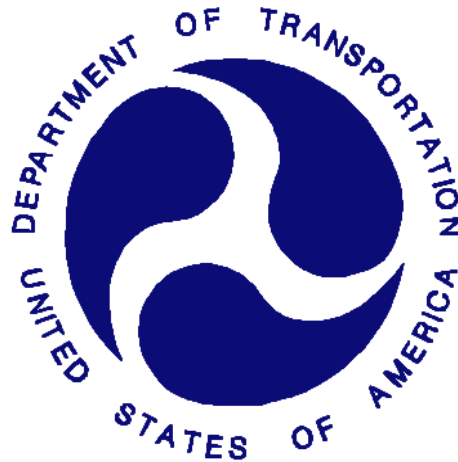


REPORT NUMBER: SideNCAPMDB-MGA-23-022

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

**TOYOTA MOTOR MANUFACTURING CANADA INC.
2023 Lexus RX 350h Luxury AWD 5-Door SUV
NHTSA No.: O20235102**

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



Test Date: May 18, 2023

Final Report Date: February 14, 2024

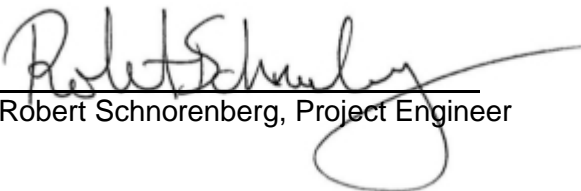
FINAL REPORT

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

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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: February 14, 2024

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-23-022	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle Final Report of New Car Assessment Program Side Impact MDB Testing and FMVSS No. 305 Indicant Testing of 2023 Lexus RX 350h Luxury AWD 5-Door SUV, NHTSA No.: O20235102	5. Report Date February 14, 2024	
	6. Performing Organization Code MGA	
7. Author(s) Ben Fischer, Program Manager	8. Performing Organization Report No. SideNCAPMDB-MGA-23-022	
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105	10. Work Unit No.	
	11. Contract or Grant No. 693JJ920D000017	
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 Washington, D.C. 20590	13. Type of Report and Period Covered: Final Test Report May 18, 2023 to February 14, 2024	
	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 2023 Lexus RX 350h Luxury AWD 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 May 18, 2023.

The impact velocity of the Moving Deformable Barrier (MDB) was 61.71 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 211 mm at level 2. The test vehicle's performance was as follows:

Measurement Description	Units	Driver ATD (ES-2re)	
		Threshold	Result
Head Injury Criteria (HIC ₃₆)		1000	58.387
Maximum Thorax Rib Deflection	mm	44	8.095
Total Abdominal Force	N	2500	439.726
Pubic Symphysis Force	N	6000	915.198
Resultant Lower Spine Acceleration	g	82*	17.108

Measurement Description	Units	Passenger ATD (SID-IIs)	
		Threshold	Result
Head Injury Criteria (HIC ₃₆)		1000	63.483
Resultant Lower Spine Acceleration	g	82	43.130
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2844.662
Maximum Thoracic Rib Deflection	mm	38*	10.169
Maximum Abdomen Rib Deflection	mm	45*	19.829

*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 260	22. Price

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SECTION 1 PURPOSE AND SUMMARY OF TEST

PURPOSE

This moving deformable barrier side impact test is part of the MY 2023 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. 693JJ920D000017. The purpose of this test is to generate comparative side impact performance in a 2023 Lexus RX 350h Luxury AWD 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 2023 Lexus RX 350h Luxury AWD 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 61.71 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 May 18, 2023. 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	58.387
Maximum Thorax Rib Deflection	mm	44	8.095
Total Abdominal Force	N	2500	439.726
Pubic Symphysis Force	N	6000	915.198
Resultant Lower Spine Acceleration	g	82*	17.108

Measurement Description	Units	Passenger ATD (SID-IIs)	
		Threshold	Result
Head Injury Criteria (HIC ₃₆)		1000	63.483
Resultant Lower Spine Acceleration	g	82	43.130
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2844.662
Maximum Thoracic Rib Deflection	mm	38*	10.169
Maximum Abdomen Rib Deflection	mm	45*	19.829

*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	
Torso Airbag			Yes	Yes
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes		Yes	
Other:				

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

GENERAL COMMENTS

None.

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

SECTION 2
OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

**DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
 Test Date: 5/18/2023

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	O20235102	Traction Control System (TCS)	Yes
Model Year	2023	Auto-Leveling System	No
Make	Lexus	Automatic Door Locks (ADL)	Yes
Model	RX 350h Luxury AWD	Power Window Auto-Reverse	Yes
Body Style	5-Door SUV	Other Optional Feature	No
VIN	2T2BBMCA0PC005158	Driver Front Airbag	Yes
Body Color	Iridium	Driver Curtain Airbag	Yes
Odometer Reading (km/mi)	10 km / 6 mi	Driver Head/Torso Airbag	No
Engine Displacement (L)	2.5 L	Driver Torso Airbag	No
Type/No. Cylinders	Inline 4	Driver Torso/Pelvis Airbag	Yes
Engine Placement	Lateral	Driver Pelvis Airbag	No
Transmission Type	Automatic	Driver Knee Airbag	Yes
Transmission Speeds	CVT	Rear Pass. Curtain Airbag	Yes
Overdrive	Yes	Rear Pass. Head/Torso Airbag	No
Final Drive	AWD	Rear Pass. Torso Airbag	Yes
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	Driver Only	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	TOYOTA MOTOR MANUFACTURING CANADA INC.	GVWR (kg)	2610
Date of Manufacture	02/23	GAWR Front (kg)	1400
Vehicle Type	MPV	GAWR Rear (kg)	1480

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3		5	
Capacity Weight (VCW) (kg)				505	(A)
DSC x 68 kg				340	(B)
Rated Cargo and Luggage Weight (RCLW) (kg)				136	(A-B)

* Rated Cargo and Luggage Weight (RCLW) limited to maximum of 300 lbs (136 kg).

* Rated Cargo and Luggage Weight (RCLW) reduced by 1 kg to account for Load Carrying Capacity Reduction Label.

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							

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

Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
 Test Date: 5/18/2023

VEHICLE TIRE INFORMATION



Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	230	230
Recommended Tire Size	235/50R21	235/50R21
Tire Size on Vehicle	235/50R21	235/50R21
Tire Manufacturer	Bridgestone	Bridgestone
Tire Model	Alenza	Alenza
Treadwear	500	500
Traction	A	A
Temperature Grade	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel, 1 Nylon	2 Polyester, 2 Steel, 1 Nylon
Load Index/Speed Symbol	101V	101V
Tire Material	Rubber	Rubber
DOT Safety Code Left	1W2 NYEC31 5122	1W2 NYEC31 5122
DOT Safety Code Right	1W2 NYEC31 5222	1W2 NYEC31 5122

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

Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
 Test Date: 5/18/2023

TEST VEHICLE TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	270	270	260	270
Tire Placard	kPa	230	230	230	230
Owner's Manual	kPa	230	230	230	230
As Tested	kPa	230	230	230	230

MDB TIRE SPECIFICATIONS

	Requirement	Units	LF	RF	LR	RR
Tire Size	P205/75R15	N/A	P205/75R15	P205/75R15	P205/75R15	P205/75R15
Tire 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	594.5	451.5		630.0	569.0		621.5	586.0	
Right	kg	531.5	471.5		542.5	566.0		530.0	576.5	
Ratio	%	55.0%	45.0%		50.8%	49.2%		49.8%	50.2%	
Totals	kg	1126.0	923.0	2049.0	1172.5	1135.0	2307.5	1151.5	1162.5	2314.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	2049.0	(A)
Sum of Actual Weight of 2 P572 ATDs Used	kg	129	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	136	(C)
Calculated Test Vehicle Target Weight (TVTWTW)	kg	2314.0	(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	827	818	Yes
Right Front	mm	830	822	Yes
Right Rear	mm	833	836	Yes
Left Rear	mm	827	819	Yes
Vehicle CG (Aft of Front Axle)	mm	1431	1401	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	36	32	

* 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: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
 Test Date: 5/18/2023

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Units	Weight
Weight of Ballast Added	kg	109
Components Removed: none	kg	

TEST SURFACE MARKINGS

	Units	Distance from 63° Impact Angle Line
Fore 25 mm Target	mm	941
Aft 25 mm Target	mm	955
Pre-Impact Angle Line	mm	100

Parallel Track Target	Units	X Location	Y Location
A	mm	0	0
B	mm	1520	3085
C	mm		
D	mm	3500	0

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

Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
 Test Date: 5/18/2023

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	20.6	8.5	14.6
Front Passenger Seat	21.3	11.6	16.3
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	14.6	0	Max	50	50	50
			Mid	25	25	25
			Min	0	0	0
Front Passenger Seat	16.3	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Front Center Seat			Max			
			Mid			
			Min			
Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed

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

Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

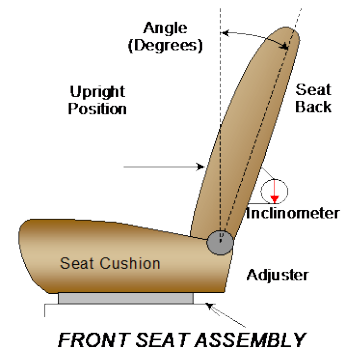
NHTSA No.: O20235102
 Test Date: 5/18/2023

SEAT FORE/AFT POSITIONS

Seat	Total Fore/Aft Travel		Test Position from Forward-Most Position	
	mm	Detents (1 st as 1)	mm	Detent (1 st as 0)
Driver Seat	240		120	
Front Passenger Seat	240		120	
Front Center Seat				
Struck Side Rear Seat	Fixed		Fixed	
Non-Struck Side Rear Seat	Fixed		Fixed	
Rear Center Seat	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 (1 st as 1)	Degrees	Detent (1 st as 0)
Driver Seat	51.7		1.4	
Front Passenger Seat	52.0		1.0	
Front Center Seat				
Struck Side Rear Seat	16.6		5.6	
Non-Struck Side Rear Seat	15.7		5.9	
Rear Center Seat	16.6		5.6	

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: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
 Test Date: 5/18/2023

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

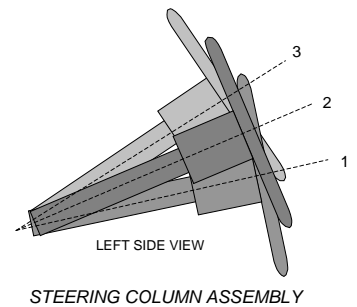
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

	Total # of Positions	Placed in Position #
Driver Seat	3	2 (Lowest as 0) / Fixed Fore-Aft
Rear Seat	2	0 (Lowest as 0) / Fixed Fore-Aft

STEERING COLUMN ADJUSTMENT

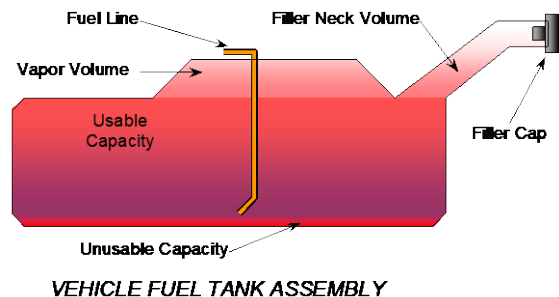
Steering wheel and column adjustments are made so that the steering wheel hub is at the center of its geometric locus it describes when it moves through its full range of motion.

	Wheel Angle (°)	Fore/Aft Position (mm)
Lowermost, Position 1	69.4	
Geometric Center, Position 2	67.0	
Uppermost, Position 3	64.6	
Telescoping Steering Wheel Travel		57
Test Position	67.0	29



FUEL PUMP

The vehicle is equipped with an electronic fuel pump. The fuel pump is activated when the ignition is ON. The filler neck is located on the driver's side.



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

Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
 Test Date: 5/18/2023

FUEL TANK CAPACITY DATA

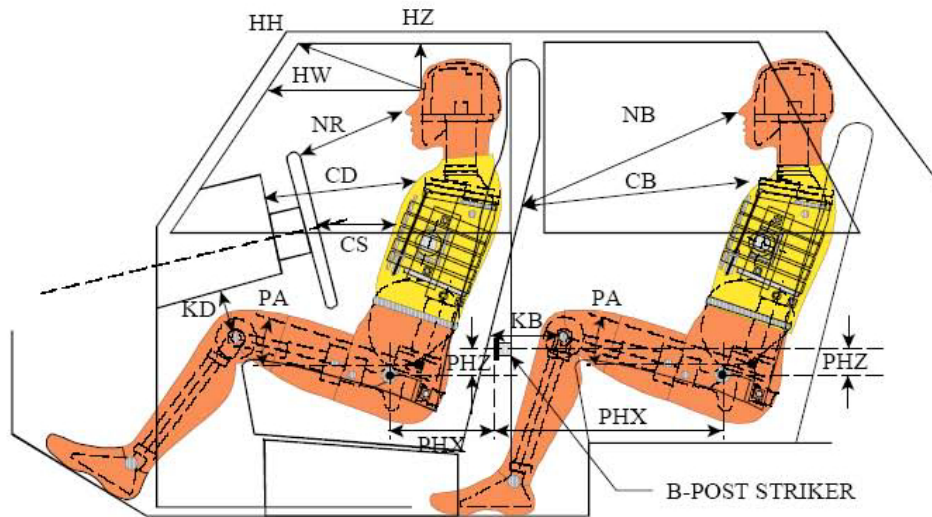
	Liters
Usable Capacity of Standard Tank (see S1 - Vehicle Setup Information)	64.2
Usable Capacity of Optional Tank (see S1 - Vehicle Setup Information)	
Usable Capacity of Standard Tank as Specified in Owner's Manual	64.2
Usable Capacity of Optional Tank as Specified in Owner's Manual	
93% of Usable Capacity	59.7
Actual Amount of Solvent Used	59.7
1/3 of Usable Capacity	21.4

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

**DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS**

Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
 Test Date: 5/18/2023



LEFT SIDE VIEW

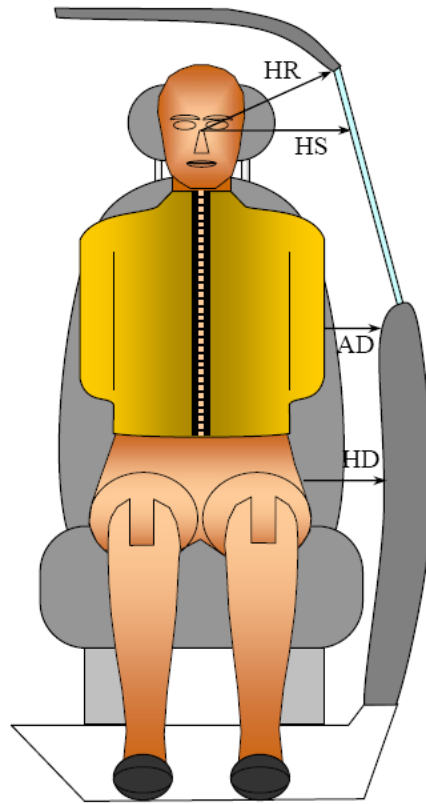
NOTE: 2-DOOR VEHICLE SHOWN.
 REAR DUMMY PHX & PHZ
 MEASUREMENTS FOR A 4-DOOR
 VEHICLE WOULD USE THE C-POST
 STRIKER AS A REFERENCE POINT

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length (mm)	Angle (°)	Length (mm)	Angle (°)
HH		Head to Header	360	14.8		
HW		Head to Windshield	625	0		
HZ	HZ	Head to Roof Liner	133	90	280	90
NR	NB	Nose to Rim/Seat Back	426	17.9	600	14.8
CD	CB	Chest to Dashboard/Seat Back	556	4.3	583	1.6
CS		Chest to Steering Wheel	346	11.2		
KDL	KBL	Left Knee to Dash/Seat Back	175	23.1	312	25.1
KDR	KBR	Right Knee to Dash/Seat Back	164	24.6	315	25.3
PAX	PAX	Pelvic Tilt Angle X		17.6		27.4
PAY	PAY	Pelvic Tilt Angle Y		-0.5		1.3
PHX	PHX	Hip Point to Striker (X-Axis)	201		332	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	235		302	

**DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS**

Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
 Test Date: 5/18/2023

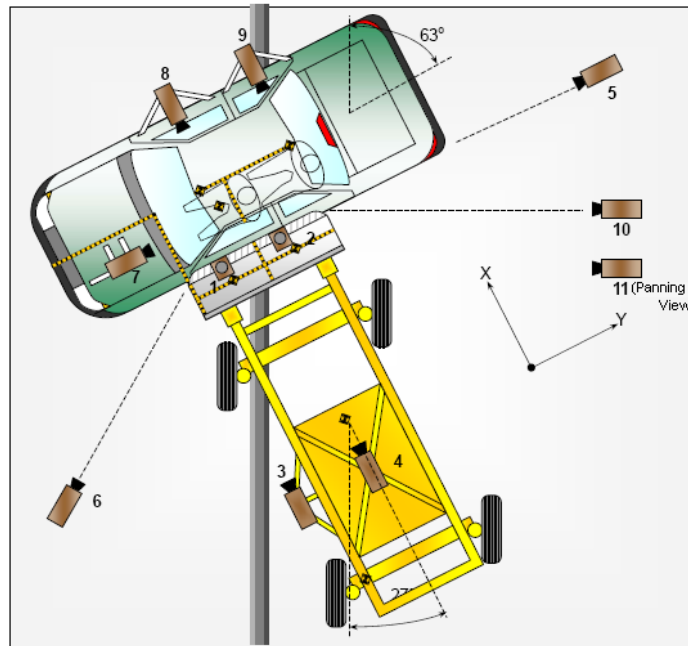


Code	Measurement Description	Driver	Passenger
		Length (mm)	
HR	Head to Side Header	210	272
HS	Head to Side Window	340	390
AD	Arm to Door	112	176
HD	Hip Point to Door	173	171

**DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA**

Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
 Test Date: 5/18/2023



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates* (mm)			Lens (mm)	Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	605	1310	-4995	8.5	1000
2	Overhead Close-Up	0	800	-4895	20	1000
3	Left Impact Point (MDB)				50	1000
4	Side Overall (MDB)				16	1000
5	Rear	-95	7885	-1495	24	1000
6	Left Front	-1450	-4270	-1520	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

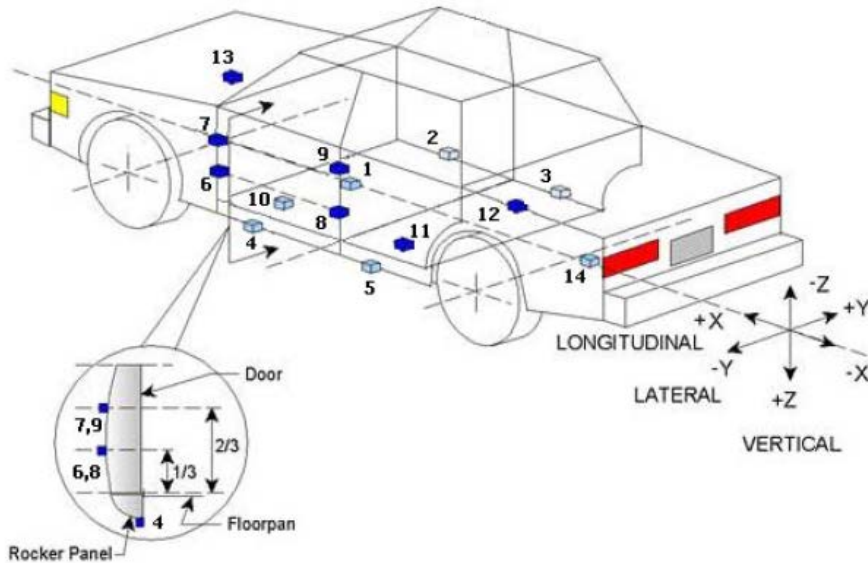
INSTRUMENTATION

	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: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
 Test Date: 5/18/2023



TEST VEHICLE ACCELEROMETER LOCATIONS

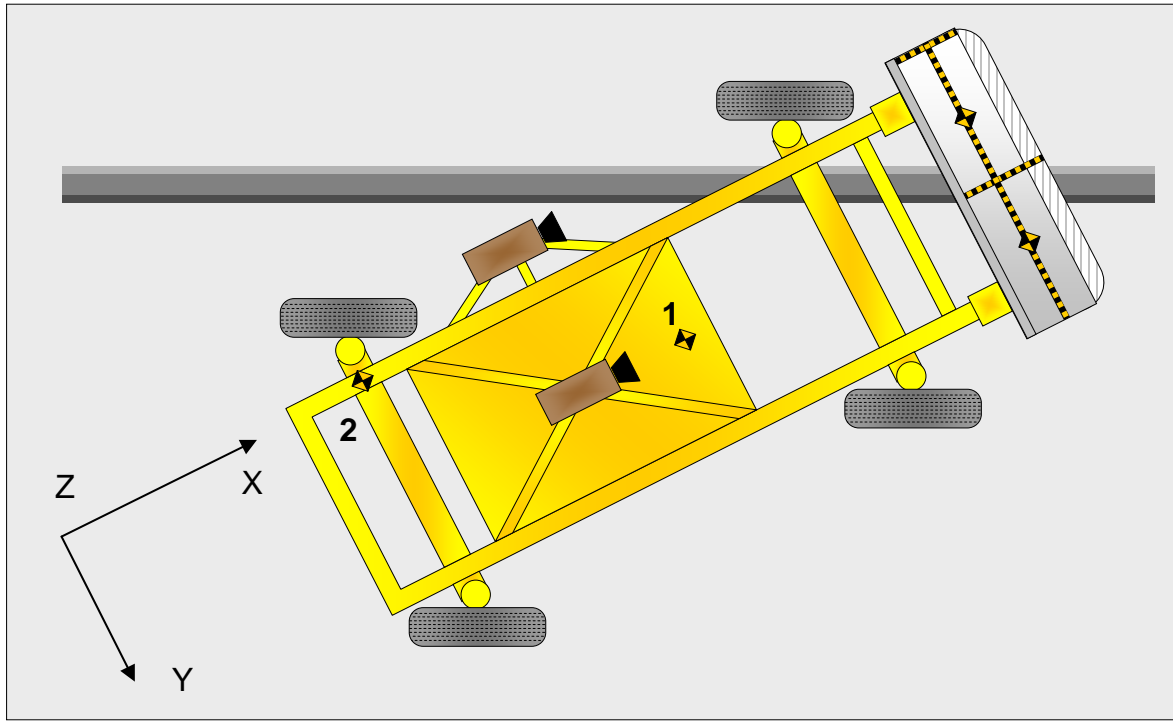
No.	ID	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2384	0	-407
2	Right Sill at Front Seat	2771	778	-280
3	Right Sill at Rear Seat	1601	778	-291
4	Left Sill at Front Door	2771	-778	-280
5	Left Sill at Rear Door	1601	-778	-291
6	Left Lower A-Post	3244	-847	-652
7	Left Middle A-Post	3244	-847	-825
8	Left Lower B-Post	2066	-742	-599
9	Left Middle B-Post	2066	-742	-815
10	Front Seat Track	2309	-457	-374
11	Rear Seat Structure	1868	-346	-374
12	Rt. Rear Occ. Compartment	1868	346	-374
13	Engine Block	3920	0	-887
14	Rear Above Axle	941	0	-710

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: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
 Test Date: 5/18/2023



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	1400
---	----	------

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

Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
 Test Date: 5/18/2023

TEST DUMMY INFORMATION AND CONTACT POINTS

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

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

Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
 Test Date: 5/18/2023

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	
Torso Airbag			Yes	Yes
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes		Yes	
Other:				

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheelbase	mm		2848
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		484
Actual Impact Point (Aft of Front Axle)	mm		495
Horizontal Offset (+forward / -rearward)	mm	+/- 50 of intended impact point	-11
Vertical Offset (+down / -up)	mm	+/- 20 of intended impact point	2

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
Test Date: 5/18/2023

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

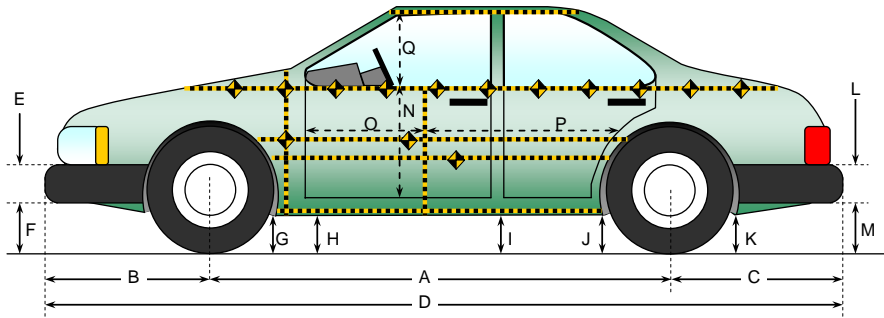
SPEED AND ANGLE AT IMPACT DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	61.71
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.92
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	89.7
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	62.8
MDB Crabbed Angle to MDB Forward Line of Motion	degrees	26 to 28	26.6

DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
Test Date: 5/18/2023



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

LEFT SIDE VIEW

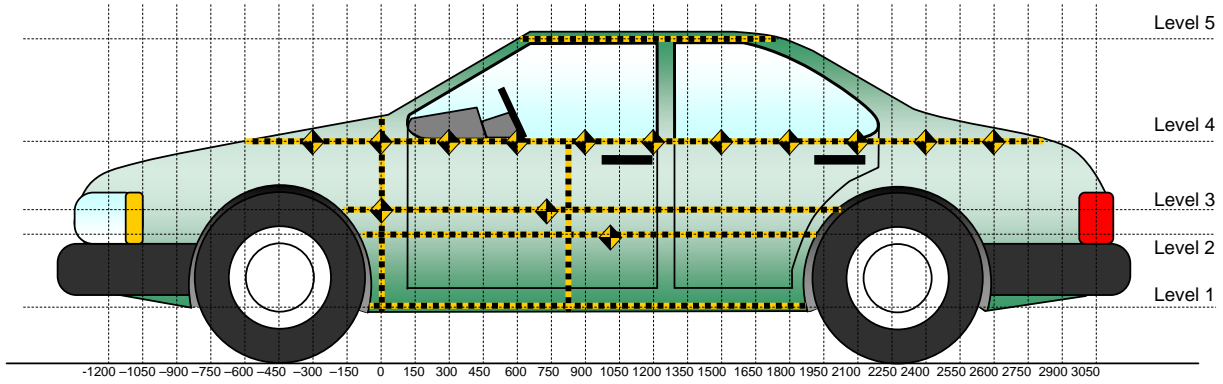
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Change
A	Wheelbase	2848	2852	4
B	Front Axle to FSOV	1104	1067	-37
C	Rear Axle to RSOV	942	963	21
D	Total Length at Centerline	4894	4882	-12
E	Front Bumper Thickness	162	162	0
F	Front Bumper Bottom to Ground	266	273	7
G	Sill Height at Front Wheel Well	279	281	2
H	Sill Height at Front Door Leading Edge	280	280	0
I	Sill Height at B Pillar	270	279	9
J1	Sill Height at Rear Wheel Well	275	272	-3
J2	Pinch Weld Height at Rear Wheel Well	273	272	-1
K	Sill Height Aft of Rear Wheel Well	263	270	7
L	Rear Bumper Thickness	74	74	0
M	Rear Bumper Bottom to Ground	330	330	0
N	Sill Height to Window Bottom Sill	837	748	-89
O	Front Door Leading Edge to Impact CL	844	775	-69
P	Rear Door Trailing Edge to Impact CL	1141	1076	-65
Q	Front Window Opening	425	422	-3
R	Right Side Length	3479	3477	-2
S	Left Side Length	3479	3475	-4
T	Vehicle Width at B Post	1959	1931	-28
U	Front Wheel Track Width	1652		
V	Rear Wheel Track Width	1667		

DATA SHEET NO. 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
Test Date: 5/18/2023



All Measurements Shown in mm

LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	392	134	1650
2	Occupant H-Point	675	211	1800
3	Mid Door	699	209	1800
4	Window Sill	1108	86	1800
5	Window Top	1595	0	1350

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: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
 Test Date: 5/18/2023

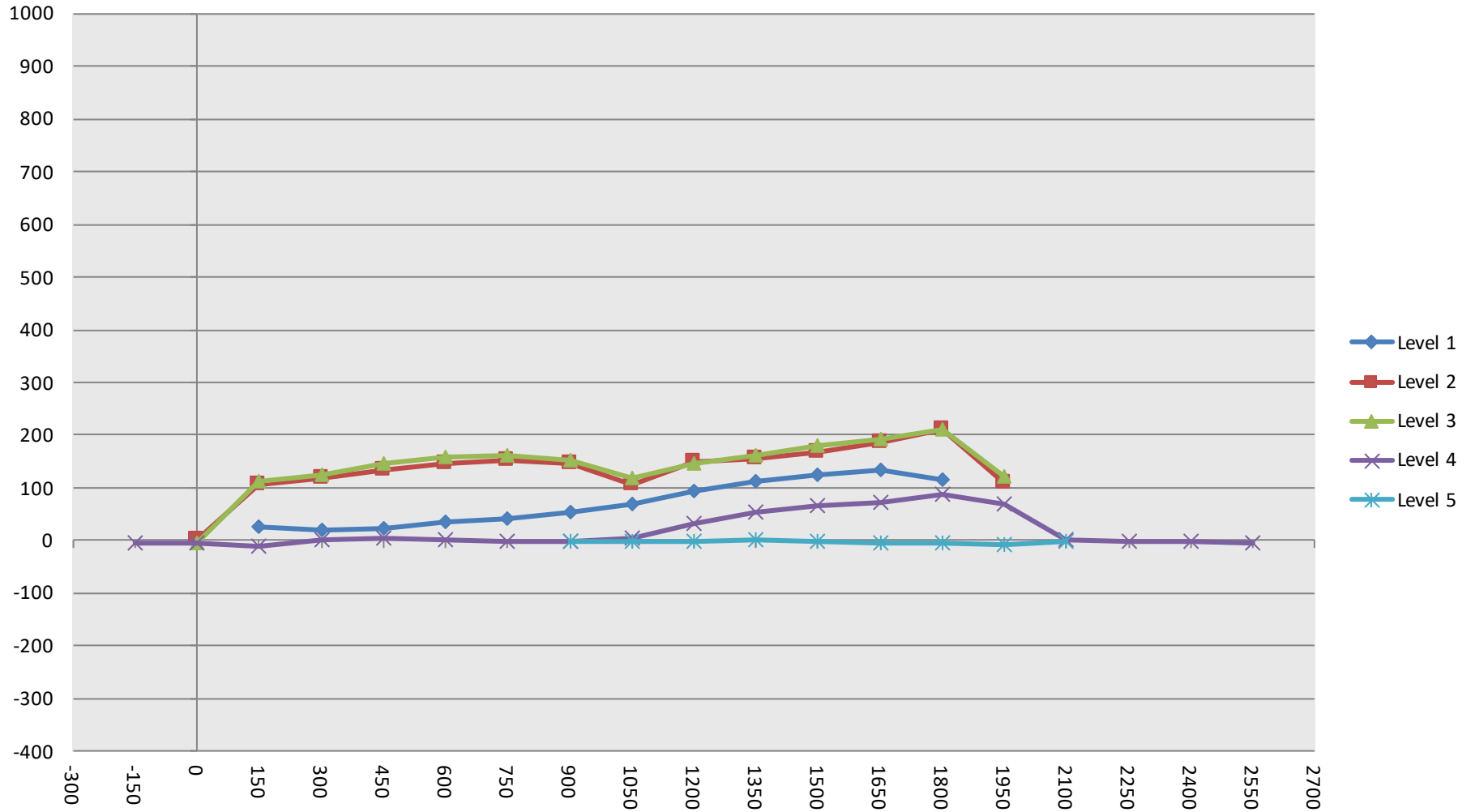
	Pre-Test					Post-Test					Exterior Crush				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-2100															
-1950															
-1800															
-1650															
-1500															
-1350															
-1200															
-1050															
-900															
-750															
-600															
-450															
-300															
-150				270					265					-5	
0		149	149	255			150	145	250			1	-4	-5	
150	184	161	161	250		211	266	274	238		27	105	113	-12	
300	200	164	166	246		218	282	290	246		18	118	124	0	
450	203	168	168	238		226	300	314	241		23	132	146	3	
600	198	169	169	230		232	314	328	231		34	145	159	1	
750	194	170	169	223		235	321	329	221		41	151	160	-2	
900	184	172	170	215	480	236	317	323	213	479	52	145	153	-2	-1
1050	175	175	173	211	469	243	282	292	216	467	68	107	119	5	-2
1200	168	180	179	207	464	263	330	326	239	463	95	150	147	32	-1
1350	159	184	183	204	464	271	339	344	256	464	112	155	161	52	0
1500	153	186	185	200	468	278	353	365	266	467	125	167	180	66	-1
1650	152	183	183	202	472	286	369	375	275	468	134	186	192	73	-4
1800	155	152	158	205	478	270	363	367	291	472	115	211	209	86	-6
1950		143	140	204	492		252	262	273	484		109	122	69	-8
2100				200	527				202	525				2	-2
2250				197					196					-1	
2400				201					200					-1	
2550				213					207					-6	
2700															
2850															
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: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

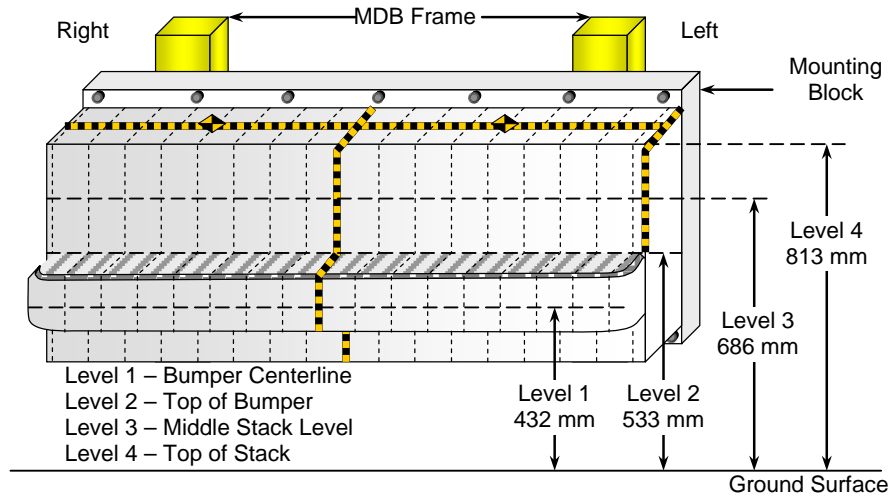
NHTSA No.: O20235102
 Test Date: 5/18/2023



DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
 Test Date: 5/18/2023



FRONT VIEW

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Row	Vertical Location		From Centerline		Maximum Crush (mm)
	Description	Height (mm)	Distance (mm)	Direction	
A	Center of Bumper	432	700	Left	271
B	Top of Bumper	533	800	Right	173
C	Mid-Level	686	100	Right	168
D	Top of Stack	813	800	Left	187

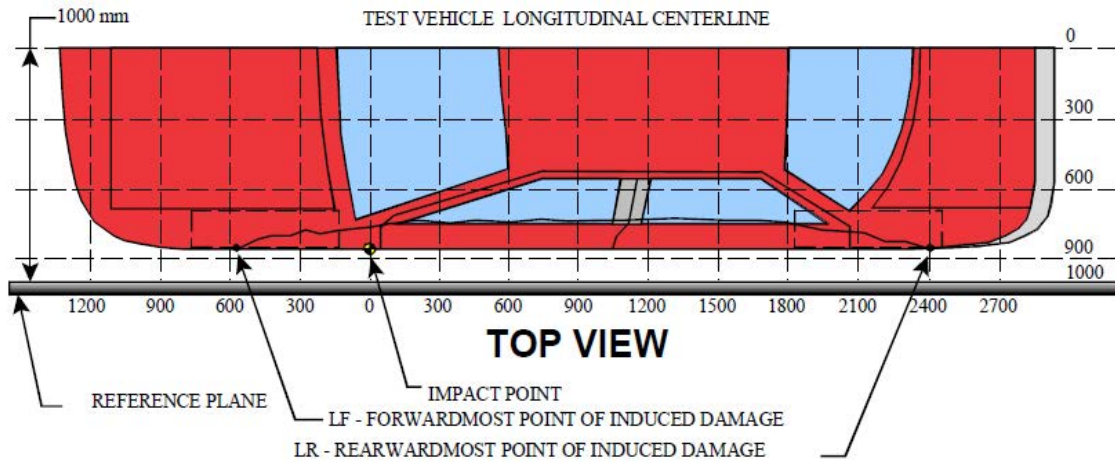
DEFORMABLE BARRIER STATIC CRUSH

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
4	99	78	70	79	94	122	166	166	160	135	120	128	134	131	140	161	187
3	98	85	86	98	102	110	146	168	158	128	112	105	104	107	119	138	160
2	173	164	164	160	155	144	136	165	157	143	143	147	156	161	165	166	171
1	268	265	263	260	262	264	262	263	262	262	263	263	264	267	268	271	270

**DATA SHEET NO. 13
VEHICLE AND MDB DAMAGE PROFILE DISTANCES**

Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
 Test Date: 5/18/2023



VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance from Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Max. Static Crush (mm)
1	1900	3	237	171	66
2	1500	3	365	185	180
3	1120	3	280	176	104
4	730	3	330	169	161
5	340	3	303	167	136
6	-50	3	150	165	-15

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	744	476	268
2	480 mm right of center	1	728	463	265
3	160 mm right of center	1	723	463	260
4	160 mm left of center	1	724	463	261
5	480 mm left of center	1	731	463	268
6	800 mm left of center	1	746	476	270

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

Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

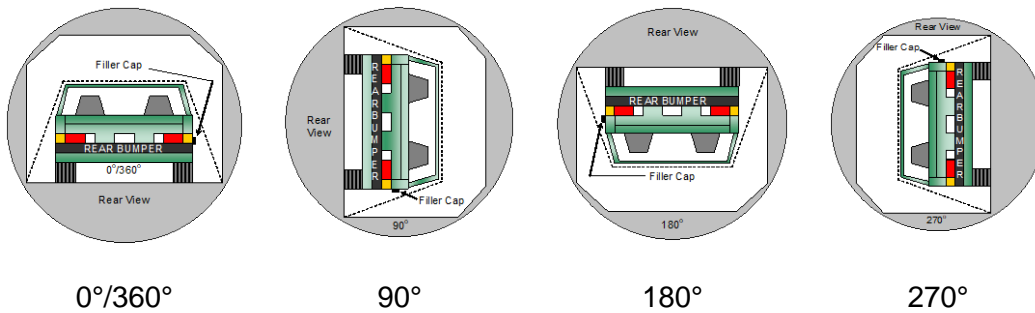
NHTSA No.: O20235102
 Test Date: 5/18/2023

Test Time: 11:52 am

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



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	93	300	393
90° to 180°	91	300	391
180° to 270°	81	300	381
270° to 360°	86	300	386

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	

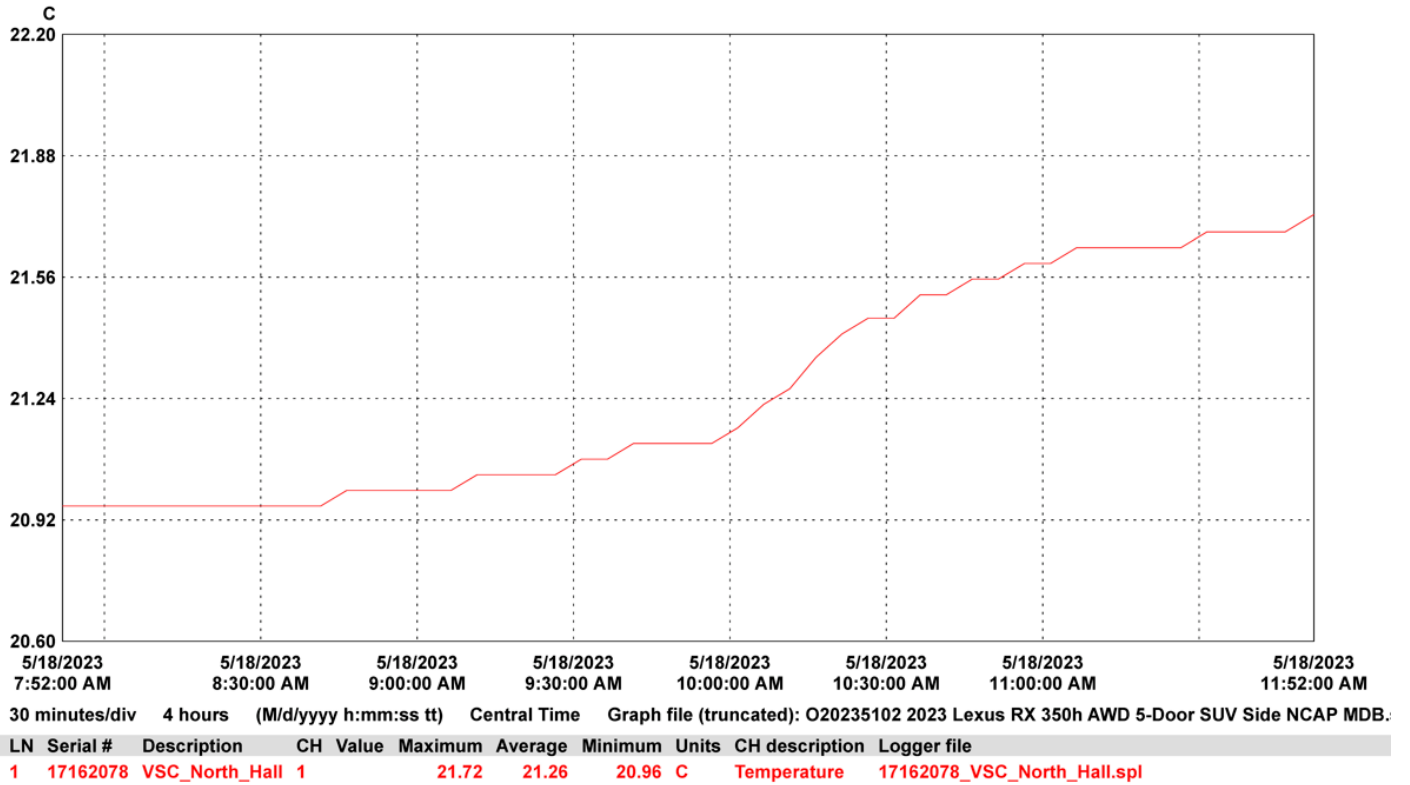
ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

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: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
 Test Date: 5/18/2023



DATA SHEET NO. 305-1
GENERAL TEST AND VEHICLE PARAMETER DATA
FOR INDICANT FMVSS NO. 305 TESTING

Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
 Test Date: 5/18/2023

ELECTRIC VEHICLE PROPULSION SYSTEM

	Units	Observations and Conclusions
Type of Electric Vehicle		Electric/Gas-Electric Hybrid
Propulsion Battery Type		Ni-MH
Nominal Voltage	V	259.2
Physical Location of Automatic Propulsion Battery Disconnect		Physically contained within the hybrid battery system
Auxiliary Battery Type		Lead-Acid Battery

PROPULSION BATTERY SYSTEM DATA

	Units	Observations and Conclusions
Electrolyte Fluid Type		KOH (Potassium Hydroxide)
Electrolyte Fluid Specific Gravity	g/L	1.27
Electrolyte Fluid Kinematic Viscosity	cSt	23.6
Electrolyte Fluid Color		Clear
Propulsion Battery Coolant Type, Color, Specific Gravity (if applicable)		Air-Cooled
Location of Battery Modules		X Inside Passenger Compartment
		Outside Passenger Compartment
		The high-voltage battery is located below the 2 nd row seat cushion.

PROPULSION BATTERY STATE OF CHARGE

<i>For all battery types:</i>	
Voltage range corresponding to useable energy of the battery:	
Minimum State of Charge	
Maximum State of Charge	
95% of Maximum State of Charge	
Test Voltage - No less than 95% of maximum State of Charge	
<i>For batteries that are rechargeable ONLY by an energy source on the vehicle:</i>	
Voltage range corresponding to useable energy of the battery:	
Minimum State of Charge	216.0 V
Maximum State of Charge	354.2 V
Test Voltage – Maximum practicable State of Charge within Normal Operating Range	271.0 V

**DATA SHEET NO. 305-2
PRE-IMPACT DATA
FOR INDICANT FMVSS NO. 305 TESTING**

Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
 Test Date: 5/18/2023

VEHICLE CHASSIS GROUND POINT(S) LOCATION(S)

Details of Vehicle Chassis Ground Point(s) & Location(s)	2 nd Row Seat Support Mounting Location
--	--

PROPULSION BATTERY SYSTEM

Details of Electric Energy Storage/Conversion System Test Points	Connected at + and – terminal ends of propulsion system
Additional Comments	None

**DATA SHEET NO. 305-3
PRE-IMPACT ELECTRICAL ISOLATION MEASUREMENTS AND CALCULATIONS
FOR INDICANT FMVSS NO. 305 TESTING**

Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
Test Date: 5/18/2023

VOLTMETER INFORMATION

	Units	Observations and Conclusions
Make		
Model		
Serial Number		
Internal Impedance Value	MΩ	
Resolution	V	
Last Calibration Date		

PROPULSION BATTERY VOLTAGE

Measurement shall be made with Energy Storage/Conversion System connected to the vehicle propulsion system, and the vehicle in the “ready-to-drive” (propulsion system energized) position.
NOTE: If voltage measurement is not at the voltage or within the normal operating voltage range specified by the manufacturer, the battery must be charged.

Vb	V	
----	---	--

**ELECTRIC ISOLATION MEASUREMENTS
PROPULSION BATTERY TO VEHICLE CHASSIS**

Vehicle chassis point(s) determined and supplied to contractor by COR.
--

V1	V	
V2	V	

PROPULSION BATTERY TO VEHICLE CHASSIS ACROSS RESISTOR

The known resistance Ro (in ohms) should be approximately 500 times the normal operating voltage of the vehicle (in volts) per SAE J1766.

Ro	Ω	
----	---	--

V1' Pre-Impact	V	
V2' Pre-Impact	V	

DATA SHEET NO. 305-3 (CONTINUED)
PRE-IMPACT ELECTRICAL ISOLATION MEASUREMENTS AND CALCULATIONS
FOR INDICANT FMVSS NO. 305 TESTING

Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
 Test Date: 5/18/2023

ELECTRICAL ISOLATION CALCULATIONS

NOTE: If measured voltage is zero and results in a division by zero, record "Zero Volts".
 This "zero voltage" condition is considered as being compliant.

$R_{i1} = R_o (1 + V_2/V_1) [(V_1 - V_1')/V_1']$		
Ri1 Pre-Impact	Ω	
$R_{i2} = R_o (1 + V_1/V_2) [(V_2 - V_2')/V_2']$		
Ri2 Pre-Impact	Ω	
Ri = The lesser of Ri1 and Ri2		
Ri Pre-Impact	Ω	
$R_i / V_b = \text{Electrical Isolation Value} / \text{Nominal Battery Voltage}$		
Ri / Vb Pre-Impact	Ω	

NOTE: The minimum Electrical Isolation Value is 500 Ω/V.

	Yes	No (Fail)
Is the measured Electrical Isolation Value ≥ 500 Ω/V?		
Additional Comments	Not Applicable, vehicle was certified to FMVSS No. 305 S5.3(c).	

**DATA SHEET NO. 305-4
POST-IMPACT DATA
FOR INDICANT FMVSS NO. 305 TESTING**

Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
 Test Date: 5/18/2023

VOLTMETER INFORMATION

	Units	Observations and Conclusions
Make		
Model		
Serial Number		
Internal Impedance Value	MΩ	
Resolution	V	
Last Calibration Date		

ELECTRICAL ISOLATION MEASUREMENTS

Vb Post-Impact	V	
----------------	---	--

V1 Post-Impact	V		Impact Time		Minutes		Seconds
V2 Post-Impact	V				Minutes		Seconds
V1' Post-Impact	V				Minutes		Seconds
V2' Post-Impact	V				Minutes		Seconds

DATA SHEET NO. 305-4 (CONTINUED)
POST-IMPACT DATA
FOR INDICANT FMVSS NO. 305 TESTING

Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
 Test Date: 5/18/2023

ELECTRICAL ISOLATION CALCULATIONS

NOTE: If measured voltage is zero and results in a division by zero, record "Zero Volts".
 This "zero voltage" condition is considered as being compliant.

$R_{i1} = R_o (1 + V_2/V_1) [(V_1 - V_1')/V_1']$							
Ri1 Post-Impact	Ω		Impact Time		Minutes		Seconds
$R_{i2} = R_o (1 + V_1/V_2) [(V_2 - V_2')/V_2']$							
Ri2 Post-Impact	Ω		Impact Time		Minutes		Seconds
Ri = The lesser of Ri1 and Ri2							
Ri Post-Impact	Ω		Impact Time		Minutes		Seconds
$R_i / V_b = \text{Electrical Isolation Value} / \text{Nominal Battery Voltage}$							
Ri / Vb Post-Impact	Ω		Impact Time		Minutes		Seconds

NOTE: The minimum Electrical Isolation Value is 500 Ω/V.

	Yes	No (Fail)
Is the measured Electrical Isolation Value ≥ 500 Ω/V?	No	No
Additional Comments	Not Applicable, vehicle was certified to FMVSS No. 305 S5.3(c).	

DATA SHEET NO. 305-4 (CONTINUED)
POST-IMPACT DATA
FOR INDICANT FMVSS NO. 305 TESTING

Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
 Test Date: 5/18/2023

PROPULSION BATTERY SYSTEM COMPONENTS

Describe any Propulsion Battery Module movement within the passenger compartment [Supply photographs as appropriate]:
Not Applicable

	Yes (Fail)	No
Has the Propulsion Battery Module moved within the passenger compartment?		X

Describe intrusion of an outside Propulsion Battery Component into the passenger compartment [Supply photographs as appropriate]:
No Intrusion

	Yes (Fail)	No
Has an outside Propulsion Battery Component intruded into the passenger compartment?		X

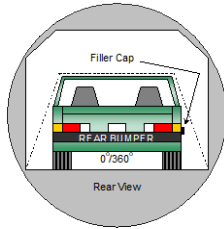
	Yes (Fail)	No
Is the Propulsion Battery Electrolyte Spillage visible in the passenger compartment?		X

**DATA SHEET NO. 305-5
STATIC ROLLOVER TEST DATA
FOR INDICANT FMVSS NO. 305 TESTING**

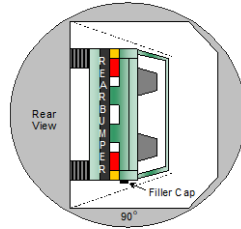
Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
Test Date: 5/18/2023

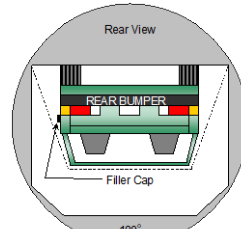
PROPULSION BATTERY SYSTEM COMPONENTS



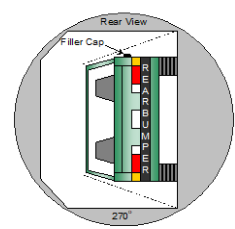
0°/360°



90°



180°



270°

PROPULSION BATTERY ELECTROLYTE COLLECTION TIME PERIOD

Test Phase	Rotation Time (spec. 1-3 min)				FMVSS 301 Hold Time		Total Time				Next Whole Minute Interval	
	1	min	33	sec	5	min	6	min	33	sec	7	min
0° - 90°	1	min	33	sec	5	min	6	min	33	sec	7	min
90° - 180°	1	min	31	sec	5	min	6	min	31	sec	7	min
180° - 270°	1	min	21	sec	5	min	6	min	21	sec	7	min
270° - 360°	1	min	26	sec	5	min	6	min	26	sec	7	min

TEST VEHICLE PROPULSION BATTERY ELECTROLYTE SPILLAGE

NOTE: The maximum allowable Propulsion Battery Electrolyte Spillage is 5.0 Liters.

Test Phase	Propulsion Battery Electrolyte Spillage (L)	Spillage Location
0° to 90°	0	Not Applicable
90° to 180°	0	Not Applicable
180° to 270°	0	Not Applicable
270° to 360°	0	Not Applicable
Total Spillage	0	

	Yes (Fail)	No
Is the total Propulsion Battery Electrolyte Spillage greater than 5.0 Liters?		X
Is the Propulsion Battery Electrolyte Spillage visible in the passenger compartment?		X

DATA SHEET NO. 305-5 (CONTINUED)
STATIC ROLLOVER TEST DATA
FOR INDICANT FMVSS NO. 305 TESTING

Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
 Test Date: 5/18/2023

VOLTMETER INFORMATION

	Units	Observations and Conclusions
Make		
Model		
Serial Number		
Internal Impedance Value	MΩ	
Resolution	V	
Last Calibration Date		

ELECTRICAL ISOLATION MEASUREMENTS

Vb Post-Impact	V	
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Record V1, V2, V1', V2' voltage measurements at the start of each successive increment of 90°, 180°, 270°, and 360° of the static rollover test.

	Voltage	Units	Test Phase	Time		
V1		V	0°	min		sec
			90°			
			180°			
			270°			
			360°			
V2		V	0°	min		sec
			90°			
			180°			
			270°			
			360°			
V1'		V	0°	min		sec
			90°			
			180°			
			270°			
			360°			
V2'		V	0°	min		sec
			90°			
			180°			
			270°			
			360°			

DATA SHEET NO. 305-5 (CONTINUED)
STATIC ROLLOVER TEST DATA
FOR INDICANT FMVSS NO. 305 TESTING

Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
 Test Date: 5/18/2023

ELECTRICAL ISOLATION CALCULATIONS

NOTE: If measured voltage is zero and results in a division by zero, record "Zero Volts".
 This "zero voltage" condition is considered as being compliant.

	Voltage	Units	Test Phase	Time		
$Ri1 = Ro (1 + V2/V1) [(V1-V1')/V1']$						
Ri1		Ω	0°	min	sec	
			90°			
			180°			
			270°			
			360°			
$Ri2 = Ro (1 + V1/V2) [(V2-V2')/V2']$						
Ri2		Ω	0°	min	sec	
			90°			
			180°			
			270°			
			360°			
Ri = The lesser of Ri1 and Ri2						
Ri		Ω	0°	min	sec	
			90°			
			180°			
			270°			
			360°			
$Ri / Vb = \text{Electrical Isolation Value} / \text{Nominal Battery Voltage}$						
Ri / Vb		Ω/V	0°	min	sec	
			90°			
			180°			
			270°			
			360°			

NOTE: The minimum Electrical Isolation Value is 500 Ω/V.

	Yes	No (Fail)
Is the measured Electrical Isolation Value ≥ 500 Ω/V?	Yes	No (Fail)
Additional Comments	Not Applicable, vehicle was certified to FMVSS No. 305 S5.3(c).	

DATA SHEET NO. 305A-1
EVALUTE PROTECTION FROM DIRECT CONTACT WITH HIGH VOLTAGES SOURCES
FOR INDICANT FMVSS NO. 305 TESTING

Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
 Test Date: 5/18/2023

For each data point where the IPXXB probe is used to evaluate electrical protection from direct contact with high voltage sources, provide a thumbnail photo and be as descriptive of the locations as possible. If an apparent failure is detected, include a photograph showing the direct contact between probe and the high voltage source and/or the probe lamp being illuminated.

POST-CRASH / PRE-ROLLOVER

Description of Evaluated Location	Probe Contact with High Voltage Source		Probe Lamp Illuminated	
	Yes, Fail	No, Pass	Yes, Fail	No, Pass
Front Drive Unit / Inverter Assembly to Electrical Ground		X		X
High-Voltage Battery Case to Electrical Ground		X		X
Rear Drive Unit to Electrical Ground		X		X
Front Drive Unit / Inverter Assembly to High-Voltage Battery Case		X		X
Rear Drive Unit to High-Voltage Battery Case		X		X

STATIC ROLLOVER

Description of Evaluated Location	Probe Contact with High Voltage Source		Probe Lamp Illuminated	
	Yes, Fail	No, Pass	Yes, Fail	No, Pass
Front Drive Unit / Inverter Assembly to Electrical Ground		X		X
High-Voltage Battery Case to Electrical Ground		X		X
Rear Drive Unit to Electrical Ground		X		X
Front Drive Unit / Inverter Assembly to High-Voltage Battery Case		X		X
Rear Drive Unit to High-Voltage Battery Case		X		X

POST-ROLLOVER

Description of Evaluated Location	Probe Contact with High Voltage Source		Probe Lamp Illuminated	
	Yes, Fail	No, Pass	Yes, Fail	No, Pass
Front Drive Unit / Inverter Assembly to Electrical Ground		X		X
High-Voltage Battery Case to Electrical Ground		X		X
Rear Drive Unit to Electrical Ground		X		X
Front Drive Unit / Inverter Assembly to High-Voltage Battery Case		X		X
Rear Drive Unit to High-Voltage Battery Case		X		X

DATA SHEET NO. 305A-2
EVALUTE PROTECTION AGAINST INDIRECT CONTACT WITH HIGH VOLTAGE SOURCES
USING A RESISTANCE TESTER OR DC POWER SUPPLY, VOLTMETER AND AMMETER
FOR INDICANT FMVSS NO. 305 TESTING

Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
 Test Date: 5/18/2023

For any measuring points where protection against indirect contact with high voltage sources is evaluated, provide a thumbnail photo and be as descriptive of the locations as possible. If an apparent failure is detected, include a photograph showing the locations in question and the related measured values. If the resistance is calculated using separately measured resistances, describe each measurement and the final calculation as separate entries in the table below.

Measuring Path	Pass	Fail
BC: Between exposed conductive parts of the electrical protection barrier of the high voltage source and the electrical chassis.	< 0.1 Ω	≥ 0.1 Ω
BB: Between exposed conductive parts of the electrical protection barrier of the high voltage source and any other simultaneously reachable exposed conductive parts of the electrical protection barriers withing 2.5 meters.	< 0.2 Ω	≥ 0.2 Ω

POST-CRASH / PRE-ROLLOVER

Description of Evaluated Location	Measuring Path	Method 2 ONLY		Methods 1 & 2	Pass or Fail
	BC or BB	Voltage (V) Volts	Current (I) Amps	Resistance (R=V/I) Ω	
Front Drive Unit / Inverter Assembly to Electrical Ground	BC			0.004	Pass
High-Voltage Battery Case to Electrical Ground	BC			0.010	Pass
Rear Drive Unit to Electrical Ground	BC			0.018	Pass
Front Drive Unit / Inverter Assembly to High-Voltage Battery Case	BB			0.006	Pass
Rear Drive Unit to High-Voltage Battery Case	BB			0.022	Pass

STATIC ROLLOVER

Description of Evaluated Location	Measuring Path	Method 2 ONLY		Methods 1 & 2	Pass or Fail
	BC or BB	Voltage (V) Volts	Current (I) Amps	Resistance (R=V/I) Ω	
Front Drive Unit / Inverter Assembly to Electrical Ground	BC			0.017	Pass
High-Voltage Battery Case to Electrical Ground	BC			0.020	Pass
Rear Drive Unit to Electrical Ground	BC			0.024	Pass
Front Drive Unit / Inverter Assembly to High-Voltage Battery Case	BB			0.019	Pass
Rear Drive Unit to High-Voltage Battery Case	BB			0.026	Pass

* Final resistance values reported after subtracting the resistance of the measurement device extensions.

DATA SHEET NO. 305A-2 (CONTINUED)
EVALUTE PROTECTION AGAINST INDIRECT CONTACT WITH HIGH VOLTAGE SOURCES
USING A RESISTANCE TESTER OR DC POWER SUPPLY, VOLTMETER AND AMMETER
FOR INDICANT FMVSS NO. 305 TESTING

Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
 Test Date: 5/18/2023

For any measuring points where protection against indirect contact with high voltage sources is evaluated, provide a thumbnail photo and be as descriptive of the locations as possible. If an apparent failure is detected, include a photograph showing the locations in question and the related measured values. If the resistance is calculated using separately measured resistances, describe each measurement and the final calculation as separate entries in the table below.

Measuring Path	Pass	Fail
BC: Between exposed conductive parts of the electrical protection barrier of the high voltage source and the electrical chassis.	< 0.1 Ω	≥ 0.1 Ω
BB: Between exposed conductive parts of the electrical protection barrier of the high voltage source and any other simultaneously reachable exposed conductive parts of the electrical protection barriers withing 2.5 meters.	< 0.2 Ω	≥ 0.2 Ω

POST-ROLLOVER

Description of Evaluated Location	Measuring Path	Method 2 ONLY		Methods 1 & 2	Pass or Fail
	BC or BB	Voltage (V) Volts	Current (I) Amps	Resistance (R=V/I) Ω	
Front Drive Unit / Inverter Assembly to Electrical Ground	BC			0.017	Pass
High-Voltage Battery Case to Electrical Ground	BC			0.020	Pass
Rear Drive Unit to Electrical Ground	BC			0.024	Pass
Front Drive Unit / Inverter Assembly to High-Voltage Battery Case	BB			0.018	Pass
Rear Drive Unit to High-Voltage Battery Case	BB			0.026	Pass

* Final resistance values reported after subtracting the resistance of the measurement device extensions.

DATA SHEET NO. 305A-3
DETERMINE VOLTAGE BETWEEN EXPOSED CONDUCTIVE PARTS
OF ELECTRICAL PROTECTION BARRIERS AND THE ELECTRICAL CHASSIS
AND BETWEEN EXPOSED PARTS OF ELECTRICAL PROTECTION BARRIERS

Test Vehicle: 2023 Lexus RX 350h Luxury AWD 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20235102
 Test Date: 5/18/2023

For each data point where the voltage between exposed conductive parts of electrical protection barriers and the electrical chassis and between exposed conductive parts of electrical protection barriers is determined, provide a thumbnail photo and be as descriptive of the locations as possible. If an apparent failure is detected, include a photograph showing the locations in question and the related measured values.

Measuring Path	Pass	Fail
BC: Between exposed conductive parts of the electrical protection barrier of the high voltage source and the electrical chassis.	≤ 30 VAC ≤ 60 VDC	> 30 VAC > 60 VDC
BB: Between exposed conductive parts of the electrical protection barrier of the high voltage source and any other simultaneously reachable exposed conductive parts of the electrical protection barriers within 2.5 meters.	≤ 30 VAC ≤ 60 VDC	> 30 VAC > 60 VDC

POST-CRASH / PRE-ROLLOVER

Description of Evaluated Location	Measuring Path	Measured Voltage		Pass or Fail
	BC or BB	VAC (V) Volts	VDC (V) Volts	
Front Drive Unit / Inverter Assembly to Electrical Ground	BC	0.0	0.0	Pass
High-Voltage Battery Case to Electrical Ground	BC	0.0	0.0	Pass
Rear Drive Unit to Electrical Ground	BC	0.0	0.0	Pass
Front Drive Unit / Inverter Assembly to High-Voltage Battery Case	BB	0.0	0.0	Pass
Rear Drive Unit to High-Voltage Battery Case	BB	0.0	0.0	Pass

STATIC ROLLOVER

Description of Evaluated Location	Measuring Path	Measured Voltage		Pass or Fail
	BC or BB	VAC (V) Volts	VDC (V) Volts	
Front Drive Unit / Inverter Assembly to Electrical Ground	BC	0.0	0.0	Pass
High-Voltage Battery Case to Electrical Ground	BC	0.0	0.0	Pass
Rear Drive Unit to Electrical Ground	BC	0.0	0.0	Pass
Front Drive Unit / Inverter Assembly to High-Voltage Battery Case	BB	0.0	0.0	Pass
Rear Drive Unit to High-Voltage Battery Case	BB	0.0	0.0	Pass

POST-ROLLOVER

Description of Evaluated Location	Measuring Path	Measured Voltage		Pass or Fail
	BC or BB	VAC (V) Volts	VDC (V) Volts	
Front Drive Unit / Inverter Assembly to Electrical Ground	BC	0.0	0.0	Pass
High-Voltage Battery Case to Electrical Ground	BC	0.0	0.0	Pass
Rear Drive Unit to Electrical Ground	BC	0.0	0.0	Pass
Front Drive Unit / Inverter Assembly to High-Voltage Battery Case	BB	0.0	0.0	Pass
Rear Drive Unit to High-Voltage Battery Case	BB	0.0	0.0	Pass

**APPENDIX A
PHOTOGRAPHS**

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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

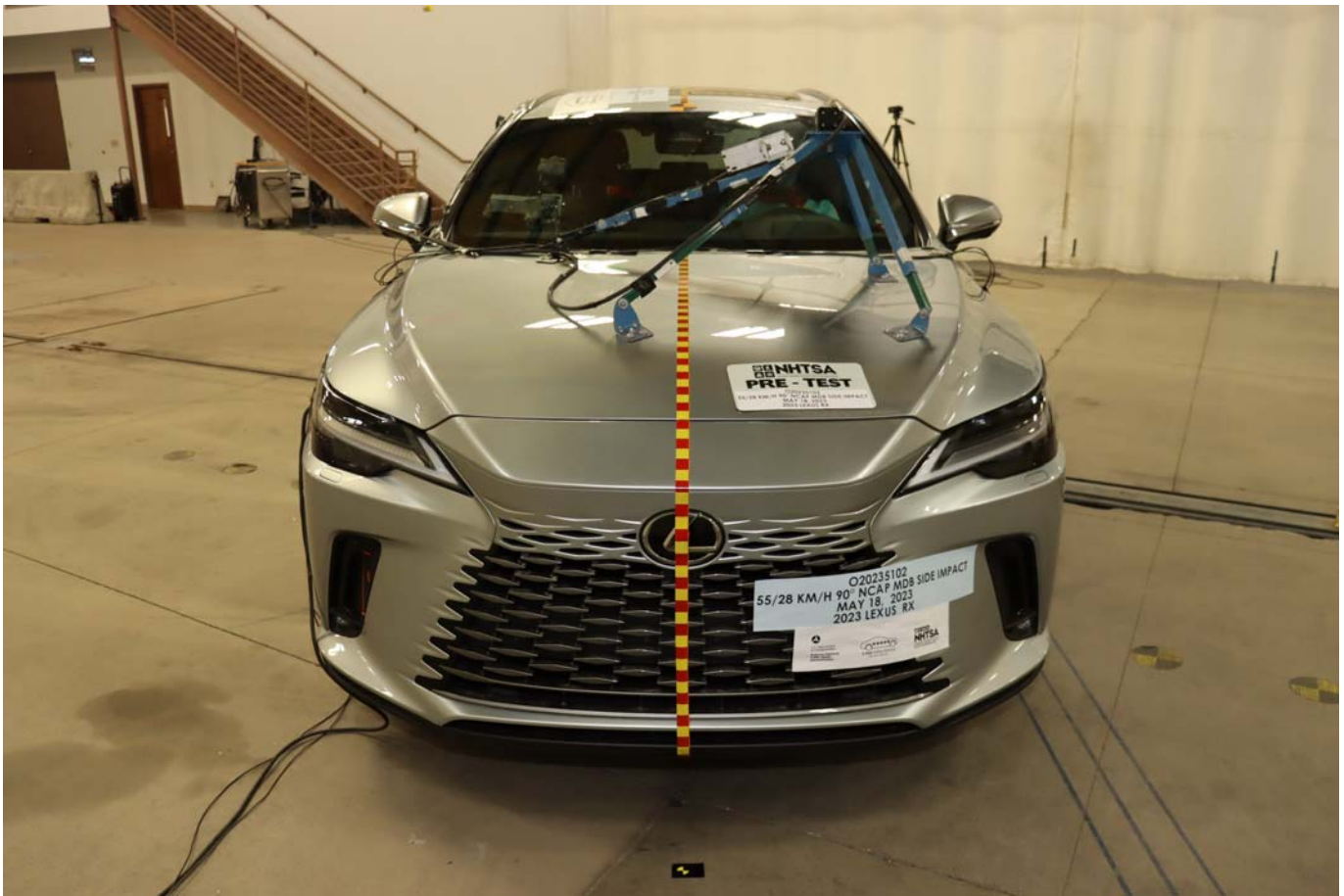


Photo No. 003 - Pre-Test Frontal View of Test Vehicle



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

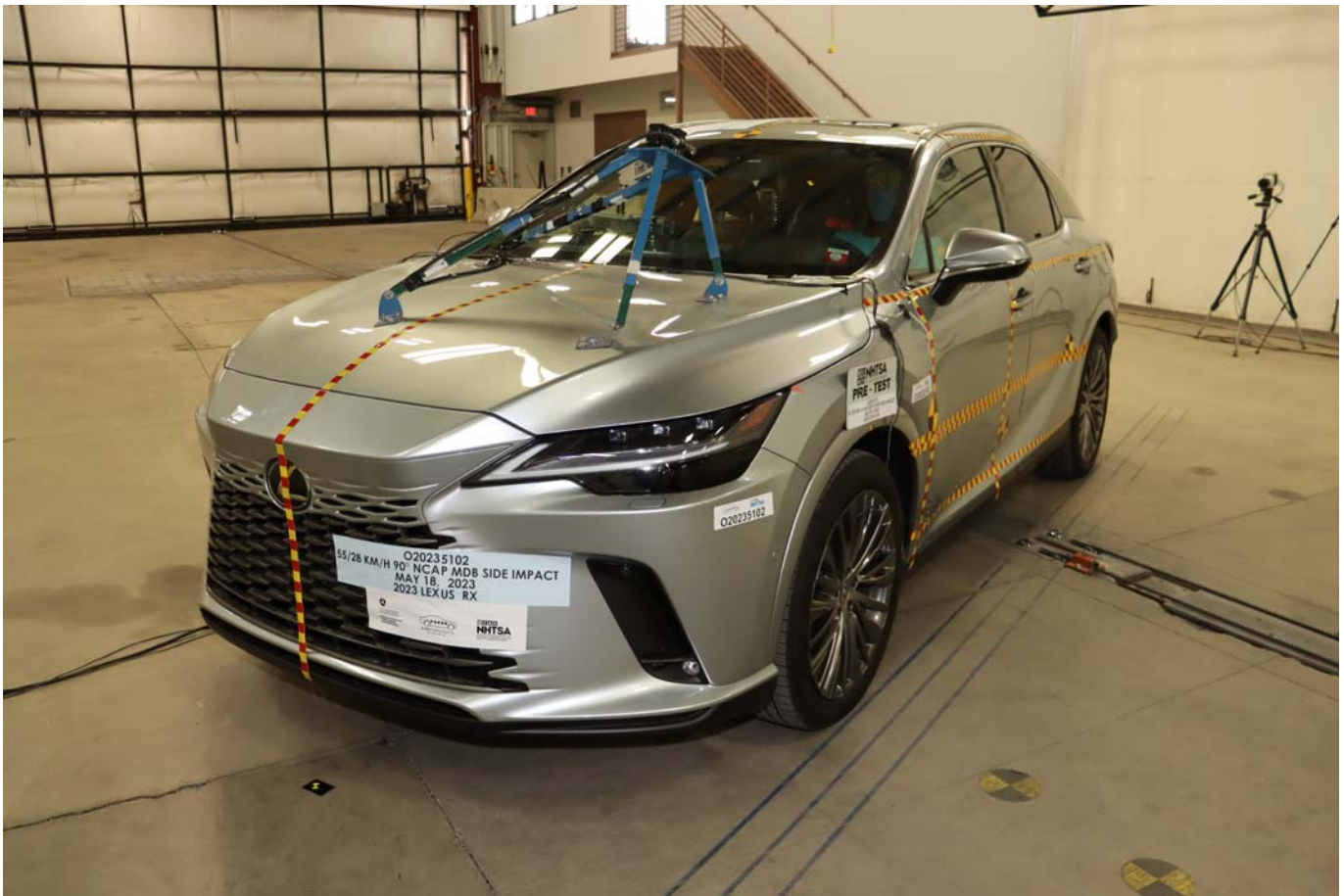


Photo No. 005 - Pre-Test Left Front Three-Quarter View of Test Vehicle

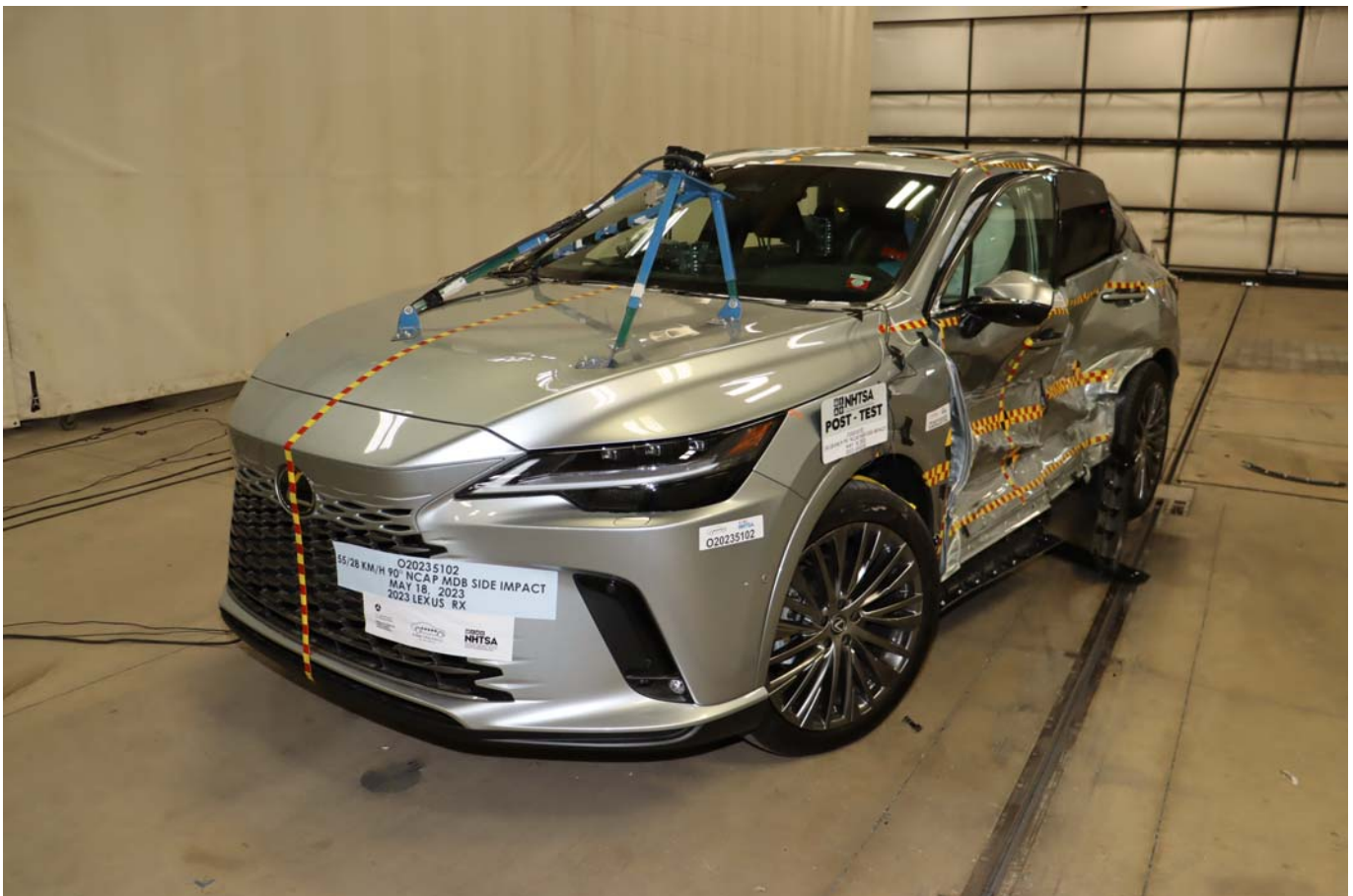


Photo No. 006 - Post-Test Left Front Three-Quarter View of Test Vehicle



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

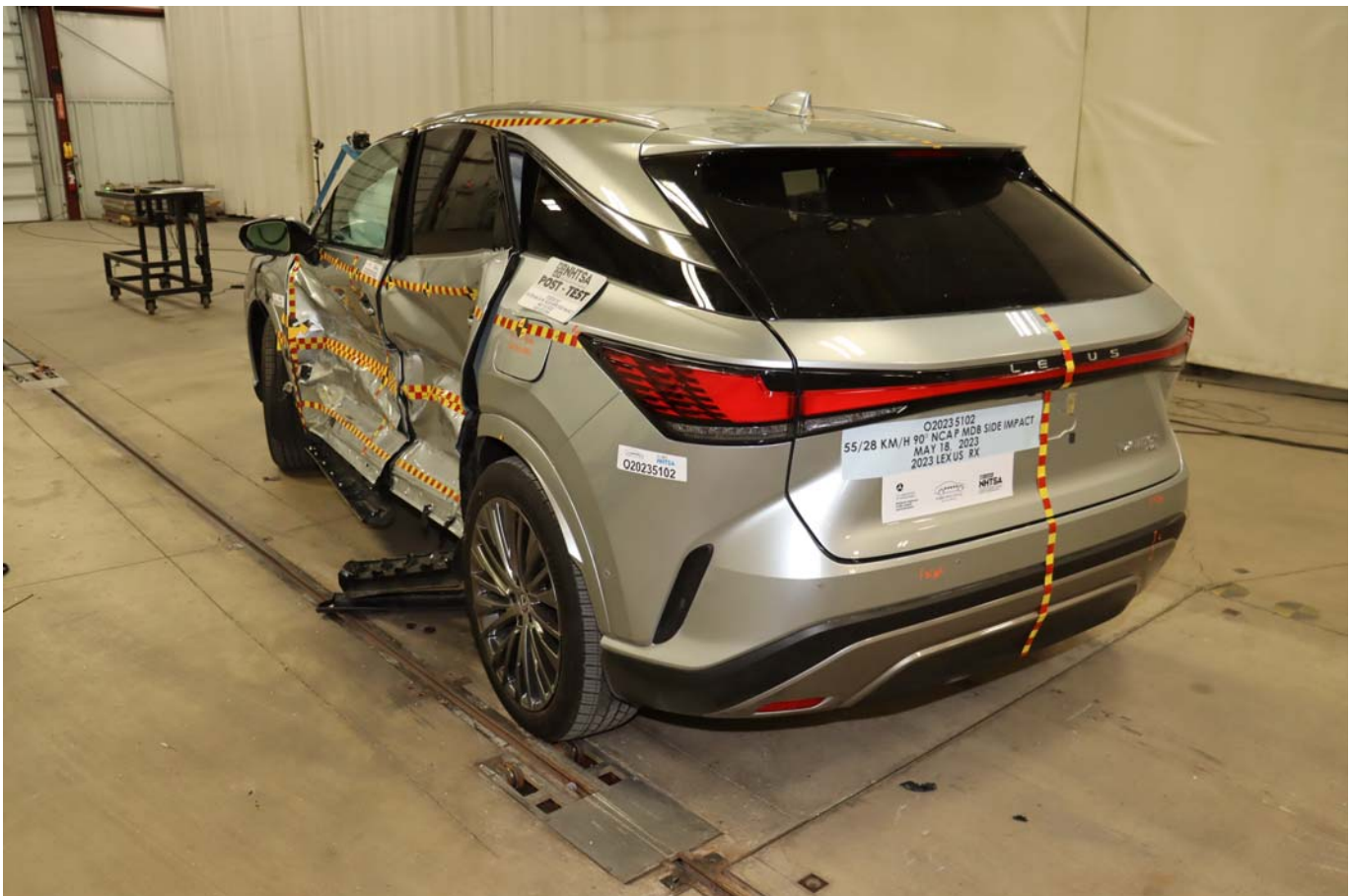


Photo No. 010 - Post-Test Left Three-Quarter Rear View of Test Vehicle



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

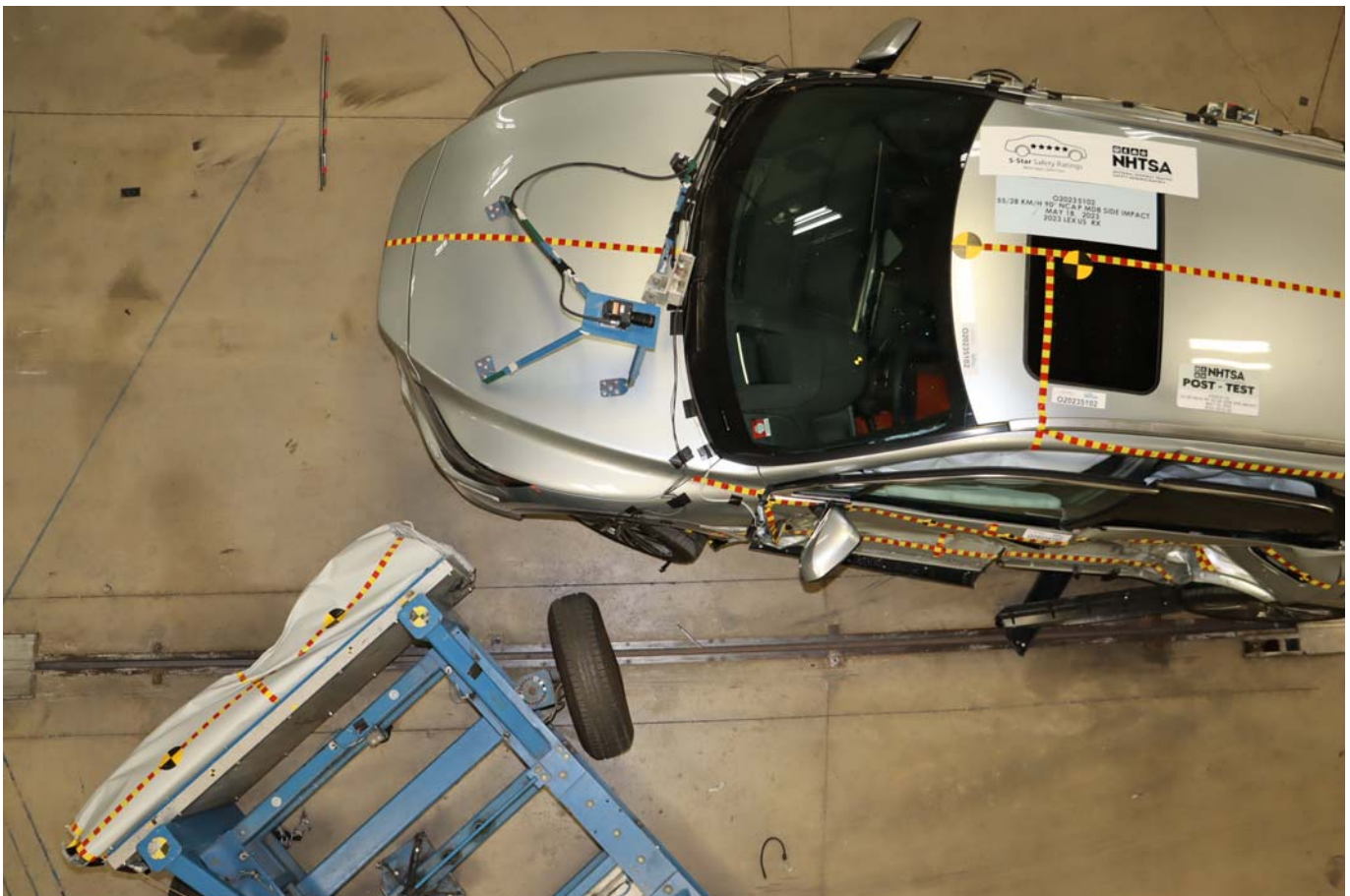


Photo No. 016 - Post-Test Overhead View of Test Area



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's 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

