No.: O20225302		**5. Report Date** December 1, 2021 **6. Performing Organization Code** MGA
7. Author(s) Ben Fischer, Program Manager		**8. Performing Organization Report No.** SideNCAPMDB-MGA-22-001
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105		**10. Work Unit No.** **11. Contract or Grant No.** DTNH22-14-D-00353
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards (NRM-100) 1200 New Jersey Ave, SE, Room W43-410 Washington, D.C. 20590		**13. Type of Report and Period Covered:** Final Test Report October 6, 2021 to December 1, 2021 **14. Sponsoring Agency Code** NRM-100
15. Supplementary Notes		

16. Abstract

A 55/28 km/h 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2022 Acura MDX 5-Door SUV in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP MDB Test Procedure for the generation of consumer information on vehicle side crash protection. The test was conducted at the MGA Research Corporation facility in Burlington, Wisconsin on October 6, 2021.

The impact velocity of the Moving Deformable Barrier (MDB) was 61.99 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 21.7°C. The target vehicle post-test maximum crush was 271 mm at level 3. The test vehicle's performance was as follows:

Measurement Description	Units	Driver ATD (ES-2re)	
		Threshold	Result
Head Injury Criteria (HIC_{36})		1000	107
Maximum Thorax Rib Deflection	mm	44	15
Total Abdominal Force	N	2500	467
Pubic Symphysis Force	N	6000	1006
Resultant Lower Spine Acceleration	g	82*	15

Measurement Description	Units	Passenger ATD (SID-IIs)	
		Threshold	Result
Head Injury Criteria (HIC_{36})		1000	142
Resultant Lower Spine Acceleration	g	82	41
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	747
Maximum Thoracic Rib Deflection	mm	38*	8
Maximum Abdomen Rib Deflection	mm	45*	18

*Proposed IARV

The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite door(s) 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 1200 New Jersey Ave, SE Washington, DC 20590

19. Security Classification of Report Unclassified	**20. Security Classification of Page** Unclassified	**21. No. of Pages** 225	**22. Price**

TABLE OF CONTENTS

SECTION 1
PURPOSE AND SUMMARY OF TEST

PURPOSE

This moving deformable barrier side impact test is part of the MY 2022 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 2022 Acura MDX 5-Door SUV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Laboratory Test Procedure dated March 2020.

SUMMARY

A 2022 Acura MDX 5-Door SUV was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.99 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 October 6, 2021. 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 March 2020. 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
Head Triaxial Angular Rate Sensors
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

Measurement Description	Units	Driver ATD (ES-2re)	
		Threshold	Result
Head Injury Criteria (HIC_{36})		1000	107
Maximum Thorax Rib Deflection	mm	44	15
Total Abdominal Force	N	2500	467
Pubic Symphysis Force	N	6000	1006
Resultant Lower Spine Acceleration	g	82*	15

Measurement Description	Units	Passenger ATD (SID-IIs)	
		Threshold	Result
Head Injury Criteria (HIC_{36})		1000	142
Resultant Lower Spine Acceleration	g	82	41
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	747
Maximum Thoracic Rib Deflection	mm	38*	8
Maximum Abdomen Rib Deflection	mm	45*	18

*Proposed IARV

Supplemental restraint information is given below:

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

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

GENERAL COMMENTS

Vehicle rolled onto MDB cart face during the impact event. Photos No. 006 and No. 010 show the original post-test position. All other post-test photos were taken after test vehicle was removed from MDB cart face.

Low-level cyclical noise observed throughout many of the data signals.

SECTION 2
OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2022 Acura MDX 5-Door SUV NHTSA No.: O20225302
Test Program: NCAP Side MDB Impact Test Test Date: 10/6/2021

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	O20225302	Traction Control System (TCS)	Yes
Model Year	2022	Auto-Leveling System	No
Make	Acura	Automatic Door Locks (ADL)	Yes
Model	MDX	Power Window Auto-Reverse	Yes
Body Style	5-Door SUV	Other Optional Feature	No
VIN	5J8YD9H33NL006246	Driver Front Airbag	Yes
Body Color	Platinum White Pearl	Driver Curtain Airbag	Yes
Odometer Reading (km/mi)	10 km / 6 mi	Driver Head/Torso Airbag	No
Engine Displacement (L)	3.5 L	Driver Torso Airbag	No
Type/No. Cylinders	V6	Driver Torso/Pelvis Airbag	Yes
Engine Placement	Lateral	Driver Pelvis Airbag	No
Transmission Type	Automatic	Driver Knee Airbag	Yes
Transmission Speeds	10	Rear Pass. Curtain Airbag	Yes
Overdrive	Yes	Rear Pass. Head/Torso Airbag	No
Final Drive	FWD	Rear Pass. Torso Airbag	No
Roof Rack	No	Rear Pass. Torso/Pelvis Airbag	No
Sunroof/T-Top	Yes	Rear Pass. Pelvis Airbag	No
Running Boards	No	Driver Seat Belt Pretensioner	Yes
Tilt Steering Wheel	Yes	Rear Pass. Seat Belt Pretensioner	Yes
Power Seats	Yes	Driver Load Limiter	Yes
Anti-Lock Brakes (ABS)	Yes	Rear Pass. Load Limiter	Yes
		Other Safety Restraint	N/A

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

DATA FROM CERTIFICATION LABEL

Manufactured By	HONDA DEVELOPMENT & MANUFACTURING OF AMERICA, LLC
Date of Manufacture	08/21
Vehicle Type	MPV

GVWR (kg)	2540
GAWR Front (kg)	1325
GAWR Rear (kg)	1255

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3	2	7	
Capacity Weight (VCW) (kg)				532	(A)
DSC x 68.04 kg				476	(B)
Rated Cargo and Luggage Weight (RCLW) (kg)				56	(A-B)

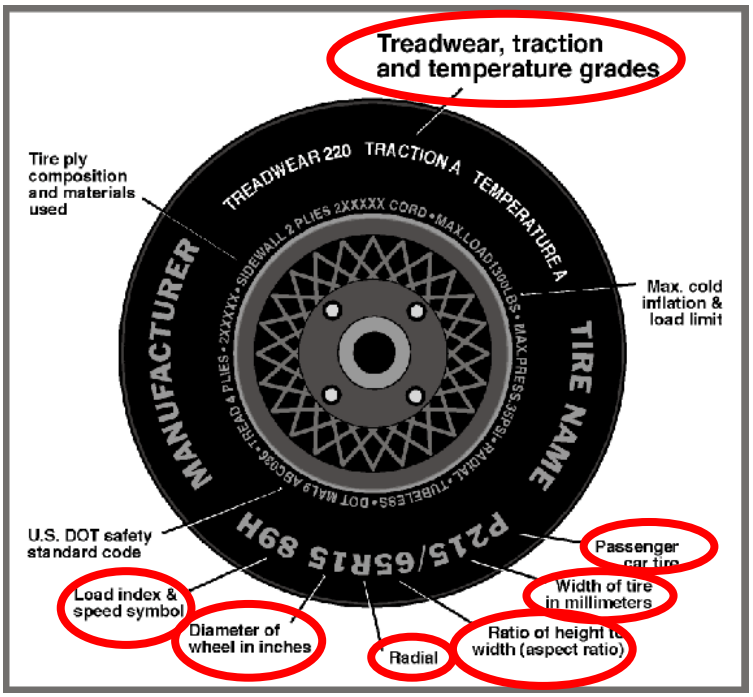
VEHICLE SEAT TYPE

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

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

Test Vehicle: 2022 Acura MDX 5-Door SUV
Test Program: NCAP Side MDB Impact Test
NHTSA No.: O20225302
Test Date: 10/6/2021

VEHICLE TIRE INFORMATION



Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	240	240
Recommended Tire Size	255/55R19	255/55R19
Tire Size on Vehicle	255/55R19	255/55R19
Tire Manufacturer	Bridgestone	Bridgestone
Tire Model	Alenza Sport	Alenza Sport
Treadwear	700	700
Traction	A	A
Temperature Grade	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	1 Polyester, 2 Steel, 1 Nylon	1 Polyester, 2 Steel, 1 Nylon
Load Index/Speed Symbol	107A	107A
Tire Material	Rubber	Rubber
DOT Safety Code Left	1W2 P6ALB1 1021	1W2 P6ALB1 1021
DOT Safety Code Right	1W2 P6ALB1 1021	1W2 P6ALB1 1021

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

Test Vehicle: 2022 Acura MDX 5-Door SUV NHTSA No.: O20225302
Test Program: NCAP Side MDB Impact Test Test Date: 10/6/2021

TEST VEHICLE TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	230	220	220	220
Tire Placard	kPa	240	240	240	240
Owner's Manual	kPa	240	240	240	240
As Tested	kPa	240	240	240	240

MDB TIRE SPECIFICATIONS

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

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	599.0	389.5		638.0	472.5		638.0	475.5	
Right	kg	545.0	403.5		548.5	456.5		543.0	465.5	
Ratio	%	59.1%	40.9%		56.1%	43.9%		55.7%	44.3%	
Totals	kg	1144.0	793.0	1937.0	1186.5	929.0	2115.5	1181.0	941.0	2122.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1937.0	(A)
Sum of Actual Weight of 2 P572 ATDs Used	kg	129	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	56	(C)
Calculated Test Vehicle Target Weight (TVTW)	kg	2122.0	(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	804	806	Yes
Right Front	mm	812	808	Yes
Right Rear	mm	800	810	Yes
Left Rear	mm	794	790	Yes
Vehicle CG (Aft of Front Axle)	mm	1282	1269	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	42	43	

* ND=Nose Down (-), NU=Nose Up (+) ** LD=Left Down (-), LU=Left Up (+)
*** 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: 2022 Acura MDX 5-Door SUV NHTSA No.: O20225302
Test Program: NCAP Side MDB Impact Test Test Date: 10/6/2021

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Units	Weight
Weight of Ballast Added	kg	12
Components Removed: none	kg	

TEST SURFACE MARKINGS

	Units	Distance from 63° Impact Angle Line
Fore 25 mm Target	mm	1000
Aft 25 mm Target	mm	1001
Pre-Impact Angle Line	mm	100

Parallel Track Target	Units	X Location	Y Location
A	mm	0	0
B	mm		
C	mm		
D	mm		

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

Test Vehicle: 2022 Acura MDX 5-Door SUV NHTSA No.: O20225302
Test Program: NCAP Side MDB Impact Test Test Date: 10/6/2021

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	25.9	13.9	19.9
Front Passenger Seat	25.5	13.3	19.4
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	Forward-Most
Driver Seat	19.9	0	Max	52	52	52
			Mid	26	26	26
			Min	0	0	0
Front Passenger Seat	19.4	0	Max	52	52	52
			Mid	26	26	26
			Min	0	0	0
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

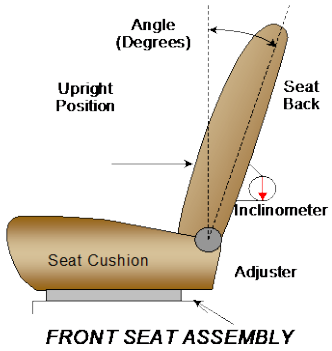
Test Vehicle: 2022 Acura MDX 5-Door SUV NHTSA No.: O20225302
Test Program: NCAP Side MDB Impact Test Test Date: 10/6/2021

SEAT FORE/AFT POSITIONS

Seat	Total Fore/Aft Travel		Test Position from Forward-Most Position	
	mm	Detents (1st as 1)	mm	Detent (1st as 0)
Driver Seat	240		120	
Front Passenger Seat	200		100	
Front Center Seat				
Struck Side Rear Seat	150	16	150	15
Non-Struck Side Rear Seat	150	16	150	15
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 center and front passenger's seat backs are positioned in a similar manner as the driver's seat back. The struck side rear seat back is positioned such that the dummy's head is level. The rear center and non-struck side rear outboard seat backs are positioned in a similar manner as the struck-side rear seat back.



Seat	Total Seat Back Angle Range		Test Position from Vertical	
	Degrees	Detents (1st as 1)	Degrees	Detent (1st as 0)
Driver Seat	68.7		3.5	
Front Passenger Seat	61.8		2.9	
Front Center Seat				
Struck Side Rear Seat	14.1	8	6.5	0
Non-Struck Side Rear Seat	14.0	8	6.5	0
Rear Center Seat	Fixed	Fixed	Fixed	Fixed

Seat back angles measured on outboard headrest post.

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

Test Vehicle: 2022 Acura MDX 5-Door SUV NHTSA No.: O20225302
Test Program: NCAP Side MDB Impact Test Test Date: 10/6/2021

SEAT BELT ANCHORAGE ADJUSTMENT

Seat belt anchorages are adjusted in accordance with the information provided by the manufacturer on S1 - Vehicle Setup Information.

	Total # of Positions	Placed in Position #
Driver Seat	4	0 (Uppermost as 0)
Rear Seat	Fixed	

HEAD RESTRAINT ADJUSTMENT

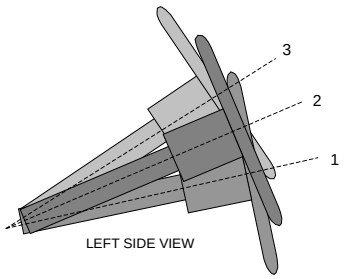
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

	Total # of Positions	Placed in Position #
Driver Seat	6	5 (Lowest as 0) / Forward
Rear Seat	2	0 (Lowest as 0) / Fixed Fore-Aft

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.

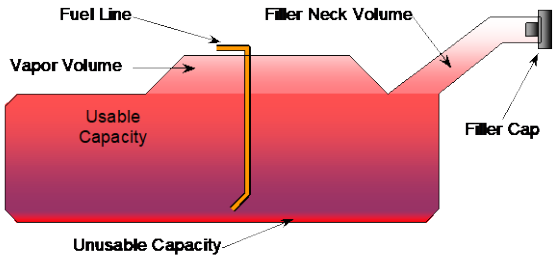
	Wheel Angle (°)	Fore/Aft Position (mm)
Lowermost, Position 1	70.7	
Geometric Center, Position 2	67.8	
Uppermost, Position 3	64.8	
Telescoping Steering Wheel Travel		58
Test Position	67.8	29



STEERING COLUMN ASSEMBLY

FUEL PUMP

The vehicle is equipped with an electronic fuel pump. With IG2 ignition position, the fuel pump will run for less than 5 seconds. With vehicle running, the fuel pump will continue to run. The filler neck is located on the driver's side.



VEHICLE FUEL TANK ASSEMBLY

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

Test Vehicle: 2022 Acura MDX 5-Door SUV NHTSA No.: O20225302
Test Program: NCAP Side MDB Impact Test Test Date: 10/6/2021

FUEL TANK CAPACITY DATA

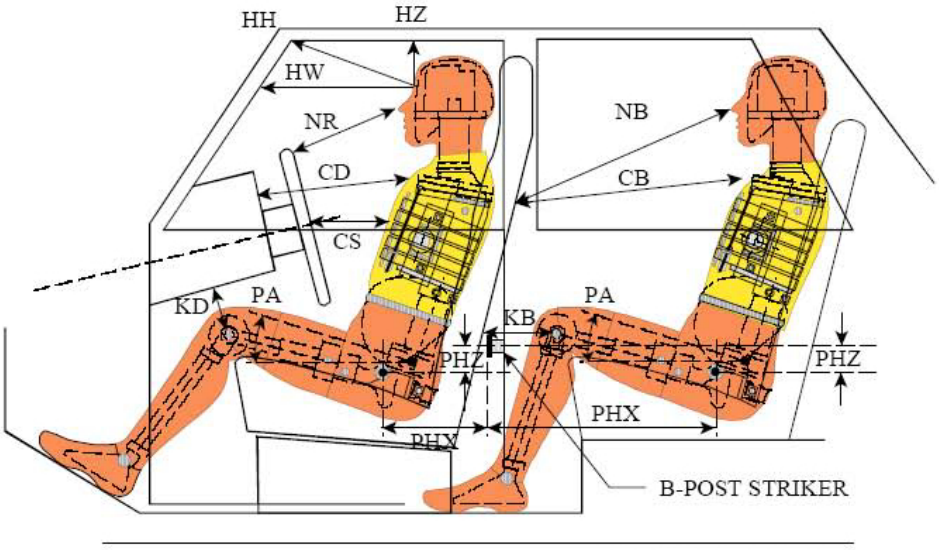
	Liters
Usable Capacity of Standard Tank (see S1 - Vehicle Setup Information)	70.0
Usable Capacity of Optional Tank (see S1 - Vehicle Setup Information)	
Usable Capacity of Standard Tank as Specified in Owner's Manual	70.0
Usable Capacity of Optional Tank as Specified in Owner's Manual	
93% of Usable Capacity	65.1
Actual Amount of Solvent Used	65.1
1/3 of Usable Capacity	23.3

Is the actual amount of solvent used in the test equal to 93% ± 1%
of the Usable Capacity stated in S1 - Vehicle Setup Information? **YES**

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2022 Acura MDX 5-Door SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20225302
Test Date: 10/6/2021



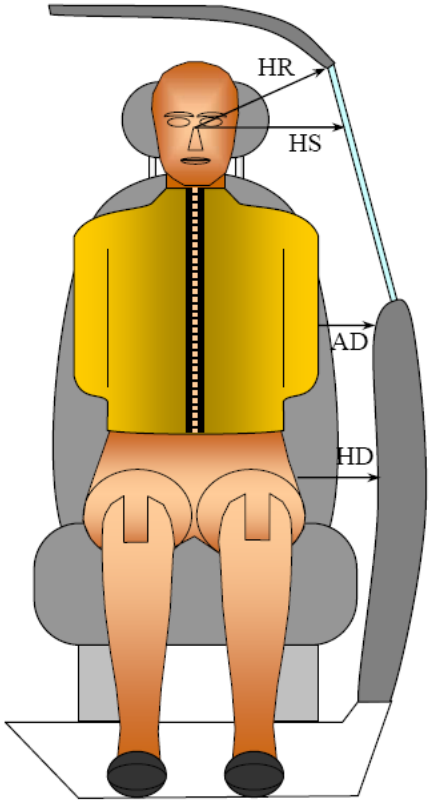
LEFT SIDE VIEW

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

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length (mm)	Angle (°)	Length (mm)	Angle (°)
HH		Head to Header	391	15.6		
HW		Head to Windshield	649	0		
HZ	HZ	Head to Roof Liner	167	90	298	90
NR	NB	Nose to Rim/Seat Back	446	12.5	496	15.0
CD	CB	Chest to Dashboard/Seat Back	579	19.9	509	1.1
CS		Chest to Steering Wheel	441	15.1		
KDL	KBL	Left Knee to Dash/Seat Back	190	24.4	290	6.5
KDR	KBR	Right Knee to Dash/Seat Back	178	25.1	294	6.5
PAX	PAX	Pelvic Tilt Angle X		24.2		21.4
PAY	PAY	Pelvic Tilt Angle Y		1.5		-1.4
PHX	PHX	Hip Point to Striker (X-Axis)	174		292	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	215		226	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

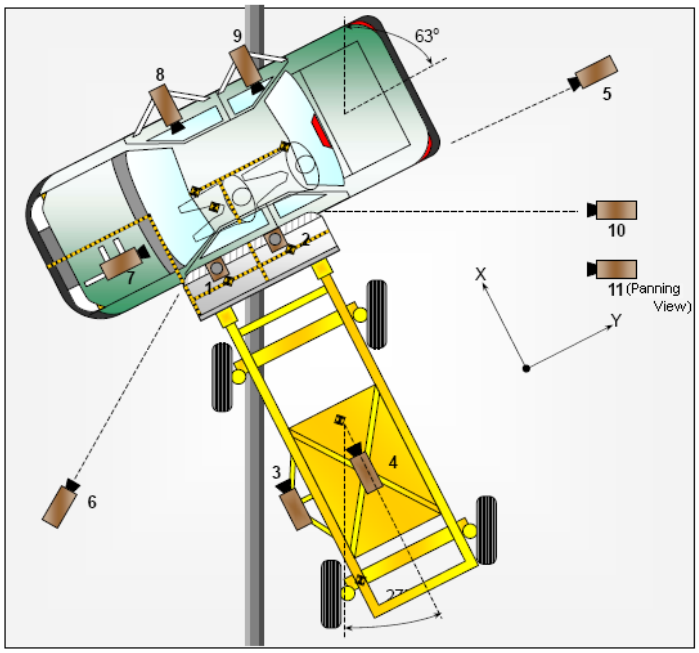
Test Vehicle: 2022 Acura MDX 5-Door SUV
Test Program: NCAP Side MDB Impact Test
NHTSA No.: O20225302
Test Date: 10/6/2021



Code	Measurement Description	Driver	Passenger
		Length (mm)	
HR	Head to Side Header	219	271
HS	Head to Side Window	342	393
AD	Arm to Door	115	180
HD	Hip Point to Door	165	163

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2022 Acura MDX 5-Door SUV NHTSA No.: O20225302
Test Program: NCAP Side MDB Impact Test Test Date: 10/6/2021



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates* (mm)			Lens (mm)	Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	900	365	-4995	8.5	1000
2	Overhead Close-Up	330	0	-4895	20	1000
3	Left Impact Point (MDB)				50	1000
4	Side Overall (MDB)				16	1000
5	Rear	25	6790	-1525	24	1000
6	Left Front	-1770	-6830	-1585	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

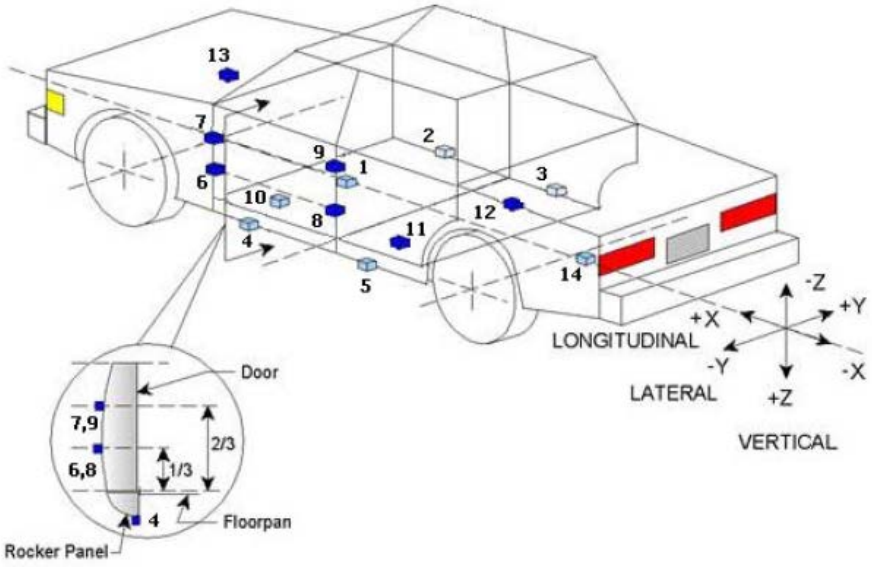
Reference: Impact Point projected to Ground; +X = To Front of MDB, + Y = To Right of MDB, +Z = Down
*All measurements accurate to ±6 mm

INSTRUMENTATION

	Number of Channels
Driver Dummy	16
Passenger Dummy	19
Vehicle Structure	23
MDB Accelerometers	5
Total	63

DATA SHEET NO. 6
TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2022 Acura MDX 5-Door SUV
Test Program: NCAP Side MDB Impact Test
NHTSA No.: O20225302
Test Date: 10/6/2021



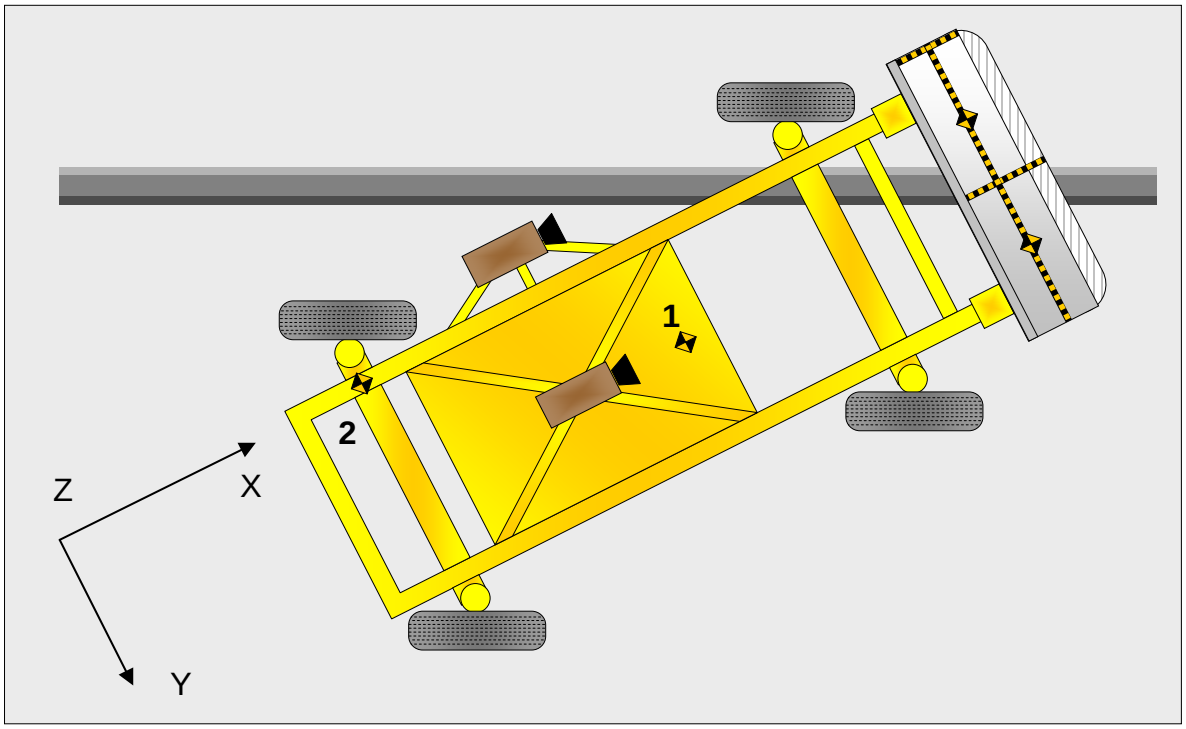
TEST VEHICLE ACCELEROMETER LOCATIONS

No.	ID	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2712	65	-375
2	Right Sill at Front Seat	2889	794	-288
3	Right Sill at Rear Seat	1932	794	-289
4	Left Sill at Front Door	2888	-798	-288
5	Left Sill at Rear Door	1834	-798	-291
6	Left Lower A-Post	3407	-908	-645
7	Left Middle A-Post	3407	-908	-915
8	Left Lower B-Post	2338	-768	-661
9	Left Middle B-Post	2338	-768	-858
10	Front Seat Track	2431	-407	-449
11	Rear Seat Structure	2049	-392	-452
12	Rt. Rear Occ. Compartment	2049	430	-453
13	Engine Block	4254	40	-1033
14	Rear Above Axle	1158	38	-469

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: 2022 Acura MDX 5-Door SUV
Test Program: NCAP Side MDB Impact Test
NHTSA No.: O20225302
Test Date: 10/6/2021



MDB ACCELEROMETER LOCATIONS

No.	Accelerometer Location	Coordinates (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)

Width between left and right MDB contact switches	mm	1401

DATA SHEET NO. 8
POST-TEST OBSERVATIONS

Test Vehicle: 2022 Acura MDX 5-Door SUV NHTSA No.: O20225302
Test Program: NCAP Side MDB Impact Test Test Date: 10/6/2021

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Front Seat Dummy (ES-2re)	Rear Seat Dummy (SID-IIs)
Face	None	Curtain Airbag
Top of Head	Headliner	Curtain Airbag
Left Side of Head	Curtain Airbag, Headliner	Curtain Airbag
Back of Head	Headrest	Curtain Airbag, Headrest
Left Shoulder	None	Door Panel
Upper Torso	Side Torso/Pelvis Airbag, Seatback, Curtain Airbag	None
Lower Torso	Side Torso/Pelvis Airbag, Seatback, Curtain Airbag	Door Panel
Left Hip	Side Torso/Pelvis Airbag, Seat Cushion	Seat Cushion, Door Panel
Left Knee	Door Panel	Door Panel

POST-TEST DOOR PERFORMANCE

Description	Struck Side		Non-Struck Side		Rear Hatch
	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)					

POST-TEST SEAT PERFORMANCE

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

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No Separation
Sill Separation	None
Windshield Damage	None
Side Window Damage	LF window cracked
Other Notable Effects	Test vehicle rolled onto MDB cart face during the impact event

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

Test Vehicle: 2022 Acura MDX 5-Door SUV NHTSA No.: O20225302
Test Program: NCAP Side MDB Impact Test Test Date: 10/6/2021

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Driver		Struck Side Left 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	
Side Airbag (Other)				
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes		Yes	
Other:	No		No	

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheelbase	mm		2890
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		505
Actual Impact Point (Aft of Front Axle)	mm		508
Horizontal Offset (+forward / -rearward)	mm	+/- 50 of intended impact point	-3
Vertical Offset (+down / -up)	mm	+/- 20 of intended impact point	0

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2022 Acura MDX 5-Door SUV
Test Program: NCAP Side MDB Impact Test
NHTSA No.: O20225302
Test Date: 10/6/2021

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1250
Overall Length Including Honeycomb Face	4119
Wheelbase of Framework Carriage	2591
CG Location aft of Front Axle	1127

MDB WEIGHTS

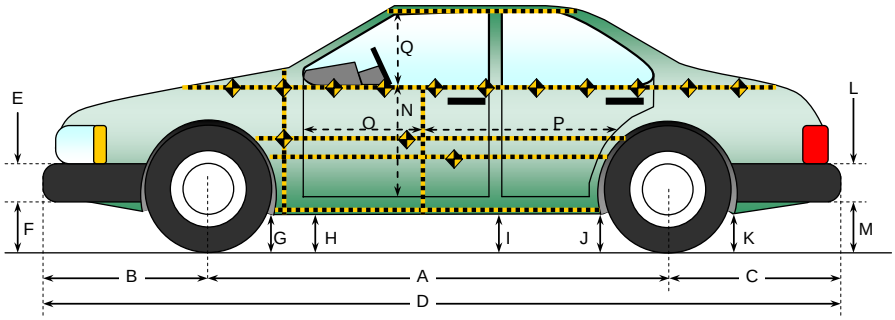
	Units	Front Axle	Rear Axle	Total
Left	kg	368.2	320.6	
Right	kg	400.7	271.4	
Ratio	%	56.5	43.5	
Totals	kg	768.9	592.0	1360.9

SPEED AND ANGLE AT IMPACT DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	61.99
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.77
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	89.6
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	26.4

DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2022 Acura MDX 5-Door SUV
Test Program: NCAP Side MDB Impact Test
NHTSA No.: O20225302
Test Date: 10/6/2021



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

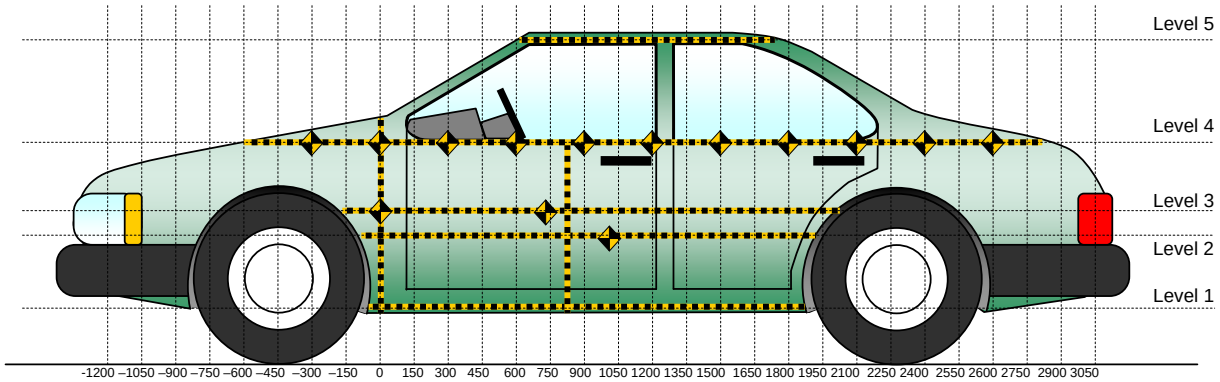
LEFT SIDE VIEW

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2890	2903	-13
B	Front Axle to FSOV	1007	994	13
C	Rear Axle to RSOV	1097	1100	-3
D	Total Length at Centerline	4994	4997	-3
E	Front Bumper Thickness	114	114	0
F	Front Bumper Bottom to Ground	268	275	-7
G	Sill Height at Front Wheel Well	263	263	0
H	Sill Height at Front Door Leading Edge	253	253	0
I	Sill Height at B Pillar	264	268	-4
J1	Sill Height at Rear Wheel Well	253	275	-22
J2	Pinch Weld Height at Rear Wheel Well	269	256	13
K	Sill Height Aft of Rear Wheel Well	284	292	-8
L	Rear Bumper Thickness	81	81	0
M	Rear Bumper Bottom to Ground	356	364	-8
N	Sill Height to Window Bottom Sill	837	825	12
O	Front Door Leading Edge to Impact CL	823	783	40
P	Rear Door Trailing Edge to Impact CL	1282	1204	78
Q	Front Window Opening	424	483	-59
R	Right Side Length	4127	4130	-3
S	Left Side Length	4127	4122	5
T	Vehicle Width at B Post	2008	1987	21
U	Front Wheel Track Width	1714		
V	Rear Wheel Track Width	1724		

DATA SHEET NO. 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2022 Acura MDX 5-Door SUV
Test Program: NCAP Side MDB Impact Test
NHTSA No.: O20225302
Test Date: 10/6/2021



All Measurements Shown in mm

LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEAUREMENTS

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	386	150	300
2	Occupant H-Point	714	268	1500
3	Mid Door	762	271	1500
4	Window Sill	1087	70	-150
5	Window Top	1610	40	750

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: 2022 Acura MDX 5-Door SUV NHTSA No.: O20225302
Test Program: NCAP Side MDB Impact Test Test Date: 10/6/2021

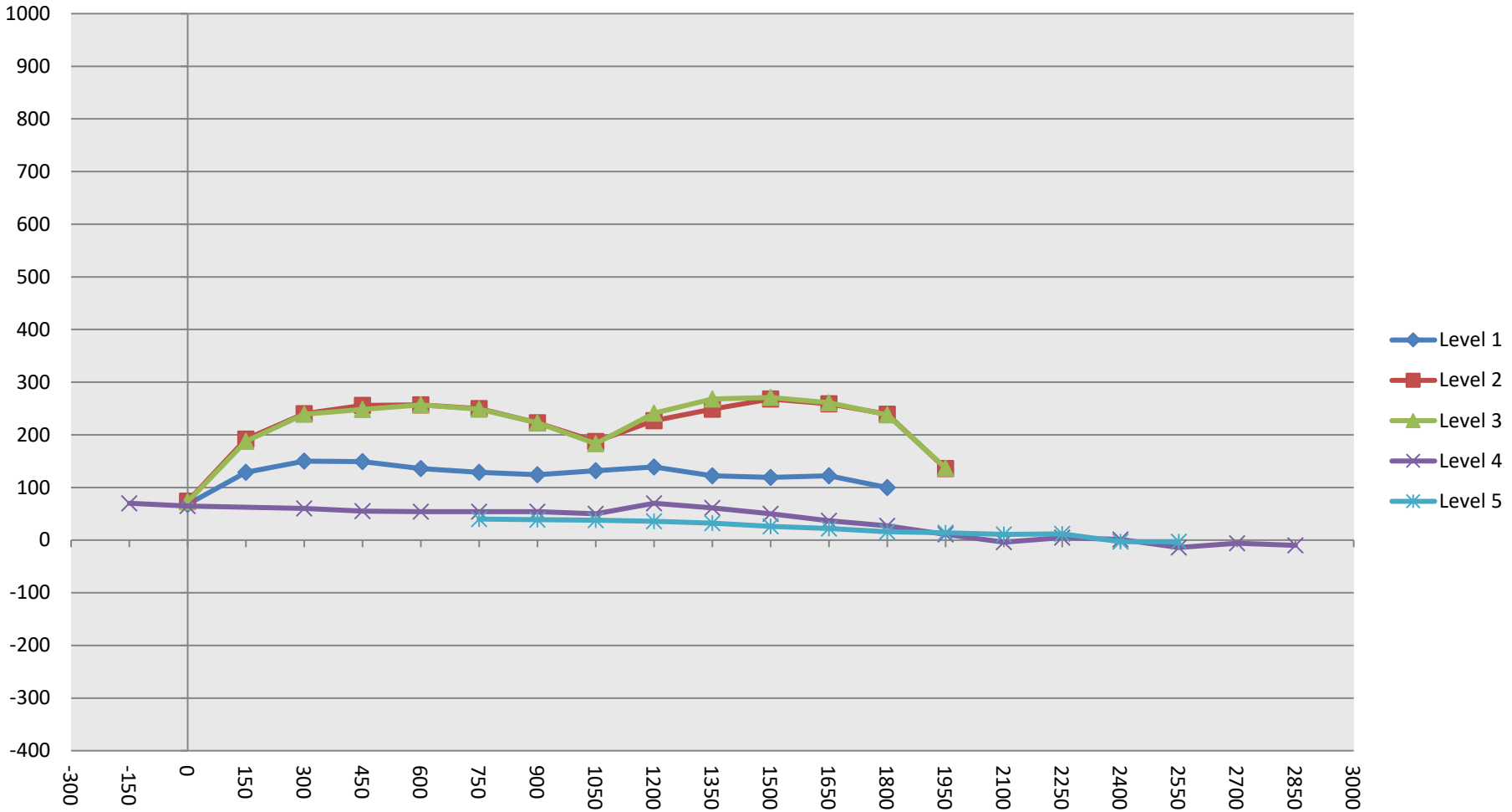
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-2100															
-1950															
-1800															
-1650															
-1500															
-1350															
-1200															
-1050															
-900															
-750															
-600															
-450															
-300															
-150				258					328					70	
0	172	145	145	252		240	219	218	317		68	74	73	65	
150	174	155	155			303	347	343			129	192	188		
300	179	164	165	238		329	404	404	298		150	240	239	60	
450	181	172	174	235		330	428	422	290		149	256	248	55	
600	188	180	180	230		324	437	437	284		136	257	257	54	
750	191	185	185	226	497	320	435	434	280	537	129	250	249	54	40
900	196	190	189	221	478	320	413	412	275	517	124	223	223	54	39
1050	199	193	191	222	474	331	380	374	272	512	132	187	183	50	38
1200	201	195	194	223	477	340	422	435	293	513	139	227	241	70	36
1350	209	196	195	225	480	331	445	463	286	512	122	249	268	61	32
1500	214	194	193	227	485	333	462	464	277	511	119	268	271	50	26
1650	212	192	191	234	490	334	451	452	271	512	122	259	261	37	22
1800	210	190	190	239	499	310	429	428	266	515	100	239	238	27	16
1950		188	188	249	505		324	325	260	519		136	137	11	14
2100				259	518				255	529				-4	11
2250				268	545				273	557				5	12
2400				278	574				279	571				1	-3
2550				294	610				280	607				-14	-3
2700				303					297					-6	
2850				321					311					-10	
3000															
3150															
3300															
3450															
3600															
3750															
3900															

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

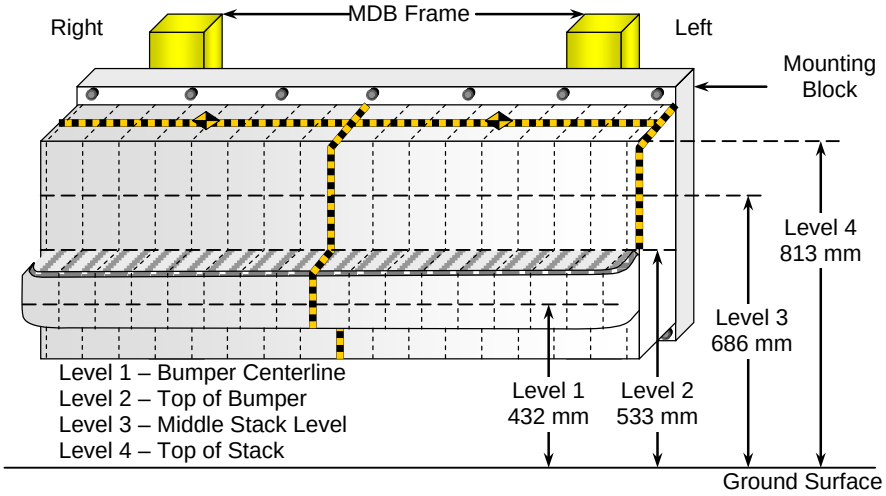
Test Vehicle: 2022 Acura MDX 5-Door SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20225302
Test Date: 10/6/2021



DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2022 Acura MDX 5-Door SUV NHTSA No.: O20225302
Test Program: NCAP Side MDB Impact Test Test Date: 10/6/2021



FRONT VIEW

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

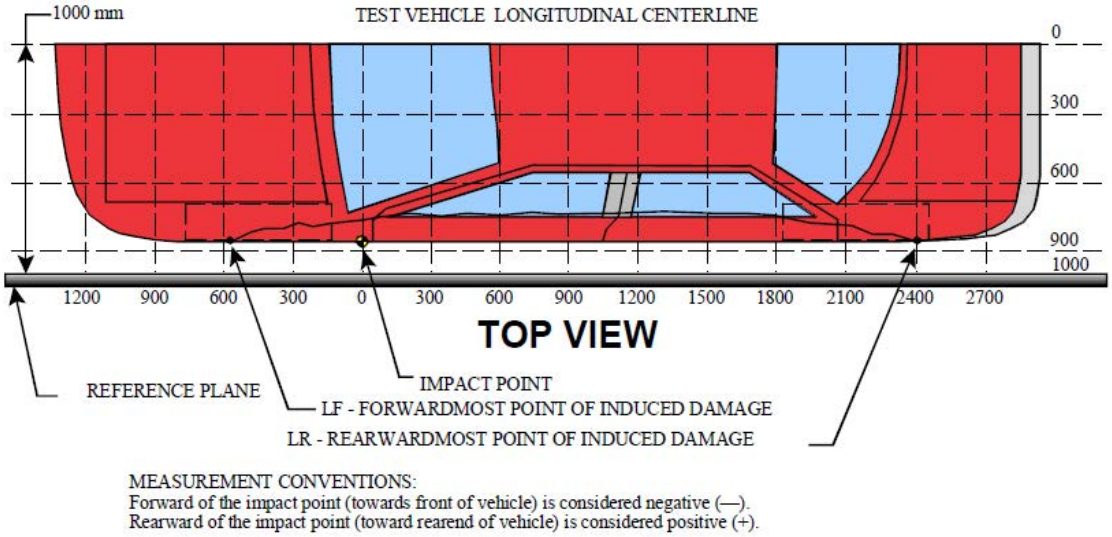
Vertical Location			From Centerline		Maximum Crush (mm)
Row	Description	Height (mm)	Distance (mm)	Direction	
A	Center of Bumper	432	700	Right	248
B	Top of Bumper	533	800	Right	153
C	Mid-Level	686	800	Left	135
D	Top of Stack	813	800	Left	144

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	75	63	48	36	36	45	66	95	118	87	76	71	71	74	84	102	144
3	71	57	46	44	53	52	72	93	85	68	48	41	44	51	64	85	135
2	153	142	126	129	121	124	122	120	118	119	133	136	135	135	134	137	144
1	240	248	230	221	221	227	232	225	220	219	219	219	219	218	220	224	224

DATA SHEET NO. 13
VEHICLE AND MDB DAMAGE PROFILE DISTANCES

Test Vehicle: 2022 Acura MDX 5-Door SUV
Test Program: NCAP Side MDB Impact Test
NHTSA No.: O20225302
Test Date: 10/6/2021



MEASUREMENT CONVENTIONS:
Forward of the impact point (towards front of vehicle) is considered negative (—).
Rearward of the impact point (toward rearend of vehicle) is considered positive (+).

VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance from Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Max. Static Crush (mm)
1	2130	3	89	205	-116
2	1707	3	342	191	151
3	1284	3	352	195	157
4	861	3	320	188	132
5	438	3	326	173	153
6	15	3	156	146	10

MDB DAMAGE PROFILE DISTANCES

DPD	Distance from Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Max. Static Crush (mm)
1	800 mm right of center	1	716	476	240
2	480 mm right of center	1	696	463	233
3	160 mm right of center	1	685	463	222
4	160 mm left of center	1	680	463	217
5	480 mm left of center	1	685	463	222
6	800 mm left of center	1	700	476	224

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

Test Vehicle: 2022 Acura MDX 5-Door SUV
Test Program: NCAP Side MDB Impact Test
NHTSA No.: O20225302
Test Date: 10/6/2021

Test Time: 12:20 pm
Temperature: 21.7°C

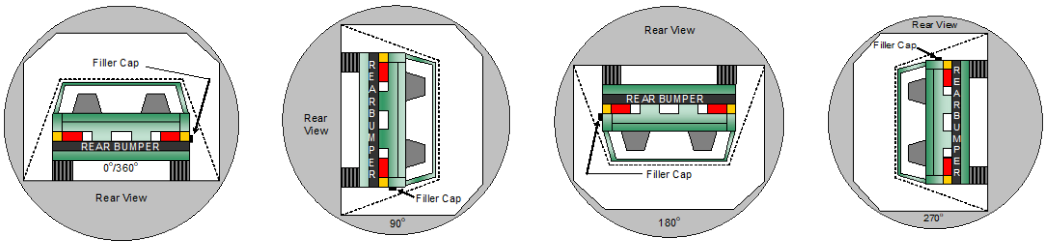
A. From impact until vehicle motion ceases: (Maximum Allowable = 1 ounce) 0.0 oz.

B. For the 5 minute period after motion ceases: (Maximum Allowable = 5 ounces) 0.0 oz.

C. For the following 25 minutes: (Maximum Allowable = 1 ounce / minute) None

D. Spillage Details: None

FMVSS 301 STATIC ROLLOVER DATA



0°/360° 90° 180° 270°

ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	113	300	413
90° to 180°	111	300	411
180° to 270°	108	300	408
270° to 360°	112	300	412

FMVSS 301 ROLLOVER SPILLAGE TABLE (UNITS IN OUNCES)

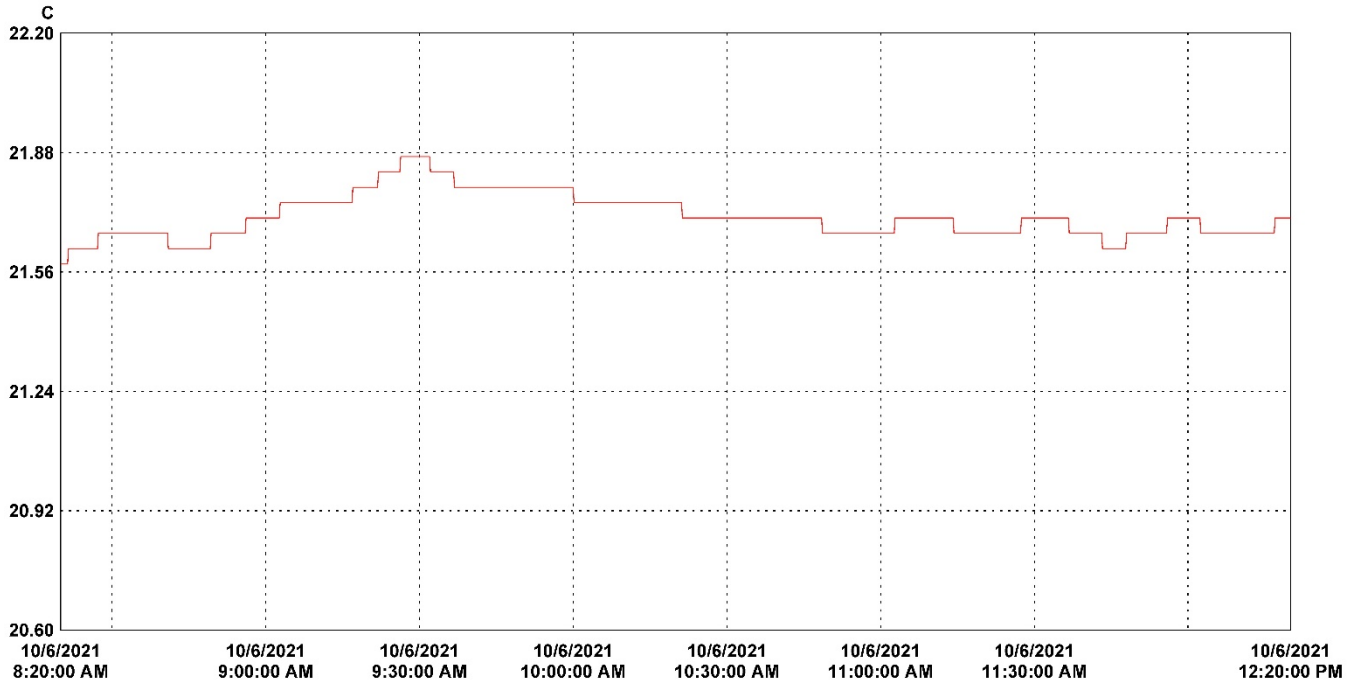
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° to 90°	0.0	0.0	0.0	
90° to 180°	0.0	0.0	0.0	
180° to 270°	0.0	0.0	0.0	
270° to 360°	0.0	0.0	0.0	

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 AND HUMIDITY STABILIZATION DATA

Test Vehicle: 2022 Acura MDX 5-Door SUV NHTSA No.: O20225302
Test Program: NCAP Side MDB Impact Test Test Date: 10/6/2021



LN	Serial #	Description	CH	Value	Maximum	Average	Minimum	Units	CH description	Logger file
1	18352047	VSC_North_Hall	1		21.87	21.71	21.58	C	Temperature	18352047_VSC_North_Hall.spl

APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

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

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

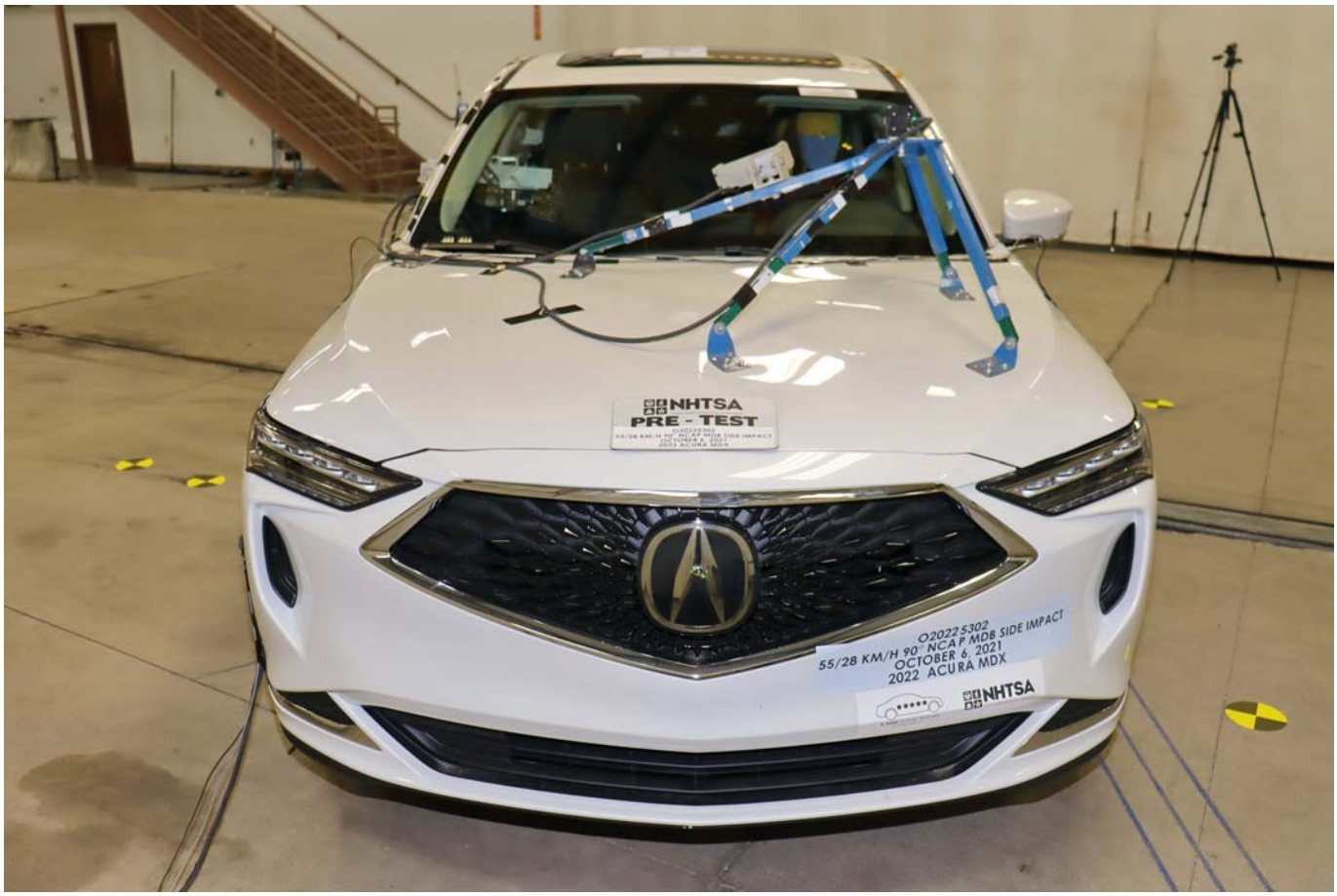


Photo No. 003 - Pre-Test Frontal View of Test Vehicle

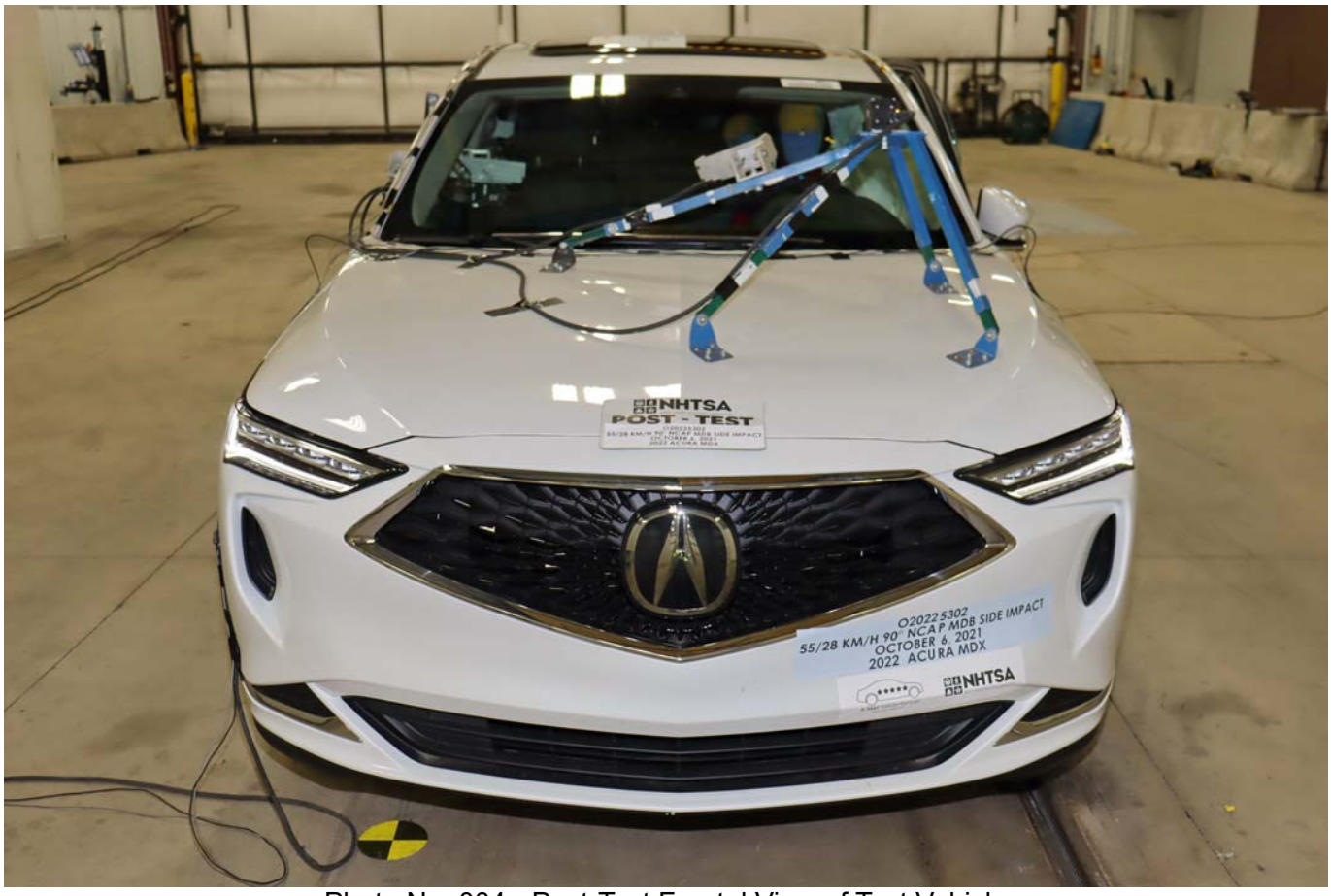


Photo No. 004 - Post-Test Frontal View of Test Vehicle

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

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

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

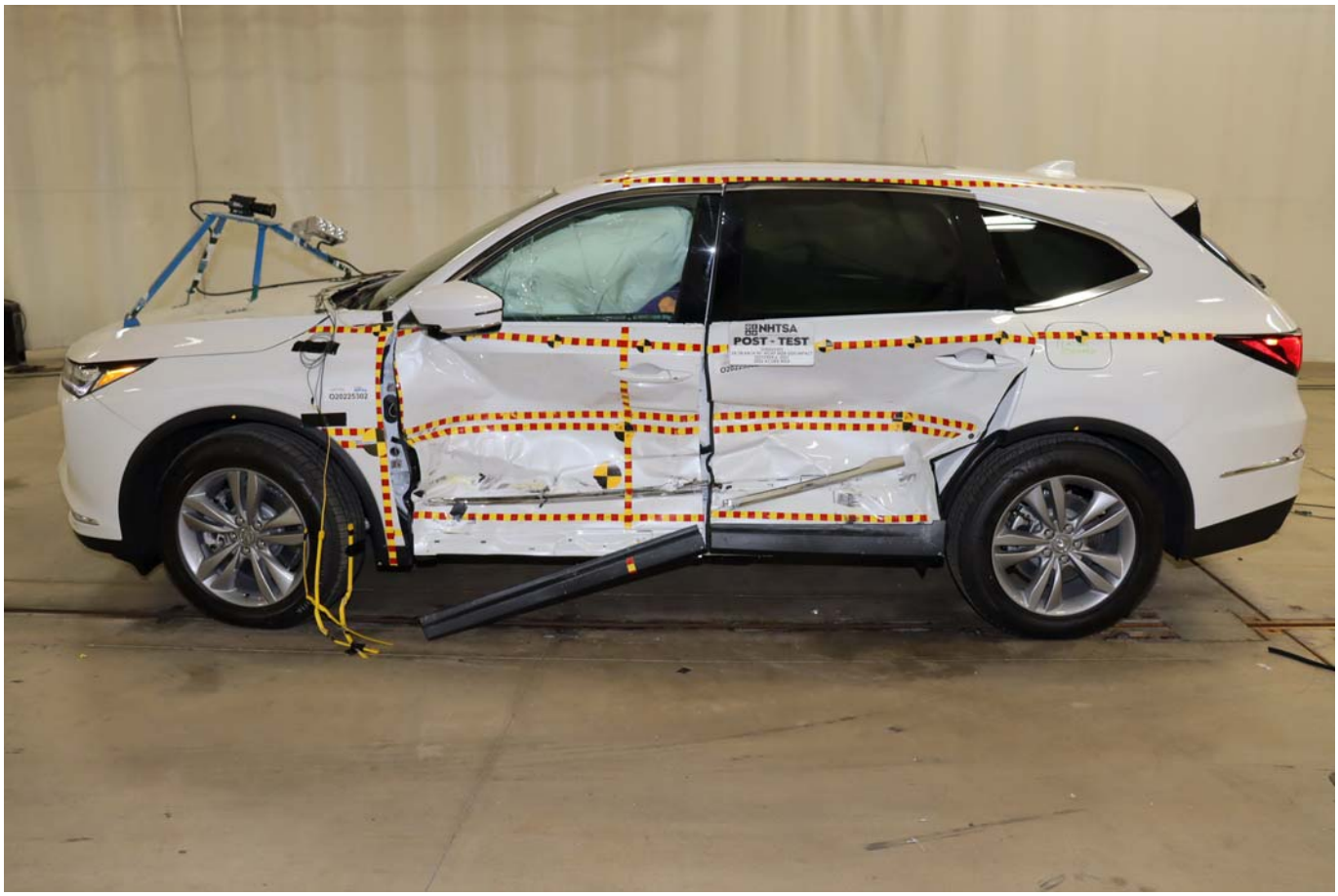


Photo No. 008 - Post-Test Left Side View of Test Vehicle

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

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

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

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

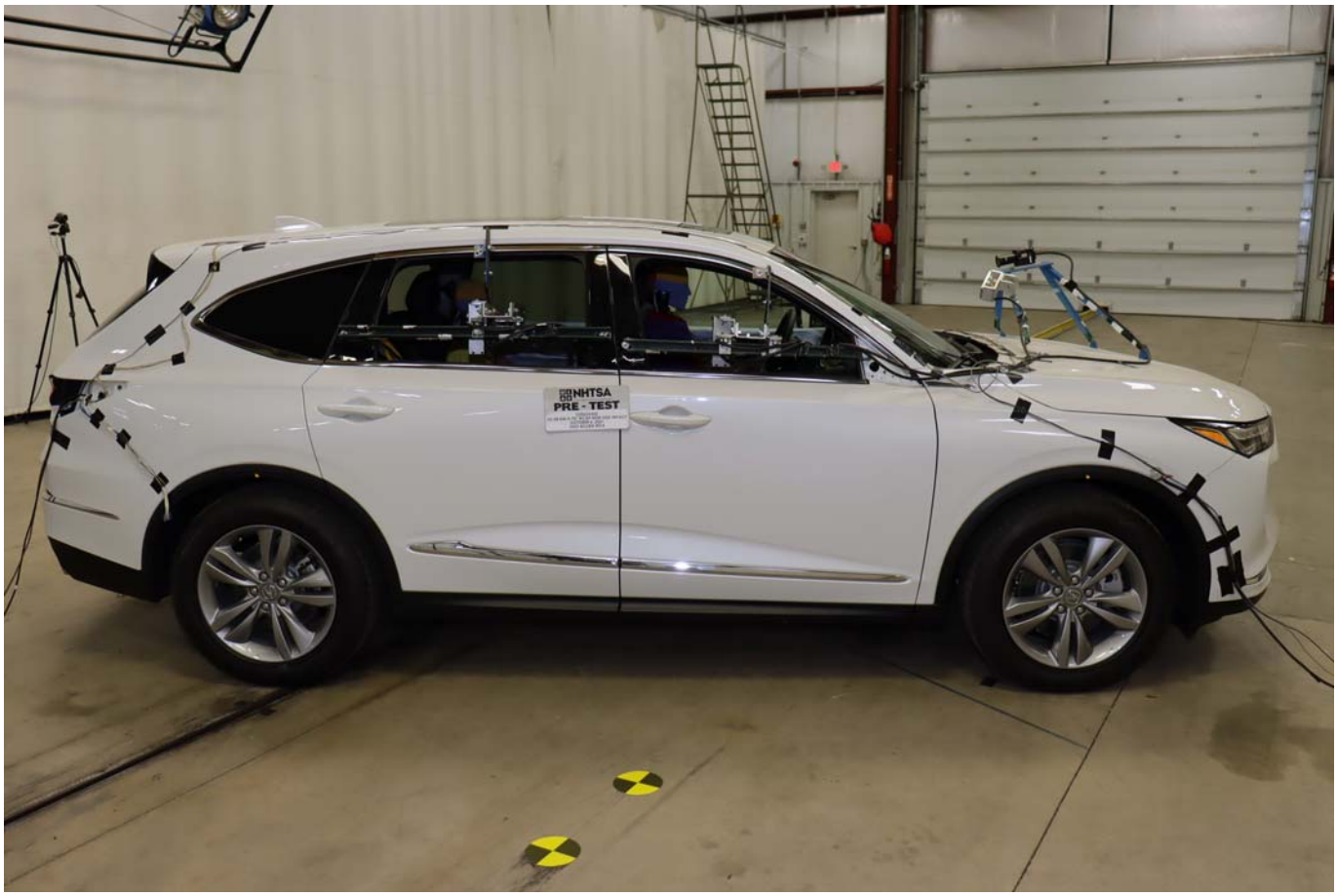


Photo No. 013 - Pre-Test Right Side View of Test Vehicle

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

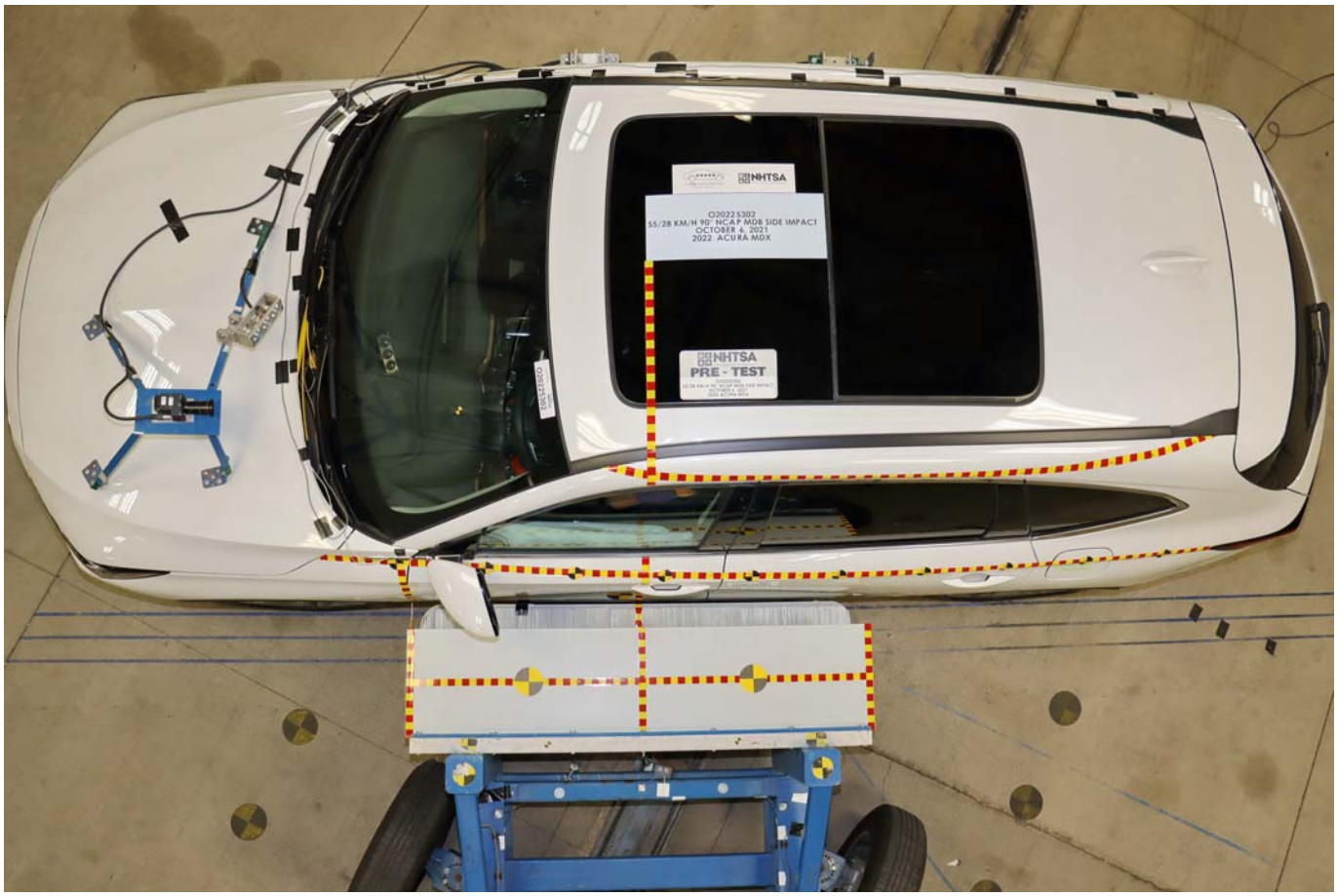


Photo No. 015 - Pre-Test Overhead View of Test Area

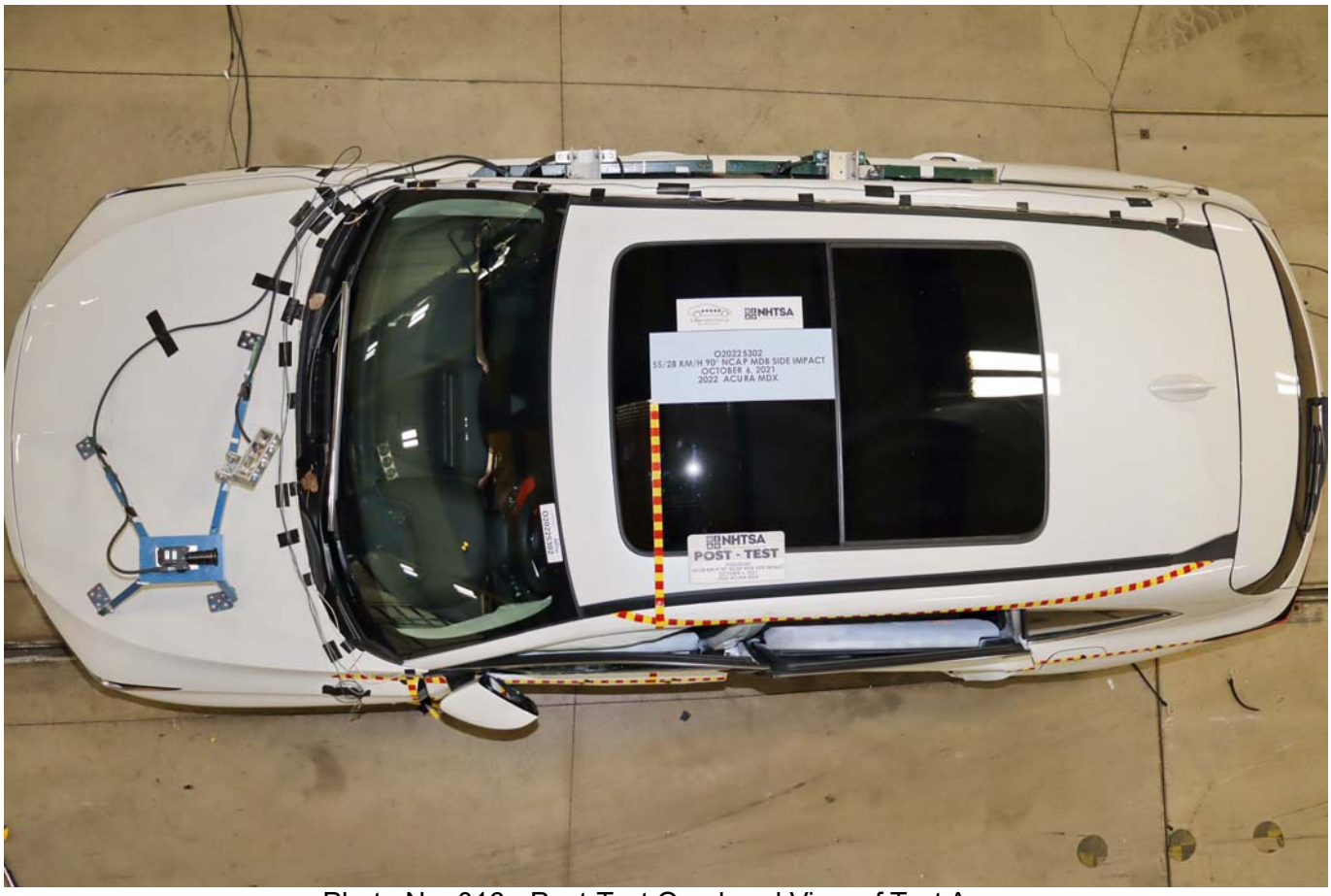


Photo No. 016 - Post-Test Overhead View of Test Area

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

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

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

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

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

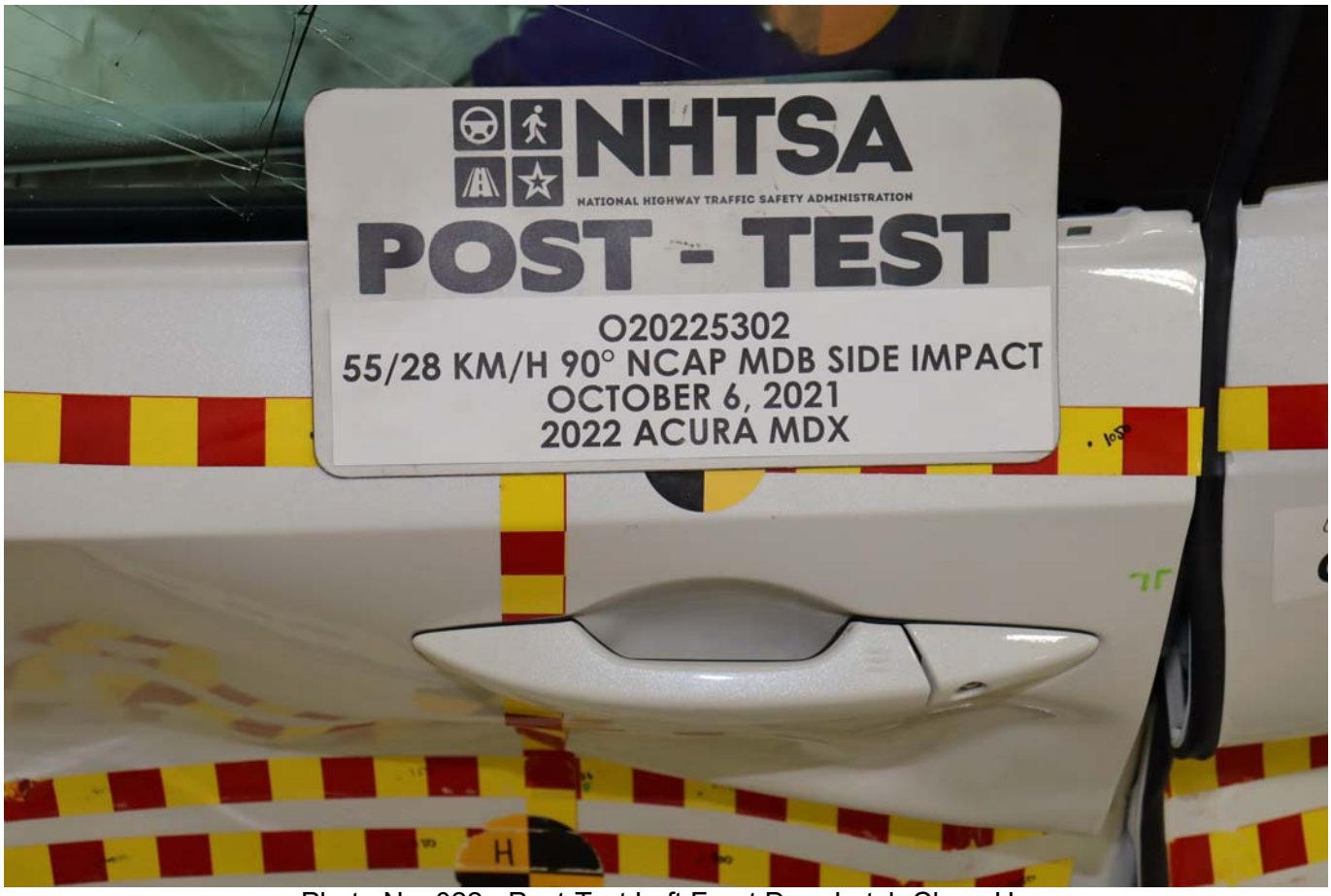


Photo No. 022 - Post-Test Left Front Door Latch Close-Up

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

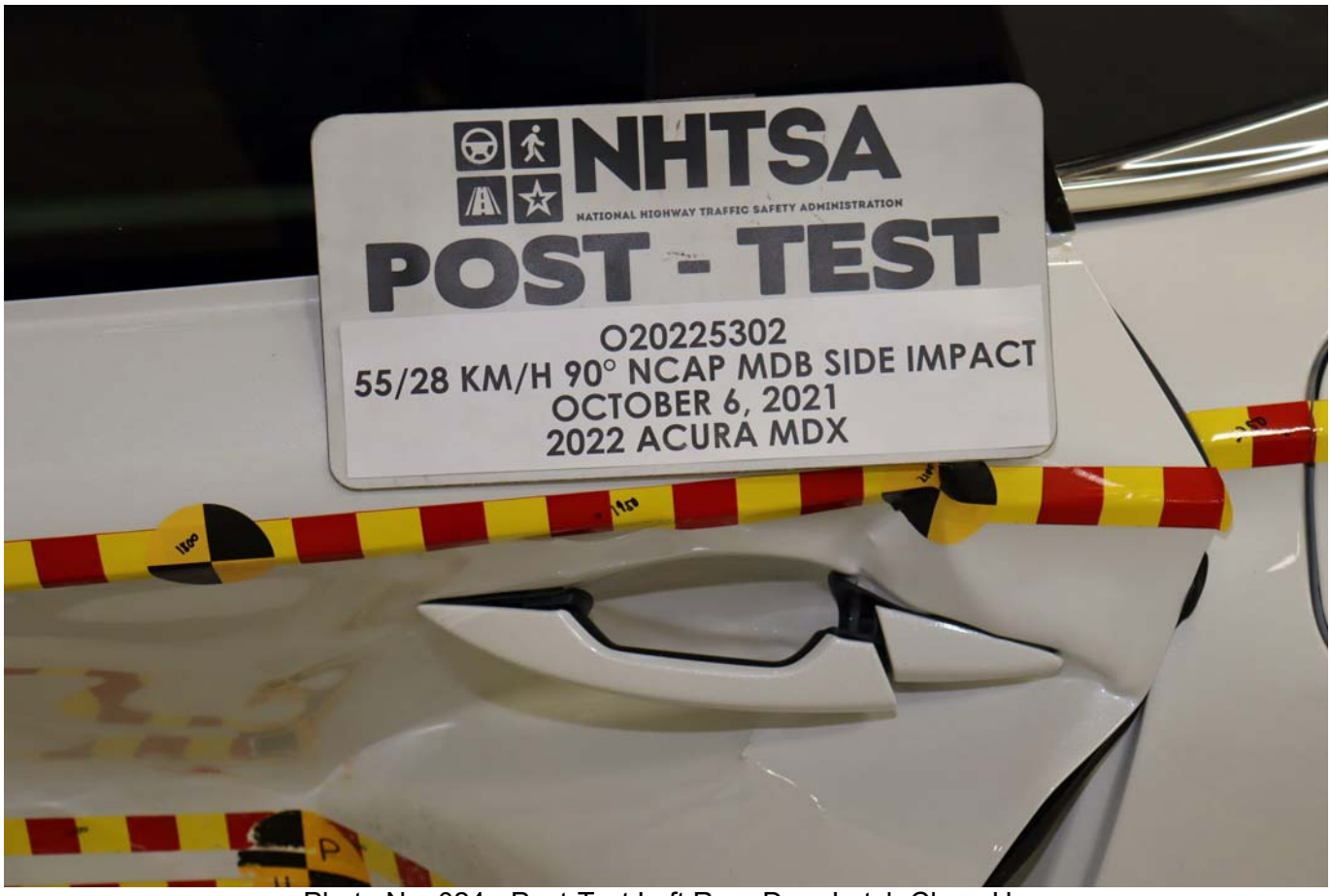


Photo No. 024 - Post-Test Left Rear Door Latch Close-Up

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

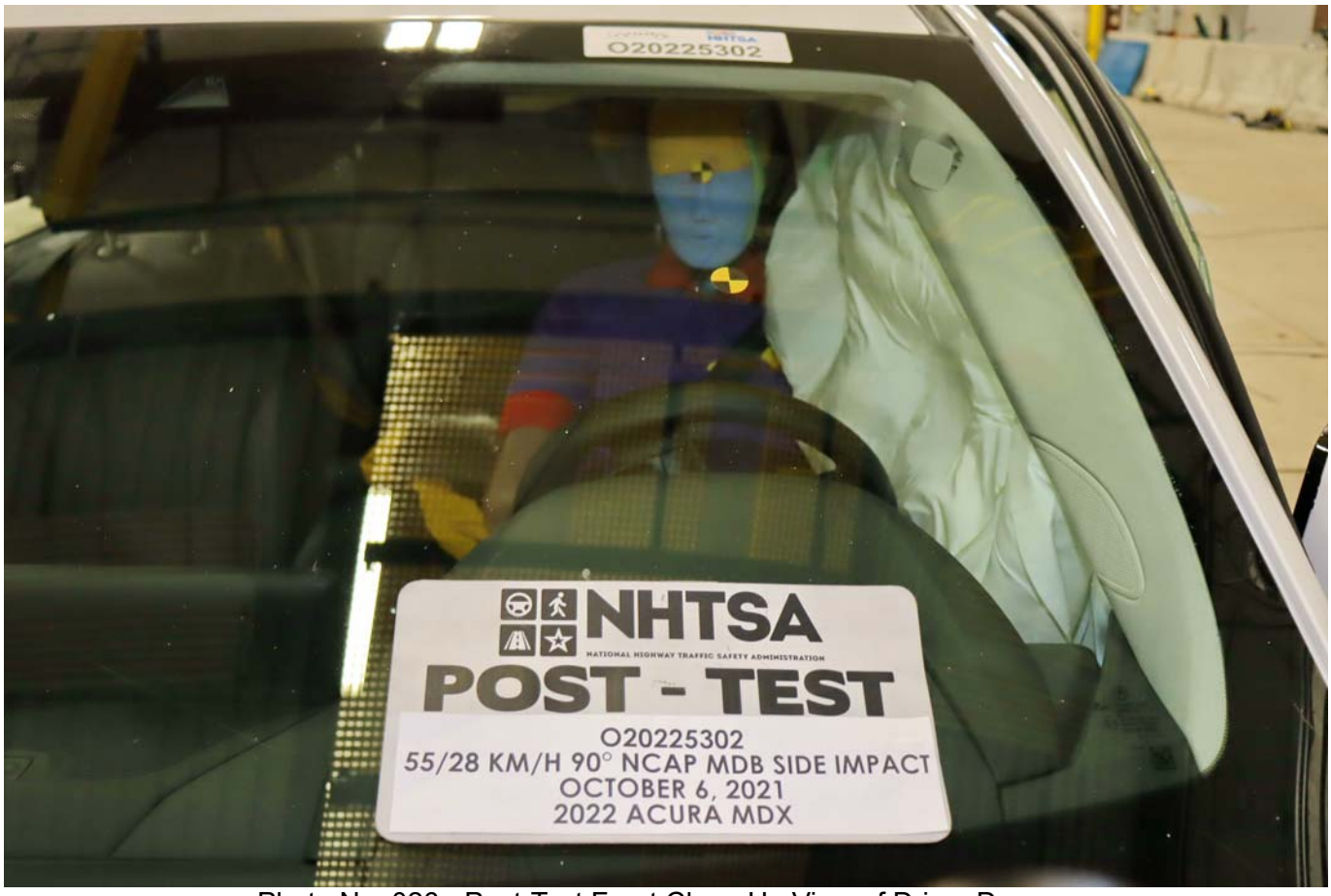


Photo No. 026 - Post-Test Front Close-Up View of Driver Dummy

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

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

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

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

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

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

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

Photo No. 034 - Pre-Test Placement of Driver Dummy Feet

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

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

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

Photo No. 038 - Pre-Test View of Parking Brake

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

PHOTOGRAPH NOT AVAILABLE

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

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

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

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

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

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

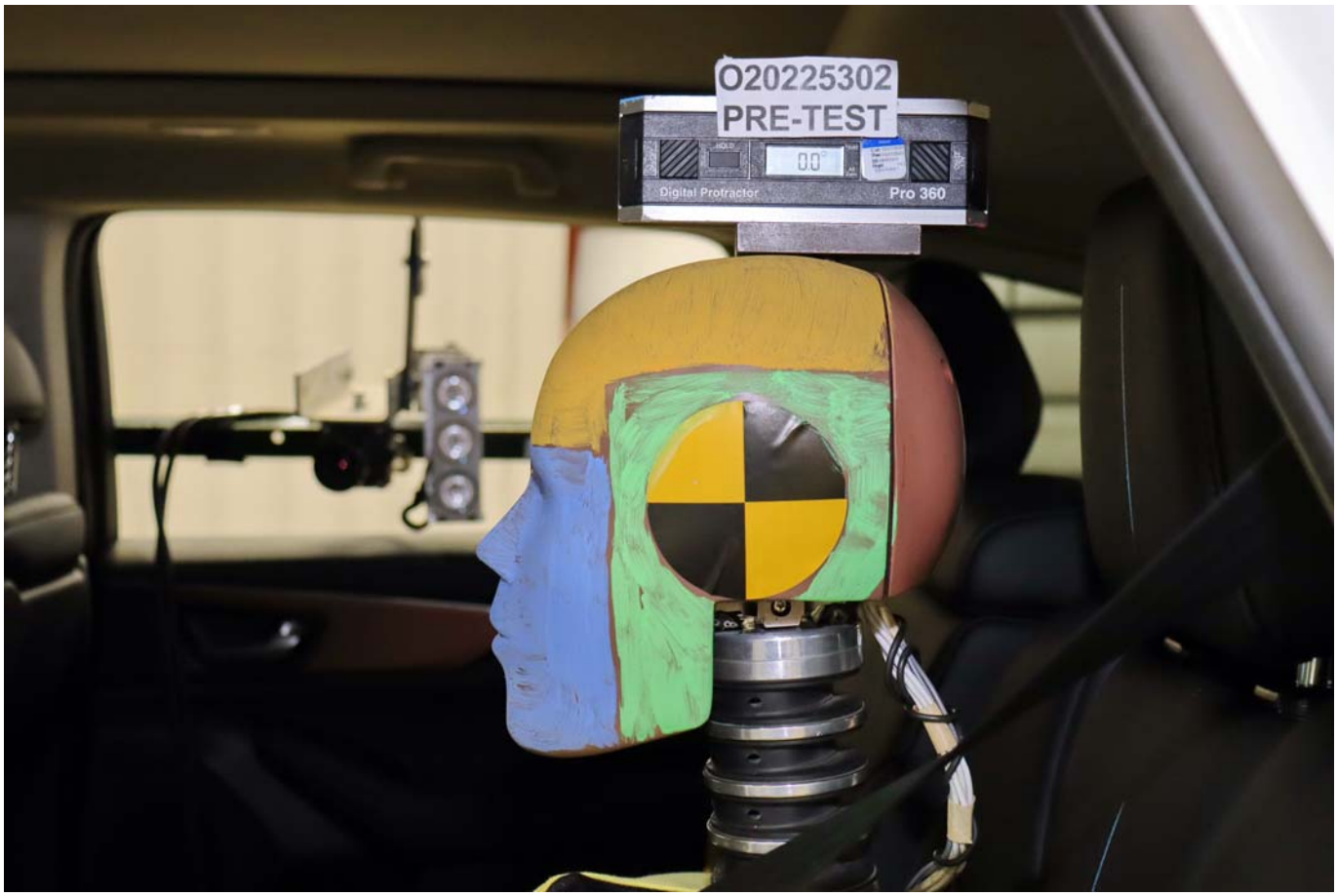


Photo No. 063 - Pre-Test View of Rear Passenger Dummy Head Showing Dummy Head is Level

