

REPORT NUMBER: SideNCAPMDB-MGA-25-014

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

**TOYOTA MOTOR MANUFACTURING, INDIANA, INC.
2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV
NHTSA No.: M20255111**

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



Test Date: February 18, 2025

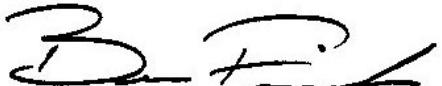
Final Report Date: April 8, 2025

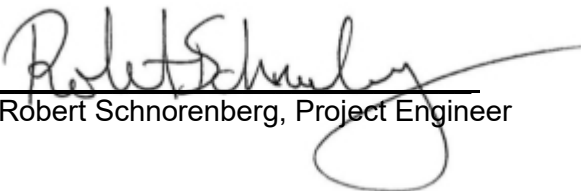
FINAL REPORT

**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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Approval Date: April 8, 2025

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

Date: _____

TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No. SideNCAPMDB-MGA-25-014	2. Government Accession No.	3. Recipient's Catalog No.																																																					
4. Title and Subtitle Final Report of New Car Assessment Program Side Impact MDB Testing and FMVSS No. 305 Indicant Testing of 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV, NHTSA No.: M20255111		5. Report Date April 8, 2025																																																					
7. Author(s) Ben Fischer, Program Manager		6. Performing Organization Code MGA																																																					
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105		8. Performing Organization Report No. SideNCAPMDB-MGA-25-014																																																					
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards (NRM-100) 1200 New Jersey Ave, SE Washington, D.C. 20590		10. Work Unit No.																																																					
		11. Contract or Grant No. 693JJ920D000017																																																					
		13. Type of Report and Period Covered: Final Test Report February 18, 2025 to April 8, 2025																																																					
15. Supplementary Notes		14. Sponsoring Agency Code NRM-100																																																					
16. Abstract A 55/28 km/h 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2025 Toyota Grand Highlander Nightshade Hybrid 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 February 18, 2025. The impact velocity of the Moving Deformable Barrier (MDB) was 62.15 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 21.6°C. The target vehicle post-test maximum crush was 281 mm at level 2. The test vehicle's performance was as follows: <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th rowspan="2">Units</th> <th colspan="2">Driver ATD (ES-2re)</th> </tr> <tr> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td></td> <td>1000</td> <td>42.266</td> </tr> <tr> <td>Maximum Thorax Rib Deflection</td> <td>mm</td> <td>44</td> <td>7.407</td> </tr> <tr> <td>Total Abdominal Force</td> <td>N</td> <td>2500</td> <td>284.184</td> </tr> <tr> <td>Pubic Symphysis Force</td> <td>N</td> <td>6000</td> <td>886.329</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td>g</td> <td>82*</td> <td>14.127</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th rowspan="2">Units</th> <th colspan="2">Passenger ATD (SID-IIs)</th> </tr> <tr> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td></td> <td>1000</td> <td>63.399</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td>g</td> <td>82</td> <td>39.371</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td>N</td> <td>5525</td> <td>2466.778</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38*</td> <td>5.898</td> </tr> <tr> <td>Maximum Abdomen Rib Deflection</td> <td>mm</td> <td>45*</td> <td>14.528</td> </tr> </tbody> </table> *Proposed IARV The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite door(s) did not open during the side impact event.				Measurement Description	Units	Driver ATD (ES-2re)		Threshold	Result	Head Injury Criteria (HIC ₃₆)		1000	42.266	Maximum Thorax Rib Deflection	mm	44	7.407	Total Abdominal Force	N	2500	284.184	Pubic Symphysis Force	N	6000	886.329	Resultant Lower Spine Acceleration	g	82*	14.127	Measurement Description	Units	Passenger ATD (SID-IIs)		Threshold	Result	Head Injury Criteria (HIC ₃₆)		1000	63.399	Resultant Lower Spine Acceleration	g	82	39.371	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2466.778	Maximum Thoracic Rib Deflection	mm	38*	5.898	Maximum Abdomen Rib Deflection	mm	45*	14.528
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19. Security Classification of Report Unclassified	20. Security Classification of Page Unclassified	21. No. of Pages 252	22. Price																																																				

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SECTION 1 PURPOSE AND SUMMARY OF TEST

PURPOSE

This moving deformable barrier side impact test is part of the MY 2025 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 2025 Toyota Grand Highlander Nightshade Hybrid 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 2025 Toyota Grand Highlander Nightshade Hybrid 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 62.15 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 February 18, 2025. Pre-test and post-test photographs of the test vehicle, the MDB, and the dummies (ES-2re and SID-IIs) are included in this report.

Dummies were placed in the driver and left rear designated seating positions according to instructions specified in the OCWS NCAP Side Laboratory Test Procedure dated March 2020. The side impact event was documented by eleven (11) cameras. Camera locations are included in this report.

The dummies were instrumented in the following manner:

DRIVER ATD (ES-2re)

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

PASSENGER ATD (SID-IIs)

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

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

Dummy Injury readings were recorded as follows:

DUMMY INJURY VALUES

Measurement Description	Units	Driver ATD (ES-2re)	
		Threshold	Result
Head Injury Criteria (HIC ₃₆)		1000	42.266
Maximum Thorax Rib Deflection	mm	44	7.407
Total Abdominal Force	N	2500	284.184
Pubic Symphysis Force	N	6000	886.329
Resultant Lower Spine Acceleration	g	82*	14.127

Measurement Description	Units	Passenger ATD (SID-IIs)	
		Threshold	Result
Head Injury Criteria (HIC ₃₆)		1000	63.399
Resultant Lower Spine Acceleration	g	82	39.371
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2466.778
Maximum Thoracic Rib Deflection	mm	38*	5.898
Maximum Abdomen Rib Deflection	mm	45*	14.528

*Proposed IARV

Supplemental restraint information is given below:

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

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

GENERAL COMMENTS

Camera No. 4 - Struck Side View at Impact did not record video of this event.

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: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV NHTSA No.: M20255111
Test Program: NCAP Side MDB Impact Test Test Date: 2/18/2025

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20255111	Traction Control System (TCS)	Yes
Model Year	2025	Auto-Leveling System	No
Make	Toyota	Automatic Door Locks (ADL)	Yes
Model	Grand Highlander	Power Window Auto-Reverse	Yes
Body Style	5-Door SUV	Other Optional Feature	No
VIN	5TDACAB59SS034657	Driver Front Airbag	Yes
Body Color	Midnight Black Metallic	Driver Curtain Airbag	Yes
Odometer Reading (km/mi)	40 km / 25 mi	Driver Head/Torso Airbag	No
Engine Displacement (L)	2.5	Driver Torso Airbag	No
Type/No. Cylinders	Inline 4	Driver Torso/Pelvis Airbag	Yes
Engine Placement	Lateral	Driver Pelvis Airbag	No
Transmission Type	Automatic	Driver Knee Airbag	Yes
Transmission Speeds	CVT	Rear Pass. Curtain Airbag	Yes
Overdrive	Yes	Rear Pass. Head/Torso Airbag	No
Final Drive	AWD	Rear Pass. Torso Airbag	No
Roof Rack	No	Rear Pass. Torso/Pelvis Airbag	No
Sunroof/T-Top	Yes	Rear Pass. Pelvis Airbag	No
Running Boards	No	Driver Seat Belt Pretensioner	Yes
Tilt Steering Wheel	Yes	Rear Pass. Seat Belt Pretensioner	Yes
Power Seats	Driver	Driver Load Limiter	Yes
Anti-Lock Brakes (ABS)	Yes	Rear Pass. Load Limiter	Yes
		Other Safety Restraint	N/A

Does owner's manual provide instruction to turn off automatic door locks?	Yes
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DATA FROM CERTIFICATION LABEL

Manufactured By	TOYOTA MOTOR MANUFACTURING, INDIANA, INC.	GVWR (kg)	2845
Date of Manufacture	01/25	GAWR Front (kg)	1345
Vehicle Type	MPV	GAWR Rear (kg)	1650

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3	3	8	
Capacity Weight (VCW) (kg)				640	(A)
DSC x 68 kg				544	(B)
Rated Cargo and Luggage Weight (RCLW) (kg)				83	(A-B)

* Rated Cargo and Luggage Weight (RCLW) reduced by 13 kg to account for Load Carrying Capacity Reduction Label.

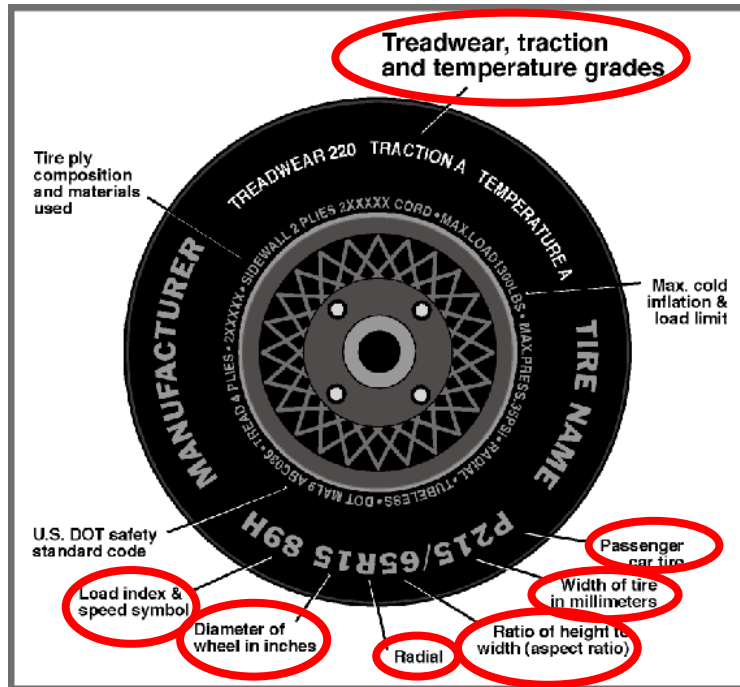
VEHICLE SEAT TYPE

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

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

Test Vehicle: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV NHTSA No.: M20255111
 Test Program: NCAP Side MDB Impact Test Test Date: 2/18/2025

VEHICLE TIRE INFORMATION



Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	240	240
Recommended Tire Size	255/55R20	255/55R20
Tire Size on Vehicle	255/55R20	255/55R20
Tire Manufacturer	Continental	Continental
Tire Model	Cross Contact LX20	Cross Contact LX20
Treadwear	680	680
Traction	A	A
Temperature Grade	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	1 Polyester, 2 Steel, 2 Polyamide	1 Polyester, 2 Steel, 2 Polyamide
Load Index/Speed Symbol	107V	107V
Tire Material	Rubber	Rubber
DOT Safety Code Left	1A3 OFB JCU 2524	1A3 OFB JCU 2524
DOT Safety Code Right	1A3 OFB JCU 2524	1A3 OFB JCU 2524

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

Test Vehicle: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV NHTSA No.: M20255111
 Test Program: NCAP Side MDB Impact Test Test Date: 2/18/2025

TEST VEHICLE TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	275	275	275	275
Tire Placard	kPa	240	240	240	240
Owner's Manual	kPa	240	240	240	240
As Tested	kPa	240	240	240	240

MDB TIRE SPECIFICATIONS

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

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	577.0	517.5		625.0	596.5		611.0	620.5	
Right	kg	531.0	532.0		528.0	612.0		531.0	606.5	
Ratio	%	51.4%	48.6%		48.8%	51.2%		48.2%	51.8%	
Totals	kg	1108.0	1049.5	2157.5	1153.0	1208.5	2361.5	1142.0	1227.0	2369.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	2157.5	(A)
Sum of Actual Weight of 2 P572 ATDs Used	kg	129	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	83	(C)
Calculated Test Vehicle Target Weight (TVTW)	kg	2369.5	(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	843	833	Yes
Right Front	mm	841	836	Yes
Right Rear	mm	855	845	Yes
Left Rear	mm	843	833	Yes
Vehicle CG (Aft of Front Axle)	mm	1526	1508	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	34	29	

* 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: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV NHTSA No.: M20255111
 Test Program: NCAP Side MDB Impact Test Test Date: 2/18/2025

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Units	Weight
Weight of Ballast Added	kg	47
Components Removed: none	kg	

TEST SURFACE MARKINGS

	Units	Distance from 63° Impact Angle Line
Fore 25 mm Target	mm	990
Aft 25 mm Target	mm	1006
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: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV NHTSA No.: M20255111
 Test Program: NCAP Side MDB Impact Test Test Date: 2/18/2025

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	19.9	10.1	15.0
Front Passenger Seat	19.0	9.6	14.3
Front Center Seat			
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed

SEAT HEIGHT AND ANGLE

Seat	As-Tested SCRL Angle (Mid) (°)	As-Tested SCR Height (mm)	SCR Height Position	SCR Height (mm)		
				Rear-Most	Mid	Forward- Most
Driver Seat	15.0	0	Max	45	45	45
			Mid	23	23	23
			Min	0	0	0
Front Passenger Seat	14.3	0	Max	46	46	46
			Mid	23	23	23
			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: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

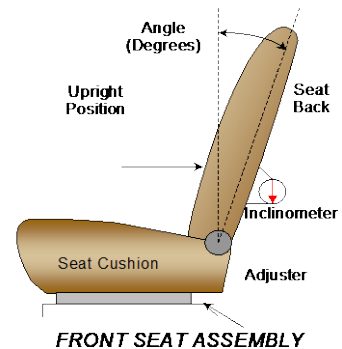
NHTSA No.: M20255111
 Test Date: 2/18/2025

SEAT FORE/AFT POSITIONS

Seat	Total Fore/Aft Travel		Test Position from Forward-Most Position	
	mm	Detents (1 st as 1)	mm	Detent (1 st as 0)
Driver Seat	240		120	
Front Passenger Seat	240		120	
Front Center Seat				
Struck Side Rear Seat	160	17	160	16
Non-Struck Side Rear Seat	160	17	160	16
Rear Center Seat	160	17	160	16

SEAT BACK ANGLE ADJUSTMENT

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



Seat	Total Seat Back Angle Range		Test Position from Vertical	
	Degrees	Detents (1 st as 1)	Degrees	Detent (1 st as 0)
Driver Seat	51.7		0.7	
Front Passenger Seat	51.5		1.0	
Front Center Seat				
Struck Side Rear Seat	16.4	9	5.9	0
Non-Struck Side Rear Seat	15.6	9	5.5	0
Rear Center Seat	15.6	9	5.5	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: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV NHTSA No.: M20255111
 Test Program: NCAP Side MDB Impact Test Test Date: 2/18/2025

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

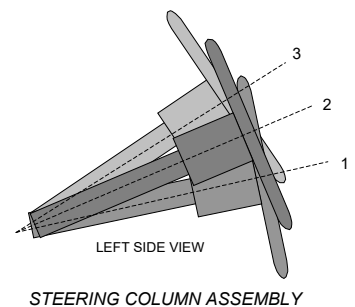
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

	Total # of Positions	Placed in Position #
Driver Seat	4	3 (Lowest as 0) / Fixed Fore-Aft
Rear Seat	2	0 (Lowest as 0) / Fixed Fore-Aft

STEERING COLUMN ADJUSTMENT

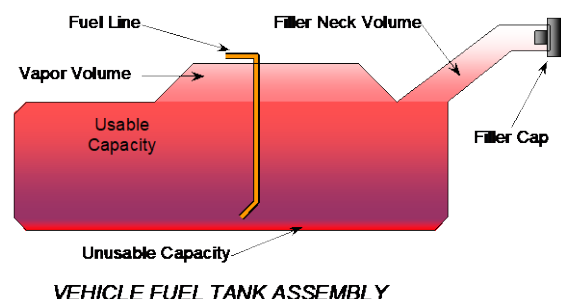
Steering wheel and column adjustments are made so that the steering wheel hub is at the center of its geometric locus it describes when it moves through its full range of motion.

	Wheel Angle (°)	Fore/Aft Position (mm)
Lowermost, Position 1	67.2	
Geometric Center, Position 2	65.0	
Uppermost, Position 3	62.8	
Telescoping Steering Wheel Travel		56
Test Position	65.0	28



FUEL PUMP

The vehicle is equipped with an electronic fuel pump. The fuel pump will run when the engine is running. The pump will also briefly run when the ignition key is turned to the "on" 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: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV NHTSA No.: M20255111
 Test Program: NCAP Side MDB Impact Test Test Date: 2/18/2025

FUEL TANK CAPACITY DATA

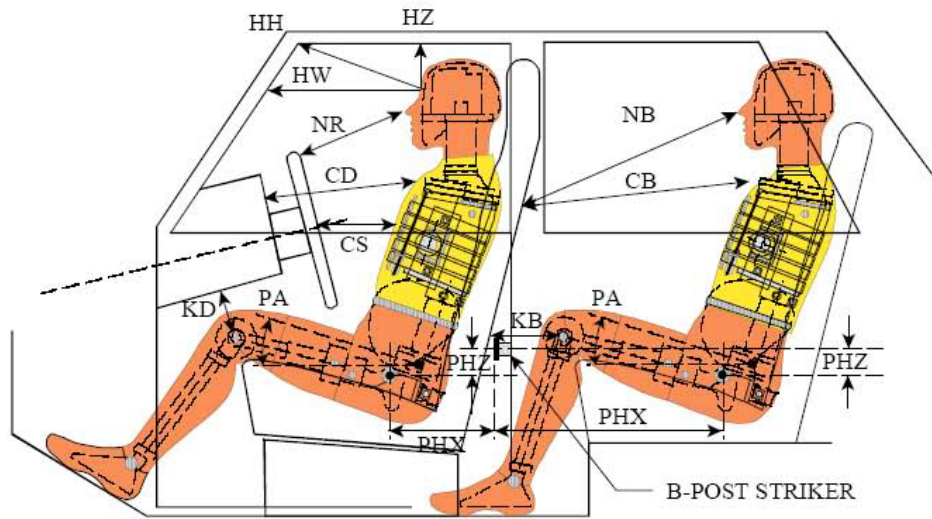
	Liters
Usable Capacity of Standard Tank (see S1 - Vehicle Setup Information)	64.4
Usable Capacity of Optional Tank (see S1 - Vehicle Setup Information)	
Usable Capacity of Standard Tank as Specified in Owner's Manual	64.4
Usable Capacity of Optional Tank as Specified in Owner's Manual	
93% of Usable Capacity	59.8
Actual Amount of Solvent Used	59.8
1/3 of Usable Capacity	21.5

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: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20255111
Test Date: 2/18/2025



LEFT SIDE VIEW

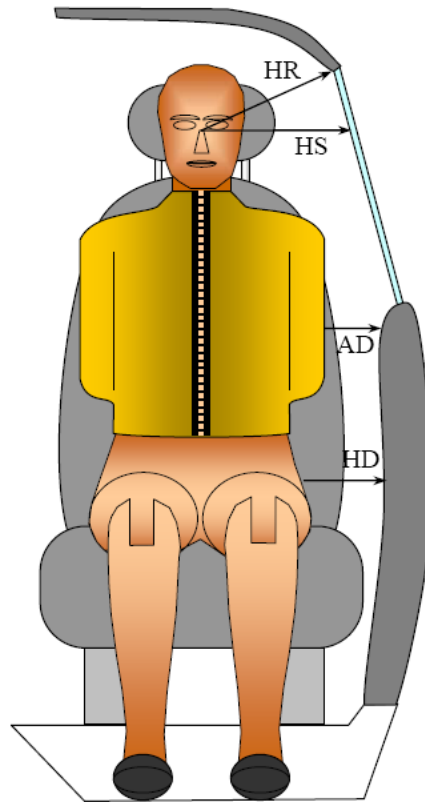
NOTE: 2-DOOR VEHICLE SHOWN.
REAR DUMMY PHX & PHZ
MEASUREMENTS FOR A 4-DOOR
VEHICLE WOULD USE THE C-POST
STRIKER AS A REFERENCE POINT

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length (mm)	Angle (°)	Length (mm)	Angle (°)
HH		Head to Header	346	22.5		
HW		Head to Windshield	581	0		
HZ	HZ	Head to Roof Liner	145	90	315	90
NR	NB	Nose to Rim/Seat Back	431	16.4	587	12.3
CD	CB	Chest to Dashboard/Seat Back	559	6.7	586	3.6
CS		Chest to Steering Wheel	342	16.4		
KDL	KBL	Left Knee to Dash/Seat Back	154	29.6	324	29.6
KDR	KBR	Right Knee to Dash/Seat Back	148	29.6	326	24.5
PAX	PAX	Pelvic Tilt Angle X		21.8		24.4
PAY	PAY	Pelvic Tilt Angle Y		0.0		-0.1
PHX	PHX	Hip Point to Striker (X-Axis)	208		414	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	200		240	

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

Test Vehicle: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20255111
 Test Date: 2/18/2025

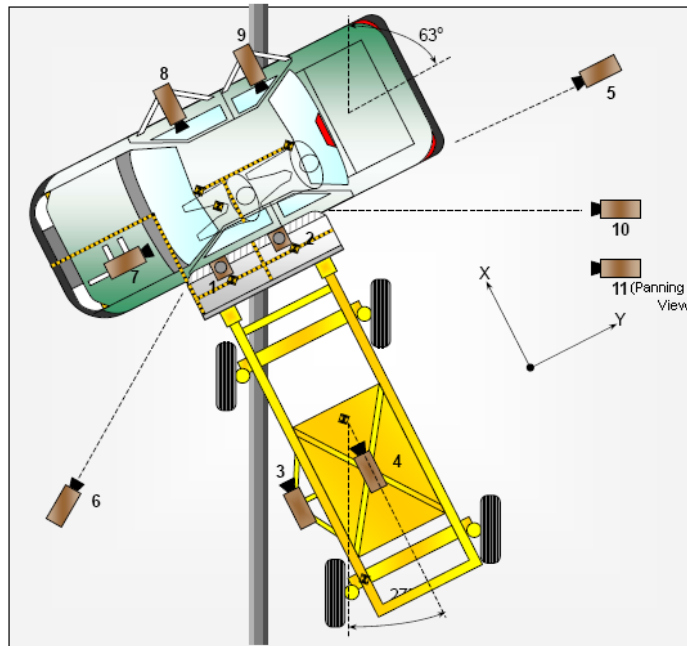


Code	Measurement Description	Driver	Passenger
		Length (mm)	
HR	Head to Side Header	236	317
HS	Head to Side Window	354	397
AD	Arm to Door	114	197
HD	Hip Point to Door	160	191

DATA SHEET NO. 5 CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20255111
Test Date: 2/18/2025



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates* (mm)			Lens (mm)	Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	590	1295	-4975	8	1000
2	Overhead Close-Up	0	815	-4940	20	1000
3	Left Impact Point (MDB)				50	1000
4*	Side Overall (MDB)				16	1000
5	Rear	-25	8110	-1515	24	1000
6	Left Front	-1565	-4430	-1530	24	1000
7	Driver Front (OB)				16	1000
8	Driver Side (OB)				8	1000
9	Passenger Side (OB)				8	1000
10	Real Time Left Rear					30
11	Real Time Inrun					30

Reference: Impact Point projected to Ground; +X = To Front of MDB, +Y = To Right of MDB, +Z = Down

*All measurements accurate to ± 6 mm

*Camera No. 4 - Struck Side View at Impact did not record video of this event.

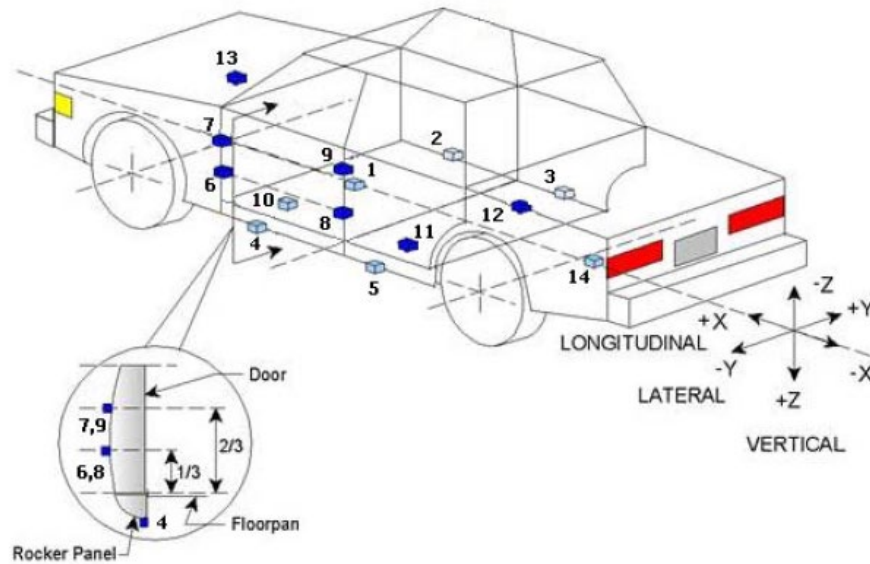
INSTRUMENTATION

	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: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20255111
Test Date: 2/18/2025



TEST VEHICLE ACCELEROMETER LOCATIONS

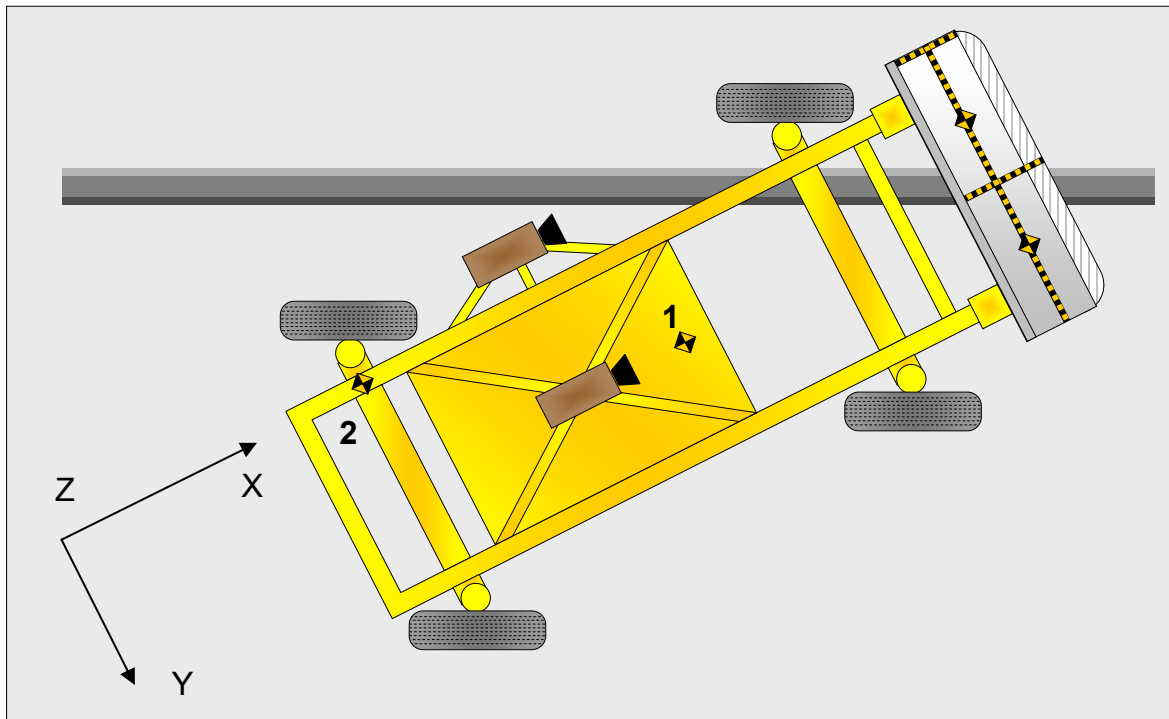
No.	ID	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2919	213	-357
2	Right Sill at Front Seat	3065	743	-302
3	Right Sill at Rear Seat	1998	743	-311
4	Left Sill at Front Door	3053	-753	-293
5	Left Sill at Rear Door	2012	-753	-304
6	Left Lower A-Post	3507	-912	-558
7	Left Middle A-Post	3531	-893	-852
8	Left Lower B-Post	2445	-754	-672
9	Left Middle B-Post	2426	-762	-906
10	Front Seat Track	2621	-408	-396
11	Rear Seat Structure	2172	-367	-471
12	Rt. Rear Occ. Compartment	2174	363	-482
13	Engine Block	4257	-10	-911
14	Rear Above Axle	786	-5	-470

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: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20255111
 Test Date: 2/18/2025



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	1397
---	----	------

DATA SHEET NO. 8
POST-TEST OBSERVATIONS

Test Vehicle: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV NHTSA No.: M20255111
Test Program: NCAP Side MDB Impact Test Test Date: 2/18/2025

TEST DUMMY INFORMATION AND CONTACT POINTS

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

POST-TEST DOOR PERFORMANCE

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

POST-TEST SEAT PERFORMANCE

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

POST-TEST STRUCTURAL OBSERVATIONS

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

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

Test Vehicle: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20255111
Test Date: 2/18/2025

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheelbase	mm		2947
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		508
Actual Impact Point (Aft of Front Axle)	mm		507
Horizontal Offset (+forward / -rearward)	mm	+/- 50 of intended impact point	1
Vertical Offset (+down / -up)	mm	+/- 20 of intended impact point	2

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle:	<u>2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV</u>	NHTSA No.:	<u>M20255111</u>
Test Program:	<u>NCAP Side MDB Impact Test</u>	Test Date:	<u>2/18/2025</u>

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1250
Overall Length Including Honeycomb Face	4119
Wheelbase of Framework Carriage	2588
CG Location aft of Front Axle	1125

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	393.4	297.1	
Right	kg	378.0	295.8	
Ratio	%	56.5	43.5	
Totals	kg	771.4	592.9	1364.4

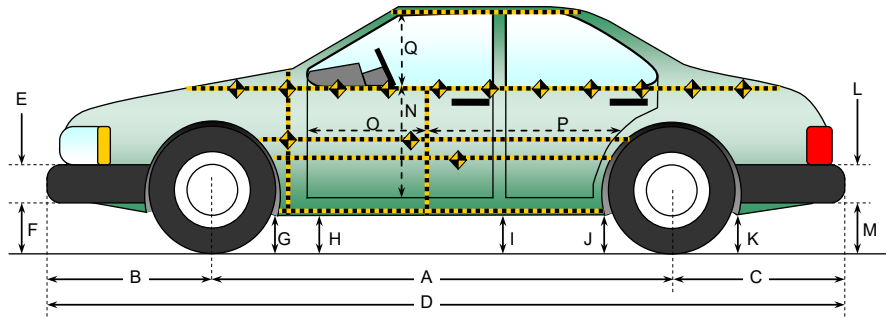
SPEED AND ANGLE AT IMPACT DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.15
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.34
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90.3
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	26.4

DATA SHEET NO. 10

TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV NHTSA No.: M20255111
 Test Program: NCAP Side MDB Impact Test Test Date: 2/18/2025



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

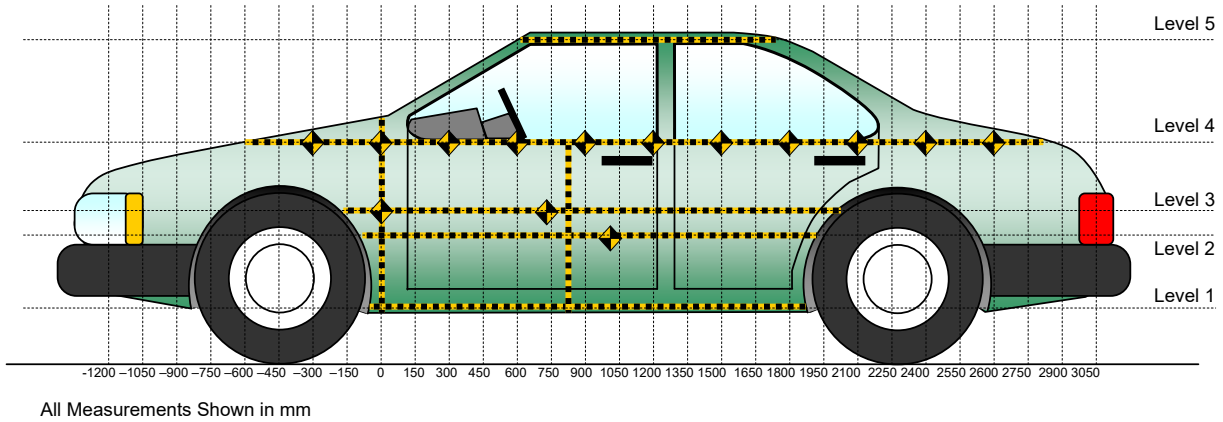
LEFT SIDE VIEW

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Change
A	Wheelbase	2947	2930	-17
B	Front Axle to FSOV	1005	1032	27
C	Rear Axle to RSOV	1133	1120	-13
D	Total Length at Centerline	5086	5081	-5
E	Front Bumper Thickness	172	172	0
F	Front Bumper Bottom to Ground	444	448	4
G	Sill Height at Front Wheel Well	288	291	3
H	Sill Height at Front Door Leading Edge	289	291	2
I	Sill Height at B Pillar	288	293	5
J1	Sill Height at Rear Wheel Well	298	300	2
J2	Pinch Weld Height at Rear Wheel Well	298	302	4
K	Sill Height Aft of Rear Wheel Well	309	318	9
L	Rear Bumper Thickness	122	122	0
M	Rear Bumper Bottom to Ground	515	517	2
N	Sill Height to Window Bottom Sill	778	725	-53
O	Front Door Leading Edge to Impact CL	836	806	-30
P	Rear Door Trailing Edge to Impact CL	1228	1143	-85
Q	Front Window Opening	430	449	19
R	Right Side Length	4566	4566	0
S	Left Side Length	4566	4559	-7
T	Vehicle Width at B Post	1938	1777	-161
U	Front Wheel Track Width	1692		
V	Rear Wheel Track Width	1685		

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

Test Vehicle: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV NHTSA No.: M20255111
Test Program: NCAP Side MDB Impact Test Test Date: 2/18/2025



LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEAUREMENTS

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	464	197	1200
2	Mid Door	737	281	1800
3	Occupant H-Point	762	281	1800
4	Window Sill	1165	117	1500
5	Window Top	1696	14	1950

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: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20255111
 Test Date: 2/18/2025

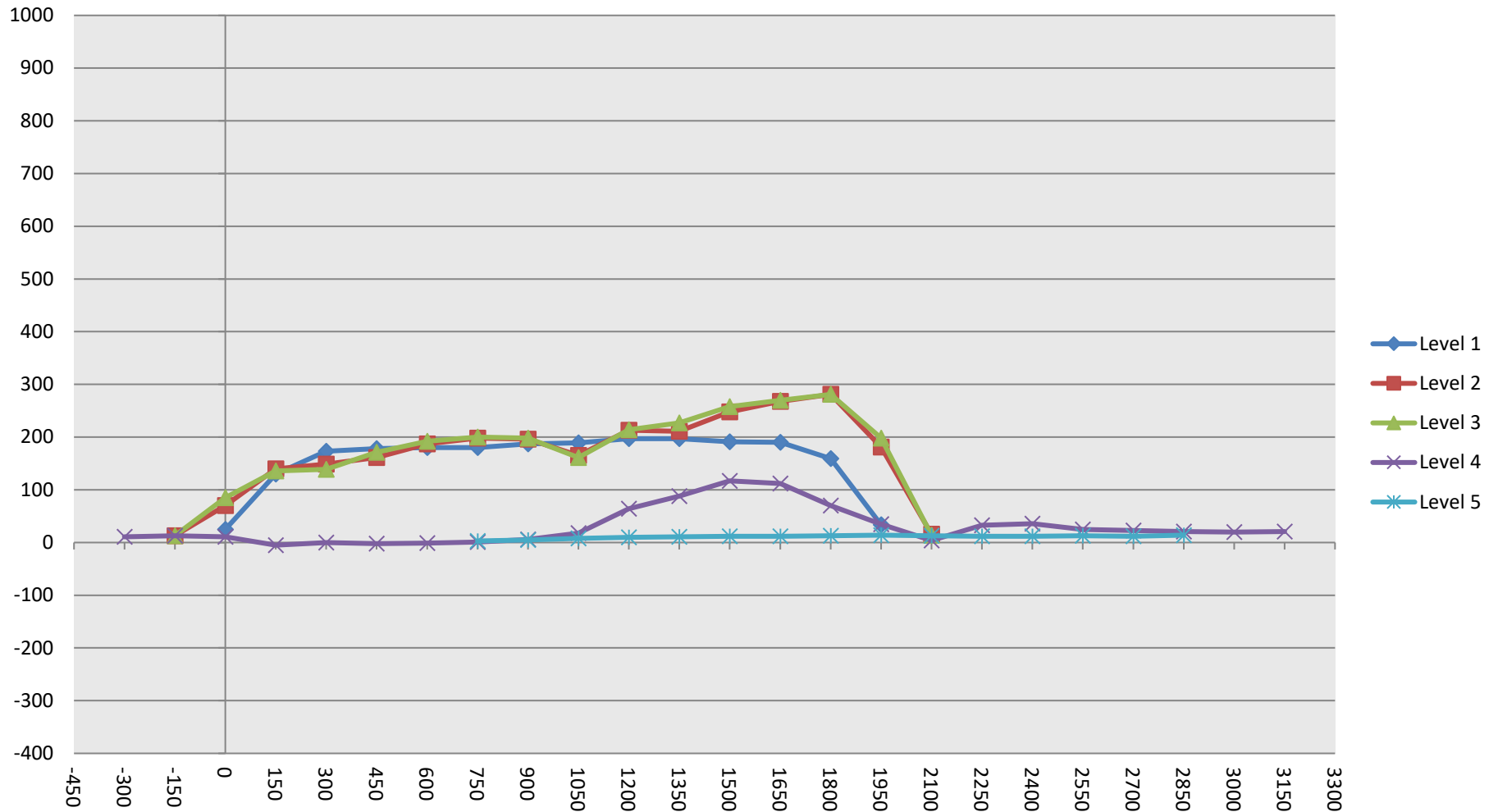
	Pre-Test					Post-Test					Exterior Crush				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-2100															
-1950															
-1800															
-1650															
-1500															
-1350															
-1200															
-1050															
-900															
-750															
-600															
-450															
-300				856					845					11	
-150		999	998	861			986	985	848			13	13	13	
0	978	996	996	869		953	926	911	858		25	70	85	11	
150	981	978	979	872		851	838	843	877		130	140	136	-5	
300	981	969	970	884		808	820	831	884		173	149	139	0	
450	982	966	968	896		804	805	797	898		178	161	171	-2	
600	982	966	968	906		802	779	776	907		180	187	192	-1	
750	982	967	968	913	654	802	769	768	912	651	180	198	200	1	3
900	982	967	969	922	674	795	771	771	916	669	187	196	198	6	5
1050	981	967	969	924	685	792	802	808	906	677	189	165	161	18	8
1200	979	968	969	929	687	782	755	755	865	677	197	213	214	64	10
1350	977	969	971	930	688	780	758	744	842	677	197	211	227	88	11
1500	973	972	973	934	687	782	724	715	817	675	191	248	258	117	12
1650	970	978	979	932	686	780	710	709	820	674	190	268	270	112	12
1800	970	988	988	933	684	811	707	707	863	671	159	281	281	70	13
1950	976	999	1000	931	682	942	818	802	896	668	34	181	198	35	14
2100		1003	1000	928	678		987	986	924	665		16	14	4	13
2250				923	675				890	663				33	12
2400				921	670				885	658				36	12
2550				914	665				889	652				25	13
2700				909	656				886	644				23	12
2850				899	646				878	632				21	14
3000				889					869					20	
3150				873					852					21	
3300															
3450															
3600															
3750															
3900															

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

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

Test Vehicle: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20255111
Test Date: 2/18/2025

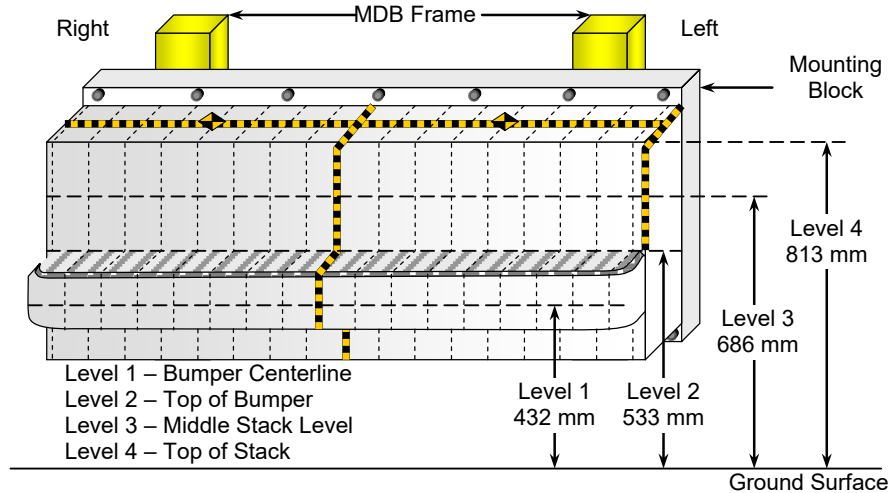


DATA SHEET NO. 12

MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20255111
 Test Date: 2/18/2025



FRONT VIEW

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush (mm)
Row	Description	Height (mm)	Distance (mm)	Direction	
A	Center of Bumper	432	800	Right	274
B	Top of Bumper	533	800	Right	164
C	Mid-Level	686	100	Right	121
D	Top of Stack	813	800	Left	168

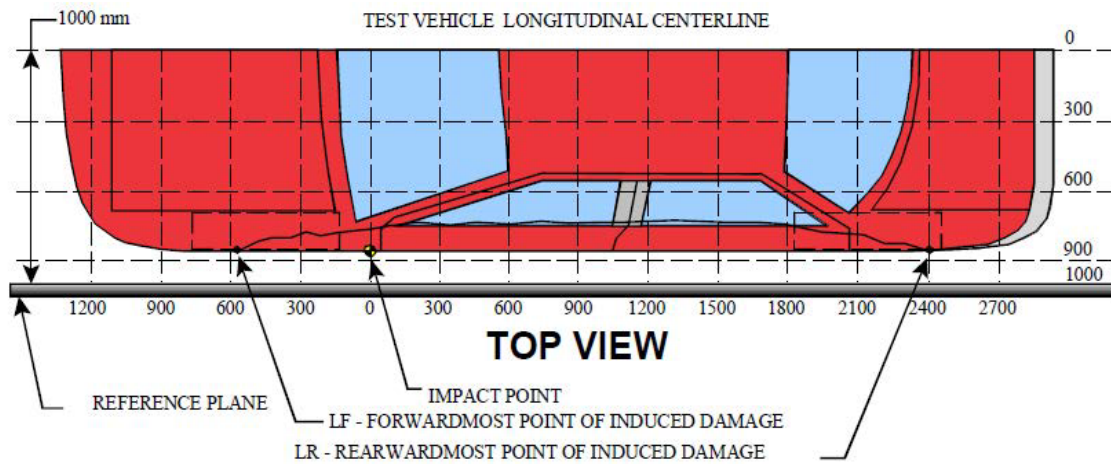
DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center (mm)								C _L	Distance Left of Center (mm)							
	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800
4	68	43	51	46	59	78	104	119	129	109	94	103	107	110	121	140	168
3	79	69	80	95	83	79	98	121	99	89	81	82	86	77	78	86	113
2	164	157	155	153	150	150	145	152	142	136	135	140	136	136	135	133	132
1	274	270	270	267	265	264	260	260	258	257	254	252	252	250	248	247	242

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

Test Vehicle: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20255111
 Test Date: 2/18/2025



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

VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance from Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Max. Static Crush (mm)
1	1950	3	198	0	198
2	1554	3	289	25	264
3	1169	3	243	31	212
4	806	3	232	32	200
5	414	3	195	32	163
6	0	3	89	4	85

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	750	476	274
2	480 mm right of center	1	732	463	269
3	160 mm right of center	1	722	463	259
4	160 mm left of center	1	717	463	254
5	480 mm left of center	1	715	463	252
6	800 mm left of center	1	718	476	242

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

Test Vehicle: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV
 Test Program: NCAP Side MDB Impact Test

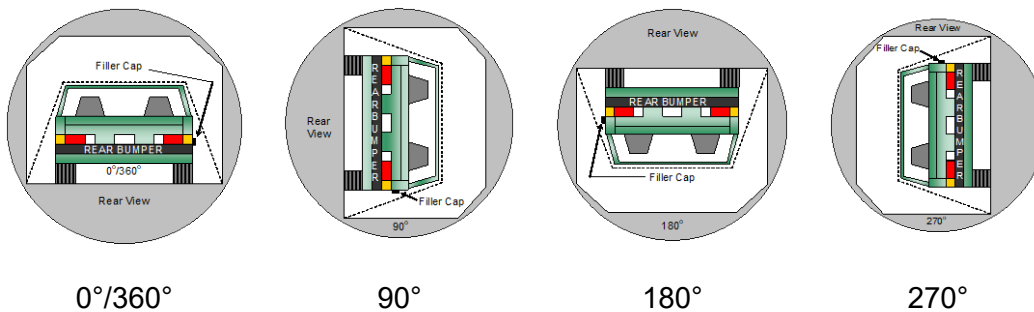
NHTSA No.: M20255111
 Test Date: 2/18/2025

Test Time: 12:59 pm

Temperature: 21.6°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°	92	300	392
90° to 180°	94	300	394
180° to 270°	89	300	389
270° to 360°	92	300	392

FMVSS 301 ROLLOVER SPILLAGE TABLE (UNITS IN OUNCES)

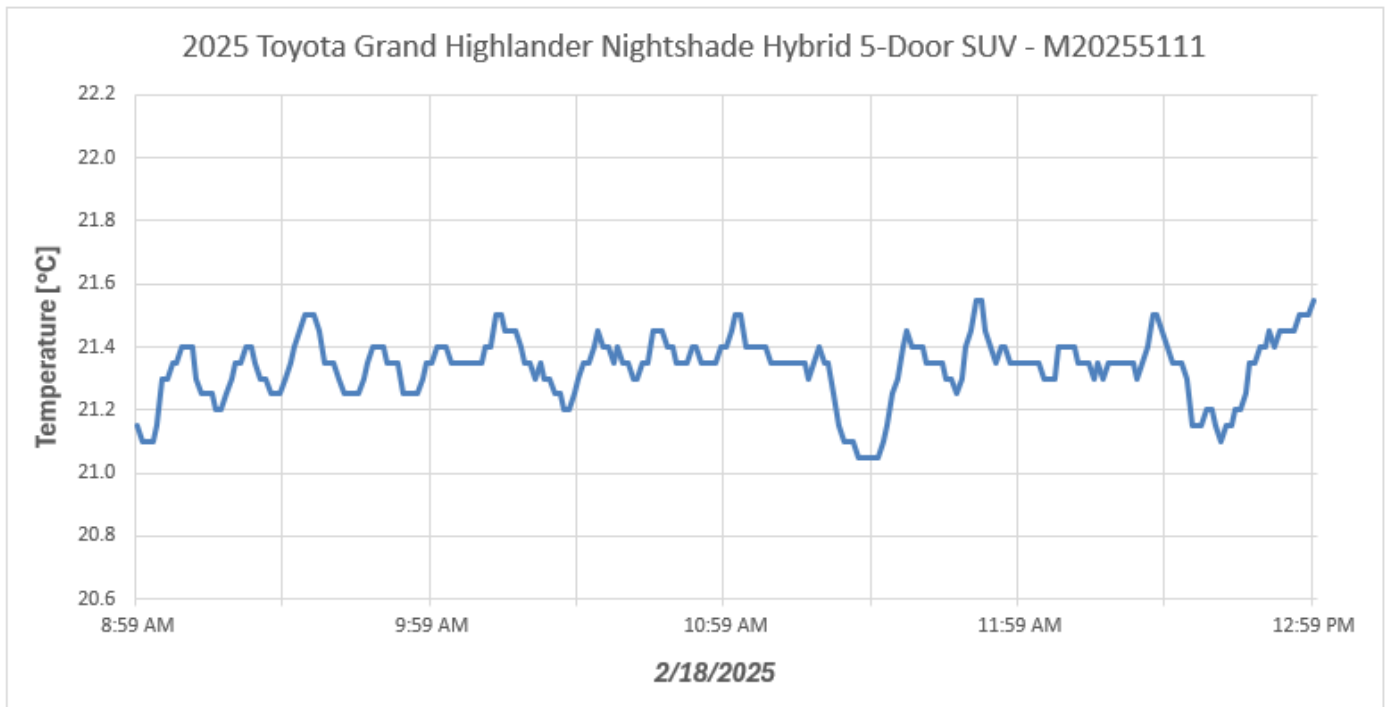
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° to 90°	0.0	0.0	0.0	
90° to 180°	0.0	0.0	0.0	
180° to 270°	0.0	0.0	0.0	
270° to 360°	0.0	0.0	0.0	

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: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV NHTSA No.: M20255111
Test Program: NCAP Side MDB Impact Test Test Date: 2/18/2025



Serial #	Description	Maximum	Average	Minimum	Units
W2425691	VSC North Hall - Temp (3016)	21.55	21.34	21.05	°C

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

Test Vehicle: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV NHTSA No.: M20255111
 Test Program: NCAP Side MDB Impact Test Test Date: 2/18/2025

ELECTRIC VEHICLE PROPULSION SYSTEM

	Units	Observations and Conclusions
Type of Electric Vehicle		Gas-Electric Hybrid
Propulsion Battery Type		Nickel Metal Hydride
Nominal Voltage	V	259.2
Physical Location of Automatic Propulsion Battery Disconnect		Inside of the traction battery
Auxiliary Battery Type		LN2

PROPULSION BATTERY SYSTEM DATA

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

PROPULSION BATTERY STATE OF CHARGE

<i>For all battery types:</i>	
Voltage range corresponding to useable energy of the battery:	
Minimum State of Charge	
Maximum State of Charge	
95% of Maximum State of Charge	
Test Voltage - No less than 95% of maximum State of Charge	
<i>For batteries that are rechargeable ONLY by an energy source on the vehicle:</i>	
Voltage range corresponding to useable energy of the battery:	
Minimum State of Charge	
Maximum State of Charge	354.2 V
Test Voltage – Maximum practicable State of Charge within Normal Operating Range	274.4 V

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

Test Vehicle: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV NHTSA No.: M20255111
Test Program: NCAP Side MDB Impact Test Test Date: 2/18/2025

VEHICLE CHASSIS GROUND POINT(S) LOCATION(S)

Details of Vehicle Chassis Ground Point(s) & Location(s)	Vehicle body
---	--------------

PROPULSION BATTERY SYSTEM

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

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

Test Vehicle: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV NHTSA No.: M20255111
Test Program: NCAP Side MDB Impact Test Test Date: 2/18/2025

VOLTMETER INFORMATION

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

PROPULSION BATTERY VOLTAGE

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

Vb	V	
----	---	--

ELECTRIC ISOLATION MEASUREMENTS
PROPULSION BATTERY TO VEHICLE CHASSIS

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

V1	V	
V2	V	

PROPULSION BATTERY TO VEHICLE CHASSIS ACROSS RESISTOR

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

Ro	Ω	
----	---	--

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

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

Test Vehicle: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV NHTSA No.: M20255111
 Test Program: NCAP Side MDB Impact Test Test Date: 2/18/2025

ELECTRICAL ISOLATION CALCULATIONS

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

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

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

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

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

Test Vehicle: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV NHTSA No.: M20255111
 Test Program: NCAP Side MDB Impact Test Test Date: 2/18/2025

VOLTMETER INFORMATION

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

ELECTRICAL ISOLATION MEASUREMENTS

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

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

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

Test Vehicle: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV NHTSA No.: M20255111
 Test Program: NCAP Side MDB Impact Test Test Date: 2/18/2025

ELECTRICAL ISOLATION CALCULATIONS

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

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

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

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

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

Test Vehicle: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV NHTSA No.: M20255111
 Test Program: NCAP Side MDB Impact Test Test Date: 2/18/2025

PROPULSION BATTERY SYSTEM COMPONENTS

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

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

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

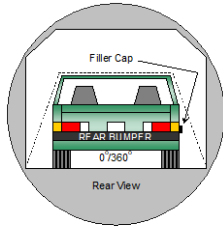
	Yes (Fail)	No
Has an outside Propulsion Battery Component intruded into the passenger compartment?		X

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

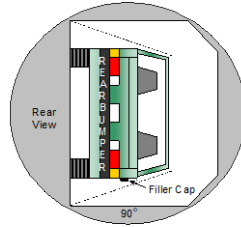
DATA SHEET NO. 305-5
STATIC ROLLOVER TEST DATA
FOR INDICANT FMVSS NO. 305 TESTING

Test Vehicle: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV NHTSA No.: M20255111
 Test Program: NCAP Side MDB Impact Test Test Date: 2/18/2025

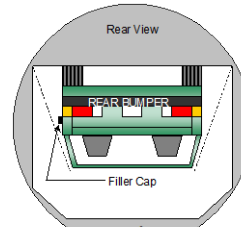
PROPULSION BATTERY SYSTEM COMPONENTS



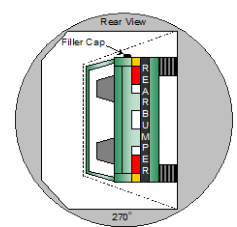
0°/360°



90°



180°



270°

PROPULSION BATTERY ELECTROLYTE COLLECTION TIME PERIOD

Test Phase	Rotation Time (spec. 1-3 min)				FMVSS 301 Hold Time		Total Time				Next Whole Minute Interval	
0° - 90°	1	min	32	sec	5	min	6	min	32	sec	7	min
90° - 180°	1	min	34	sec	5	min	6	min	34	sec	7	min
180° - 270°	1	min	29	sec	5	min	6	min	29	sec	7	min
270° - 360°	1	min	32	sec	5	min	6	min	32	sec	7	min

TEST VEHICLE PROPULSION BATTERY ELECTROLYTE SPILLAGE

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

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

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

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

Test Vehicle: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV NHTSA No.: M20255111
 Test Program: NCAP Side MDB Impact Test Test Date: 2/18/2025

VOLTMETER INFORMATION

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

ELECTRICAL ISOLATION MEASUREMENTS

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

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

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

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

Test Vehicle: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV NHTSA No.: M20255111
Test Program: NCAP Side MDB Impact Test Test Date: 2/18/2025

ELECTRICAL ISOLATION CALCULATIONS

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

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

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

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

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

Test Vehicle: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV NHTSA No.: M20255111
 Test Program: NCAP Side MDB Impact Test Test Date: 2/18/2025

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

POST-CRASH / PRE-ROLLOVER

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

STATIC ROLLOVER

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

POST-ROLLOVER

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

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

Test Vehicle: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV NHTSA No.: M20255111
Test Program: NCAP Side MDB Impact Test Test Date: 2/18/2025

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

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

POST-CRASH / PRE-ROLLOVER

Description of Evaluated Location	Measuring Path	Method 2 ONLY		Methods 1 & 2	Pass or Fail
	BC or BB	Voltage (V) Volts	Current (I) Amps	Resistance (R=V/I) Ω	
High-Voltage Battery to Electrical Ground	BC			0.017	Pass
Inverter to Electrical Ground	BC			0.001	Pass
Rear Drive Motor to Ground	BC			0.017	Pass
High-Voltage Battery to Inverter	BB			0.004	Pass
High-Voltage Battery to Rear Drive Motor	BB			0.013	Pass
Rear Drive Motor to Inverter	BB			0.014	Pass

STATIC ROLLOVER

Description of Evaluated Location	Measuring Path	Method 2 ONLY		Methods 1 & 2	Pass or Fail
	BC or BB	Voltage (V) Volts	Current (I) Amps	Resistance (R=V/I) Ω	
High-Voltage Battery to Electrical Ground	BC			0.001	Pass
Inverter to Electrical Ground	BC			0.001	Pass
Rear Drive Motor to Ground	BC			0.001	Pass
High-Voltage Battery to Inverter	BB			0.000	Pass
High-Voltage Battery to Rear Drive Motor	BB			0.000	Pass
Rear Drive Motor to Inverter	BB			0.000	Pass

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

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

Test Vehicle: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV NHTSA No.: M20255111
Test Program: NCAP Side MDB Impact Test Test Date: 2/18/2025

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

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

POST-ROLLOVER

Description of Evaluated Location	Measuring Path	Method 2 ONLY		Methods 1 & 2	Pass or Fail
	BC or BB	Voltage (V) Volts	Current (I) Amps	Resistance (R=V/I) Ω	
High-Voltage Battery to Electrical Ground	BC			0.001	Pass
Inverter to Electrical Ground	BC			0.001	Pass
Rear Drive Motor to Ground	BC			0.001	Pass
High-Voltage Battery to Inverter	BB			0.000	Pass
High-Voltage Battery to Rear Drive Motor	BB			0.000	Pass
Rear Drive Motor to Inverter	BB			0.000	Pass

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

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

Test Vehicle: 2025 Toyota Grand Highlander Nightshade Hybrid 5-Door SUV NHTSA No.: M20255111
Test Program: NCAP Side MDB Impact Test Test Date: 2/18/2025

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

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

POST-CRASH / PRE-ROLLOVER

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

STATIC ROLLOVER

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

POST-ROLLOVER

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

APPENDIX A
PHOTOGRAPHS

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



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



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



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



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



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



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



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



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



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



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



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



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



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

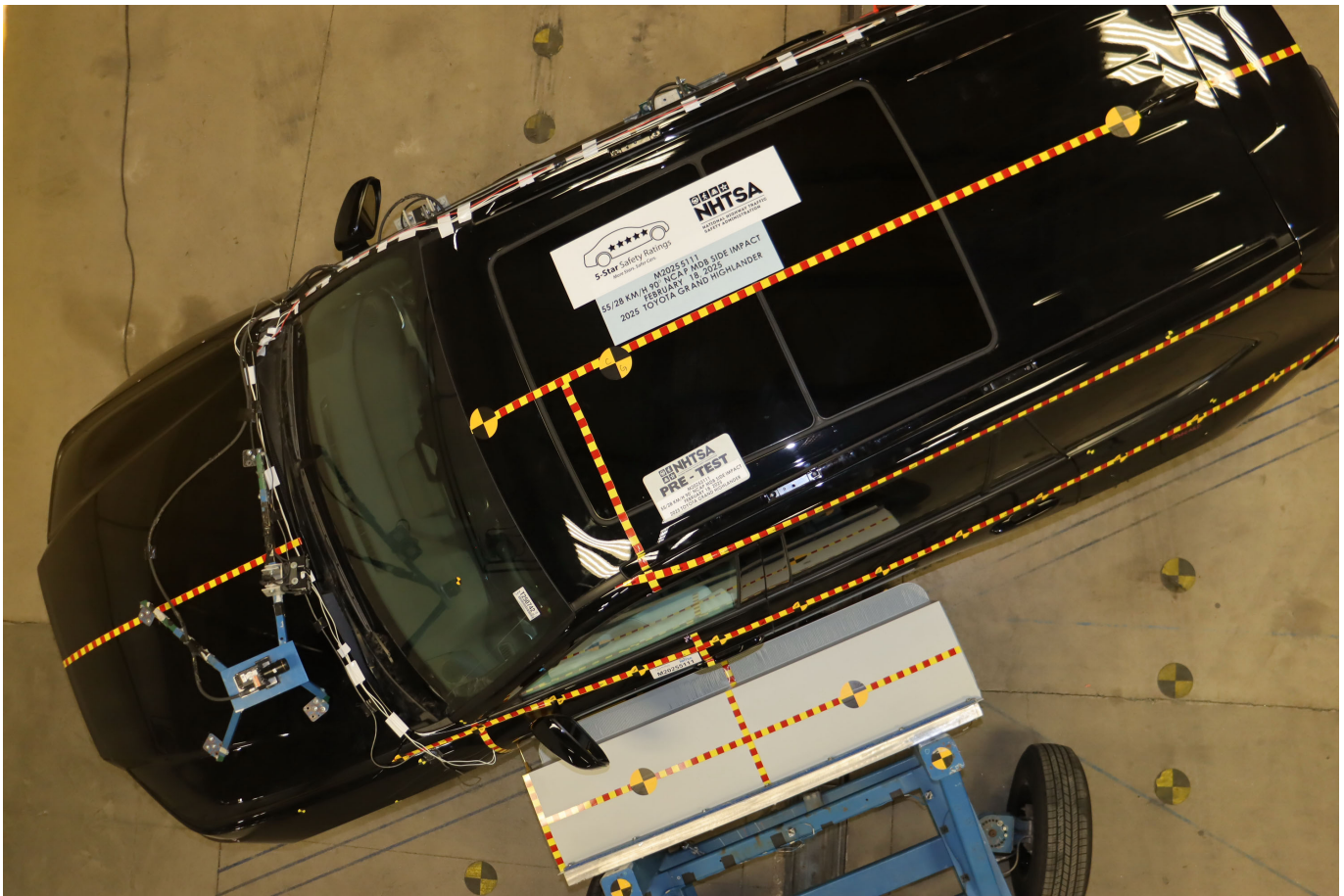


Photo No. 015 - Pre-Test Overhead View of Test Area



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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

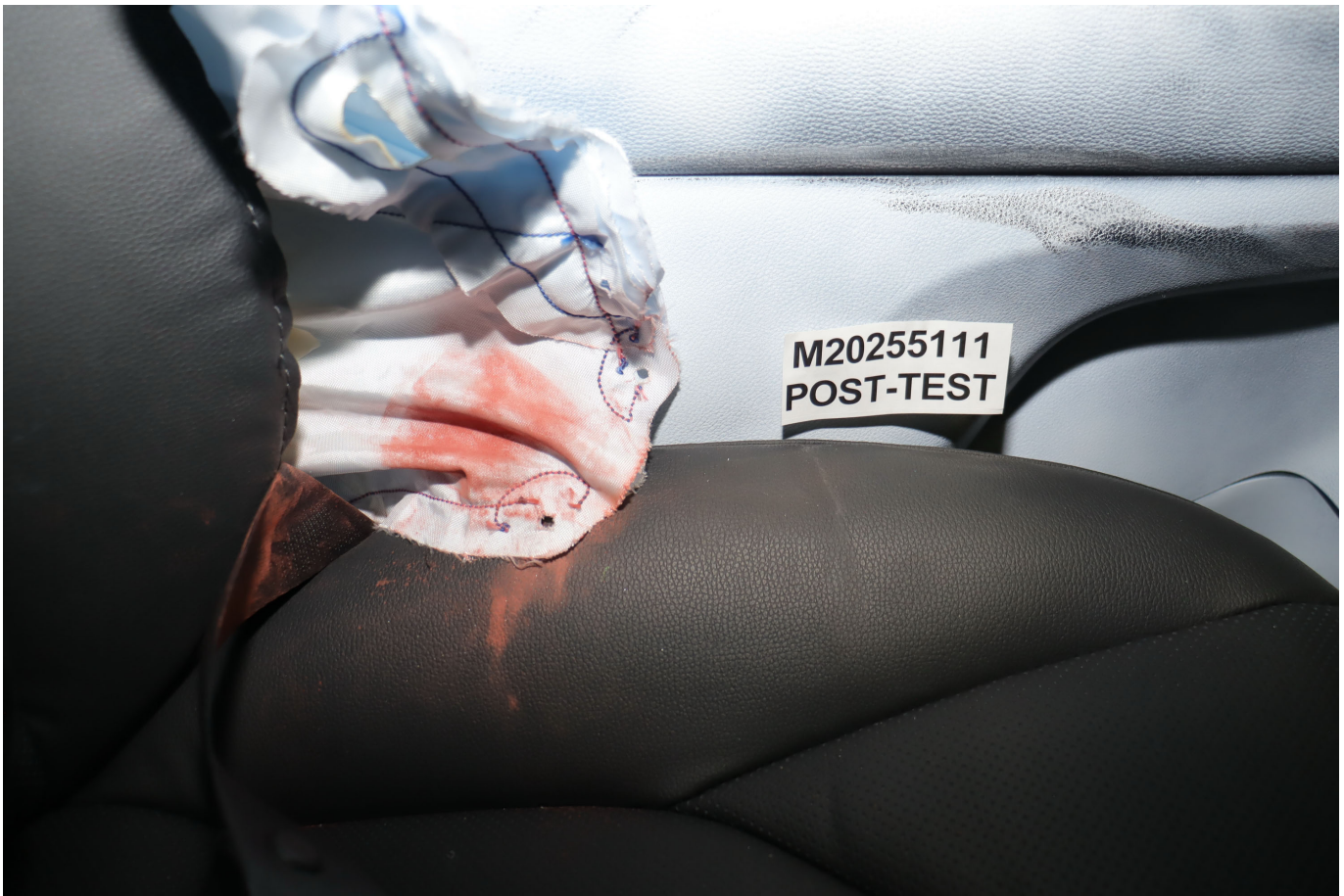


Photo No. 053 - Post-Test Driver Dummy Close-Up Pelvis Contact with Side Airbag View



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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

PHOTOGRAPH NOT APPLICABLE

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. 093a - Close-Up View of Vehicle Load Carrying Capacity Reduction Label



Photo No. 094 - Pre-Test Ballast View



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



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



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



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



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



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



Photo No. 101 - Impact Event



TOYOTA

DESC.: **GRAND HIGHLANDER NIGHTSHADE HYBRID**
VIN: **5TDACAB59S034657**
YR/MDL: 2025/6733A
CLR: MIDNIGHT BLACK METAL/BLACK (0218/20)
FINAL ASSEMBLY POINT: PRINCETON, INDIANA, U.S.A.

GOVERNMENT 5-STAR SAFETY RATINGS

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

Star ratings range from 1 to 5 stars (★★★★★) with 5 being the highest.
Source: National Highway Traffic Safety Administration (NHTSA)
www.safercar.gov or 1-888-327-4236

Fuel Economy and Environment

Fuel Economy

34 MPG
combined city/hwy

36 city
32 highway

2.9 gallons per 100 miles

You save \$1,750
in fuel costs
over 5 years
compared to the
average new vehicle.

Annual fuel cost

\$1,550

Fuel Economy & Greenhouse Gas Rating (tailpipe only)

7

Best 10 Worst

This vehicle emits 268 grams CO₂ per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions. Learn more at fuelconomy.gov.

Smog Rating (tailpipe only)

6

Best 10 Worst

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 28 MPG and costs \$5,500 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$3.50 per gallon. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fuelconomy.gov
Calculate personalized estimates and compare vehicles

Smartphone QR Code

STANDARD EQUIPMENT

UNLESS REPLACED BY OPTIONAL EQUIPMENT

MECHANICAL & PERFORMANCE

- 2.5L 4-Cylinder Engine, ECVT
- 3,500-lb Tow Capacity
- AWD w/ Trail Mode

SAFETY & CONVENIENCE

- Toyota Safety Sense 3.0 w/ Pre-Collision
- Frt & Rear Parking Assist w/ Auto Brake
- Blind Spot Monitor
- w/ Rear Cross-Traffic Alert
- Star Safety System
- LATCH-Lower Anchor & Tether for Children
- Connected Services Capable, 4G Network
- Dependent. See Toyota.com for Details.

EXTERIOR

- 20-in. Alloy Wheels
- LED Headlights, Taillights & Fog lights
- 5-Door Smart Key w/ Push Button Start
- Heated Power Outside Mirrors
- Hands-free Power Liftgate
- Rain-Sensing Wipers

INTERIOR

- 12.3-in. Toyota Audio Multimedia w/ 11 JBL-Speakers, Wireless Apple CarPlay & Android Auto Compatibility
- SiriusXM w/ 3-Month Trial
- Leather Trimmed Seating
- Heated, Ventilated, & Power Front Seats
- Heated Steering Wheel
- Heated 2nd Row Seats
- 3rd Row 60/40 Split Fold-Flat Seats
- Integrated 2nd Row Window Sunshades
- 3-Zone Auto Climate Control
- Qi Wireless Smartphone Charger
- 13 Cup/Bottle Holders
- 7 USB-C Ports
- 12.3-in. Digital Gauge Cluster
- 1500W Inverter with Two 120V AC Outlets
- For Full Product Details, Please Visit Toyota.com/GrandHighlander
- ***Full Tank of Gas***

BASE MANUFACTURER'S SUGGESTED RETAIL PRICE **\$52,610.00**

OPTIONAL EQUIPMENT

FE	50 STATE EMISSIONS	
BK	NIGHTSHADE	
BS	BENCH SEAT	
SB	PANORAMIC VIEW MONITOR	600.00
SR	PANORAMIC ROOF	1,350.00
2T	All Weather Floor Liners / Cargo Tray	378.00
3T	Cross Bars	325.00
3Z	First Aid Kit	26.00
BM	Body Side Moldings	275.00
D5	Door Edge Guards	160.00
G4	Illuminated Door Sills	345.00
J6	Illuminated Cargo Sill	345.00

MANUFACTURER'S SUGGESTED RETAIL PRICE[†] **\$56,414.00**

DELIVERY, PROCESSING AND HANDLING FEE **1,450.00**

TOTAL SUGGESTED RETAIL PRICE \$57,864.00

Delivered by Truck to:
KENOSHA TOYOTA
8180 120TH AVENUE
KENOSHA WI 53142

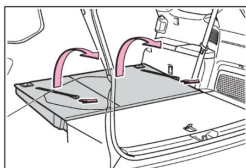
[†]Manufacturer's suggested retail price excludes delivery processing and handling fees, license and title fees, applicable federal, state and local taxes, and dealer and distributor options and accessories.



TMLEIN150FOWD

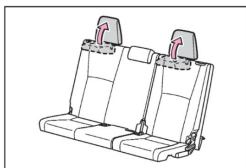
Photo No. 102 - Monroney Label

3-3. Adjusting the seats 165



2 Returning the outer head restraints.

Remove the secured seat belts from the seat belt hangers before using them.



Head restraints

Head restraints are provided for all seats.

WARNING

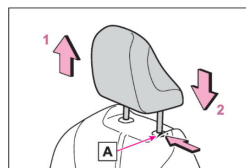
Head restraint precautions

Observe the following precautions regarding the head restraints. Failure to do so may result in death or serious injury.

- Use the head restraints designed for each respective seat.
- Adjust the head restraints to the correct position at all times.
- After adjusting the head restraints, push down on them and make sure they are locked in position.
- Do not drive with the head restraints removed.
- When sitting on the third seat, make sure that the head restraint is not folded.

Adjusting a head restraint vertically

Front seats



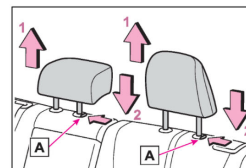
- 1 Up**
Pull the head restraints up.

166 3-3. Adjusting the seats

2 Down

Push the head restraint down while pressing the lock release button **A**.

Second seats

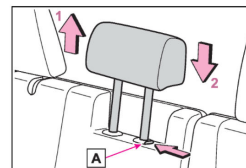


- 1 Up**
Pull the head restraints up.

2 Down

Push the head restraint down while pressing the lock release button **A**.

Third center seat



- 1 Up**
Pull the head restraints up.

2 Down

Push the head restraint down while pressing the lock release button **A**.

Adjusting the height of the head restraints



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

Adjusting the rear center seat head restraints

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

Removing the head restraints

Pull the head restraint up while pressing the lock release button **A**.

If the head restraint touches the ceiling, making the removal difficult, change the seat height or angle. (→P.159, 160)

Front seats

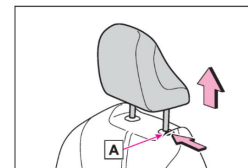
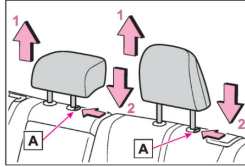


Photo No. 103 - Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

2 Down

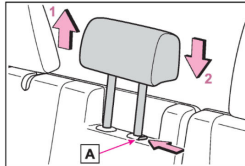
Push the head restraint down while pressing the lock release button **A**.

■ Second seats**1 Up**

Pull the head restraints up.

2 Down

Push the head restraint down while pressing the lock release button **A**.

■ Third center seat**1 Up**

Pull the head restraints up.