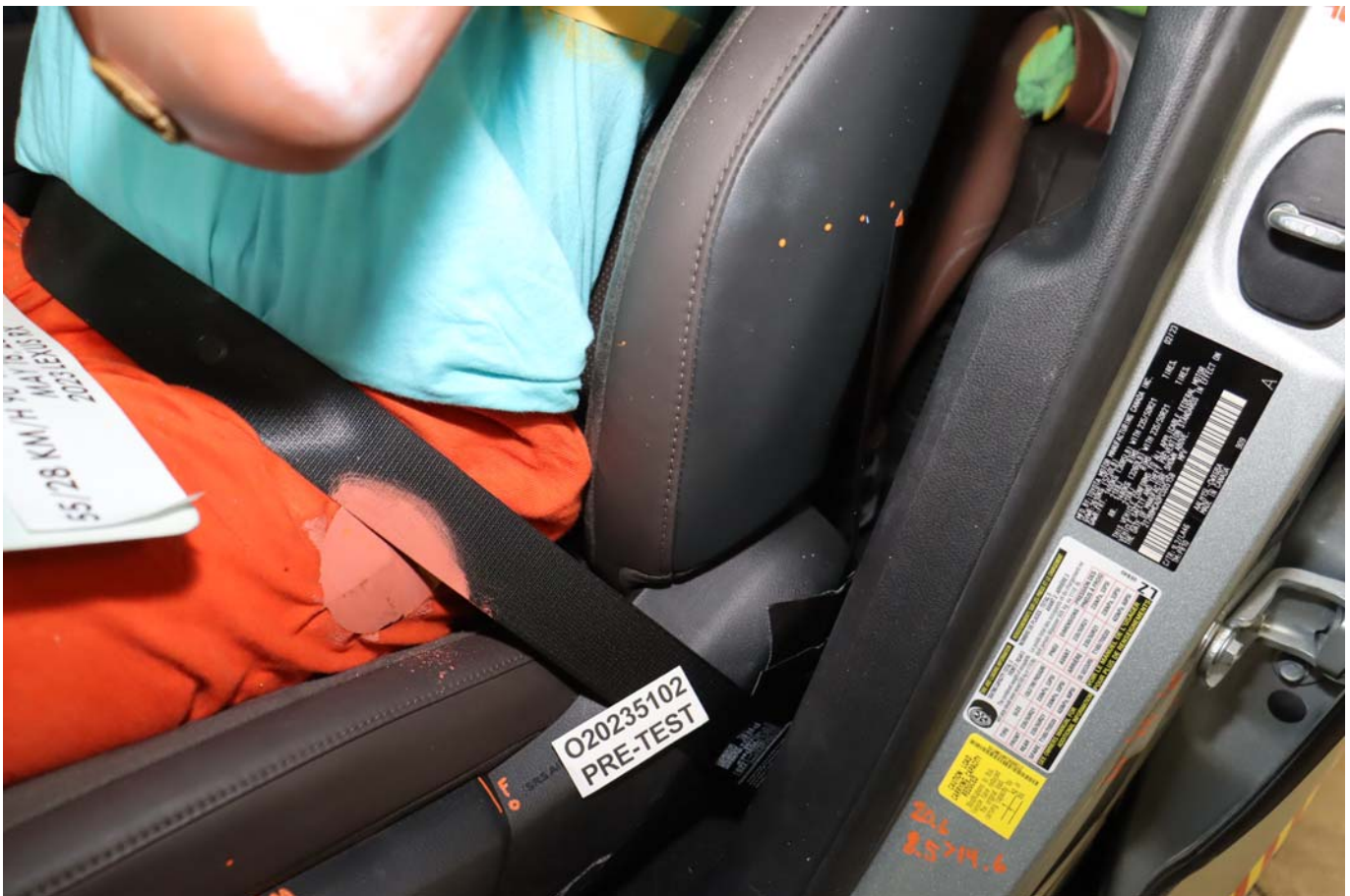


Photo No. 040 - Pre-Test Close-Up Left Side View of Driver Seat Back



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

PHOTOGRAPH NOT AVAILABLE

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



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's Neck Showing Position of Adjustable Neck Bracket



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



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

PHOTOGRAPH NOT AVAILABLE

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

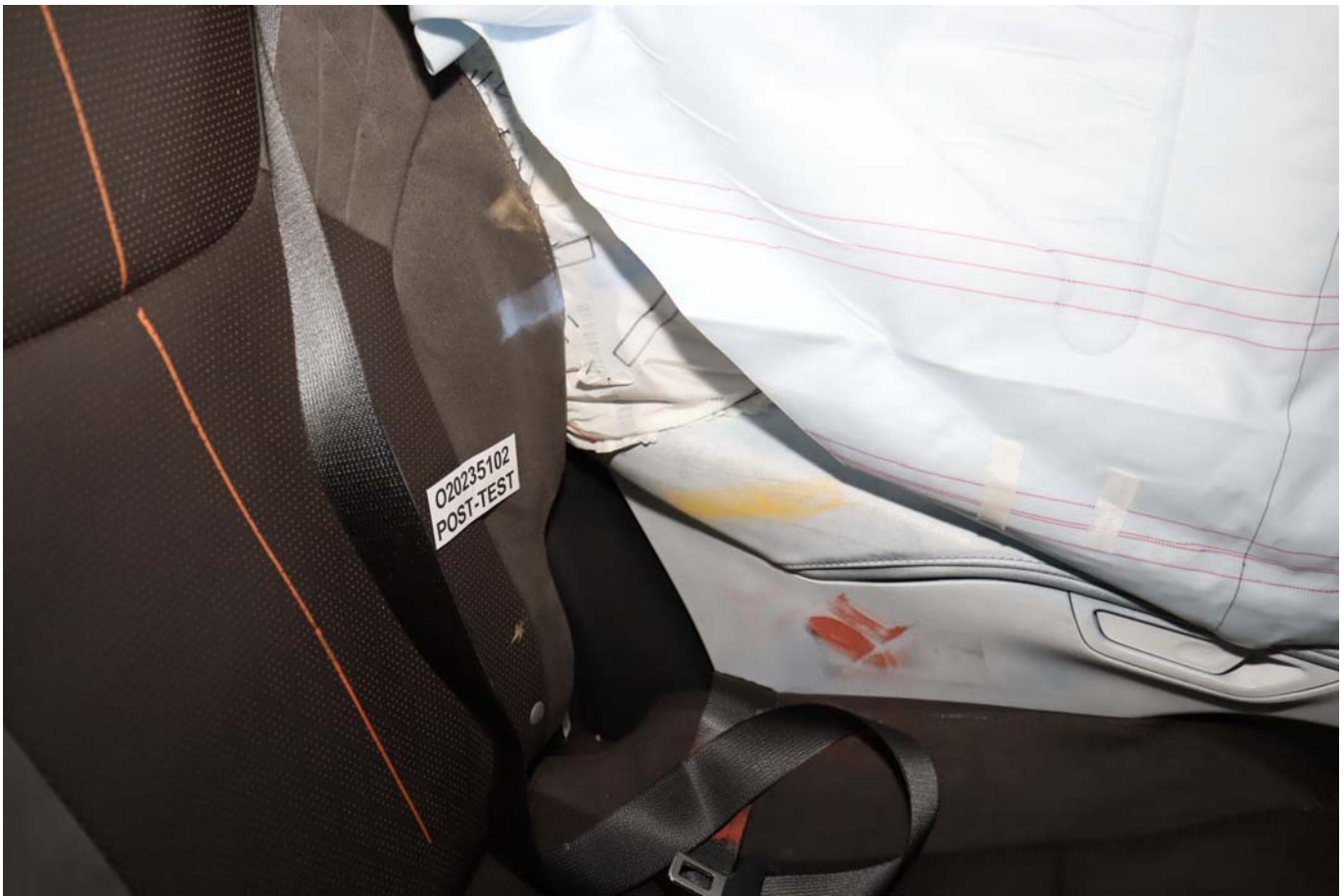


Photo No. 077 - Post-Test Rear Passenger Dummy Close-up Torso Contact with Vehicle Interior View



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

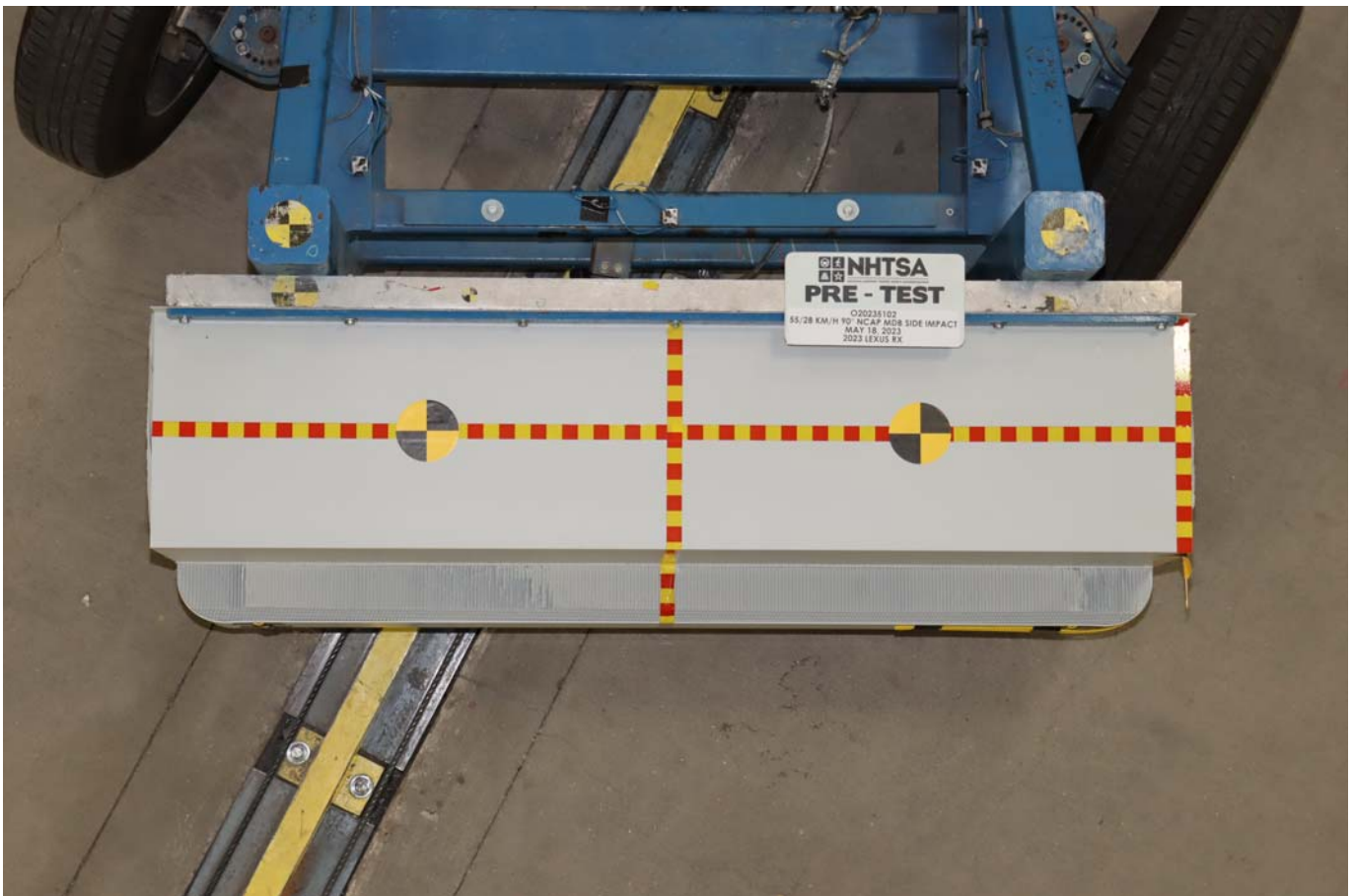


Photo No. 086 - Pre-Test Top View of MDB Impactor Face



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's Certification Label

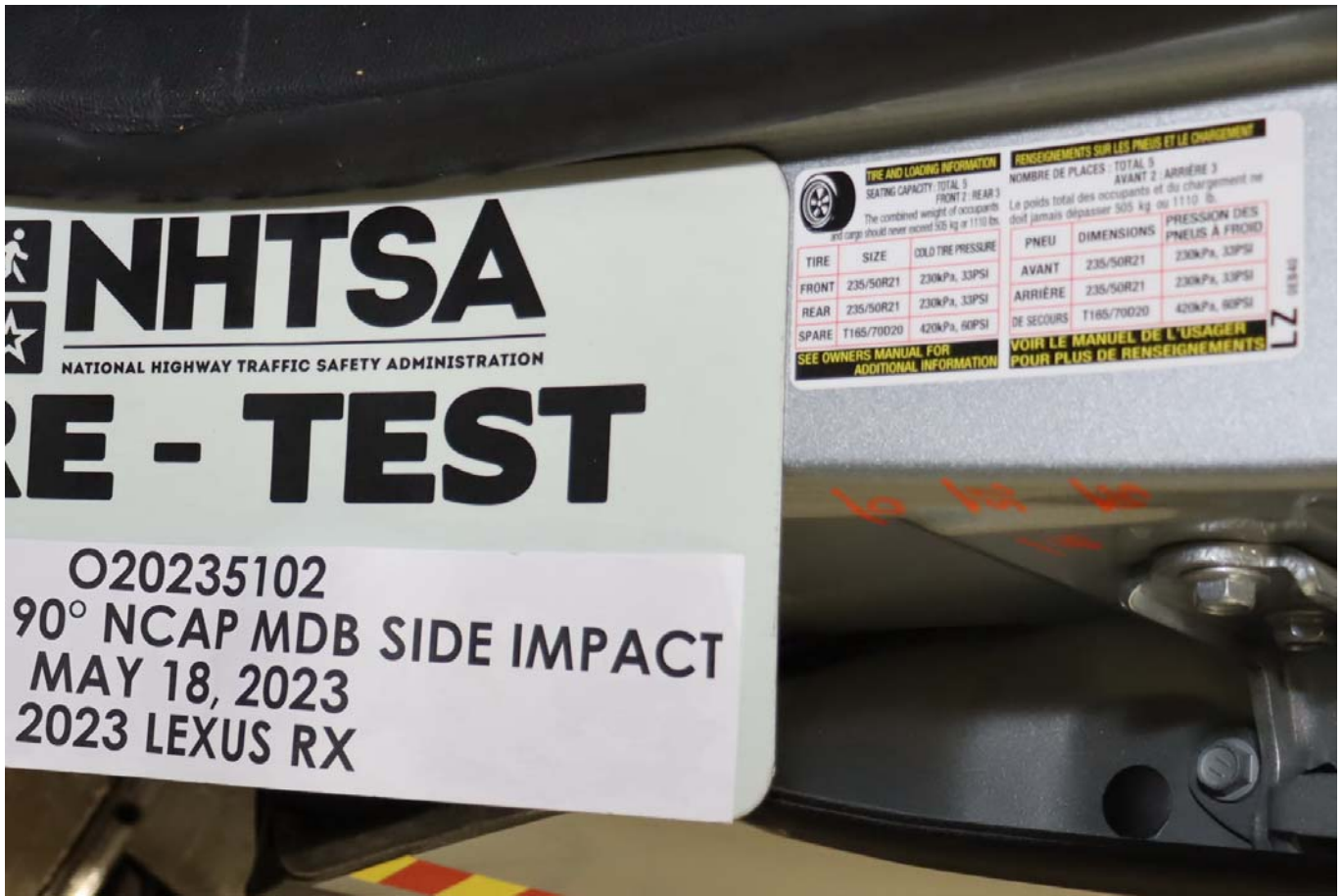


Photo No. 093 - Close-Up View of Vehicle's Tire Information Placard or Label



Photo No. 093a - Close-Up View of Vehicle Load Carrying Capacity Reduction Label

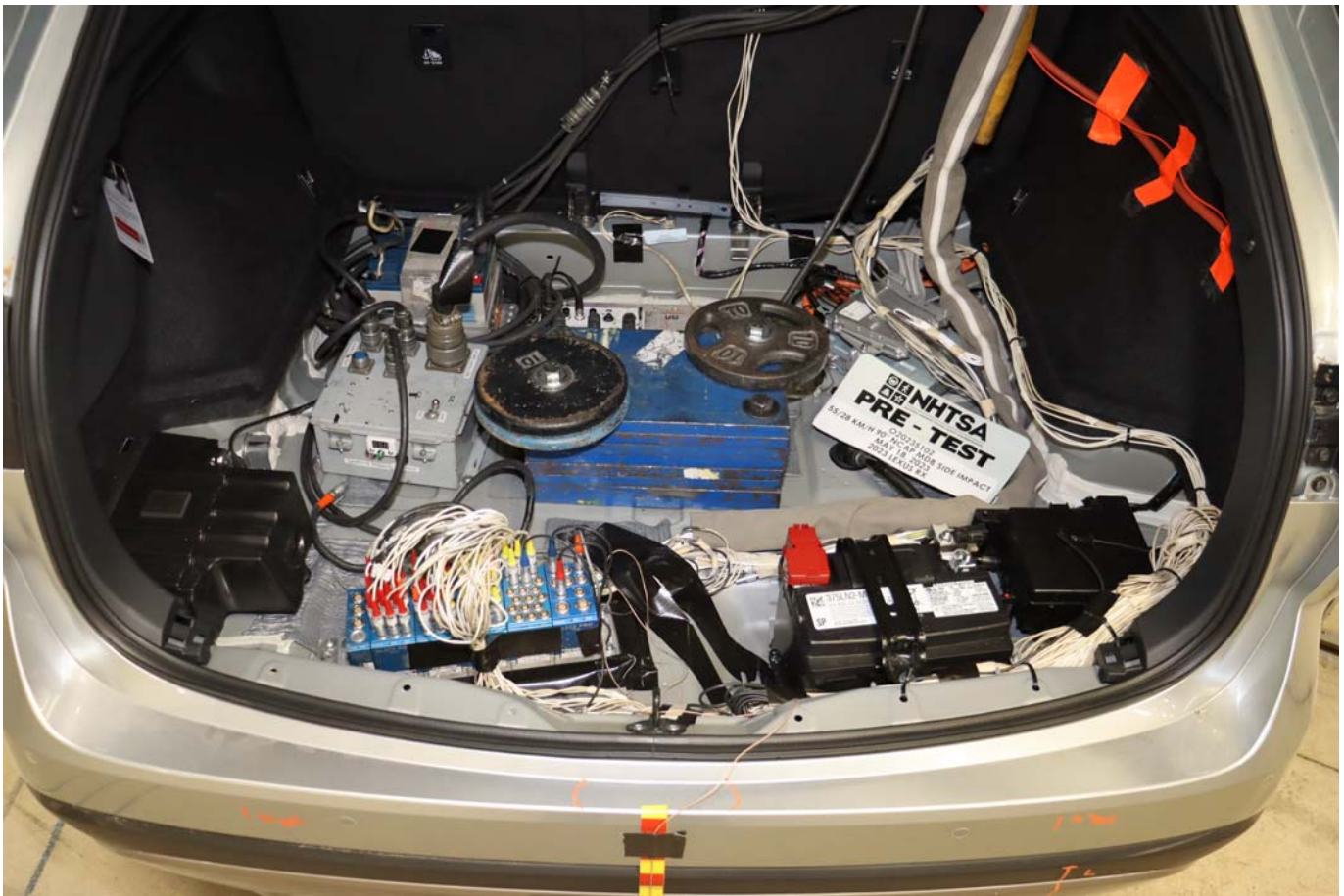


Photo No. 094 - Pre-Test Ballast View



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

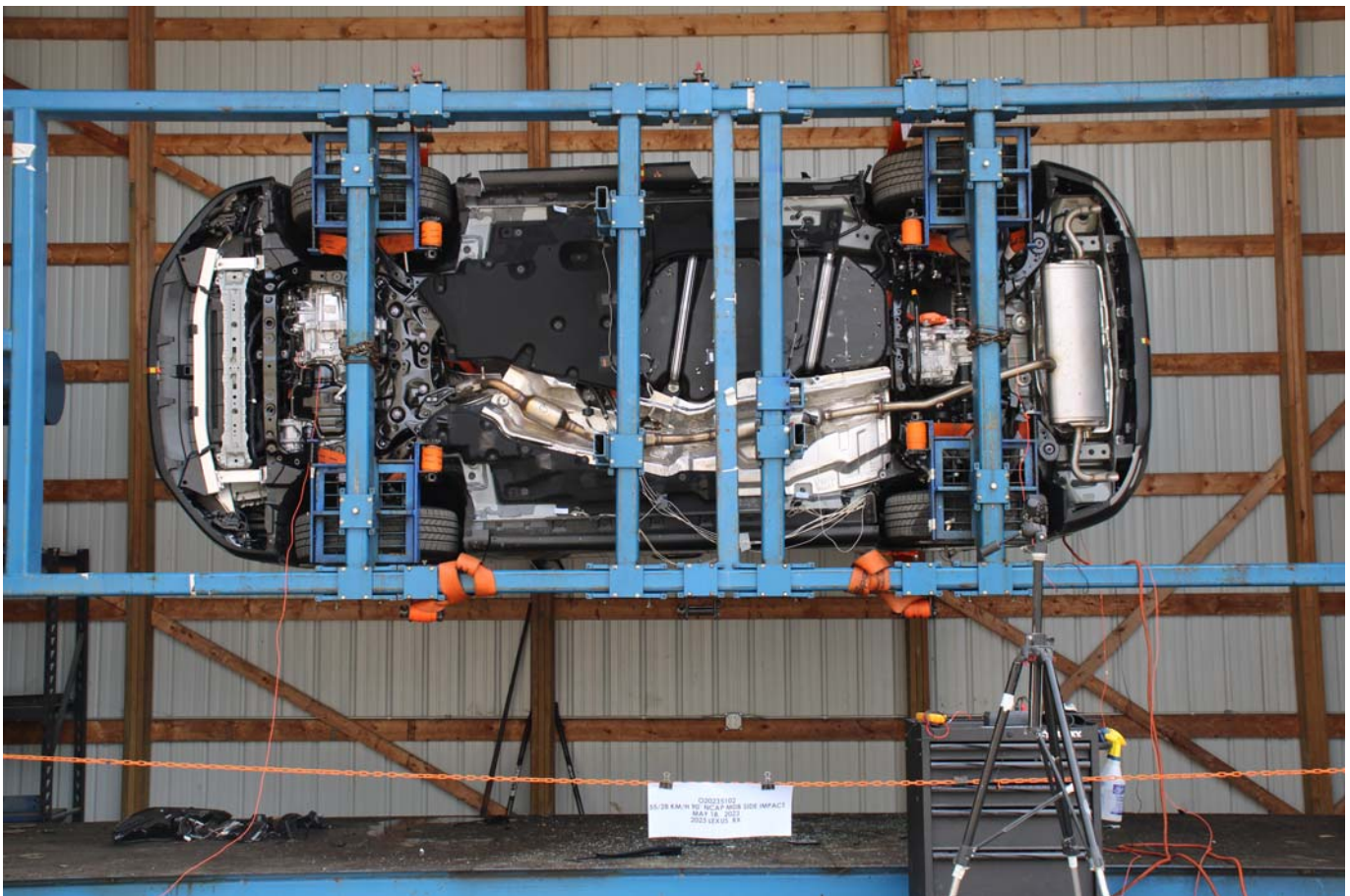


Photo No. 099 - FMVSS Photo No. 301 Static Rollover 270 Degrees



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



Photo No. 101 - Impact Event



DESCRIPTION **2023 / 9453C RX 350h LUXURY**
 COLOR **IRIDIUM**
 VIN **2T2B8MCA0PC005158**
 FINAL ASSEMBLY POINT **CAMBRIDGE, ONTARIO, CANADA**

Delivered by Truck to:
 LEXUS OF FREEPORT
 70 W. SUNRISE HWY
 FREEPORT NY1520

STANDARD EQUIPMENT UNLESS REPLACED BY INSTALLED OPTIONS

- Standard Features**
- Powertrain**
- 2.5-Liter Hybrid Engine
 - Electronically Controlled Variable Transmission
 - All Wheel Drive
- Safety / Advanced Technology**
- Lexus Safety System™-3.0-Lane Tracing Assist, Road Sign Assist, Pre-Collision System w/ Pedestrian Detection, All-Speed Dynamic Radar Cruise Control w/ Curve Speed Management, Lane Departure Alert w/ Steering Assist, Intelligent High Beam Headlamps
 - Blind Spot Monitor w/ Rear Cross Traffic Alert
 - 10 Airbags / Brake Assist w/ Smart Stop Technology
 - Intuitive Parking Assist with Auto Braking
 - Digital Latch with Safe Exit Assist
- Multimedia / Connected Services**
- Lexus Interface with 14-inch touchscreen display
 - Wireless Apple CarPlay Integration and Android Auto Compatibility
 - Safety Connect, Service Connect, Remote Connect, Wi-Fi Connect (AT&T Hotspot, Integrated Streaming) Trials, Drive Connect with Cloud Navigation, Intelligent Assistant (Hey Lexus), and Destination Assist Trial. Paid subscription required after trial. 4G network dependent. See Lexus.com for details.

- SiriusXM 3-Month Platinum Trial
 - 12-speaker Premium Sound System
- Exterior**
- 21" Alloy Wheels
 - Bi-LED Headlamps
 - Power tilt-and-slide moonroof
 - Roof Rails
- Interior**
- Front Heated and Ventilated Seats
 - Semi-aniline Leather Trimmed Power Adjustable Front Seats
 - Multi-zone Climate Control w/ auto recirculation mode
 - Thematic Ambient Lighting
 - Lexus Memory System for Driver's Seat, Steering Wheel and Outer Mirrors
 - Wireless Charger
 - Heated Wood and Leather Trimmed Steering Wheel
 - Head-Up Display
 - Ultrasuede Interior Door Trim

Please see Lexus.com/RX for more details

INSTALLED OPTIONS

BASE MANUFACTURER'S SUGGESTED RETAIL PRICE	\$57,000.00
** 120V AC Inverter	550.00
** Cold Area Package	100.00
** Digital Key (Requires Remote Connect Subscription, 3YR Trial Incl) 4G Network Dependent	275.00
** Digital Rearview Mirror	200.00
** Power Rear Seats	550.00
** Heated and Ventilated Rear Seats	680.00
** Premium Triple-Beam LED Headlamps	1,565.00
** Mark Levinson Surround Sound Audio System	1,160.00
** Power Rear Door with Kick Sensor	150.00
** Advanced Park	250.00
** Premium Paint	500.00
** Panoramic View Monitor	800.00
** Traffic Jam Assist (Requires Drive Connect Subscription, 3YR Trial Incl) 4G Network Dependent	620.00
** All Weather Floor Liners	190.00
** Door Edge Guard	155.00
** Side Puddle Lamps	175.00
** Cargo Mat/Cargo Net/Key Glove	250.00

EPA DOT Fuel Economy and Environment Gasoline Vehicle

Fuel Economy

36 MPG combined city/hwy

37 city

34 highway

2.8 gallons per 100 miles

You save \$500 in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost \$1,500

Fuel Economy & Greenhouse Gas Rating (tailpipe only)

Smog Rating (tailpipe only)

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 28 MPG and costs \$3,000 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$3.69 per gallon. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fuelconomy.gov

Calculate personalized estimates and compare vehicles

MANUFACTURER'S SUGGESTED RETAIL PRICE* \$65,170.00

DELIVERY, PROCESSING AND HANDLING FEE 1,150.00

TOTAL \$66,320.00

GOVERNMENT 5-STAR SAFETY RATINGS

This vehicle has not been rated by the government for overall vehicle score, frontal crash, side crash or rollover risk.

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

LEXUS IS PLEASED TO OFFER THE FOLLOWING OWNER SUPPORT PACKAGE WITH EACH NEW LEXUS

- 24-hour, 365-day, roadside assistance plan
- Complimentary 1st and 2nd scheduled maintenance services
- Lodging for emergencies for additional \$50 miles from home.

An extended service contract may be available for this vehicle. Ask dealer for details.

LML1E2H1S0F0W1

704 L031

Photo No. 102 - Monroney Label

152 3-3. Adjusting the seats

Head restraints

Head restraints are provided for all seats.

WARNING

Head restraint precautions

- Observe the following precautions regarding the head restraints. Failure to do so may result in death or serious injury.
- Use the head restraints designed for each respective seat.
- Adjust the head restraints to the correct position at all times.
- After adjusting the head restraints, push down on them and make sure they are locked in position.
- Do not drive with the head restraints removed.

Adjusting a head restraint vertically

Front seats

- 1 Up Pull the head restraints up.
- 2 Down Push the head restraint down while pressing the lock release button [A].

Adjusting the height of the head restraints

- 1 Up Pull the head restraints up.
- 2 Down Push the head restraint down while pressing the lock release button [A].

Rear outer seats

- 1 Up Pull the head restraints up.
- 2 Down Push the head restraint down while pressing the lock release button [A].

Rear center seat

- 1 Up Pull the head restraints up.
- 2 Down Push the head restraint down while pressing the lock release button [A].

Adjusting a head restraint horizontally (if equipped)

The position of the head restraint can be adjusted forward in 4 stages. If the head restraint is pulled forward from the foremost position, it will return to the rearmost position.

Removing the head restraints

Front seats and rear outer seats

Pull the head restraint up while pressing the lock release button [A]. If the head restraint touches the ceiling, making the removal difficult, change the seat height or angle. (→P.144, 145)

Installing the head restraints

Front seats and rear outer seats

Align the head restraint with the installation holes and push it down to the lock position. Press and hold the lock release button [A] when lowering the head restraint.

3-3. Adjusting the seats 153

Make sure that the head restraints are adjusted so that the center of the head restraint is closest to the top of your ears.

Adjusting the rear center seat head restraints

Always raise the head restraint one level from the stowed position when using.

Adjusting a head restraint horizontally (if equipped)

The position of the head restraint can be adjusted forward in 4 stages. If the head restraint is pulled forward from the foremost position, it will return to the rearmost position.

Removing the head restraints

Front seats and rear outer seats

Pull the head restraint up while pressing the lock release button [A]. If the head restraint touches the ceiling, making the removal difficult, change the seat height or angle. (→P.144, 145)

Installing the head restraints

Front seats and rear outer seats

Align the head restraint with the installation holes and push it down to the lock position. Press and hold the lock release button [A] when lowering the head restraint.

3-3. Adjusting the seats 154

Rear center seat

Align the head restraint with the installation holes and push it down to the lock position. Press and hold the lock release button [A] when lowering the head restraint.

3 Blind driving

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

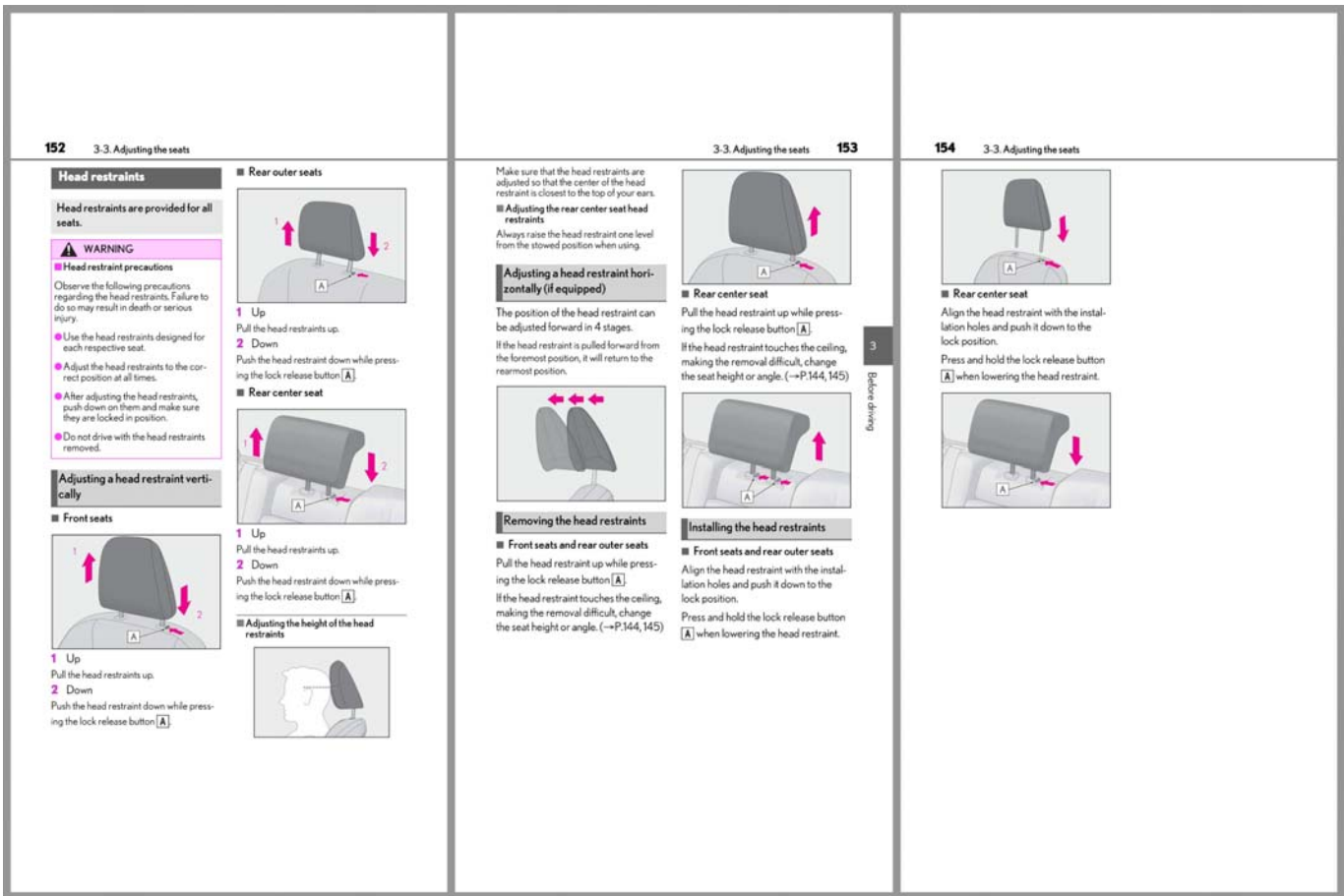


Photo No. 104 - Left Rear Passenger Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

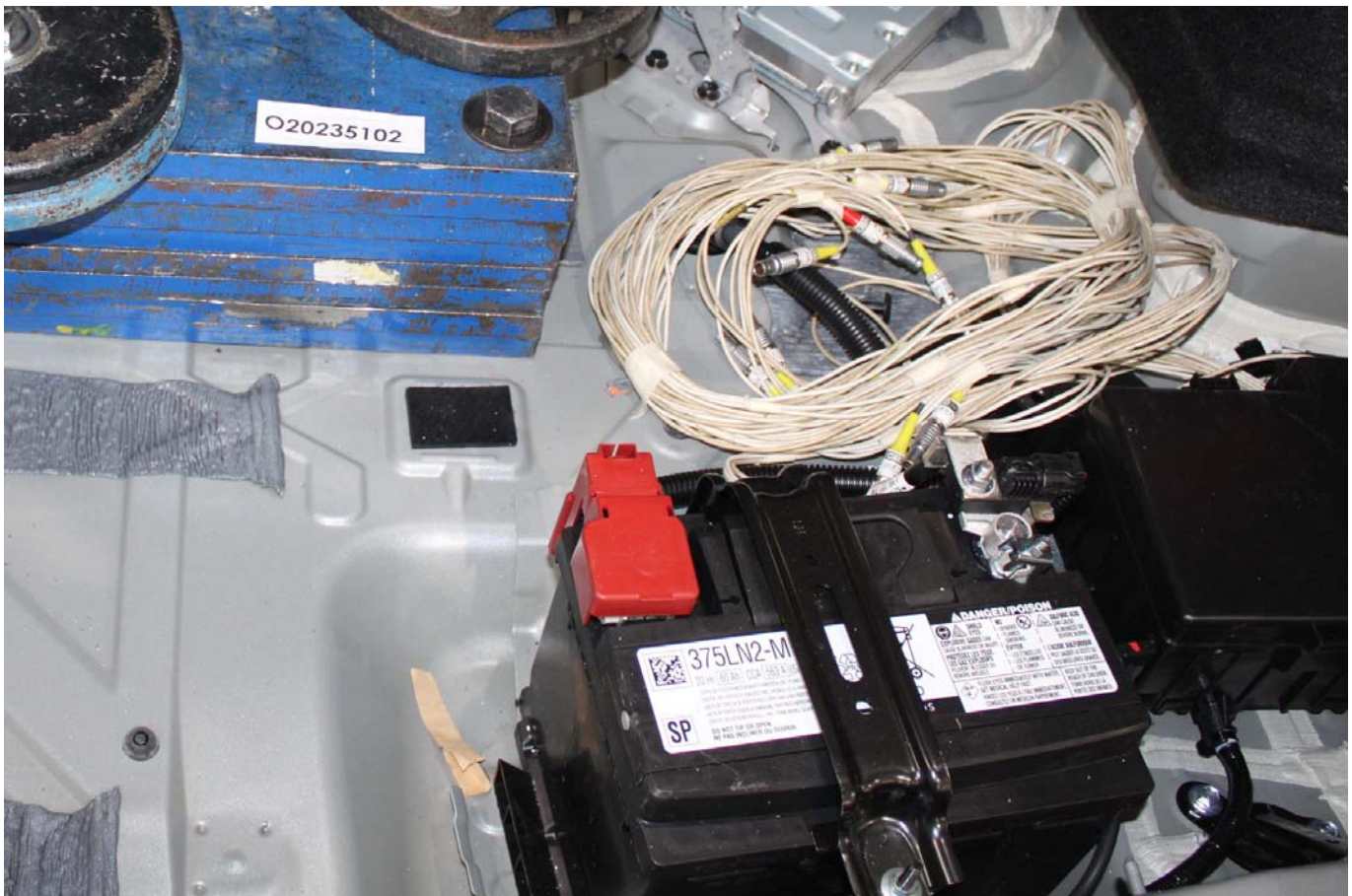


Photo No. 305-01 - Auxiliary Power Module Warning Label



Photo No. 305-02 - Power Inverter Warning Label



Photo No. 305-03 - First Responder Warning Label



Photo No. 305-04 - First Responder Warning Location



Photo No. 305-05 - Other Vehicle Label(s) Related to Electrical Propulsion System

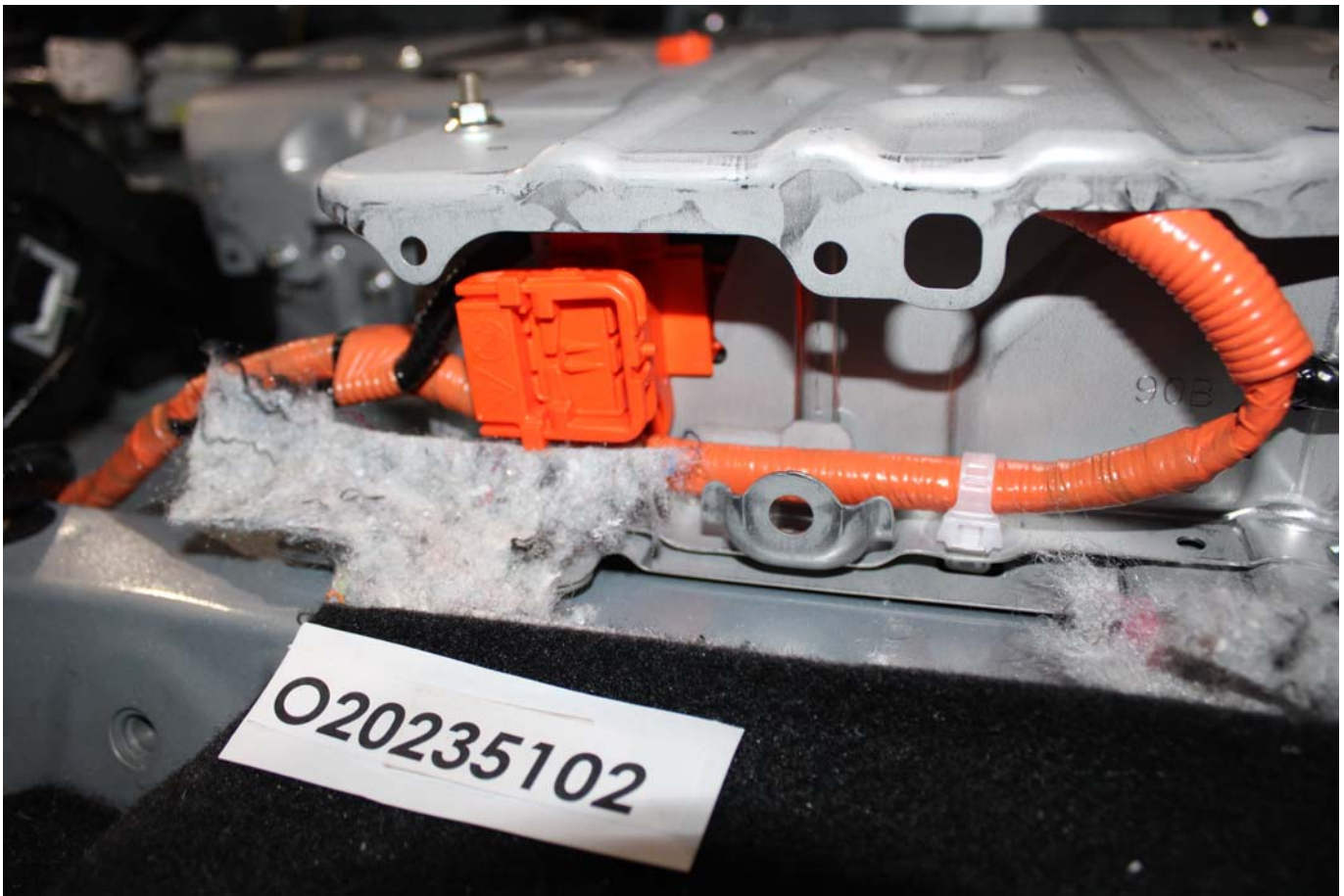


Photo No. 305-06 - Manual High Voltage Service Disconnect in Place



Photo No. 305-07 - Manual High Voltage Service Disconnect Removed



Photo No. 305-08 - Manual High Voltage Service Disconnect Removed



Photo No. 305-09 - Pre-Impact View of Propulsion Battery

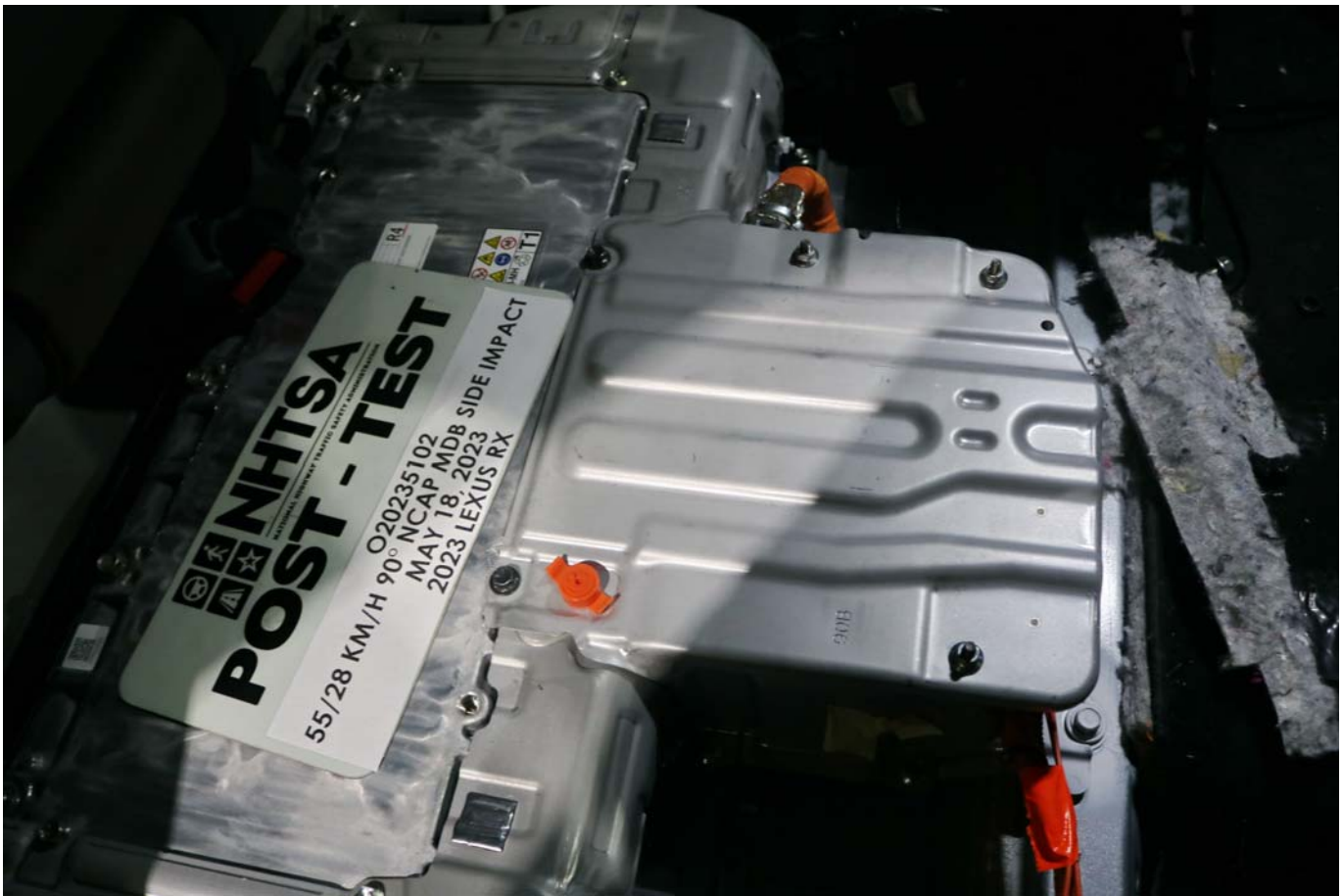


Photo No. 305-10 - Post-Impact Front View of Propulsion Battery

PHOTOGRAPH NOT AVAILABLE

Photo No. 305-11 - Post-Impact Rear View of Propulsion Battery

PHOTOGRAPH NOT APPLICABLE

Photo No. 305-12 - Pre-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules

PHOTOGRAPH NOT APPLICABLE

Photo No. 305-13 - Post-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules

PHOTOGRAPH NOT APPLICABLE

Photo No. 305-14 - Pre-Impact View of Propulsion Battery Module(s)

PHOTOGRAPH NOT APPLICABLE

Photo No. 305-15 - Post-Impact View of Propulsion Battery Module(s)



Photo No. 305-16 - Pre-Impact View of Electric Propulsion Drive



Photo No. 305-17 - Post-Impact View of Electric Propulsion Drive



Photo No. 305-18 - Pre-Impact View of High Voltage Interconnect(s)

PHOTOGRAPH NOT APPLICABLE

Photo No. 305-19 - Pre-Impact View Propulsion Battery Venting System(s)

PHOTOGRAPH NOT APPLICABLE

Photo No. 305-20 - Pre-Impact View of Other Visible Electric Propulsion Components



Photo No. 305-21 - Pre-Impact View of Ground Lead Attached

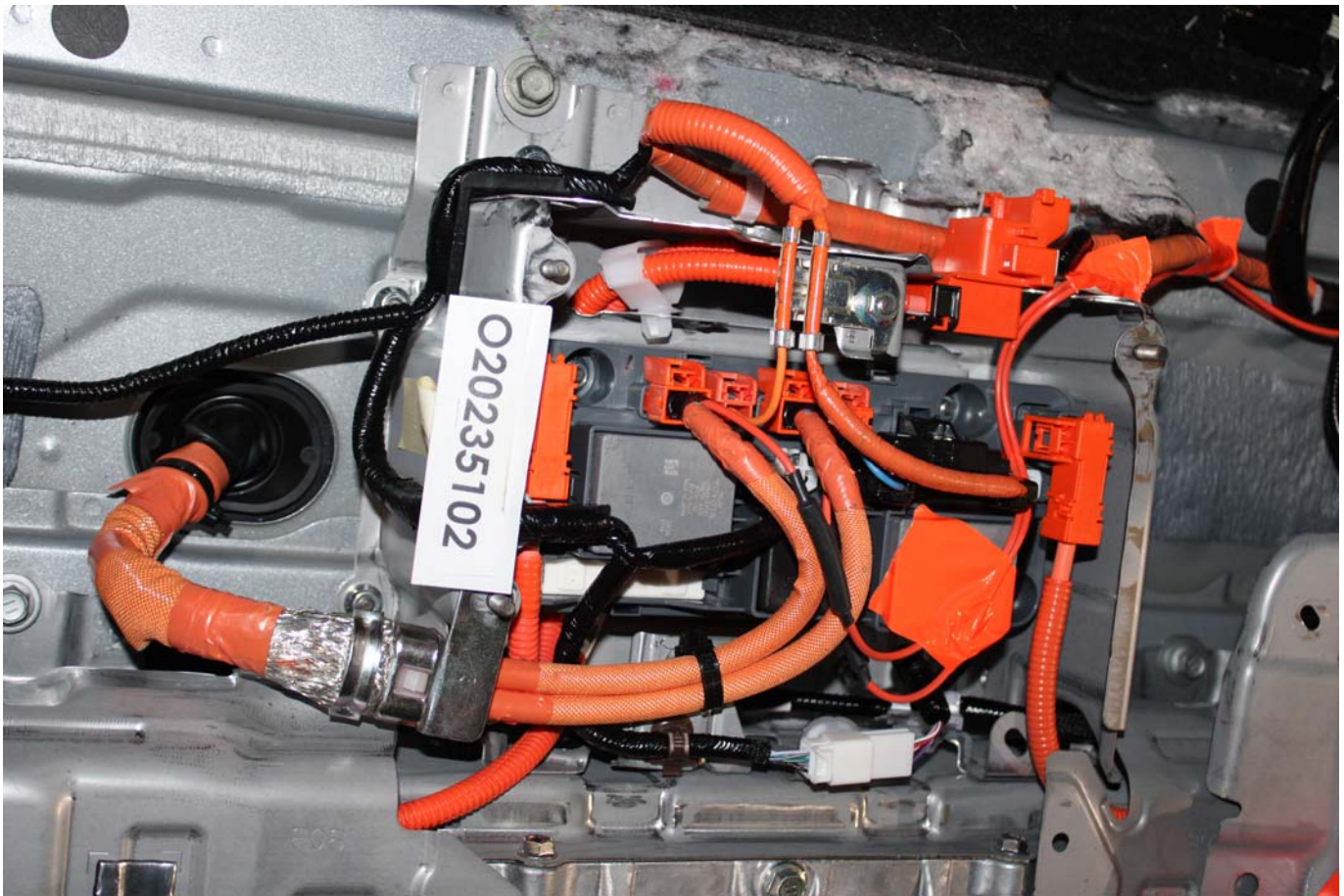


Photo No. 305-22 - Pre-Impact View of High Voltage Leads Attached



Photo No. 305-23 - Pre-Impact Close-Up View of High Voltage Leads Attached



Photo No. 305-24 - Pre-Impact View of Installed Test Interface Port

PHOTOGRAPH NOT AVAILABLE

Photo No. 305-25 - Post-Impact View of Installed Test Interface Port



Photo No. 305-26 - Pre-Impact View of Other Test Devices



Photo No. 305-27 - Post-Impact View of Other Test Devices



Photo No. 305-28 - FMVSS No. 305 Static Rollover at 90 Degrees



Photo No. 305-29 - FMVSS No. 305 Static Rollover at 180 Degrees

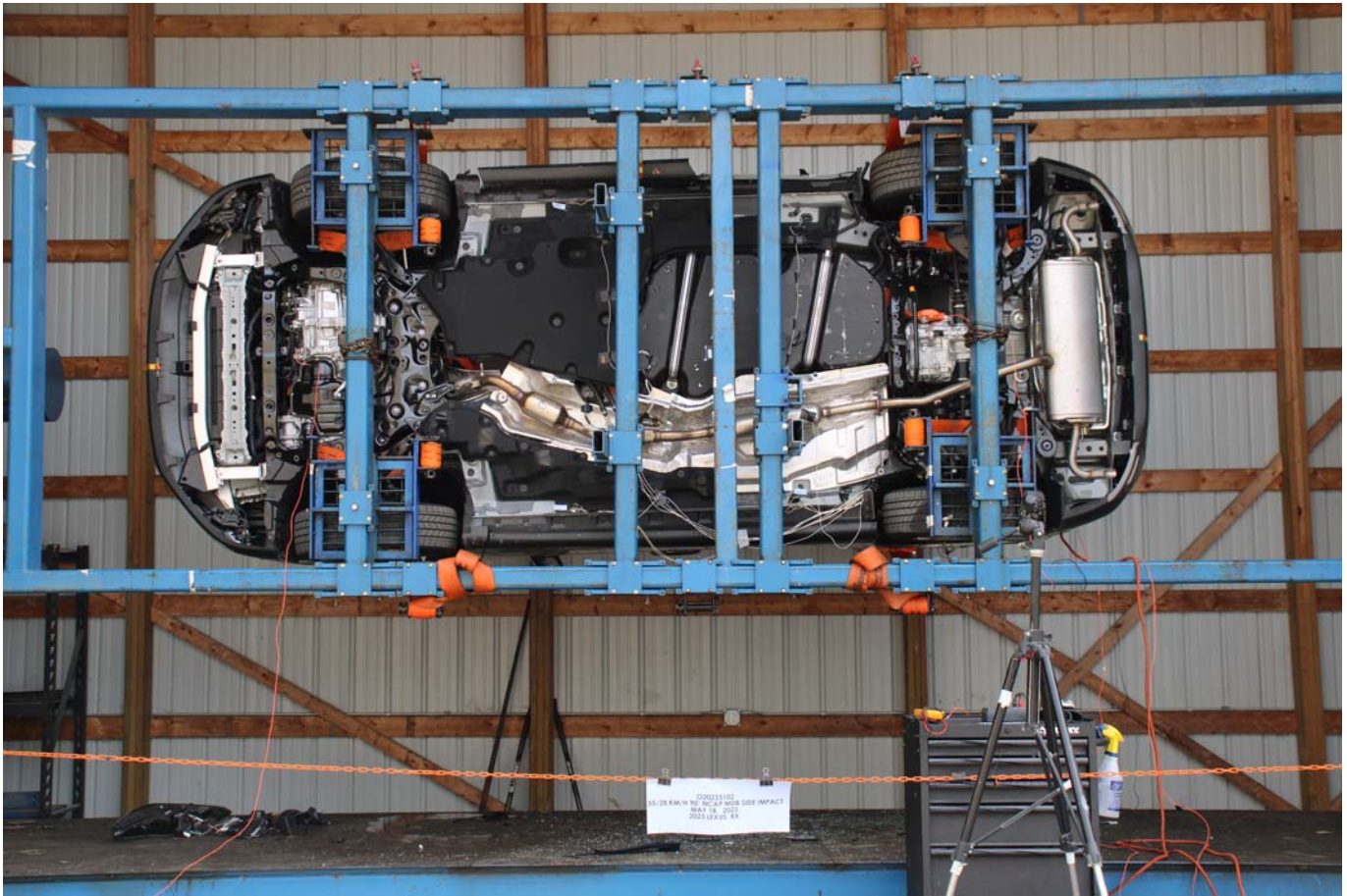


Photo No. 305-30 - FMVSS No. 305 Static Rollover at 270 Degrees



Photo No. 305-31 - FMVSS No. 305 Static Rollover at 360 Degrees



Photo No. 305-32 - Pre-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery



Photo No. 305-33 - Post-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery

PHOTOGRAPH NOT APPLICABLE

Photo No. 305-34 - Post-Impact Propulsion Battery System Mounting and-or Intrusion Failure(s)

PHOTOGRAPH NOT APPLICABLE

Photo No. 305-35 - Post-Impact View of Battery Component Intrusion

PHOTOGRAPH NOT APPLICABLE

Photo No. 305-36 - Post-Impact View of Battery Module Movement or Retention Loss

PHOTOGRAPH NOT APPLICABLE

Photo No. 305-37 - Post-Impact View of Propulsion Battery Electrolyte Spillage Location

PHOTOGRAPH NOT APPLICABLE

Photo No. 305-38 - Post-Test View of Propulsion Battery Electrolyte Spillage Location

APPENDIX B
DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS
Driver Dummy Instrumentation Plots

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Figure No. 21.	Passenger Lower Spine T12 Resultant Acceleration vs. Time	B-6
Figure No. 22.	Passenger Iliac Force on Impact Side (Y) vs. Time	B-7
Figure No. 23.	Passenger Acetabulum Force on Impact Side (Y) vs. Time	B-7
Figure No. 24.	Passenger Total Pelvic Force on Impact Side (Y) vs. Time	B-7

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

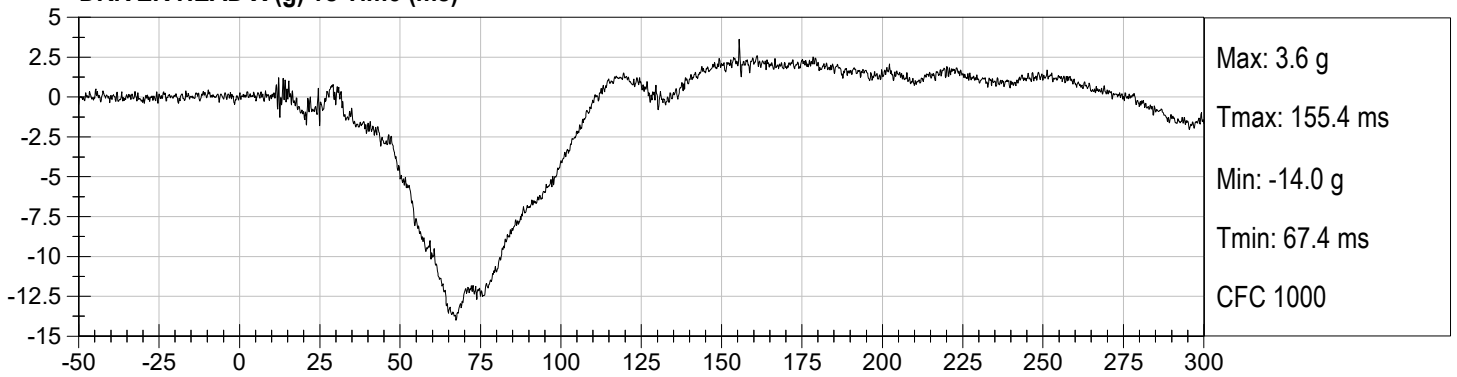
MDB Rear Acceleration (X)

MDB Rear Acceleration (Y)

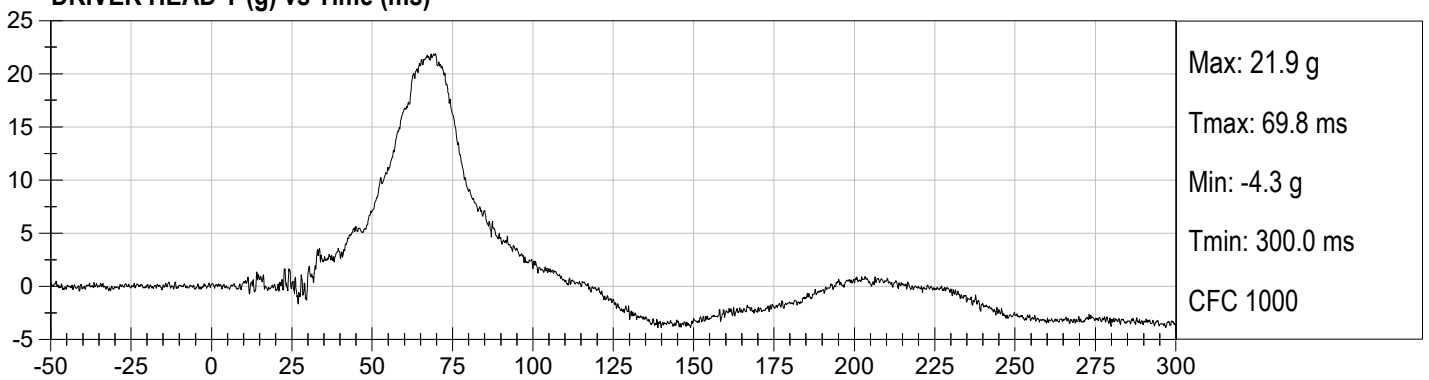
Left MDB Contact Switch

Right MDB Contact Switch

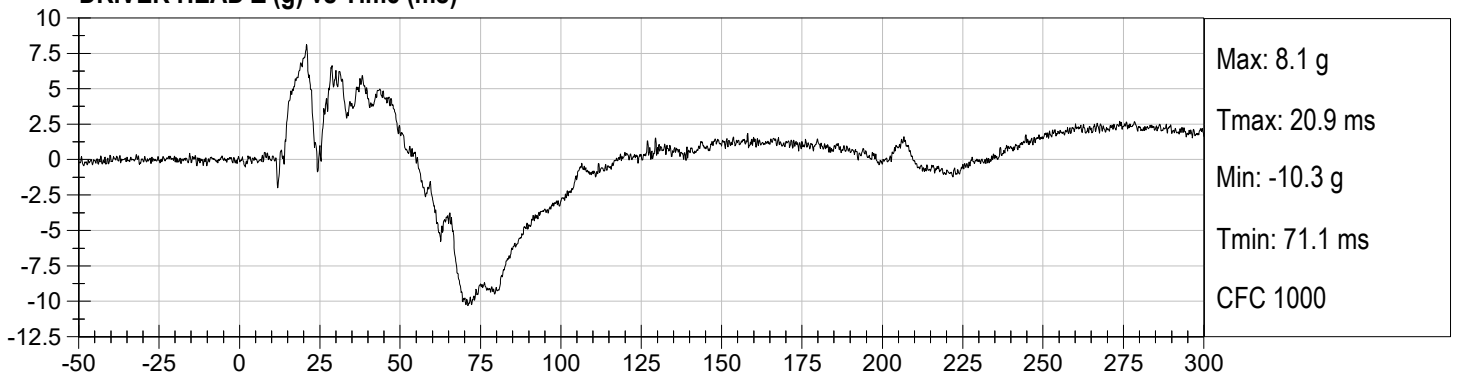
DRIVER HEAD X (g) vs Time (ms)



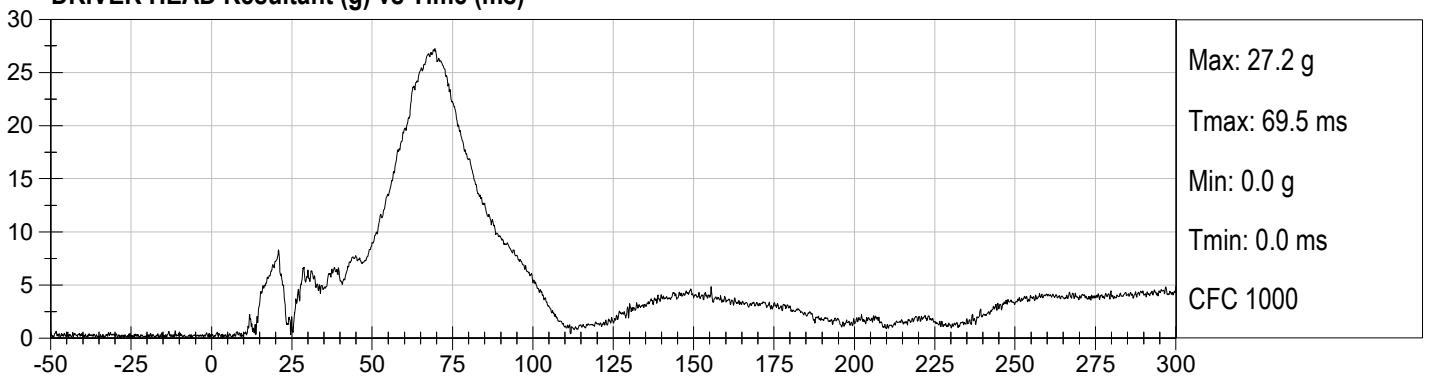
DRIVER HEAD Y (g) vs Time (ms)



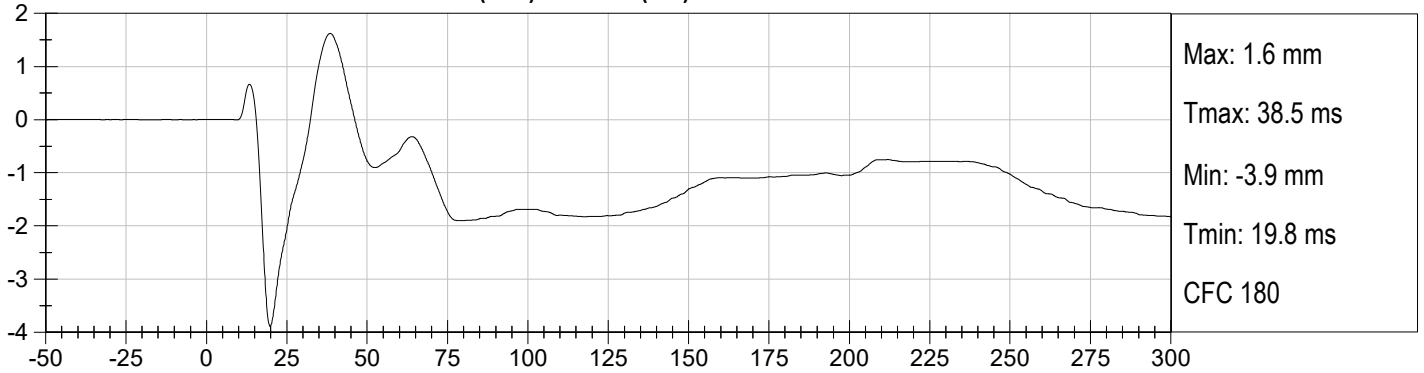
DRIVER HEAD Z (g) vs Time (ms)



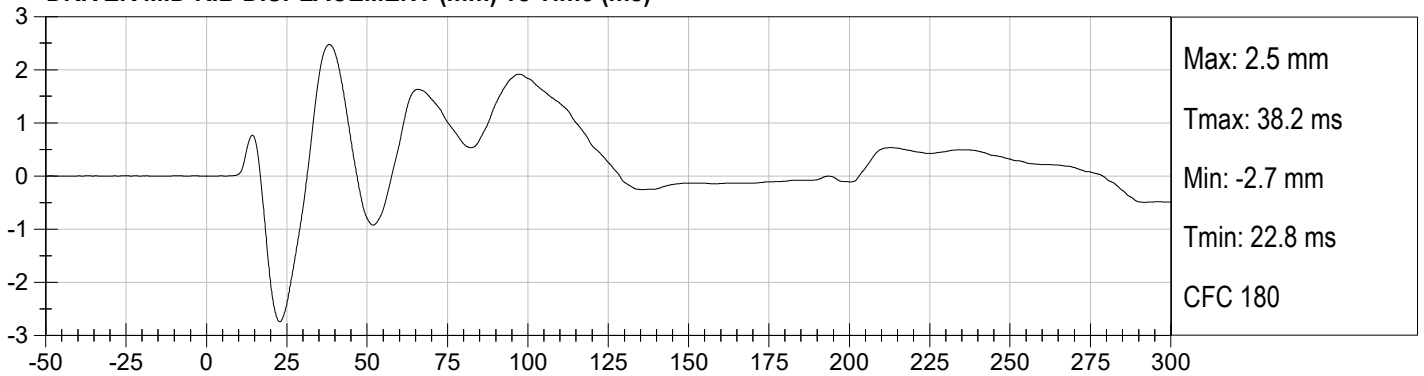
DRIVER HEAD Resultant (g) vs Time (ms)



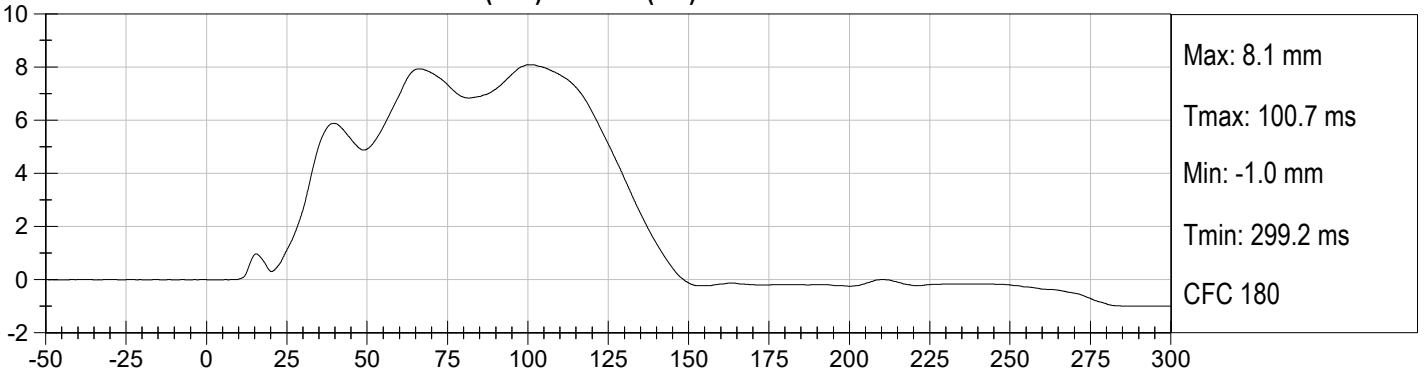
DRIVER UPPER RIB DISPLACEMENT (mm) vs Time (ms)



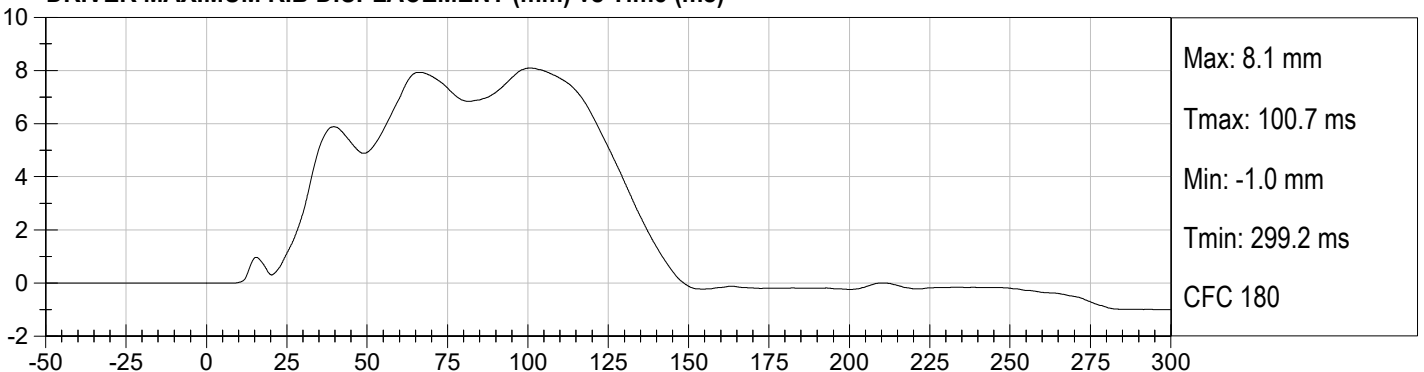
DRIVER MID RIB DISPLACEMENT (mm) vs Time (ms)



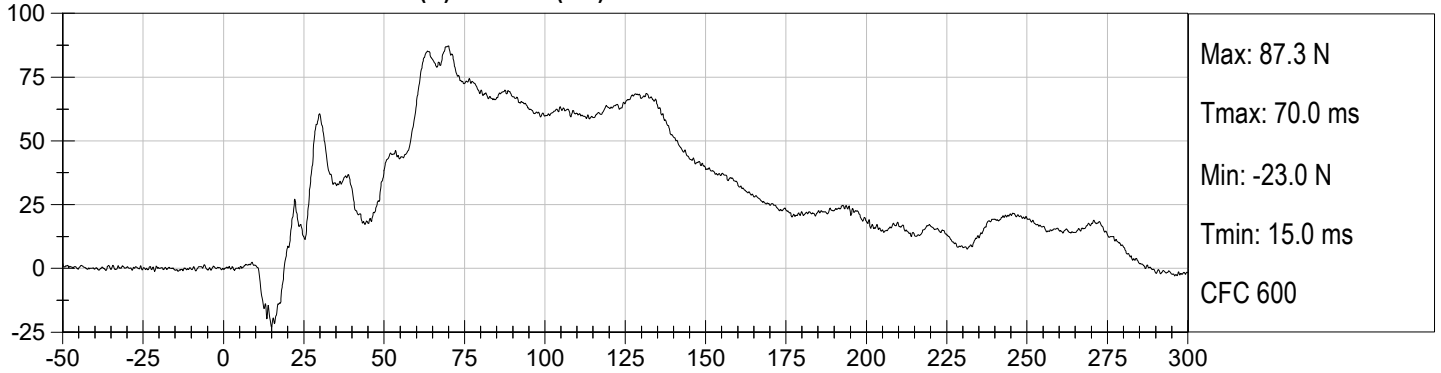
DRIVER LOWER RIB DISPLACEMENT (mm) vs Time (ms)



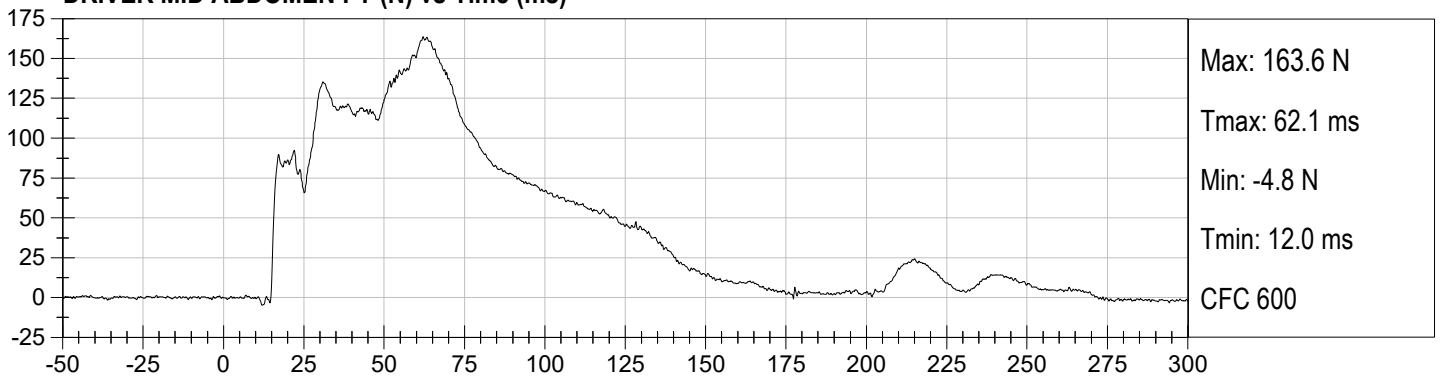
DRIVER MAXIMUM RIB DISPLACEMENT (mm) vs Time (ms)



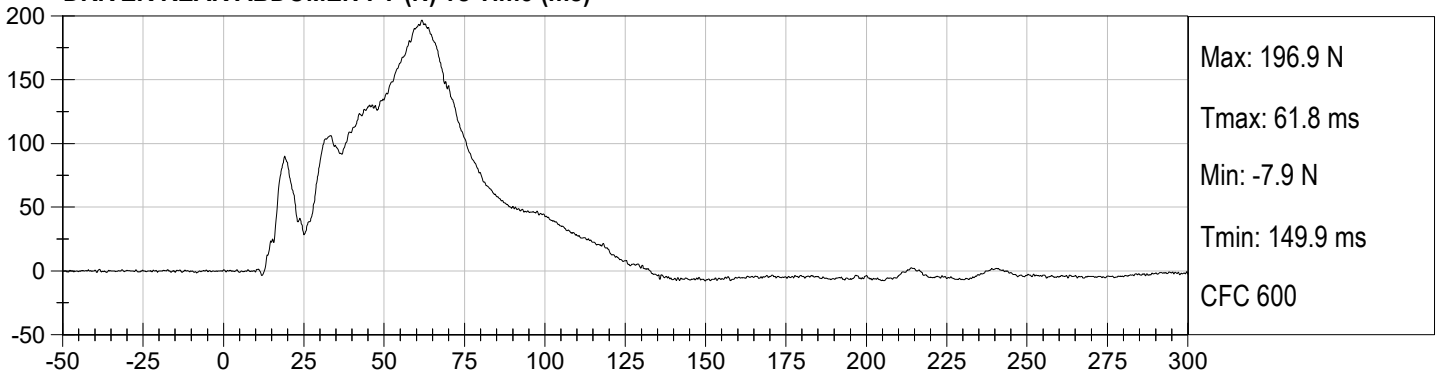
DRIVER FRONT ABDOMEN FY (N) vs Time (ms)



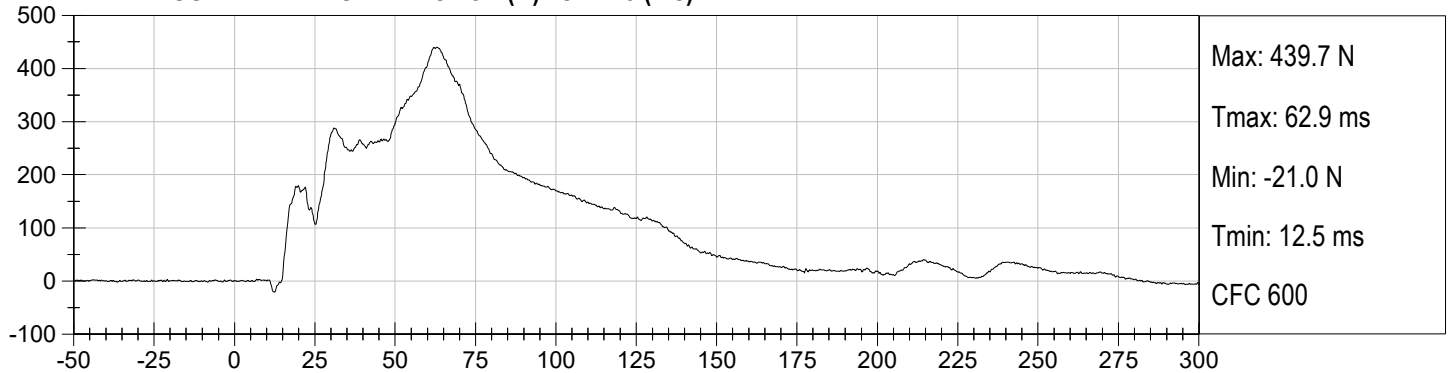
DRIVER MID ABDOMEN FY (N) vs Time (ms)

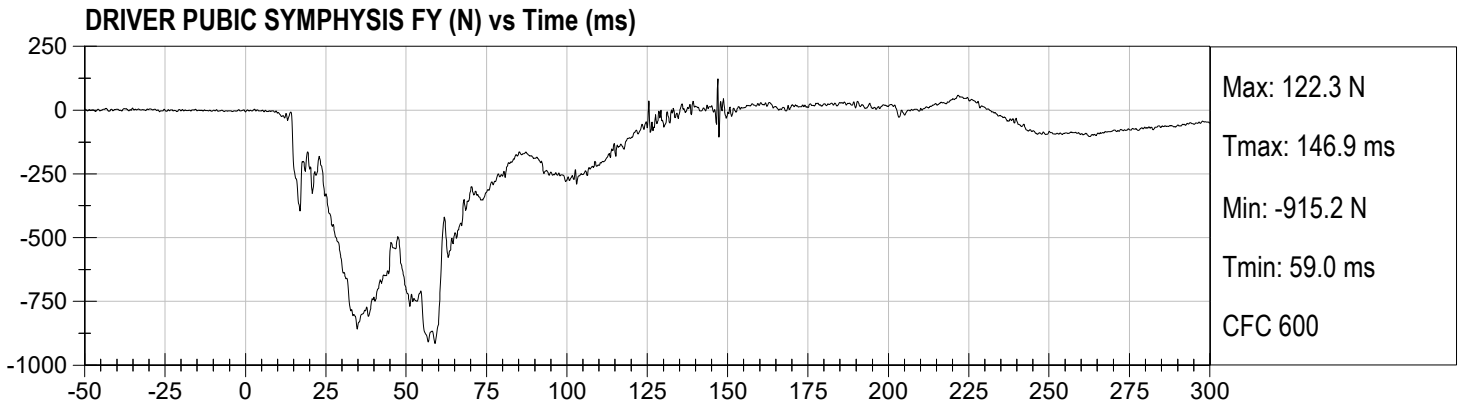


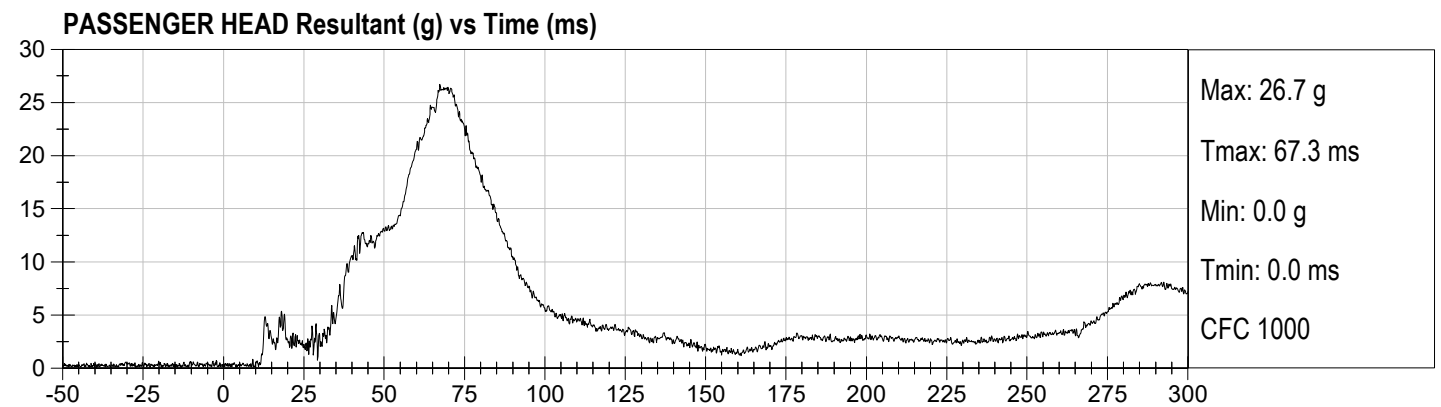
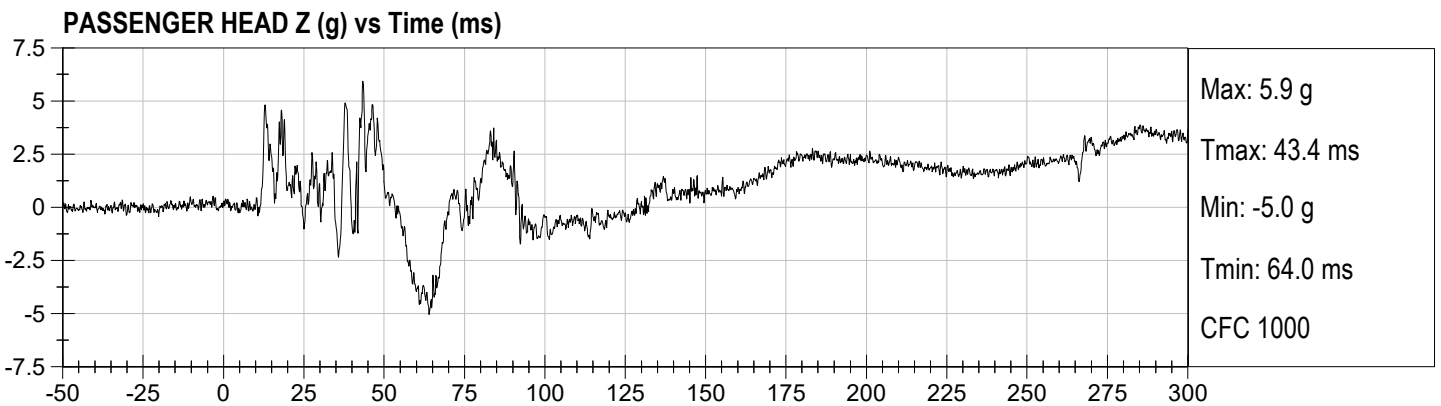
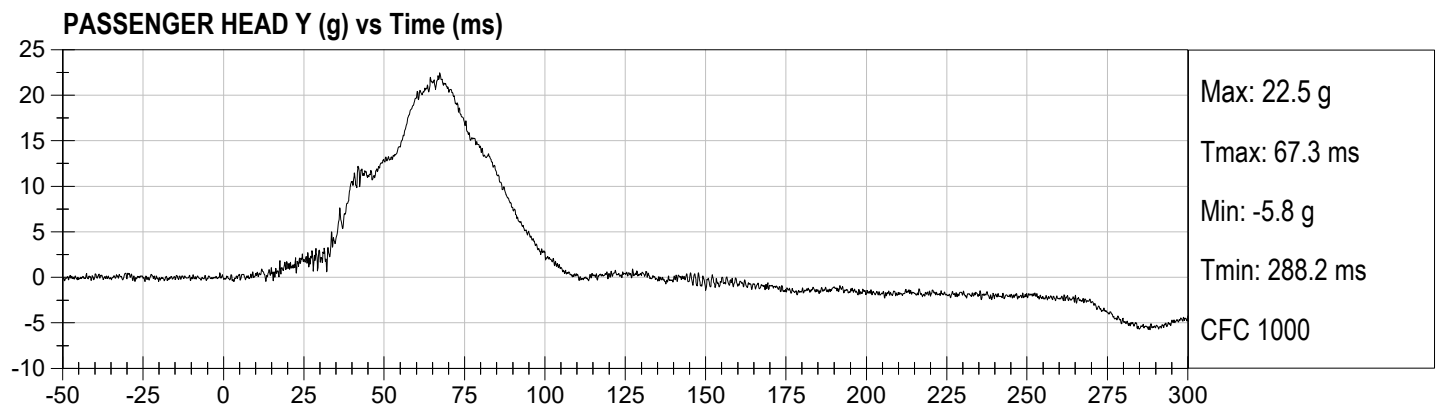
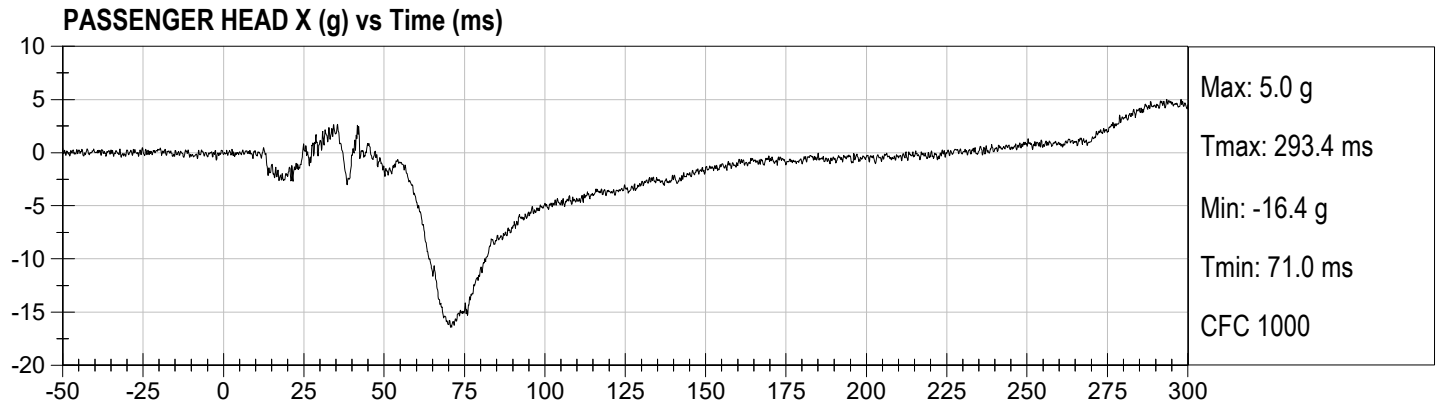
DRIVER REAR ABDOMEN FY (N) vs Time (ms)