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

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

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

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

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

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

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

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

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

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

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

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

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

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

PHOTOGRAPH NOT APPLICABLE

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

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

PHOTOGRAPH NOT APPLICABLE

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

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

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

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

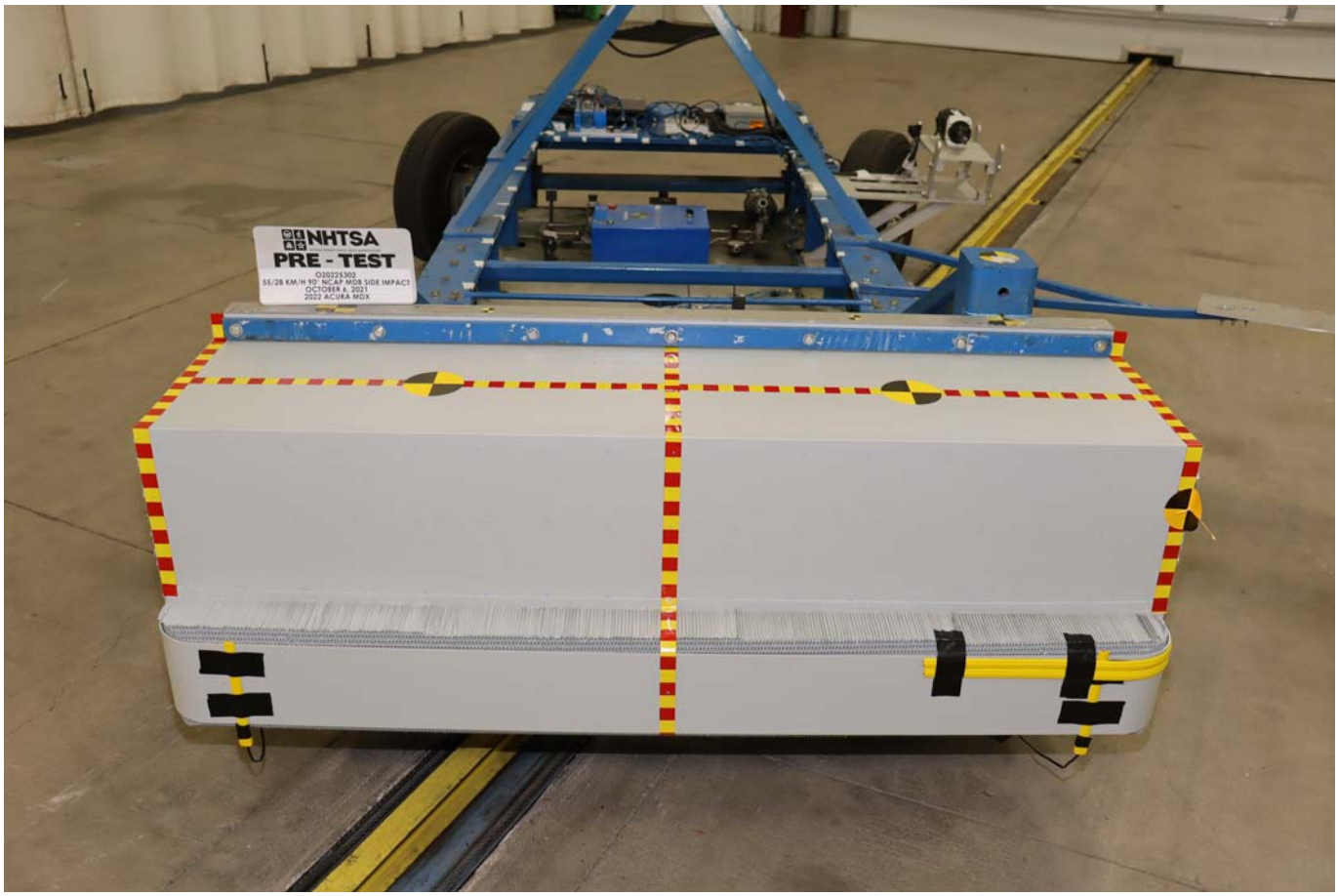


Photo No. 084 - Pre-Test Front View of MDB Impactor Face

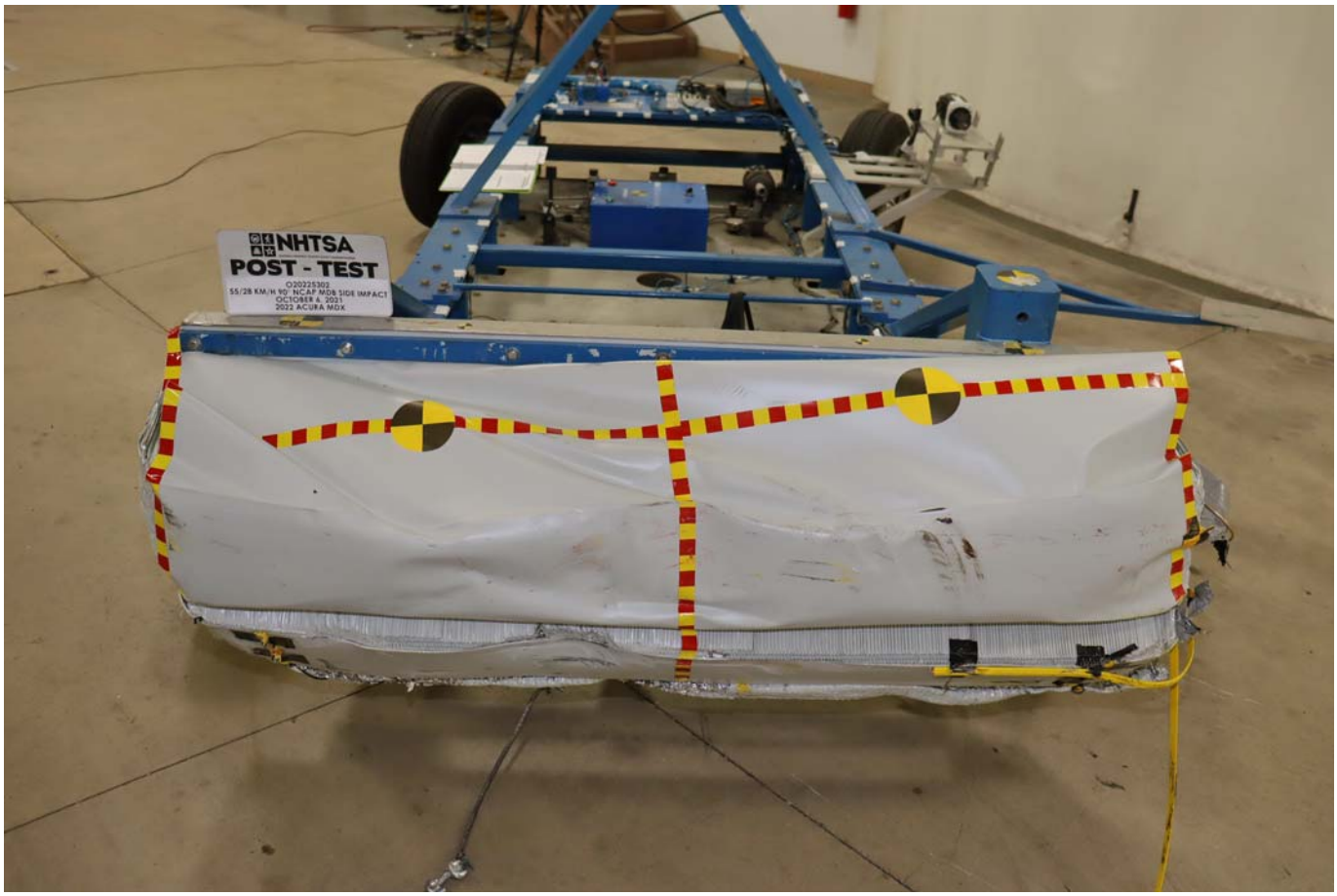


Photo No. 085 - Post-Test Front View of MDB Impactor Face

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

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

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

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

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

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

Photo No. 092 - Close-Up View of Vehicle Certification Label

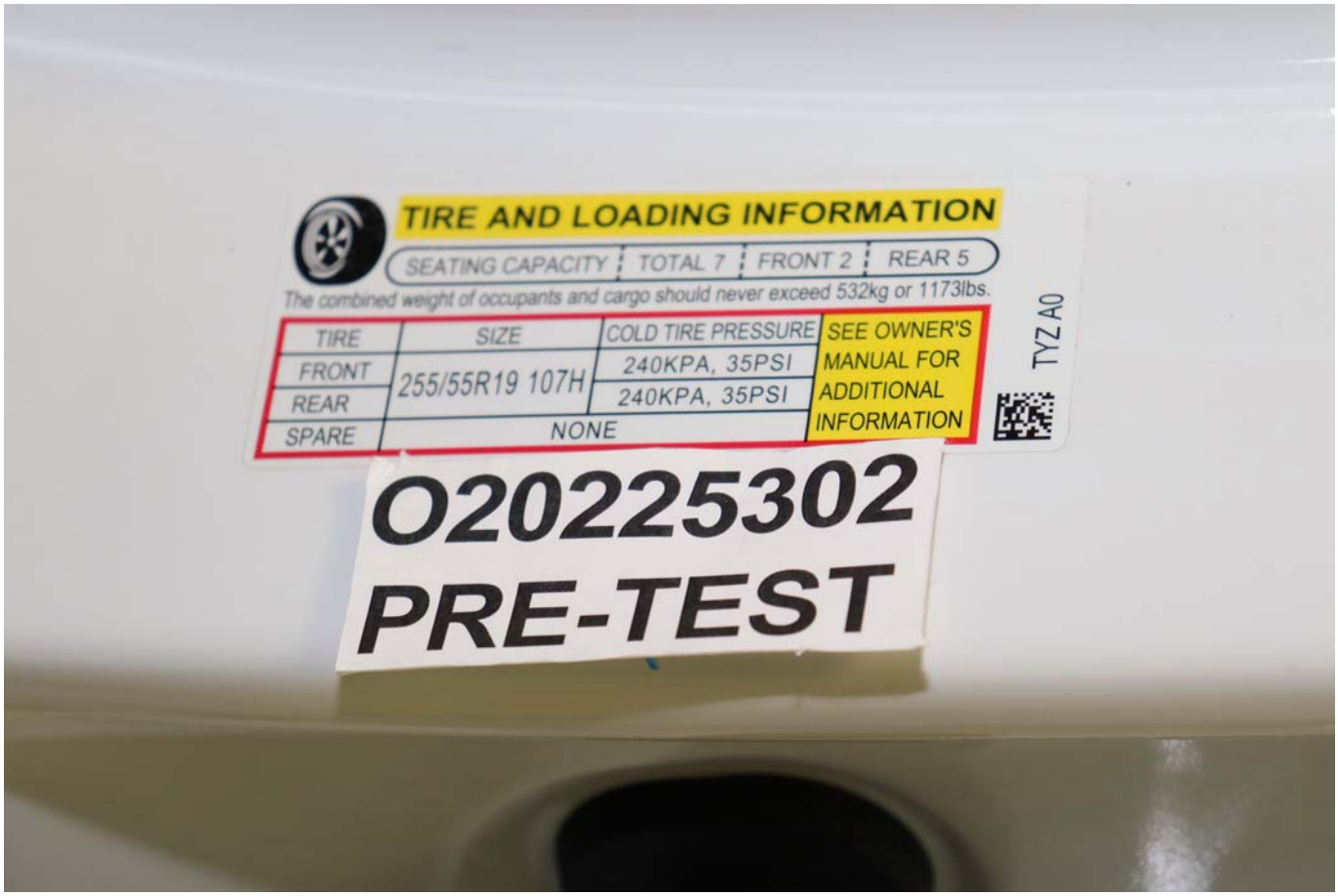


Photo No. 093 - Close-Up View of Vehicle Tire Information Placard or Label

Photo No. 094 - Pre-Test Ballast View

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


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

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

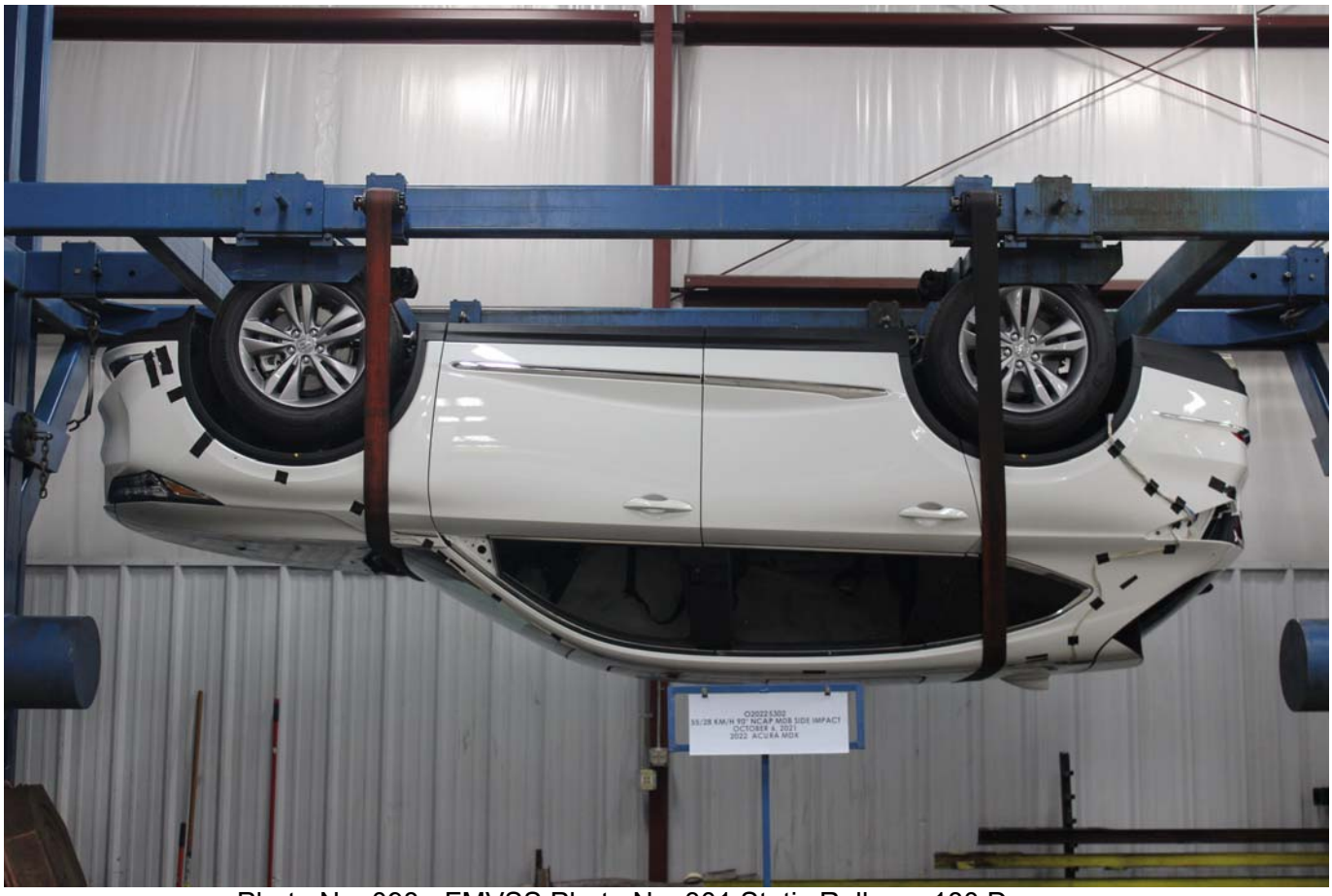


Photo No. 098 - FMVSS Photo No. 301 Static Rollover 180 Degrees

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

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

Photo No. 101 - Impact Event

ACURA

2022 MDX
EXT: PLATINUM WHITE P
INT: EBONY
ENGINE NUMBER: J35Y5-7682303

STANDARD EQUIPMENT AT NO EXTRA COST

* TECHNICAL FEATURES *
- 290hp 3.5-Liter VTEC V6 Engine with Variable Cylinder Management
- 10-Speed Automatic Transmission
- Paddle Shifters
- Electric Power Steering

* SAFETY FEATURES *
- Driver's and Front Passenger's Airbags
- Driver's and Front Passenger's Side Airbags
- Side Curtain Airbags with Rollover Sensor
- Driver's and Front Passenger's Knee Airbags
- Vehicle Stability Assist (VSA)
- Anti-Lock Braking System (ABS)
- Electric Parking Brake
- Tire Pressure Monitoring System
- LED Day Time Running Lights
- LATCH System for Child Seats

* INTERIOR FEATURES *
- Precision Cockpit - Digital Instrument Panel
- High Resolution Center Display with True Touchpad Interface
- AcuraLink Communication System
- Multi-View Rear Camera
- Acura Premium Sound System with 9 Speakers
- HD Radio
- SiriusXM Satellite Radio
- Bluetooth HandsFreeLink
- WiFi Hotspot
- Alexa Built-In
- Wireless CarPlay / Android Auto Integration
- Wireless Phone Charging
- Driver's and Front Passenger's 12-Way Power Seats
- Heated Front Seats
- Tri-Zone Automatic Climate Control with Air Filtration System

* EXTERIOR FEATURES *
- Panoramic Moonroof with Tilt and Slide Feature
- Power Tailgate
- 19" Alloy Wheels
- P255/55 R19 All-Season Tires
- Tire Sealant and Inflator Kit (in place of spare tire)
- Jewel Eye LED Headlights
- LED Tail Lights
- Blind Spot Information
- Heated Power Door Mirrors with Turn Indicators
- Keyless Access System with Smart Entry

* ACURAWATCH FEATURES *
- Adaptive Cruise Control
- Collision Mitigation Braking
- Forward Collision Warning
- Lane Departure Warning
- Lane Keeping Assist System
- Road Departure Mitigation
- Traffic Jam Assist
- Auto High-Beam Assist

Manufacturer's Suggested Retail Price	$47,200.00

MSRP Includes:
-6YR/70K Mile Powertrain Warranty
-4YR/50K Mile Ltd Vehicle Warranty
-Full Tank of Fuel

- SiriusXM Includes:
Free Activation and 3 Months Free Service (excl. AK & HI)

PLATINUM WHITE P	500.00
Destination and Handling	1,045.00
TOTAL VEHICLE PRICE (includes Pre-Delivery Service)	**$48,745.00**

License and title fees, state and local taxes and dealer options and accessories are not included in the manufacturer's suggested retail price.

VANDERGRIFF ACURA
1100 W. I-20
ARLINGTON, TX 76017

VIN: 5J8YD9H33NL006246

PORT OF ENTRY: EAST LIBERTY
DELIVERY POINT: HOUSTON
SHIP#:
ROW/SPACE: 745-002
TRANS.METHOD: J10 ALLIANCE

ORIG. DLR: 251470
REF.NO: 41046
HN CODE: AL-1450
EMISSION: 50 STATE
CONTROL NO: 654084
DEALER: 251470

EPA DOT Fuel Economy and Environment — Gasoline Vehicle

Fuel Economy
22 MPG
19 city
26 highway
combined city/hwy
4.5 gallons per100 miles

Small SUVs range from 16 to 125 MPG.
The best vehicle rates 142 MPGe.

You spend $3,500 in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost $2,000

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

This vehicle emits 411 grams CO^2 per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions; learn more at fueleconomy.gov.

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 27 MPG and costs $6,500 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at $2.95 per gallon. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fueleconomy.gov
Calculate personalized estimates and compare vehicles

Smartphone QR Code™

PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS CARLINE
U.S./Canadian Parts Content: 60 %

NOTE: Parts content does not include final assembly, distribution or other non-parts costs.

FOR THIS VEHICLE
Final Assembly Point:
EAST LIBERTY, OHIO USA
Country of Origin: Engine:
U.S.A
Transmission:
U.S.A

GOVERNMENT 5-STAR SAFETY RATING

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.

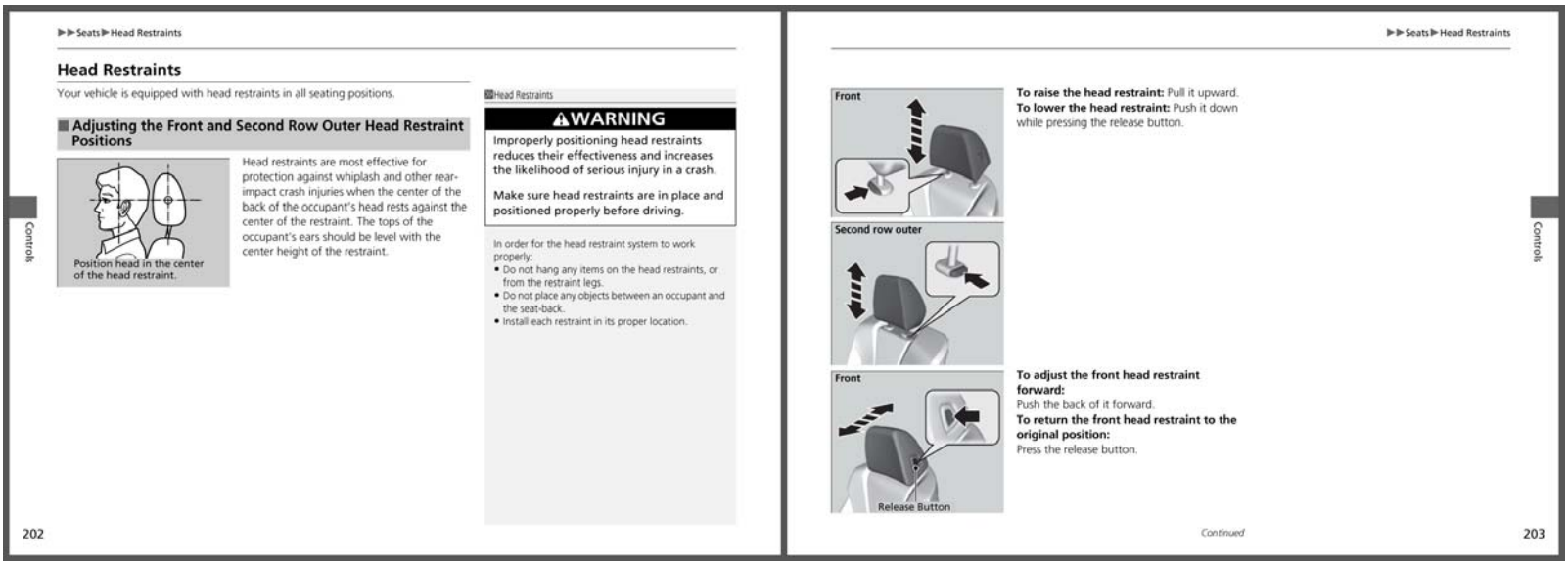
Side Crash	Front seat	Not Rated
	Rear seat	Not Rated

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

Photo No. 102 - Monroney Label



Head Restraints

Your vehicle is equipped with head restraints in all seating positions.

■ Adjusting the Front and Second Row Outer Head Restraint Positions

Position head in the center of the head restraint.

Head restraints are most effective for protection against whiplash and other rear-impact crash injuries when the center of the back of the occupant's head rests against the center of the restraint. The tops of the occupant's ears should be level with the center height of the restraint.

⚠WARNING

Improperly positioning head restraints reduces their effectiveness and increases the likelihood of serious injury in a crash.

Make sure head restraints are in place and positioned properly before driving.

In order for the head restraint system to work properly:

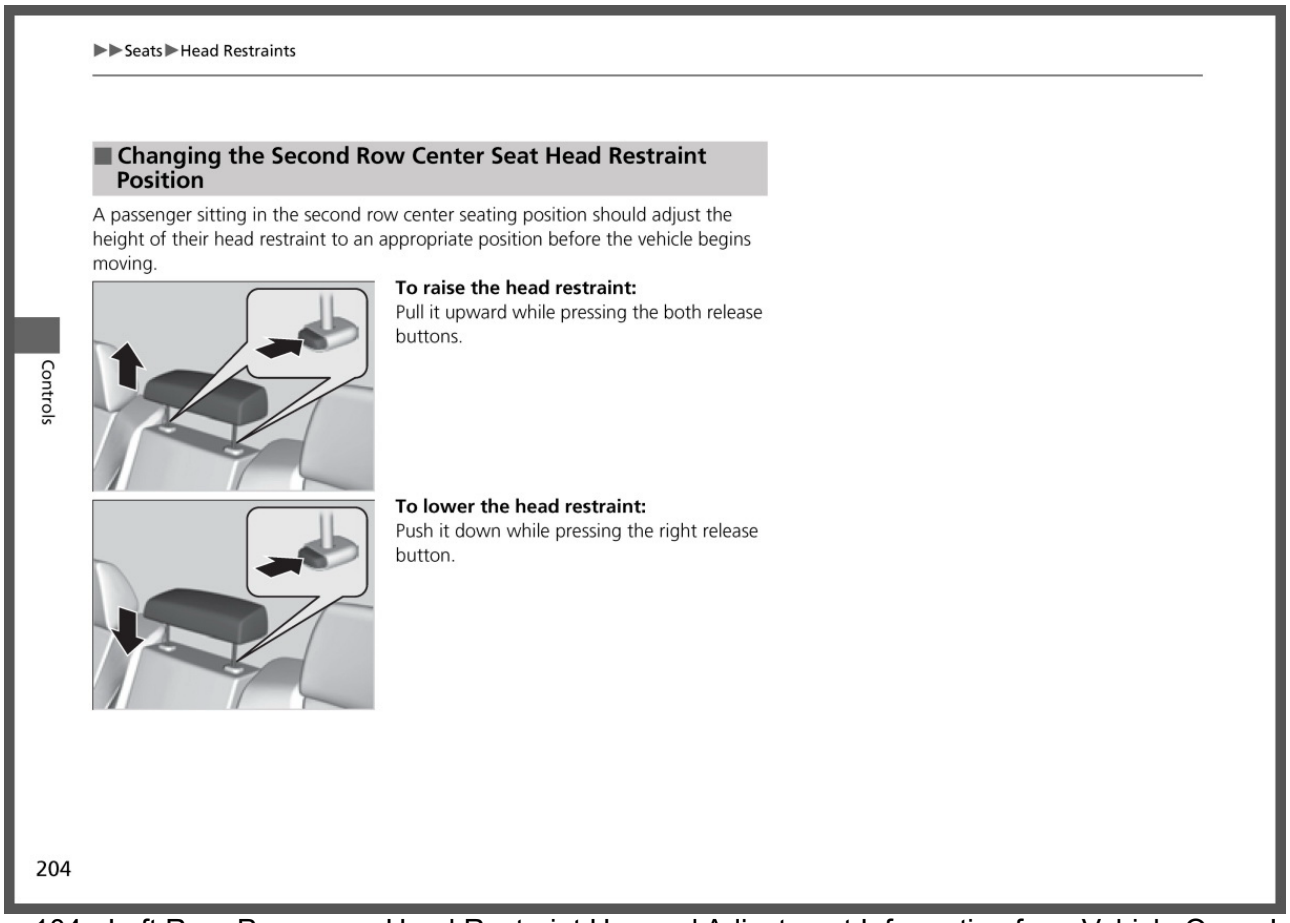
- Do not hang any items on the head restraints, or from the restraint legs.
- Do not place any objects between an occupant and the seat-back.
- Install each restraint in its proper location.

To raise the head restraint: Pull it upward.
To lower the head restraint: Push it down while pressing the release button.

To adjust the front head restraint forward:
Push the back of it forward.
To return the front head restraint to the original position:
Press the release button.

Continued

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



■ Changing the Second Row Center Seat Head Restraint Position

A passenger sitting in the second row center seating position should adjust the height of their head restraint to an appropriate position before the vehicle begins moving.

To raise the head restraint:
Pull it upward while pressing the both release buttons.

To lower the head restraint:
Push it down while pressing the right release button.

Photo No. 104 - Left Rear Passenger Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

APPENDIX B
DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS
Driver Dummy Instrumentation Plots

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.gov

Additional Driver & Passenger Dummy Instrumentation Data

Passenger Head Angular Velocity (X)

Passenger Head Angular Velocity (Y)

Passenger Head Angular Velocity (Z)

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)

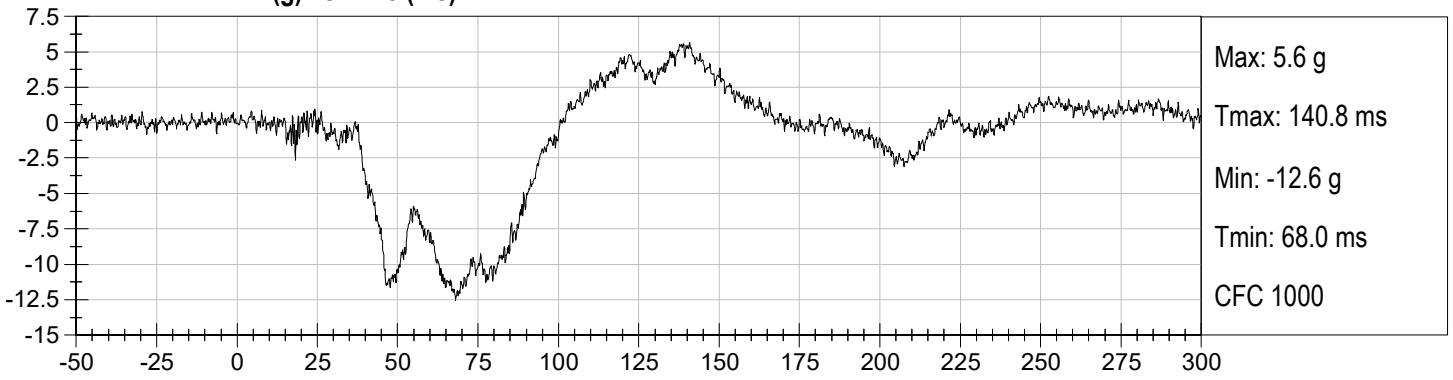
MDB Rear Acceleration (X)

MDB Rear Acceleration (Y)

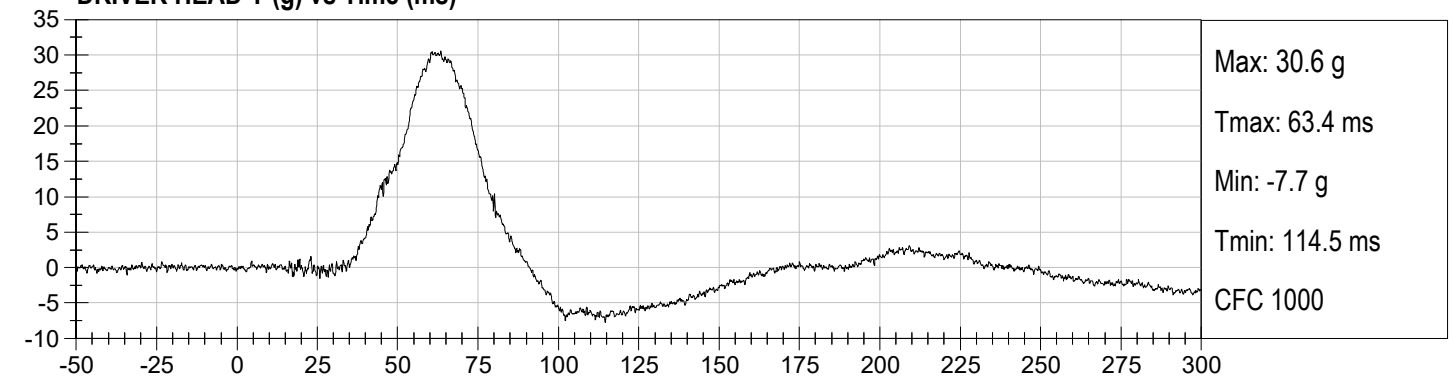
Left MDB Contact Switch

Right MDB Contact Switch

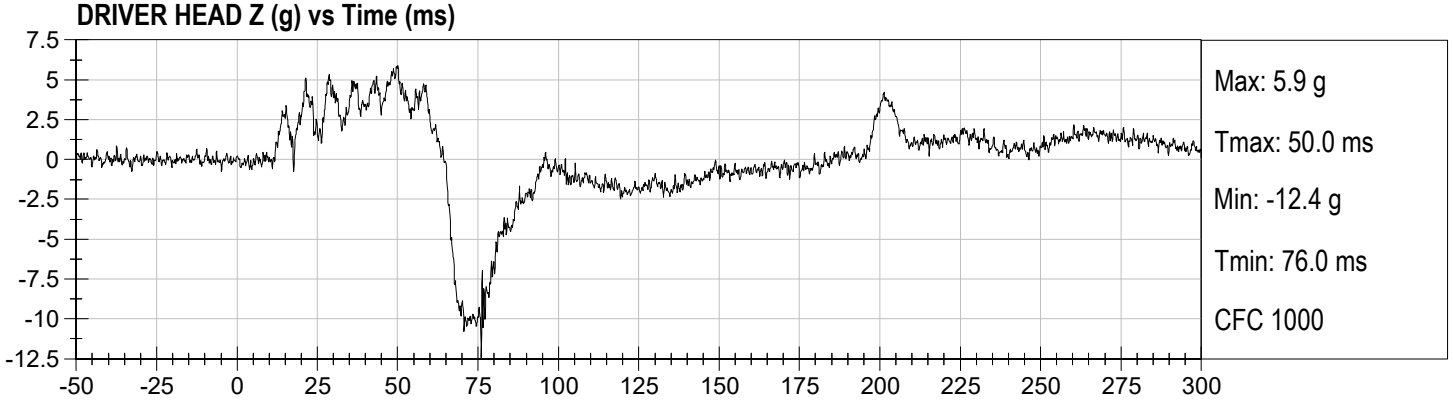
DRIVER HEAD X (g) vs Time (ms)



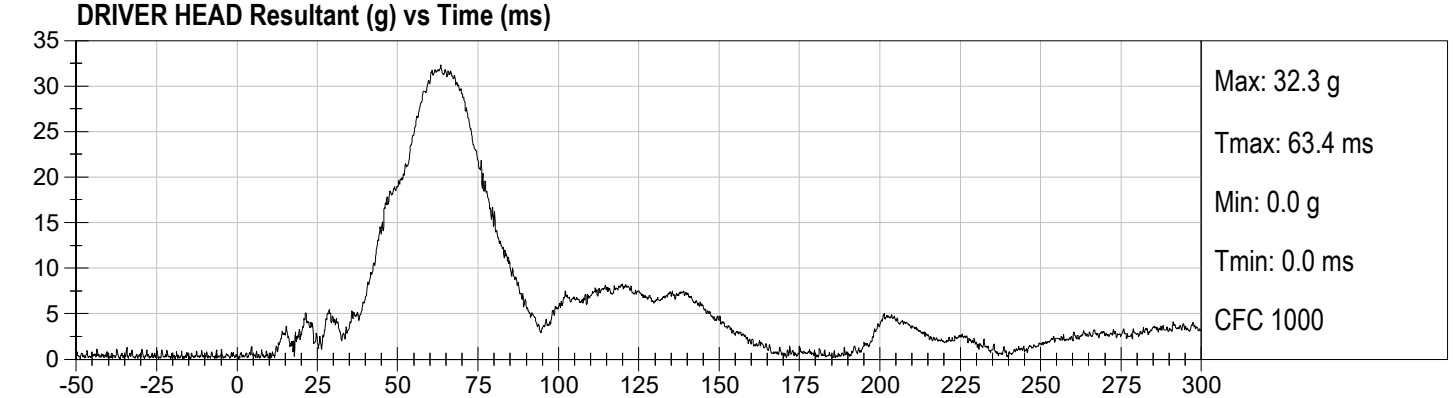
DRIVER HEAD Y (g) vs Time (ms)



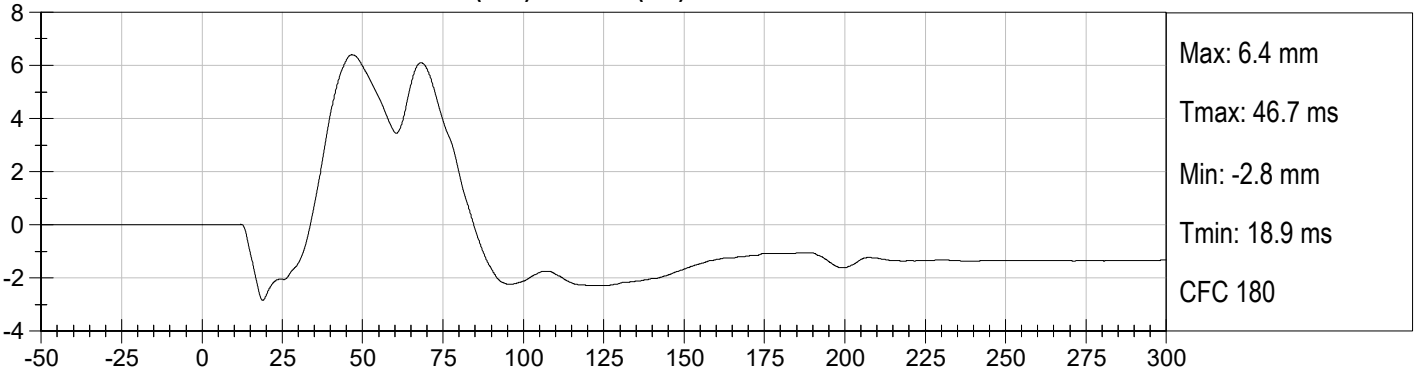
DRIVER HEAD Z (g) vs Time (ms)



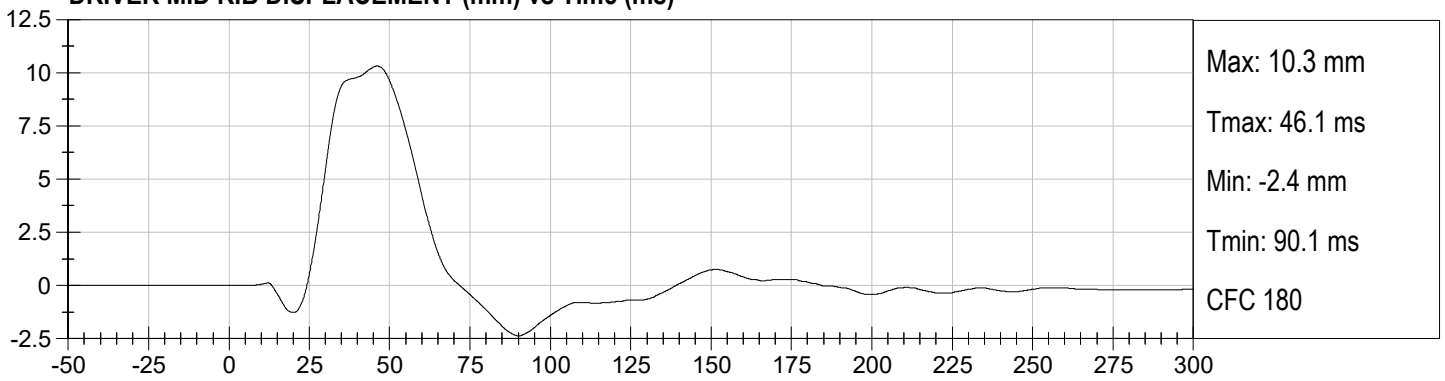
DRIVER HEAD Resultant (g) vs Time (ms)



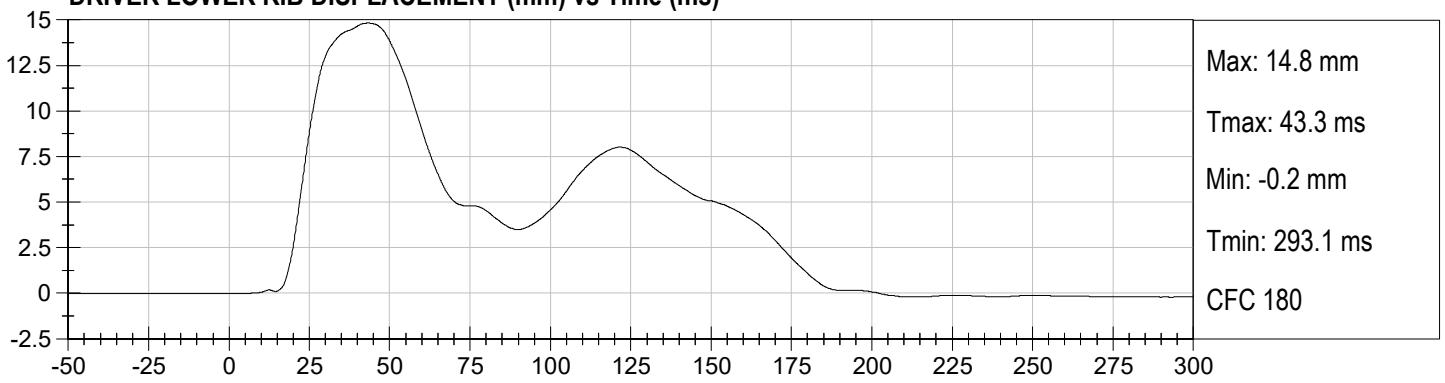
DRIVER UPPER RIB DISPLACEMENT (mm) vs Time (ms)



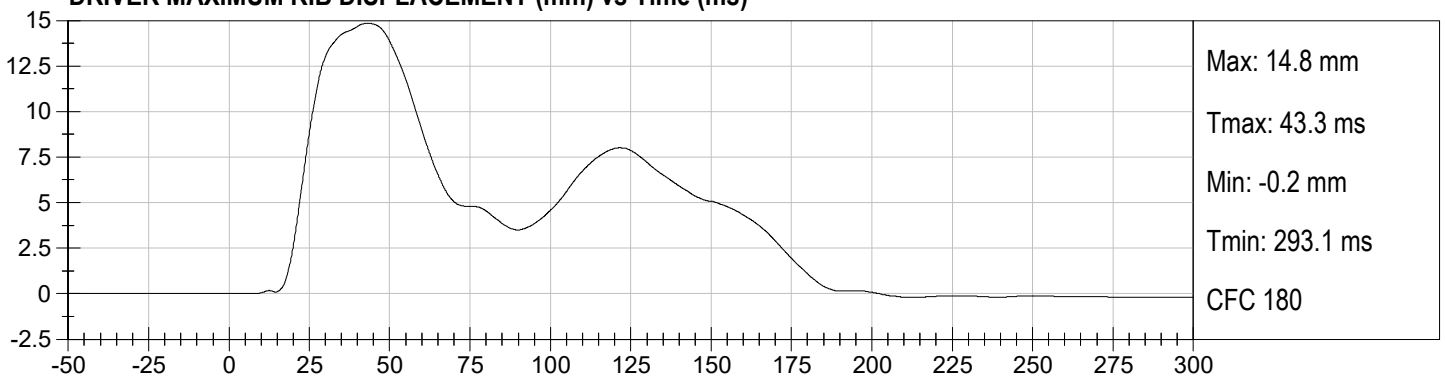
DRIVER MID RIB DISPLACEMENT (mm) vs Time (ms)



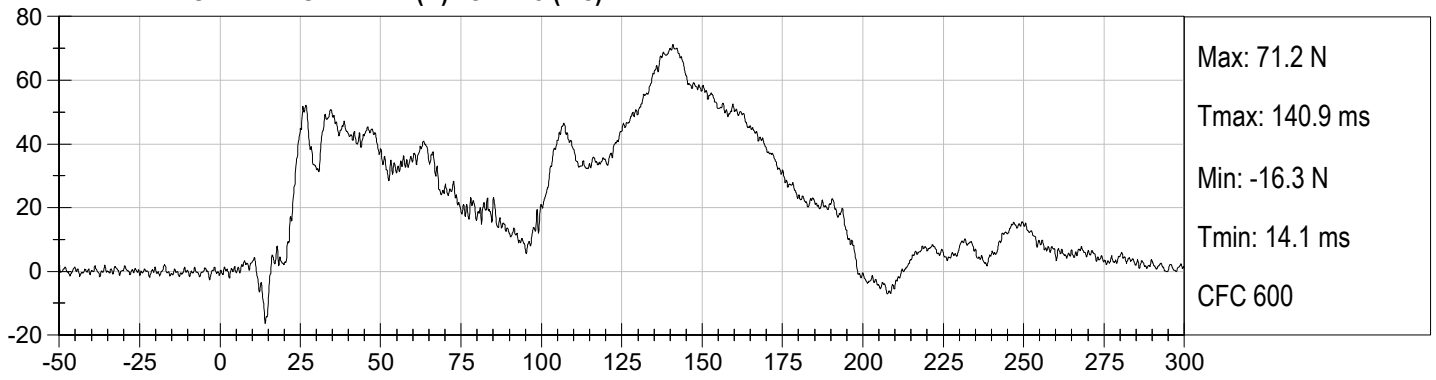
DRIVER LOWER RIB DISPLACEMENT (mm) vs Time (ms)



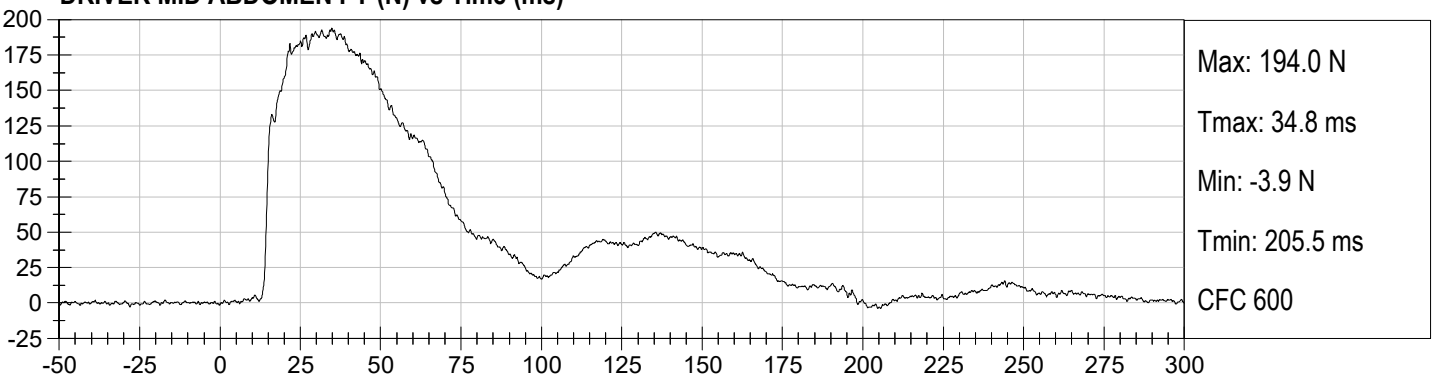
DRIVER MAXIMUM RIB DISPLACEMENT (mm) vs Time (ms)



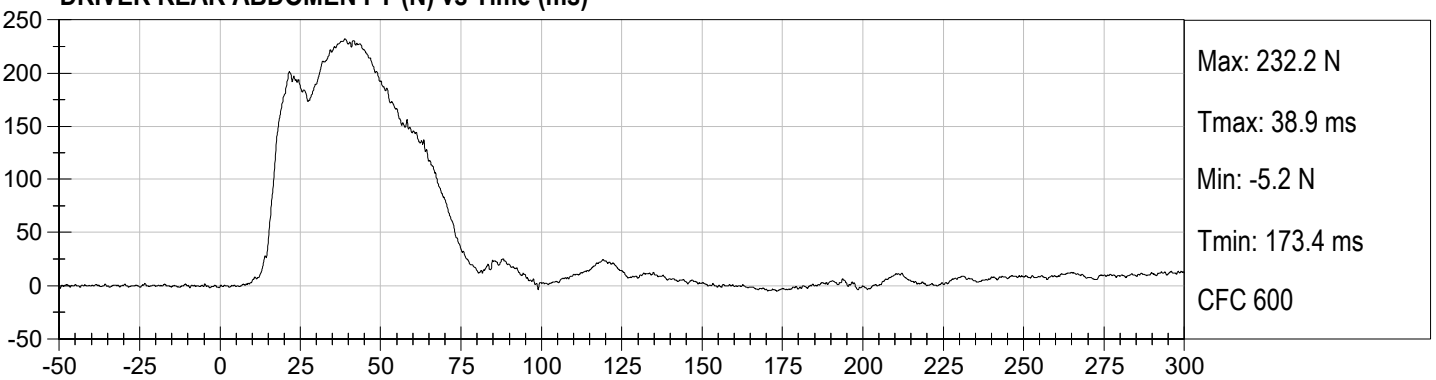
DRIVER FRONT ABDOMEN FY (N) vs Time (ms)



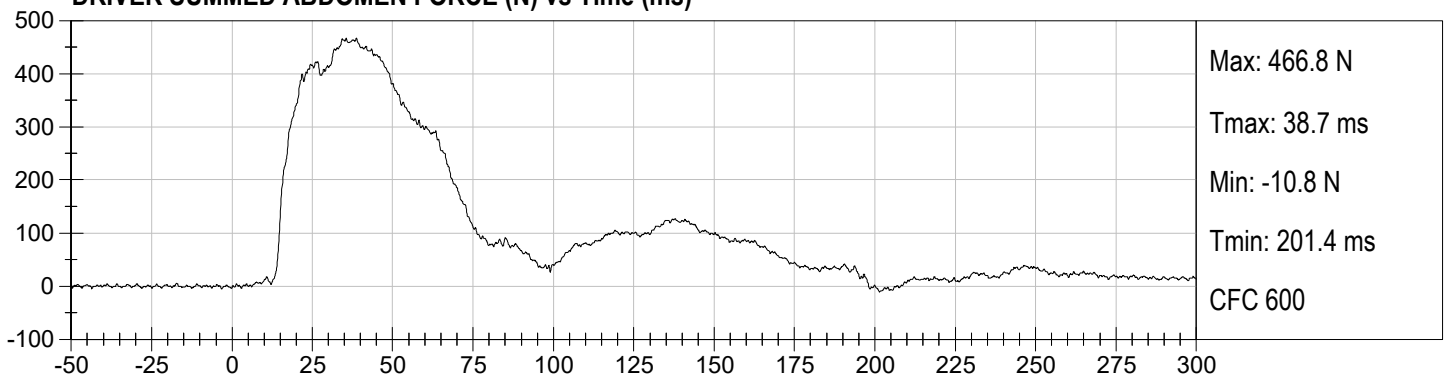
DRIVER MID ABDOMEN FY (N) vs Time (ms)



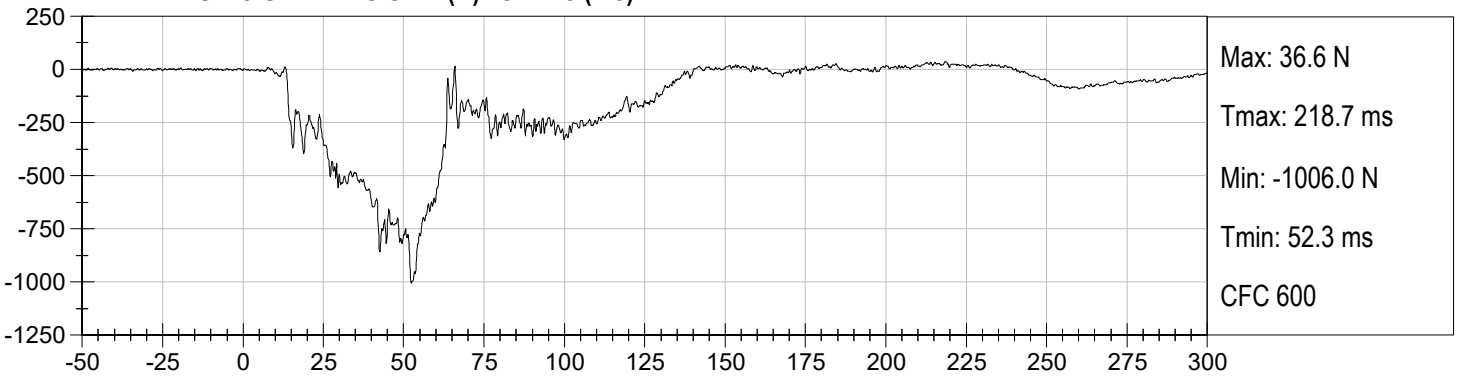
DRIVER REAR ABDOMEN FY (N) vs Time (ms)



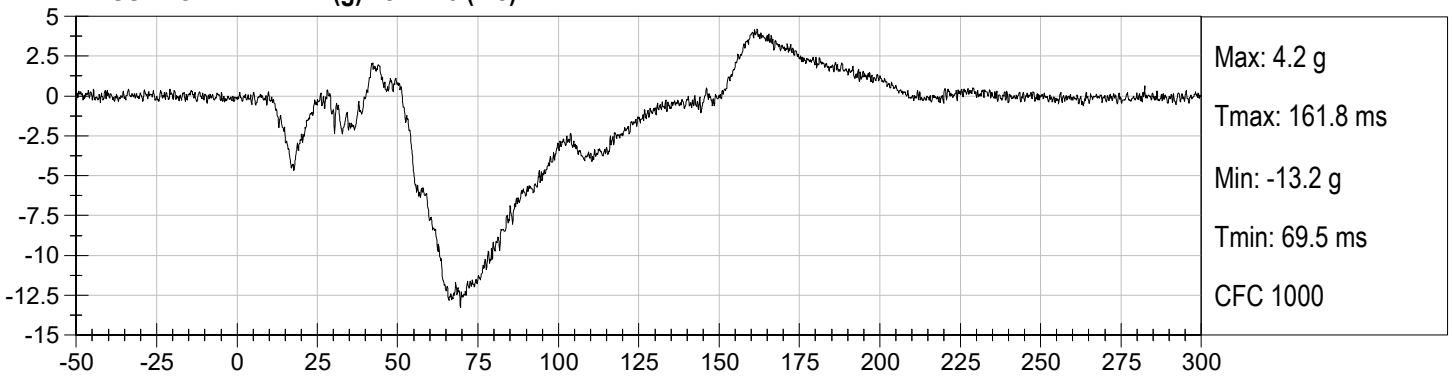
DRIVER SUMMED ABDOMEN FORCE (N) vs Time (ms)



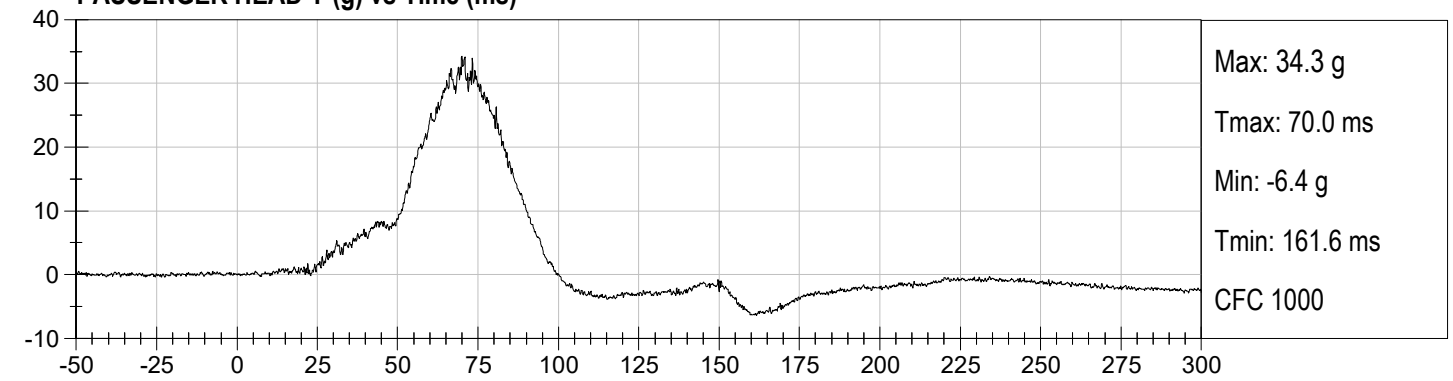
DRIVER PUBIC SYMPHYSIS FY (N) vs Time (ms)



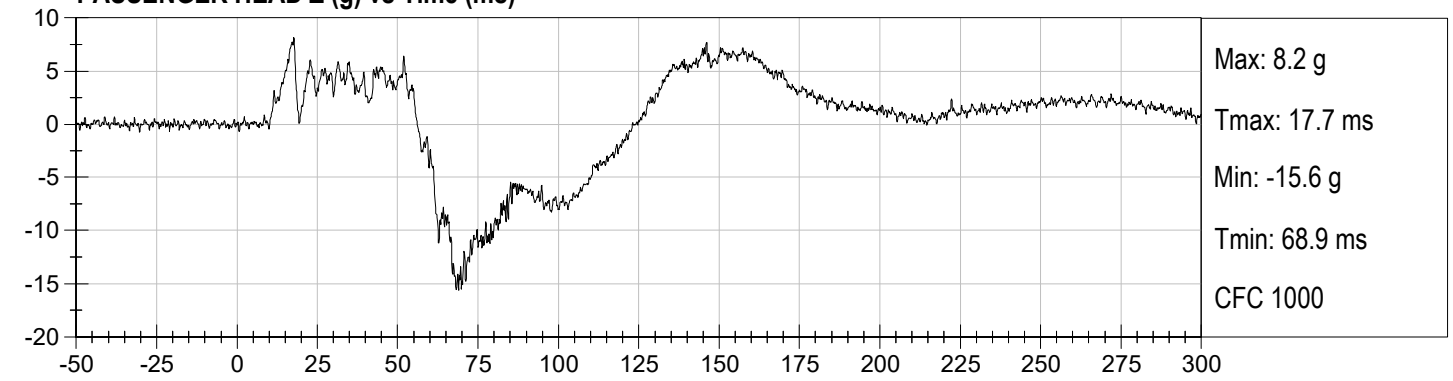
PASSENGER HEAD X (g) vs Time (ms)



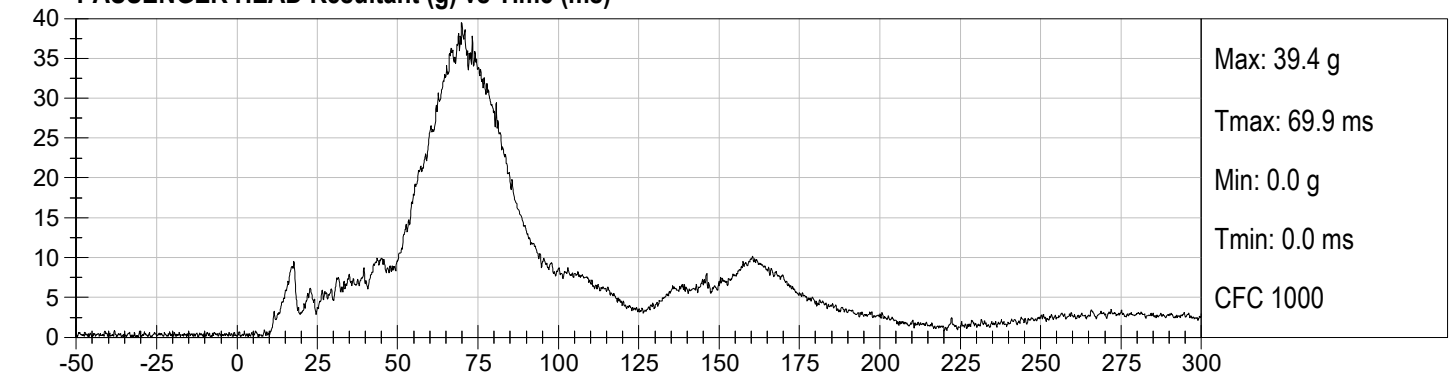
PASSENGER HEAD Y (g) vs Time (ms)



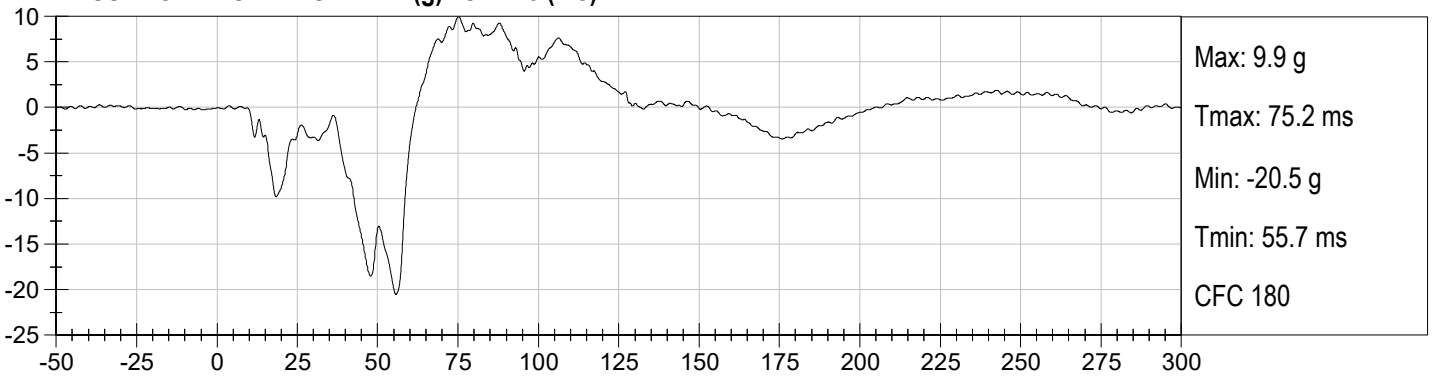
PASSENGER HEAD Z (g) vs Time (ms)



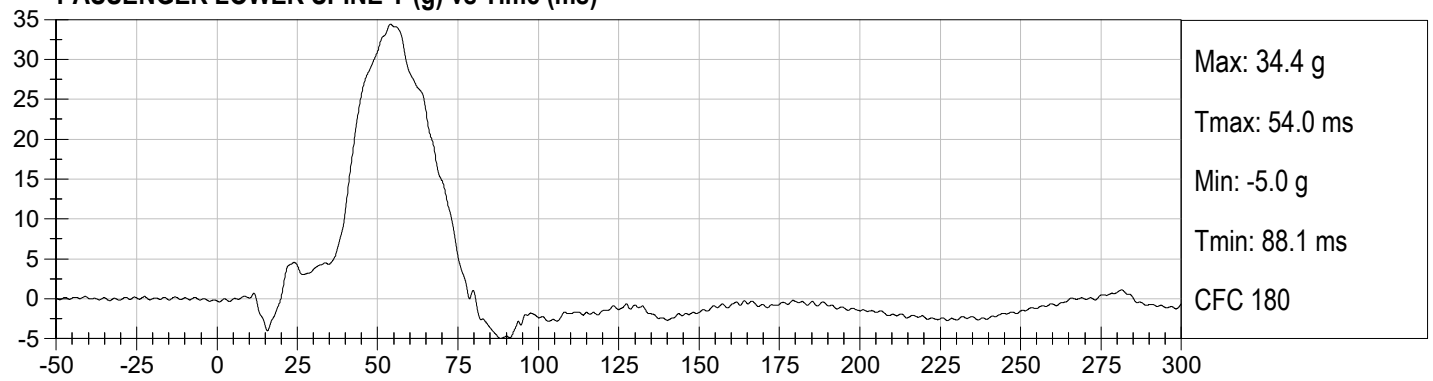
PASSENGER HEAD Resultant (g) vs Time (ms)



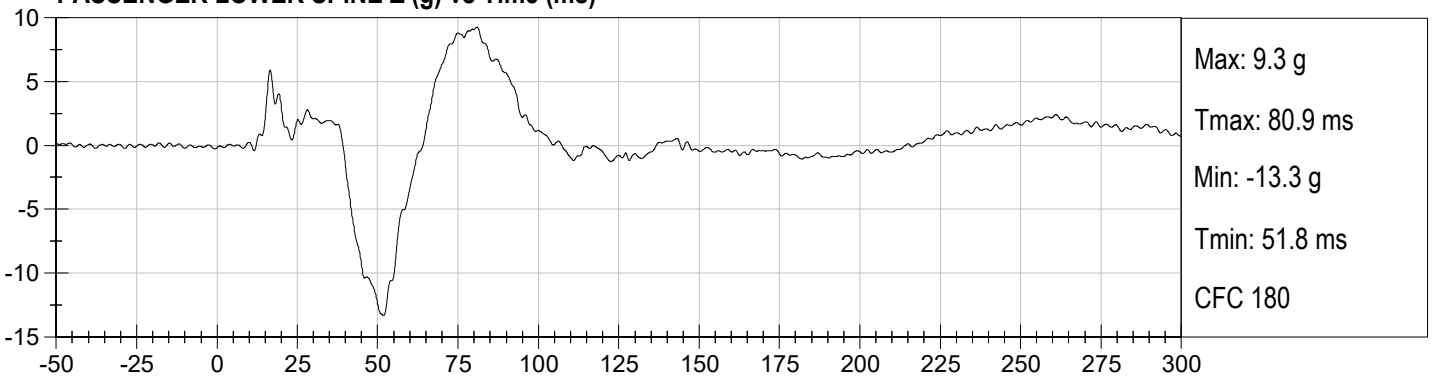
PASSENGER LOWER SPINE X (g) vs Time (ms)



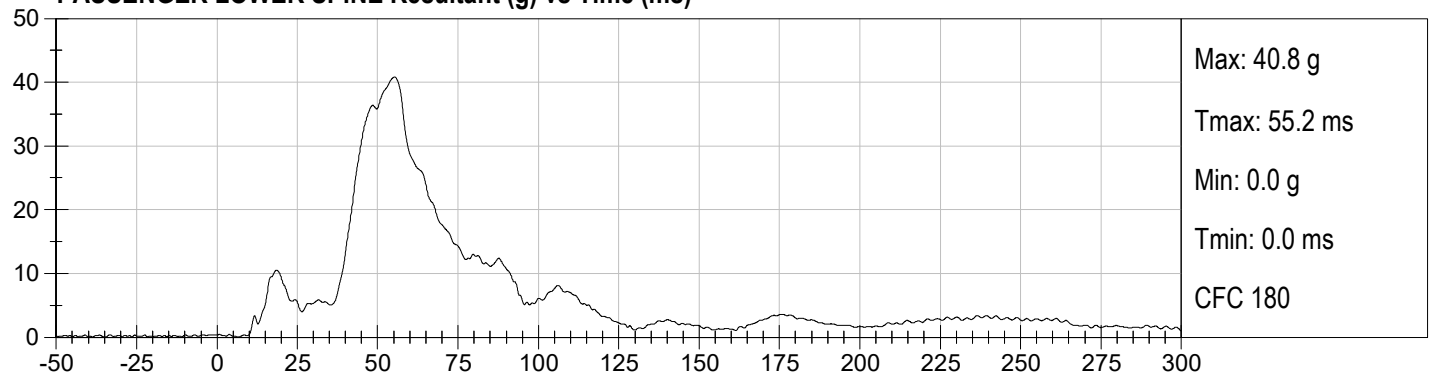
PASSENGER LOWER SPINE Y (g) vs Time (ms)



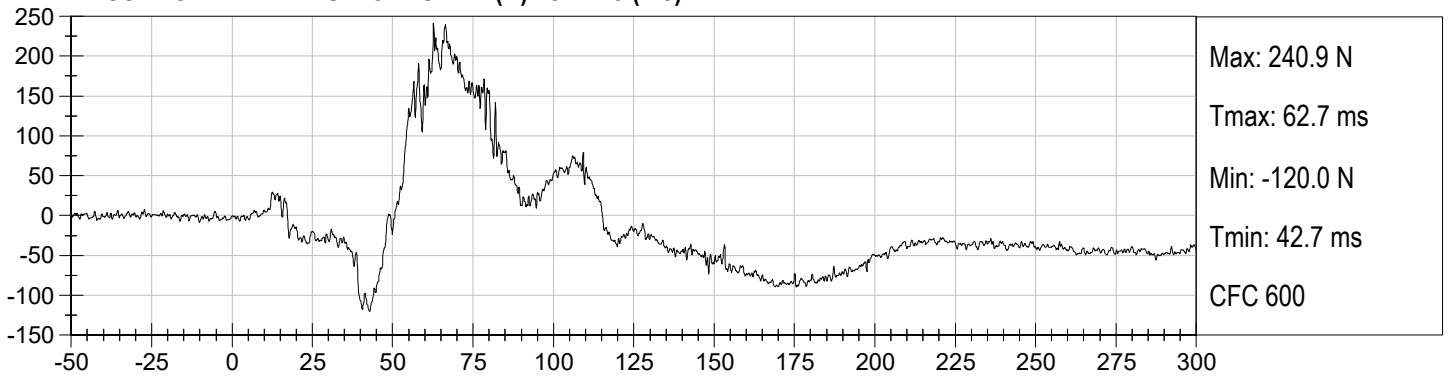
PASSENGER LOWER SPINE Z (g) vs Time (ms)



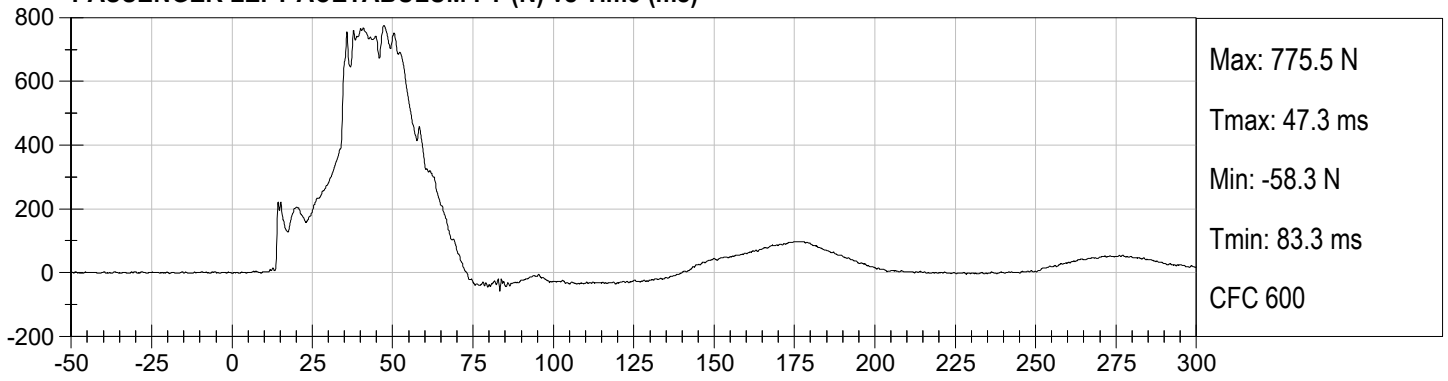
PASSENGER LOWER SPINE Resultant (g) vs Time (ms)



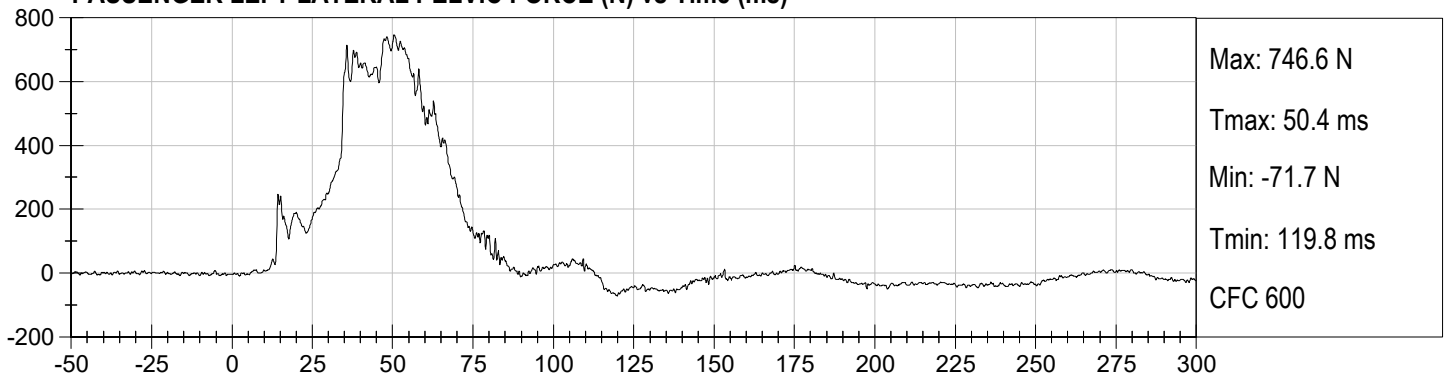
PASSENGER LEFT ILIUM CREST FY (N) vs Time (ms)



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

CALIBRATION TEST RESULTS

PRE-TEST

EUROSID 2 (ES-2RE) MALE – DRIVER ATD

ES-2re External Measurements
SN: F032

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: F032 **Test ID:** D212891

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	42	Pass
Peak Resultant Acceleration	G's	125 to 155	137	Pass
Peak Longitudinal Acceleration	G's	<= +/- 15.0	7.0	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 15% of peak	Yes	Pass
		Overall Test Results		Pass

