

**REPORT NUMBER: SINCAP-CAL-22-008**

**NEW CAR ASSESSMENT PROGRAM (NCAP)  
MOVING DEFORMABLE BARRIER SIDE IMPACT TEST**

**KIA Corporation  
2022 KIA EV6 WIND  
Five Door SUV**

**NHTSA No: O20224205**

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



**September 8, 2023**

**FINAL REPORT**

**PREPARED FOR:  
U.S. DEPARTMENT OF TRANSPORTATION  
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION  
OFFICE OF CRASHWORTHINESS STANDARDS  
MAIL CODE: NRM-110  
1200 NEW JERSEY AVE SE  
WASHINGTON, D.C. 20590**

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Prepared by: Nicholas Marshall Date: January 20, 2023  
Nicolas Marshall, Test Engineer

Approved by: Matthew Pronko Date: January 20, 2023  
Matthew Pronko, Test Engineer

**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: \_\_\_\_\_

## TECHNICAL REPORT DOCUMENTATION PAGE

<b>1. Report No.</b> SINCAP-CAL-22-008	<b>2. Government Accession No.</b>	<b>3. Recipient's Catalog No.</b>																												
<b>4. Title and Subtitle</b> Final Report of New Car Assessment Program Side Impact MDB & FMVSS 305 Indicant Testing of a 2022 KIA EV6 WIND Five Door SUV NHTSA No.: O20224205		<b>5. Report Date</b> September 8, 2023																												
		<b>6. Performing Organization Code</b> CAL																												
Nicholas Marshall, Test Engineer Matthew Pronko, Test Engineer		<b>8. Performing Organization Report No.</b> CAL-DOT-2022-008																												
<b>9. Performing Organization Name and Address</b> Calspan Corporation Transportation Test Operations P.O. Box 400 Buffalo, New York 14225		<b>10. Work Unit No.</b>																												
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<b>12. Sponsoring Agency Name and Address</b> U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards (NRM-110) 1200 New Jersey Ave., SE Washington, D.C. 20590		<b>13. Type of Report and Period Covered:</b> Final Test Report January 6, 2023 - September 8, 2023																												
		<b>14. Sponsoring Agency Code</b> NRM-110																												
<b>15. Supplementary Notes</b>																														
<b>16. Abstract</b> A 55/28, (61.90kph / 38.5 mph), 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2022 KIA EV6 WIND 5 Door SUV in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for the generation of consumer information on vehicle side crash protection. This test was conducted at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on January 6, 2023.  The impact velocity of the Moving Deformable Barrier (MDB) was 61.9 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 21°C. The target vehicle's maximum post-test static crush was 269 mm located at level 3. The test vehicle's occupant performance data is as follows:																														
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<p>* Proposed IARV</p> <p>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.</p>																														
<b>17. Key Words</b> New Car Assessment Program (NCAP) Side Impact MDB ES-2re SID-IIs		<b>18. Distribution Statement</b> Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division, NPO-411 1200 New Jersey Ave. SE Washington, D.C. 20590																												
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## TABLE OF CONTENTS

<u>Section</u>		<u>Page</u>
1	Test Purpose and Procedure	1-1
2	Summary of Test Results	2-1
3	Occupant and Vehicle Information	3-1
<u>Data Sheet</u>		<u>Page</u>
1	General Test and Vehicle Parameter Data	3-2
2	Seat, Seat Belt, Steering Wheel Adjustment and Fuel System Data	3-6
3	Dummy Longitudinal Clearance Dimensions	3-10
4	Dummy Lateral Clearance Dimensions	3-11
5	Camera and Instrumentation Data	3-12
6	Test Vehicle Accelerometer Locations	3-13
7	MDB Accelerometer Locations	3-14
8	Post-Test Observations	3-15
9	MDB Summary of Results	3-17
10	Test Vehicle Profile Measurements	3-18
11	Test Vehicle Exterior Crush Measurements	3-19
12	MDB Exterior Static Crush Measurements	3-22
13	Vehicle and MDB Damage Profile Distances	3-23
14	FMVSS No. 301 Static Rollover Results	3-24
15	Dummy/Vehicle Temperature and Humidity Stabilization Data	3-25
305-1	General Test and Vehicle Parameter Data for Indicant FMVSS No. 305 Testing	3-26
305-2	Pre-Impact Data for Indicant FMVSS No.305 Testing	3-27
305-3	Pre-Impact Electrical Isolation Measurements and Calculations for Indicant FMVSS No. 305 Testing	3-28
305-4	Post-Impact Data for Indicant FMVSS No. 305 Testing	3-29
305-5	Static Rollover Test Data for Indicant FMVSS No. 305 Testing	3-30
<u>Appendix</u>		<u>Page</u>
A	Photographs	A-1
B	Vehicle and Dummy Response Data Plots	B-1
C	Dummy Configuration and Performance Verification Data	C-1
D	Test Equipment and Instrumentation Calibration Data	D-1

## **SECTION 1**

### **TEST PURPOSE AND PROCEDURE**

This moving deformable barrier side impact test is part of the MY 2022 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract number 693JJ920D000016. The purpose of this test is to generate comparative side impact performance in a 2022 KIA EV6 WIND 5 Door SUV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated March 2020.

## SECTION 2

### SUMMARY OF TEST RESULTS

A 2022 KIA EV6 WIND 5 Door SUV was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.9 km/h. The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by the Calspan Corporation's Transportation Test Operations Center in Buffalo, New York on January 6, 2023. Pre-test and post-test photographs of the test vehicle, the MDB and the dummies (ES-2re and SID-IIs) are included in this report.

Dummies were placed in the driver and left rear designated seating positions according to instructions specified in the OCWS Side Impact Laboratory Test Procedure, dated March 2020. The side impact event was documented by 9 high-speed and 2 real-time cameras. Camera locations are included in this report.

The Dummies were instrumented in the following manner:

#### DRIVER ATD (ES-2re)

Primary and redundant head CG tri-axial accelerometers

Chest upper rib, middle rib, and lower rib y-axis displacement potentiometers

Abdomen forward, middle, and rear y-axis load cells

Lower spine (T12) tri-axial accelerometers

Public symphysis y-axis load cell

#### PASSENGER ATD (SID-IIs)

Primary and redundant head CG tri-axial accelerometers

Chest upper rib, middle rib, and lower rib y-axis displacement potentiometers

Abdomen upper rib and lower rib y-axis displacement potentiometers

Lower spine (T12) tri-axial accelerometers

Acetabulum and iliac wing y-axis load cells

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

### DUMMY INJURY VALUES

Measurement Description	Driver ATD (ES-2re)		
	Units	Threshold	Result
Head Injury Criteria (HIC36)		1000	76.508
Maximum Thorax Rib Deflection	mm	44	25.243
Combined Abdominal Force	N	2500	1306.059
Pubic Symphysis Force	N	6000	1308.475

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC36)		1000	82.496
Lower Spine (T12) Resultant Acceleration	G	82	53.499
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	1632.874
Maximum Thoracic Rib Deflection	mm	38*	20.732
Maximum Abdominal Rib Deflection	mm	45*	29.825

\*Proposed IARV

### SUPPLEMENTAL RESTRAINT INFORMATION

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

**GENERAL COMMENTS:**

1. P1 serial number – F033
2. P4 serial number – 300

**Data Anomalies:**

The following channel was questionable for

- Left B-Pillar Lower Y Acceleration, Exceeded calibration range and saturated at 12.4 ms
- Left B-Pillar Middle Y Acceleration, Exceeded calibration range and saturated at 12.1 ms
- Left Rear Sill Y Acceleration, Exceeded calibration range at 6.4 ms 12.9 ms 23.2 ms 47.6 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 System 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 – Test Vehicle Accelerometer Locations

Data Sheet No. 7 – MDB Accelerometer Locations

Data Sheet No. 8 – Post-Test Observations

Data Sheet No. 9 – MDB Summary of Results

Data Sheet No. 10 – Test Vehicle Profile Measurements

Data Sheet No. 11 – Test Vehicle Exterior Crush Measurements

Data Sheet No. 12 – MDB Exterior Static Crush Measurements

Data Sheet No. 13 – Vehicle and MDB Damage Profile Distances

Data Sheet No. 14 – FMVSS No. 301 Static Rollover Results

Data Sheet No. 15 – 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: 2022 KIA EV6 WIND 5 Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20224205  
 Test Date: 01/06/2023

**TEST VEHICLE INFORMATION AND OPTIONS**

NHTSA No.	O20224205
Model Year	2022
Make	KIA
Model	EV6 WIND
Body Style	SUV
VIN	KNDC34LA6N5084321
Body Color	Aurora Black Pearl
Odometer Reading (km/mi)	26 miles
Engine Displacement (L)	N/A
Type/No. Cylinders	Electric Vehicle
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 Air Bag	Yes
Driver Curtain Air Bag	Yes
Driver Head/Torso Air Bag	No
Driver Torso Air Bag	No
Driver Torso/Pelvis Air Bag	Yes
Driver Pelvis Air Bag	No
Driver Knee Air Bag	Yes
Rear Pass. Curtain Air Bag	Yes
Rear Pass. Head/Torso Air Bag	No
Rear Pass. Torso Air bag	No
Rear Pass. Torso/Pelvis Air Bag	No
Rear Pass. Pelvis Air Bag	No
Driver Seat Belt Pretensioners	Yes
Rear Pass. Seat Belt Pretensioners	No
Driver Load Limiter	Yes
Rear Pass. Load Limiter	No
Other Safety Restraint	N/A

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

**DATA FROM CERTIFICATION LABEL**

Manufactured By	KIA CORPORATION
Date of Manufacture	08/22
Vehicle Type	MPV

GVWR (kg)	2420
GAWR Front (kg)	1280
GAWR Rear (kg)	1390

**VEHICLE SEATING AND WEIGHT CAPACITY DATA**

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3	N/A	5	
Capacity Weight (VCW) (kg)				375	(A)
DSC X 68.04 kg				340.2	(B)
Cargo Weight (RCLW) (kg)				34.8	(A-B)

**VEHICLE SEAT TYPE**

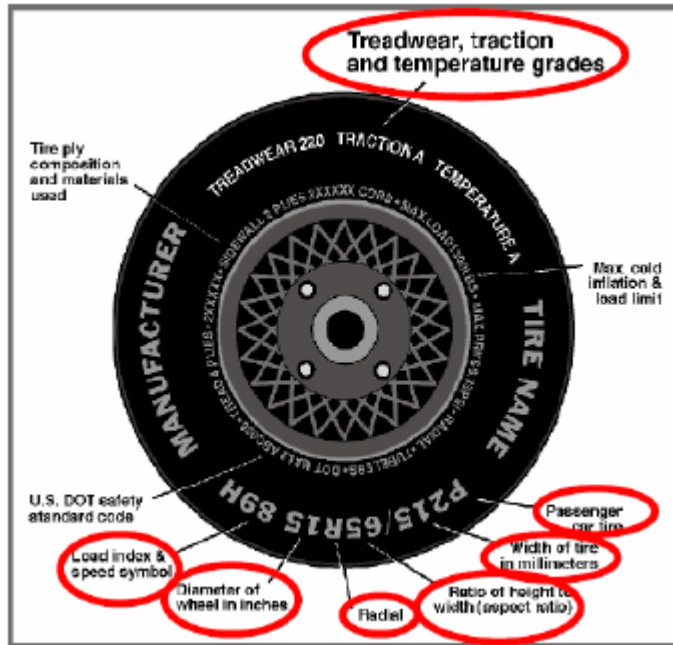
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						W/ Lever	W/ Knob
Front Seat	X						X
Rear or Second Row Seat			X			X	
Third Row Seat							

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

Test Vehicle: 2022 KIA EV6 WIND 5 Door SUV NHTSA No.: 020224205  
 Test Program: NCAP Side MDB Impact Test Test Date: 01/06/2023

**VEHICLE TIRE INFORMATION**

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



**TIRE SIDEWALL INFORMATION**

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	250	250
Recommended Tire Size	235/55R19	235/55R19
Tire Size on Vehicle	235/55R19	235/55R19
Tire Manufacturer	Kumho	Kumho
Tire Model	Crugen	Crugen
Treadwear	500	500
Traction	A	A
Temperature Grade	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Steel, 2 Polyester, 1 Polyamide	2 Steel, 2 Polyester, 1 Polyamide
Load Index/Speed Symbol	101H	101H
Tire Material	Rubber	Rubber
DOT Safety Code Left	1H2 JTYA8E 2722	1H2 JTYA8E
DOT Safety Code Right	1H2 JTYA8E 2722	1H2 JTYA8E

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

Test Vehicle: 2022 KIA EV6 WIND 5 Door SUV NHTSA No.: 020224205  
 Test Program: NCAP Side MDB Impact Test Test Date: 01/06/2023

**TIRE PRESSURES**

	Units	LF	RF	LR	RR
As Delivered	kPa	240	242	241	243
Tire Placard	kPa	250	250	250	250
Owner's Manual	kPa	250	250	250	250
As Tested	kPa	250	250	250	250

**MDB TIRE SPECIFICATIONS**

	Units	Requirement	LF	RF	LR	RR
Tire Size		P205/75R15	P205/75R15	P205/75R15	P205/75R15	P205/75R15
Tire Pressure	kPa	200 ± 21	207	207	207	207

**TEST VEHICLE WEIGHTS**

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	450.5	533		491	593		495	601.5	
Right	kg	447.5	522.5		472	552		461.5	560.5	
Ratio	%	46.0	54.0		45.7	54.3		45.1	54.9	
Totals	kg	898	1055.5	1953.5	963	1145	2108	956.5	1162	2118.5

**TARGET TEST WEIGHT CALCULATION**

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1953.5	(A)
Sum of Actual Weight of 1 ES2re and 1 P572 ATD (SID-IIs)	kg	127	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	34.8	(C)
Calculated Target Vehicle Test Weight (TVTW)	kg	2115.3	(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)?  Yes  No

**TEST VEHICLE ATTITUDES AND CG**

Measurement Description	Units	Fully Loaded	As Tested	Meets Requirement**
LF	mm	866	863	Yes
RF	mm	878	872	Yes
RR	mm	895	893	Yes
LR	mm	887	891	Yes
Vehicle CG (Aft of Front Axle)	mm	1593	1577	
Vehicle CG (Left+)/Right(-) from Longitudinal Centerline)	mm	28	23	

\*\*\* The "As Tested" vehicle attitude measurements must be equal to or within ± 10mm of the "Fully Loaded" vehicle attitude measurements at each wheel well. Indicate "Yes" or "No" for "Meets Requirements".

Test height adjustable suspension setting, if applicable: N/A

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

Test Vehicle:	<u>2022 KIA EV6 WIND 5 Door SUV</u>	NHTSA No.:	<u>020224205</u>
Test Program:	<u>NCAP Side MDB Impact Test</u>	Test Date:	<u>01/06/2023</u>

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

Component Description	Weight (kg)
Trunk Carpeting	14.5
Rear Speaker	4.5
Tire Kit & Charger	3
Front Storage	5.5
Rear Spoiler	4.5
Rear Bumper, Fascia, & Parts	16
Door Panels on Non Struck Side	7.5
<b>Ballast / Equipment Added</b>	<b>0</b>

**TEST SURFACE MARKINGS**

	Distance from 63° Impact Angle Line (mm)
Fore 25 mm target	900
Aft 25 mm target	904
Pre-Impact Angle Line	236

Parallel Track Target	X Location (mm)	Y Location (mm)
A	0	0
B	2955	1555
C	2955	3555
D	0	3000

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

Test Vehicle: 2022 KIA EV6 WIND 5 Door SUV NHTSA No.: O20224205  
 Test Program: NCAP Side MDB Impact Test Test Date: 01/06/2023

**SEAT POSITIONING**

*The driver's seat, front center seat (if applicable), and right front passenger's seat should be set to the mid-track, lowest, mid-angle position. The struck-side rear passenger's seat, rear center seat, and non-struck side rear passengers' seats should be set to the rear-most, lowest, mid-angle position.*

**SCRL ANGLE RANGE**

Seat	SCRL (°)		
	Max	Min	Mid
Driver Seat	21.9	13.4	17.7
Front Passenger Seat	21.7	13.2	17.5
Front Center Seat*			
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat*	Fixed	Fixed	Fixed

*\*if applicable*

**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	17.7	14	Max	74	80	87
			Mid	40	46	54
			Min	5	14	20
Front Passenger Seat	17.5	11	Max	72	78	83
			Mid	38	45	50
			Min	4	11	16
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*	Fixed	Fixed	Max			
			Mid			
			Min			

*\*if applicable*

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

Test Vehicle: 2022 KIA EV6 WIND 5 Door SUV NHTSA No.: 020224205  
 Test Program: NCAP Side MDB Impact Test Test Date: 01/06/2023

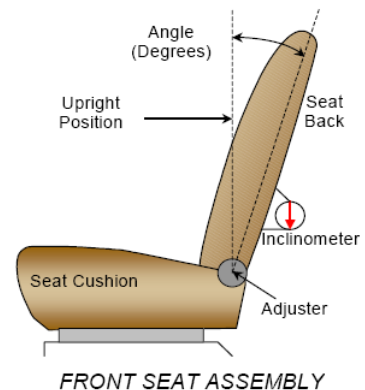
**SEAT FORE / AFT POSITION**

Seat	Total Fore / Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	260	Power	130	Power
Front Passenger Seat	240	Power	120	Power
Front Center Seat*				
Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat*	Fixed	Fixed	Fixed	Fixed

*\*if applicable*

**SEAT BACK ANGLE ADJUSTMENT**

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



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detents*
Driver Seat w/ Seated Dummy	55.8	Power	3.2	Power
Front Passenger Seat	55.4	Power	3.2	Power
Front Center Seat*				
Struck Side Rear Seat w/ Seated Dummy	20.1	13 (0-12)	5.2	0
Non-Struck Side Rear Seat	20.4	13 (0-12)	5.2	0
Rear Center Seat*	20.4	13 (0-12)	5.2	0

*\*if applicable*

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

Test Vehicle: 2022 KIA EV6 WIND 5 Door SUV NHTSA No.: O20224205  
 Test Program: NCAP Side MDB Impact Test Test Date: 01/06/2023

**SEAT BELT ANCHORAGE ADJUSTMENT**

*Seat belt anchorages are adjusted in accordance with the information provided by the manufacturer on Form No. 1. For this test zero is defined as the uppermost position.*

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

**HEAD RESTRAINT ADJUSTMENT**

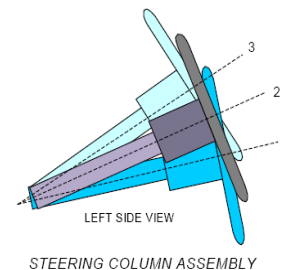
*The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.*

	Total # of Positions	Placed in Position #
Driver Seat	5 (0-4)	Uppermost & Forward
Rear Seat	3 (0-2)	Lowest

**STEERING COLUMN ADJUSTMENT**

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

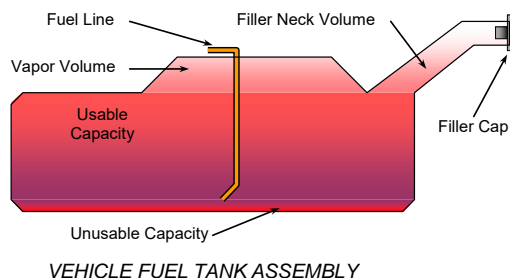
	Degrees	Fore/Aft Position (mm)
Lowermost – Position 1	22.0	
Geometric Center – Position 2	24.6	
Uppermost – Position 3	27.1	
Telescoping Steering Wheel Travel		52
Test Position	24.6	26



**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  
located on the right rear of the vehicle.  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



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

Test Vehicle: 2022 KIA EV6 WIND 5 Door SUV NHTSA No.: O20224205  
 Test Program: NCAP Side MDB Impact Test Test Date: 01/06/2023

**FUEL TANK CAPACITY**

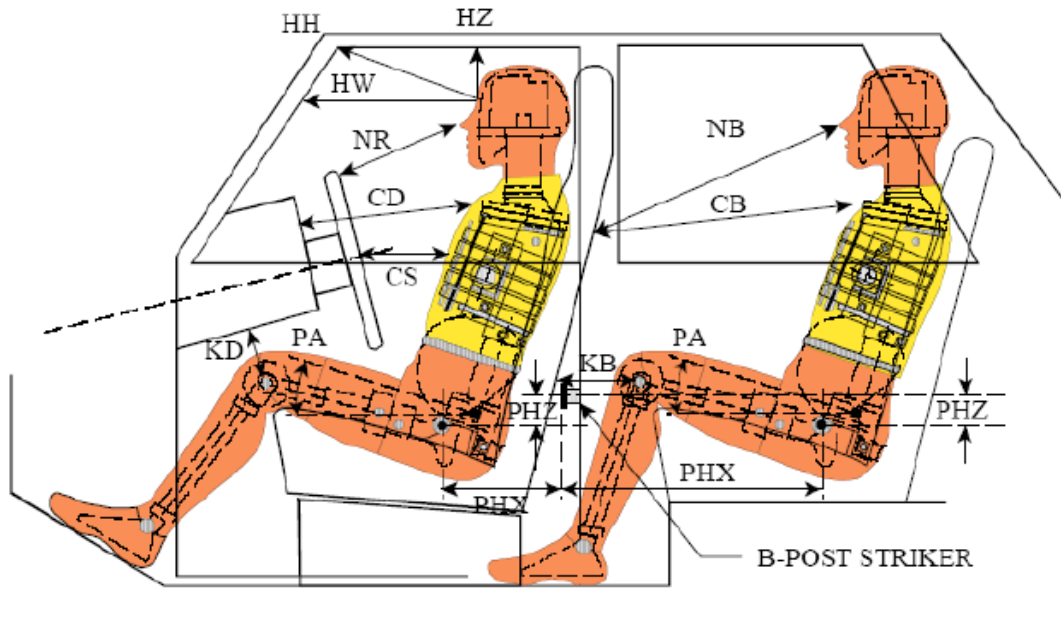
	<b>Liters</b>
Usable Capacity of "Standard Tank" (see Form No. 1)	N/A
Usable Capacity of "Optional Tank" (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	N/A
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	N/A
Actual Amount of Solvent Used in Test	Electric Vehicle
1/3 of Usable Capacity	N/A

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

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

Test Vehicle: 2022 KIA EV6 WIND 5 Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: 020224205  
 Test Date: 01/06/2023



**LEFT SIDE VIEW**

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

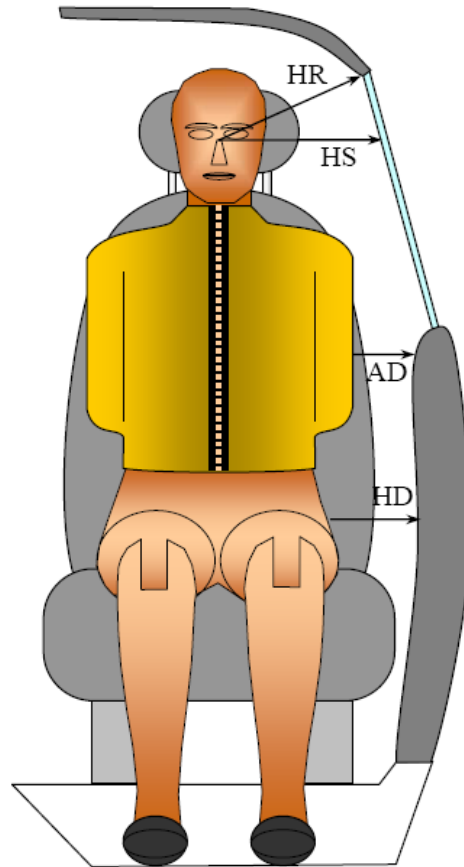
**DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION**

Driver Code	Pass. Code	Description	Driver (Serial No. F033)		Passenger (Serial No.300)	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	340			
HW		Header to Windshield	635			
HZ	HZ	Head to Roof Liner	168		269	
NR	NB	Nose to Rim/Seat Back	455		565	
CD	CB	Chest to Dash/Seat Back	661		566	
CS		Chest to Steering Wheel	381			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	248	28.4	350	17.2
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	210	19.2	344	26.5
PAX°	PAX°	Pelvic Tilt Angle X		22.5		21.1
	PAY°	Pelvic Tilt Angle Y				0.3
PHX	PHX	Hip Point to Striker (X-Axis)	188		219	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	206		198	

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

Test Vehicle: 2022 KIA EV6 WIND 5 Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20224205  
 Test Date: 01/06/2023



*FRONT VIEW OF DUMMY*

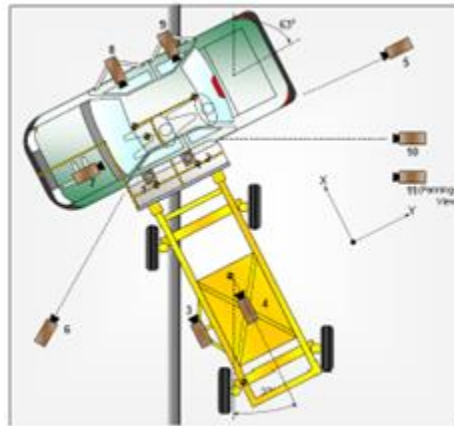
**DUMMY LATERAL CLEARANCE DIMENSION INFORMATION**

Code	Measurement Description	Units	Driver (Serial No. F033)	Passenger (Serial No. 300)
HR	Head to Side Header	mm	174	228
HS	Head to Side Window	mm	310	352
AD	Arm to Door	mm	113	153
HD	Hip Point to Door	mm	158	172

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

Test Vehicle: 2022 KIA EV6 WIND 5 Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20224205  
 Test Date: 01/06/2023



**CAMERA LOCATIONS AND DATA**

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	0	-560	-8992	12.5	1000
2	Overhead Close-up	0	0	-8992	24	1000
3	Left Impact Point (MDB)	-1470	0	-847	25	1000
4	Side Overall (MDB)	-1140	878	-1587	8	1000
5	Rear	442	9148	-1494	28	1000
6	Left Front	-3205	-5375	-1411	24	1000
7	Driver Front (OB)				25	1000
8	Driver Side (OB)				12.5	1000
9	Passenger Side (OB)				12.5	1000
10	Real-time Left Rear				Zoom	30
11	Real-time In run				Zoom	30

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

If applicable, explain why camera(s) did not operate as intended: All cameras operated normally

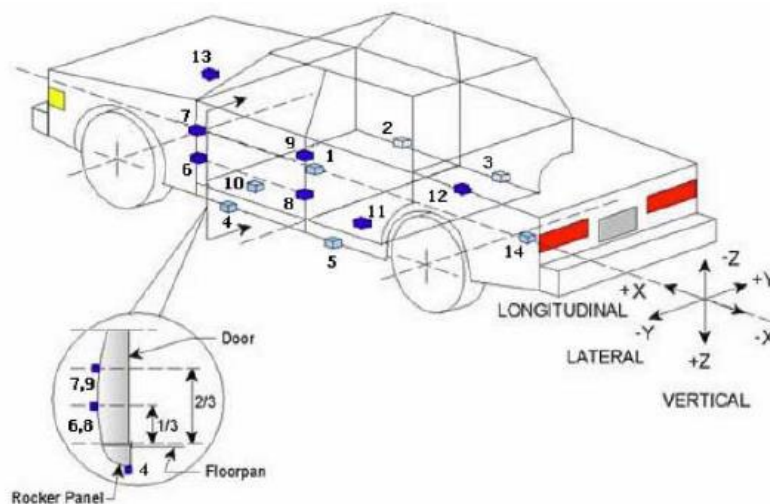
**INSTRUMENTATION**

Driver Dummy Channels	16
Passenger Dummy Channels	16
Vehicle Structure Accelerometers	23
MDB Accelerometers	7
<b>Total</b>	<b>62</b>

**DATA SHEET NO. 6**  
**TEST VEHICLE ACCELEROMETER LOCATIONS**

Test Vehicle: 2022 KIA EV6 WIND 5 Door SUV  
Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20224205  
Test Date: 01/06/2023



**TEST VEHICLE ACCELEROMETER LOCATIONS**

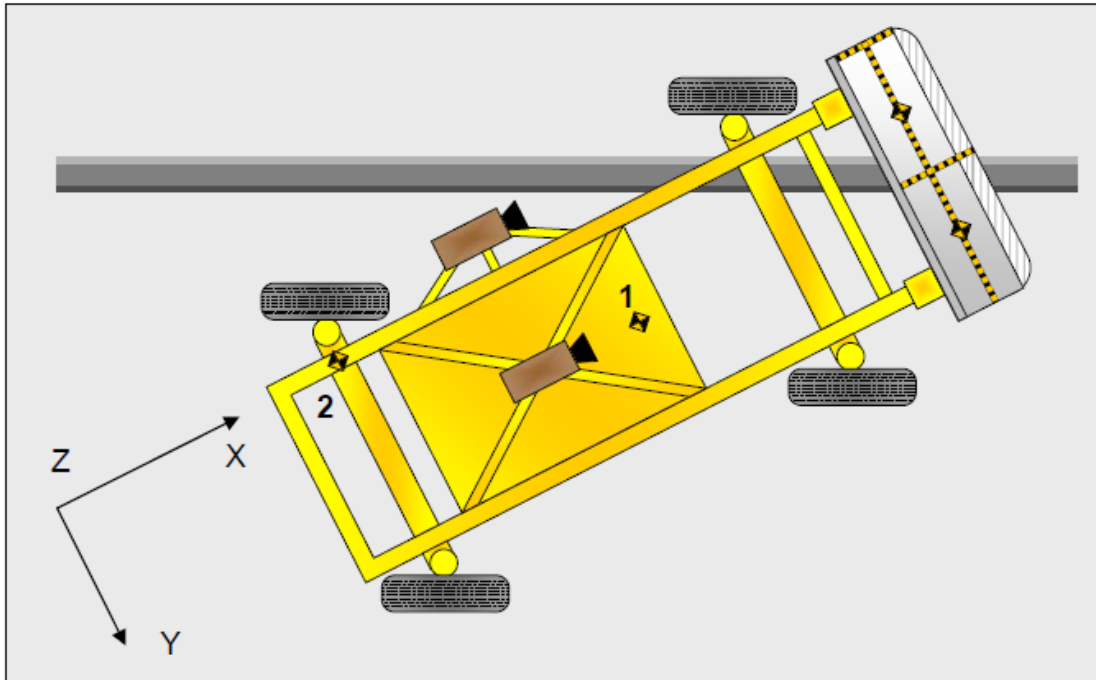
No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2234	-1	158
2	Right Sill at Front Seat	2912	668	88
3	Right Sill at Rear Seat	1869	662	105
4	Left Sill at Front Door	3059	-664	109
5	Left Sill at Rear Door	1956	-667	96
6	A-Post Lower	3319	-648	-143
7	A-Post Middle	3223	-652	-566
8	B-Post Lower	2217	-676	-38
9	B-Post Middle	2159	-661	-503
10	Front Seat Track	2411	-565	121
11	Rear Seat Structure	1840	-363	110
12	Rt. Rear Occ. Compartment	2069	363	155
13	Engine Block	3985	10	-106
14	Rear Above Axle	1044	-17	-114

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

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

Test Vehicle: 2022 KIA EV6 WIND 5 Door SUV  
Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20224205  
Test Date: 01/06/2023



**MDB ACCELEROMETER LOCATIONS**

No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	MDB CG	1859	0	-330
2	MDB Rear	386	-660	-660

Reference: X – Face of MDB (+ forward)  
Y – MDB centerline (+ to right)  
Z – Ground plane (+ down)

Width between left and right contact switches (mm):

1490

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

Test Vehicle: 2022 KIA EV6 WIND 5 Door SUV NHTSA No.: 020224205  
 Test Program: NCAP Side MDB Impact Test Test Date: 01/06/2023

**TEST DUMMY INFORMATION AND CONTACT POINTS**

Dummy Body Part	Front Seat Dummy (ES-2re)	Rear Seat Dummy (SID-IIs)
Face	Curtain Airbag, Side Header	Curtain Airbag
Top of Head	Side Header	Curtain Airbag
Left Side of Head	Curtain Airbag, Side Header	Curtain Airbag
Back of Head	Curtain Airbag, Side Header, & Head Restraint	Curtain Airbag, P6 Head Restraint
Left Shoulder	Curtain Airbag & Torso/Pelvis Airbag	Curtain Airbag
Upper Torso	Torso/Pelvis Airbag, Seat Back	Passenger Door
Lower Torso	Torso/Pelvis Airbag, Seat Back	Passenger Door
Left Hip	Torso/Pelvis Airbag, Seat Back	Passenger Door, Seat Pan
Left Knee	Driver Door	Passenger Door

**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

**POST-TEST STRUCTURAL OBSERVATIONS**

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	A-Pillar, B-Pillar and C-Pillar Buckled
Sill Separation	None
Windshield Damage	None
Side Window Damage	P1 Cracked Throughout, P4 Shattered Completely
Other Notable Effects	P1 Seatback Reclined After Impact From Door Intrusion

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

Test Vehicle: 2022 KIA EV6 WIND 5 Door SUV NHTSA No.: O20224205  
 Test Program: NCAP Side MDB Impact Test Test Date: 01/06/2023

**SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION**

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

**IMPACT POINT LOCATION DATA**

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		2904
Vertical Impact Reference Line (Aft of Front Axle - Intended Impact Point)	mm		508
Actual Impact Point (Aft of Frontal Axle)	mm		498
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact Point	+10
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact Point	+2

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

Test Vehicle: 2022 KIA EV6 WIND 5 Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20224205  
 Test Date: 01/06/2023

**MDB SPECIFICATIONS**

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1,250
Overall Length Including Honeycomb Frame	4,120
Wheelbase of Framework Carriage	2,600
CG Location of Front Axle	1,120

**MDB WEIGHTS**

	Units	Front Axle	Rear Axle	Total
Left	kg	392.5	297.5	690
Right	kg	386	291.5	677.5
Ratio	%	57.4	42.6	100
Totals	kg	778.5	589	1367.5

**SPEED AND ANGLE AT IMPACT DATA**

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.10 to 62.70	61.90
Trap No. 2 Velocity (Redundant)	km/h	61.10 to 62.70	61.91
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90.0
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	63.0
MDB Crabbed angle to MDB Forward Line of Motion	degrees	26.0 to 28.0	27.0

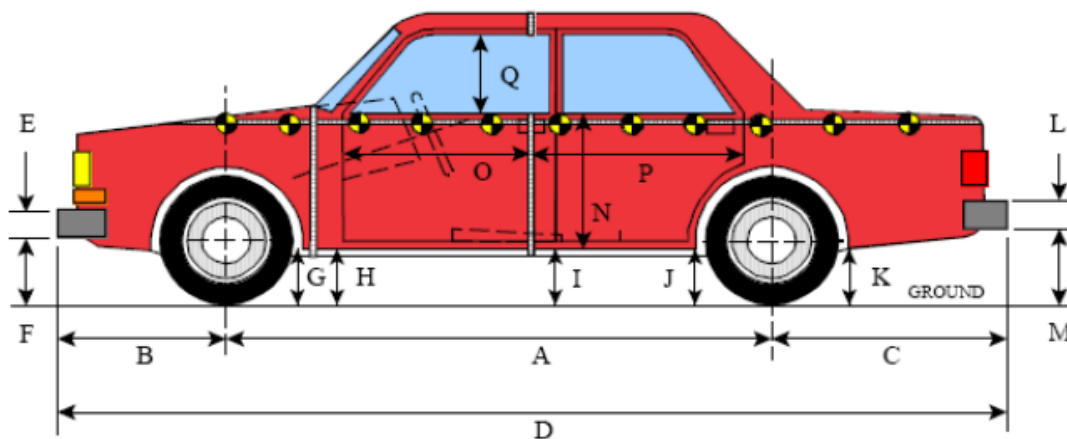
**MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE**

Vertical Location			From Centerline		Maximum Crush (mm)
Row	Description	Height (mm)	Distance (mm)	Direction	
A	Center of Bumper	432	800	Right	261
B	Top of Bumper	533	300	Right	131
C	Mid-Level	686	800	Right	105
D	Top of Stack	813	800	Left	117

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

Test Vehicle: 2022 KIA EV6 WIND 5 Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20224205  
 Test Date: 01/06/2023



**LEFT SIDE VIEW**

All MEASUREMENTS IN (mm) WITH TOLERANCE OF  $\pm 3$ mm

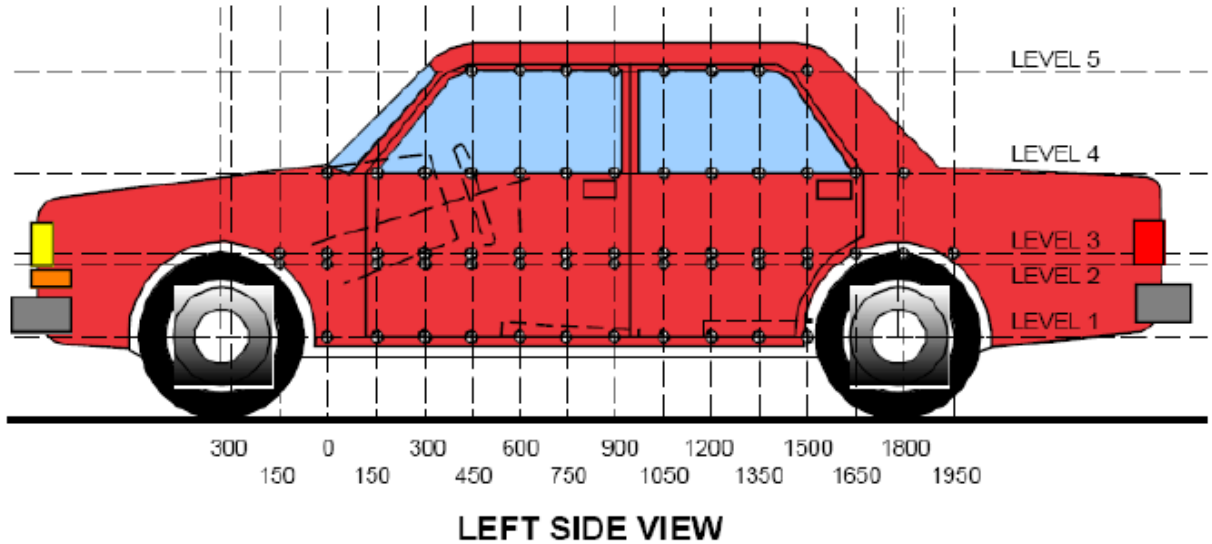
**VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION**

Code	Description	Pre-Test	Post-Test	Change
A	Wheelbase	2904	2897	-7
B	Front Axle to FSOV	829	831	2
C	Rear Axle to RSOV	944	948	4
D	Total Length at Centerline	4674	4676	2
E	Front Bumper Thickness	130	130	0
F	Front Bumper Bottom to Ground	459	465	6
G	Sill Height at Front Wheel Well	186	188	2
H	Sill Height at Front Door Leading Edge	187	193	6
I	Sill Height at B Pillar	196	205	9
J1	Sill Height at Rear Wheel Well	199	197	-2
J2	Pinch Weld Height at Rear Wheel Well	188	190	2
K	Sill Height Aft of Rear Wheel Well	450	452	2
L	Rear Bumper Thickness	335	335	0
M	Rear Bumper Bottom to Ground	387	387	0
N	Sill Height to Bottom of Front Window Sill	852	835	-17
O	Front Door Leading Edge to Impact CL	765	746	-19
P	Rear Door Trailing Edge to Impact CL	1429	1350	-79
Q	Front Window Opening	432	452	20
R	Right Side Length	4595	4598	3
S	Left Side Length	4599	4601	2
T	Maximum Vehicle Width	1860	1658	-202
U	Front Wheel Track Width	1602	1615	13
V	Rear Wheel Track Width	1613	1634	21

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

Test Vehicle: 2022 KIA EV6 WIND 5 Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20224205  
 Test Date: 01/06/2023



**MAXIMUM EXTERIOR CRUSH MEASUREMENTS**

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	328	68	150
2	Driver Hip Point	mm	594	254	1500
3	Mid-Door	mm	664	269	1500
4	Window Sill	mm	1008	131	1500
5	Window Top	mm	1448	12	1500

**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. 11 ... (CONTINUED)**  
**TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2022 KIA EV6 WIND 5 Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20224205  
 Test Date: 01/06/2023

**EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL**

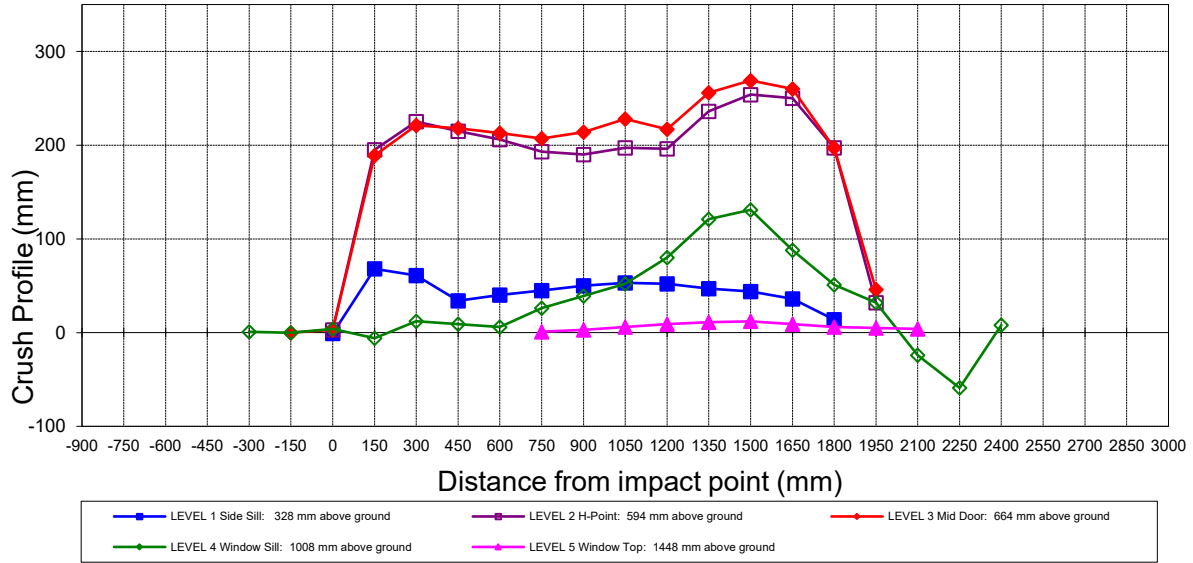
	Pre-Test					Post-Test					Crush				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750															
-600															
-450															
-300				787					786					1	
-150			937	800				937	800				0	0	
0	906	931	931	810		907	928	928	806		-1	3	3	4	
150	891	925	927	817		823	730	738	823		68	195	189	-6	
300	877	928	930	823		816	703	709	811		61	225	221	12	
450	877	931	934	827		843	716	716	818		34	215	218	9	
600	882	933	936	833		842	727	723	827		40	206	213	6	
750	890	933	936	836	602	845	740	729	810	601	45	193	207	26	1
900	896	932	935	840	628	846	742	721	801	625	50	190	214	39	3
1050	901	930	934	842	627	848	733	706	790	621	53	197	228	52	6
1200	907	926	930	843	625	855	730	713	763	616	52	196	217	80	9
1350	909	921	926	842	621	862	685	670	721	610	47	236	256	121	11
1500	912	918	922	841	616	868	664	653	710	604	44	254	269	131	12
1650	908	918	921	841	609	872	668	661	753	600	36	250	260	88	9
1800	903	923	925	845	599	889	726	728	794	593	14	197	197	51	6
1950		929	935	854	588		897	889	822	583		32	46	32	5
2100				870	576				894	572				-24	4
2250				889					948					-59	
2400				899					891					8	
2550															
2700															
2850															
3000															

**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 test based on an estimated impact point.

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

Test Vehicle: 2022 KIA EV6 WIND 5 Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20224205  
 Test Date: 01/06/2023

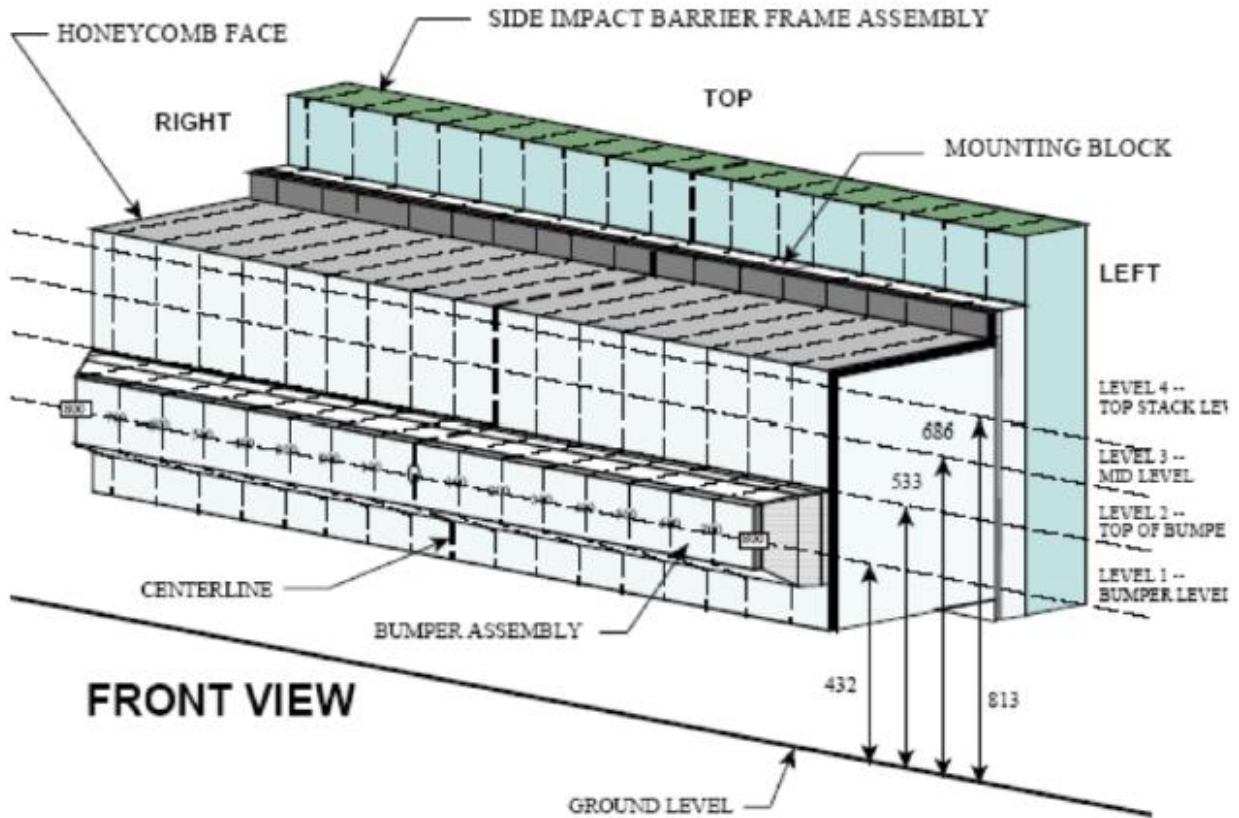


**Vehicle Exterior Crush Measurements - Visual Representation**

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

Test Vehicle: 2022 KIA EV6 WIND 5 Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20224205  
 Test Date: 01/06/2023



NOTE: Dimensions are shown in millimeters, mm

**DEFORMABLE BARRIER STATIC CRUSH**

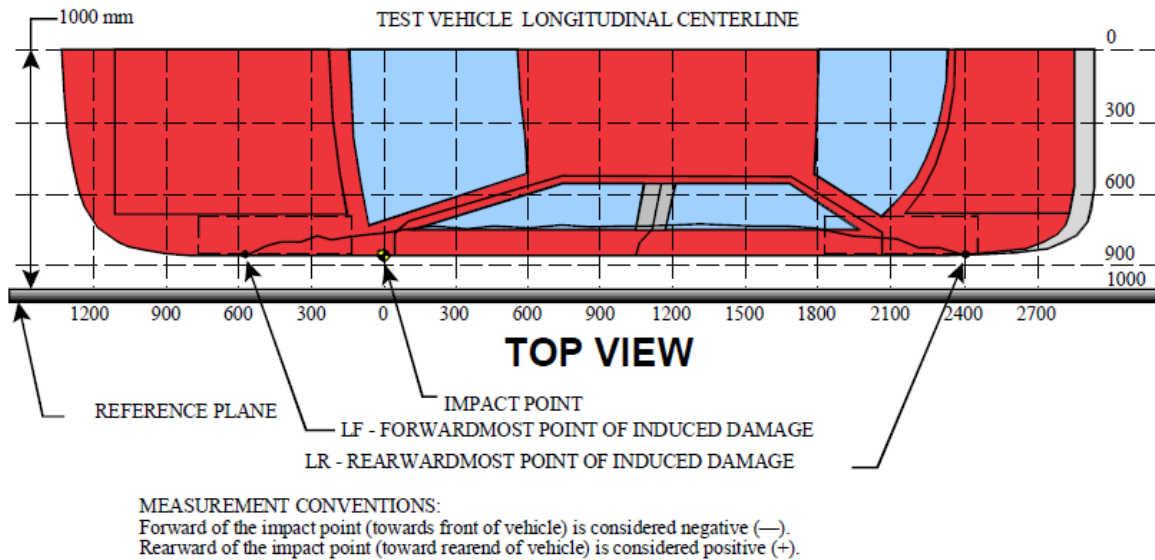
Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100		0	100	200	300	400	500	600	700
1	261	261	258	257	255	257	248	244	241	234	231	228	225	222	219	224	240
2	129	127	129	128	122	131	126	123	119	114	116	101	97	96	95	99	113
3	105	48	34	34	39	55	53	65	45	47	43	40	37	39	47	59	104
4	68	30	23	32	42	78	89	95	67	63	64	60	60	66	72	83	117

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

Test Vehicle: 2022 KIA EV6 WIND 5 Door SUV  
Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20224205  
Test Date: 01/06/2023

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



**VEHICLE DAMAGE PROFILE DISTANCES**

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	-150	3	72	69	3
2	270	3	287	68	219
3	690	3	273	64	209
4	1110	3	288	69	219
5	1530	3	344	78	266
6	1950	3	111	65	46

**MDB DAMAGE PROFILE DISTANCES**

DPD	Distance From Center of MDB	Level	Post-Test (mm)*
1	800 mm left of center	1	240
2	480 mm left of center	1	223
3	160 mm left of center	1	232
4	160 mm right of center	1	246
5	480 mm right of center	1	257
6	800 mm right of center	1	261

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

Test Vehicle: 2022 KIA EV6 WIND 5 Door SUV NHTSA No.: O20224205  
 Test Program: NCAP Side MDB Impact Test Test Date: 01/06/2023

Test Time: 12:25 PM Temperature: 21.0°C

- A. From impact until vehicle motion ceases: \_\_\_\_\_ 0 \_\_\_\_\_ oz.  
 (Maximum allowable is 1 oz.)
- B. For the 5-minute period after motion ceases: \_\_\_\_\_ 0 \_\_\_\_\_ oz.  
 (Maximum allowable is 5 oz.)
- C. For the following 25 minutes: \_\_\_\_\_ 0 \_\_\_\_\_ oz.  
 (Maximum allowable is 1 oz./minute)
- D. Spillage Details: Electric Vehicle

**FMVSS NO. 301 STATIC ROLLOVER DATA**



**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 NO. 301 ROLLOVER 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°				

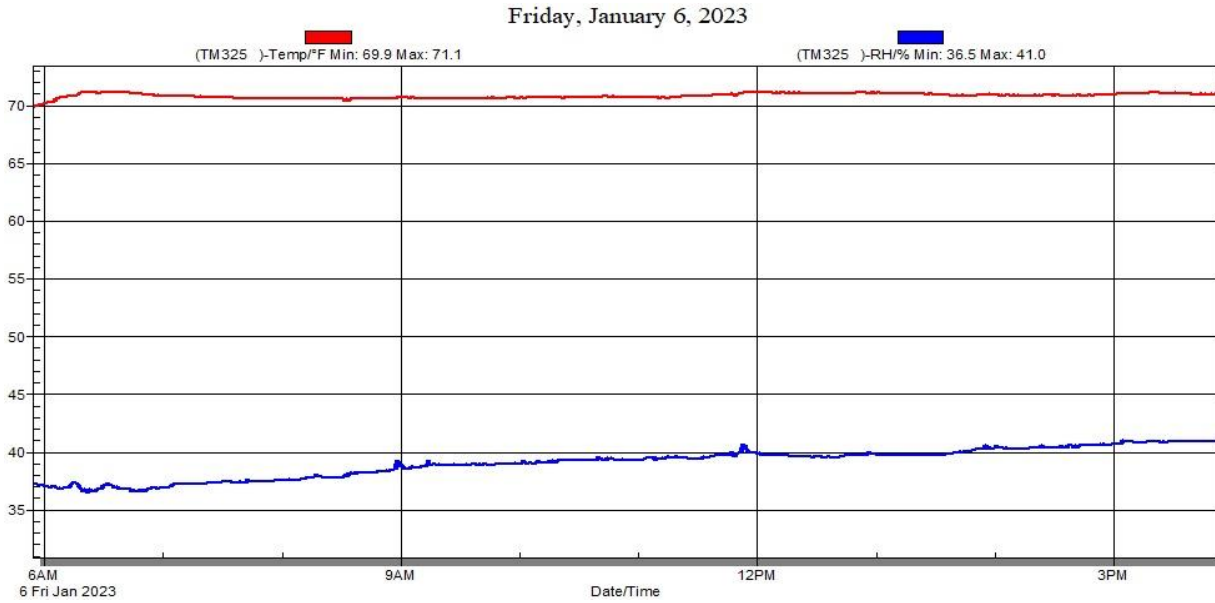
**ROLLOVER SOLVENT SPILLAGE LOCATION TABLE**

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

**DATA SHEET NO. 15**  
**DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA**

Test Vehicle: 2022 KIA EV6 WIND 5 Door SUV  
Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20224205  
Test Date: 01/06/2023



***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:	2022 KIA EV6 WIND 5 Door SUV	NHTSA No.:	O20224205
Test Program:	NCAP Side MDB Impact Test	Test Date:	01/06/2023

**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
Nominal Voltage (Volts)	523
Is this Vehicle equipped with an Automatic Propulsion Battery Disconnect?	Yes
Physical Location of Automatic Propulsion Battery Disconnect, if applicable	Inside of propulsion battery (Rear side)
Auxiliary Battery Type	Lead-Acid

**PROPULSION BATTERY SYSTEM DATA (COTR SUPPLIED)**

Measured Parameter	Value
Electrolyte Fluid Type	Liquid solution, LiPF6 salt, Carbonate solvent
Electrolyte Fluid Specific Gravity	1.19 g/cm3
Electrolyte Fluid Kinematic Viscosity (centistokes)	2~3 cP @ 25°C
Electrolyte Fluid Color	Transparent & Pale Yellow
Propulsion Battery Coolant Type, Color and Specific Gravity (if applicable)	Applied (Water-cooled type) Blue
Location of Battery Modules (Inside or Outside of Passenger Compartment?)	Outside Passenger Compartment

**PROPULSION BATTERY STATE OF CHARGE**

Measured Parameter	Units	Value
<i>For all battery types:</i>		
Voltage Range corresponding to <b>useable energy</b> of the battery:		
Minimum State of Charge	V	480
Maximum State of Charge	V	826
95% of Maximum	V	784.7
Test Voltage *	V	786
<i>For batteries that are rechargeable ONLY by an energy source on the vehicle:</i>		
Voltage range corresponding to <b>useable energy</b> 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: 2022 KIA EV6 WIND 5 Door SUV NHTSA No.: 020224205  
Test Program: NCAP Side MDB Impact Test Test Date: 01/06/2023

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

Measured Parameter	Value
Details of Vehicle Chassis Ground Points & Locations	Any door striker
Details of Propulsion Battery Components	OEM provided necessary documentation

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

Test Vehicle: 2022 KIA EV6 WIND 5 Door SUV NHTSA No.: O20224205  
 Test Program: NCAP Side MDB Impact Test Test Date: 01/06/2023