2 Down

Push the head restraint down while pressing the lock release button **A**.

■ Adjusting the height of the head restraints

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

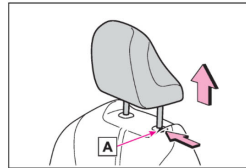
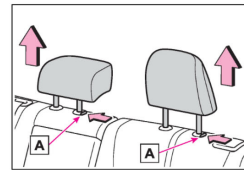
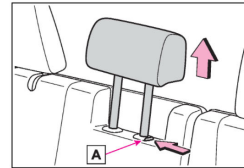
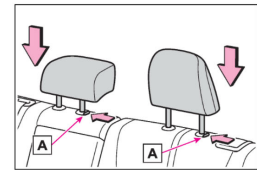
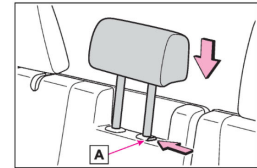
■ Adjusting the rear center seat head restraints

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

Removing the head restraints

Pull the head restraint up while pressing the lock release button **A**.

If the head restraint touches the ceiling, making the removal difficult, change the seat height or angle. (→P.159, 160)

► Front seats**► Second seats****► Third center seat****► Second seats****► Third center seat**

3

Before driving

Installing the head restraints

Align the head restraint with the installation holes and push it down to the lock position.

Press and hold the lock release button **A** when lowering the head restraint.

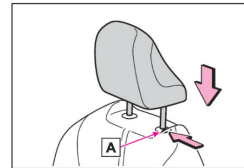
► Front seats

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

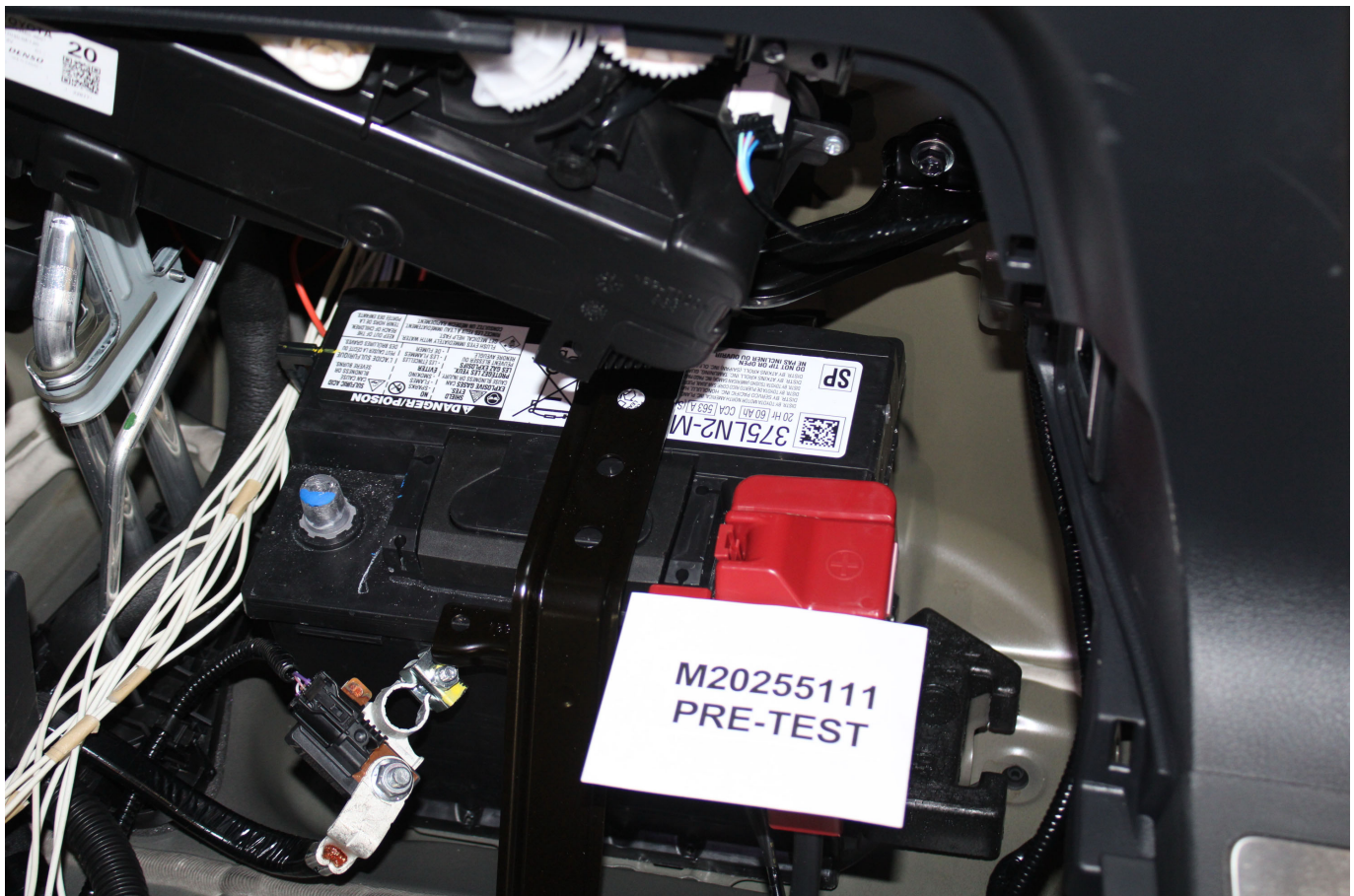


Photo No. 305-01 - Auxiliary Power Module Warning Label

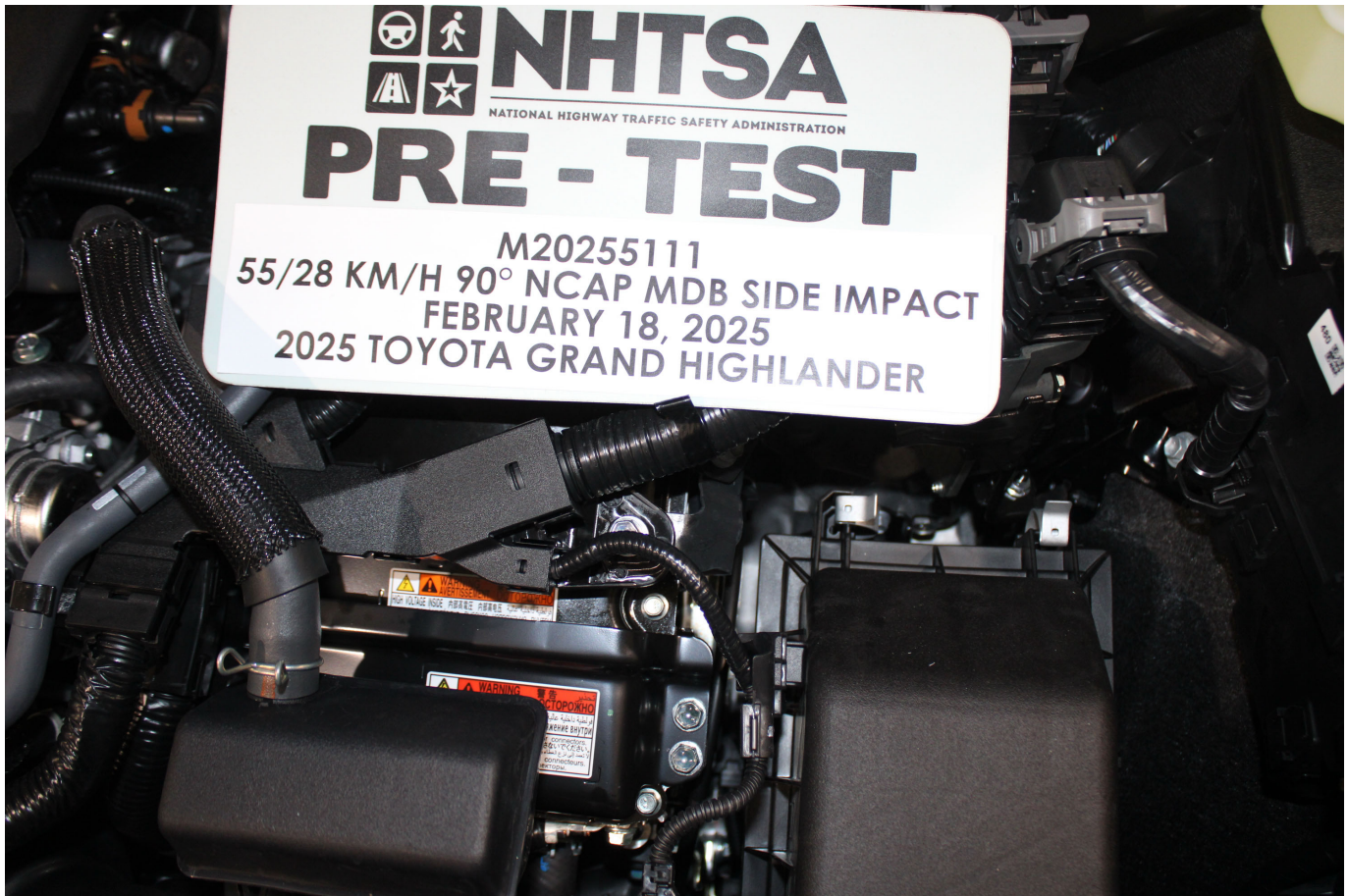


Photo No. 305-02 - Power Inverter Warning Label

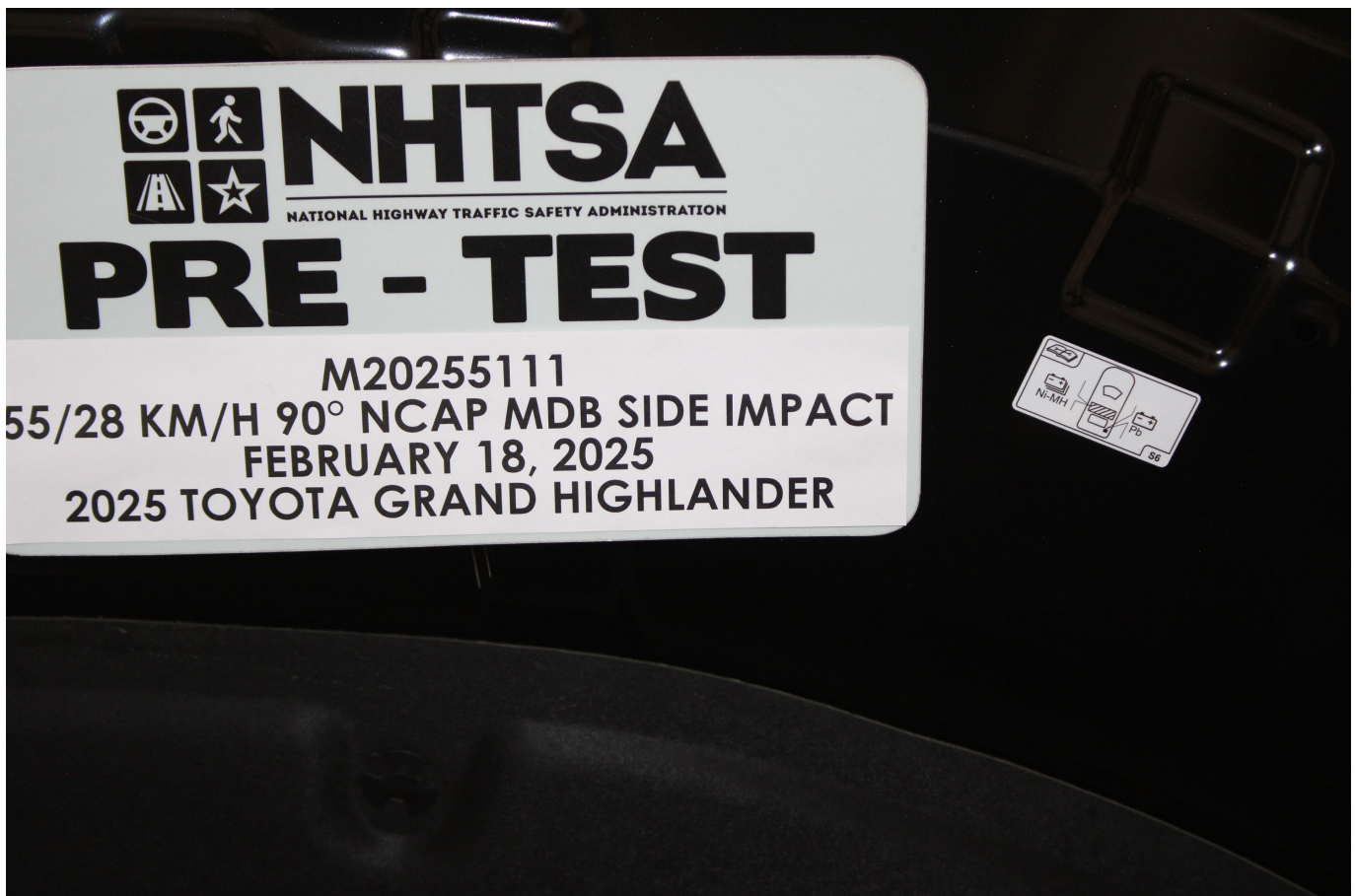


Photo No. 305-03 - First Responder Warning Label



Photo No. 305-04 - First Responder Warning Location



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



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



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



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



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



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

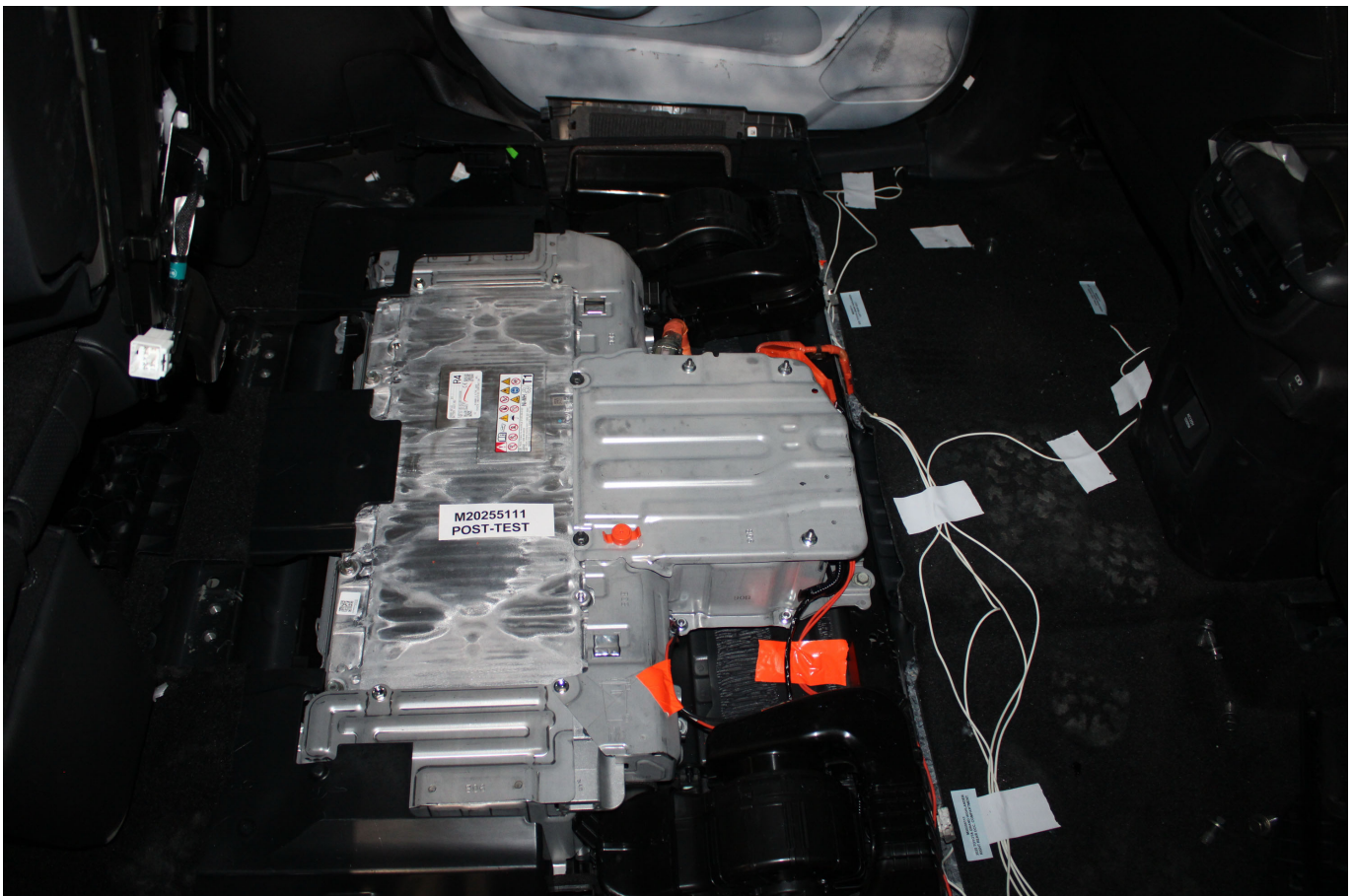


Photo No. 305-11 - Post-Impact Rear View of Propulsion Battery

PHOTOGRAPH NOT AVAILABLE

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

PHOTOGRAPH NOT AVAILABLE

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

PHOTOGRAPH NOT AVAILABLE

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

PHOTOGRAPH NOT AVAILABLE

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

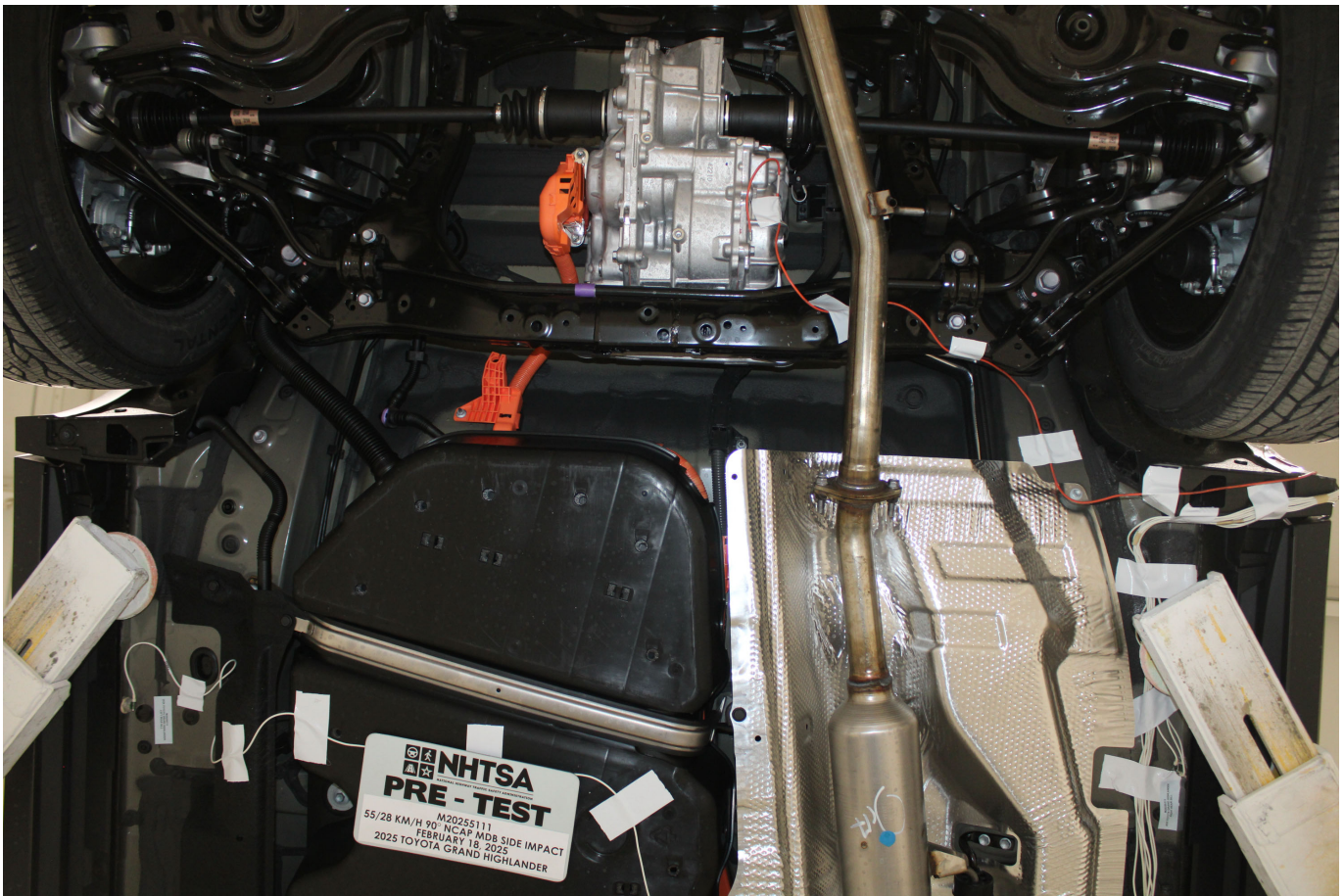


Photo No. 305-16 - Pre-Impact View of Electric Propulsion Drive



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

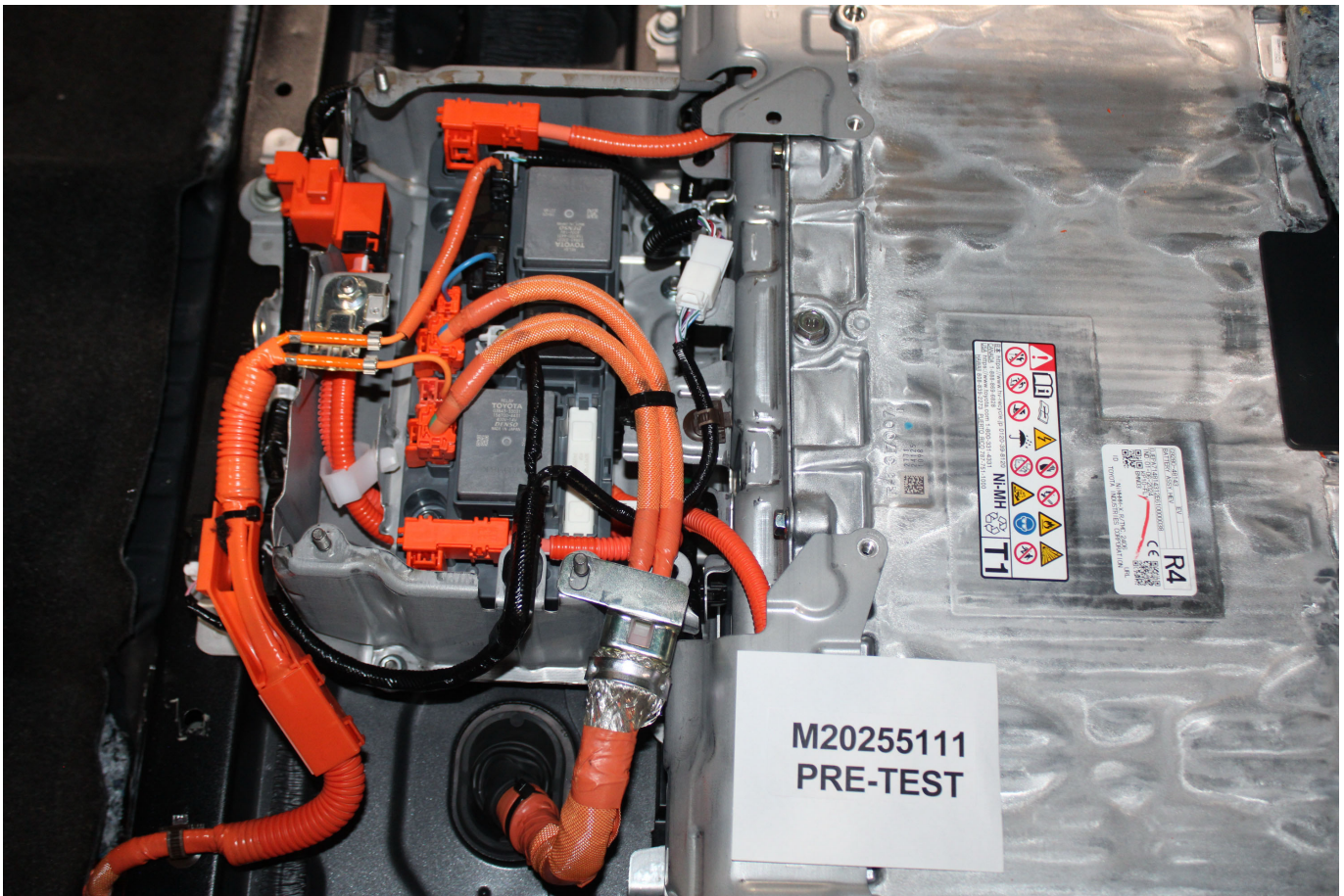


Photo No. 305-18 - Pre-Impact View of High Voltage Interconnect(s)

PHOTOGRAPH NOT APPLICABLE

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

PHOTOGRAPH NOT APPLICABLE

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



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



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

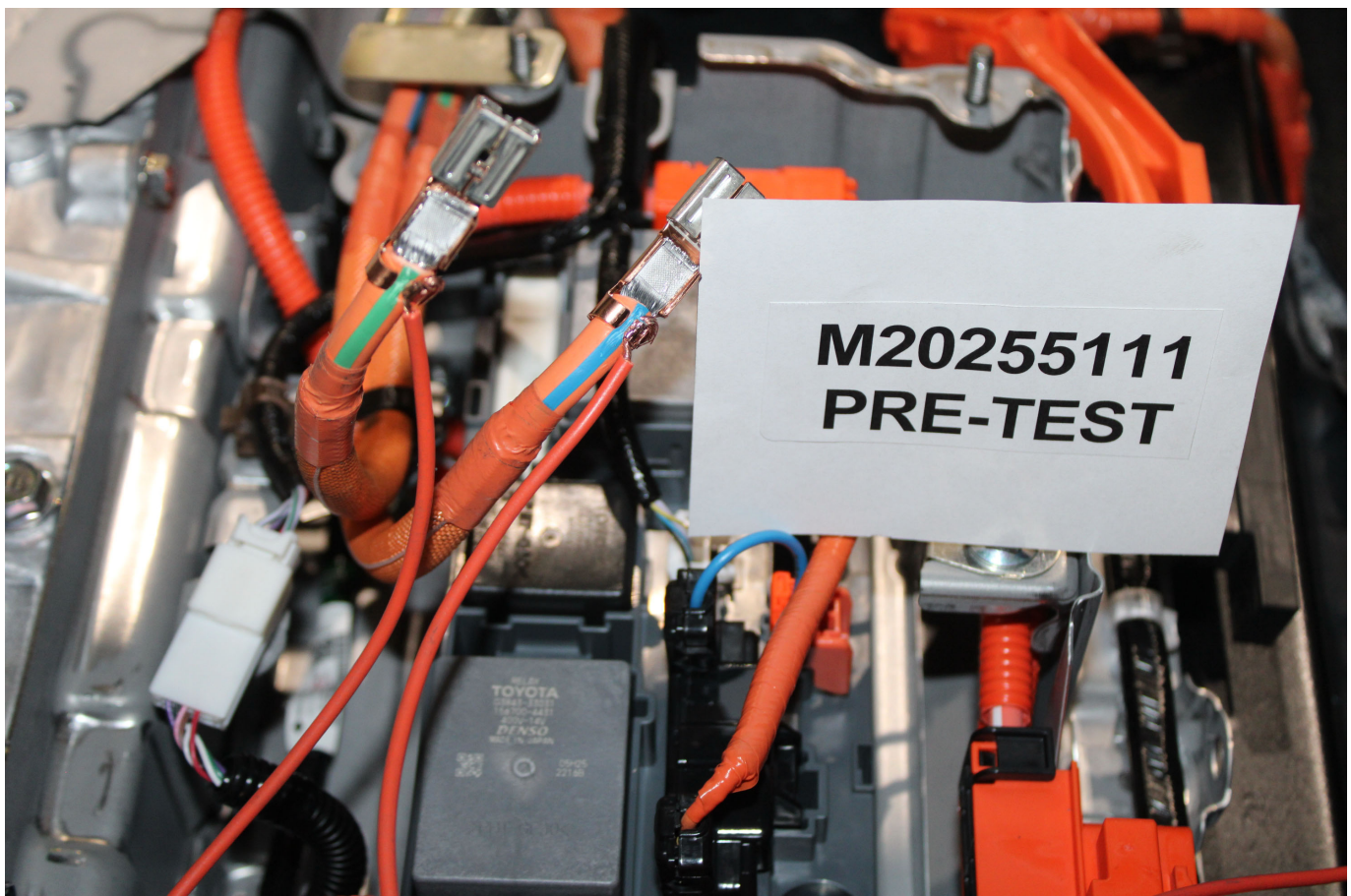


Photo No. 305-23 - Pre-Impact Close-Up View of High Voltage Leads Attached

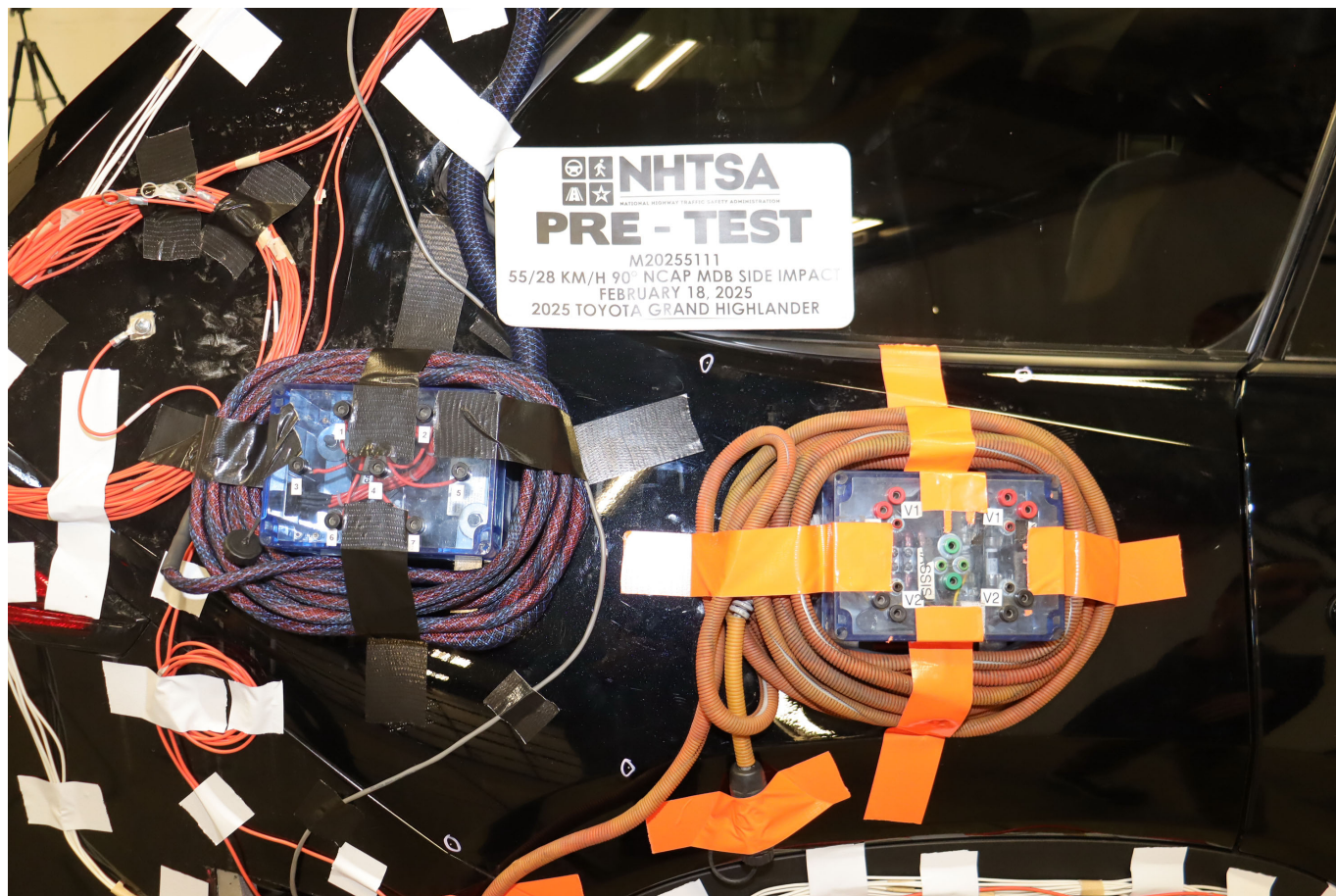


Photo No. 305-24 - Pre-Impact View of Installed Test Interface Port

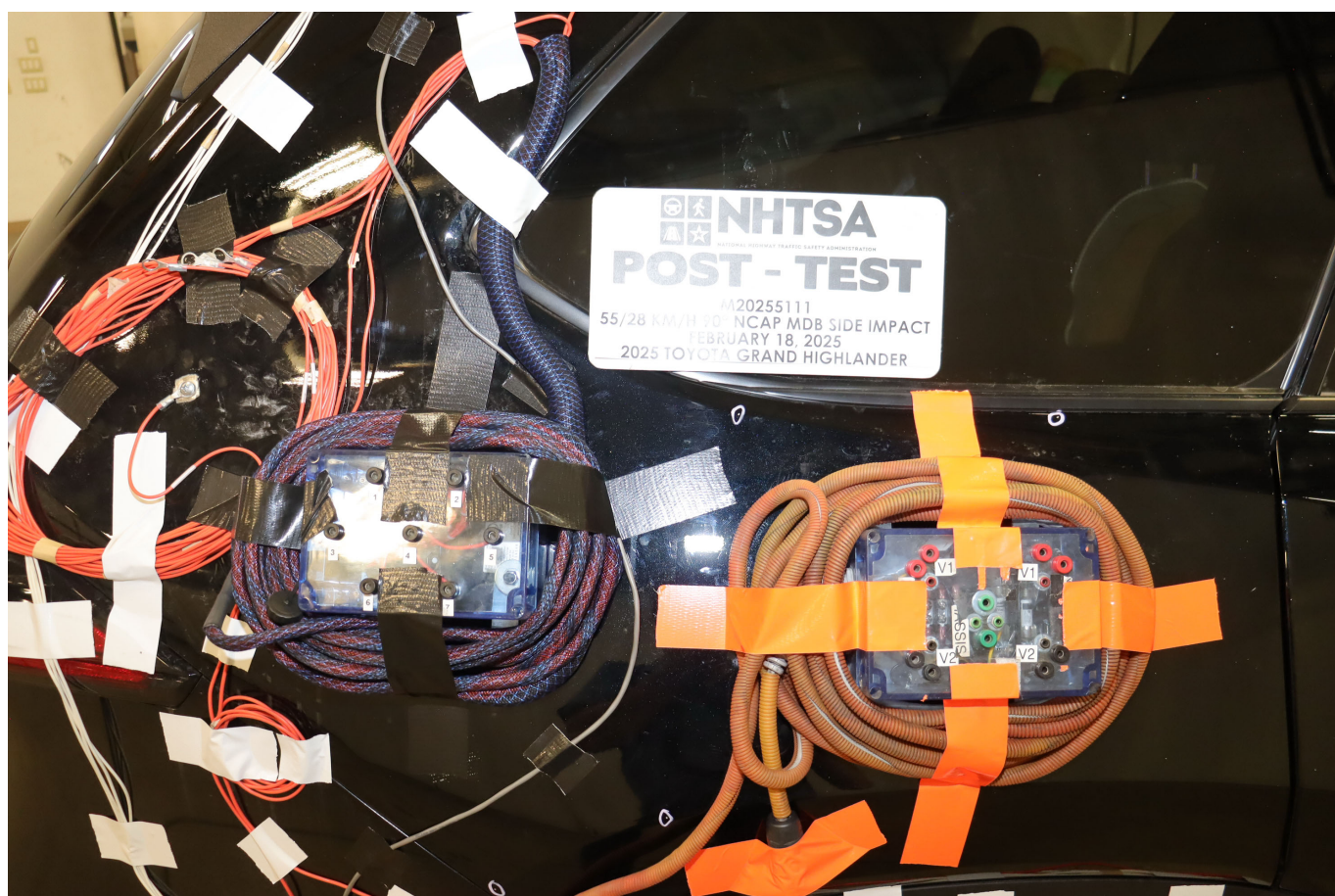


Photo No. 305-25 - Post-Impact View of Installed Test Interface Port



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



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



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



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



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



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



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



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

PHOTOGRAPH NOT APPLICABLE

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

PHOTOGRAPH NOT APPLICABLE

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

PHOTOGRAPH NOT APPLICABLE

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

PHOTOGRAPH NOT APPLICABLE

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

PHOTOGRAPH NOT APPLICABLE

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

APPENDIX B
DUMMY RESPONSE DATA PLOTS

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

Additional Driver & Passenger Dummy Instrumentation Data

Passenger Head Angular Velocity (X)
Passenger Head Angular Velocity (Y)
Passenger Head Angular Velocity (Z)
Driver Lower Spine T12 Acceleration (X)
Driver Lower Spine T12 Acceleration (Y)
Driver Lower Spine T12 Acceleration (Z)
Passenger Upper Thorax Rib Deflection (Y)
Passenger Middle Thorax Rib Deflection (Y)
Passenger Lower Thorax Rib Deflection (Y)
Passenger Upper Abdomen Rib Deflection (Y)
Passenger Lower Abdomen Rib Deflection (Y)
Driver Head Acceleration Redundant (X)
Driver Head Acceleration Redundant (Y)
Driver Head Acceleration Redundant (Z)
Passenger Head Acceleration Redundant (X)
Passenger Head Acceleration Redundant (Y)
Passenger Head Acceleration Redundant (Z)

Vehicle Instrumentation Data

Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Right Side Sill at Front Seat Acceleration (X)
Right Side Sill at Front Seat Acceleration (Y)
Right Side Sill at Front Seat Acceleration (Z)
Right Side Sill at Rear Seat Acceleration (X)
Right Side Sill at Rear Seat Acceleration (Y)
Right Side Sill at Rear Seat Acceleration (Z)
Left Side Sill at Front Seat Acceleration (Y)
Left Side Sill at Rear Seat Acceleration (Y)
Lower A-Post Acceleration (Y)
Middle A-Post Acceleration (Y)
Lower B-Post Acceleration (Y)
Middle B-Post Acceleration (Y)
Front Seat Track Acceleration (Y)
Rear Seat Track Acceleration (Y)
Right Rear Occupant Compartment Acceleration (Y)
Engine Block (X)
Engine Block (Y)
Rear Floorpan Above Axle Acceleration (X)
Rear Floorpan Above Axle Acceleration (Y)
Rear Floorpan Above Axle Acceleration (Z)

MDB Instrumentation Data

MDB Center of Gravity Acceleration (X)

MDB Center of Gravity Acceleration (Y)

MDB Center of Gravity Acceleration (Z)

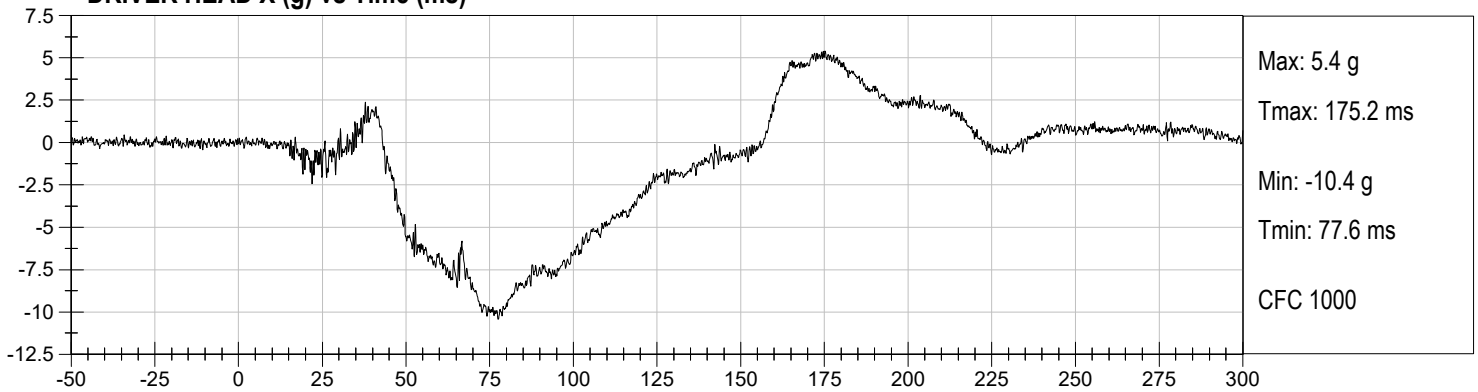
MDB Rear Acceleration (X)

MDB Rear Acceleration (Y)

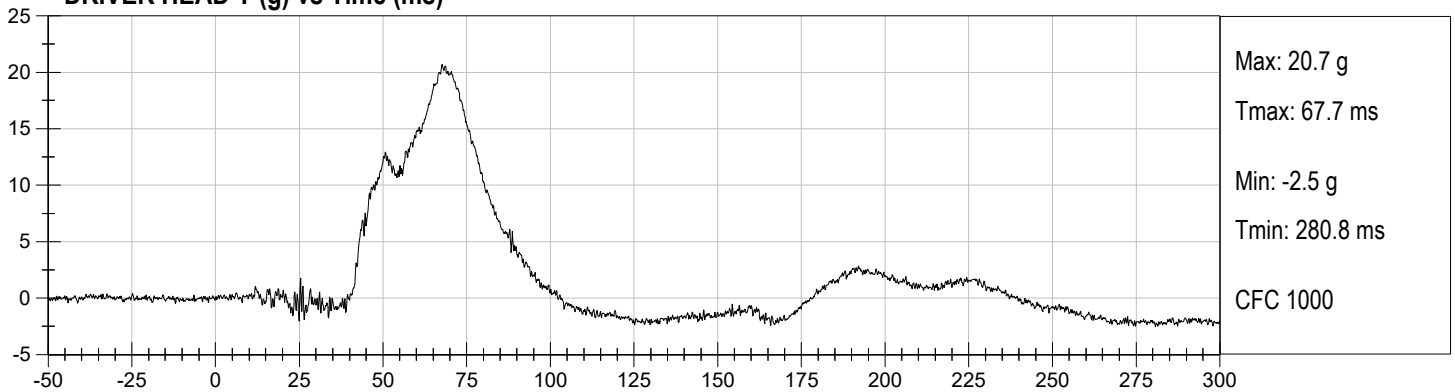
Left MDB Contact Switch

Right MDB Contact Switch

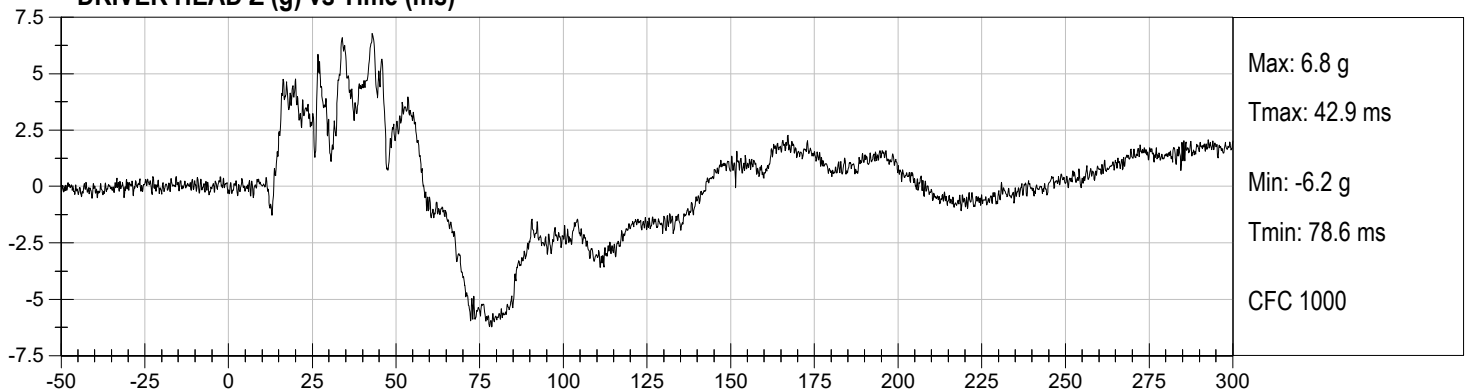
DRIVER HEAD X (g) vs Time (ms)



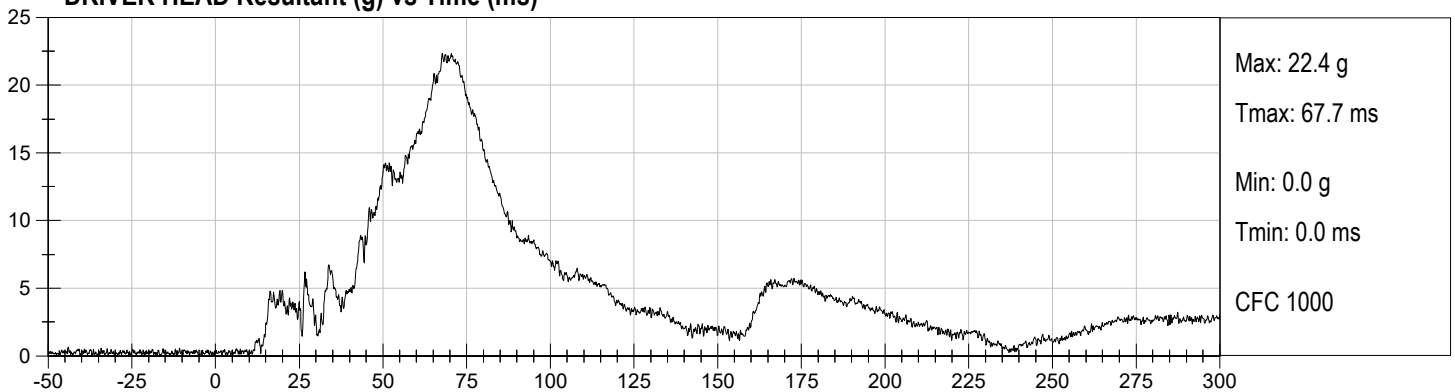
DRIVER HEAD Y (g) vs Time (ms)



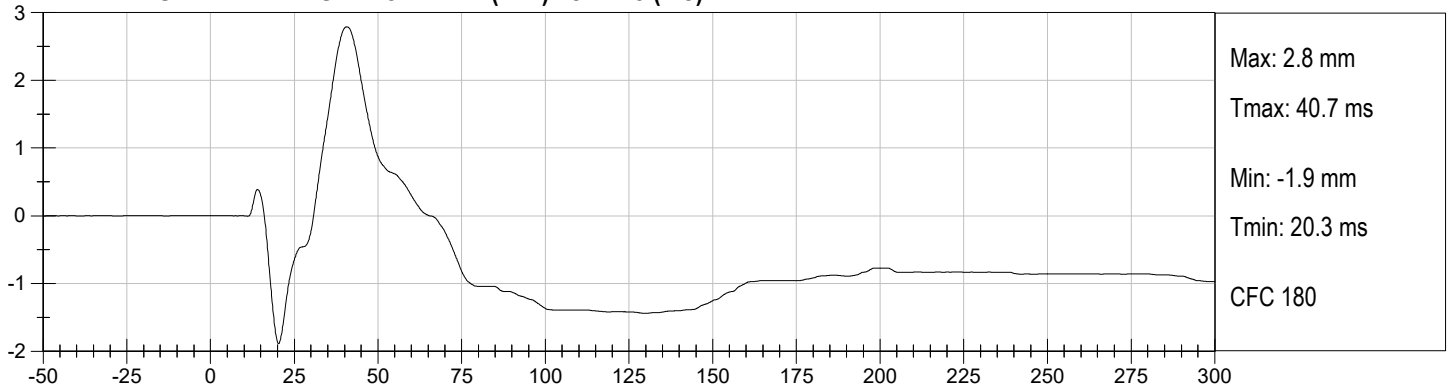
DRIVER HEAD Z (g) vs Time (ms)



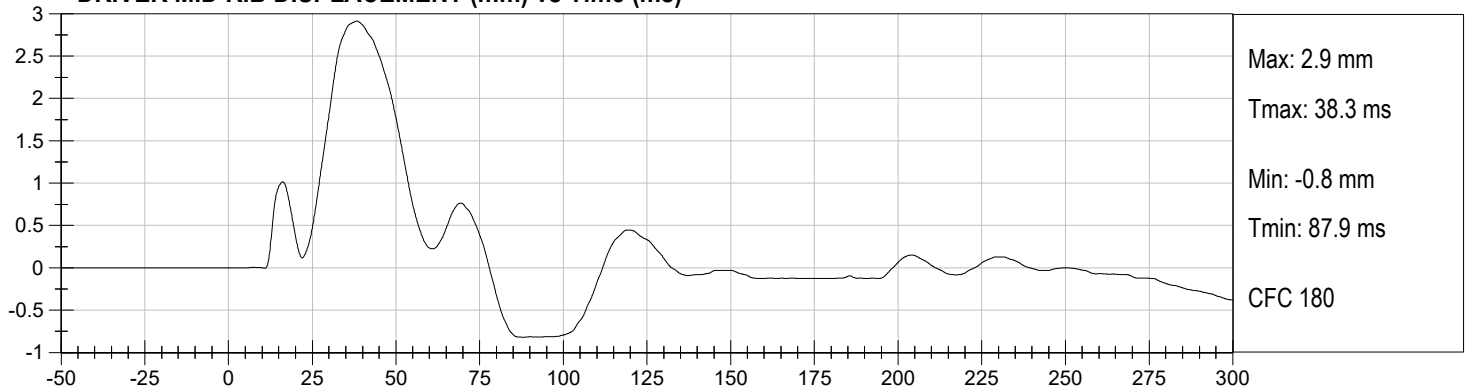
DRIVER HEAD Resultant (g) vs Time (ms)



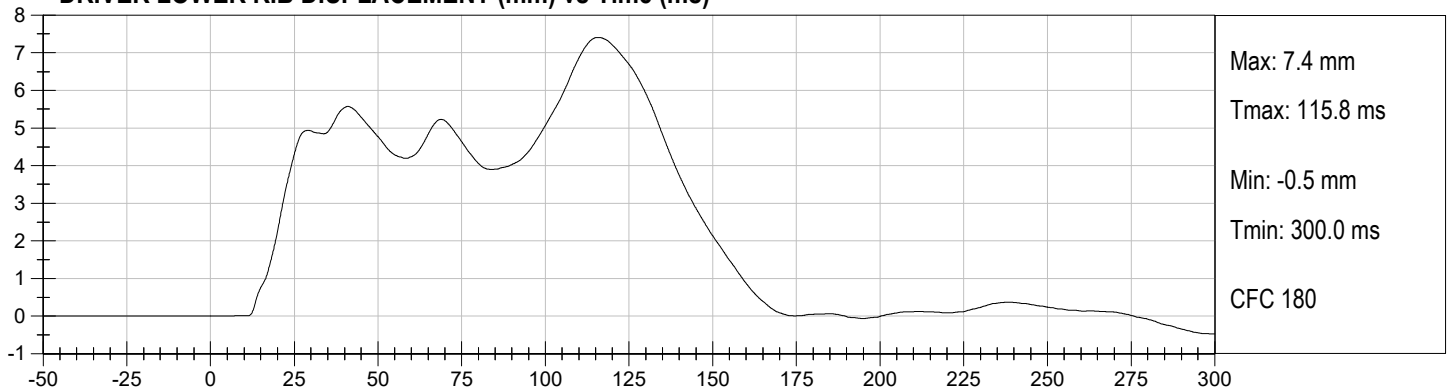
DRIVER UPPER RIB DISPLACEMENT (mm) vs Time (ms)



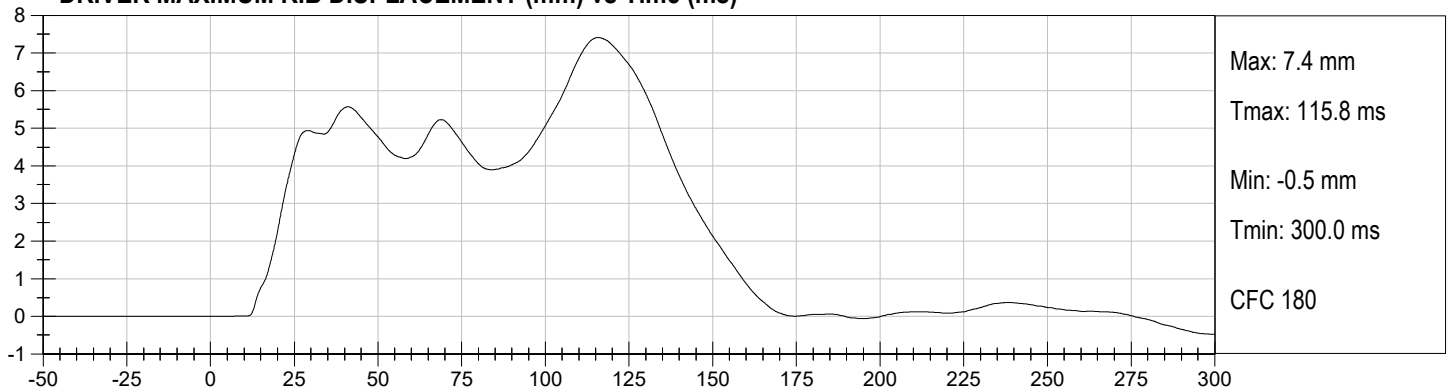
DRIVER MID RIB DISPLACEMENT (mm) vs Time (ms)



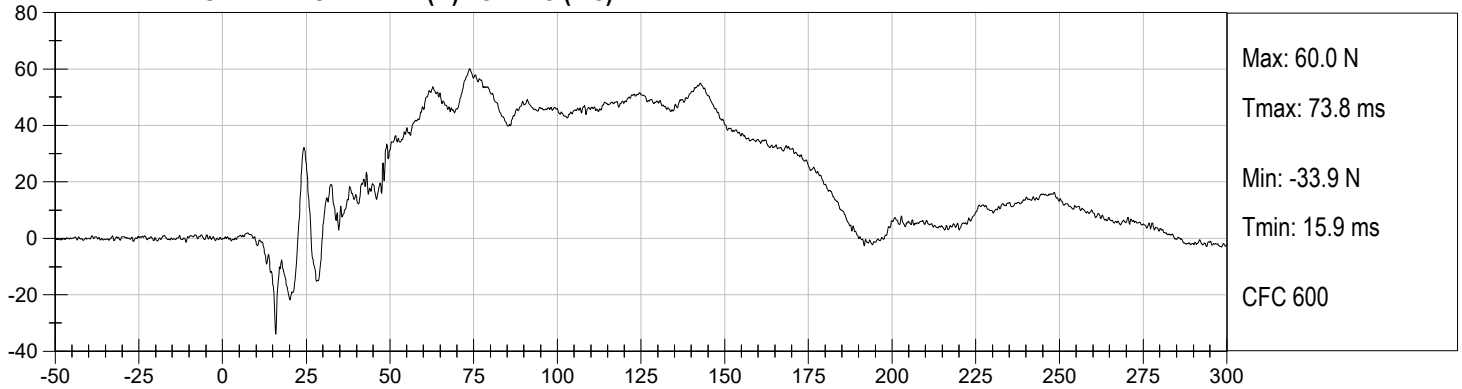
DRIVER LOWER RIB DISPLACEMENT (mm) vs Time (ms)



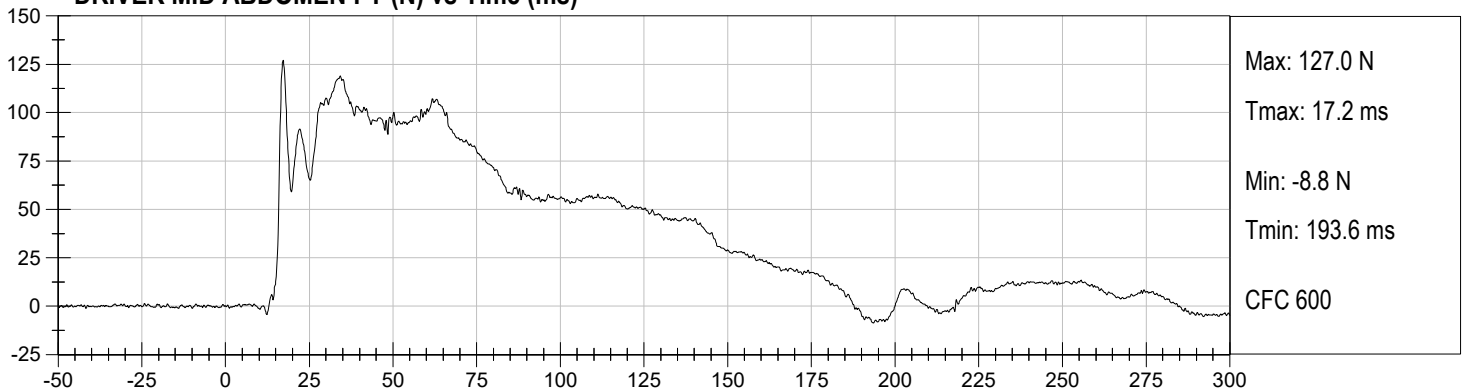
DRIVER MAXIMUM RIB DISPLACEMENT (mm) vs Time (ms)



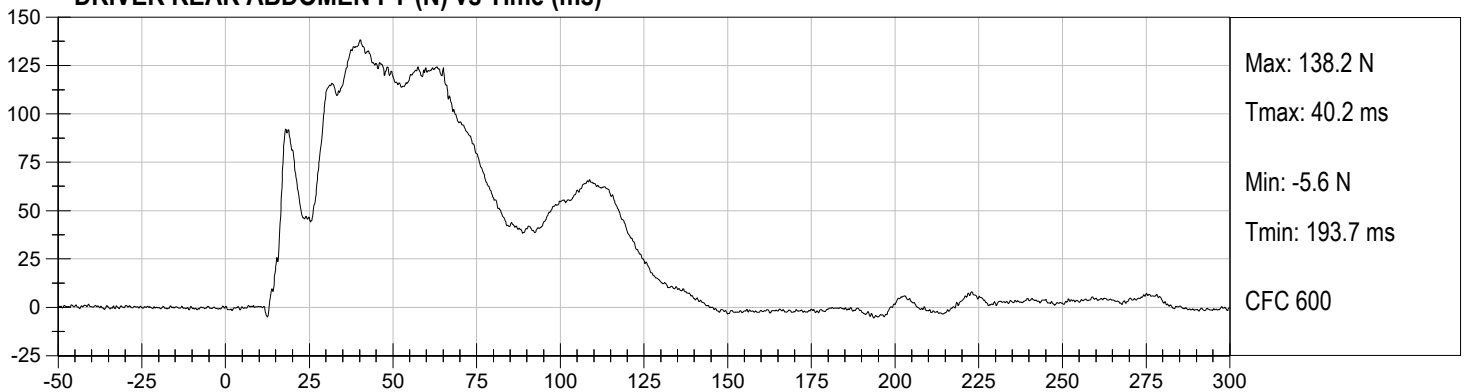
DRIVER FRONT ABDOMEN FY (N) vs Time (ms)



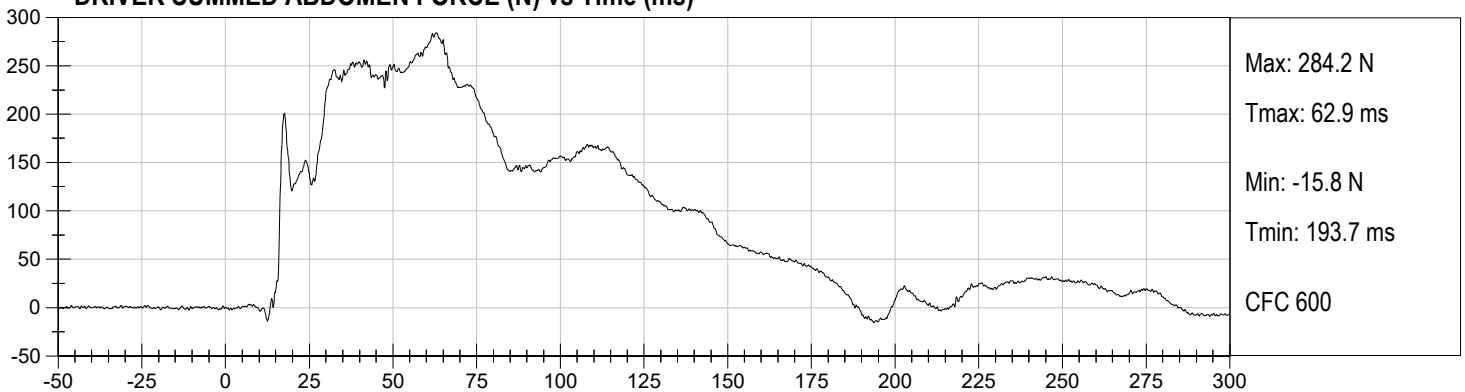
DRIVER MID ABDOMEN FY (N) vs Time (ms)

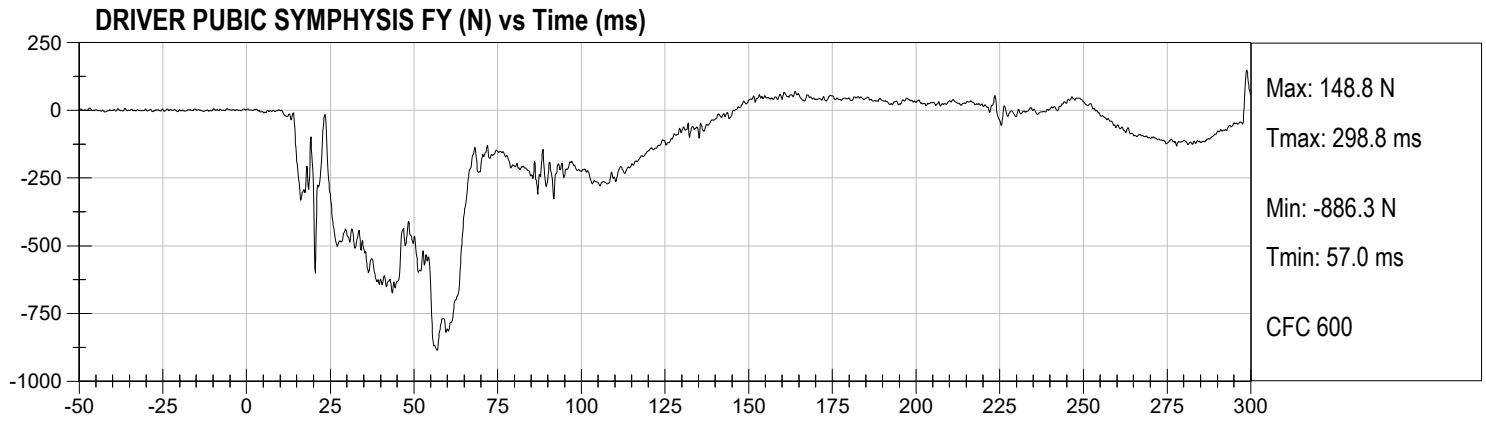


DRIVER REAR ABDOMEN FY (N) vs Time (ms)

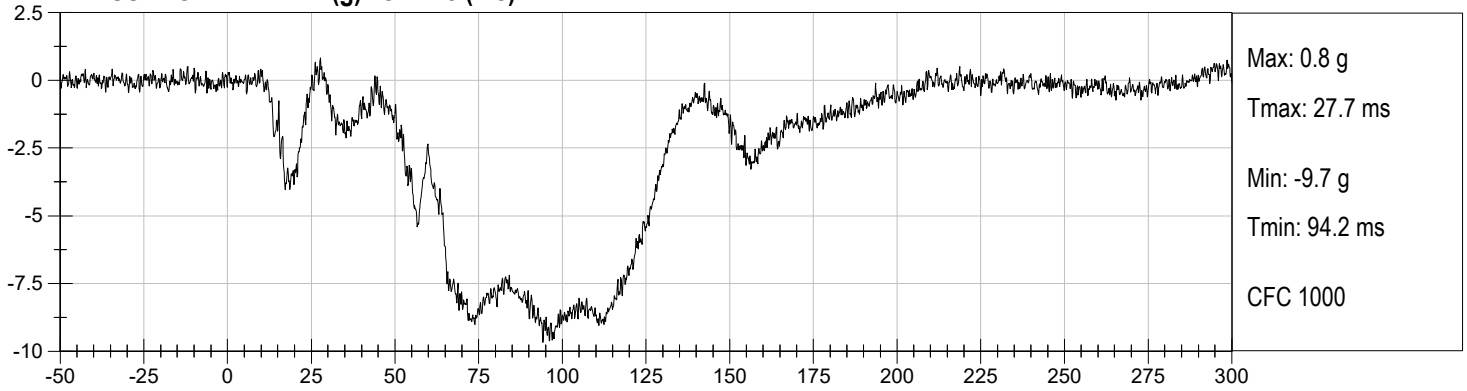


DRIVER SUMMED ABDOMEN FORCE (N) vs Time (ms)

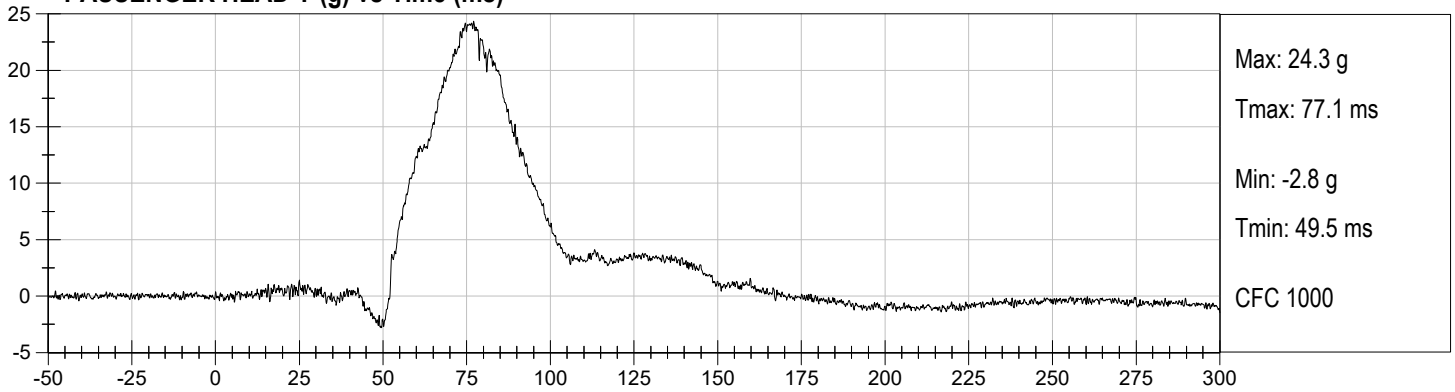




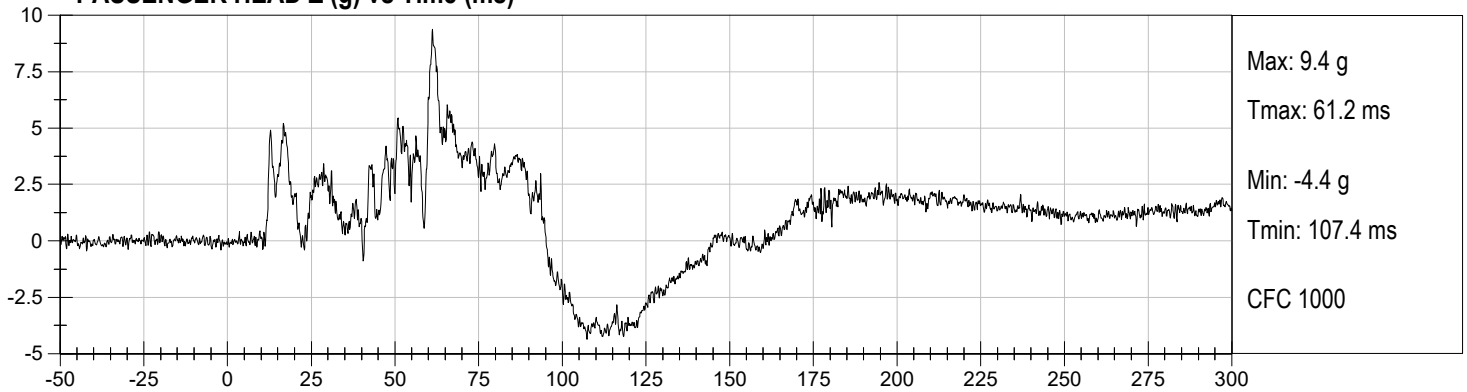
PASSENGER HEAD X (g) vs Time (ms)



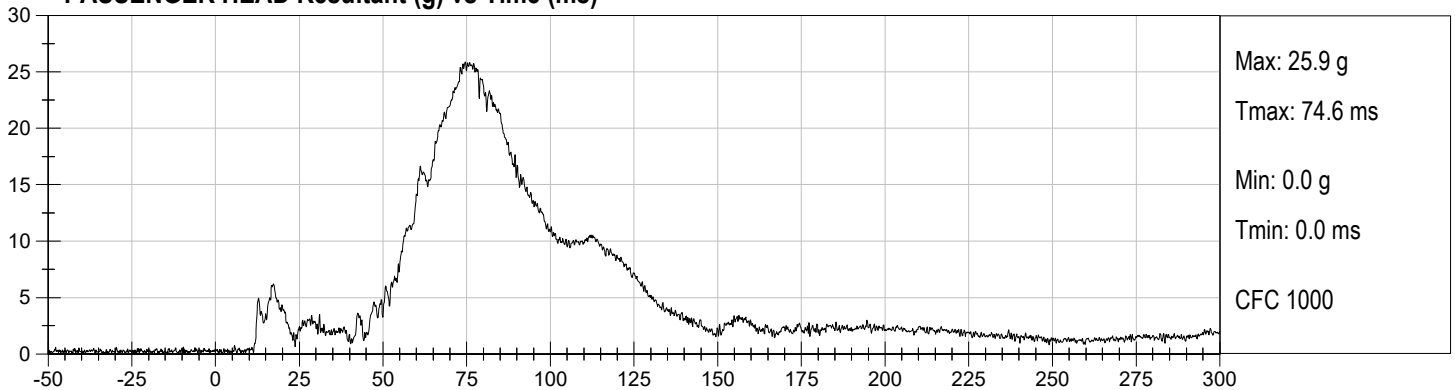
PASSENGER HEAD Y (g) vs Time (ms)



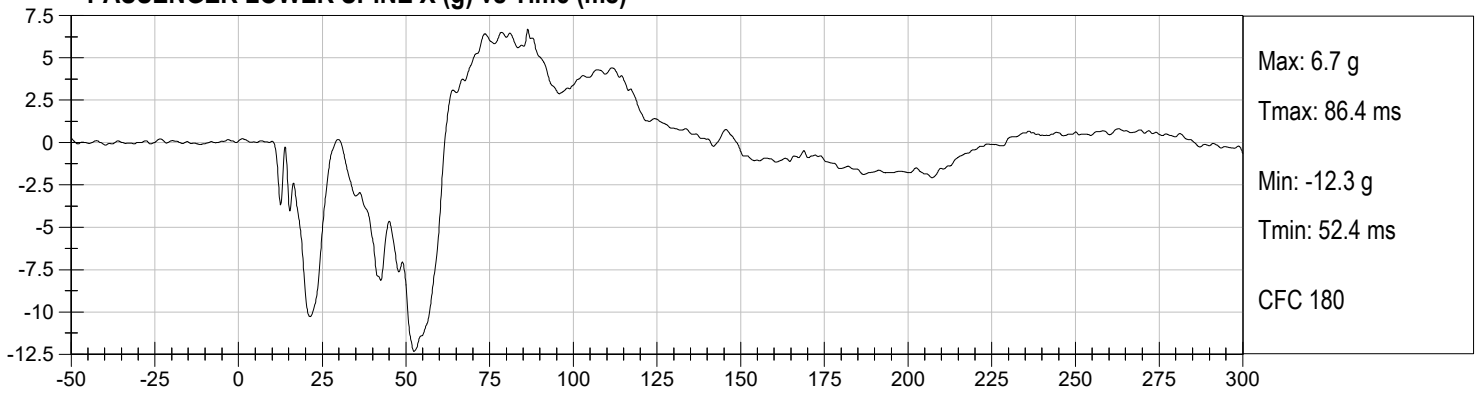
PASSENGER HEAD Z (g) vs Time (ms)



