

**REPORT NUMBER: SideNCAPMDB-MGA-23-034**

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

**FCA USA LLC  
2023 Jeep Wagoneer 5-Door SUV  
NHTSA No.: M20230307**

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



**Test Date: August 10, 2023**

**Final Report Date: February 5, 2024**

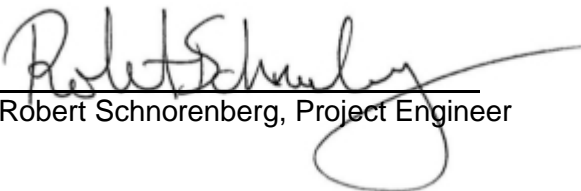
**FINAL REPORT**

**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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Prepared by:   
Ben Fischer, Program Manager

Approved by:   
Robert Schnorenberg, Project Engineer

Approval Date: February 5, 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

<b>1. Report No.</b> SideNCAPMDB-MGA-23-034	<b>2. Government Accession No.</b>	<b>3. Recipient's Catalog No.</b>																											
<b>4. Title and Subtitle</b> Final Report of New Car Assessment Program Side Impact MDB Testing of 2023 Jeep Wagoneer 5-Door SUV, NHTSA No.: M20230307		<b>5. Report Date</b> February 5, 2024																											
<b>7. Author(s)</b> Ben Fischer, Program Manager		<b>6. Performing Organization Code</b> MGA																											
<b>9. Performing Organization Name and Address</b> MGA Research Corporation 5000 Warren Road Burlington, WI 53105		<b>8. Performing Organization Report No.</b> SideNCAPMDB-MGA-23-034																											
<b>12. Sponsoring Agency Name and Address</b> 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		<b>10. Work Unit No.</b>																											
		<b>11. Contract or Grant No.</b> 693JJ920D000017																											
<b>15. Supplementary Notes</b>		<b>13. Type of Report and Period Covered:</b> Final Test Report August 10, 2023 to February 5, 2024																											
		<b>14. Sponsoring Agency Code</b> NRM-100																											
<b>16. Abstract</b> A 55/28 km/h 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2023 Jeep Wagoneer 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 August 10, 2023.  The impact velocity of the Moving Deformable Barrier (MDB) was 61.91 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 22.0°C. The target vehicle post-test maximum crush was 155 mm at level 2. The test vehicle's performance was as follows:																													
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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.																													
<b>17. Key Words</b> New Car Assessment Program (NCAP) Side Impact MDB ES-2re SID-IIs		<b>18. Distribution Statement</b> Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division 1200 New Jersey Ave, SE Washington, DC 20590																											
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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 Jeep Wagoneer 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 Jeep Wagoneer 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 61.91 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 August 10, 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 <sub>36</sub> )		1000	20.025
Maximum Thorax Rib Deflection	mm	44	11.662
Total Abdominal Force	N	2500	470.511
Pubic Symphysis Force	N	6000	901.699
Resultant Lower Spine Acceleration	g	82*	19.560

Measurement Description	Units	Passenger ATD (SID-IIs)	
		Threshold	Result
Head Injury Criteria (HIC <sub>36</sub> )		1000	36.760
Resultant Lower Spine Acceleration	g	82	32.645
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2292.904
Maximum Thoracic Rib Deflection	mm	38*	11.259
Maximum Abdomen Rib Deflection	mm	45*	11.250

\*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	Yes		
Knee Airbag	Yes	Yes		
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	No	
Side Airbag (Other)				
Seat Belt Pretensioner	Yes	Yes	No	
Seat Belt Load Limiter	Yes		No	
Other:				

The test data can be found on the NHTSA website at [www.nhtsa.gov](http://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 Jeep Wagoneer 5-Door SUV  
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20230307  
Test Date: 8/10/2023

**TEST VEHICLE INFORMATION AND OPTIONS**

NHTSA No.	M20230307	Traction Control System (TCS)	Yes
Model Year	2023	Auto-Leveling System	No
Make	Jeep	Automatic Door Locks (ADL)	Yes
Model	Wagoneer Series III 4x2	Power Window Auto-Reverse	Yes
Body Style	5-Door SUV	Other Optional Feature	No
VIN	1C4SJUDP9PS515727	Driver Front Airbag	Yes
Body Color	Bright White	Driver Curtain Airbag	Yes
Odometer Reading (km/mi)	88 mi	Driver Head/Torso Airbag	No
Engine Displacement (L)	3.0 L	Driver Torso Airbag	No
Type/No. Cylinders	V6	Driver Torso/Pelvis Airbag	Yes
Engine Placement	Longitudinal	Driver Pelvis Airbag	No
Transmission Type	Automatic	Driver Knee Airbag	Yes
Transmission Speeds	8	Rear Pass. Curtain Airbag	Yes
Overdrive	Yes	Rear Pass. Head/Torso Airbag	No
Final Drive	FWD	Rear Pass. Torso Airbag	No
Roof Rack	No	Rear Pass. Torso/Pelvis Airbag	No
Sunroof/T-Top	Yes	Rear Pass. Pelvis Airbag	No
Running Boards	Yes	Driver Seat Belt Pretensioner	Yes
Tilt Steering Wheel	Yes	Rear Pass. Seat Belt Pretensioner	No
Power Seats	Yes	Driver Load Limiter	Yes
Anti-Lock Brakes (ABS)	Yes	Rear Pass. Load Limiter	No
		Other Safety Restraint	N/A

Does owner's manual provide instruction to turn off automatic door locks?	No
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**DATA FROM CERTIFICATION LABEL**

Manufactured By	FCA USA LLC	GVWR (kg)	3357
Date of Manufacture	3-23	GAWR Front (kg)	1770
Vehicle Type	MPV	GAWR Rear (kg)	2055

**VEHICLE SEATING AND WEIGHT CAPACITY DATA**

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3	3	8	
Capacity Weight (VCW) (kg)				693	(A)
DSC x 68 kg				544	(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).

**VEHICLE SEAT TYPE**

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

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

Test Vehicle: 2023 Jeep Wagoneer 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20230307  
 Test Date: 8/10/2023

**VEHICLE TIRE INFORMATION**



Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	340	340
Cold Pressure (kPa)	275	275
Recommended Tire Size	285/45R22	285/45R22
Tire Size on Vehicle	285/45R22	285/45R22
Tire Manufacturer	Pirelli	Pirelli
Tire Model	Scorpion	Scorpion
Treadwear	600	600
Traction	A	A
Temperature Grade	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel, 2 Polyamide	2 Polyester, 2 Steel, 2 Polyamide
Load Index/Speed Symbol	114H	114H
Tire Material	Rubber	Rubber
DOT Safety Code Left	UNLER 477 0823	UNLER 477 0823
DOT Safety Code Right	UNLER 477 0823	UNLER 477 0823

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

Test Vehicle: 2023 Jeep Wagoneer 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20230307  
 Test Date: 8/10/2023

**TEST VEHICLE TIRE PRESSURES**

	Units	LF	RF	LR	RR
As Delivered	kPa	275	285	275	275
Tire Placard	kPa	275	275	275	275
Owner's Manual	kPa	275	275	275	275
As Tested	kPa	275	275	275	275

**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	650.5	683.0		681.5	700.5		664.5	702.5	
Right	kg	656.5	687.0		768.0	784.5		770.5	804.5	
Ratio	%	48.8%	51.2%		49.4%	50.6%		48.8%	51.2%	
Totals	kg	1307.0	1370.0	2677.0	1449.5	1485.0	2934.5	1435.0	1507.0	2942.0

**TARGET TEST WEIGHT CALCULATION**

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	2677.0	(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	2942.0	(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	899	893	Yes
Right Front	mm	906	907	Yes
Right Rear	mm	909	899	Yes
Left Rear	mm	893	884	Yes
Vehicle CG (Aft of Front Axle)	mm	1607	1588	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	-61	-50	

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

Test Vehicle: 2023 Jeep Wagoneer 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20230307  
 Test Date: 8/10/2023

**WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW**

Component Description	Units	Weight
Weight of Ballast Added	kg	104
Components Removed: none	kg	

**TEST SURFACE MARKINGS**

	Units	Distance from 63° Impact Angle Line
Fore 25 mm Target	mm	1005
Aft 25 mm Target	mm	1022
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 Jeep Wagoneer 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20230307  
 Test Date: 8/10/2023

**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	18.8	10.0	14.4
Front Passenger Seat	20.0	10.0	15.0
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	14.4	0	Max	40	40	40
			Mid	20	20	20
			Min	0	0	0
Front Passenger Seat	15.0	0	Max	40	40	40
			Mid	20	20	20
			Min	0	0	0
Front Center Seat			Max			
			Mid			
			Min			
Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed

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

Test Vehicle: 2023 Jeep Wagoneer 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

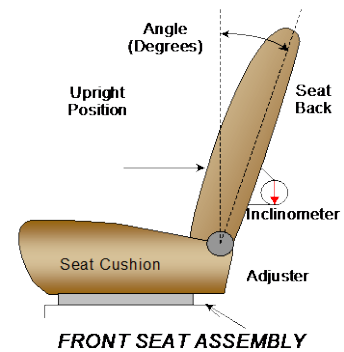
NHTSA No.: M20230307  
 Test Date: 8/10/2023

**SEAT FORE/AFT POSITIONS**

Seat	Total Fore/Aft Travel		Test Position from Forward-Most Position	
	mm	Detents (1 <sup>st</sup> as 1)	mm	Detent (1 <sup>st</sup> as 0)
Driver Seat	210		105	
Front Passenger Seat	194		97	
Front Center Seat				
Struck Side Rear Seat	250	26	250	24
Non-Struck Side Rear Seat	250	26	250	24
Rear Center Seat	250	26	250	24

**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 <sup>st</sup> as 1)	Degrees	Detent (1 <sup>st</sup> as 0)
Driver Seat	63.6		1.8	
Front Passenger Seat	64.0		0.0	
Front Center Seat				
Struck Side Rear Seat	26.3	15	5.7	0
Non-Struck Side Rear Seat	24.9	15	5.7	0
Rear Center Seat	26.3	15	5.7	0

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 Jeep Wagoneer 5-Door SUV  
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**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**

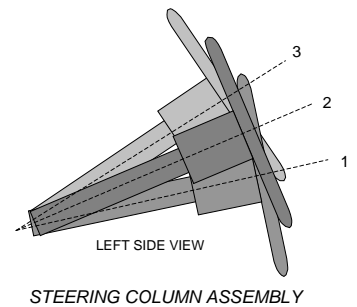
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

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

**STEERING COLUMN ADJUSTMENT**

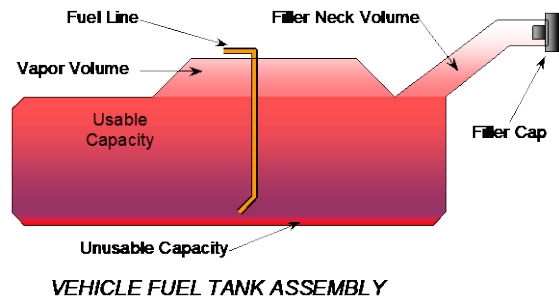
Steering wheel and column adjustments are made so that the steering wheel hub is at the center of its geometric locus it describes when it moves through its full range of motion.

	Wheel Angle (°)	Fore/Aft Position (mm)
Lowermost, Position 1	70.6	
Geometric Center, Position 2	68.1	
Uppermost, Position 3	65.6	
Telescoping Steering Wheel Travel		70
Test Position	68.1	35



**FUEL PUMP**

The vehicle is equipped with an electronic fuel pump. The fuel pump will run when ignition key in and turned to the run position. 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 Jeep Wagoneer 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20230307  
 Test Date: 8/10/2023

**FUEL TANK CAPACITY DATA**

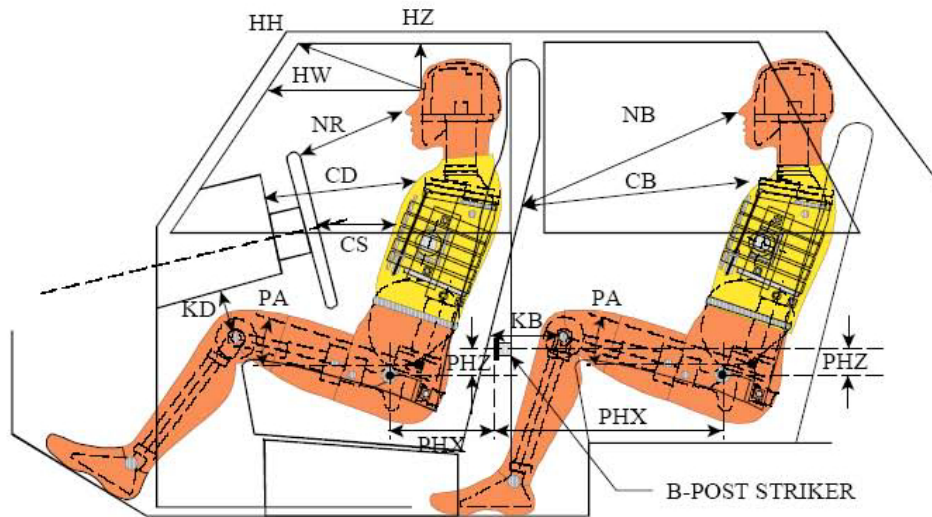
	<b>Liters</b>
Usable Capacity of Standard Tank (see S1 - Vehicle Setup Information)	100.3
Usable Capacity of Optional Tank (see S1 - Vehicle Setup Information)	
Usable Capacity of Standard Tank as Specified in Owner's Manual	100.3
Usable Capacity of Optional Tank as Specified in Owner's Manual	
93% of Usable Capacity	93.3
Actual Amount of Solvent Used	93.5
1/3 of Usable Capacity	33.4

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 Jeep Wagoneer 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20230307  
 Test Date: 8/10/2023



**LEFT SIDE VIEW**

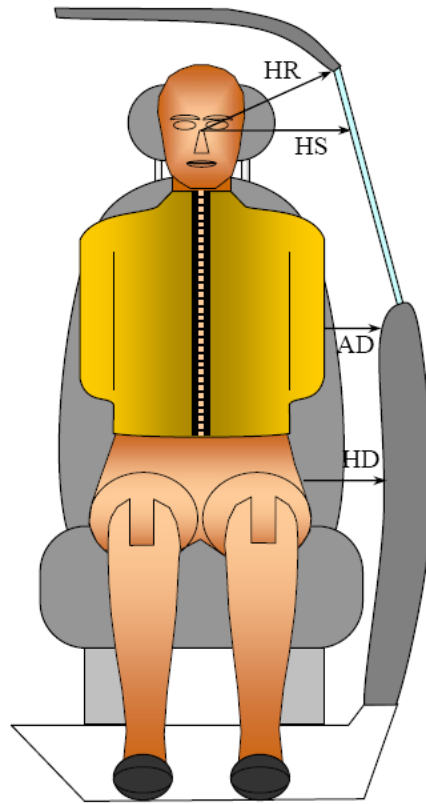
NOTE: 2-DOOR VEHICLE SHOWN.  
 REAR DUMMY PHX & PHZ  
 MEASUREMENTS FOR A 4-DOOR  
 VEHICLE WOULD USE THE C-POST  
 STRIKER AS A REFERENCE POINT

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length (mm)	Angle (°)	Length (mm)	Angle (°)
HH		Head to Header	476	12.9		
HW		Head to Windshield	736	0		
HZ	HZ	Head to Roof Liner	194	90	278	90
NR	NB	Nose to Rim/Seat Back	445	17.9	564	12.8
CD	CB	Chest to Dashboard/Seat Back	611	2.9	567	2.0
CS		Chest to Steering Wheel	382	10.8		
KDL	KBL	Left Knee to Dash/Seat Back	215	30.4	326	8.5
KDR	KBR	Right Knee to Dash/Seat Back	210	31.0	327	8.5
PAX	PAX	Pelvic Tilt Angle X		24.0		21.6
PAY	PAY	Pelvic Tilt Angle Y		-0.7		-1.0
PHX	PHX	Hip Point to Striker (X-Axis)	174		264	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	63		23	

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

Test Vehicle: 2023 Jeep Wagoneer 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20230307  
 Test Date: 8/10/2023

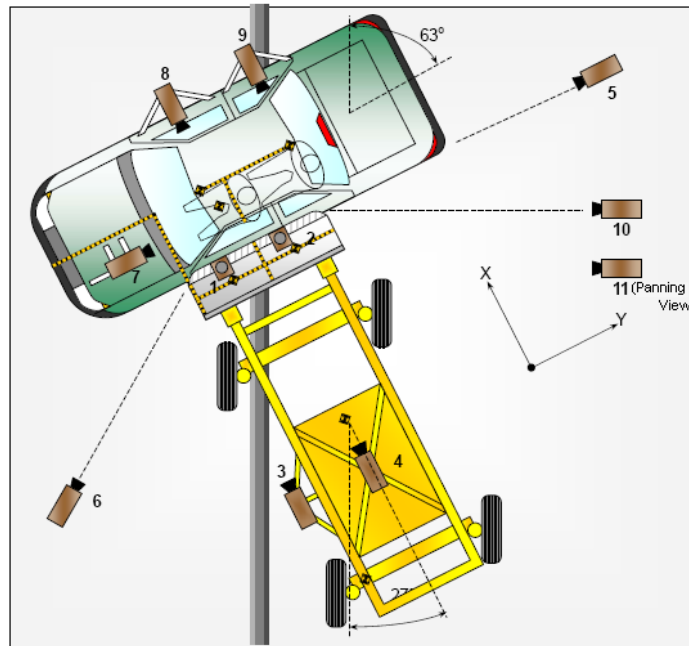


Code	Measurement Description	Driver	Passenger
		Length (mm)	
HR	Head to Side Header	210	286
HS	Head to Side Window	319	358
AD	Arm to Door	79	152
HD	Hip Point to Door	148	162

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

Test Vehicle: 2023 Jeep Wagoneer 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20230307  
 Test Date: 8/10/2023



**CAMERA LOCATIONS AND DATA**

No.	Camera View	Coordinates* (mm)			Lens (mm)	Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	900	1185	-4995	8.5	1000
2	Overhead Close-Up	395	825	-4895	20	1000
3	Left Impact Point (MDB)				50	1000
4	Side Overall (MDB)				16	1000
5	Rear	45	7675	-1560	24	1000
6	Left Front	-1760	-6105	-1595	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  $\pm 6$  mm

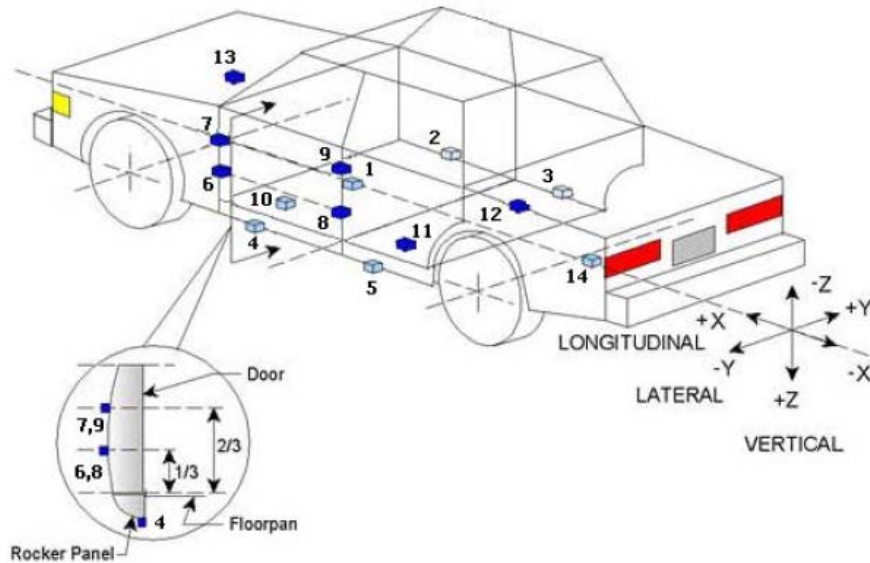
**INSTRUMENTATION**

	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 Jeep Wagoneer 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20230307  
 Test Date: 8/10/2023



**TEST VEHICLE ACCELEROMETER LOCATIONS**

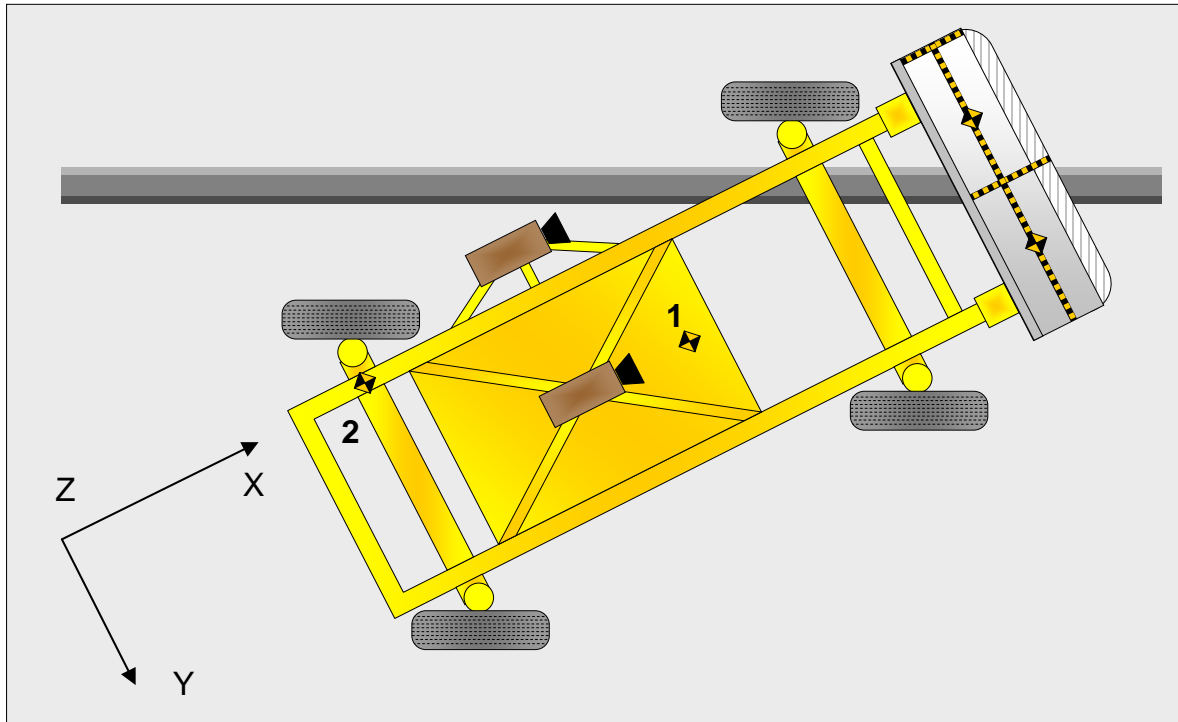
No.	ID	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2804	0	-562
2	Right Sill at Front Seat	2991	850	-356
3	Right Sill at Rear Seat	1807	850	-350
4	Left Sill at Front Door	3218	-850	-347
5	Left Sill at Rear Door	2275	-850	-341
6	Left Lower A-Post	3711	-920	-750
7	Left Middle A-Post	3711	-960	-1010
8	Left Lower B-Post	2622	-830	-840
9	Left Middle B-Post	2622	-830	-1090
10	Front Seat Track	2690	-485	-550
11	Rear Seat Structure	2241	-480	-585
12	Rt. Rear Occ. Compartment	2241	480	-584
13	Engine Block	4301	110	-1092
14	Rear Above Axle	1306	0	-633

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

**DATA SHEET NO. 7  
MDB ACCELEROMETER LOCATIONS**

Test Vehicle: 2023 Jeep Wagoneer 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20230307  
 Test Date: 8/10/2023



**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 Jeep Wagoneer 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20230307  
 Test Date: 8/10/2023

**TEST DUMMY INFORMATION AND CONTACT POINTS**

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

**POST-TEST DOOR PERFORMANCE**

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

**POST-TEST SEAT PERFORMANCE**

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

**POST-TEST STRUCTURAL OBSERVATIONS**

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No Separation
Sill Separation	None
Windshield Damage	None
Side Window Damage	None
Other Notable Effects	None

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

Test Vehicle: 2023 Jeep Wagoneer 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20230307  
 Test Date: 8/10/2023

**SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION**

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

**IMPACT POINT LOCATION DATA**

Measured Parameter	Units	Tolerance	Value
Vehicle Wheelbase	mm		3138
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		508
Actual Impact Point (Aft of Front Axle)	mm		510
Horizontal Offset (+forward / -rearward)	mm	+/- 50 of intended impact point	-2
Vertical Offset (+down / -up)	mm	+/- 20 of intended impact point	3

**DATA SHEET NO. 9**  
**MDB SUMMARY OF RESULTS**

Test Vehicle: 2023 Jeep Wagoneer 5-Door SUV  
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20230307  
Test Date: 8/10/2023

**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

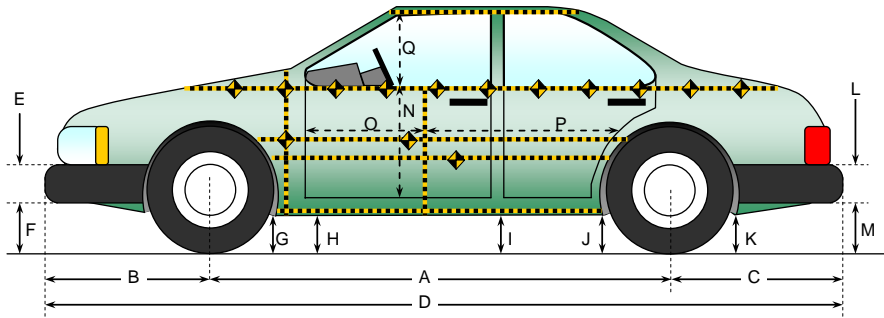
**SPEED AND ANGLE AT IMPACT DATA**

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	61.91
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.97
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90.0
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	26.3

**DATA SHEET NO. 10**  
**TEST VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2023 Jeep Wagoneer 5-Door SUV  
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20230307  
Test Date: 8/10/2023



All measurements in (mm) with tolerance of  $\pm 3$  mm

**LEFT SIDE VIEW**

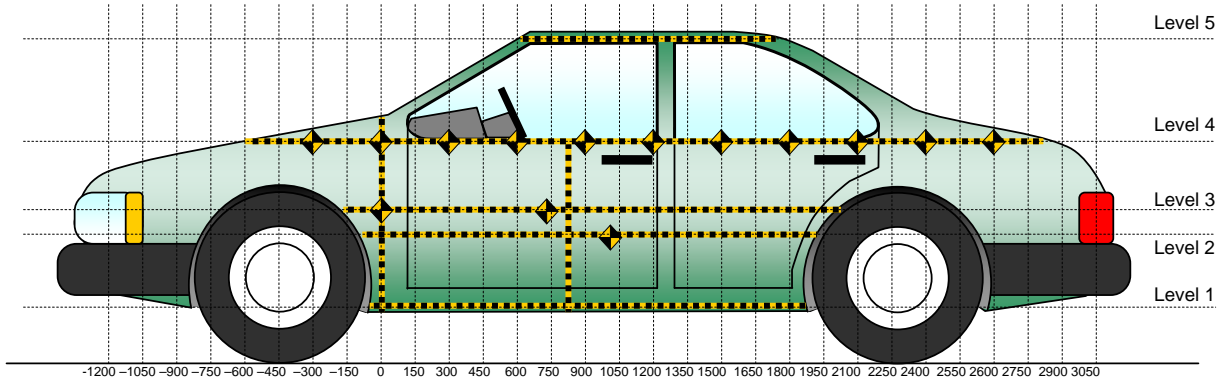
**VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION**

Code	Measurement Description	Pre-Test	Post-Test	Change
A	Wheelbase	3138	3114	-24
B	Front Axle to FSOV	1043	1132	89
C	Rear Axle to RSOV	1276	1219	-57
D	Total Length at Centerline	5457	5465	8
E	Front Bumper Thickness	146	146	0
F	Front Bumper Bottom to Ground	428	441	13
G	Sill Height at Front Wheel Well	289	260	-29
H	Sill Height at Front Door Leading Edge	285	265	-20
I	Sill Height at B Pillar	291	273	-18
J1	Sill Height at Rear Wheel Well	292	275	-17
J2	Pinch Weld Height at Rear Wheel Well	291	283	-8
K	Sill Height Aft of Rear Wheel Well	272	277	5
L	Rear Bumper Thickness	146	146	0
M	Rear Bumper Bottom to Ground	390	392	2
N	Sill Height to Window Bottom Sill	846	824	-22
O	Front Door Leading Edge to Impact CL	779	757	-22
P	Rear Door Trailing Edge to Impact CL	1412	1395	-17
Q	Front Window Opening	577	576	-1
R	Right Side Length	4451	4457	6
S	Left Side Length	4451	4439	-12
T	Vehicle Width at B Post	2038	1952	-86
U	Front Wheel Track Width	1729		
V	Rear Wheel Track Width	1737		

**DATA SHEET NO. 11**  
**TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2023 Jeep Wagoneer 5-Door SUV  
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20230307  
Test Date: 8/10/2023



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	461	99	1200
2	Mid Door	844	155	1200
3	Occupant H-Point	869	135	1200
4	Window Sill	1224	46	1200
5	Window Top	1835	15	2400

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 Jeep Wagoneer 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20230307  
 Test Date: 8/10/2023

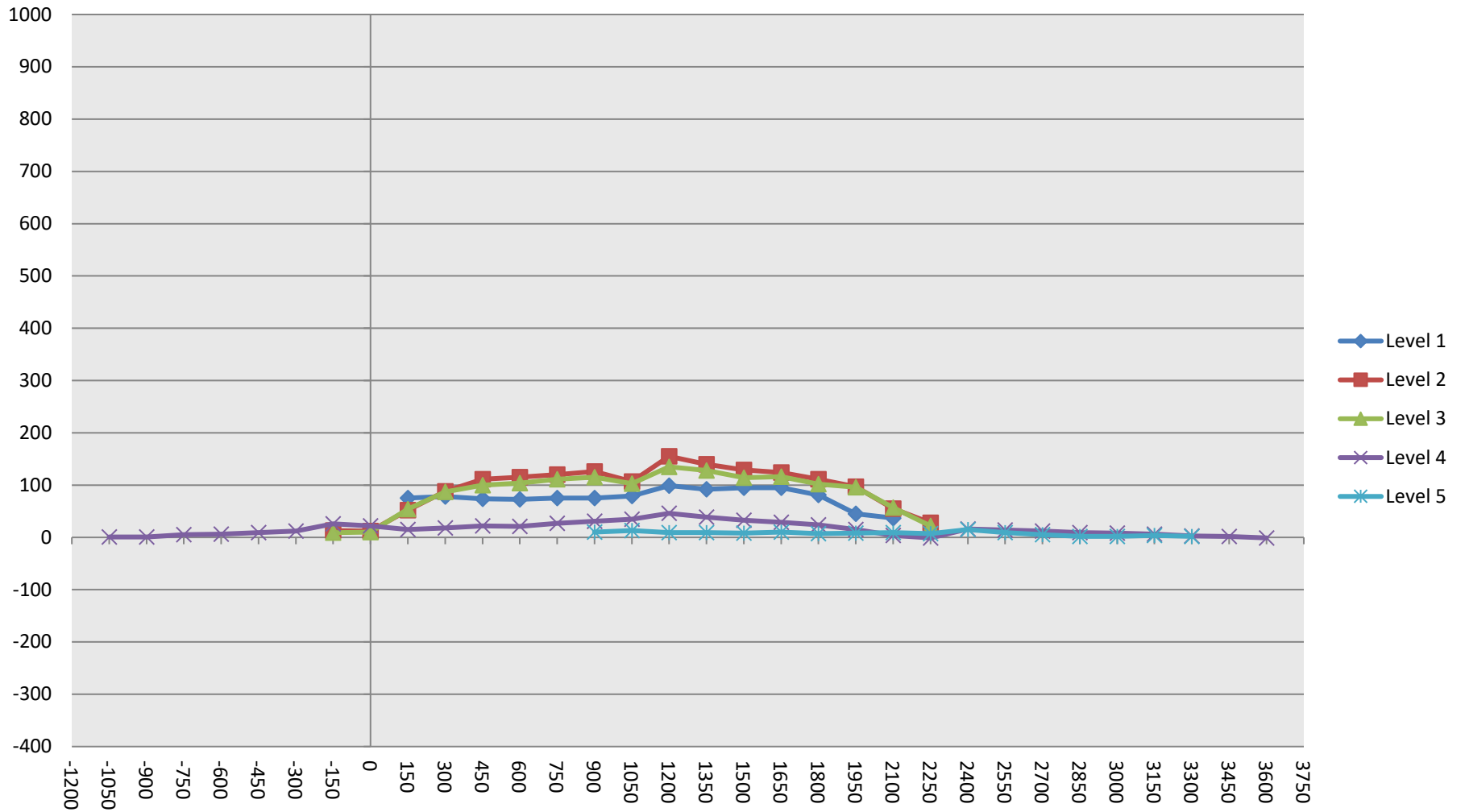
	Pre-Test					Post-Test					Exterior Crush				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-2100															
-1950															
-1800															
-1650															
-1500															
-1350															
-1200															
-1050				260					261					1	
-900				230					231					1	
-750				206					211					5	
-600				194					200					6	
-450				180					189					9	
-300				170					182					12	
-150		79	80	160			92	89	186			13	9	26	
0		83	84	154			95	94	176			12	10	22	
150	117	92	93	147		192	144	147	162		75	52	54	15	
300	124	91	91	142		202	179	178	160		78	88	87	18	
450	134	88	88	136		208	199	188	158		74	111	100	22	
600	133	85	85	131		206	200	189	152		73	115	104	21	
750	131	83	83	128		206	203	194	155		75	120	111	27	
900	130	82	82	123	392	205	208	197	154	402	75	126	115	31	10
1050	130	80	80	122	378	209	187	183	157	391	79	107	103	35	13
1200	129	80	80	120	371	228	235	215	166	380	99	155	135	46	9
1350	129	80	80	118	371	221	220	208	157	380	92	140	128	39	9
1500	128	80	80	116	370	223	209	194	149	378	95	129	114	33	8
1650	129	81	81	115	369	224	205	197	144	379	95	124	116	29	10
1800	130	83	83	116	369	211	194	185	140	376	81	111	102	24	7
1950	132	86	86	117	370	177	183	182	132	378	45	97	96	15	8
2100	127	82	83	120	371	164	137	140	124	380	37	55	57	4	9
2250		82	81	123	374		110	103	122	381		28	22	-1	7
2400				127	377				143	392				16	15
2550				132	382				146	391				14	9
2700				138	387				150	392				12	5
2850				146	394				155	396				9	2
3000				154	402				162	404				8	2
3150				164	411				170	415				6	4
3300				175	421				178	423				3	2
3450				189					191					2	
3600				207					206					-1	
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 Jeep Wagoneer 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

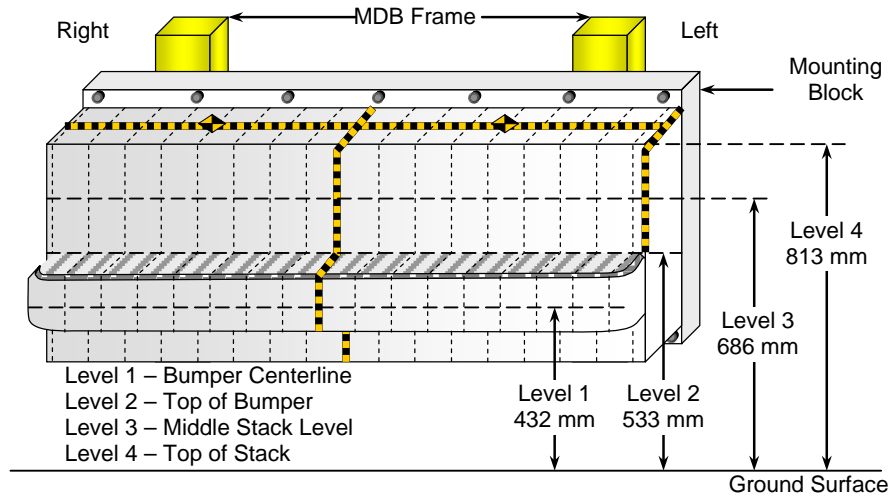
NHTSA No.: M20230307  
 Test Date: 8/10/2023



**DATA SHEET NO. 12**  
**MDB EXTERIOR STATIC CRUSH MEASUREMENTS**

Test Vehicle: 2023 Jeep Wagoneer 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20230307  
 Test Date: 8/10/2023



**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	Right	285
B	Top of Bumper	533	500	Left	198
C	Mid-Level	686	800	Right	197
D	Top of Stack	813	800	Right	208

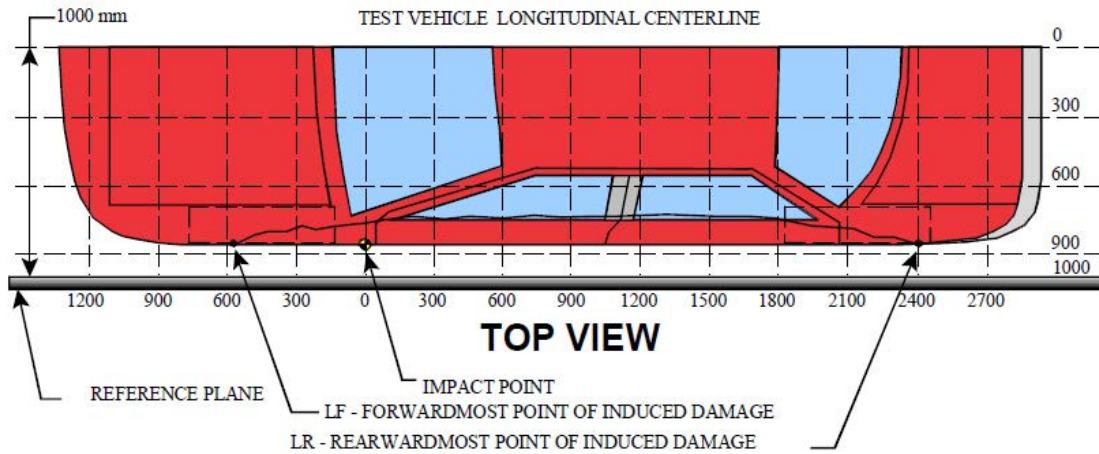
**DEFORMABLE BARRIER STATIC CRUSH**

Stack Level	Distance Right of Center (mm)								C <sub>L</sub>	Distance Left of Center (mm)							
	800	700	600	500	400	300	200	100		0	100	200	300	400	500	600	700
4	208	185	171	167	161	158	184	171	144	129	125	126	128	146	166	175	194
3	197	170	145	133	134	157	173	155	145	133	122	114	114	116	125	137	166
2	193	191	193	197	197	195	193	193	190	191	195	193	197	198	197	196	194
1	284	285	278	276	273	268	263	260	254	254	252	248	243	243	243	249	234

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

Test Vehicle: 2023 Jeep Wagoneer 5-Door SUV  
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20230307  
Test Date: 8/10/2023



**VEHICLE DAMAGE PROFILE DISTANCES**

DPD	Distance from Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Max. Static Crush (mm)
1	2250	3	103	81	22
2	1810	3	185	83	102
3	1370	3	198	80	118
4	930	3	195	82	113
5	490	3	184	87	97
6	50	3	96	87	9

**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	760	476	284
2	480 mm right of center	1	739	463	276
3	160 mm right of center	1	724	463	261
4	160 mm left of center	1	713	463	250
5	480 mm left of center	1	710	463	247
6	800 mm left of center	1	710	476	234

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

Test Vehicle: 2023 Jeep Wagoneer 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

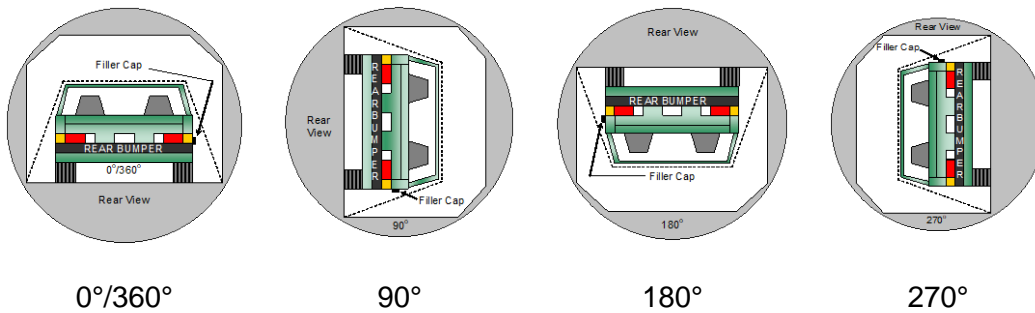
NHTSA No.: M20230307  
 Test Date: 8/10/2023

Test Time: 12:02 pm

Temperature: 22.0°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°	94	300	394
90° to 180°	90	300	390
180° to 270°	82	300	382
270° to 360°	87	300	387

**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	

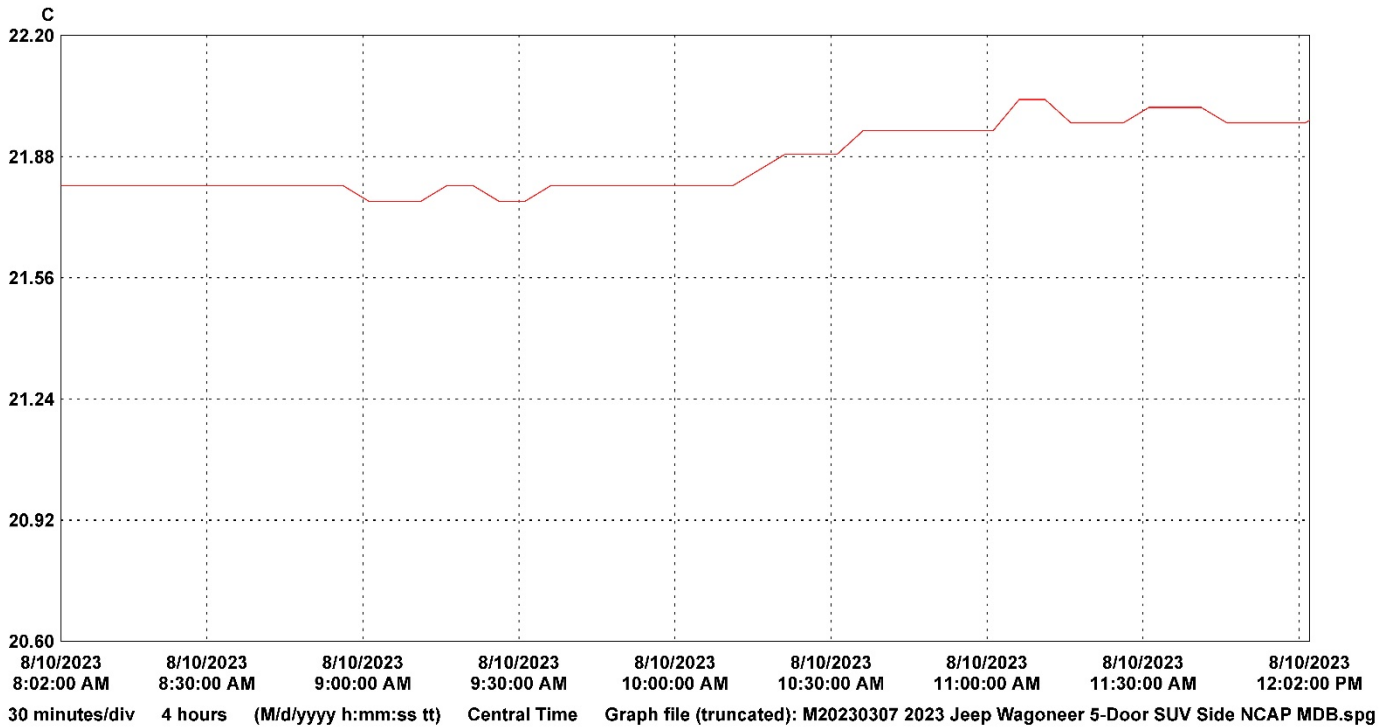
**ROLLOVER SOLVENT SPILLAGE LOCATION TABLE**

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 Jeep Wagoneer 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20230307  
 Test Date: 8/10/2023



LN	Serial #	Description	CH	Value	Maximum	Average	Minimum	Units	CH description	Logger file
1	17162078	VSC_North_Hall 1	1		22.03	21.87	21.76	C	Temperature	C:\Users\bfischer\Desktop\17162078_VSC_North_Hall.spl

**APPENDIX A  
PHOTOGRAPHS**

## TABLE OF PHOTOGRAPHS

		<u>Page No.</u>
Photo No. 001	As Delivered Right Front Three-Quarter View of Test Vehicle	A-1
Photo No. 002	As Delivered Left Rear Three-Quarter View of Test Vehicle	A-1
Photo No. 003	Pre-Test Frontal View of Test Vehicle	A-2
Photo No. 004	Post-Test Frontal View of Test Vehicle	A-2
Photo No. 005	Pre-Test Left Front Three-Quarter View of Test Vehicle	A-3
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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

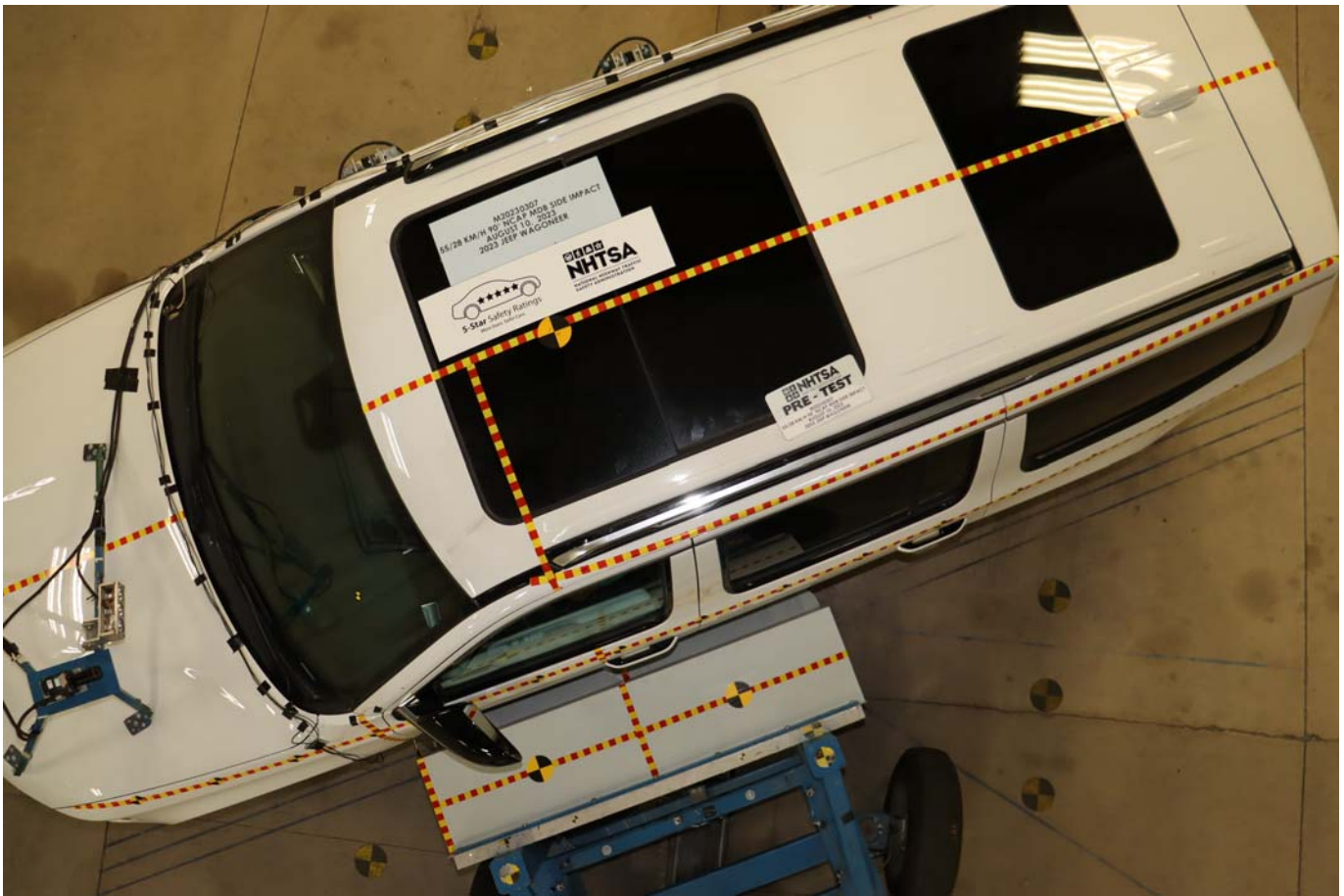


Photo No. 015 - Pre-Test Overhead View of Test Area



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

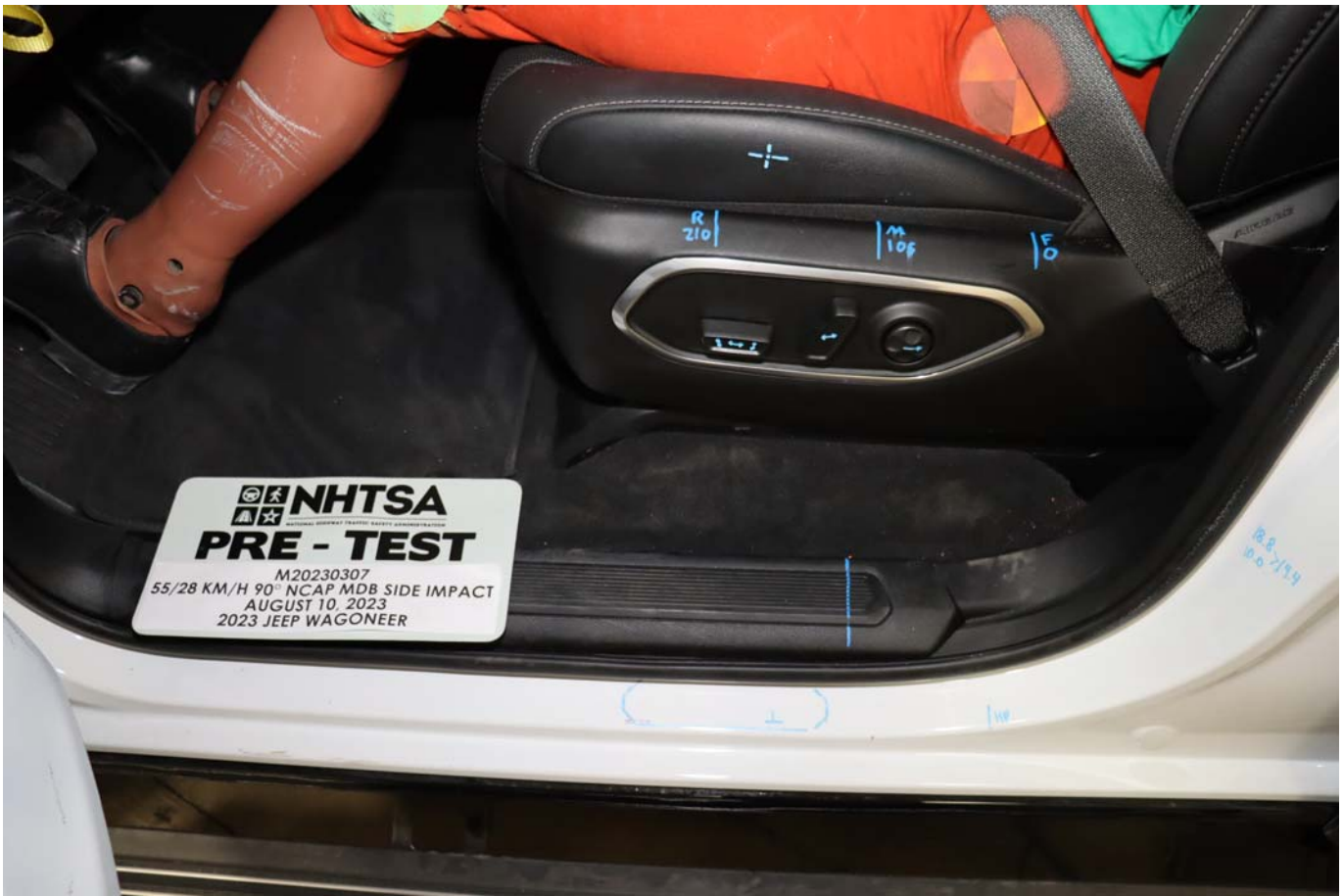


Photo No. 039 - Pre-Test Close-Up Left Side View of Driver Seat Track



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



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

# PHOTOGRAPH NOT APPLICABLE

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

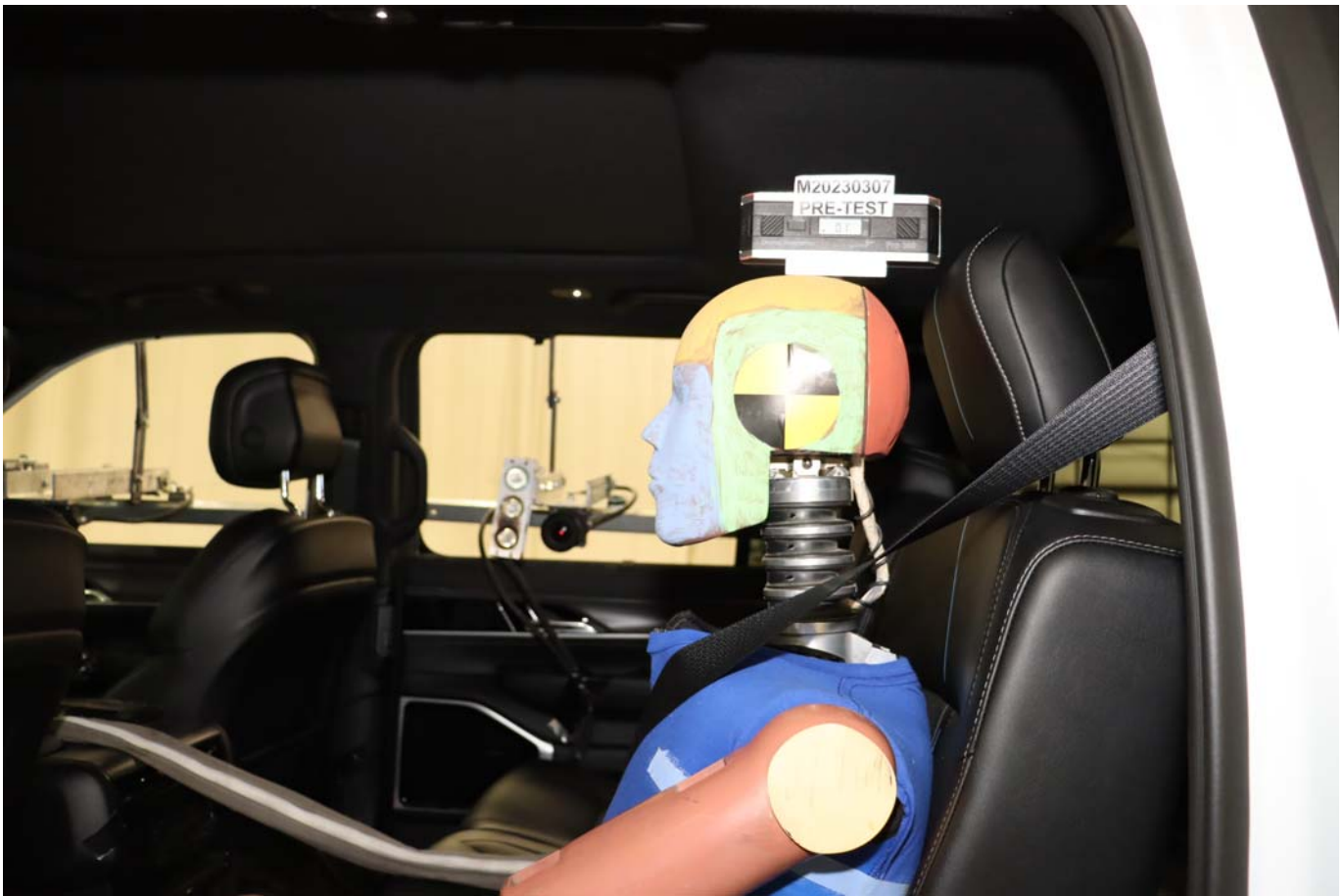


Photo No. 063 - Pre-Test View of Rear Passenger Dummy's Head Showing Dummy's Head is Level



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

**PHOTOGRAPH NOT APPLICABLE**

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



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

**PHOTOGRAPH NOT APPLICABLE**

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



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



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



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



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

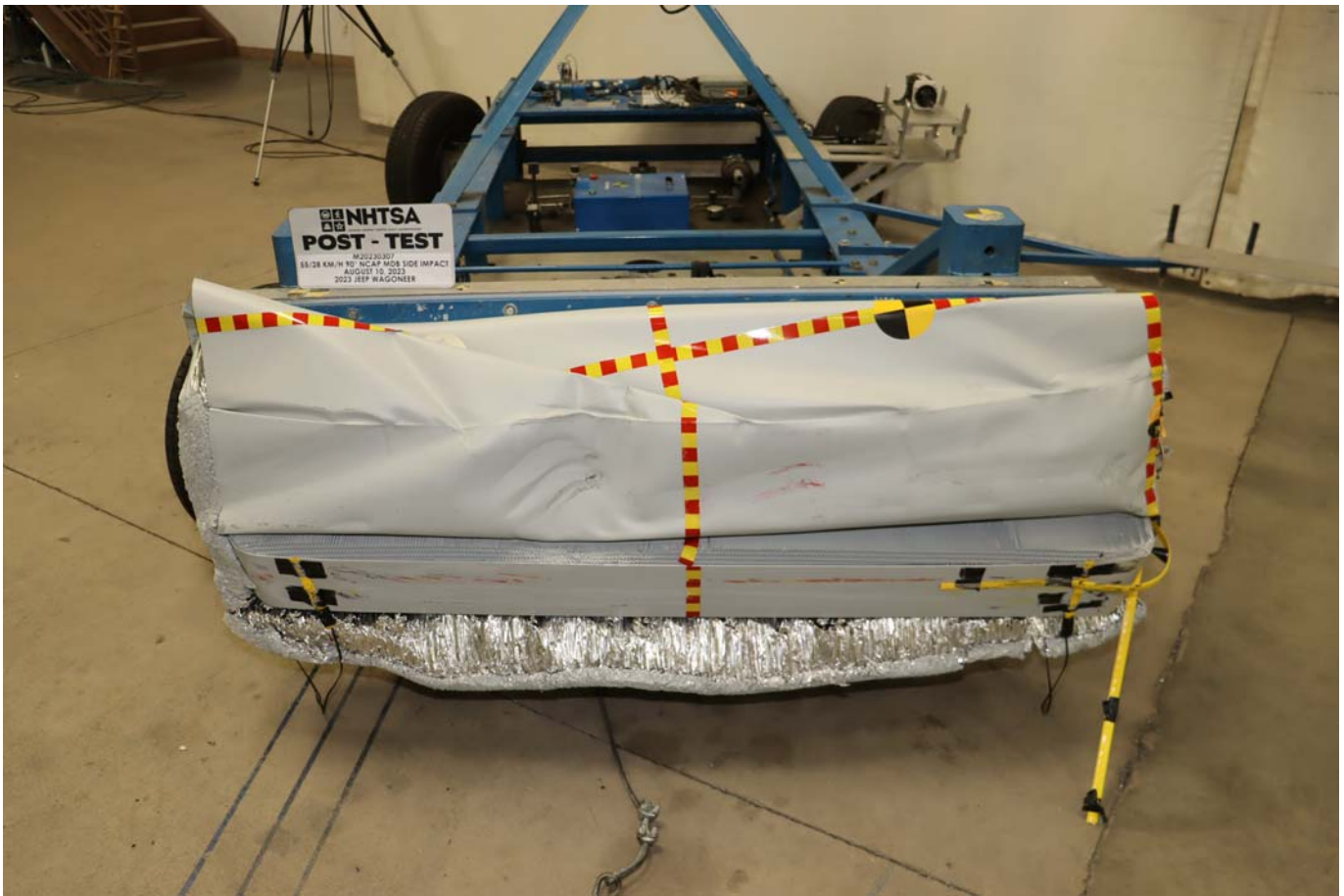


Photo No. 085 - Post-Test Front View of MDB Impactor Face



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



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



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



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



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



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



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



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



Photo No. 094 - Pre-Test Ballast View



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

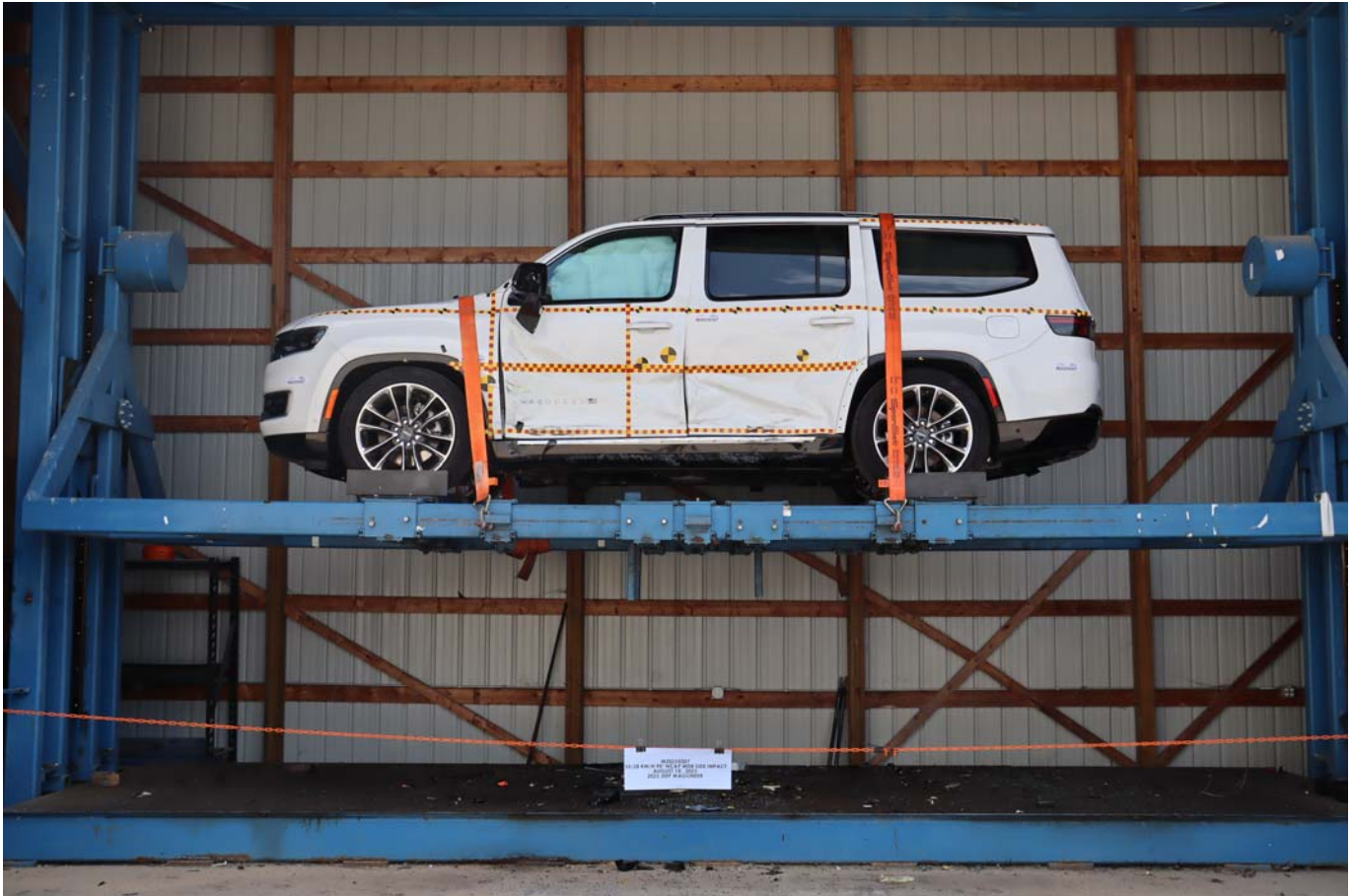


Photo No. 096 - FMVSS Photo No. 301 Static Rollover 0 Degrees



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



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

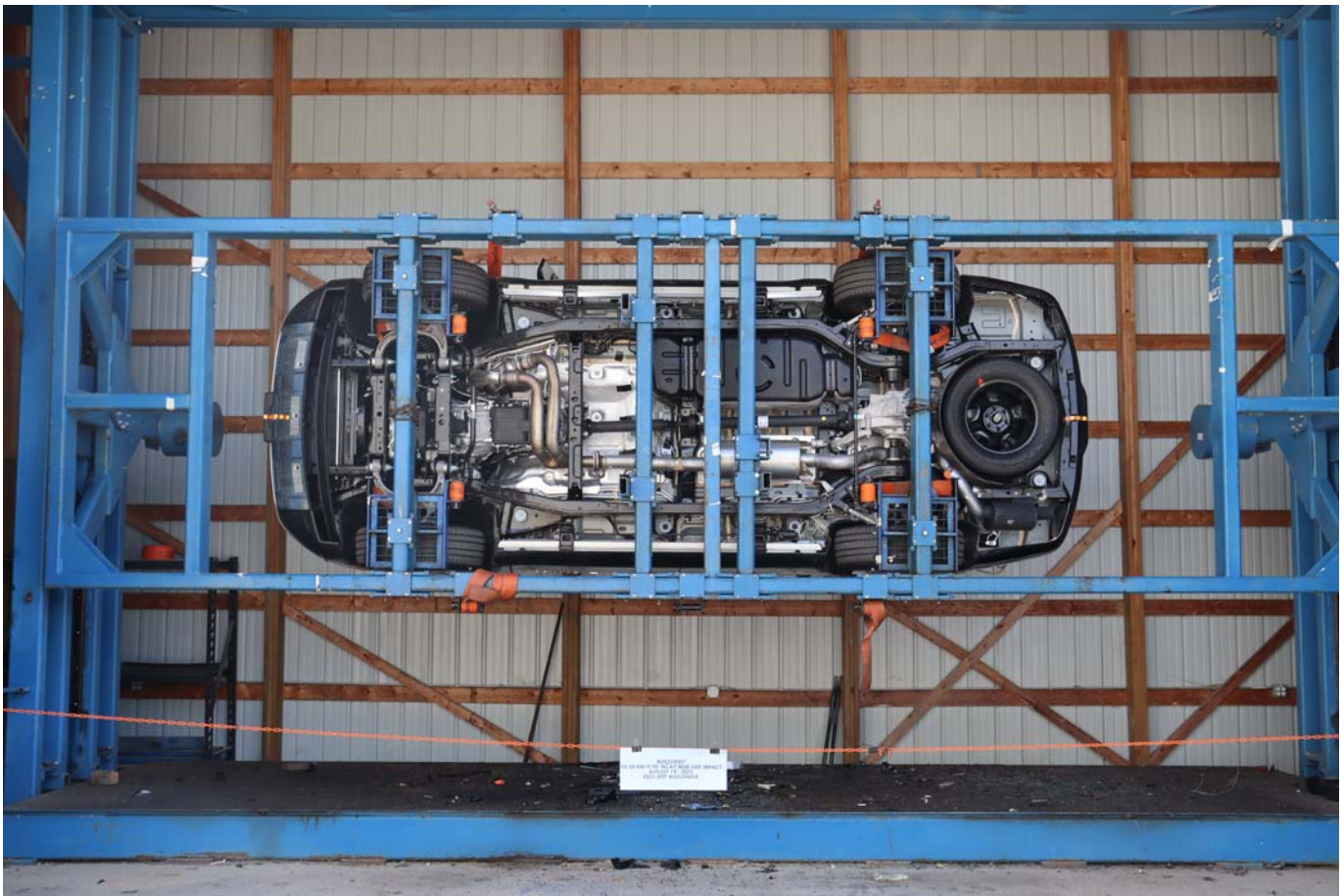


Photo No. 099 - FMVSS Photo No. 301 Static Rollover 270 Degrees

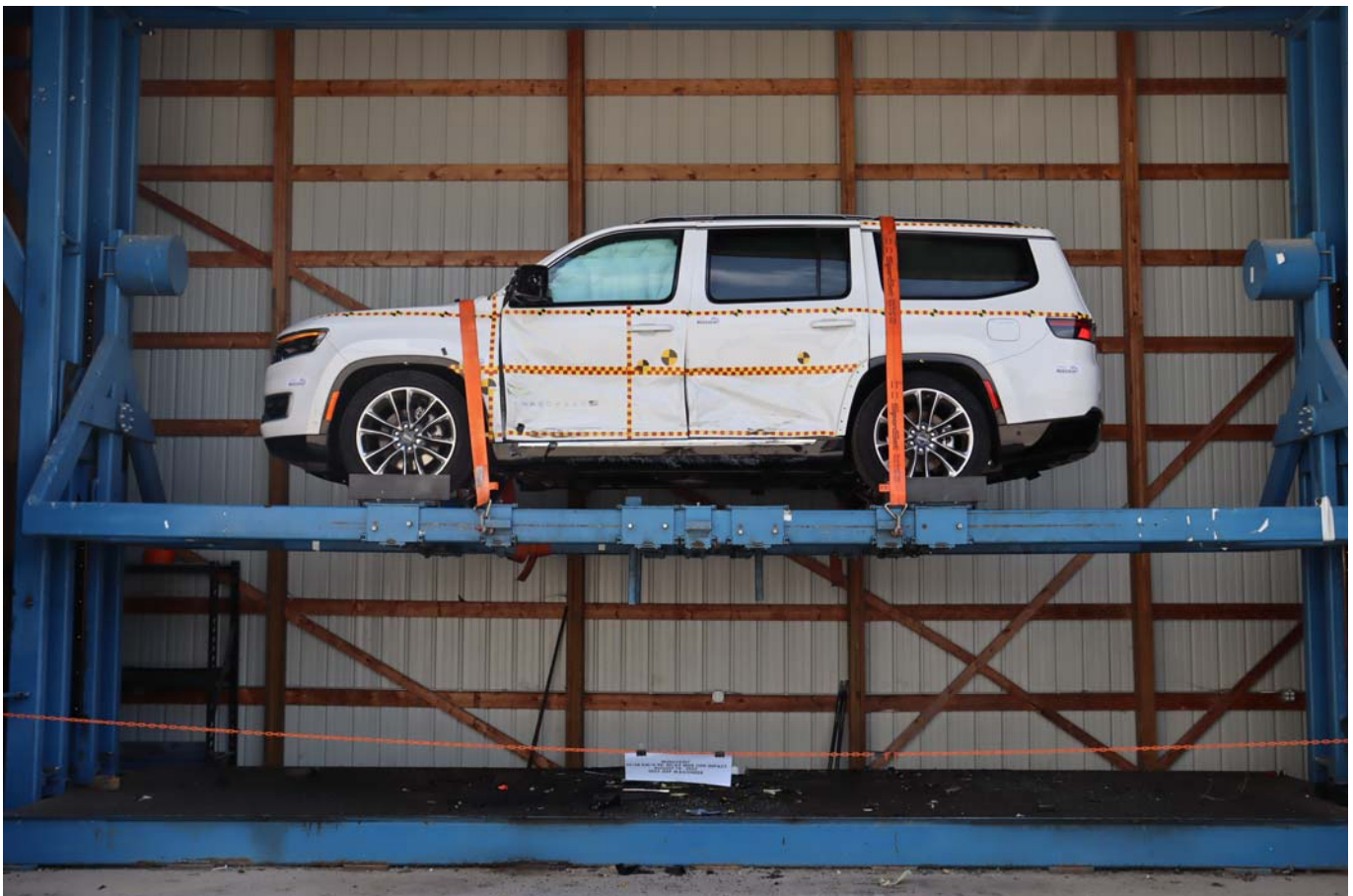


Photo No. 100 - FMVSS Photo No. 301 Static Rollover 360 Degrees



Photo No. 101 - Impact Event

2023 MODEL YEAR  
**WAGONEER SERIES III 4X2**

THIS VEHICLE IS MANUFACTURED TO MEET SPECIFIC UNITED STATES REQUIREMENTS. THIS VEHICLE IS NOT MANUFACTURED FOR SALE OR REGISTRATION OUTSIDE OF THE UNITED STATES.

MANUFACTURER'S SUGGESTED RETAIL PRICE OF THIS MODEL INCLUDING DEALER PREPARATION

Base Price: **\$71,220**

**JEEP WAGONEER SERIES III 4X2**  
 Exterior Color: Bright White Clear-Coat Exterior Paint  
 Interior Color: Global Black Interior Color  
 Interior: Nappa Leather-Trimmed Seats  
 Engine: Hurricane Twin Turbo with Stop/Start  
 Transmission: 8-Speed Automatic 8HP75 Transmission with ERS

STANDARD EQUIPMENT (UNLESS REPLACED BY OPTIONAL EQUIPMENT)

**FUNCTIONAL/SAFETY FEATURES**  
 Wagoneer Client Services  
 Trac-Lok® Anti-Spin Rear Differential  
 Anti-Lock 4-Wheel Disc Brakes  
 Remote-Start System  
 Adaptive Cruise-Control with Stop and Go  
 Active Lane-Management System  
 Full-Speed Forward-Collision Warning Plus  
 ParkView® Rear Back-Up Camera  
 ParkSense® Front and Rear Park-Assist with Stop  
 Blind-Spot and Rear Cross-Path Detection  
 Pedestrian Emergency-Braking  
 Electronic Stability Control  
 Hill-Start Assist  
 Selectable Tire Fill Alert  
 Security Alarm  
 Power-Adjustable Pedals with Memory  
 Sentry Key® Theft-Deterrent System  
 Rain-Sensitive Windshield Wipers

**INTERIOR FEATURES**  
 Uconnect® 5 Nav with 10.1-Inch Touch Screen Display  
 10.25-Inch Cluster Display  
 Apple CarPlay®  
 Google Android Auto™  
 4G LTE Wi-Fi Hot Spot with Trial Included  
 GPS Navigation  
 SiriusXM® 360L with 6-Month Sub Call 800-643-2112  
 Wagoneer Connect (Connected Services) with Trial  
 Alpine 9-Speaker System with Subwoofer  
 Wireless Charging-Pad  
 Air Conditioning with 3-Zone Automatic Temp Control  
 Ambient LED Interior Lighting  
 Heated Steering Wheel  
 Ventilated Front Seats  
 Heated Front Seats  
 Heated Second-Row Seats  
 8-Way Power Adjustable Driver Seat  
 8-Way Power Adjustable Front Passenger Seat  
 3rd-Row Seat with 60/40 Manual Fold/Recline  
 8-Passenger Seating

**EXTERIOR FEATURES**  
 20.0-Inch x 9.0-Inch Aluminum Wheels

LED Headlamps  
 Automatic High-Beam Headlamp  
 Heated Exterior Mirrors  
 Body Side-Steps  
 Hands-Free Power Liftgate  
 7-and 4-Pin Wiring Harness  
 Class IV Receiver-Hitch

**OPTIONAL EQUIPMENT (May Replace Standard Equipment)**

**Customer Preferred Package 25M** \$2,395

Convenience Group  
 2nd-Row Manual Window-Shades  
 360 Surround-View Camera  
 Drowsy Driver Detection  
 Parallel and Perpendicular Park-Assist with Stop  
 Intersection Collision Assist System  
 Traffic Sign Recognition  
 Preferred Equipment Group  
 3rd-Row Seat with 60/40 Power Fold/Recline  
 Head-Up Display

**Premium Group** \$5,995

285/45R22XL BSW All-Season Tires  
 Pirelli Brand Tires  
 Reversible Cargo Mat  
 Luxury Front and Rear Floor Mats  
 Foldable Cargo Shade  
 Tri-Pane Panoramic Sunroof  
 Power Deployable Running Boards  
 Adjustable Roof-Rail Crossbars  
 22" Polished Aluminum Wheels w/ Black Noise Pockets  
 McIntosh® MX500 Entertainment Sys with 19 Speakers

**DESTINATION CHARGE** \$2,000

**TOTAL PRICE: \* \$82,205**

**WARRANTY COVERAGE**  
 5-year or 60,000-mile Powertrain Limited Warranty.  
 3-year or 36,000-mile Basic Limited Warranty.  
 Ask Dealer for a copy of the limited warranties or see your owner's manual for details.

**5 YEAR/60,000 MILE  
 POWERTRAIN WARRANTY**

SHIP TO: 48933 47 SOLD TO: 26 4888  
 Original Chrysler Dodge Jeep Ram or  
 14211 JEFFERSON DAVIS HWY  
 WOODBRIDGE VA 22191-2108  
 14211 JEFFERSON DAVIS HWY  
 WOODBRIDGE VA 22191-2108

THIS LABEL IS ADDED TO THIS VEHICLE TO COMPLY WITH FEDERAL LAW. THE LABEL CANNOT BE REMOVED OR ALTERED PRIOR TO DELIVERY TO THE US-LEGAL PURCHASER.

\* STATE AND/OR LOCAL TAXES IF ANY, LICENSE AND TITLE FEES AND DEALER SUPPLIED AND INSTALLED OPTIONS AND ACCESSORIES ARE NOT INCLUDED IN THIS PRICE. DISCOUNT, IF ANY, IS BASED ON PRICE OF OPTION IF PURCHASED SEPARATELY.

For more information visit: [www.wagoneer.com](http://www.wagoneer.com)  
 or call 1-833-677-4825

FCA US LLC

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

Fuel Economy: 20 17 24 MPG  
 combined city/hwy city highway  
 5.0 gallons per 100 miles

You spend **\$3,000** more in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost **\$2,200**

Fuel Economy & Greenhouse Gas Rating (tailpipe only): 4 (Best)

Smog Rating (tailpipe only): 6 (Best)

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 cost \$3,000 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$2.95 per gallon. MPG is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

[fuelconomy.gov](http://fuelconomy.gov)  
 Calculate personalized estimates and compare vehicles

**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.

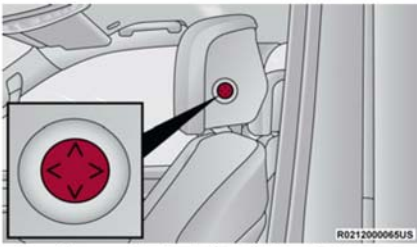
Source: National Highway Traffic Safety Administration (NHTSA)  
[www.safercar.gov](http://www.safercar.gov) or 1-888-327-4236

**PARTS CONTENT INFORMATION FOR VEHICLES IN THIS CARLINE:**  
 U.S./CANADIAN PARTS CONTENT: 60%  
 MAJOR SOURCES OF FOREIGN PARTS CONTENT:  
 MEXICO: 33%  
 NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.

