REPORT NUMBER: SINCAP-CAL-24-009

NEW CAR ASSESSMENT PROGRAM (NCAP)
SIDE IMPACT POLE TEST

KIA Corporation
2024 KIA EV9
5 Door SUV

NHTSA No: O20244220

PREPARED BY:
CALSPAN CORPORATION
P.O. BOX 400
BUFFALO, NEW YORK 14225

January 2, 2025

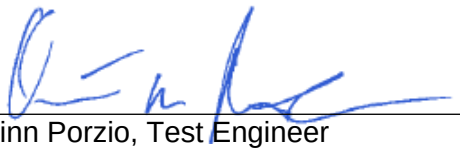
FINAL REPORT

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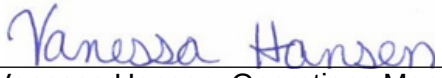
This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, in response to Contract Number 693JJ920D000016.

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Prepared by:  Date: January 2, 2025

Quinn Porzio, Test Engineer

Approved by:  Date: January 2, 2025

Vanessa Hansen, Operations Manager

FINAL REPORT ACCEPTANCE BY OCWS:

_____

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

Date: _____

_____

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

Date: _____

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Final Report of New Car Assessment Program Side Impact Pole Testing & FMVSS 305 Indicant Testing of a 2024 KIA EV9 5 Door SUV NHTSA No.: O20244220	January 2, 2025
	6. *Performing Organization Code* CAL
7. *Author(s)* Quinn Porzio, Test Engineer Vanessa Hansen, Operations Manager	8. *Performing Organization Report No.* CAL-DOT-2024-009
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15. *Supplementary Notes*

16. *Abstract*

A 32.20 km/h (20 mph), 75° oblique impact Side NCAP Test was conducted on the subject 2024 KIA EV9 5 Door SUV in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP Pole Laboratory Test Procedure for the generation of consumer information on vehicle side pole crash protection. This test was conducted at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on August 27, 2024.

The impact velocity of the vehicle was 32.03 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle was 21°C. The target vehicle's maximum post-test static crush was 212 mm located at level 2. The test vehicle's occupant performance data is as follows:

M easurement Description	Driver ATD (SID-IIs) (Serial No.300)		
	Units	Threshold	Result
Head Injury Criteria (HIC36)		1000	183.003
Resultant Lower Spine Acceleration	G	82	42.891
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3237.196
Maximum Thoracic Rib Deflection	mm	38	21.790
Maximum Abdominal Rib Deflection	mm	45*	20.173

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

17. *Key Words*	18. *Distribution Statement*
New Car Assessment Program (NCAP) Side Impact Pole Part 572V SID-IIs	Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division, 1200 New Jersey Ave. SE Washington, D.C. 20590

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Form DOT F1700.7 (8-72)

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SECTION 1

TEST PURPOSE AND PROCEDURE

This side impact test was conducted as part of the MY 2024 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. 693JJ920D000016. The purpose of this test is to generate comparative side impact performance in a 2024 KIA EV9 5 Door SUV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Pole Laboratory Test Procedure, dated March 2020.

SECTION 2

SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2024 KIA EV9 5 Door SUV. The subject vehicle was towed into the rigid pole at an angle of 75º and a velocity of 32.03 km/h. The test was conducted by Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on August 27, 2024. Pre-test and post-test photographs of the test vehicle and side impact dummy (SID-IIs) are included in Appendix A of this report.

One Part 572V (SID-IIs) dummy was placed in the driver designated seating position according to instructions specified in the OCWS Side NCAP Pole Laboratory Test Procedure, dated March 2020. The side impact event was documented by 11 cameras. Camera locations and other pertinent camera information are included on page 3-11 in this report.

The Part 572V (SID-IIs) dummy was instrumented accordingly:

Head CG tri-axial accelerometers
Thorax upper, middle, and lower rib displacement potentiometers
Abdomen upper and lower rib displacement potentiometers
Lower spine tri-axial accelerometers
Iliac load cell
Acetabulum load cell

Appendix B contains the dummy response data. Dummy configuration and performance verification data can be found in Appendix C of this report. Appendix D identifies all serial numbers, manufacturers, and calibration dates for test equipment, dummy sensors, potentiometers, and load cells used to collect data during the test.

Injury readings for the SID-IIs dummy were recorded as follows:

INJURY READINGS

Measurement Description	Driver ATD (SID-IIs)		
	Units	IARV	Result
Head Injury Criteria (HIC36)		1000	183.003
Resultant Lower Spine Acceleration	G	82	42.891
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3237.196
Maximum Thoracic Rib Deflection	mm	38	21.790
Maximum Abdominal Rib Deflection	mm	45*	20.173

*Proposed IARV

Supplemental restraint information was recorded as follows:

SUPPLEMENTAL RESTRAINT INFORMATION

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Front Airbag	Yes	No		
Knee Airbag	Yes	No		
Side Airbag 1 - Curtain	Yes	Yes	Yes	Yes
Side Airbag 2 - Torso/Pelvis Airbag	Yes	Yes	Yes	Yes
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Other - Center Seat Airbag	Yes	Yes	No	N/A

GENERAL COMMENTS:

1. P1 serial number - 300

Data Anomalies:

- Left Sill A-Pillar Y Acceleration, Exceeded calibration range at 43.3 ms 52.8 ms
- Left Lower A-Pillar Y Acceleration, Exceeded calibration range at 43 ms 46.2 ms 67.9 ms

SECTION 3

OCCUPANT AND VEHICLE INFORMATION

This section contains information reporting for the following Data Sheets:

Data Sheet No. 1 - General Test and Vehicle Parameter Data

Data Sheet No. 2 - Seat, Seat Belt, Steering Wheel Adjustment and Fuel Systems Data

Data Sheet No. 3 - Dummy Longitudinal Clearance Dimensions

Data Sheet No. 4 - Dummy Lateral Clearance Dimensions

Data Sheet No. 5 - Camera and Instrumentation Data

Data Sheet No. 6 - Vehicle Accelerometer Locations

Data Sheet No. 7- Rigid Pole Load Cell Data

Data Sheet No. 8 - Post-Test Observations

Data Sheet No. 9 - Test Vehicle Profile Measurements

Data Sheet No. 10 - Test Vehicle Exterior Crush Measurements

Data Sheet No. 11 - Vehicle Damage Profile Distances

Data Sheet No. 12 - FMVSS No. 301 Static Rollover Results

Data Sheet No. 13 - Dummy / Vehicle Temperature and Humidity Stabilization Data

Data Sheet No. 305-1 - General Test and Parameter Data for Indicant FMVSS No. 305 Testing

Data Sheet No. 305-2 - Pre-Impact Data for Indicant FMVSS No. 305 Testing

Data Sheet No. 305-3 - Pre-Impact Electrical Isolation Measurements and Calculations for Indicant FMVSS No. 305 Testing

Data Sheet No. 305-4 - Post-Impact Data for Indicant FMVSS No. 305 Testing

Data Sheet No. 305-5 - Static Rollover Test Data for Indicant FMVSS No. 305 Testing

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2024 KIA EV9 5 Door SUV
NHTSA No.: O20244220
Test Program: NCAP Side Pole Impact Test
Test Date: 08/27/2024

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	O20244220
Model Year	2024
Make	KIA
Model	EV9
Body Style	5 Door SUV
VIN	693JJ920D000016
Body Color	Pebble Gray
Odometer Reading (km/mi)	102
Engine Displacement (L)	Electric Vehicle
Type / No. Cylinders	N/A
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	Direct Drive
Overdrive	No
Final Drive	Rear Wheel Drive
Roof Rack	No
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	Yes

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

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

DATA FROM CERTIFICATION LABEL

Manufactured By	KIA Corporation
Date of Manufacture	10/23
Vehicle Type	MPV

GVWR (KG)	2940
GVWR Front (KG)	1440
GVWR Rear (KG)	1860

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	2	2	6	
Vehicle Capacity Weight (VCW) (kg)				480	(A)
DSC x 68.0 kg				408	(B)
Cargo Weight (RCLW) (kg)				72	(A-B)

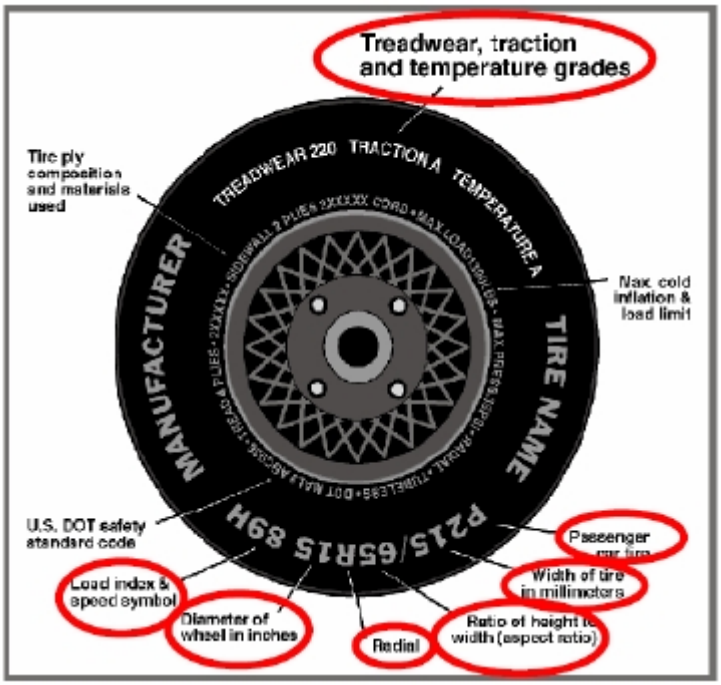
VEHICLE SEAT TYPE

Seating Location	Type Of Seat Pan				Type Of Seat Back		
	Bucket	Bench	Split Bench	Contour	Fixed	Adjustable	
						W/ Lever	W/ Knob
Front	X						X
Rear or Second Row Seat	X					X	
Third Row seat			X			X	

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

Test Vehicle:	2024 KIA EV9 5 Door SUV	NHTSA No.:	O20244220
Test Program:	NCAP Side Pole Impact Test	Test Date:	08/27/2024

Collected for year, make, model, & VIN, all items circled in red, tire manufacturer and tire name



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	340	340
Cold Pressure (kPa)	260	260
Recommended Tire Size	255/60R19	255/60R19
Tire Size on Vehicle	255/60R19	255/60R19
Tire Manufacturer	Kumho	Kumho
Tire Model	Crugen EV HP71	Crugen EV HP71
Treadwear	500	500
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Steel, 2 Polyester, 2 Polyamide	2 Steel, 2 Polyester, 2 Polyamide
Load Index / Speed Symbol	113V	113V
Tire Material	Rubber	Rubber
DOT Safety Code Left	1H2KMYC8E2823	1H2KMYC8E2923
DOT Safety Code Right	1H2KMYC8E2823	1H2KMYC8E2923

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

Test Vehicle: 2024 KIA EV9 5 Door SUV | NHTSA No.: O20244220
Test Program: NCAP Side Pole Impact Test | Test Date: 08/27/2024

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	294	296	289	288
Tire Placard	kPa	260	260	260	260
Owner's Manual	kPa	260	260	260	260
As Tested	kPa	260	260	260	260

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	573.0	643.5		594.0	688.5		584.5	707.0	
Right	kg	528.5	668.5		541.5	705.0		544.0	704.0	
Ratio	%	45.6	54.4		44.9	55.1		44.4	55.6	
Totals	kg	1101.5	1312.0	2413.5	1135.5	1393.5	2529.0	1128.5	1411.0	2539.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	2413.5	(A)
Actual Weight of 1 P572V (SID-IIs) ATD Used	kg	50.0	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	72.0	(C)
Calculated Vehicle Target Weight (TVTW)	kg	2535.5	(A+B+C)

Does the measured As Test Vehicle Weight lie within the required weight range

(i.e. Calculated Test Vehicle Target Weight – 4.5 kg to – 9 kg)? [X] **Yes** [ ] **No**

TEST VEHICLE ATTITUDES AND CG

Measurement Description	Units	As Delivered	As Tested	Fully Loaded	Meets Rqmt***
Driver Door Sill Angle (front-to-rear)*	Deg	-0.45	-0.45	-0.40	Yes
Front Passenger Sill Angle (front-to-rear)*	Deg	-0.45	-0.45	-0.50	Yes
Front Bumper-Line Angle (left-to-right)**	Deg	+0.15	-0.20	-0.30	Yes
Rear Bumper-Line Angle (left-to-right)**	Deg	-0.60	-0.60	-0.85	Yes
Vehicle CG (Aft of Front Axle)	mm	1686	1709	1724	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	4	8	9	

* ND = Nose Down (-), NU = Nose Up (+)
** LD = Left Down (-), LU = Left Up (+)
*** The “As Tested” vehicle attitude measurements must be equal to or between the “As Delivered” and “Fully Loaded” vehicle attitude measurements. Indicate “Yes” or “No” for Meets Requirement”

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

Test Vehicle:	2024 KIA EV9 5 Door SUV	NHTSA No.:	O20244220
Test Program:	NCAP Side Pole Impact Test	Test Date:	08/27/2024

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Trunk Carpeting	8
Ballast / Equipment Added	30.6

Test Height – Adjustable Suspension Setting, if Applicable	N/A

TEST SURFACE MARKING

	Distance from 75° Impact Location Line (mm)
Fore 25 mm target	1059
Aft 25 mm target	1050

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

Test Vehicle:	2024 KIA EV9 5 Door SUV	NHTSA No.:	O20244220
Test Program:	NCAP Side Pole Impact Test	Test Date:	08/27/2024

SEAT POSITIONING

The driver's seat, front center seat (if applicable), and right front passenger's seat should be set to the forward-most, mid-height, 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	19.4	11.9	15.6
Front Passenger Seat	19.2	11.8	15.5
Front Center Seat			
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat	N/A	N/A	N/A

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid-Fore / Aft	Forward-Most
Driver Seat	15.6	46	Max	70	75	80
			Mid	36	41	46
			Min	1	6	11
Front Passenger Seat	15.5	45	Max	70	74	79
			Mid	35	40	45
			Min	1	6	11
Front Center Seat*			Max			
			Mid			
			Min			
Struck Side Rear Seat	Fixed	Fixed	Max			
			Mid			
			Min			
Non-Struck Side Rear Seat	Fixed	Fixed	Max			
			Mid			
			Min			
Rear Center Seat*	N/A	N/A	Max			
			Mid			
			Min			

**If applicable*

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

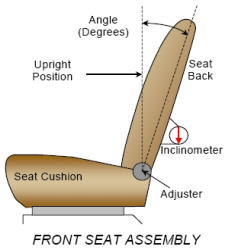
Test Vehicle: 2024 KIA EV9 5 Door SUV NHTSA No.: O20244220
Test Program: NCAP Side Pole Impact Test Test Date: 08/27/2024

SEAT FORE / AFT POSITION

Seat	Total Fore / Aft Travel		Test Position from Forward most Position	
	mm	Detents*	mm	Detents*
Driver Seat	260	Power	0	Power
Front Passenger Seat	260	Power	0	Power
Front Center Seat				
Struck Side Rear Seat	135	9 (0-8)	135	9
Non-Struck Side Rear Seat	135	9 (0-8)	135	9
Rear Center Seat	N/A	N/A	N/A	N/A

SEAT BACK ANGLE ADJUSTMENT

The driver's seat back is positioned such that the dummy's head is level. 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 passenger seat back is positioned in accordance with the information provided by the manufacturer on Form No. 1 for the 5th percentile female dummy in a Side NCAP MDB test. The rear center and non-struck side rear passenger's seat back are set to match the struck-side rear seat back.



FRONT SEAT ASSEMBLY

Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detents*
Driver Seat	64.4	Power	6.8	Power
Front Passenger Seat	64.5	Power	6.8	Power
Front Center Seat				
Struck Side Rear Seat	28.0	14 (0-13)	8.0	4
Non-Struck Side Rear Seat	28.0	14 (0-13)	8.0	4
Rear Center Seat	N/A	N/A	N/A	N/A

SEAT BELT ANCHORAGE ADJUSTMENT

Seat belt anchorages are adjusted in accordance with the information provided by the manufacturer on Form No. 1. Zero is defined as the uppermost detent

Seat	Total # of Positions	Placed in Position #
Driver Seat	4 (0-3)	0

HEAD RESTRAINT ADJUSTMENT

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

Seat	Total # of Positions	Placed in Position #
Driver Seat	6 (0-5)	Lowermost

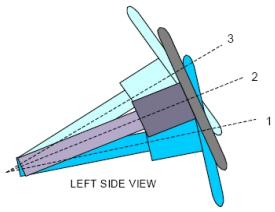
DATA SHEET NO. 2 … (CONTINUED)
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle:	2024 KIA EV9 5 Door SUV	NHTSA No.:	O20244220
Test Program:	NCAP Side Pole Impact Test	Test Date:	08/27/2024

STEERING COLUMN POSITIONS

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

	Degrees	Fore / Aft Position (mm)
Lowermost position No. 1	23.1	
Geometric center position No. 2	25.5	
Uppermost position No. 3	27.9	
Telescoping Steering Wheel Travel		60
Test Position	25.5	30

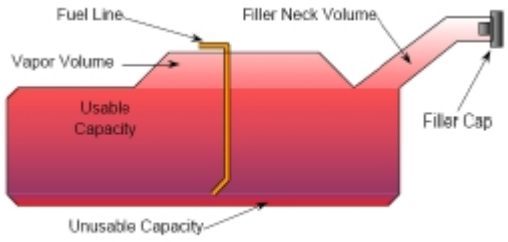


STEERING COLUMN ASSEMBLY

FUEL PUMP

Describe the fuel pump type, details about how it operates, and the location of the fuel filler neck

The vehicle is equipped with an electric charge port. The charge port is on the right rear corner above the bumper.



VEHICLE FUEL TANK ASSEMBLY

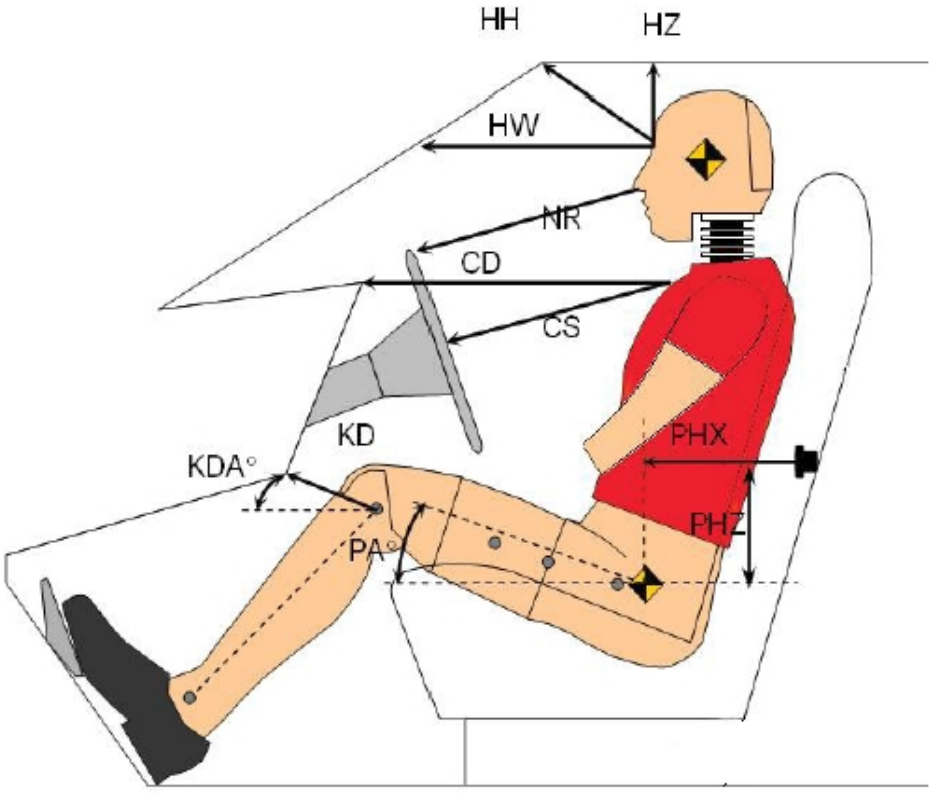
FUEL TANK CAPACITY

Description	Liters
Usable Capacity of “Standard Tank” - see Form No. 1	
Usable Capacity of “Optional Tank” - see Form No. 1	
Usable Capacity of “Standard Tank” - see Owner’s Manual	
Usable Capacity of “Optional Tank” - see Owner’s Manual	
93% of Usable Capacity	
Actual Amount of Solvent Used in Test	Electric Vehicle
1/3 of Usable Capacity	

Is the Actual Amount of Solvent Used in the test equal to 93% ±1% of the Usable Capacity stated in Form No. 1? ☐ **Yes** ☐ **No** ☒ **N/A**

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle:	2024 KIA EV9 5 Door SUV	NHTSA No.:	O20244220
Test Program:	NCAP Side Pole Impact Test	Test Date:	08/27/2024



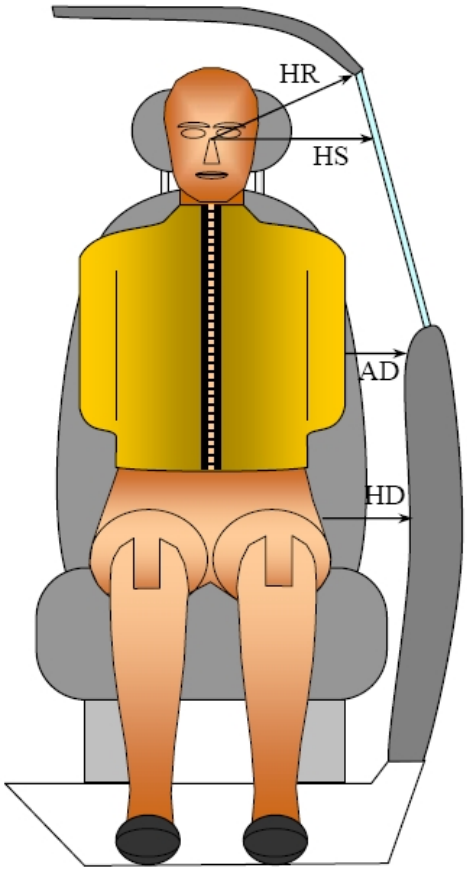
Left Side View

DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Description	Driver (Serial No. 300)	
		Length (mm)	Angle (°)
HH	Head to Header	311	
HW	Head to Windshield	577	
HZ	Head to Roof Liner	232	
NR	Nose to Rim	238	
CD	Chest to Dash	441	
CS	Chest to Steering Wheel	186	
KD(L) / KDA(L)◦	Left Knee to Dash	111	25.0
KD(R) / KDA(R)◦	Right Knee to Dash	102	29.0
PAX◦	Pelvic Tilt Angle (X-Axis)		19.3
PAY◦	Pelvic Tilt Angle (Y-Axis)		0.1
PHX	Hip Point to Striker (X-Axis)	370	
PHZ	Hip Point to Striker (Z-Axis)	141	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle:	2024 KIA EV9 5 Door SUV	NHTSA No.:	O20244220
Test Program:	NCAP Side Pole Impact Test	Test Date:	08/27/2024



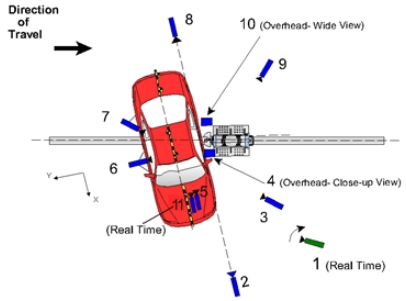
FRONT VIEW OF DUMMY

DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver – Length (Serial No. 300)
HR	Head to Side Header	mm	292
HS	Head to Side Window	mm	397
AD	Arm to Door	mm	173
HD	H-Point to Door	mm	213

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2024 KIA EV9 5 Door SUV
NHTSA No.: O20244220
Test Program: NCAP Side Pole Impact Test
Test Date: 08/27/2024



CAMERA LOCATIONS AND DATA

No.	Camera View	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-time (24 - 30 fps) pan view of impact				Zoom	60
2	Front ground level - impact view	7409	0	-1477	28	1000
3	Impact side 45º - forward pole view	4267	1244	-1512	24	1000
4	Overhead Close-up view of impact	0	0	-8220	28	1000
5	Onboard - dummy front view				25	1000
6	Onboard - dummy side view				12.5	1000
7	Onboard - dummy rear oblique view				12.5	1000
8	Rear ground level - impact view	-9031	0	-1414	28	1000
9	Impact side 45º - rearward pole view	-4269	2893	-1482	24	1000
10	Overhead wide - view of impact	0	-374	-8220	16	1000
11	Real-time (24 - 30 fps) - dummy front view				Zoom	60

Notes: *Reference - From Point of Impact for X and Y; from Ground for Z*
+X = Forward of vehicle, +Y = Right of vehicle, +Z = Down
** All measurements accurate to ± 6 mm. Vehicle is at a 75º angle to the rigid pole.*

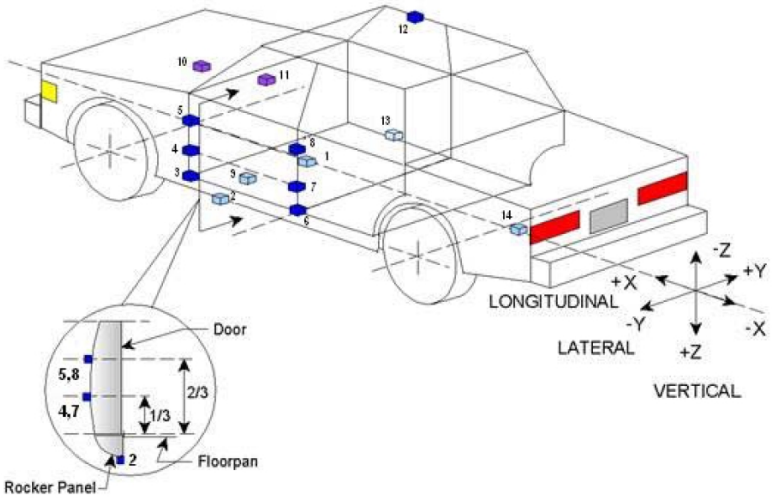
Comments: All cameras operated as intended.

INSTRUMENTATION

Description	Number of Channels
Driver Dummy Channels	16
Vehicle Structure Accelerometers	18
Pole Load Cells	8
Total	42

DATA SHEET NO. 6
TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle:	2024 KIA EV9 5 Door SUV	NHTSA No.:	O20244220
Test Program:	NCAP Side Pole Impact Test	Test Date:	08/27/2024



TEST VEHICLE ACCELEROMETER LOCATIONS

No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2952	1	-414
2	Left Floor Sill	3124	-707	46
3	A-Pillar Sill	3522	-676	31
4	A-Pillar Low	3613	-684	-183
5	A-Pillar Mid	3473	-697	-706
6	B-Pillar Sill	2526	-710	33
7	B-Pillar Low	2505	-733	-346
8	B-Pillar Mid	2459	-719	-679
9	Seat	2819	-619	9
10	Engine	4175	-46	-132
11	Firewall	3833	359	-438
12	Roof	2664	707	-1206
13	Right Floor Sill	3185	709	41
14	Rear Deck	764	-11	-175

Reference: *X – Rear surface of vehicle (+ forward)*
Y – Vehicle centerline (+ to right)
Z – Ground plane (+ down)

DATA SHEET NO. 7
RIGID POLE LOAD CELL DATA

Test Vehicle:	2024 KIA EV9 5 Door SUV	NHTSA No.:	O20244220
Test Program:	NCAP Side Pole Impact Test	Test Date:	08/27/2024

POLE BARRIER



RIGID POLE LOAD CELL LOCATION

ID	Units	Height From Ground
1	mm	200
2	mm	590
3	mm	750
4	mm	1075
5	mm	1260
6	mm	1740
7	mm	1920
8	mm	2300

DATA SHEET NO. 8
POST-TEST OBSERVATIONS

Test Vehicle: 2024 KIA EV9 5 Door SUV NHTSA No.: O20244220
Test Program: NCAP Side Pole Impact Test Test Date: 08/27/2024

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Driver Seat Dummy (SID-IIs)
Face	Curtain Airbag
Top of Head	Curtain Airbag
Left Side of Head	Curtain Airbag
Back of Head	Curtain Airbag & Headrest
Left Shoulder	Torso/Pelvis Airbag & Seatback
Upper Torso	Seatback
Lower Torso	Seatback
Left Hip	Torso/Pelvis Airbag & Seat Pan
Left Knee	Driver Door Trim

POST-TEST DOOR PERFORMANCE

Description	Struck Side		Non-Struck Side		Rear Hatch/ Other
	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, Width of Opening at Striker (mm)	0	0	0	0	0

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

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

Test Vehicle: 2024 KIA EV9 5 Door SUV NHTSA No.: O20244220
Test Program: NCAP Side Pole Impact Test Test Date: 08/27/2024

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	A-Pillar buckled
Sill Separation	None
Windshield Damage	Cracked throughout
Side Window Damage	Drive window cracked throughout
Other Notable Effects	None

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Driver		Struck Side Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Front Airbag	Yes	No		
Knee Airbag	Yes	No		
Side Airbag 1 - Curtain	Yes	Yes	Yes	Yes
Side Airbag 2 - Torso/Pelvis Airbag	Yes	Yes	Yes	Yes
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Other - Center Seat Airbag	Yes	Yes	No	N/A

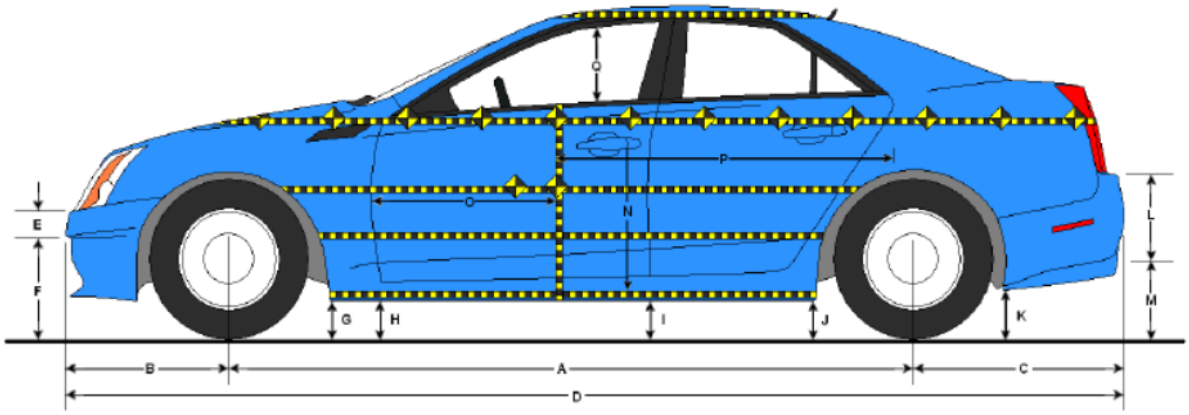
VEHICLE SPEED, VEHICLE ANGLE AT IMPACT AND IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vertical Impact Ref Line - Aft of Front Axle, Intended Impact Pt	mm		1110
Actual Impact Point - Aft of Front Axle	mm		1110
Horizontal Offset (+ forward / - rearward)	mm	+/- 38*	0
Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion	deg	75 +/- 3	75
Trap No. 1 Velocity - Primary	kph	31.4 to 33.0	32.03
Trap No. 2 Velocity - Redundant	kph	31.4 to 33.0	32.03

*Of Intended Impact Point

DATA SHEET NO. 9
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle:	2024 KIA EV9 5 Door SUV	NHTSA No.:	O20244220
Test Program:	NCAP Side Pole Impact Test	Test Date:	08/27/2024



LEFT SIDE VIEW

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

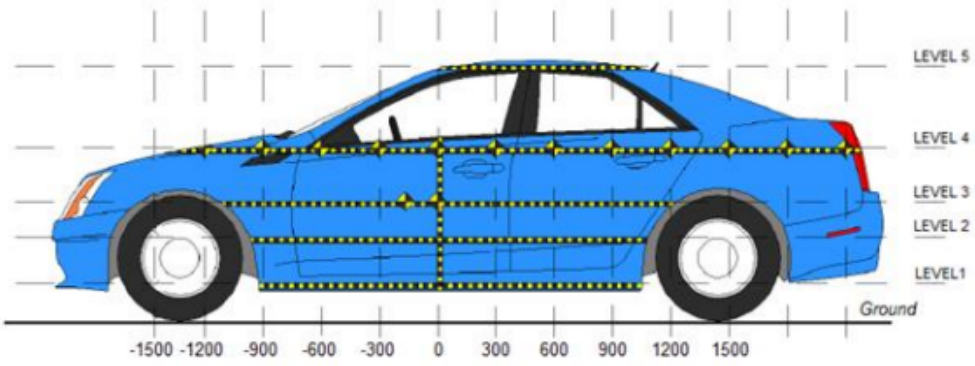
No.	Measurement Description	Pre-Test	Post-Test	Change
A	Vehicle Wheelbase	3102	3100	-2
B	Front Axle to FSOV	870	870	0
C	Rear Axle to RSOV	1036	1034	-2
D	Total Vehicle Length at Centerline	5008	5004	-4
E	Front Bumper Thickness	125	125	0
F	Front Bumper Bottom to Ground	481	500	19
G	Sill Height at Front Wheel Well	246	262	16
H	Sill Height at Front Door Leading Edge	246	263	17
I	Sill Height at B Pillar	250	279	29
J1	Sill Height at Rear Wheel Well	270	284	14
J2	Pinch Weld Height at Rear Wheel Well	251	272	21
K	Sill Height Aft of Rear Wheel Well	291	296	5
L	Rear Bumper Thickness	116	116	0
M	Rear Bumper Bottom to Ground	580	565	-15
N	Sill Height to Window Bottom Sill	906	908	2
O	Front Door Leading Edge to Impact CL	556	536	-20
P	Rear Door Trailing Edge to Impact CL	1695	1674	-21
Q	Front Window Opening	424	422	-2
R	Right Side Length	4940	4942	2
S	Left Side Length	4939	4932	-7
T	Vehicle Width at B-Pillars	1988	1970	-18
U	Front Wheel Track width	1670	1686	16
V	Rear Wheel Track Width	1708	1714	6

* All measurements in mm with tolerance of ± 3mm

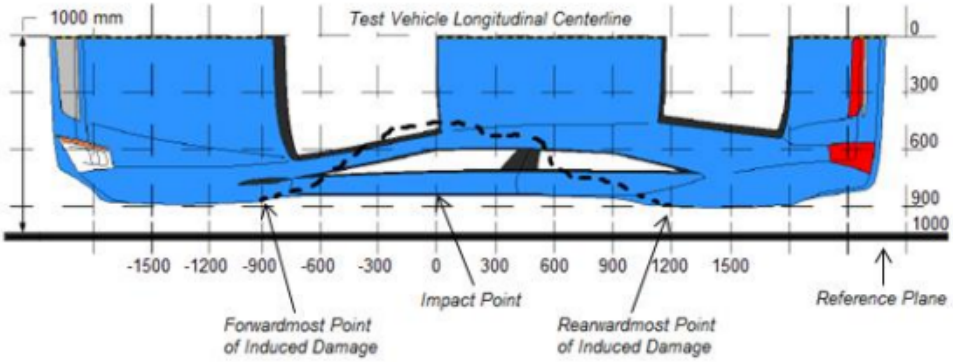
DATA SHEET NO.10
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle:	2024 KIA EV9 5 Door SUV	NHTSA No.:	O20244220
Test Program:	NCAP Side Pole Impact Test	Test Date:	08/27/2024

MAXIMUM EXTERIOR CRUSH MEASUREMENTS



Left Side View



Overhead View

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	433	153	0
2	Occupant H-Point	mm	768	212	0
3	Mid-Door	mm	830	211	0
4	Window Sill	mm	1140	125	0
5	Window Top	mm	1659	9	0

NOTE: *The above measurements should be taken along the vertical impact reference line. Vehicle measurements forward of the vertical impact reference line are negative.*

DATA SHEET NO.10 … (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2024 KIA EV9 5 Door SUV NHTSA No.: O20244220
Test Program: NCAP Side Pole Impact Test Test Date: 08/27/2024

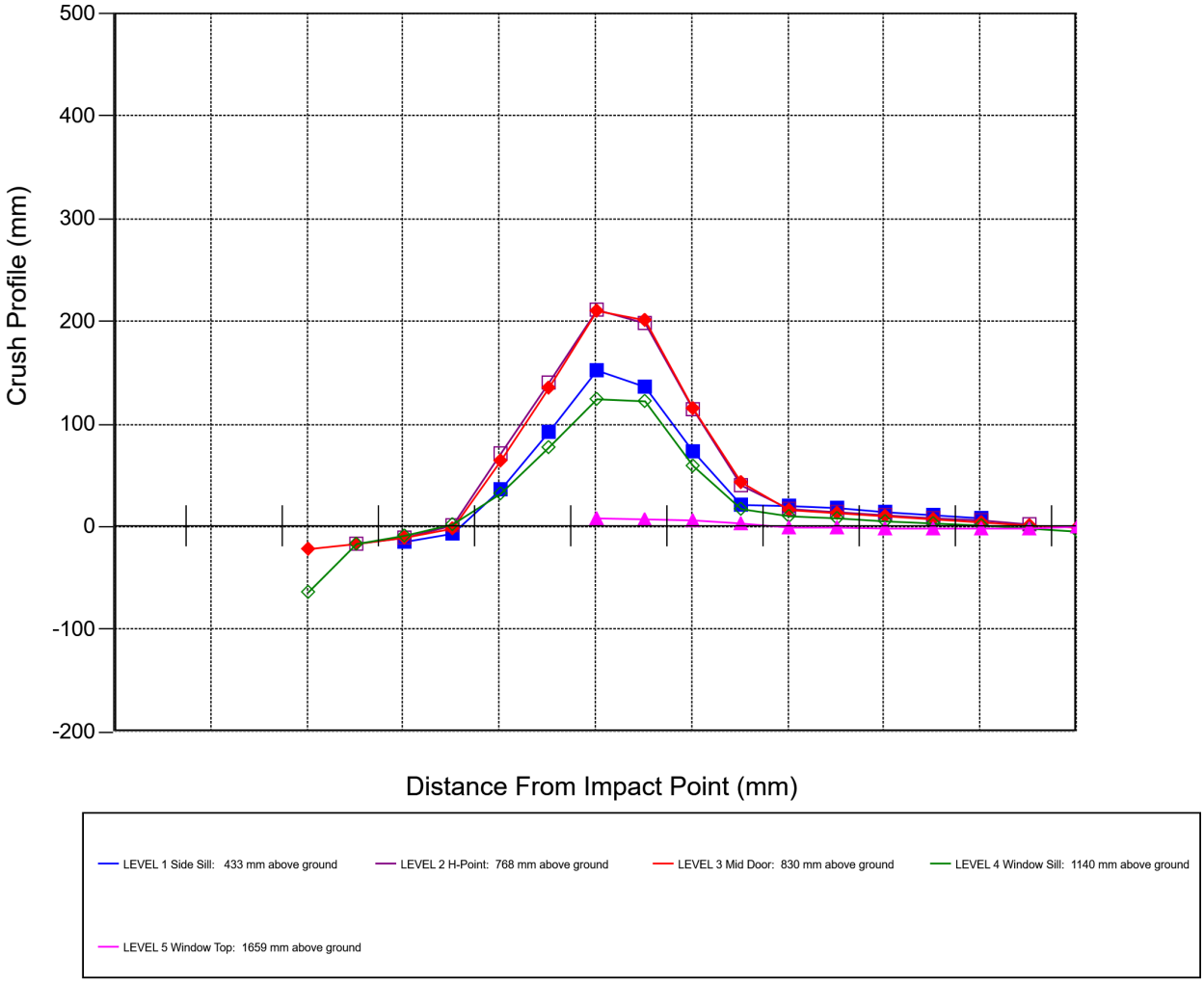
EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

	Pre-Test					Post-Test					Crush				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1500															
-1350															
-1200															
-1050															
-900			991	859				1012	922				-21	-63	
-750		991	982	863			1007	998	879			-16	-16	-16	
-600	973	981	977	861		987	991	987	869		-14	-10	-10	-8	
-450	950	970	966	866		956	968	967	863		-6	2	-1	3	
-300	965	977	973	875		928	905	908	842		37	72	65	33	
-150	969	983	980	884		876	842	844	806		93	141	136	78	
0	973	987	985	892	677	820	775	774	767	668	153	212	211	125	9
150	975	990	989	898	711	838	791	787	775	703	137	199	202	123	8
300	977	992	991	903	716	903	877	875	843	709	74	115	116	60	7
450	978	993	993	907	718	956	952	949	889	714	22	41	44	18	4
600	977	992	993	909	718	956	974	976	898	718	21	18	17	11	0
750	977	990	993	910	719	958	975	979	901	719	19	15	14	9	0
900	975	987	991	909	717	960	975	980	903	718	15	12	11	6	-1
1050	976	984	988	907	714	964	975	980	903	715	12	9	8	4	-1
1200	975	982	985	908	710	966	975	980	906	711	9	7	5	2	-1
1350		987	986	917	705		984	984	918	706		3	2	-1	-1
1500			986	920	700			986	924	699			0	-4	1

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. The final distance from impact is determined after the final dummy positioning and the pole is aligned with the center of gravity of the dummy's head.*

DATA SHEET NO.10 … (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle:	2024 KIA EV9 5 Door SUV	NHTSA No.:	O20244220
Test Program:	NCAP Side Pole Impact Test	Test Date:	08/27/2024

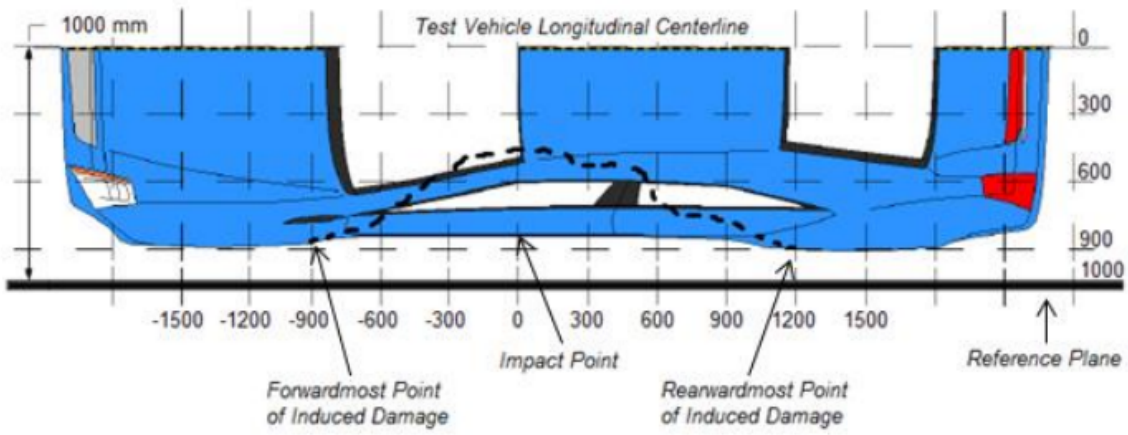


Vehicle Exterior Crush Measurements - Visual Representation

DATA SHEET NO.11
VEHICLE DAMAGE PROFILE DISTANCE

Test Vehicle:	2024 KIA EV9 5 Door SUV	NHTSA No.:	O20244220
Test Program:	NCAP Side Pole Impact Test	Test Date:	08/27/2024

For guidance regarding damage profile distance measurements, please refer to the latest version of the *NHTSA Test Reference Guide, Volume 1: Vehicle Tests.*



Overhead View

VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	-900	3	-12	9	-21
2	-450	3	33	34	-1
3	0	3	226	15	211
4	450	3	51	7	44
5	900	3	20	9	11
6	1350	3	16	14	2

DATA SHEET NO.12
FMVSS NO.301 STATIC ROLLOVER RESULTS

Test Vehicle:	2024 KIA EV9 5 Door SUV	NHTSA No.:	O20244220
Test Program:	NCAP Side Pole Impact Test	Test Date:	08/27/2024

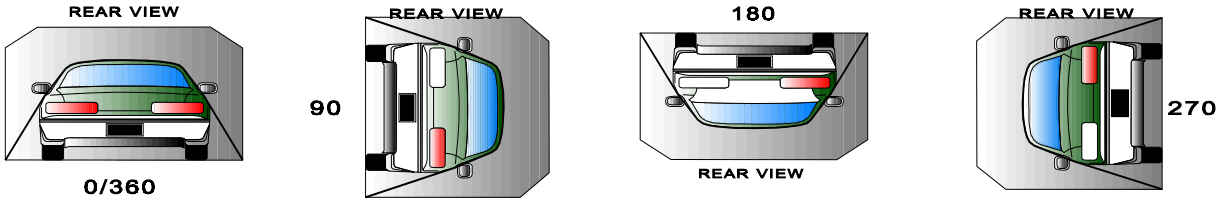
Test Time: 10:06 AM Temperature: 21 °C

A. From impact until vehicle motion ceases: N/A oz
(Maximum allowable is 1 oz.)

B. For the 5-minute period after motion ceases: N/A oz
(Maximum allowable is 5 oz.)

C. For the following 25 minutes: N/A oz
(Maximum allowable is 1 oz.)

D. Spillage Detail: Electric Vehicle



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°			
90° to 180°			
180° to 270°			
270° to 360°			

FMVSS 301 SPILLAGE TABLE

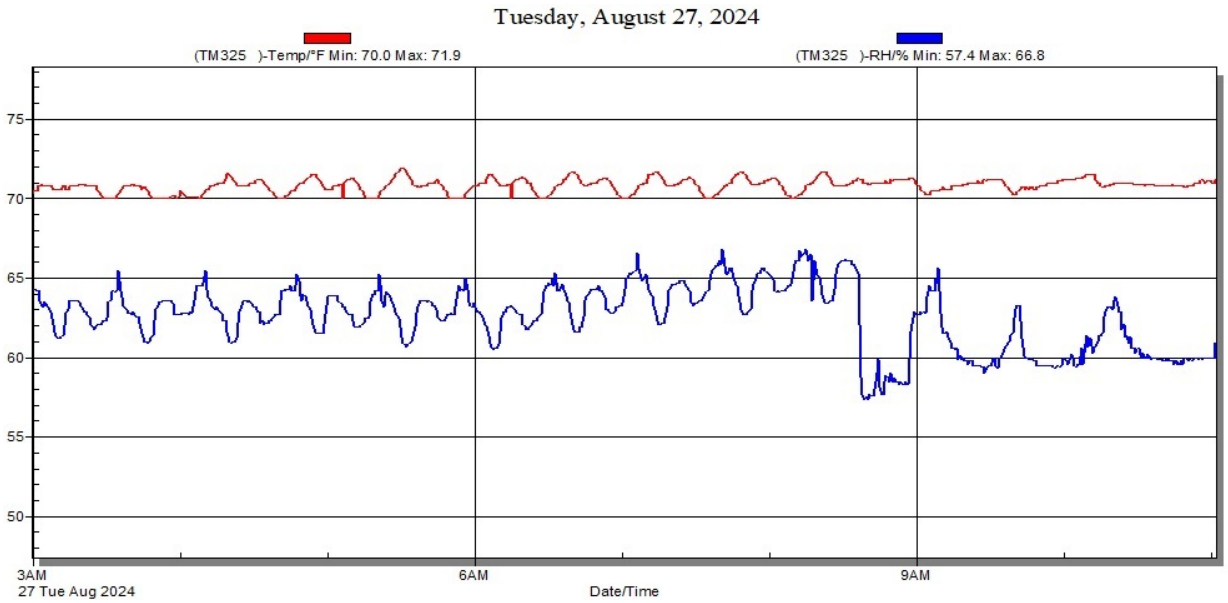
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° to 90°				
90° to 180°				
180° to 270°				
270° to 360°				

SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 13
DUMMY / VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle:	2024 KIA EV9 5 Door SUV	NHTSA No.:	O20244220
Test Program:	NCAP Side Pole Impact Test	Test Date:	08/27/2024



Temperature and Humidity Stabilization Chart/Data for Dummies and Test Vehicle

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

Test Vehicle: 2024 KIA EV9 5 Door SUV NHTSA No.: O20244220
Test Program: NCAP Side Pole Impact Test Test Date: 08/27/2024

ELECTRIC VEHICLE PROPULSION SYSTEM

Measured Parameter	Value
Type of Electric Vehicle (Electric/Gas-Electric Hybrid/Fuel Cell-Electric Hybrid)	Electric
Propulsion Battery Type	Lithium-Ion Battery
Nominal Voltage (Volts)	552
Is this Vehicle equipped with an Automatic Propulsion Battery Disconnect?	Yes
Physical Location of Automatic Propulsion Battery Disconnect, if applicable	Inside of Propulsion Battery
Auxiliary Battery Type	Lead-Acid Battery

PROPULSION BATTERY SYSTEM DATA (COTR SUPPLIED)

Measured Parameter	Value
Electrolyte Fluid Type	LiPF6 Salt, Carbonate Solvent
Electrolyte Fluid Specific Gravity	1.21g/cm3
Electrolyte Fluid Kinematic Viscosity (centistokes)	3.87cP @ 25°C
Electrolyte Fluid Color	Transparent/Pale Yellow
Propulsion Battery Coolant Type, Color and Specific Gravity (if applicable)	Applied (Water-Cooled Type), Pink
Location of Battery Modules (Inside or Outside of Passenger Compartment?)	Outside Passenger Compartment

PROPULSION BATTERY STATE OF CHARGE

Measured Parameter	Units	Value
For all battery types: Voltage Range corresponding to **useable energy** of the battery:		
Minimum State of Charge	V	380
Maximum State of Charge	V	654
95% of Maximum	V	621.3
Test Voltage *	V	625.4
For batteries that are rechargeable ONLY by an energy source on the vehicle: Voltage range corresponding to **useable energy** of the battery:		
Minimum State of Charge	V	
Maximum State of Charge	V	
95% of Maximum	V	
Test Voltage *	V	

* *For all battery types-No less than 95% of Maximum Operating Voltage; for batteries that are rechargeable ONLY by an energy source on the vehicle-maximum practicable state of charge within normal operating range*.