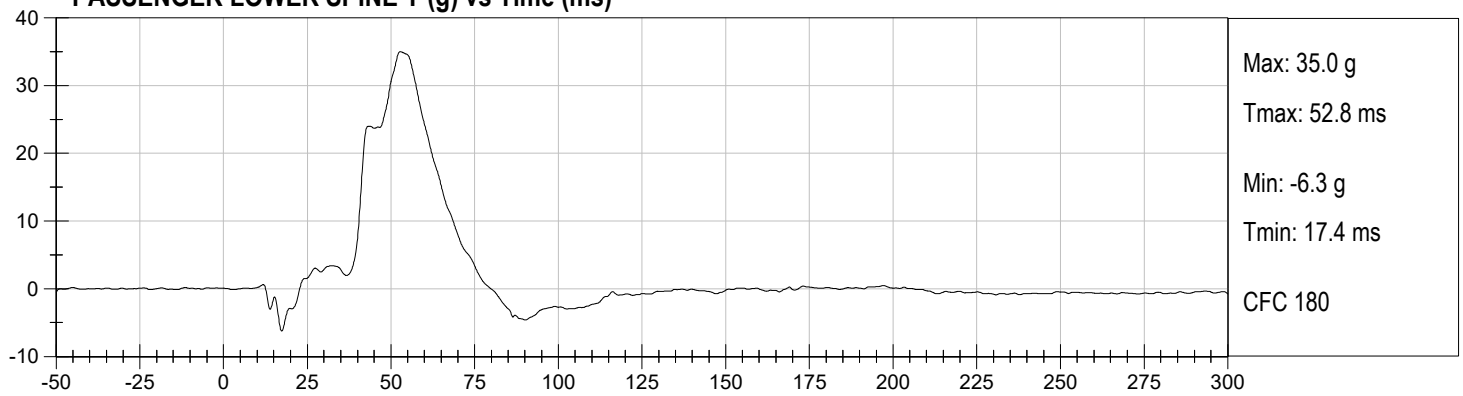
PASSENGER HEAD Resultant (g) vs Time (ms)



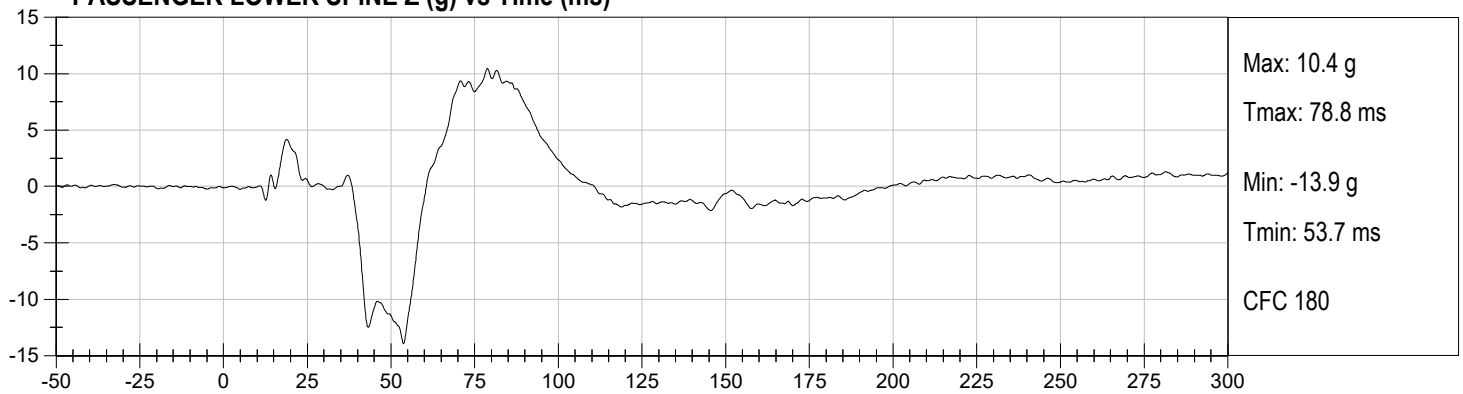
PASSENGER LOWER SPINE X (g) vs Time (ms)



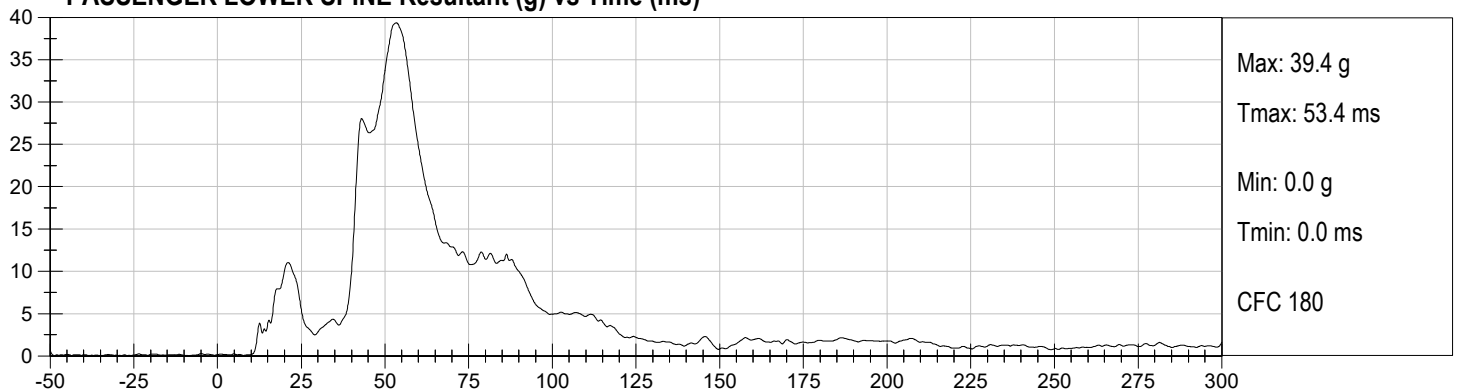
PASSENGER LOWER SPINE Y (g) vs Time (ms)



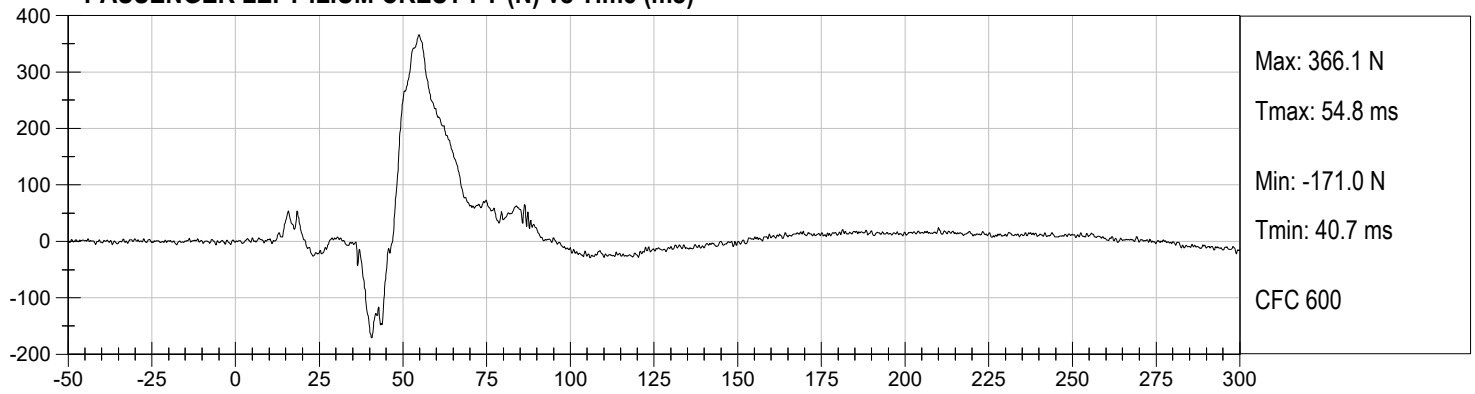
PASSENGER LOWER SPINE Z (g) vs Time (ms)



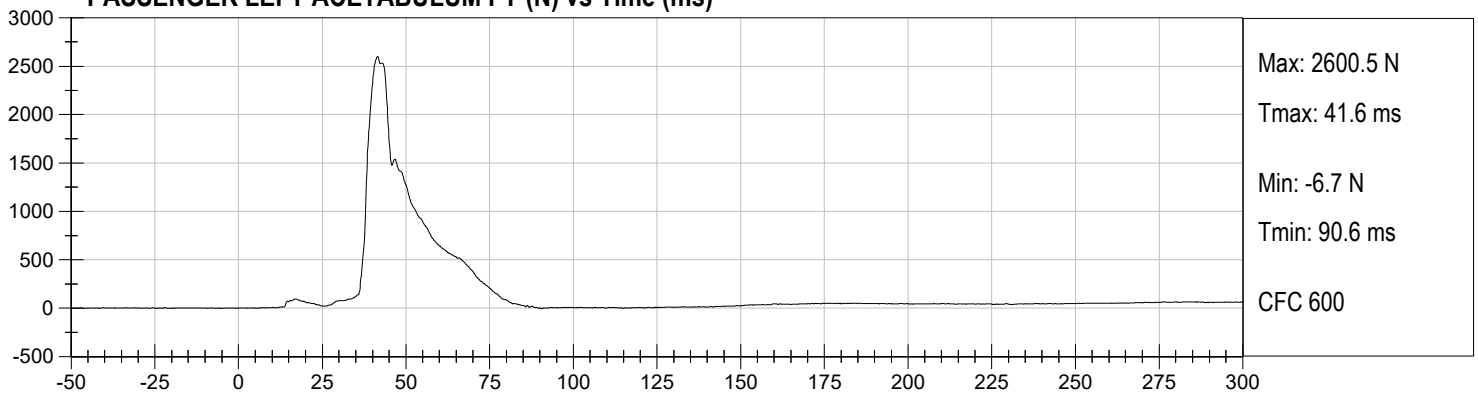
PASSENGER LOWER SPINE Resultant (g) vs Time (ms)



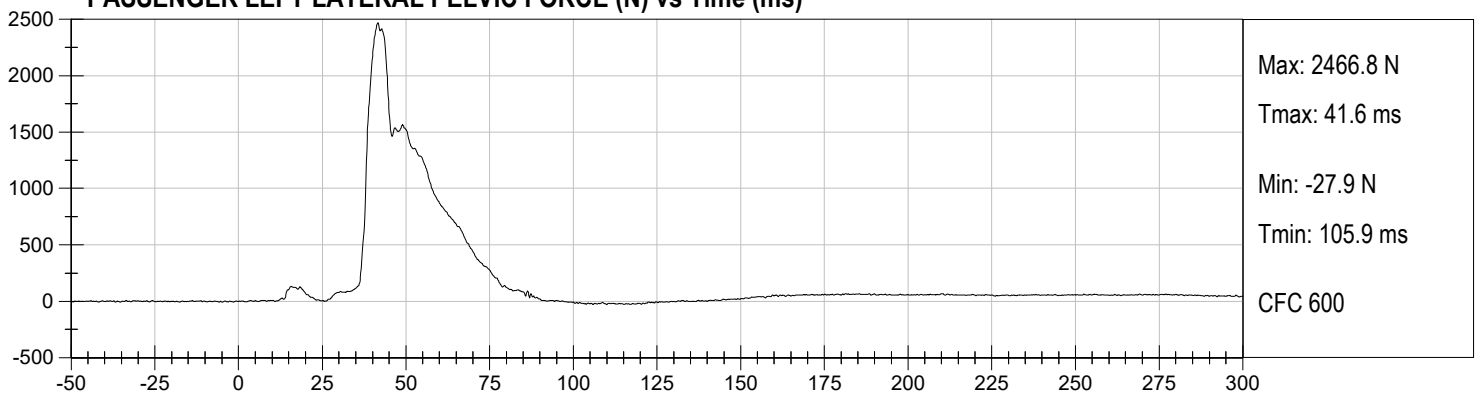
PASSENGER LEFT ILIUM CREST FY (N) vs Time (ms)



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



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



APPENDIX C
DUMMY QUALIFICATION AND PERFORMANCE VERIFICATION

QUALIFICATION TEST RESULTS

PRE-TEST

EUROSID 2 (ES-2RE) MALE – DRIVER ATD

ES-2re External Measurements
SN: F032

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

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HEAD DROP TEST

ES-2re DUMMY

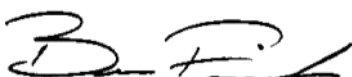
ATD Serial No: F032

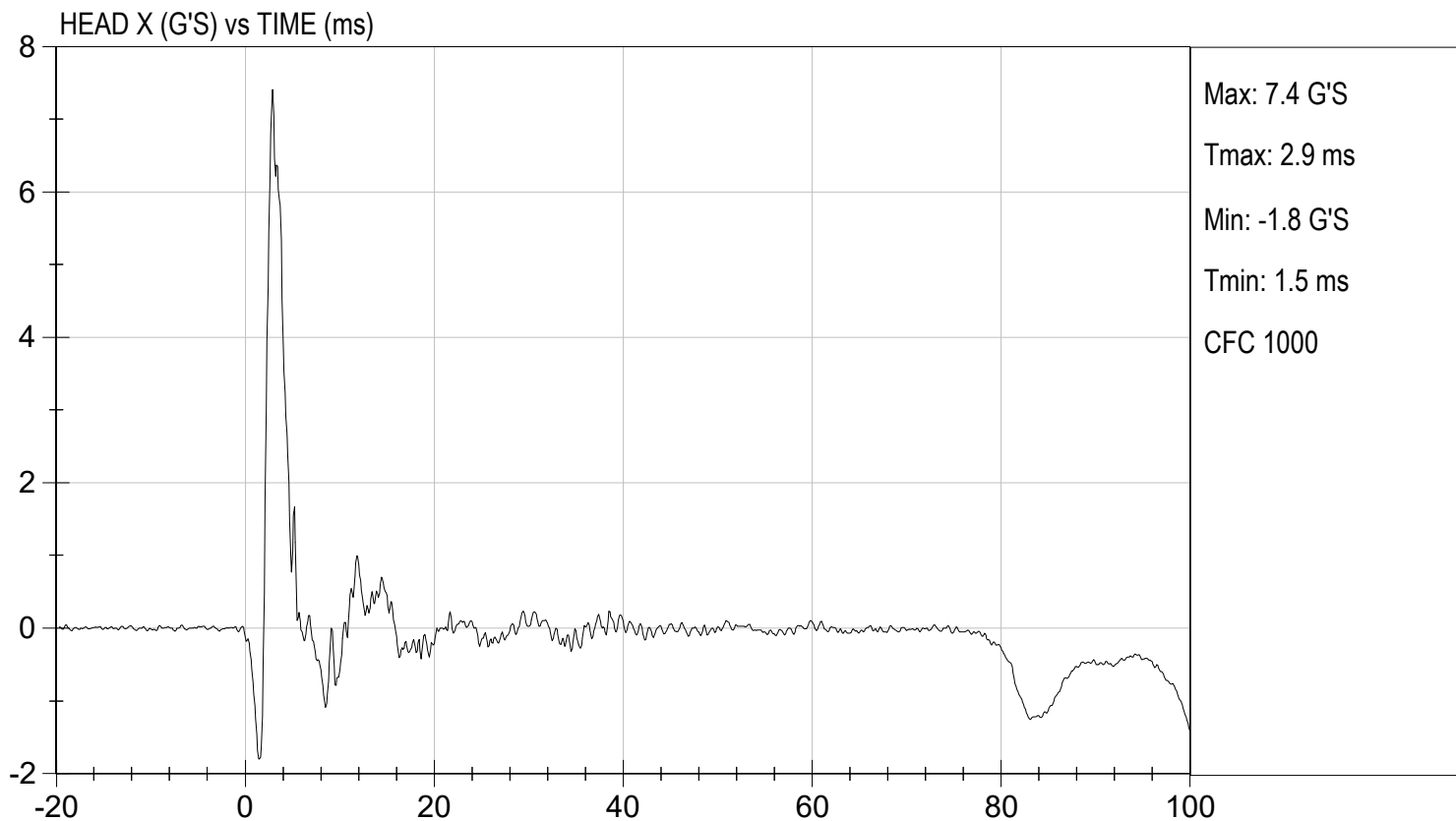
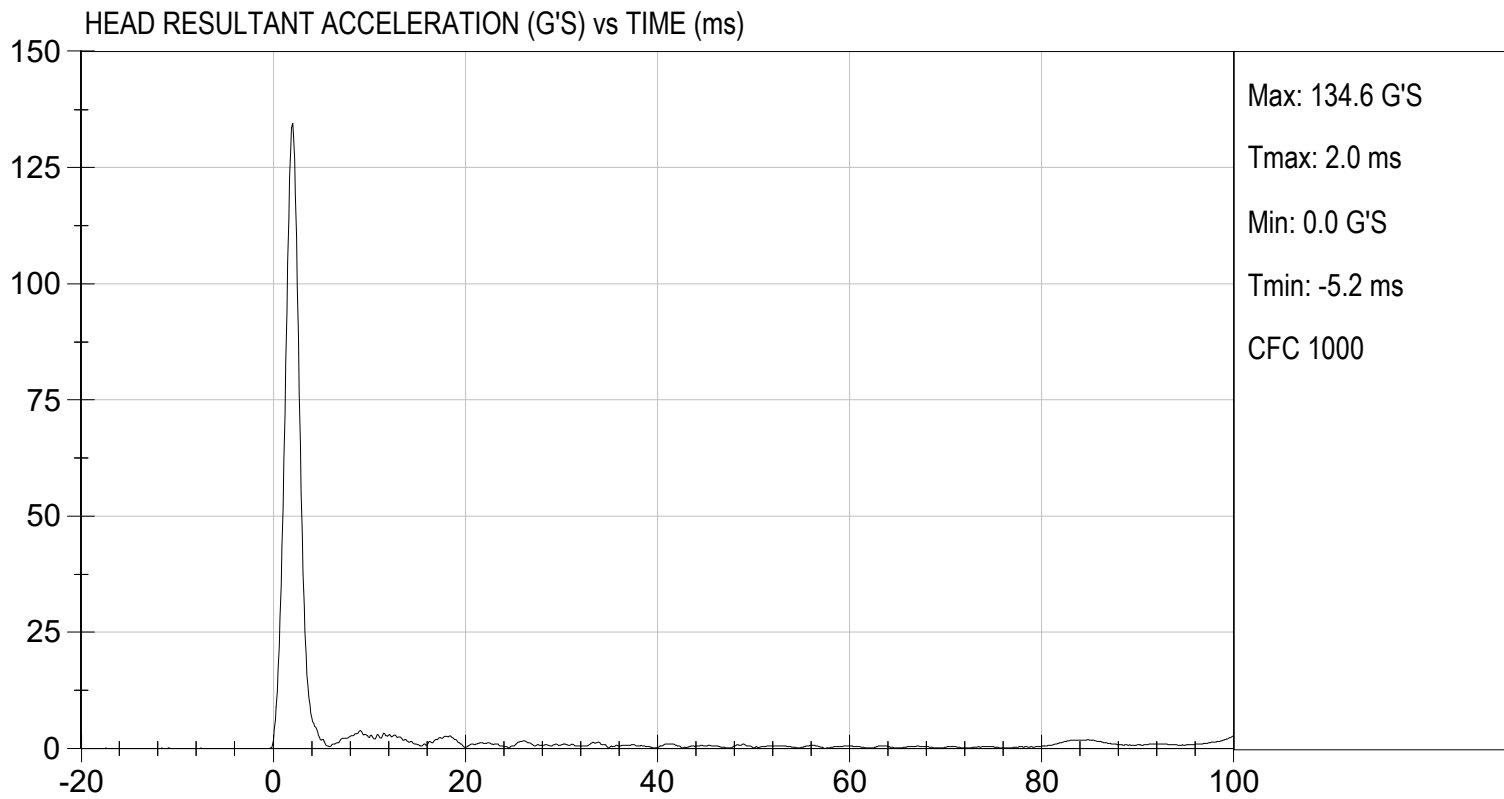
Test ID: D250301

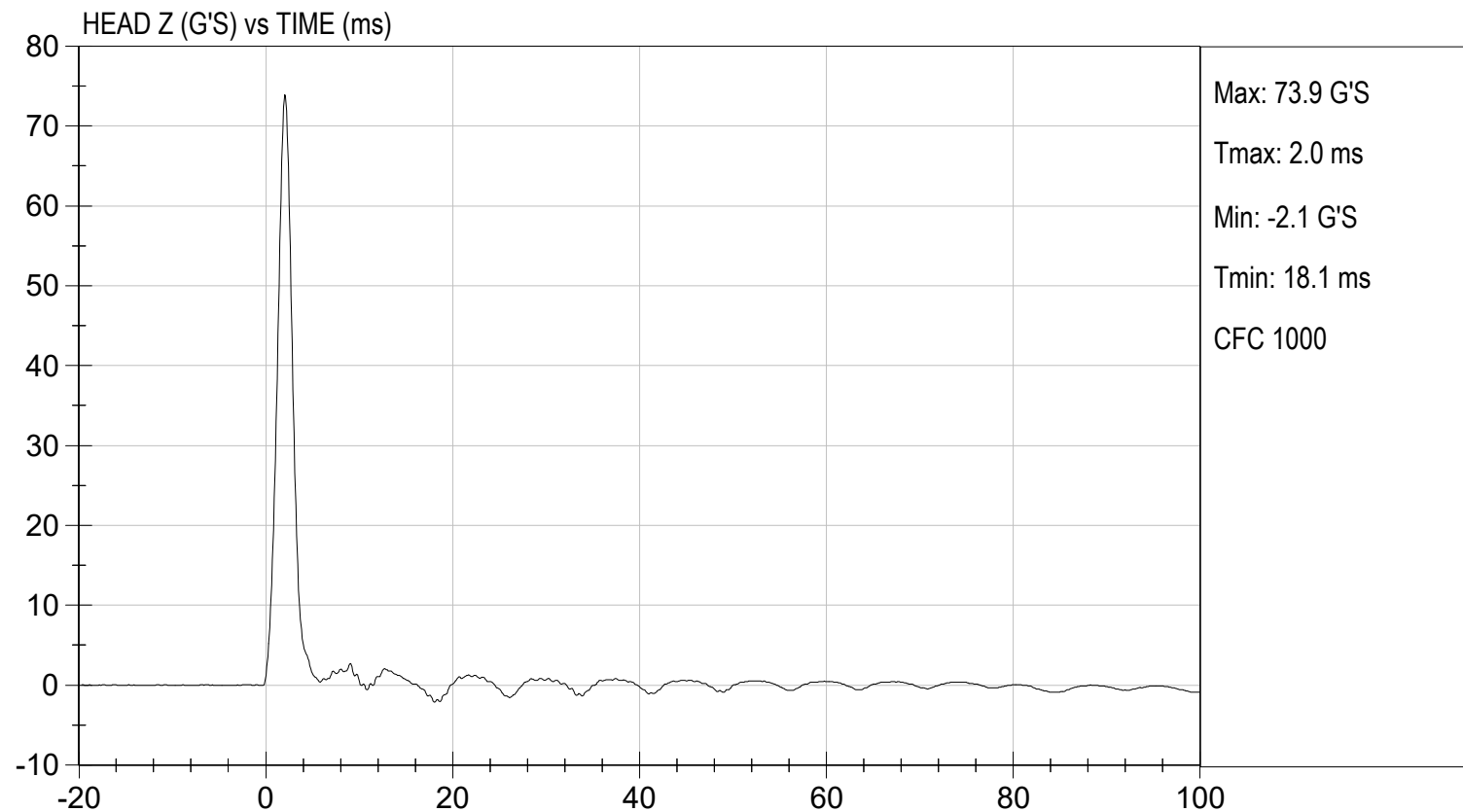
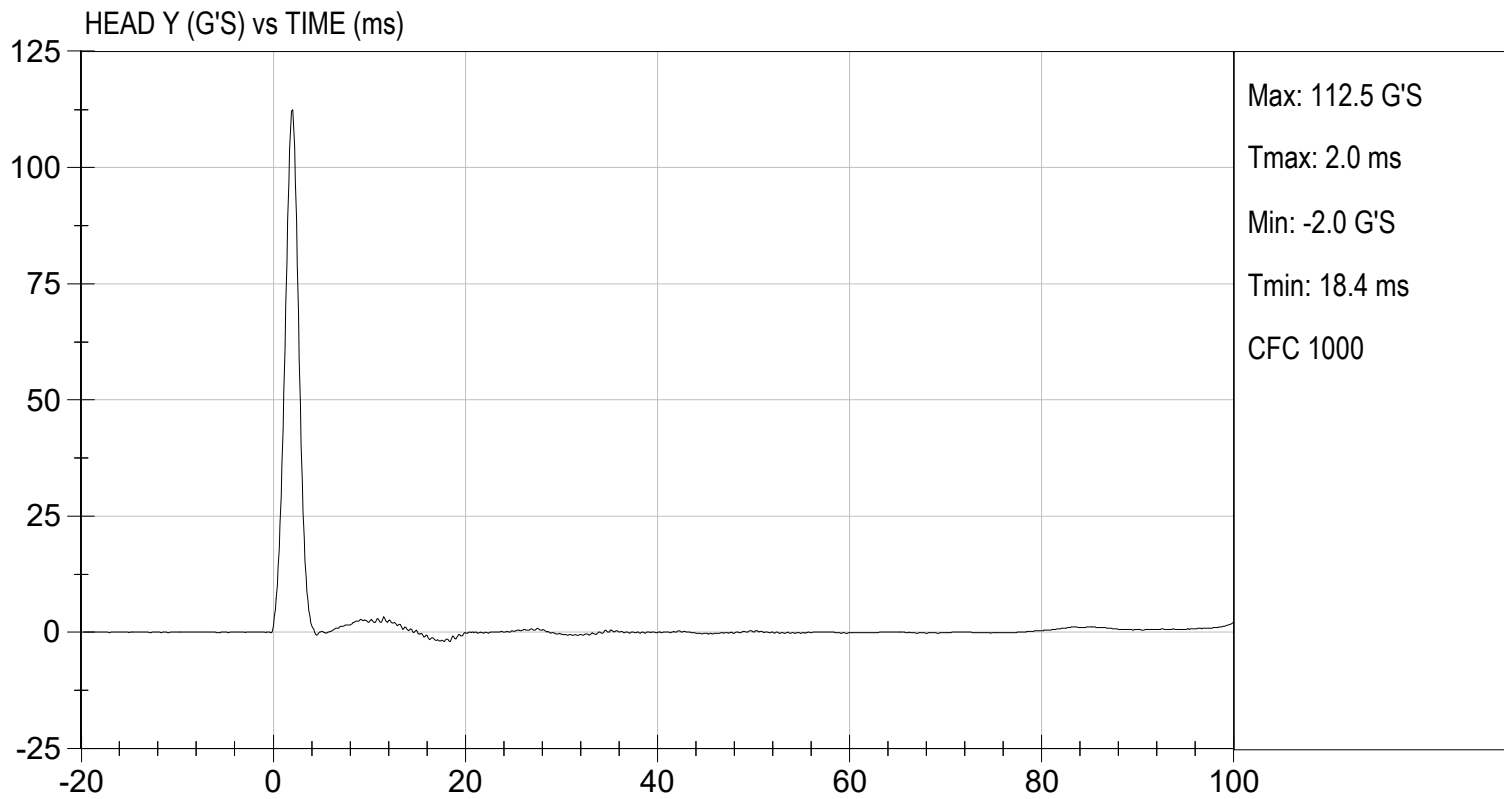
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Peak Resultant Acceleration	G's	125 to 155	135	Pass
Peak Longitudinal Acceleration	G's	<= +/- 15.0	7.4	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 15% of peak	Yes	Pass
Overall Test Results				Pass


Laboratory Technician

01/27/2025
Test Date


Approved By





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NECK PENDULUM TEST
ES-2re DUMMY

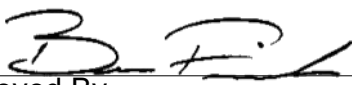
ATD Serial No: F032

Test I.D: D250302

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	17	Pass
Pendulum Speed		m/s	3.30 to 3.50	3.39	Pass
Pendulum Velocity	1 ms	m/s	-0.05 to 0.00	-0.01	Pass
	3 ms	m/s	-0.25 to -0.375	-0.34	Pass
	14 ms	m/s	-3.20 to -3.70	-3.59	Pass
	17 ms	m/s	>= -3.70	-3.67	Pass
Maximum Flexion Angle		deg	49.0 to 59.0	52.4	Pass
Time of Maximum Flexion Angle		ms	54.0 to 66.0	57.0	Pass
Head Rotation Decay Time to 0 Degree		ms	53.0 to 88.0	64.4	Pass
Overall Results				Pass	

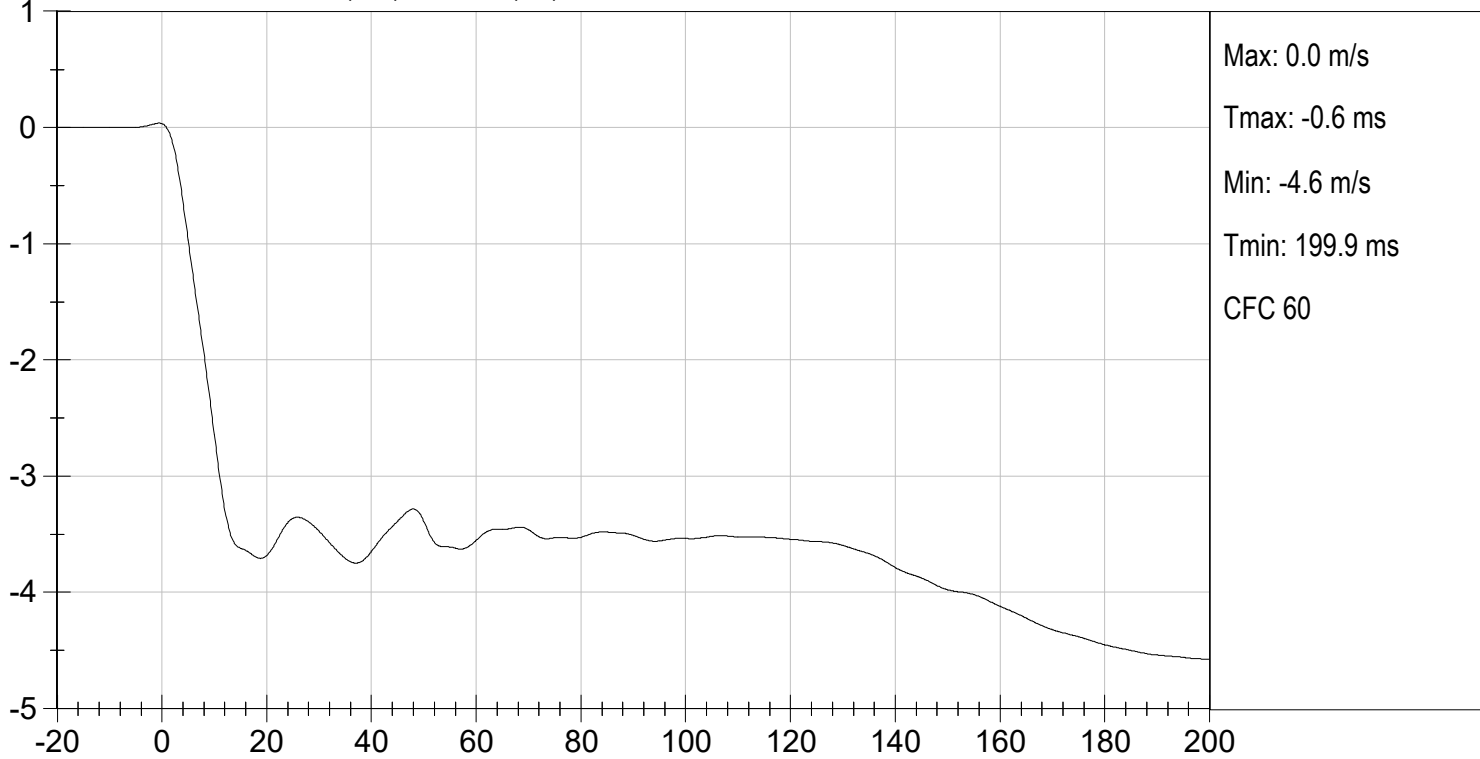

 Laboratory Technician

01/27/2025
 Test Date

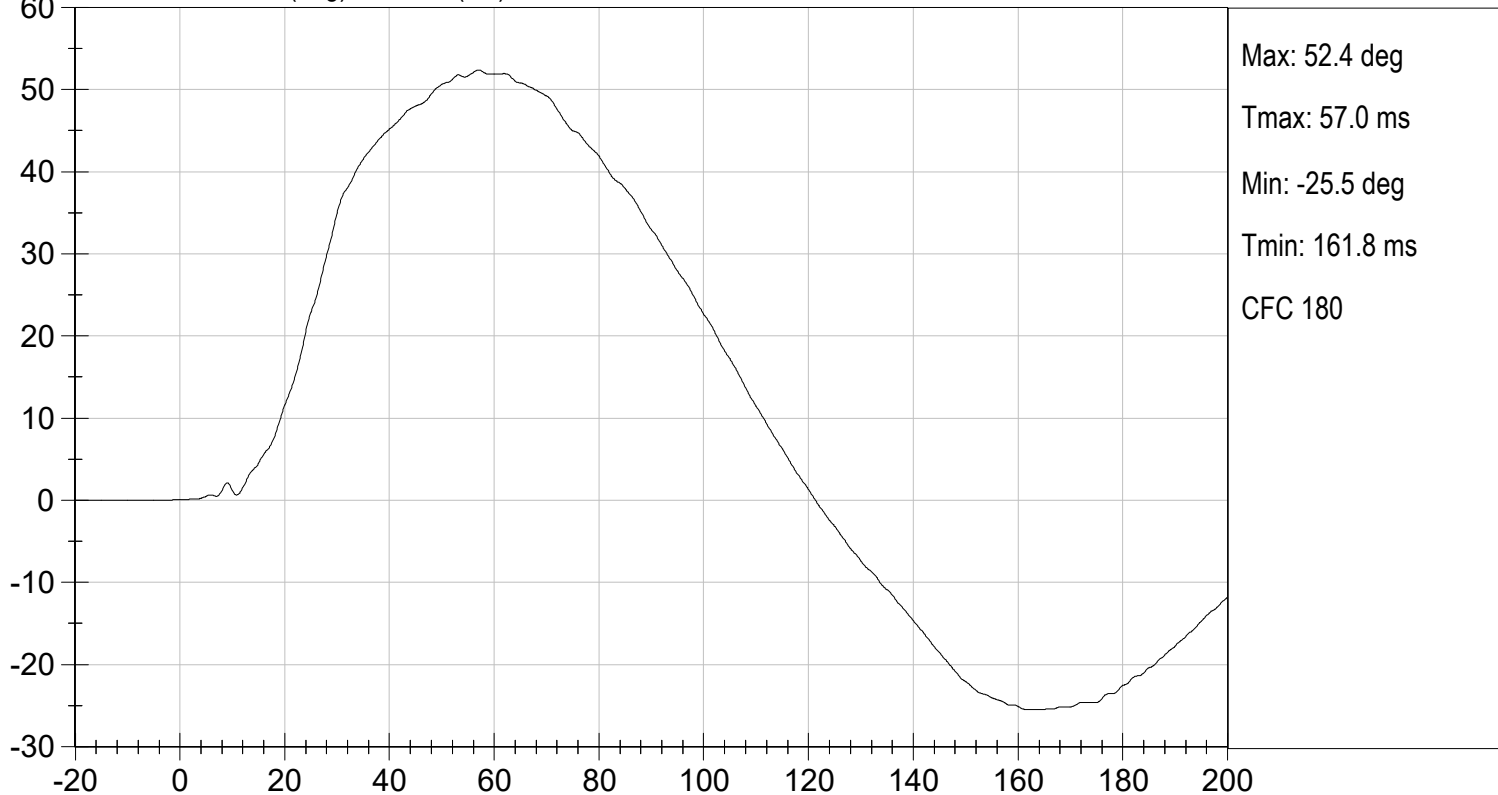

 Approved By



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



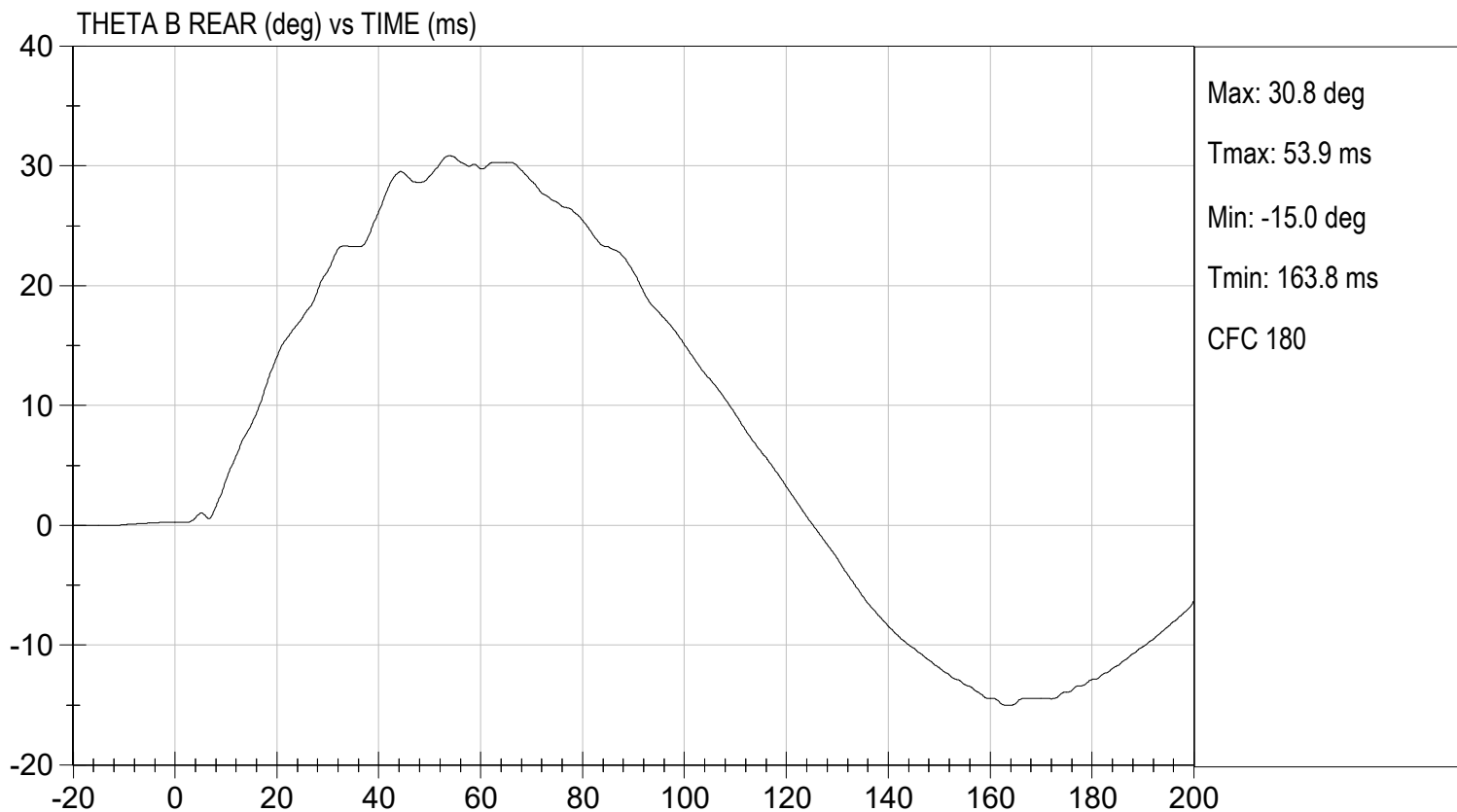
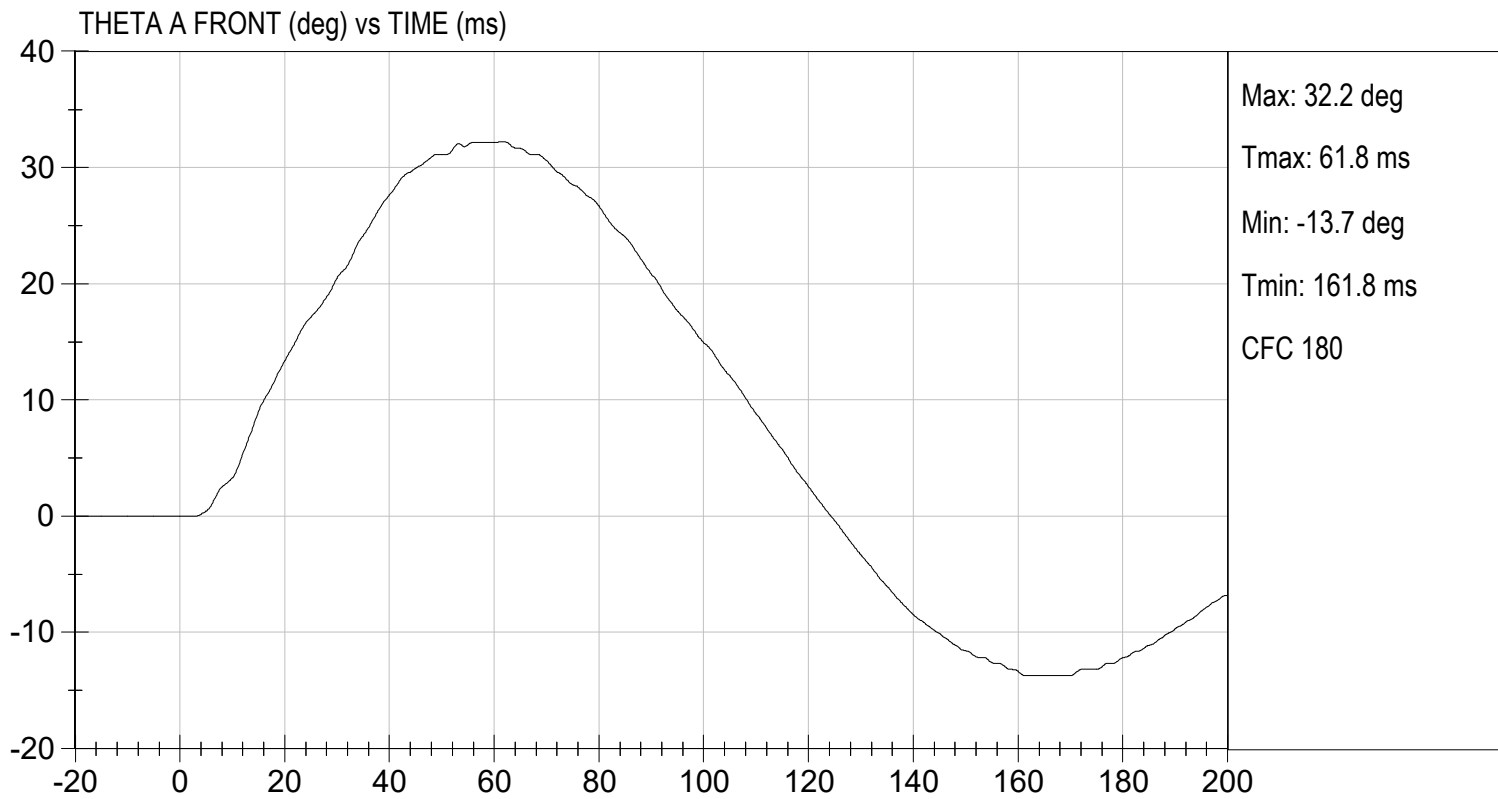
FLEXION ANGLE (deg) vs TIME (ms)





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

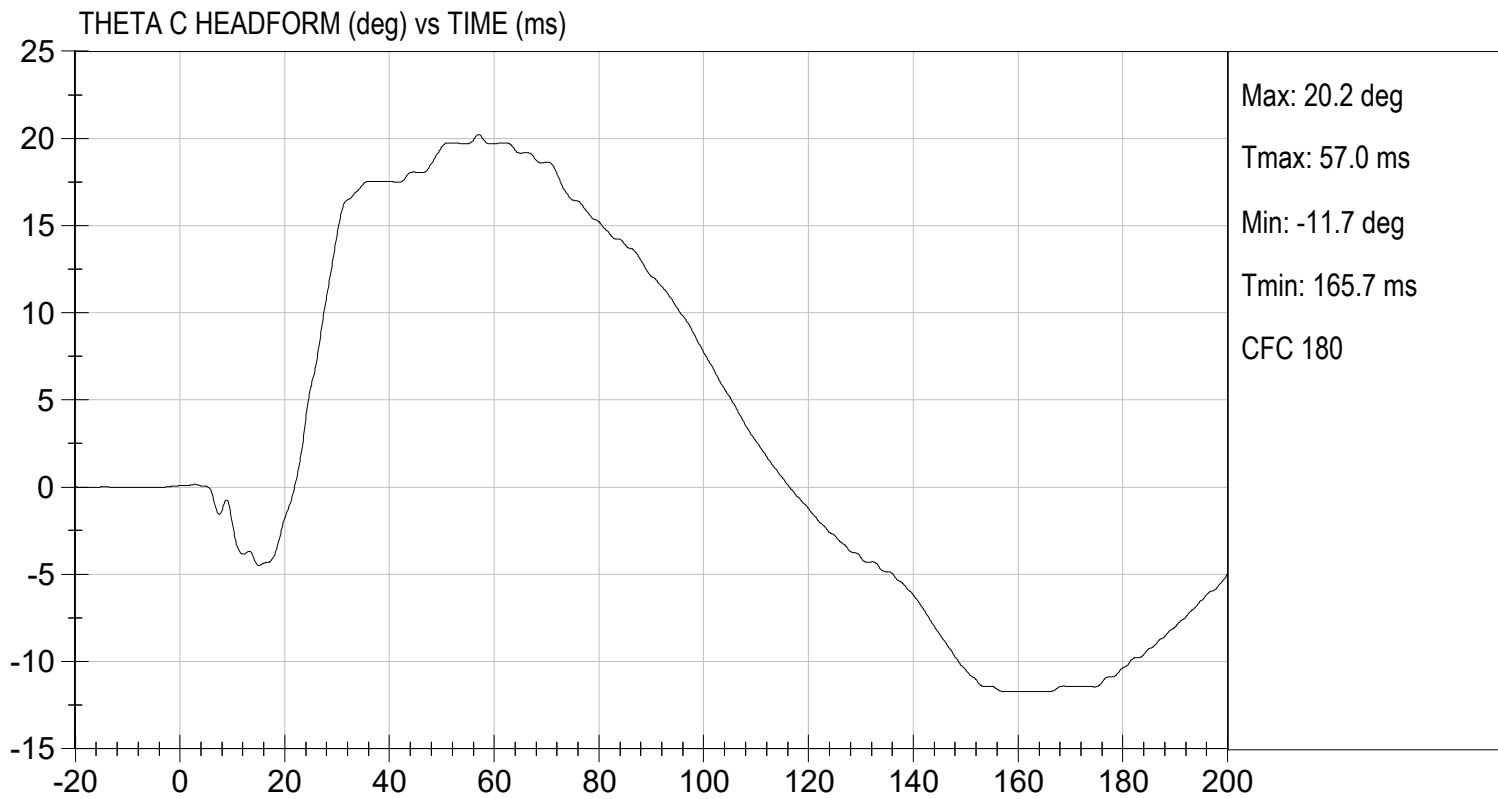
TEST DATE: 01/27/2025
TEST #: D250302





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

TEST DATE: 01/27/2025
TEST #: D250302



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SHOULDER IMPACT TEST

ES-2re DUMMY

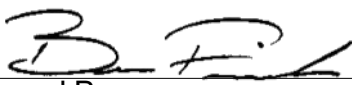
ATD Serial No: F032

Test I.D: D250303

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	22	Pass
Pendulum Speed	m/s	4.20 to 4.40	4.2	Pass
Peak Impactor Acceleration	G's	7.5 to 10.5	9.3	Pass
Overall Test Results				Pass


Laboratory Technician

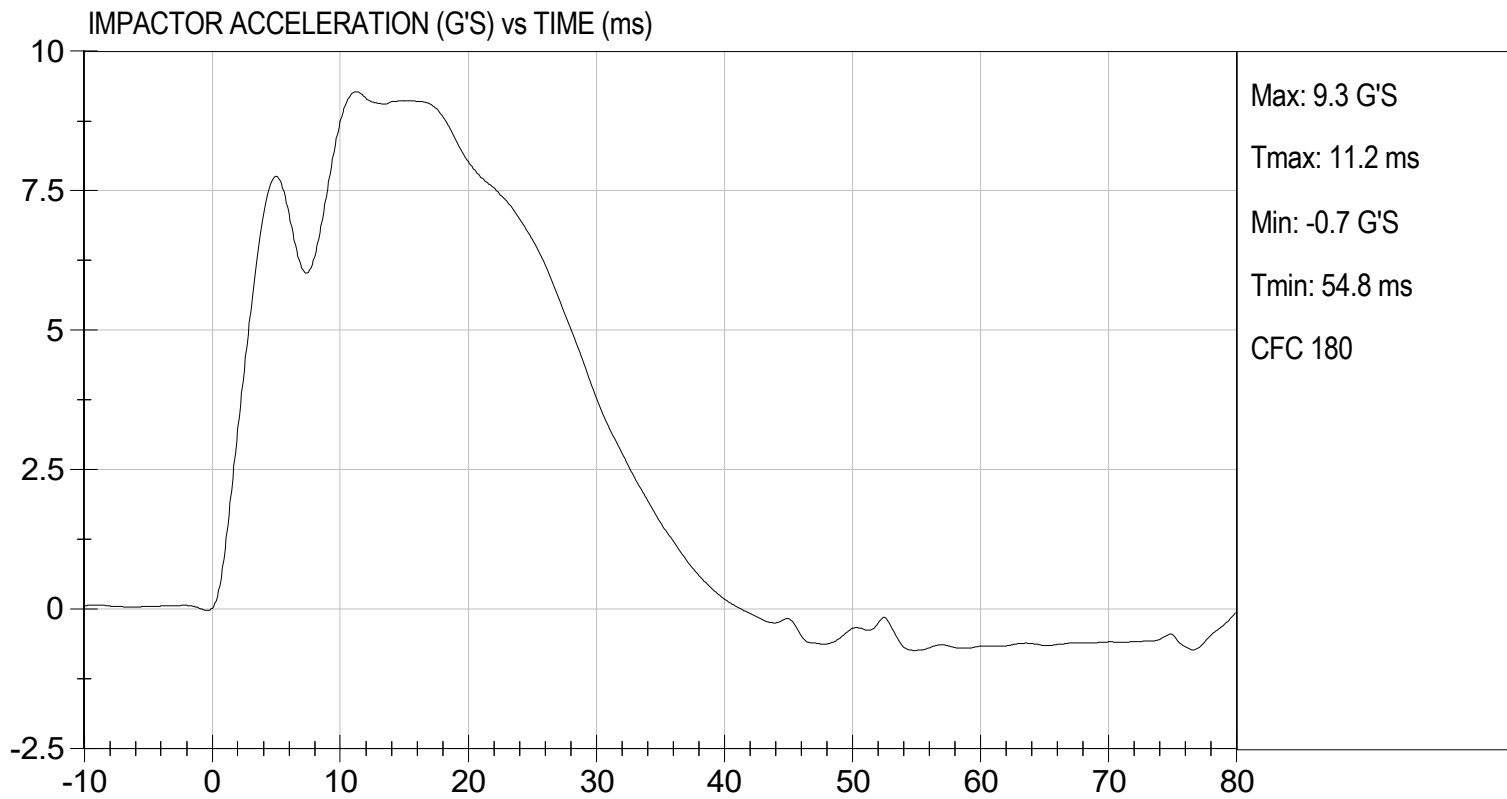
01/27/2025
Test Date


Approved By



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

TEST DATE: 01/27/2025
TEST #: D250303



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UPPER RIB TEST

ES-2re DUMMY

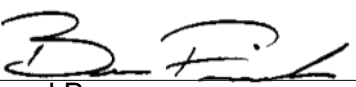
ATD Serial No: F032

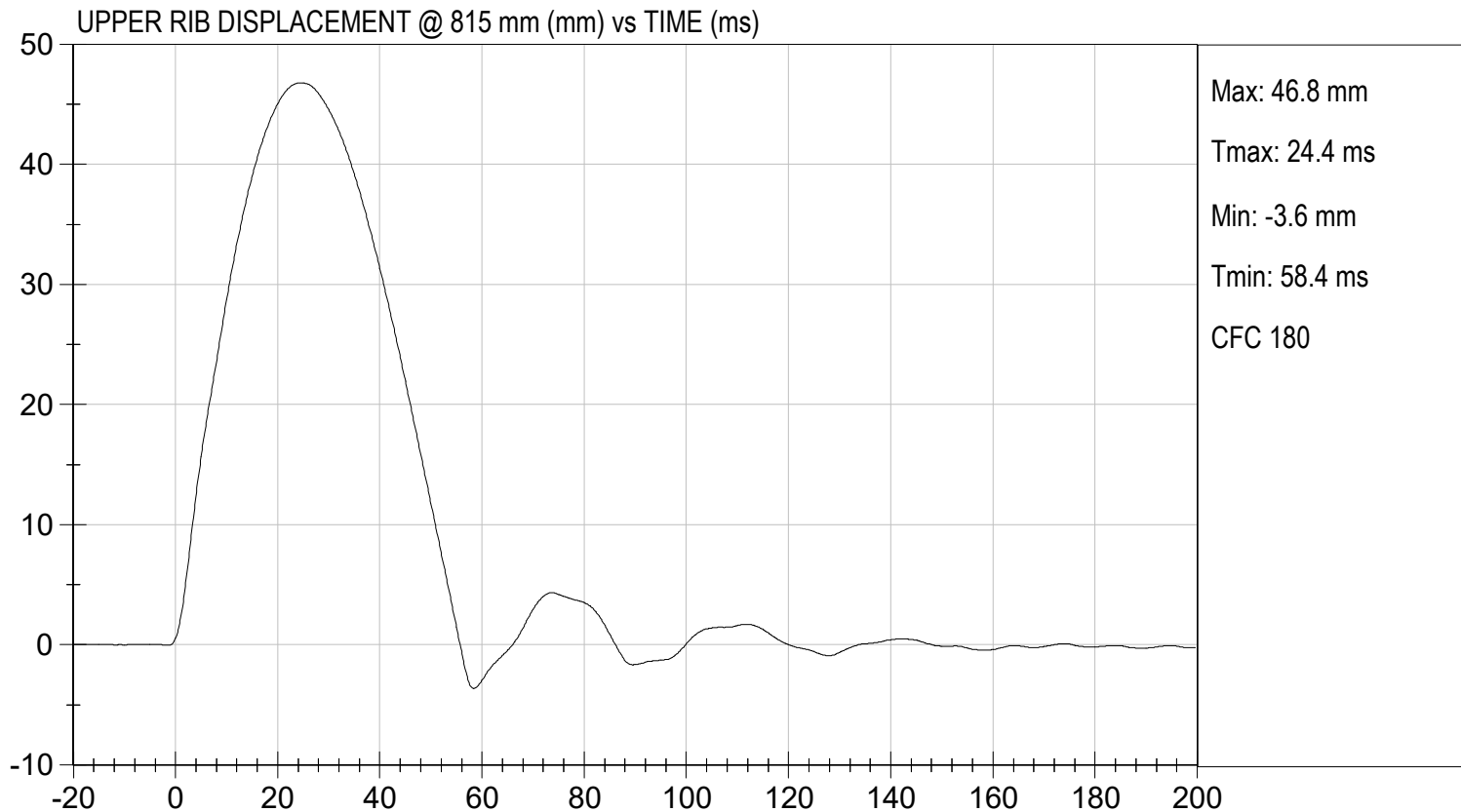
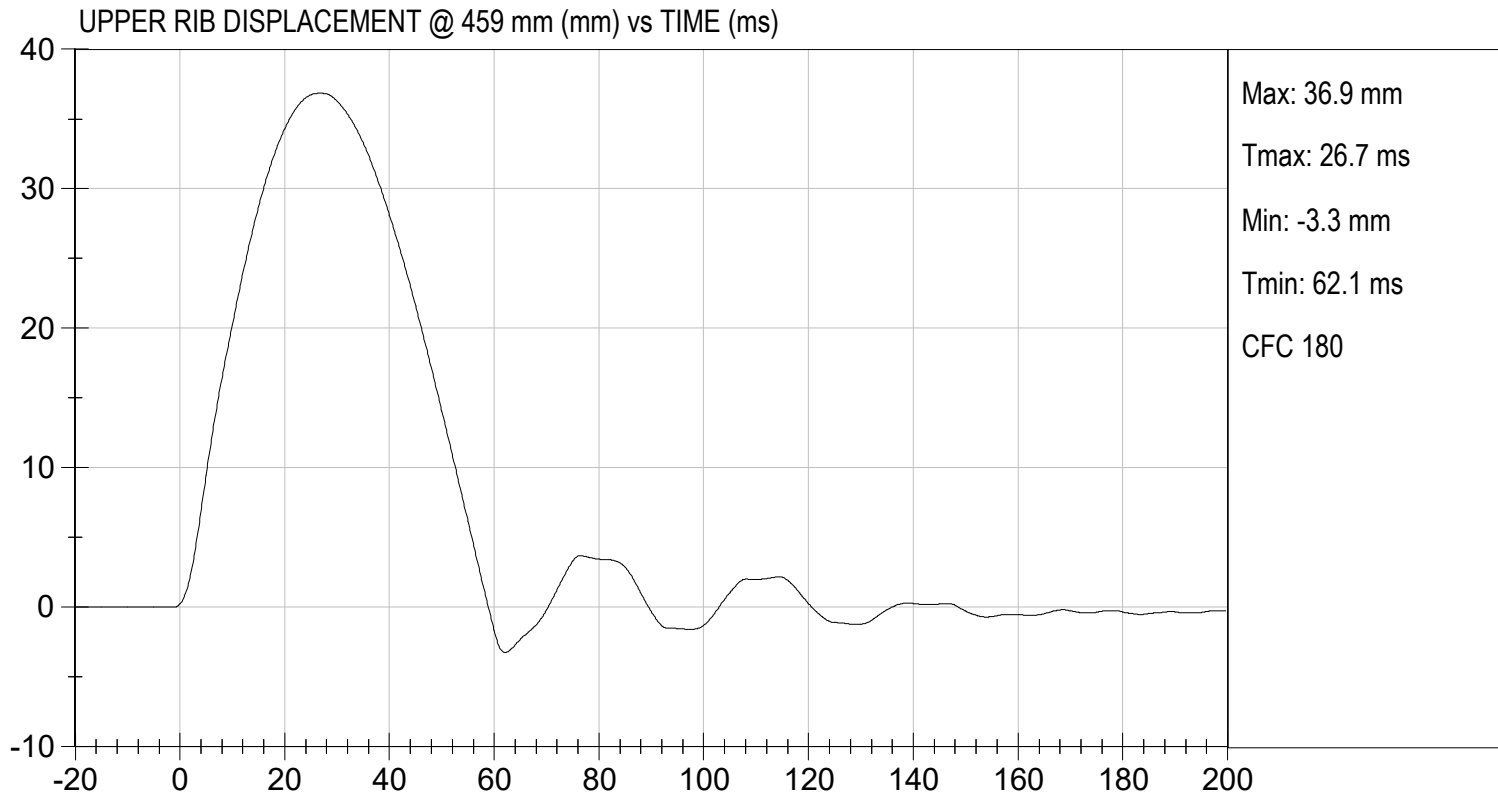
Test I.D: D250304

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	20	Pass
Displacement at 459 mm	mm	36.0 to 40.0	36.9	Pass
Displacement at 815 mm	mm	46.0 to 51.0	46.8	Pass
Overall Test Results			Pass	


Laboratory Technician

01/27/2025
Test Date


Approved By



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MID RIB TEST

ES-2re DUMMY

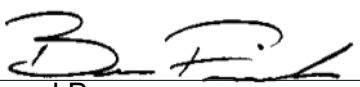
ATD Serial No: F032

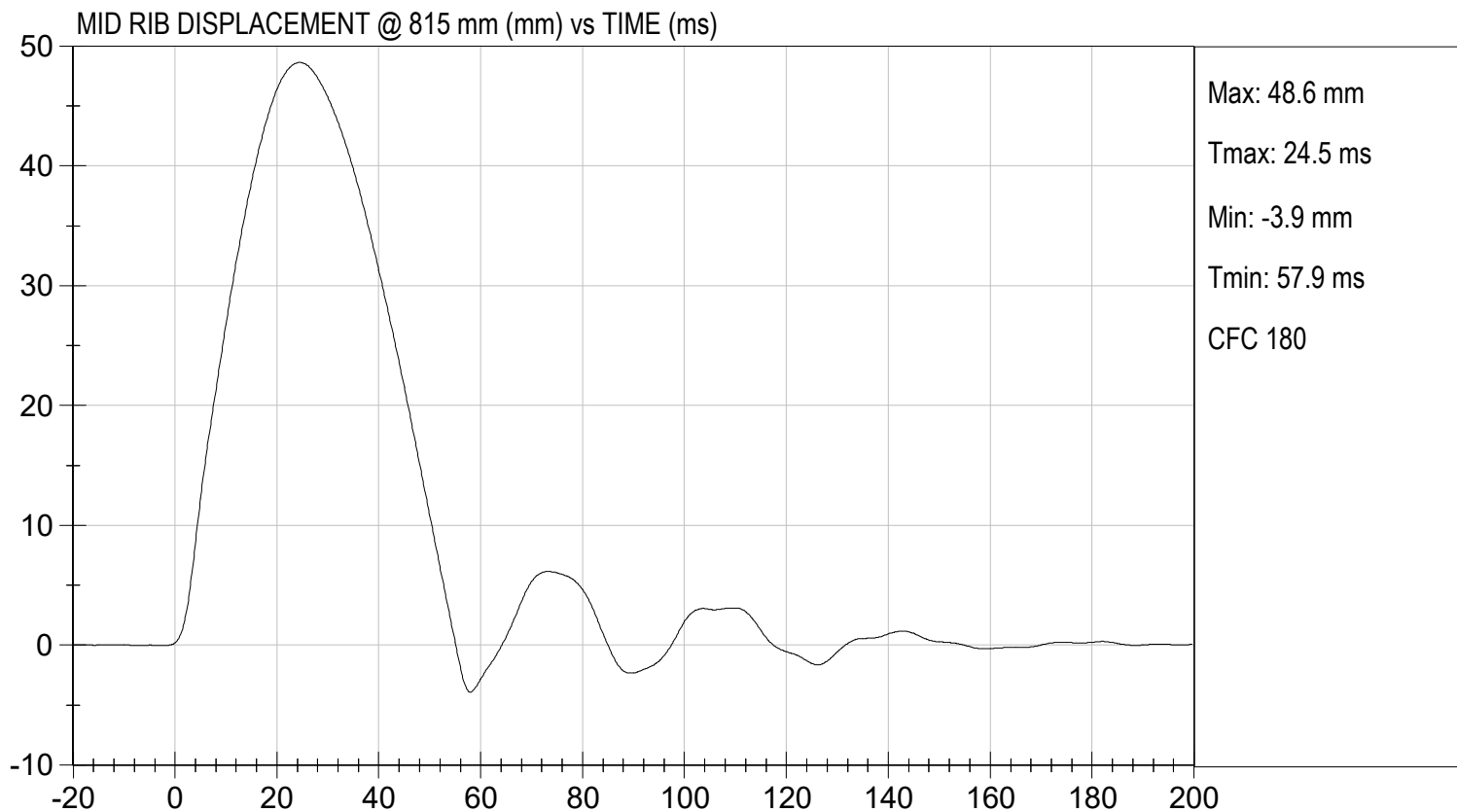
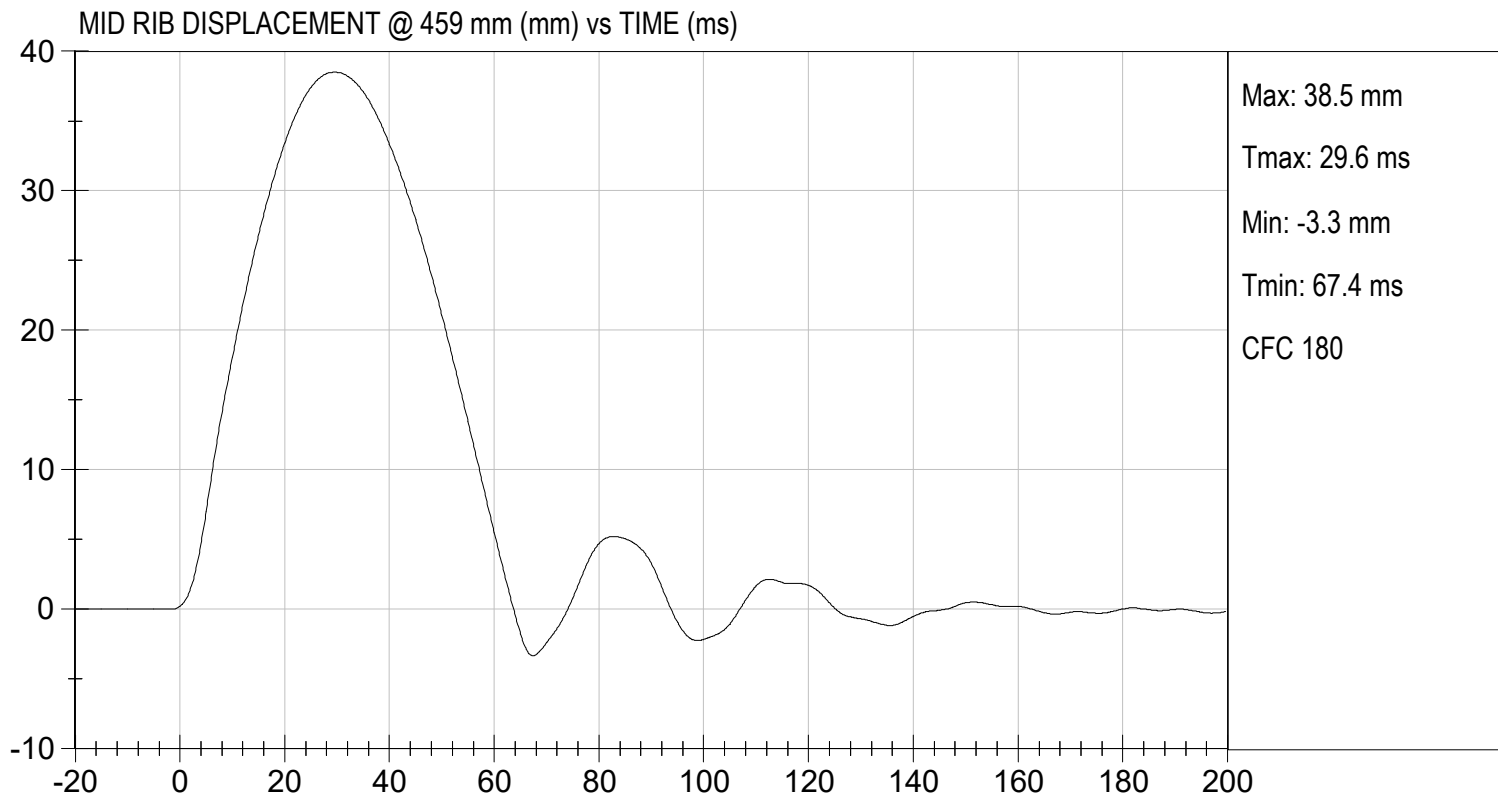
Test I.D: D250305

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	20	Pass
Displacement at 459 mm	mm	36.0 to 40.0	38.5	Pass
Displacement at 815 mm	mm	46.0 to 51.0	48.6	Pass
			Overall Test Results	Pass


Laboratory Technician

01/27/2025
Test Date


Approved By



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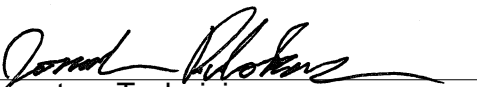
LOWER RIB TEST