**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		5/3/2022

**NOTES:**

- The voltmeter used in this test shall measure DC values and have an internal impedance of at least 10 MΩ
- 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	480~826
Propulsion Battery Voltage : (ready to drive position)	$V_b$	V	786.0
Propulsion Battery to Vehicle Chassis	$V_1$	V	552.8
Propulsion Battery to Vehicle Chassis	$V_2$	V	555.9
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	126.1
Propulsion Battery to Vehicle Chassis with $R_o$ installed	$V_2'$	V	127.6
$R_{i1} = R_o * (1 + V_2/V_1) * [(V_1 - V_1')/V_1']$	$R_{i1}$	Ω	2,714,648
$R_{i2} = R_o * (1 + V_1/V_2) * [(V_2 - V_2')/V_2']$	$R_{i2}$	Ω	2,677,779
Lesser value of $R_{i1}$ and $R_{i2}$	$R_i$	Ω	2,677,779
Electrical Isolation Value (Minimum E.I. Value is 500 Ω/V)	$R_i/V_b$	Ω/V	3,407

Is the Electrical Isolation Value  $\geq 500 \Omega/V$  (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  $R_o$  (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: 2022 KIA EV6 WIND 5 Door SUV NHTSA No.: 020224205  
 Test Program: NCAP Side MDB Impact Test Test Date: 01/06/2023

**VOLTMETER INFORMATION**

Measured Parameter	Units	Value
Make & Model		Fluke 1587
Serial No.		581
Internal Impedance Value	MΩ	10
Resolution	V	0.001
Last Calibration Date		5/3/2022

**NOTES:**

- The voltmeter used in this test shall measure DC values and have an internal impedance of at least 10 MΩ
- 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 <sub>b</sub> =	6.0	V	Time:	1	Minutes	45	Seconds
V <sub>1</sub> =	0.500	V	Time:	1	Minutes	56	Seconds
V <sub>2</sub> =	3.200	V	Time:	2	Minutes	11	Seconds
R <sub>o</sub> =	400,000	Ω	Time:		Minutes		Seconds
V <sub>1</sub> ' =	0.040	V	Time:	2	Minutes	24	Seconds
V <sub>2</sub> ' =	0.160	V	Time:	2	Minutes	31	Seconds
R <sub>i1</sub> =	34,040,000	Ω	Time:	2	Minutes	24	Seconds
R <sub>i2</sub> =	8,787,500	Ω	Time:	2	Minutes	31	Seconds
R <sub>i</sub> =	8,787,500	Ω	Time:	2	Minutes	31	Seconds
R <sub>i</sub> /V <sub>b</sub> =	1,464,583	Ω/V	Time:	2	Minutes	31	Seconds

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

**NOTES:**

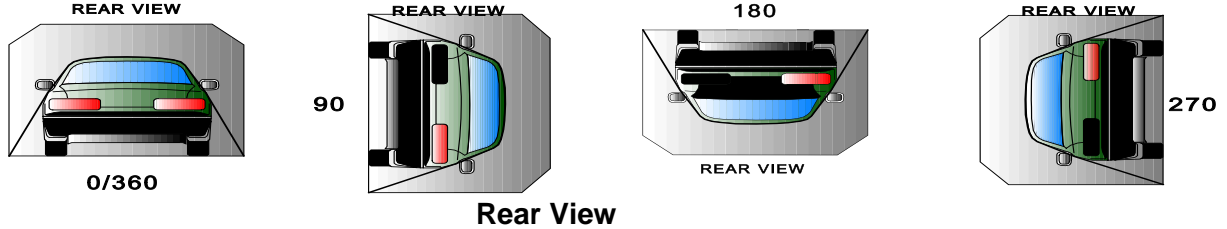
- $R_{i1} = R_o * (1 + V_2/V_1) * [(V_1 - V_1')/V_1']$ ,  $R_{i2} = R_o * (1 + V_1/V_2) * [(V_2 - V_2')/V_2']$ ,  $R_i =$  Lesser value of  $R_{i1}$  and  $R_{i2}$
- If measured voltage is zero and results in a division by zero, record "Zero Volts." This "zero voltage" condition is considered as being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

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

Test Vehicle: 2022 KIA EV6 WIND 5 Door SUV NHTSA No.: 020224205  
 Test Program: NCAP Side MDB Impact Test Test Date: 01/06/2023



**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	Seconds	
0° to 90°	1	12	5	6	12	7
90° to 180°	1	6	5	6	6	7
180° to 270°	1	2	5	6	2	7
270° to 360°	1	10	5	6	10	7

**ACTUAL TEST VEHICLE PROPULSION BATTERY ELECTROLYTE SPILLAGE**

Rollover Stage	Propulsion Battery Electrolyte Spillage	Units	Spillage Location
0° to 90°	0.0	Liters	None
90° to 180°	0.0	Liters	None
180° to 270°	0.0	Liters	None
270° to 360°	0.0	Liters	None
<b>Total Spillage</b>	<b>0.0</b>	<b>Liters</b>	<b>None</b>

\* 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)  No  
 Is propulsion battery electrolyte spillage visible in the passenger compartment?  Yes (Fail)  No

**VOLTMETER INFORMATION**

Measured Parameter	Units	Value
Make & Model		Fluke 1587
Serial No.		51800115
Internal Impedance Value	MΩ	10
Propulsion Battery Voltage (V <sub>b</sub> )	V	5.93

**NOTES:**

- The voltmeter used in this test shall measure DC values and have an internal impedance of at least 10 MΩ
- 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: 2022 KIA EV6 WIND 5 Door SUV NHTSA No.: O20224205  
 Test Program: NCAP Side MDB Impact Test Test Date: 01/06/2023

**ELECTRICAL ISOLATION MEASUREMENTS & CALCULATIONS**

Parameter	Rollover Stage	Value	Units		Minutes	Seconds
$V_1 =$	90°	0.22	V	Time:	1	27
	180°	1.38	V		19	46
	270°	0.22	V		28	18
	360°	0.19	V		36	40
$V_2 =$	90°	3.86	V	Time:	1	45
	180°	3.12	V		19	58
	270°	3.90	V		28	33
	360°	3.51	V		36	57
$V_1' =$	90°	0.01	V	Time:	2	13
	180°	0.11	V		20	5
	270°	0.04	V		28	46
	360°	0.06	V		37	11
$V_2' =$	90°	0.22	V	Time:	2	26
	180°	0.18	V		20	16
	270°	0.18	V		28	55
	360°	0.17	V		37	29
$R_{i1} =$	90°	155,781,818	$\Omega$	Time:	2	13
	180°	15,059,289	$\Omega$		20	5
	270°	33,709,091	$\Omega$		28	46
	360°	16,877,193	$\Omega$		37	11
$R_{i2} =$	90°	6,995,384	$\Omega$	Time:	2	26
	180°	9,423,077	$\Omega$		20	16
	270°	8,732,991	$\Omega$		28	55
	360°	8,284,230	$\Omega$		37	29
$R_i =$	90°	6,995,384	$\Omega$	Time:	2	26
	180°	9,423,077	$\Omega$		20	16
	270°	8,732,991	$\Omega$		28	55
	360°	8,284,230	$\Omega$		37	29
$R_i/V_b =$	90°	1,177,674	$\Omega/V$	Time:	2	26
	180°	1,589,052	$\Omega/V$		20	16
	270°	1,472,680	$\Omega/V$		28	55
	360°	1,394,652	$\Omega/V$		37	29

Is the Electrical Isolation Value  $\geq 500 \Omega/V$  (Yes/No)?  Yes  No (Fail)

**APPENDIX A**  
**PHOTOGRAPHS**

## TABLE OF PHOTOGRAPHS

Fig.	Description	Page
1	As-Delivered Right Front 3/4 View of Test Vehicle	A-6
2	As-Delivered Left Rear 3/4 View of Test Vehicle	A-6
3	Pre-Test Frontal View of Test Vehicle	A-7
4	Post-Test Frontal View of Test Vehicle	A-7
5	Pre-Test Left Front 3/4 View of Test Vehicle	A-8
6	Post-Test Left Front 3/4 View of Test Vehicle	A-8
7	Pre-Test Left Side View of Test Vehicle	A-9
8	Post-Test Left Side View of Test Vehicle	A-9
9	Pre-Test Left Rear 3/4 View of Test Vehicle	A-10
10	Post-Test Left Rear 3/4 View of Test Vehicle	A-10
11	Pre-Test Rear View of Test Vehicle	A-11
12	Post-Test Rear View of Test Vehicle	A-11
13	Pre-Test Right Side View of Test Vehicle	A-12
14	Post-Test Right Side View of Test Vehicle	A-12
15	Pre-Test Overhead View of Test Area	A-13
16	Post-Test Overhead View of Test Area	A-13
17	Pre-Test Left Side View of MDB Positioned Against Side of Test Vehicle	A-14
18	Pre-Test Right Side View of MDB Positioned Against Side of Test Vehicle	A-14
19	Pre-Test Close-Up View of Impact Point Target	A-15
20	Post-Test Close-up View of Impact Point Target	A-15
21	Pre-Test Left Front Door Latch Close-Up	A-16
22	Post-Test Left Front Door Latch Close-Up	A-16
23	Pre-Test Left Rear Door Latch Close-Up	A-17
24	Post-Test Left Rear Door Latch Close-Up	A-17
25	Pre-Test Front Close-up View of Driver Dummy	A-18
26	Post-Test Front Close-up View of Driver Dummy	A-18
27	Pre-Test Left Side View of Driver Dummy Showing Belt and Chalking	A-19
28	Pre-Test Left Side View of Driver Dummy Shoulder and Door Top View	A-19
29	Post-Test Left Side View of Driver Dummy Shoulder and Door Top View	A-20
30	Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning	A-20
31	Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint	A-21
32	Pre-Test Frontal View of Driver Seat Pan Prior to Dummy Positioning	A-21
33	Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan	A-22
34	Pre-Test Placement of Driver Dummy's Feet	A-22

<b>Fig.</b>	<b>Description</b>	<b>Page</b>
35	Pre-Test View of Belt Anchorage for Driver Dummy	A-23
36	Pre-Test Left Side View of Steering Wheel	A-23
37	View of Disengaged Parking Brake	A-24
38	Pre-Test View of Parking Brake	A-24
39	Pre-Test Close-Up Left Side View of Driver Seat Track	A-25
40	Pre-Test Close-Up Left Side View of Driver Seat Back	A-25
41	Pre-Test Close-Up View of Driver Seat Back or Head Restraint	A-26
42	Pre-Test Driver Dummy and Door Clearance View	A-26
43	Post-Test Driver Dummy and Door Clearance View	A-27
44	Pre-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment	A-27
45	Post-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment	A-28
46	Pre-Test Driver Inner Door Panel View	A-28
47	Post-Test Driver Inner Door Panel View Showing Driver Dummy Contact Locations	A-29
48	Post-Test Driver Dummy Close-Up Head Contact with Vehicle View	A-29
49	Post-Test Driver Dummy Close-Up Head Contact with Side Air Bag View	A-30
50	Post-Test Driver Dummy Close-Up Torso Contact with Vehicle Interior View	A-30
51	Post-Test Driver Dummy Close-Up Torso Contact with Side Air Bag View	A-31
52	Post-Test Driver Dummy Close-Up Pelvis Contact View	A-31
53	Post-Test Driver Dummy Close-Up Pelvis Contact with Side Air Bag View	A-32
54	Post-Test Driver Dummy Close-Up Knee Contact View	A-32
55	Pre-Test Left Side View of Rear Passenger Dummy Showing Belt and Chalking	A-33
56	Pre-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View	A-33
57	Post-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View	A-34
58	Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning	A-34
59	Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint	A-35
60	Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning	A-35
61	Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan	A-36
62	Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket	A-36
63	Pre-Test View of Rear Passenger Dummy's Head Showing Dummy's Head is Level	A-37
64	Pre-Test Placement of Rear Passenger Dummy's Feet	A-37
65	Pre-Test View of Belt Anchorage for Rear Passenger Dummy	A-38
66	Pre-Test Close-Up Left Side View of Rear Passenger Seat Track	A-38
67	Pre-test Close-Up Left Side View of Rear Passenger Seat Back	A-39
68	Pre-Test Close-Up View of Rear Passenger Seat Back or Head Restraint	A-39

<b>Fig.</b>	<b>Description</b>	<b>Page</b>
69	Pre-Test Rear Passenger Dummy and Door Clearance View	A-40
70	Post-Test Rear Passenger Dummy and Door Clearance View	A-40
71	Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment	A-41
72	Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment	A-41
73	Pre-Test Rear Passenger Inner Door Panel View	A-42
74	Post-Test Rear Passenger Inner Door Panel View Showing Rear Passenger Dummy Contact Locations	A-42
75	Post-Test Rear Passenger Dummy Close-Up Head Contact with Vehicle View	A-43
76	Post-Test Rear Passenger Dummy Close-Up Head Contact with Side Air Bag View	A-43
77	Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Interior View	A-44
78	Post-Test Rear Passenger Dummy Close-Up Torso Contact with Side Air Bag View	A-44
79	Post-Test Rear Passenger Dummy Close-Up Pelvis Contact View	A-45
80	Post-Test Rear Passenger Dummy Close-Up Pelvis Contact with Side Air Bag View	A-45
81	Post-Test Rear Passenger Dummy Close-Up Knee Contact View	A-46
82	Pre-Test View of Charging Port	A-46
83	Post-Test View of Charging Port	A-47
84	Pre-Test Front View of MDB Impactor Face	A-47
85	Post-Test Front View of MDB Impactor Face	A-48
86	Pre-Test Top View of MDB Impactor Face	A-48
87	Post-Test Top View of MDB Impactor Face	A-49
88	Pre-Test Left Side View of MDB Impactor Face	A-49
89	Post-Test Left Side View of MDB Impactor Face	A-50
90	Pre-Test Right Side View of MDB Impactor Face	A-50
91	Post-Test Right Side View of MDB Impactor Face	A-51
92	Close-Up View of Vehicle's Certification Label	A-51
93	Close-Up View of Vehicle's Tire Information Placard or Label	A-52
94	Pre-Test Ballast View	A-52
95	Post-Test Primary and Redundant Speed Trap Read-Out	A-53
96	FMVSS No. 301 Static Rollover 0 Degrees	A-53
97	FMVSS No. 301 Static Rollover 90 Degrees	A-54
98	FMVSS No. 301 Static Rollover 180 Degrees	A-54
99	FMVSS No. 301 Static Rollover 270 Degrees	A-55
100	FMVSS No. 301 Static Rollover 360 Degrees	A-55
101	Impact Event	A-56
102	Monroney Label	A-56
103	Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual	A-57
104	Left Rear Passenger Head Restraint Use and Adjustment Information from Vehicle Owner's Manual	A-57

<b>Fig.</b>	<b>Description</b>	<b>Page</b>
305-1	Auxiliary Power Module Warning Label	A-58
305-2	Power Inverter Warning Label	A-58
305-3	First Responder Warning Label	A-59
305-4	First Responder Warning Location	A-59
305-5	Other Vehicle Label(s) Related to Electrical Propulsion System	A-60
305-6	Manual High Voltage Service Disconnect in Place	A-60
305-7	Manual High Voltage Service Disconnect Removed (Plug)	A-61
305-8	Manual High Voltage Service Disconnect Removed Location	A-61
305-9	Pre-Impact View of Propulsion Battery	A-62
305-10	Post-Impact Front View of Propulsion Battery	A-62
305-11	Post-Impact Rear View of Propulsion Battery (if any part of it is visible)	A-63
305-12	Pre-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules	A-63
305-13	Post-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules	A-64
305-14	Pre-Impact View of Propulsion Battery Module(s)	A-64
305-15	Post-Impact View of Propulsion Battery Module(s)	A-65
305-16	Pre-Impact View of Electric Propulsion Drive	A-65
305-17	Post-Impact View of Electric Propulsion Drive	A-66
305-18	Pre-Impact View of High Voltage Interconnects	A-66
305-19	Pre-Impact View of Propulsion Venting System(s)	A-67
305-20	Pre-Impact View of Other Visible Electric Propulsion Components	A-67
305-21	Pre-Impact View of Ground Lead Attached	A-68
305-22	Pre-Impact View of High Voltage Leads Attached	A-68
305-23	Pre-Impact Close-Up View of High Voltage Leads Attached	A-69
305-24	Pre-Impact View of Installed Test Interface Port	A-69
305-25	Post-Impact View of Installed Test Interface Port	A-70
305-26	Pre-Impact View or Other Test Devices	A-70
305-27	Post-Impact View or Other Test Devices	A-71
305-28	FMVSS No. 305 Static Rollover 90 Degrees	A-71
305-29	FMVSS No. 305 Static Rollover 180 Degrees	A-72
305-30	FMVSS No. 305 Static Rollover 270 Degrees	A-72
305-31	FMVSS No. 305 Static Rollover 360 Degrees	A-73
305-32	Pre-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery	A-73
305-33	Post-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery	A-74
305-34	Post-Impact Propulsion Battery System Mounting and/or Intrusion Failure(s)	A-74
305-35	Post-Impact View of Battery Component Intrusion	A-75
305-36	Post-Impact View of Battery Module Movement or Retention Loss	A-75
305-37	Post –Impact View of Propulsion Battery Electrolyte Spillage Location (Prior to static roll)	A-76
305-38	Post –Impact View of Propulsion Battery Electrolyte Spillage Location (After static roll)	A-76



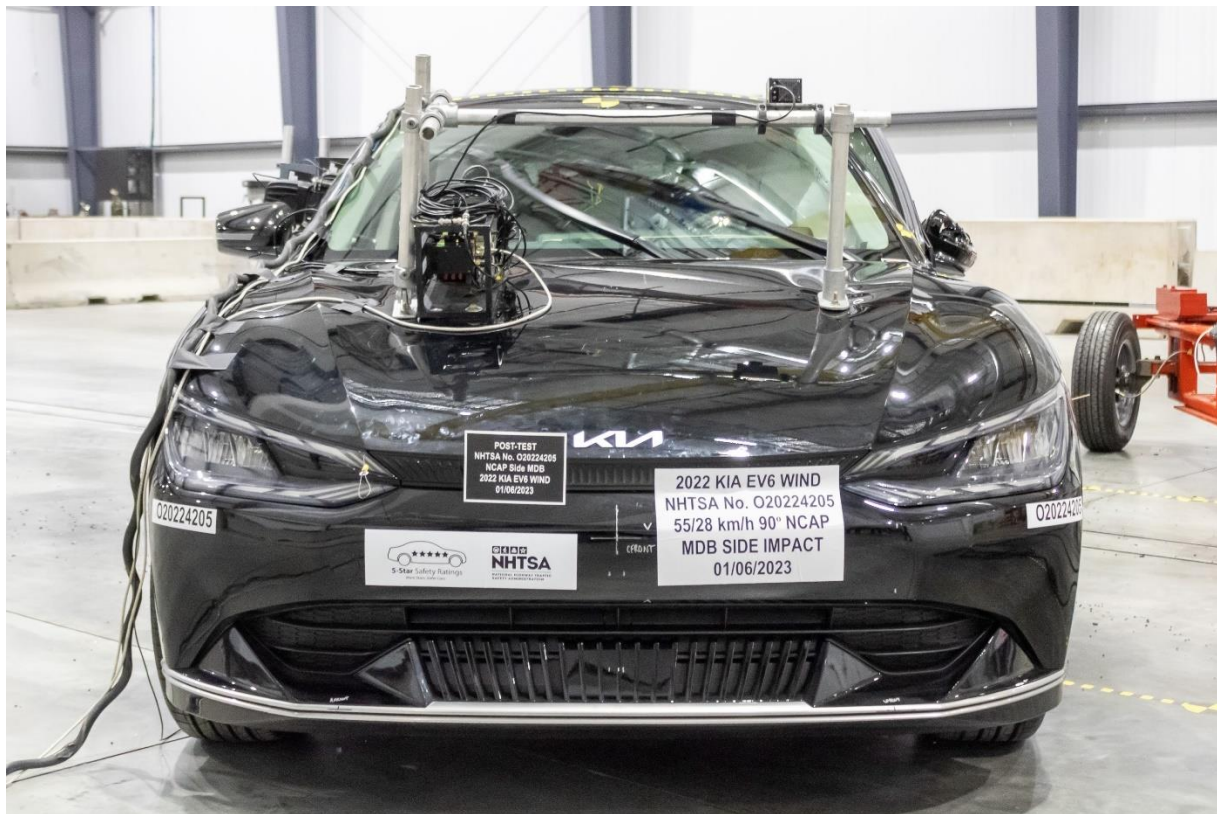
**Figure A-1: As-Delivered Right Front 3/4 View of Test Vehicle**



**Figure A-2: As-Delivered Left Rear 3/4 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  $\frac{3}{4}$  View of Test Vehicle**



**Figure A-6: Post-Test Left Front  $\frac{3}{4}$  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  $\frac{3}{4}$  View of Test Vehicle**



**Figure A-10: Post-Test Left Rear  $\frac{3}{4}$  View of Test Vehicle**



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



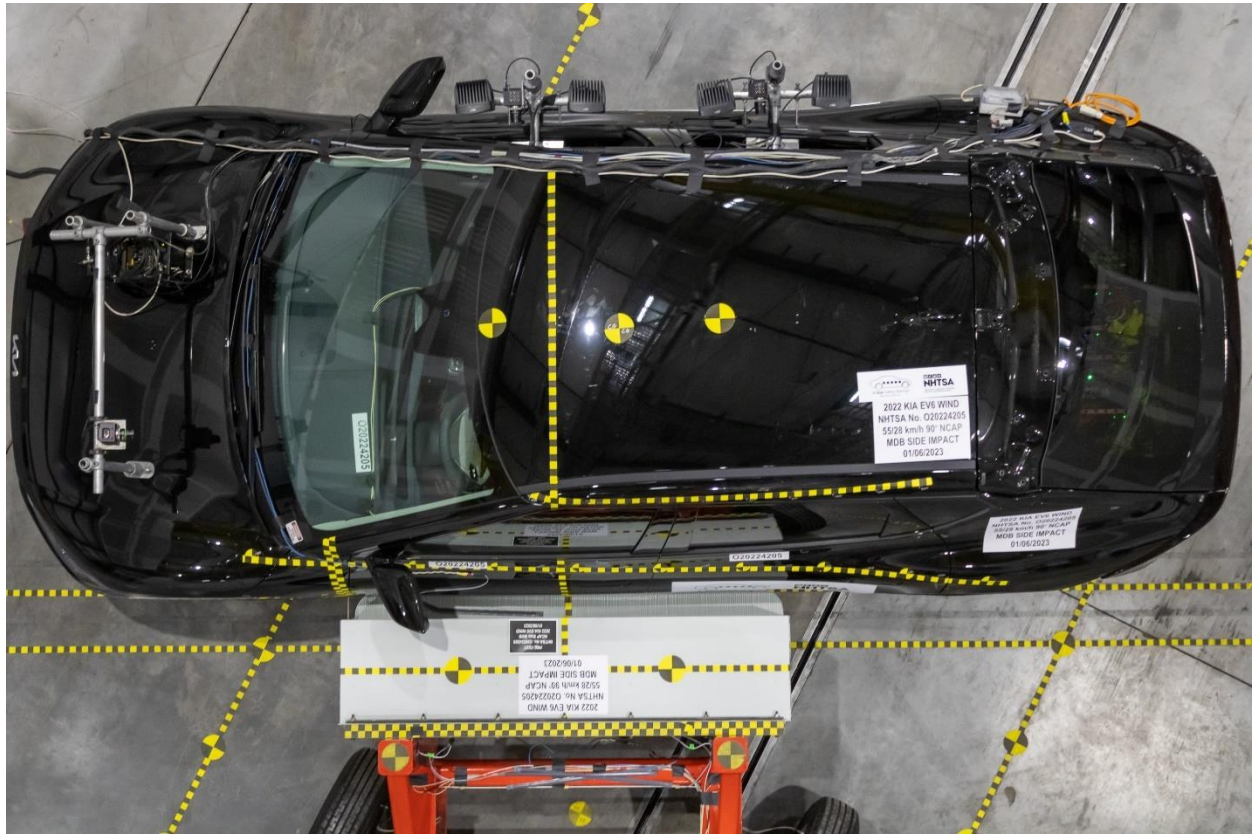
**Figure A-12: Post-Test Rear Side View of Test Vehicle**



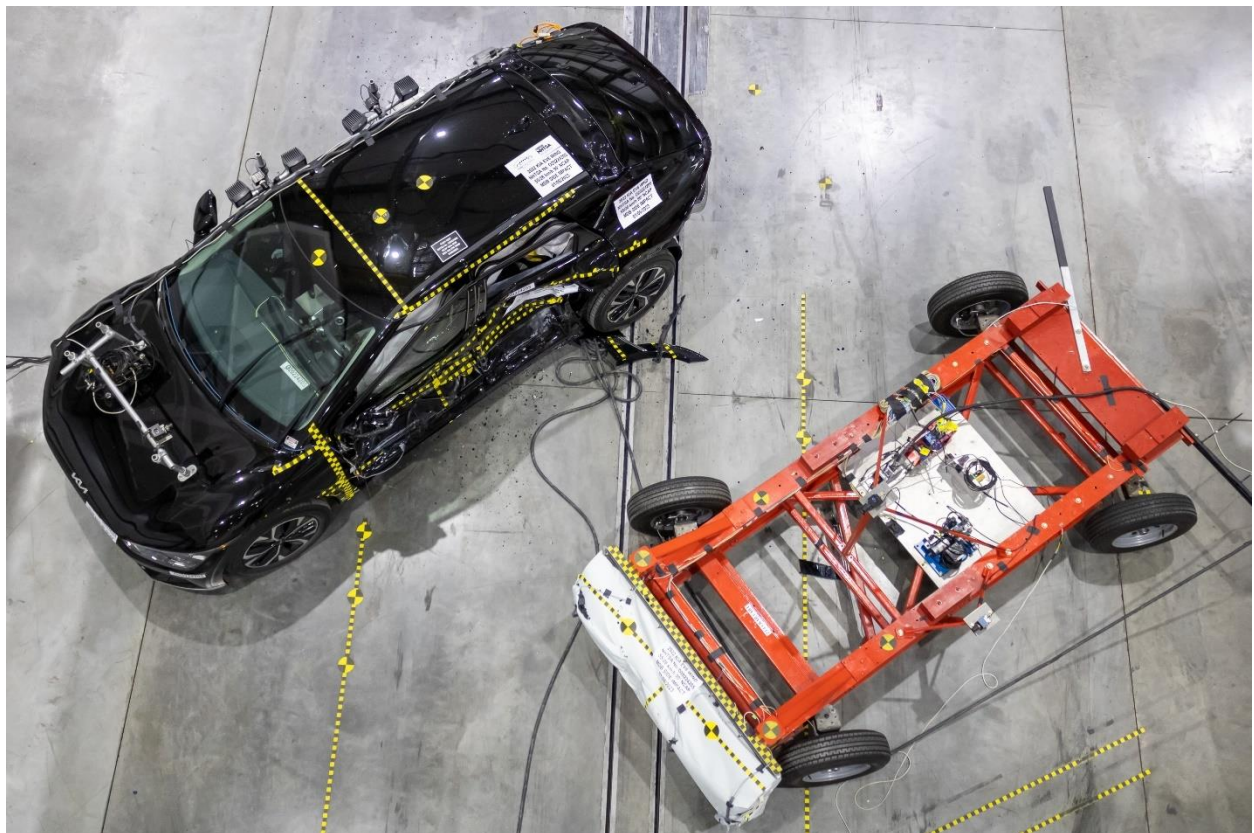
**Figure A-13: Pre-Test Right Side View of Test Vehicle**



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



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



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



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



**Figure A-18: Pre-Test Right Side View of MDB Positioned Against Side of Test 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**



Figure A-21: Pre-Test Left Front Door Latch Close-Up



Figure A-22: Post-Test Left Front Door Latch Close-Up

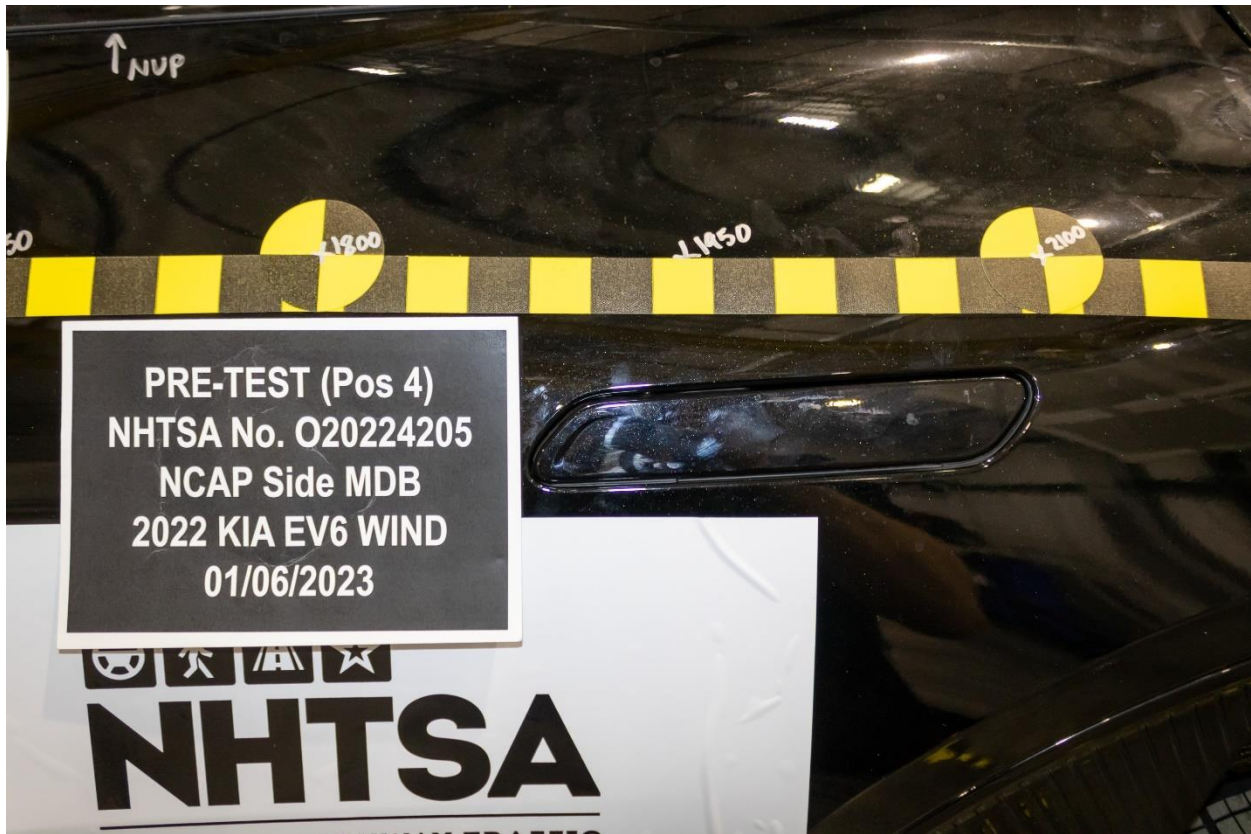


Figure A-23: Pre-Test Left Rear Door Latch Close-Up



Figure A-24: Post-Test Left Rear Door Latch Close-Up



**Figure A-25: Pre-Test Front Close-up View of Driver Dummy**



**Figure A-26: Post-Test Front Close-up View of Driver Dummy**



Figure A-27: Pre-Test Left Side View of Driver Dummy Showing Belt and Chalking



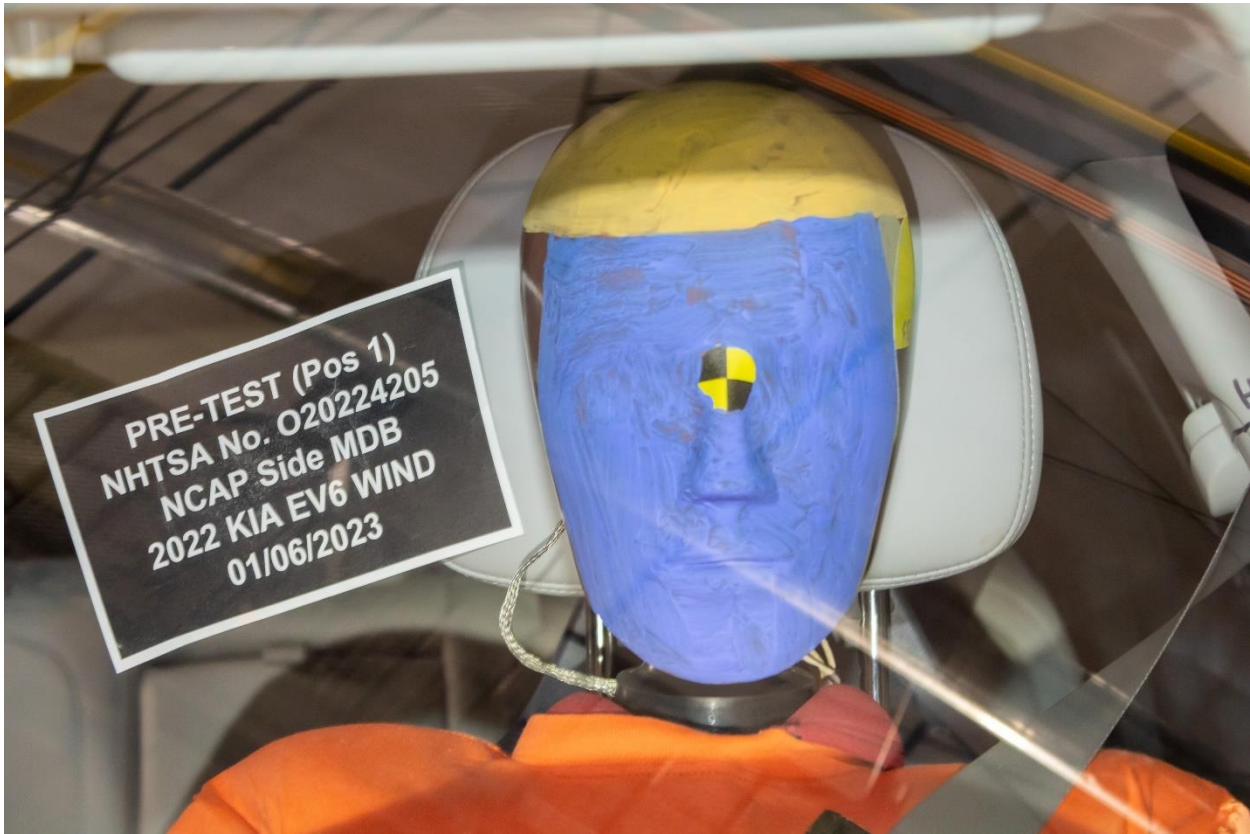
Figure A-28: Pre-Test Left Side View of Driver Dummy Shoulder and Door Top View



**Figure A-29: Post-Test Left Side View of Driver Dummy Shoulder and Door Top View**



**Figure A-30: Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning**



**Figure A-31: Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint**



**Figure A-32: Pre-Test Frontal View of Driver Seat Pan Prior to Dummy Positioning**



**Figure A-33: Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan**



**Figure A-34: Pre-Test Placement of Driver Dummy's Feet**

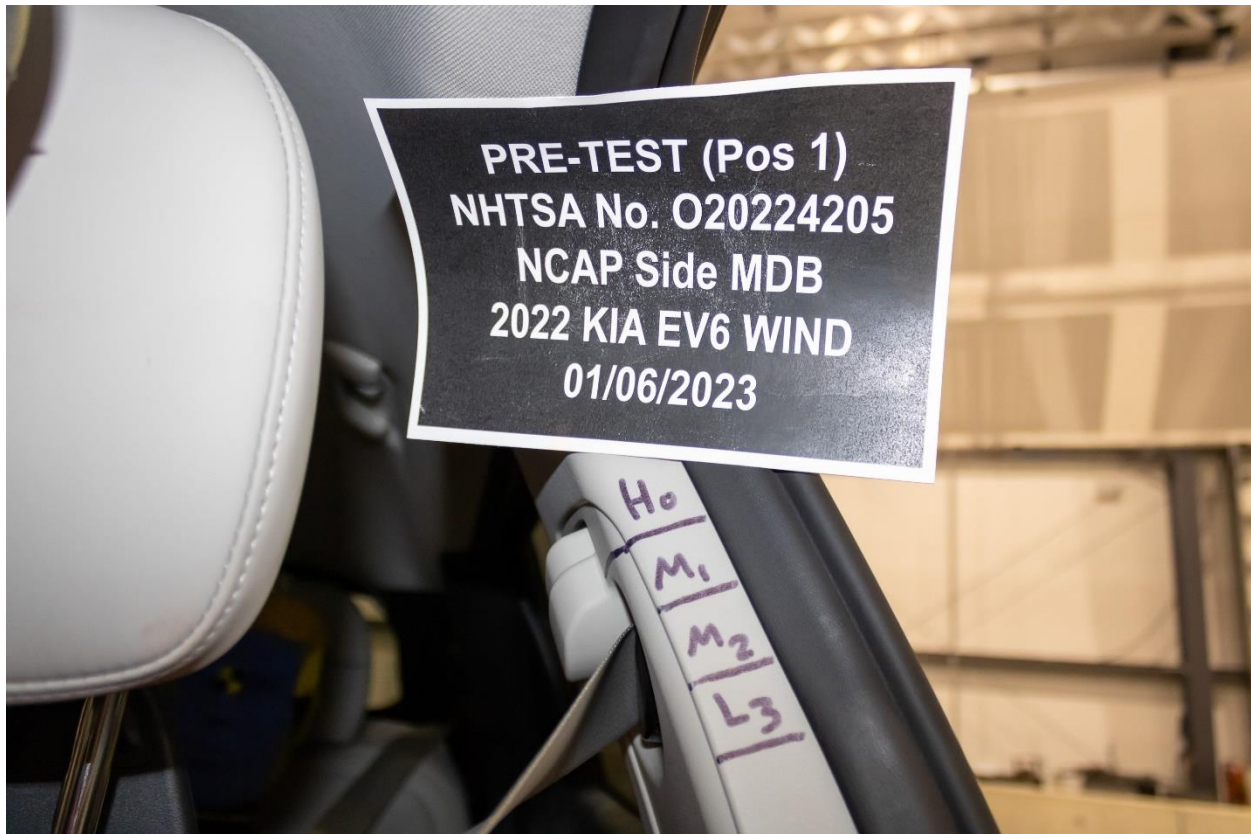
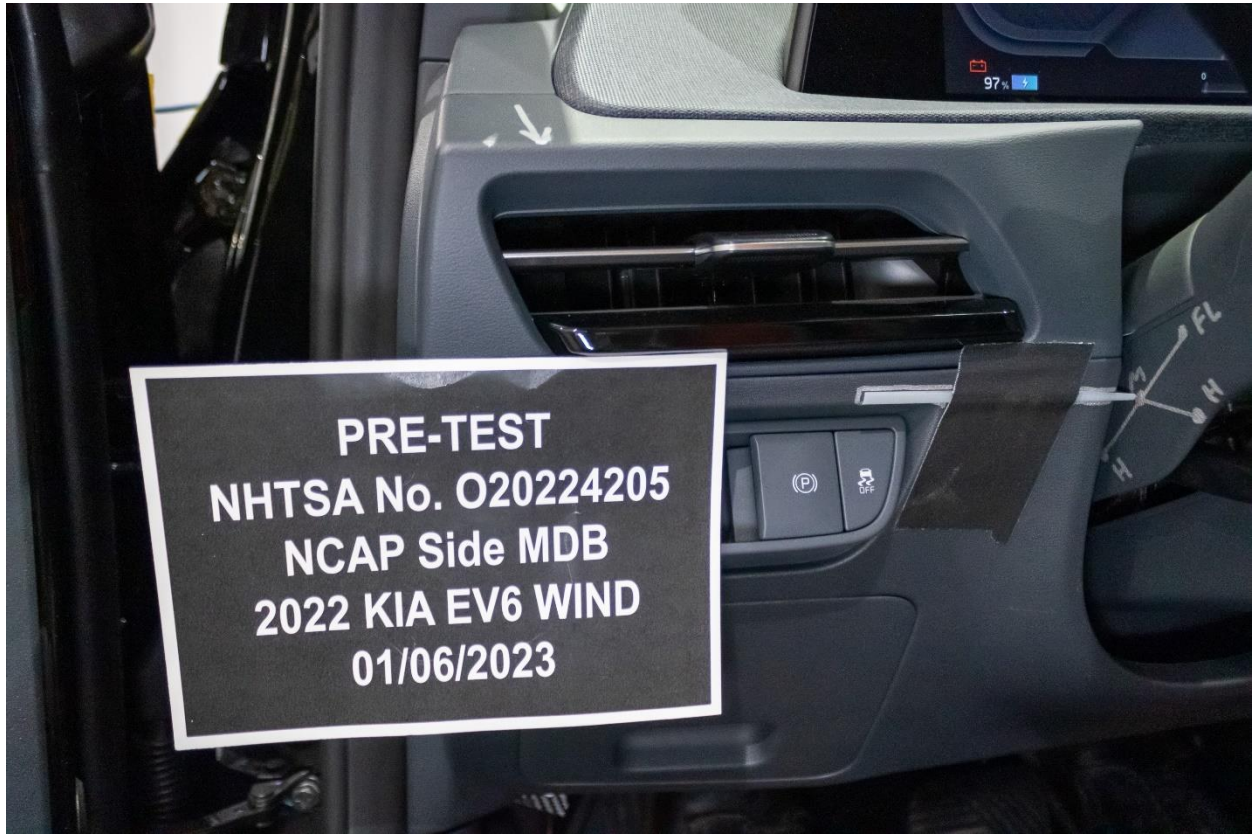


Figure A-35: Pre-Test View of Belt Anchorage for Driver Dummy



Figure A-36: Pre-Test Left Side View of Steering Wheel



**Figure A-37: View of Disengaged Parking Brake**



**Figure A-38: Pre-Test View of Parking Brake**



Figure A-39: Pre-Test Close-Up Left Side View of Driver Seat Track

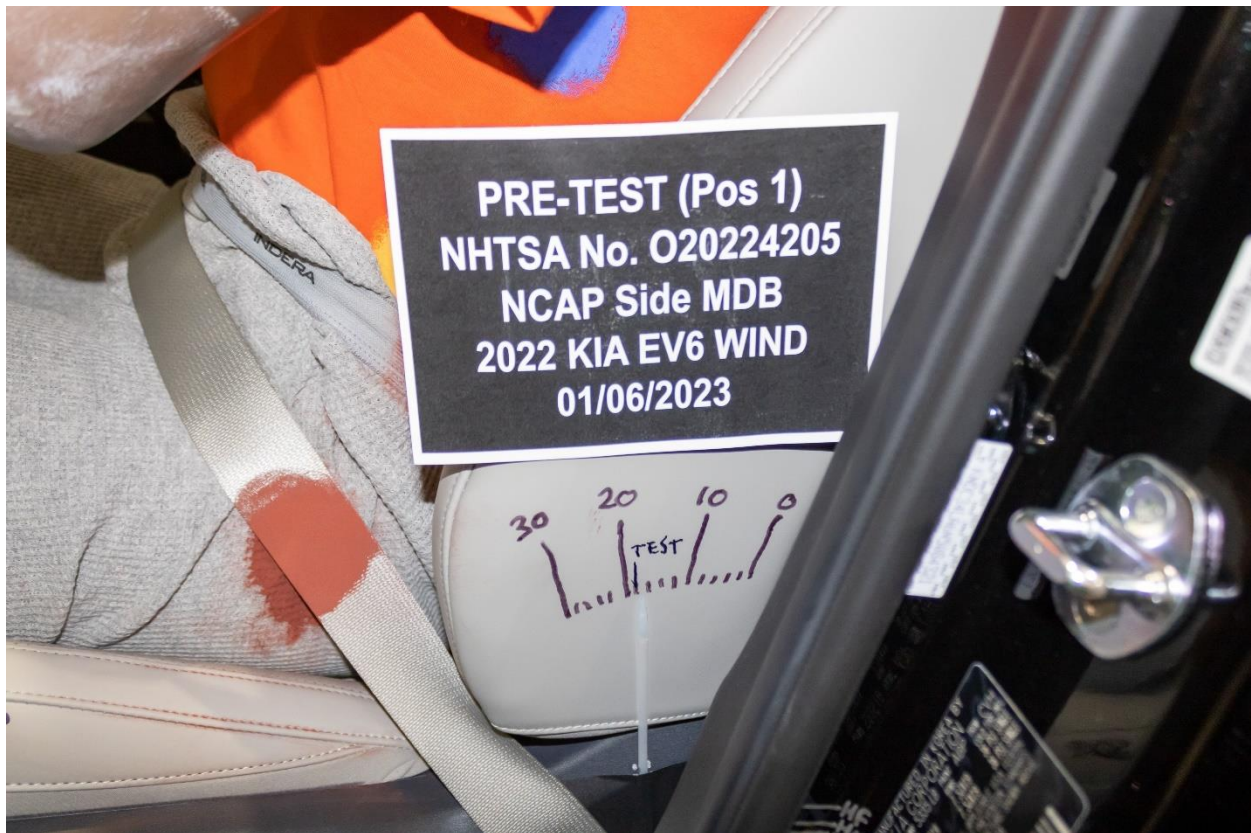


Figure A-40: Pre-Test Close-Up Left Side View of Driver Seat Back



Figure A-41: Pre-Test Close-Up View of Driver Seat Back or Head Restraint



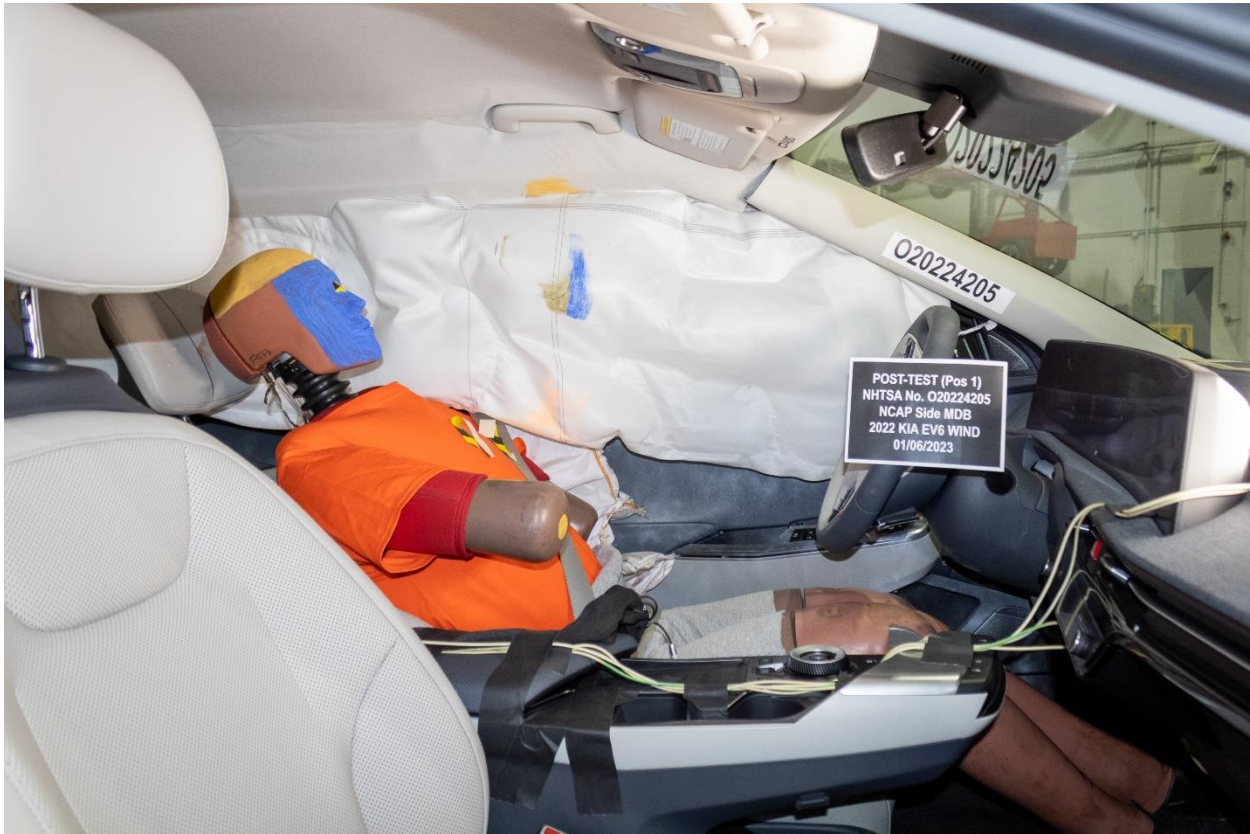
Figure A-42: Pre-Test Driver Dummy and Door Clearance View



**Figure A-43: Post-Test Driver Dummy and Door Clearance View**



**Figure A-44: Pre-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment**



**Figure A-45: Post-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment**



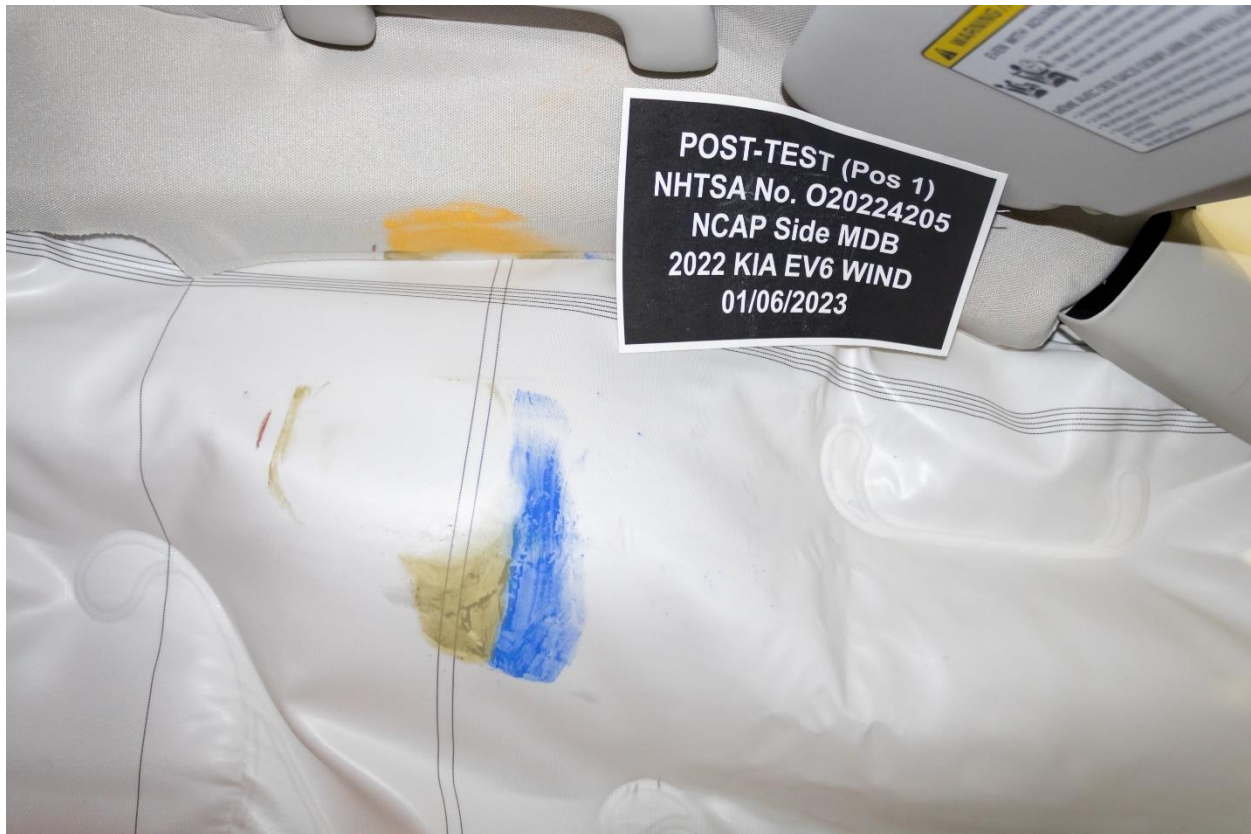
**Figure A-46: Pre-Test Driver Inner Door Panel View**



**Figure A-47: Post-Test Driver Inner Door Panel View Showing Driver Dummy Contact Locations**



**Figure A-48: Post-Test Driver Dummy Close-Up Head Contact with Vehicle View**



**Figure A-49: Post-Test Driver Dummy Close-Up Head Contact with Side Air Bag View**



**Figure A-50: Post-Test Driver Dummy Close-Up Torso Contact with Vehicle Interior View**



**Figure A-51: Post-Test Driver Dummy Close-Up Torso Contact with Side Air Bag View**



**Figure A-52: Post-Test Driver Dummy Close-Up Pelvis Contact View**



**Figure A-53: Post-Test Driver Dummy Close-Up Pelvis Contact with Side Air Bag View**



**Figure A-54: Post-Test Driver Dummy Close-Up Knee Contact View**



**Figure A-55: Pre-Test Left Side View of Rear Passenger Dummy Showing Belt and Chalking**



**Figure A-56: Pre-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View**



**Figure A-57: Post-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View**



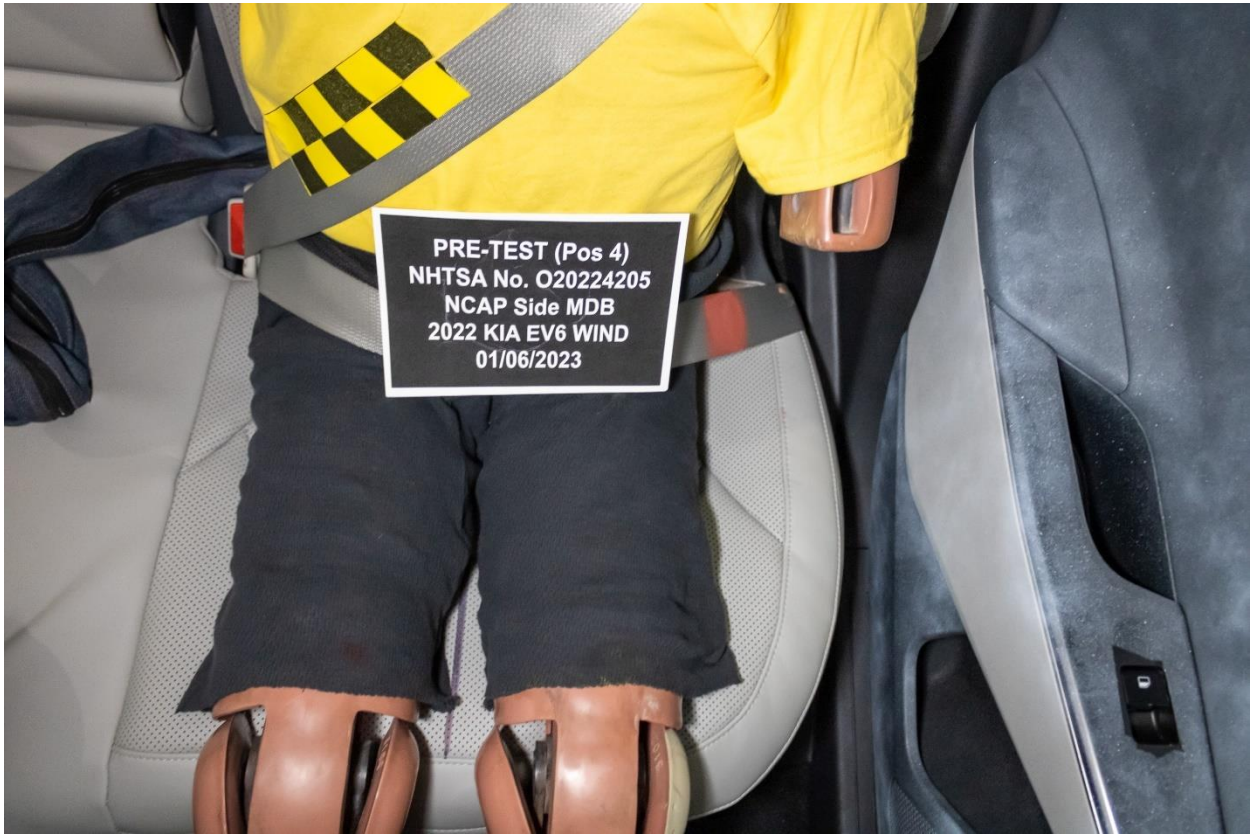
**Figure A-58: Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning**