Laboratory Technician

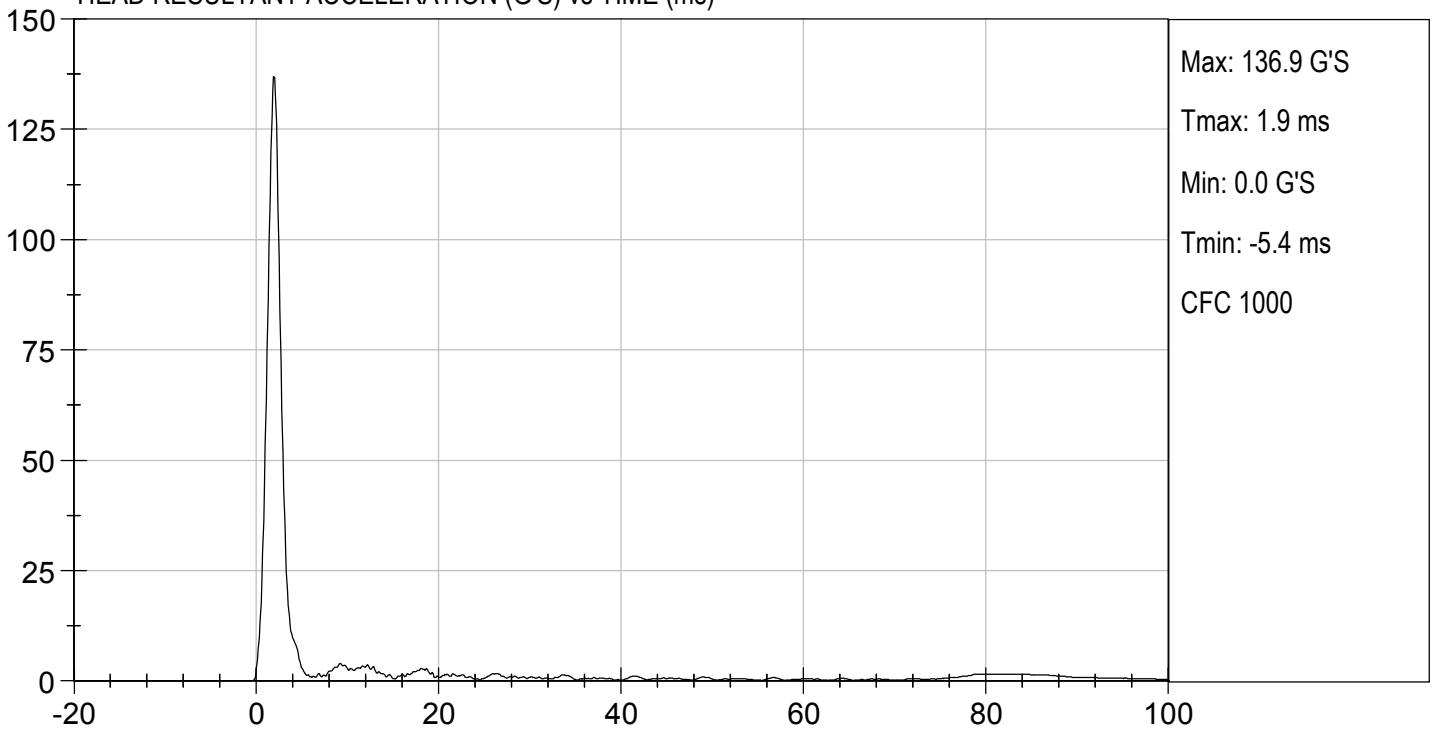
09/07/2021
Test Date

Approved By

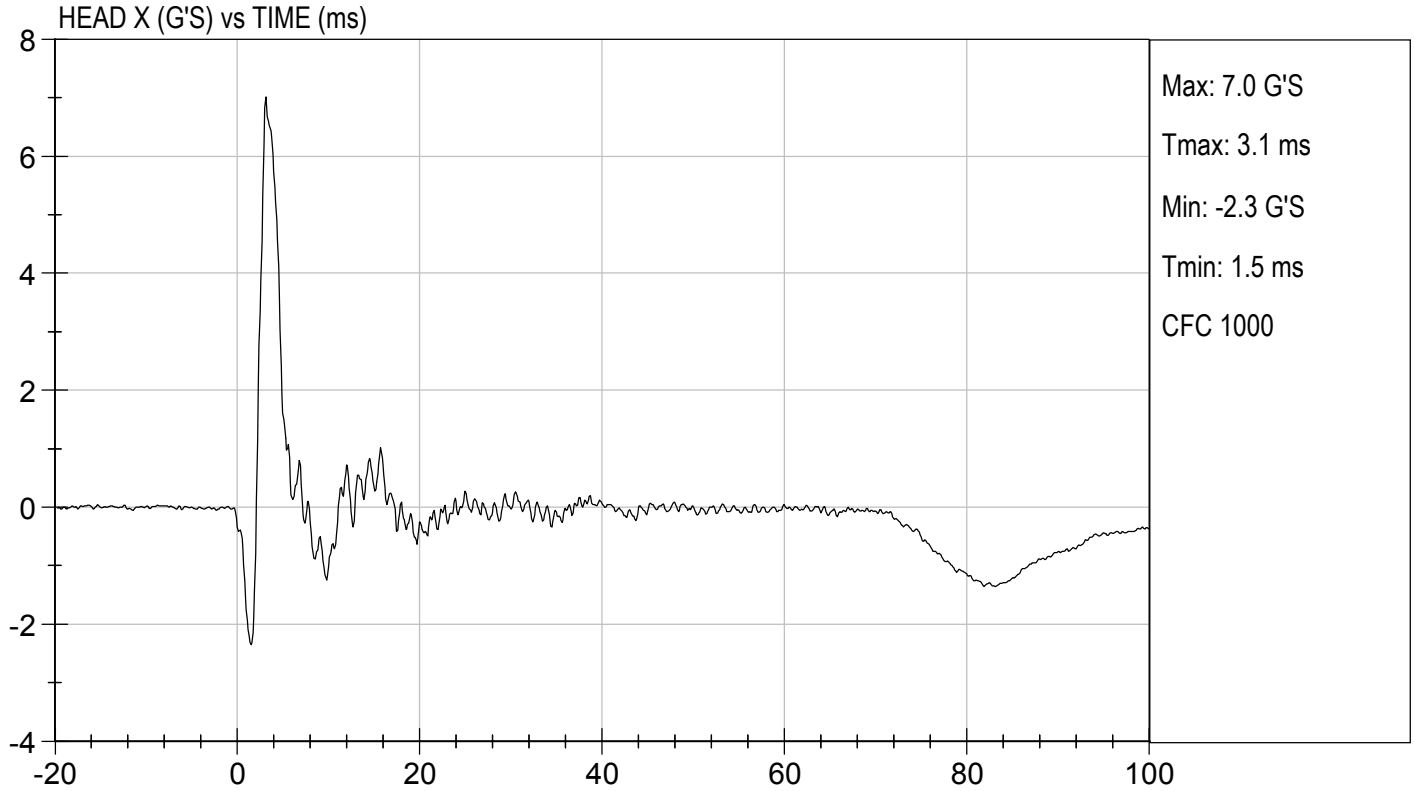
TEST DESC: HEAD DROP

TEST DATE: 09/07/2021
TEST #: D212891

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

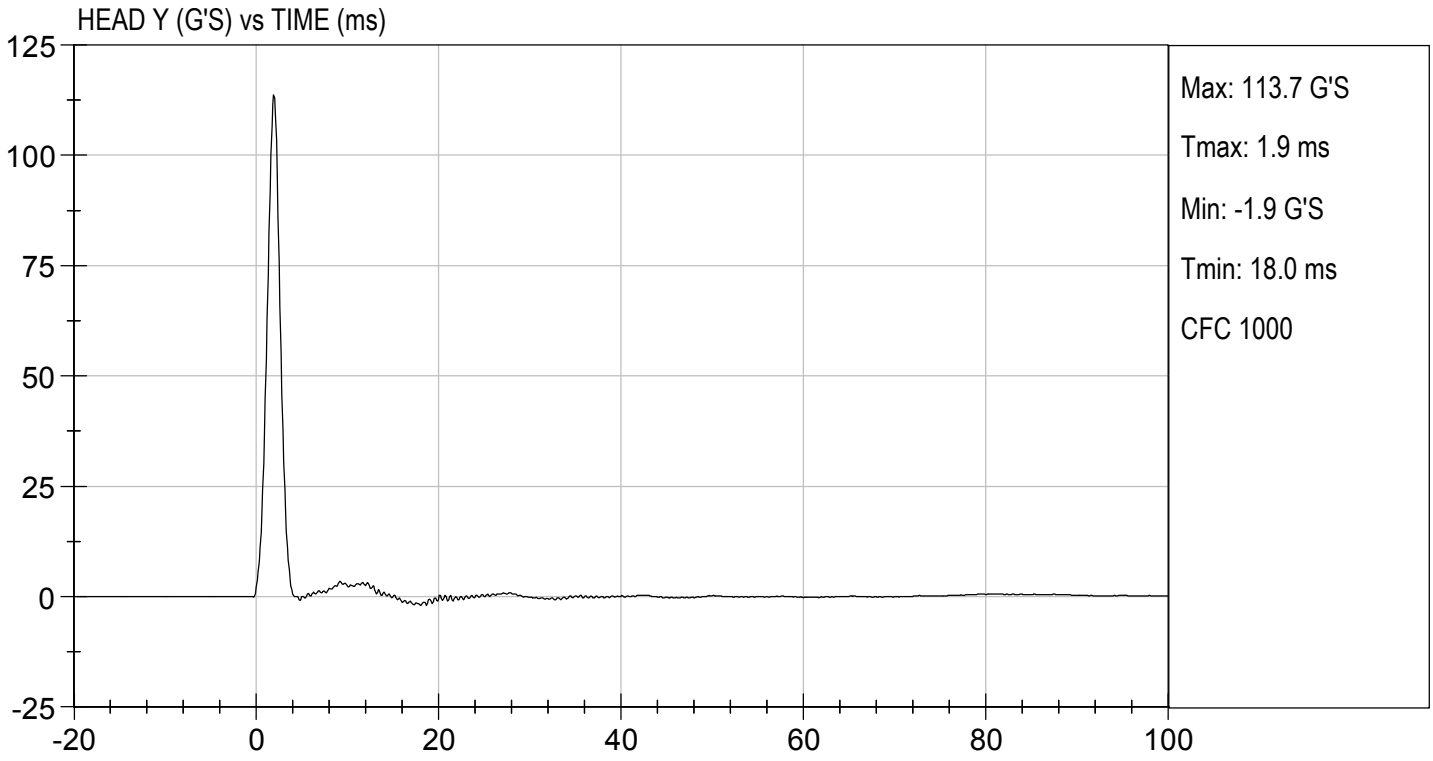


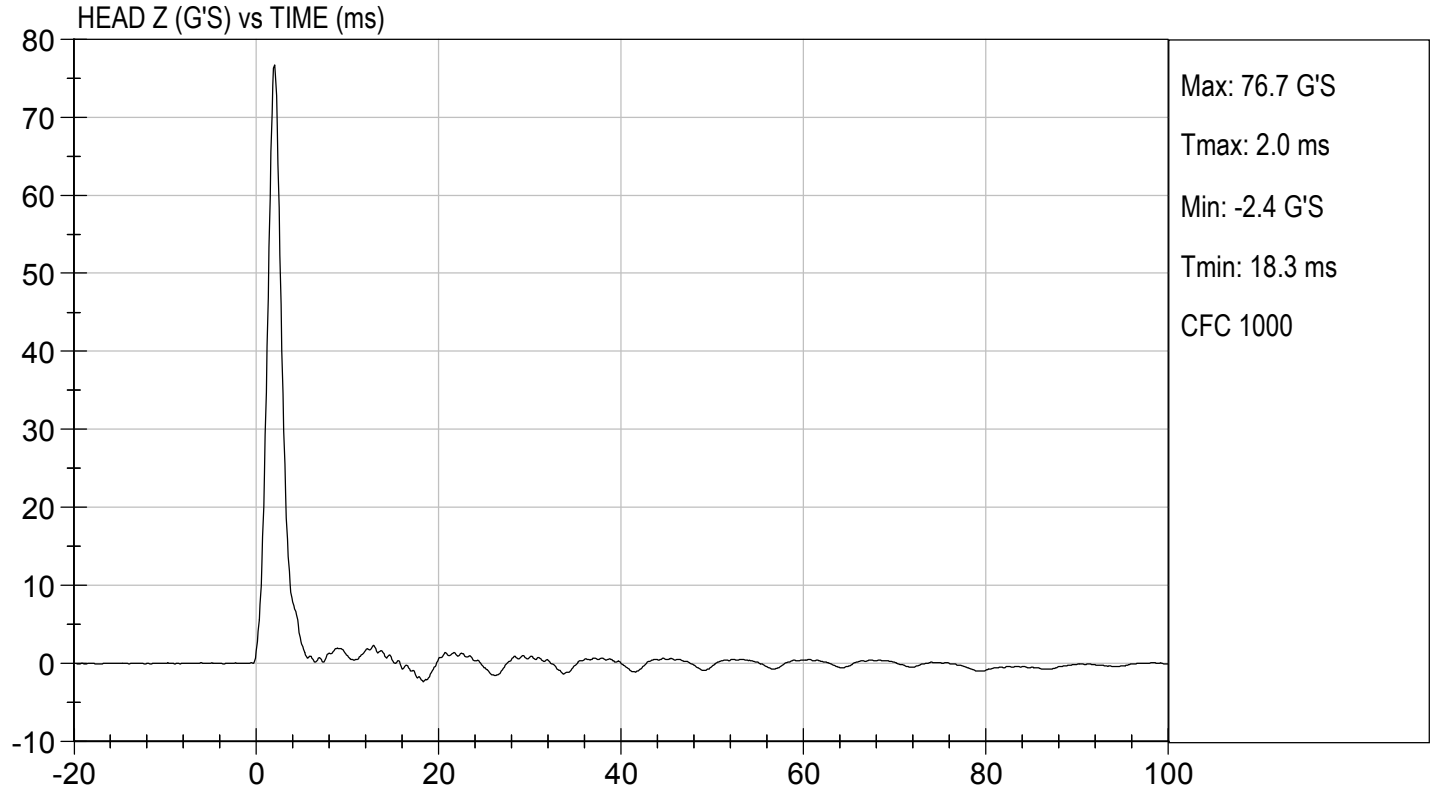
HEAD X (G'S) vs TIME (ms)



TEST DESC: HEAD DROP

TEST DATE: 09/07/2021
TEST #: D212891





MGA RESEARCH CORPORATION

NECK PENDULUM TEST

ES-2re DUMMY

ATD Serial No: f032 **Test I.D:** D212892

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	44.4	Pass
Pendulum Speed		m/s	3.30 to 3.50	3.50	Pass
Pendulum Velocity	1 ms	m/s	-0.05 to 0.00	0.00	Pass
	3 ms	m/s	-0.25 to -0.375	-0.34	Pass
	14 ms	m/s	-3.20 to -3.70	-3.57	Pass
	17 ms	m/s	>= -3.70	-3.40	Pass
Maximum Flexion Angle		deg	49.0 to 59.0	49.8	Pass
Time of Maximum Flexion Angle		ms	54.0 to 66.0	57.5	Pass
Head Rotation Decay Time to 0 Degree		ms	53.0 to 88.0	60.5	Pass
			Overall Results		Pass

Laboratory Technician

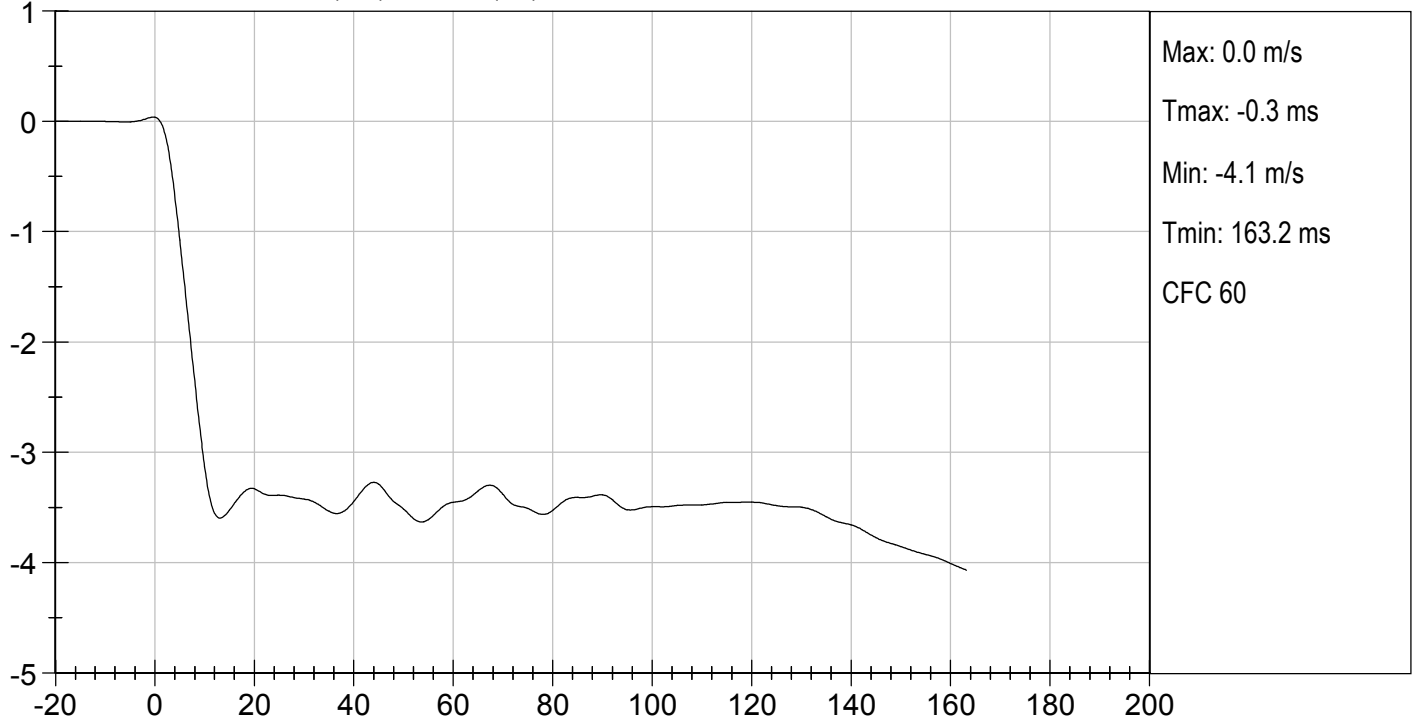
09/14/2021
Test Date

Approved By

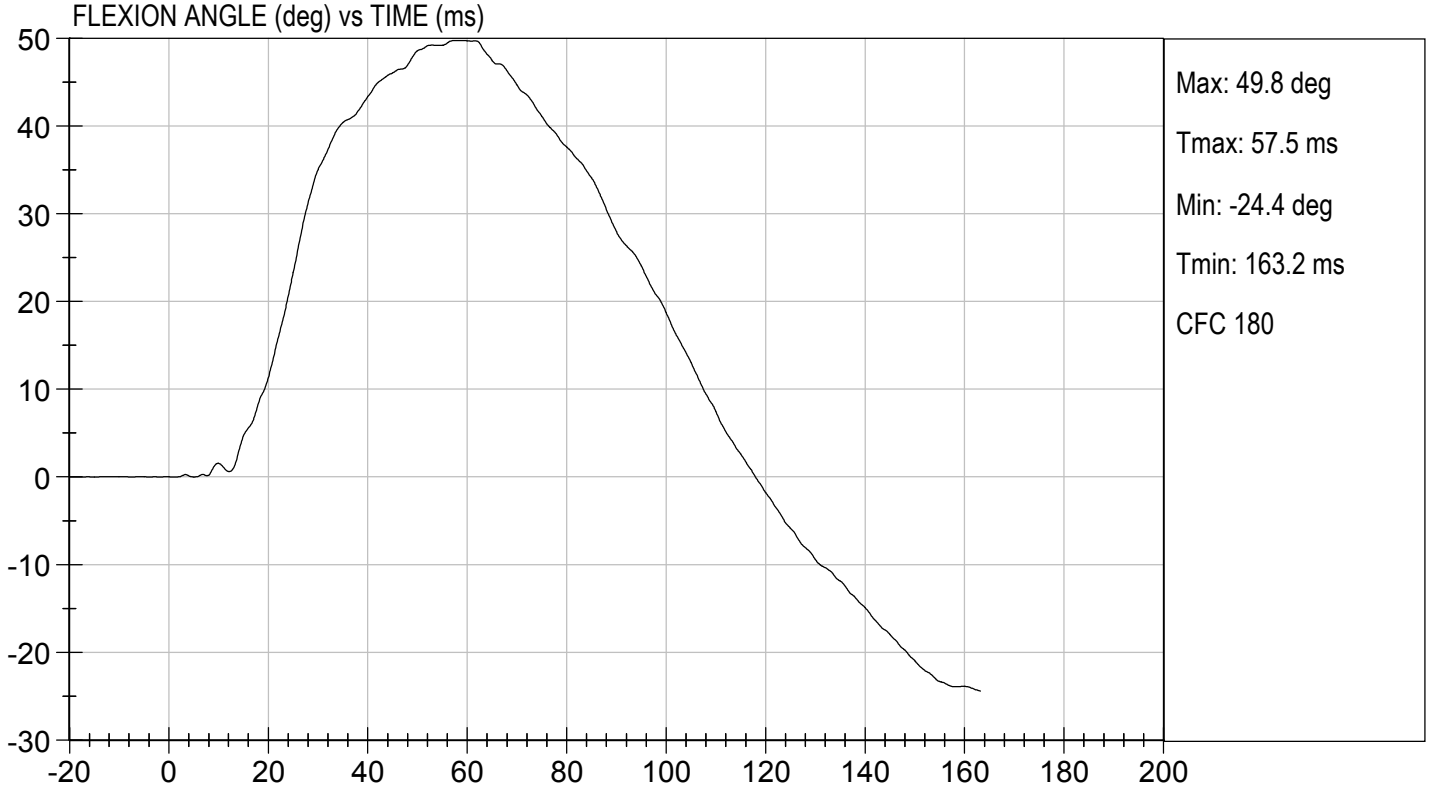
TEST DESC: NECK BENDING
VELOCITY: 11.49 ft/s, 3.50 m/s

TEST DATE: 09/14/2021
TEST #: D212892

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



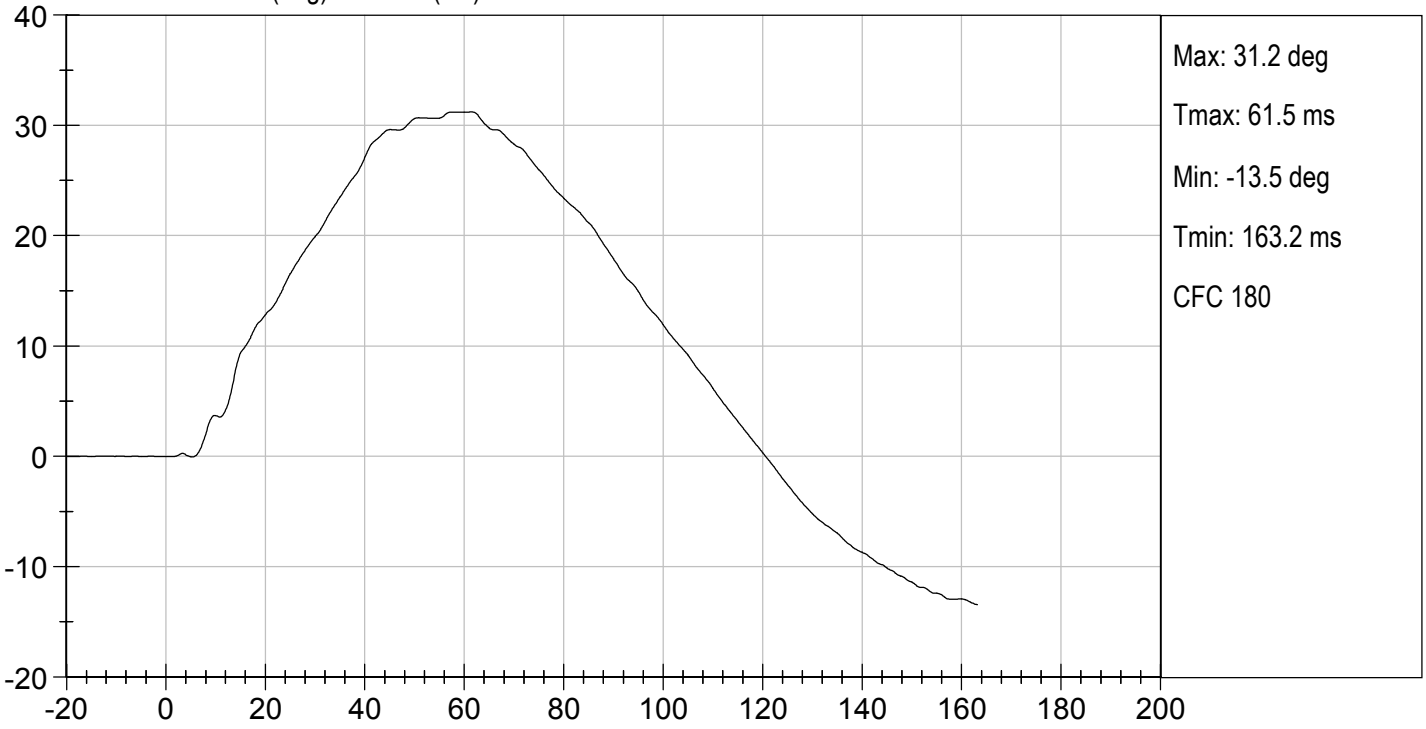
FLEXION ANGLE (deg) vs TIME (ms)



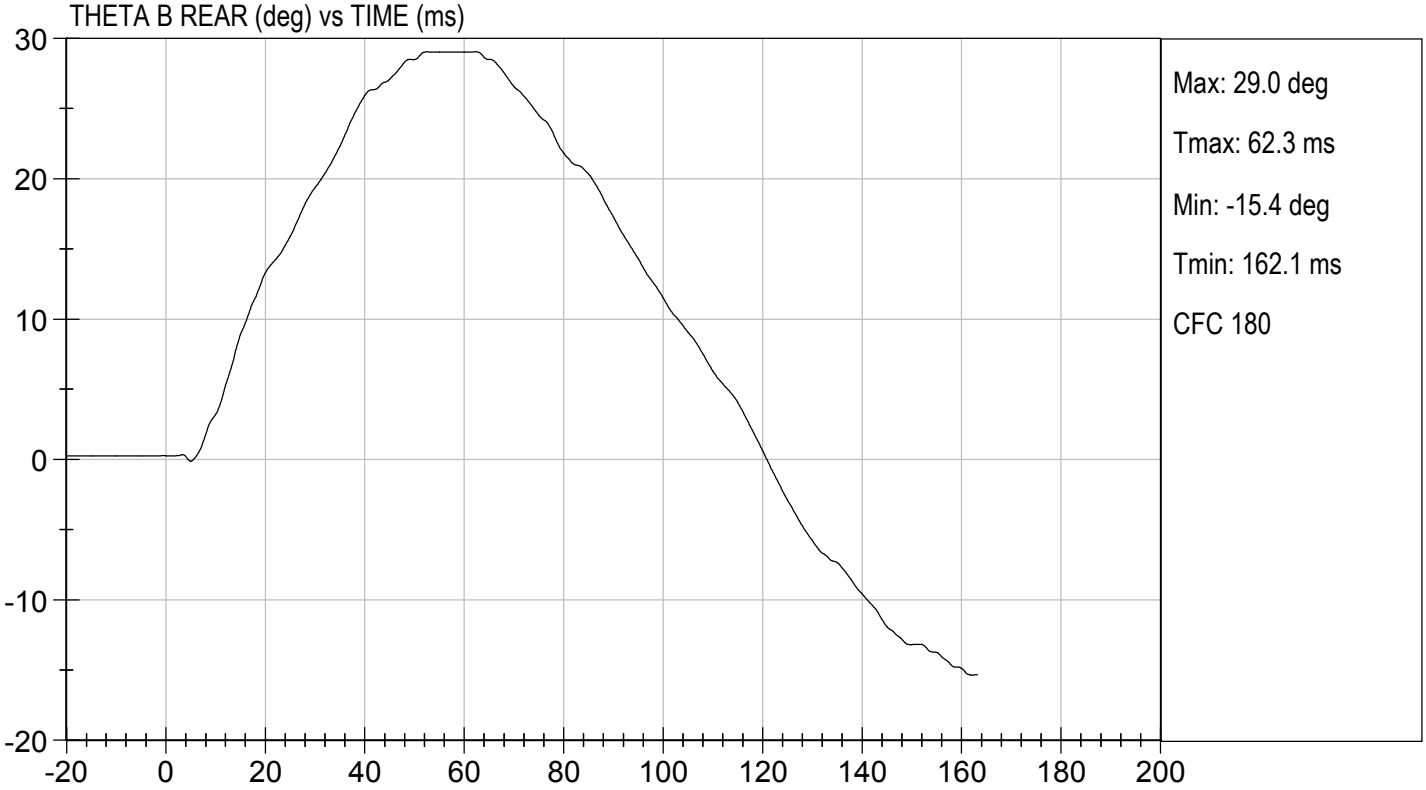
TEST DESC: NECK BENDING
VELOCITY: 11.49 ft/s, 3.50 m/s

TEST DATE: 09/14/2021
TEST #: D212892

THETA A FRONT (deg) vs TIME (ms)

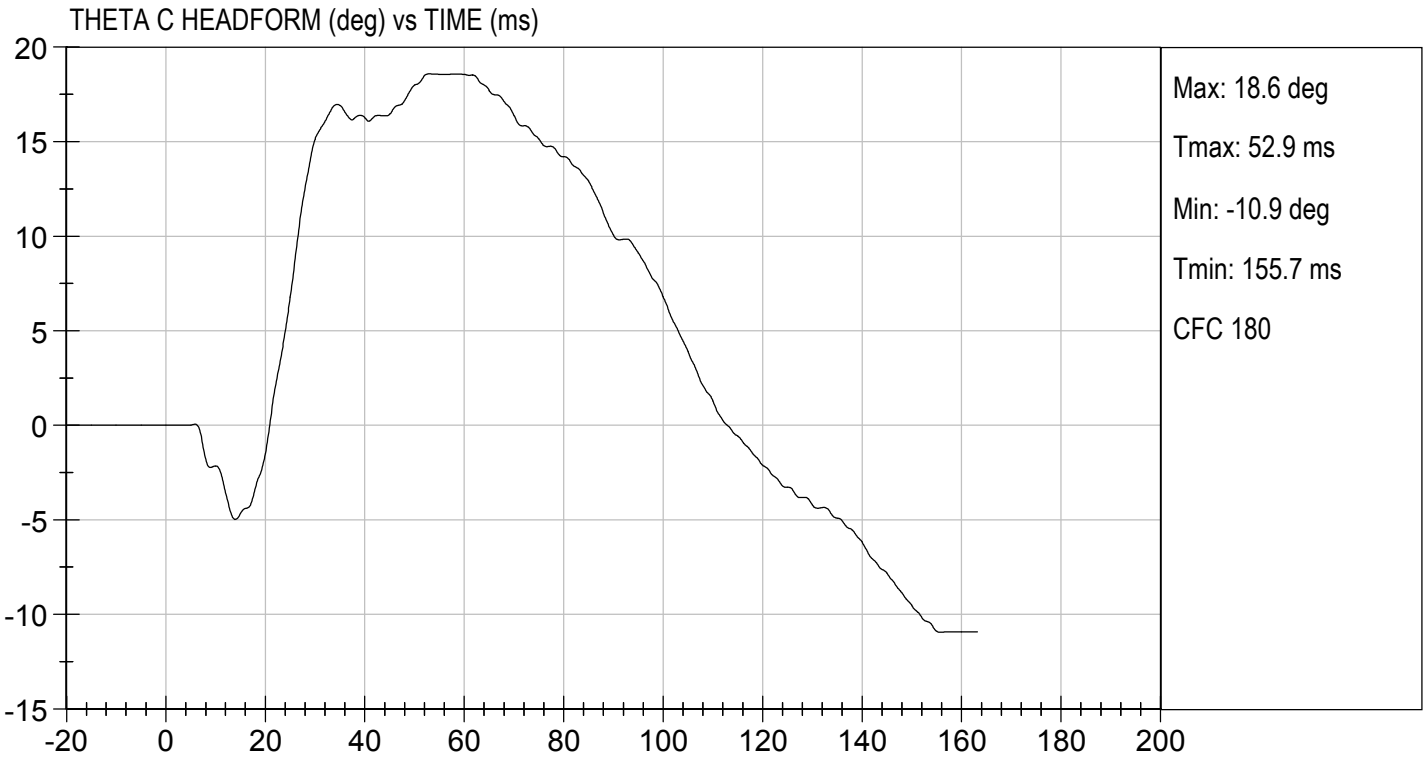


THETA B REAR (deg) vs TIME (ms)



TEST DESC: NECK BENDING
VELOCITY: 11.49 ft/s, 3.50 m/s

TEST DATE: 09/14/2021
TEST #: D212892



MGA RESEARCH CORPORATION

SHOULDER IMPACT TEST

ES-2re DUMMY

ATD Serial No: F032 **Test I.D:** D212893

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	42.8	Pass
Pendulum Speed	m/s	4.20 to 4.40	4.23	Pass
Peak Impactor Acceleration	G's	7.5 to 10.5	10.3	Pass
		Overall Test Results		Pass

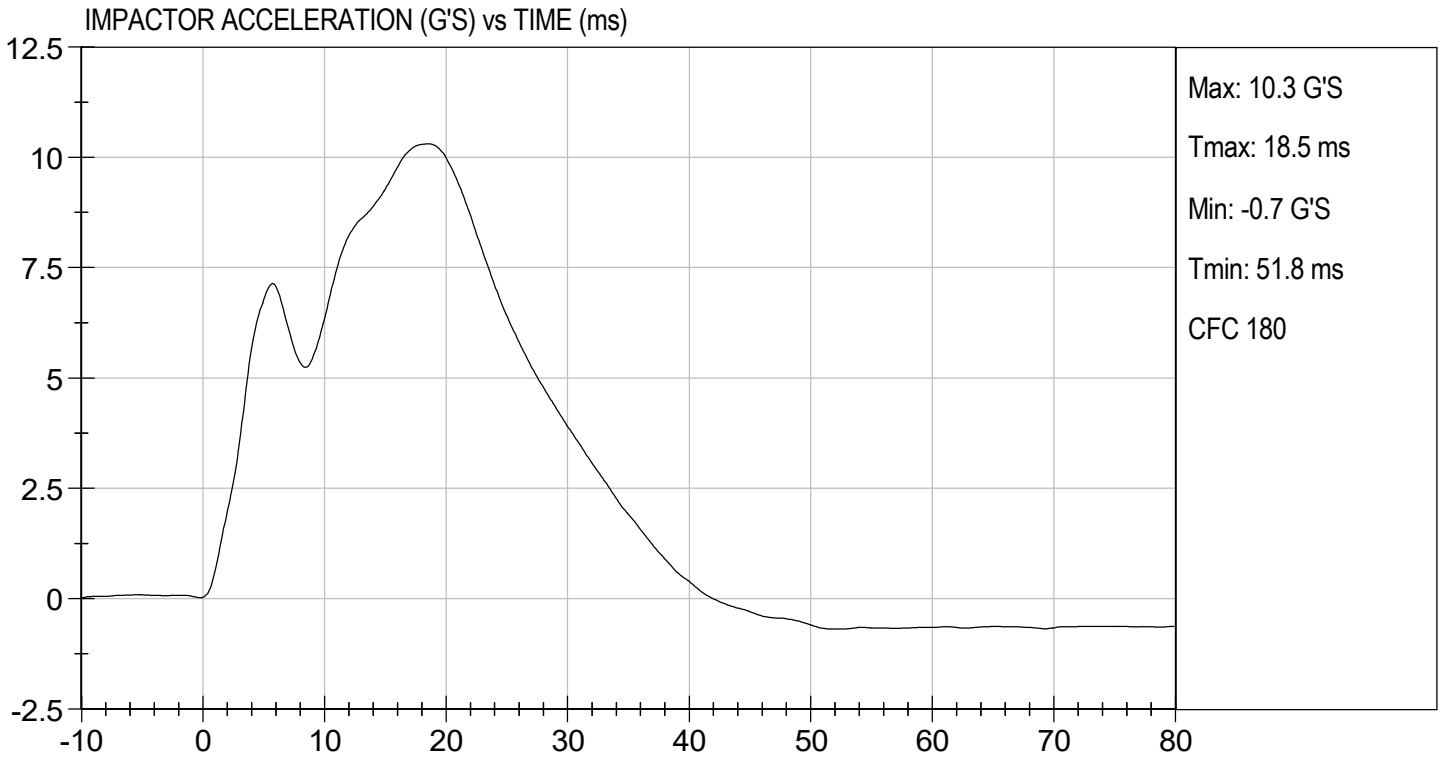
Laboratory Technician

09/09/2021
Test Date

Approved By

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

TEST DATE: 09/09/2021
TEST #: D212893



MGA RESEARCH CORPORATION

UPPER RIB TEST

ES-2re DUMMY

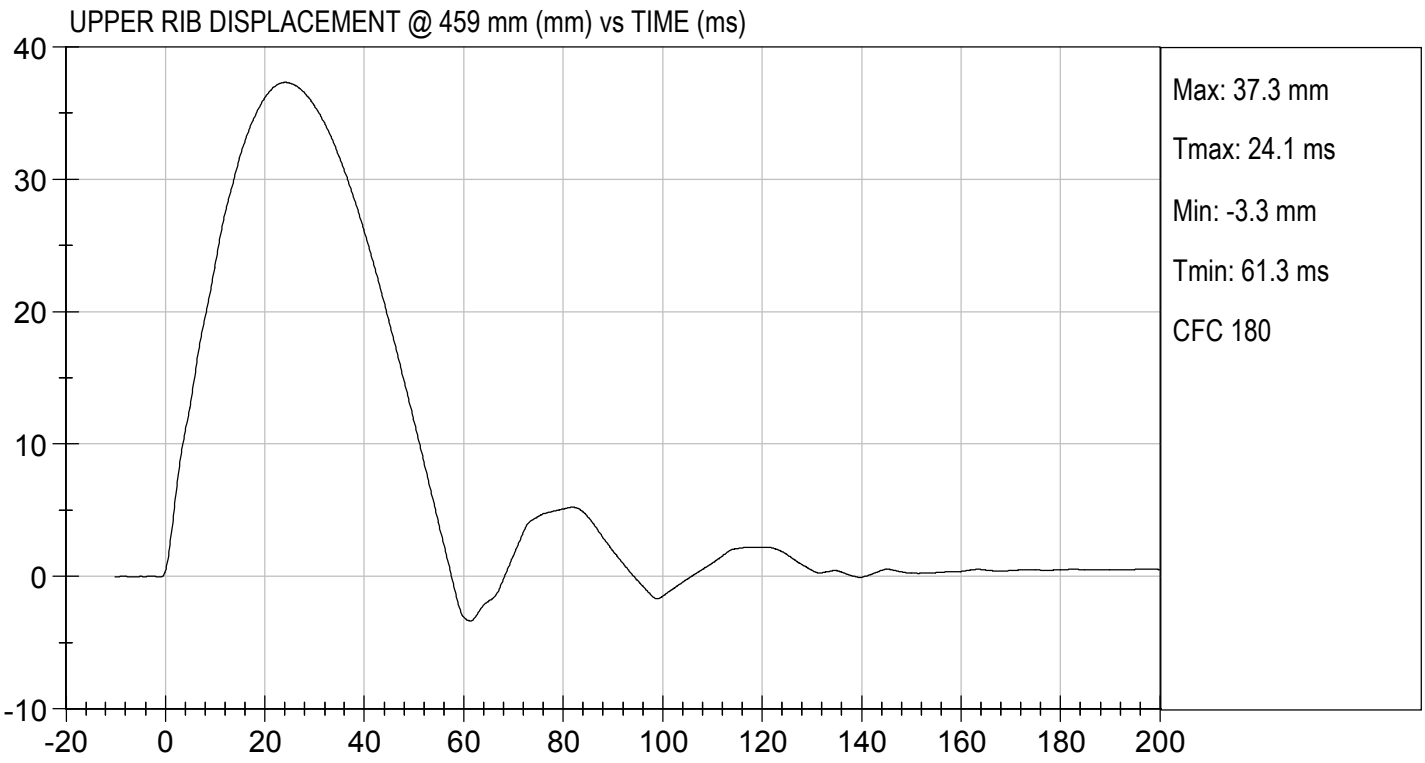
ATD Serial No: F032 **Test I.D:** D212894

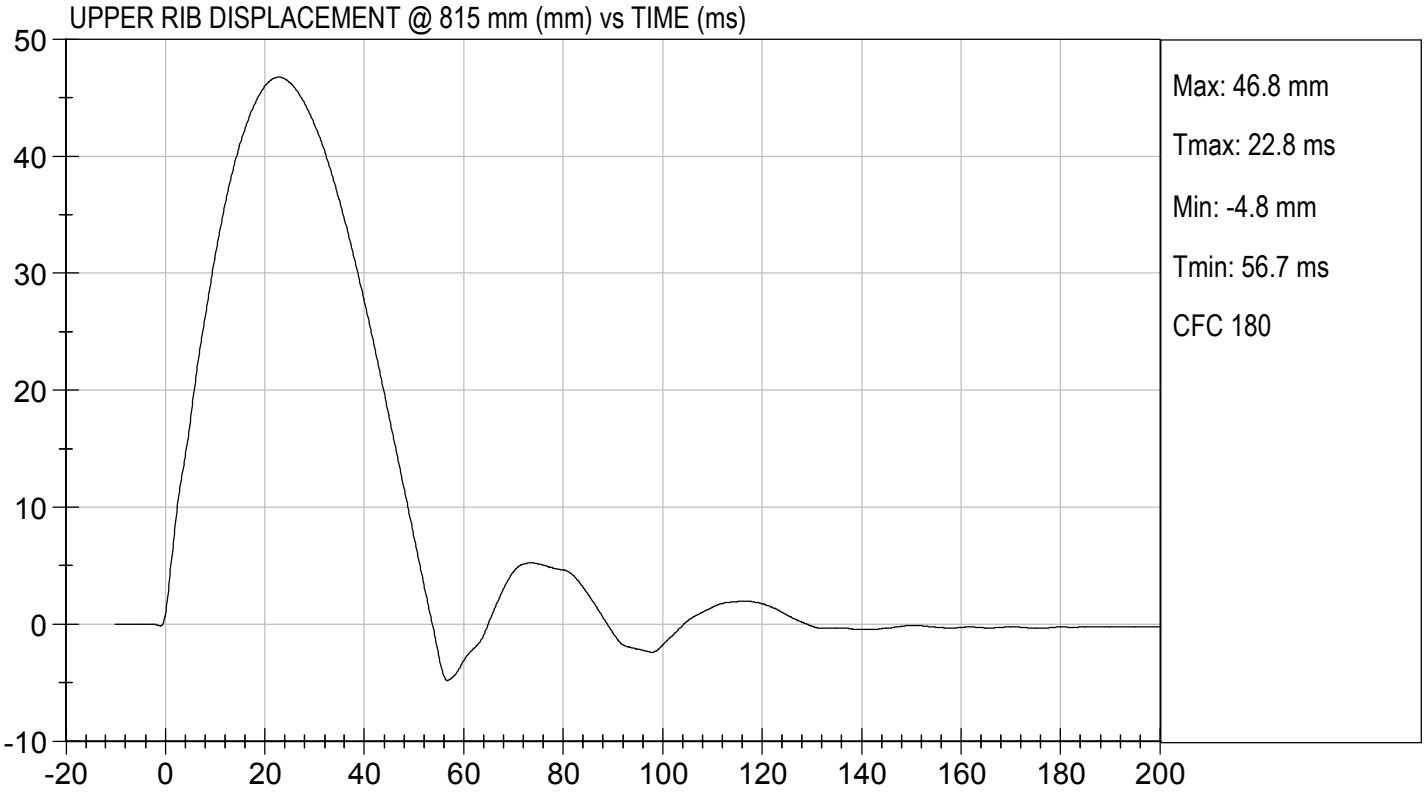
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	45	Pass
Displacement at 459 mm	mm	36.0 to 40.0	37.3	Pass
Displacement at 815 mm	mm	46.0 to 51.0	46.8	Pass
		Overall Test Results		Pass

Laboratory Technician

09/14/2021
Test Date

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: 37.3 mm
Tmax: 24.1 ms
Min: -3.3 mm
Tmin: 61.3 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: 46.8 mm
Tmax: 22.8 ms
Min: -4.8 mm
Tmin: 56.7 ms
CFC 180

MGA RESEARCH CORPORATION

MID RIB TEST

ES-2re DUMMY

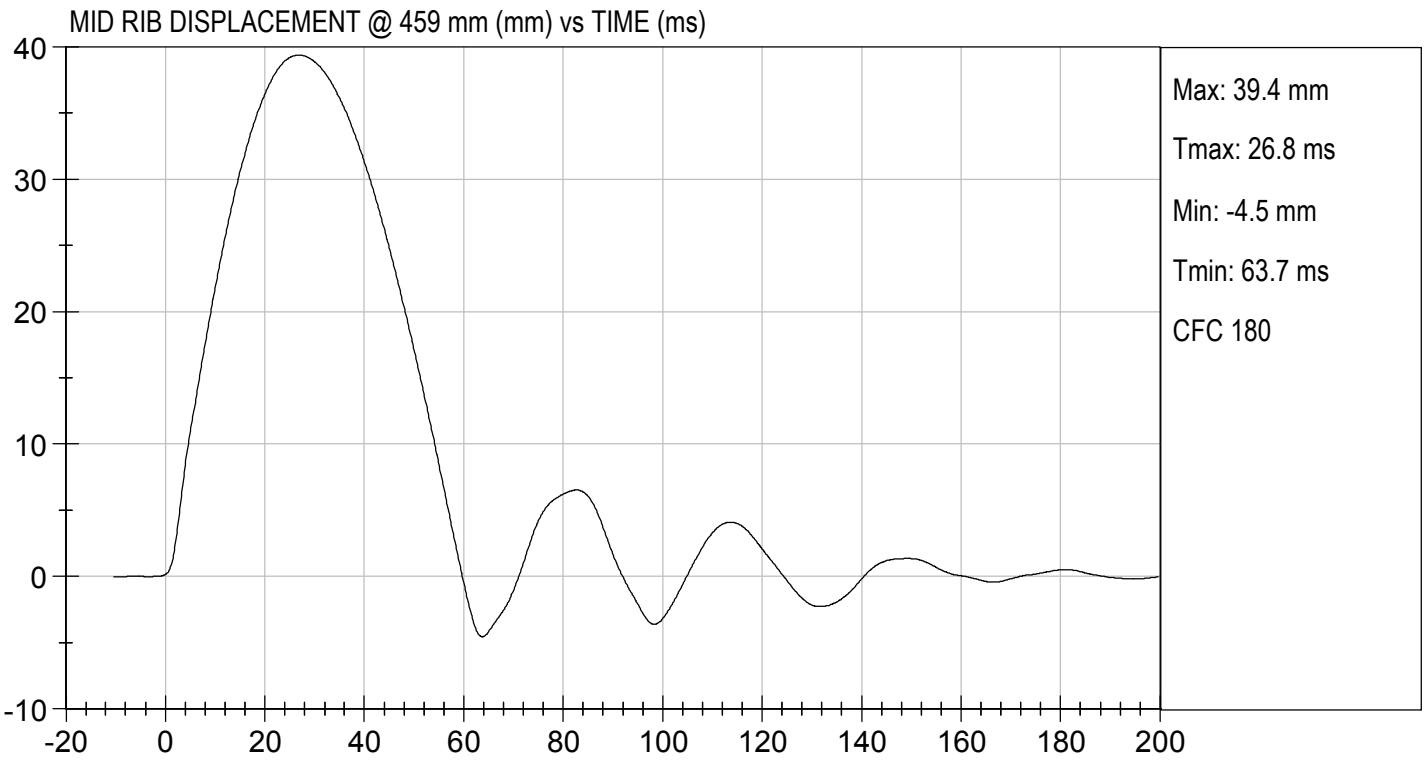
ATD Serial No: F032 **Test I.D:** D212895

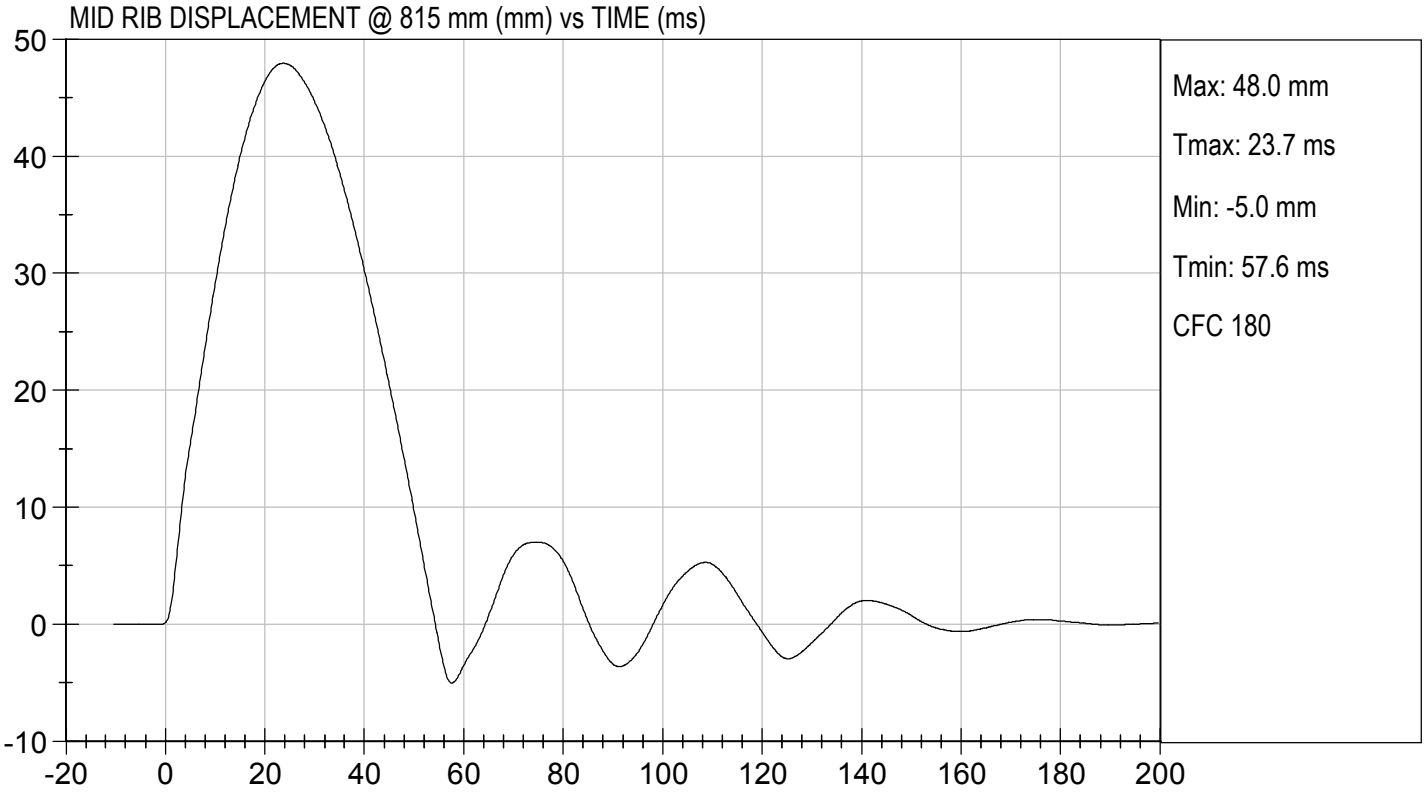
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	45	Pass
Displacement at 459 mm	mm	36.0 to 40.0	39.4	Pass
Displacement at 815 mm	mm	46.0 to 51.0	47.9	Pass
		Overall Test Results		Pass

Laboratory Technician

09/14/2021
Test Date

Approved By


MID 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: 39.4 mm
Tmax: 26.8 ms
Min: -4.5 mm
Tmin: 63.7 ms
CFC 180


MID 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: 48.0 mm
Tmax: 23.7 ms
Min: -5.0 mm
Tmin: 57.6 ms
CFC 180

MGA RESEARCH CORPORATION

LOWER RIB TEST

ES-2re DUMMY

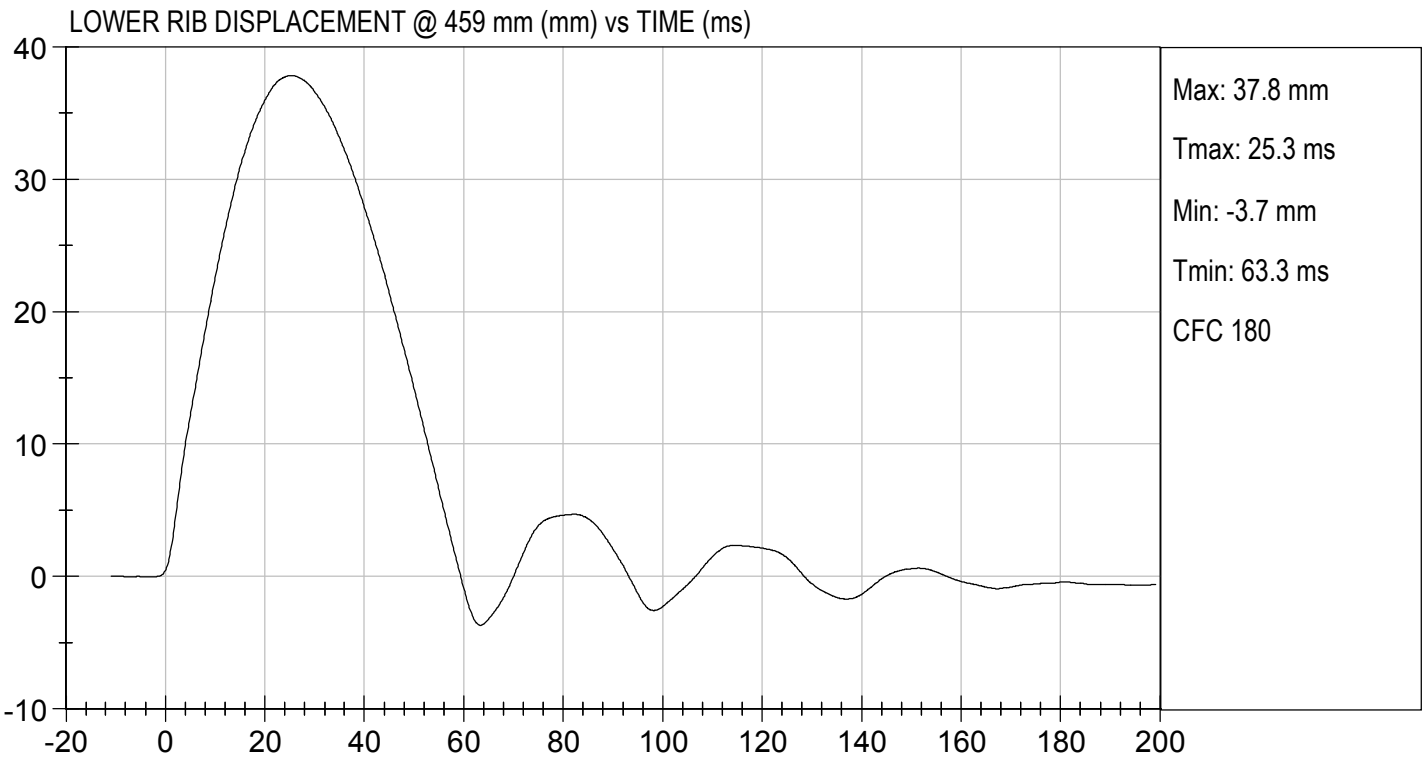
ATD Serial No: F032 **Test I.D:** D212896

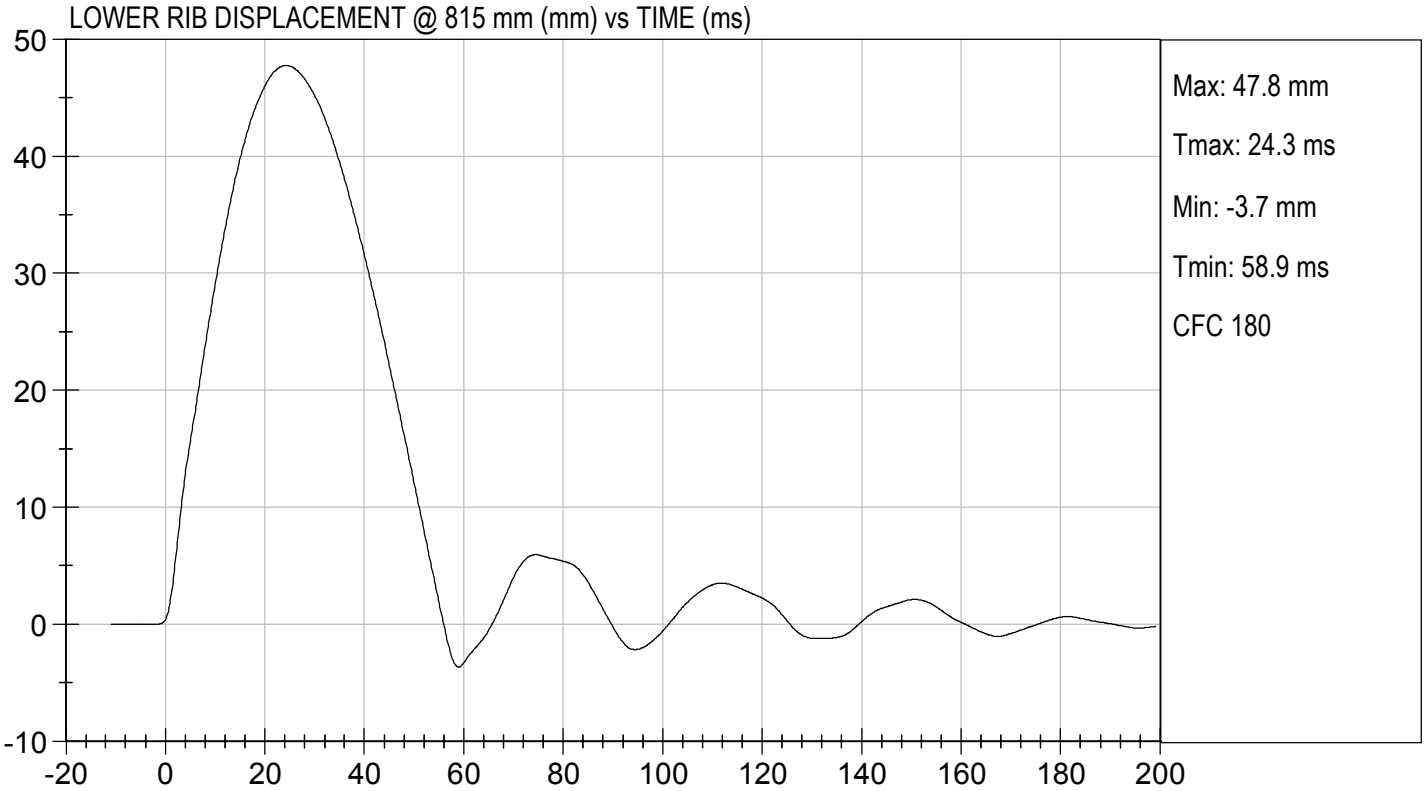
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	45	Pass
Displacement at 459 mm	mm	36.0 to 40.0	37.8	Pass
Displacement at 815 mm	mm	46.0 to 51.0	47.8	Pass
		Overall Test Results		Pass

Laboratory Technician

09/14/2021
Test Date

Approved By


LOWER 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: 37.8 mm
Tmax: 25.3 ms
Min: -3.7 mm
Tmin: 63.3 ms
CFC 180


LOWER 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: 47.8 mm
Tmax: 24.3 ms
Min: -3.7 mm
Tmin: 58.9 ms
CFC 180

MGA RESEARCH CORPORATION

ABDOMEN TEST

ES-2re DUMMY

ATD Serial No: F032 **Test I.D:** D212897

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	43	Pass
Probe Speed	m/s	3.90 to 4.10	4.10	Pass
Maximum Impactor Force	N	4000 to 4800	4324	Pass
Time of Maximum Impactor Force	ms	10.6 to 13.0	12.0	Pass
Maximum Total Abdomen Force	N	2200 to 2700	2297	Pass
Time of Maximum Abdomen Force	ms	10.0 to 12.3	11.5	Pass
		Overall Test Results		Pass

Laboratory Technician

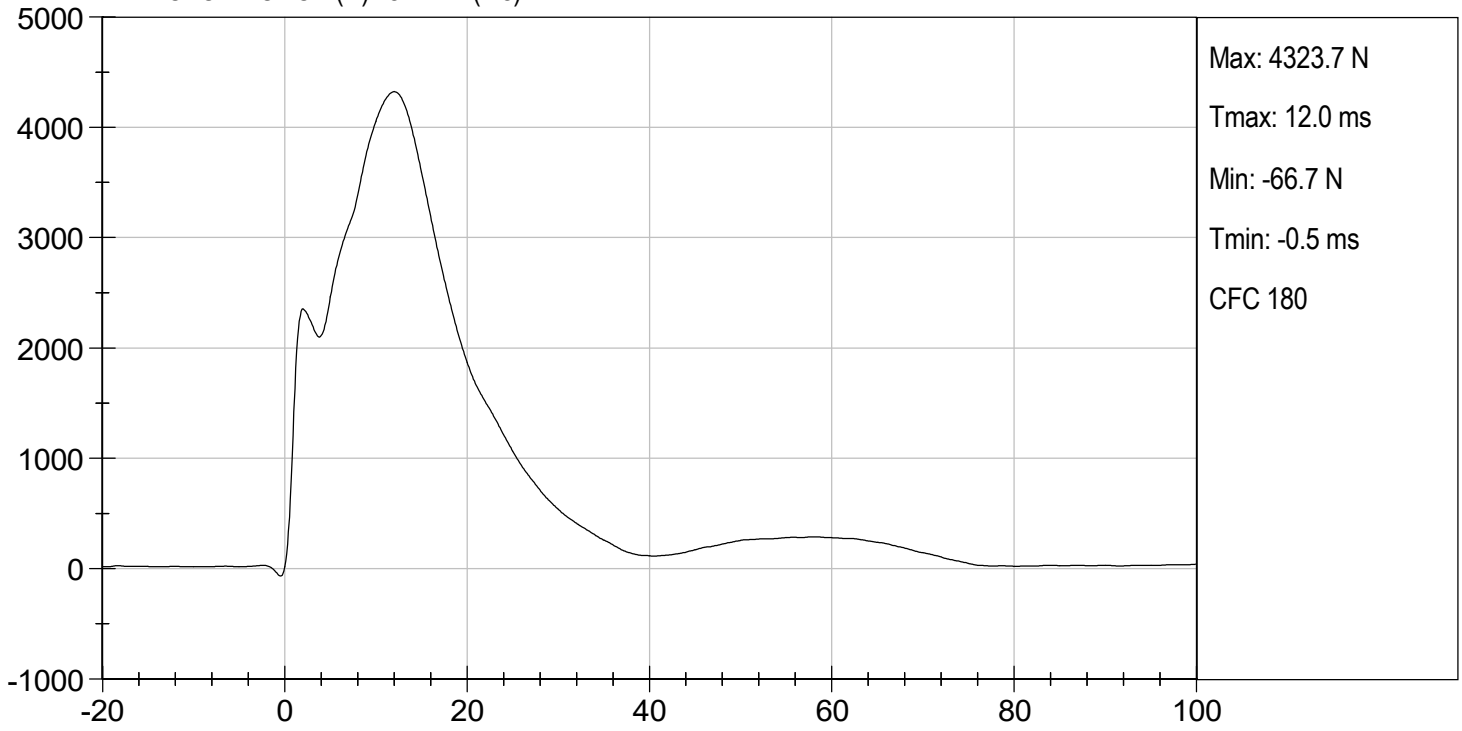
09/10/2021
Test Date

Approved By

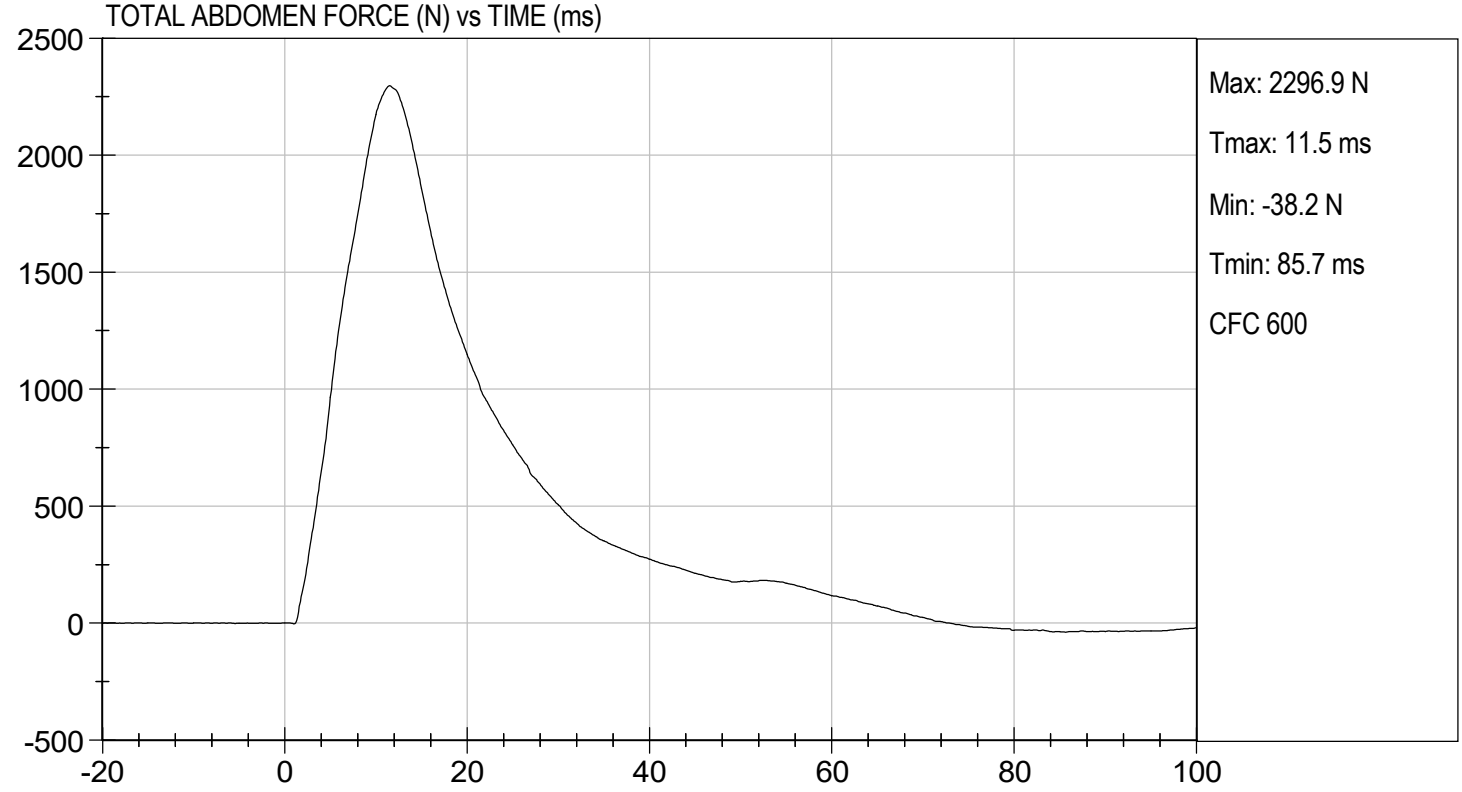
TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.44 ft/s, 4.10 m/s

TEST DATE: 09/10/2021
TEST #: D212897

IMPACTOR FORCE (N) vs TIME (ms)



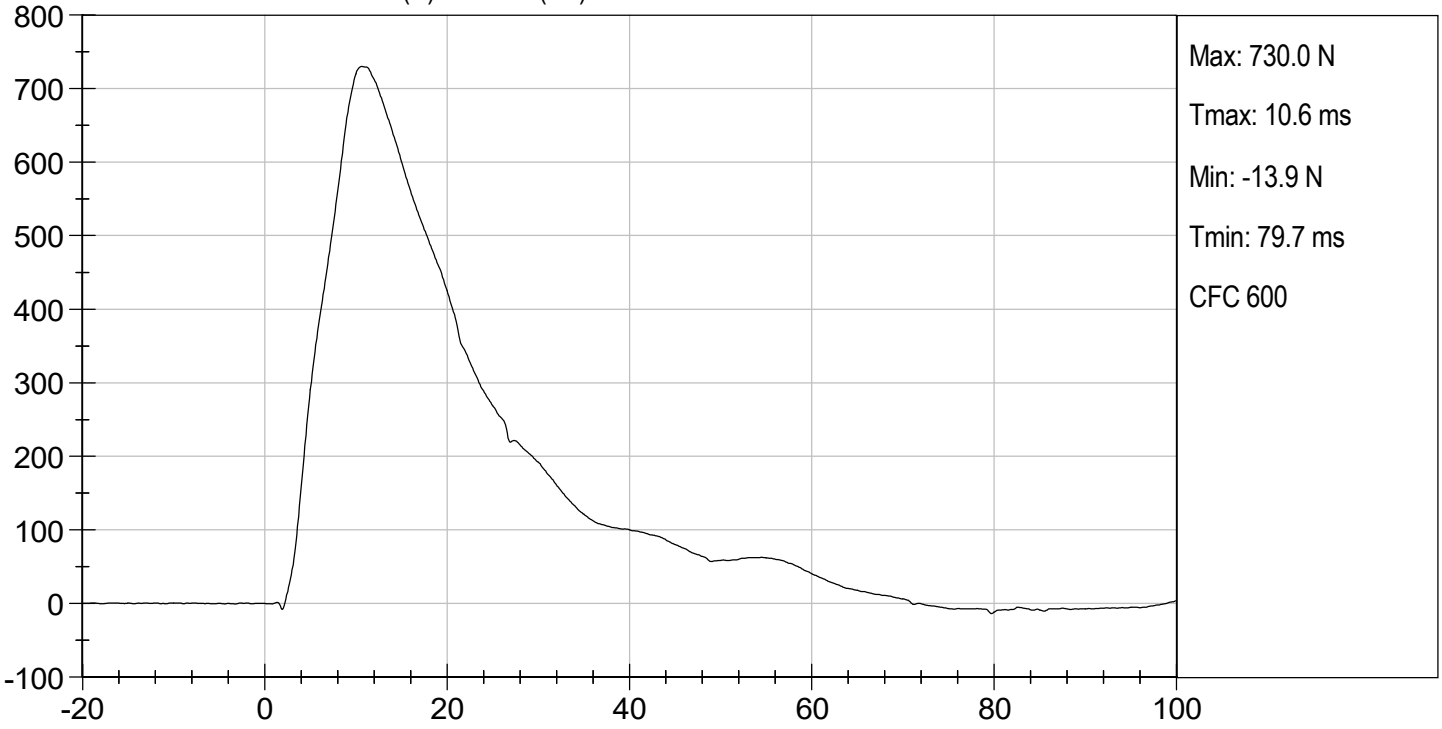
TOTAL ABDOMEN FORCE (N) vs TIME (ms)



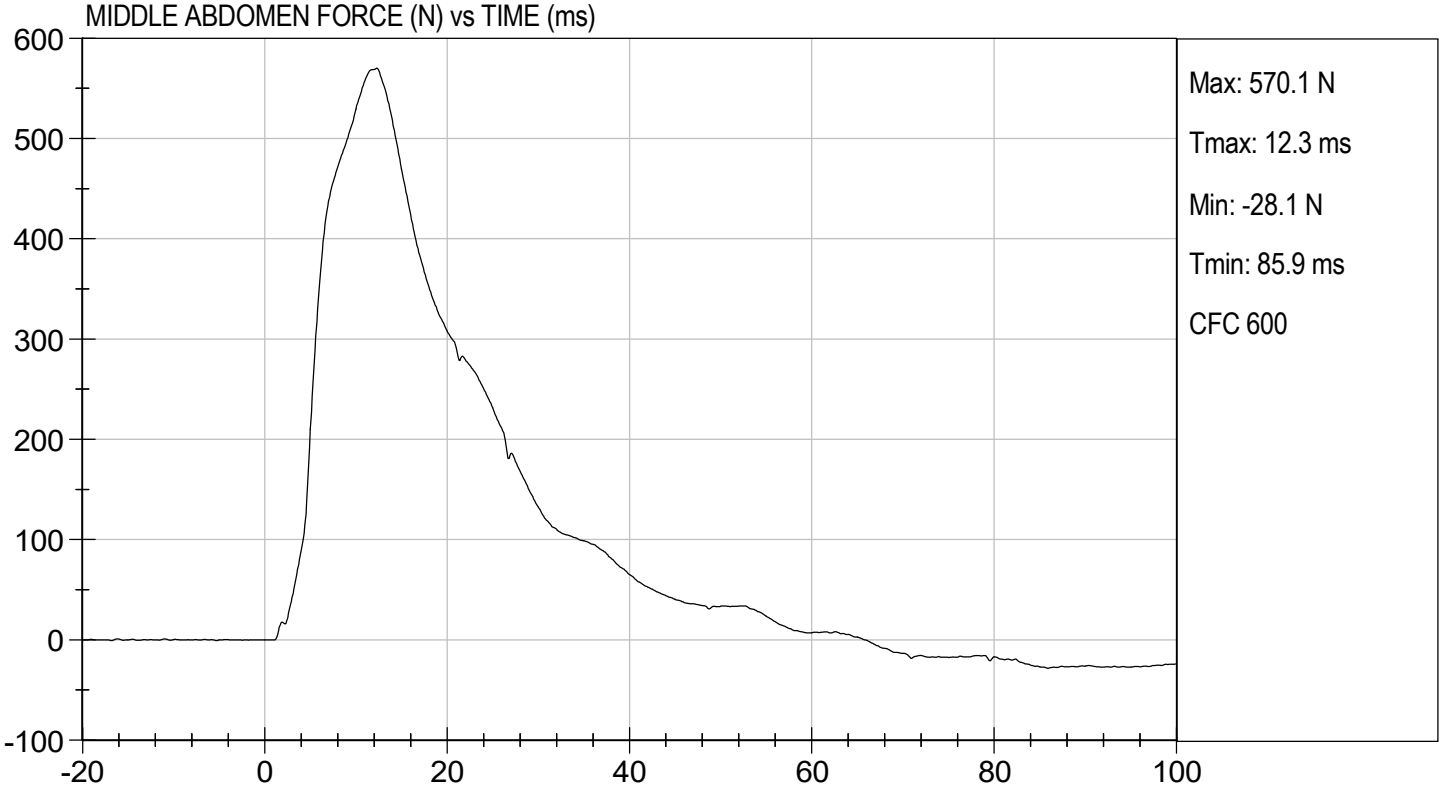
TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.44 ft/s, 4.10 m/s

TEST DATE: 09/10/2021
TEST #: D212897

FRONT ABDOMEN FORCE (N) vs TIME (ms)



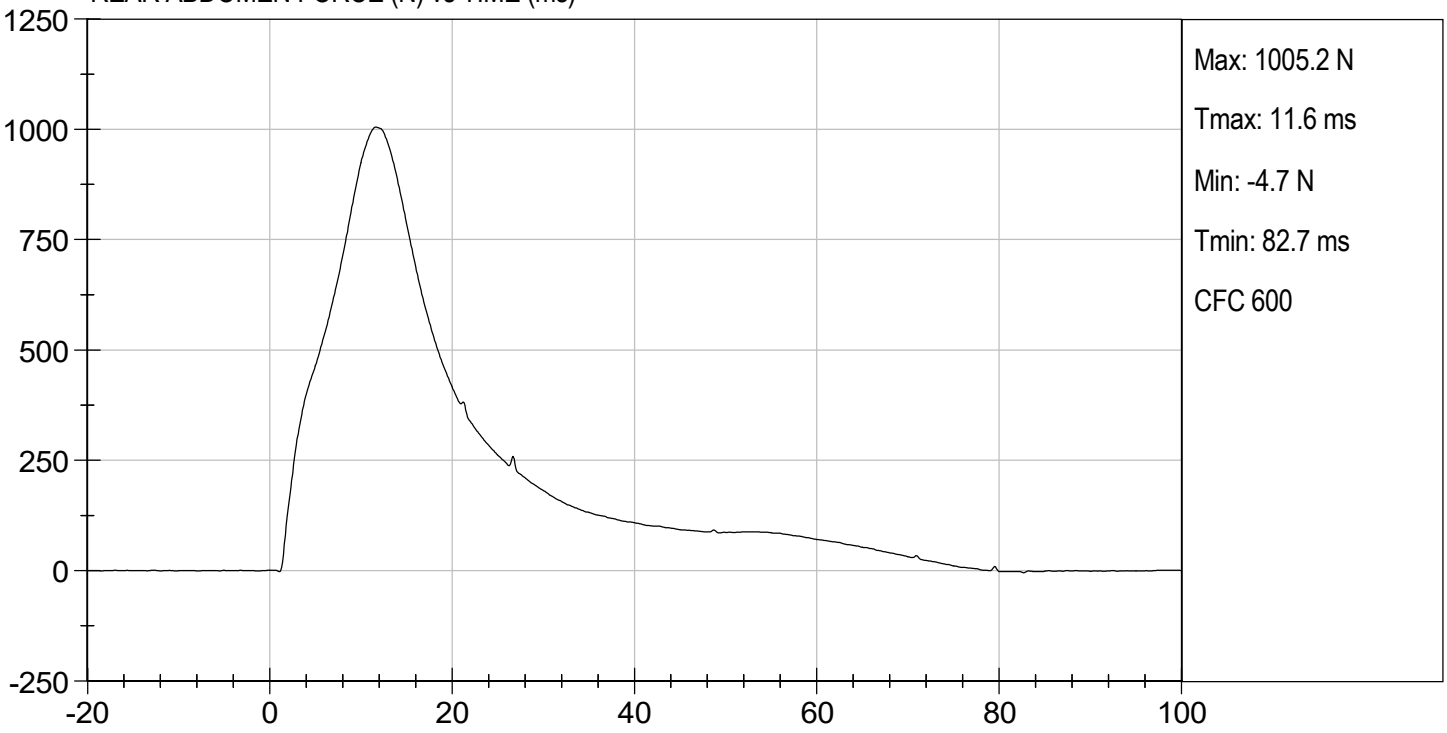
MIDDLE ABDOMEN FORCE (N) vs TIME (ms)



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

TEST DATE: 09/10/2021
TEST #: D212897

REAR ABDOMEN FORCE (N) vs TIME (ms)



MGA RESEARCH CORPORATION

LUMBAR SPINE TEST

ES-2re DUMMY

ATD Serial No: F032 **Test I.D:** D212898

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	42.2	Pass
Pendulum Speed		m/s	5.95 to 6.15	6.05	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	-0.409	Pass
	27 ms	m/s	-6.50 to -5.80	-5.95	Pass
	30 ms	m/s	>= -6.50	-6.14	Pass
Maximum Flexion Angle		deg	45.0 to 55.0	46.4	Pass
Time of Maximum Flexion Angle		ms	39.0 to 53.0	43.0	Pass
Headform Rotation Decay to Initial Position		ms	37 to 57	41	Pass
			Overall Results		Pass

Laboratory Technician

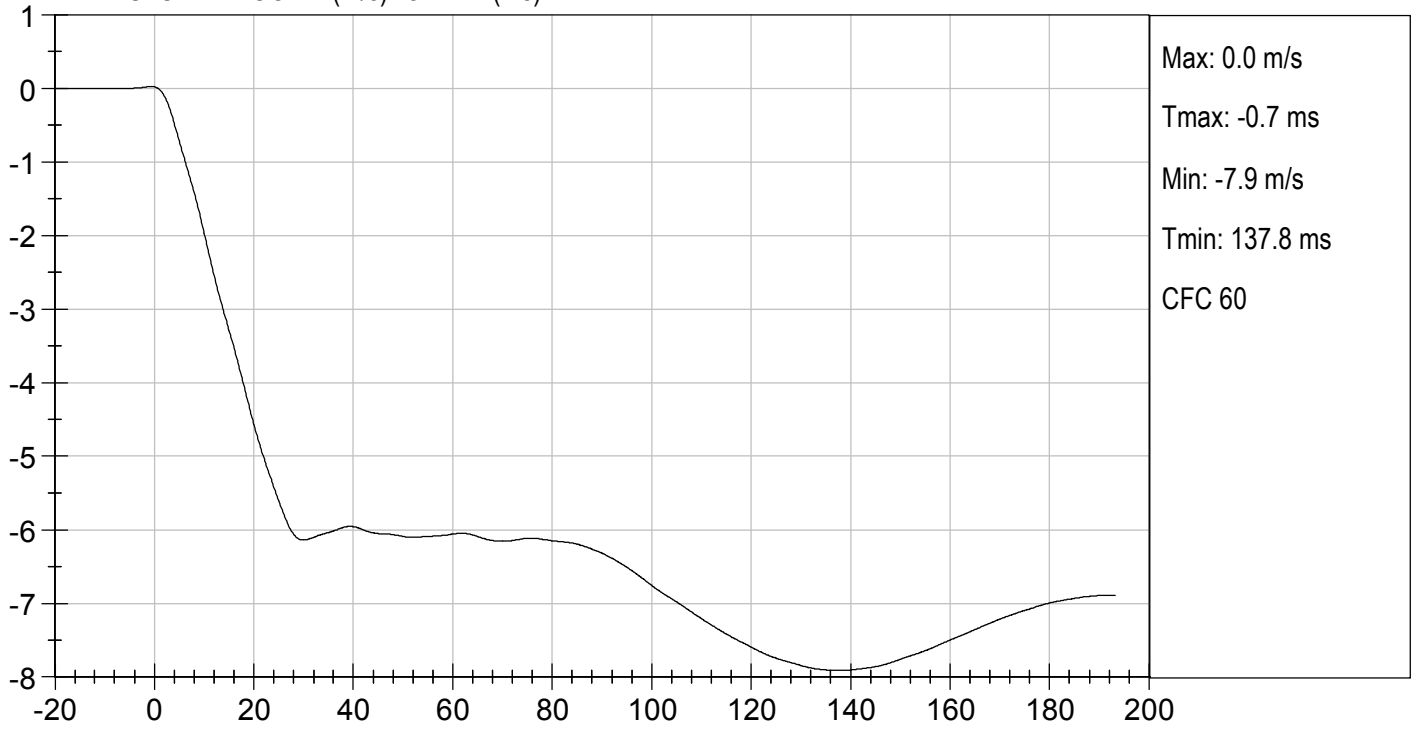
09/08/2021
Test Date

Approved By

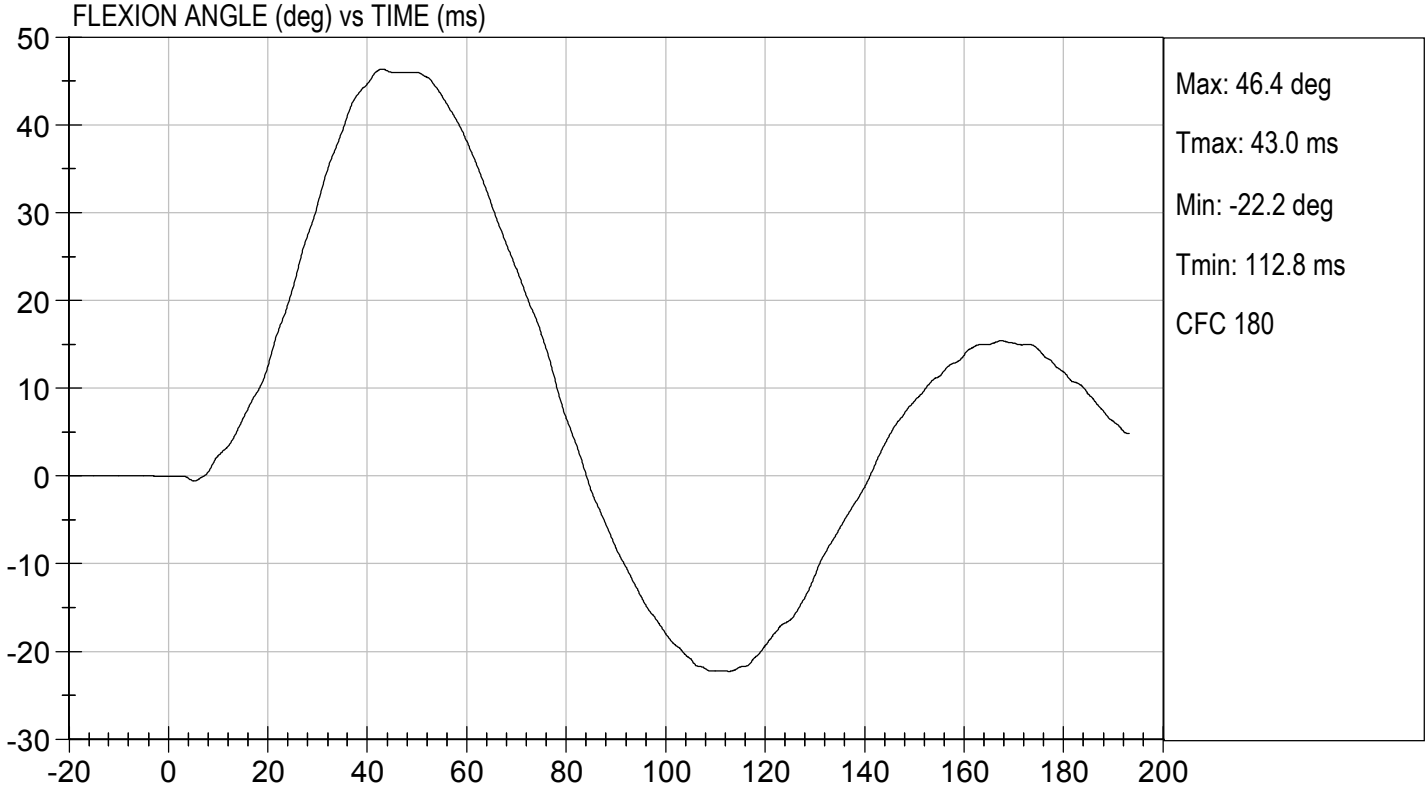
TEST DESC: LUMBAR BENDING
VELOCITY: 19.84 ft/s, 6.05 m/s