ES-2re DUMMY

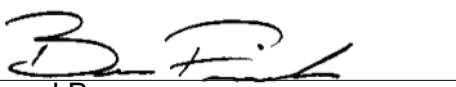
ATD Serial No: F032

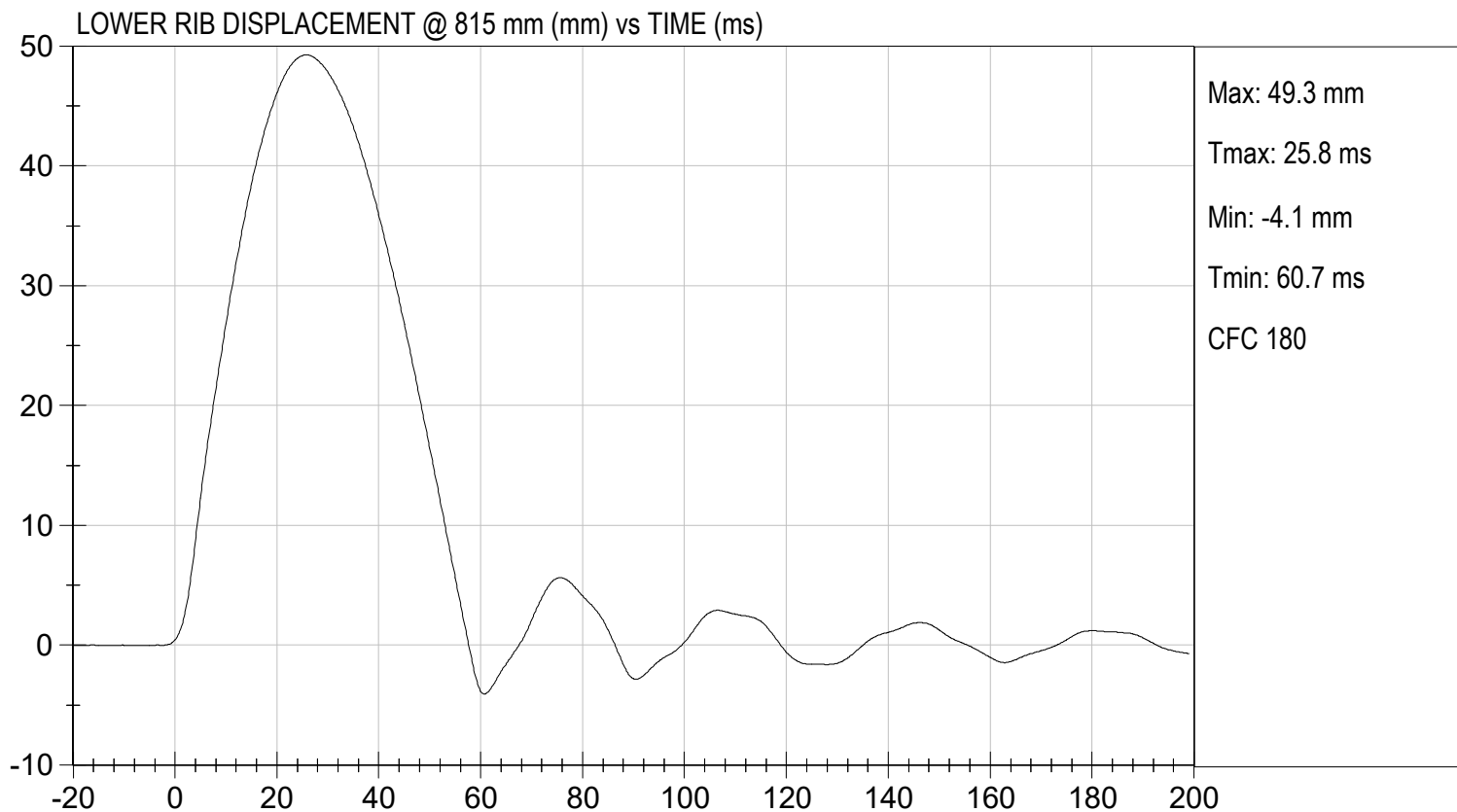
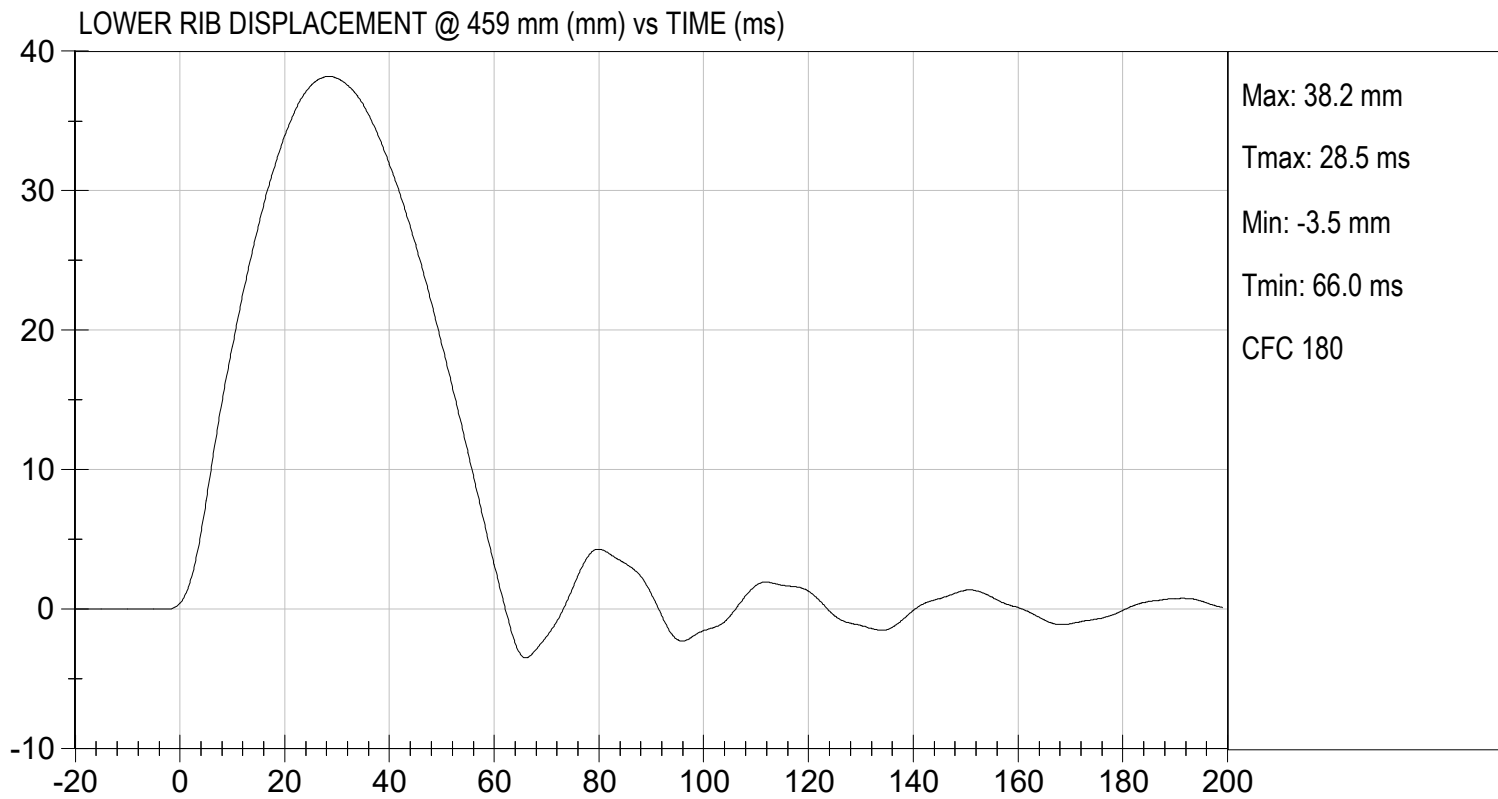
Test I.D: D250306

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	20	Pass
Displacement at 459 mm	mm	36.0 to 40.0	38.2	Pass
Displacement at 815 mm	mm	46.0 to 51.0	49.3	Pass
Overall Test Results			Pass	


Laboratory Technician

01/27/2025
Test Date


Approved By

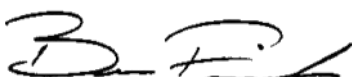


MGA RESEARCH CORPORATION**ABDOMEN TEST****ES-2re DUMMY****ATD Serial No:** F032**Test I.D:** D250307

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Probe Speed	m/s	3.90 to 4.10	4.10	Pass
Maximum Impactor Force	N	4000 to 4800	4372	Pass
Time of Maximum Impactor Force	ms	10.6 to 13.0	10.6	Pass
Maximum Total Abdomen Force	N	2200 to 2700	2378	Pass
Time of Maximum Abdomen Force	ms	10.0 to 12.3	10.7	Pass
Overall Test Results				Pass


Laboratory Technician

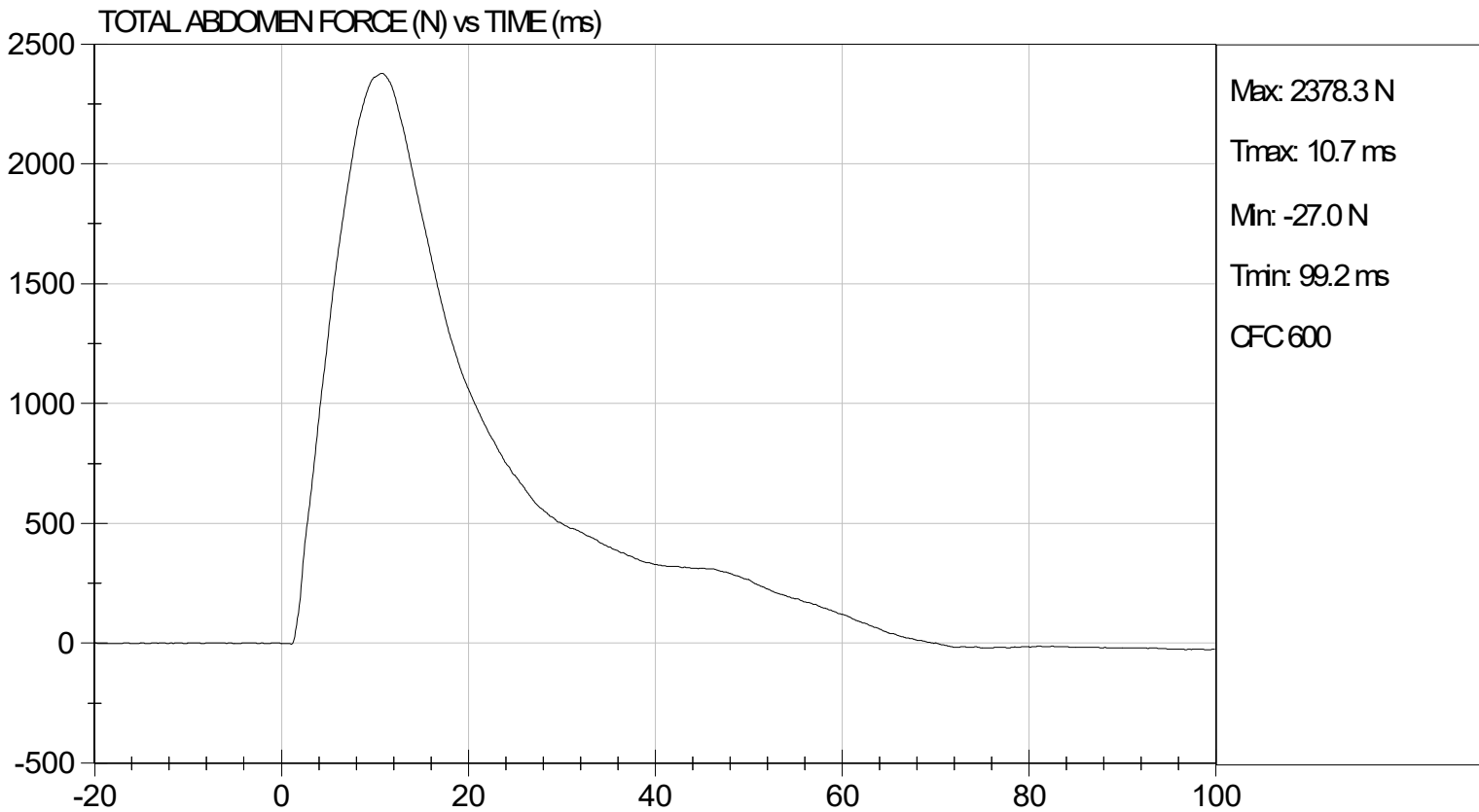
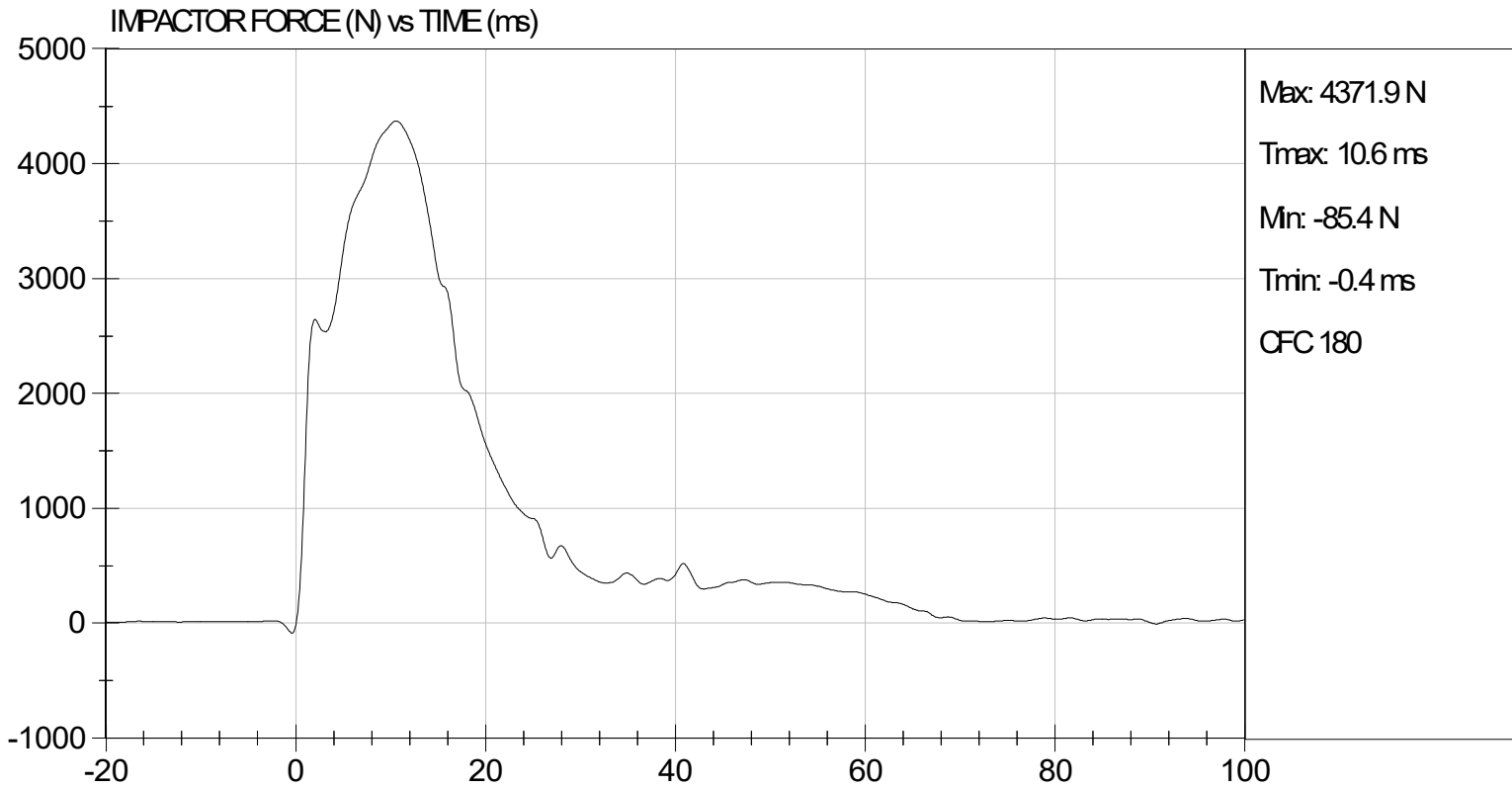
01/27/2025
Test Date


Approved By



TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.45 ft/s, 4.10 m/s

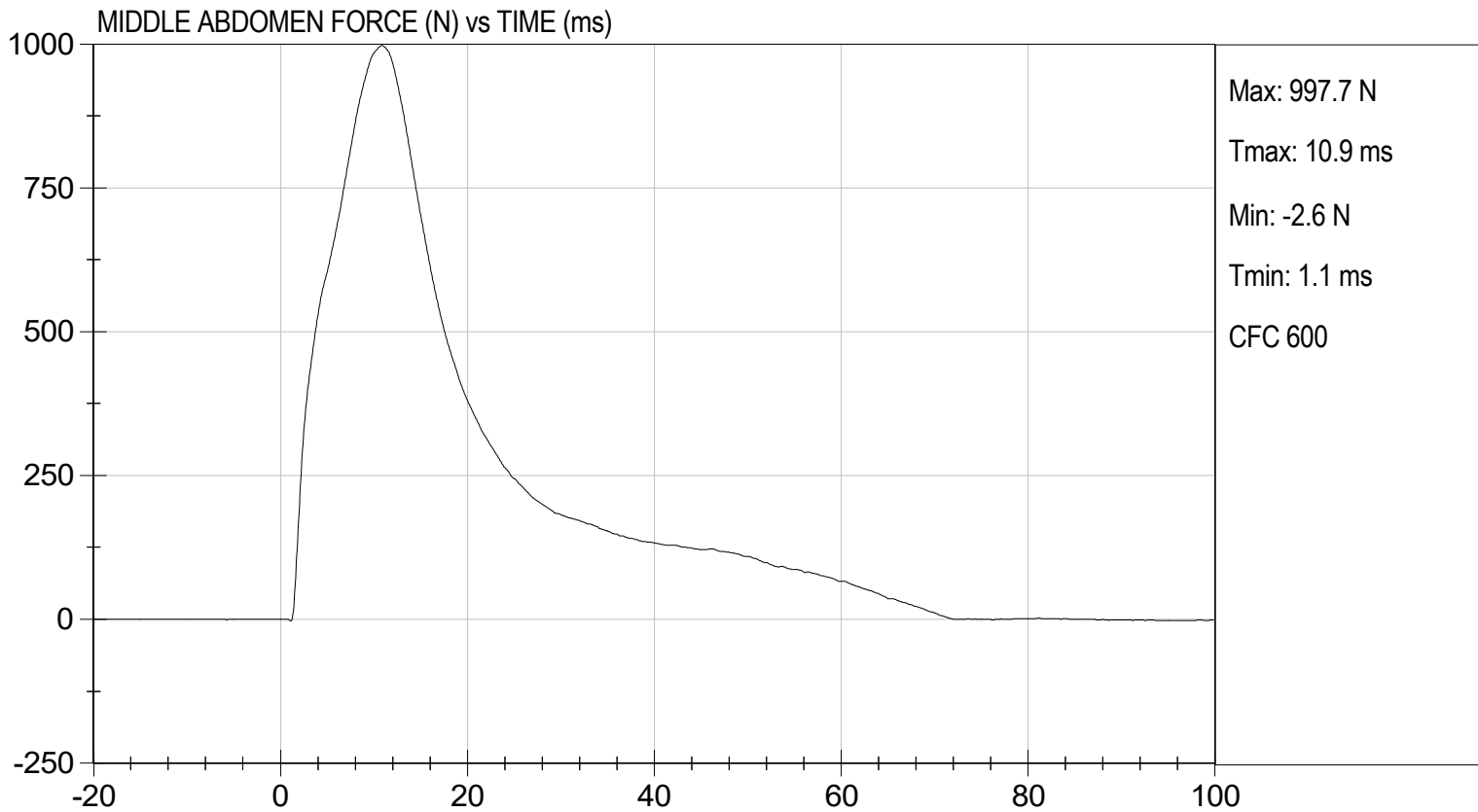
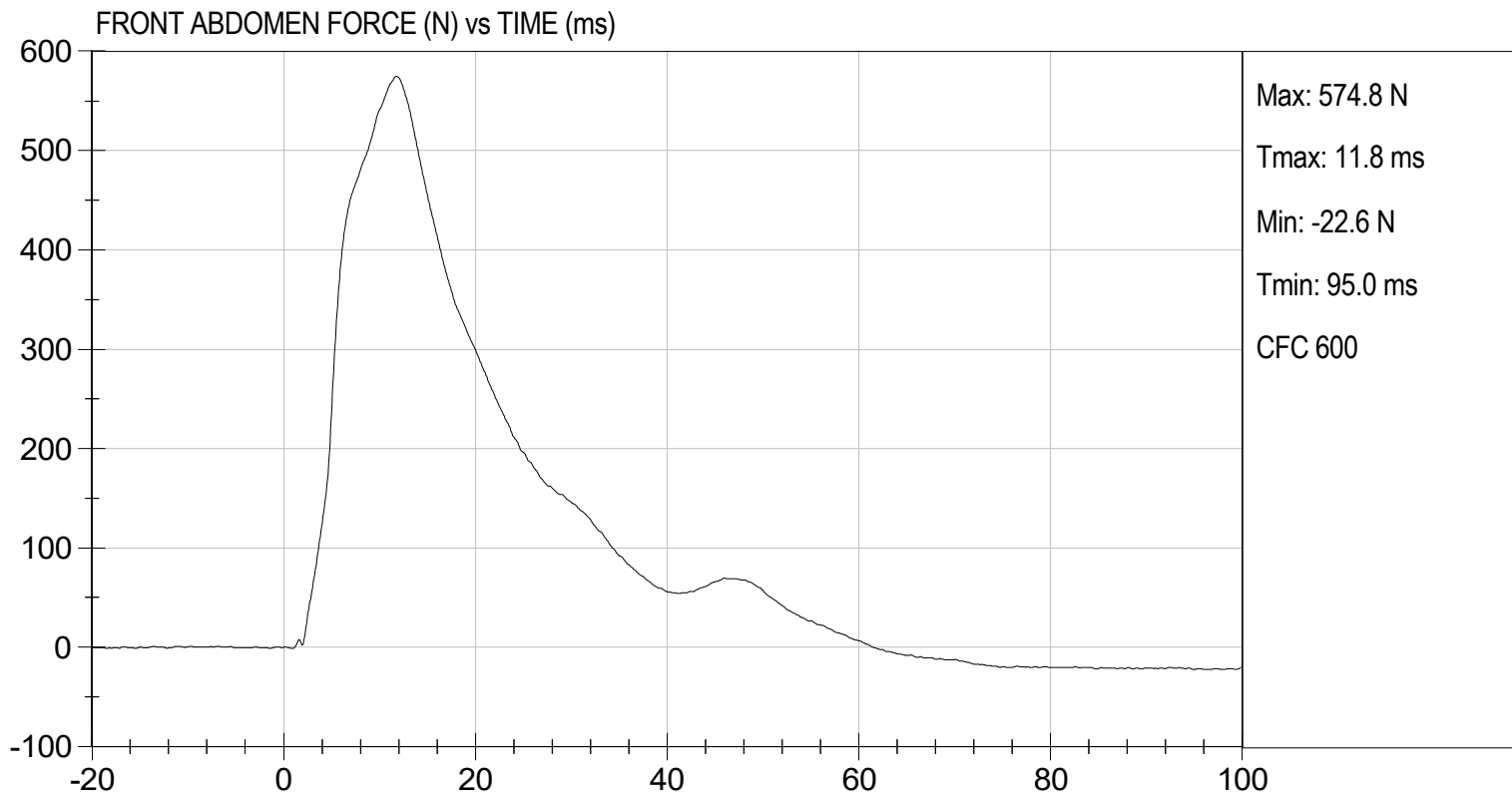
TEST DATE: 01/27/2025
TEST #: D250307





TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.45 ft/s, 4.10 m/s

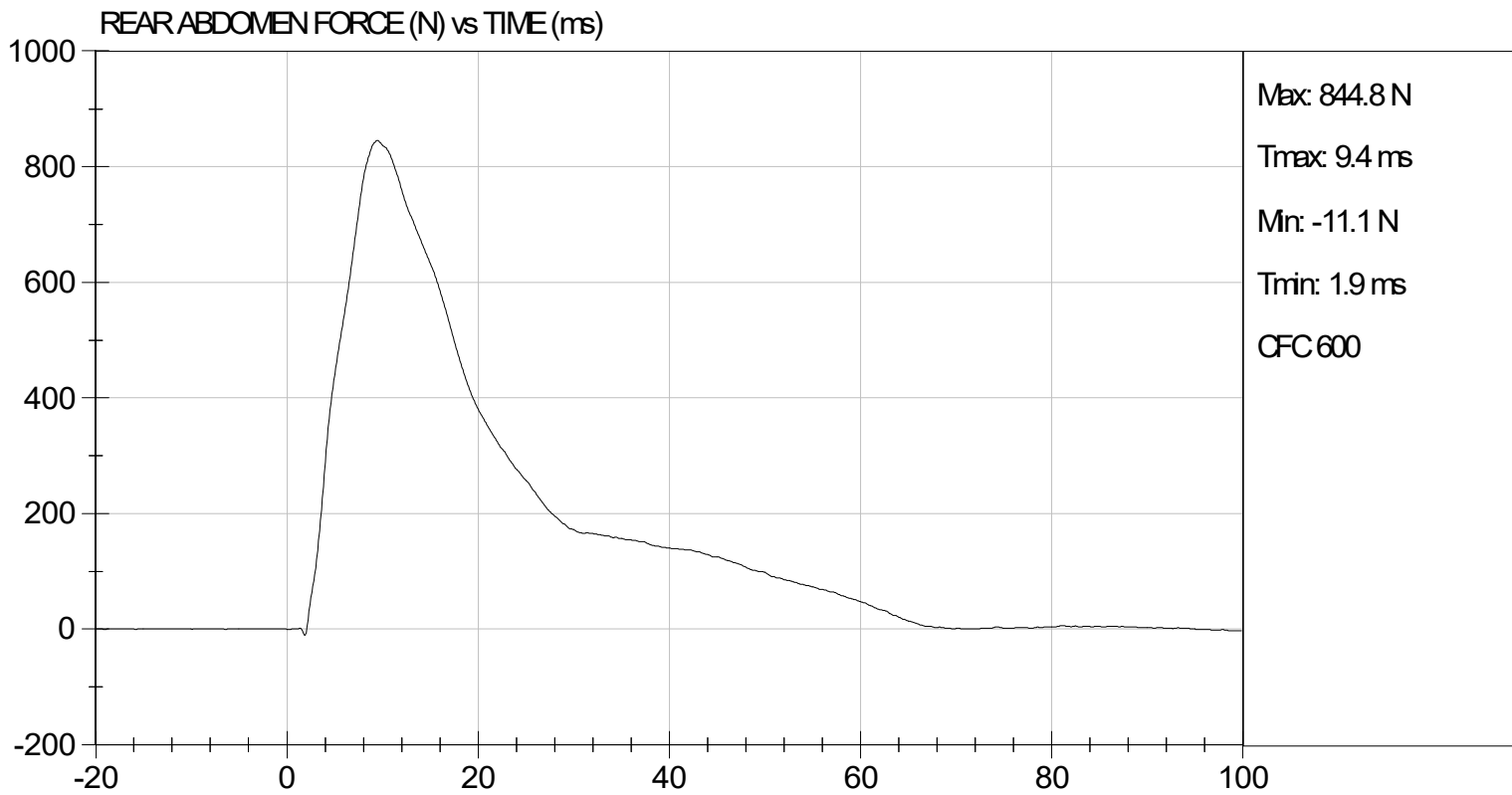
TEST DATE: 01/27/2025
TEST #: D250307





TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.45 ft/s, 4.10 m/s

TEST DATE: 01/27/2025
TEST #: D250307



MGA RESEARCH CORPORATION

LUMBAR SPINE TEST

ES-2re DUMMY

ATD Serial No: F032

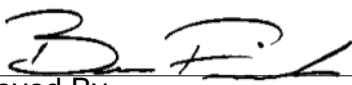
Test I.D: D250308

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	20	Pass
Pendulum Speed		m/s	5.95 to 6.15	6.05	Pass
Pendulum Velocity	1 ms	m/s	-0.05 to 0.00	-0.02	Pass
	3.7 ms	m/s	-0.425 to -0.24	-0.418	Pass
	27 ms	m/s	-6.50 to -5.80	-5.82	Pass
	30 ms	m/s	>= -6.50	-6.30	Pass
Maximum Flexion Angle		deg	45.0 to 55.0	49.2	Pass
Time of Maximum Flexion Angle		ms	39.0 to 53.0	49.9	Pass
Headform Rotation Decay to Initial Position		ms	37 to 57	39	Pass
Overall Results				Pass	


Laboratory Technician

01/27/2025

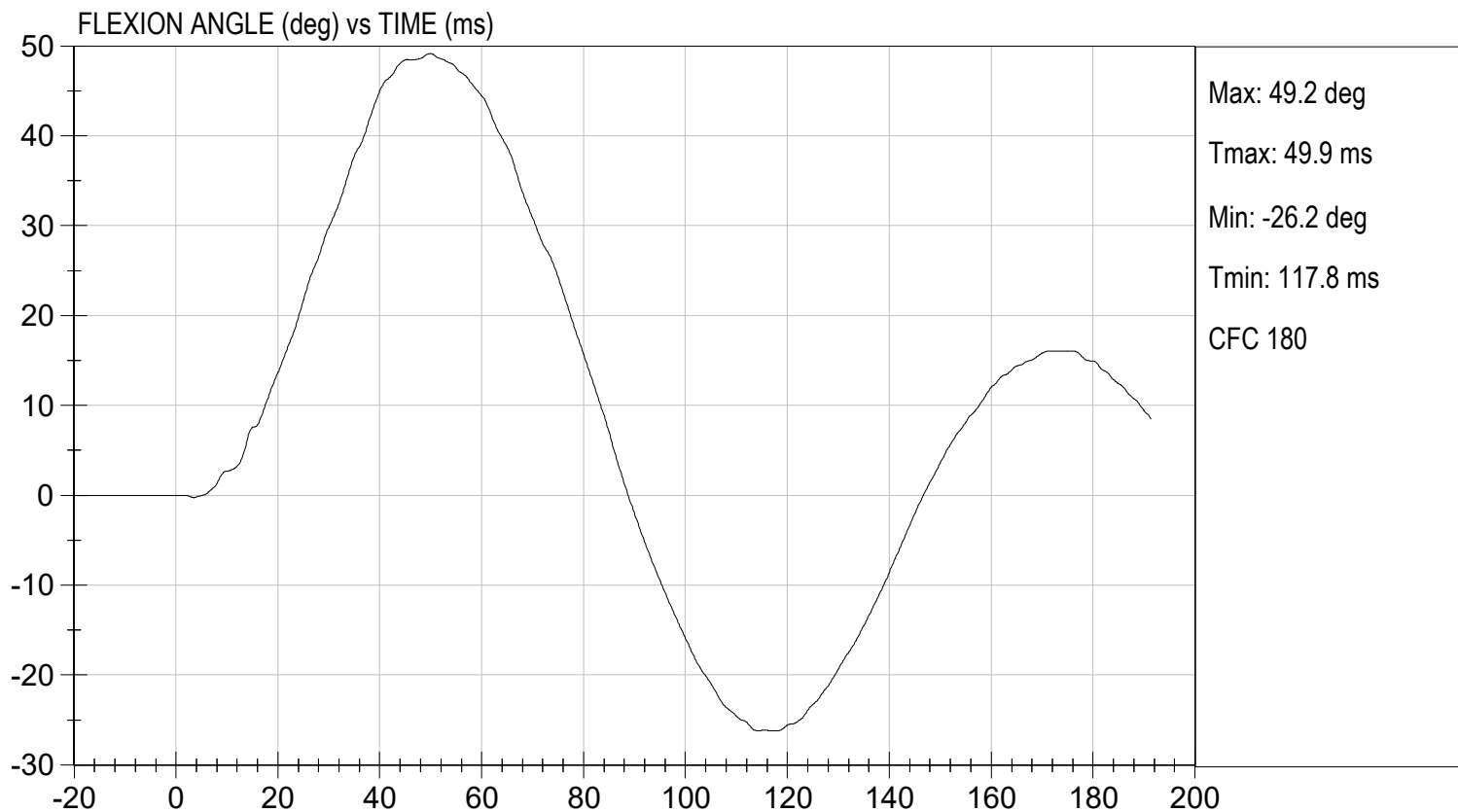
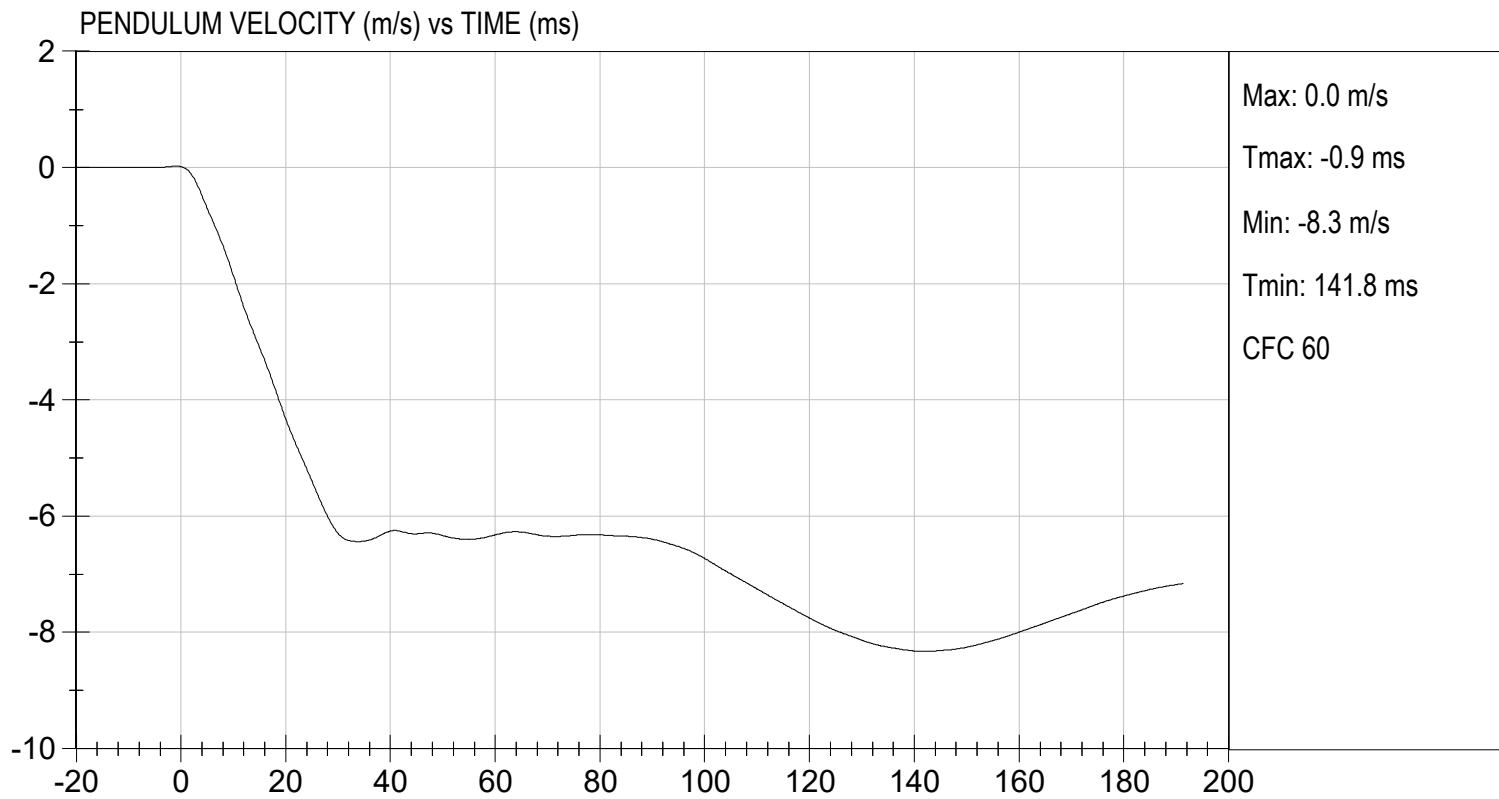
Test Date


Approved By



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

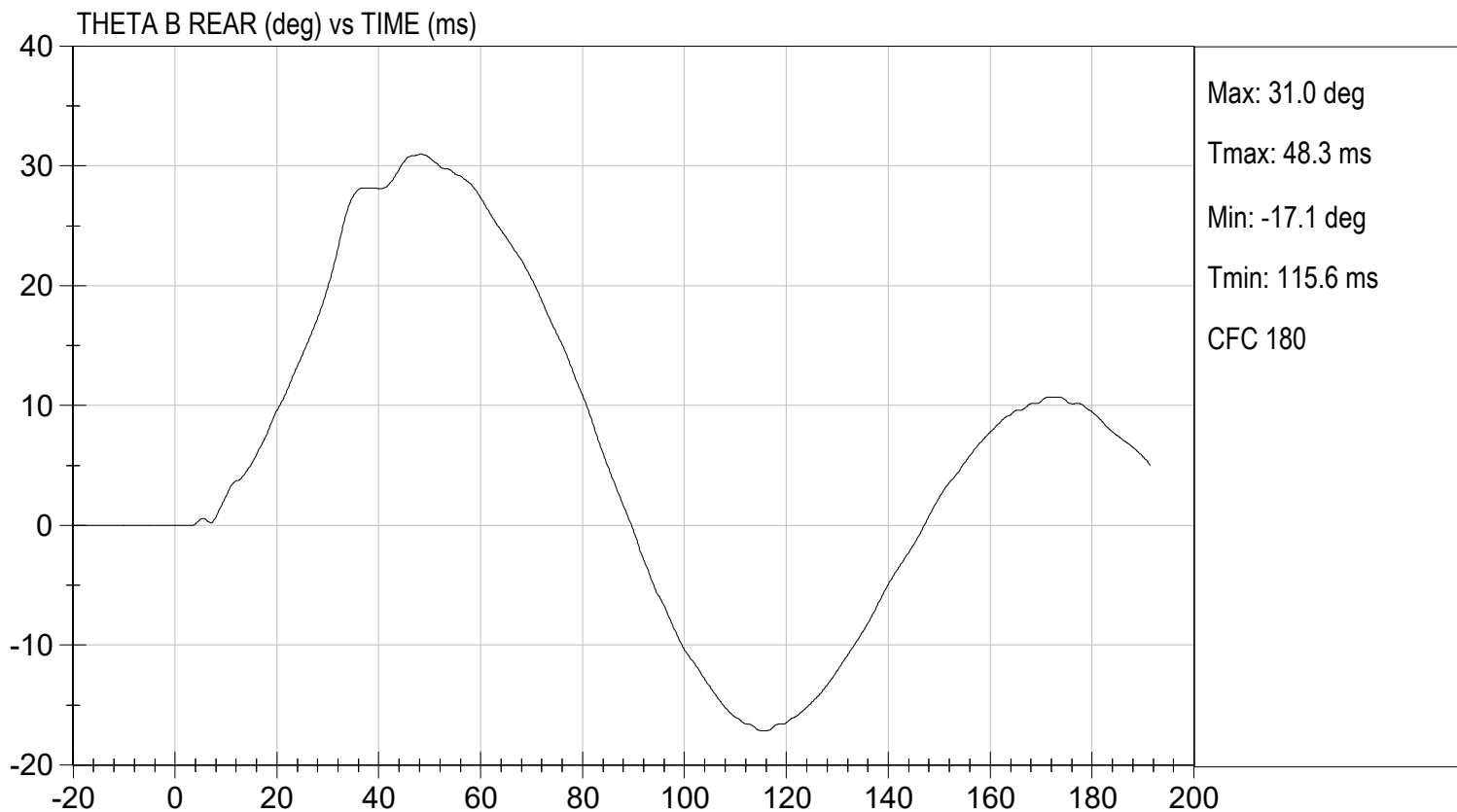
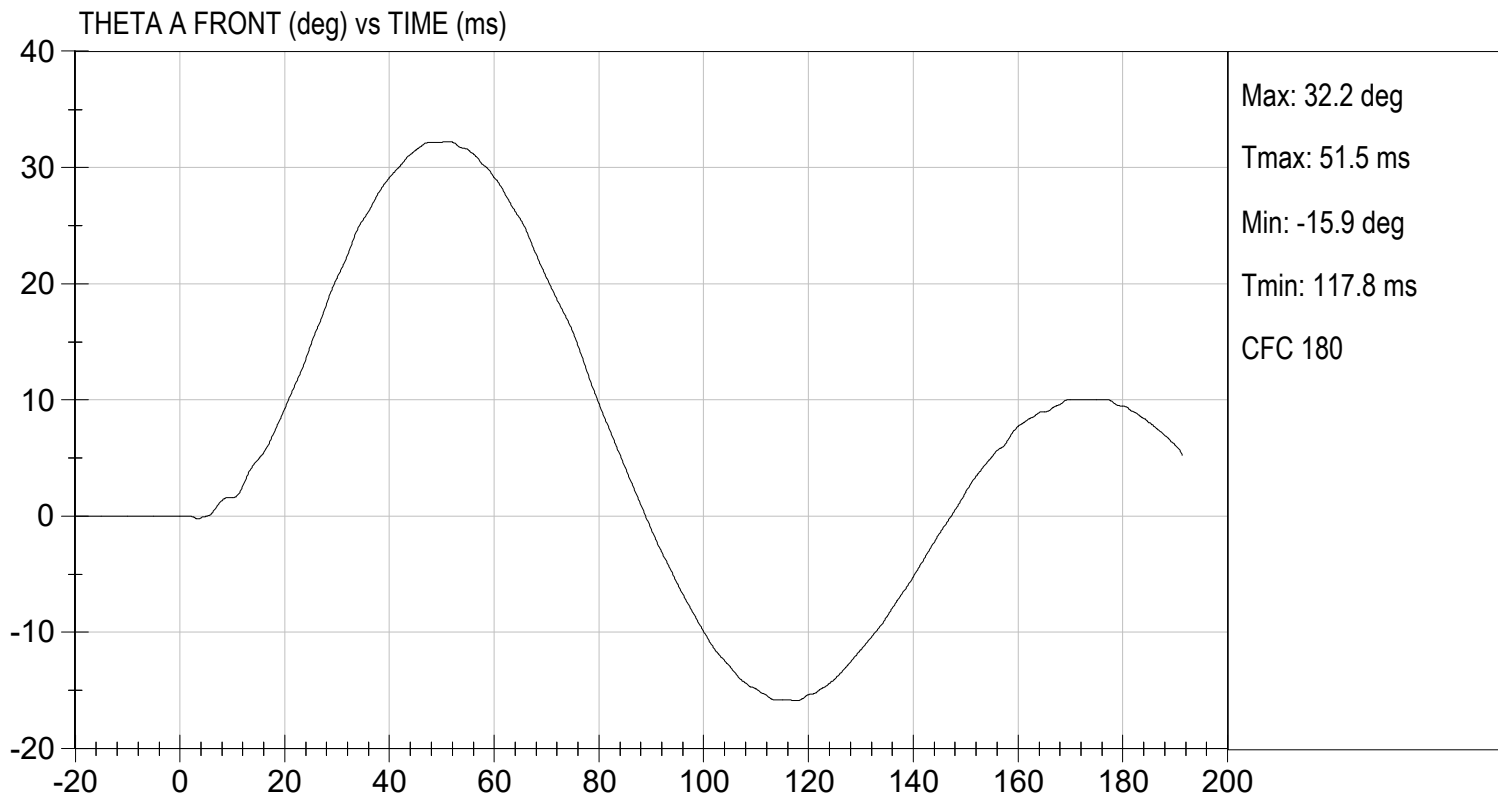
TEST DATE: 01/27/2025
TEST #: D250308





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

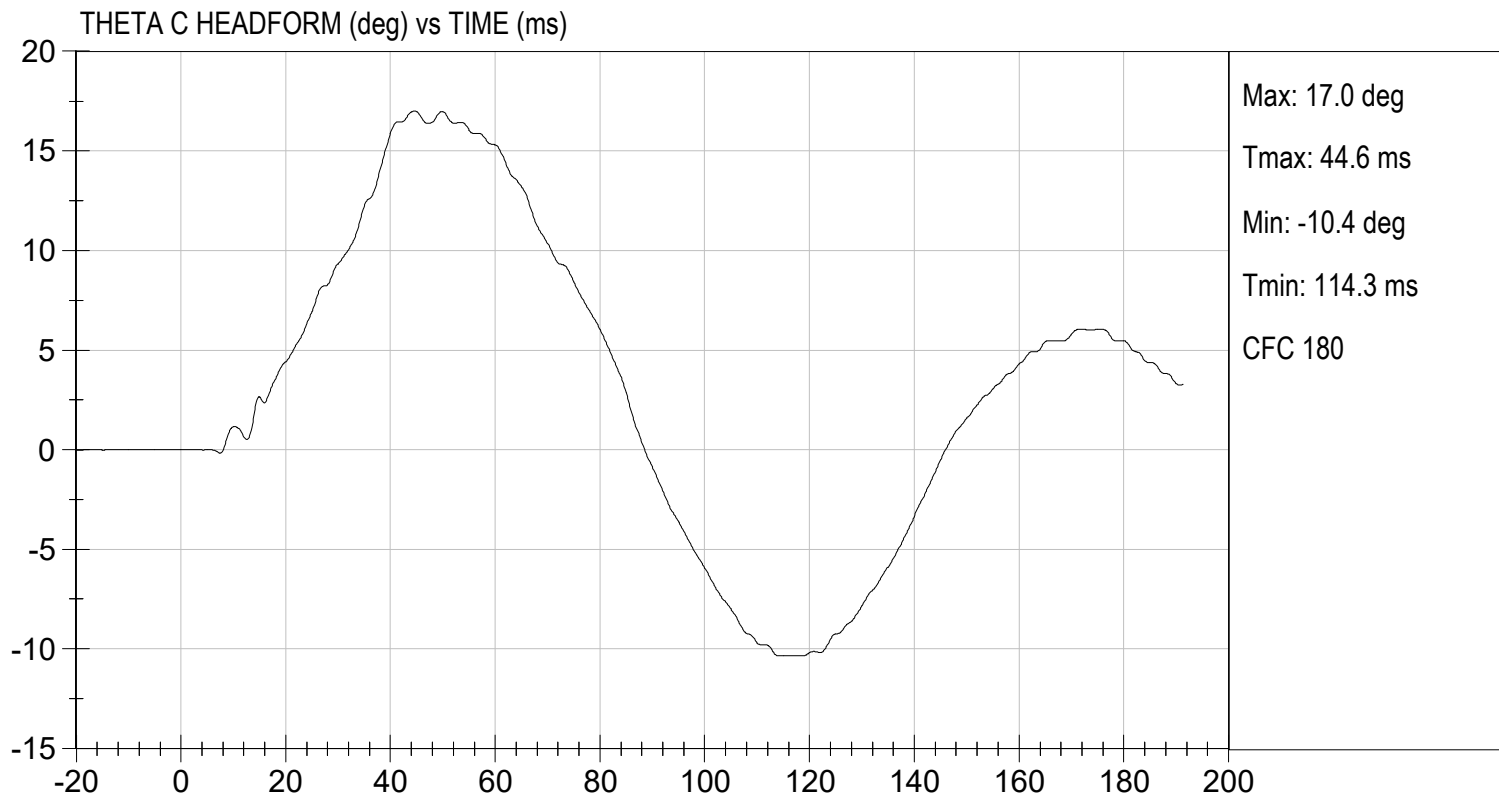
TEST DATE: 01/27/2025
TEST #: D250308





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

TEST DATE: 01/27/2025
TEST #: D250308



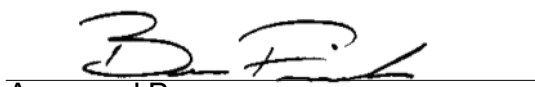
MGA RESEARCH CORPORATION**PELVIS TEST****ES-2re DUMMY****ATD Serial No:** F032**Test I.D:** D250309

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	22	Pass
Probe Speed	m/s	4.20 to 4.40	4.30	Pass
Maximum Impactor Force	N	4700 to 5400	5009	Pass
Time of Maximum Impactor Force	ms	11.8 to 16.1	12.1	Pass
Maximum Pubic Force	N	1230 to 1590	1273	Pass
Time of Maximum Pubic Force	ms	12.2 to 17.0	13.6	Pass
Overall Test Results			Pass	


Laboratory Technician

01/27/2025

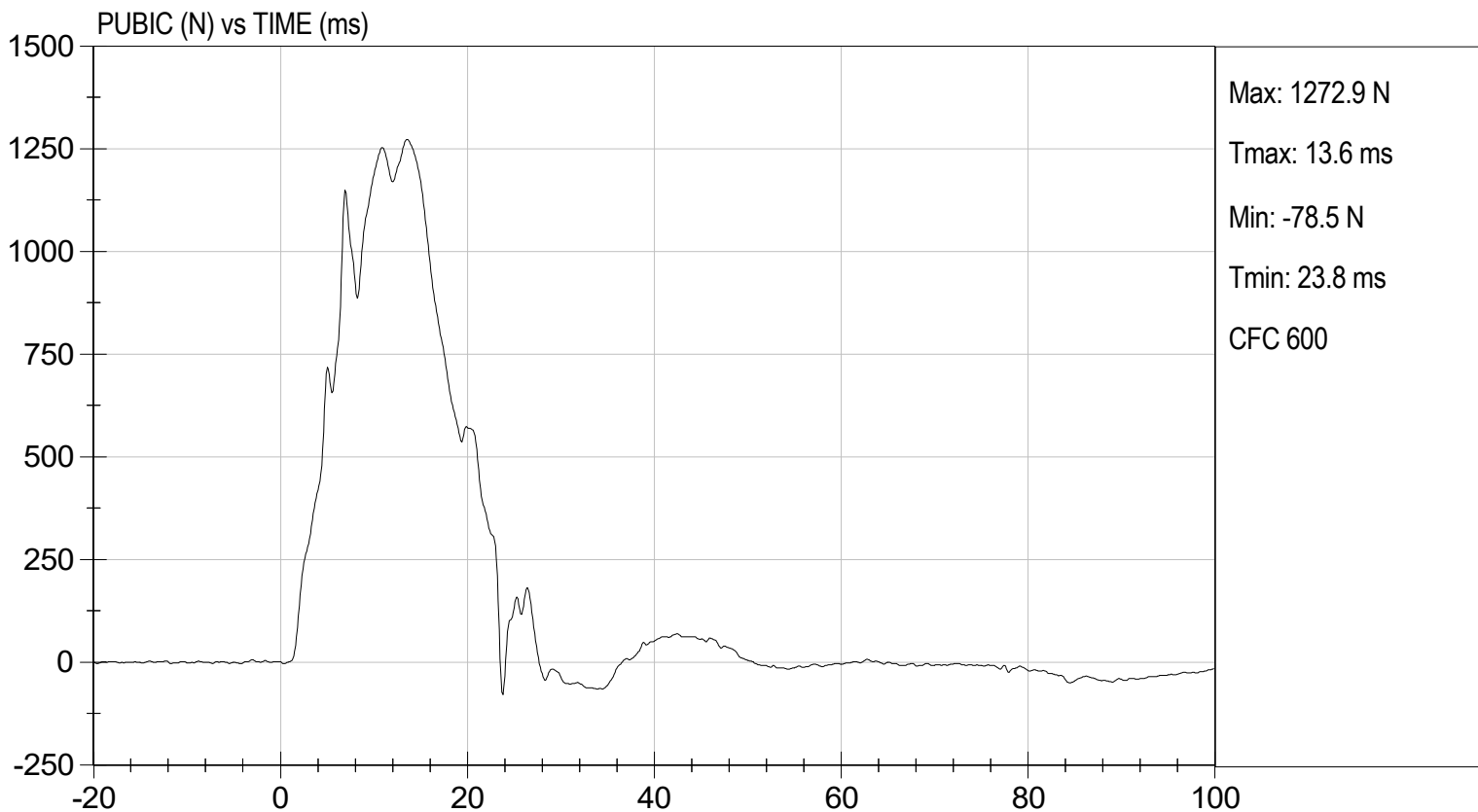
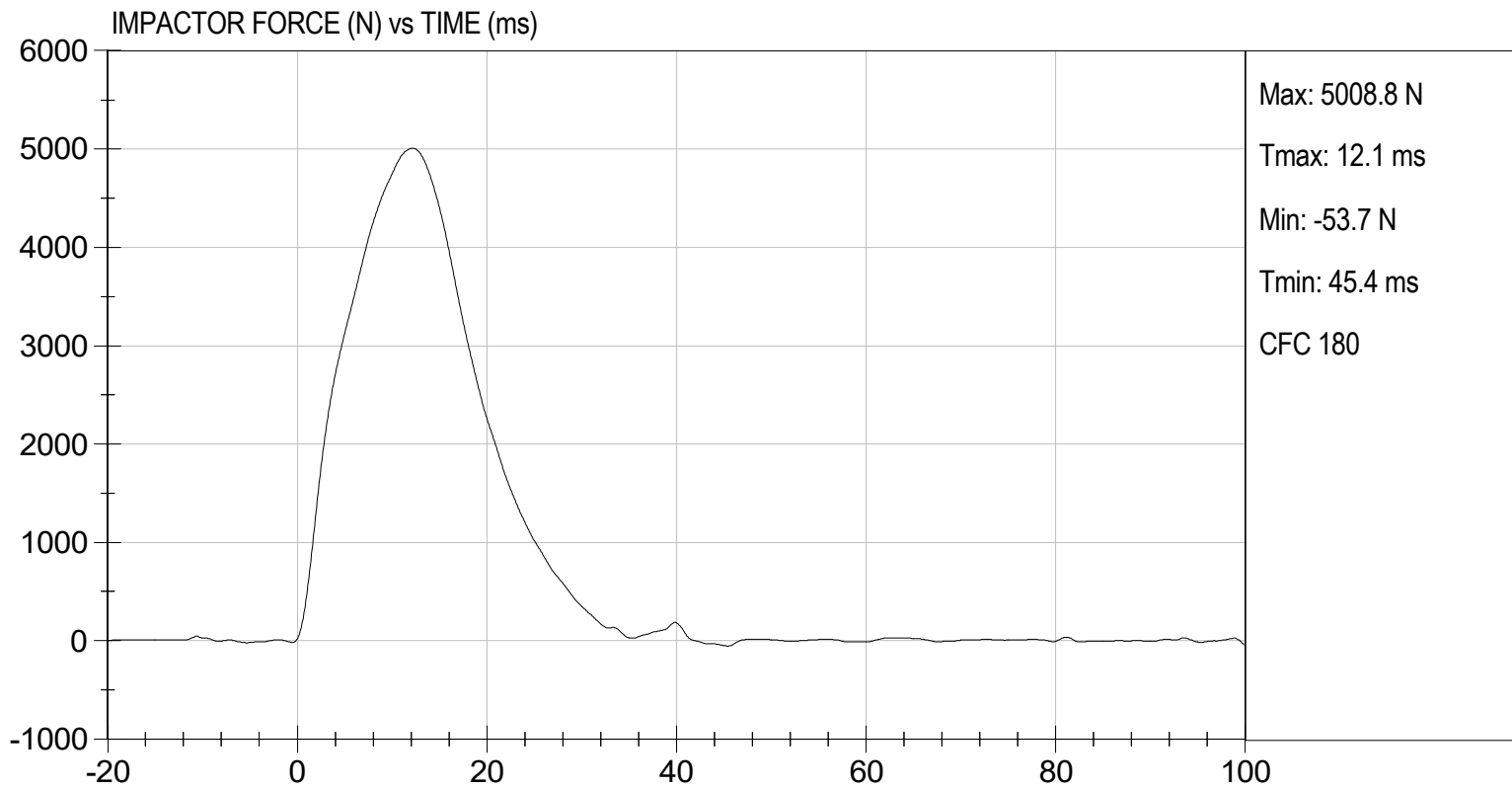
Test Date


Approved By



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

TEST DATE: 01/27/2025
TEST #: D250309



MGA RESEARCH CORPORATION

THORAX IMPACT TEST

ES-2re DUMMY

ATD Serial No: F032

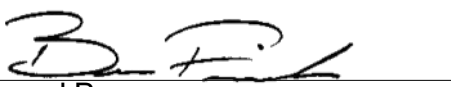
Test I.D: D250300

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.7	Pass
Humidity	%	10 to 70	22	Pass
Probe Speed	m/s	5.40 to 5.60	5.40	Pass
Maximum Impactor Force (after 6 ms)	N	5100 to 6200	5639	Pass
Upper Rib Displacement	mm	34.0 to 41.0	38.0	Pass
Middle Rib Displacement	mm	37.0 to 45.0	40.2	Pass
Lower Rib Displacement	mm	37.0 to 44.0	38.2	Pass
Overall Test Results			Pass	


Laboratory Technician

01/27/2025

Test Date

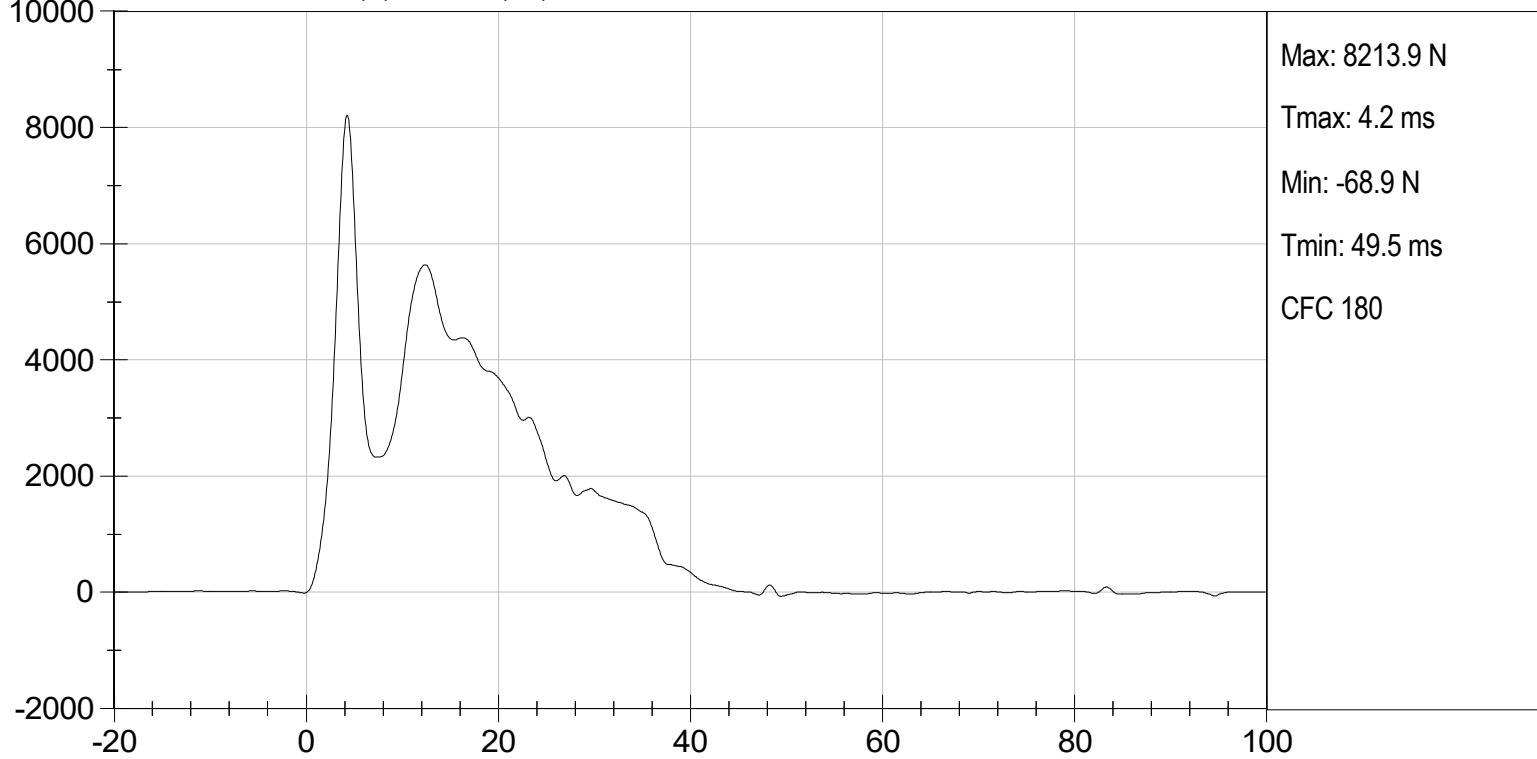

Approved By



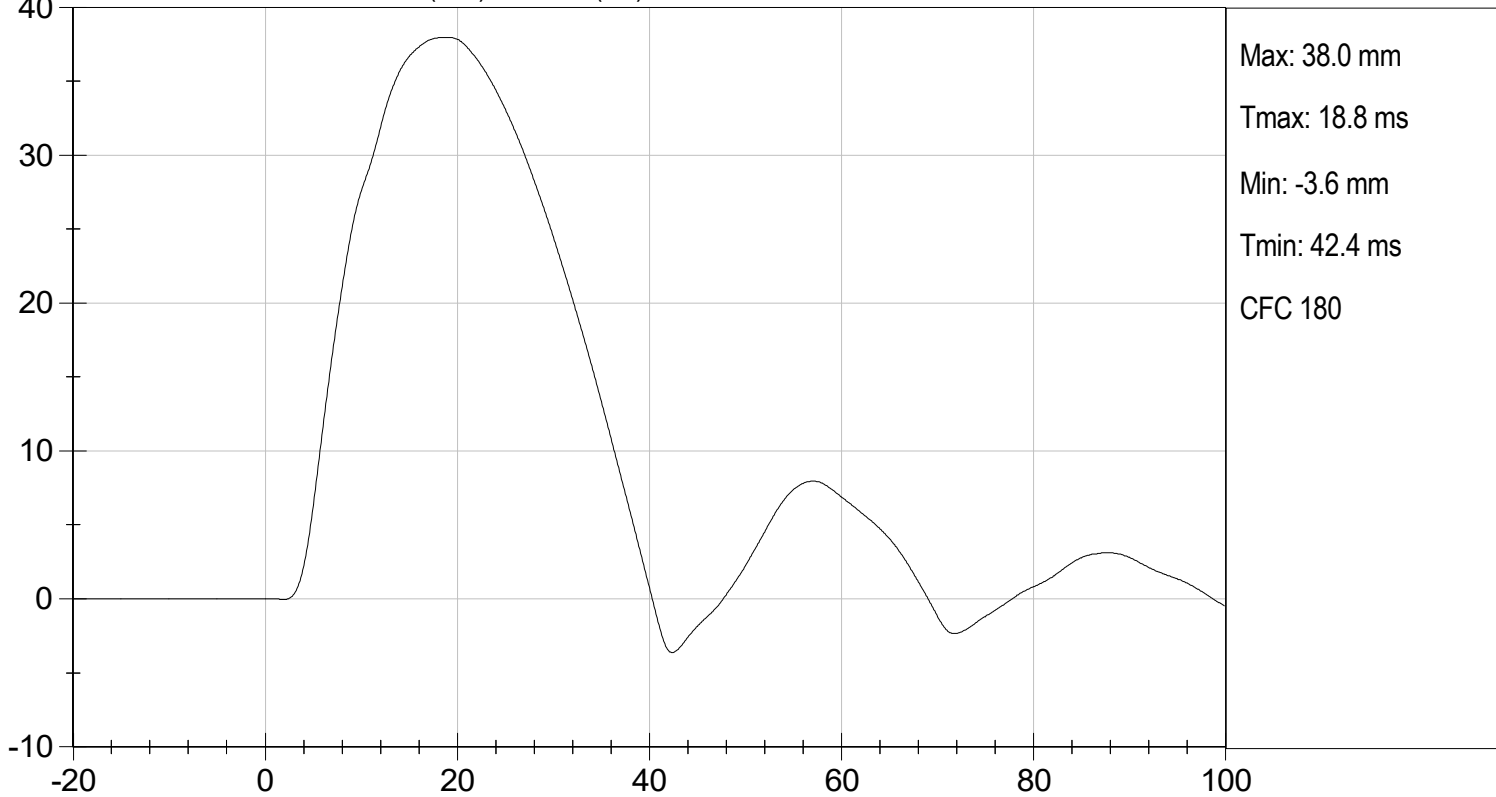
TEST DESC: THORAX IMPACT
VELOCITY: 17.73 ft/s, 5.40 m/s

TEST DATE: 01/27/2025
TEST #: D250300

IMPACTOR FORCE (N) vs TIME (ms)



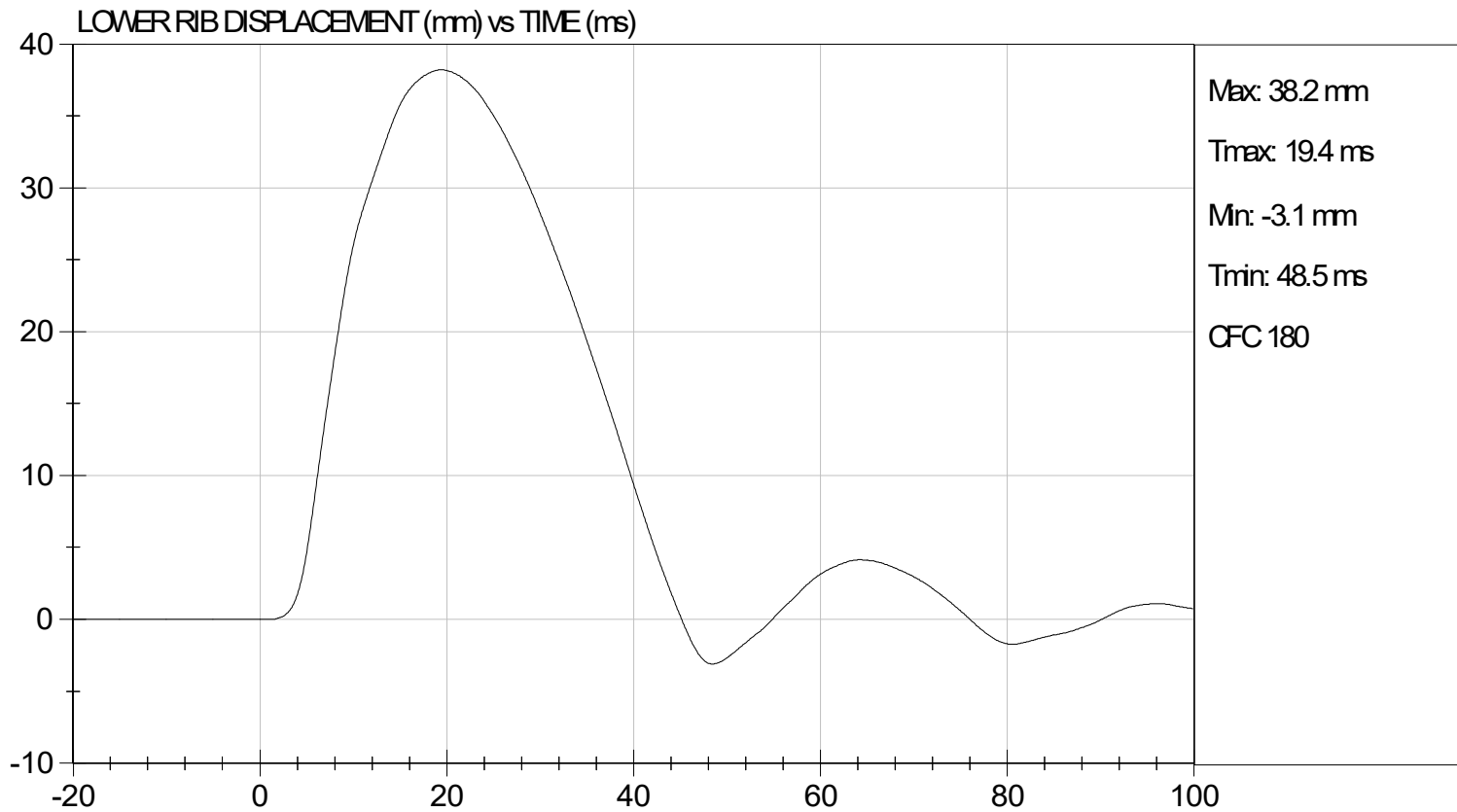
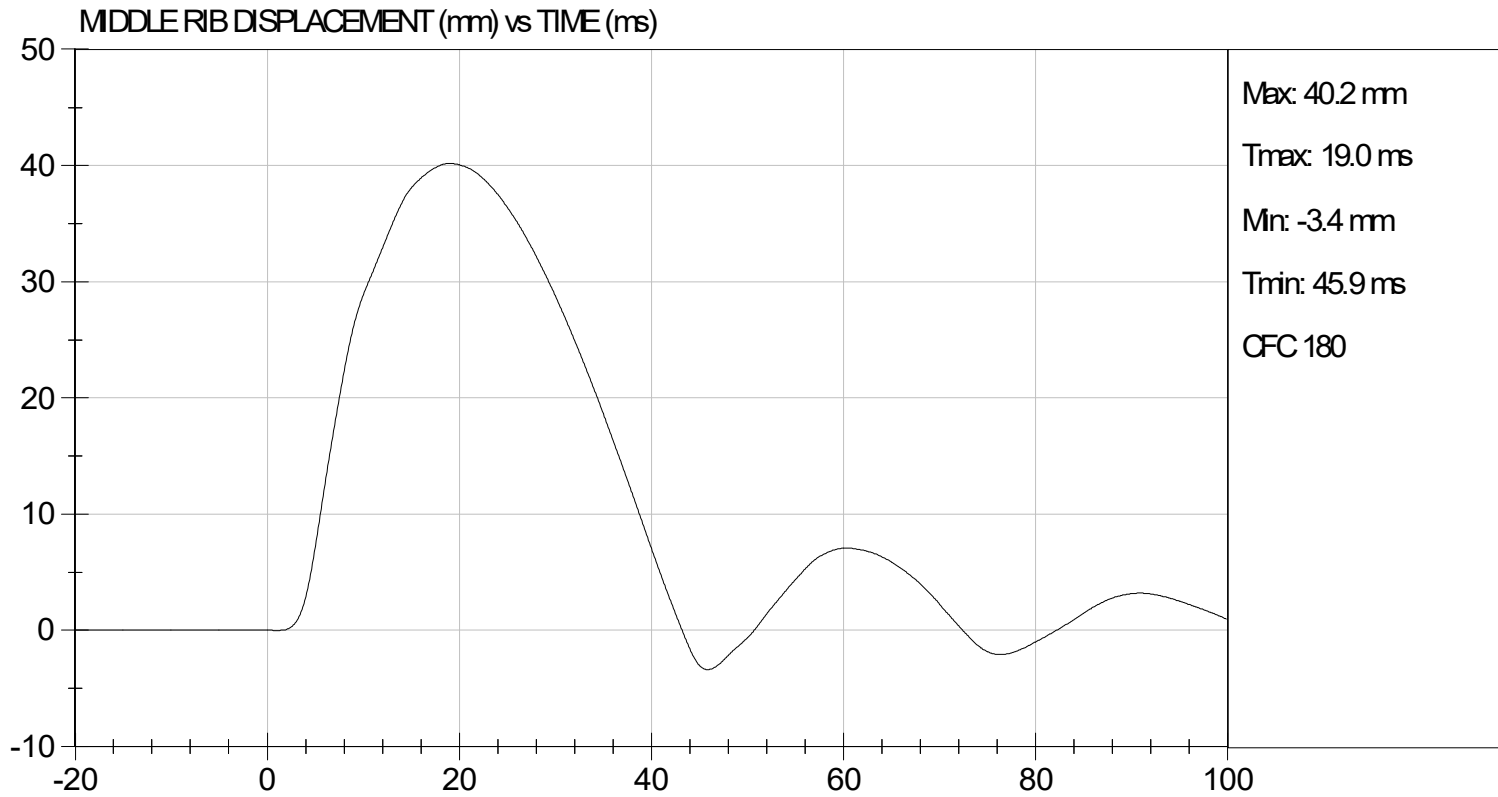
UPPER RIB DISPLACEMENT (mm) vs TIME (ms)