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

Test Vehicle:	2024 KIA EV9 5 Door SUV	NHTSA No.:	O20244220
Test Program:	NCAP Side Pole Impact Test	Test Date:	08/27/2024

VEHICLE CHASSIS GROUND PT(S) LOCATION(S) & PROPULSION BATTERY SYSTEM

Measured Parameter	Value
Details of Vehicle Chassis Ground Points & Locations	Vehicle Chassis
Details of Propulsion Battery Components	HV battery main cable is located at the rear-side of battery

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

Test Vehicle:	2024 KIA EV9 5 Door SUV	NHTSA No.:	O20244220
Test Program:	NCAP Side Pole Impact Test	Test Date:	08/27/2024

VOLTMETER INFORMATION

Measured Parameter	Units	Value
Make & Model		Fluke 1587
Serial No.		51800115
Internal Impedance Value	MΩ	10
Resolution	V	0.001
Last Calibration Date		6/20/2024

NOTES:

- *The voltmeter used in this test shall measure DC values and have an internal impedance of at least 10 M Ω*
- *An oscilloscope meeting the above requirements may need to be used to adequately measure voltage in some vehicles.*

PROPULSION BATTERY VOLTAGE, RESISTANCE & ELECTRICAL ISOLATION MEASUREMENTS & CALCULATIONS

Measured Parameter	Symbol	Units	Value
Normal operating voltage range specified by the manufacturer	V_b	V	380-654
Propulsion Battery Voltage: (ready to drive position)	V_b	V	625.4
Propulsion Battery to Vehicle Chassis	V_1	V	446.2
Propulsion Battery to Vehicle Chassis	V_2	V	458.1
Propulsion Battery to Vehicle Chassis Across Known Resistor	R_o	Ω	400,000
Propulsion Battery to Vehicle Chassis with R_o installed	V_1'	V	94.0
Propulsion Battery to Vehicle Chassis with R_o installed	V_2'	V	94.1
$_{i1}= R_o*(1+V_2/V_1)*[(V_1-V_1')/V_1']$	R_{i1}	Ω	3,037,417
$R_{i2}= R_o*(1+V_1/V_2)*[(V_2-V_2')/V_2']$	R_{i2}	Ω	3,054,386
Lesser value of R_{i1} and R_{i2}	R_i	Ω	3,037,417
Electrical Isolation Value (Minimum E.I. Value is 500 Ω/V)	R_i/V_b	Ω/V	4,857

Is the Electrical Isolation Value ≥ 500 Ω/V (Yes/No)? [X] Yes [ ] No (Fail)

NOTES:

- *The measurement shall be made with the propulsion battery connected to the vehicle propulsion system, and the vehicle in the "ready-to-drive" (propulsion motor(s) activated) position.*
- *If the voltage measurement is not at the voltage or within the normal operating voltage range specified by the manufacturer, the battery must be charged.*
- *The known resistance Ro (in Ohms) should be approximately 500 times the nominal operating voltage of the vehicle (in volts) per SAE J1766*

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

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

Test Vehicle: 2024 KIA EV9 5 Door SUV | NHTSA No.: O20244220
Test Program: NCAP Side Pole Impact Test | Test Date: 08/27/2024

VOLTMETER INFORMATION

Measured Parameter	Units	Value
Make & Model		Fluke 1587
Serial No.		58100115
Internal Impedance Value	MΩ	10
Resolution	V	0.001
Last Calibration Date		06/20/2024

NOTES:

- *The voltmeter used in this test shall measure DC values and have an internal impedance of at least 10 M Ω*
- *An oscilloscope meeting the above requirements may need to be used to adequately measure voltage in some vehicles.*

ELECTRICAL ISOLATION MEASUREMENTS & IMPACT CALCULATIONS

Parameter	Value	Units		Value		Value	
V_b =	14.1	V	Time:	2	Minutes	3	Seconds
V_1 =	0.7	V	Time:	2	Minutes	22	Seconds
V_2 =	9.4	V	Time:	2	Minutes	26	Seconds
R_o =	400,000	Ω					
V_1' =	0.1	V	Time:	2	Minutes	35	Seconds
V_2' =	0.0	V	Time:	42	Minutes	40	Seconds
R_{i1} =	34,628,571	Ω	Time:	2	Minutes	35	Seconds
R_{i2} =	Zero Volts	Ω	Time:	42	Minutes	40	Seconds
R_i =	34,628,571	Ω/V	Time:	2	Minutes	35	Seconds
R_i/V_b =	2,455,927	Ω/V	Time:	2	Minutes	35	Seconds

Is the Electrical Isolation Value ≥ 500 Ω/V (Yes/No)? [X] Yes [ ] No (Fail)

NOTES:

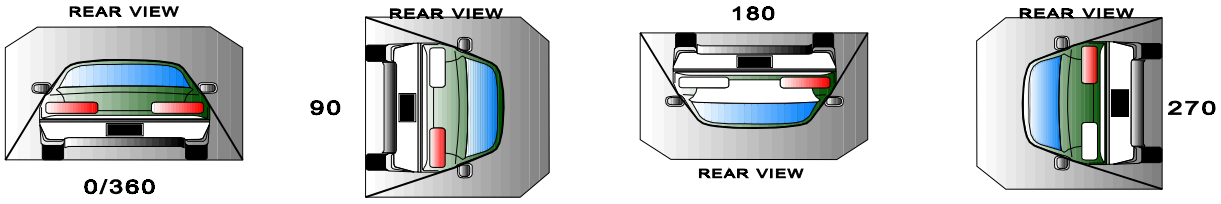
- *$R_{i1} = R_o*(1+V_2/V_1)*[(V_1-V_1')/V_1']$, $R_{i2} = R_o*(1+V_1/V_2)*[(V_2-V_2')/V_2']$, R_i = Lesser value of R_{i1} and R_{i2}*
- *If measured voltage is zero and results in a division by zero, record "Zero Volts." This "zero voltage" condition is considered as being compliant*
- *Minimum Electrical Isolation Value is 500 Ω/V*

PROPULSION BATTERY SYSTEM COMPONENTS

Measured Parameter	Comments	Passed	Failed
Propulsion Battery Module movement within the passenger compartment	None	X	
Intrusion of an outside Propulsion Battery Component into the passenger compartment	None	X	
Is propulsion battery electrolyte spillage visible in the passenger compartment?	None	X	

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

Test Vehicle: 2024 KIA EV9 5 Door SUV
Test Program: NCAP Side Pole Impact Test
NHTSA No.: O20244220
Test Date: 08/27/2024



Rear View

DETERMINATION OF PROPULSION BATTERY ELECTROLYTE COLLECTION TIME PERIOD

Rollover Stage	Rotation Time (spec. 1 -3 min)		FMVSS 301 Hold Time	Total Time		Next Whole Minute Interval
	Minutes	Seconds	Minutes	Minutes	Seconds	Minutes
0° to 90°	1	7	5	6	7	7
90° to 180°	1	8	5	6	8	7
180° to 270°	1	3	5	6	3	7
270° to 360°	1	3	5	6	3	7

ACTUAL TEST VEHICLE PROPULSION BATTERY ELECTROLYTE SPILLAGE

Rollover Stage	Propulsion Battery Electrolyte Spillage	Units	Spillage Location
0° to 90°	0	Liters	No Spillage
90° to 180°	0	Liters	No Spillage
180° to 270°	0	Liters	No Spillage
270° to 360°	0	Liters	No Spillage
Total Spillage	0	Liters	No Spillage

** FMVSS 305 Requirements: Maximum allowable propulsion battery electrolyte spillage is **5.0 Liters***

Is the total spillage of propulsion battery electrolyte greater than 5.0 Liters? [ ] Yes (Fail) [X] No

Is propulsion battery electrolyte spillage visible in the passenger compartment? [ ] Yes (Fail) [X] No

VOLTMETER INFORMATION

Measured Parameter	Units	Value
Make & Model		Fluke 1587
Serial No.		58100115
Internal Impedance Value	MΩ	10
Resolution	V	0.001
Last Calibration Date		06/20/2024

NOTES:

- *The voltmeter used in this test shall measure DC values and have an internal impedance of at least 10 M Ω*
- *An oscilloscope meeting the above requirements may need to be used to adequately measure voltage in some vehicles.*

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

Test Vehicle: 2024 KIA EV9 5 Door SUV NHTSA No.: O20244220
Test Program: NCAP Side Pole Impact Test Test Date: 08/27/2024

ELECTRICAL ISOLATION MEASUREMENTS & CALCULATIONS

Parameter	Rollover Stage	Value	Units	R_o=404,900	Minutes	Seconds
V_b =	90°	14.1	V	Time:	7	23
	180°	14.1	V		14	52
	270°	14.1	V		22	52
	360°	14.1	V		29	35
V_1 =	90°	11.2	V	Time:	7	34
	180°	2.1	V		15	47
	270°	5.5	V		22	59
	360°	9.6	V		29	47
V_2 =	90°	7.3	V	Time:	7	40
	180°	12.0	V		15	51
	270°	8.5	V		23	2
	360°	7.4	V		29	49
V_1' =	90°	0.4	V	Time:	7	48
	180°	0.0	V		16	1
	270°	1.4	V		23	5
	360°	1.4	V		29	52
V_2' =	90°	0.7	V	Time:	7	54
	180°	0.1	V		16	9
	270°	0.6	V		23	8
	360°	0.5	V		29	56
R_{i1} =	90°	17,839,286	Ω	Time:	7	48
	180°	Zero Volts	Ω		16	1
	270°	2,981,818	Ω		23	5
	360°	4,148,810	Ω		29	52
R_{i2} =	90°	9,557,730	Ω	Time:	7	54
	180°	55,930,000	Ω		16	9
	270°	8,674,510	Ω		23	8
	360°	12,681,081	Ω		29	56
R_i =	90°	9,557,730	Ω	Time:	7	54
	180°	55,930,000	Ω		16	9
	270°	2,981,818	Ω		23	5
	360°	4,148,810	Ω		29	52
R_i/V_b =	90°	677,853	Ω/V	Time:	7	54
	180°	3,966,667	Ω/V		16	9
	270°	211,476	Ω/V		23	5
	360°	294,242	Ω/V		29	52

Is the Electrical Isolation Value ≥ 500 Ω/V (Yes/No)? [X] Yes [ ] No (Fail)

APPENDIX A

PHOTOGRAPHS

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Figure A-1: As Delivered Right Front ¾ View of Test Vehicle



Figure A-2: As Delivered Left Rear ¾ View of Test Vehicle



Figure A-3: Pre-Test Frontal View of Test Vehicle

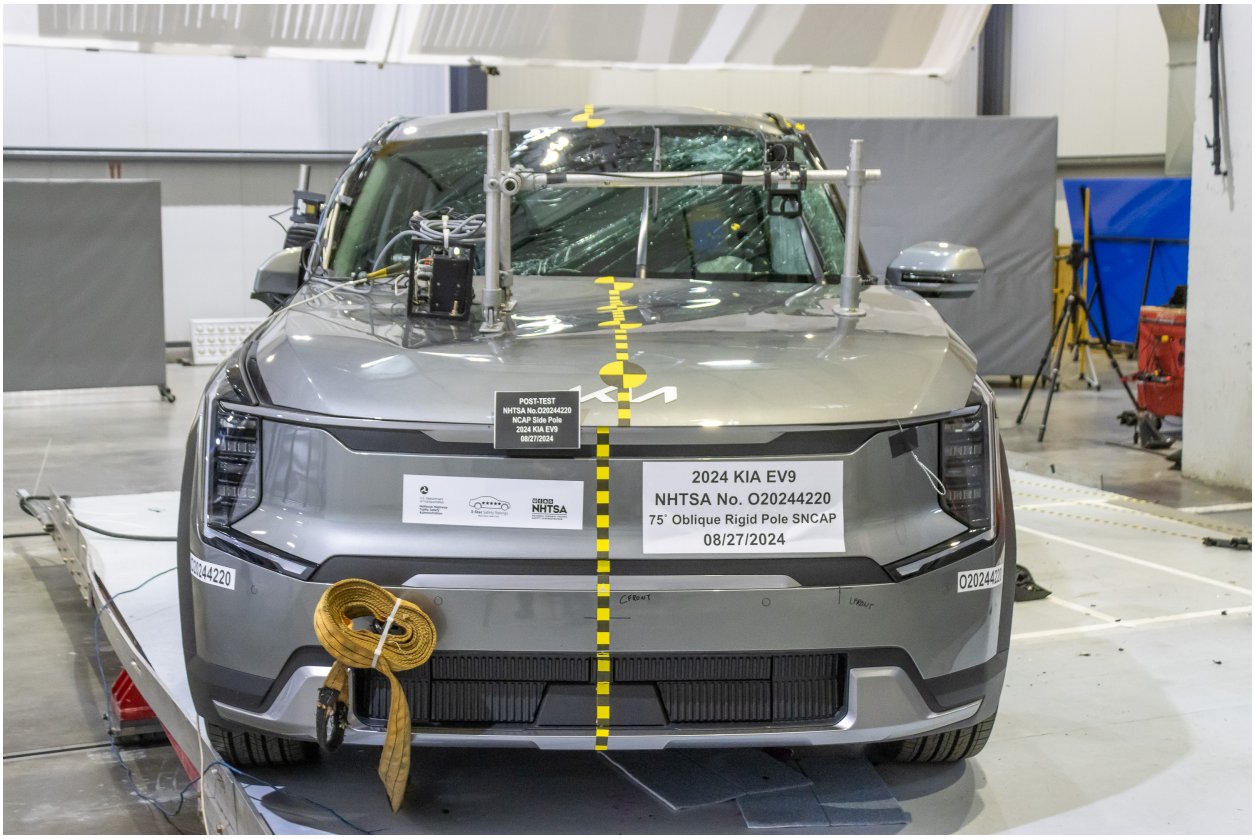


Figure A-4: Post-Test Frontal View of Test Vehicle

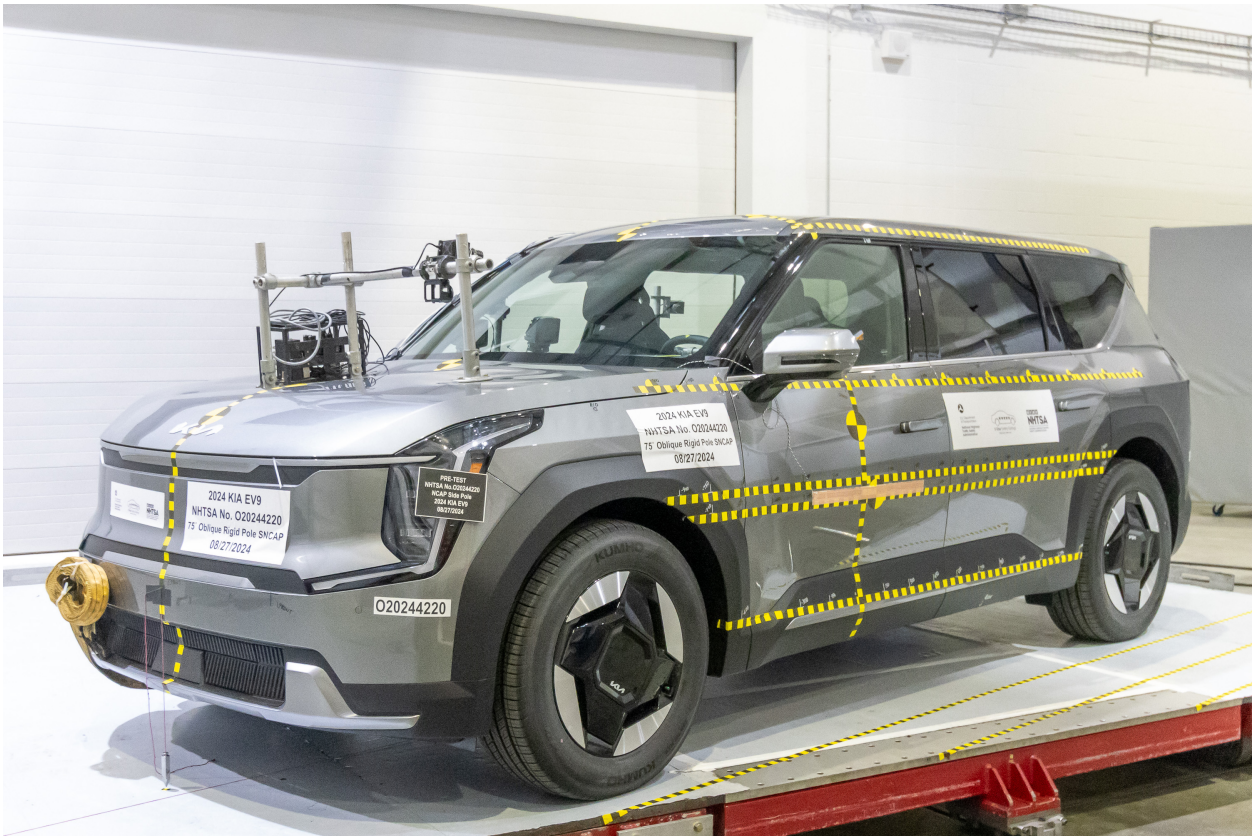


Figure A-5: Pre-Test Left Front ¾ View of Test Vehicle



Figure A-6: Post-Test Left Front ¾ View of Test Vehicle

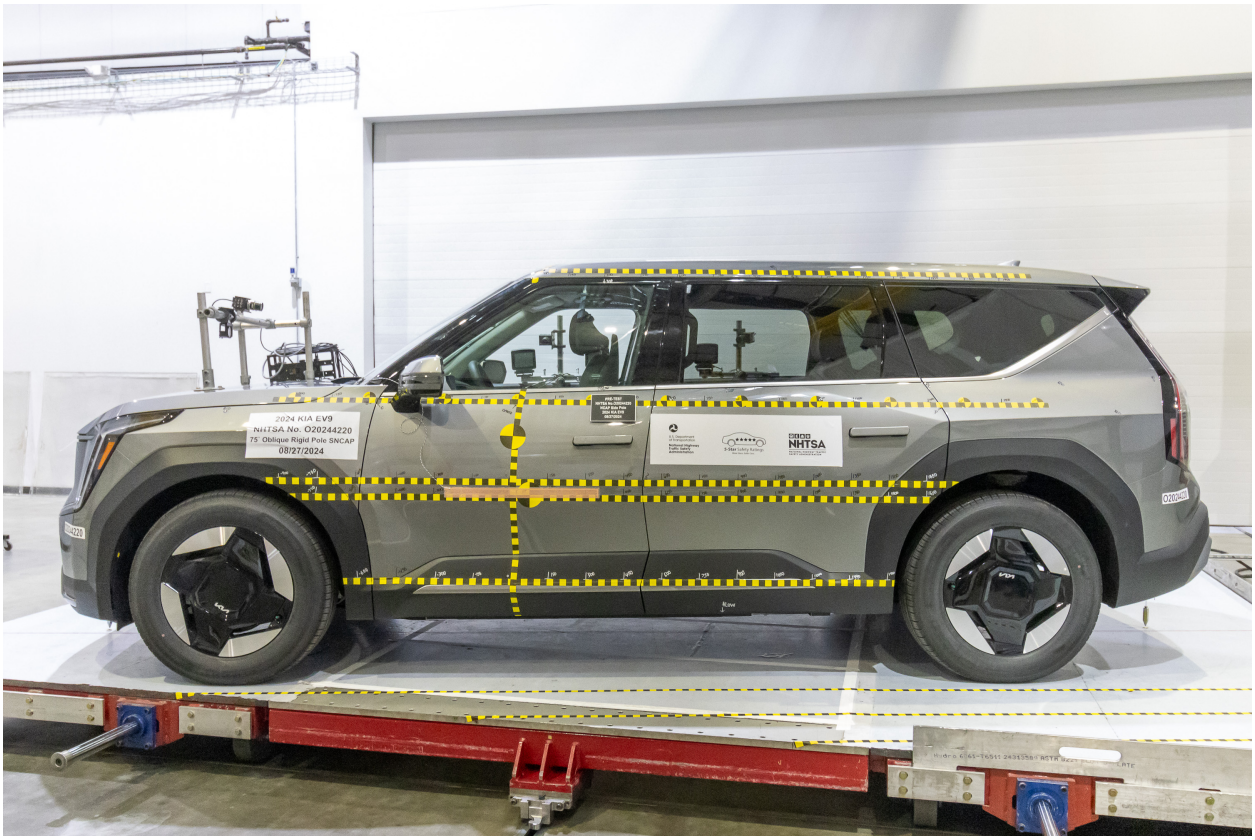


Figure A-7: Pre-Test Left Side View of Test Vehicle



Figure A-8: Post-Test Left Side View of Test Vehicle



Figure A-9: Pre-Test Left Rear ¾ View of Test Vehicle



Figure A-10: Post-Test Left Rear ¾ View of Test Vehicle



Figure A-11: Pre-Test Rear View of Test Vehicle



Figure A-12: Post-Test Rear View of Test Vehicle



Figure A-13: Pre-Test Right Side View of Test Vehicle



Figure A-14: Post-Test Right Side View of Test Vehicle

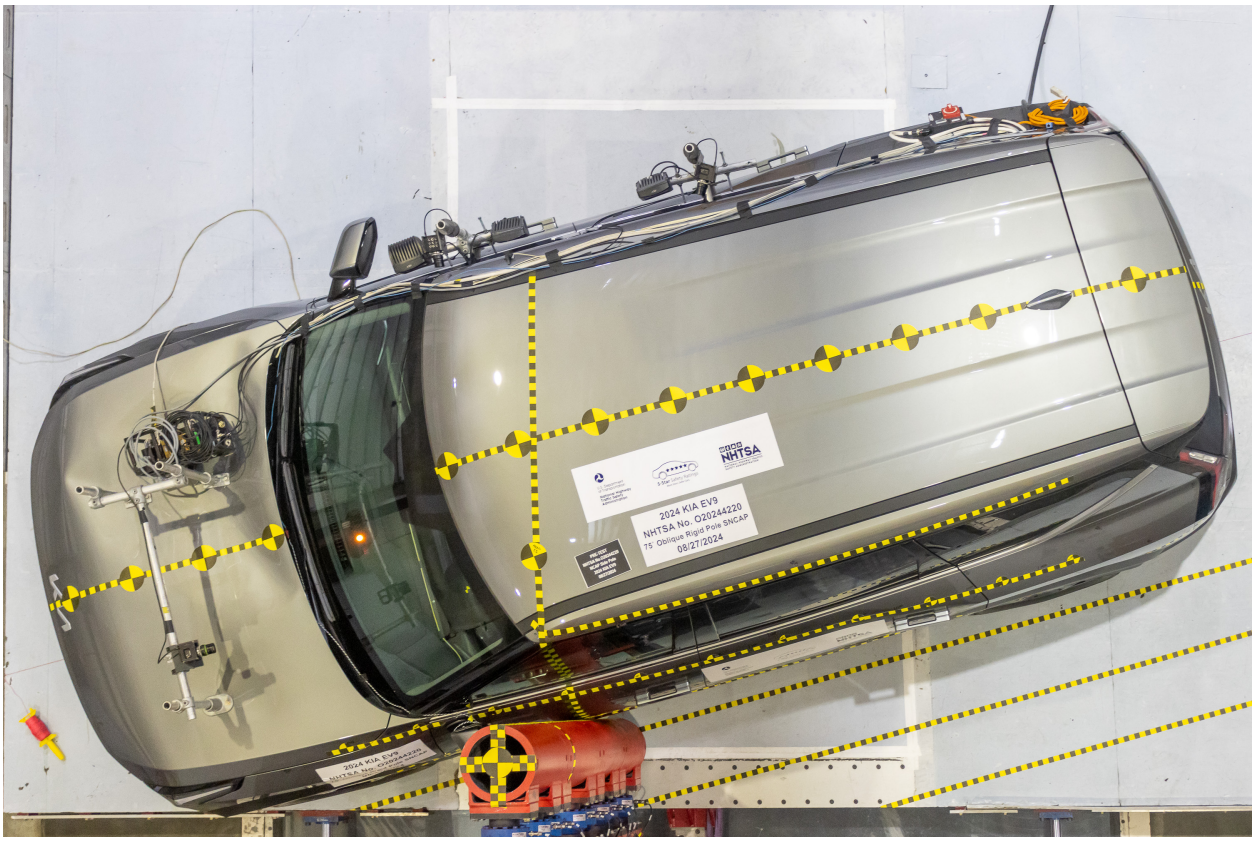


Figure A-15: Pre-Test Overhead View of Test Area

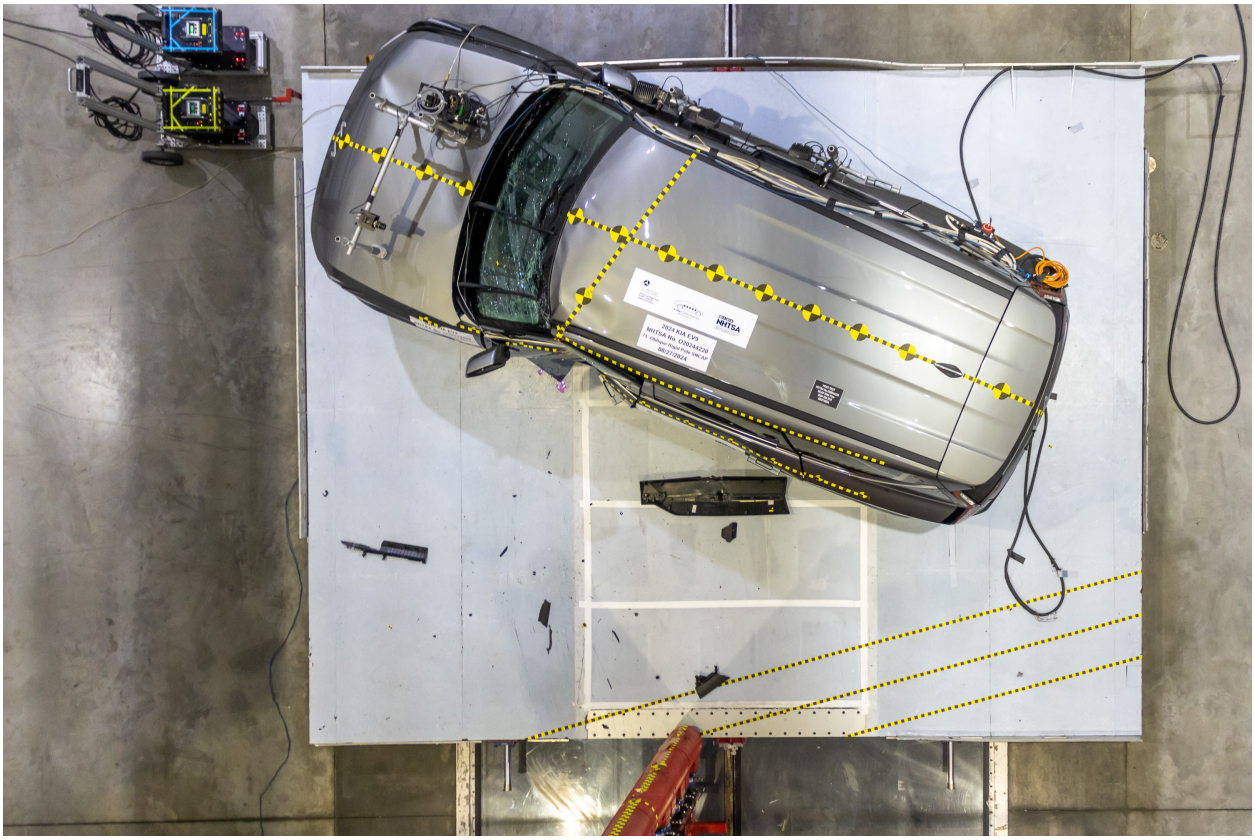


Figure A-16: Post-Test Overhead View of Test Area



Figure A-17: Pre-Test Left Side View of Pole Positioned Against Side of Vehicle



Figure A-18: Pre-Test Right Side View of Pole Positioned Against Side of Vehicle



Figure A-19: Pre-Test Close-Up View of Impact Point Target



Figure A-20: Post-Test Close-Up View of Impact Point Target Showing Impact Location

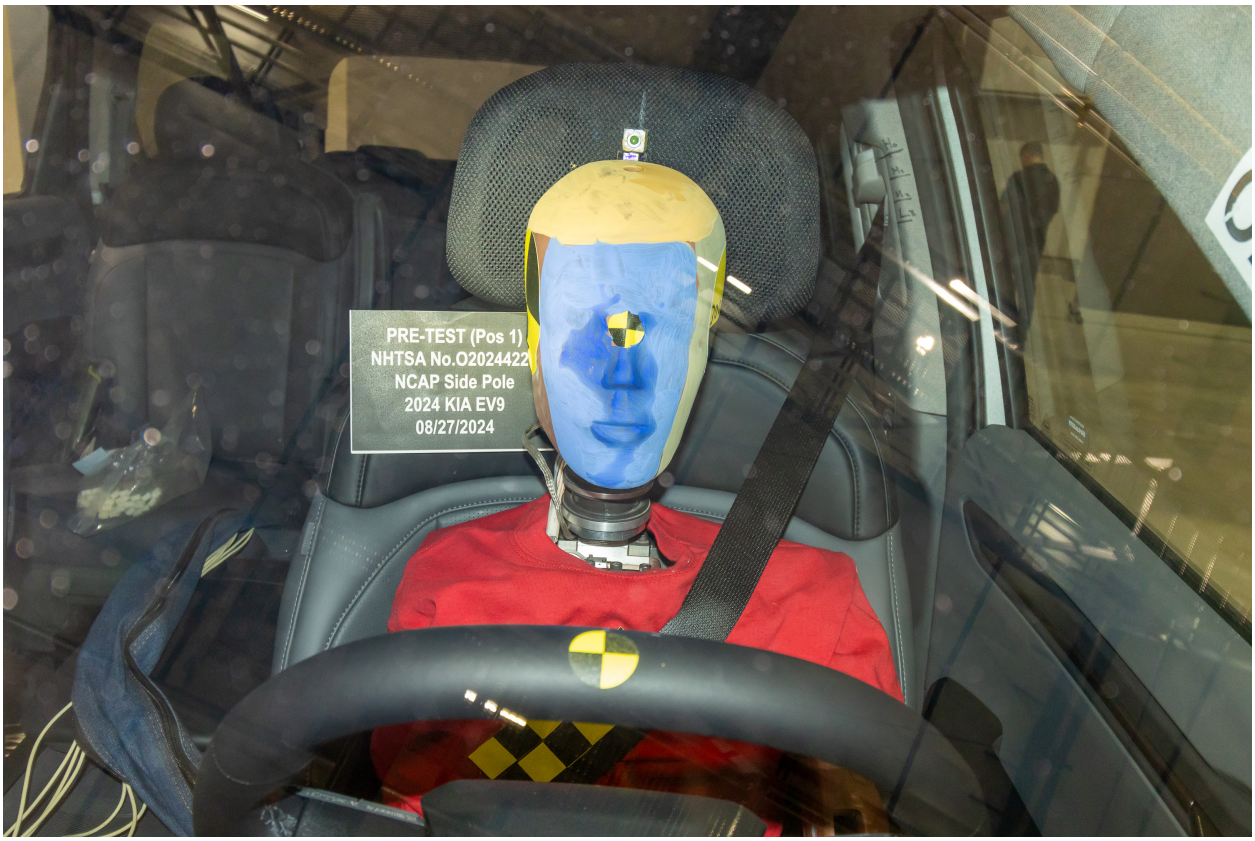


Figure A-21: Pre-Test Front Close-Up View of Dummy Head and Chest



Figure A-22: Post-Test Front Close-Up View of Dummy



Figure A-23: Pre-Test Left Side View of Dummy Showing Belt and Chalking



Figure A-24: Pre-Test Left Side View of Dummy Shoulder and Door Top View



Figure A-25: Post-Test Left Side View of Dummy Shoulder and Door Top View



Figure A-26: Pre-Test Frontal View of Seat Back Prior to Dummy Positioning

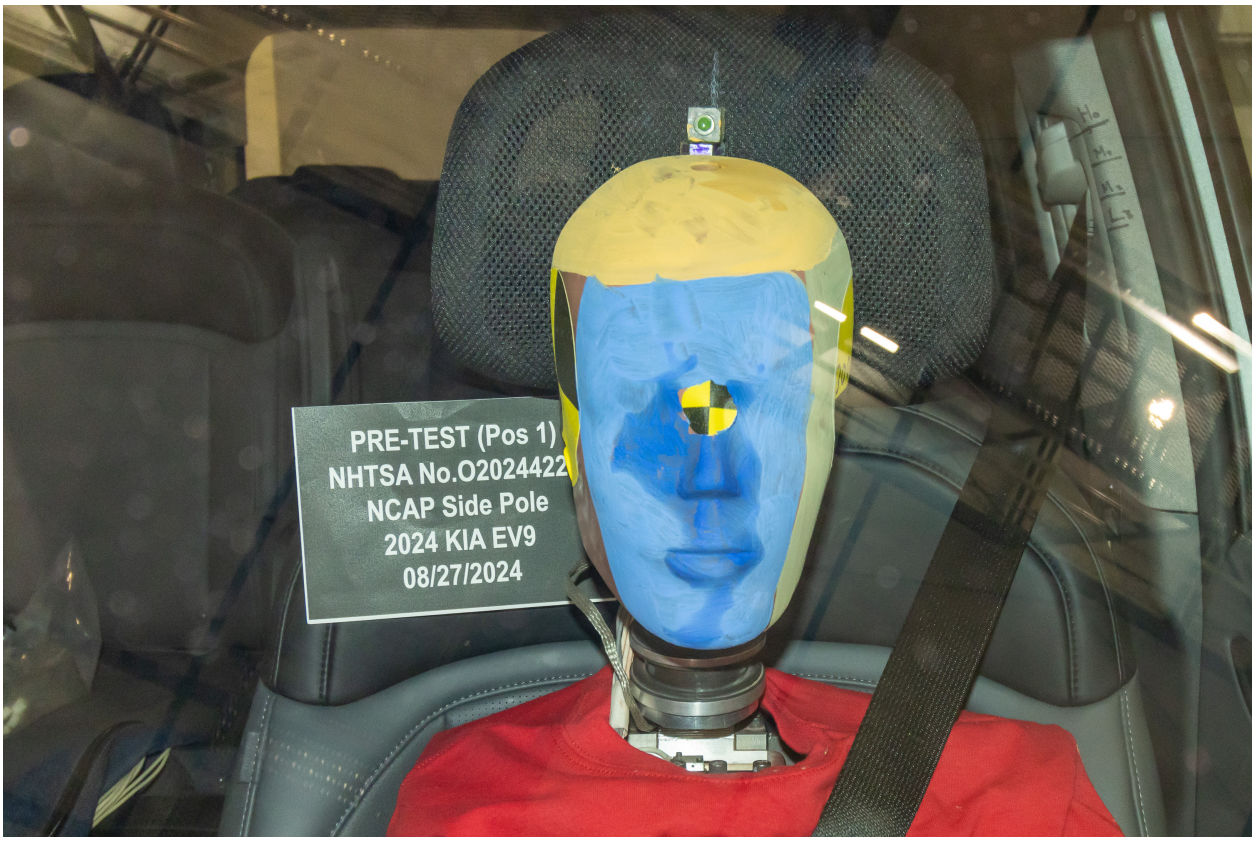


Figure A-27: Pre-Test Frontal Close-Up View of Dummy Head / Shoulders in Relation to Head Restraint



Figure A-28: Pre-Test Frontal View of Seat Pan Prior to Dummy Positioning



Figure A-29: Pre-Test Overhead View of Dummy Thighs on Seat Pan



Figure A-30: Pre-Test Left Side View of Dummy's Neck Showing Position of Adjustable Neck Bracket



Figure A-31: Pre-Test Left Side View of Dummy's Head Showing Dummy's Head is Level



Figure A-32: Pre-Test Placement of Dummy's Feet



Figure A-33: Pre-Test View of Belt Anchorage for Dummy



Figure A-34: Pre-Test Left Side View of Steering Wheel



Figure A-35: Pre-Test View of Disengaged Parking Brake



Figure A-36: Pre-Test View of Parking Brake



Figure A-37: Pre-Test Close-Up Left Side View of Driver Seat Track



Figure A-38: Pre-Test Close-Up Left Side View of Driver Seat Back



Figure A-39: Pre-Test Close-Up View of Driver Seat Back or Head Restraint



Figure A-40: Pre-Test Dummy and Door Clearance View



Figure A-41: Post-Test Dummy and Door Clearance View



Figure A-42: Pre-Test Right Side View of Dummy and Front Seat of Occupant Compartment



Figure A-43: Post-Test Right Side View of Dummy and Front Seat of Occupant Compartment



Figure A-44: Pre-Test Inner Door Panel View



Figure A-45: Post-Test Inner Door Panel View Showing Dummy Contact Location



Figure A-46: Post-Test Dummy Close-Up Head Contact with Vehicle Interior View



Figure A-47: Post-Test Dummy Close-Up Head Contact with Side Airbag View



Figure A-48: Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View



Figure A-49: Post-Test Dummy Close-Up Torso Contact with Side Airbag View



Figure A-50: Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View



Figure A-51: Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View



Figure A-52: Post-Test Dummy Close-Up Knee Contact with Vehicle Interior View



Figure A-53: Pre-Test Right Side View of Dummy and Rear Seat of Occupant Compartment



Figure A-54: Post-Test Inner Rear Passenger Torso Air Bag Deployment View



Figure A-55: Pre-Test Charging Port



Figure A-56: Post-Test Charging Port



Figure A-57: Close-Up View of Vehicle's Certification Label



Figure A-58: Close-Up View of Vehicle's Tire Information Placard or Label

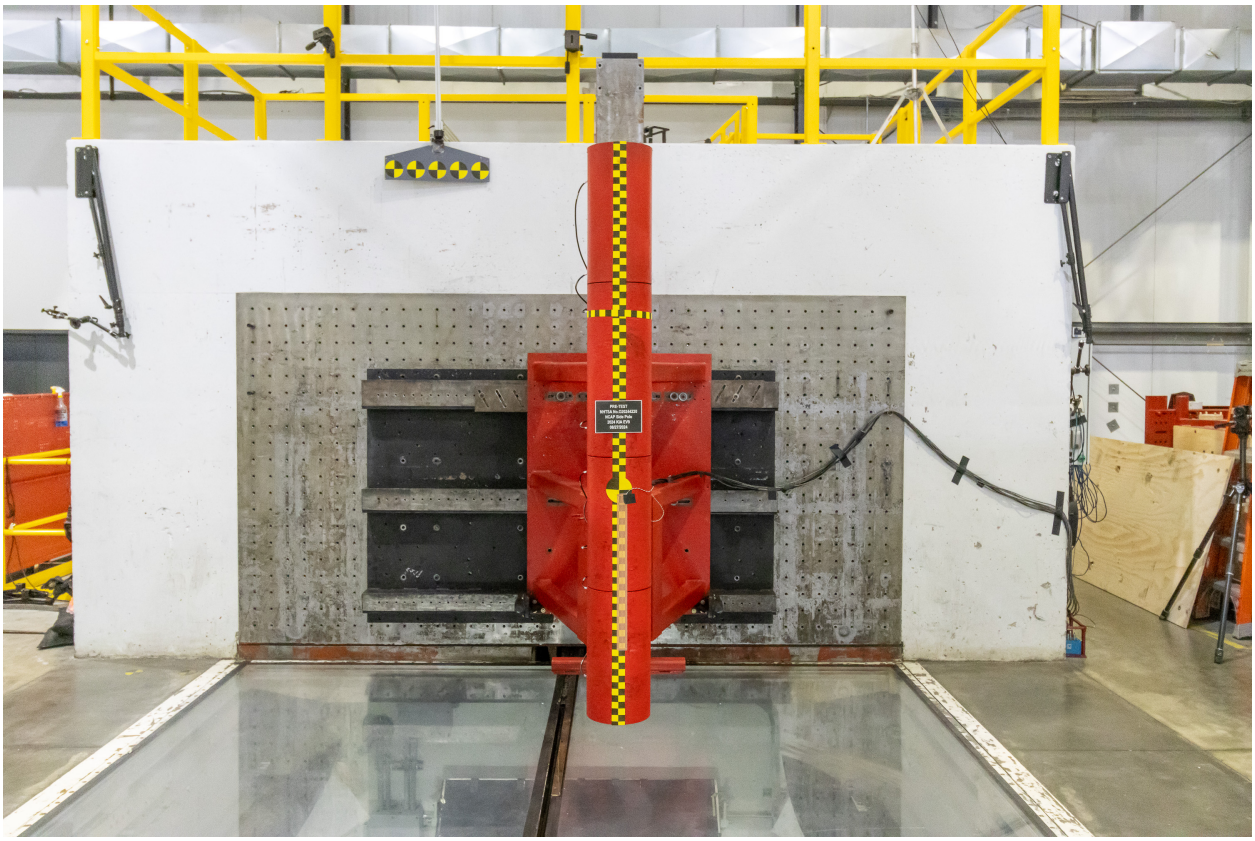


Figure A-59: Pre-Test Pole Barrier Front View

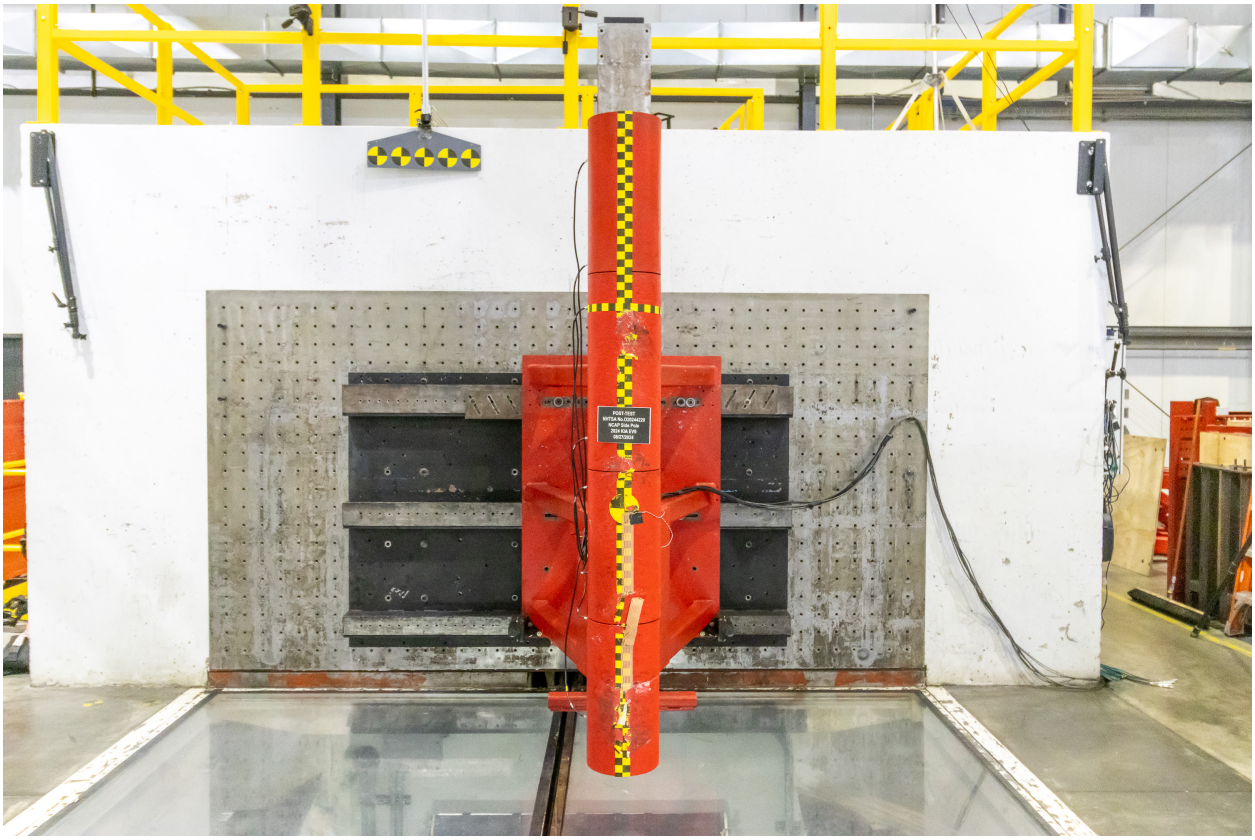


Figure A-60: Post-Test Pole Barrier Front View

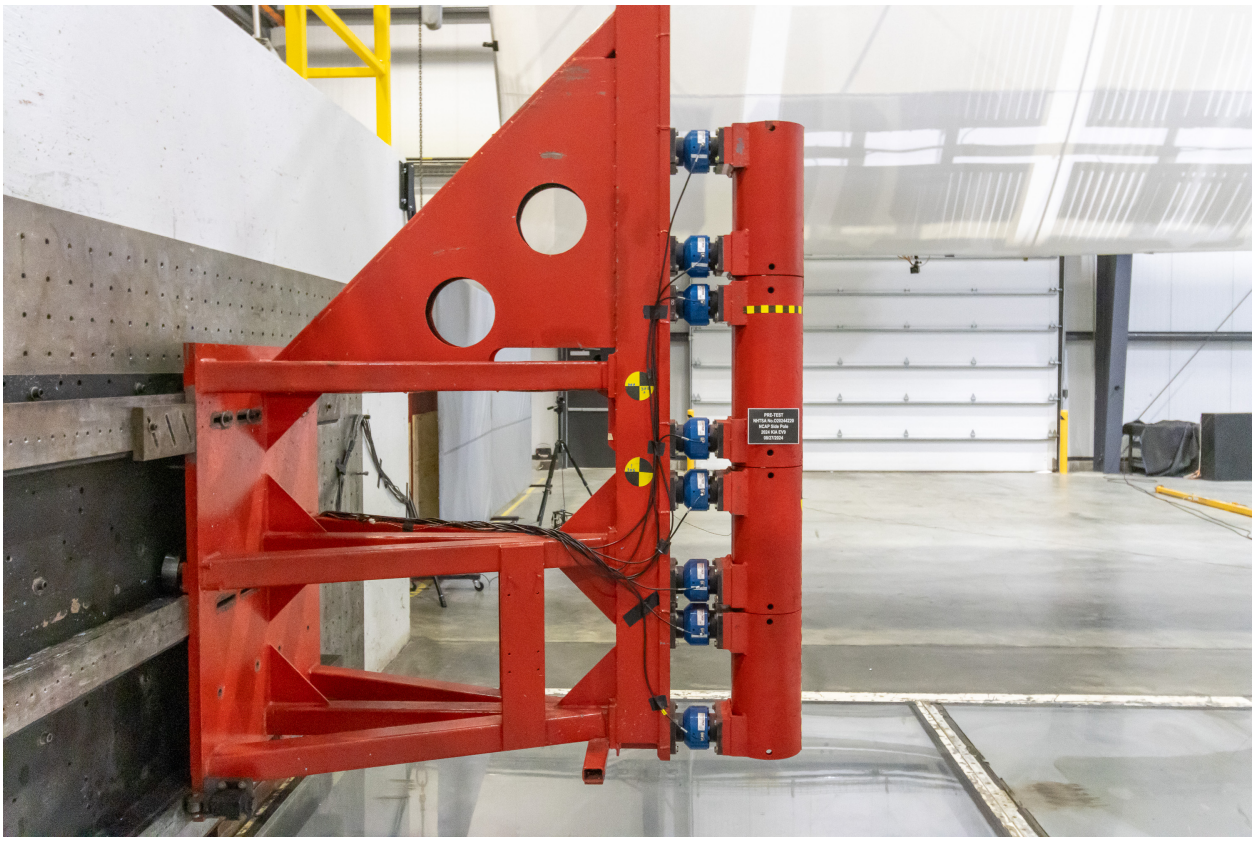


Figure A-61: Pre-Test Pole Barrier Side View

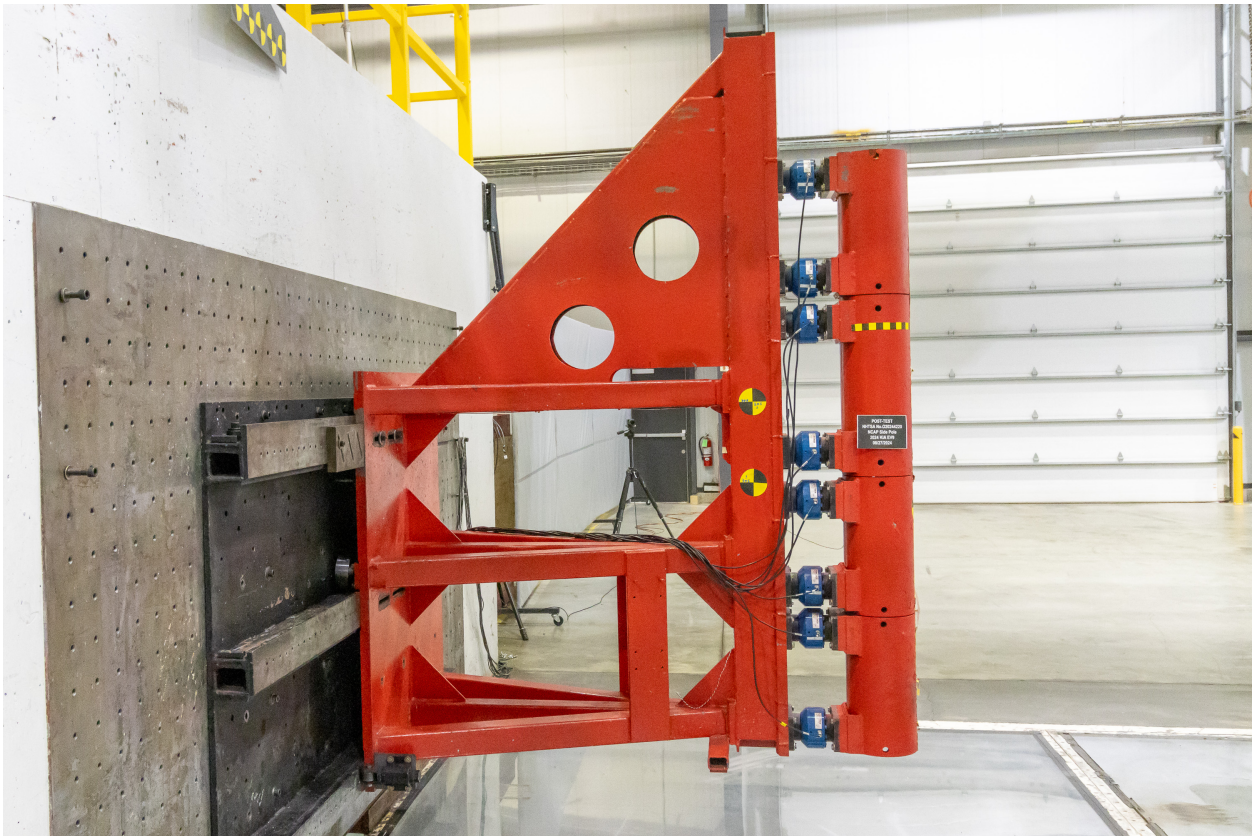


Figure A-62: Post-Test Pole Barrier Side View

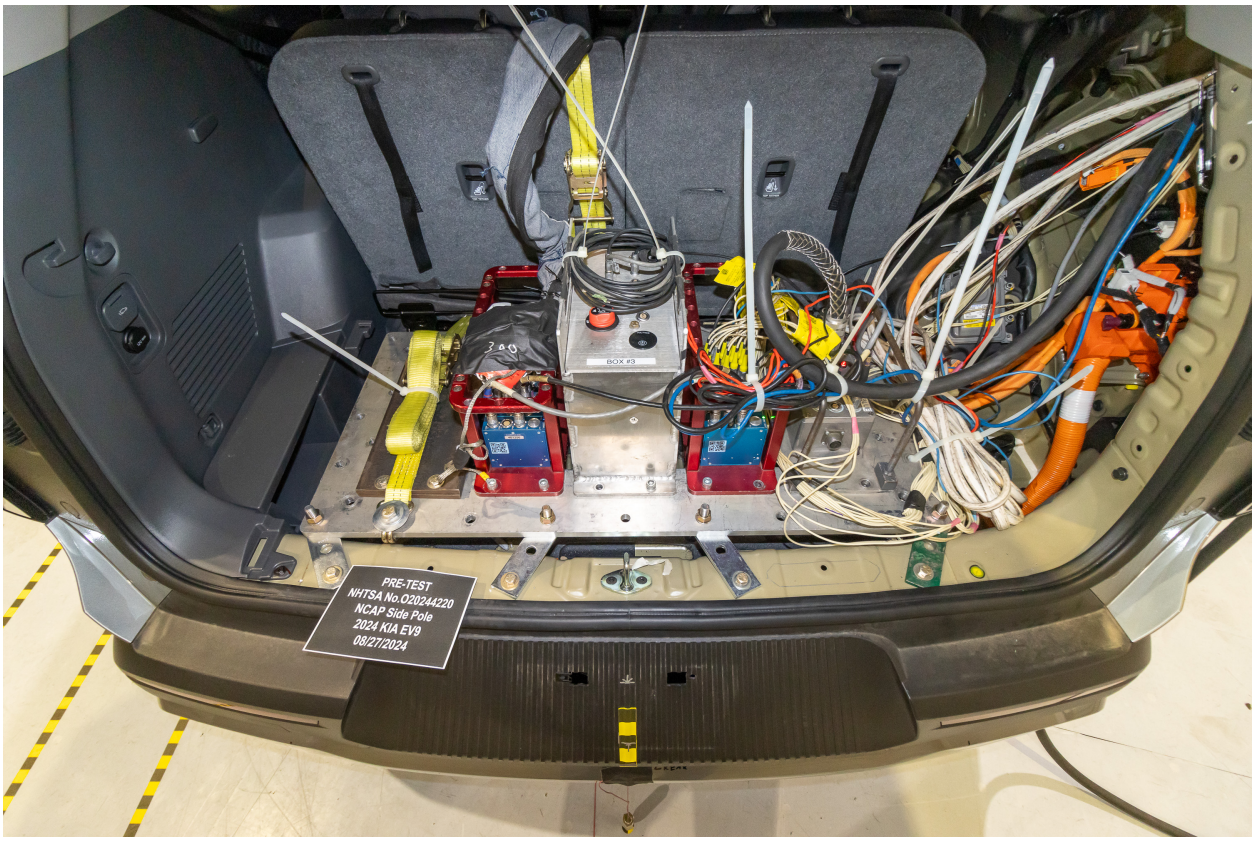


Figure A-63: Pre-Test Ballast View



Figure A-64: Post-Test Primary and Redundant Speed Trap Read-Out



Figure A-65: FMVSS No. 301 Static Rollover 0 Degrees

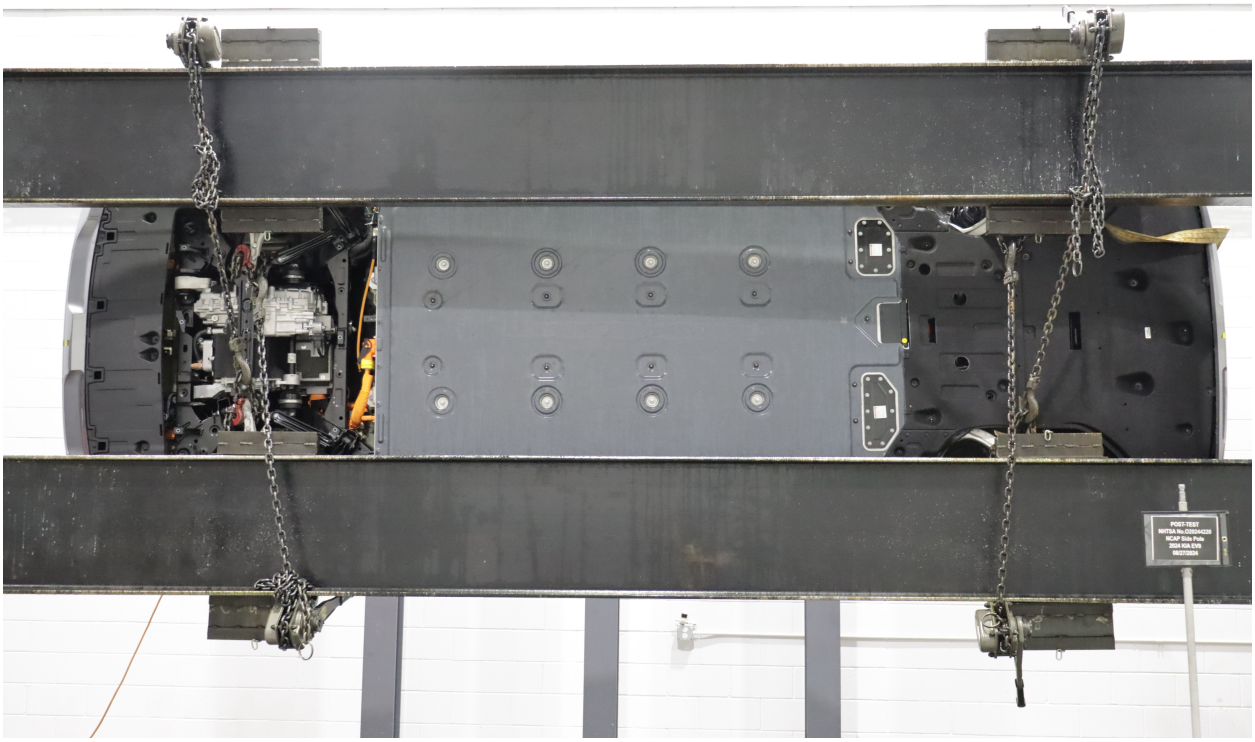


Figure A-66: FMVSS No. 301 Static Rollover 90 Degrees



Figure A-67: FMVSS No. 301 Static Rollover 180 Degrees

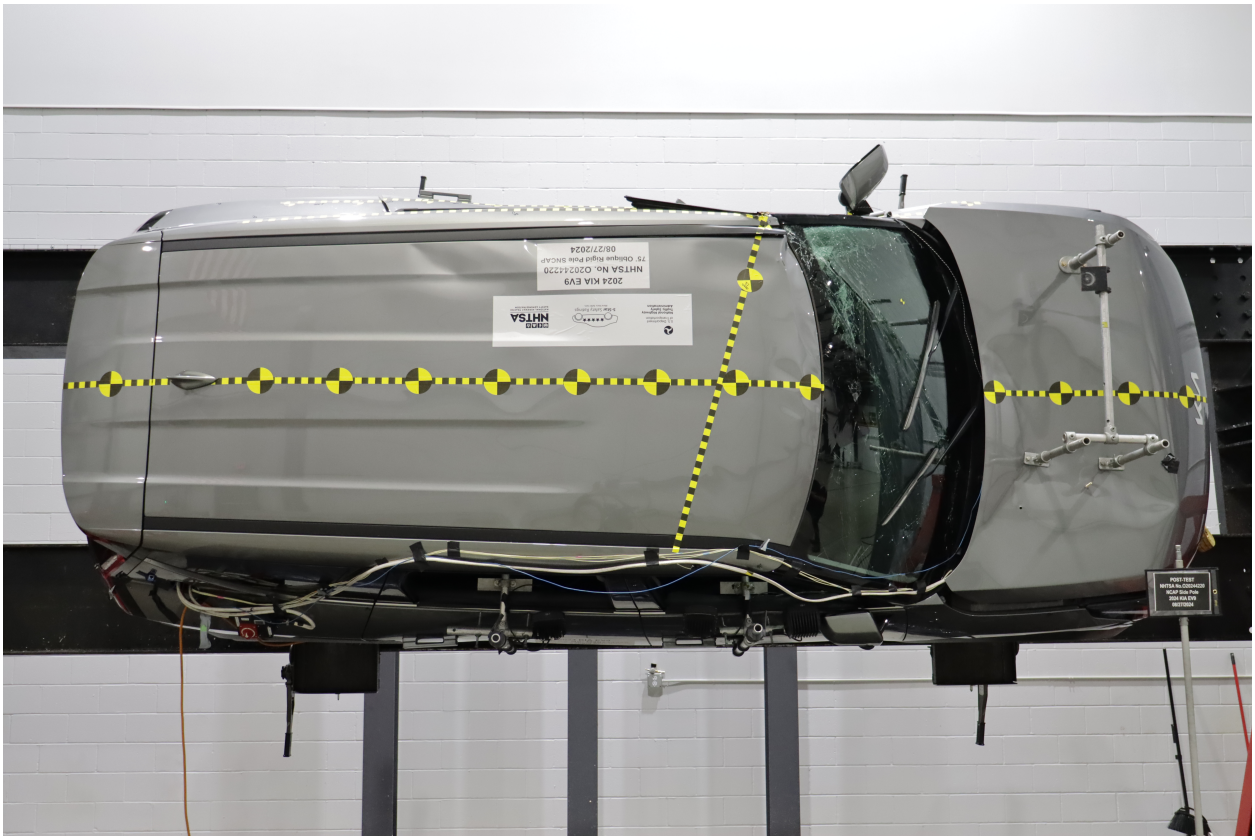


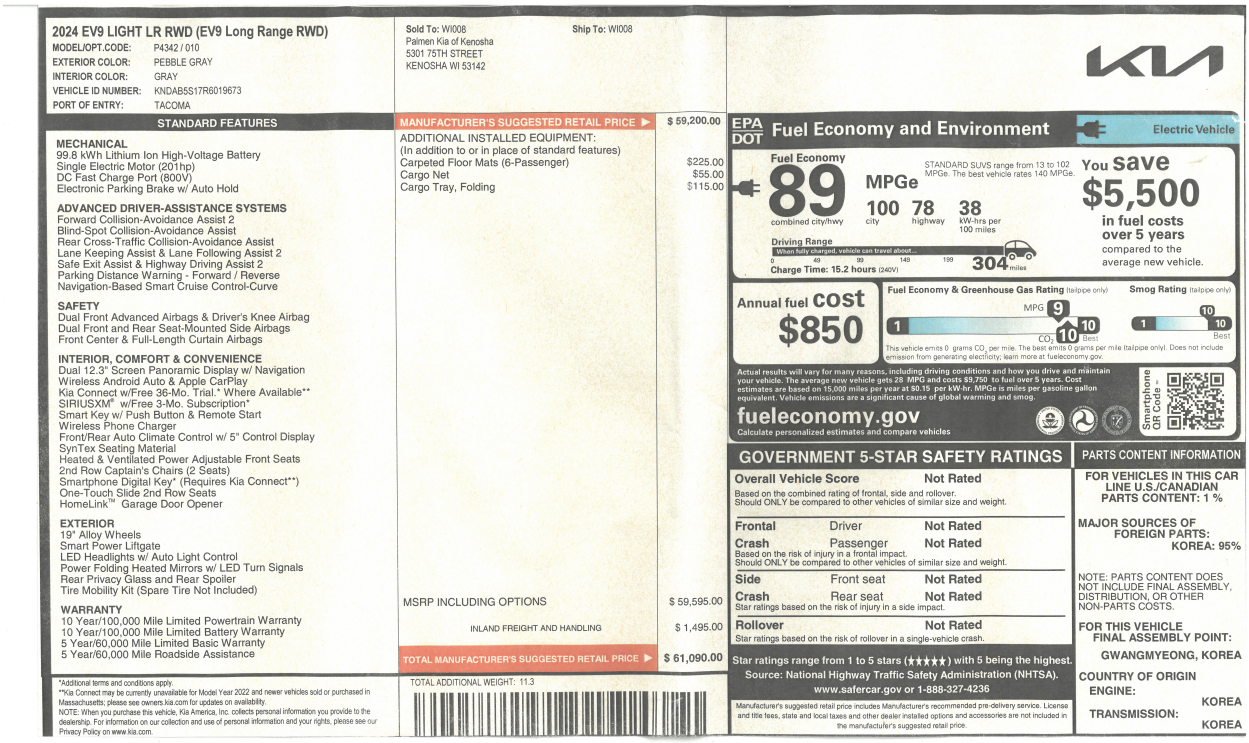
Figure A-68: FMVSS No. 301 Static Rollover 270 Degrees



Figure A-69: FMVSS No. 301 Static Rollover 360 Degrees



Figure A-70: Impact Event



2024 EV9 LIGHT LR RWD (EV9 Long Range RWD)
MODEL/OPT.CODE: P4342 / 010
EXTERIOR COLOR: PEBBLE GRAY
INTERIOR COLOR: GRAY
VEHICLE ID NUMBER: KNDAB5S17R6019673
PORT OF ENTRY: TACOMA

Sold To: WI008
Palmen Kia of Kenosha
5301 75TH STREET
KENOSHA WI 53142

Ship To: WI008

STANDARD FEATURES

MECHANICAL
99.8 kWh Lithium Ion High-Voltage Battery
Single Electric Motor (201hp)
DC Fast Charge Port (800V)
Electronic Parking Brake w/ Auto Hold

ADVANCED DRIVER-ASSISTANCE SYSTEMS
Forward Collision-Avoidance Assist 2
Blind-Spot Collision-Avoidance Assist
Rear Cross-Traffic Collision-Avoidance Assist
Lane Keeping Assist & Lane Following Assist 2
Safe Exit Assist & Highway Driving Assist 2
Parking Distance Warning - Forward / Reverse
Navigation-Based Smart Cruise Control-Curve

SAFETY
Dual Front Advanced Airbags & Driver's Knee Airbag
Dual Front and Rear Seat-Mounted Side Airbags
Front Center & Full-Length Curtain Airbags

INTERIOR, COMFORT & CONVENIENCE
Dual 12.3" Screen Panoramic Display w/ Navigation
Wireless Android Auto & Apple CarPlay
Kia Connect w/Free 36-Mo. Trial.* Where Available**
SIRIUSXM® w/Free 3-Mo. Subscription*
Smart Key w/ Push Button & Remote Start
Wireless Phone Charger
Front/Rear Auto Climate Control w/ 5" Control Display
SynTex Seating Material
Heated & Ventilated Power Adjustable Front Seats
2nd Row Captain's Chairs (2 Seats)
Smartphone Digital Key* (Requires Kia Connect**)
One-Touch Slide 2nd Row Seats
HomeLink™ Garage Door Opener

EXTERIOR
19" Alloy Wheels
Smart Power Liftgate
LED Headlights w/ Auto Light Control
Power Folding Heated Mirrors w/ LED Turn Signals
Rear Privacy Glass and Rear Spoiler
Tire Mobility Kit (Spare Tire Not Included)

WARRANTY
10 Year/100,000 Mile Limited Powertrain Warranty
10 Year/100,000 Mile Limited Battery Warranty
5 Year/60,000 Mile Limited Basic Warranty
5 Year/60,000 Mile Roadside Assistance

*Additional terms and conditions apply.
**Kia Connect may be currently unavailable for Model Year 2022 and newer vehicles sold or purchased in Massachusetts; please see owners.kia.com for updates on availability.
NOTE: When you purchase this vehicle, Kia America, Inc. collects personal information you provide to the dealership. For information on our collection and use of personal information and your rights, please see our Privacy Policy on www.kia.com.