**FOR THIS VEHICLE:**  
 FINAL ASSEMBLY POINT:  
 WARREN, MICHIGAN, U.S.A.  
 COUNTRY OF ORIGIN:  
 ENGINE: MEXICO  
 TRANSMISSION: UNITED STATES

**MOPAR VEHICLE PROTECTION**  
 A PRODUCT OF FCA US LLC  
 Ask for Mopar Vehicle Protection for your vehicle. We built it. We back it.

Photo No. 102 - Monroney Label

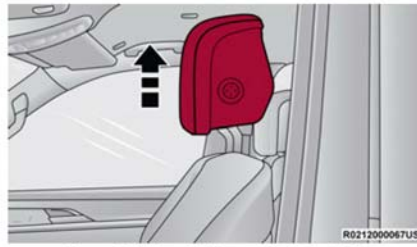


**Wagoneer Head Restraint Adjustment Button**

To adjust the head restraint forward, press the adjustment button on the left side of the head restraint, and pull the top of the head restraint toward the front of the vehicle as desired and release. To adjust the head restraint rearward, press the adjustment button, and push the top of the head restraint toward the rear of the vehicle as desired and release.



**Upright Position (Manual Head Restraint)**



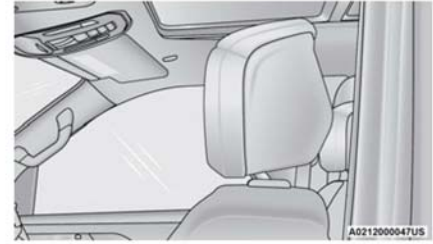
**Upward Adjustment (Manual Head Restraint)**



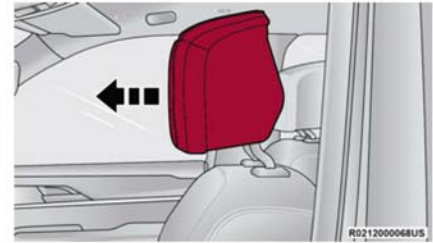
**Grand Wagoneer Head Restraint Adjustment Switch**

If your vehicle is equipped with power front head restraints, push upward or push downward on the head restraint adjustment switch, located on the door trim panel, to raise or lower the head restraint. The head restraint will move in the direction of the switch. Release the switch when the desired position has been reached.

The head restraint can also be adjusted both forward and rearward. Push the head restraint switch forward or rearward. The head restraint will move in the direction of the switch. Release the switch when the desired position has been reached.



**Upright Position (Power Head Restraint)**



**Forward Adjustment (Power Head Restraint)**

2

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

**WARNING!**

- Head restraints should never be adjusted while the vehicle is in motion. Driving a vehicle with the head restraints improperly adjusted or removed could cause serious injury or death in the event of a collision.

The center head restraint has one adjustment position, and can be adjusted up, when the seat is occupied, or down for storage. To adjust this head restraint, push the adjustment button, located on the base of the head restraint, while pulling upward or pushing downward until it locks into place.

**NOTE:**  
The center head restraint is not removable.

**WARNING!**

- Head restraints should never be adjusted while the vehicle is in motion. Driving a vehicle with the head restraints improperly adjusted or removed could cause serious injury or death in the event of a collision.

2

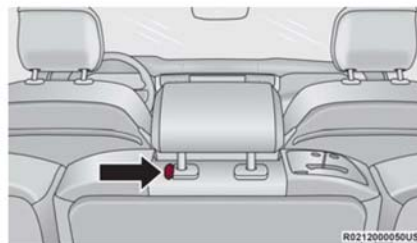
**Head Restraints – Second Row Bench**

If the second row is equipped with a bench seat, the head restraints on the outboard seats are not adjustable or removable. They automatically fold forward when the seatback is folded, and do not return to their normal position when the seatback is raised. After returning the seatback to its upright position after a folding operation, raise the head restraint until it locks in place.

The driver can also fold the second row outboard head restraints through the radio, for improved visibility when the vehicle is in REVERSE, and there are no occupants in the seats.

Press the Headrest Fold button within the Controls menu of the Uconnect system to power fold the second row outboard head restraints.

- NOTE:**
- The head restraints must be raised manually when occupying the second row.
  - Do not fold if there are passengers seated in the second row seats.



**Center Seat Head Restraint Adjustment Button**

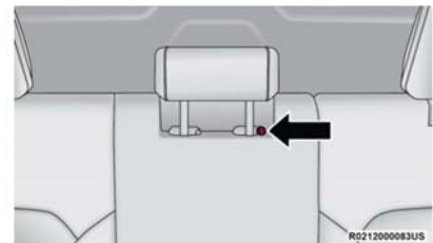
**NOTE:**  
For information on child restraint tethering, see page 256.

**WARNING!**

- All occupants, including the driver, should not operate a vehicle or sit in a vehicle's seat until the head restraints are placed in their proper positions in order to minimize the risk of neck injury in the event of a crash.

**Third Row Head Restraints**

The head restraint in the center position can be raised and lowered for tether routing or height adjustment page 256.



**Center Head Restraint Adjustment Button**

**NOTE:**  
The center head restraint should only be removed by qualified technicians, for service purposes only. If the head restraint requires removal, see an authorized dealer.

(Continued)

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

**APPENDIX B**  
**DUMMY RESPONSE DATA PLOTS**

**TABLE OF DATA PLOTS**  
**Driver Dummy Instrumentation Plots**

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

The following additional data for this test can be obtained from the Research and Development section of the NHTSA website. The website can be found at [www.nhtsa.gov](http://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)

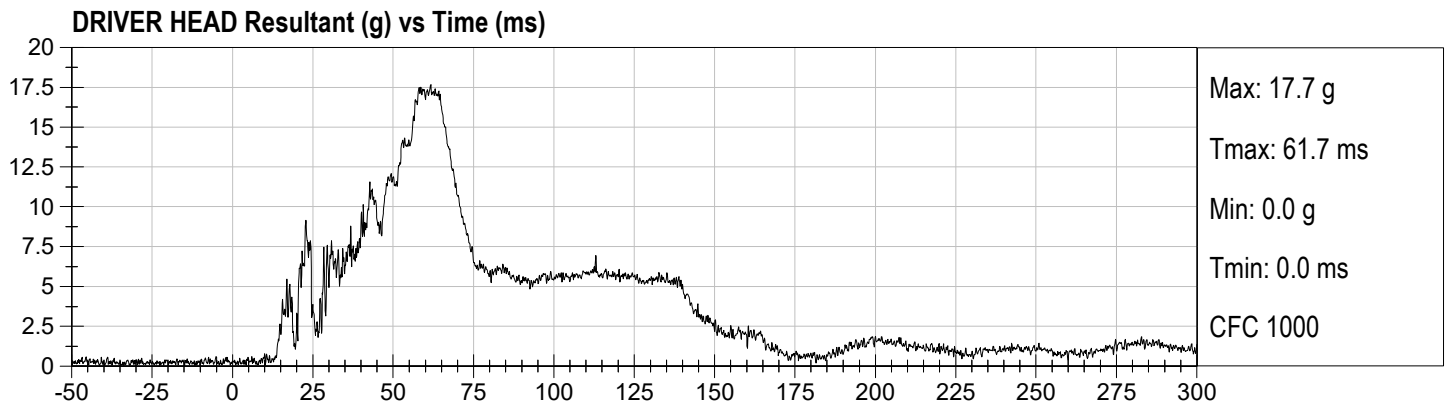
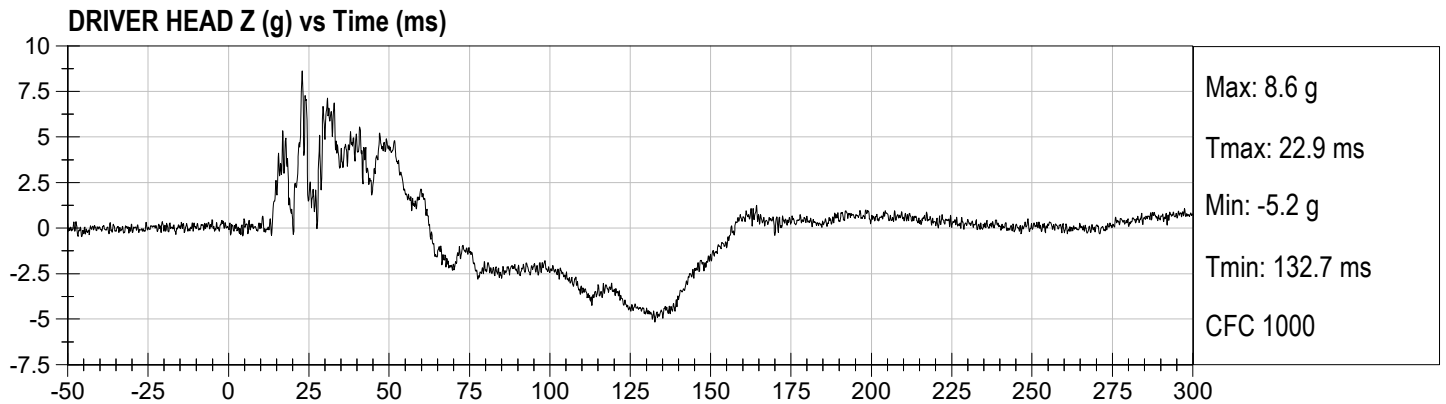
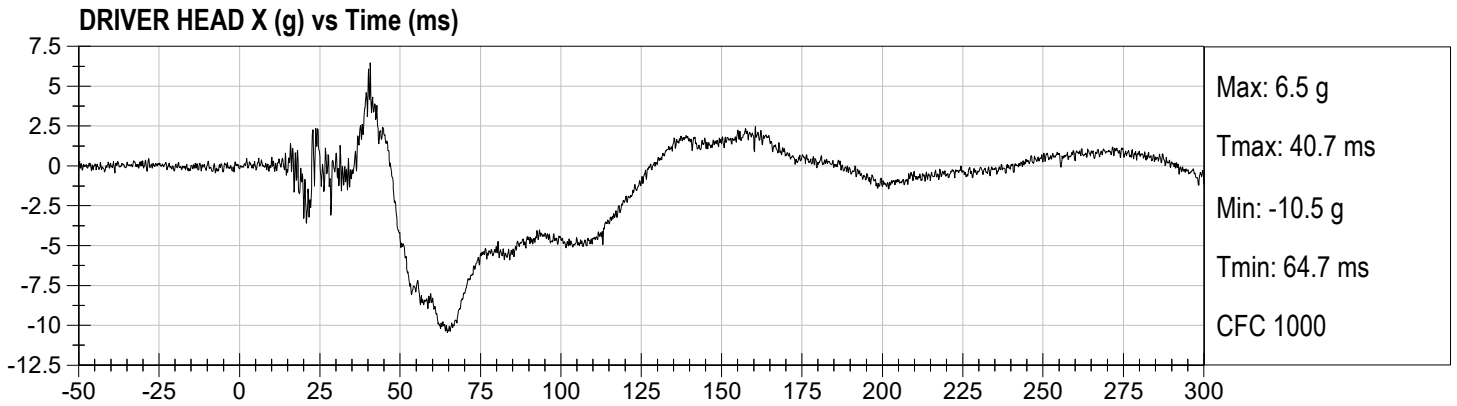
MDB Center of Gravity Acceleration (Z)

MDB Rear Acceleration (X)

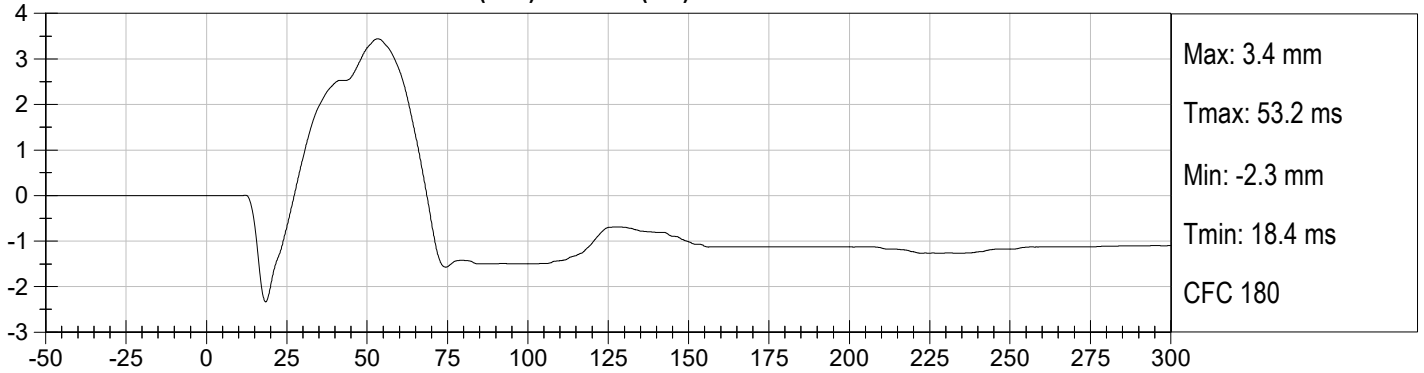
MDB Rear Acceleration (Y)

Left MDB Contact Switch

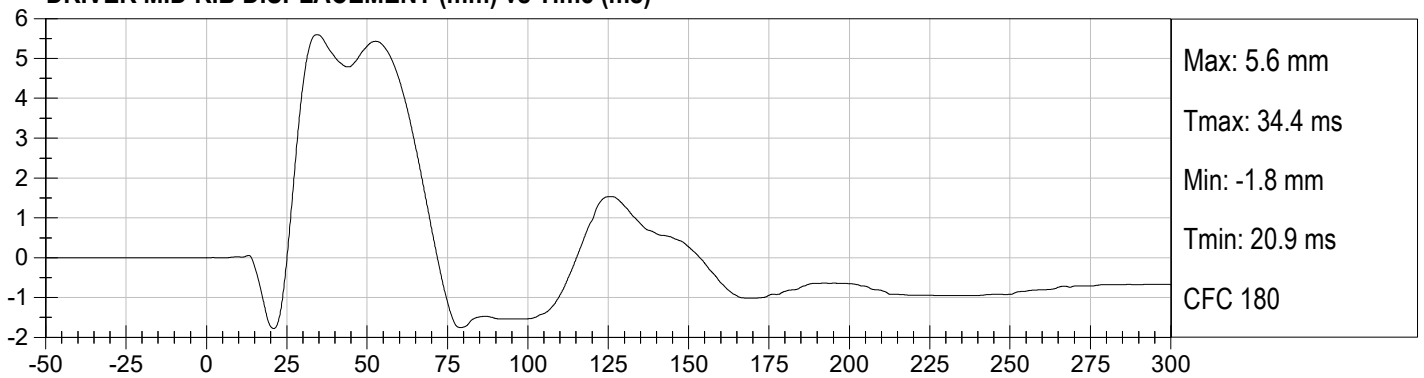
Right MDB Contact Switch



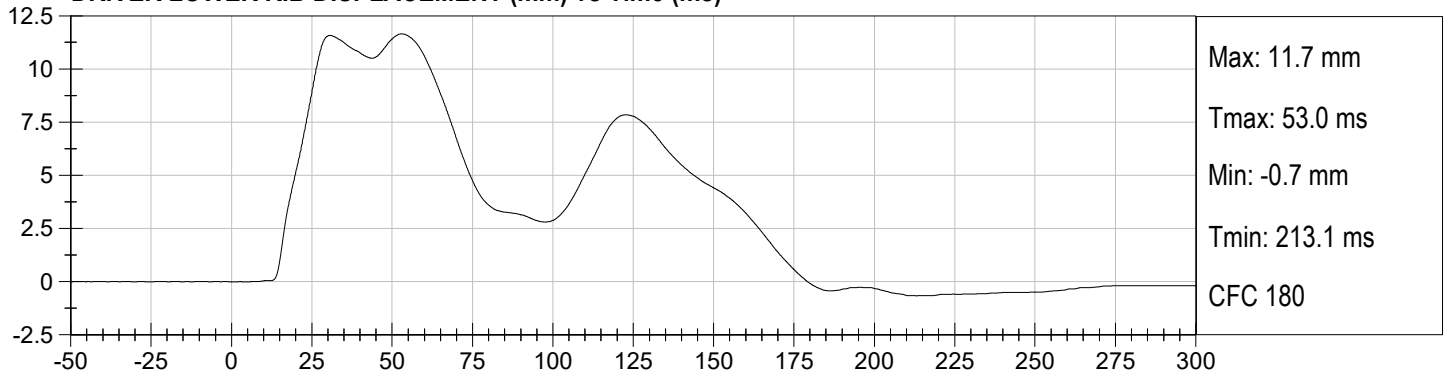
**DRIVER UPPER RIB DISPLACEMENT (mm) vs Time (ms)**



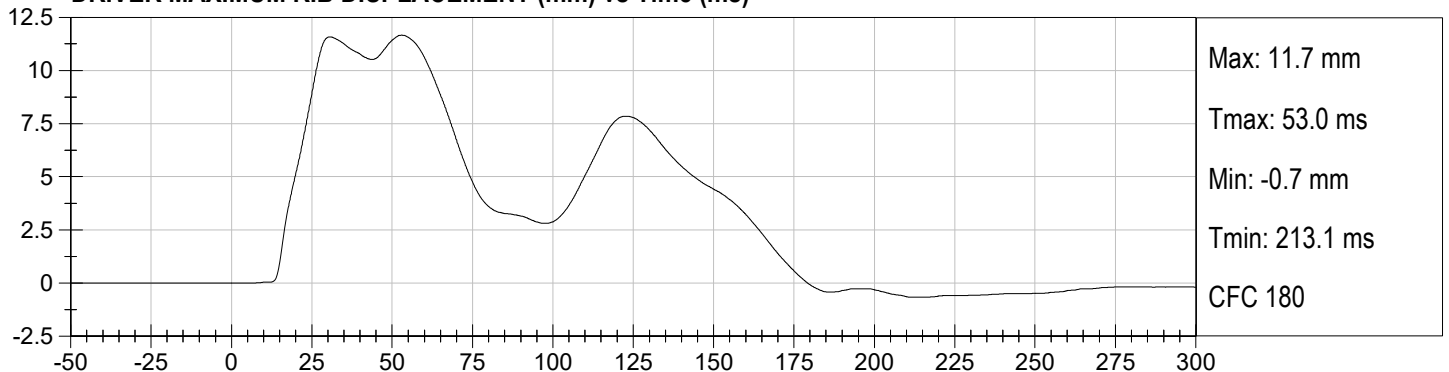
**DRIVER MID RIB DISPLACEMENT (mm) vs Time (ms)**



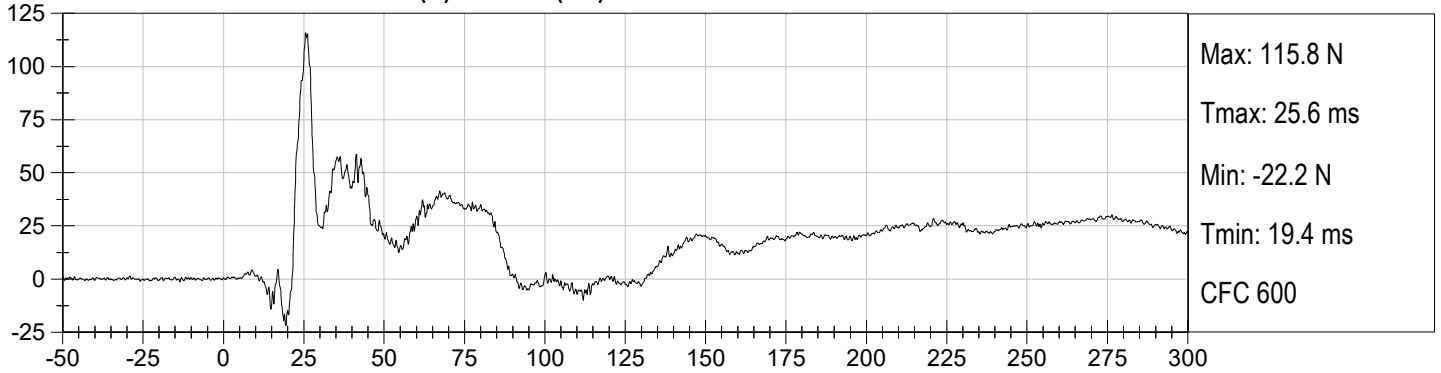
**DRIVER LOWER RIB DISPLACEMENT (mm) vs Time (ms)**



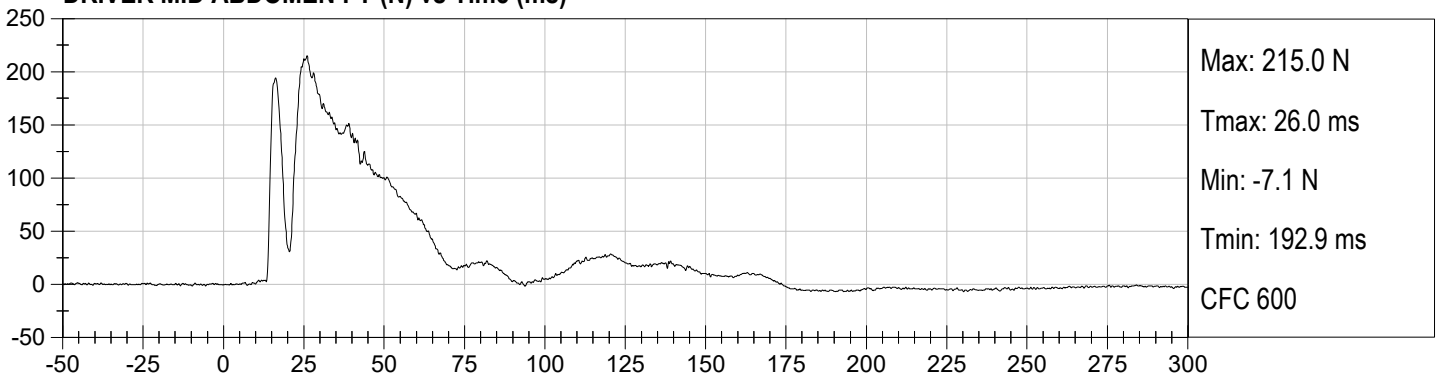
**DRIVER MAXIMUM RIB DISPLACEMENT (mm) vs Time (ms)**



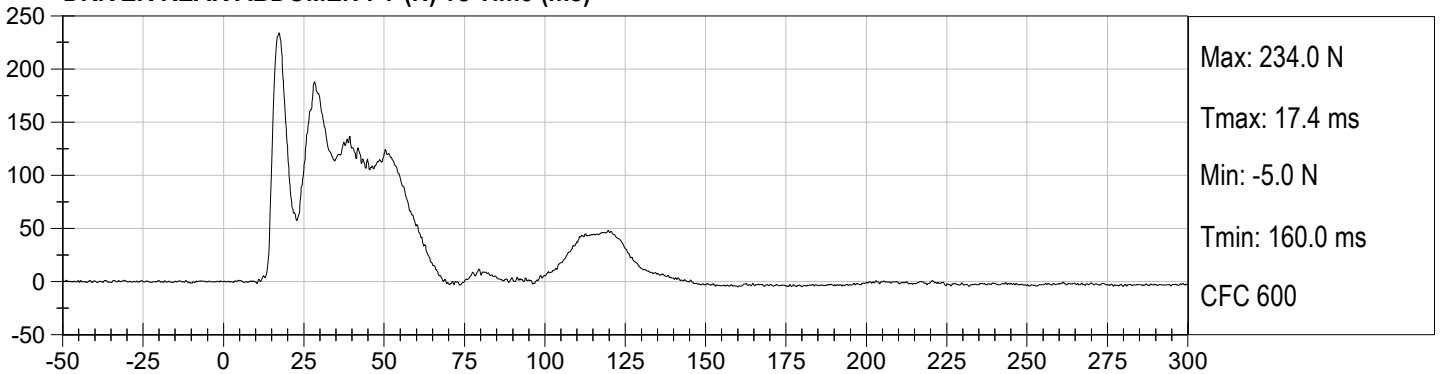
**DRIVER FRONT ABDOMEN FY (N) vs Time (ms)**



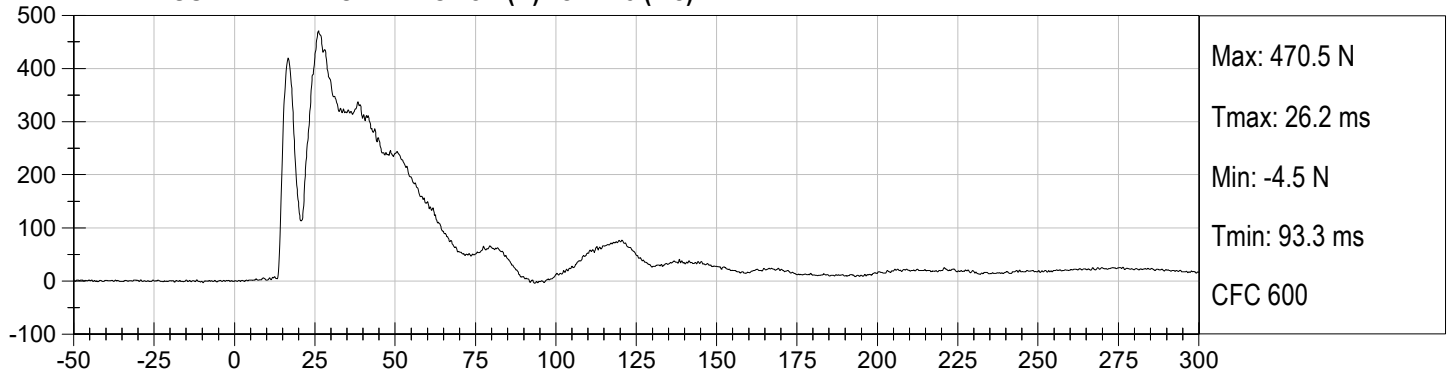
**DRIVER MID ABDOMEN FY (N) vs Time (ms)**

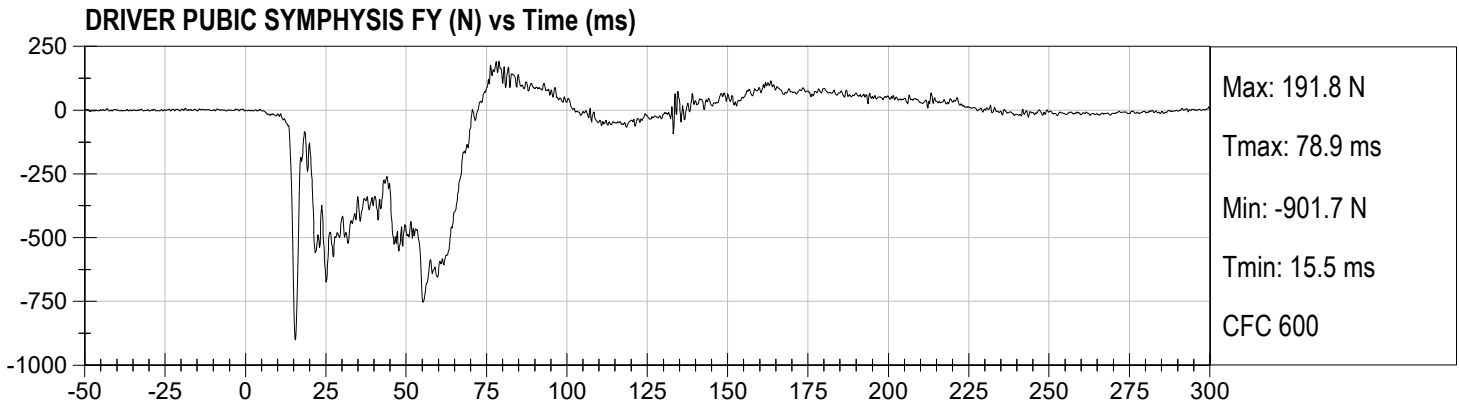


**DRIVER REAR ABDOMEN FY (N) vs Time (ms)**

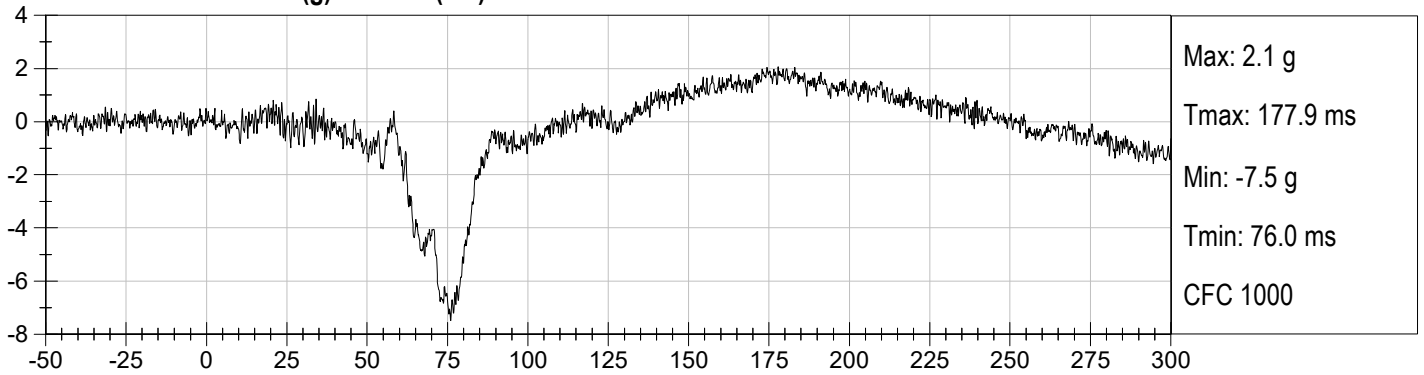


**DRIVER SUMMED ABDOMEN FORCE (N) vs Time (ms)**

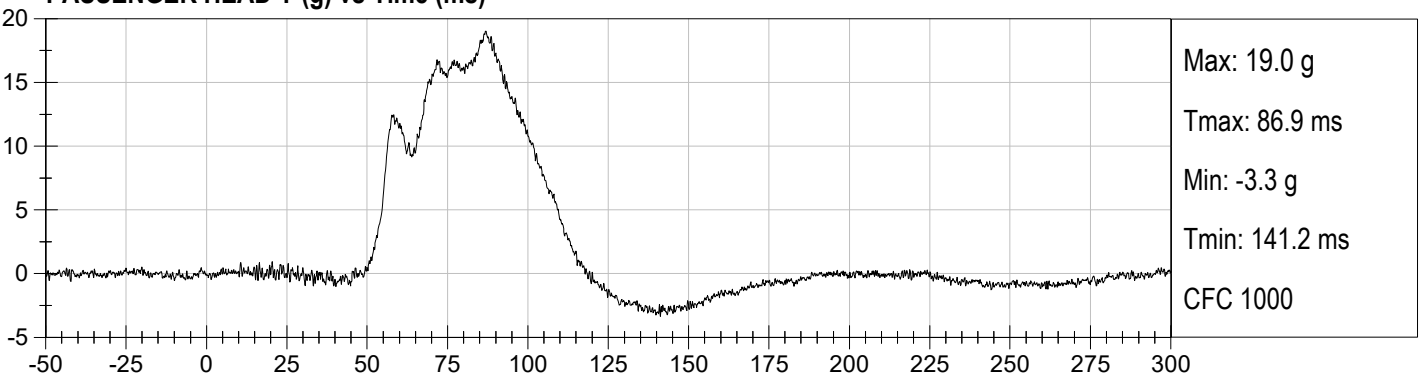




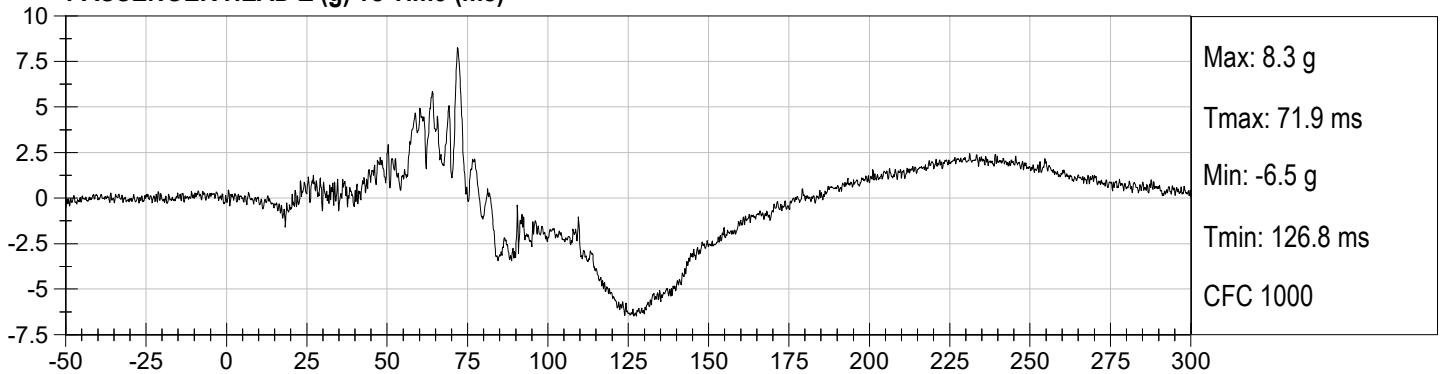
**PASSENGER HEAD X (g) vs Time (ms)**



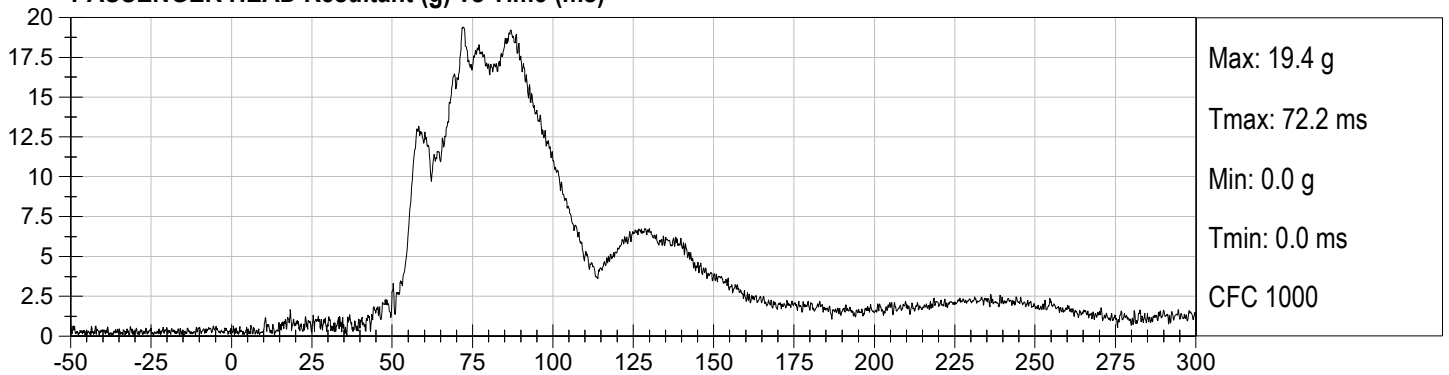
**PASSENGER HEAD Y (g) vs Time (ms)**

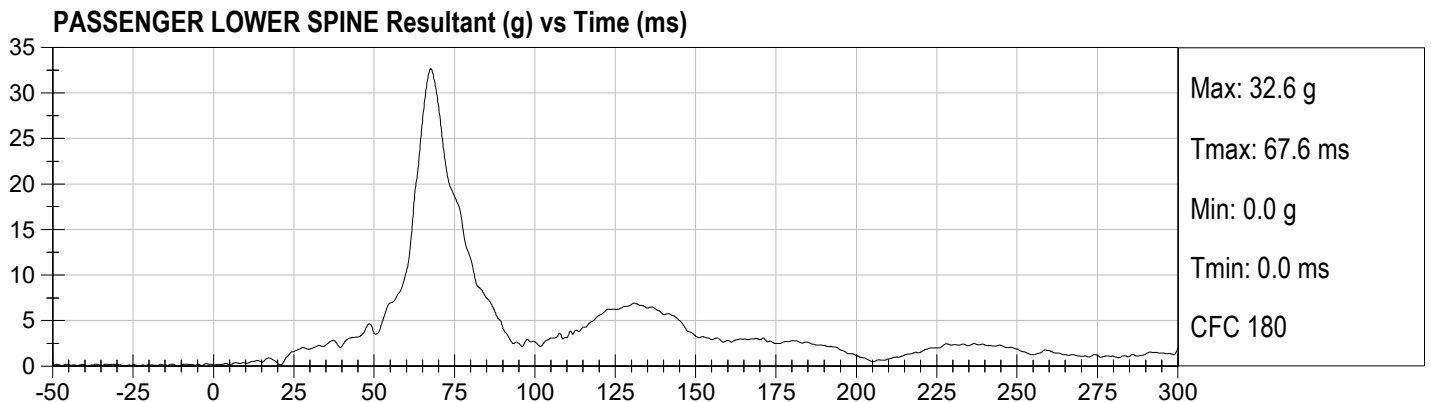
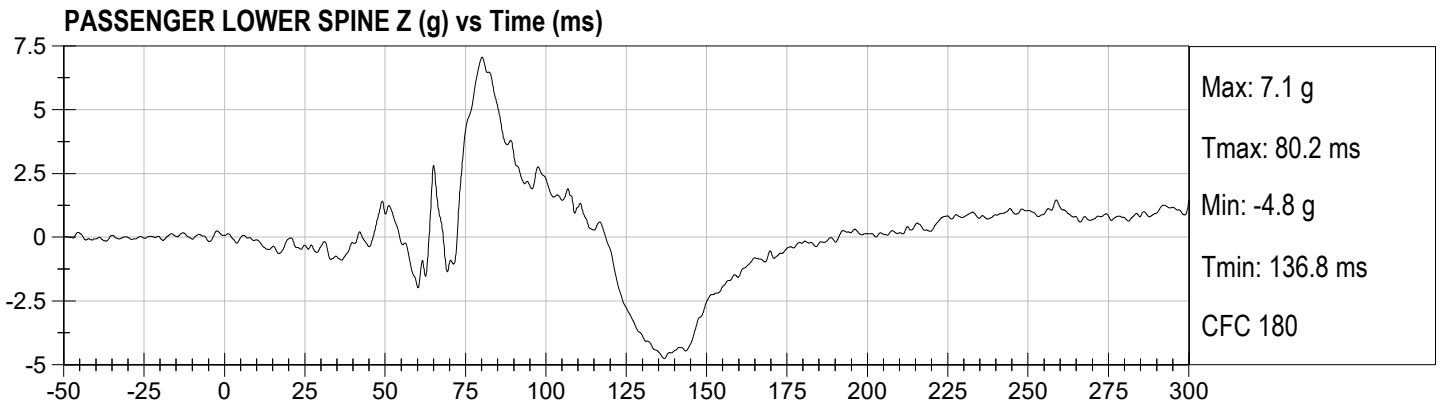
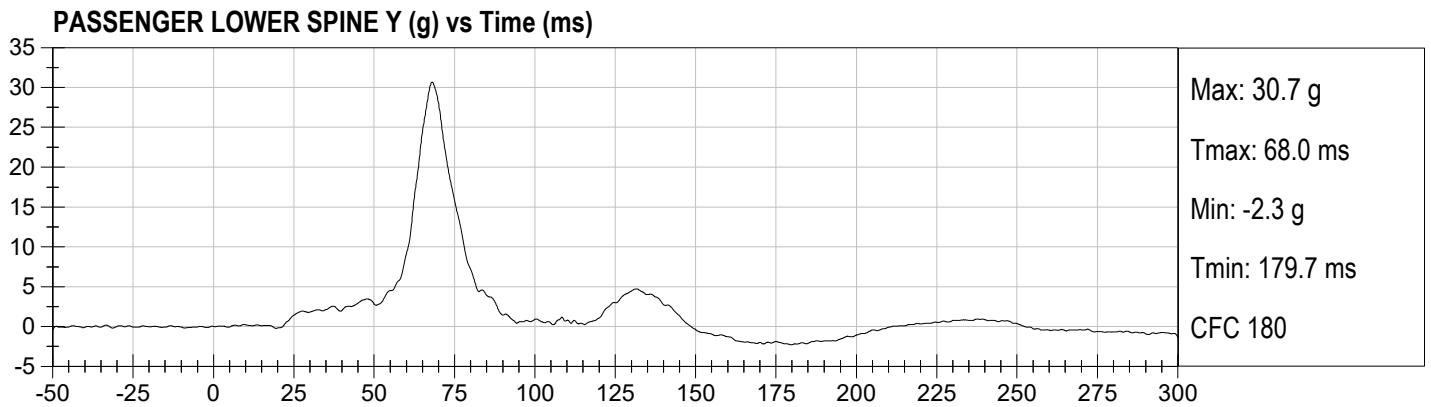
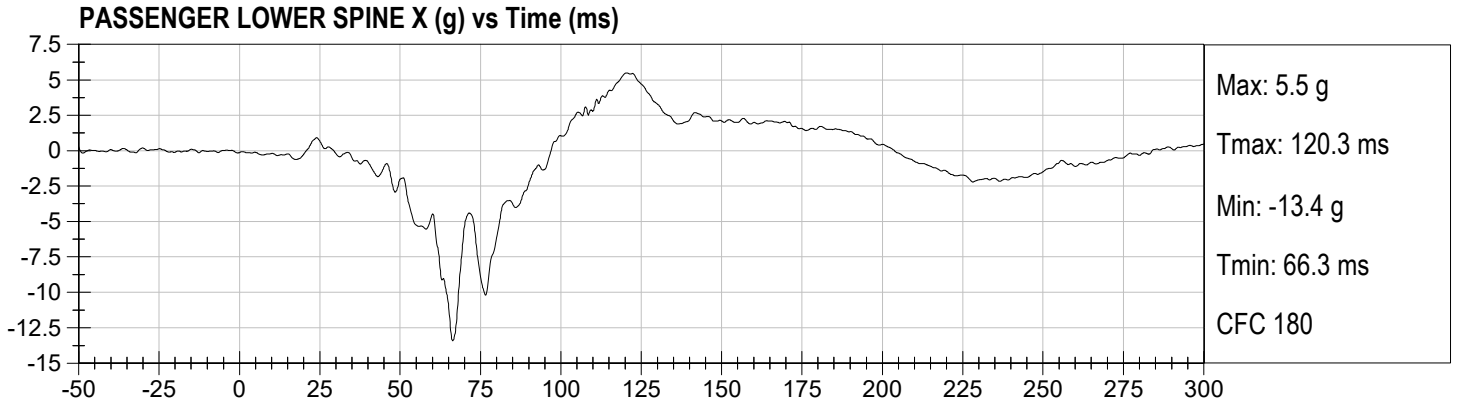


**PASSENGER HEAD Z (g) vs Time (ms)**

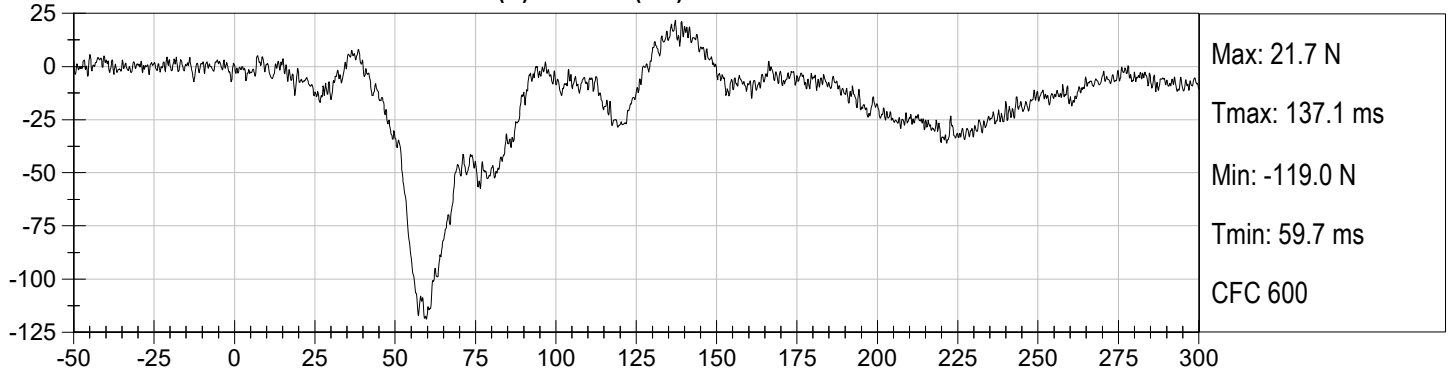


**PASSENGER HEAD Resultant (g) vs Time (ms)**

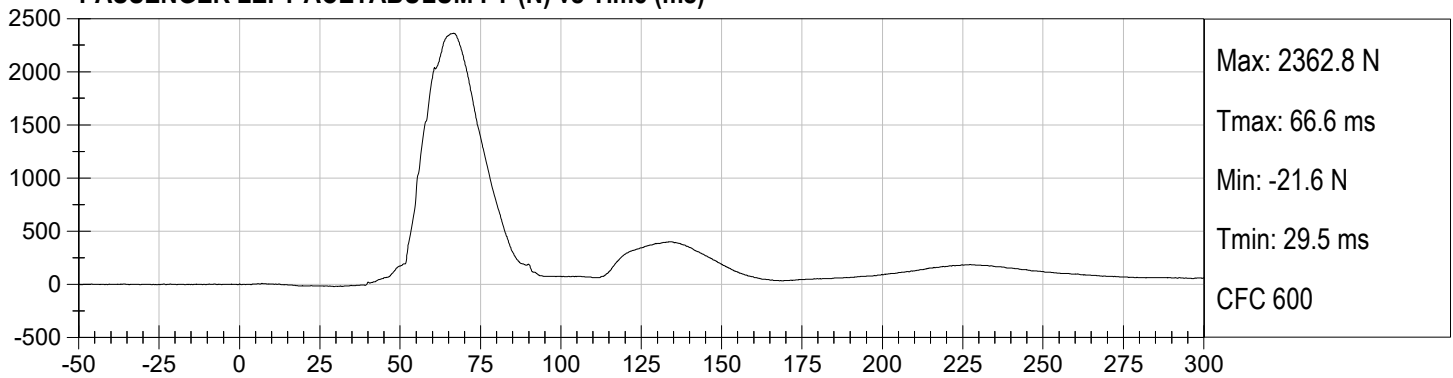




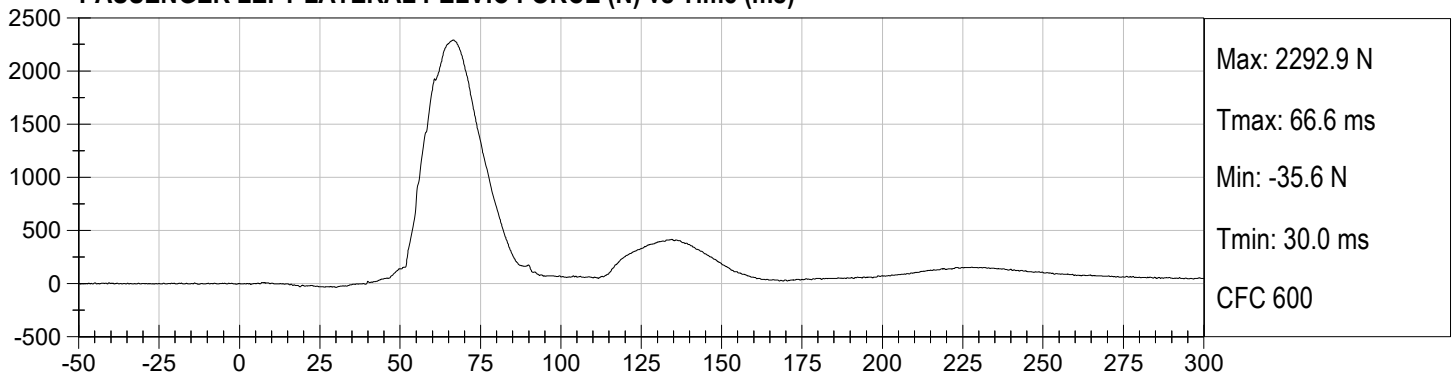
**PASSENGER LEFT ILIUM CREST FY (N) vs Time (ms)**



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



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



**APPENDIX C**  
**DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA**

**CALIBRATION TEST RESULTS**

**PRE-TEST**

**EUROSID 2 (ES-2RE) MALE – DRIVER ATD**

**ES-2re External Measurements  
SN: F032**

<b>No.</b>	<b>Name</b>	<b>Spec. (mm)</b>	<b>Result</b>	<b>Pass/Fail</b>
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**

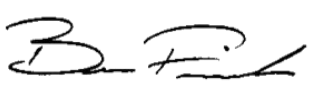
ATD Serial No:       F032      

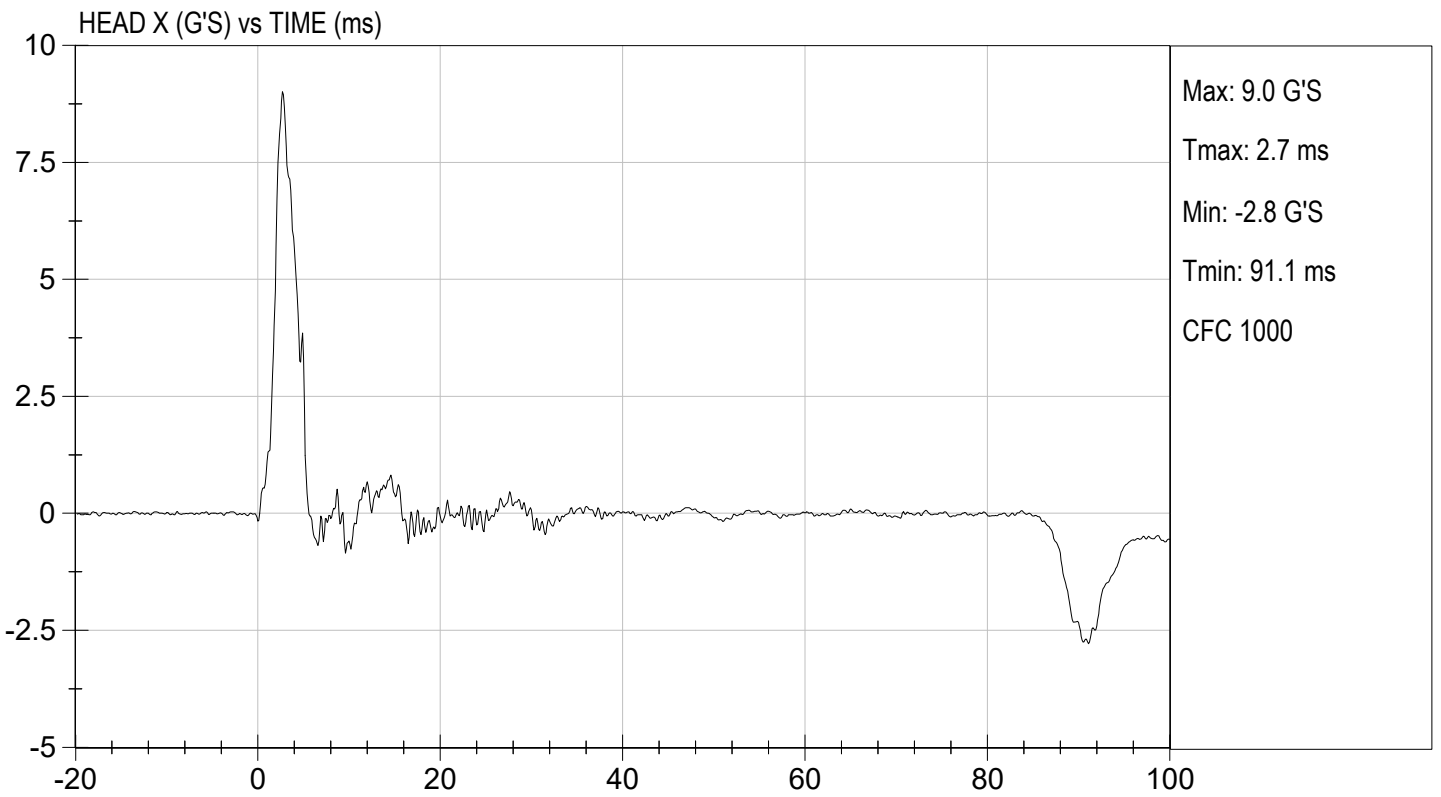
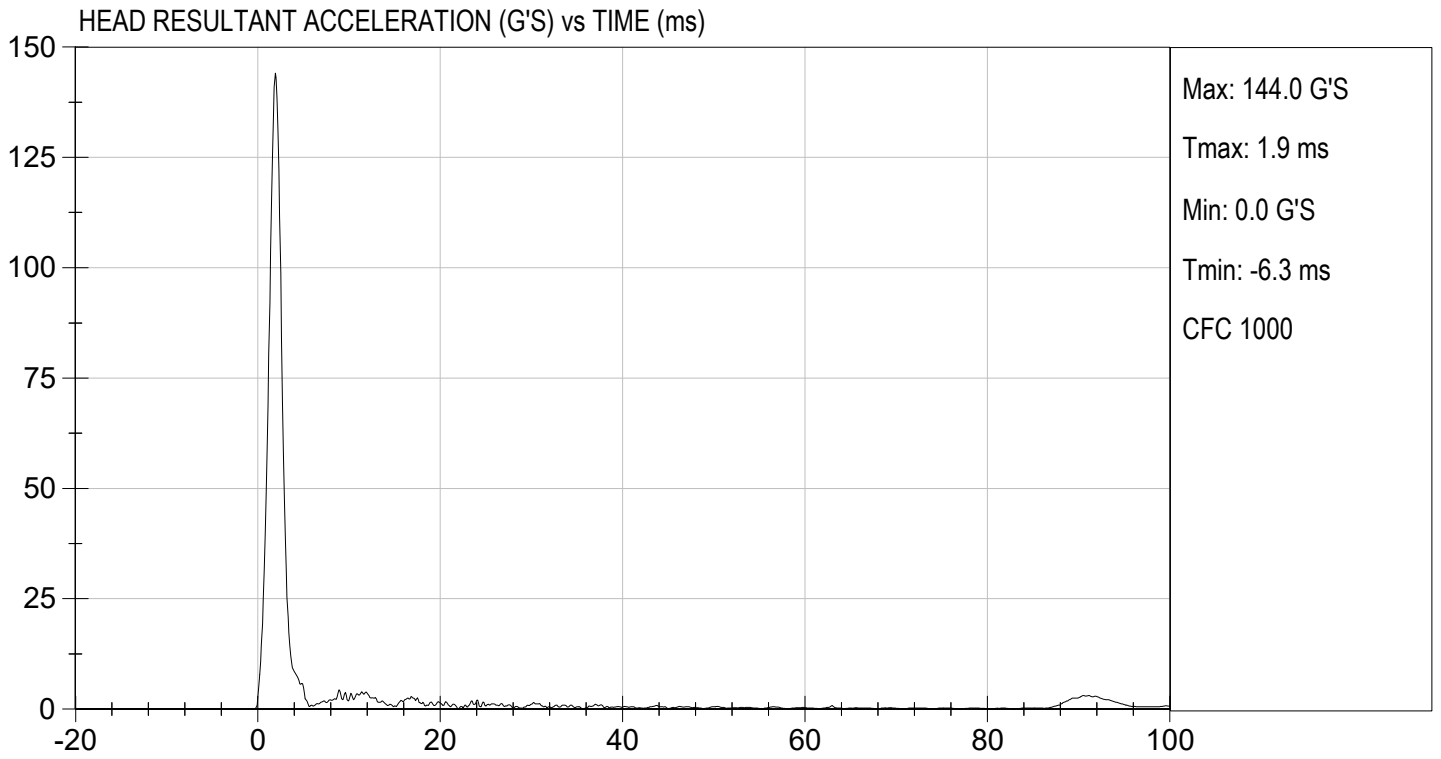
Test ID:       D231961      

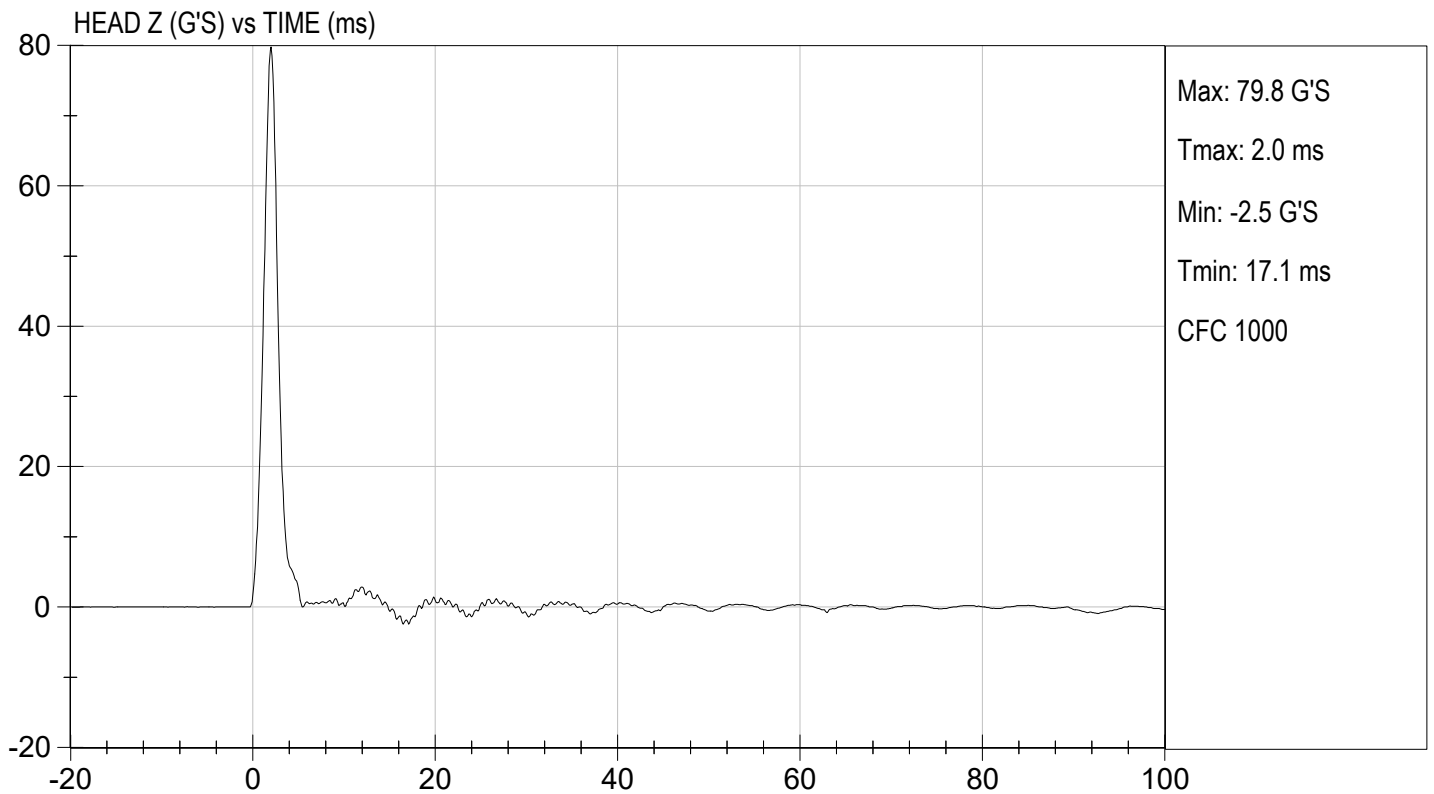
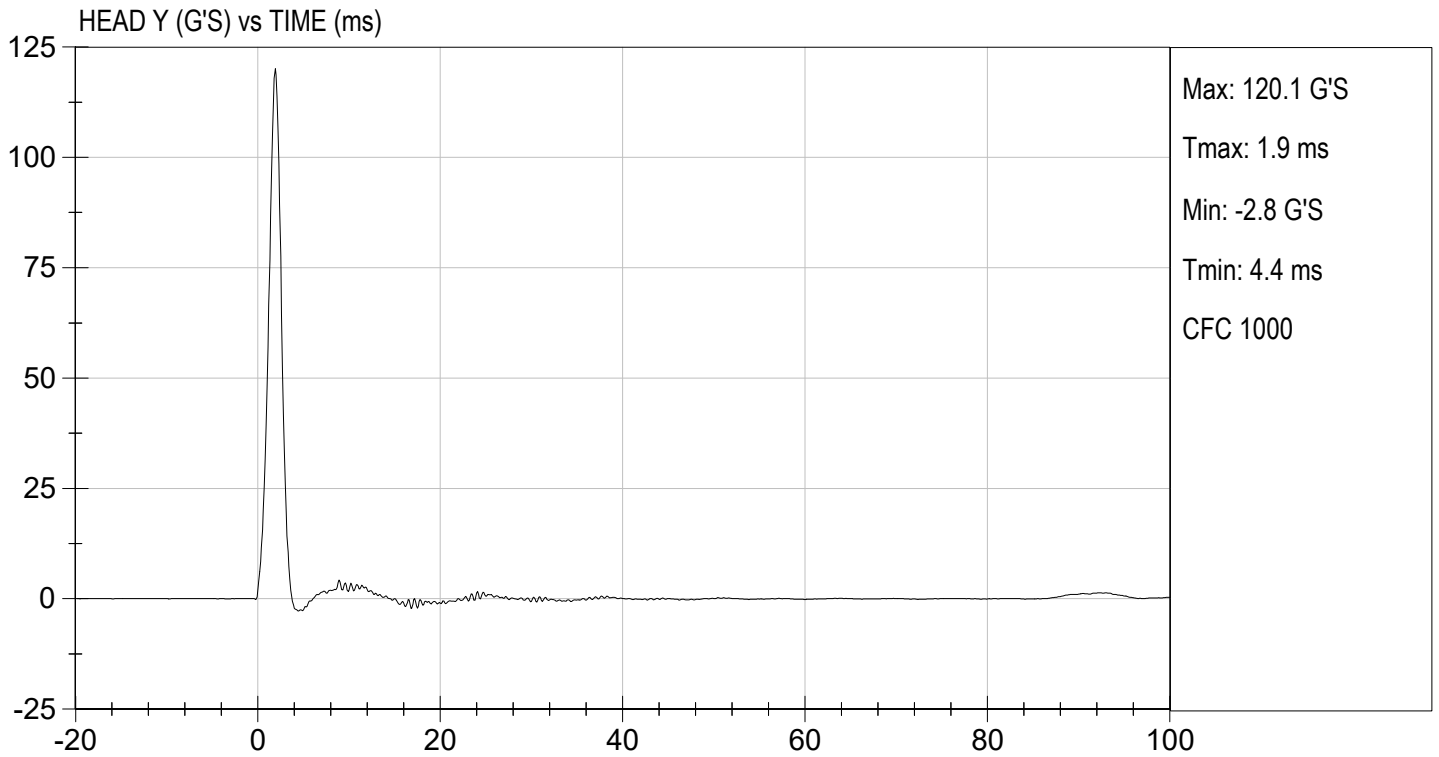
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	42	Pass
Peak Resultant Acceleration	G's	125 to 155	144	Pass
Peak Longitudinal Acceleration	G's	<= +/- 15.0	9.0	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 15% of peak	Yes	Pass
<b>Overall Test Results</b>				<b>Pass</b>

  
 \_\_\_\_\_  
 Laboratory Technician

07/28/2023  
 \_\_\_\_\_  
 Test Date

  
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 Approved By





**MGA RESEARCH CORPORATION**  
**NECK PENDULUM TEST**  
**ES-2re DUMMY**

ATD Serial No:           F032          

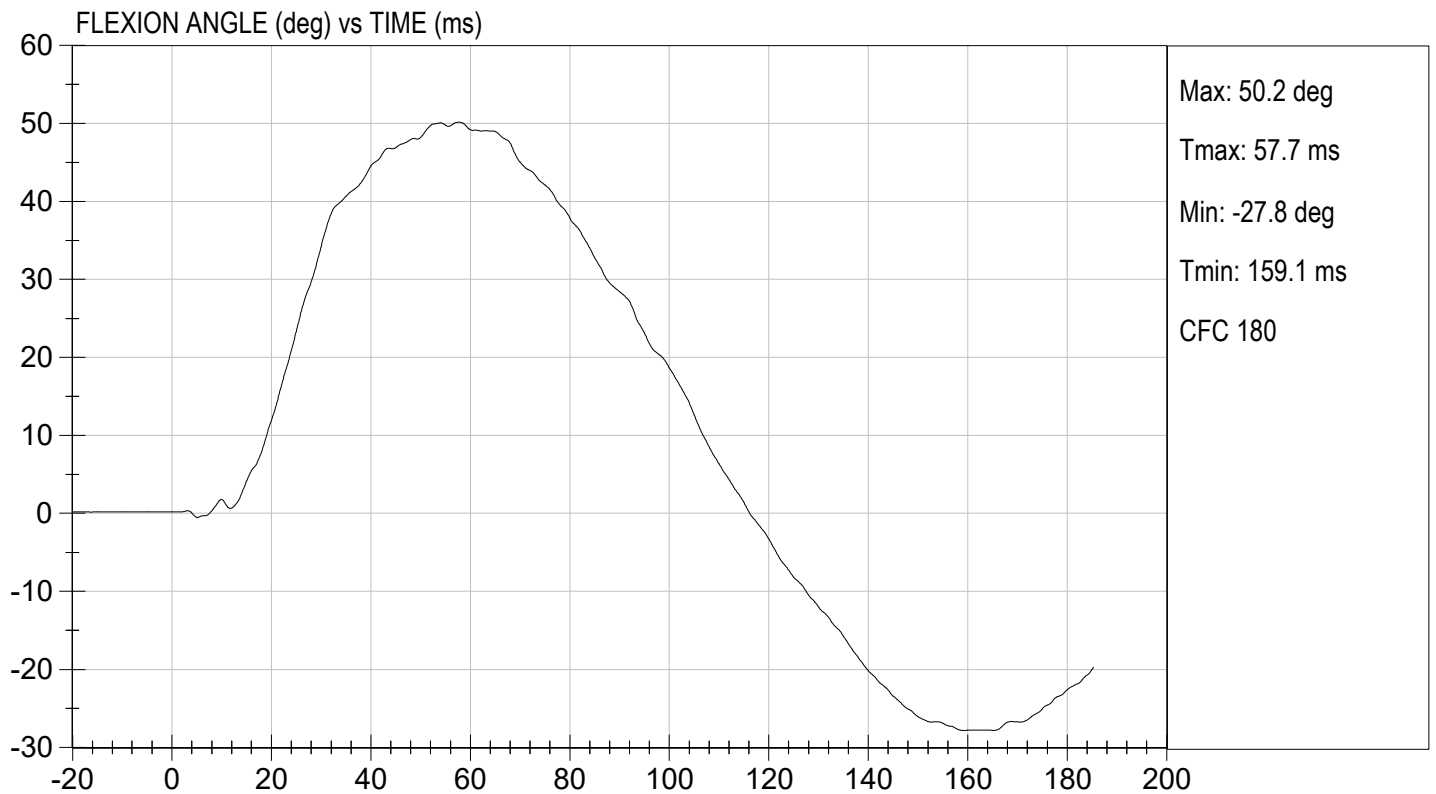
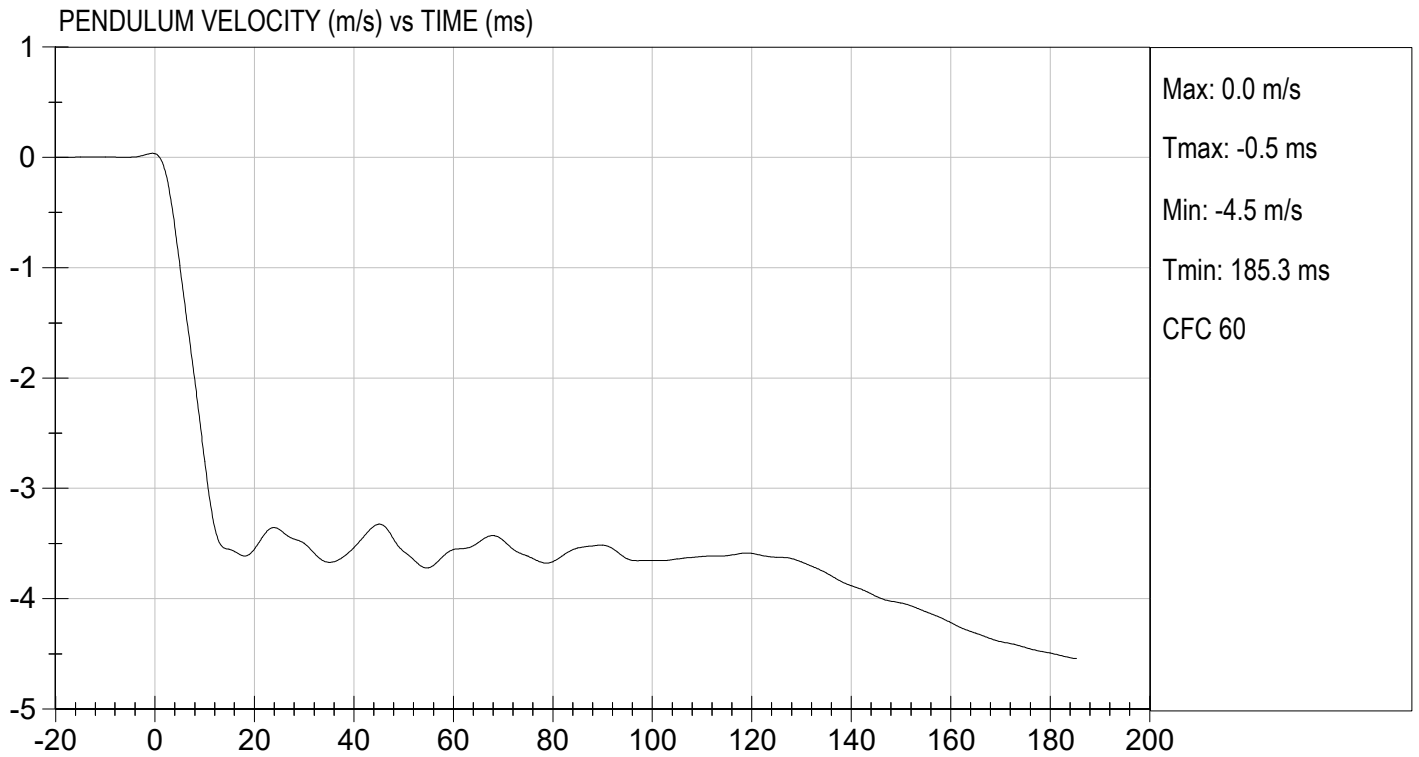
Test I.D:           D231962          

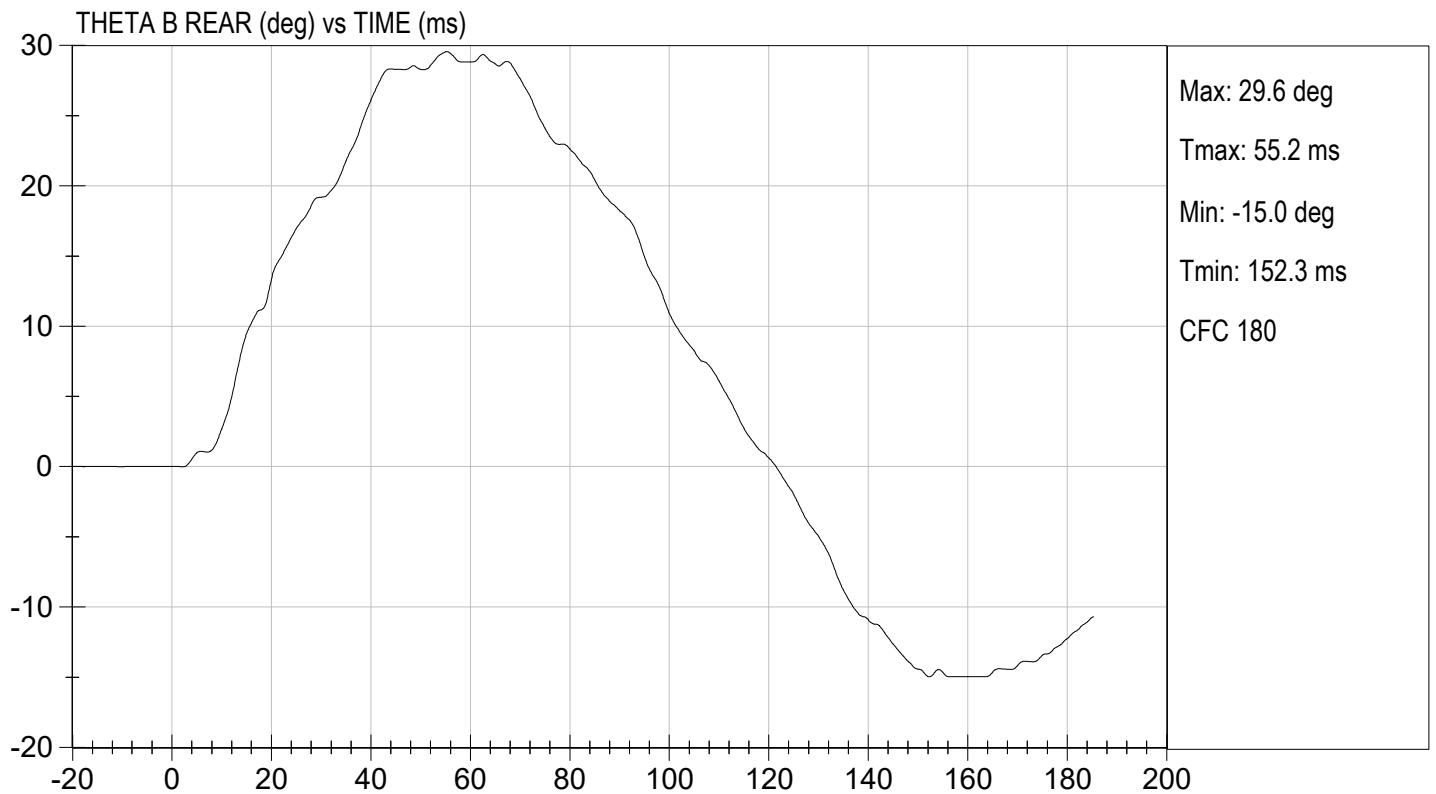
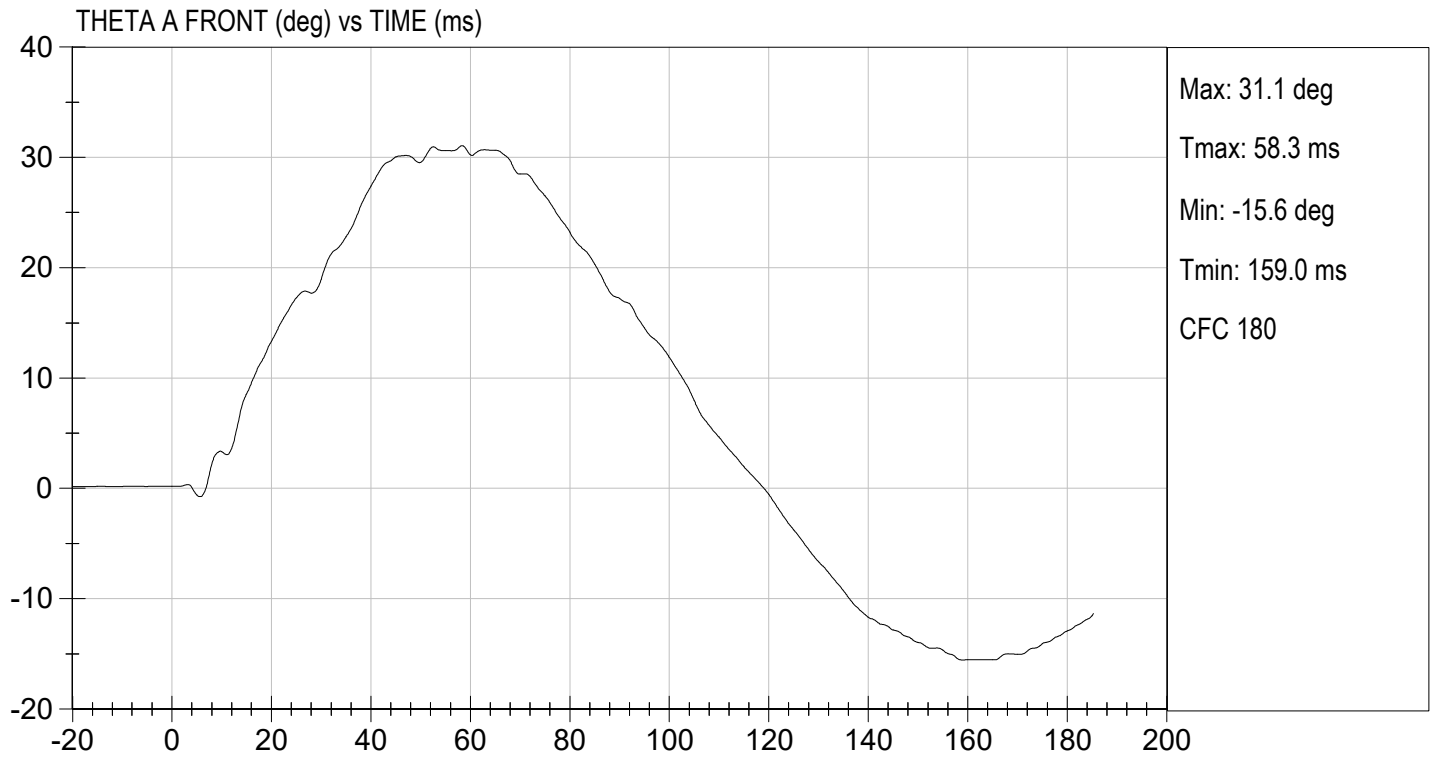
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity		%	10 to 70	46	Pass
Pendulum Speed		m/s	3.30 to 3.50	3.48	Pass
Pendulum Velocity	1 ms	m/s	-0.05 to 0.00	-0.00	Pass
	3 ms	m/s	-0.25 to -0.375	-0.33	Pass
	14 ms	m/s	-3.20 to -3.70	-3.54	Pass
	17 ms	m/s	>= -3.70	-3.60	Pass
Maximum Flexion Angle		deg	49.0 to 59.0	50.2	Pass
Time of Maximum Flexion Angle		ms	54.0 to 66.0	57.7	Pass
Head Rotation Decay Time to 0 Degree		ms	53.0 to 88.0	58.5	Pass
Overall Results					Pass