**Figure A-59: Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint**



**Figure A-60: Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning**



**Figure A-61: Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan**



**Figure A-62: Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket**



**Figure A-63: Pre-Test View of Rear Passenger Dummy's Head Showing Dummy's Head is Level**



**Figure A-64: Pre-Test Placement of Rear Passenger Dummy's Feet**



**Figure A-65: Pre-Test View of Belt Anchorage for Rear Passenger Dummy**



**Figure A-66: Pre-Test Close-Up Left Side View of Rear Passenger Seat Track**



**Figure A-67: Pre-Test Close-Up Left Side View of Rear Passenger Seat Back**



**Figure A-68: Pre-Test Close-Up View of Rear Passenger Seat Back or Head Restraint**



Figure A-69: Pre-Test Rear Passenger Dummy and Door Clearance View



Figure A-70: Post-Test Rear Passenger Dummy and Door Clearance View



**Figure A-71: Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment**



**Figure A-72: Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment**



**Figure A-73: Pre-Test Rear Passenger Inner Door Panel View**



**Figure A-74: Post-Test Rear Passenger Inner Door Panel View Showing Rear Passenger Dummy Contact Locations**



Figure A-75: Post-Test Rear Passenger Dummy Close-Up Head Contact with Vehicle View

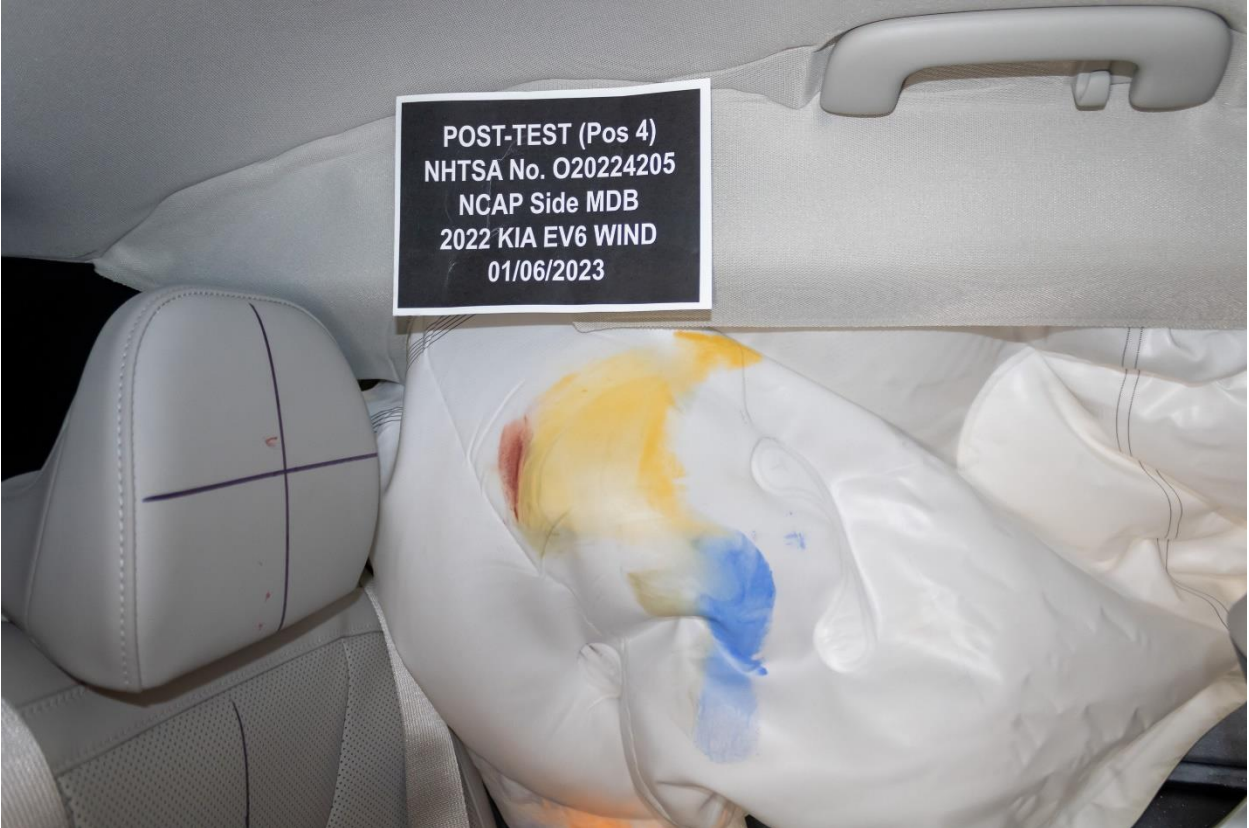


Figure A-76: Post-Test Rear Passenger Dummy Close-Up Head Contact with Side Air Bag View



**Figure A-77: Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Interior View**

**Photo Not Applicable**

**Figure A-78: Post-Test Rear Passenger Dummy Close-Up Torso Contact with Side Air Bag View**



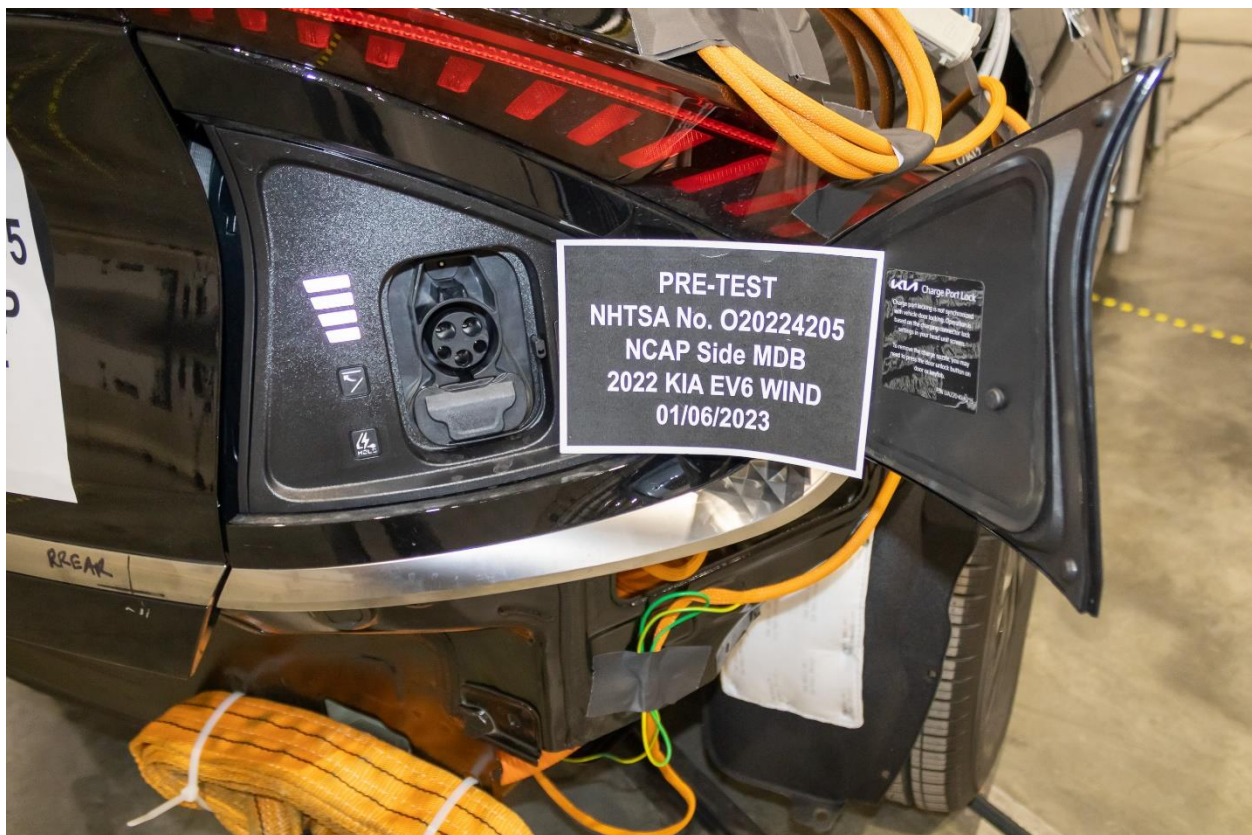
**Figure A-79: Post-Test Rear Passenger Dummy Close-Up Pelvis Contact View**

**Photo Not Applicable**

**Figure A-80: Post-Test Rear Passenger Dummy Close-Up Pelvis Contact with Side Air Bag View**



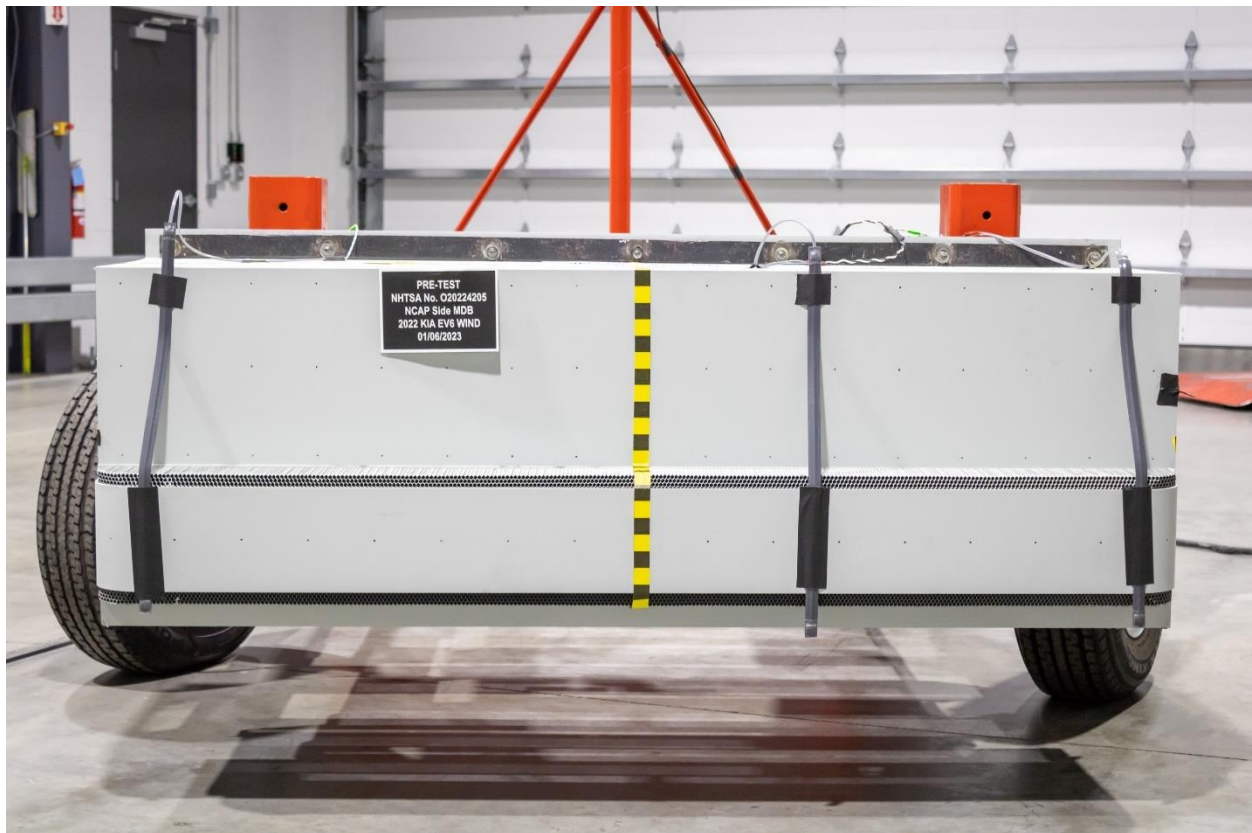
**Figure A-81: Post-Test Rear Passenger Dummy Close-Up Knee Contact View**



**Figure A-82: Pre-Test View of Charging Port**



**Figure A-83: Post-Test View of Charging Port**



**Figure A-84: Pre-Test Front View of MDB Impactor Face**



**Figure A-85: Post-Test Front View of MDB Impactor Face**



**Figure A-86: Pre-Test Top View of MDB Impactor Face**



**Figure A-87: Post-Test Top View of MDB Impactor Face**



**Figure A-88: Pre-Test Left Side View of MDB Impactor Face**



**Figure A-89: Post-Test Left Side View of MDB Impactor Face**



**Figure A-90: Pre-Test Right Side View of MDB Impactor Face**



Figure A-91: Post-Test Right Side View of MDB Impactor Face



Figure A-92: Close-Up View of Vehicle's Certification Label

# O20224205

**TIRE AND LOADING INFORMATION**  
**RENSEIGNEMENTS SUR LES PNEUS ET LE CHARGEMENT**

SEATING CAPACITY NOMBRE DE PLACES	TOTAL 5	FRONT AVANT 2	REAR ARRIÈRE 3
--------------------------------------	---------	------------------	-------------------

The combined weight of occupants and cargo should never exceed 375 kg or 826 lbs.  
Le poids total des occupants et du chargement ne doit jamais dépasser 375 kg ou 826 lb.

TIRE PNEU	SIZE DIMENSIONS	COLD TIRE PRESSURE PRESSION DES PNEUS À FROID	<b>SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION</b>  <b>VOIR LE MANUEL DE L'USAGER POUR PLUS DE RENSEIGNEMENTS</b>
FRONT AVANT	235/55R19	250kPa, 36psi	
REAR ARRIÈRE	235/55R19	250kPa, 36psi	
SPARE DE SECOURS	NONE AUCUN		

**A30**

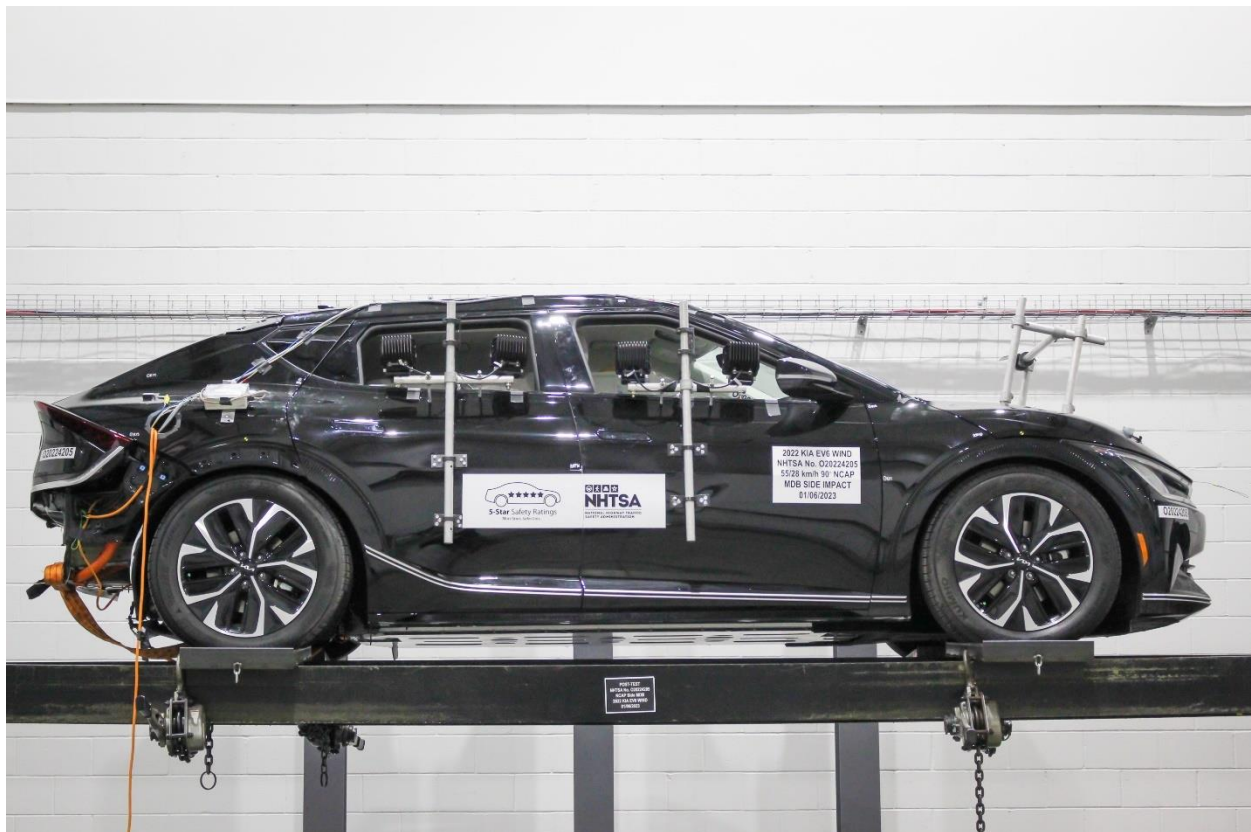
Figure A-93: Close-Up View of Vehicle's Tire Information Placard or Label



Figure A-94: Pre-Test Ballast View



**Figure A-95: Post-Test Primary and Redundant Speed Trap Read-Out**



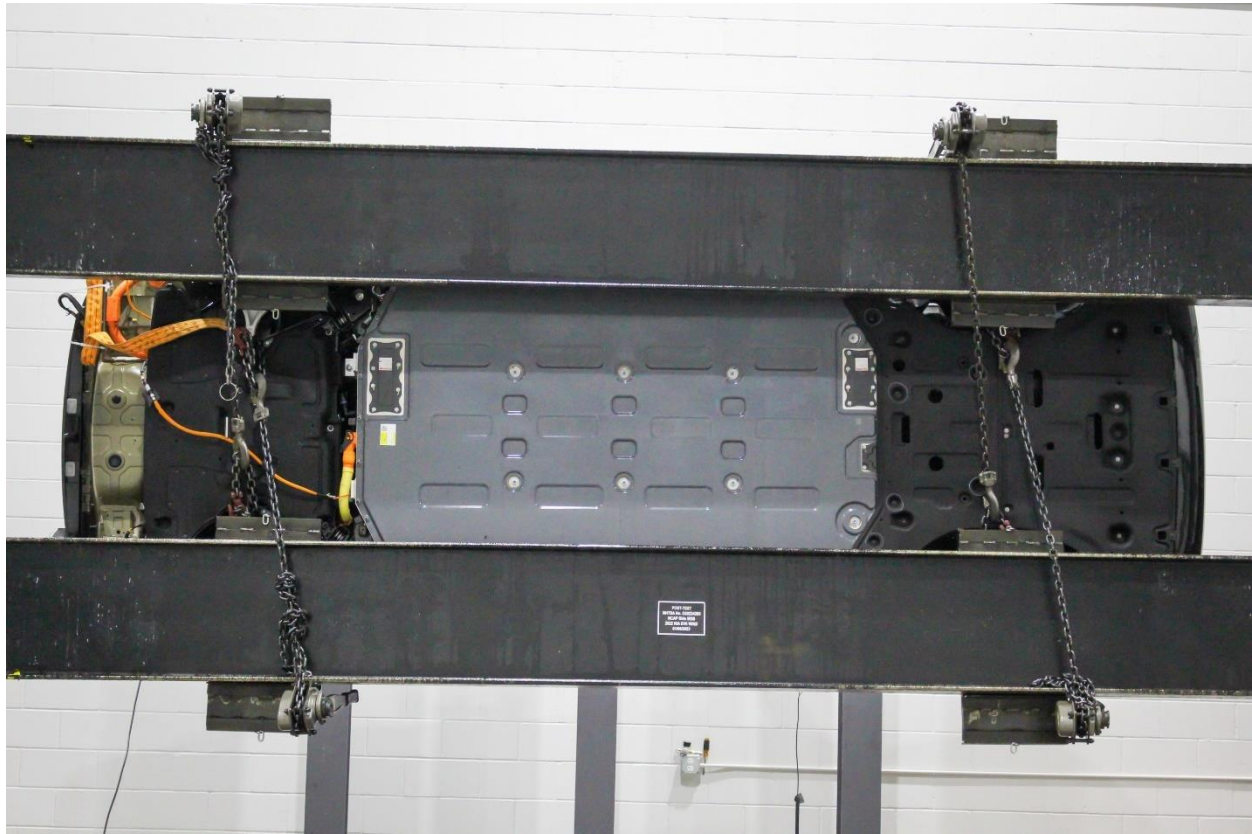
**Figure A-96: FMVSS No. 301 Static Rollover 0 Degrees**



**Figure A-97: FMVSS No. 301 Static Rollover 90 Degrees**



**Figure A-98: FMVSS No. 301 Static Rollover 180 Degrees**



**Figure A-99: FMVSS No. 301 Static Rollover 270 Degrees**



**Figure A-100: FMVSS No. 301 Static Rollover 360 Degrees**

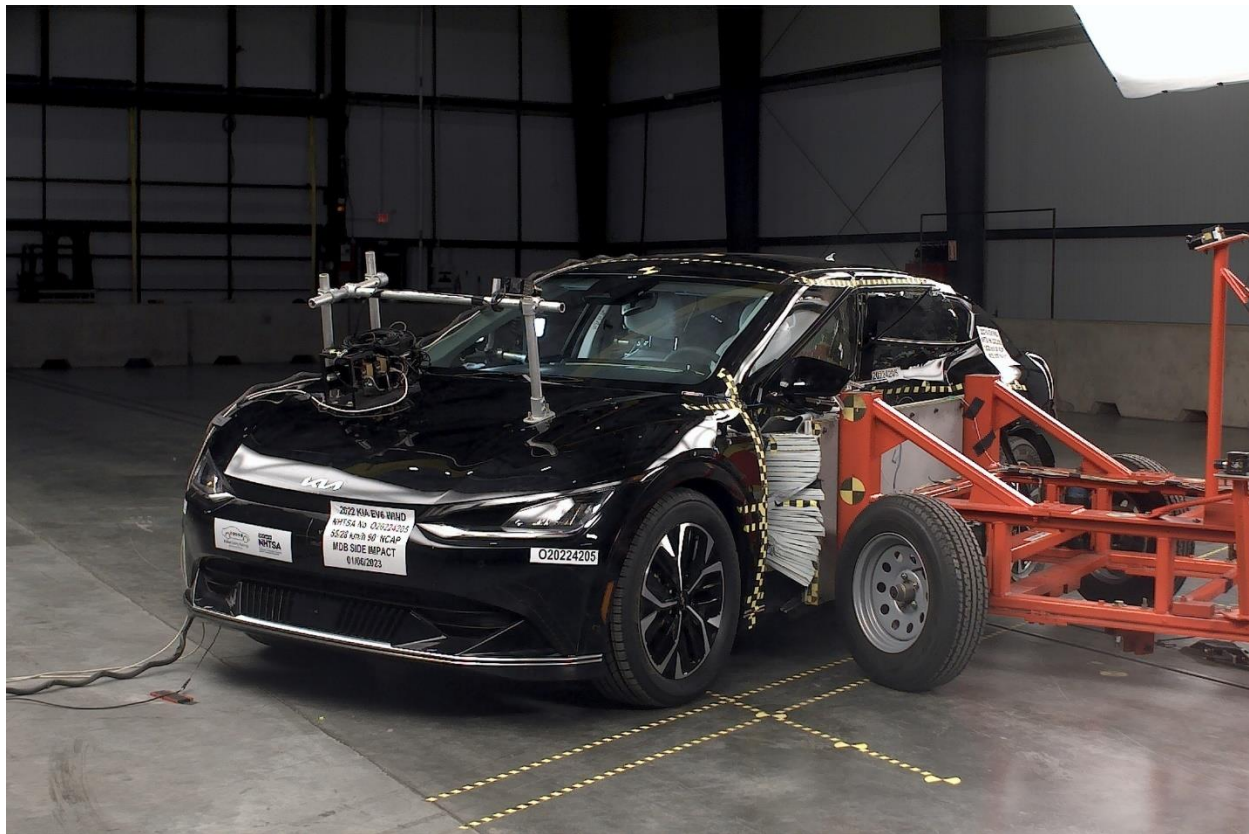


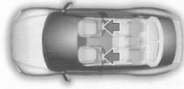
Figure A-101: Impact Event

<b>2022 EV6 WIND RWD</b> MODEL/OPT CODE: N4352/010 EXTERIOR COLOR: AURORA BLACK PEARL INTERIOR COLOR: GRAY VEHICLE ID NUMBER: KNDC34L6N5084321 PORT OF ENTRY: BRUNSWICK		Sold To: NC063 Hendrick Kia of Concord 7550 HENDRICK AUTO PLAZA NW CONCORD NC 28027		Ship To: NC063 #1 Brand in Dependability Awarded to Kia					
<b>STANDARD FEATURES</b> <b>STANDARD LIGHT RWD FEATURES</b> <b>MECHANICAL</b> 58.0 kWh Lithium Ion Battery 125 kW Electric Motor (167hp w/ 258 lb-ft Torque) Ultra-Fast DC Charging (800V) Electronic Parking Brake w/ Auto Hold <b>KIA DRIVE WISE DRIVER-ASSIST TECHNOLOGY</b> Forward Collision-Avoidance Assist - Cyclist/Jct Turning Blind-Spot Collision-Avoidance Assist Rear Cross-Traffic Collision-Avoidance Assist Lane Keeping Assist & Lane Following Assist Parking Distance Warning - Reverse Safe Exit Assist & Highway Driving Assist <b>SAFETY</b> Dual Front Advanced Airbags & Driver's Knee Airbag Dual Front Seat-Mounted Side & Full-Length Curtain Airbags <b>INTERIOR, COMFORT &amp; CONVENIENCE</b> Dual Panoramic 12.3" Displays w/Navigation Android Auto and Apple CarPlay Kia Connect (Kia UVO) w/free trial. *Where available** SIRIUSXM® w/Free 3-Mo. Subscription* Navigation-Based Smart Cruise Control w/Stop & Go Smart Key w/ Push Button & Remote Start Dual-Zone Automatic Climate Control w/ Rear Vents Wireless Phone Charger Combination Recycled Fabric/Vegan Leather Seat Material Heated Front Seats Power Adj. Driver's Seat w/ Power Lumbar Support Rear Occupant Alert <b>EXTERIOR</b> 19" Alloy Wheels w/ Dark Gray Finish LED Headlamps w/ Auto Light Control Rear Privacy Glass and Rear Spoiler Power Folding Heated Outside Mirrors w/ Turn Signals <b>WARRANTY</b> 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		<b>MANUFACTURER'S SUGGESTED RETAIL PRICE ▶ \$47,500.00</b> <b>COMPARE WIND RWD FEATURES</b> Added to/in place of standard LIGHT RWD features - 77.4 kWh Lithium Ion Battery - 168 kW Electric Motor (223hp w/ 258 lb-ft Torque) - On-Board Power Generator (V2L) - 19" Alloy Wheels w/ Black Finish - Gloss Black Exterior Accents - Ventilated Front Seats - Vegan Leather Seating Material - Power Front Passenger's Seat w/ Lumbar Support - Meridian Premium Audio System - Smart Power Tailgate - Parking Distance Warning-Forward/Reverse - Towing Package Pre-Wiring <b>ADDITIONAL INSTALLED EQUIPMENT:</b> (In addition to or in place of standard features) Aurora Black Pearl Paint Carpeted Floor Mats \$495.00 \$170.00		<b>EPA DOT Fuel Economy and Environment</b> <b>Fuel Economy</b> <b>117</b> MPGE <small>combined city/hwy</small> <b>134</b> MPGE <small>city</small> <b>101</b> MPGE <small>highway</small> <b>29</b> MPGE <small>city</small> <b>29</b> MPGE <small>highway</small> Charge Time: 8.7 hours (240V) <b>Annual fuel cost \$550</b> Fuel Economy & Greenhouse Gas Rating (tailpipe only) Smog Rating (tailpipe only) Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 27 MPGE and costs \$8,800 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$6.15 per kWh. MPGE is miles per gallon equivalent. Vehicle emissions are a significant cause of global warming and smog.		<b>GOVERNMENT 5-STAR SAFETY RATINGS</b> <b>Overall Vehicle Score Not Rated</b> Based on the combined rating of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight. <b>Frontal Driver Not Rated</b> <b>Crash Passenger Not Rated</b> Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight. <b>Side Front seat Not Rated</b> <b>Crash Rear seat Not Rated</b> Star ratings based on the risk of injury in a side impact. <b>Rollover Not Rated</b> 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). <a href="http://www.safercar.gov">www.safercar.gov</a> or 1-888-327-4236		<b>PARTS CONTENT INFORMATION</b> <b>FOR VEHICLES IN THIS CAR LINE U.S./CANADIAN PARTS CONTENT: 0%</b> <b>MAJOR SOURCES OF FOREIGN PARTS: KOREA: 95%</b> NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS. <b>FOR THIS VEHICLE FINAL ASSEMBLY POINT: HWASUNG, KOREA</b> <b>COUNTRY OF ORIGIN: KOREA</b> <b>ENGINE: KOREA</b> <b>TRANSMISSION: KOREA</b>	
<b>MSRP INCLUDING OPTIONS \$48,165.00</b> INLAND FREIGHT AND HANDLING \$1,295.00 <b>TOTAL MANUFACTURER'S SUGGESTED RETAIL PRICE ▶ \$49,460.00</b>		<b>TOTAL ADDITIONAL WEIGHT: 7.9</b> 		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 <a href="http://www.kia.com">www.kia.com</a> for details 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 <a href="http://www.kia.com">www.kia.com</a> .					

Figure A-102: Monroney Label

**Headrest (for front seat)**

The driver's and front passenger's seats are equipped with a headrest for the occupant's safety and comfort.



The headrest not only provides comfort for the driver and front passenger, but also helps protect the head and neck in the event of a rear collision.

For maximum effectiveness in case of an accident, the headrest should be adjusted so the middle of the headrest is at the same height of the center of gravity of an occupant's head. Generally, the center of gravity of most people's head is similar with the height of the top of their eyes.

Also, adjust the headrest as close to your head as possible. For this reason, the use of a cushion that holds the body away from the seatback is not recommended.

**WARNING**

**Headrest Removal/Adjustment**

- Do not operate the vehicle with the headrests removed. Headrests can provide critical neck and head support in a crash.
- Do not adjust the headrest height while the vehicle is in motion. Driver may lose control of the vehicle.

**CAUTION**

Excessive pulling or pushing may damage the headrest.

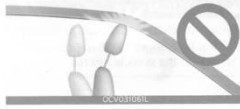
**Adjusting the height up and down (if equipped)**



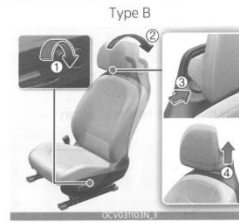
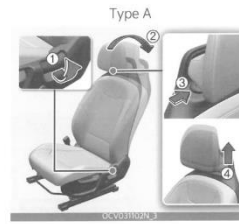
- Pull it up to the desired position (1).
- To lower the headrest, push and hold the release button (2) on the headrest support.
- Lower the headrest to the desired position (3).

**NOTICE**

If you recline the seatback towards the front with the headrest and seat cushion raised, the headrest may come in contact with the sun visor or other parts of the vehicle.



**Removing headrest**



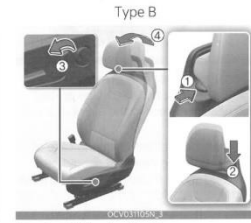
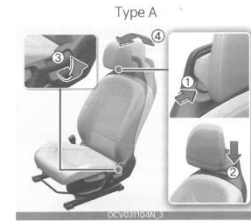
- To remove the headrest:
1. Recline the seatback (2) with the recline lever or switch (1).
  2. Raise headrest as far as it can go.
  3. Press the headrest release button (3) while pulling the headrest up (4).

**WARNING**

**Headrest Removal**

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

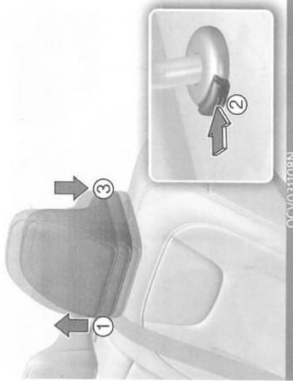
**Reinstalling headrest**



- 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 recline lever or switch (3).
  3. Adjust the headrest to the appropriate height.

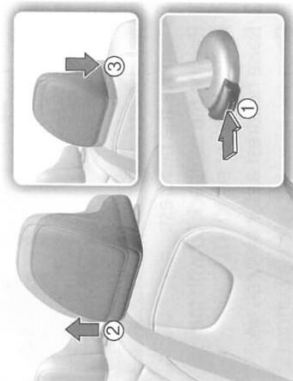
**Figure A-103: Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual**

**Adjusting the height up and down**



- 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 and lower the headrest to the desired position (3).

**Removal and reinstallation**



- To remove the headrest, raise it as far as it can go then press the release button (1) while pulling the headrest upward (2).
- To reinstall the headrest, put the headrest poles (3) into the holes while pressing the release button (1).

**WARNING**  
**Headrest Reinstallation**

To reduce the risk of injury to the head or neck, always make sure the headrest is locked into position and adjusted properly after reinstalling.

**Headrest (for rear seat)**

The rear seat is equipped with headrests in all the seating positions for the occupant's safety and comfort.



The headrest not only provides comfort for passengers, but also helps protect the head and neck in the event of a collision.

For maximum effectiveness in case of an accident, the headrest should be adjusted so the middle of the headrest is at the same height of the center of gravity of an occupant's head. Generally, the center of gravity of most people's heads is similar with the height as the top of their eyes.

Also, adjust the headrest as close to your head as possible. For this reason, the use of a cushion that holds the body away from the seatback is not recommended.

**Figure A-104: Left Rear Passenger Head Restraint Use and Adjustment Information from Vehicle Owner's Manual-Rear Restraints Not Adjustable**



O20224205

Figure 305-1: Auxiliary Power Module Warning Label



O20224205

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

O20224205



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

O20224205



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



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



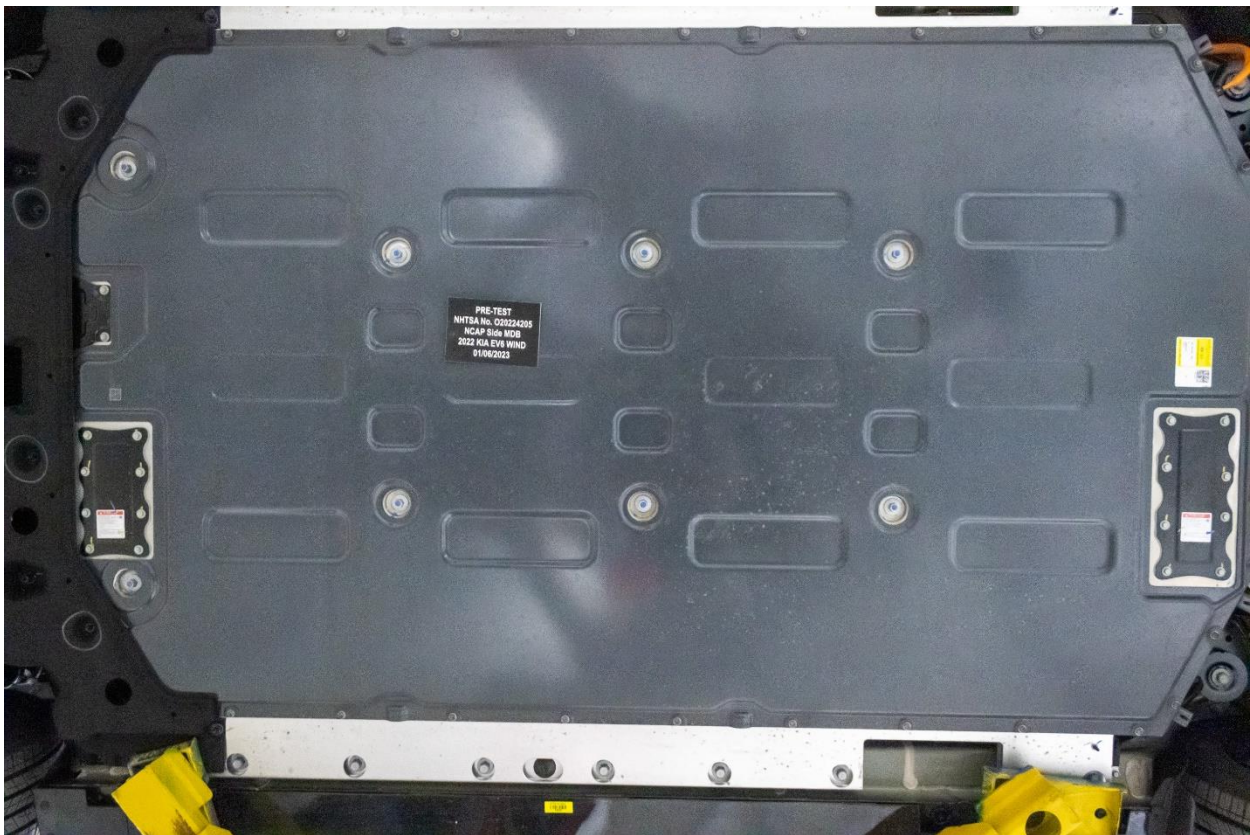
**Figure 305-9: Pre-Impact View of Propulsion Battery**



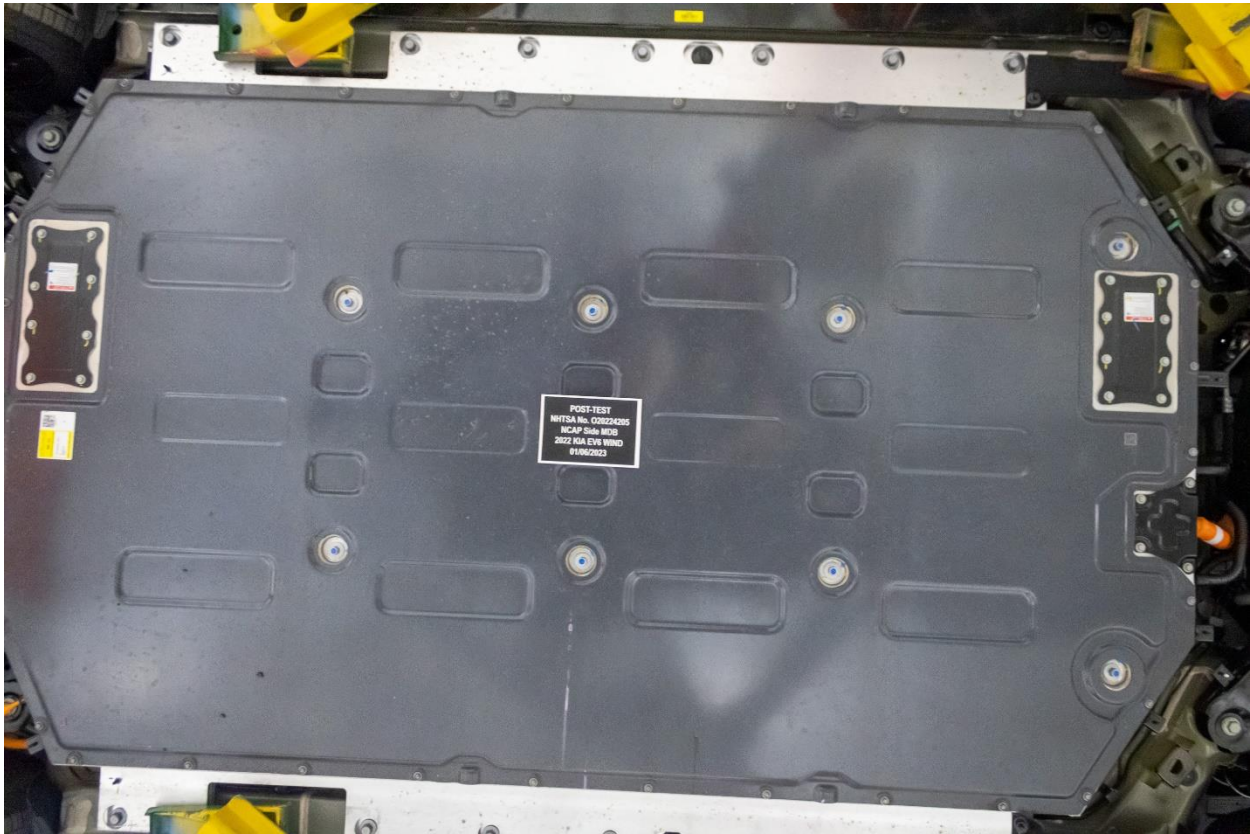
**Figure 305-10: Post-Impact Front View of Propulsion Battery**



**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**



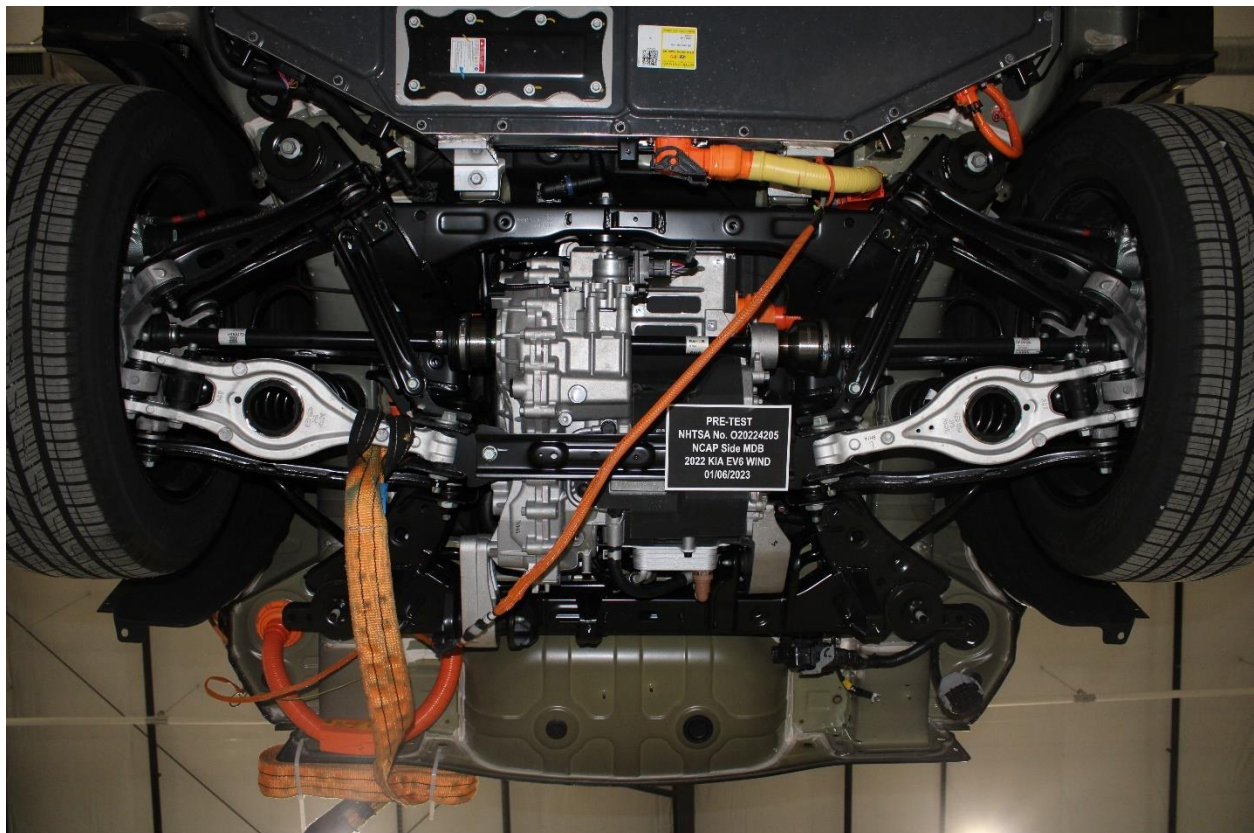
**Figure 305-13: Post-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules**

**Photo Not Applicable**

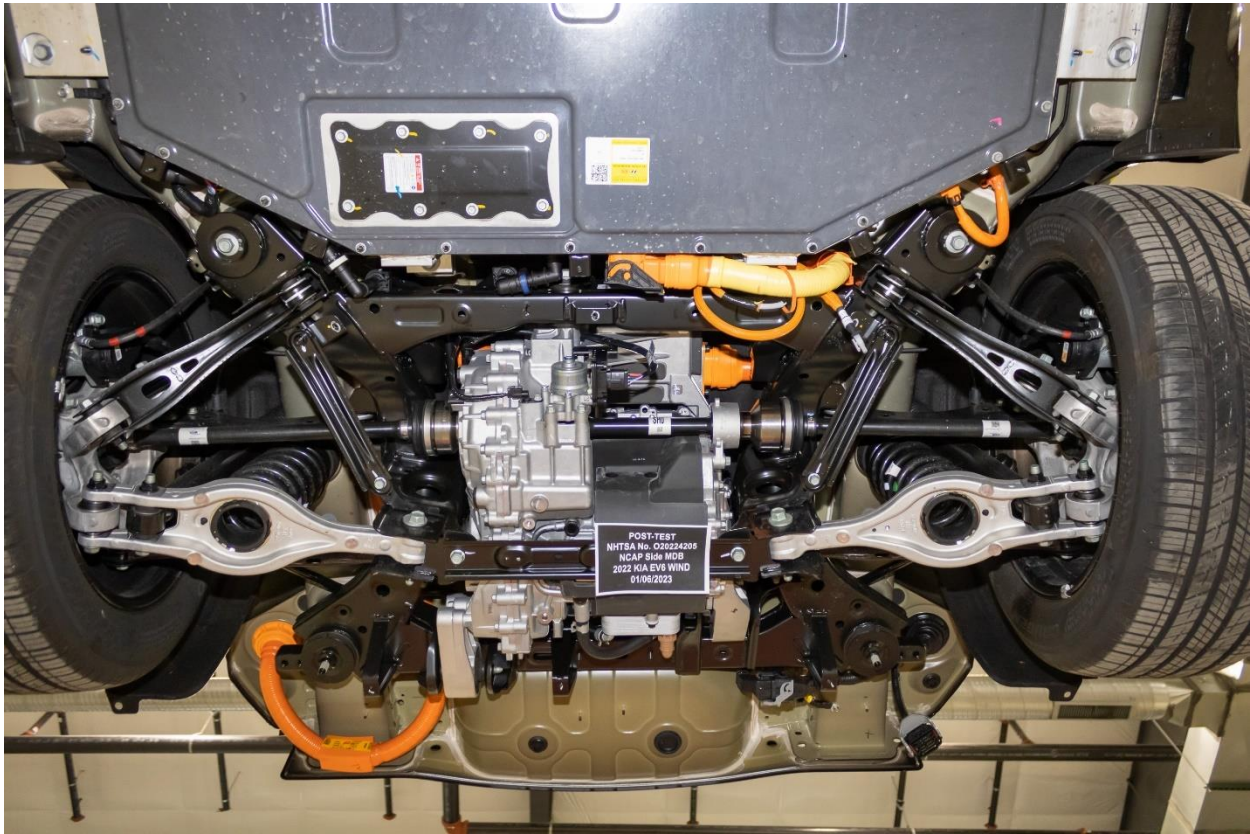
**Figure 305-14: Pre-Impact View of Propulsion Battery Module(s)**

# 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**

**Photo Not Applicable**

**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

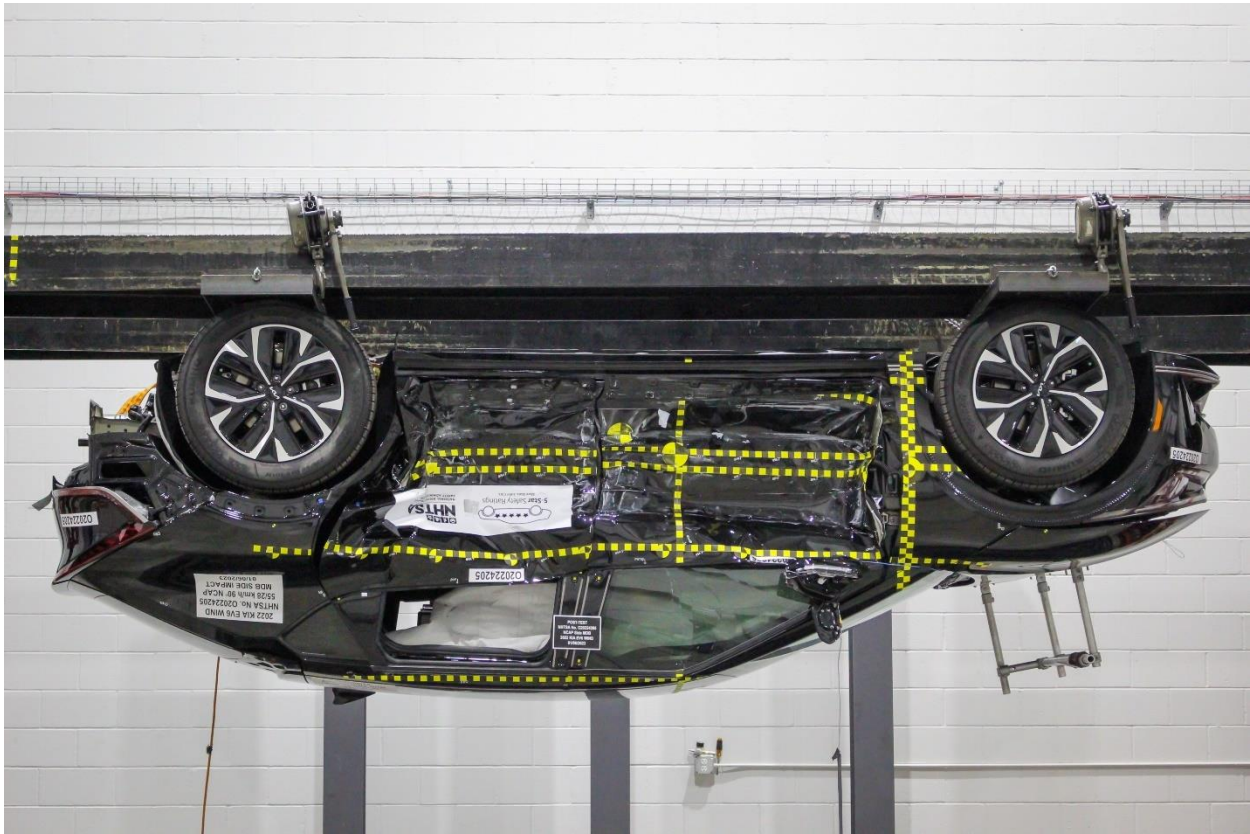
**Figure 305-26: Pre-Impact View of Other Test Devices**

# Photo Not Applicable

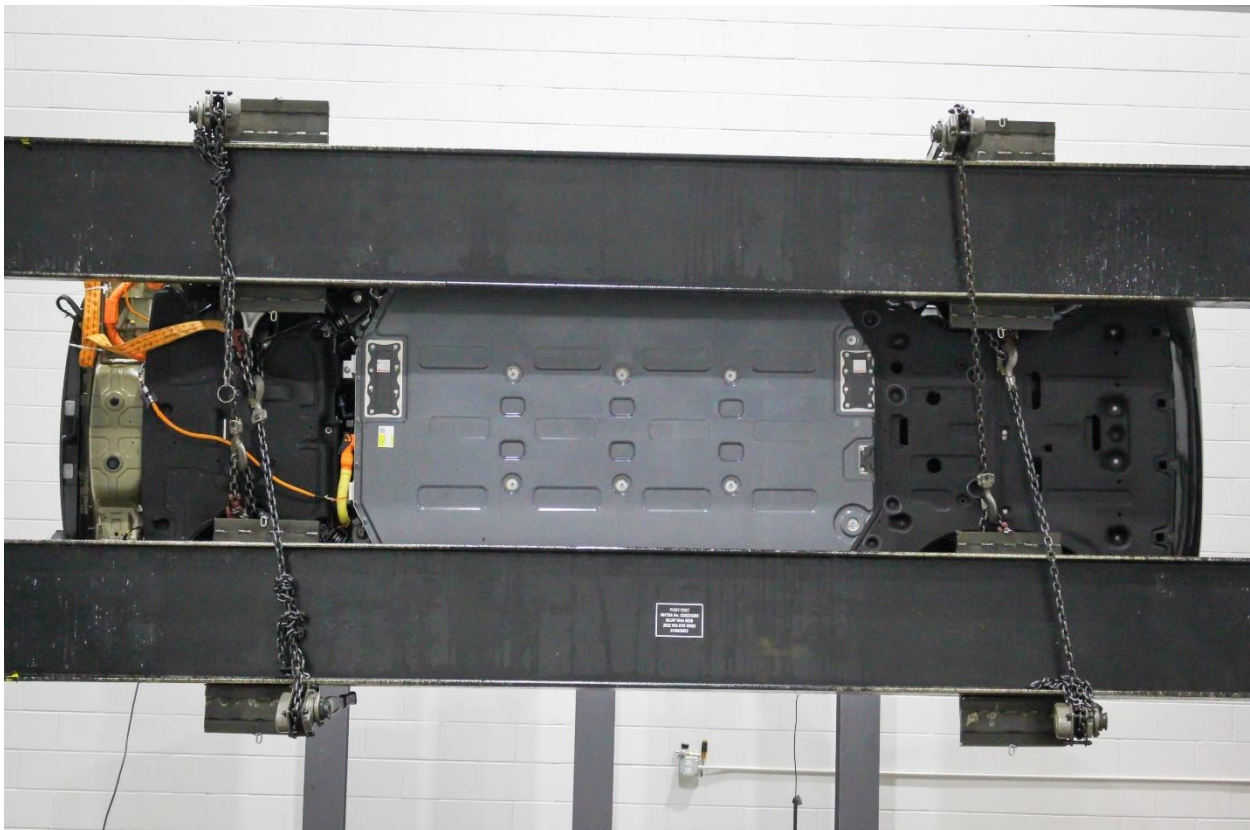
Figure 305-27: Post-Impact View of Other Test Devices



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)**

**Photo Not Applicable**

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

**Photo Not Applicable**

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

**Photo Not Applicable**

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

**Photo Not Applicable**

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

**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-5
Plot 2	Driver Head Acceleration (Y) Primary vs. Time	B-5
Plot 3	Driver Head Acceleration (Z) Primary vs. Time	B-5
Plot 4	Driver Head Resultant Acceleration Primary vs. Time	B-5
Plot 5	Driver Upper Thorax Rib Deflection (Y) vs. Time	B-6
Plot 6	Driver Middle Thorax Rib Deflection (Y) vs. Time	B-6
Plot 7	Driver Lower Thorax Rib Deflection (Y) vs. Time	B-6
Plot 8	Driver Thorax Rib Deflection Maximum vs. Time	B-6
Plot 9	Driver Anterior Abdominal Force (Y) vs. Time	B-7
Plot 10	Driver Middle Abdominal Force (Y) vs. Time	B-7
Plot 11	Driver Posterior Abdominal Force (Y) vs. Time	B-7
Plot 12	Driver Total Abdominal Force (Y) vs. Time	B-7
Plot 13	Driver Pubic Symphysis Force (Y) vs. Time	B-8
Plot 14	Passenger Head Acceleration (X) vs. Time Primary	B-8
Plot 15	Passenger Head Acceleration (Y) vs. Time Primary	B-8
Plot 16	Passenger Head Acceleration (Z) vs. Time Primary	B-8
Plot 17	Passenger Head Resultant Acceleration Primary vs. Time	B-9
Plot 18	Passenger Lower Spine T12 Acceleration (X) vs. Time	B-9
Plot 19	Passenger Lower Spine T12 Acceleration (Y) vs. Time	B-9
Plot 20	Passenger Lower Spine T12 Acceleration (Z) vs. Time	B-9
Plot 21	Passenger Lower Spine T12 Resultant Acceleration vs. Time	B-10
Plot 22	Passenger Iliac Force on Impact Side (Y) vs. Time	B-10
Plot 23	Passenger Acetabulum Force on Impact Side (Y) vs. Time	B-10
Plot 24	Passenger Total Pelvic Force on Impact Side (Y) vs. Time	B-10

## **Additional Driver & Passenger Dummy Instrumentation Data**

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

## **Vehicle Instrumentation Data**

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

## **MDB Instrumentation Data**

MDB Center of Gravity Acceleration (X)

MDB Center of Gravity Acceleration (Y)

MDB Center of Gravity Acceleration (Z)