TEST DESC: THORAX IMPACT
VELOCITY: 17.73 ft/s, 5.40 m/s

TEST DATE: 01/27/2025
TEST #: D250300



QUALIFICATION TEST RESULTS

POST-TEST

EUROSID 2 (ES-2RE) MALE – DRIVER ATD

ES-2re External Measurements
SN: F032

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

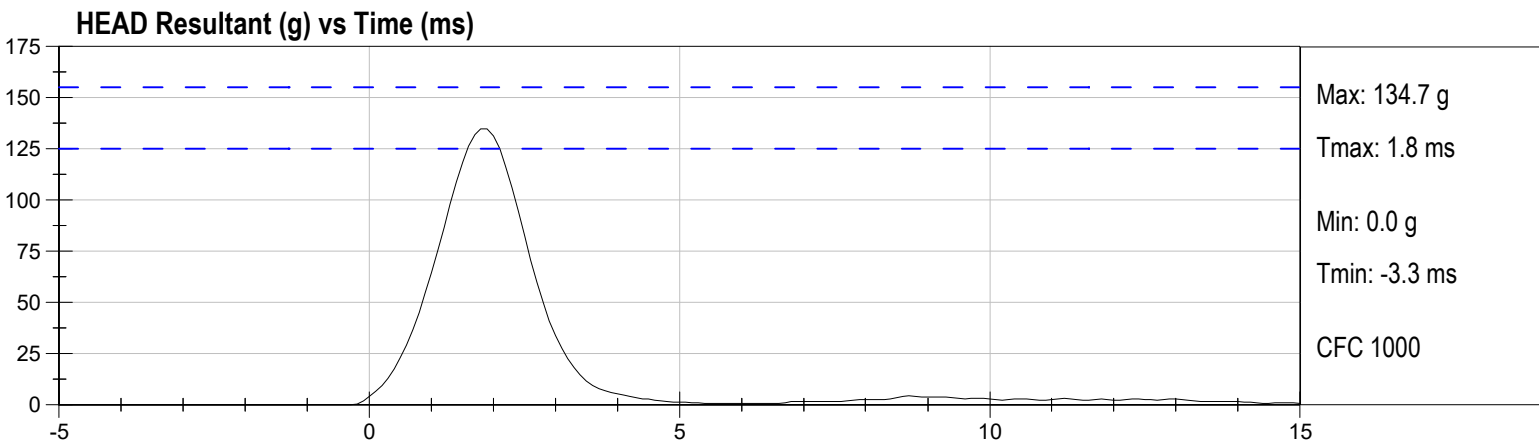
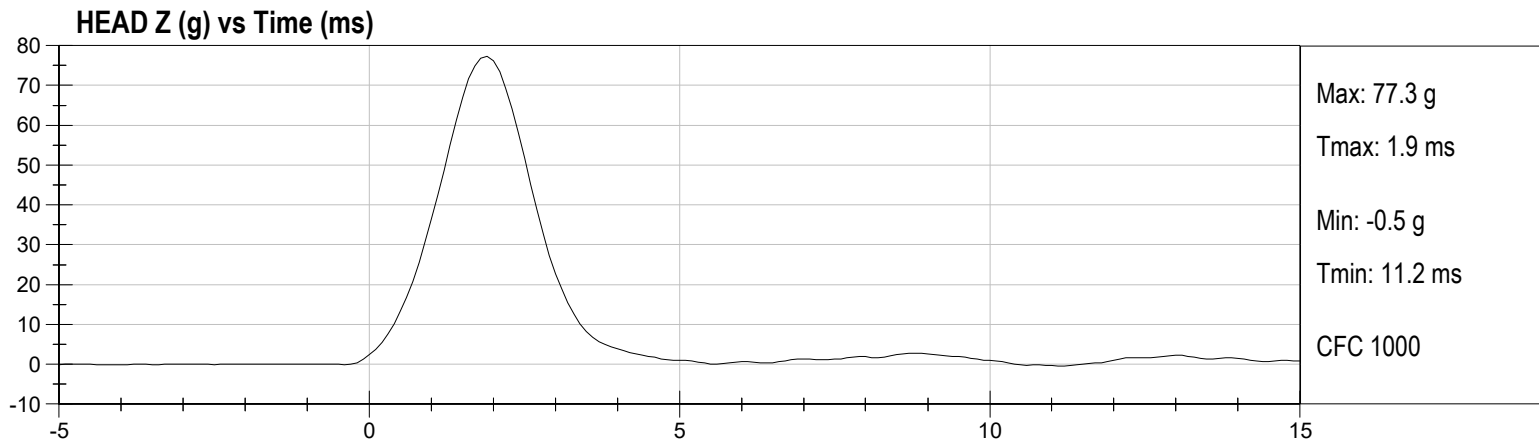
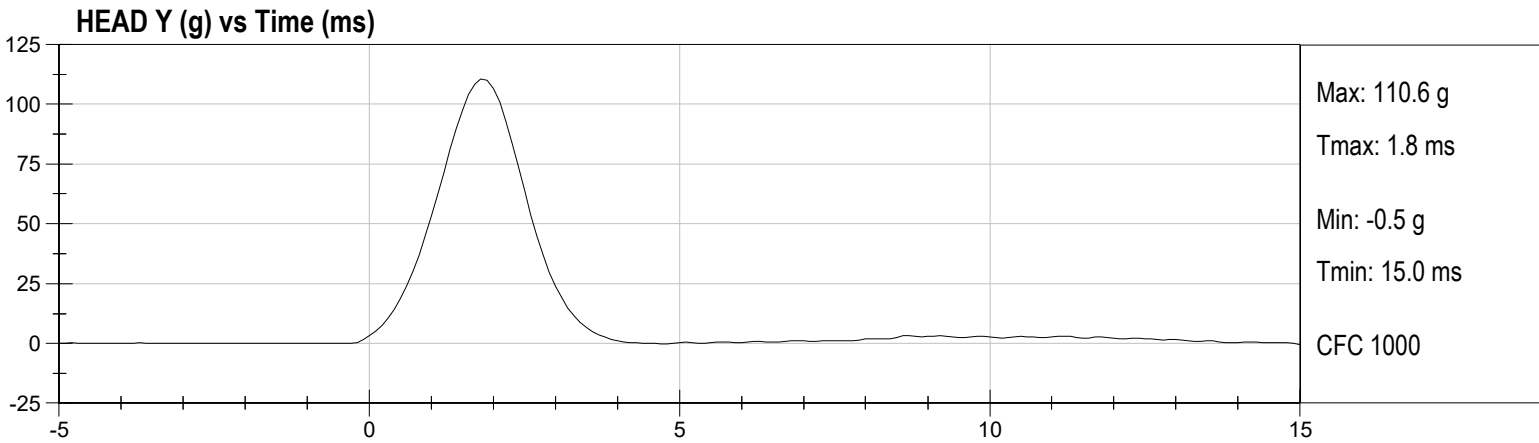
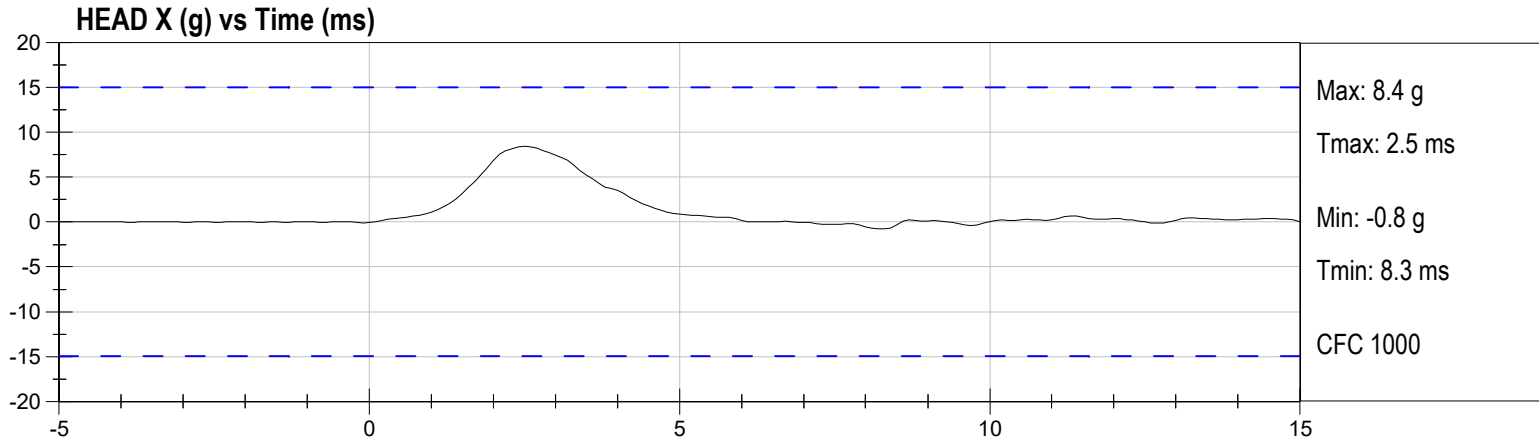


Lateral Head Drop Test
ES2re
ATD Serial No: F032

Test Date: 02/19/2025
Test ID: D250531
Test Technician: Jonah Pulokas

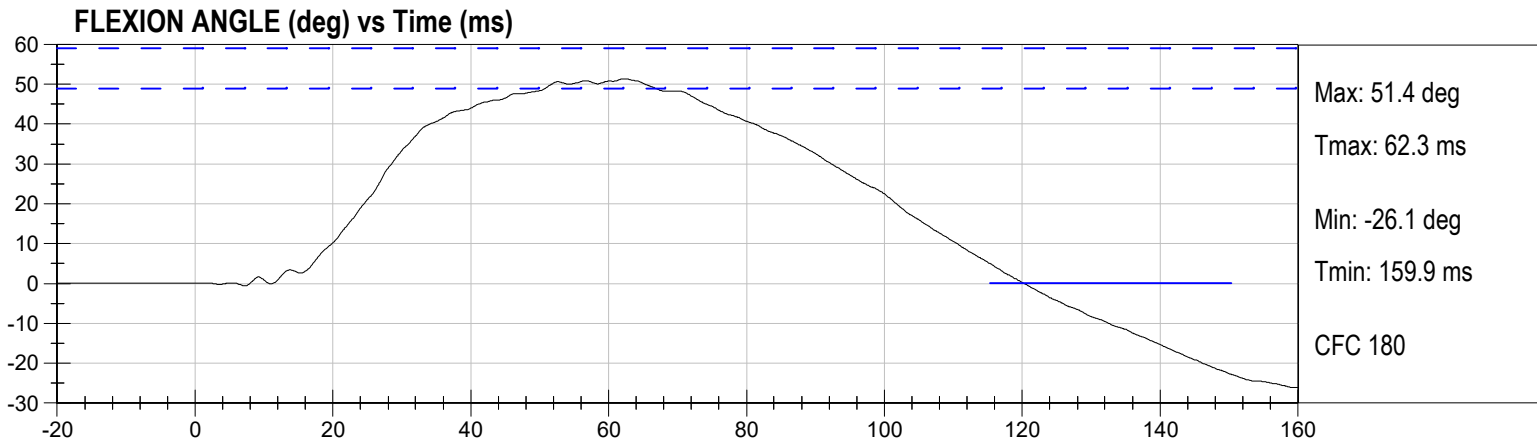
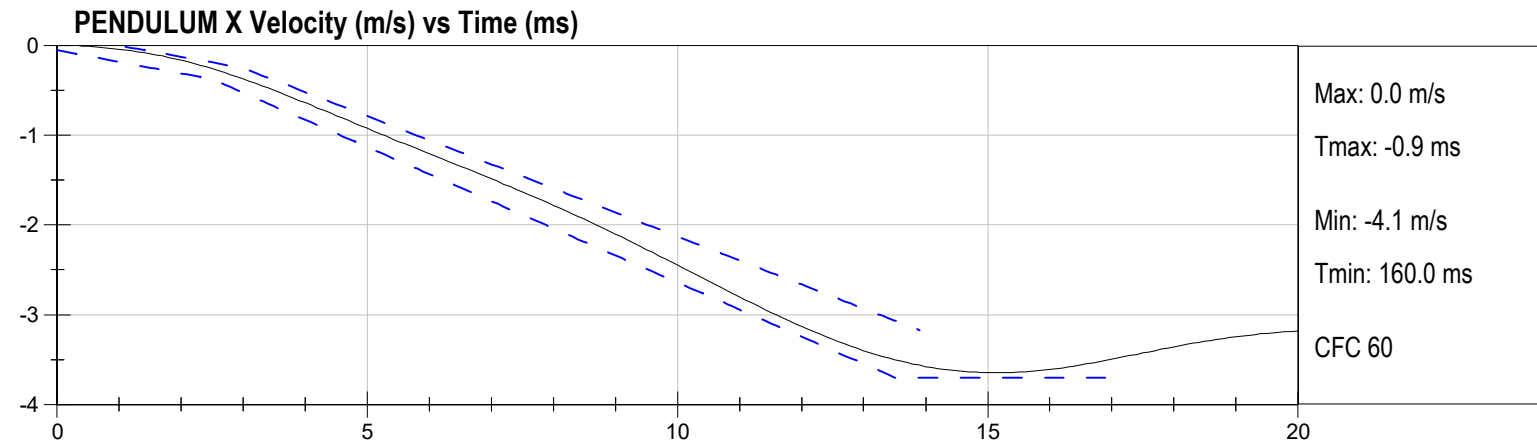
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	24	Pass
Peak Resultant Acceleration	g	125 to 155	135	Pass
Peak Longitudinal Acceleration	g	-15 to 15	8.4	Pass
Unimodal	%	within 15% of peak	3	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
HEAD X	Endevco	T30974	11/25/2024	5/27/2025
HEAD Y	Endevco	T30975	11/25/2024	5/27/2025
HEAD Z	Endevco	T30976	11/25/2024	5/27/2025

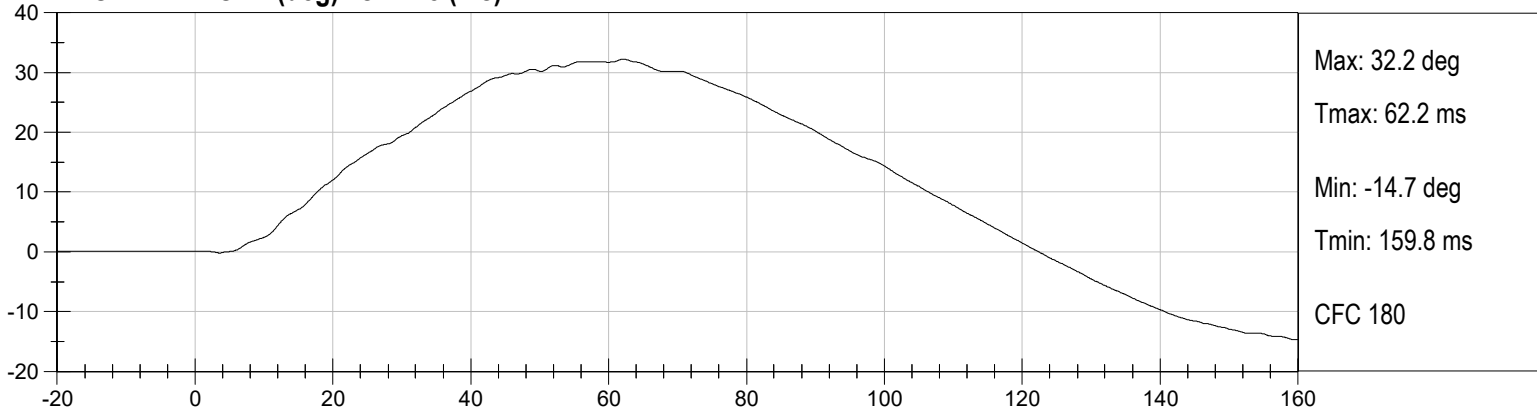


Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	24	Pass
Impact Velocity	m/s	3.30 to 3.50	3.43	Pass
Pendulum Velocity Within Corridor	m/s	Within	Yes	Pass
Maximum Flexion Angle	deg	49 to 59	51.4	Pass
Time of Maximum Flexion Angle	ms	54 to 66	62.3	Pass
Decay Time to Zero Crossing	ms	53 to 88	58.1	Pass

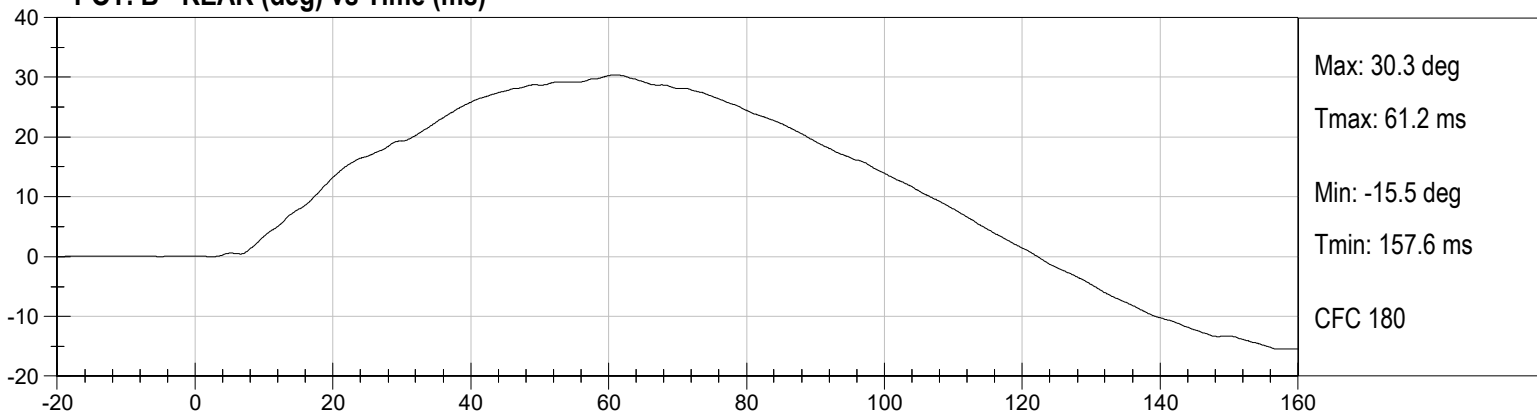
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
PEND. ACCEL.	Endevco	AH5P1	01/13/2025	7/15/2025
POT. B - REAR	Spectrol	025_es2	01/13/2025	7/15/2025
POT. A - FRONT	Spectrol	027_es2	01/13/2025	7/15/2025
POT. C - HEADFORM	Spectrol	028_es2	01/13/2025	7/15/2025



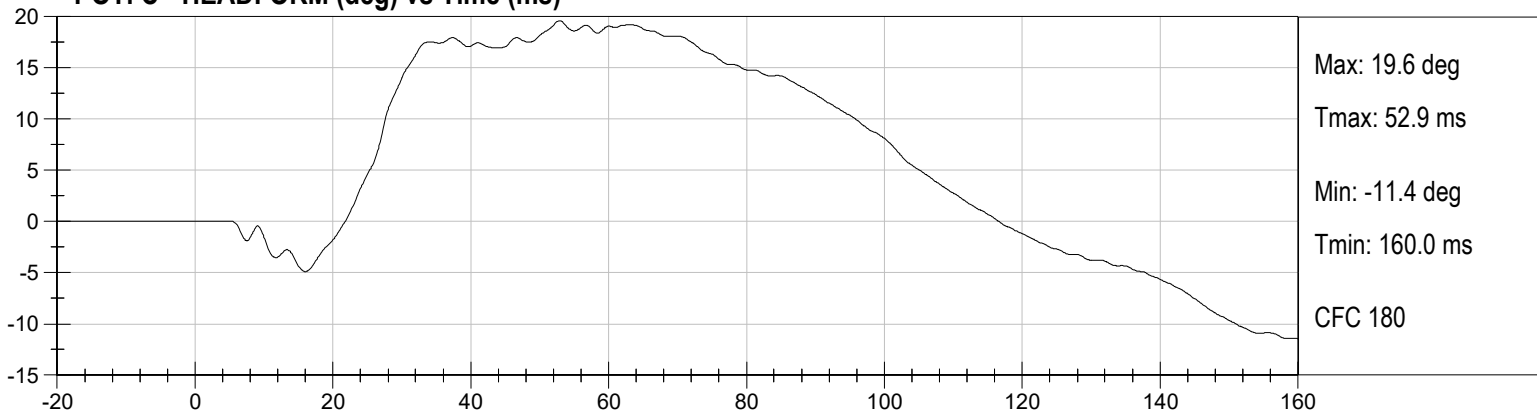
POT. A - FRONT (deg) vs Time (ms)



POT. B - REAR (deg) vs Time (ms)



POT. C - HEADFORM (deg) vs Time (ms)



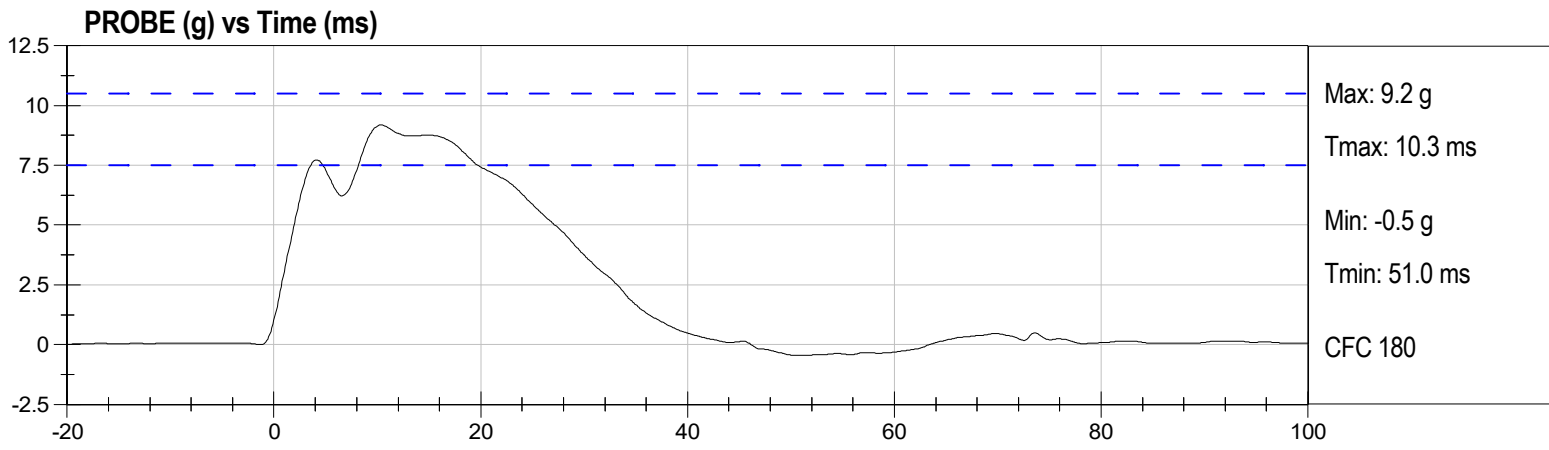


Shoulder Impact Test
ES2re
ATD Serial No: F032

Test Date: 02/19/2025
Test ID: D250533
Test Technician: Jonah Pulokas

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Impact Velocity	m/s	4.2 to 4.4	4.2	Pass
Peak Probe Acceleration	G's	7.5 to 10.5	9.2	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
PROBE	Endevco	P79577	09/18/2024	3/20/2025



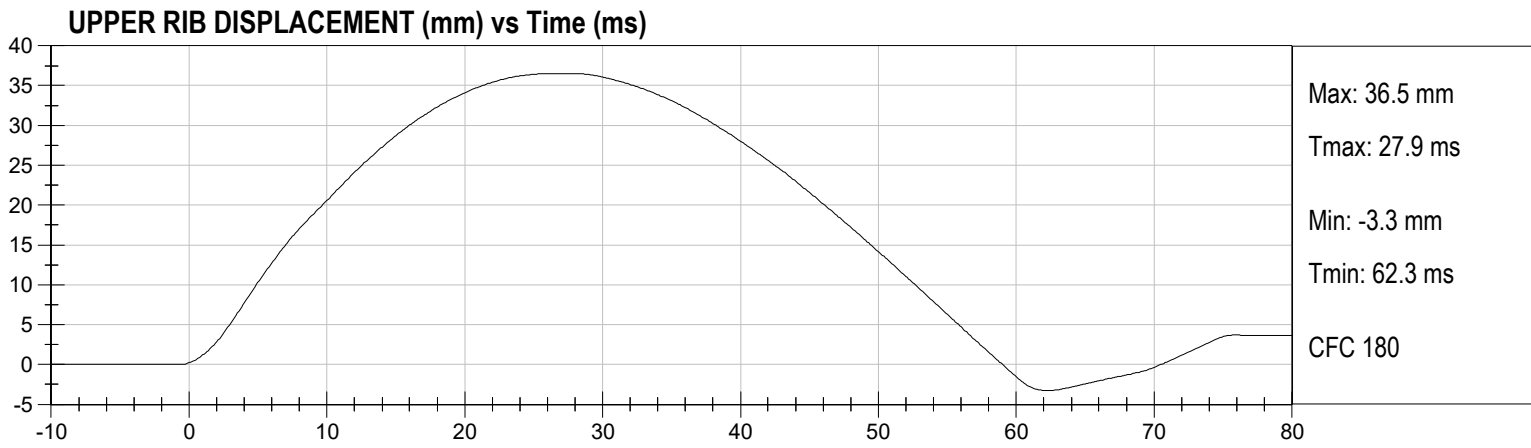


Upper Rib Drop Test - 459mm
ES2re
ATD Serial No: F032

Test Date: 02/19/2025
Test ID: D250534L
Test Technician: Brian Lucas

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Rib Deflection at 459 mm	mm	36 to 40	36.5	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
UPPER RIB DISPLACEMENT	Honeywell	G236	11/21/2024	5/23/2025



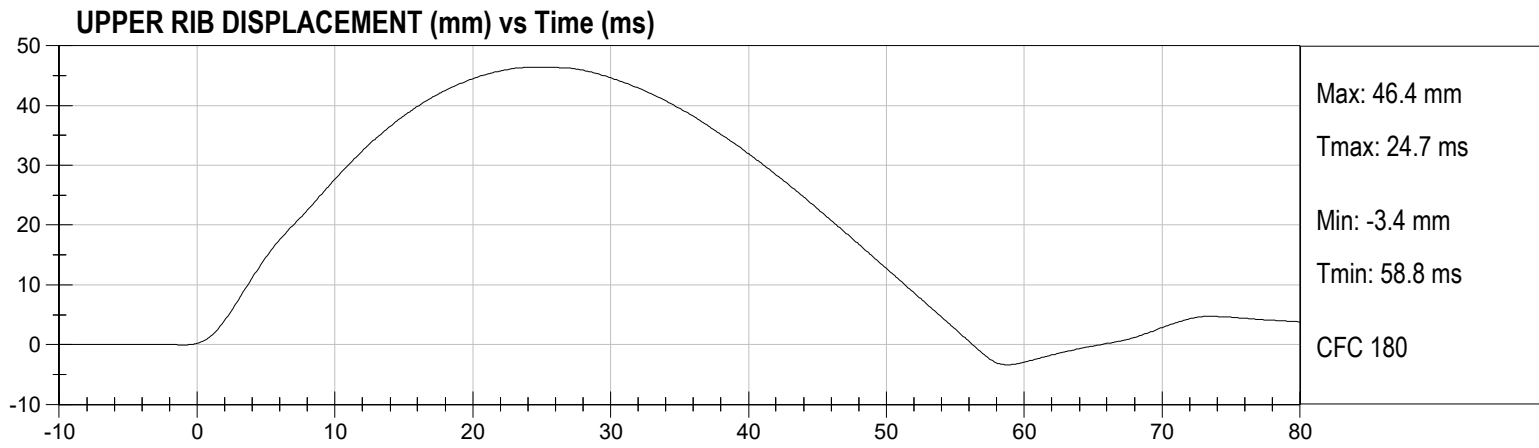


Upper Rib Drop Test - 815mm
ES2re
ATD Serial No: F032

Test Date: 02/19/2025
Test ID: D250534H
Test Technician: Brian Lucas

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Rib Deflection at 815 mm	mm	46 to 51	46.4	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
UPPER RIB DISPLACEMENT	Honeywell	G236	11/21/2024	5/23/2025



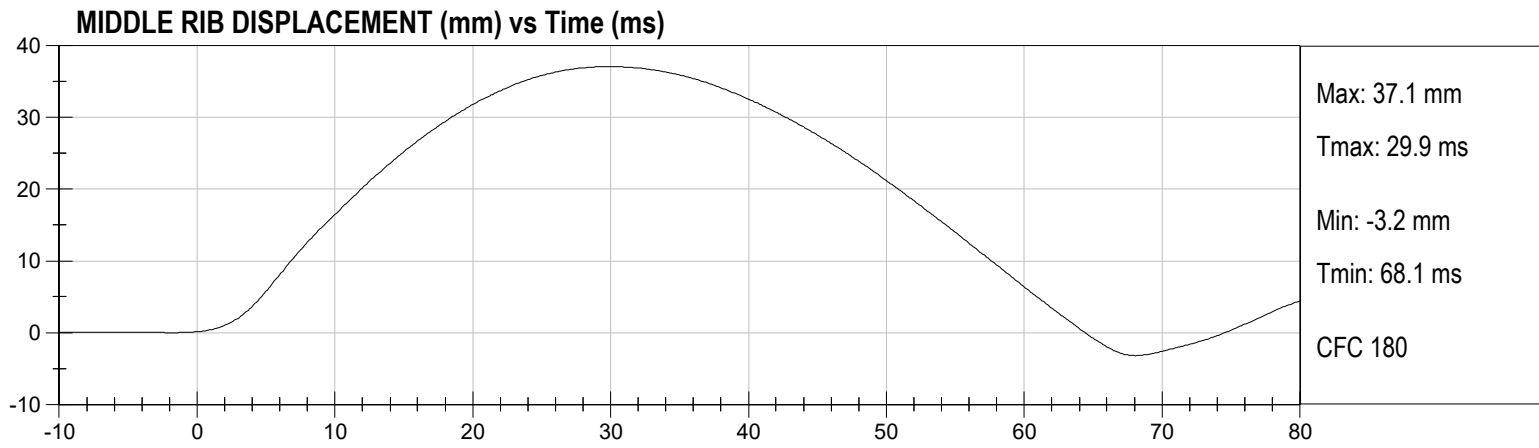


Middle Rib Drop Test - 459mm
ES2re
ATD Serial No: F032

Test Date: 02/19/2025
Test ID: D250535L
Test Technician: Brian Lucas

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Rib Deflection at 459 mm	mm	36 to 40	37.1	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
MIDDLE RIB DISPLACEMENT	Honeywell	G368	11/21/2024	5/23/2025



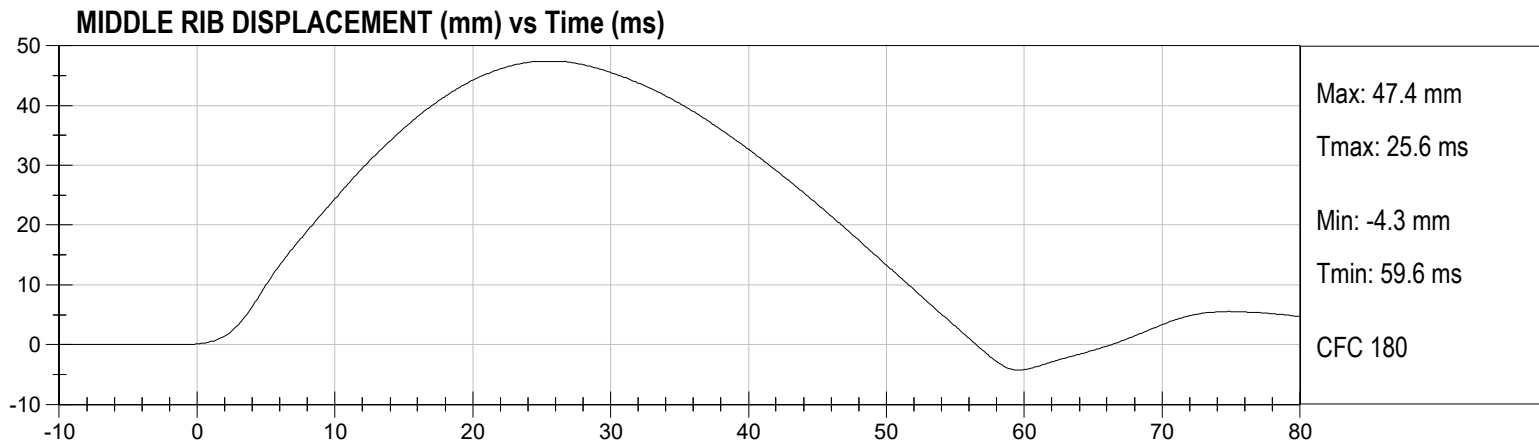


Middle Rib Drop Test - 815mm
ES2re
ATD Serial No: F032

Test Date: 02/19/2025
Test ID: D250535H
Test Technician: Brian Lucas

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Rib Deflection at 815 mm	mm	46 to 51	47.4	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
MIDDLE RIB DISPLACEMENT	Honeywell	G368	11/21/2024	5/23/2025



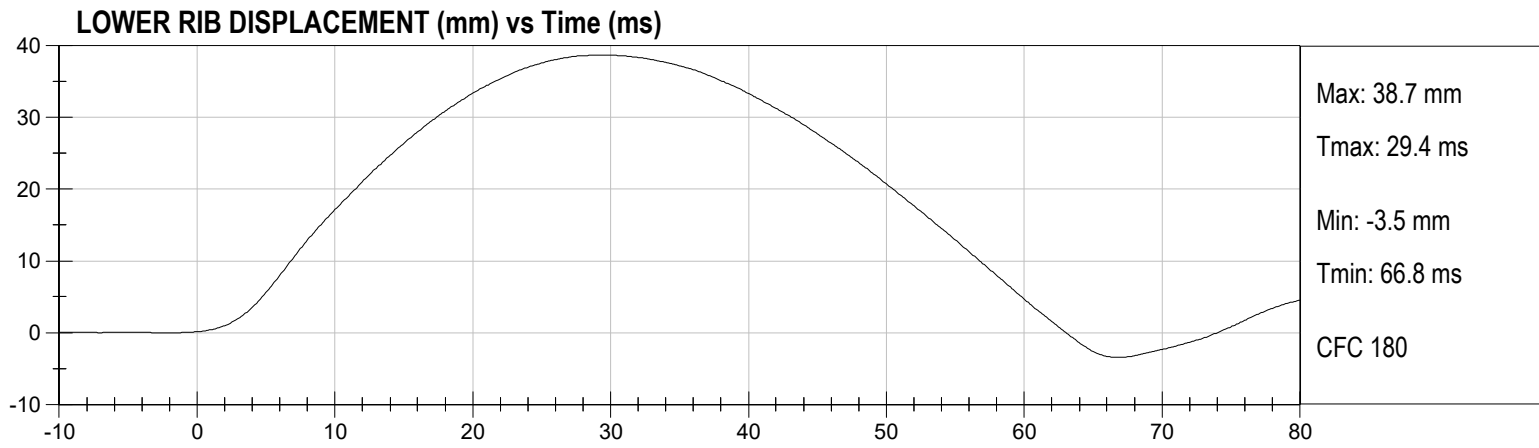


Lower Rib Drop Test - 459mm
ES2re
ATD Serial No: F032

Test Date: 02/19/2025
Test ID: D250536L
Test Technician: Brian Lucas

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Rib Deflection at 459 mm	mm	36 to 40	38.7	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
LOWER RIB DISPLACEMENT	Honeywell	G164	11/21/2024	5/23/2025



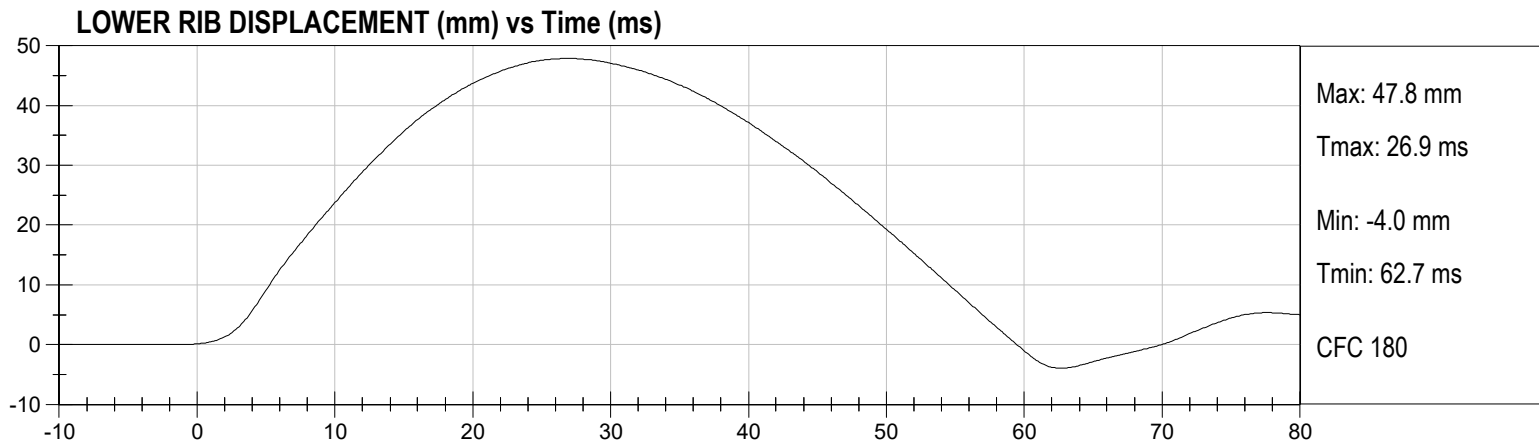


Lower Rib Drop Test - 815mm
ES2re
ATD Serial No: F032

Test Date: 02/19/2025
Test ID: D250536H
Test Technician: Brian Lucas

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Rib Deflection at 815 mm	mm	46 to 51	47.8	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
LOWER RIB DISPLACEMENT	Honeywell	G164	11/21/2024	5/23/2025



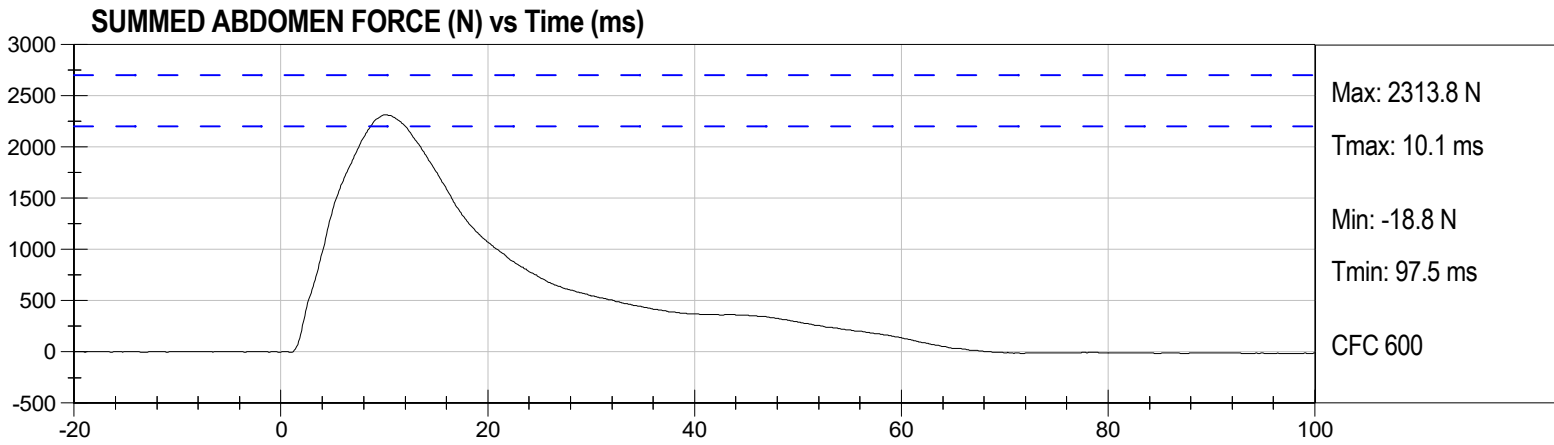
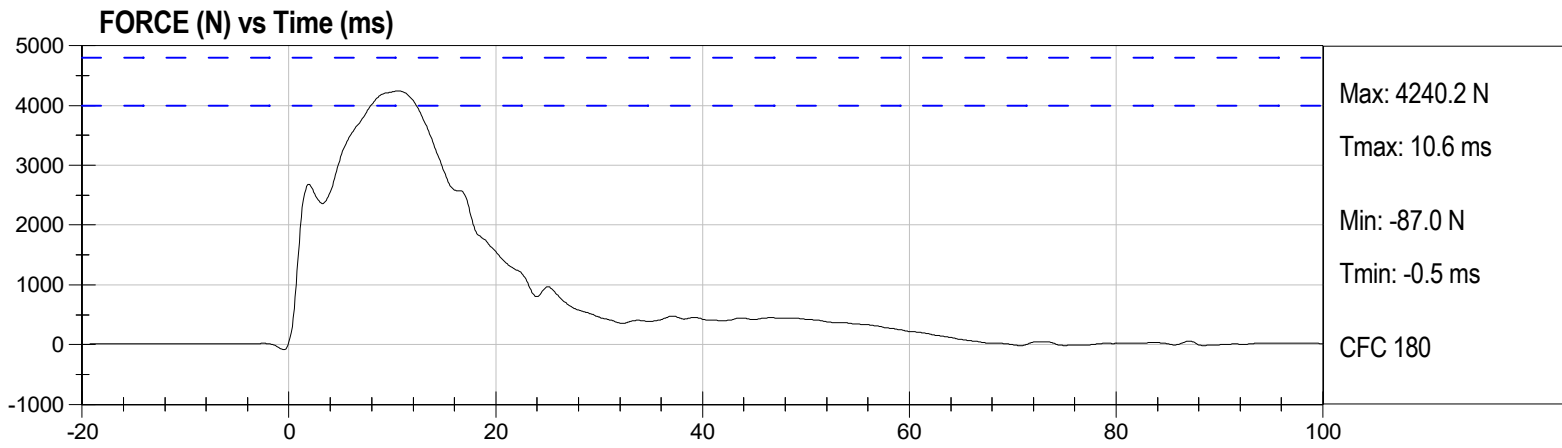


Abdomen Impact Test
ES2re
ATD Serial No: F032

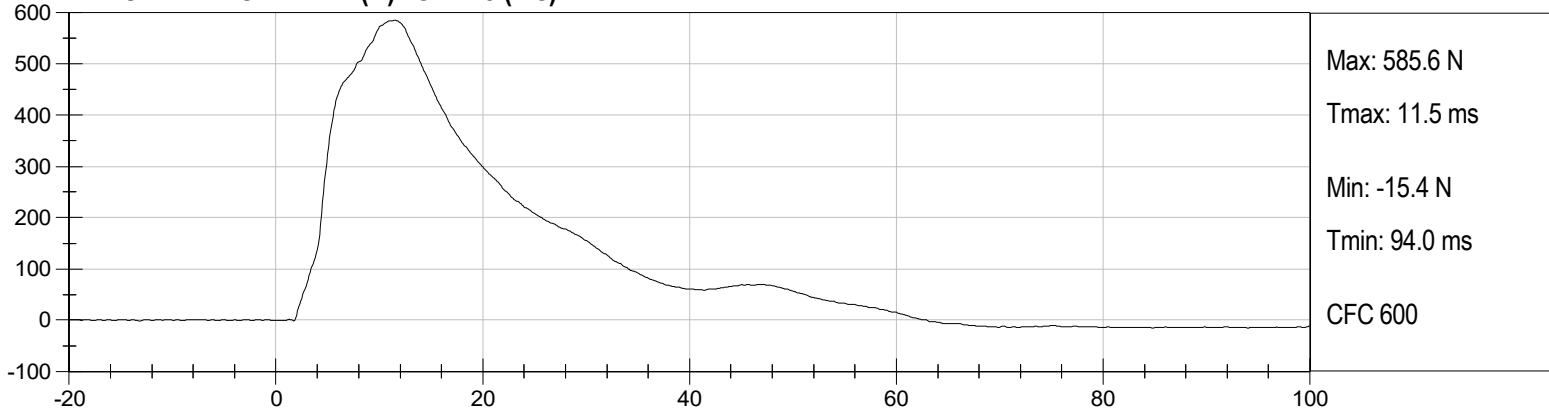
Test Date: 02/19/2025
Test ID: D250537
Test Technician: Jonah Pulokas

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Impact Velocity	m/s	3.9 to 4.1	4.0	Pass
Peak Probe Force	N	4000 to 4800	4240	Pass
Time of Peak Probe Force	ms	10.6 to 13.0	10.6	Pass
Peak Abdomen Force	N	2200 to 2700	2314	Pass
Time of Peak Abdomen Force	ms	10.0 to 12.3	10.1	Pass

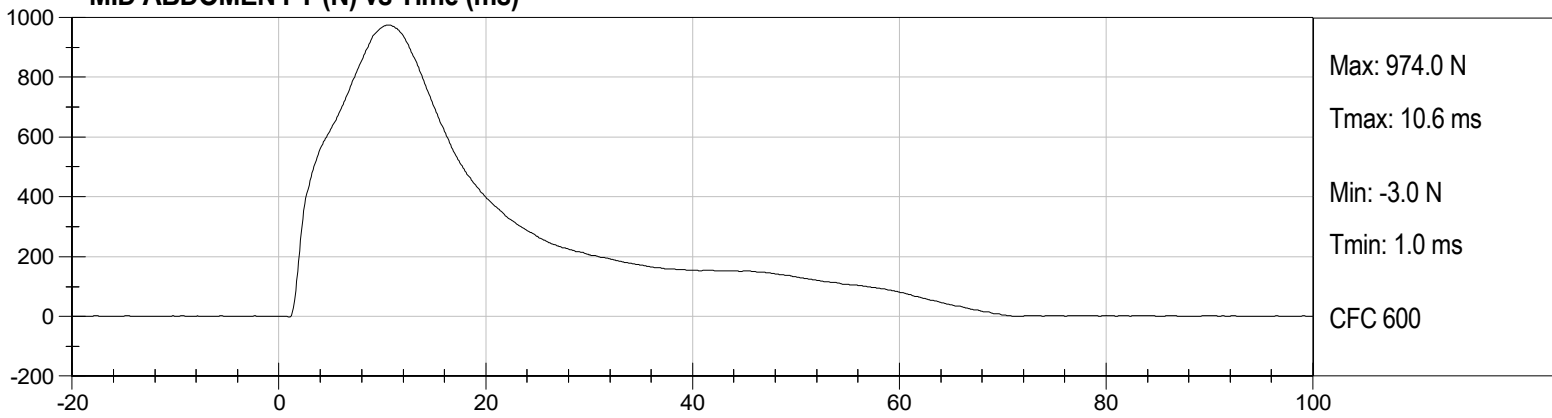
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
PROBE	Endevco	P79577	09/18/2024	3/20/2025
FRONT ABDOMEN FY	Denton	ABG1532FY	01/20/2025	1/20/2026
MID ABDOMEN FY	Denton	ABG1534FY	01/20/2025	1/20/2026
REAR ABDOMEN FY	Denton	ABG1535FY	01/20/2025	1/20/2026



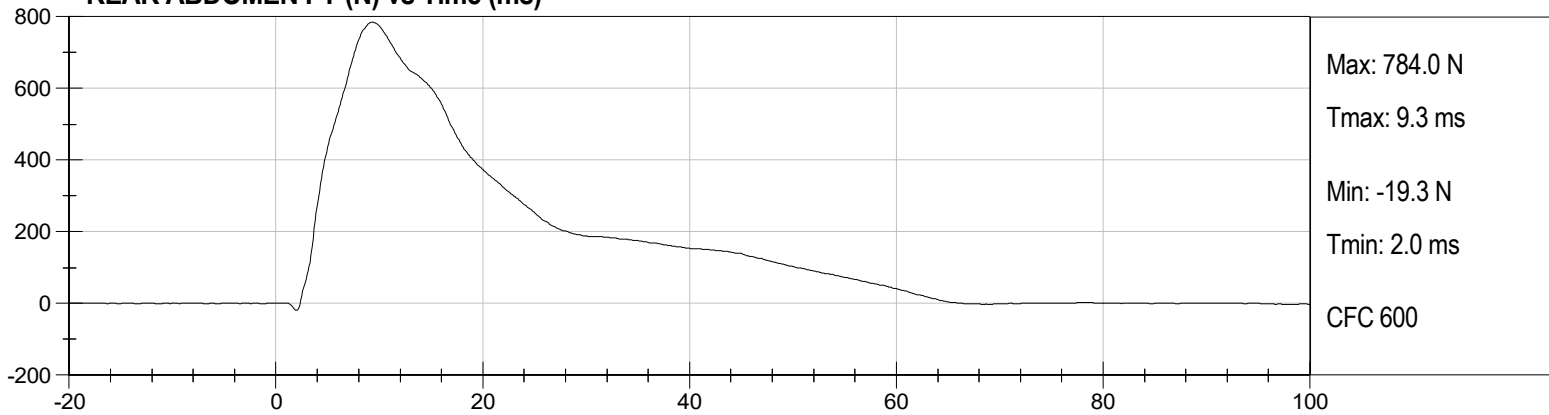
FRONT ABDOMEN FY (N) vs Time (ms)



MID ABDOMEN FY (N) vs Time (ms)

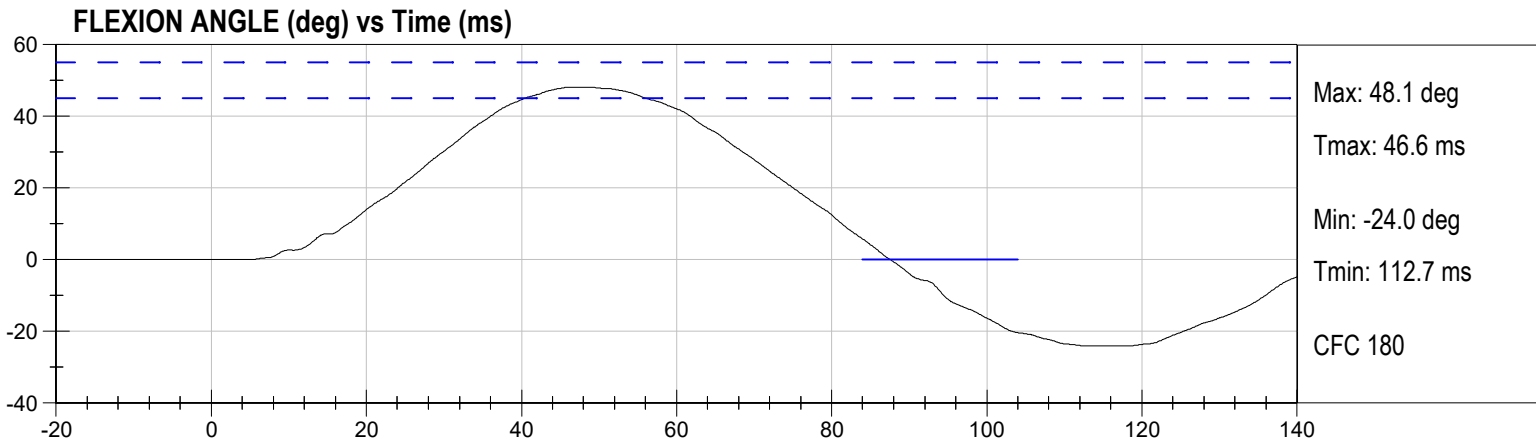
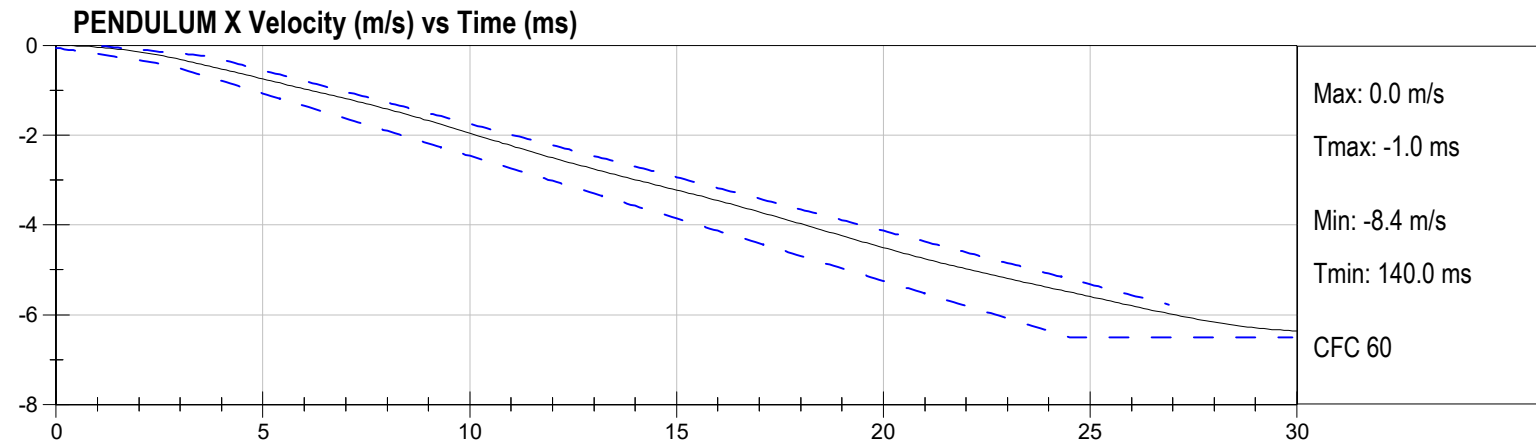


REAR ABDOMEN FY (N) vs Time (ms)

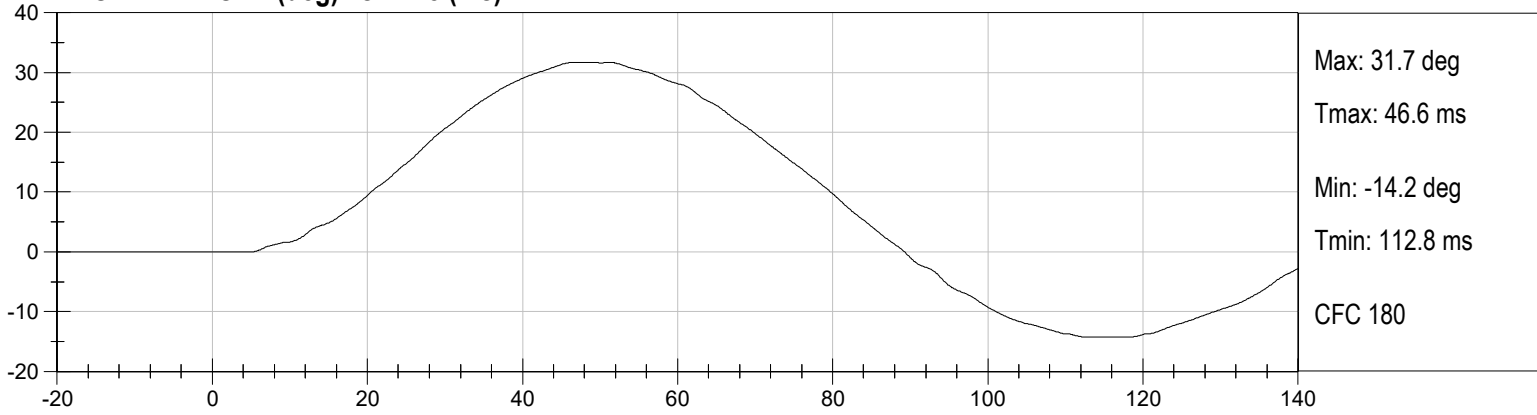


Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	23	Pass
Impact Velocity	m/s	5.95 to 6.15	6.05	Pass
Pendulum Velocity Within Corridor	m/s	Within	Yes	Pass
Maximum Flexion Angle	deg	45 to 55	48	Pass
Time of Maximum Flexion Angle	ms	39 to 53	47	Pass
Decay Time to Zero Crossing from Peak	ms	37 to 57	41	Pass

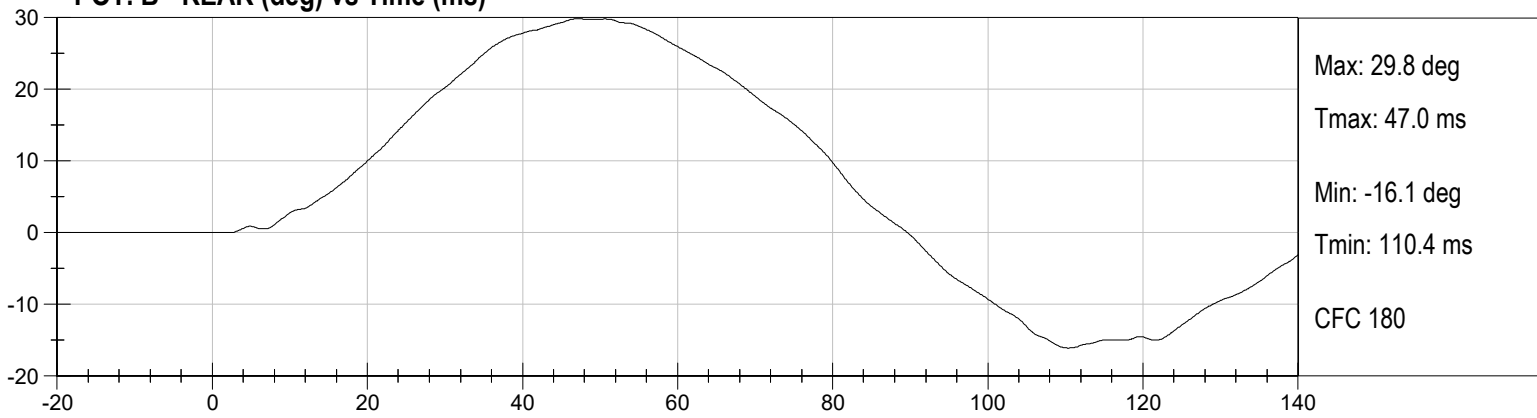
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
PEND. ACCEL.	Endevco	AH5P1	01/13/2025	7/15/2025
POT. B - REAR	Spectrol	025_es2	01/13/2025	7/15/2025
POT. A - FRONT	Spectrol	027_es2	01/13/2025	7/15/2025
POT. C - HEADFORM	Spectrol	028_es2	01/13/2025	7/15/2025



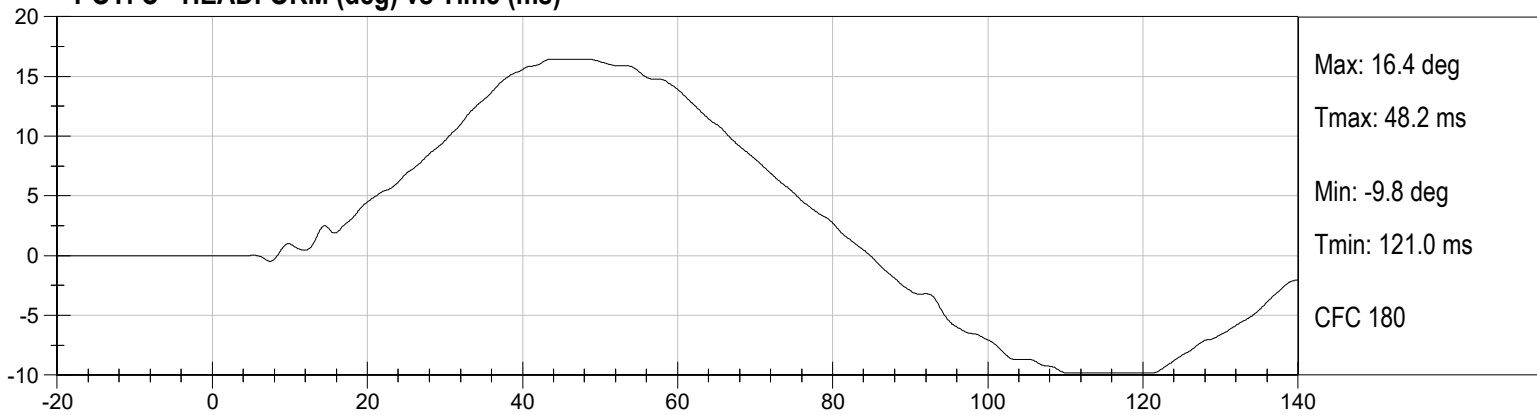
POT. A - FRONT (deg) vs Time (ms)



POT. B - REAR (deg) vs Time (ms)



POT. C - HEADFORM (deg) vs Time (ms)



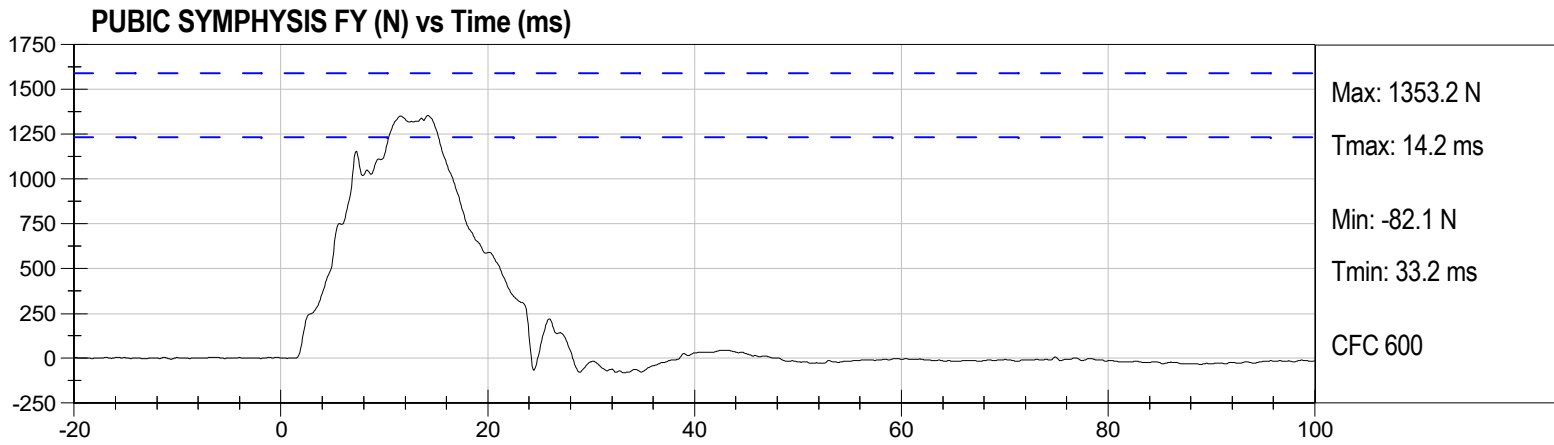
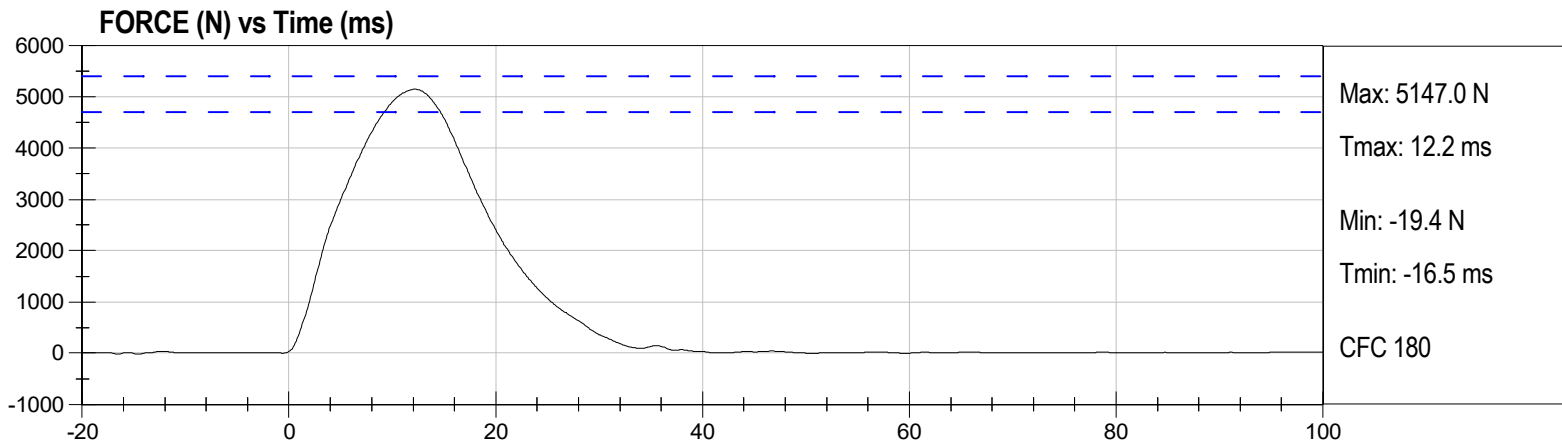


Pelvis Impact Test
ES2re
ATD Serial No: F032

Test Date: 02/19/2025
Test ID: D250539
Test Technician: Jonah Pulokas

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Impact Velocity	m/s	4.2 to 4.4	4.38	Pass
Peak Probe Force	N	4700 to 5400	5147	Pass
Time of Peak Probe Force	ms	11.8 to 16.1	12.2	Pass
Peak Pubic Force	N	1230 to 1590	1353	Pass
Time of Peak Pubic Force	ms	12.2 to 17.0	14.2	Pass

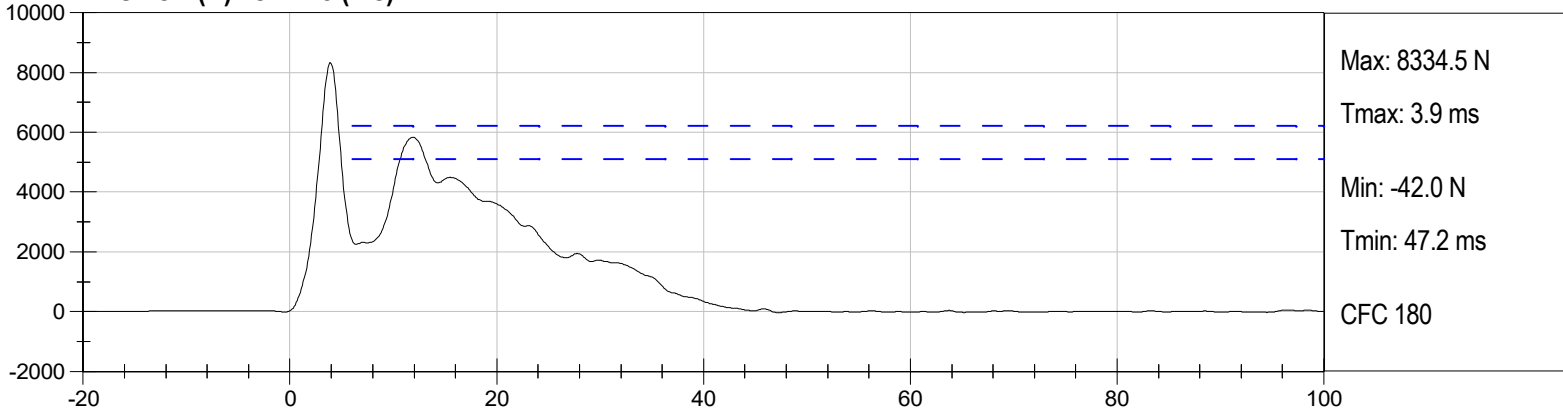
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
PROBE	Endevco	P79577	09/18/2024	3/20/2025
PUBIC SYMPHYSIS FY	Denton	PG461FY	01/20/2025	1/20/2026



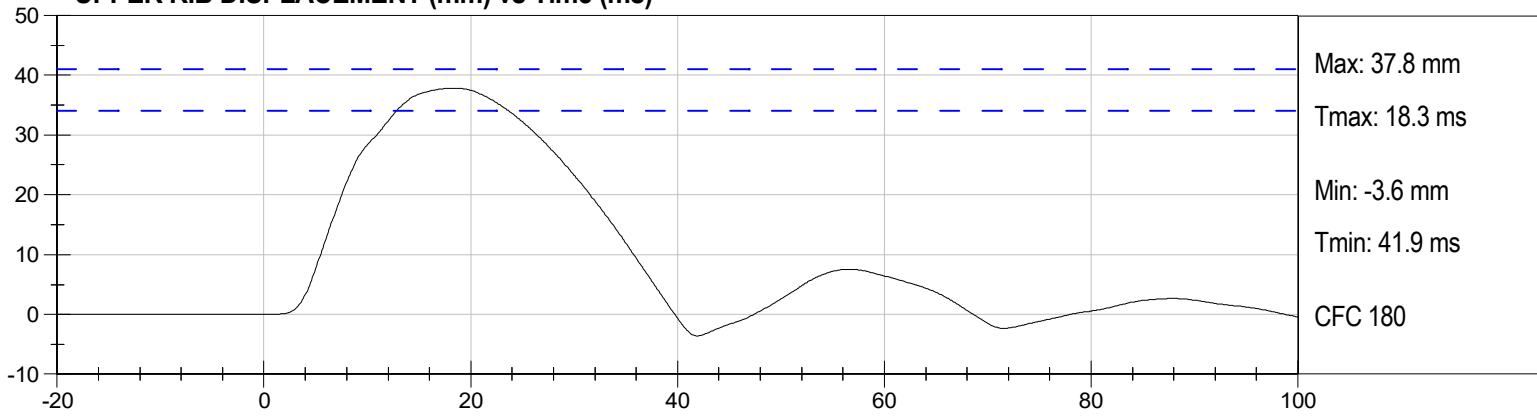
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Impact Velocity	m/s	5.4 to 5.6	5.52	Pass
Peak Probe Force after 6 ms	N	5100 to 6200	5820	Pass
Maximum Upper Thorax Rib Displacement	mm	34 to 41	37.8	Pass
Maximum Middle Thorax Rib Displacement	mm	37 to 45	40.3	Pass
Maximum Lower Thorax Rib Displacement	mm	37 to 44	39.2	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
PROBE	Endevco	P79577	09/18/2024	3/20/2025
UPPER RIB DISPLACEMENT	Honeywell	G236	11/21/2024	5/23/2025
MIDDLE RIB DISPLACEMENT	Honeywell	G368	11/21/2024	5/23/2025
LOWER RIB DISPLACEMENT	Honeywell	G164	11/21/2024	5/23/2025

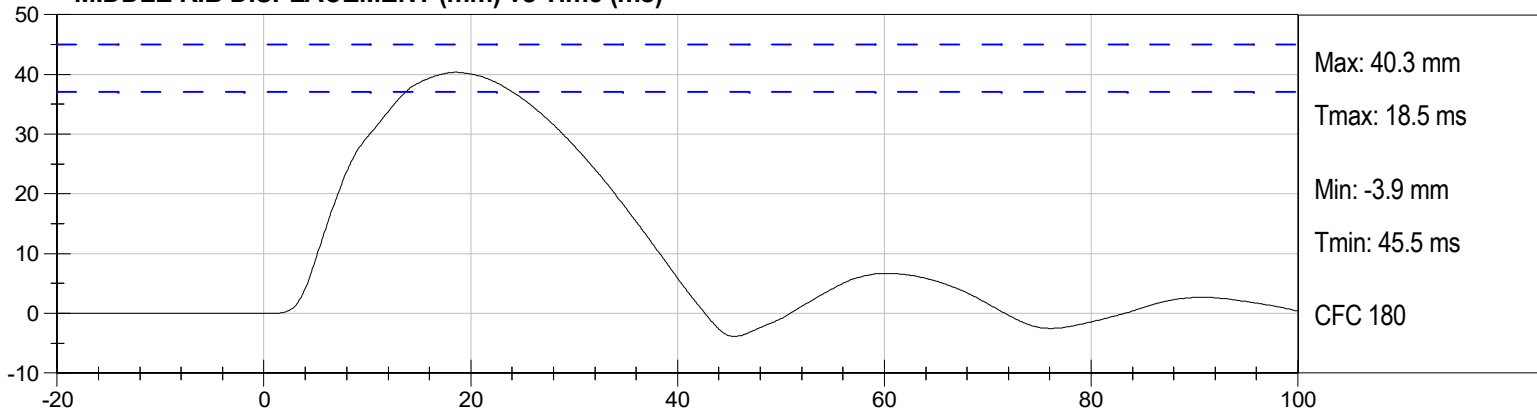
FORCE (N) vs Time (ms)



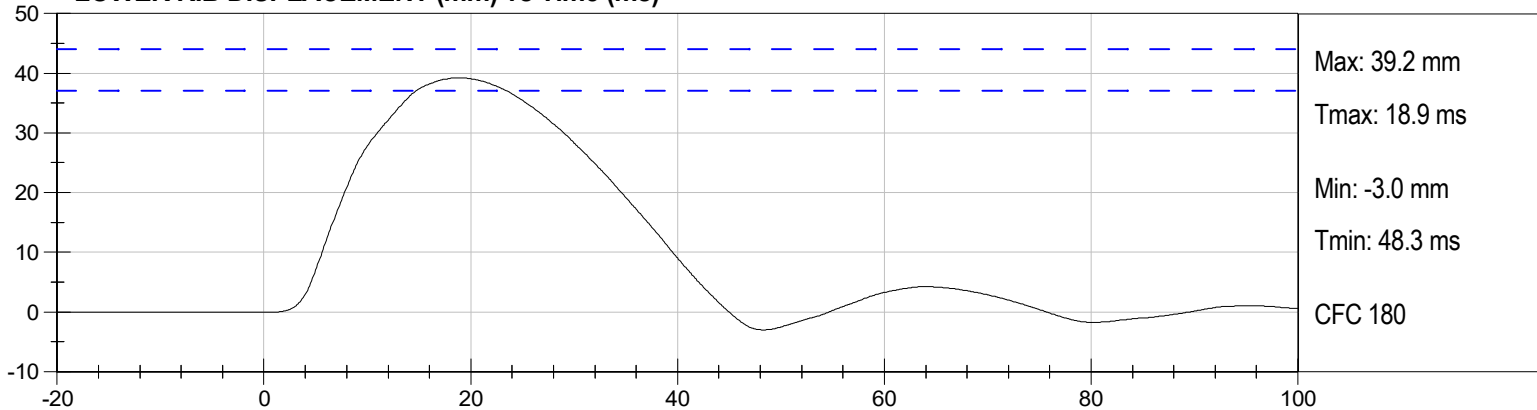
UPPER RIB DISPLACEMENT (mm) vs Time (ms)



MIDDLE RIB DISPLACEMENT (mm) vs Time (ms)



LOWER RIB DISPLACEMENT (mm) vs Time (ms)