  
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 Laboratory Technician

07/28/2023  
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 Test Date

  
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 Approved By

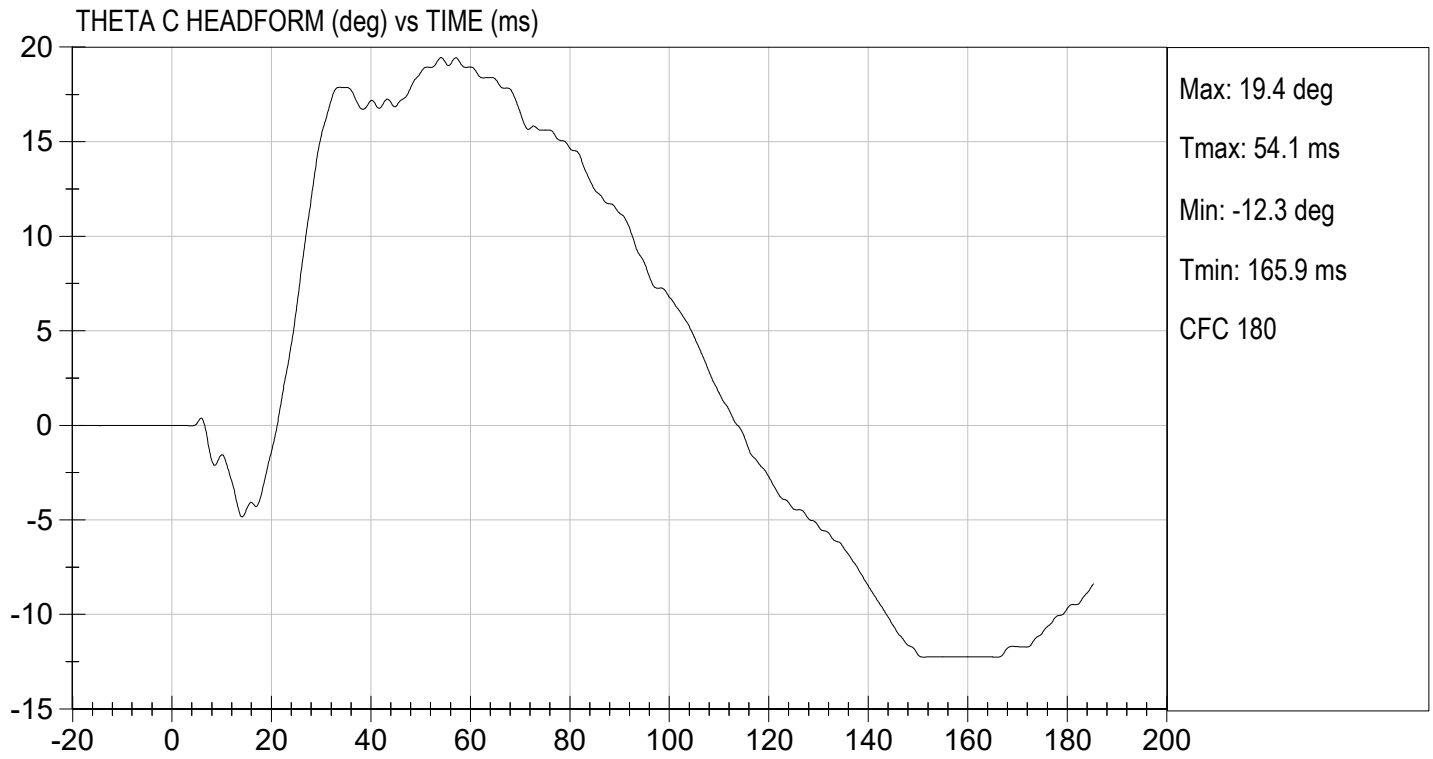






TEST DESC: NECK BENDING  
VELOCITY: 11.42 ft/s, 3.48 m/s

TEST DATE: 07/28/2023  
TEST #: D231962



**MGA RESEARCH CORPORATION**  
**SHOULDER IMPACT TEST**  
**ES-2re DUMMY**

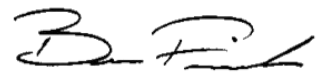
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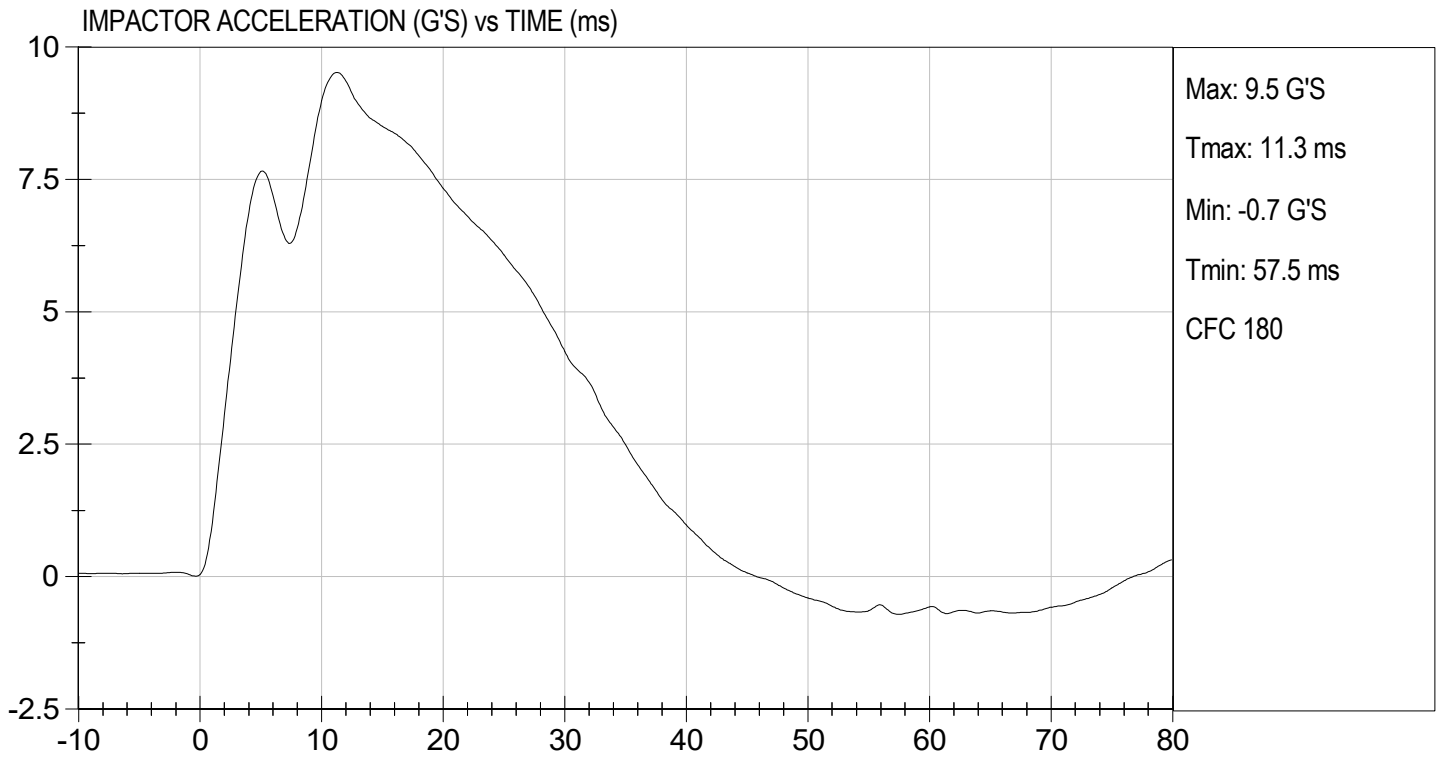
Test I.D:           D231963          

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	46	Pass
Pendulum Speed	m/s	4.20 to 4.40	4.27	Pass
Peak Impactor Acceleration	G's	7.5 to 10.5	9.5	Pass
Overall Test Results				Pass

  
\_\_\_\_\_  
Laboratory Technician

          07/28/2023            
Test Date

  
\_\_\_\_\_  
Approved By



**MGA RESEARCH CORPORATION**

**UPPER RIB TEST**

**ES-2re DUMMY**

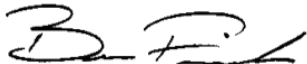
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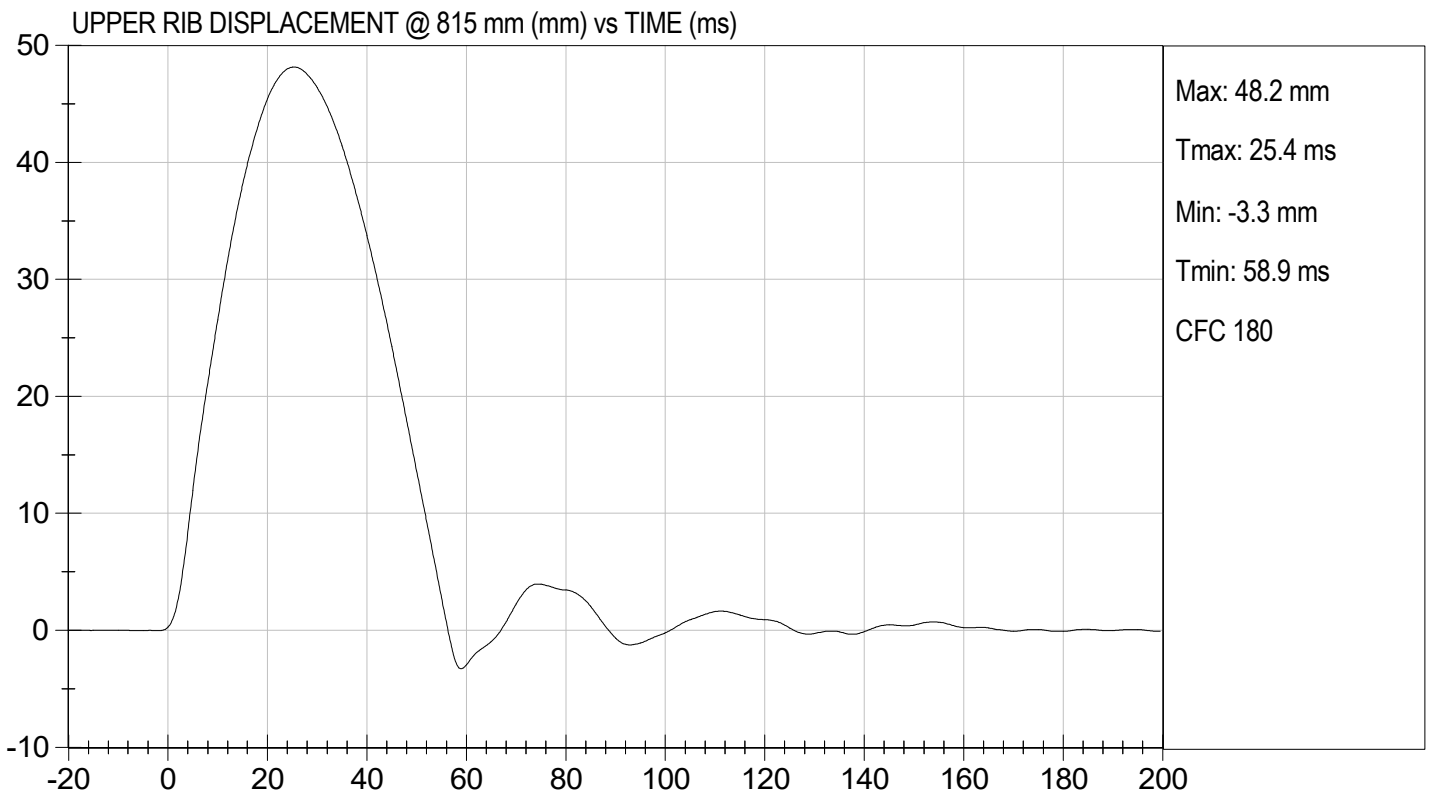
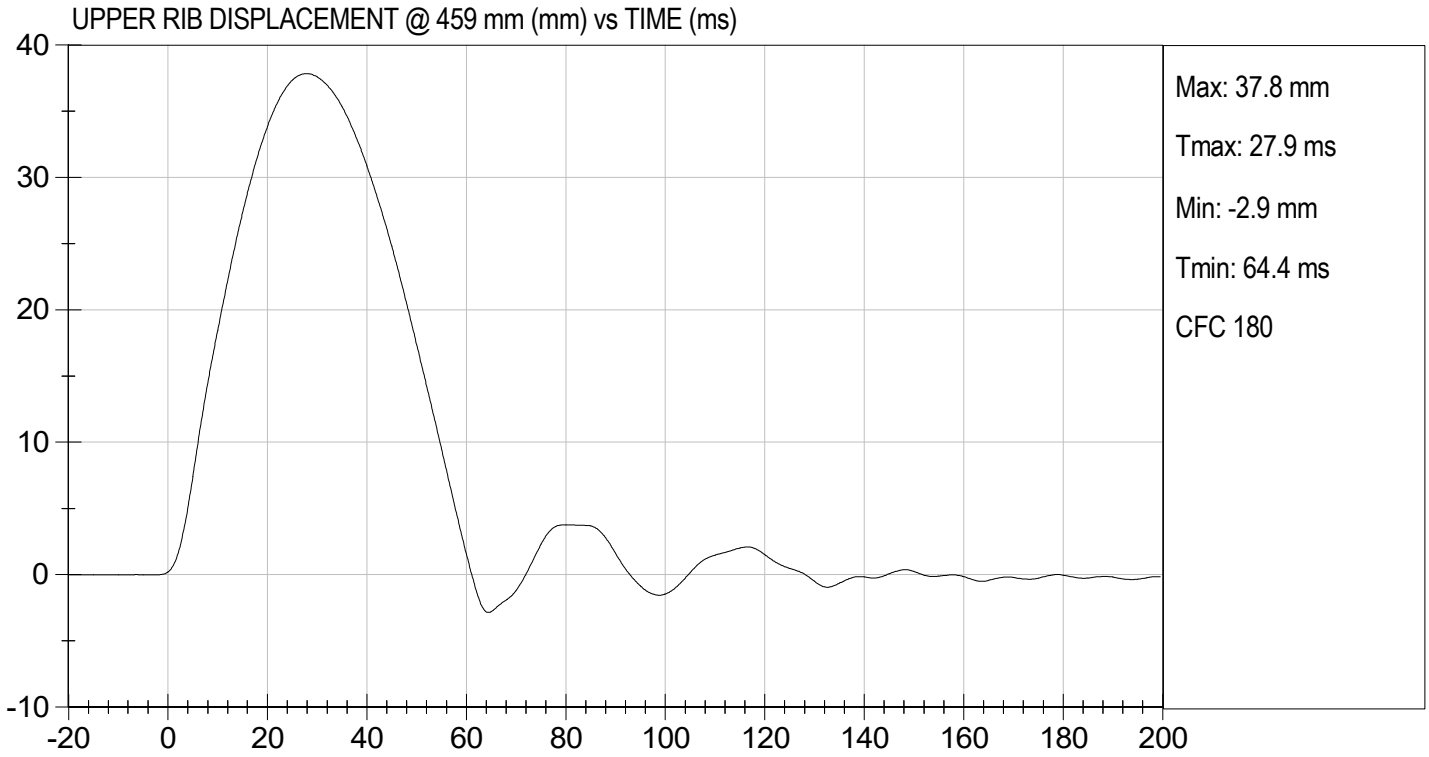
**Test I.D:**       D231964      

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	37.8	Pass
Displacement at 815 mm	mm	46.0 to 51.0	48.2	Pass
Overall Test Results				Pass

  
\_\_\_\_\_  
Laboratory Technician

      07/28/2023        
Test Date

  
\_\_\_\_\_  
Approved By



**MGA RESEARCH CORPORATION**

**MID RIB TEST**

**ES-2re DUMMY**

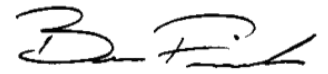
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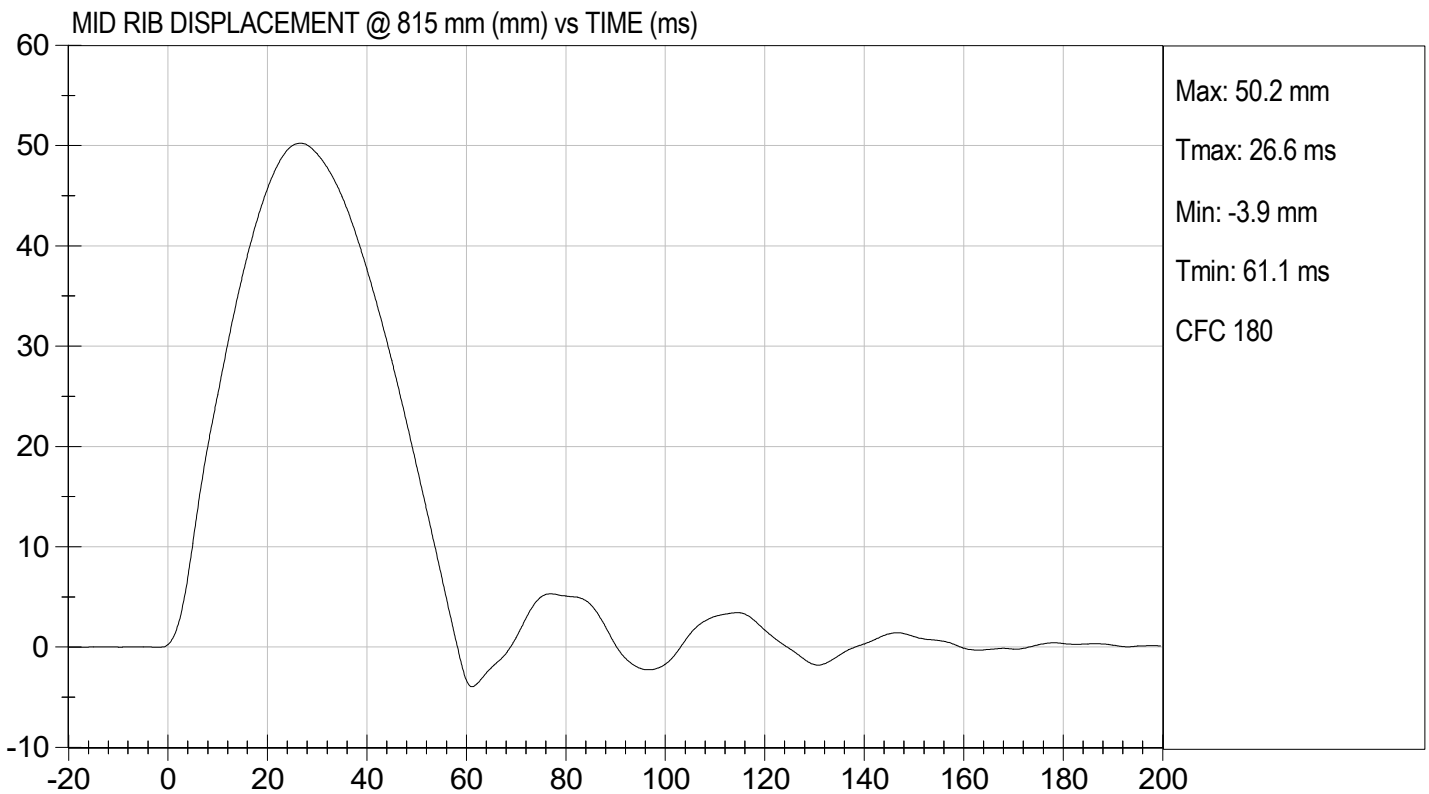
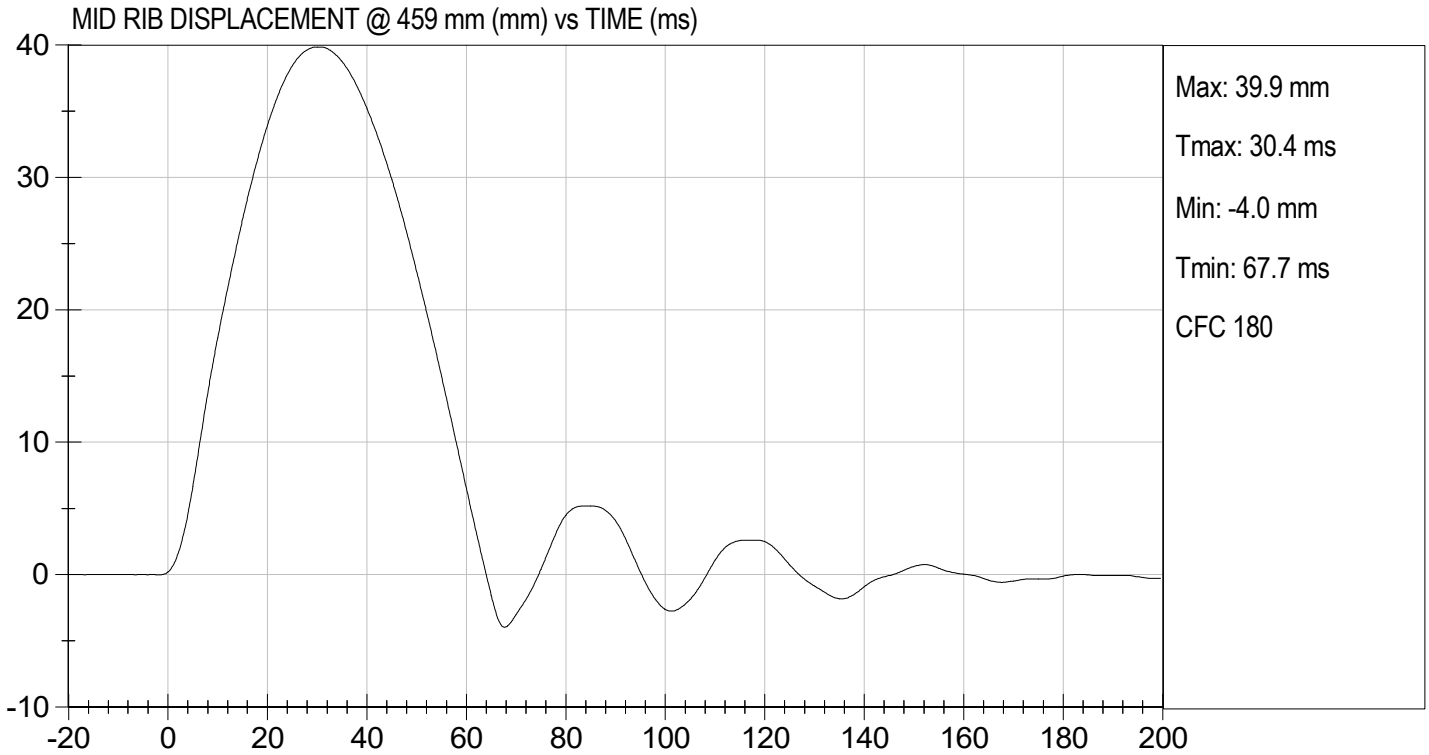
**Test I.D.:**       D231965      

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	39.9	Pass
Displacement at 815 mm	mm	46.0 to 51.0	50.2	Pass
			Overall Test Results	Pass

  
\_\_\_\_\_  
Laboratory Technician

07/28/2023  
\_\_\_\_\_  
Test Date

  
\_\_\_\_\_  
Approved By



**MGA RESEARCH CORPORATION**

**LOWER RIB TEST**

**ES-2re DUMMY**

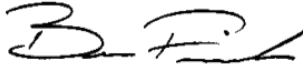
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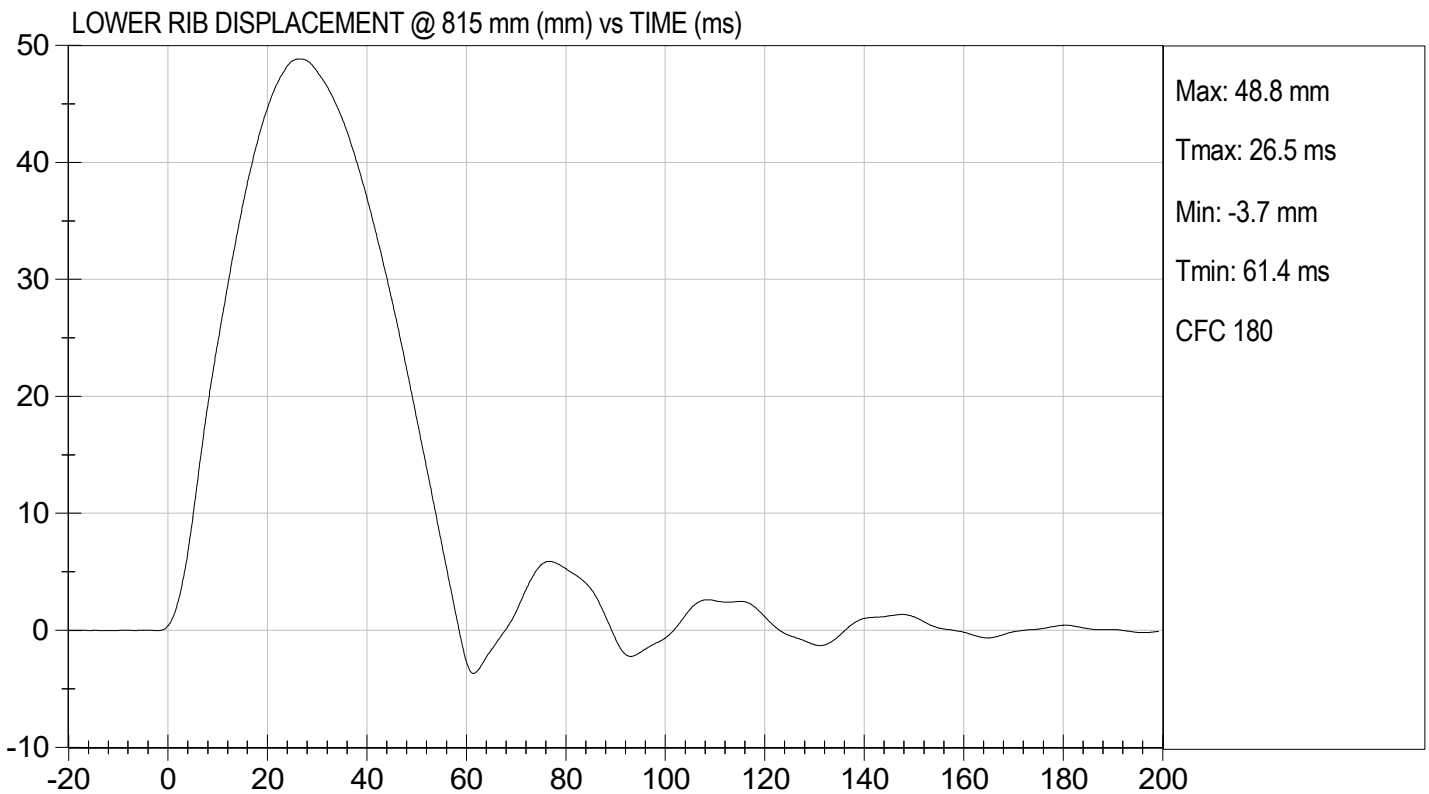
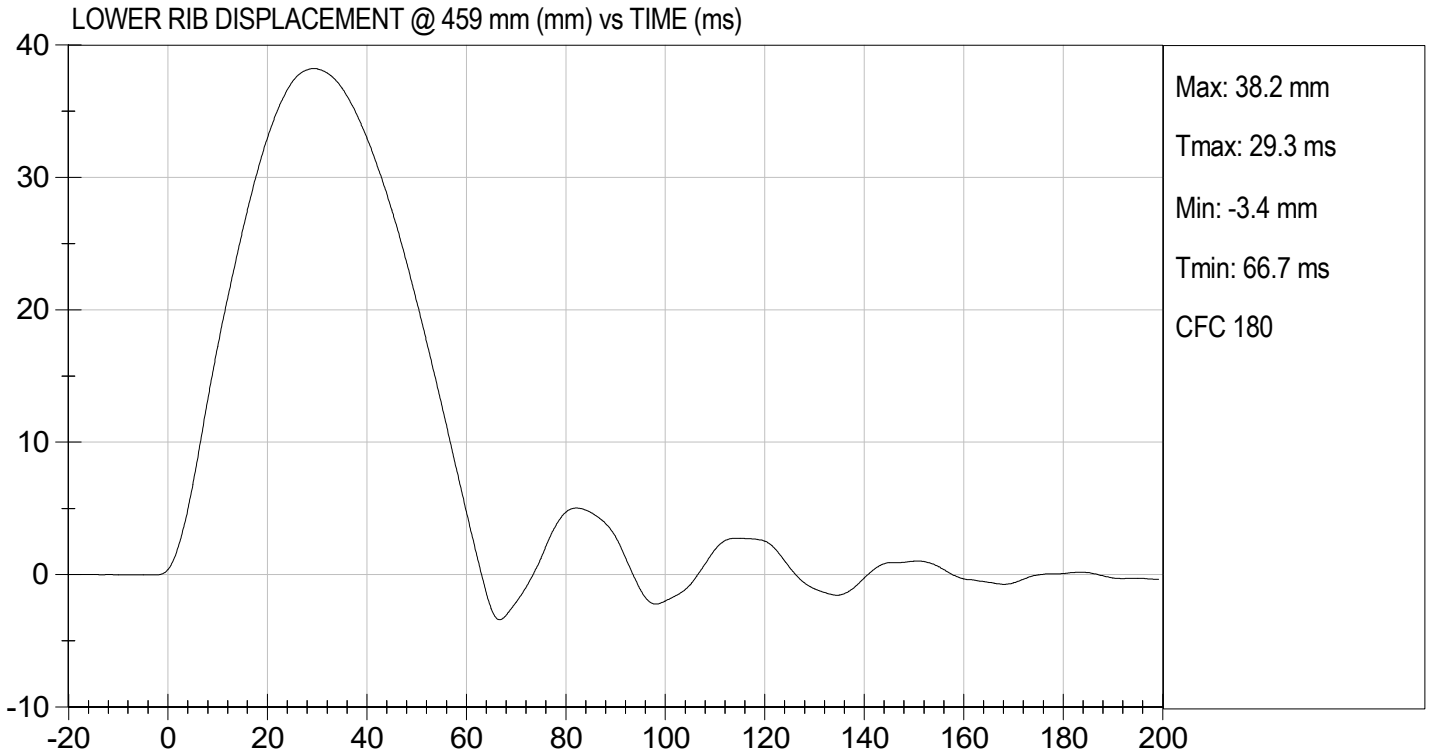
**Test I.D.:**       D231966      

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	38.2	Pass
Displacement at 815 mm	mm	46.0 to 51.0	48.8	Pass
			Overall Test Results	Pass

  
\_\_\_\_\_  
Laboratory Technician

07/28/2023  
\_\_\_\_\_  
Test Date

  
\_\_\_\_\_  
Approved By



**MGA RESEARCH CORPORATION**

**ABDOMEN TEST**

**ES-2re DUMMY**

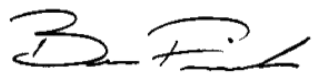
**ATD Serial No:**       F032      

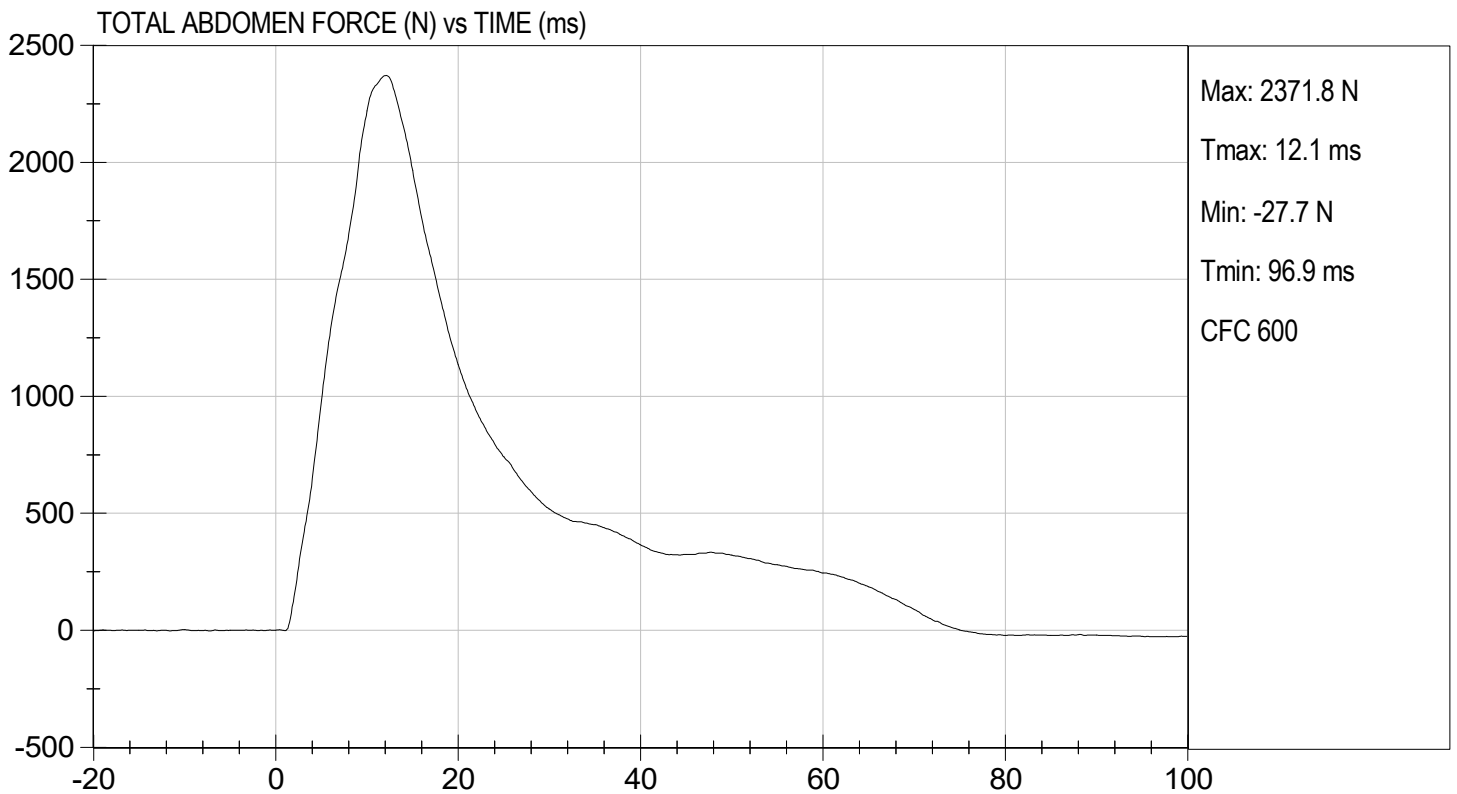
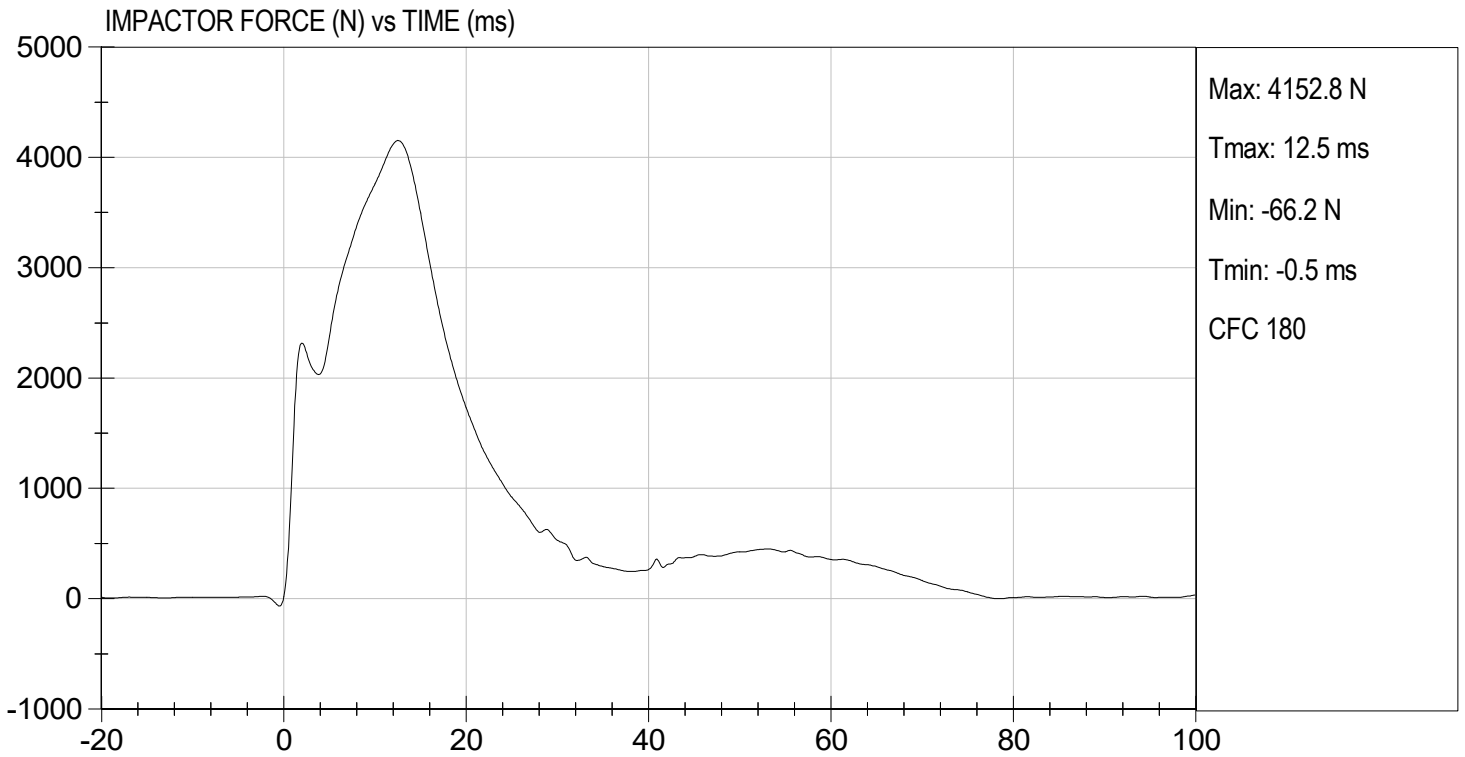
**Test I.D.:**       D231967      

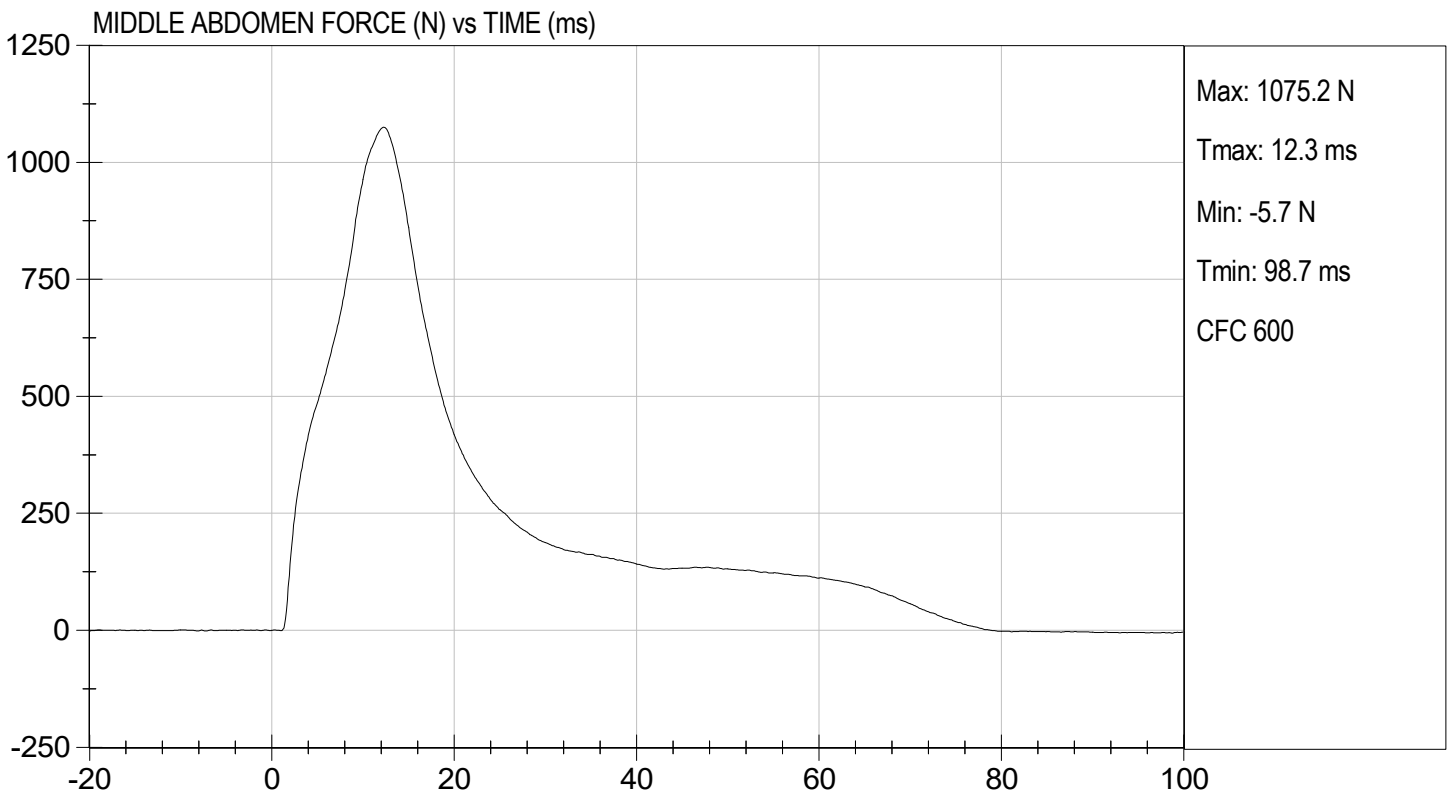
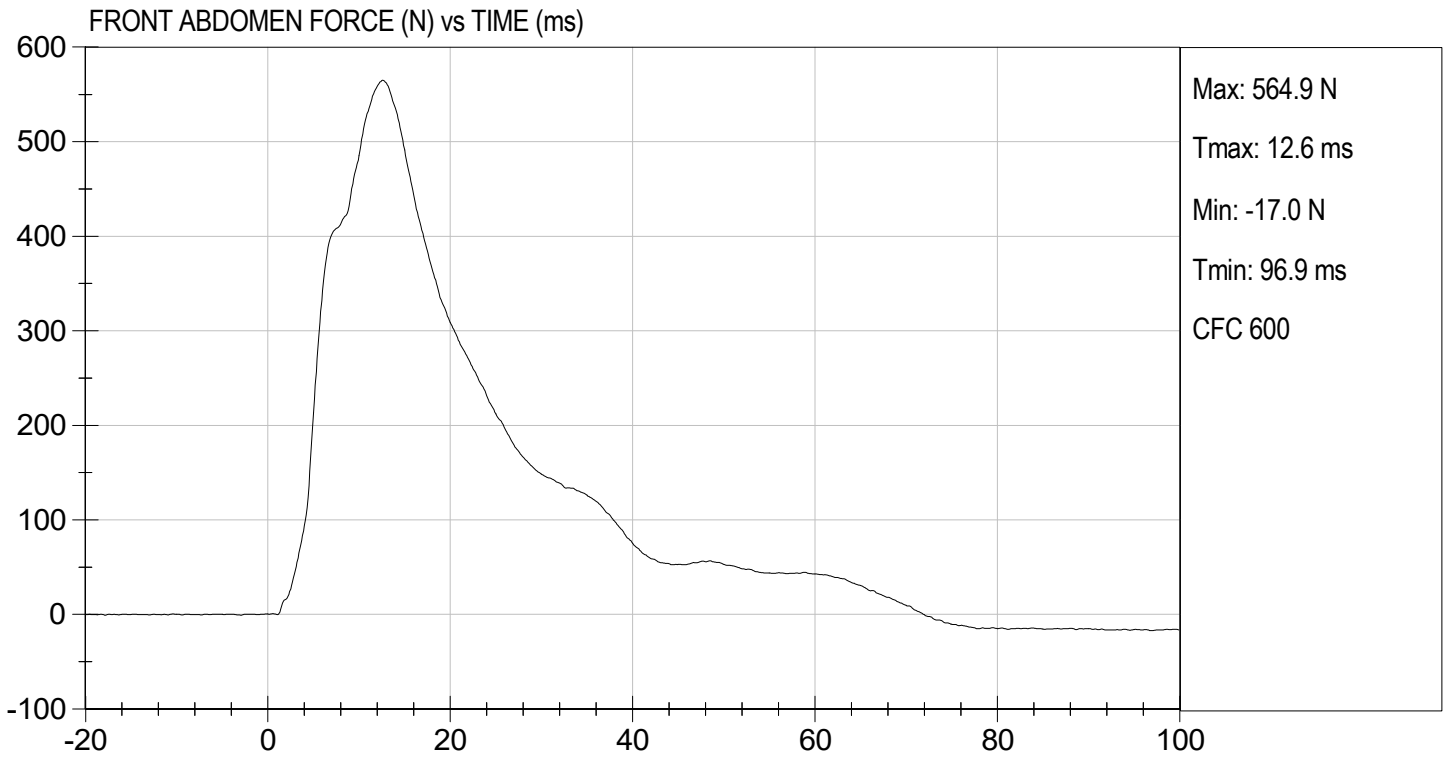
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	46	Pass
Probe Speed	m/s	3.90 to 4.10	4.10	Pass
Maximum Impactor Force	N	4000 to 4800	4153	Pass
Time of Maximum Impactor Force	ms	10.6 to 13.0	12.5	Pass
Maximum Total Abdomen Force	N	2200 to 2700	2372	Pass
Time of Maximum Abdomen Force	ms	10.0 to 12.3	12.1	Pass
Overall Test Results				Pass

  
\_\_\_\_\_  
Laboratory Technician

07/28/2023  
\_\_\_\_\_  
Test Date

  
\_\_\_\_\_  
Approved By

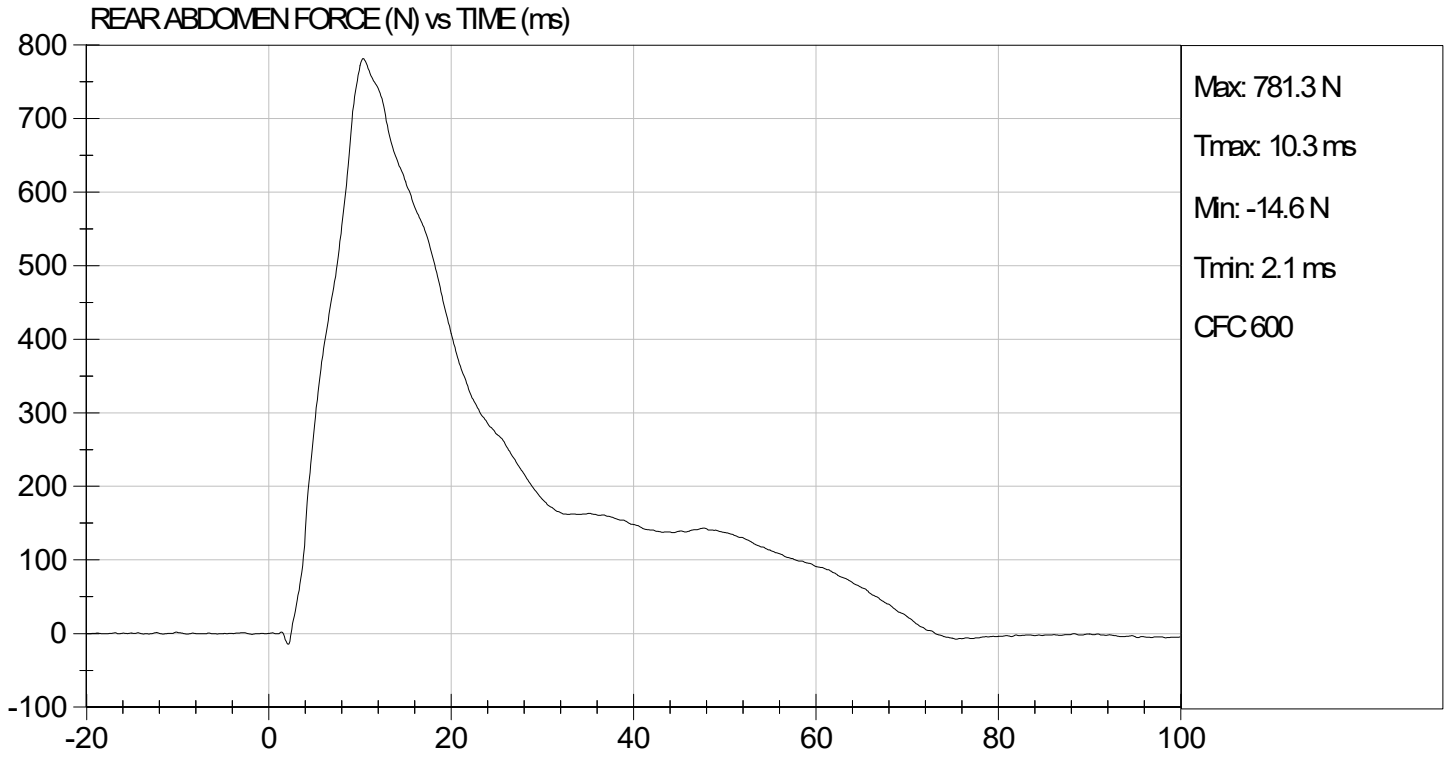






TEST DESC: ABDOMEN IMPACT  
VELOCITY: 13.44 ft/s, 4.10 m/s

TEST DATE: 07/28/2023  
TEST #: D231967



**MGA RESEARCH CORPORATION**  
**LUMBAR SPINE TEST**  
**ES-2re DUMMY**

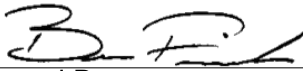
ATD Serial No:           F032          

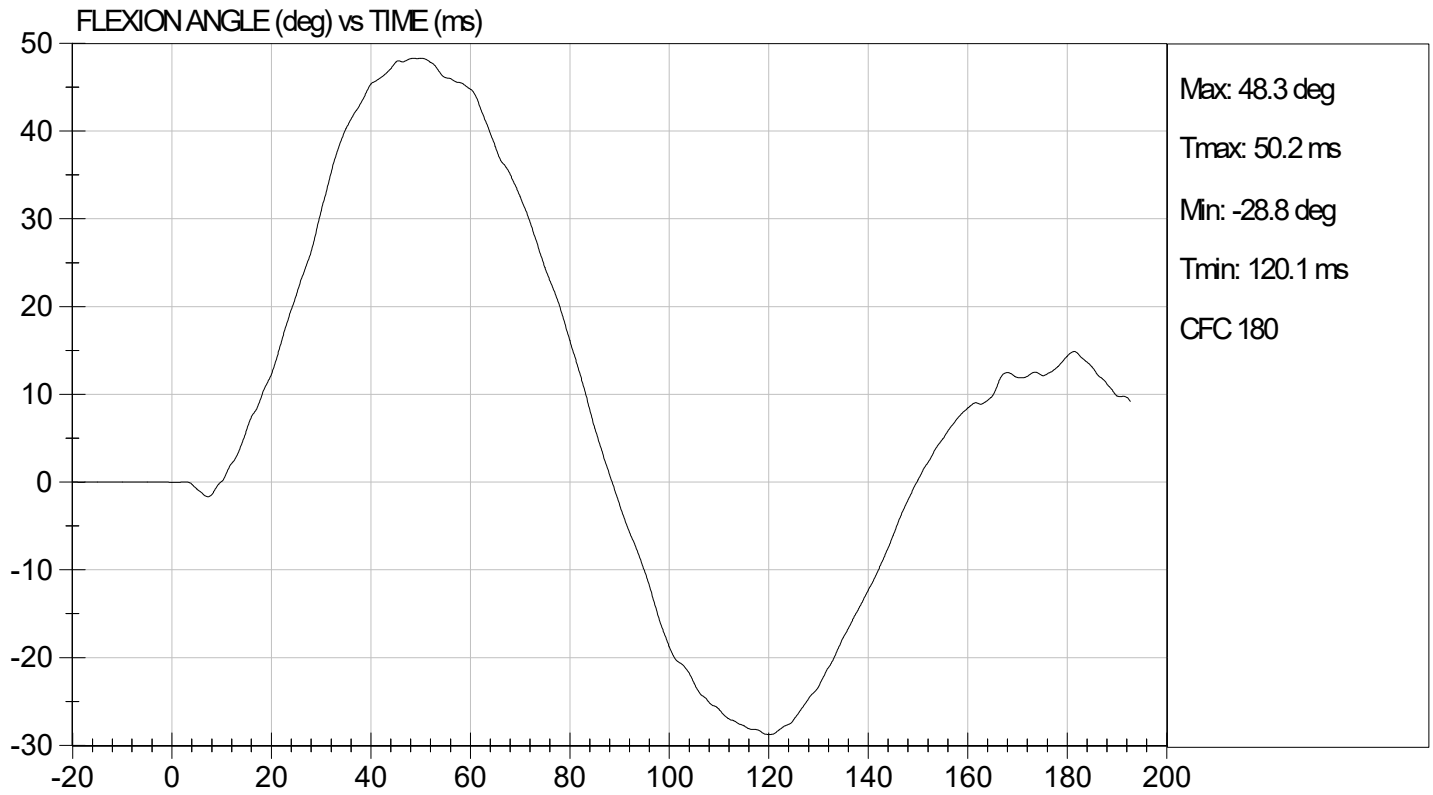
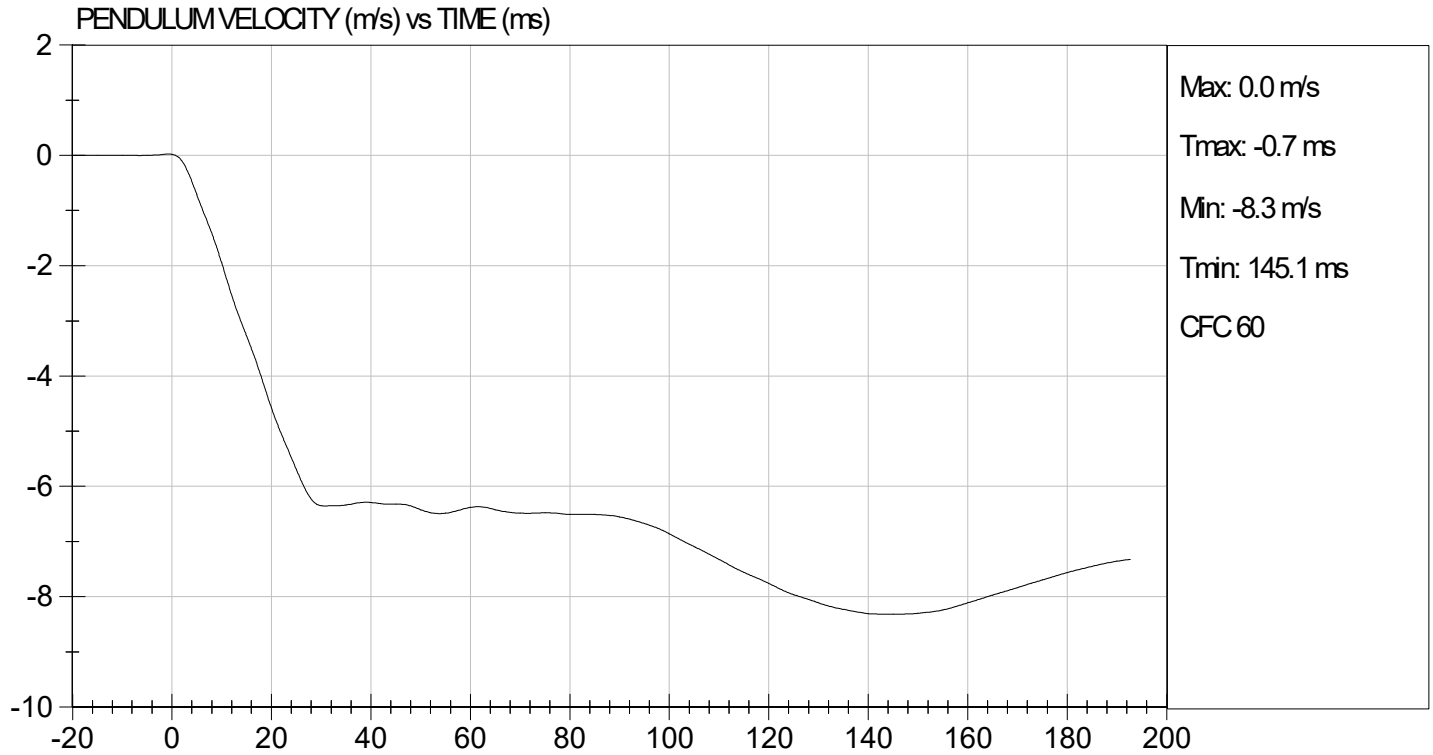
Test I.D.:           D231968          

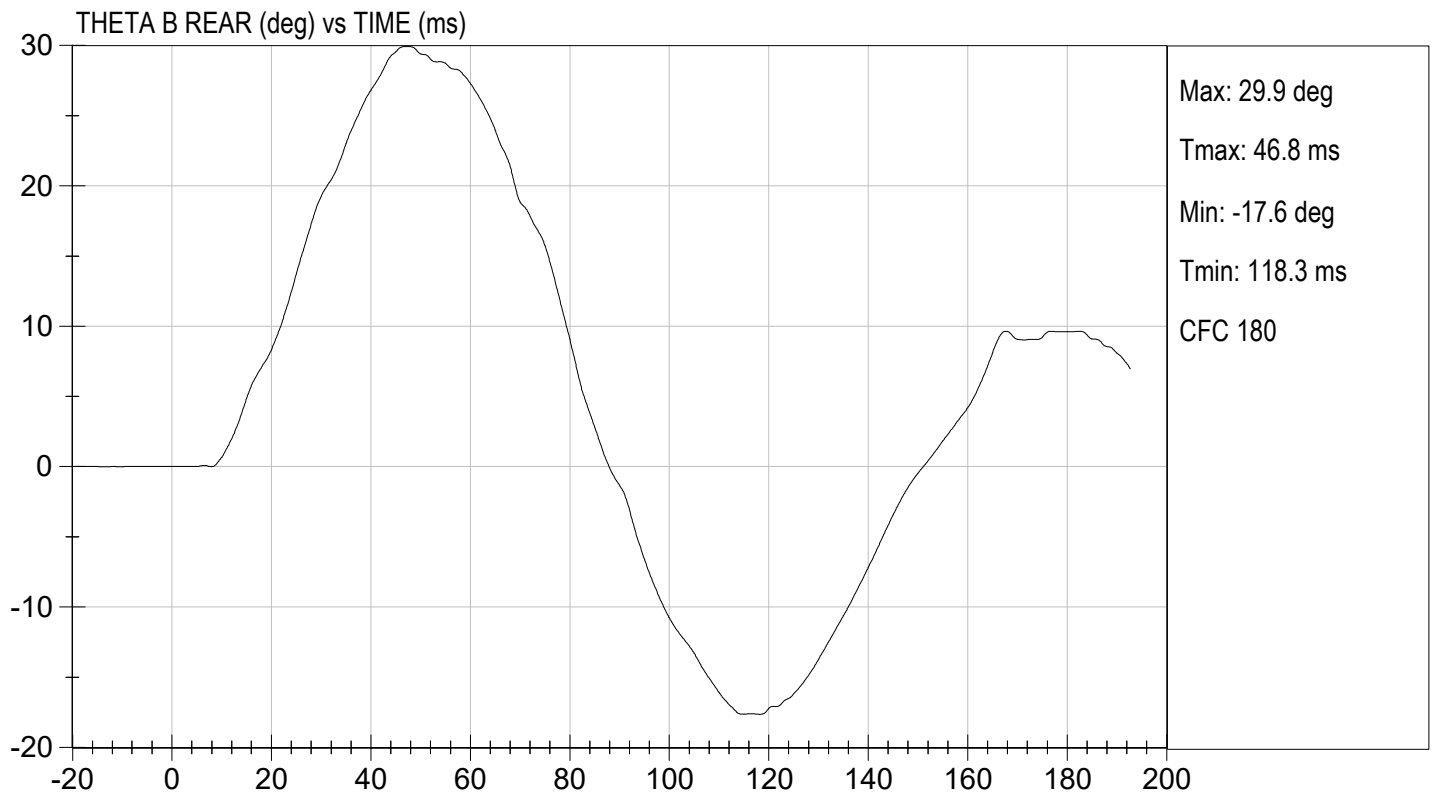
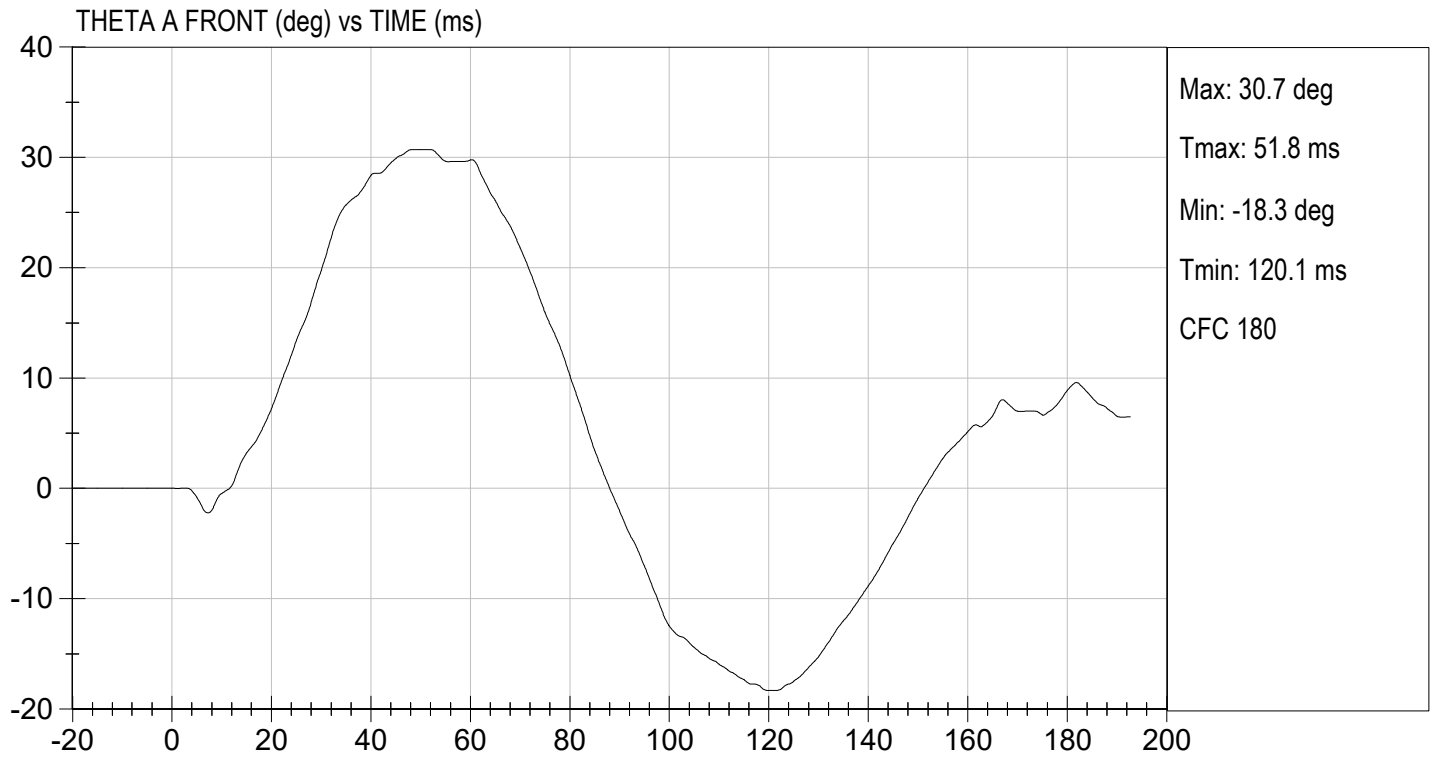
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity		%	10 to 70	47	Pass
Pendulum Speed		m/s	5.95 to 6.15	6.12	Pass
Pendulum Velocity	1 ms	m/s	-0.05 to 0.00	-0.01	Pass
	3.7 ms	m/s	-0.425 to -0.24	-0.406	Pass
	27 ms	m/s	-6.50 to -5.80	-6.09	Pass
	30 ms	m/s	>= -6.50	-6.35	Pass
Maximum Flexion Angle		deg	45.0 to 55.0	48.3	Pass
Time of Maximum Flexion Angle		ms	39.0 to 53.0	50.2	Pass
Headform Rotation Decay to Initial Position		ms	37 to 57	38	Pass
<b>Overall Results</b>					<b>Pass</b>

  
 Laboratory Technician

          07/28/2023            
 Test Date

  
 Approved By

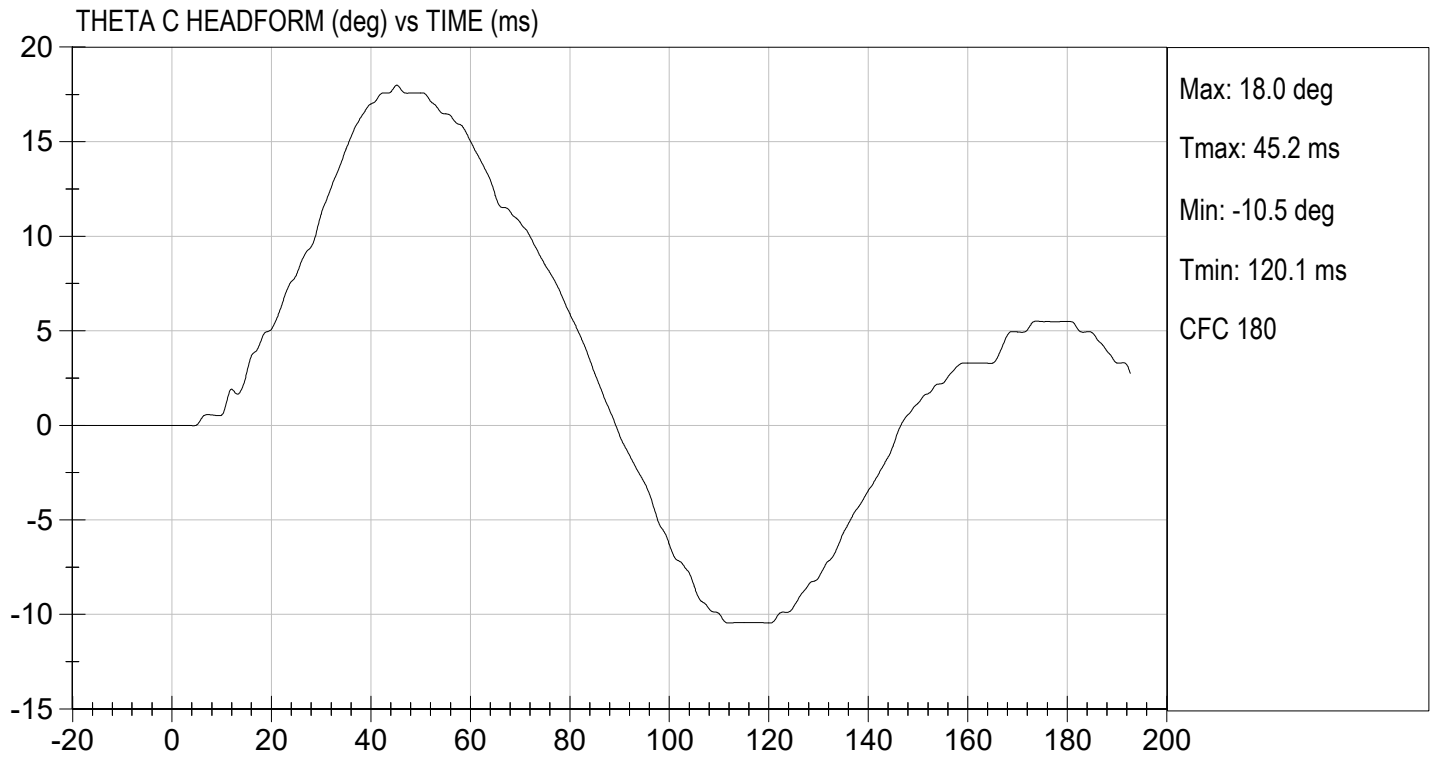






TEST DESC: LUMBAR BENDING  
VELOCITY: 20.08 ft/s, 6.12 m/s

TEST DATE: 07/28/2023  
TEST #: D231968



**MGA RESEARCH CORPORATION**

**PELVIS TEST  
ES-2re DUMMY**

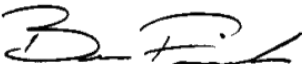
**ATD Serial No:**           F032          

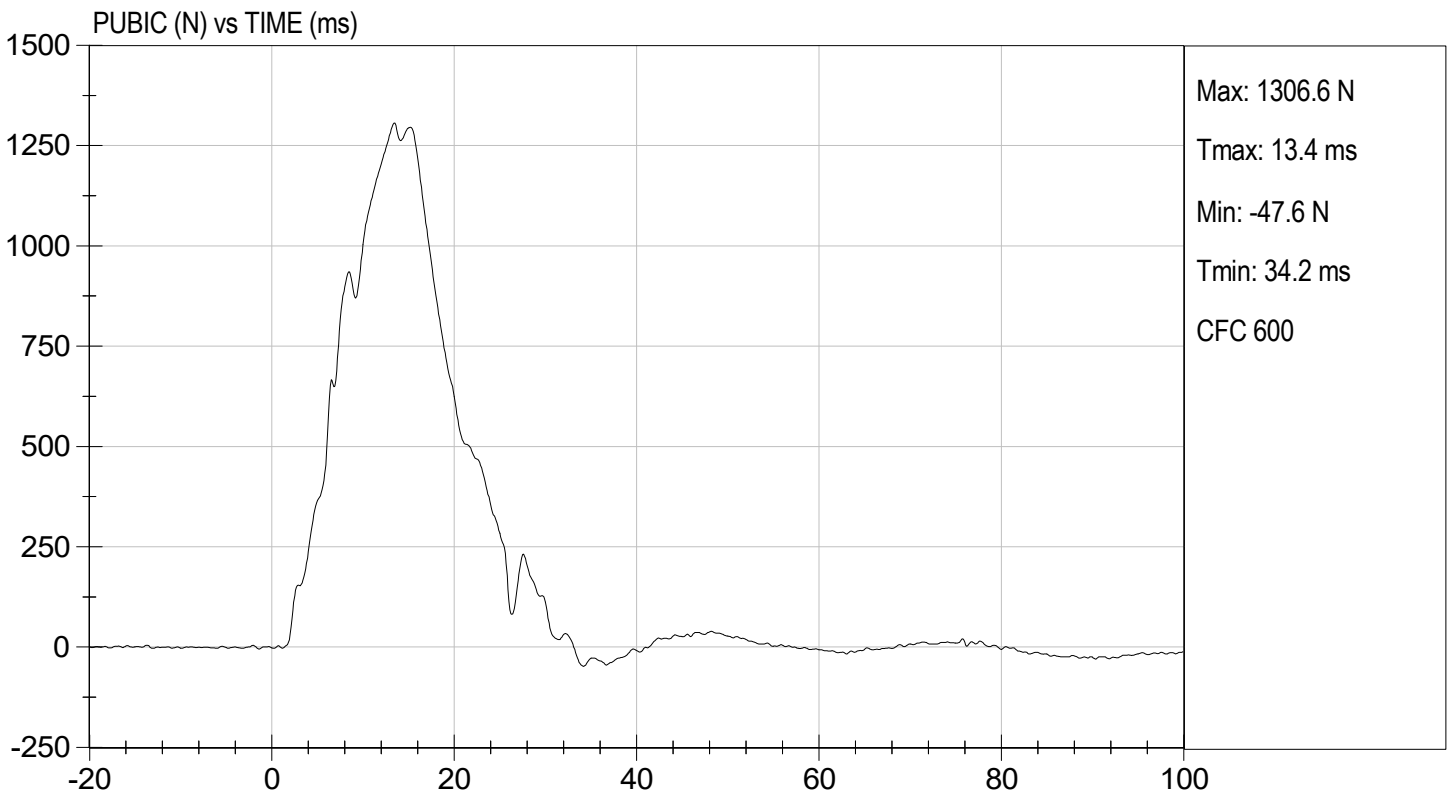
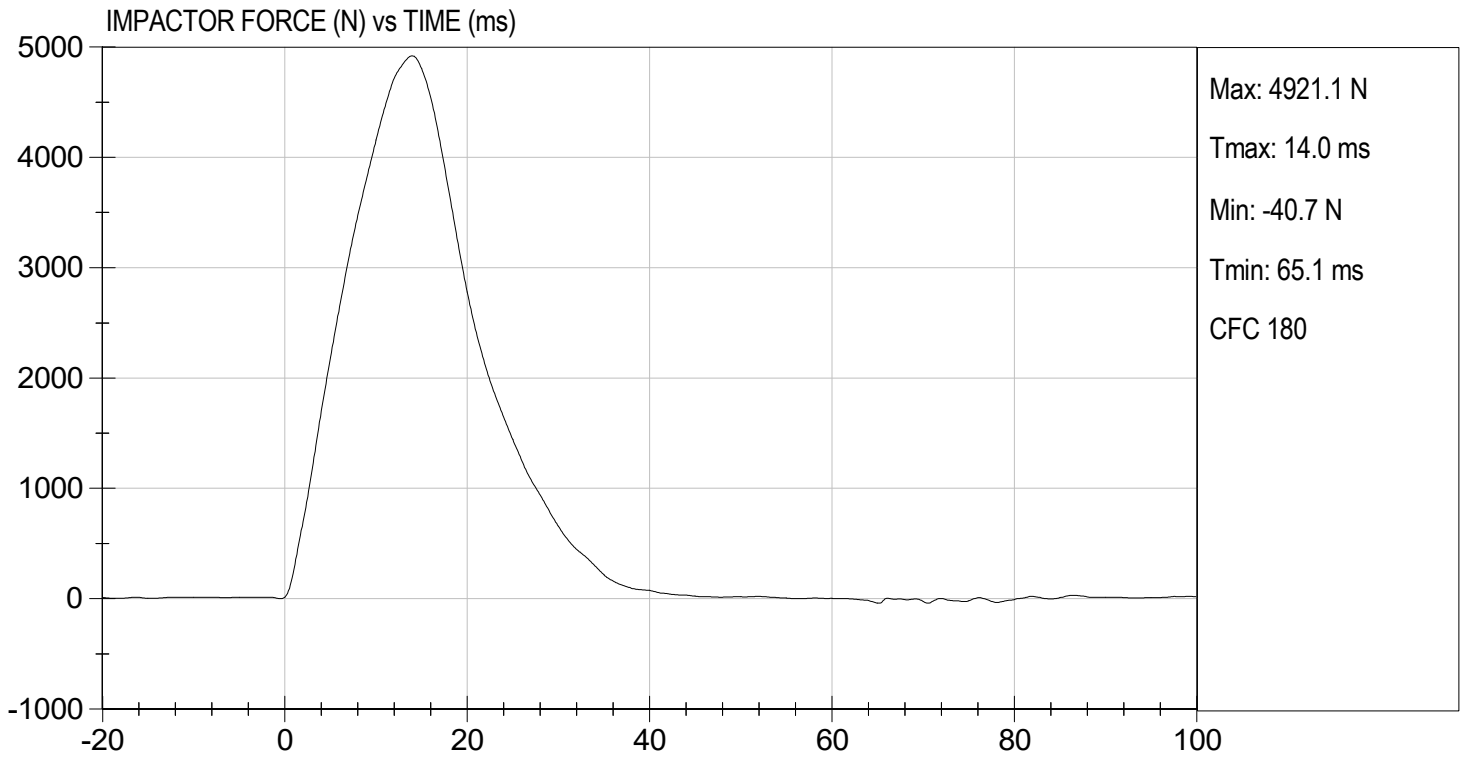
**Test I.D.:**           D231969          

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	46	Pass
Probe Speed	m/s	4.20 to 4.40	4.34	Pass
Maximum Impactor Force	N	4700 to 5400	4921	Pass
Time of Maximum Impactor Force	ms	11.8 to 16.1	14.0	Pass
Maximum Pubic Force	N	1230 to 1590	1307	Pass
Time of Maximum Pubic Force	ms	12.2 to 17.0	13.4	Pass
Overall Test Results				Pass