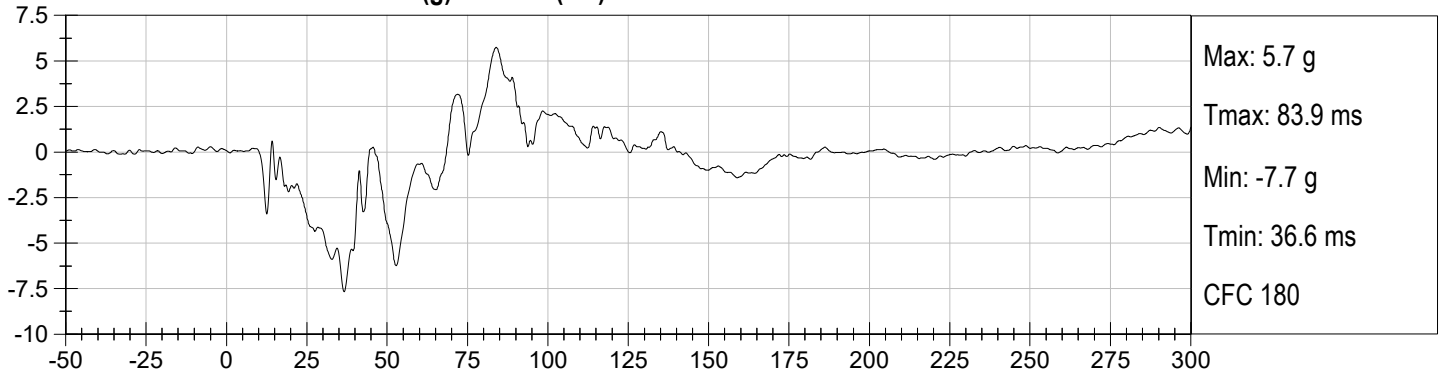
DRIVER SUMMED ABDOMEN FORCE (N) vs Time (ms)



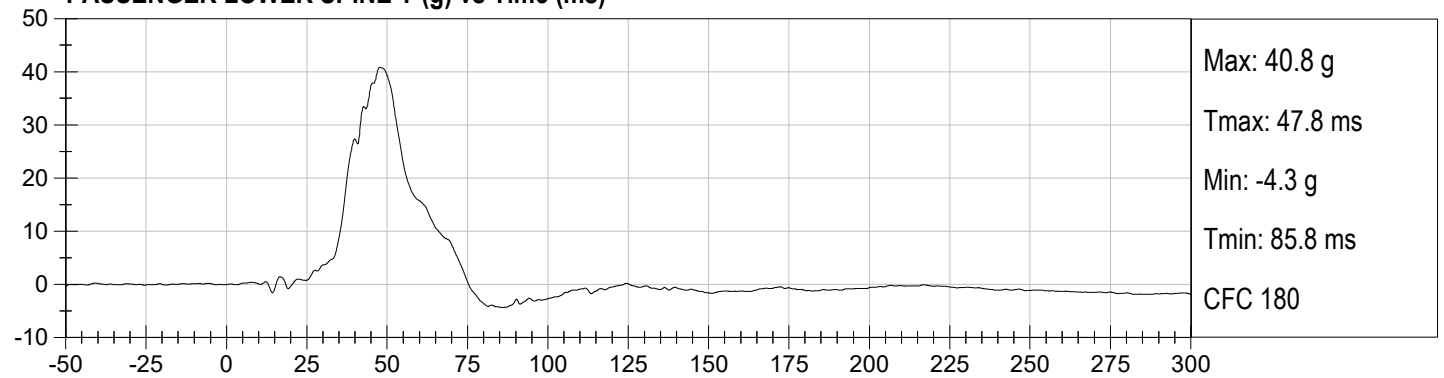




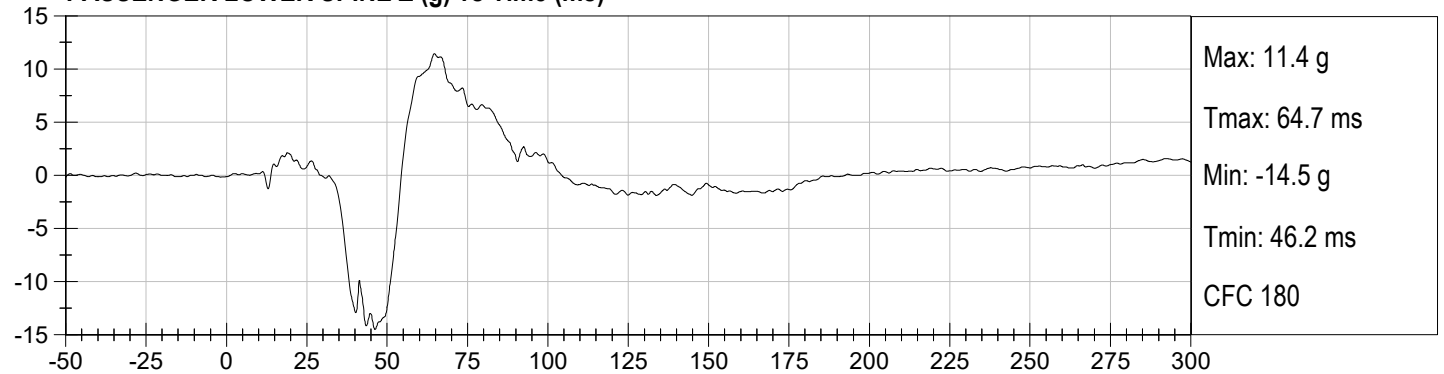
PASSENGER LOWER SPINE X (g) vs Time (ms)



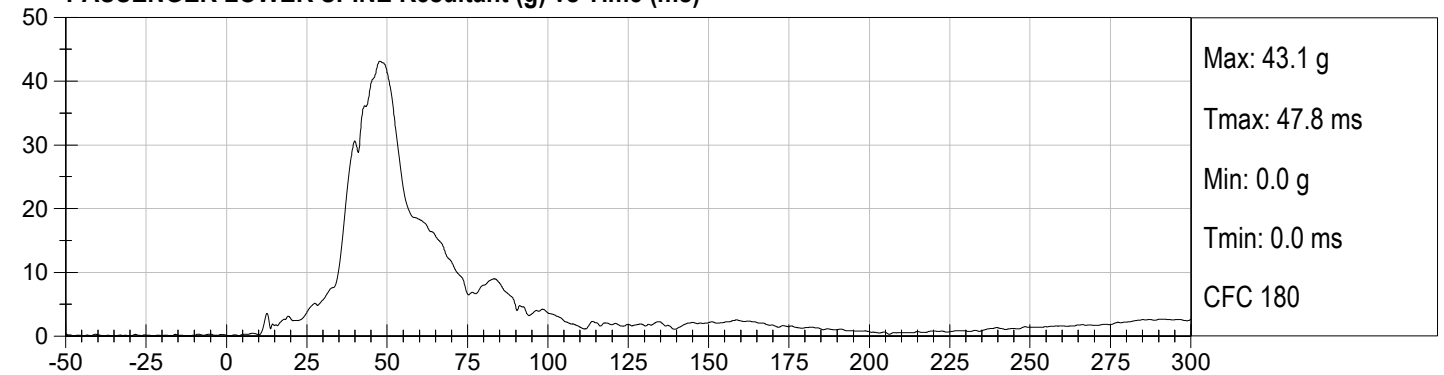
PASSENGER LOWER SPINE Y (g) vs Time (ms)



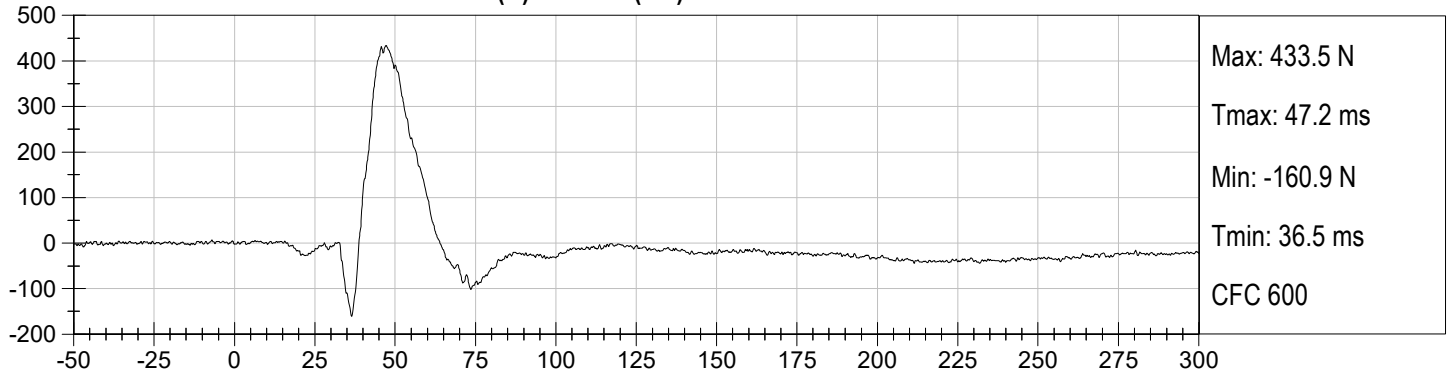
PASSENGER LOWER SPINE Z (g) vs Time (ms)



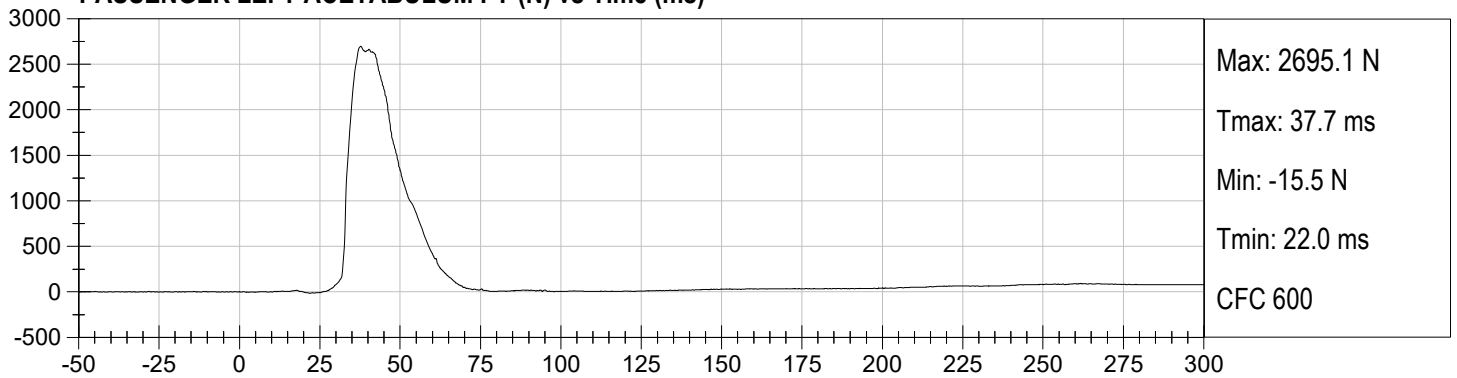
PASSENGER LOWER SPINE Resultant (g) vs Time (ms)



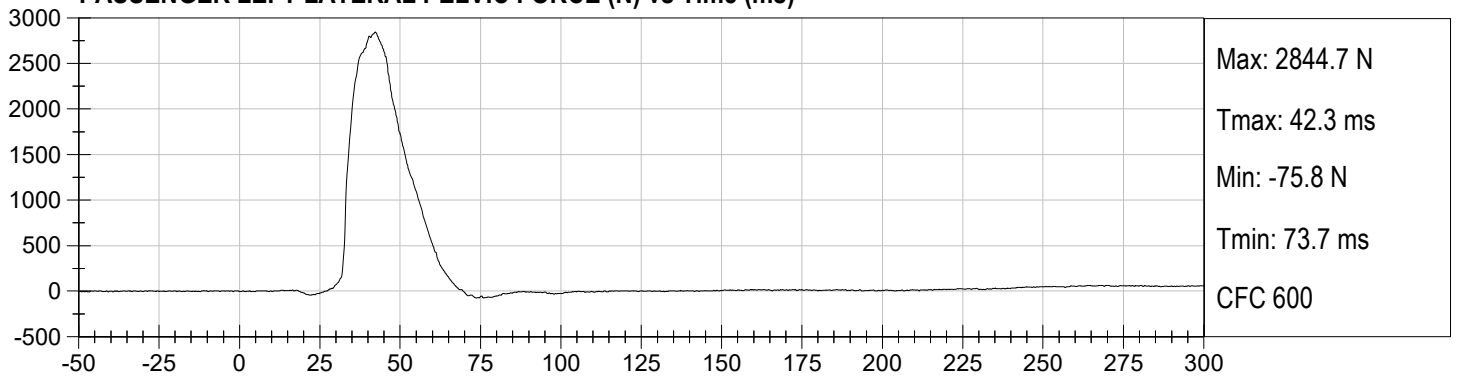
PASSENGER LEFT ILIUM CREST FY (N) vs Time (ms)



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



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



APPENDIX C
DUMMY QUALIFICATION AND PERFORMANCE VERIFICATION

QUALIFICATION 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

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HEAD DROP TEST
ES-2re DUMMY

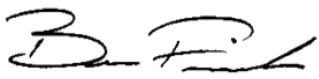
ATD Serial No: F032

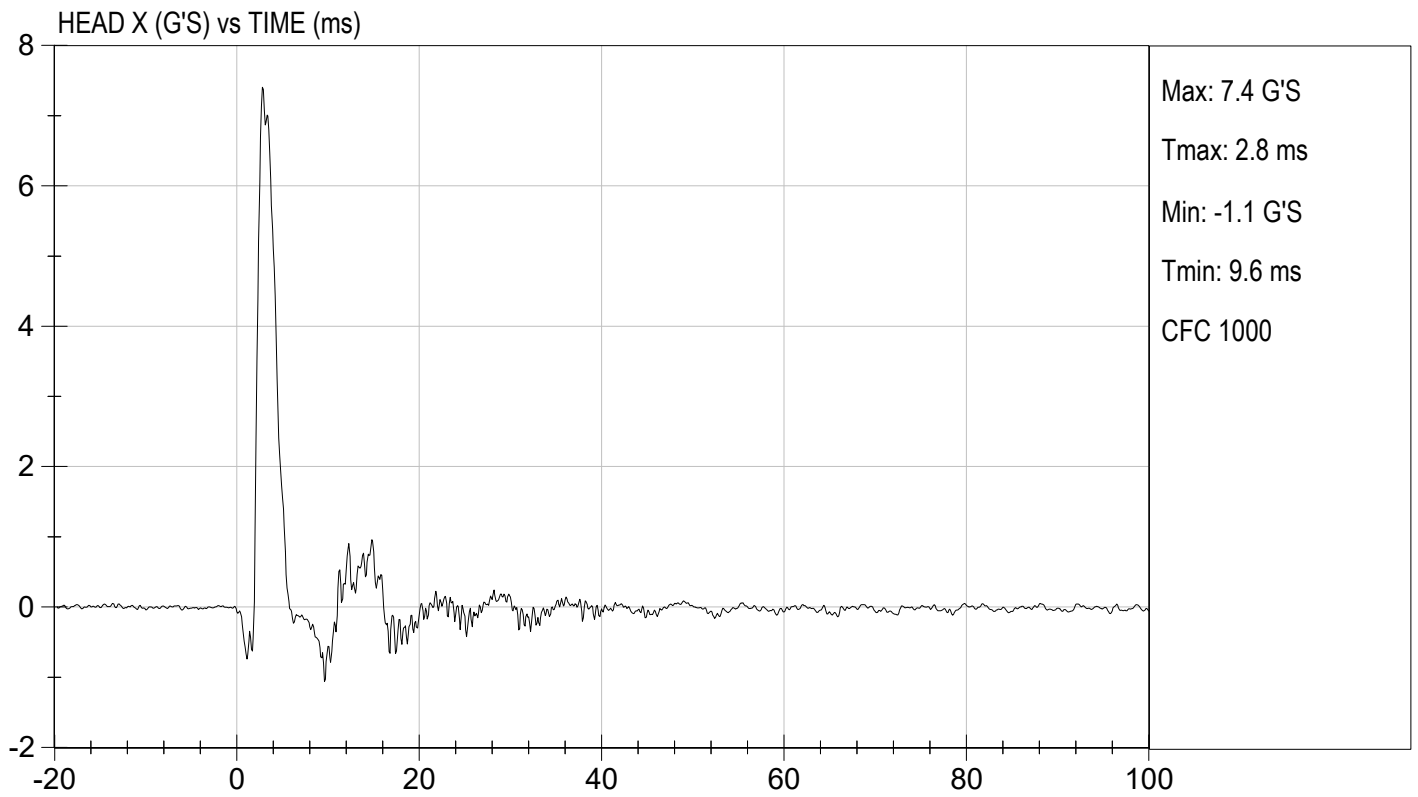
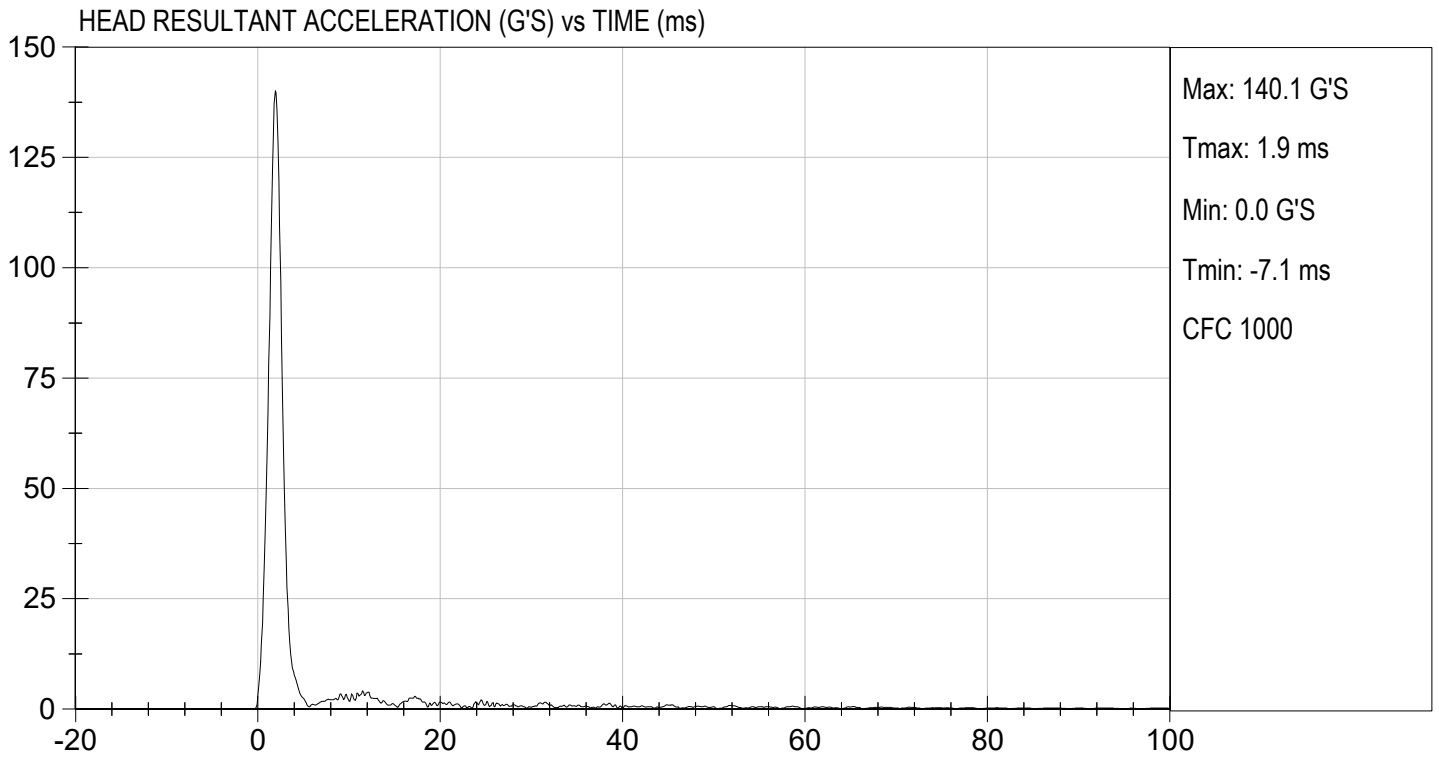
Test ID: D231181

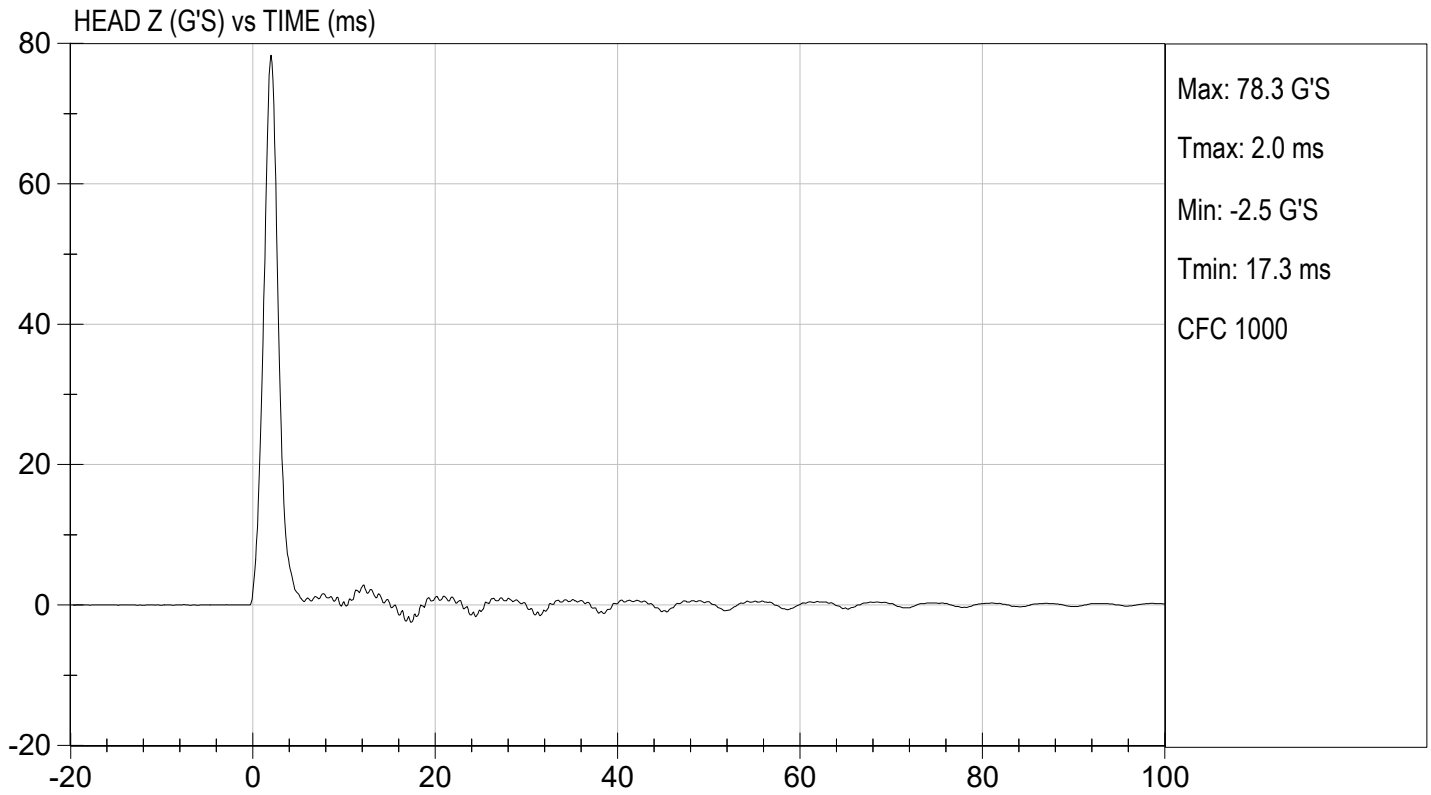
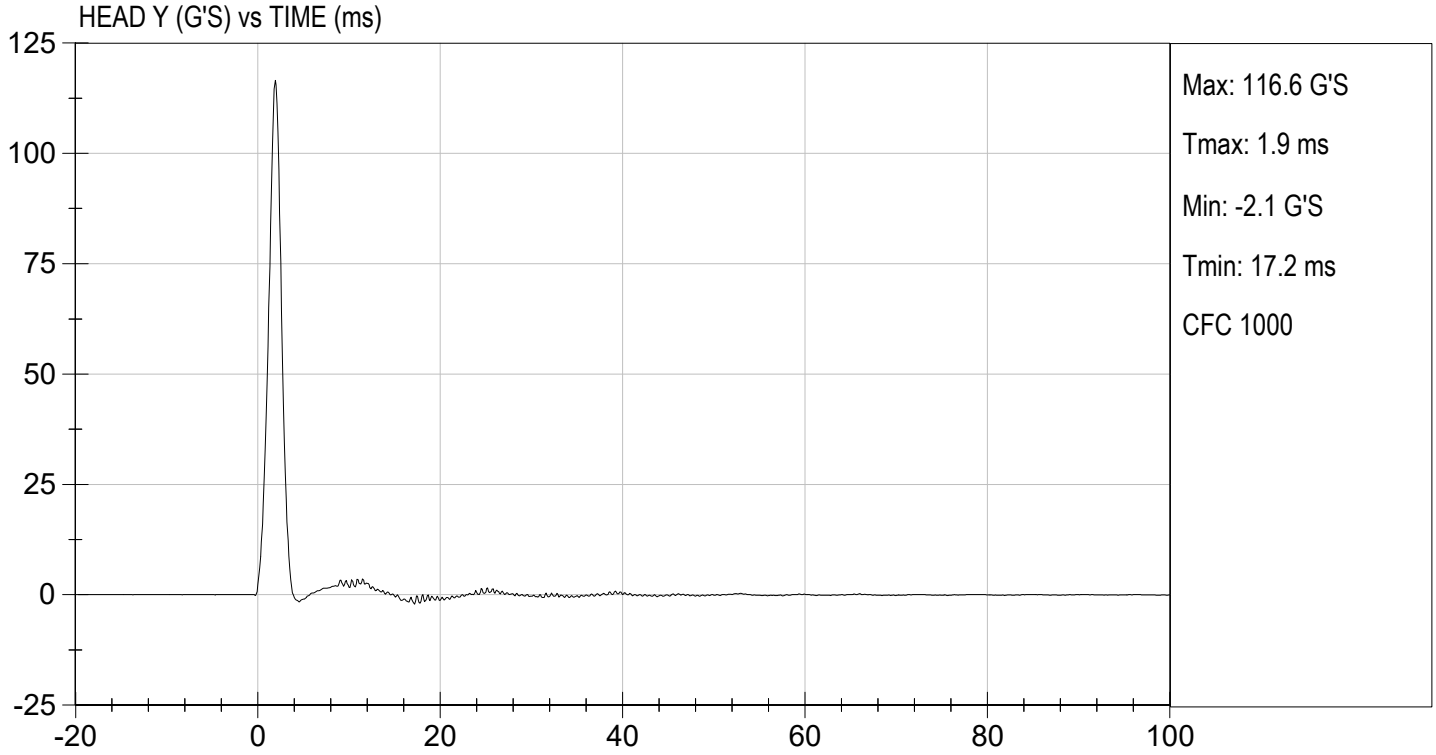
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	45	Pass
Peak Resultant Acceleration	G's	125 to 155	140	Pass
Peak Longitudinal Acceleration	G's	<= +/- 15.0	7.4	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 15% of peak	Yes	Pass
Overall Test Results				Pass


 Laboratory Technician

05/12/2023
 Test Date


 Approved By





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NECK PENDULUM TEST
ES-2re DUMMY

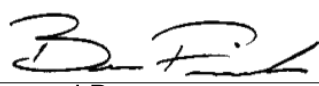
ATD Serial No: F032

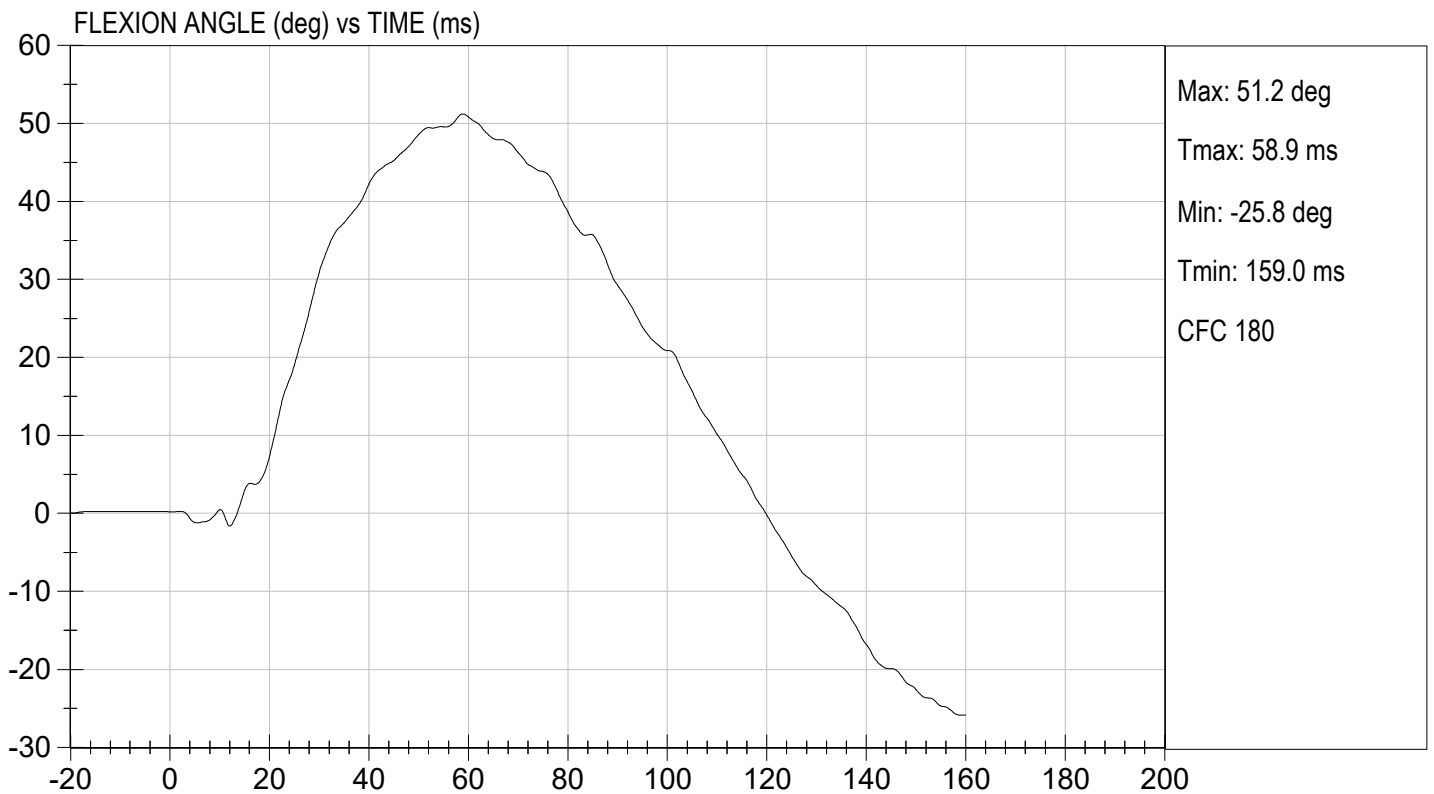
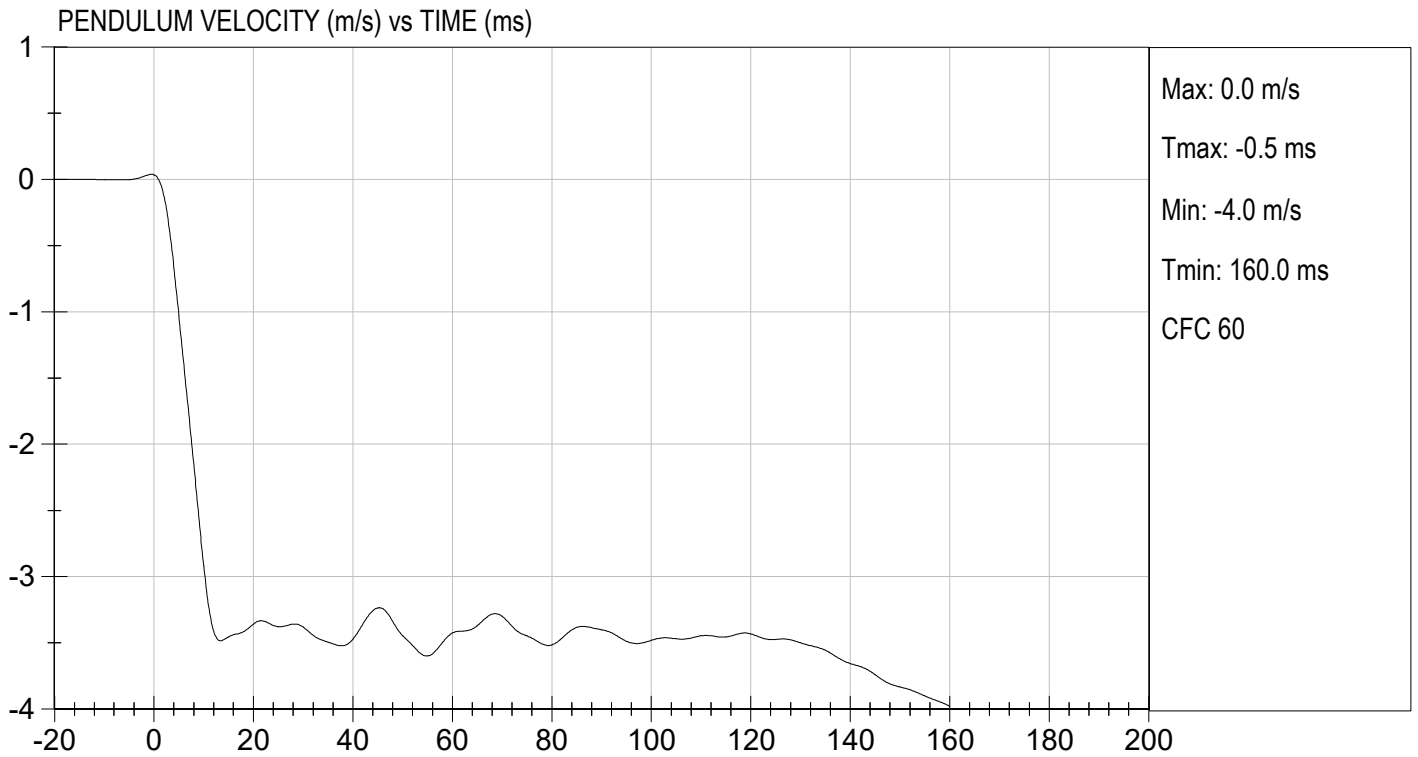
Test I.D.: D231182

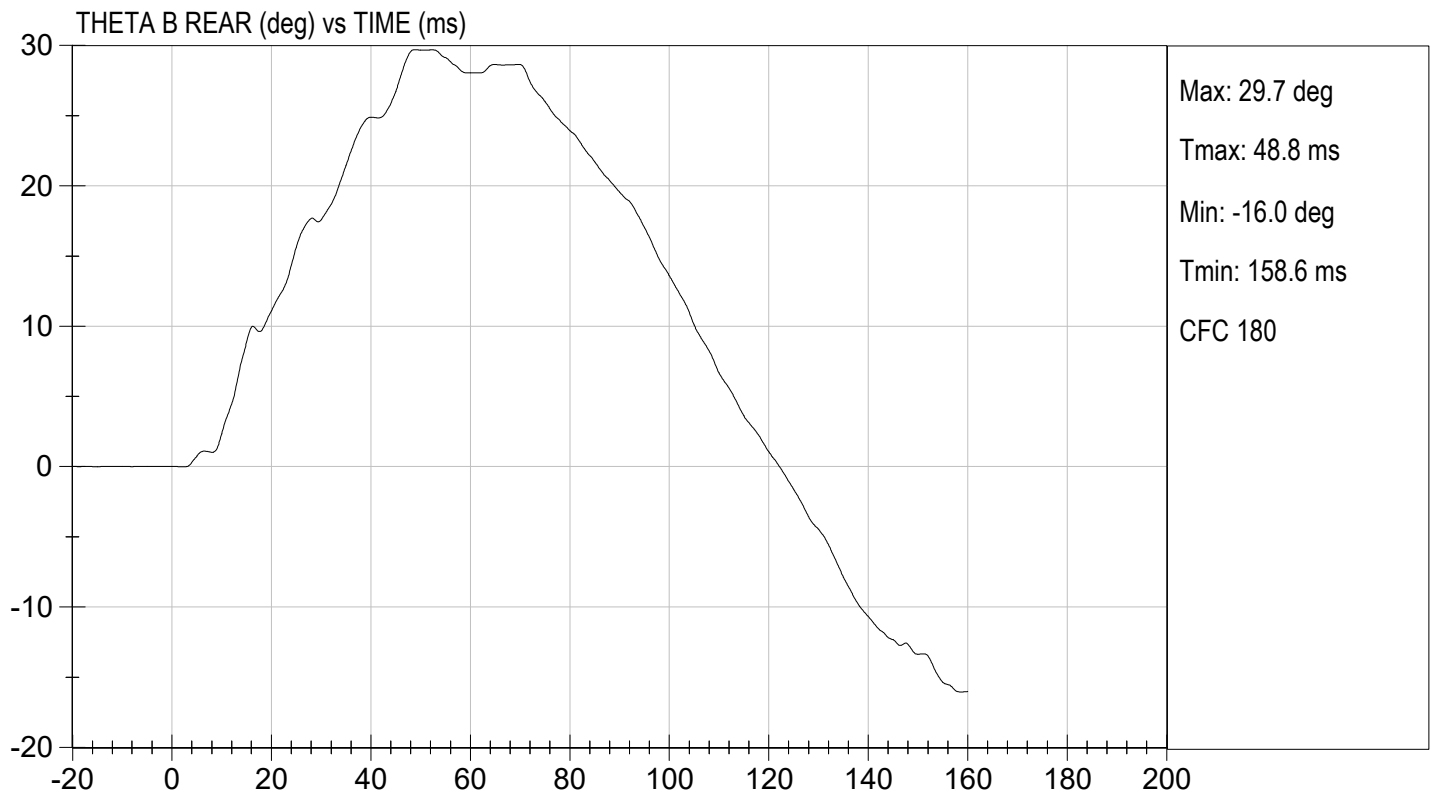
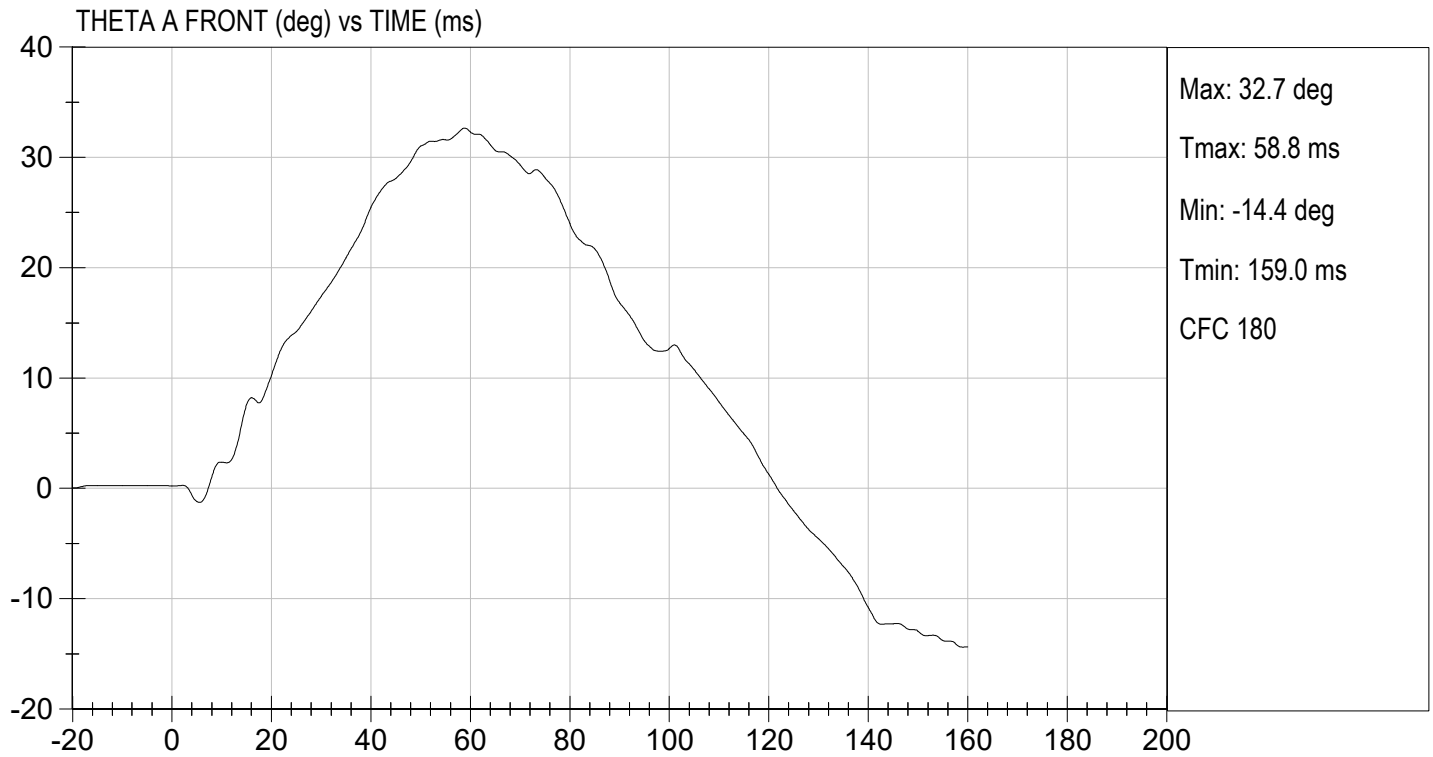
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity		%	10 to 70	43	Pass
Pendulum Speed		m/s	3.30 to 3.50	3.43	Pass
Pendulum Velocity	1 ms	m/s	-0.05 to 0.00	-0.01	Pass
	3 ms	m/s	-0.25 to -0.375	-0.35	Pass
	14 ms	m/s	-3.20 to -3.70	-3.48	Pass
	17 ms	m/s	>= -3.70	-3.43	Pass
Maximum Flexion Angle		deg	49.0 to 59.0	51.2	Pass
Time of Maximum Flexion Angle		ms	54.0 to 66.0	58.9	Pass
Head Rotation Decay Time to 0 Degree		ms	53.0 to 88.0	61.0	Pass
Overall Results					Pass


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 05/12/2023
 Test Date


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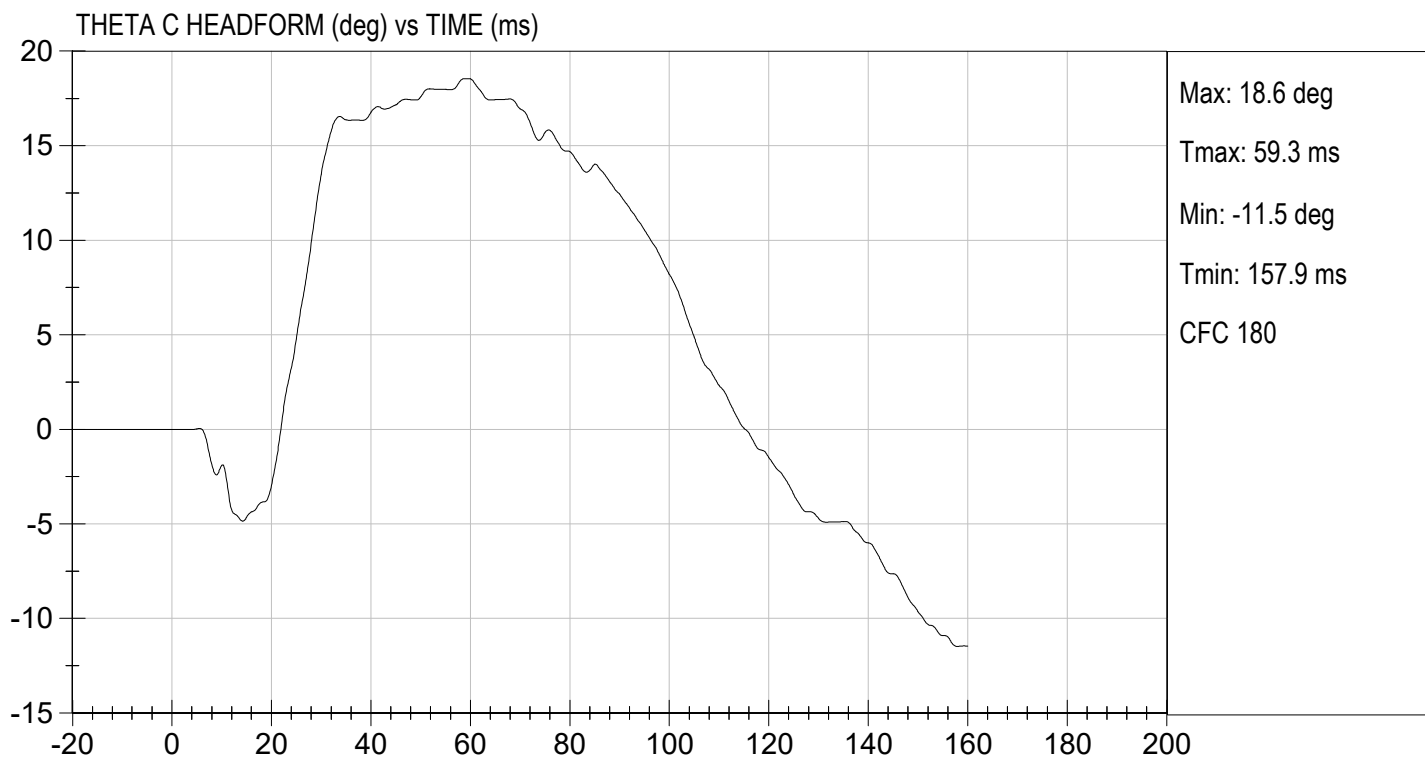






TEST DESC: NECK BENDING
VELOCITY: 11.26 ft/s, 3.43 m/s

TEST DATE: 05/12/2023
TEST #: D231182



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SHOULDER IMPACT TEST
ES-2re DUMMY

ATD Serial No: F032

Test I.D: D231183

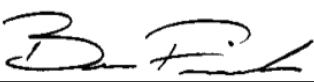
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	44	Pass
Pendulum Speed	m/s	4.20 to 4.40	4.3	Pass
Peak Impactor Acceleration	G's	7.5 to 10.5	8.2	Pass
Overall Test Results				Pass



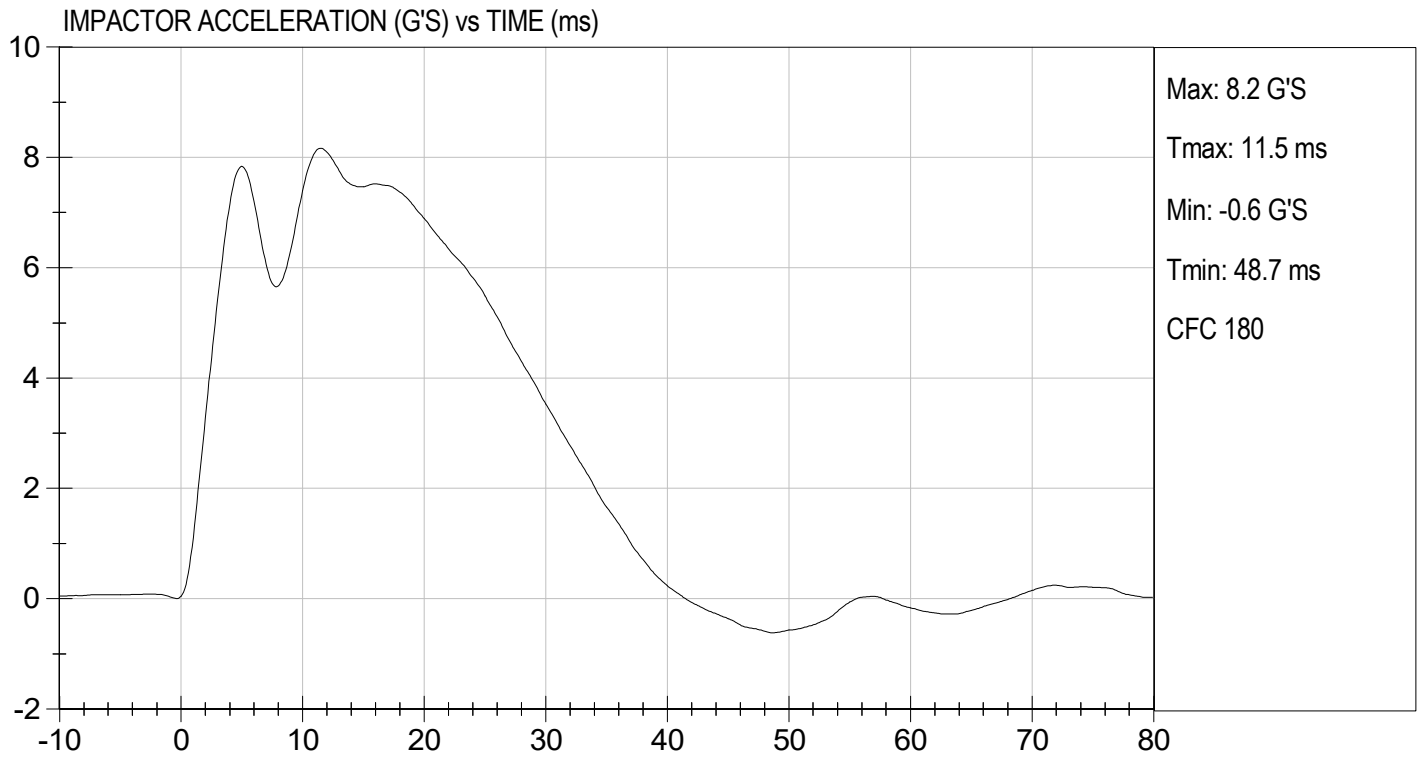
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05/12/2023

Test Date



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UPPER RIB TEST

ES-2re DUMMY

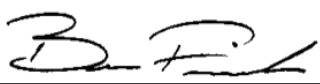
ATD Serial No: F032

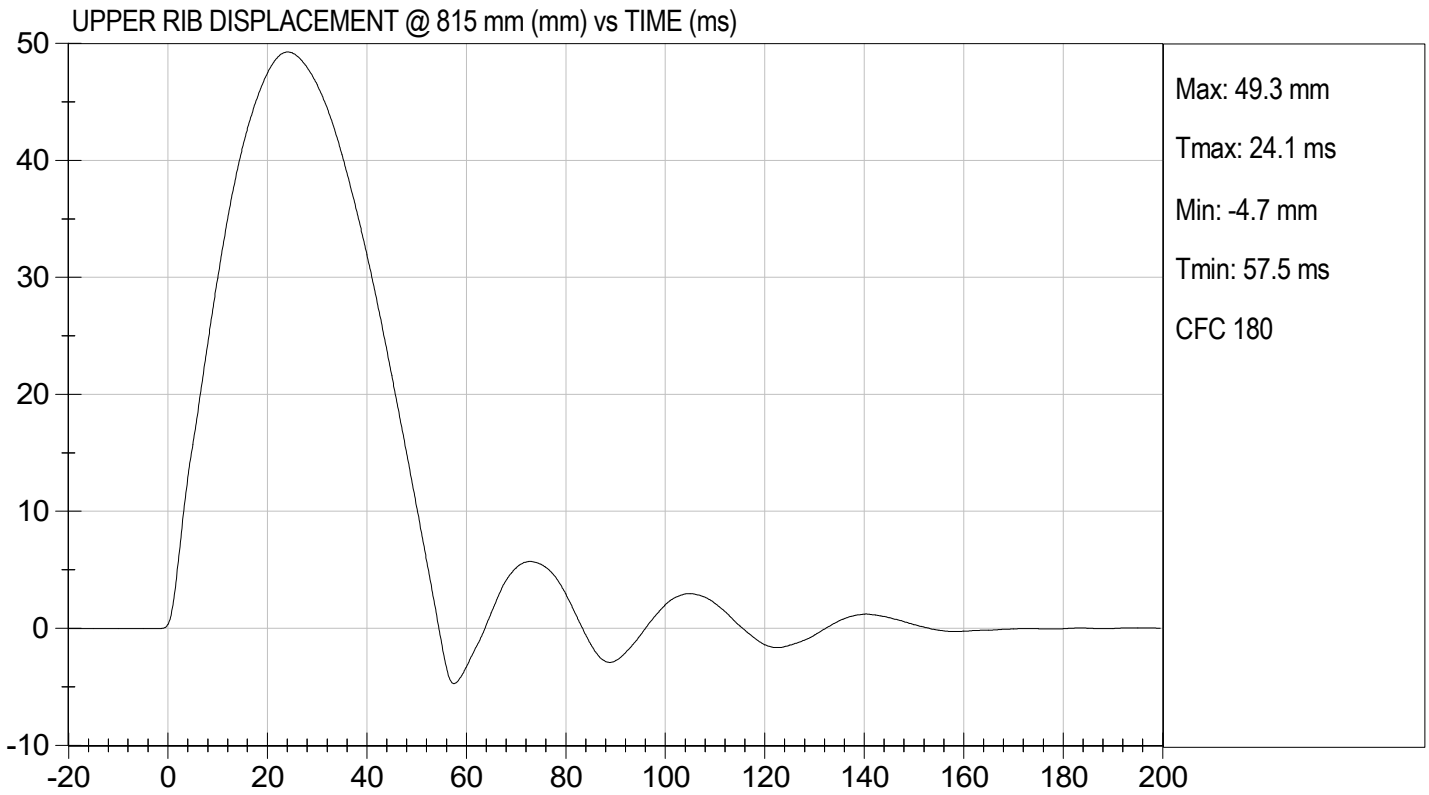
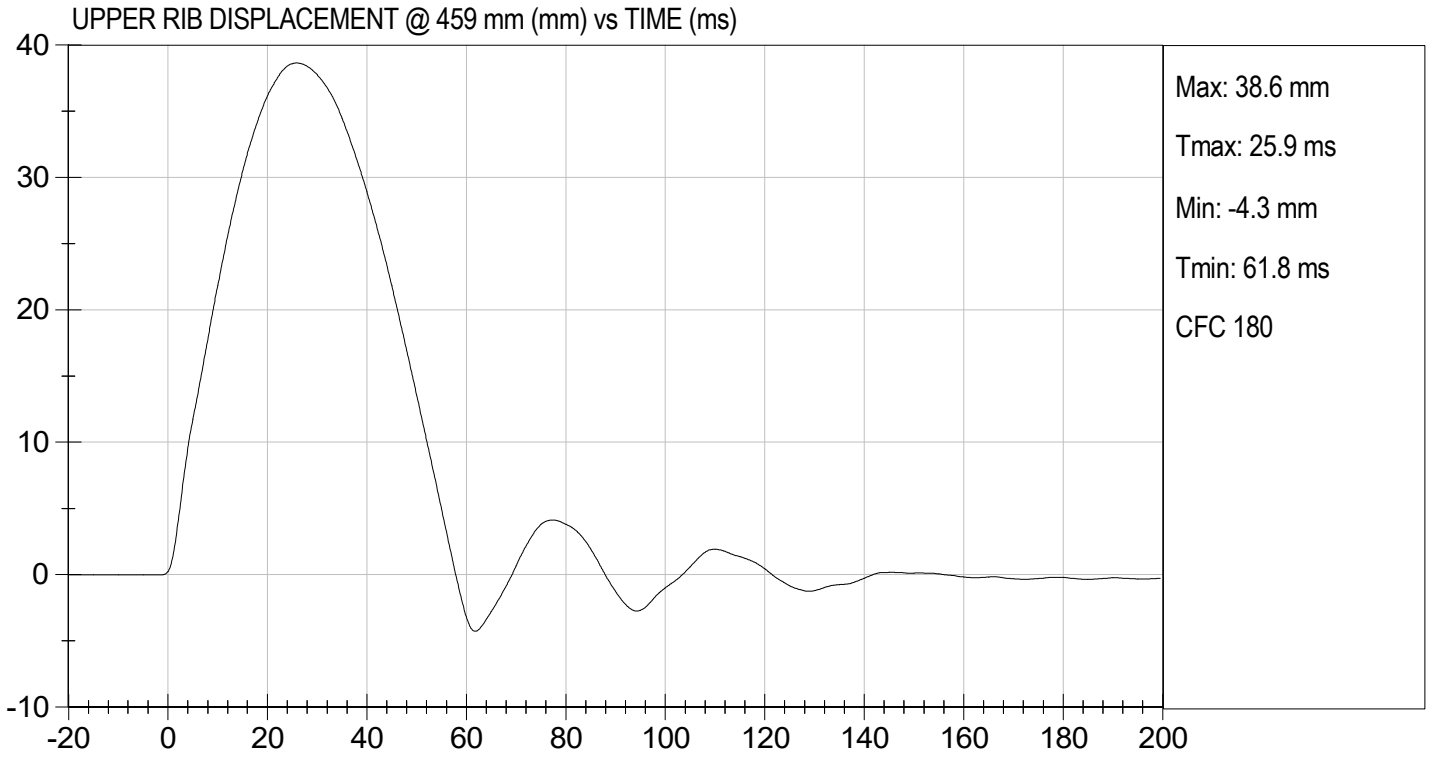
Test I.D: D231184

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	43	Pass
Displacement at 459 mm	mm	36.0 to 40.0	38.6	Pass
Displacement at 815 mm	mm	46.0 to 51.0	49.3	Pass
Overall Test Results				Pass


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05/12/2023
Test Date


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MID RIB TEST

ES-2re DUMMY

ATD Serial No: F032

Test I.D.: D231185

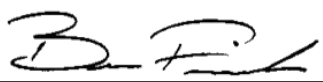
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	43	Pass
Displacement at 459 mm	mm	36.0 to 40.0	39.6	Pass
Displacement at 815 mm	mm	46.0 to 51.0	49.8	Pass
			Overall Test Results	Pass



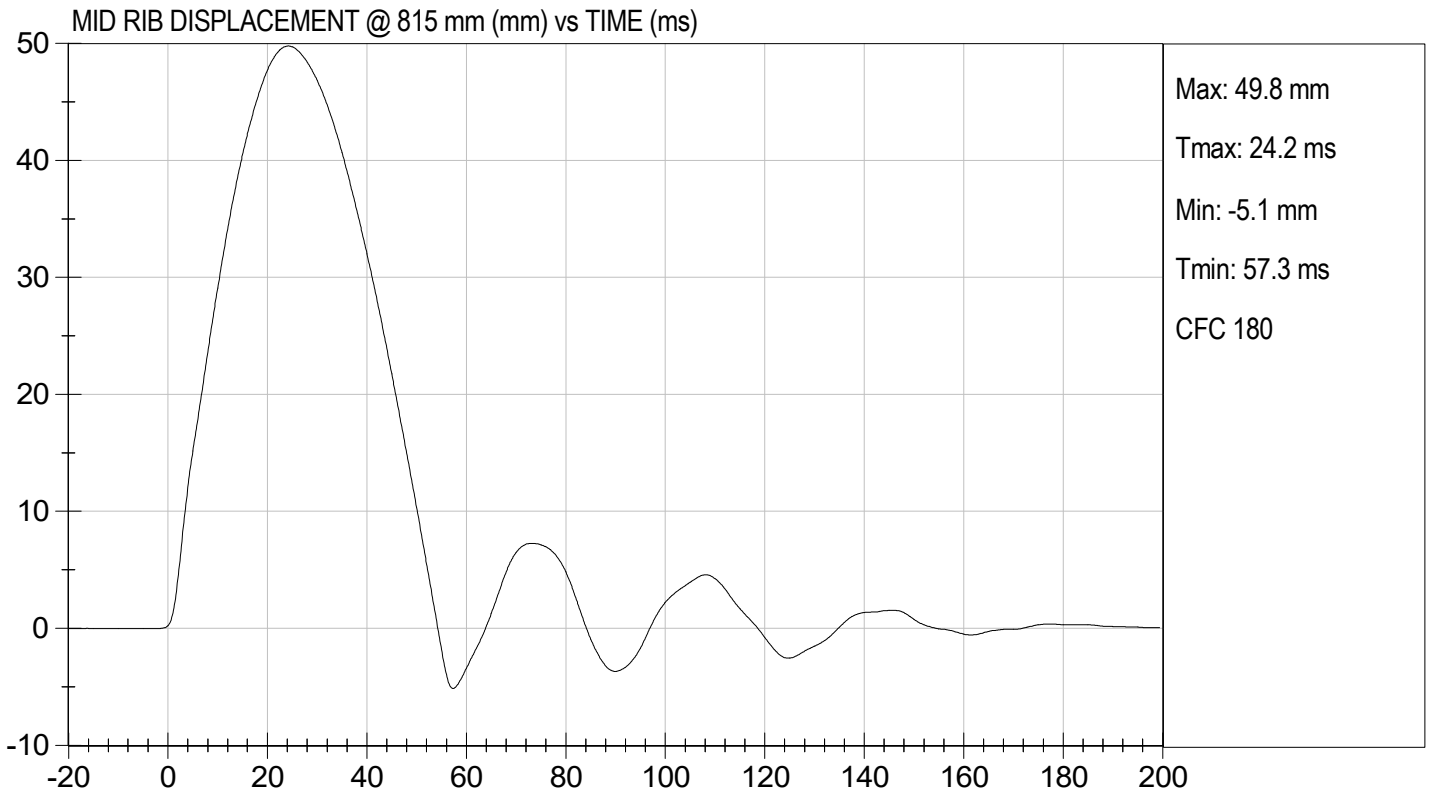
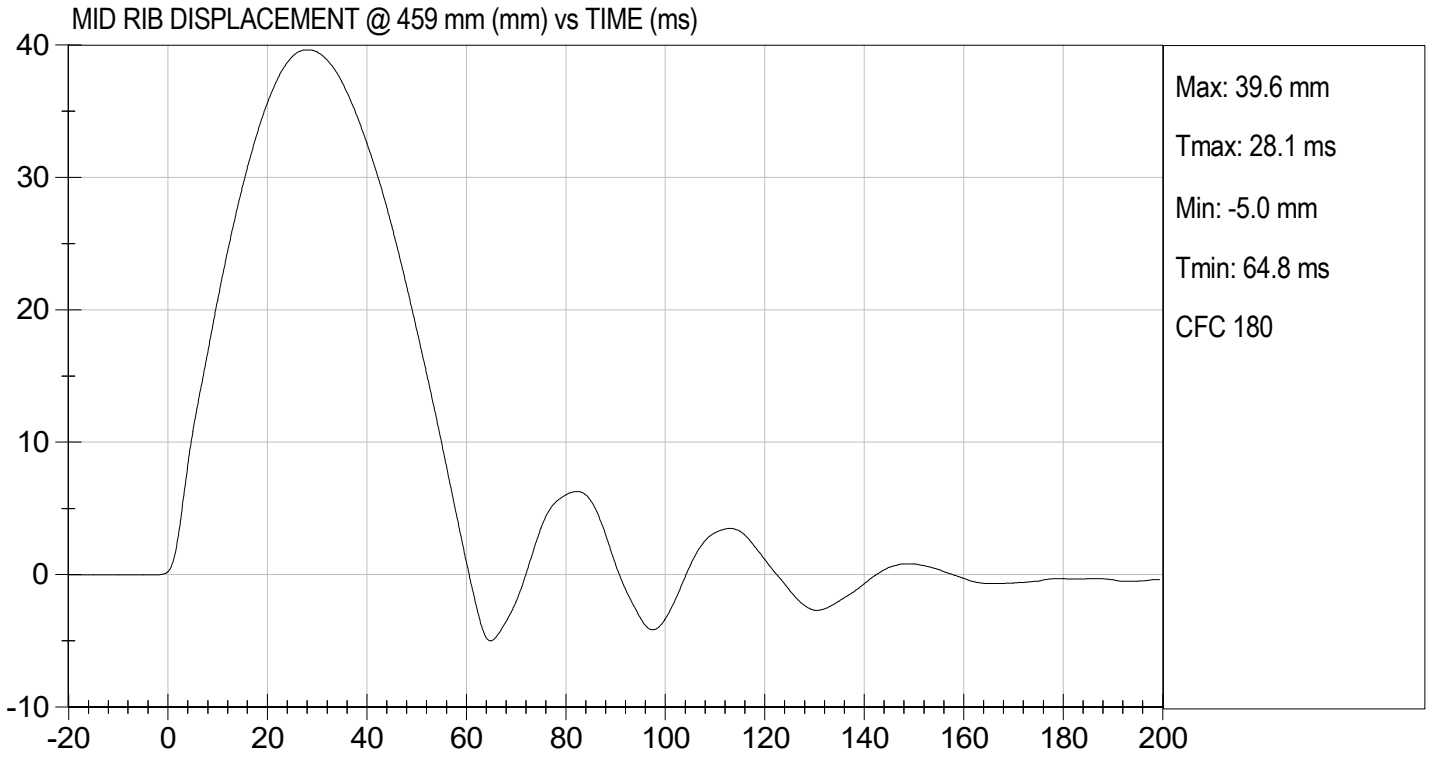
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Test Date



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LOWER RIB TEST

ES-2re DUMMY

ATD Serial No: F032

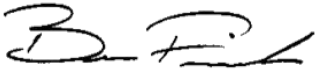
Test I.D.: D231186

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	43	Pass
Displacement at 459 mm	mm	36.0 to 40.0	38.0	Pass
Displacement at 815 mm	mm	46.0 to 51.0	49.1	Pass
			Overall Test Results	Pass

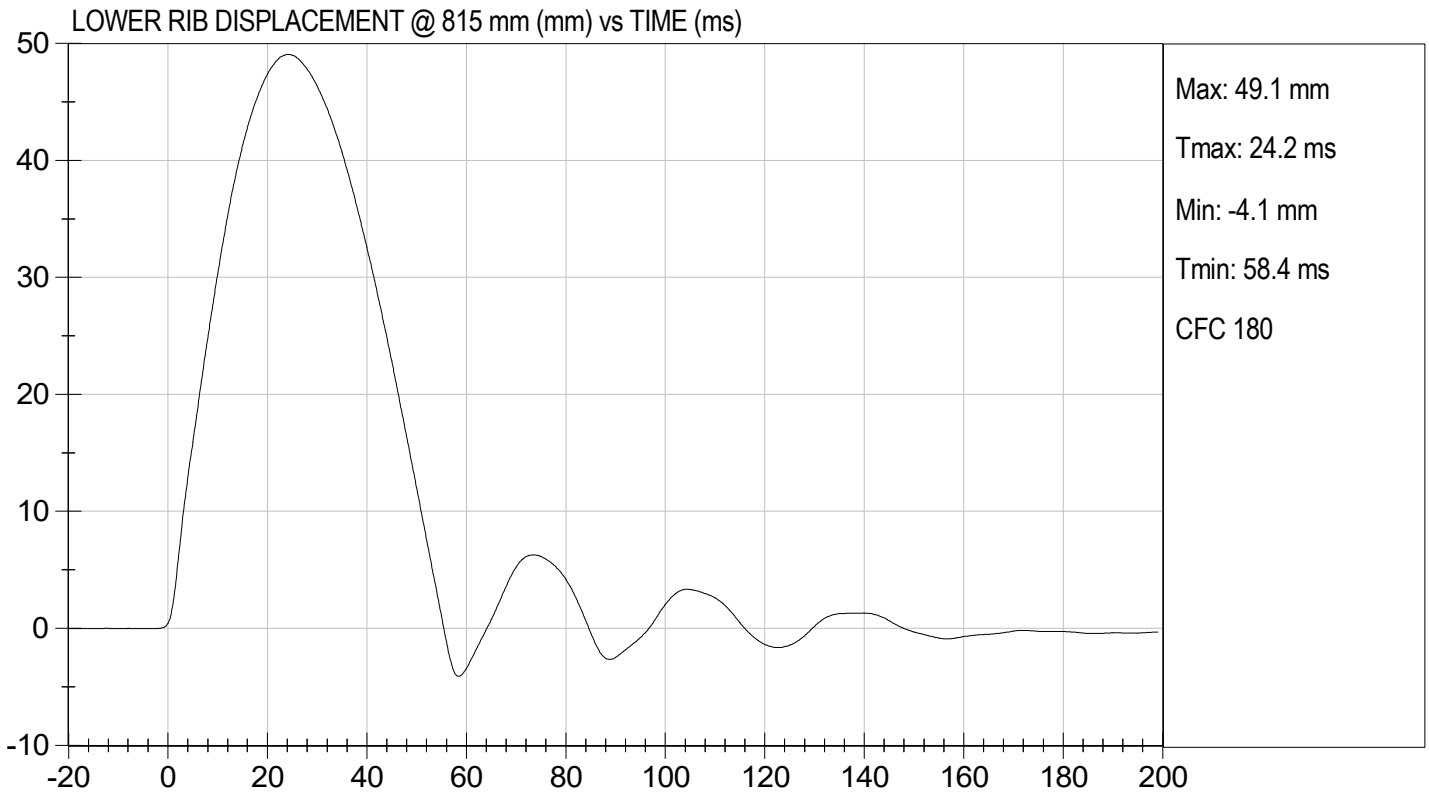
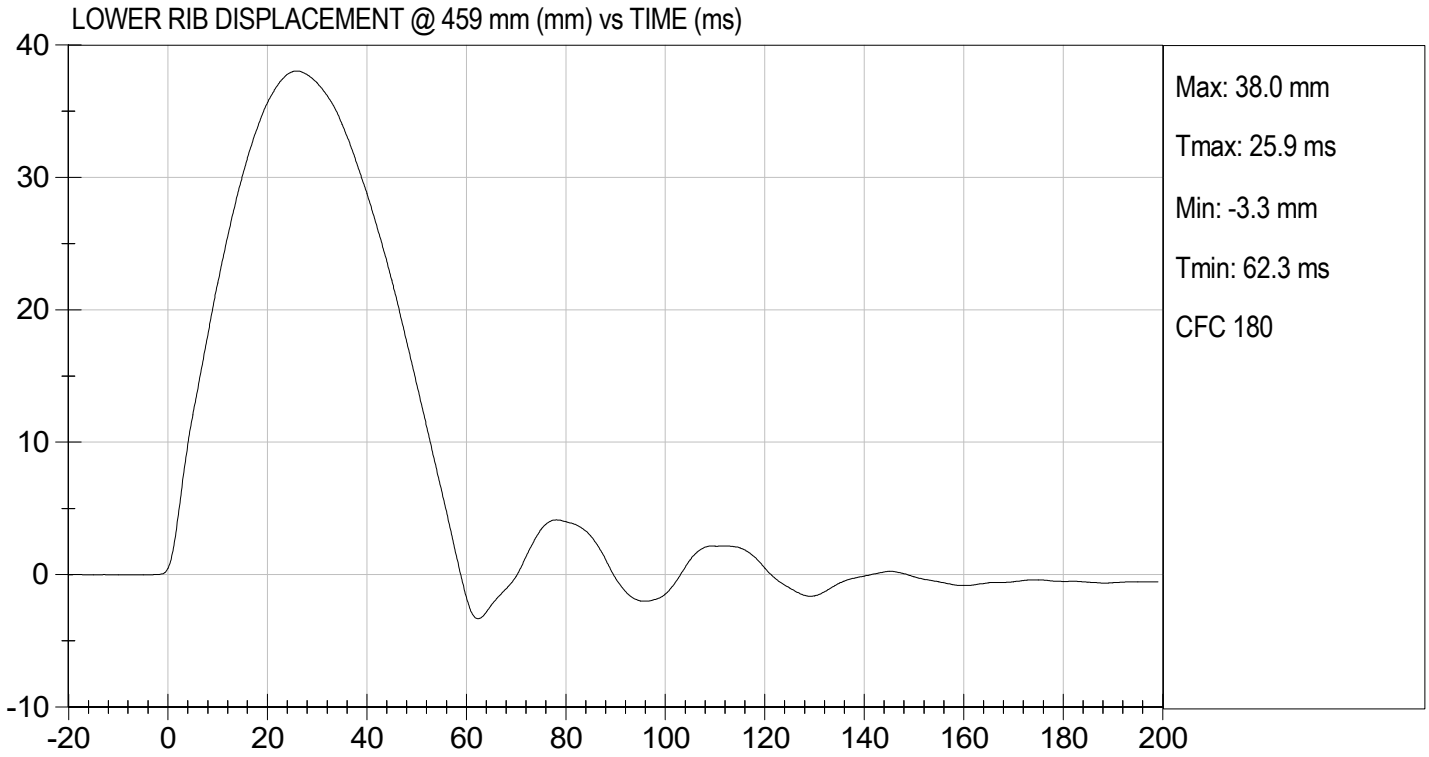


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Test Date



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ABDOMEN TEST

ES-2re DUMMY

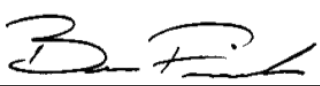
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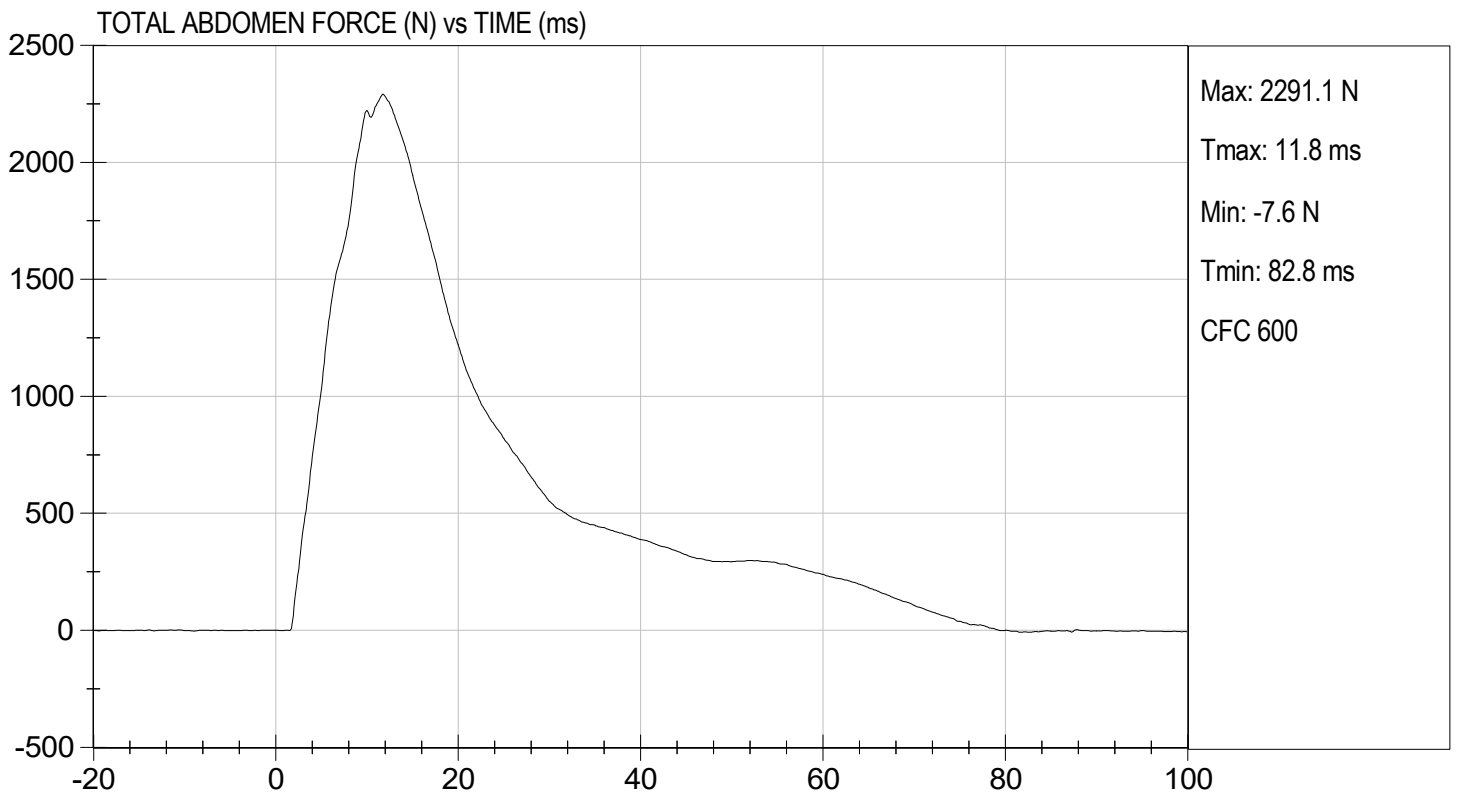
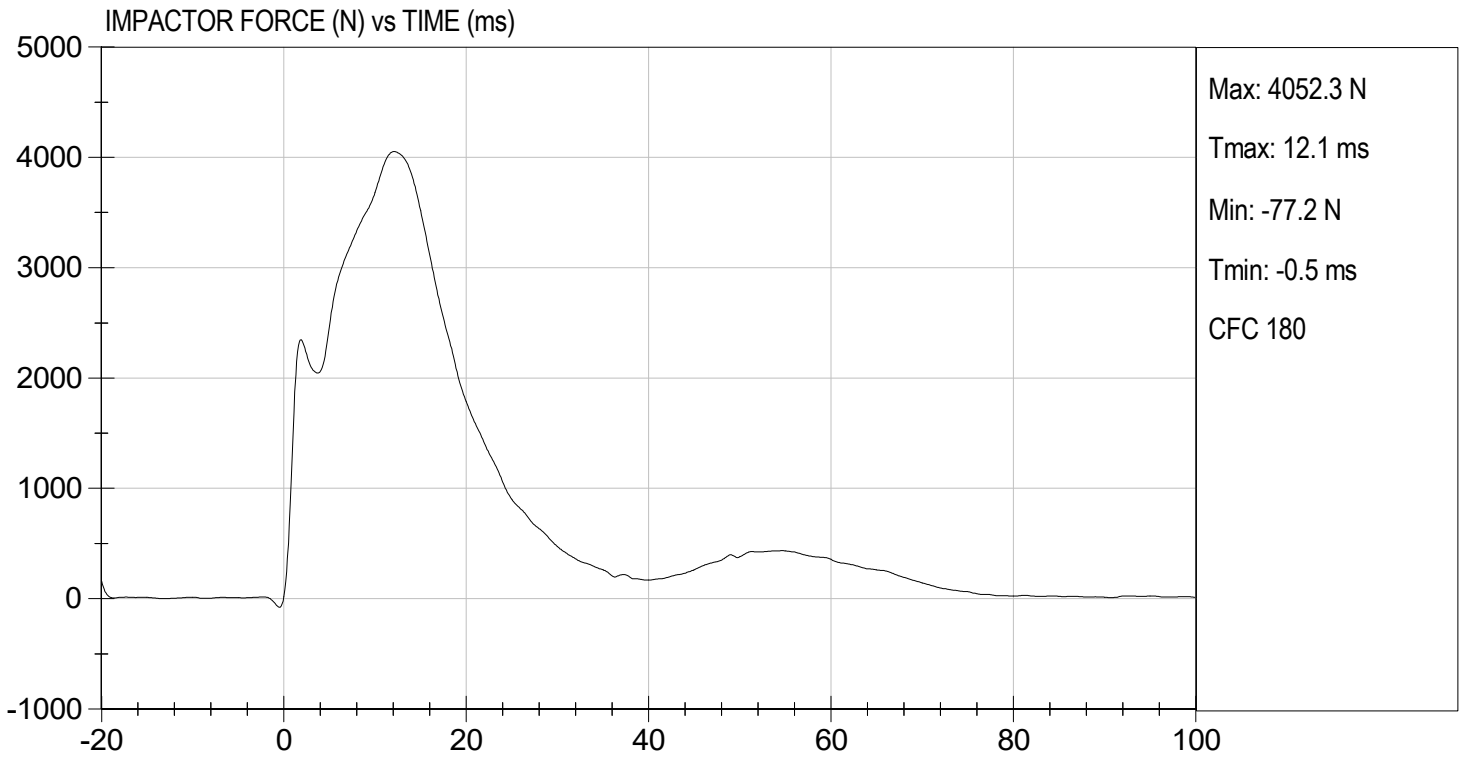
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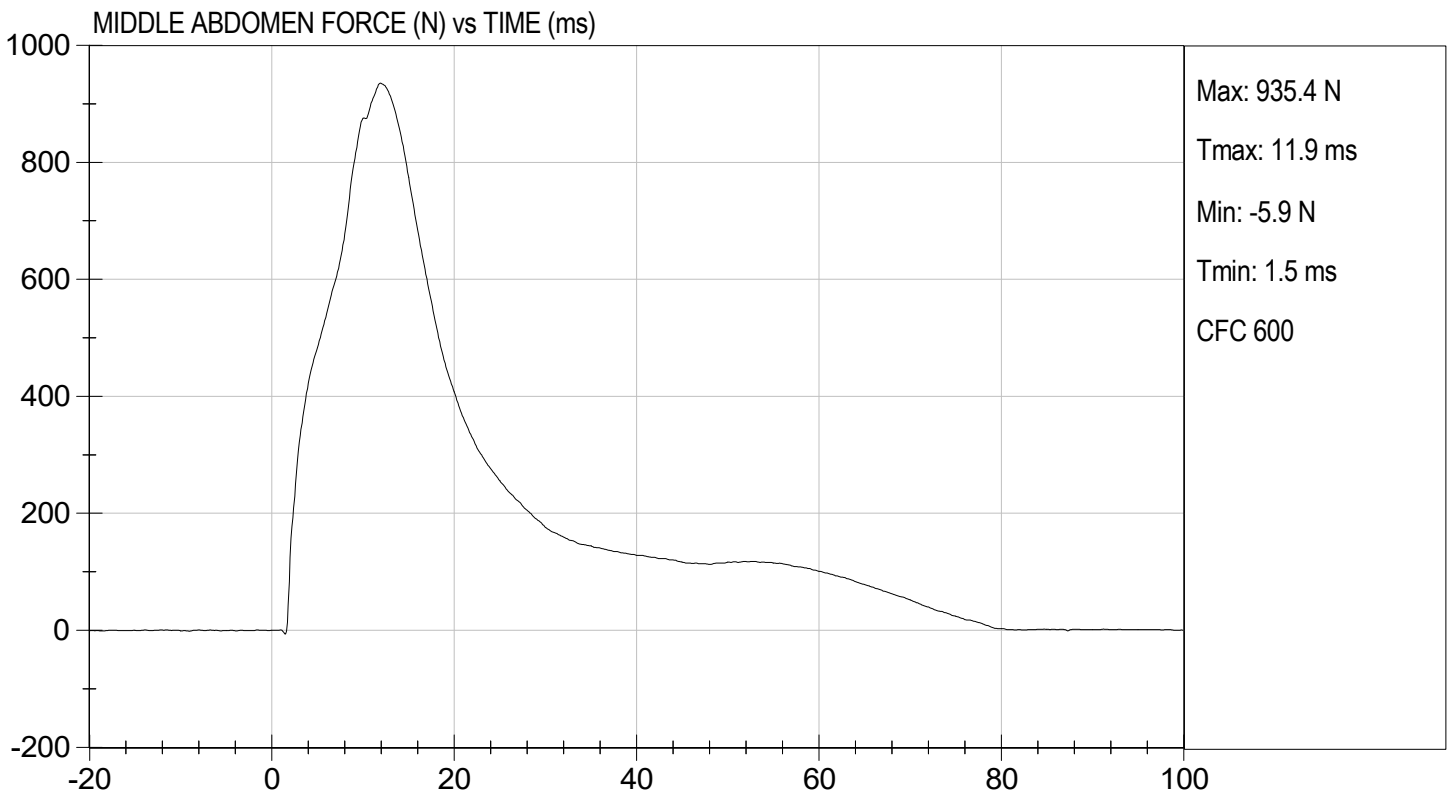
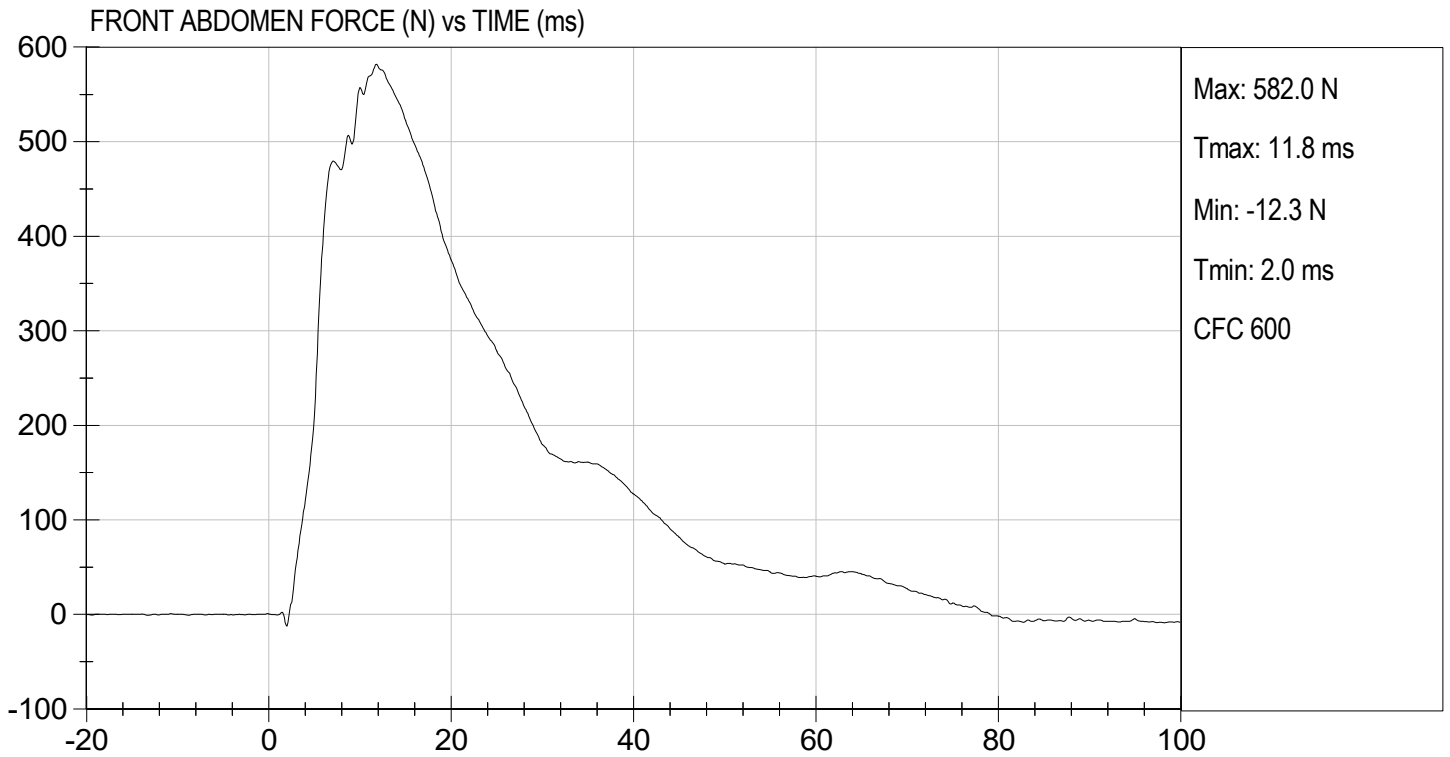
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	44	Pass
Probe Speed	m/s	3.90 to 4.10	4.08	Pass
Maximum Impactor Force	N	4000 to 4800	4052	Pass
Time of Maximum Impactor Force	ms	10.6 to 13.0	12.1	Pass
Maximum Total Abdomen Force	N	2200 to 2700	2291	Pass
Time of Maximum Abdomen Force	ms	10.0 to 12.3	11.8	Pass
Overall Test Results				Pass