TEST DATE: 09/08/2021
TEST #: D212898

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

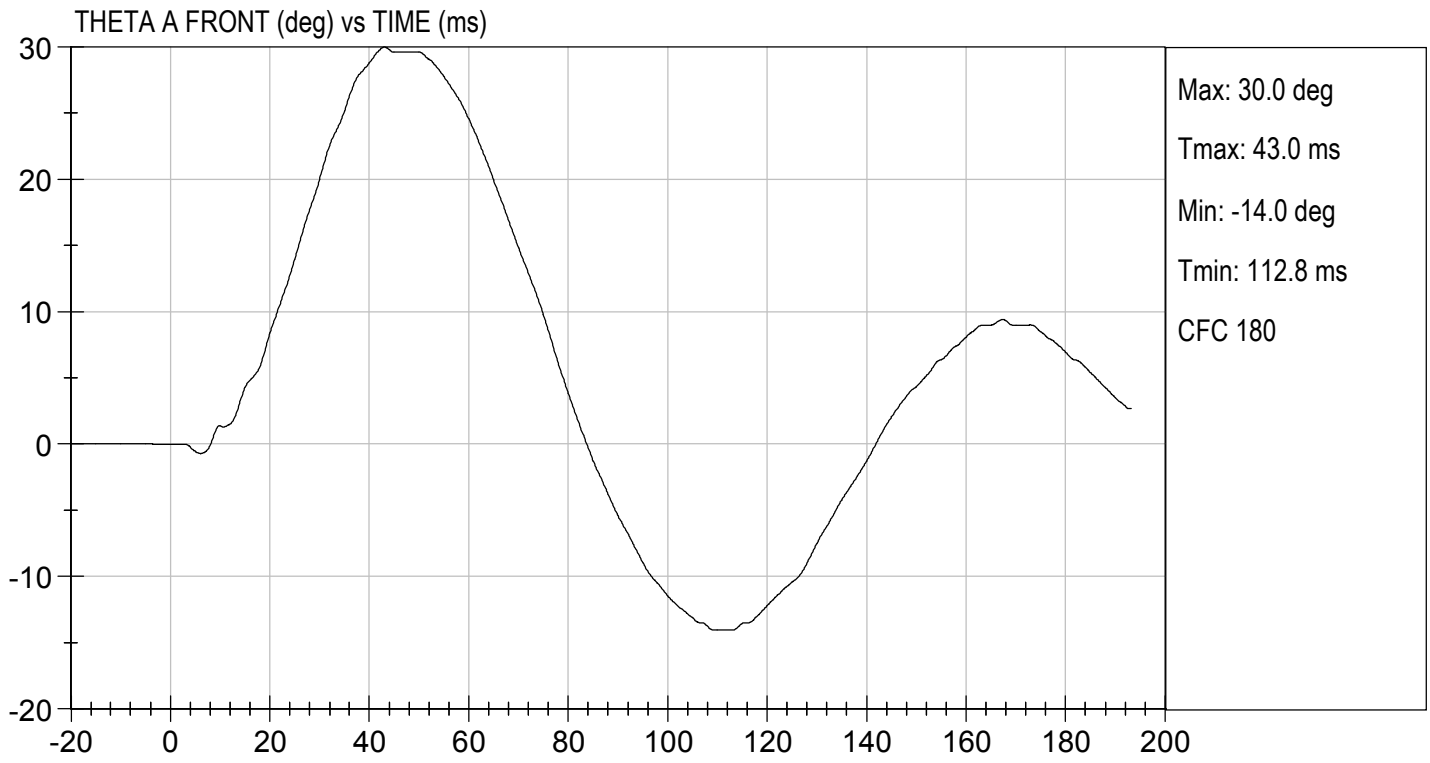


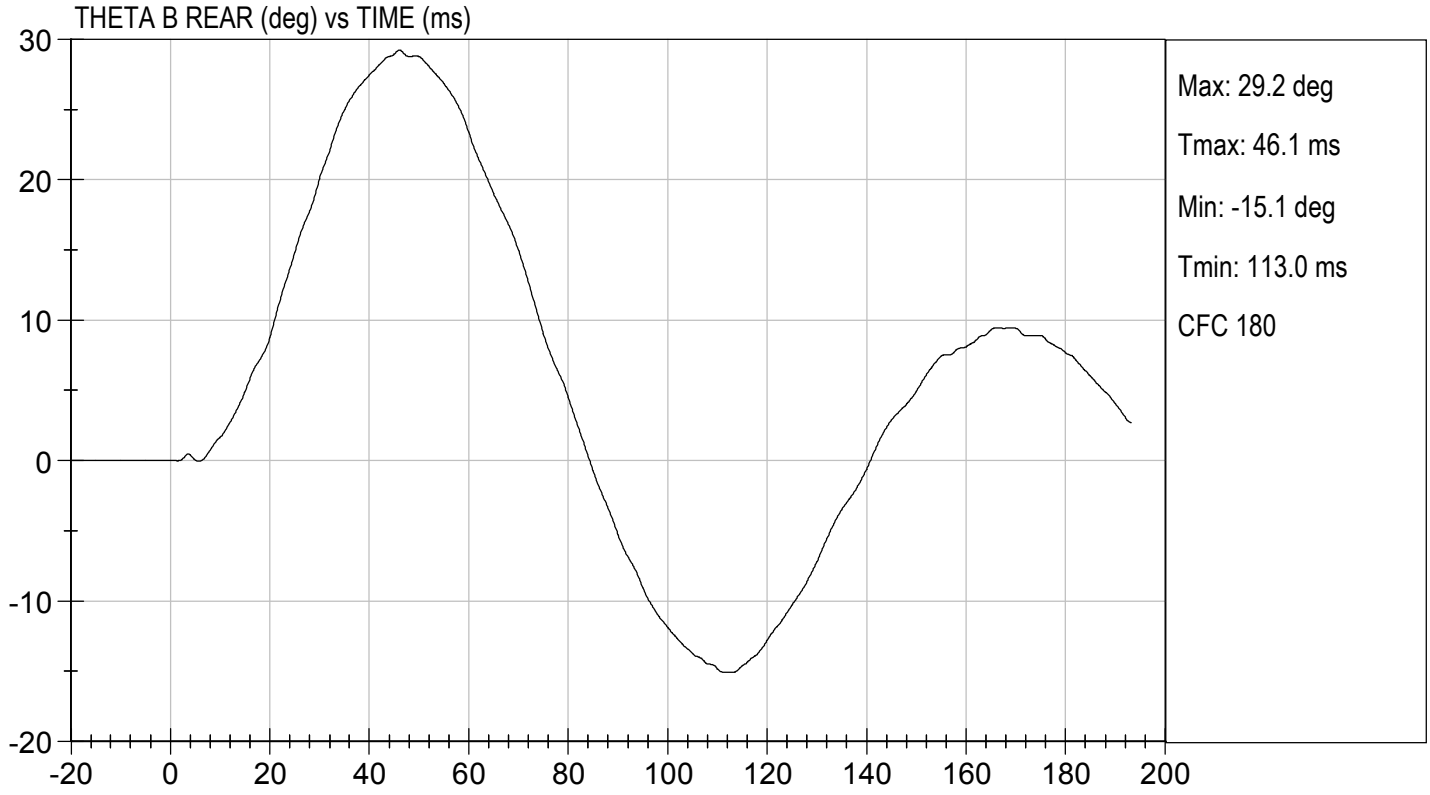
FLEXION ANGLE (deg) vs TIME (ms)



TEST DESC: LUMBAR BENDING
VELOCITY: 19.84 ft/s, 6.05 m/s

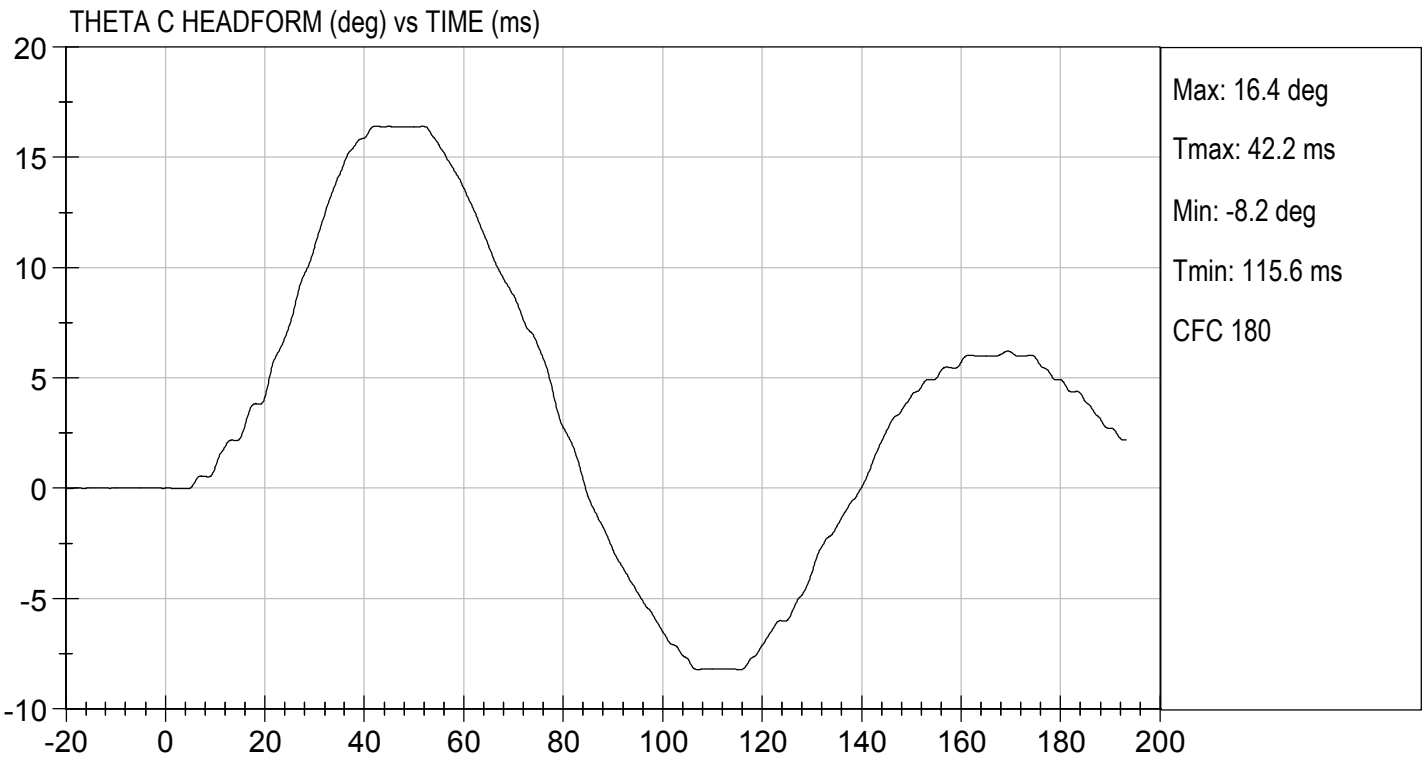
TEST DATE: 09/08/2021
TEST #: D212898





TEST DESC: LUMBAR BENDING
VELOCITY: 19.84 ft/s, 6.05 m/s

TEST DATE: 09/08/2021
TEST #: D212898



MGA RESEARCH CORPORATION

PELVIS TEST

ES-2re DUMMY

ATD Serial No: F032 **Test I.D:** D212899

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	43	Pass
Probe Speed	m/s	4.20 to 4.40	4.21	Pass
Maximum Impactor Force	N	4700 to 5400	4891	Pass
Time of Maximum Impactor Force	ms	11.8 to 16.1	13.3	Pass
Maximum Pubic Force	N	1230 to 1590	1318	Pass
Time of Maximum Pubic Force	ms	12.2 to 17.0	12.9	Pass
		Overall Test Results		Pass

Laboratory Technician

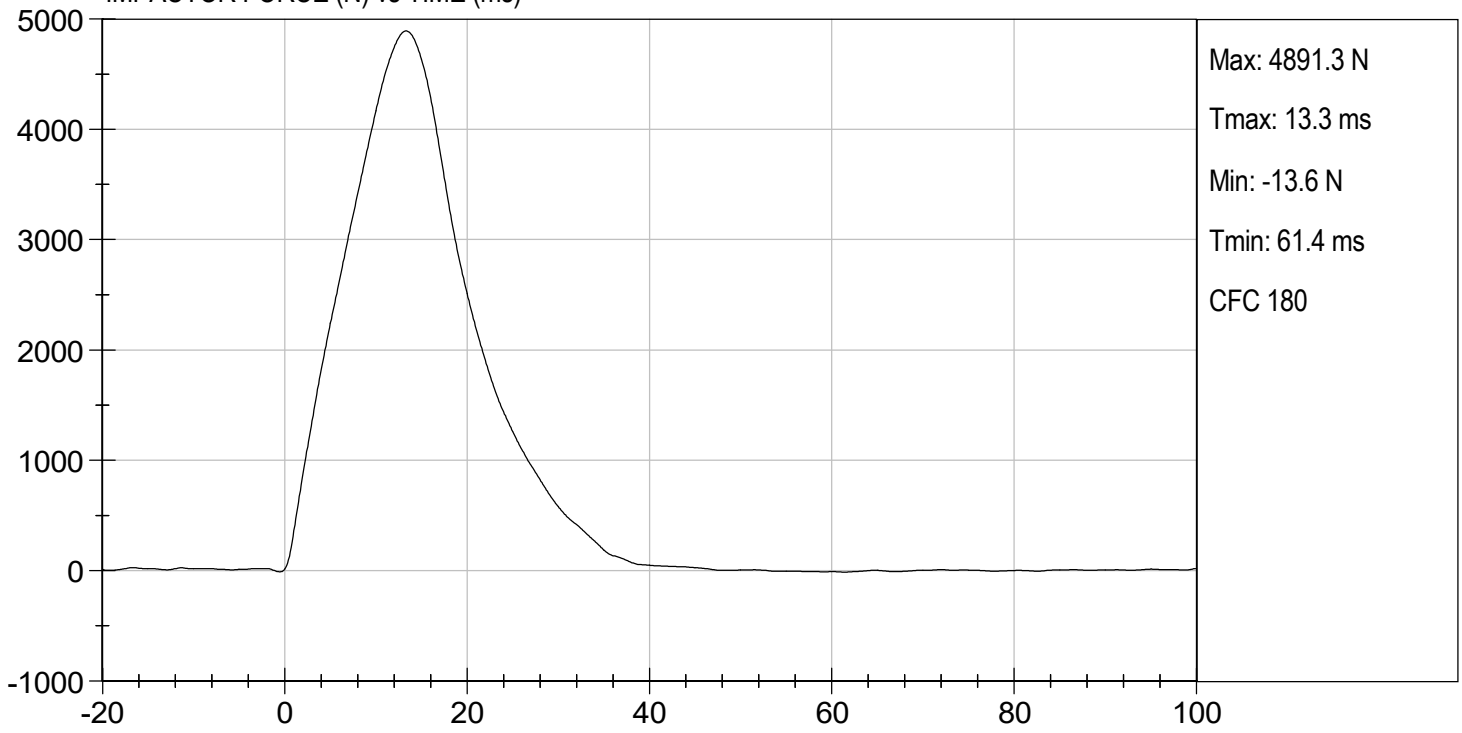
09/10/2021
Test Date

Approved By

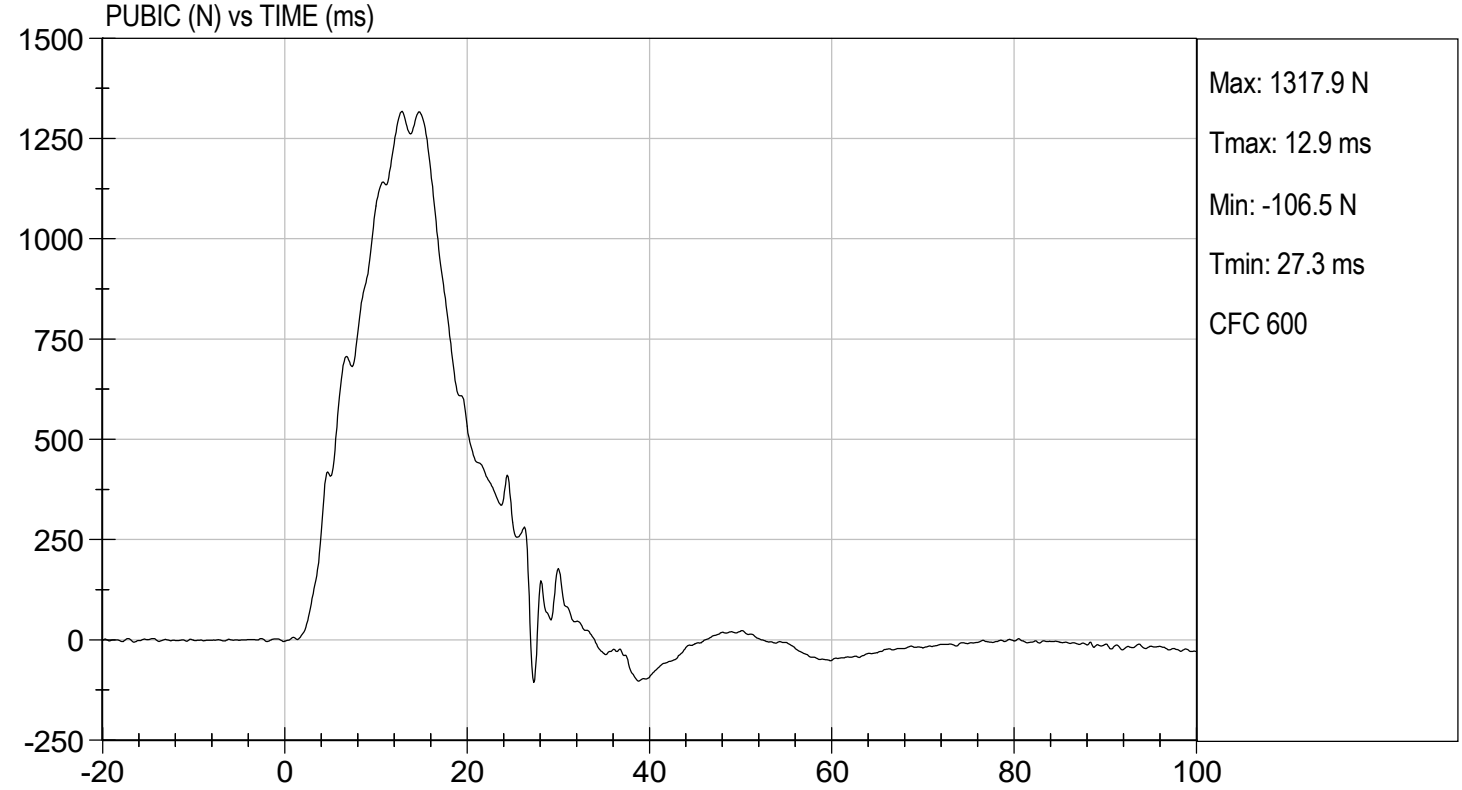
TEST DESC: PELVIS IMPACT
VELOCITY: 13.82 ft/s, 4.21 m/s

TEST DATE: 09/10/2021
TEST #: D212899

IMPACTOR FORCE (N) vs TIME (ms)



PUBIC (N) vs TIME (ms)



MGA RESEARCH CORPORATION

THORAX IMPACT TEST

ES-2re DUMMY

ATD Serial No: F032 **Test I.D:** D212890

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	43	Pass
Probe Speed	m/s	5.40 to 5.60	5.46	Pass
Maximum Impactor Force (after 6 ms)	N	5100 to 6200	6003	Pass
Upper Rib Displacement	mm	34.0 to 41.0	36.7	Pass
Middle Rib Displacement	mm	37.0 to 45.0	38.9	Pass
Lower Rib Displacement	mm	37.0 to 44.0	39.6	Pass
		Overall Test Results		Pass

Laboratory Technician

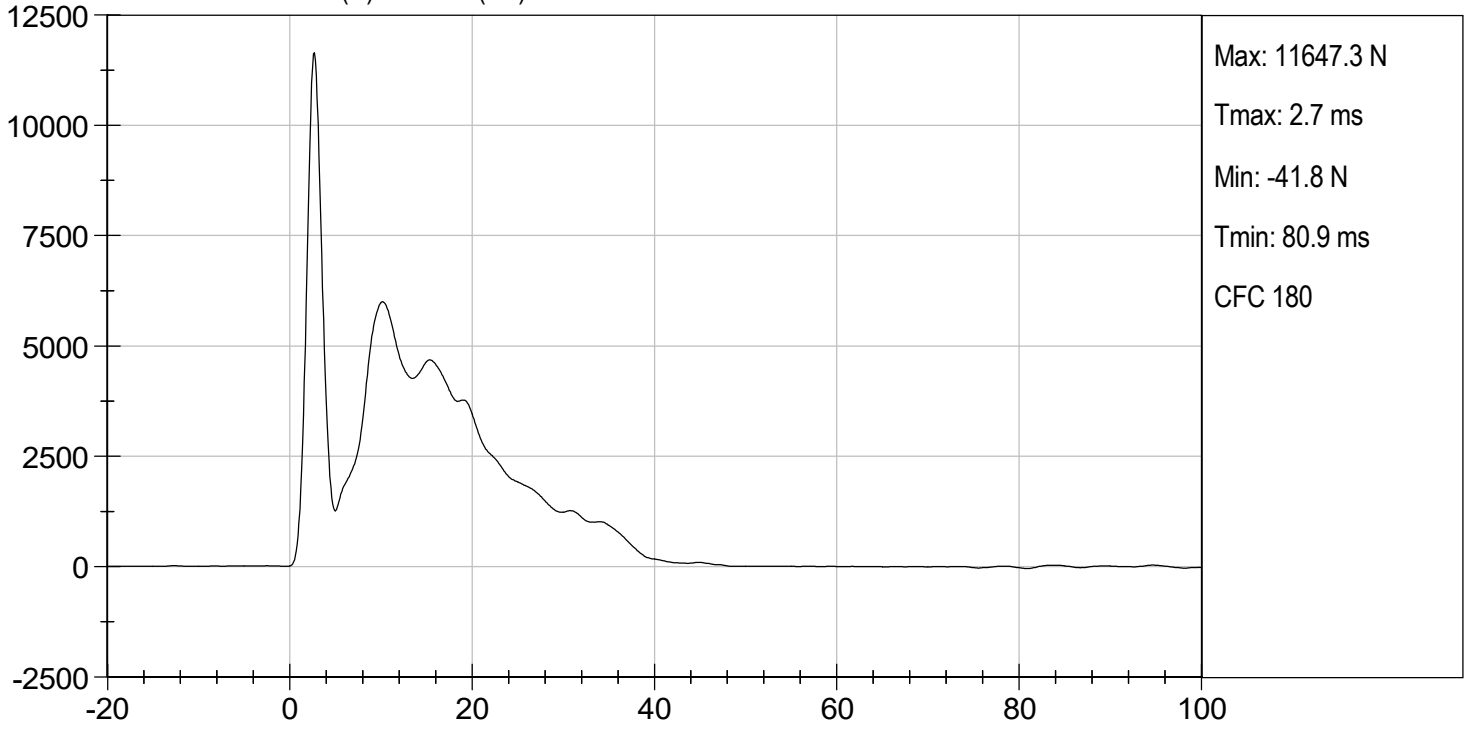
09/10/2021
Test Date

Approved By

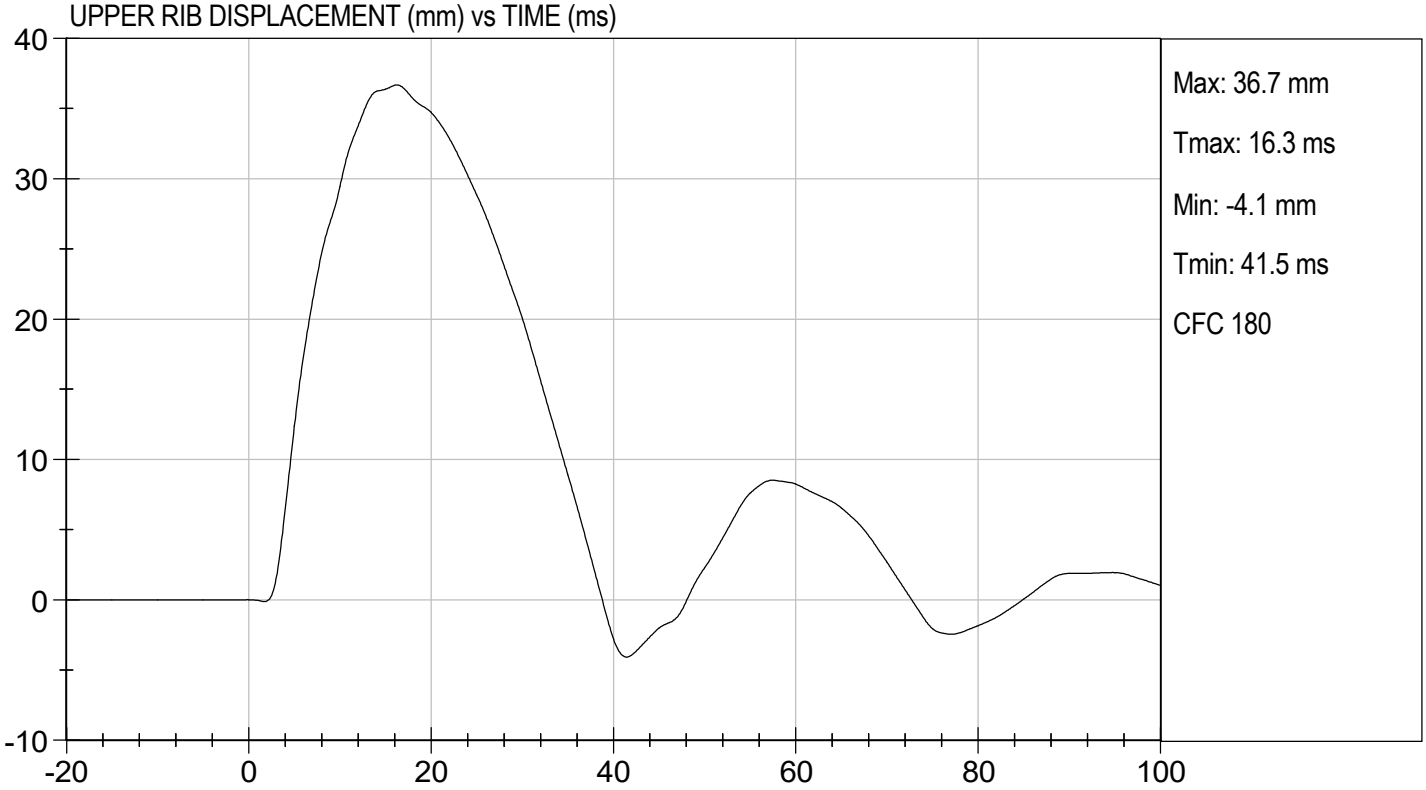
TEST DESC: THORAX IMPACT
VELOCITY: 17.92 ft/s, 5.46 m/s

TEST DATE: 09/10/2021
TEST #: D212890

IMPACTOR FORCE (N) vs TIME (ms)



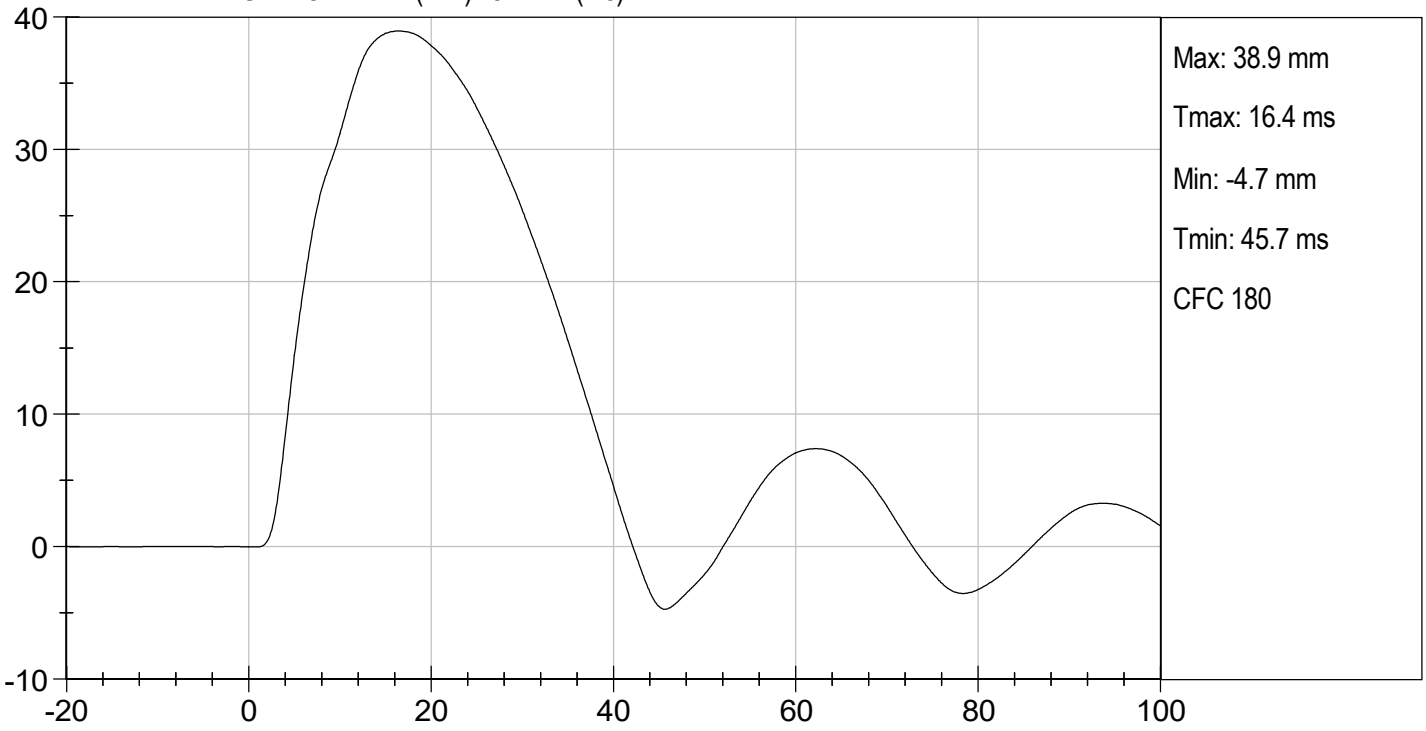
UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



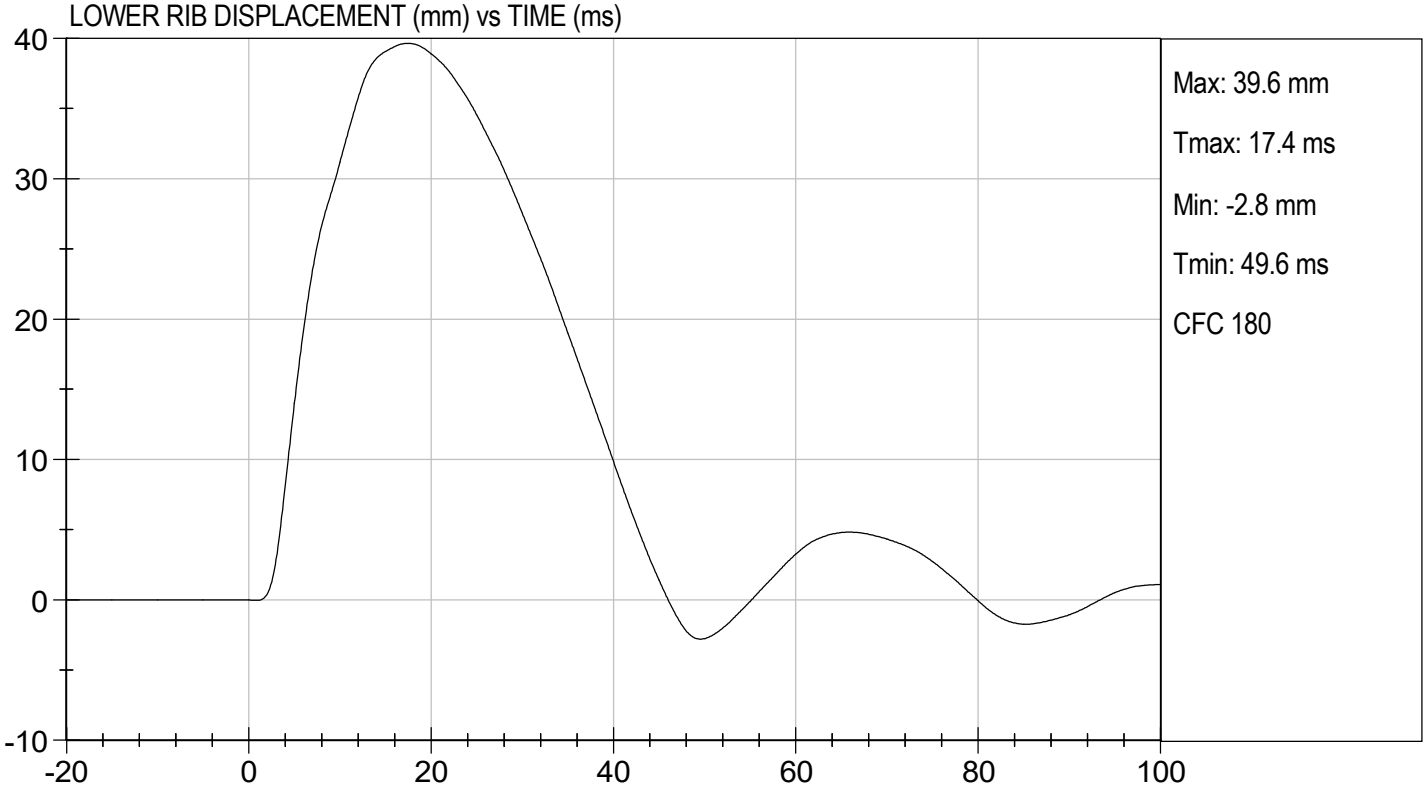
TEST DESC: THORAX IMPACT
VELOCITY: 17.92 ft/s, 5.46 m/s

TEST DATE: 09/10/2021
TEST #: D212890

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



CALIBRATION TEST RESULTS

POST-TEST

EUROSID 2 (ES-2RE) MALE – DRIVER ATD

ES-2re External Measurements
SN: F032

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: F032 **Test ID:** D213191

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	46	Pass
Peak Resultant Acceleration	G's	125 to 155	148	Pass
Peak Longitudinal Acceleration	G's	<= +/- 15.0	8.7	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 15% of peak	Yes	Pass
		Overall Test Results		Pass

Laboratory Technician

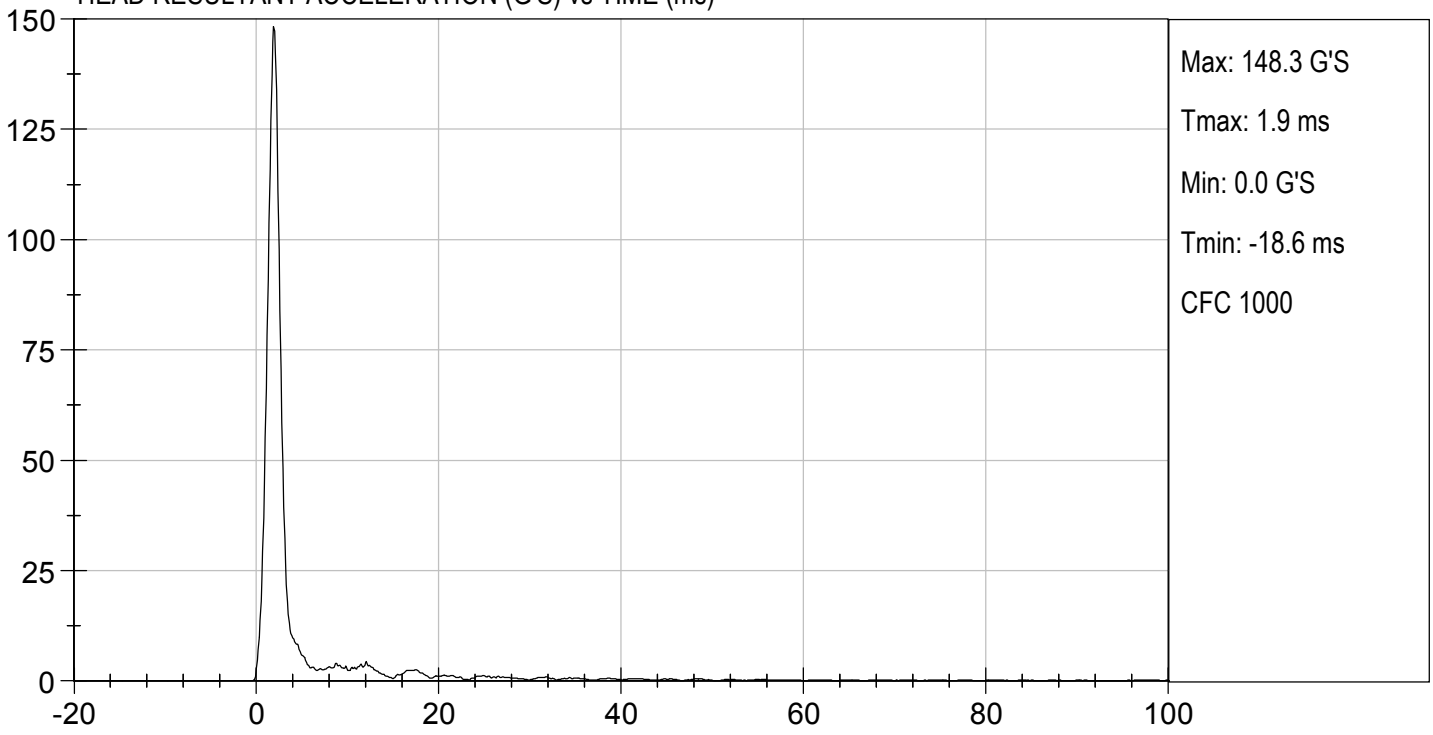
10/07/2021
Test Date

Approved By

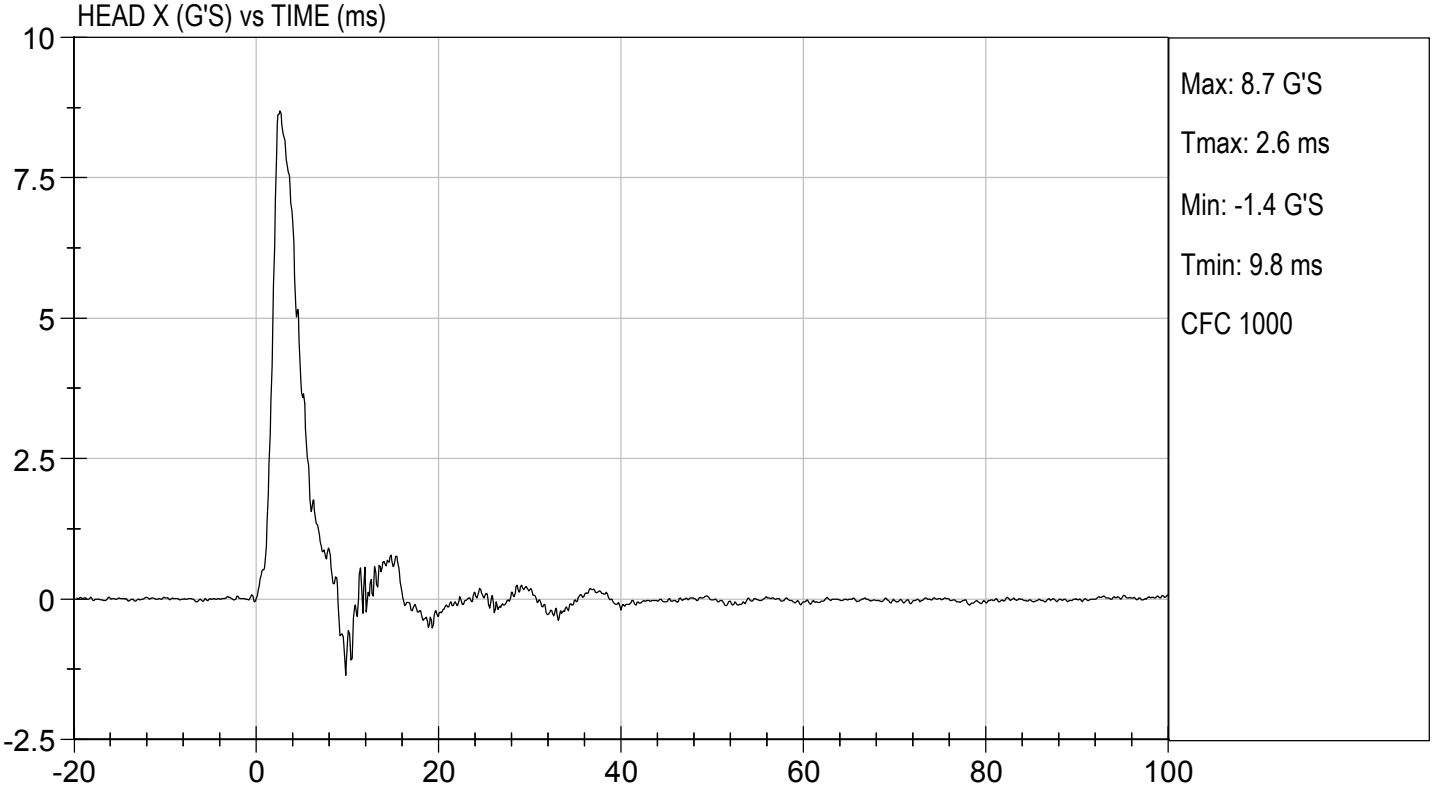
TEST DESC: HEAD DROP

TEST DATE: 10/07/2021
TEST #: D213191

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

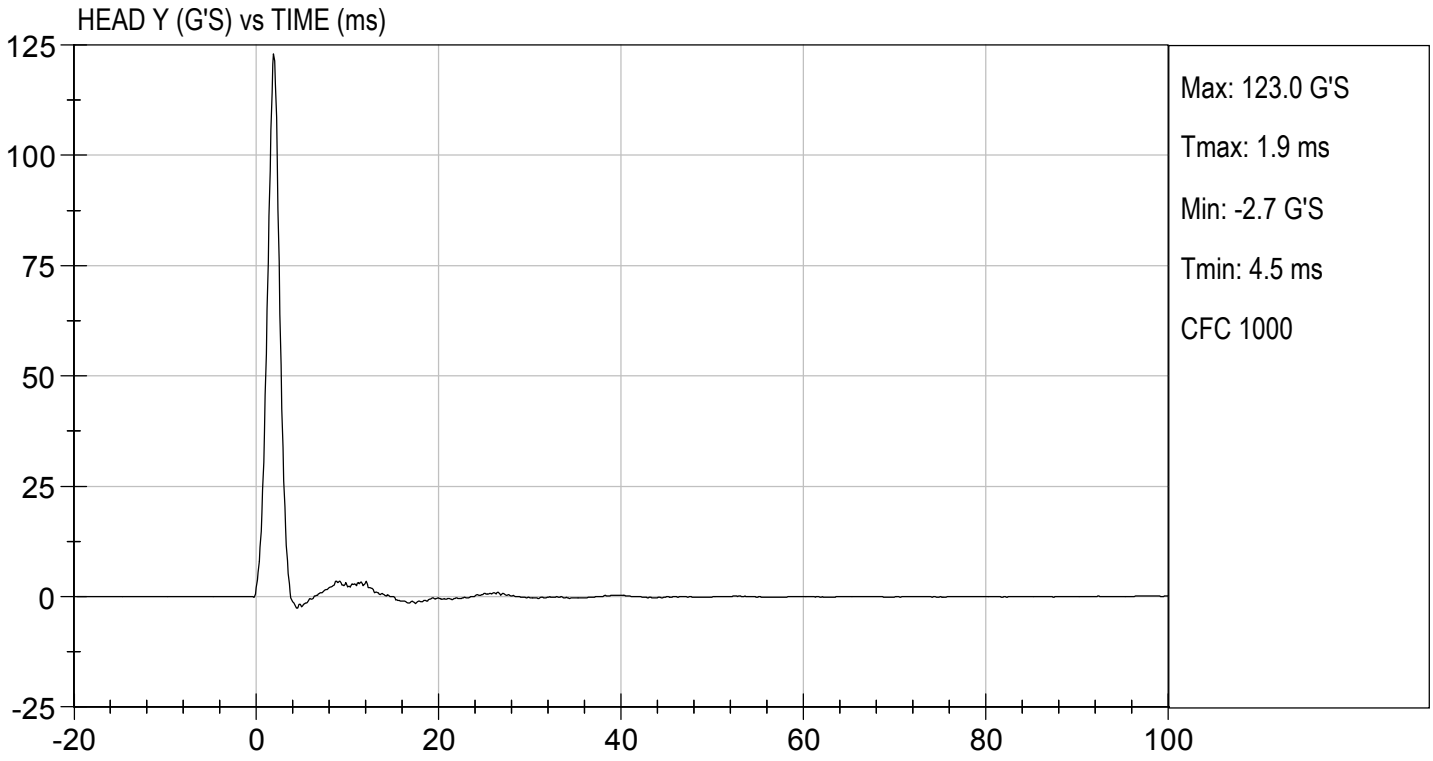


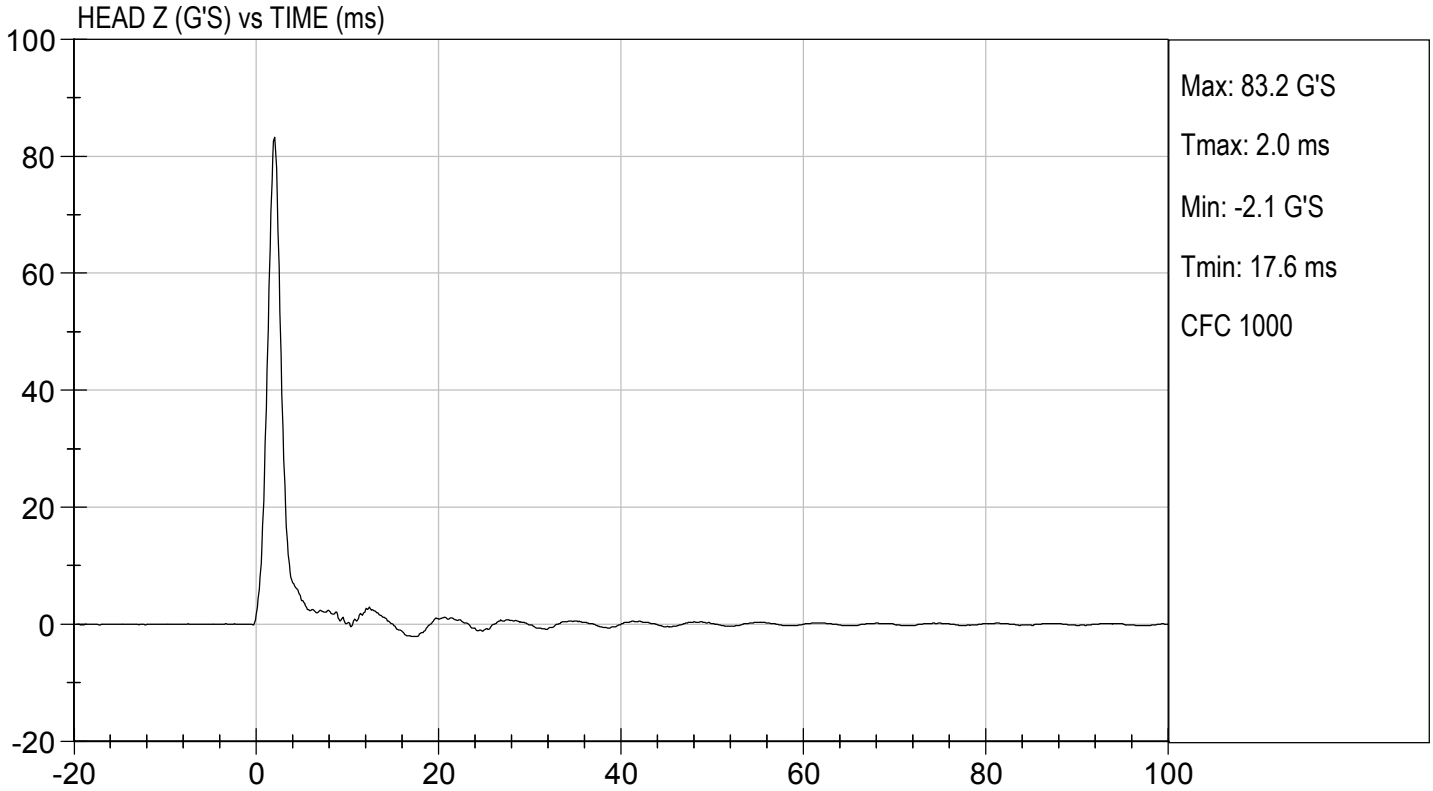
HEAD X (G'S) vs TIME (ms)



TEST DESC: HEAD DROP

TEST DATE: 10/07/2021
TEST #: D213191





MGA RESEARCH CORPORATION

NECK PENDULUM TEST

ES-2re DUMMY

ATD Serial No: F032 **Test I.D:** D213192

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity		%	10 to 70	45	Pass
Pendulum Speed		m/s	3.30 to 3.50	3.48	Pass
Pendulum Velocity	1 ms	m/s	-0.05 to 0.00	0.00	Pass
	3 ms	m/s	-0.25 to -0.375	-0.34	Pass
	14 ms	m/s	-3.20 to -3.70	-3.55	Pass
	17 ms	m/s	>= -3.70	-3.54	Pass
Maximum Flexion Angle		deg	49.0 to 59.0	50.2	Pass
Time of Maximum Flexion Angle		ms	54.0 to 66.0	55.3	Pass
Head Rotation Decay Time to 0 Degree		ms	53.0 to 88.0	62.0	Pass
			Overall Results		Pass

Alex Thomas
Laboratory Technician

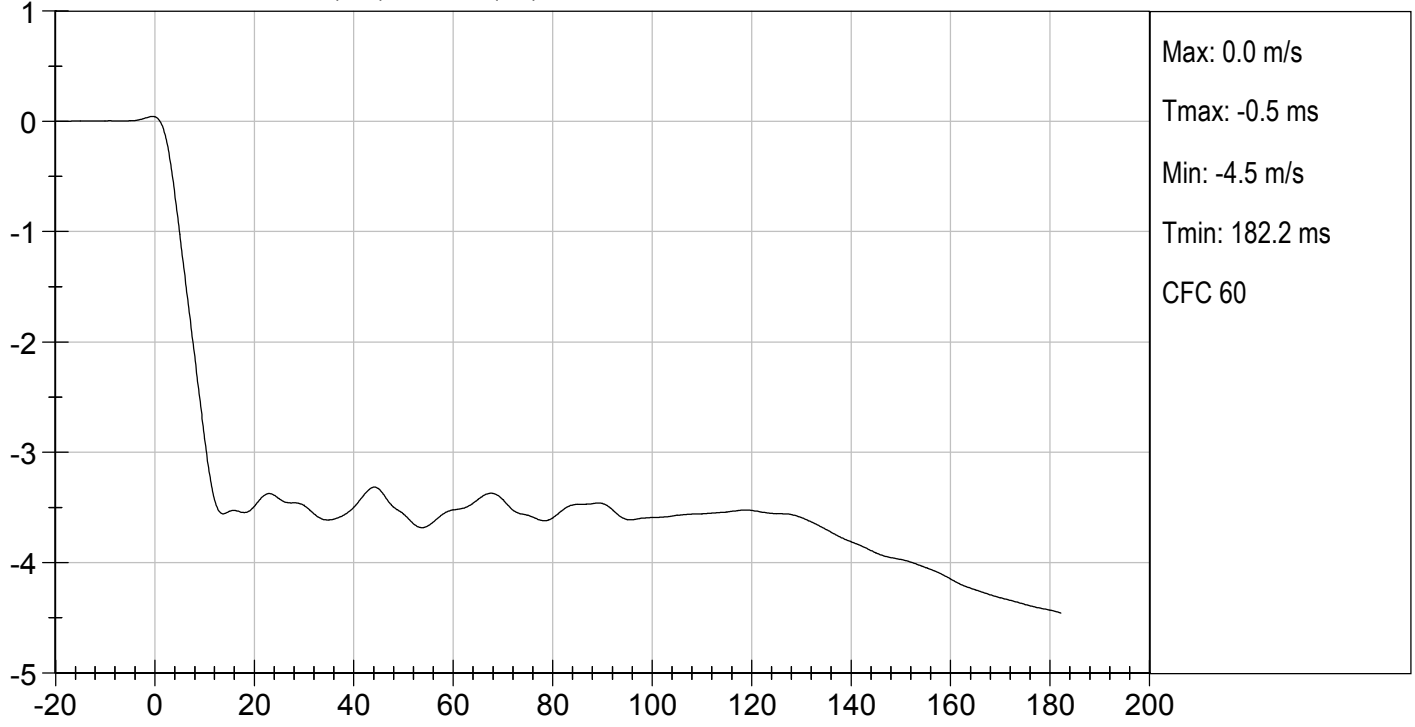
10/07/2021
Test Date

Approved By

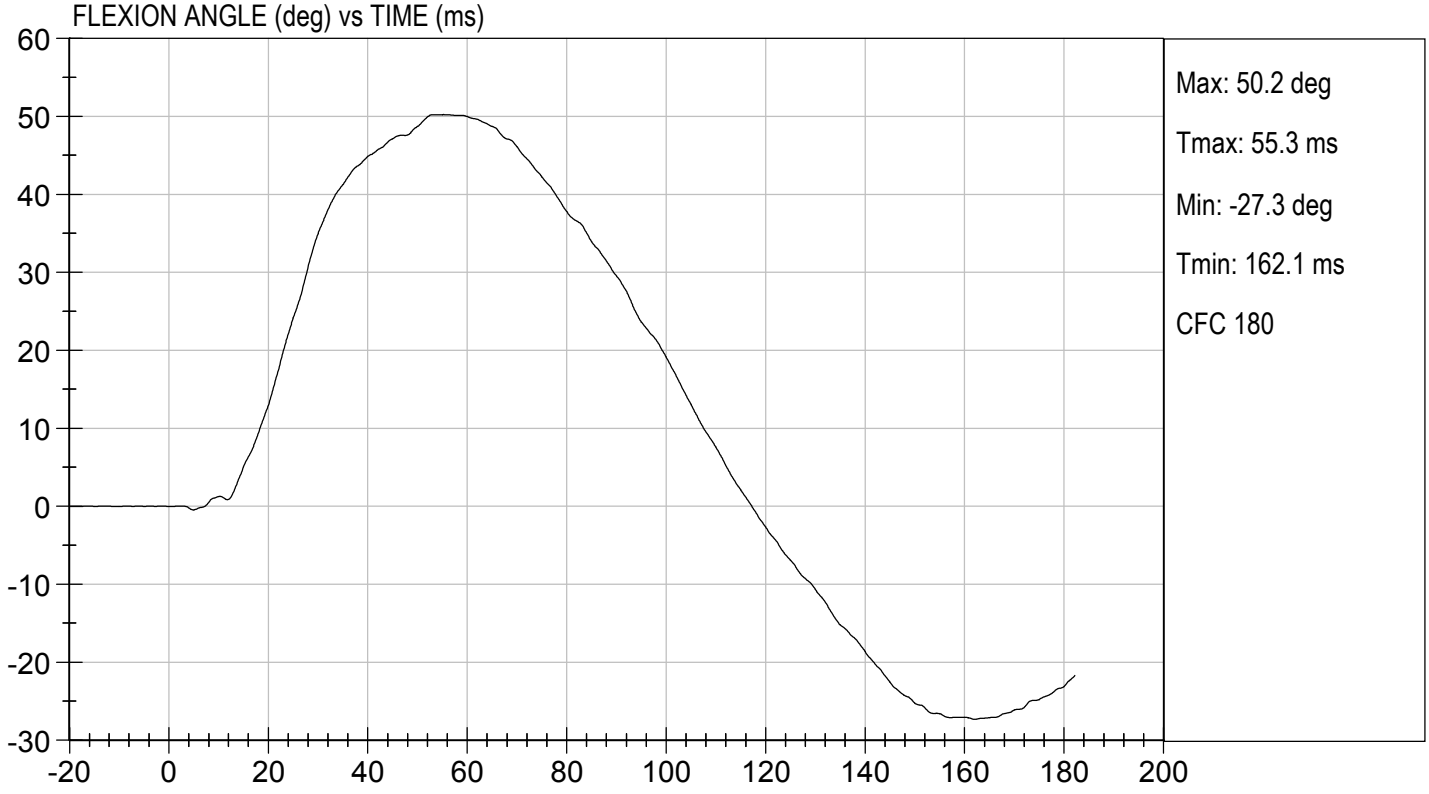
TEST DESC: NECK BENDING
VELOCITY: 11.41 ft/s, 3.48 m/s

TEST DATE: 10/07/2021
TEST #: D213192

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



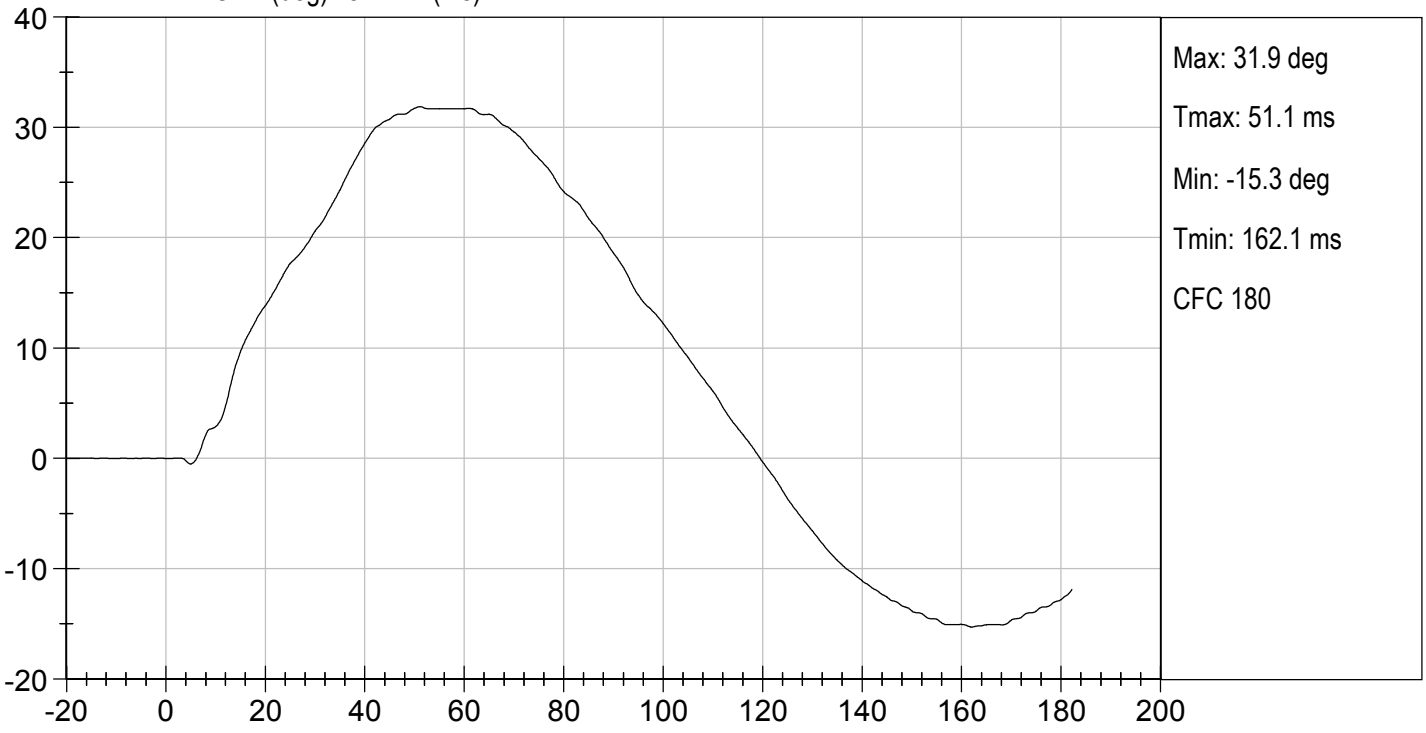
FLEXION ANGLE (deg) vs TIME (ms)



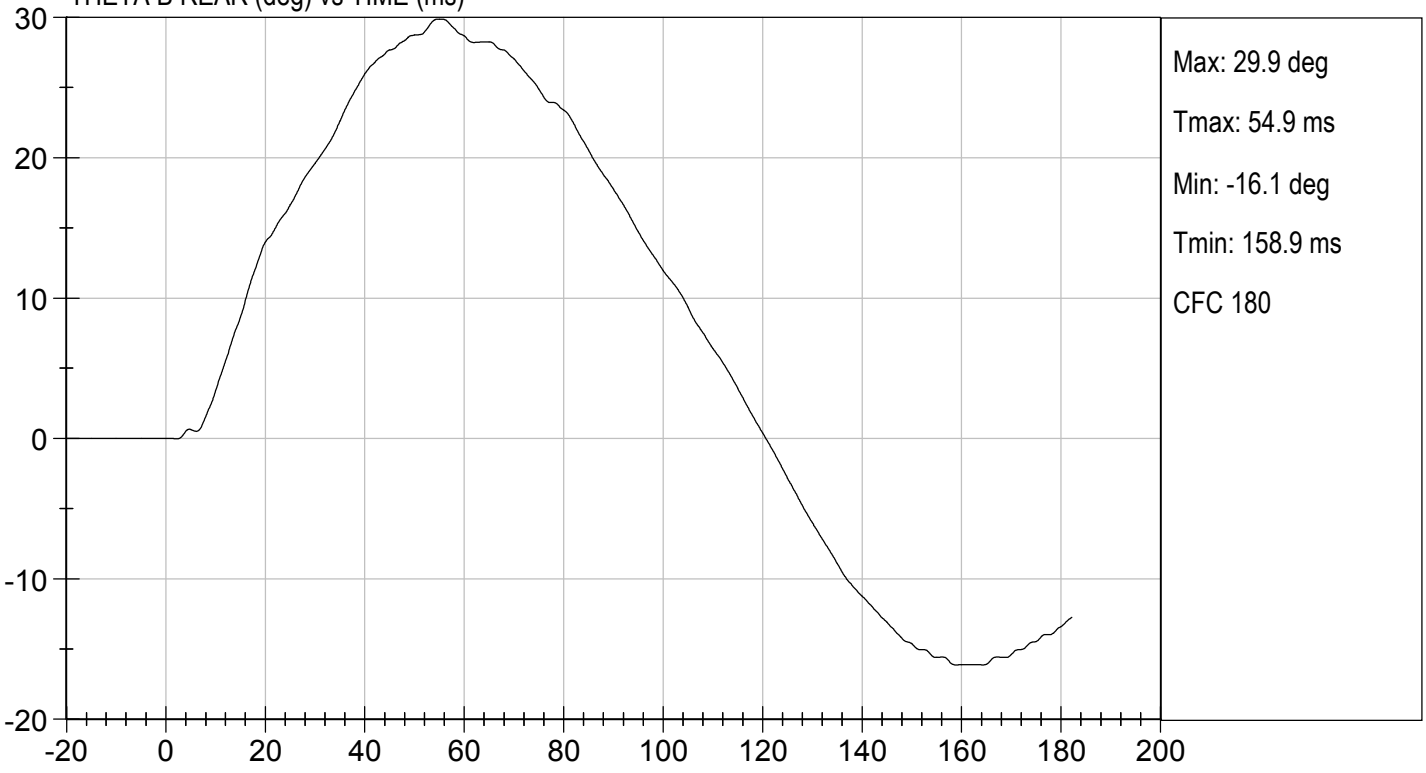
TEST DESC: NECK BENDING
VELOCITY: 11.41 ft/s, 3.48 m/s

TEST DATE: 10/07/2021
TEST #: D213192

THETA A FRONT (deg) vs TIME (ms)

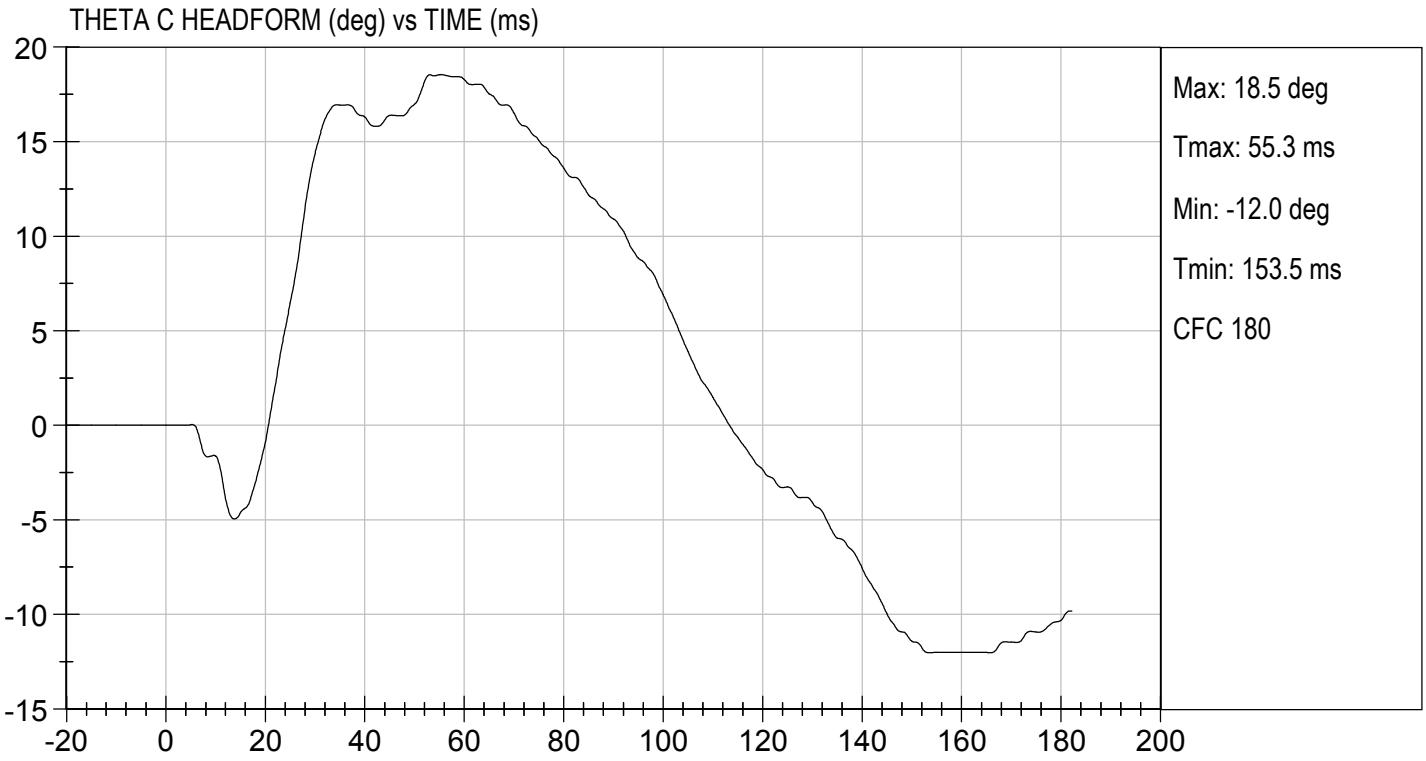


THETA B REAR (deg) vs TIME (ms)



TEST DESC: NECK BENDING
VELOCITY: 11.41 ft/s, 3.48 m/s

TEST DATE: 10/07/2021
TEST #: D213192



MGA RESEARCH CORPORATION

SHOULDER IMPACT TEST

ES-2re DUMMY

ATD Serial No: F032 **Test I.D:** D213193

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	46	Pass
Pendulum Speed	m/s	4.20 to 4.40	4.2	Pass
Peak Impactor Acceleration	G's	7.5 to 10.5	10.0	Pass
		Overall Test Results		Pass

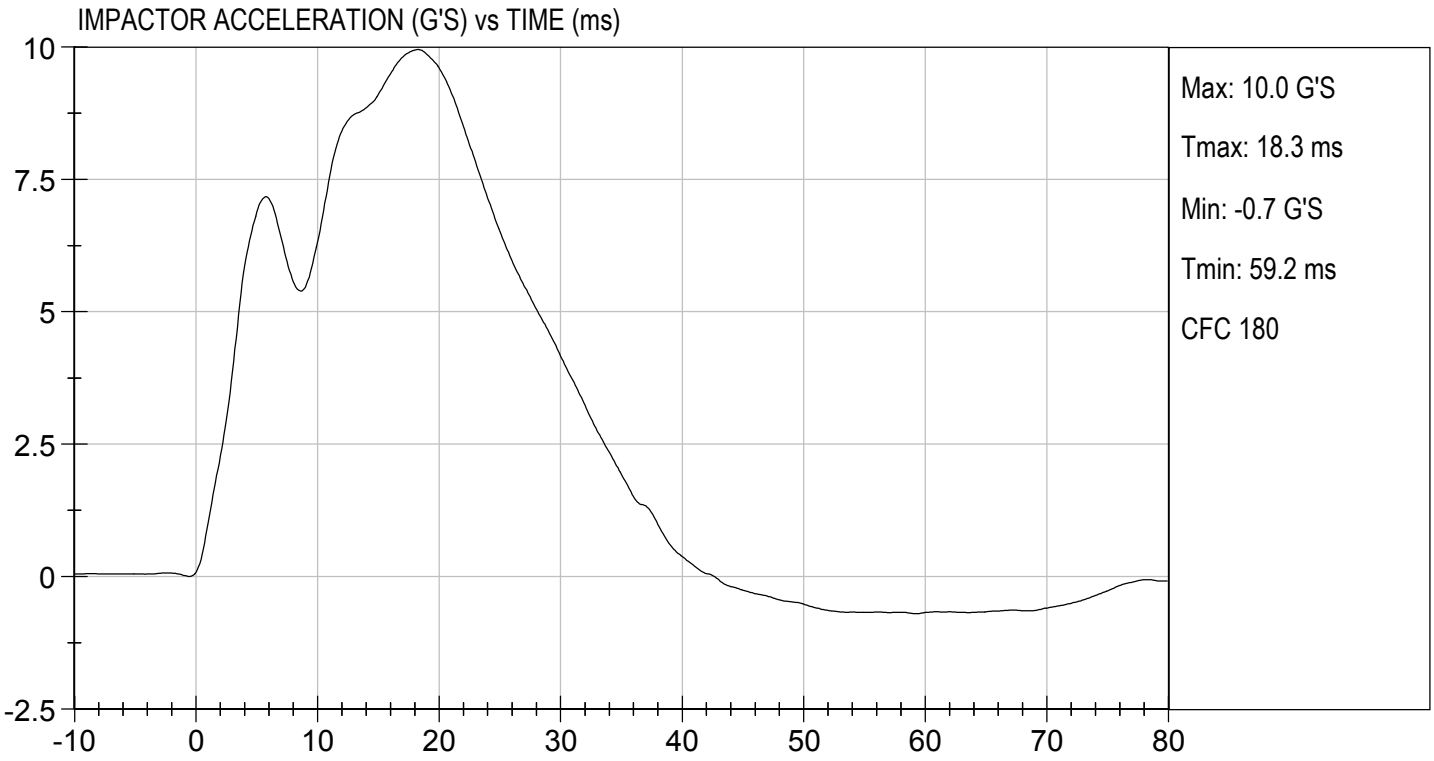
Laboratory Technician

10/07/2021
Test Date

Approved By

TEST DESC: SHOULDER IMPACT
VELOCITY: 13.77 ft/s, 4.2 m/s

TEST DATE: 10/07/2021
TEST #: D213193



MGA RESEARCH CORPORATION

UPPER RIB TEST

ES-2re DUMMY

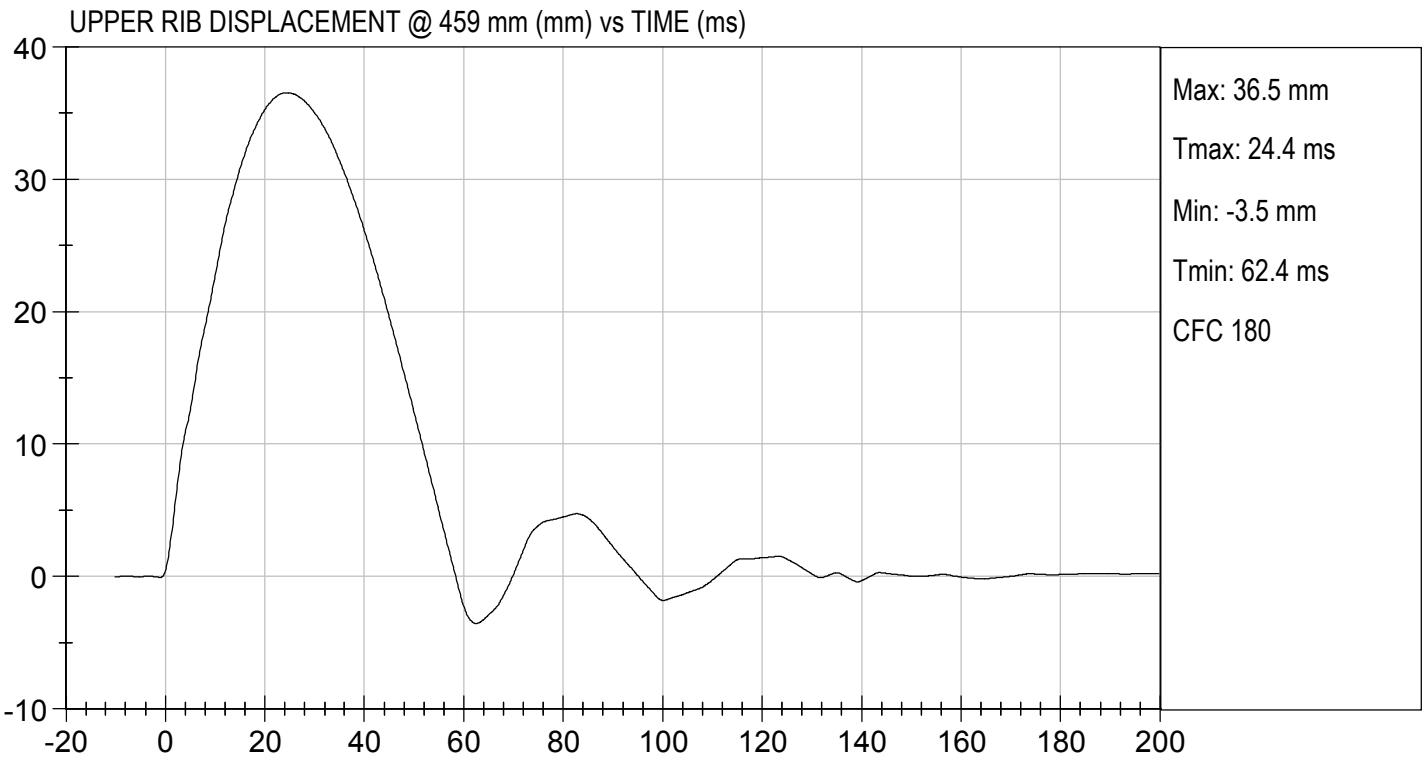
ATD Serial No: F032 **Test I.D:** D213194

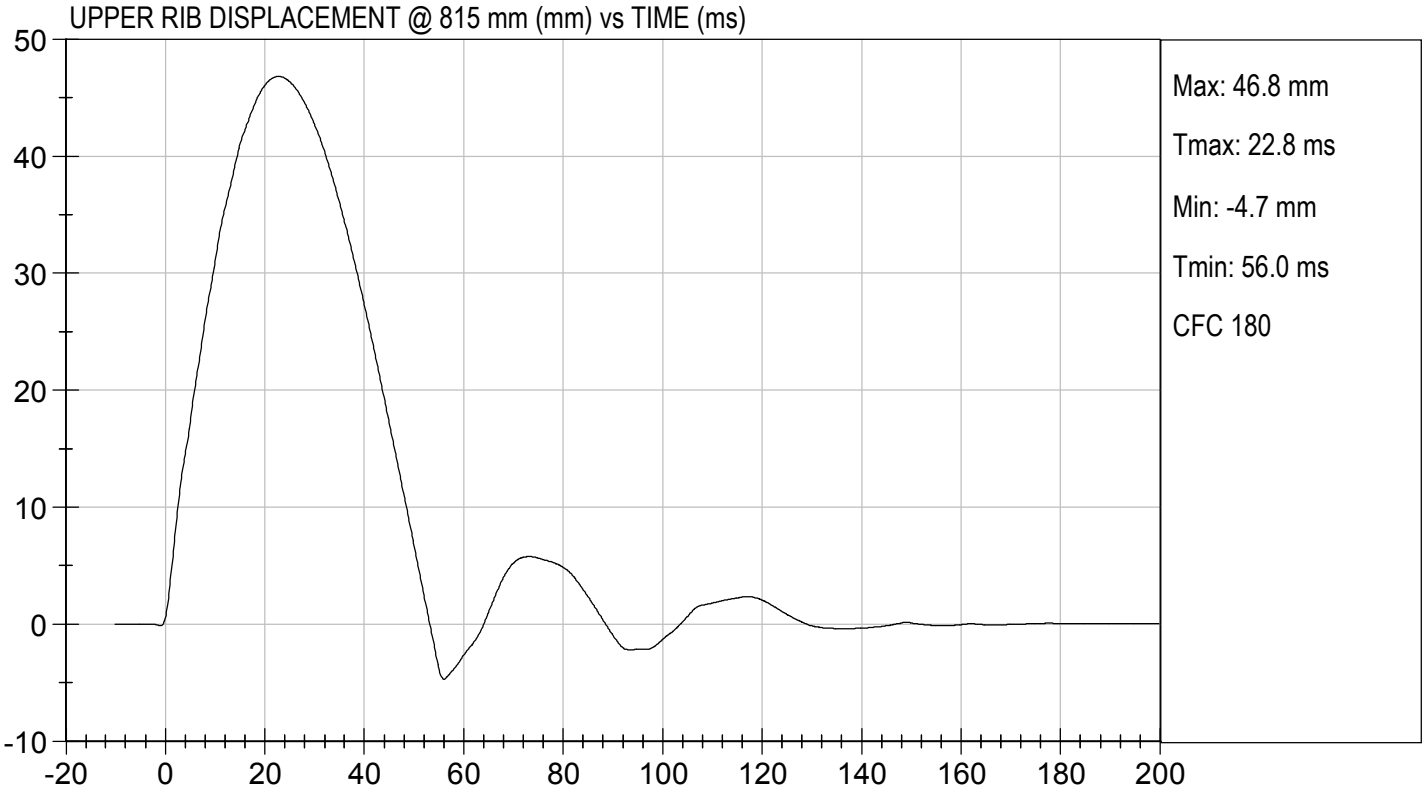
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	46	Pass
Displacement at 459 mm	mm	36.0 to 40.0	36.5	Pass
Displacement at 815 mm	mm	46.0 to 51.0	46.8	Pass
		Overall Test Results		Pass

Laboratory Technician

10/07/2021
Test Date

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: 36.5 mm
Tmax: 24.4 ms
Min: -3.5 mm
Tmin: 62.4 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: 46.8 mm
Tmax: 22.8 ms
Min: -4.7 mm
Tmin: 56.0 ms
CFC 180

MGA RESEARCH CORPORATION

MID RIB TEST

ES-2re DUMMY

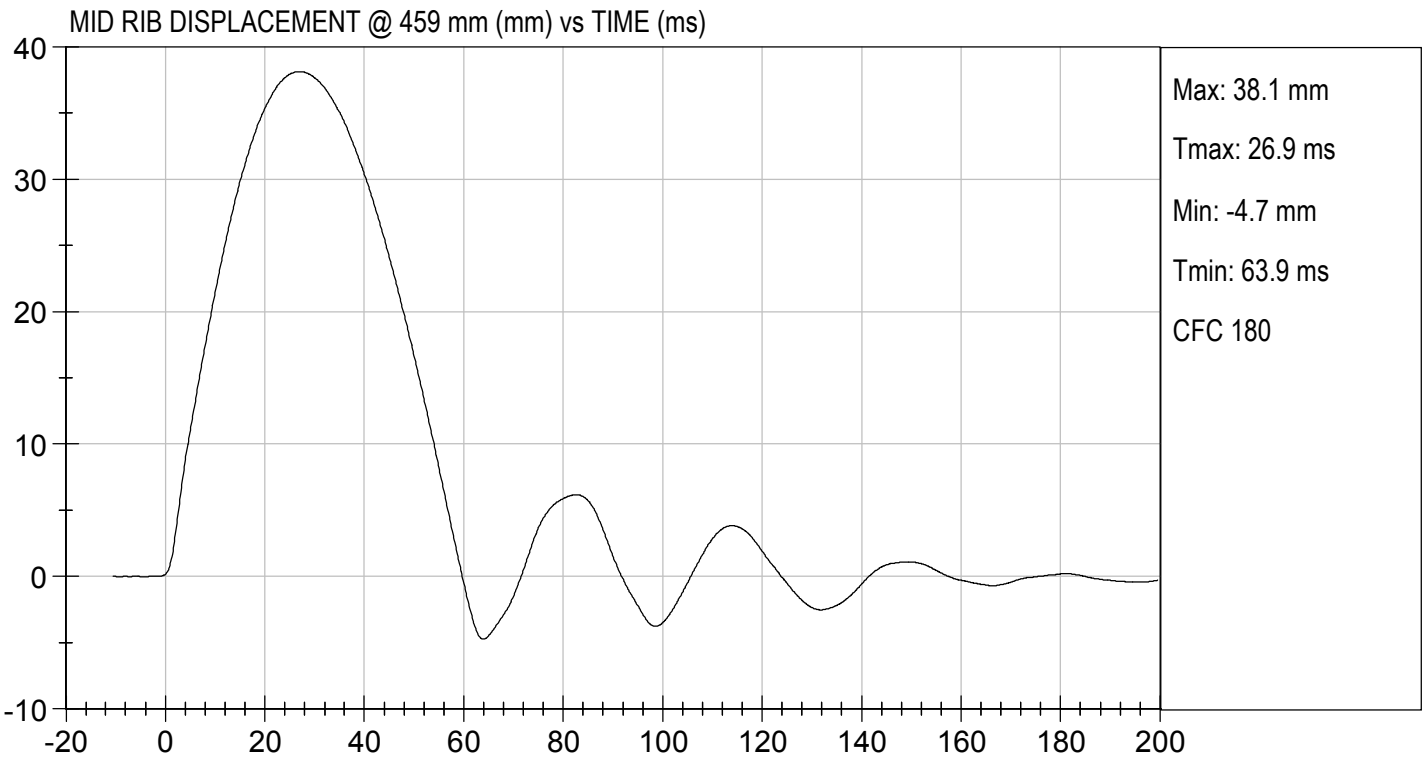
ATD Serial No: F032 **Test I.D:** D213195

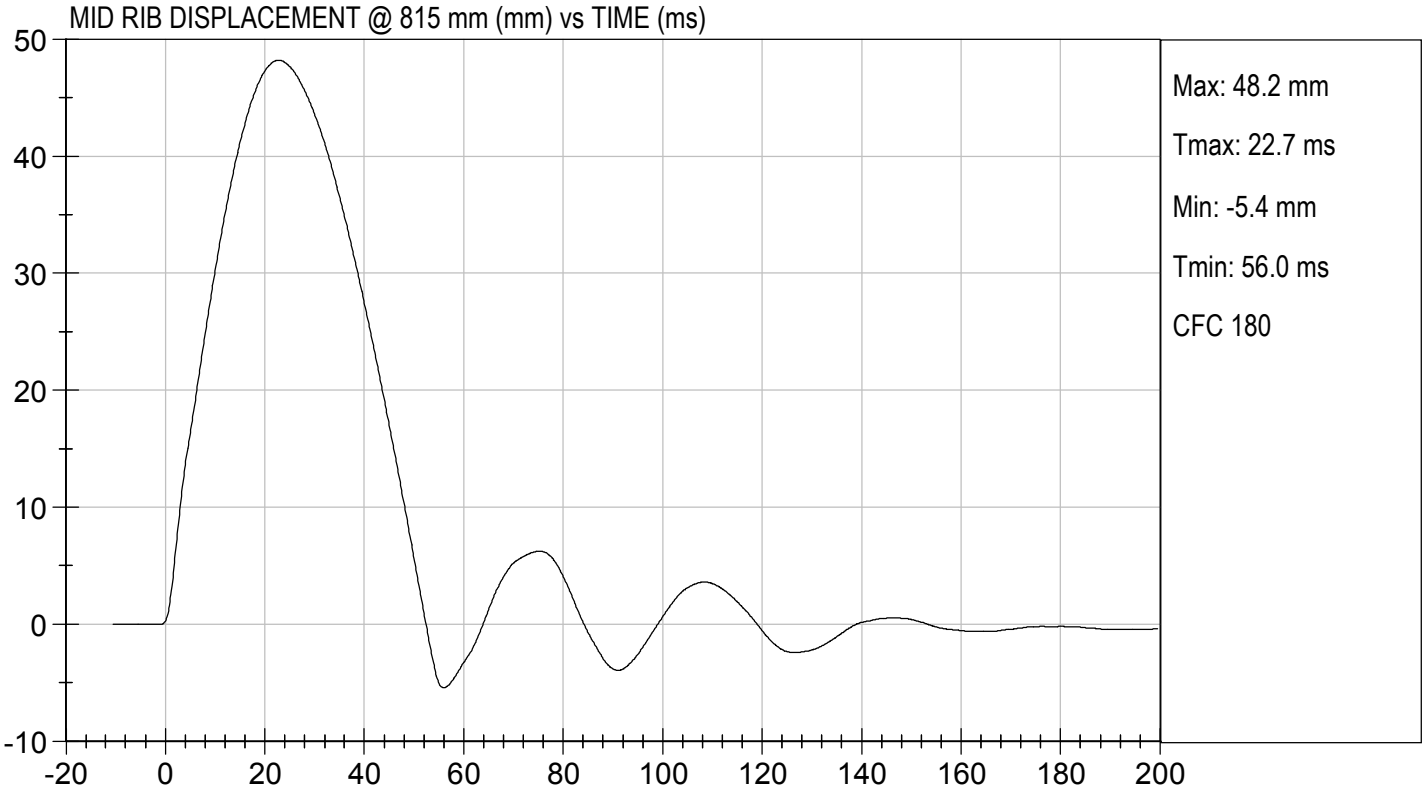
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	46	Pass
Displacement at 459 mm	mm	36.0 to 40.0	38.1	Pass
Displacement at 815 mm	mm	46.0 to 51.0	48.2	Pass
		Overall Test Results		Pass