MANUFACTURER'S SUGGESTED RETAIL PRICE ▶	$ 59,200.00
ADDITIONAL INSTALLED EQUIPMENT: (In addition to or in place of standard features)	
Carpeted Floor Mats (6-Passenger)	$225.00
Cargo Net	$55.00
Cargo Tray, Folding	$115.00
MSRP INCLUDING OPTIONS	$ 59,595.00
INLAND FREIGHT AND HANDLING	$ 1,495.00
TOTAL MANUFACTURER'S SUGGESTED RETAIL PRICE ▶	$ 61,090.00

TOTAL ADDITIONAL WEIGHT: 11.3

EPA DOT Fuel Economy and Environment — Electric Vehicle

Fuel Economy: 89 MPGe combined city/hwy
100 city | 78 highway | 38 kW-hrs per 100 miles
STANDARD SUVS range from 13 to 102 MPGe. The best vehicle rates 140 MPGe.
Driving Range: When fully charged, vehicle can travel about... 304 miles
Charge Time: 15.2 hours (240V)

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

Annual fuel cost $850

Fuel Economy & Greenhouse Gas Rating (tailpipe only): MPG 9; CO_2 10 Best
Smog Rating (tailpipe only): 10 Best
This vehicle emits 0 grams CO_2 per mile. The best emits 0 grams per mile (tailpipe only). Does not include emission from generating electricity; learn more at fueleconomy.gov.

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 28 MPG and costs $9,750 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at $0.15 per kW-hr. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of global warming and smog.

fueleconomy.gov
Calculate personalized estimates and compare vehicles
Smartphone QR Code ~

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score: Not Rated
Based on the combined rating of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight.

Frontal Crash	Driver	Not Rated
	Passenger	Not Rated
Side Crash	Front seat	Not Rated
	Rear seat	Not Rated
Rollover		Not Rated

Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.
Star ratings based on the risk of injury in a side impact.
Star ratings based on the risk of rollover in a single-vehicle crash.

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

Manufacturer's suggested retail price includes Manufacturer's recommended pre-delivery service. License and title fees, state and local taxes and other dealer installed options and accessories are not included in the manufacturer's suggested retail price.

PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS CAR LINE U.S./CANADIAN PARTS CONTENT: 1 %

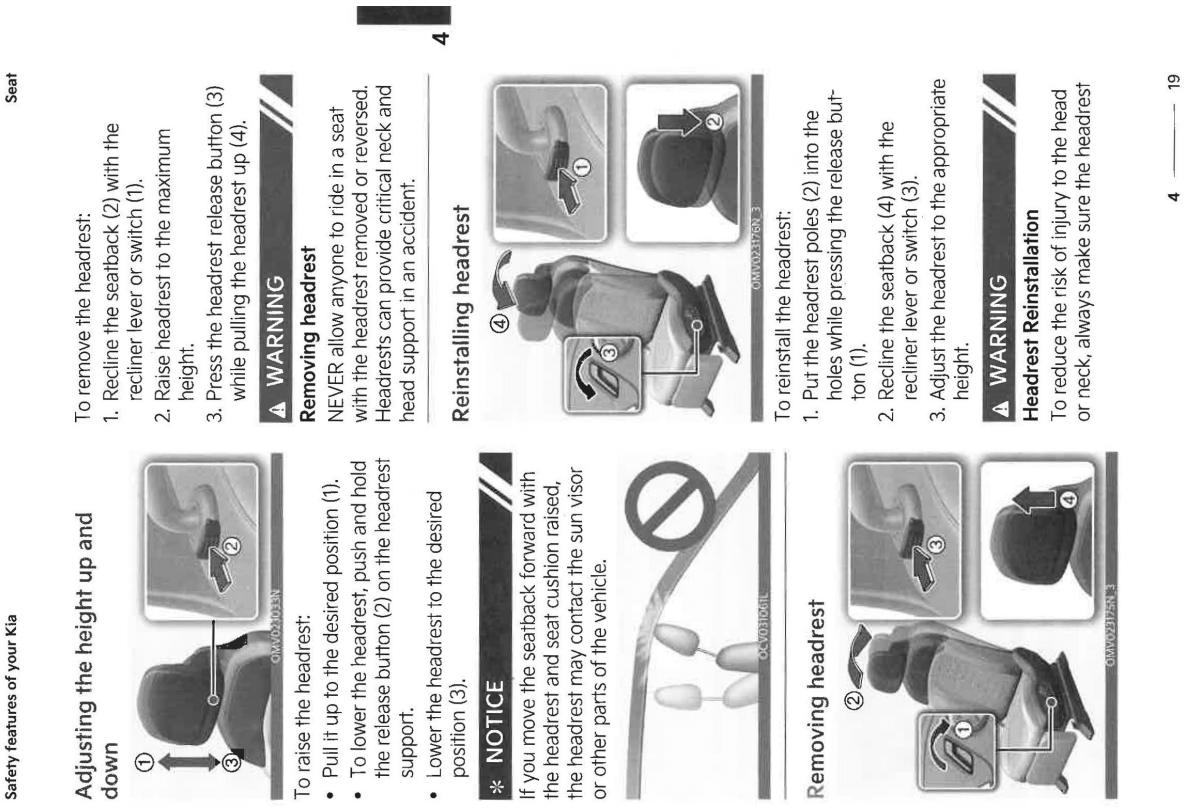
MAJOR SOURCES OF FOREIGN PARTS: KOREA: 95%

NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.

FOR THIS VEHICLE FINAL ASSEMBLY POINT: GWANGMYEONG, KOREA

COUNTRY OF ORIGIN
ENGINE: KOREA
TRANSMISSION: KOREA

Figure A-71: Monroney Label



Seat

To remove the headrest:
1. Recline the seatback (2) with the recliner lever or switch (1).
2. Raise headrest to the maximum height.
3. Press the headrest release button (3) while pulling the headrest up (4).

⚠ WARNING

Removing headrest

NEVER allow anyone to ride in a seat with the headrest removed or reversed. Headrests can provide critical neck and head support in an accident.

Reinstalling headrest

OMV023176K 3

To reinstall the headrest:
1. Put the headrest poles (2) into the holes while pressing the release button (1).
2. Recline the seatback (4) with the recliner lever or switch (3).
3. Adjust the headrest to the appropriate height.

⚠ WARNING

Headrest Reinstallation

To reduce the risk of injury to the head or neck, always make sure the headrest

4 — 19

Safety features of your Kia

Adjusting the height up and down

OMV023033N

To raise the headrest:
- Pull it up to the desired position (1).
- To lower the headrest, push and hold the release button (2) on the headrest support.
- Lower the headrest to the desired position (3).

✱ NOTICE

If you move the seatback forward with the headrest and seat cushion raised, the headrest may contact the sun visor or other parts of the vehicle.

OCV031061L

Removing headrest

OMV023175N 3

Figure A-72: Head Restraint Use and Adjustment Information from Vehicle Owner's Manual



Figure A-73: Post-Test View of Shattered Vehicle Inner Door Panel



Figure 305-1: Auxiliary Power Module Warning Label



Figure 305-2: Power Inverter Warning Label



Figure 305-3 First Responder Warning Label

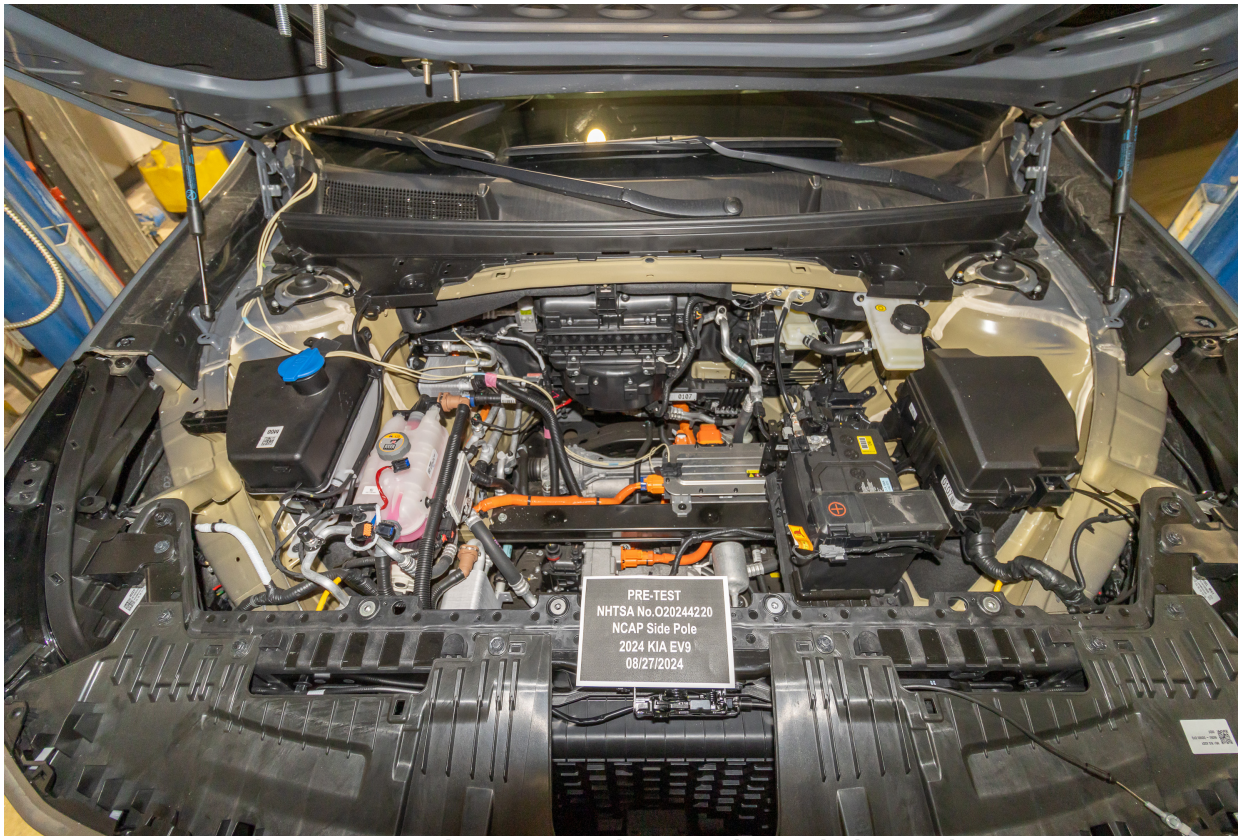


Figure 305-4: First Responder Warning Label Location

Photo Not Applicable

Figure 305-5: Other Vehicle Label Related to Electric Propulsion System



Figure 305-6: Manual High Voltage Service Disconnect in Place



Figure 305-7: Manual High Voltage Service Disconnect Removed (Show Plug)



Figure 305-8: Manual High Voltage Service Disconnect Removed Location

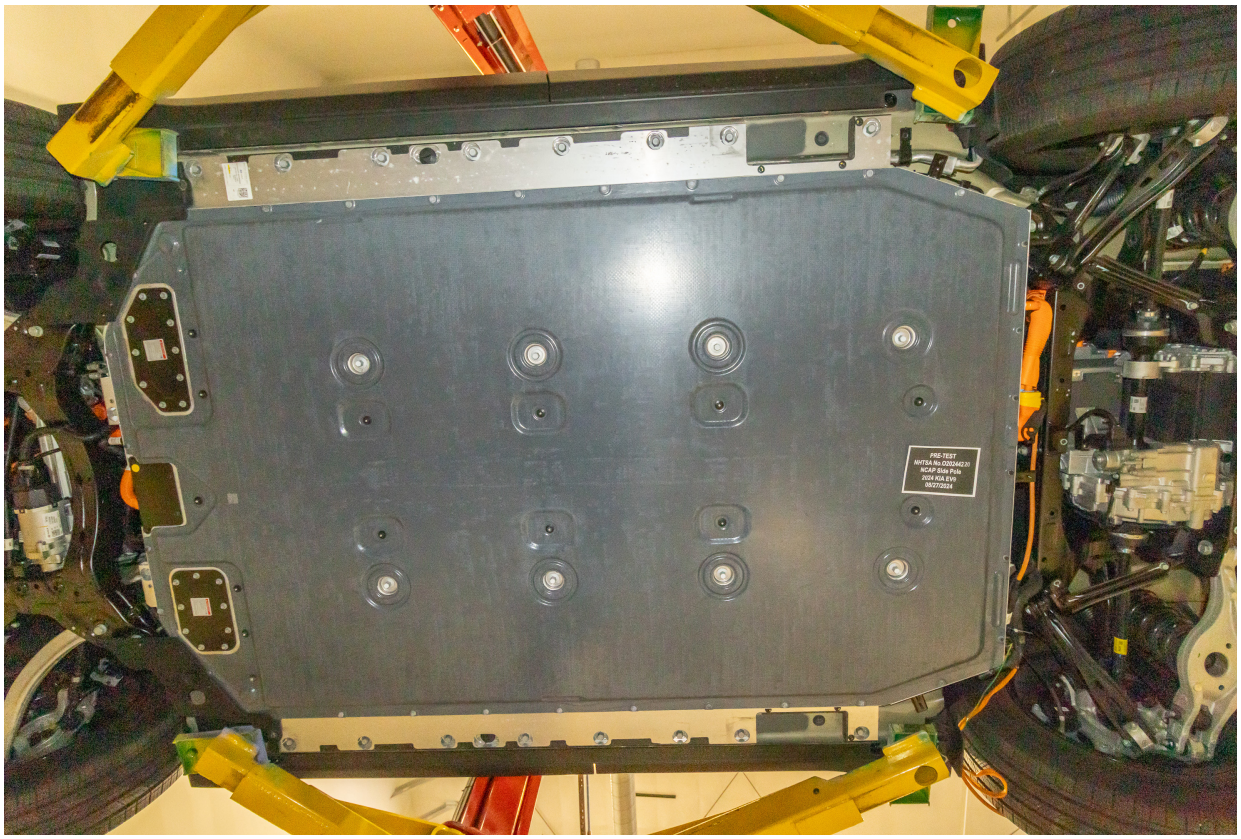


Figure 305-9: Pre-Impact View of Propulsion Battery

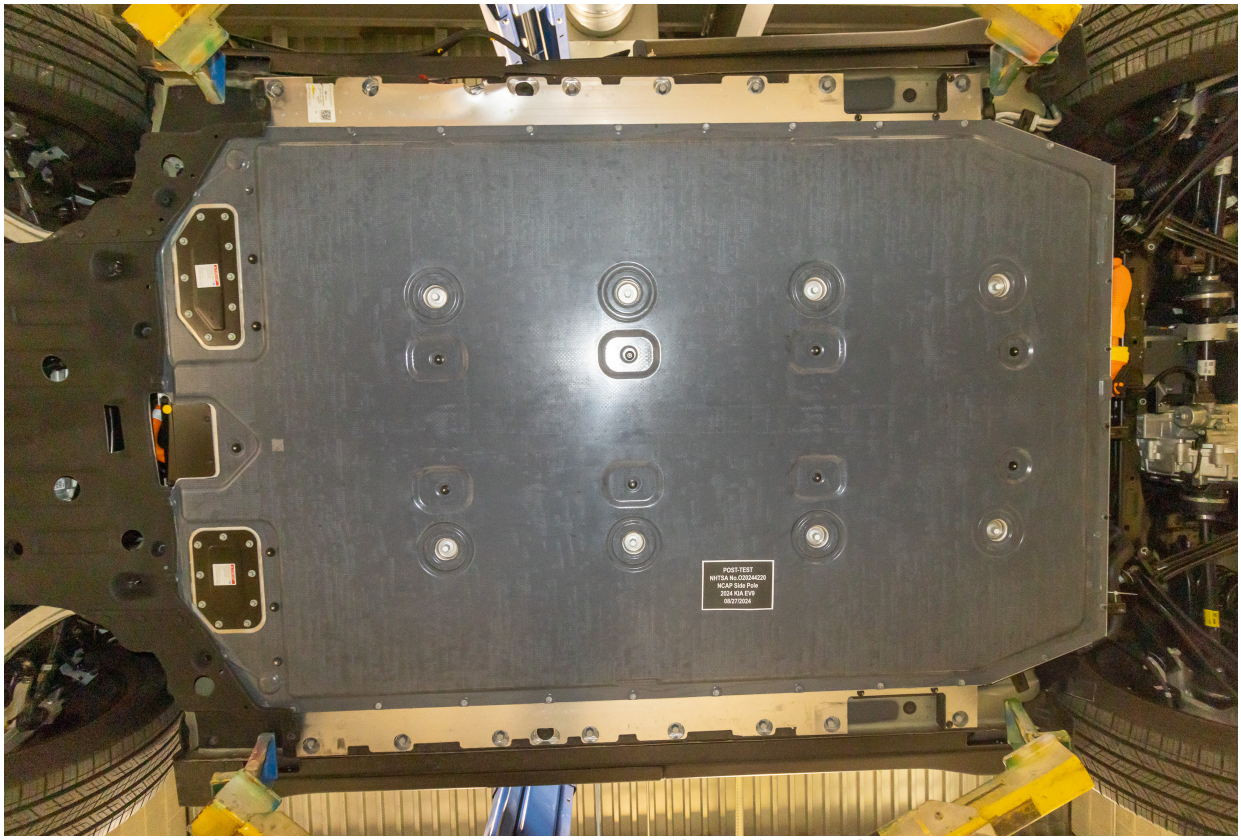


Figure 305-10: Post-Impact Front View of Propulsion Battery

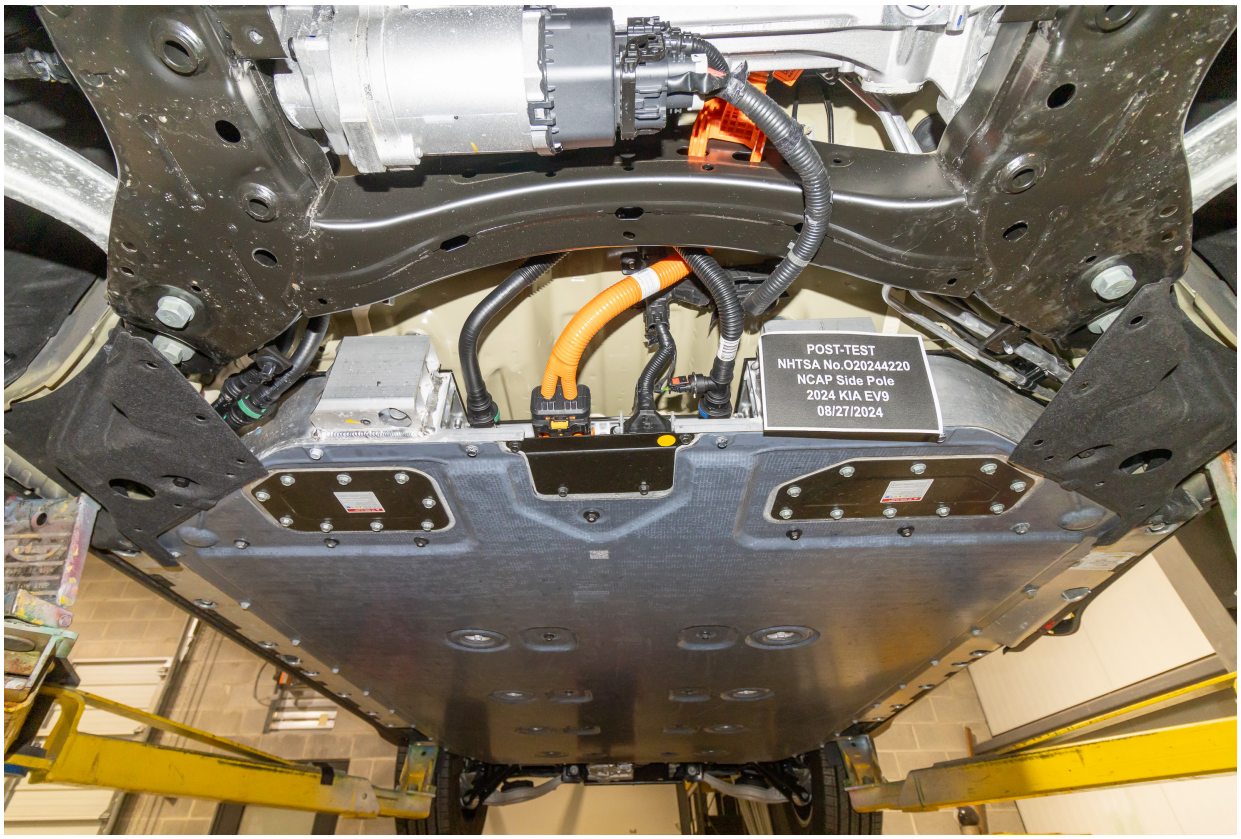


Figure 305-11: Post-Impact Rear View of Propulsion Battery (if any part of it is visible)

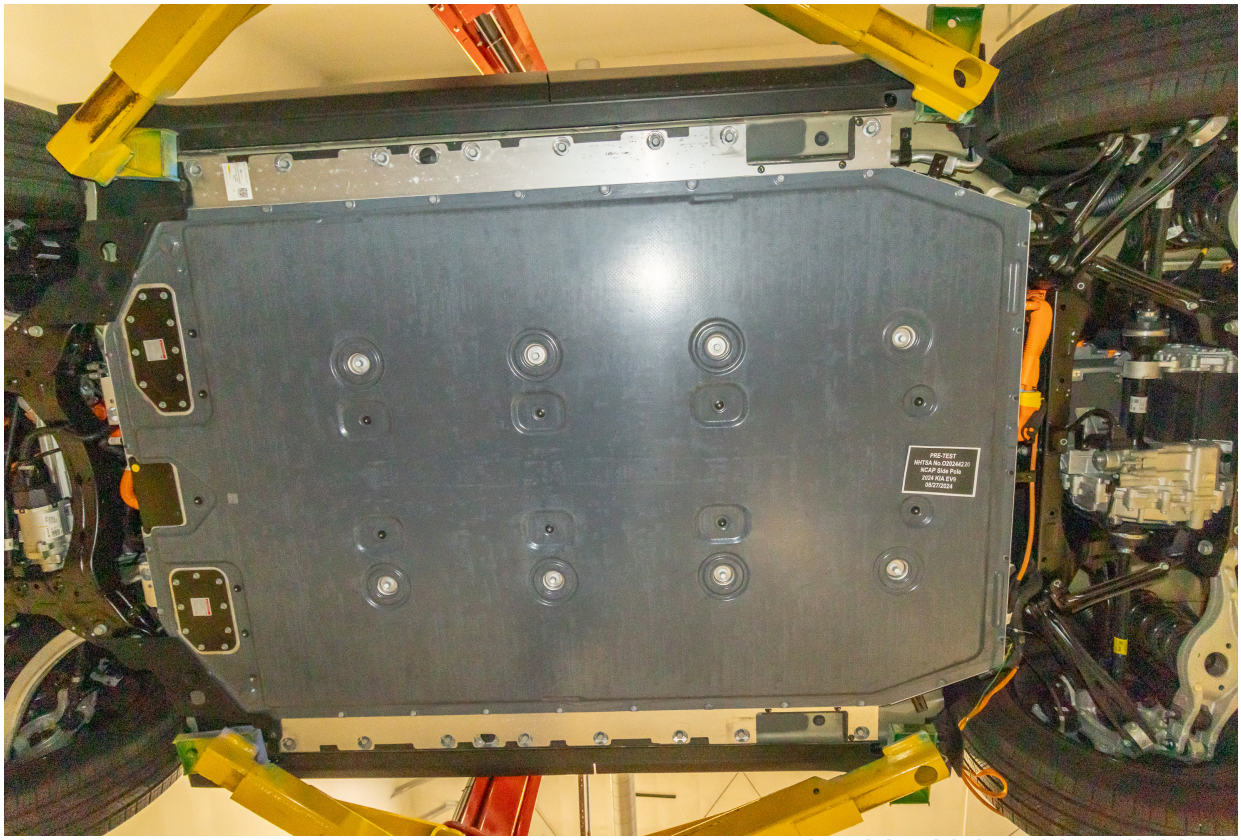


Figure 305-12: Pre-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules



Figure 305-13: Post-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules

Figure 305-14: Pre-Impact View of Propulsion Battery Module(s)

Photo Not Applicable

Figure 305-15: Post-Impact View of Propulsion Battery Module(s)

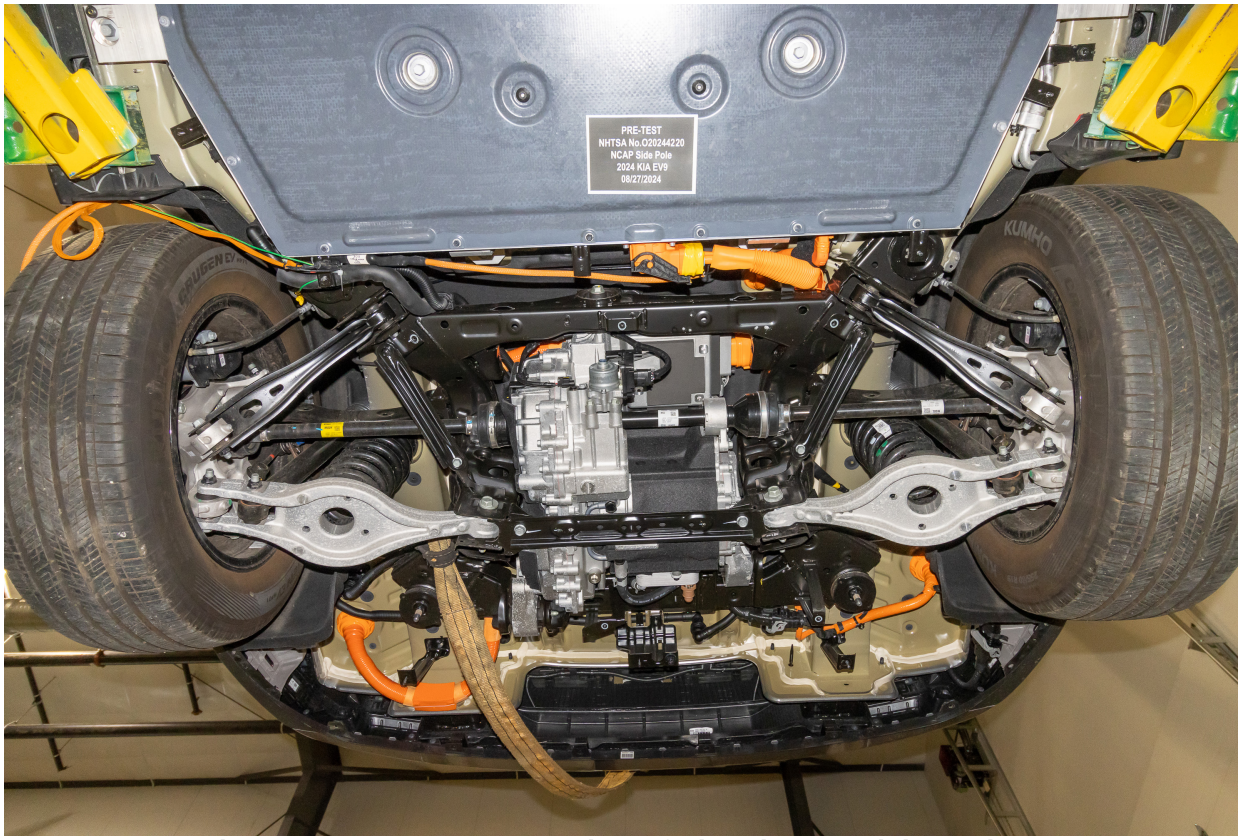


Figure 305-16: Pre-Impact View of Electric Propulsion Drive

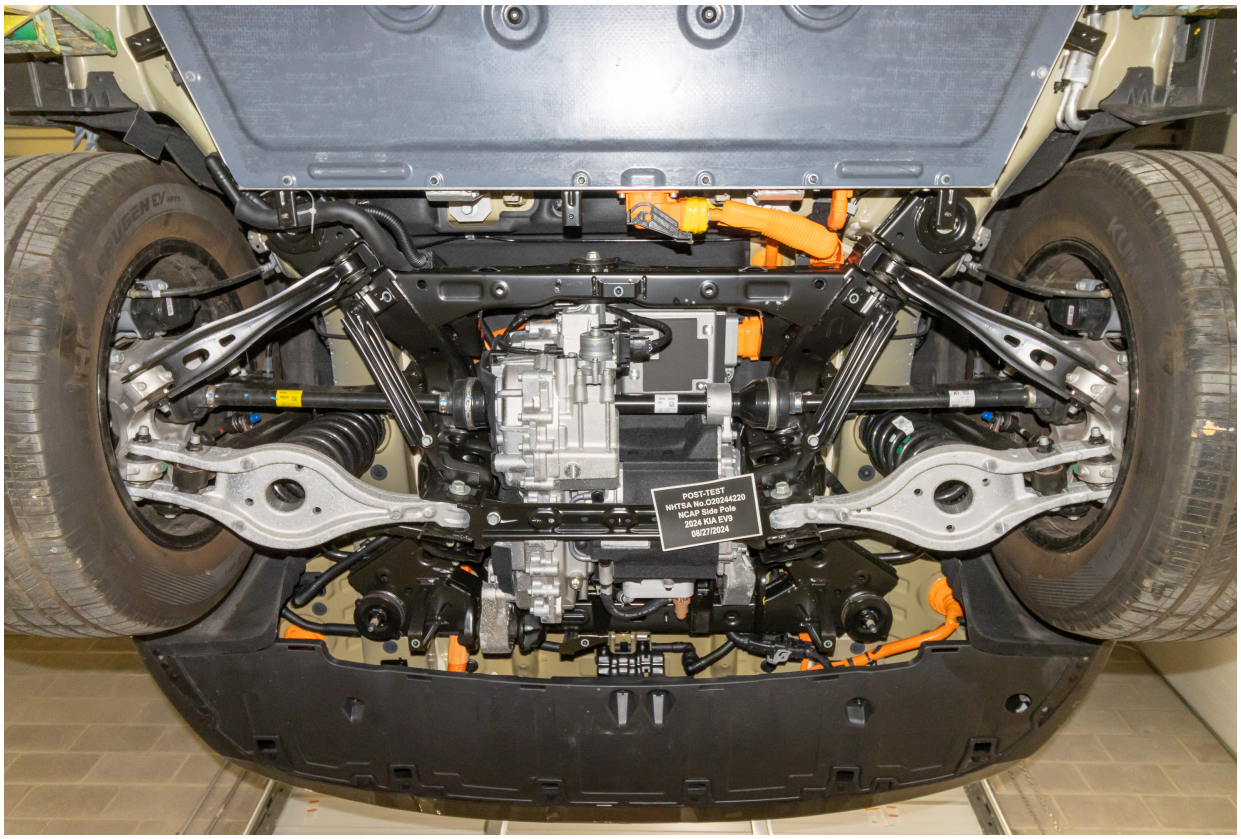


Figure 305-17: Post-Impact View of Electric Propulsion Drive



Figure 305-18: Pre-Impact View of High Voltage Interconnects

Photo Not Applicable

Figure 305-19: Pre-Impact View of Propulsion Battery Venting System

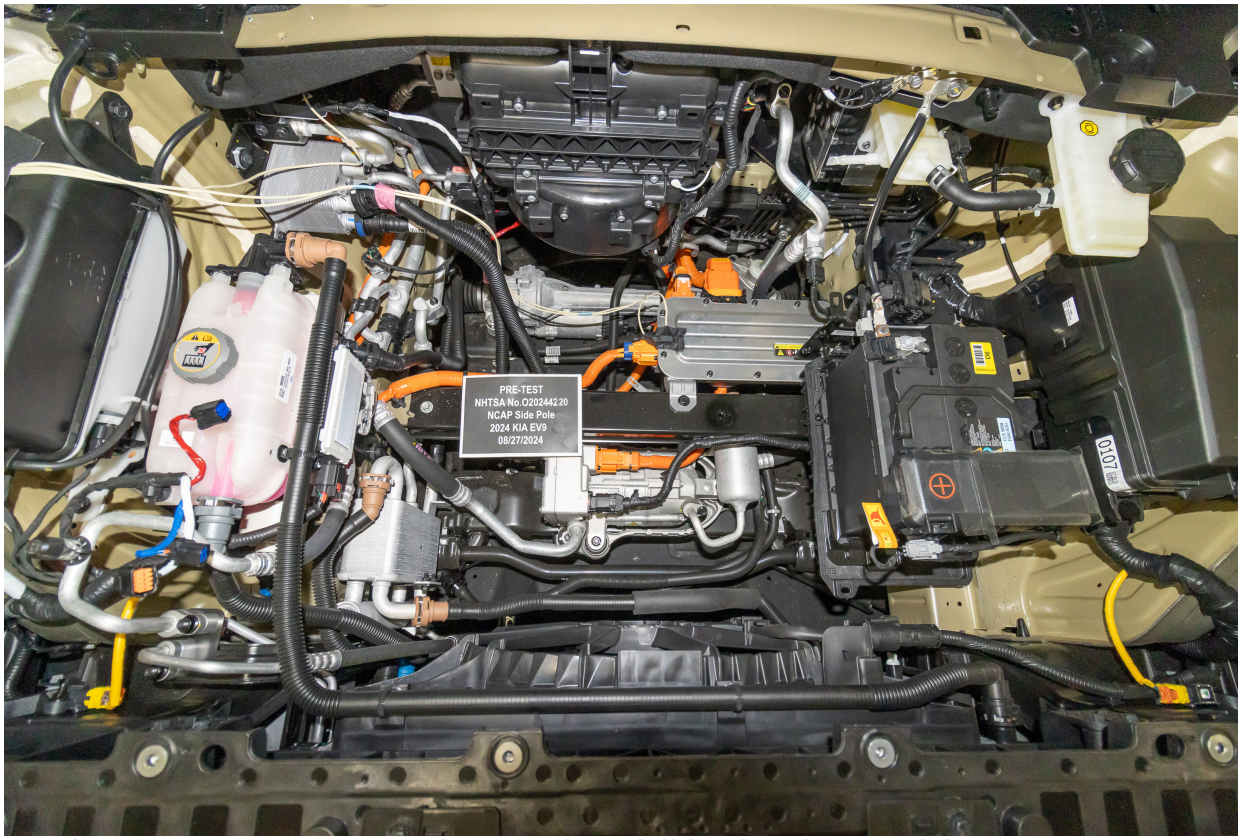


Figure 305-20: Pre-Impact View of Other Visible Electric Propulsion Components



Figure 305-21: Pre-Impact View of Ground Lead Attached

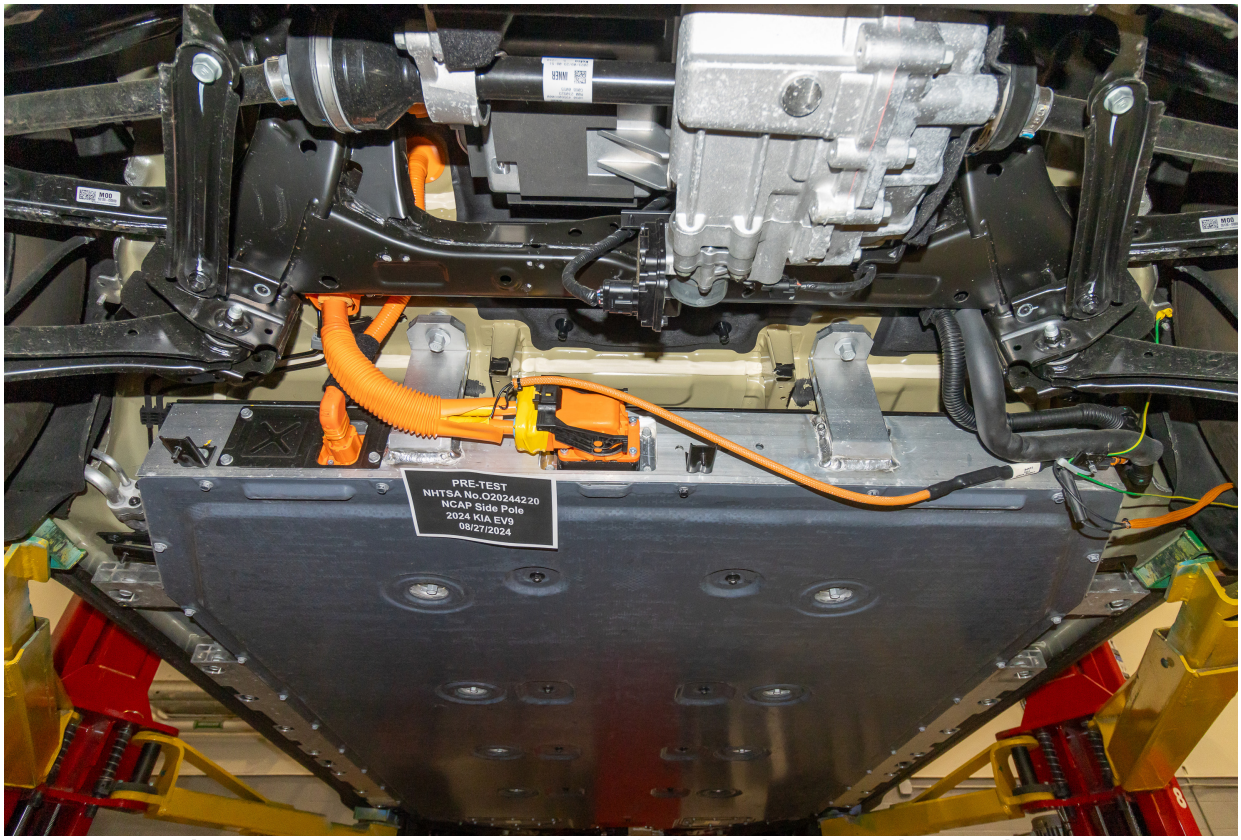


Figure 305-22: Pre-Impact View of High Voltage Leads Attached



Figure 305-23: Pre-Impact Close Up View of High Voltage Leads Attached

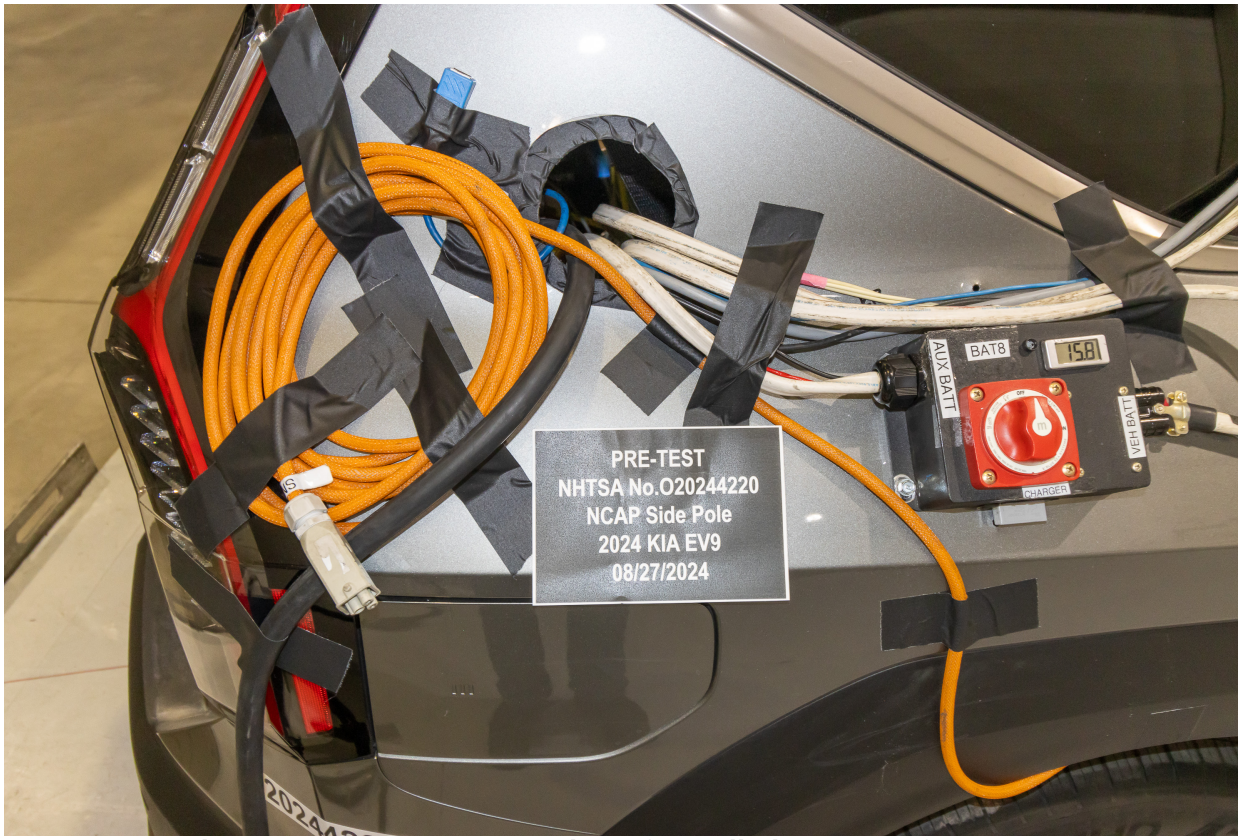


Figure 305-24: Pre-Impact View of Installed Test Interface Port

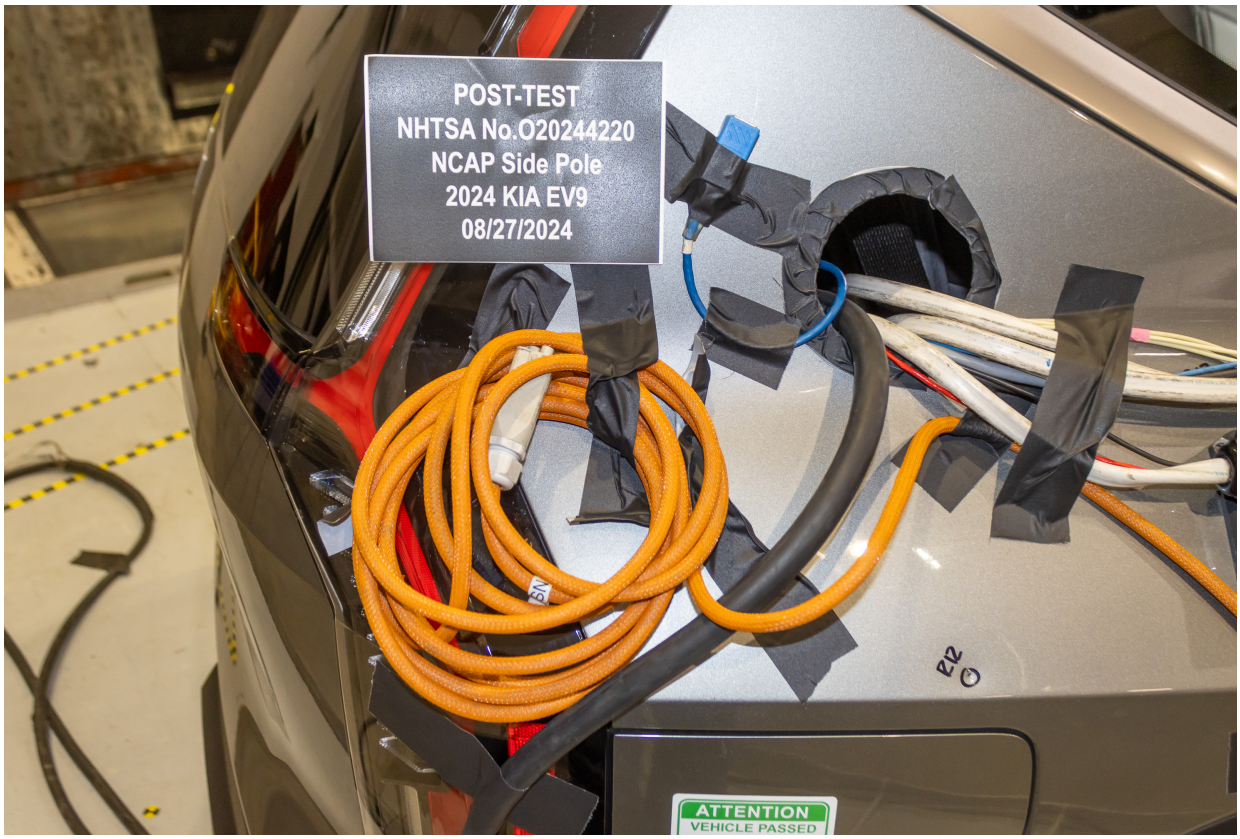


Figure 305-25: Post-Impact View of Installed Test Interface Port

Photo Not Applicable

Figure 305-26: Pre-Impact View of Other Test Devices

Photo Not Applicable

Figure 305-27: Post-Impact View of Other Test Devices

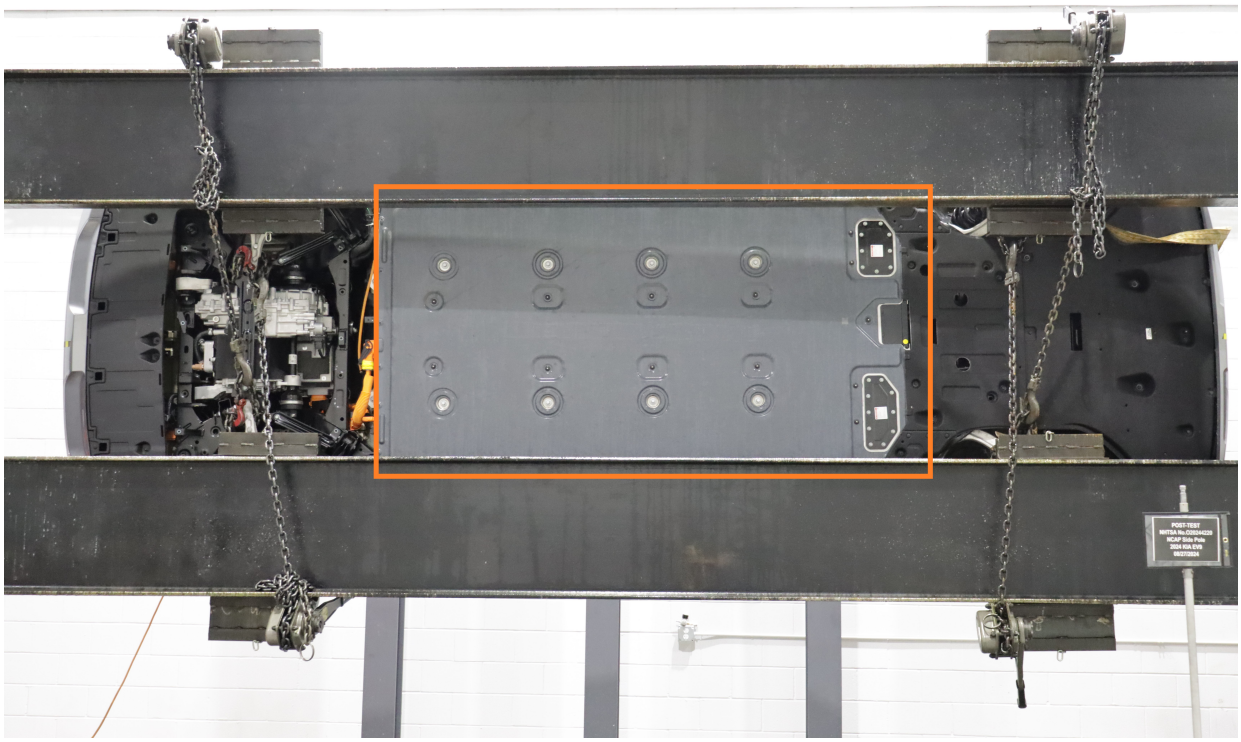


Figure 305-28: FMVSS No. 305 Static Rollover 90 Degrees

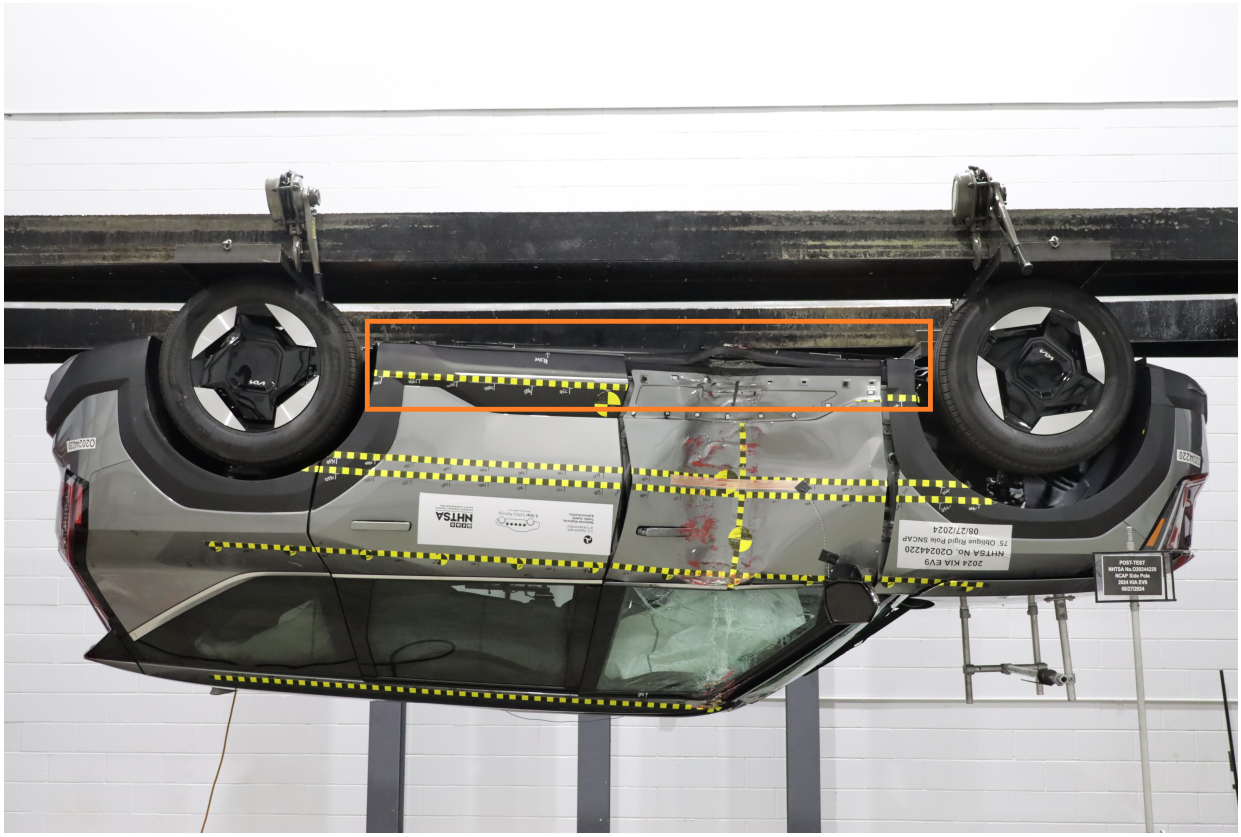


Figure 305-29: FMVSS No. 305 Static Rollover 180 Degrees

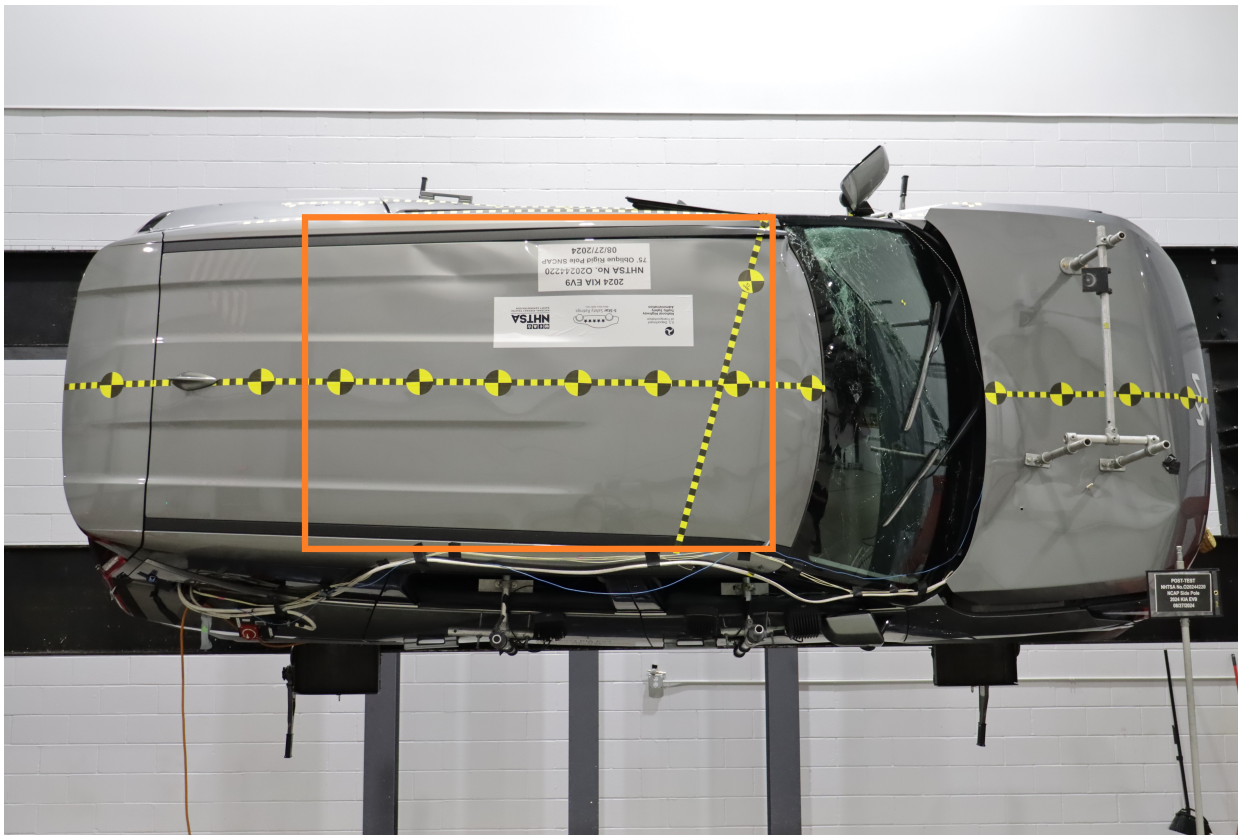


Figure 305-30: FMVSS No. 305 Static Rollover 270 Degrees



Figure 305-31: FMVSS No. 305 Static Rollover 360 Degrees



Figure 305-32: Pre-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery



Figure 305-33: Post-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery

Photo Not Applicable

Figure 305-34: Post-Impact Propulsion Battery System Mounting and-or Intrusion Failure(s)



Figure 305-35: Post-Impact View of Battery Component Intrusion (if applicable)

Figure 305-36: Post-Impact View of Battery Module Movement or Retention Loss (if applicable)



Figure 305-37: Post-Impact View of Propulsion Battery Electrolyte Spillage Location (if applicable)

Figure 305-38: Post-Impact View of Propulsion Battery Electrolyte Spillage Location (after rollover)



Figure 305-39: Pre-Impact Charging Port View

Figure 305-38: Post-Impact Charging Port View

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA TRACES

Table of Data Plots
Driver Dummy Instrumentation Plots

Fig.	Description	Page
Plot 1	Driver Head Acceleration (X) Primary vs. Time	B-4
Plot 2	Driver Head Acceleration (Y) Primary vs. Time	B-4
Plot 3	Driver Head Acceleration (Z) Primary vs. Time	B-4
Plot 4	Driver Head Resultant Primary vs. Time	B-4
Plot 5	Driver Lower Spine T12 Acceleration (X) vs. Time	B-5
Plot 6	Driver Lower Spine T12 Acceleration (Y) vs. Time	B-5
Plot 7	Driver Lower Spine T12 Acceleration (Z) vs. Time	B-5
Plot 8	Driver Lower Spine T12 Resultant Acceleration vs. Time	B-5
Plot 9	Driver Iliac Wing Force on Impact Side (Y) vs. Time	B-6
Plot 10	Driver Acetabulum Force on Impact Side (Y) vs. Time	B-6
Plot 11	Driver Total Pelvis Force on Impact Side (Y) vs. Time	B-6

The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at www.NHTSA.gov

Additional Driver Dummy Instrumentation Data

Driver Head Acceleration Redundant (X)
Driver Head Acceleration Redundant (Y)
Driver Head Acceleration Redundant (Z)
Driver Upper Thorax Rib Deflection (Y)
Driver Middle Thorax Rib Deflection (Y)
Driver Lower Thorax Rib Deflection (Y)
Driver Upper Abdomen Rib Deflection (Y)
Driver Lower Abdomen Rib Deflection (Y)

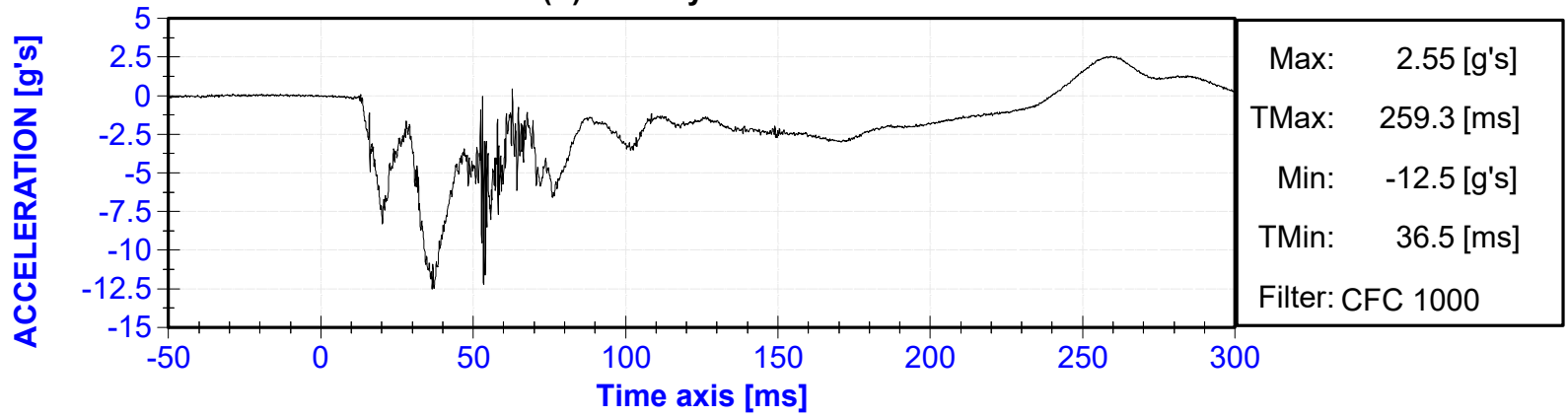
Vehicle Instrumentation Data

Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Left Floor Sill Acceleration (Y)
Left A-Pillar Sill Acceleration (Y)
Left Lower A-Pillar Acceleration (Y)
Left Mid A-Pillar Acceleration (Y)
Left B-Pillar Sill Acceleration (Y)
Left Lower B-Pillar Acceleration (Y)
Left Mid B-Pillar Acceleration (Y)
Driver Seat Track at Dummy Hip Point Acceleration (Y)
Engine Top Acceleration (X)
Engine Top Acceleration (Y)
Firewall Center Acceleration (Y)
Right Roof at Vertical Impact Reference Line Acceleration (Y)
Right Sill at Vertical Impact Reference Line Acceleration (Y)
Rear Floorpan Behind Rear Axle at Centerline Acceleration (X)
Rear Floorpan Behind Rear Axle at Centerline Acceleration (Y)