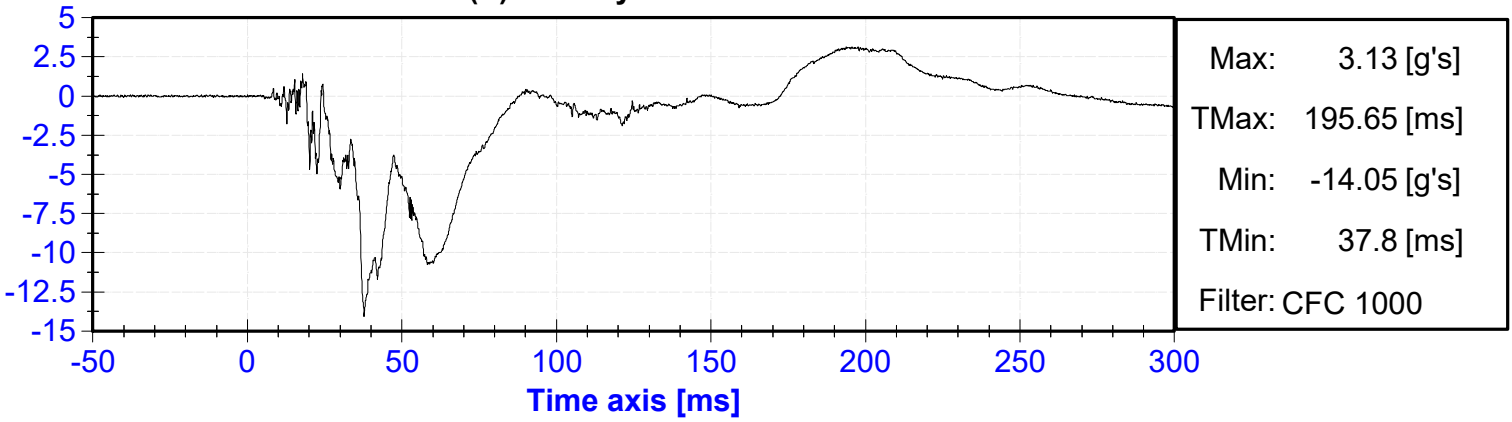
MDB Rear Acceleration (X)

MDB Rear Acceleration (Y)

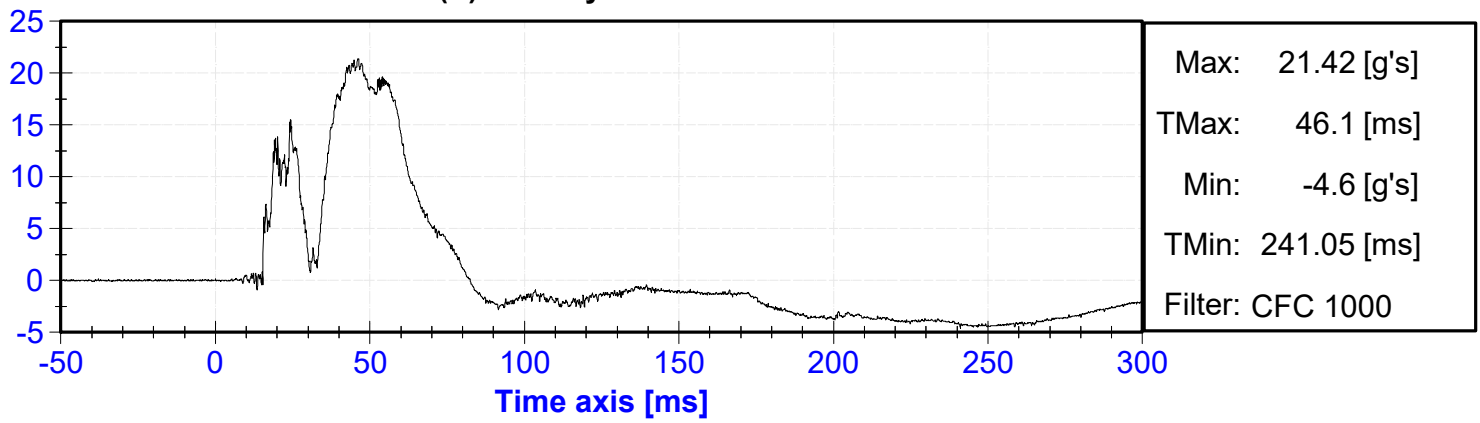
Left MDB Contact Switch

Right MDB Contact Switch

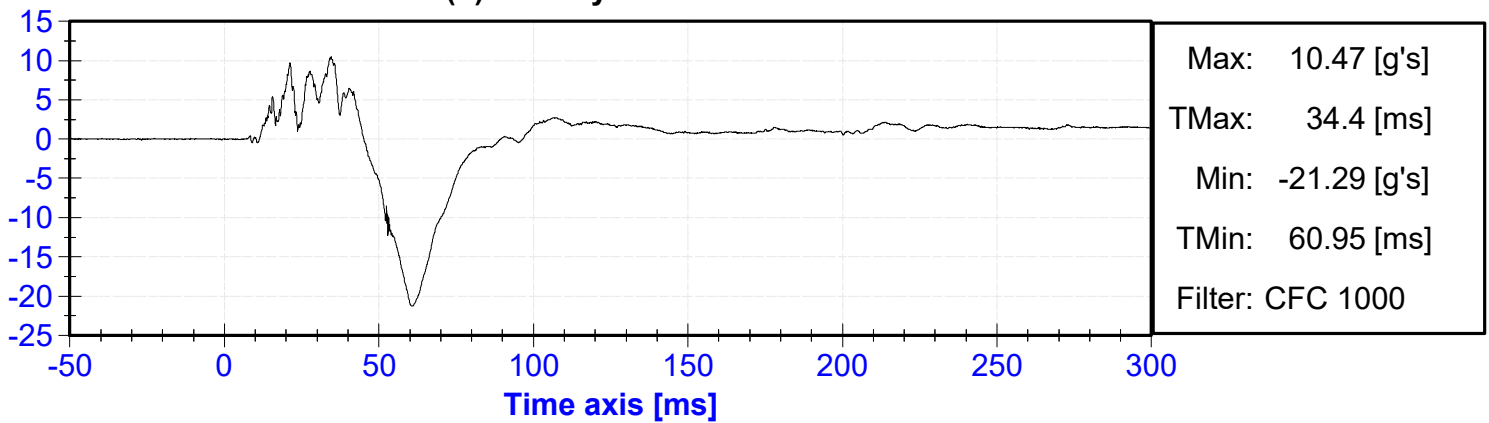
Driver Head Acceleration (X) Primary vs. Time



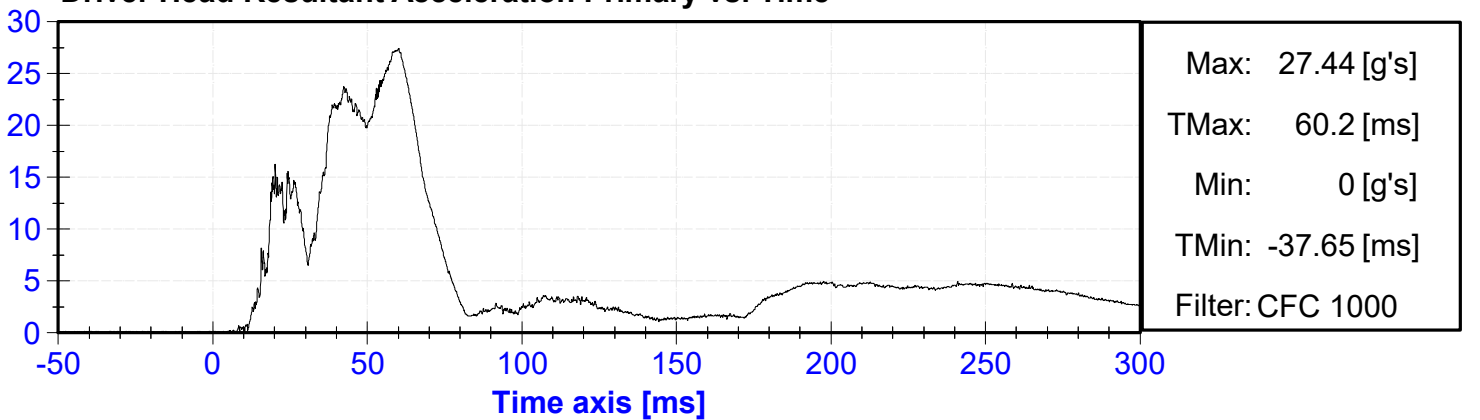
Driver Head Acceleration (Y) Primary vs. Time



Driver Head Acceleration (Z) Primary vs. Time

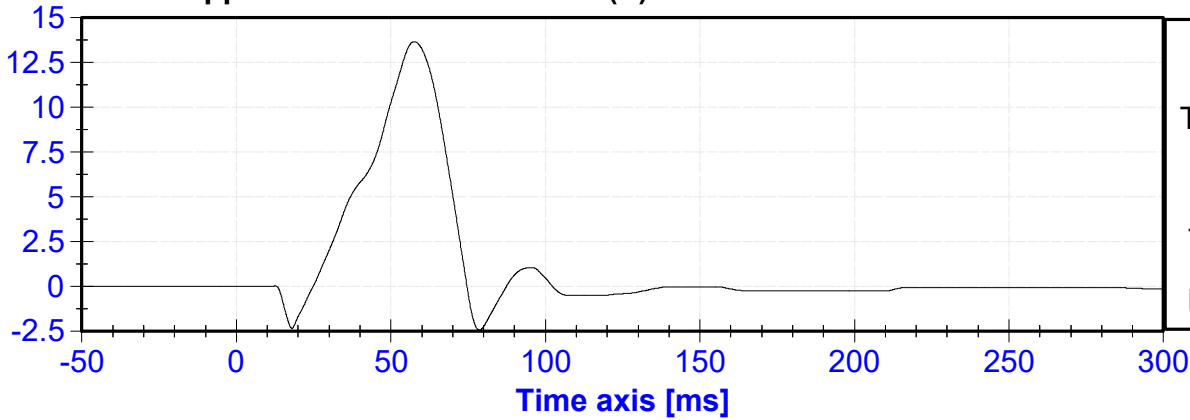


Driver Head Resultant Acceleration Primary vs. Time



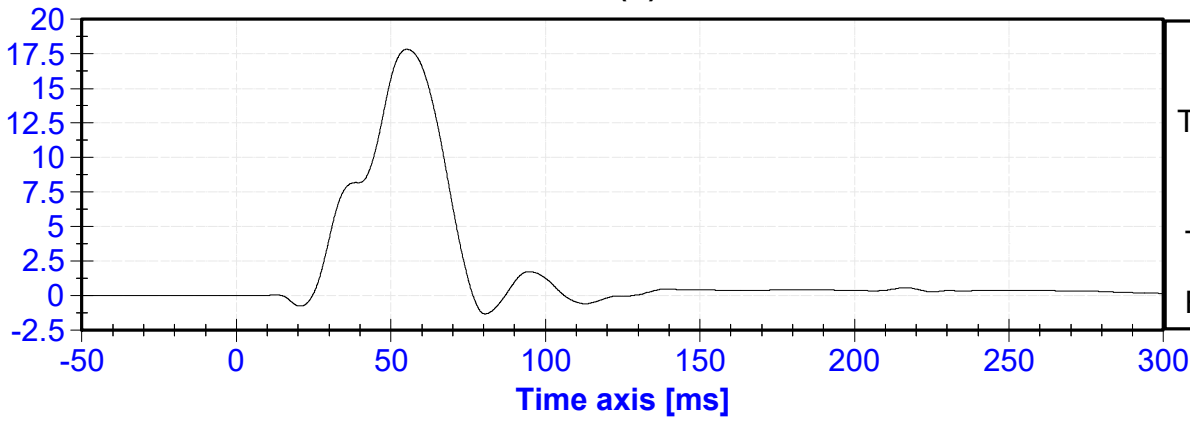
Driver Upper Thorax Rib Deflection (Y) vs. Time

DISPLACEMENT [mm]



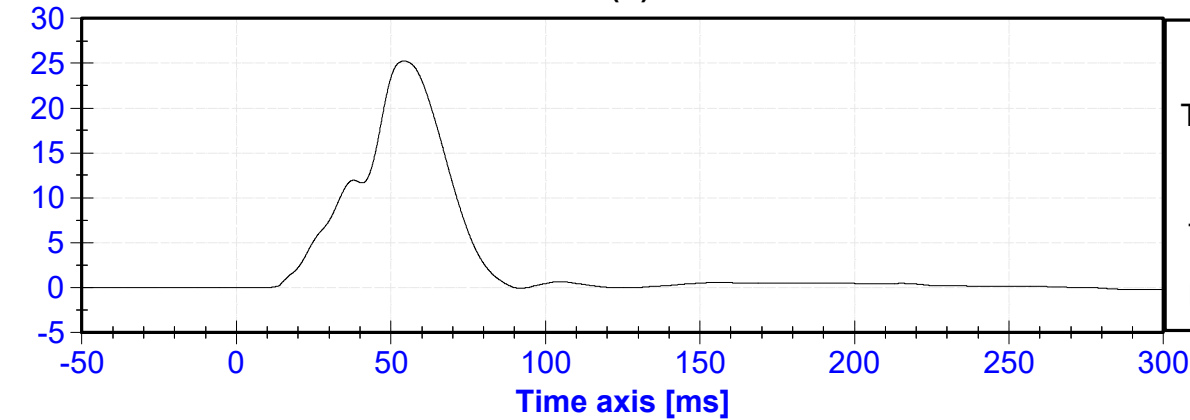
Driver Middle Thorax Rib Deflection (Y) vs. Time

DISPLACEMENT [mm]



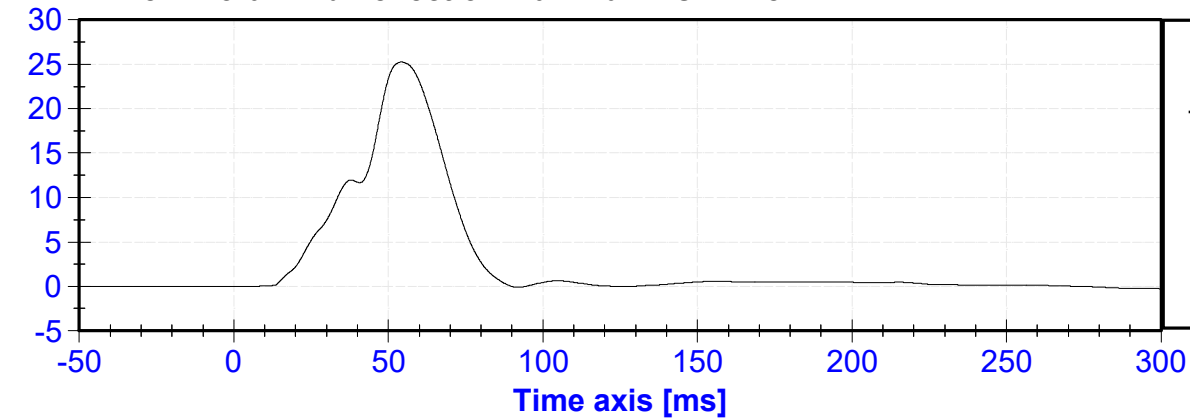
Driver Lower Thorax Rib Deflection (Y) vs. Time

DISPLACEMENT [mm]

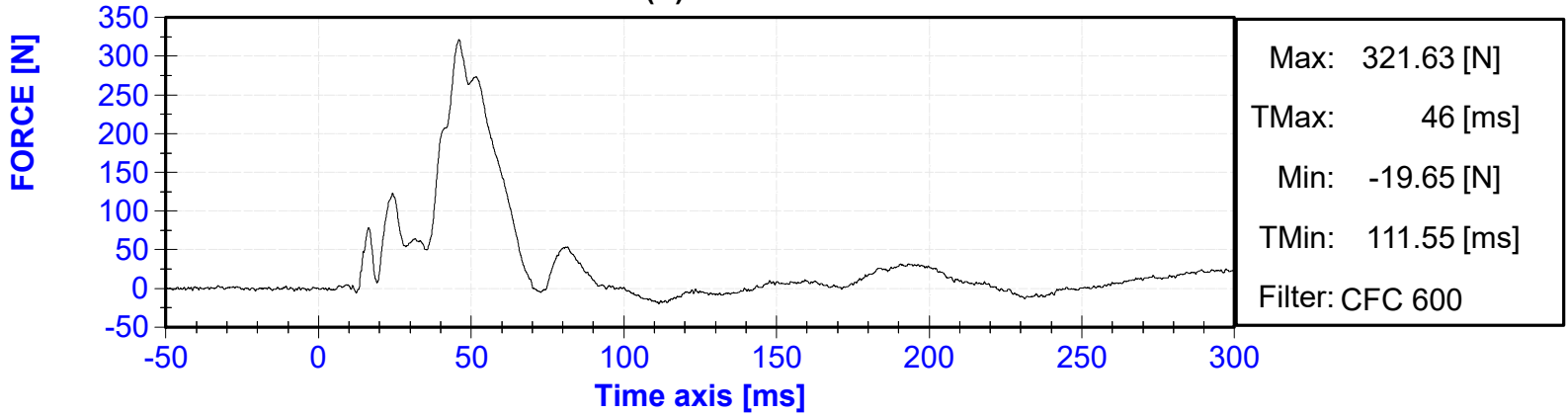


Driver Thorax Rib Deflection Maximum vs. Time

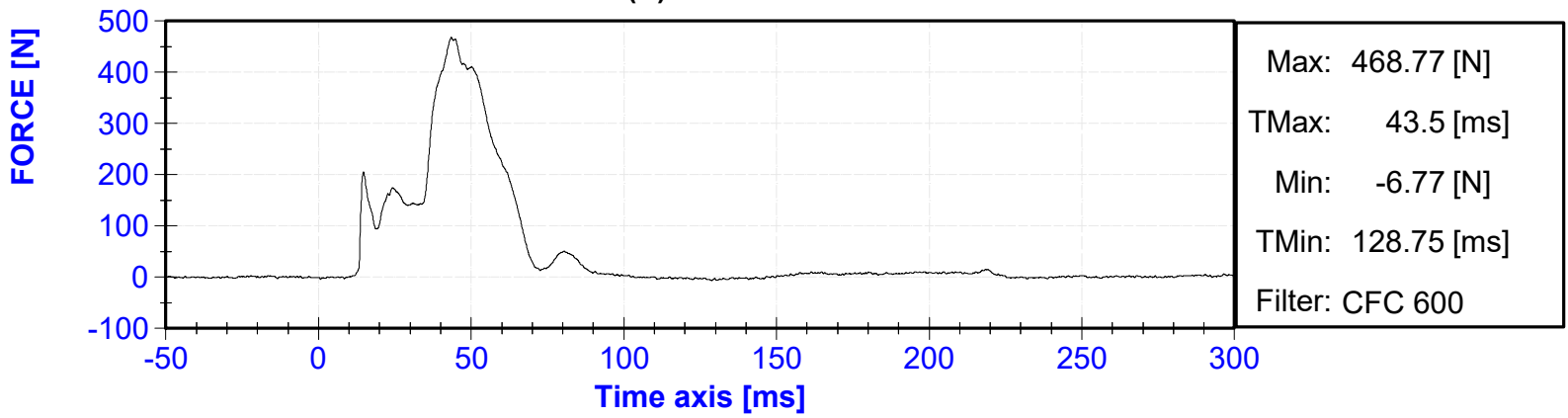
DISPLACEMENT [mm]



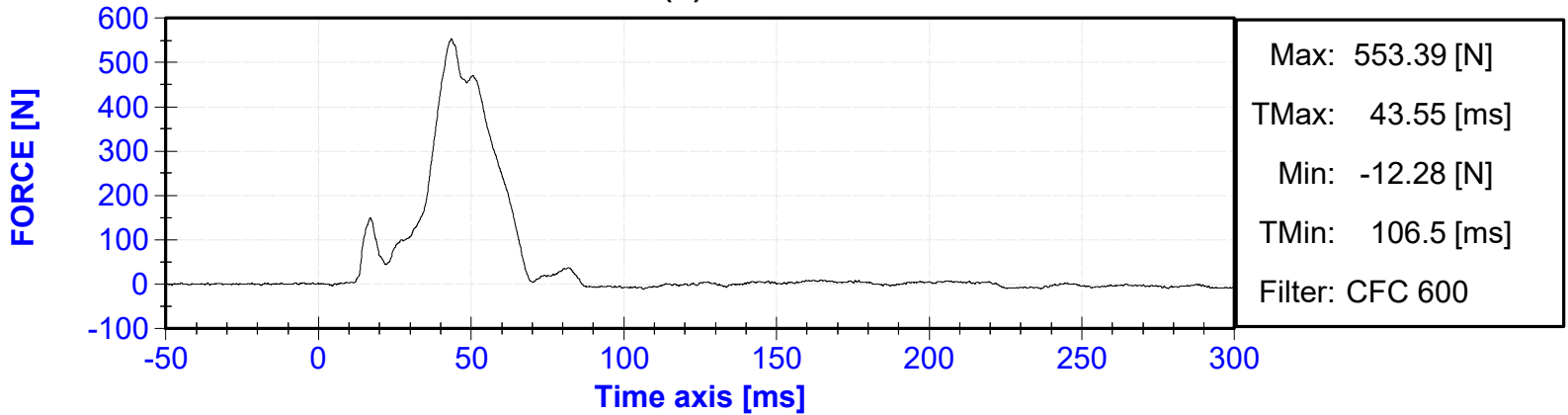
Driver Anterior Abdominal Force (Y) vs. Time



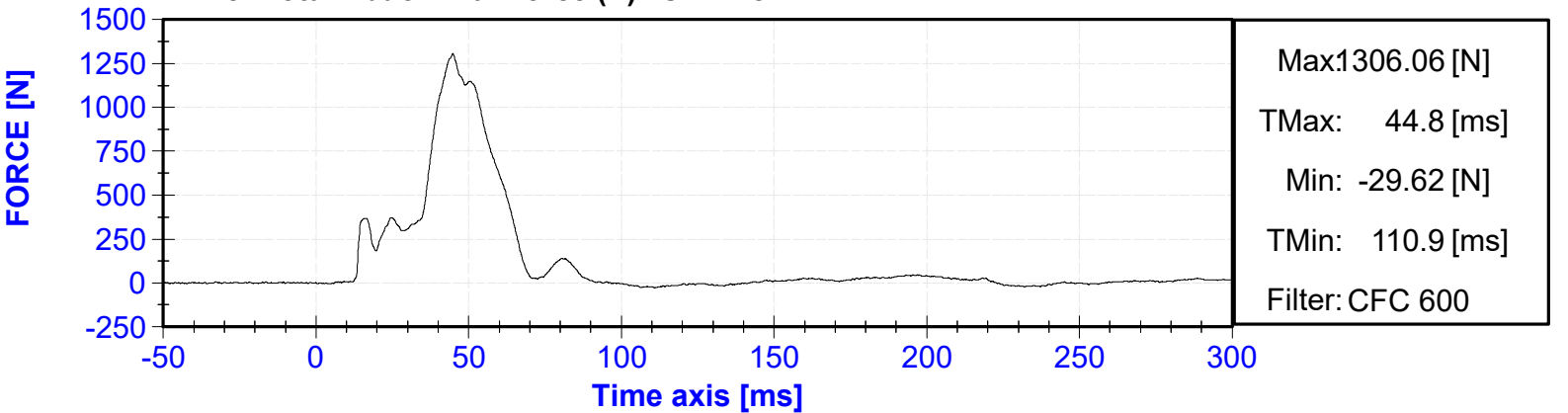
Driver Middle Abdominal Force (Y) vs. Time



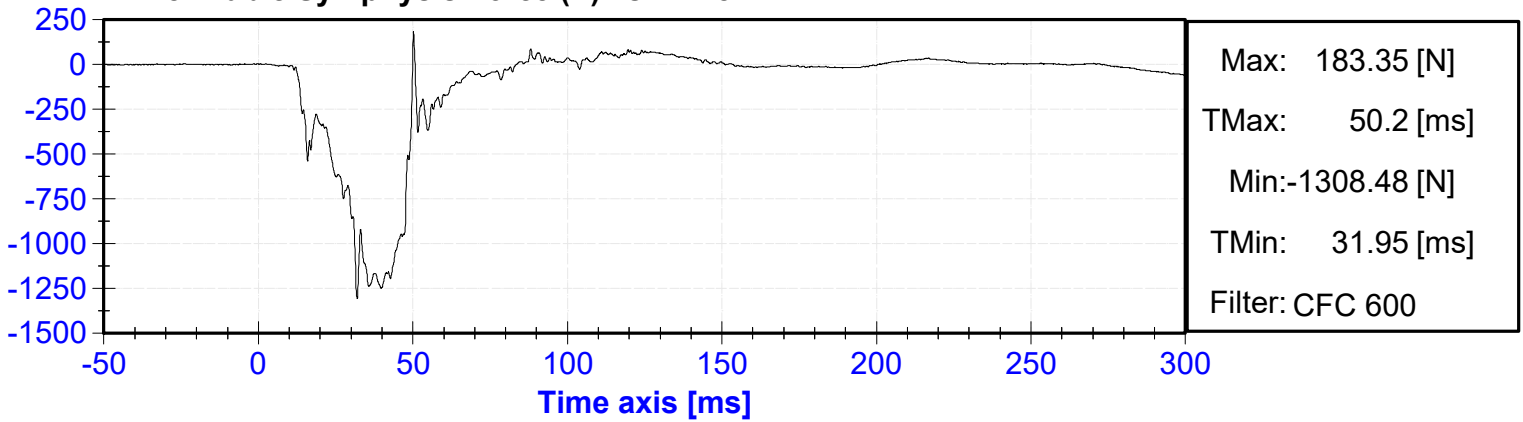
Driver Posterior Abdominal Force (Y) vs. Time



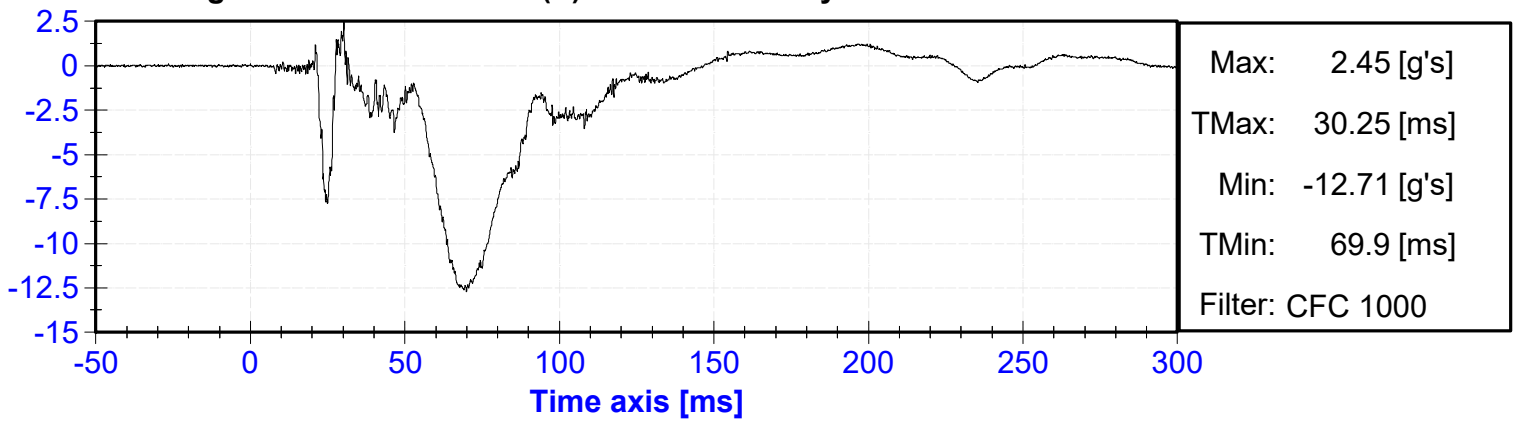
Driver Total Abdominal Force (Y) vs. Time



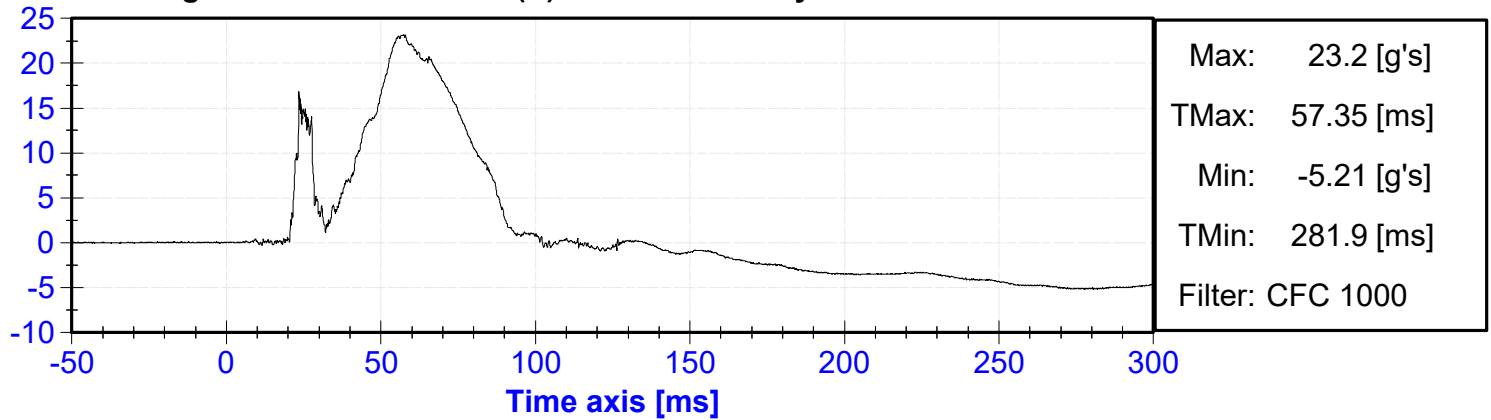
Driver Pubic Symphysis Force (Y) vs. Time



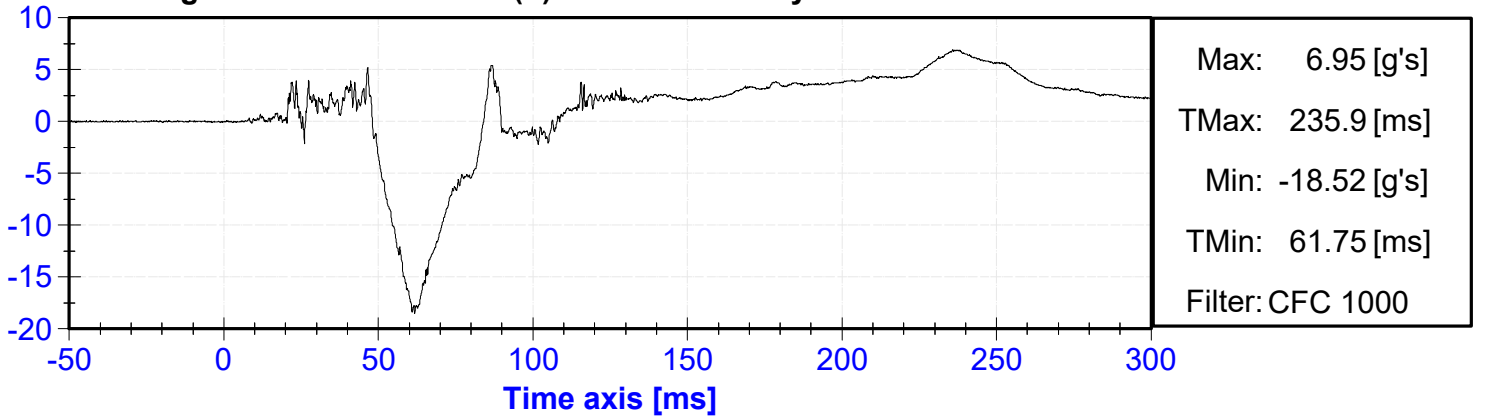
Passenger Head Acceleration (X) vs. Time Primary



Passenger Head Acceleration (Y) vs. Time Primary

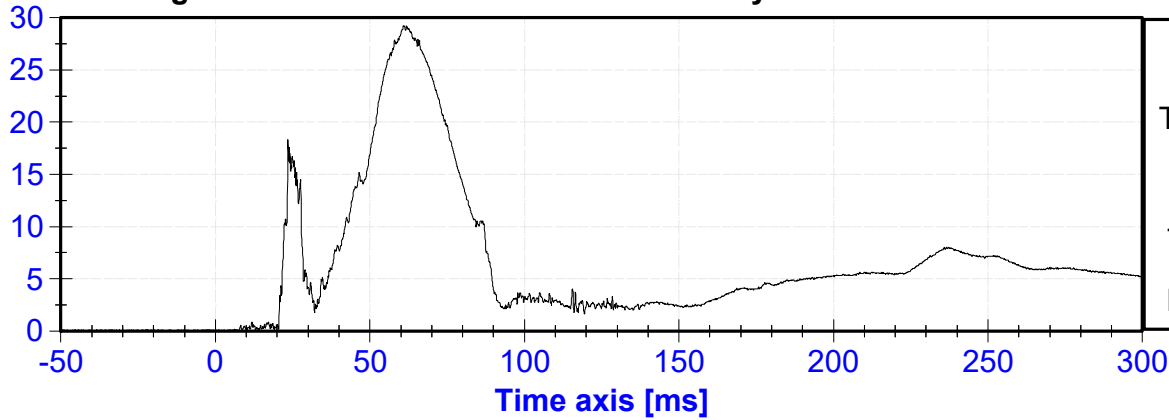


Passenger Head Acceleration (Z) vs. Time Primary



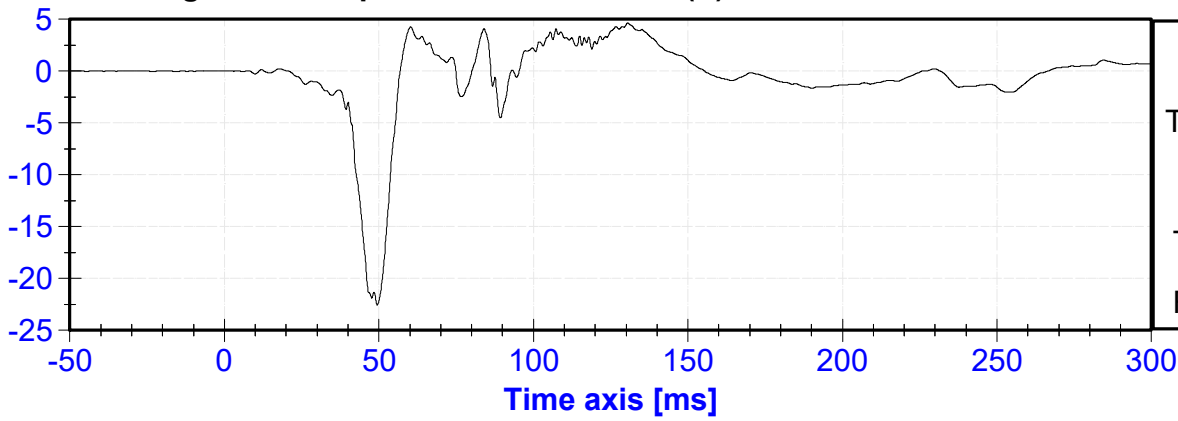
Passenger Head Resultant Acceleration Primary vs. Time

ACCELERATION [g's]



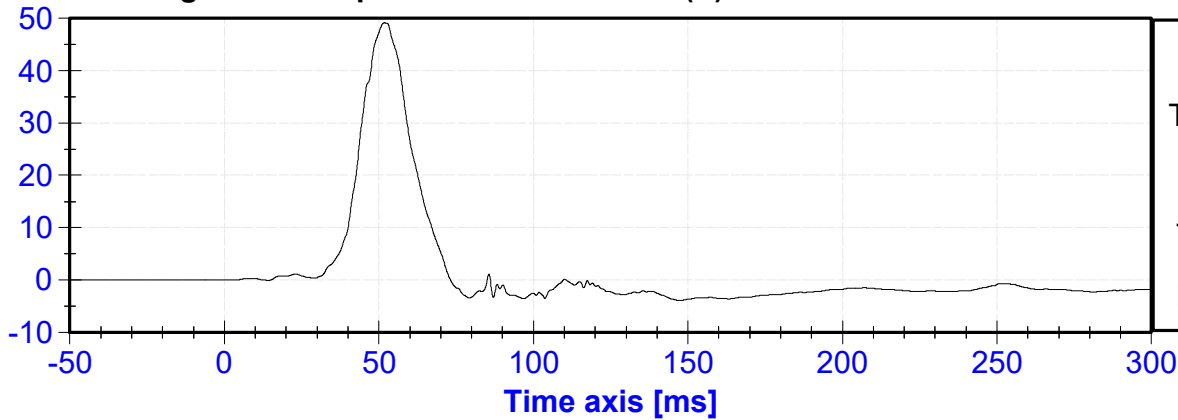
Passenger Lower Spine T12 Acceleration (X) vs. Time

ACCELERATION [g's]



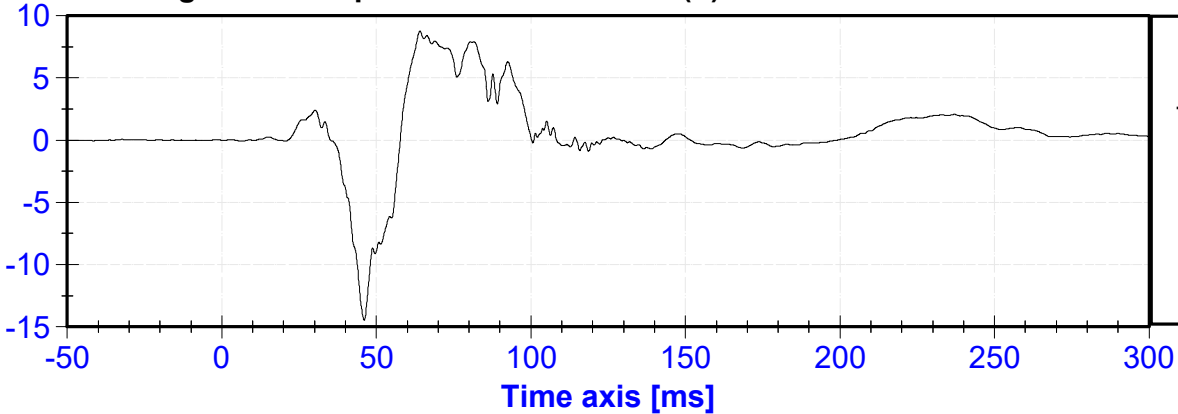
Passenger Lower Spine T12 Acceleration (Y) vs. Time

ACCELERATION [g's]



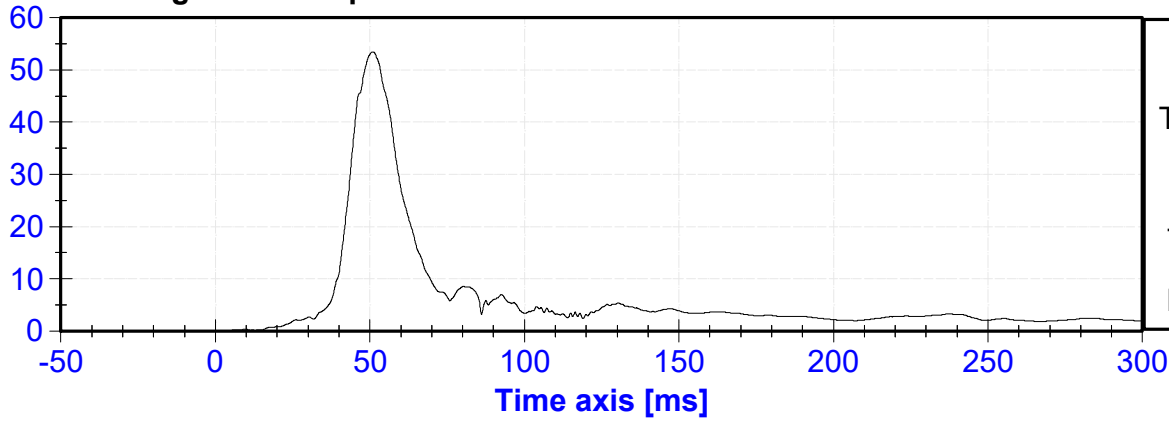
Passenger Lower Spine T12 Acceleration (Z) vs. Time

ACCELERATION [g's]



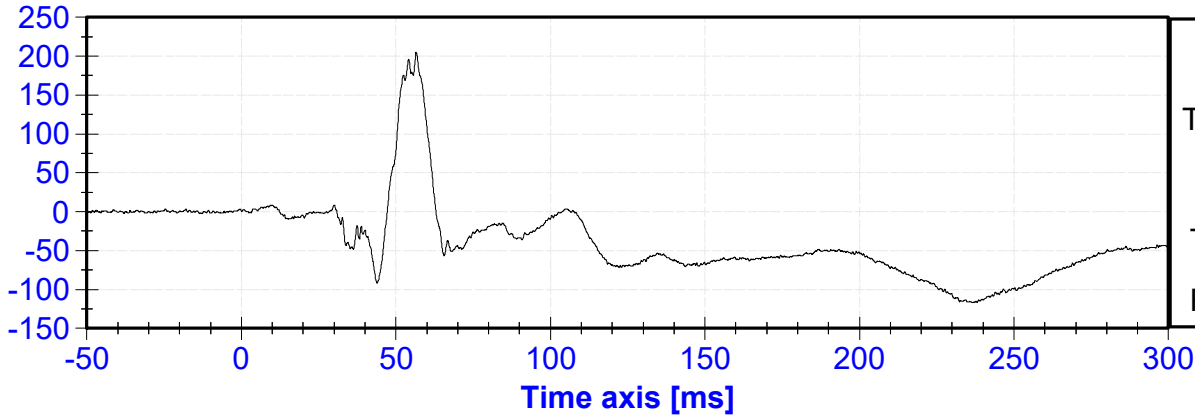
Passenger Lower Spine T12 Resultant Acceleration vs. Time

ACCELERATION [g's]



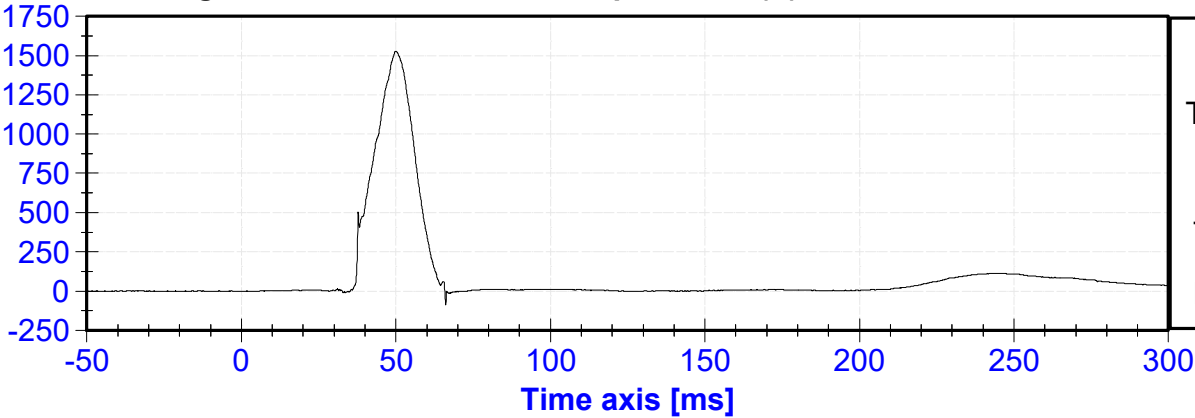
Passenger Iliac Force on Impact Side (Y) vs. Time

FORCE [N]



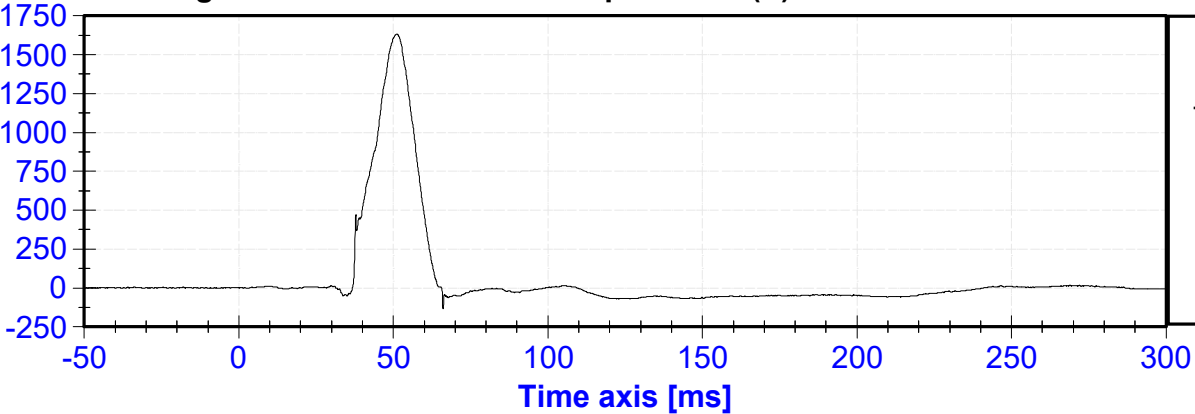
Passenger Acetabulum Force on Impact Side (Y) vs. Time

FORCE [N]



Passenger Total Pelvic Force on Impact Side (Y) vs. Time

FORCE [N]



## APPENDIX C

### DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

**CALIBRATION TEST RESULTS**

**PRE-TEST**

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

**SERIAL NO:F033**

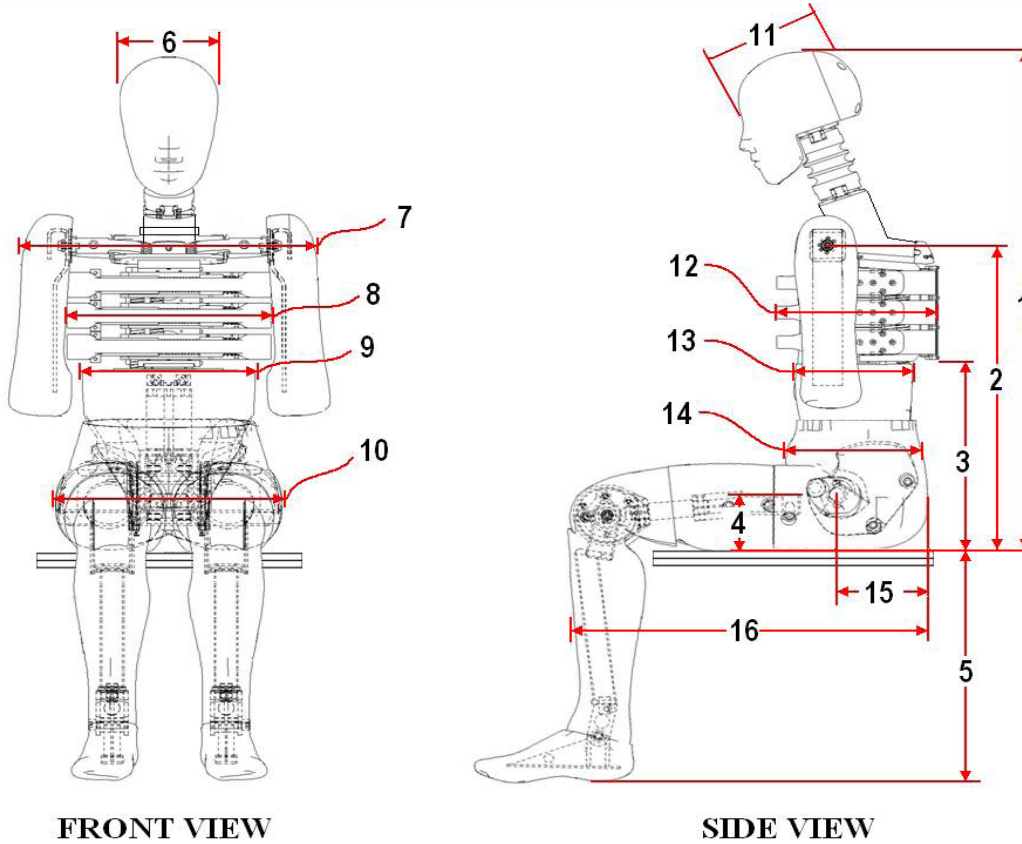
**(CONFIGURED FOR LEFT SIDE IMPACT)**

External Measurements - EuroSID-2re

Technician: K. Brogan

Date: 12/19/2022

Dummy Serial Number: F033



Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	908	Pass
2	Seat to Shoulder Joint	558	572	567	Pass
3	Seat to Lower Face of Thoracic Spine Box	346	356	350	Pass
4	Seat to Hip Joint (center of bolt)	97	103	99	Pass
5	Sole to Seat, Sitting	333	451	420	Pass
6	Head Width	152	158	157	Pass
7	Shoulder/Arm Width	461	479	469	Pass
8	Thorax Width	322	332	329	Pass
9	Abdomen Width	273	287	280	Pass
10	Pelvis Lap Width	359	373	365	Pass
11	Head Depth	196	206	203	Pass
12	Thorax Depth	262	272	268	Pass
13	Abdomen Depth	194	204	200	Pass
14	Pelvis Depth	235	245	240	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150	160	157	Pass
16	Back of Buttocks to Front Knee	597	615	606	Pass

ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

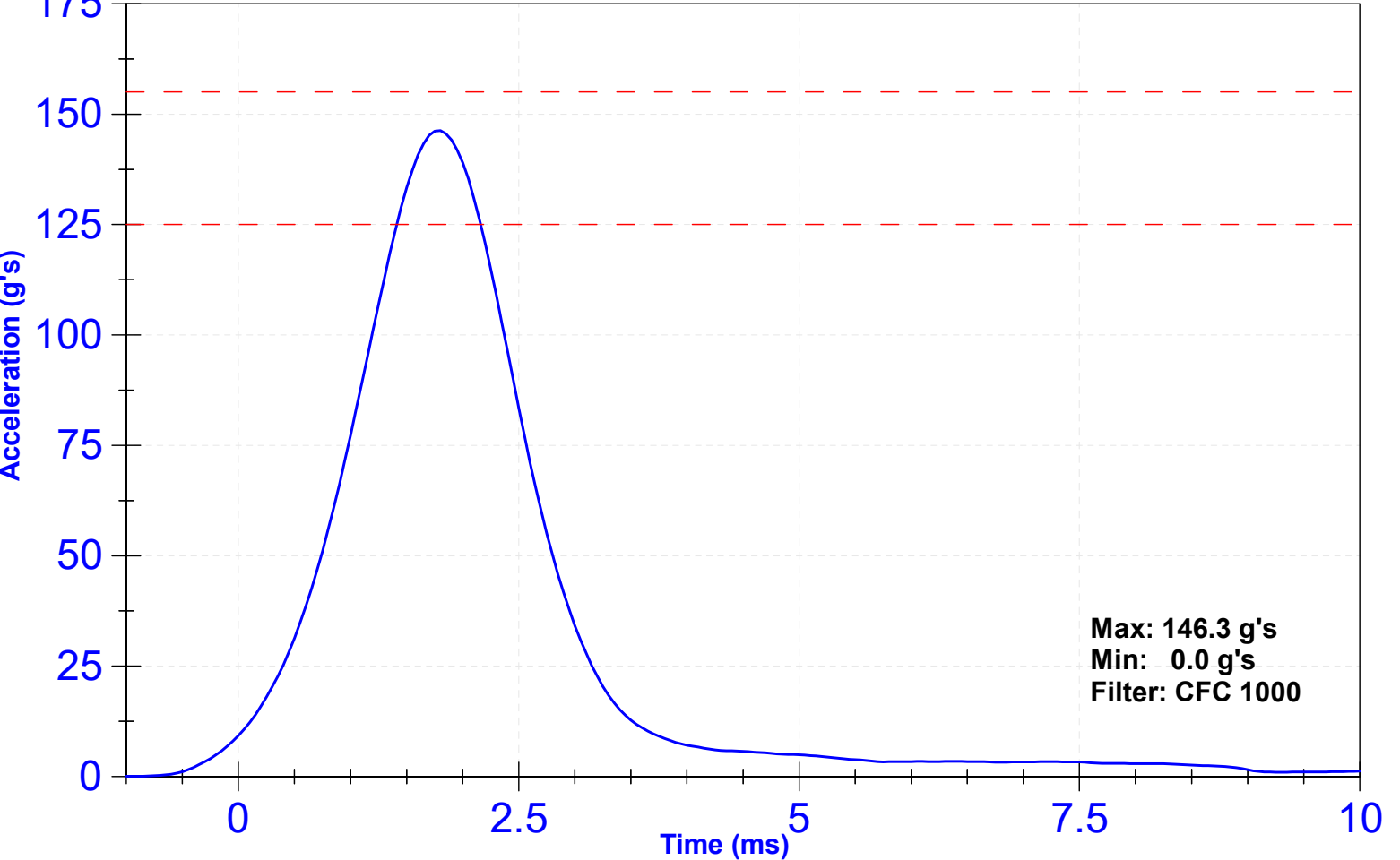
**Results**

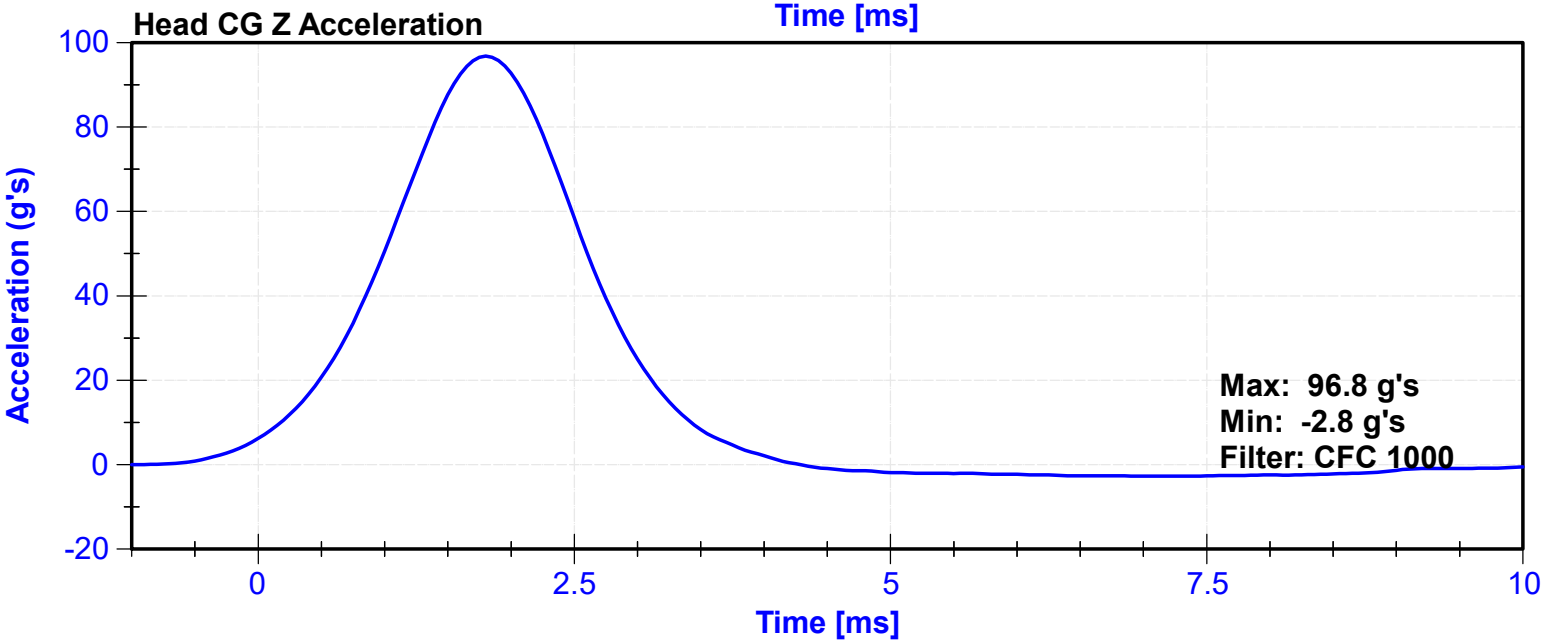
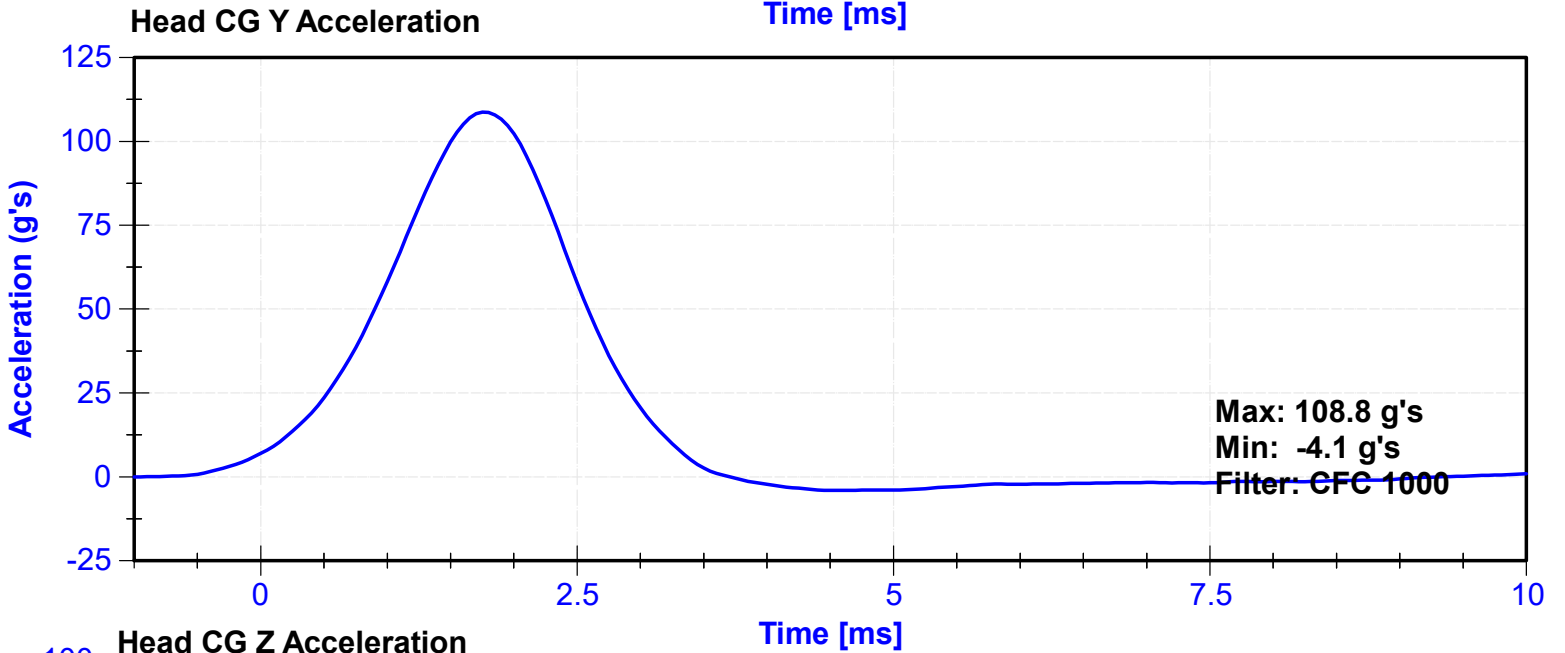
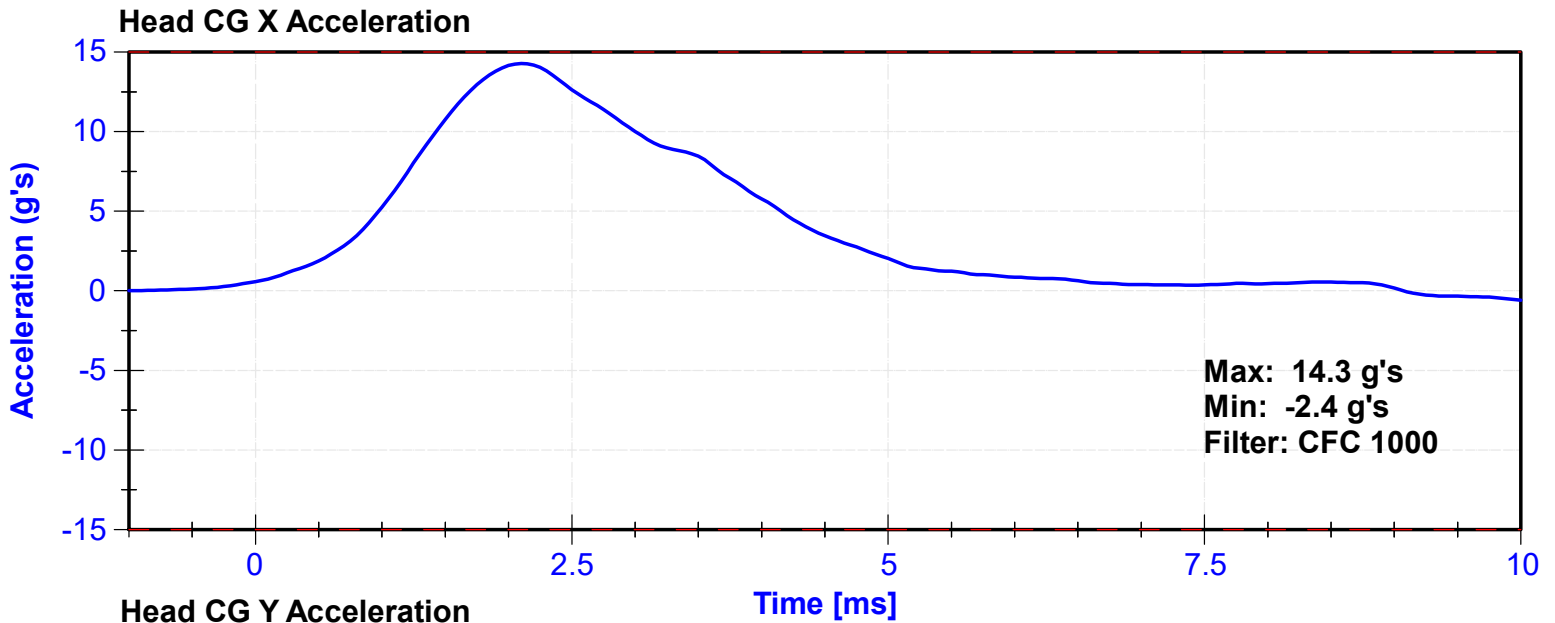
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	21	Pass
Resultant Acceleration	125	155	g's	146.3	Pass
Oscillation	0	15	%	2.36	Pass
Fore-Aft Acceleration	-15	15	g's	14.3	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	P63861	7/21/2022	1/17/2023
Y Accelerometer	Endevco	P49216	7/21/2022	1/17/2023
Z Accelerometer	Endevco	P51303	7/21/2022	1/17/2023