Laboratory Technician

10/07/2021
Test Date

Approved By


MID 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: 26.9 ms
Min: -4.7 mm
Tmin: 63.9 ms
CFC 180


MID 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: 48.2 mm
Tmax: 22.7 ms
Min: -5.4 mm
Tmin: 56.0 ms
CFC 180

MGA RESEARCH CORPORATION

LOWER RIB TEST

ES-2re DUMMY

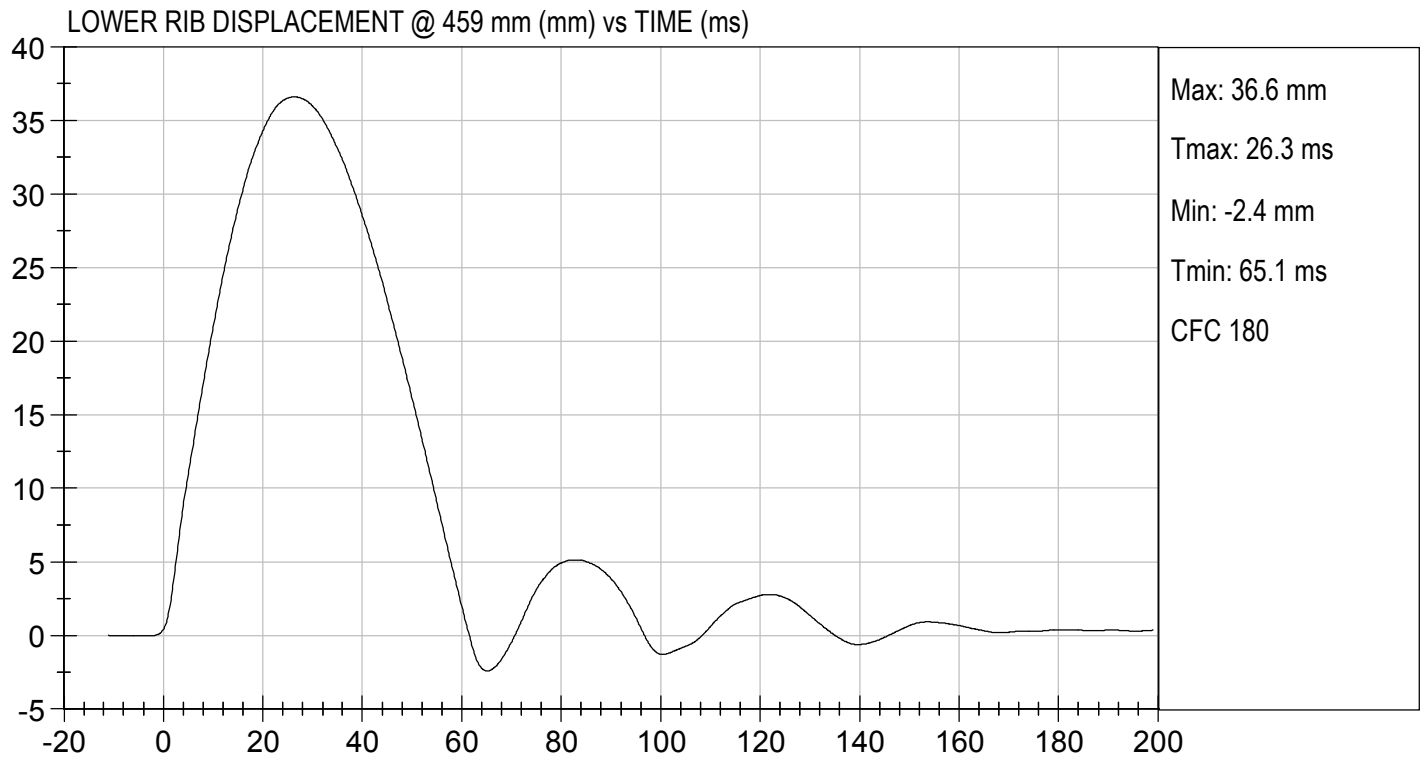
ATD Serial No: F032 **Test I.D:** D213196

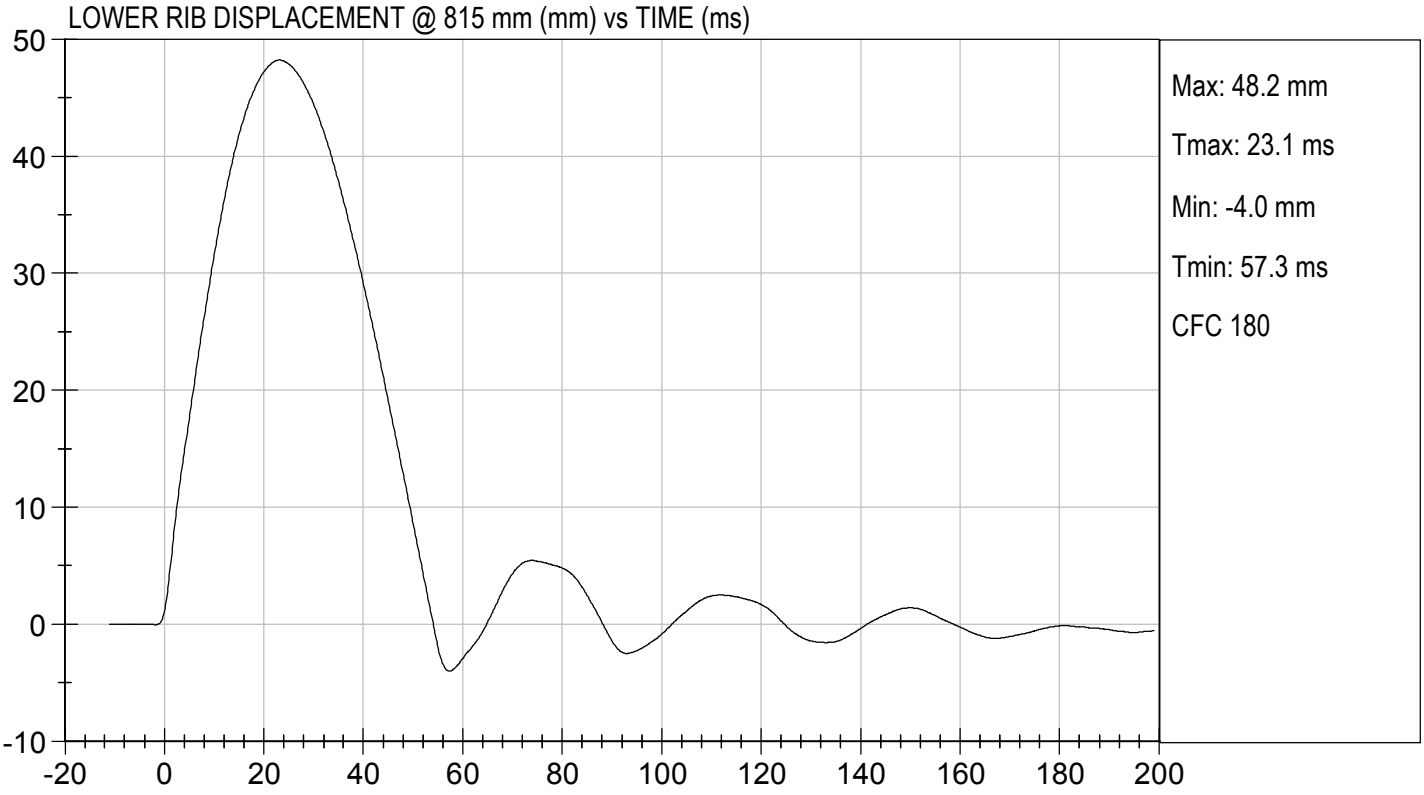
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	46	Pass
Displacement at 459 mm	mm	36.0 to 40.0	36.6	Pass
Displacement at 815 mm	mm	46.0 to 51.0	48.2	Pass
		Overall Test Results		Pass

Laboratory Technician

10/07/2021
Test Date

Approved By


LOWER RIB DISPLACEMENT @ 459 mm (mm) vs TIME (ms)
Max: 36.6 mm
Tmax: 26.3 ms
Min: -2.4 mm
Tmin: 65.1 ms
CFC 180
40
35
30
25
20
15
10
5
0
-5
-20
0
20
40
60
80
100
120
140
160
180
200


LOWER RIB DISPLACEMENT @ 815 mm (mm) vs TIME (ms)
Max: 48.2 mm
Tmax: 23.1 ms
Min: -4.0 mm
Tmin: 57.3 ms
CFC 180
50
40
30
20
10
0
-10
-20
0
20
40
60
80
100
120
140
160
180
200

MGA RESEARCH CORPORATION

ABDOMEN TEST

ES-2re DUMMY

ATD Serial No: F032 **Test I.D:** D213197

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	46	Pass
Probe Speed	m/s	3.90 to 4.10	4.06	Pass
Maximum Impactor Force	N	4000 to 4800	4138	Pass
Time of Maximum Impactor Force	ms	10.6 to 13.0	12.1	Pass
Maximum Total Abdomen Force	N	2200 to 2700	2297	Pass
Time of Maximum Abdomen Force	ms	10.0 to 12.3	11.7	Pass
		Overall Test Results		Pass

Laboratory Technician

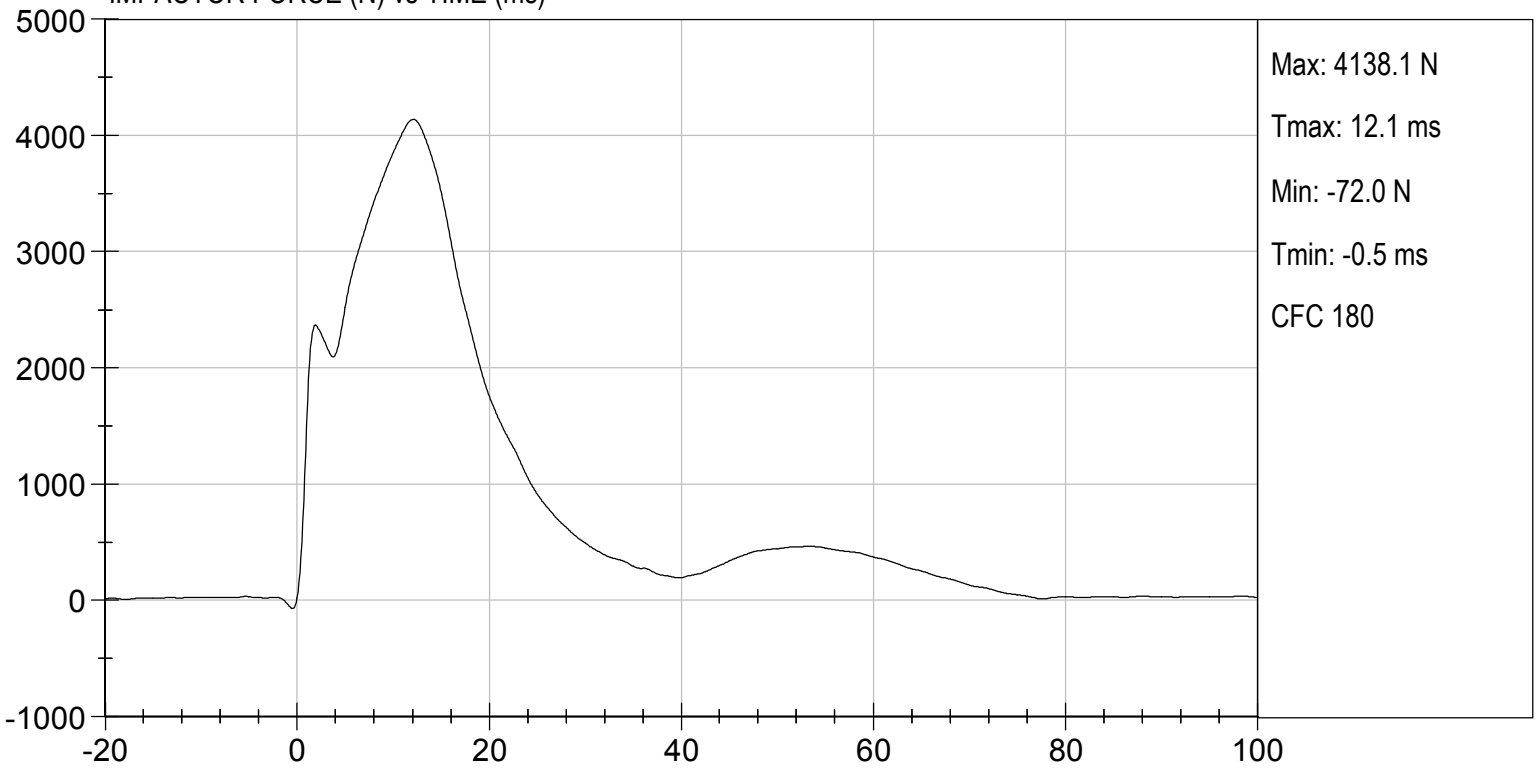
10/07/2021
Test Date

Approved By

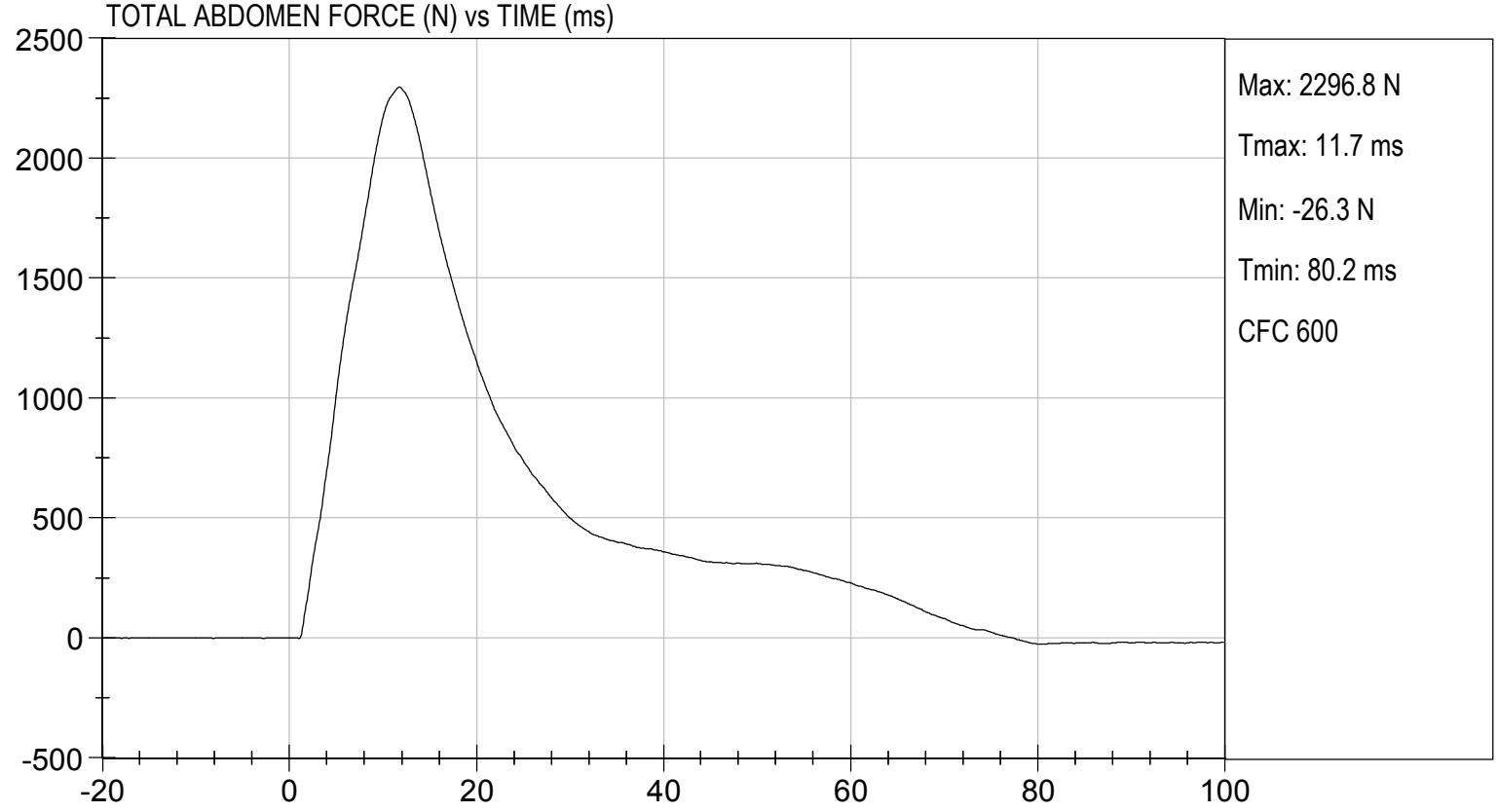
TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.33 ft/s, 4.06 m/s

TEST DATE: 10/07/2021
TEST #: D213197

IMPACTOR FORCE (N) vs TIME (ms)



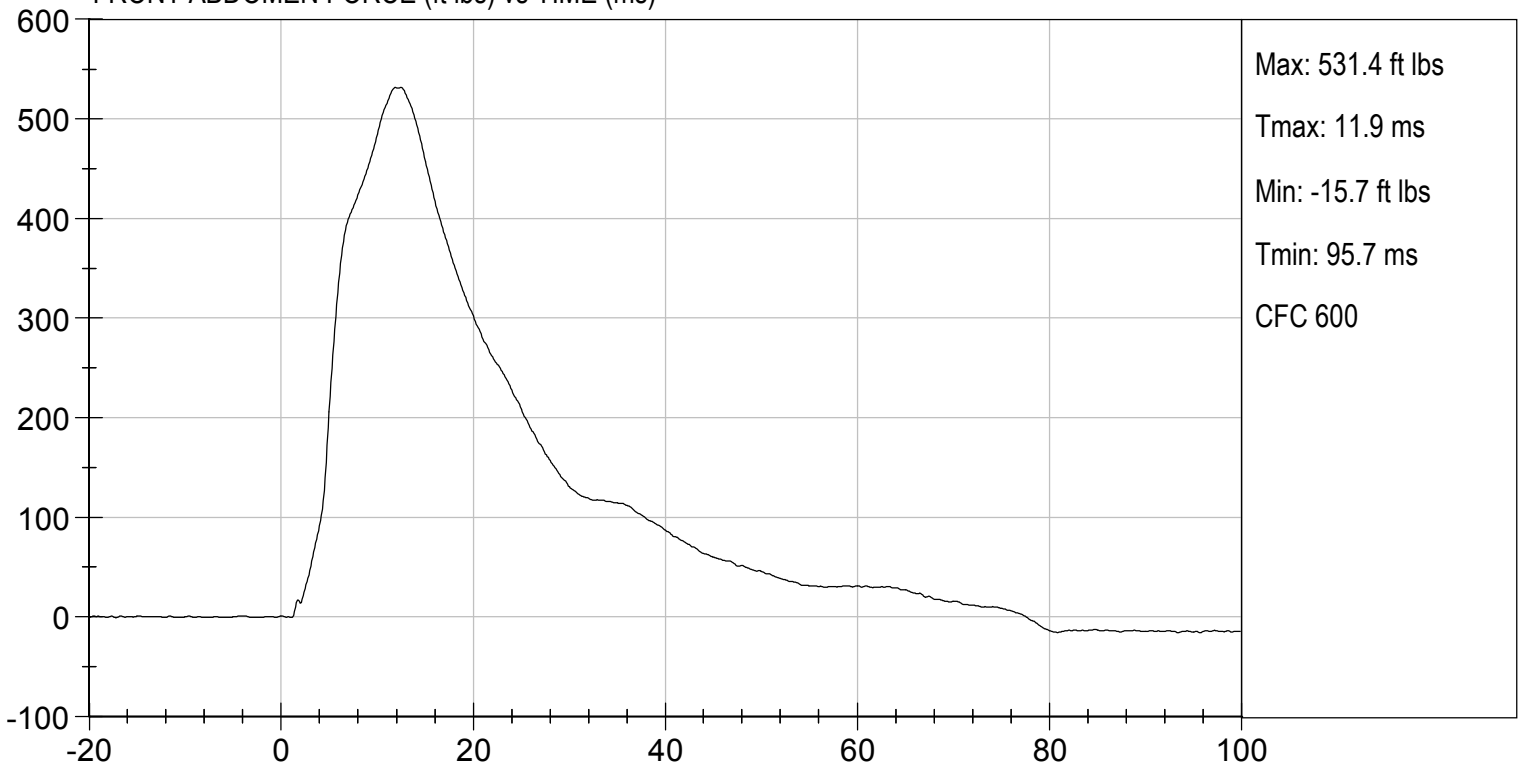
TOTAL ABDOMEN FORCE (N) vs TIME (ms)



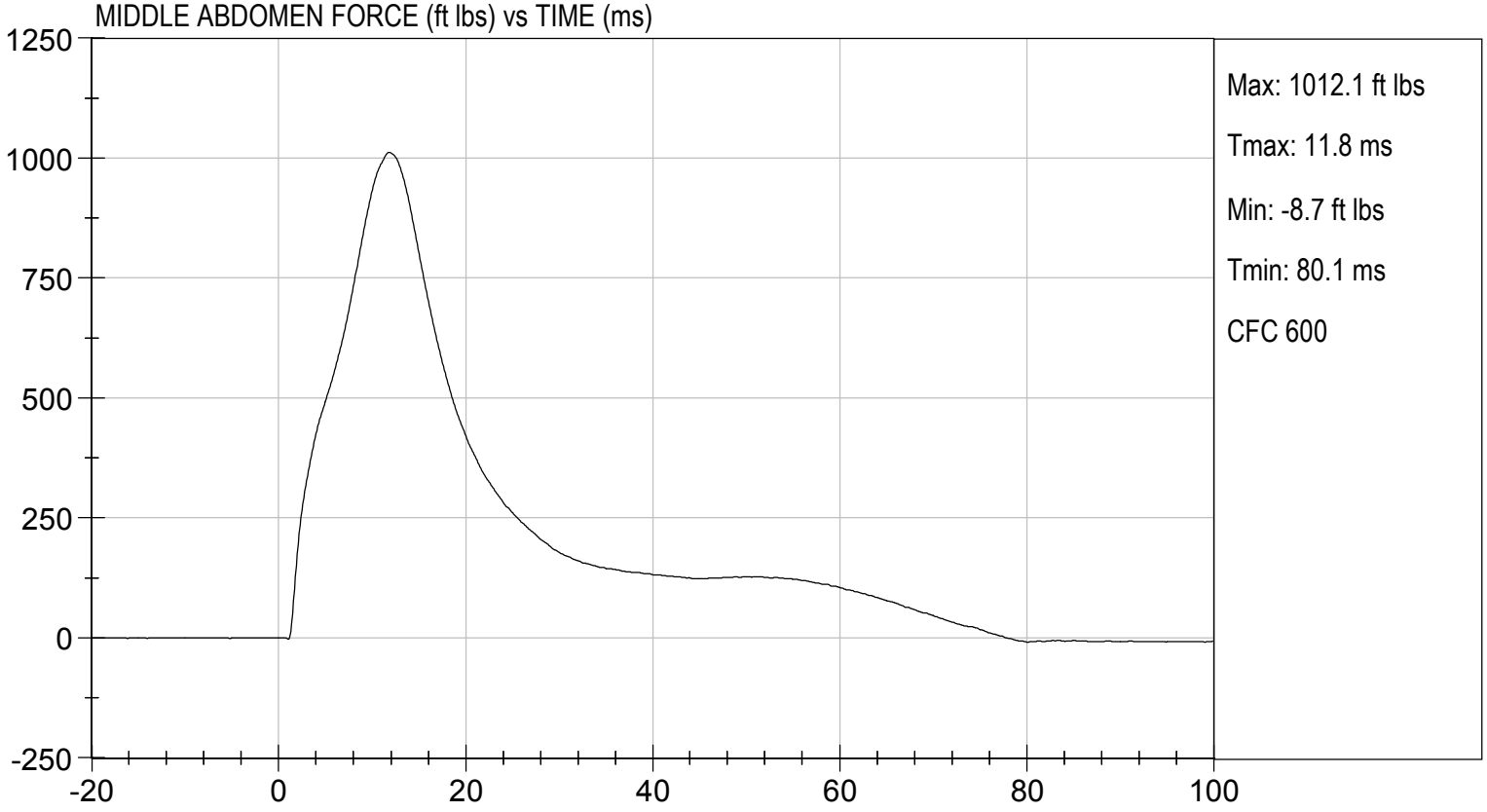
TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.33 ft/s, 4.06 m/s

TEST DATE: 10/07/2021
TEST #: D213197

FRONT ABDOMEN FORCE (ft lbs) vs TIME (ms)

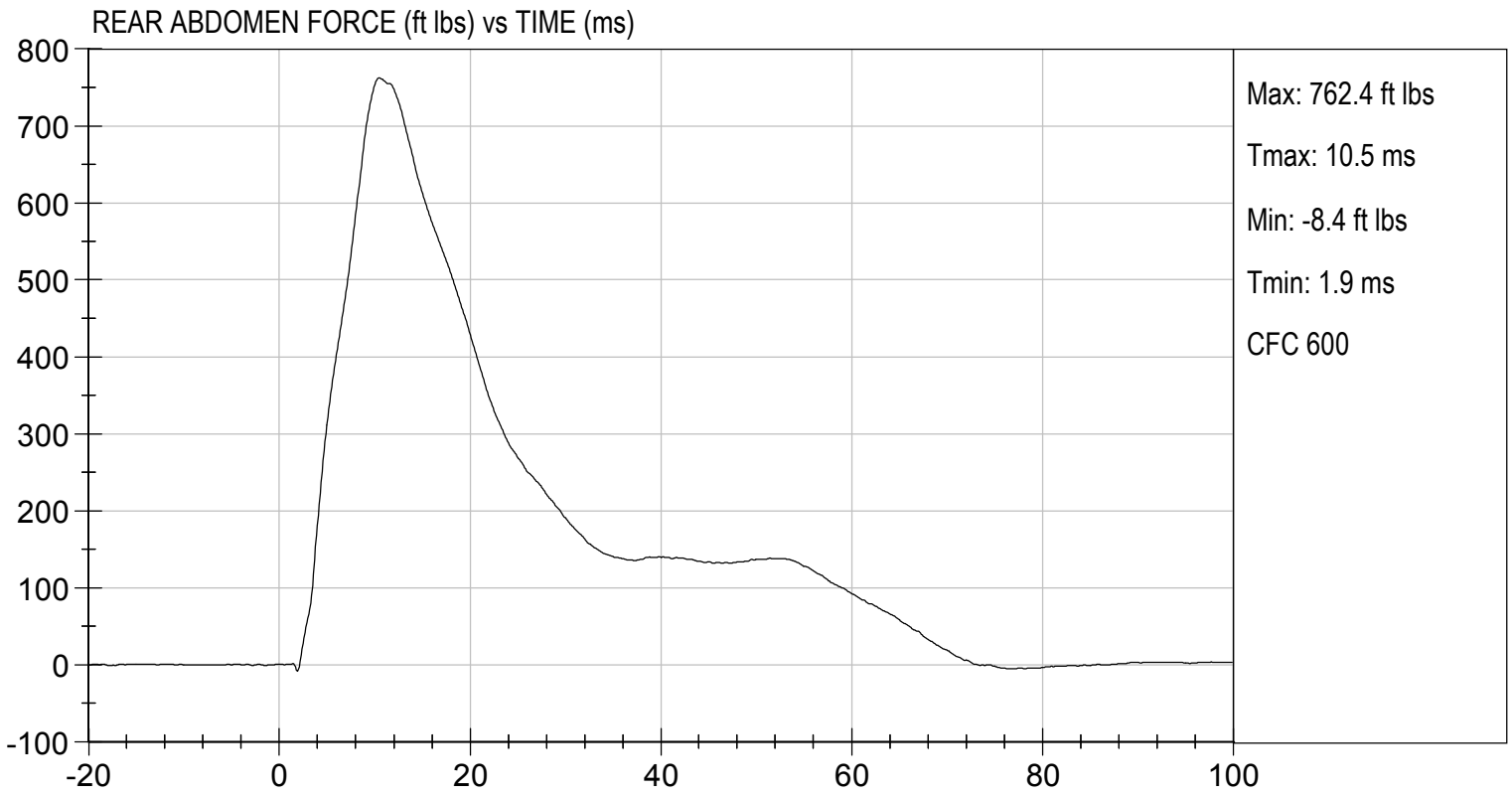


MIDDLE ABDOMEN FORCE (ft lbs) vs TIME (ms)



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

TEST DATE: 10/07/2021
TEST #: D213197



MGA RESEARCH CORPORATION

LUMBAR SPINE TEST

ES-2re DUMMY

ATD Serial No: F032 **Test I.D:** D213198

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	46	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	-0.419	Pass
	27 ms	m/s	-6.50 to -5.80	-5.97	Pass
	30 ms	m/s	>= -6.50	-6.15	Pass
Maximum Flexion Angle		deg	45.0 to 55.0	47.5	Pass
Time of Maximum Flexion Angle		ms	39.0 to 53.0	46.2	Pass
Headform Rotation Decay to Initial Position		ms	37 to 57	38	Pass
			Overall Results		Pass

Alex Thomas
Laboratory Technician

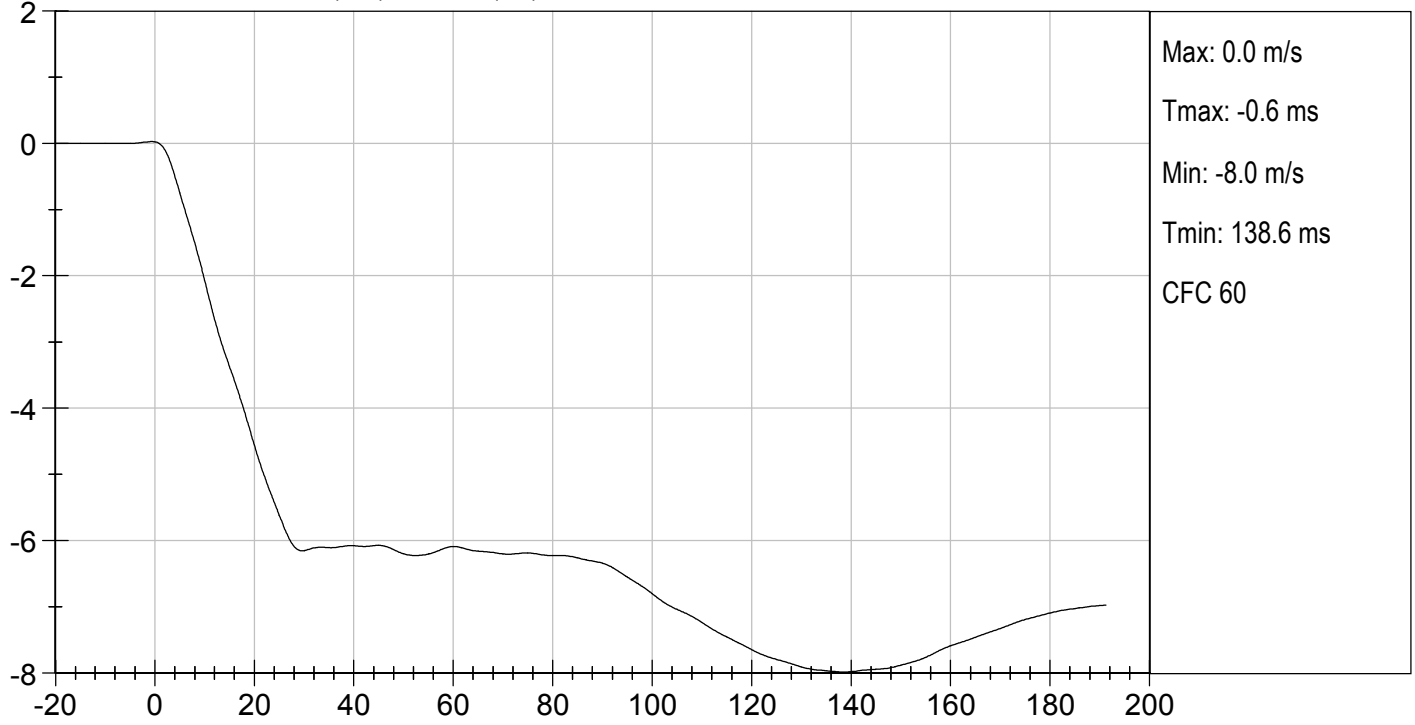
10/07/2021
Test Date

Approved By

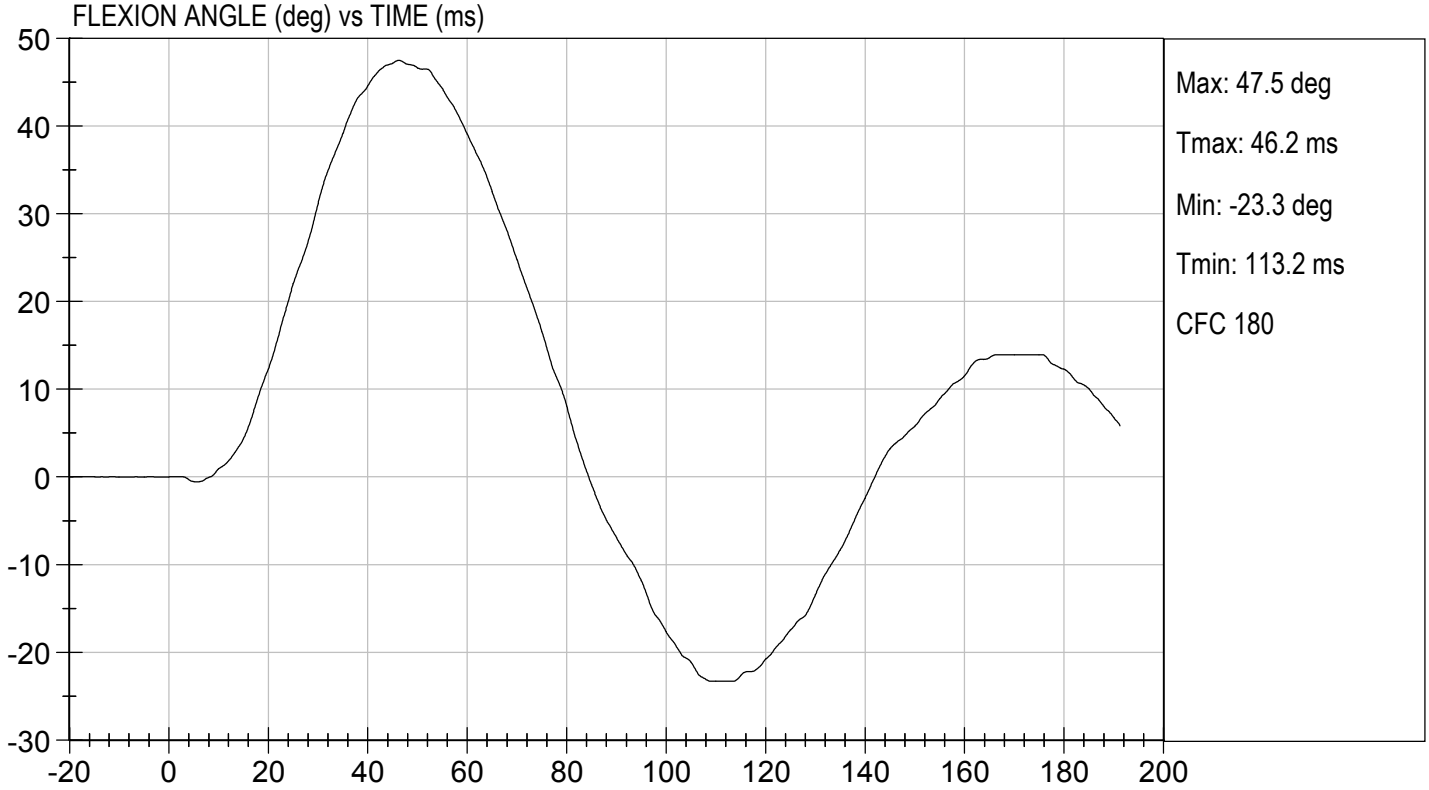
TEST DESC: LUMBAR BENDING
VELOCITY: 20.08 ft/s, 6.12 m/s

TEST DATE: 10/07/2021
TEST #: D213198

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



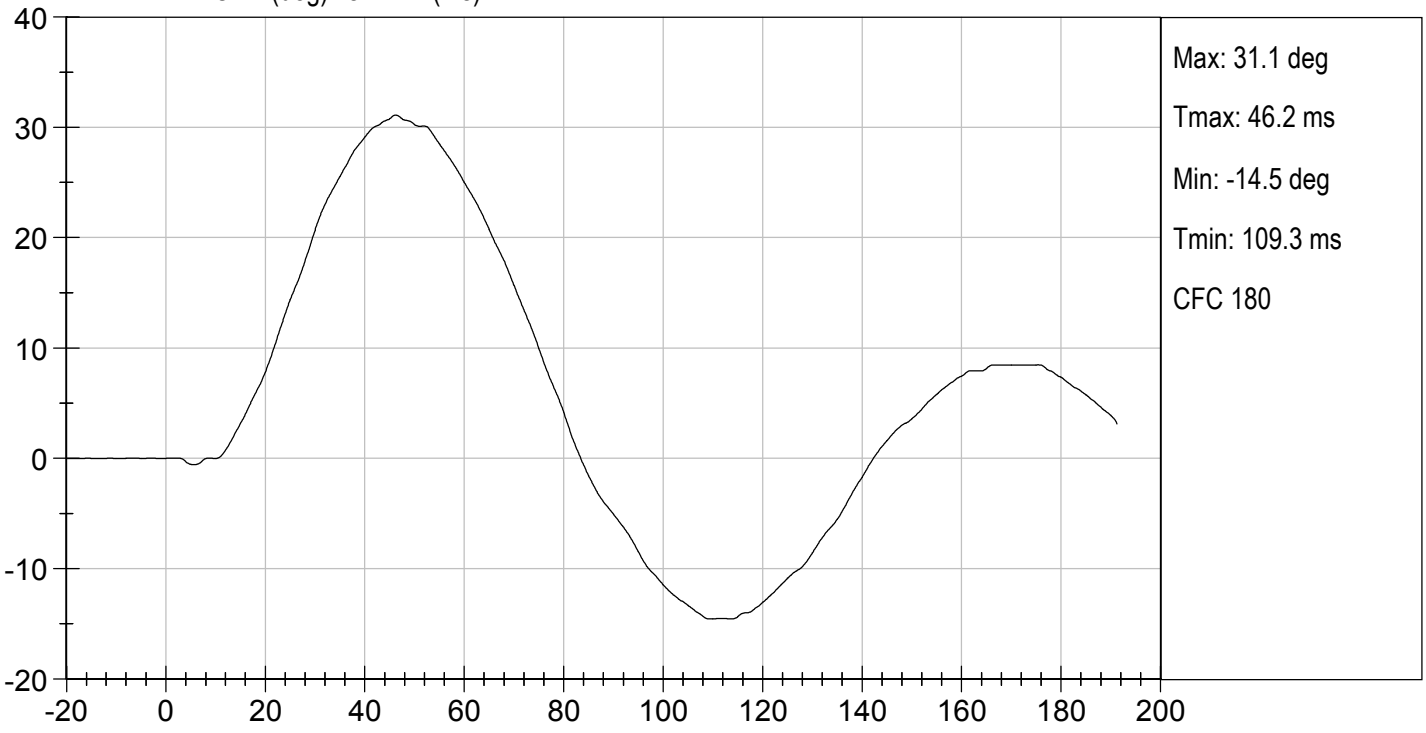
FLEXION ANGLE (deg) vs TIME (ms)



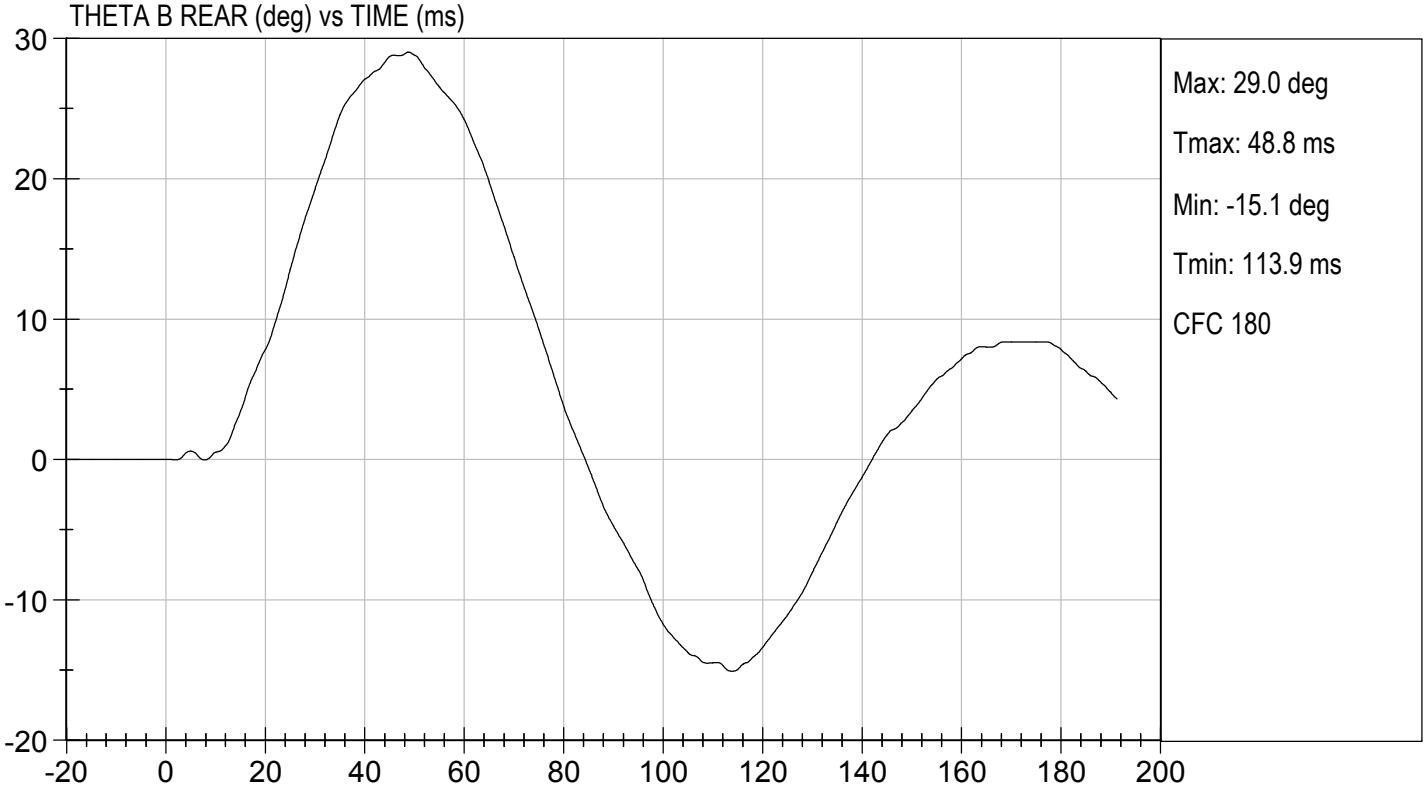
TEST DESC: LUMBAR BENDING
VELOCITY: 20.08 ft/s, 6.12 m/s

TEST DATE: 10/07/2021
TEST #: D213198

THETA A FRONT (deg) vs TIME (ms)

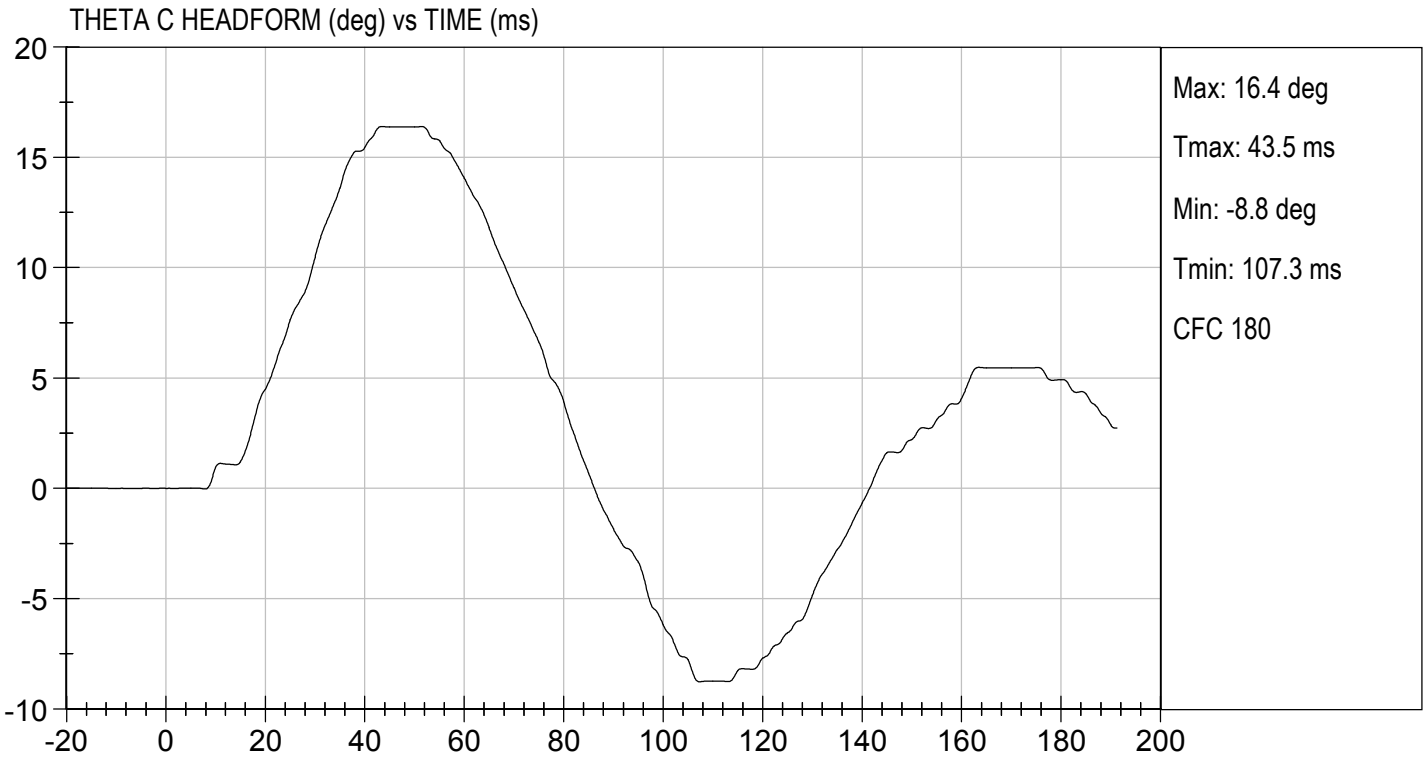


THETA B REAR (deg) vs TIME (ms)



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

TEST DATE: 10/07/2021
TEST #: D213198



MGA RESEARCH CORPORATION

PELVIS TEST

ES-2re DUMMY

ATD Serial No: F032 **Test I.D:** D213199

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	46	Pass
Probe Speed	m/s	4.20 to 4.40	4.23	Pass
Maximum Impactor Force	N	4700 to 5400	4969	Pass
Time of Maximum Impactor Force	ms	11.8 to 16.1	13.9	Pass
Maximum Pubic Force	N	1230 to 1590	1367	Pass
Time of Maximum Pubic Force	ms	12.2 to 17.0	13.5	Pass
		Overall Test Results		Pass

Laboratory Technician

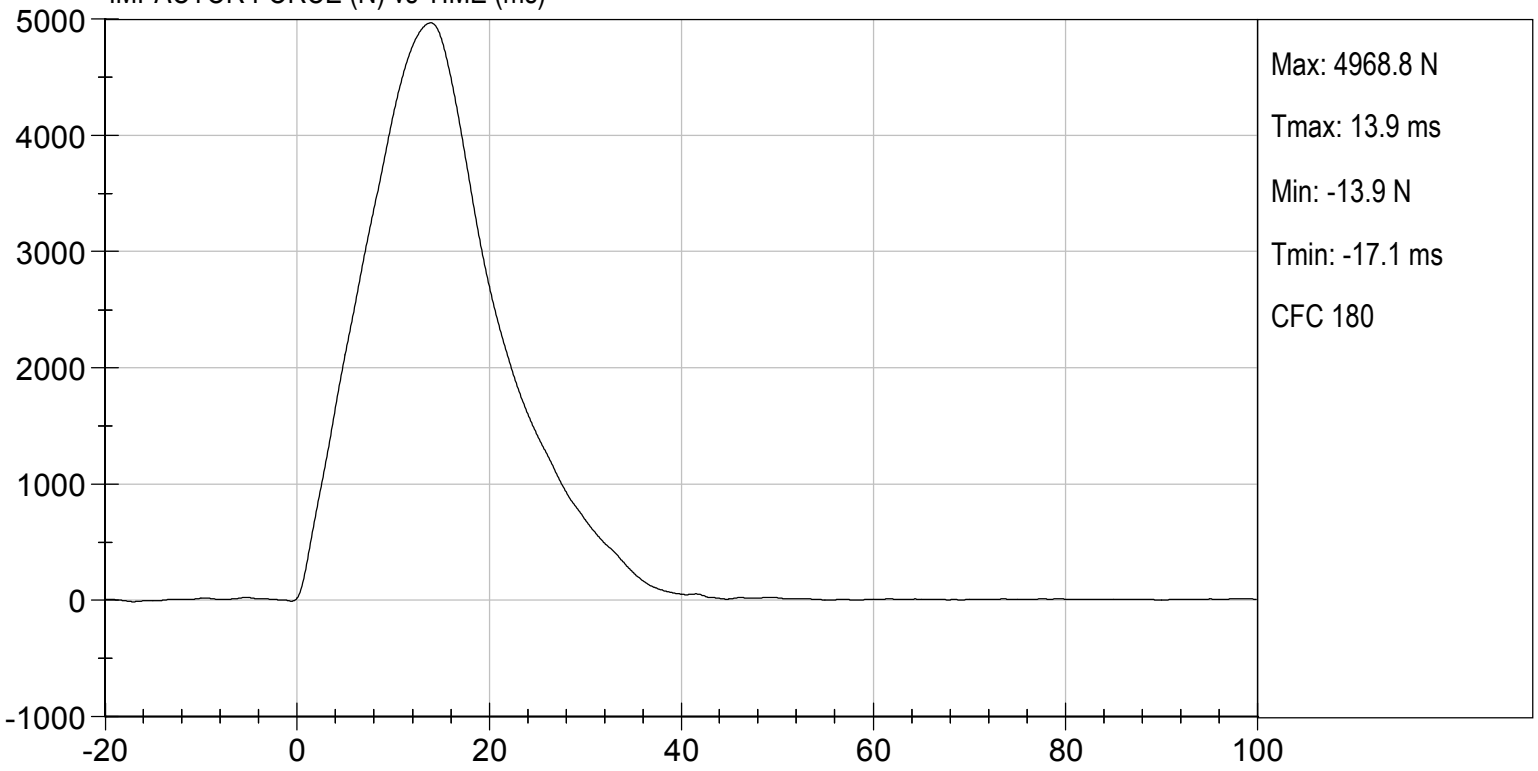
10/07/2021
Test Date

Approved By

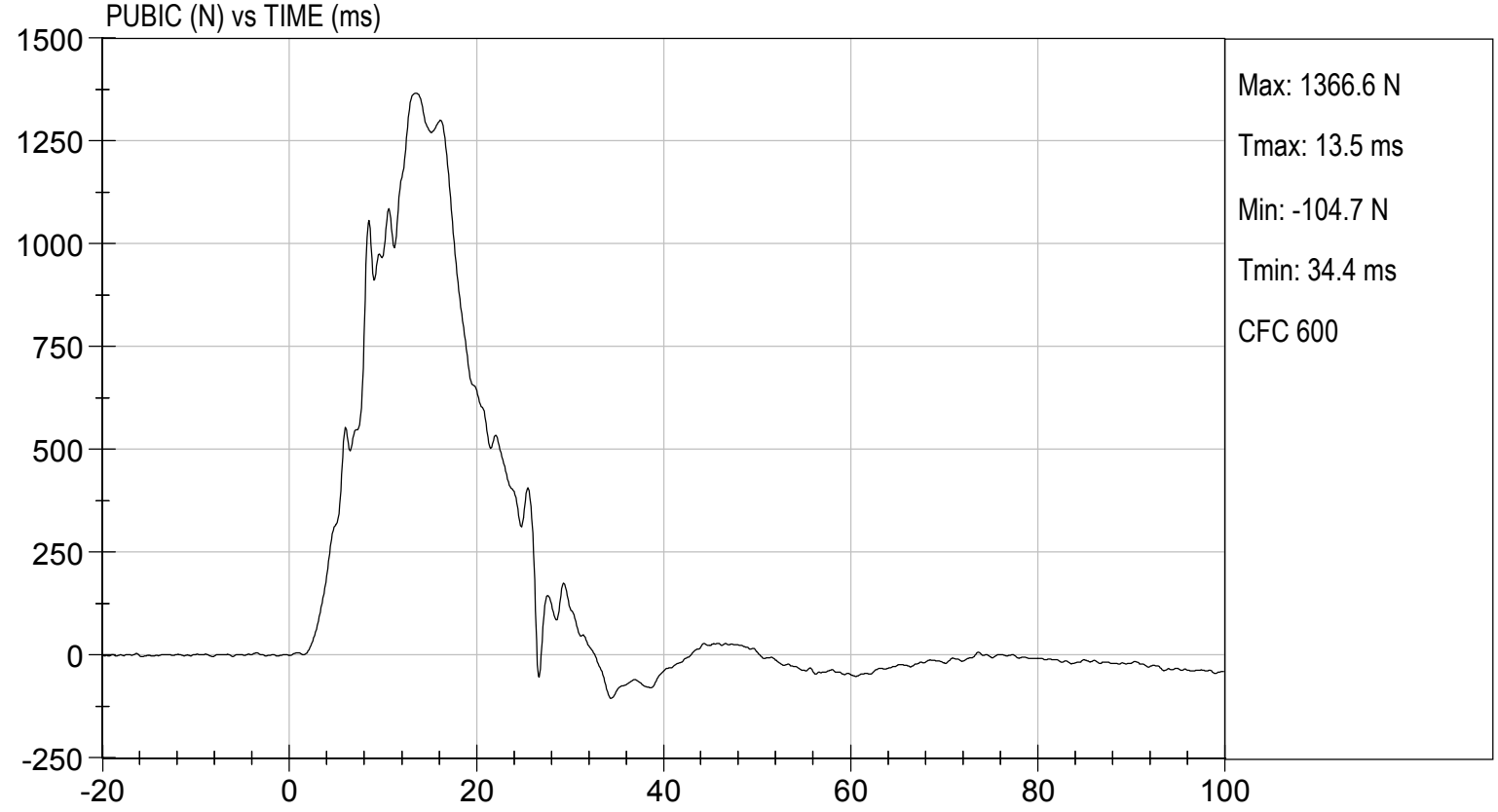
TEST DESC: PELVIS IMPACT
VELOCITY: 13.89 ft/s, 4.23 m/s

TEST DATE: 10/07/2021
TEST #: D213199

IMPACTOR FORCE (N) vs TIME (ms)



PUBIC (N) vs TIME (ms)



MGA RESEARCH CORPORATION

THORAX IMPACT TEST

ES-2re DUMMY

ATD Serial No: F032 **Test I.D:** D213190

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	46	Pass
Probe Speed	m/s	5.40 to 5.60	5.52	Pass
Maximum Impactor Force (after 6 ms)	N	5100 to 6200	6119	Pass
Upper Rib Displacement	mm	34.0 to 41.0	38.2	Pass
Middle Rib Displacement	mm	37.0 to 45.0	40.6	Pass
Lower Rib Displacement	mm	37.0 to 44.0	41.2	Pass
		Overall Test Results		Pass

Laboratory Technician

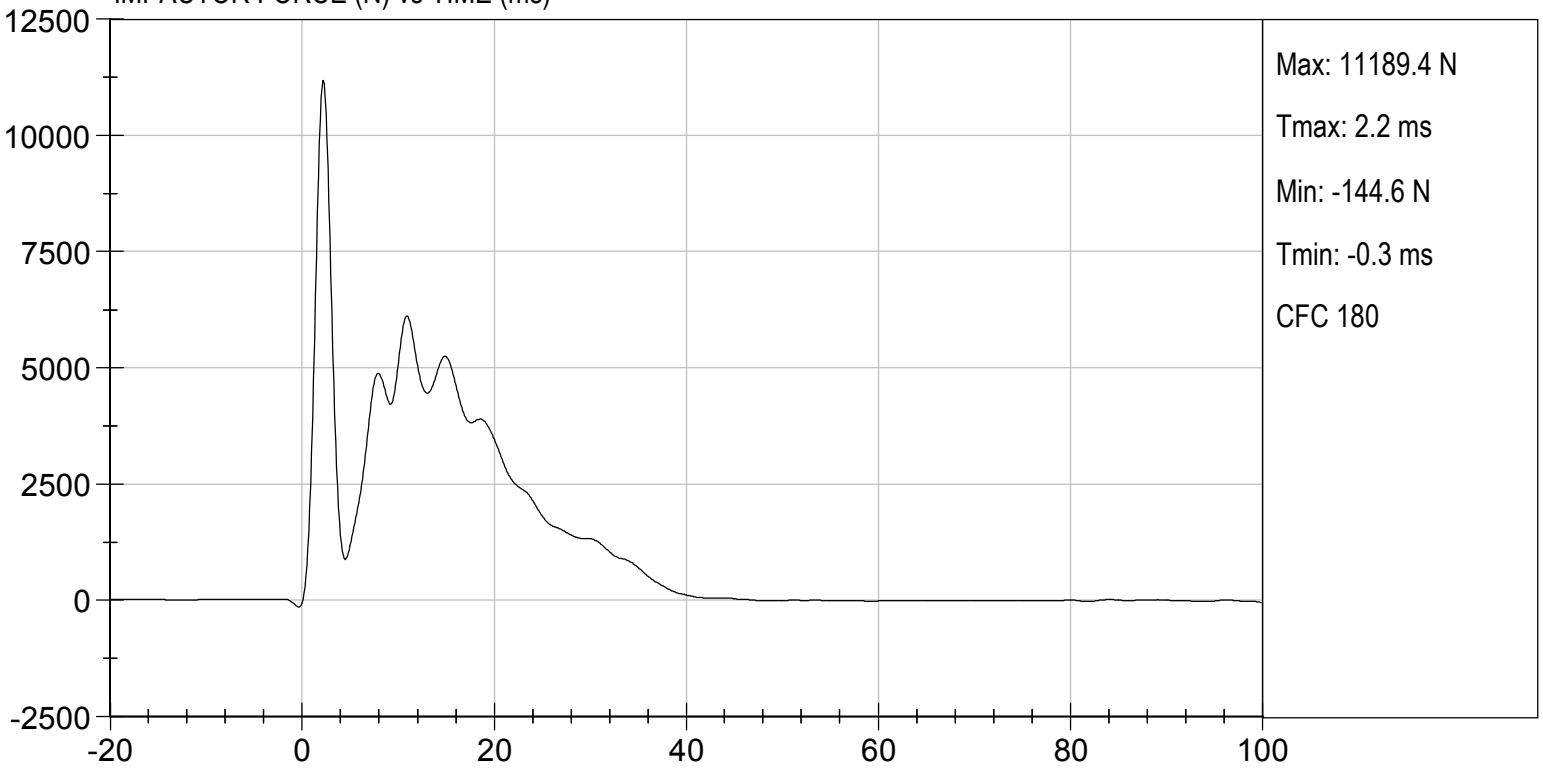
10/07/2021
Test Date

Approved By

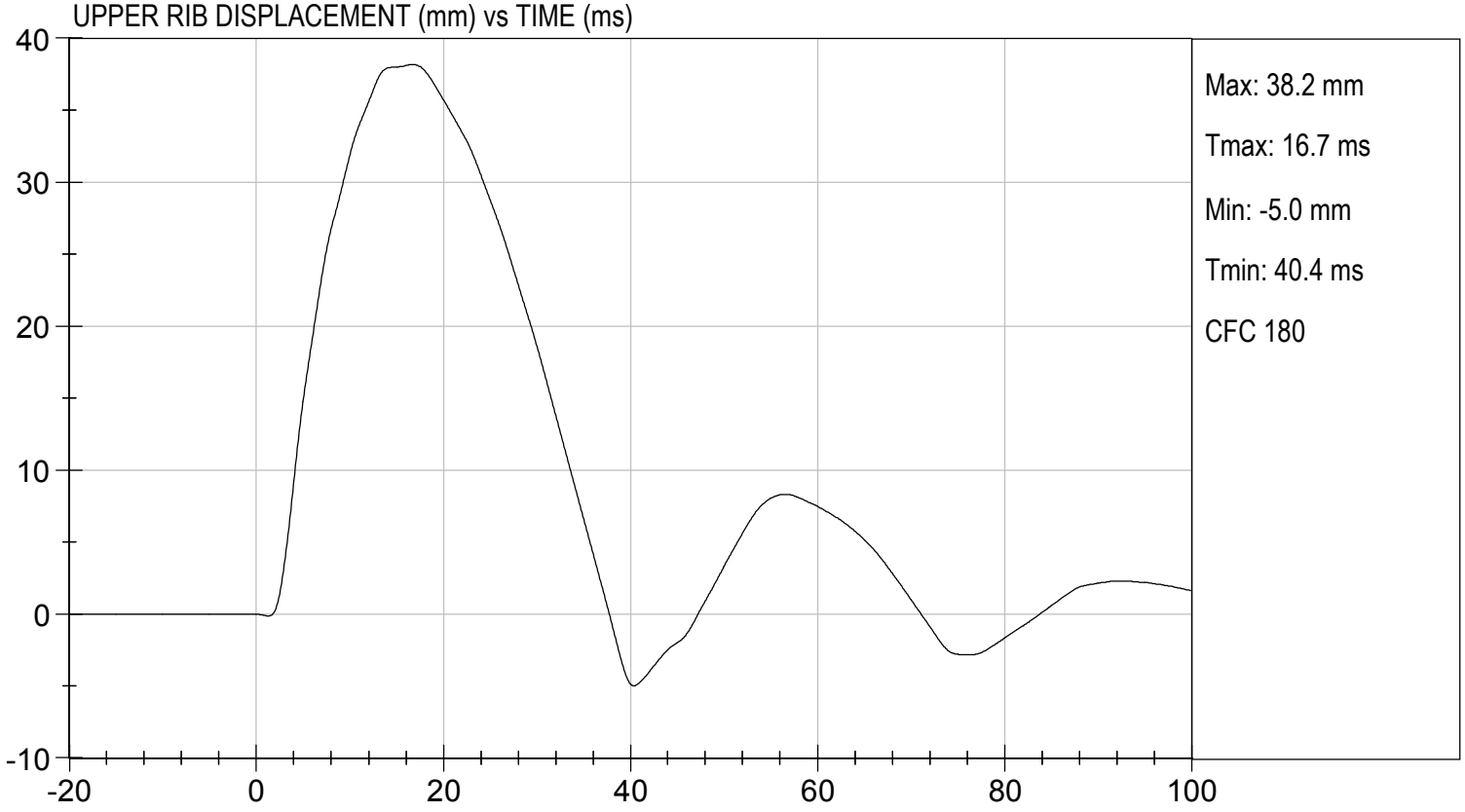
TEST DESC: THORAX IMPACT
VELOCITY: 18.12 ft/s, 5.52 m/s

TEST DATE: 10/07/2021
TEST #: D213190

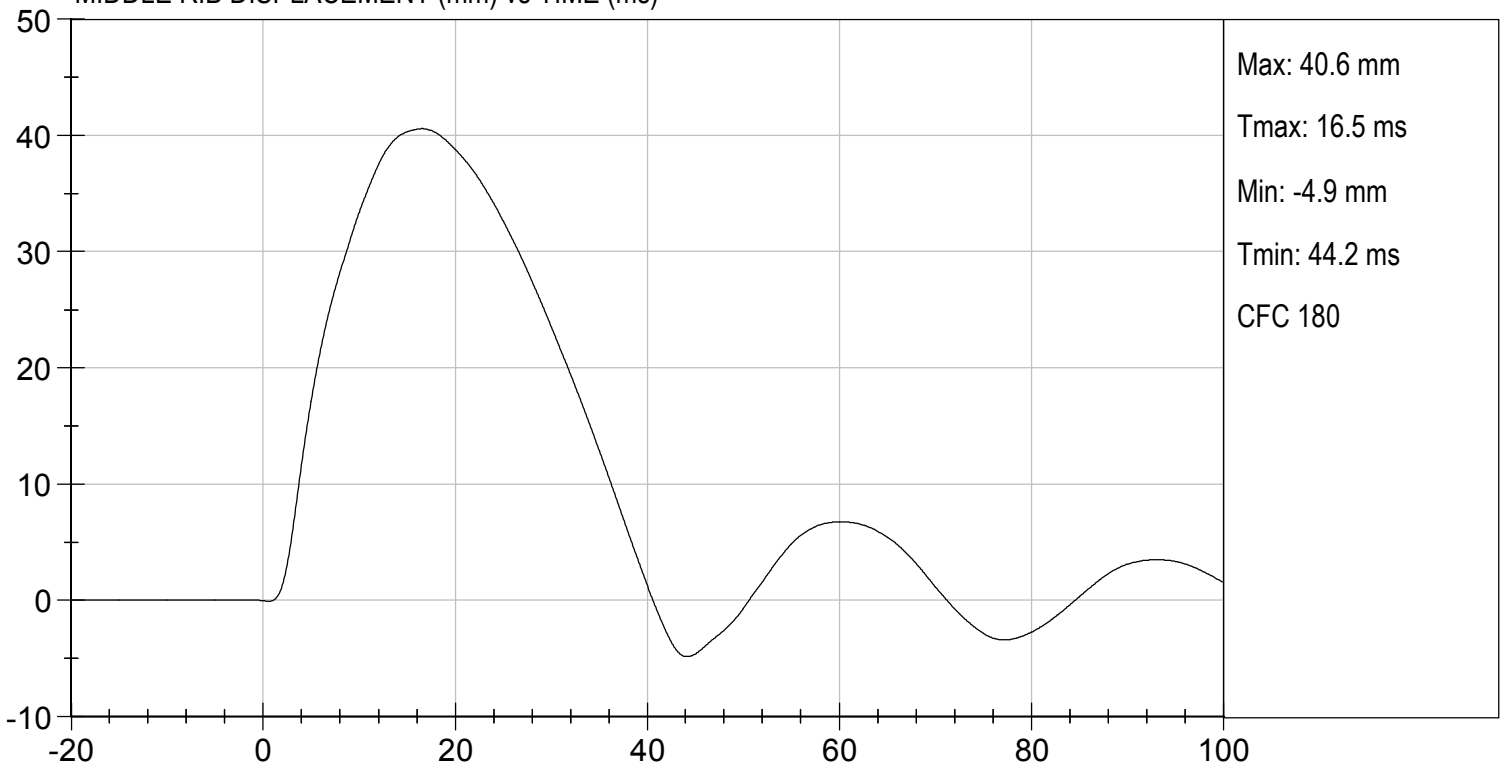
IMPACTOR FORCE (N) vs TIME (ms)



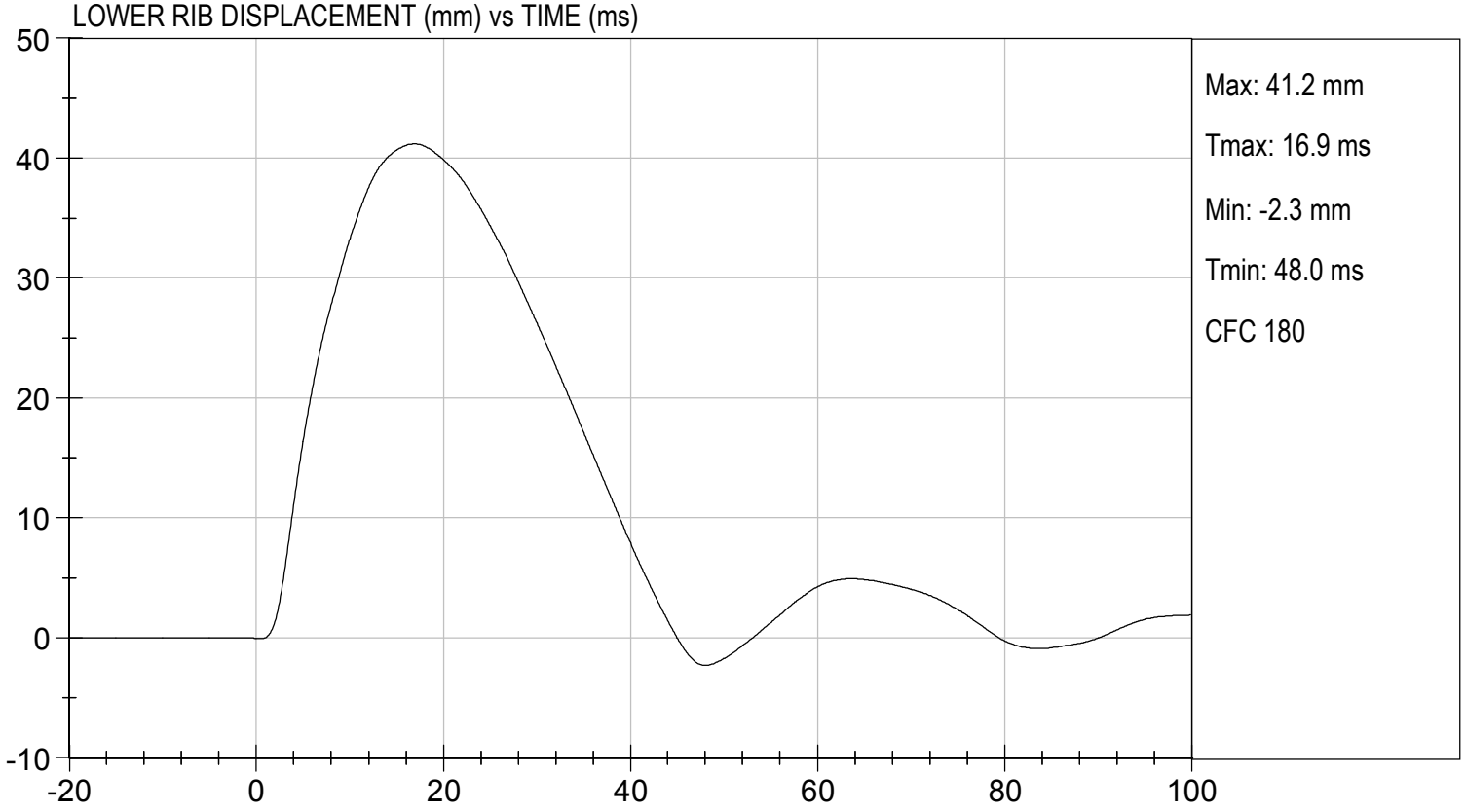
UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



CALIBRATION TEST RESULTS

PRE-TEST

SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD

SID-IIsD External Measurements
SN: 306

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

MGA RESEARCH CORPORATION

HEAD DROP TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306 **Test ID:** D212901

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	42	Pass
Peak Resultant Acceleration	G's	115 to 137	133	Pass
Peak Longitudinal Acceleration	G's	+/- 15	-9.2	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	<15%	Yes	Pass
		Overall Test Results		Pass

Laboratory Technician

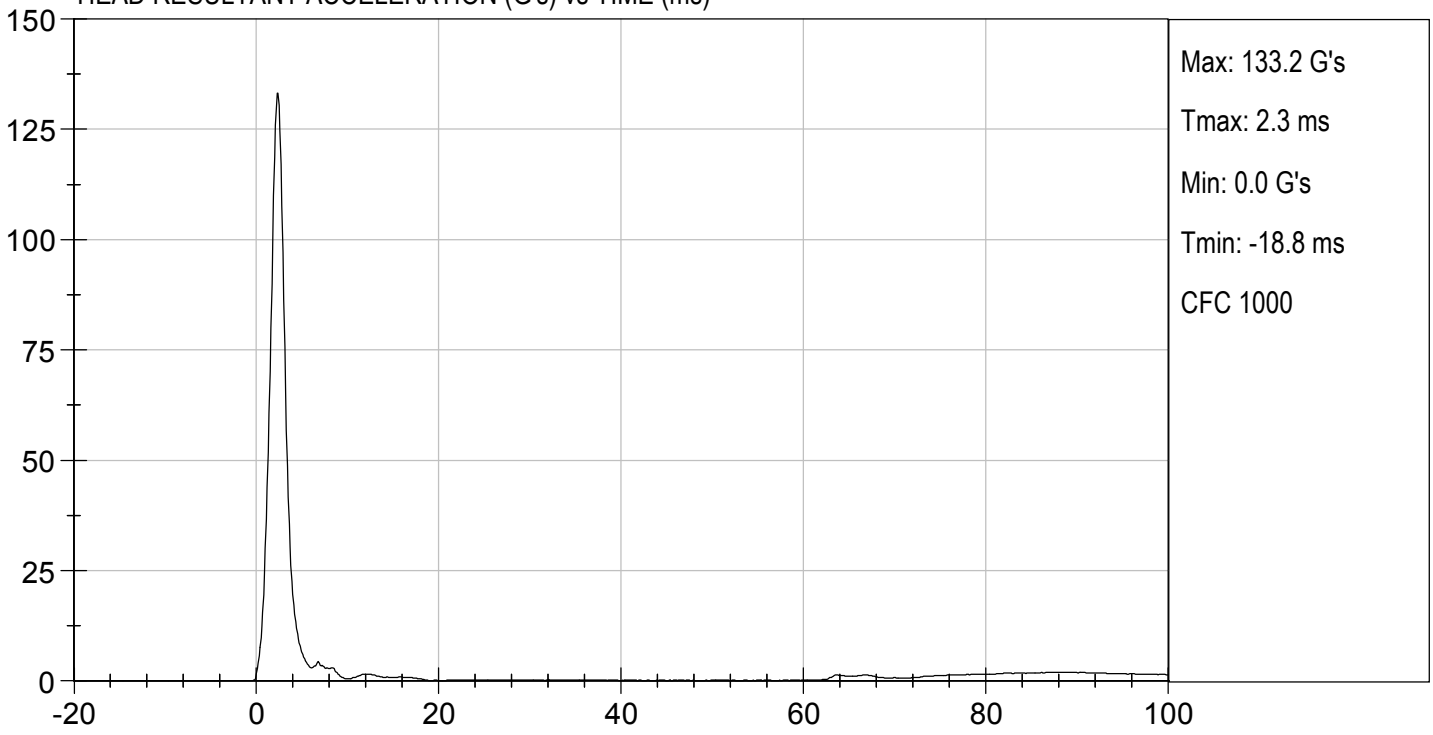
09/08/2021
Test Date

Approved By

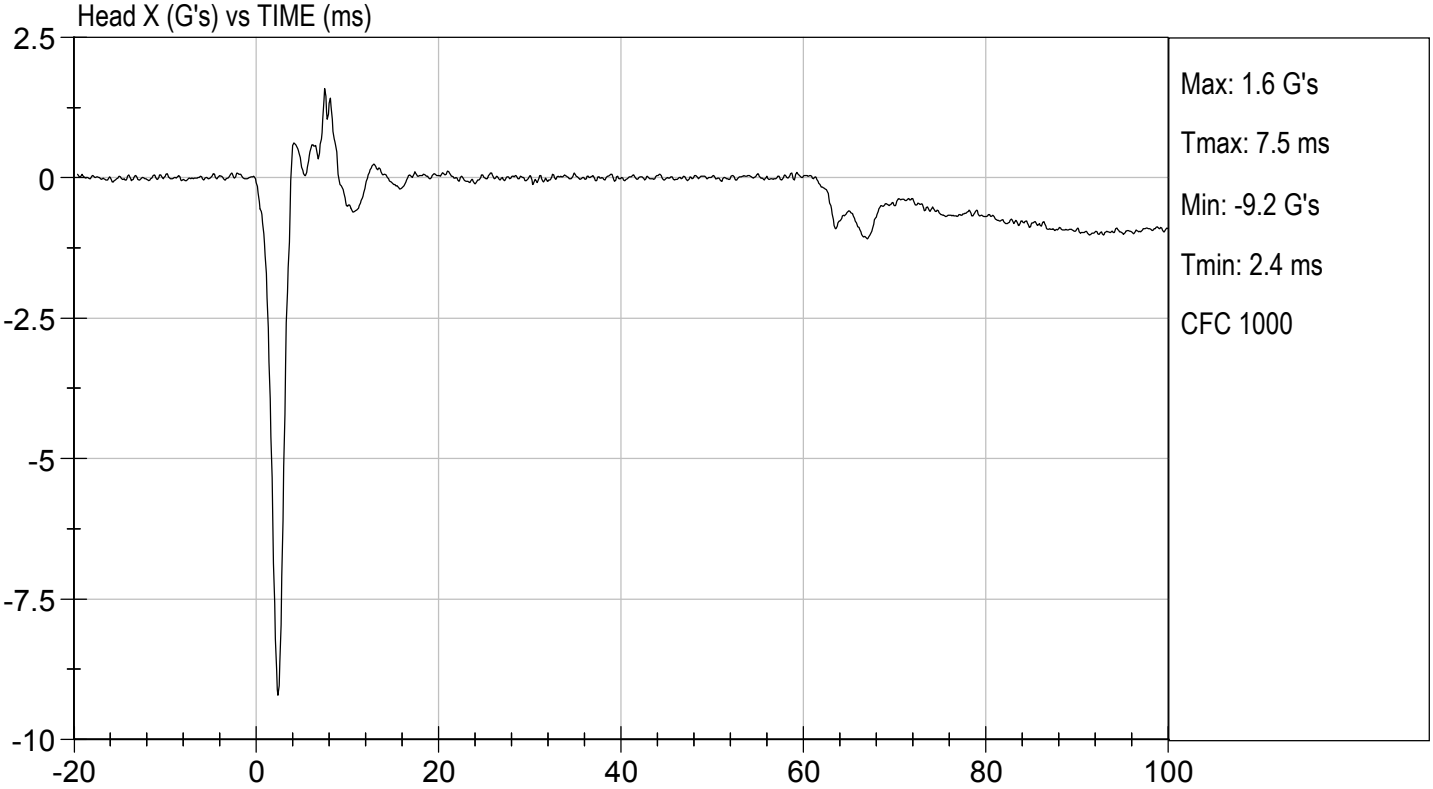
TEST DESC: HEAD DROP

TEST DATE: 09/08/2021
TEST #: D212901

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

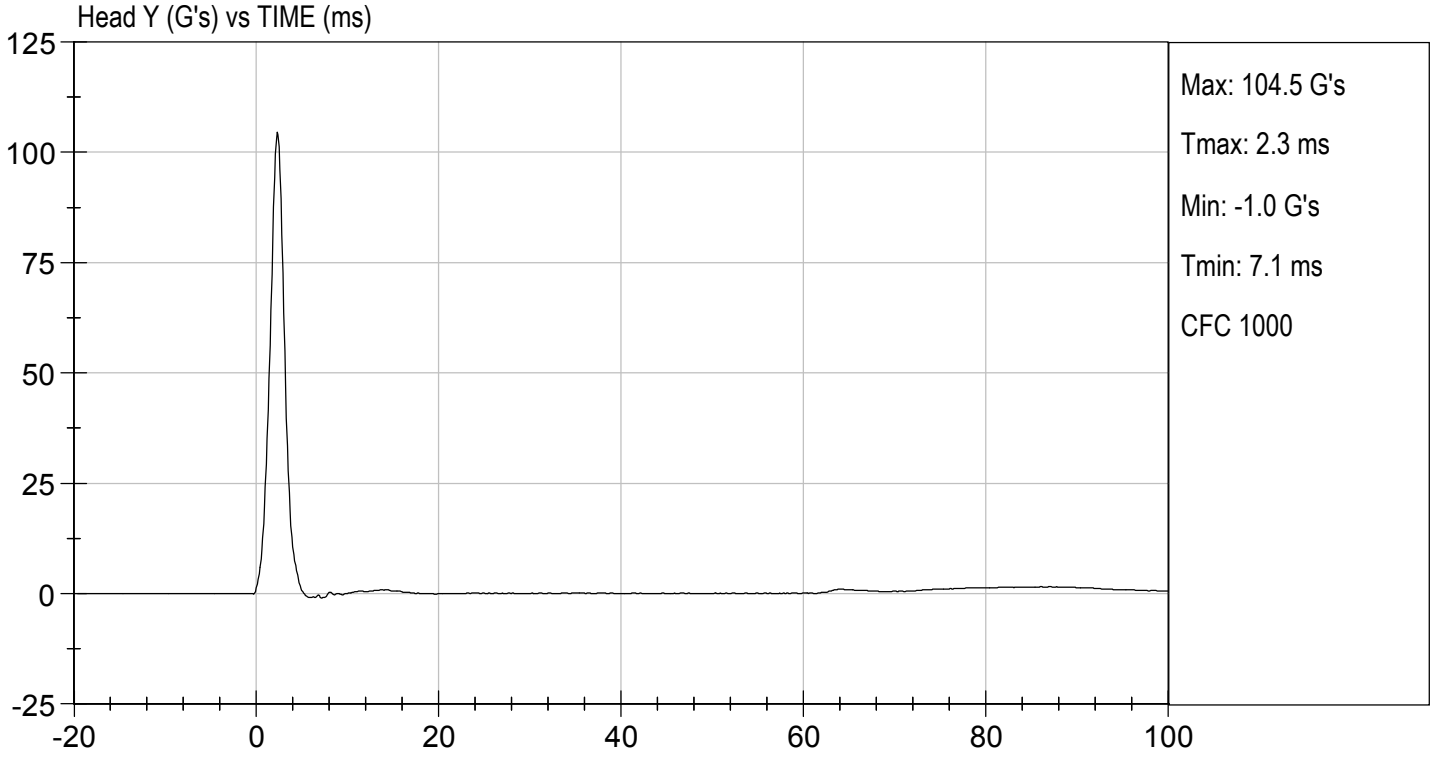


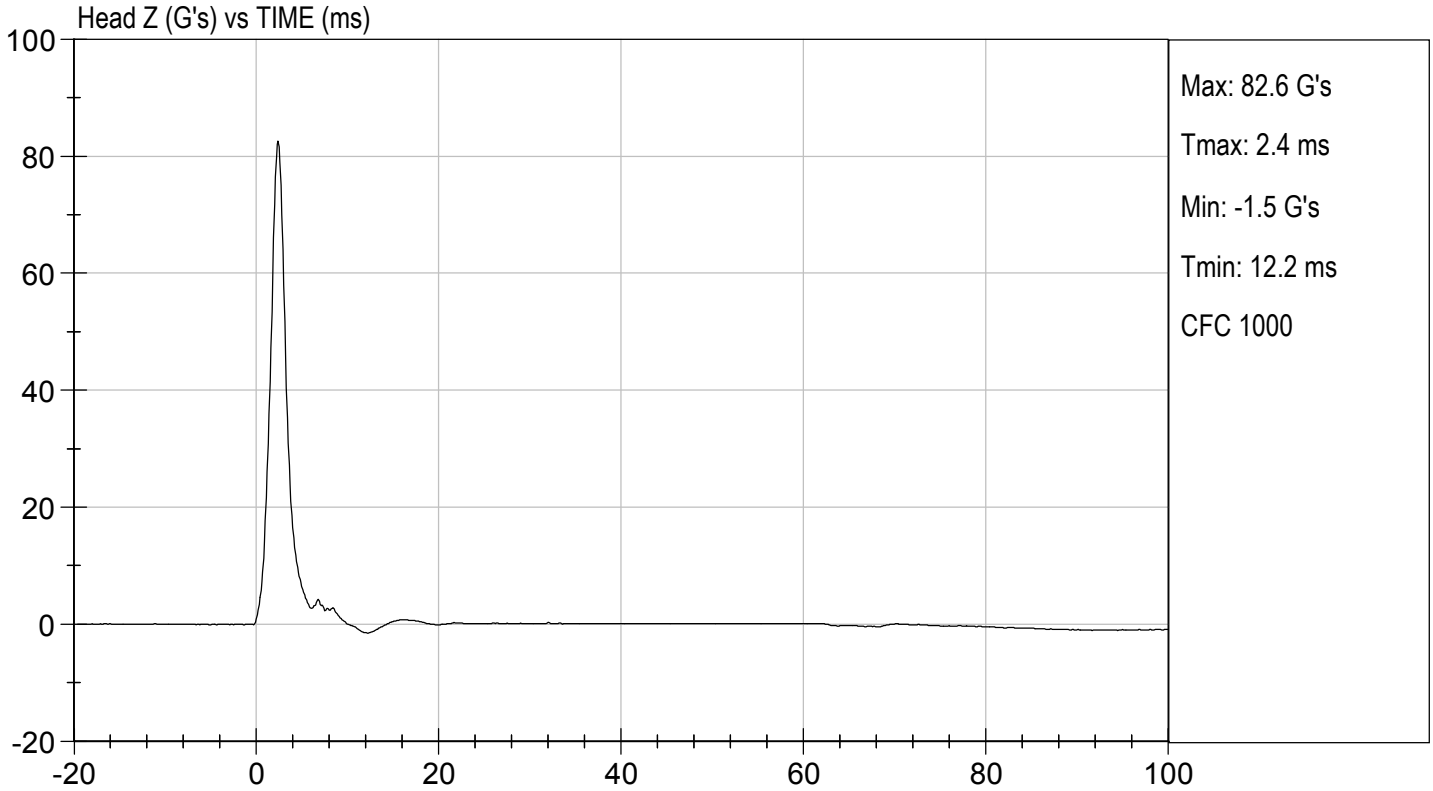
Head X (G's) vs TIME (ms)