  
\_\_\_\_\_  
Laboratory Technician

          07/28/2023            
Test Date

  
\_\_\_\_\_  
Approved By



**MGA RESEARCH CORPORATION**  
**THORAX IMPACT TEST**  
**ES-2re DUMMY**

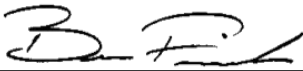
ATD Serial No:           F032          

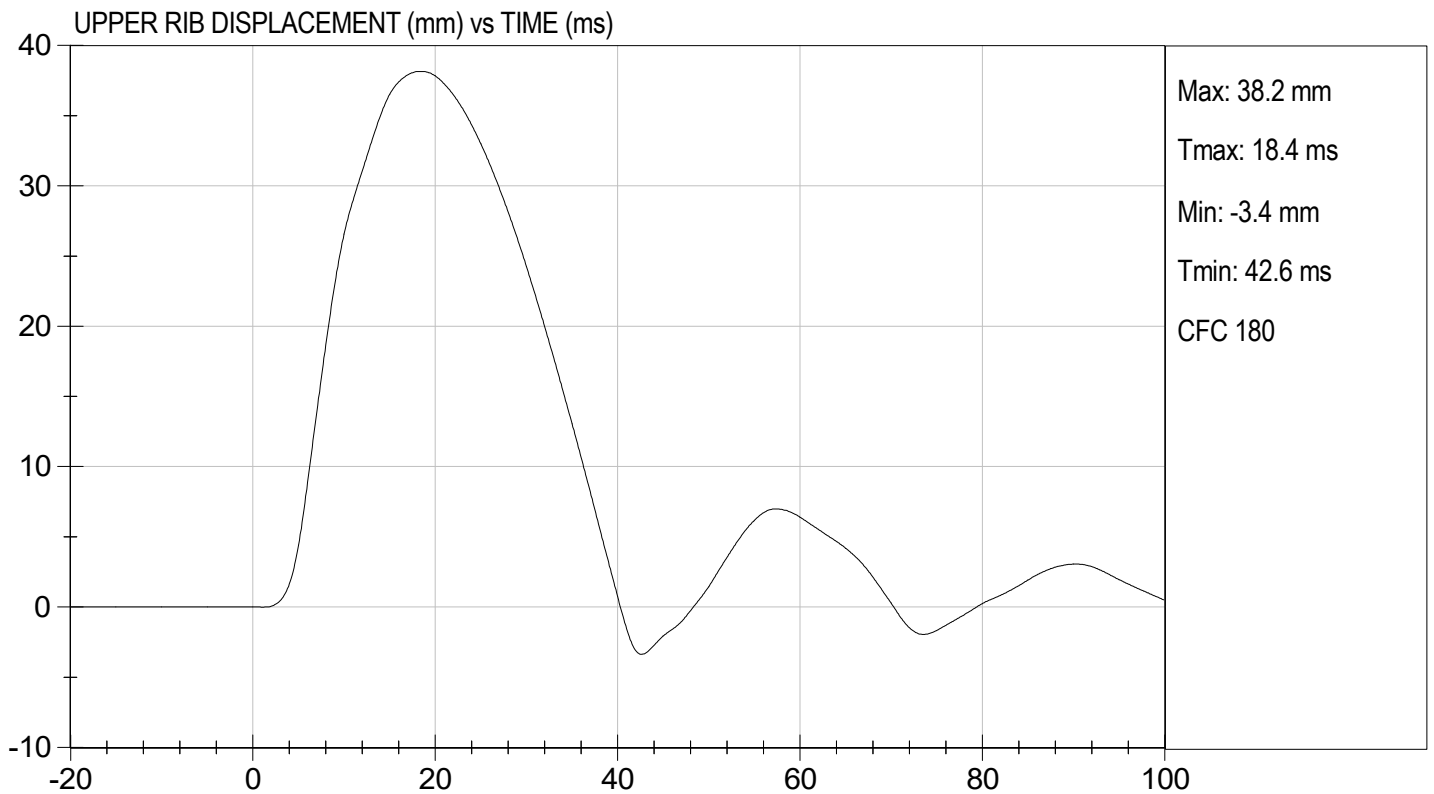
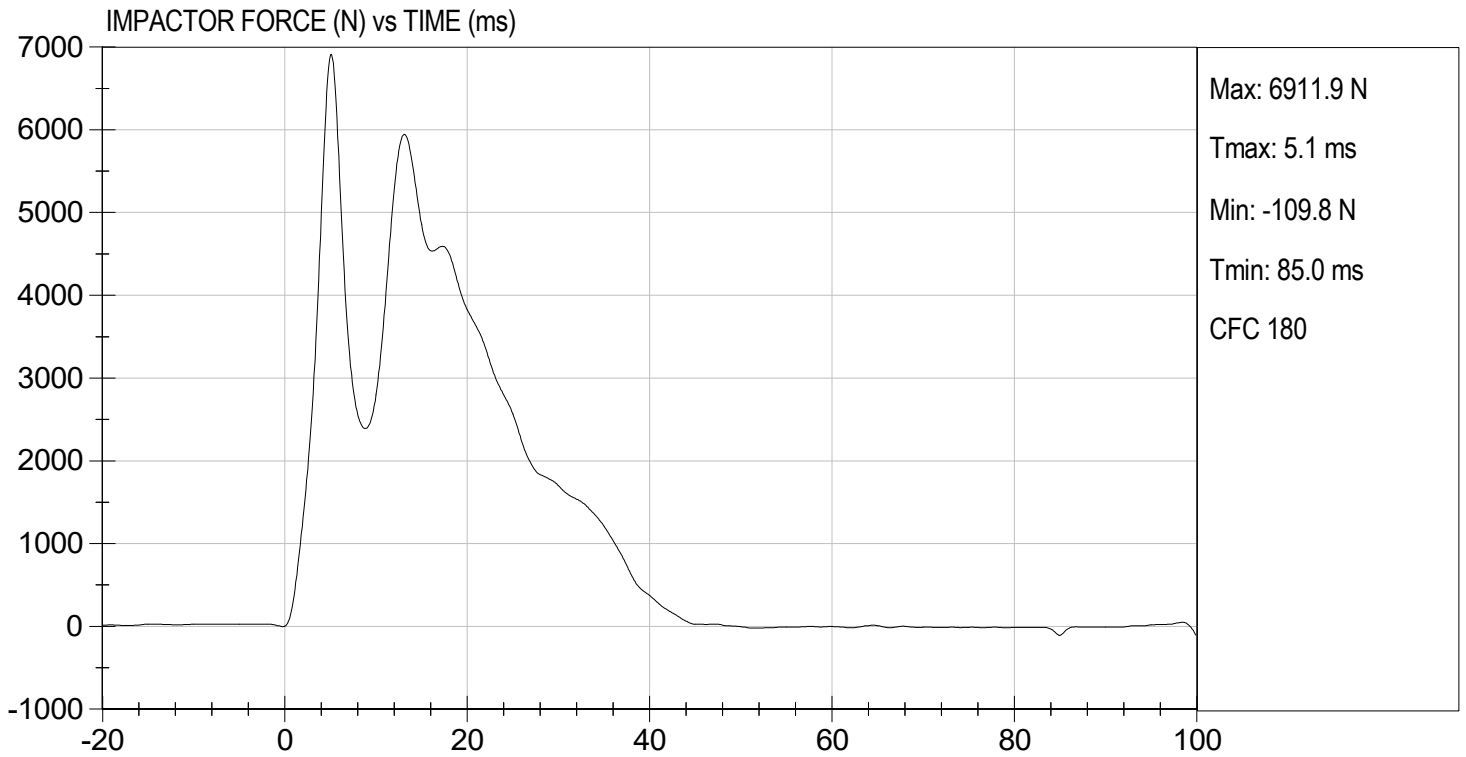
Test I.D:           D231960          

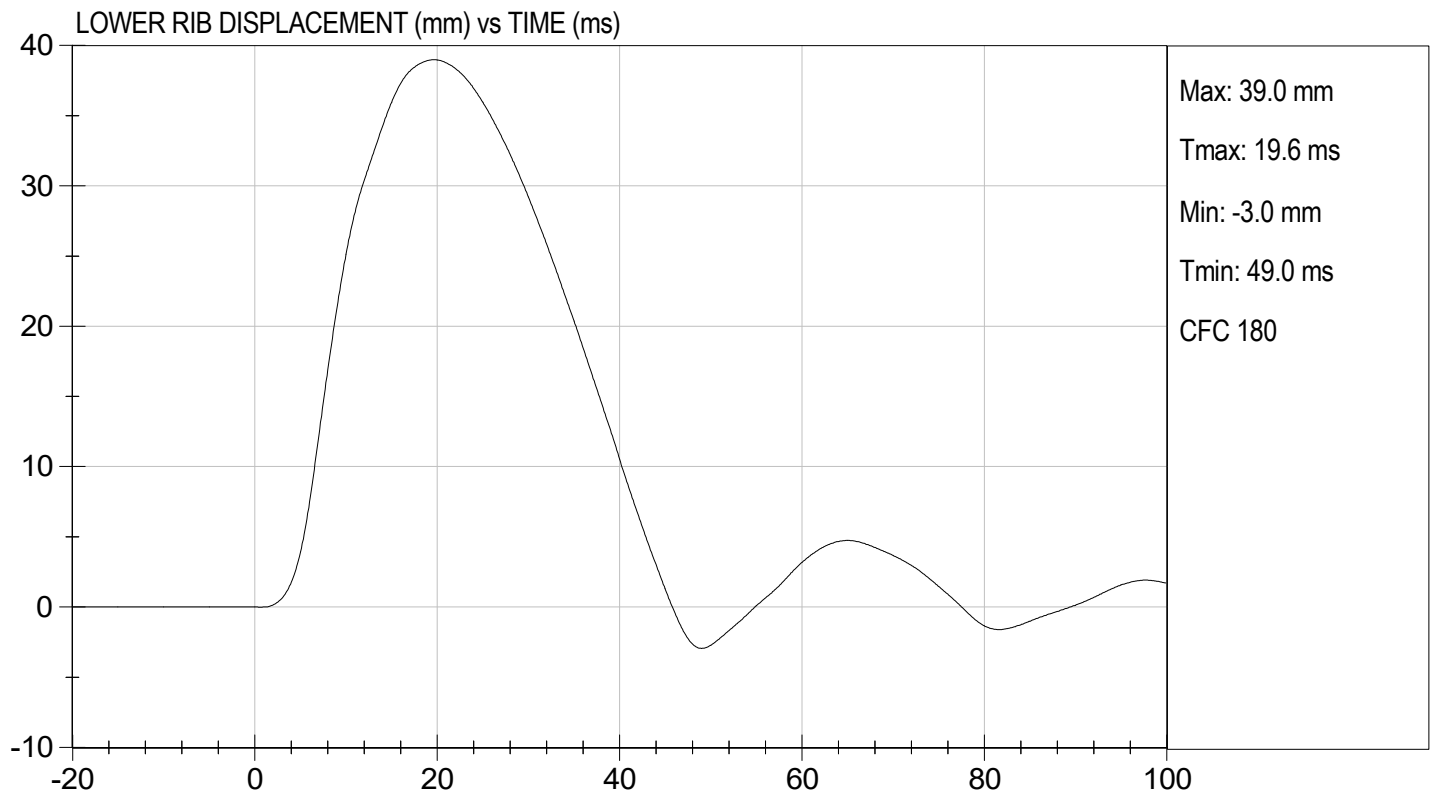
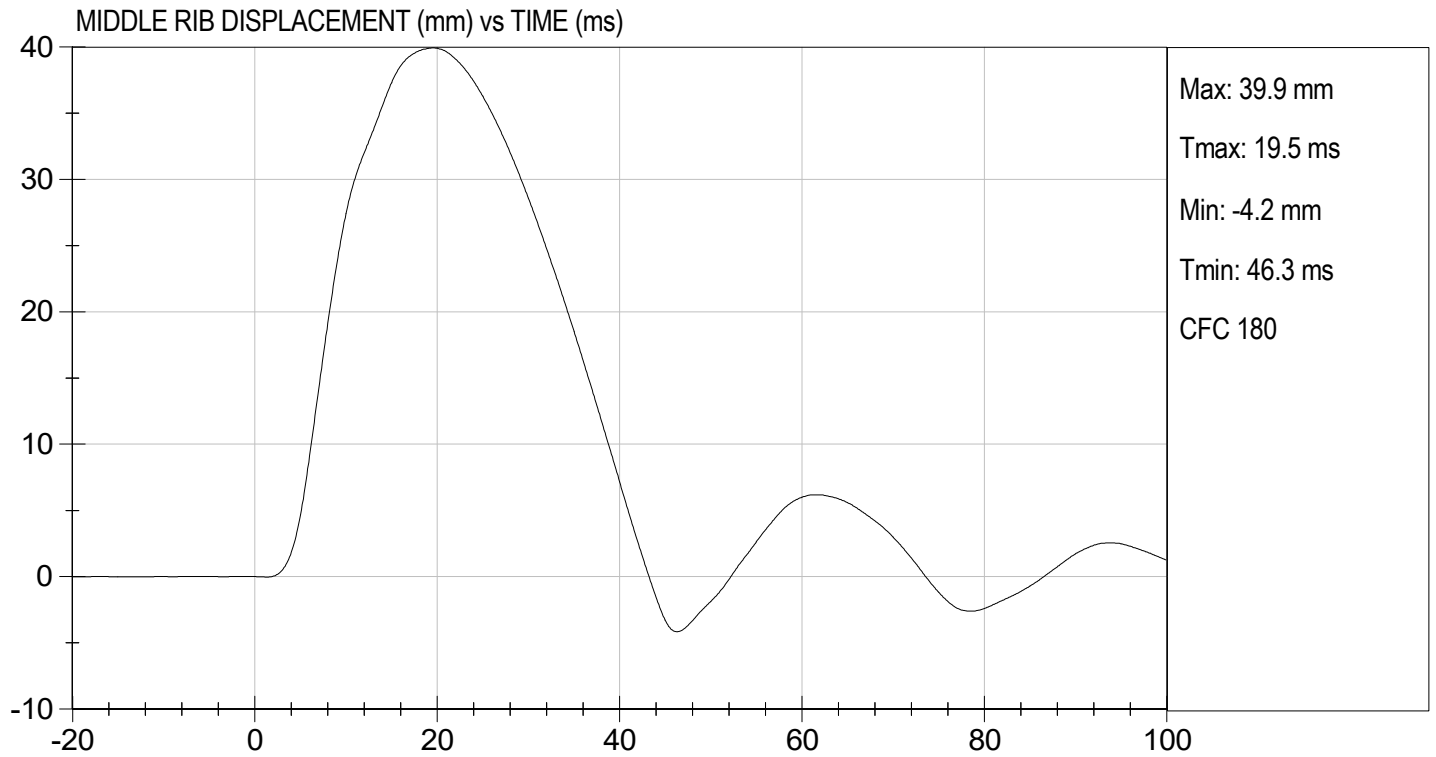
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	46	Pass
Probe Speed	m/s	5.40 to 5.60	5.46	Pass
Maximum Impactor Force (after 6 ms)	N	5100 to 6200	5944	Pass
Upper Rib Displacement	mm	34.0 to 41.0	38.2	Pass
Middle Rib Displacement	mm	37.0 to 45.0	39.9	Pass
Lower Rib Displacement	mm	37.0 to 44.0	39.0	Pass
Overall Test Results				Pass

  
 Laboratory Technician

          07/28/2023            
 Test Date

  
 Approved By





**CALIBRATION TEST RESULTS**

**POST-TEST**

**EUROSID 2 (ES-2RE) MALE – DRIVER ATD**

**ES-2re External Measurements  
SN: F032**

<b>No.</b>	<b>Name</b>	<b>Spec. (mm)</b>	<b>Result</b>	<b>Pass/Fail</b>
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**

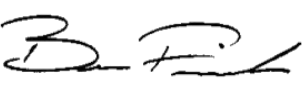
ATD Serial No:           F032          

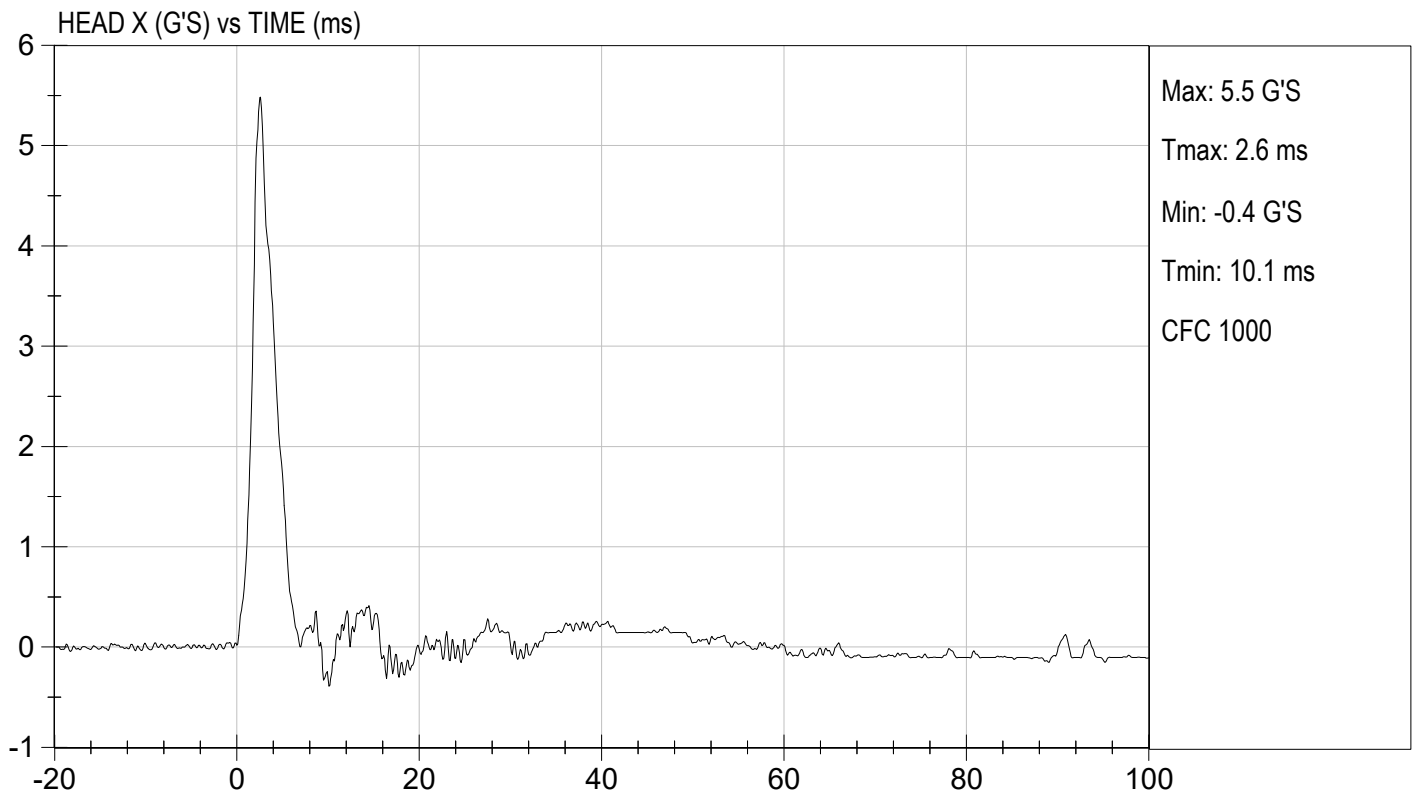
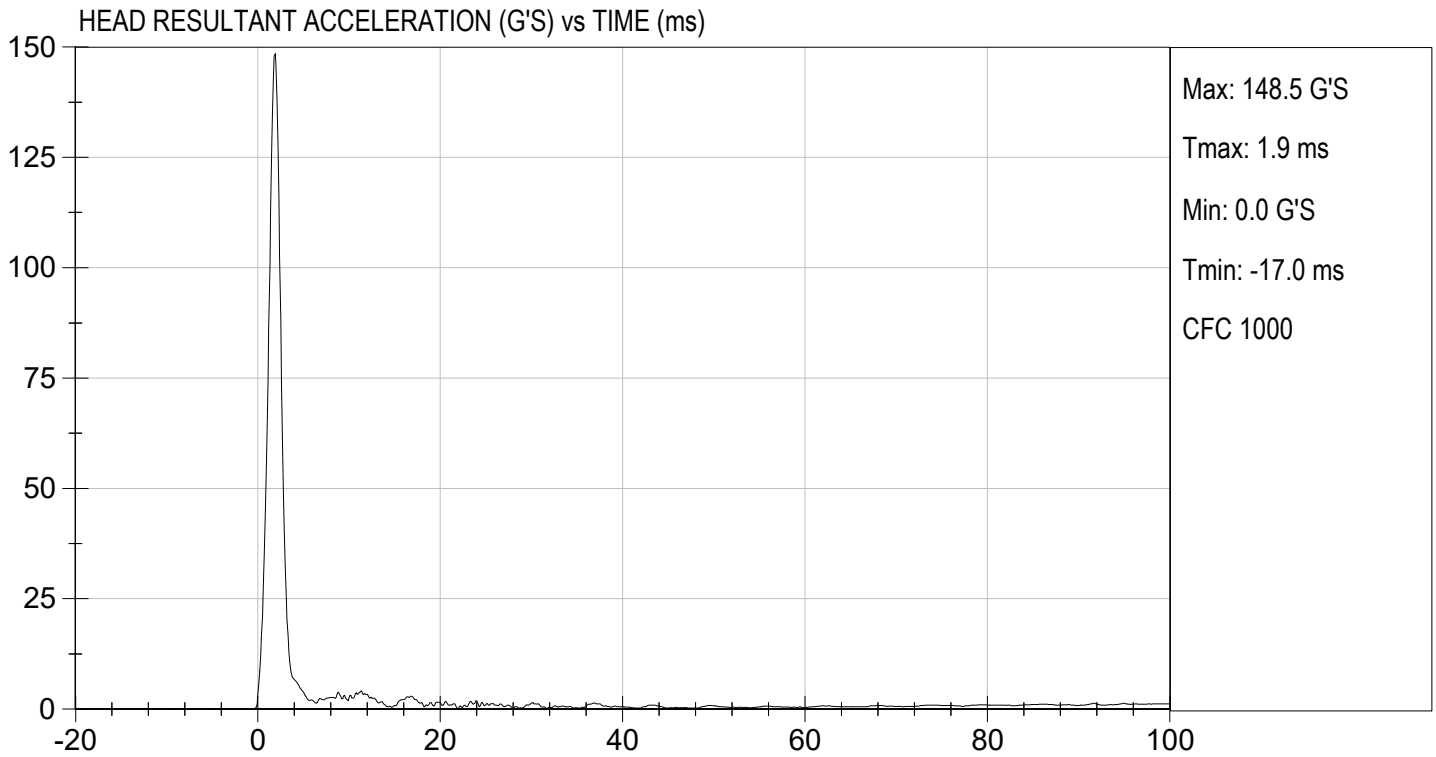
Test ID:           D232181          

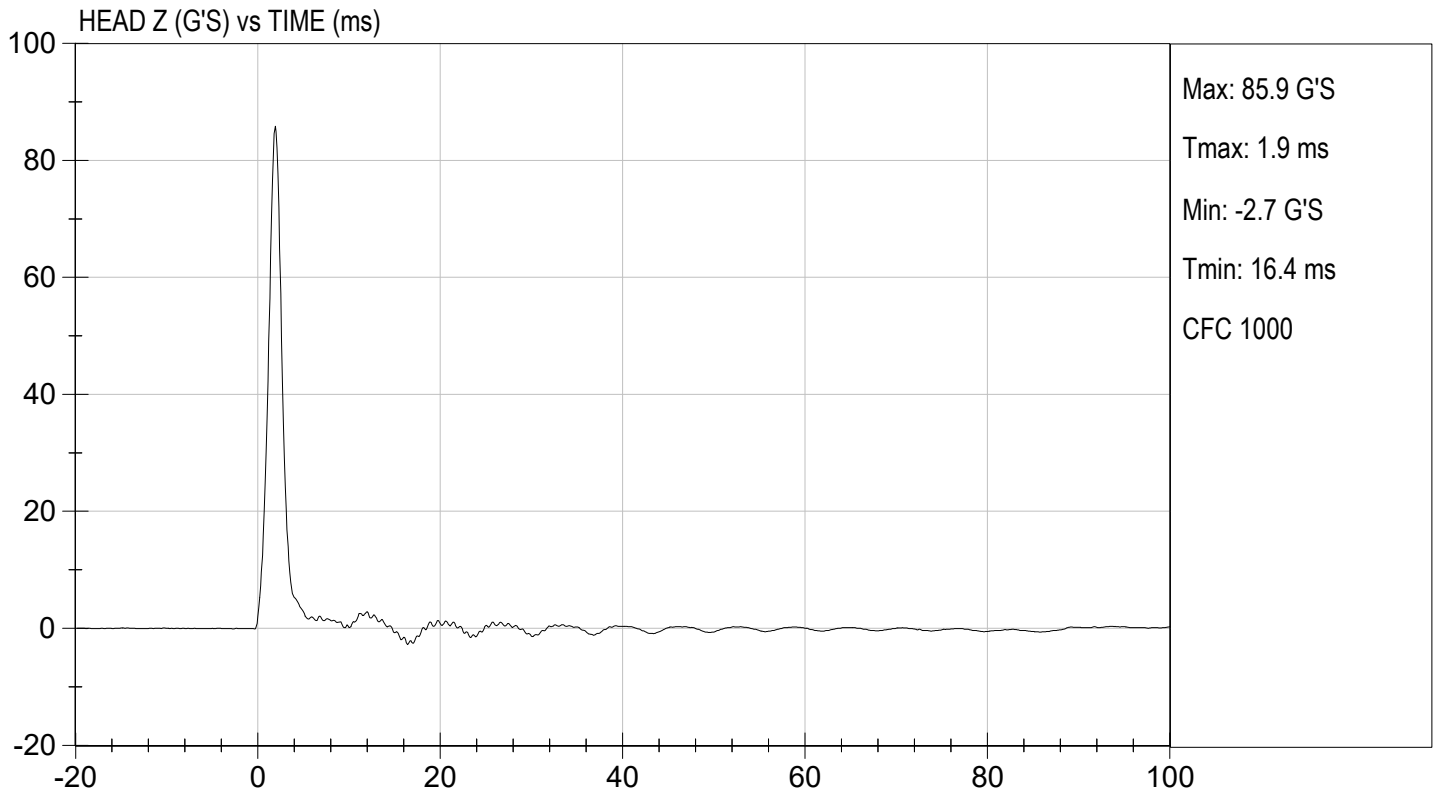
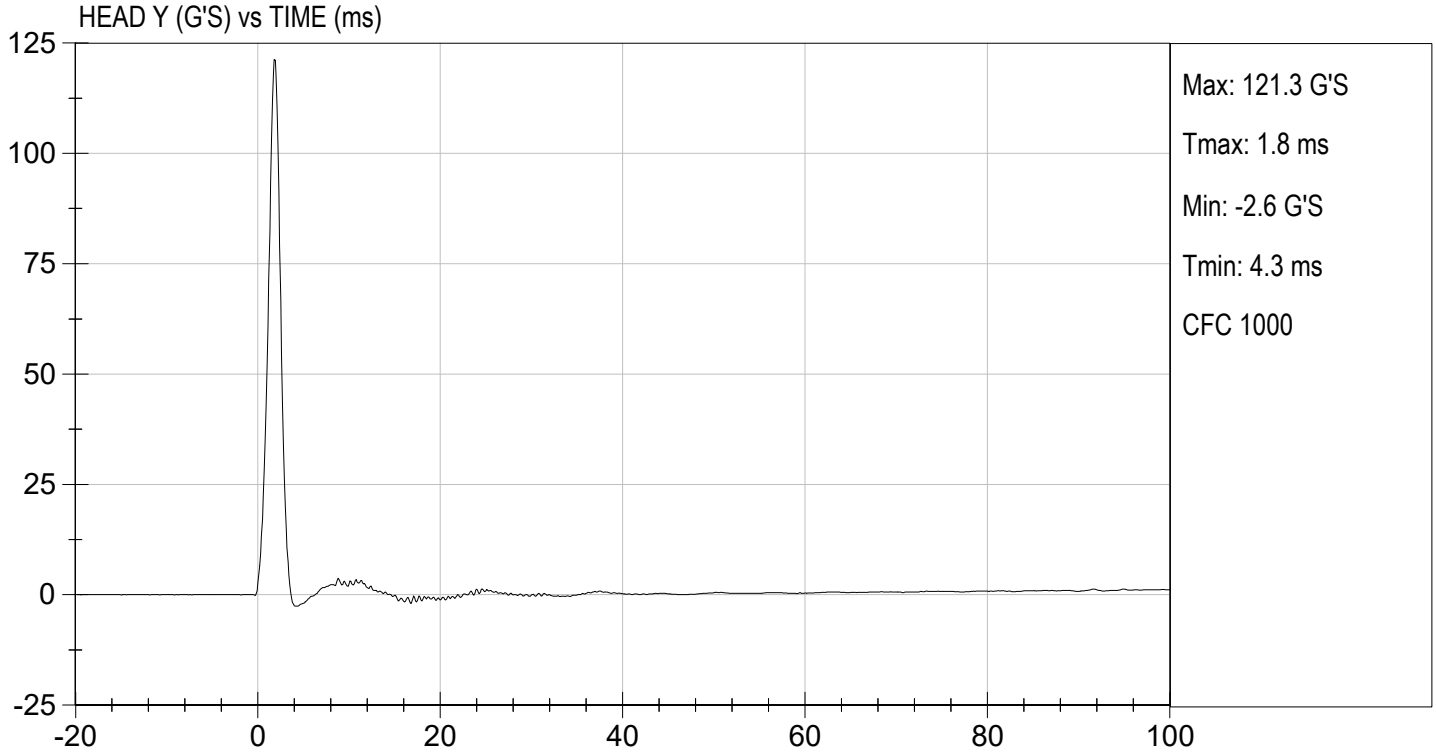
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	46	Pass
Peak Resultant Acceleration	G's	125 to 155	148	Pass
Peak Longitudinal Acceleration	G's	<= +/- 15.0	5.5	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 15% of peak	Yes	Pass
			Overall Test Results	Pass

  
 Laboratory Technician

          08/11/2023            
 Test Date

  
 Approved By





**MGA RESEARCH CORPORATION**  
**NECK PENDULUM TEST**  
**ES-2re DUMMY**


ATD Serial No:           F032          

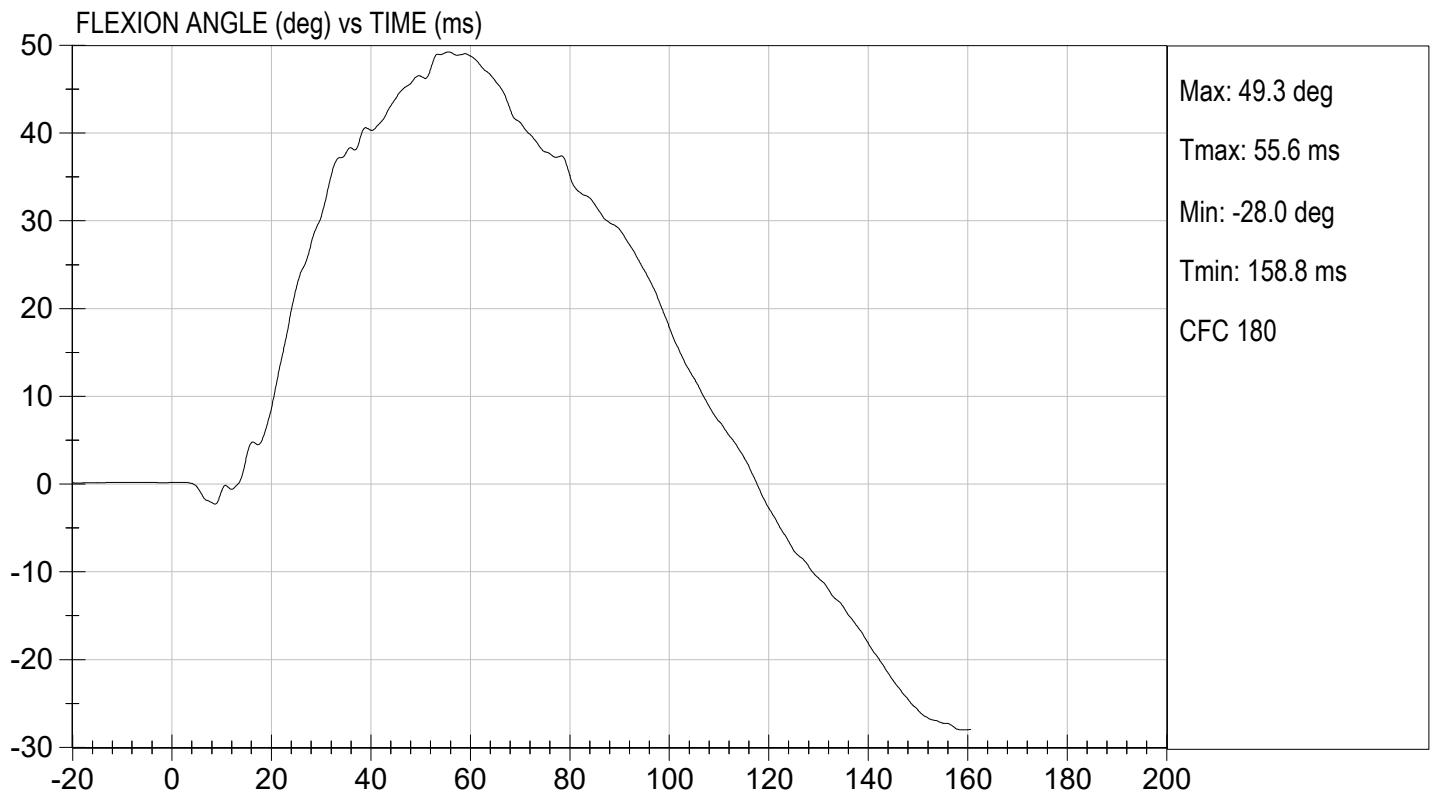
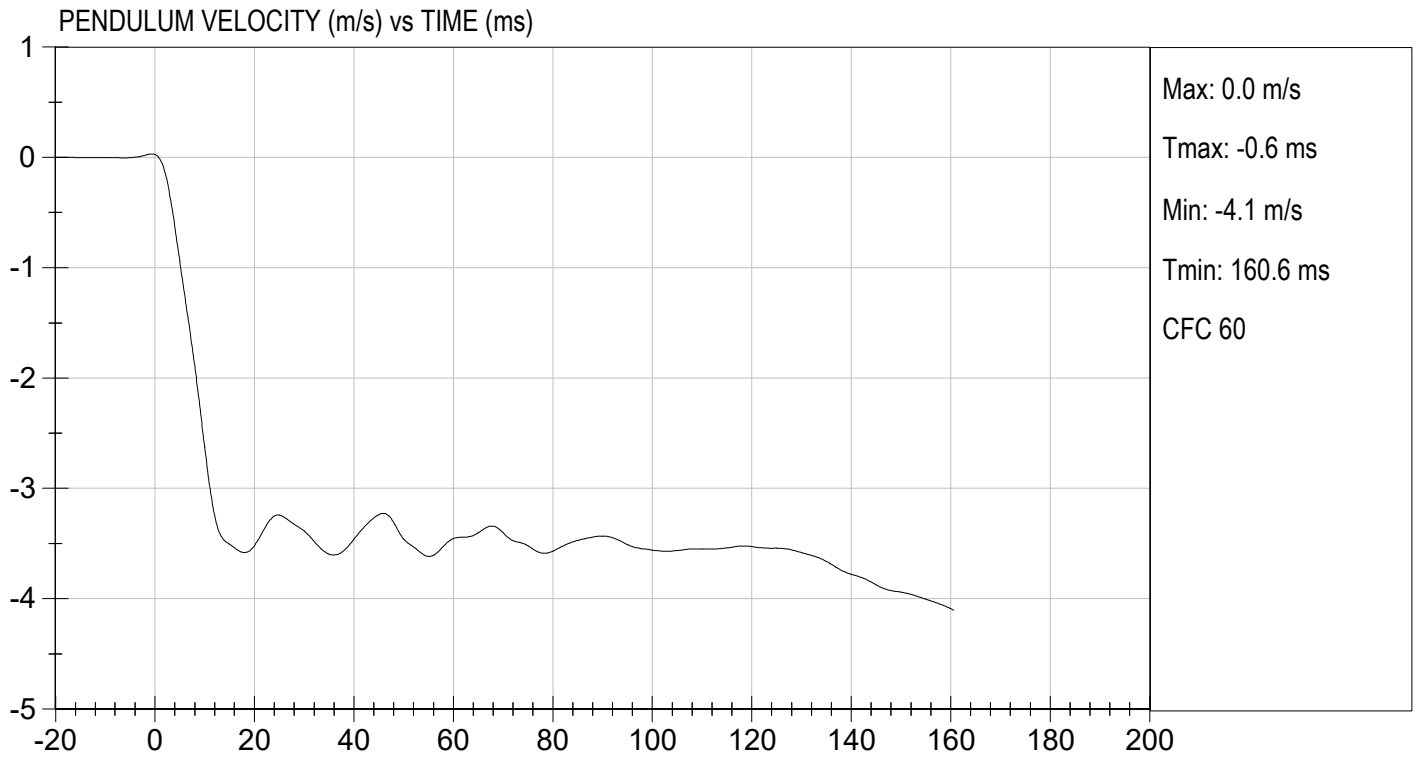
Test I.D.:           D232182          

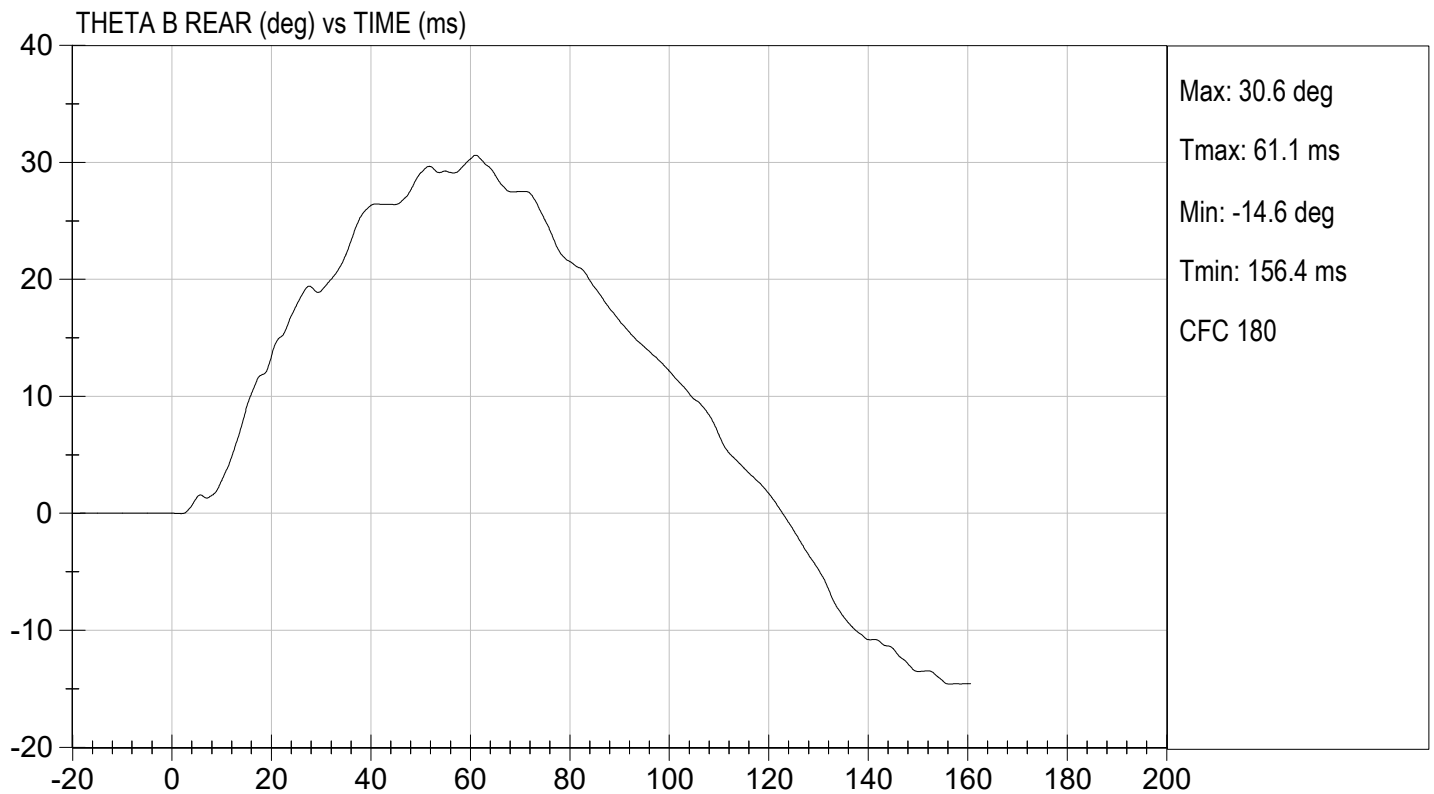
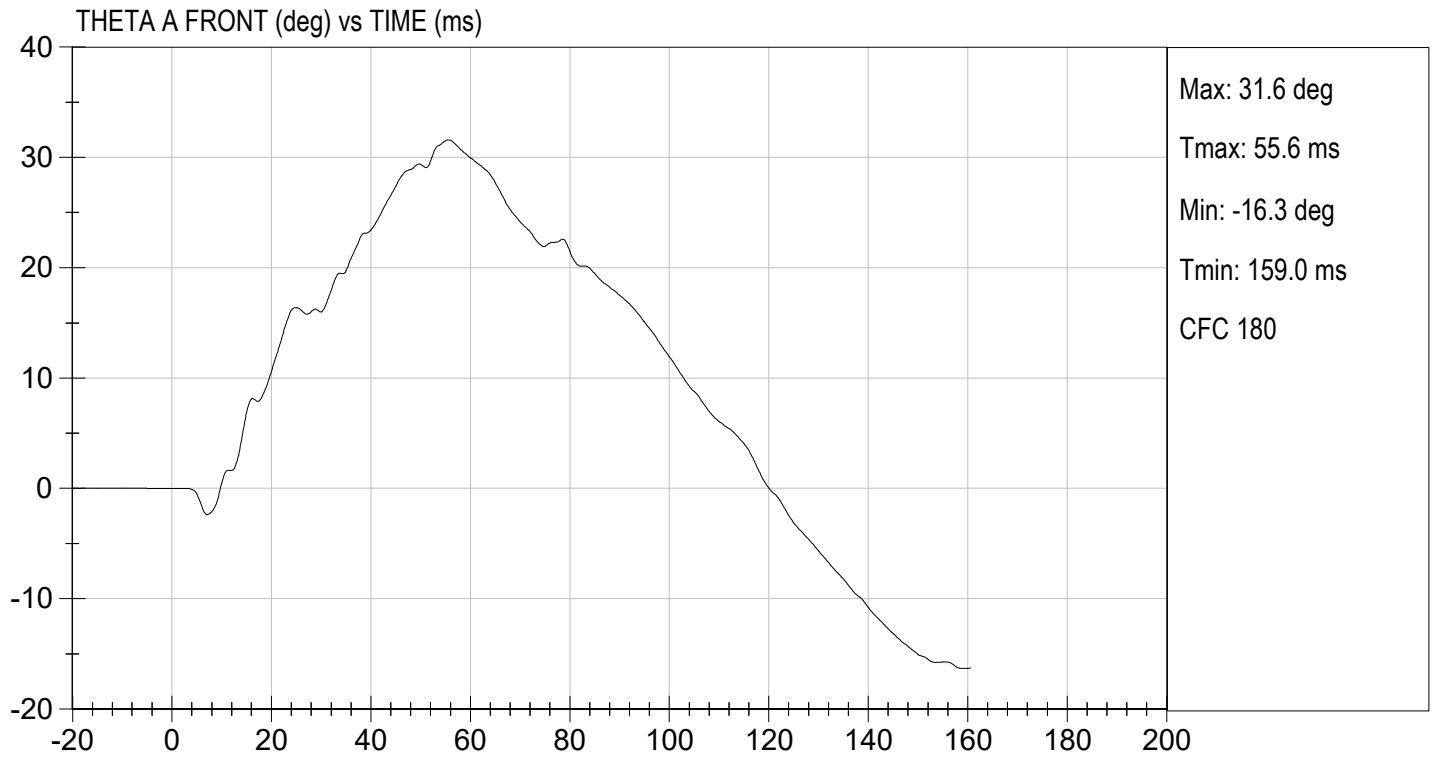
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity		%	10 to 70	45	Pass
Pendulum Speed		m/s	3.30 to 3.50	3.34	Pass
Pendulum Velocity	1 ms	m/s	-0.05 to 0.00	-0.02	Pass
	3 ms	m/s	-0.25 to -0.375	-0.34	Pass
	14 ms	m/s	-3.20 to -3.70	-3.47	Pass
	17 ms	m/s	>= -3.70	-3.57	Pass
Maximum Flexion Angle		deg	49.0 to 59.0	49.3	Pass
Time of Maximum Flexion Angle		ms	54.0 to 66.0	55.6	Pass
Head Rotation Decay Time to 0 Degree		ms	53.0 to 88.0	62.1	Pass
Overall Results					Pass

  
 Laboratory Technician

          08/11/2023            
 Test Date

  
 Approved By

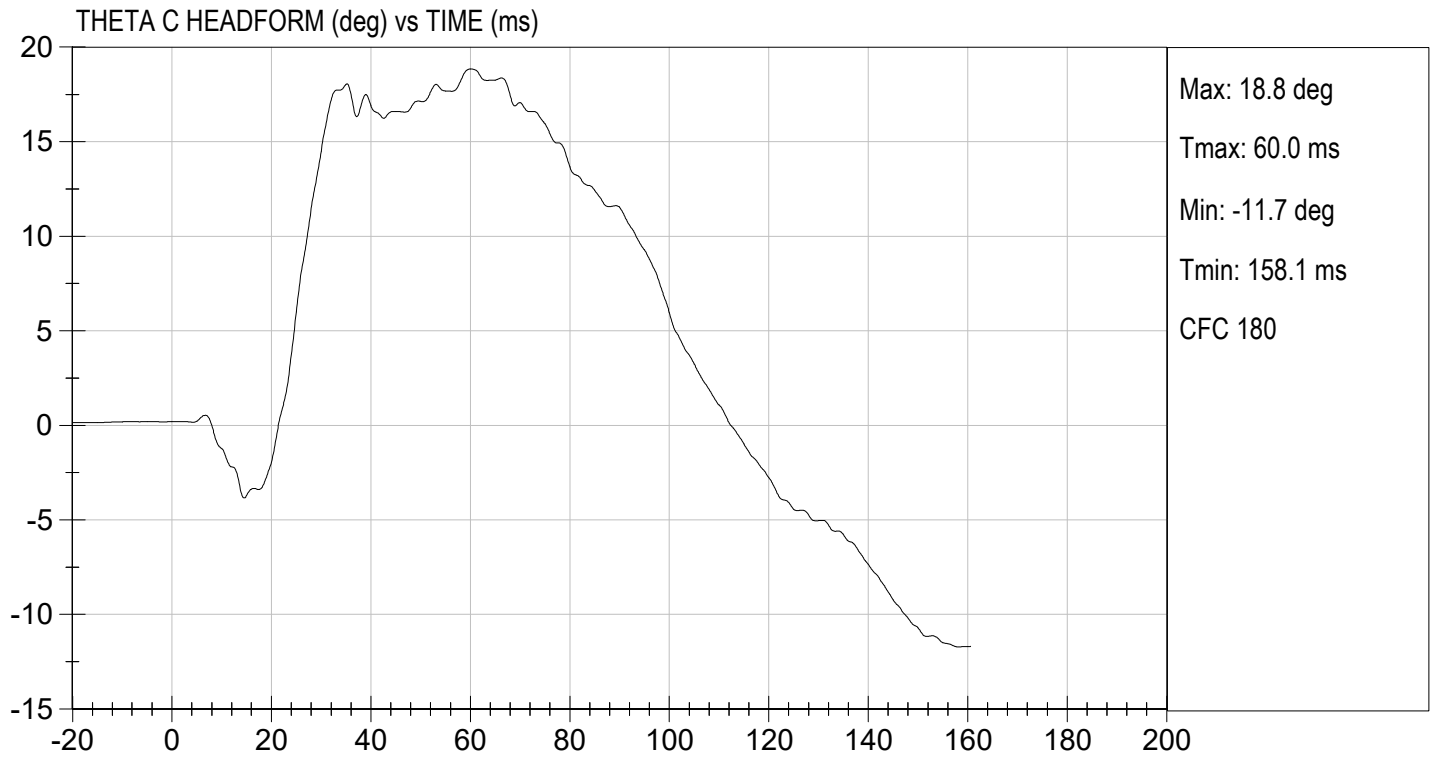






TEST DESC: NECK BENDING  
VELOCITY: 10.96 ft/s, 3.34 m/s

TEST DATE: 08/11/2023  
TEST #: D232182



**MGA RESEARCH CORPORATION**  
**SHOULDER IMPACT TEST**  
**ES-2re DUMMY**

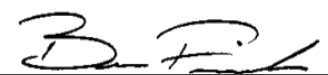
ATD Serial No:           F032          

Test I.D:           D232183          

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	48	Pass
Pendulum Speed	m/s	4.20 to 4.40	4.27	Pass
Peak Impactor Acceleration	G's	7.5 to 10.5	8.5	Pass
Overall Test Results				Pass

  
 \_\_\_\_\_  
 Laboratory Technician

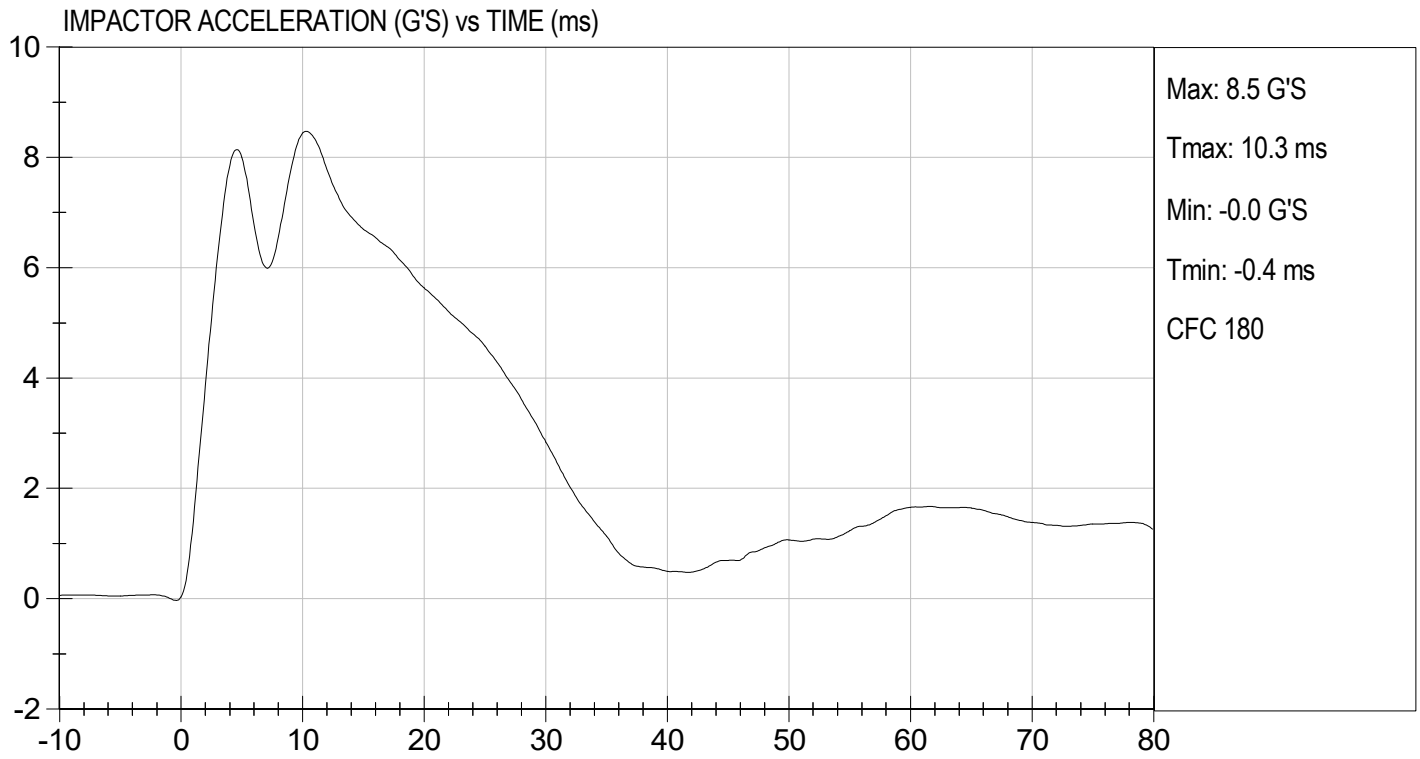
          08/11/2023            
 \_\_\_\_\_  
 Test Date

  
 \_\_\_\_\_  
 Approved By



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

TEST DATE: 08/11/2023  
TEST #: D232183



MGA RESEARCH CORPORATION

UPPER RIB TEST

ES-2re DUMMY

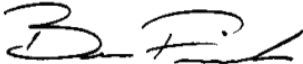
ATD Serial No:       F032      

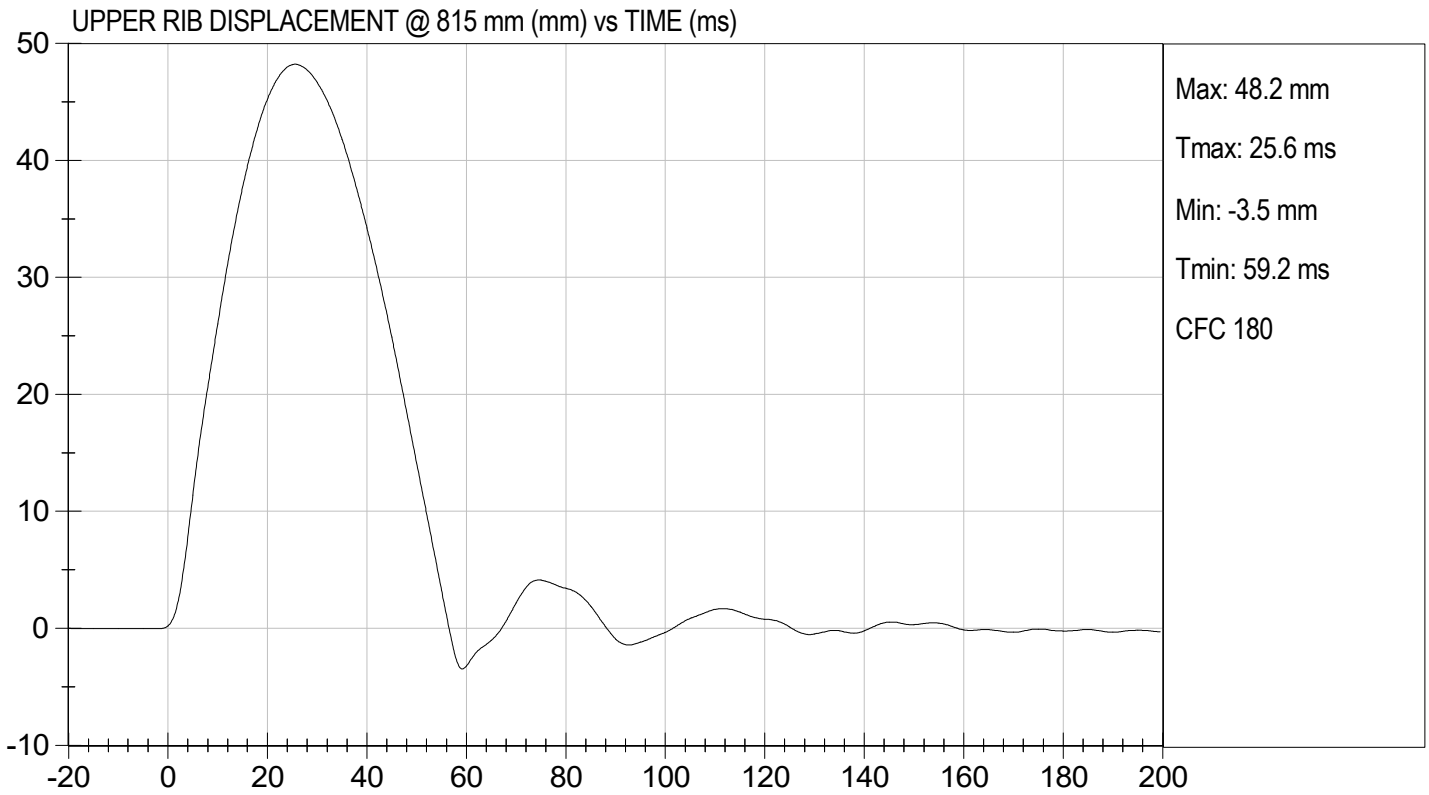
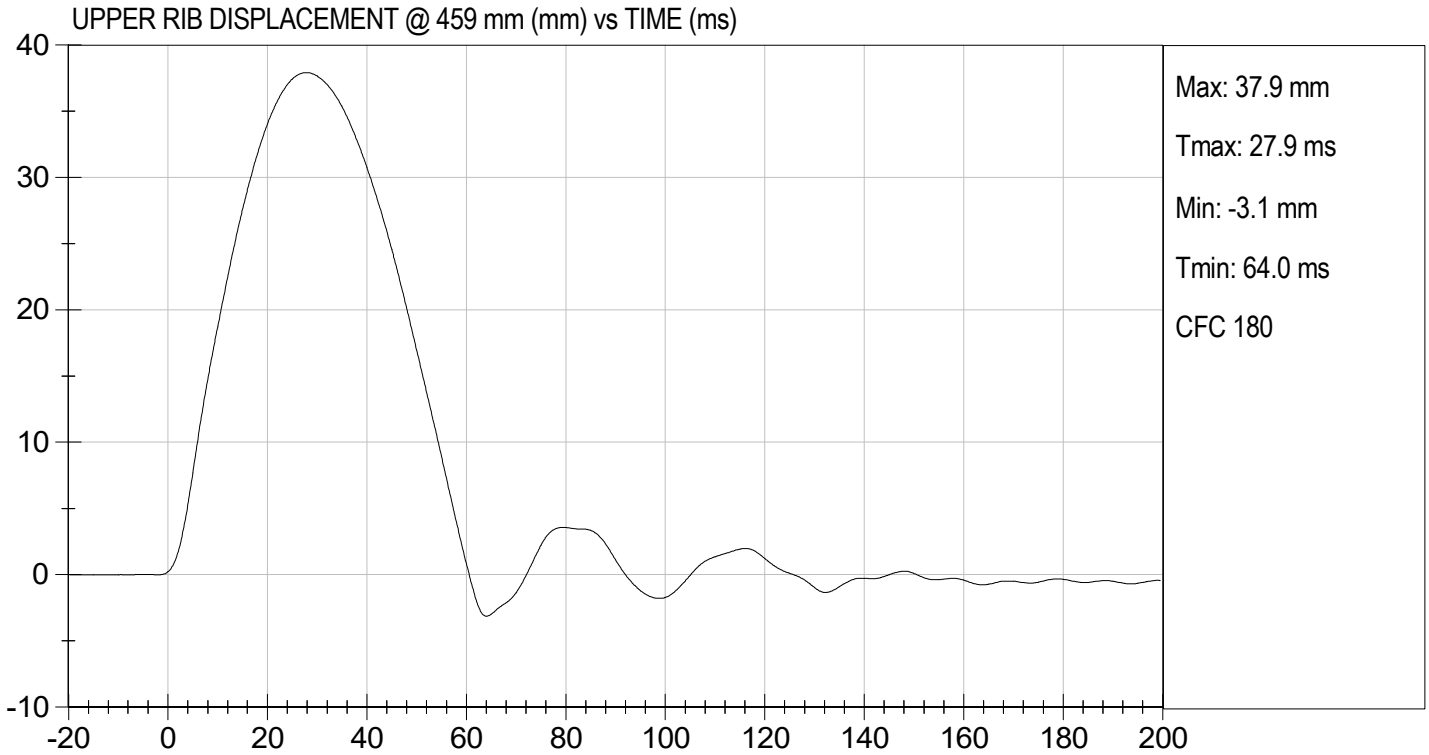
Test I.D:       D232184      

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	43	Pass
Displacement at 459 mm	mm	36.0 to 40.0	37.9	Pass
Displacement at 815 mm	mm	46.0 to 51.0	48.2	Pass
			Overall Test Results	Pass

  
\_\_\_\_\_  
Laboratory Technician

08/11/2023  
Test Date

  
\_\_\_\_\_  
Approved By



**MGA RESEARCH CORPORATION**

**MID RIB TEST**

**ES-2re DUMMY**

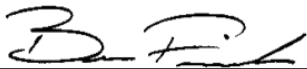
**ATD Serial No:** F032

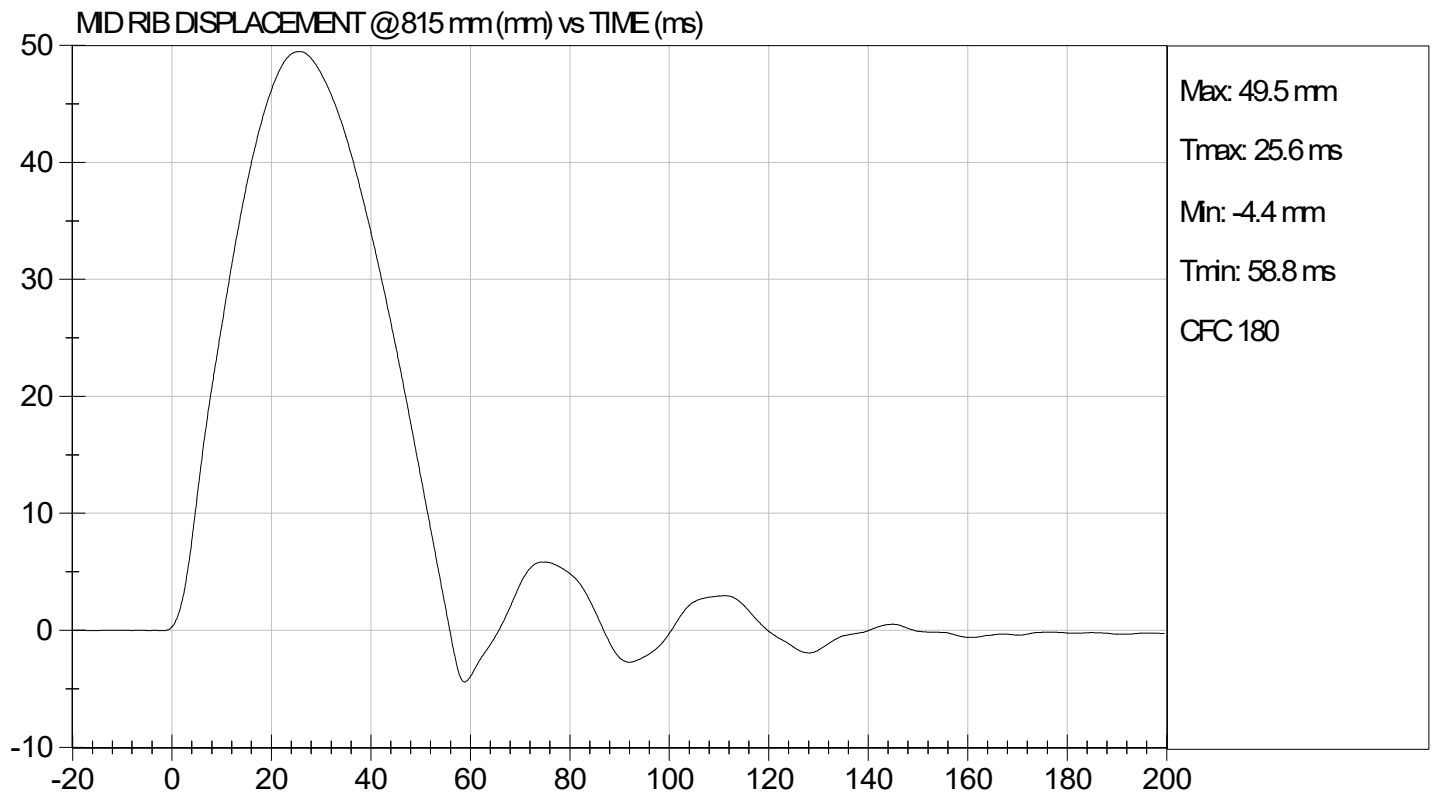
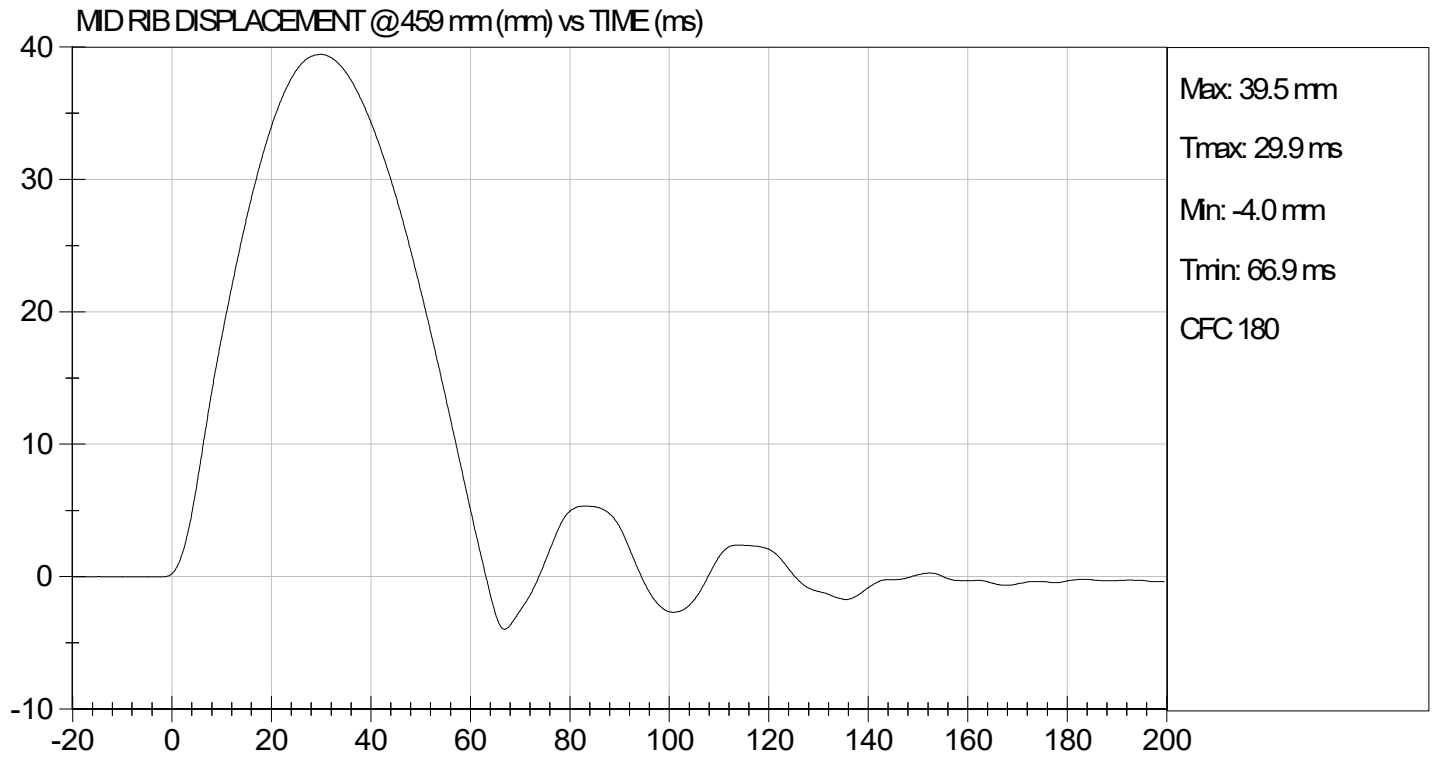
**Test I.D.:** D232185

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	43	Pass
Displacement at 459 mm	mm	36.0 to 40.0	39.5	Pass
Displacement at 815 mm	mm	46.0 to 51.0	49.5	Pass
Overall Test Results			Pass	

  
\_\_\_\_\_  
Laboratory Technician

08/11/2023  
Test Date

  
\_\_\_\_\_  
Approved By



**MGA RESEARCH CORPORATION**

**LOWER RIB TEST**

**ES-2re DUMMY**

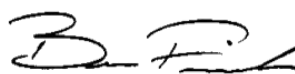
**ATD Serial No:**       F032      

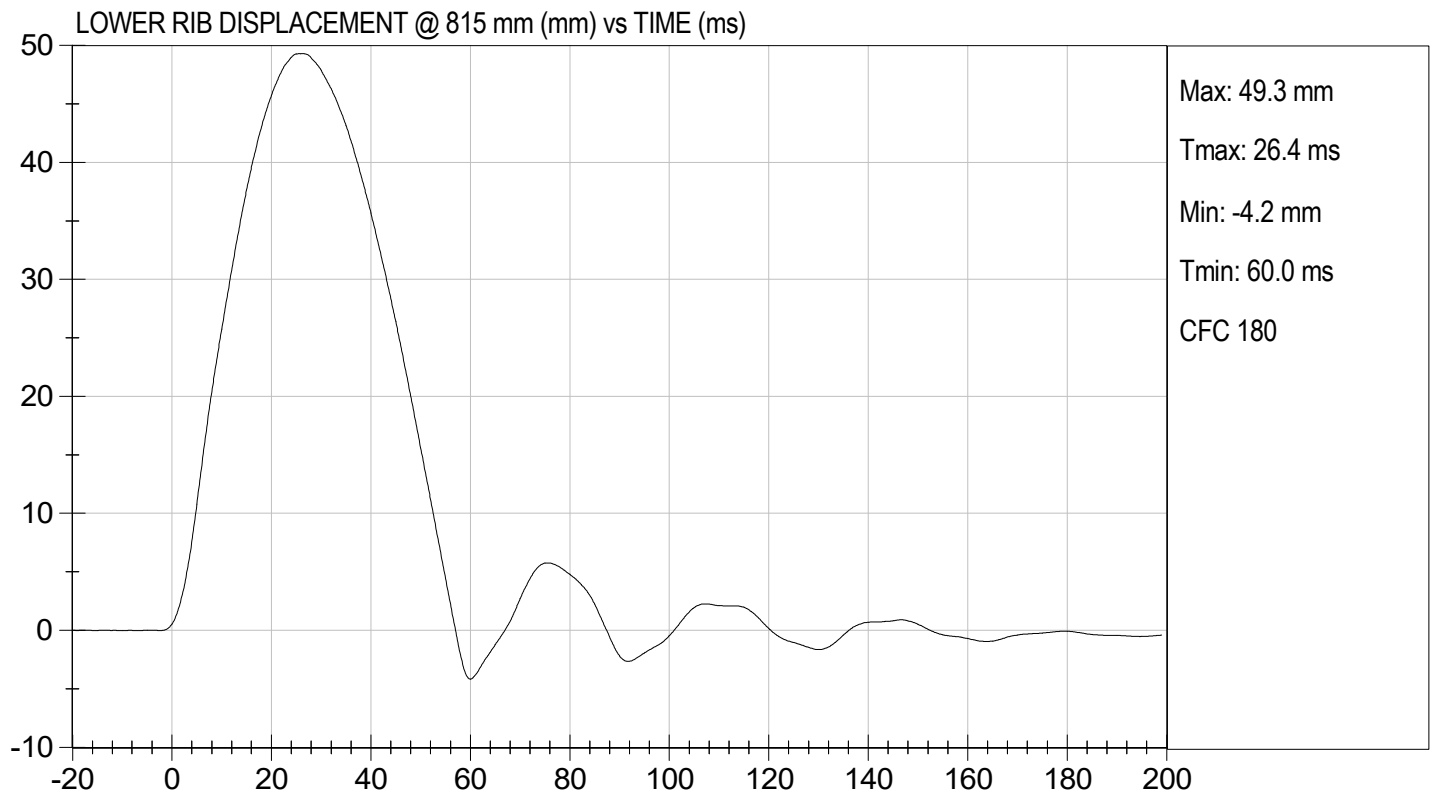
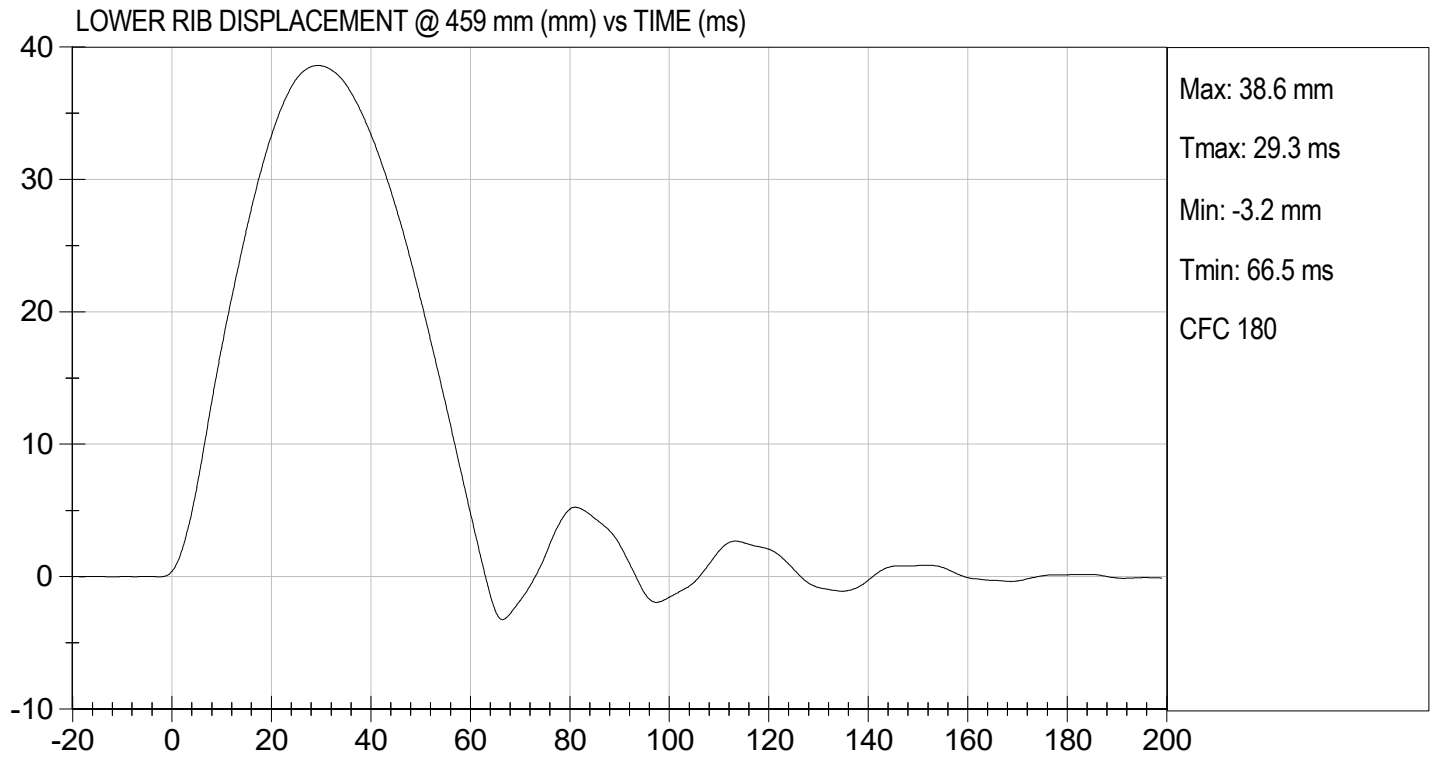
**Test I.D.:**       D232186      

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	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