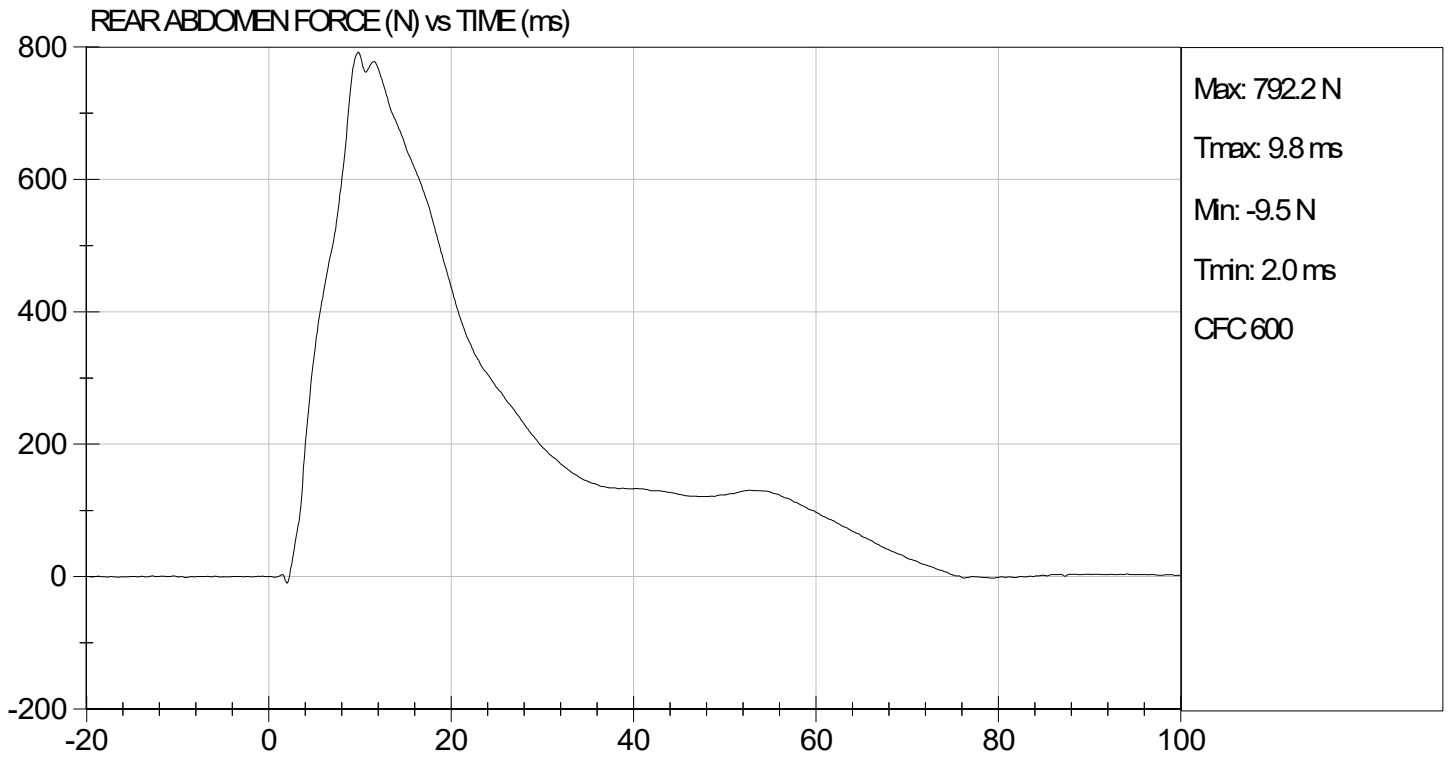

Laboratory Technician

 05/12/2023
Test Date


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LUMBAR SPINE TEST
ES-2re DUMMY

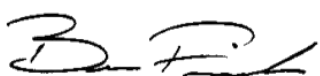
ATD Serial No: F032

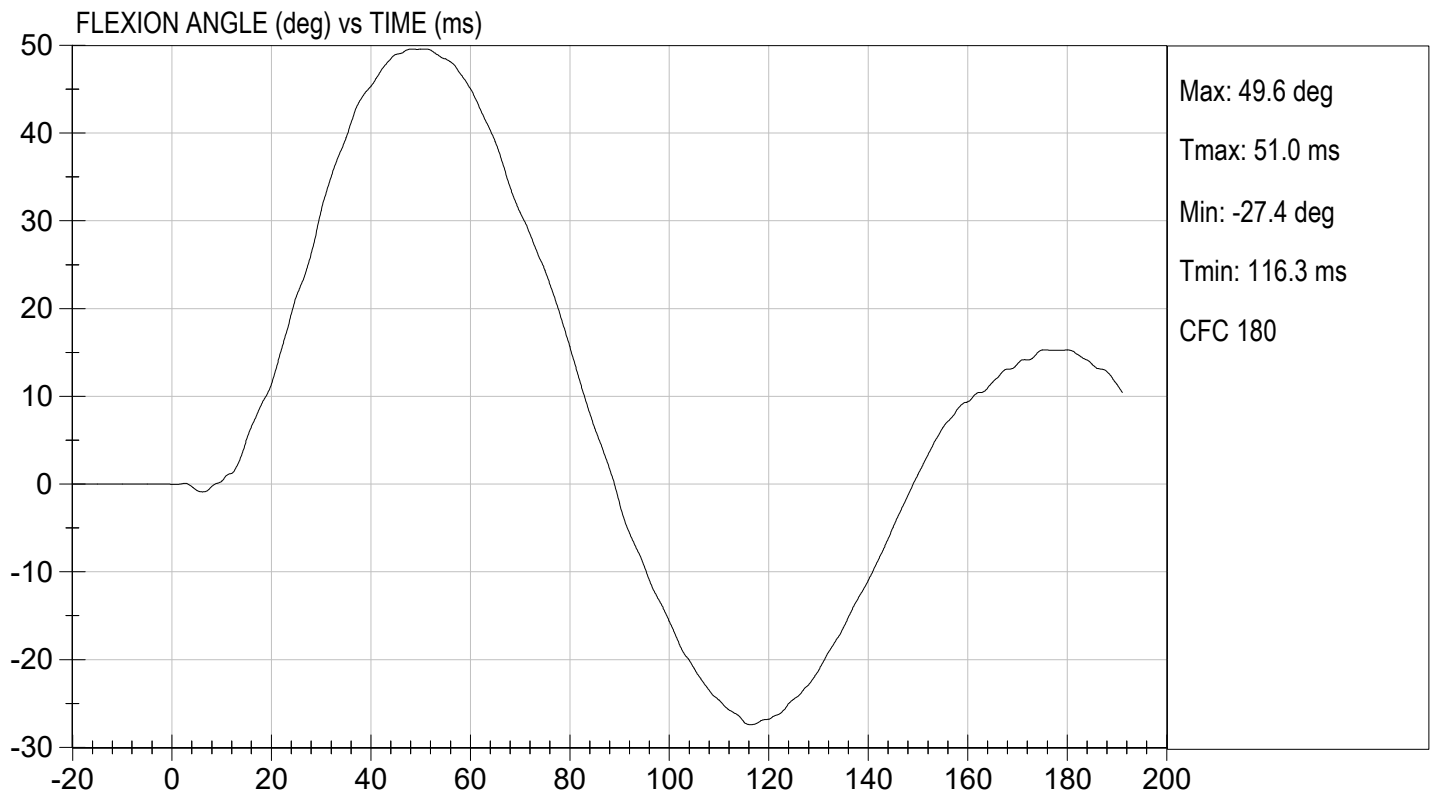
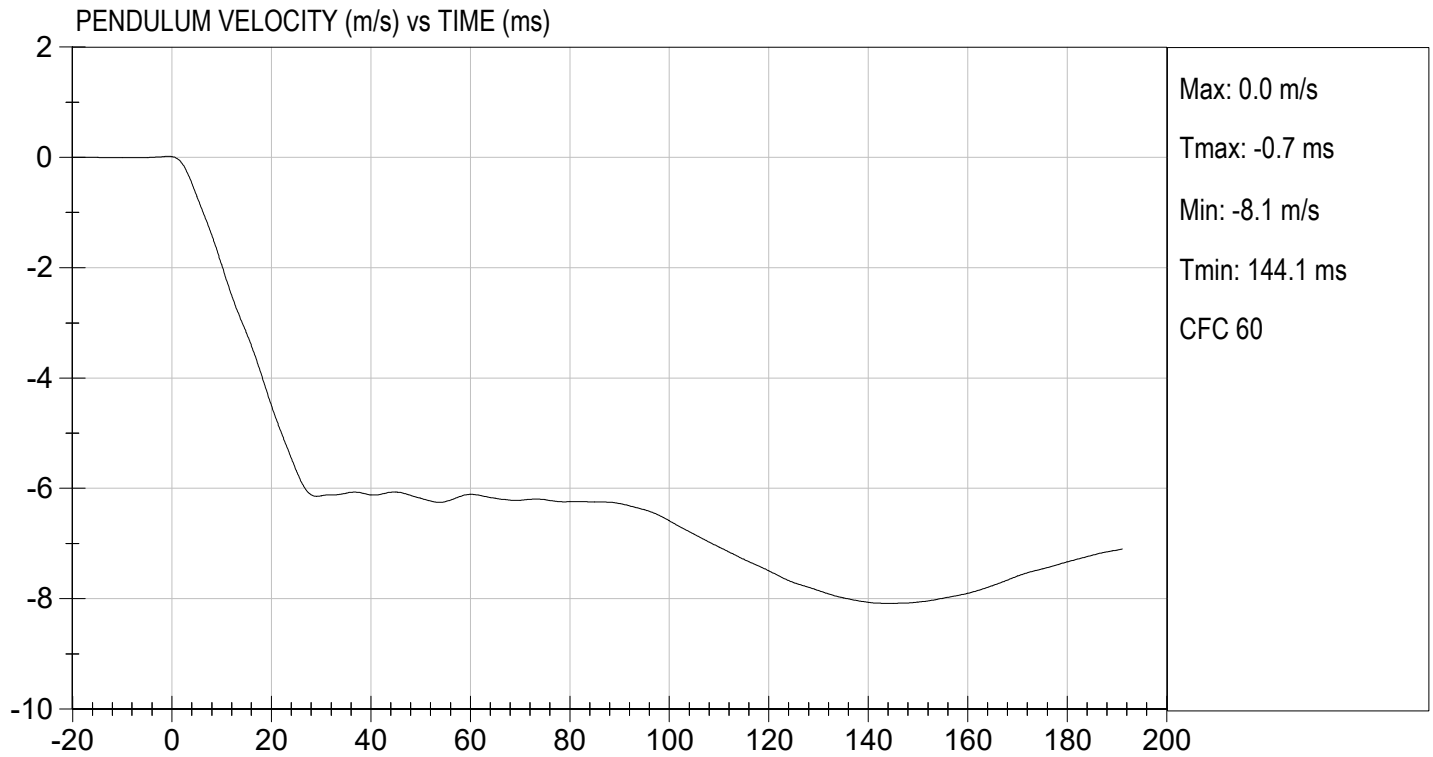
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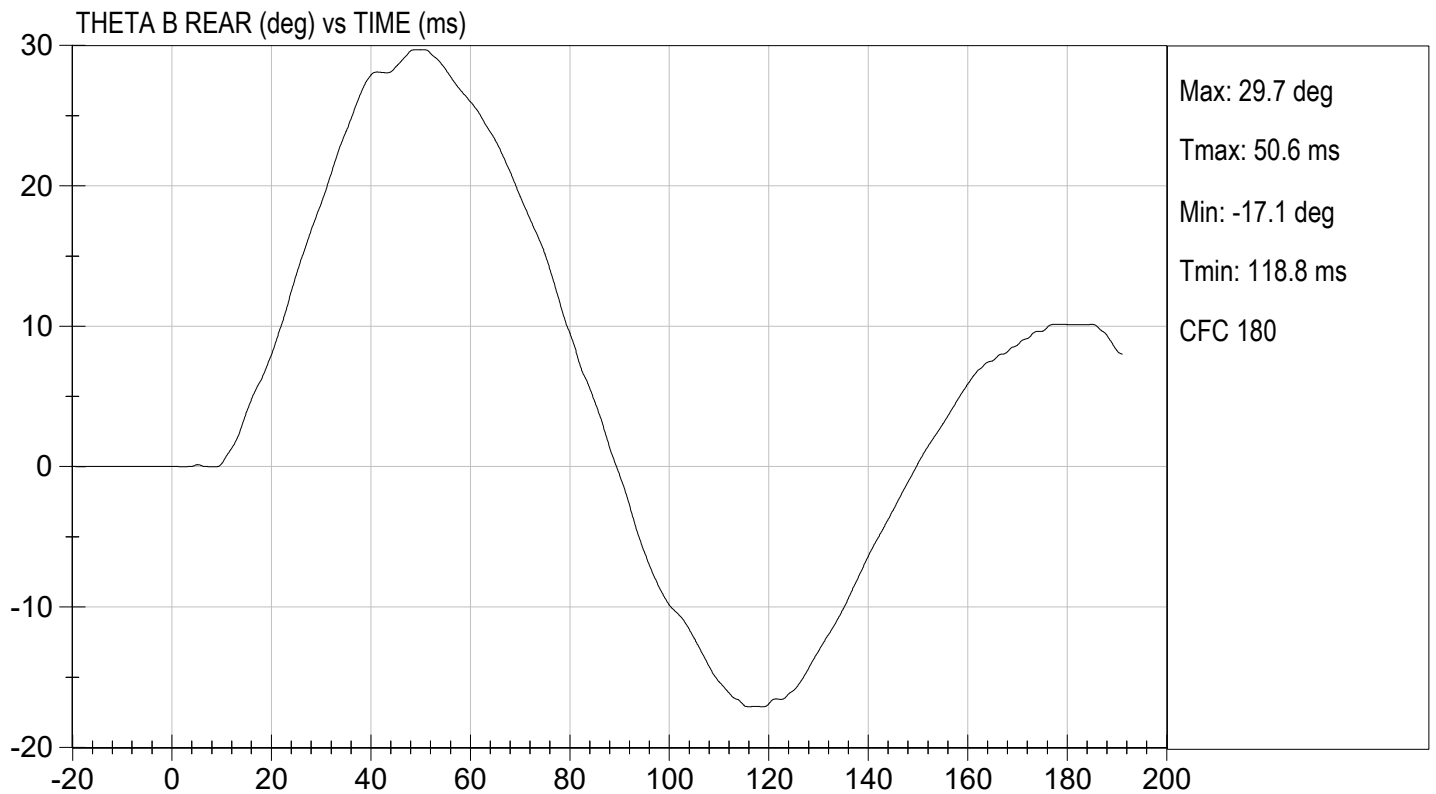
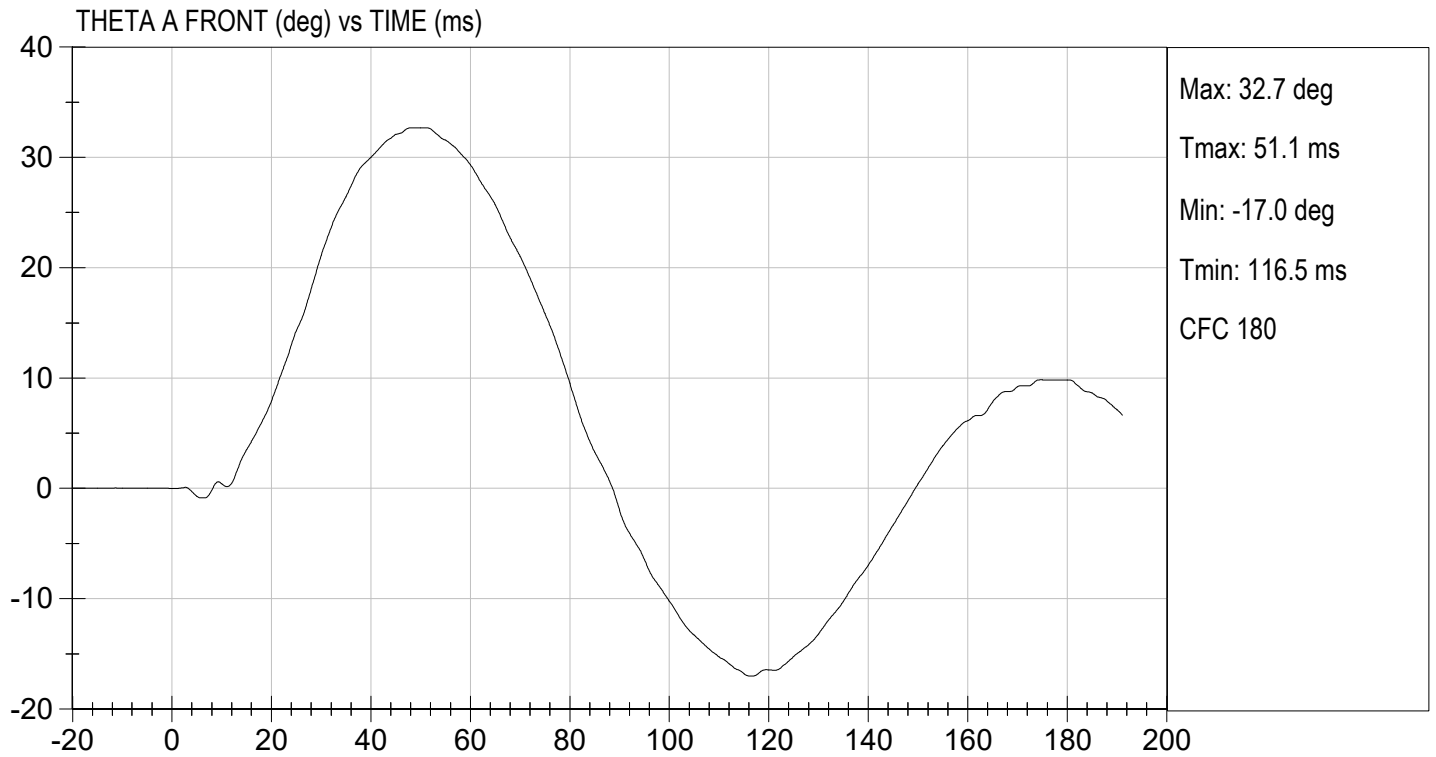
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity		%	10 to 70	43	Pass
Pendulum Speed		m/s	5.95 to 6.15	6.12	Pass
Pendulum Velocity	1 ms	m/s	-0.05 to 0.00	-0.02	Pass
	3.7 ms	m/s	-0.425 to -0.24	-0.403	Pass
	27 ms	m/s	-6.50 to -5.80	-6.03	Pass
	30 ms	m/s	>= -6.50	-6.13	Pass
Maximum Flexion Angle		deg	45.0 to 55.0	49.6	Pass
Time of Maximum Flexion Angle		ms	39.0 to 53.0	51.0	Pass
Headform Rotation Decay to Initial Position		ms	37 to 57	38	Pass
Overall Results					Pass

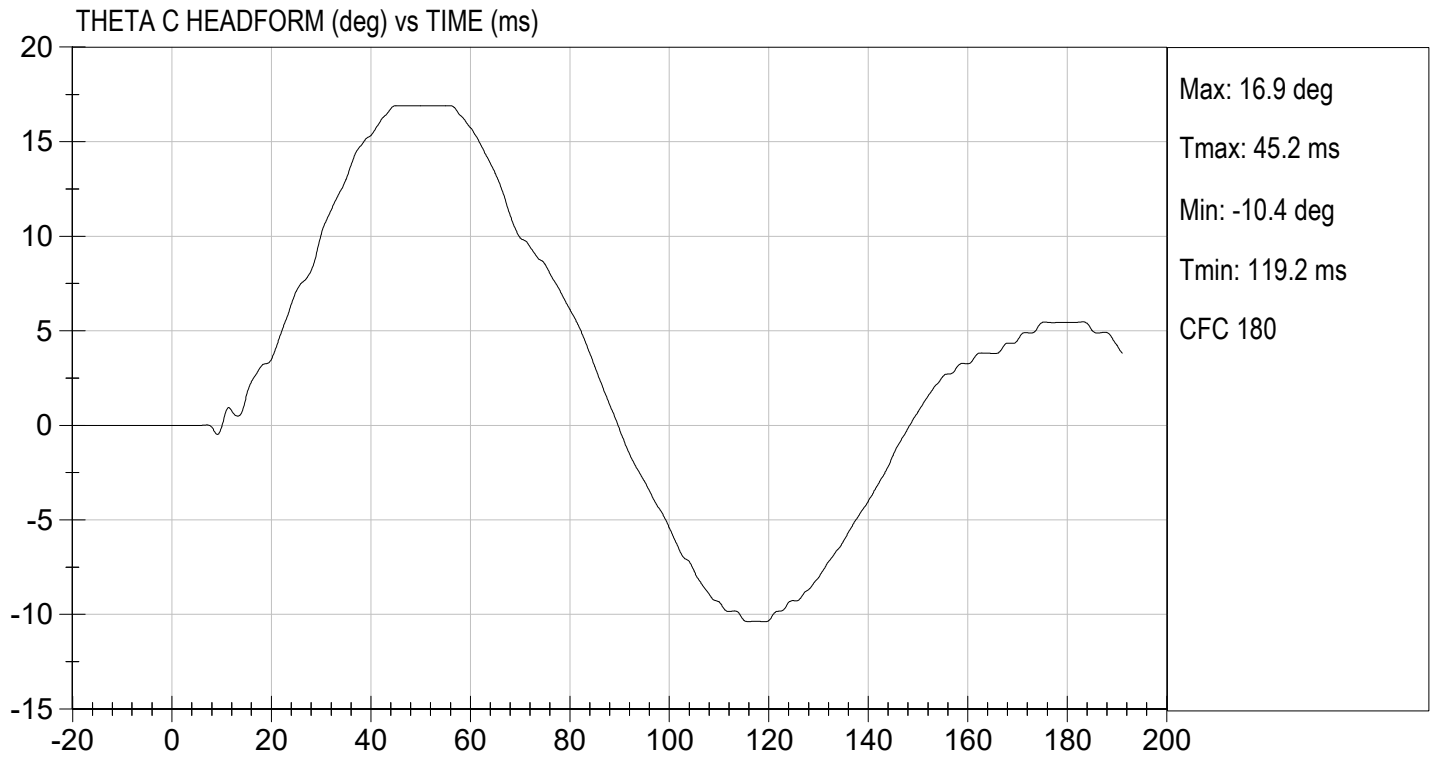

 Laboratory Technician

 05/12/2023
 Test Date


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MGA RESEARCH CORPORATION

PELVIS TEST
ES-2re DUMMY

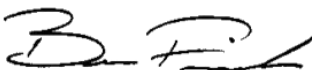
ATD Serial No: F032

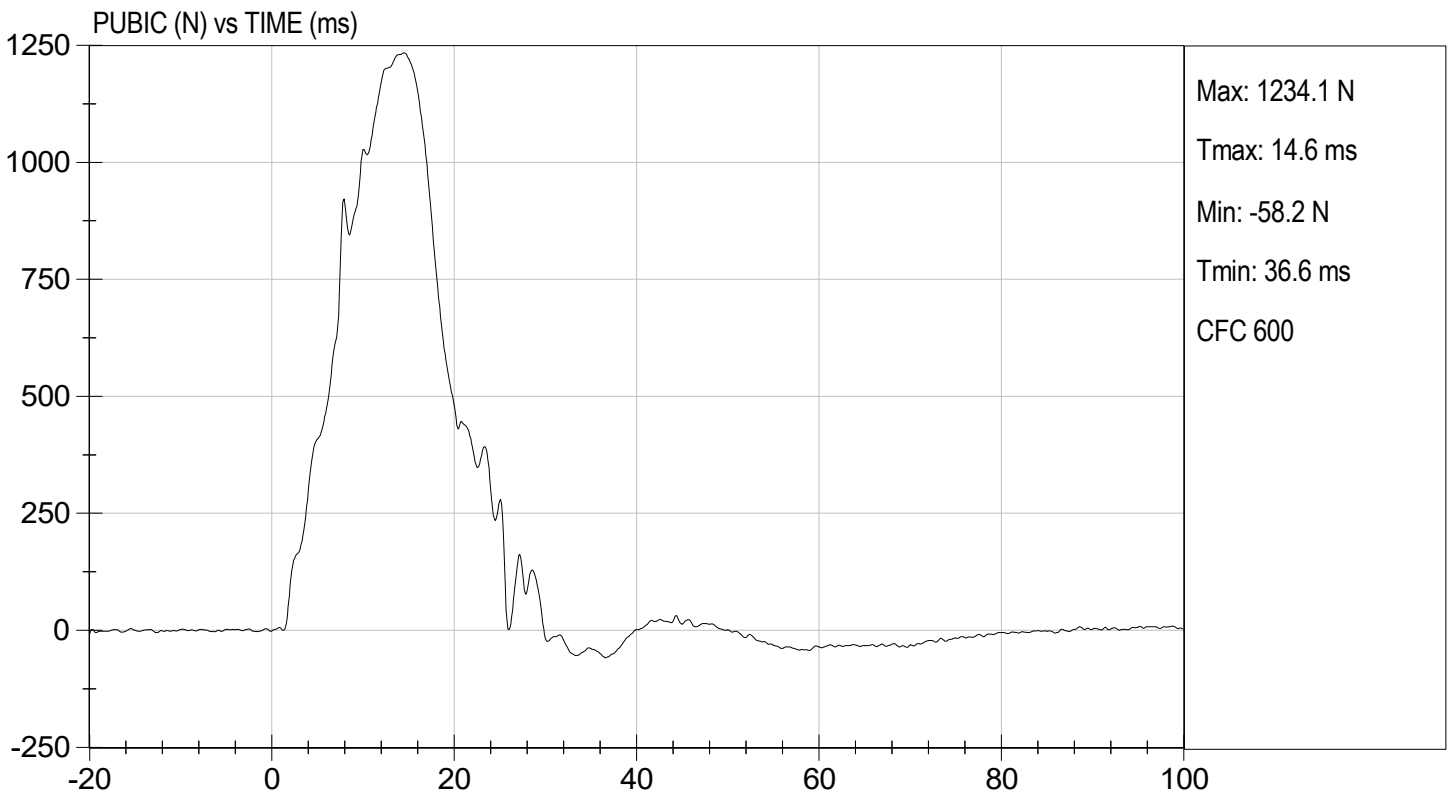
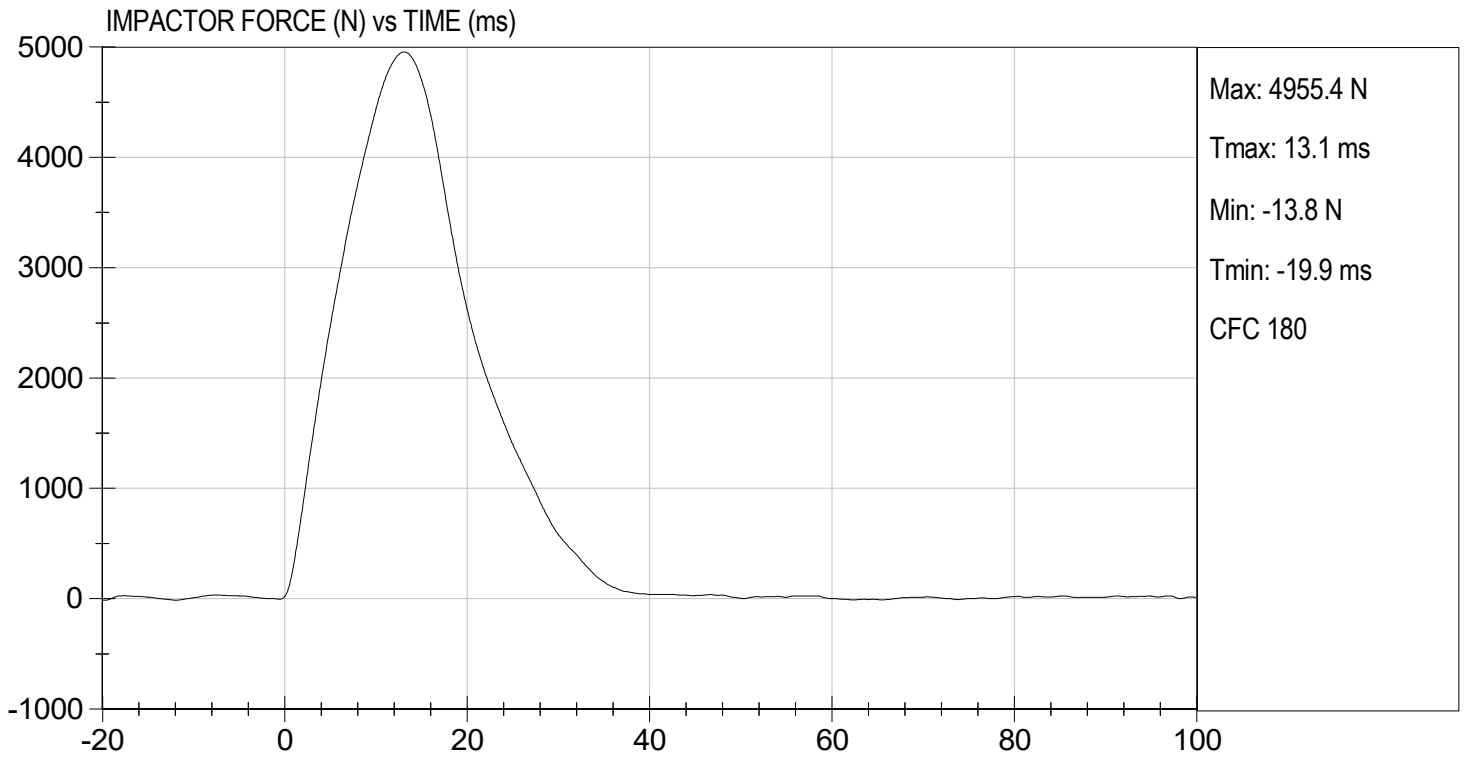
Test I.D: D231189

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	43	Pass
Probe Speed	m/s	4.20 to 4.40	4.34	Pass
Maximum Impactor Force	N	4700 to 5400	4955	Pass
Time of Maximum Impactor Force	ms	11.8 to 16.1	13.1	Pass
Maximum Pubic Force	N	1230 to 1590	1234	Pass
Time of Maximum Pubic Force	ms	12.2 to 17.0	14.6	Pass
Overall Test Results				Pass


Laboratory Technician

05/12/2023
Test Date


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MGA RESEARCH CORPORATION
THORAX IMPACT TEST
ES-2re DUMMY

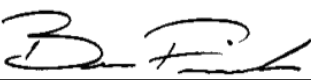
ATD Serial No: F032

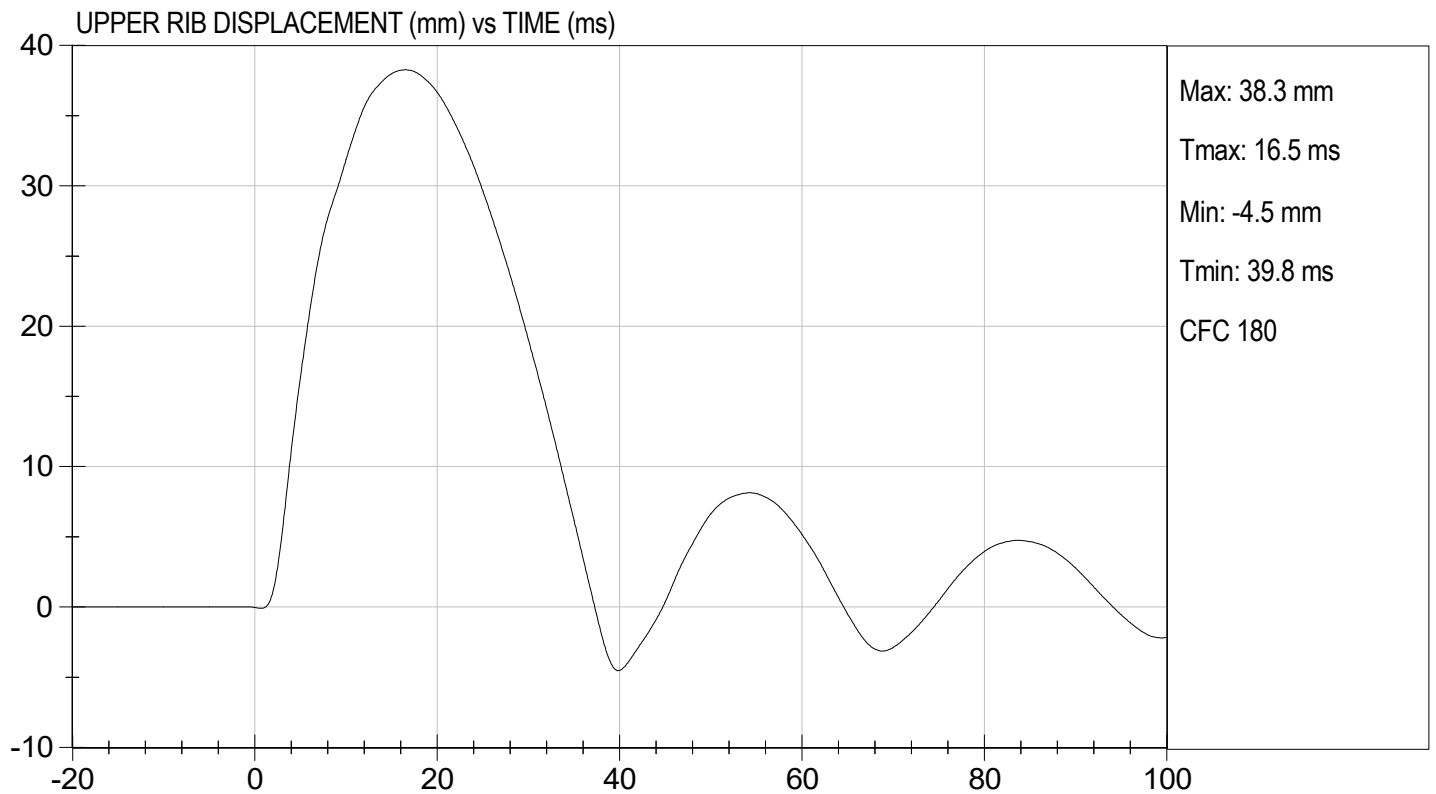
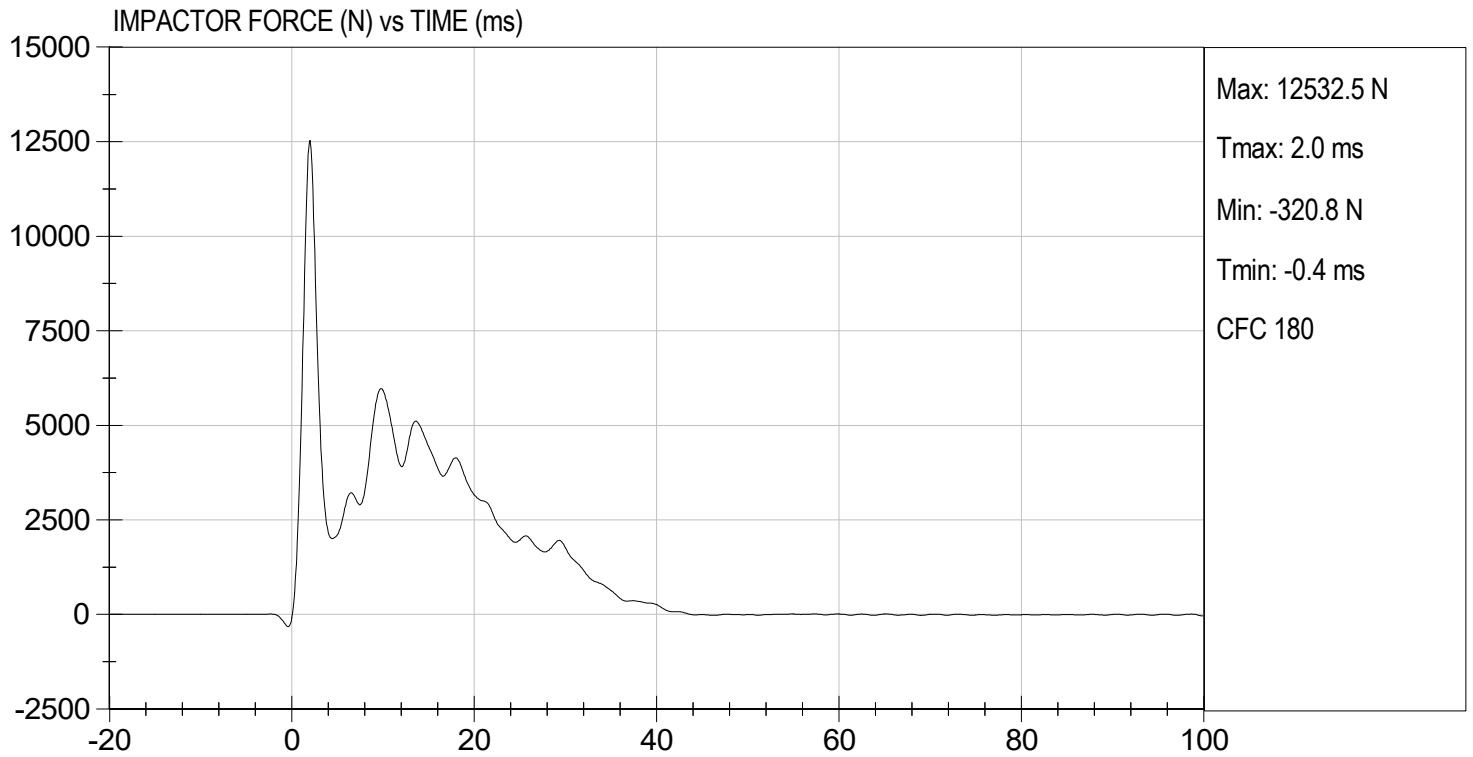
Test I.D: D231180

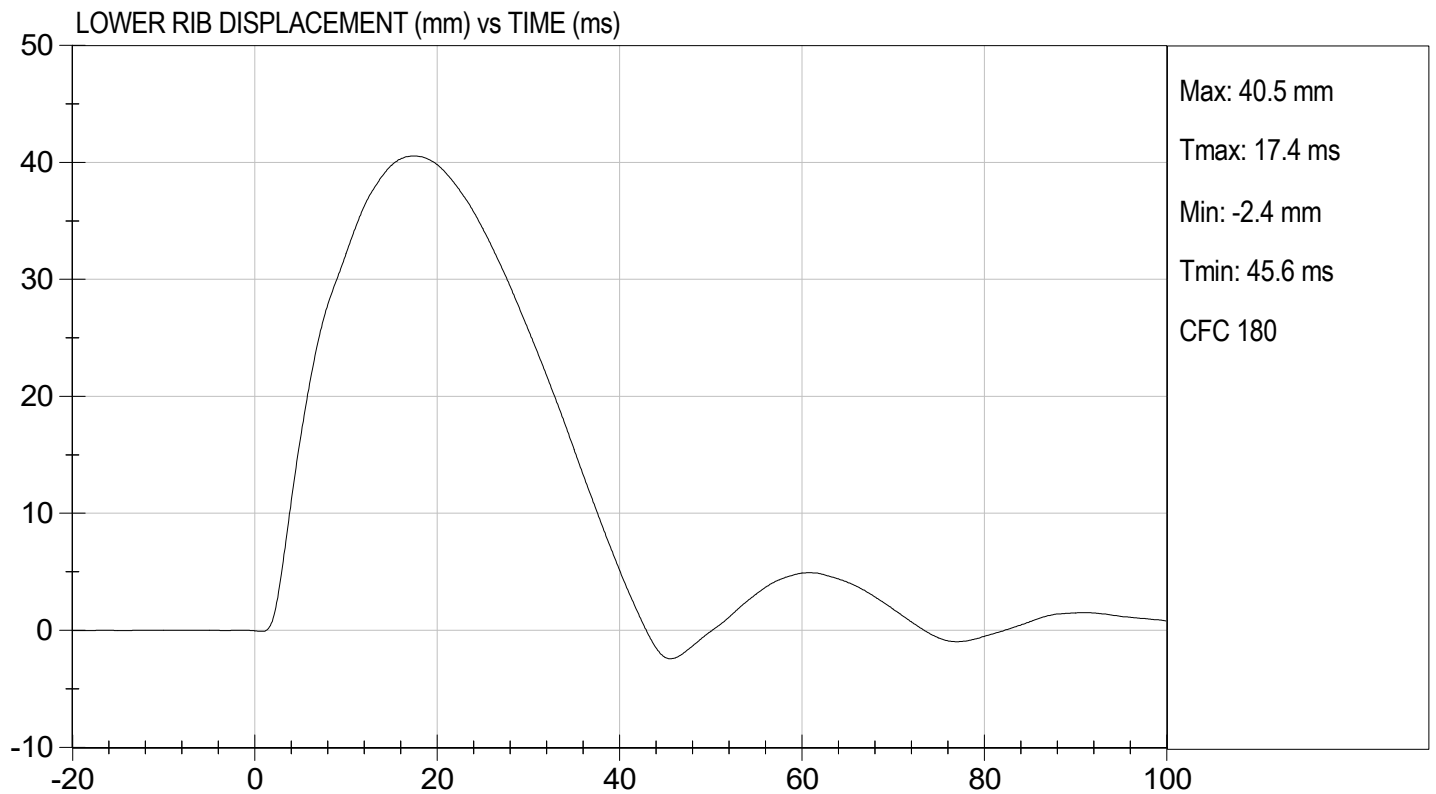
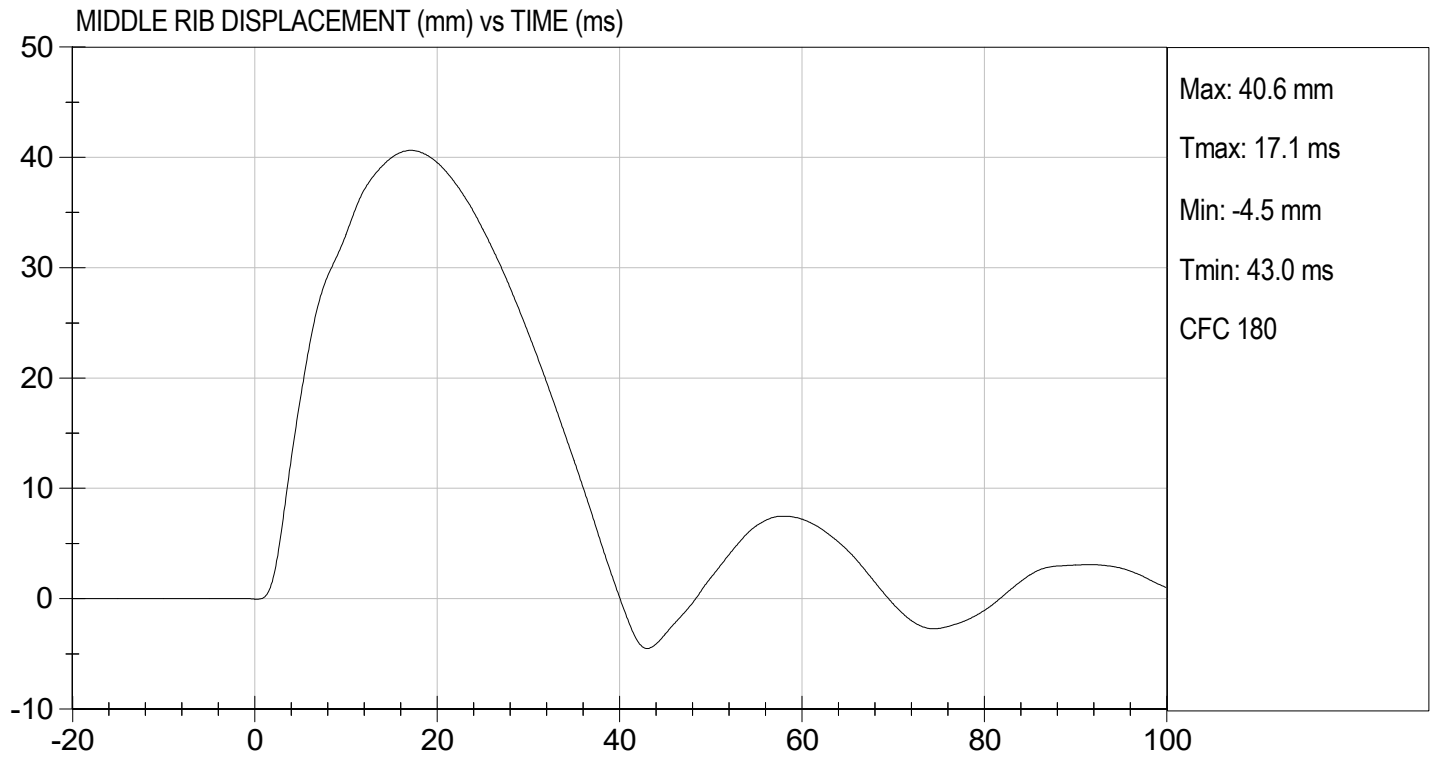
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.4	Pass
Humidity	%	10 to 70	44	Pass
Probe Speed	m/s	5.40 to 5.60	5.58	Pass
Maximum Impactor Force (after 6 ms)	N	5100 to 6200	5972	Pass
Upper Rib Displacement	mm	34.0 to 41.0	38.3	Pass
Middle Rib Displacement	mm	37.0 to 45.0	40.6	Pass
Lower Rib Displacement	mm	37.0 to 44.0	40.5	Pass
Overall Test Results				Pass


 Laboratory Technician

 05/12/2023
 Test Date


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QUALIFICATION 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

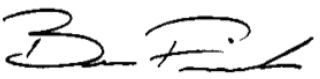
ATD Serial No: F032

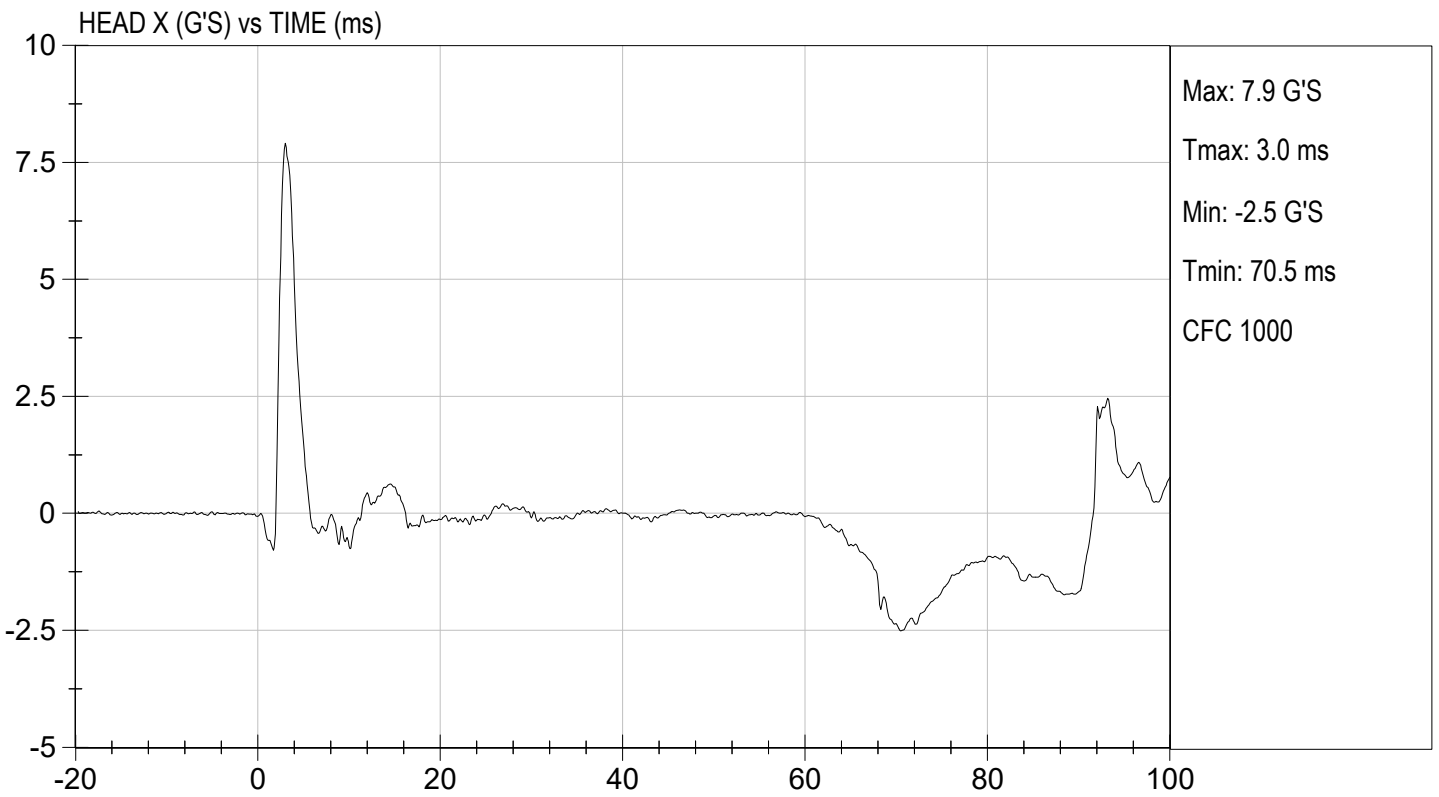
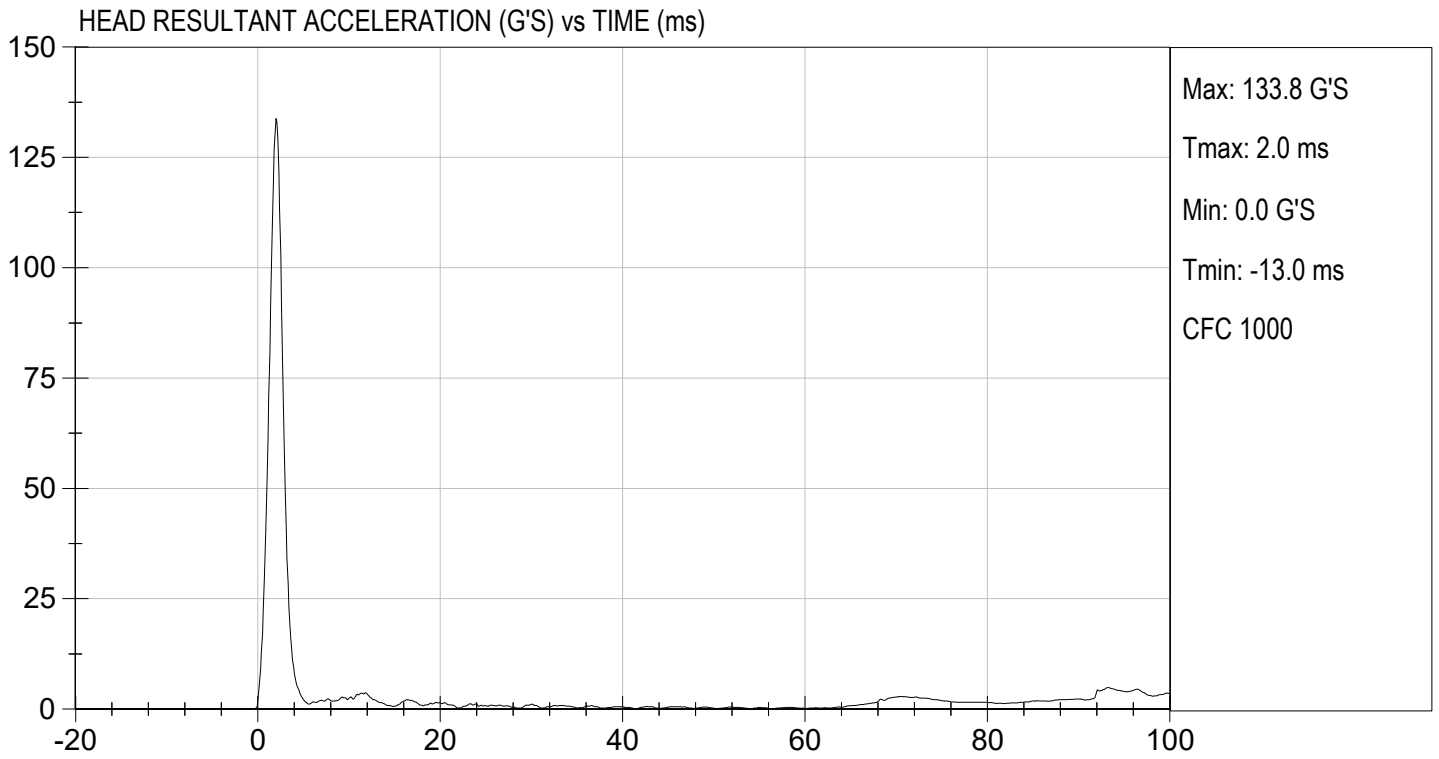
Test ID: D231271

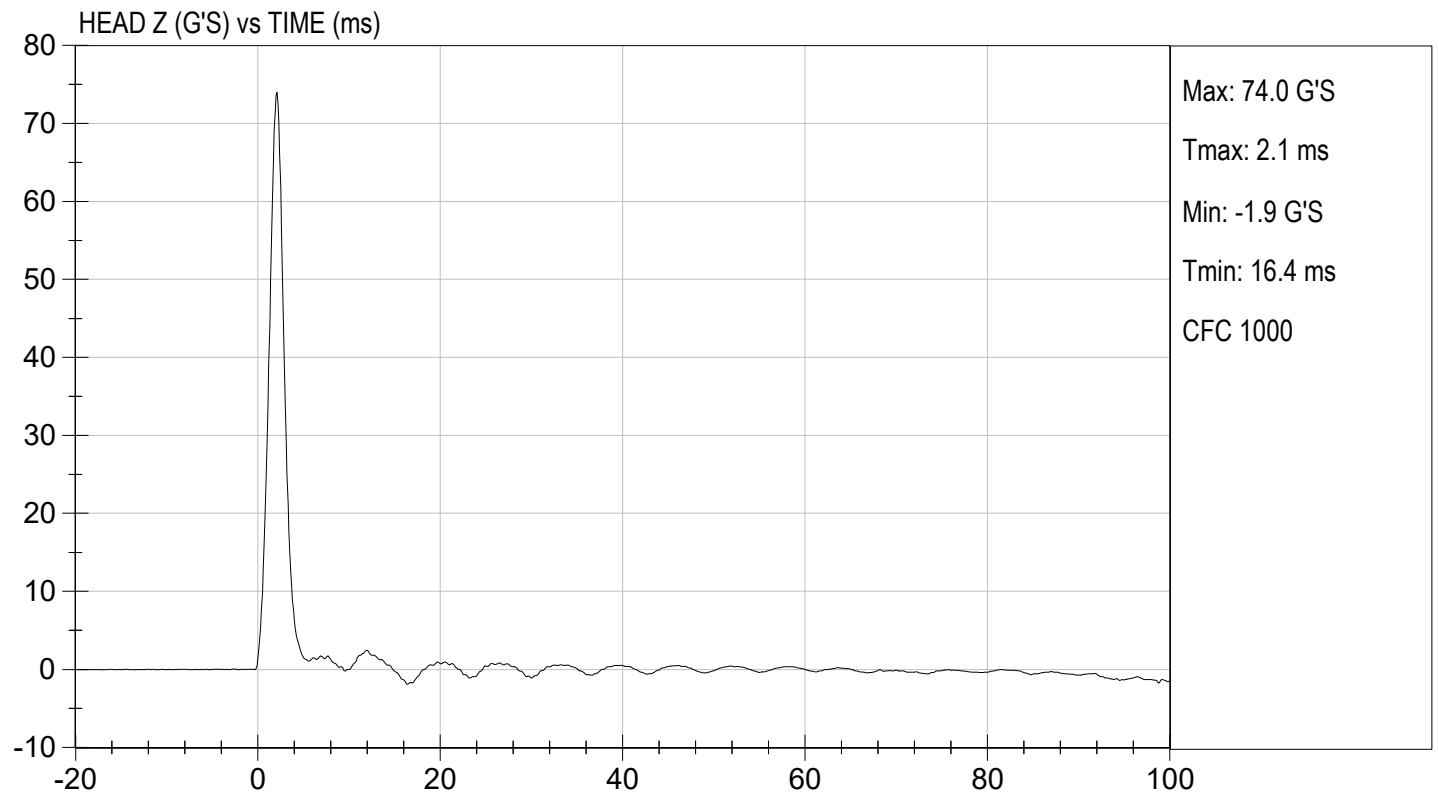
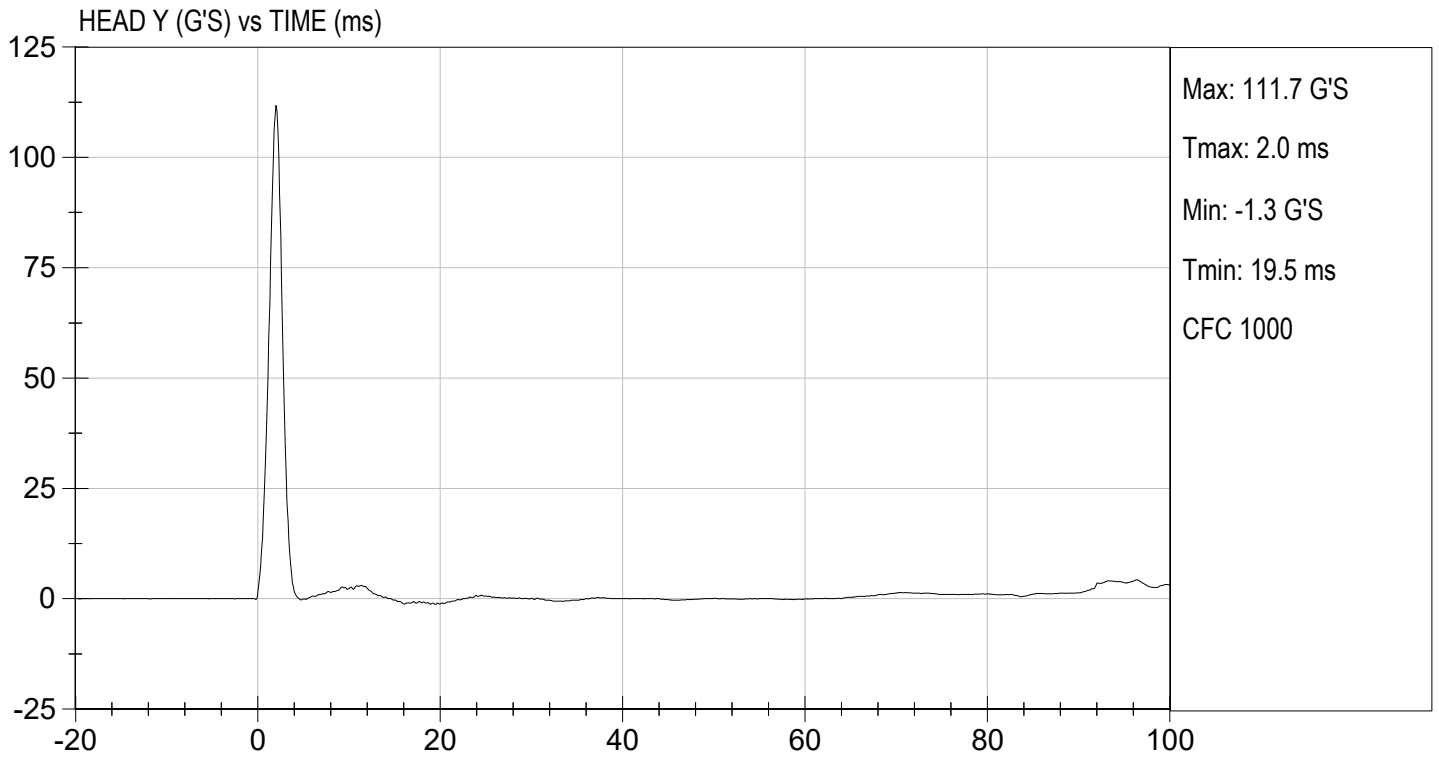
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	40	Pass
Peak Resultant Acceleration	G's	125 to 155	134	Pass
Peak Longitudinal Acceleration	G's	<= +/- 15.0	7.9	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 15% of peak	Yes	Pass
			Overall Test Results	Pass


 Laboratory Technician

05/22/2023
 Test Date


 Approved By





MGA RESEARCH CORPORATION
NECK PENDULUM TEST
ES-2re DUMMY

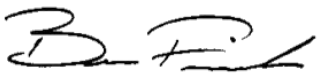
ATD Serial No: F032

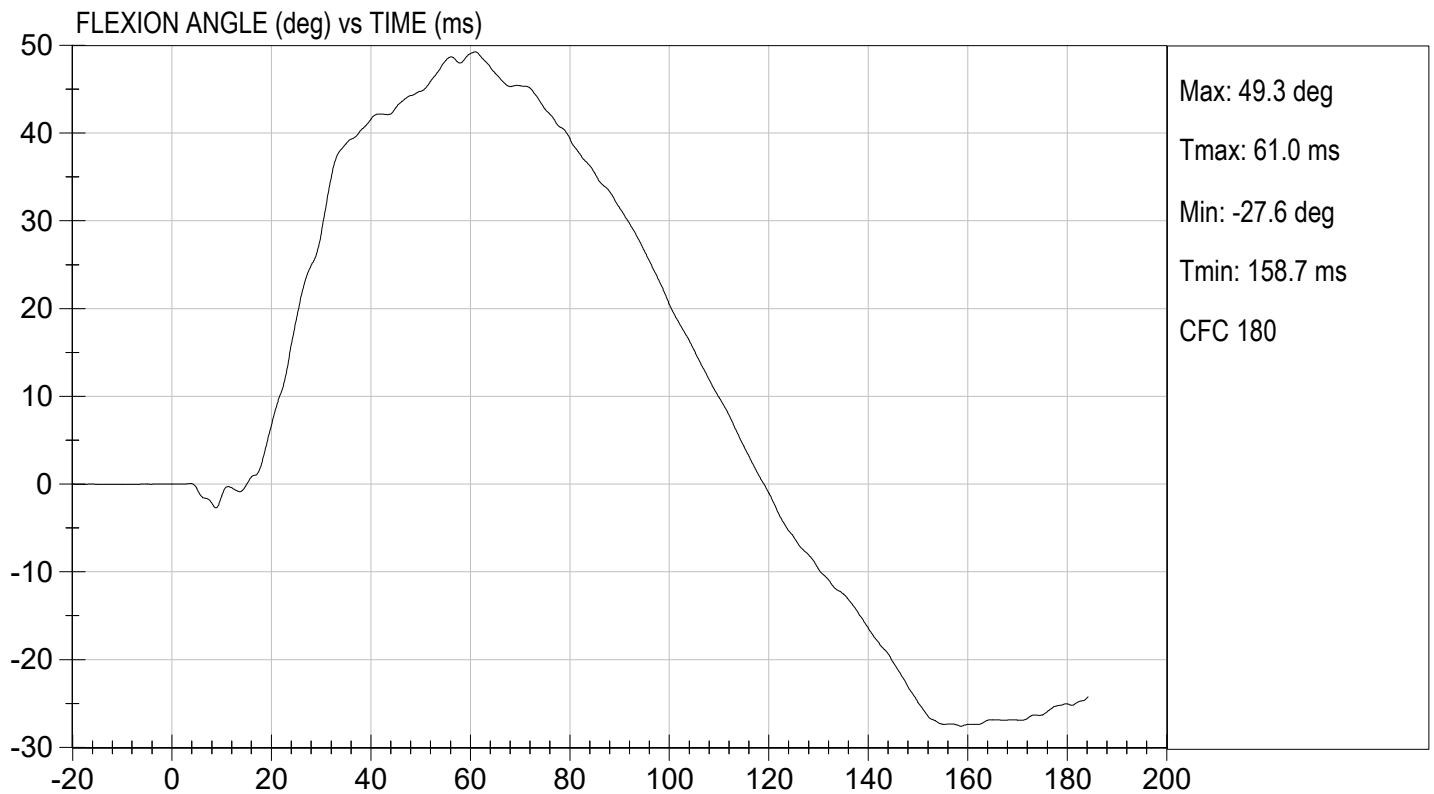
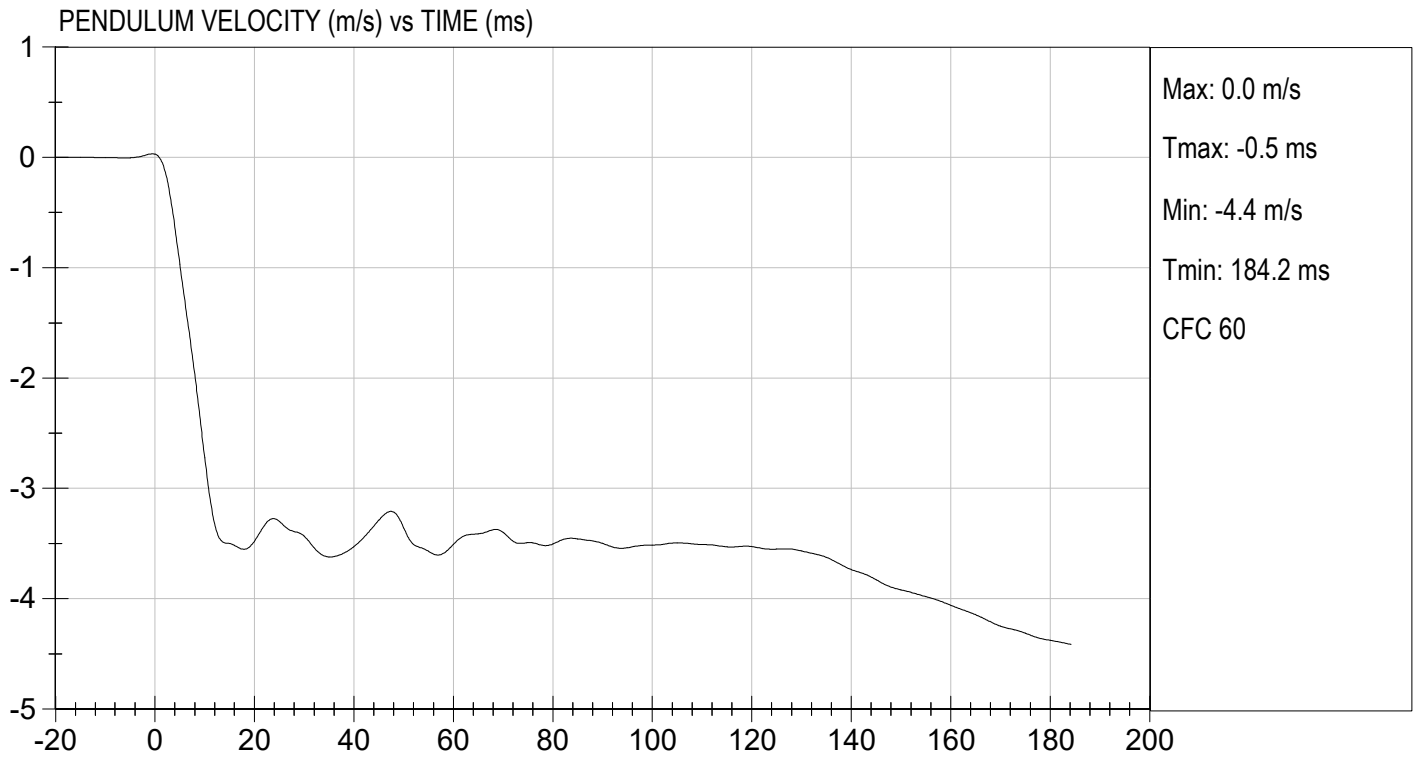
Test I.D.: D231272

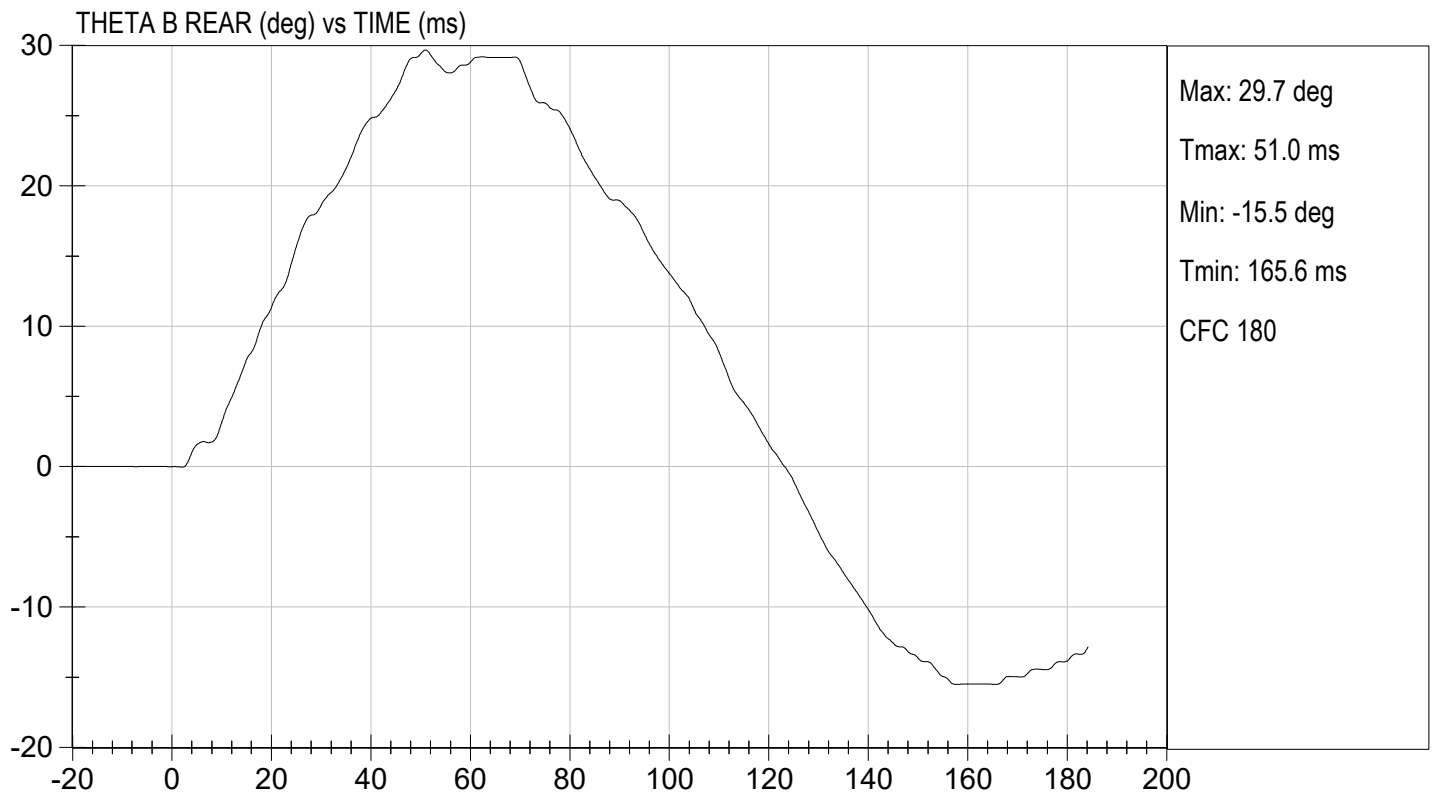
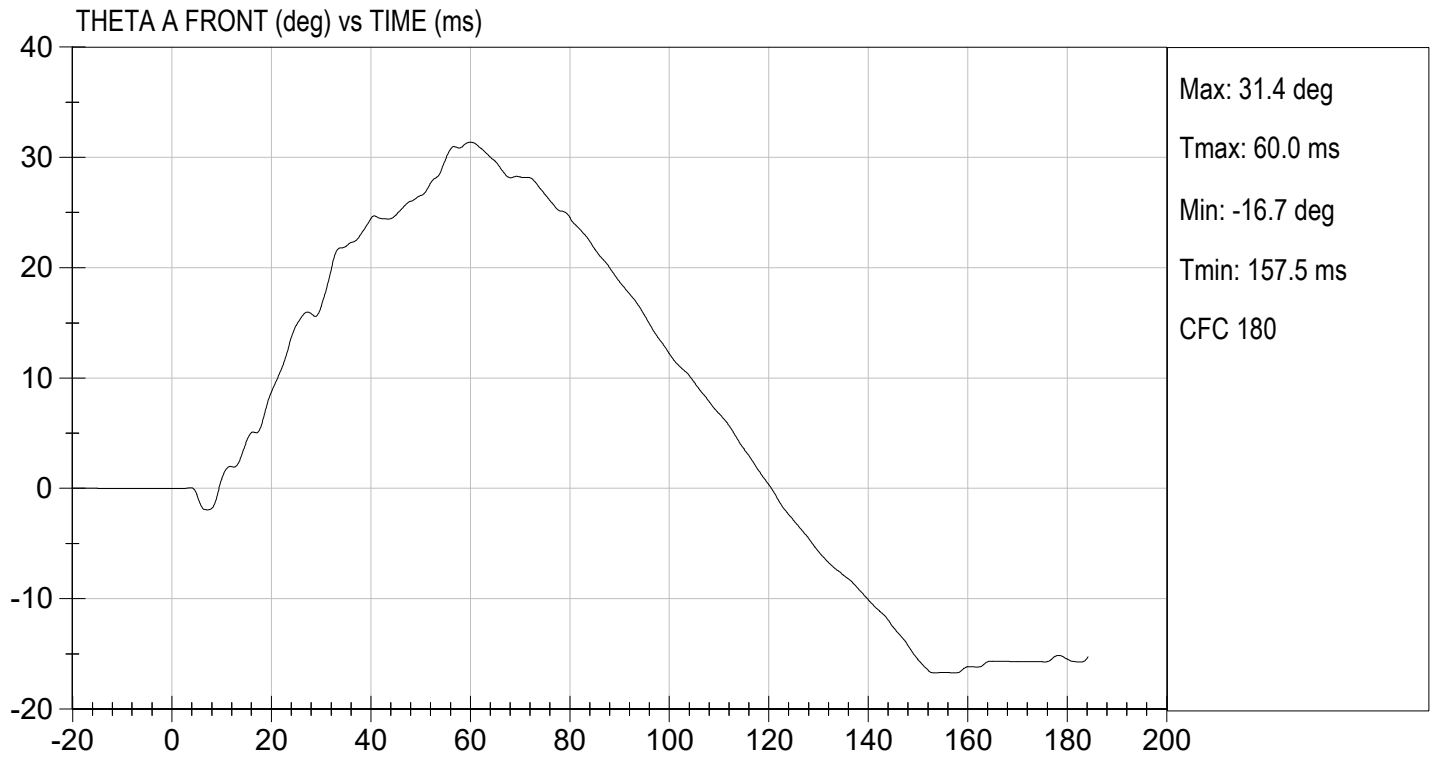
Tested Parameter	Units	Specification	Result	Pass/Fail	
Laboratory Temperature	deg C	20.6 to 22.2	21.2	Pass	
Laboratory Relative Humidity	%	10 to 70	41	Pass	
Pendulum Speed	m/s	3.30 to 3.50	3.43	Pass	
Pendulum Velocity	1 ms	m/s	-0.05 to 0.00	-0.01	Pass
	3 ms	m/s	-0.25 to -0.375	-0.33	Pass
	14 ms	m/s	-3.20 to -3.70	-3.49	Pass
	17 ms	m/s	>= -3.70	-3.54	Pass
Maximum Flexion Angle	deg	49.0 to 59.0	49.3	Pass	
Time of Maximum Flexion Angle	ms	54.0 to 66.0	61.0	Pass	
Head Rotation Decay Time to 0 Degree	ms	53.0 to 88.0	58.1	Pass	
Overall Results				Pass	


 Laboratory Technician

 05/22/2023
 Test Date


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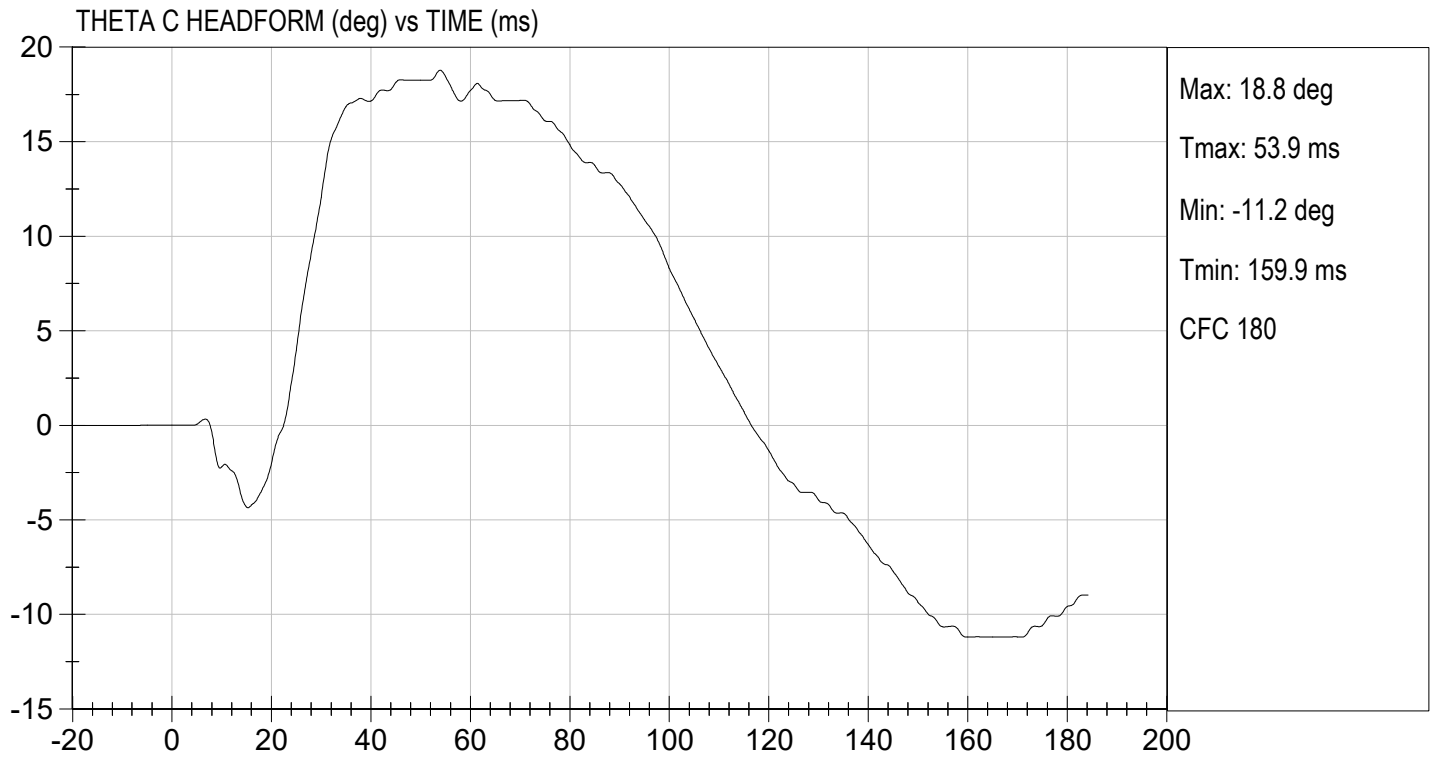






TEST DESC: NECK BENDING
VELOCITY: 11.26 ft/s, 3.43 m/s

TEST DATE: 05/22/2023
TEST #: D231272



MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
ES-2re DUMMY

ATD Serial No: F032

Test I.D: D231273

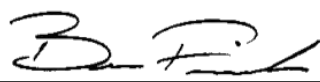
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	38	Pass
Pendulum Speed	m/s	4.20 to 4.40	4.27	Pass
Peak Impactor Acceleration	G's	7.5 to 10.5	8.8	Pass
Overall Test Results				Pass