TEST DESC: HEAD DROP

TEST DATE: 09/08/2021
TEST #: D212901





MGA RESEARCH CORPORATION

LATERAL NECK PENDULUM TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306 **Test I.D:** D212902

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.3	Pass
Humidity		%	10 to 70	45	Pass
Impact Velocity		m/s	5.51 to 5.63	5.62	Pass
Pendulum Velocity	10 ms	m/s	2.20 to 2.80	2.52	Pass
	15 ms	m/s	3.30 to 4.10	3.67	Pass
	20 ms	m/s	4.40 to 5.40	5.08	Pass
	25 ms	m/s	5.40 to 6.10	5.67	Pass
	25-100 ms	m/s	5.50 to 6.20	5.70	Pass
Maximum D-Plane Rotation		deg	71 to 81	75	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	65	Pass
Maximum Occipital Condyle Moment		Nm	-44 to -36	-36	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	121	Pass
			Overall Test Results		Pass

Laboratory Technician

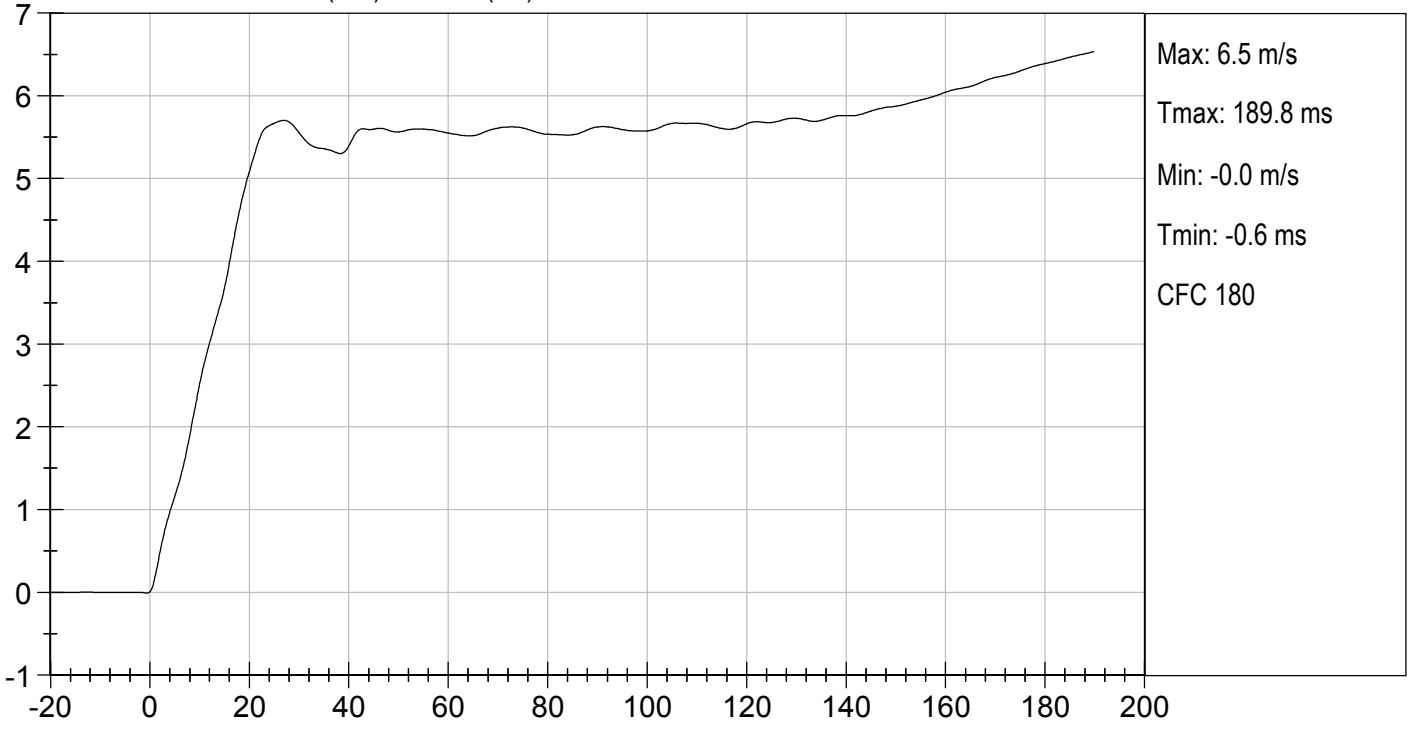
09/10/2021
Test Date

Approved By

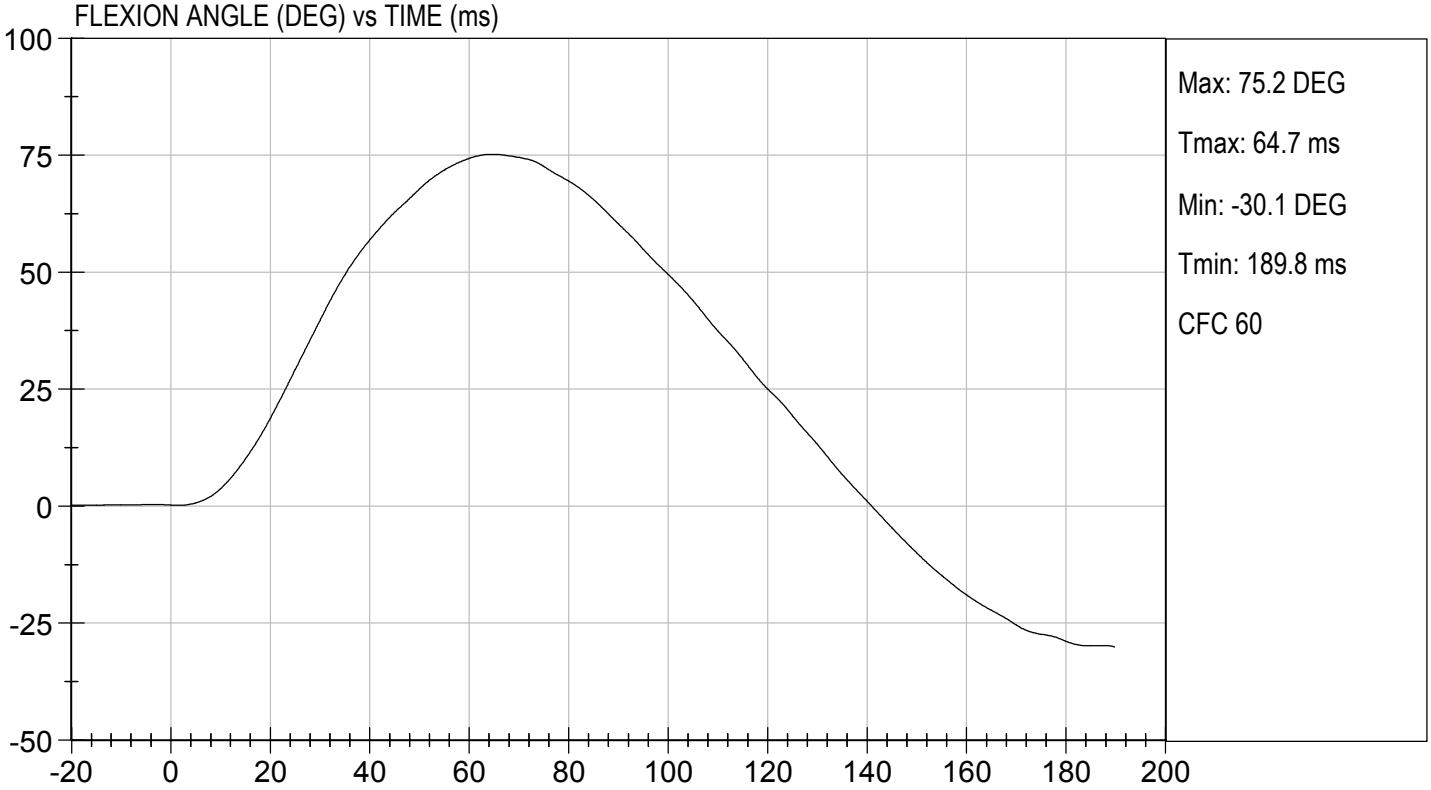
TEST DESC: NECK BENDING
VELOCITY: 18.45 ft/s, 5.62 m/s

TEST DATE: 09/10/2021
TEST #: D212902

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

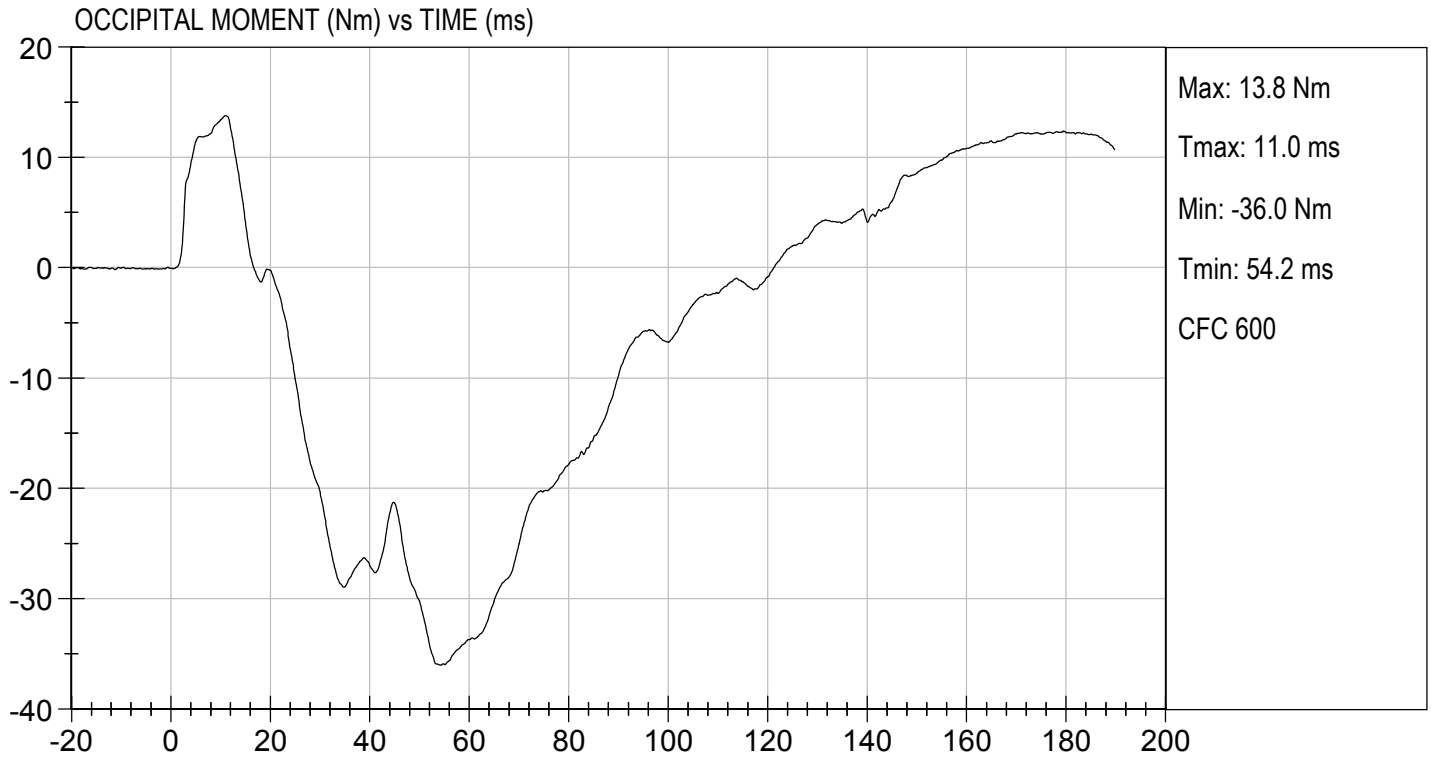


FLEXION ANGLE (DEG) vs TIME (ms)



TEST DESC: NECK BENDING
VELOCITY: 18.45 ft/s, 5.62 m/s

TEST DATE: 09/10/2021
TEST #: D212902



MGA RESEARCH CORPORATION

SHOULDER IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306 **Test ID:** D212903

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	42	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Maximum Probe Acceleration	G's	13 to 18	15	Pass
Shoulder Displacement	mm	28 to 37	31	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	18	Pass
		Overall Test Results		Pass

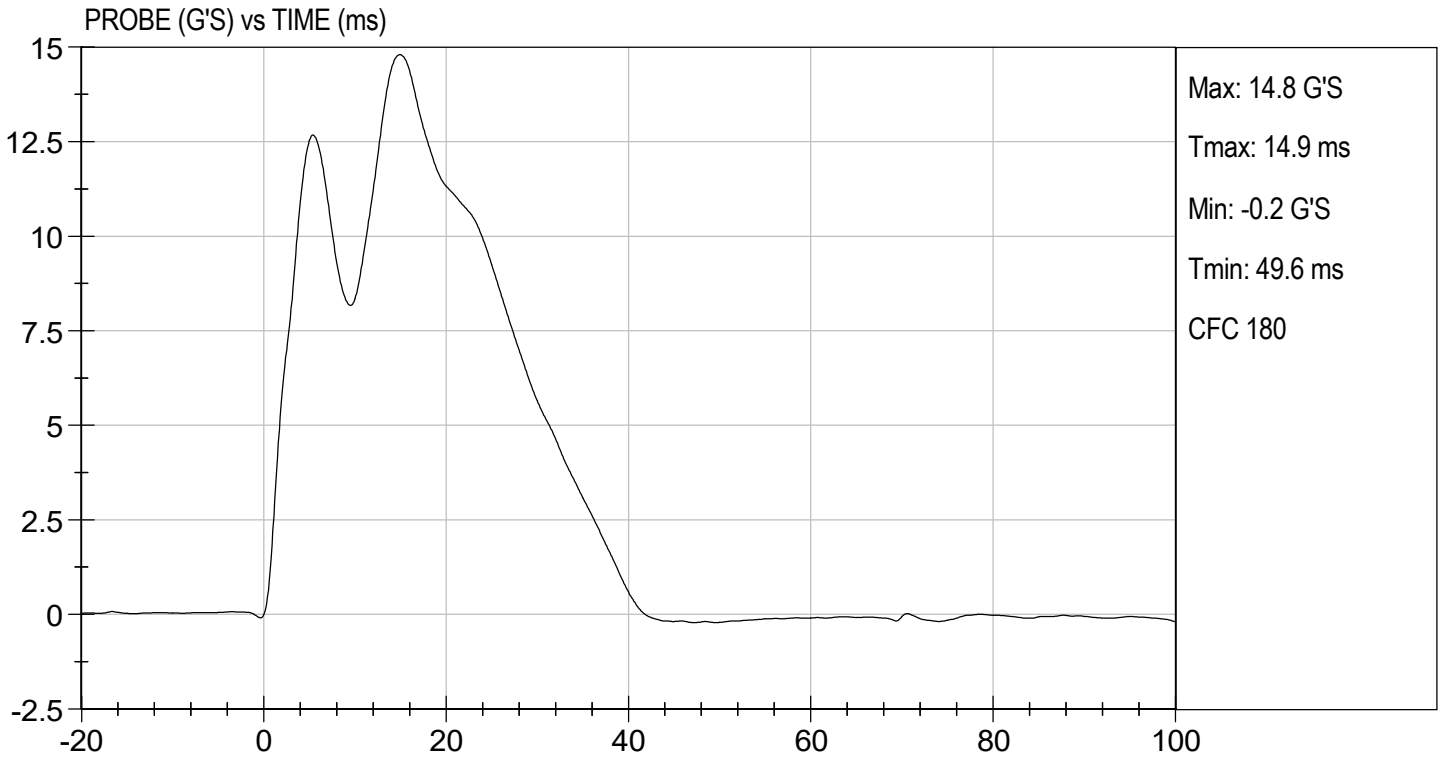
Laboratory Technician

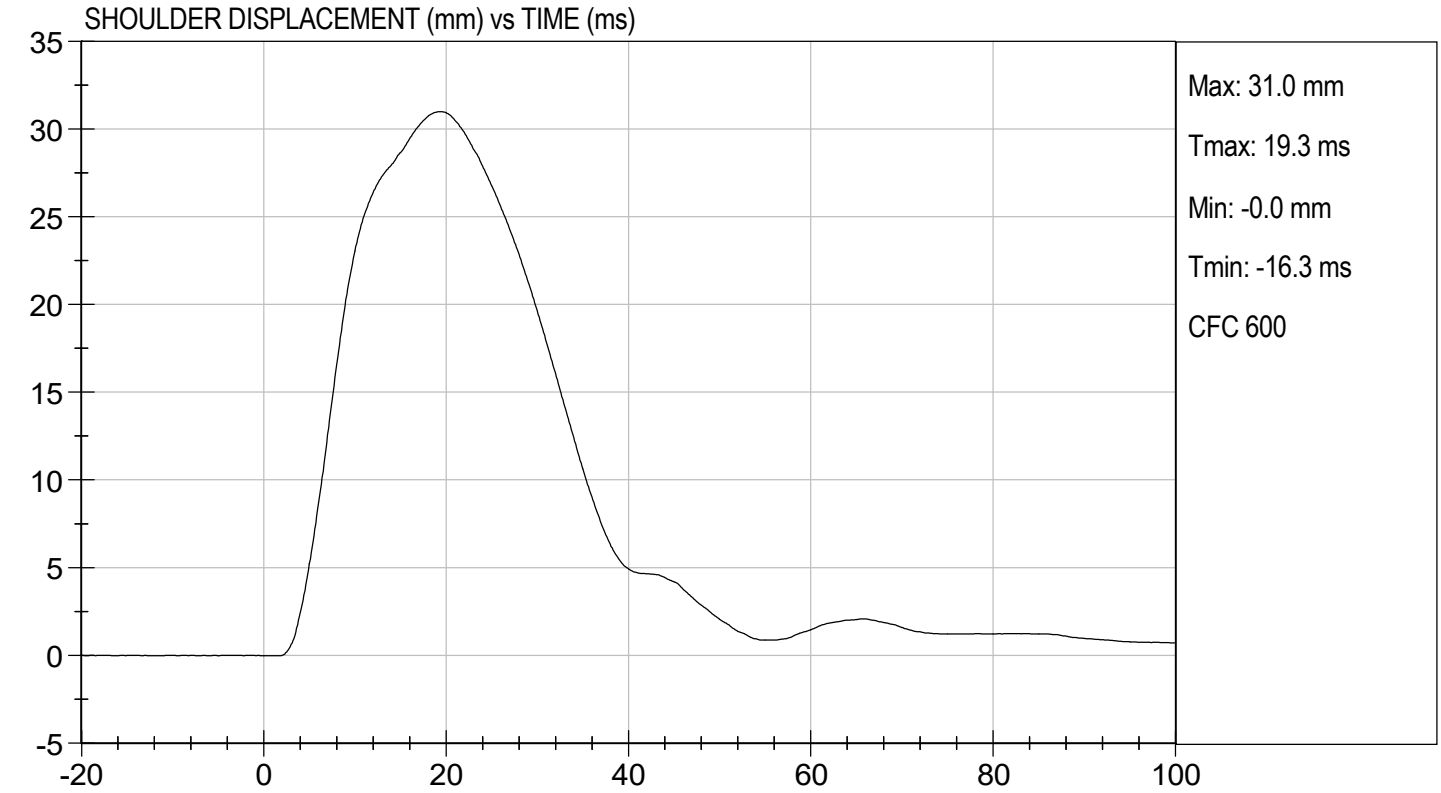
09/08/2021
Test Date

Approved By

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

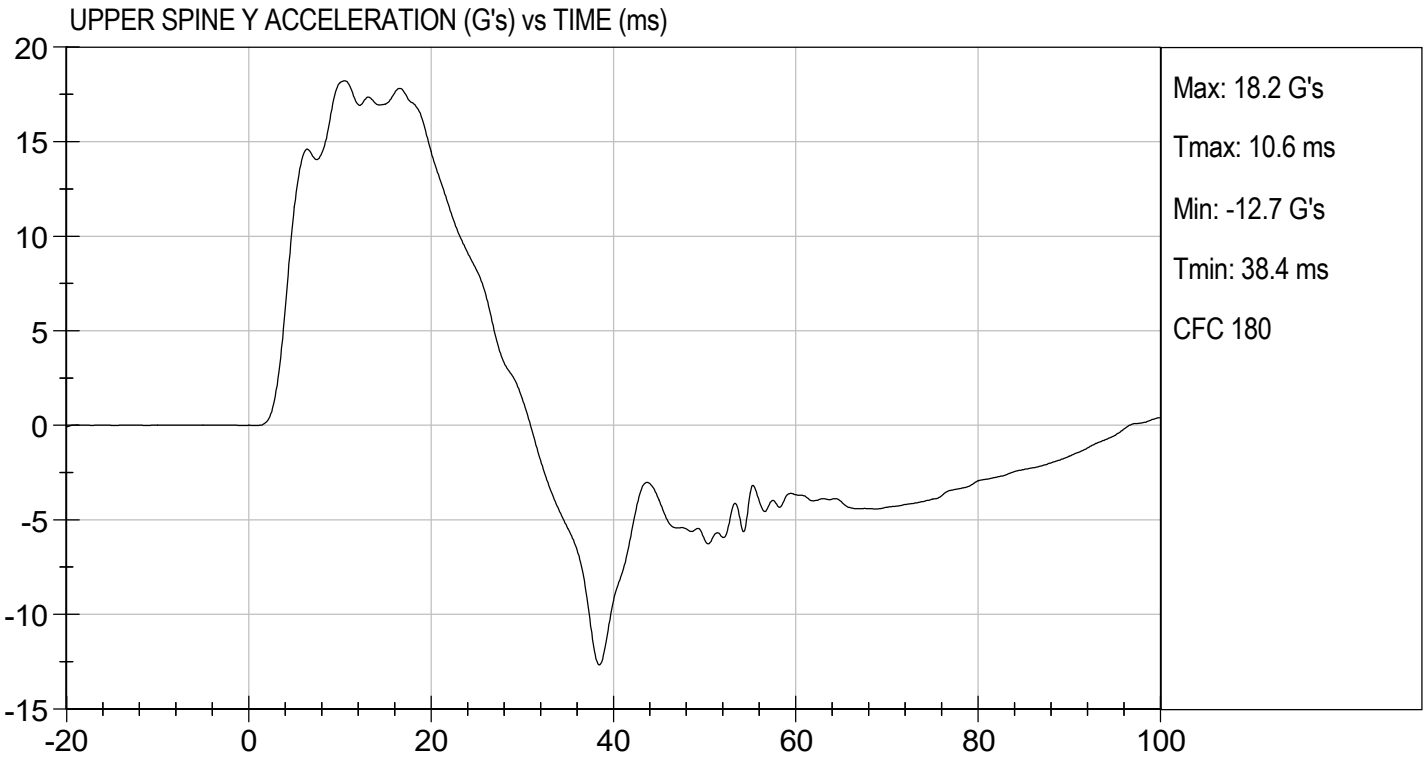
TEST DATE: 09/08/2021
TEST #: D212903





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

TEST DATE: 09/08/2021
TEST #: D212903



MGA RESEARCH CORPORATION

THORAX (WITH ARM) IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306 **Test I.D:** D212904

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	42	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Maximum Probe Acceleration	G's	30 to 36	34	Pass
Shoulder Displacement	mm	31 to 40	35	Pass
Upper Rib Displacement	mm	25 to 32	28	Pass
Middle Rib Displacement	mm	30 to 36	33	Pass
Lower Rib Displacement	mm	32 to 38	36	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	38	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	32	Pass
		Overall Test Results		Pass

Laboratory Technician

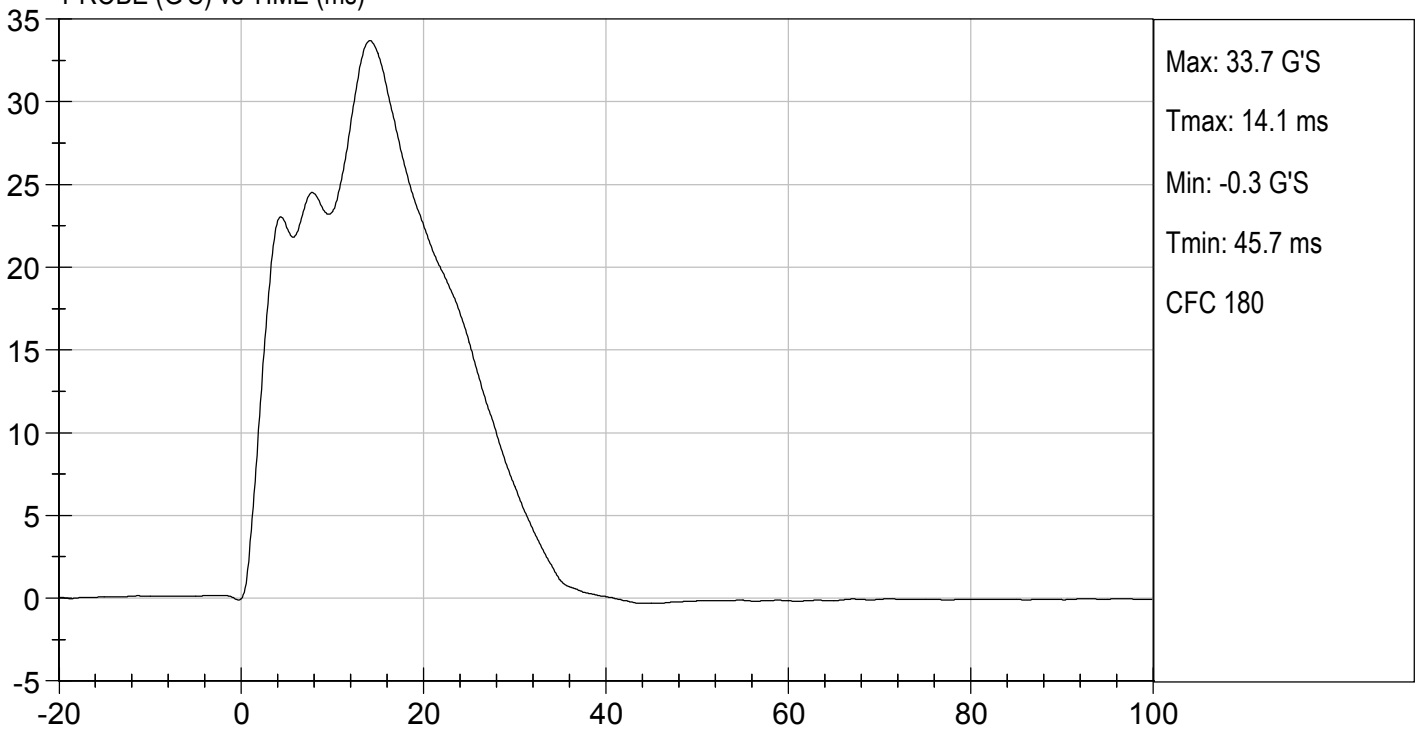
09/08/2021
Test Date

Approved By

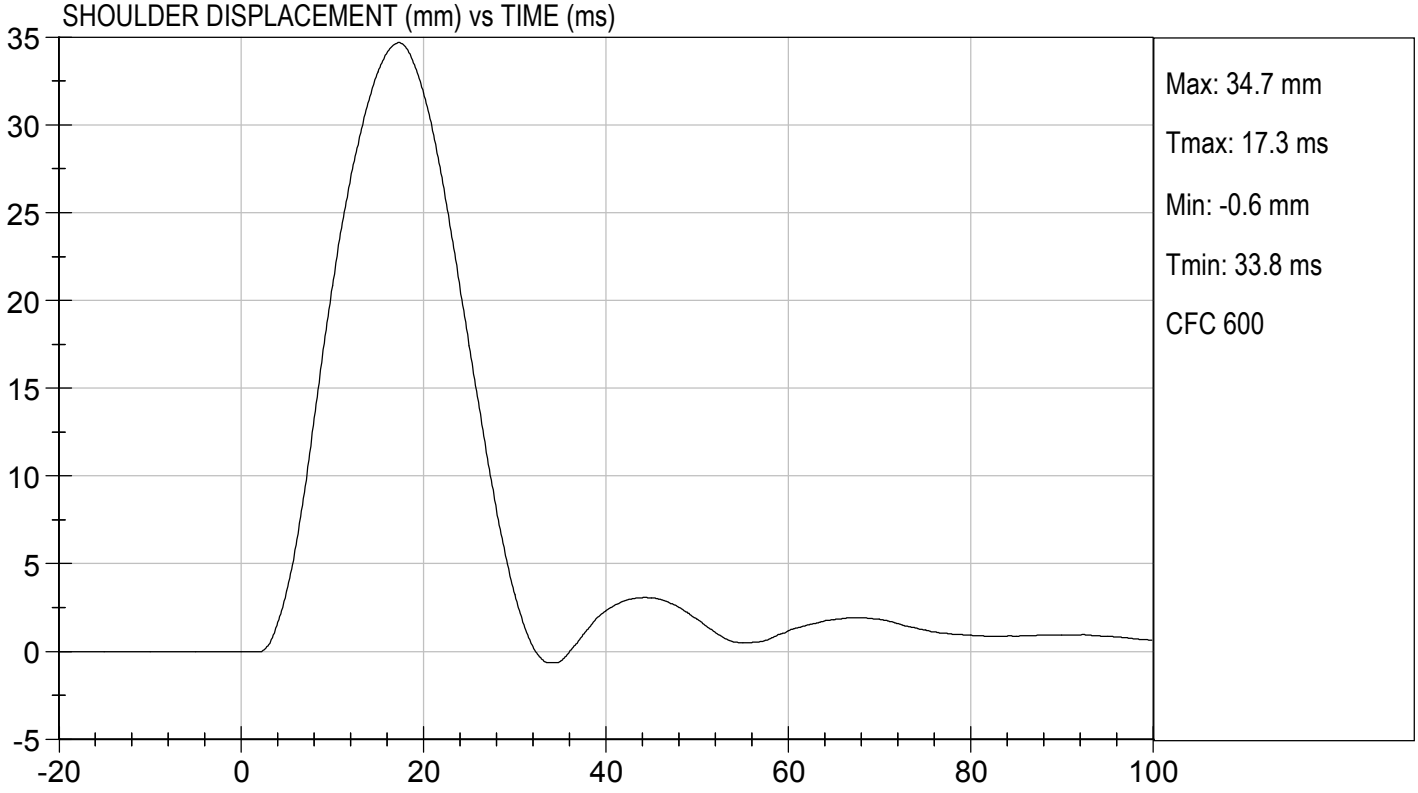
TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

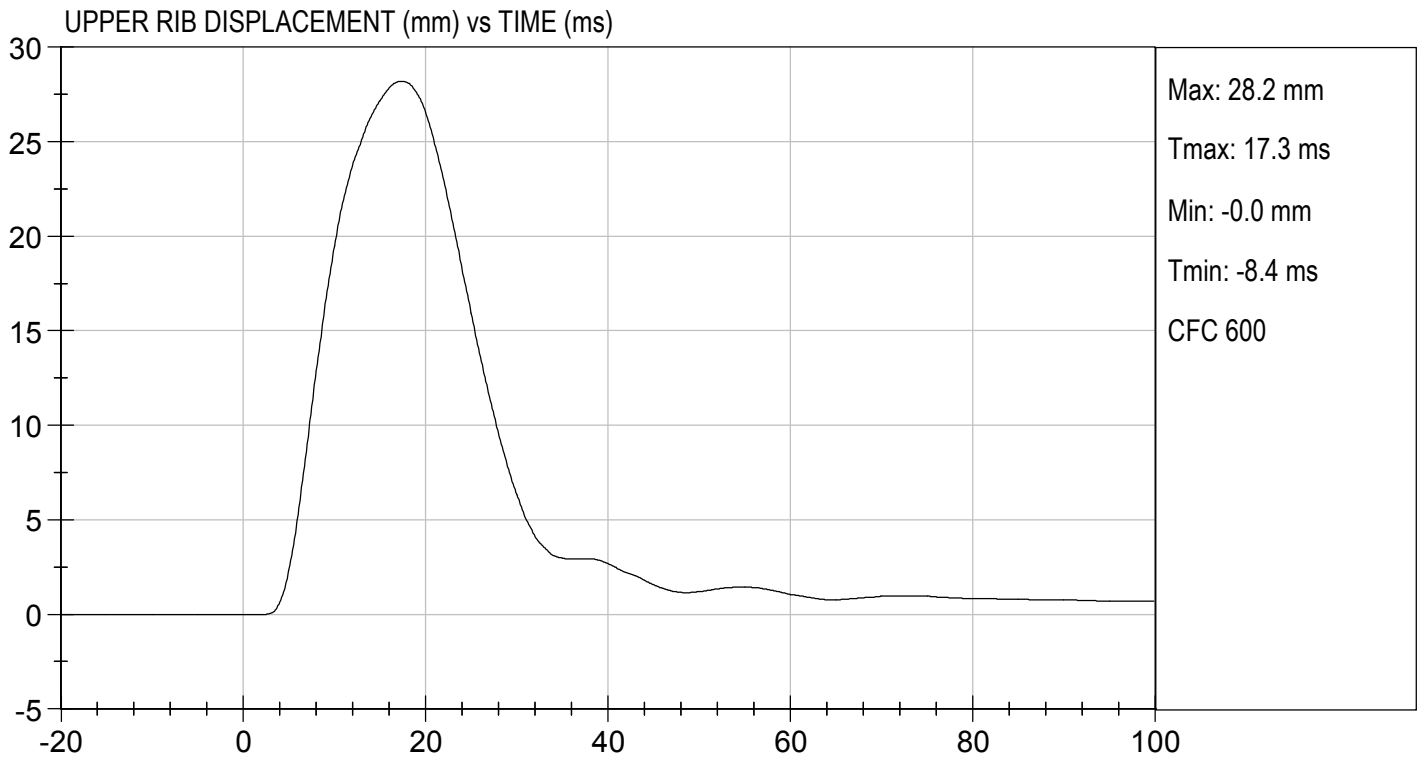
TEST DATE: 09/08/2021
TEST #: D212904

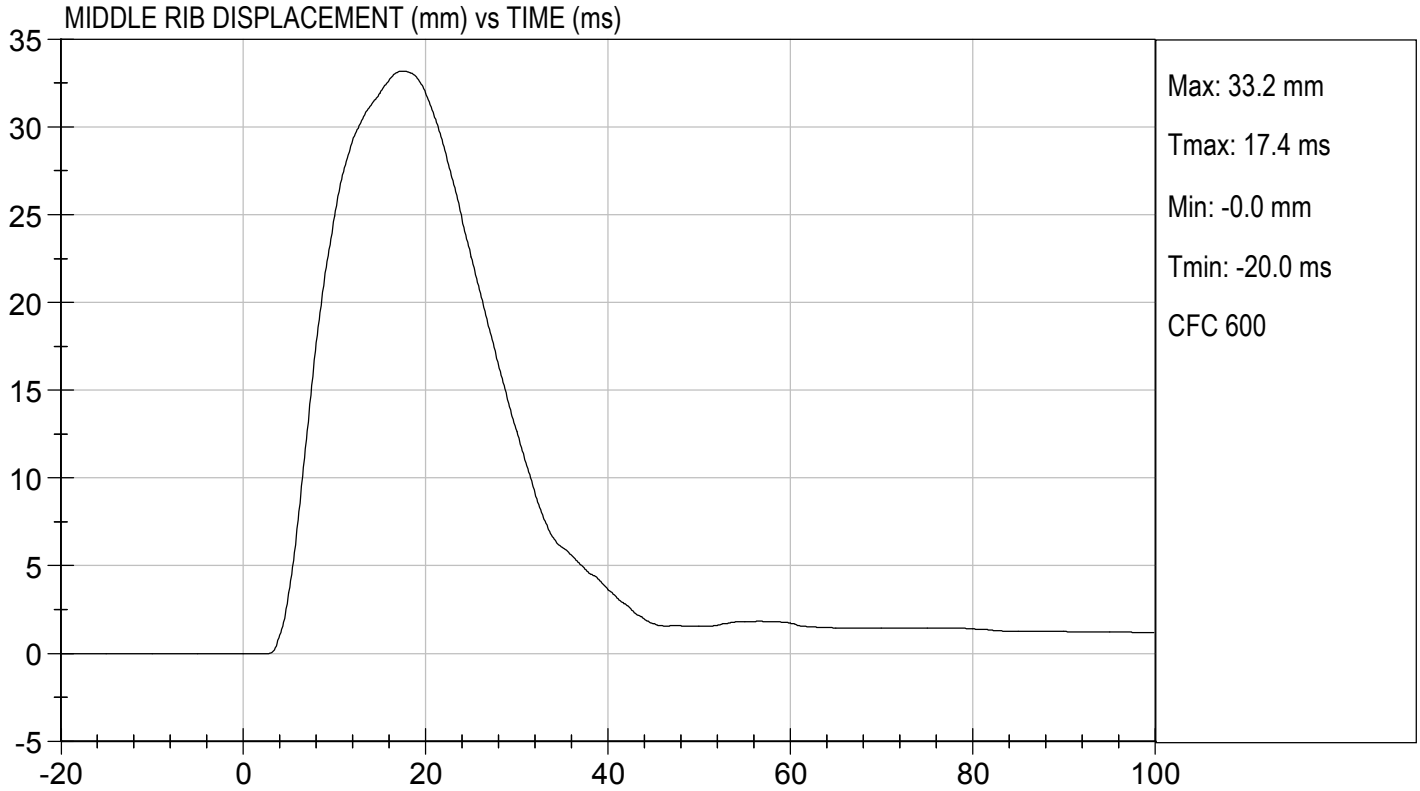
PROBE (G'S) vs TIME (ms)



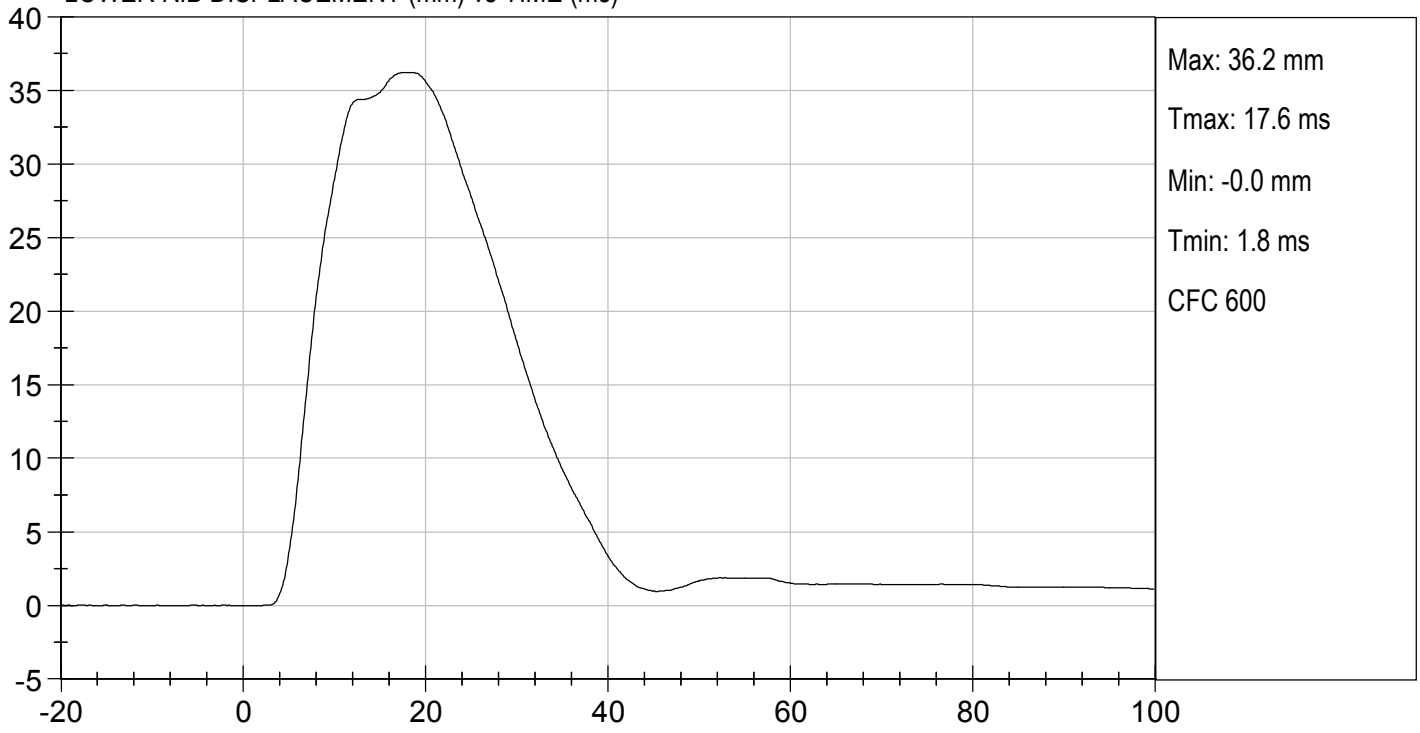
SHOULDER DISPLACEMENT (mm) vs TIME (ms)



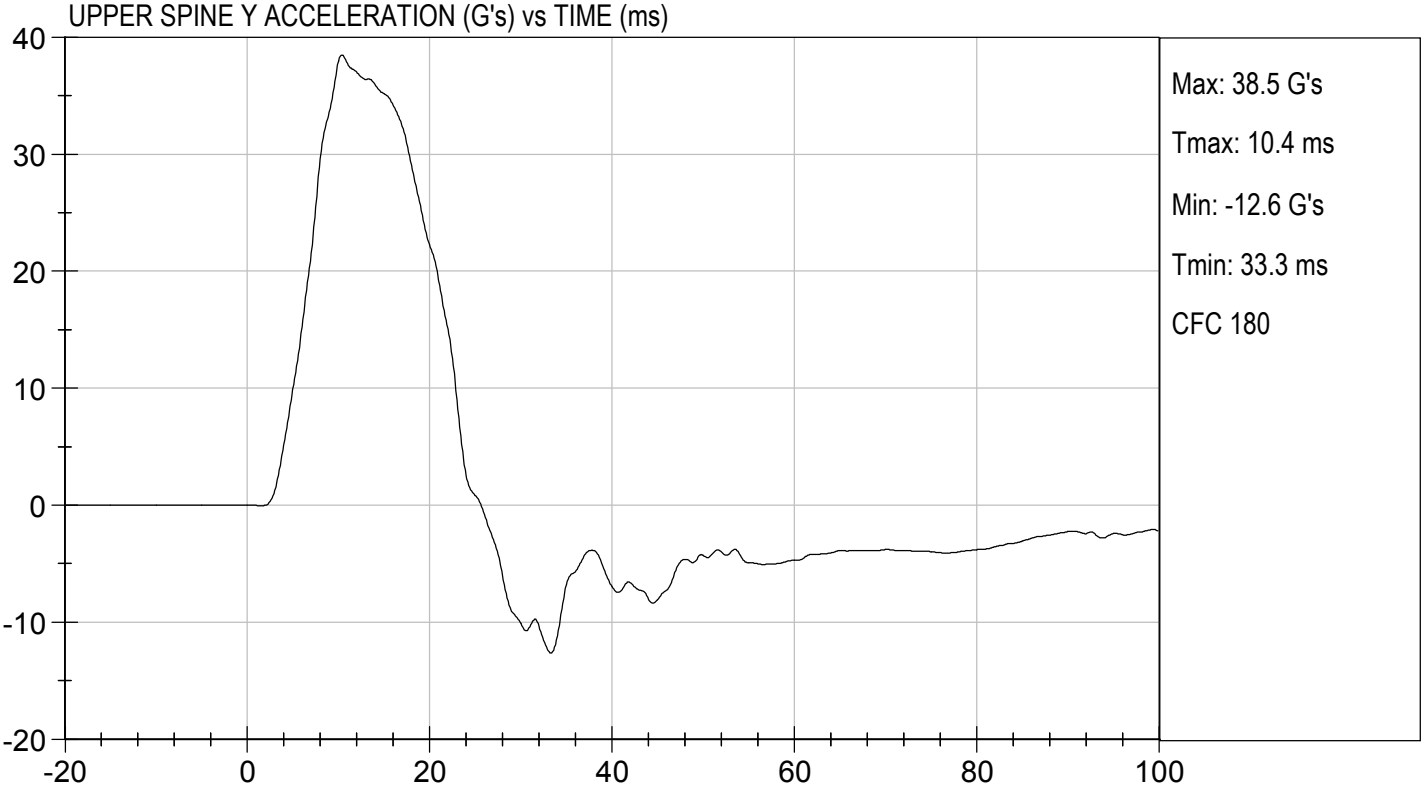

UPPER RIB DISPLACEMENT (mm) vs TIME (ms)
30
25
20
15
10
5
0
-5
-20
0
20
40
60
80
100
Max: 28.2 mm
Tmax: 17.3 ms
Min: -0.0 mm
Tmin: -8.4 ms
CFC 600


MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)
35
30
25
20
15
10
5
0
-5
-20
0
20
40
60
80
100
Max: 33.2 mm
Tmax: 17.4 ms
Min: -0.0 mm
Tmin: -20.0 ms
CFC 600

LOWER RIB DISPLACEMENT (mm) vs TIME (ms)

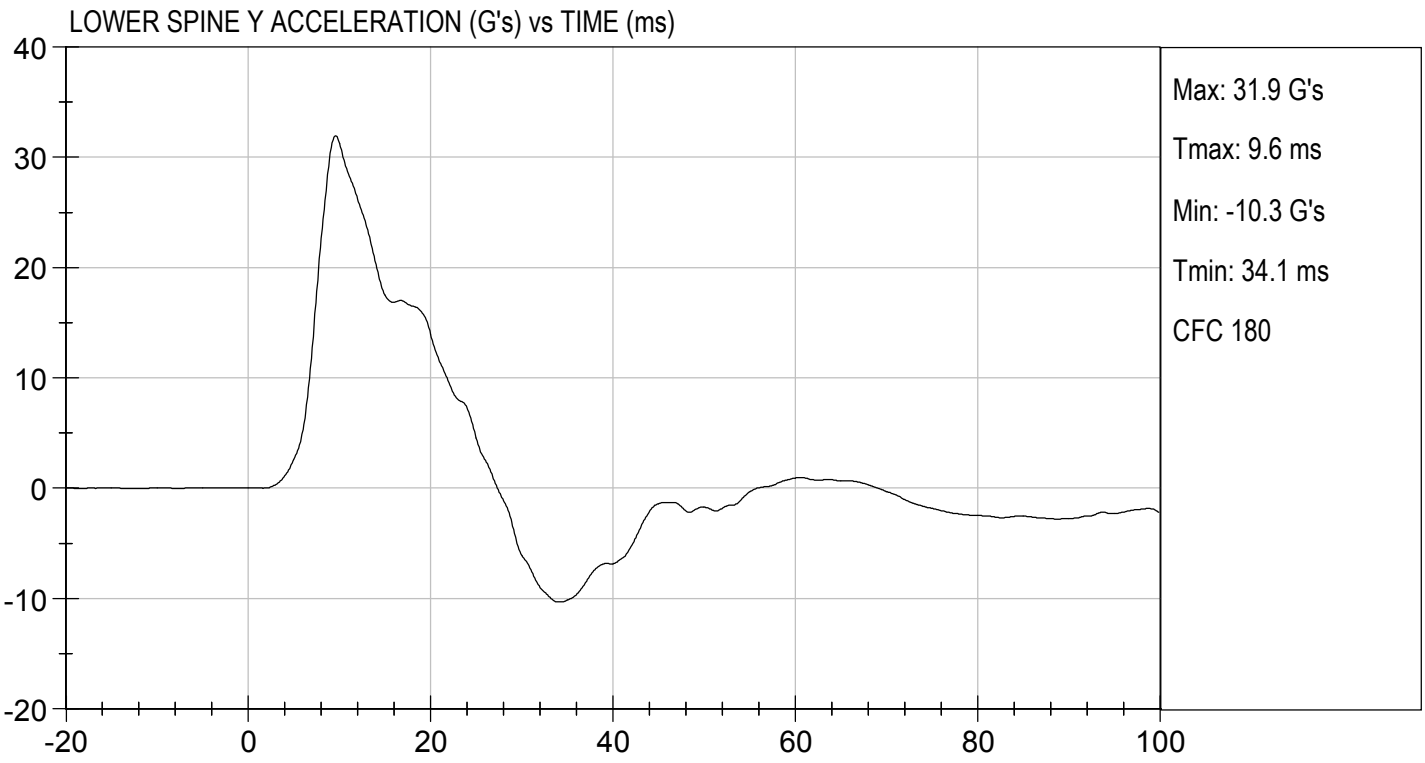


UPPER SPINE Y ACCELERATION (G's) vs TIME (ms)



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

TEST DATE: 09/08/2021
TEST #: D212904



MGA RESEARCH CORPORATION

THORAX (WITHOUT ARM) IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306 **Test I.D:** D212905

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	42	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	38	Pass
Middle Rib Displacement	mm	39 to 45	42	Pass
Lower Rib Displacement	mm	35 to 43	39	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	16	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	10	Pass
		Overall Test Results		Pass

Laboratory Technician

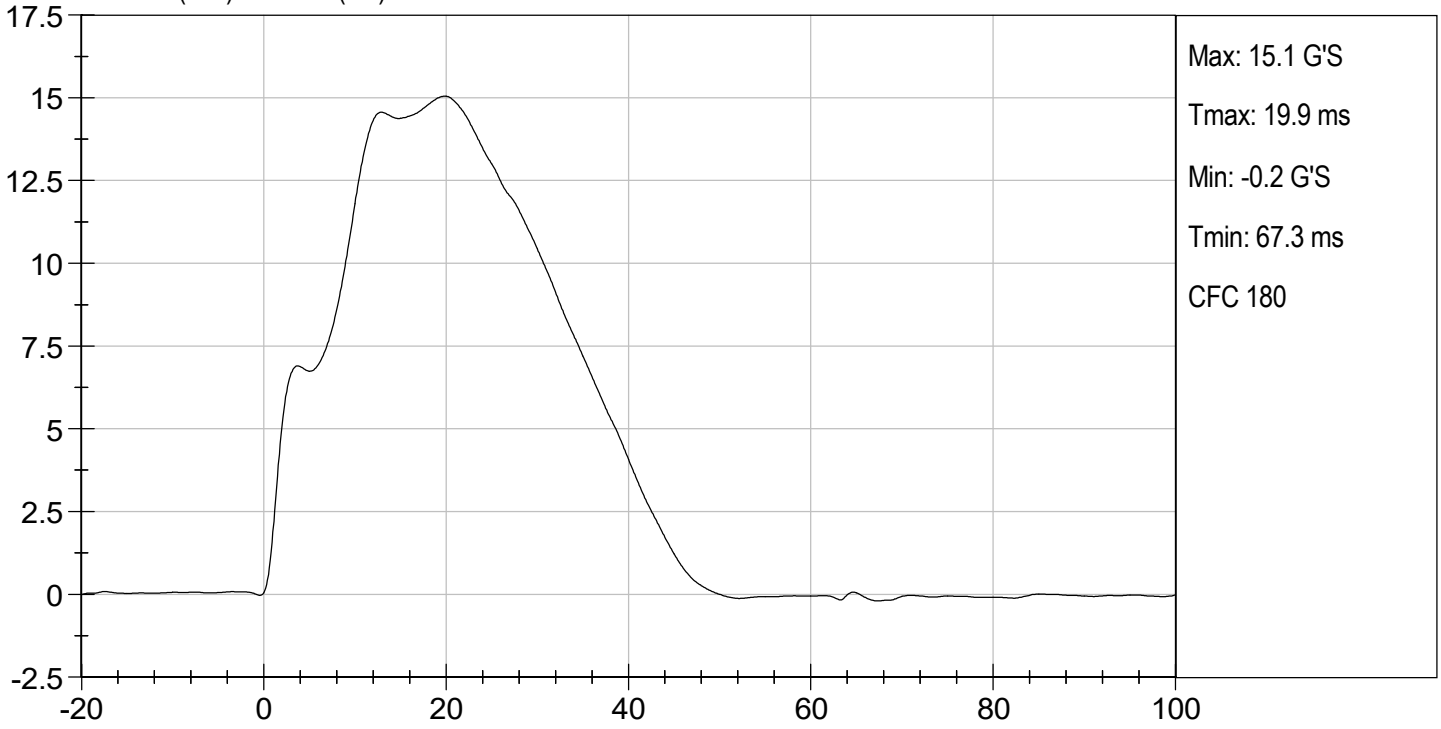
09/08/2021
Test Date

Approved By

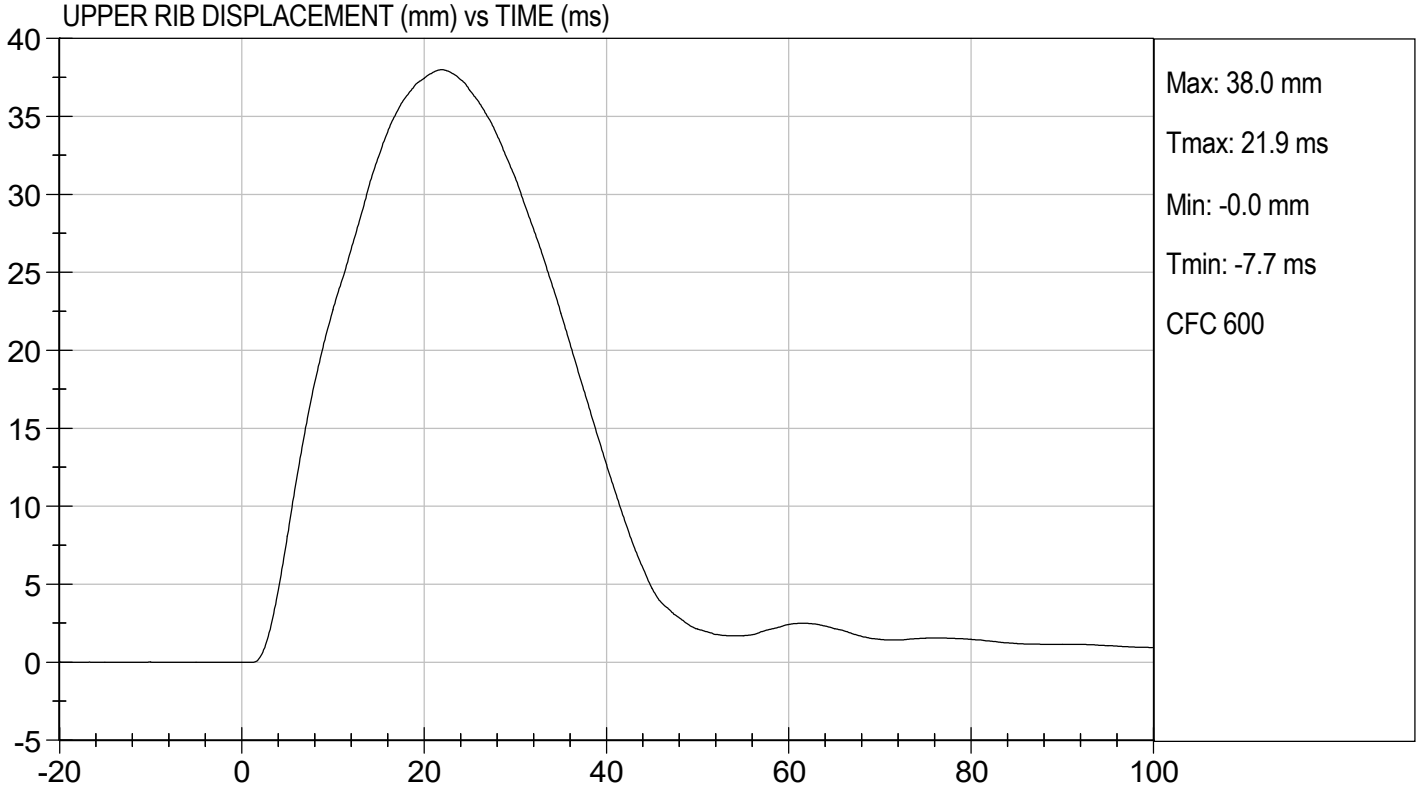
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 09/08/2021
TEST #: D212905

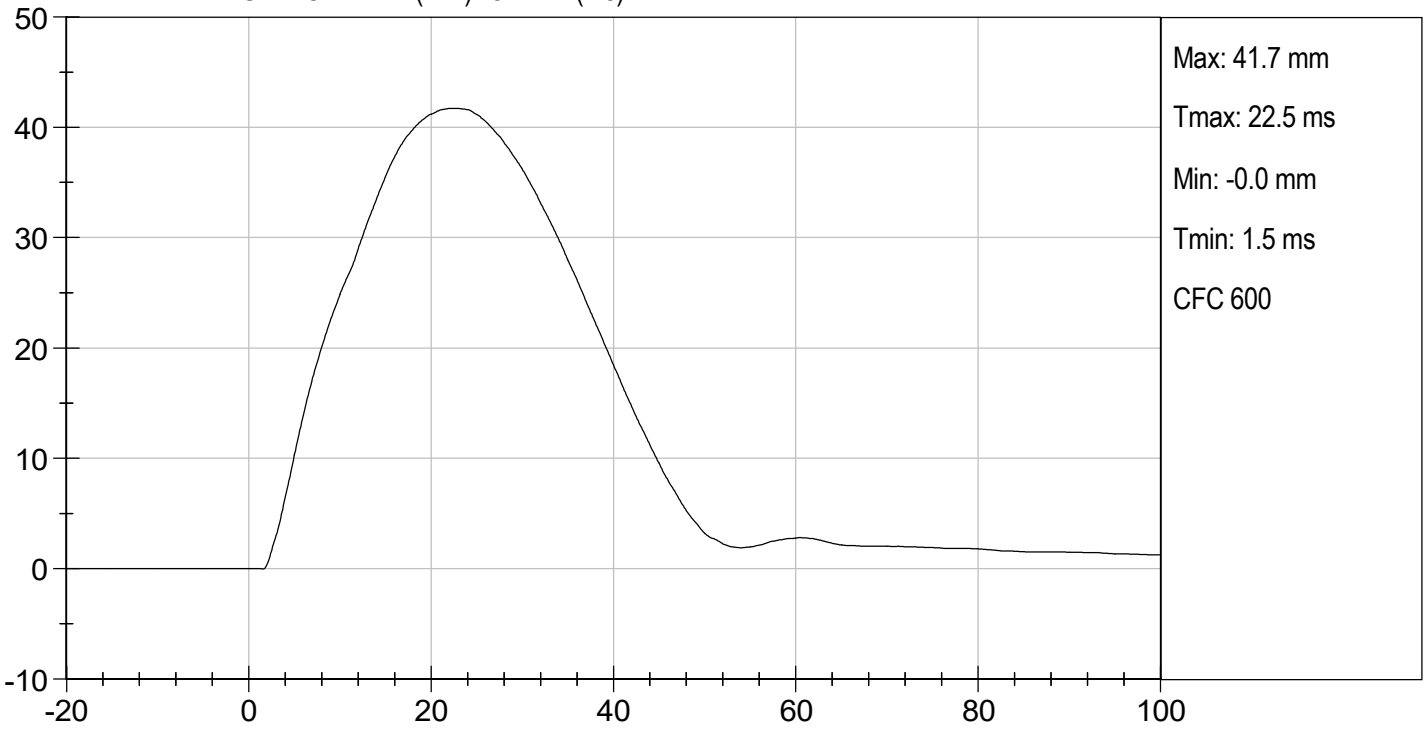
PROBE (G'S) vs TIME (ms)



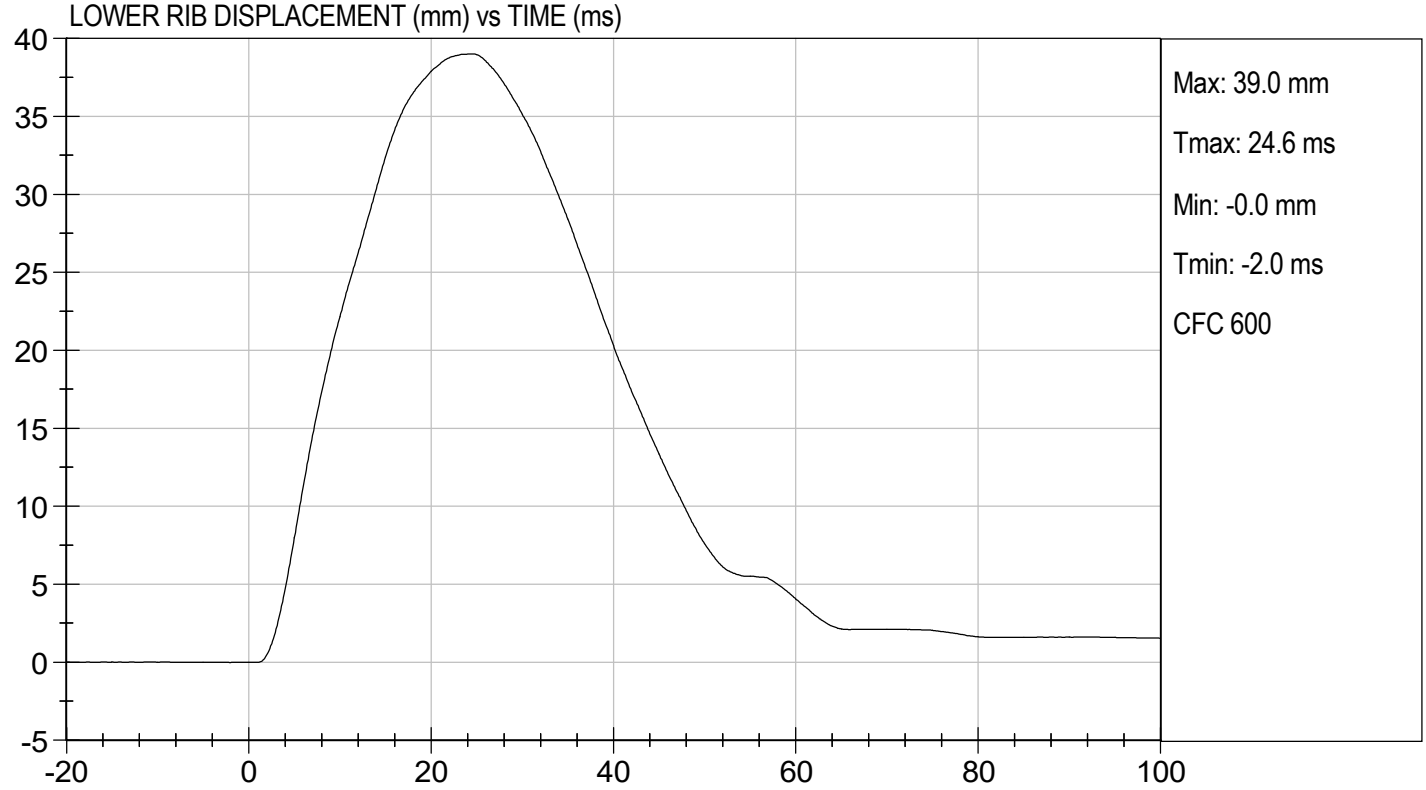
UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



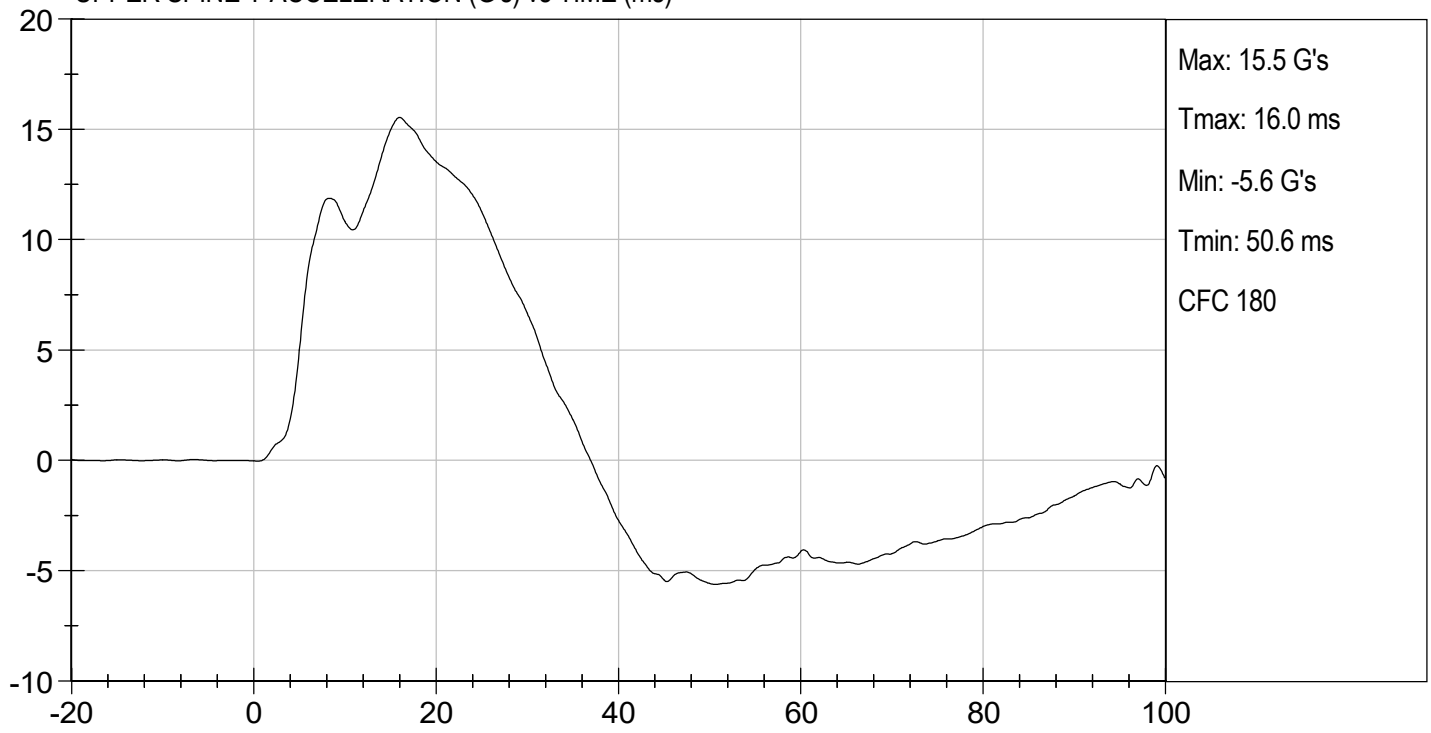
LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



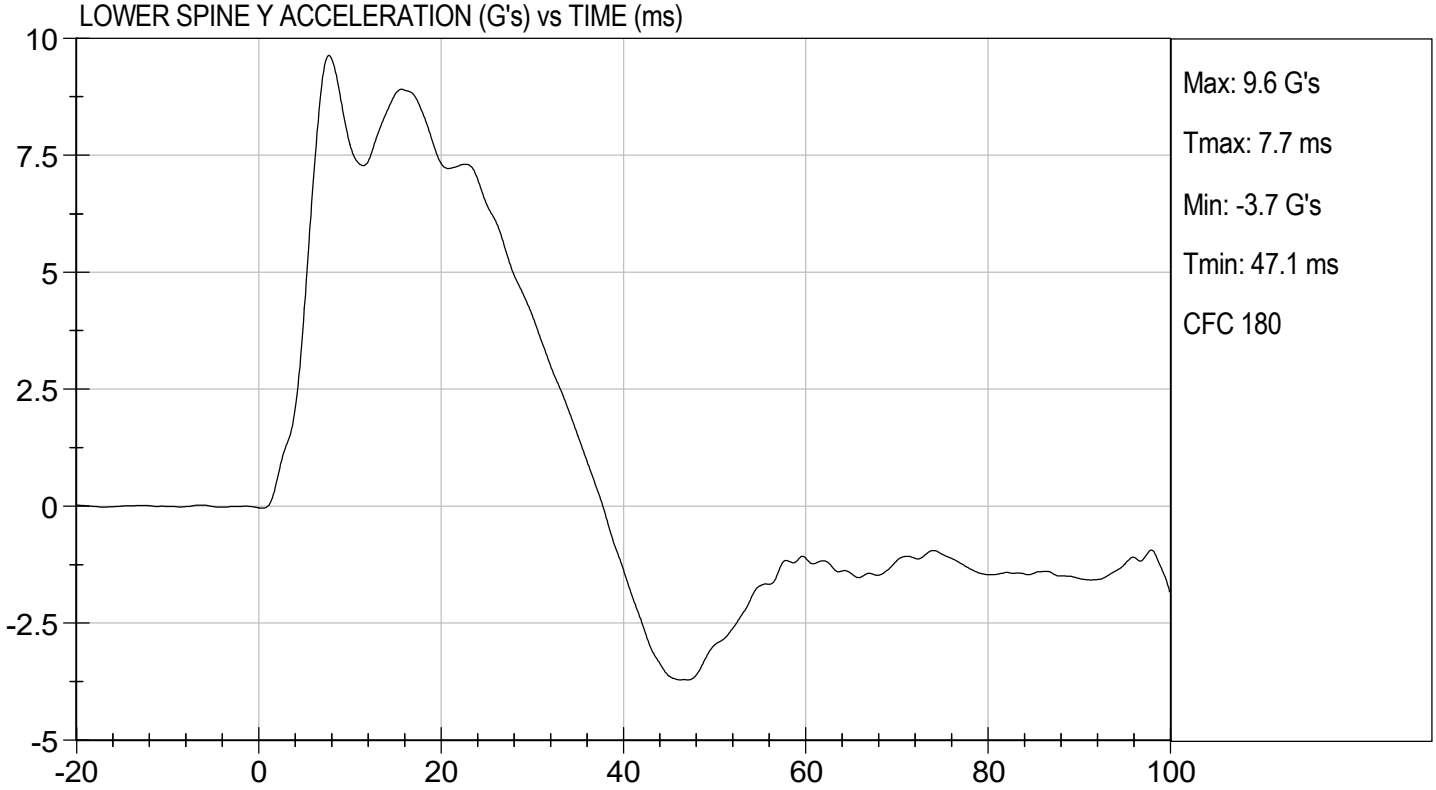
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 09/08/2021
TEST #: D212905

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



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



MGA RESEARCH CORPORATION

ABDOMINAL IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306 **Test I.D:** D212906

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	42	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	40	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	12	Pass
		Overall Test Results		Pass

Laboratory Technician

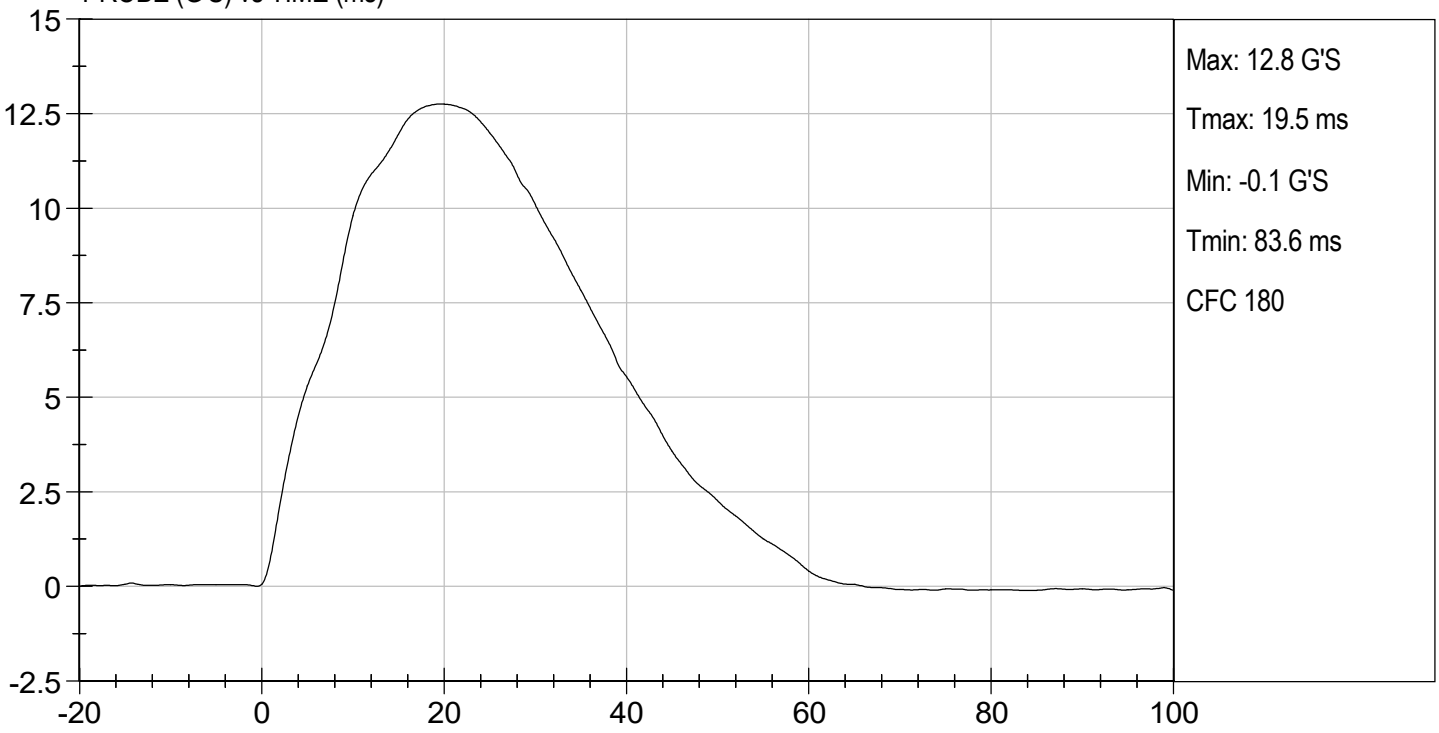
09/08/2021
Test Date

Approved By

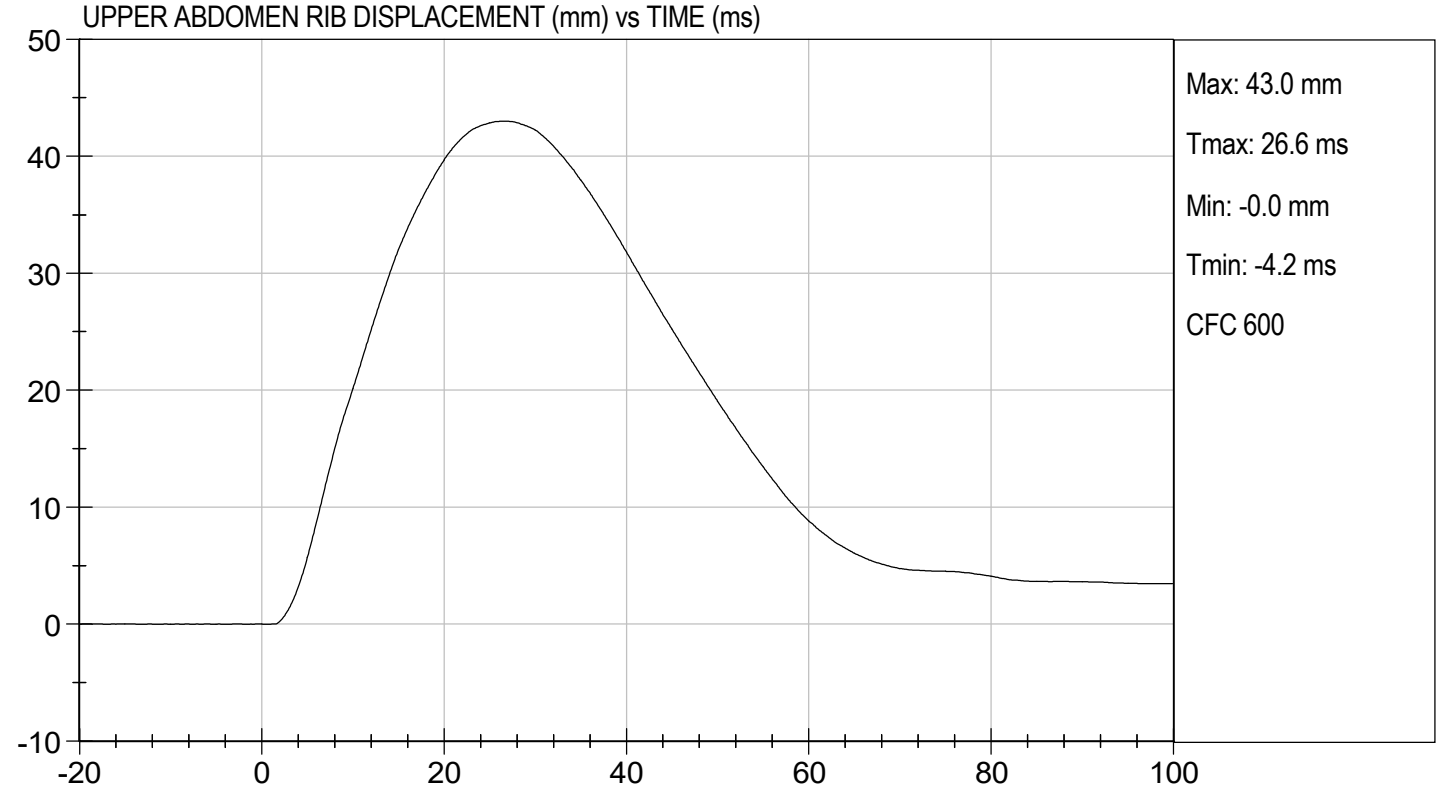
TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 09/08/2021
TEST #: D212906

PROBE (G'S) vs TIME (ms)