  
\_\_\_\_\_  
Laboratory Technician

08/11/2023  
Test Date

  
\_\_\_\_\_  
Approved By



**MGA RESEARCH CORPORATION**

**ABDOMEN TEST**

**ES-2re DUMMY**

**ATD Serial No:**           F032          

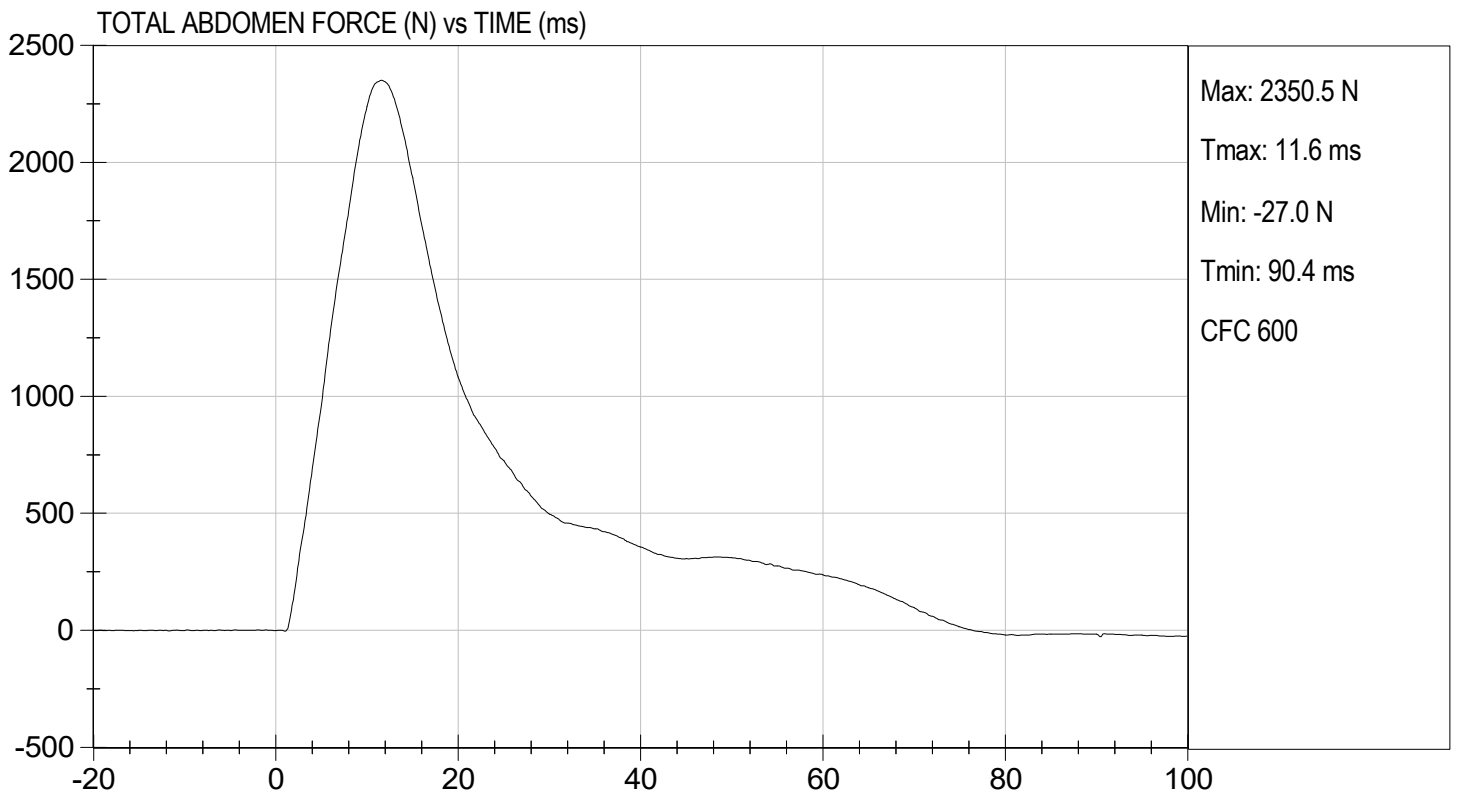
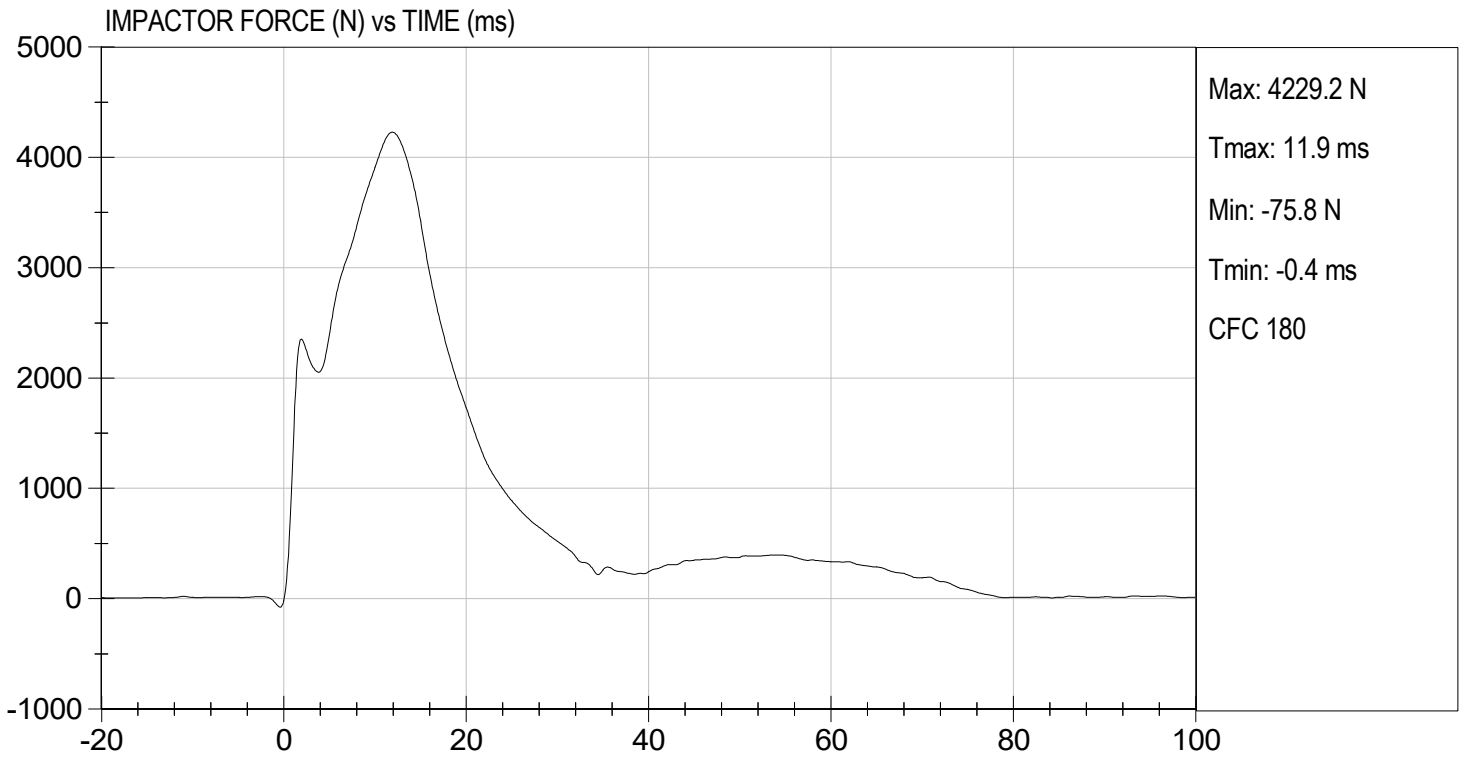
**Test I.D:**           D232187          

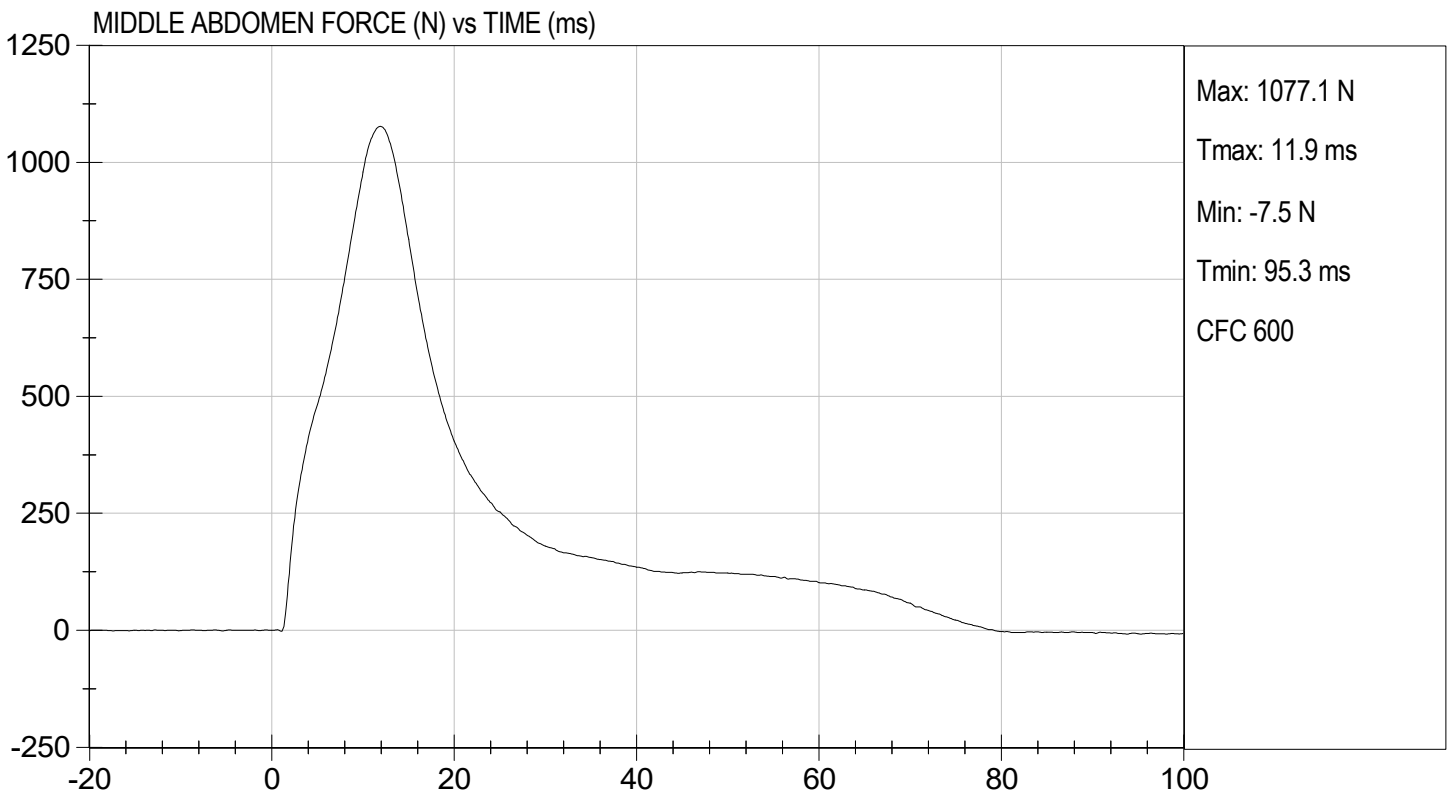
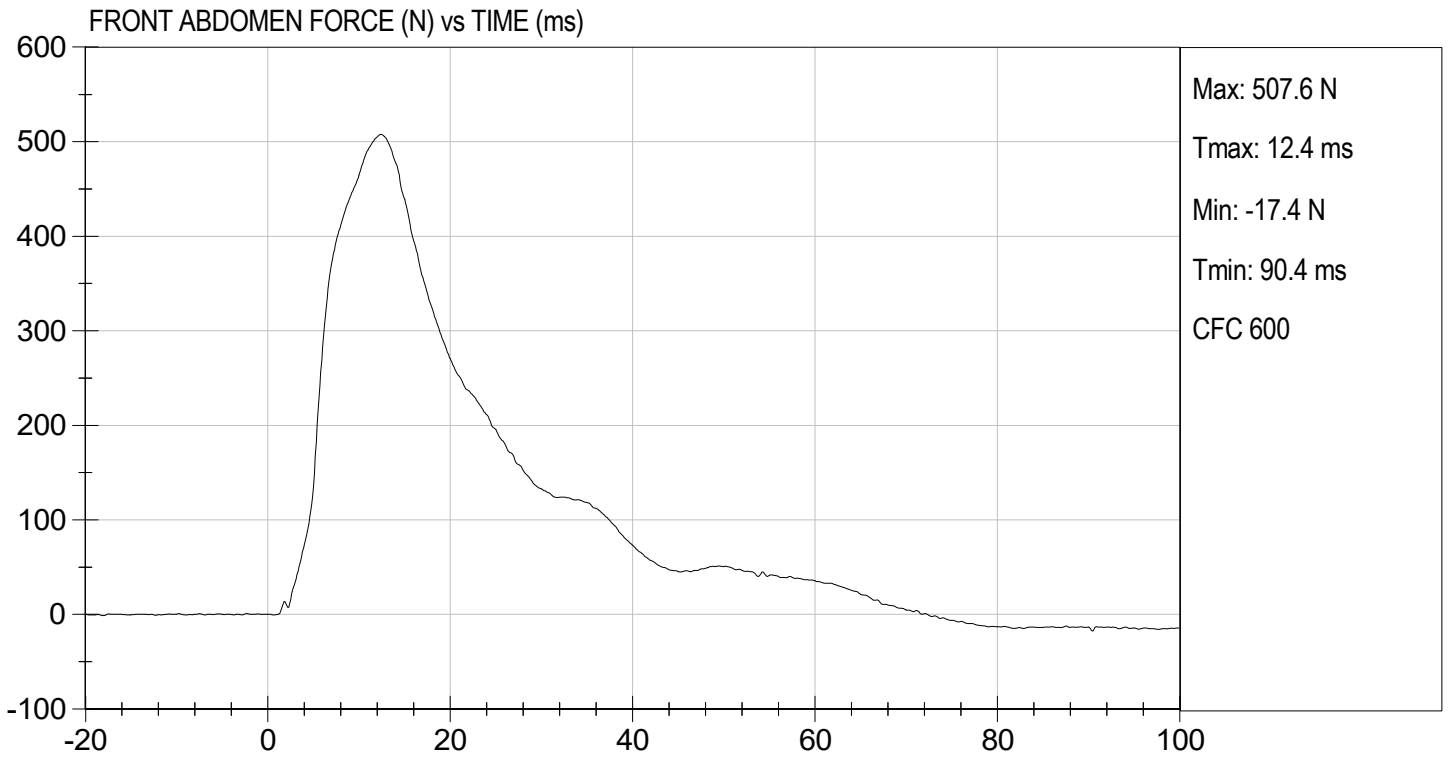
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	47	Pass
Probe Speed	m/s	3.90 to 4.10	4.01	Pass
Maximum Impactor Force	N	4000 to 4800	4229	Pass
Time of Maximum Impactor Force	ms	10.6 to 13.0	11.9	Pass
Maximum Total Abdomen Force	N	2200 to 2700	2351	Pass
Time of Maximum Abdomen Force	ms	10.0 to 12.3	11.6	Pass
Overall Test Results				Pass

  
\_\_\_\_\_  
Laboratory Technician

          08/11/2023            
Test Date

  
\_\_\_\_\_  
Approved By

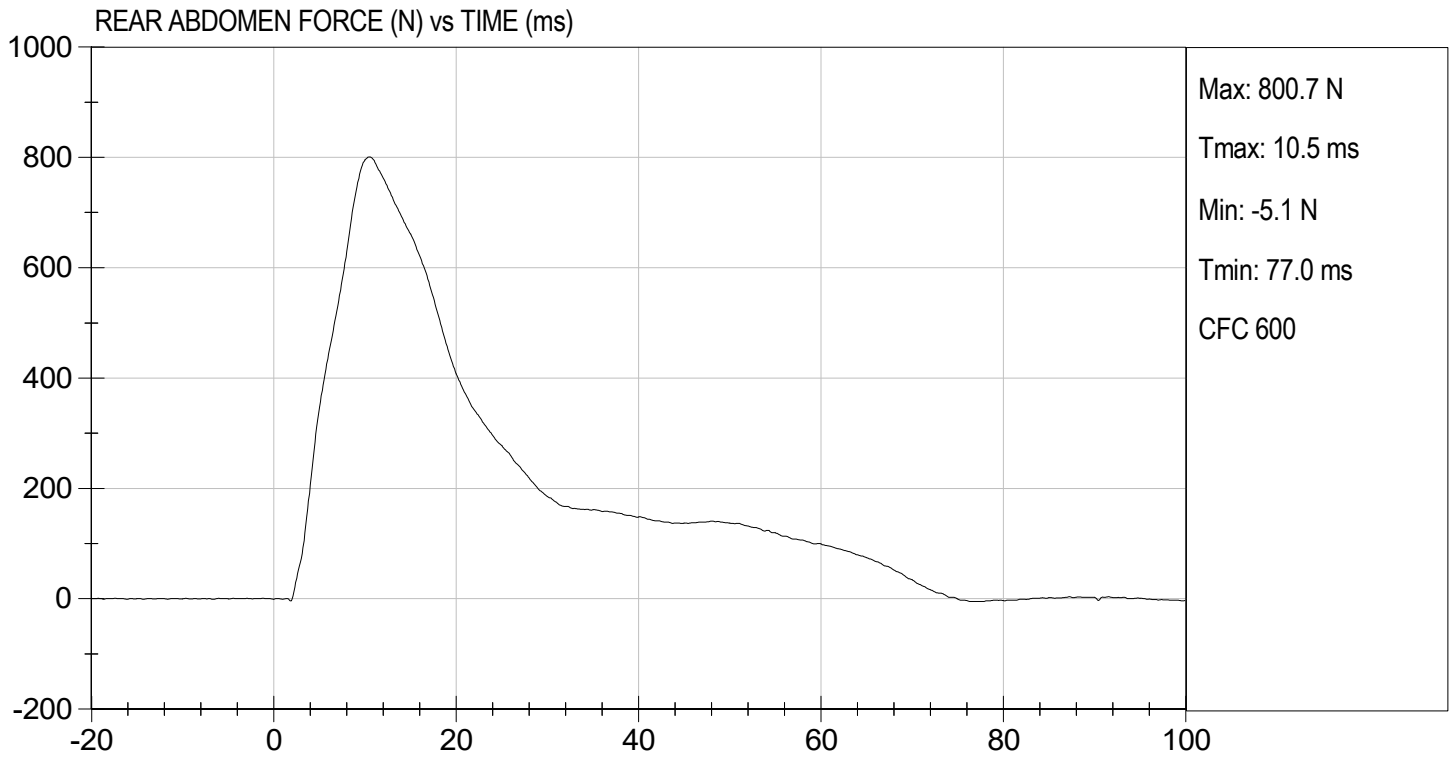






TEST DESC: ABDOMEN IMPACT  
VELOCITY: 13.15 ft/s, 4.01 m/s

TEST DATE: 08/11/2023  
TEST #: D232187



**MGA RESEARCH CORPORATION**  
**LUMBAR SPINE TEST**  
**ES-2re DUMMY**

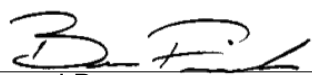
ATD Serial No:           F032          

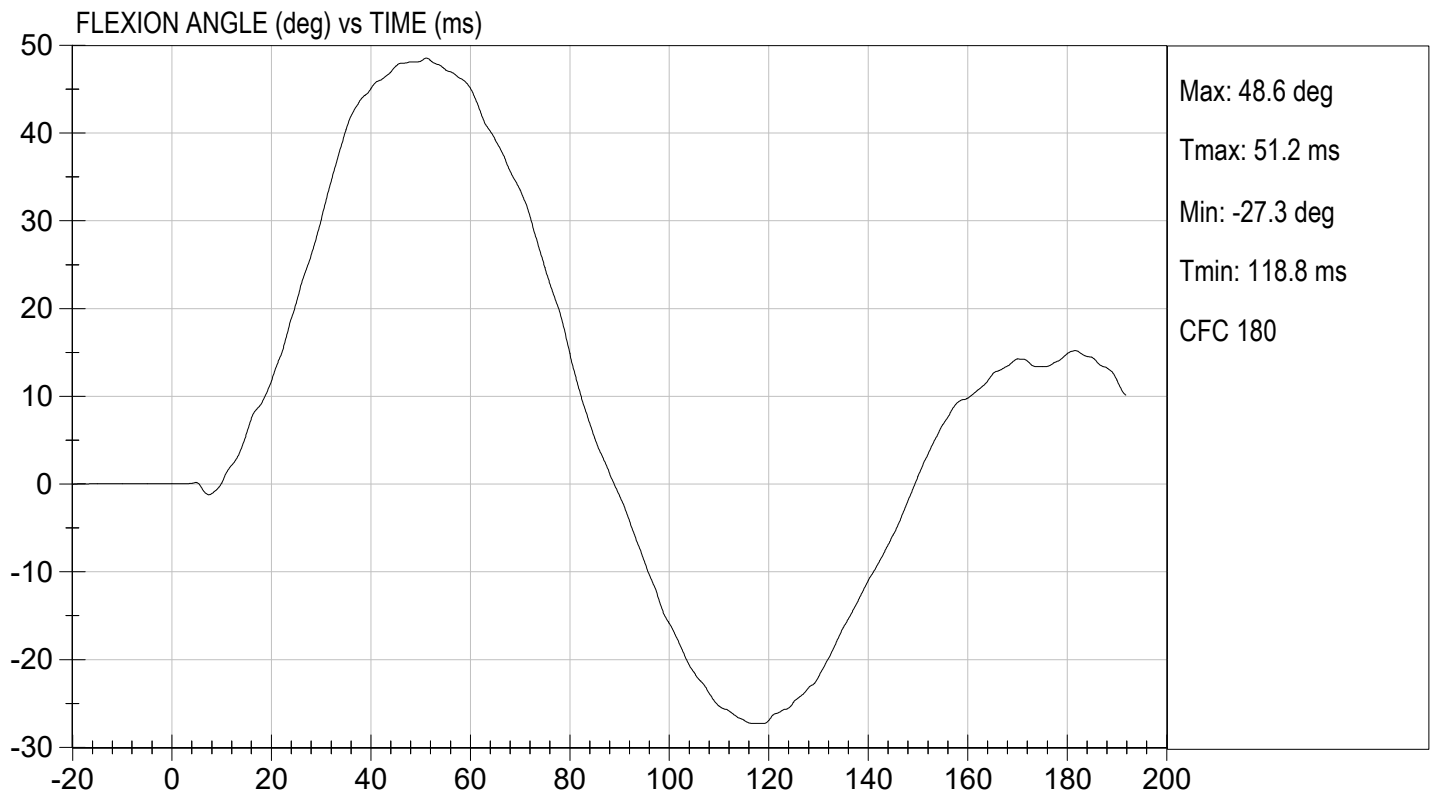
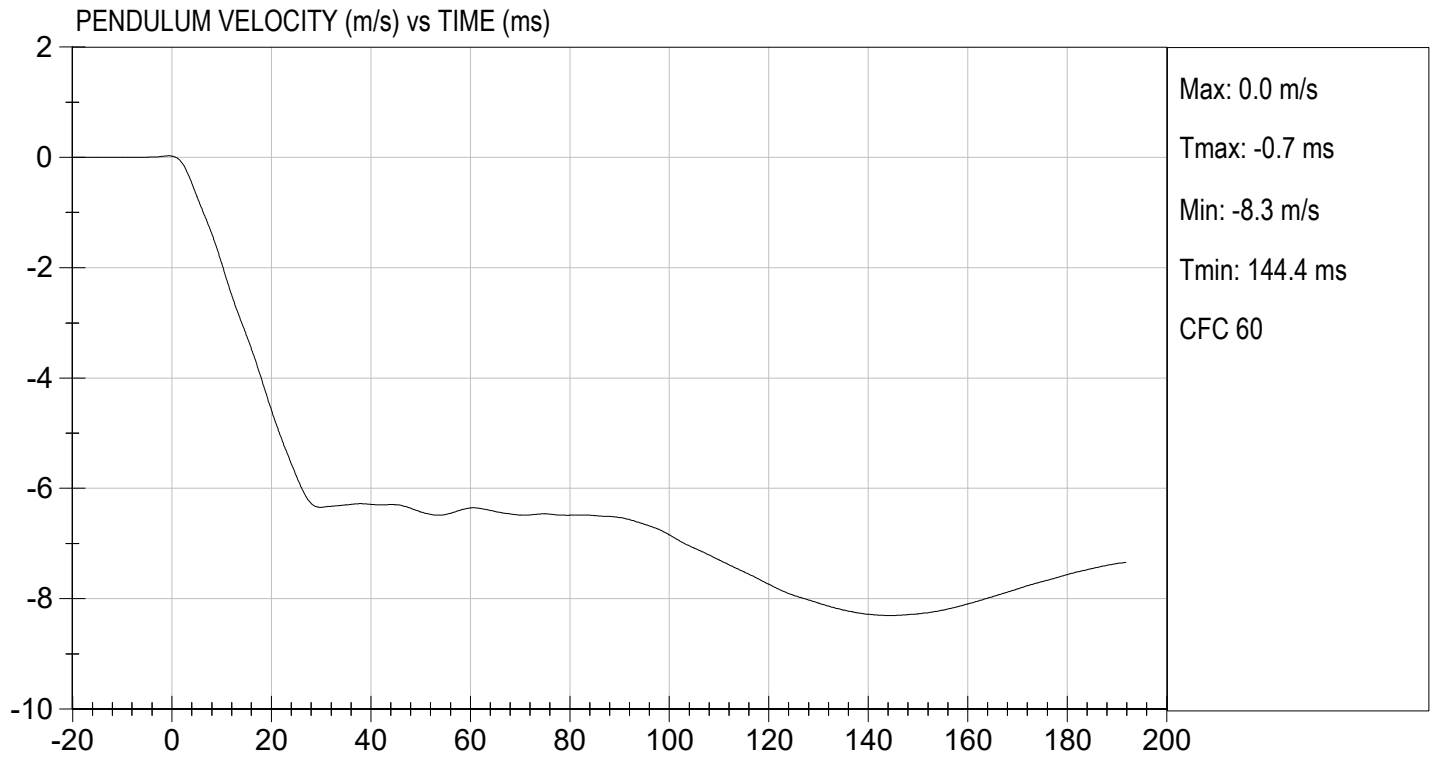
Test I.D.:           D232188          

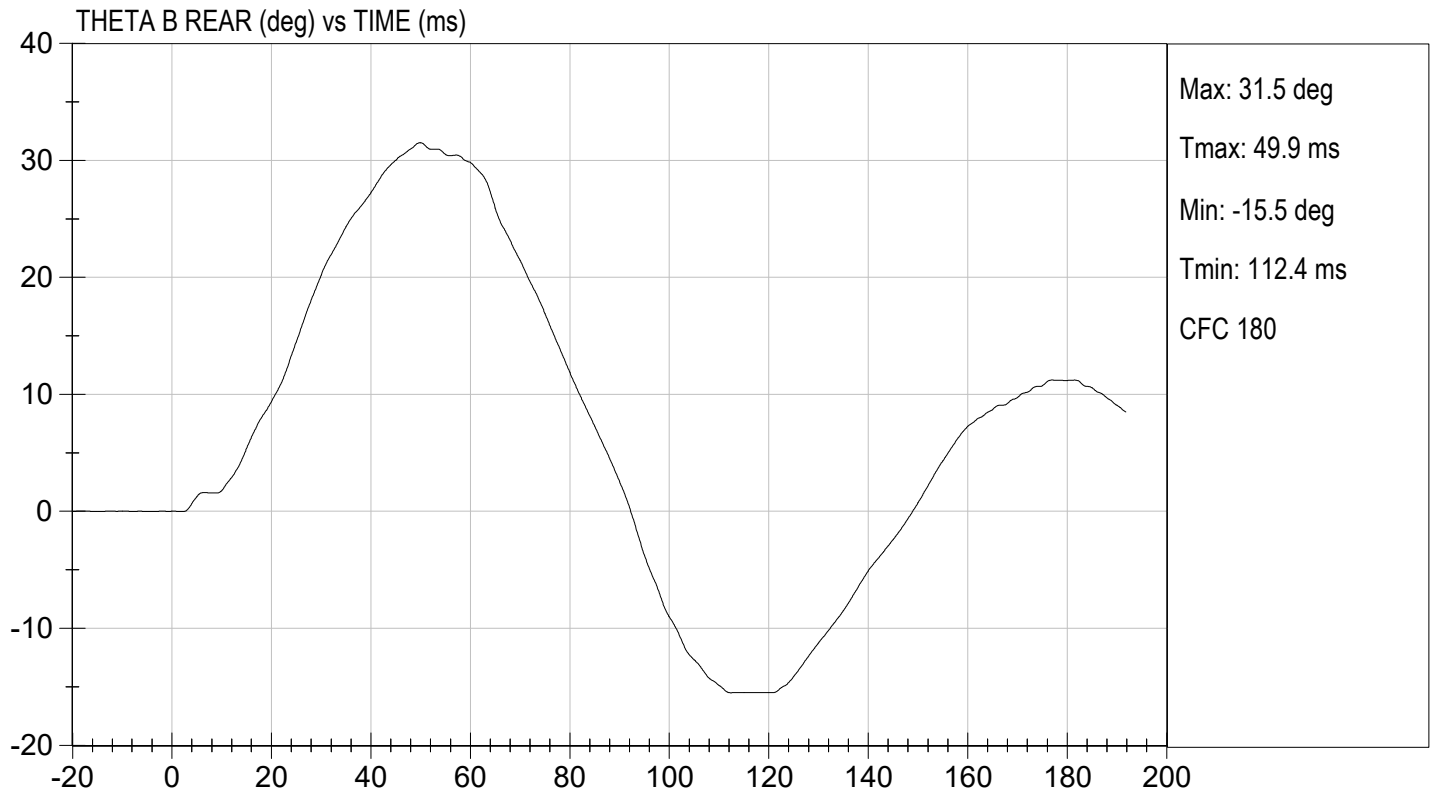
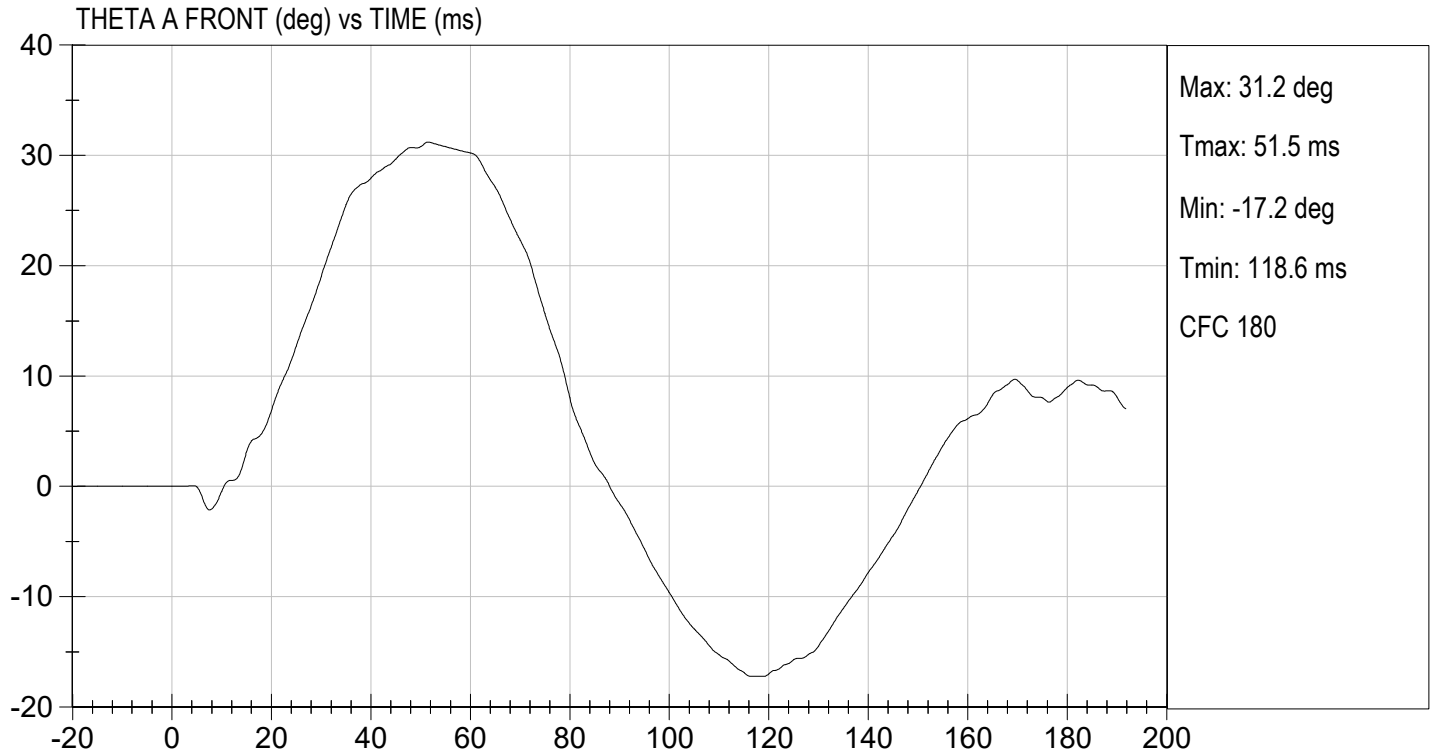
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity		%	10 to 70	47	Pass
Pendulum Speed		m/s	5.95 to 6.15	6.12	Pass
Pendulum Velocity	1 ms	m/s	-0.05 to 0.00	-0.01	Pass
	3.7 ms	m/s	-0.425 to -0.24	-0.402	Pass
	27 ms	m/s	-6.50 to -5.80	-6.15	Pass
	30 ms	m/s	>= -6.50	-6.34	Pass
Maximum Flexion Angle		deg	45.0 to 55.0	48.6	Pass
Time of Maximum Flexion Angle		ms	39.0 to 53.0	51.2	Pass
Headform Rotation Decay to Initial Position		ms	37 to 57	38	Pass
<b>Overall Results</b>					<b>Pass</b>

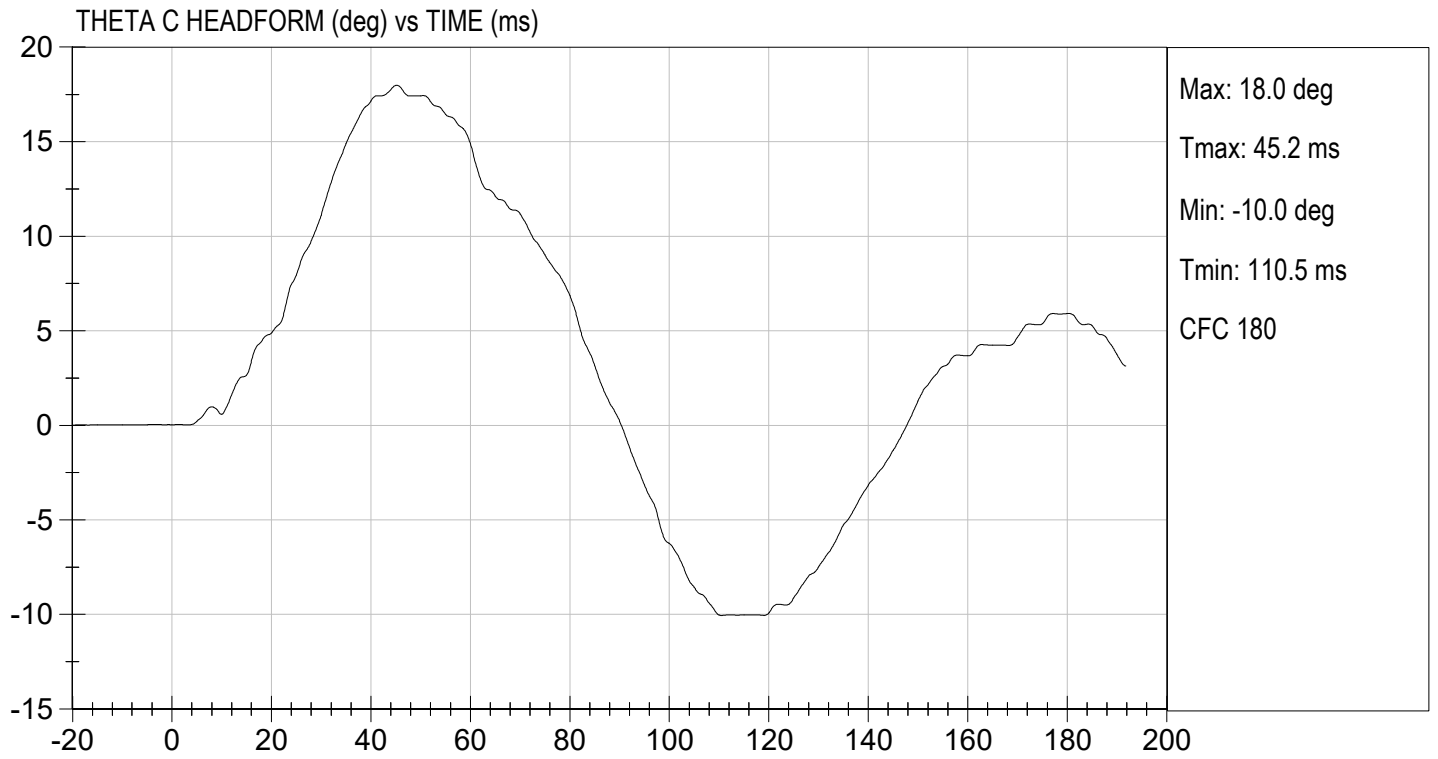
  
 Laboratory Technician

          08/11/2023            
 Test Date

  
 Approved By







**MGA RESEARCH CORPORATION**

**PELVIS TEST  
ES-2re DUMMY**

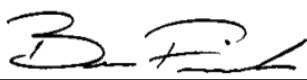
**ATD Serial No:**       F032      

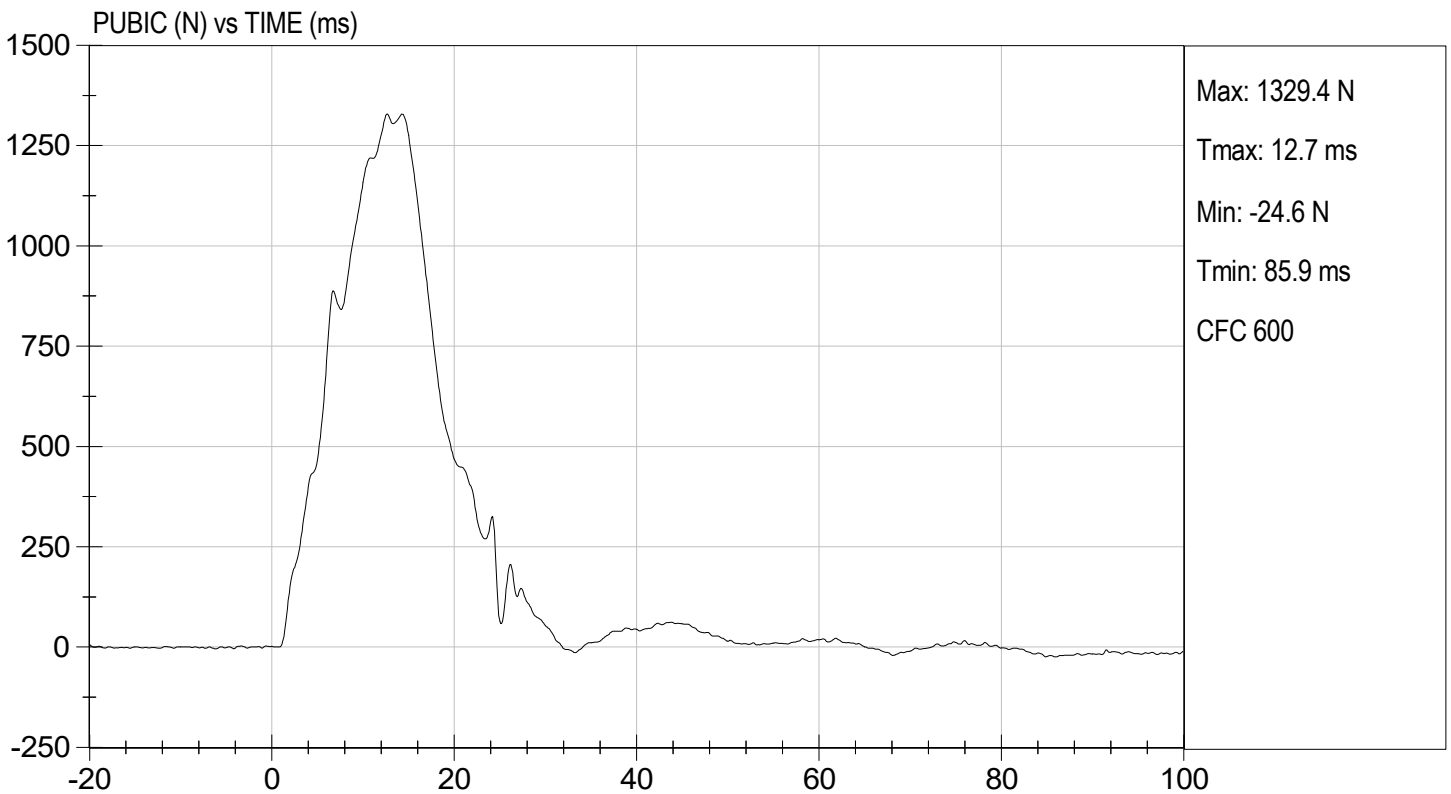
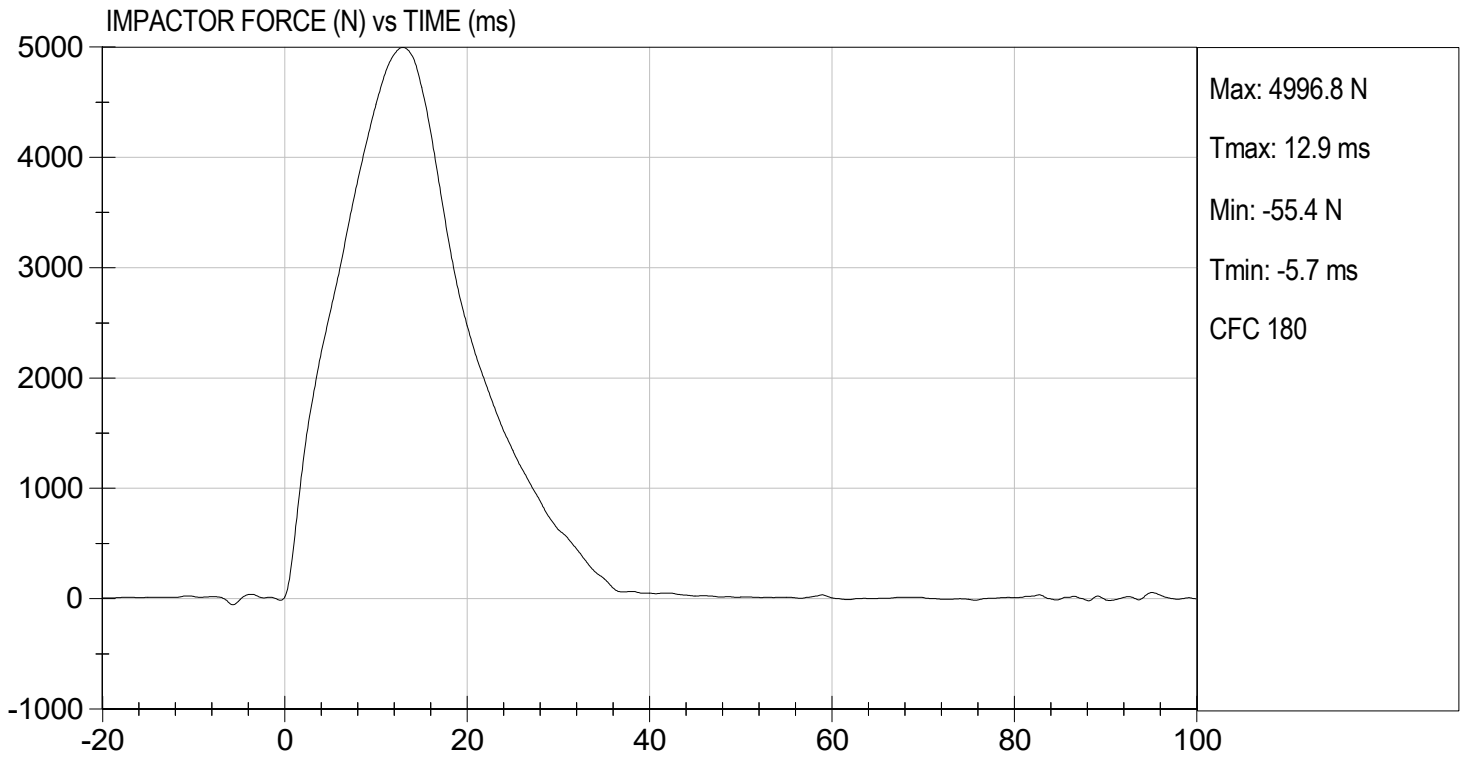
**Test I.D.:**       D232189      

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	48	Pass
Probe Speed	m/s	4.20 to 4.40	4.38	Pass
Maximum Impactor Force	N	4700 to 5400	4997	Pass
Time of Maximum Impactor Force	ms	11.8 to 16.1	12.9	Pass
Maximum Pubic Force	N	1230 to 1590	1329	Pass
Time of Maximum Pubic Force	ms	12.2 to 17.0	12.7	Pass
Overall Test Results				Pass

  
\_\_\_\_\_  
Laboratory Technician

08/11/2023  
Test Date

  
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Approved By



**MGA RESEARCH CORPORATION**  
**THORAX IMPACT TEST**  
**ES-2re DUMMY**

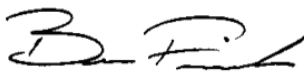
ATD Serial No:           F032          

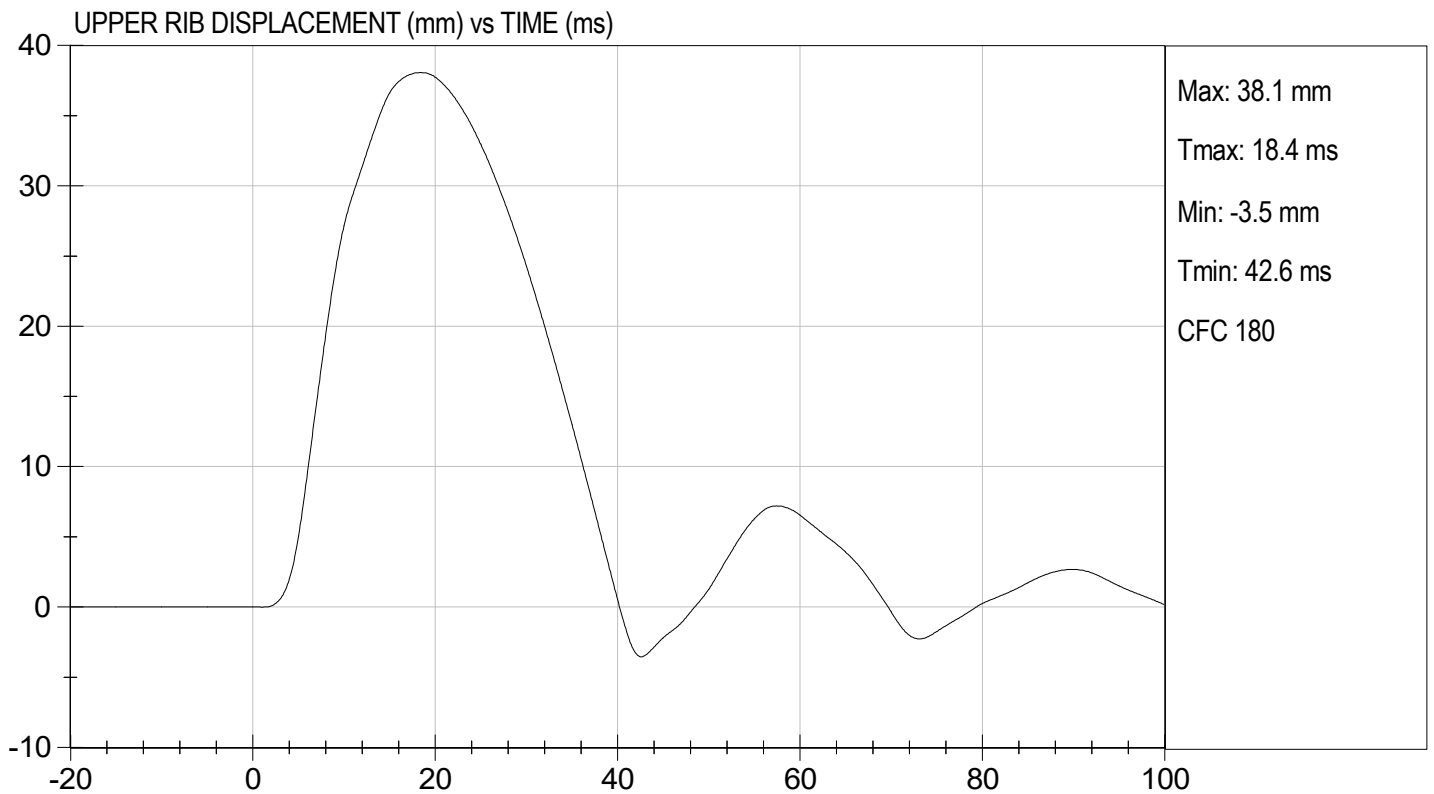
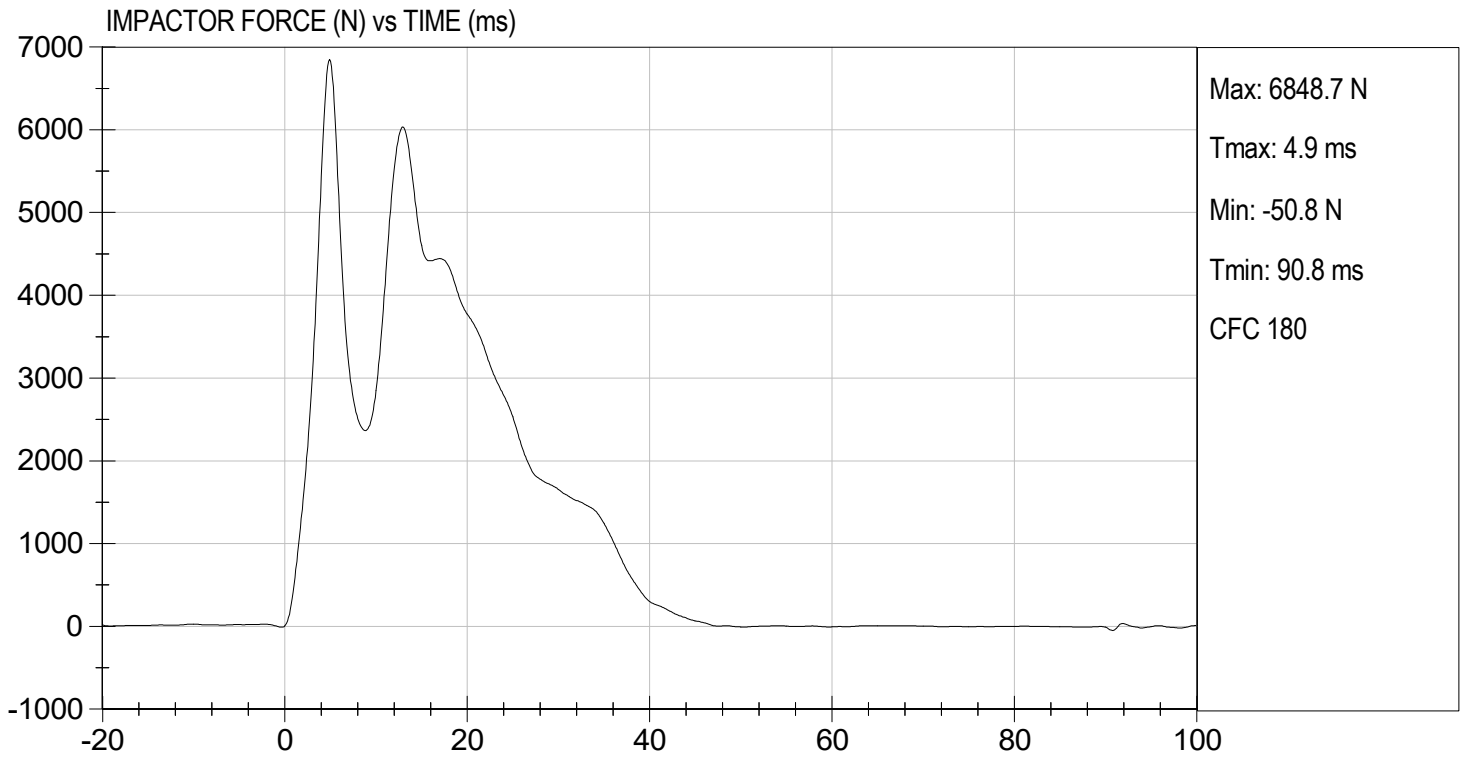
Test I.D:           D232180          

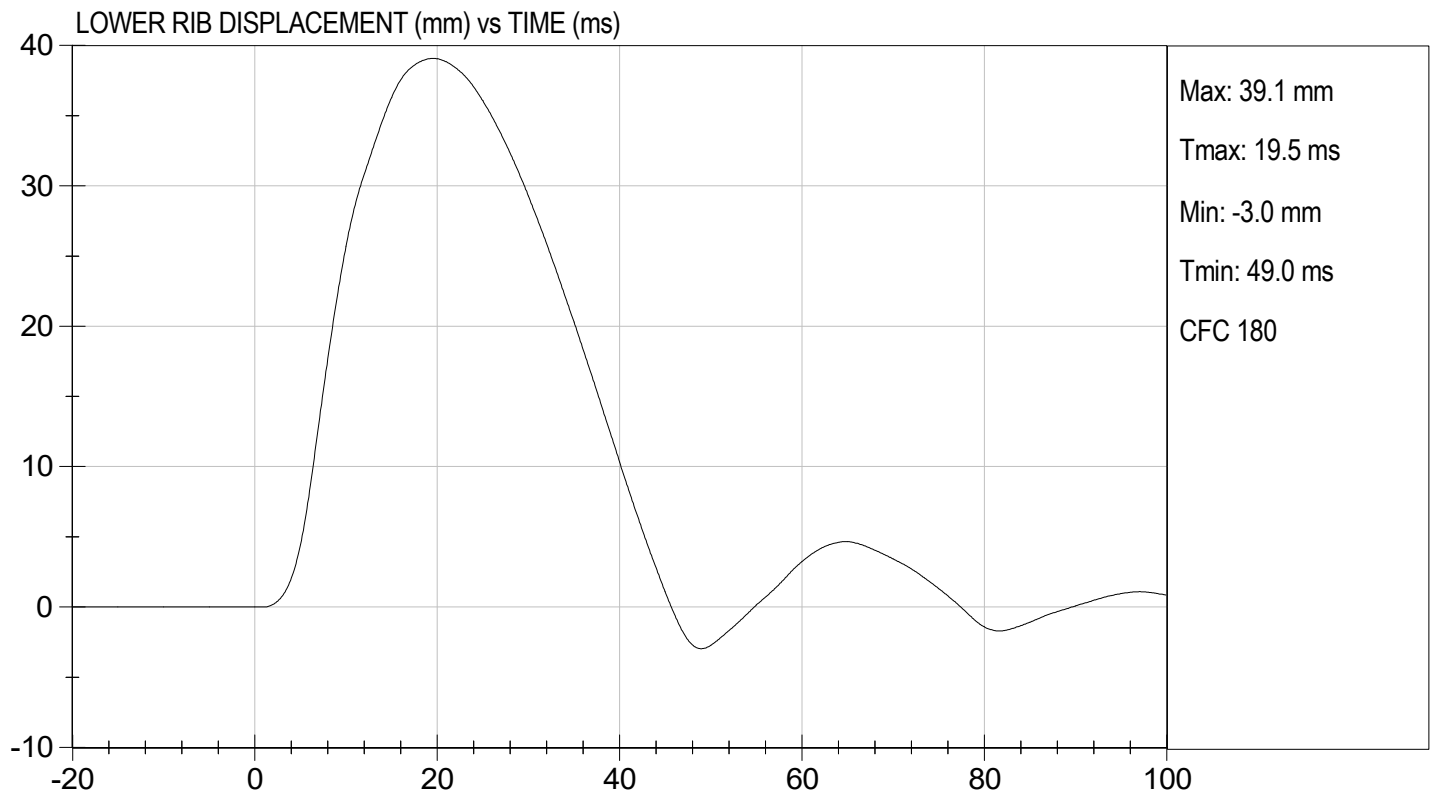
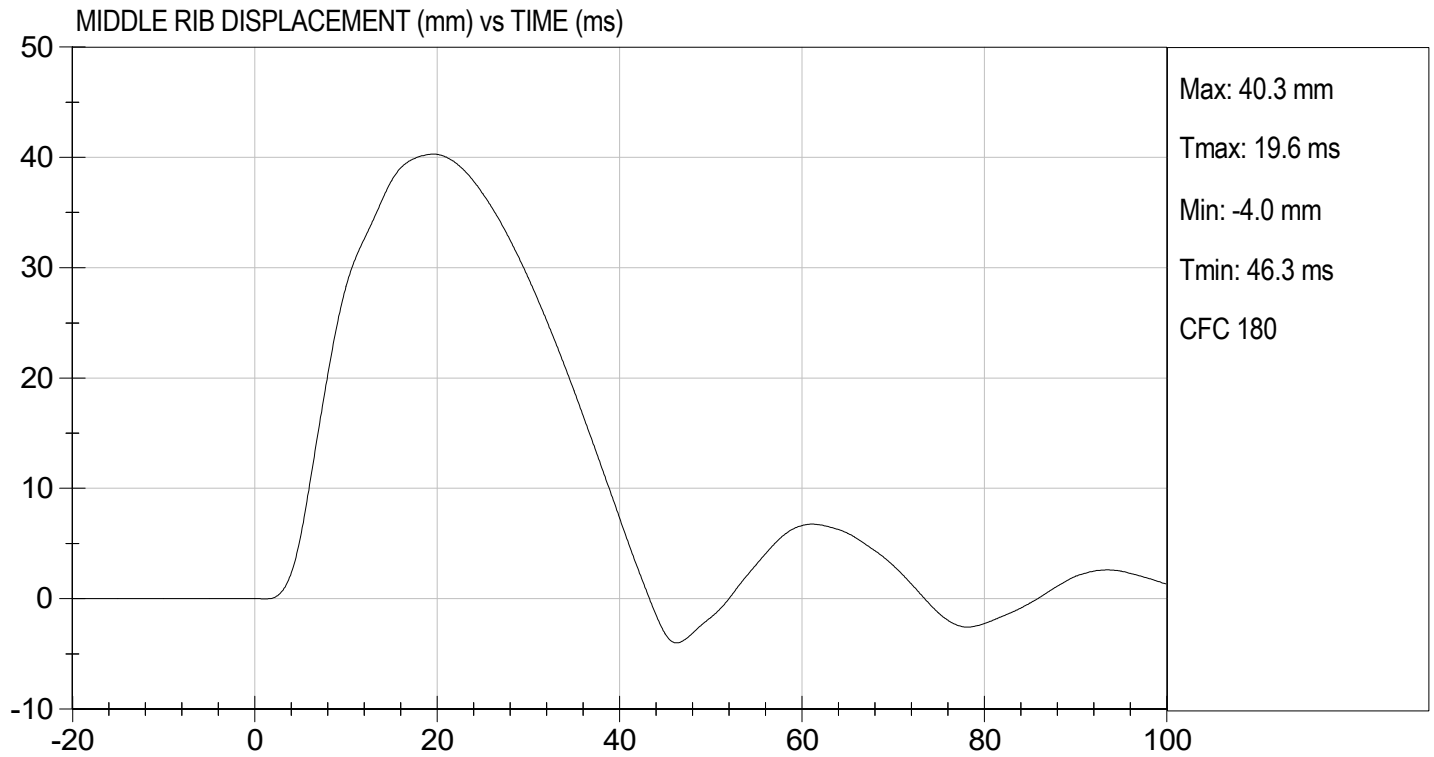
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	47	Pass
Probe Speed	m/s	5.40 to 5.60	5.40	Pass
Maximum Impactor Force (after 6 ms)	N	5100 to 6200	6034	Pass
Upper Rib Displacement	mm	34.0 to 41.0	38.1	Pass
Middle Rib Displacement	mm	37.0 to 45.0	40.3	Pass
Lower Rib Displacement	mm	37.0 to 44.0	39.1	Pass
Overall Test Results				Pass

  
 \_\_\_\_\_  
 Laboratory Technician

08/11/2023  
 \_\_\_\_\_  
 Test Date

  
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 Approved By





**CALIBRATION TEST RESULTS**

**PRE-TEST**

**SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD**

**SID-IIsD External Measurements**  
**SN: 306**

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

**MGA RESEARCH CORPORATION**  
**HEAD DROP TEST**  
**SID-IIs BUILD LEVEL D DUMMY**

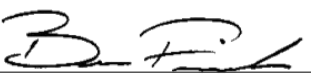
ATD Serial No: 306

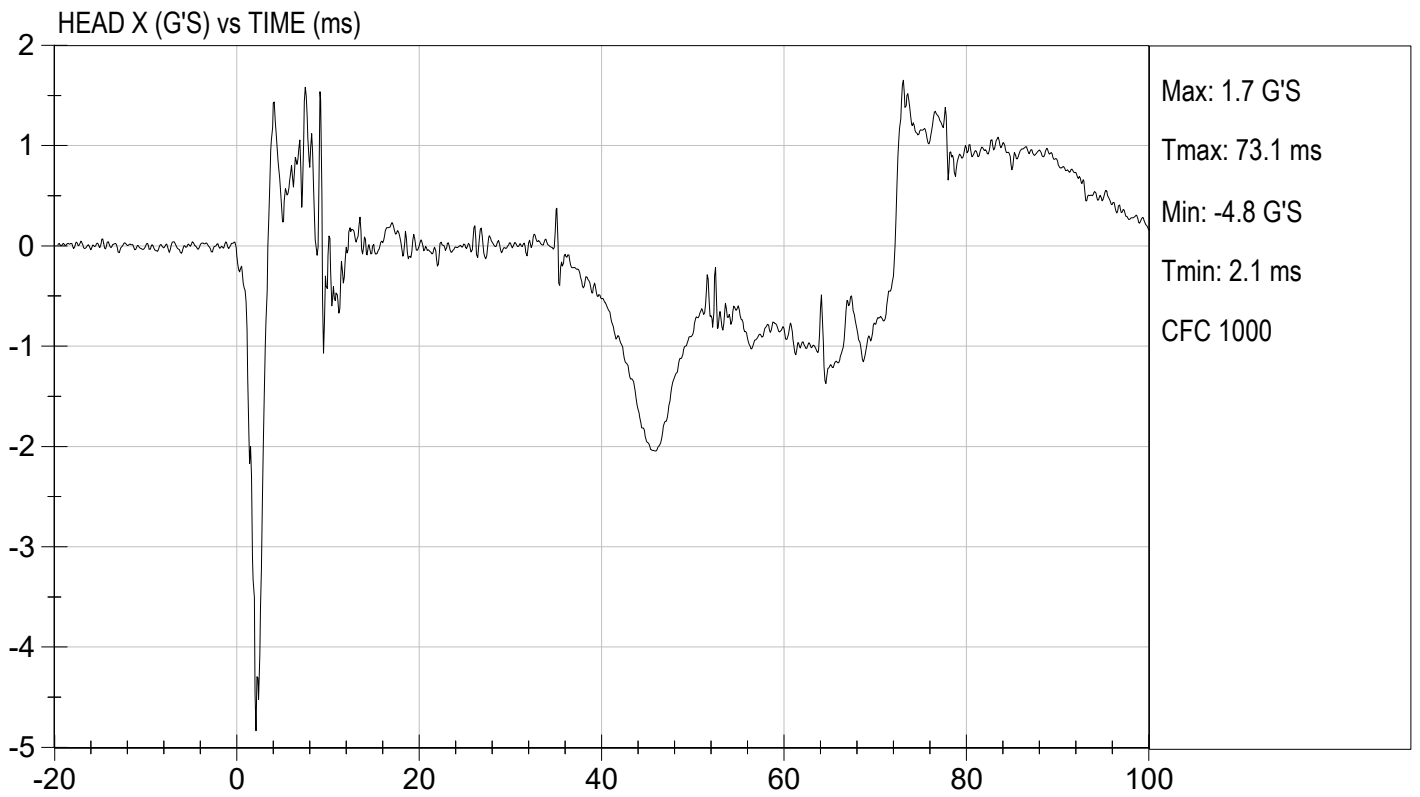
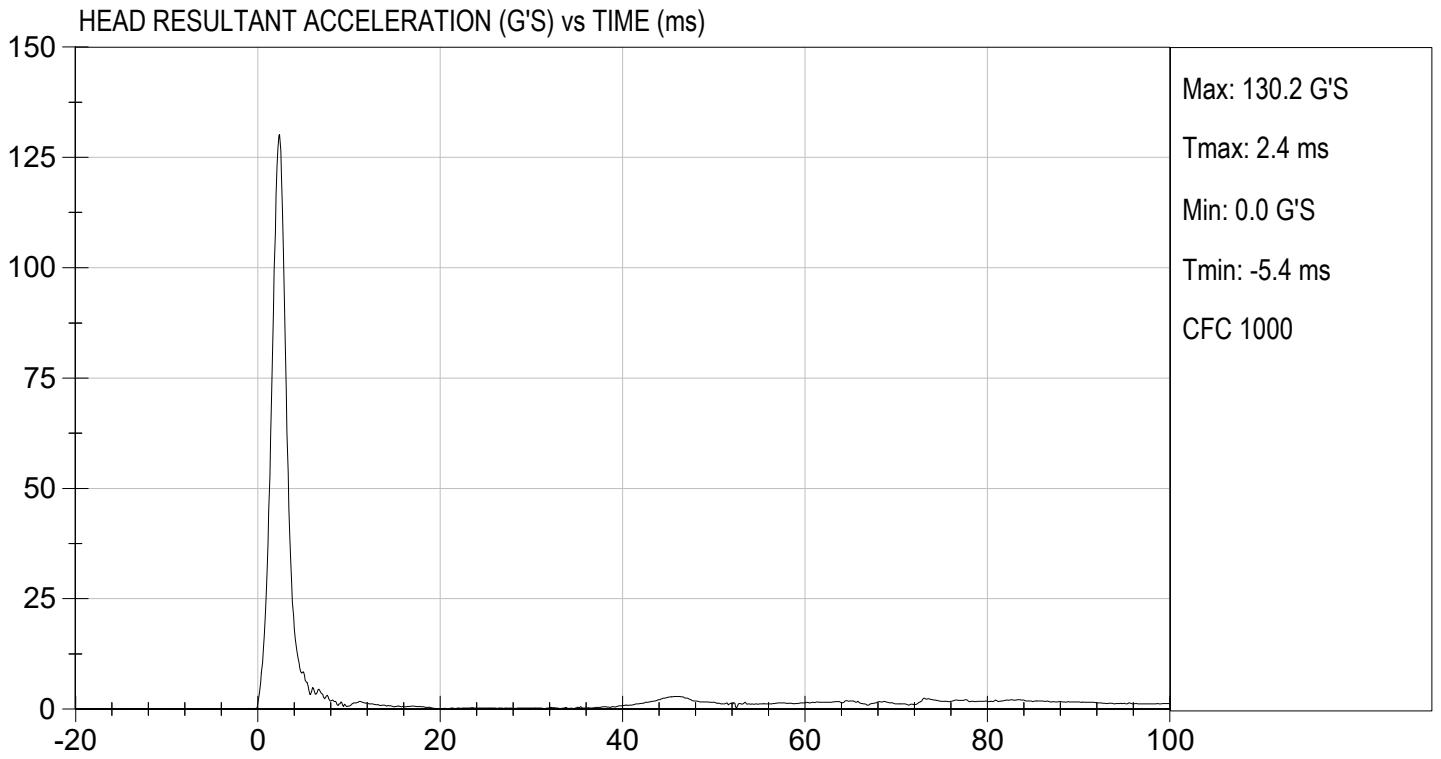
Test ID: D231951

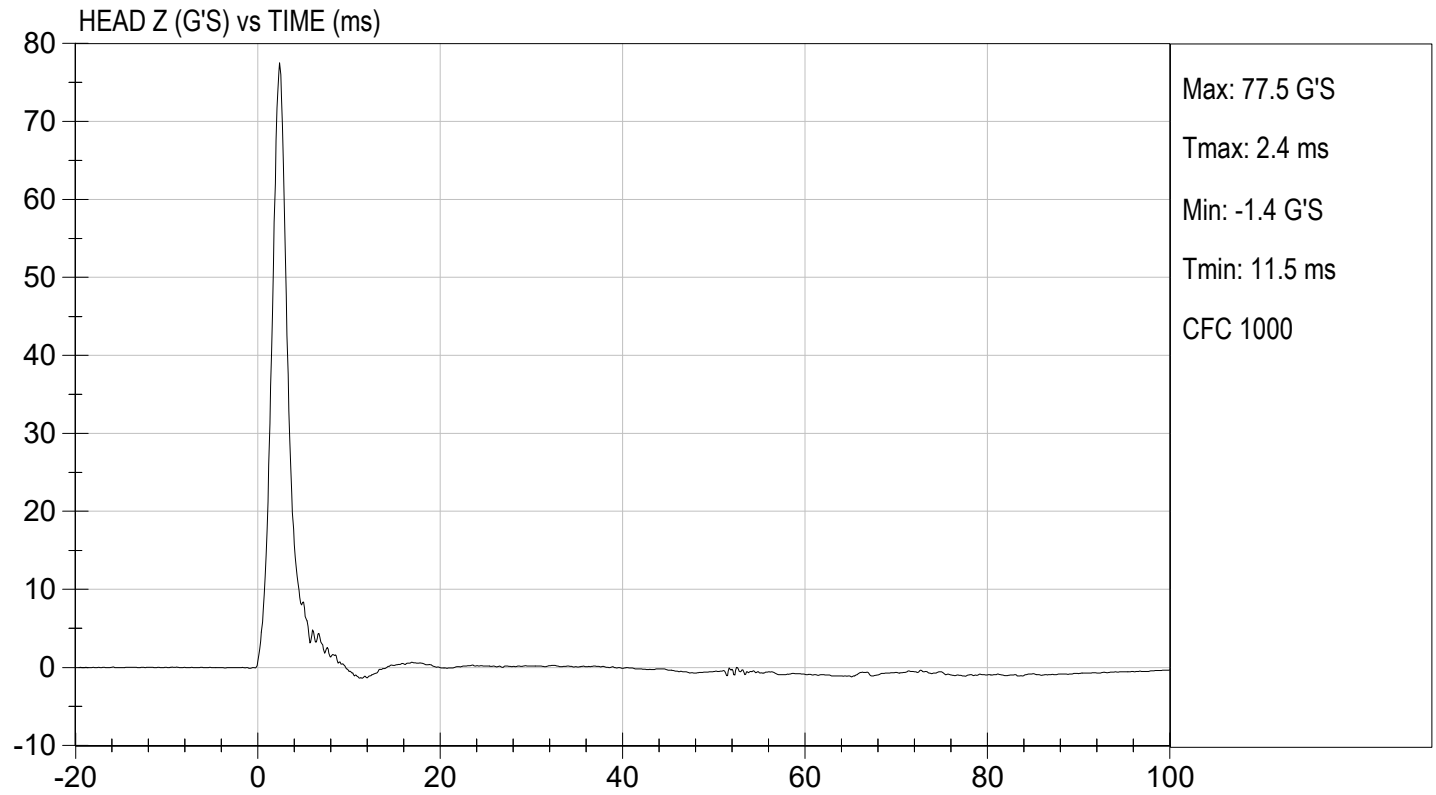
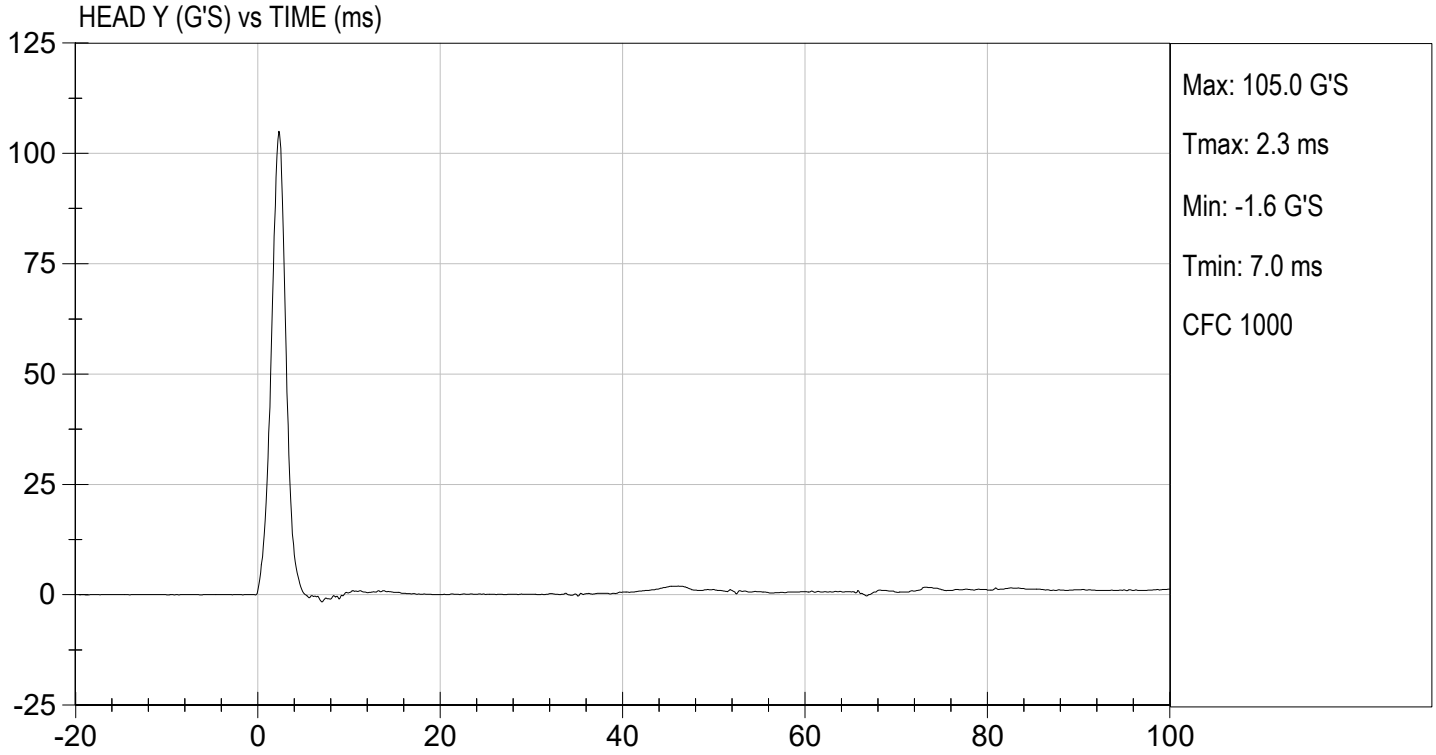
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	46	Pass
Peak Resultant Acceleration	G's	115 to 137	130	Pass
Peak Longitudinal Acceleration	G's	+/- 15	-4.8	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	<15%	Yes	Pass
Overall Test Results				Pass

  
 \_\_\_\_\_  
 Laboratory Technician

07/28/2023  
 \_\_\_\_\_  
 Test Date

  
 \_\_\_\_\_  
 Approved By





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

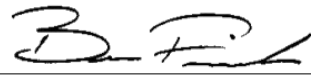
ATD Serial No: 306

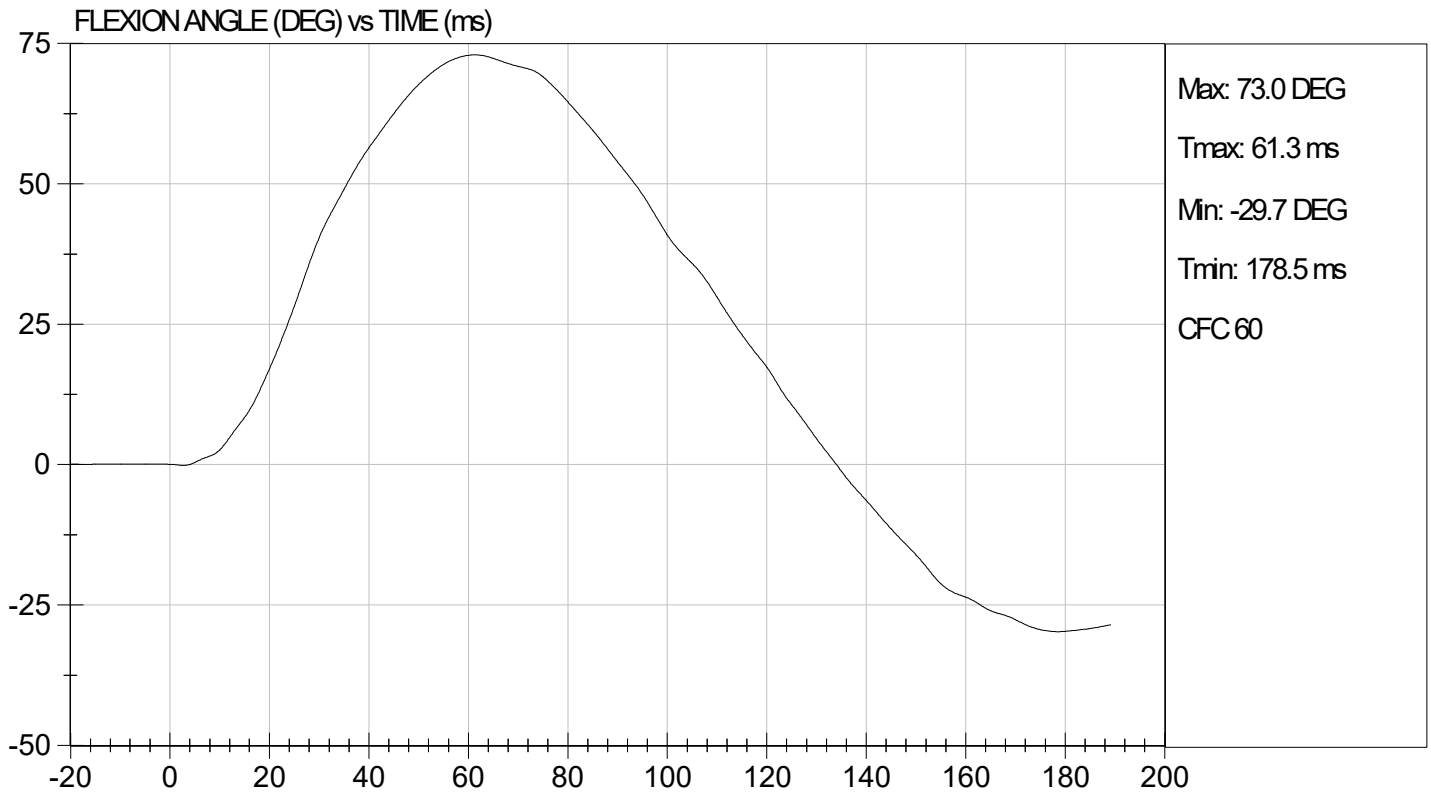
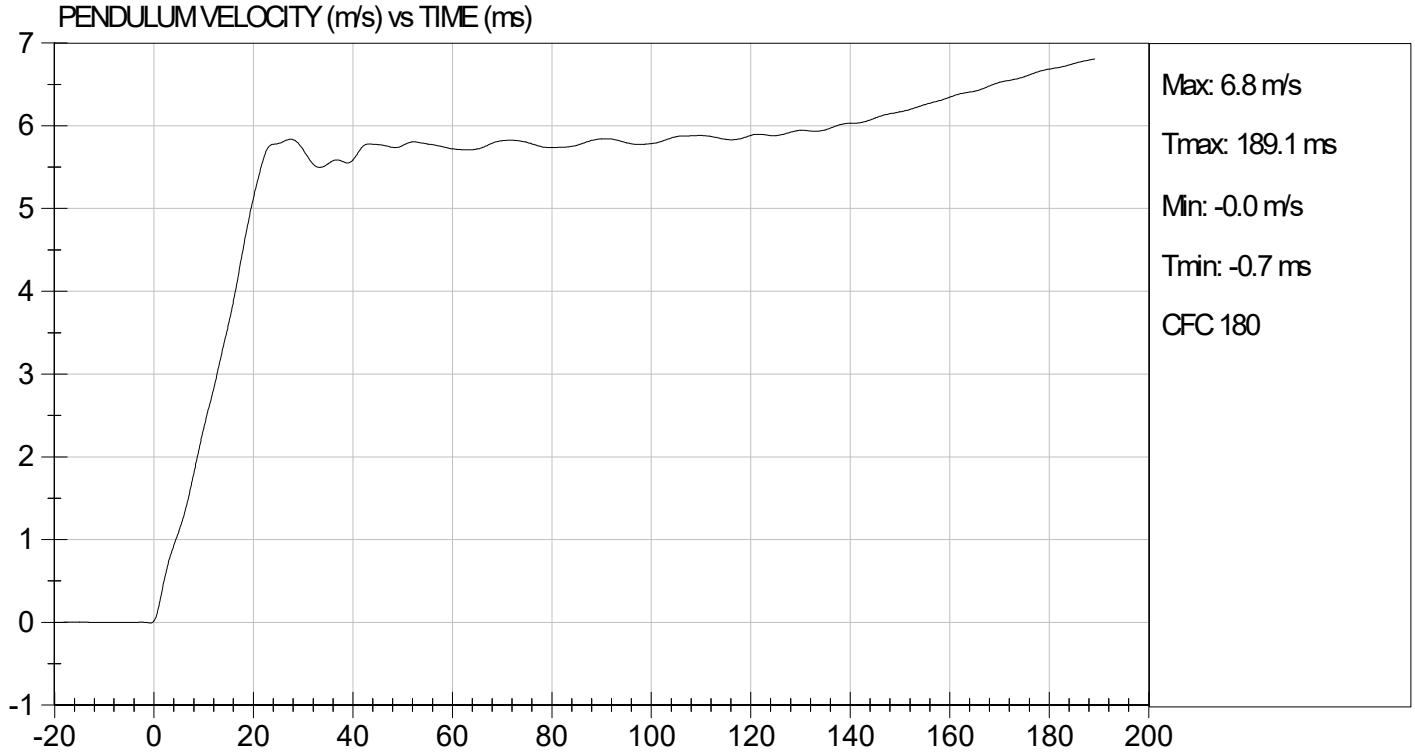
Test I.D.: D231952