**Resultant Acceleration**





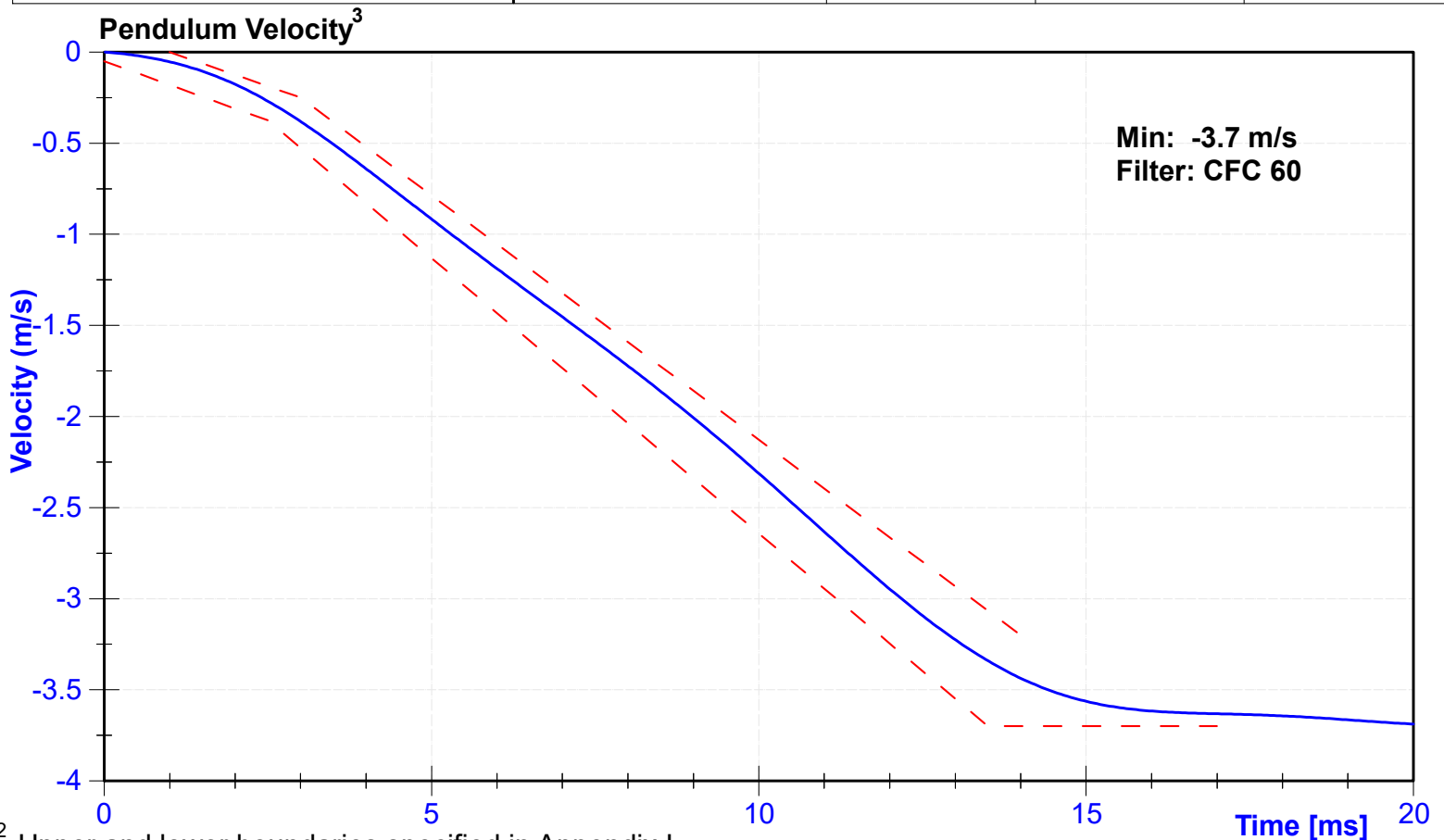
ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	F033	Laboratory Supervisor	C. Mantell

**Results**

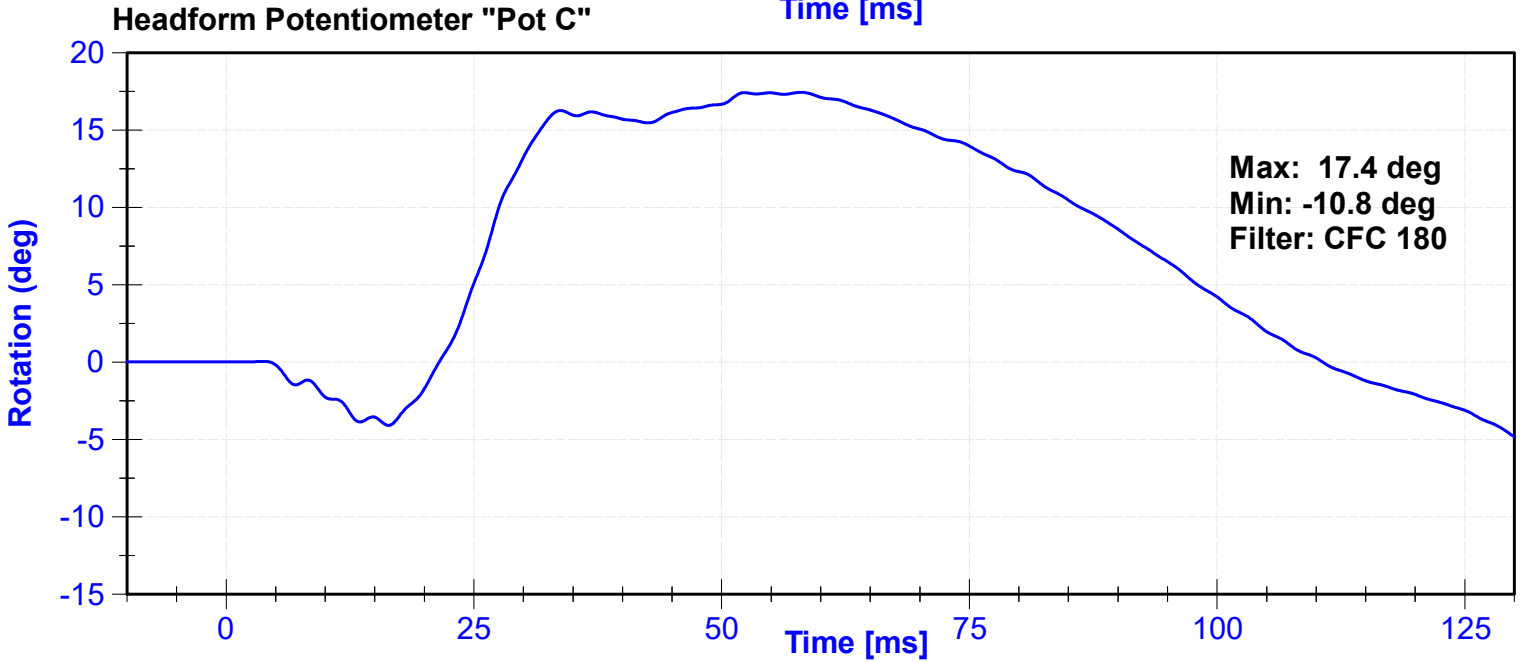
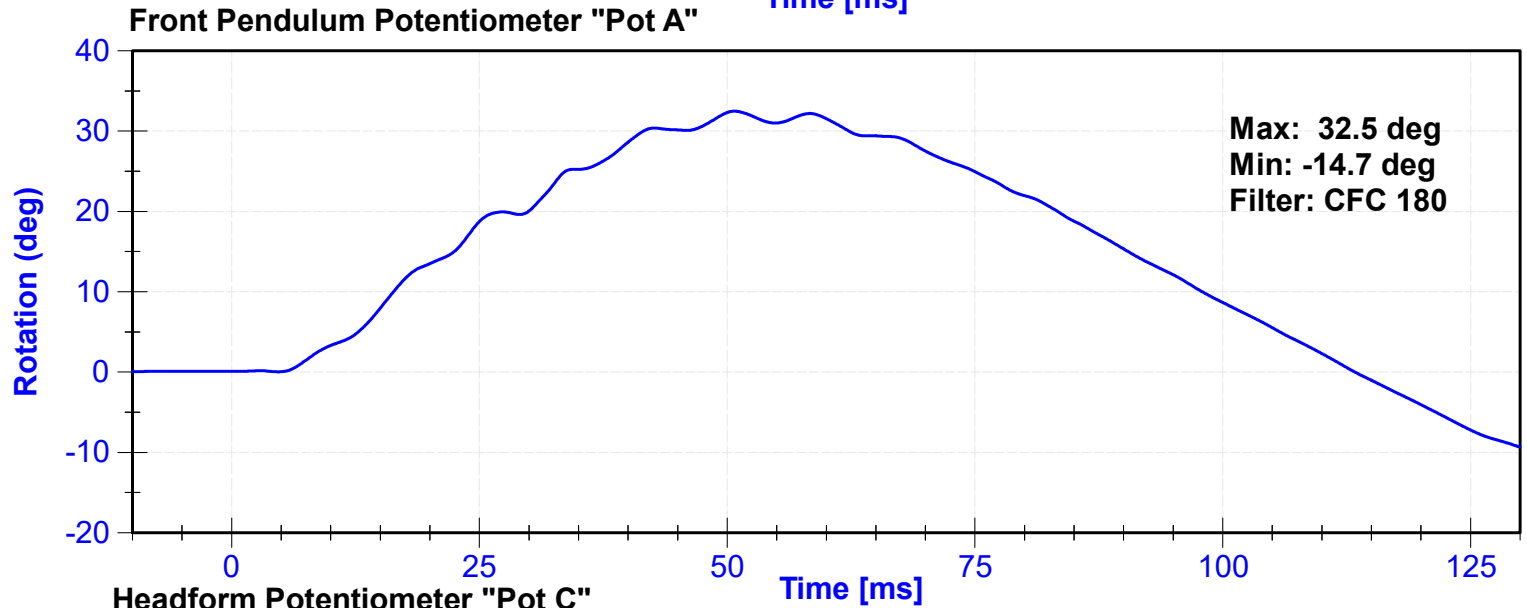
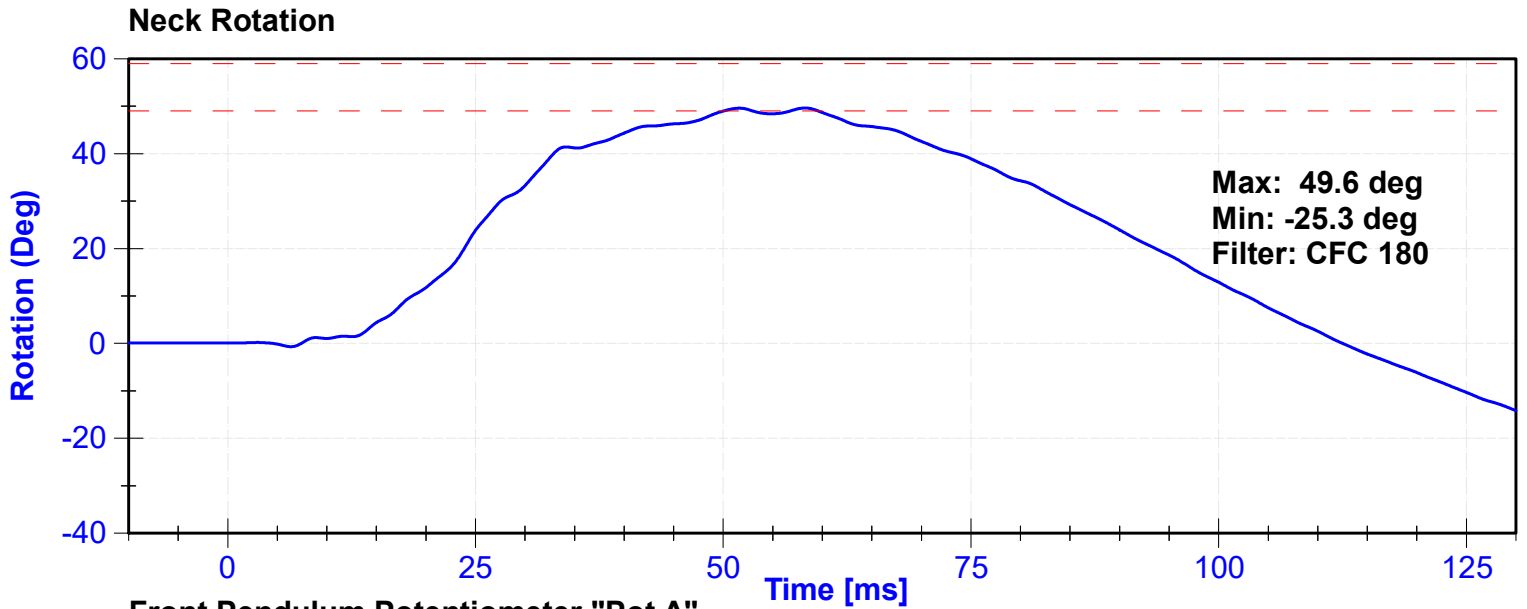
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	21	Pass
Velocity	3.3	3.5	m/s	3.41	Pass
Lateral Neck Rotation	49	59	deg	49.6	Pass
Time at Maximum Rotation	54	66	ms	58.3	Pass
Time of Rotation Decay from Maximum	53	88	ms	54.3	Pass
Pendulum Velocity Overall Corridor	Lower Boundary <sup>1</sup>	Upper Boundary <sup>2</sup>	m/s	See Plot <sup>3</sup>	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16503	10/26/2022	10/26/2023
Front Pendulum Potentiometer	Sfernice	094	10/5/2022	10/5/2023
Headform Potentiometer	Sfernice	095	10/5/2022	10/5/2023



<sup>1,2</sup> Upper and lower boundaries specified in Appendix I



## Appendix I

<sup>2</sup> Upper Boundary Corridor		<sup>1</sup> Lower Boundary Corridor	
Time (ms)	Velocity (m/s)	Time (ms)	Velocity (m/s)
1.0	0.00	0.0	-0.05
3.0	-0.25	2.5	-0.375
14.0	-3.20	13.5	-3.7
		17.0	-3.7

ATD Manufacturer	FTSS	Test Technician	D. Sakona
ATD Serial Number	F033	Laboratory Supervisor	C. Mantell

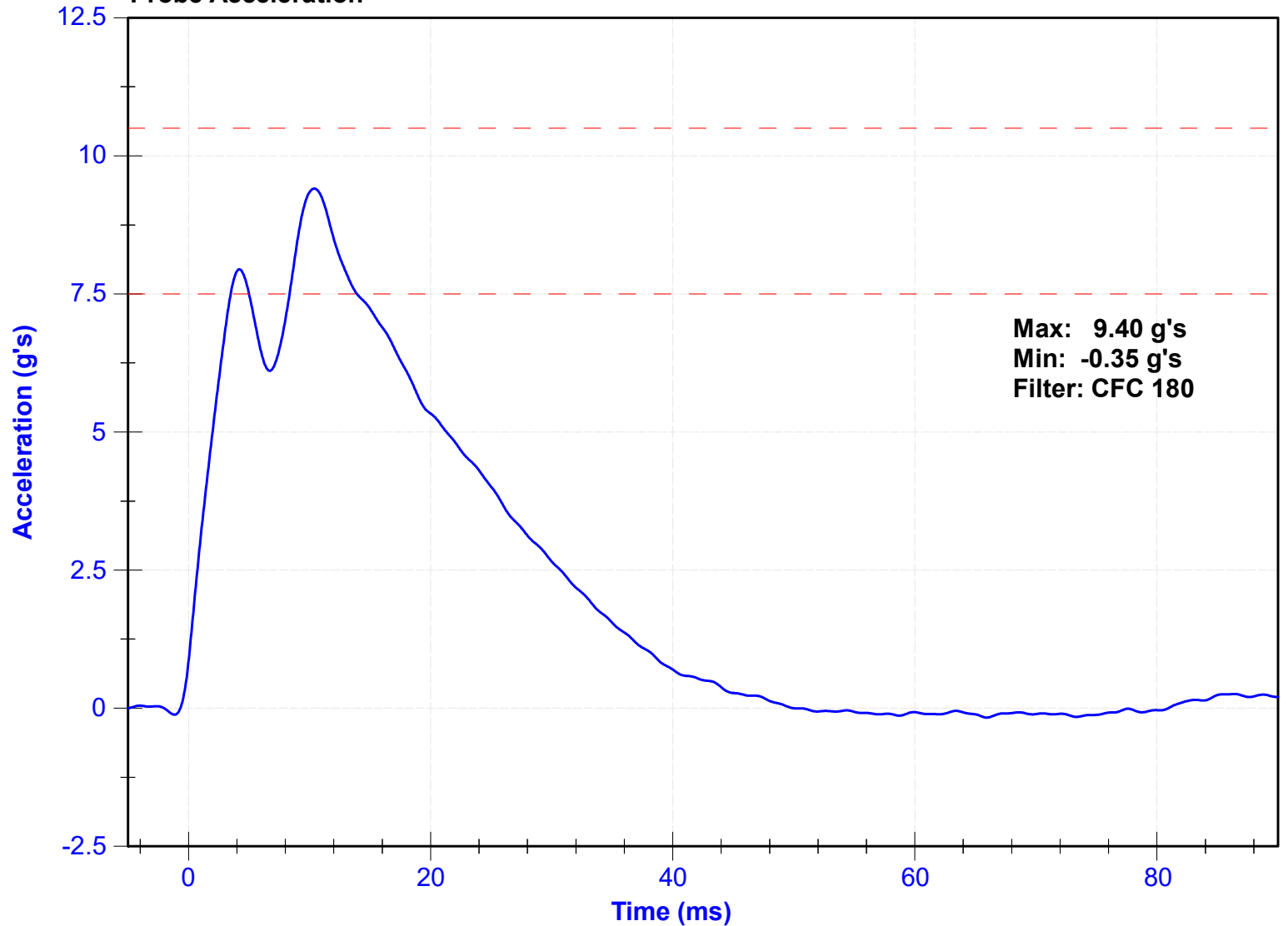
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	20.5	Pass
Velocity	4.2	4.4	m/s	4.34	Pass
Probe Acceleration	7.5	10.5	g's	9.40	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	18494	11/5/2022	5/4/2023

**Probe Acceleration**



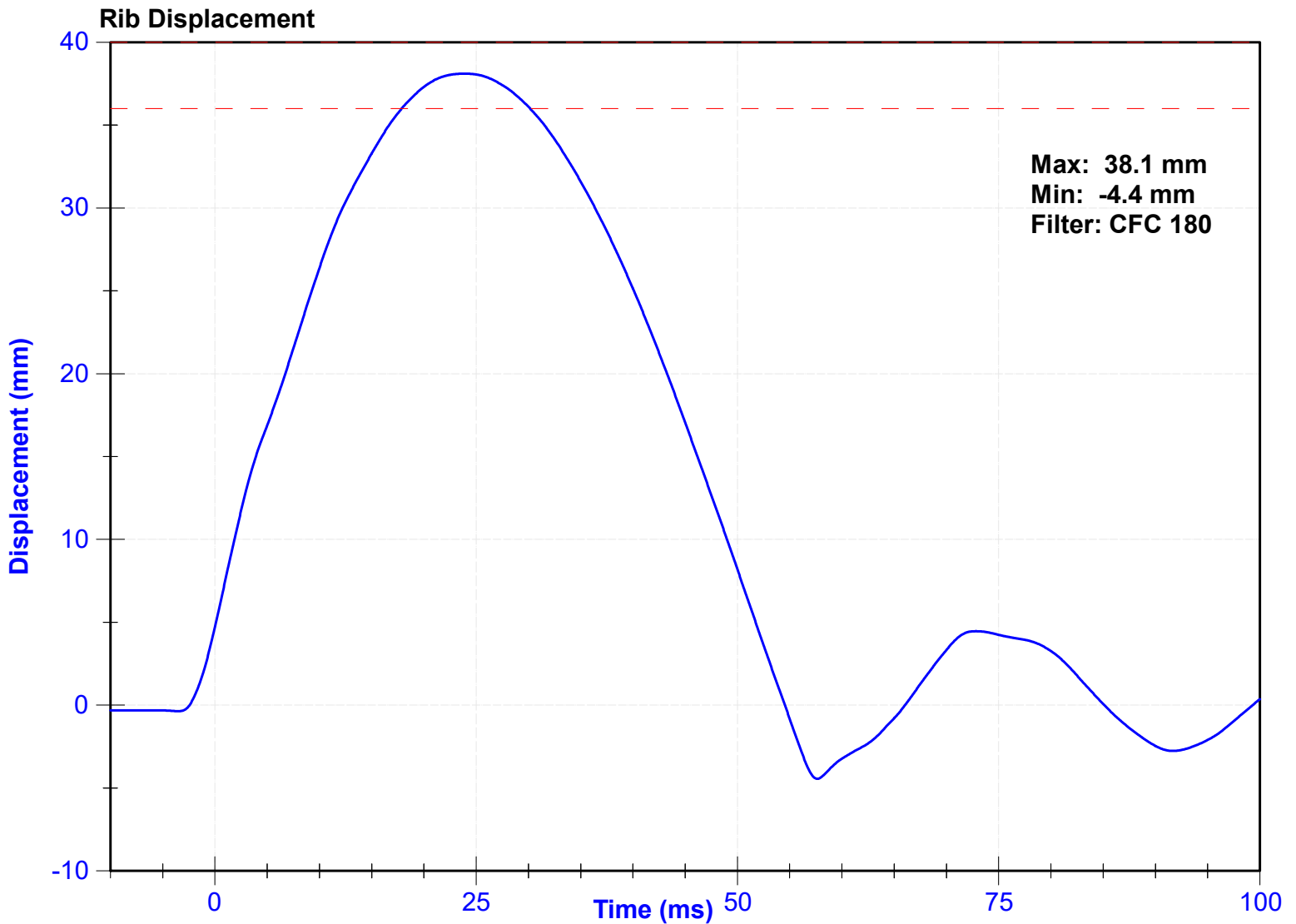
ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	21	Pass
Rib Displacement	36	40	mm	38.1	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	179GFE	7/25/2022	1/23/2023



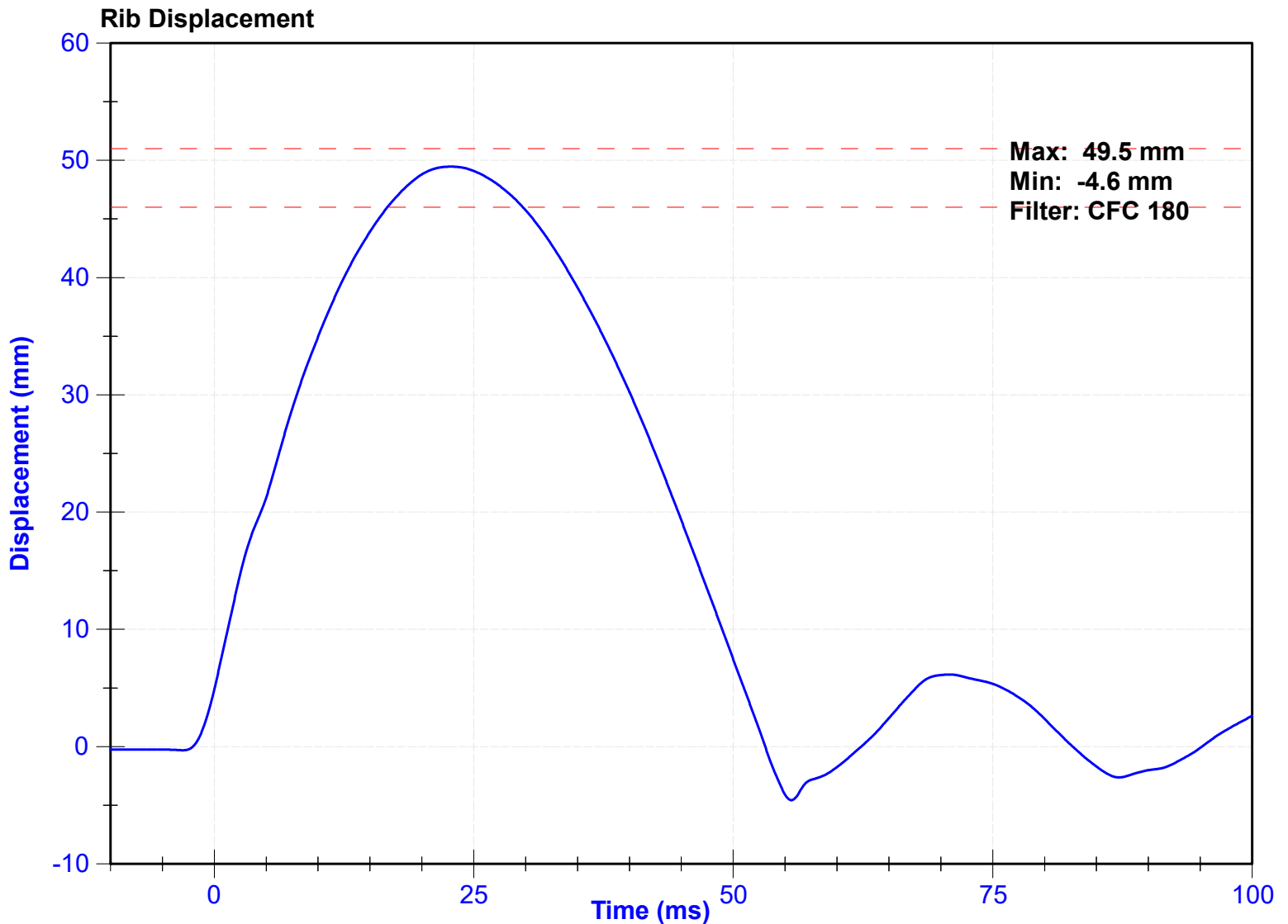
ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	21	Pass
Rib Displacement	46	51	mm	49.5	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	179GFE	7/25/2022	1/23/2023



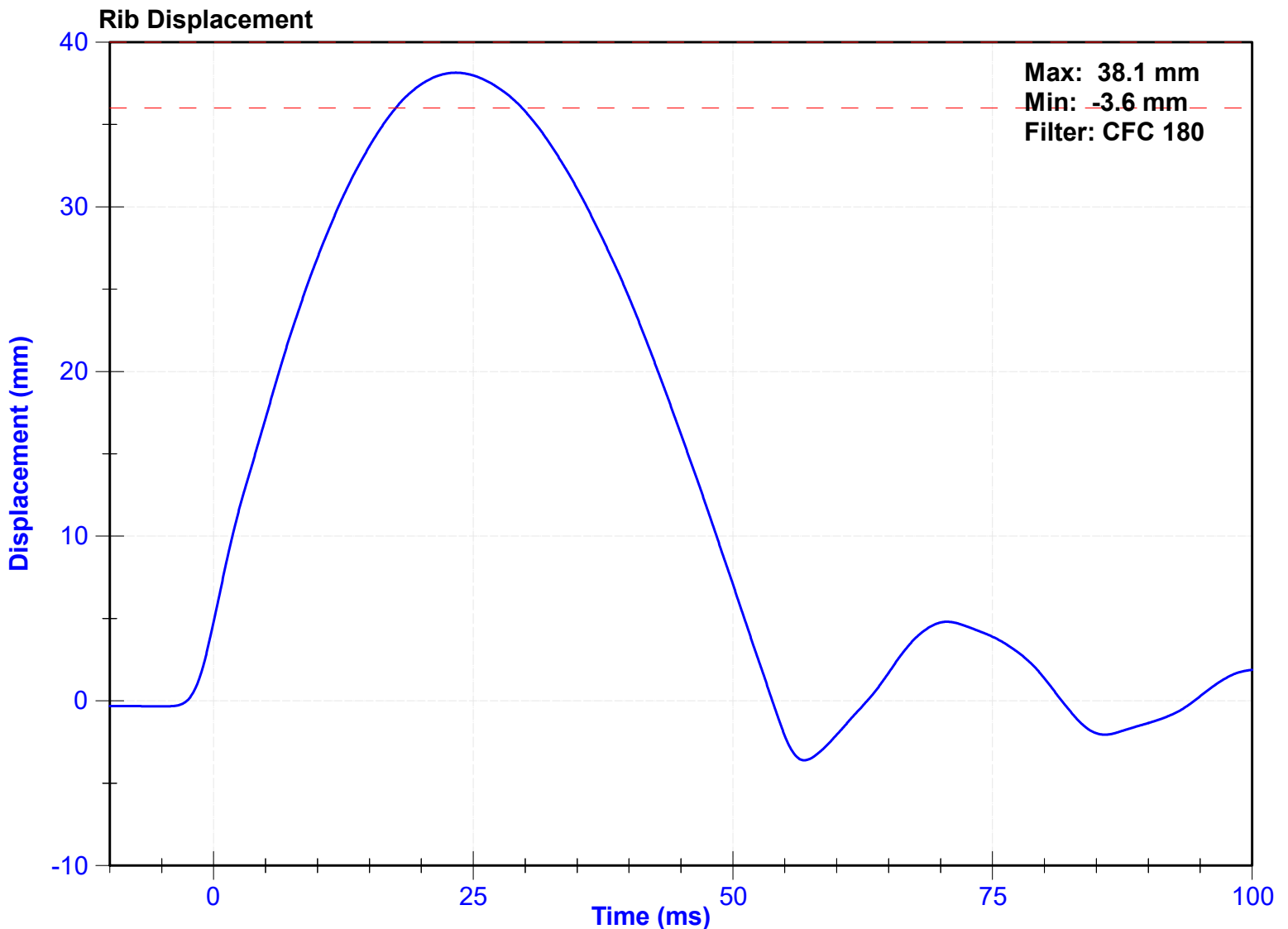
ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	21	Pass
Rib Displacement	36	40	mm	38.1	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	185GFE	7/21/2022	1/19/2023



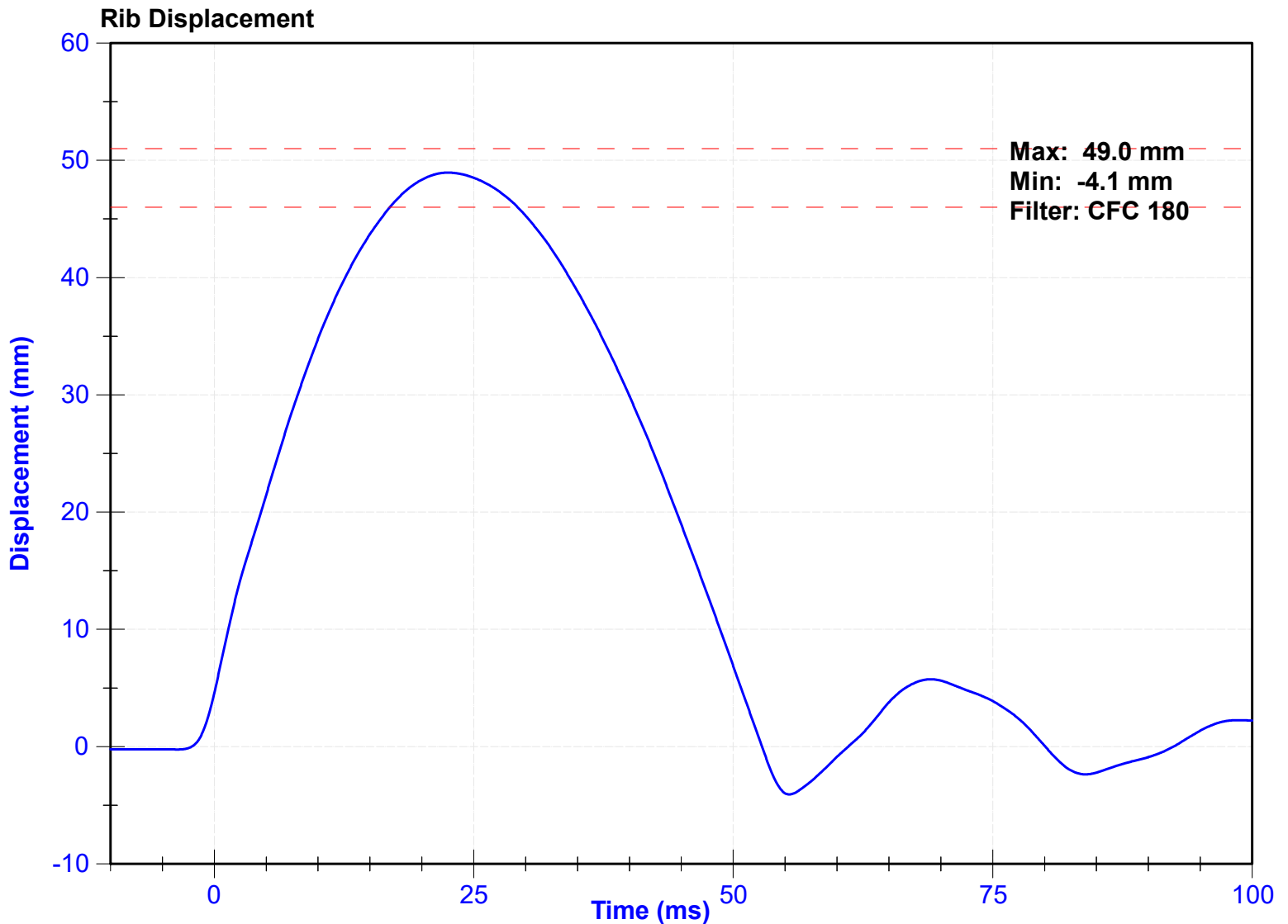
ATD Manufacturer	FTSS	Test Technician	Z.Schneider
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	21	Pass
Rib Displacement	46	51	mm	49.0	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	185GFE	7/21/2022	1/19/2023



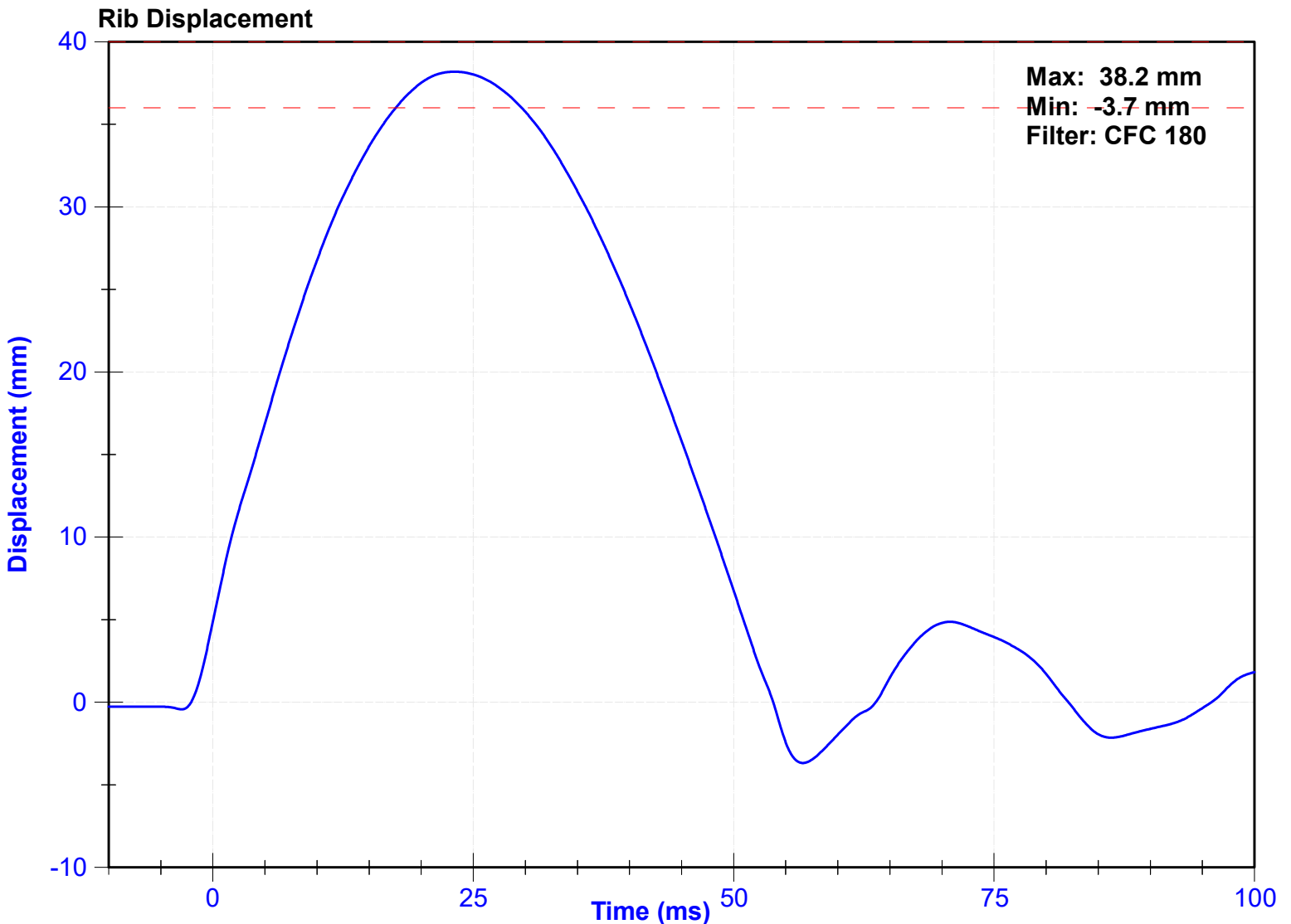
ATD Manufacturer	FTSS	Test Technician	Z.Schneider
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	21	Pass
Rib Displacement	36	40	mm	38.2	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	178GFE	7/21/2022	1/19/2023



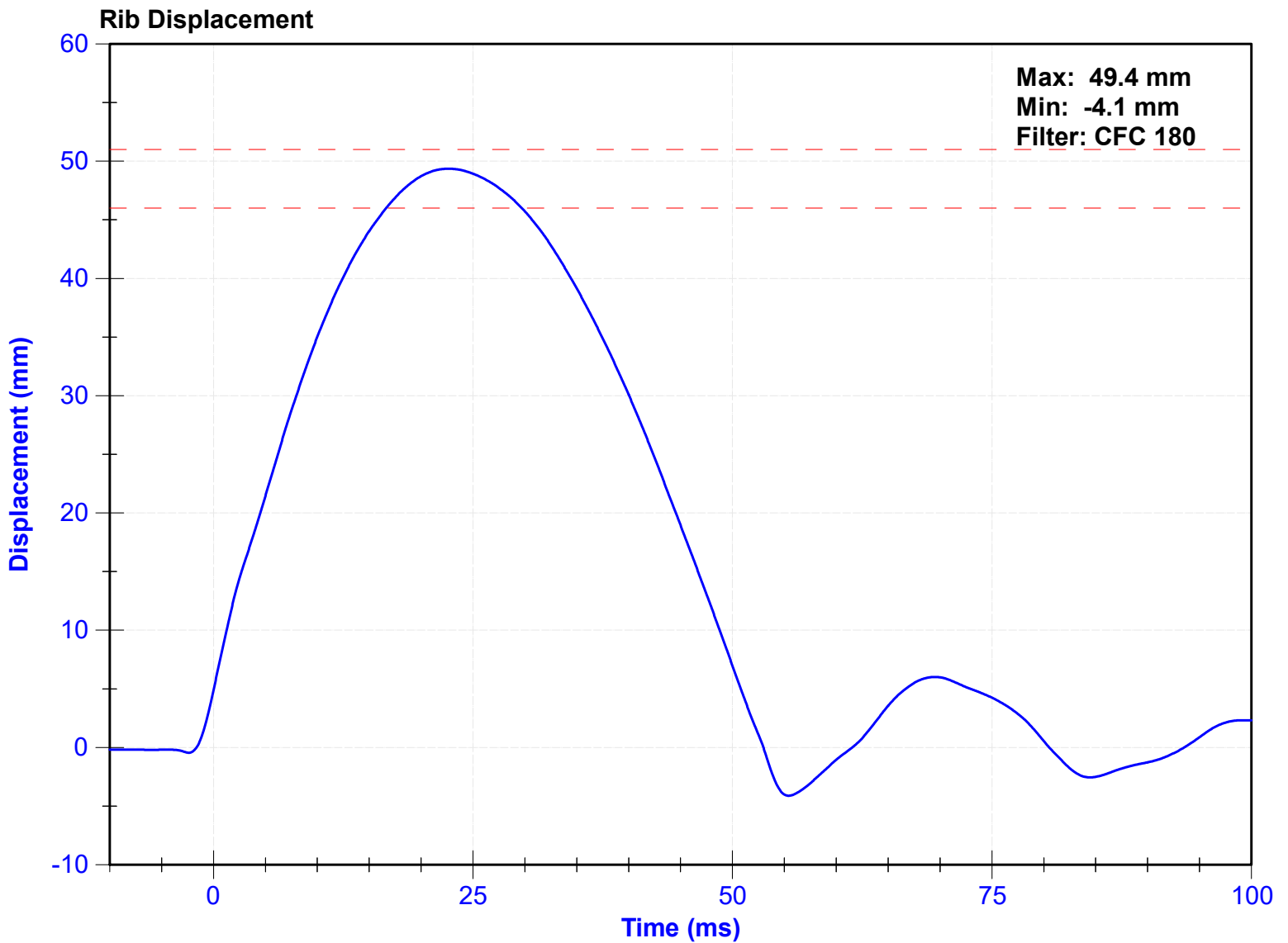
ATD Manufacturer	FTSS	Test Technician	Z.Schneider
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	21	Pass
Rib Displacement	46	51	mm	49.4	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	178GFE	7/21/2022	1/19/2023



ATD Manufacturer	FTSS	Test Technician	D. Sakona
ATD Serial Number	F033	Laboratory Supervisor	C. Mantell

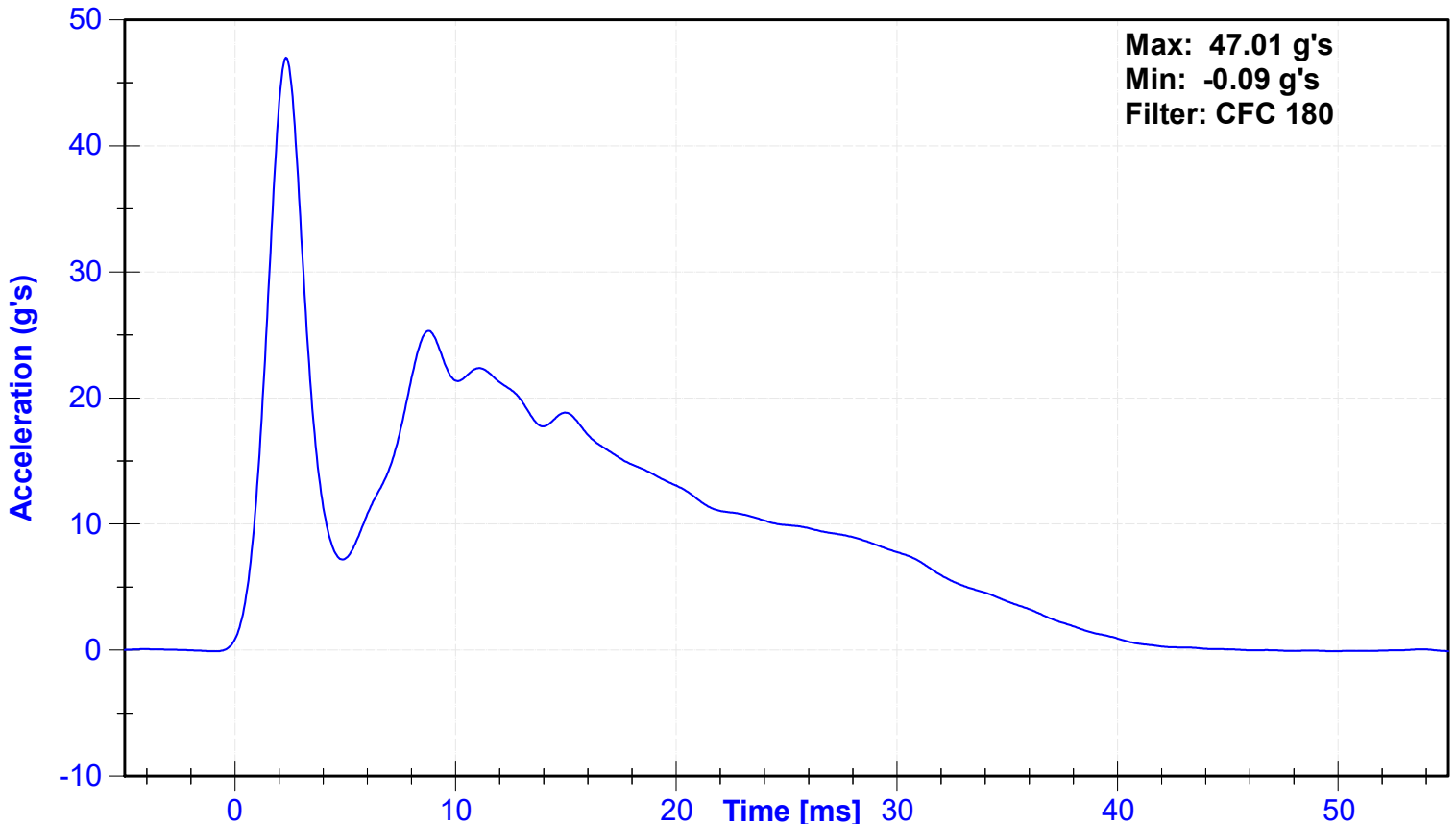
**Results**

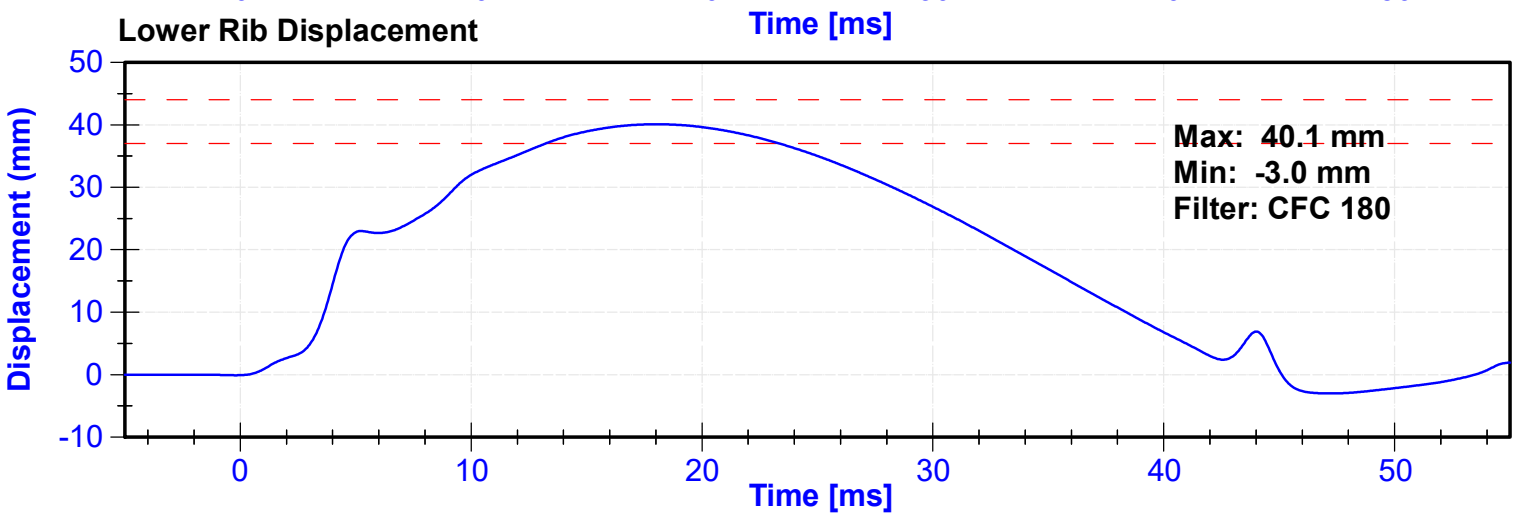
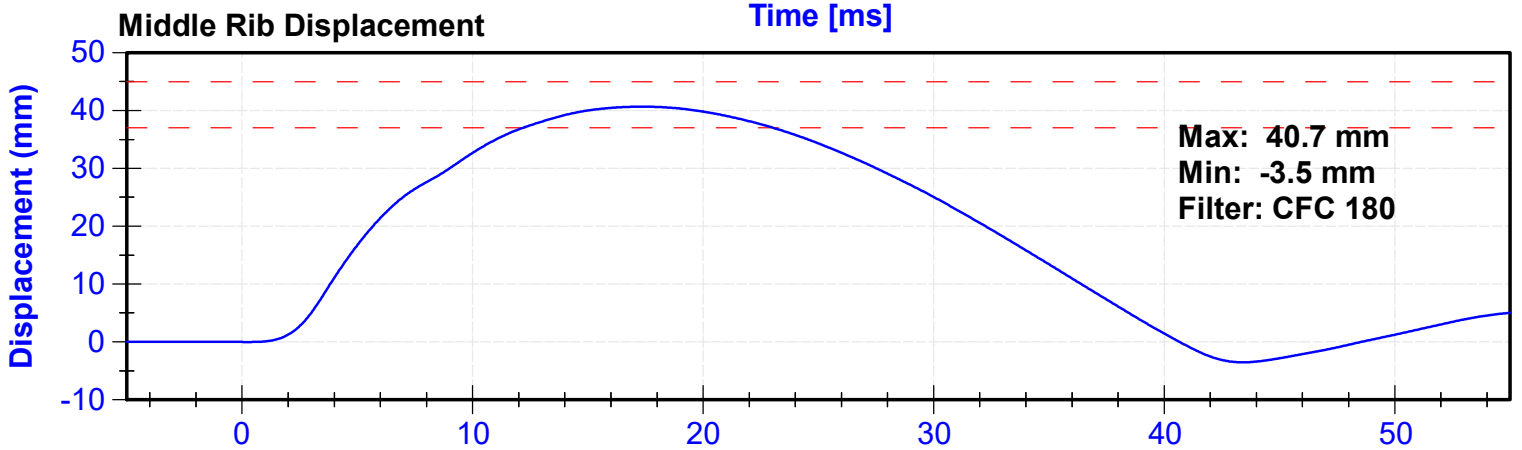
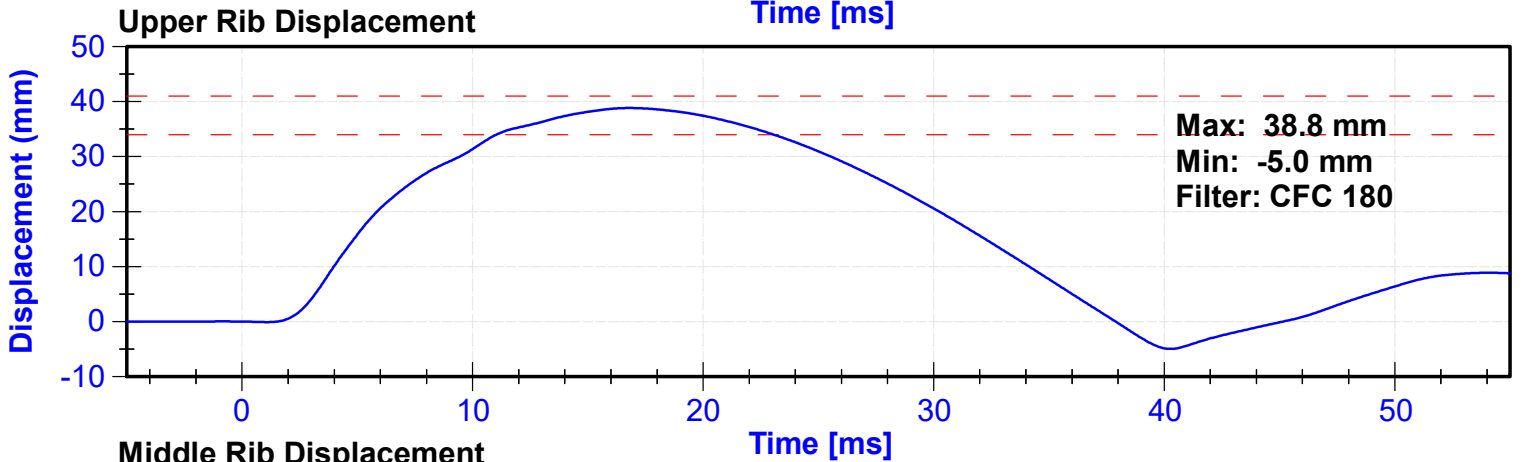
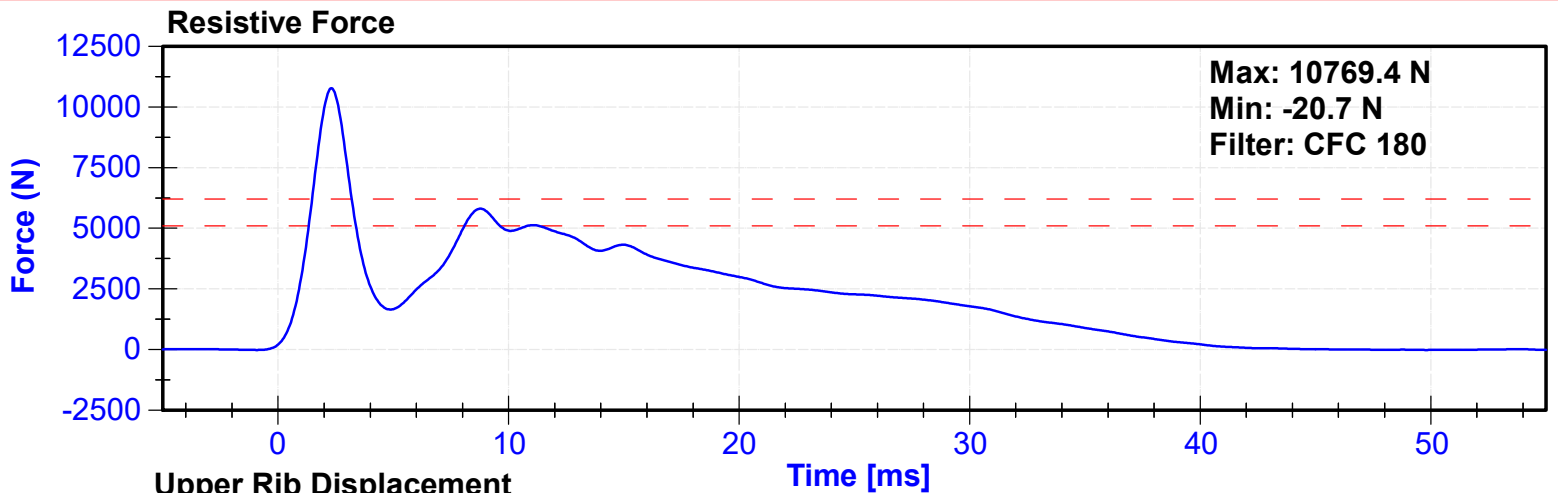
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	20.5	Pass
Velocity	5.4	5.6	m/s	5.52	Pass
Resistive Force after 6ms	5100	6200	N	5804.9	Pass
Upper Thorax Rib Deflection	34	41	mm	38.8	Pass
Mid Thorax Rib Deflection	37	45	mm	40.7	Pass
Lower Thorax Rib Deflection	37	44	mm	40.1	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	18494	11/5/2022	5/4/2023
Upper Thorax Rib Potentiometer	Honeywell	179GFE	7/25/2022	1/23/2023
Middle Thorax Rib Potentiometer	Honeywell	185GFE	7/21/2022	1/19/2023
Lower Thorax Rib Potentiometer	Honeywell	178GFE	7/21/2022	1/19/2023