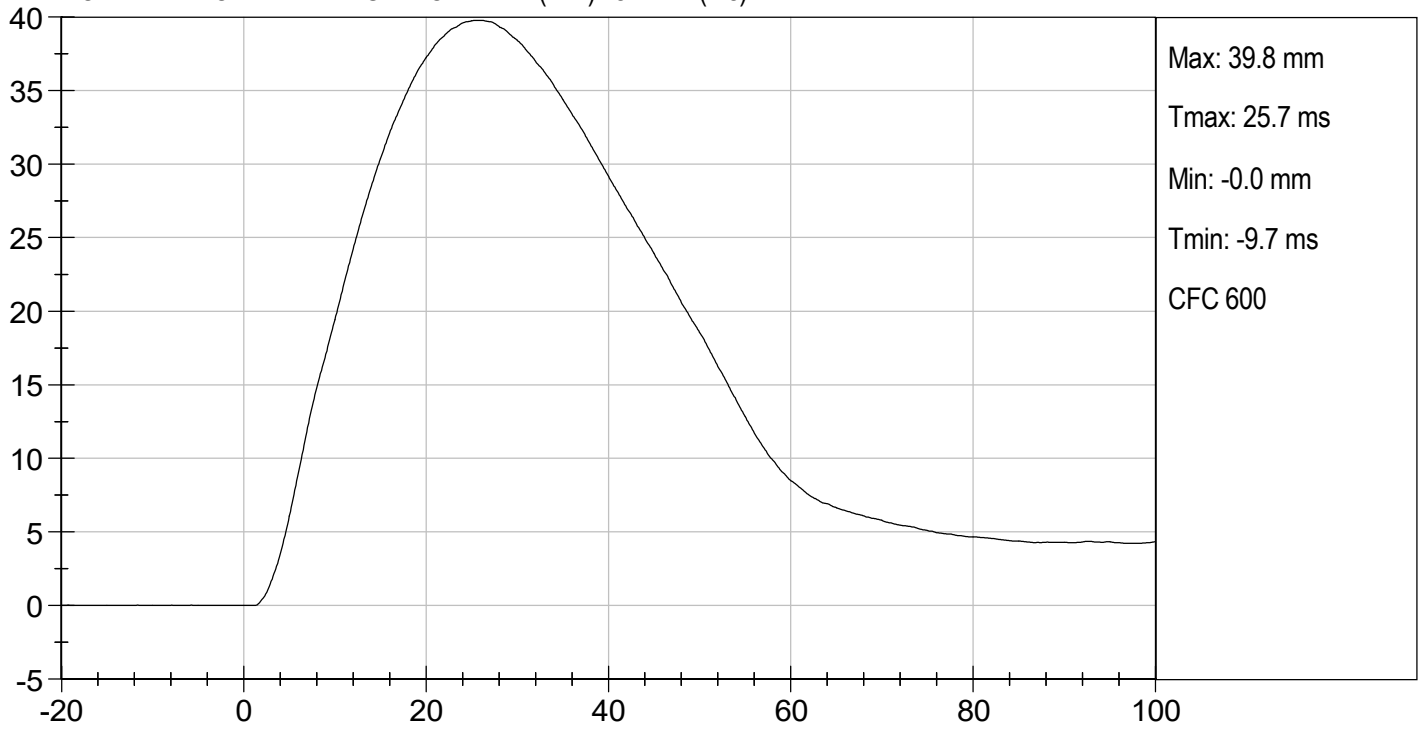
UPPER ABDOMEN RIB DISPLACEMENT (mm) vs TIME (ms)



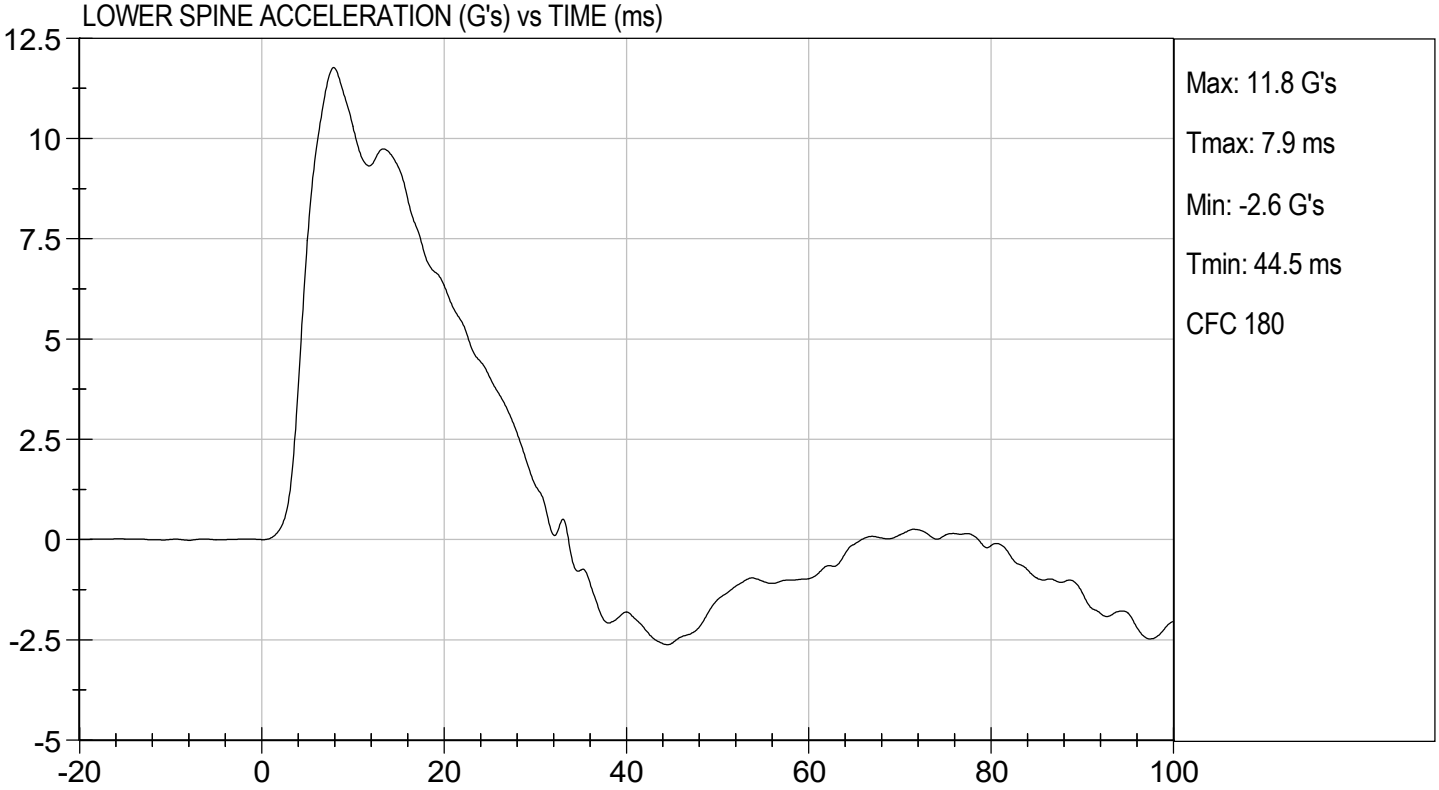
TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 09/08/2021
TEST #: D212906

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



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



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306 **Test I.D:** D212907

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	42	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	Pass
Maximum Probe Acceleration	G's	38 to 47	42	Pass
Pelvis Y Acceleration After 6 ms	G's	34 to 42	39	Pass
Peak Acetabulum Force	N	3600 to 4300	4,221	Pass
		Overall Test Results		Pass

Laboratory Technician

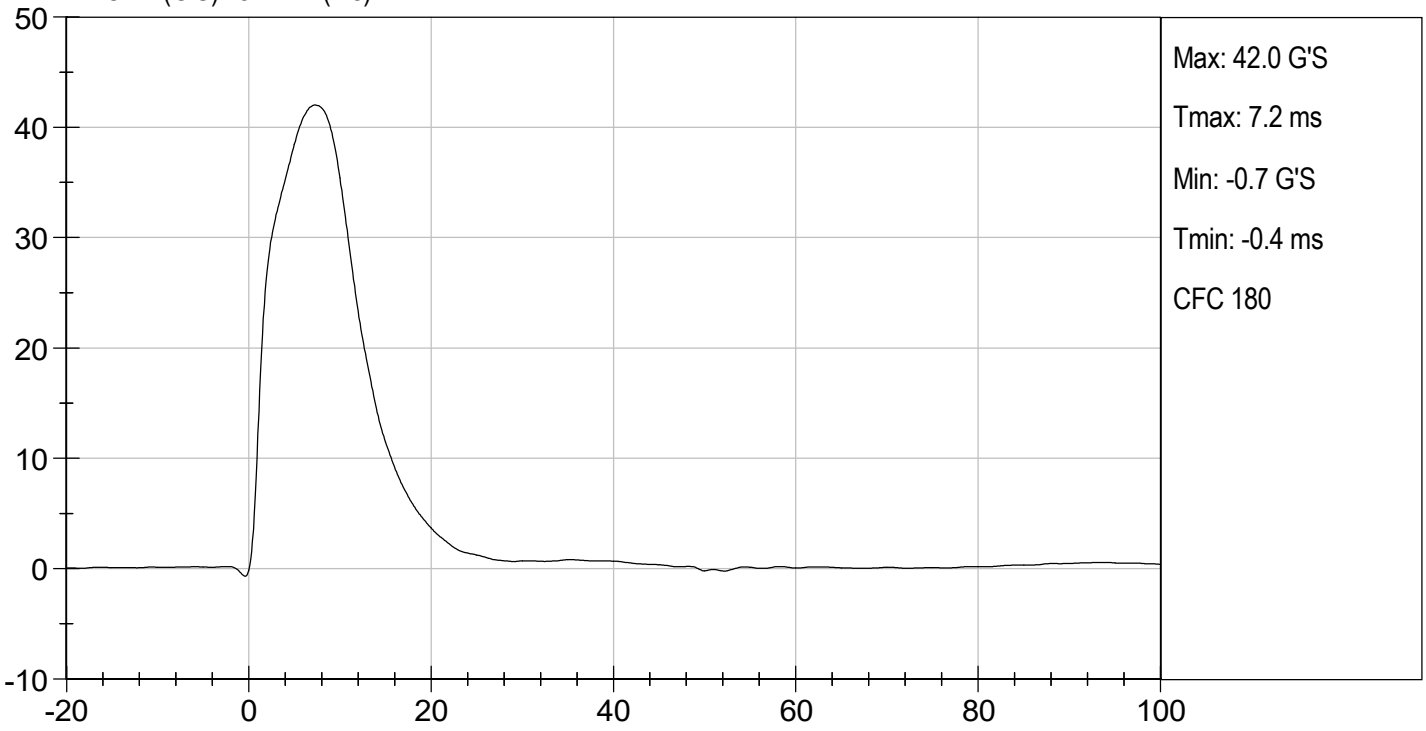
09/08/2021
Test Date

Approved By

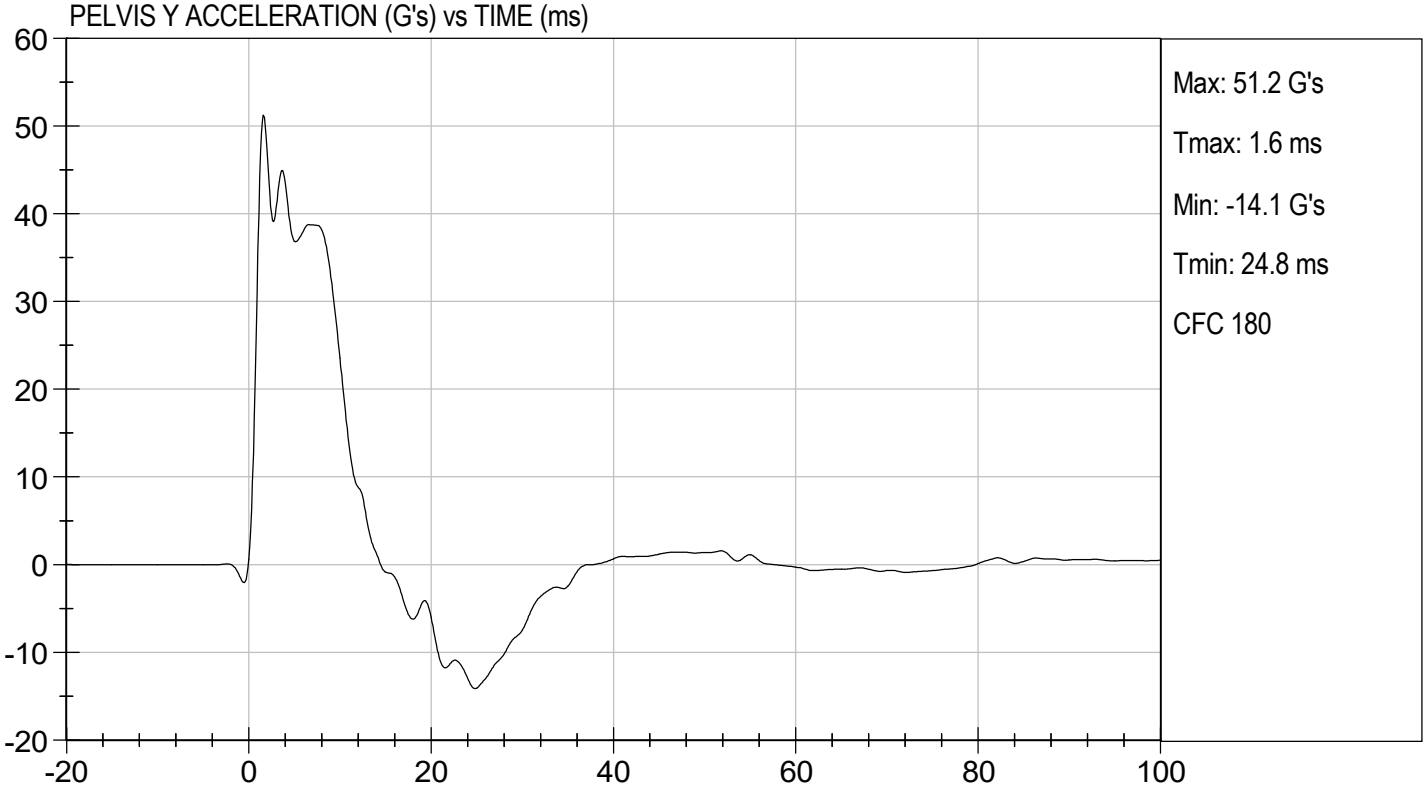
TEST DESC: PELVIS IMPACT
VELOCITY: 21.93 ft/s, 6.68 m/s

TEST DATE: 09/08/2021
TEST #: D212907

PROBE (G'S) vs TIME (ms)

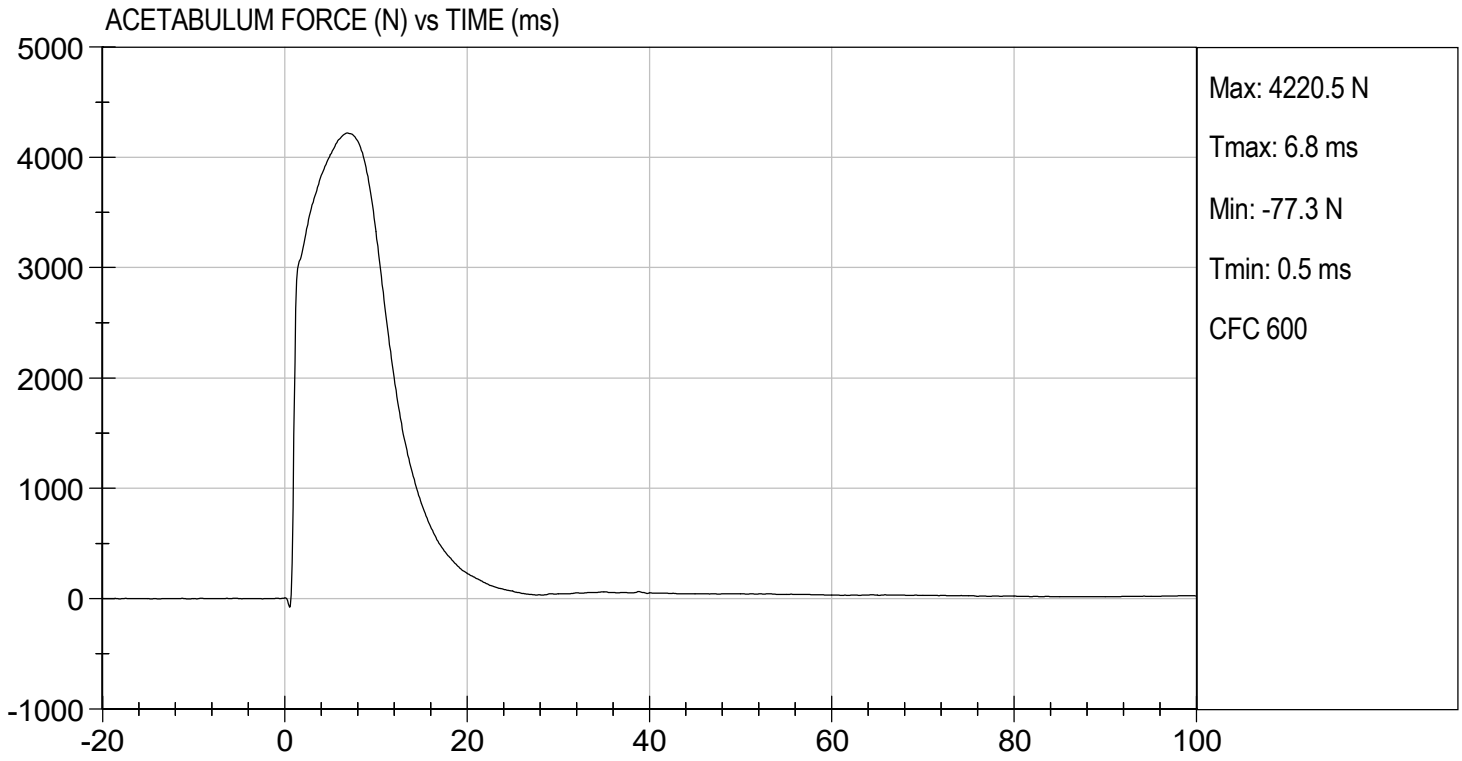


PELVIS Y ACCELERATION (G's) vs TIME (ms)



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

TEST DATE: 09/08/2021
TEST #: D212907



MGA RESEARCH CORPORATION

ILIAC IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306 **Test I.D:** D212908

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	42.8	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	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	4,936	Pass
		Overall Test Results		Pass

Laboratory Technician

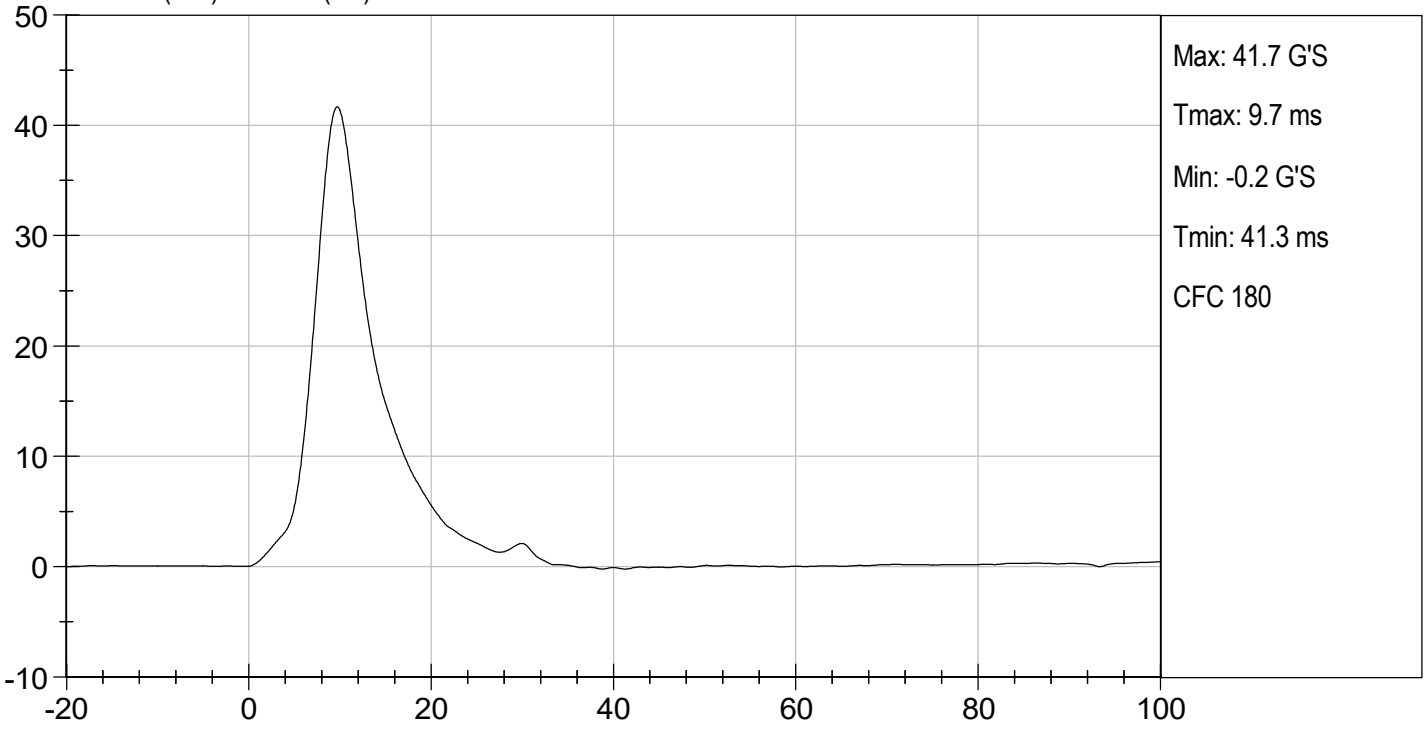
09/09/2021
Test Date

Approved By

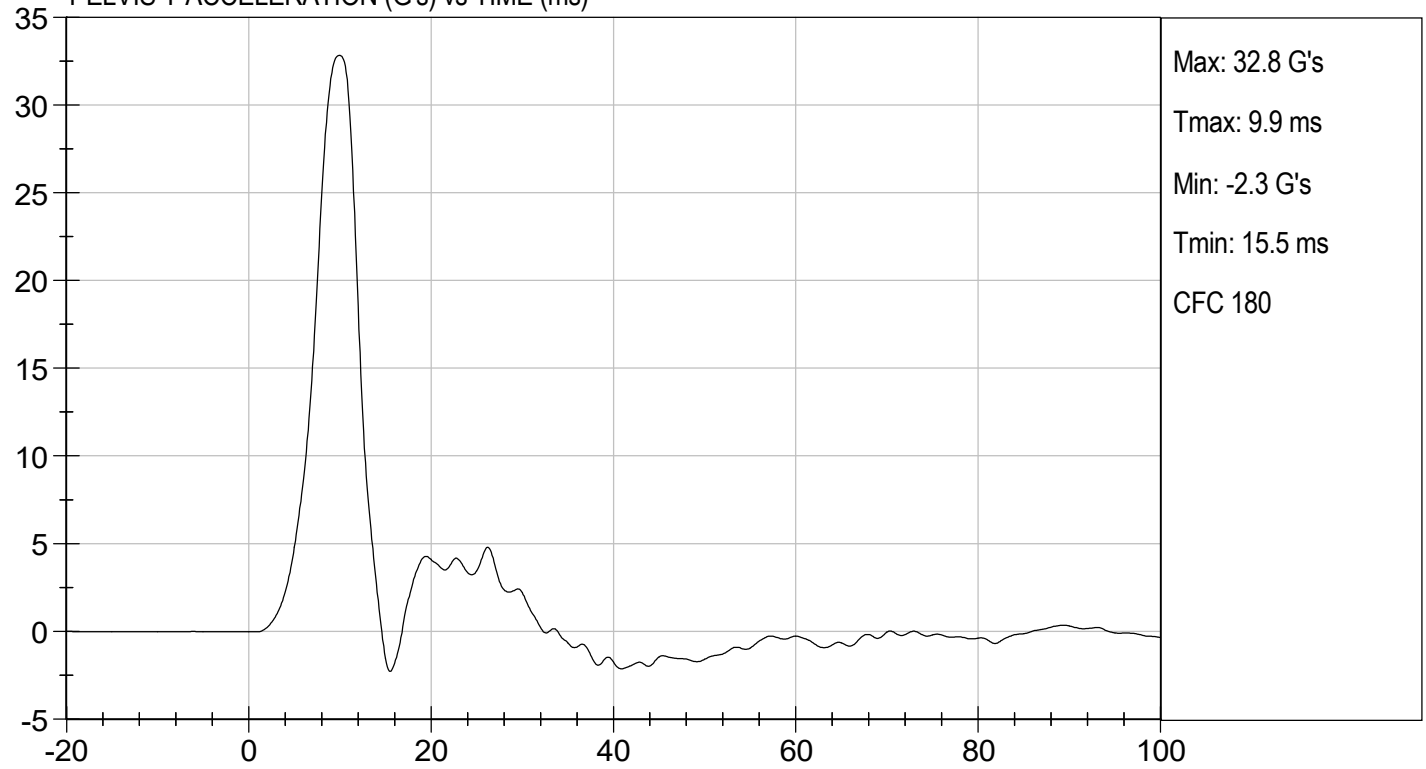
TEST DESC: ILLIAC
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 09/09/2021
TEST #: D212908

PROBE (G'S) vs TIME (ms)

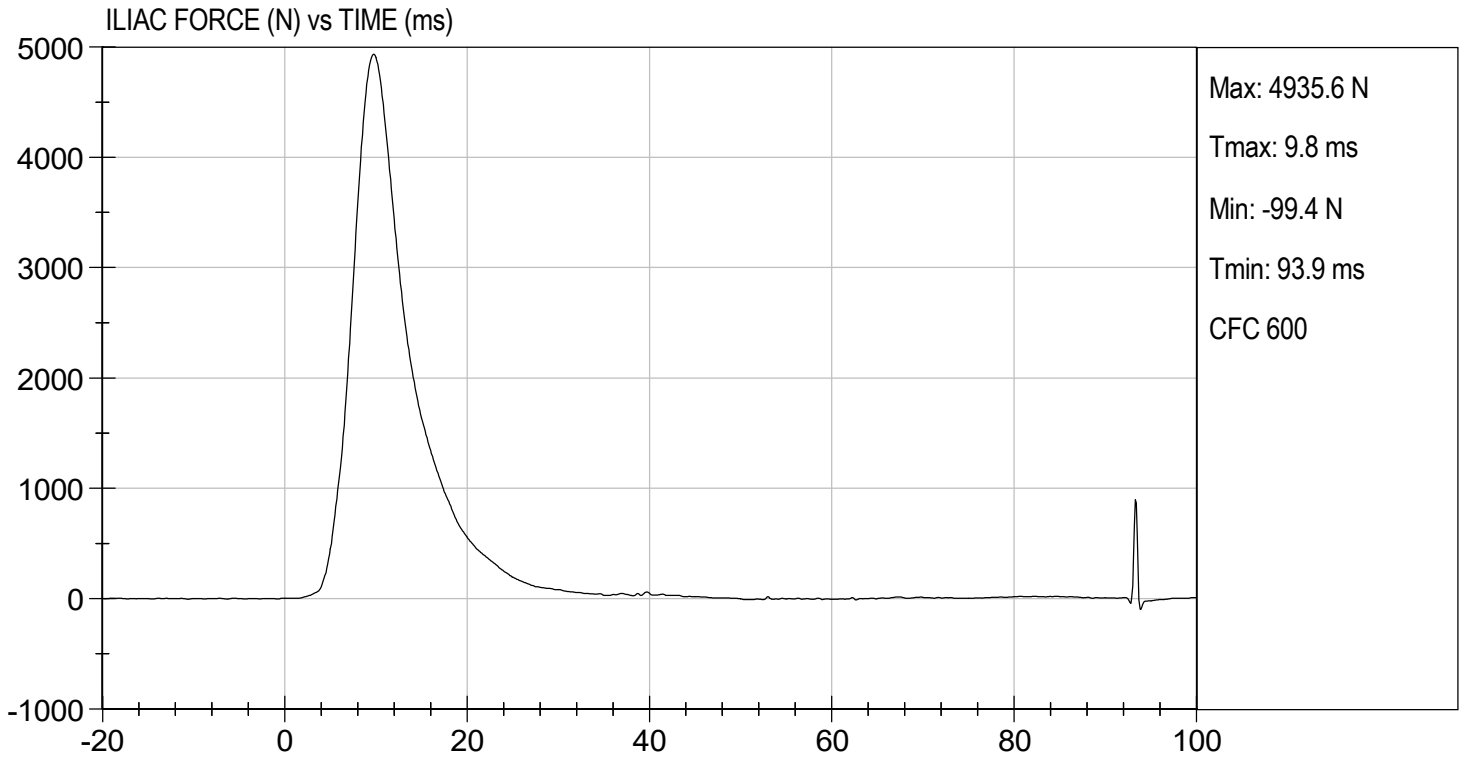


PELVIS Y ACCELERATION (G's) vs TIME (ms)



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

TEST DATE: 09/09/2021
TEST #: D212908



CALIBRATION TEST RESULTS

POST-TEST

SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD

SID-IIsD External Measurements
SN: 306

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

MGA RESEARCH CORPORATION

HEAD DROP TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306 **Test ID:** D213201

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	45	Pass
Peak Resultant Acceleration	G's	115 to 137	136	Pass
Peak Longitudinal Acceleration	G's	+/- 15	-9.6	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	<15%	Yes	Pass
		Overall Test Results		Pass

Laboratory Technician

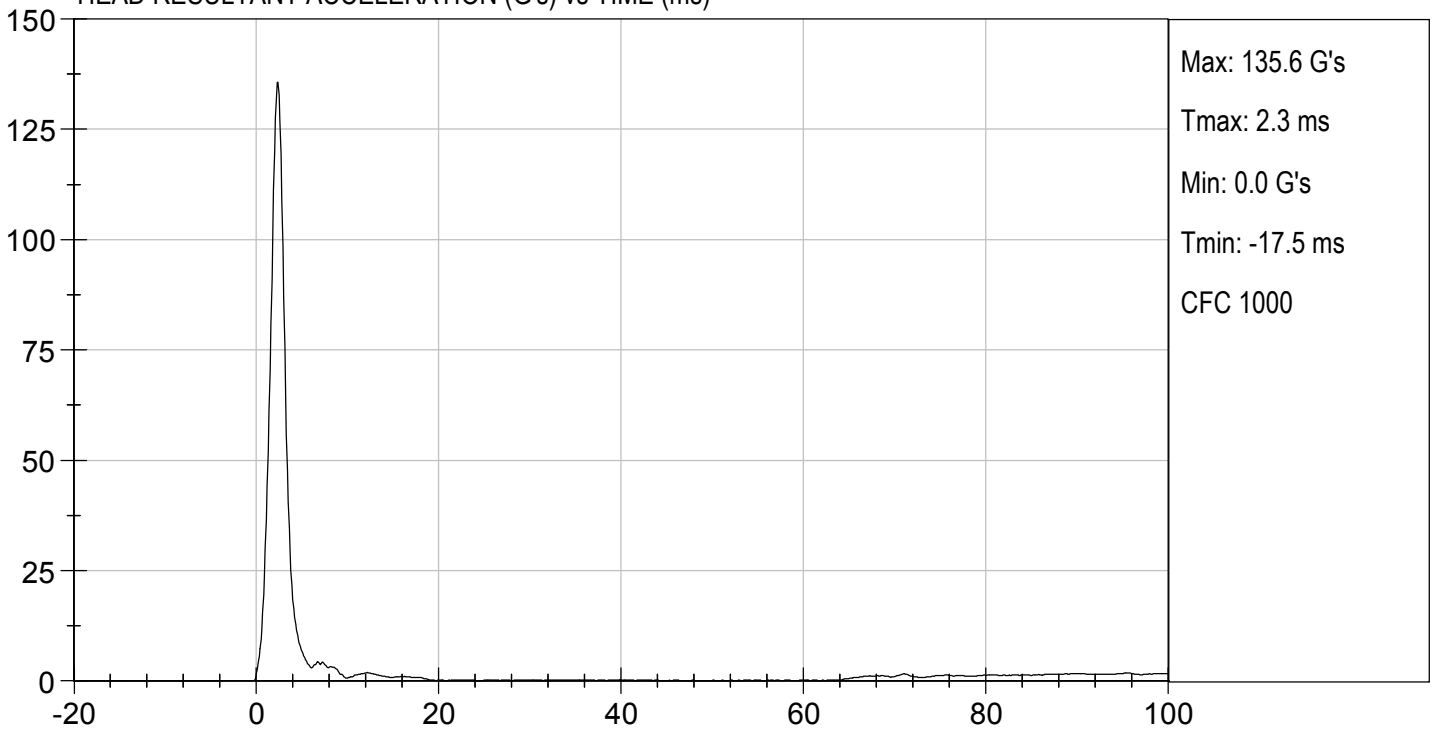
10/06/2021
Test Date

Approved By

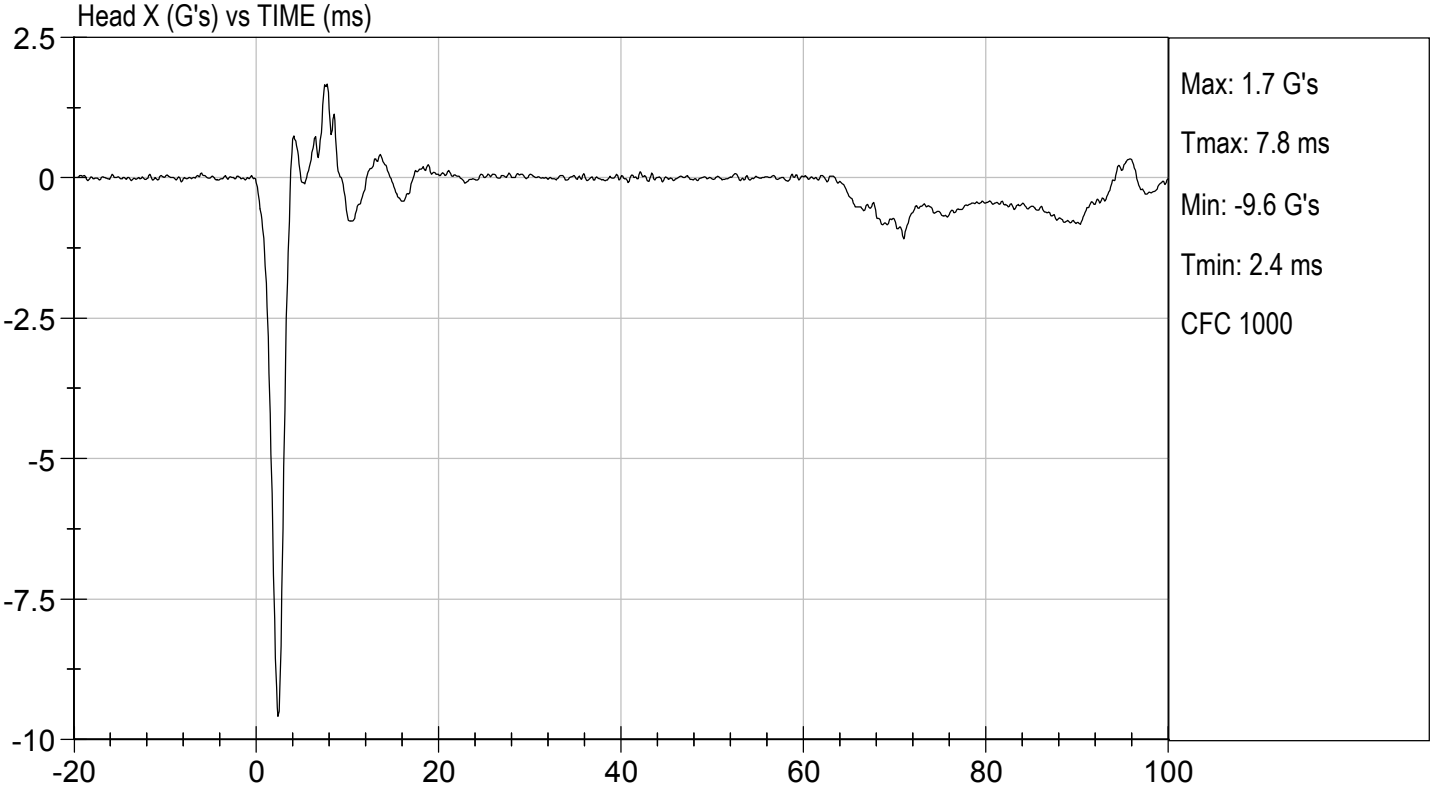
TEST DESC: HEAD DROP

TEST DATE: 10/06/2021
TEST #: D213201

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

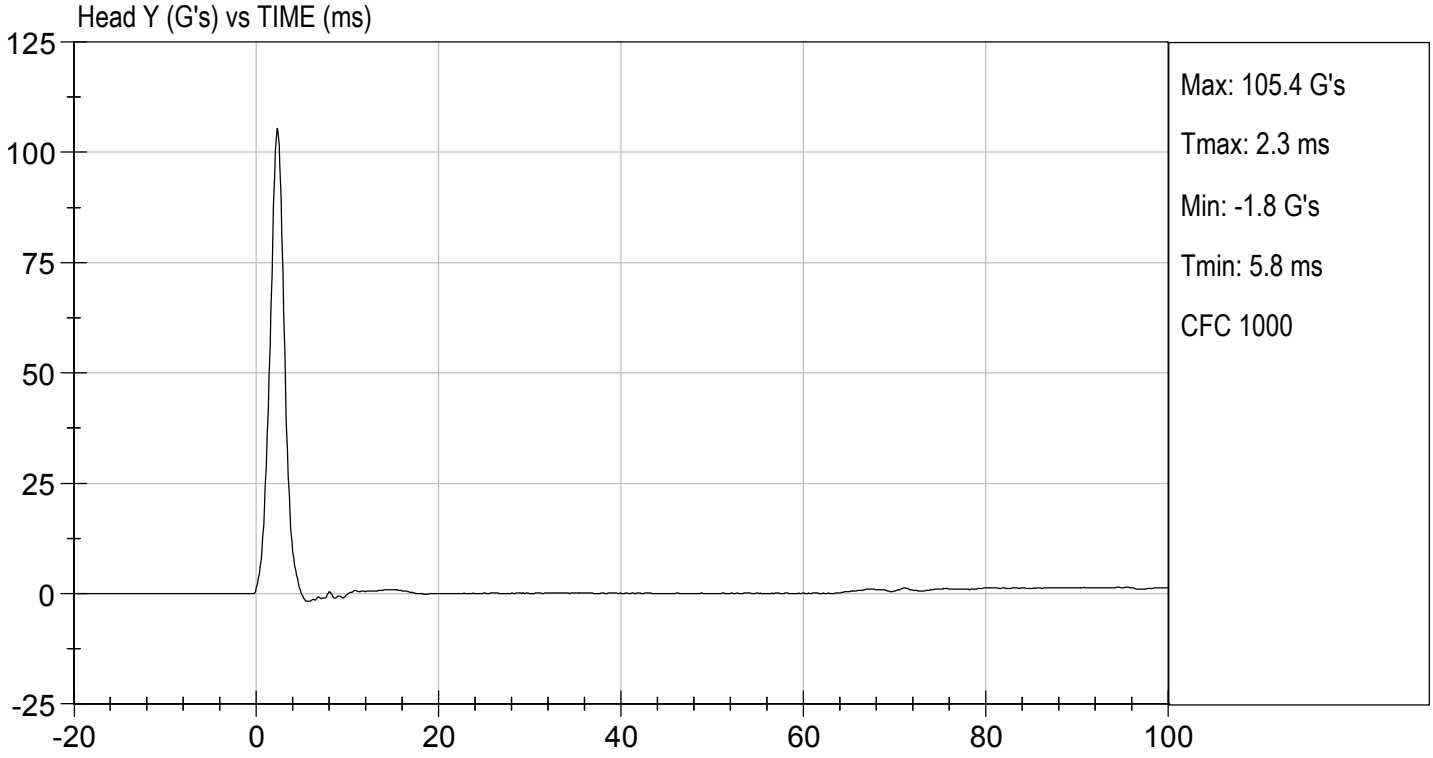


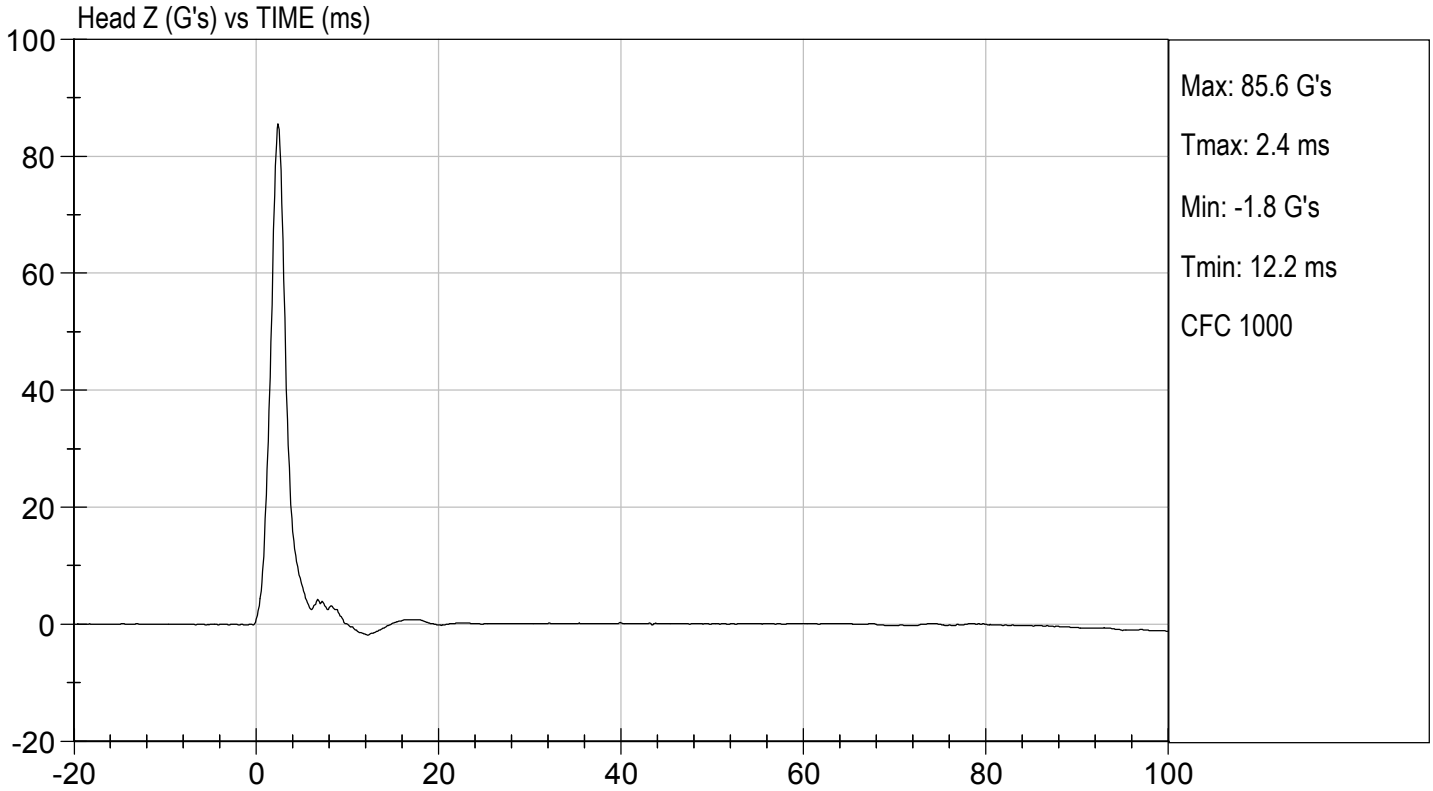
Head X (G's) vs TIME (ms)



TEST DESC: HEAD DROP

TEST DATE: 10/06/2021
TEST #: D213201





MGA RESEARCH CORPORATION

LATERAL NECK PENDULUM TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306 **Test I.D:** D213202

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.5	Pass
Humidity		%	10 to 70	46	Pass
Impact Velocity		m/s	5.51 to 5.63	5.63	Pass
Pendulum Velocity	10 ms	m/s	2.20 to 2.80	2.48	Pass
	15 ms	m/s	3.30 to 4.10	3.67	Pass
	20 ms	m/s	4.40 to 5.40	5.25	Pass
	25 ms	m/s	5.40 to 6.10	5.69	Pass
	25-100 ms	m/s	5.50 to 6.20	5.74	Pass
Maximum D-Plane Rotation		deg	71 to 81	74	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	64	Pass
Maximum Occipital Condyle Moment		Nm	-44 to -36	-38	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	118	Pass
			Overall Test Results		Pass

Laboratory Technician

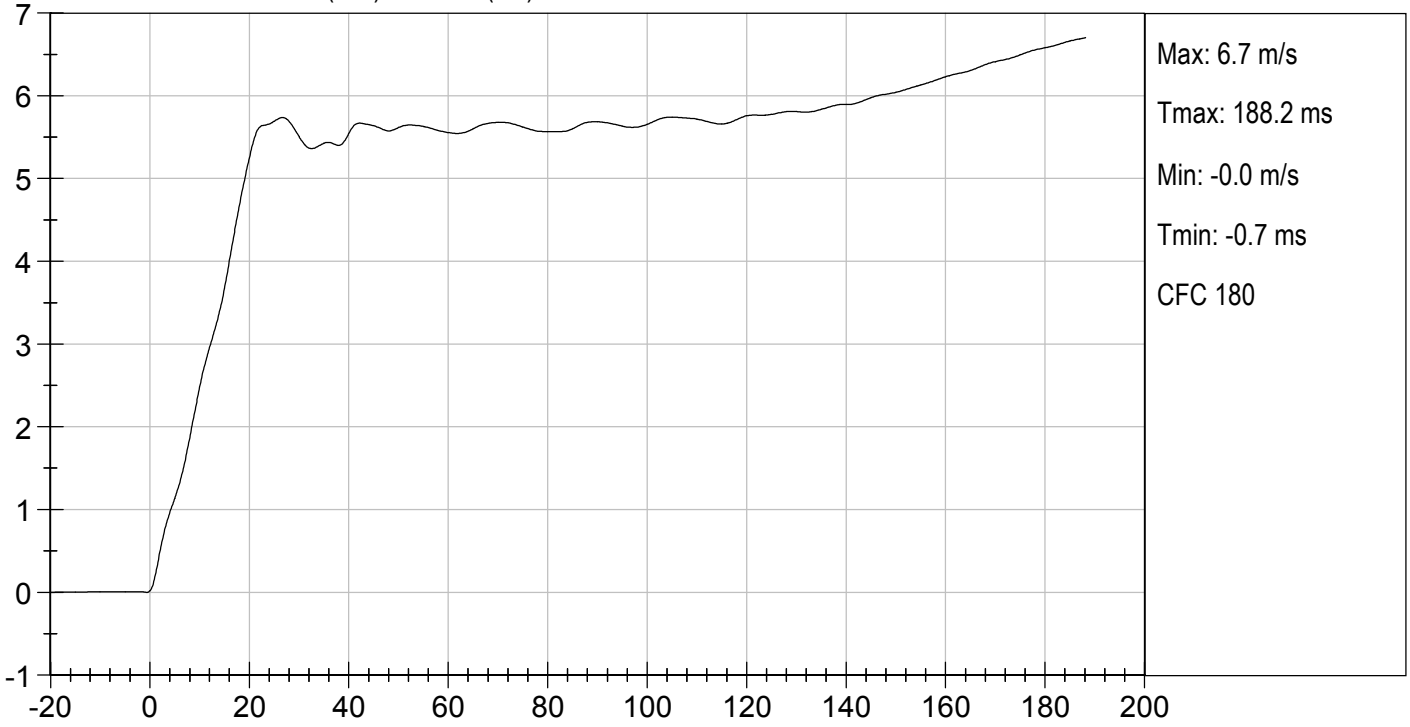
10/07/2021
Test Date

Approved By

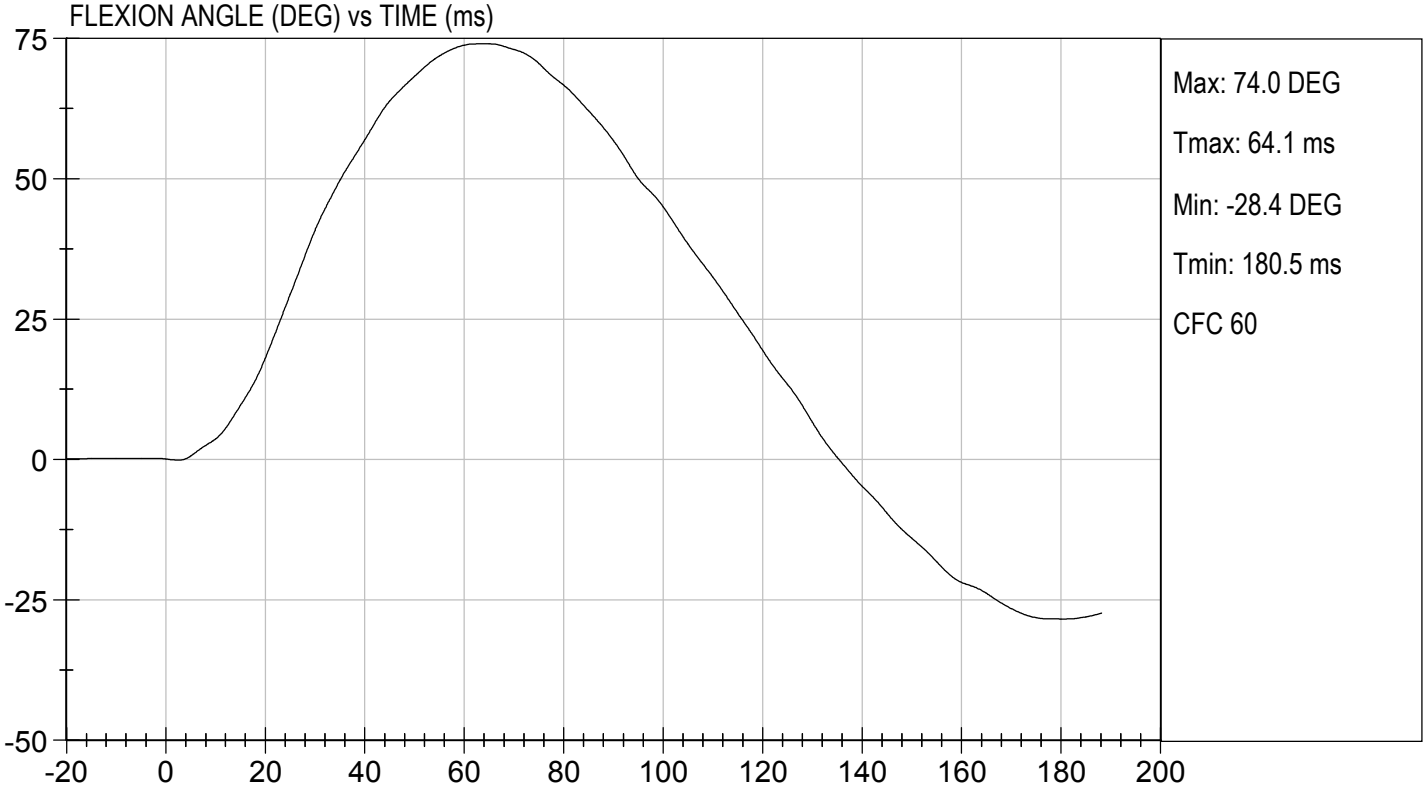
TEST DESC: NECK BENDING
VELOCITY: 18.48 ft/s, 5.63 m/s

TEST DATE: 10/07/2021
TEST #: D213202

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

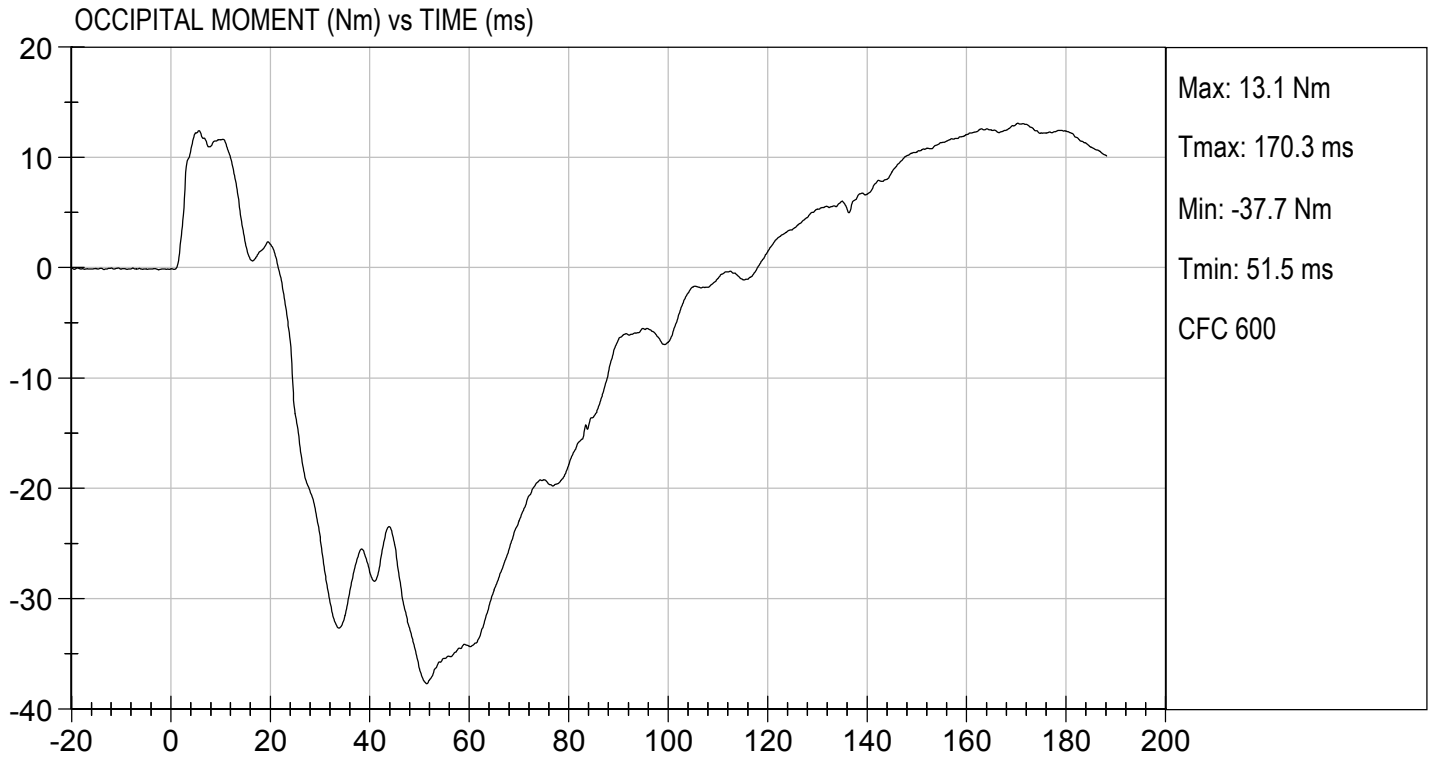


FLEXION ANGLE (DEG) vs TIME (ms)



TEST DESC: NECK BENDING
VELOCITY: 18.48 ft/s, 5.63 m/s

TEST DATE: 10/07/2021
TEST #: D213202



MGA RESEARCH CORPORATION

SHOULDER IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306 **Test ID:** D213203

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	46	Pass
Impact Velocity	m/s	4.20 to 4.40	4.27	Pass
Maximum Probe Acceleration	G's	13 to 18	15	Pass
Shoulder Displacement	mm	28 to 37	30	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	19	Pass
		Overall Test Results		Pass

Alex Thomas

Laboratory Technician

10/07/2021

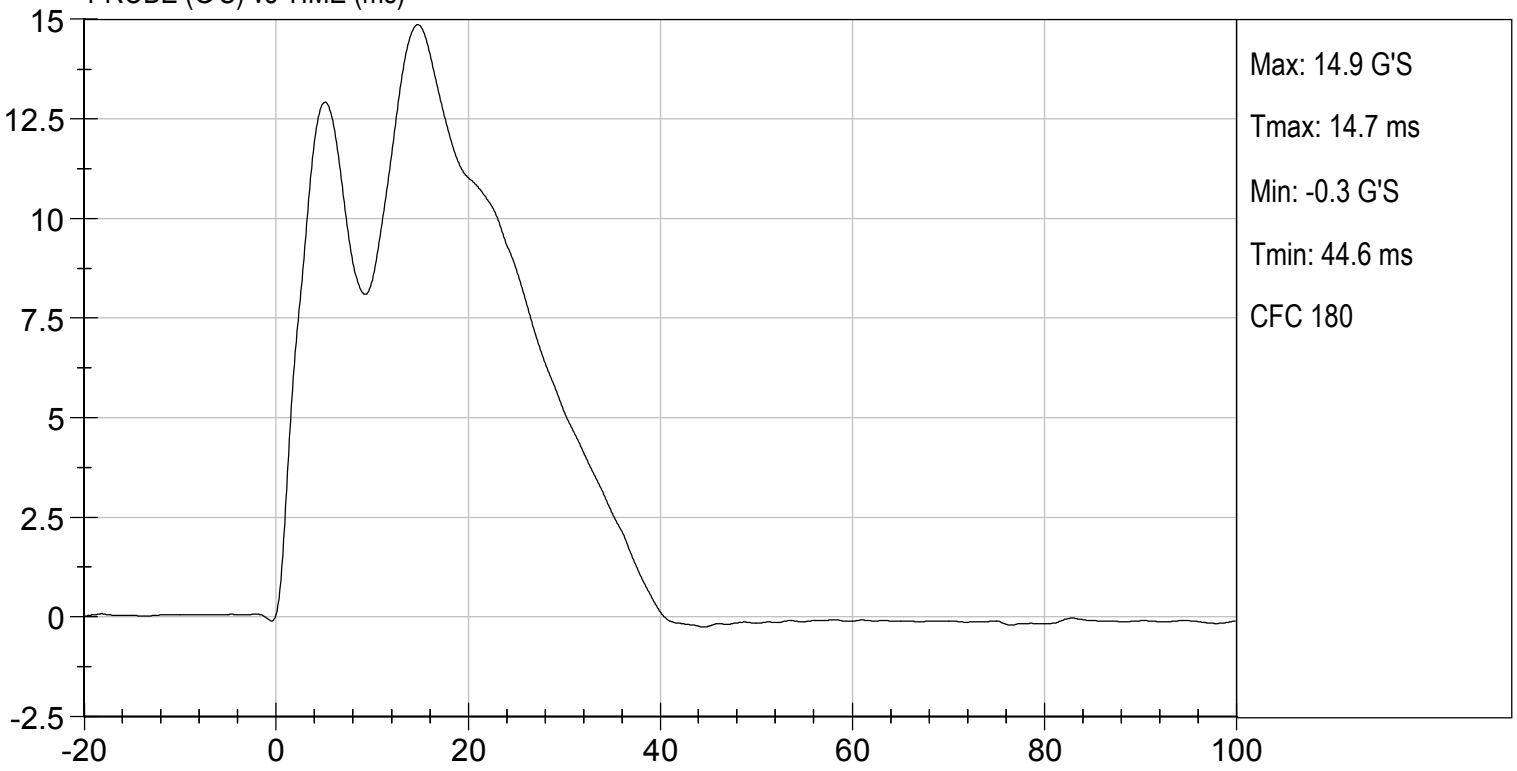
Test Date

Approved By

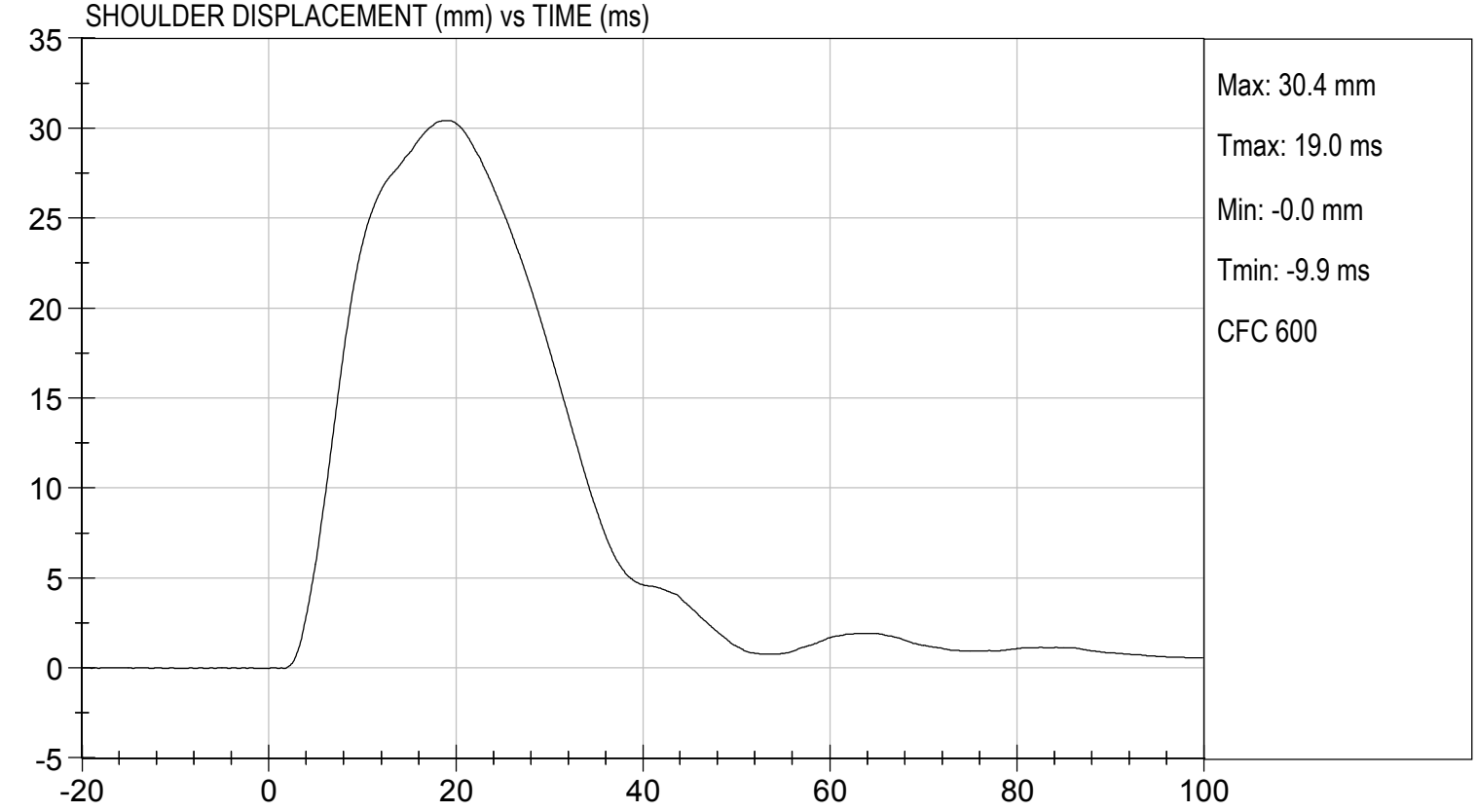
TEST DESC: SHOULDER IMPACT
VELOCITY: 14.01 ft/s, 4.27 m/s

TEST DATE: 10/07/2021
TEST #: D213203

PROBE (G'S) vs TIME (ms)

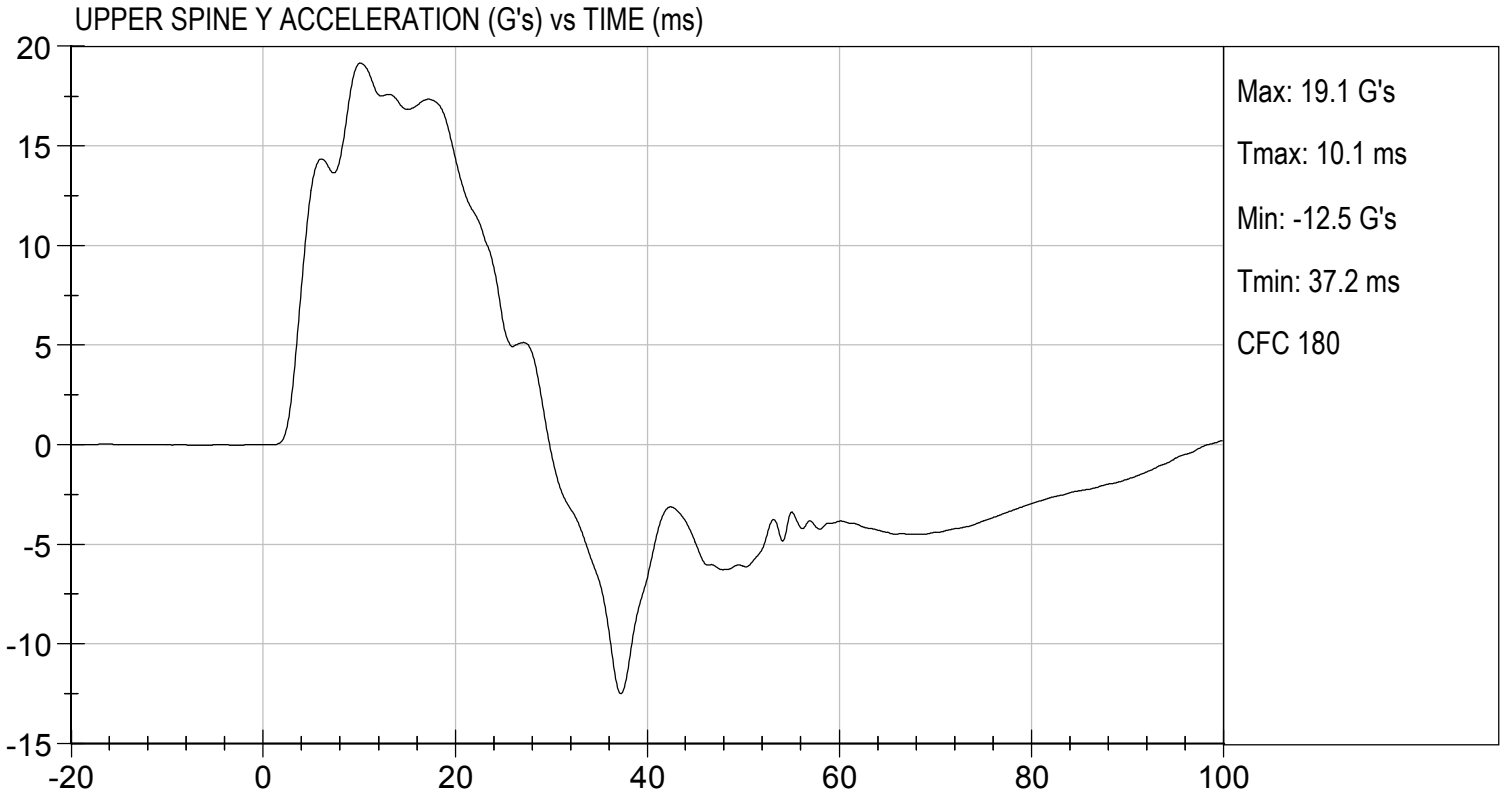


SHOULDER DISPLACEMENT (mm) vs TIME (ms)



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

TEST DATE: 10/07/2021
TEST #: D213203



MGA RESEARCH CORPORATION

THORAX (WITH ARM) IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306 **Test I.D:** D213204

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	46	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Maximum Probe Acceleration	G's	30 to 36	34	Pass
Shoulder Displacement	mm	31 to 40	39	Pass
Upper Rib Displacement	mm	25 to 32	30	Pass
Middle Rib Displacement	mm	30 to 36	32	Pass
Lower Rib Displacement	mm	32 to 38	32	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	41	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	32	Pass
		Overall Test Results		Pass

Laboratory Technician

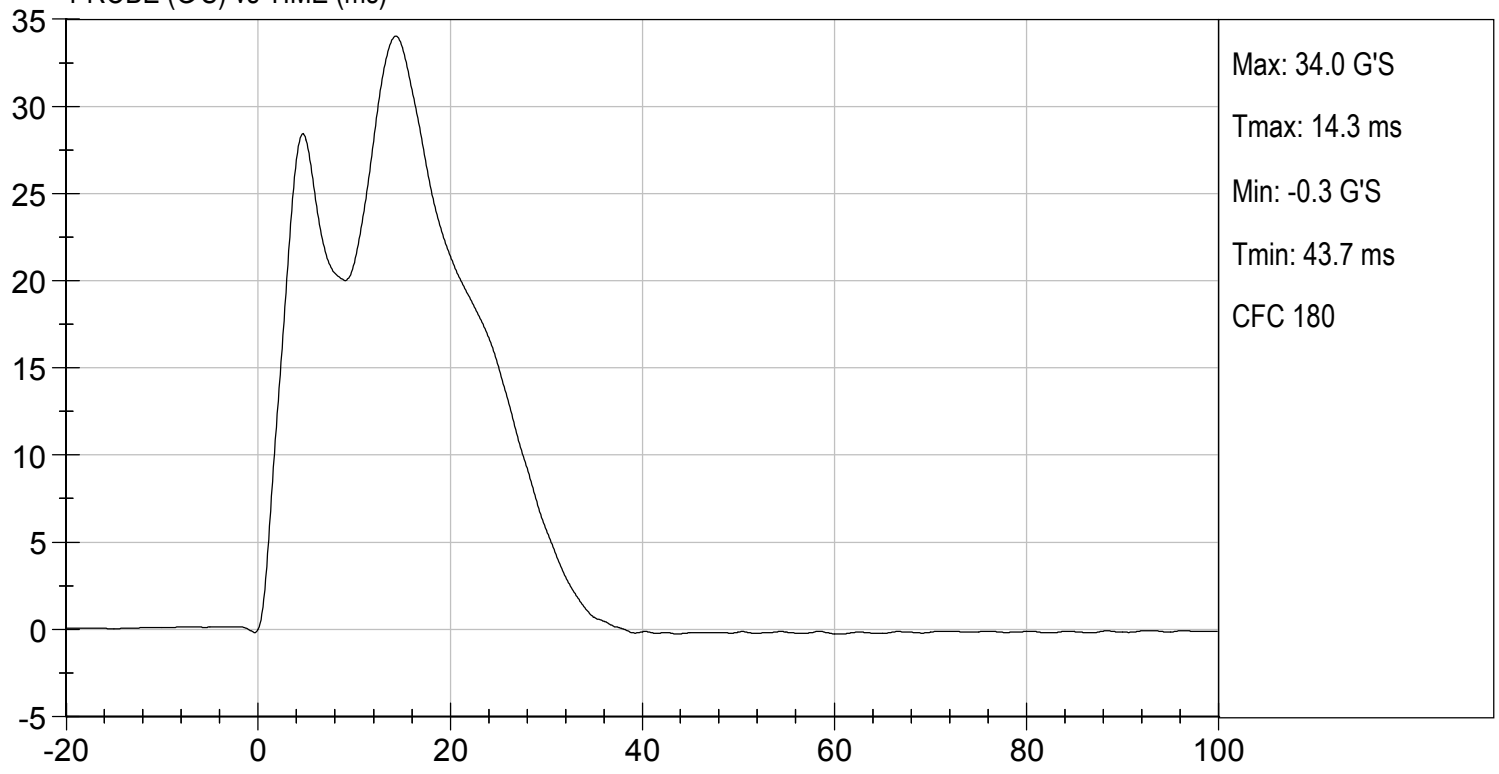
10/07/2021
Test Date

Approved By

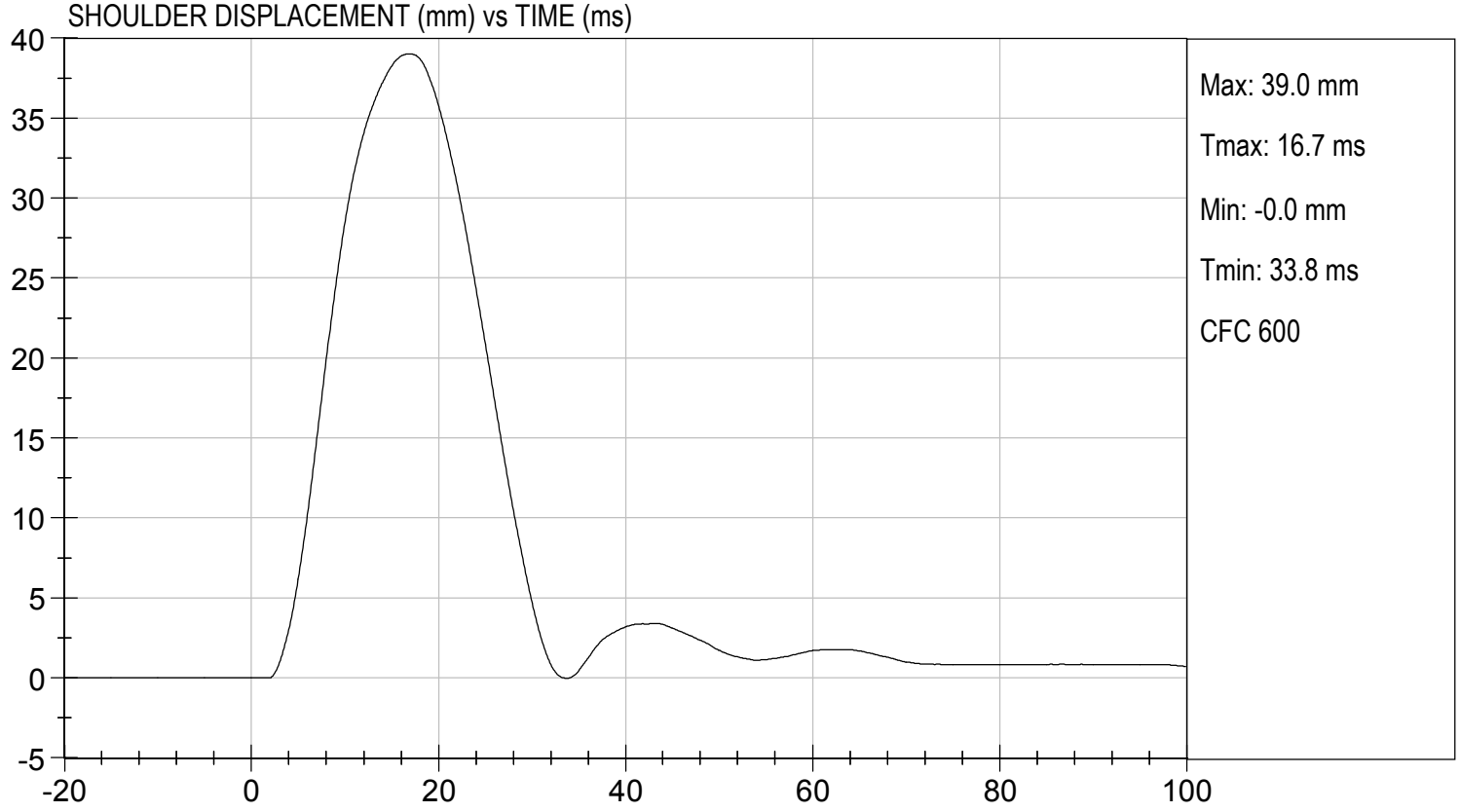
TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

TEST DATE: 10/07/2021
TEST #: D213204

PROBE (G'S) vs TIME (ms)



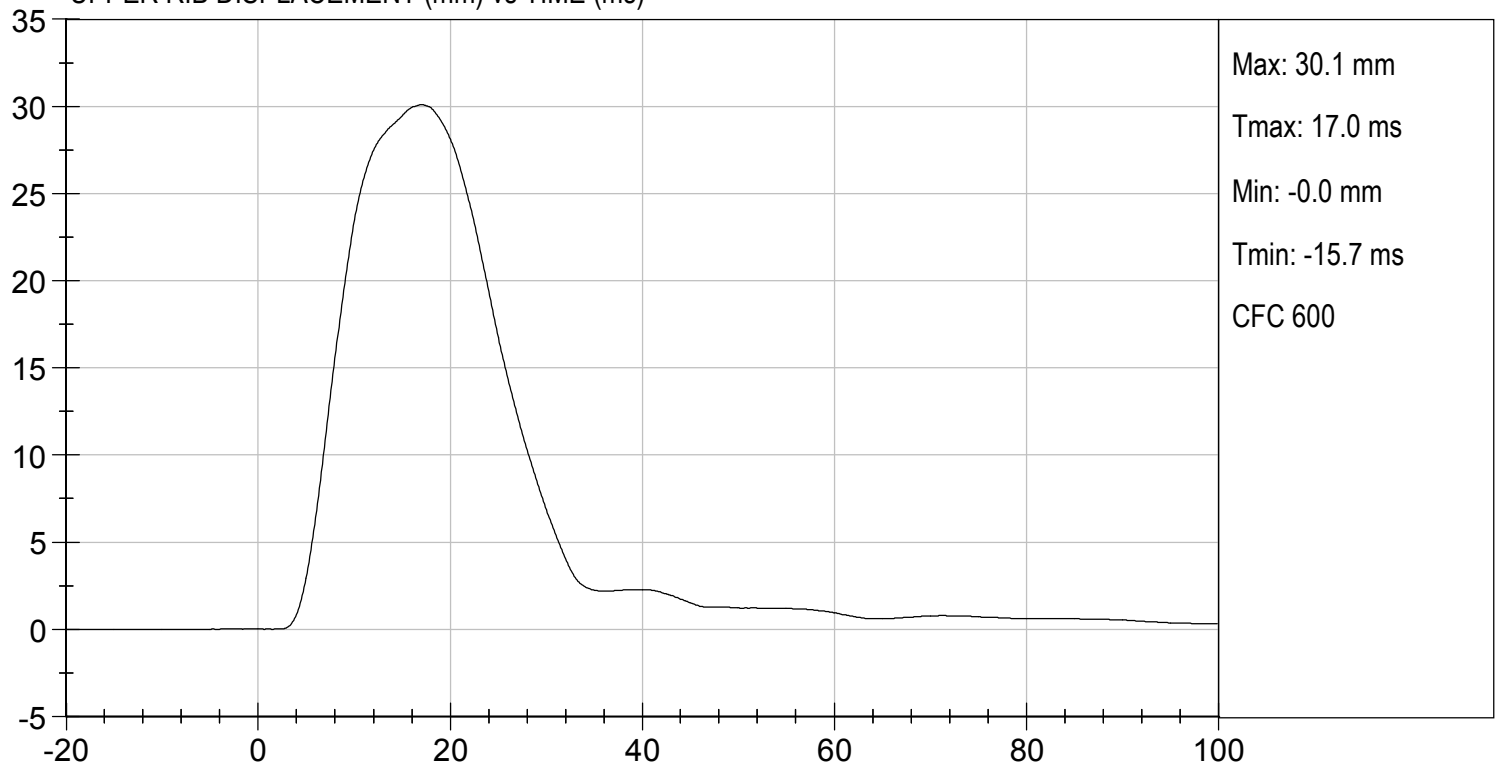
SHOULDER DISPLACEMENT (mm) vs TIME (ms)



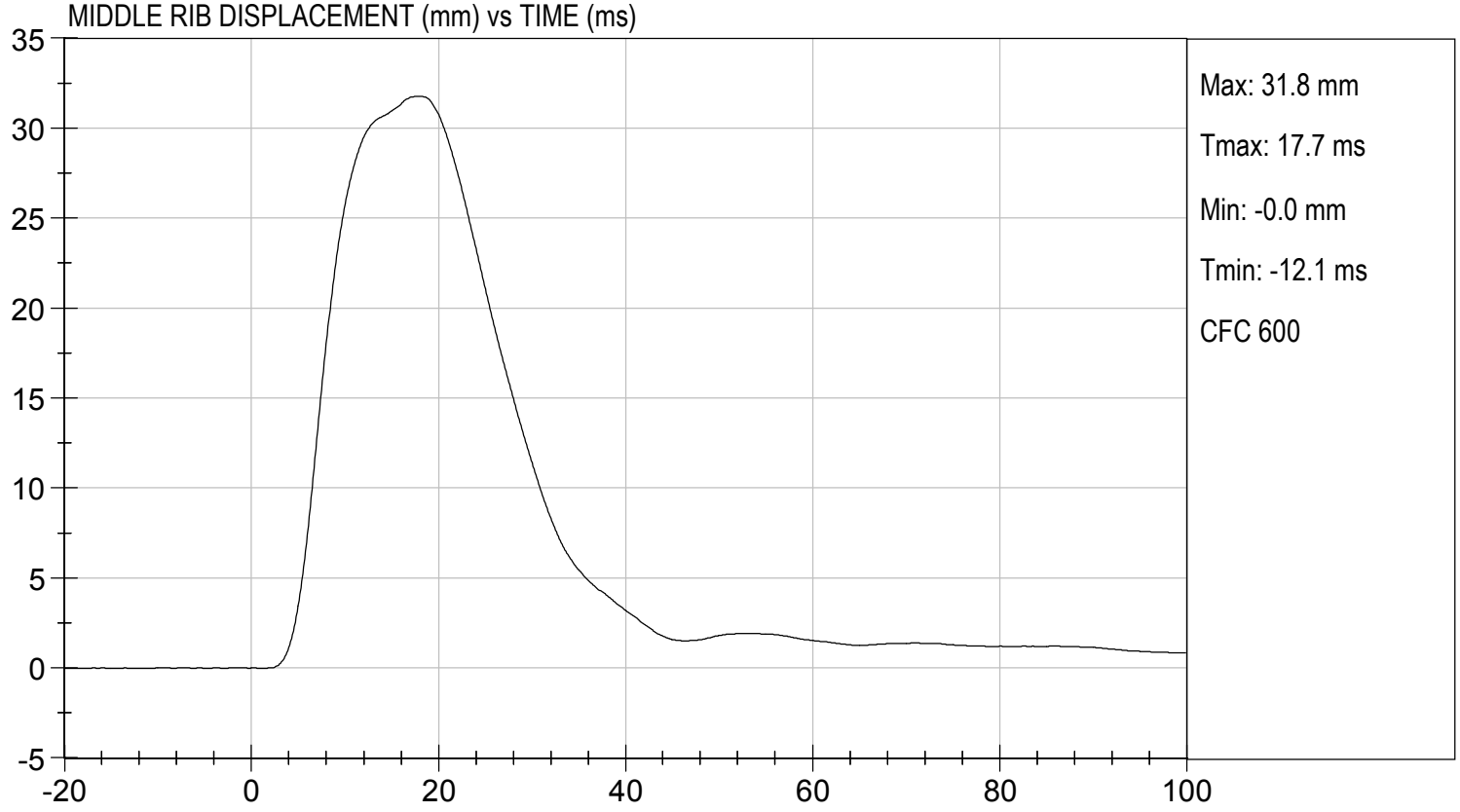
TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