Tested Parameter	Units	Specification	Result	Pass/Fail	
Temperature	deg C	20.6 to 22.2	21.4	Pass	
Humidity	%	10 to 70	46	Pass	
Impact Velocity	m/s	5.51 to 5.63	5.58	Pass	
Pendulum Velocity	10 ms	m/s	2.20 to 2.80	2.35	Pass
	15 ms	m/s	3.30 to 4.10	3.60	Pass
	20 ms	m/s	4.40 to 5.40	5.13	Pass
	25 ms	m/s	5.40 to 6.10	5.79	Pass
	25-100 ms	m/s	5.50 to 6.20	5.84	Pass
Maximum D-Plane Rotation	deg	71 to 81	73	Pass	
Time of Maximum D-Plane Rotation	ms	50 to 70	61	Pass	
Maximum Occipital Condyle Moment	Nm	-44 to -36	-38	Pass	
Time of Moment Decay to 0 Nm	ms	102 to 126	112	Pass	
<b>Overall Test Results</b>				<b>Pass</b>	

  
 Laboratory Technician

07/28/2023  
 Test Date

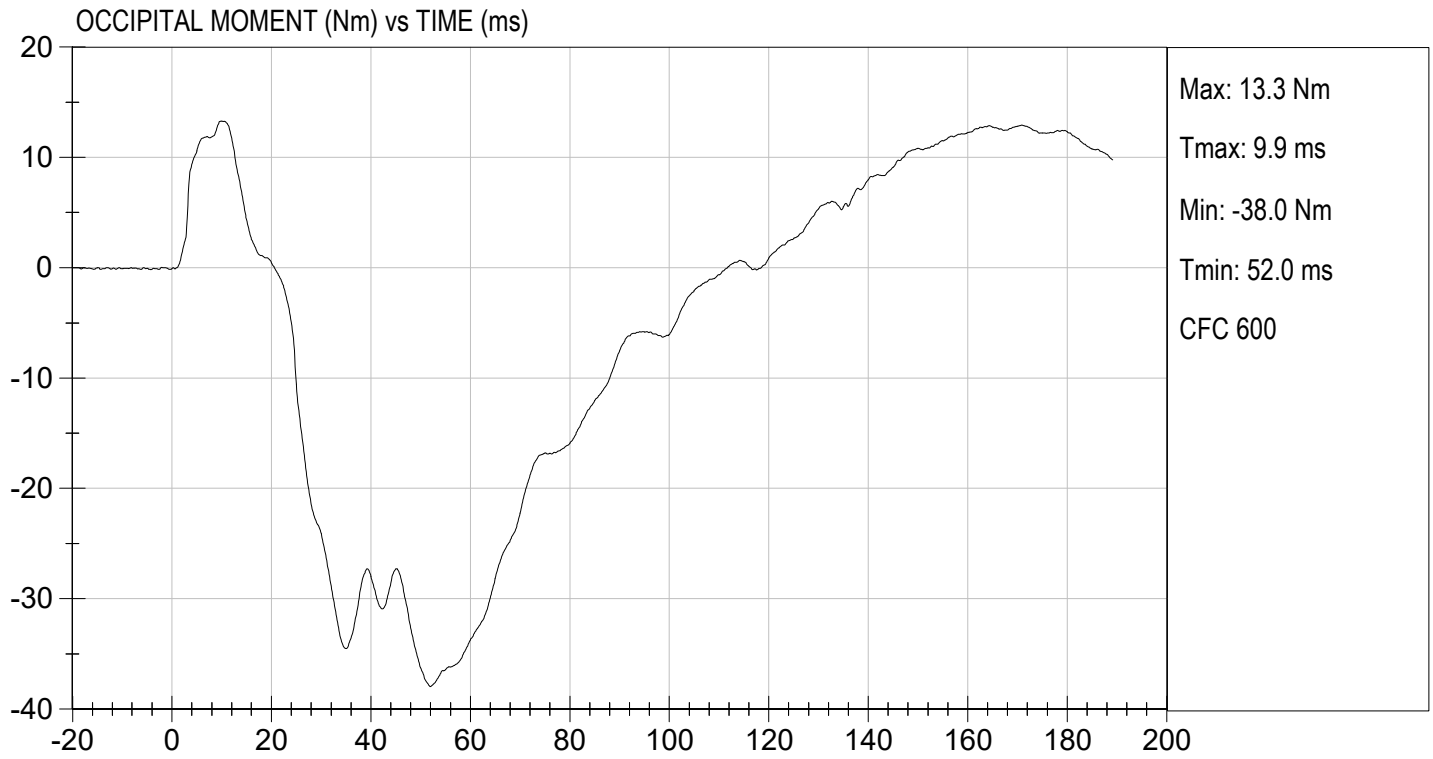
  
 Approved By





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

TEST DATE: 07/28/2023  
TEST #: D231952



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

ATD Serial No: 306

Test ID: D231953

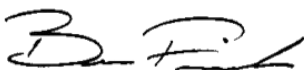
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	46	Pass
Impact Velocity	m/s	4.20 to 4.40	4.39	Pass
Maximum Probe Acceleration	G's	13 to 18	15	Pass
Shoulder Displacement	mm	28 to 37	31	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	19	Pass
Overall Test Results				Pass



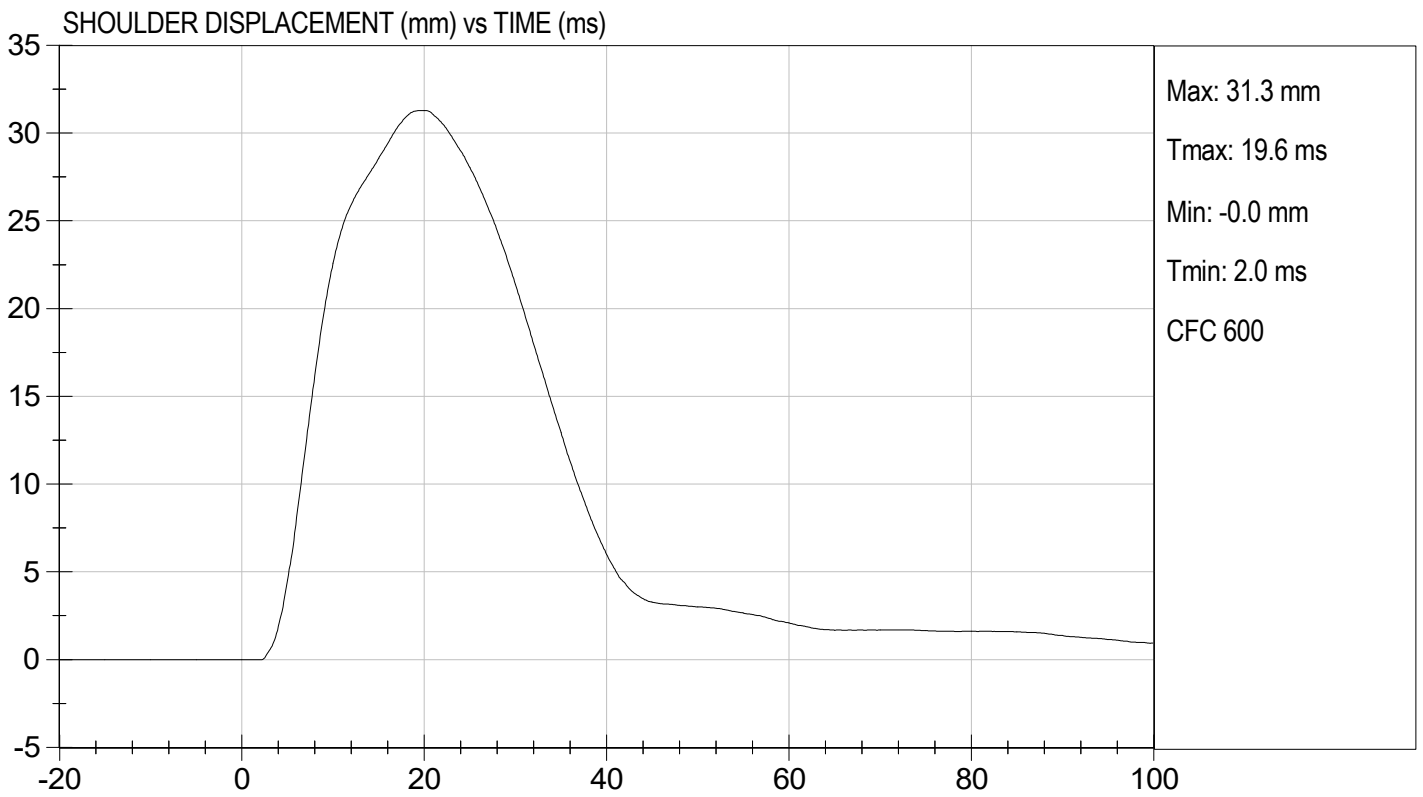
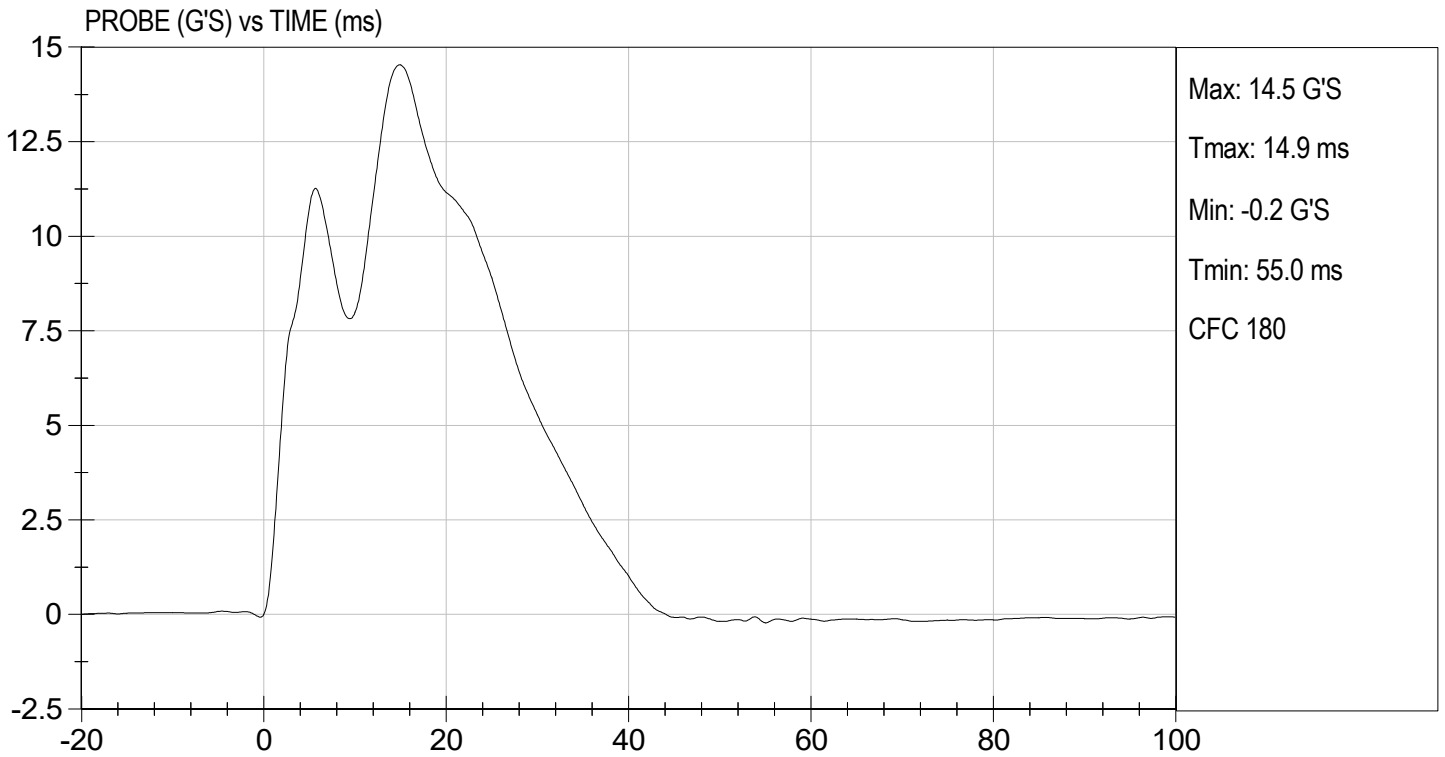
Laboratory Technician

07/28/2023

Test Date



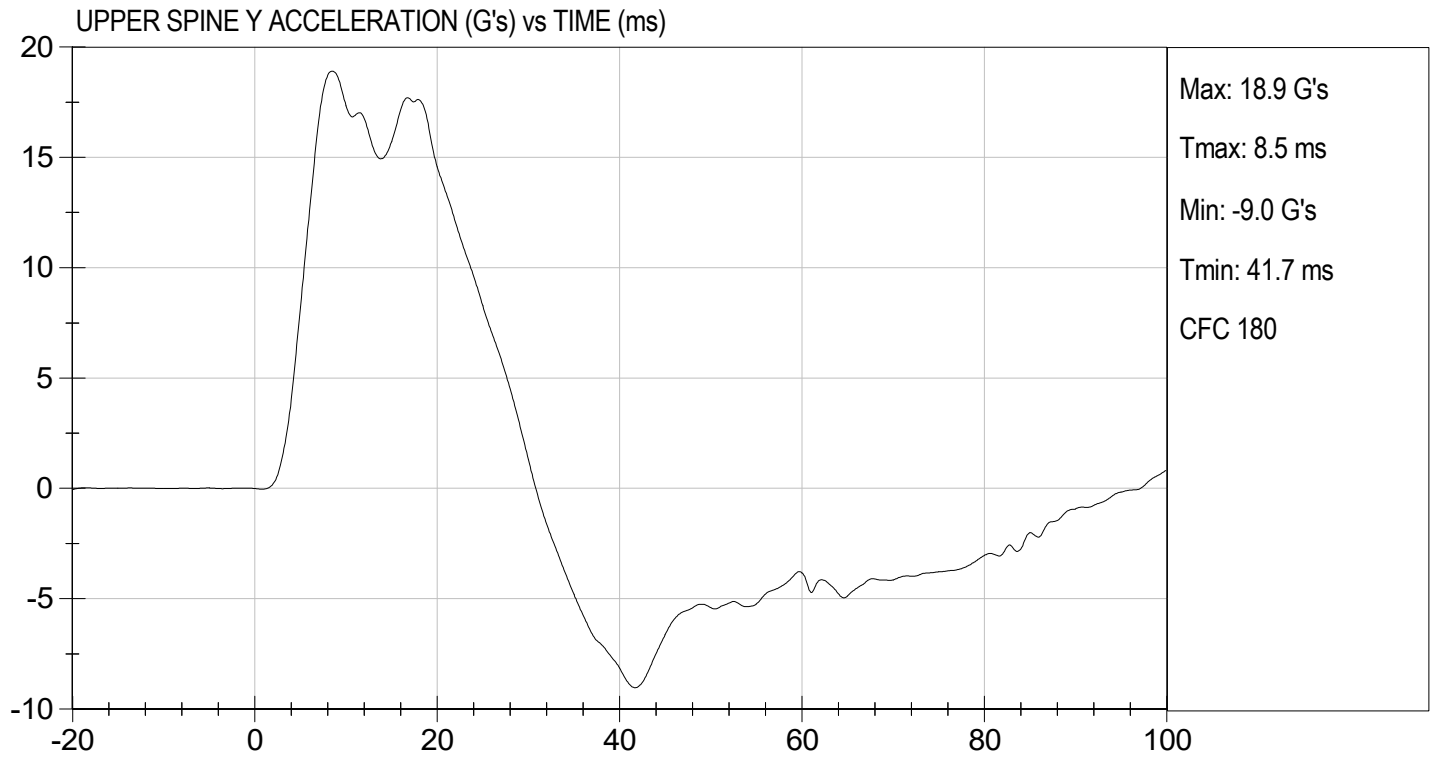
Approved By





TEST DESC: SHOULDER IMPACT  
VELOCITY: 14.40 ft/s, 4.39 m/s

TEST DATE: 07/28/2023  
TEST #: D231953



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

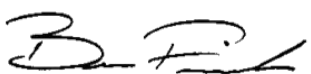
**ATD Serial No:** 306

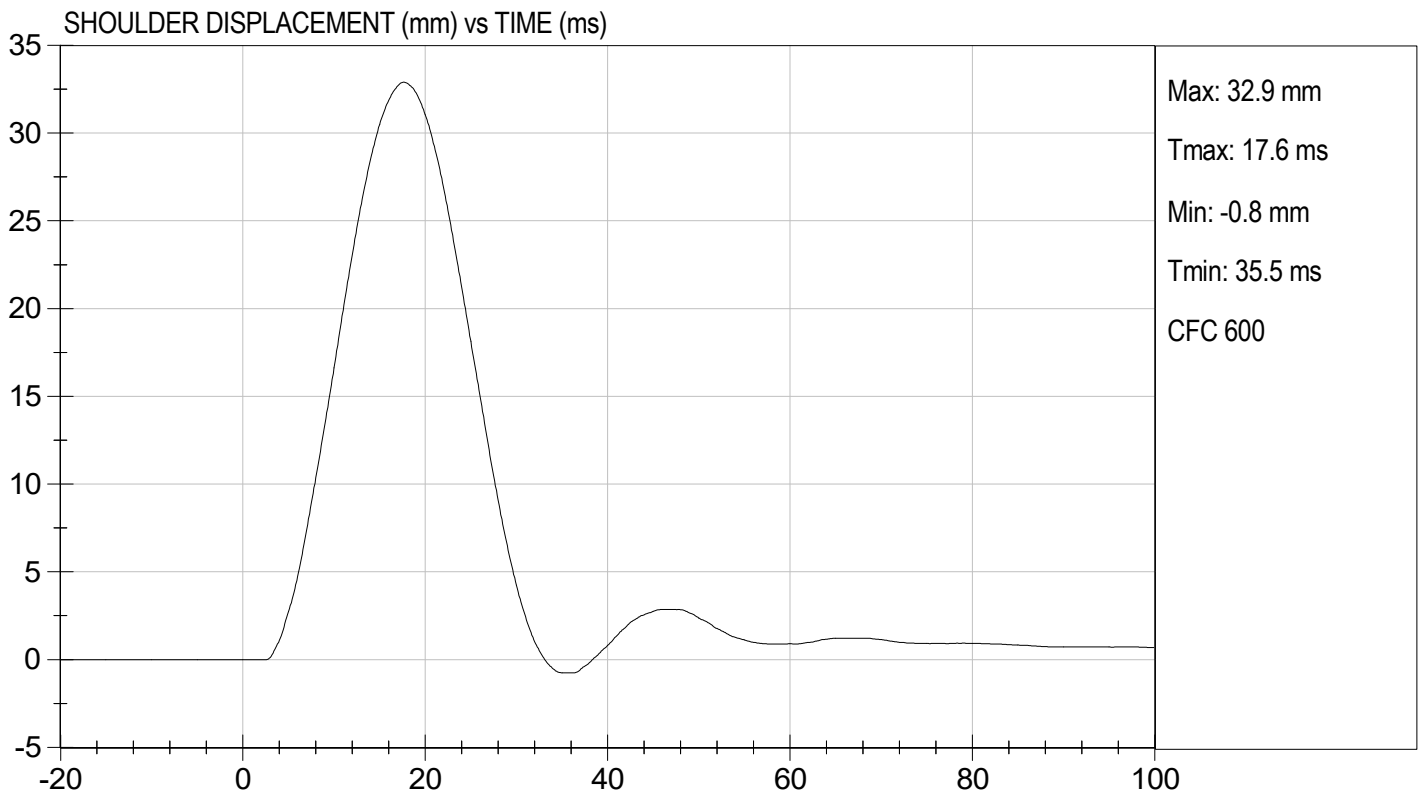
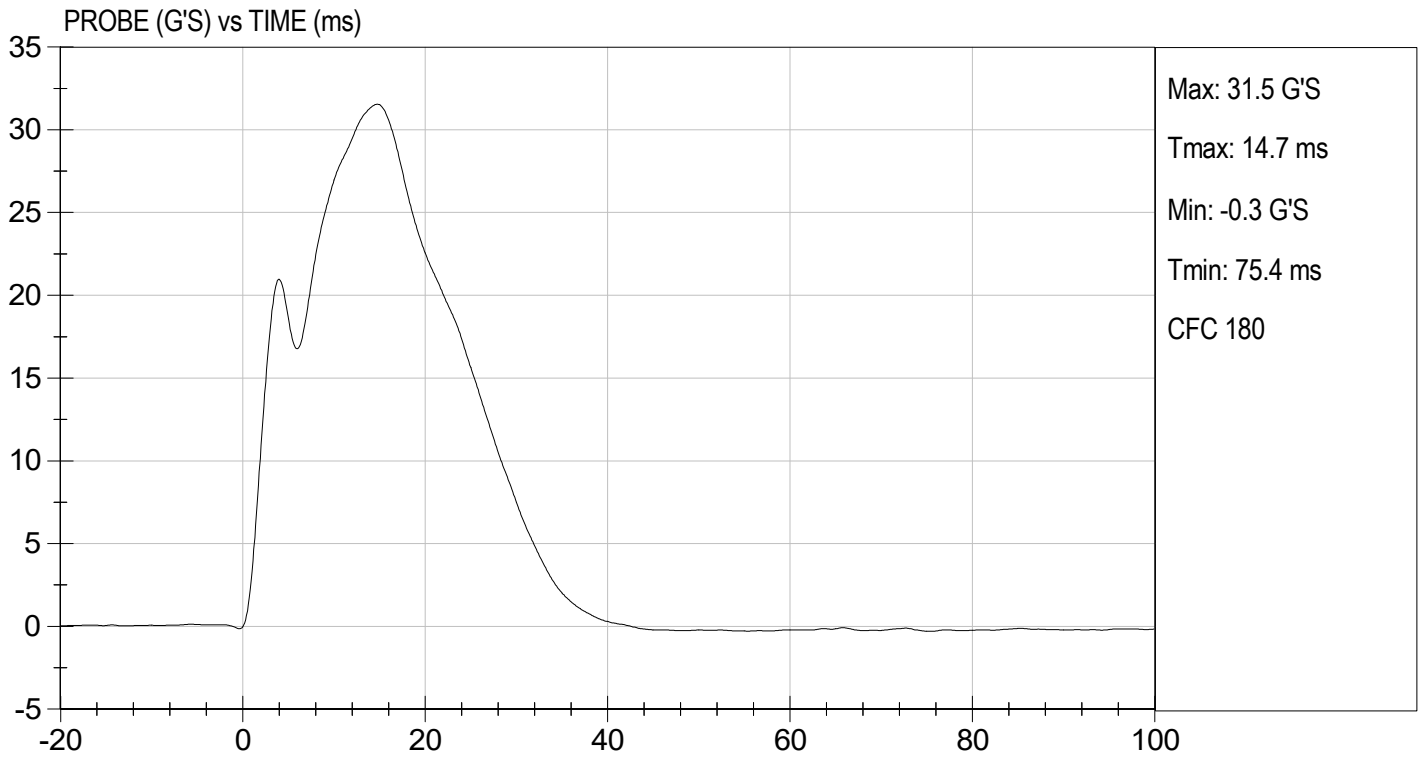
**Test I.D.:** D231954

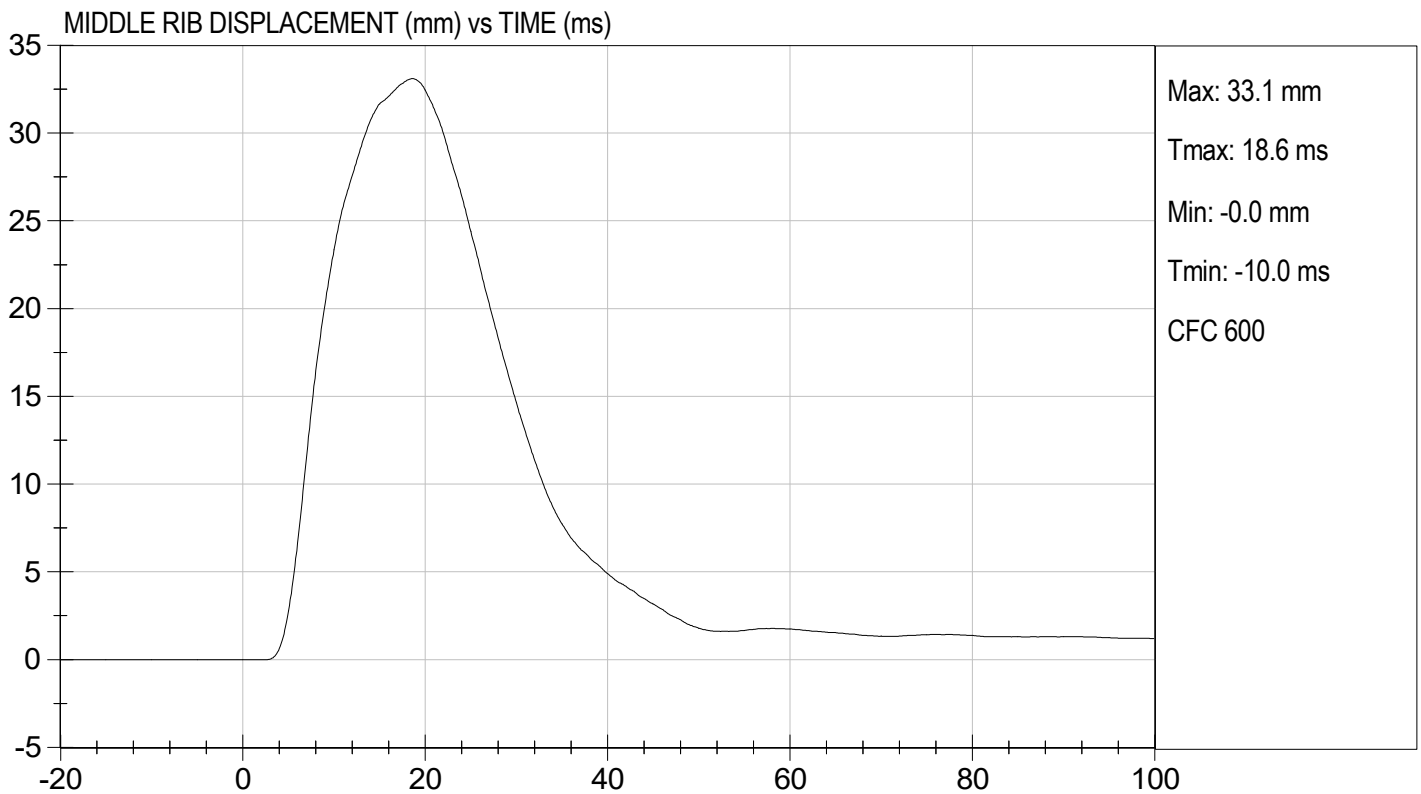
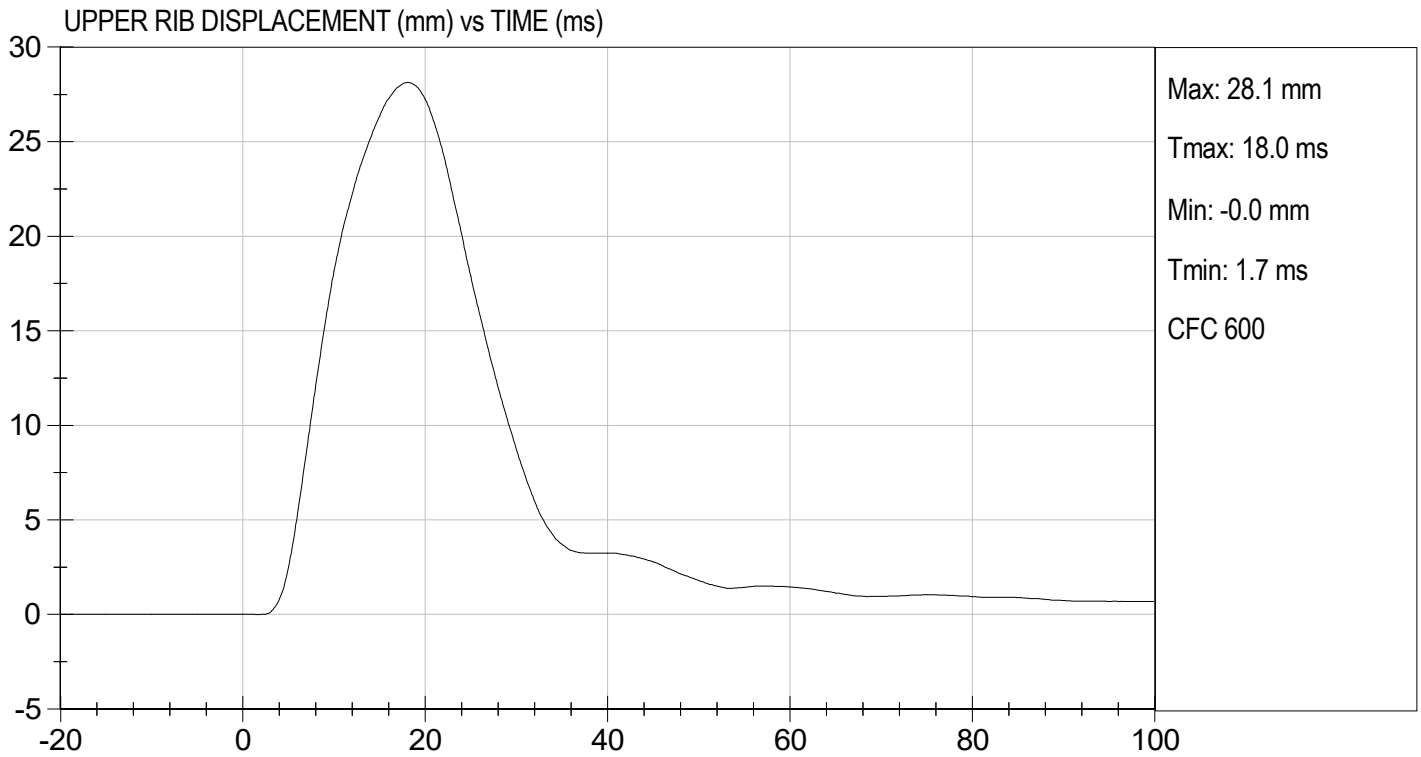
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	46	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	Pass
Maximum Probe Acceleration	G's	30 to 36	32	Pass
Shoulder Displacement	mm	31 to 40	33	Pass
Upper Rib Displacement	mm	25 to 32	28	Pass
Middle Rib Displacement	mm	30 to 36	33	Pass
Lower Rib Displacement	mm	32 to 38	36	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	36	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	30	Pass
Overall Test Results				Pass

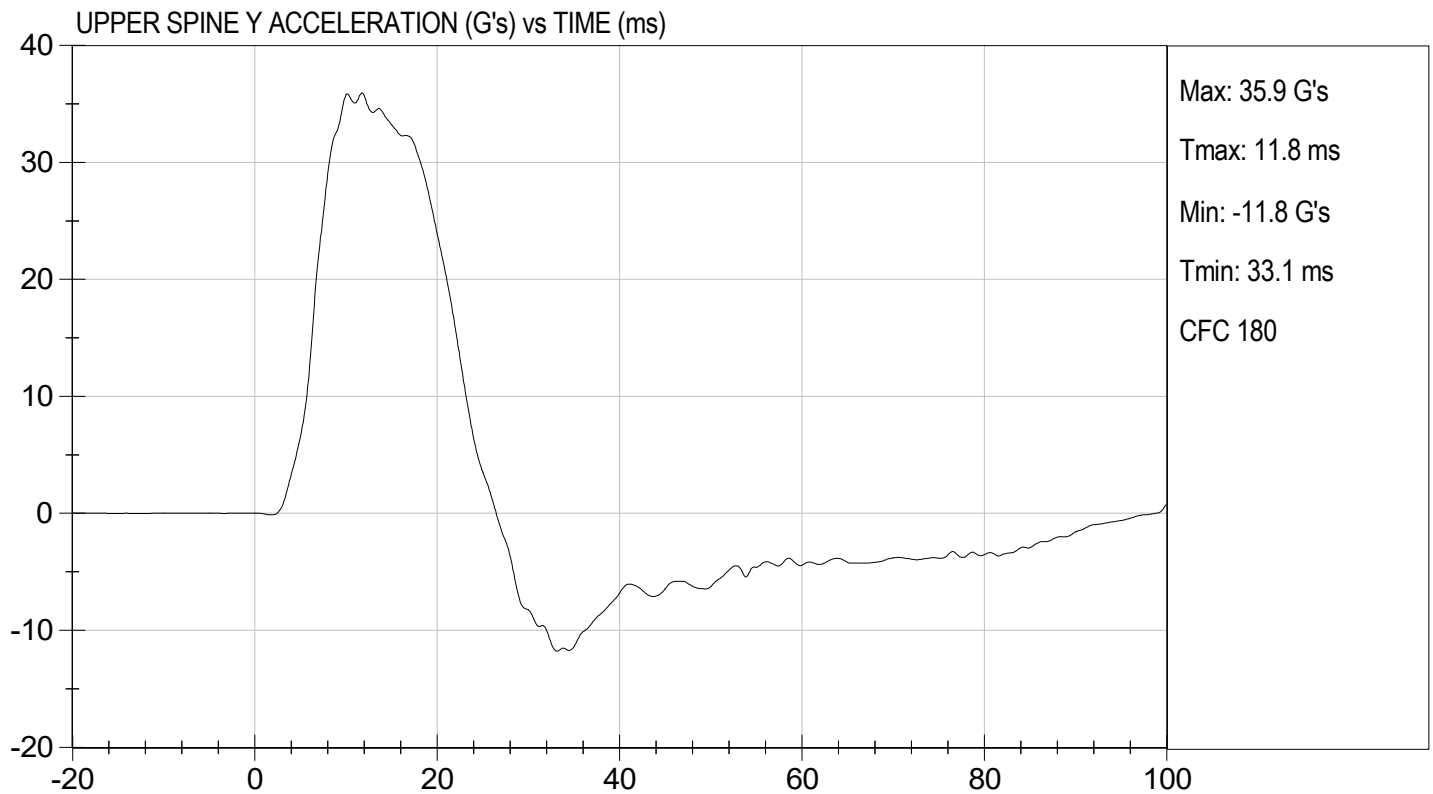
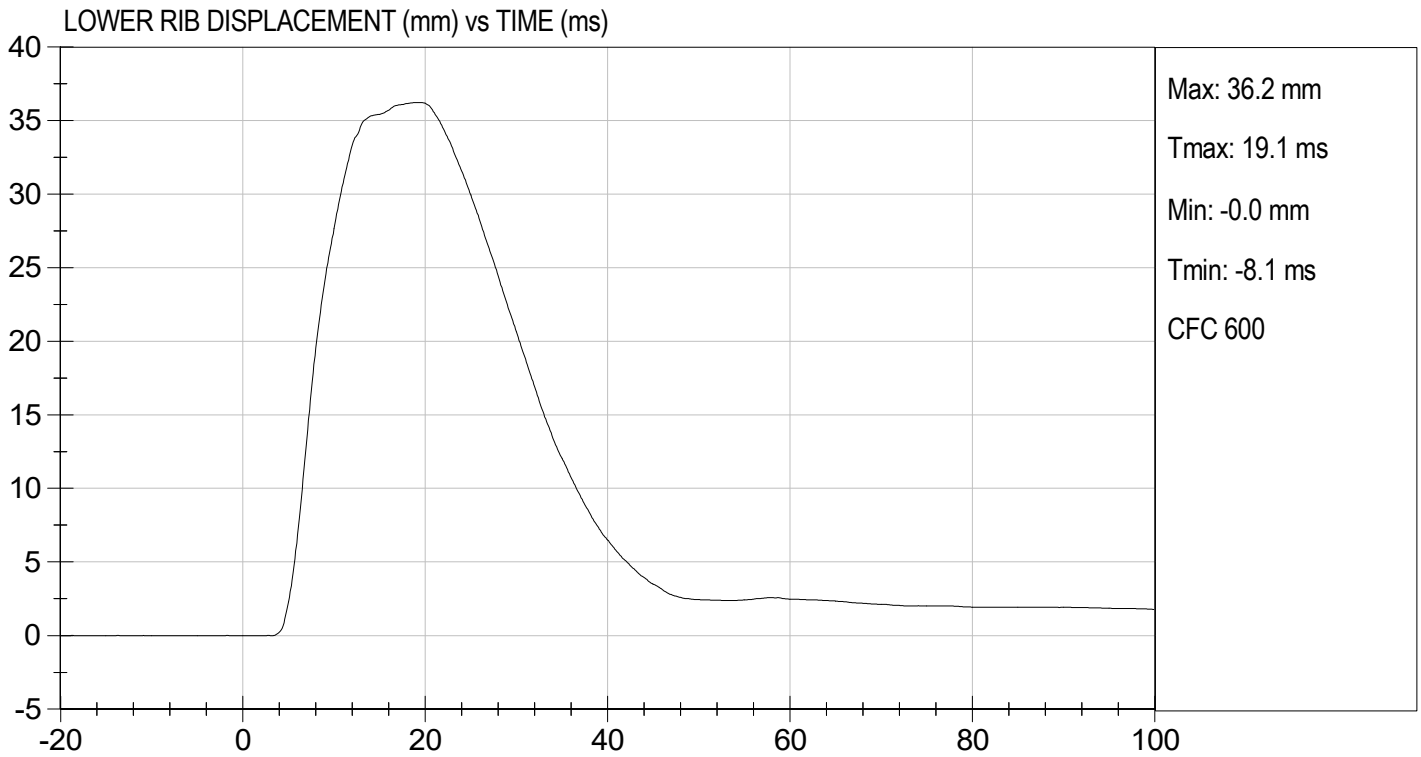
  
Laboratory Technician

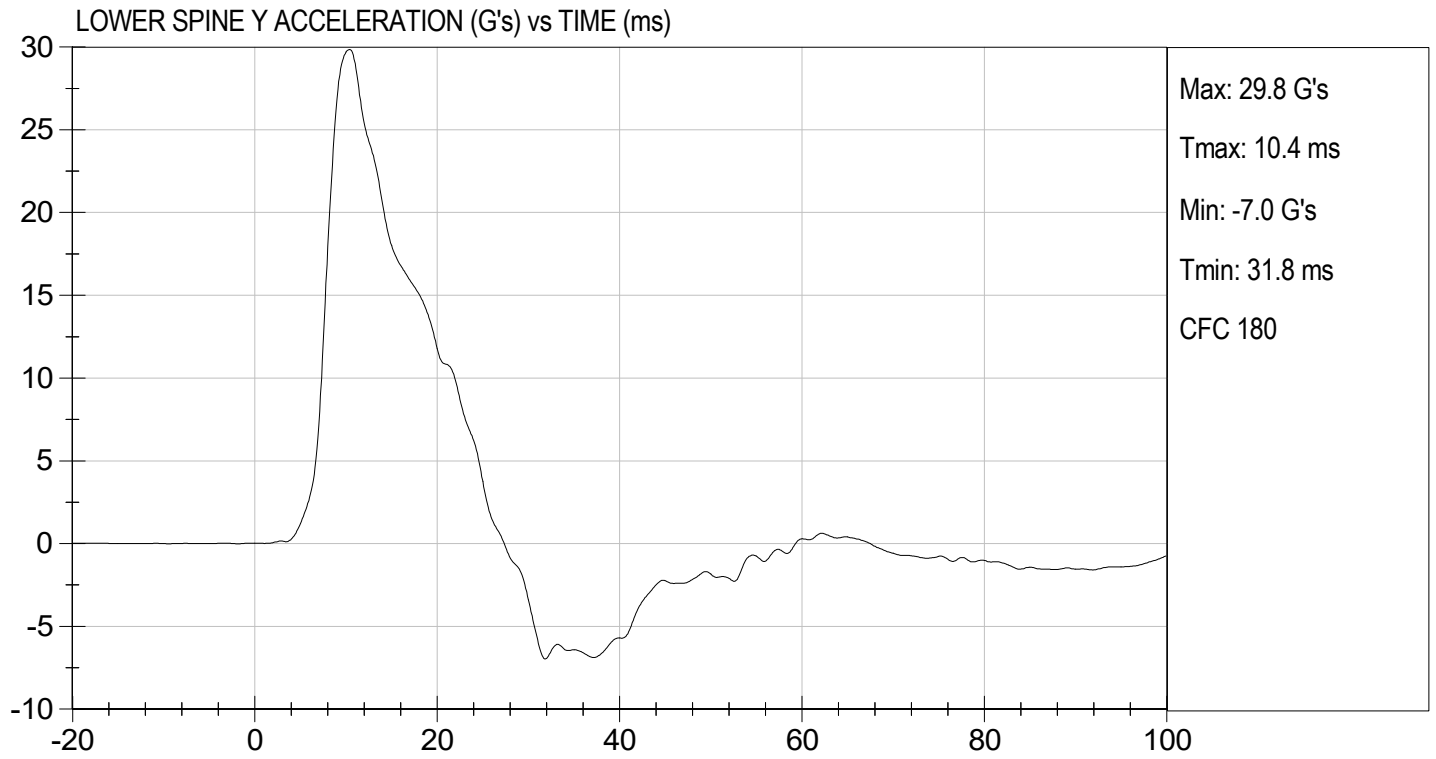
07/28/2023  
Test Date

  
Approved By









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

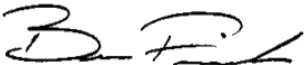
ATD Serial No: 306

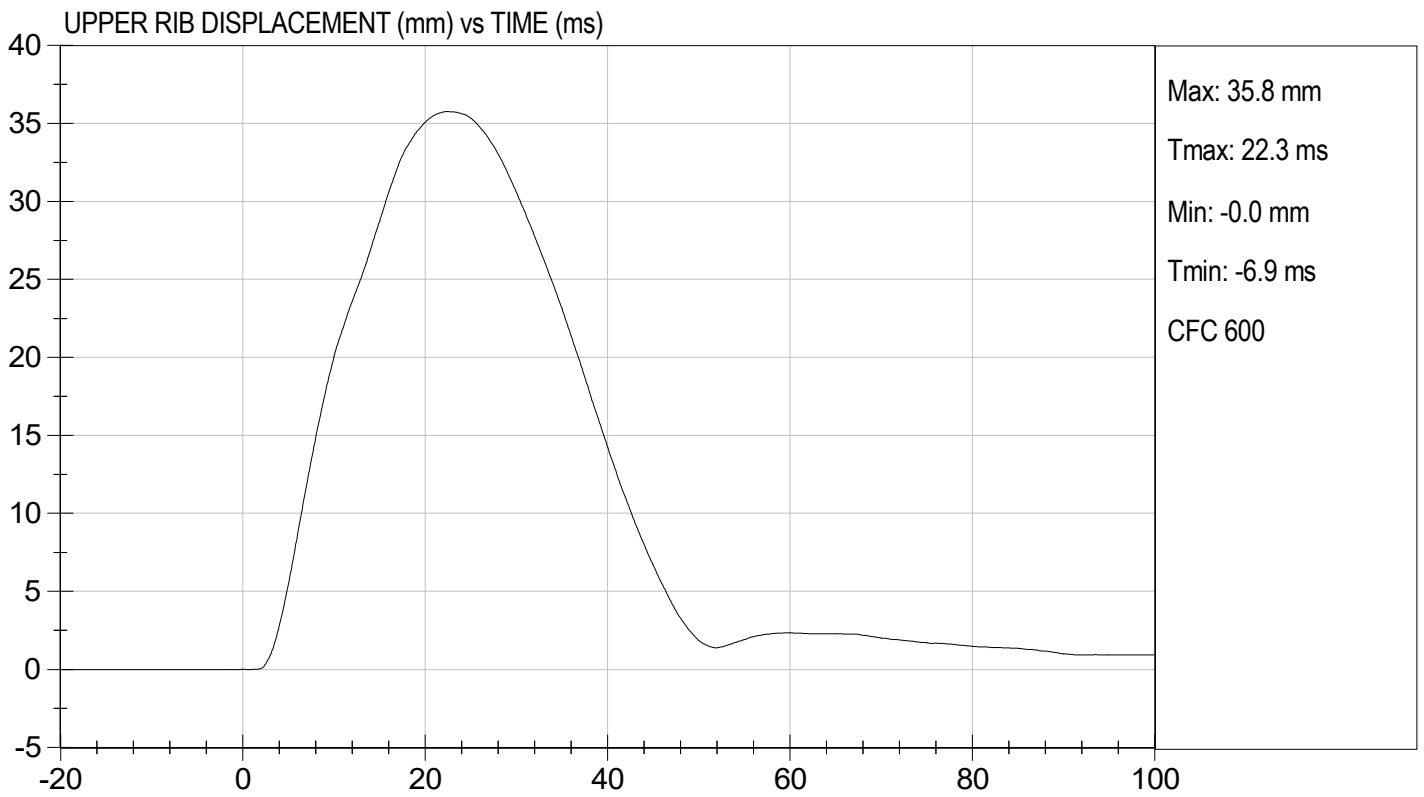
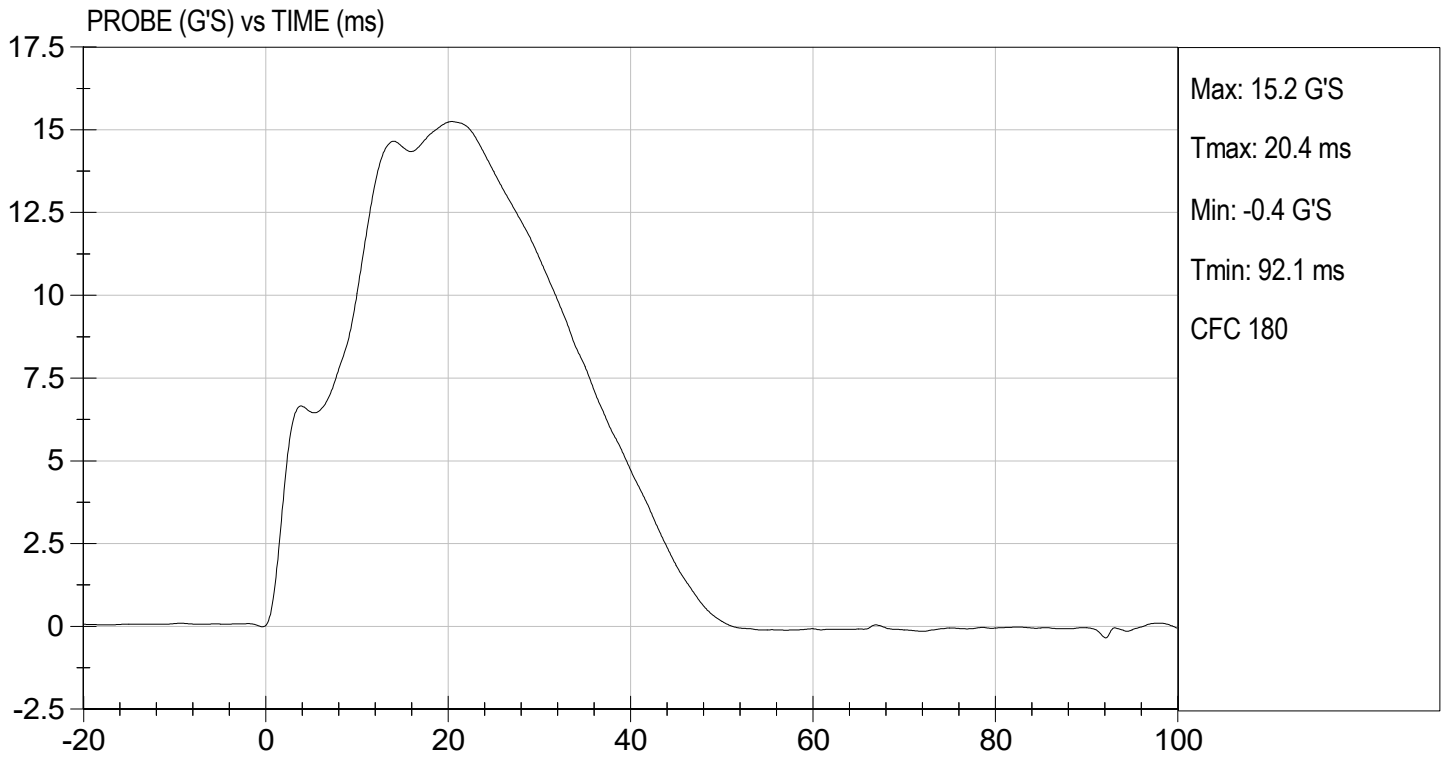
Test I.D: D231955

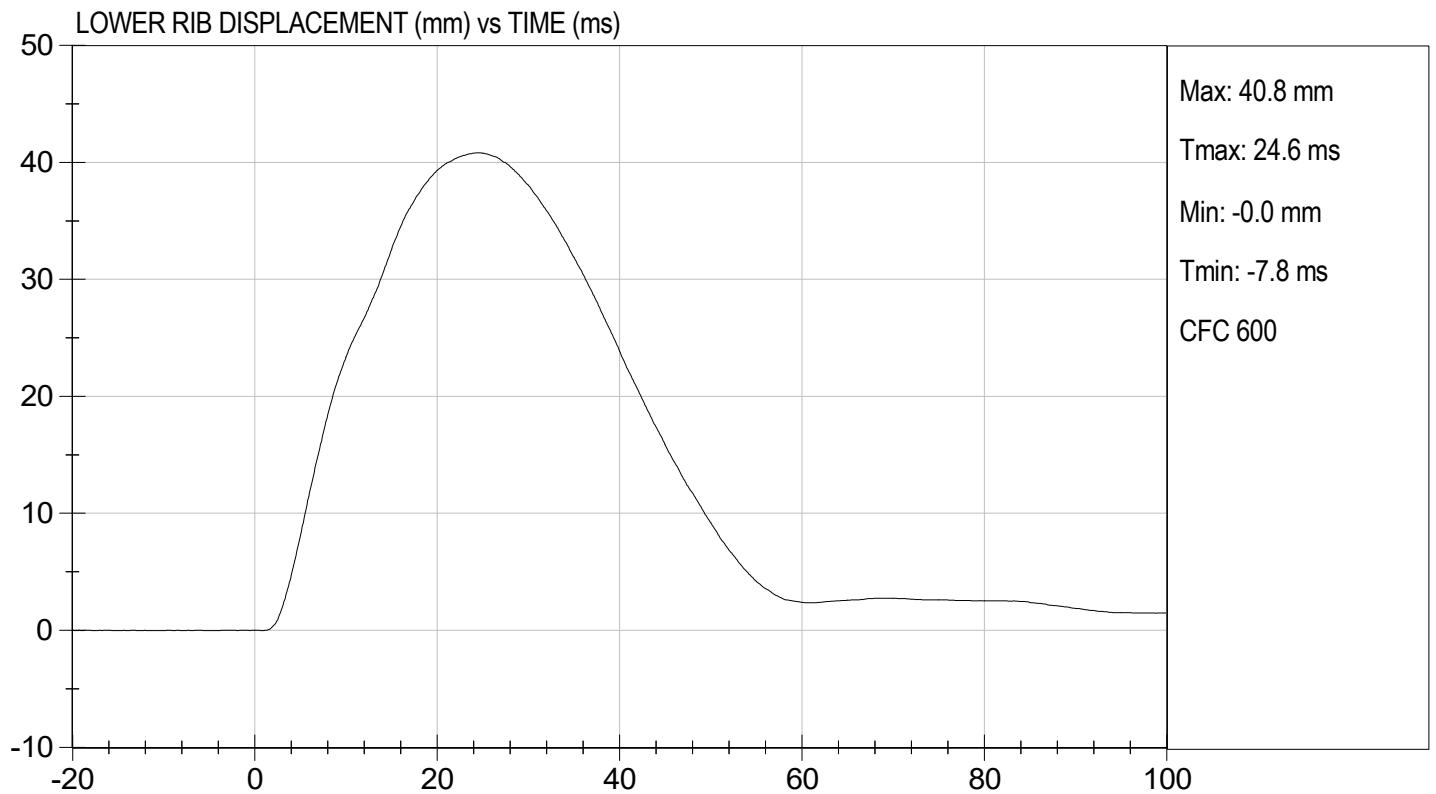
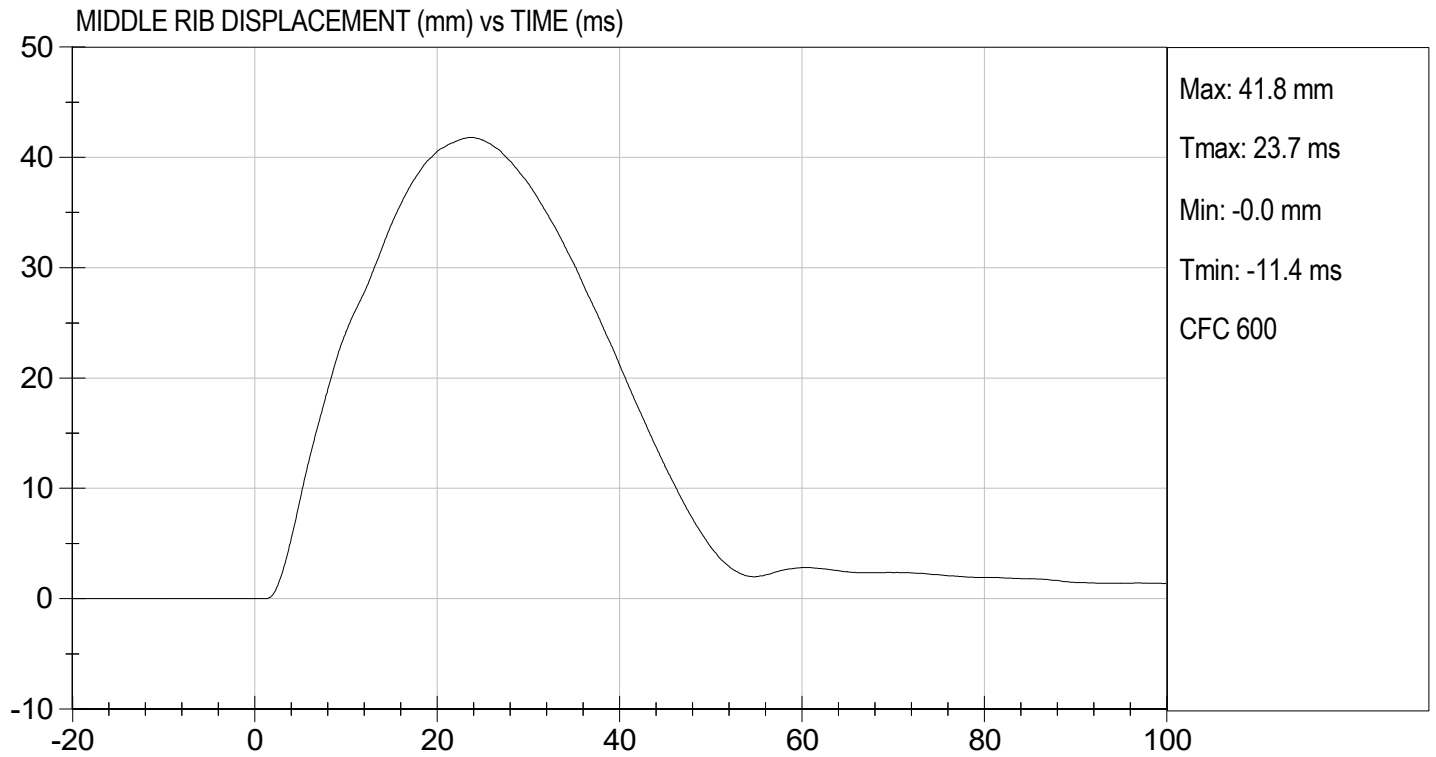
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	46	Pass
Impact Velocity	m/s	4.20 to 4.40	4.27	Pass
Maximum Probe Acceleration	G's	14 to 18	15	Pass
Upper Rib Displacement	mm	32 to 40	36	Pass
Middle Rib Displacement	mm	39 to 45	42	Pass
Lower Rib Displacement	mm	35 to 43	41	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

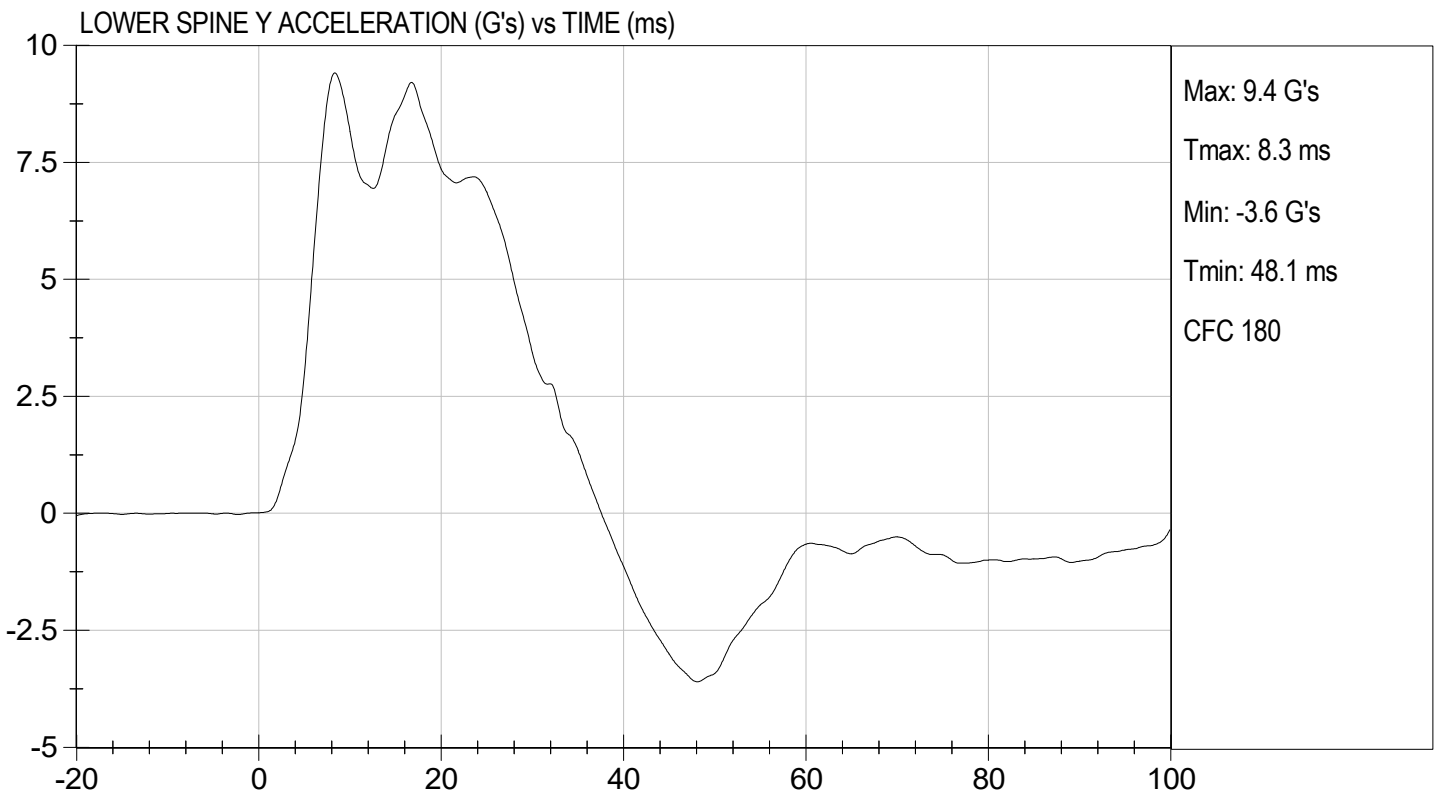
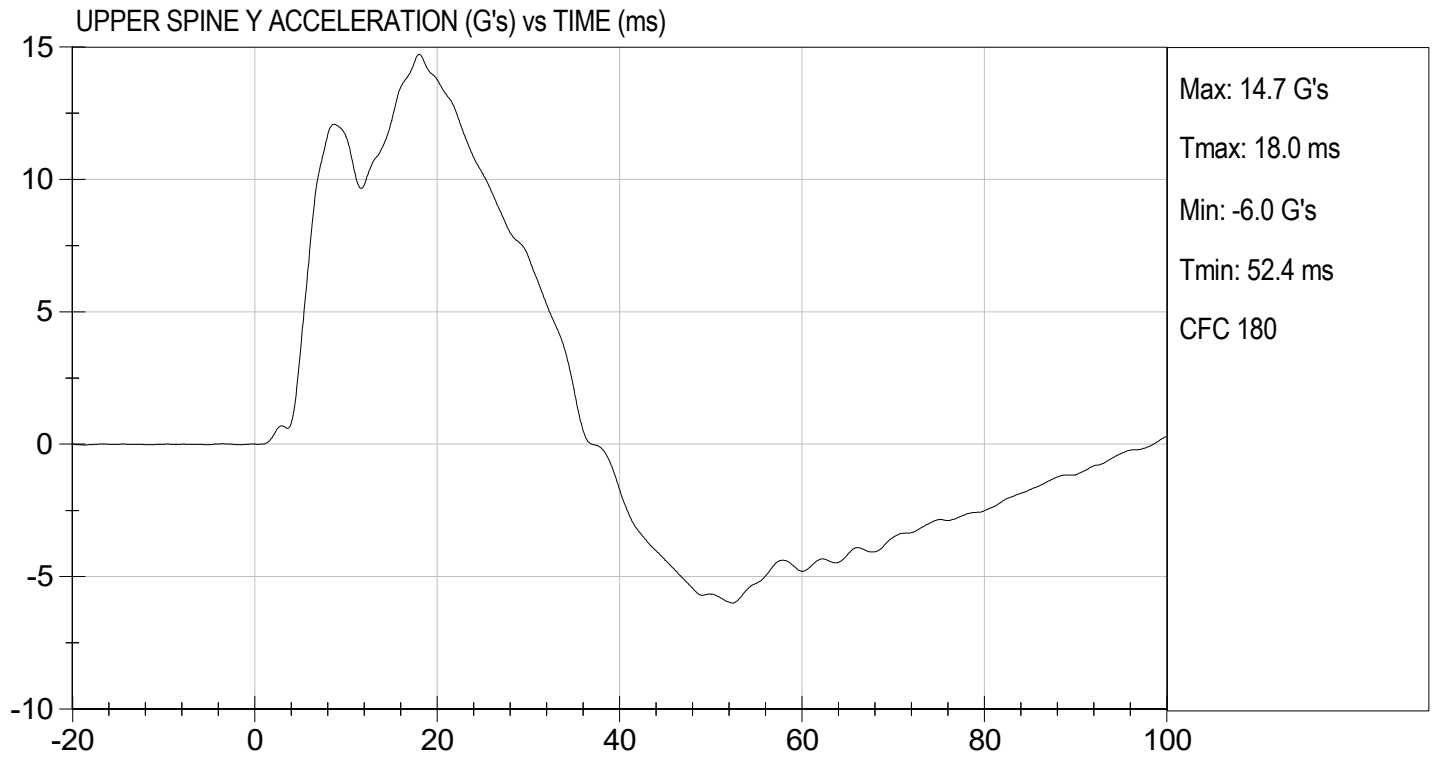
  
 Laboratory Technician

07/28/2023  
 Test Date

  
 Approved By







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

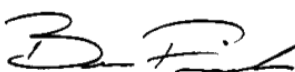
ATD Serial No: 306

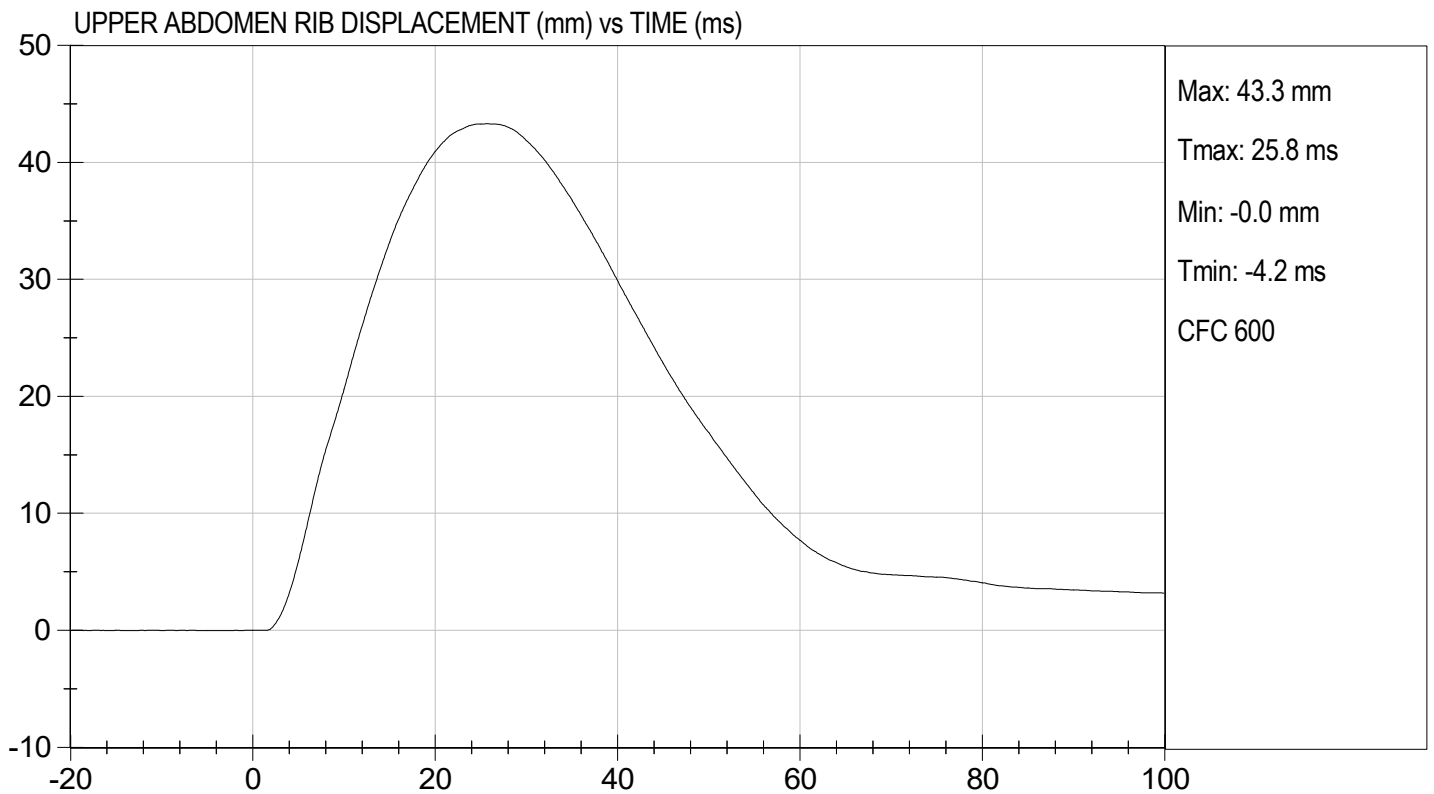
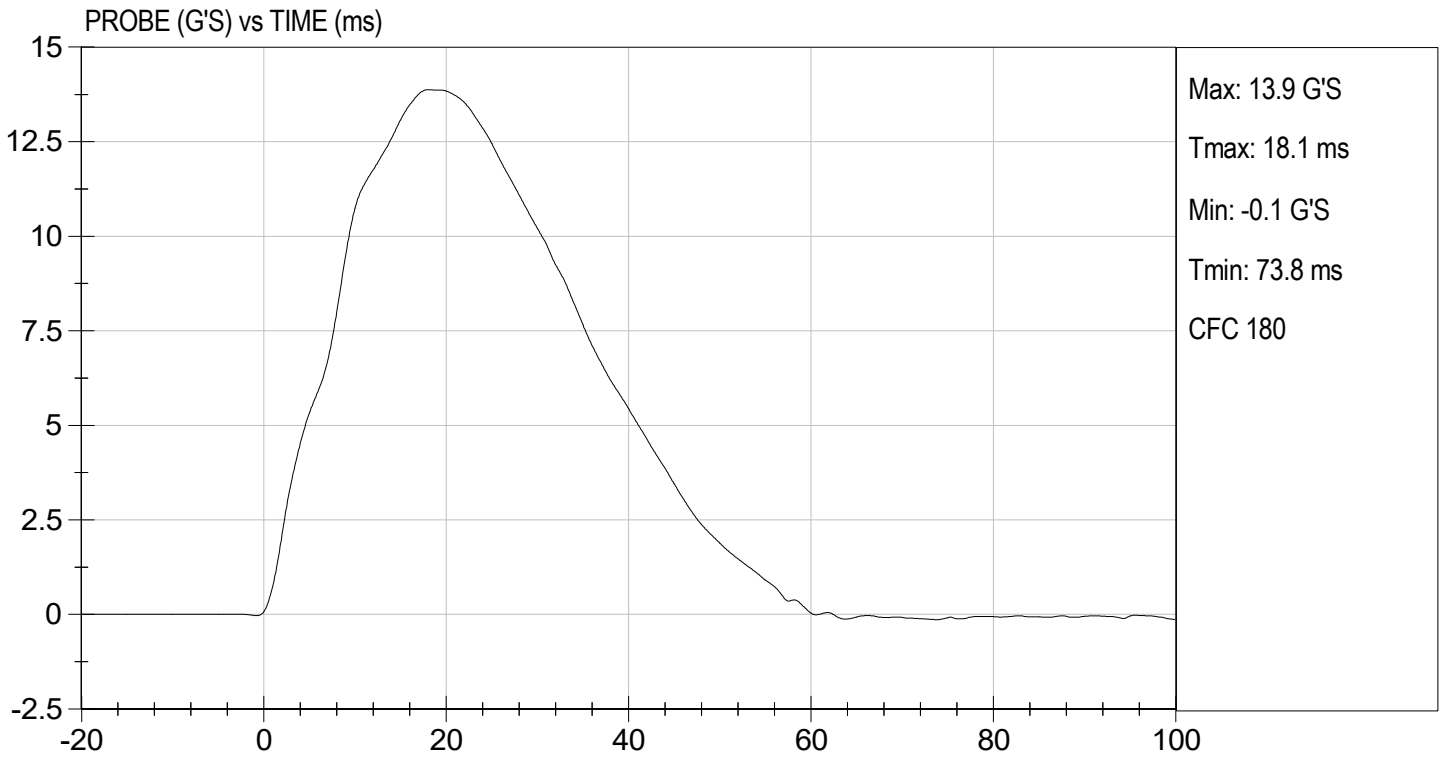
Test I.D: D231956

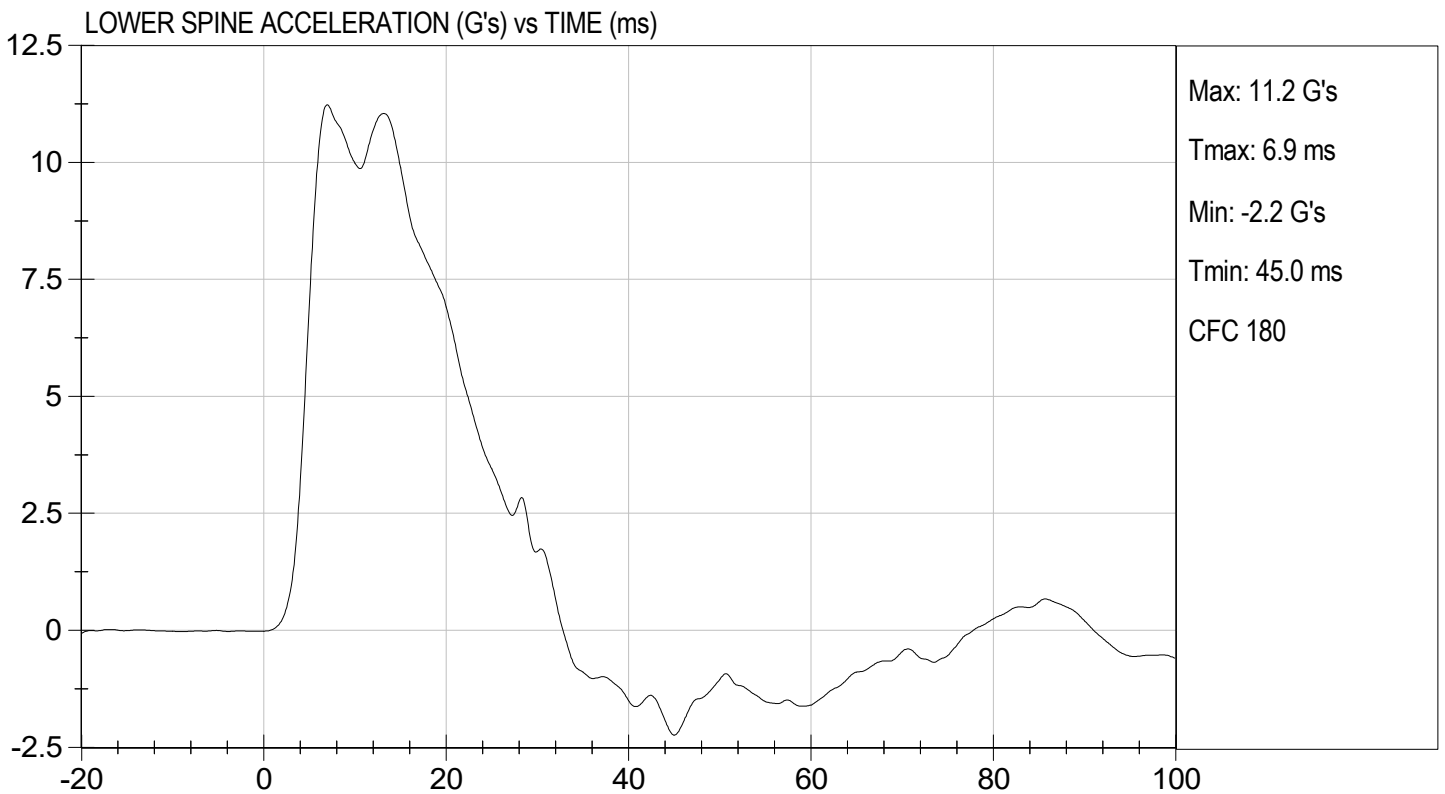
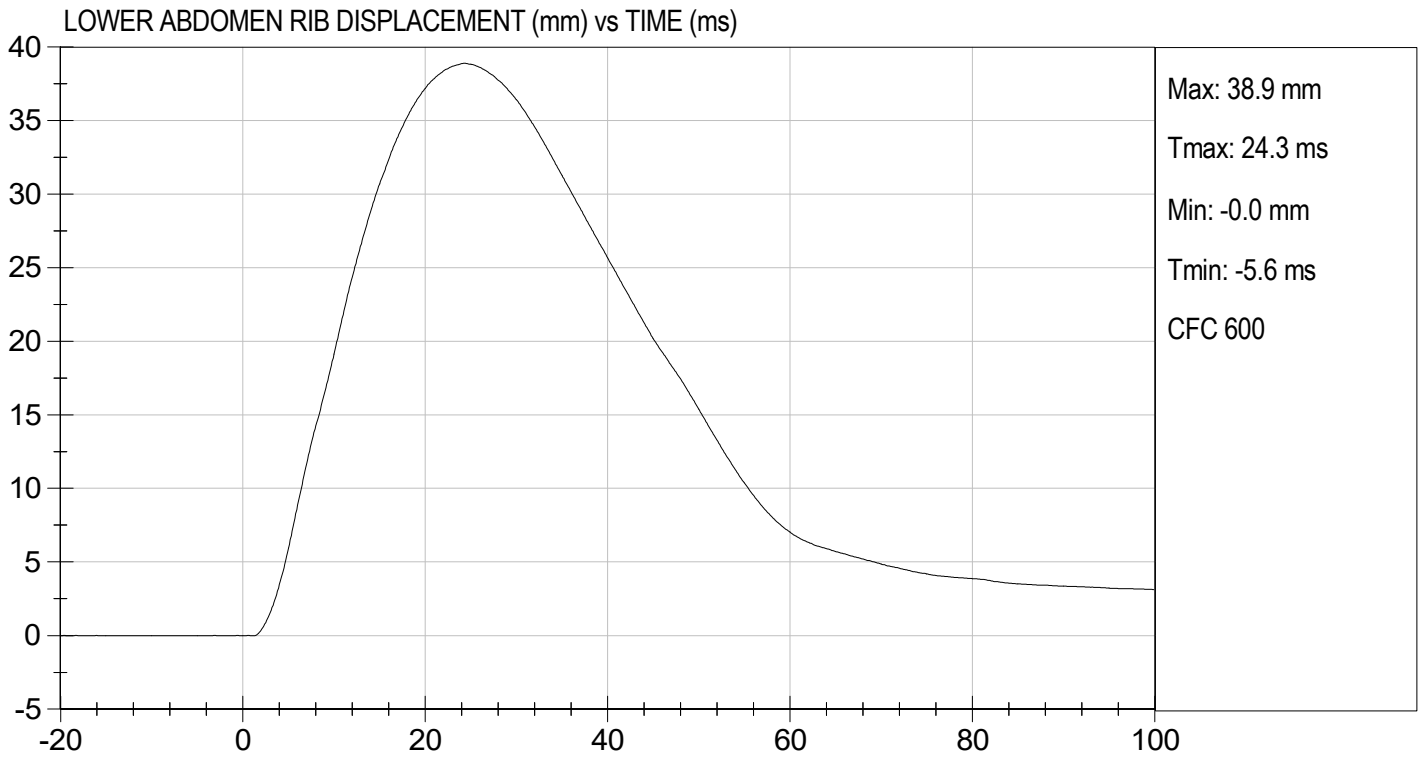
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	46	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Maximum Probe Acceleration	G's	12 to 16	14	Pass
Upper Abdomen Rib Displacement	mm	36 to 47	43	Pass
Lower Abdomen Rib Displacement	mm	33 to 44	39	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	11	Pass
Overall Test Results				Pass