 Laboratory Technician

 05/22/2023

 Test Date

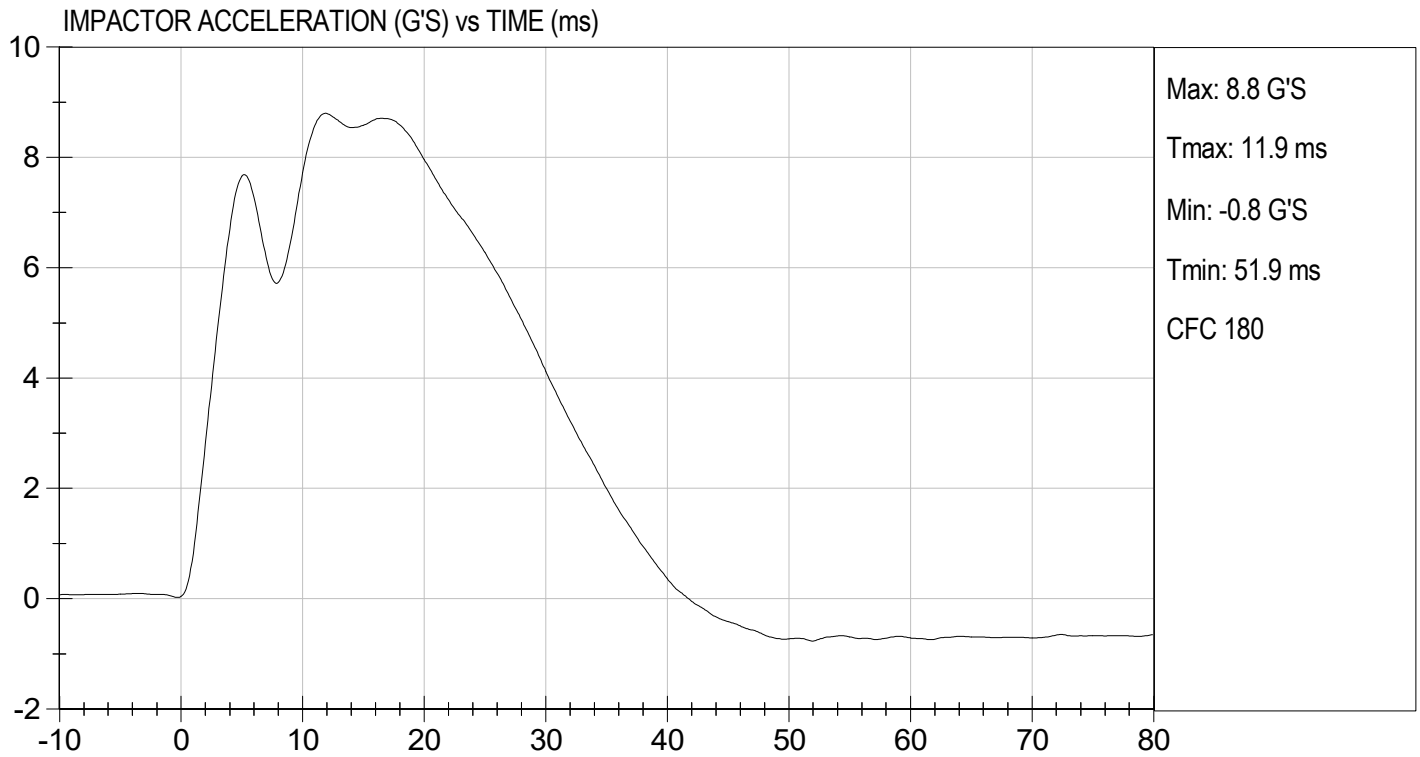


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TEST DESC: SHOULDER IMPACT
VELOCITY: 14.01 ft/s, 4.27 m/s

TEST DATE: 05/22/2023
TEST #: D231273



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UPPER RIB TEST

ES-2re DUMMY

ATD Serial No: F032

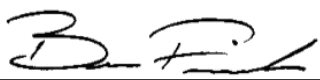
Test I.D.: D231274

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	39	Pass
Displacement at 459 mm	mm	36.0 to 40.0	38.7	Pass
Displacement at 815 mm	mm	46.0 to 51.0	49.8	Pass
			Overall Test Results	Pass

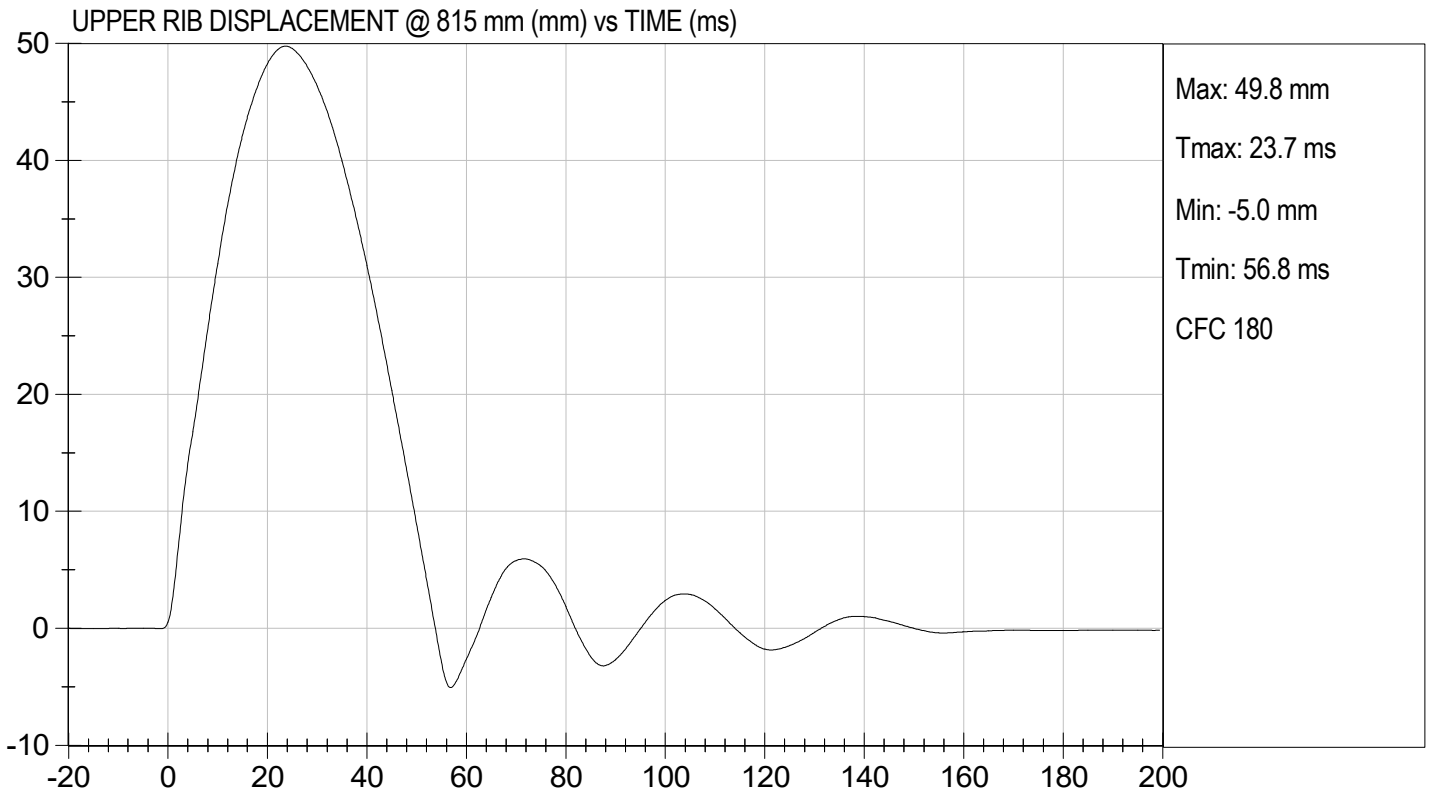
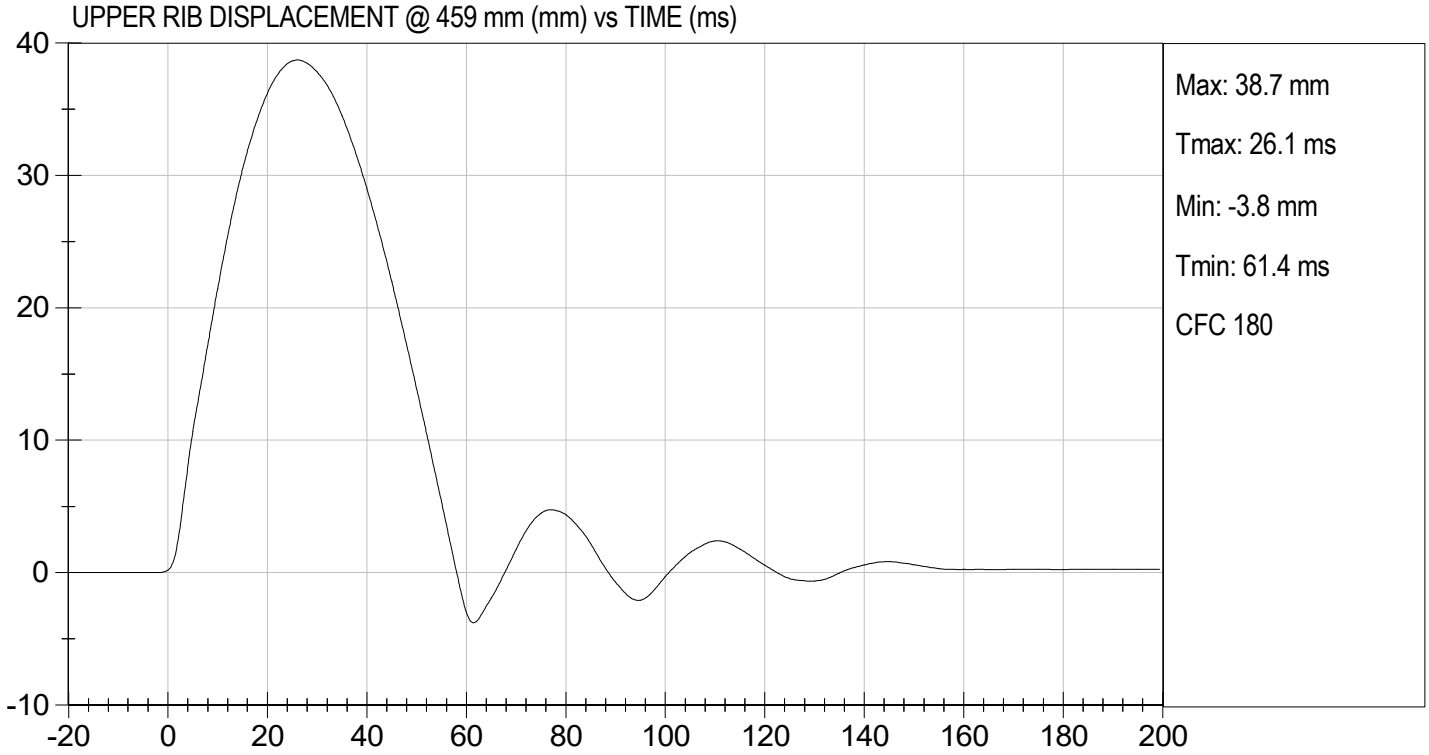


Laboratory Technician

05/22/2023
Test Date



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MID RIB TEST

ES-2re DUMMY

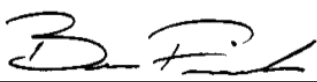
ATD Serial No: F032

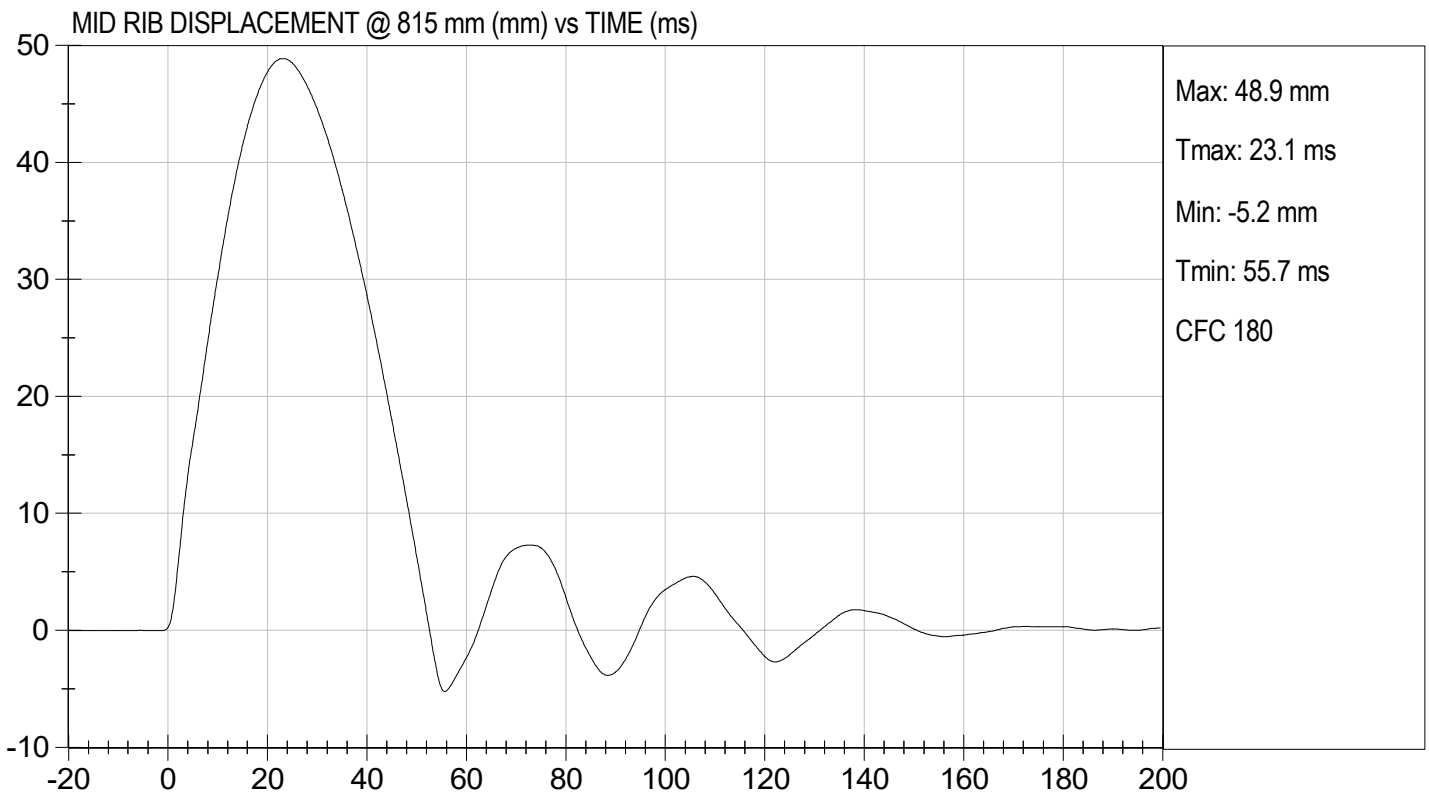
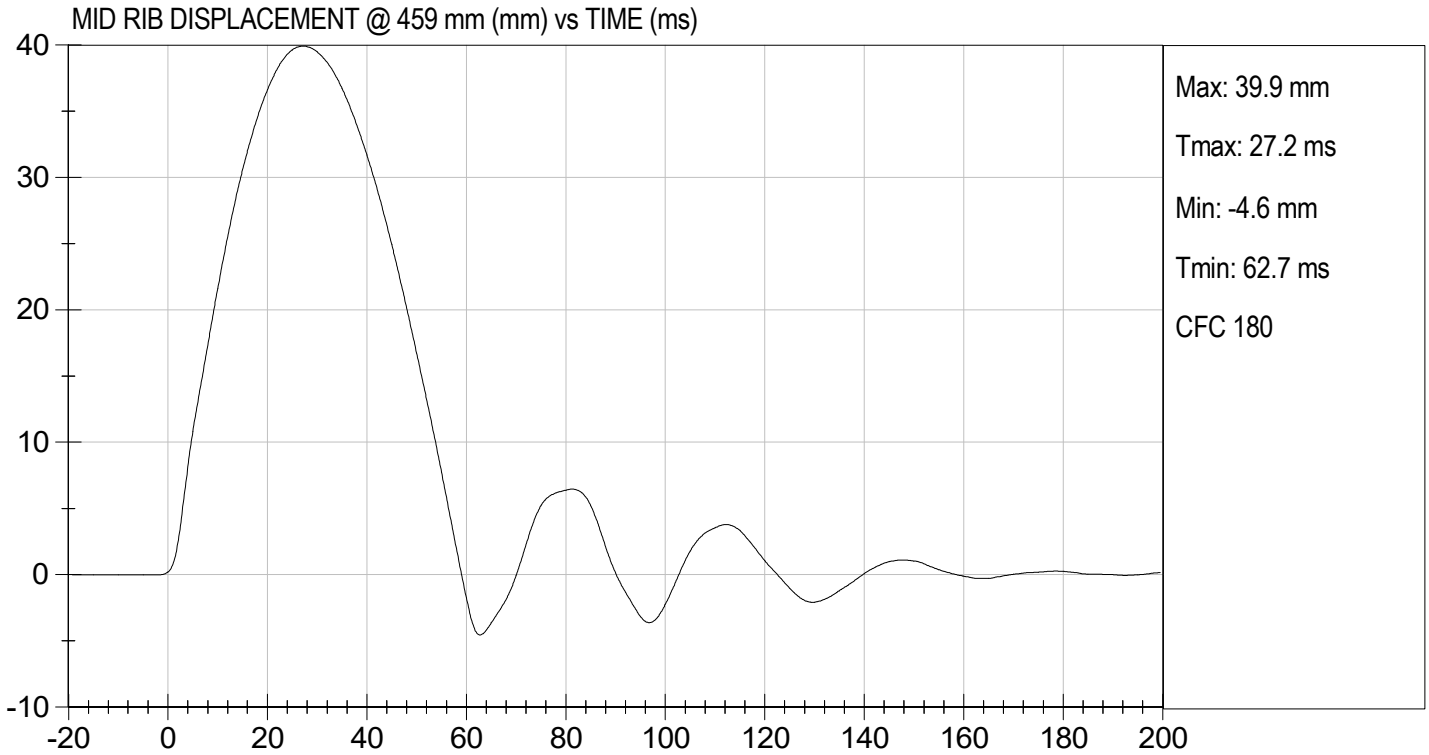
Test I.D: D231275

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	39	Pass
Displacement at 459 mm	mm	36.0 to 40.0	39.9	Pass
Displacement at 815 mm	mm	46.0 to 51.0	48.9	Pass
Overall Test Results			Pass	


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05/22/2023
Test Date


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LOWER RIB TEST

ES-2re DUMMY

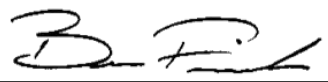
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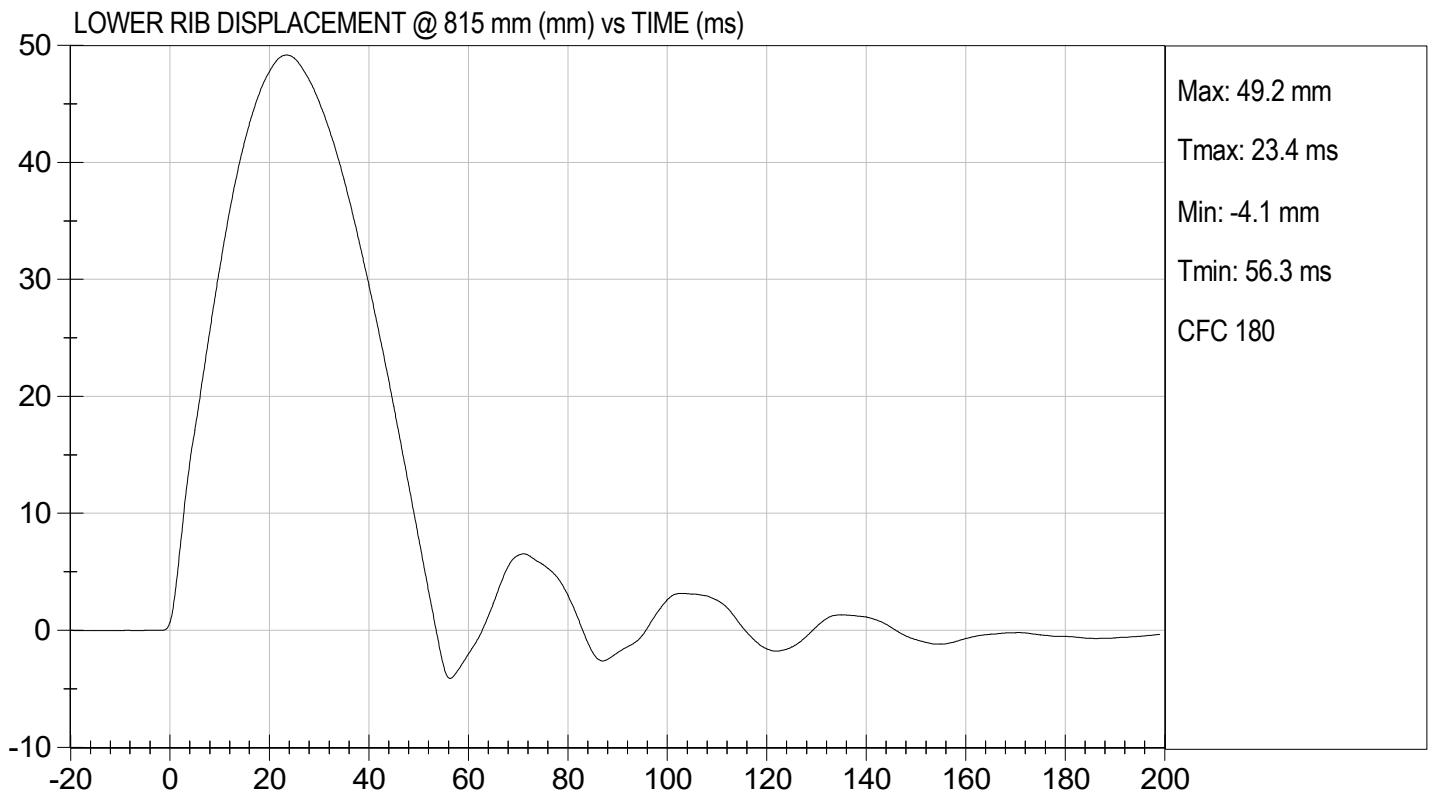
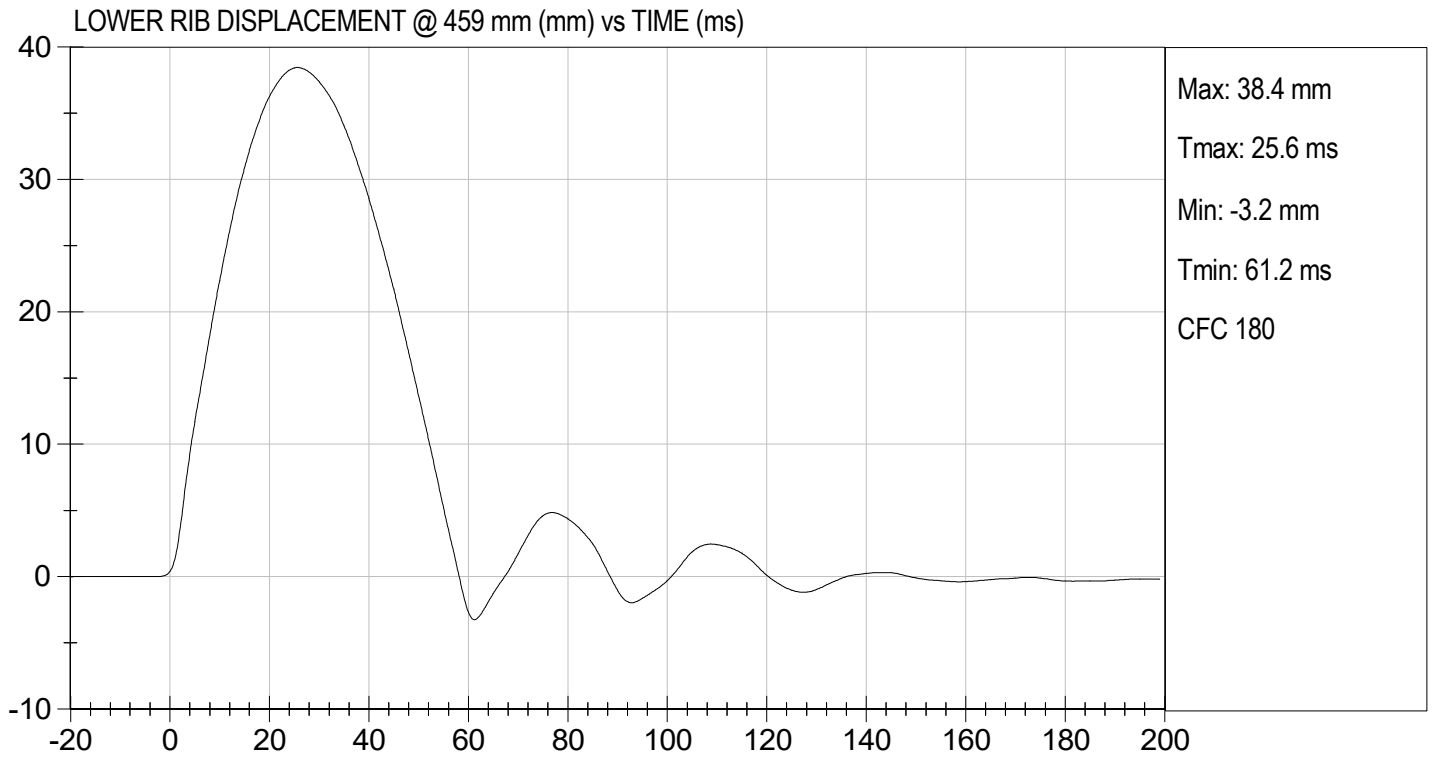
Test I.D: D231276

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	39	Pass
Displacement at 459 mm	mm	36.0 to 40.0	38.5	Pass
Displacement at 815 mm	mm	46.0 to 51.0	49.2	Pass
Overall Test Results				Pass


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Test Date


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ABDOMEN TEST

ES-2re DUMMY

ATD Serial No: F032

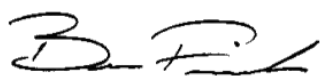
Test I.D.: D231277

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	39	Pass
Probe Speed	m/s	3.90 to 4.10	4.10	Pass
Maximum Impactor Force	N	4000 to 4800	4067	Pass
Time of Maximum Impactor Force	ms	10.6 to 13.0	12.5	Pass
Maximum Total Abdomen Force	N	2200 to 2700	2328	Pass
Time of Maximum Abdomen Force	ms	10.0 to 12.3	12.3	Pass
Overall Test Results				Pass

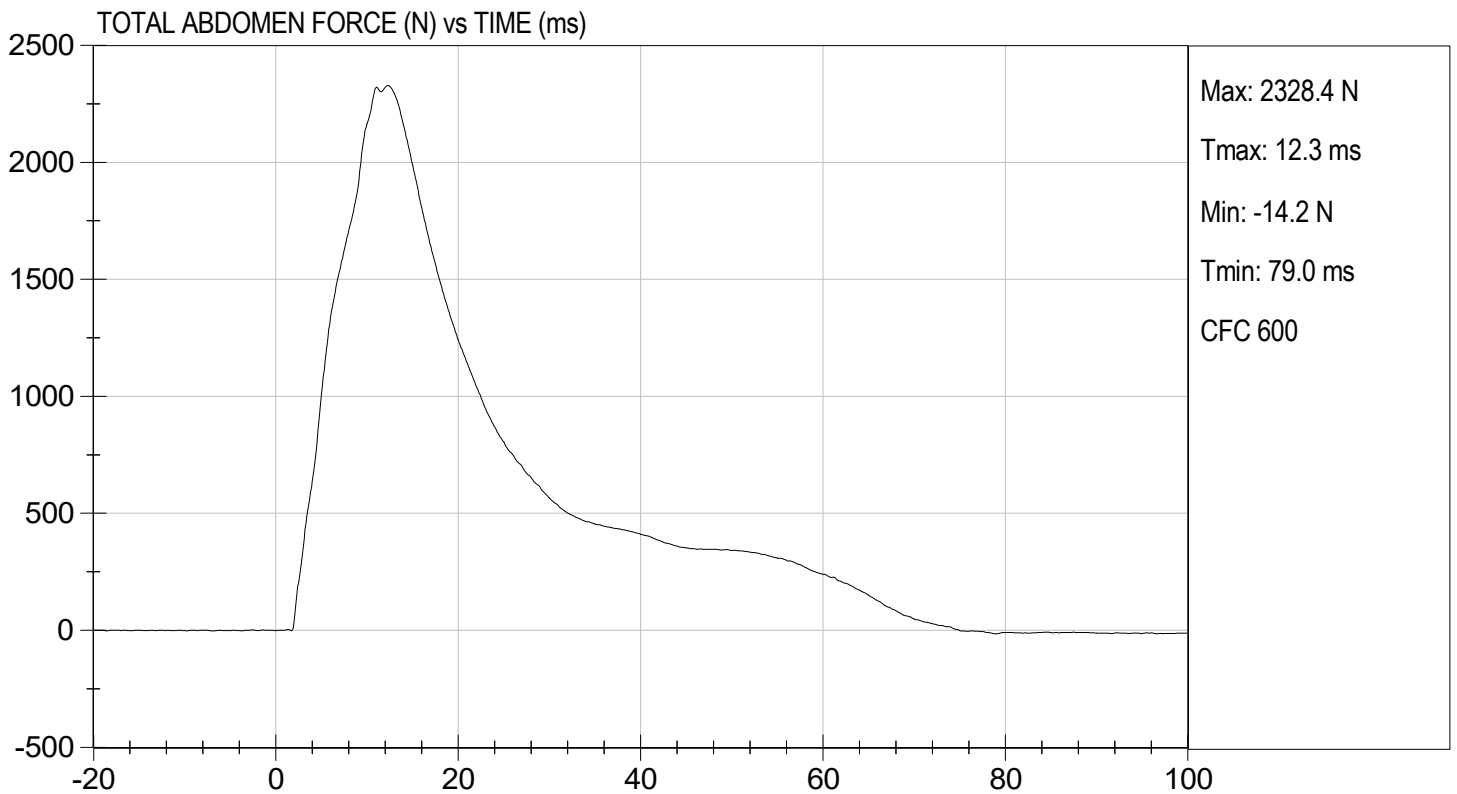
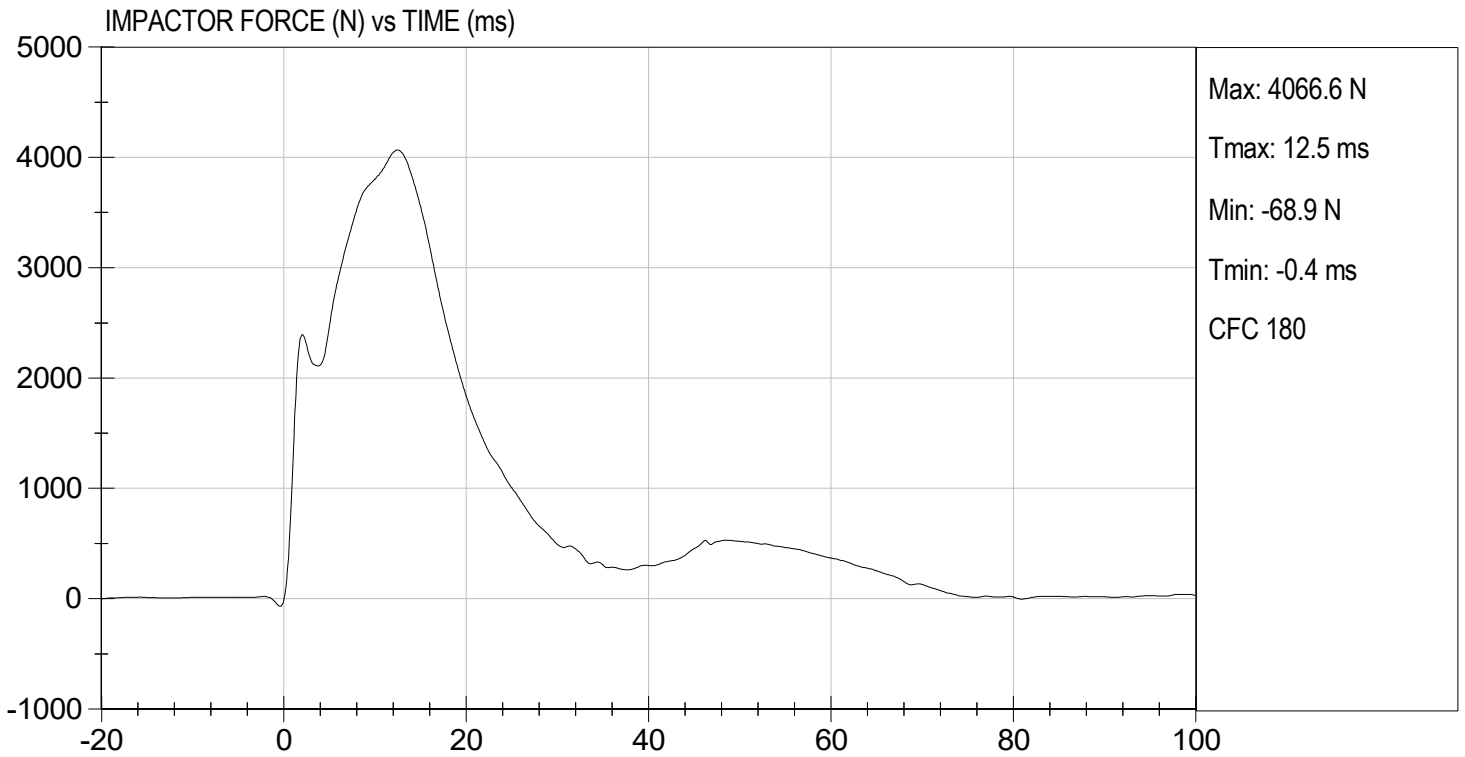


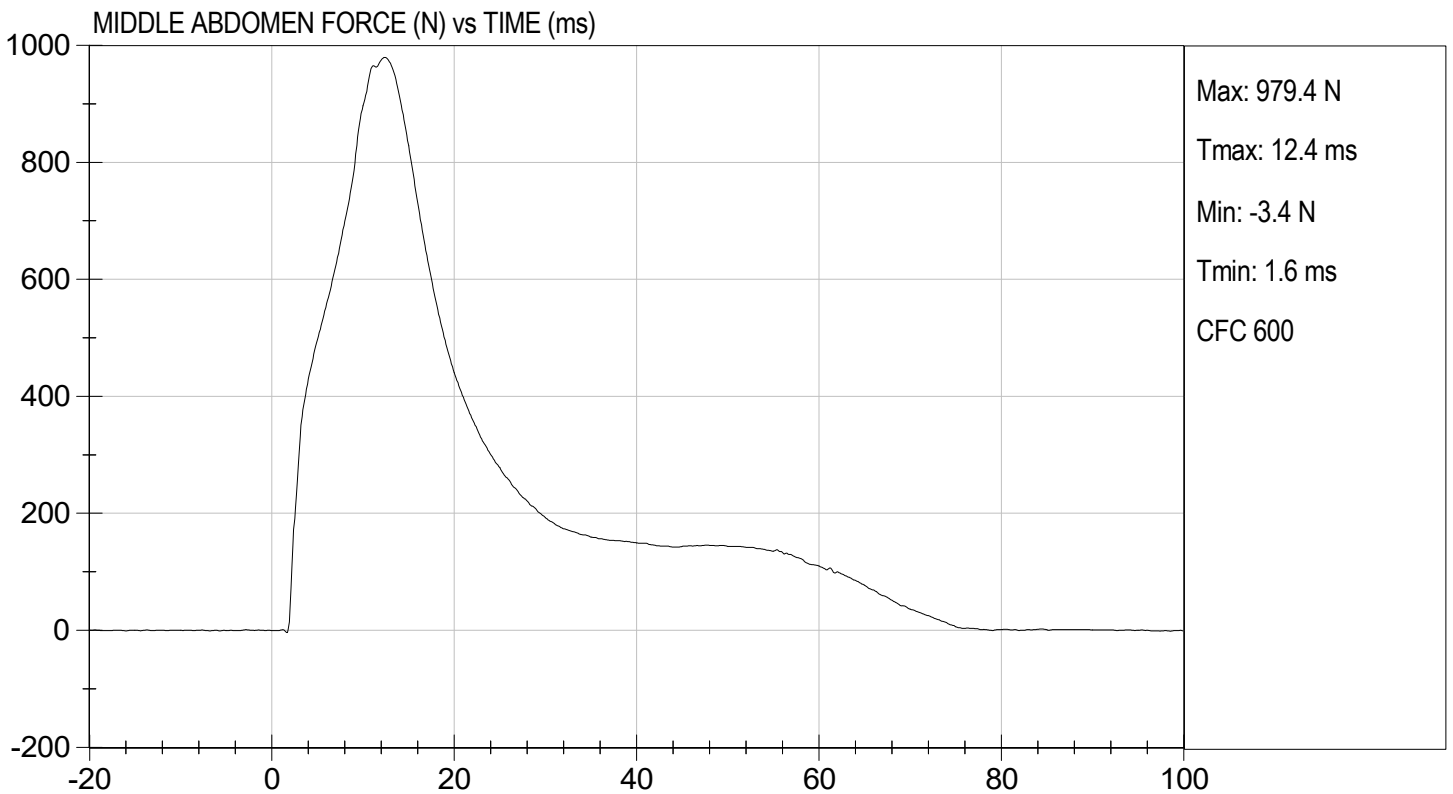
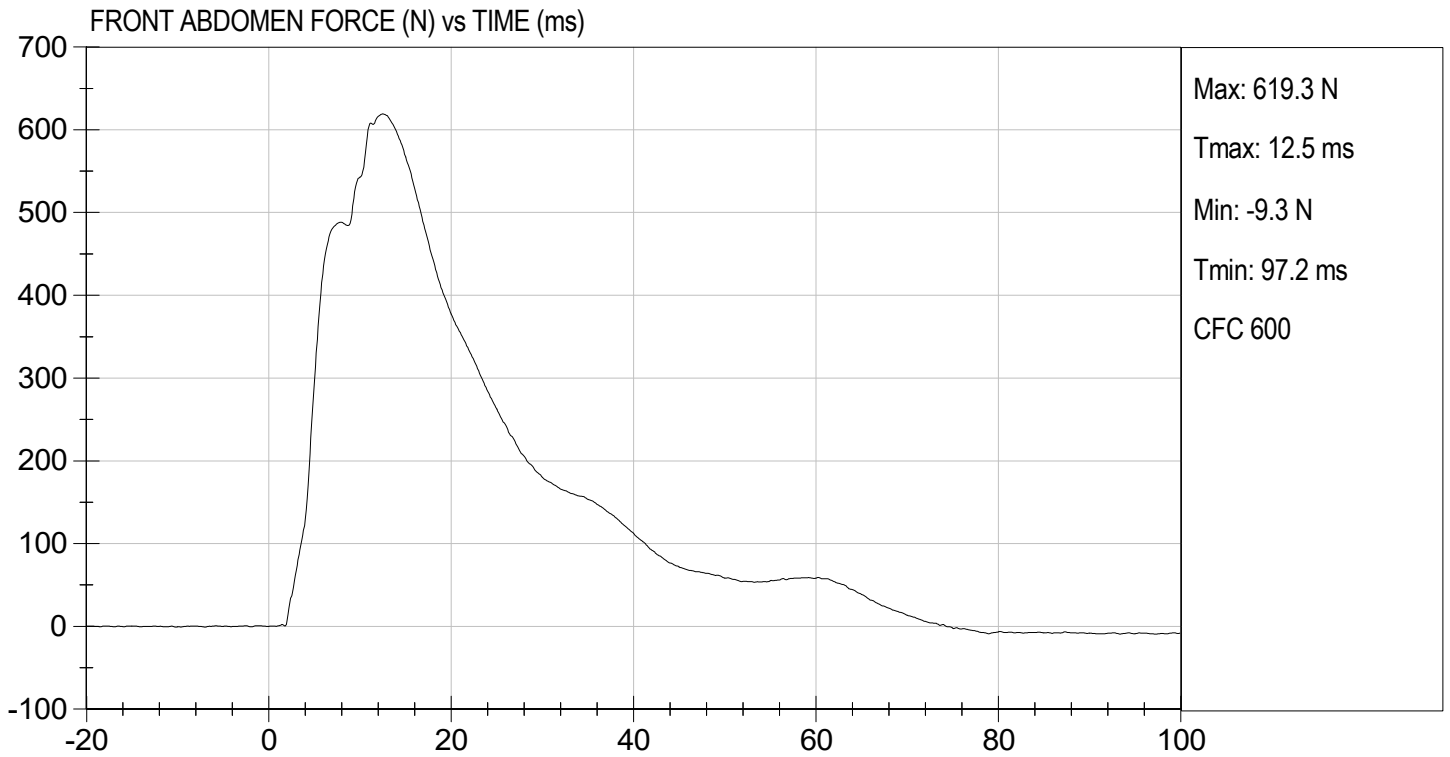
Laboratory Technician

 05/22/2023
Test Date



Approved By

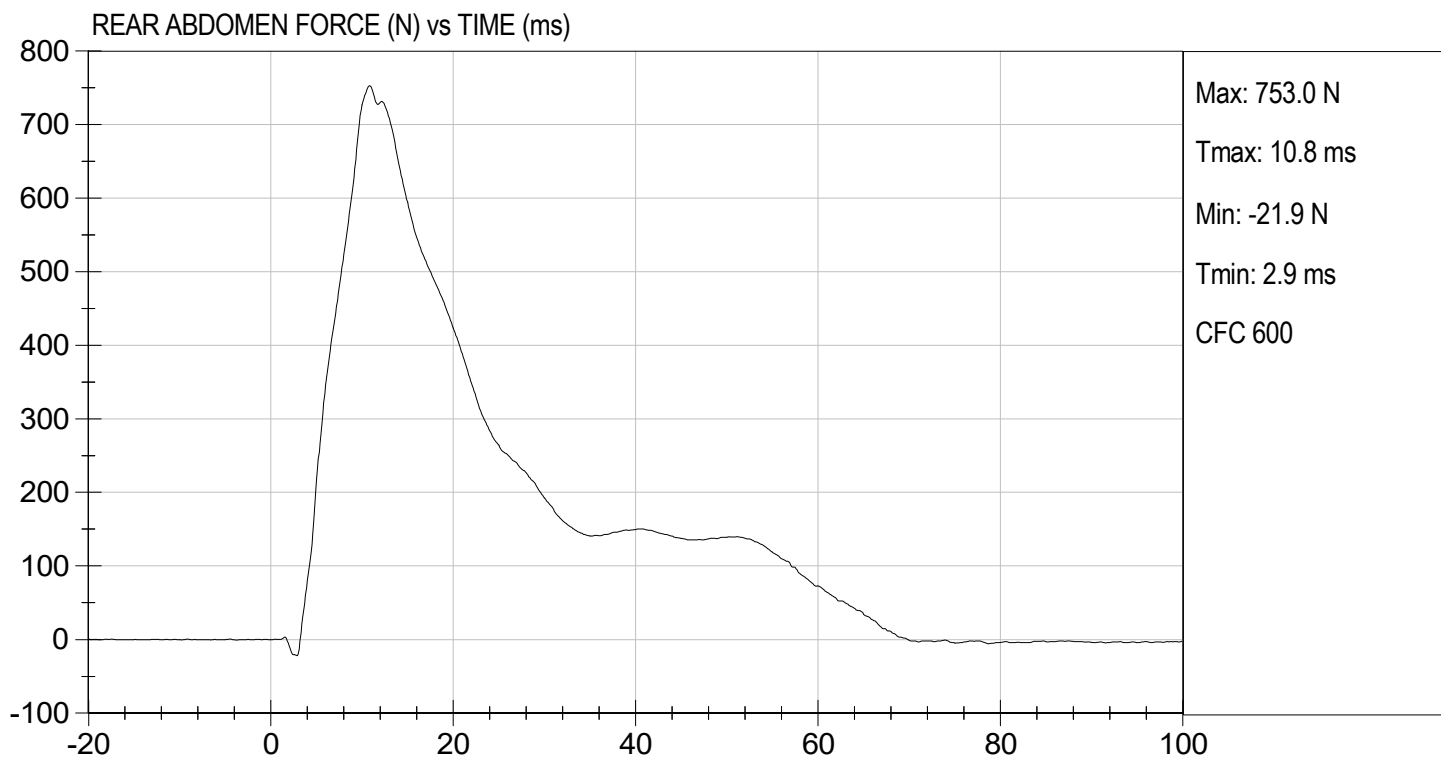






TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.44 ft/s, 4.10 m/s

TEST DATE: 05/22/2023
TEST #: D231277



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LUMBAR SPINE TEST
ES-2re DUMMY

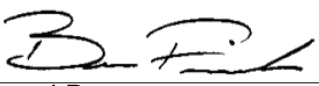
ATD Serial No: F032

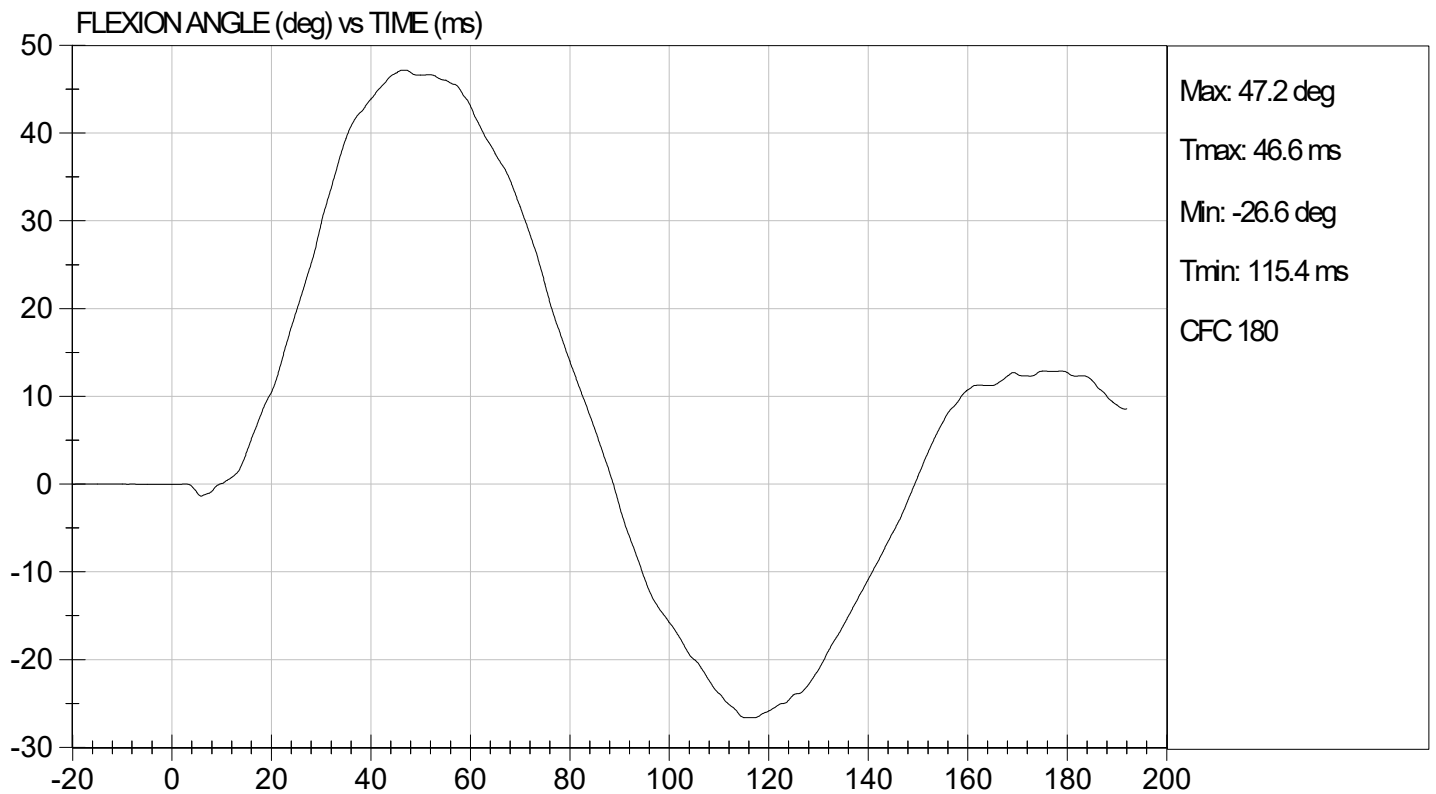
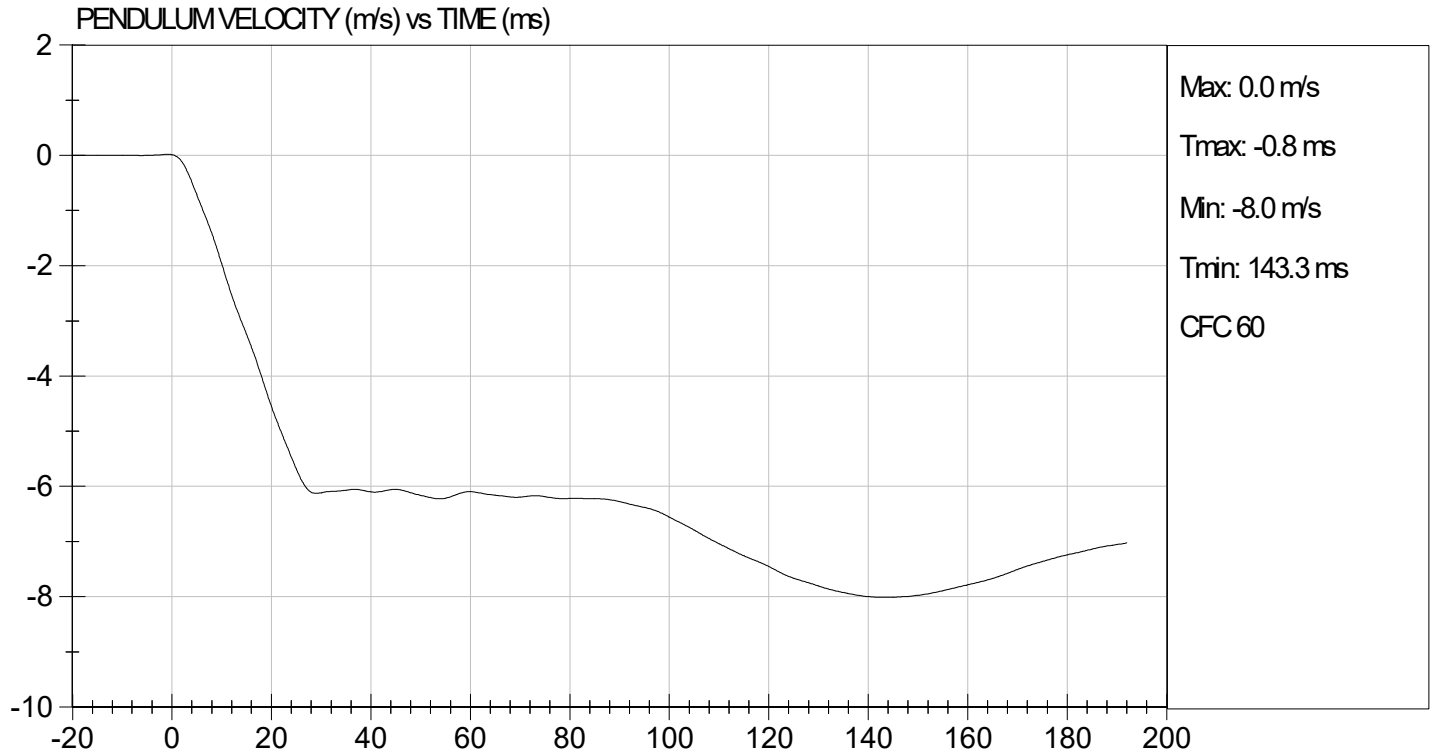
Test I.D.: D231278

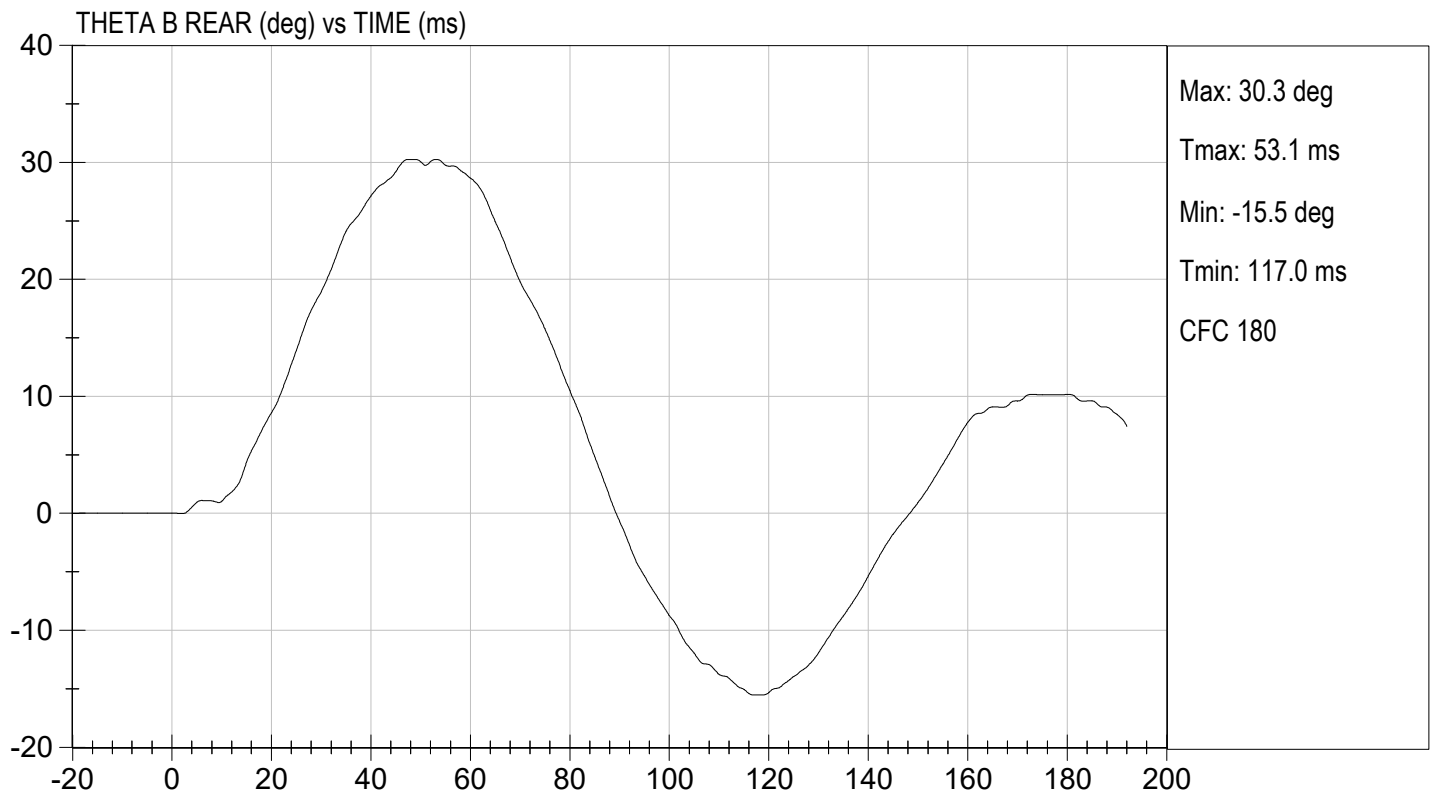
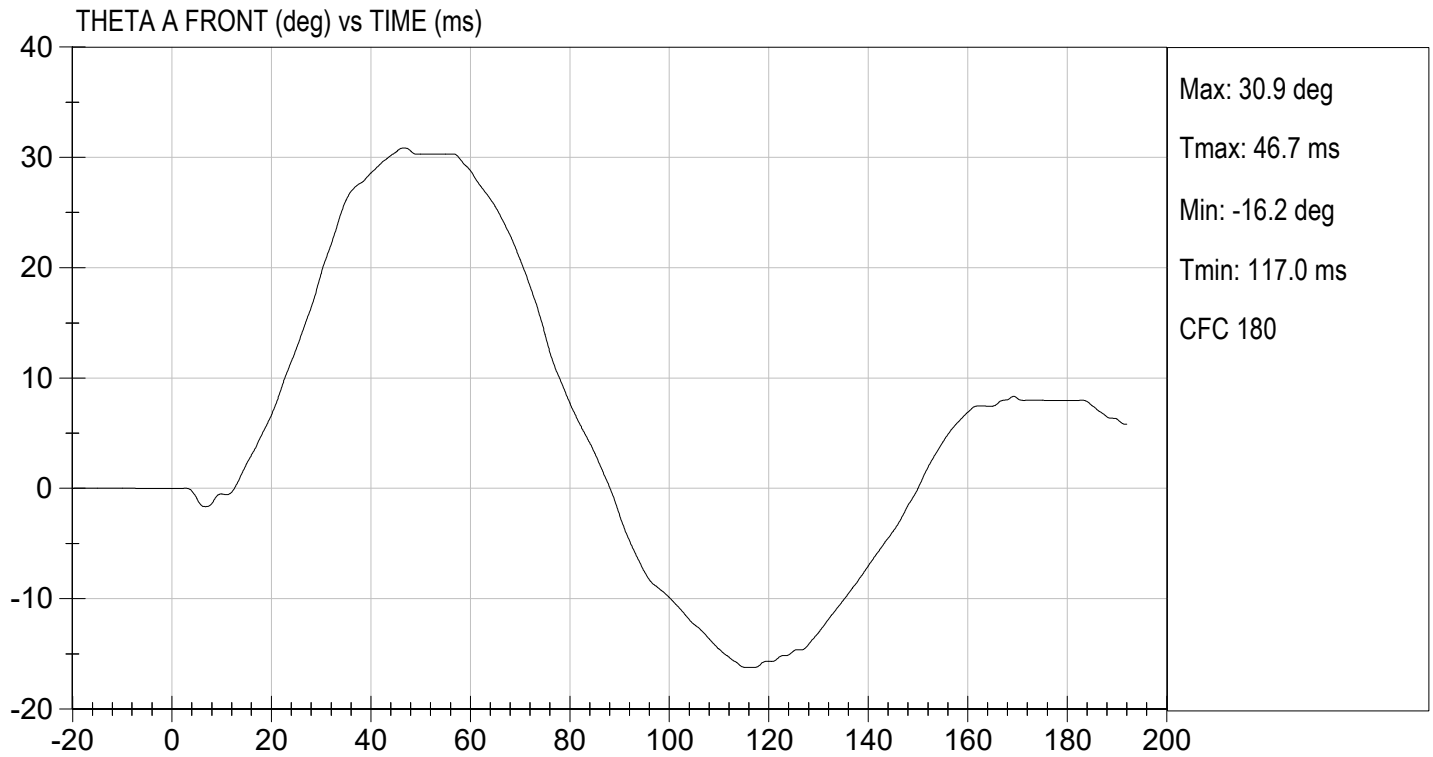
Tested Parameter	Units	Specification	Result	Pass/Fail	
Laboratory Temperature	deg C	20.6 to 22.2	21.2	Pass	
Laboratory Relative Humidity	%	10 to 70	40	Pass	
Pendulum Speed	m/s	5.95 to 6.15	5.98	Pass	
Pendulum Velocity	1 ms	m/s	-0.05 to 0.00	-0.02	Pass
	3.7 ms	m/s	-0.425 to -0.24	-0.420	Pass
	27 ms	m/s	-6.50 to -5.80	-6.02	Pass
	30 ms	m/s	>= -6.50	-6.12	Pass
Maximum Flexion Angle	deg	45.0 to 55.0	47.2	Pass	
Time of Maximum Flexion Angle	ms	39.0 to 53.0	46.6	Pass	
Headform Rotation Decay to Initial Position	ms	37 to 57	42	Pass	
Overall Results				Pass	

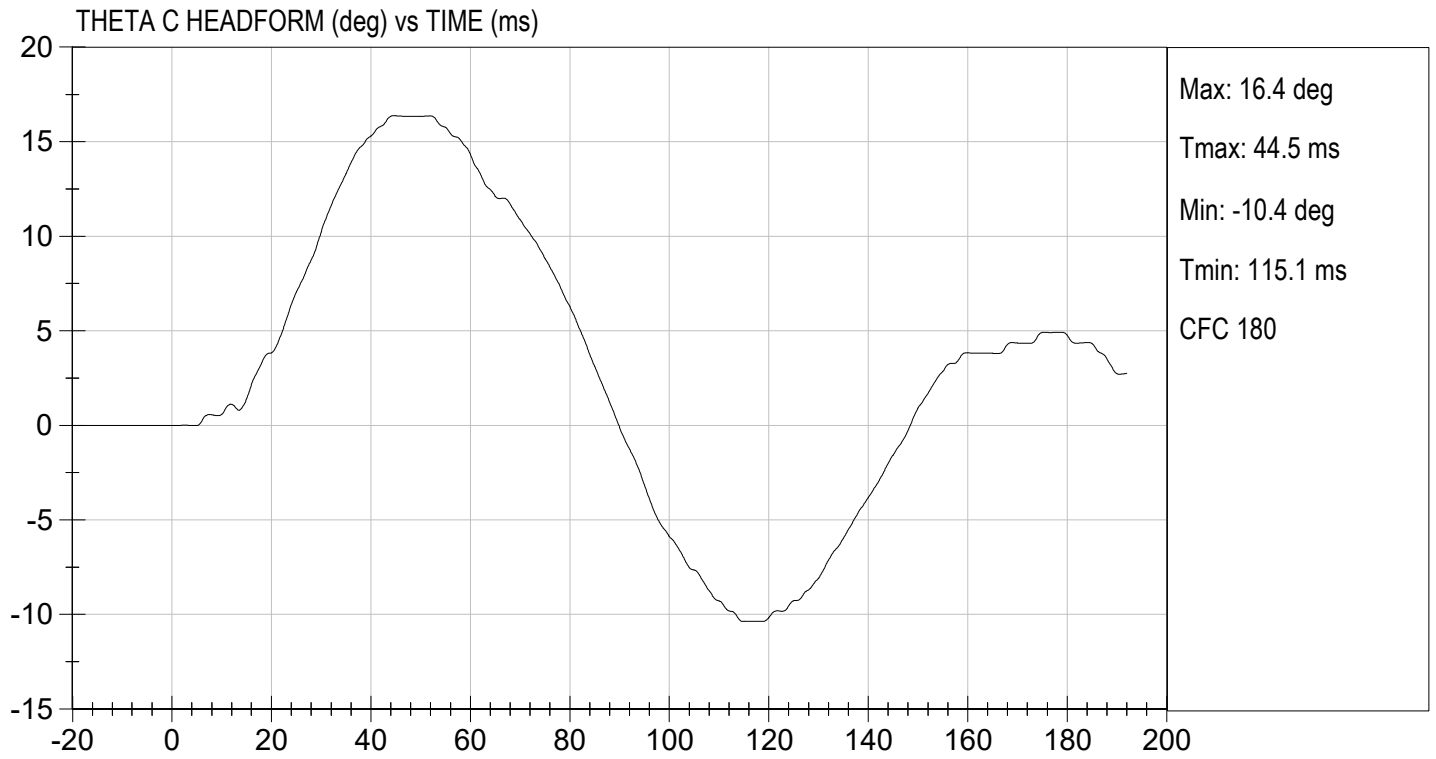

 Laboratory Technician

 05/22/2023
 Test Date


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MGA RESEARCH CORPORATION

PELVIS TEST
ES-2re DUMMY

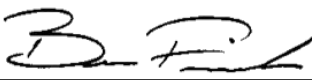
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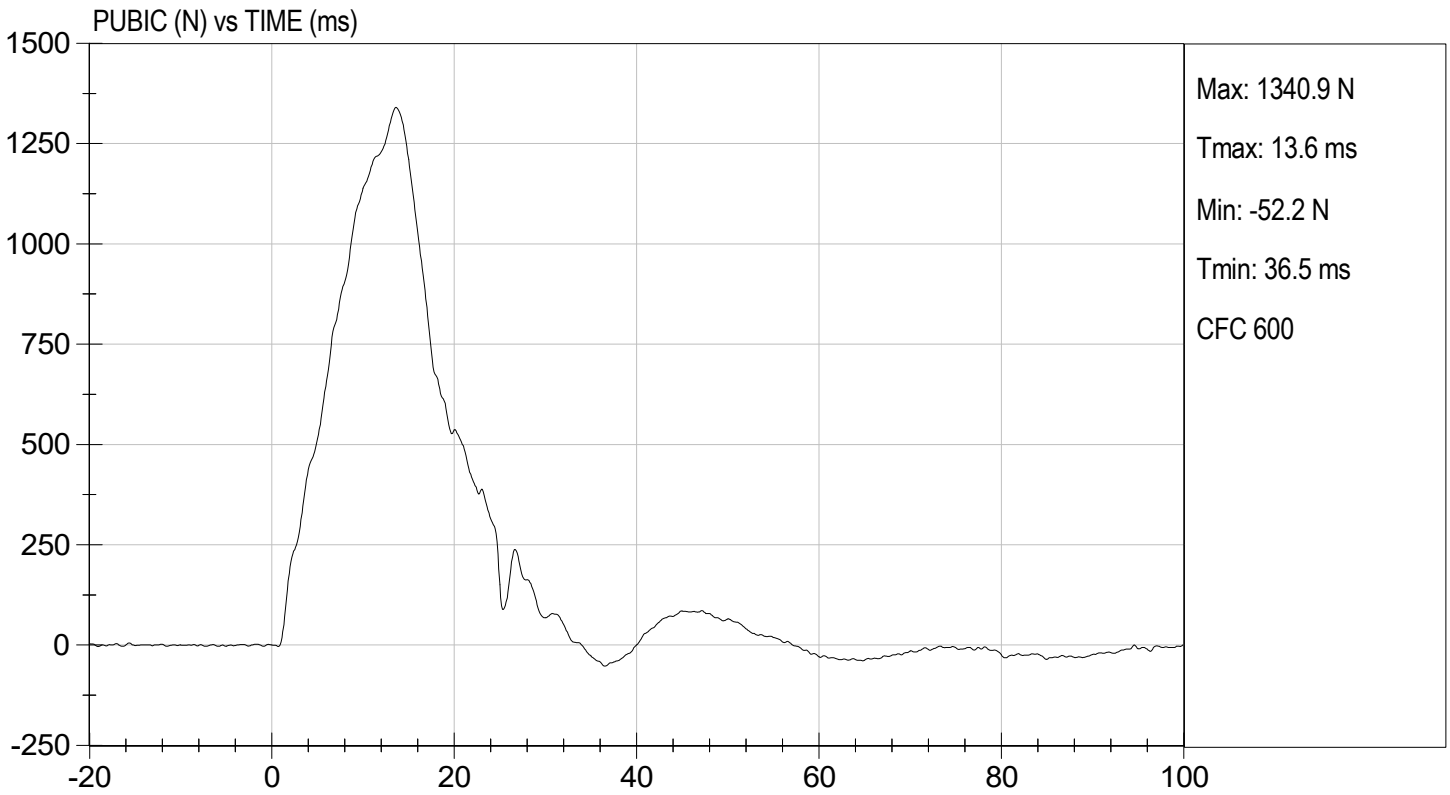
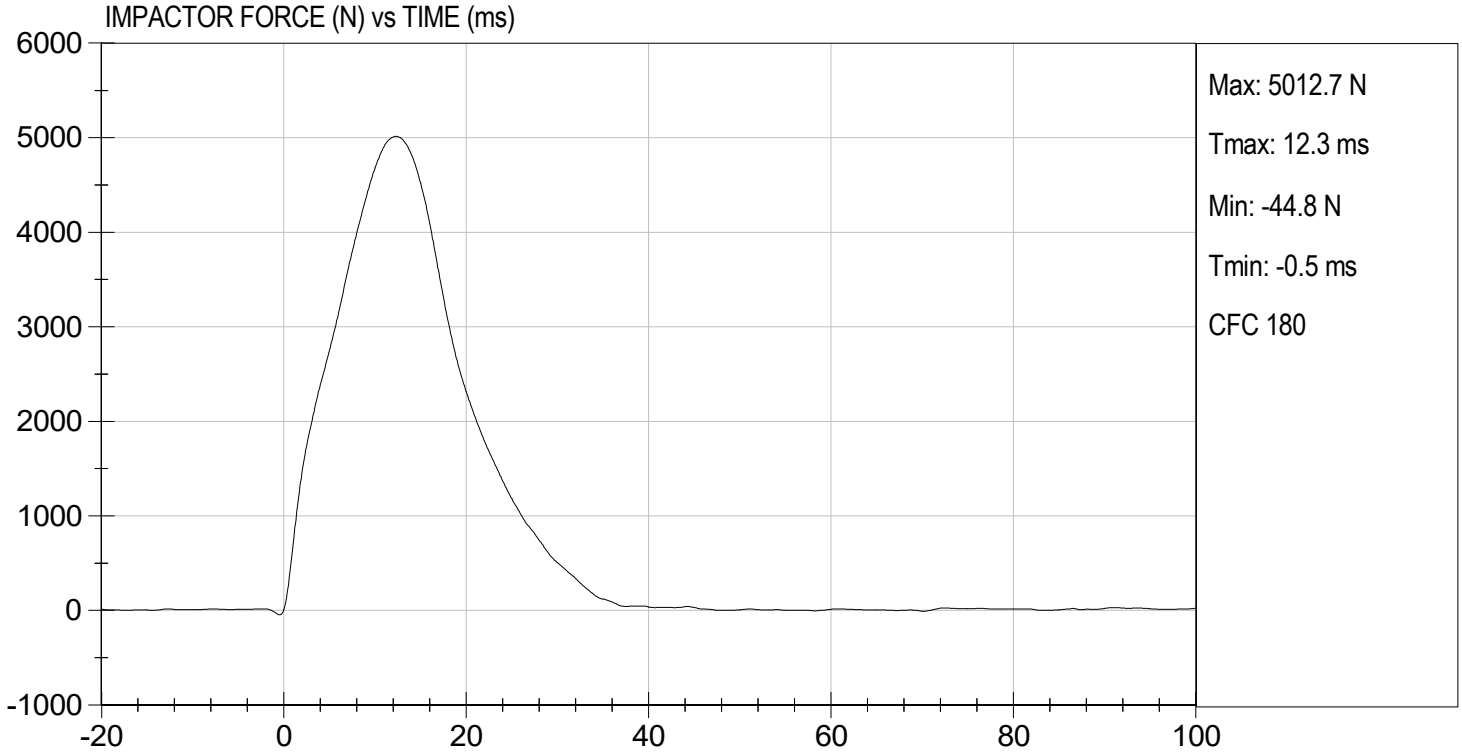
Test I.D: D231279

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	39	Pass
Probe Speed	m/s	4.20 to 4.40	4.38	Pass
Maximum Impactor Force	N	4700 to 5400	5013	Pass
Time of Maximum Impactor Force	ms	11.8 to 16.1	12.3	Pass
Maximum Pubic Force	N	1230 to 1590	1341	Pass
Time of Maximum Pubic Force	ms	12.2 to 17.0	13.6	Pass
Overall Test Results				Pass


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05/22/2023
Test Date


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MGA RESEARCH CORPORATION
THORAX IMPACT TEST
ES-2re DUMMY

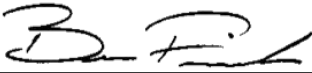
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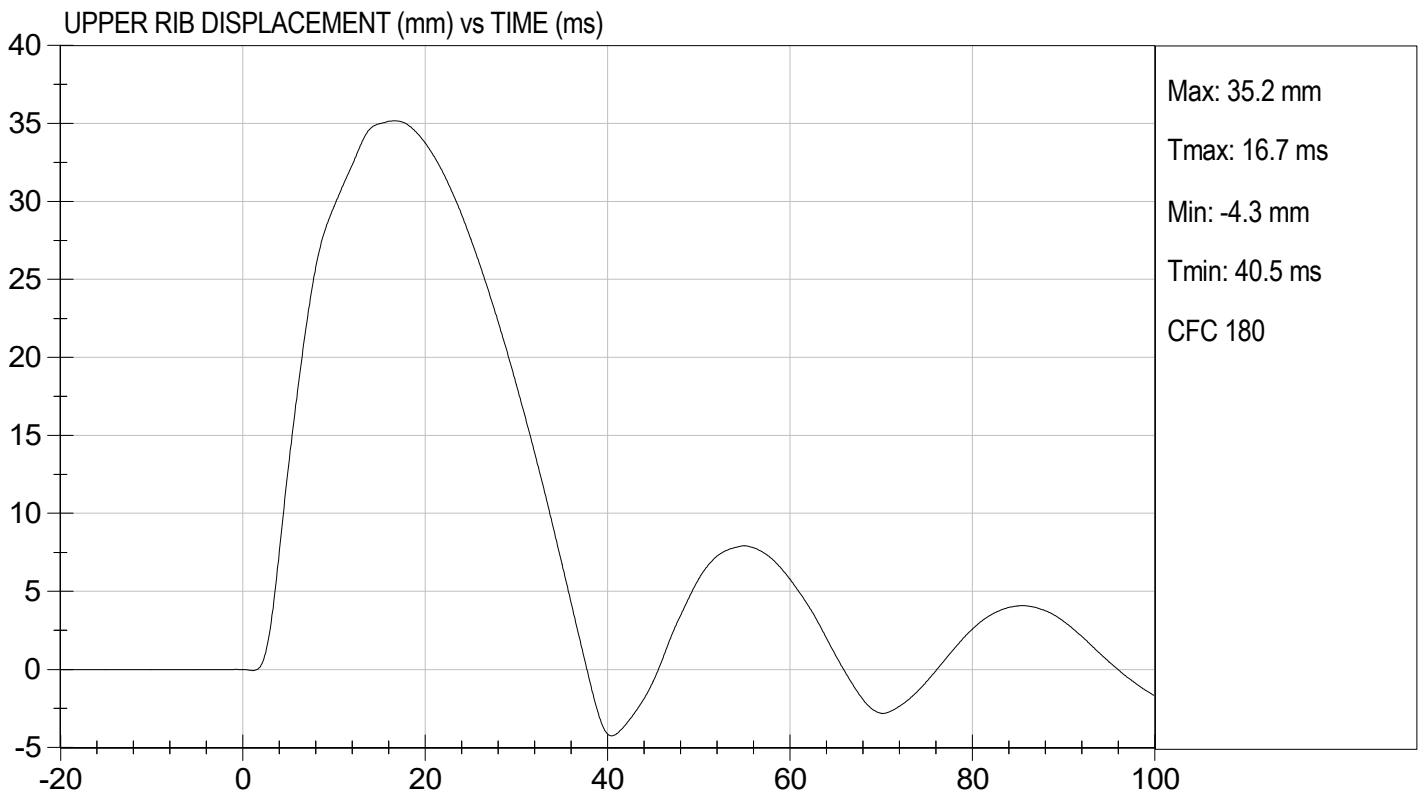
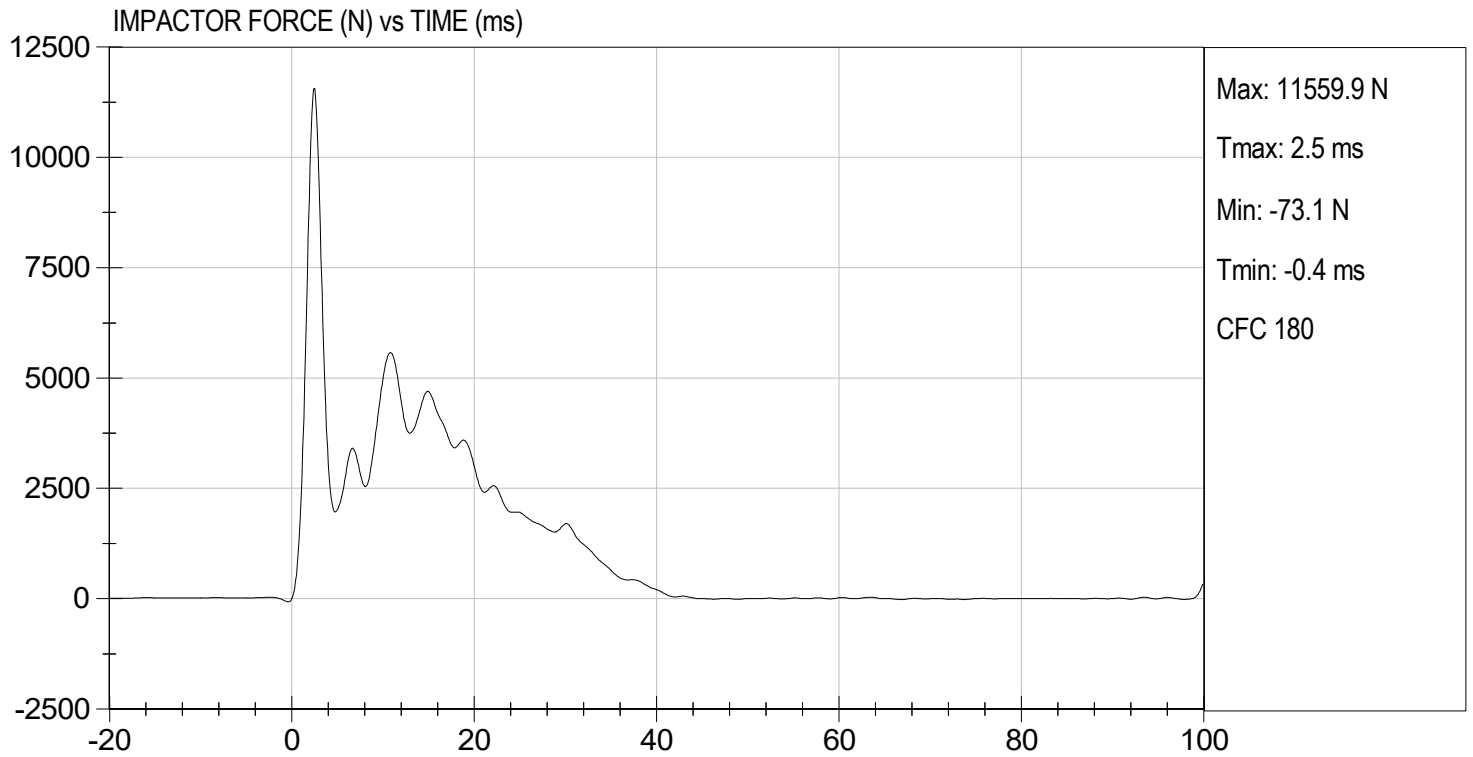
Test I.D: D231270

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.7	Pass
Humidity	%	10 to 70	39	Pass
Probe Speed	m/s	5.40 to 5.60	5.46	Pass
Maximum Impactor Force (after 6 ms)	N	5100 to 6200	5583	Pass
Upper Rib Displacement	mm	34.0 to 41.0	35.2	Pass
Middle Rib Displacement	mm	37.0 to 45.0	37.9	Pass
Lower Rib Displacement	mm	37.0 to 44.0	38.6	Pass
Overall Test Results				Pass


 Laboratory Technician

 05/22/2023
 Test Date

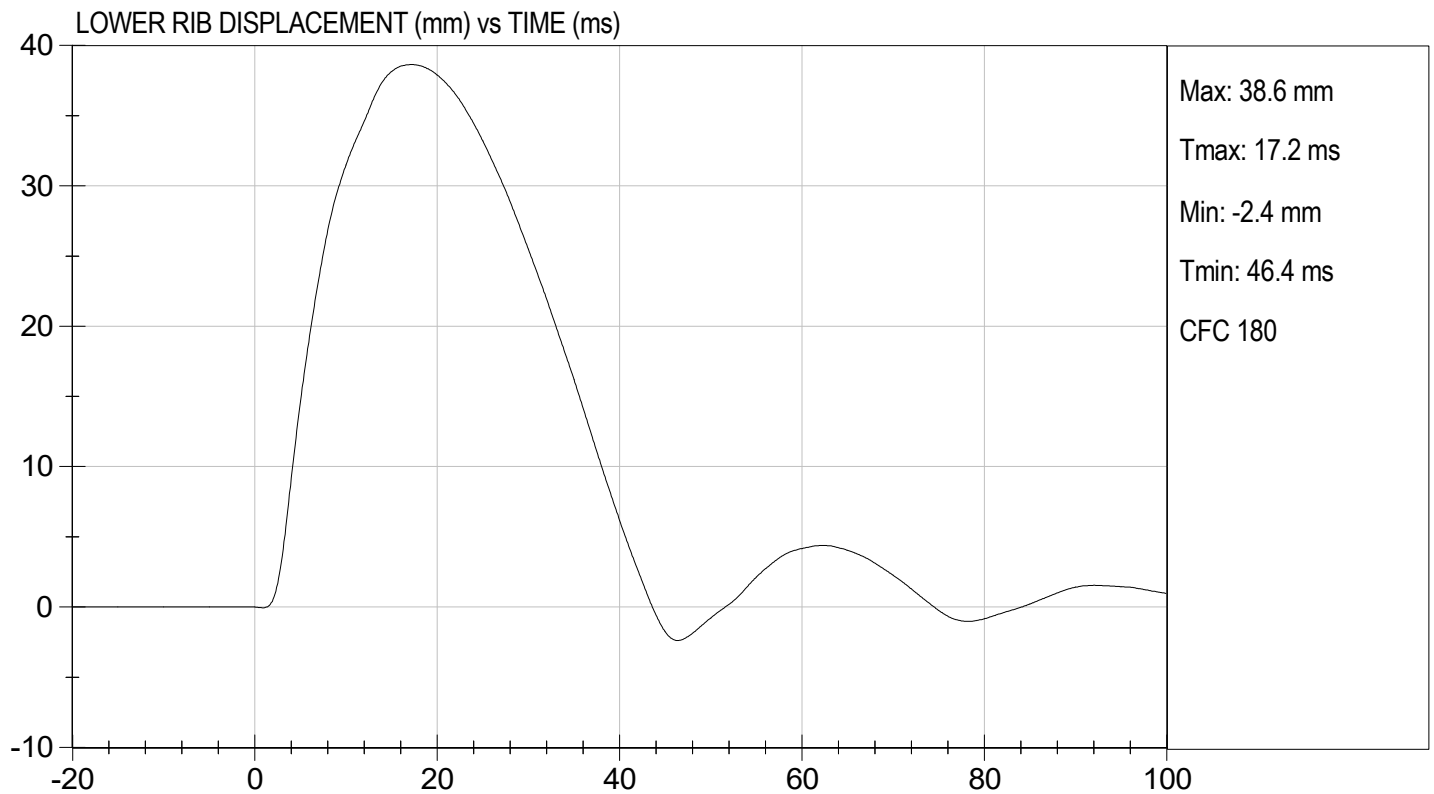
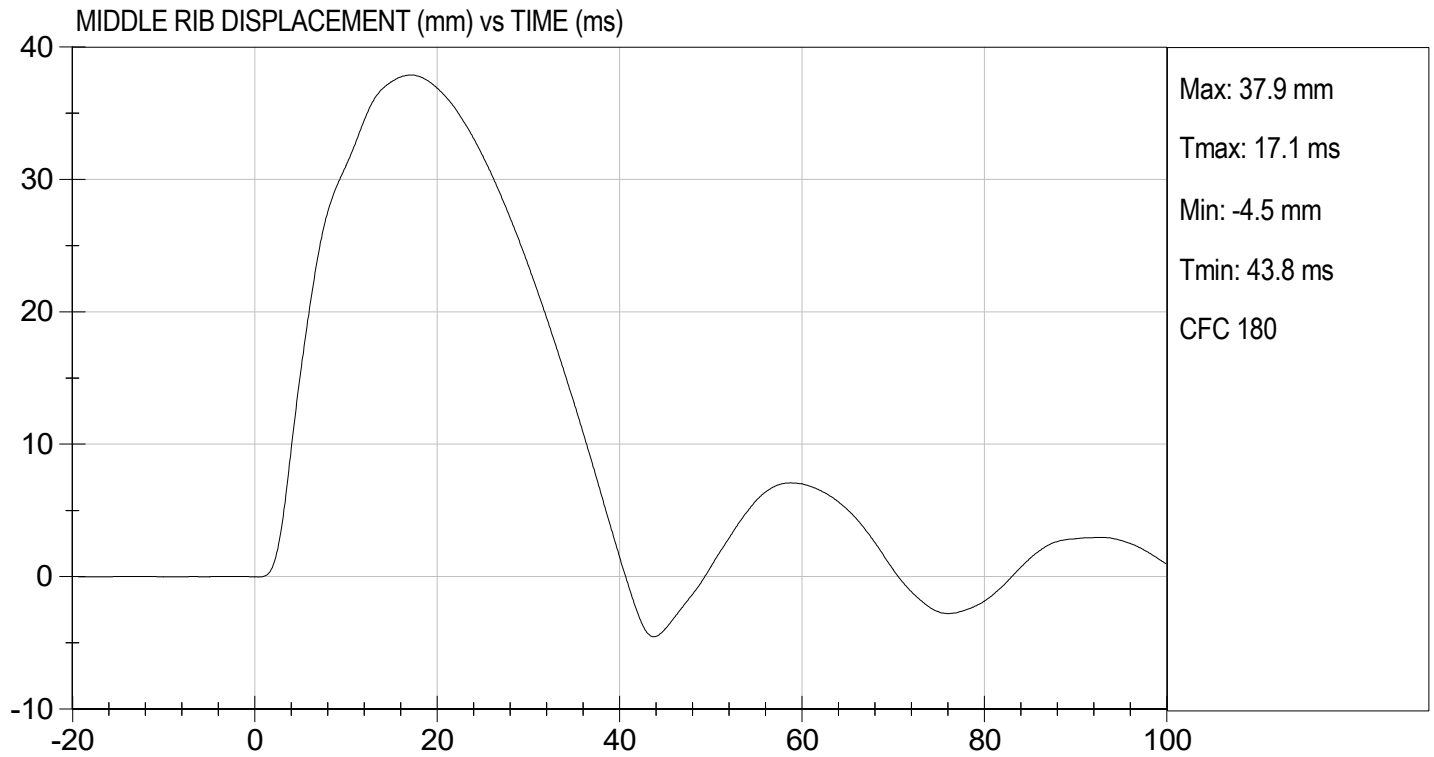