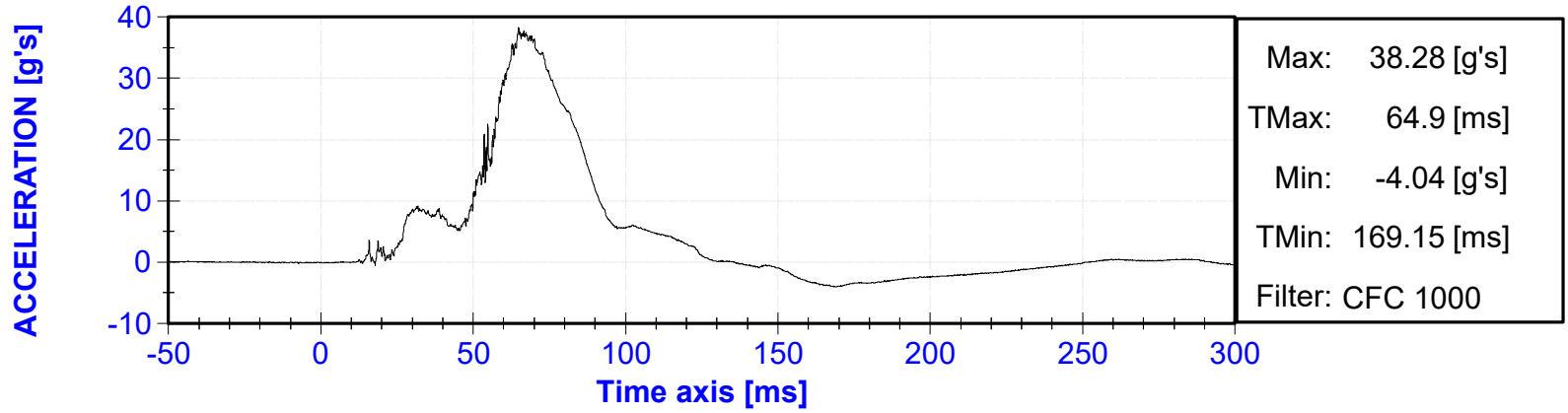
Pole Instrumentation Data

Load Cell Pole Barrier #1 Force (Y)
Load Cell Pole Barrier #2 Force (Y)
Load Cell Pole Barrier #3 Force (Y)
Load Cell Pole Barrier #4 Force (Y)
Load Cell Pole Barrier #5 Force (Y)
Load Cell Pole Barrier #6 Force (Y)
Load Cell Pole Barrier #7 Force (Y)
Load Cell Pole Barrier #8 Force (Y)

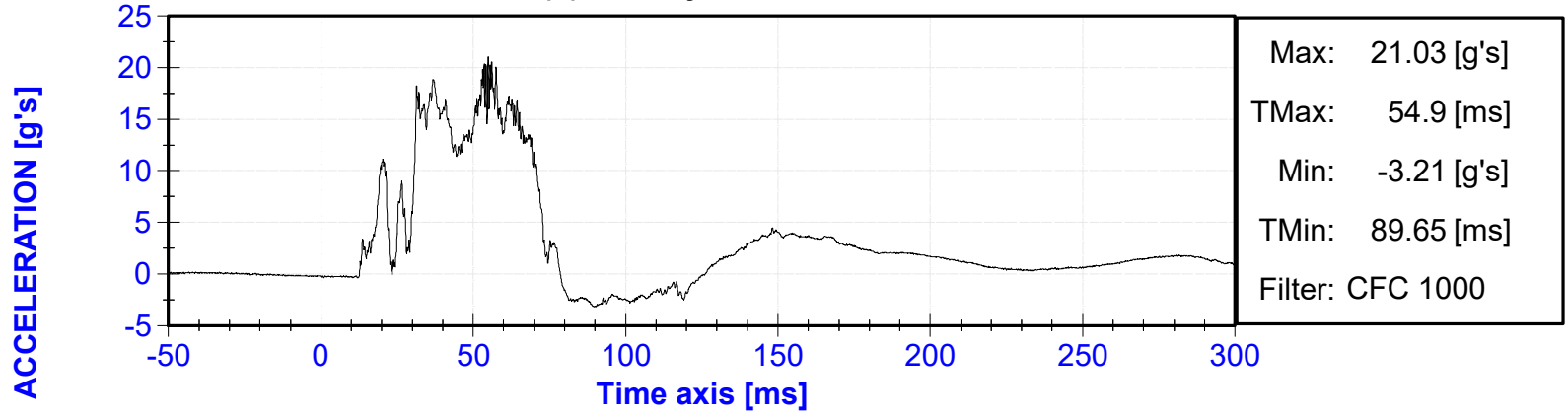
Driver Head Acceleration (X) Primary vs. Time



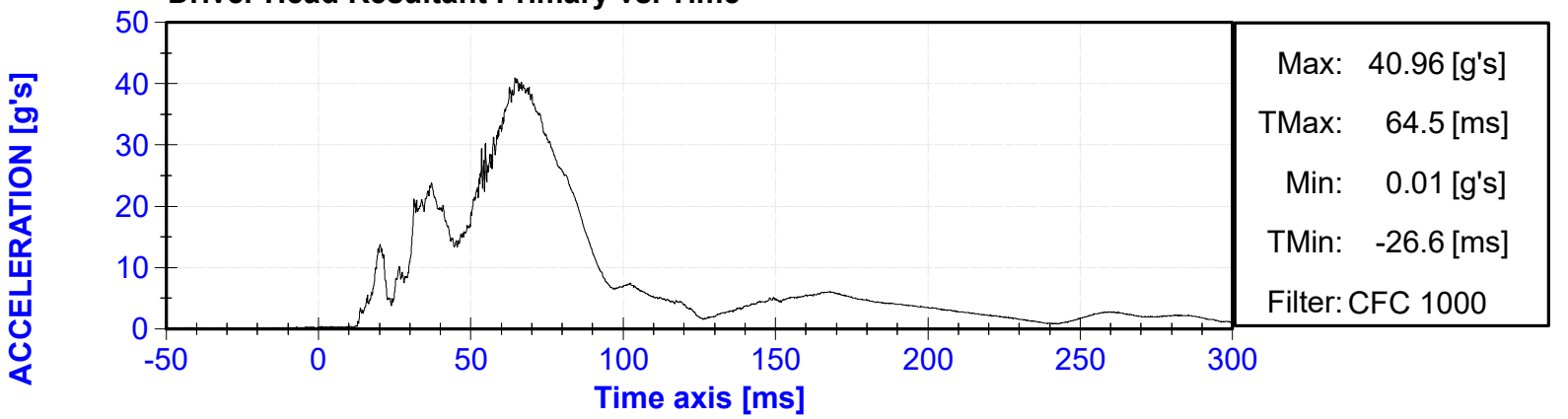
Driver Head Acceleration (Y) Primary vs. Time



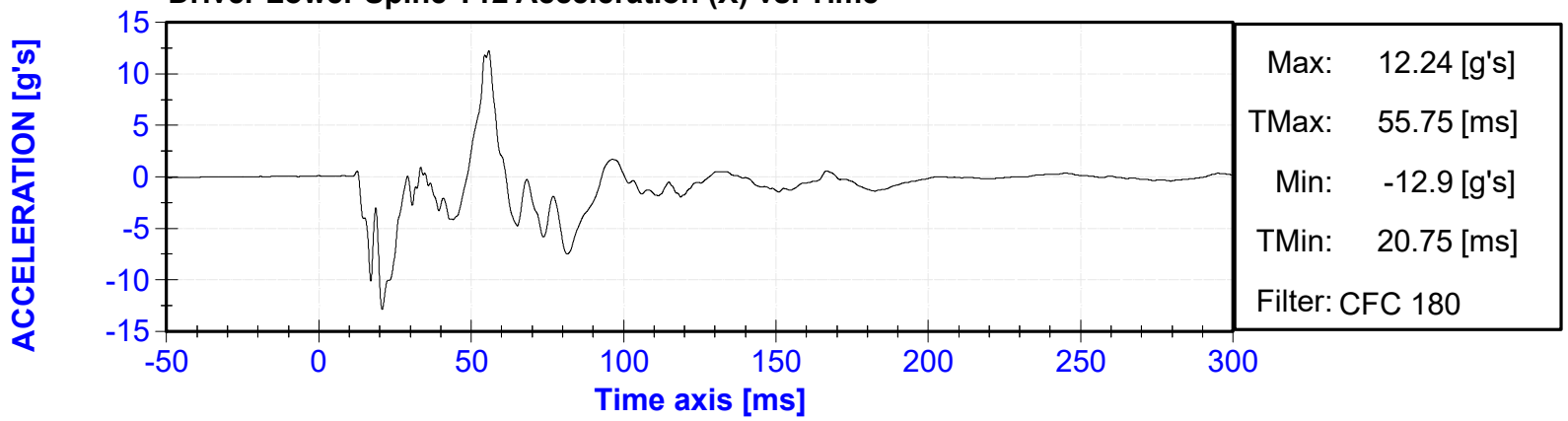
Driver Head Acceleration (Z) Primary vs. Time



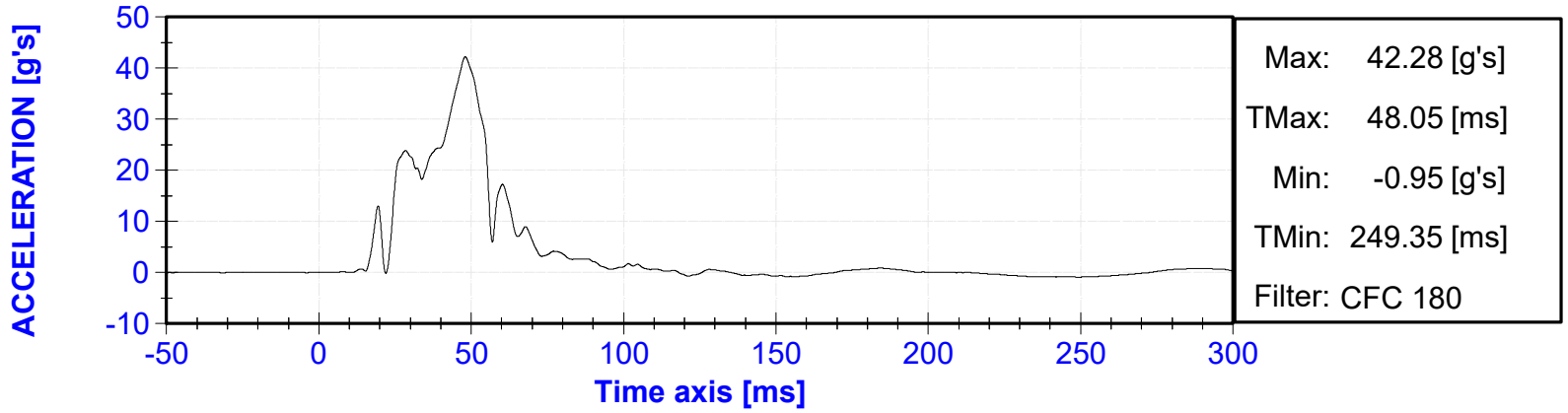
Driver Head Resultant Primary vs. Time



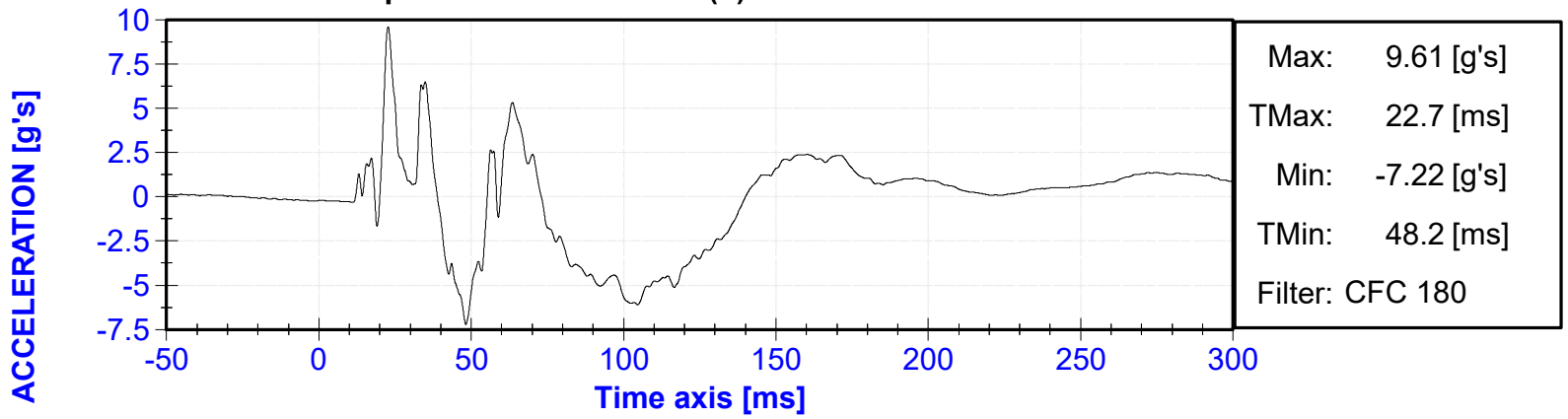
Driver Lower Spine T12 Acceleration (X) vs. Time



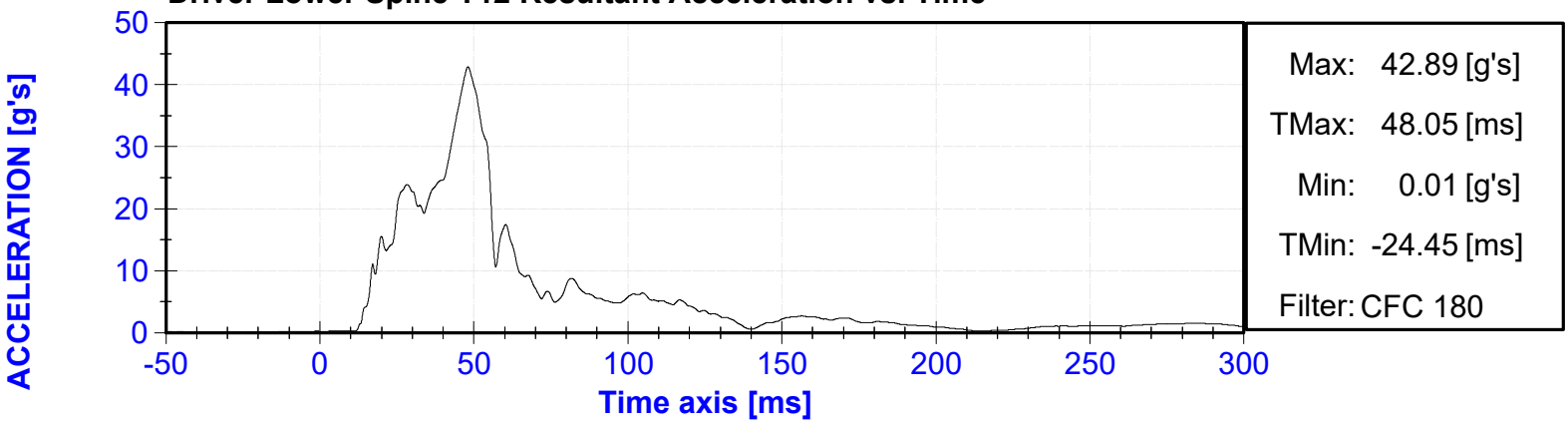
Driver Lower Spine T12 Acceleration (Y) vs. Time



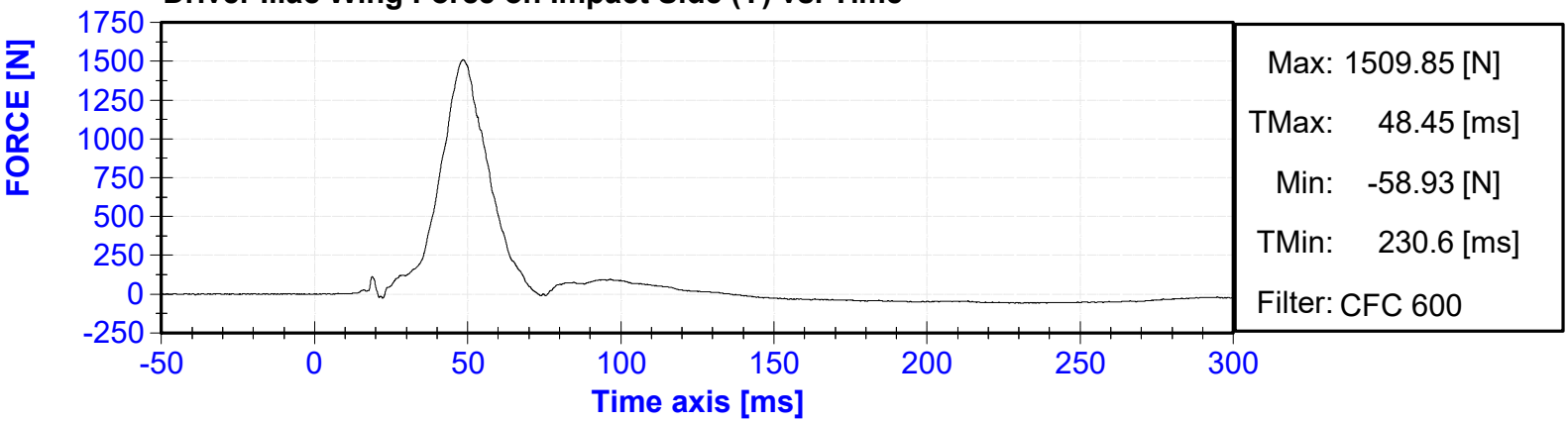
Driver Lower Spine T12 Acceleration (Z) vs. Time



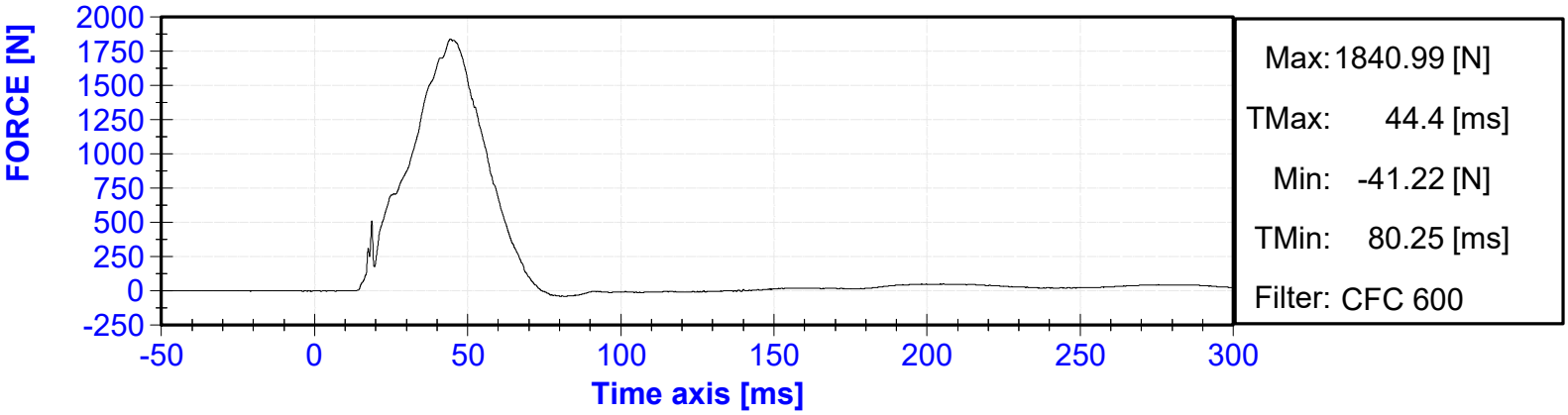
Driver Lower Spine T12 Resultant Acceleration vs. Time



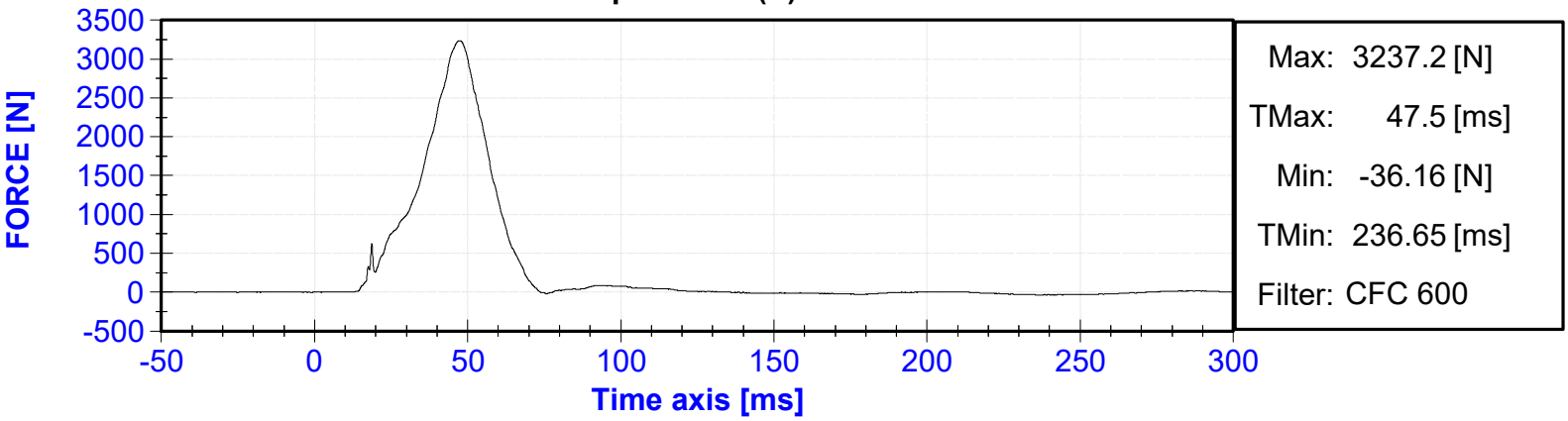
Driver Iliac Wing Force on Impact Side (Y) vs. Time



Driver Acetabulum Force on Impact Side (Y) vs. Time



Driver Total Pelvis Force on Impact Side (Y) vs. Time



APPENDIX C

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

SID-IIS 5TH PERCENTILE FEMALE - DRIVER ATD

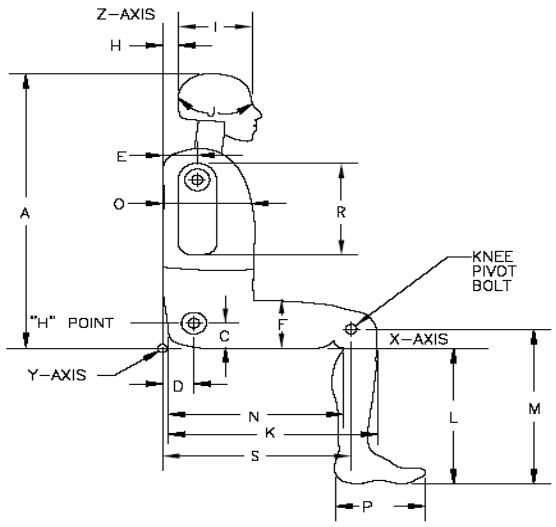
SERIAL NO:300

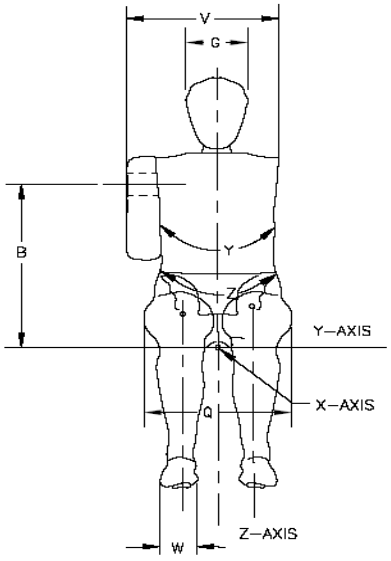
(CONFIGURED FOR LEFT SIDE IMPACT)

External Measurements - SID-IIs

Technician: J. Rios Date: 7/19/2024

Dummy Serial Number: 300





Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	780	Pass
B	Shoulder Pivot Height	437	453	446	Pass
C	H-point Height	79	89	83	Pass
D	H-point from seatback	141	151	146	Pass
E	Shoulder Pivot from Backline	97	107	98	Pass
F	Thigh Clearance	119	135	126	Pass
G	Head Breadth	140	148	144	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	182	Pass
J	Head Circumference	541	551	550	Pass
K	Buttock to Knee Length	514	540	530	Pass
L	Popliteal Height	343	369	356	Pass
M	Knee Pivot to floor height	392	409	400	Pass
N	Buttock Popliteal Length	416	442	435	Pass
O	Chest Depth w/o jacket	195	211	202	Pass
P	Foot Length	216	232	224	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	319	Pass
R	Arm Length	249	259	255	Pass
S	Knee Joint to seatback	477	493	485	Pass
V	Shoulder Width	341	357	350	Pass
W	Foot Width	78	94	85	Pass
Y	Chest Circumference w/jacket	851	881	878	Pass
Z	Waist Circumference	761	791	781	Pass

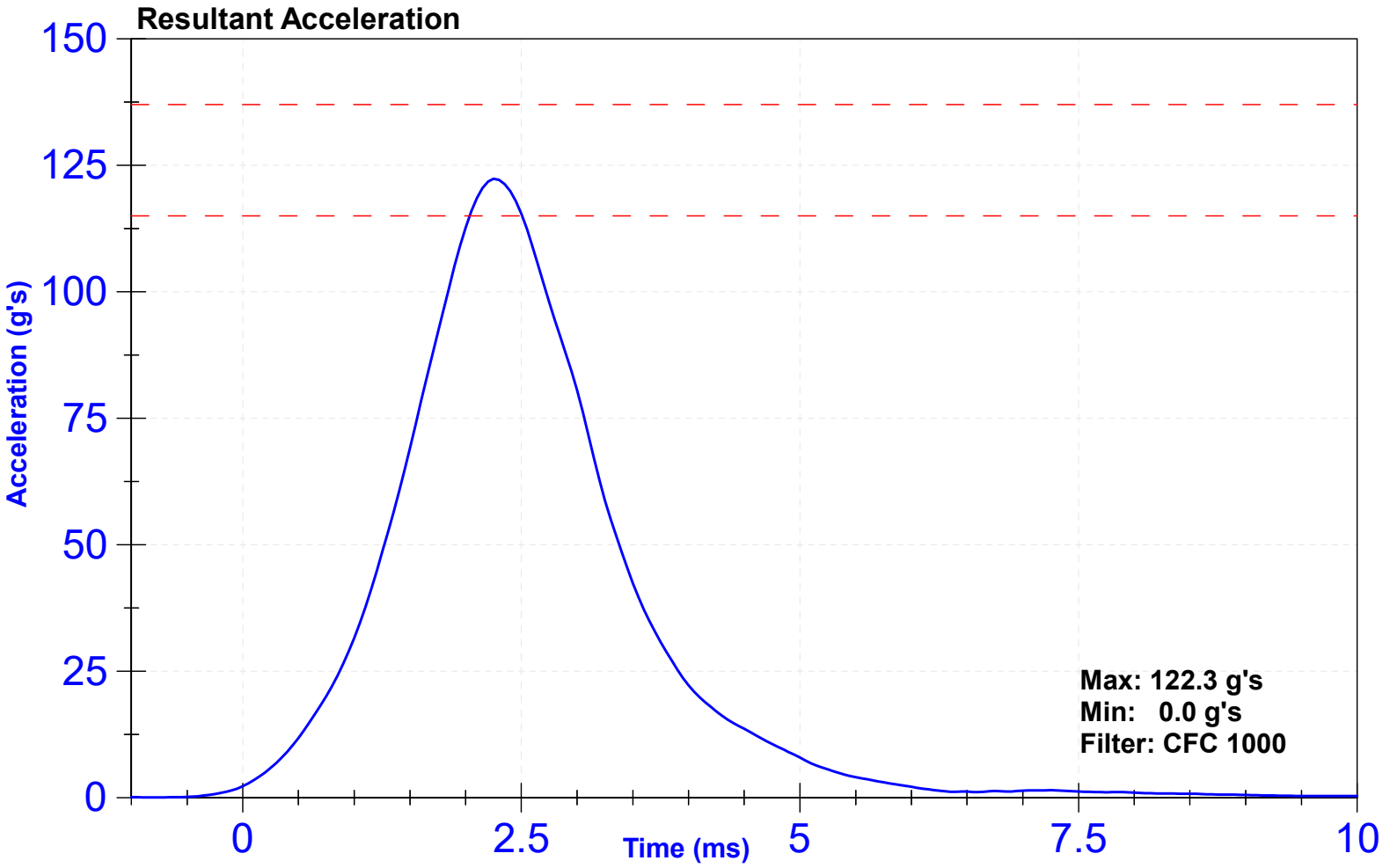
ATD Manufacturer	FTSS	Test Technician	J. Rios
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

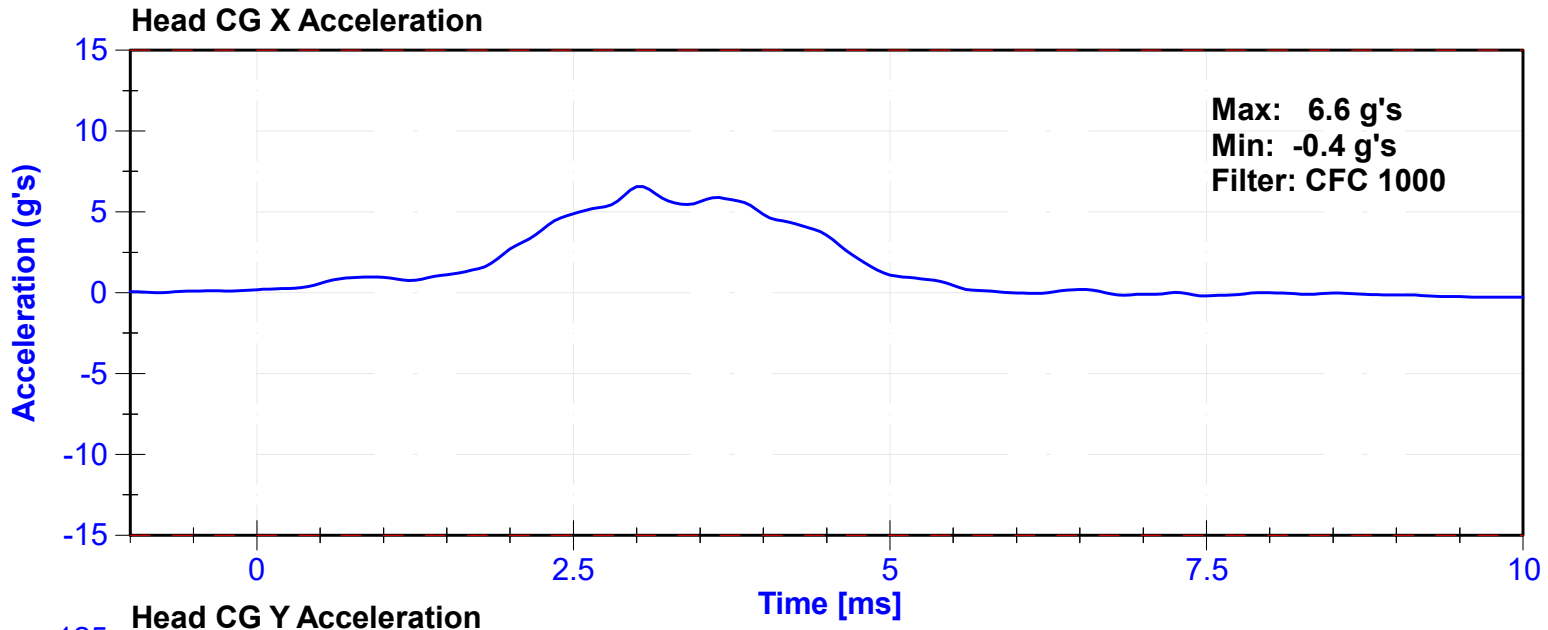
Results

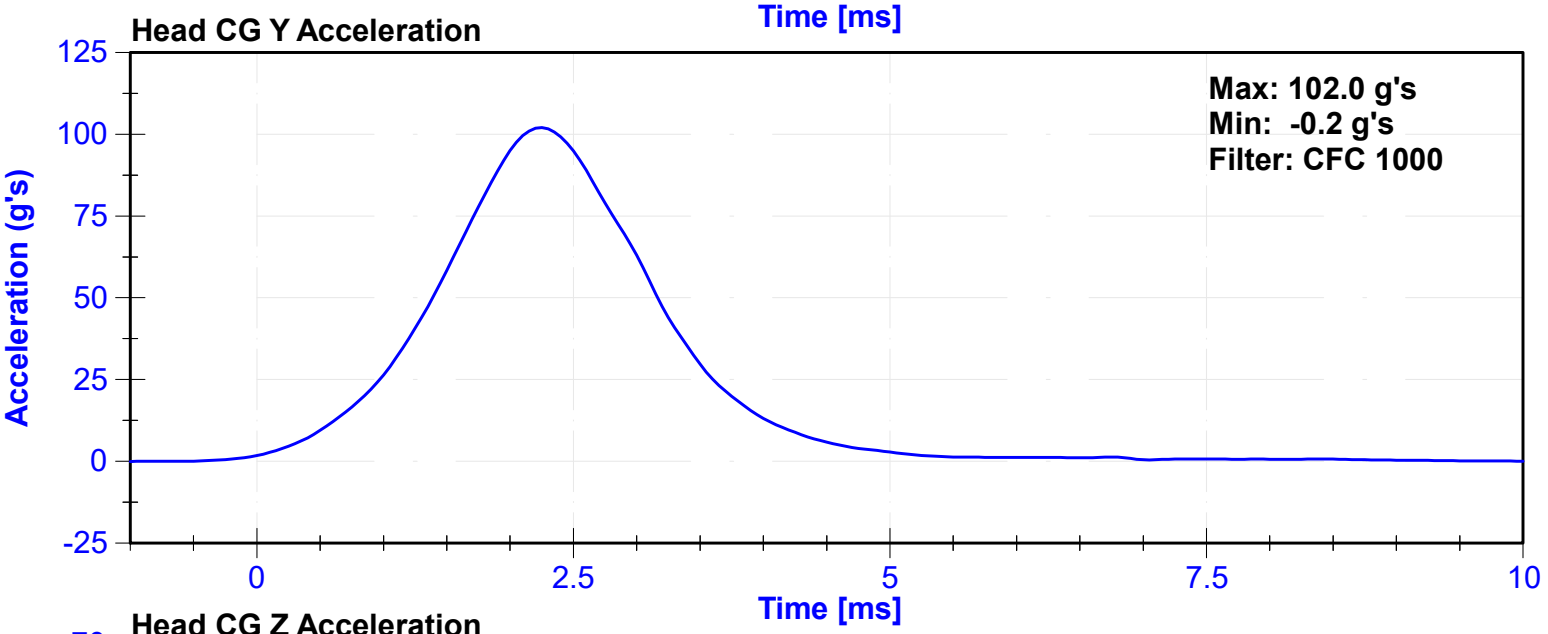
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.8	Pass
Humidity	10	70	%	51	Pass
Resultant Acceleration	115	137	g's	122.3	Pass
Oscillation	0	15	%	1.2	Pass
Fore-Aft Acceleration	-15	15	g's	6.6	Pass

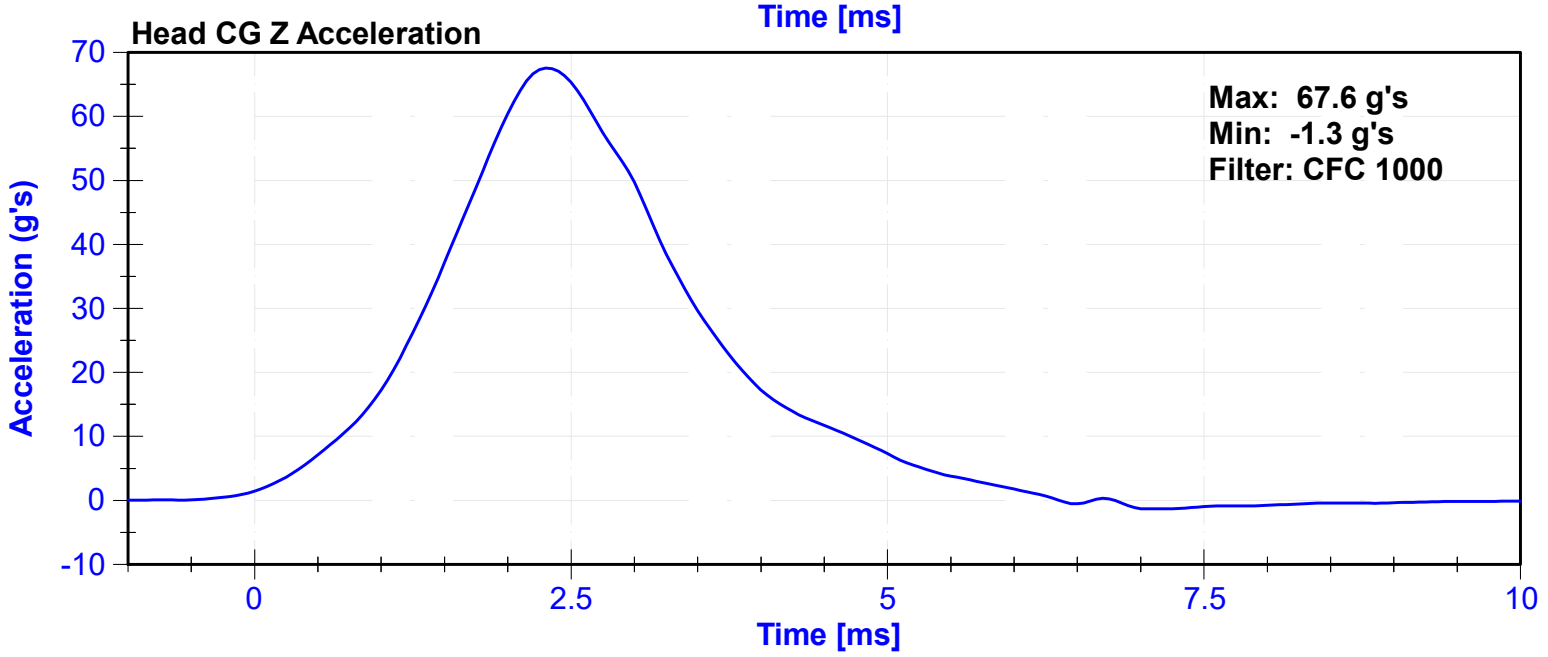
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibratio Date	Calibratio Due Date
X Accelerometer	Endevco	P59018	5/9/2024	11/5/2024
Y Accelerometer	Endevco	P79189	5/9/2024	11/5/2024
Z Accelerometer	Endevco	P79587	5/9/2024	11/5/2024




Head CG X Acceleration
Max: 6.6 g's
Min: -0.4 g's
Filter: CFC 1000
Acceleration (g's)
Time [ms]


Head CG Y Acceleration
Max: 102.0 g's
Min: -0.2 g's
Filter: CFC 1000
Acceleration (g's)
Time [ms]


Head CG Z Acceleration
Max: 67.6 g's
Min: -1.3 g's
Filter: CFC 1000
Acceleration (g's)
Time [ms]

ATD Manufacturer	FTSS	Test Technician	J. Rios
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

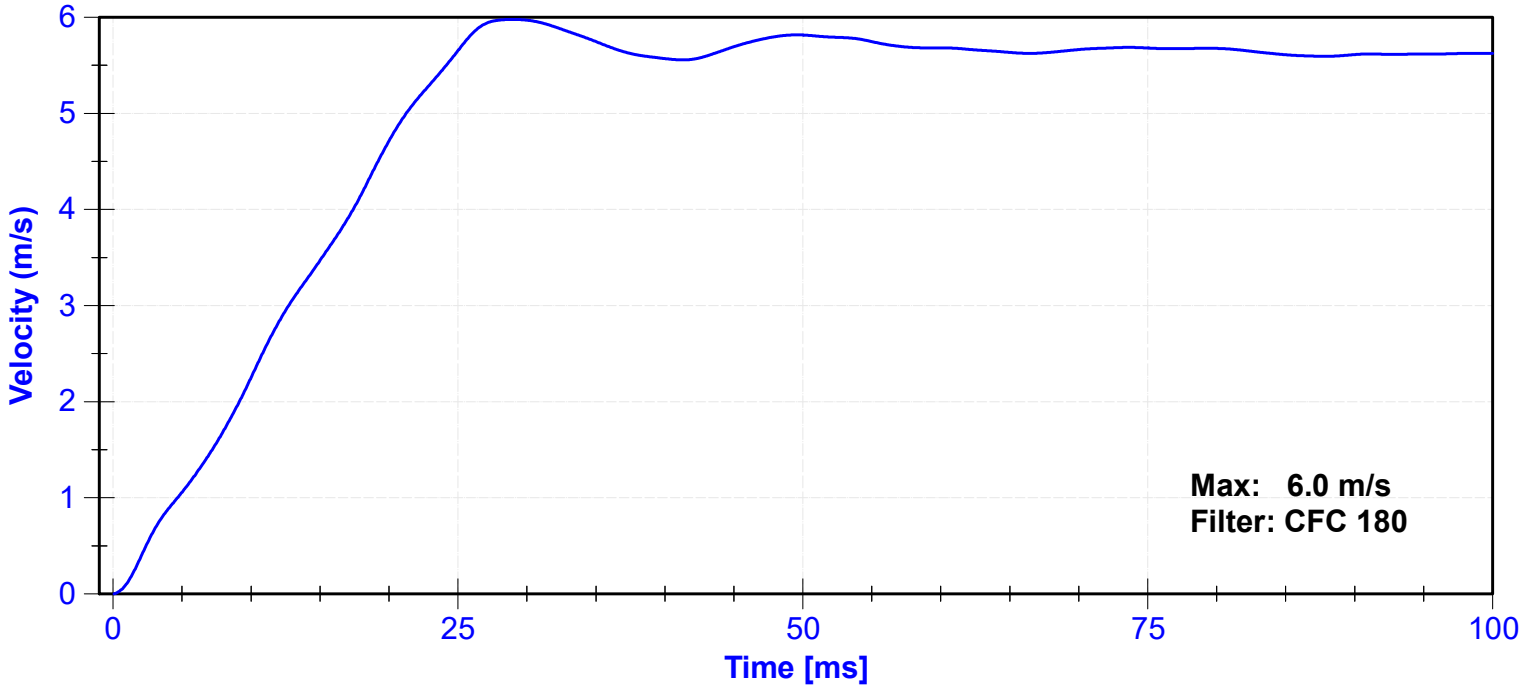
Results

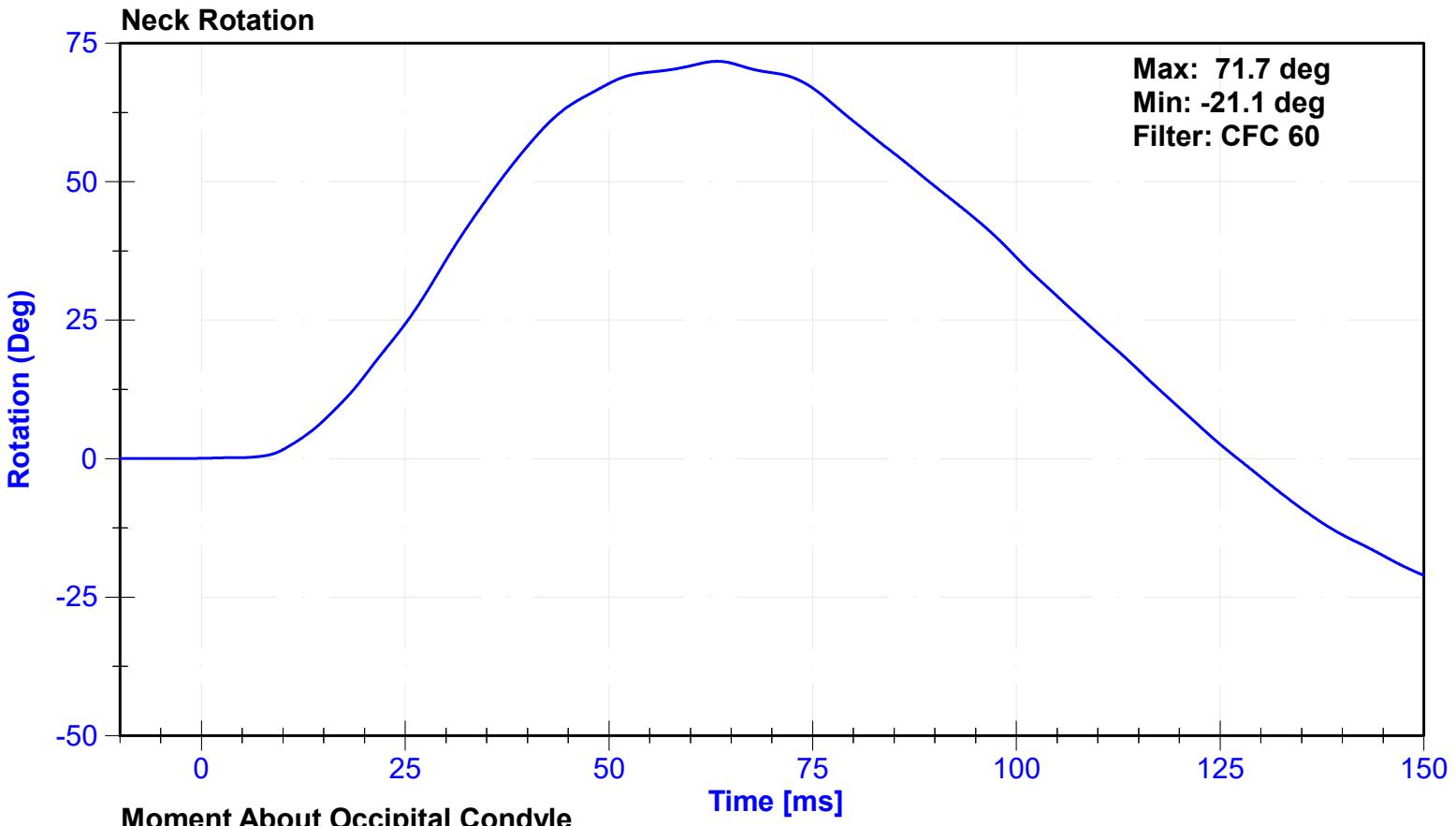
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.9	Pass
Humidity	10	70	%	59	Pass
Velocity	5.51	5.63	m/s	5.588	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.25	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.47	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.71	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.65	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.98	Pass
Neck Rotation	71	81	deg	71.7	Pass
Time at Maximum Rotation	50	70	ms	63.3	Pass
Moment about the OC	36	44	Nm	43.8	Pass
Moment Decay to 0 Nm	102	126	ms	111.5	Pass

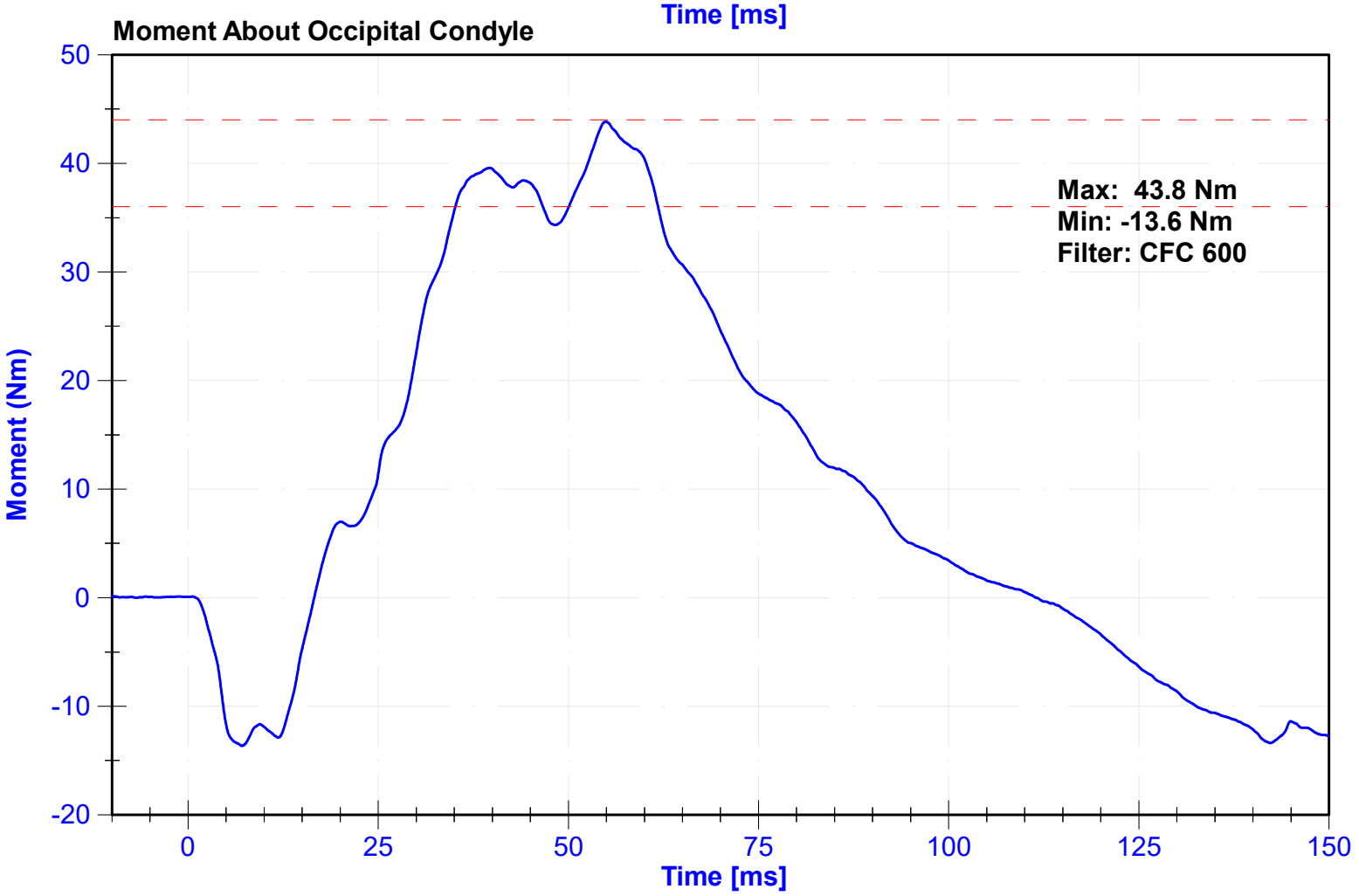
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	7231C-750	4/29/2024	10/26/2024
Pendulum Potentiometer	Servo	4961	10/2/2023	10/1/2024
Condyle Potentiometer	Servo	DS185	10/2/2023	10/1/2024
Upper Neck Load Cell	Denton	1716A_2187-FY	12/5/2023	12/4/2024

Pendulum Impulse




Neck Rotation
Max: 71.7 deg
Min: -21.1 deg
Filter: CFC 60
Rotation (Deg)
75
50
25
0
-25
-50
0
25
50
75
100
125
150
Time [ms]


Moment About Occipital Condyle
Max: 43.8 Nm
Min: -13.6 Nm
Filter: CFC 600
Moment (Nm)
50
40
30
20
10
0
-10
-20
0
25
50
75
100
125
150
Time [ms]

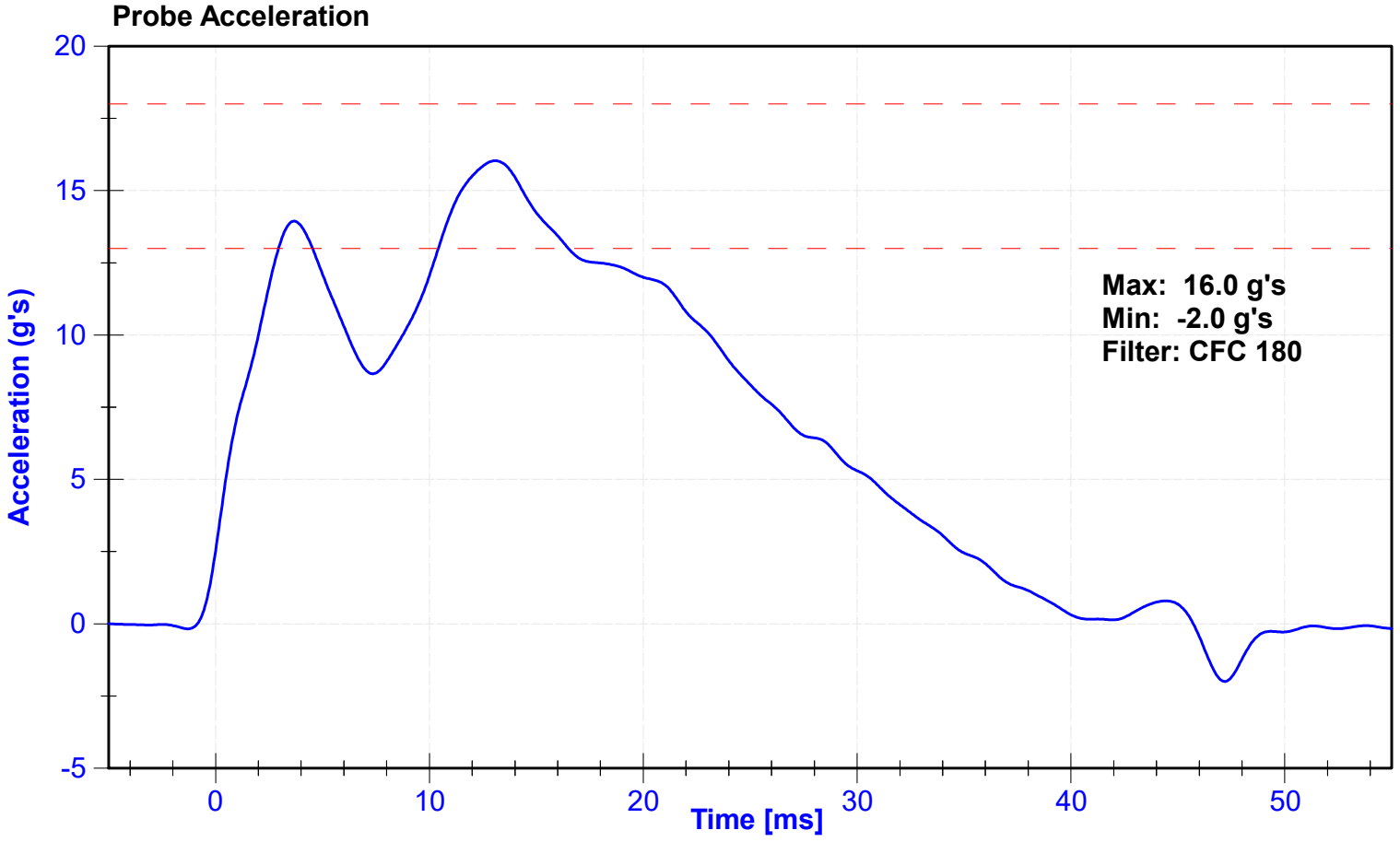
ATD Manufacturer	FTSS	Test Technician	J. Rios
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