  
 Laboratory Technician

07/28/2023  
 Test Date

  
 Approved By





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

ATD Serial No: 306

Test I.D: D231957

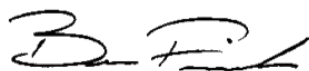
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	46	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Maximum Probe Acceleration	G's	38 to 47	42	Pass
Pelvis Y Acceleration After 6 ms	G's	34 to 42	41.3	Pass
Peak Acetabulum Force	N	3600 to 4300	3,732	Pass
<b>Overall Test Results</b>				<b>Pass</b>



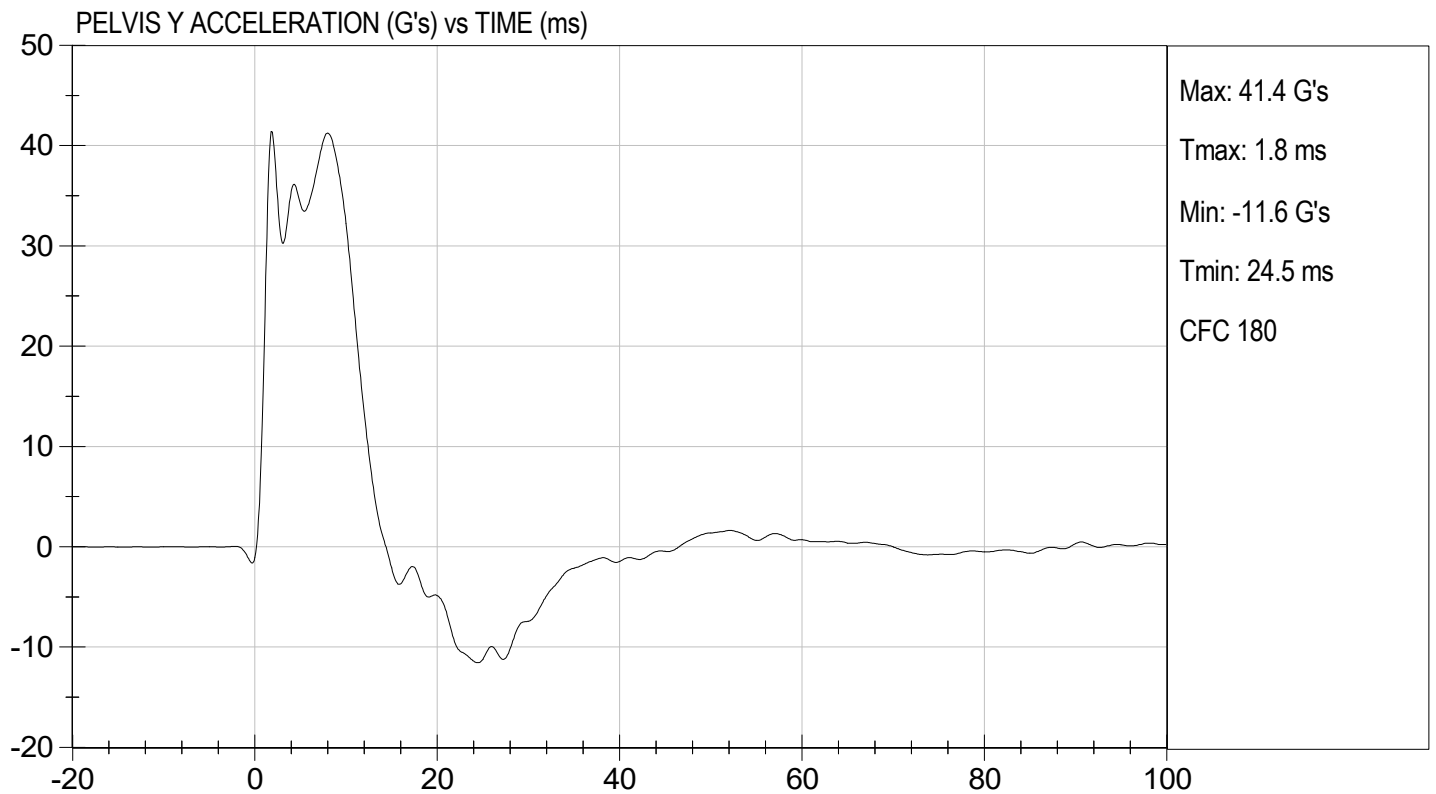
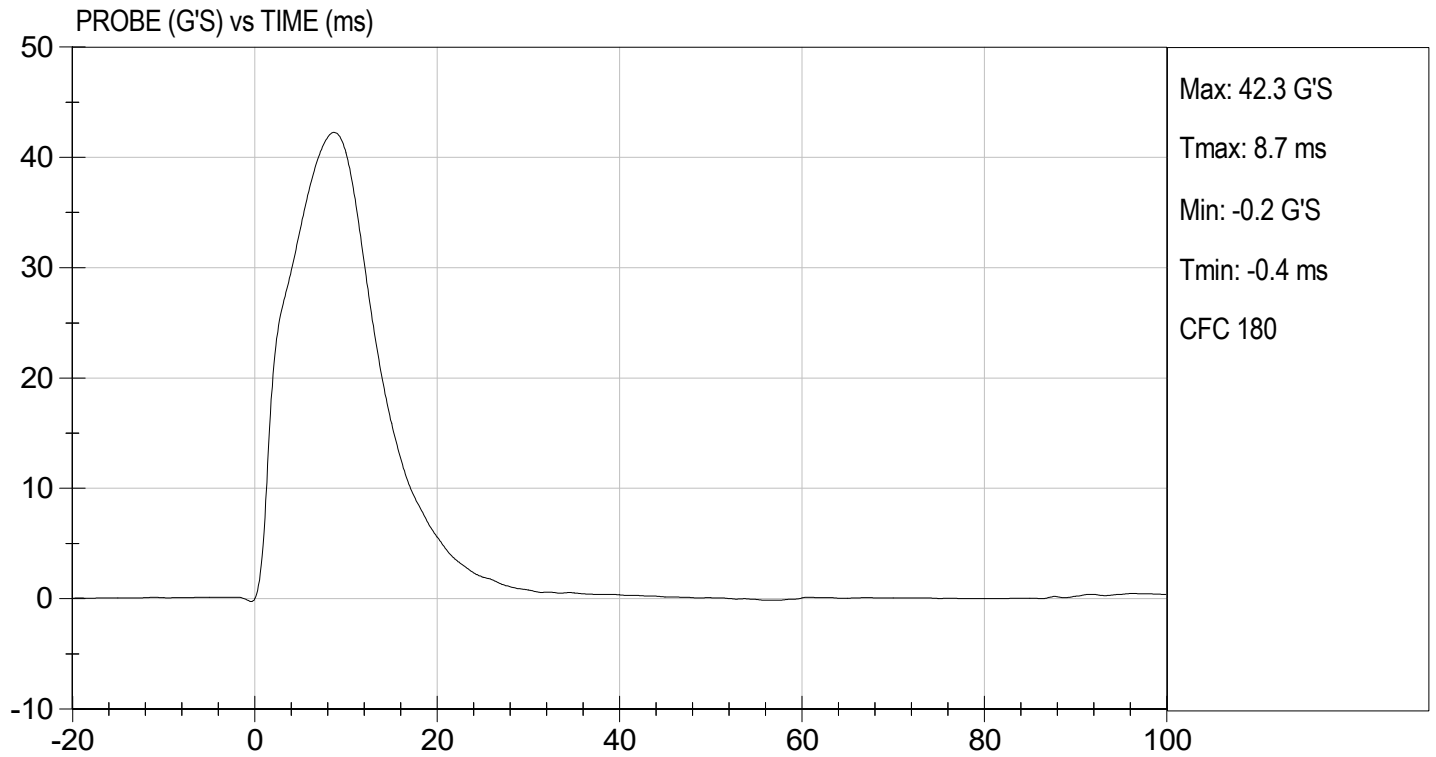
Laboratory Technician

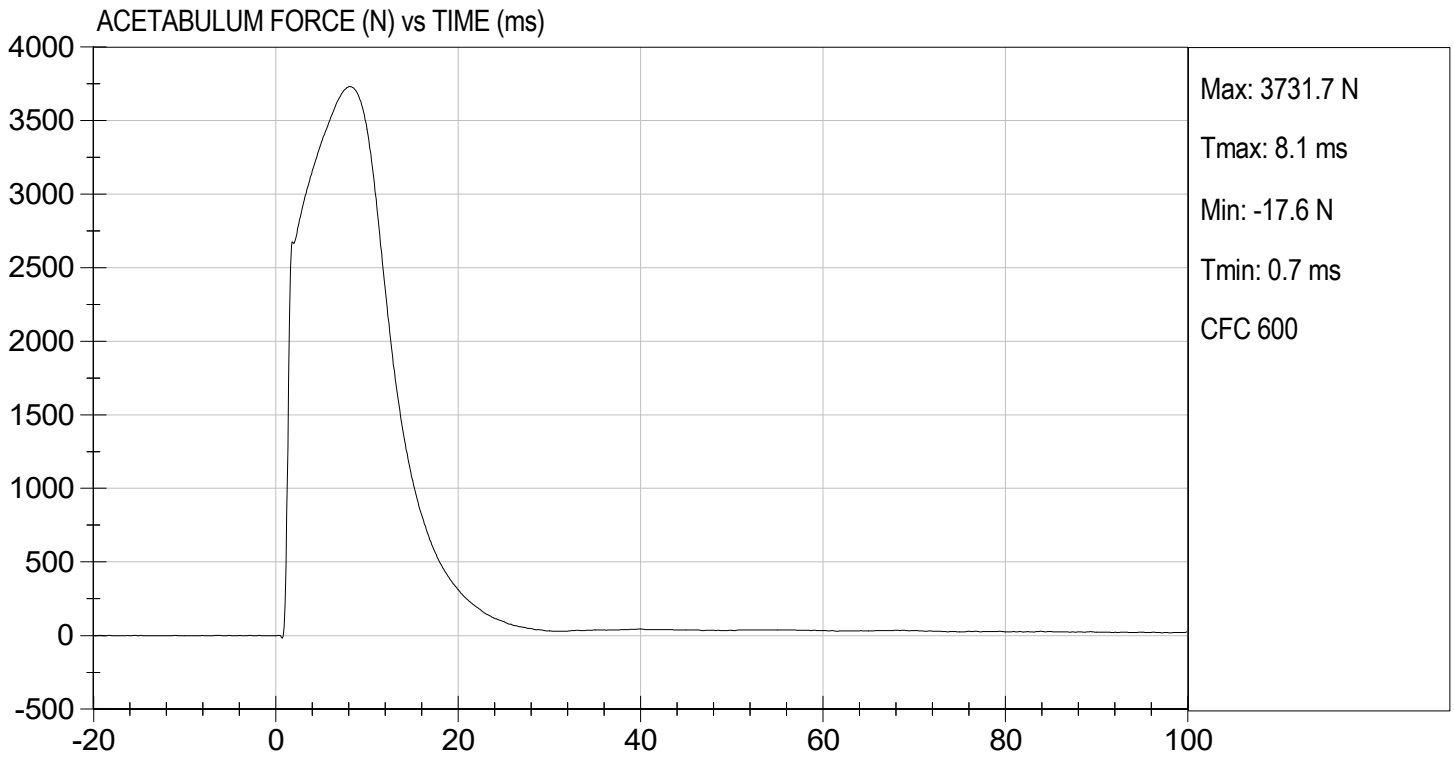
07/28/2023

Test Date



Approved By





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

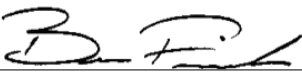
ATD Serial No: 306

Test I.D: D231958

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	45	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Maximum Probe Acceleration	G's	36 to 45	39	Pass
Pelvis Y Acceleration	G's	28 to 39	30	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4,349	Pass
Overall Test Results				Pass

  
 \_\_\_\_\_  
 Laboratory Technician

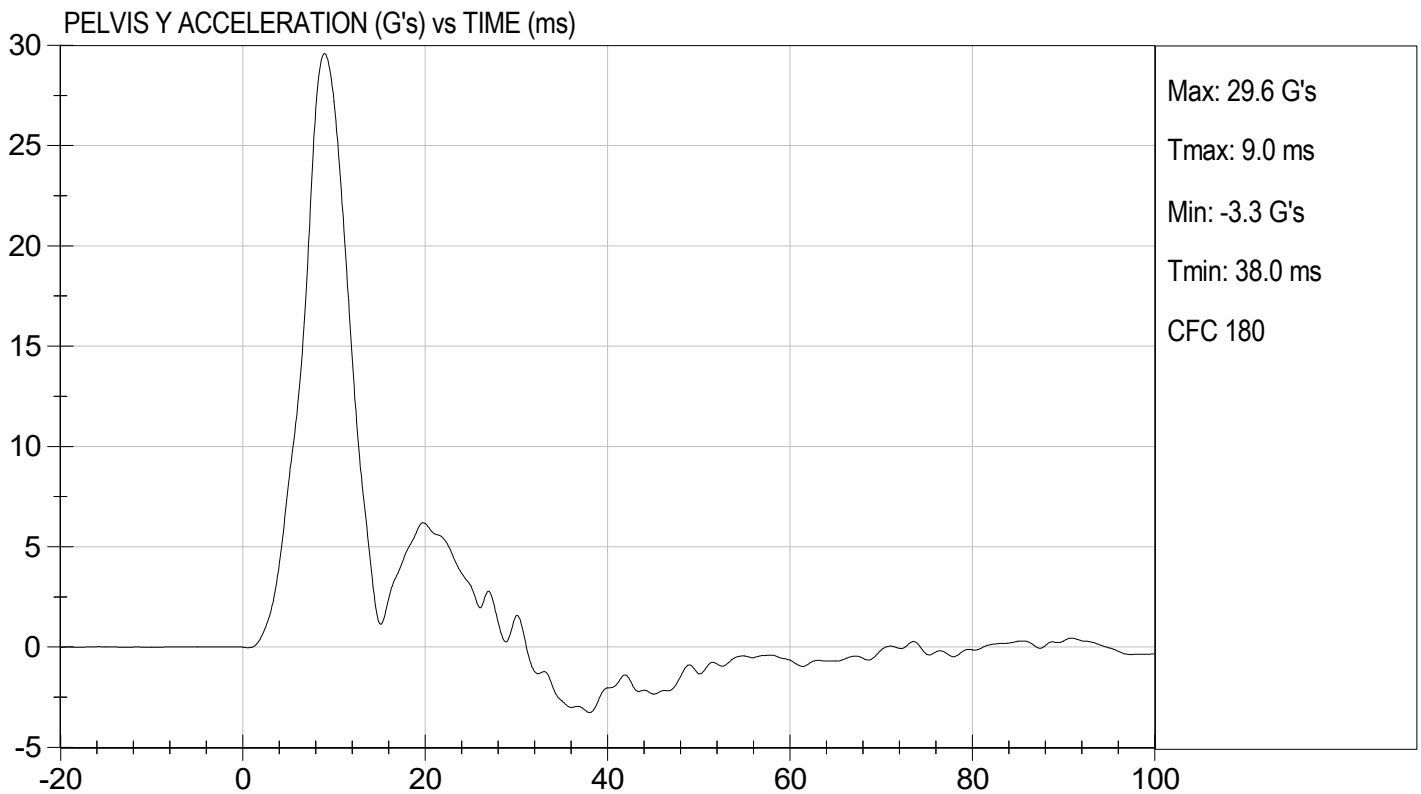
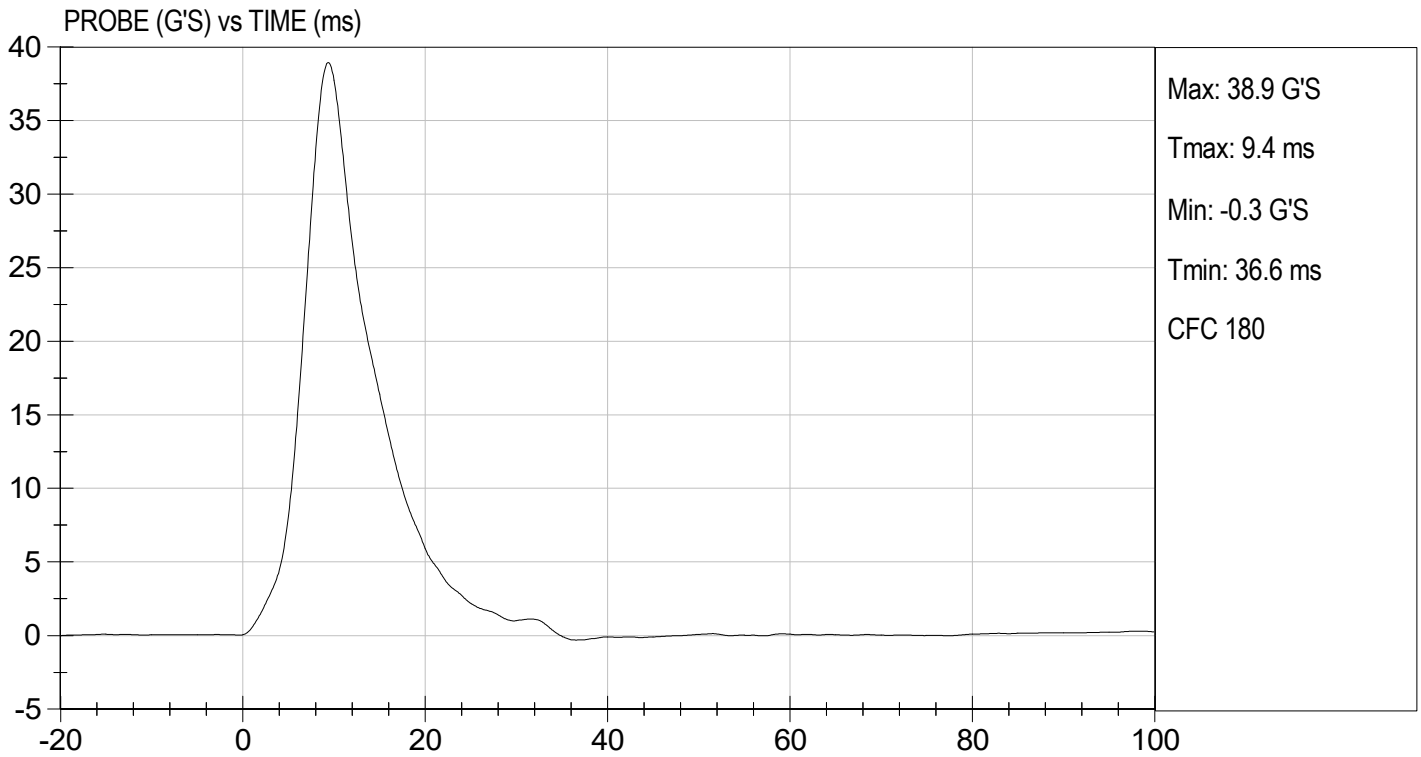
07/28/2023  
 \_\_\_\_\_  
 Test Date

  
 \_\_\_\_\_  
 Approved By



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

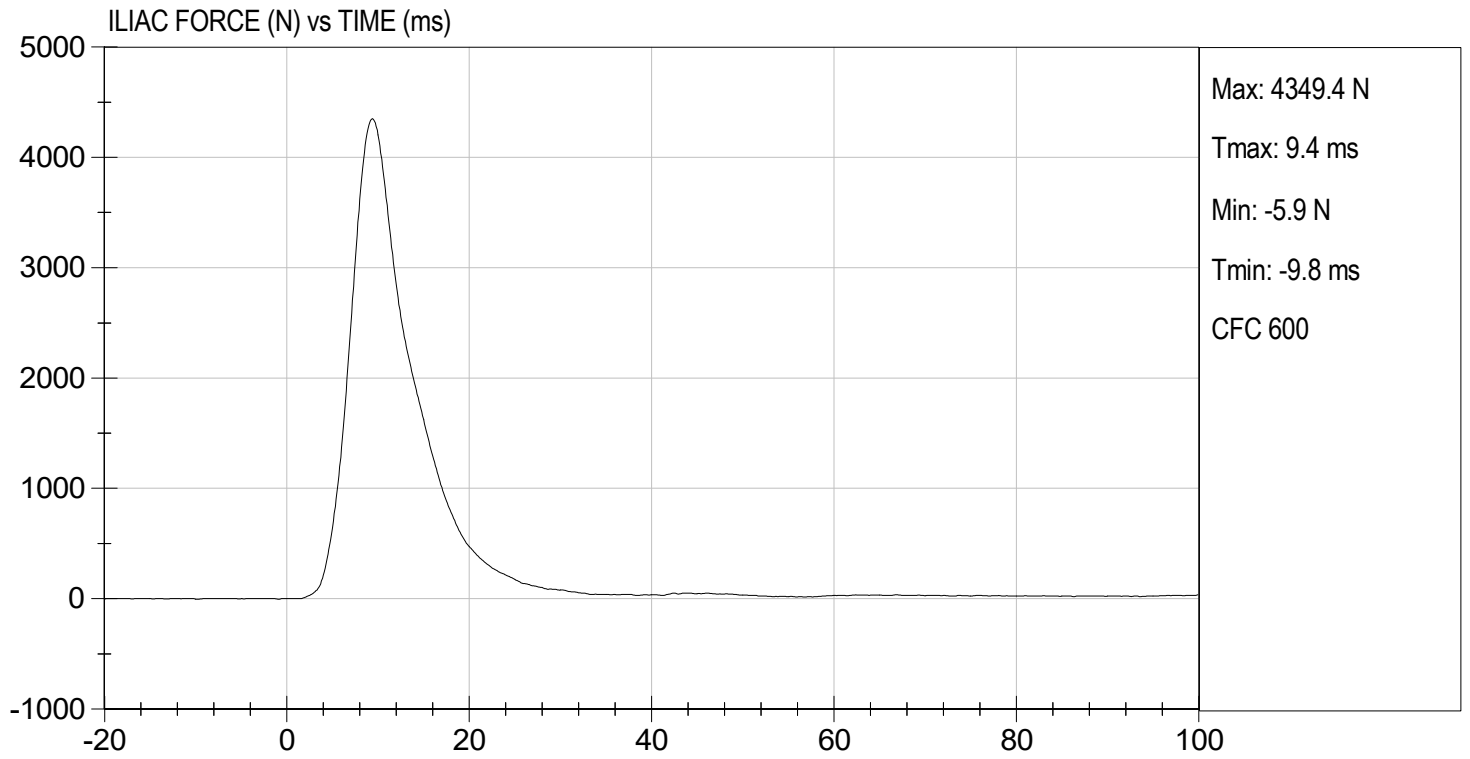
TEST DATE: 07/28/2023  
TEST #: D231958





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

TEST DATE: 07/28/2023  
TEST #: D231958



**CALIBRATION TEST RESULTS**

**POST-TEST**

**SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD**

**SID-IIsD External Measurements**  
**SN: 306**

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

**MGA RESEARCH CORPORATION**  
**HEAD DROP TEST**  
**SID-IIs BUILD LEVEL D DUMMY**

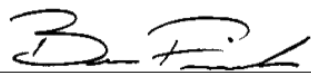
ATD Serial No: 306

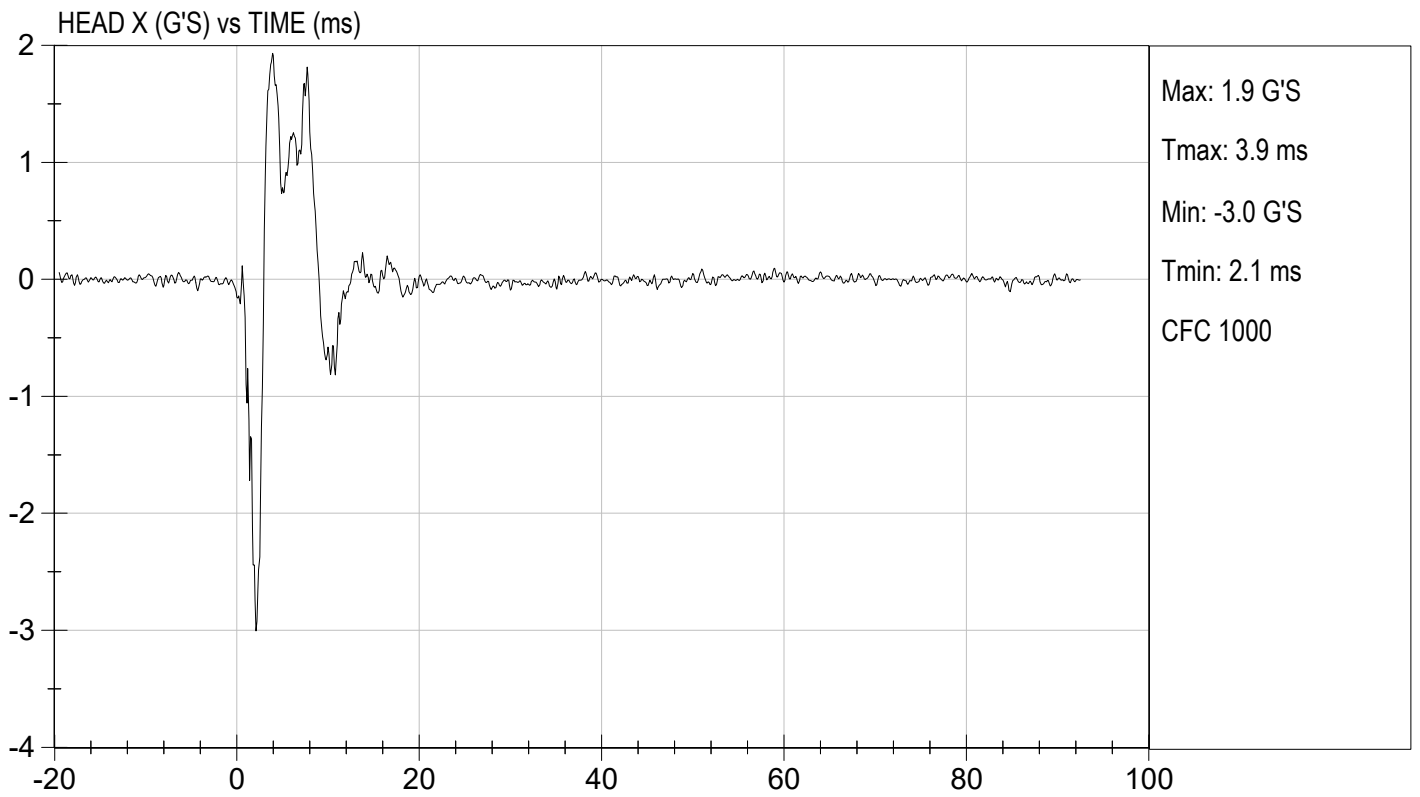
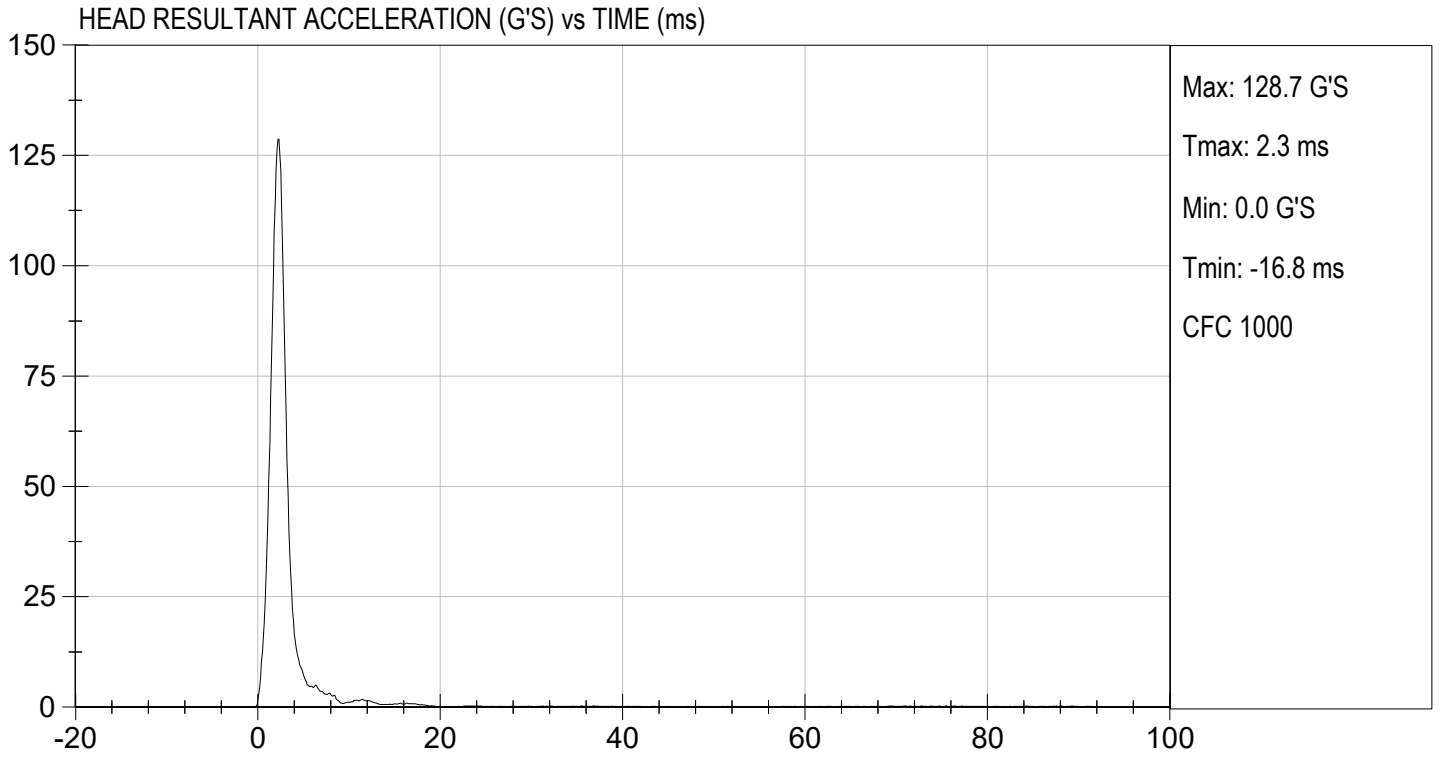
Test ID: D232171

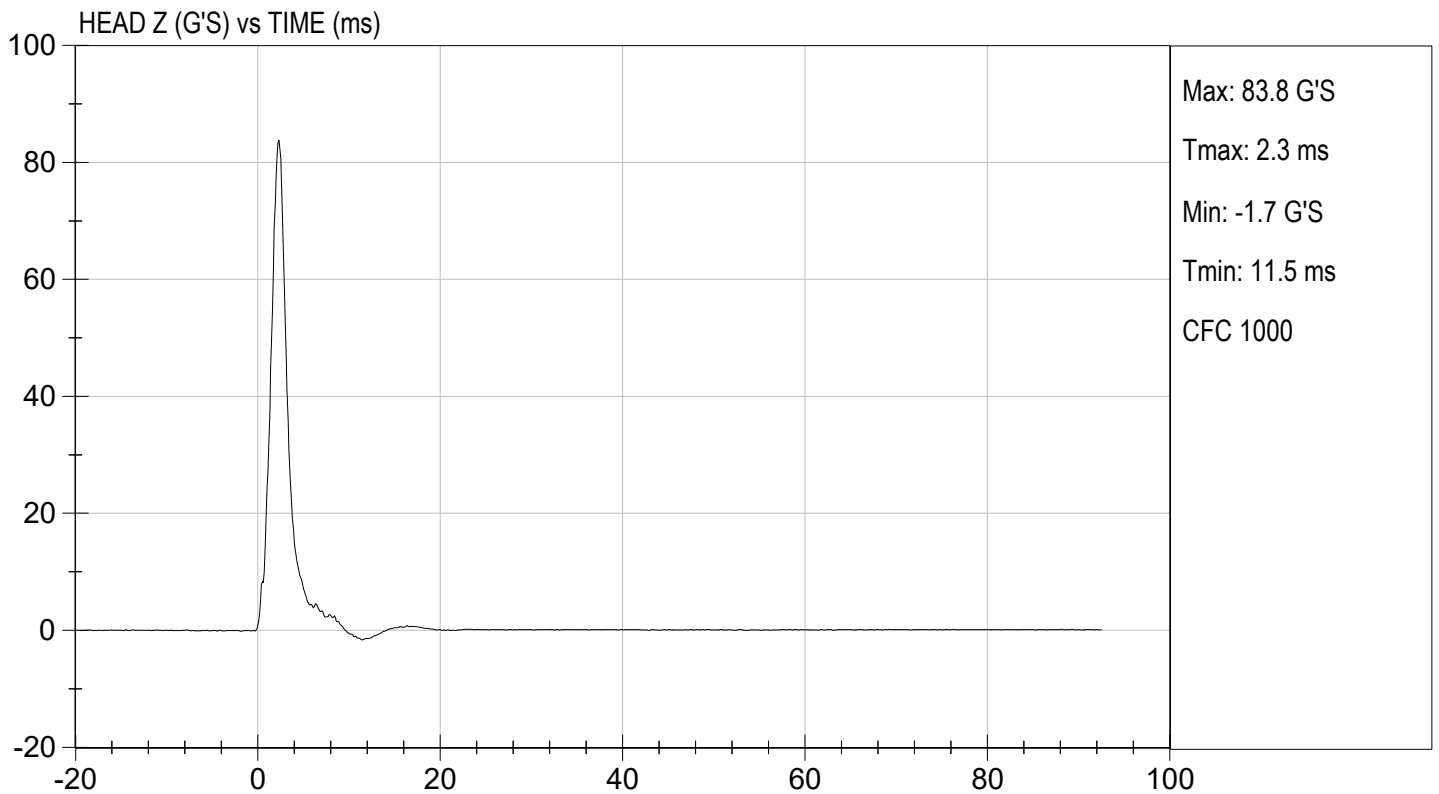
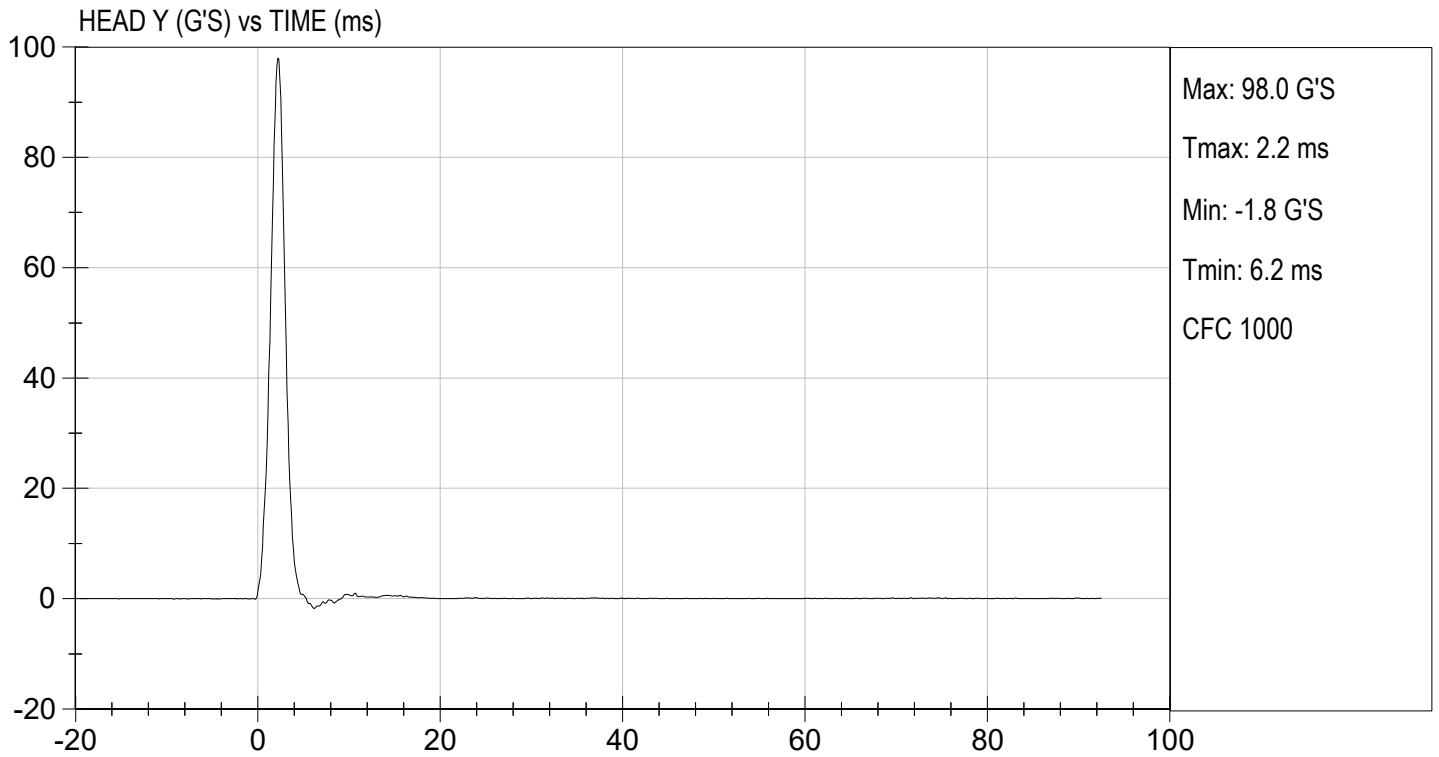
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	45	Pass
Peak Resultant Acceleration	G's	115 to 137	129	Pass
Peak Longitudinal Acceleration	G's	+/- 15	-3.0	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	<15%	Yes	Pass
Overall Test Results				Pass

  
 \_\_\_\_\_  
 Laboratory Technician

08/11/2023  
 \_\_\_\_\_  
 Test Date

  
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 Approved By





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

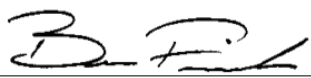
ATD Serial No: 306

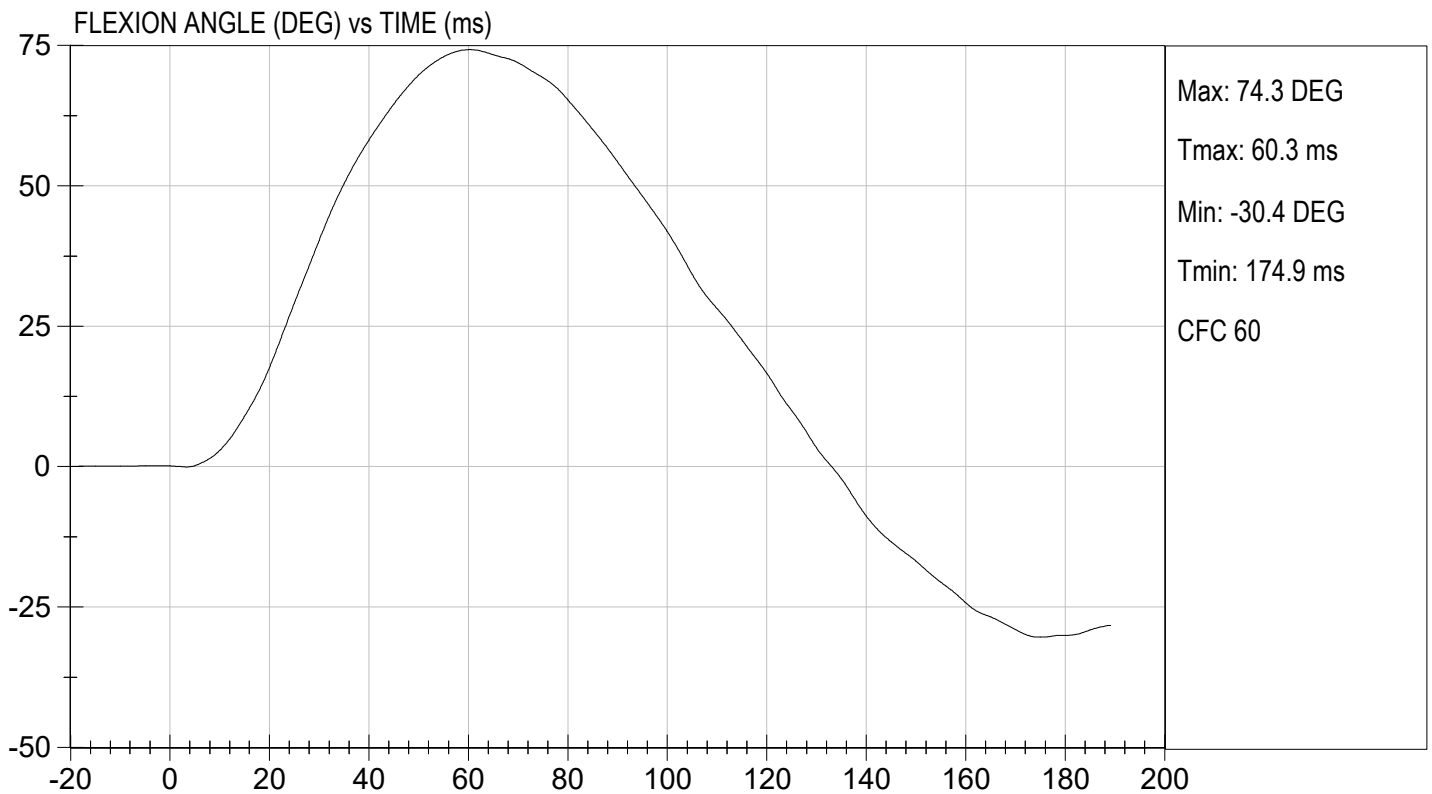
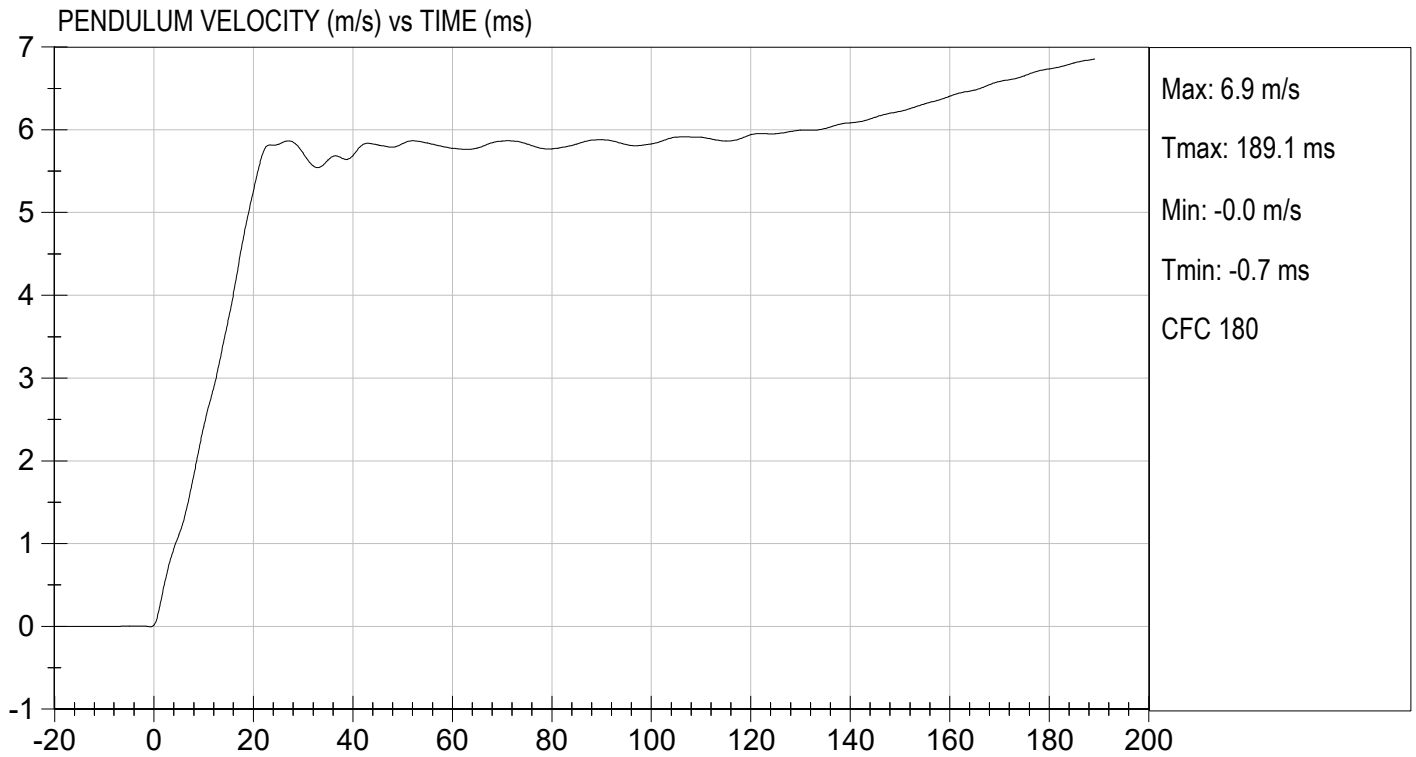
Test I.D.: D232172

Tested Parameter	Units	Specification	Result	Pass/Fail	
Temperature	deg C	20.6 to 22.2	21.3	Pass	
Humidity	%	10 to 70	49	Pass	
Impact Velocity	m/s	5.51 to 5.63	5.62	Pass	
Pendulum Velocity	10 ms	m/s	2.20 to 2.80	2.41	Pass
	15 ms	m/s	3.30 to 4.10	3.72	Pass
	20 ms	m/s	4.40 to 5.40	5.26	Pass
	25 ms	m/s	5.40 to 6.10	5.82	Pass
	25-100 ms	m/s	5.50 to 6.20	5.88	Pass
Maximum D-Plane Rotation	deg	71 to 81	74	Pass	
Time of Maximum D-Plane Rotation	ms	50 to 70	60	Pass	
Maximum Occipital Condyle Moment	Nm	-44 to -36	-40	Pass	
Time of Moment Decay to 0 Nm	ms	102 to 126	111	Pass	
<b>Overall Test Results</b>				<b>Pass</b>	

  
 Laboratory Technician

08/11/2023  
 Test Date

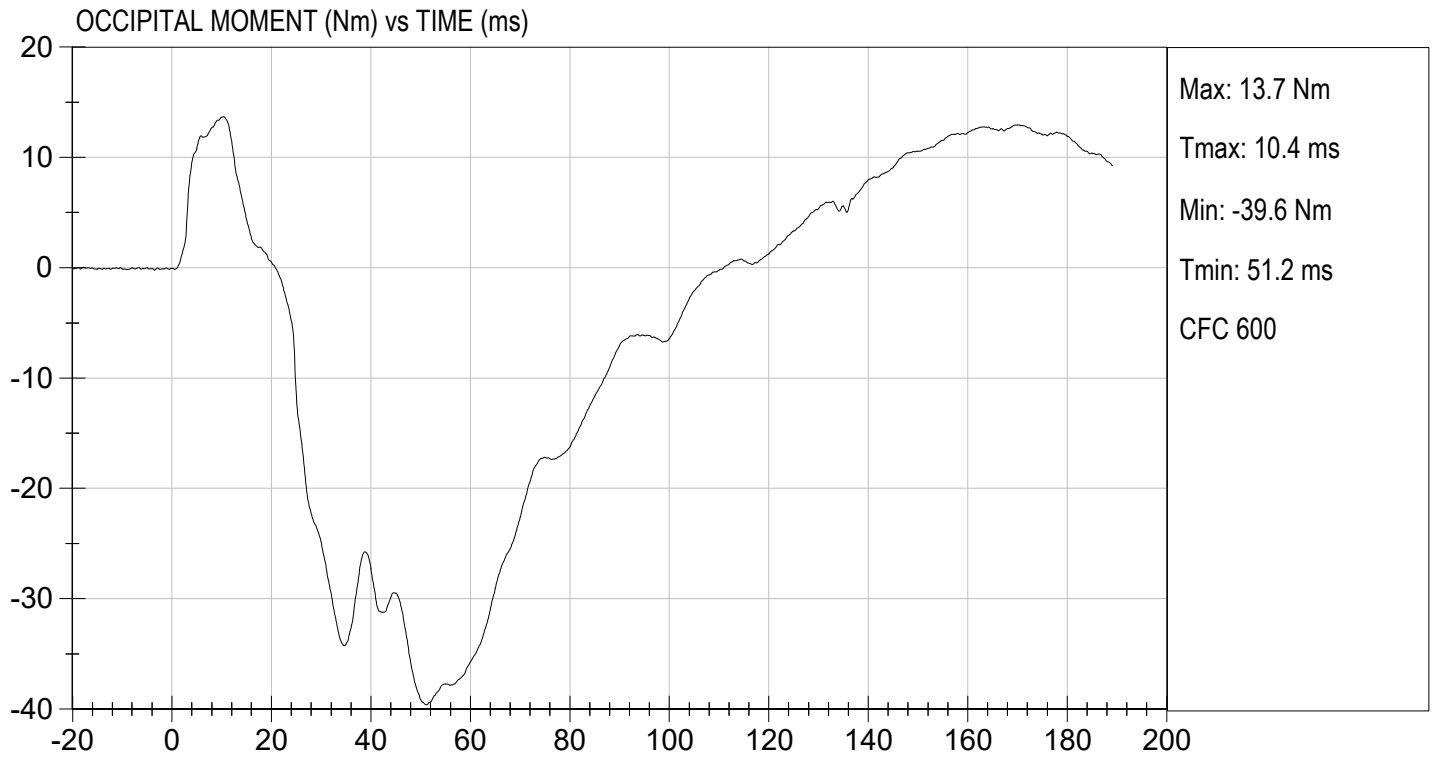
  
 Approved By





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

TEST DATE: 08/11/2023  
TEST #: D232172



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

ATD Serial No: 306

Test ID: D232173

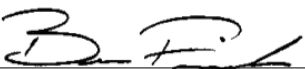
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	46	Pass
Impact Velocity	m/s	4.20 to 4.40	4.39	Pass
Maximum Probe Acceleration	G's	13 to 18	15	Pass
Shoulder Displacement	mm	28 to 37	33	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	19	Pass
Overall Test Results				Pass



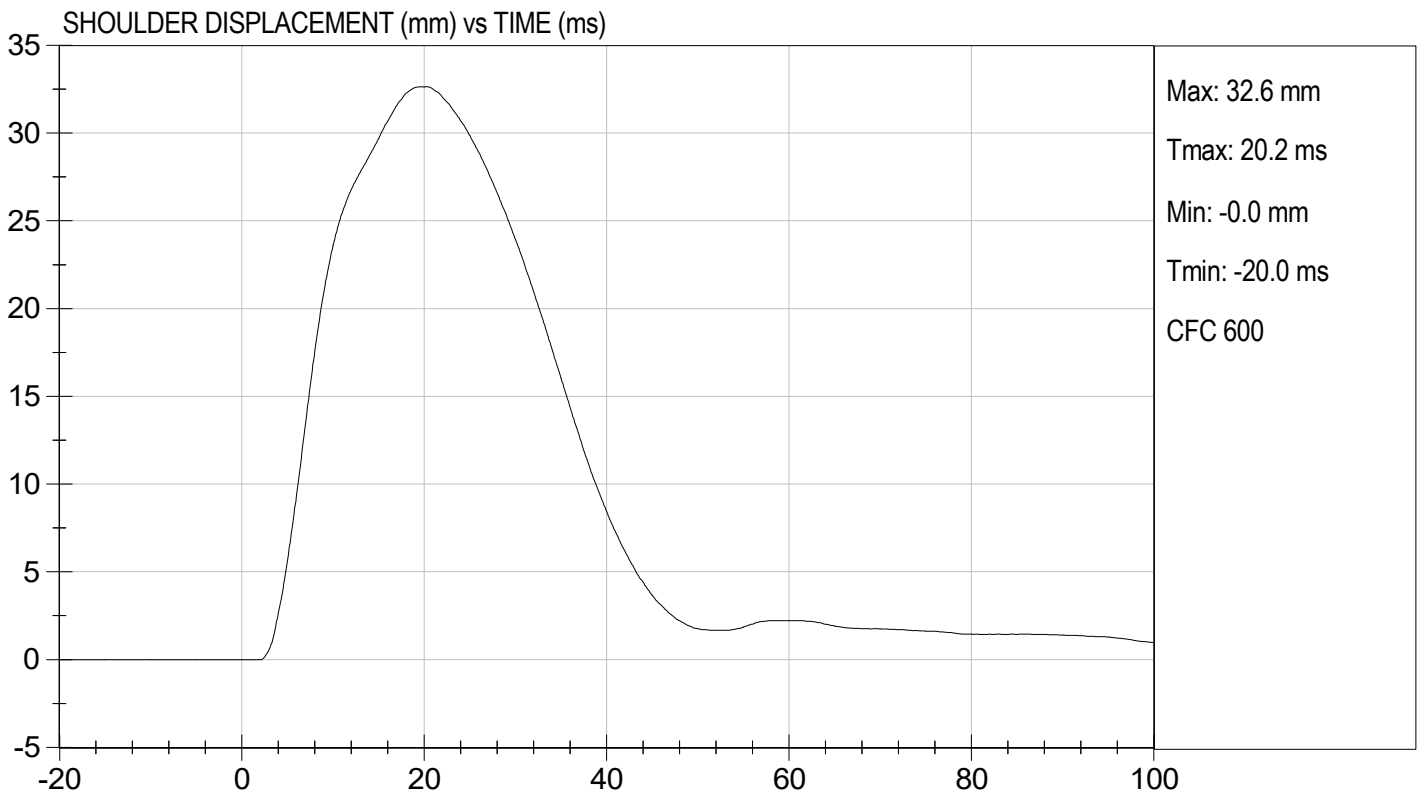
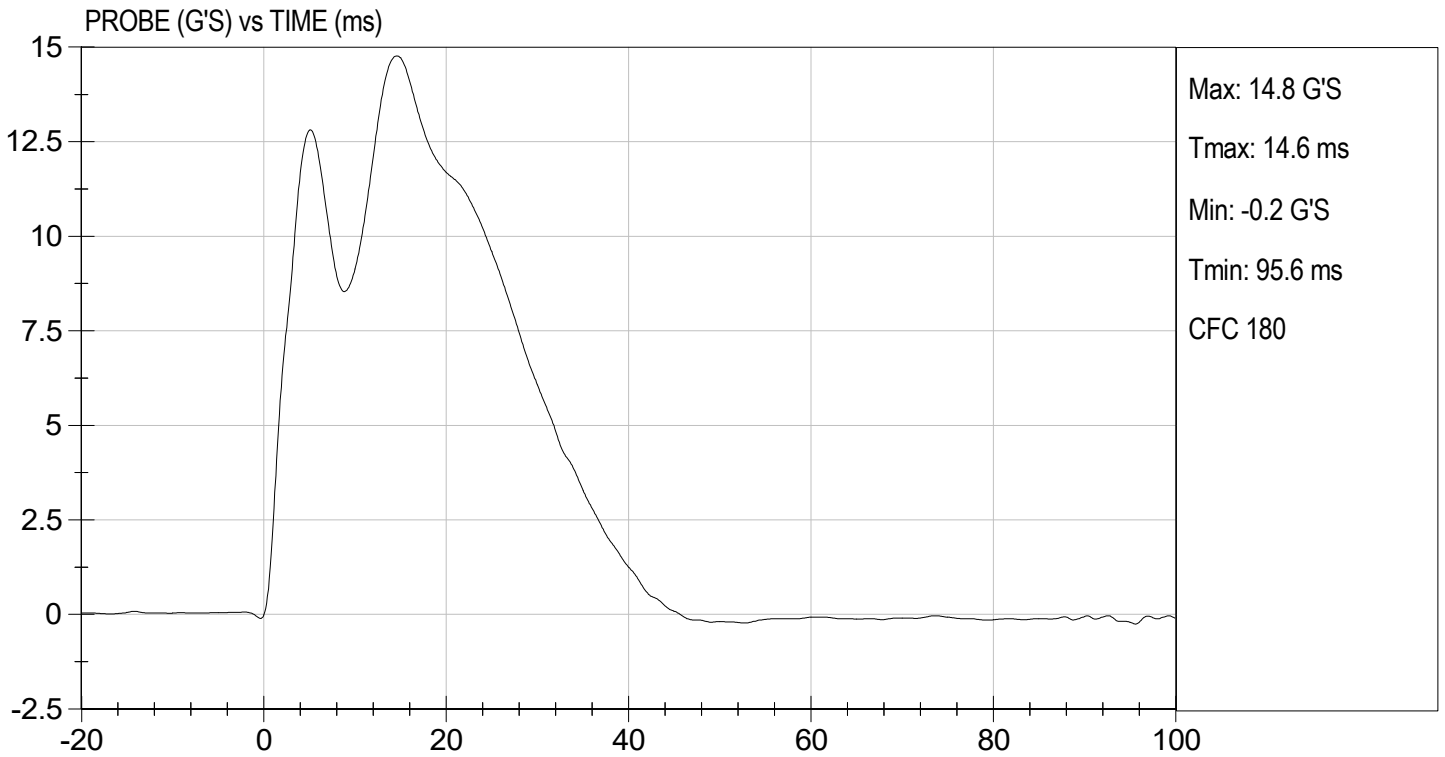
Laboratory Technician

08/11/2023

Test Date



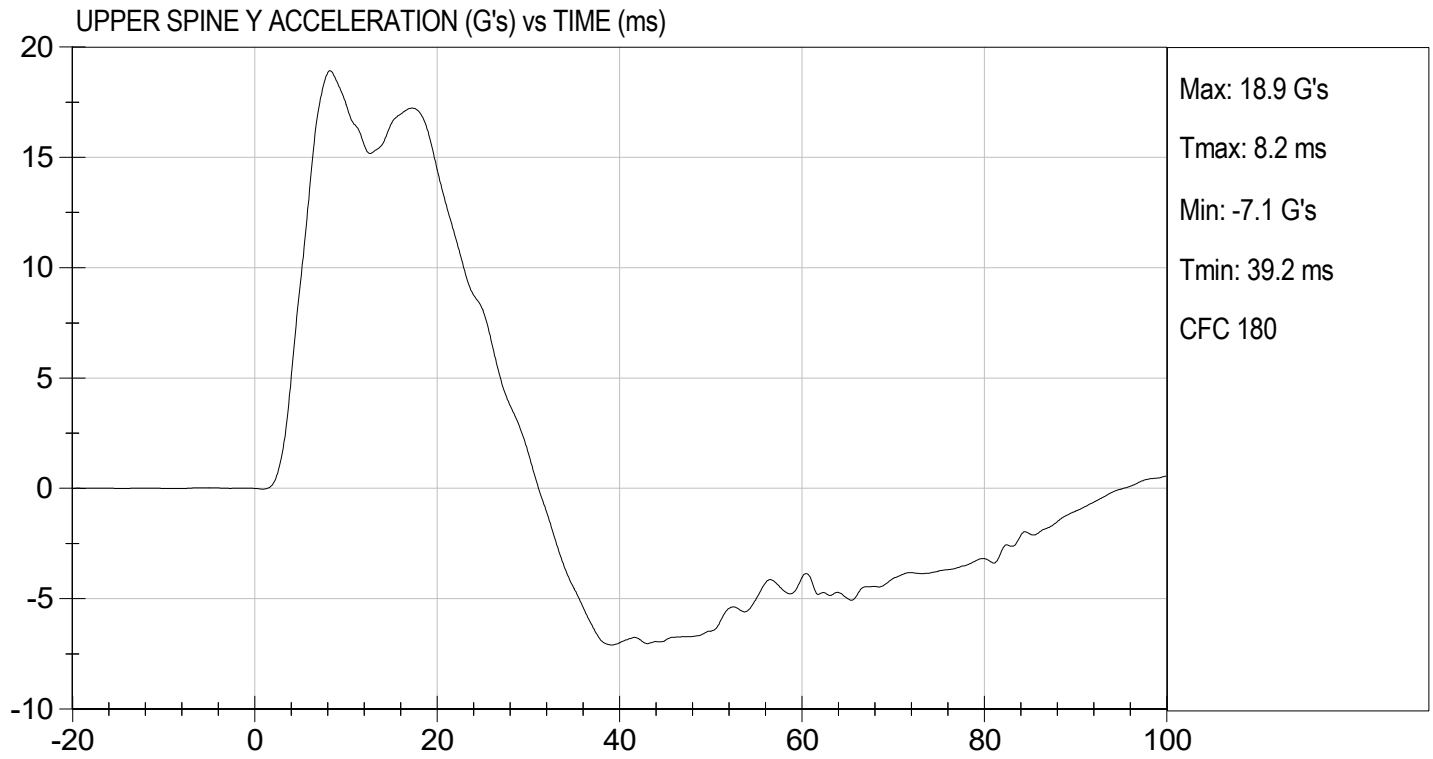
Approved By





TEST DESC: SHOULDER IMPACT  
VELOCITY: 14.40 ft/s, 4.39 m/s

TEST DATE: 08/11/2023  
TEST #: D232173



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

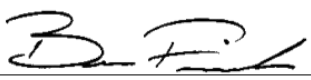
ATD Serial No: 306

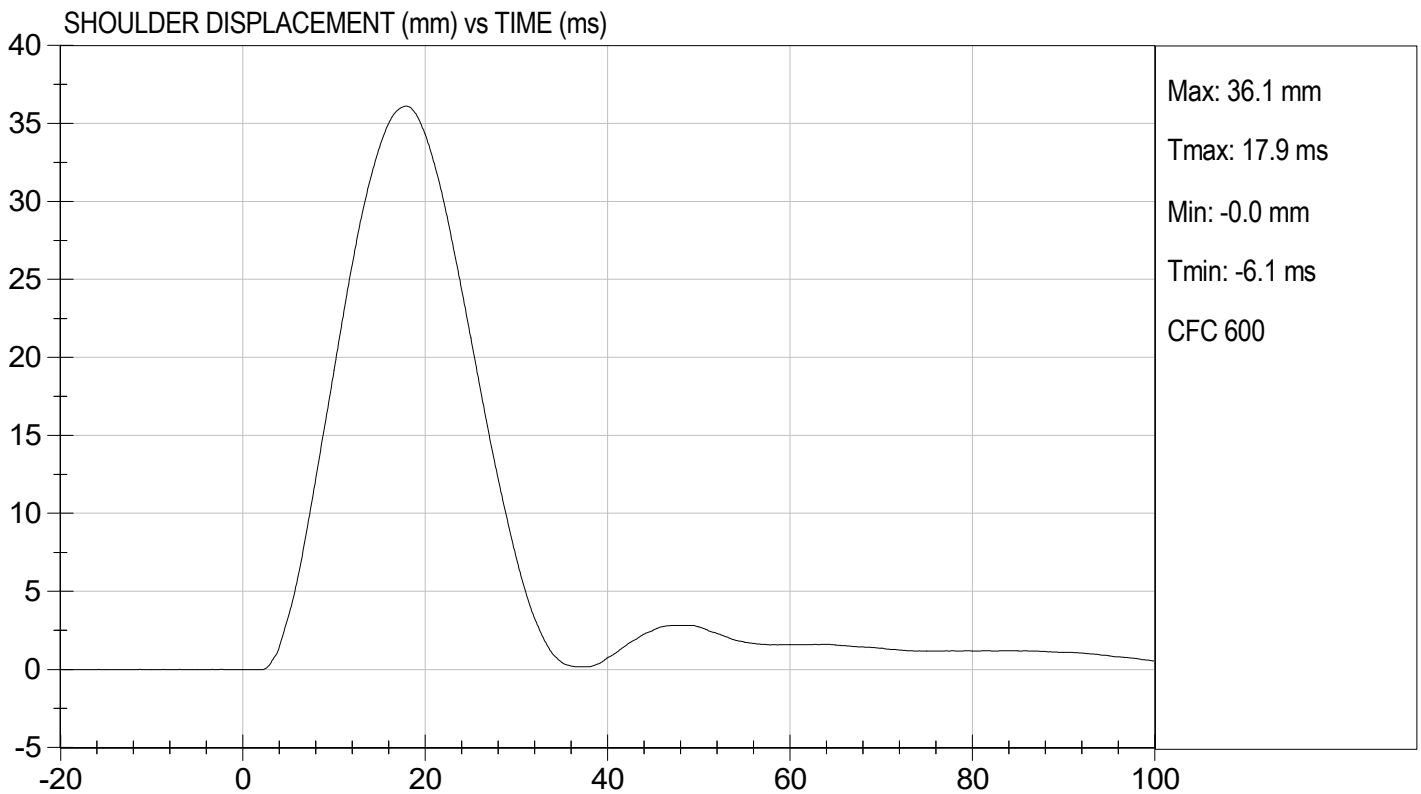
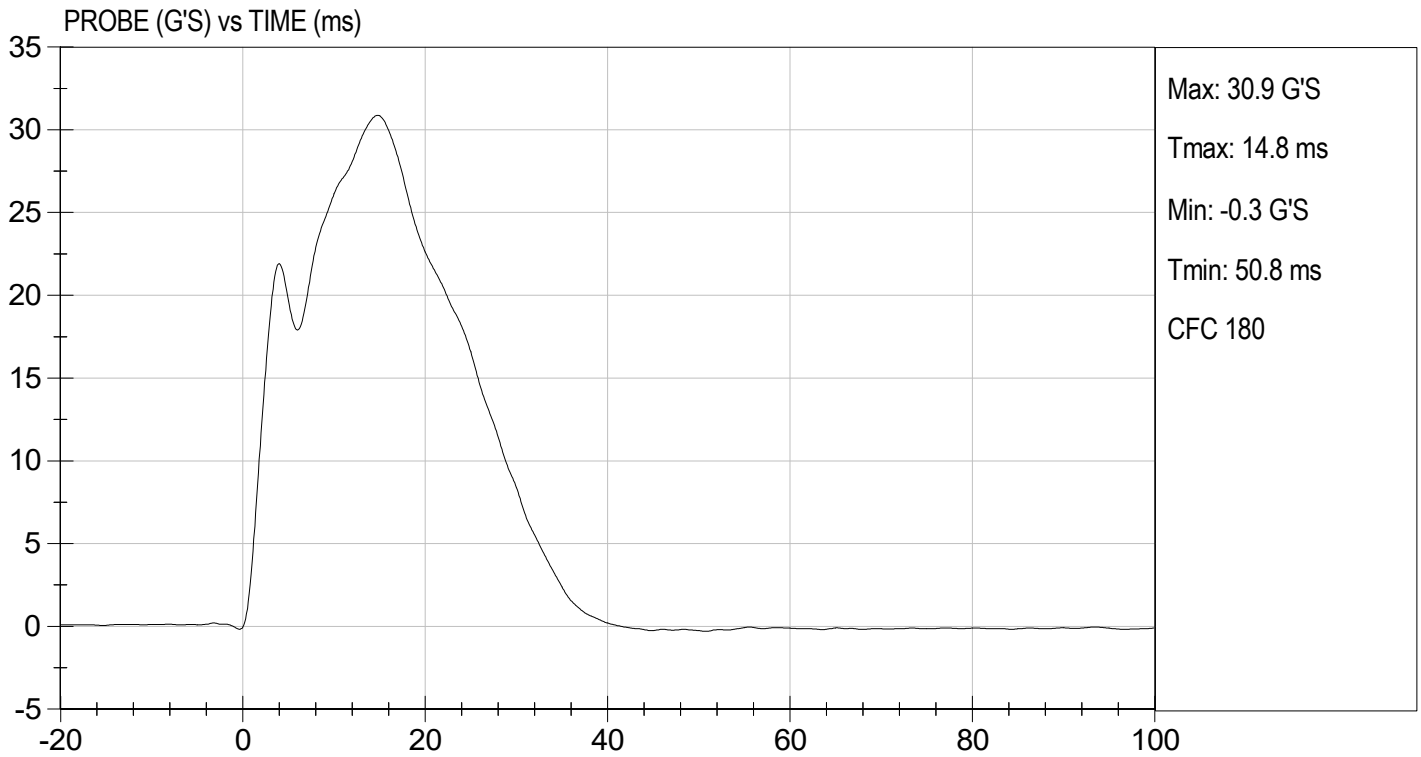
Test I.D: D232174

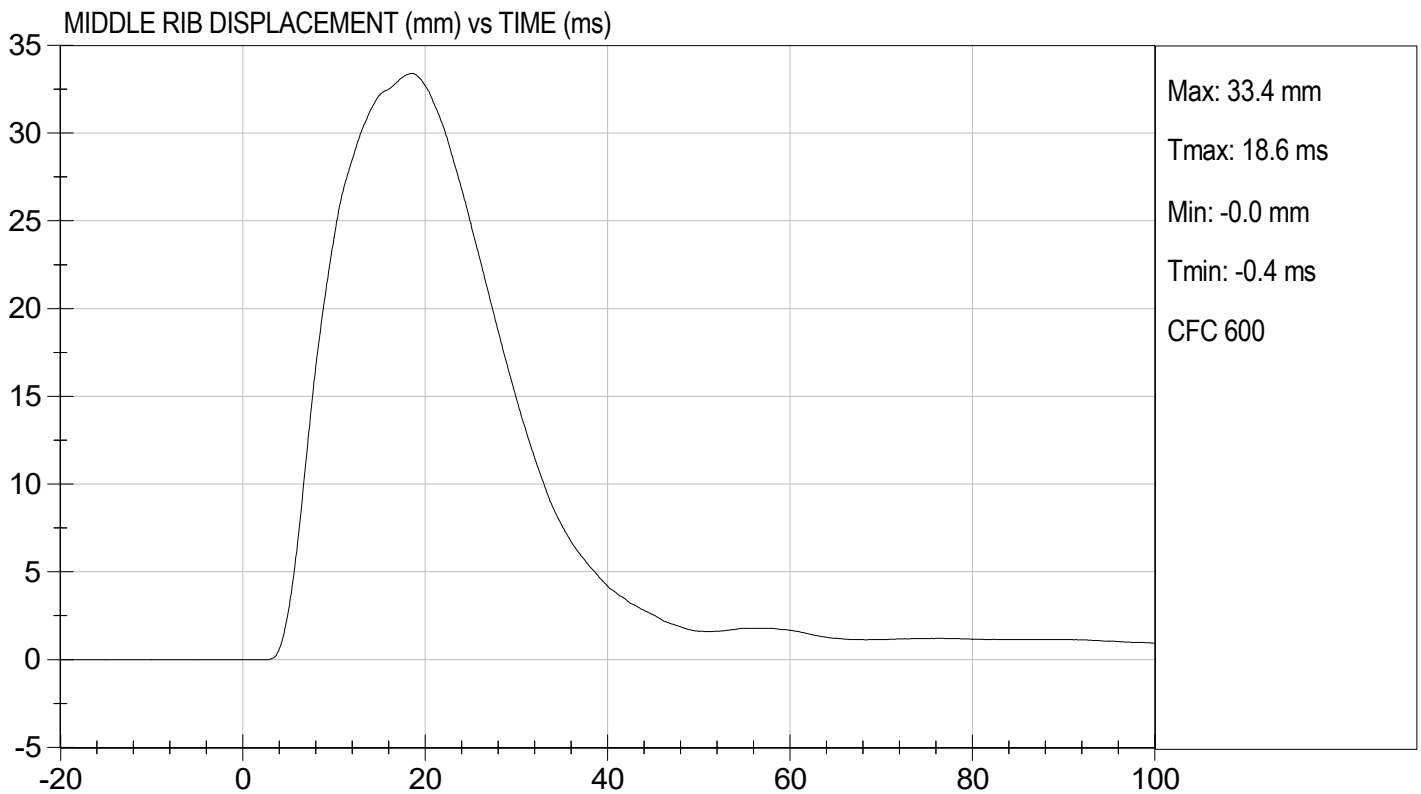
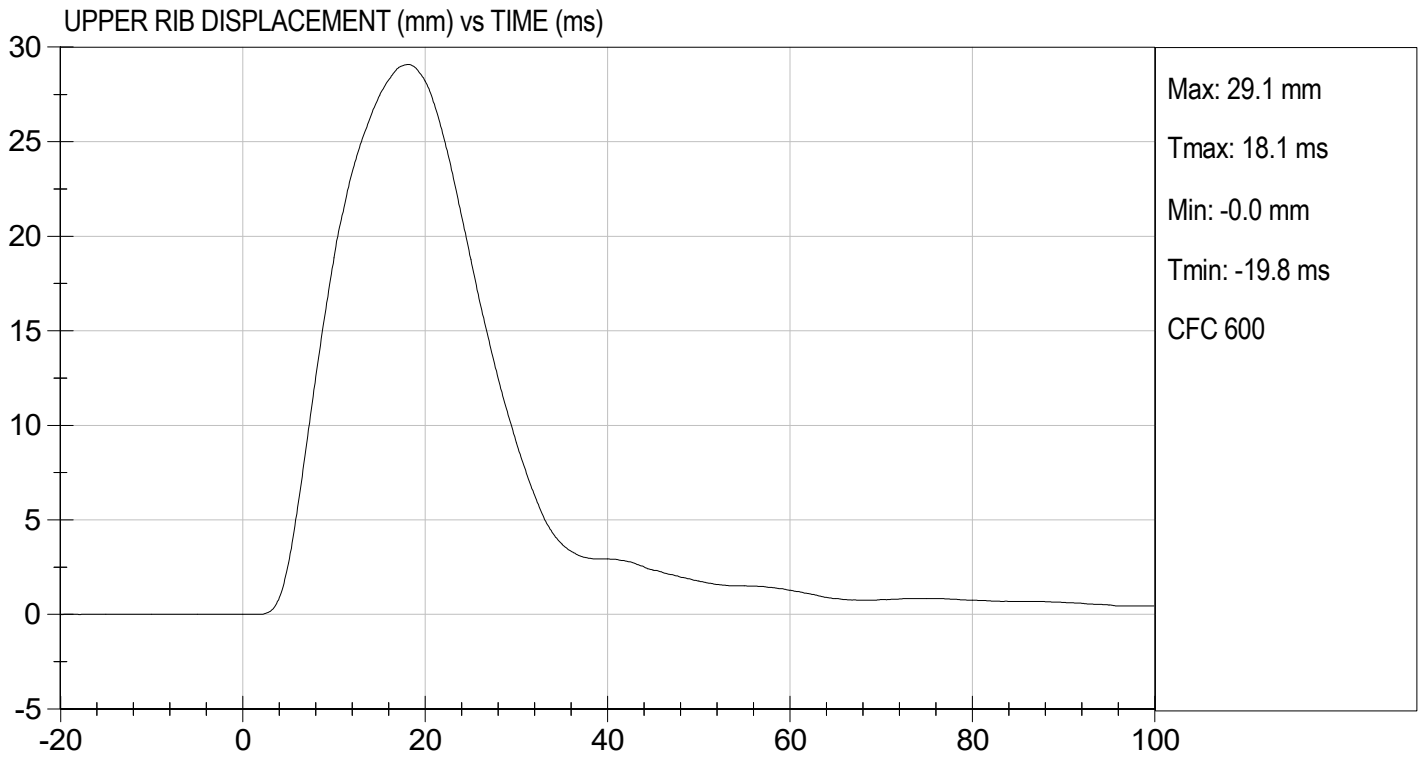
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	44	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Maximum Probe Acceleration	G's	30 to 36	31	Pass
Shoulder Displacement	mm	31 to 40	36	Pass
Upper Rib Displacement	mm	25 to 32	29	Pass
Middle Rib Displacement	mm	30 to 36	33	Pass
Lower Rib Displacement	mm	32 to 38	36	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	35	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	30	Pass
Overall Test Results				Pass