QUALIFICATION TEST RESULTS

PRE-TEST

SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD

SID-IIsD External Measurements
SN: 306

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

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

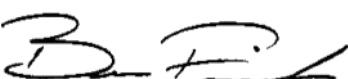
ATD Serial No: 306

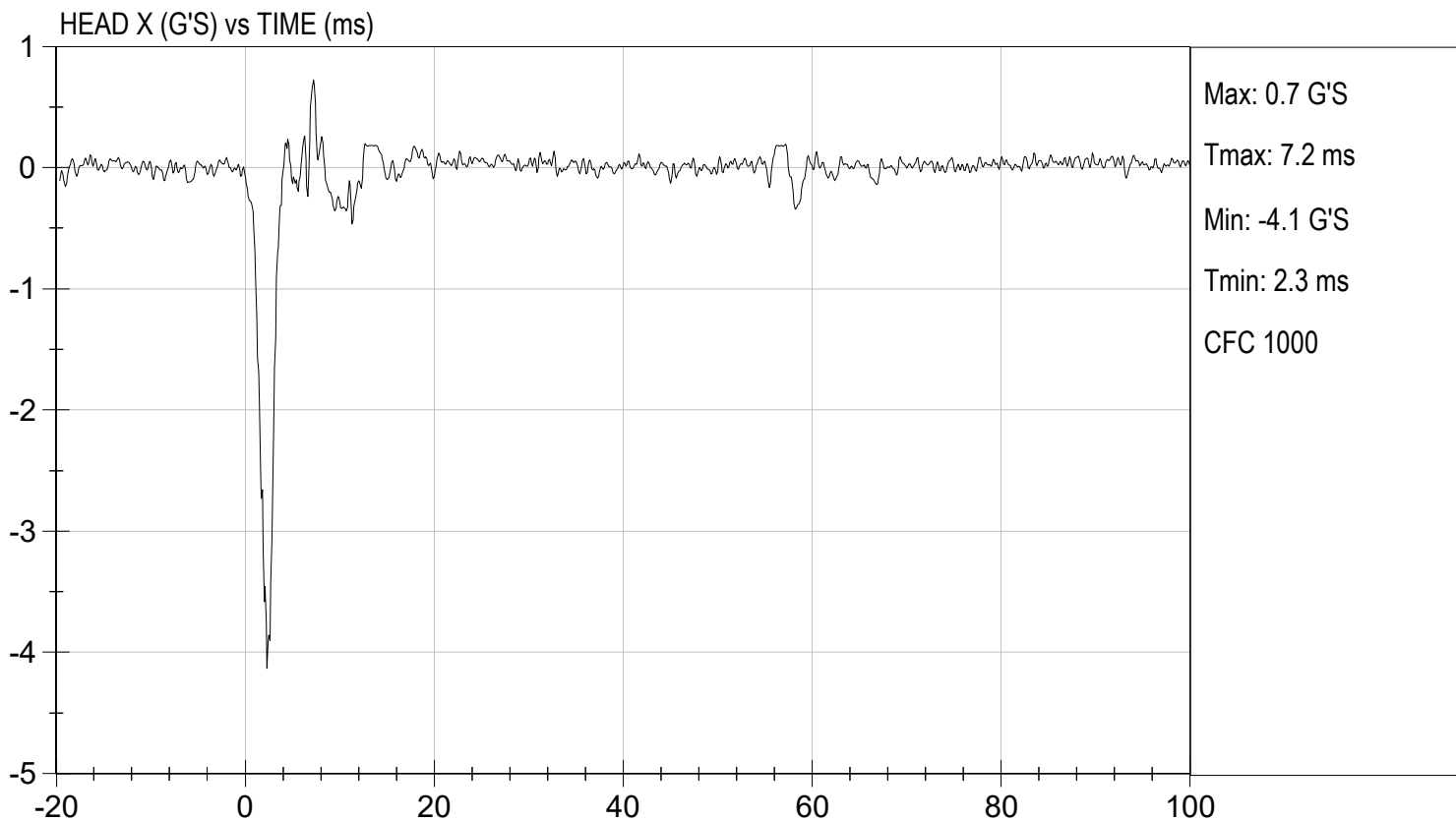
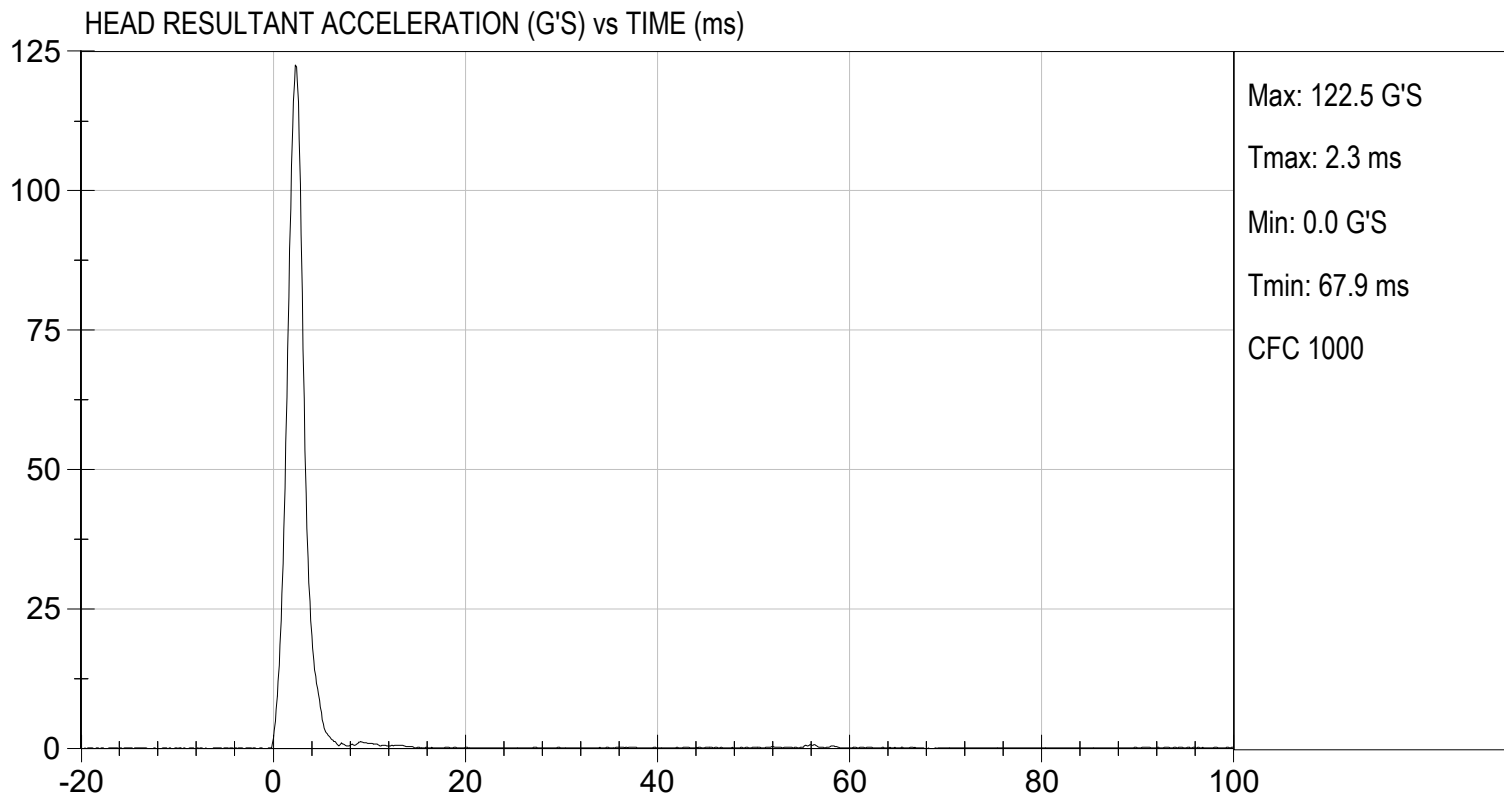
Test ID: D250291

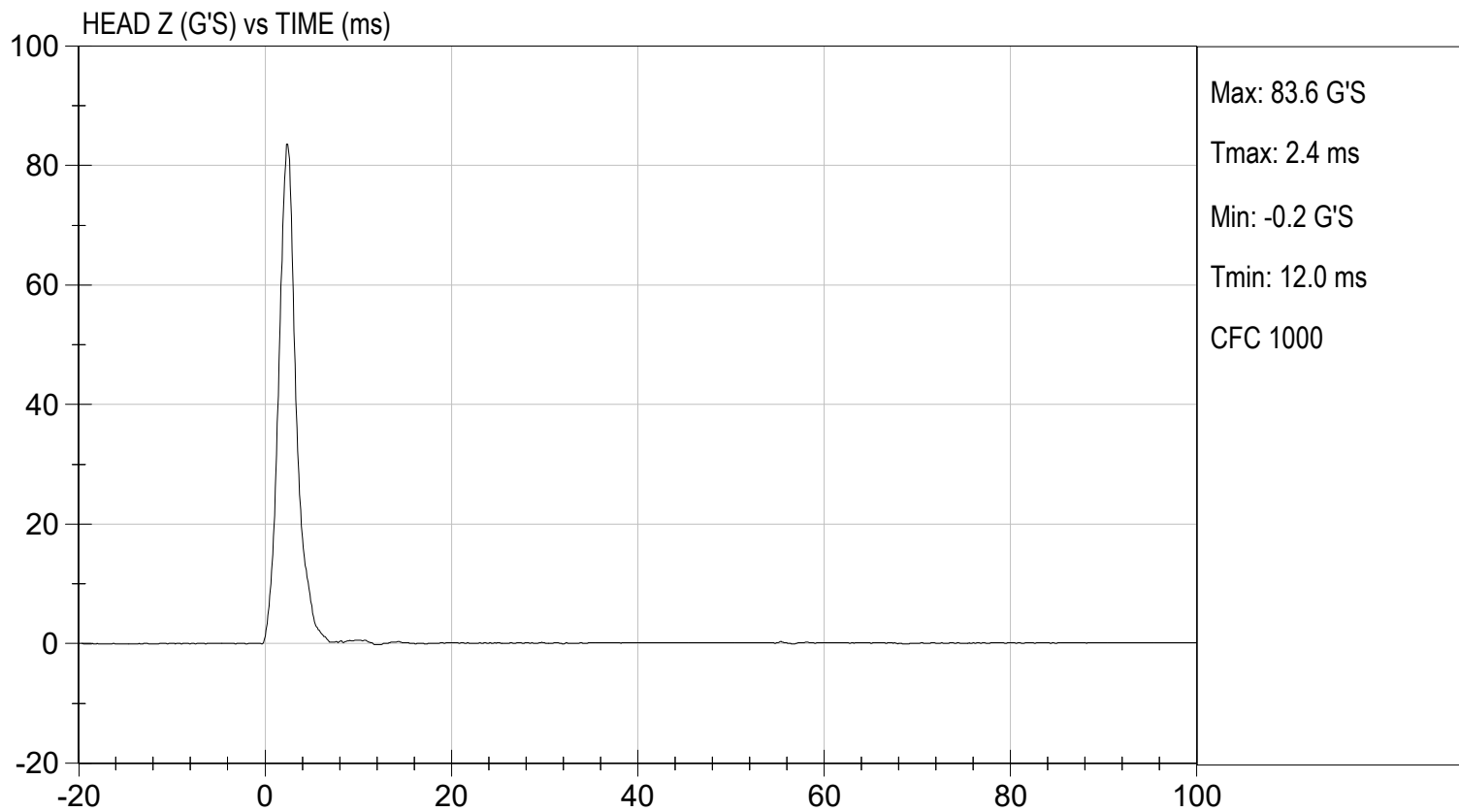
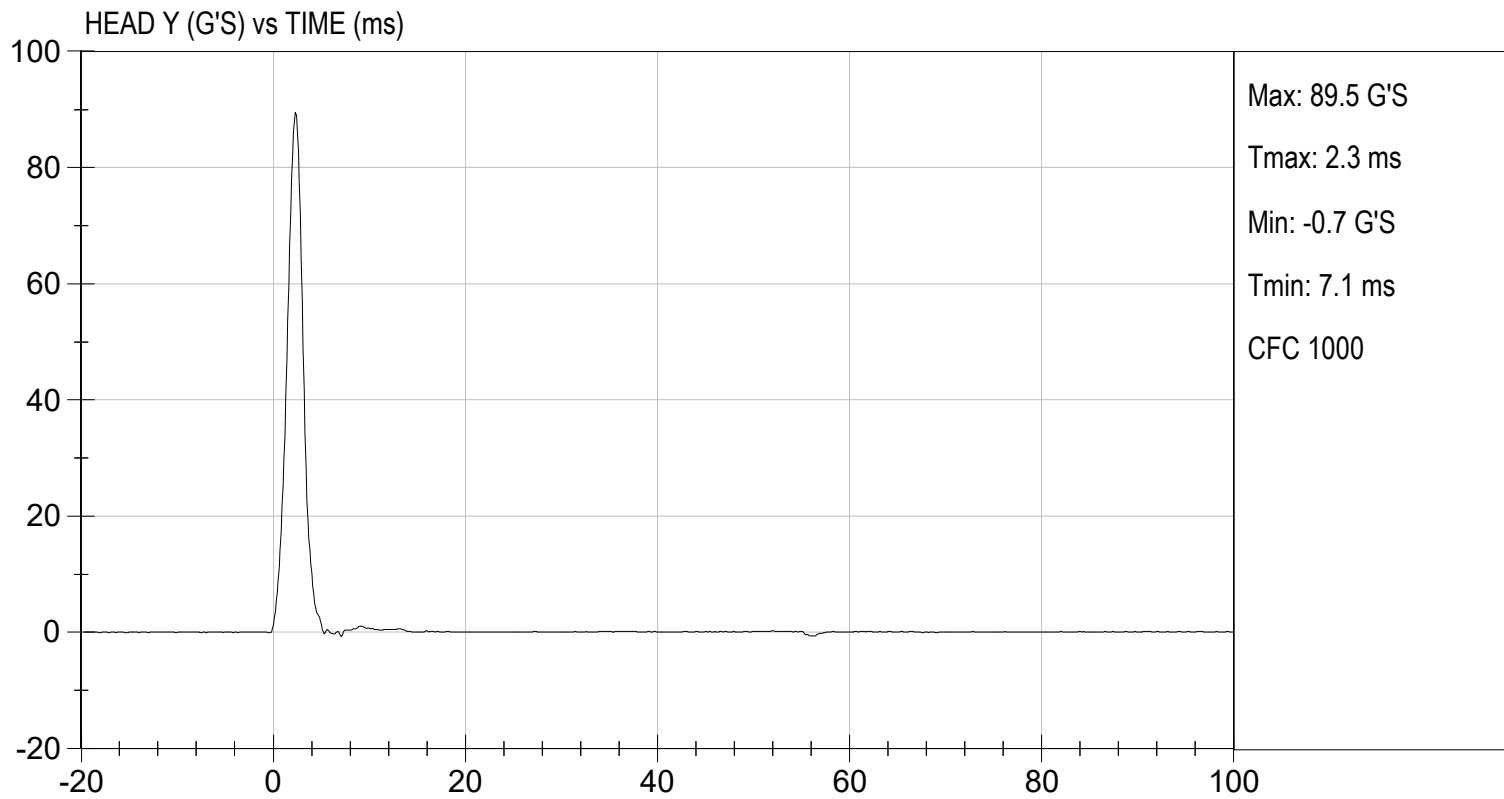
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Peak Resultant Acceleration	G's	115 to 137	123	Pass
Peak Longitudinal Acceleration	G's	+/- 15	-4.1	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	<15%	Yes	Pass
Overall Test Results				Pass


Laboratory Technician

01/27/2025
Test Date


Approved By





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

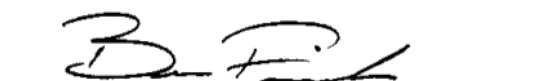
ATD Serial No: 306

Test I.D: D250292

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.4	Pass
Humidity		%	10 to 70	13	Pass
Impact Velocity		m/s	5.51 to 5.63	5.52	Pass
Pendulum Velocity	10 ms	m/s	2.20 to 2.80	2.26	Pass
	15 ms	m/s	3.30 to 4.10	3.56	Pass
	20 ms	m/s	4.40 to 5.40	5.03	Pass
	25 ms	m/s	5.40 to 6.10	5.99	Pass
	25-100 ms	m/s	5.50 to 6.20	6.01	Pass
Maximum D-Plane Rotation		deg	71 to 81	75	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	66	Pass
Maximum Occipital Condyle Moment		Nm	-44 to -36	-38	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	120	Pass
Overall Test Results				Pass	


Laboratory Technician

01/27/2025
Test Date

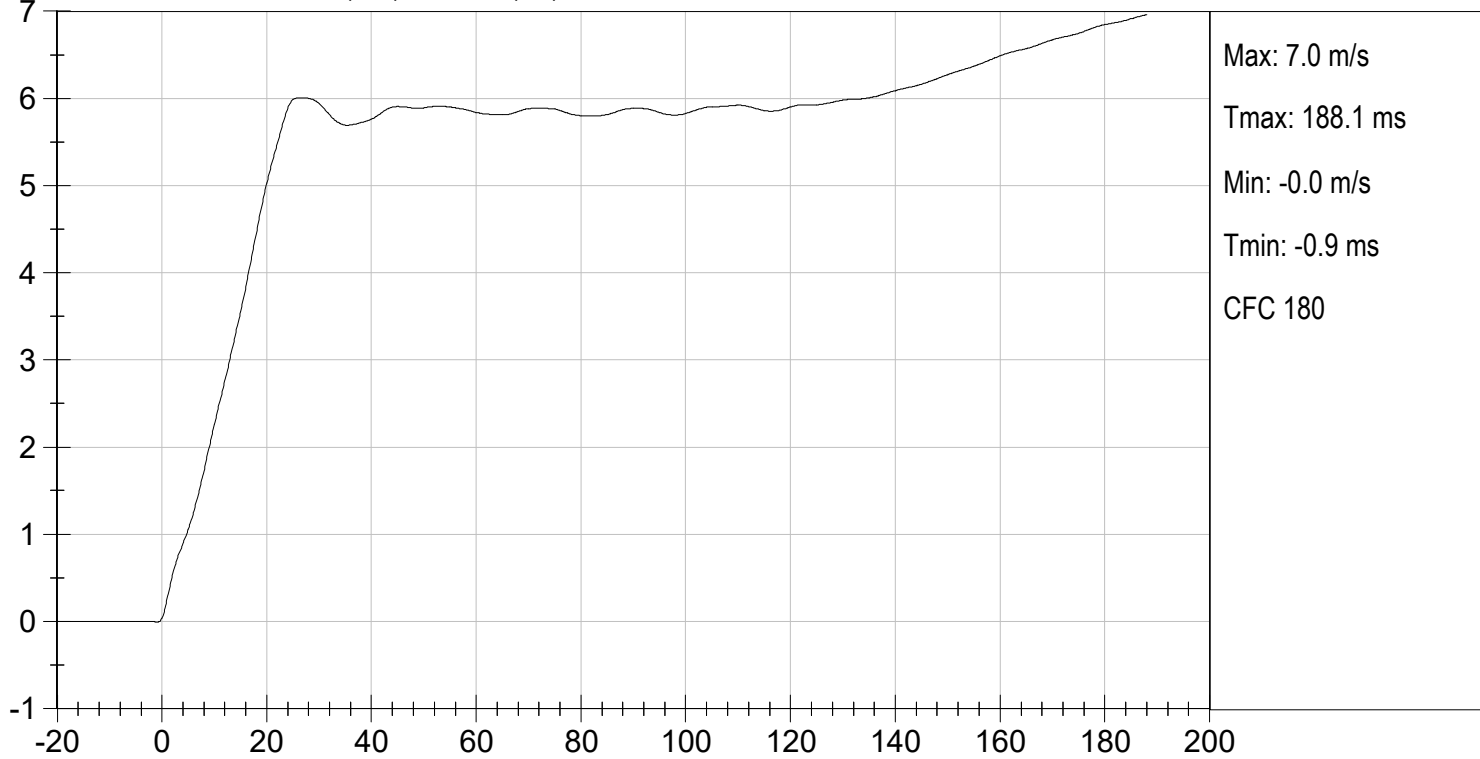

Approved By



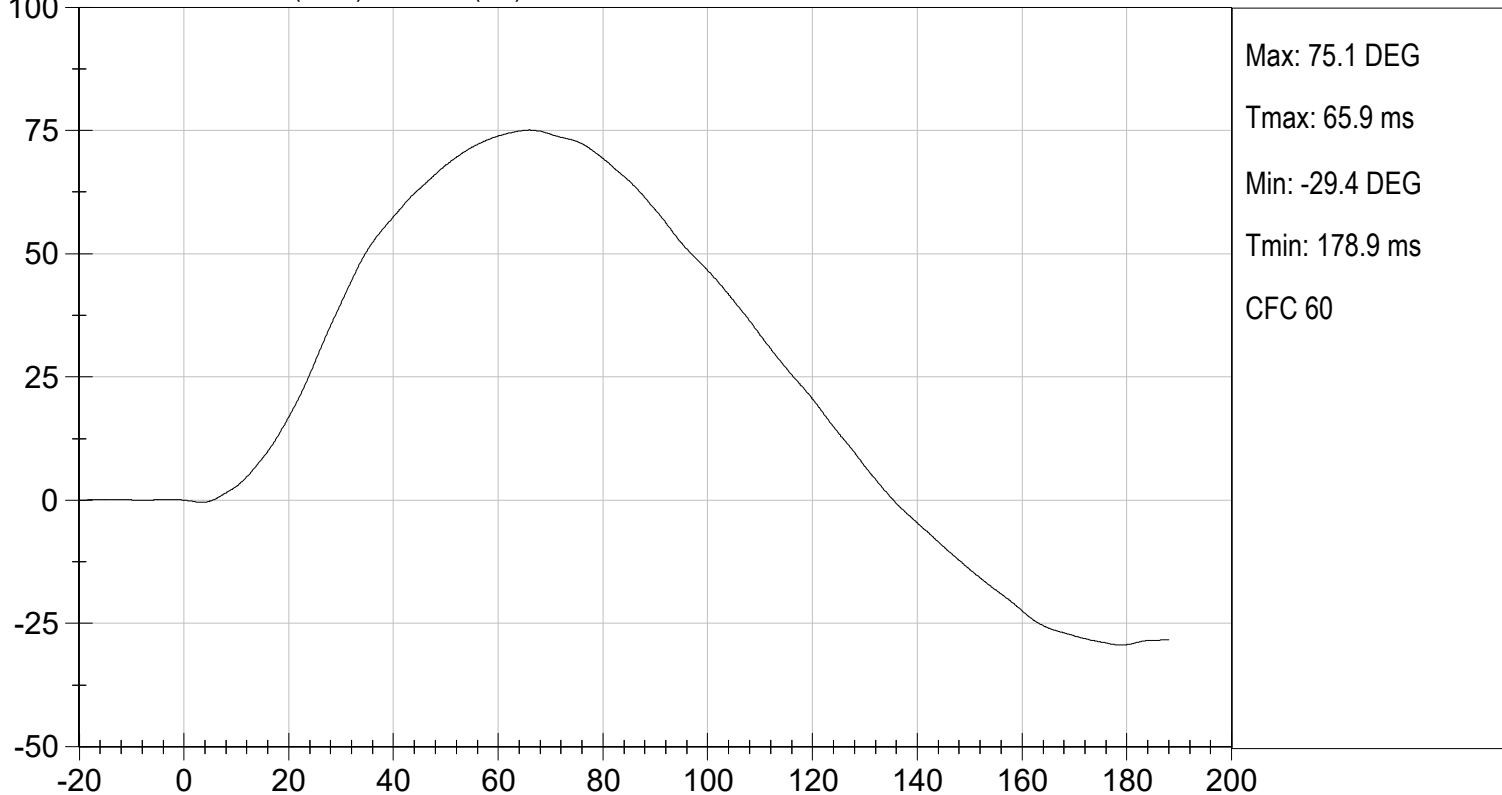
TEST DESC: NECK BENDING
VELOCITY: 18.12 ft/s, 5.52 m/s

TEST DATE: 01/27/2025
TEST #: D250292

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



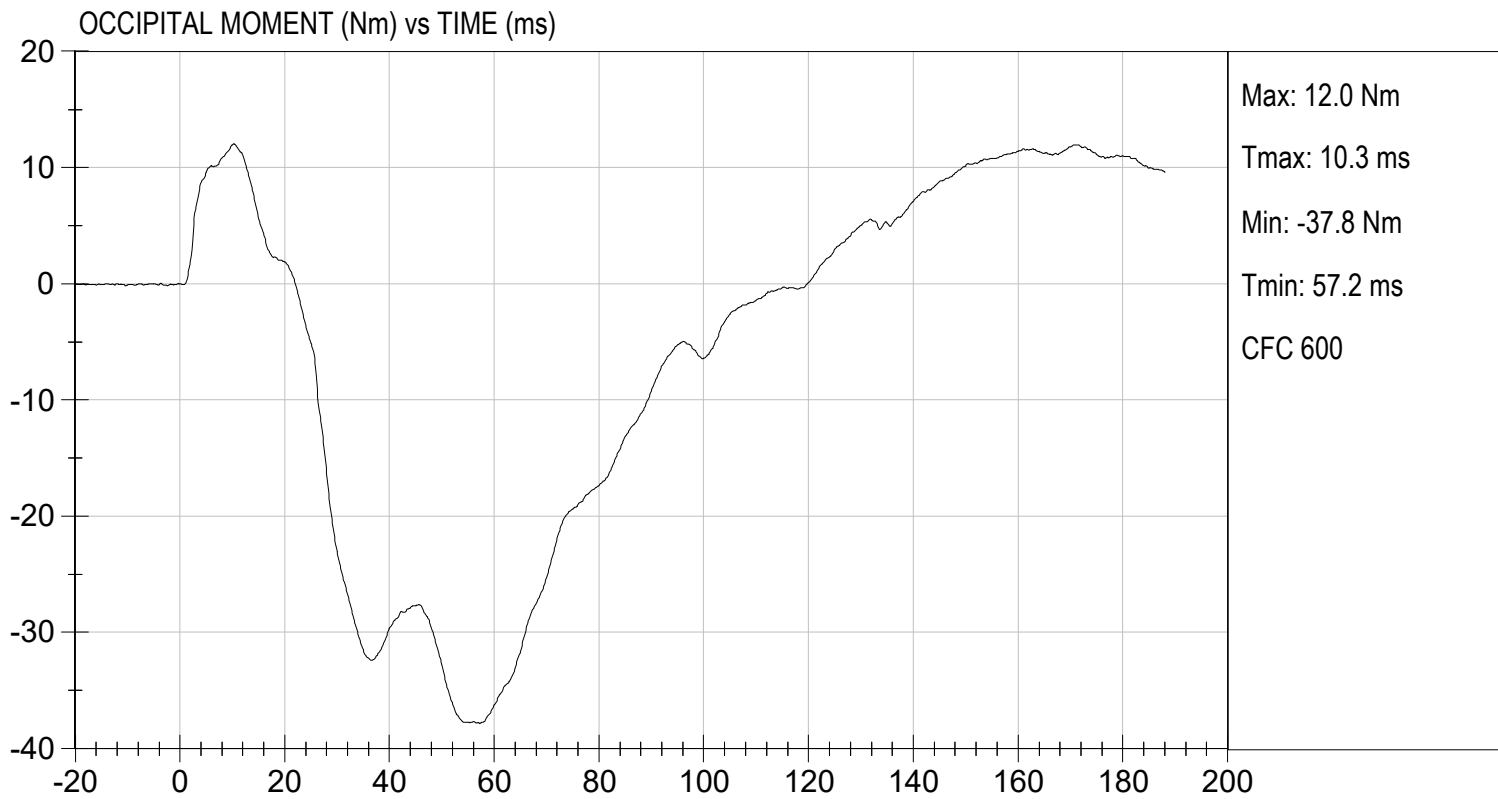
FLEXION ANGLE (DEG) vs TIME (ms)





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

TEST DATE: 01/27/2025
TEST #: D250292



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

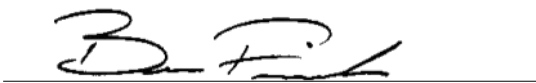
ATD Serial No: 306

Test ID: D250293

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Maximum Probe Acceleration	G's	13 to 18	14	Pass
Shoulder Displacement	mm	28 to 37	30	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	19	Pass
Overall Test Results			Pass	


Laboratory Technician

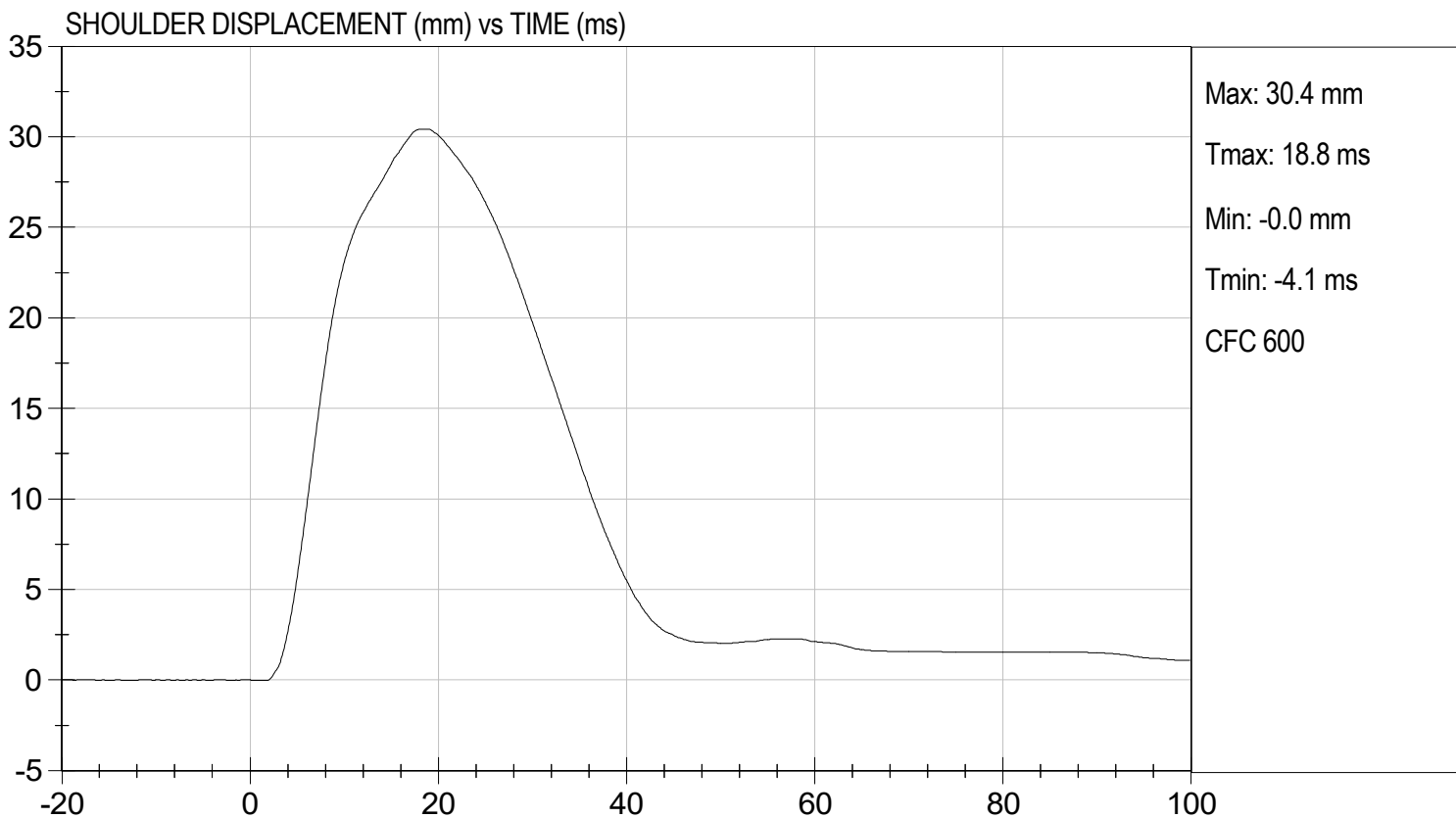
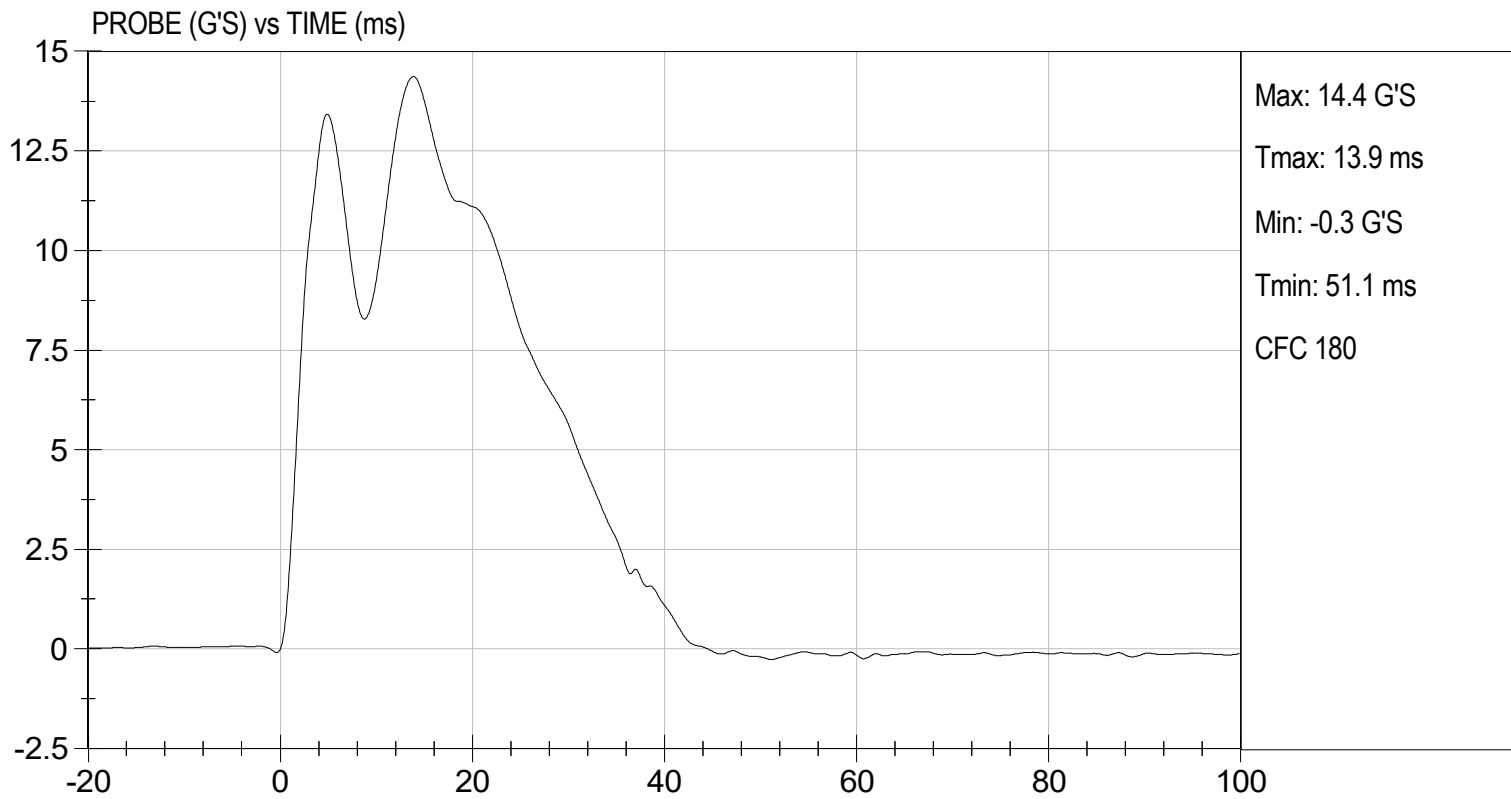
01/27/2025
Test Date


Approved By



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

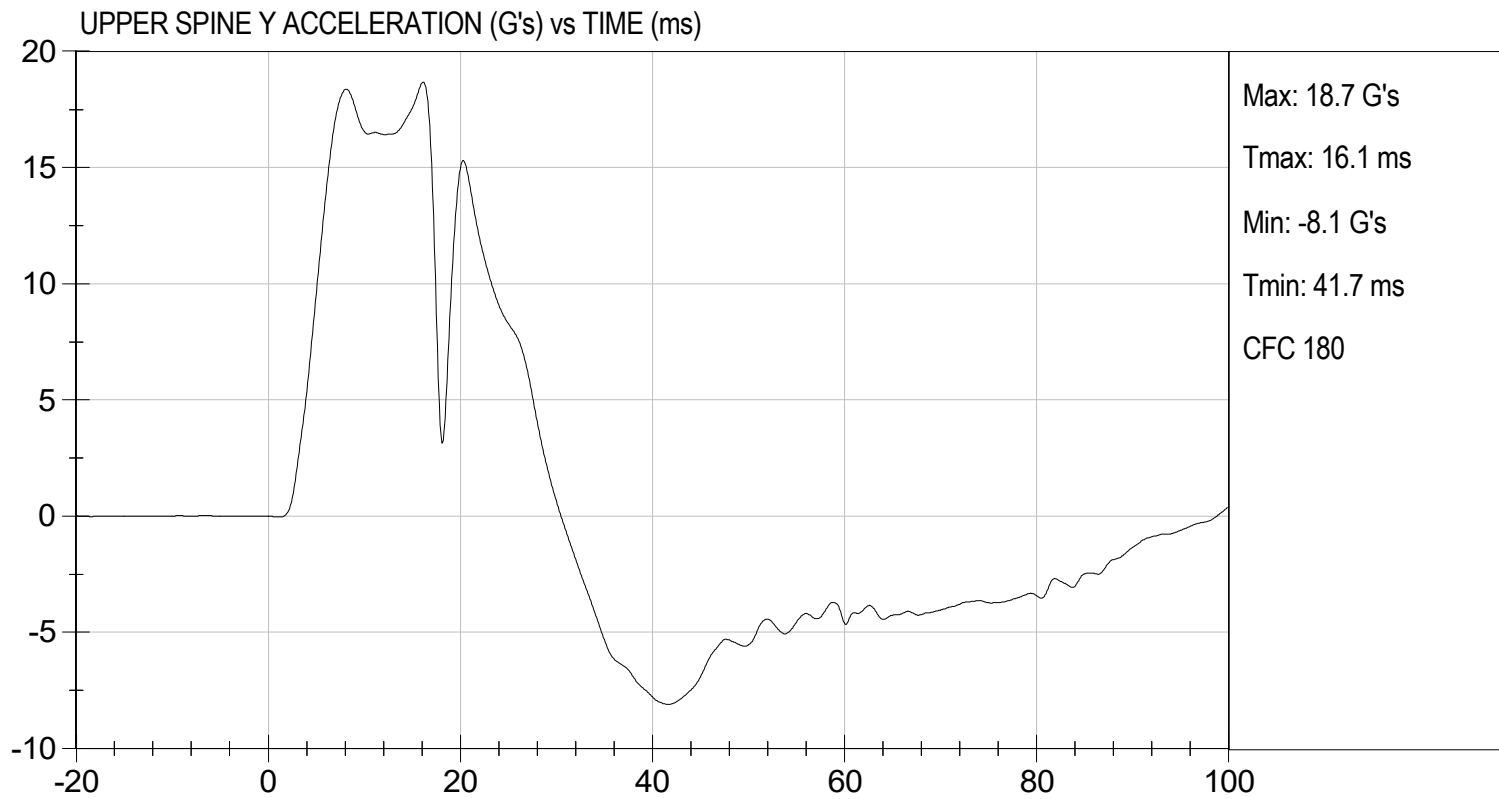
TEST DATE: 01/27/2025
TEST #: D250293





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

TEST DATE: 01/27/2025
TEST #: D250293



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

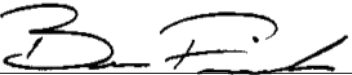
ATD Serial No: 306

Test I.D: D250294

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	22	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Maximum Probe Acceleration	G's	30 to 36	32	Pass
Shoulder Displacement	mm	31 to 40	35	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	38	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	32	Pass
Overall Test Results				Pass


Laboratory Technician

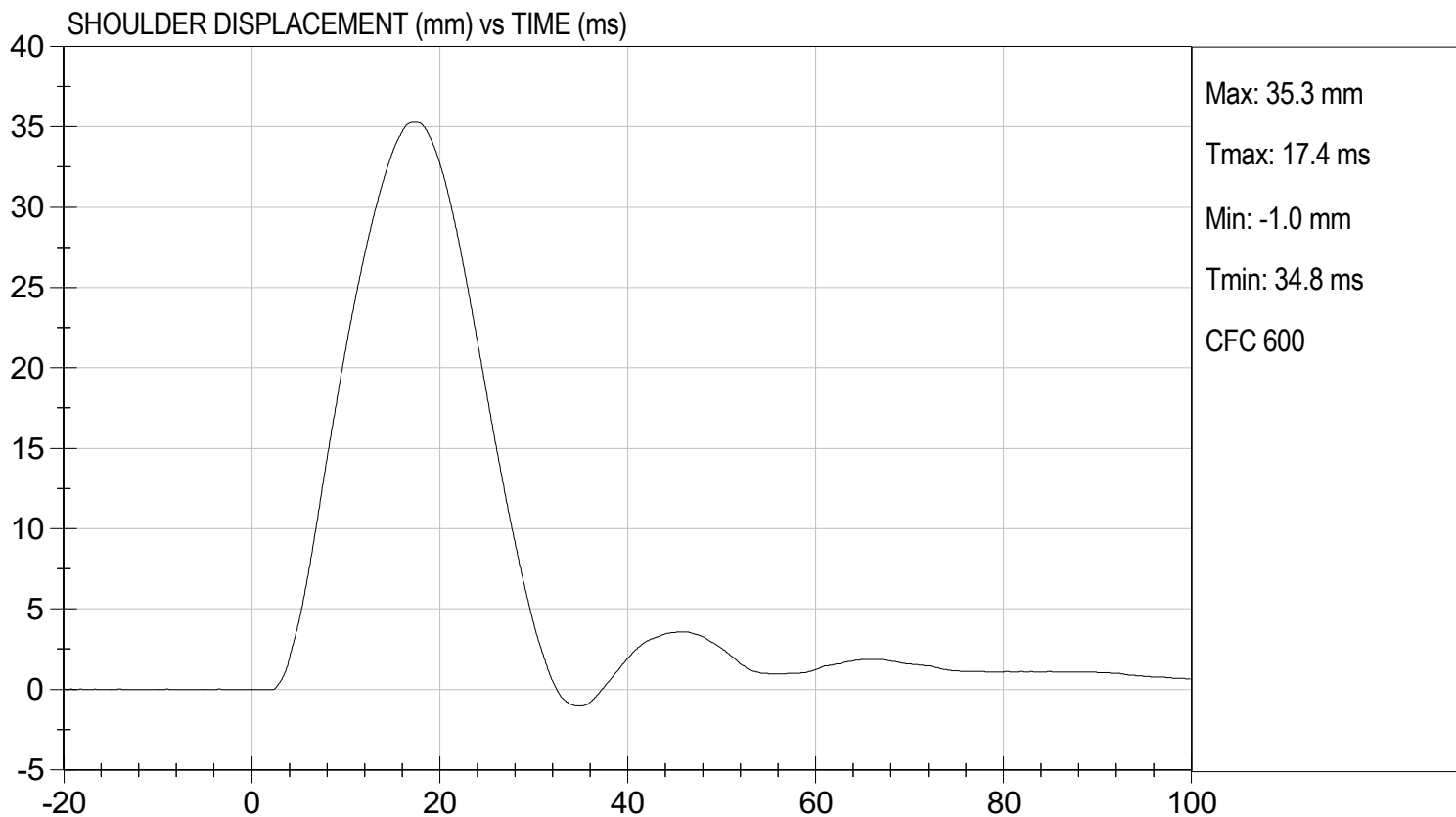
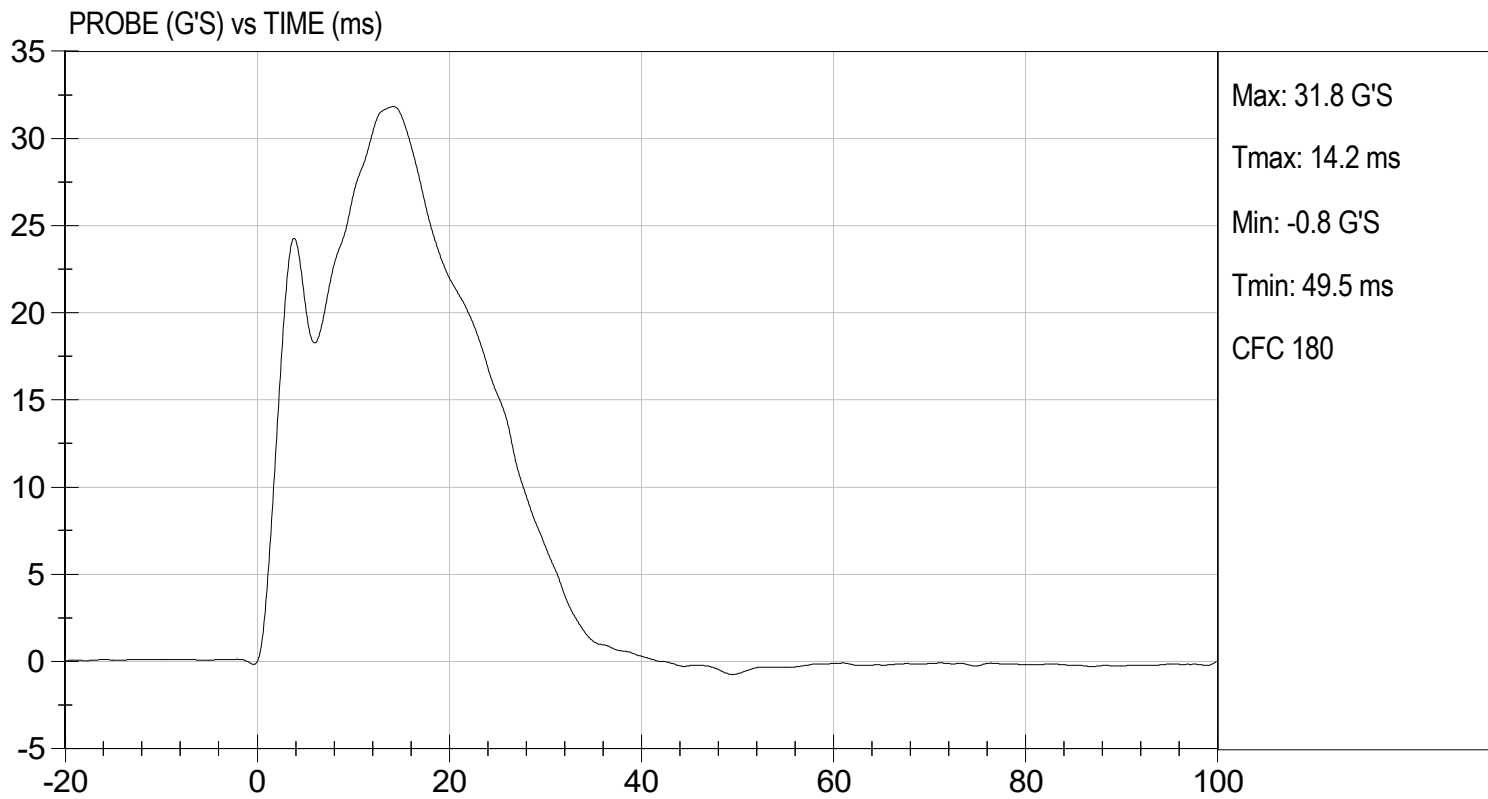
01/27/2025
Test Date

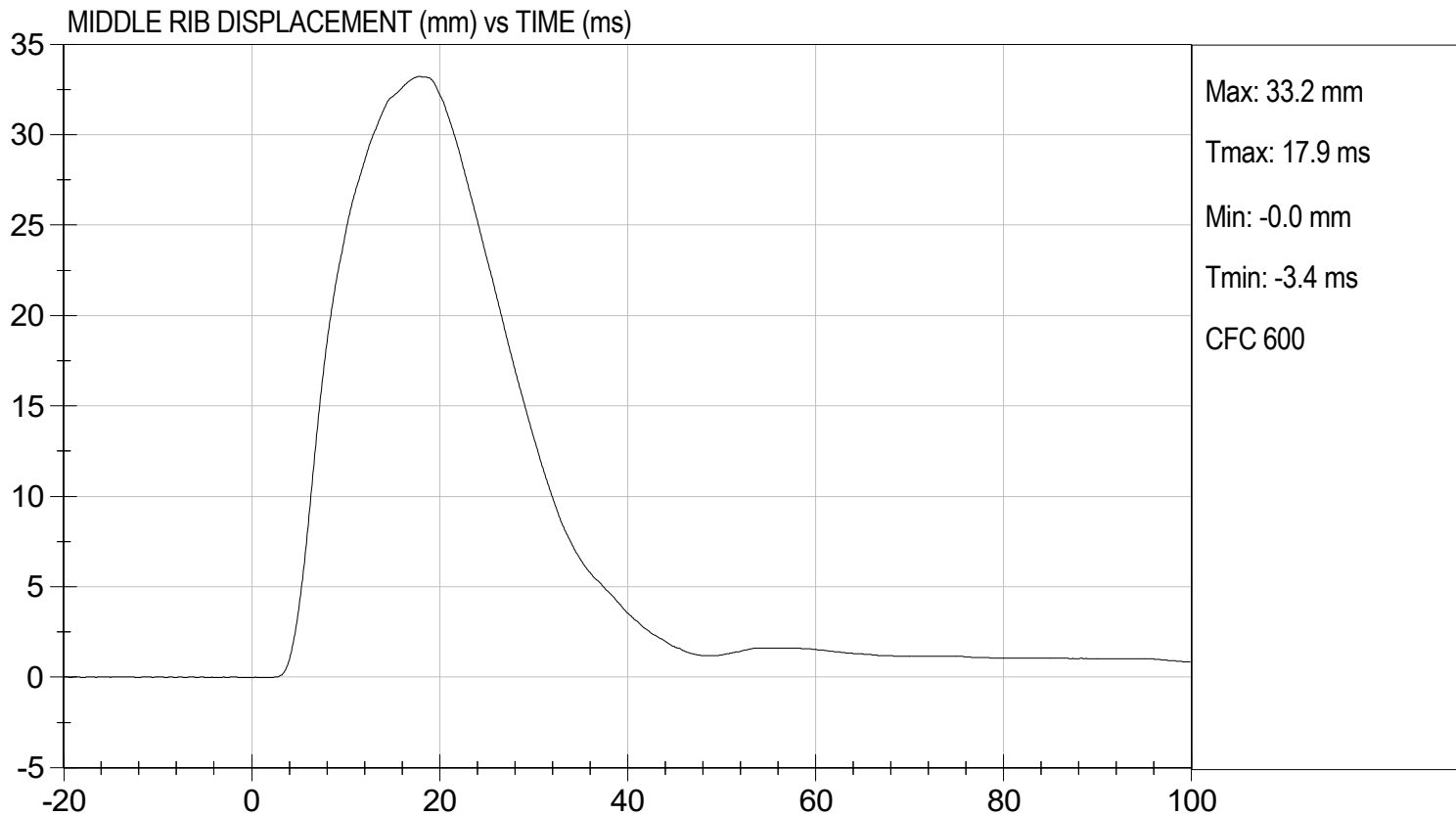
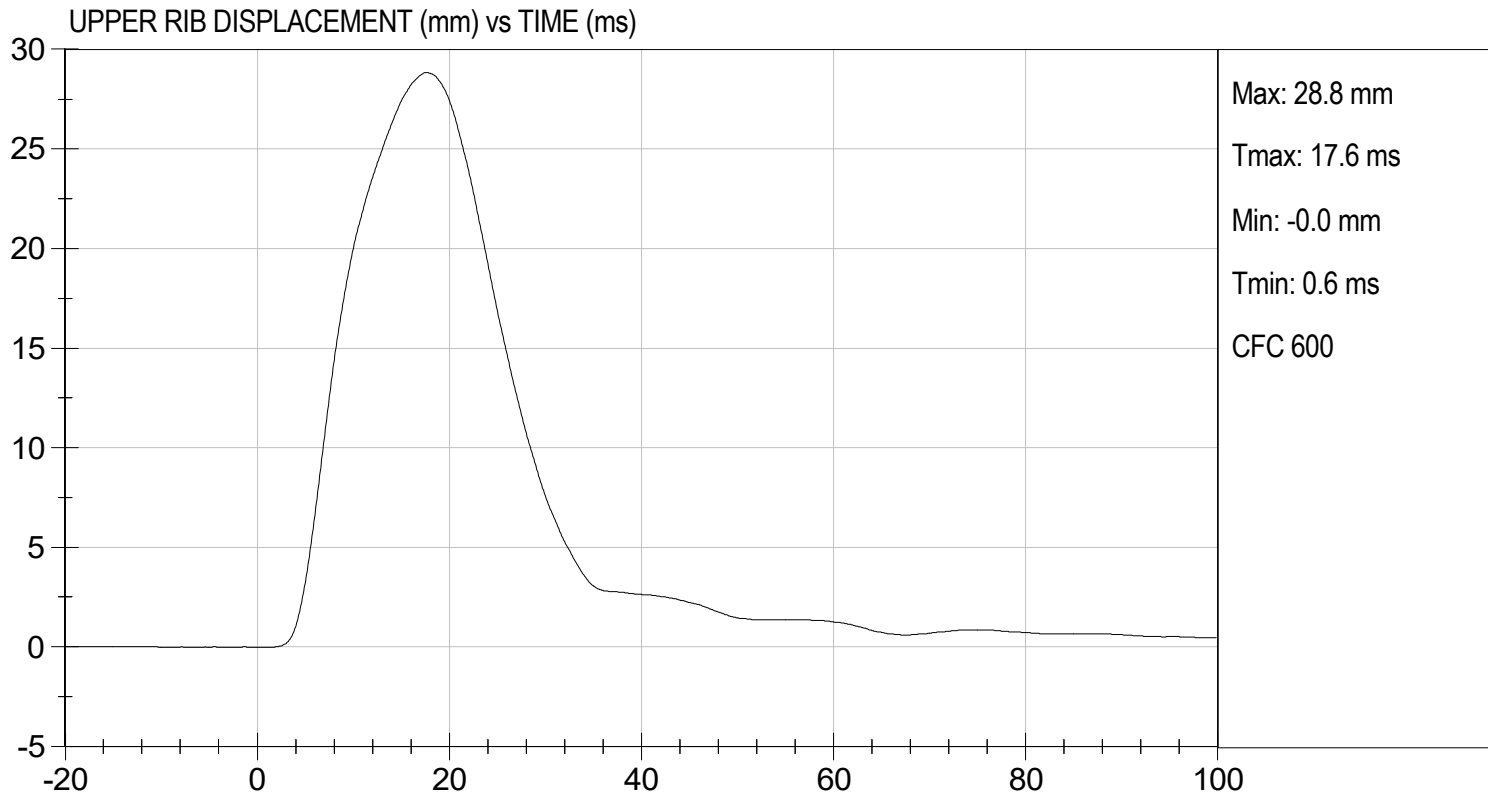

Approved By



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

TEST DATE: 01/27/2025
TEST #: D250294

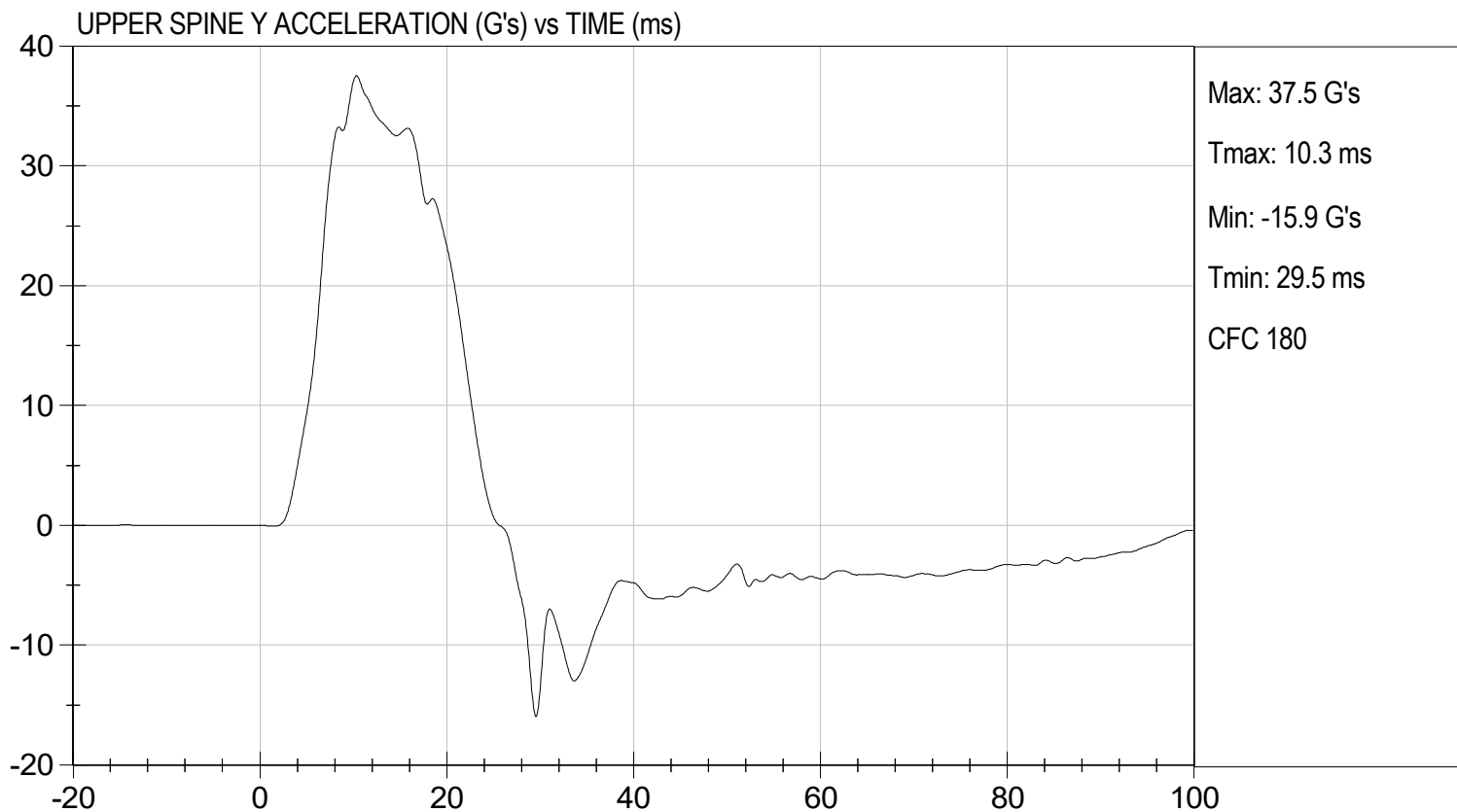
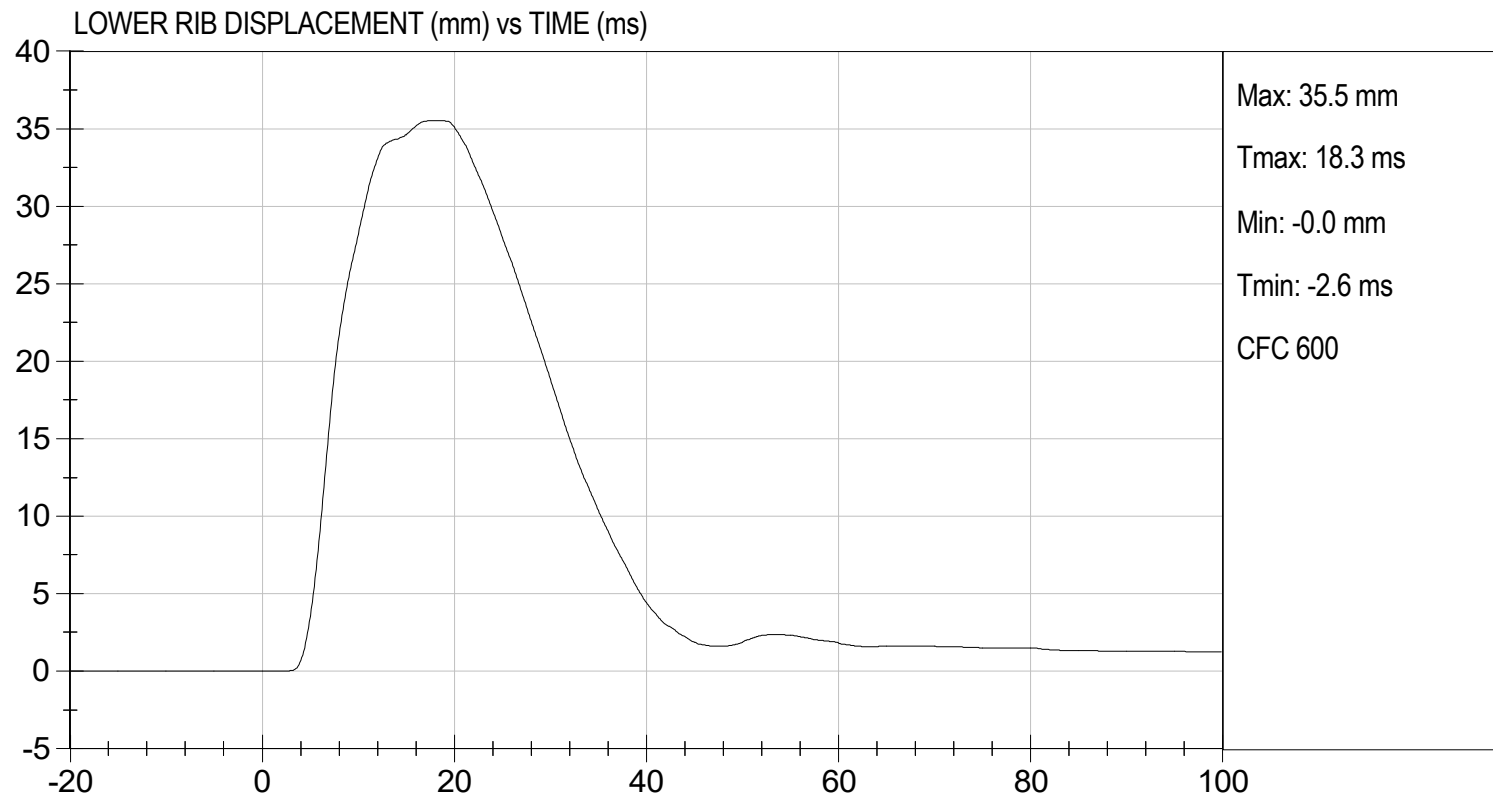






TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

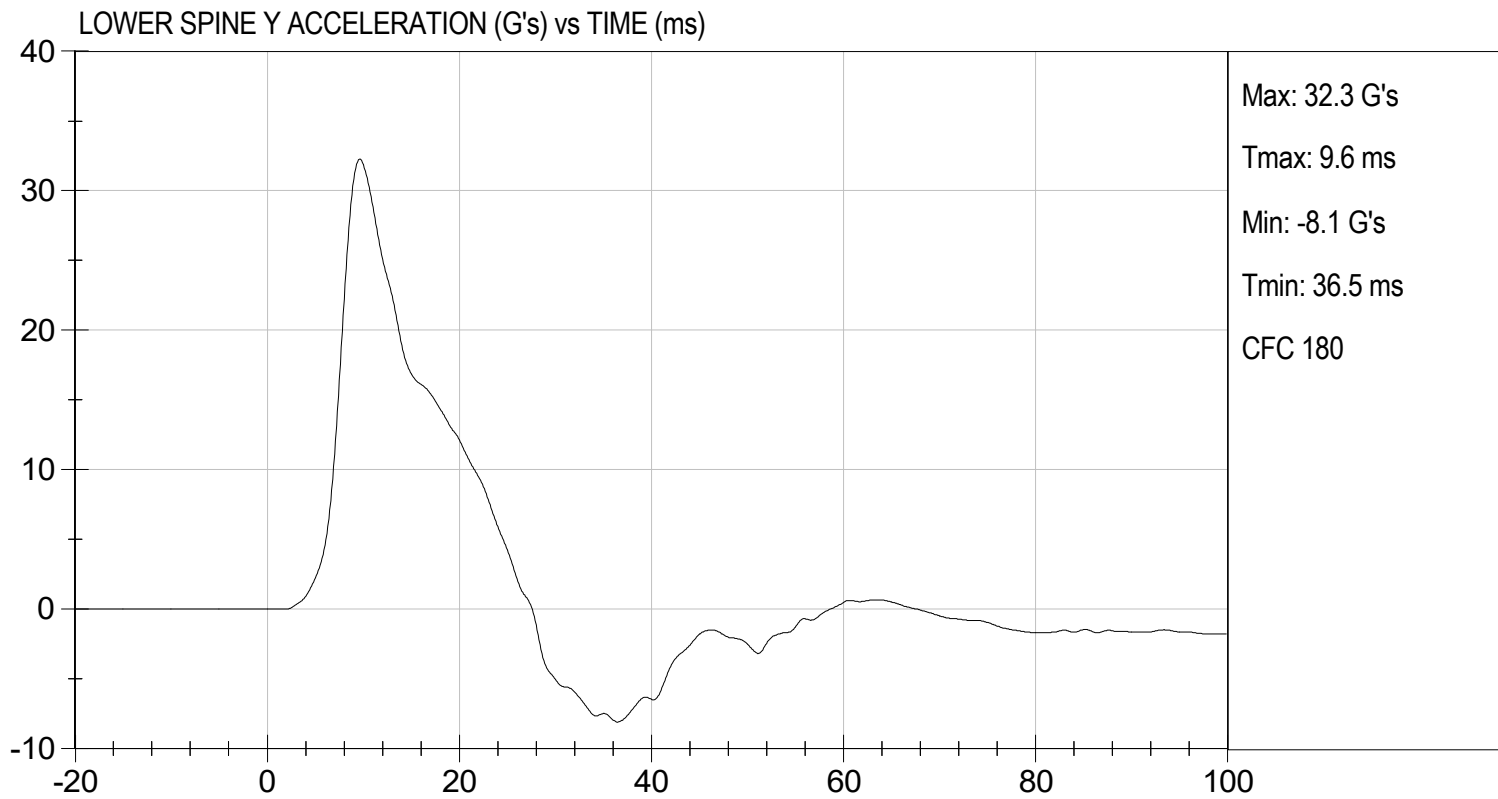
TEST DATE: 01/27/2025
TEST #: D250294





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

TEST DATE: 01/27/2025
TEST #: D250294



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

ATD Serial No: 306

Test I.D: D250295

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.4	Pass
Humidity	%	10 to 70	22	Pass
Impact Velocity	m/s	4.20 to 4.40	4.23	Pass
Maximum Probe Acceleration	G's	14 to 18	15	Pass
Upper Rib Displacement	mm	32 to 40	36	Pass
Middle Rib Displacement	mm	39 to 45	42	Pass
Lower Rib Displacement	mm	35 to 43	40	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

01/27/2025

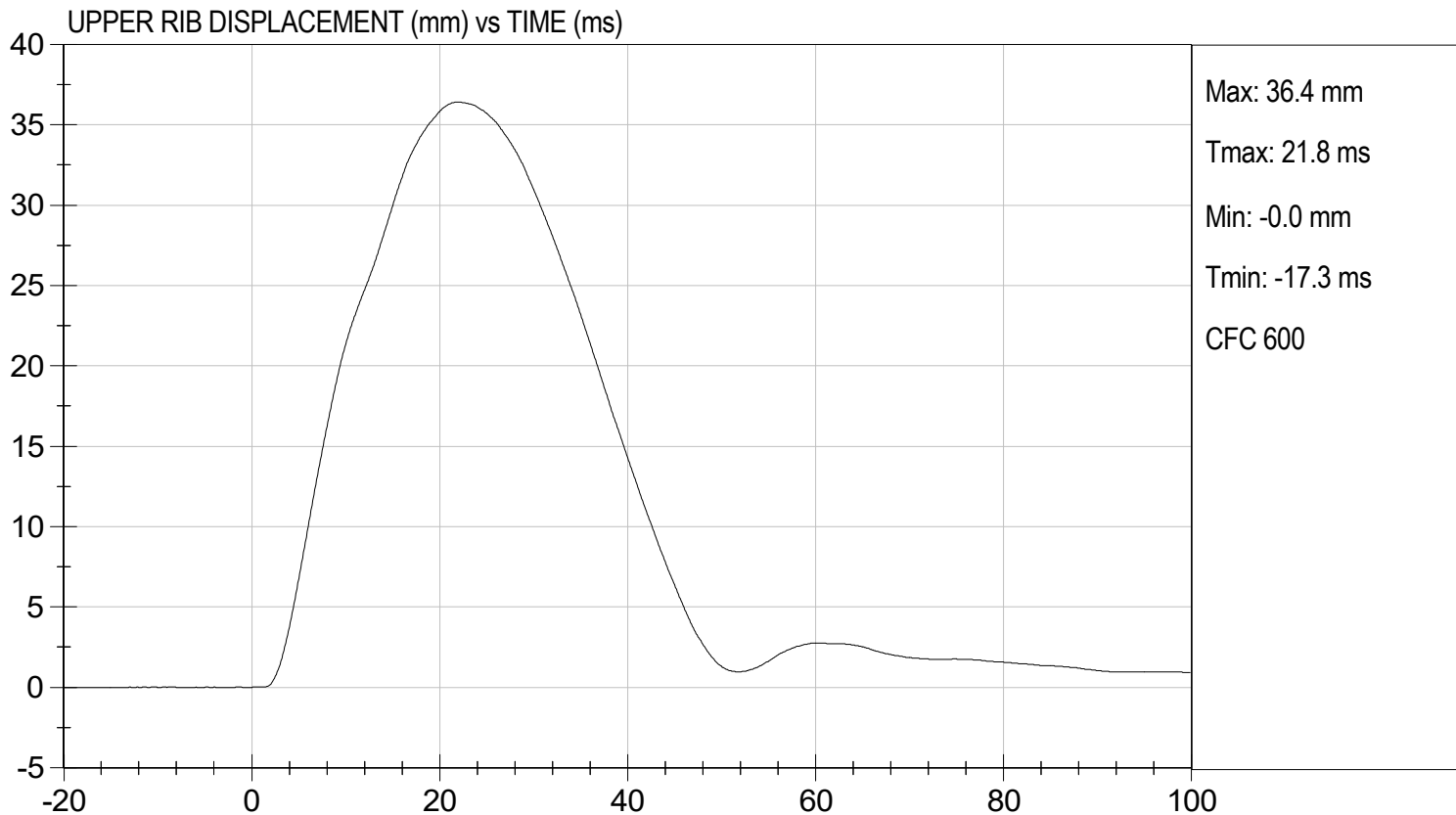
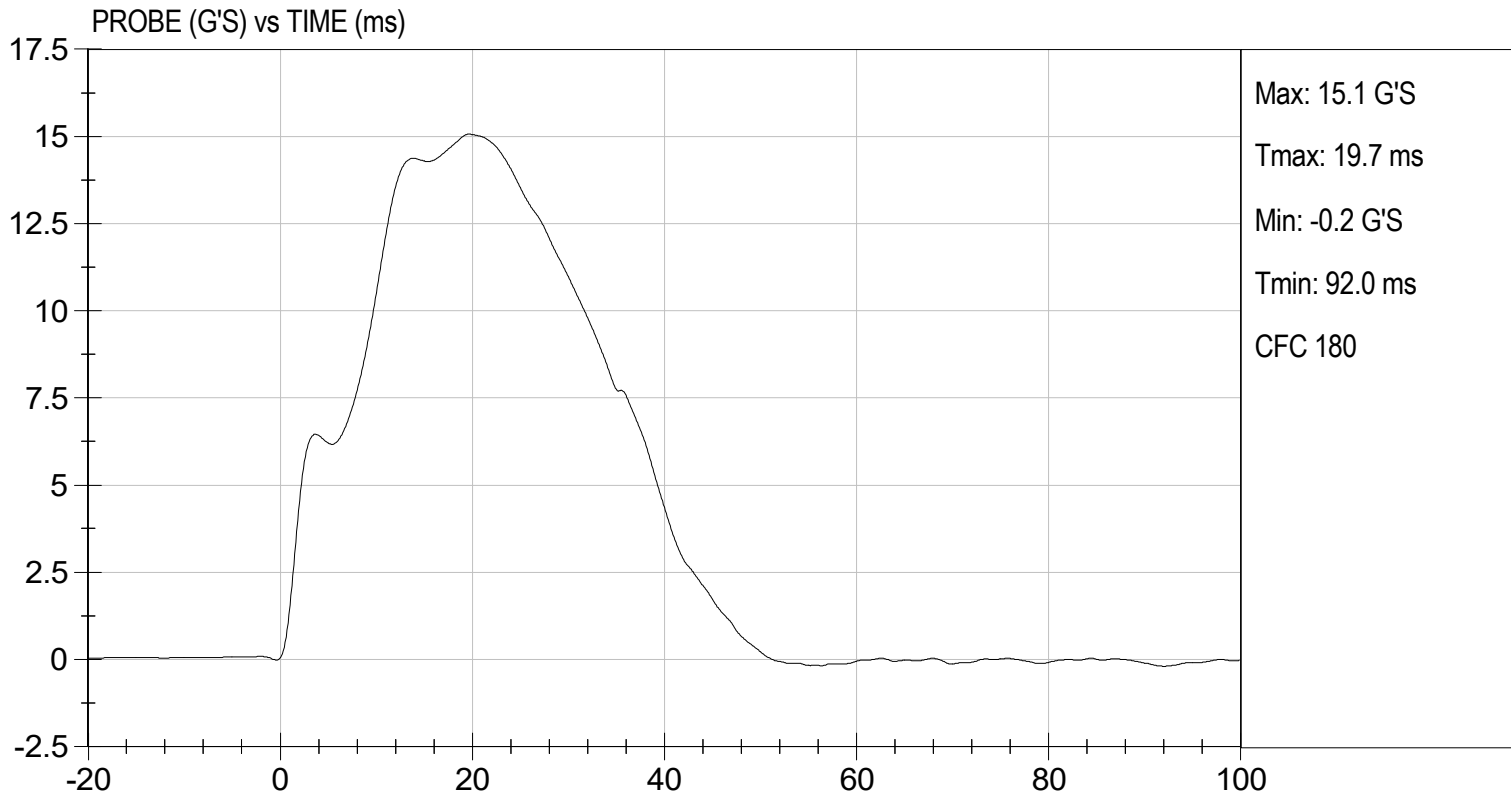
Test Date