**Probe Acceleration**





ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	F033	Laboratory Supervisor	C. Mantell

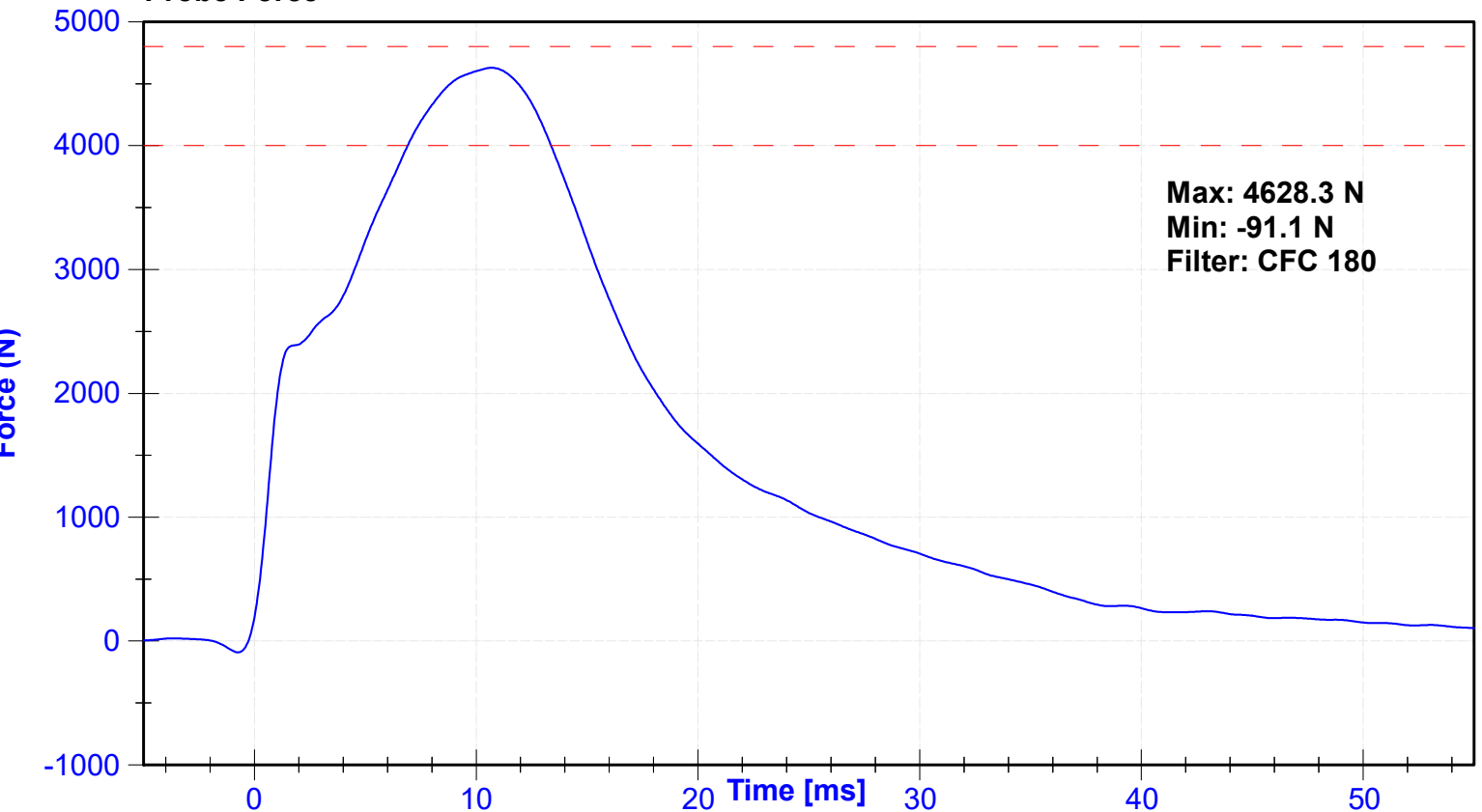
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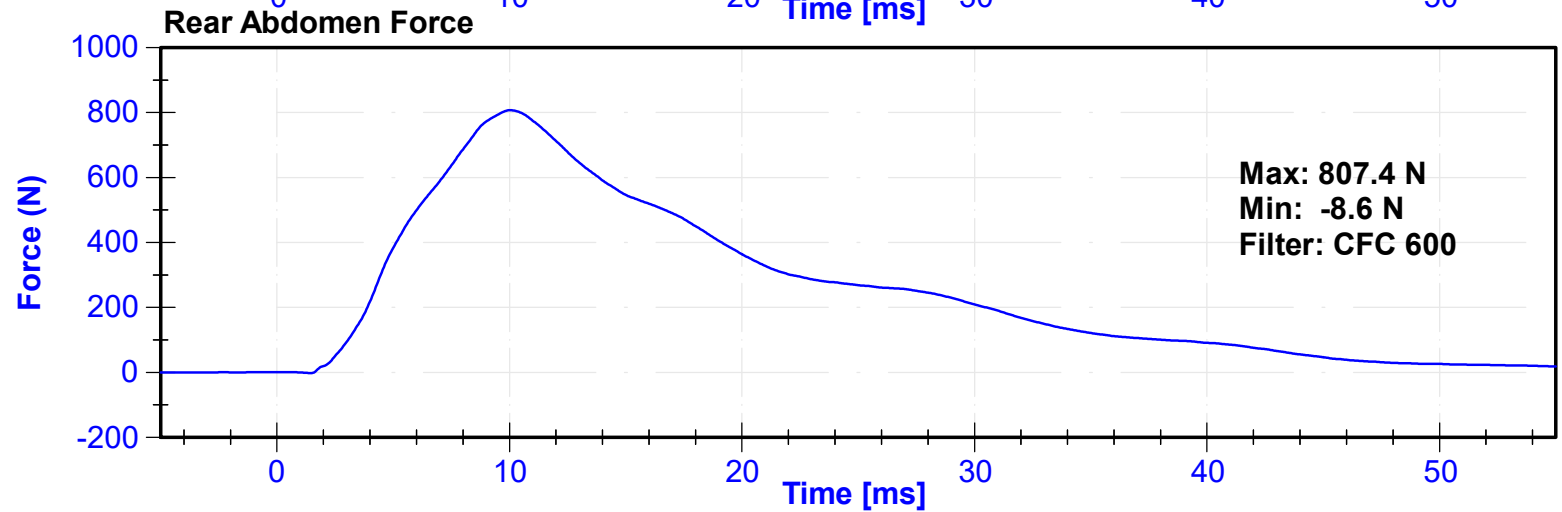
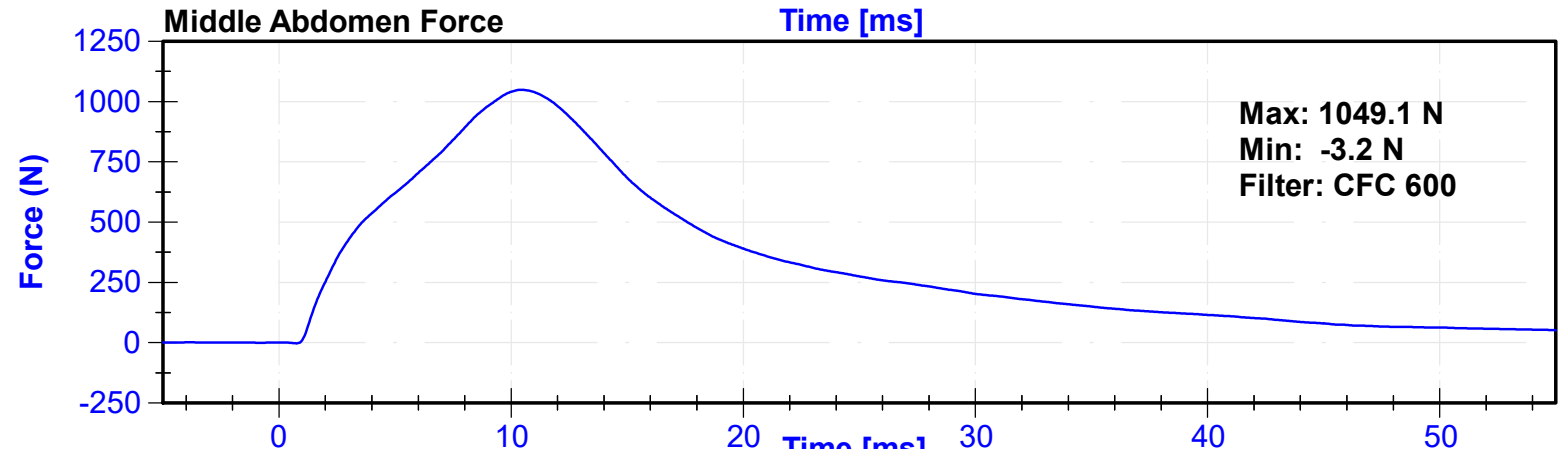
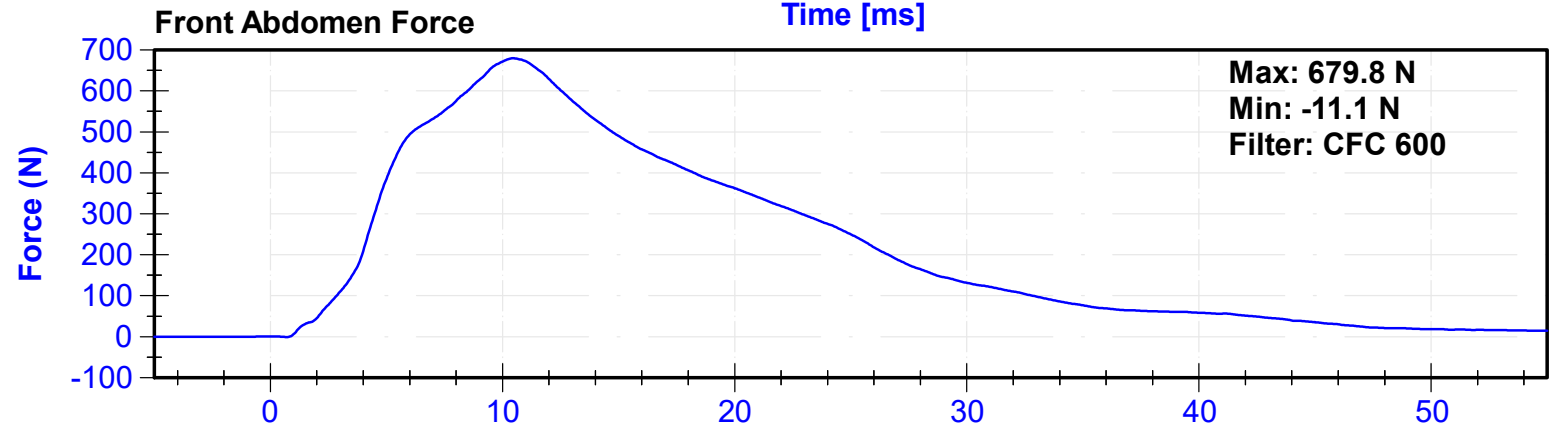
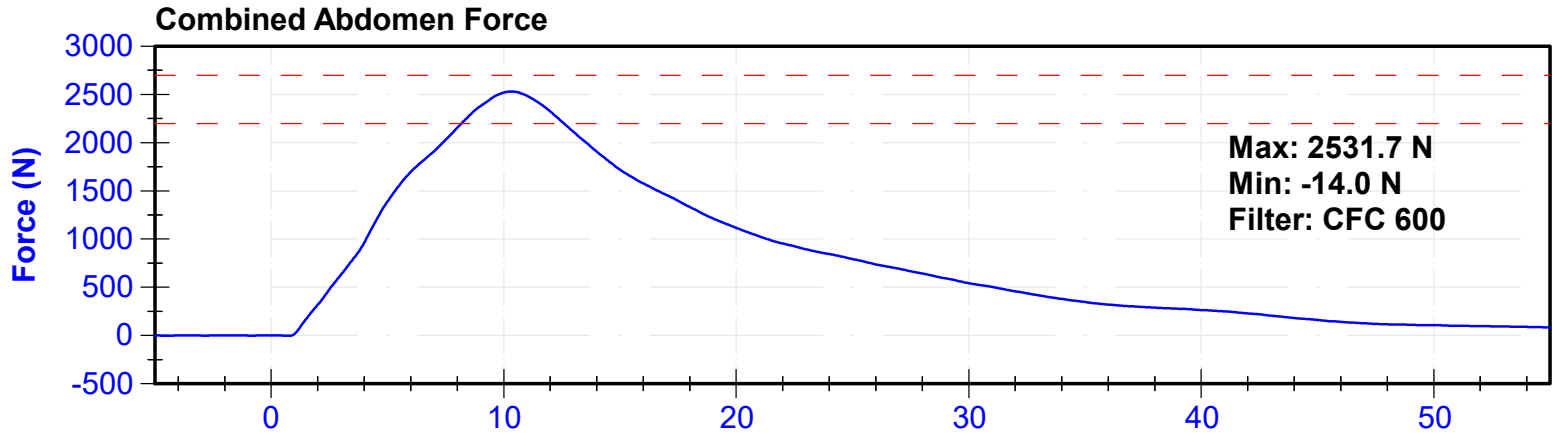
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	20.5	Pass
Velocity	3.9	4.1	m/s	4.06	Pass
Combined Abdomen Force	2200	2700	N	2531.7	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	10.30	Pass
Resistive Probe Force	4000	4800	N	4628.3	Pass
Time at Peak Resistive Force	10.6	13.0	ms	10.70	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18494	11/5/2022	5/4/2023
Front Abdomen Load Cell	Denton	1509	8/12/2022	8/12/2023
Middle Abdomen Load Cell	Denton	1508	8/12/2022	8/12/2023
Rear Abdomen Load Cell	Denton	1507	8/12/2022	8/12/2023

**Probe Force**





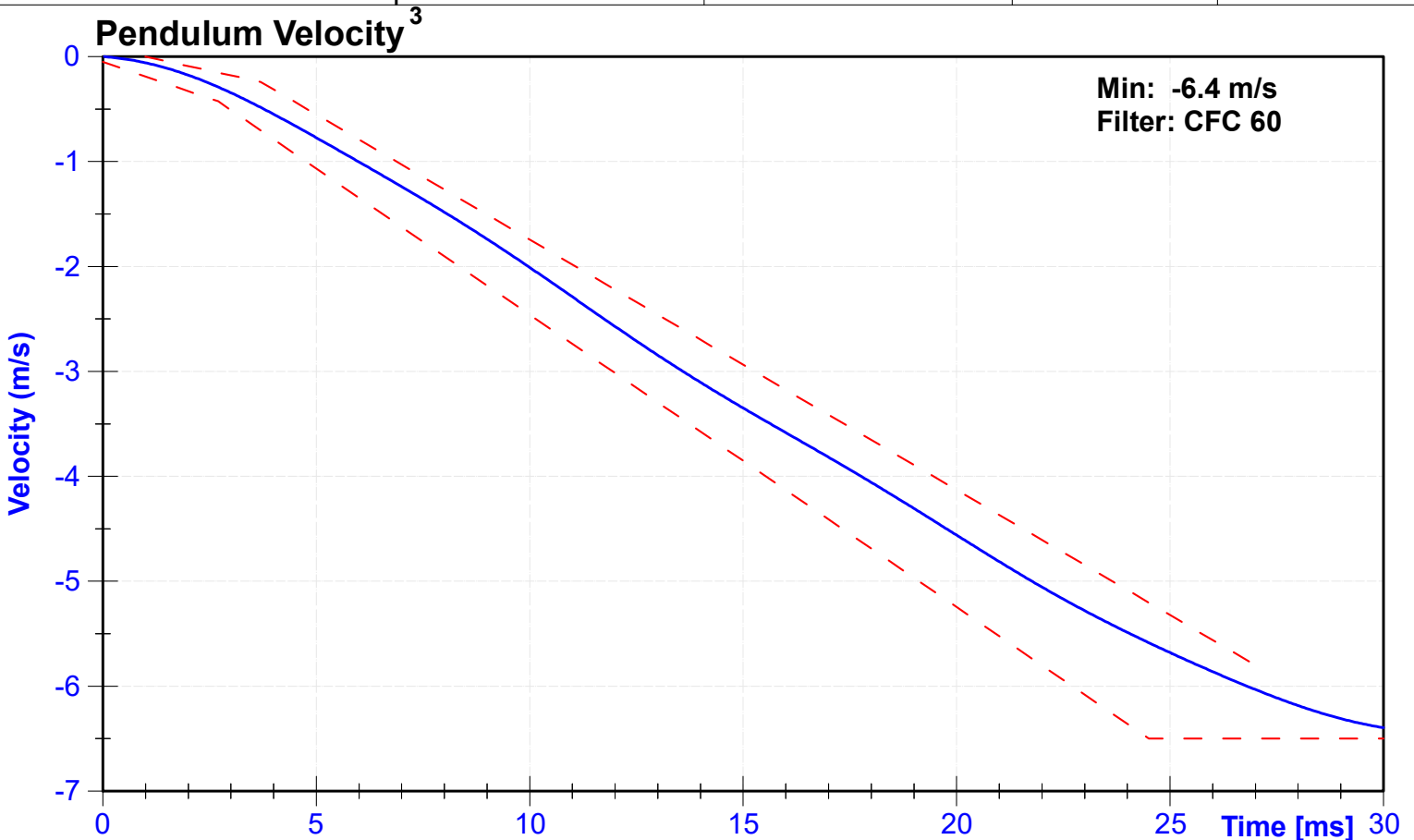
ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	F033	Laboratory Supervisor	C. Mantell

**Results**

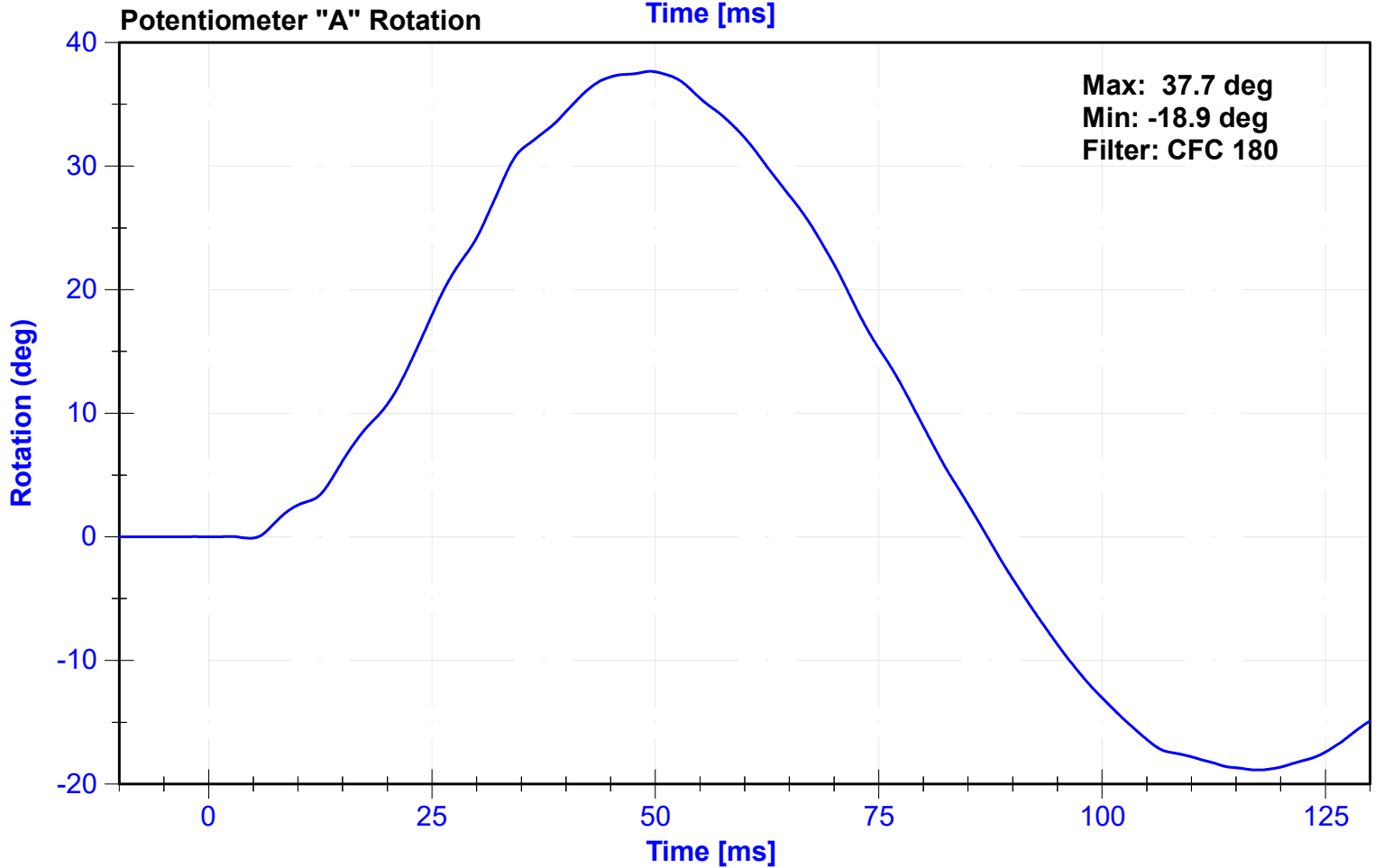
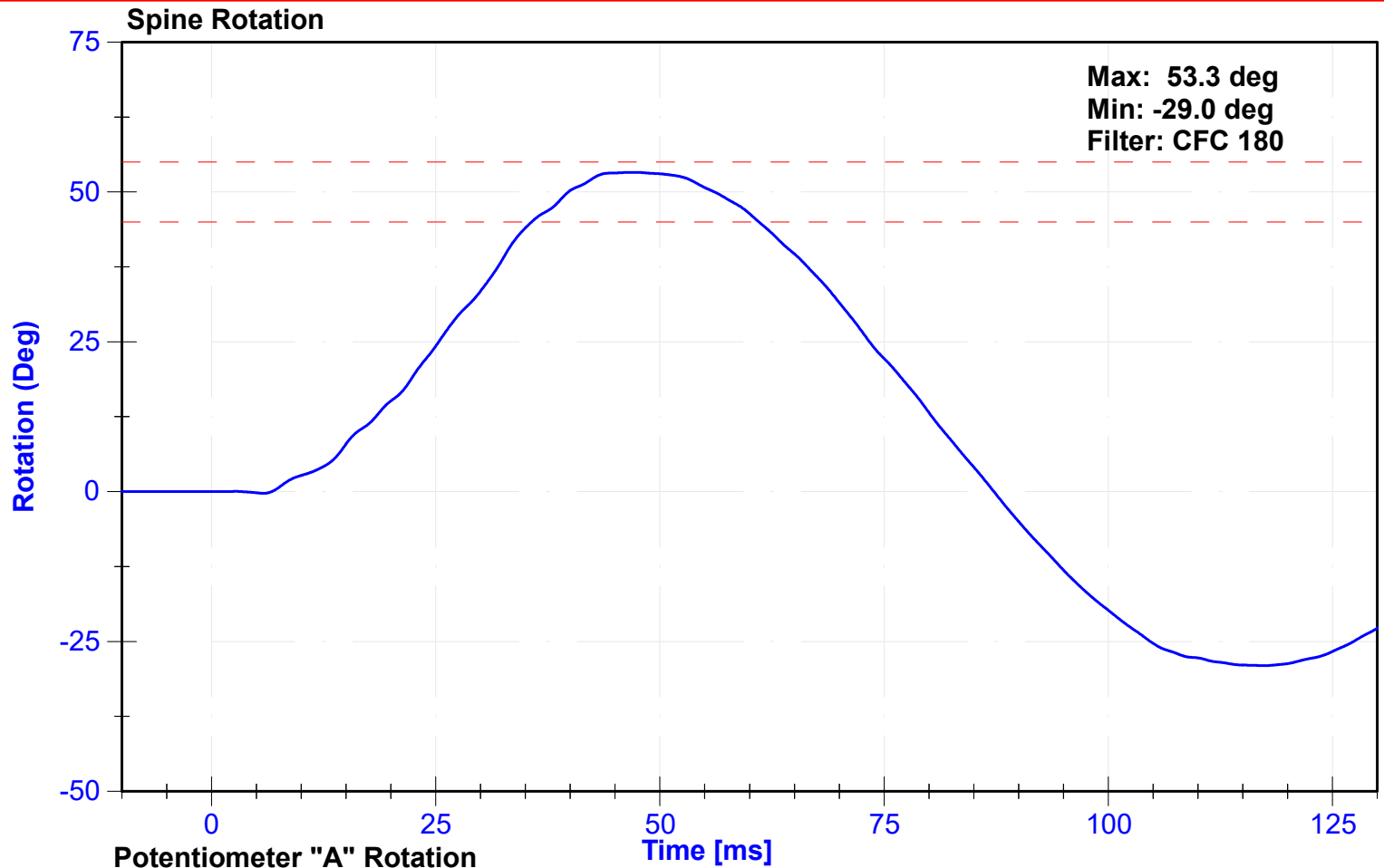
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	21	Pass
Velocity	5.95	6.15	m/s	6.067	Pass
Lateral Spine Rotation	45	55	deg	53.3	Pass
Time at Maximum Rotation	39	53	ms	47.2	Pass
Time of Decay to Zero Degrees	37	57	ms	40.1	Pass
Pendulum Velocity Overall Corridor	Lower Boundary <sup>1</sup>	Upper Boundary <sup>2</sup>	m/s	See Plot <sup>3</sup>	Pass

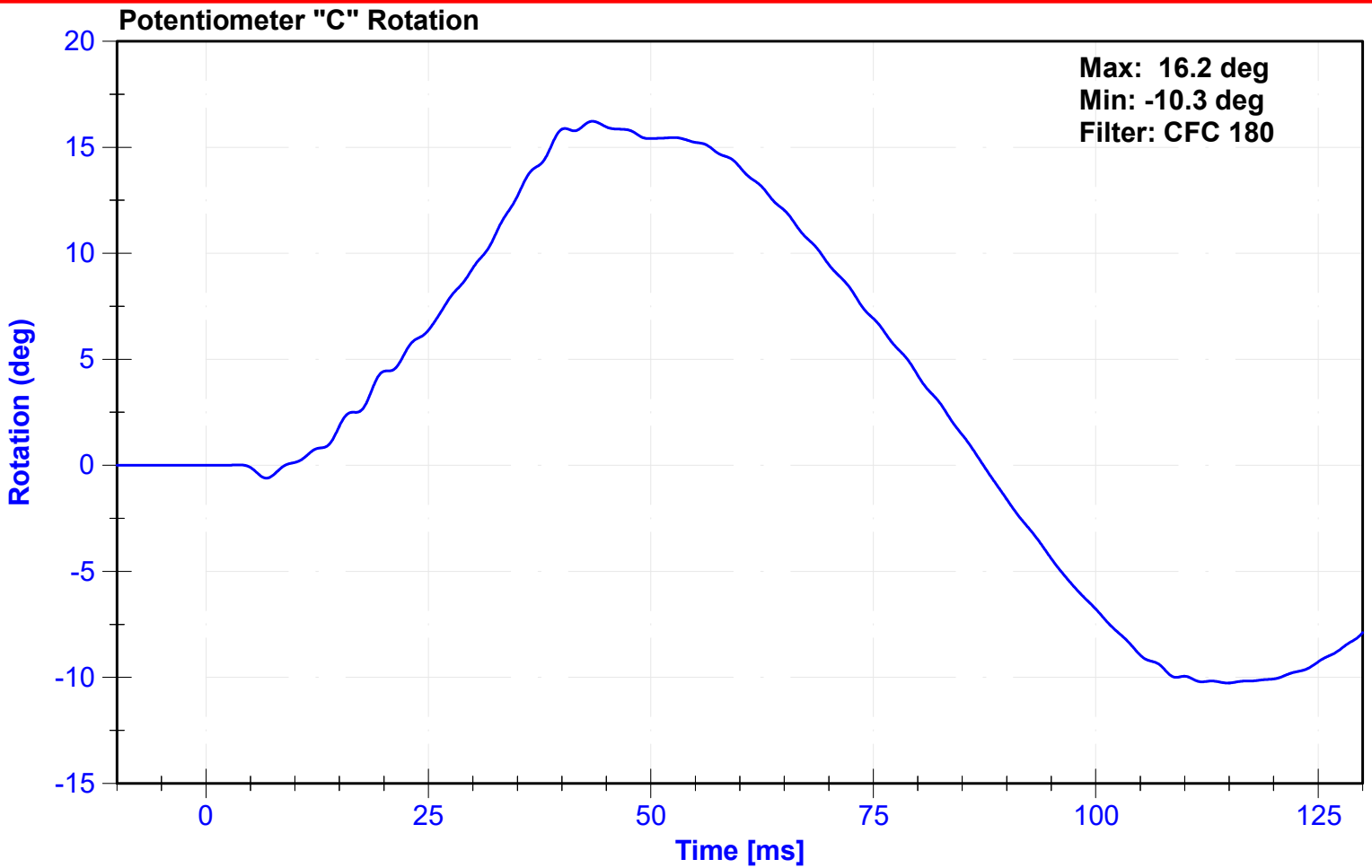
**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16503	10/26/2022	10/26/2023
Pendulum "A" Potentiometer	Sfernice	094	10/5/2022	10/5/2023
Condyle "B" Potentiometer	Sfernice	095	10/5/2022	10/5/2023



<sup>1,2</sup> Upper and lower boundaries specified in Appendix I





## Appendix I

<sup>2</sup> Upper Boundary Corridor		<sup>1</sup> Lower Boundary Corridor	
Time (ms)	Velocity (m/s)	Time (ms)	Velocity (m/s)
1.0	0.00	0.0	-0.05
3.7	-0.24	2.7	-0.425
27.0	-5.80	24.5	-6.5
		30.0	-6.5

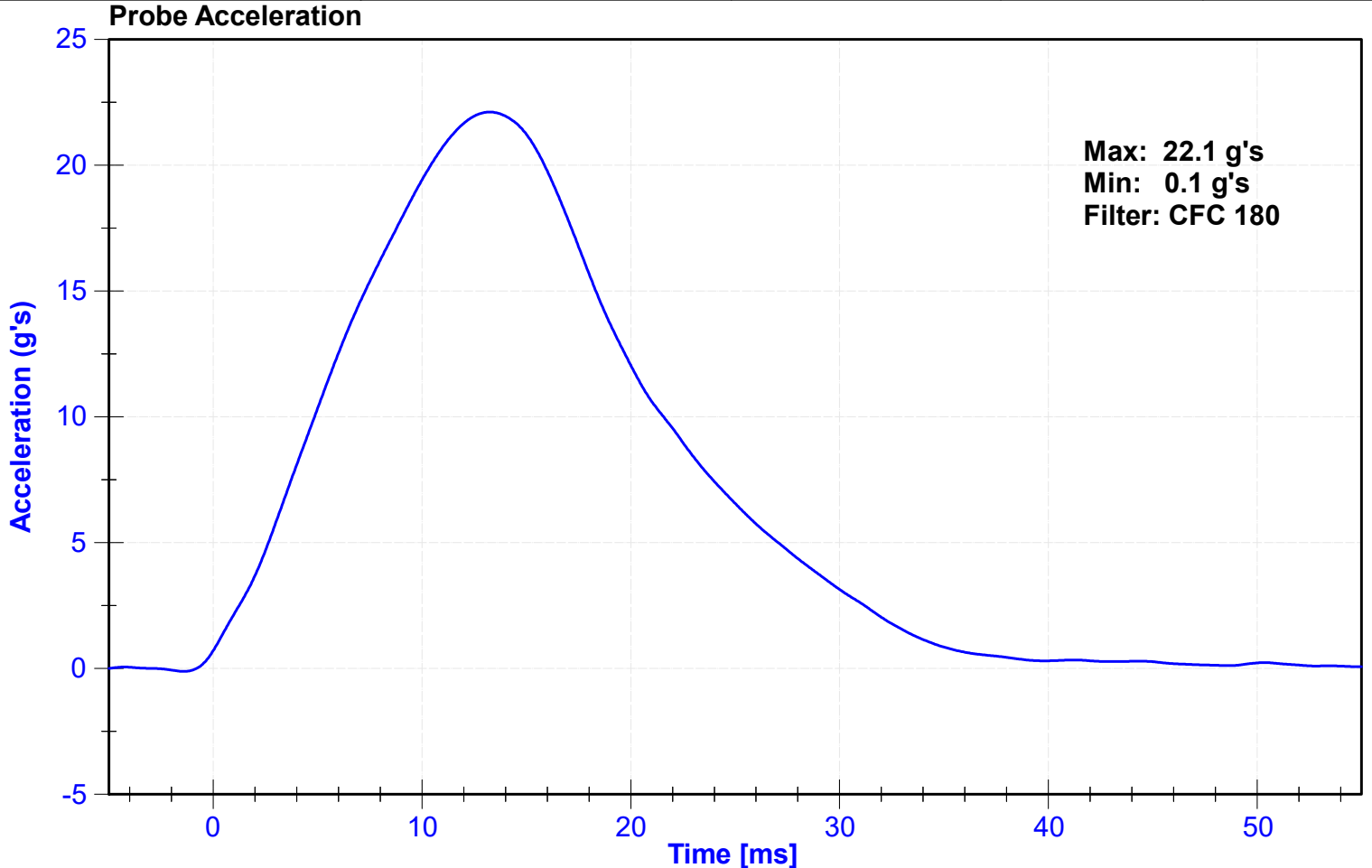
ATD Manufacturer	FTSS	Test Technician	D. Sakona
ATD Serial Number	F033	Laboratory Supervisor	C. Mantell

**Results**

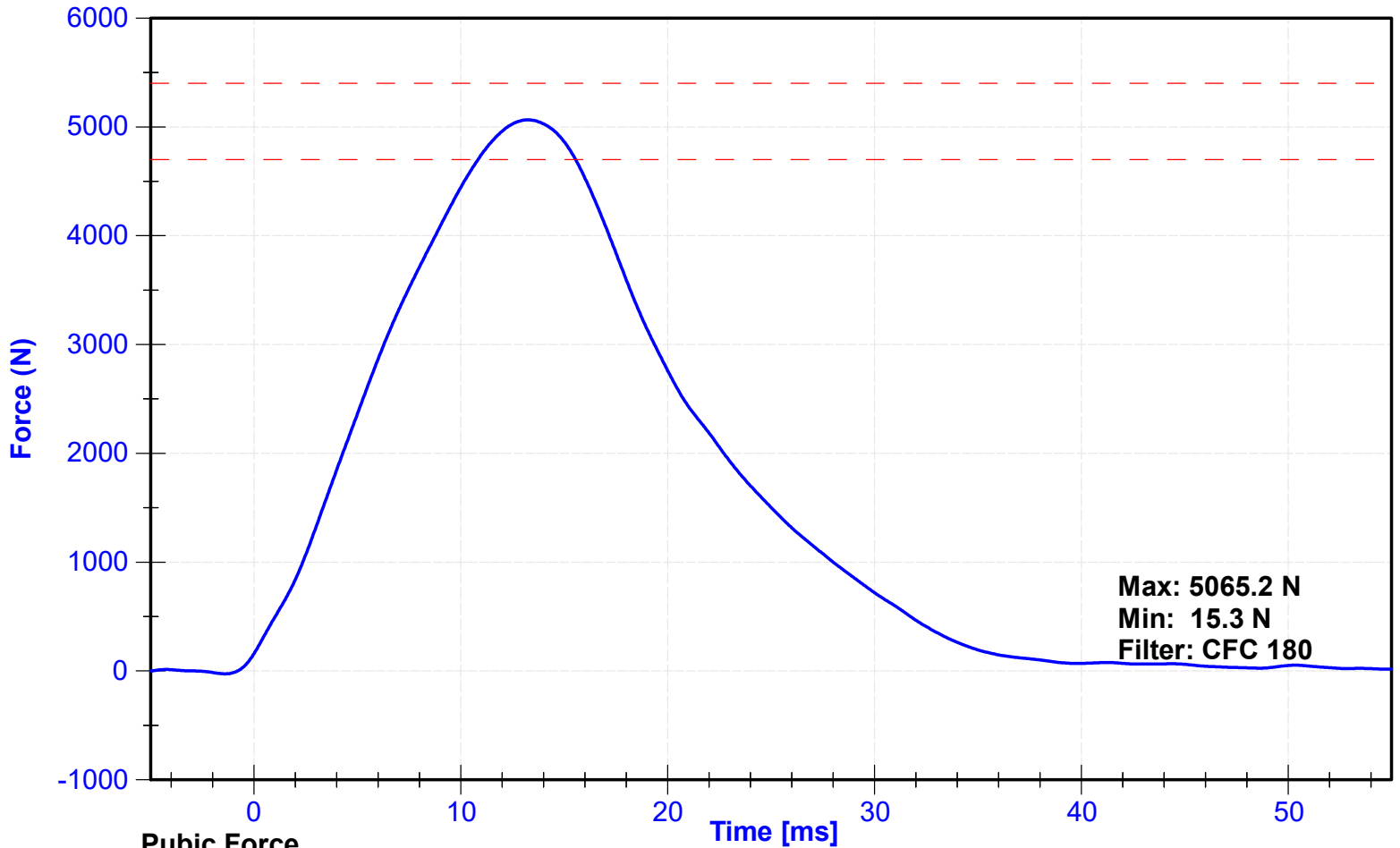
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	20.5	Pass
Velocity	4.2	4.4	m/s	4.31	Pass
Resistive Force	4700	5400	N	5065.2	Pass
Time at Peak Resistive Force	11.8	16.1	ms	13.25	Pass
Pubic Force	-1590	-1230	N	-1244.4	Pass
Time at Peak Pubic Force	12.2	17.0	ms	13.80	Pass

**Transducer Calibrations**

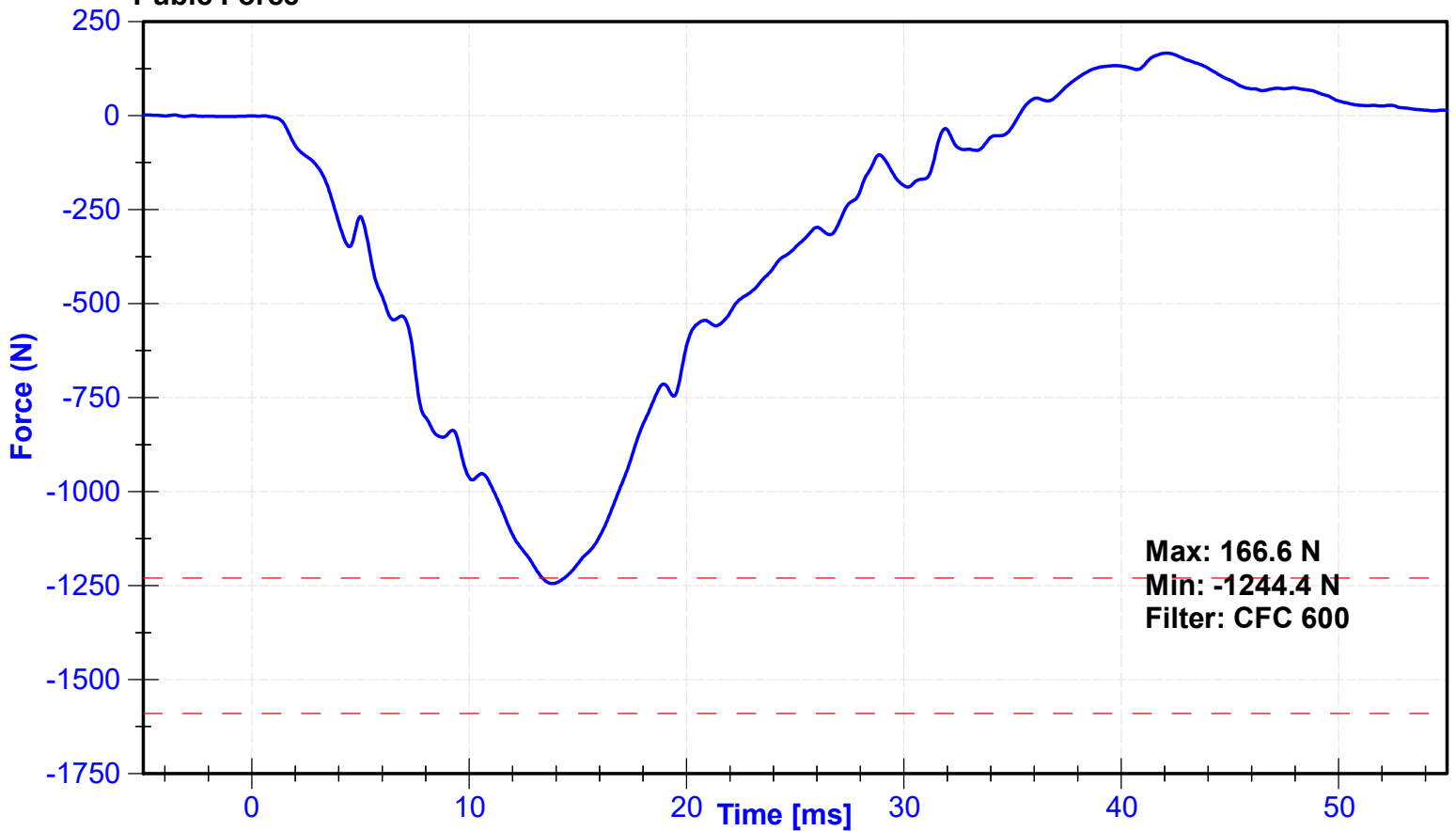
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18494	11/5/2022	5/4/2023
Pubic Load Cell	Denton	459-FY	6/14/2022	6/14/2023



### Resistive Force



### Pubic Force



**CALIBRATION TEST RESULTS**

**PRE-TEST**

**SID-IIS 5<sup>TH</sup> PERCENTILE FEMALE – PASSENGER ATD**

**SERIAL NO:300**

**(CONFIGURED FOR LEFT SIDE IMPACT)**

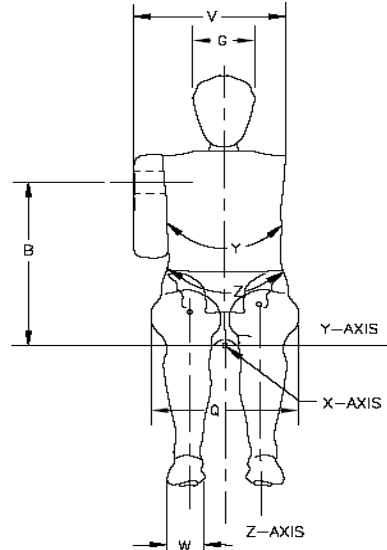
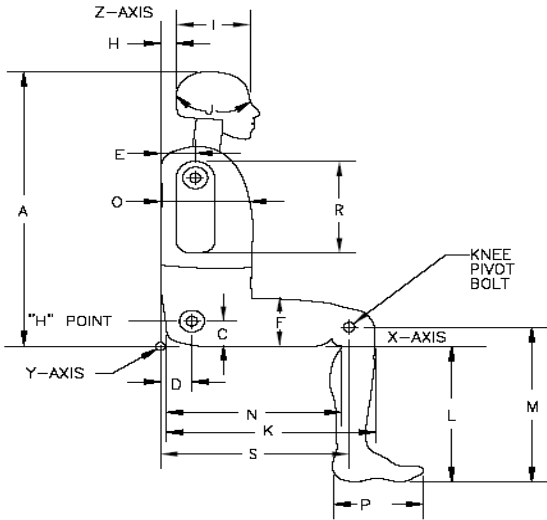


External Measurements - SID-IIs

Technician: K. Brogan

Date: 12/19/2022

Dummy Serial Number: 300



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	779	Pass
B	Shoulder Pivot Height	437	453	444	Pass
C	H-point Height	79	89	85	Pass
D	H-point from seatback	141	151	146	Pass
E	Shoulder Pivot from Backline	97	107	102	Pass
F	Thigh Clearance	119	135	125	Pass
G	Head Breadth	140	148	145	Pass
H	Head Back from Backline	40	46	42	Pass
I	Head Depth	178	188	185	Pass
J	Head Circumference	541	551	545	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	400	Pass
N	Buttock Popliteal Length	416	442	432	Pass
O	Chest Depth w/o jacket	195	211	201	Pass
P	Foot Length	216	232	223	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	315	Pass
R	Arm Length	249	259	252	Pass
S	Knee Joint to seatback	477	493	483	Pass
V	Shoulder Width	341	357	350	Pass
W	Foot Width	78	94	86	Pass
Y	Chest Circumference w/jacket	851	881	876	Pass
Z	Waist Circumference	761	791	775	Pass

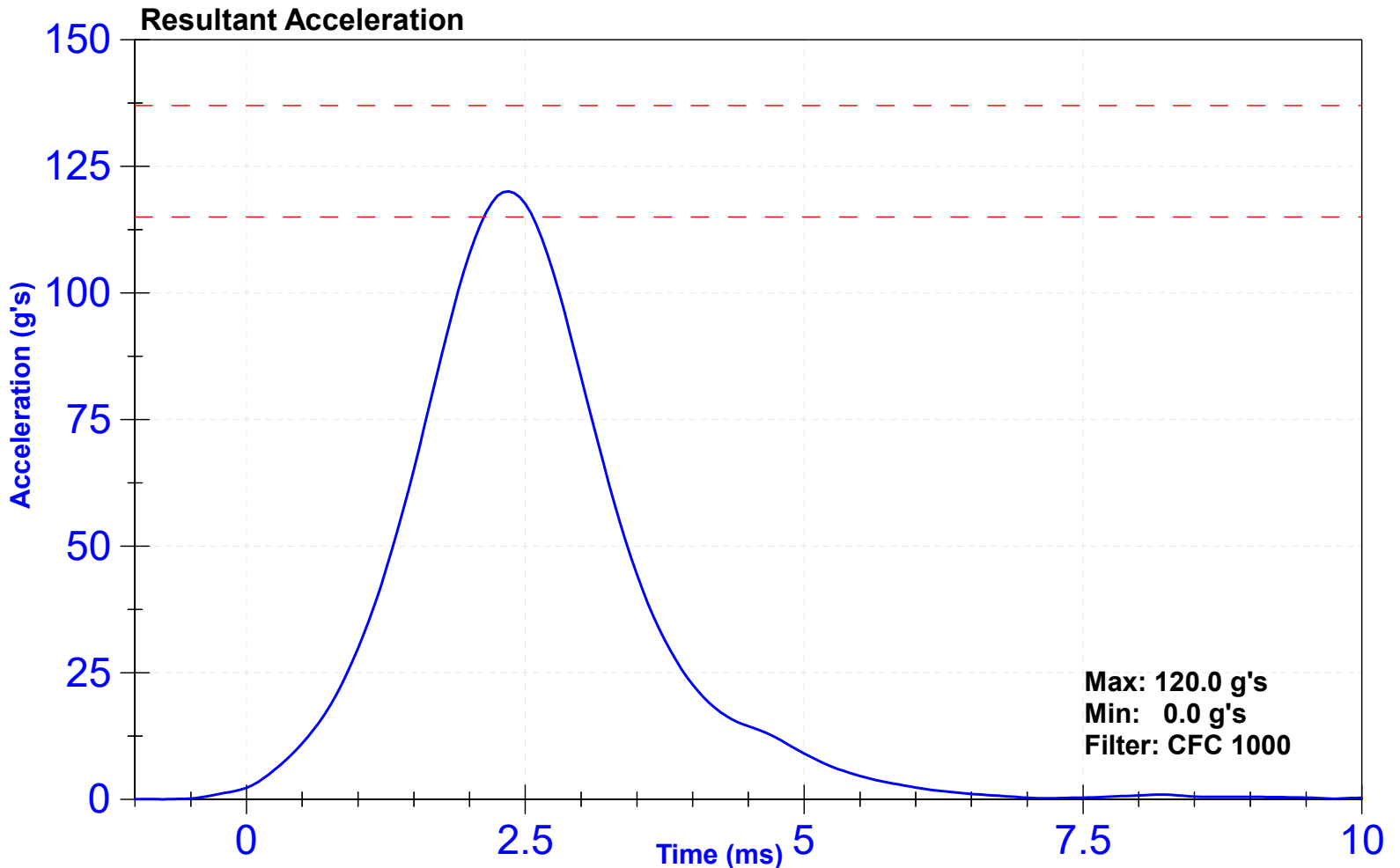
ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