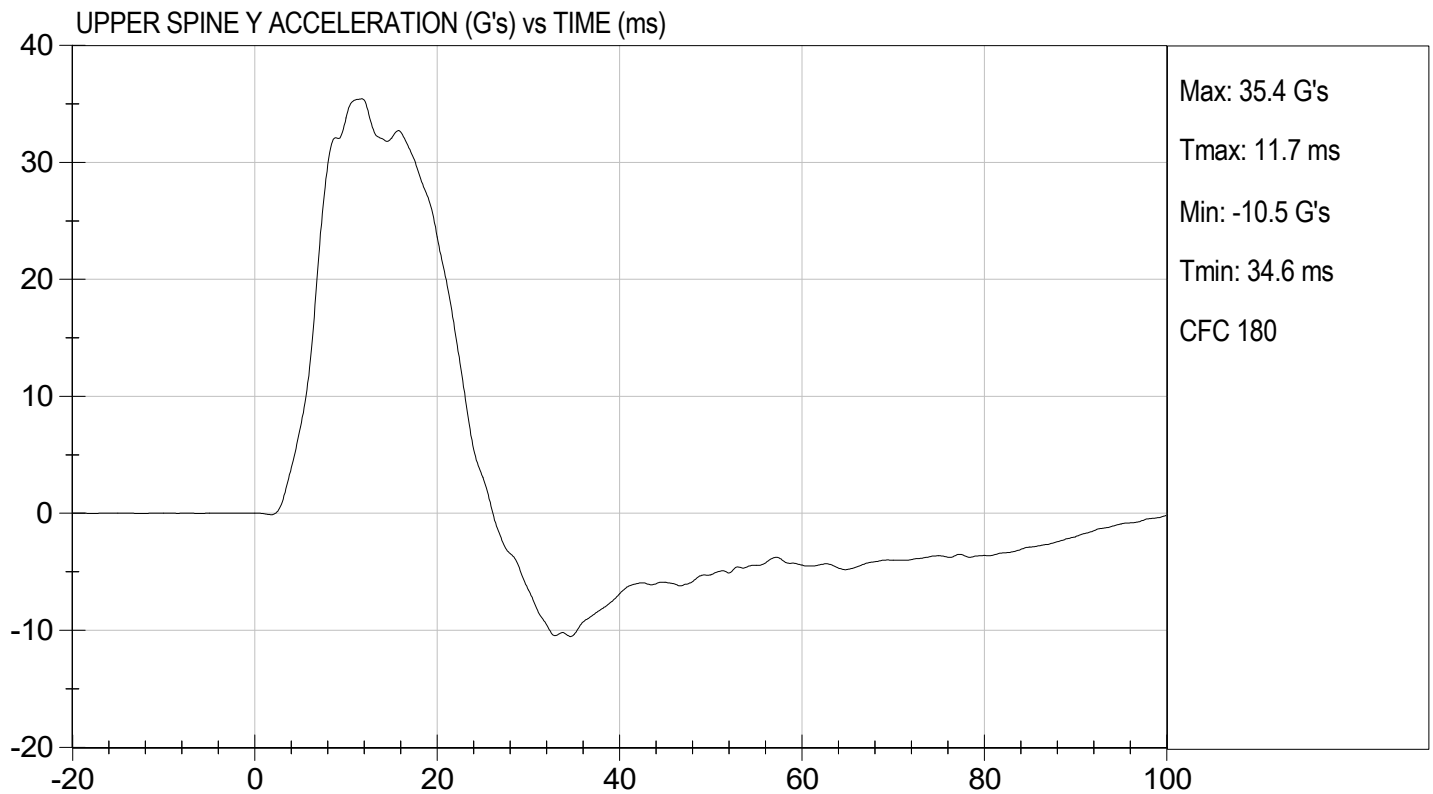
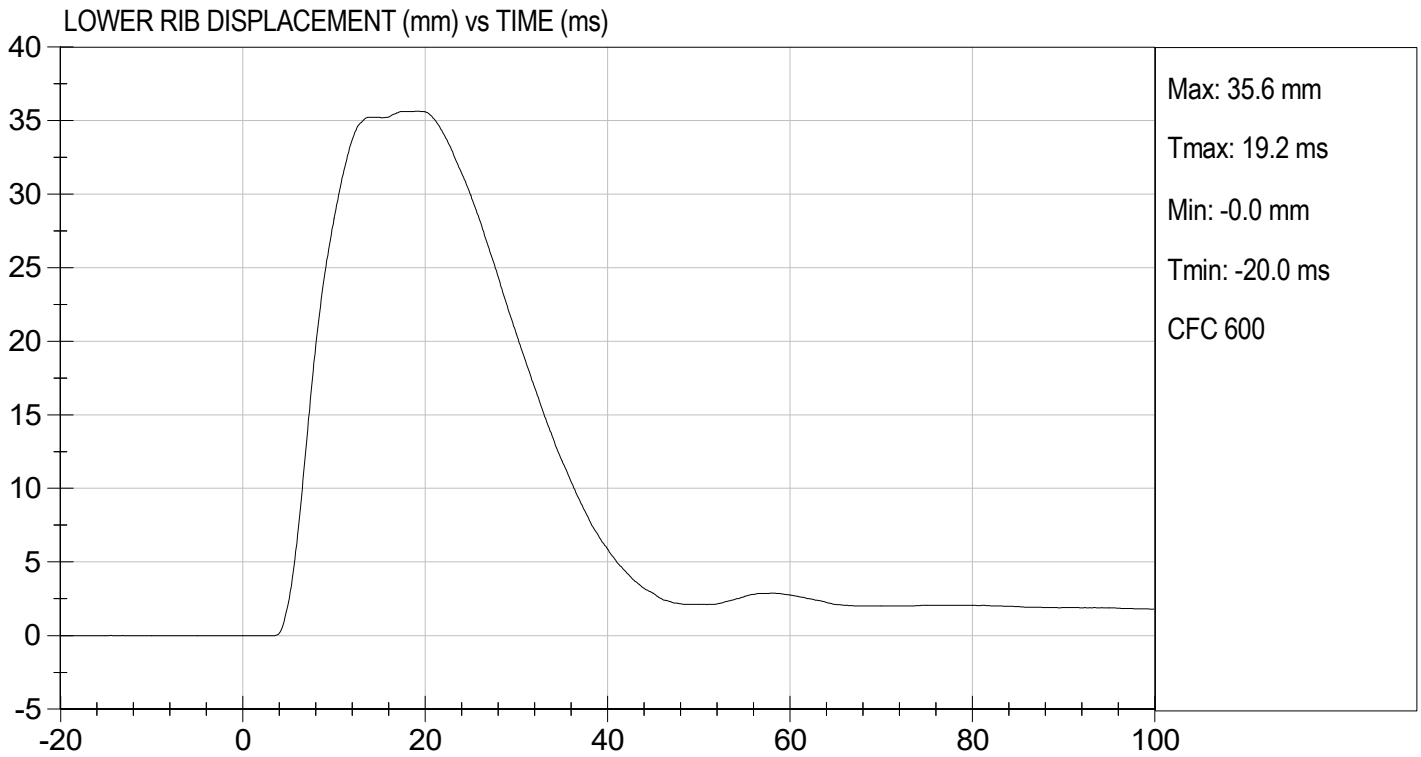
  
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 Laboratory Technician

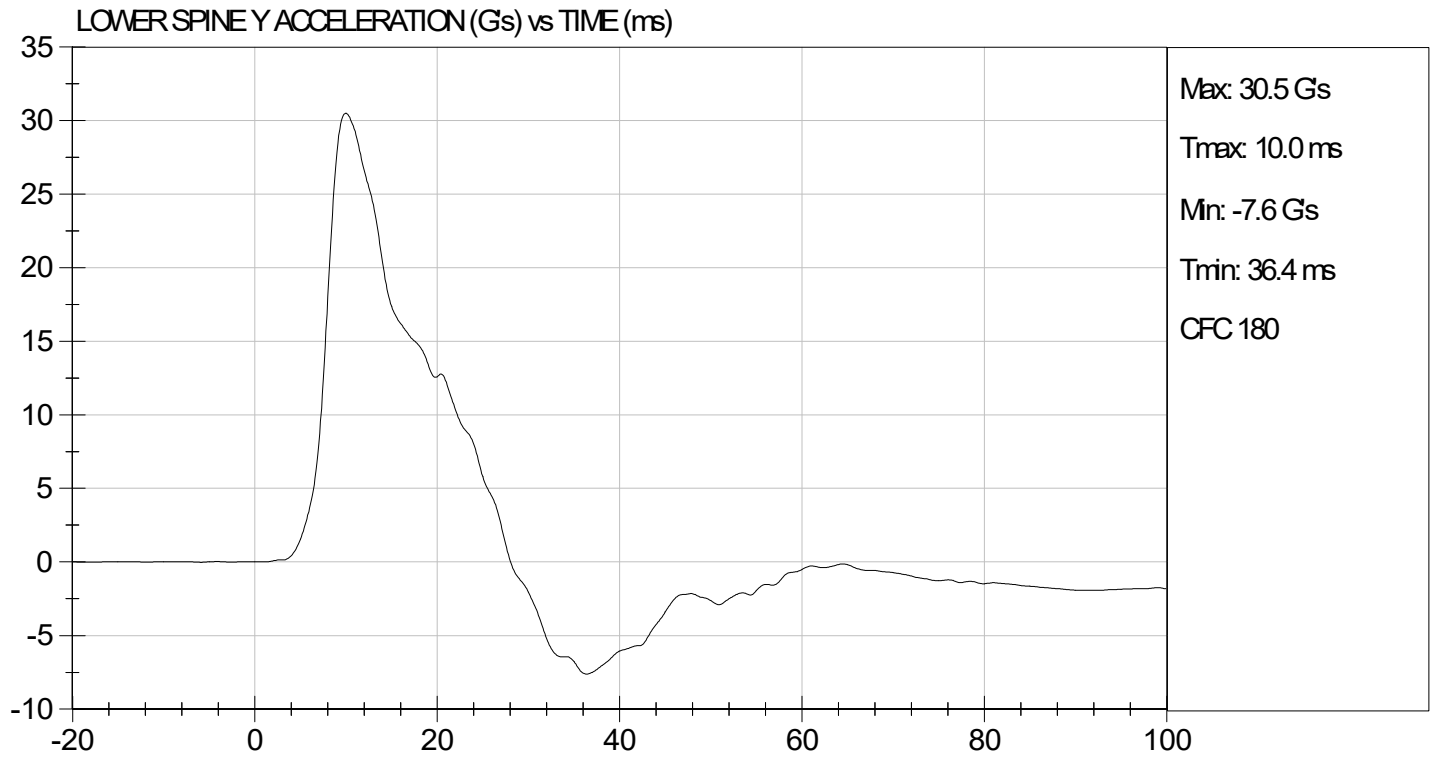
08/11/2023  
 \_\_\_\_\_  
 Test Date

  
 \_\_\_\_\_  
 Approved By









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

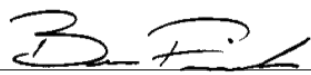
ATD Serial No: 306

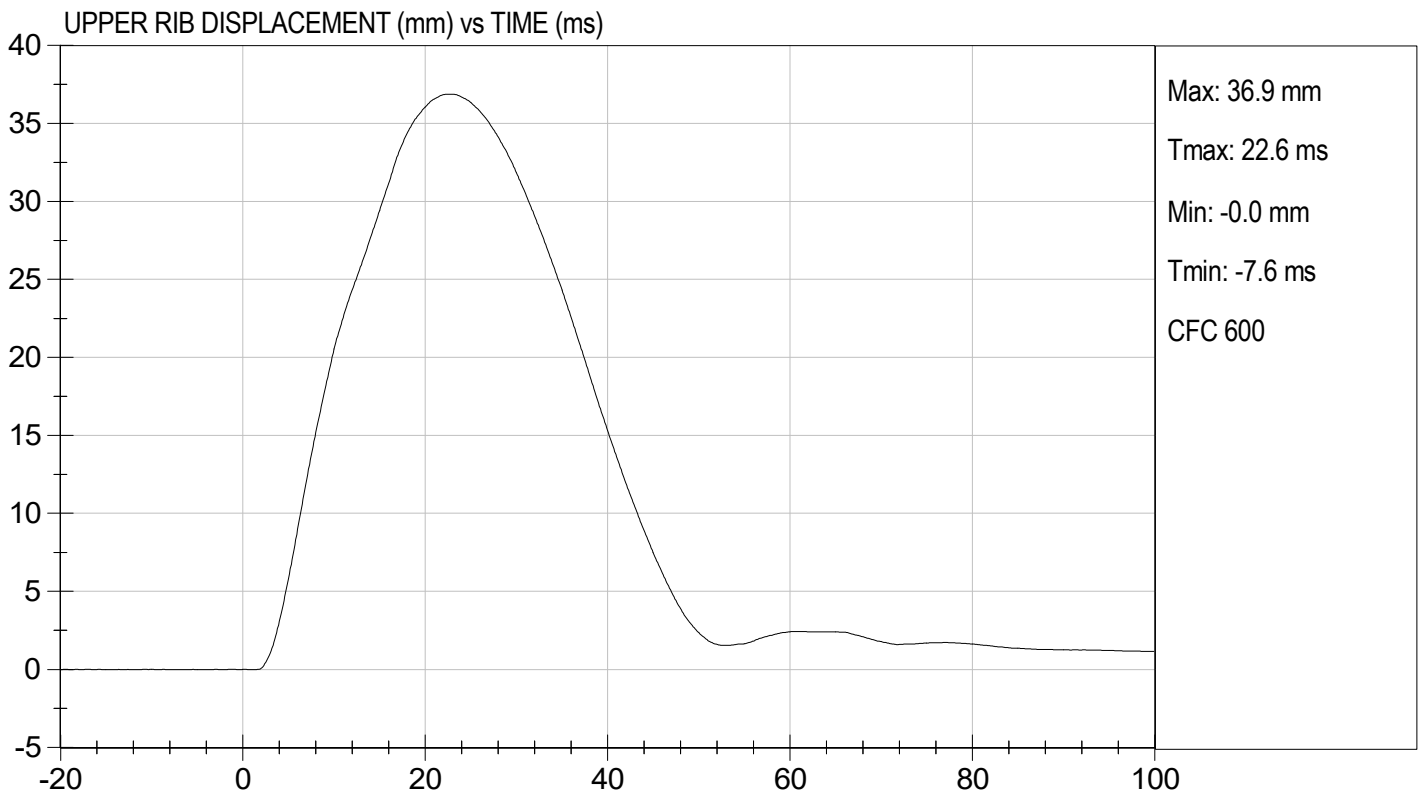
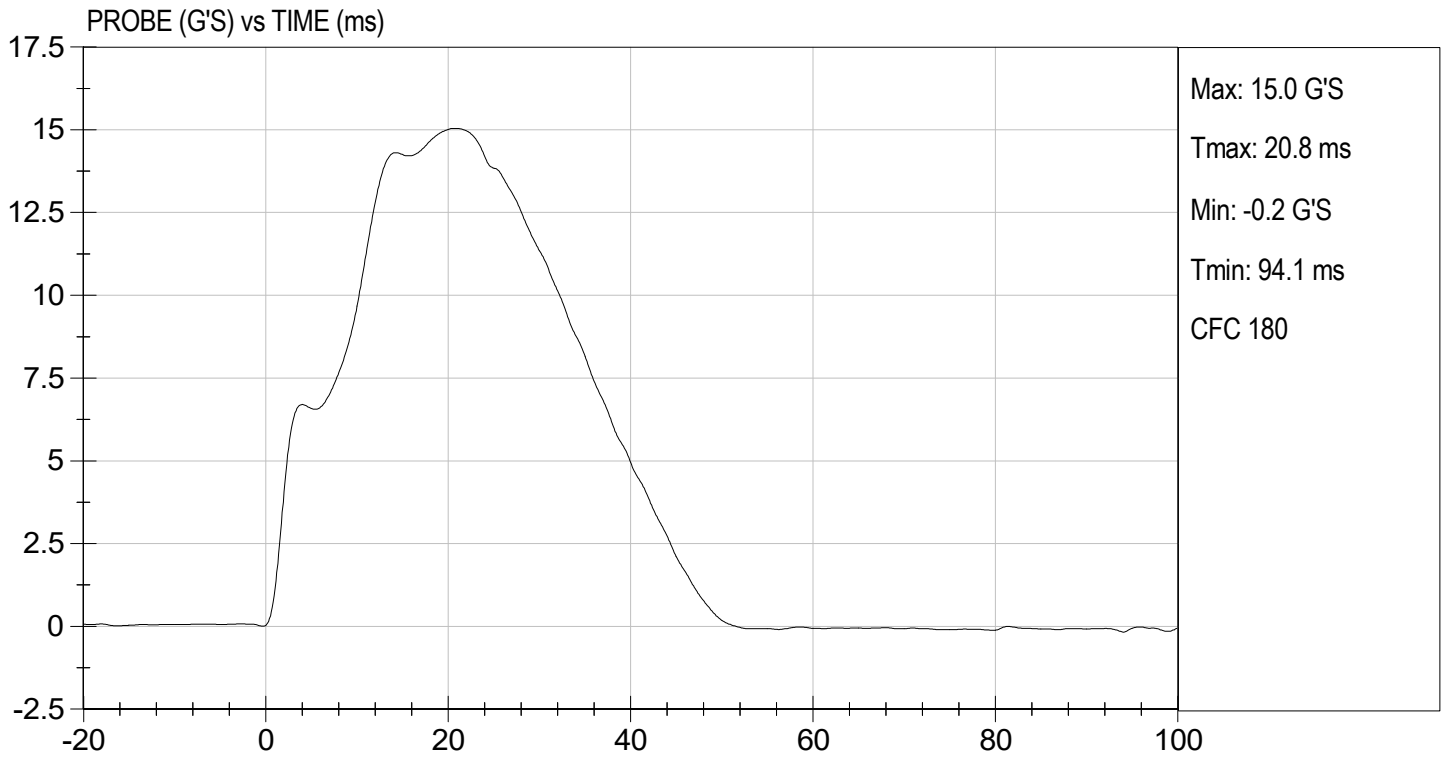
Test I.D: D232175

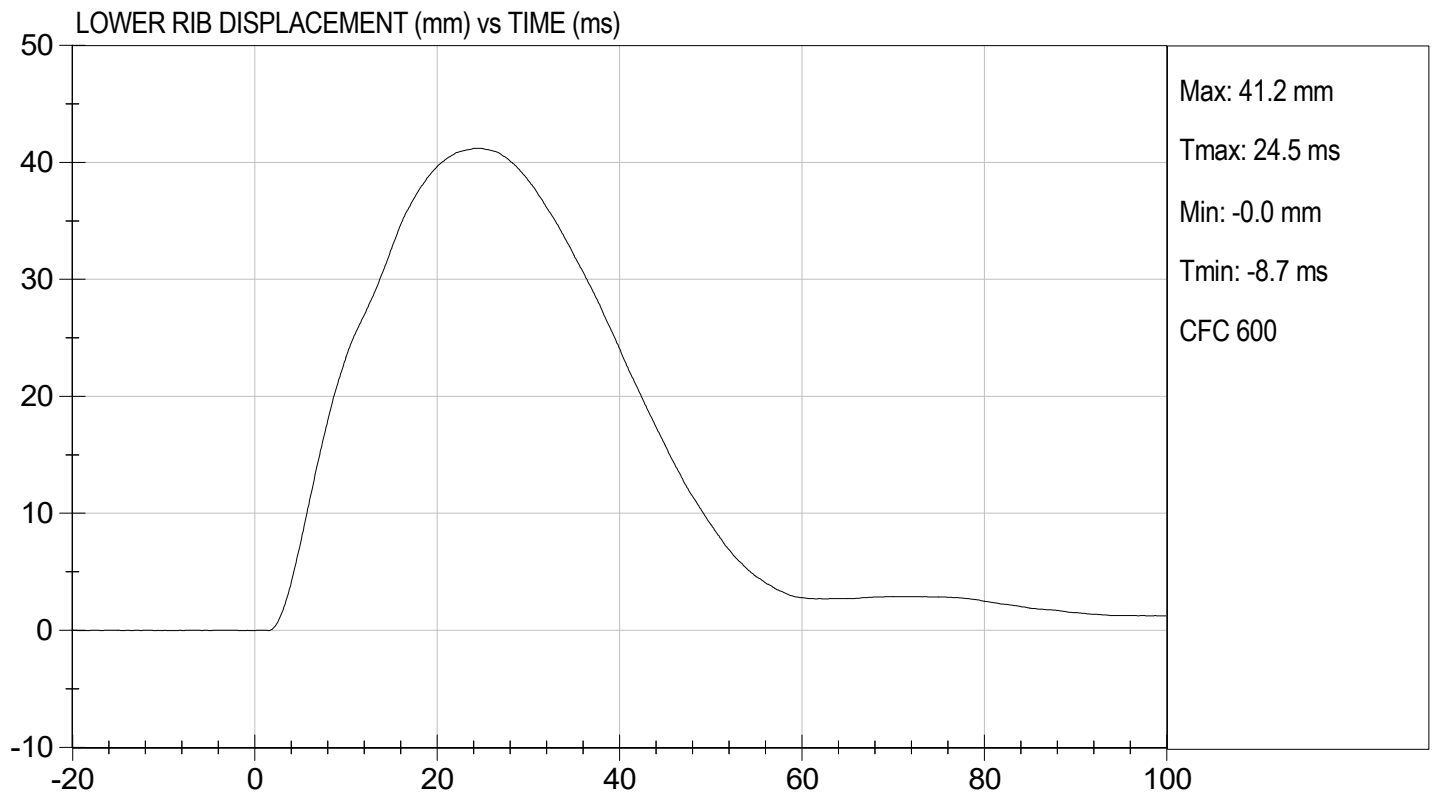
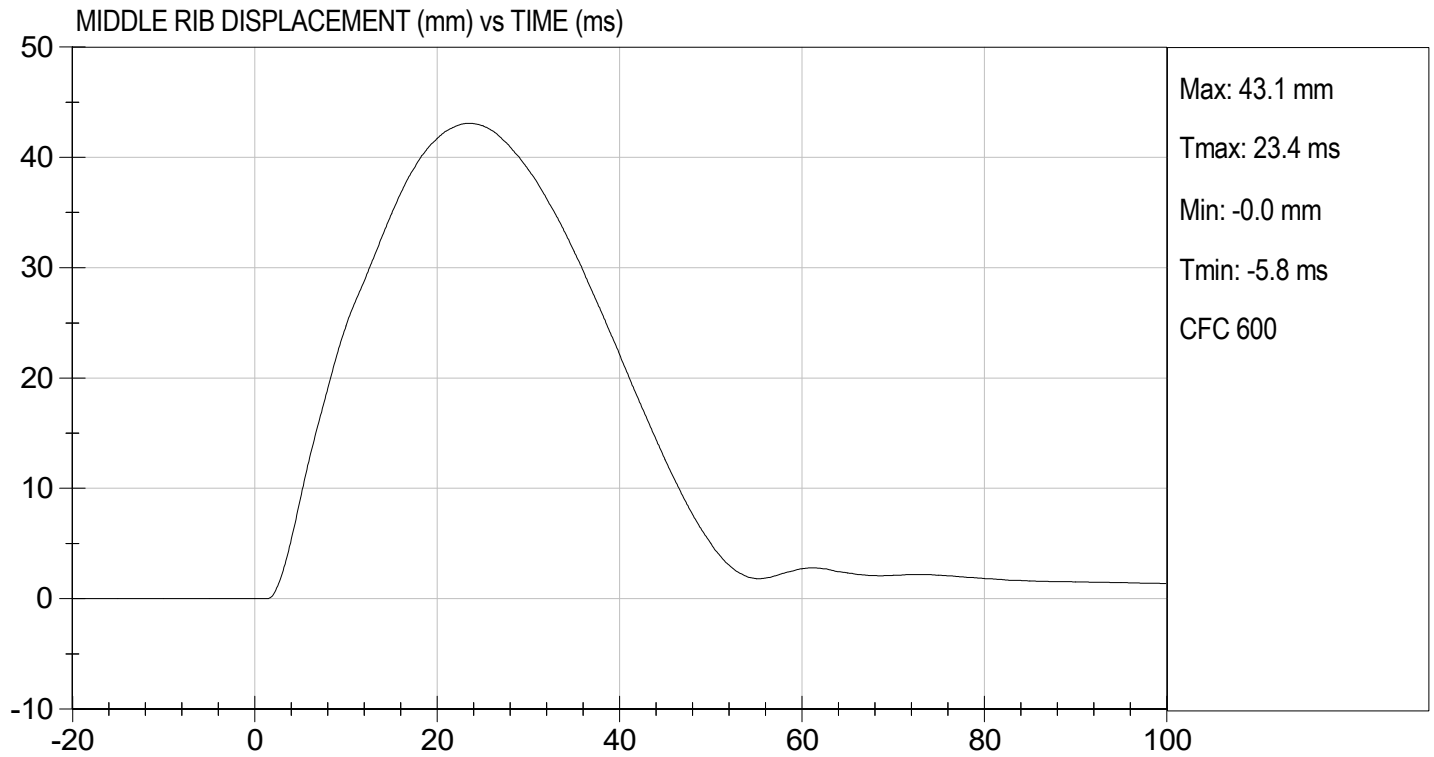
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	46	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Maximum Probe Acceleration	G's	14 to 18	15	Pass
Upper Rib Displacement	mm	32 to 40	37	Pass
Middle Rib Displacement	mm	39 to 45	43	Pass
Lower Rib Displacement	mm	35 to 43	41	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	14	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	9	Pass
Overall Test Results				Pass

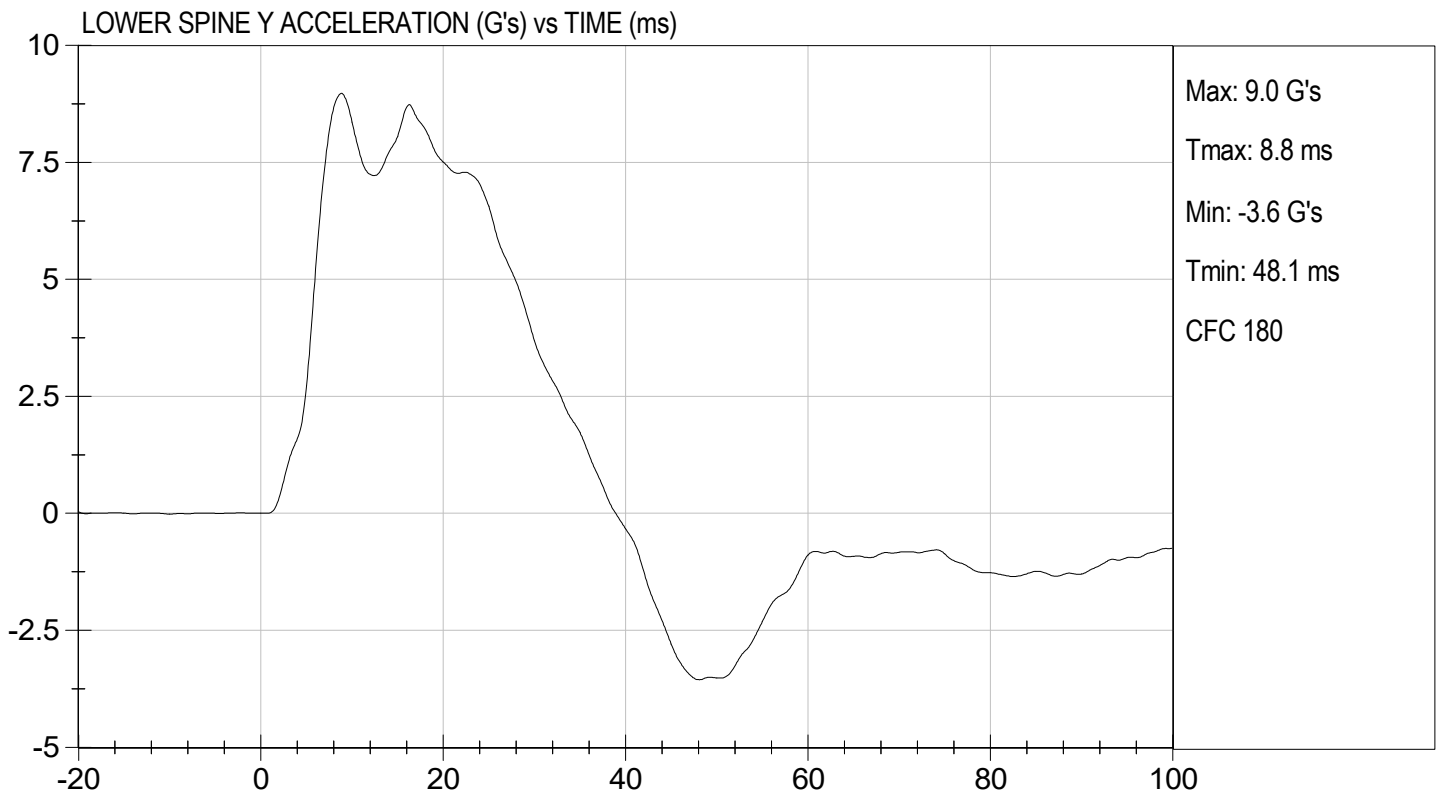
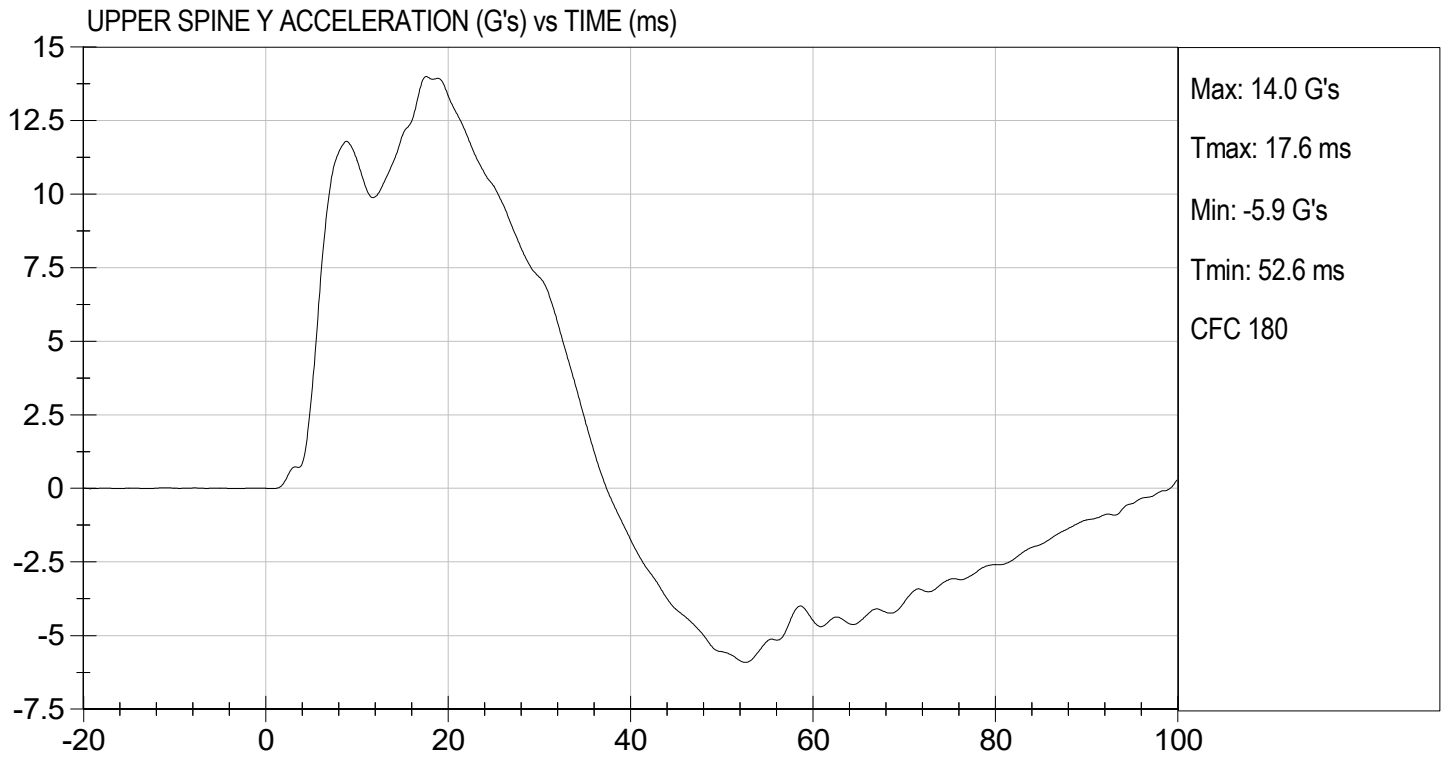
  
 Laboratory Technician

08/11/2023  
 Test Date

  
 Approved By







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

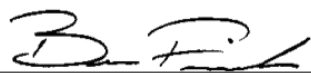
ATD Serial No: 306

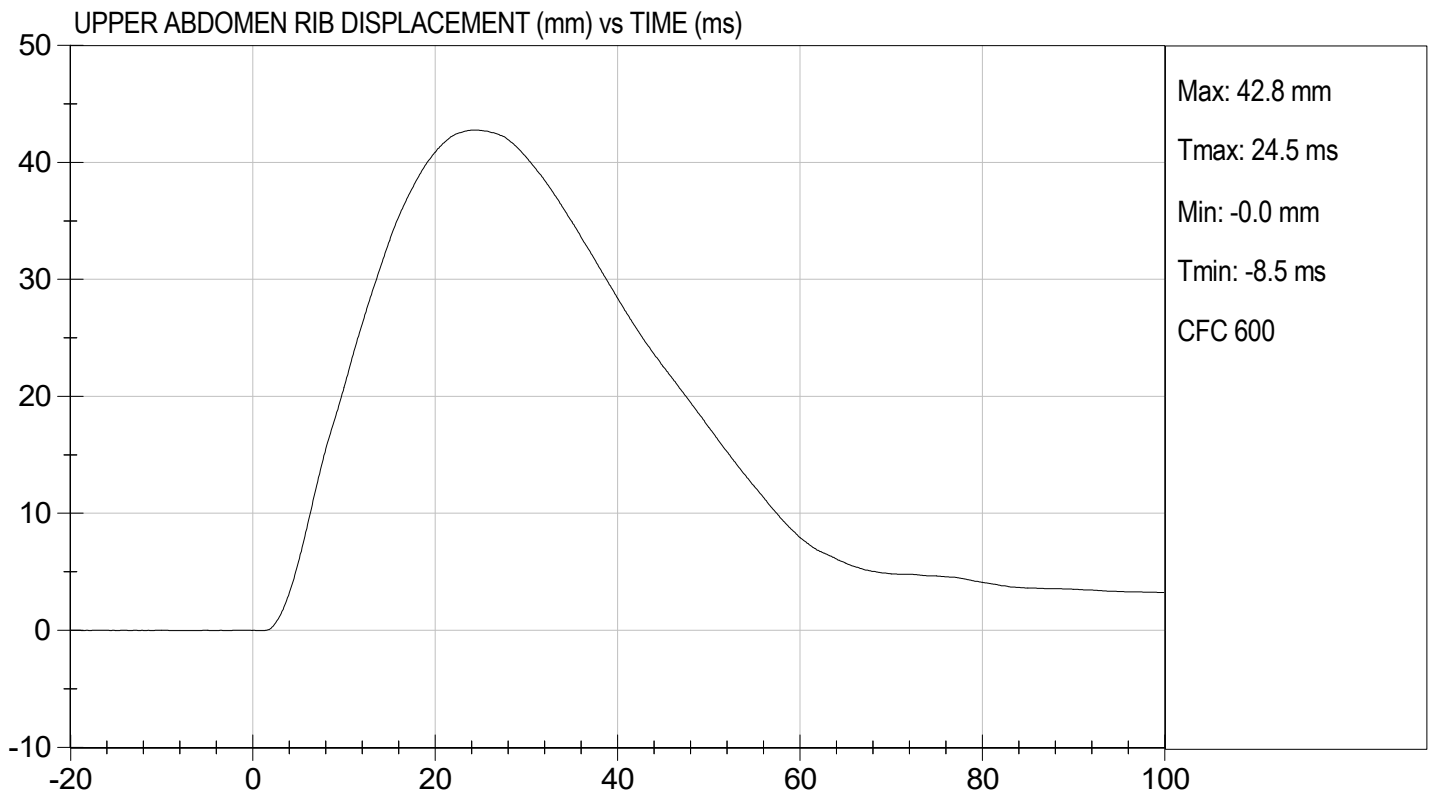
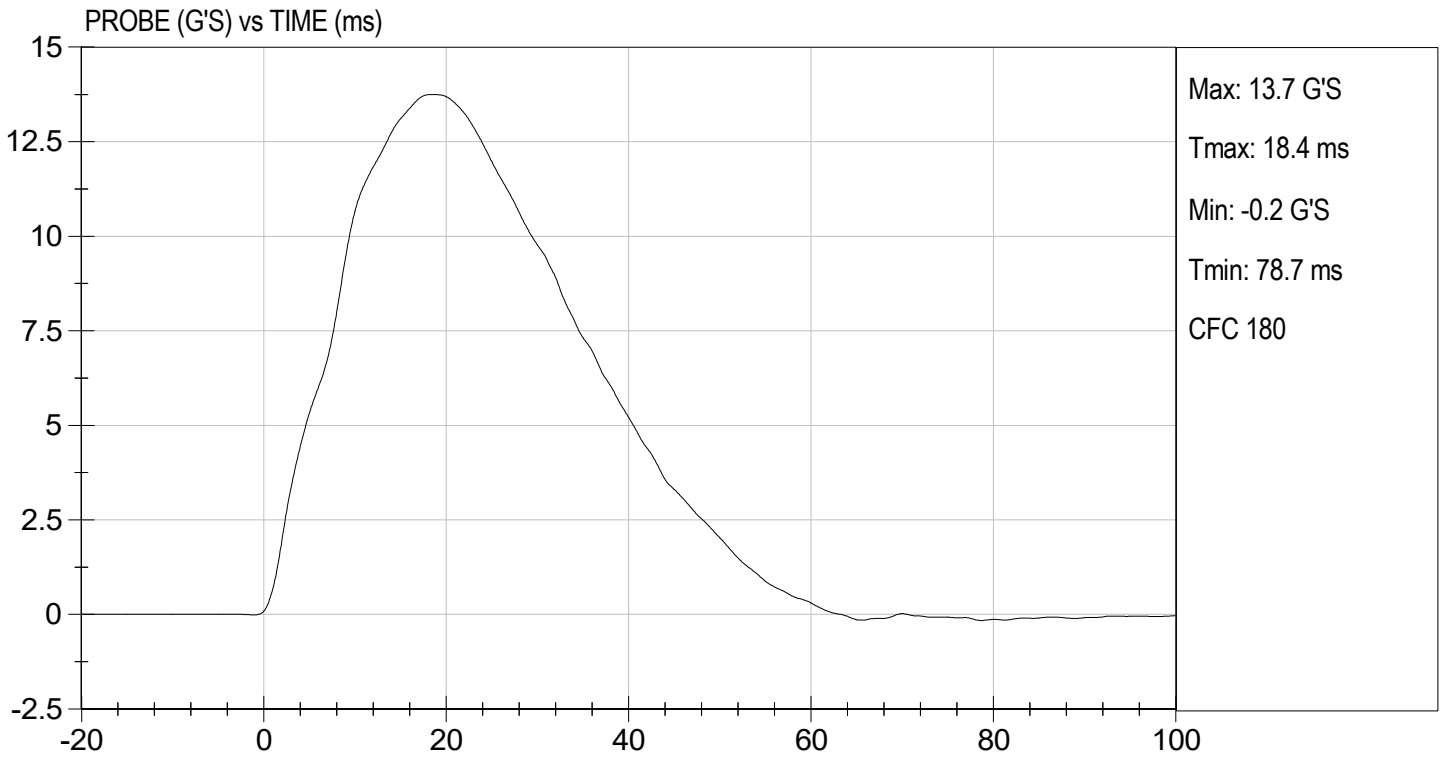
Test I.D: D232176

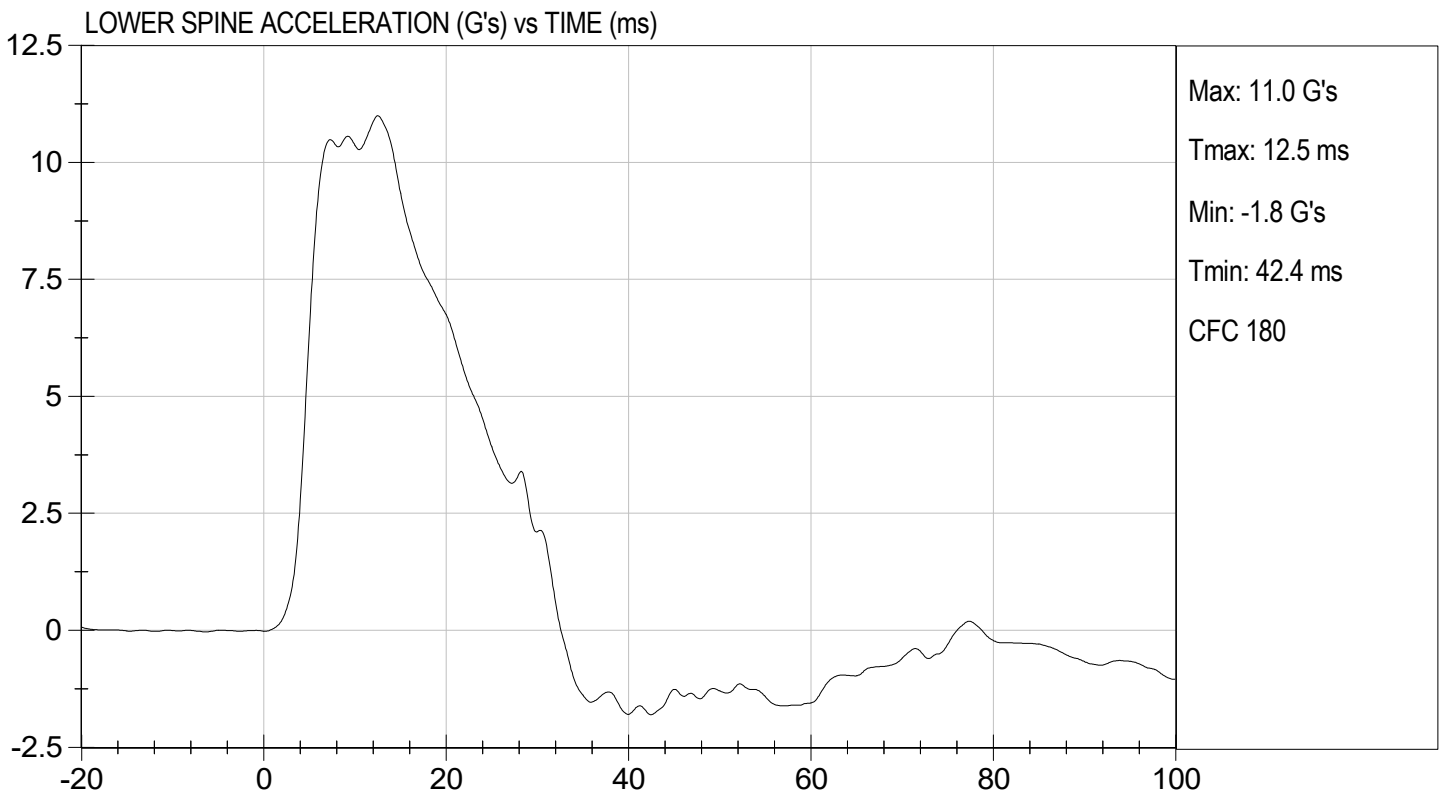
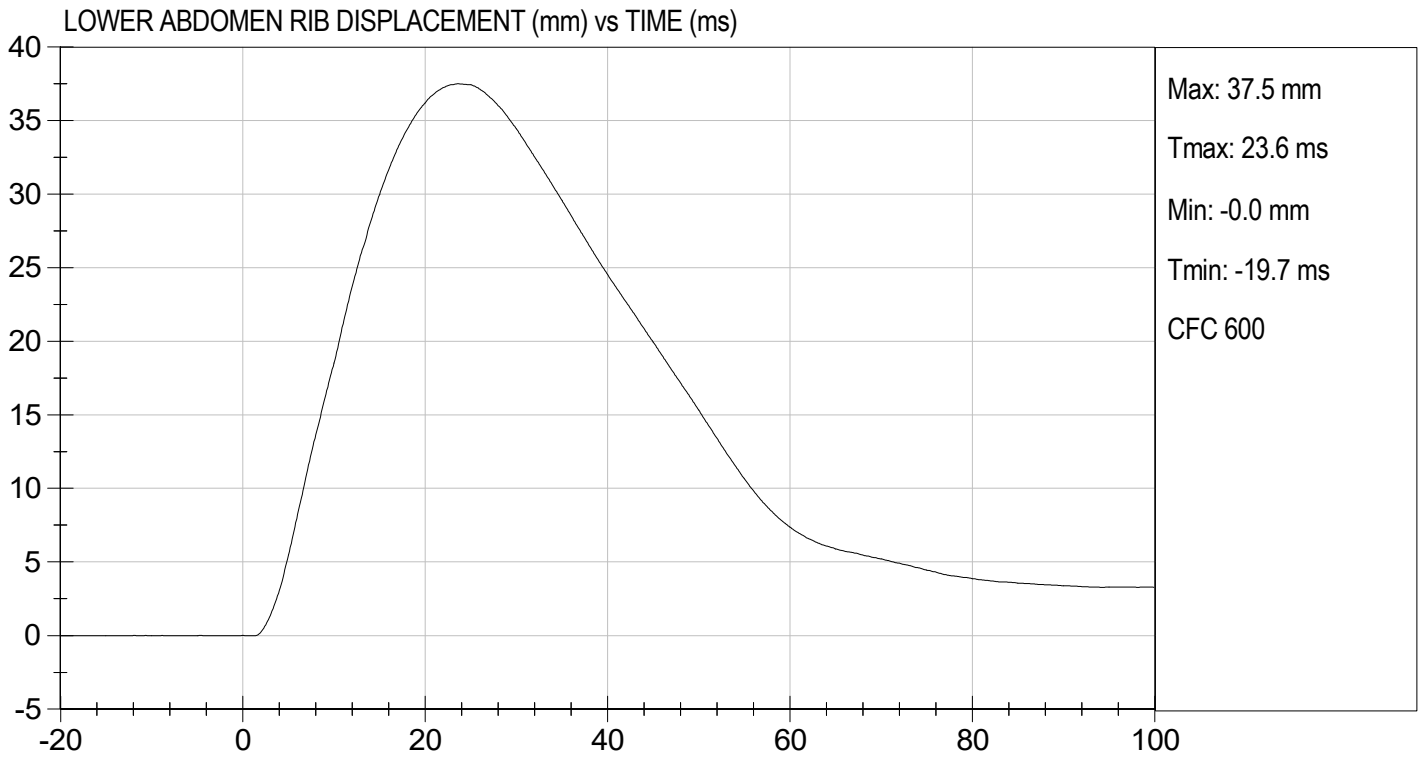
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.2	Pass
Humidity	%	10 to 70	44	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Maximum Probe Acceleration	G's	12 to 16	14	Pass
Upper Abdomen Rib Displacement	mm	36 to 47	43	Pass
Lower Abdomen Rib Displacement	mm	33 to 44	38	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	11	Pass
Overall Test Results				Pass

  
 Laboratory Technician

08/11/2023  
 Test Date

  
 Approved By





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

ATD Serial No: 306

Test I.D: D232177

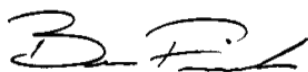
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	46	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Maximum Probe Acceleration	G's	38 to 47	43	Pass
Pelvis Y Acceleration After 6 ms	G's	34 to 42	37.1	Pass
Peak Acetabulum Force	N	3600 to 4300	3,834	Pass
Overall Test Results				Pass



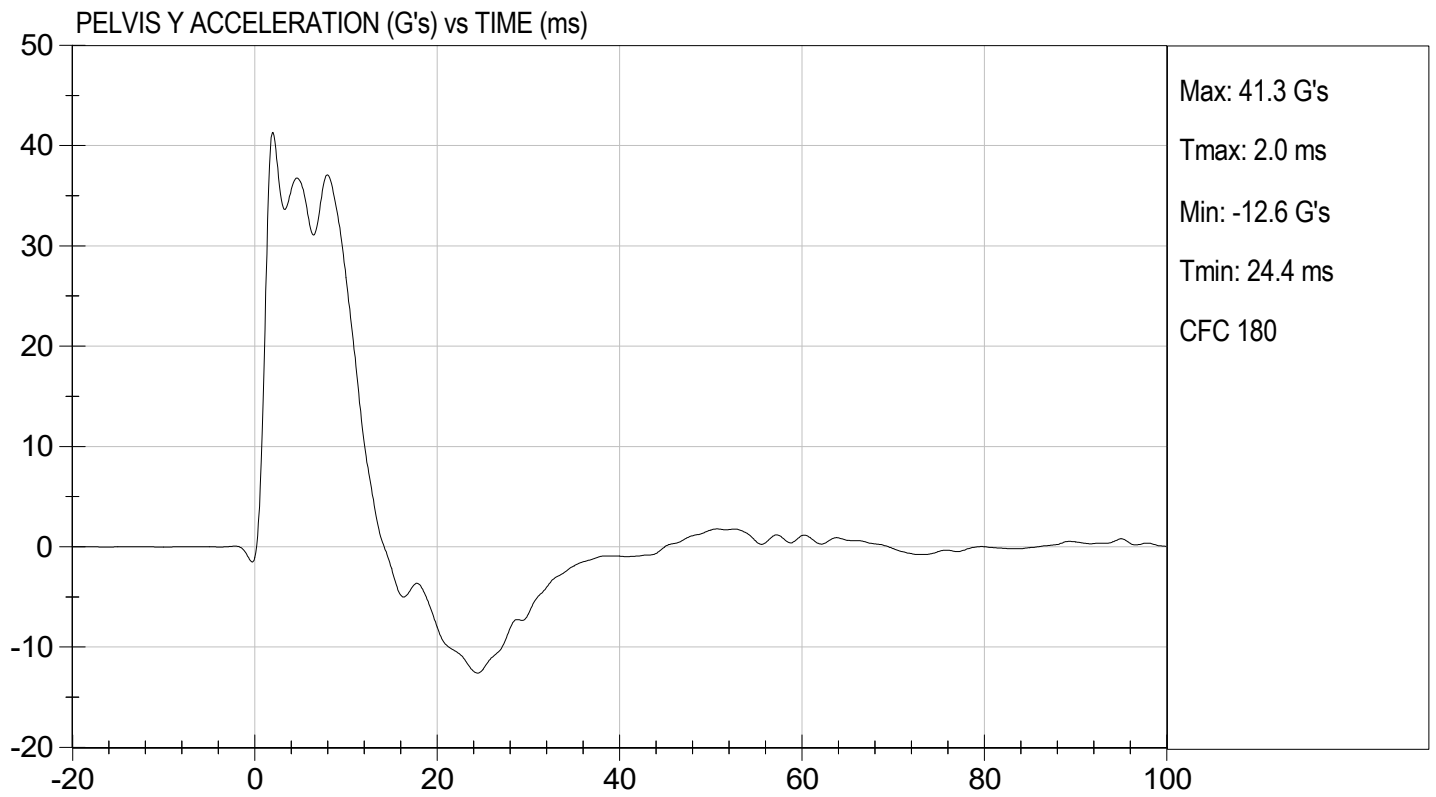
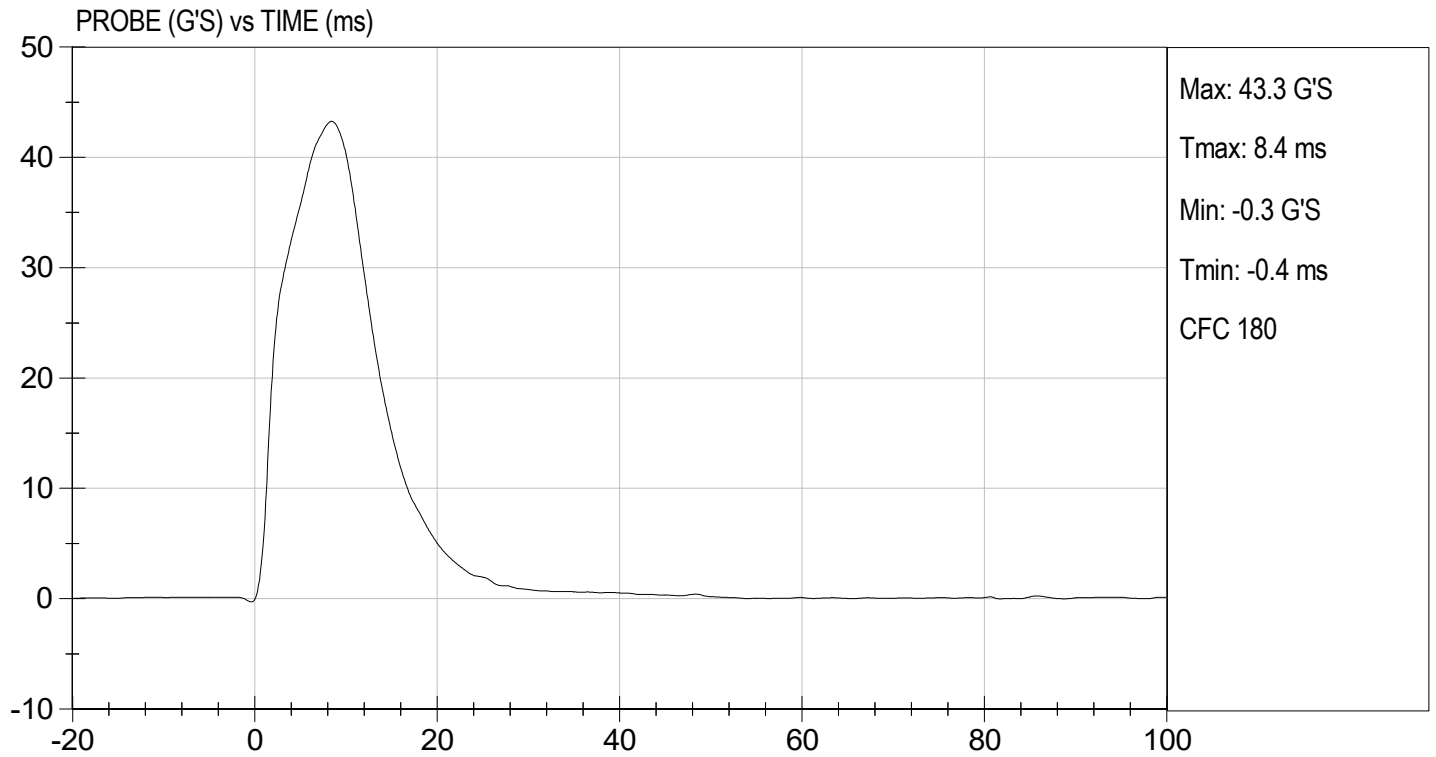
Laboratory Technician

08/11/2023

Test Date



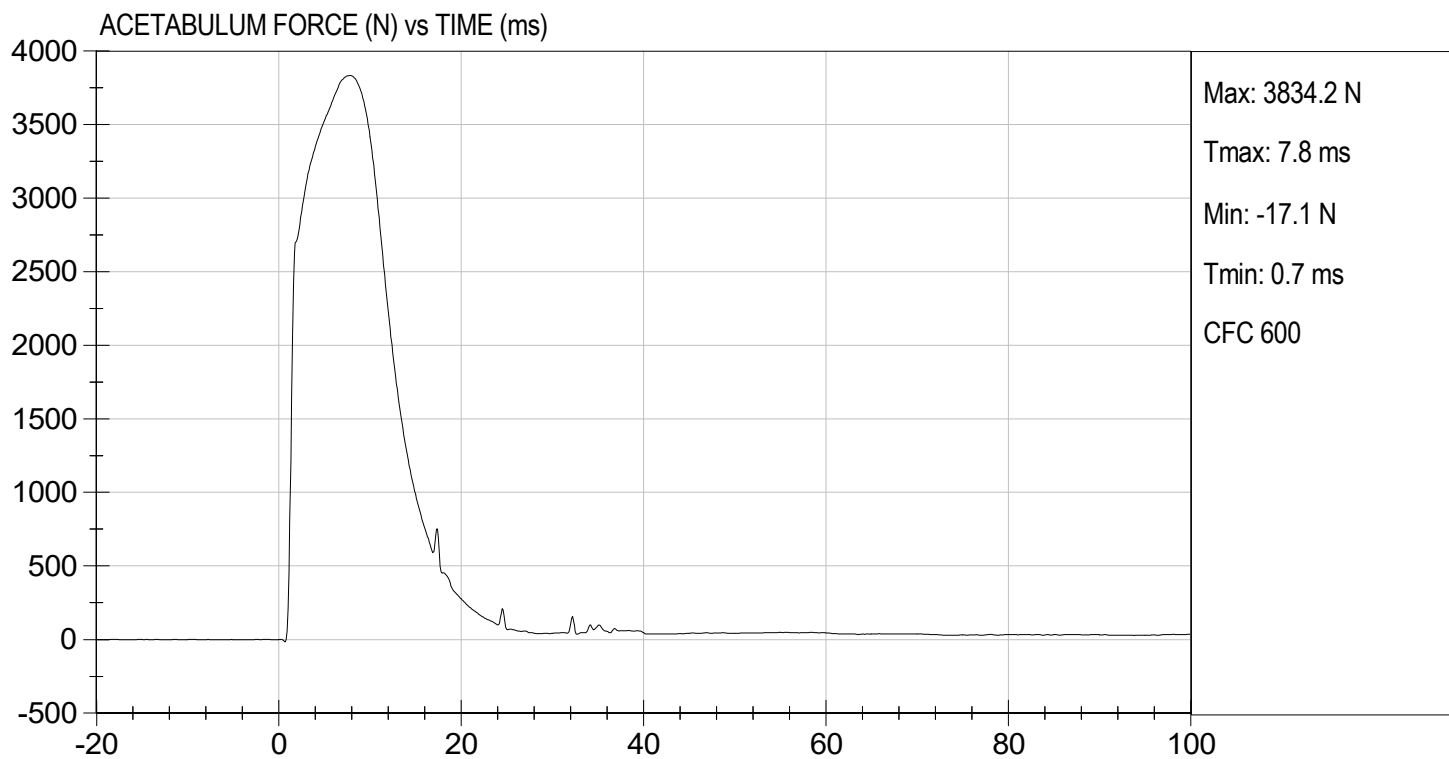
Approved By





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

TEST DATE: 08/11/2023  
TEST #: D232177



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

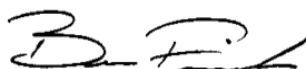
ATD Serial No: 306

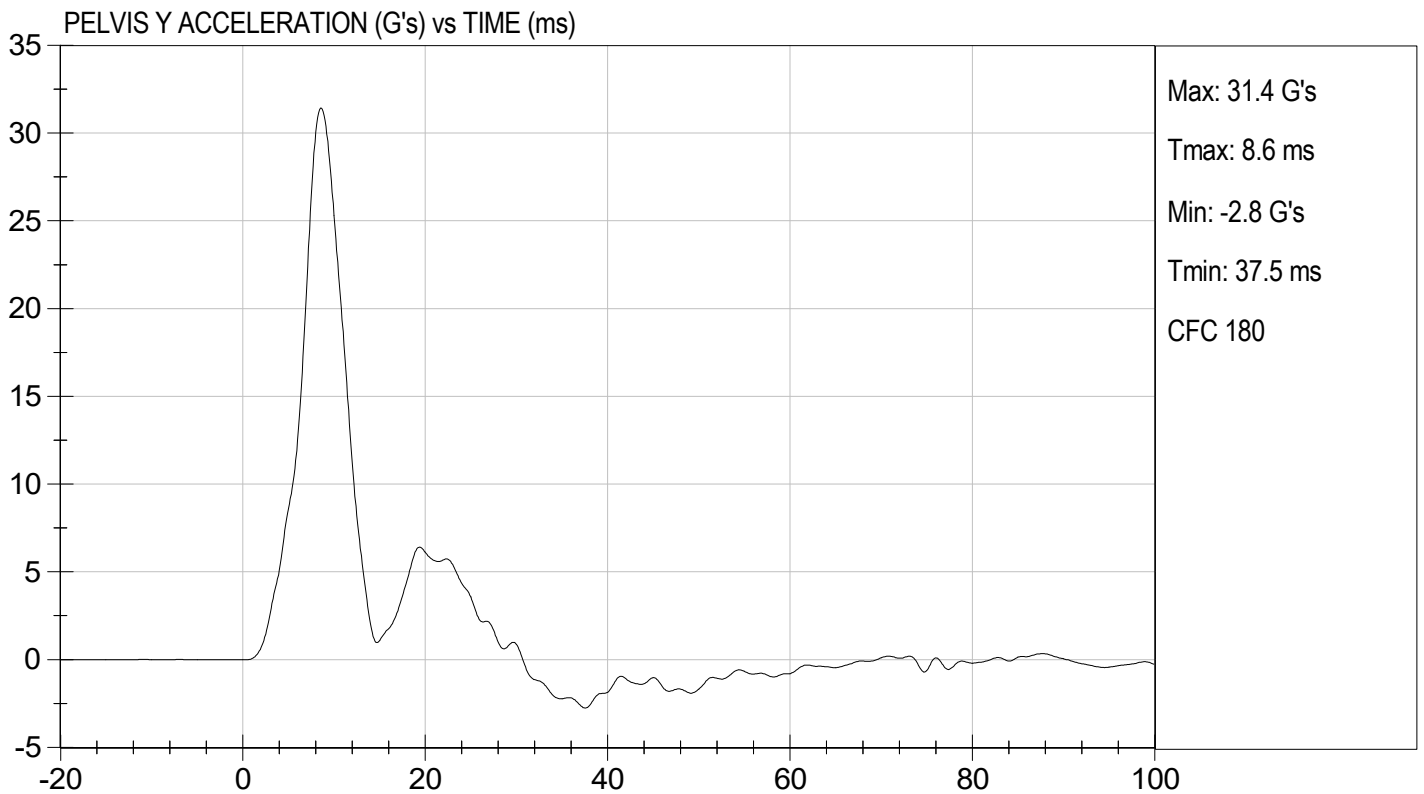
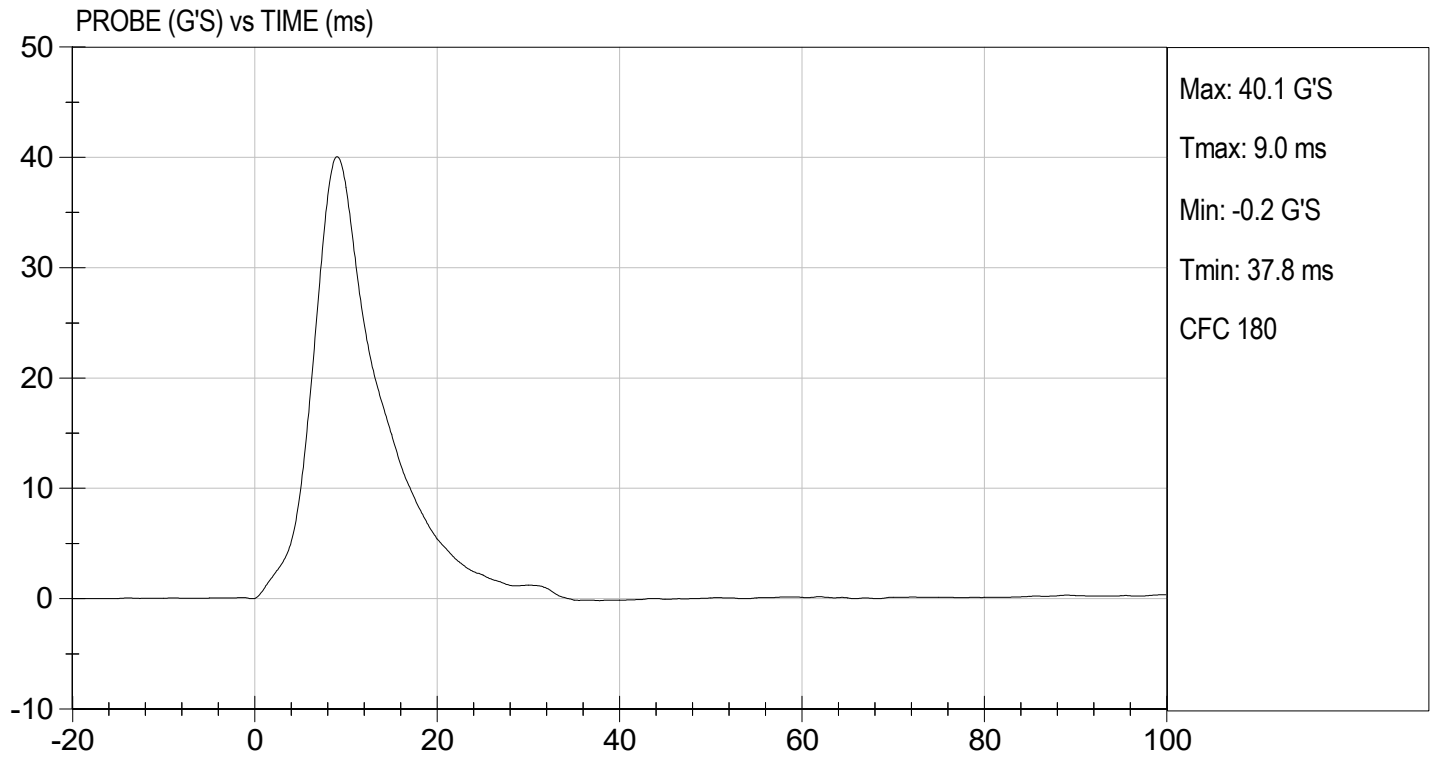
Test I.D: D232178

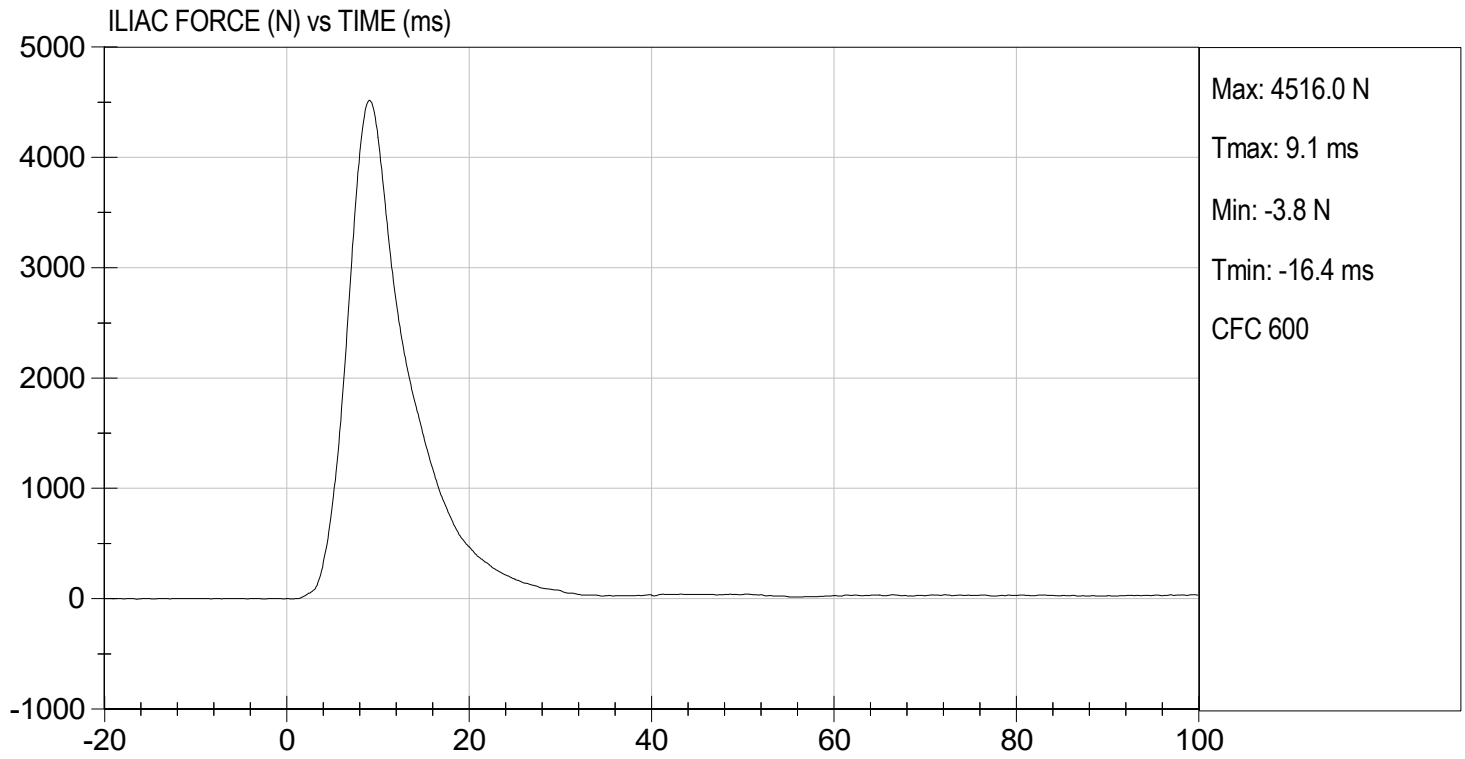
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	48	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Maximum Probe Acceleration	G's	36 to 45	40	Pass
Pelvis Y Acceleration	G's	28 to 39	31	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4,516	Pass
Overall Test Results				Pass

  
 \_\_\_\_\_  
 Laboratory Technician

08/11/2023  
 \_\_\_\_\_  
 Test Date

  
 \_\_\_\_\_  
 Approved By







### SID-IIs Pelvis Plug Certification Test

Plug S/N 17013

Test Number 23911

Report Number 23968

Test Date 8/18/2022 1:18:57 PM

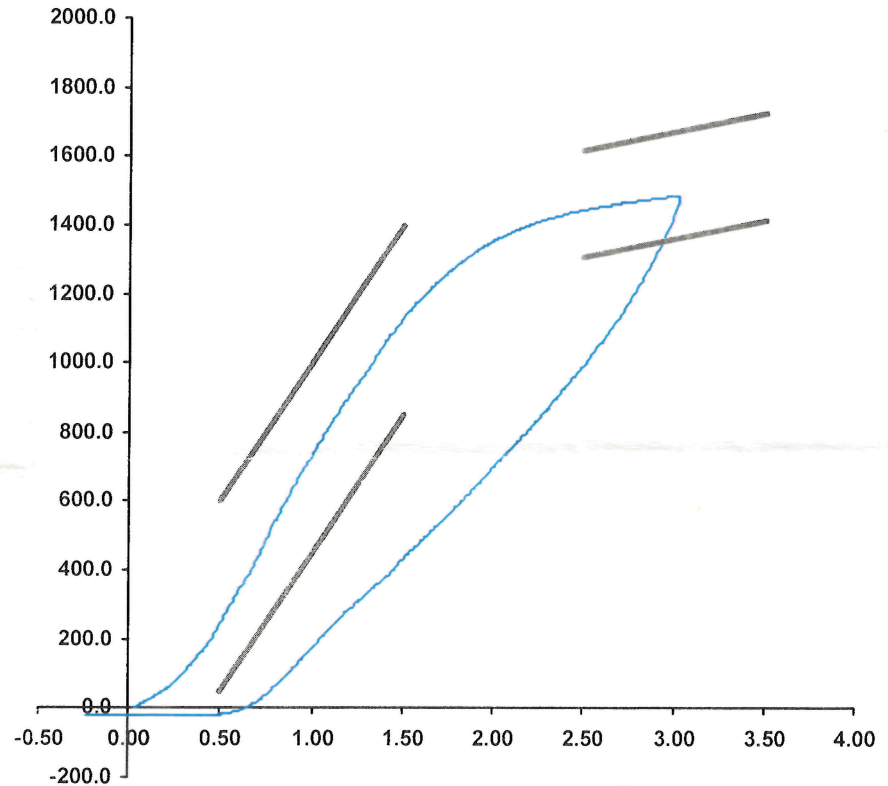
	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	250	50	600
Force @ 1.5 mm (N)	1,129	850	1,400
Force @ 2.5 mm (N)	1,447	1,306	1,618
Force @ 3.0 mm (N)	1,486	1,361	1,673

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

18-Aug-22

SACO Research

By : DC

Date : 8/18/22



**SID-IIs Pelvis Plug Certification Test**

Plug S/N 14166

Test Number 14204

Report Number 14249

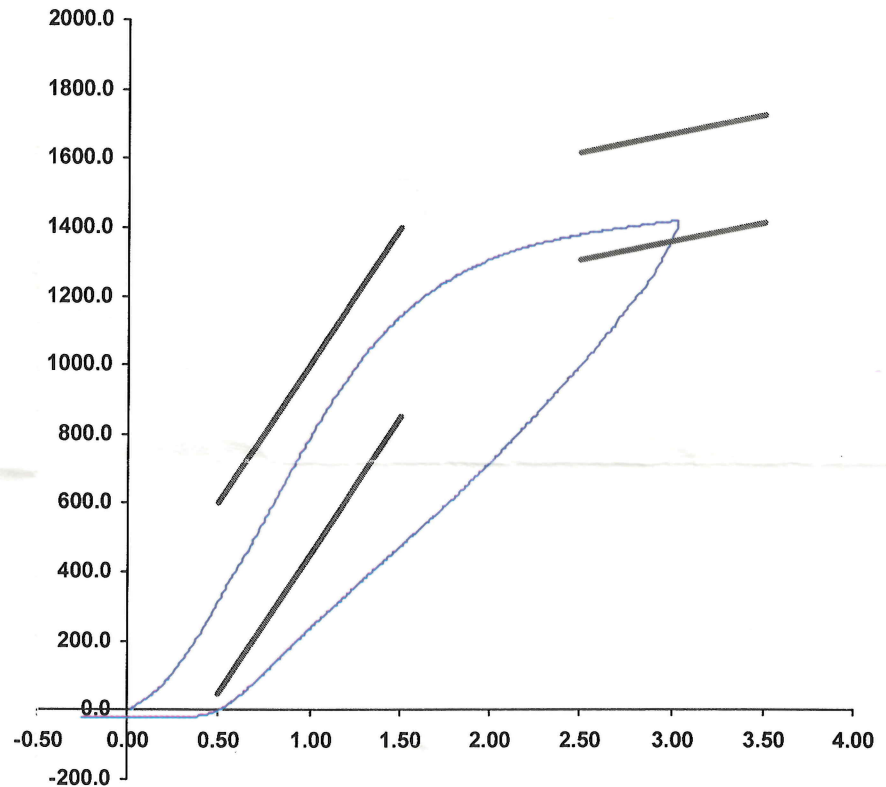
Test Date 6/28/2020 12:37:51 PM

	<u>Test Results</u>	<u>Spec Min</u>	<u>Spec Max</u>
Force @ 0.5 mm (N)	319.45	50.00	600.00
Force @ 1.5 mm (N)	1,141.56	850.00	1,400.00
Force @ 2.5 mm (N)	1,382.25	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,421.57	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 28-Jun-20  
 SACO Research

By : D. C. Date : 6-28-2020

**APPENDIX D**  
**TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA**

**Table 1 – Dummy Instrumentation (ES-2re)**

		ES-2re S/N F032			
		Serial Number	Manufacturer	Calibration Date	
Head CG Accelerometers		X	P79568	Endevco	06/09/2023
		Y	P79569	Endevco	06/09/2023
		Z	P79570	Endevco	06/09/2023
		Xr	P86797	Endevco	06/09/2023
		Yr	P94957	Endevco	06/09/2023
		Zr	P97381	Endevco	06/09/2023
Thorax Rib Displacement Potentiometers	Upper	Y	G236	Honeywell	06/13/2023
	Middle	Y	G368	Honeywell	06/16/2023
	Lower	Y	G164	Honeywell	06/13/2023
Abdomen Load Cells	Forward	Y	ABG1532	Denton	04/20/2023
	Middle	Y	ABG1534	Denton	04/20/2023
	Rear	Y	ABG1535	Denton	04/20/2023
Lower Spine Accelerometers (T12)		X	P79574	Endevco	06/09/2023
		Y	T14094	Endevco	06/09/2023
		Z	P82603	Endevco	06/09/2023
Public Symphysis Load Cell		Y	PG461	Denton	04/20/2023

**Table 2 – Dummy Instrumentation (SID-IIs)**

			SID-IIs S/N 306			
			Serial Number	Manufacturer	Calibration Date	
Head CG Accelerometers			X	P79003	Endevco	06/22/2023
			Y	P79445	Endevco	06/22/2023
			Z	P79724	Endevco	06/22/2023
			Xr	P84999	Endevco	06/22/2023
			Yr	P85000	Endevco	06/22/2023
			Zr	P85001	Endevco	06/22/2023
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	06/22/2023
		Middle	Y	G2403	Servo	06/22/2023
		Lower	Y	G1270	FTSS	06/22/2023
	Abdominal Rib	Upper	Y	G032	FTSS	06/22/2023
		Lower	Y	MJ5171	Medius	06/22/2023
Lower Spine Accelerometers (T12)			X	P96332	Endevco	06/22/2023
			Y	P96335	Endevco	06/22/2023
			Z	P96341	Endevco	06/22/2023
Acetabulum Load Cell			Y	ACG4285	FTSS	08/18/2022
Iliac Wing Load Cell			Y	IWG3023	FTSS	08/18/2022
Pelvis Plug (struck side)				17013	SACO	08/18/2022
Pelvis Plug (non-struck side)				14166	SACO	06/28/2020

**Table 3 – Vehicle Instrumentation**

			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	A383144	MSI	07/28/2023
	Vehicle Center of Gravity	Y	A390969	MSI	07/28/2023
	Vehicle Center of Gravity	Z	A340800	MSI	07/28/2023
2	Right Sill at Front Seat	X	A361022	MSI	07/28/2023
	Right Sill at Front Seat	Y	T33448	Endevco	04/05/2023
	Right Sill at Front Seat	Z	A383079	MSI	07/28/2023
3	Right Sill at Rear Seat	X	A393860	MSI	07/28/2023
	Right Sill at Rear Seat	Y	A340203	MSI	07/28/2023
	Right Sill at Rear Seat	Z	A360966	MSI	07/28/2023
4	Left Sill at Front Door	Y	P88170	Endevco	07/27/2023
5	Left Sill at Rear Door	Y	P94811	Endevco	07/14/2023
6	Left A-Post Lower	Y	T33466	Endevco	04/05/2023
7	Left A-Post Middle	Y	T35331	Endevco	04/05/2023
8	Left B-Post Lower	Y	T33418	Endevco	04/05/2023
9	Left B-Post Middle	Y	T33445	Endevco	04/05/2023
10	Front Seat Track	Y	T22235	Endevco	07/12/2023
11	Rear Seat Track or Structure	Y	T33153	Endevco	04/20/2023
12	Right Rear Occ. Compartment	Y	PCB399	PCB	07/13/2023
13	Engine Block	X	A416949	MSI	03/30/2023
	Engine Block	Y	A416936	MSI	03/30/2023
14	Rear Floorpan Above Axle	X	A416947	MSI	07/28/2023
	Rear Floorpan Above Axle	Y	A305725	MSI	07/28/2023
	Rear Floorpan Above Axle	Z	T33456	Endevco	07/28/2023

**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