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TEST DESC: THORAX IMPACT
VELOCITY: 17.92 ft/s, 5.46 m/s

TEST DATE: 05/22/2023
TEST #: D231270



QUALIFICATION 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

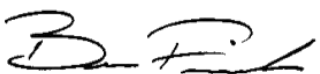
ATD Serial No: 306

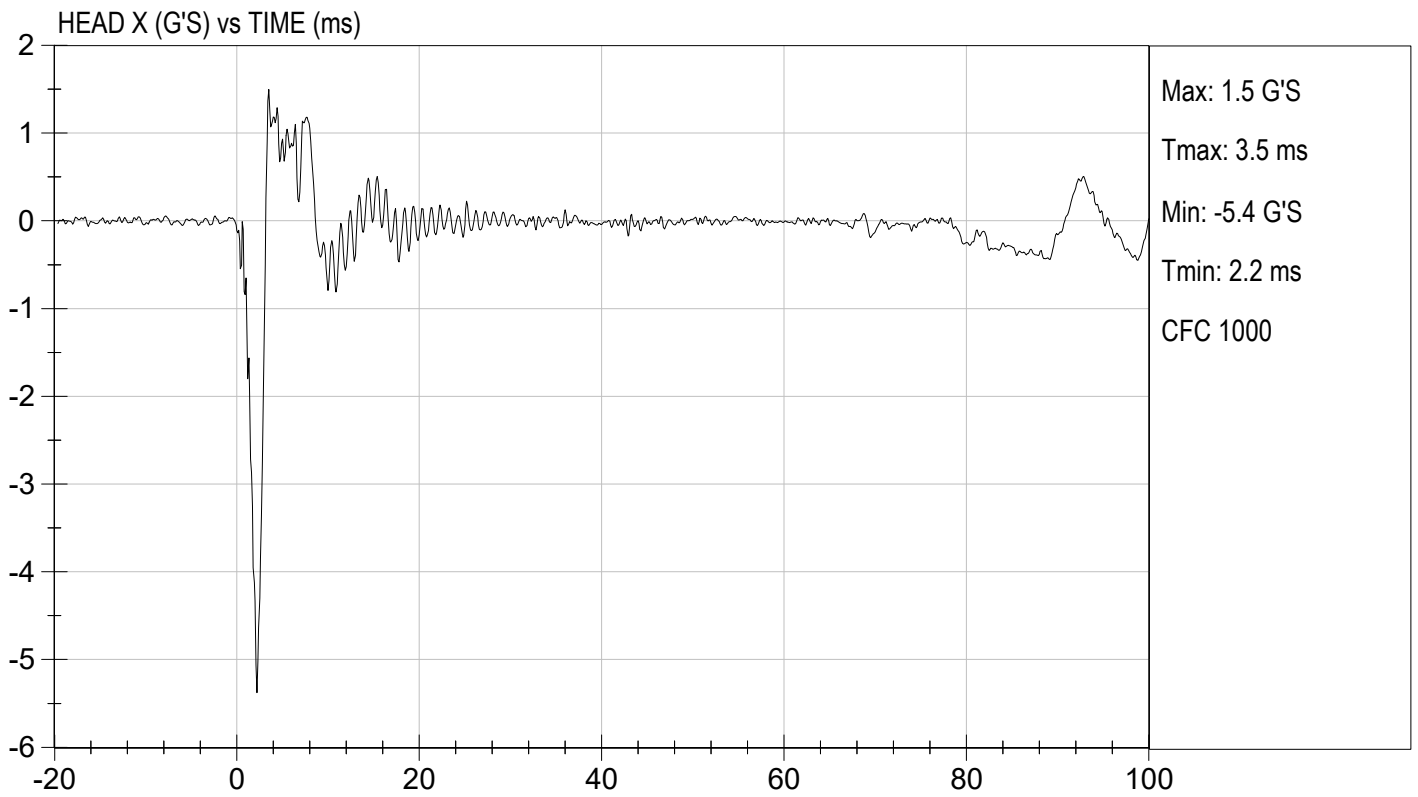
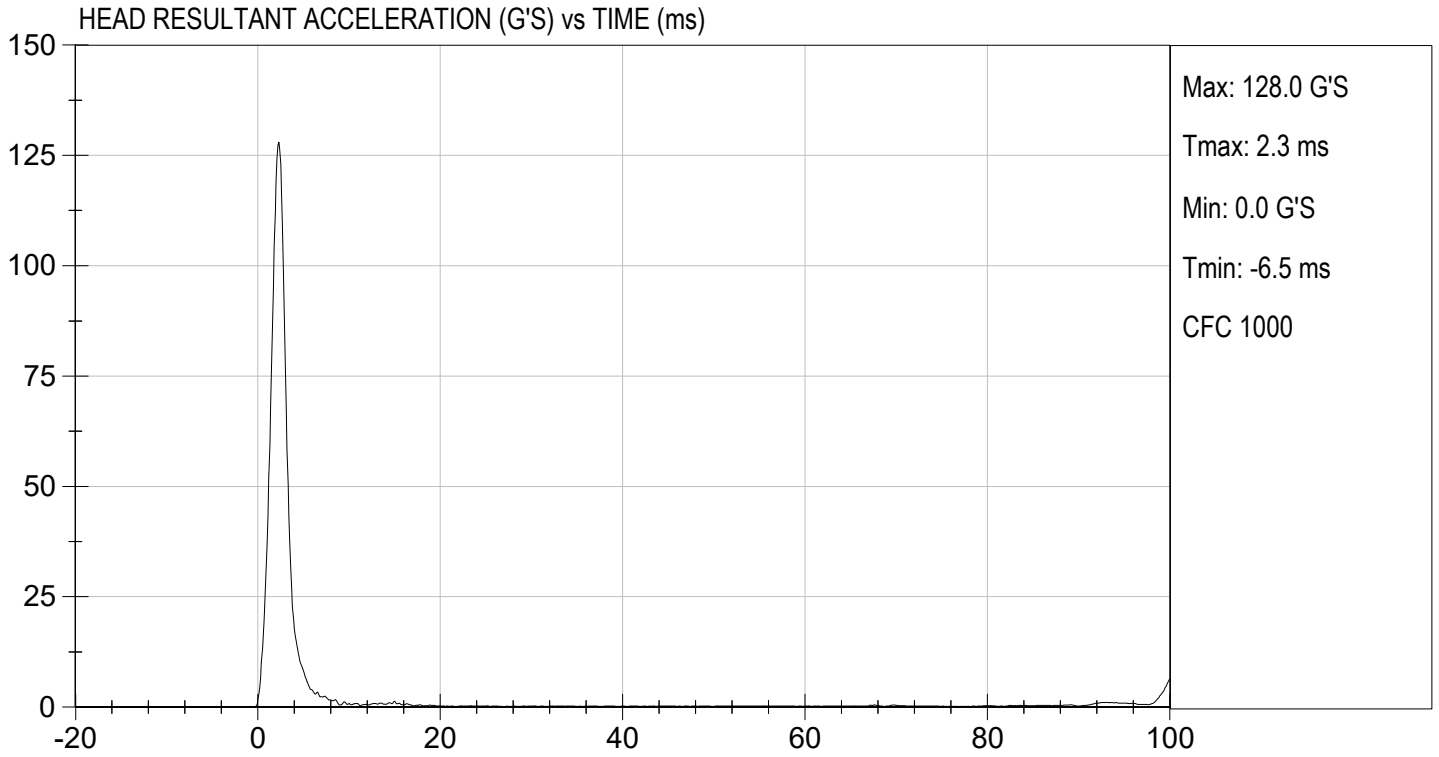
Test ID: D231171

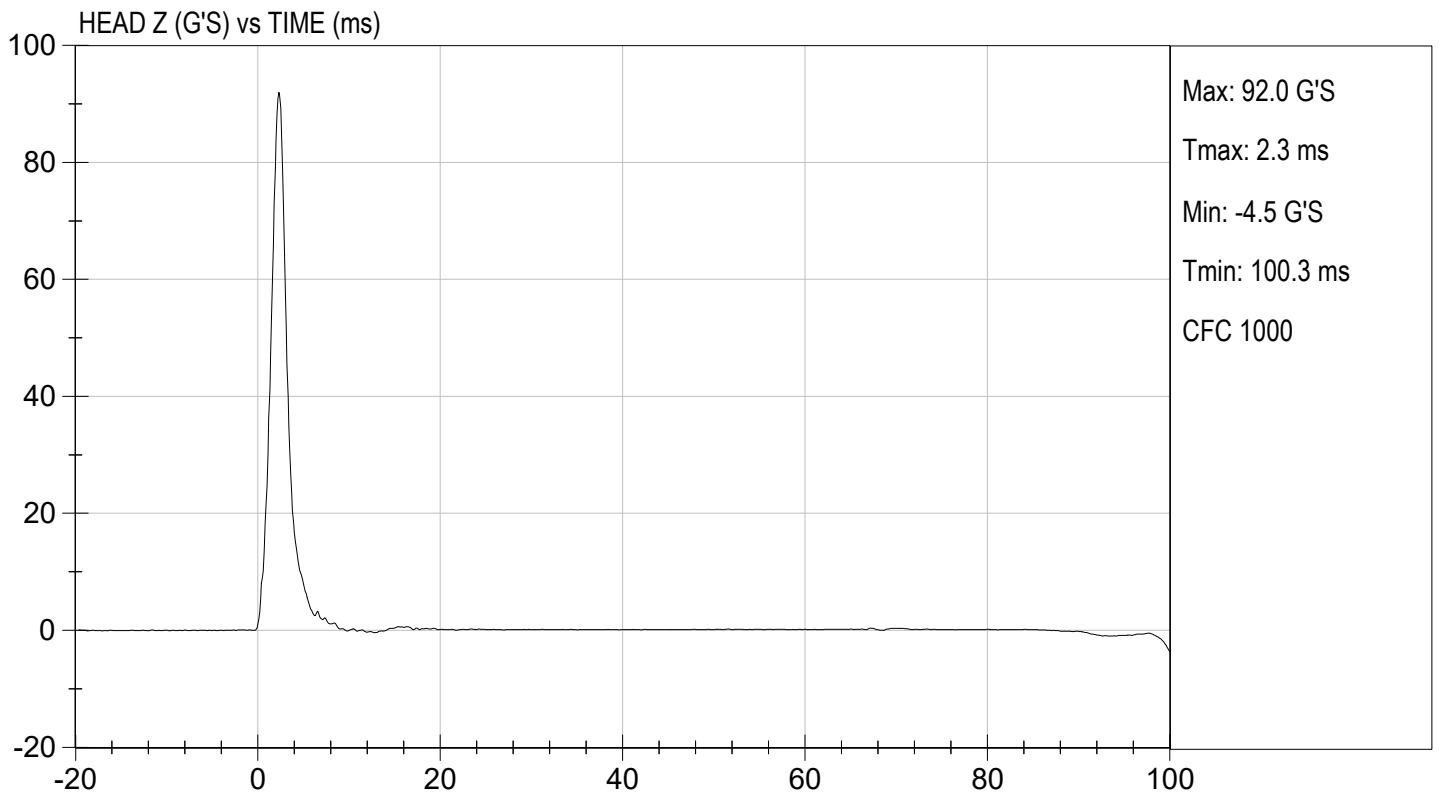
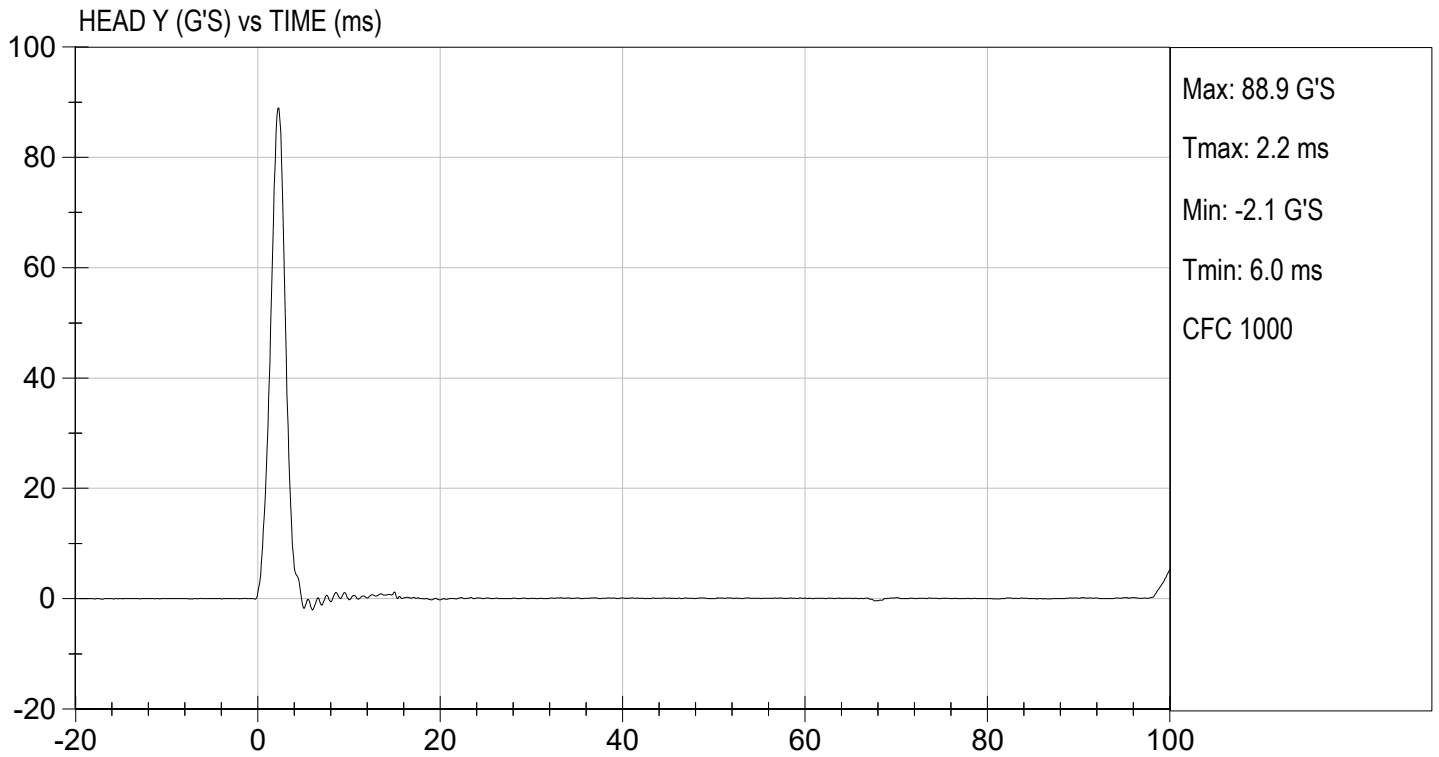
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	44	Pass
Peak Resultant Acceleration	G's	115 to 137	128	Pass
Peak Longitudinal Acceleration	G's	+/- 15	-5.4	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	<15%	Yes	Pass
Overall Test Results				Pass


 Laboratory Technician

05/12/2023
 Test Date


 Approved By





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

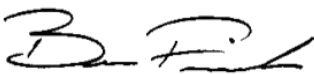
ATD Serial No: 306

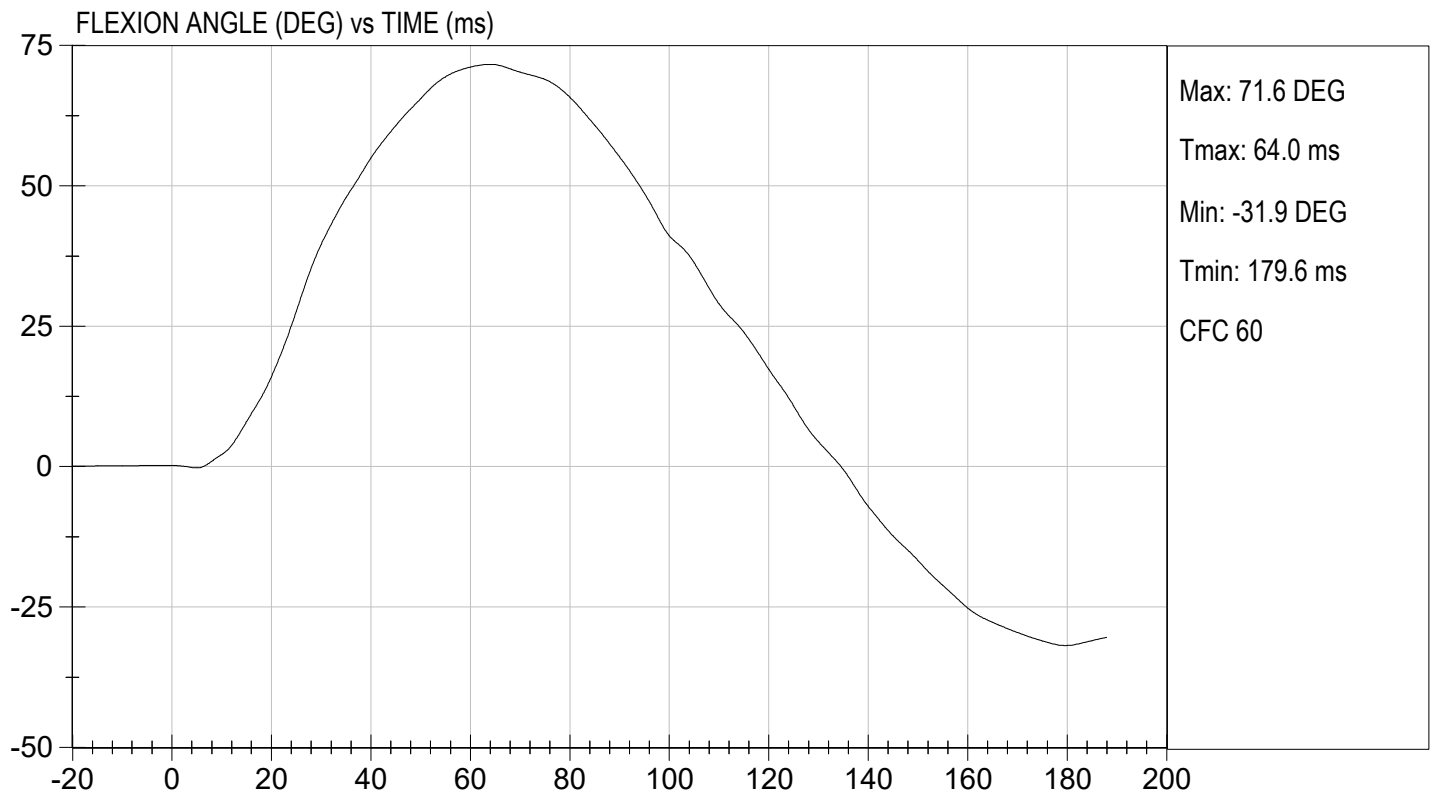
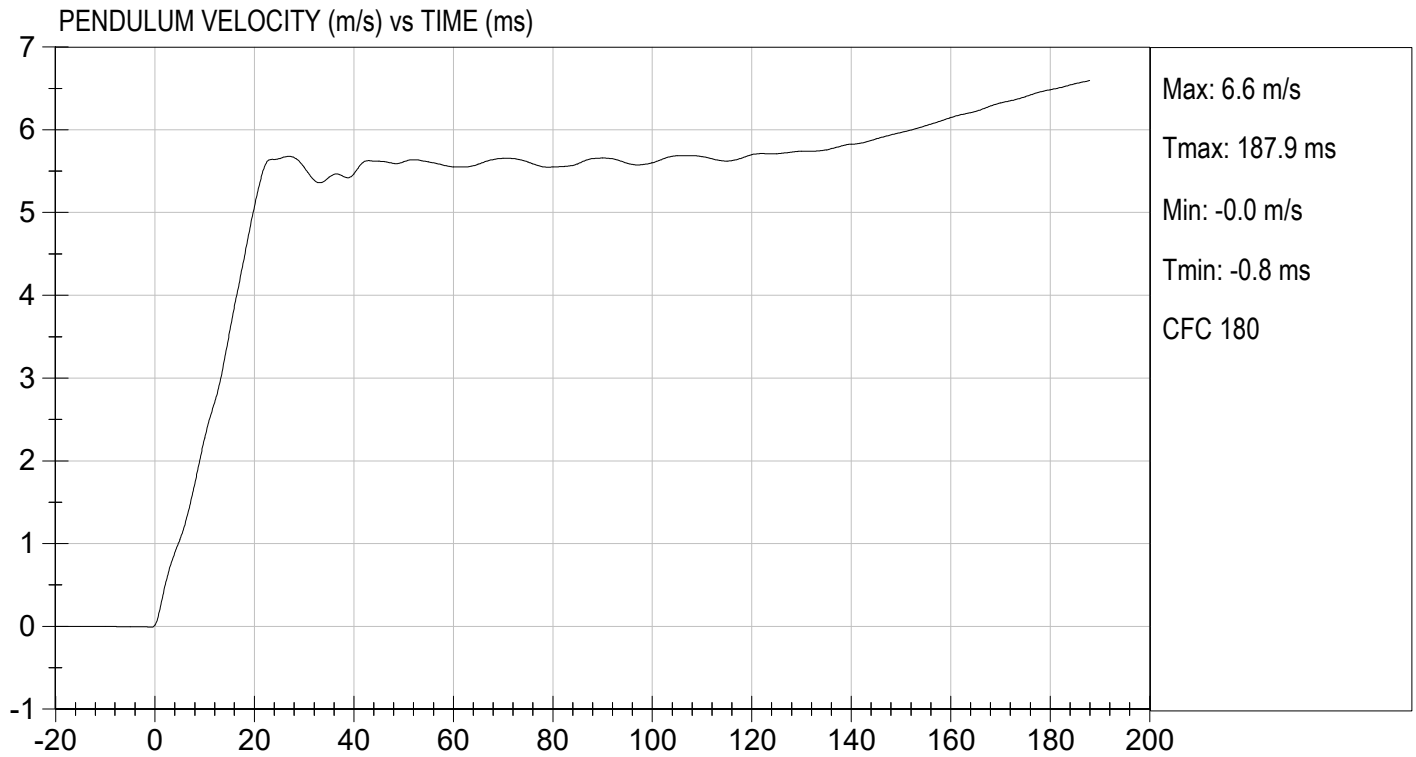
Test I.D.: D231172

Tested Parameter	Units	Specification	Result	Pass/Fail	
Temperature	deg C	20.6 to 22.2	21.3	Pass	
Humidity	%	10 to 70	43	Pass	
Impact Velocity	m/s	5.51 to 5.63	5.58	Pass	
Pendulum Velocity	10 ms	m/s	2.20 to 2.80	2.28	Pass
	15 ms	m/s	3.30 to 4.10	3.55	Pass
	20 ms	m/s	4.40 to 5.40	5.07	Pass
	25 ms	m/s	5.40 to 6.10	5.65	Pass
	25-100 ms	m/s	5.50 to 6.20	5.68	Pass
Maximum D-Plane Rotation	deg	71 to 81	72	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	112	Pass	
Overall Test Results				Pass	


 Laboratory Technician

05/12/2023
 Test Date

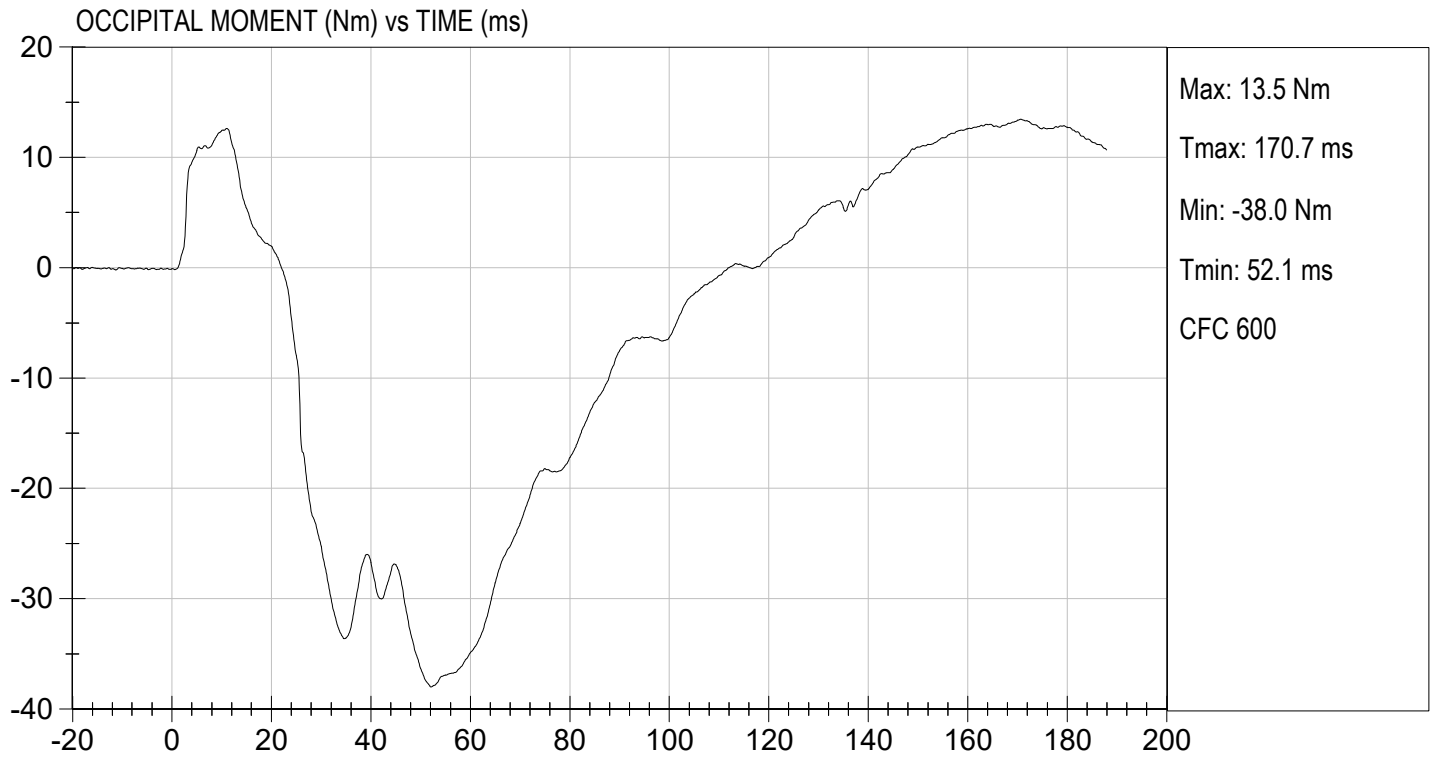

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TEST DESC: NECK BENDING
VELOCITY: 18.32 ft/s, 5.58 m/s

TEST DATE: 05/12/2023
TEST #: D231172



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

ATD Serial No: 306

Test ID: D231173

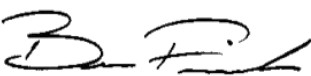
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	43	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Maximum Probe Acceleration	G's	13 to 18	14	Pass
Shoulder Displacement	mm	28 to 37	31	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	18	Pass
Overall Test Results				Pass



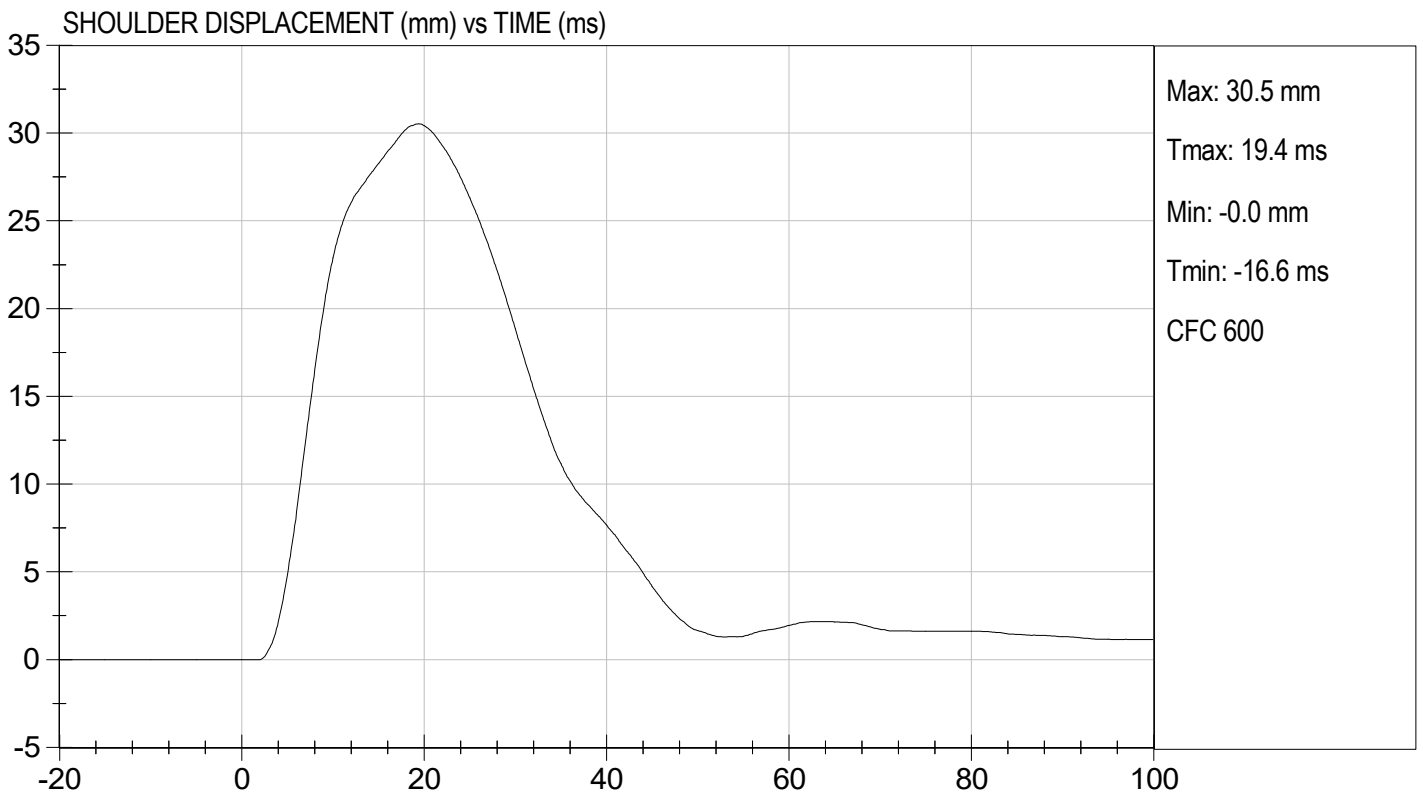
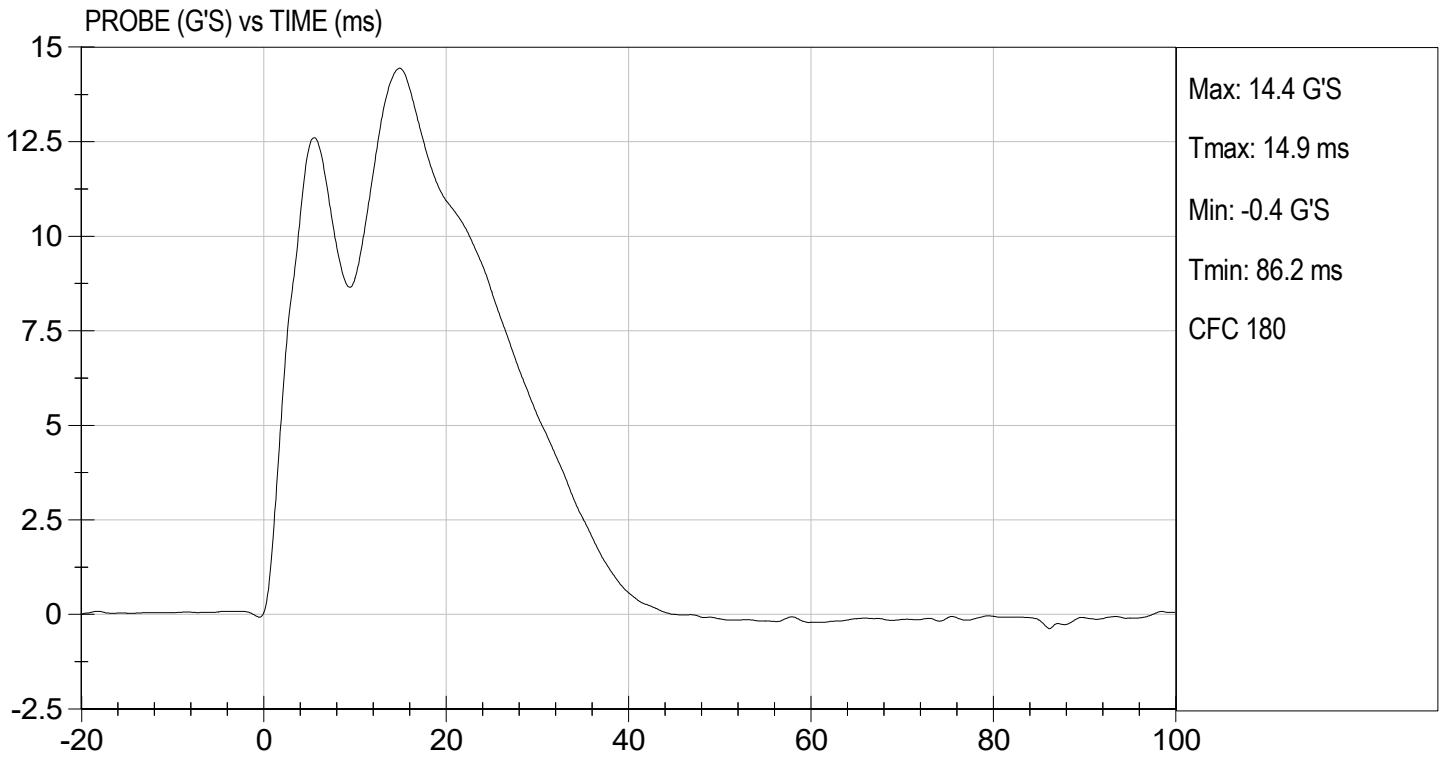
 Laboratory Technician

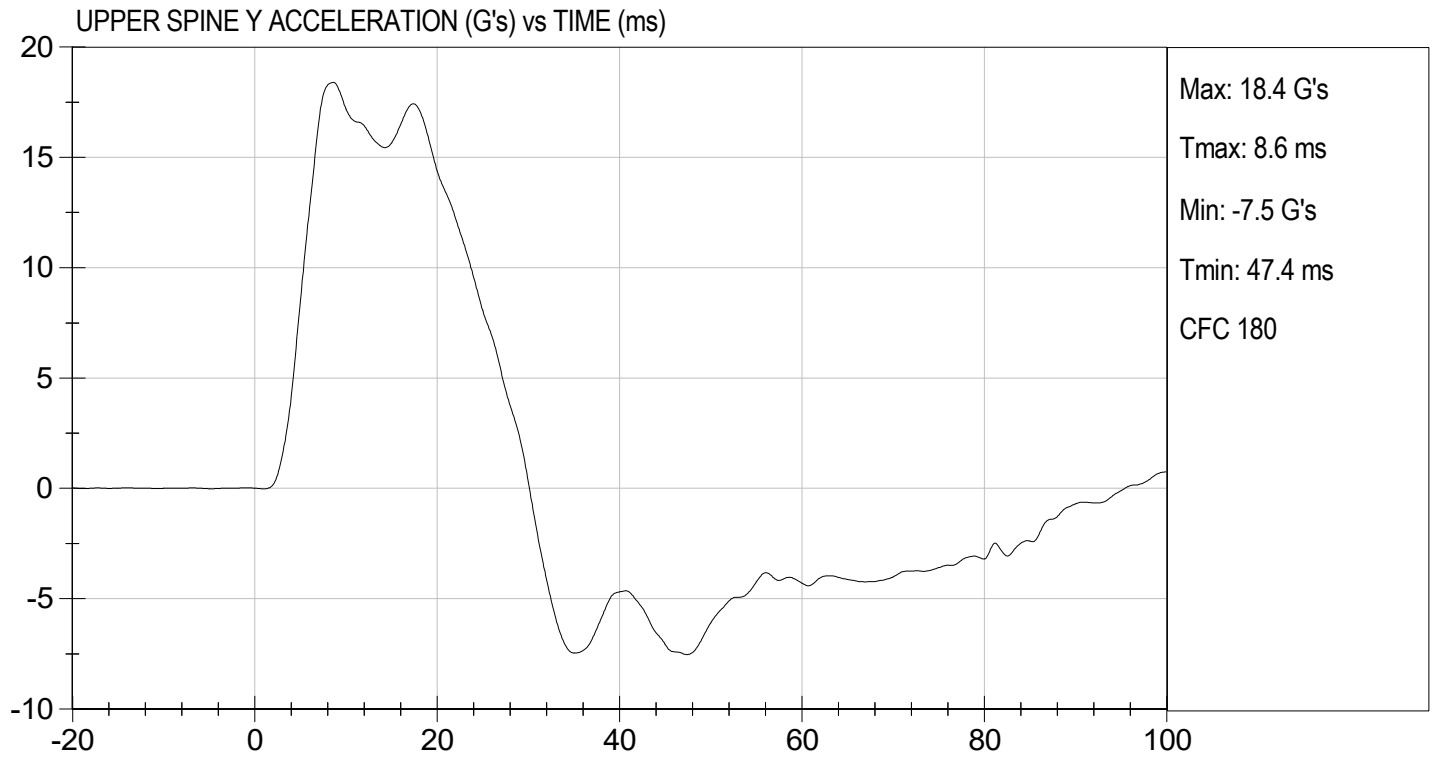
05/12/2023

 Test Date



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

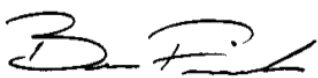
ATD Serial No: 306

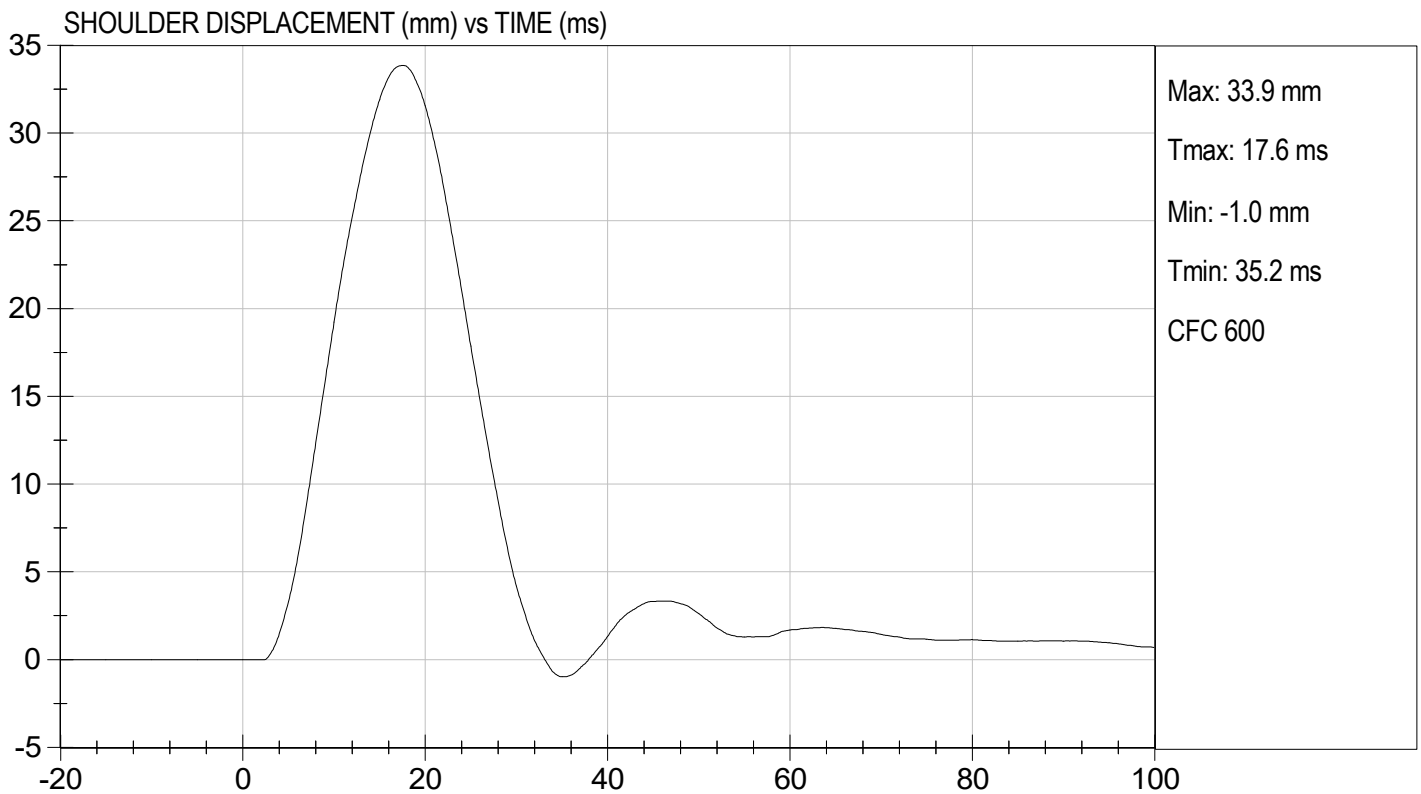
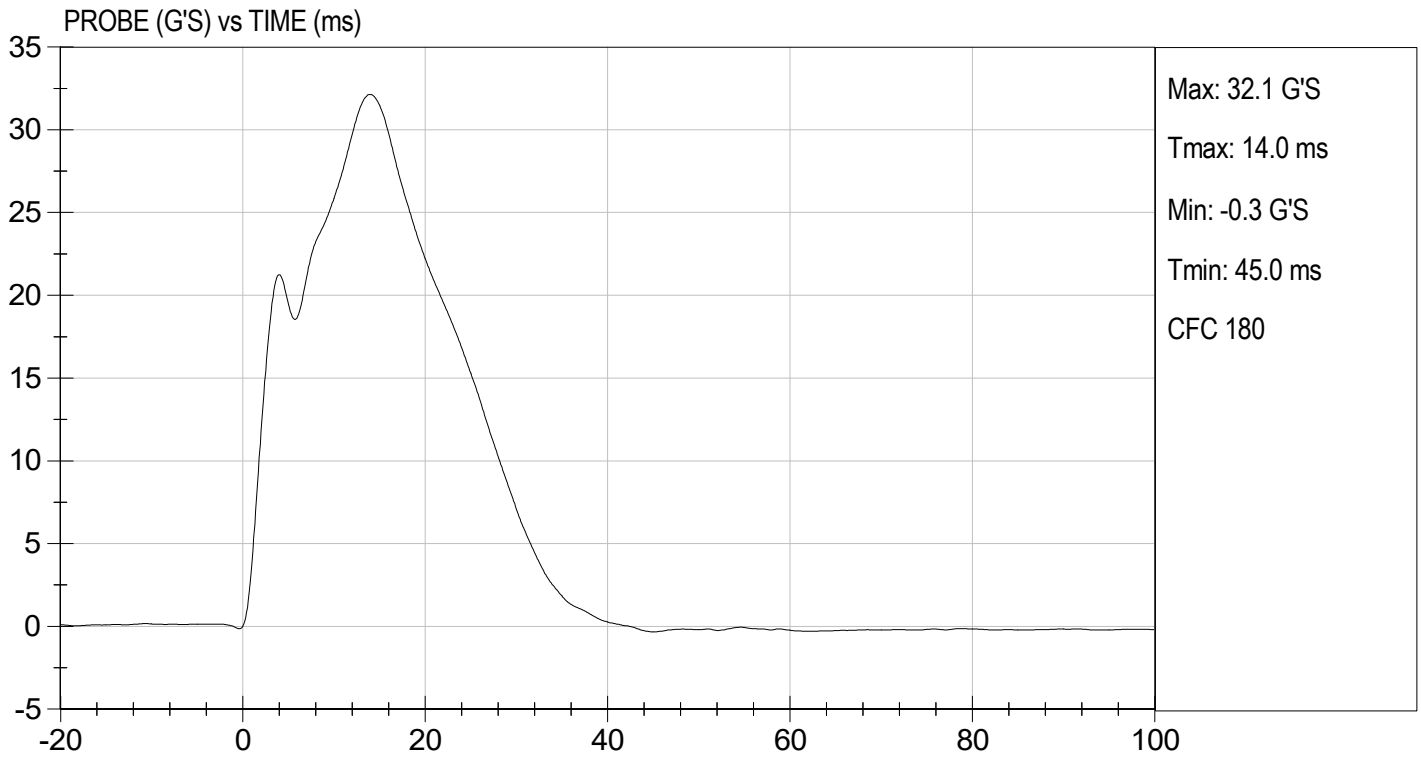
Test I.D: D231174

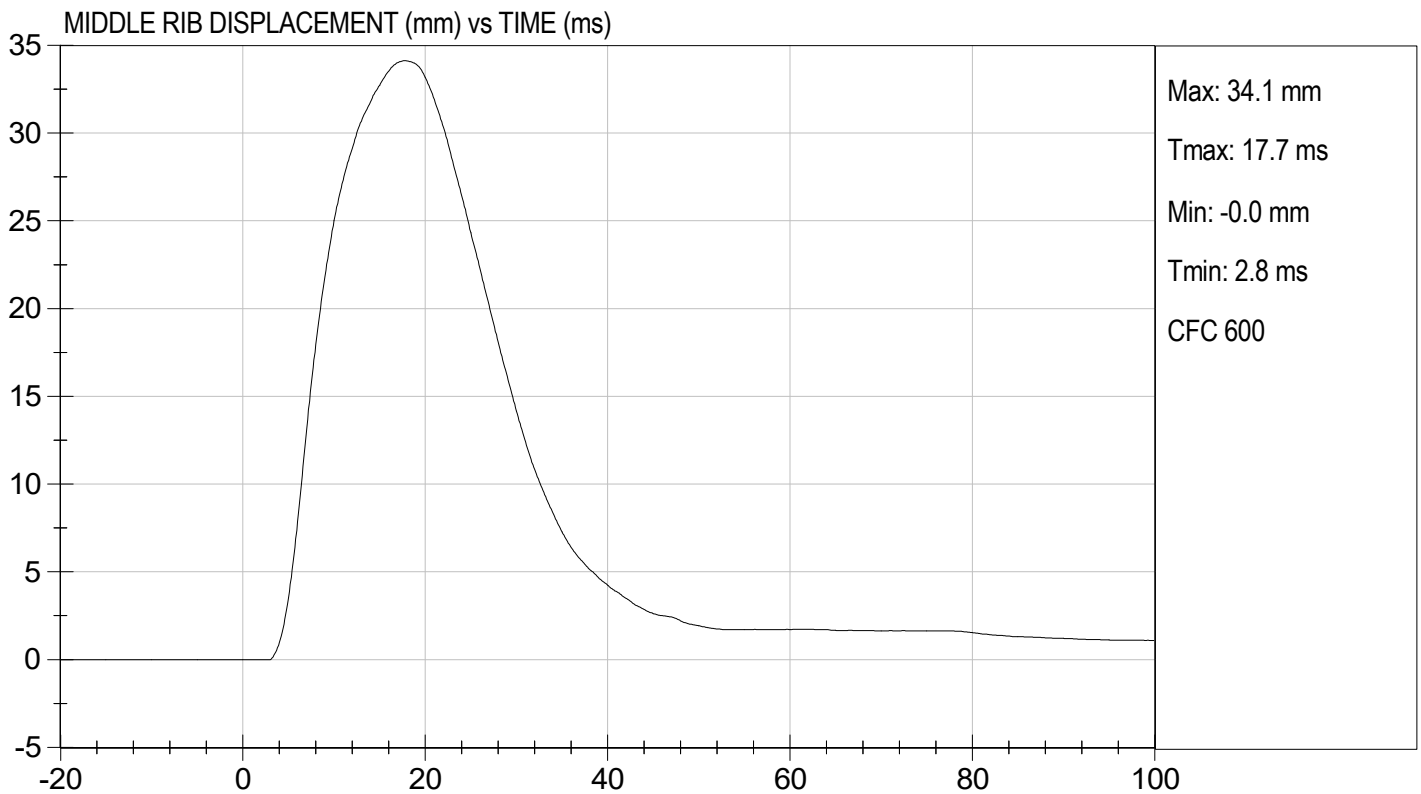
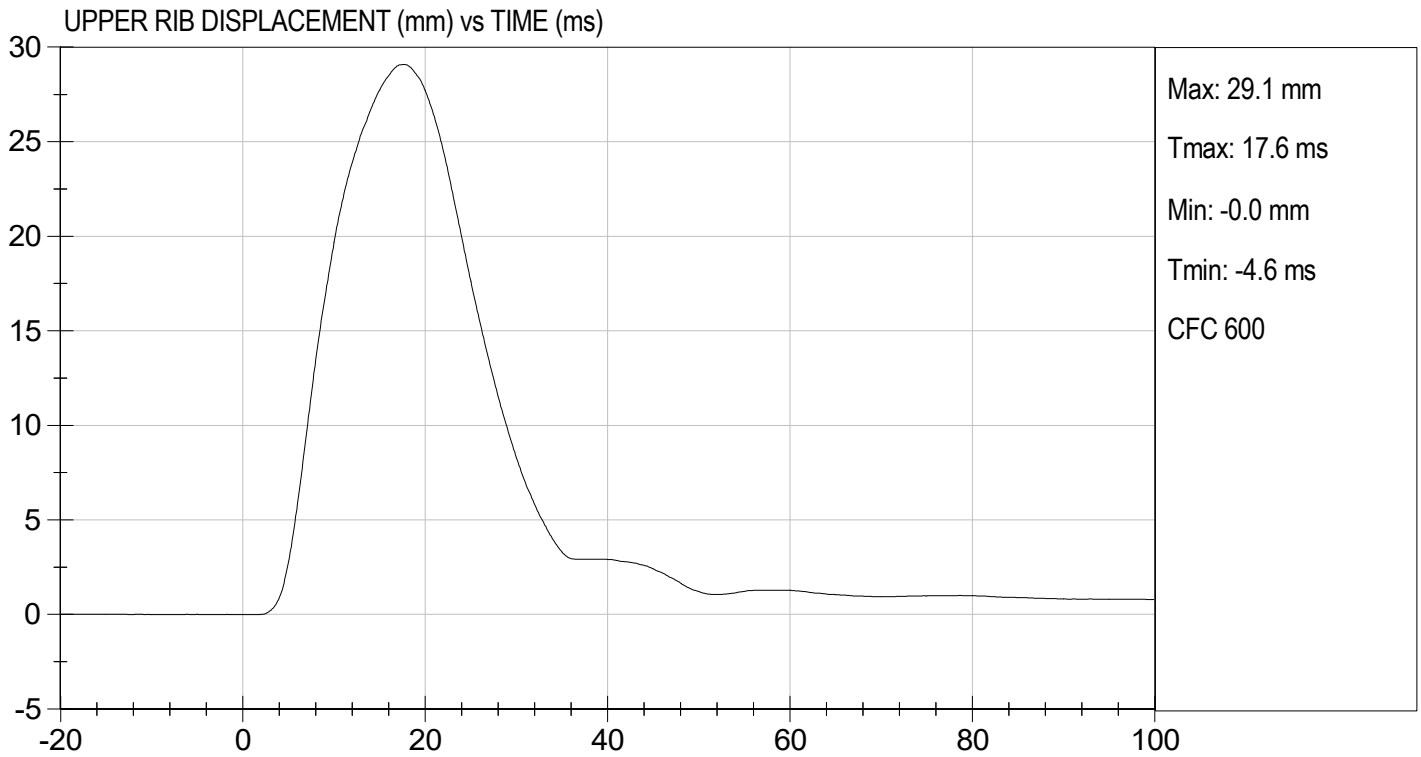
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.4	Pass
Humidity	%	10 to 70	43	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	Pass
Maximum Probe Acceleration	G's	30 to 36	32	Pass
Shoulder Displacement	mm	31 to 40	34	Pass
Upper Rib Displacement	mm	25 to 32	29	Pass
Middle Rib Displacement	mm	30 to 36	34	Pass
Lower Rib Displacement	mm	32 to 38	37	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	38	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	31	Pass
Overall Test Results				Pass

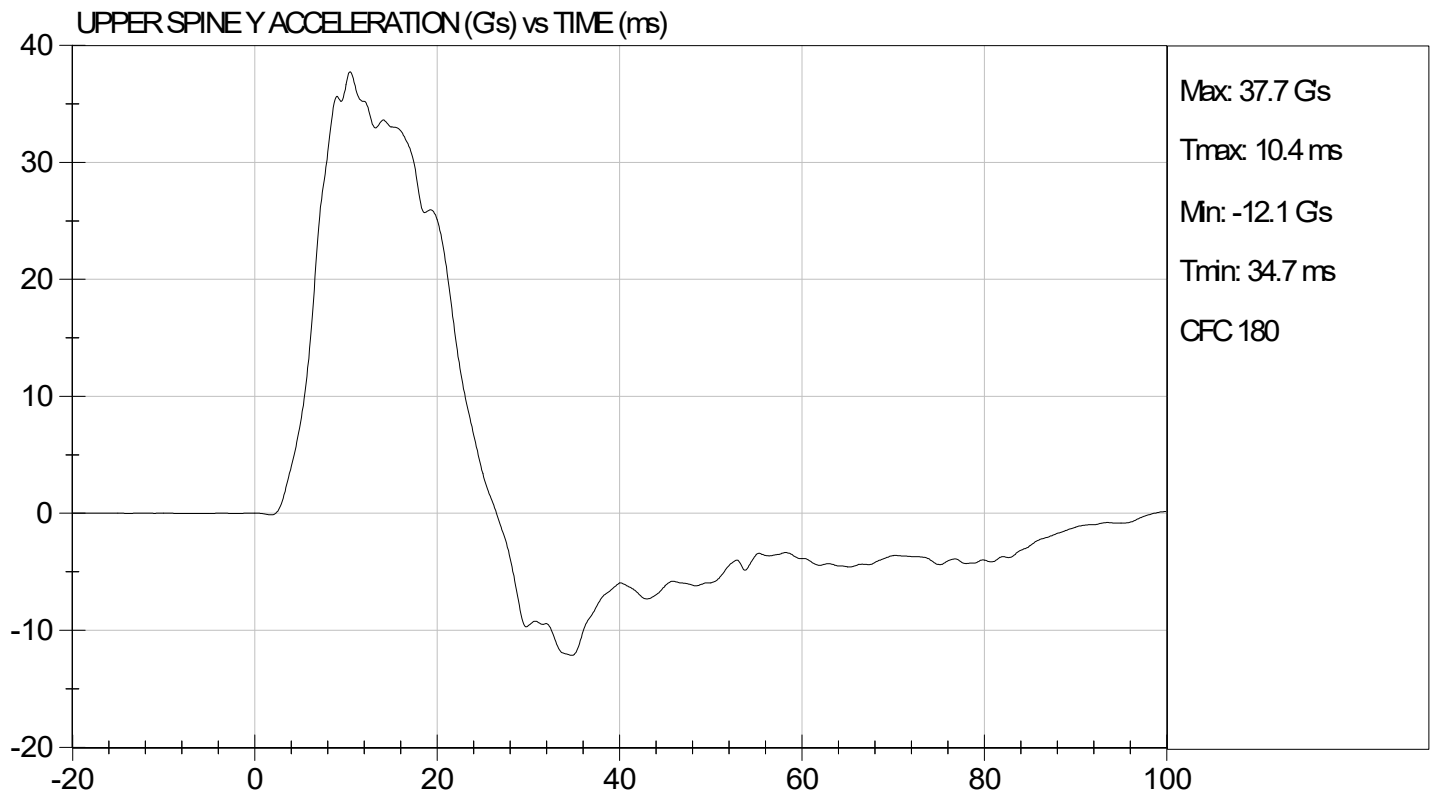
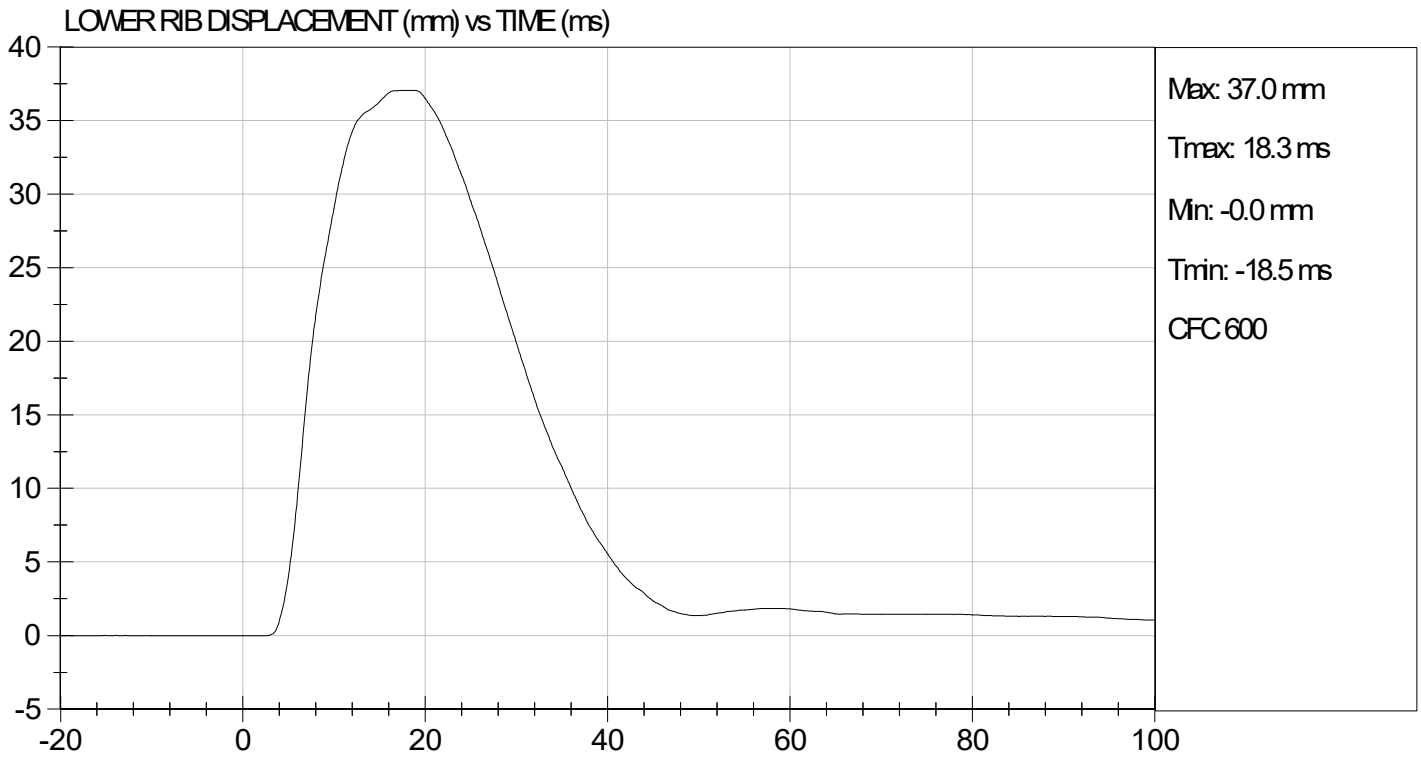

 Laboratory Technician

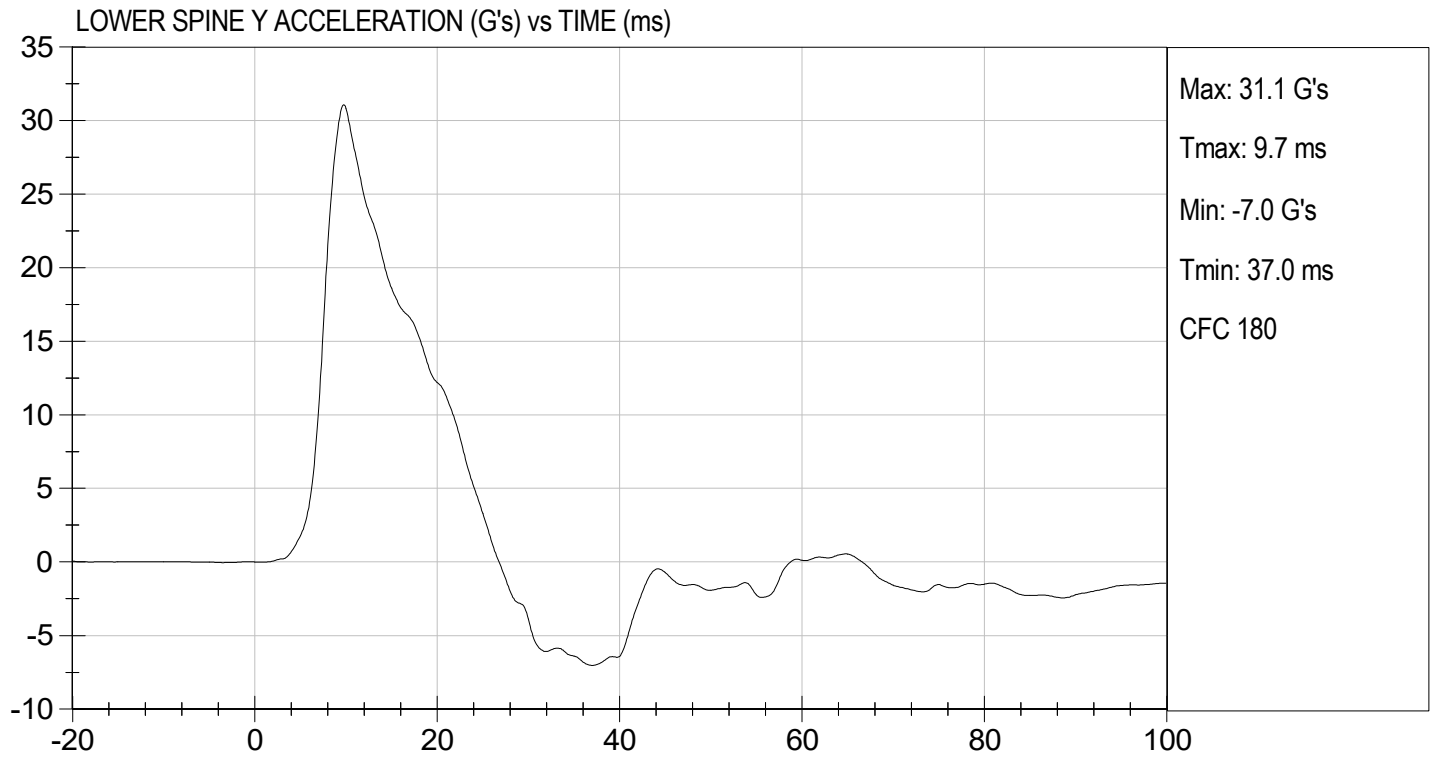
05/12/2023
 Test Date


 Approved By









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

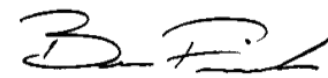
ATD Serial No: 306

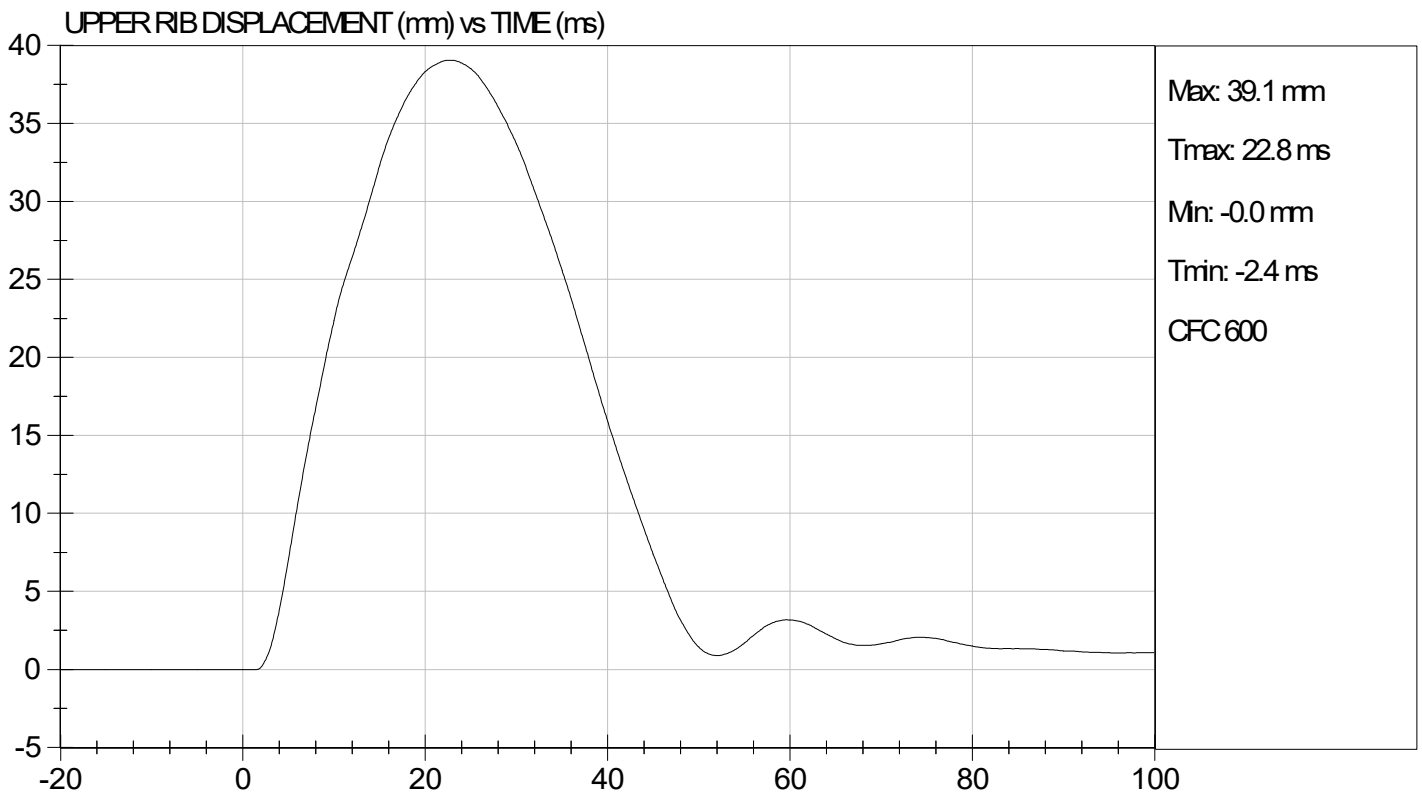
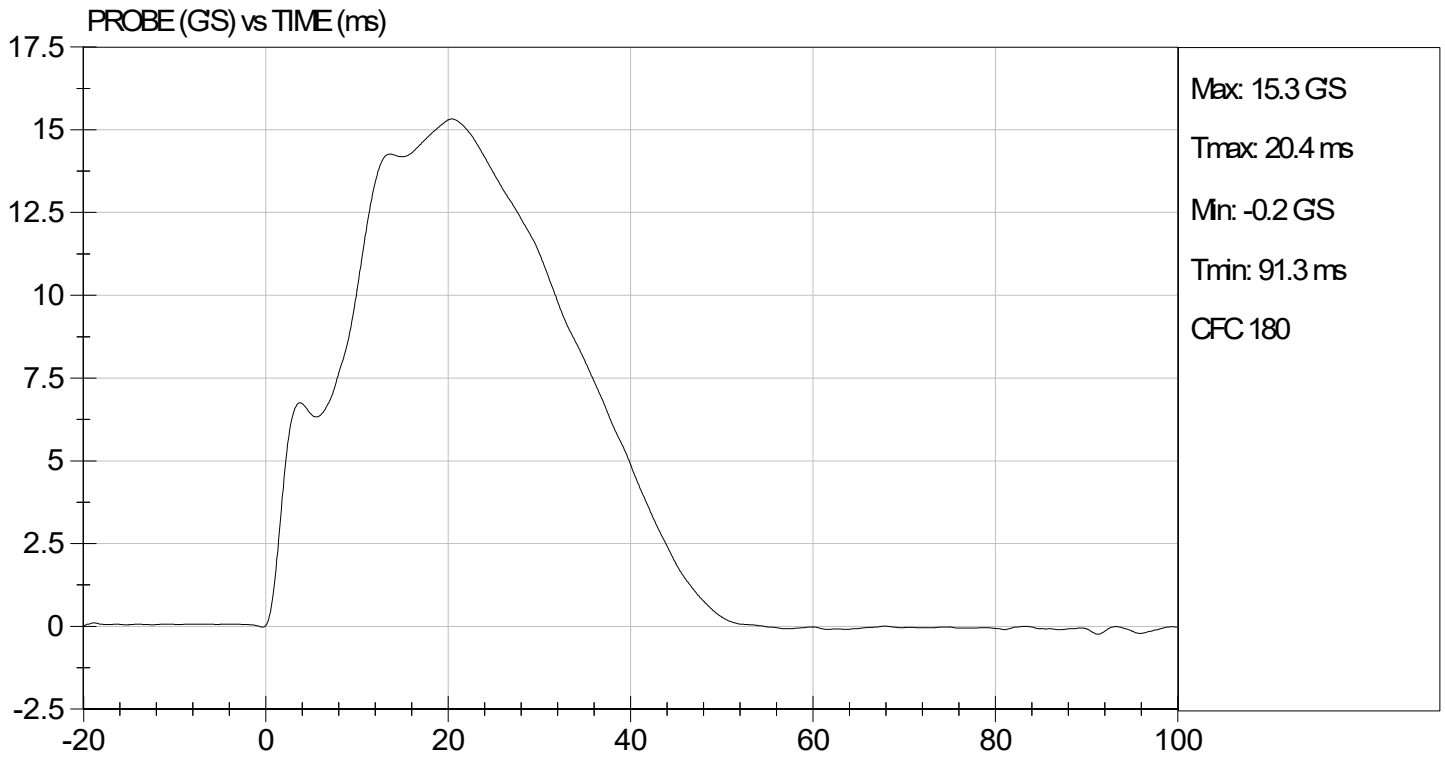
Test I.D: D231175

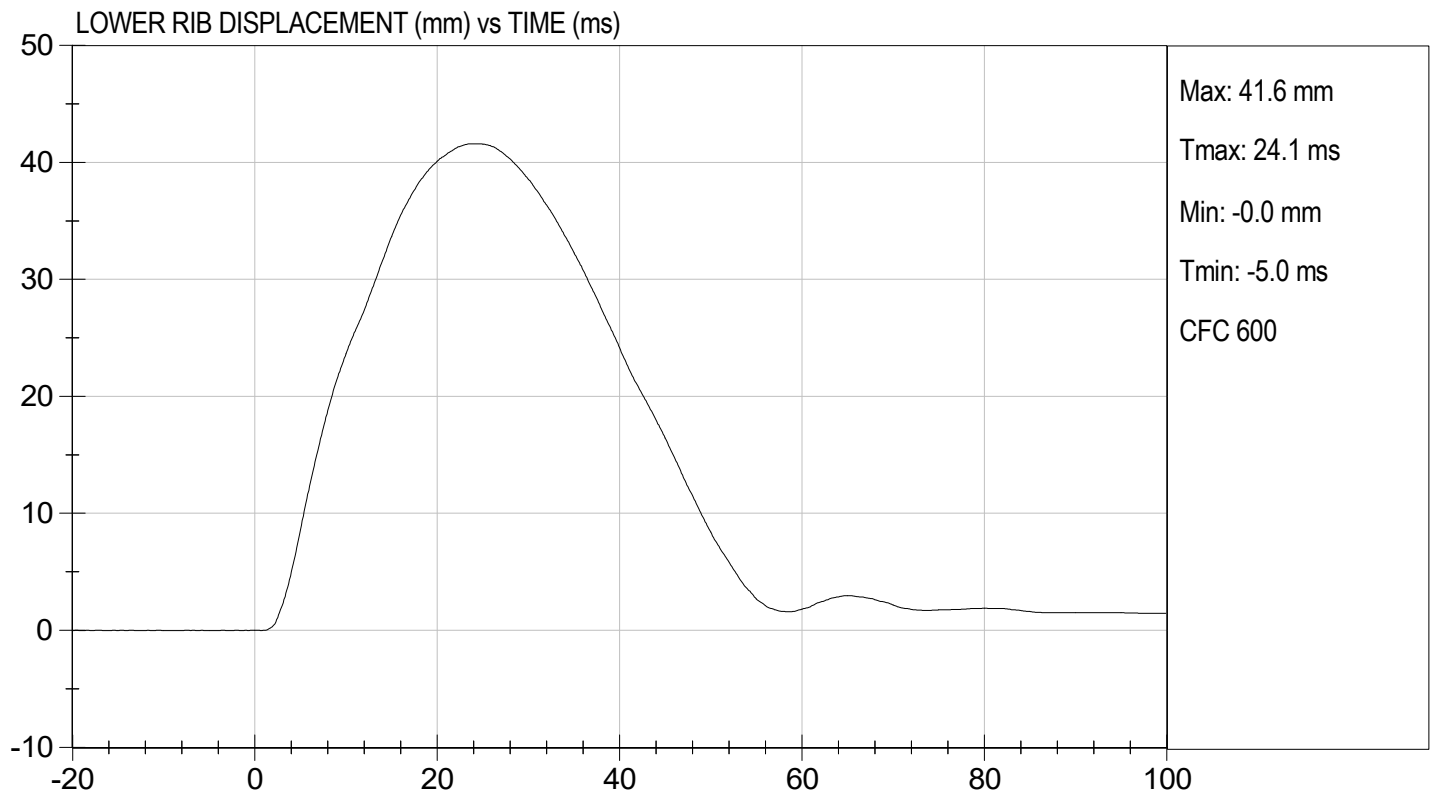
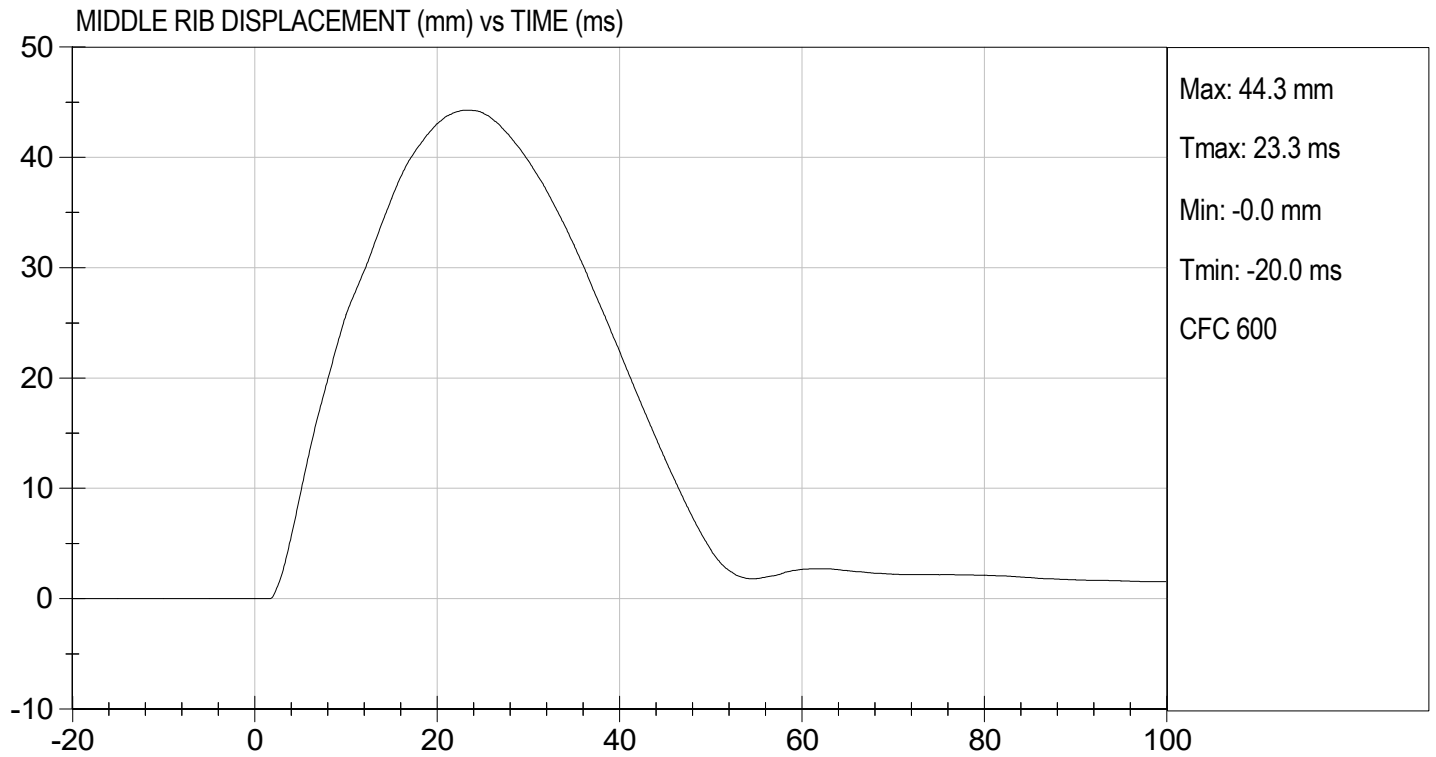
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.4	Pass
Humidity	%	10 to 70	43	Pass
Impact Velocity	m/s	4.20 to 4.40	4.23	Pass
Maximum Probe Acceleration	G's	14 to 18	15	Pass
Upper Rib Displacement	mm	32 to 40	39	Pass
Middle Rib Displacement	mm	39 to 45	44	Pass
Lower Rib Displacement	mm	35 to 43	42	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	15	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	9	Pass
Overall Test Results				Pass

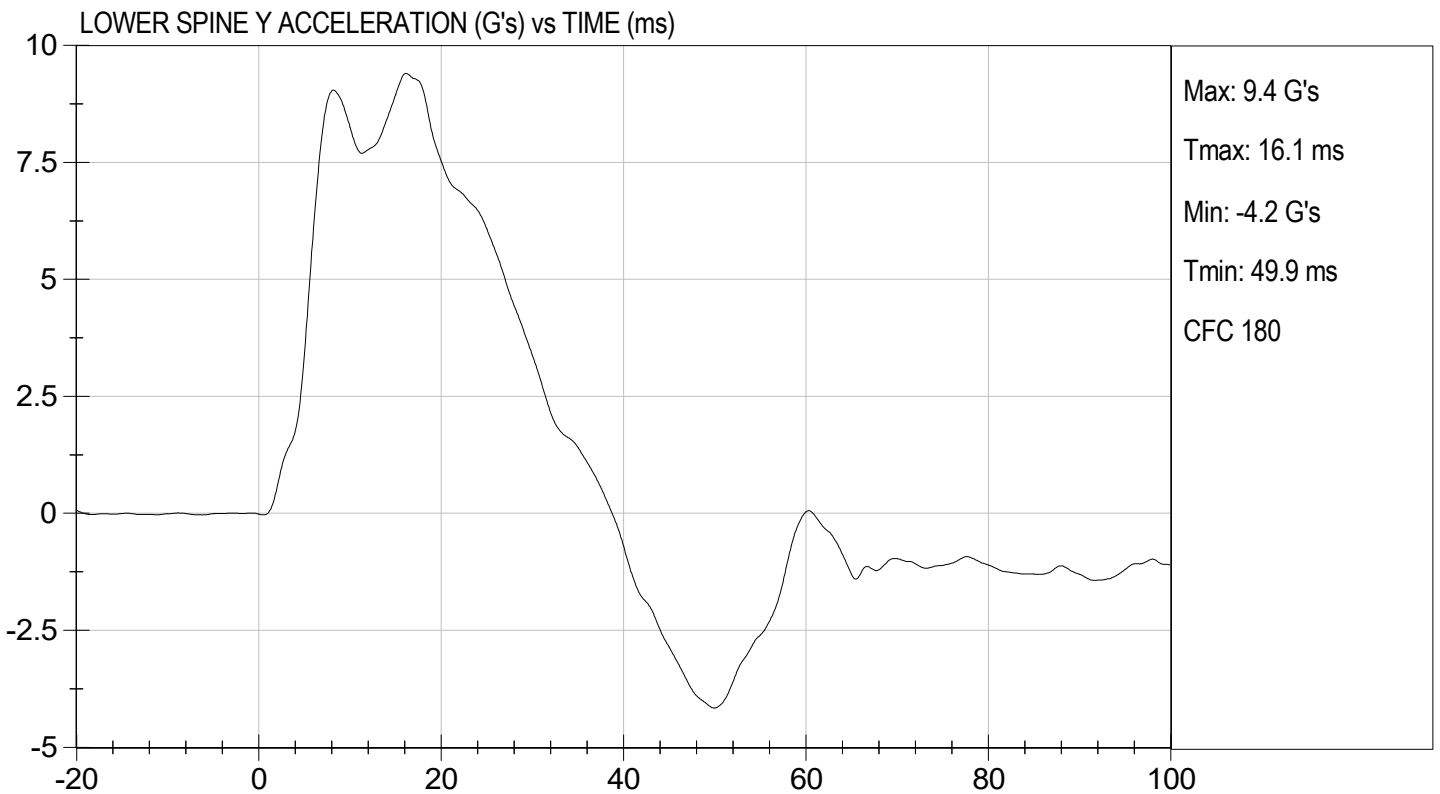
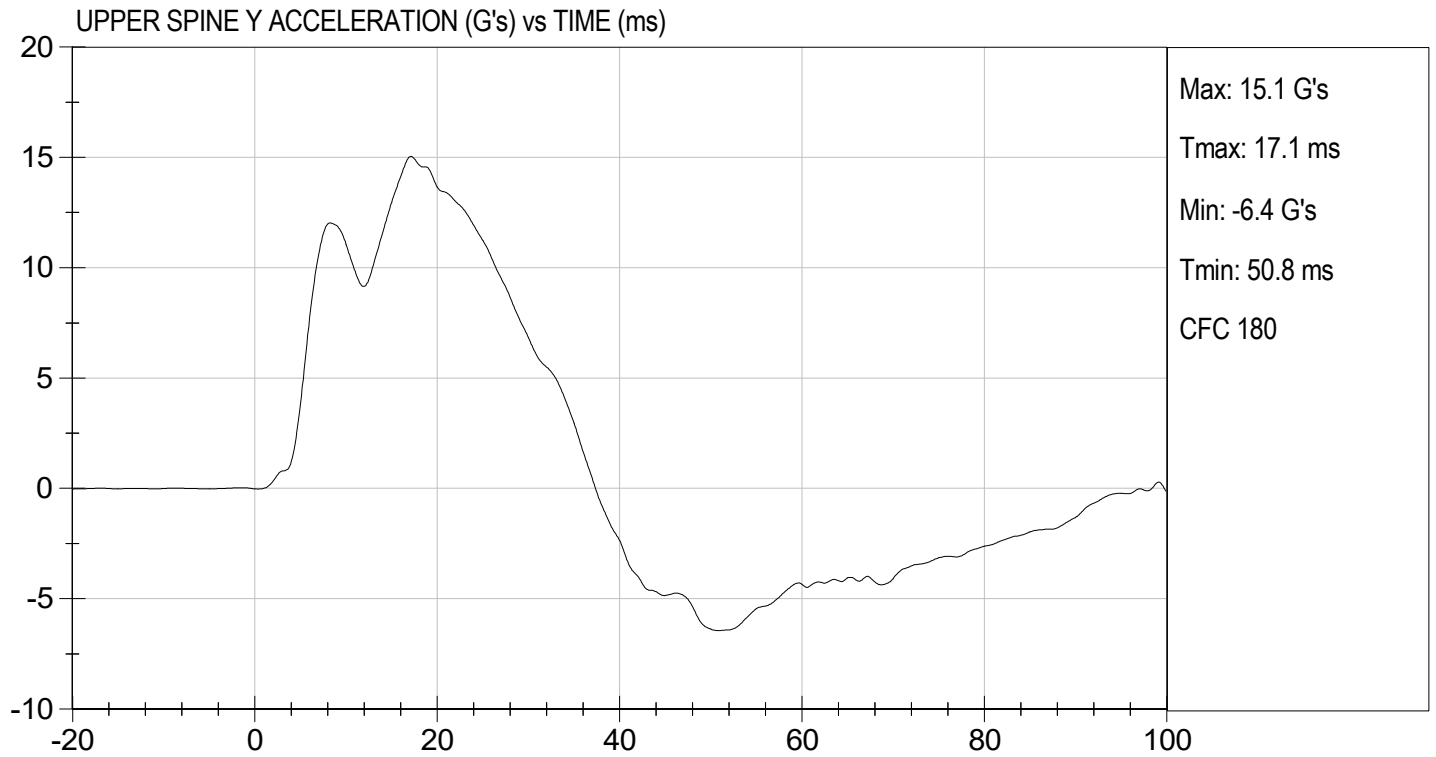