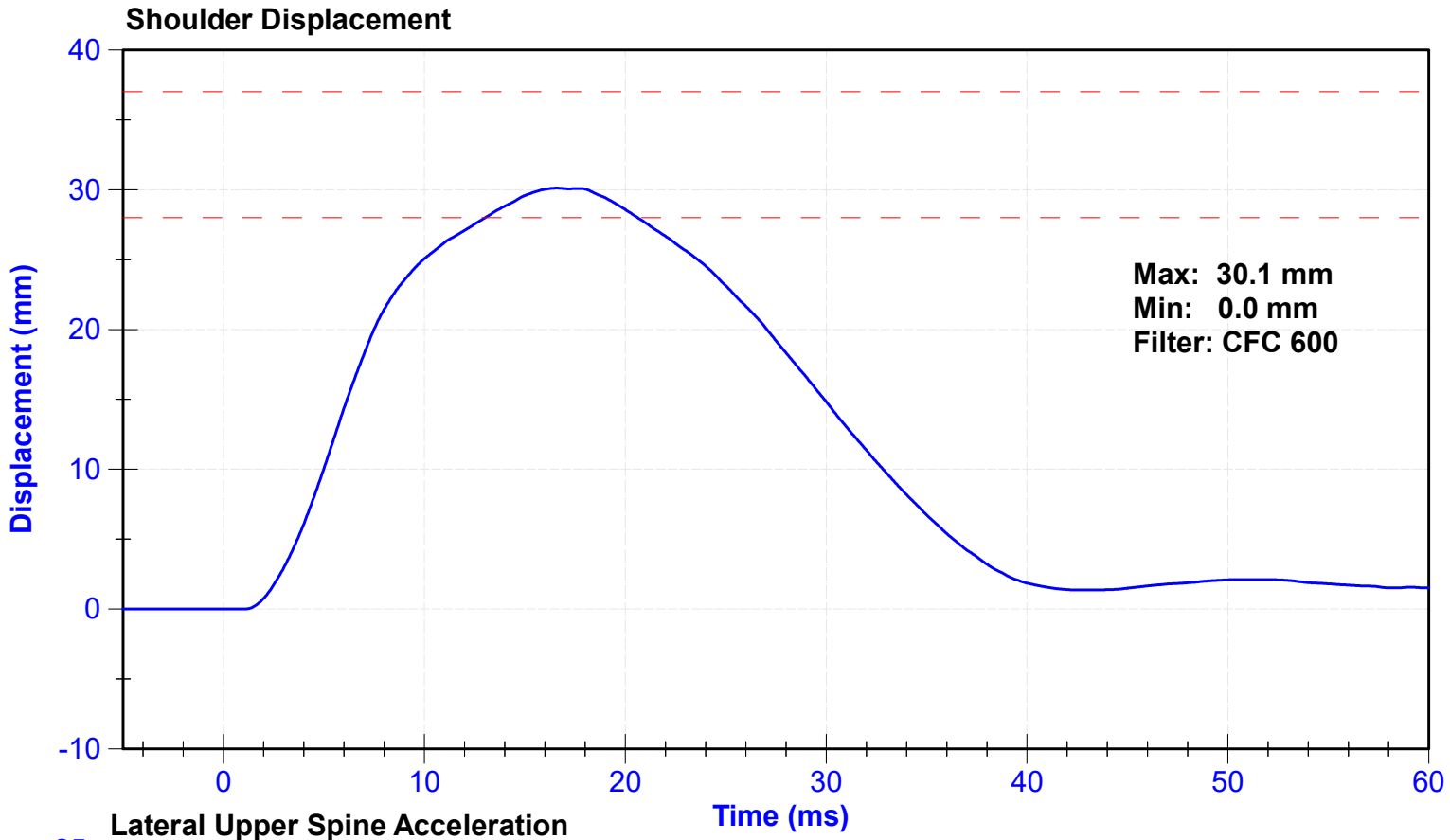
Results

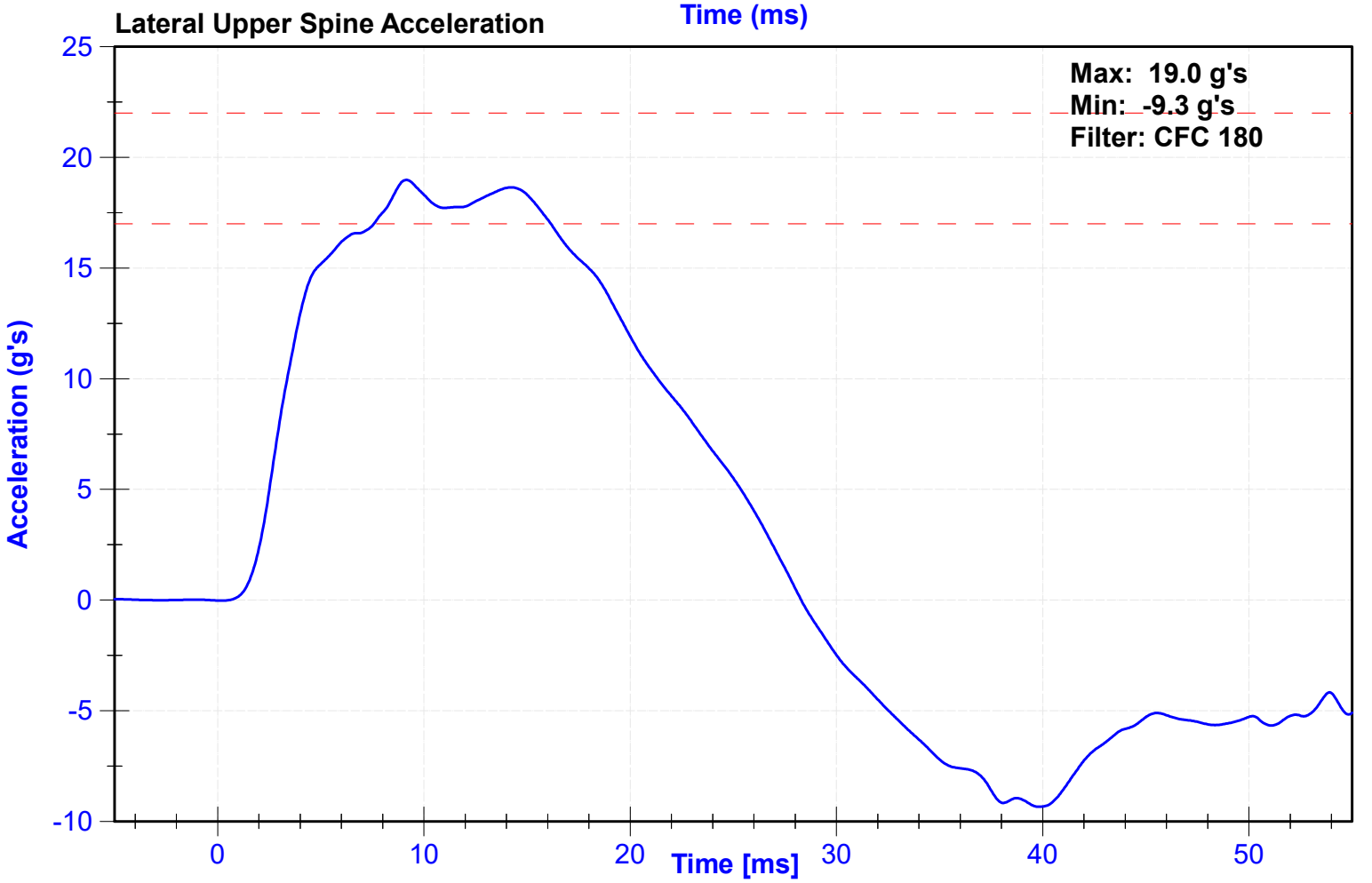
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.0	Pass
Humidity	10	70	%	57	Pass
Velocity	4.2	4.4	m/s	4.28	Pass
Probe Acceleration	13	18	g's	16.0	Pass
Shoulder Deflection	28	37	mm	30.1	Pass
Lateral Upper Spine Acceleration	17	22	g's	19.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18619	3/29/2024	9/25/2024
Shoulder Potentiometer	Servo	053GFE	5/9/2024	11/7/2024
Upper Spine Y Accelerometer	Endevco	T20880	5/9/2024	11/5/2024




Shoulder Displacement
Displacement (mm)
Time (ms)
Max: 30.1 mm
Min: 0.0 mm
Filter: CFC 600


Lateral Upper Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 19.0 g's
Min: -9.3 g's
Filter: CFC 180

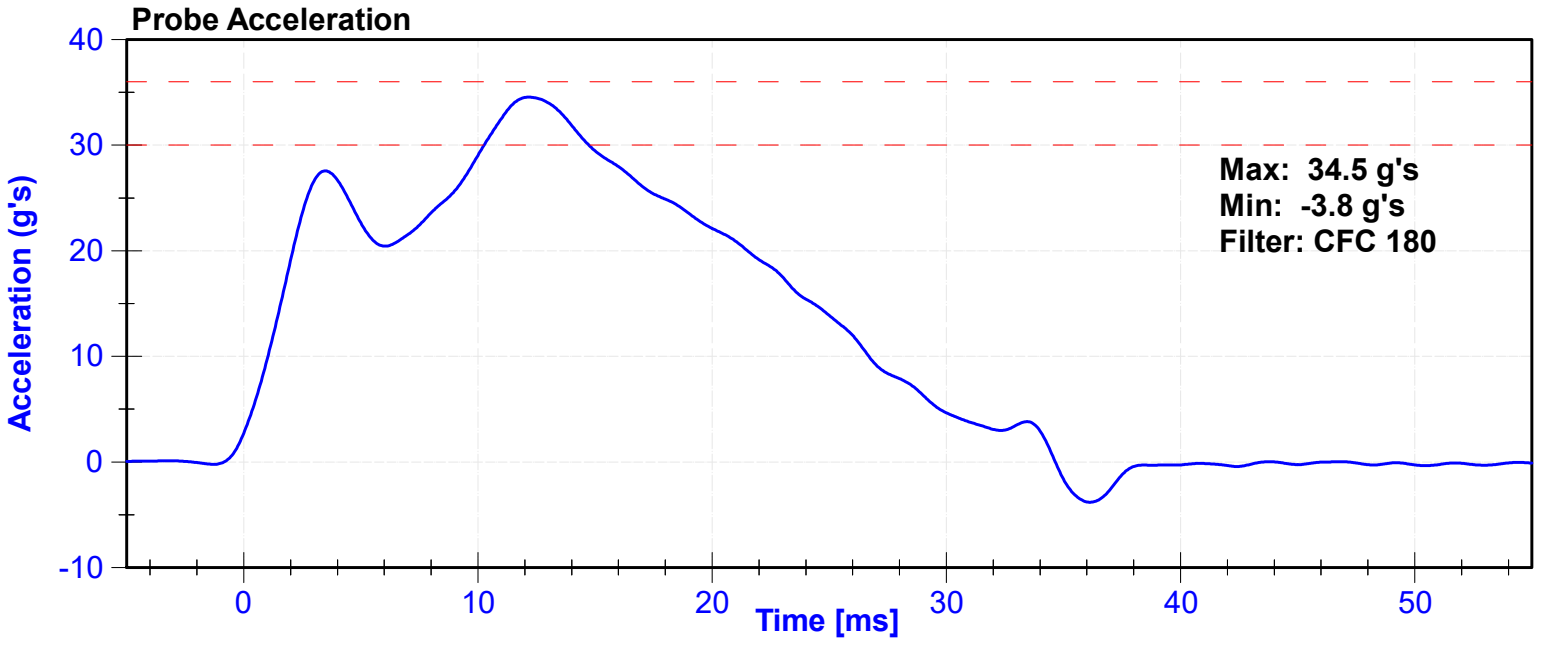
ATD Manufacturer	FTSS	Test Technician	J. Rios
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

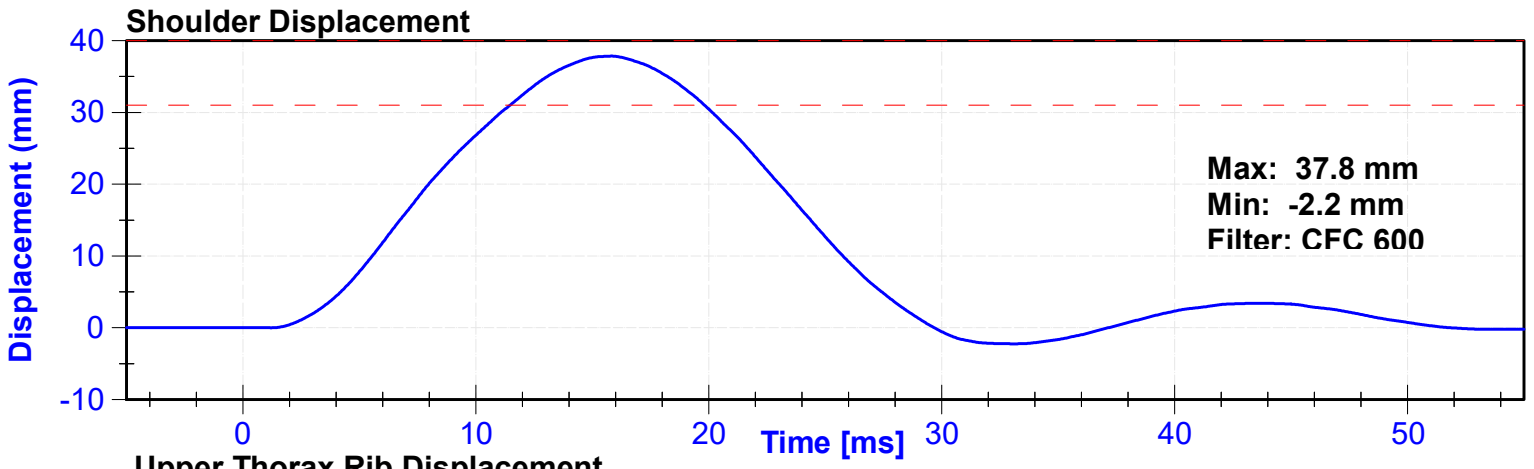
Results

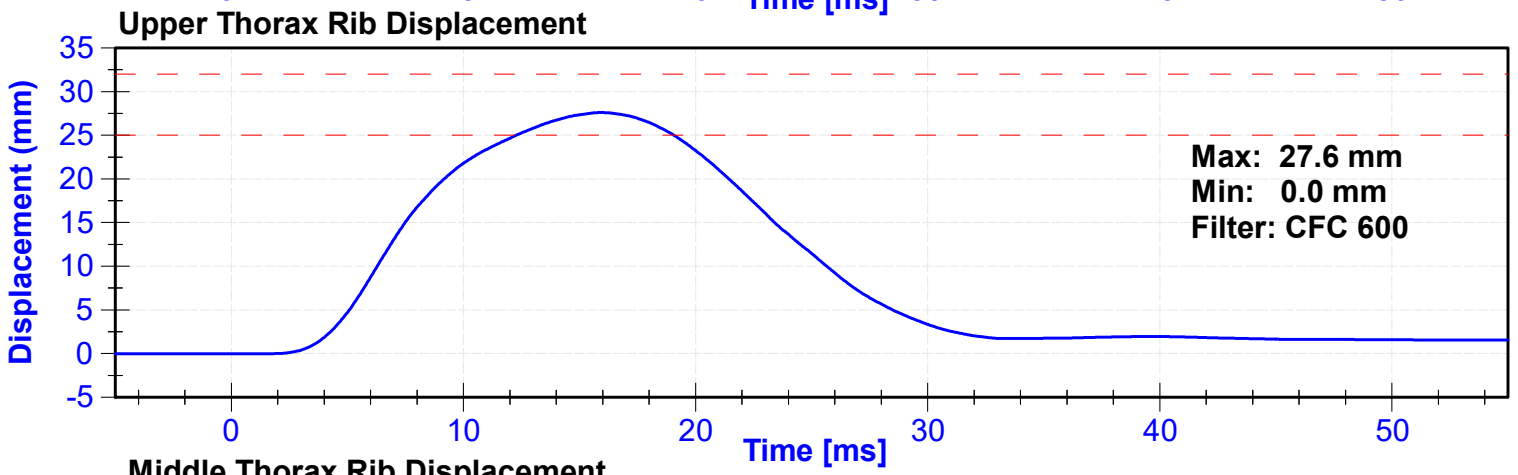
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.0	Pass
Humidity	10	70	%	57	Pass
Velocity	6.6	6.8	m/s	6.66	Pass
Probe Acceleration after 5 ms	30	36	g's	34.5	Pass
Lateral Upper Spine Acceleration	34	43	g's	35.5	Pass
Lateral Lower Spine Acceleration	29	37	g's	35.4	Pass
Shoulder Deflection	31	40	mm	37.8	Pass
Upper Thorax Rib Deflection	25	32	mm	27.6	Pass
Mid Thorax Rib Deflection	30	36	mm	30.3	Pass
Lower Thorax Rib Deflection	32	38	mm	32.2	Pass

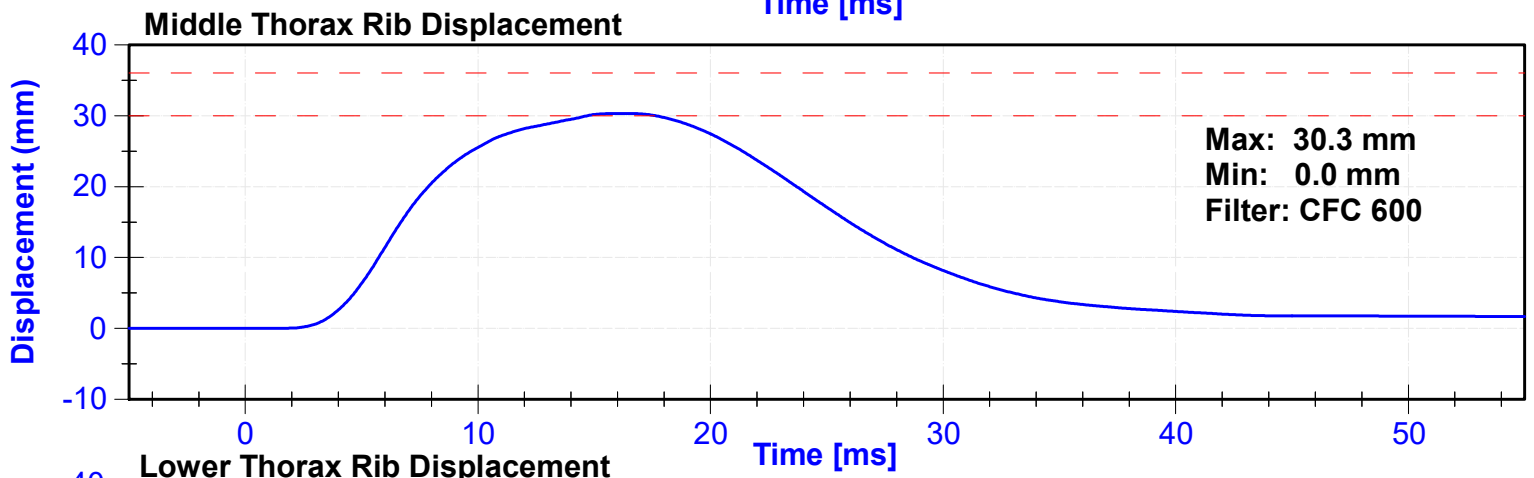
Transducer Calibrations

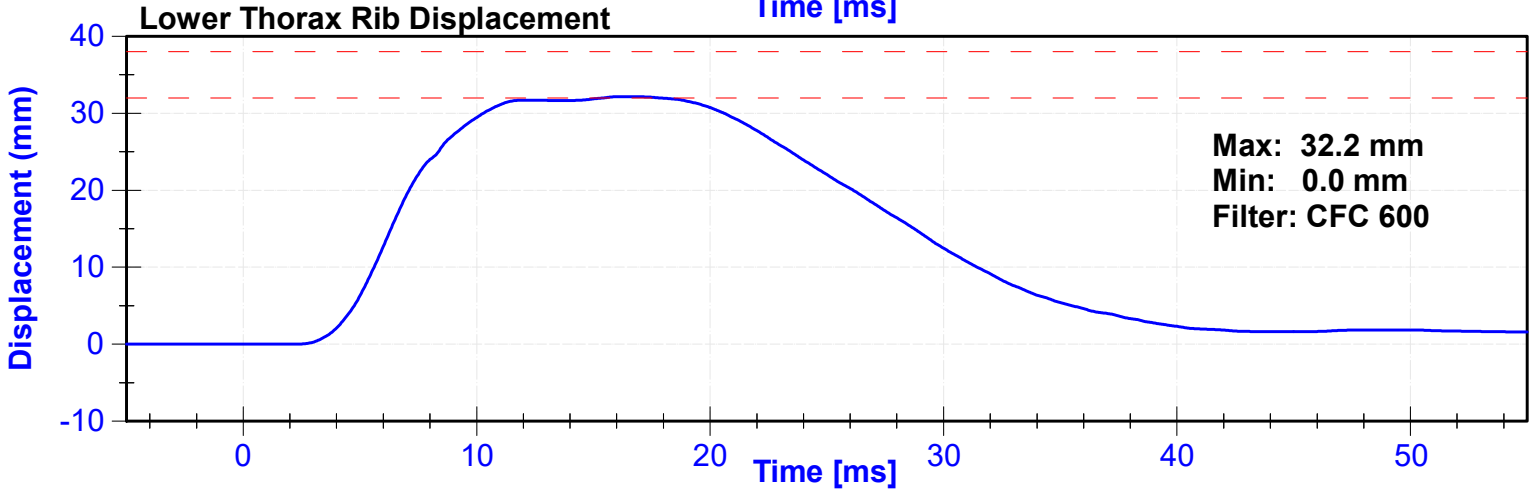
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18619	3/29/2024	9/25/2024
Upper Spine T1 Y Accelerometer	Endevco	T20880	5/9/2024	11/5/2024
Upper Spine T12 Y Accelerometer	Endevco	P52071	5/9/2024	11/5/2024
Shoulder Potentiometer	Servo	053GFE	5/9/2024	11/7/2024
Upper Thorax Rib Potentiometer	Servo	2316GFE	5/9/2024	11/7/2024
Middle Thorax Rib Potentiometer	Servo	085GFE	5/9/2024	11/7/2024
Lower Thorax Rib Potentiometer	Servo	1156GFE	5/9/2024	11/7/2024

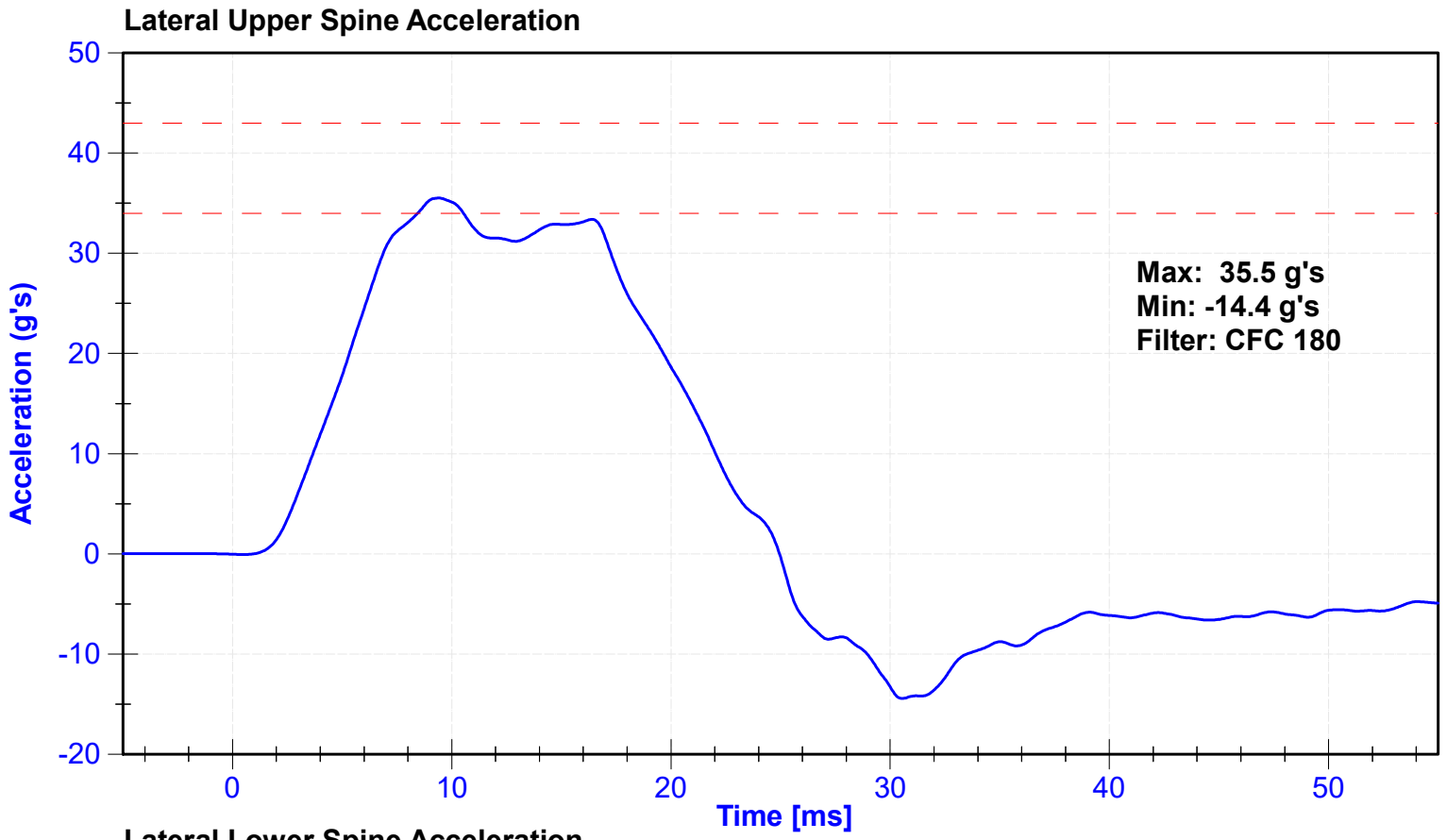


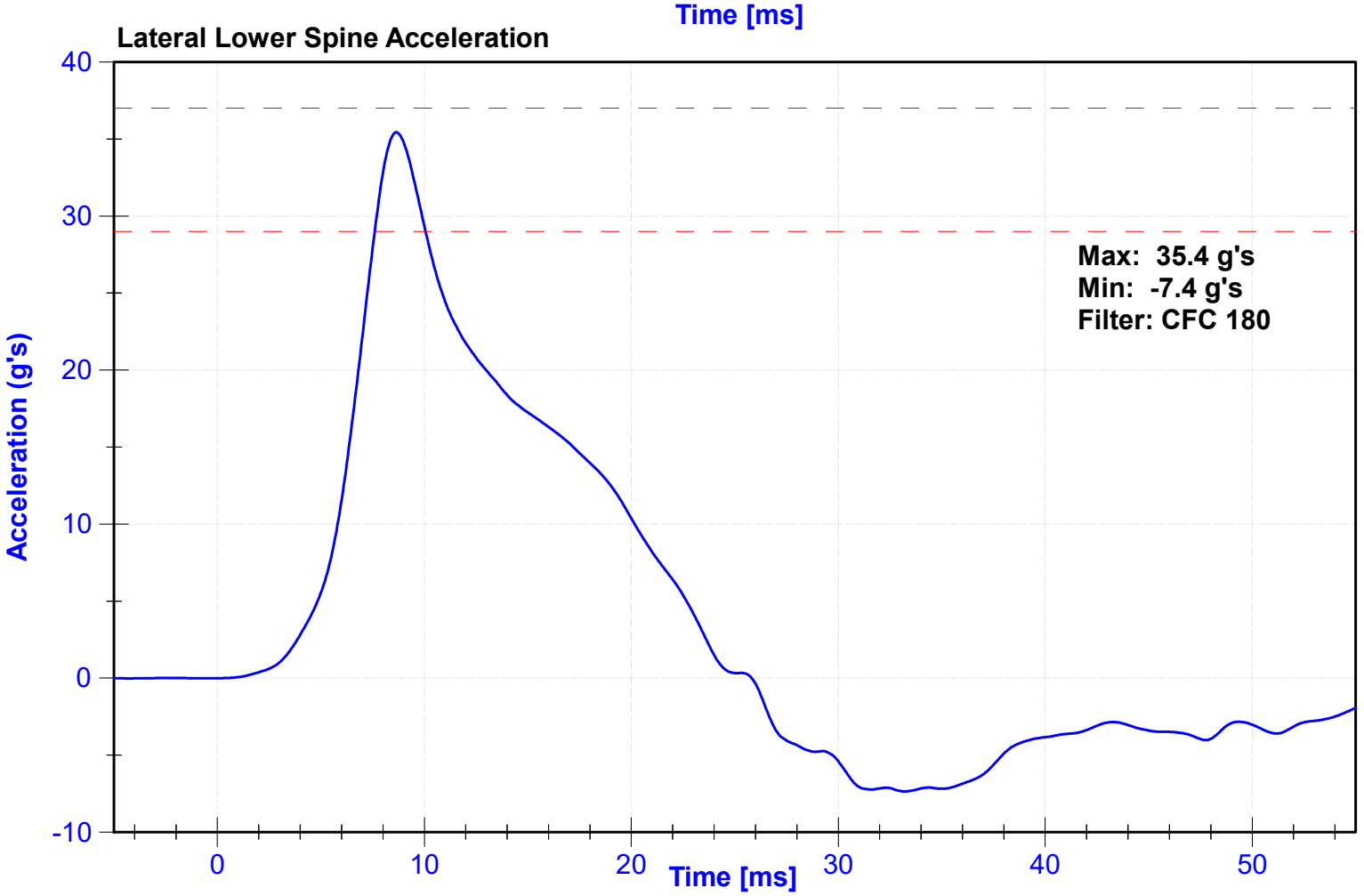

Shoulder Displacement
Displacement (mm)
Time [ms]
Max: 37.8 mm
Min: -2.2 mm
Filter: CFC 600


Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 27.6 mm
Min: 0.0 mm
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 30.3 mm
Min: 0.0 mm
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 32.2 mm
Min: 0.0 mm
Filter: CFC 600


Lateral Upper Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 35.5 g's
Min: -14.4 g's
Filter: CFC 180


Lateral Lower Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 35.4 g's
Min: -7.4 g's
Filter: CFC 180

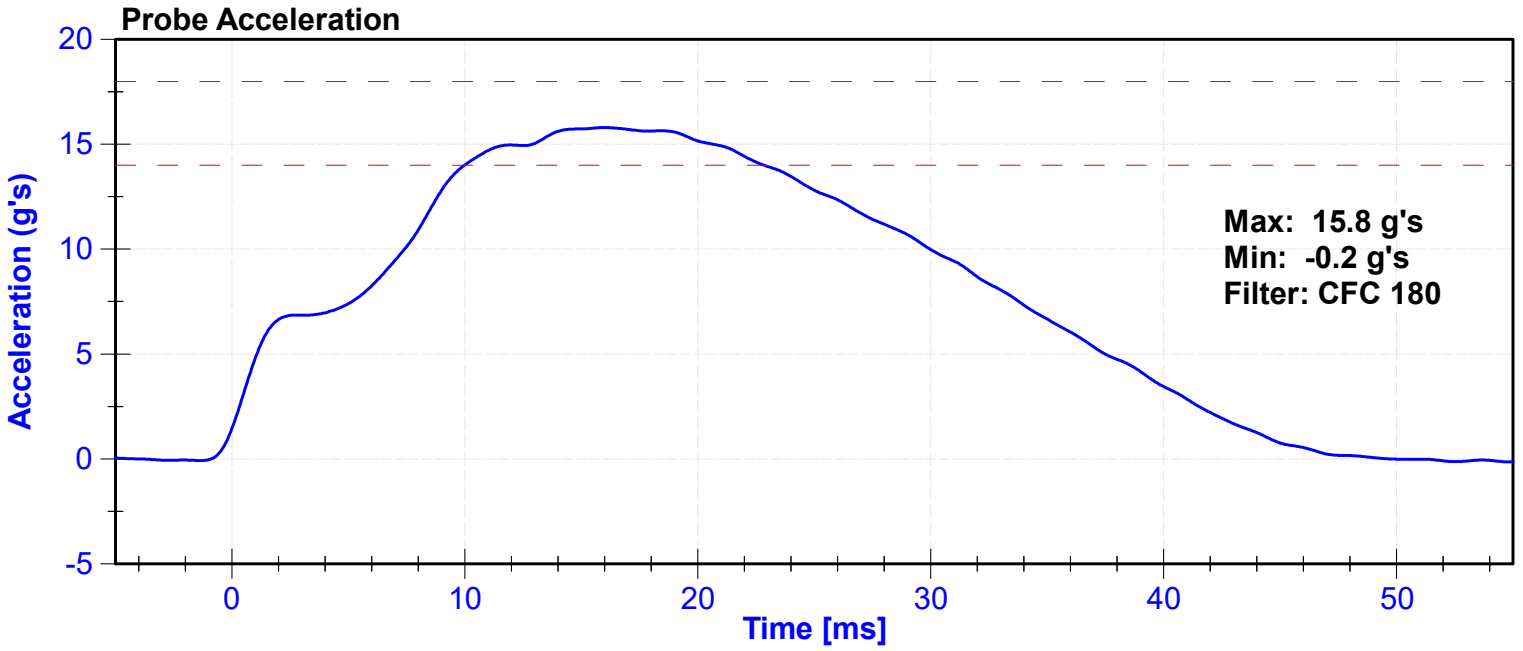
ATD Manufacturer	FTSS	Test Technician	J. Rios
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

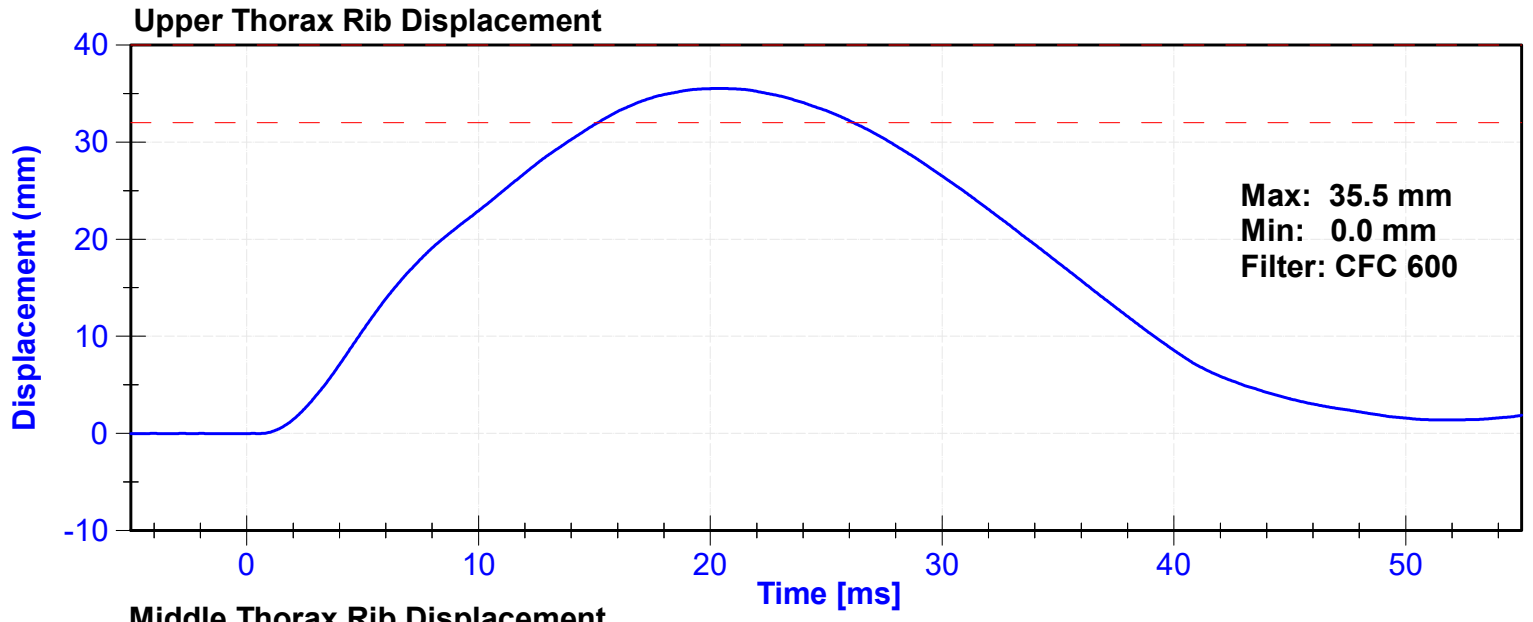
Results

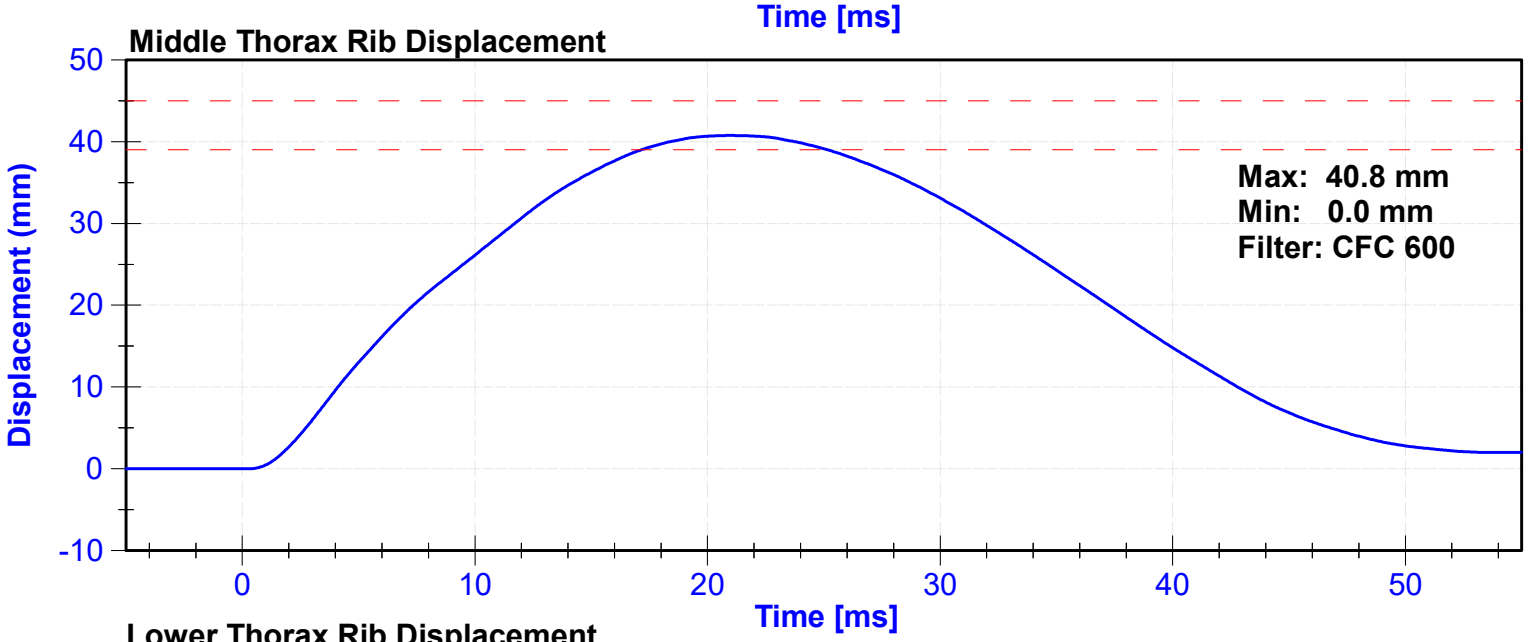
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.0	Pass
Humidity	10	70	%	57	Pass
Velocity	4.2	4.4	m/s	4.29	Pass
Probe Acceleration	14	18	g's	15.8	Pass
Lateral Upper Spine Acceleration	13	17	g's	14.0	Pass
Lateral Lower Spine Acceleration	7	11	g's	8.5	Pass
Upper Thorax Rib Deflection	32	40	mm	35.5	Pass
Middle Thorax Rib Deflection	39	45	mm	40.8	Pass
Lower Thorax Rib Deflection	35	43	mm	36.6	Pass

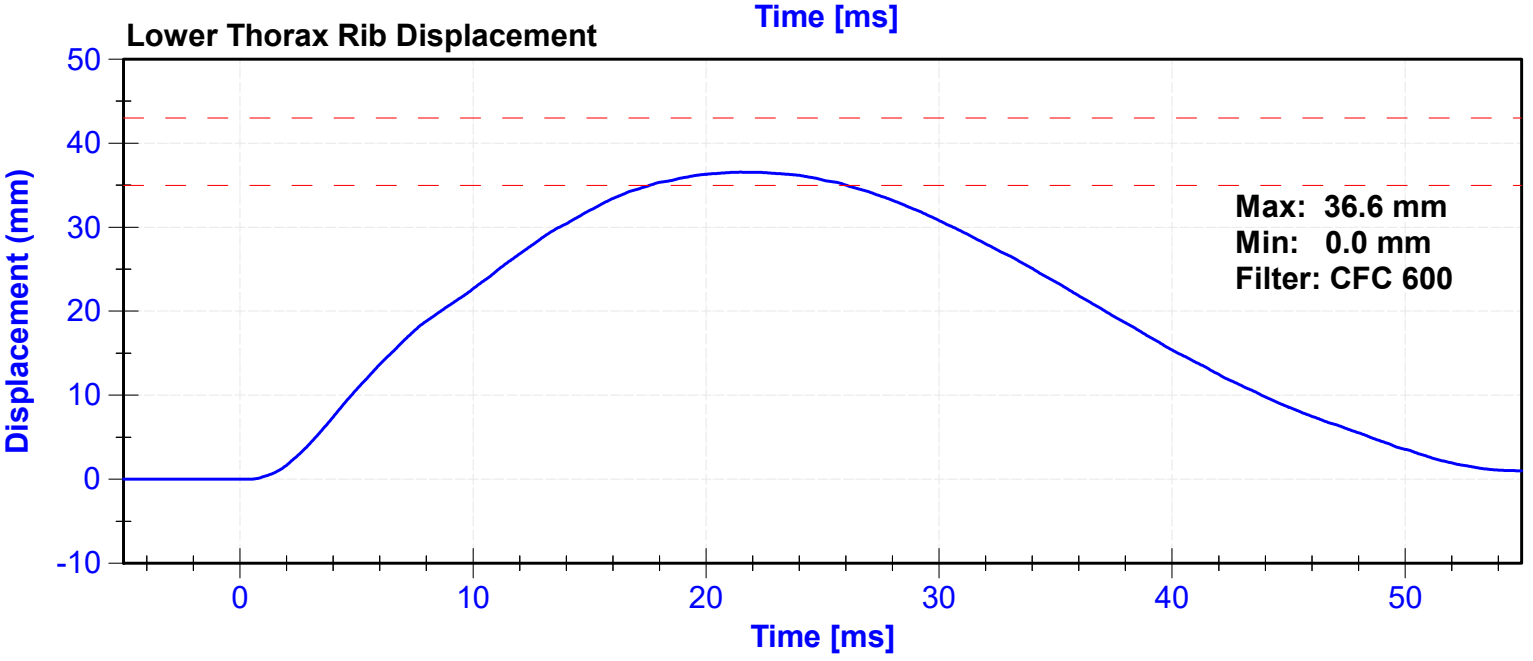
Transducer Calibrations

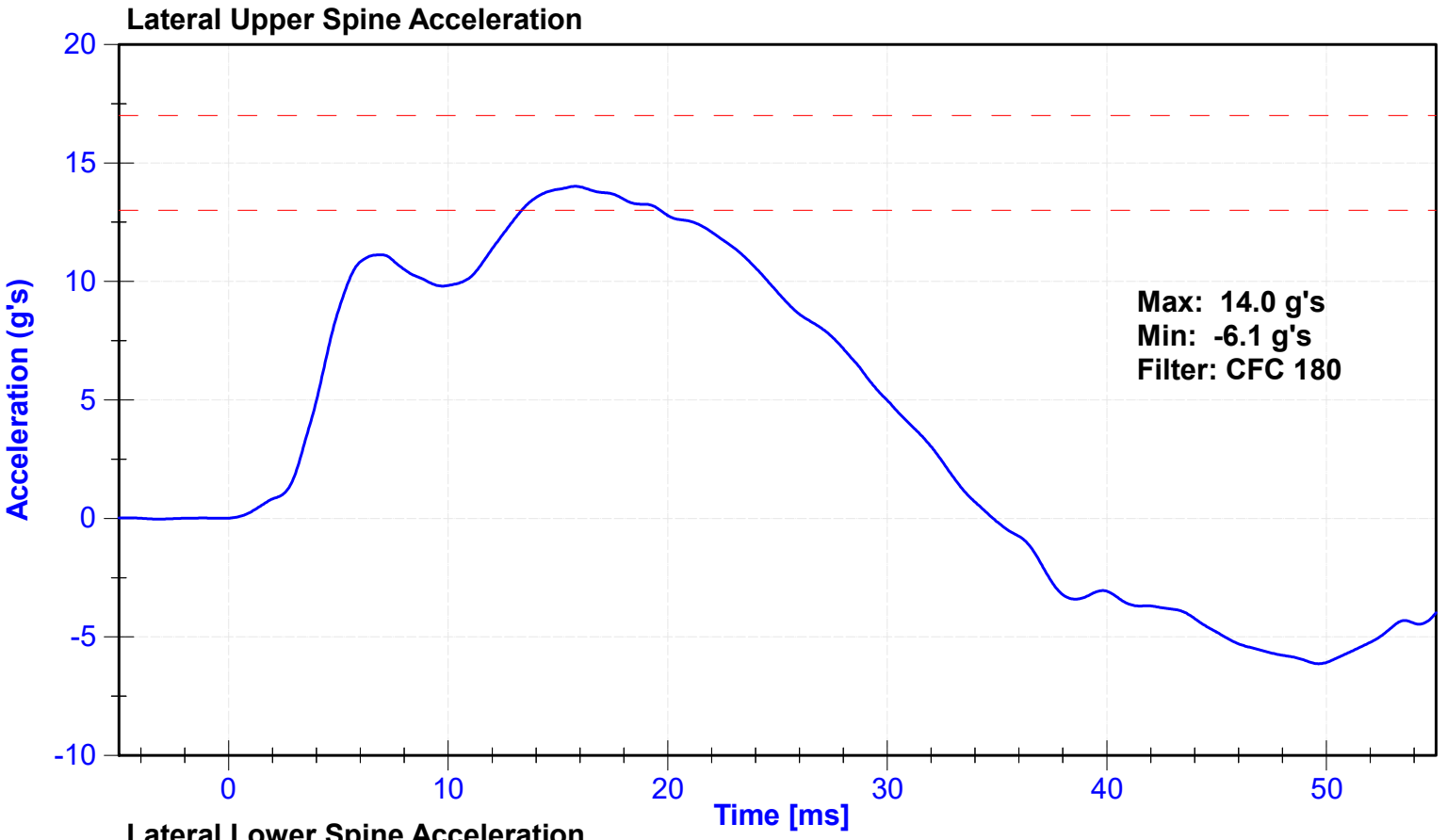
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18619	3/29/2024	9/25/2024
Upper Spine Y Accelerometer	Endevco	T20880	5/9/2024	11/5/2024
Lower Spine Y Accelerometer	Endevco	P52071	5/9/2024	11/5/2024
Upper Thorax Rib Potentiometer	Servo	2316GFE	5/9/2024	11/7/2024
Middle Thorax Rib Potentiometer	Servo	085GFE	5/9/2024	11/7/2024
Lower Thorax Rib Potentiometer	Servo	1156GFE	5/9/2024	11/7/2024

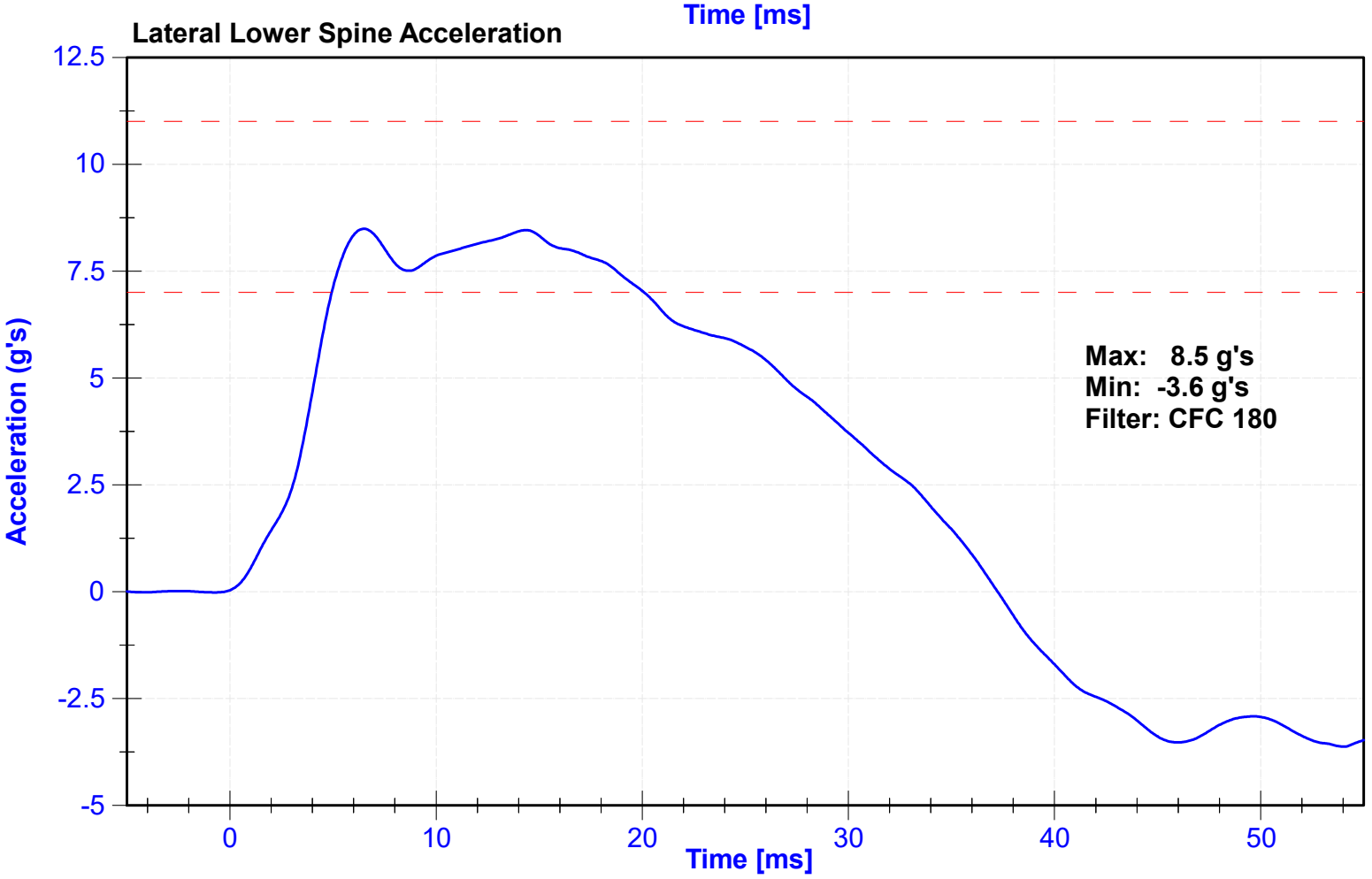



Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 35.5 mm
Min: 0.0 mm
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 40.8 mm
Min: 0.0 mm
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 36.6 mm
Min: 0.0 mm
Filter: CFC 600


Lateral Upper Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 14.0 g's
Min: -6.1 g's
Filter: CFC 180


Lateral Lower Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 8.5 g's
Min: -3.6 g's
Filter: CFC 180

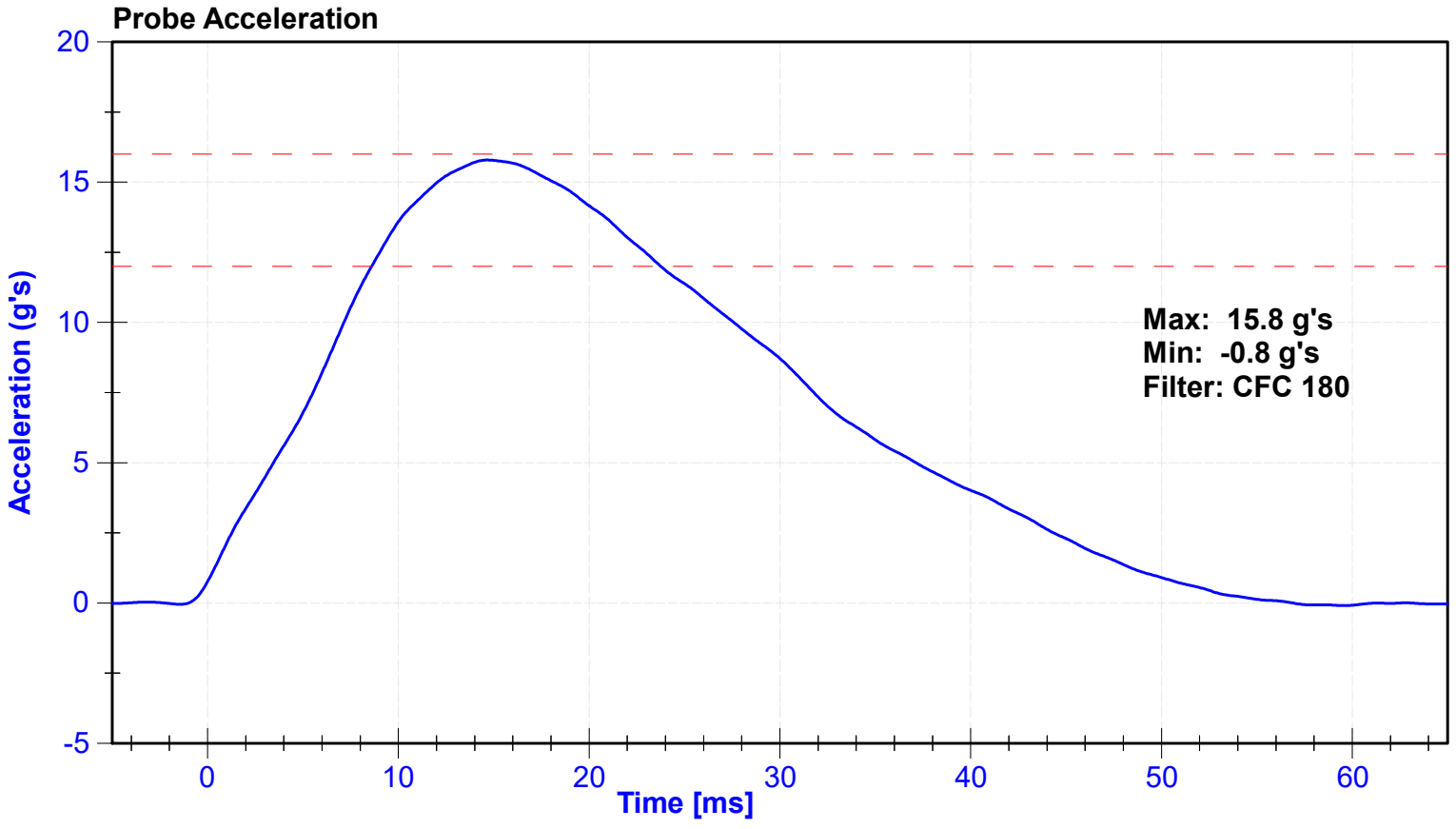
ATD Manufacturer	FTSS	Test Technician	J. Rios
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

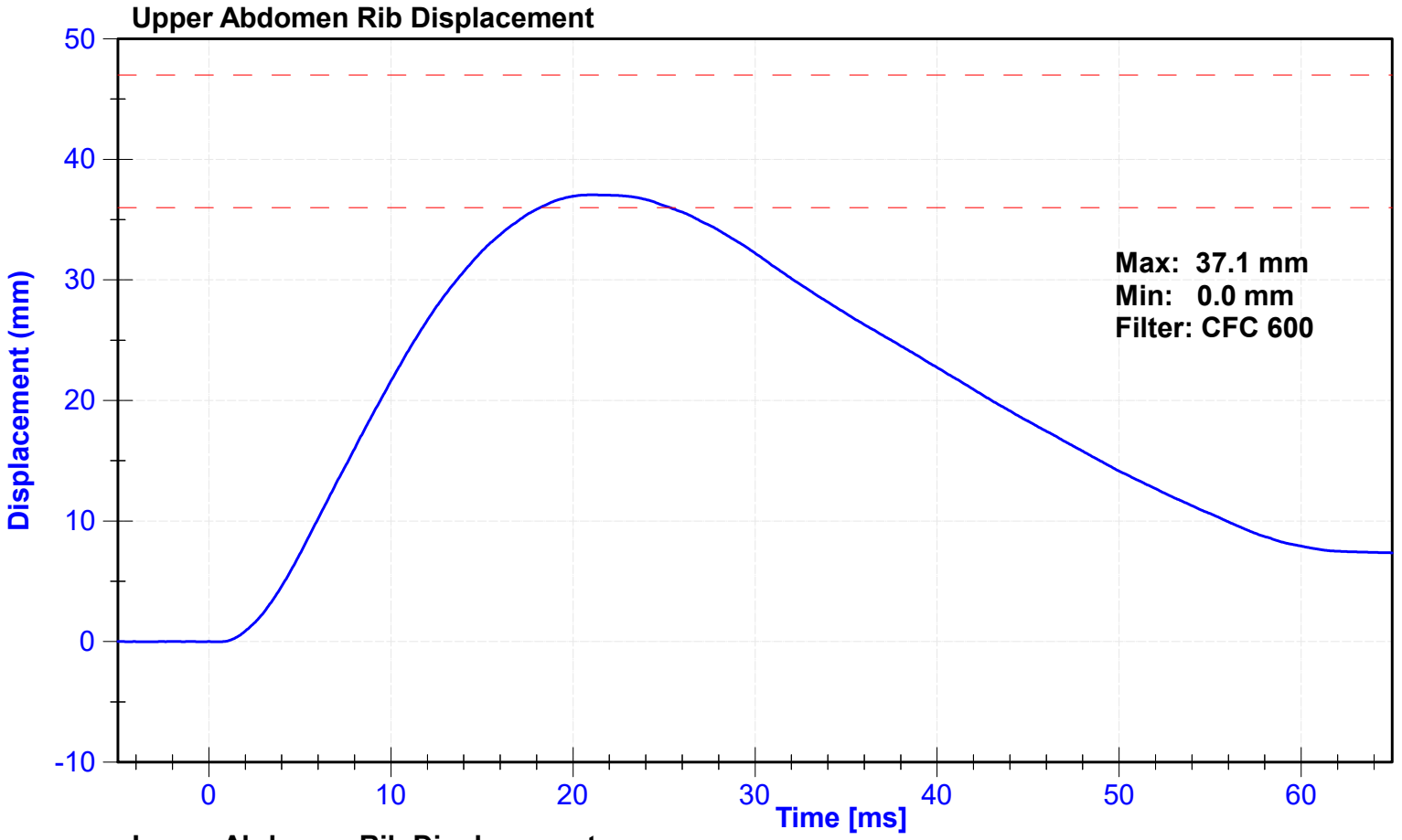
Results

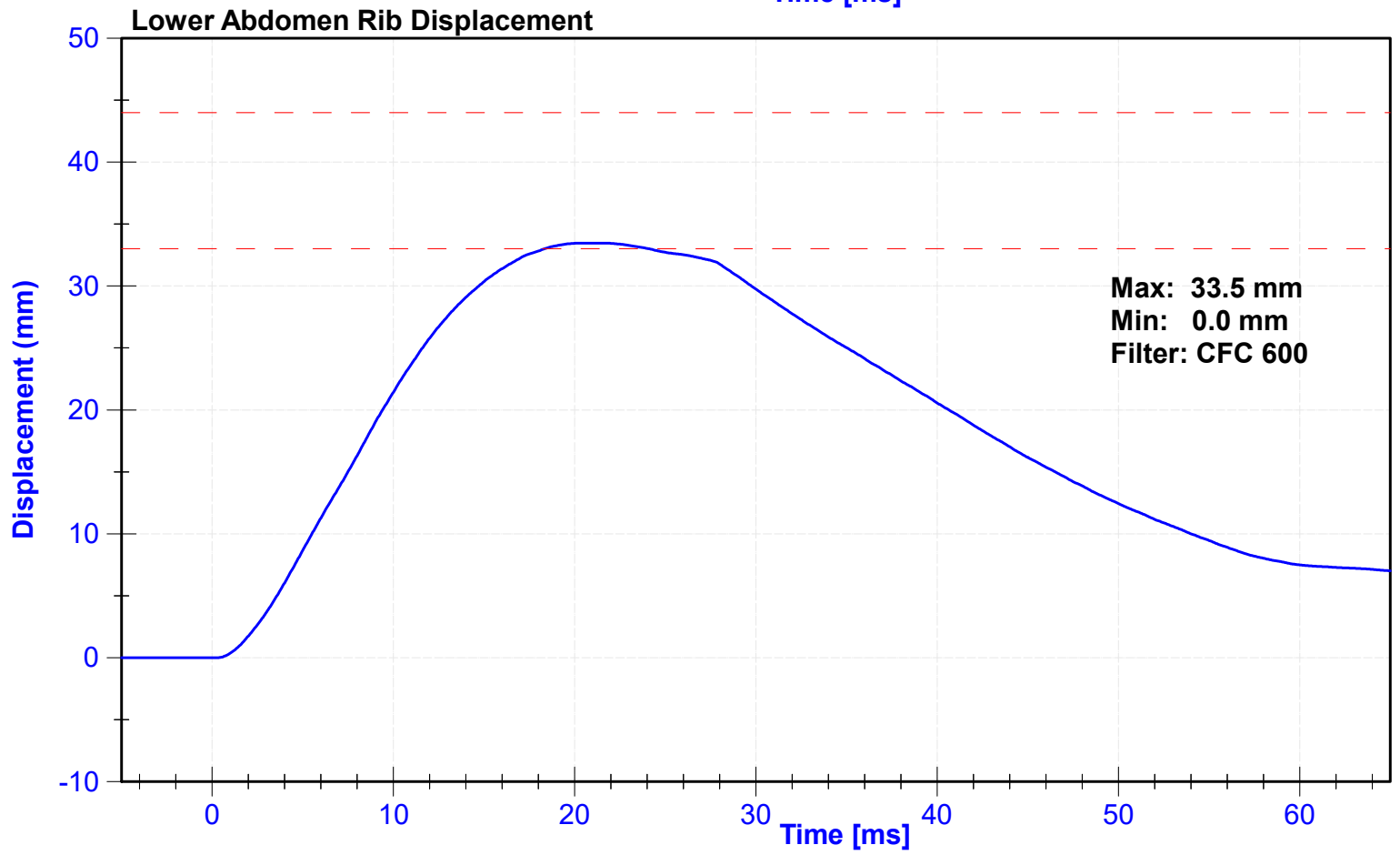
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.0	Pass
Humidity	10	70	%	57	Pass
Velocity	4.2	4.4	m/s	4.28	Pass
Probe Acceleration	12	16	g's	15.8	Pass
Lateral Lower Spine Acceleration	9	14	g's	11.8	Pass
Upper Abdomen Rib Deflection	36	47	mm	37.1	Pass
Lower Abdomen Rib Deflection	33	44	mm	33.5	Pass