TEST DATE: 10/07/2021
TEST #: D213204

UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



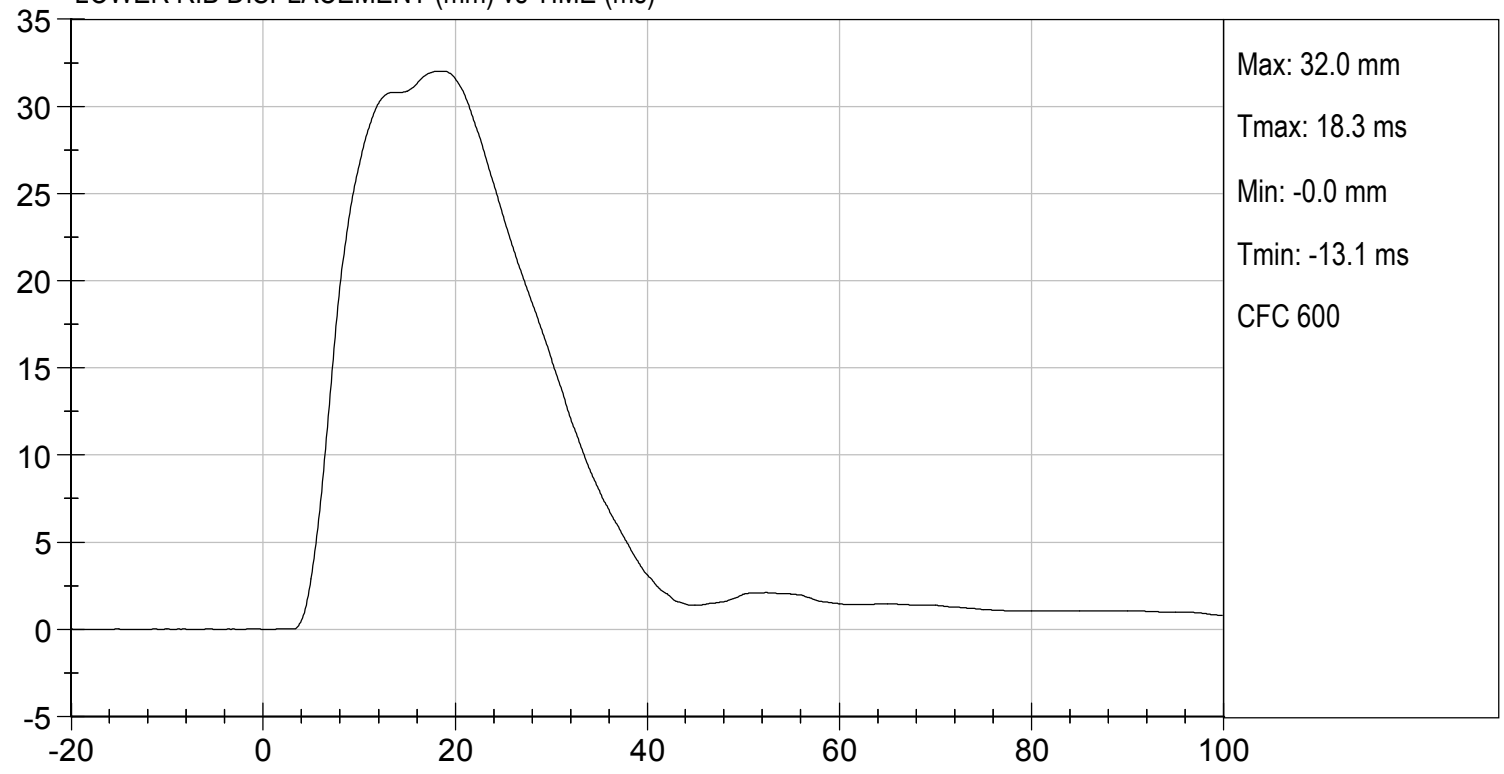
MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



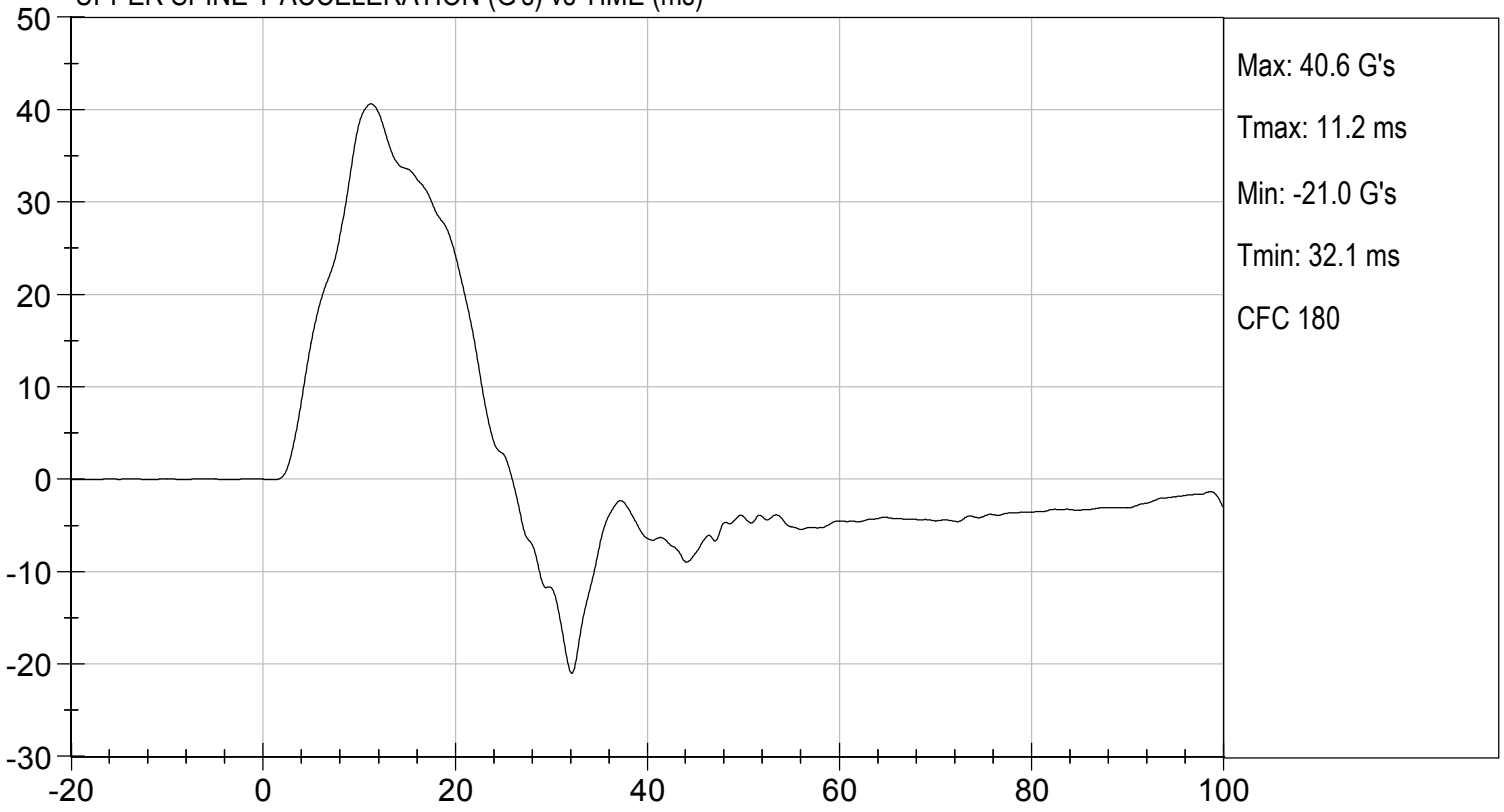
TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

TEST DATE: 10/07/2021
TEST #: D213204

LOWER RIB DISPLACEMENT (mm) vs TIME (ms)

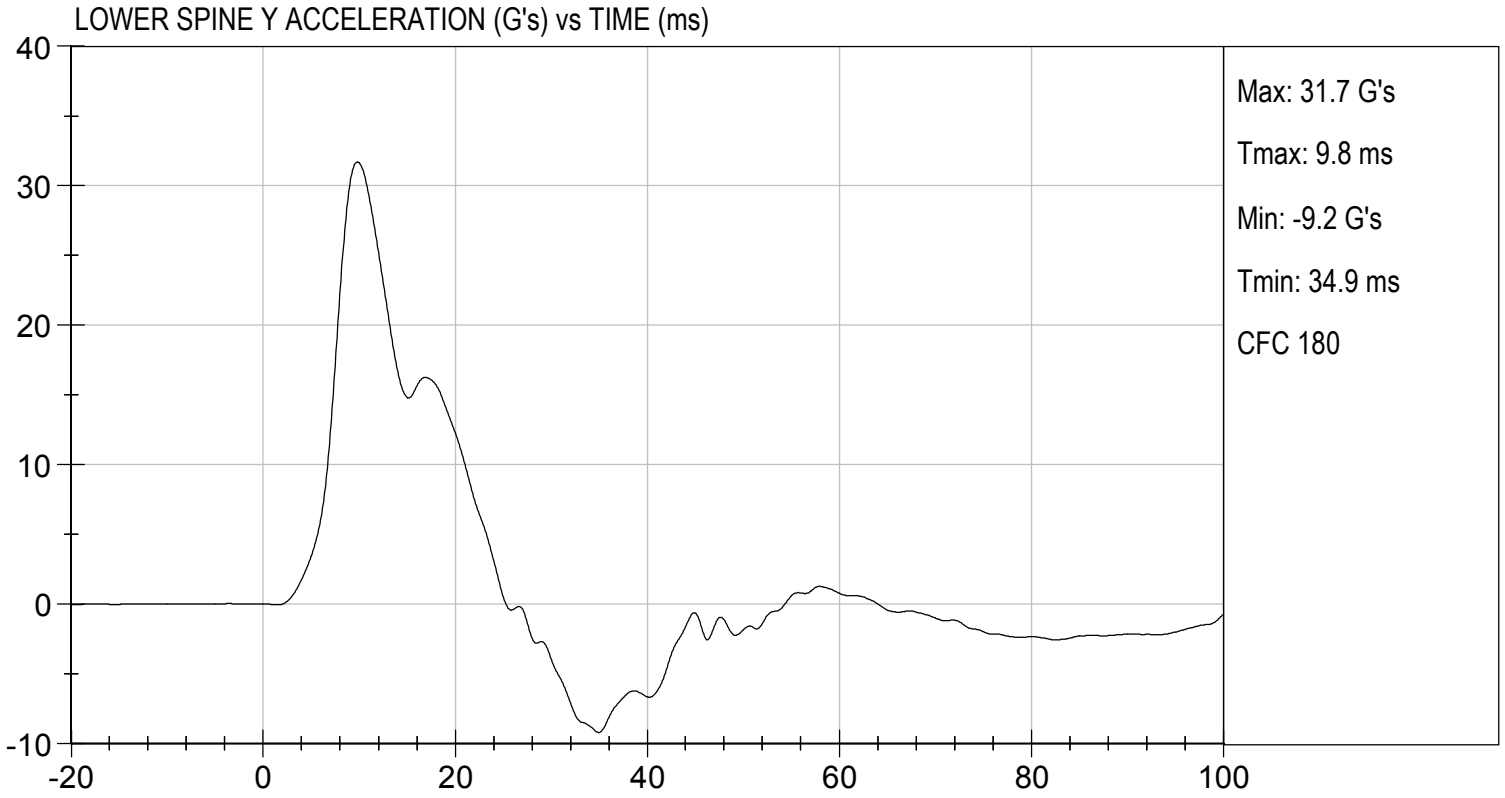


UPPER SPINE Y ACCELERATION (G's) vs TIME (ms)



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

TEST DATE: 10/07/2021
TEST #: D213204



MGA RESEARCH CORPORATION

THORAX (WITHOUT ARM) IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306 **Test I.D:** D213205

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	46	Pass
Impact Velocity	m/s	4.20 to 4.40	4.27	Pass
Maximum Probe Acceleration	G's	14 to 18	15	Pass
Upper Rib Displacement	mm	32 to 40	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

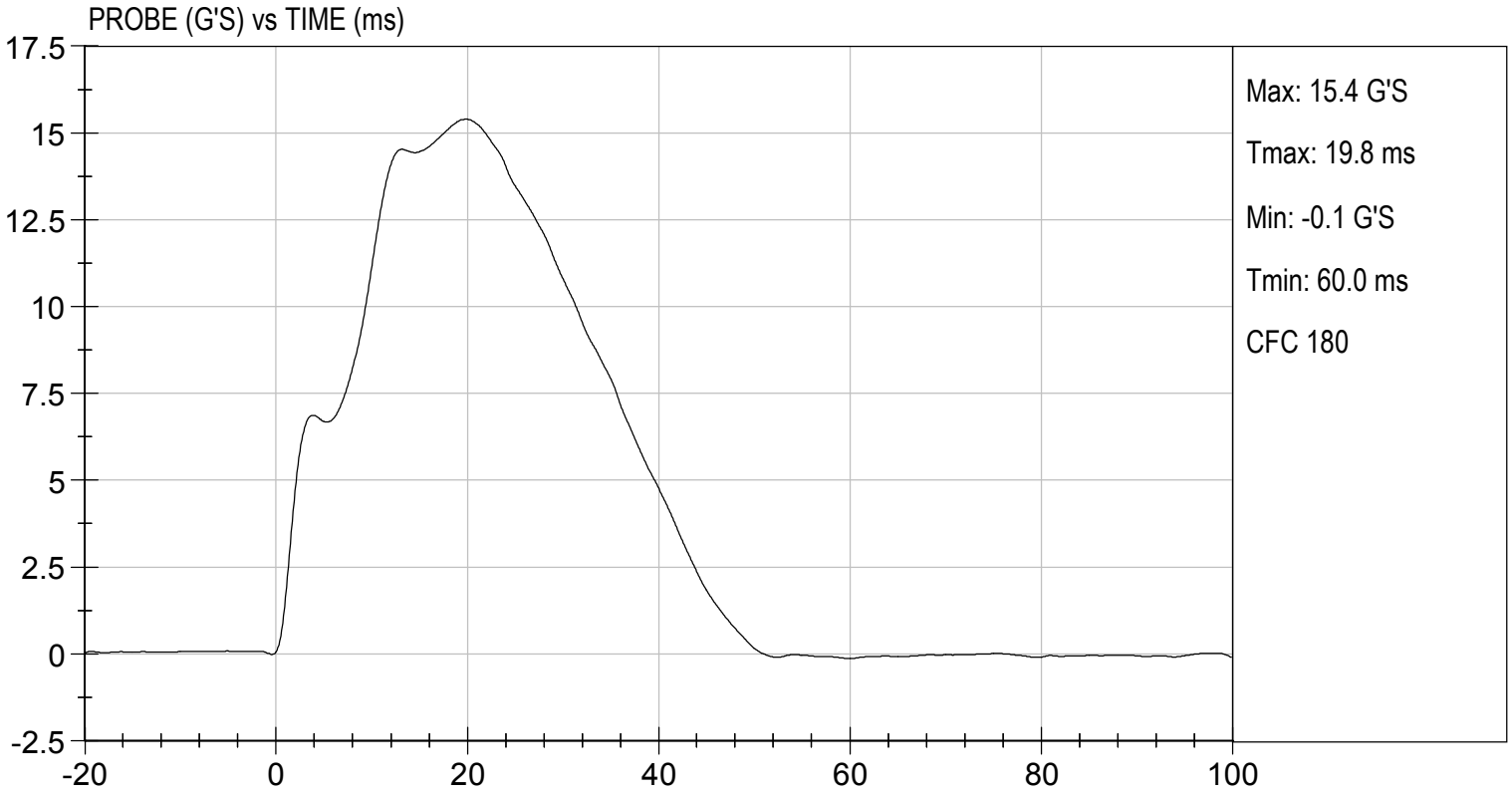
Laboratory Technician

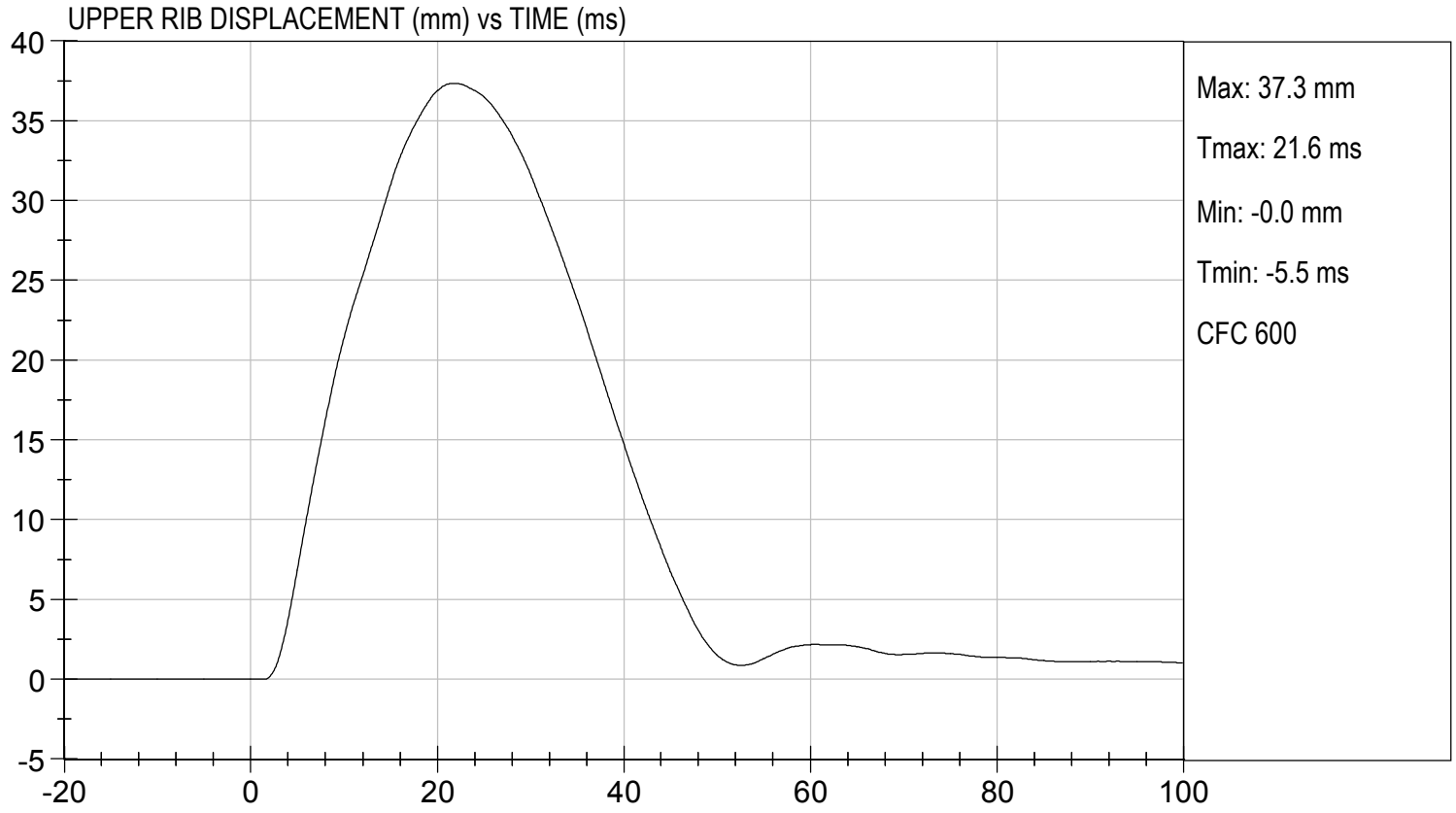
10/07/2021
Test Date

Approved By

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

TEST DATE: 10/07/2021
TEST #: D213205

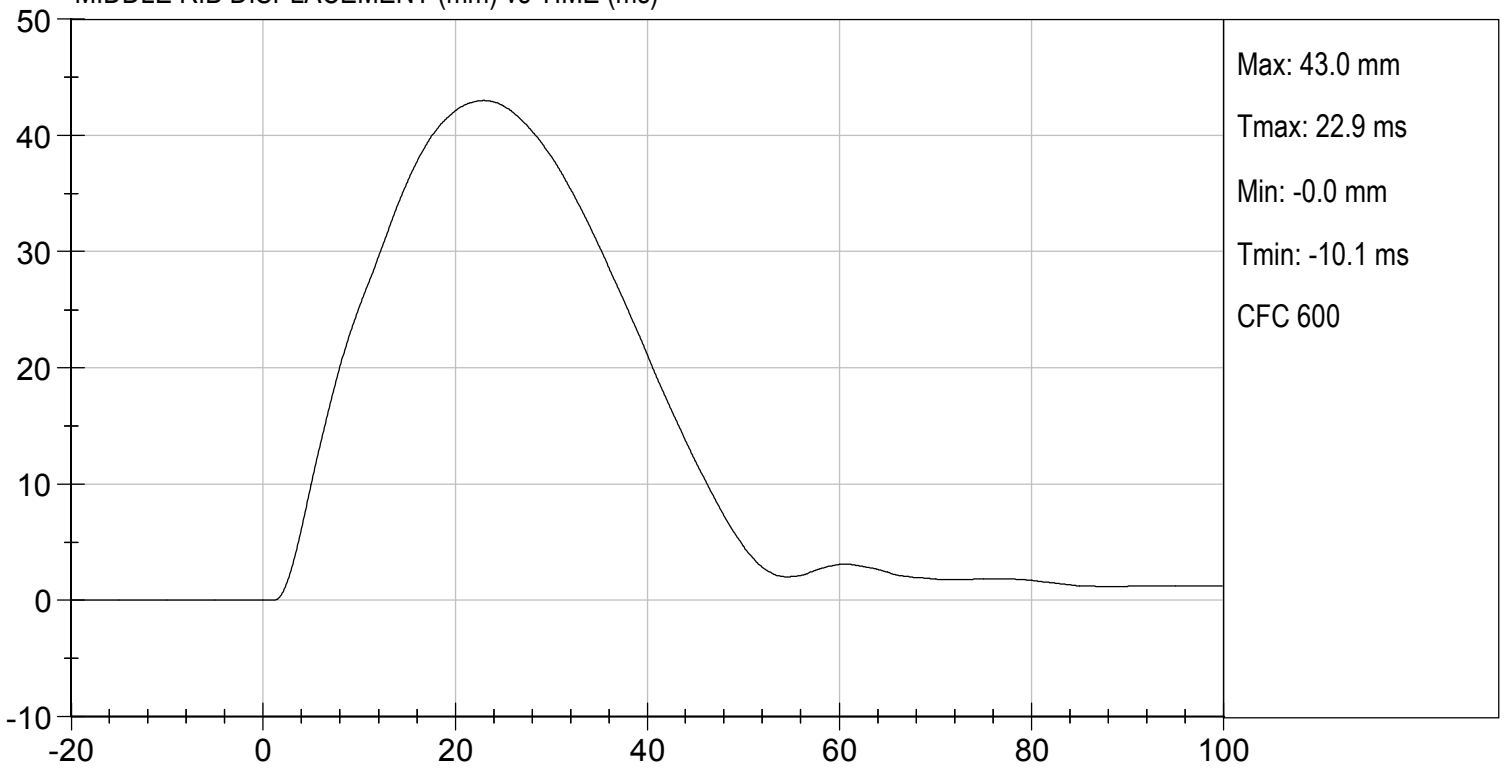




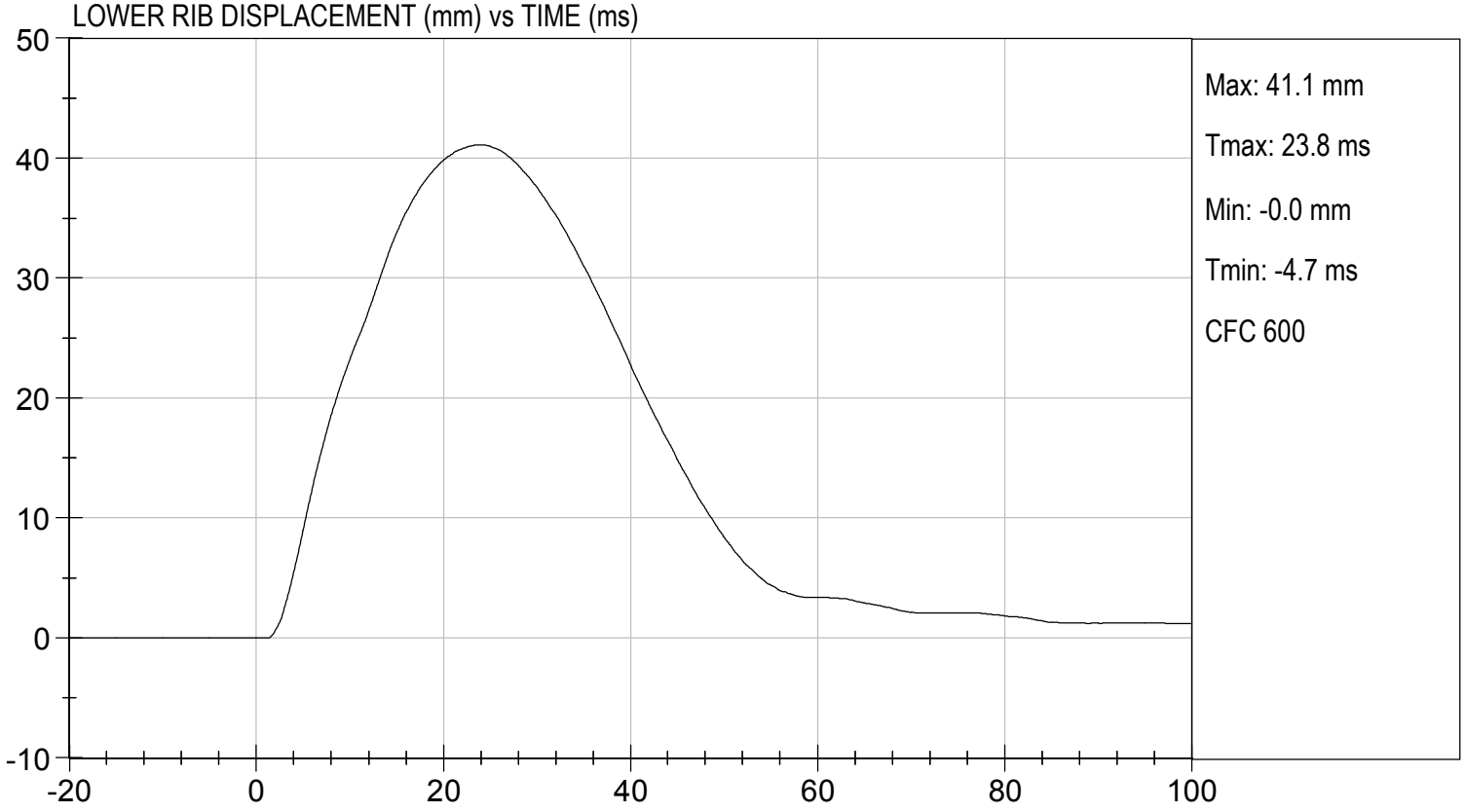
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.01 ft/s, 4.27 m/s

TEST DATE: 10/07/2021
TEST #: D213205

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



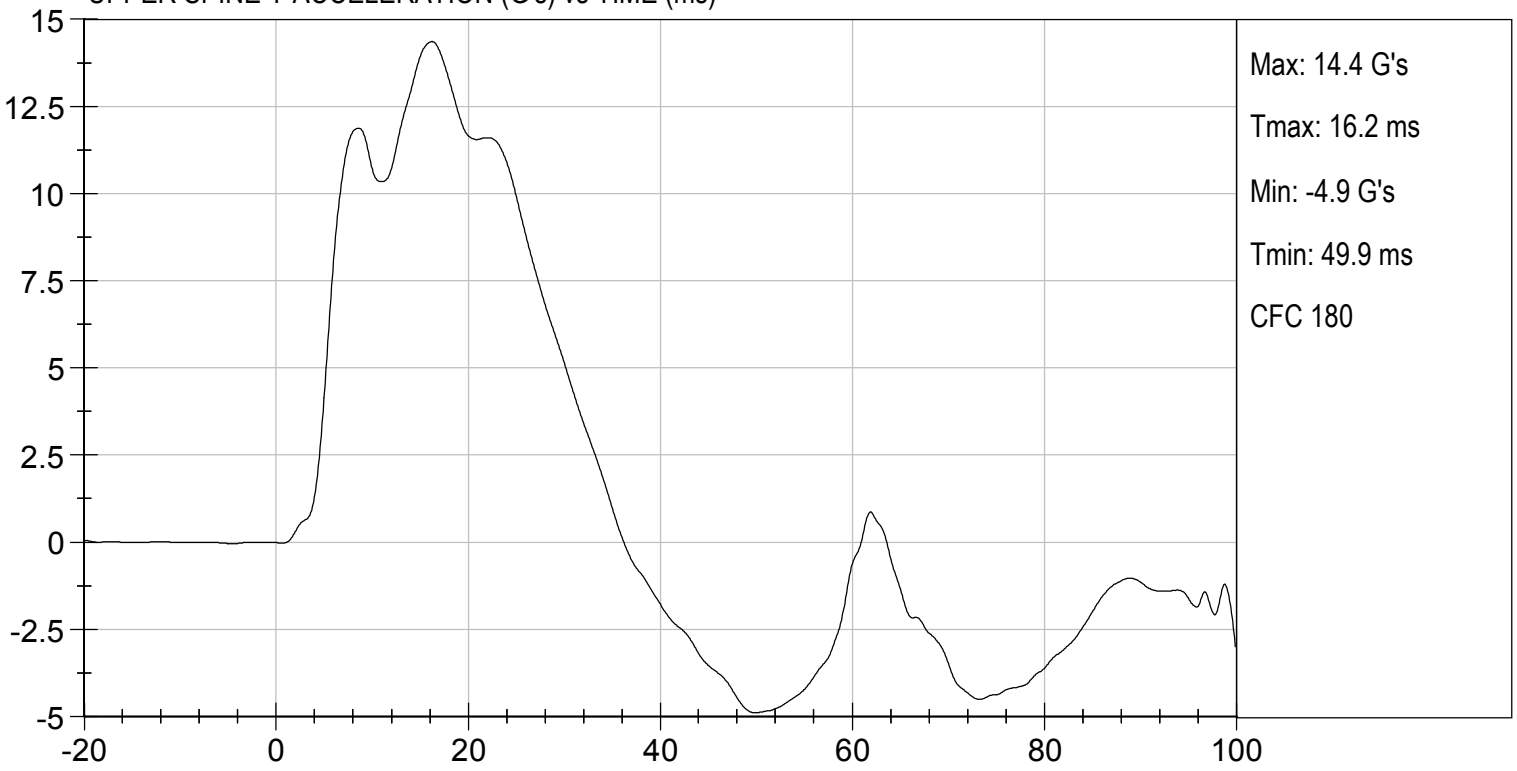
LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



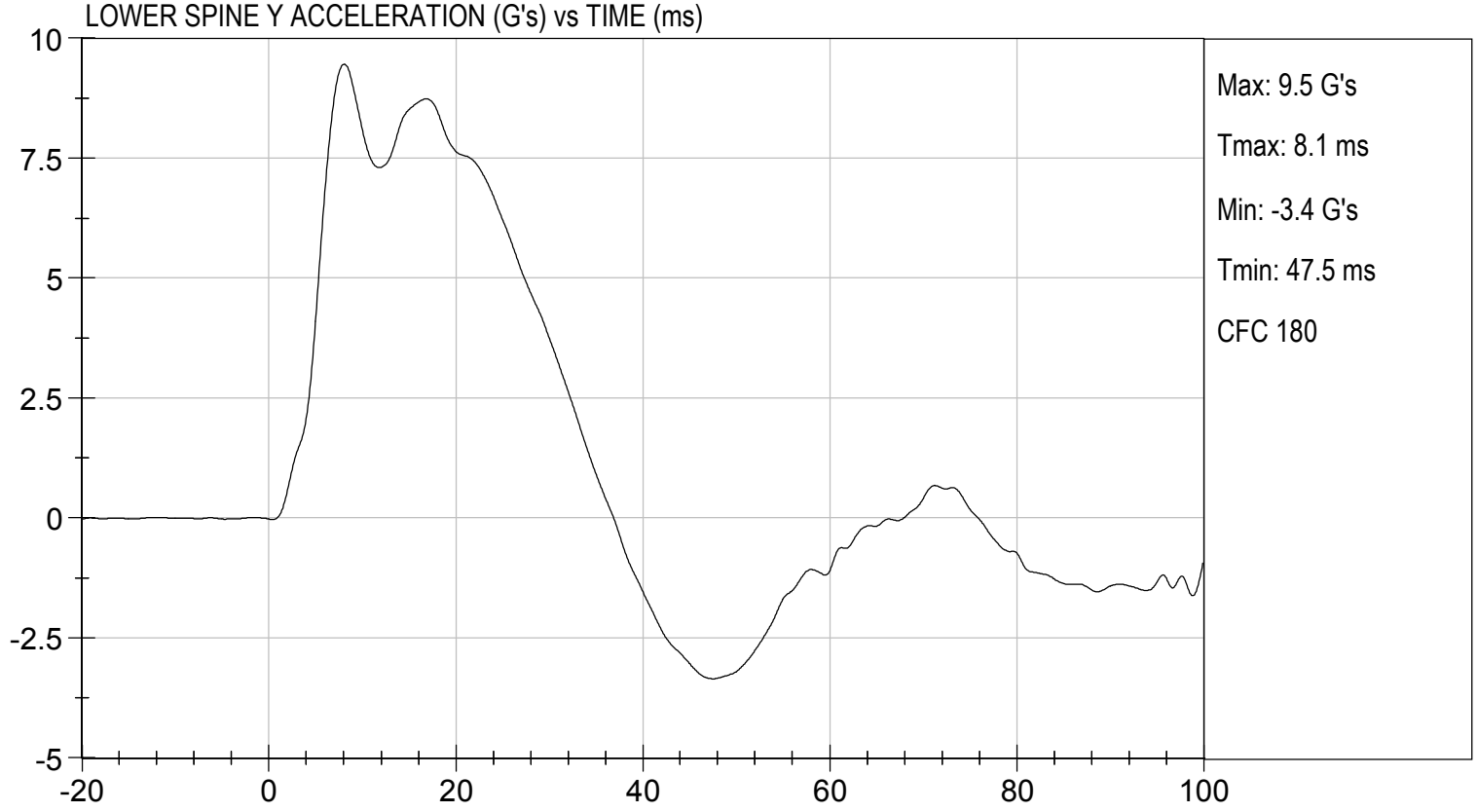
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.01 ft/s, 4.27 m/s

TEST DATE: 10/07/2021
TEST #: D213205

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



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



MGA RESEARCH CORPORATION

ABDOMINAL IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306 **Test I.D:** D213206

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	46	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Maximum Probe Acceleration	G's	12 to 16	14	Pass
Upper Abdomen Rib Displacement	mm	36 to 47	40	Pass
Lower Abdomen Rib Displacement	mm	33 to 44	39	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	11	Pass
		Overall Test Results		Pass

Laboratory Technician

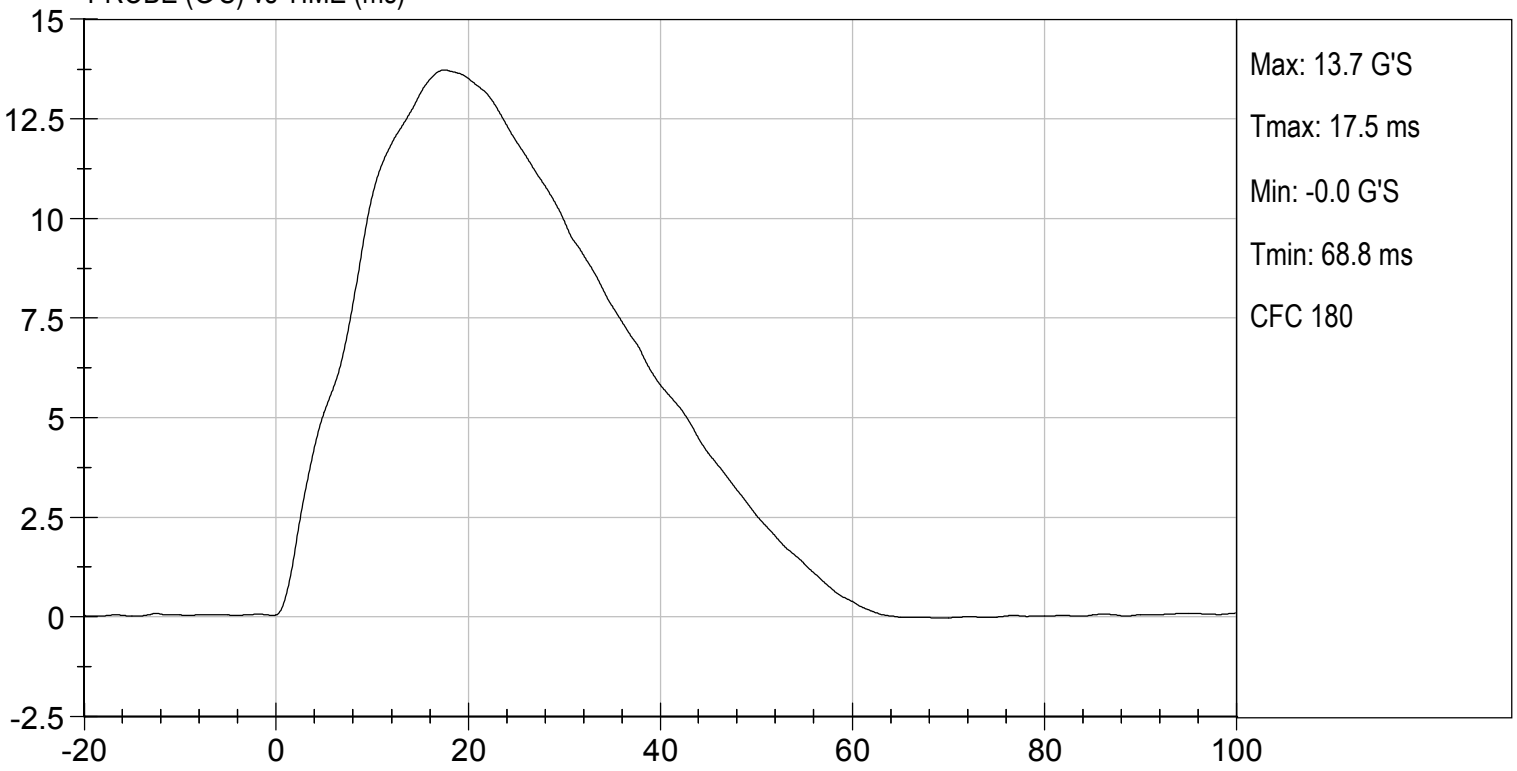
10/07/2021
Test Date

Approved By

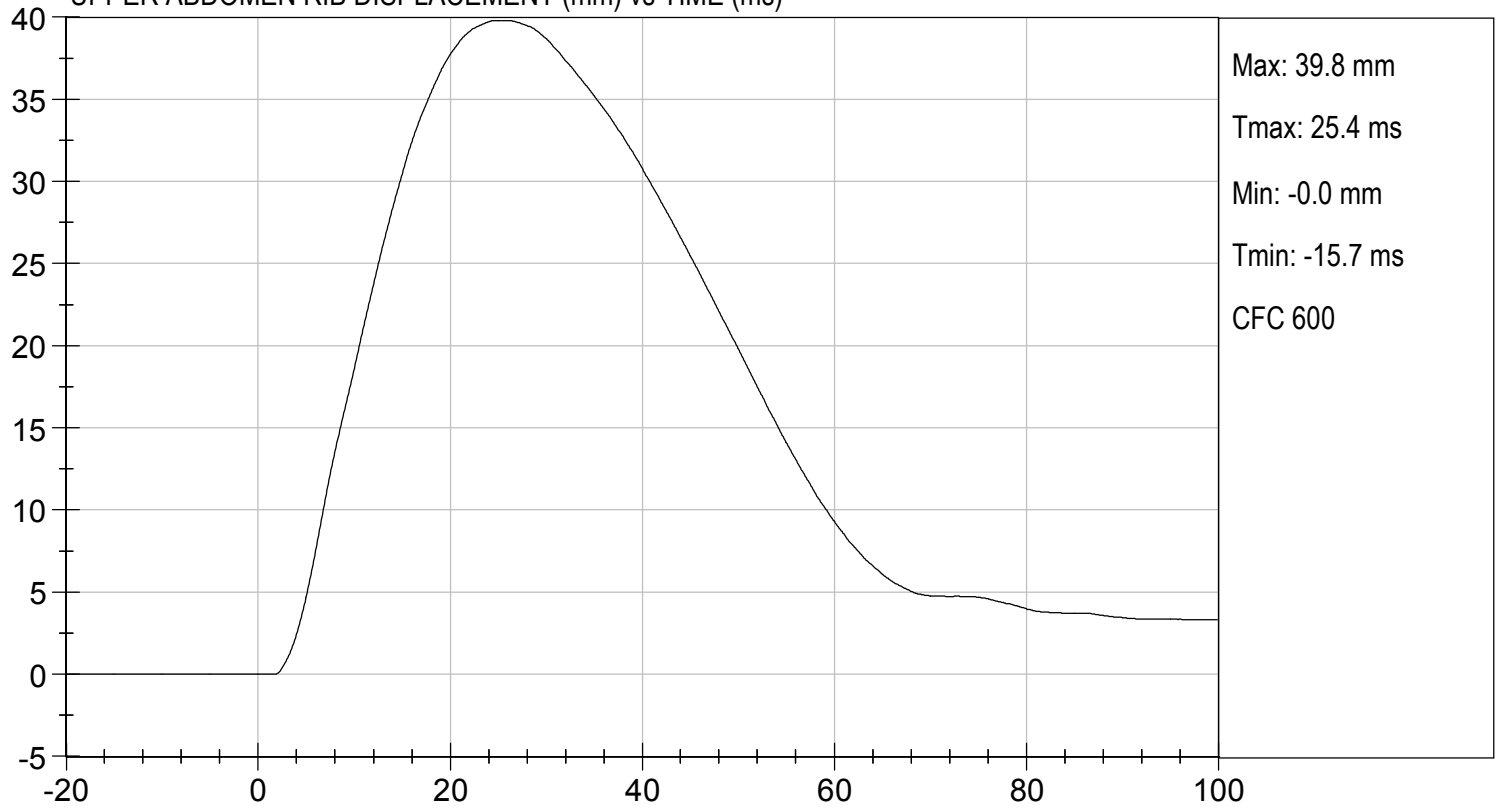
TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 10/07/2021
TEST #: D213206

PROBE (G'S) vs TIME (ms)



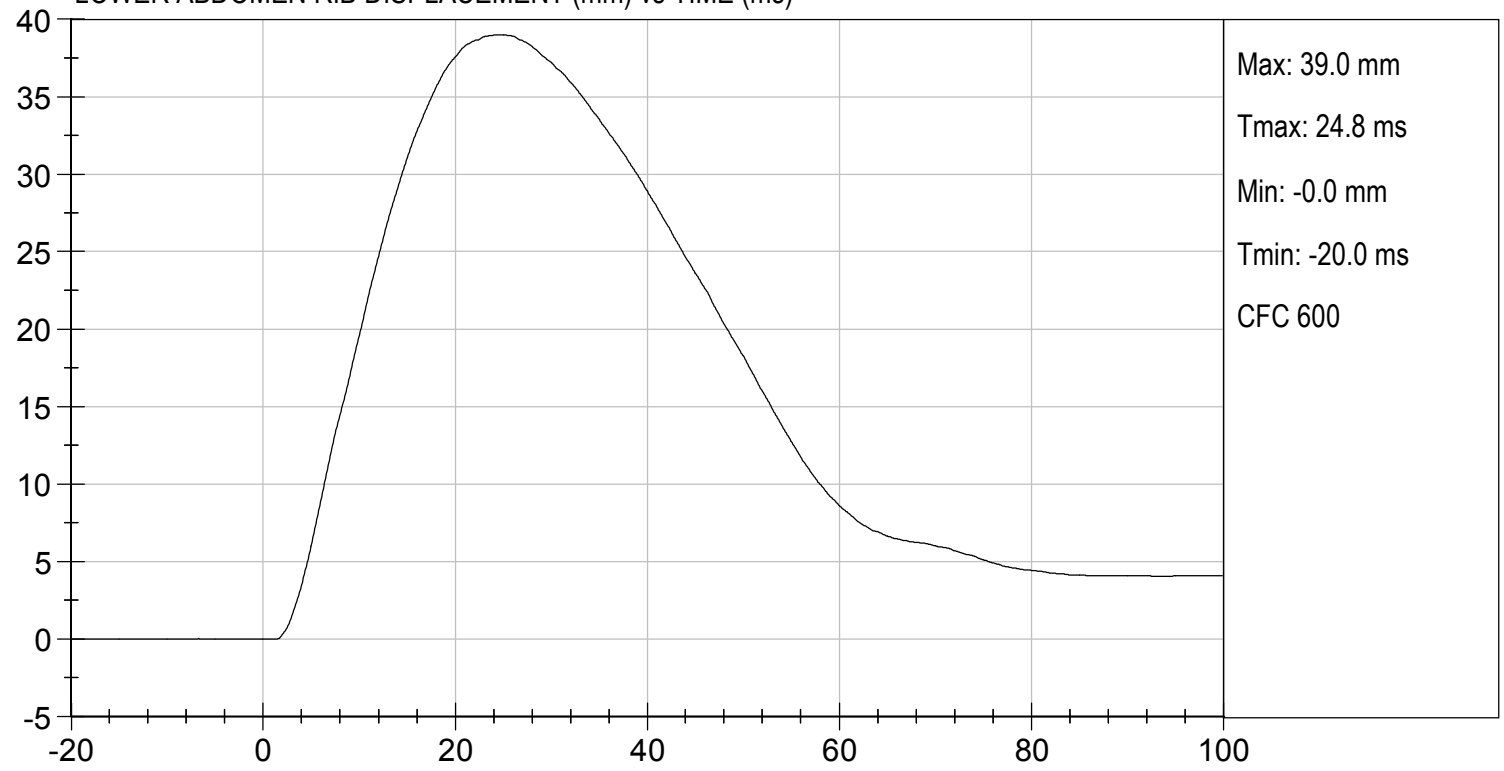
UPPER ABDOMEN RIB DISPLACEMENT (mm) vs TIME (ms)



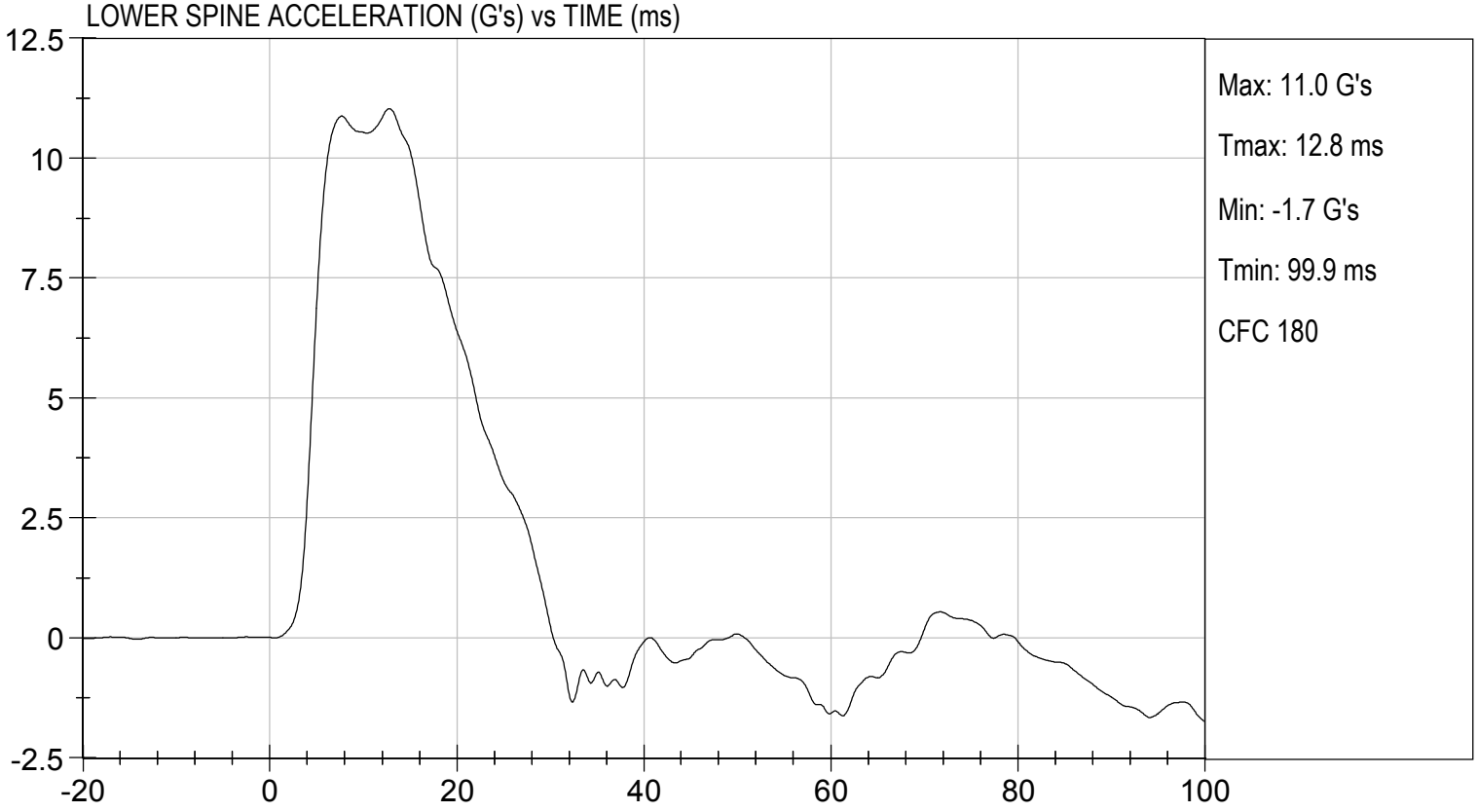
TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 10/07/2021
TEST #: D213206

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



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



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306 **Test I.D:** D213207

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	46	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	Pass
Maximum Probe Acceleration	G's	38 to 47	41	Pass
Pelvis Y Acceleration After 6 ms	G's	34 to 42	42	Pass
Peak Acetabulum Force	N	3600 to 4300	3,923	Pass
		Overall Test Results		Pass

Laboratory Technician

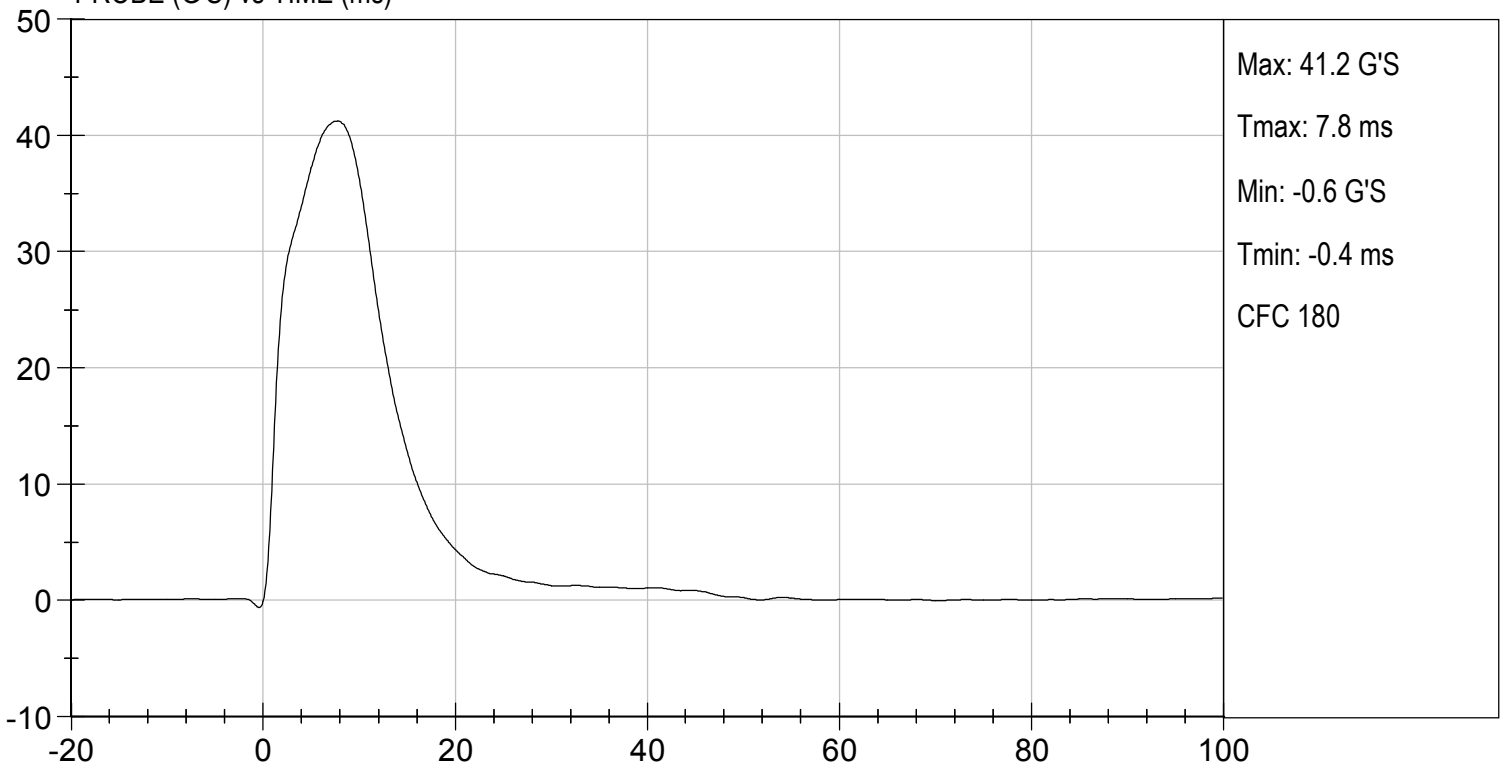
10/08/2021
Test Date

Approved By

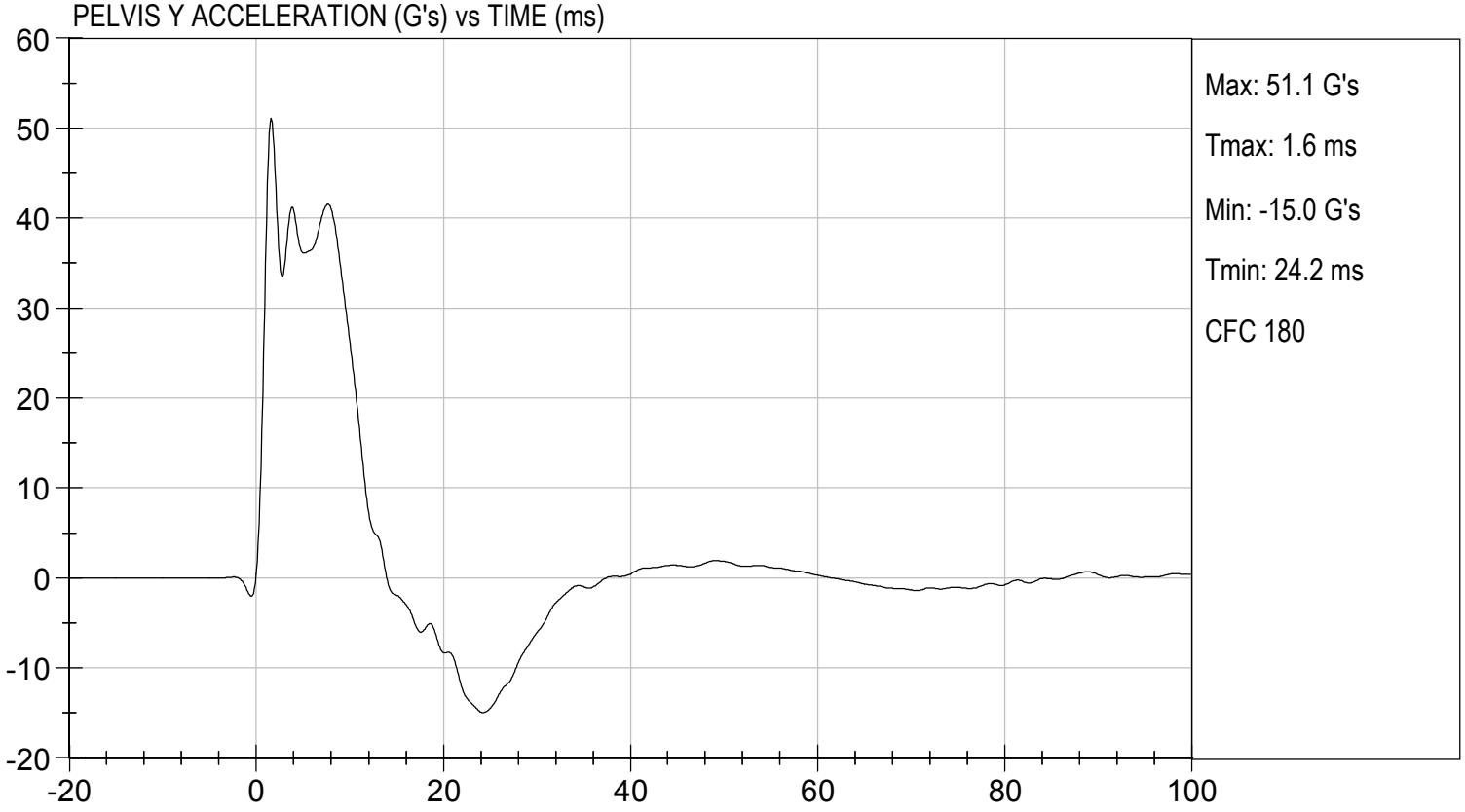
TEST DESC: PELVIS IMPACT
VELOCITY: 21.93 ft/s, 6.68 m/s

TEST DATE: 10/08/2021
TEST #: D213207

PROBE (G'S) vs TIME (ms)

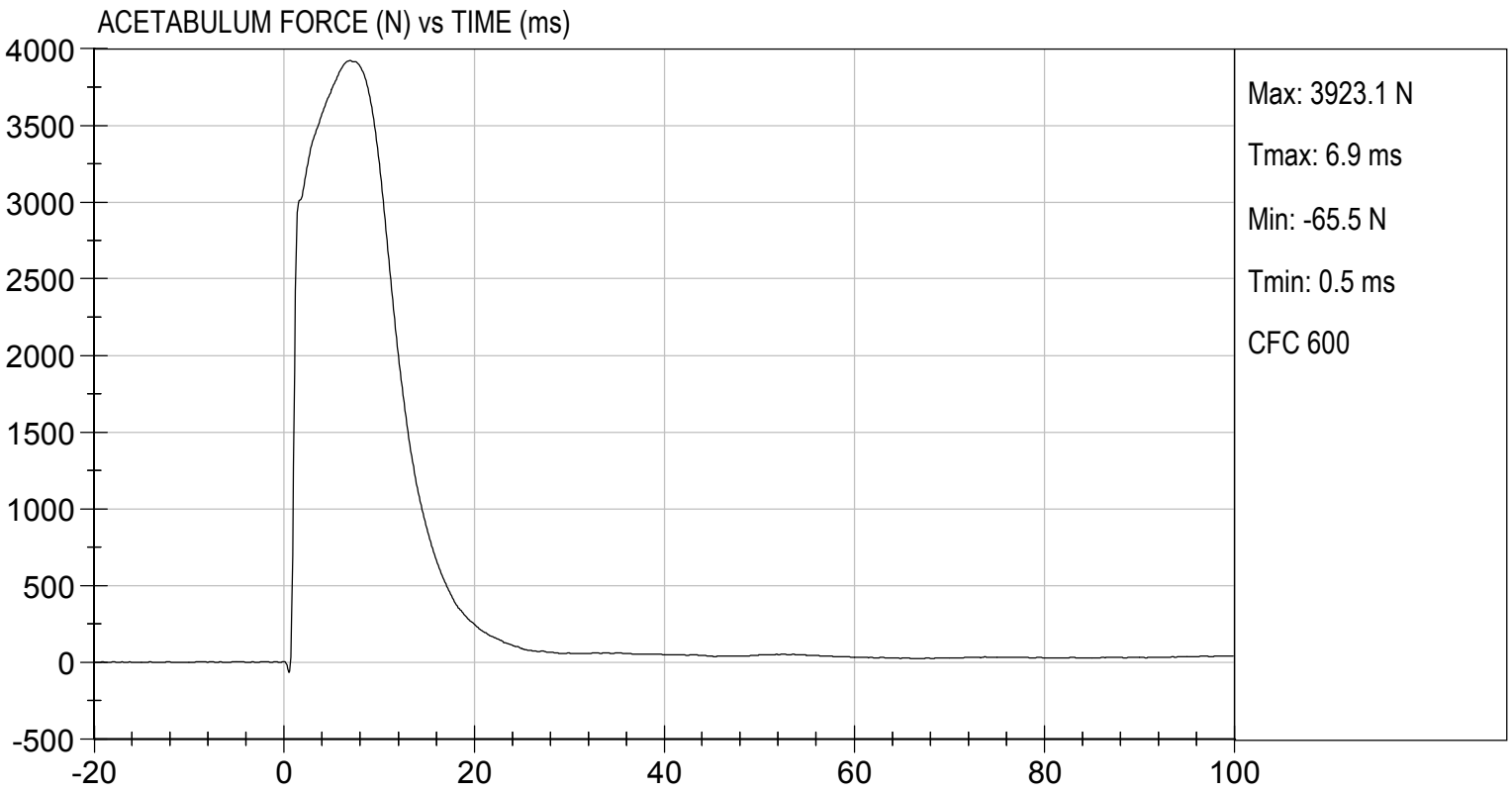


PELVIS Y ACCELERATION (G's) vs TIME (ms)



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

TEST DATE: 10/08/2021
TEST #: D213207



MGA RESEARCH CORPORATION

ILIAC IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306 **Test I.D:** D213208

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	46	Pass
Impact Velocity	m/s	4.20 to 4.40	4.20	Pass
Maximum Probe Acceleration	G's	36 to 45	40	Pass
Pelvis Y Acceleration	G's	28 to 39	32	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4,575	Pass
		Overall Test Results		Pass

Alex Thomas
Laboratory Technician

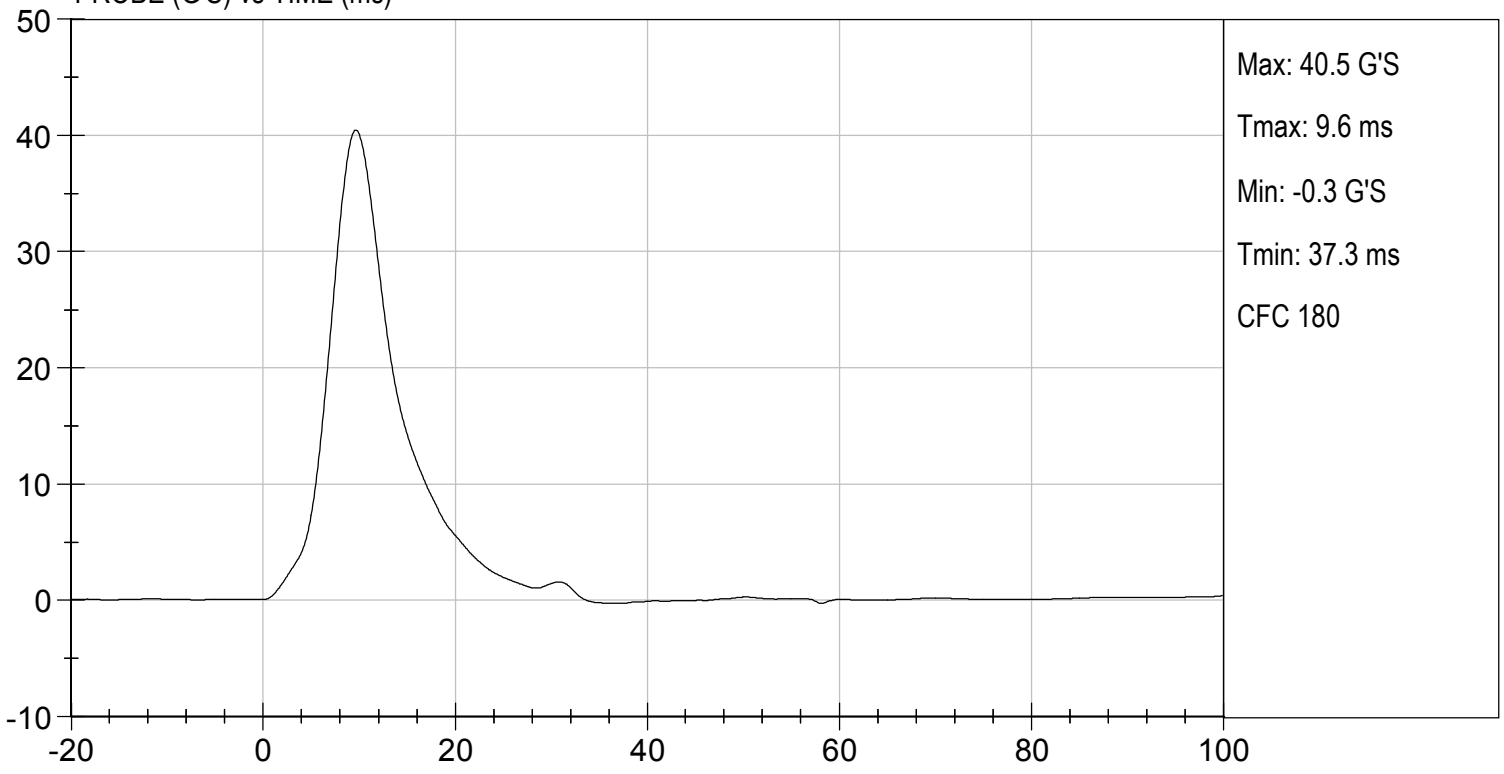
10/07/2021
Test Date

Approved By

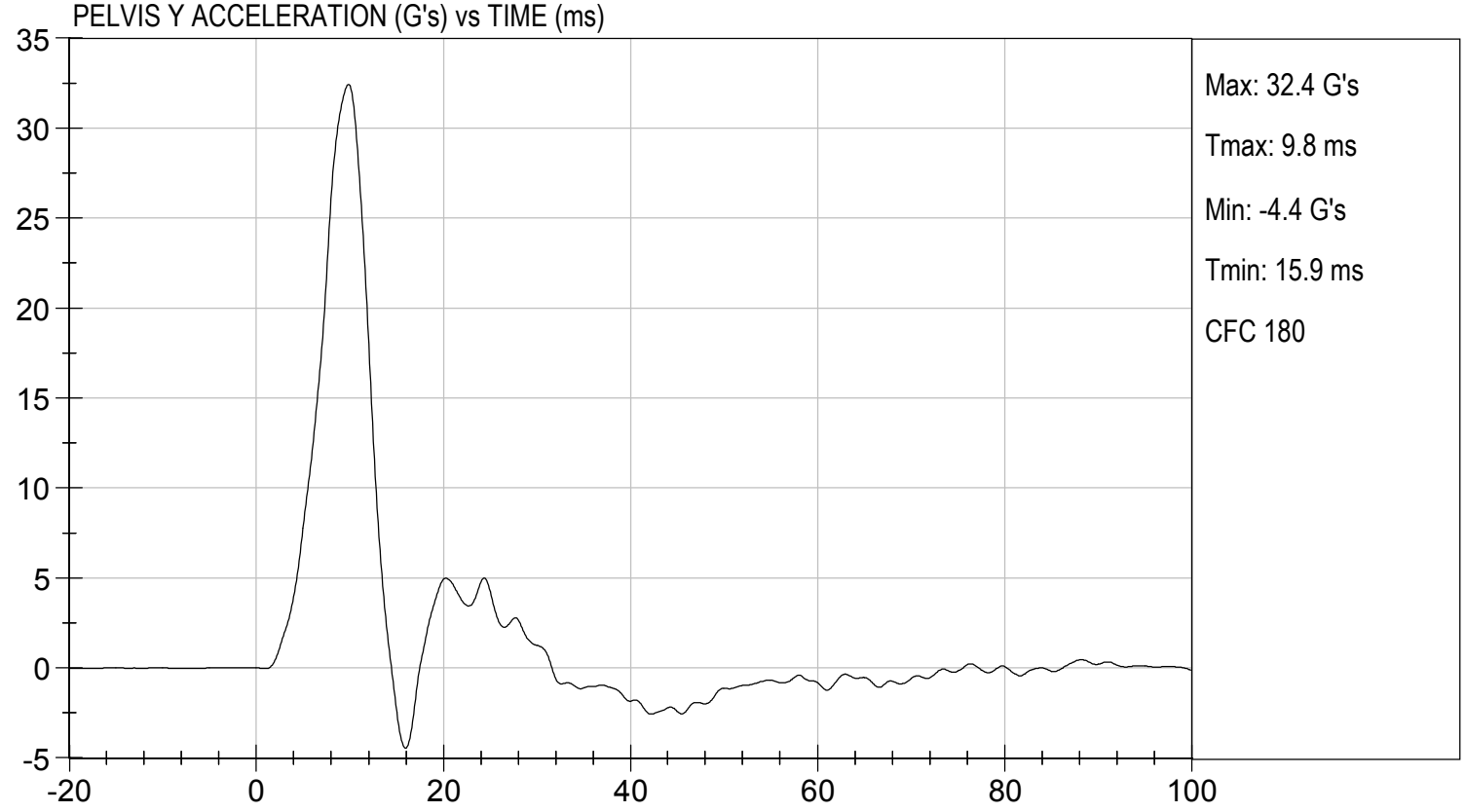
TEST DESC: ILLIAC
VELOCITY: 13.77 ft/s, 4.20 m/s

TEST DATE: 10/07/2021
TEST #: D213208

PROBE (G'S) vs TIME (ms)

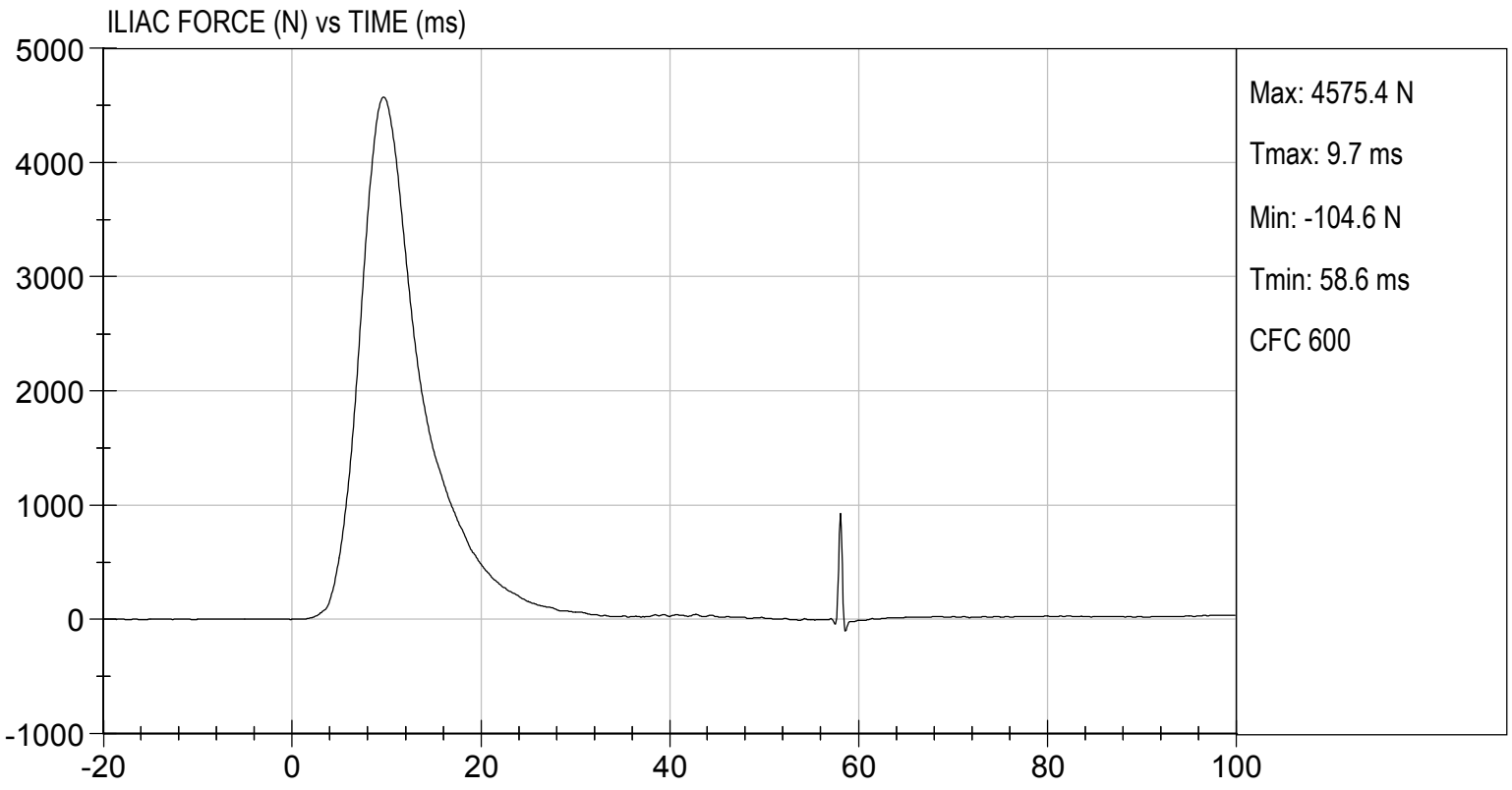


PELVIS Y ACCELERATION (G's) vs TIME (ms)



TEST DESC: ILLIAC
VELOCITY: 13.77 ft/s, 4.20 m/s

TEST DATE: 10/07/2021
TEST #: D213208



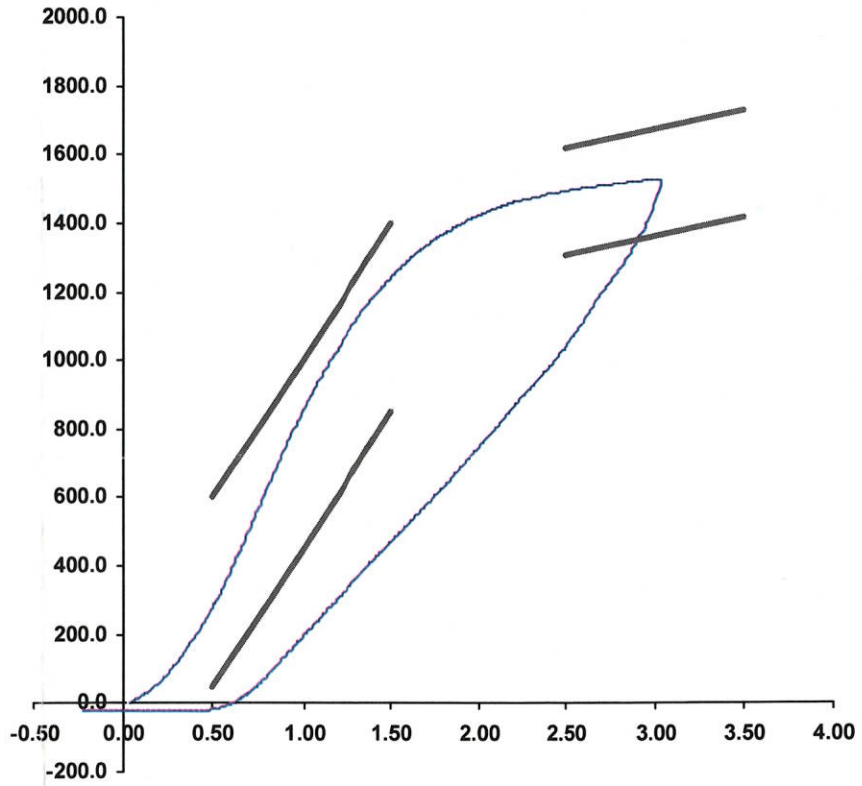
SACO RESEARCH

SID-IIs Pelvis Plug Certification Test

Plug S/N 13549
Test Number 11193
Report Number 11231
Test Date 9/23/2019 12:05:14 PM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	293.54	50.00	600.00
Force @ 1.5 mm (N)	1,243.22	850.00	1,400.00
Force @ 2.5 mm (N)	1,494.08	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,527.87	1,361.00	1,673.00

Force (-N) vs Extension (-mm)



Testing Machine STM-20 5965542
Load Cell S/N (FI360947), Units (LBS 1000

Crosshead Speed (mm / min) or Rat 12.7
Extension or Position Measured by XHD_100 (XHD100)

Notes:

Operator

Part Number 180-4450

Template No 107 23-Sep-19
SACO Research

By : DC Date : 9/23/2019

SACO RESEARCH

SID-IIs Pelvis Plug Certification Test

Plug S/N 13550
Test Number 11194
Report Number 11232
Test Date 9/23/2019 12:06:26 PM

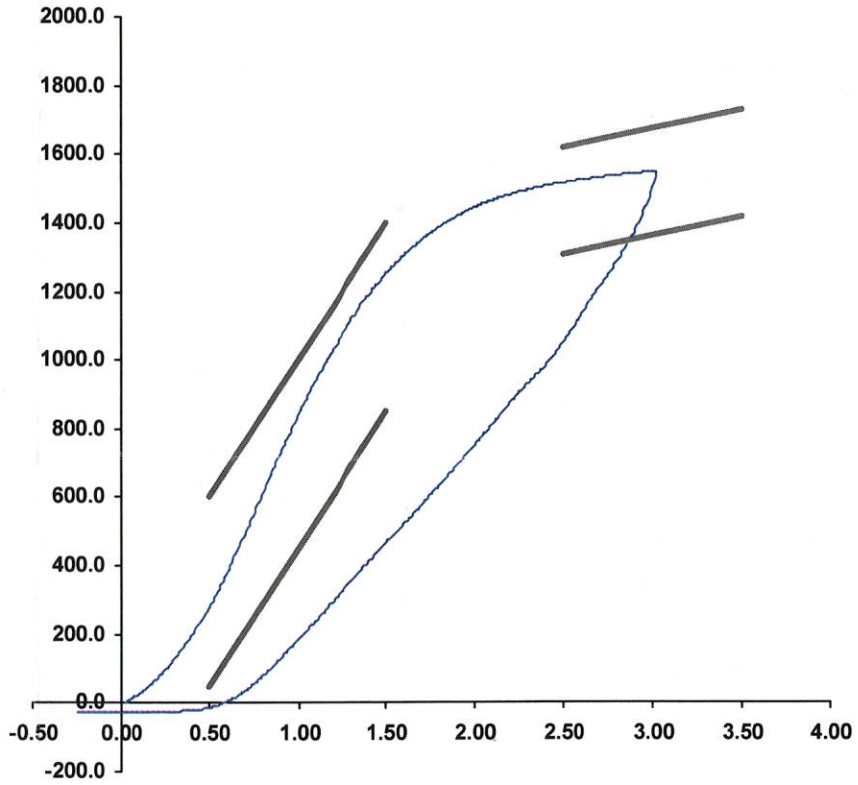
	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	290.26	50.00	600.00
Force @ 1.5 mm (N)	1,257.61	850.00	1,400.00
Force @ 2.5 mm (N)	1,517.58	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,549.90	1,361.00	1,673.00

Testing Machine STM-20 5965542
Load Cell S/N (FI360947), Units (LBS 1000

Crosshead Speed (mm / min) or Rat 12.7
Extension or Position Measured by XHD_100 (XHD100)

Notes:

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107 23-Sep-19
SACO Research

By : DC Date : 9/23/2019

SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 FAX

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation (ES-2re)

			ES-2re S/N F032		
			Serial Number	Manufacturer	Calibration Date
Head CG Accelerometers		X	P79750	Endevco	07/01/2021
		Y	P79751	Endevco	07/01/2021
		Z	P79753	Endevco	07/01/2021
		Xr	P79711	Endevco	07/01/2021
		Yr	P79712	Endevco	07/01/2021
		Zr	P88170	Endevco	07/01/2021
Thorax Rib Displacement Potentiometers	Upper	Y	G236	Honeywell	07/23/2021
	Middle	Y	G169	Honeywell	07/02/2021
	Lower	Y	G164	Honeywell	07/02/2021
Abdomen Load Cells	Forward	Y	ABG1532	Denton	07/05/2021
	Middle	Y	ABG1534	Denton	07/05/2021
	Rear	Y	ABG1535	Denton	07/05/2021
Lower Spine Accelerometers (T12)		X	P79574	Endevco	07/01/2021
		Y	P82097	Endevco	07/01/2021
		Z	P82603	Endevco	07/01/2021
Public Symphysis Load Cell		Y	PG461	Denton	07/05/2021

Table 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N 306		
				Serial Number	Manufacturer	Calibration Date
Head CG Accelerometers			X	P79445	Endevco	07/02/2021
			Y	P79721	Endevco	07/02/2021
			Z	P79724	Endevco	07/02/2021
			Xr	P84999	Endevco	07/02/2021
			Yr	P85000	Endevco	07/02/2021
			Zr	P85001	Endevco	07/02/2021
Head Angular Rate Sensors			X	ARS7423	DTS	03/02/2021
			Y	ARS7502	DTS	03/02/2021
			Z	ARS7566	DTS	03/02/2021
Displacement Potentiometers	Thoracic Rib	Upper	Y	G033	FTSS	07/02/2021
		Middle	Y	2403	Servo	07/02/2021
		Lower	Y	G1270	FTSS	07/02/2021
	Abdominal Rib	Upper	Y	G032	FTSS	07/02/2021
		Lower	Y	G1304	FTSS	07/02/2021
Lower Spine Accelerometers (T12)			X	P79574	Endevco	07/01/2021
			Y	P82097	Endevco	07/01/2021
			Z	P82603	Endevco	07/01/2021
Acetabulum Load Cell			Y	ACG268	Denton	11/23/2020
Iliac Wing Load Cell			Y	IWG273	Denton	11/23/2020
Pelvis Plug (struck side)				13549	SACO	09/23/2019
Pelvis Plug (non-struck side)				13550	SACO	09/23/2019

Table 3 – Vehicle Instrumentation

			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	A295237	MSI	07/07/2021
	Vehicle Center of Gravity	Y	A295228	MSI	07/07/2021
	Vehicle Center of Gravity	Z	A356212	MSI	07/07/2021
2	Right Sill at Front Seat	X	T22882	Endevco	08/24/2021
	Right Sill at Front Seat	Y	T22879	Endevco	09/27/2021
	Right Sill at Front Seat	Z	T19018	Endevco	09/27/2021
3	Right Sill at Rear Seat	X	PCB1414	PCB	08/24/2021
	Right Sill at Rear Seat	Y	PCB1033	PCB	08/24/2021
	Right Sill at Rear Seat	Z	PCB130	PCB	07/30/2021
4	Left Sill at Front Door	Y	A383131	MSI	05/14/2021
5	Left Sill at Rear Door	Y	PCB1402	PCB	08/16/2021
6	Left A-Post Lower	Y	A340237	MSI	07/06/2021
7	Left A-Post Middle	Y	T22622	Endevco	08/16/2021
8	Left B-Post Lower	Y	A383135	MSI	06/01/2021
9	Left B-Post Middle	Y	PCB1399	PCB	08/16/2021
10	Front Seat Track	Y	A370272	MSI	08/13/2021
11	Rear Seat Track or Structure	Y	A360987	MSI	08/16/2021
12	Right Rear Occ. Compartment	Y	A370341	MSI	08/16/2021
13	Engine Block	X	A356235	MSI	06/14/2021
	Engine Block	Y	A360993	MSI	07/30/2021
14	Rear Floorpan Above Axle	X	A383455	MSI	06/02/2021
	Rear Floorpan Above Axle	Y	A340619	MSI	04/19/2021
	Rear Floorpan Above Axle	Z	A382563	MSI	06/02/2021

Table 4 – MDB Instrumentation

		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	PCB1725D	PCB	05/28/2021
MDB Center of Gravity	Y	PCB1619D	PCB	05/25/2021
MDB Center of Gravity	Z	PCB1453D	PCB	05/25/2021
Left Frame at Rear Axle Centerline	X	PCB1715D	PCB	06/04/2021
Left Frame at Rear Axle Centerline	Y	PCB1978D	PCB	06/30/2021