 Laboratory Technician

05/12/2023
 Test Date


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

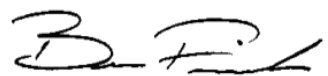
ATD Serial No: 306

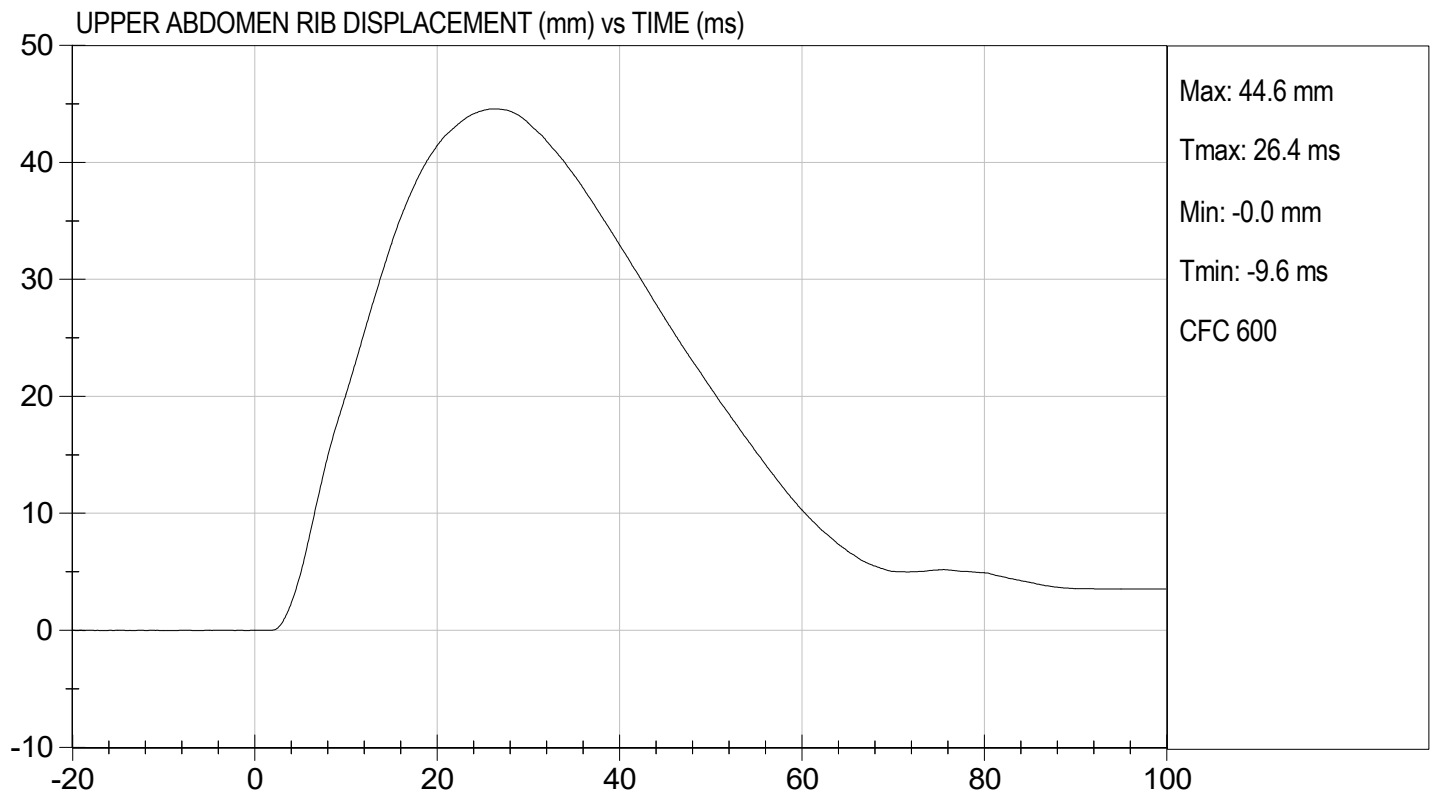
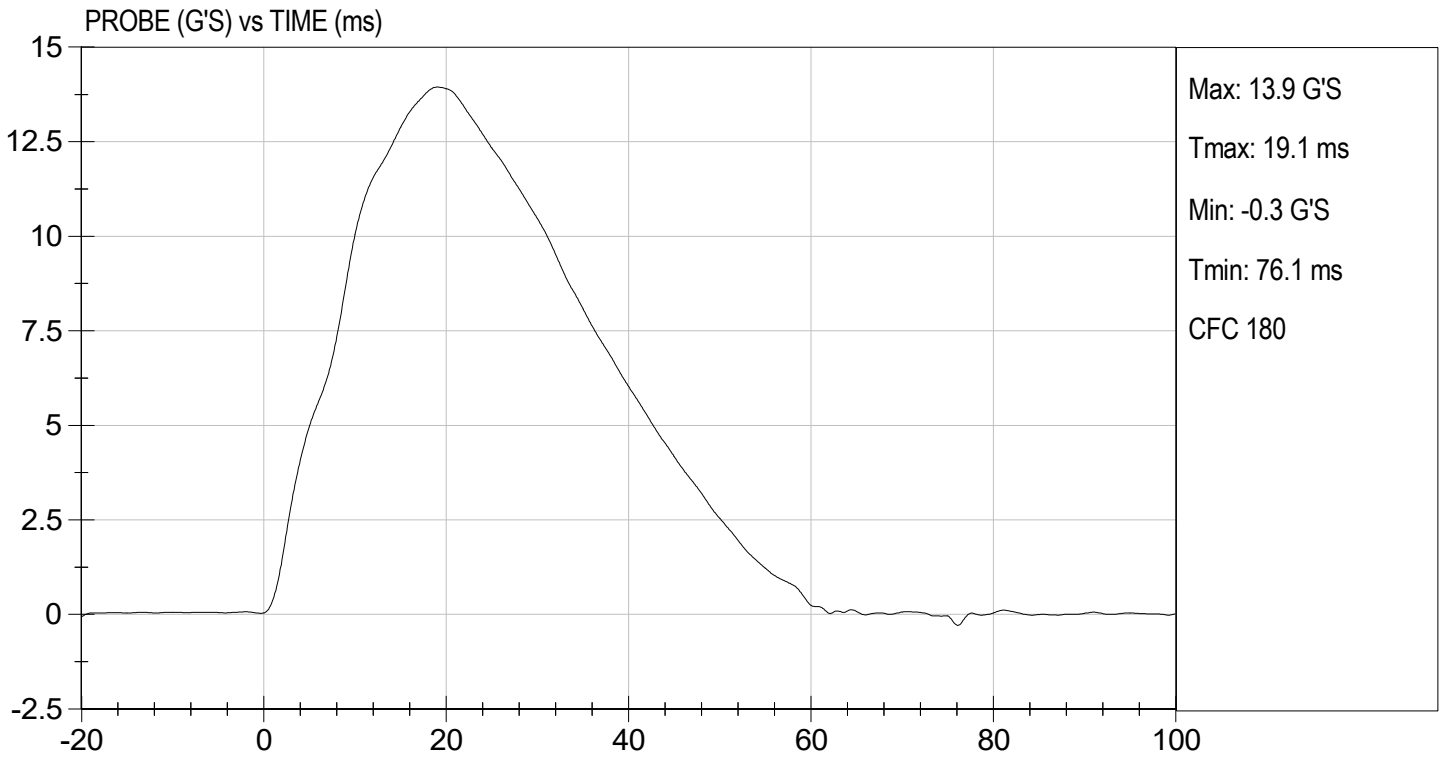
Test I.D: D231176

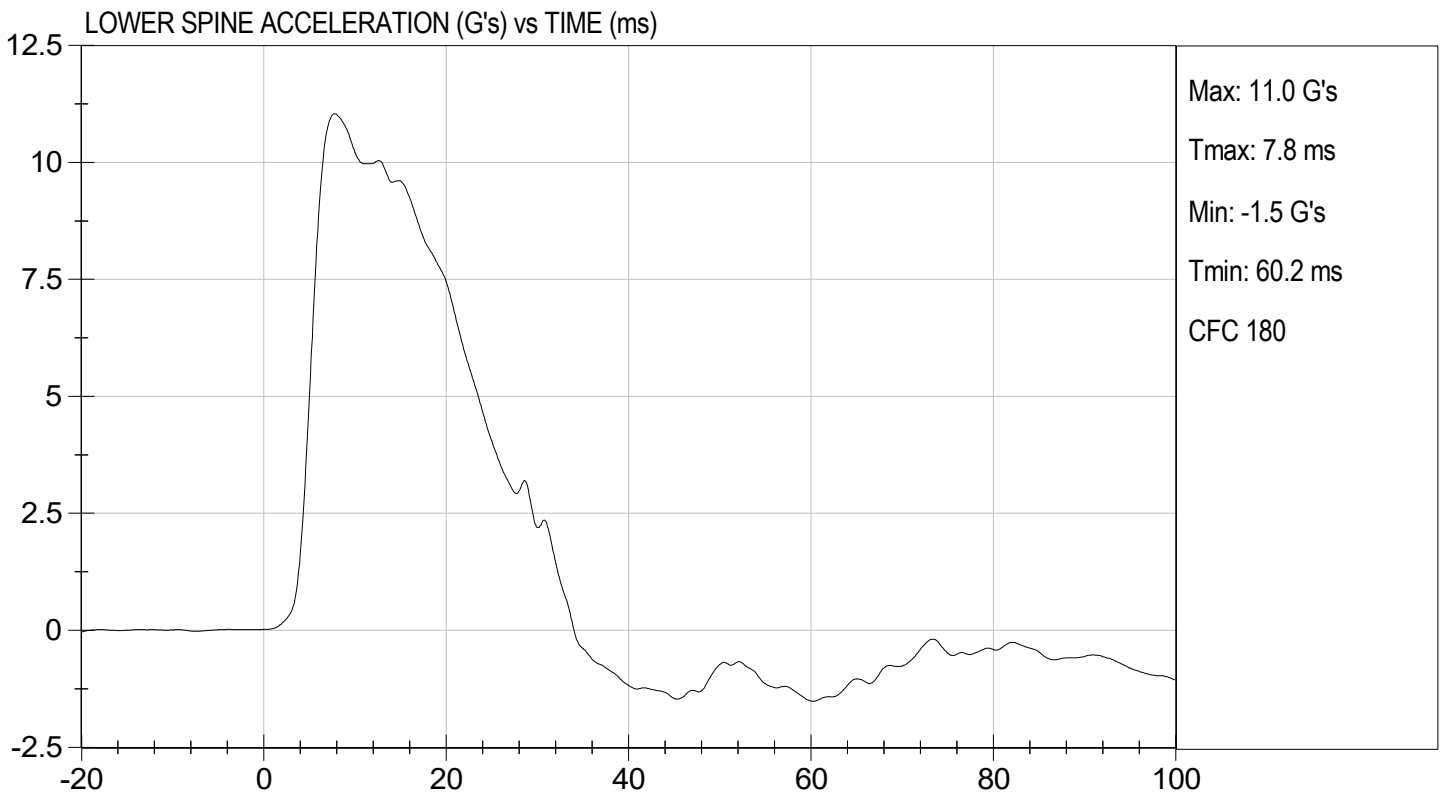
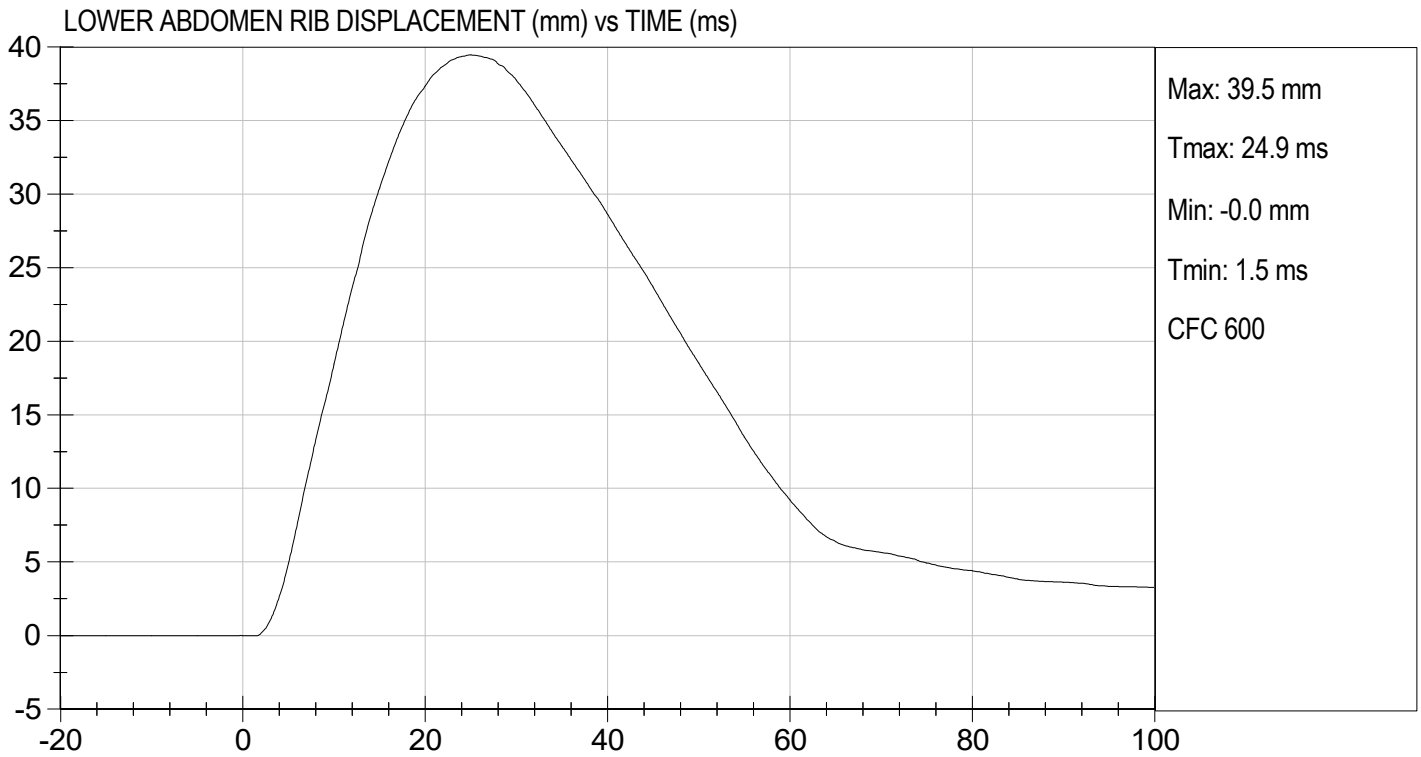
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.4	Pass
Humidity	%	10 to 70	43	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Maximum Probe Acceleration	G's	12 to 16	14	Pass
Upper Abdomen Rib Displacement	mm	36 to 47	45	Pass
Lower Abdomen Rib Displacement	mm	33 to 44	39	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	11	Pass
Overall Test Results				Pass


 Laboratory Technician

05/12/2023
 Test Date


 Approved By





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

ATD Serial No: 306

Test I.D: D231177

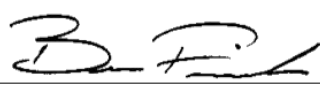
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.4	Pass
Humidity	%	10 to 70	43	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	Pass
Maximum Probe Acceleration	G's	38 to 47	43	Pass
Pelvis Y Acceleration After 6 ms	G's	34 to 42	39	Pass
Peak Acetabulum Force	N	3600 to 4300	4,024	Pass
Overall Test Results				Pass



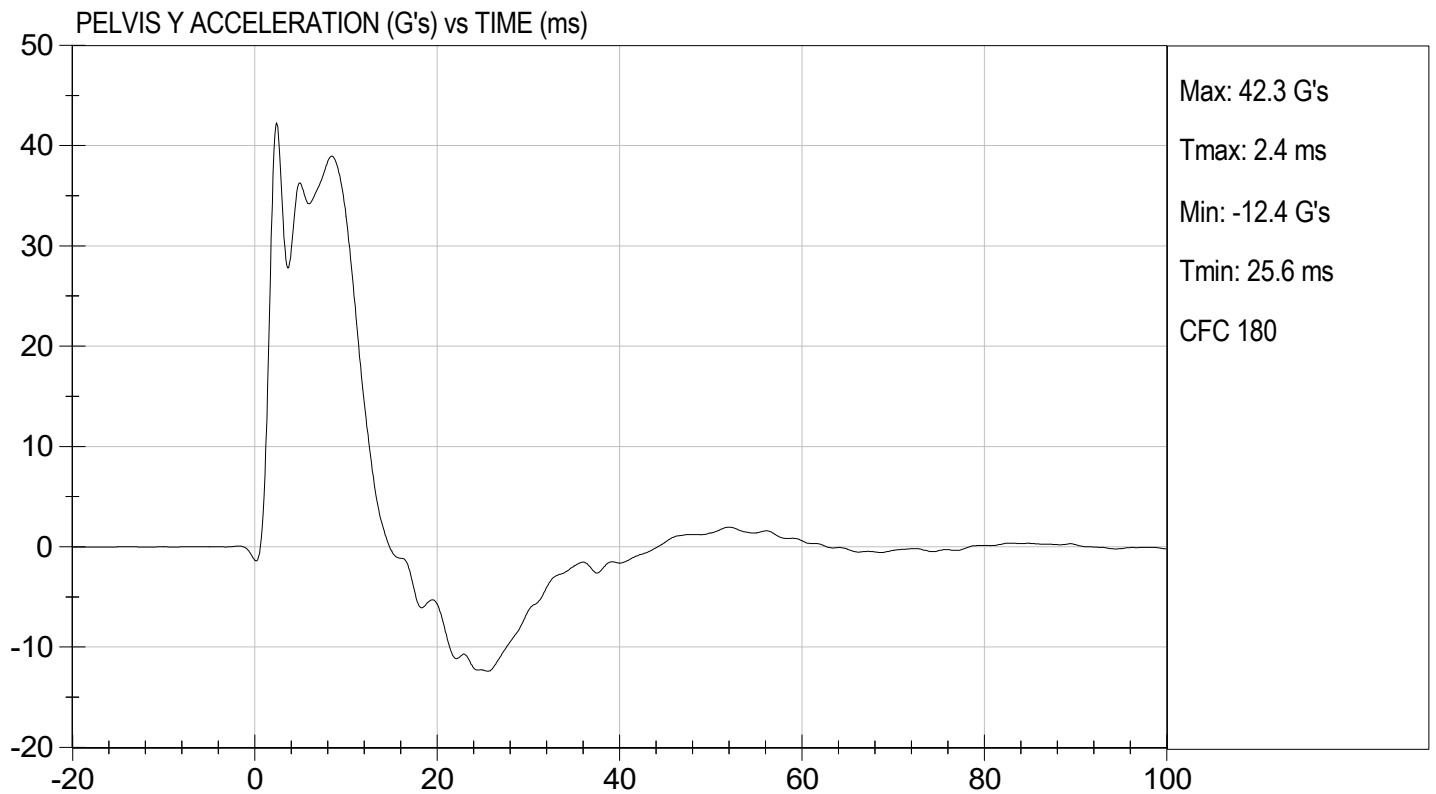
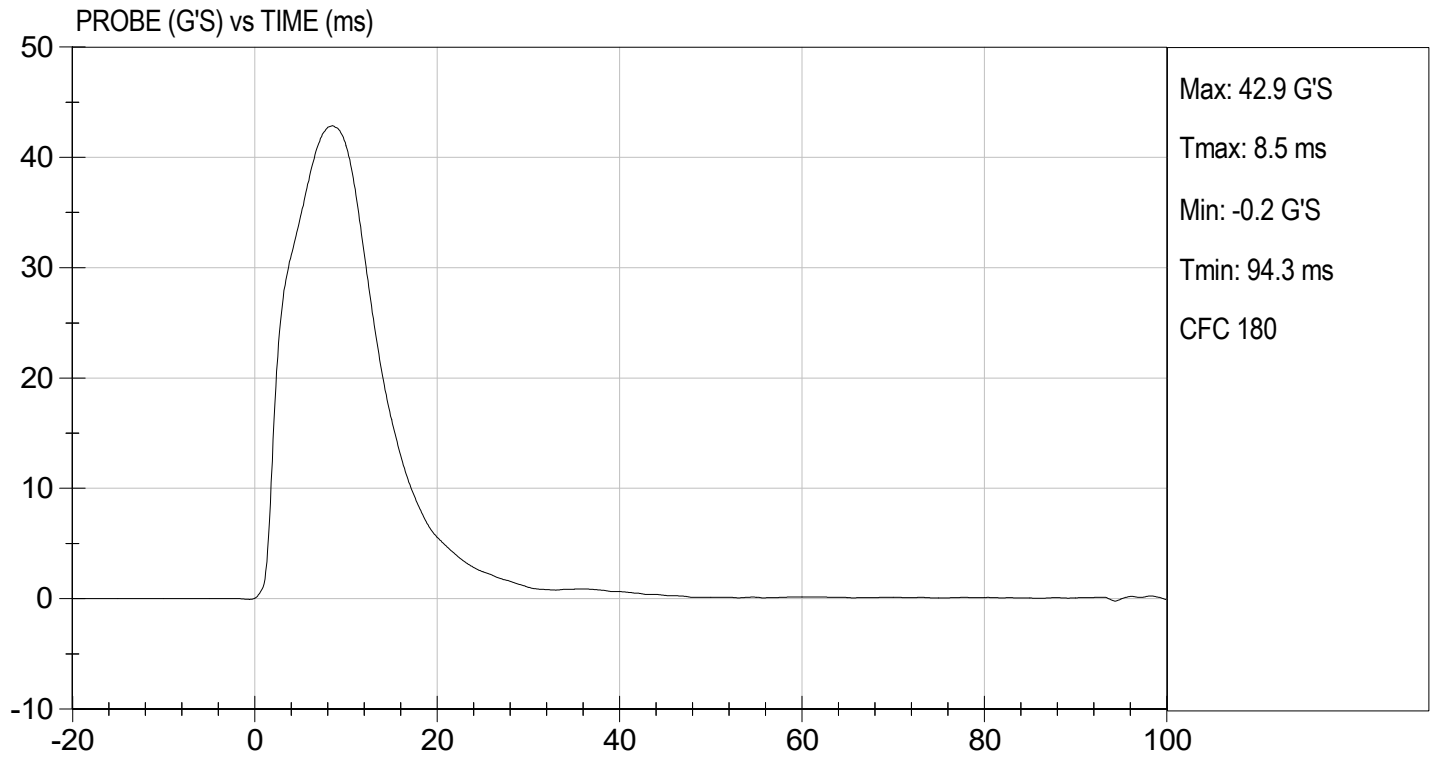
 Laboratory Technician

05/12/2023

 Test Date



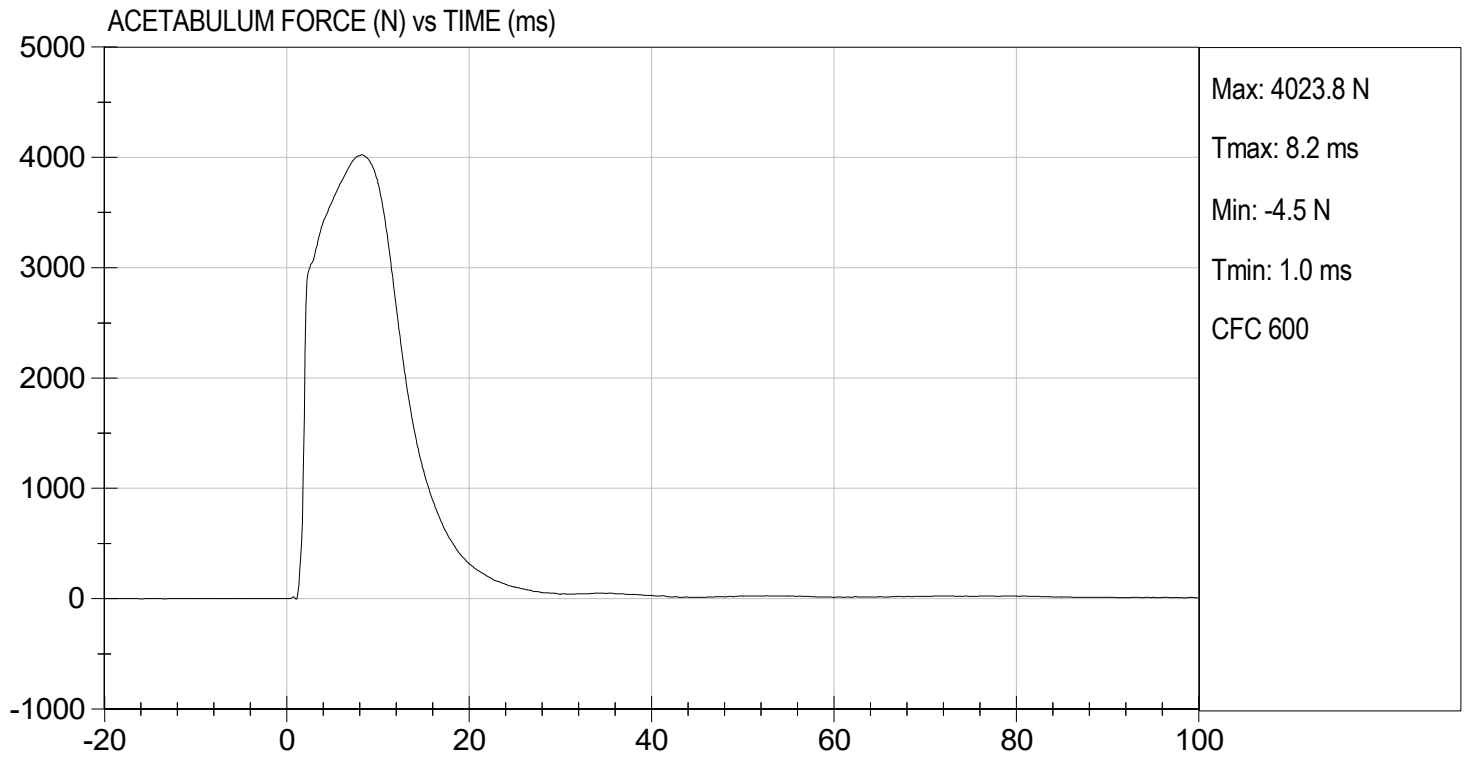
 Approved By





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

TEST DATE: 05/12/2023
TEST #: D231177



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

ATD Serial No: 306

Test I.D: D231178

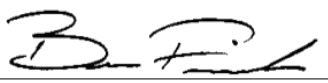
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	43	Pass
Impact Velocity	m/s	4.20 to 4.40	4.27	Pass
Maximum Probe Acceleration	G's	36 to 45	43	Pass
Pelvis Y Acceleration	G's	28 to 39	34	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4,945	Pass
Overall Test Results				Pass



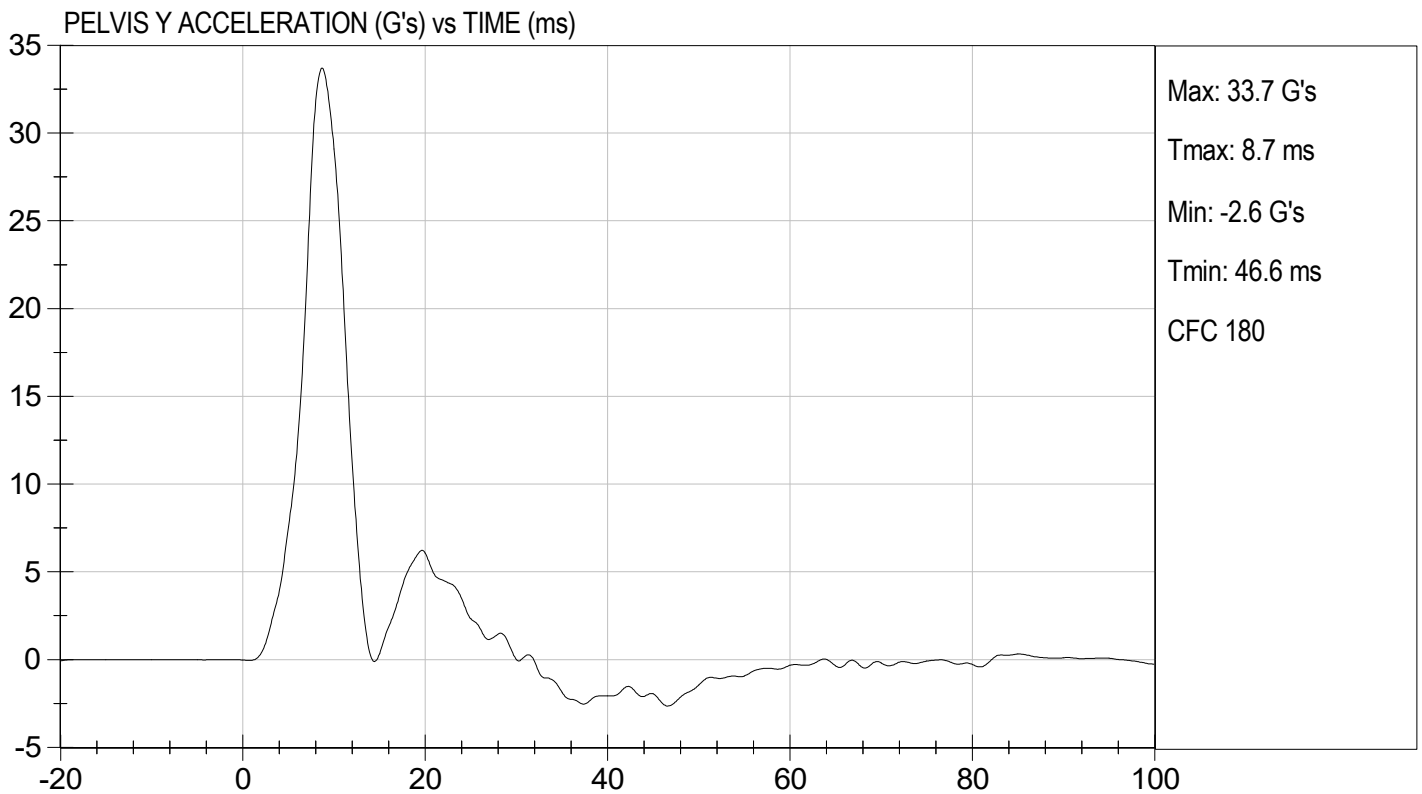
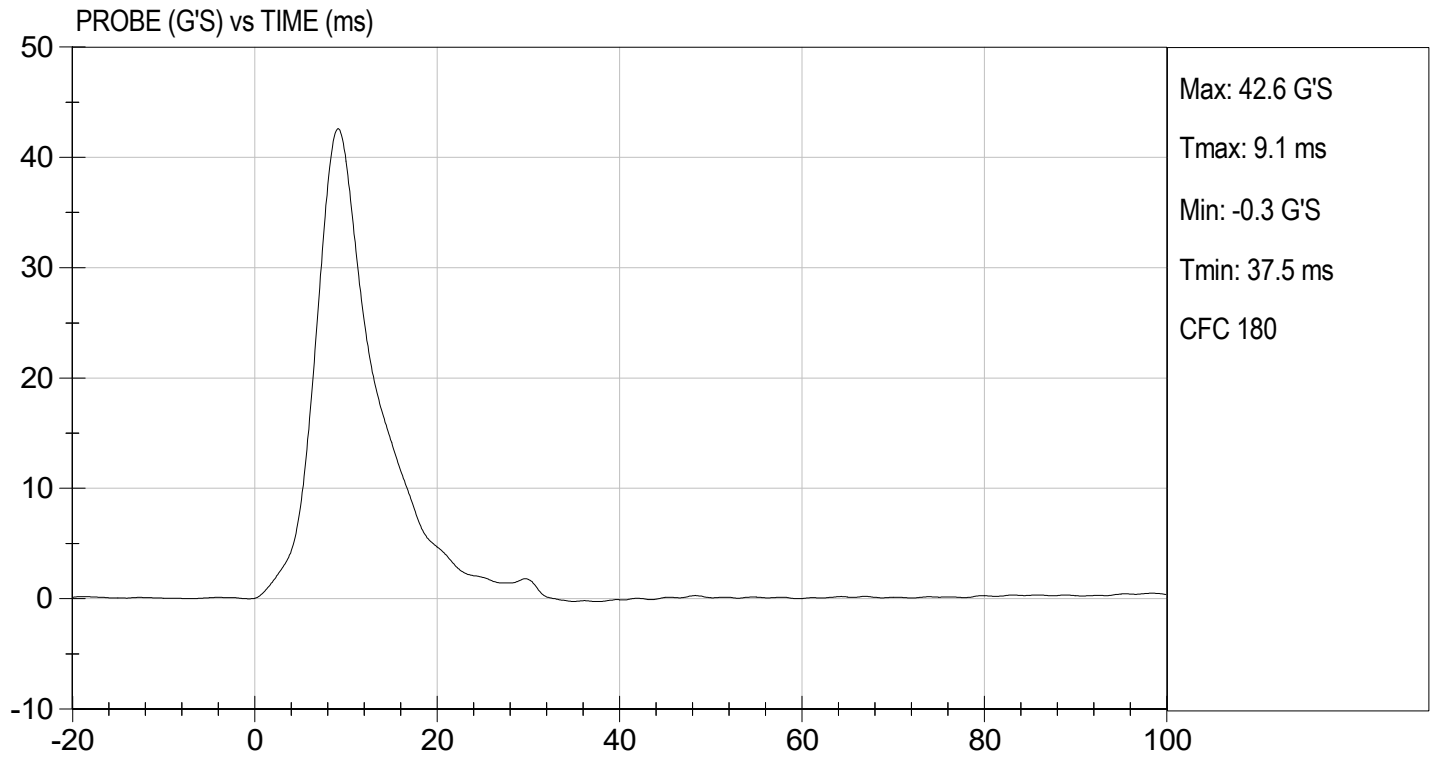
 Laboratory Technician

05/12/2023

 Test Date



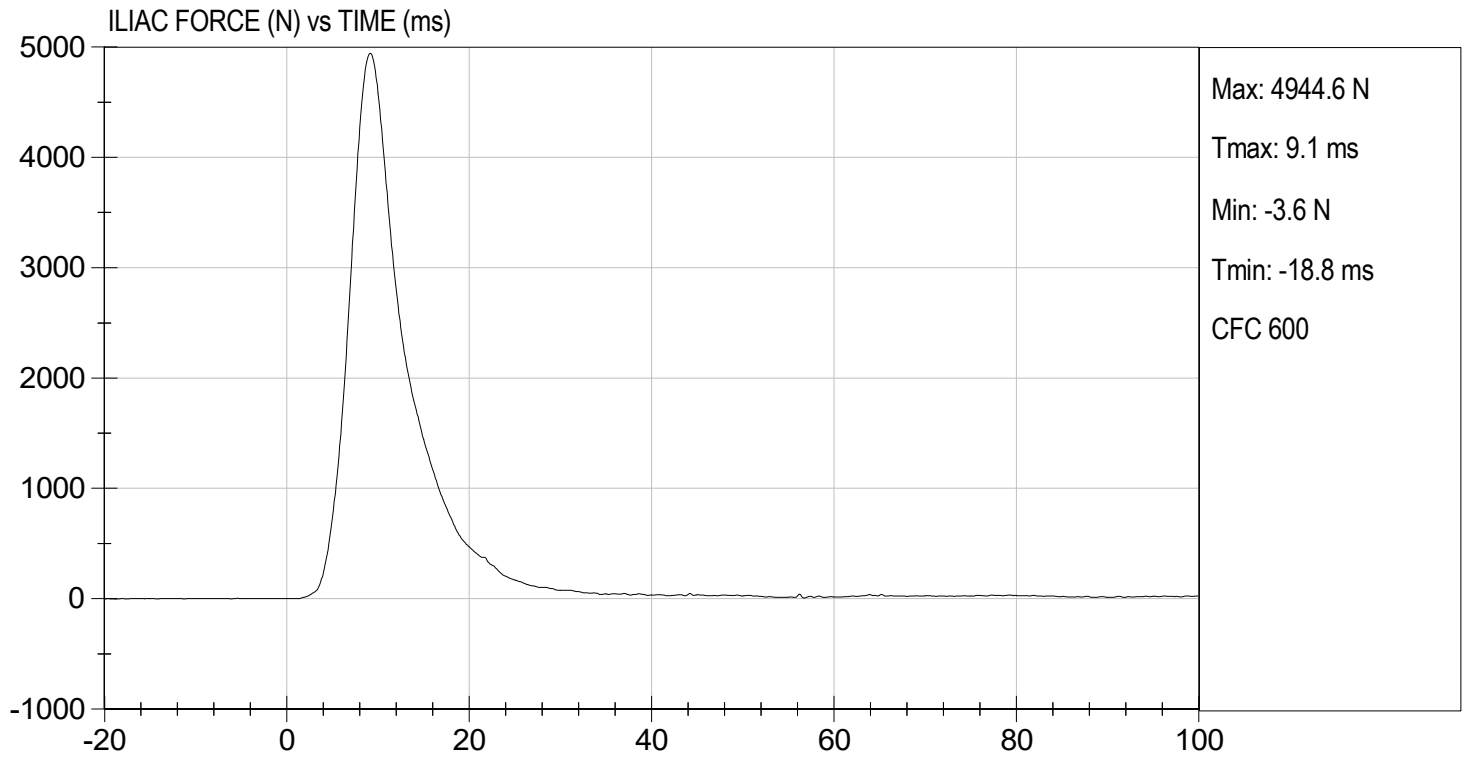
 Approved By





TEST DESC: ILLIAC
VELOCITY: 14.01 ft/s, 4.27 m/s

TEST DATE: 05/12/2023
TEST #: D231178



QUALIFICATION TEST RESULTS

POST-TEST

SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD

SID-IIsD External Measurements
SN: 306

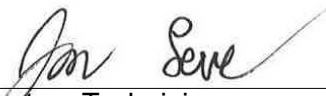
No.	Name	Spec. (mm)	Result	Pass/Fail
A	Sitting Height	772 - 788	785	Pass
B	Shoulder Pivot Height	437 - 453	449	Pass
C	H-point Height	79 - 89	86	Pass
D	H-point from Seatback	141 - 151	147	Pass
E	Shoulder Pivot from Backline	97 - 107	99	Pass
F	Thigh Clearance	119 -135	120	Pass
G	Head Breadth	140 - 148	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: D231261

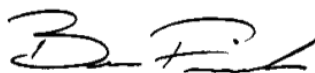
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	39	Pass
Peak Resultant Acceleration	G's	115 to 137	130	Pass
Peak Longitudinal Acceleration	G's	+/- 15	-10.7	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	<15%	Yes	Pass
Overall Test Results				Pass



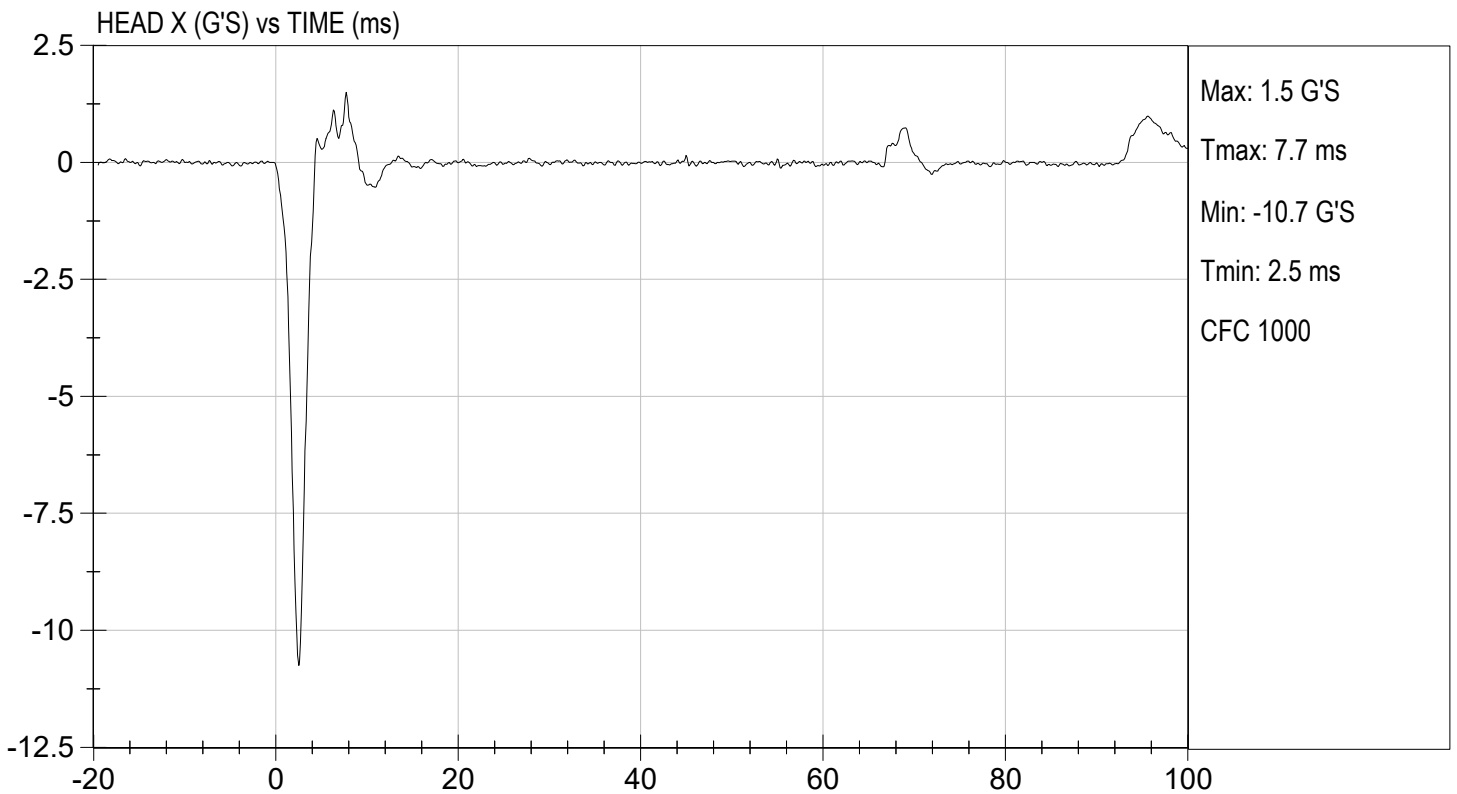
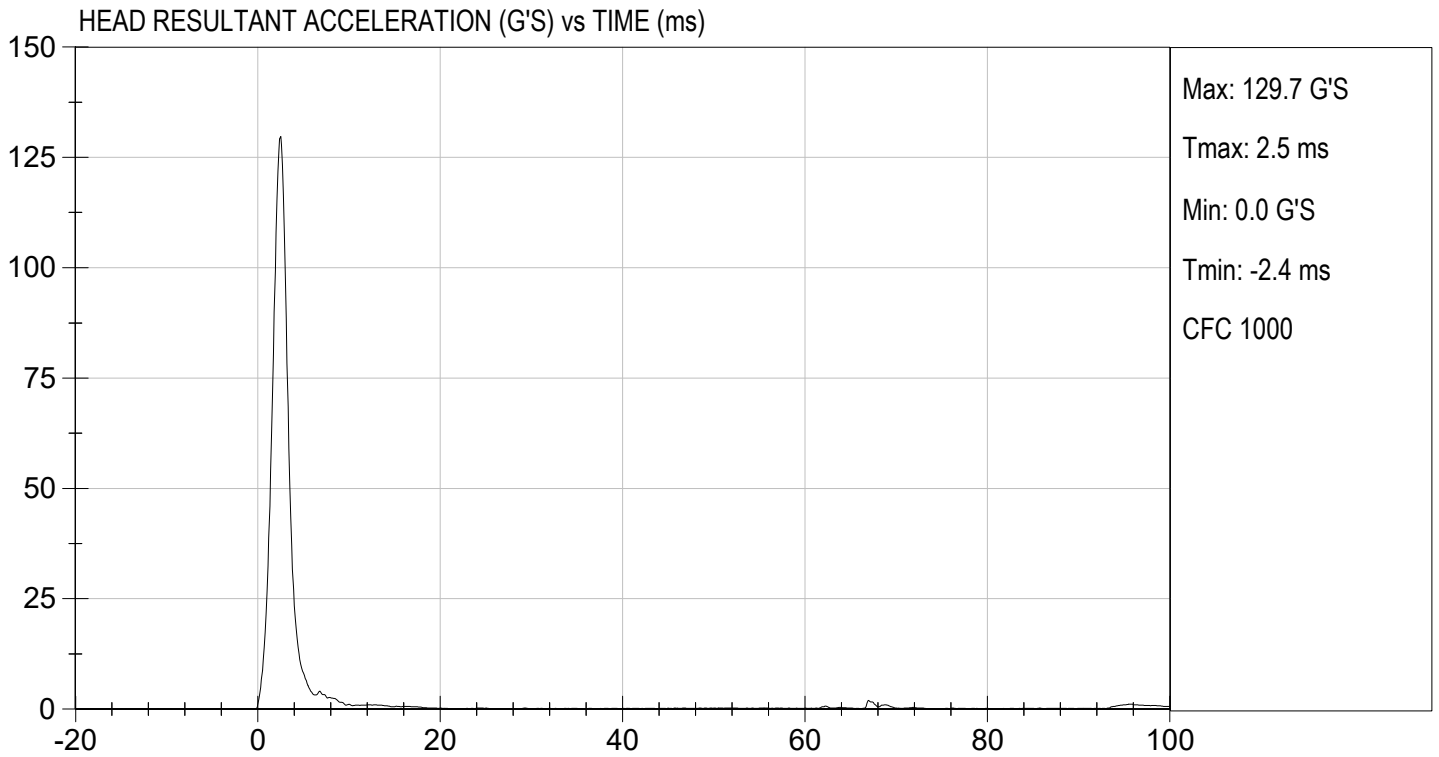
 Laboratory Technician

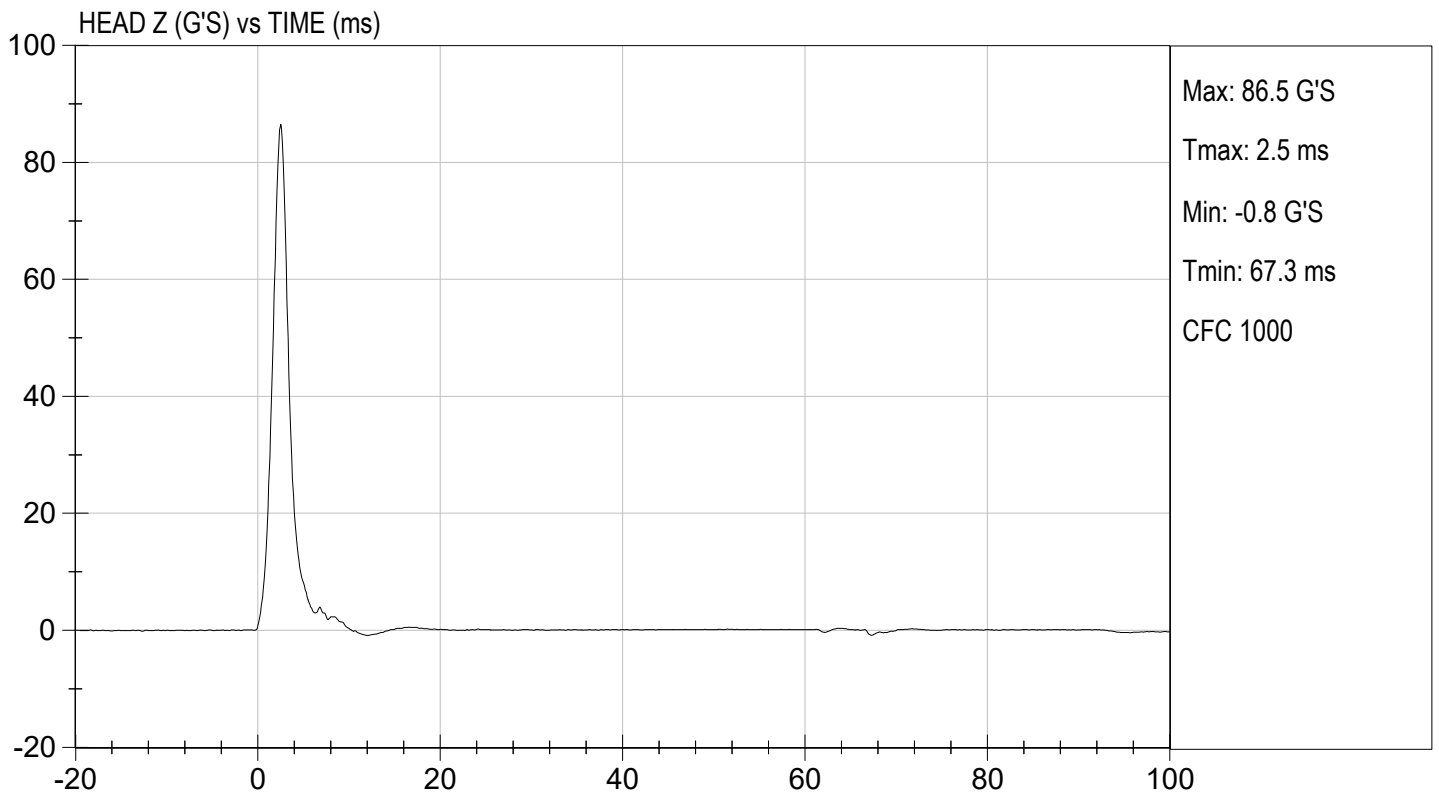
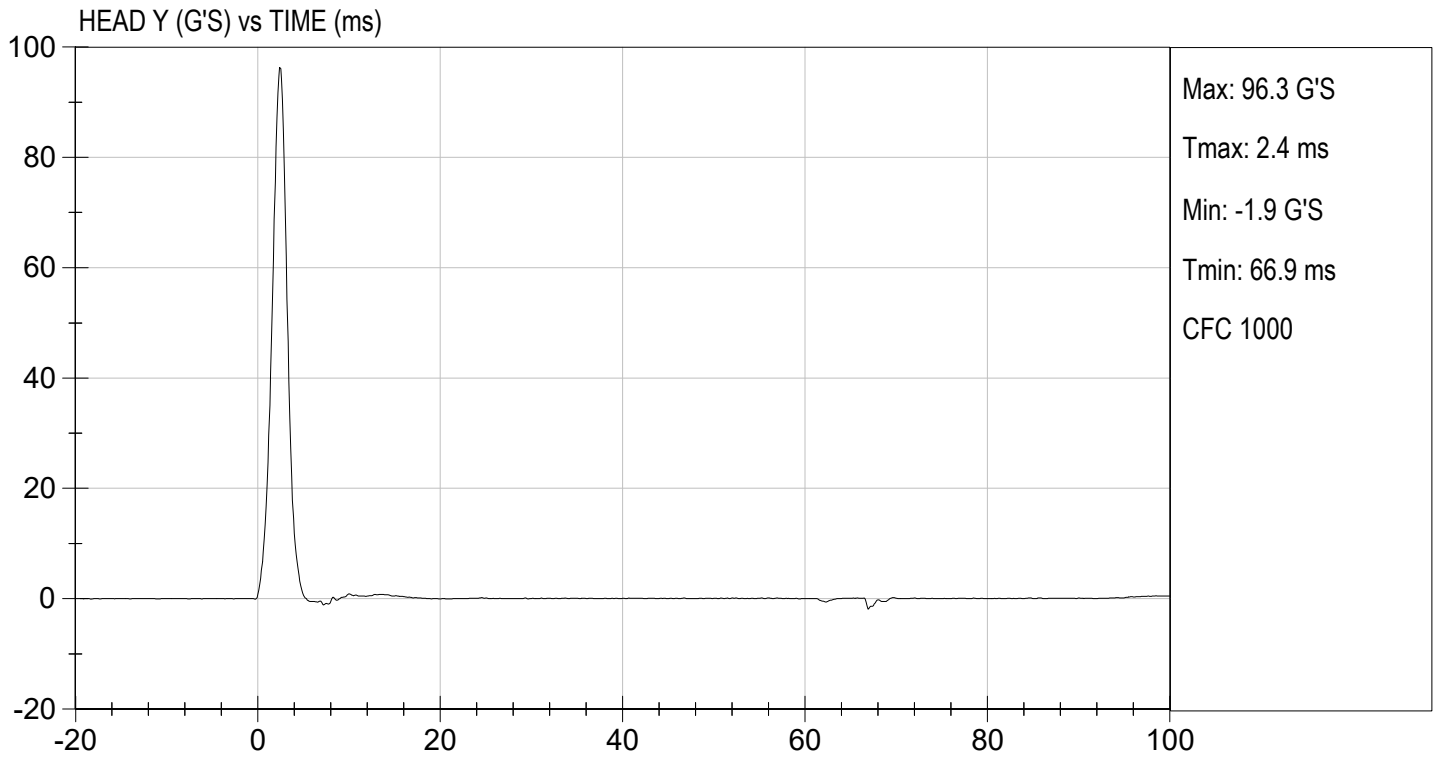
05/22/2023

 Test Date



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

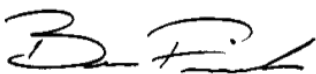
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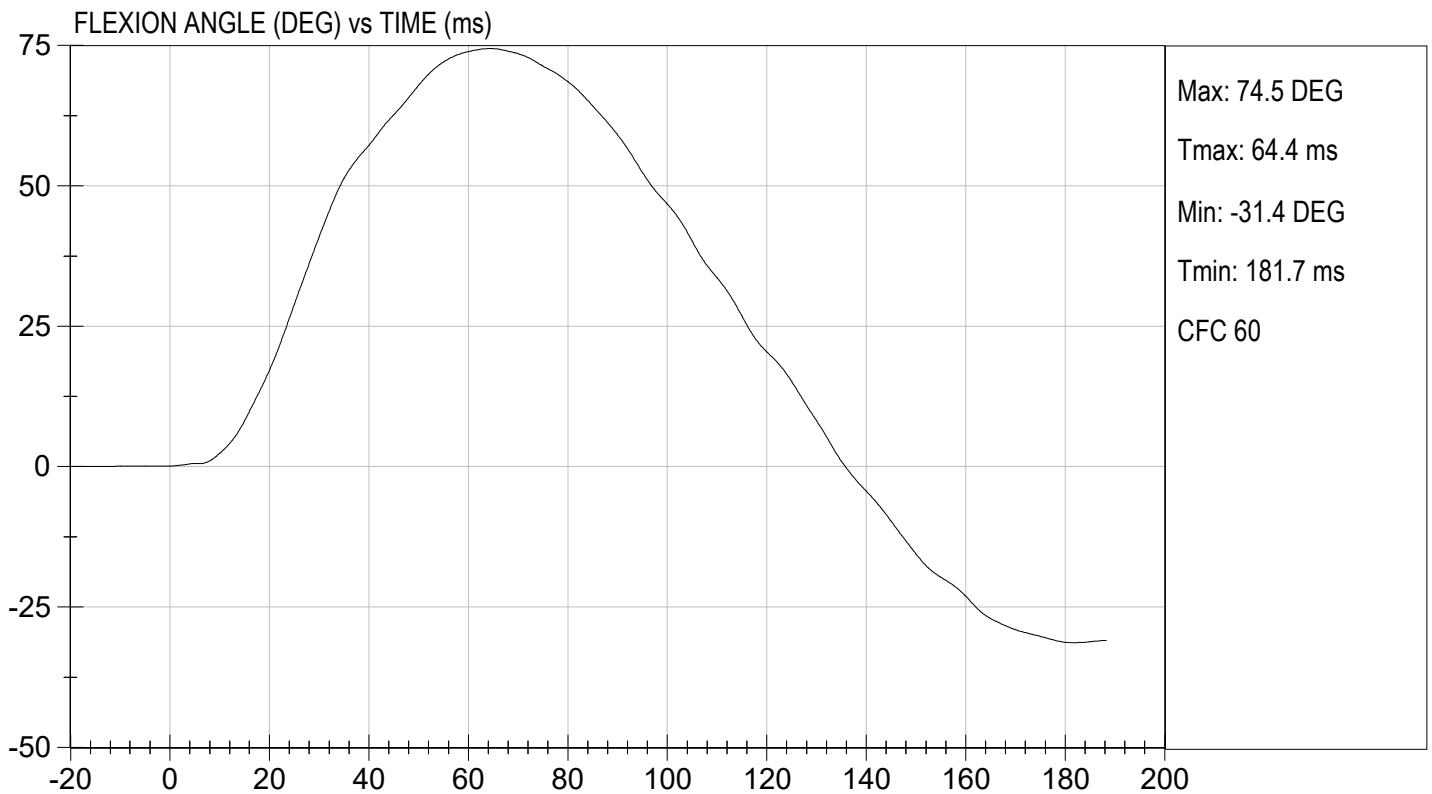
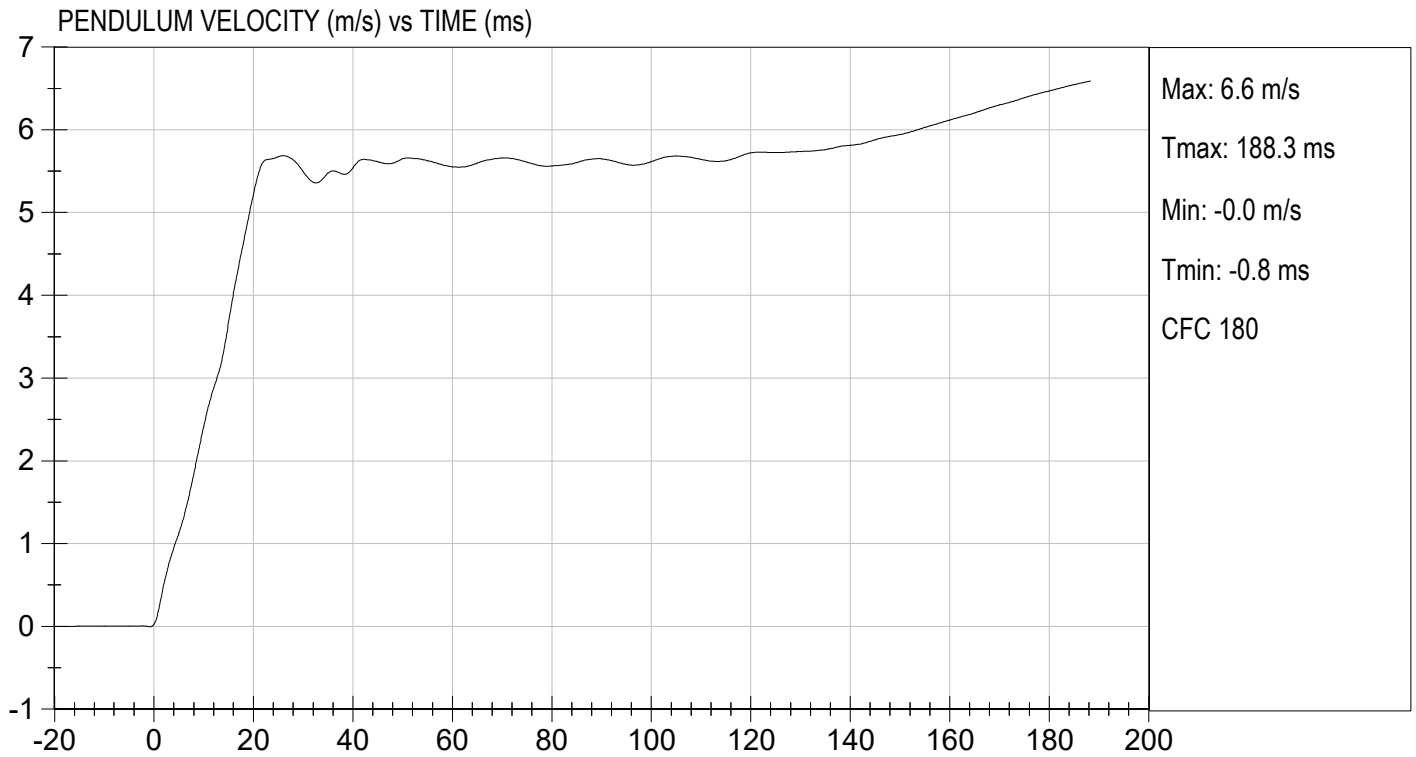
Test I.D.: D231262

Tested Parameter	Units	Specification	Result	Pass/Fail	
Temperature	deg C	20.6 to 22.2	21.4	Pass	
Humidity	%	10 to 70	39	Pass	
Impact Velocity	m/s	5.51 to 5.63	5.58	Pass	
Pendulum Velocity	10 ms	m/s	2.20 to 2.80	2.42	Pass
	15 ms	m/s	3.30 to 4.10	3.67	Pass
	20 ms	m/s	4.40 to 5.40	5.22	Pass
	25 ms	m/s	5.40 to 6.10	5.68	Pass
	25-100 ms	m/s	5.50 to 6.20	5.69	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	-37	Pass	
Time of Moment Decay to 0 Nm	ms	102 to 126	119	Pass	
Overall Test Results				Pass	


 Laboratory Technician

05/23/2023
 Test Date

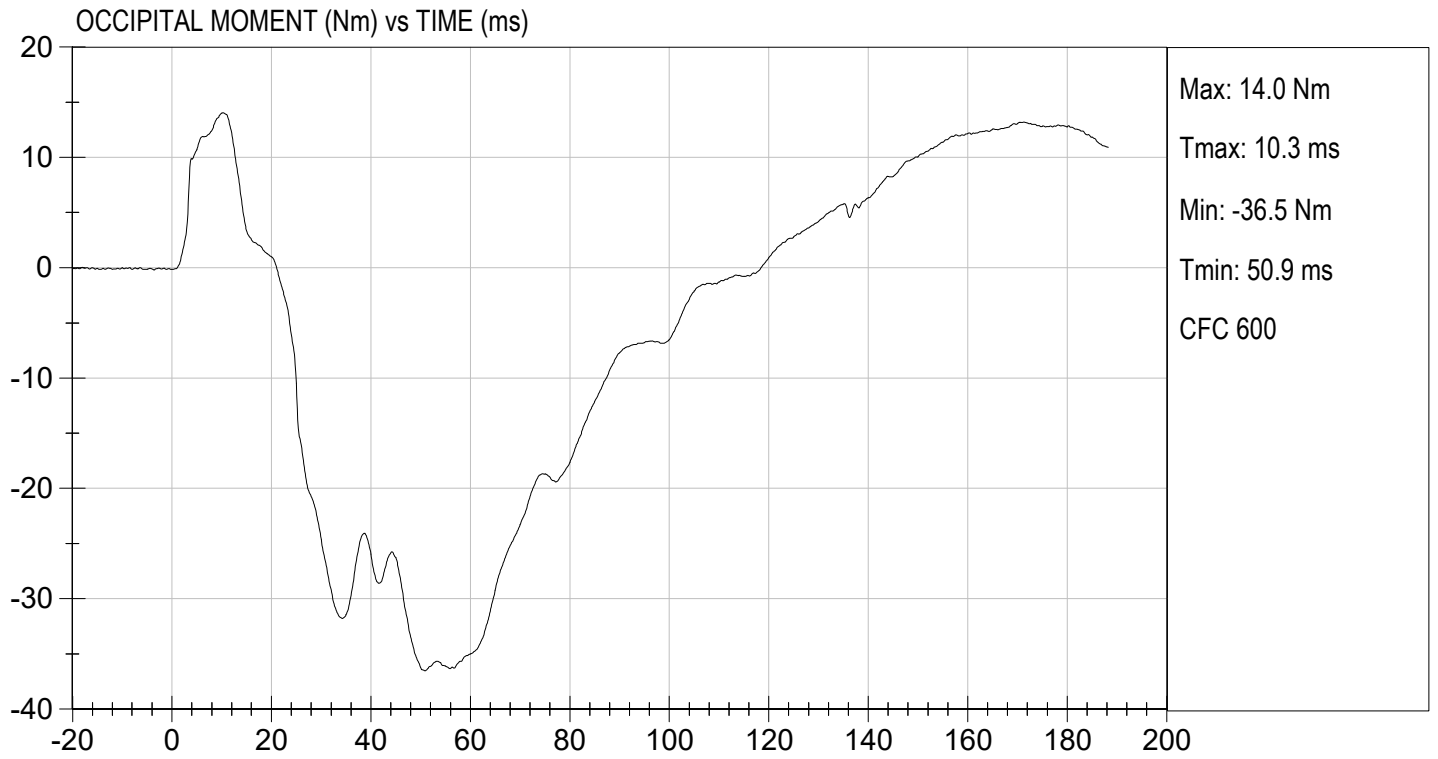

 Approved By





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

TEST DATE: 05/23/2023
TEST #: D231262



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

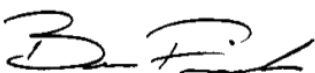
ATD Serial No: 306

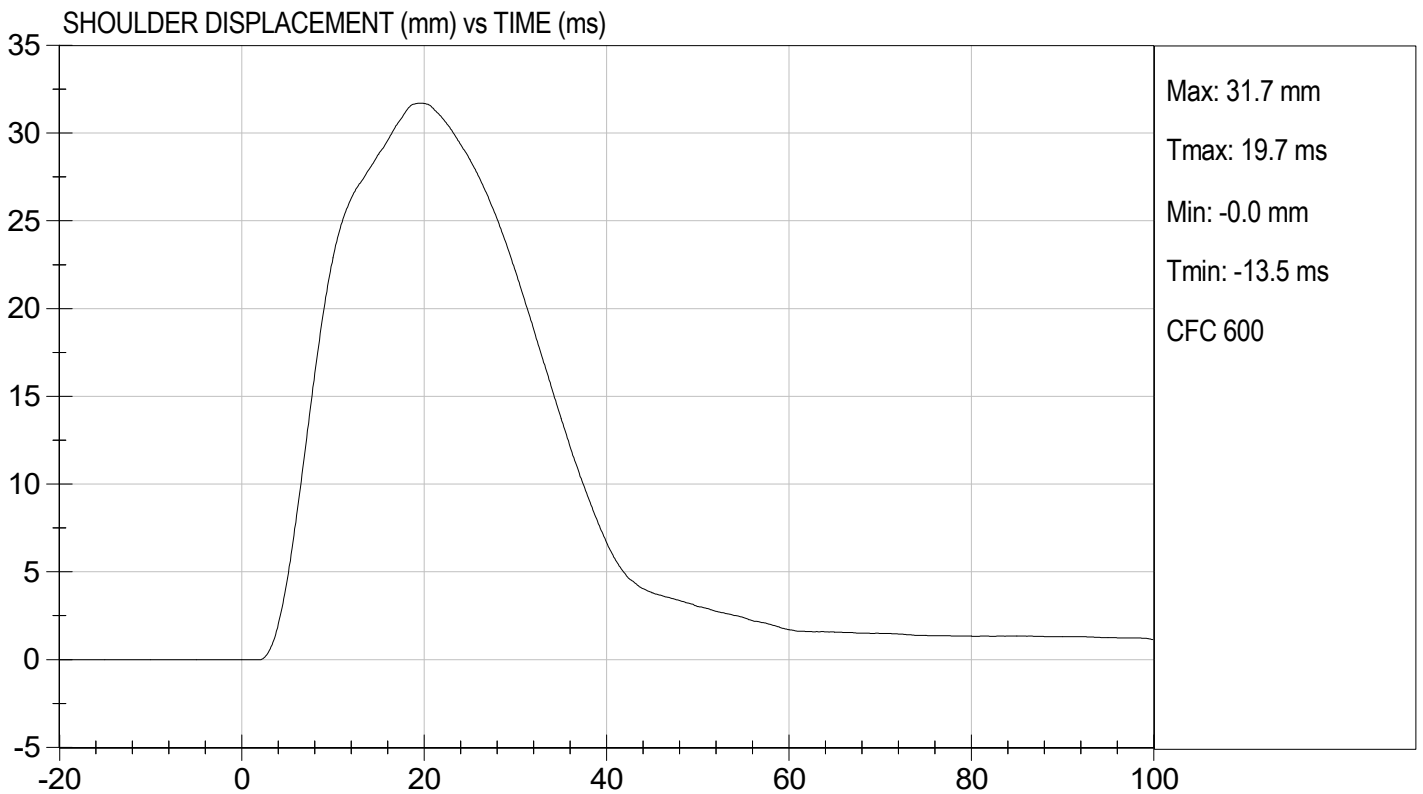
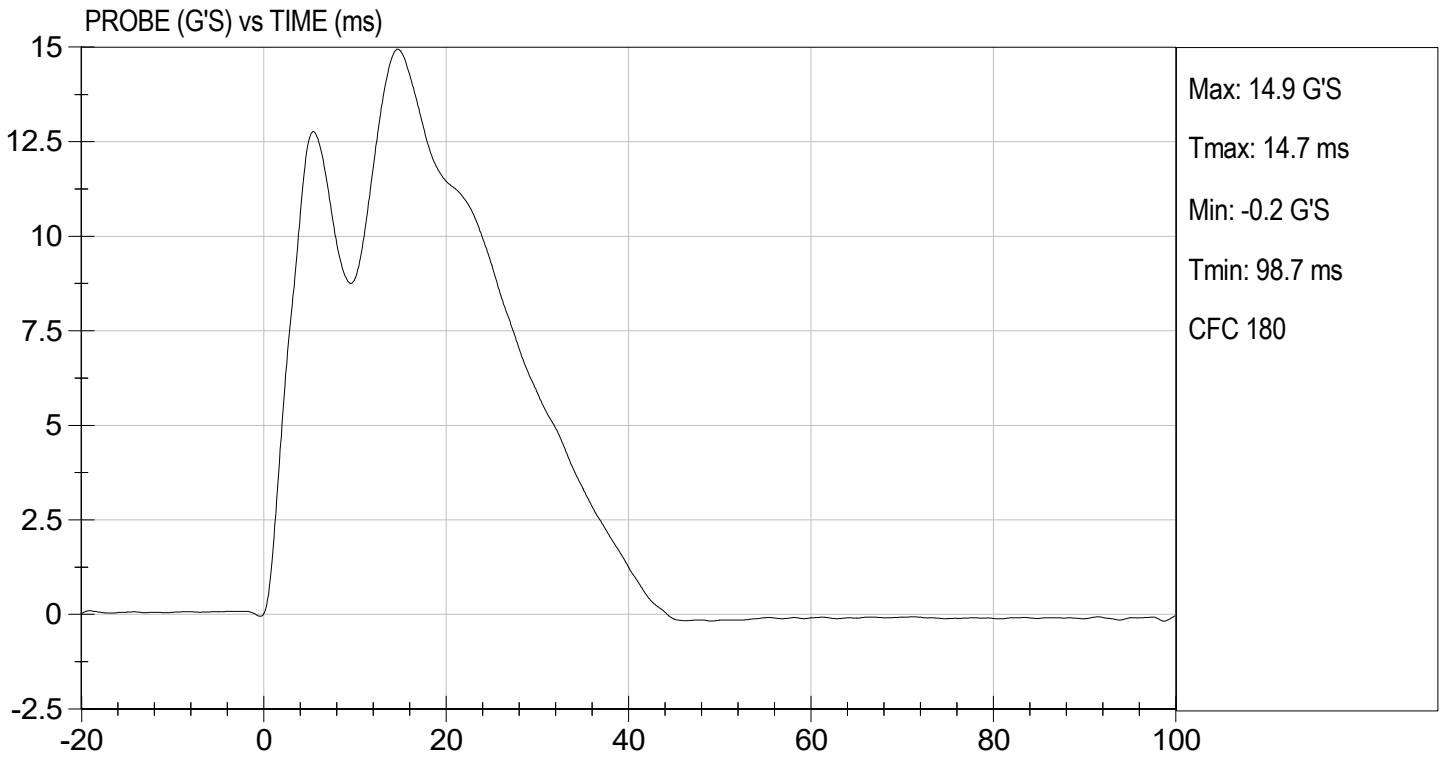
Test ID: D231263

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	42	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Maximum Probe Acceleration	G's	13 to 18	15	Pass
Shoulder Displacement	mm	28 to 37	32	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	18	Pass
Overall Test Results				Pass


Laboratory Technician

05/23/2023
Test Date

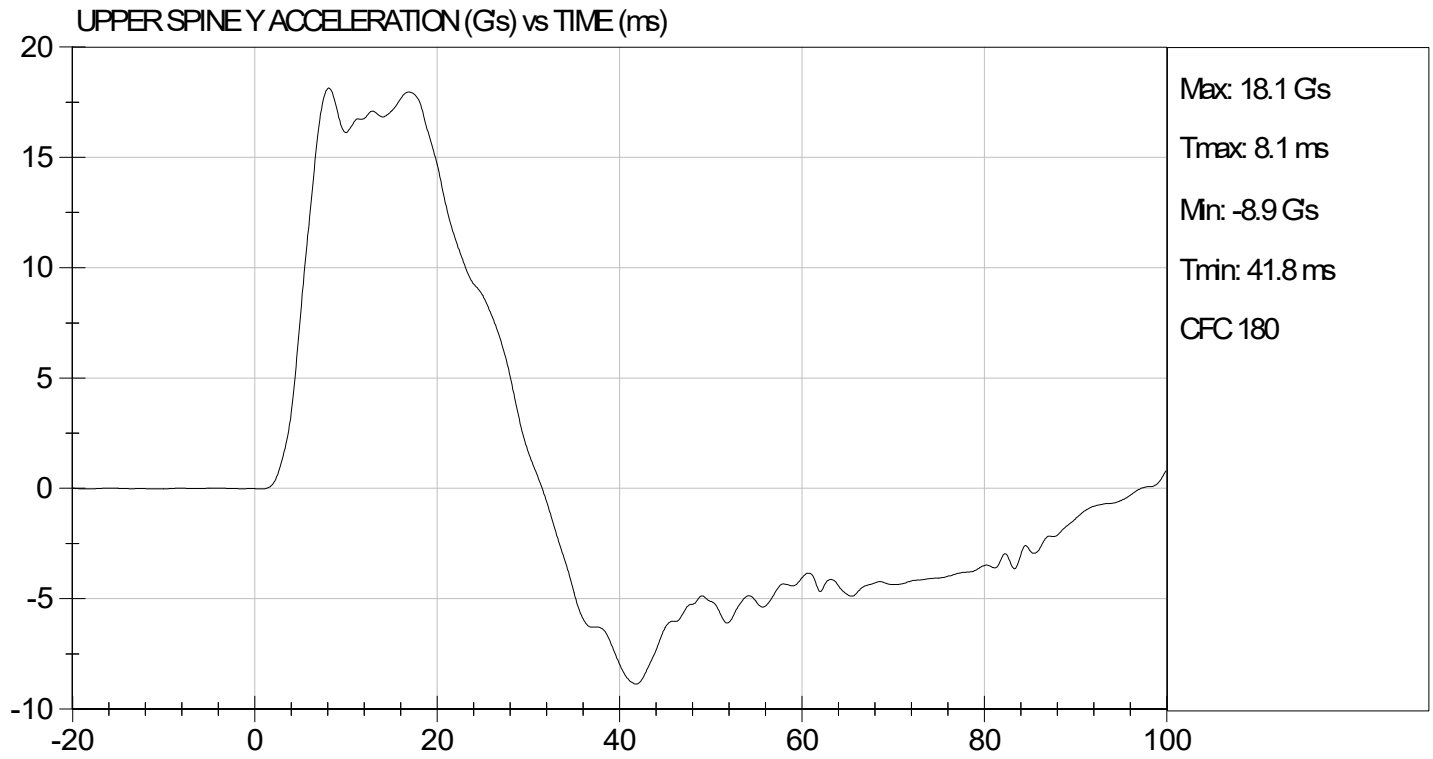

Approved By





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

TEST DATE: 05/23/2023
TEST #: D231263



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

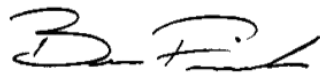
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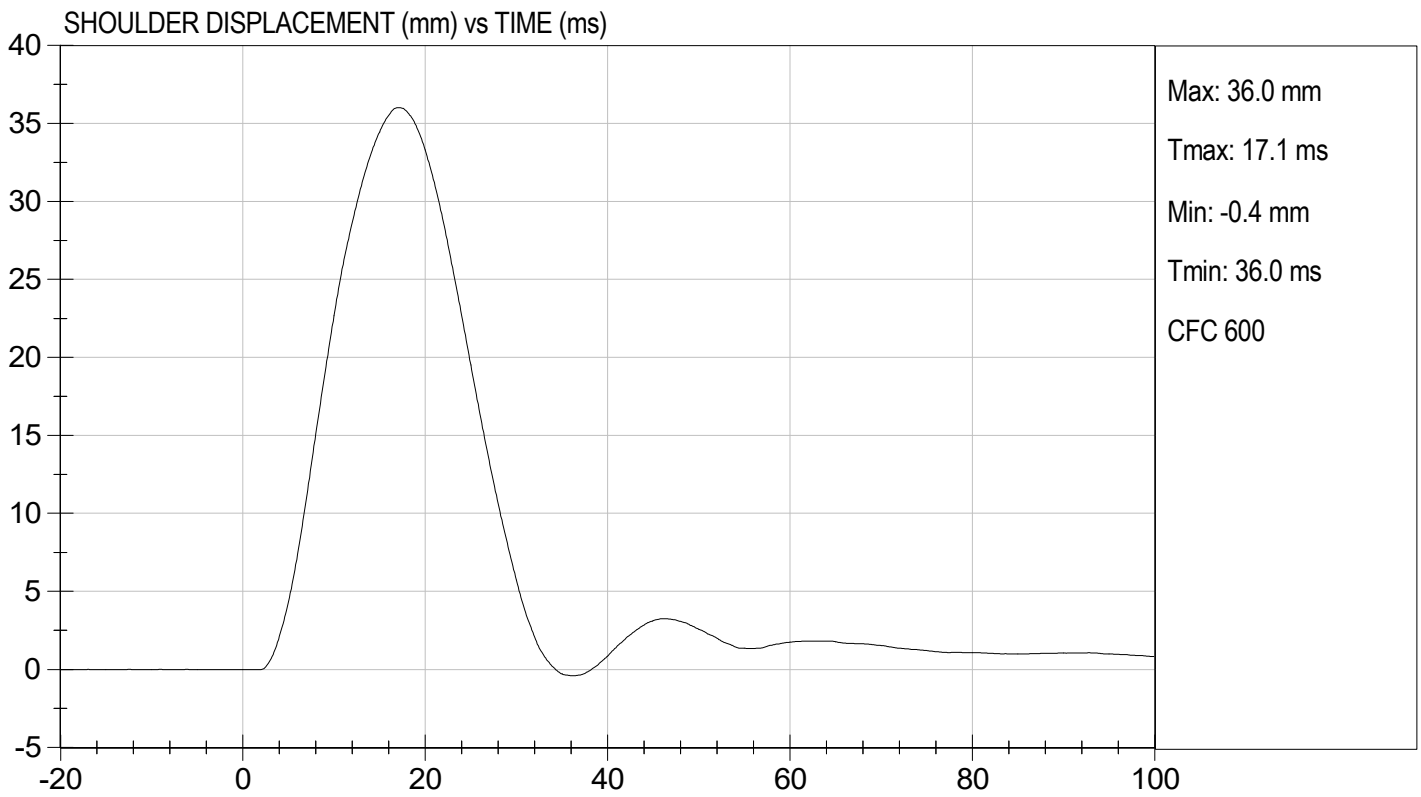
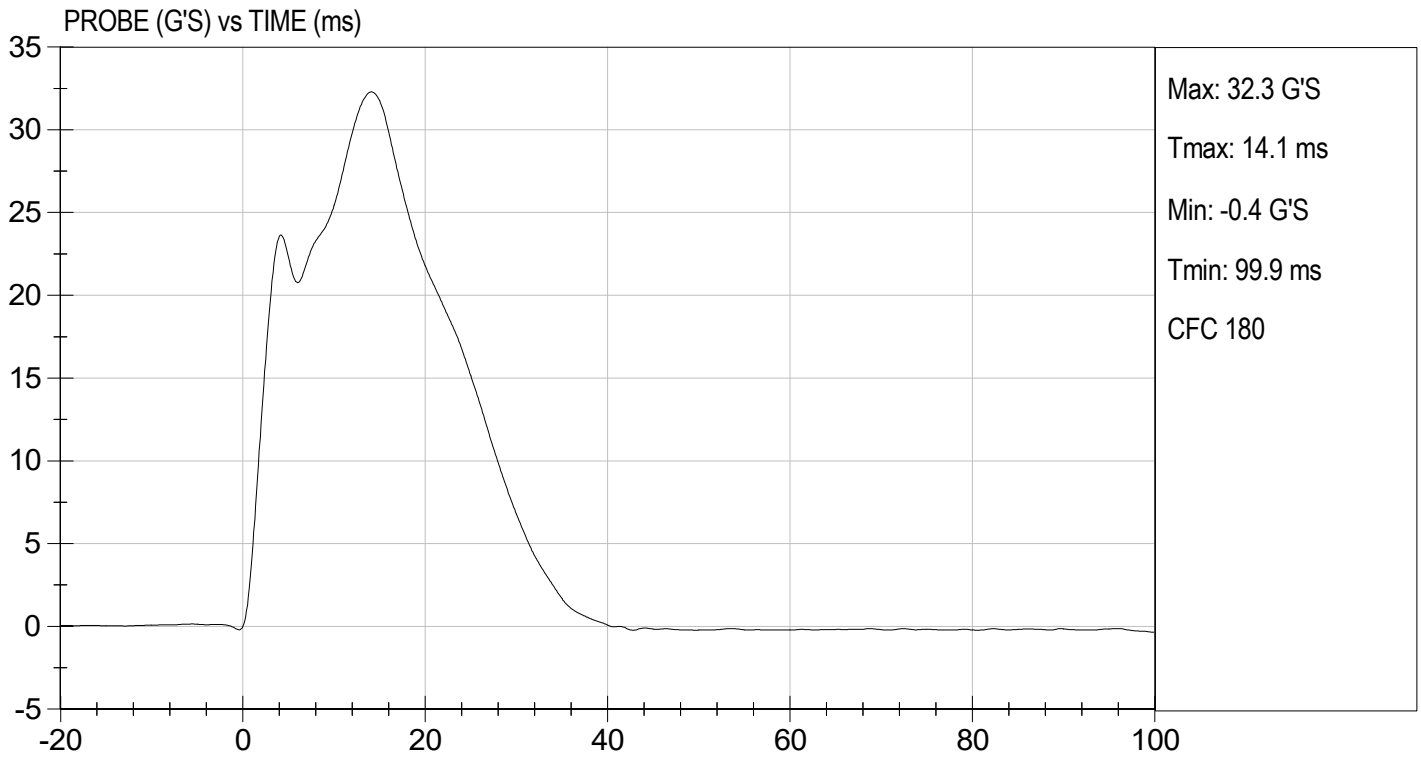
Test I.D: D231264