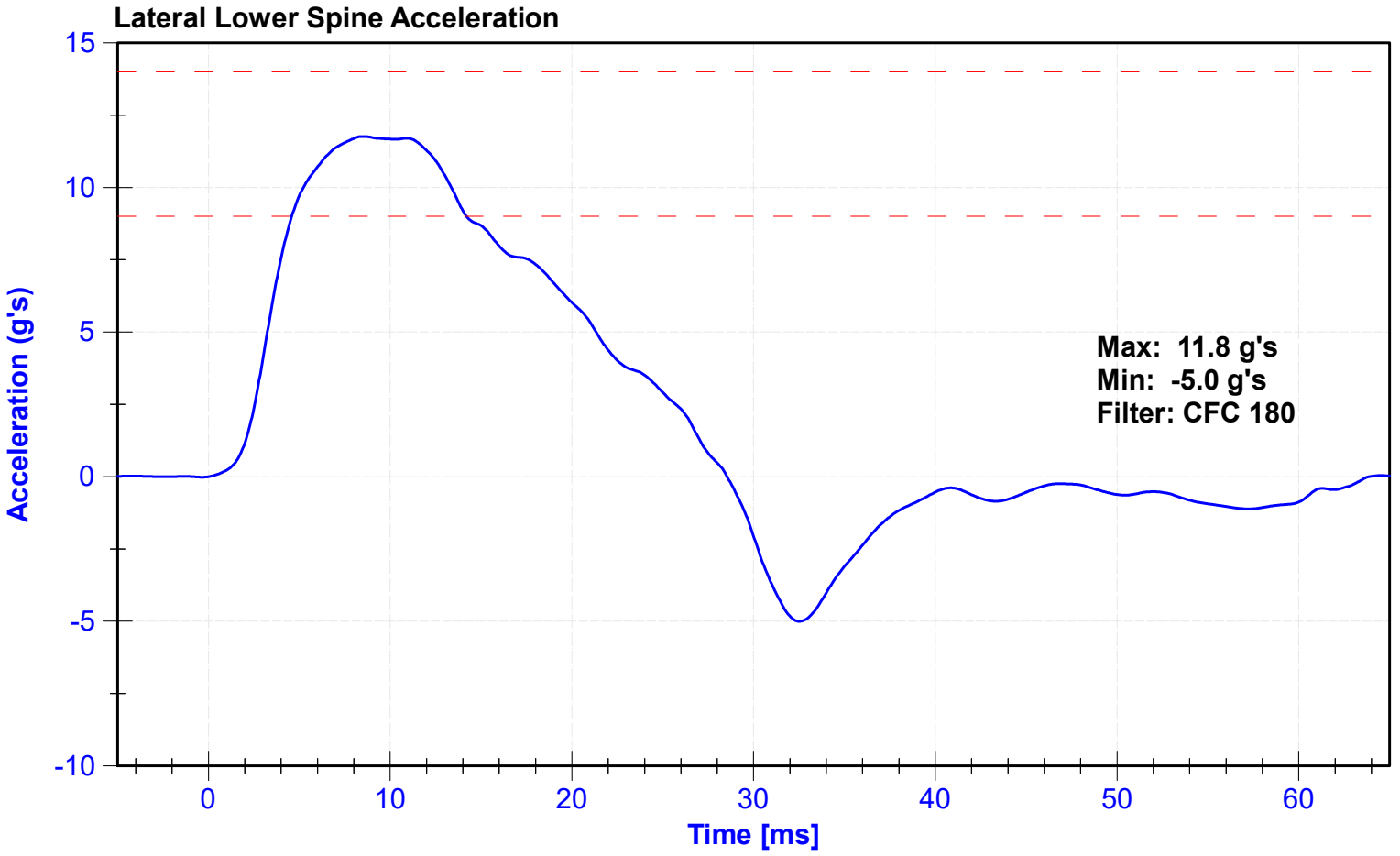
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	18619	3/29/2024	9/25/2024
Lower Spine Y Accelerometer	Endevco	P52071	5/9/2024	11/5/2024
Upper Abdomen Rib Potentiometer	Servo	074GFE	5/9/2024	11/5/2024
Lower Abdomen Rib Potentiometer	Servo	075GFE	5/9/2024	11/5/2024




Upper Abdomen Rib Displacement
Displacement (mm)
50
40
30
20
10
0
-10
0
10
20
30
40
50
60
Time [ms]
Max: 37.1 mm
Min: 0.0 mm
Filter: CFC 600


Lower Abdomen Rib Displacement
Displacement (mm)
50
40
30
20
10
0
-10
0
10
20
30
40
50
60
Time [ms]
Max: 33.5 mm
Min: 0.0 mm
Filter: CFC 600


Lateral Lower Spine Acceleration
Acceleration (g's)
15
10
5
0
-5
-10
0
10
20
30
40
50
60
Time [ms]
Max: 11.8 g's
Min: -5.0 g's
Filter: CFC 180

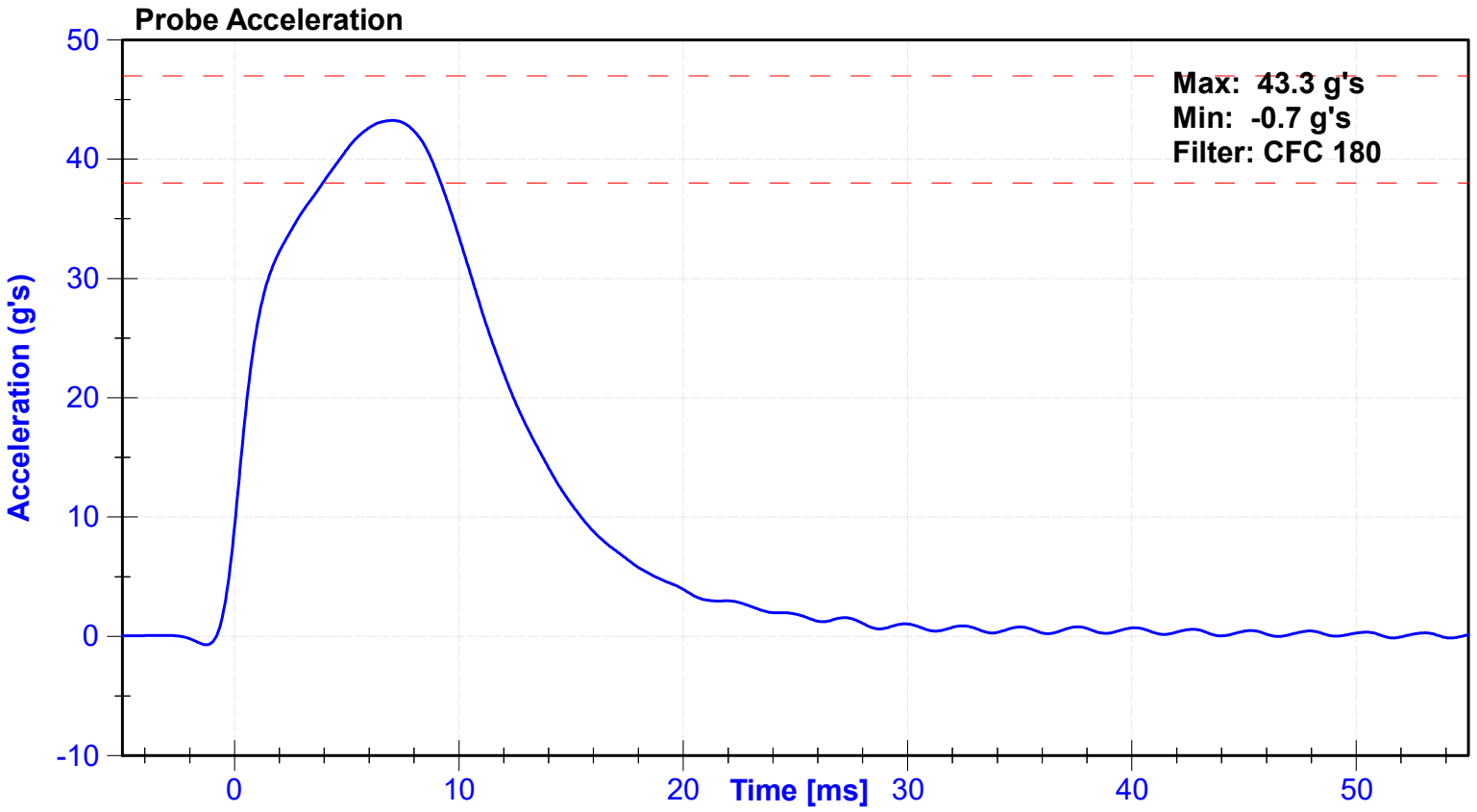
ATD Manufacturer	FTSS	Test Technician	J. Rios
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

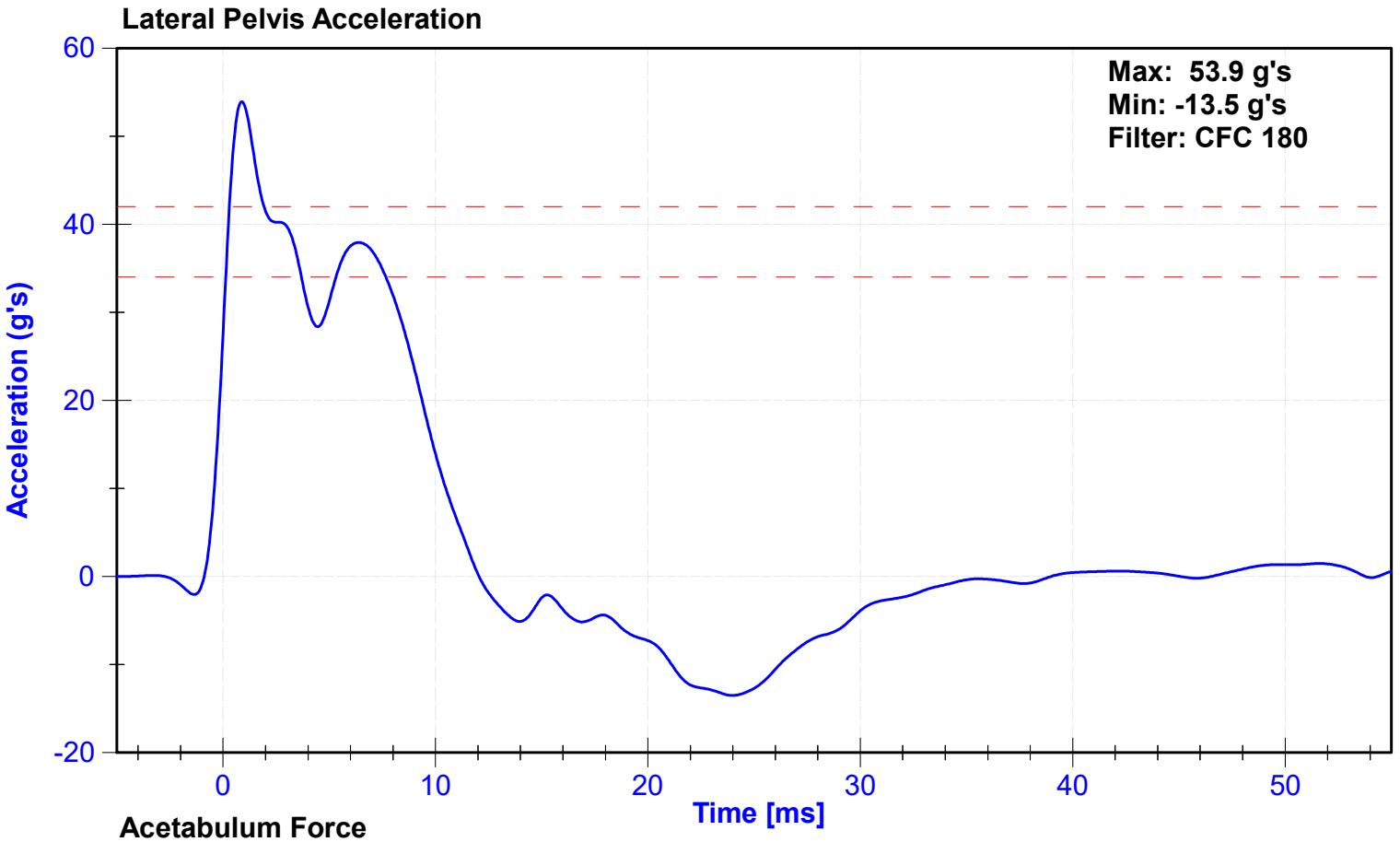
Results

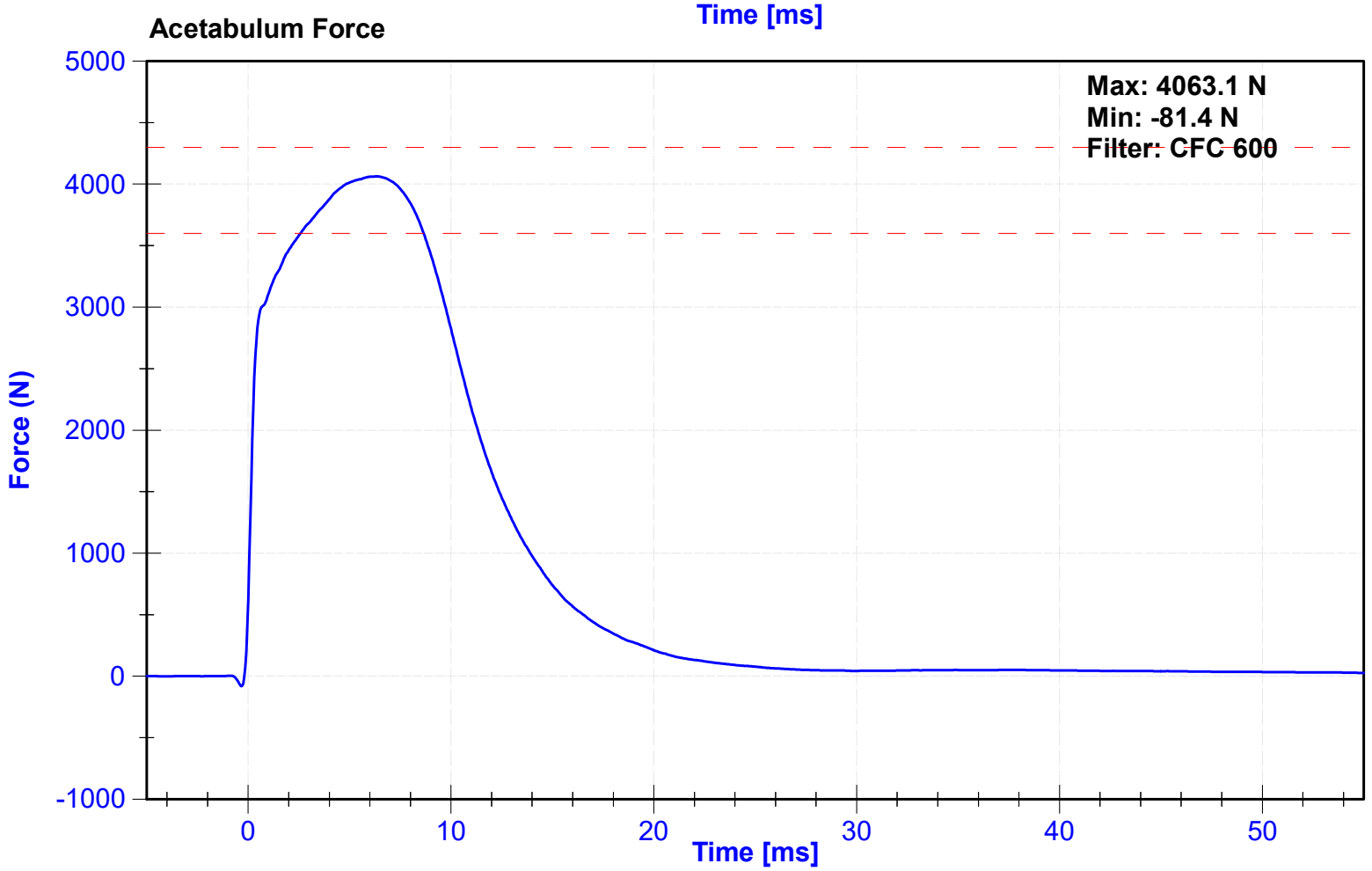
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.0	Pass
Humidity	10	70	%	57	Pass
Velocity	6.6	6.8	m/s	6.66	Pass
Probe Acceleration	38	47	g's	43.3	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	37.9	Pass
Acetabulum Force	3600	4300	N	4063.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18619	3/29/2024	9/25/2024
Pelvis Y Accelerometer	Endevco	P51731	5/9/2024	11/5/2024
Acetabulum Load Cell	Denton	267-FY	9/11/2023	9/10/2024
Certification Plug	SACO			N/A
Crash Test Plug	SACO			N/A




Lateral Pelvis Acceleration
Max: 53.9 g's
Min: -13.5 g's
Filter: CFC 180
Acceleration (g's)
60
40
20
0
-20
0
10
20
30
40
50
Time [ms]


Acetabulum Force
Max: 4063.1 N
Min: -81.4 N
Filter: CFC 600
Force (N)
5000
4000
3000
2000
1000
0
-1000
0
10
20
30
40
50
Time [ms]

SACO RESEARCH

SID-IIs Pelvis Plug Certification Test

Plug S/N 16341
Test Number 22908
Report Number 22965
Test Date 5/20/2022 12:00:36 PM

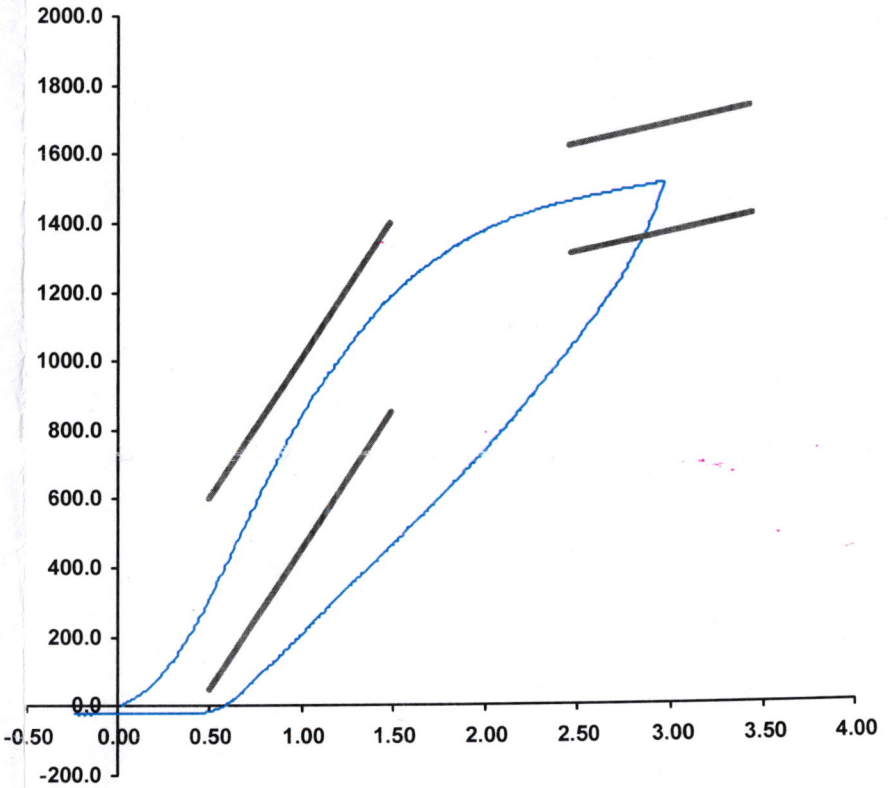
	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	317	50	600
Force @ 1.5 mm (N)	1,184	850	1,400
Force @ 2.5 mm (N)	1,458	1,306	1,618
Force @ 3.0 mm (N)	1,509	1,361	1,673

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:
Cert Plug 07/18/2024 300

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107 20-May-22
SACO Research

By : DC Date : 5/20/2022

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

C-20

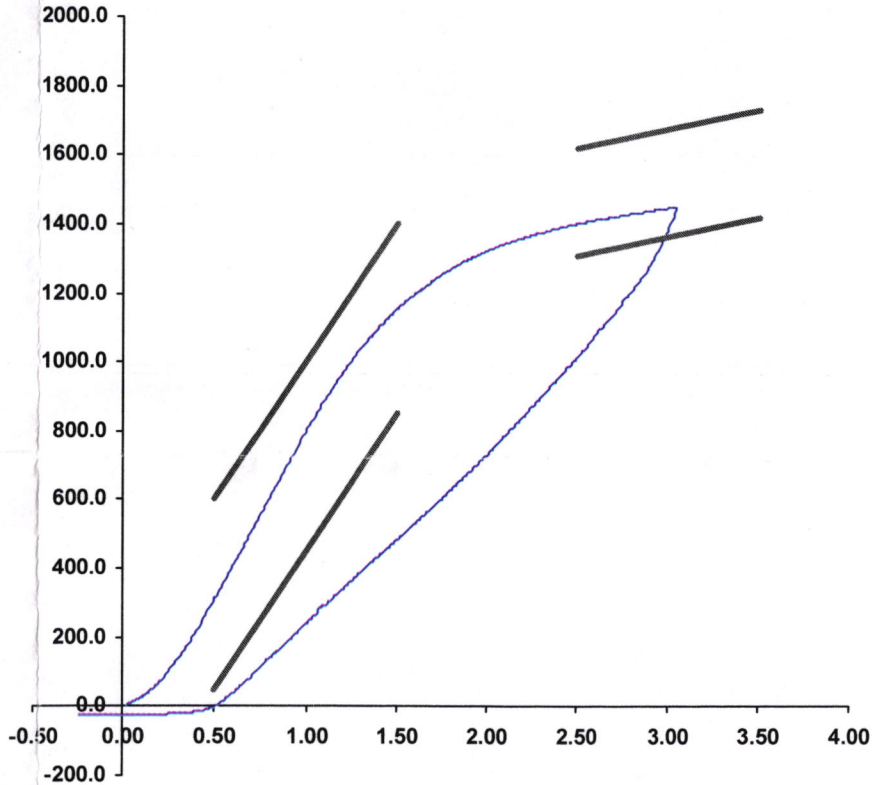
SACO RESEARCH

SID-IIs Pelvis Plug Certification Test

Plug S/N 14156
Test Number 14194
Report Number 14239
Test Date 6/28/2020 12:26:06 PM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	316.32	50.00	600.00
Force @ 1.5 mm (N)	1,148.80	850.00	1,400.00
Force @ 2.5 mm (N)	1,398.65	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,444.84	1,361.00	1,673.00

Force (-N) vs Extension (-mm)



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

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

Notes:
IMPACT 300 7/19/24

Operator

Part Number 180-4450

Template No 107 28-Jun-20
SACO Research

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

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

SACO RESEARCH

SID-IIs Pelvis Plug Certification Test

Plug S/N 14168
Test Number 14206
Report Number 14251
Test Date 6/28/2020 12:44:18 PM

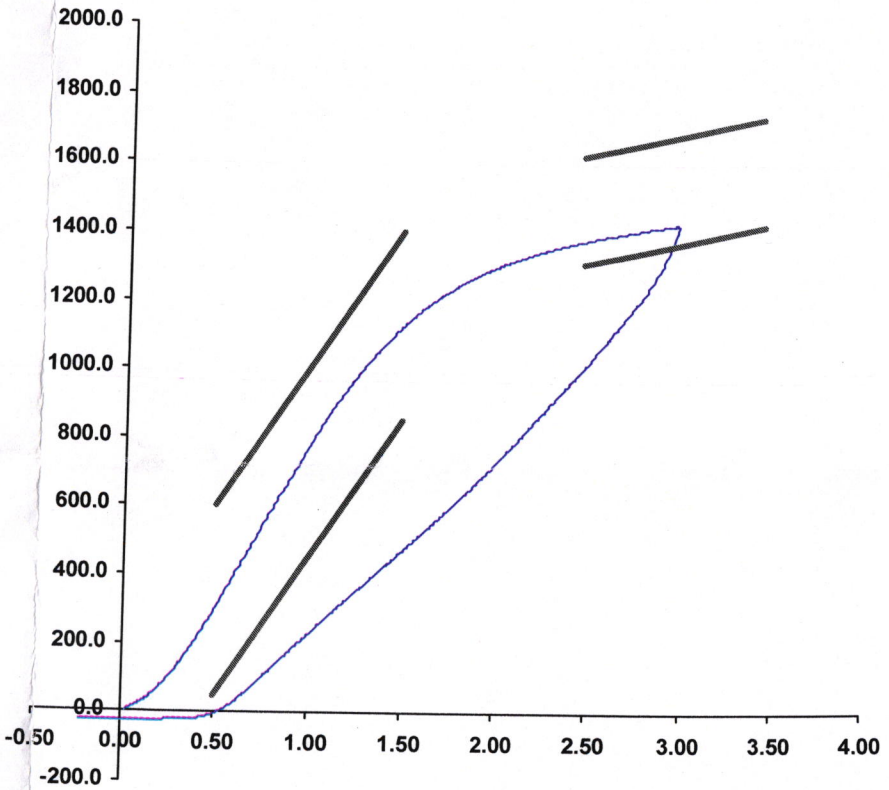
	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	312.37	50.00	600.00
Force @ 1.5 mm (N)	1,124.07	850.00	1,400.00
Force @ 2.5 mm (N)	1,373.07	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,419.26	1,361.00	1,673.00

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

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

Notes:
NON-IMPACT 7/19/24 300

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107 28-Jun-20
SACO Research

By : D.C. Date : 6-28-2021

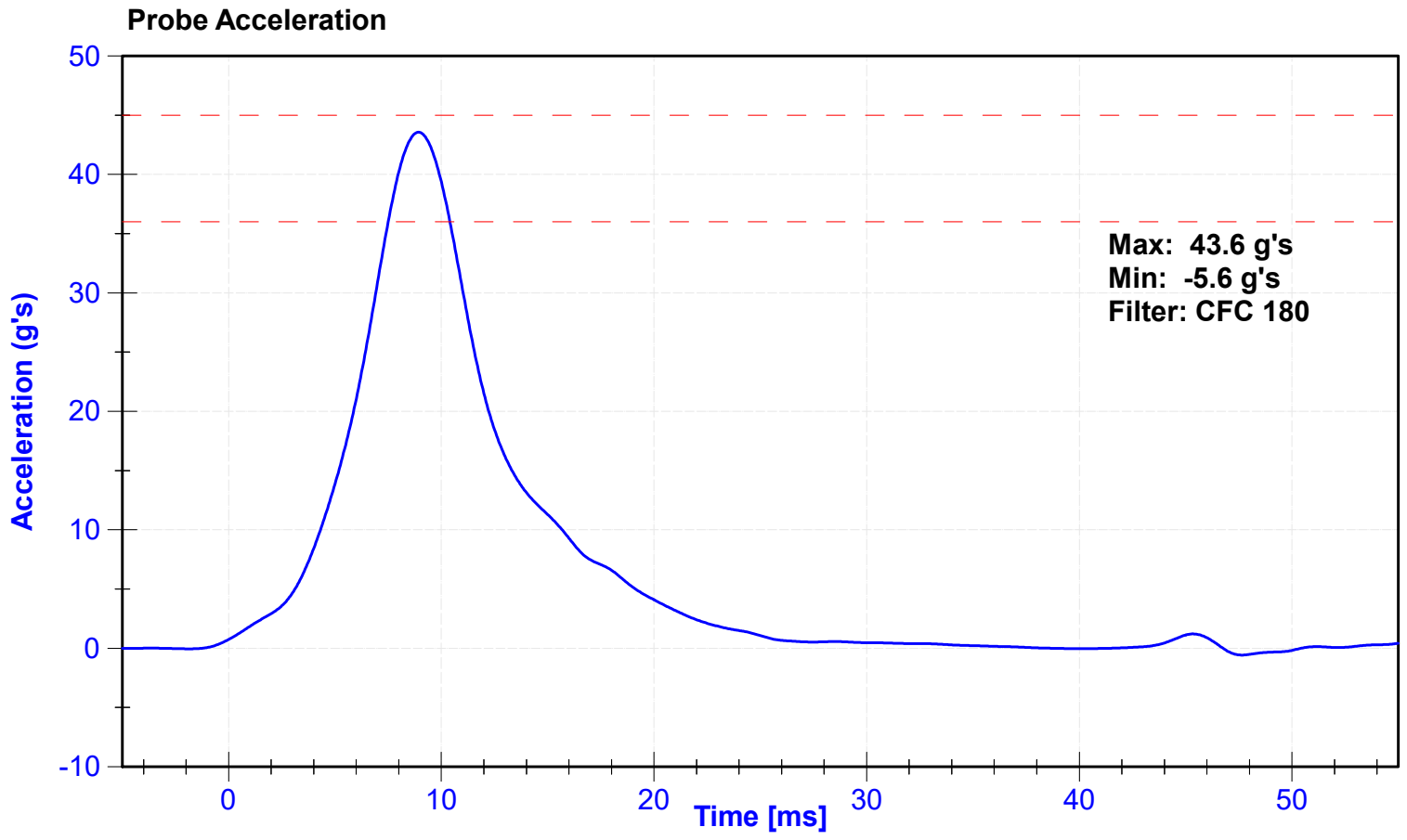
ATD Manufacturer	FTSS	Test Technician	J. Rios
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

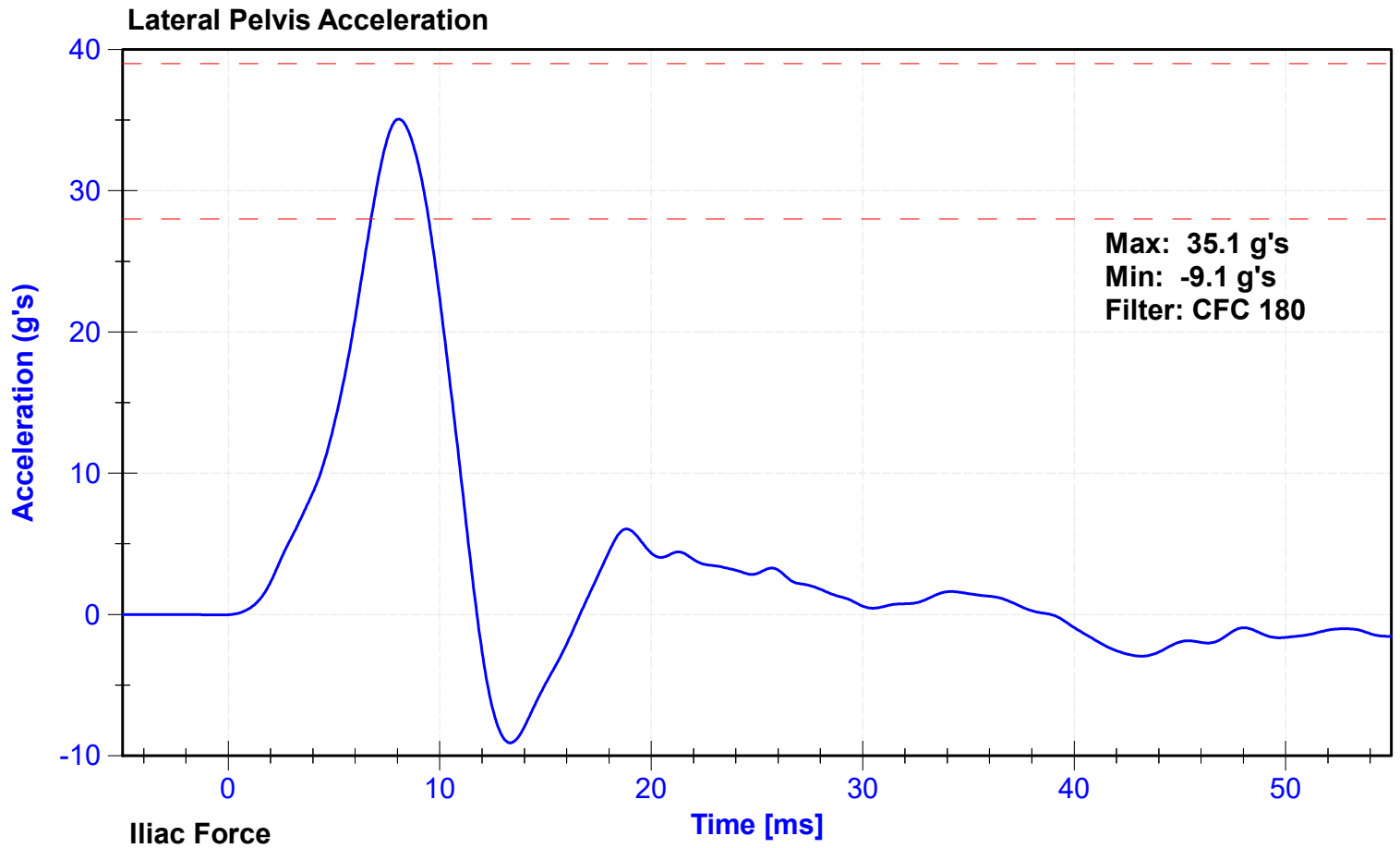
Results

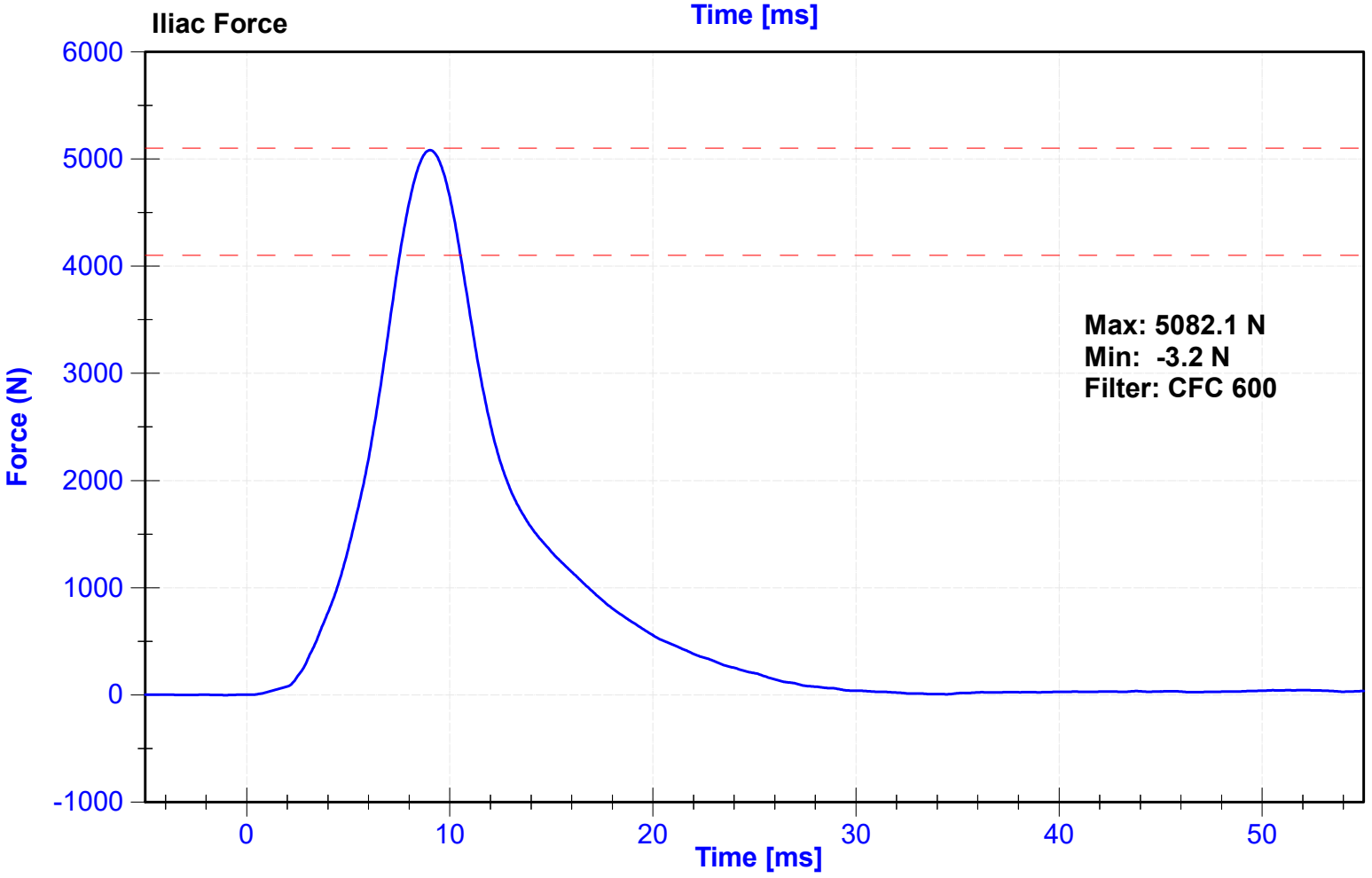
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.0	Pass
Humidity	10	70	%	57	Pass
Velocity	4.2	4.4	m/s	4.28	Pass
Probe Acceleration	36	45	g's	43.6	Pass
Lateral Pelvis Acceleration	28	39	g's	35.1	Pass
Iliac Force	4100	5100	N	5082.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18619	3/29/2024	9/25/2024
Pelvis Y Accelerometer	Endevco	P51731	5/9/2024	11/5/2024
Iliac Load Cell	Denton	321	9/11/2023	9/10/2024




Lateral Pelvis Acceleration
Acceleration (g's)
40
30
20
10
0
-10
0
10
20
30
40
50
Time [ms]
Max: 35.1 g's
Min: -9.1 g's
Filter: CFC 180


Iliac Force
Force (N)
6000
5000
4000
3000
2000
1000
0
-1000
0
10
20
30
40
50
Time [ms]
Max: 5082.1 N
Min: -3.2 N
Filter: CFC 600

CALIBRATION TEST RESULTS

POST-TEST

SID-IIS 5TH PERCENTILE FEMALE - DRIVER ATD

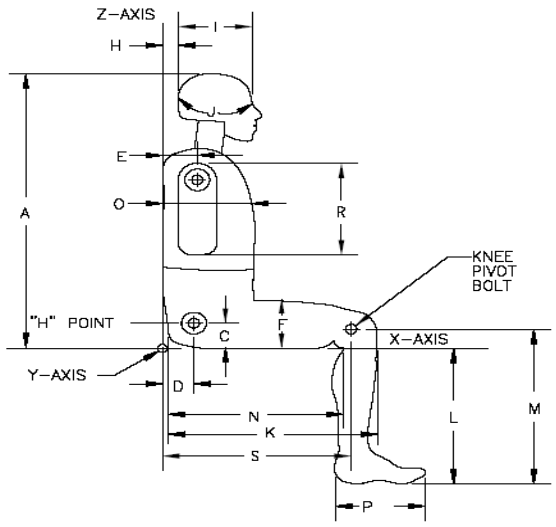
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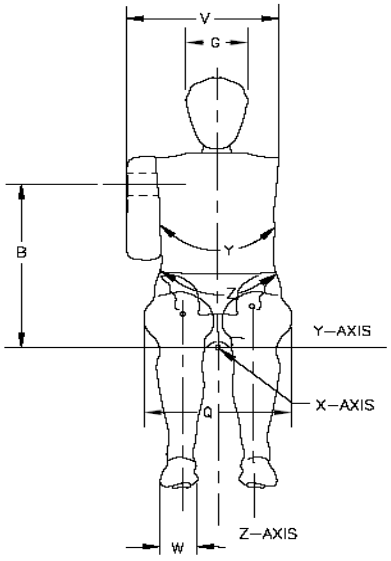
(CONFIGURED FOR LEFT SIDE IMPACT)

External Measurements - SID-IIs

Technician: J. Rios Date: 8/29/2024

Dummy Serial Number: 300





Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	777	Pass
B	Shoulder Pivot Height	437	453	444	Pass
C	H-point Height	79	89	82	Pass
D	H-point from seatback	141	151	142	Pass
E	Shoulder Pivot from Backline	97	107	98	Pass
F	Thigh Clearance	119	135	127	Pass
G	Head Breadth	140	148	145	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	182	Pass
J	Head Circumference	541	551	550	Pass
K	Buttock to Knee Length	514	540	528	Pass
L	Popliteal Height	343	369	357	Pass
M	Knee Pivot to floor height	392	409	401	Pass
N	Buttock Popliteal Length	416	442	428	Pass
O	Chest Depth w/o jacket	195	211	199	Pass
P	Foot Length	216	232	224	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	320	Pass
R	Arm Length	249	259	255	Pass
S	Knee Joint to seatback	477	493	488	Pass
V	Shoulder Width	341	357	348	Pass
W	Foot Width	78	94	85	Pass
Y	Chest Circumference w/jacket	851	881	872	Pass
Z	Waist Circumference	761	791	770	Pass

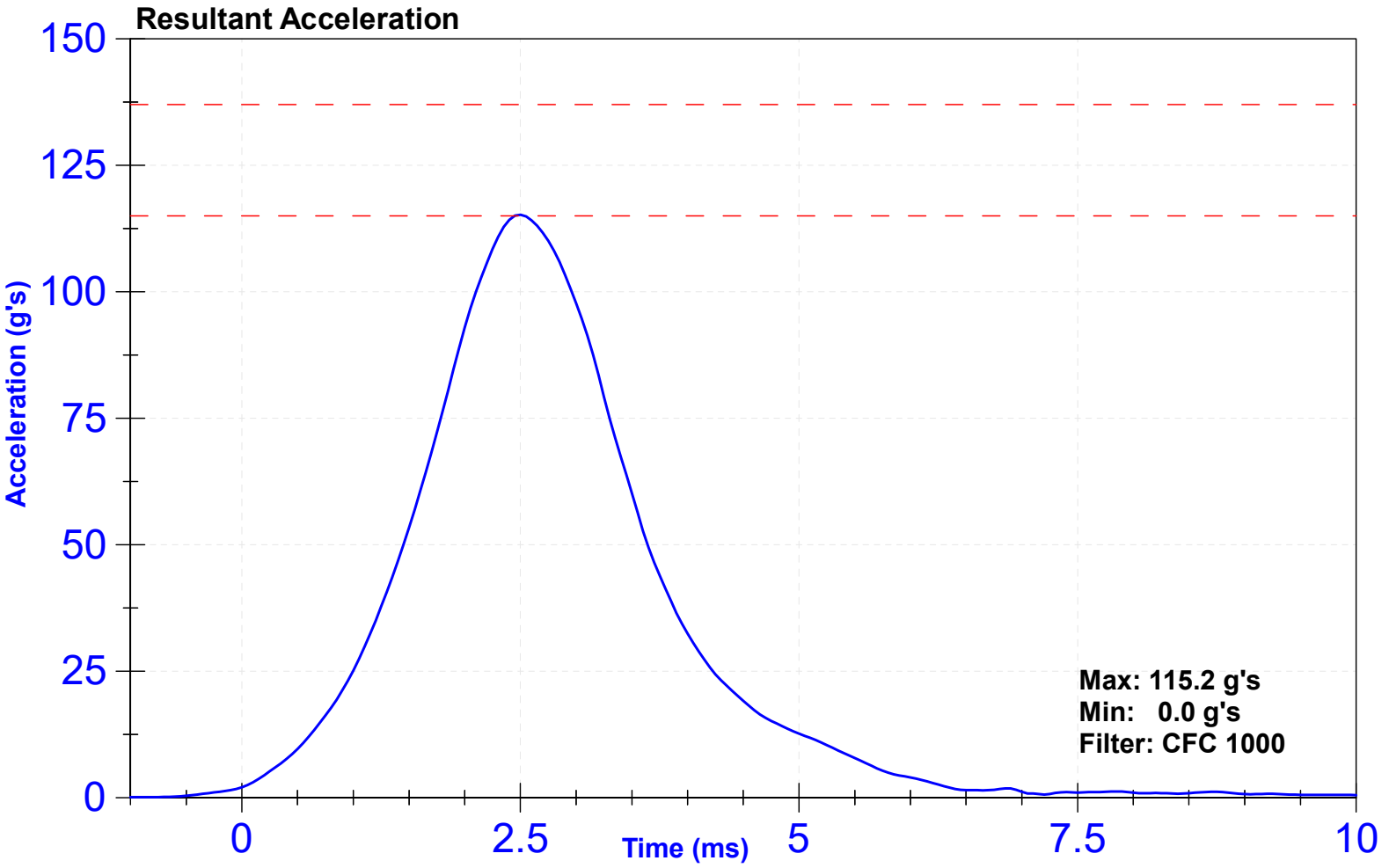
ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

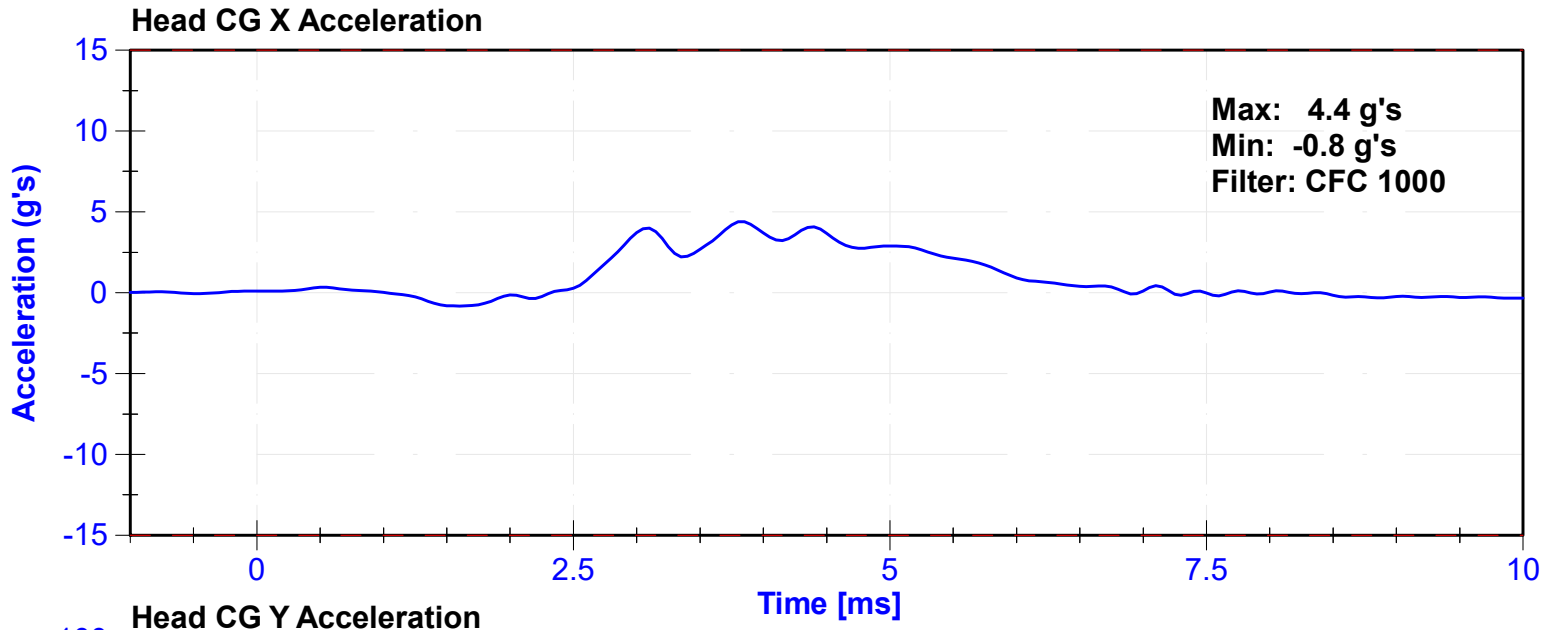
Results

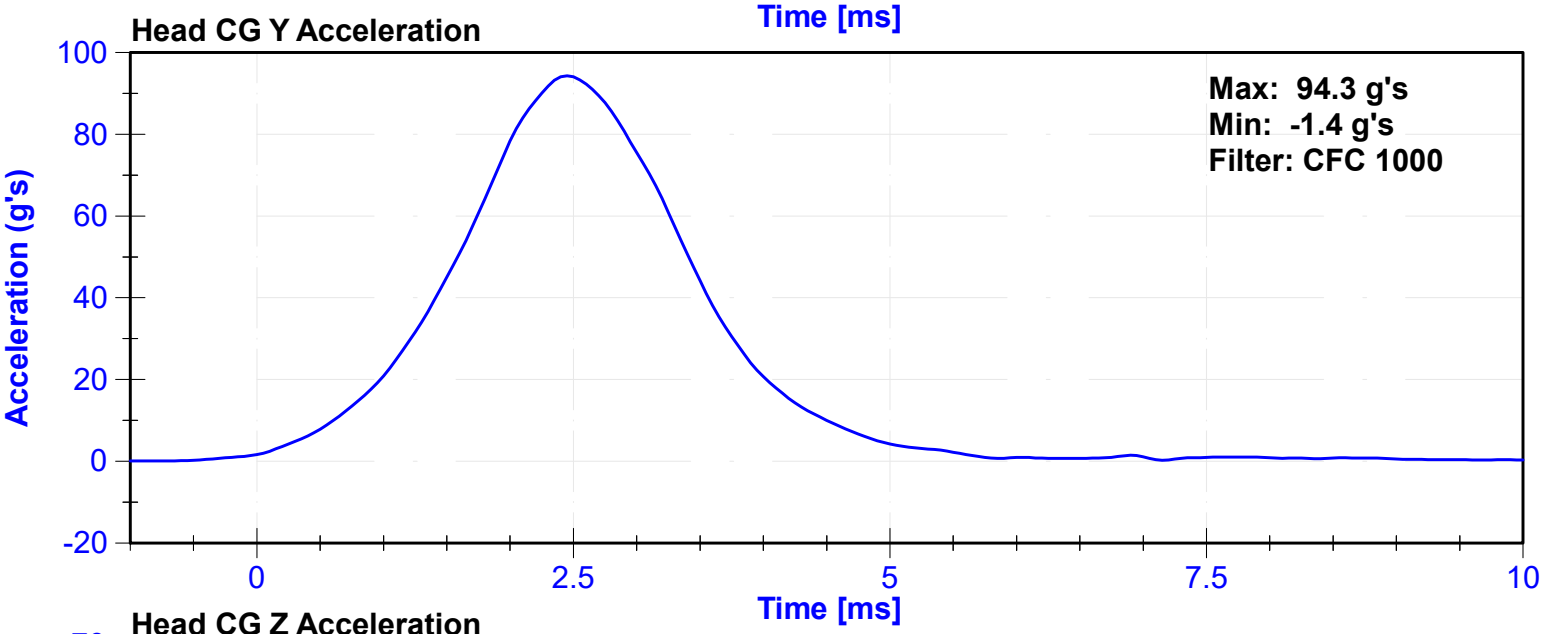
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.8	Pass
Humidity	10	70	%	66	Pass
Resultant Acceleration	115	137	g's	115.2	Pass
Oscillation	0	15	%	1.5	Pass
Fore-Aft Acceleration	-15	15	g's	4.4	Pass

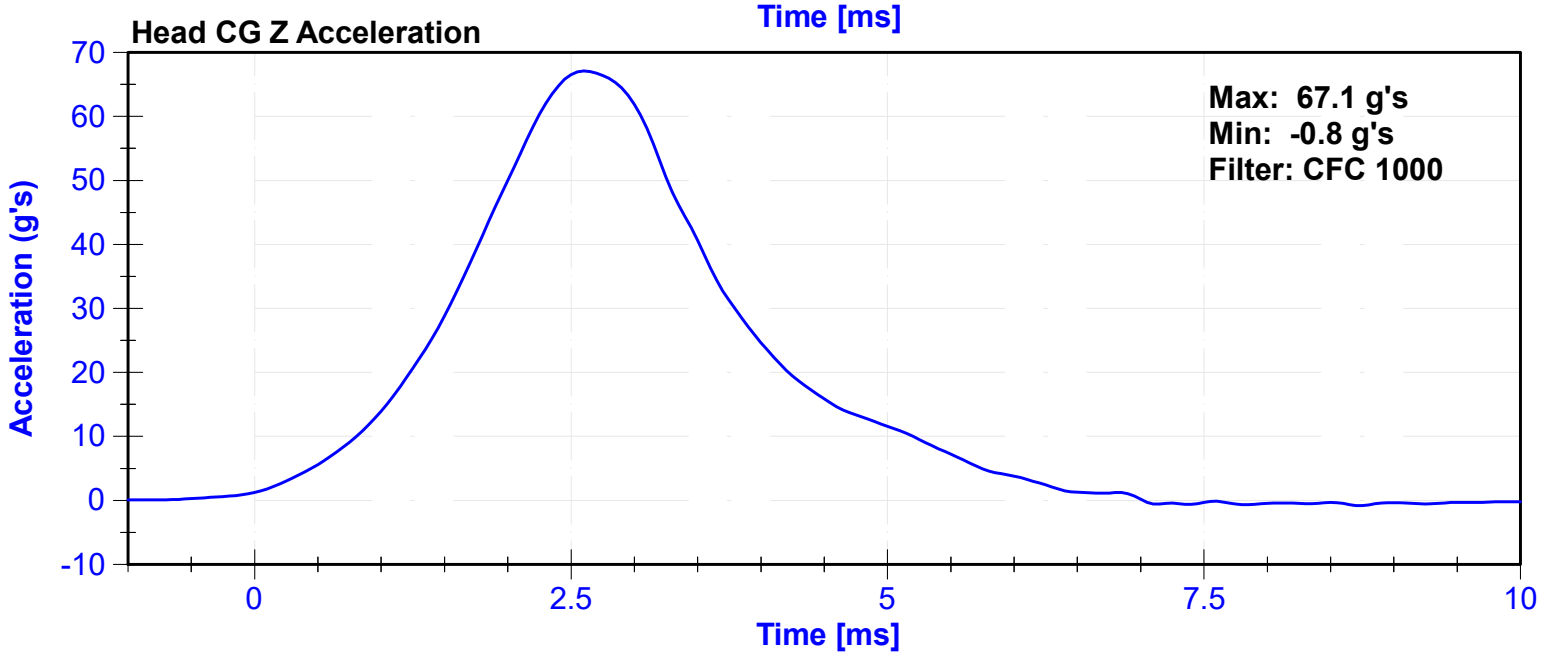
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibratio Date	Calibratio Due Date
X Accelerometer	Endevco	P59018	5/9/2024	11/5/2024
Y Accelerometer	Endevco	P79189	5/9/2024	11/5/2024
Z Accelerometer	Endevco	P79587	5/9/2024	11/5/2024




Head CG X Acceleration
Max: 4.4 g's
Min: -0.8 g's
Filter: CFC 1000
Acceleration (g's)
15
10
5
0
-5
-10
-15
0
2.5
5
7.5
10
Time [ms]


Head CG Y Acceleration
Max: 94.3 g's
Min: -1.4 g's
Filter: CFC 1000
Acceleration (g's)
100
80
60
40
20
0
-20
0
2.5
5
7.5
10
Time [ms]


Head CG Z Acceleration
Max: 67.1 g's
Min: -0.8 g's
Filter: CFC 1000
Acceleration (g's)
70
60
50
40
30
20
10
0
-10
0
2.5
5
7.5
10
Time [ms]

ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

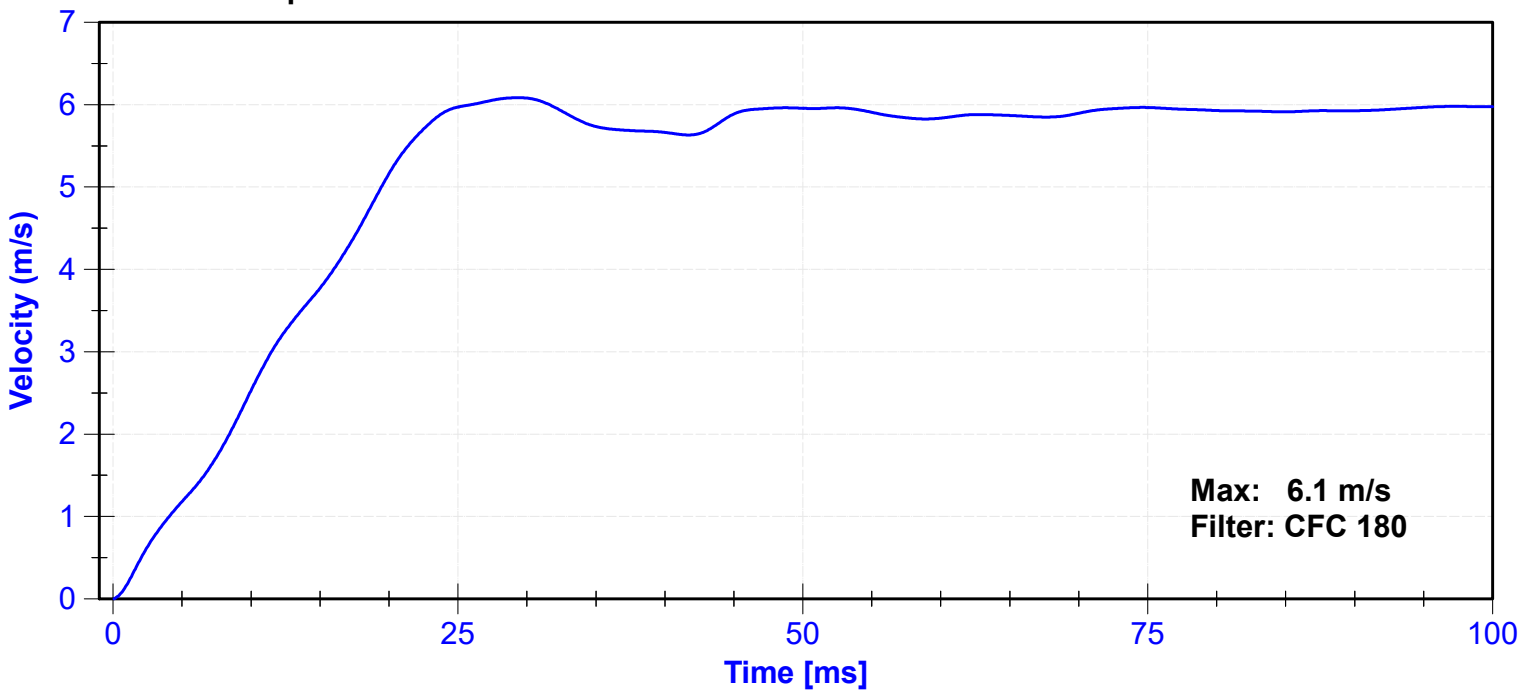
Results

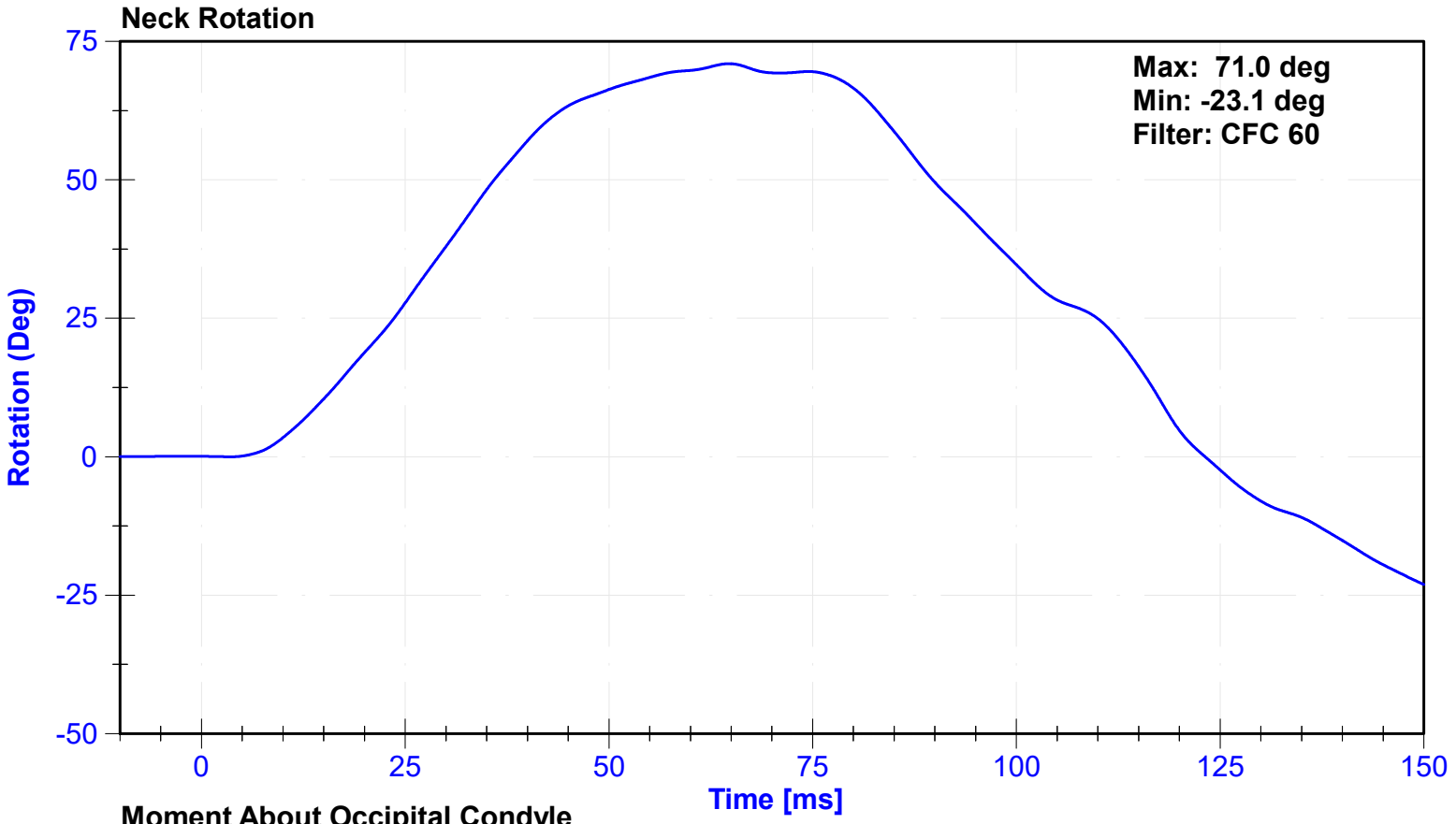
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.8	Pass
Humidity	10	70	%	66	Pass
Velocity	5.51	5.63	m/s	5.612	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.53	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.77	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	5.16	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.97	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	6.08	Pass
Neck Rotation	71	81	deg	71.0	Pass
Time at Maximum Rotation	50	70	ms	64.7	Pass
Moment about the OC	36	44	Nm	42.7	Pass
Moment Decay to 0 Nm	102	126	ms	108.4	Pass

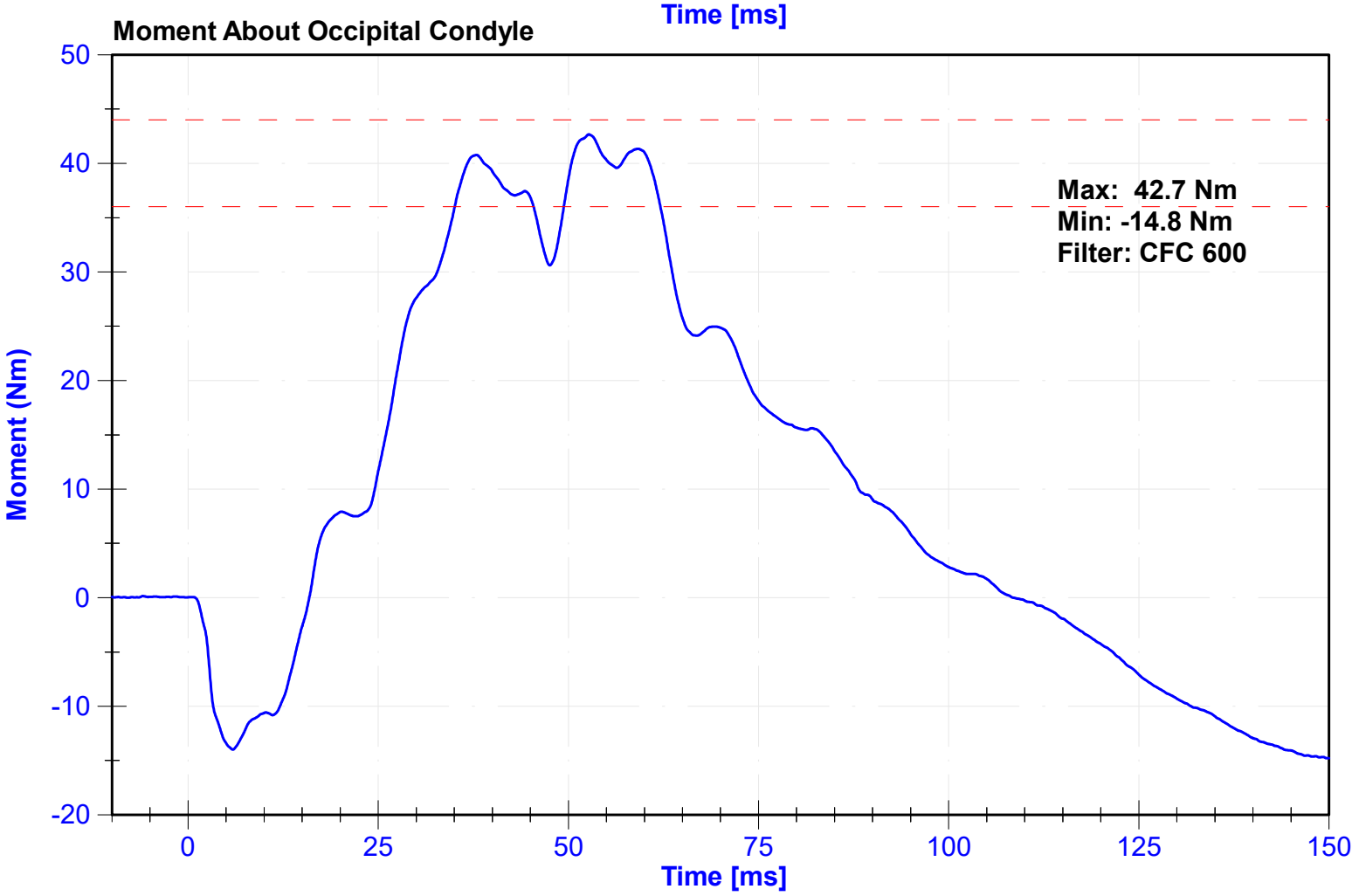
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	7231C-750	10/31/2023	10/30/2024
Pendulum Potentiometer	Servo	4961	10/2/2023	10/1/2024
Condyle Potentiometer	Servo	DS185	10/2/2023	10/1/2024
Upper Neck Load Cell	Denton	1716A_2187-FY	12/5/2023	12/4/2024

Pendulum Impulse




Neck Rotation
Max: 71.0 deg
Min: -23.1 deg
Filter: CFC 60
Rotation (Deg)
75
50
25
0
-25
-50
0
25
50
75
100
125
150
Time [ms]


Moment About Occipital Condyle
Max: 42.7 Nm
Min: -14.8 Nm
Filter: CFC 600
Moment (Nm)
50
40
30
20
10
0
-10
-20
0
25
50
75
100
125
150
Time [ms]

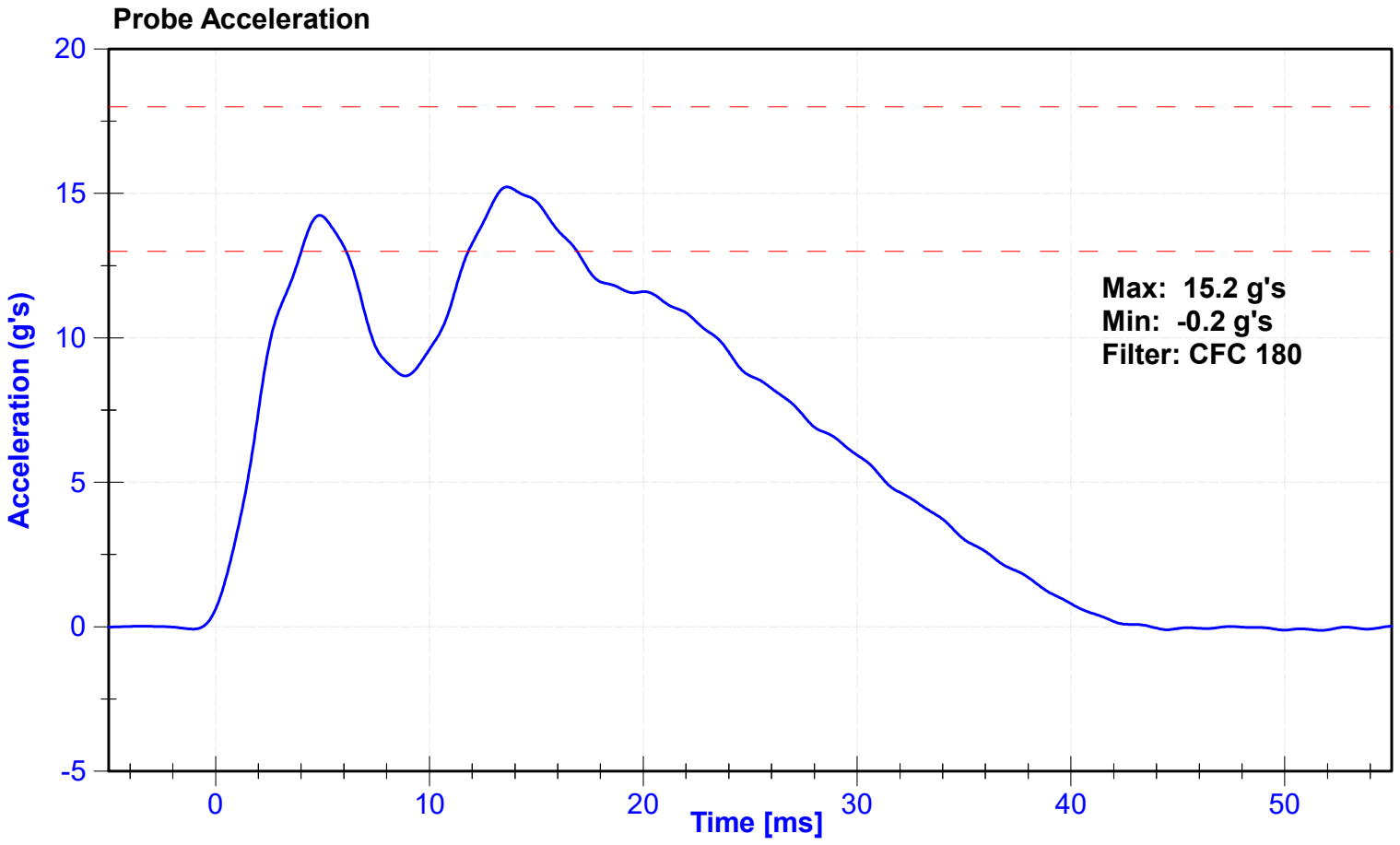
ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

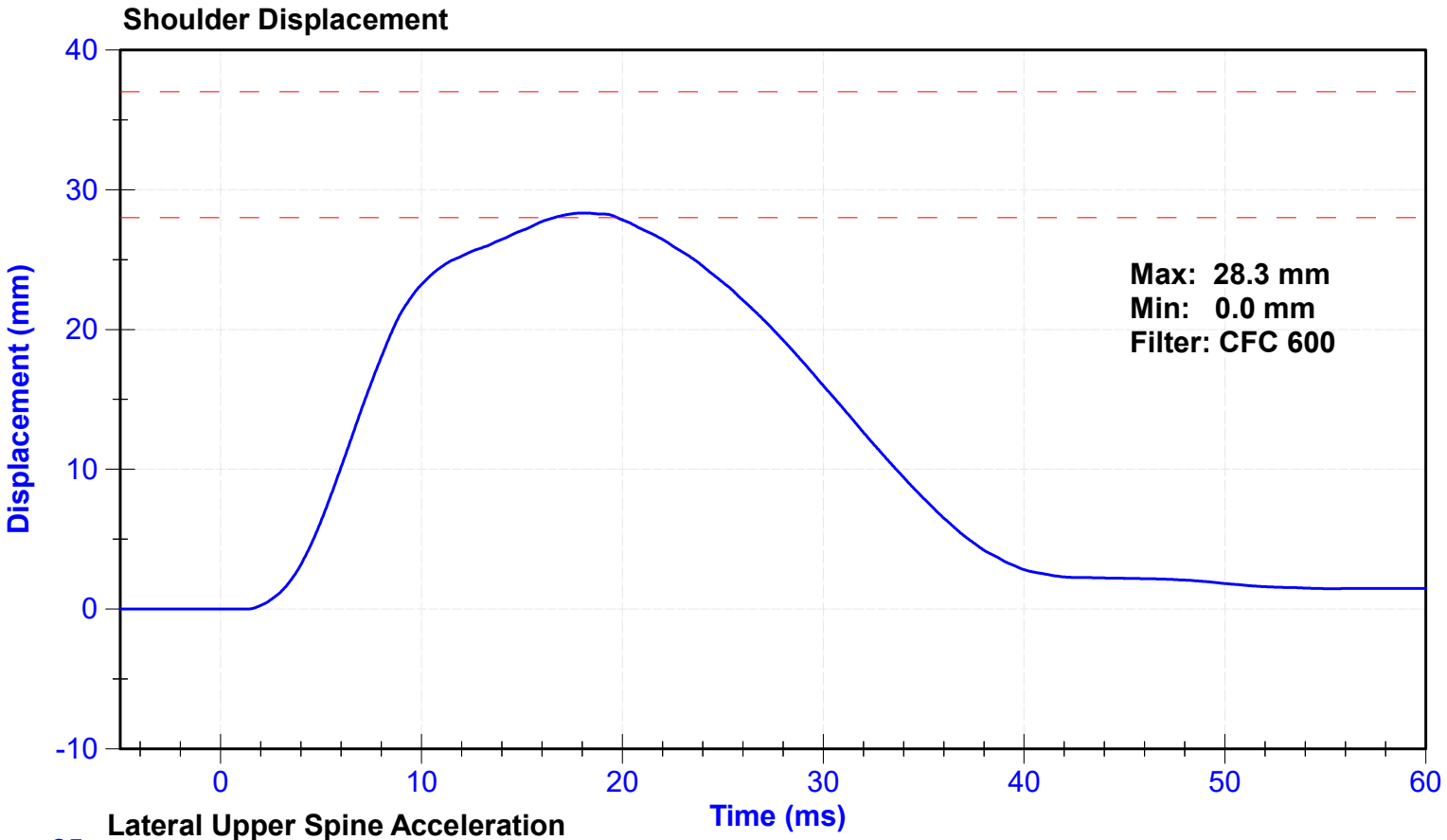
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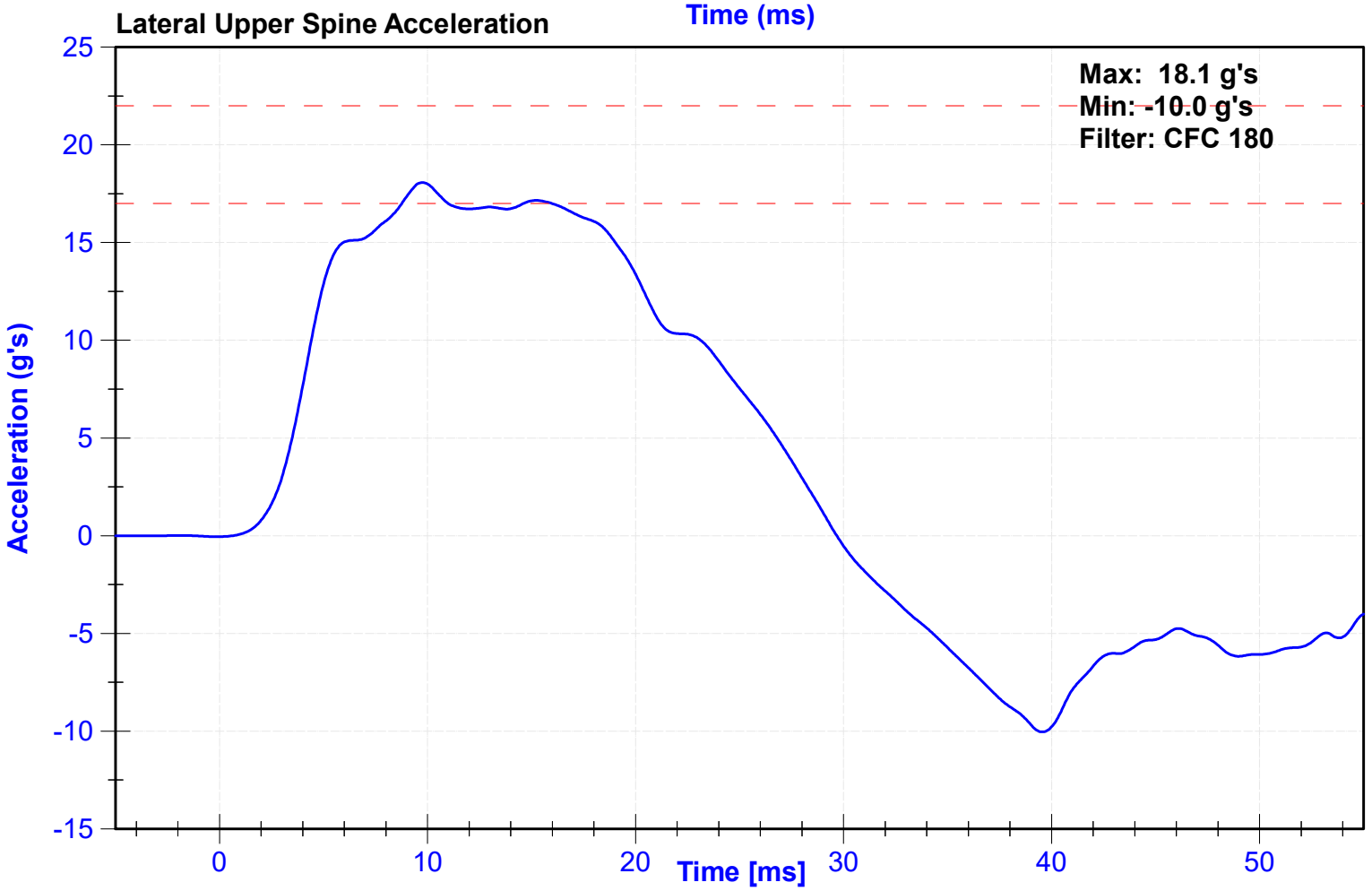
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.9	Pass
Humidity	10	70	%	62	Pass
Velocity	4.2	4.4	m/s	4.29	Pass
Probe Acceleration	13	18	g's	15.2	Pass
Shoulder Deflection	28	37	mm	28.3	Pass
Lateral Upper Spine Acceleration	17	22	g's	18.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18527	8/2/2024	1/29/2025
Shoulder Potentiometer	Servo	053GFE	5/9/2024	11/7/2024
Upper Spine Y Accelerometer	Endevco	T20880	5/9/2024	11/5/2024




Shoulder Displacement
Displacement (mm)
Time (ms)
Max: 28.3 mm
Min: 0.0 mm
Filter: CFC 600


Lateral Upper Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 18.1 g's
Min: -10.0 g's
Filter: CFC 180

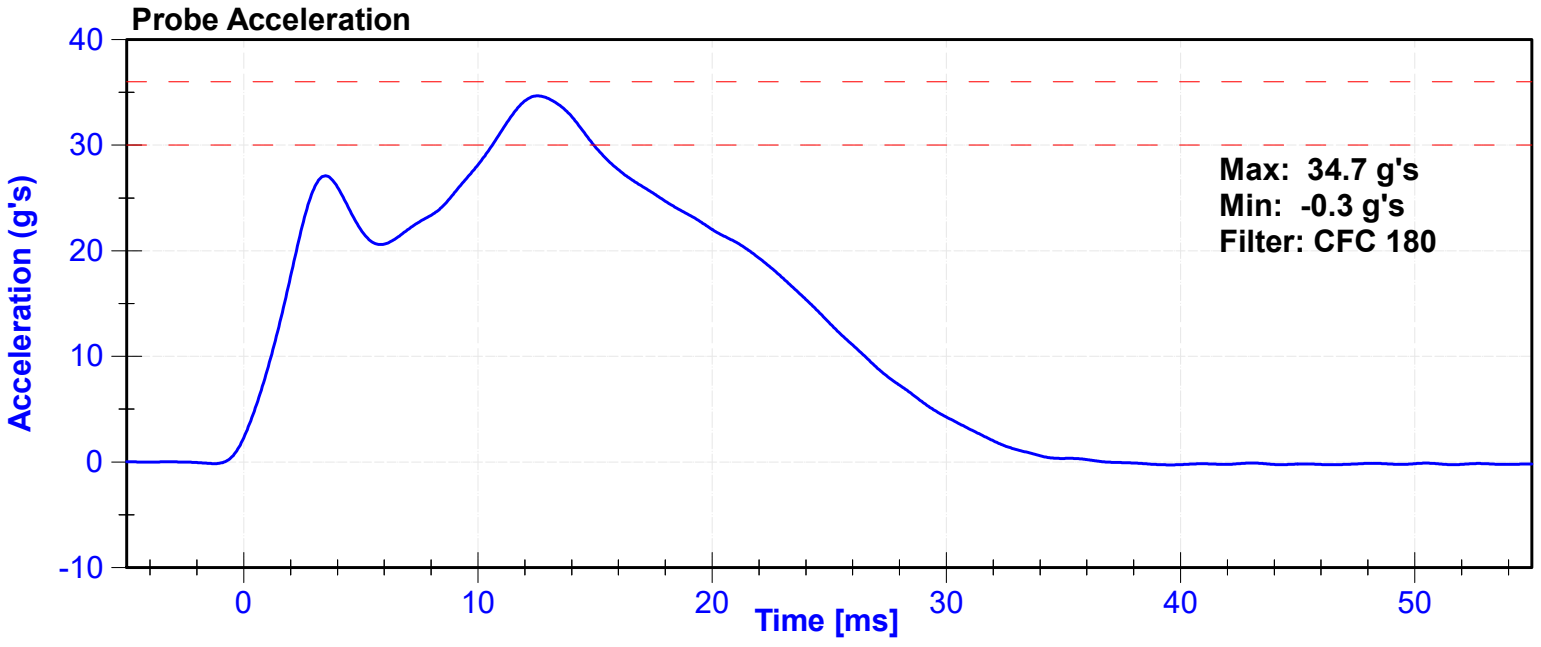
ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

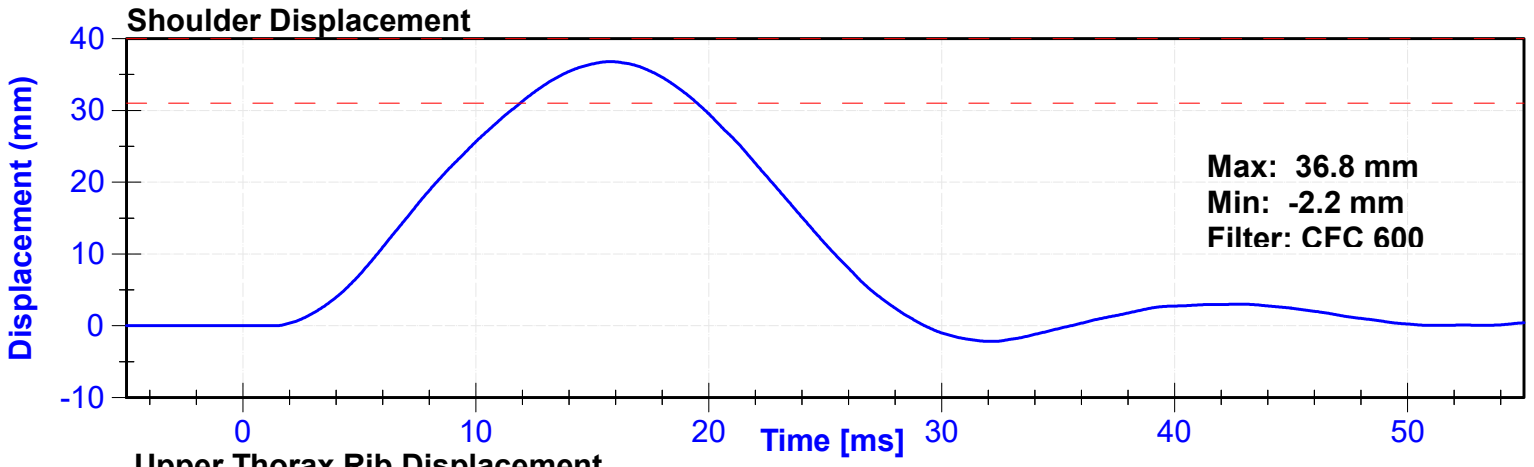
Results

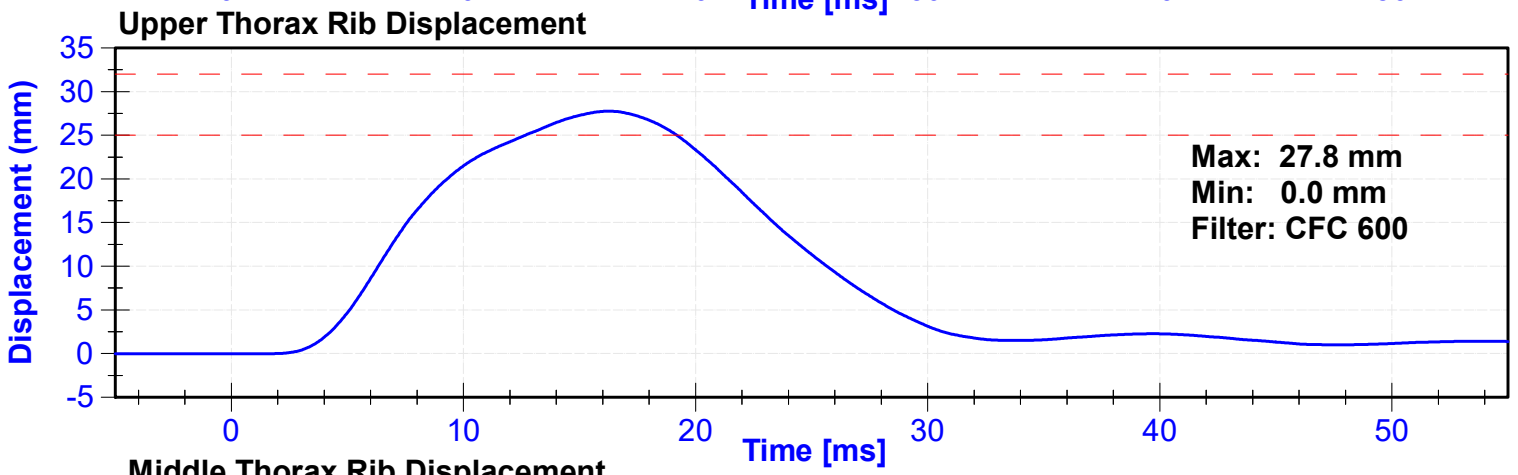
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.9	Pass
Humidity	10	70	%	62	Pass
Velocity	6.6	6.8	m/s	6.63	Pass
Probe Acceleration after 5 ms	30	36	g's	34.7	Pass
Lateral Upper Spine Acceleration	34	43	g's	35.8	Pass
Lateral Lower Spine Acceleration	29	37	g's	35.5	Pass
Shoulder Deflection	31	40	mm	36.8	Pass
Upper Thorax Rib Deflection	25	32	mm	27.8	Pass
Mid Thorax Rib Deflection	30	36	mm	30.6	Pass
Lower Thorax Rib Deflection	32	38	mm	32.3	Pass

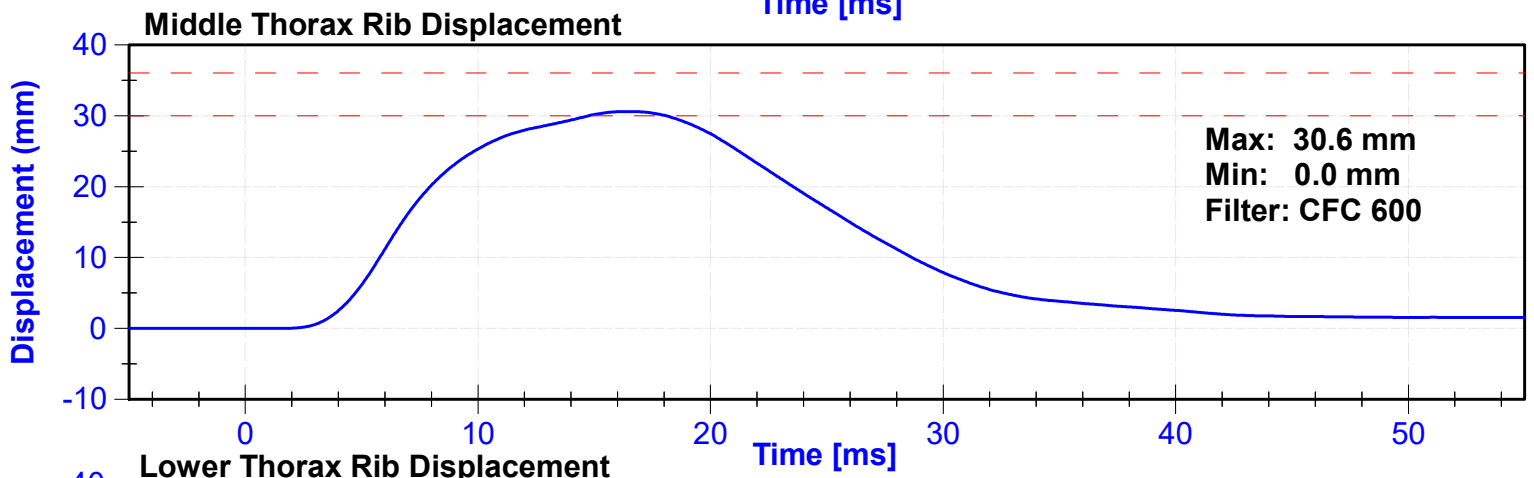
Transducer Calibrations

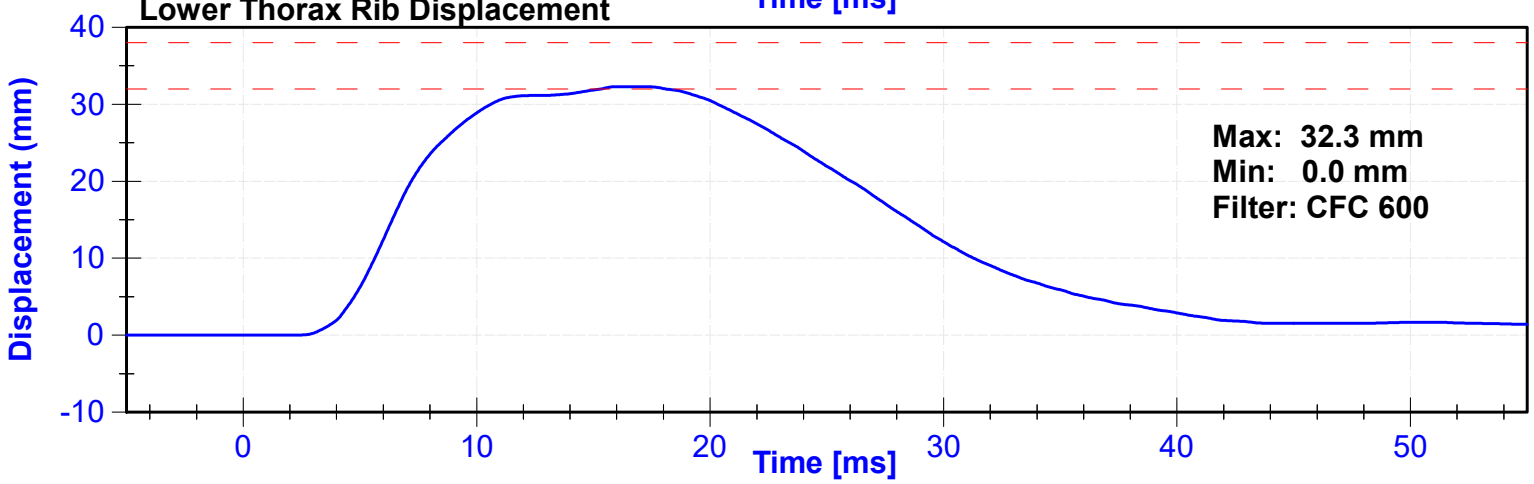
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18527	8/2/2024	1/29/2025
Upper Spine T1 Y Accelerometer	Endevco	T20880	5/9/2024	11/5/2024
Upper Spine T12 Y Accelerometer	Endevco	P52071	5/9/2024	11/5/2024
Shoulder Potentiometer	Servo	053GFE	5/9/2024	11/7/2024
Upper Thorax Rib Potentiometer	Servo	2316GFE	5/9/2024	11/7/2024
Middle Thorax Rib Potentiometer		085GFE	MM/DD/YYYY	
Lower Thorax Rib Potentiometer	Servo	1156GFE	5/9/2024	11/7/2024

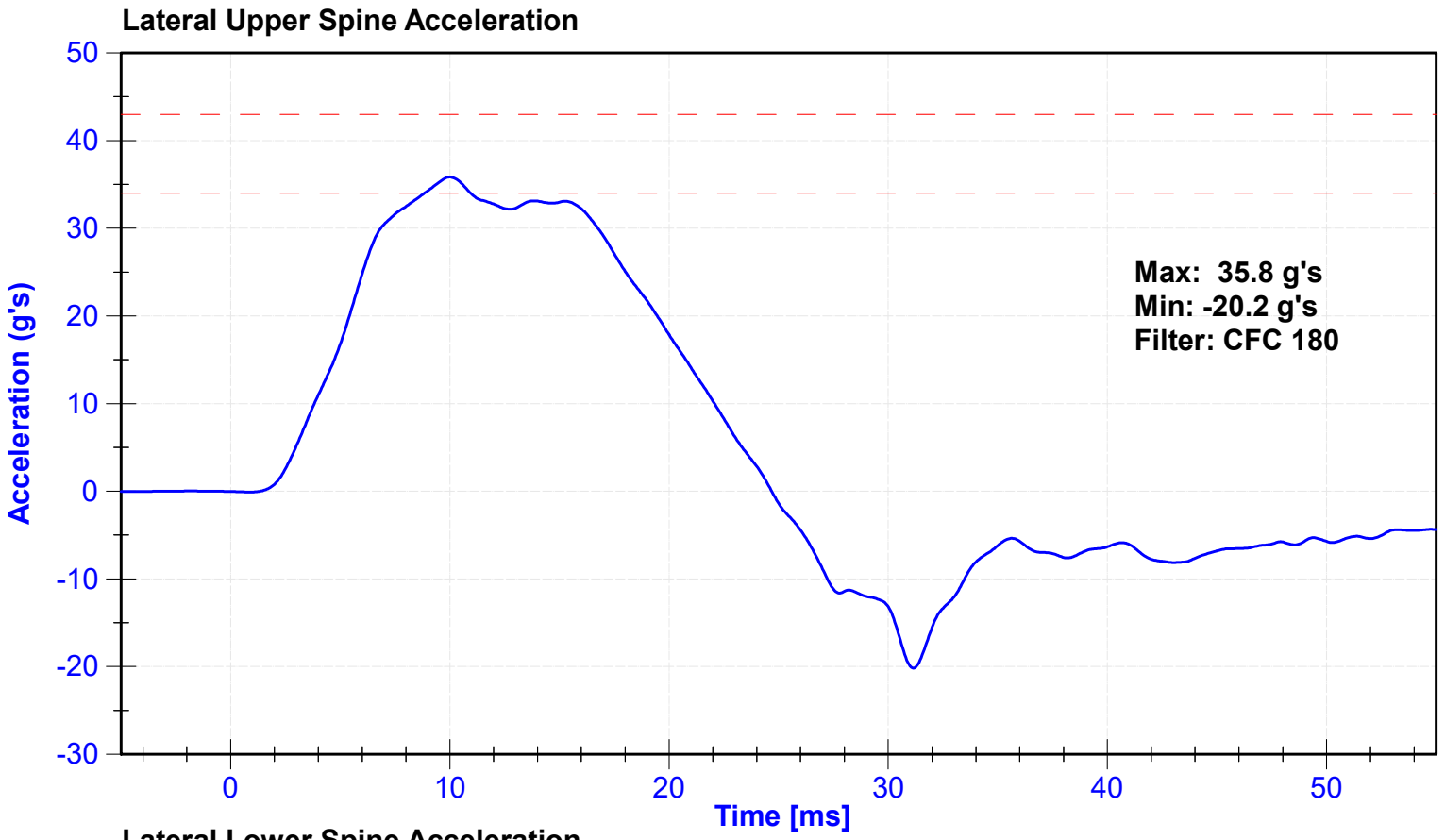


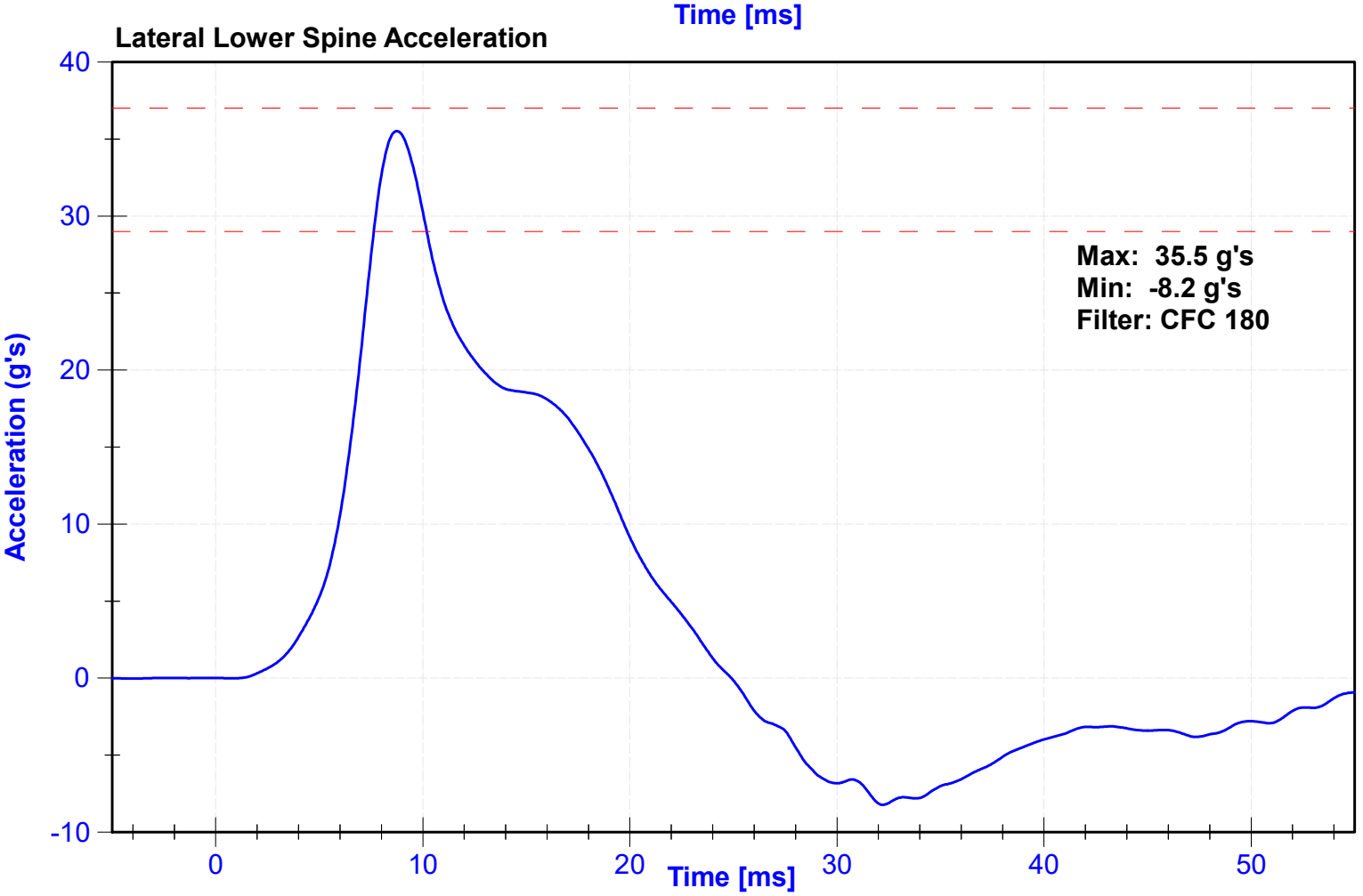

Shoulder Displacement
Displacement (mm)
Time [ms]
Max: 36.8 mm
Min: -2.2 mm
Filter: CFC 600


Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 27.8 mm
Min: 0.0 mm
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 30.6 mm
Min: 0.0 mm
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 32.3 mm
Min: 0.0 mm
Filter: CFC 600


Lateral Upper Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 35.8 g's
Min: -20.2 g's
Filter: CFC 180


Lateral Lower Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 35.5 g's
Min: -8.2 g's
Filter: CFC 180

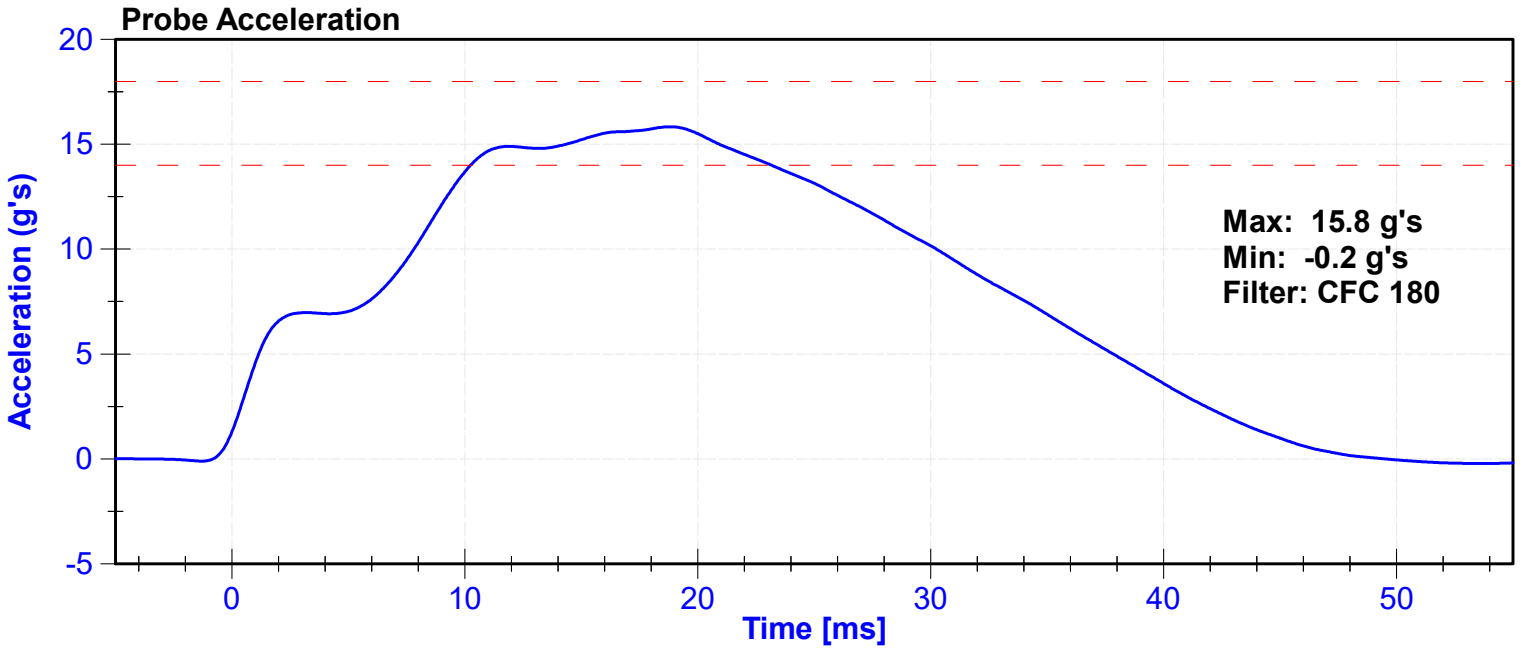
ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

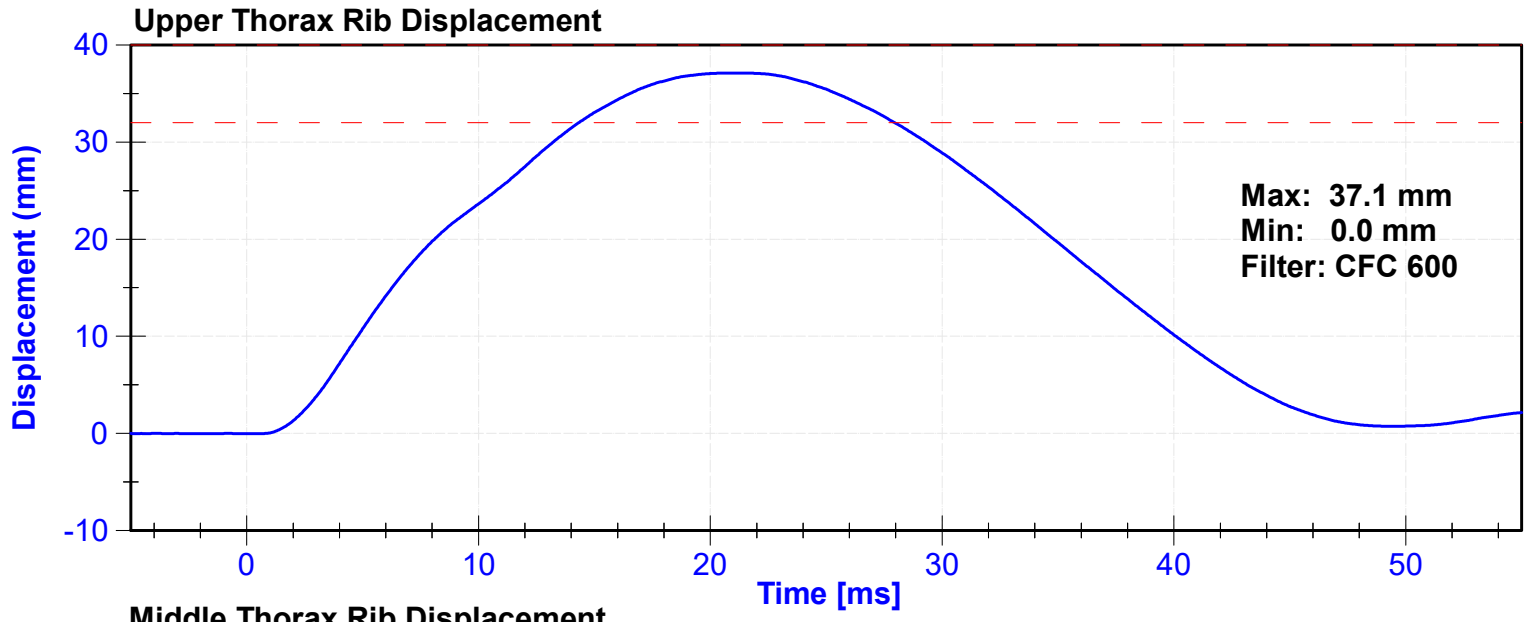
Results

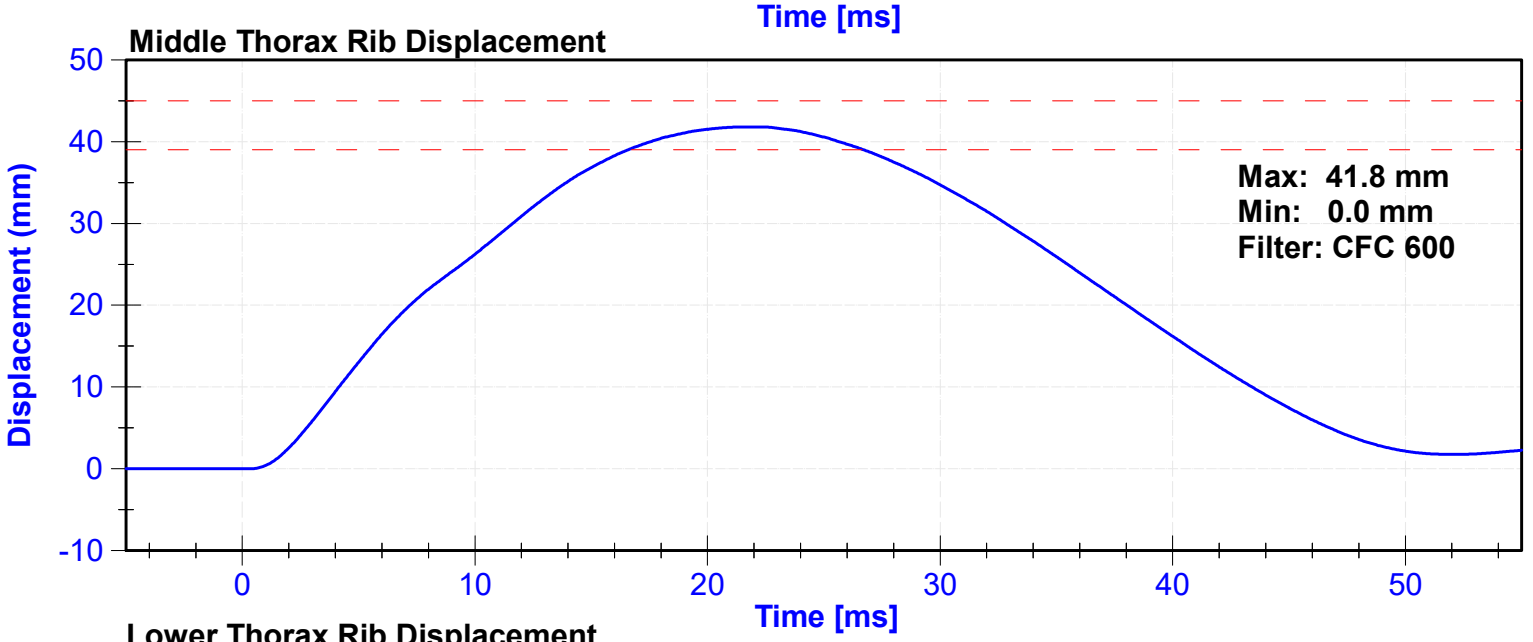
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.9	Pass
Humidity	10	70	%	62	Pass
Velocity	4.2	4.4	m/s	4.29	Pass
Probe Acceleration	14	18	g's	15.8	Pass
Lateral Upper Spine Acceleration	13	17	g's	15.3	Pass
Lateral Lower Spine Acceleration	7	11	g's	9.2	Pass
Upper Thorax Rib Deflection	32	40	mm	37.1	Pass
Middle Thorax Rib Deflection	39	45	mm	41.8	Pass
Lower Thorax Rib Deflection	35	43	mm	37.3	Pass

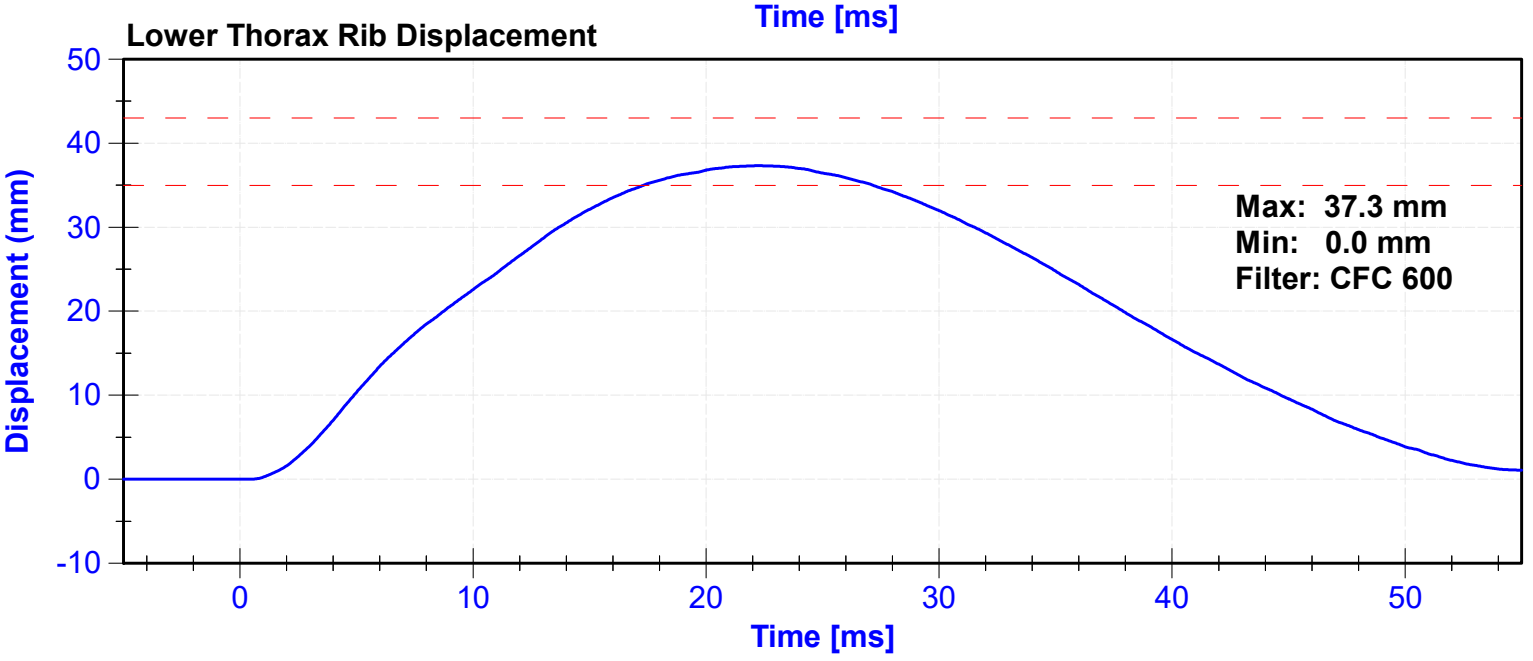
Transducer Calibrations

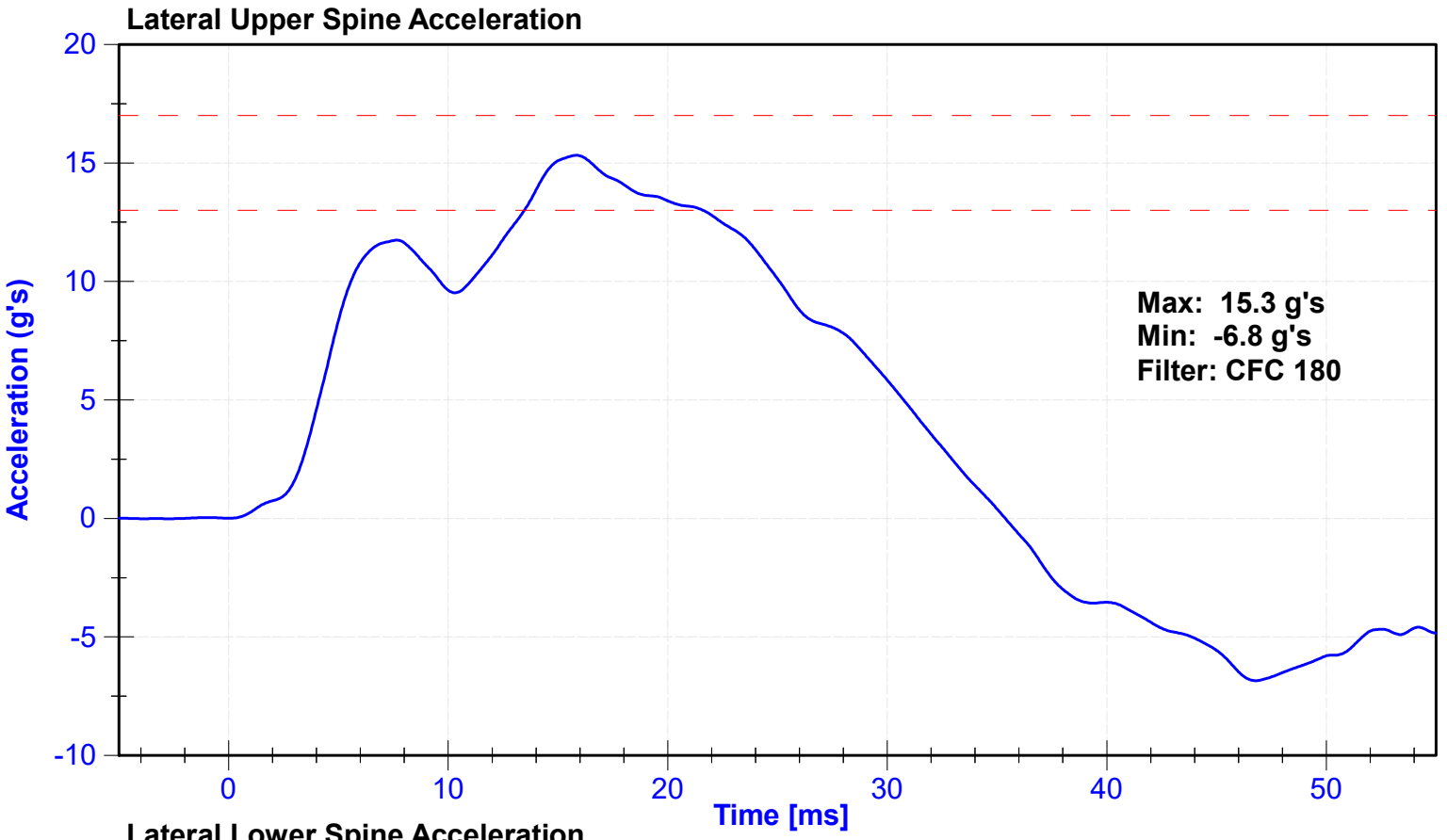
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18527	8/2/2024	1/29/2025
Upper Spine Y Accelerometer	Endevco	T20880	5/9/2024	11/5/2024
Lower Spine Y Accelerometer	Endevco	P52071	5/9/2024	11/5/2024
Upper Thorax Rib Potentiometer	Servo	2316GFE	5/9/2024	11/7/2024
Middle Thorax Rib Potentiometer		085GFE		
Lower Thorax Rib Potentiometer	Servo	1156GFE	5/9/2024	11/7/2024