Approved By



TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 13.89 ft/s, 4.23 m/s

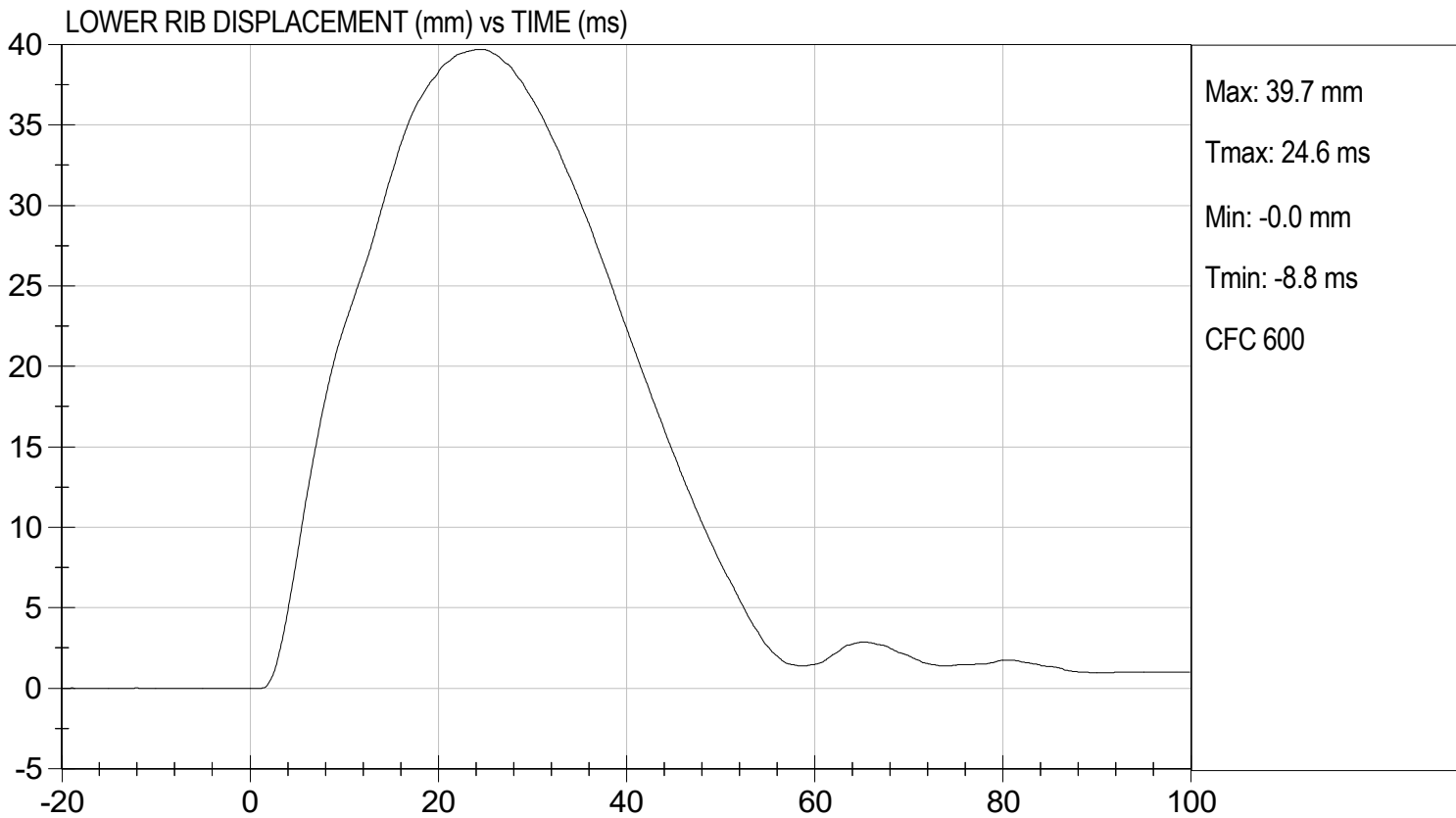
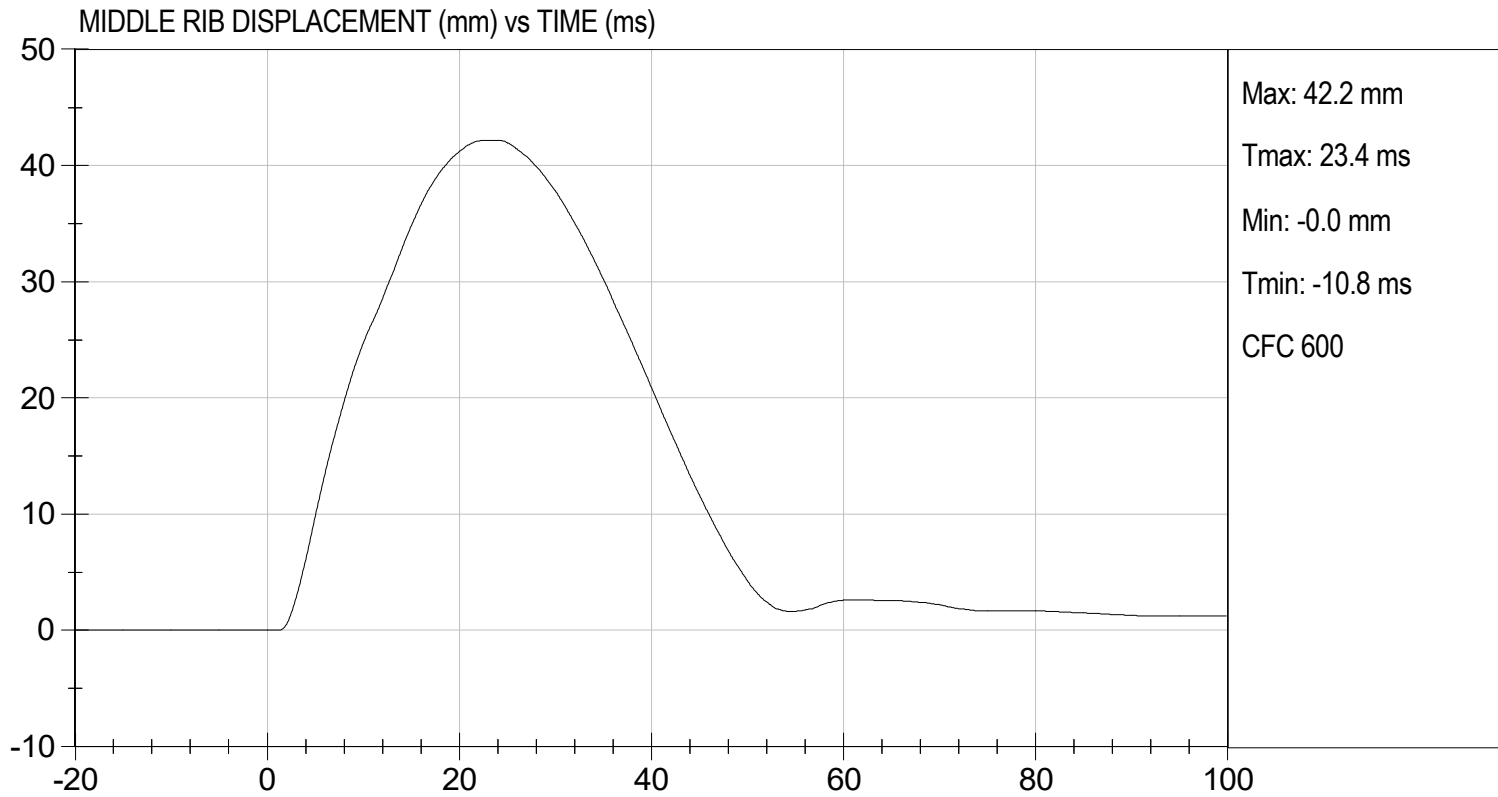
TEST DATE: 01/27/2025
TEST #: D250295





TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 13.89 ft/s, 4.23 m/s

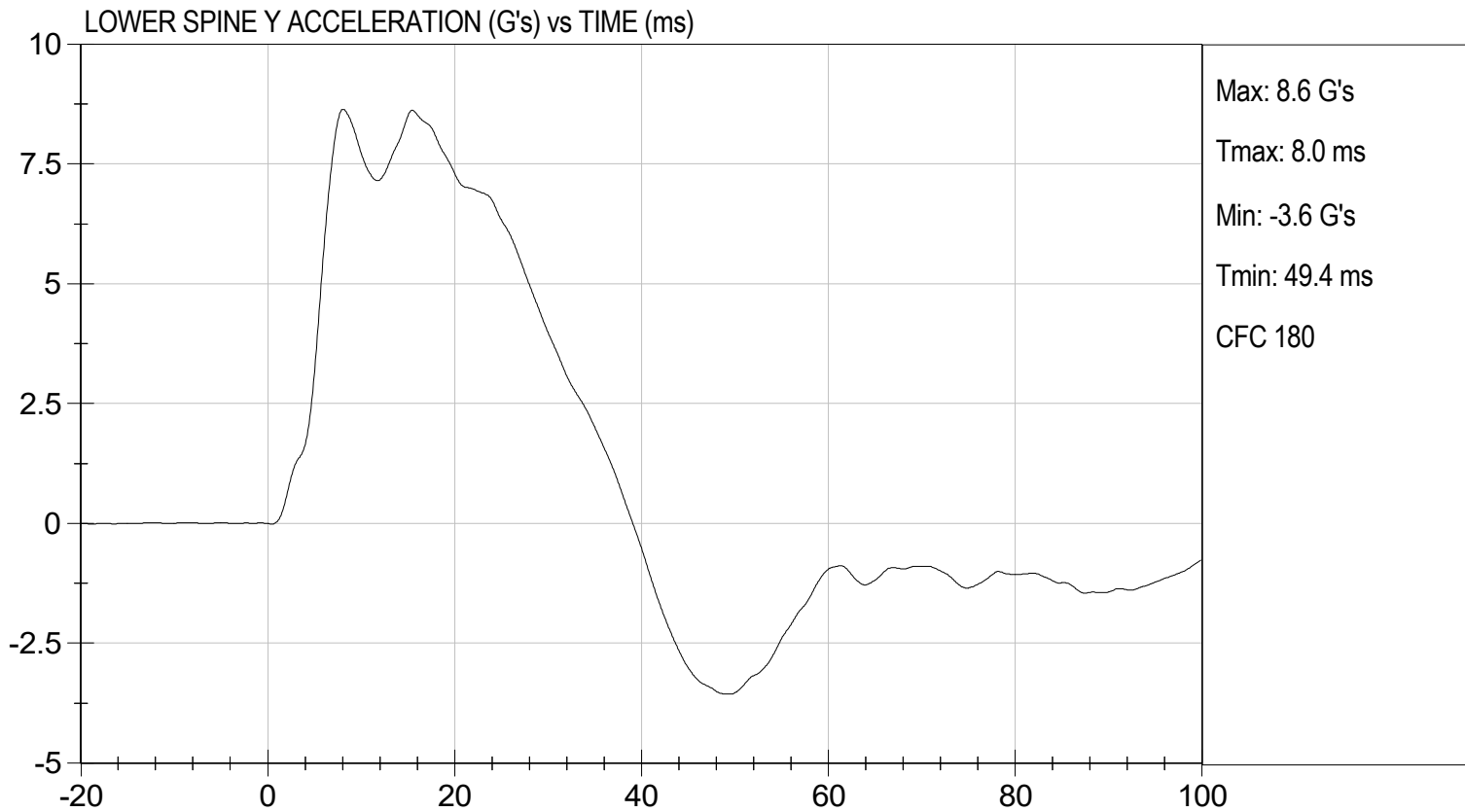
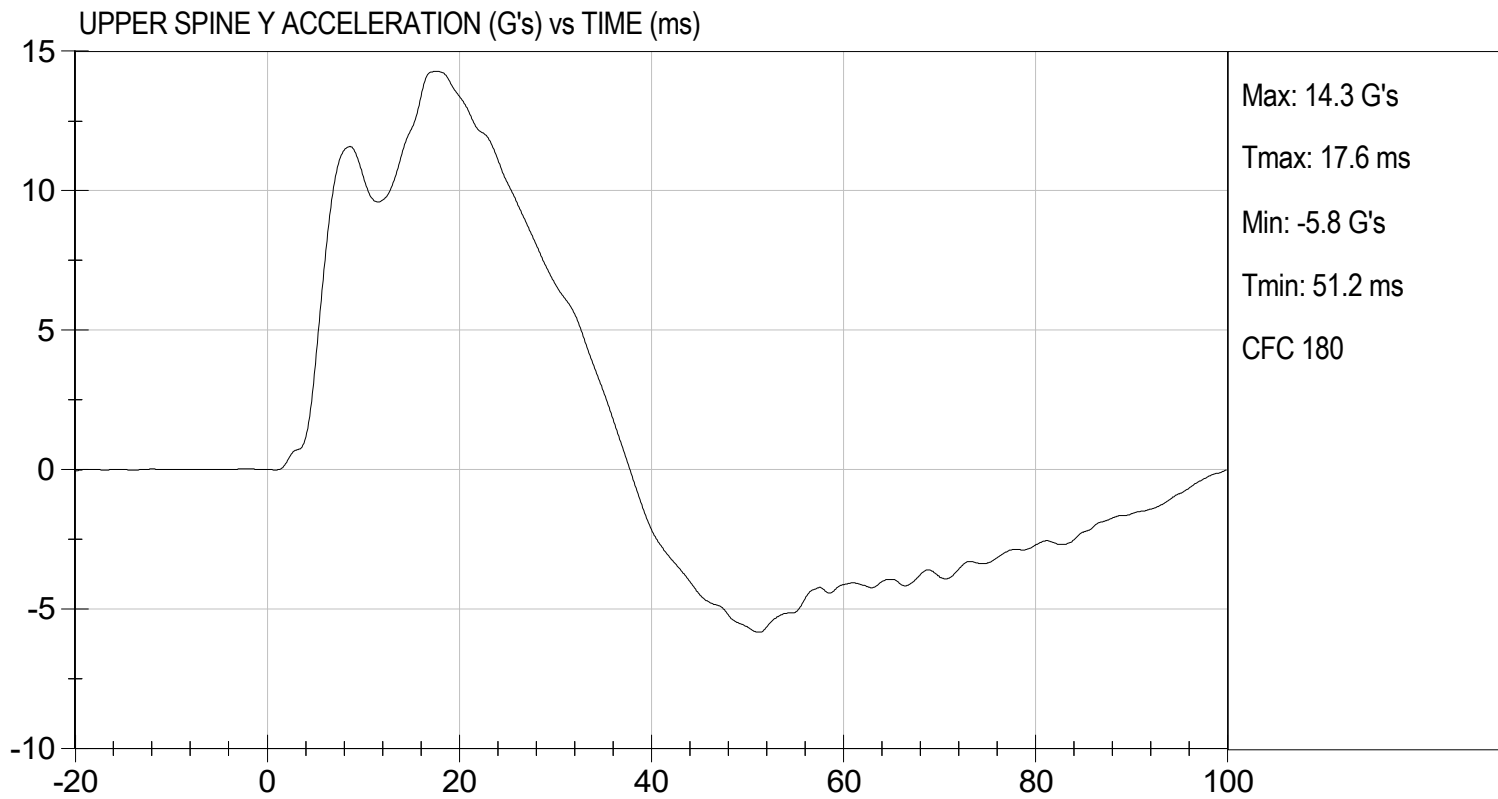
TEST DATE: 01/27/2025
TEST #: D250295





TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 13.89 ft/s, 4.23 m/s

TEST DATE: 01/27/2025
TEST #: D250295



MGA RESEARCH CORPORATION

ABDOMINAL IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

Test I.D: D250296

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	22	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Maximum Probe Acceleration	G's	12 to 16	13	Pass
Upper Abdomen Rib Displacement	mm	36 to 47	42	Pass
Lower Abdomen Rib Displacement	mm	33 to 44	37	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	11	Pass
Overall Test Results				Pass


Laboratory Technician

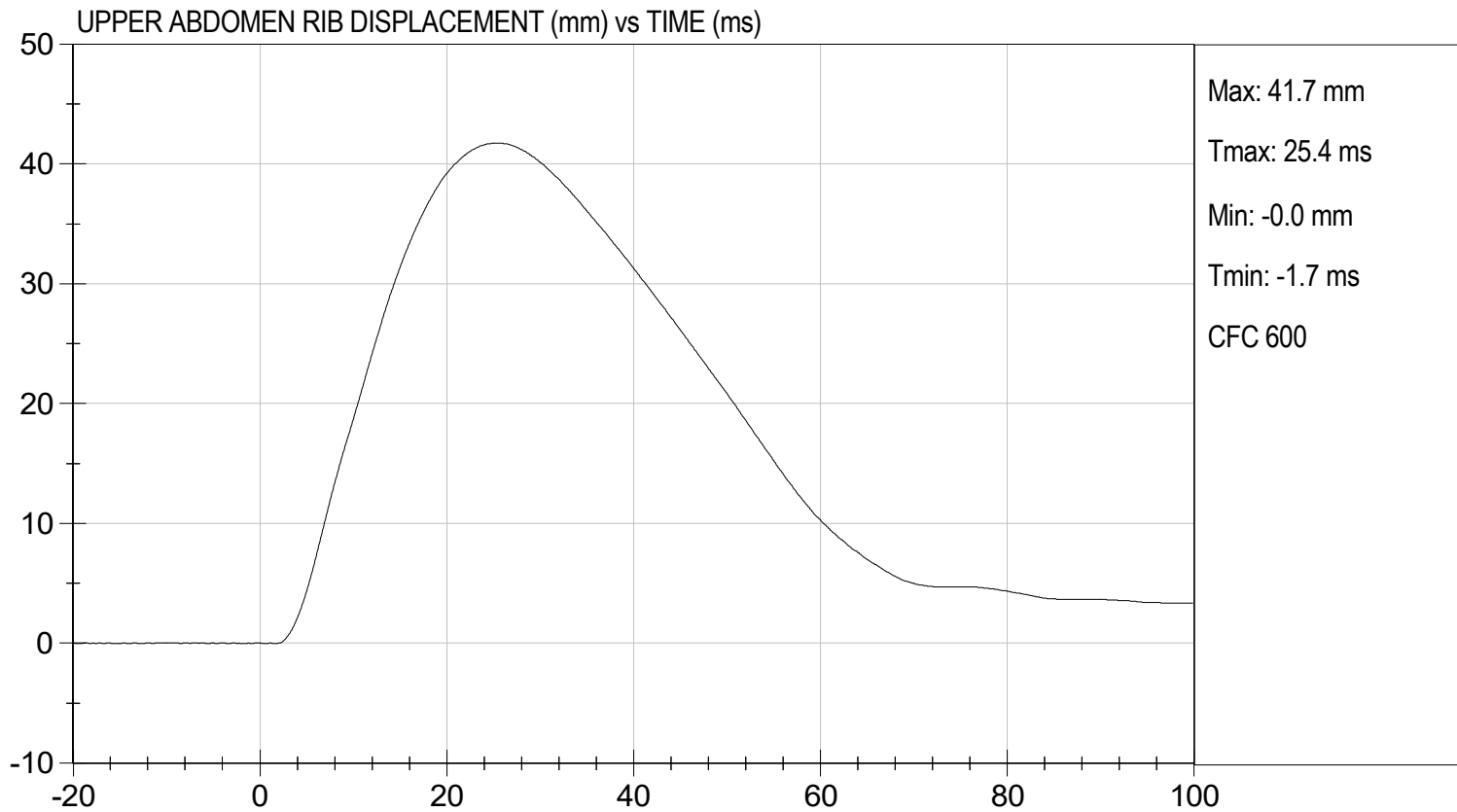
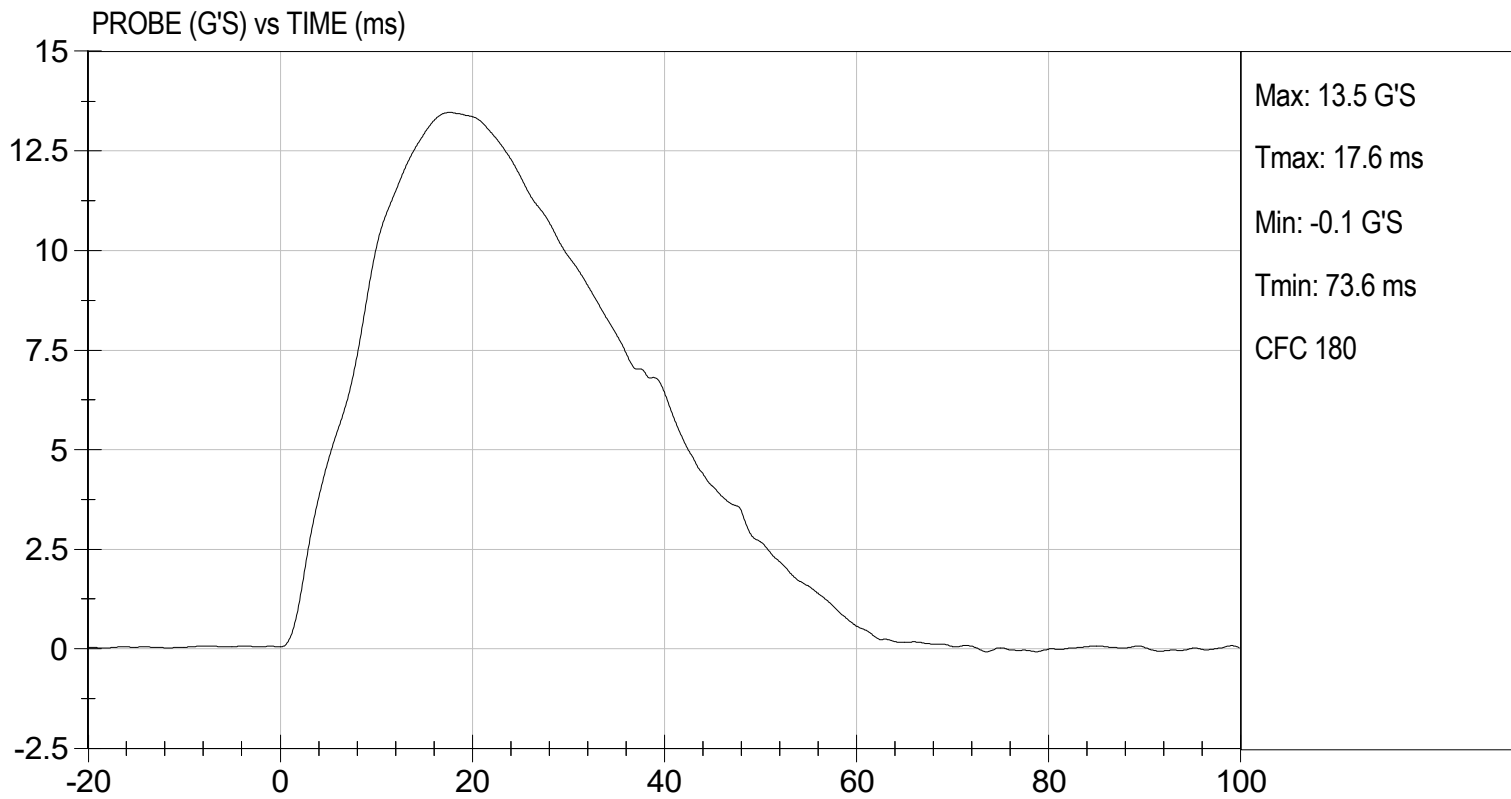
01/27/2025
Test Date


Approved By



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

TEST DATE: 01/27/2025
TEST #: D250296

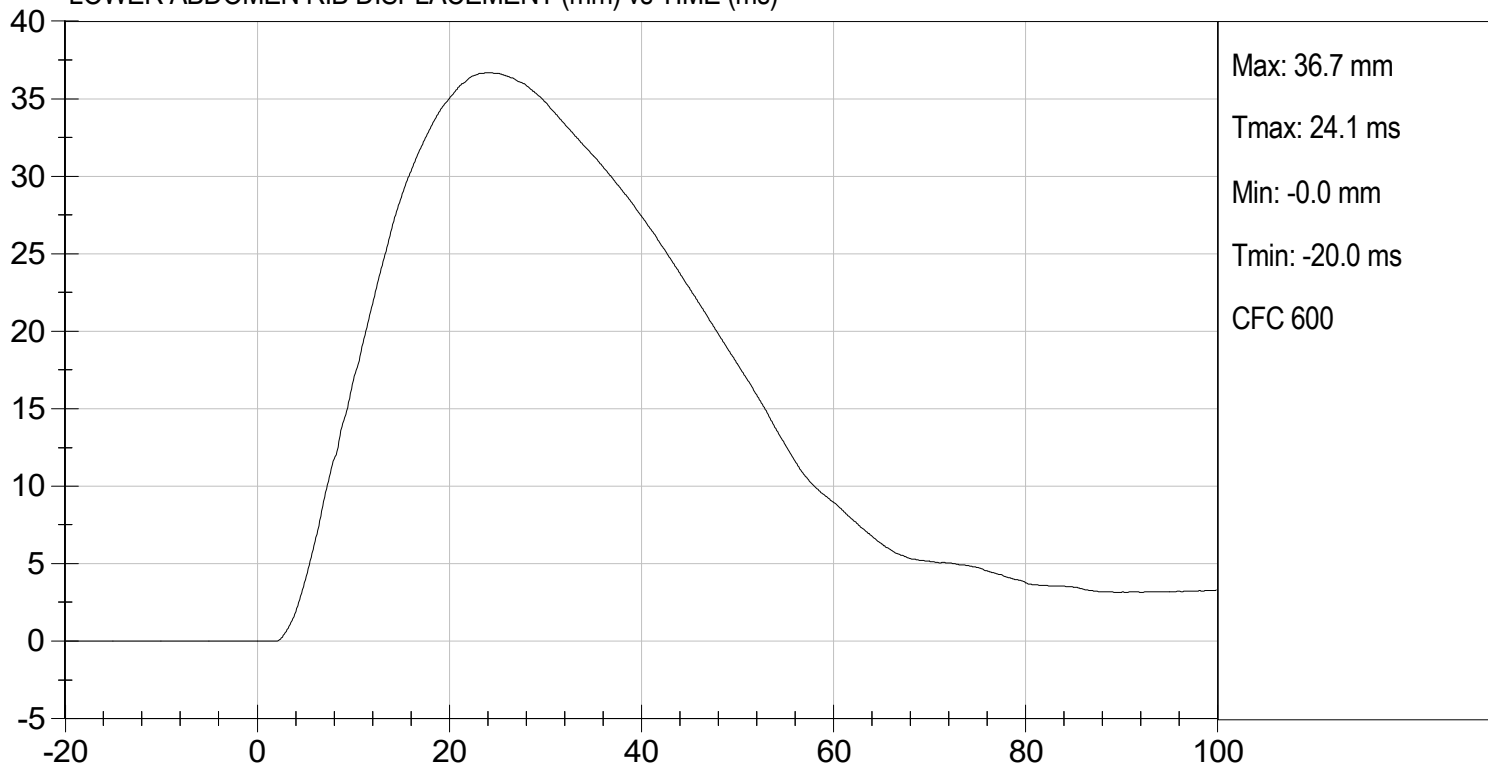




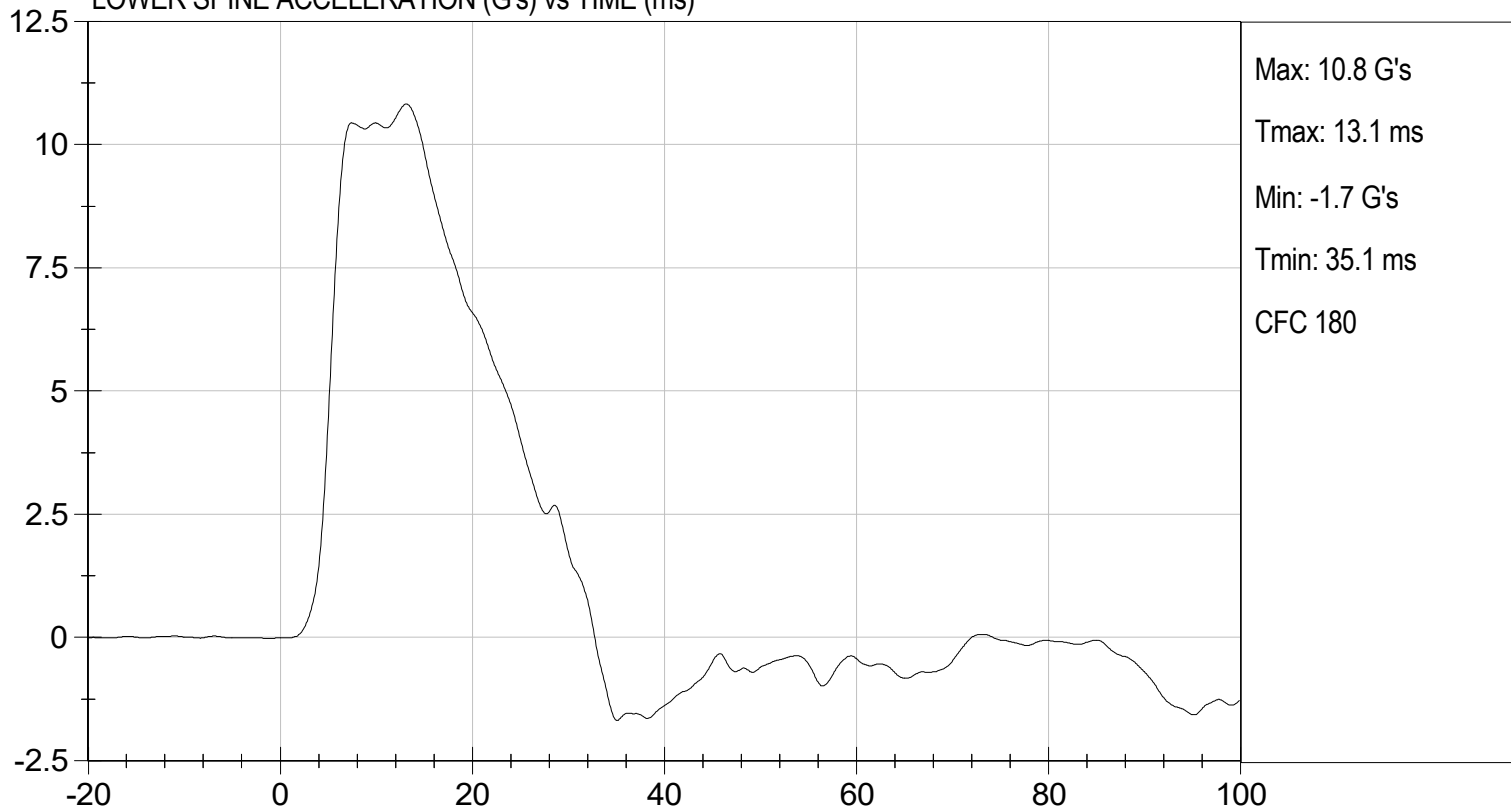
TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 01/27/2025
TEST #: D250296

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



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



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SID-Its BUILD LEVEL D DUMMY

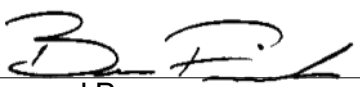
ATD Serial No: 306

Test I.D: D250297

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.4	Pass
Humidity	%	10 to 70	22	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	41.6	Pass
Peak Acetabulum Force	N	3600 to 4300	4,061	Pass
Overall Test Results			Pass	


Laboratory Technician

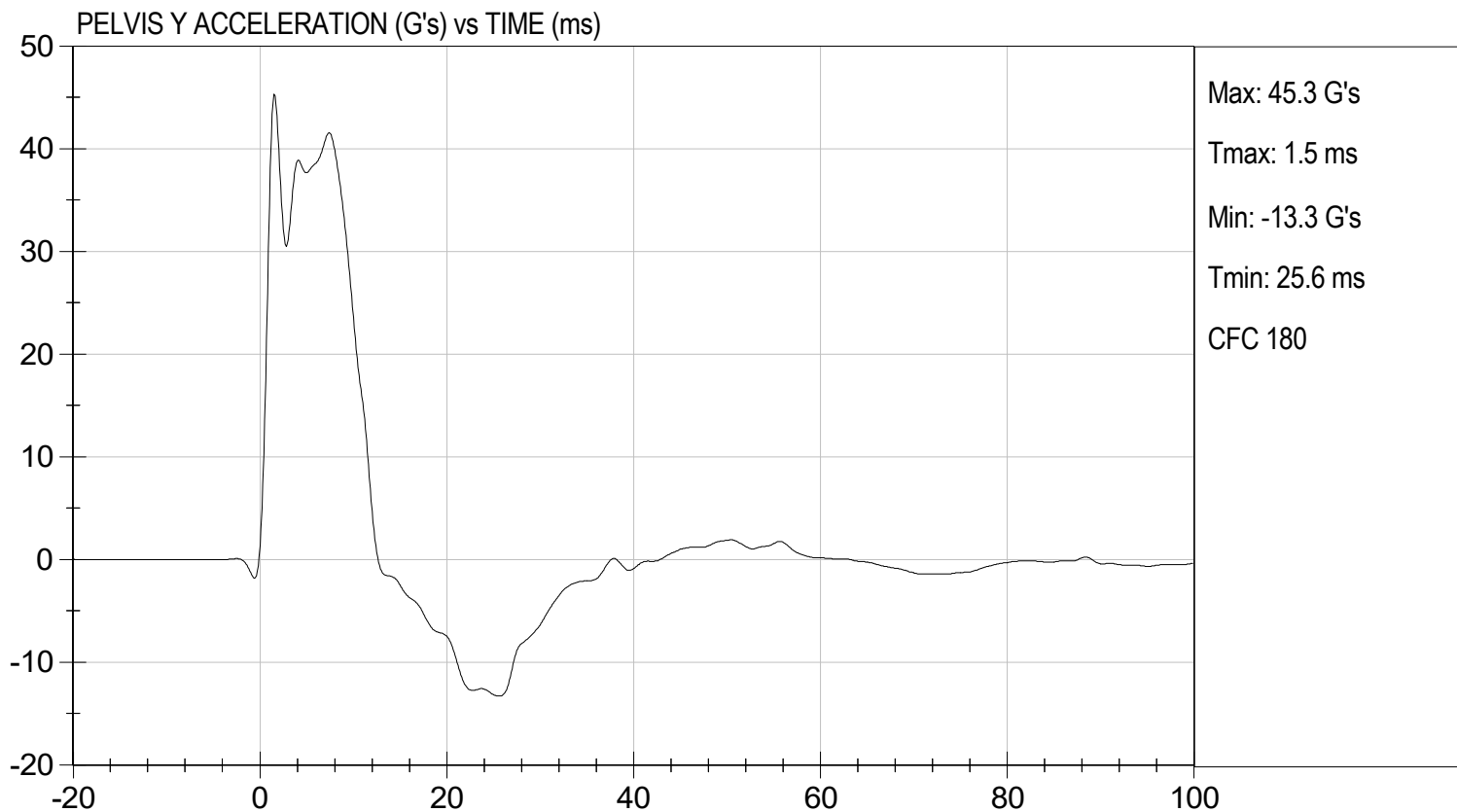
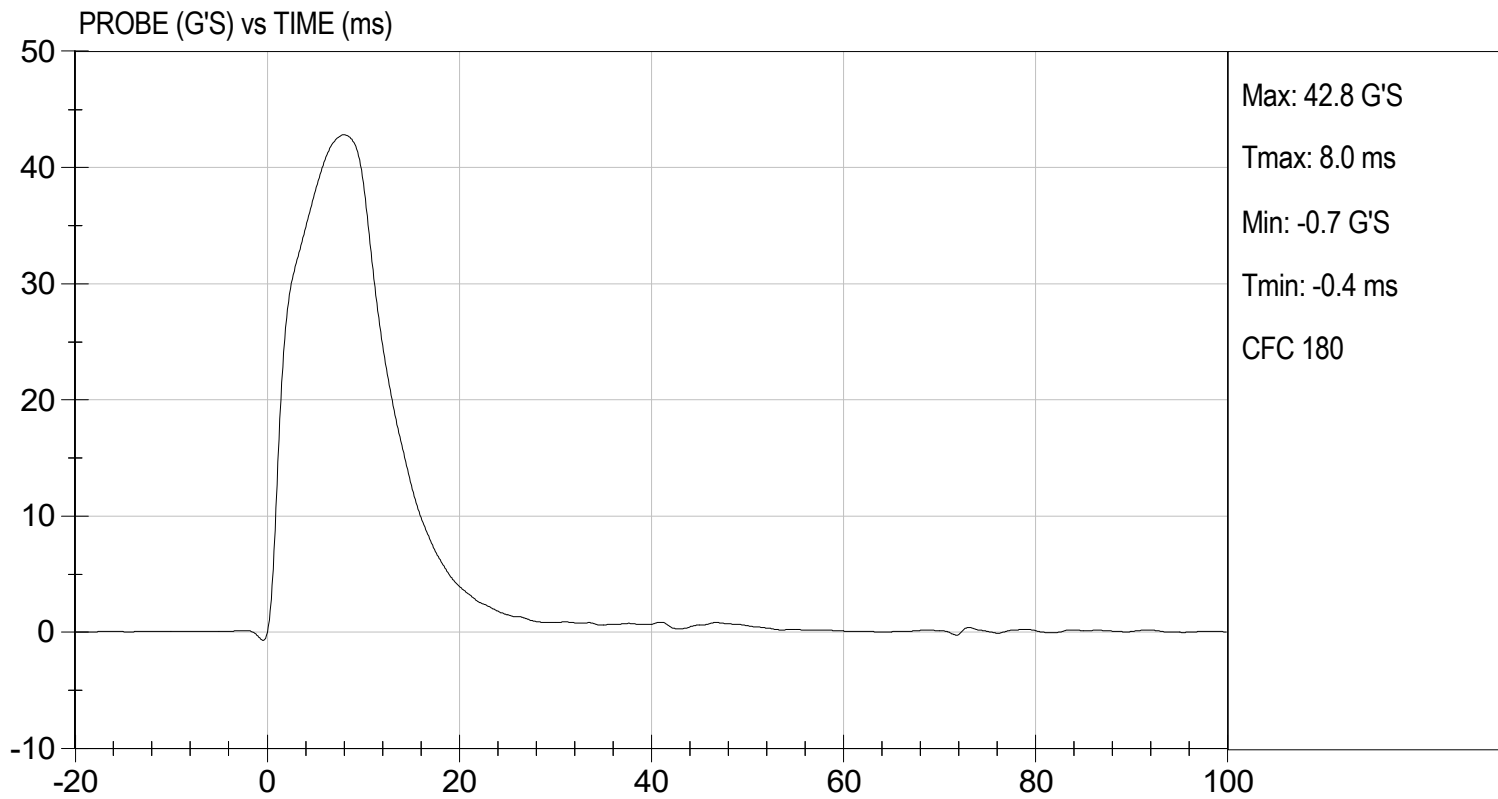
01/27/2025
Test Date


Approved By



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

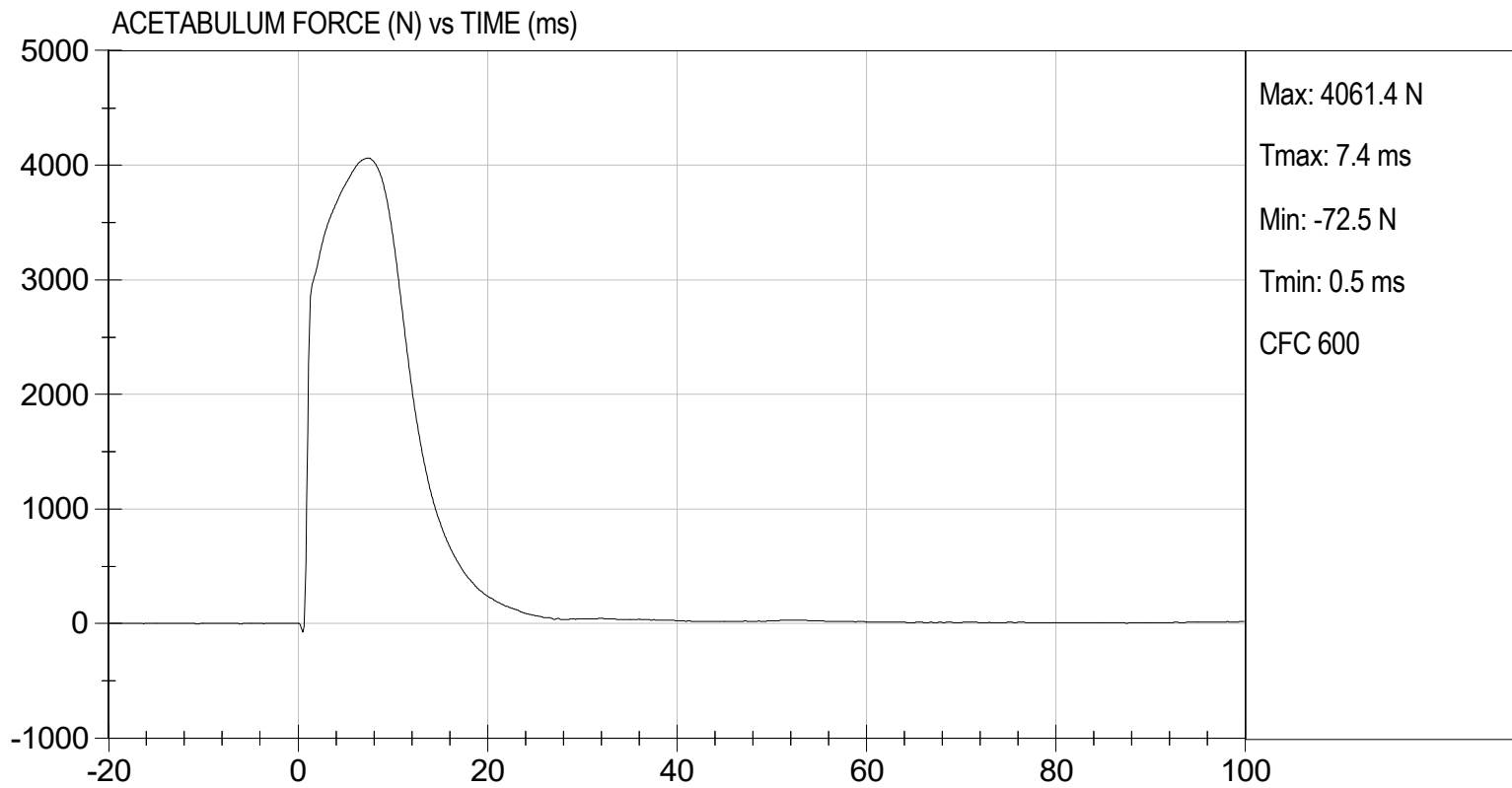
TEST DATE: 01/27/2025
TEST #: D250297





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

TEST DATE: 01/27/2025
TEST #: D250297



MGA RESEARCH CORPORATION

ILIAC IMPACT TEST

SID-Its BUILD LEVEL D DUMMY

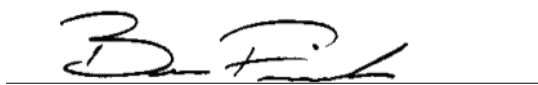
ATD Serial No: 306

Test I.D: D250308

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	22	Pass
Impact Velocity	m/s	4.20 to 4.40	4.23	Pass
Maximum Probe Acceleration	G's	36 to 45	40	Pass
Pelvis Y Acceleration	G's	28 to 39	32	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4,520	Pass
Overall Test Results			Pass	


Laboratory Technician

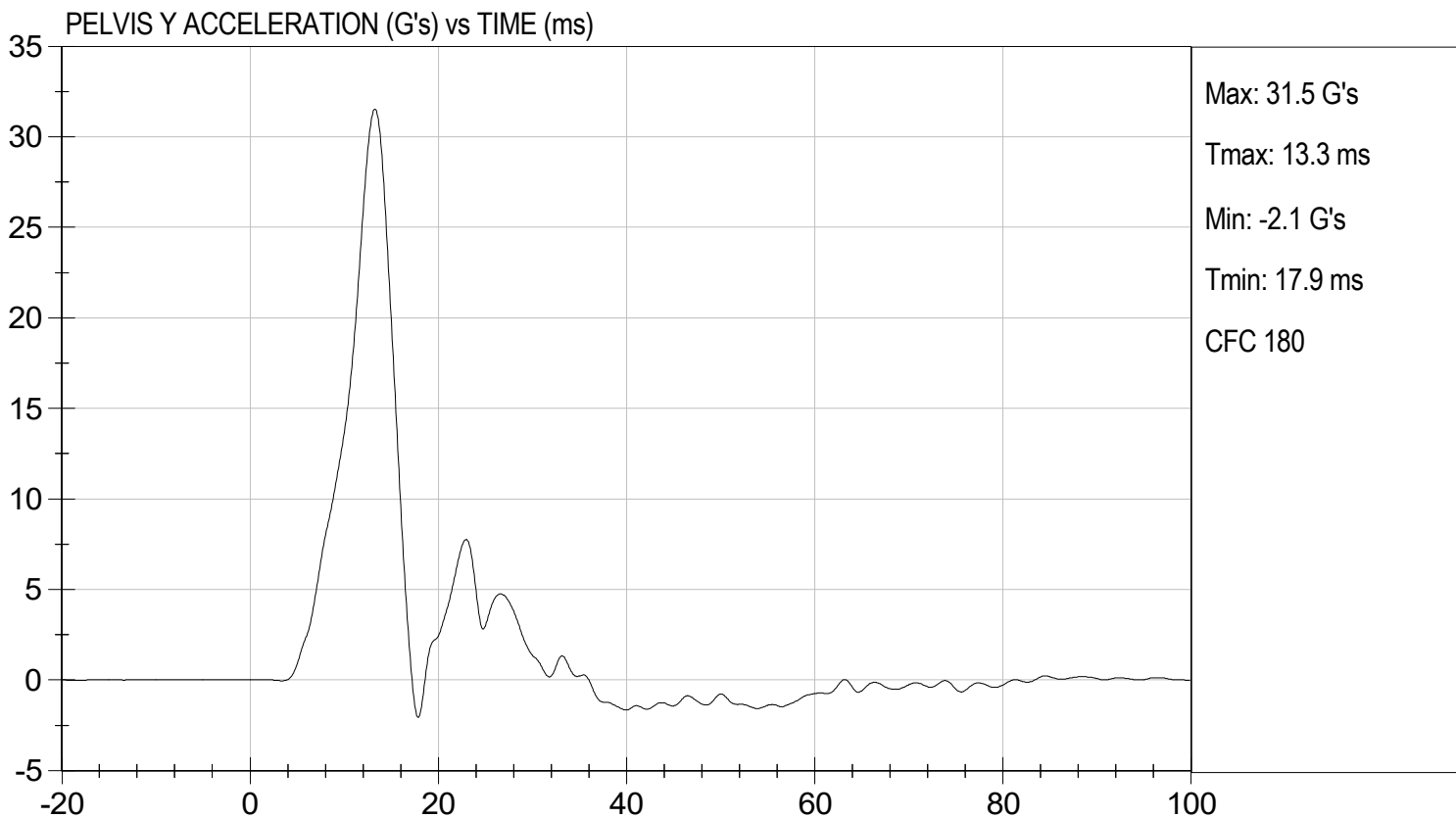
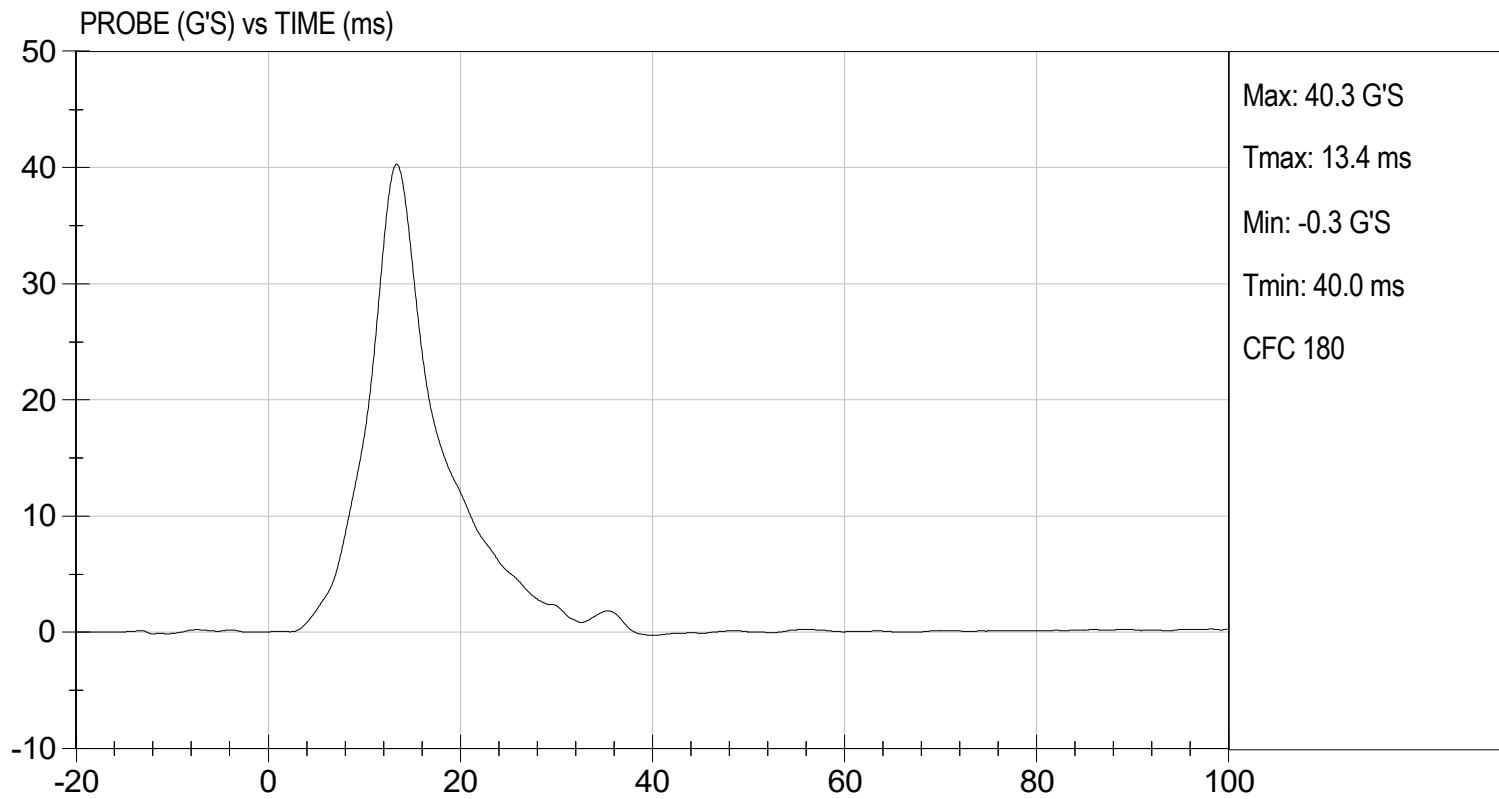
01/27/2025
Test Date


Approved By



TEST DESC: ILLIAC
VELOCITY: 13.89 ft/s, 4.23 m/s

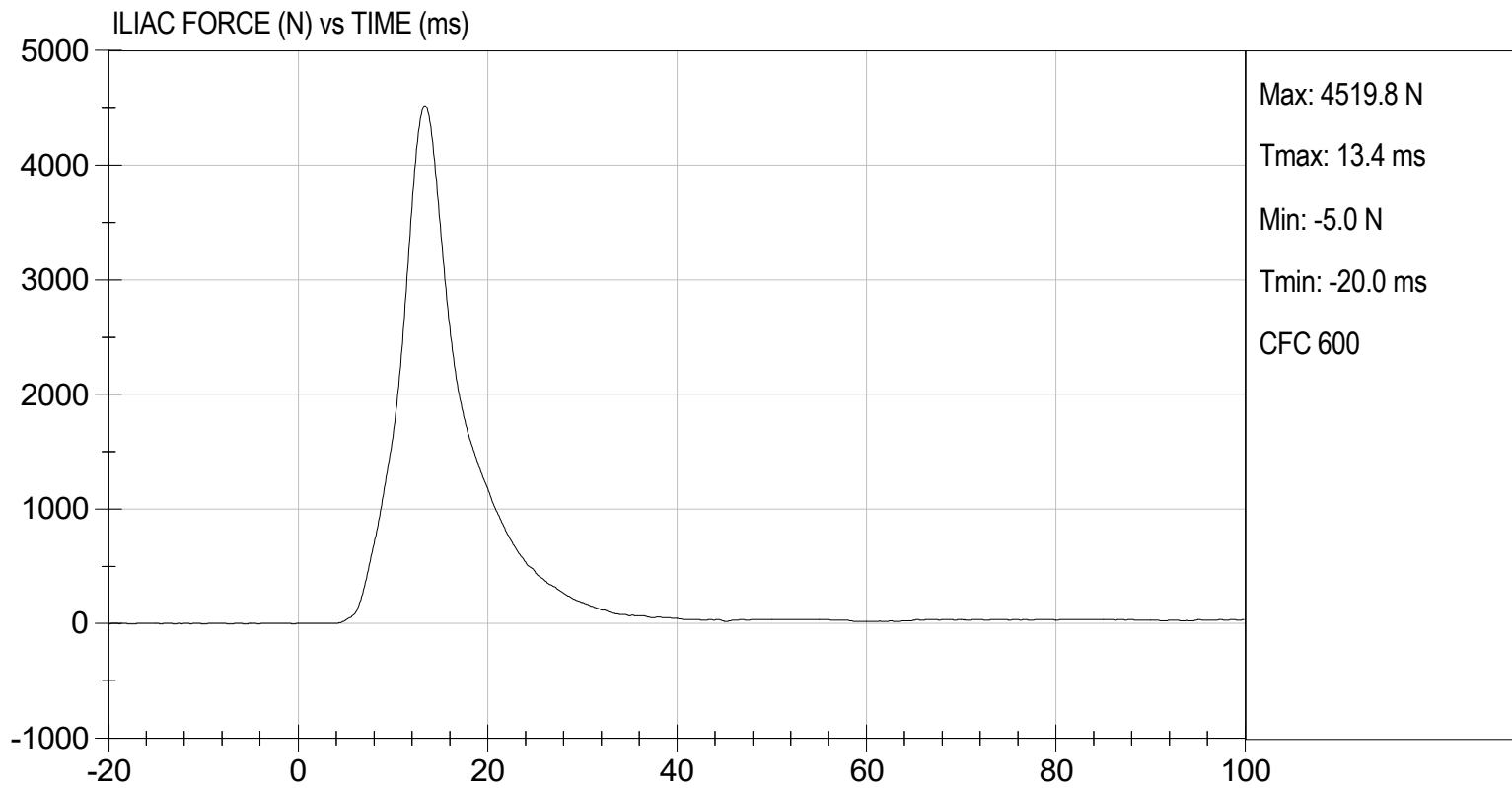
TEST DATE: 01/27/2025
TEST #: D250308





TEST DESC: ILLIAC
VELOCITY: 13.89 ft/s, 4.23 m/s

TEST DATE: 01/27/2025
TEST #: D250308



QUALIFICATION TEST RESULTS

POST-TEST

SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD

SID-IIsD External Measurements
SN: 306

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

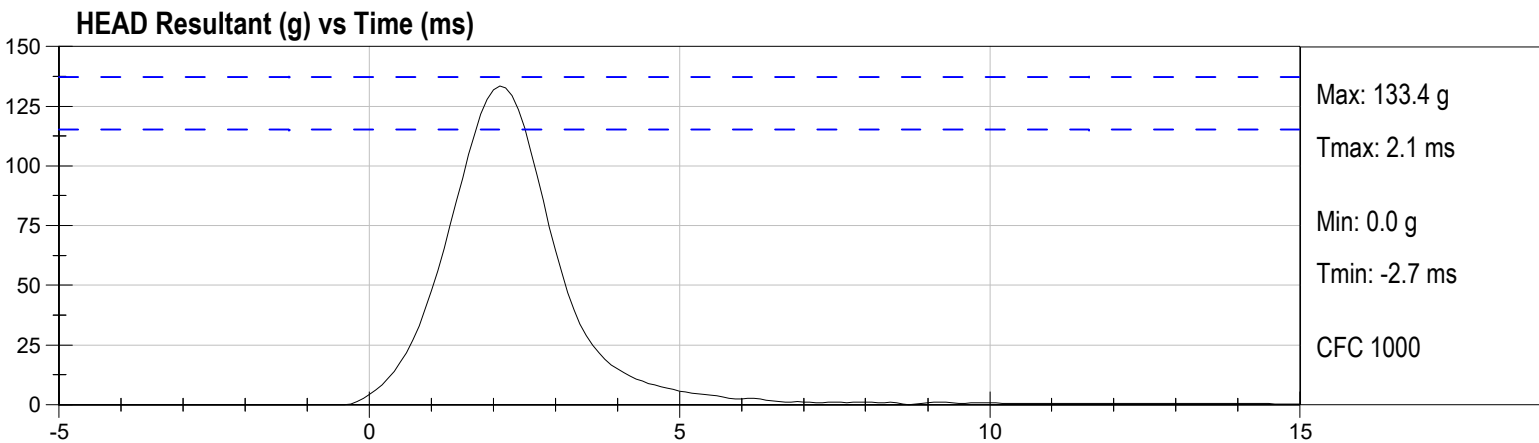
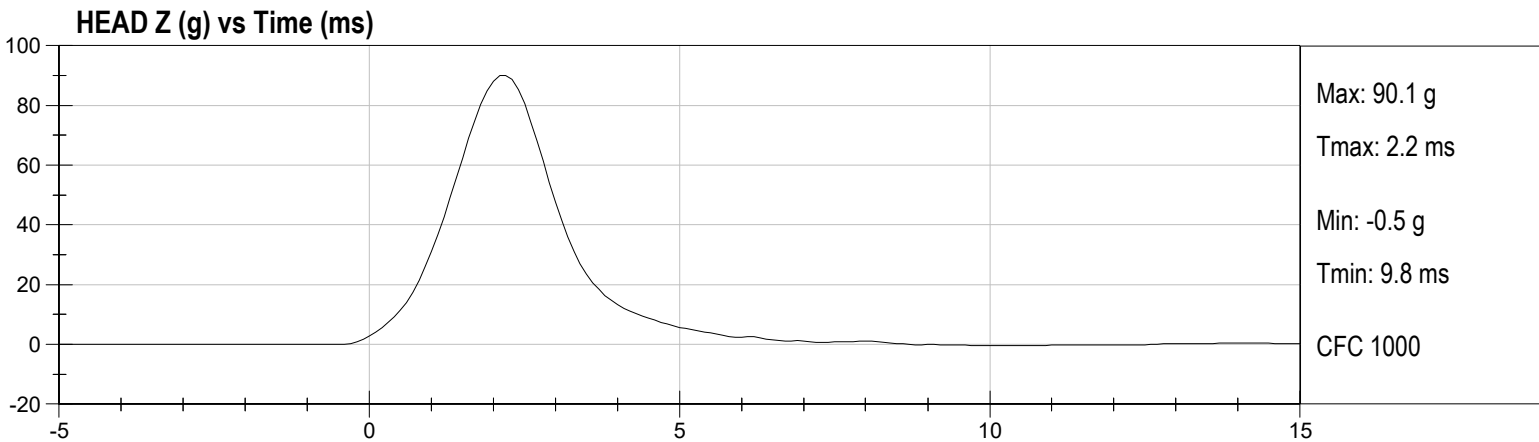
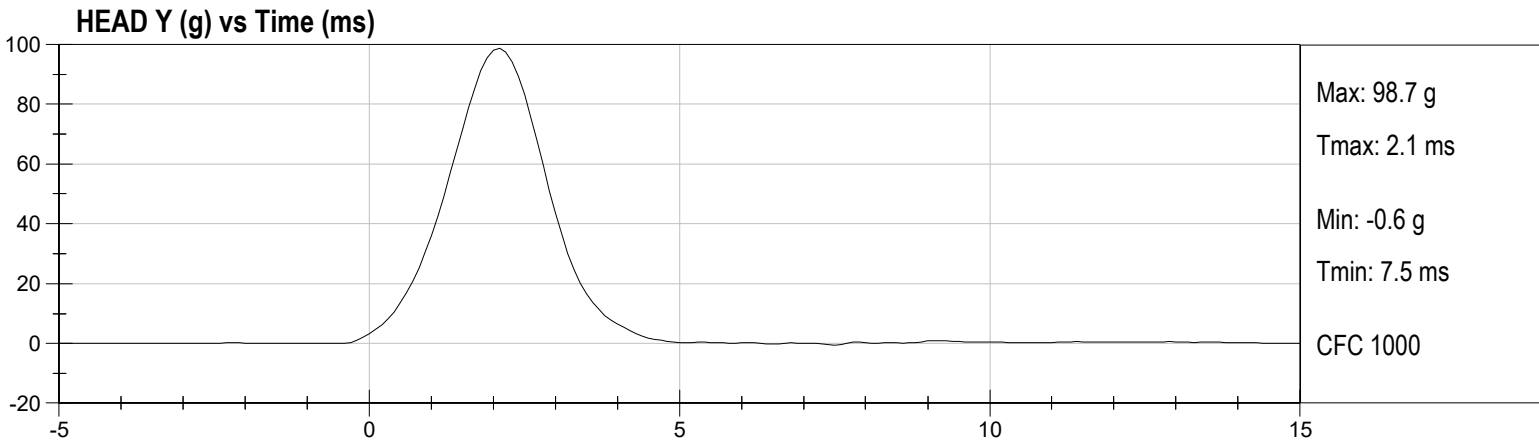
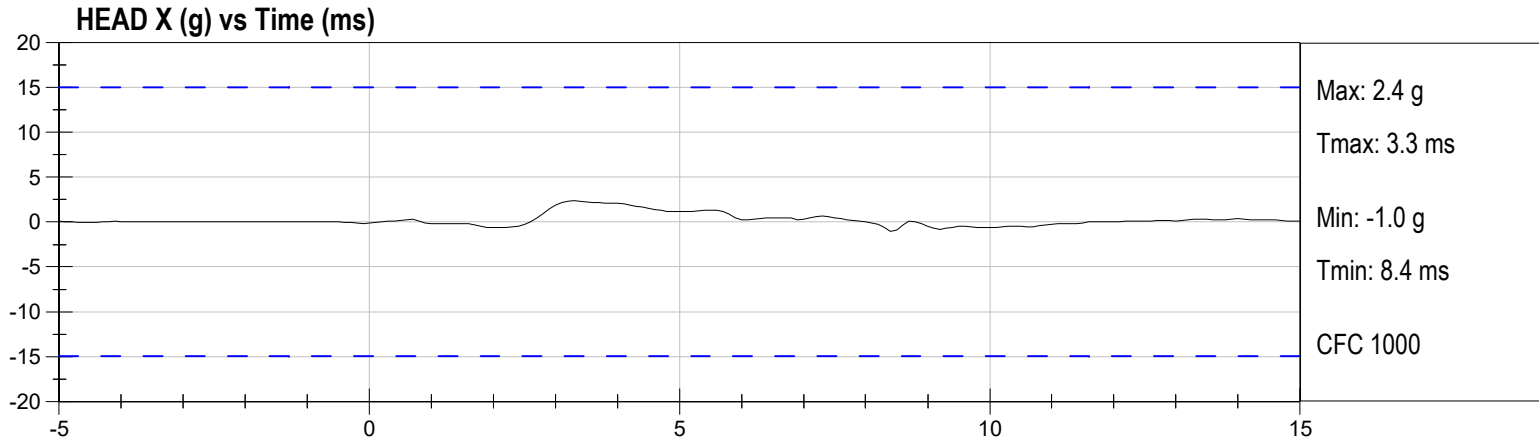


Lateral Head Drop Test
SID IIs
ATD Serial No: 306

Test Date: 02/19/2025
Test ID: D250521
Test Technician: Brian Lucas

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Peak Resultant Acceleration	g	115 to 137	133	Pass
Peak Longitudinal Acceleration	g	-15.0 to 15.0	2.4	Pass
Unimodal	%	within 15% of peak	2	Pass

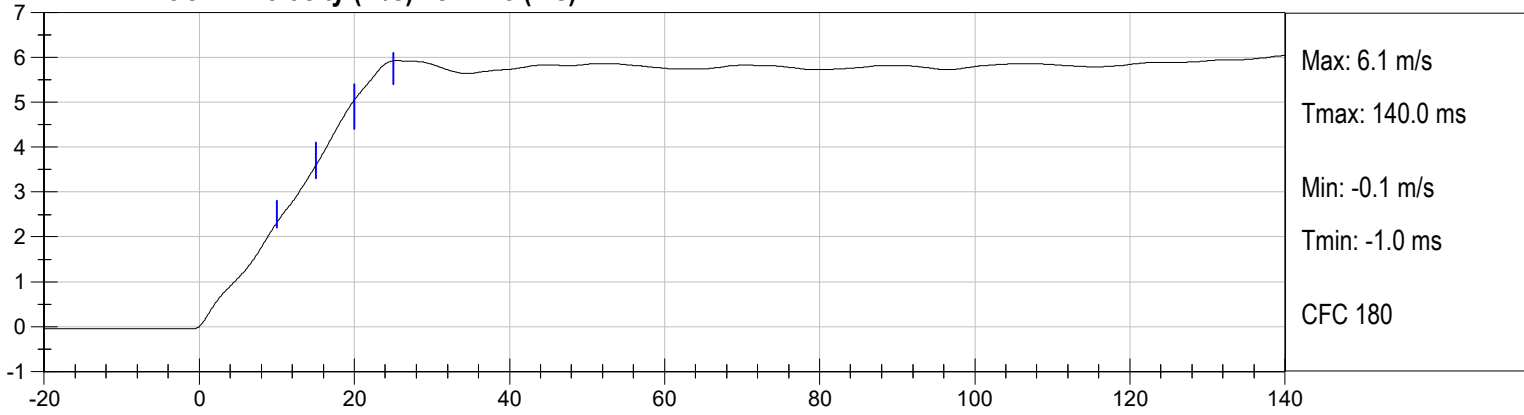
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
HEAD Y	Endevco	T30974	11/25/2024	5/27/2025
HEAD X	Endevco	T30975	11/25/2024	5/27/2025
HEAD Z	Endevco	T30976	11/25/2024	5/27/2025



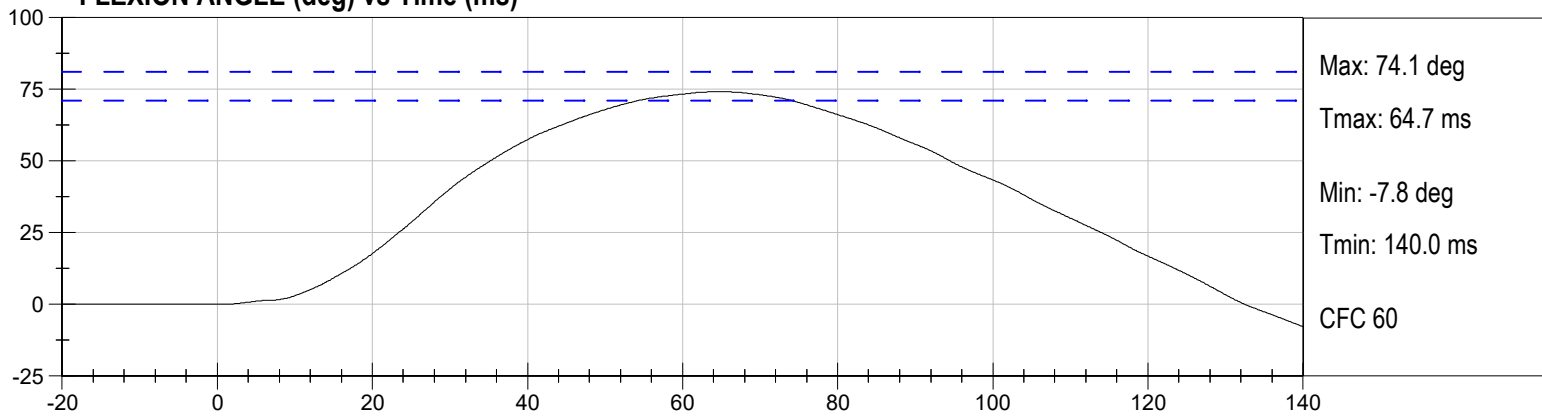
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	23	Pass
Impact Velocity	m/s	5.51 to 5.63	5.58	Pass
Pendulum Velocity at 10 ms	m/s	2.2 to 2.8	2.29	Pass
Pendulum Velocity at 15 ms	m/s	3.30 to 4.10	3.56	Pass
Pendulum Velocity at 20 ms	m/s	4.40 to 5.40	5.03	Pass
Pendulum Velocity at 25 ms	m/s	5.40 to 6.10	5.92	Pass
Peak Pendulum Velocity from 25 to 100 ms	m/s	5.50 to 6.20	5.93	Pass
Maximum "D" Plane Rotation	deg	71 to 81	74	Pass
Time of Maximum "D" Plane Rotation	ms	50 to 70	65	Pass
Maximum Moment About Occipital Condyle	Nm	-44 to -36	-38	Pass
Time of Moment Decay Time To 0 Nm	ms	102 to 126	117	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
PEND. ACCEL.	Endevco	AH5P1	01/13/2025	7/15/2025
NECK FORCE Y	Denton	N252FY	02/05/2025	8/7/2025
NECK MOMENT X	Denton	N252MX	02/05/2025	8/7/2025
POT. A - FRONT	Servo	2732	01/09/2025	7/11/2025
POT. C - HEADFORM	Servo	2204	01/09/2025	7/11/2025