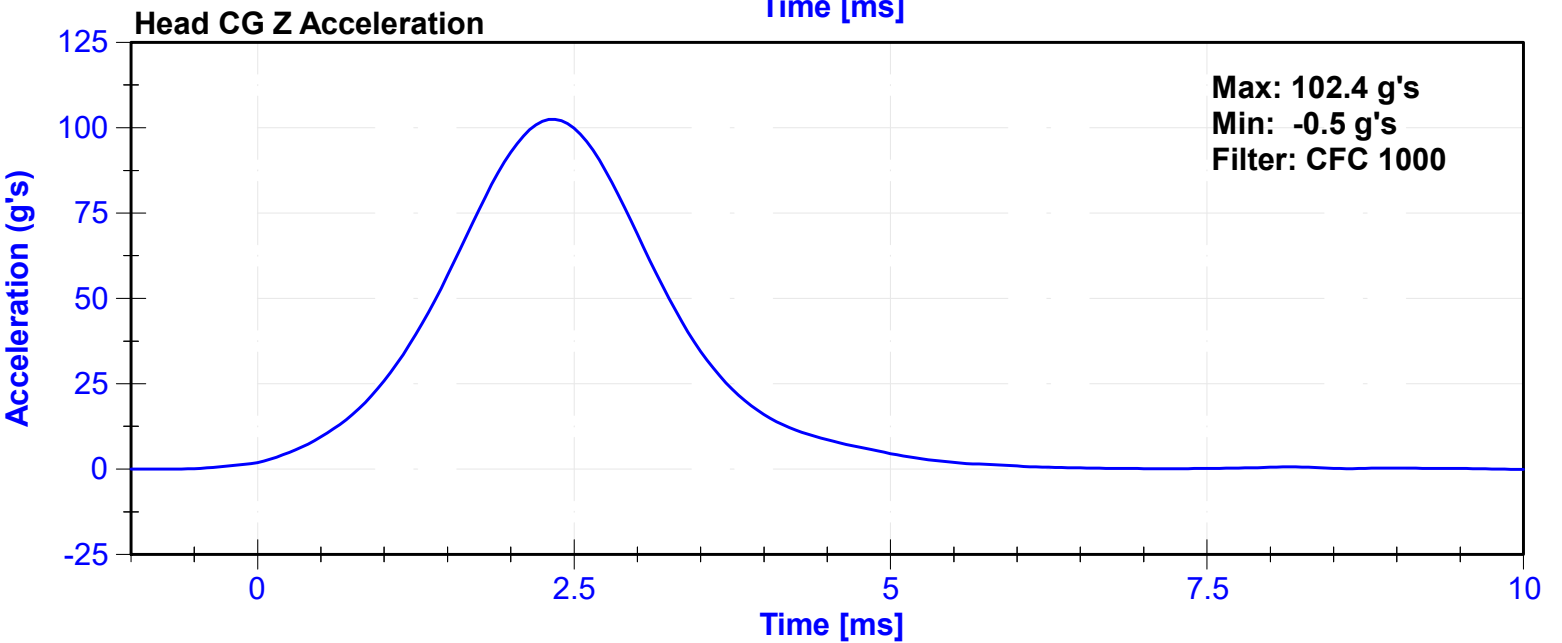
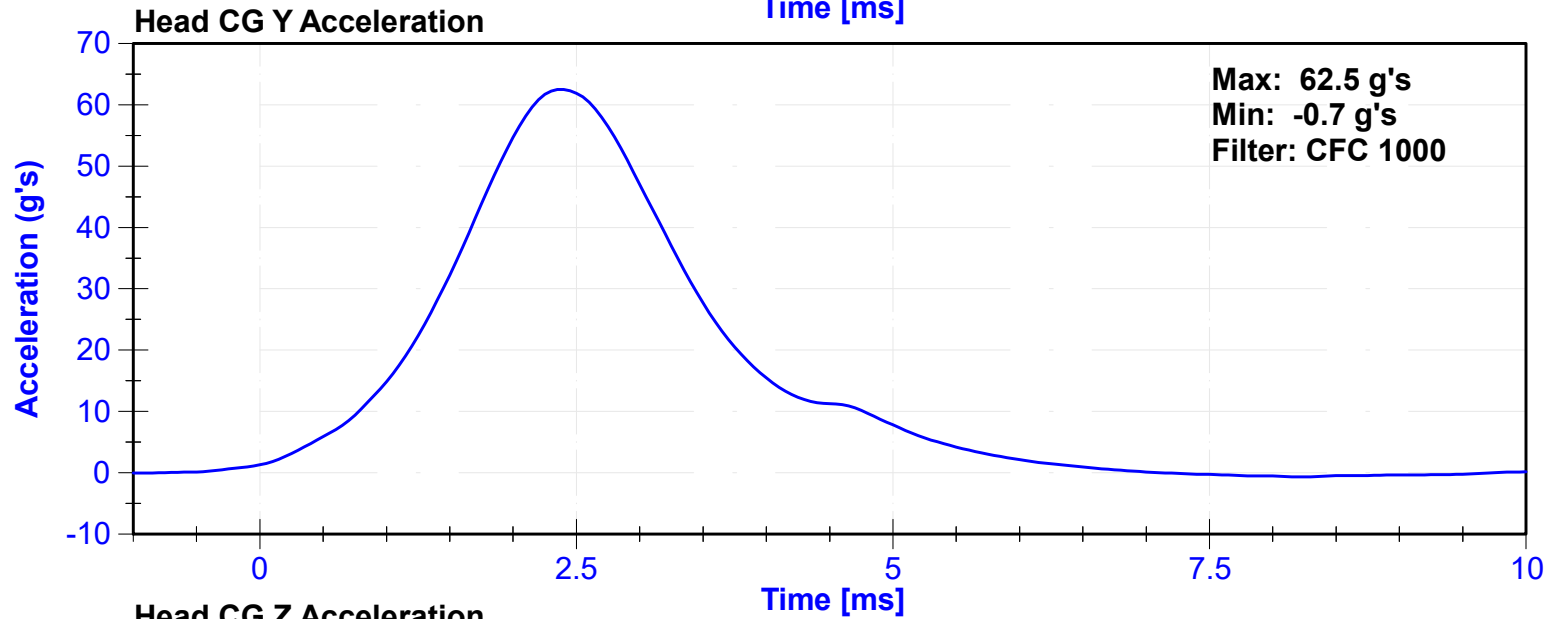
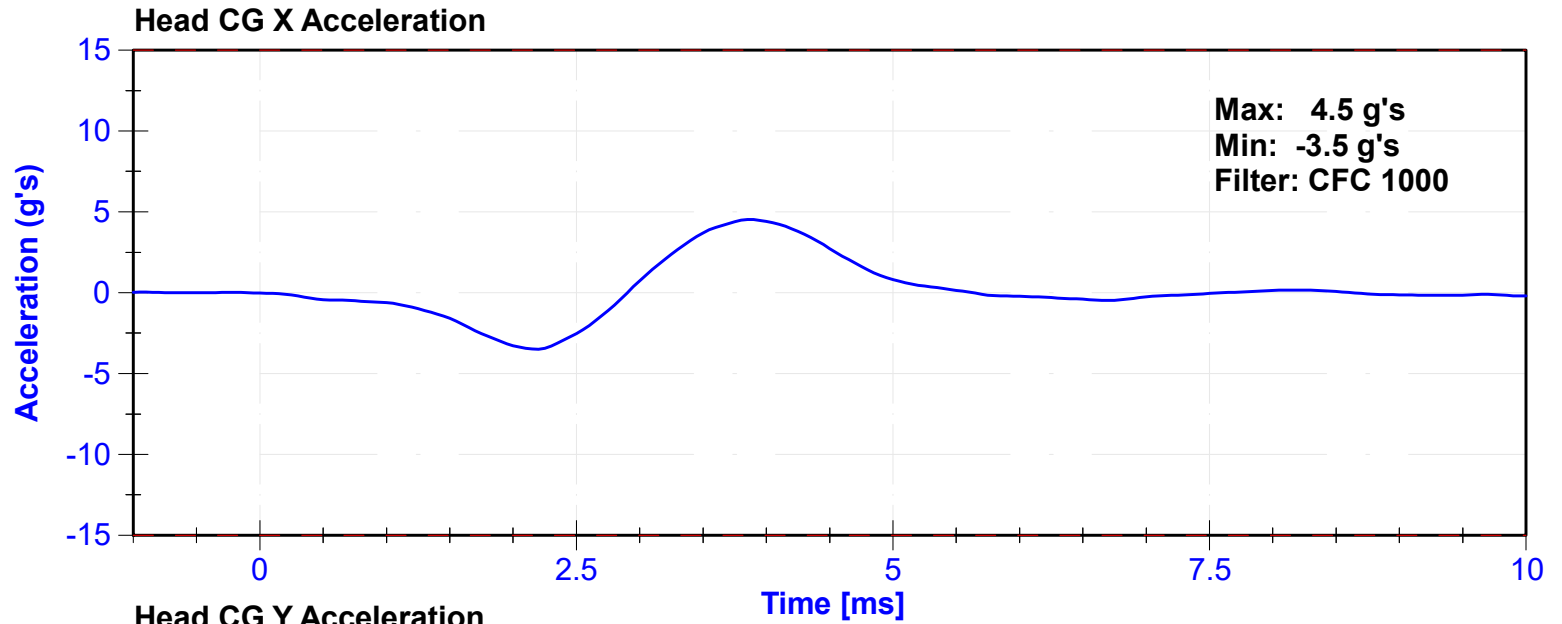
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	21	Pass
Resultant Acceleration	115	137	g's	120.0	Pass
Oscillation	0	15	%	0.7	Pass
Fore-Aft Acceleration	-15	15	g's	4.5	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibratio Date	Calibratio Due Date
X Accelerometer	Endevco	P59018	10/3/2022	4/1/2023
Y Accelerometer	Endevco	P58777	10/3/2022	4/1/2023
Z Accelerometer	Endevco	P79189	10/3/2022	4/1/2023





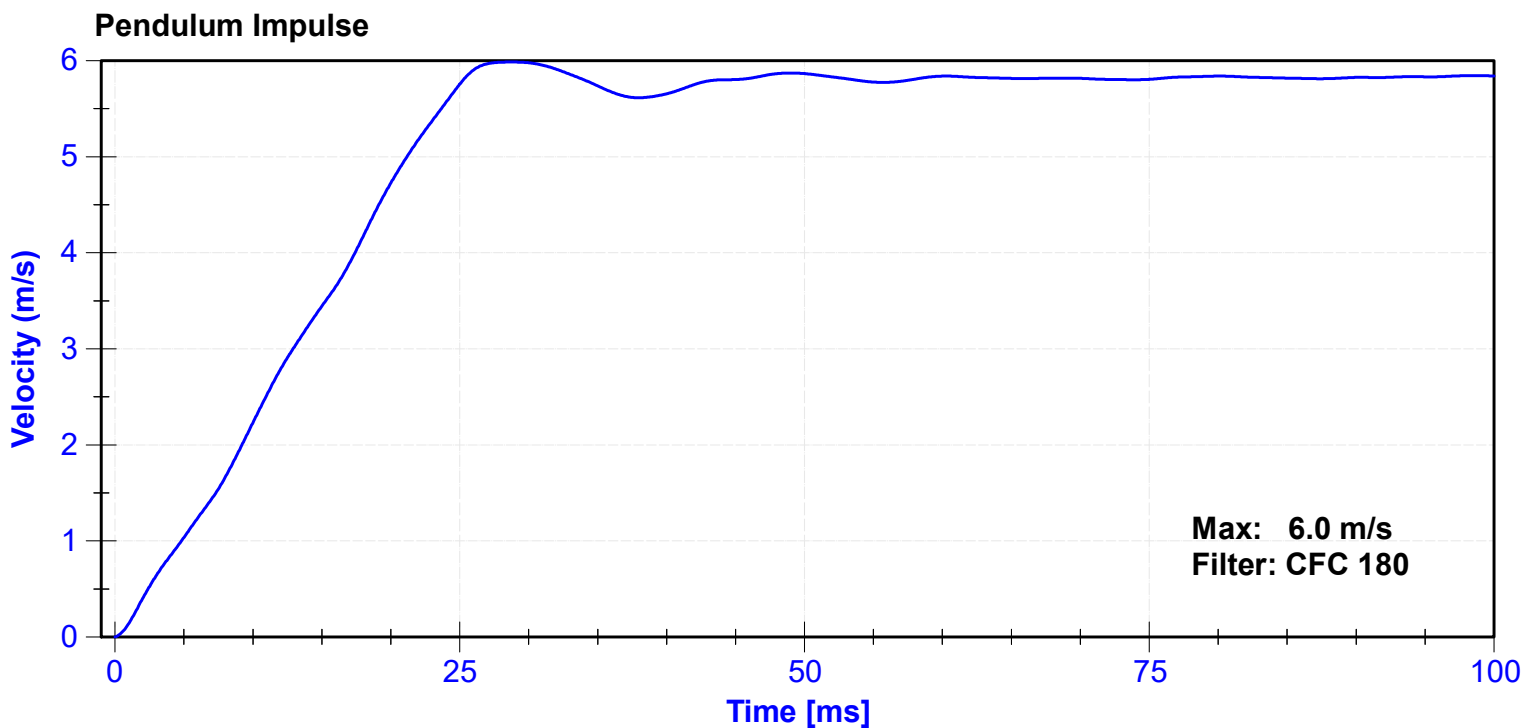
ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

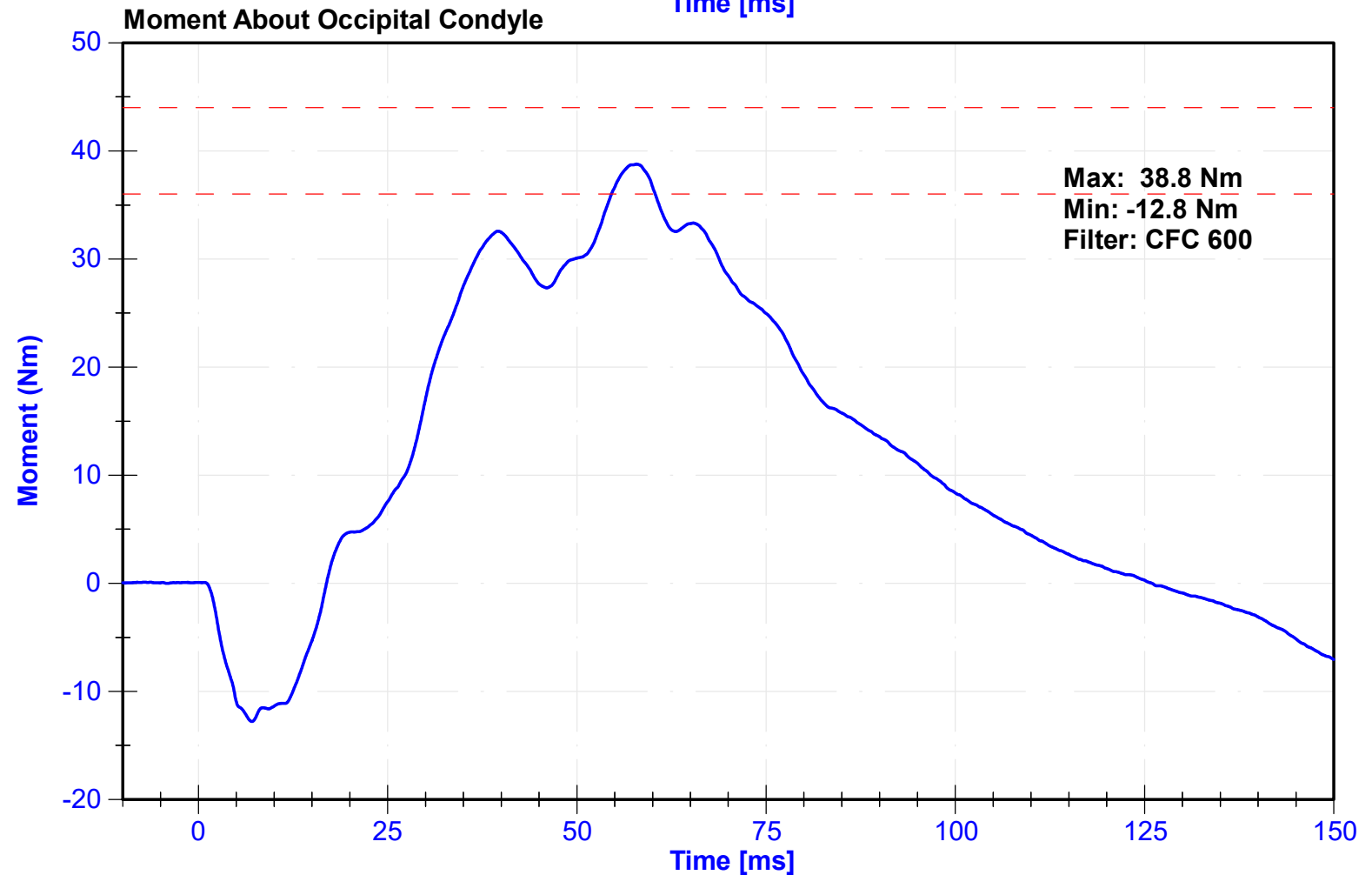
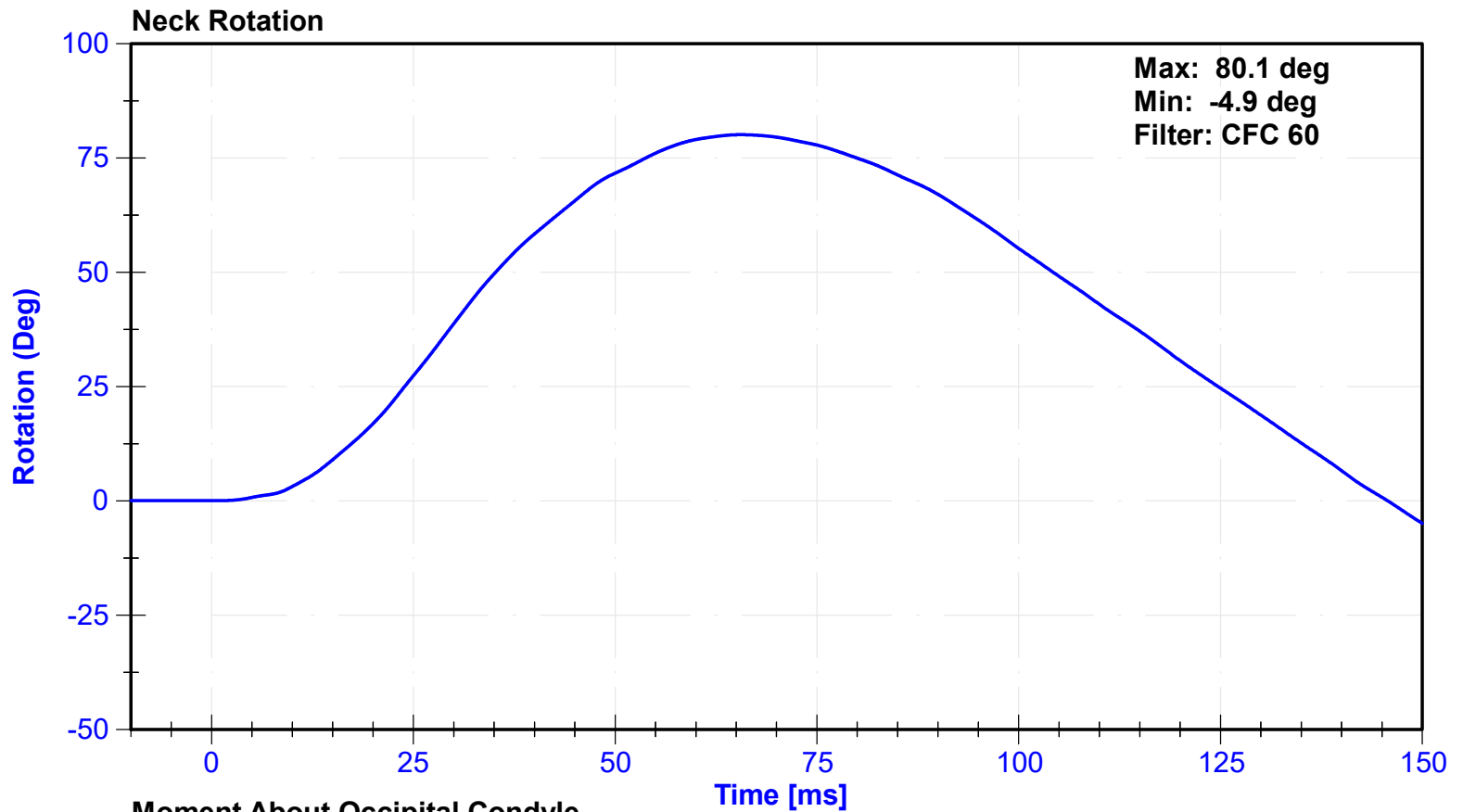
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	21	Pass
Velocity	5.51	5.63	m/s	5.599	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.23	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.44	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.73	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.75	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.98	Pass
Neck Rotation	71	81	deg	80.1	Pass
Time at Maximum Rotation	50	70	ms	65.6	Pass
Moment about the OC	36	44	Nm	38.8	Pass
Moment Decay to 0 Nm	102	126	ms	126.0	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	7231C-750	10/26/2022	10/26/2023
Pendulum Potentiometer	Servo	4961	11/11/2022	11/11/2023
Condyle Potentiometer	Servo	DS185	11/11/2022	11/11/2023
Upper Neck Load Cell	Denton	1716A-1037-FY	8/12/2022	8/12/2023





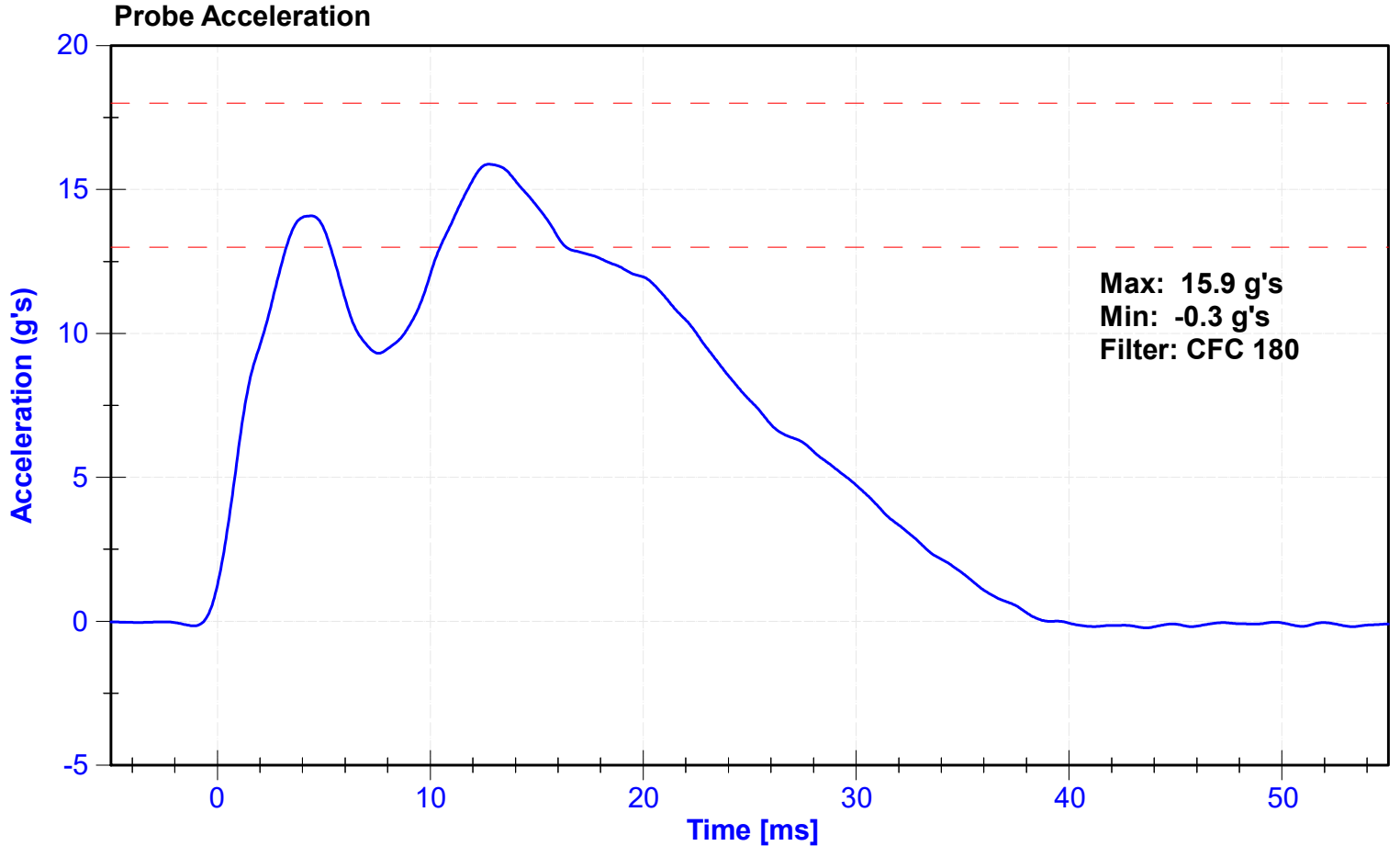
ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

**Results**

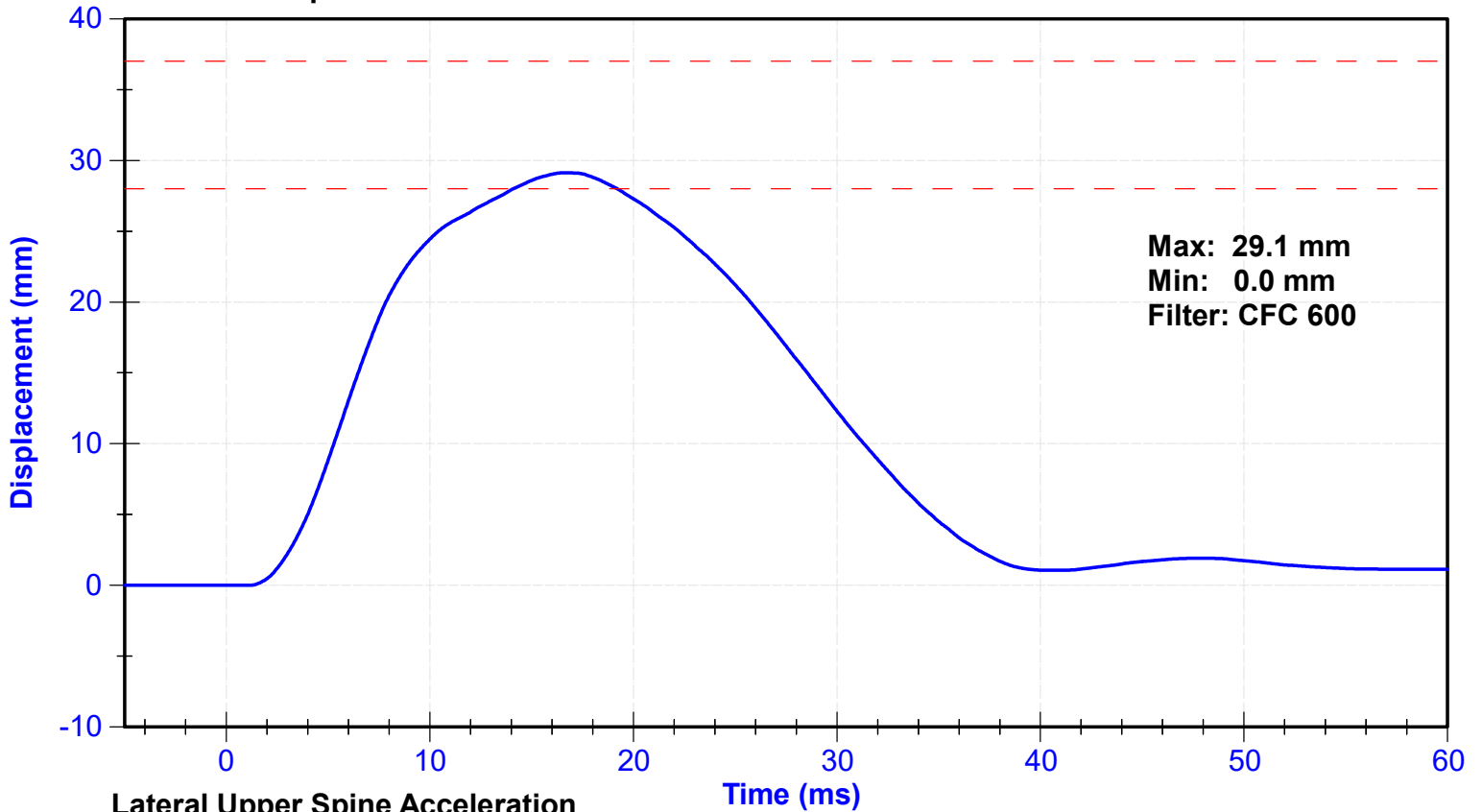
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	21	Pass
Velocity	4.2	4.4	m/s	4.34	Pass
Probe Acceleration	13	18	g's	15.9	Pass
Shoulder Deflection	28	37	mm	29.1	Pass
Lateral Upper Spine Acceleration	17	22	g's	20.1	Pass

**Transducer Calibrations**

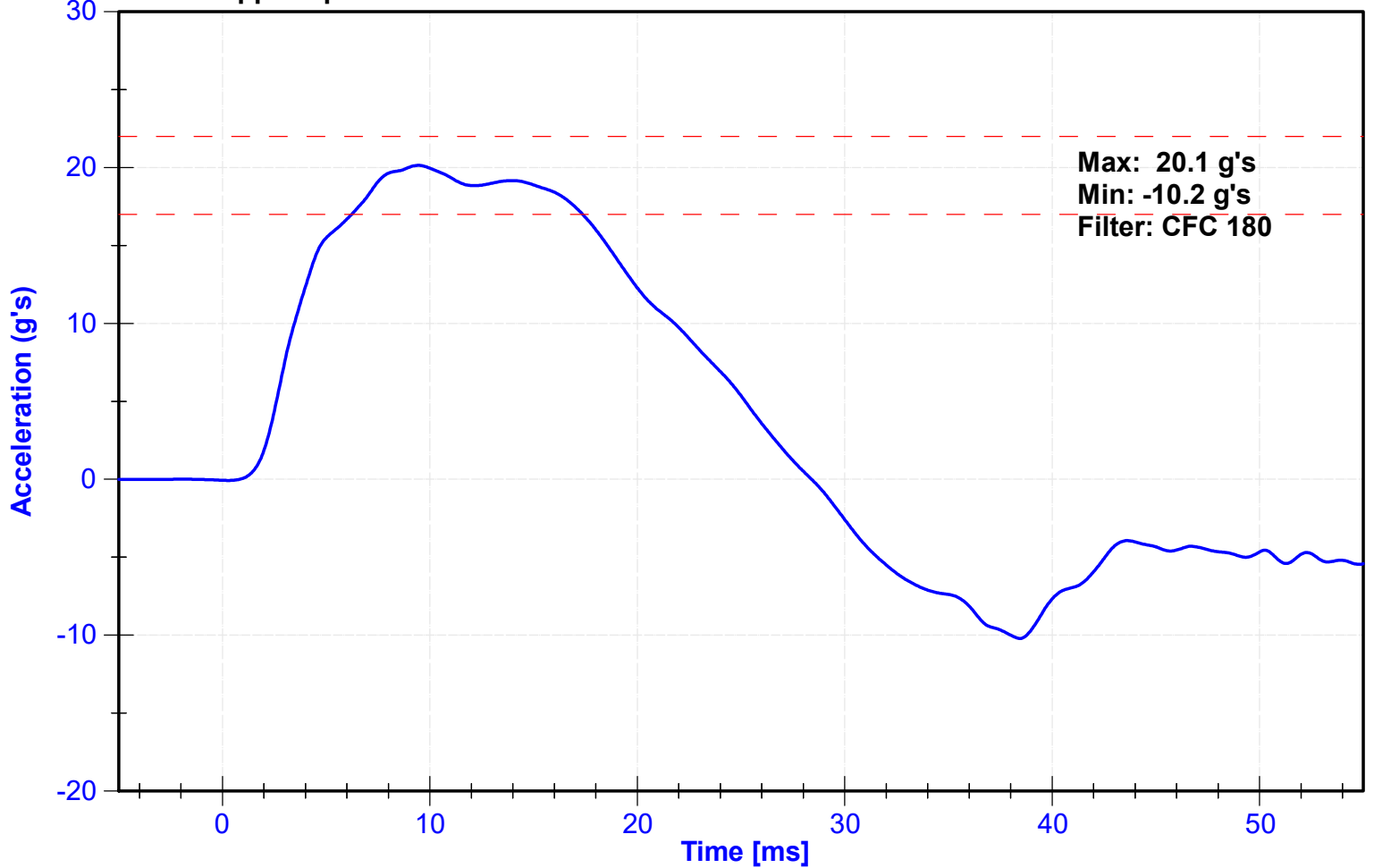
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	P51736	10/25/2022	4/23/2023
Shoulder Potentiometer	Servo	053GFE	10/4/2022	4/4/2023
Upper Spine Y Accelerometer	Endevco	T20880	10/3/2022	4/1/2023



### Shoulder Displacement



### Lateral Upper Spine Acceleration



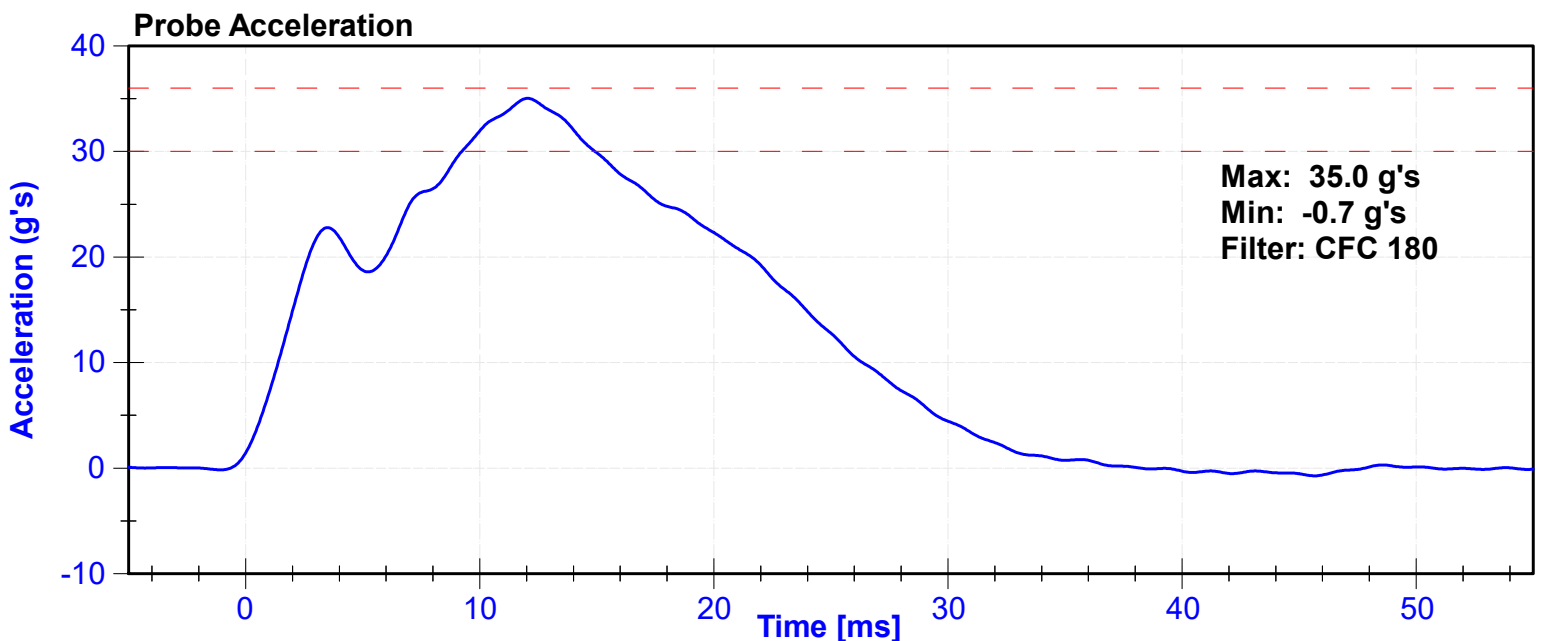
ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

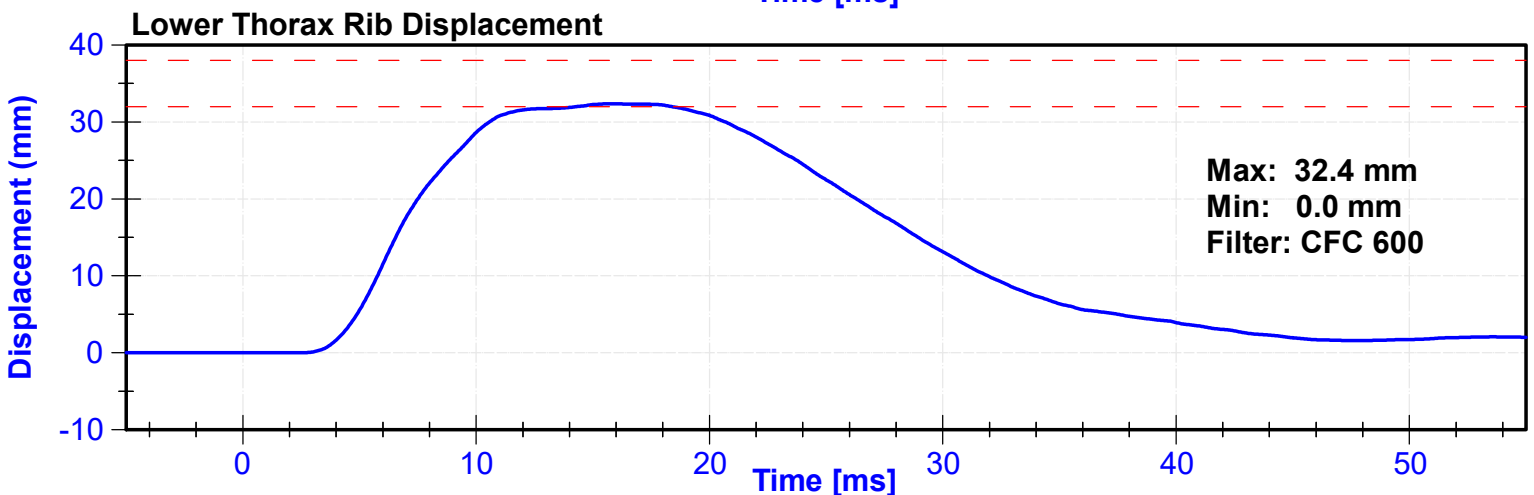
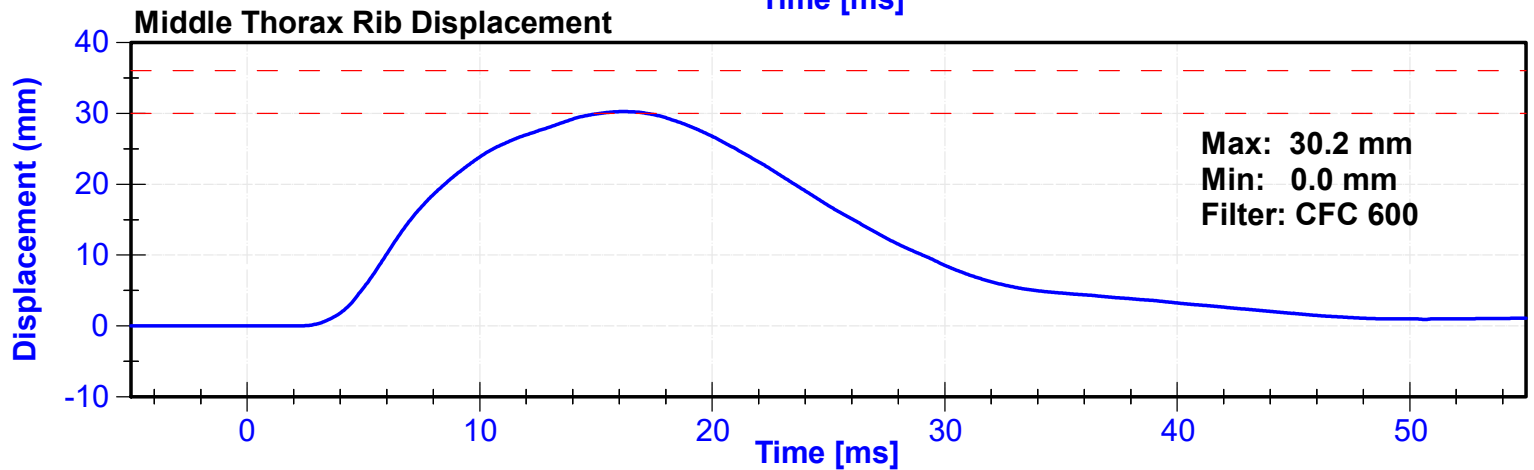
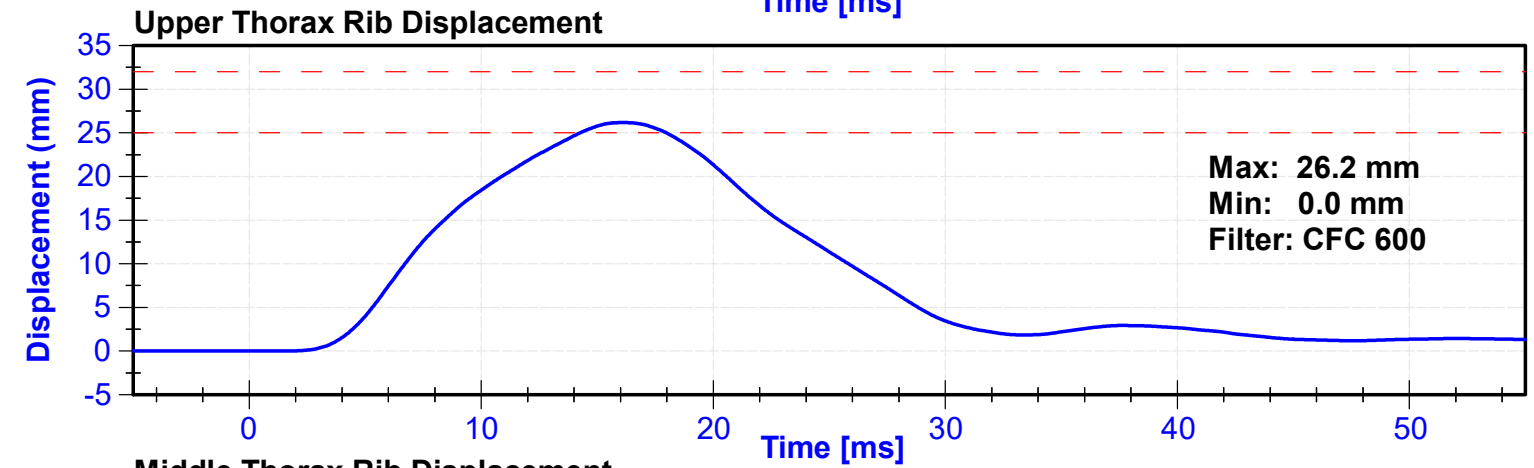
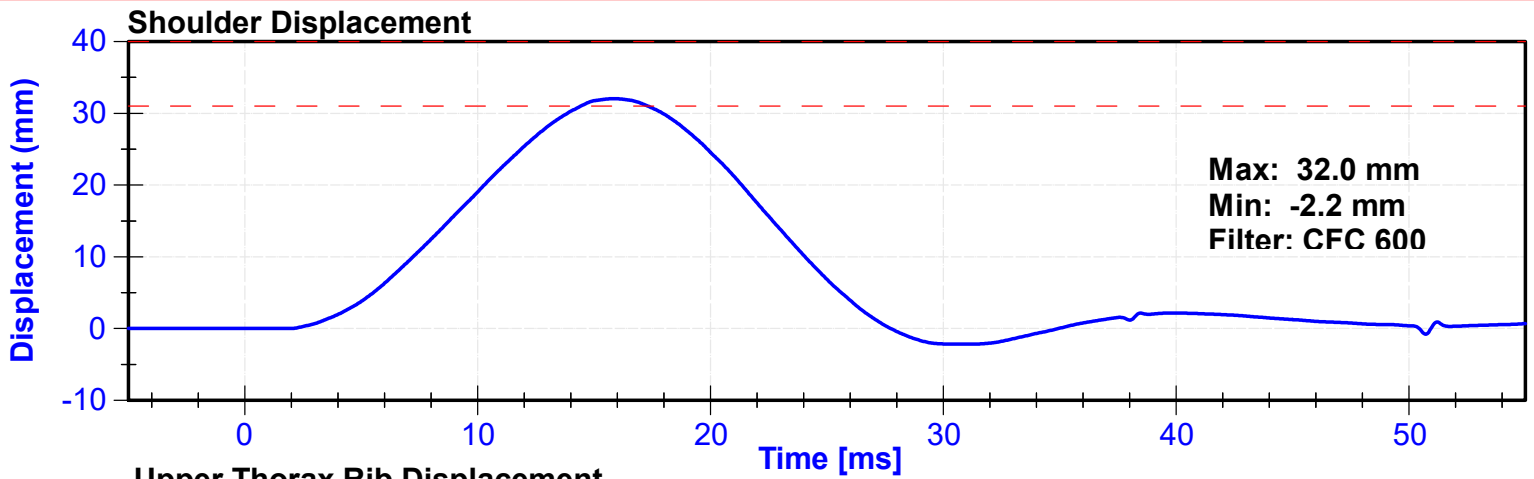
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	21	Pass
Velocity	6.6	6.8	m/s	6.73	Pass
Probe Acceleration after 5 ms	30	36	g's	35.0	Pass
Lateral Upper Spine Acceleration	34	43	g's	38.0	Pass
Lateral Lower Spine Acceleration	29	37	g's	31.4	Pass
Shoulder Deflection	31	40	mm	32.0	Pass
Upper Thorax Rib Deflection	25	32	mm	26.2	Pass
Mid Thorax Rib Deflection	30	36	mm	30.2	Pass
Lower Thorax Rib Deflection	32	38	mm	32.4	Pass

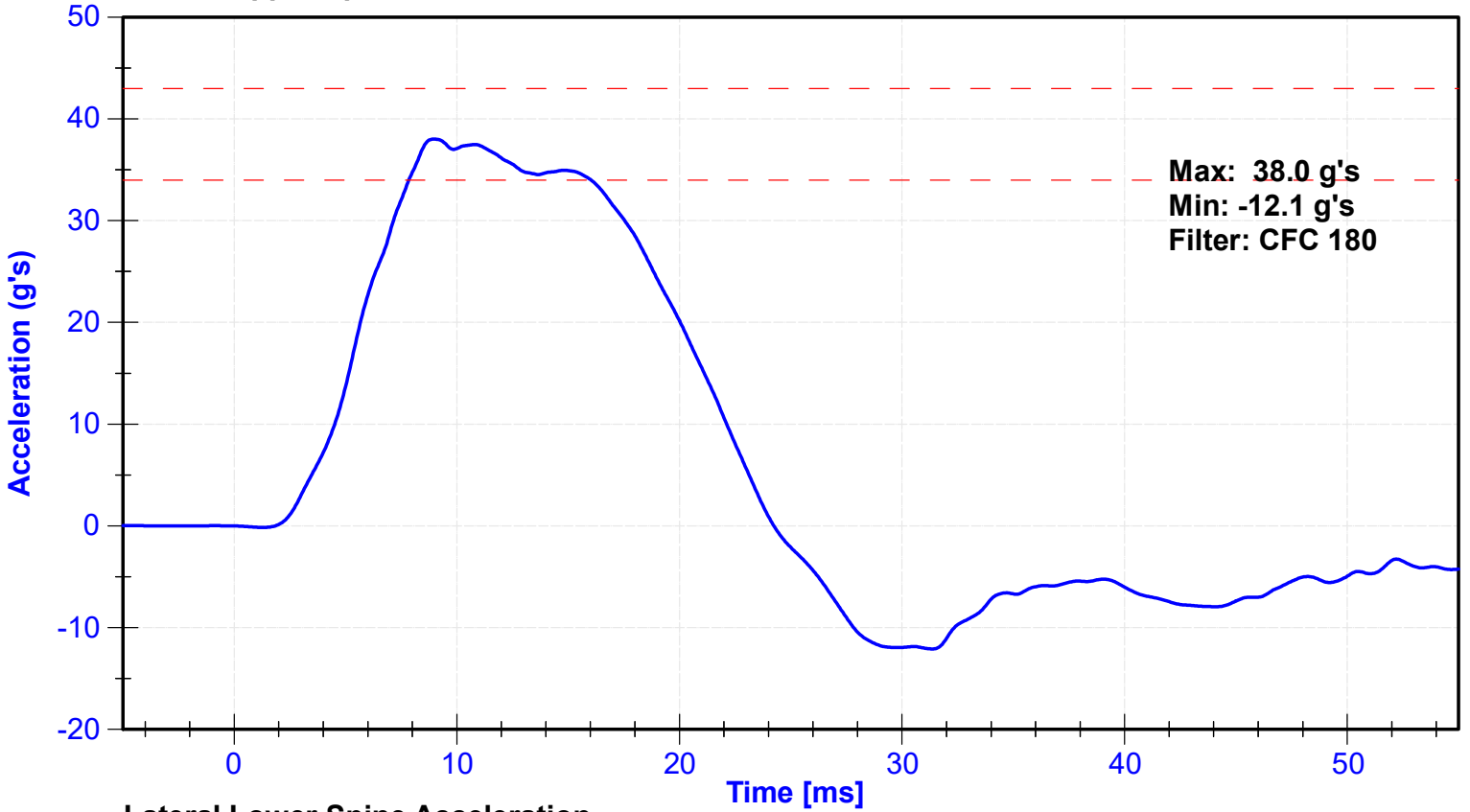
**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	P51736	10/25/2022	4/23/2023
Upper Spine T1 Y Accelerometer	Endevco	T20880	10/3/2022	4/1/2023
Upper Spine T12 Y Accelerometer	Endevco	P52071	10/3/2022	4/1/2023
Shoulder Potentiometer	Servo	053GFE	10/4/2022	4/4/2023
Upper Thorax Rib Potentiometer	Servo	2316GFE	10/4/2022	4/4/2023
Middle Thorax Rib Potentiometer	Servo	040GFE	10/4/2022	4/4/2023
Lower Thorax Rib Potentiometer	Servo	1156GFE	10/4/2022	4/4/2023

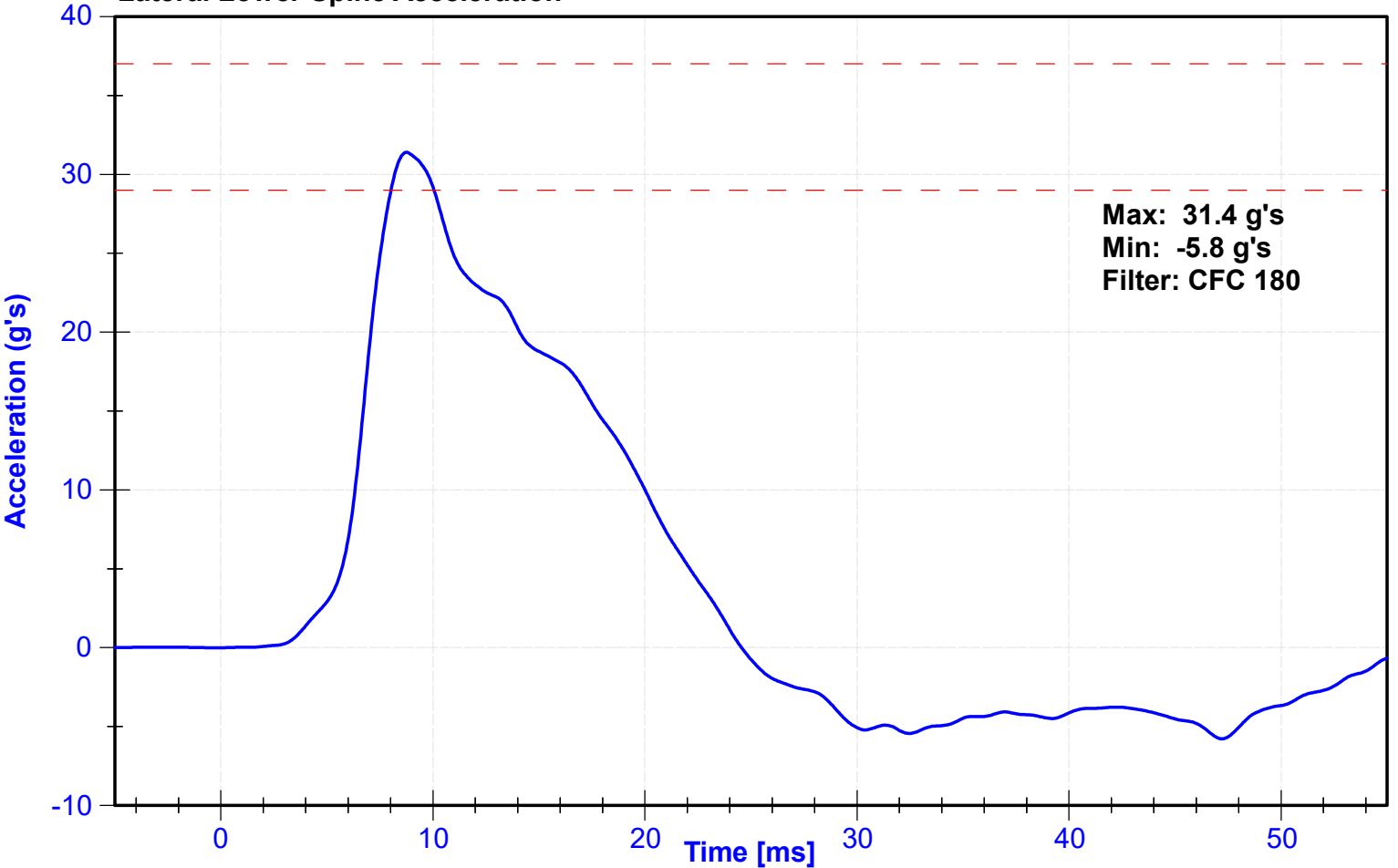




### Lateral Upper Spine Acceleration



### Lateral Lower Spine Acceleration



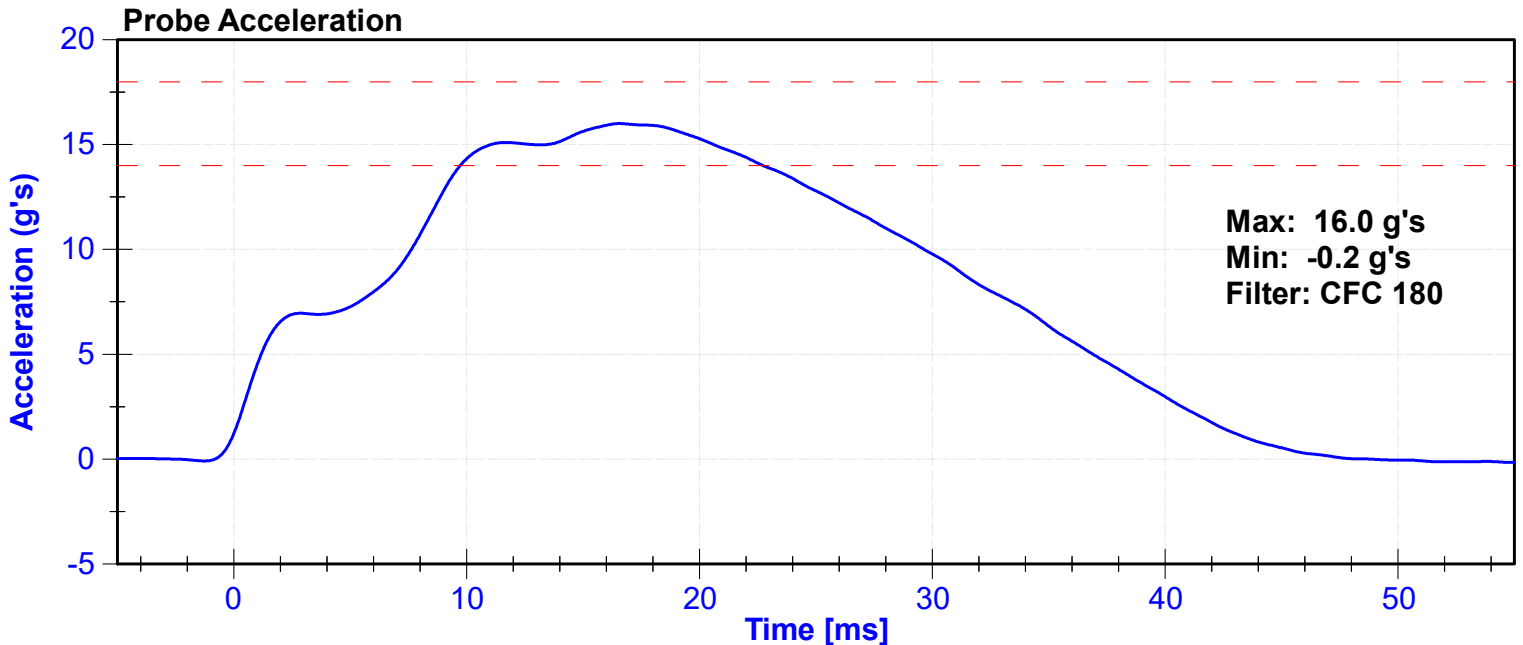
ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