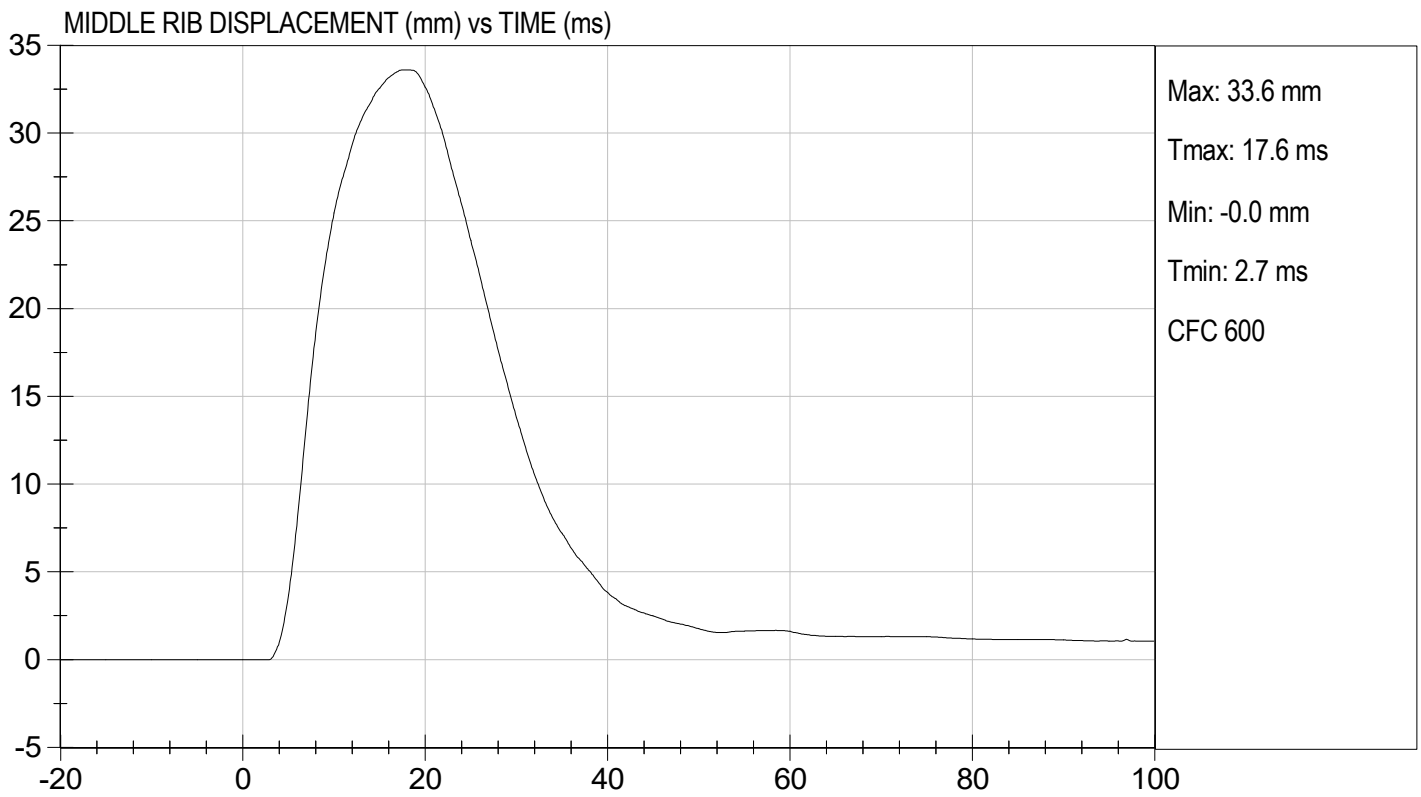
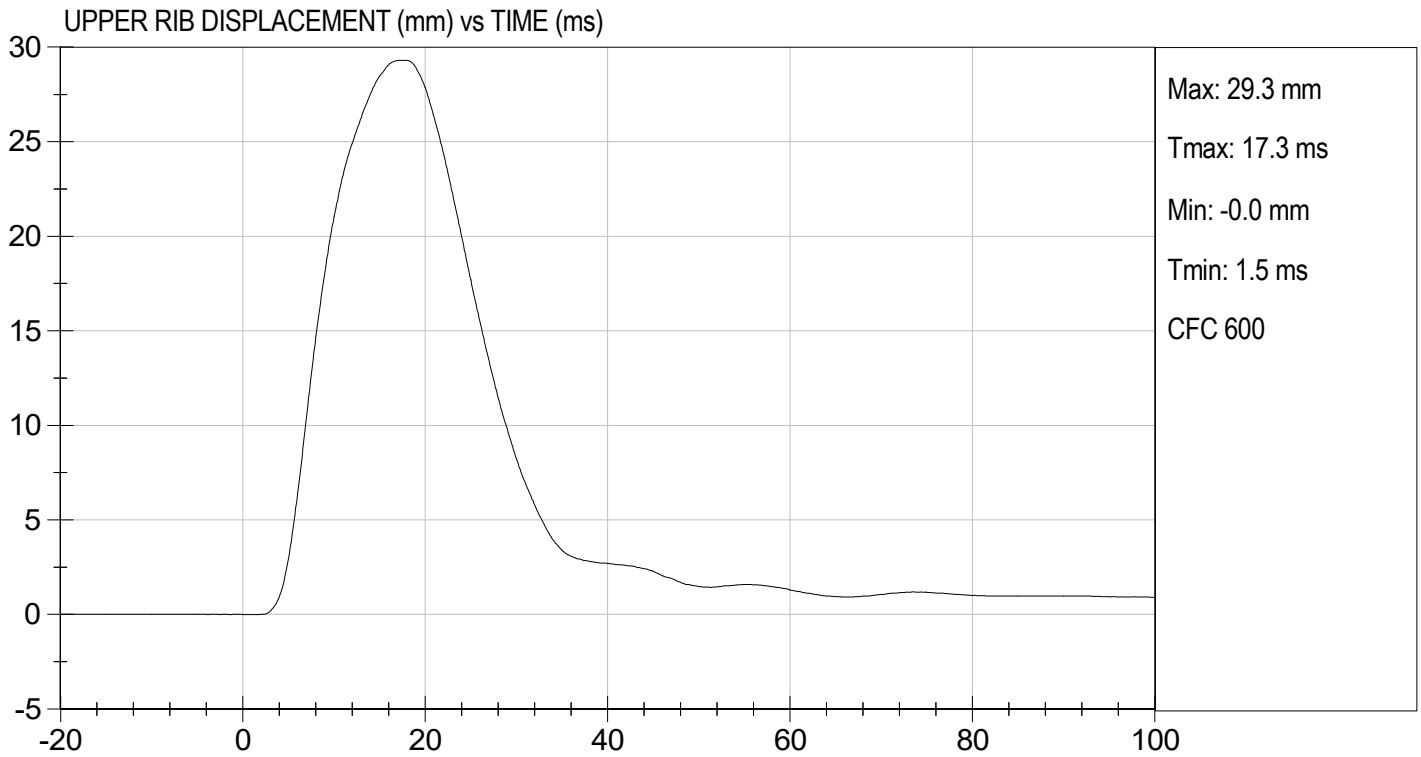
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	42	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	Pass
Maximum Probe Acceleration	G's	30 to 36	32	Pass
Shoulder Displacement	mm	31 to 40	36	Pass
Upper Rib Displacement	mm	25 to 32	29	Pass
Middle Rib Displacement	mm	30 to 36	34	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	33	Pass
Overall Test Results				Pass

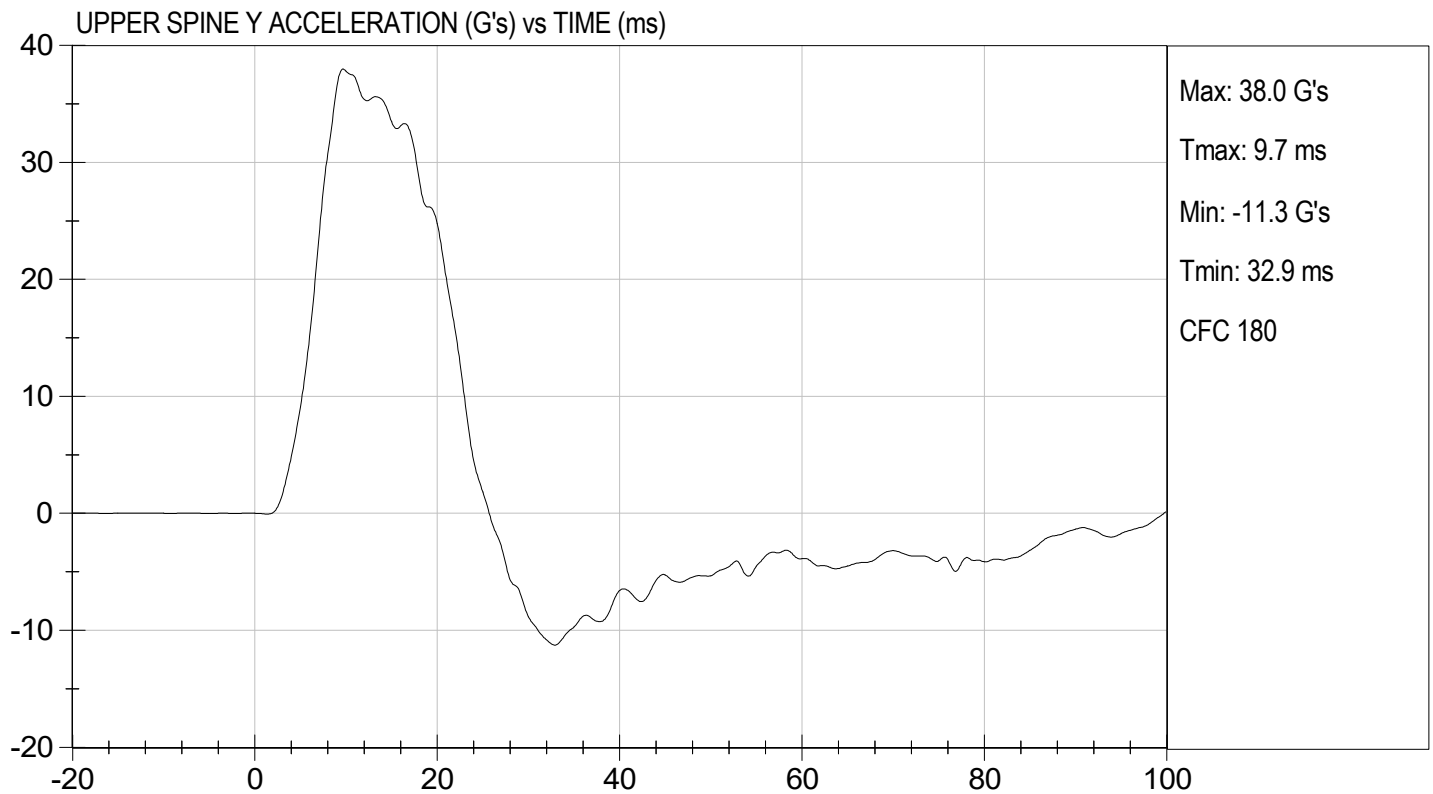
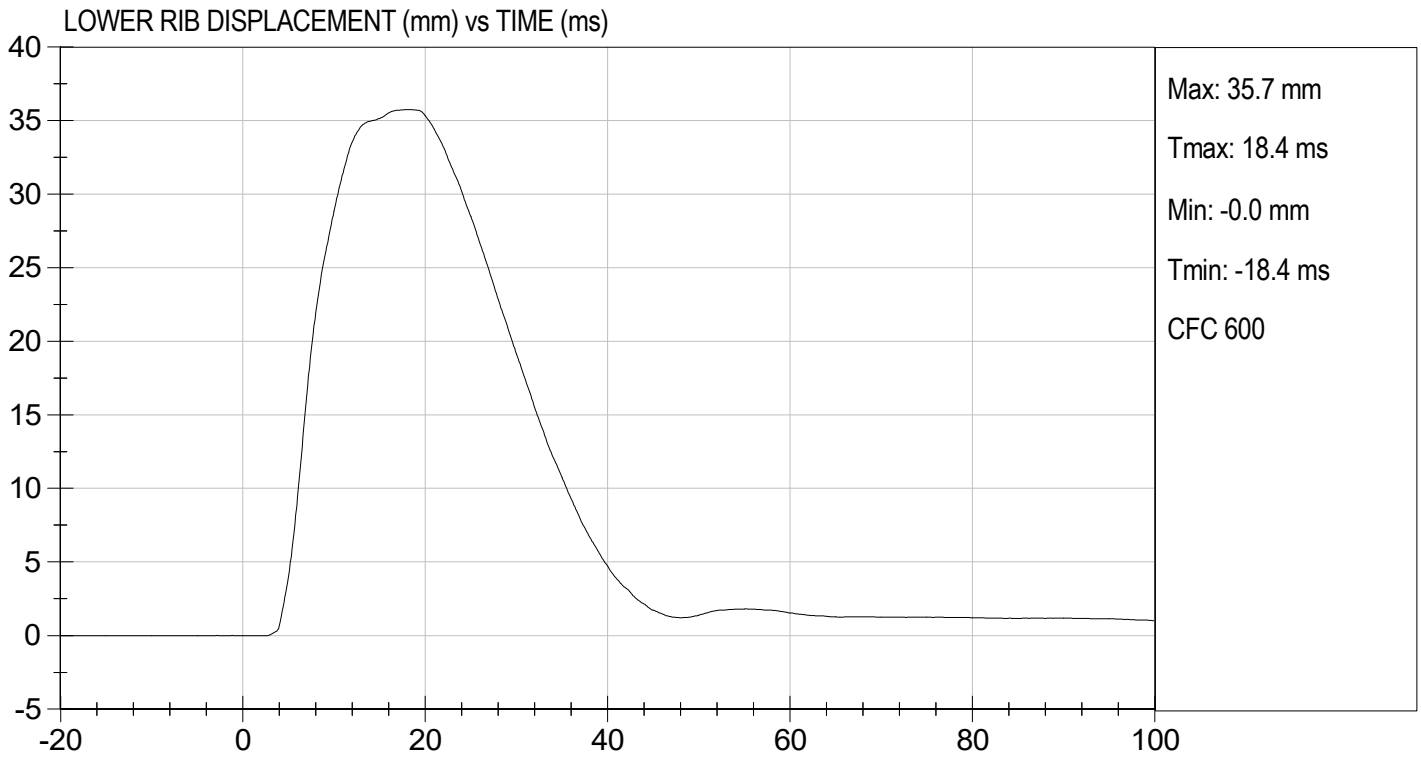

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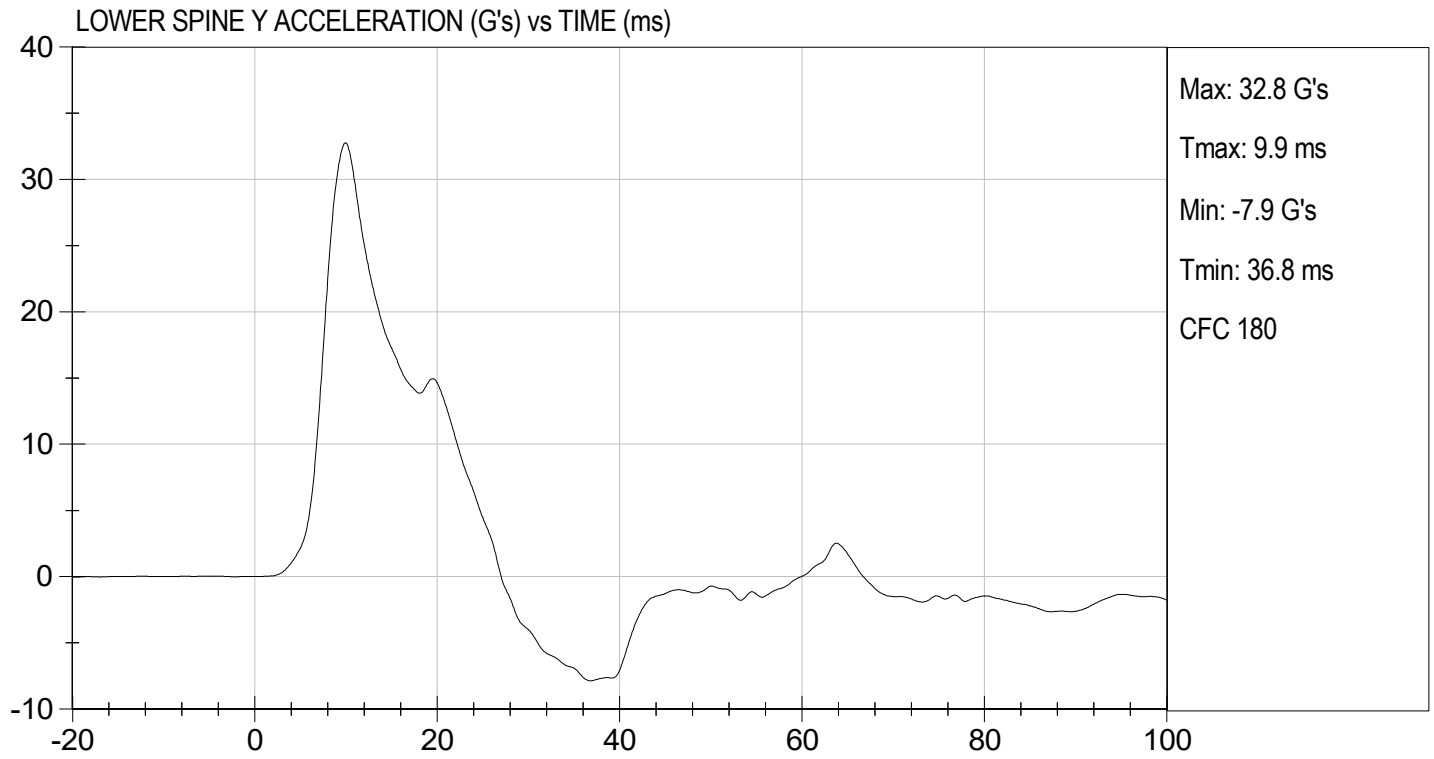
05/23/2023
 Test Date


 Approved By









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

ATD Serial No: 306

Test I.D: D231265

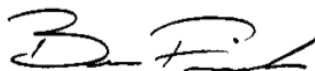
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	41	Pass
Impact Velocity	m/s	4.20 to 4.40	4.23	Pass
Maximum Probe Acceleration	G's	14 to 18	15	Pass
Upper Rib Displacement	mm	32 to 40	38	Pass
Middle Rib Displacement	mm	39 to 45	44	Pass
Lower Rib Displacement	mm	35 to 43	42	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	15	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	9	Pass
Overall Test Results				Pass



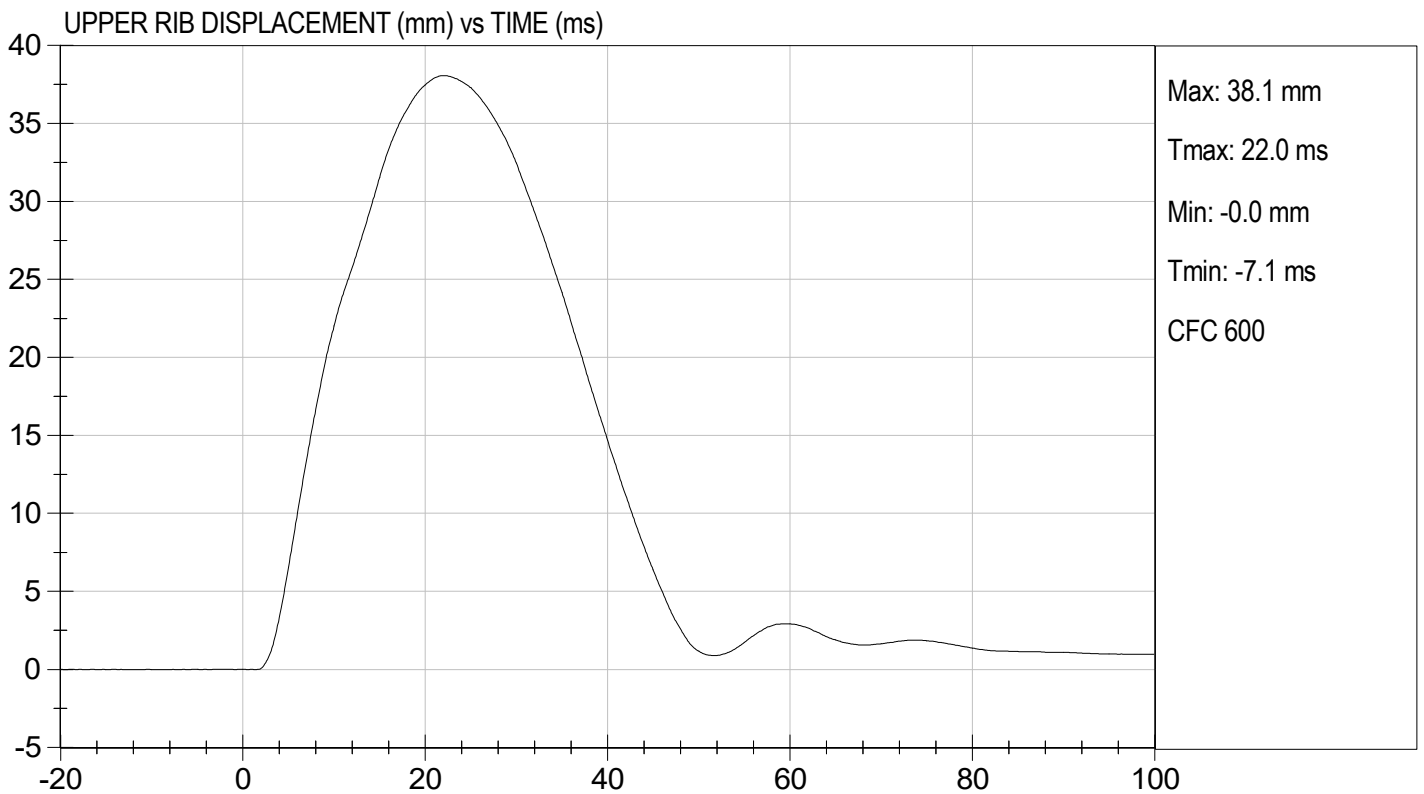
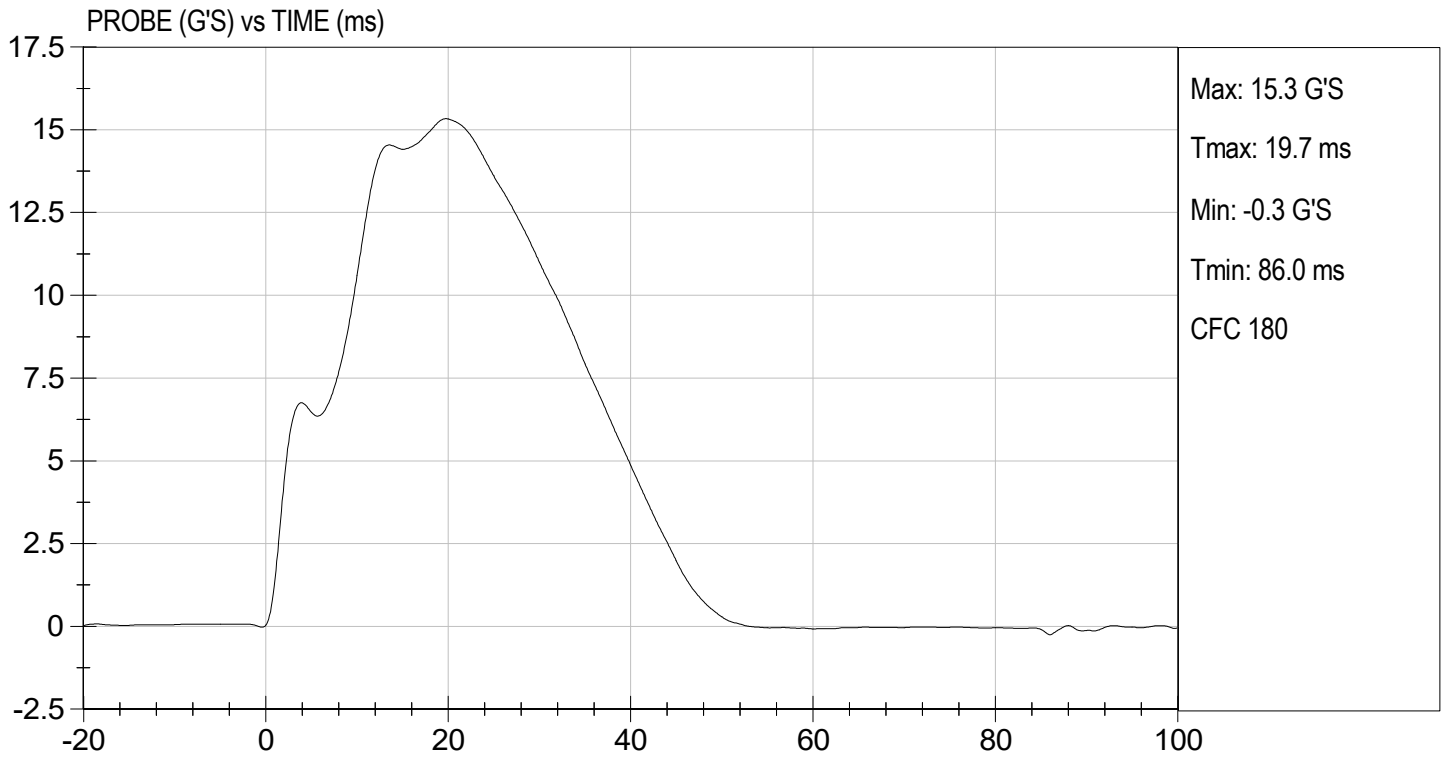
Laboratory Technician

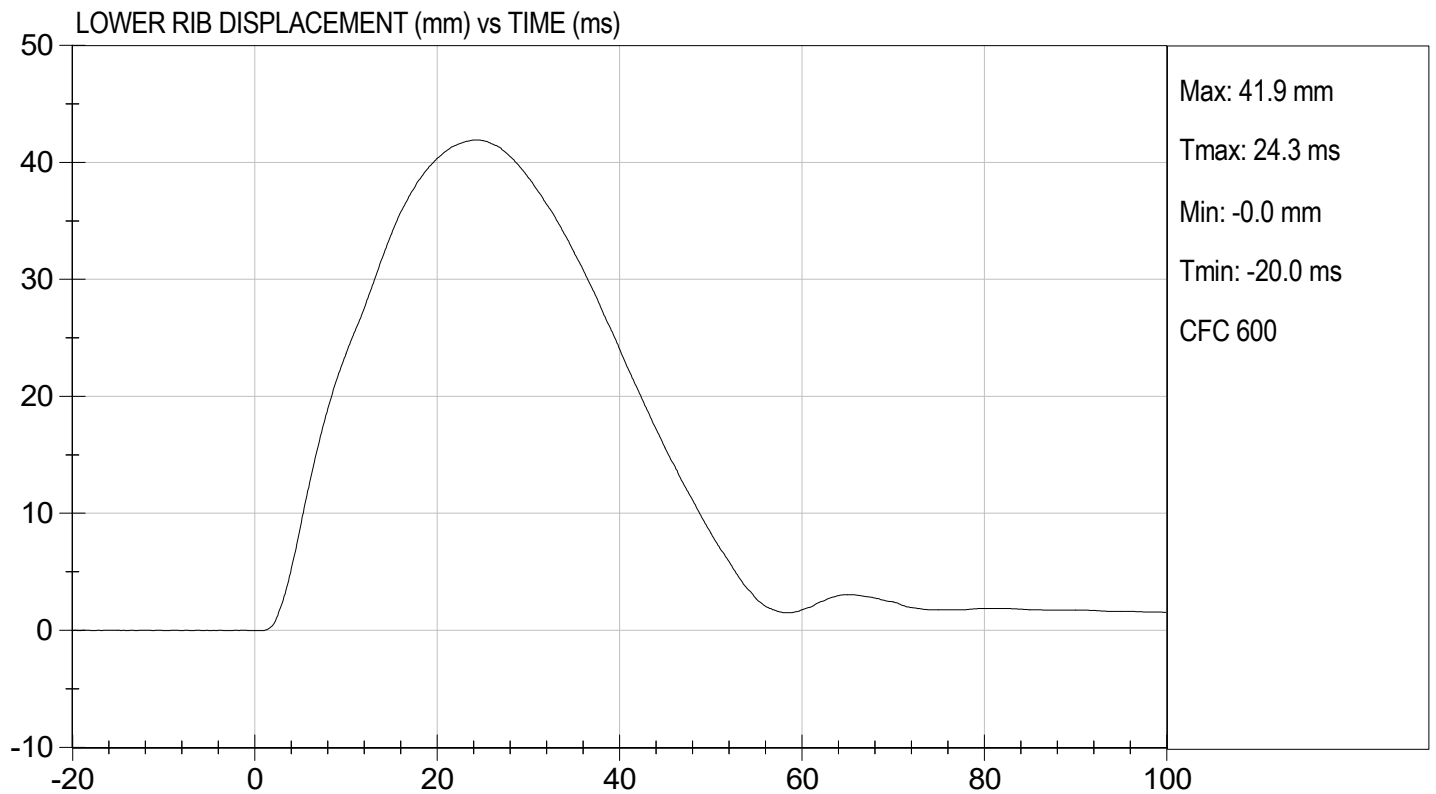
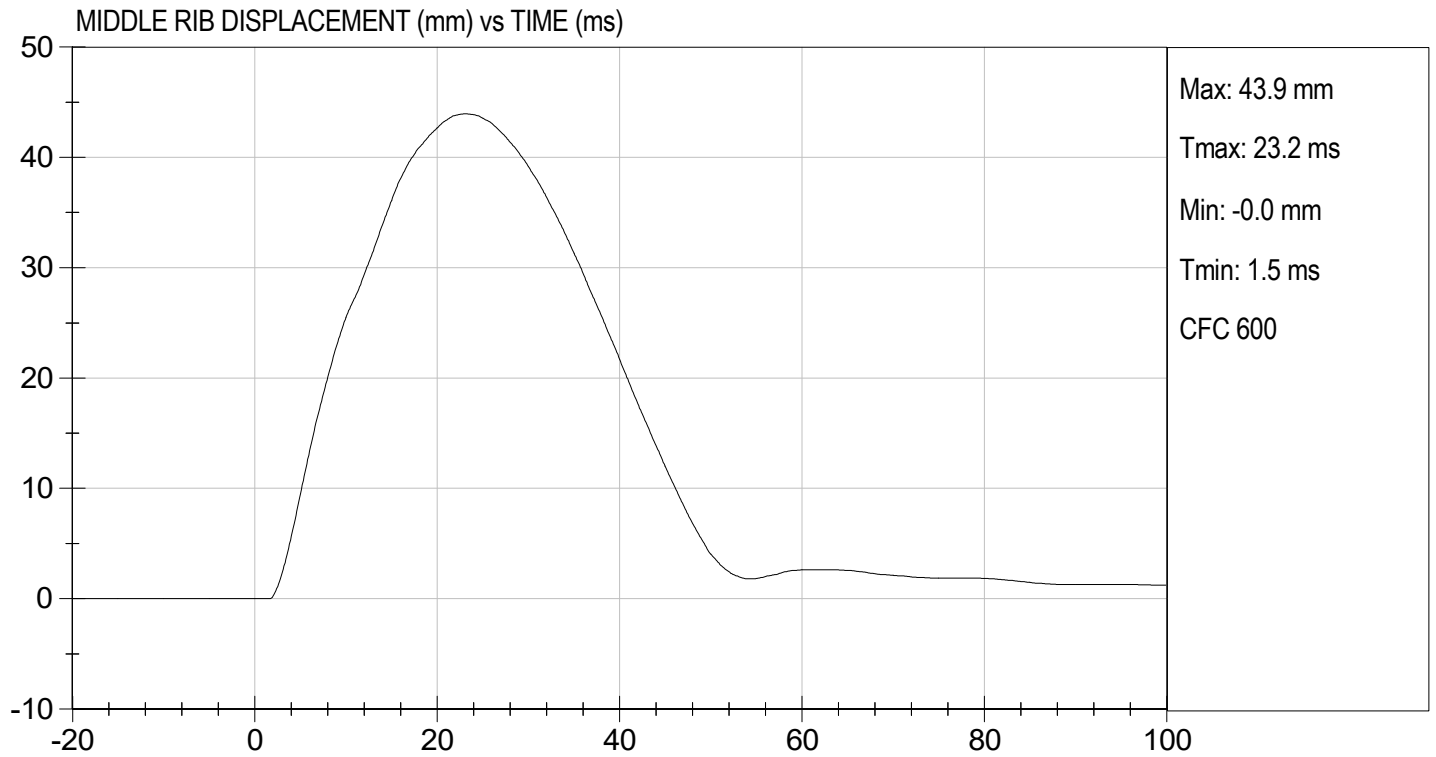
05/23/2023

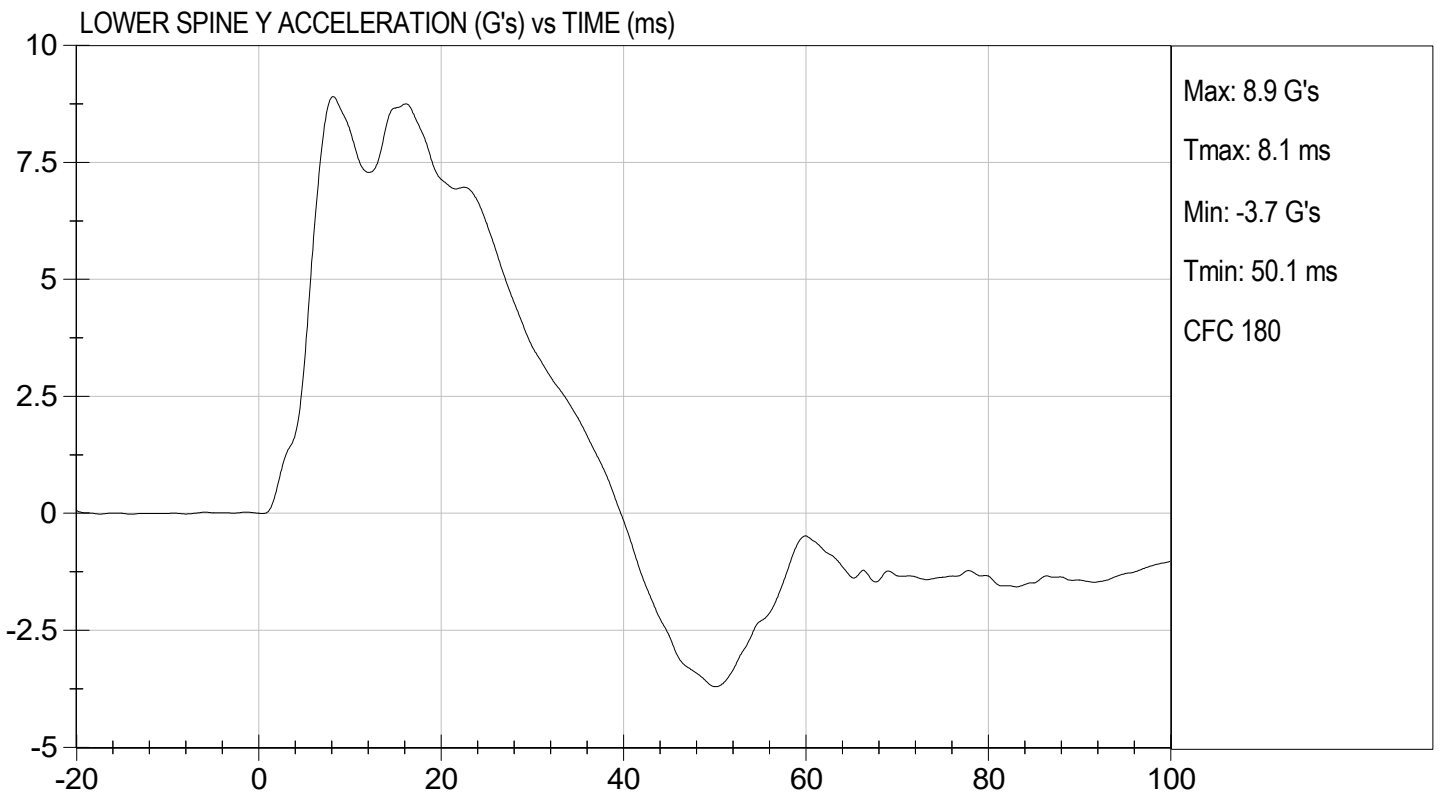
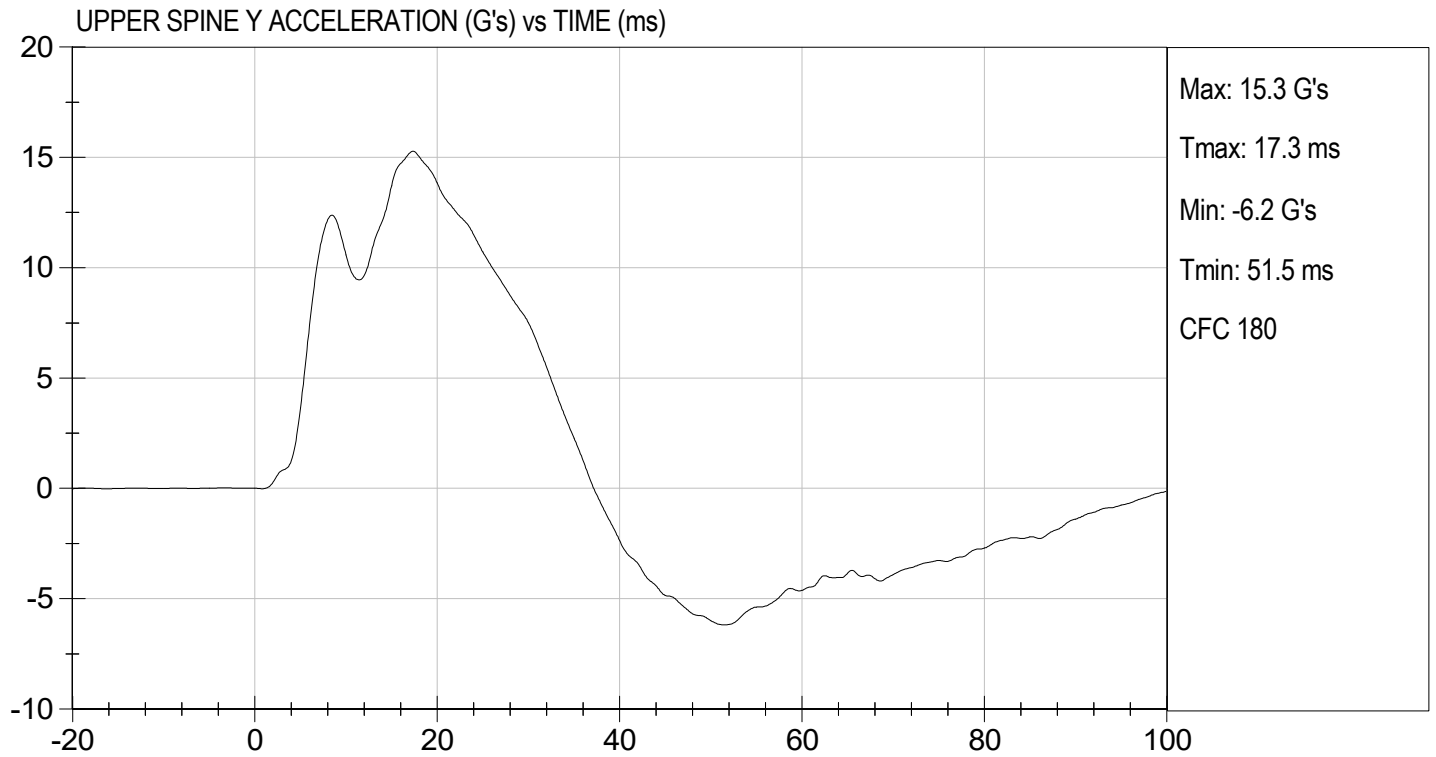
Test Date



Approved By







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

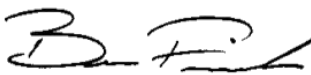
ATD Serial No: 306

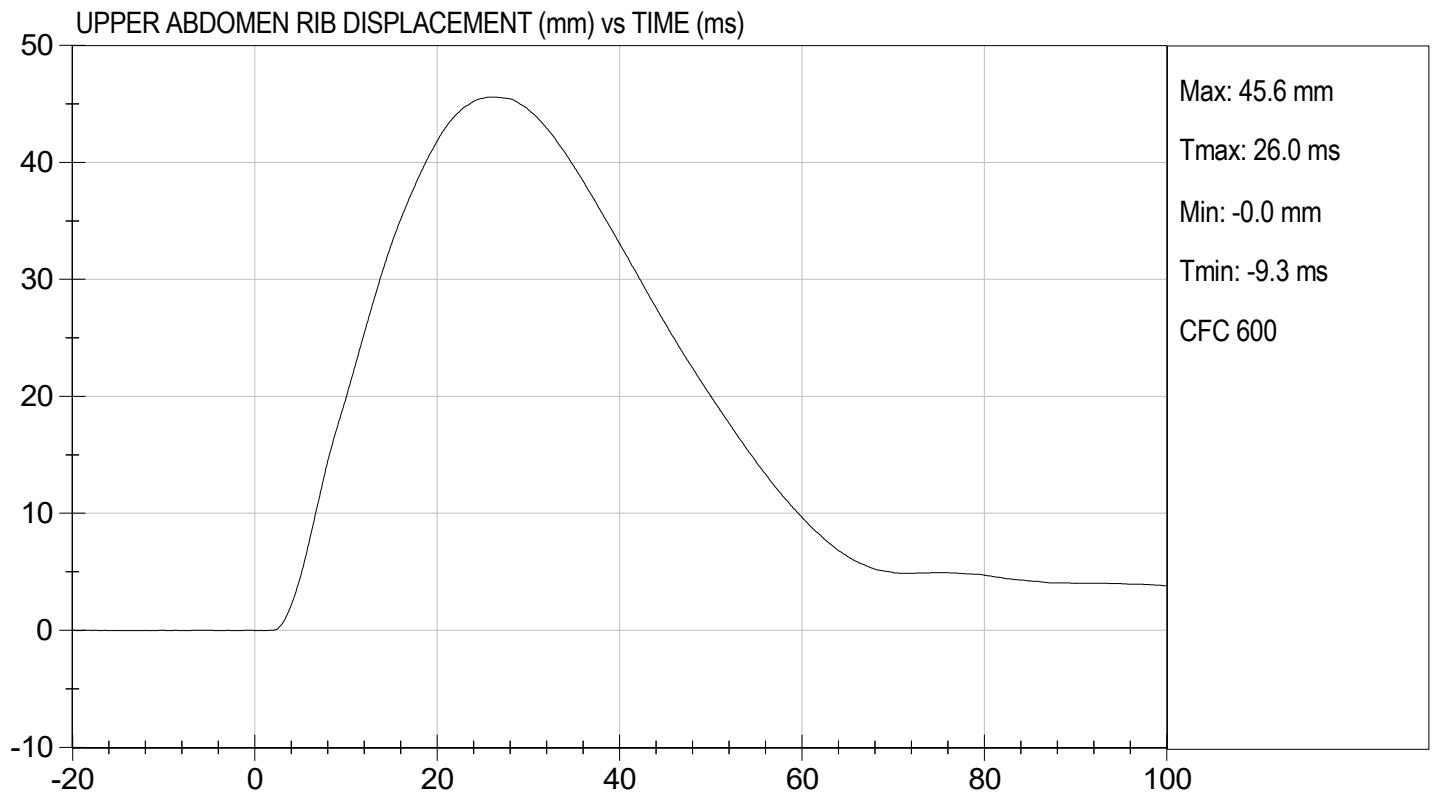
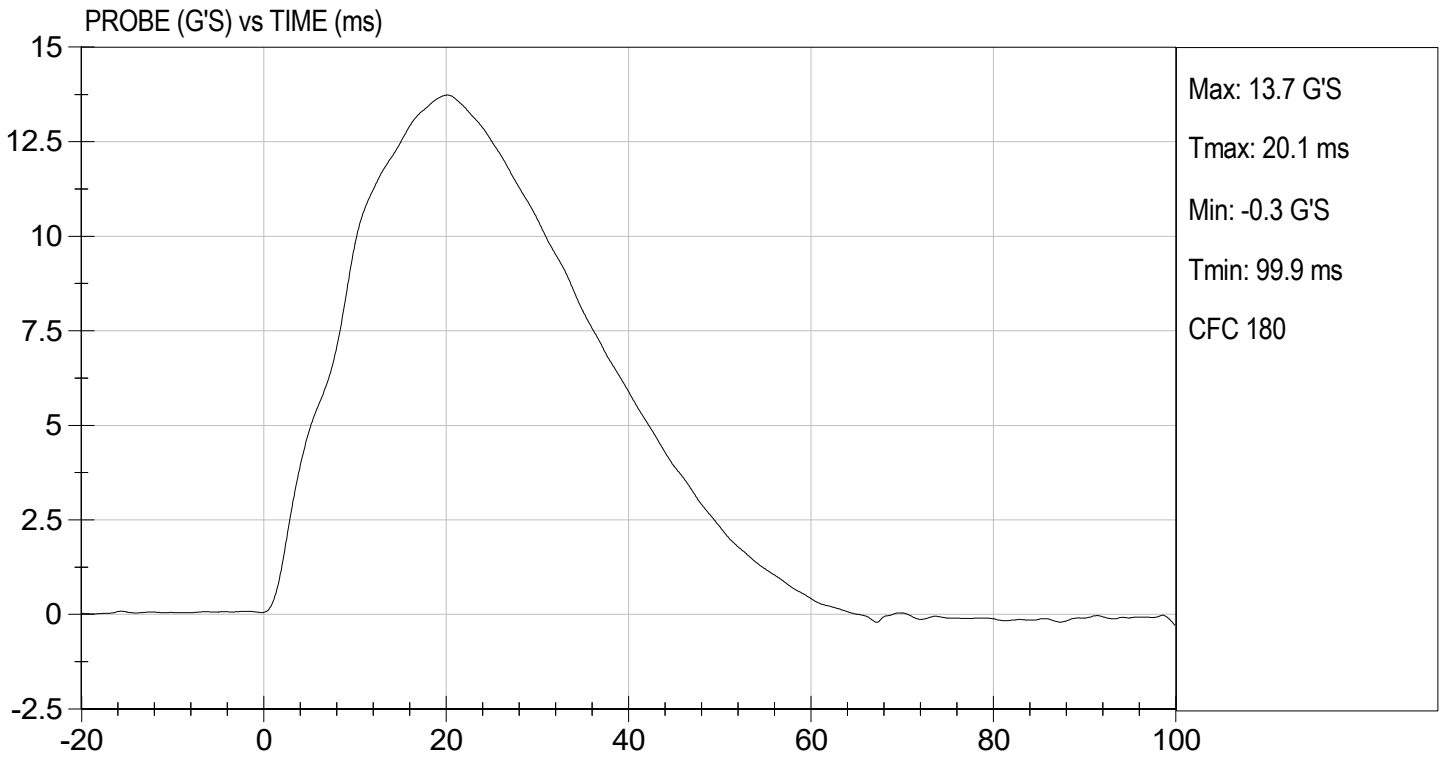
Test I.D: D231266

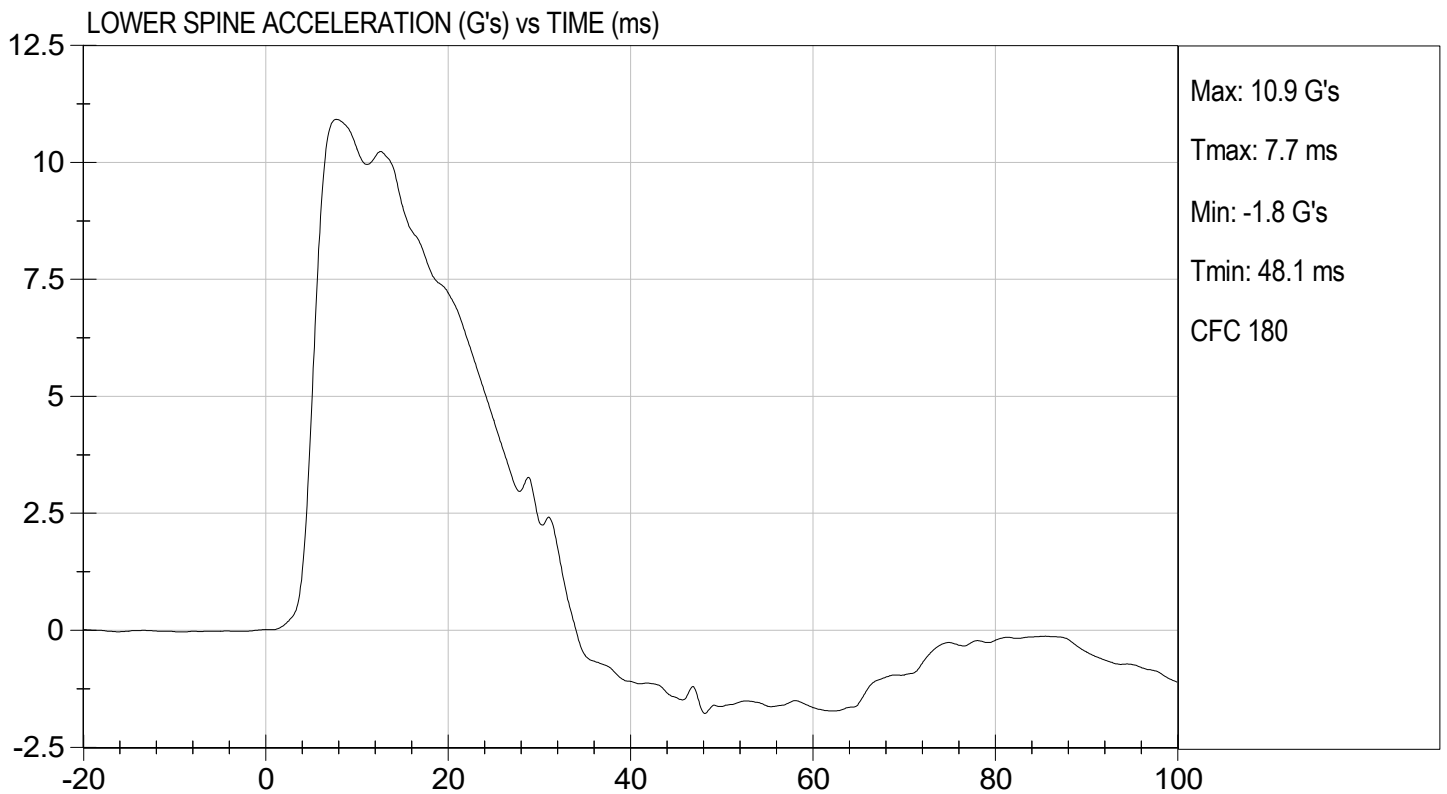
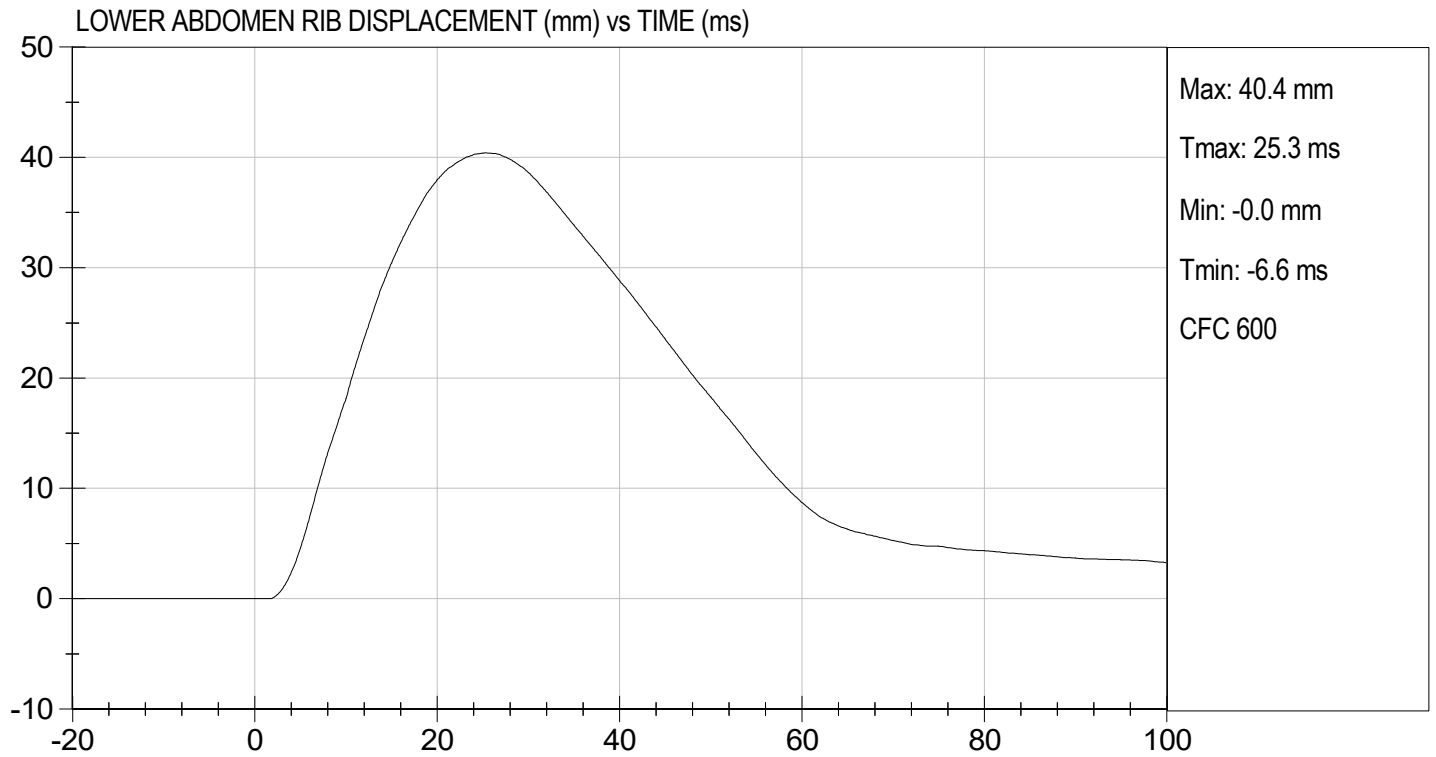
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	41	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Maximum Probe Acceleration	G's	12 to 16	14	Pass
Upper Abdomen Rib Displacement	mm	36 to 47	46	Pass
Lower Abdomen Rib Displacement	mm	33 to 44	40	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	11	Pass
Overall Test Results				Pass


 Laboratory Technician

05/23/2023
 Test Date


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

ATD Serial No: 306

Test I.D: D231267

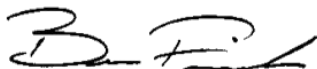
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.4	Pass
Humidity	%	10 to 70	41	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	Pass
Maximum Probe Acceleration	G's	38 to 47	43	Pass
Pelvis Y Acceleration After 6 ms	G's	34 to 42	39	Pass
Peak Acetabulum Force	N	3600 to 4300	3,953	Pass
Overall Test Results				Pass



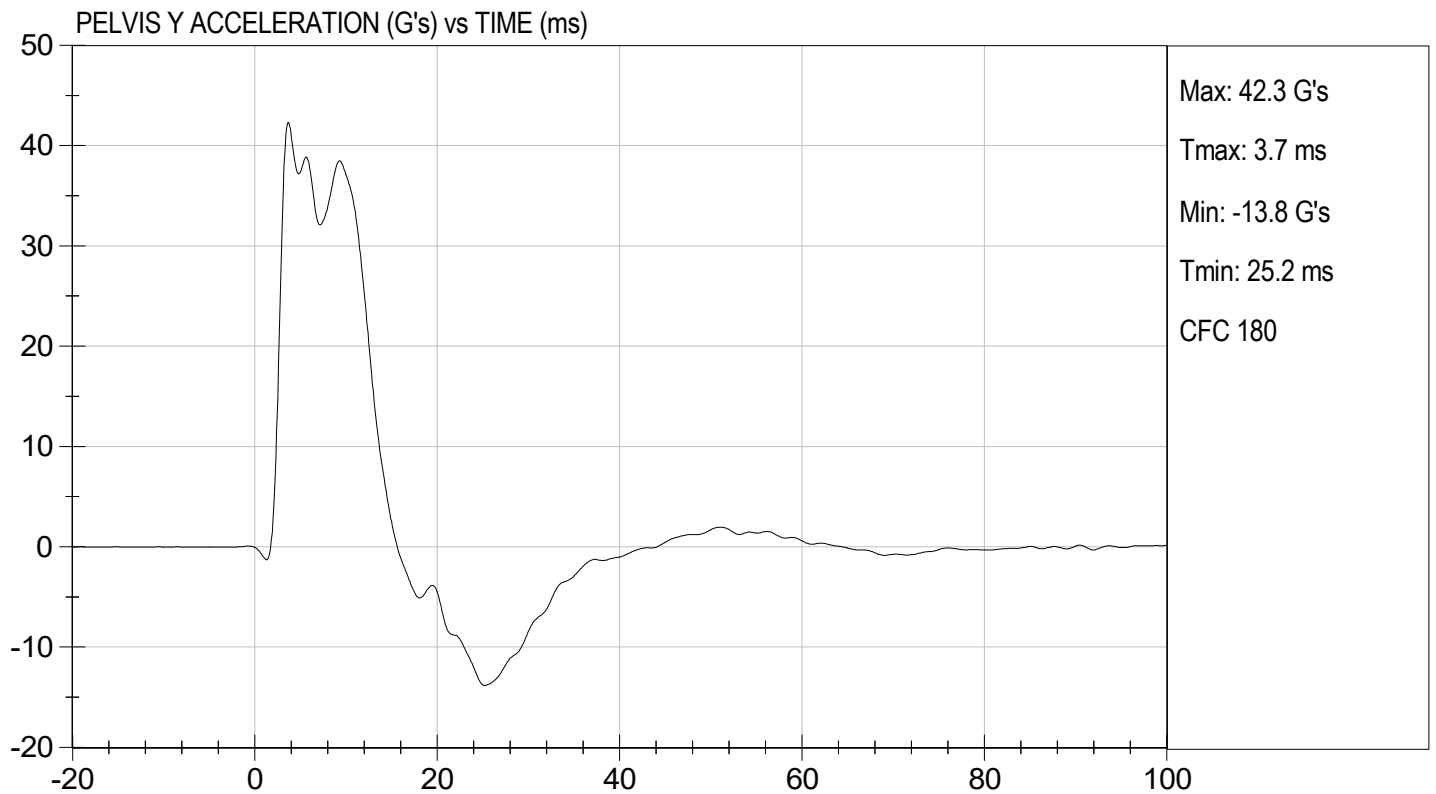
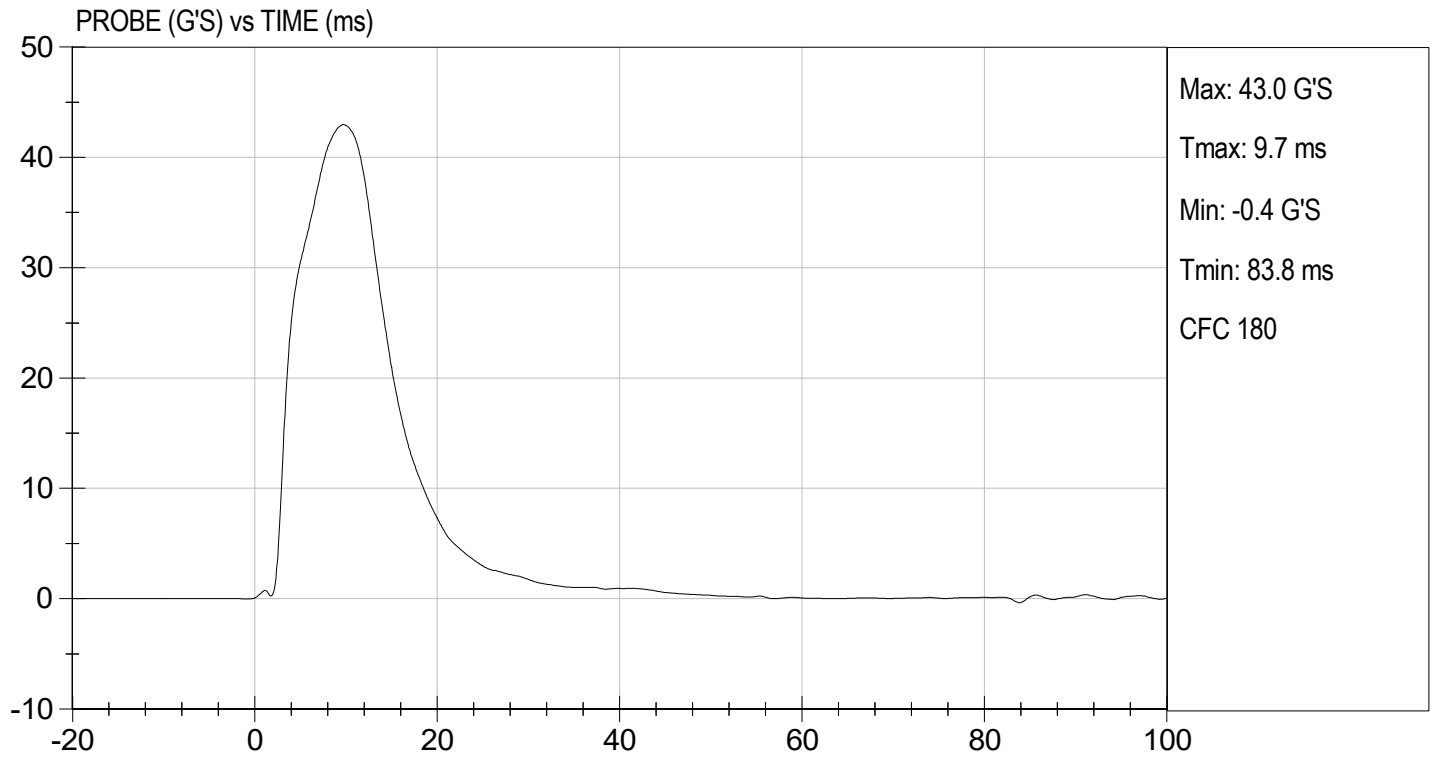
Laboratory Technician

05/23/2023

Test Date



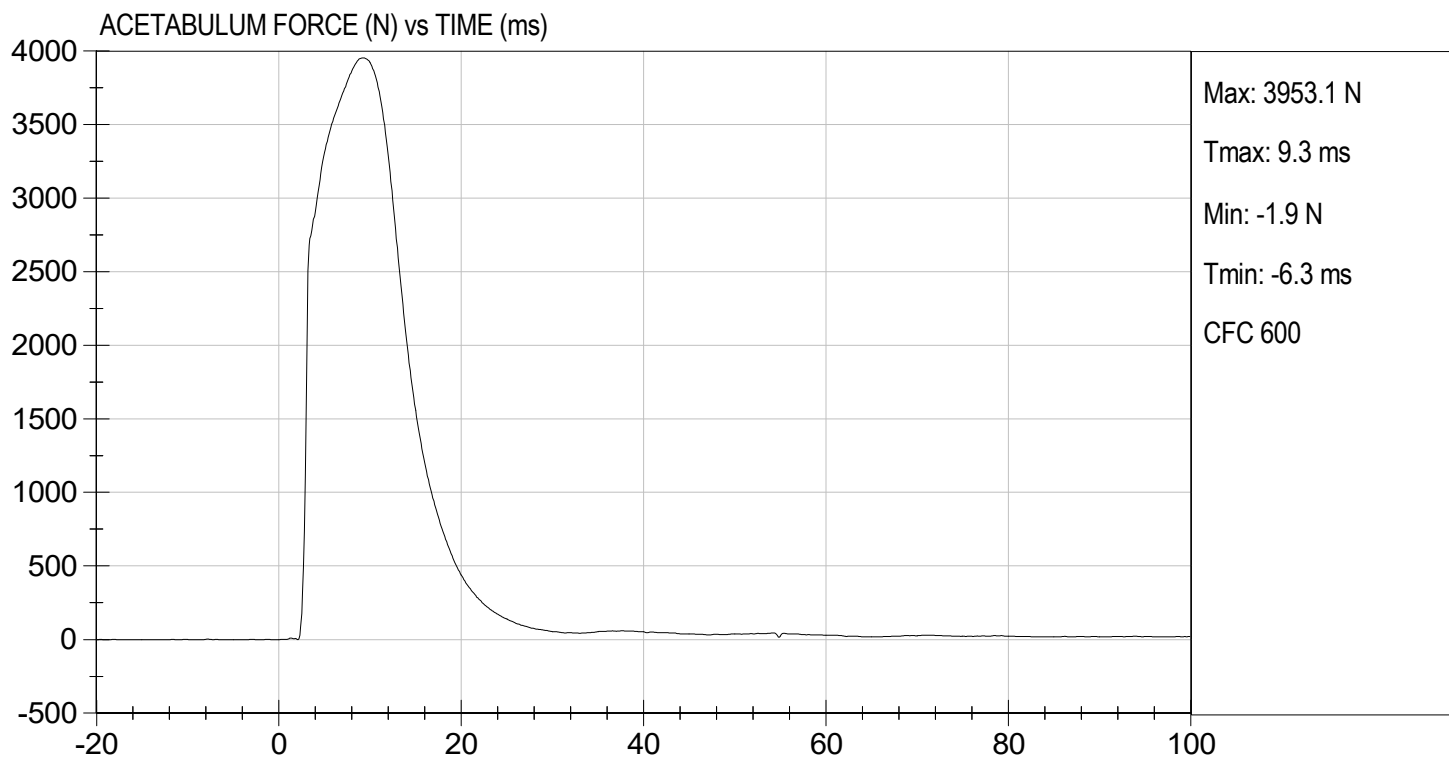
Approved By





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

TEST DATE: 05/23/2023
TEST #: D231267



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

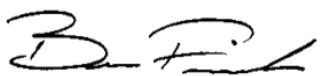
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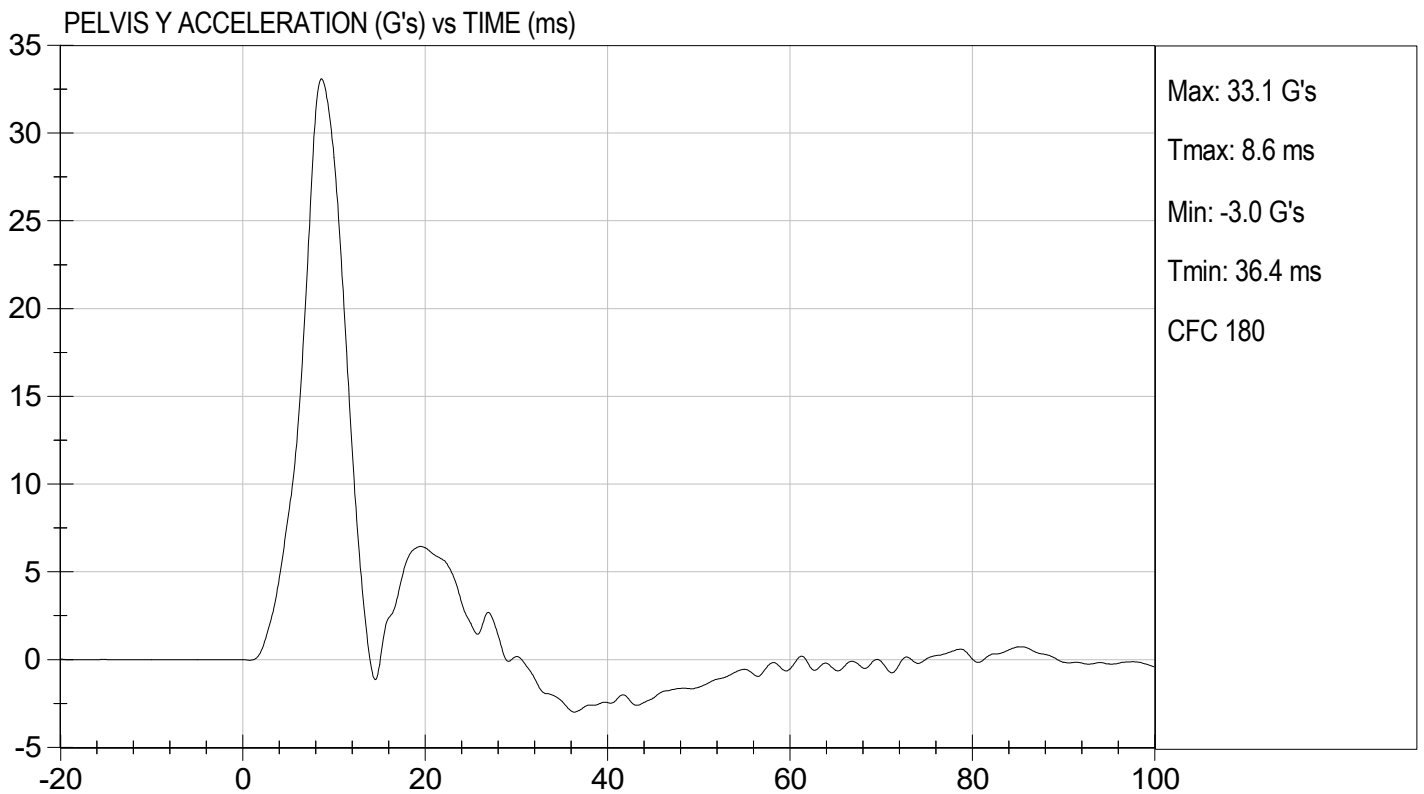
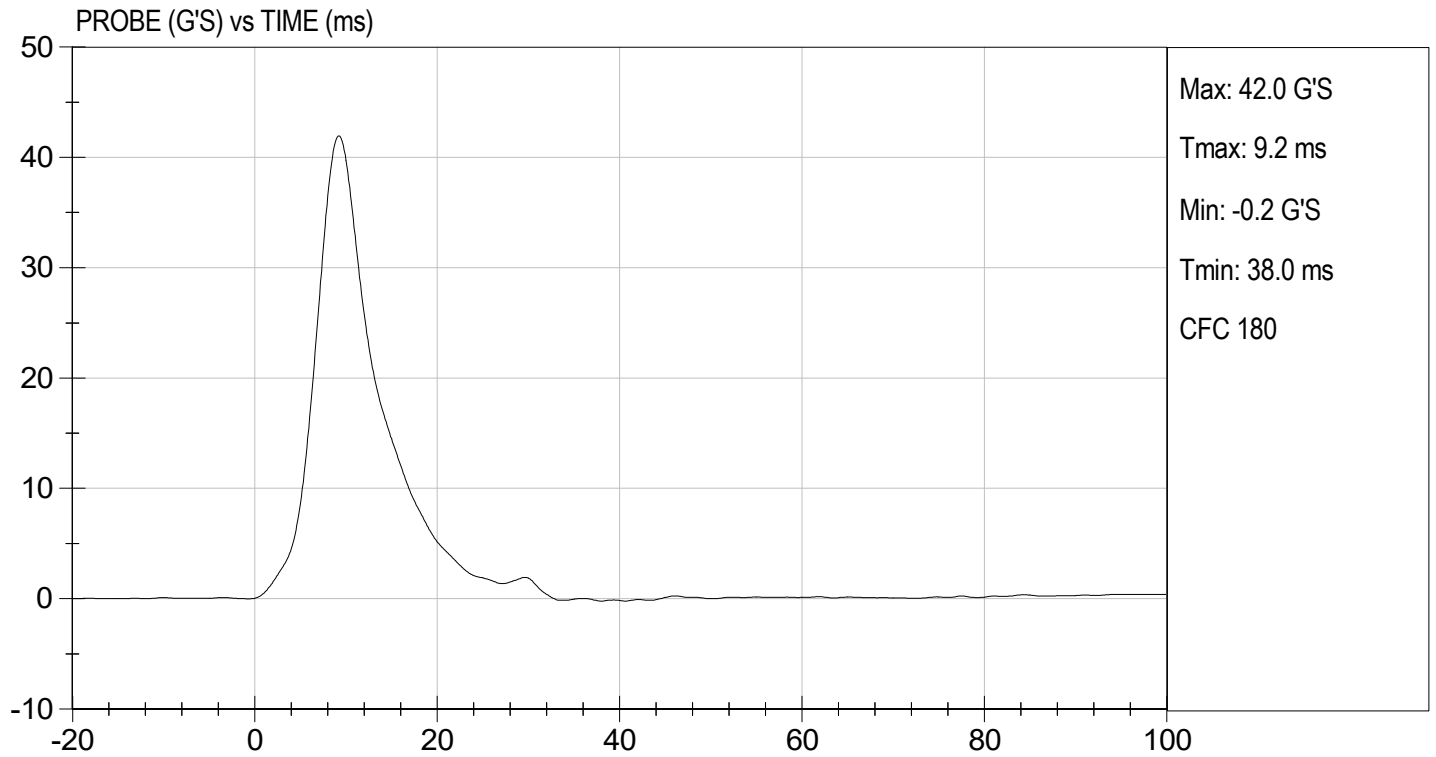
Test I.D: D231268

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	41	Pass
Impact Velocity	m/s	4.20 to 4.40	4.27	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	4,789	Pass
Overall Test Results				Pass


 Laboratory Technician

05/23/2023
 Test Date

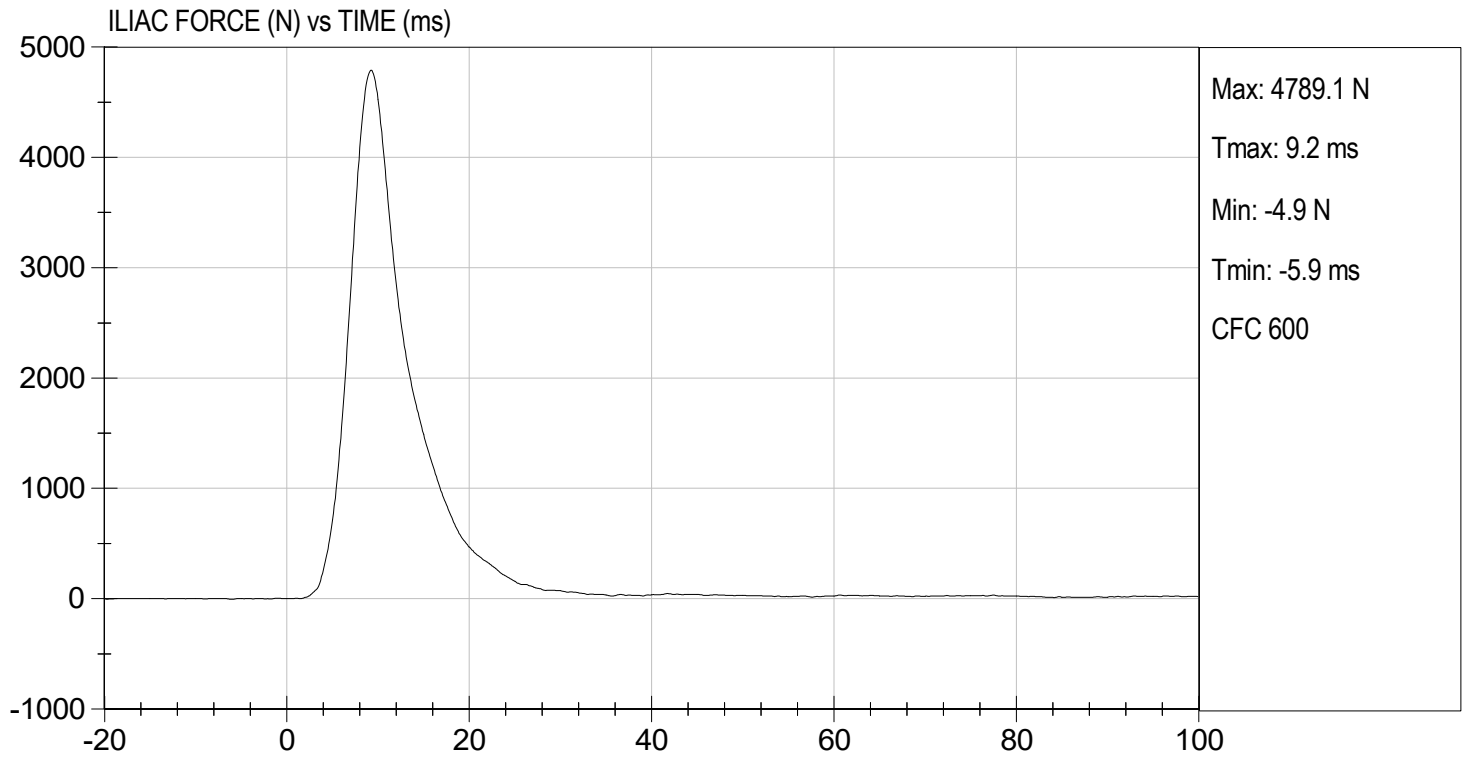

 Approved By





TEST DESC: ILLIAC
VELOCITY: 14.01 ft/s, 4.27 m/s

TEST DATE: 05/23/2023
TEST #: D231268





SID-IIs Pelvis Plug Certification Test

Plug S/N 17016

Test Number 23914

Report Number 23971

Test Date 8/18/2022 1:24:32 PM

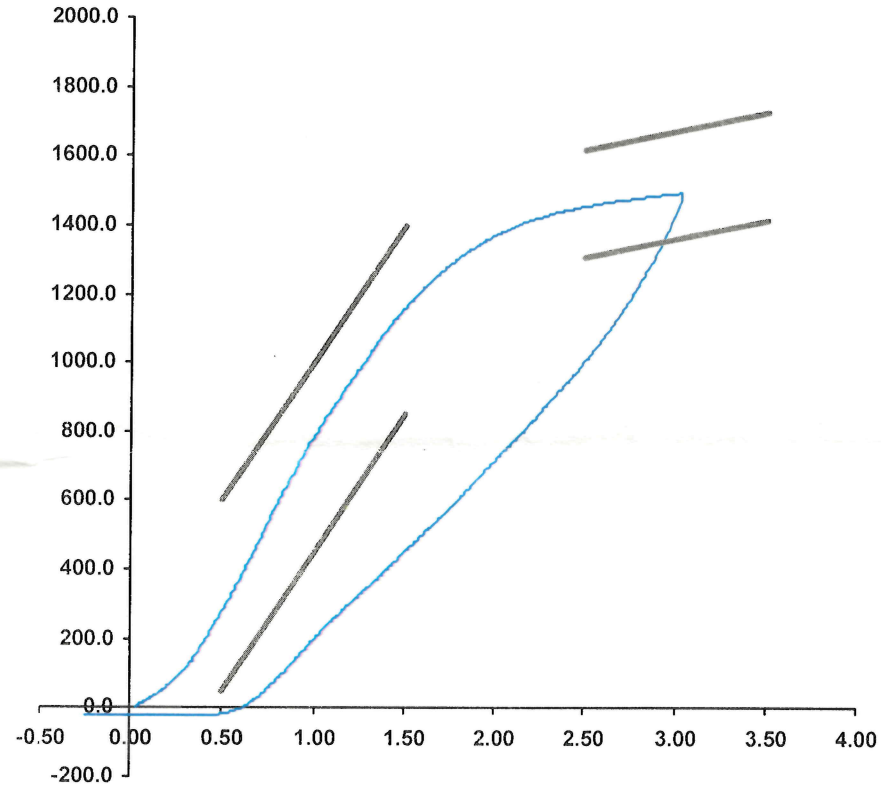
	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	283	50	600
Force @ 1.5 mm (N)	1,159	850	1,400
Force @ 2.5 mm (N)	1,457	1,306	1,618
Force @ 3.0 mm (N)	1,495	1,361	1,673

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

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

Notes:

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107
 SACO Research

18-Aug-22

By: DC Date: 8/18/22



SID-IIs Pelvis Plug Certification Test

Plug S/N 13971

Test Number 13445

Report Number 13490

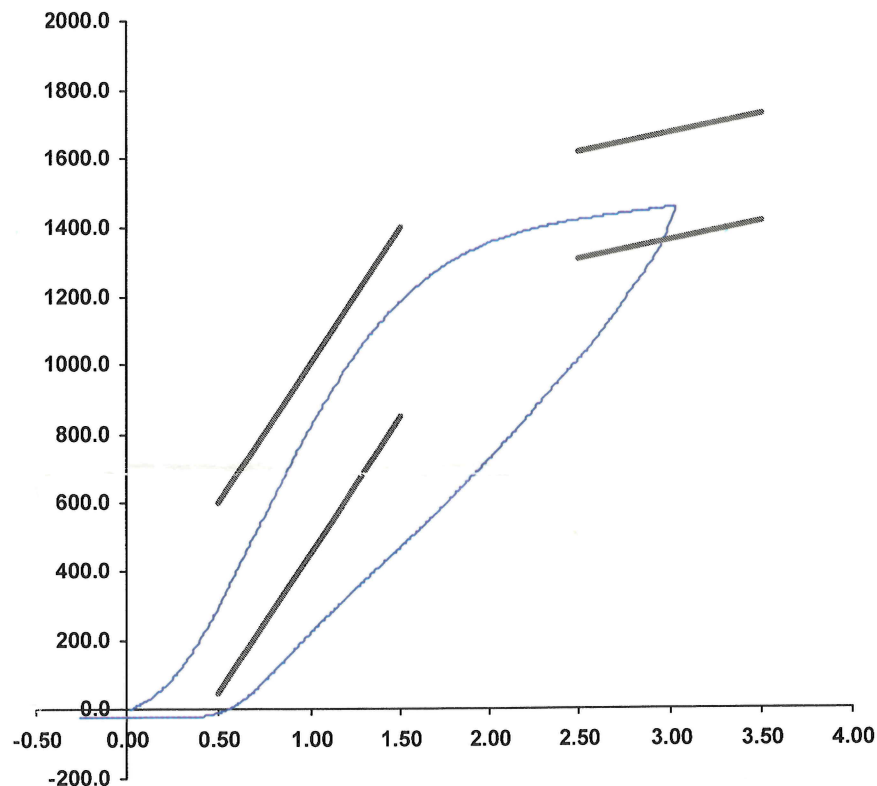
Test Date 5/22/2020 9:10:47 AM

	<u>Test Results</u>	<u>Spec Min</u>	<u>Spec Max</u>
Force @ 0.5 mm (N)	300.21	50.00	600.00
Force @ 1.5 mm (N)	1,182.46	850.00	1,400.00
Force @ 2.5 mm (N)	1,421.10	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,455.82	1,361.00	1,673.00

Testing Machine STM-20 5965542
 Load Cell S/N (FI360947), Units (LBS) 1000
 Crosshead Speed (mm / min) or Rate 12.7
 Extension or Position Measured by XHD_100 (XHD100)

Notes:

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107 22-May-20

SACO Research

By: DC Date: 5-22-2020

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION

Table 1 – Dummy Instrumentation (ES-2re)

		ES-2re S/N F032			
		Serial Number	Manufacturer	Calibration Date	
Head CG Accelerometers		X	P79568	Endevco	12/29/2022
		Y	P79569	Endevco	12/29/2022
		Z	P79570	Endevco	12/29/2022
		Xr	P86797	Endevco	12/29/2022
		Yr	P94957	Endevco	12/29/2022
		Zr	P97381	Endevco	12/29/2022
Thorax Rib Displacement Potentiometers	Upper	Y	G236	Honeywell	12/29/2022
	Middle	Y	G169	Honeywell	12/29/2022
	Lower	Y	G164	Honeywell	12/29/2022
Abdomen Load Cells	Forward	Y	ABG1513	Denton	06/14/2022
	Middle	Y	ABG1531	Denton	06/14/2022
	Rear	Y	ABG1536	Denton	06/14/2022
Lower Spine Accelerometers (T12)		X	P79574	Endevco	12/29/2022
		Y	T14094	Endevco	03/21/2023
		Z	P82603	Endevco	12/29/2022
Public Symphysis Load Cell		Y	PG462	Denton	06/14/2022

Table 2 – Dummy Instrumentation (SID-IIs)

			SID-IIs S/N 306			
			Serial Number	Manufacturer	Calibration Date	
Head CG Accelerometers			X	P79003	Endevco	01/30/2023
			Y	P79445	Endevco	12/29/2022
			Z	P79724	Endevco	12/29/2022
			Xr	P84999	Endevco	12/29/2022
			Yr	P85000	Endevco	12/29/2022
			Zr	P85001	Endevco	12/29/2022
Head Angular Rate Sensors			X	ARS7566	DTS	04/07/2023
			Y	ARS7586	DTS	04/07/2023
			Z	ARS7602	DTS	04/07/2023
Displacement Potentiometers	Thoracic Rib	Upper	Y	G033	FTSS	12/29/2022
		Middle	Y	G2403	Servo	12/29/2022
		Lower	Y	G1270	FTSS	12/29/2022
	Abdominal Rib	Upper	Y	G032	FTSS	12/29/2022
		Lower	Y	MJ5171	Medius	12/29/2022
Lower Spine Accelerometers (T12)			X	P96332	Endevco	12/29/2022
			Y	P96335	Endevco	12/29/2022
			Z	P96341	Endevco	12/29/2022
Acetabulum Load Cell			Y	ACG4285	FTSS	08/18/2022
Iliac Wing Load Cell			Y	IWG3023	FTSS	08/18/2022
Pelvis Plug (struck side)				SACO	17016	08/18/2022
Pelvis Plug (non-struck side)				SACO	13971	05/22/2020

Table 3 – Vehicle Instrumentation

			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	T33419	Endevco	04/05/2023
	Vehicle Center of Gravity	Y	T33468	Endevco	04/05/2023
	Vehicle Center of Gravity	Z	T33412	Endevco	04/05/2023
2	Right Sill at Front Seat	X	A383101	MSI	05/15/2023
	Right Sill at Front Seat	Y	P49062	Endevco	05/15/2023
	Right Sill at Front Seat	Z	A337227	MSI	05/15/2023
3	Right Sill at Rear Seat	X	A340731	MSI	05/15/2023
	Right Sill at Rear Seat	Y	A391163	MSI	05/15/2023
	Right Sill at Rear Seat	Z	A383454	MSI	05/15/2023
4	Left Sill at Front Door	Y	T26699	Endevco	02/08/2023
5	Left Sill at Rear Door	Y	T25697	Endevco	02/01/2023
6	Left A-Post Lower	Y	T32727	Endevco	02/10/2023
7	Left A-Post Middle	Y	T32745	Endevco	02/10/2023
8	Left B-Post Lower	Y	T33458	Endevco	04/05/2023
9	Left B-Post Middle	Y	T33408	Endevco	04/05/2023
10	Front Seat Track	Y	T32179	Endevco	01/04/2023
11	Rear Seat Track or Structure	Y	T24818	Endevco	01/04/2023
12	Right Rear Occ. Compartment	Y	T32349	Endevco	05/15/2023
13	Engine Block	X	A416927	MSI	01/09/2023
	Engine Block	Y	A416904	MSI	12/05/2022
14	Rear Floorpan Above Axle	X	A340250	MSI	05/10/2023
	Rear Floorpan Above Axle	Y	A360969	MSI	05/10/2023
	Rear Floorpan Above Axle	Z	A395076	MSI	05/10/2023

Table 4 – MDB Instrumentation

		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	PCB1183D	PCB	01/10/2023
MDB Center of Gravity	Y	PCB1822D	PCB	01/10/2023
MDB Center of Gravity	Z	PCB1753D	PCB	01/10/2023
Left Frame at Rear Axle Centerline	X	PCB1438D	PCB	01/10/2023
Left Frame at Rear Axle Centerline	Y	PCB1653D	PCB	01/10/2023