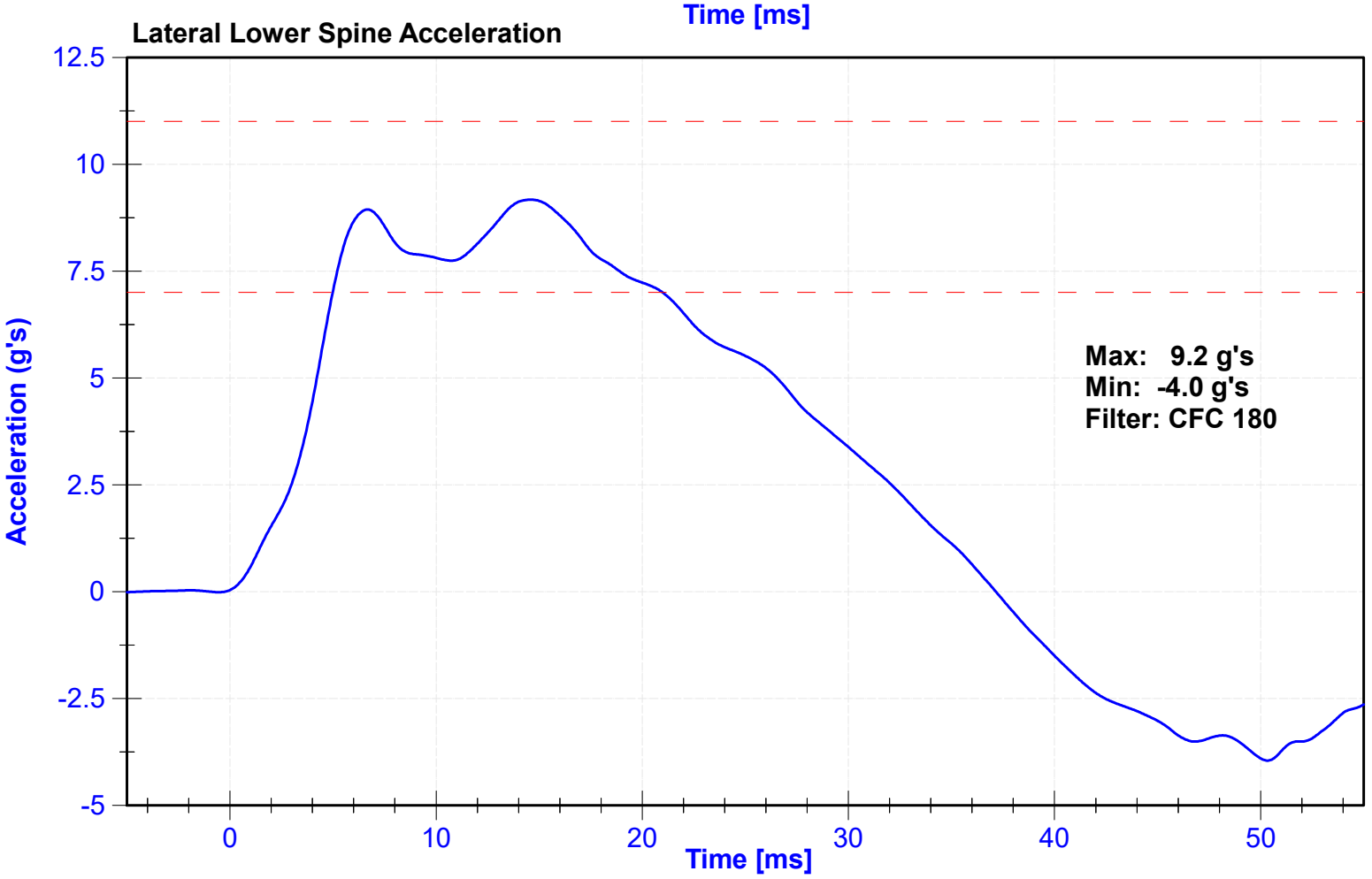



Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 37.1 mm
Min: 0.0 mm
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 41.8 mm
Min: 0.0 mm
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 37.3 mm
Min: 0.0 mm
Filter: CFC 600


Lateral Upper Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 15.3 g's
Min: -6.8 g's
Filter: CFC 180


Lateral Lower Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 9.2 g's
Min: -4.0 g's
Filter: CFC 180

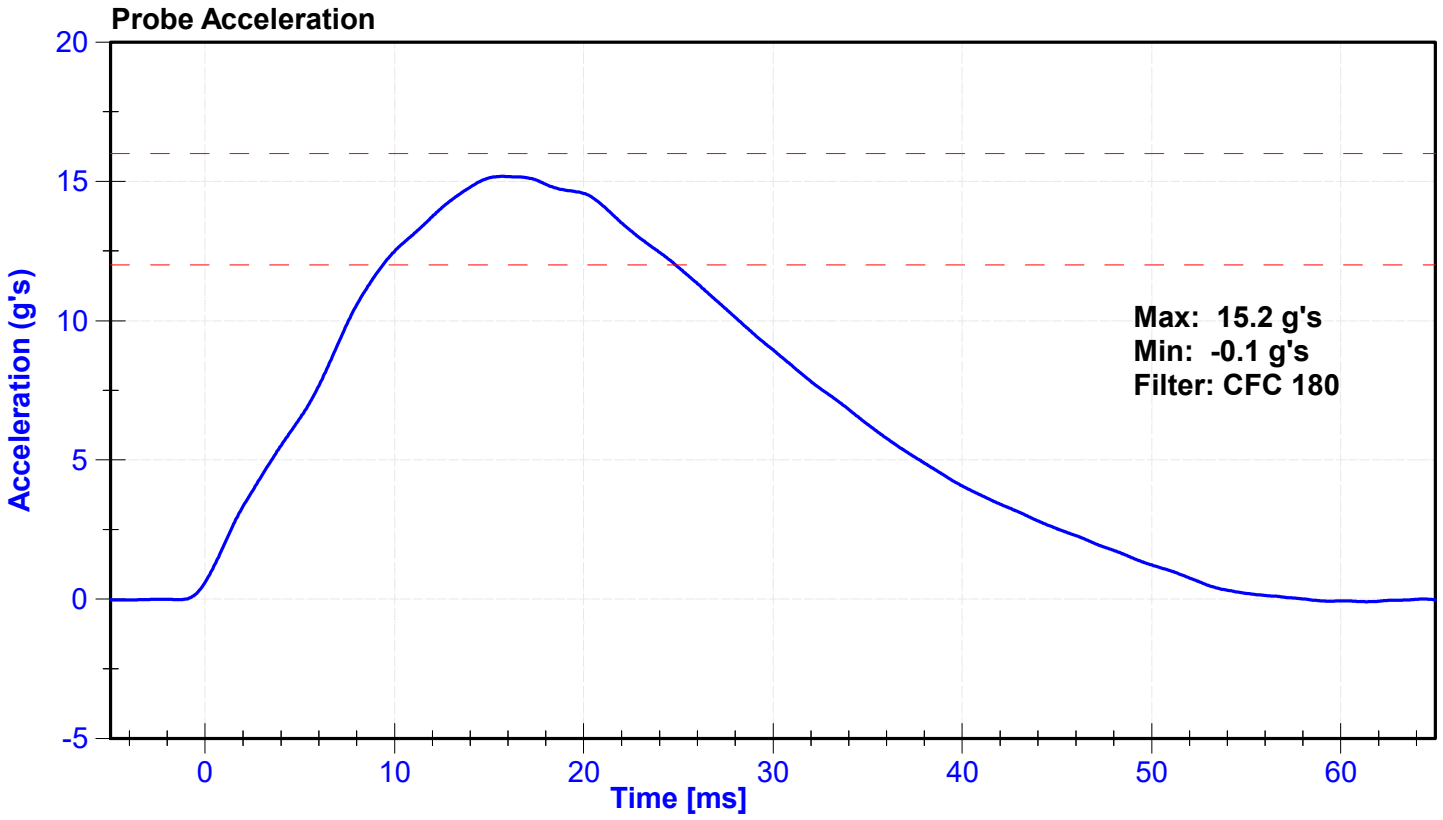
ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

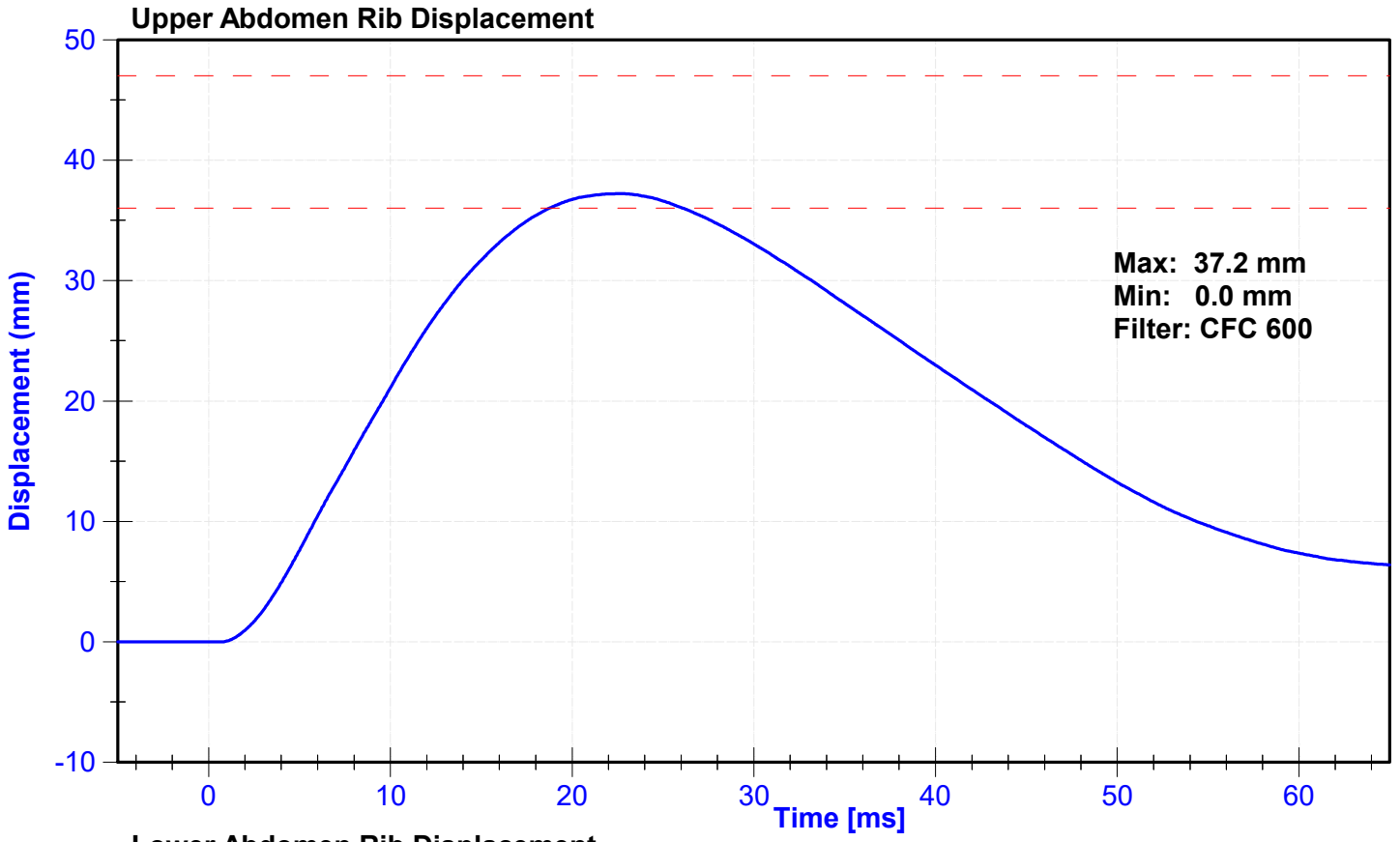
Results

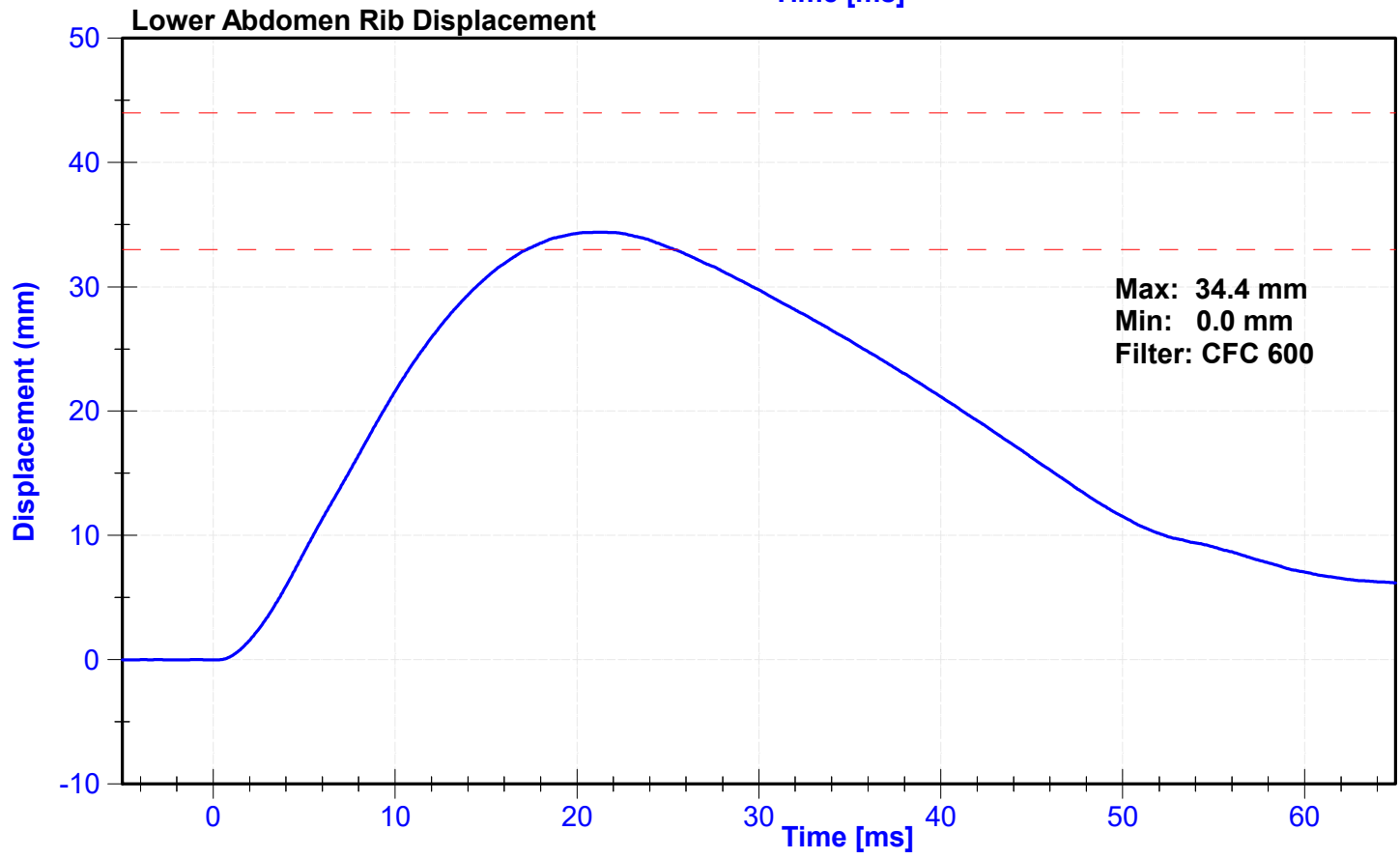
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.9	Pass
Humidity	10	70	%	62	Pass
Velocity	4.2	4.4	m/s	4.28	Pass
Probe Acceleration	12	16	g's	15.2	Pass
Lateral Lower Spine Acceleration	9	14	g's	12.1	Pass
Upper Abdomen Rib Deflection	36	47	mm	37.2	Pass
Lower Abdomen Rib Deflection	33	44	mm	34.4	Pass

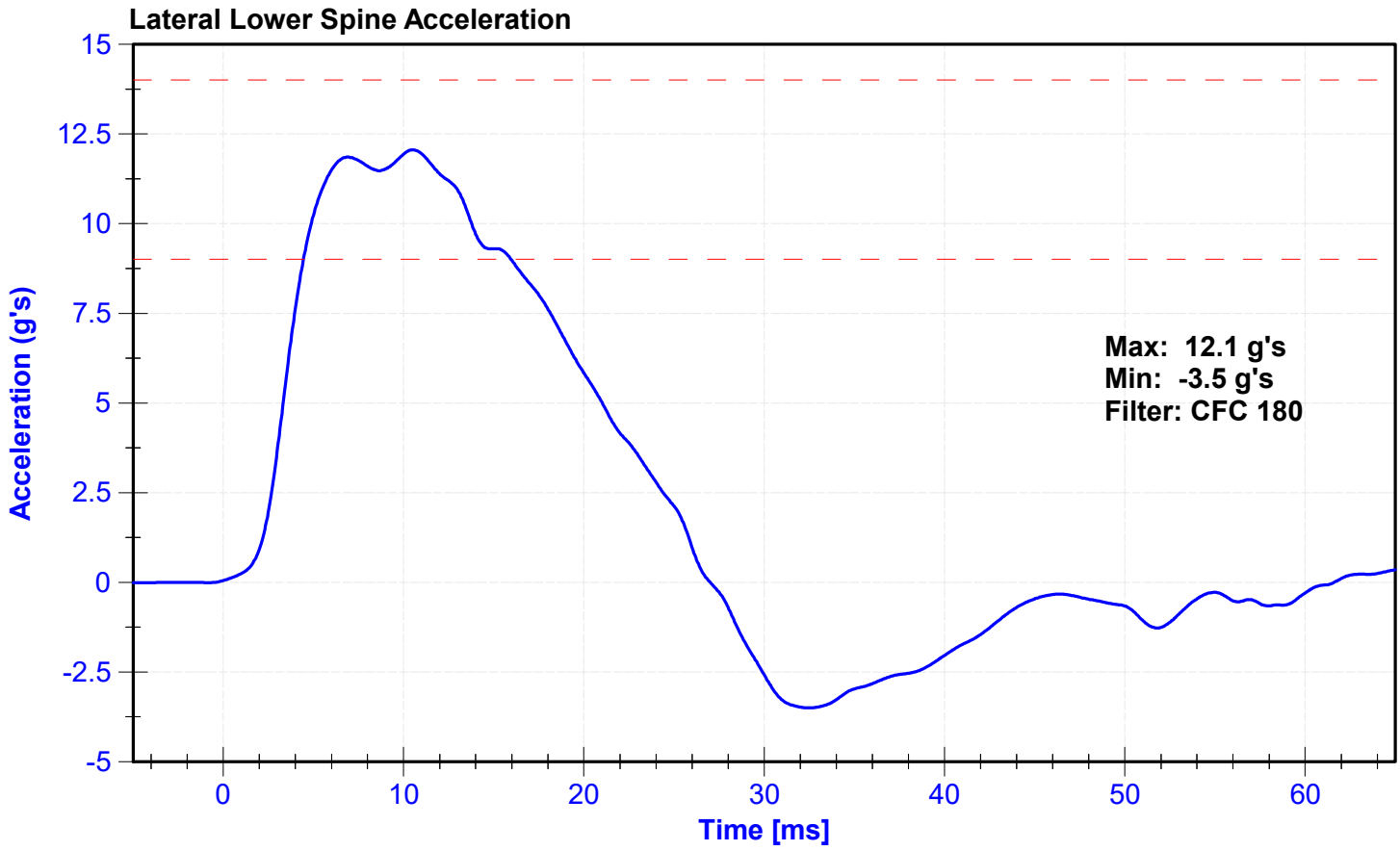
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	18527	8/2/2024	1/29/2025
Lower Spine Y Accelerometer	Endevco	P52071	5/9/2024	11/5/2024
Upper Abdomen Rib Potentiometer		074GFE		
Lower Abdomen Rib Potentiometer		075GFE		




Upper Abdomen Rib Displacement
Displacement (mm)
Time [ms]
Max: 37.2 mm
Min: 0.0 mm
Filter: CFC 600


Lower Abdomen Rib Displacement
Displacement (mm)
Time [ms]
Max: 34.4 mm
Min: 0.0 mm
Filter: CFC 600


Lateral Lower Spine Acceleration
Acceleration (g's)
15
12.5
10
7.5
5
2.5
0
-2.5
-5
0
10
20
30
40
50
60
Time [ms]
Max: 12.1 g's
Min: -3.5 g's
Filter: CFC 180

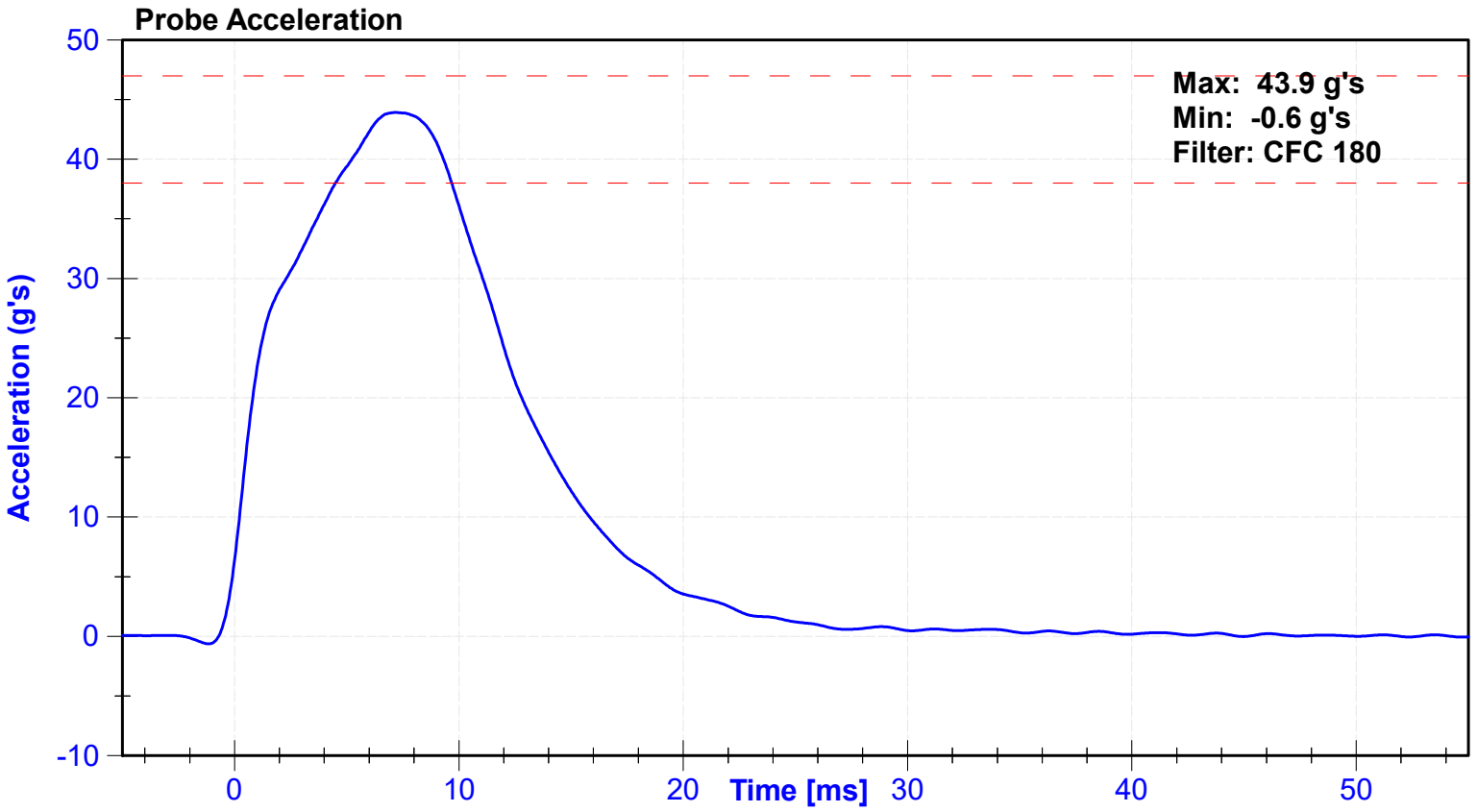
ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

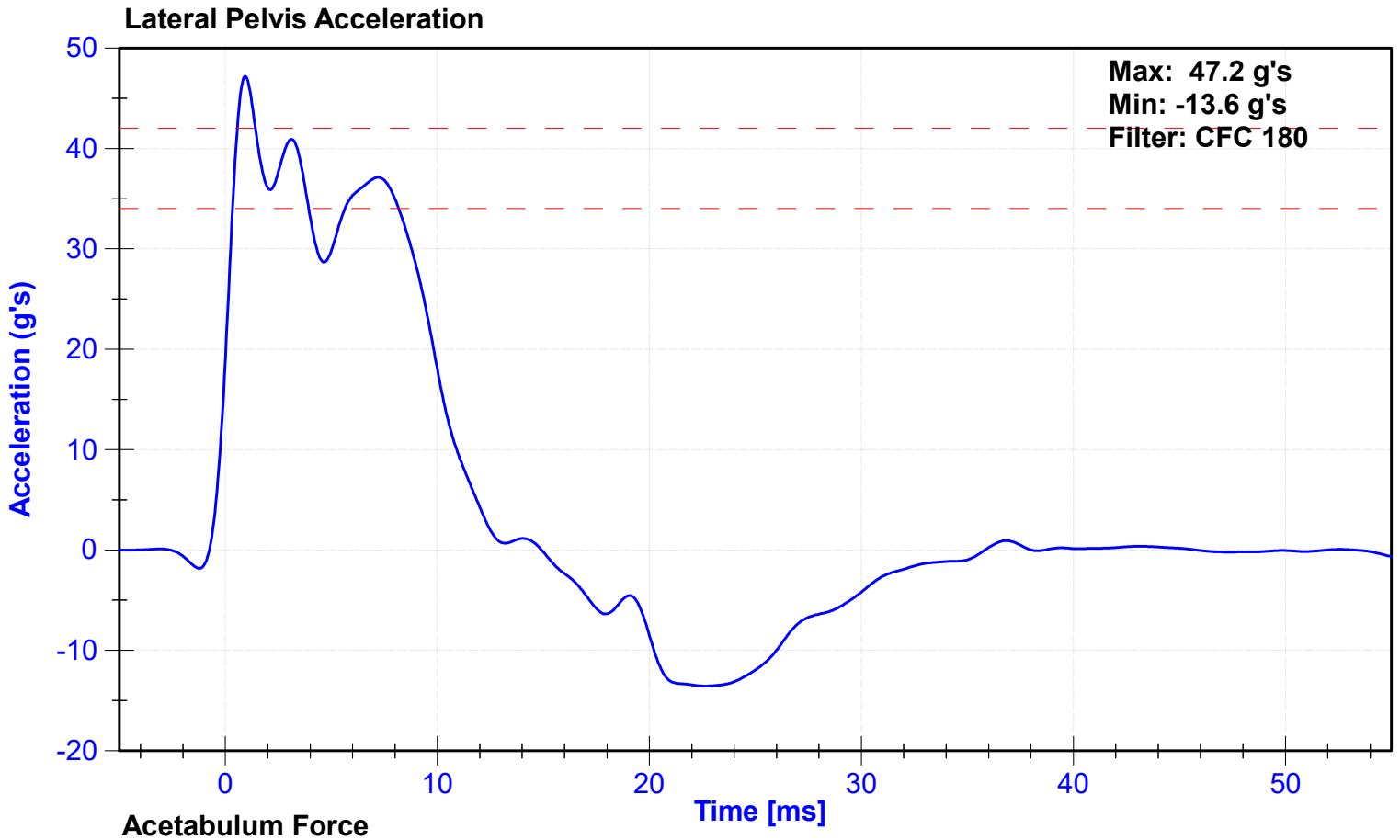
Results

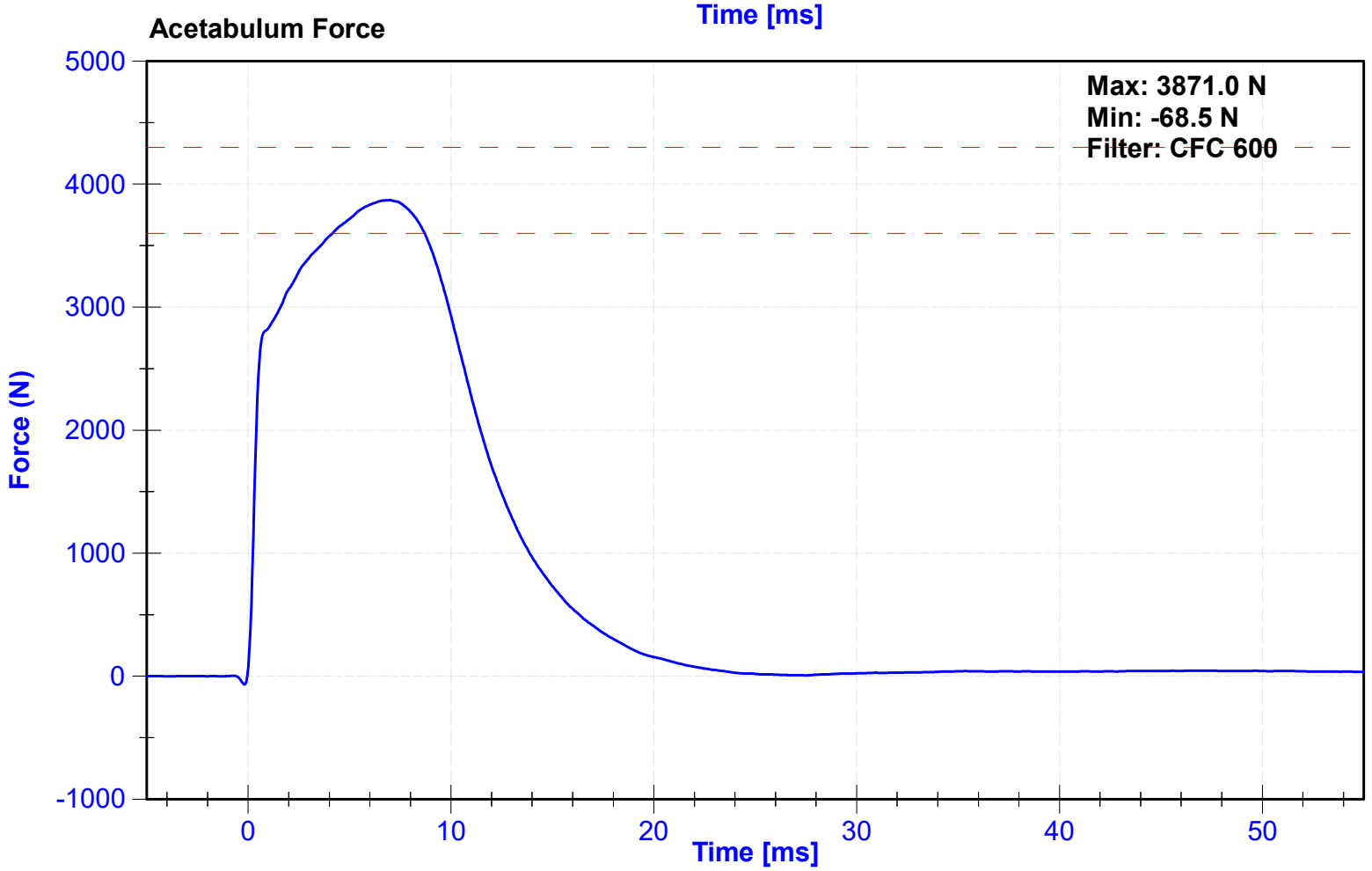
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.7	Pass
Humidity	10	70	%	62	Pass
Velocity	6.6	6.8	m/s	6.66	Pass
Probe Acceleration	38	47	g's	43.9	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	37.1	Pass
Acetabulum Force	3600	4300	N	3871.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18527	8/2/2024	1/29/2025
Pelvis Y Accelerometer	Endevco	P51731	5/9/2024	11/5/2024
Acetabulum Load Cell	Denton	275-FY	7/12/2024	7/12/2025
Certification Plug	SACO			N/A
Crash Test Plug	SACO			N/A




Lateral Pelvis Acceleration
Max: 47.2 g's
Min: -13.6 g's
Filter: CFC 180
Acceleration (g's)
50
40
30
20
10
0
-10
-20
0
10
20
30
40
50
Time [ms]


Acetabulum Force
Max: 3871.0 N
Min: -68.5 N
Filter: CFC 600
Force (N)
5000
4000
3000
2000
1000
0
-1000
0
10
20
30
40
50
Time [ms]

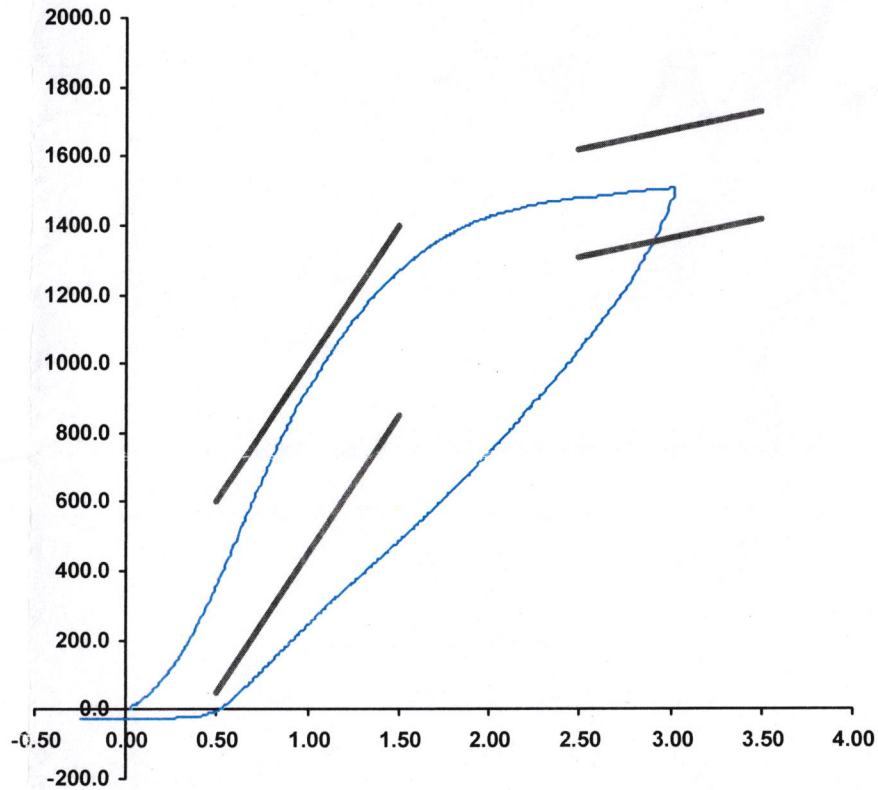
Cert 8/29/24

SID-IIs Pelvis Plug Certification Test

Plug S/N 16439
Test Number 23008
Report Number 23066
Test Date 5/23/2022 11:35:28 AM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	361	50	600
Force @ 1.5 mm (N)	1,267	850	1,400
Force @ 2.5 mm (N)	1,479	1,306	1,618
Force @ 3.0 mm (N)	1,506	1,361	1,673

Force (-N) vs Extension (-mm)



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:

Operator

Part Number 180-4450

Template No 107 23-May-22
SACO Research

By : DC Date : 5/23/2022

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

C-44

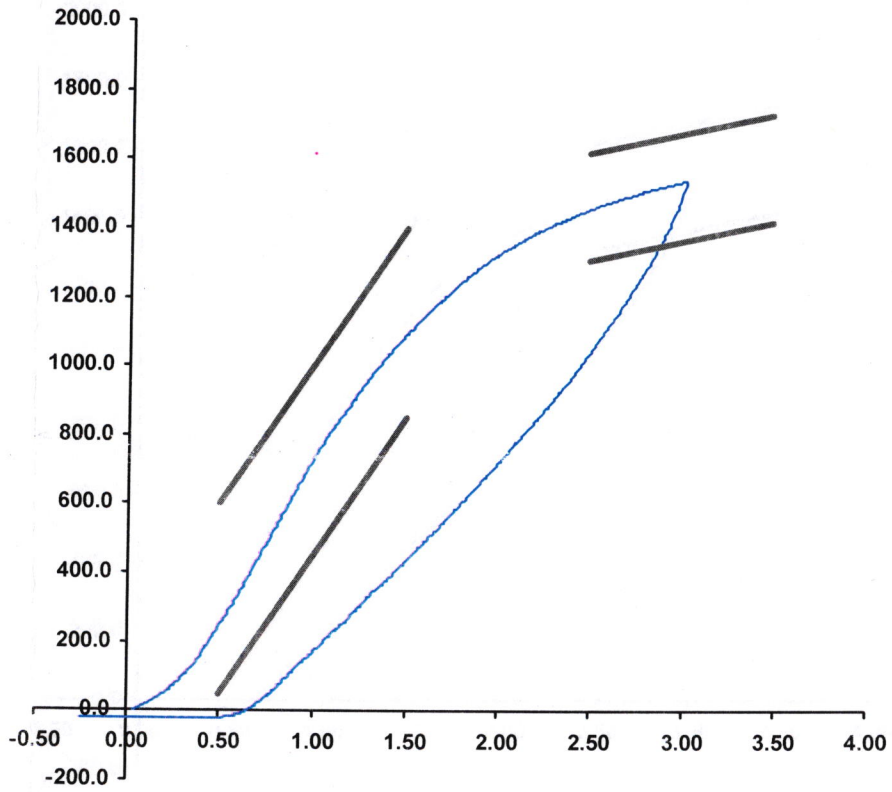
Impact 8/29/24

SID-IIs Pelvis Plug Certification Test

Plug S/N 16482
Test Number 23265
Report Number 23322
Test Date 7/14/2022 12:15:46 PM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	254	50	600
Force @ 1.5 mm (N)	1,091	850	1,400
Force @ 2.5 mm (N)	1,456	1,306	1,618
Force @ 3.0 mm (N)	1,536	1,361	1,673

Force (-N) vs Extension (-mm)



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:

Operator

Part Number 180-4450

Template No 107 14-Jul-22
SACO Research

By : DC Date : 7/14/22

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

C-45

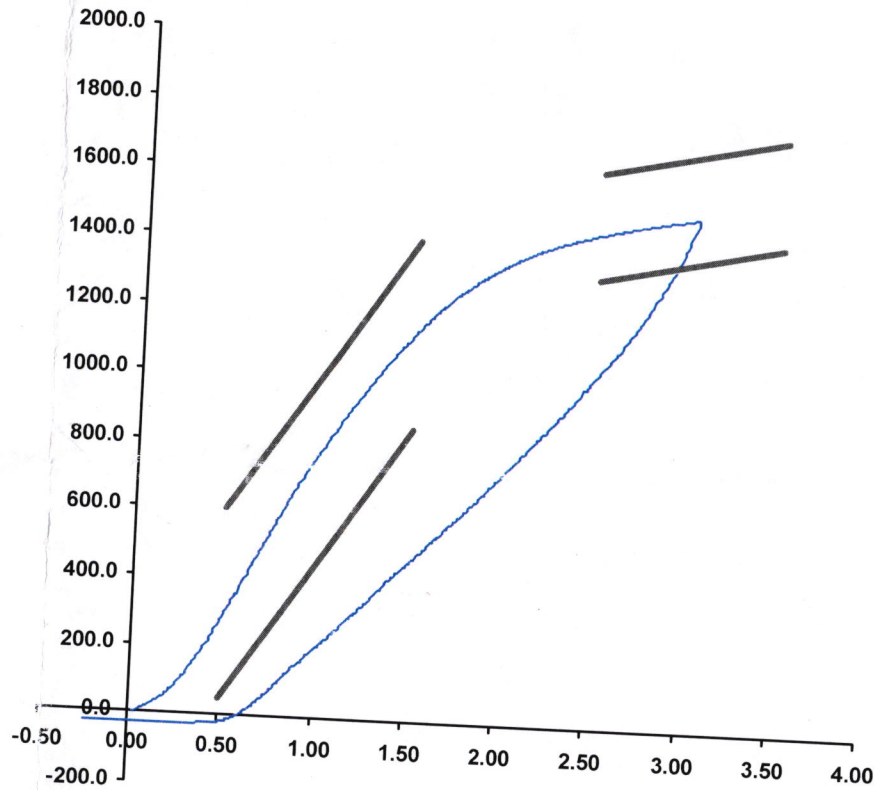
Non Impact 8/29/24

SID-IIs Pelvis Plug Certification Test

Plug S/N 15623
Test Number 20478
Report Number 20532
Test Date 10/7/2021 1:54:28 PM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	294	50	600
Force @ 1.5 mm (N)	1,137	850	1,400
Force @ 2.5 mm (N)	1,441	1,306	1,618
Force @ 3.0 mm (N)	1,495	1,361	1,673

Force (-N) vs Extension (-mm)



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:

Operator

Part Number 180-4450

Template No 107 07-Oct-21
SACO Research

By : DC Date : 10/7/21

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

C-46

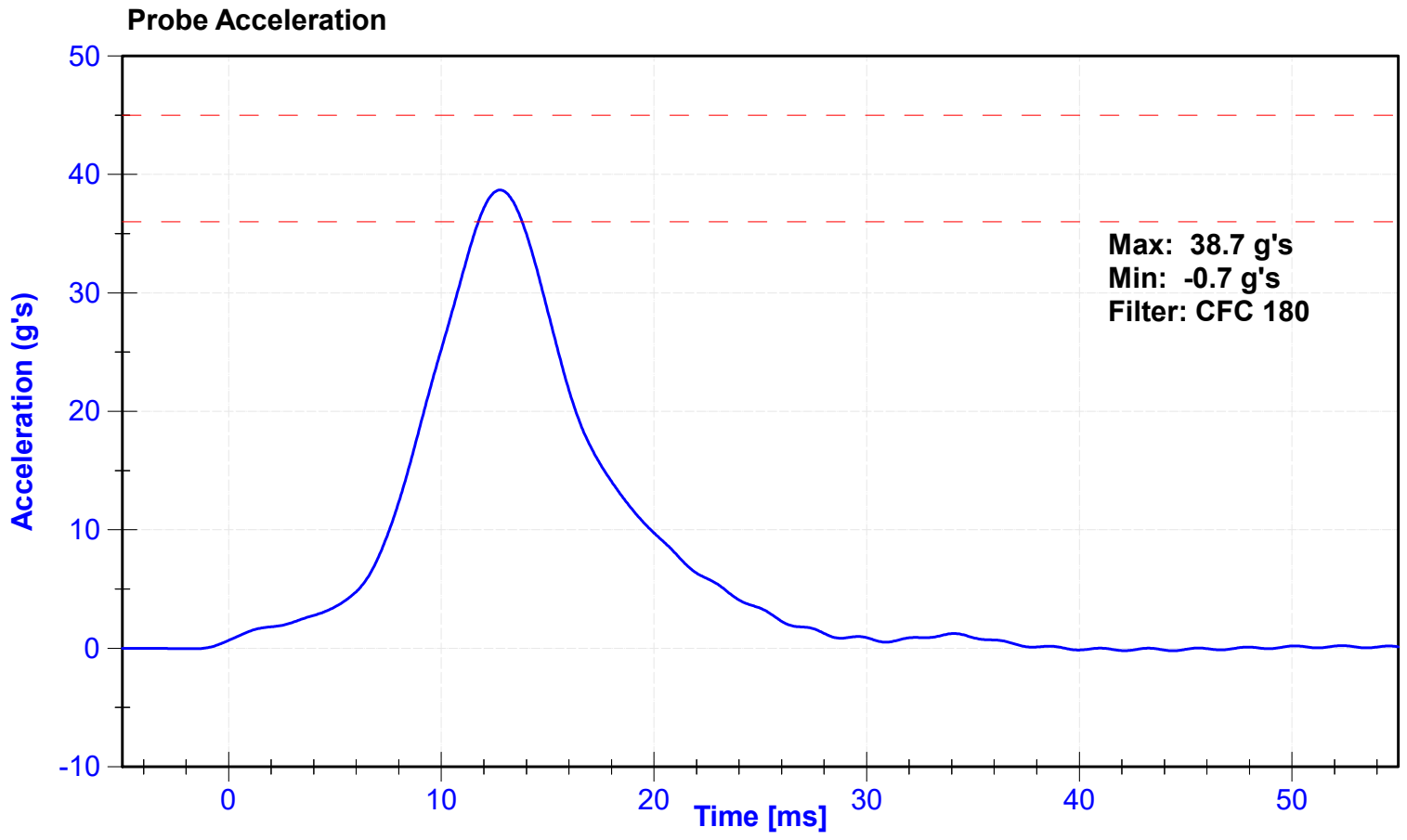
ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

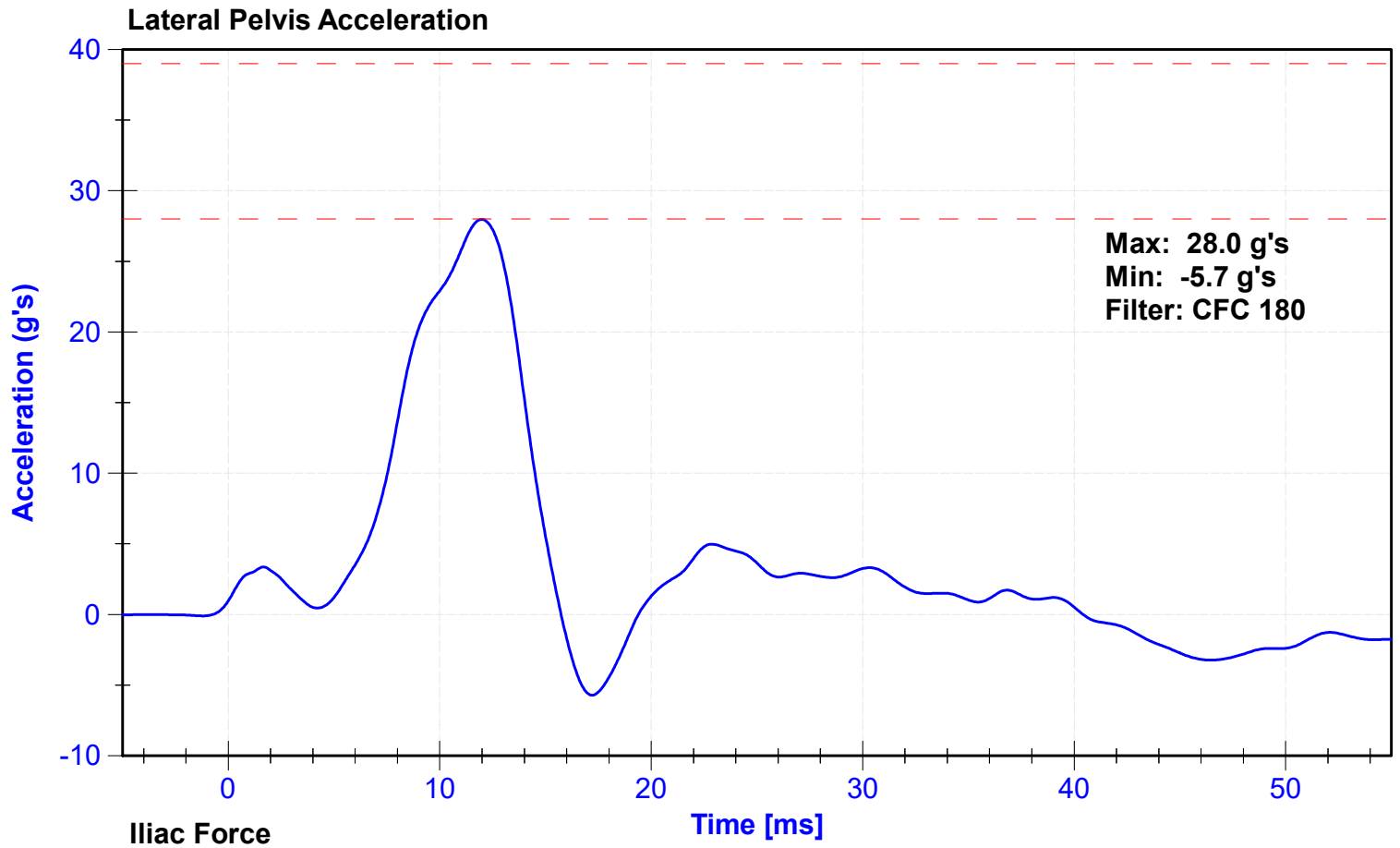
Results

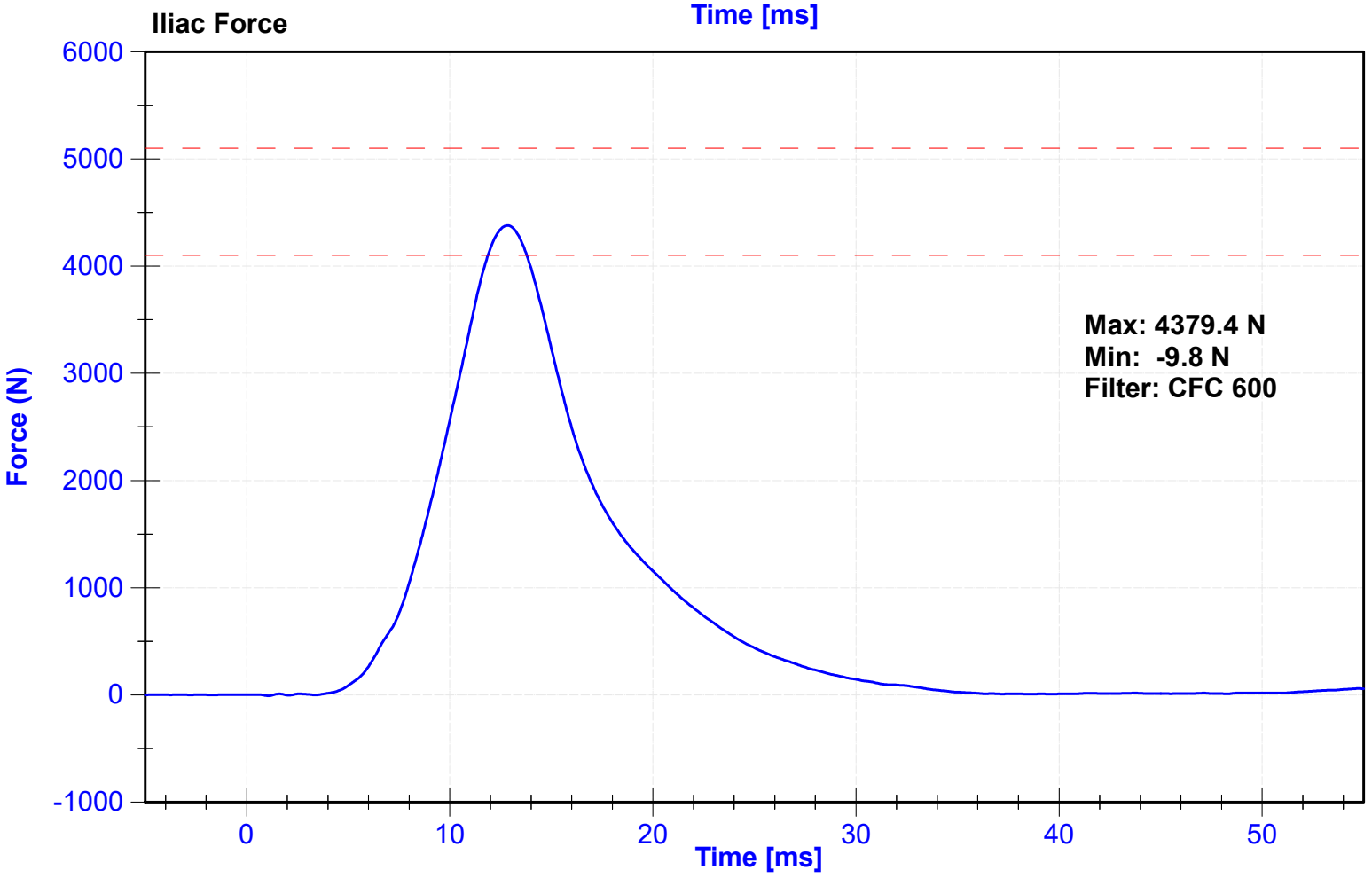
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.7	Pass
Humidity	10	70	%	62	Pass
Velocity	4.2	4.4	m/s	4.28	Pass
Probe Acceleration	36	45	g's	38.7	Pass
Lateral Pelvis Acceleration	28	39	g's	28.0	Pass
Iliac Force	4100	5100	N	4379.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18527	8/2/2024	1/29/2025
Pelvis Y Accelerometer	Endevco	P51731	5/9/2024	11/5/2024
Iliac Load Cell	Denton	279-FY	12/5/2023	12/4/2024




Lateral Pelvis Acceleration
Acceleration (g's)
40
30
20
10
0
-10
0
10
20
30
40
50
Time [ms]
Max: 28.0 g's
Min: -5.7 g's
Filter: CFC 180


Iliac Force
Force (N)
6000
5000
4000
3000
2000
1000
0
-1000
0
10
20
30
40
50
Time [ms]
Max: 4379.4 N
Min: -9.8 N
Filter: CFC 600

APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N: 300		
				Serial Number	**Manufacturer**	**Calibration Date**
Head Accelerometers			X	P59018	Endevco	05/09/2024
			Y	P79189	Endevco	05/09/2024
			Z	P52025	Endevco	05/09/2024
Head Accelerometers - Redundant			X	P68057	Endevco	05/09/2024
			Y	P58986	Endevco	05/09/2024
			Z	P79587	Endevco	05/09/2024
Displacement Potentiometer	Shoulder		Y			
	Thoracic Rib	Upper	Y	2316GFE	Servo	05/09/2024
		Middle	Y	085GFE	Servo	05/09/2024
		Lower	Y	1156GFE	Servo	05/09/2024
	Abdominal Rib	Upper	Y	074GFE	Servo	05/28/2024
		Lower	Y	075GFE	Servo	05/09/2024
Lower Spine Accelerometers (T12)			X	P64003	Endevco	05/09/2024
			Y	P52071	Endevco	05/09/2024
			Z	P17283	Endevco	05/09/2024
Acetabulum Load Cell			Y	267-FY	Denton	09/11/2023
Lilac Wing Load Cell			Y	321	Denton	09/11/2023
Pelvis Plug (Struck Side)				14156	SACO	06/28/2020
Pelvis Plug (Non-Struck Side)				14168	SACO	06/28/2020

Table 2 – Vehicle Instrumentation

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	G25522	Endevco	04/27/2024
Vehicle Center of Gravity	Y	G25523	Endevco	04/27/2024
Vehicle Center of Gravity	Z	G25542	Endevco	04/27/2024
Left Floor Sill	Y	G25559	Endevco	05/09/2024
A-Pillar Sill	Y	G25561	Endevco	05/09/2024
A-Pillar Low	Y	G25581	Endevco	05/09/2024
A-Pillar Mid	Y	G25571	Endevco	05/09/2024
B-Pillar Sill	Y	G23439	Endevco	06/11/2024
B-Pillar Low	Y	G24621	Endevco	05/31/2024
B-Pillar Mid	Y	G23670	Endevco	04/03/2024
Driver Seat	Y	G22603	Endevco	03/18/2024
Engine Top	X	G25863	Endevco	06/04/2024
Engine Top	Y	G25866	Endevco	06/03/2024
Firewall	Y	G23647	Endevco	05/03/2024
Right Roof	Y	G22770	Endevco	04/05/2024
Right Floor Sill	Y	G22719	Endevco	05/07/2024
Rear Floorpan	X	A315020	Measurement Specialties	04/25/2024
Rear Floorpan	Y	A315780	Measurement Specialties	04/25/2024

Table 3 – Pole Instrumentation

Pole Instrumentation	Serial Number	Manufacturer	Calibration Date
Load Cell 1	1220AF-1277329-F0	Interface	06/21/2024
Load Cell 2	1220AF-1117017-F0	Interface	06/21/2024
Load Cell 3	1220AF-1117025-F0	Interface	06/21/2024
Load Cell 4	1220AF-1130989-F0	Interface	06/21/2024
Load Cell 5	1220AF-1281288-F0	Interface	06/21/2024
Load Cell 6	1220AF-1281285-F0	Interface	06/21/2024
Load Cell 7	1220AF-1117035-F0	Interface	06/21/2024
Load Cell 8	1220AF-1117011-F0	Interface	06/21/2024