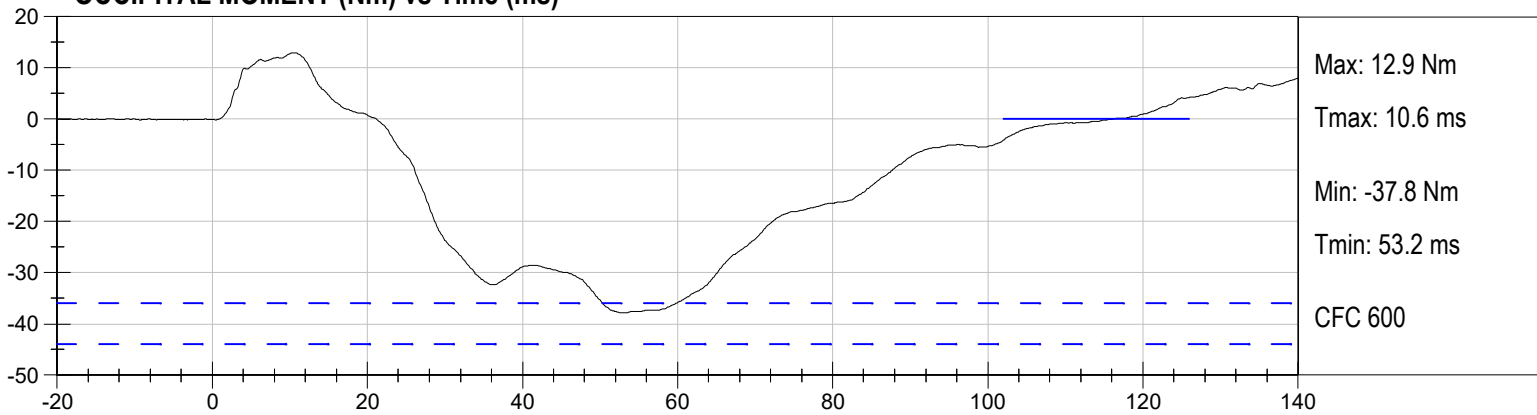
PEND. ACCEL. Velocity (m/s) vs Time (ms)



FLEXION ANGLE (deg) vs Time (ms)



OCCIPITAL MOMENT (Nm) vs Time (ms)



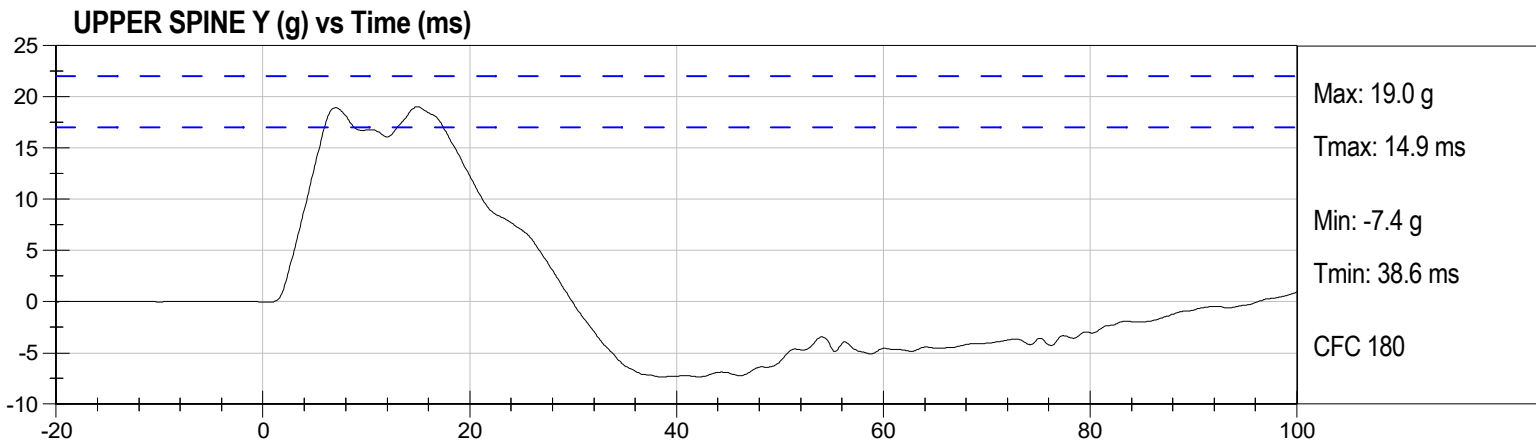
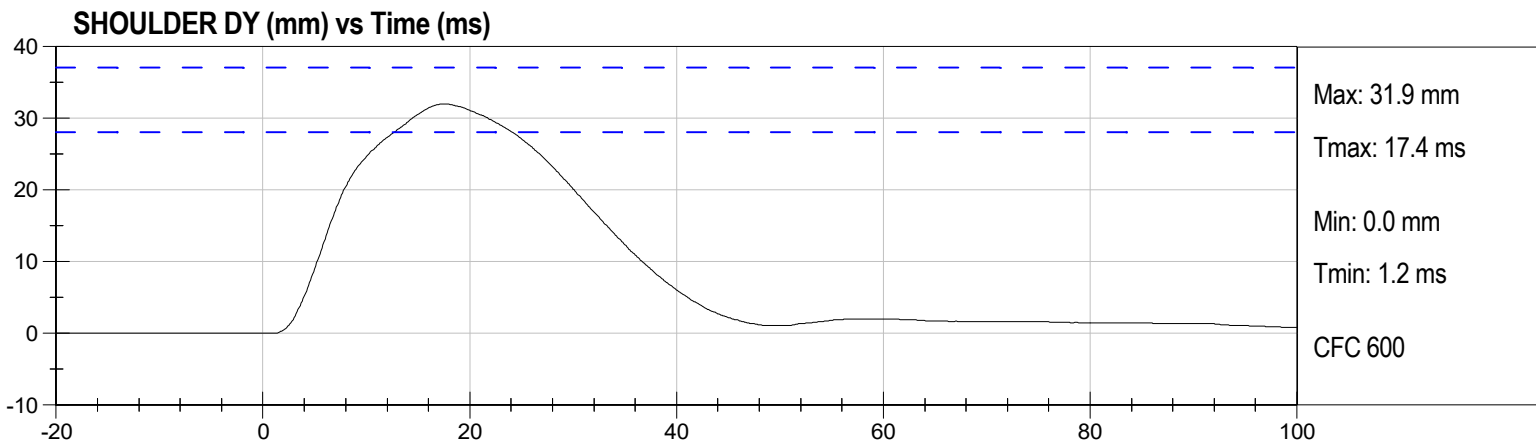
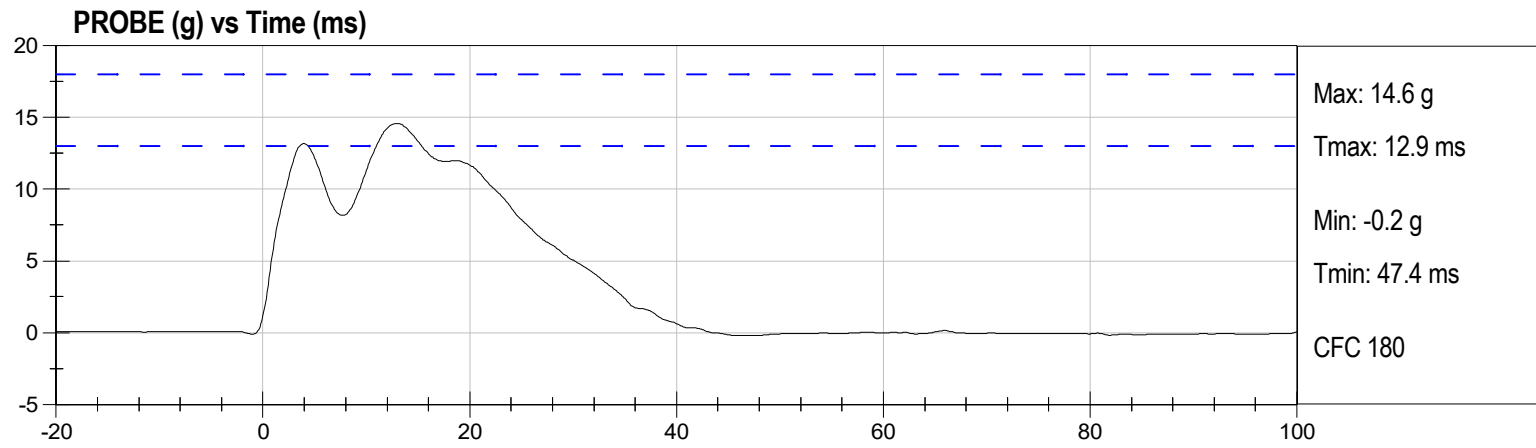


Shoulder Impact Test
SID IIs
ATD Serial No: 306

Test Date: 02/19/2025
Test ID: D250523
Test Technician: Jonah Pulokas

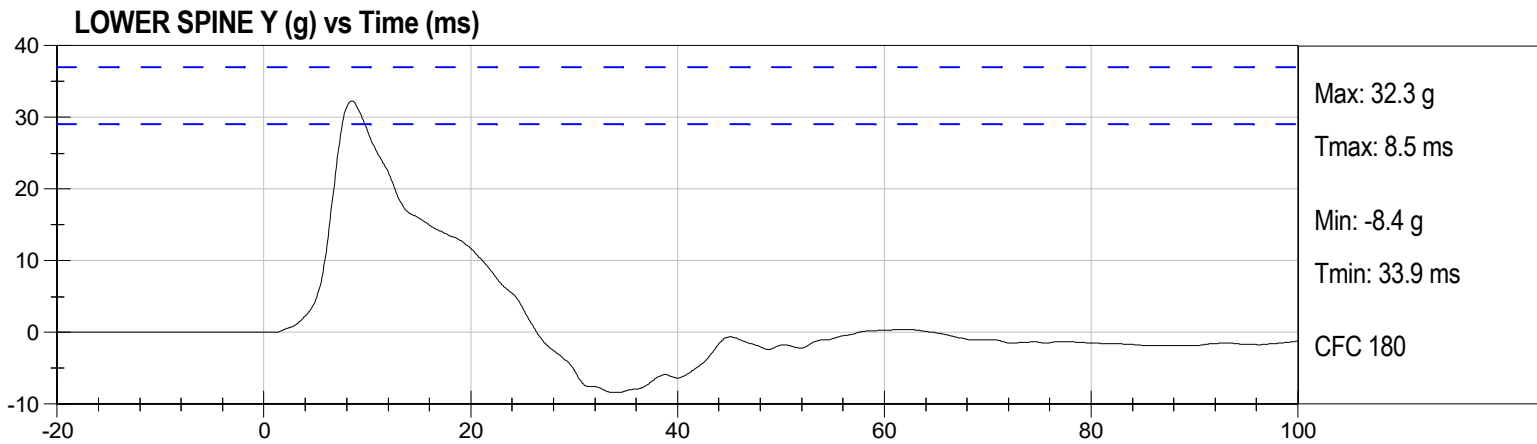
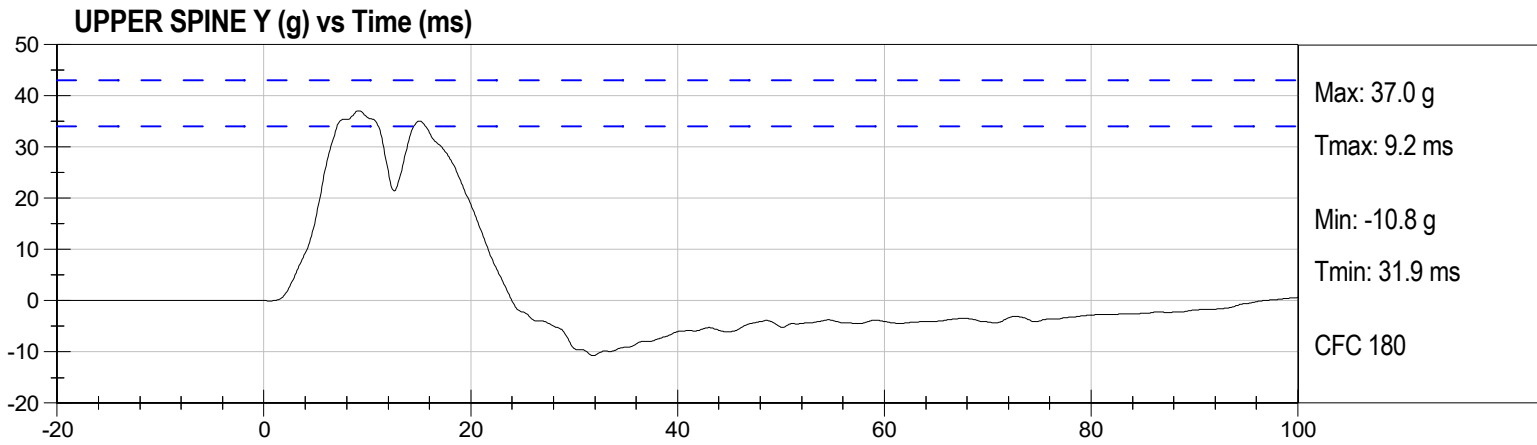
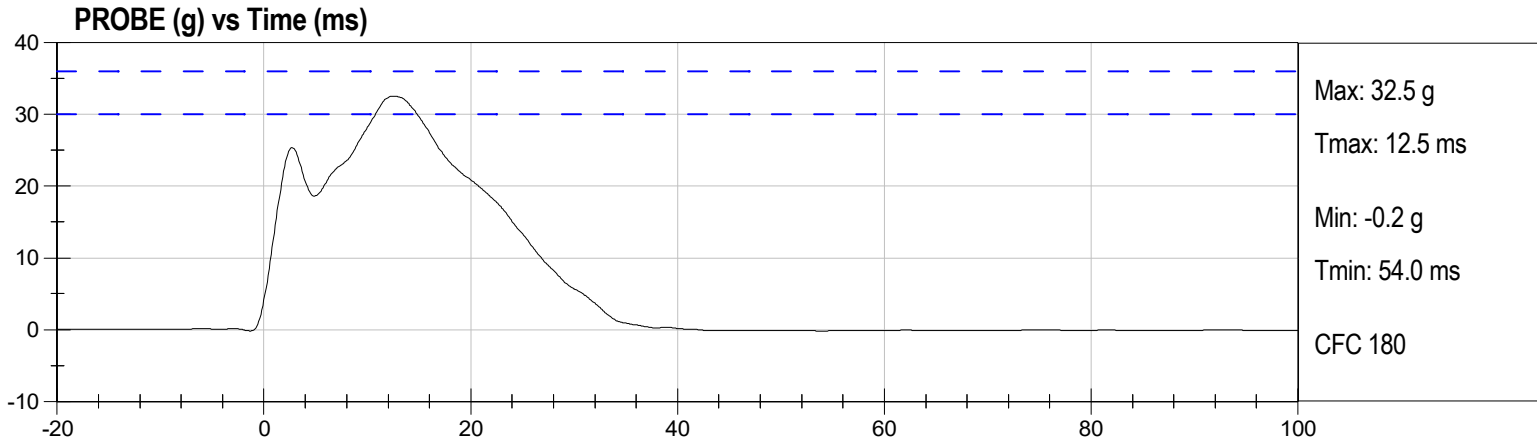
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	23	Pass
Impact Velocity	m/s	4.2 to 4.4	4.38	Pass
Peak Probe Acceleration	g	13 to 18	15	Pass
Shoulder Displacement	mm	28 to 37	32	Pass
Upper Spine (T1) Y Acceleration	g	17 to 22	19	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
PROBE	Endevco	P79577	09/18/2024	3/20/2025
UPPER SPINE Y	Endevco	P82319	12/10/2024	6/11/2025
SHOULDER DY	FTSS	G050	12/11/2024	6/12/2025

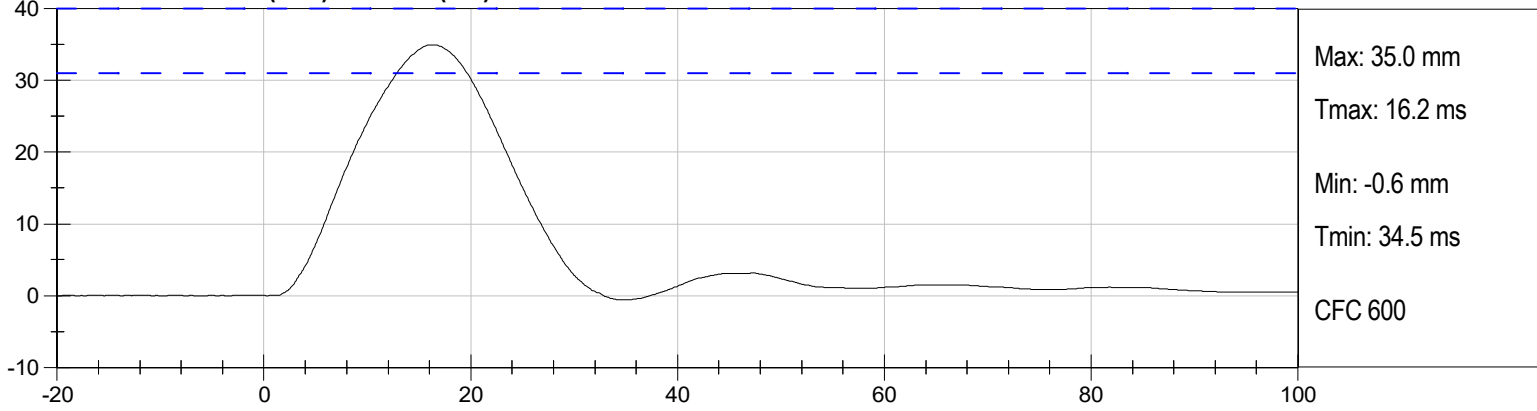


Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	23	Pass
Impact Velocity	m/s	6.6 to 6.8	6.77	Pass
Peak Probe Acceleration after 5 ms	g	30 to 36	33	Pass
Upper Spine (T1) Y Acceleration	g	34 to 43	37	Pass
Lower Spine (T12) Y Acceleration	g	29 to 37	32	Pass
Shoulder Displacement	mm	31 to 40	35	Pass
Upper Thorax Rib Displacement	mm	25 to 32	29	Pass
Middle Thorax Rib Displacement	mm	30 to 36	33	Pass
Lower Thorax Rib Displacement	mm	32 to 38	36	Pass

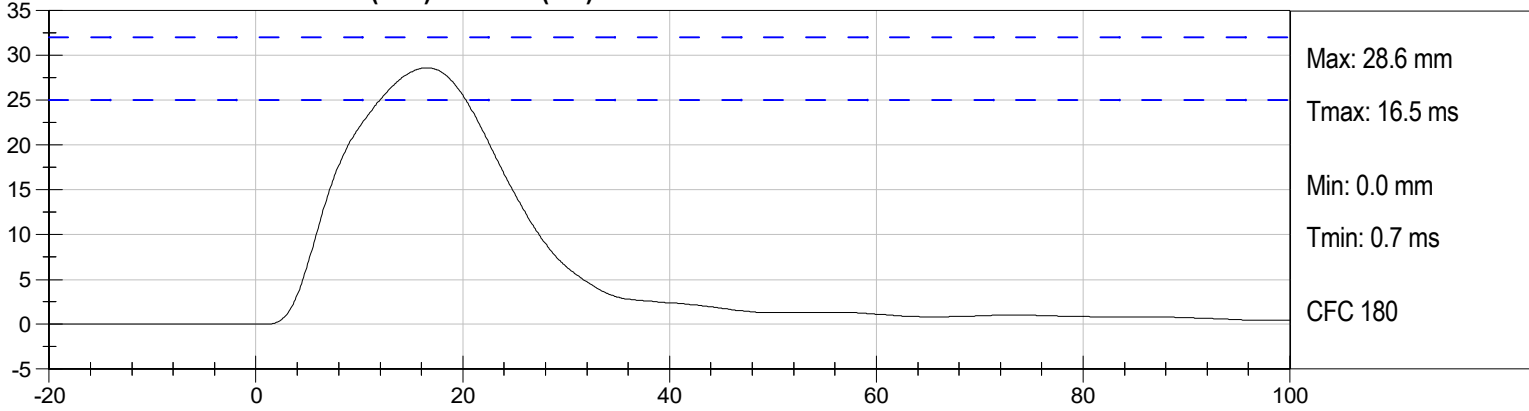
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
PROBE	Endevco	P79577	09/18/2024	3/20/2025
UPPER SPINE Y	Endevco	P82319	12/10/2024	6/11/2025
LOWER SPINE Y	Endevco	P96335	12/10/2024	6/11/2025
SHOULDER DY	FTSS	G050	12/11/2024	6/12/2025
UPPER THORAX RIB DY	FTSS	G033	12/11/2024	6/12/2025
MID THORAX RIB DY	Servo	G2403	12/11/2024	6/12/2025
LOWER THORAX RIB DY	FTSS	G1270	12/11/2024	6/12/2025



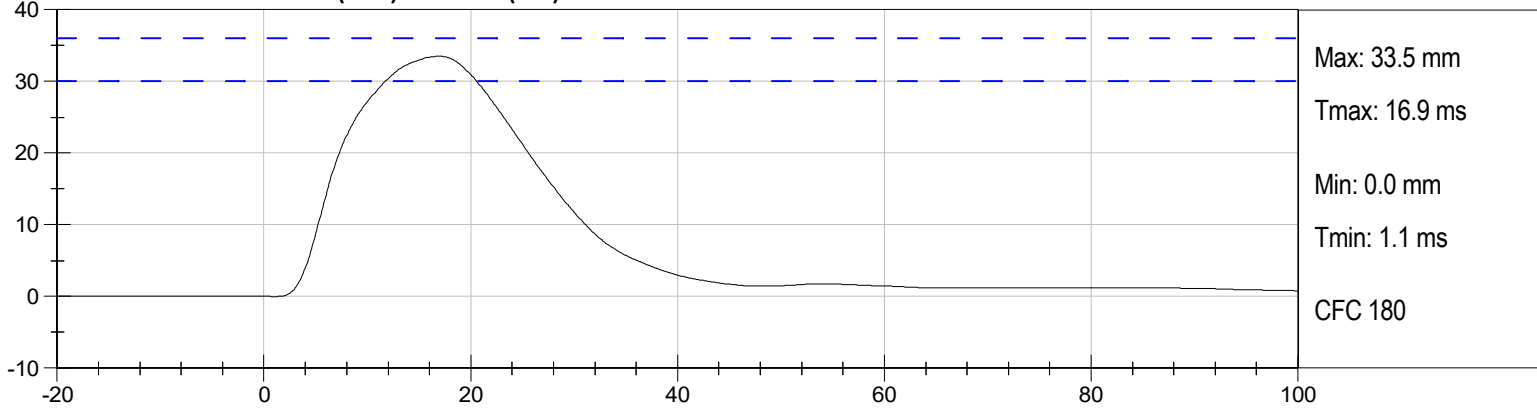
SHOULDER DY (mm) vs Time (ms)



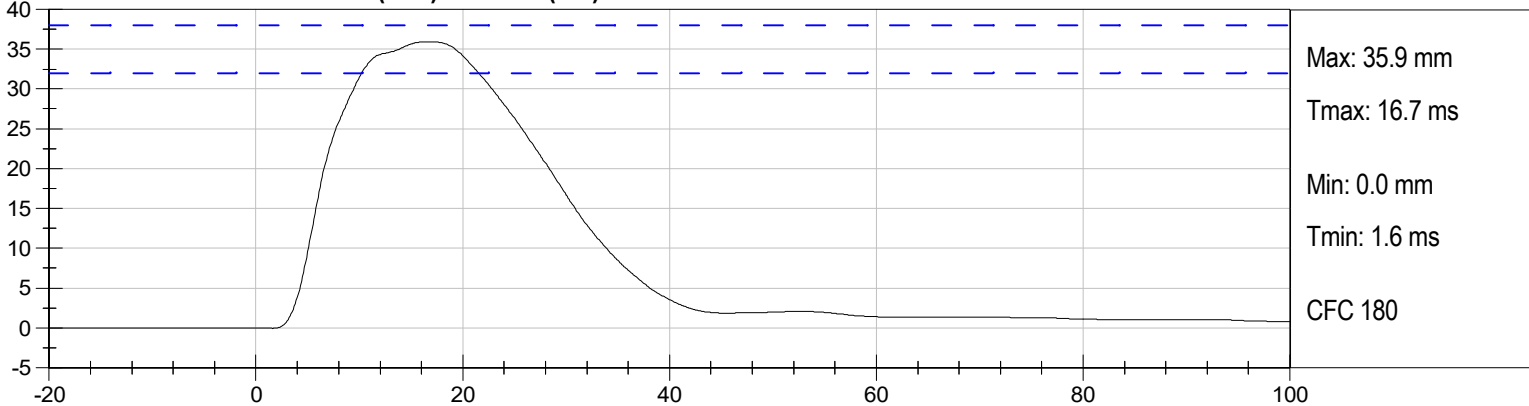
UPPER THORAX RIB DY (mm) vs Time (ms)



MID THORAX RIB DY (mm) vs Time (ms)



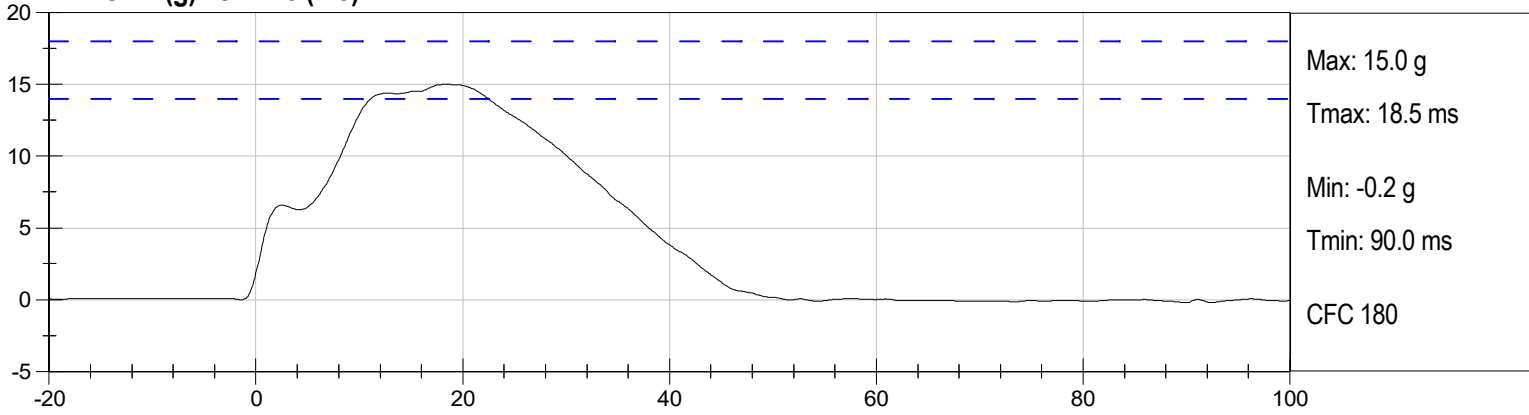
LOWER THORAX RIB DY (mm) vs Time (ms)



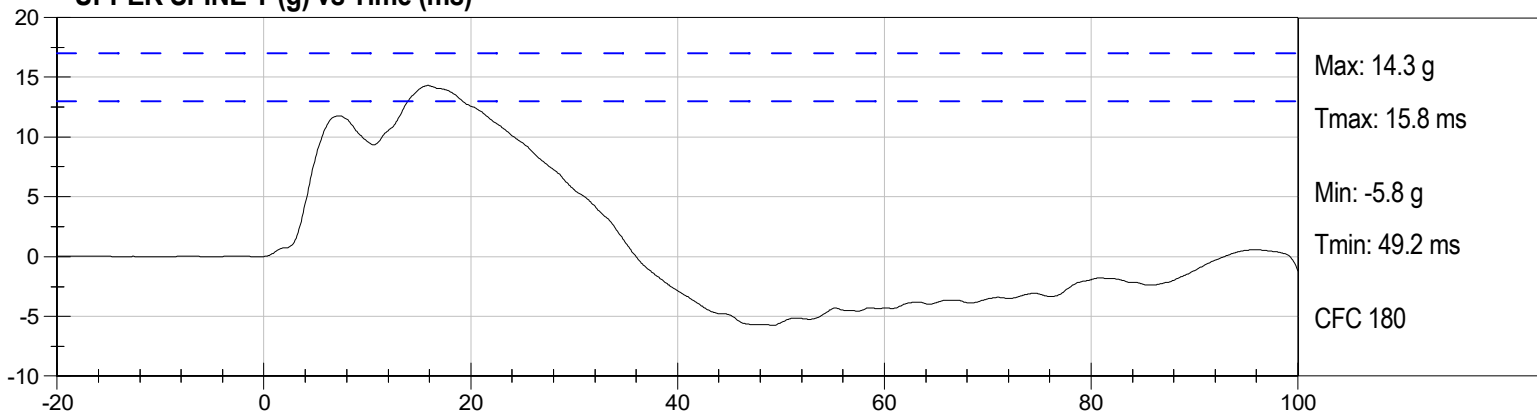
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	23	Pass
Impact Velocity	m/s	4.2 to 4.4	4.27	Pass
Peak Probe Acceleration	g	14 to 18	15	Pass
Upper Spine (T1) Y Acceleration	g	13 to 17	14	Pass
Lower Spine (T12) Y Acceleration	g	7 to 11	9	Pass
Upper Thorax Rib Displacement	mm	32 to 40	35	Pass
Middle Thorax Rib Displacement	mm	39 to 45	42	Pass
Lower Thorax Rib Displacement	mm	35 to 43	39	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
PROBE	Endevco	P79577	09/18/2024	3/20/2025
UPPER SPINE Y	Endevco	P82319	12/10/2024	6/11/2025
LOWER SPINE Y	Endevco	P96335	12/10/2024	6/11/2025
UPPER THORAX RIB DY	FTSS	G033	12/11/2024	6/12/2025
MID THORAX RIB DY	Servo	G2403	12/11/2024	6/12/2025
LOWER THORAX RIB DY	FTSS	G1270	12/11/2024	6/12/2025

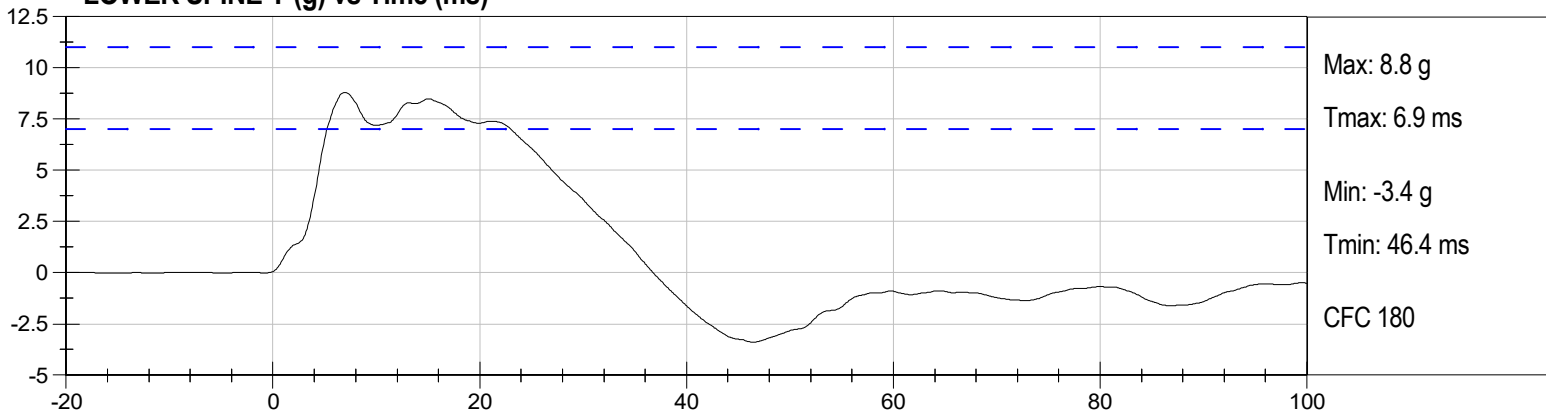
PROBE (g) vs Time (ms)



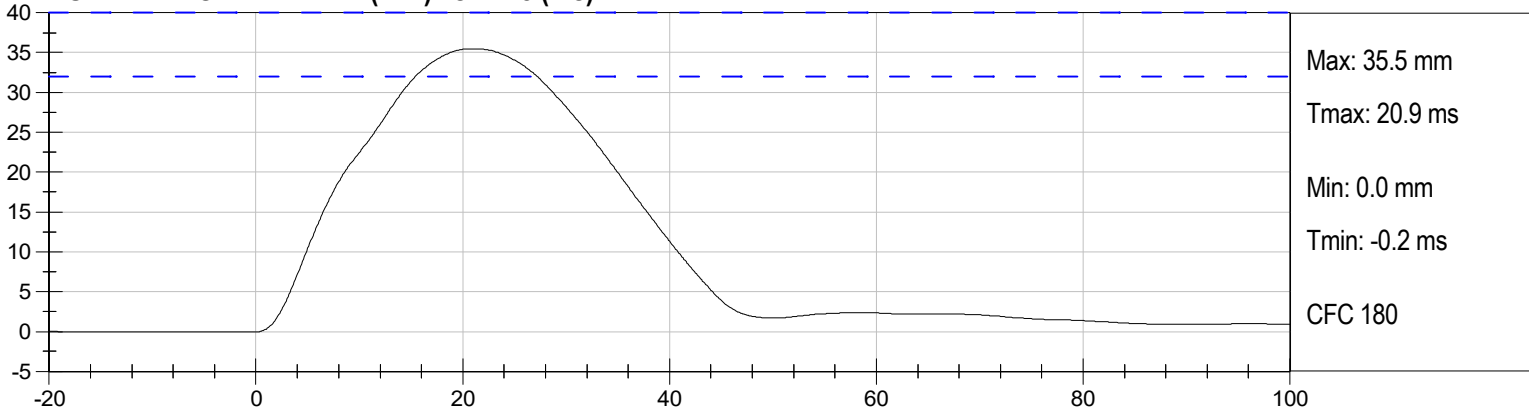
UPPER SPINE Y (g) vs Time (ms)



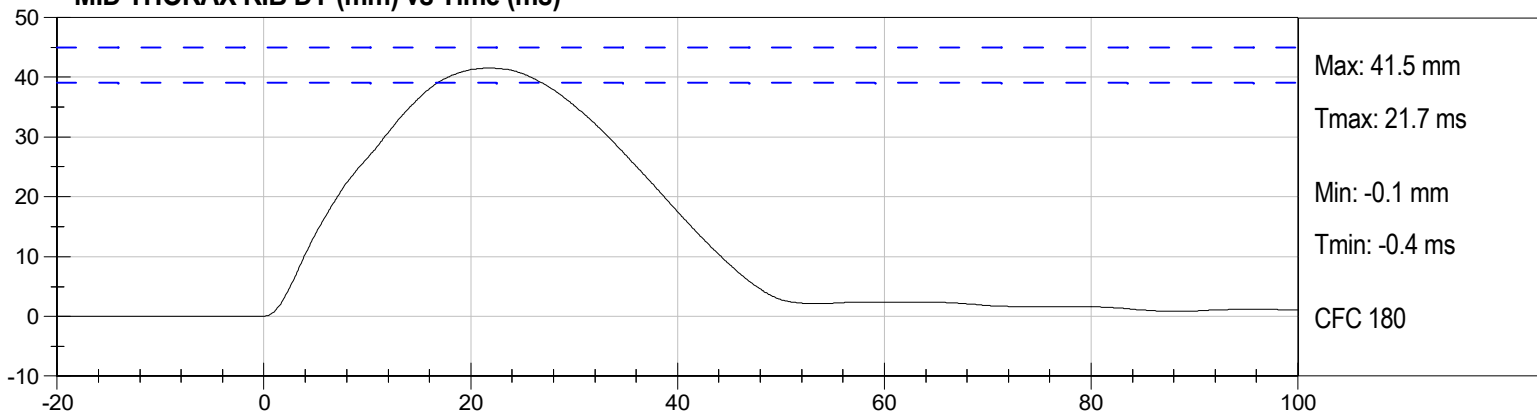
LOWER SPINE Y (g) vs Time (ms)



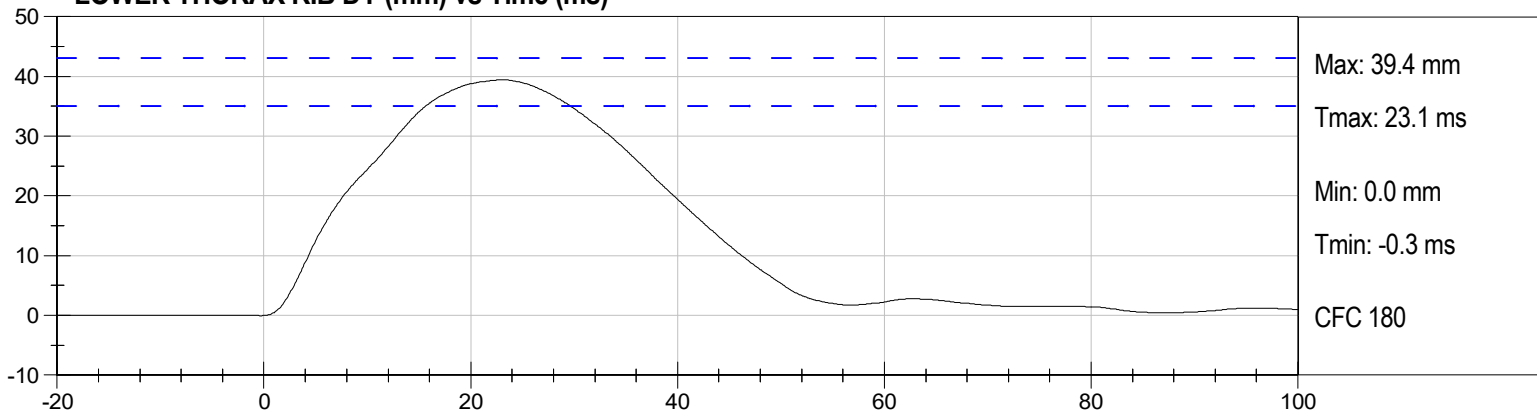
UPPER THORAX RIB DY (mm) vs Time (ms)



MID THORAX RIB DY (mm) vs Time (ms)



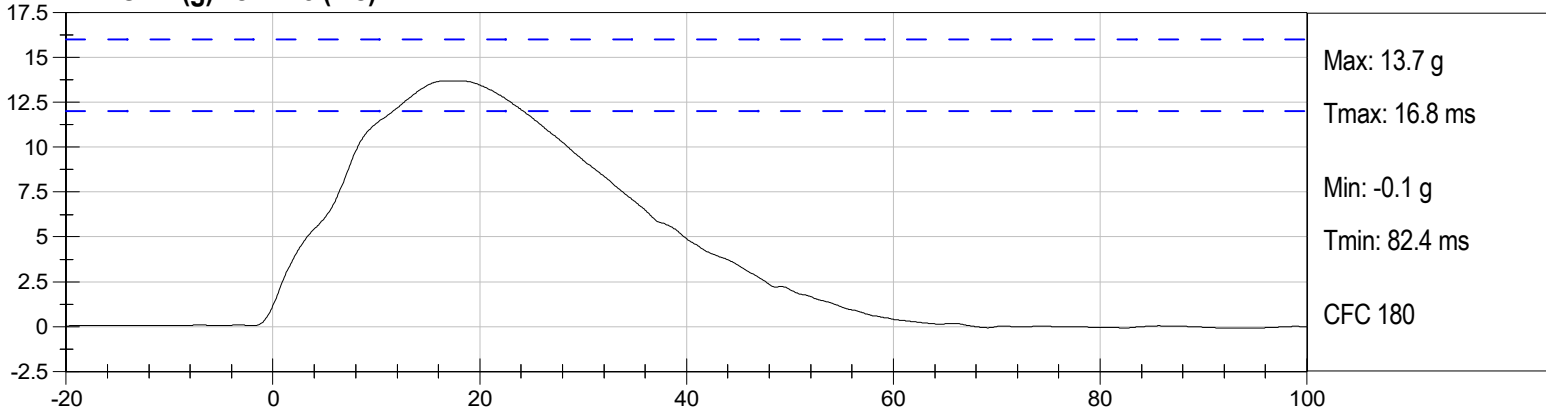
LOWER THORAX RIB DY (mm) vs Time (ms)



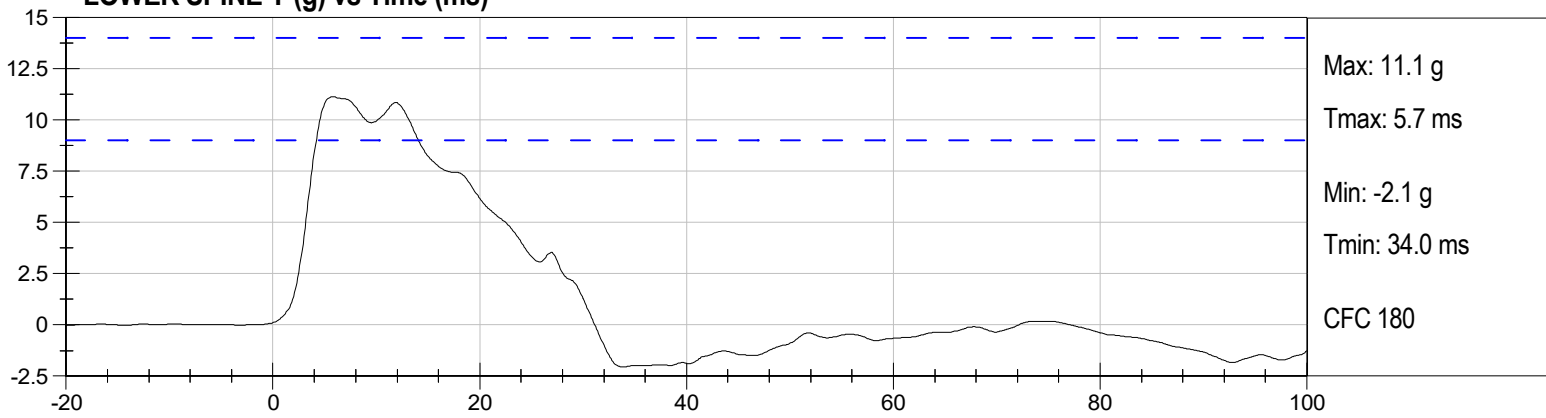
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	23	Pass
Impact Velocity	m/s	4.2 to 4.4	4.38	Pass
Peak Probe Acceleration	g	12 to 16	14	Pass
Lower Spine (T12) Y Acceleration	g	9 to 14	11	Pass
Upper Abdomen Rib Displacement	mm	36 to 47	44	Pass
Lower Abdomen Rib Displacement	mm	33 to 44	38	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
PROBE	Endevco	P79577	09/18/2024	3/20/2025
LOWER SPINE Y	Endevco	P96335	12/10/2024	6/11/2025
UPPER ABDOMINAL RIB DY	FTSS	G032	12/11/2024	6/12/2025
LOWER ABDOMINAL RIB DY	Medius	MJ5171	12/11/2024	6/12/2025

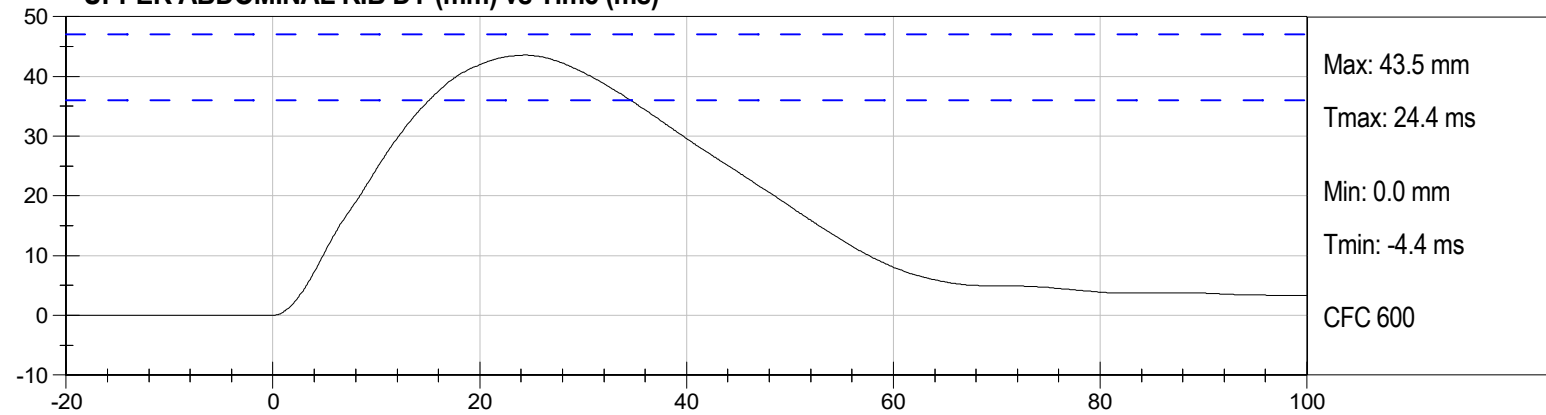
PROBE (g) vs Time (ms)



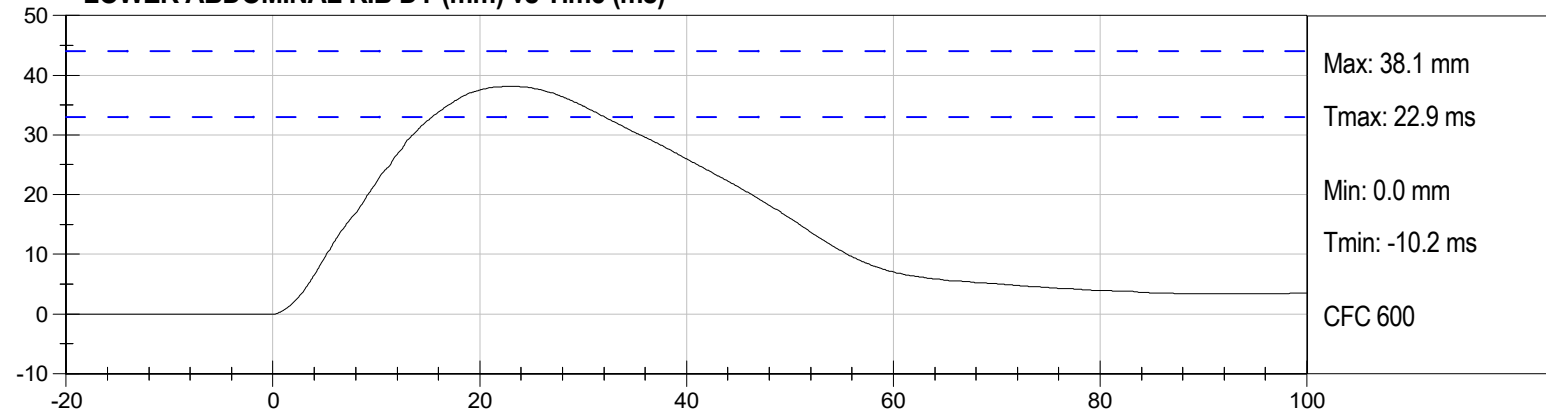
LOWER SPINE Y (g) vs Time (ms)



UPPER ABDOMINAL RIB DY (mm) vs Time (ms)



LOWER ABDOMINAL RIB DY (mm) vs Time (ms)





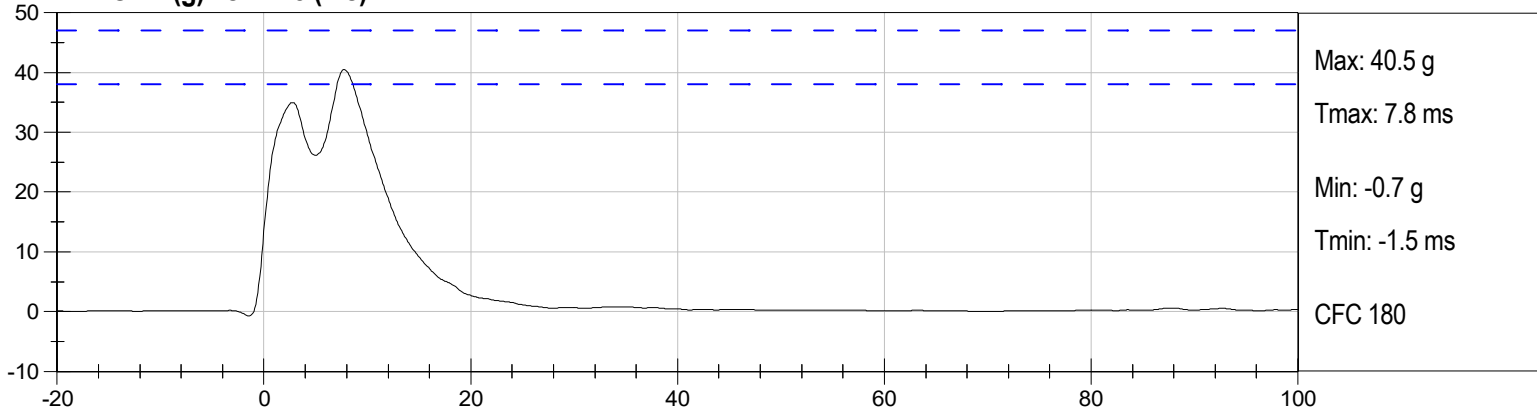
Acetabulum Impact Test
SID IIs
ATD Serial No: 306

Test Date: 02/19/2025
Test ID: D250527
Test Technician: Jonah Pulokas

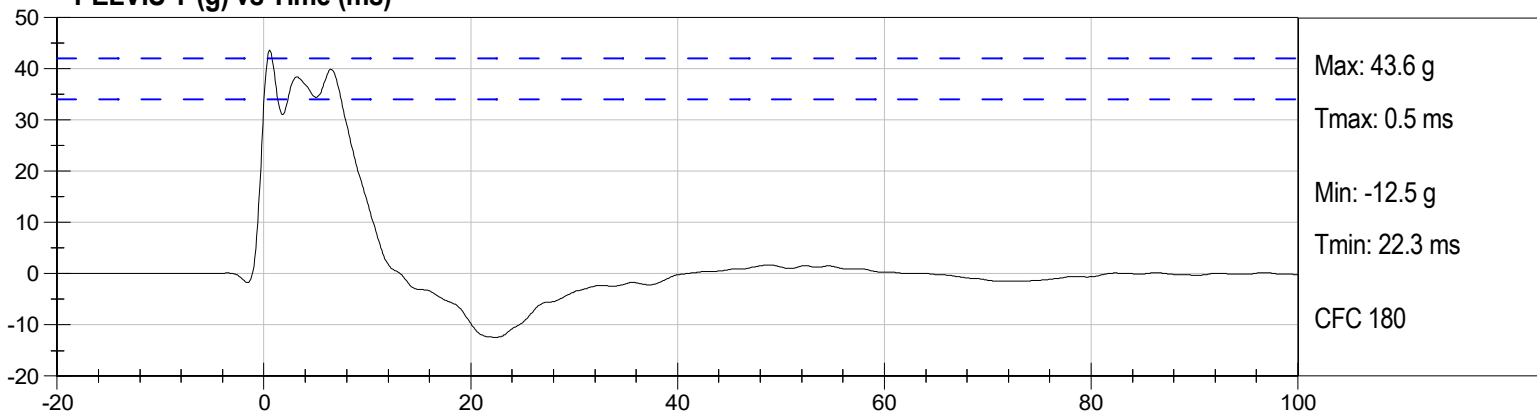
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	24	Pass
Impact Velocity	m/s	6.6 to 6.8	6.70	Pass
Peak Probe Acceleration	g	38 to 47	40	Pass
Peak Pelvis Y Acceleration after 6 ms	g	34 to 42	40	Pass
Acetabulum Force	N	3600 to 4300	4231	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
PROBE	Endevco	P79577	09/18/2024	3/20/2025
PELVIS Y	Endevco	P82673	12/10/2024	6/11/2025
ACETABULUM FY	FTSS	ACG4285FY	05/24/2024	5/24/2025

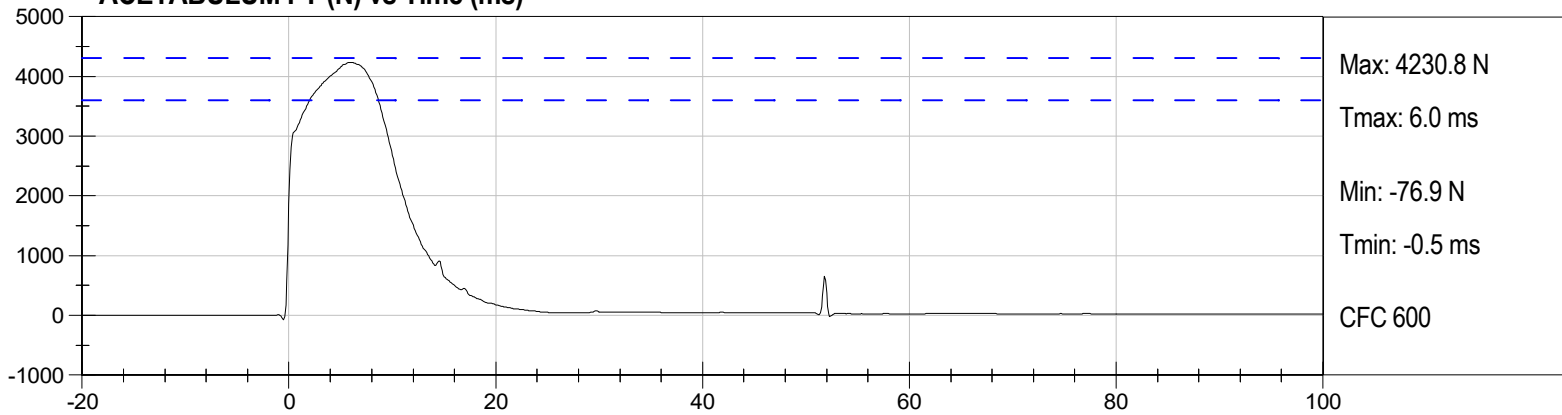
PROBE (g) vs Time (ms)



PELVIS Y (g) vs Time (ms)



ACETABULUM FY (N) vs Time (ms)





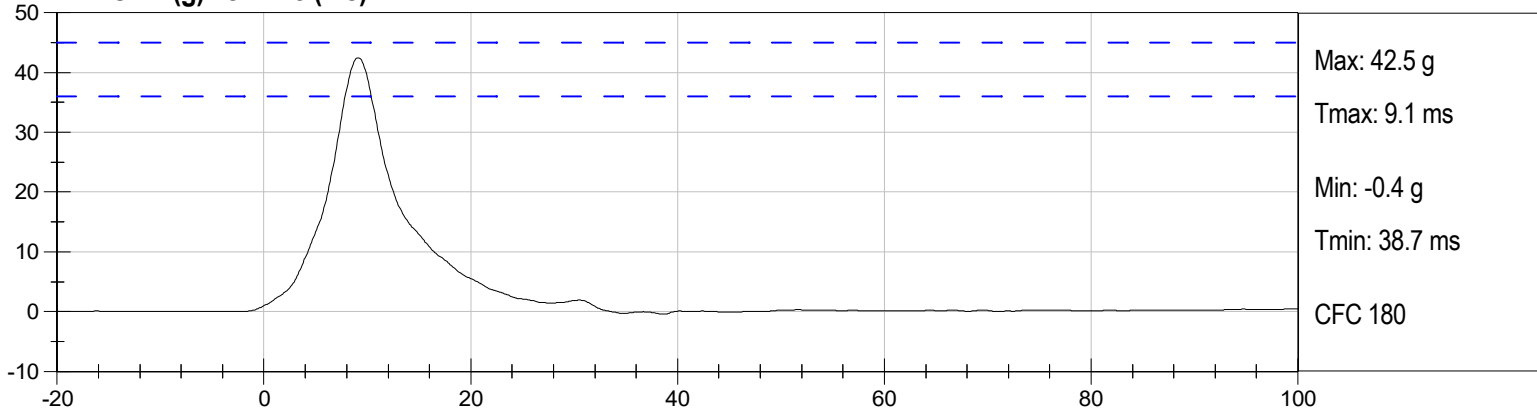
Iliac Impact Test
SID IIs
ATD Serial No: 306

Test Date: 02/19/2025
Test ID: D250528
Test Technician: Jonah Pulokas

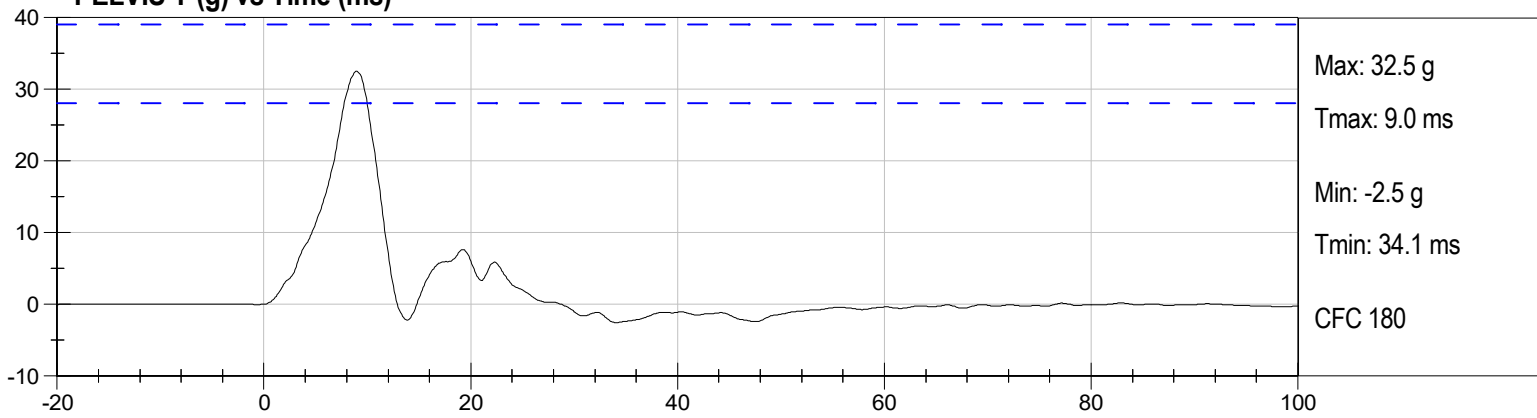
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Impact Velocity	m/s	4.2 to 4.4	4.38	Pass
Peak Probe Acceleration	g	36 to 45	42	Pass
Peak Pelvis Y Acceleration	g	28 to 39	33	Pass
Iliac Force	N	4100 to 5100	4810	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
PROBE	Endevco	P79577	09/18/2024	3/20/2025
PELVIS Y	Endevco	P82673	12/10/2024	6/11/2025
ILIUM CREST FY	FTSS	IWG3023FY	05/24/2024	5/24/2025

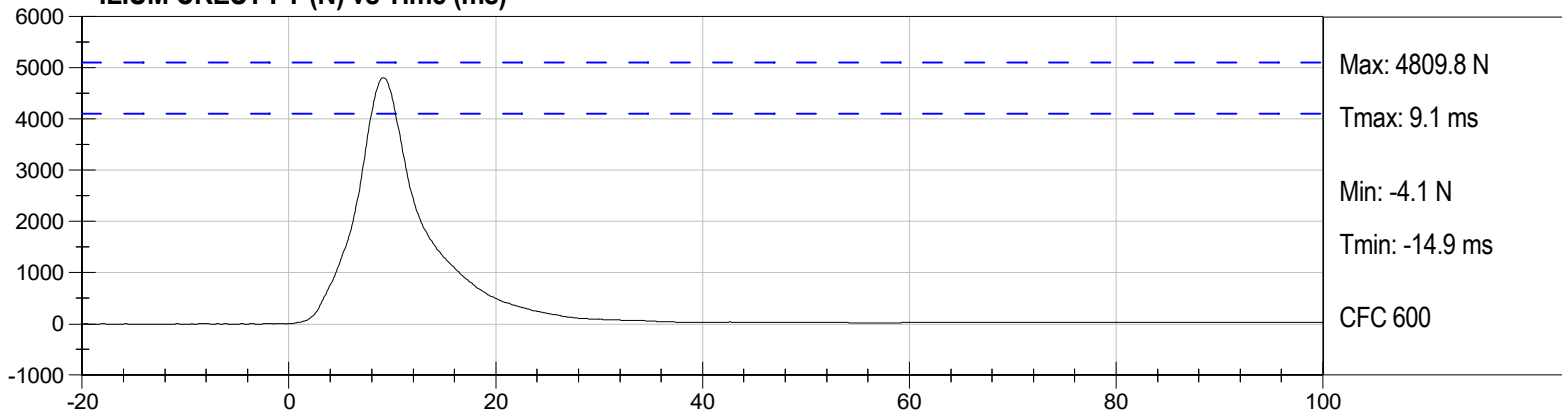
PROBE (g) vs Time (ms)



PELVIS Y (g) vs Time (ms)



ILIUM CREST FY (N) vs Time (ms)





SID-IIs Pelvis Plug Certification Test

Plug S/N 16298

Test Number 22864

Report Number 22921

Test Date 5/20/2022 10:10:01 AM

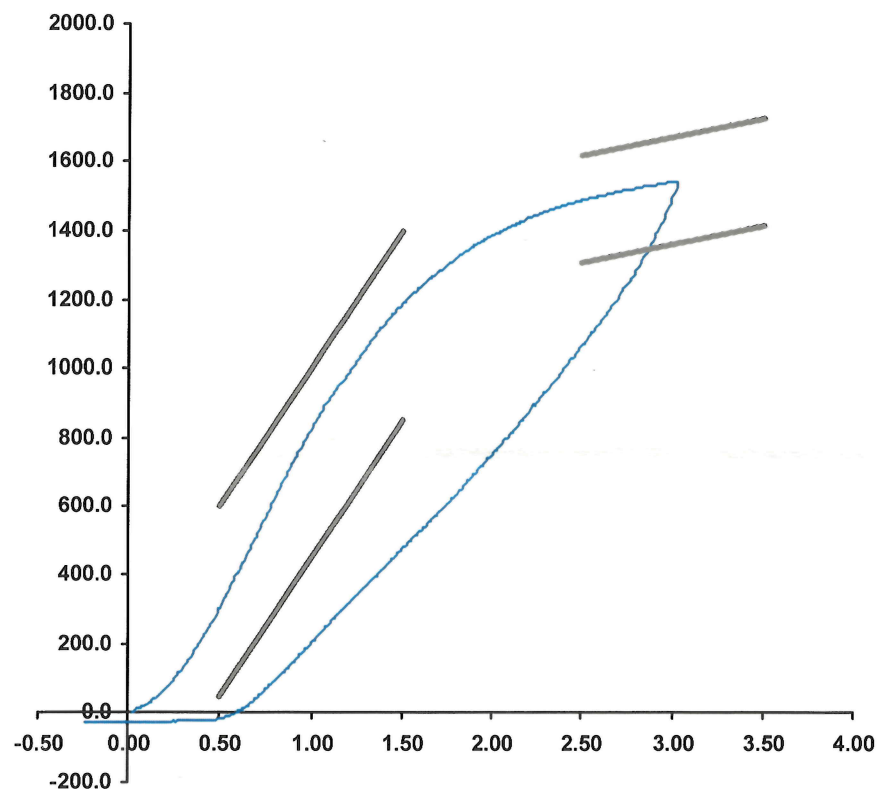
	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	303	50	600
Force @ 1.5 mm (N)	1,185	850	1,400
Force @ 2.5 mm (N)	1,491	1,306	1,618
Force @ 3.0 mm (N)	1,544	1,361	1,673

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

20-May-22

SACO Research

By : De

Date : 5/20/2022



SID-IIs Pelvis Plug Certification Test

Plug S/N 15777

Test Number 20677

Report Number 20731

Test Date 10/15/2021 8:08:11 AM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	267	50	600
Force @ 1.5 mm (N)	1,180	850	1,400
Force @ 2.5 mm (N)	1,505	1,306	1,618
Force @ 3.0 mm (N)	1,559	1,361	1,673

Testing Machine STM-20 5965542

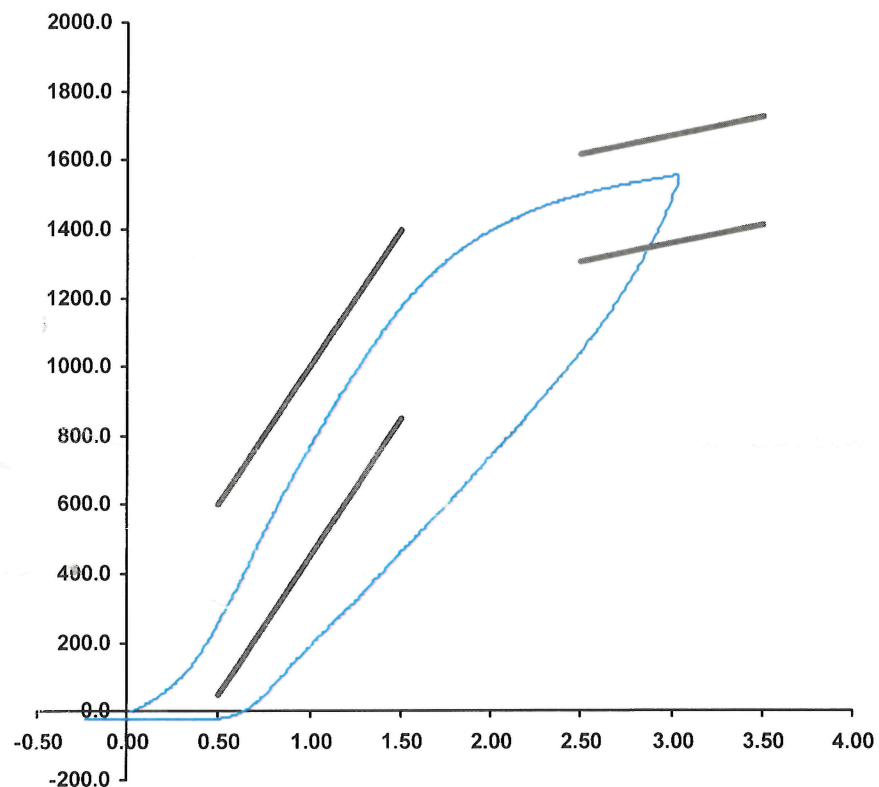
Load Cell S/N (FI360947), Units (LBS) 1000

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

15-Oct-21

SACO Research

By :

OC

Date :

10/15/21

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION

Table 1 – Dummy Instrumentation (ES-2re)

			ES-2re S/N F032		
			Serial Number	Manufacturer	Calibration Date
Head CG Accelerometers		X	P79568	Endevco	11/21/2024
		Y	P79569	Endevco	11/21/2024
		Z	T30941	Endevco	11/21/2024
		Xr	P86797	Endevco	11/21/2024
		Yr	P94957	Endevco	11/21/2024
		Zr	P97381	Endevco	11/21/2024
Thorax Rib Displacement Potentiometers	Upper	Y	G236	Honeywell	11/21/2024
	Middle	Y	G368	Honeywell	11/21/2024
	Lower	Y	G164	Honeywell	11/21/2024
Abdomen Load Cells	Forward	Y	ABG1532	Denton	01/20/2025
	Middle	Y	ABG1534	Denton	01/20/2025
	Rear	Y	ABG1535	Denton	01/20/2025
Lower Spine Accelerometers (T12)		X	P79574	Endevco	11/21/2024
		Y	T14094	Endevco	11/21/2024
		Z	P82603	Endevco	11/21/2024
Public Symphysis Load Cell		Y	PG461	Denton	01/20/2025

Table 2 – Dummy Instrumentation (SID-IIs)

			SID-IIs S/N 306			
			Serial Number	Manufacturer	Calibration Date	
Head CG Accelerometers			X	P79003	Endevco	12/10/2024
			Y	P79445	Endevco	12/10/2024
			Z	P79724	Endevco	12/10/2024
			Xr	P84999	Endevco	12/10/2024
			Yr	P85000	Endevco	12/10/2024
			Zr	P85001	Endevco	12/10/2024
Head Angular Rate Sensors			X	ARS7566	DTS	07/31/2024
			Y	ARS7586	DTS	07/31/2024
			Z	ARS7602	DTS	07/31/2024
Displacement Potentiometers	Thoracic Rib	Upper	Y	G033	FTSS	12/11/2024
		Middle	Y	G2403	Servo	12/11/2024
		Lower	Y	G1270	FTSS	12/11/2024
	Abdominal Rib	Upper	Y	G032	FTSS	12/11/2024
		Lower	Y	MJ5171	Medius	12/11/2024
Lower Spine Accelerometers (T12)			X	P96332	Endevco	12/10/2024
			Y	P96335	Endevco	12/10/2024
			Z	P96341	Endevco	12/10/2024
Acetabulum Load Cell			Y	ACG4285	FTSS	05/24/2024
Iliac Wing Load Cell			Y	IWG3023	FTSS	05/24/2024
Pelvis Plug (struck side)				16298	SACO	05/20/2022
Pelvis Plug (non-struck side)				15777	SACO	10/15/2021

Table 3 – Vehicle Instrumentation

			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	T45152	Endevco	02/09/2025
	Vehicle Center of Gravity	Y	T43458	Endevco	01/31/2025
	Vehicle Center of Gravity	Z	T45301	Endevco	02/02/2025
2	Right Sill at Front Seat	X	T43544	Endevco	10/08/2024
	Right Sill at Front Seat	Y	T43512	Endevco	02/09/2025
	Right Sill at Front Seat	Z	T43528	Endevco	10/08/2024
3	Right Sill at Rear Seat	X	T44845	Endevco	12/04/2024
	Right Sill at Rear Seat	Y	T45140	Endevco	02/09/2025
	Right Sill at Rear Seat	Z	T44866	Endevco	12/05/2024
4	Left Sill at Front Door	Y	T43948	Endevco	02/06/2025
5	Left Sill at Rear Door	Y	T44534	Endevco	02/09/2025
6	Left A-Post Lower	Y	T44566	Endevco	02/07/2025
7	Left A-Post Middle	Y	T43962	Endevco	02/07/2025
8	Left B-Post Lower	Y	T44876	Endevco	12/04/2024
9	Left B-Post Middle	Y	T45274	Endevco	02/06/2025
10	Front Seat Track	Y	T45161	Endevco	02/09/2025
11	Rear Seat Track or Structure	Y	T44842	Endevco	02/09/2025
12	Right Rear Occ. Compartment	Y	T45181	Endevco	02/09/2025
13	Engine Block	X	T43953	Endevco	02/09/2025
	Engine Block	Y	T45272	Endevco	02/06/2025
14	Rear Floorpan Above Axle	X	T44024	Endevco	02/09/2025
	Rear Floorpan Above Axle	Y	T45012	Endevco	02/09/2025
	Rear Floorpan Above Axle	Z	T44849	Endevco	02/09/2025

Table 4 – MDB Instrumentation

		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	PCB1183D	PCB	03/15/2024
MDB Center of Gravity	Y	PCB1822D	PCB	03/15/2024
MDB Center of Gravity	Z	PCB1753D	PCB	03/15/2024
Left Frame at Rear Axle Centerline	X	PCB1438D	PCB	03/15/2024
Left Frame at Rear Axle Centerline	Y	PCB1653D	PCB	03/15/2024