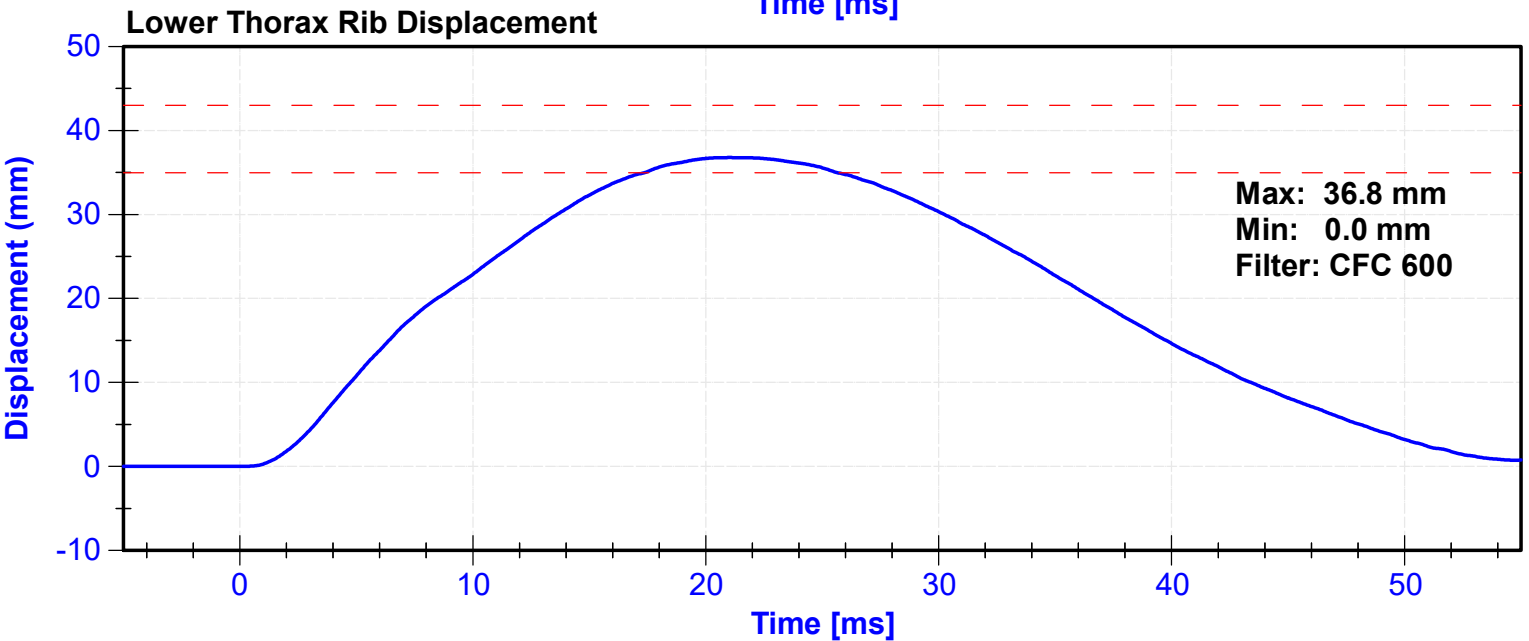
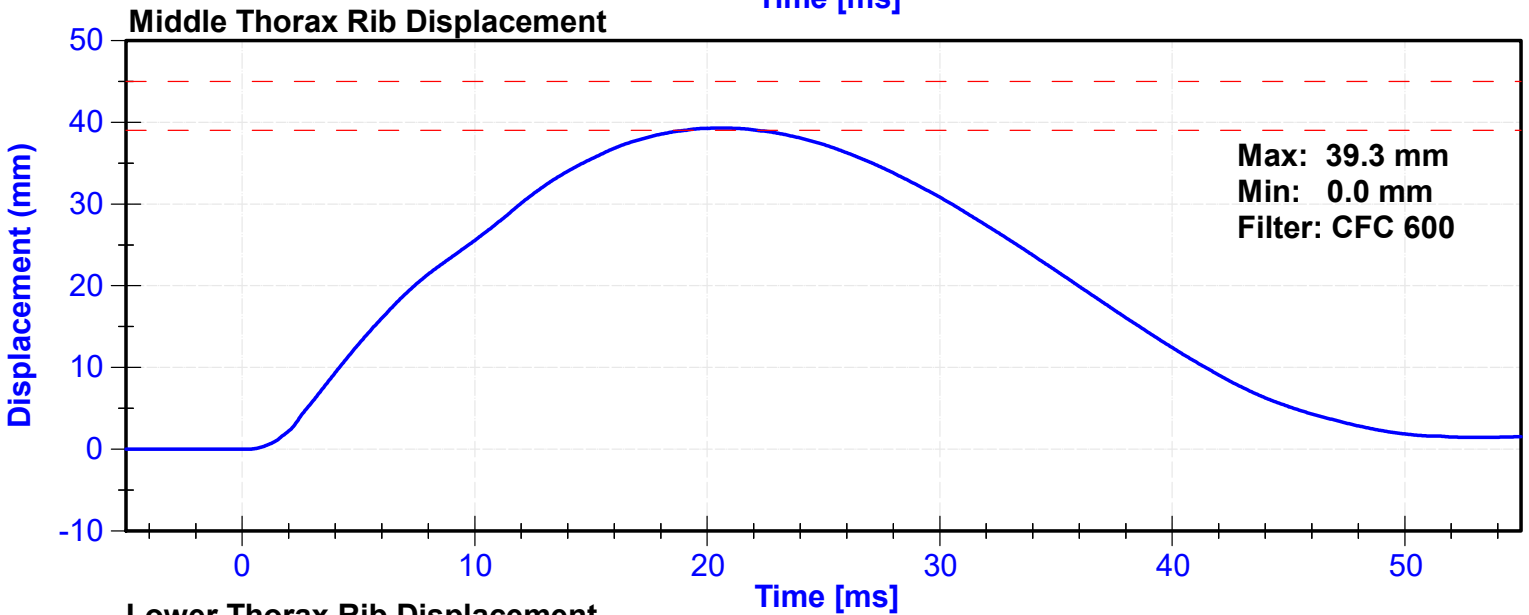
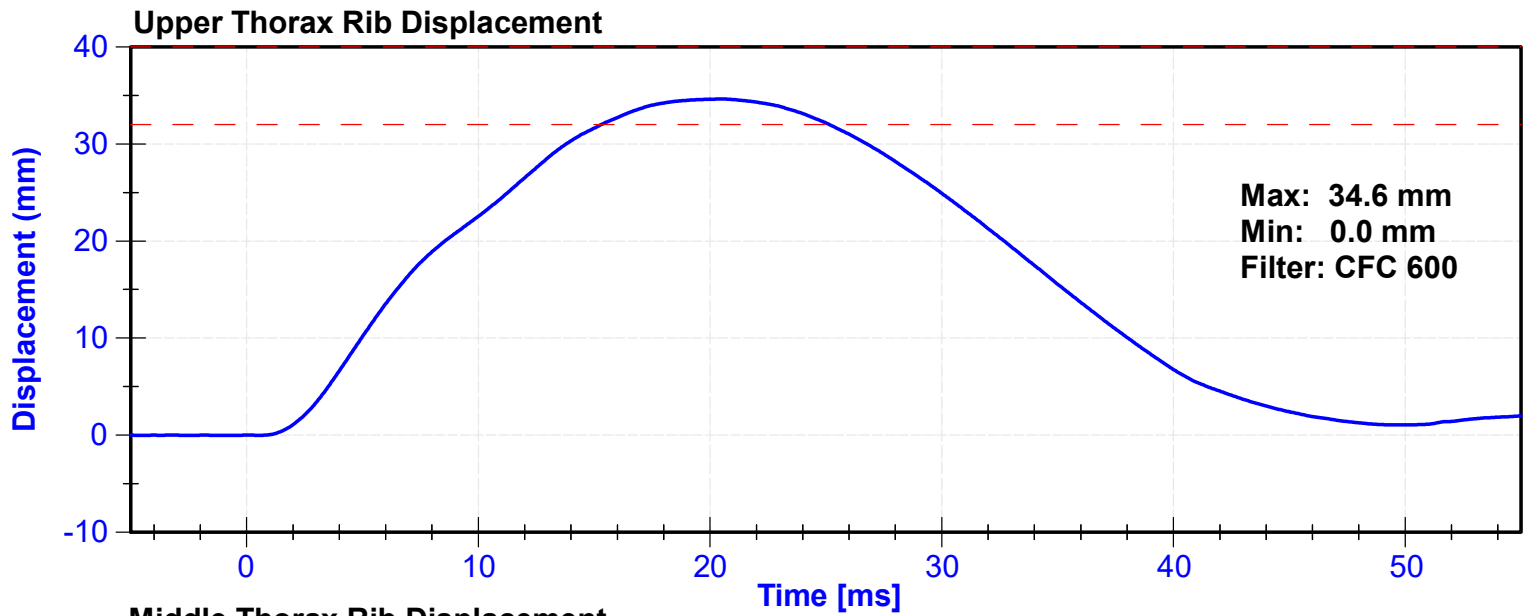
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	21	Pass
Velocity	4.2	4.4	m/s	4.34	Pass
Probe Acceleration	14	18	g's	16.0	Pass
Lateral Upper Spine Acceleration	13	17	g's	16.0	Pass
Lateral Lower Spine Acceleration	7	11	g's	9.3	Pass
Upper Thorax Rib Deflection	32	40	mm	34.6	Pass
Middle Thorax Rib Deflection	39	45	mm	39.3	Pass
Lower Thorax Rib Deflection	35	43	mm	36.8	Pass

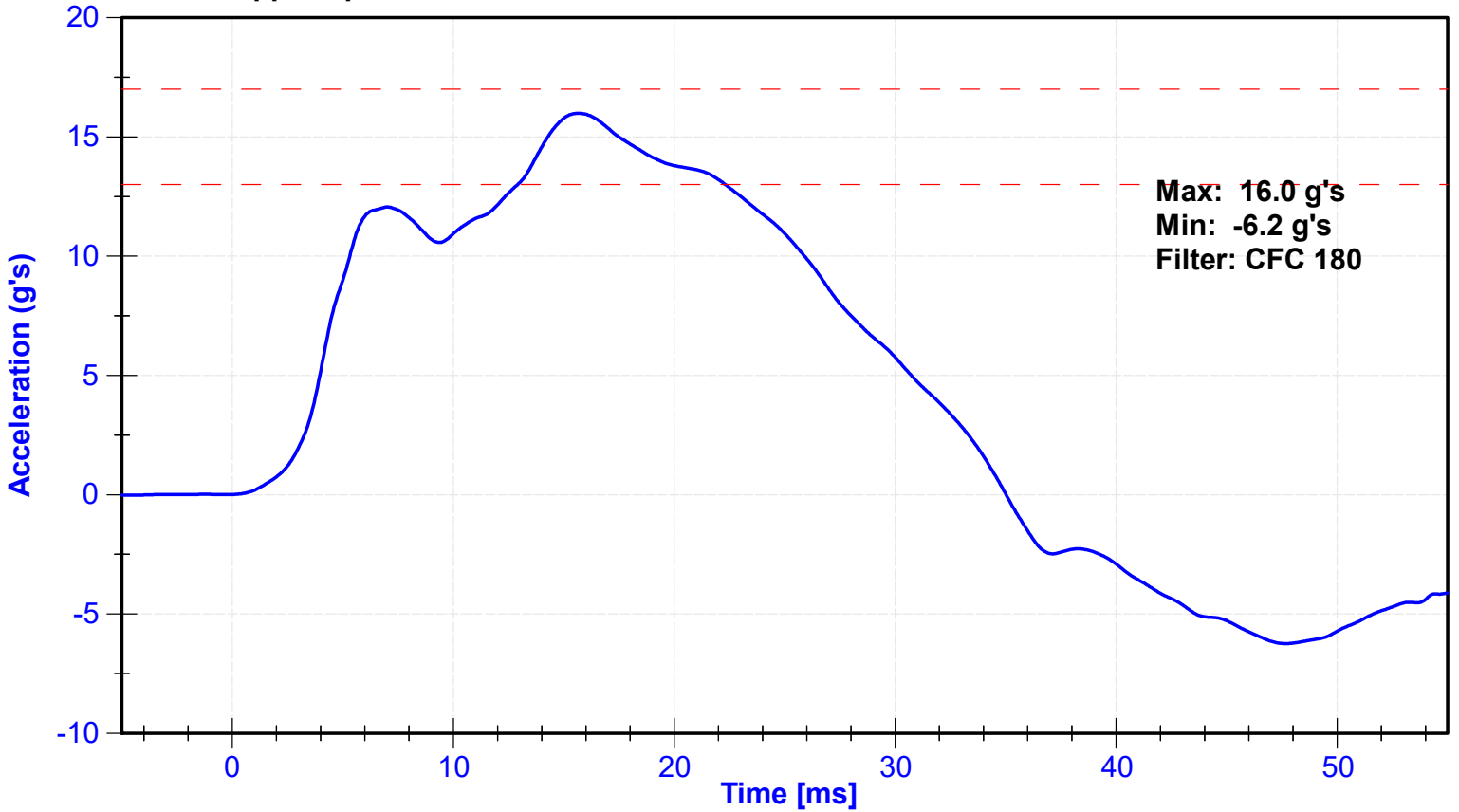
**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	P51736	10/25/2022	4/23/2023
Upper Spine Y Accelerometer	Endevco	T20880	10/3/2022	4/1/2023
Lower Spine Y Accelerometer	Endevco	P52071	10/3/2022	4/1/2023
Upper Thorax Rib Potentiometer	Servo	2316GFE	10/4/2022	4/4/2023
Middle Thorax Rib Potentiometer	Servo	040GFE	10/4/2022	4/4/2023
Lower Thorax Rib Potentiometer	Servo	1156GFE	10/4/2022	4/4/2023

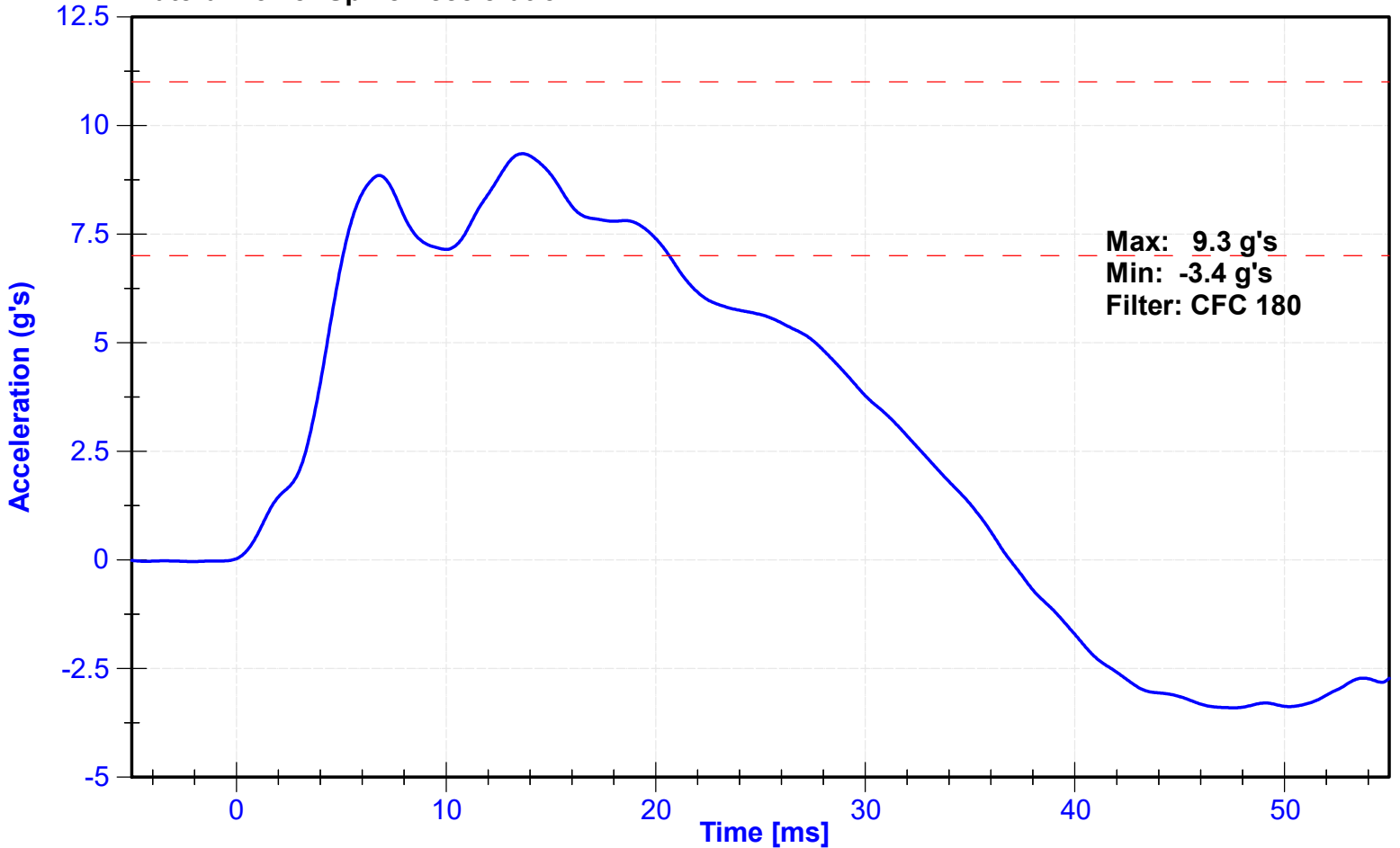




### Lateral Upper Spine Acceleration



### Lateral Lower Spine Acceleration



ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

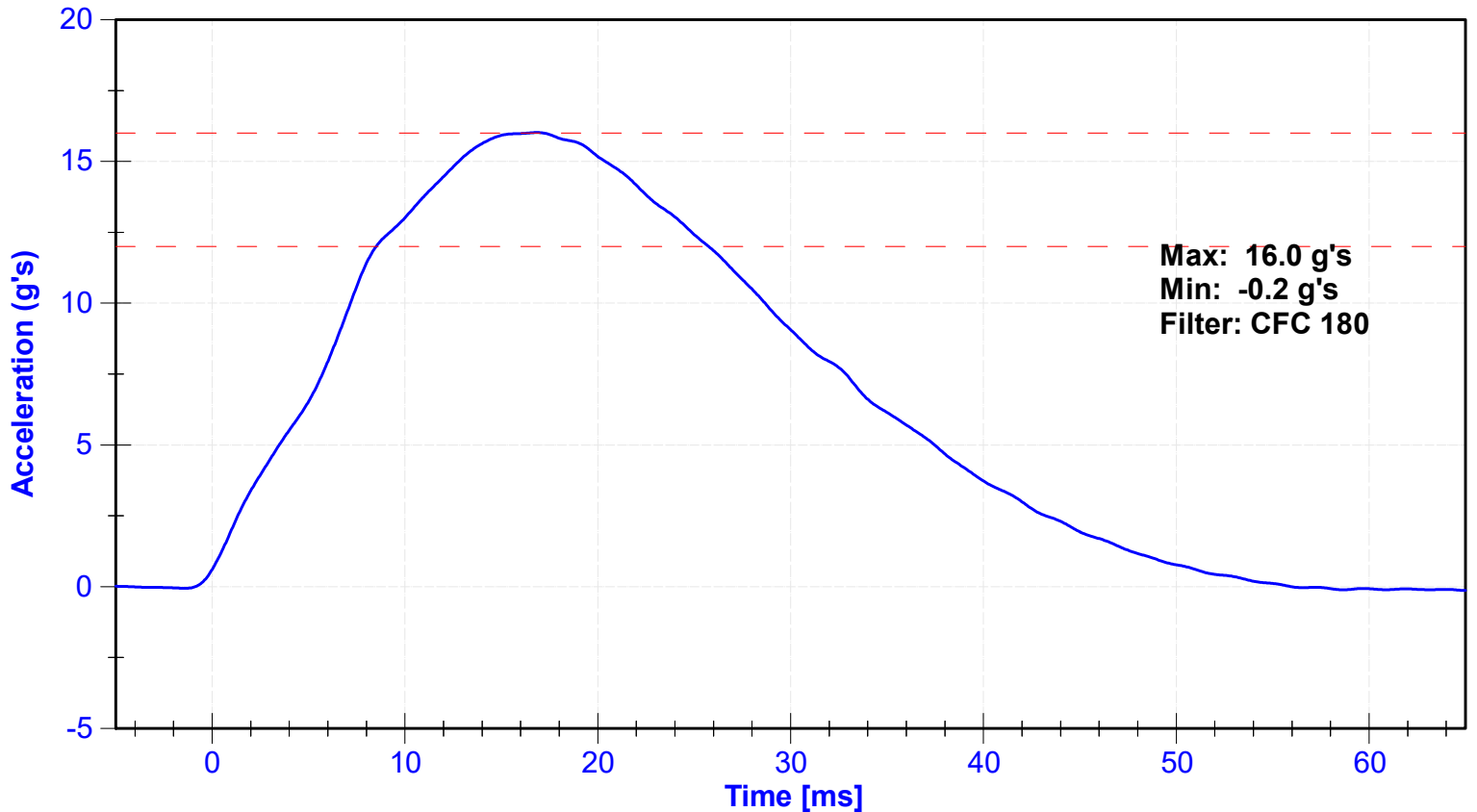
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	21	Pass
Velocity	4.2	4.4	m/s	4.38	Pass
Probe Acceleration	12	16	g's	16.0	Pass
Lateral Lower Spine Acceleration	9	14	g's	13.6	Pass
Upper Abdomen Rib Deflection	36	47	mm	38.7	Pass
Lower Abdomen Rib Deflection	33	44	mm	34.4	Pass

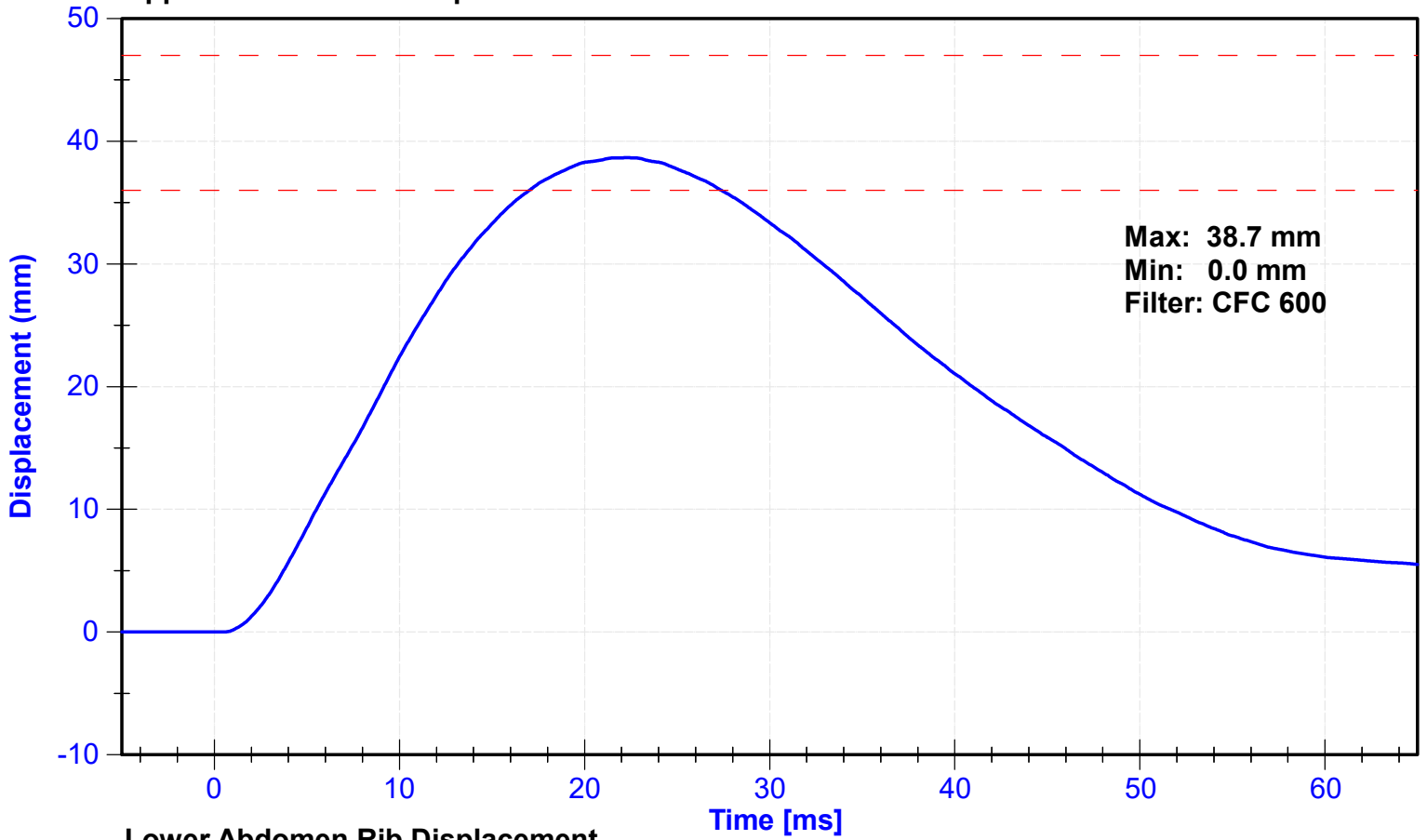
**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	P51736	10/25/2022	4/23/2023
Lower Spine Y Accelerometer	Endevco	P52071	10/3/2022	4/1/2023
Upper Abdomen Rib Potentiometer	Servo	307GFE	10/4/2022	4/4/2023
Lower Abdomen Rib Potentiometer	Servo	308GFE	10/4/2022	4/4/2023

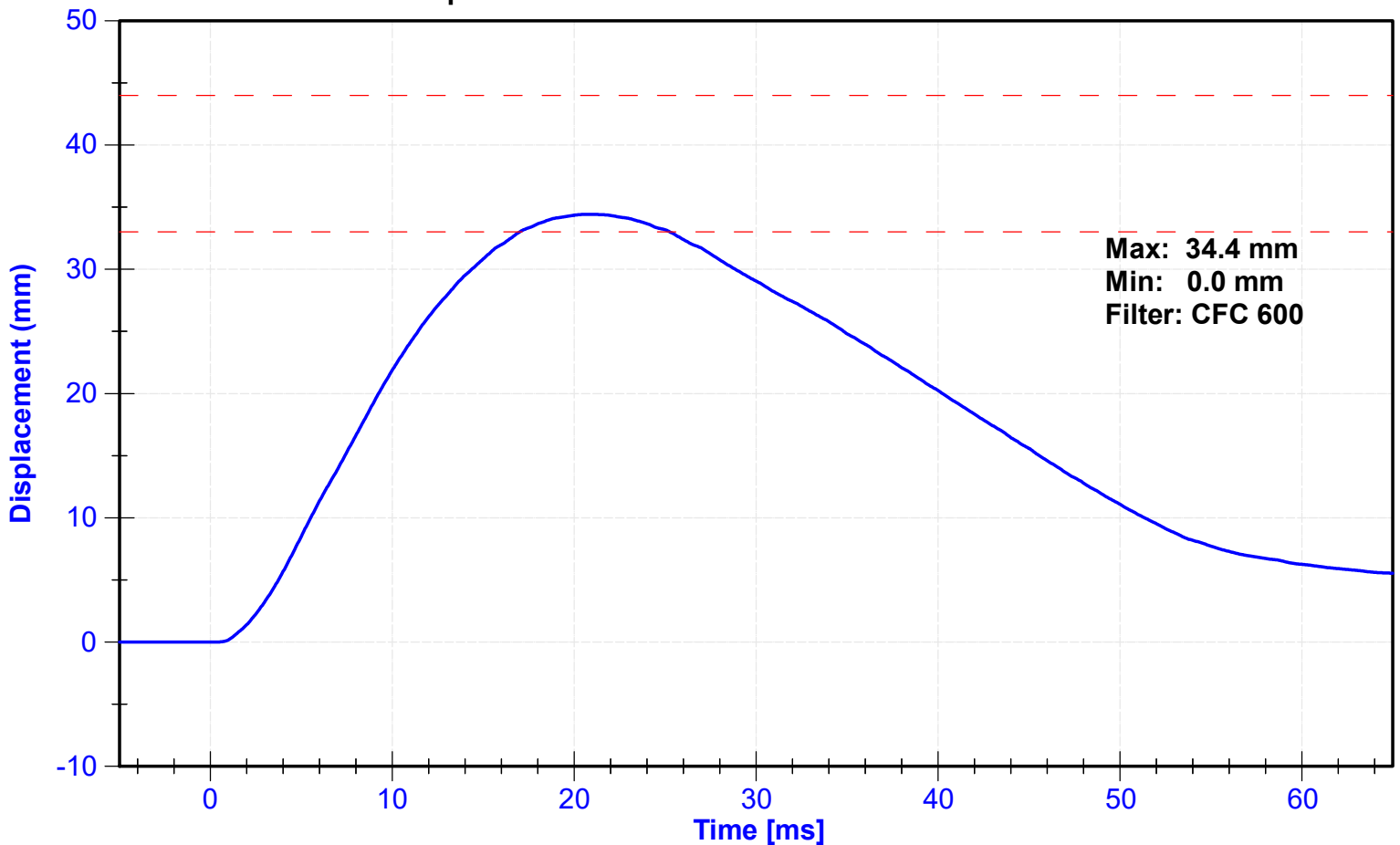
**Probe Acceleration**

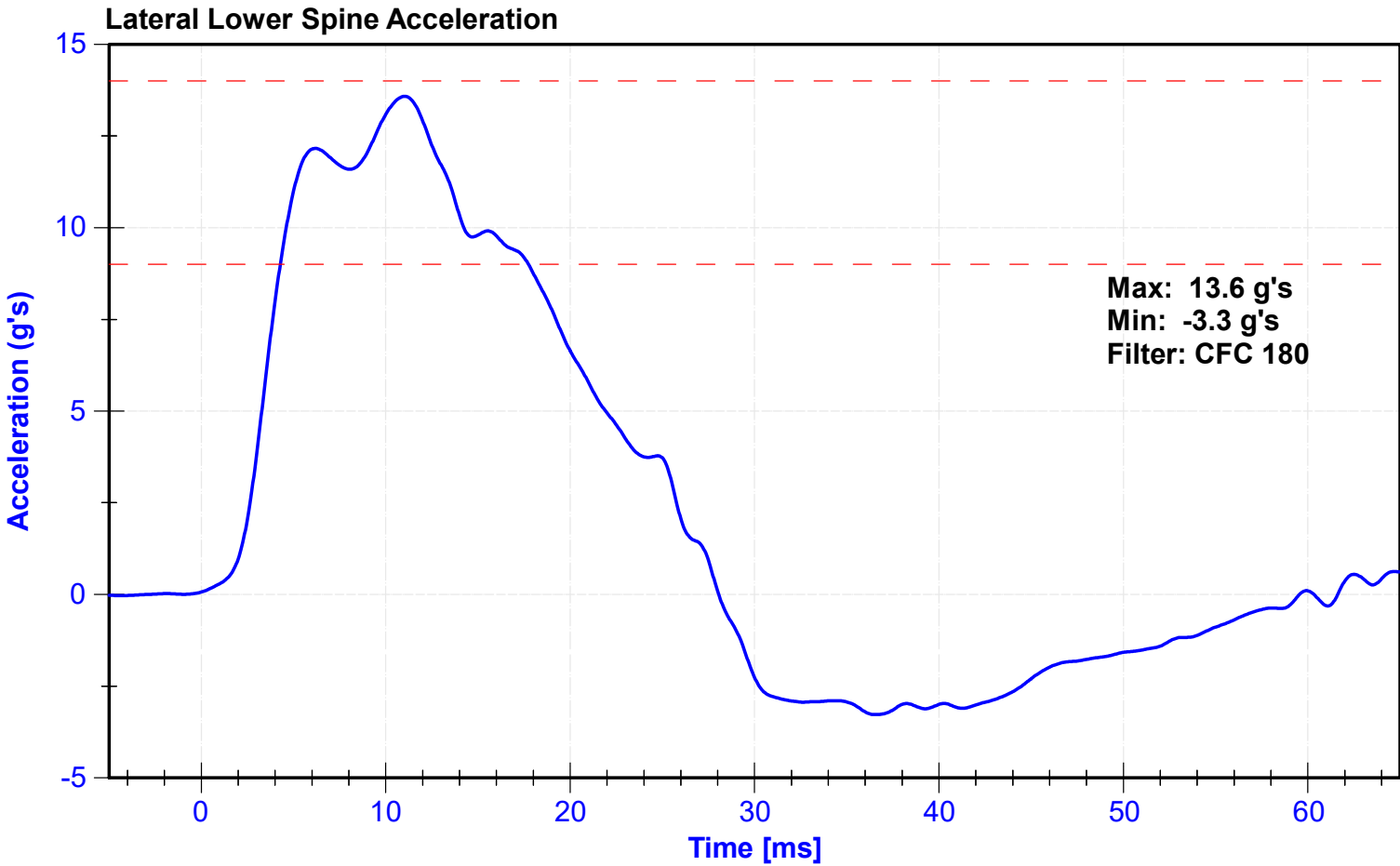


### Upper Abdomen Rib Displacement



### Lower Abdomen Rib Displacement





ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

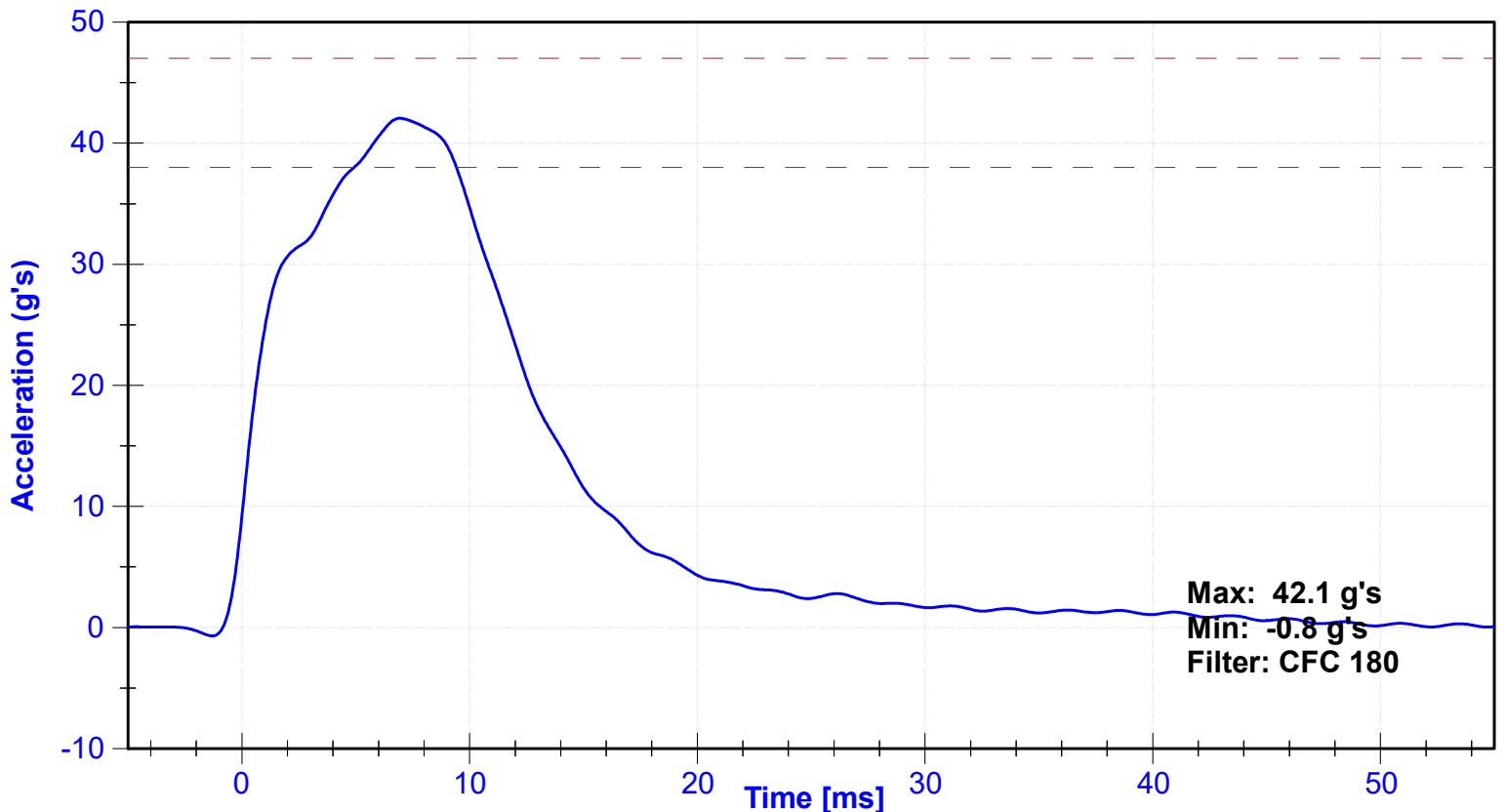
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	21	Pass
Velocity	6.6	6.8	m/s	6.72	Pass
Probe Acceleration	38	47	g's	42.1	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	38.1	Pass
Acetabulum Force	3600	4300	N	3963.4	Pass

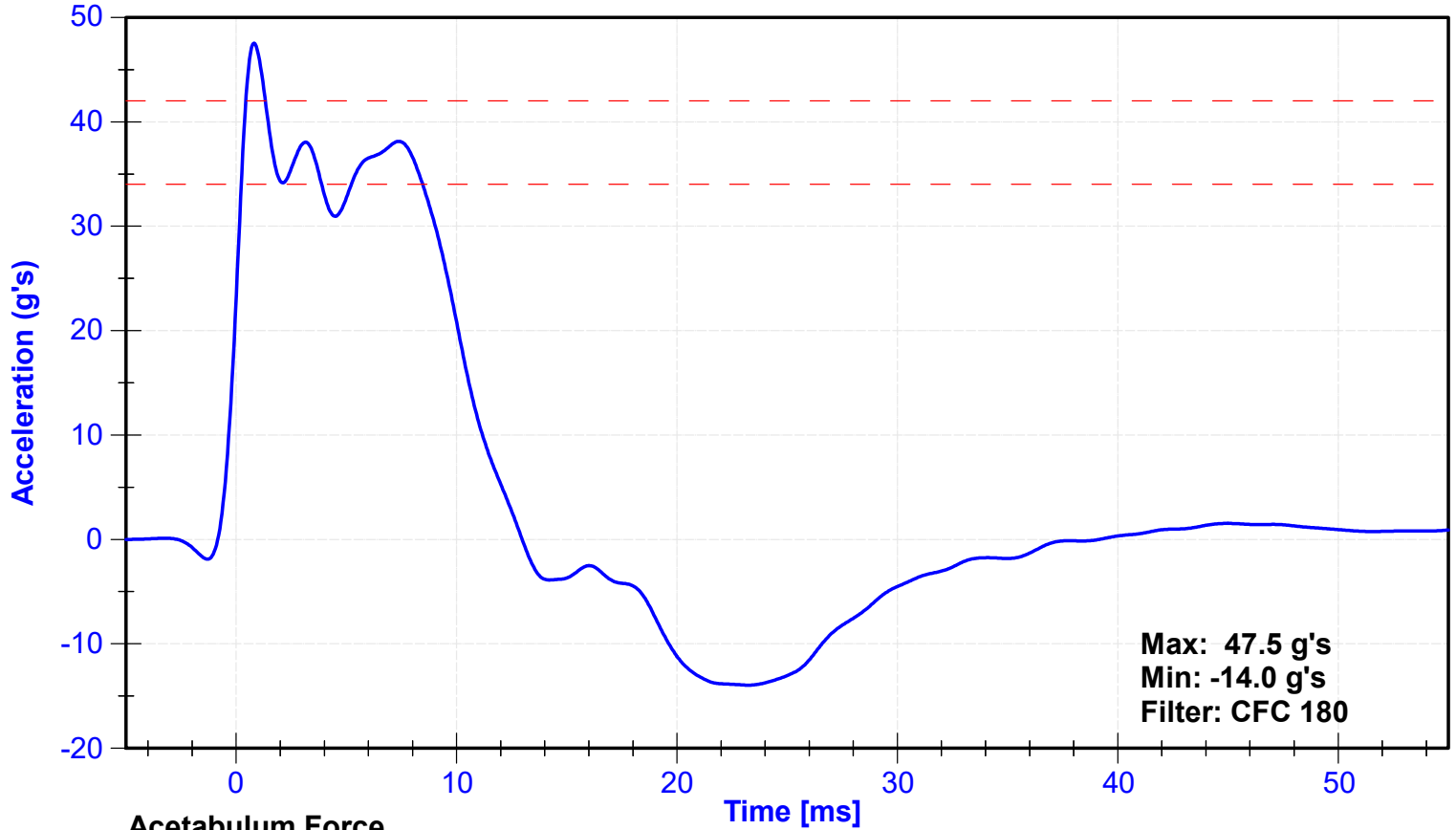
**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	P51736	10/25/2022	4/23/2023
Pelvis Y Accelerometer	Endevco	P51731	10/3/2022	4/1/2023
Acetabulum Load Cell	Denton	267-FY	8/11/2022	8/11/2023
Certification Plug	SACO			N/A
Crash Test Plug	SACO			N/A

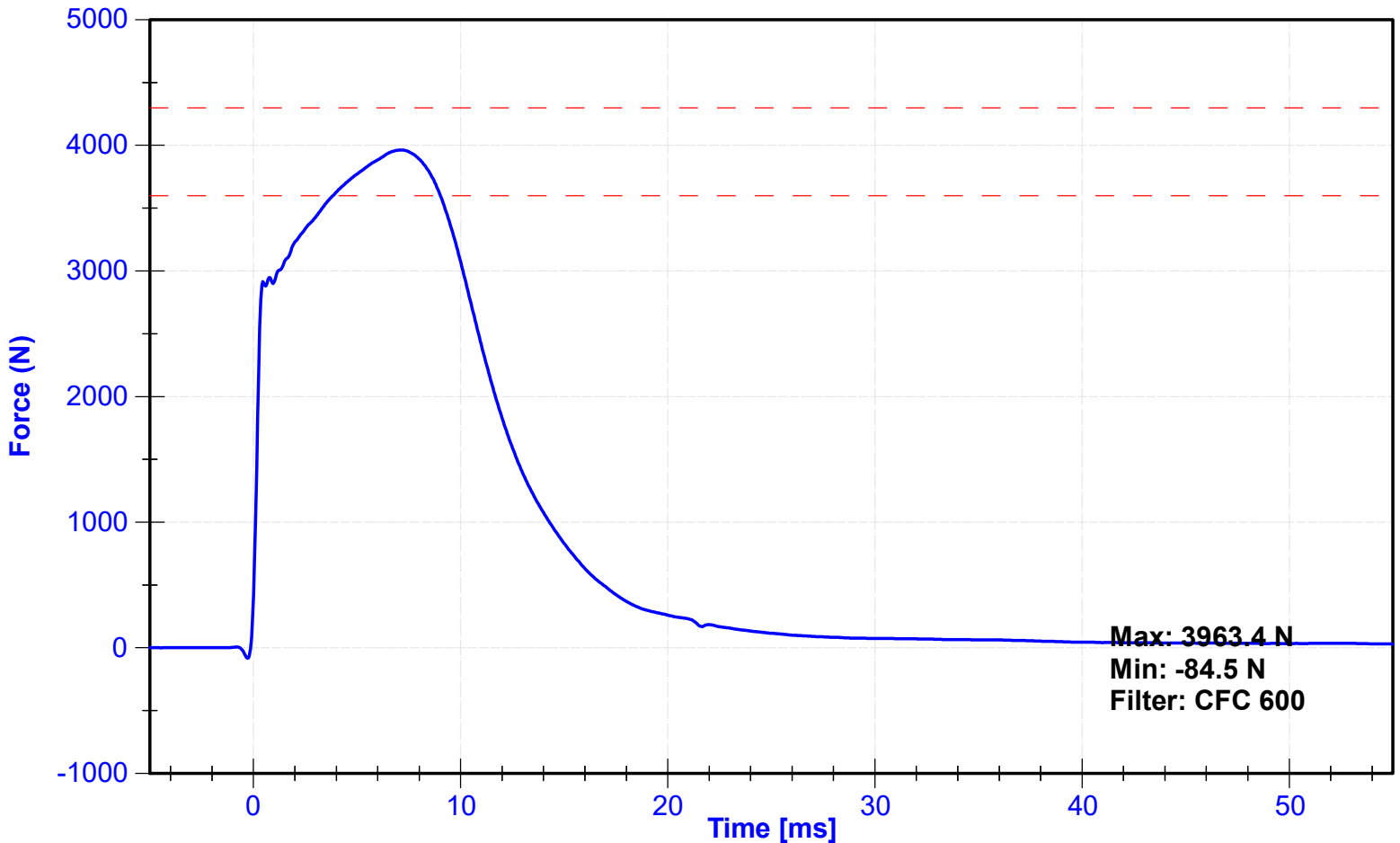
**Probe Acceleration**



### Lateral Pelvis Acceleration



### Acetabulum Force





CERT PLUG NHTSA 300 12/28/22

**SID-IIs Pelvis Plug Certification Test**

Plug S/N 15355

Test Number 19702

Report Number 19754

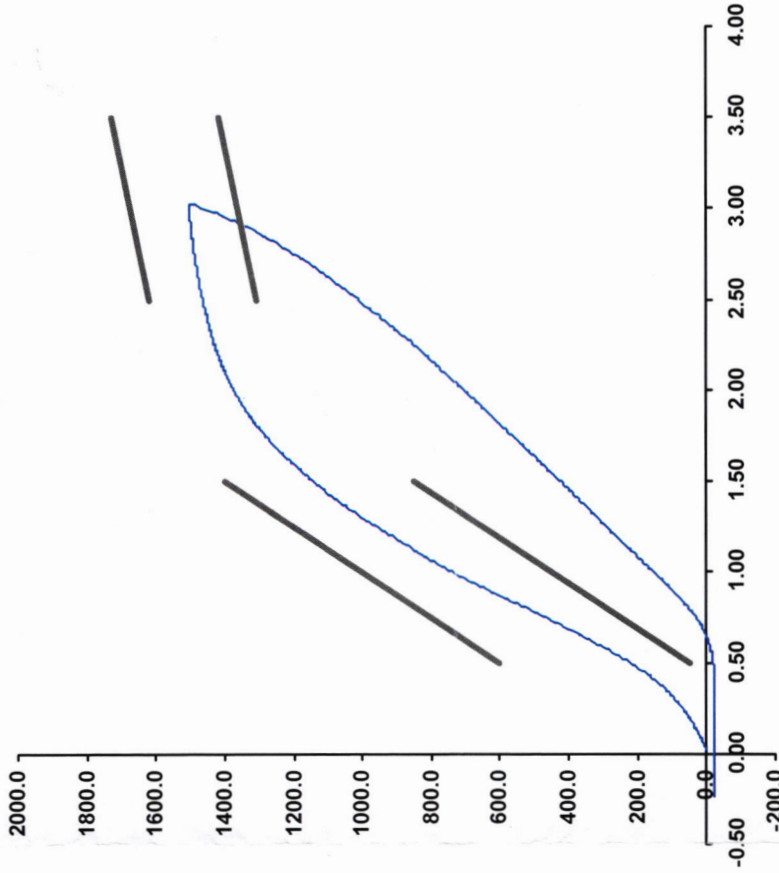
Test Date 7/20/2021 12:42:34 PM

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

Testing Machine STM-20 5965542  
 Load Cell S/N (F1360947), Units (LBS) 1000  
 Crosshead Speed ( mm / min ) or Rate 12.7  
 Extension or Position Measured by XHD\_100 ( XHD100 )

Notes:

Force (-N) vs Extension (-mm)



Operator \_\_\_\_\_  
 Part Number 180-4450

By: *DC* Date: *7/20/2021*

Template No 107 20-Jul-21  
 SACO Research

300 CRASH

10/17/22



### SID-IIs Pelvis Plug Certification Test

Plug S/N 15162

Test Number 17874

Report Number 17923

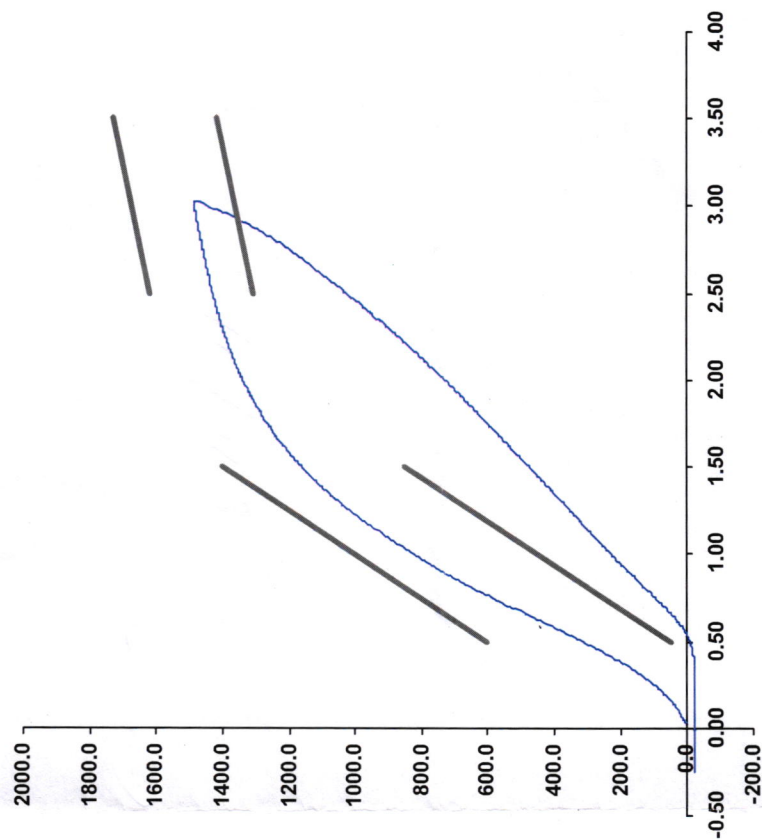
Test Date 3/5/2021 11:37:24 AM

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

Testing Machine STM-20 5965542  
 Load Cell S/N (FI360947), Units (LBS) 1000  
 Crosshead Speed (mm / min) or Rate 12.7  
 Extension or Position Measured by XHD\_100 (XHD100)

Notes:

Force (-N) vs Extension (-mm)



Operator  
 Part Number 180-4450

Template No 107 05-Mar-21  
 SACO Research

By: DC Date: 3/5/2021

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



**SID-IIs Pelvis Plug Certification Test**

Plug S/N 15453

Test Number 20114

Report Number 20168

Test Date 9/9/2021 10:52:30 AM

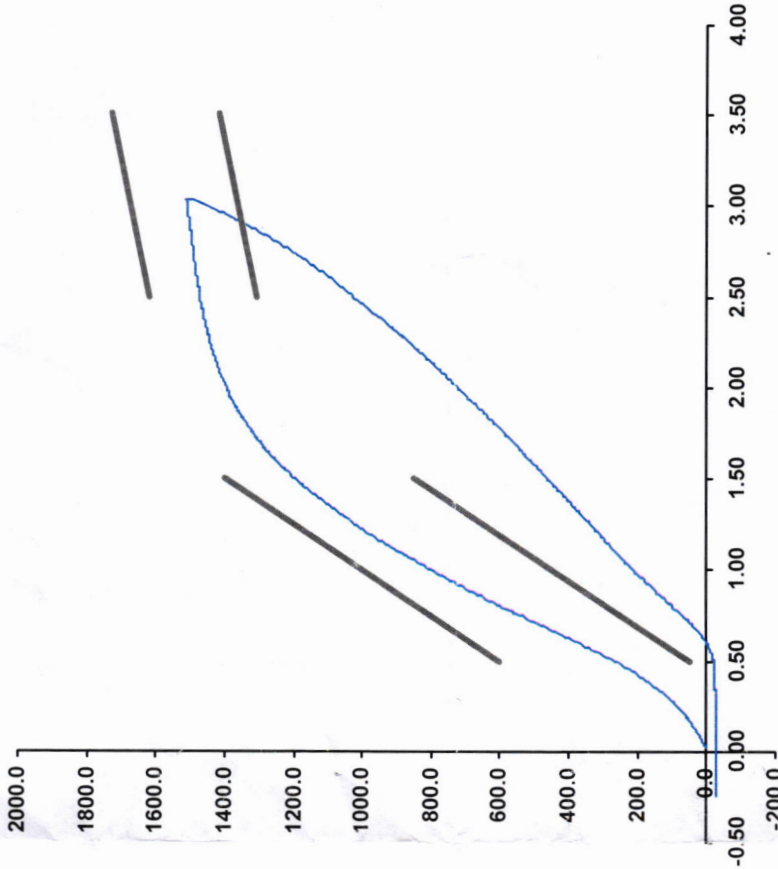
Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	50	600
Force @ 1.5 mm (N)	850	1,400
Force @ 2.5 mm (N)	1,306	1,618
Force @ 3.0 mm (N)	1,361	1,673

Testing Machine STM-20 5965542  
 Load Cell S/N (F1360947), Units (LBS) 1000  
 Preload Value (-N) 22.24  
 Crosshead Speed (mm / min) or Rate 12.7  
 Extension or Position Measured by XHD\_100 (XHD100)

Notes:

300 NON IMPACT 10/17/22

Force (-N) vs Extension (-mm)



Operator  
 Part Number 180-4450

Template No 107 09-Sep-21  
 SACO Research

By: DC Date: 9/9/2021  
 SACO Research 41735 Elm St, #401 Murrieta CA 92562 Tel 310-694-2082 FAX

ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

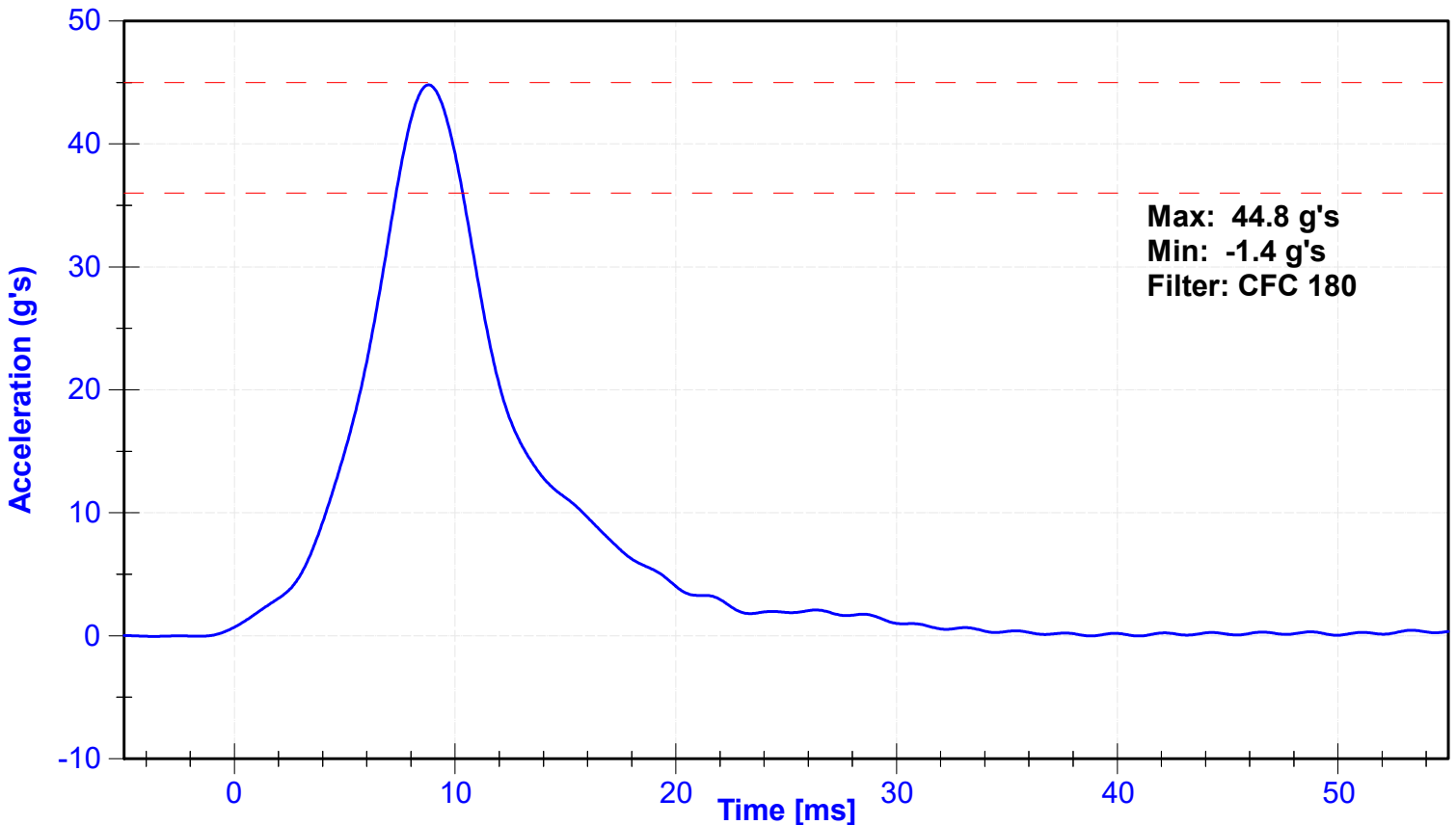
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	21	Pass
Velocity	4.2	4.4	m/s	4.27	Pass
Probe Acceleration	36	45	g's	44.8	Pass
Lateral Pelvis Acceleration	28	39	g's	36.8	Pass
Iliac Force	4100	5100	N	4978.5	Pass

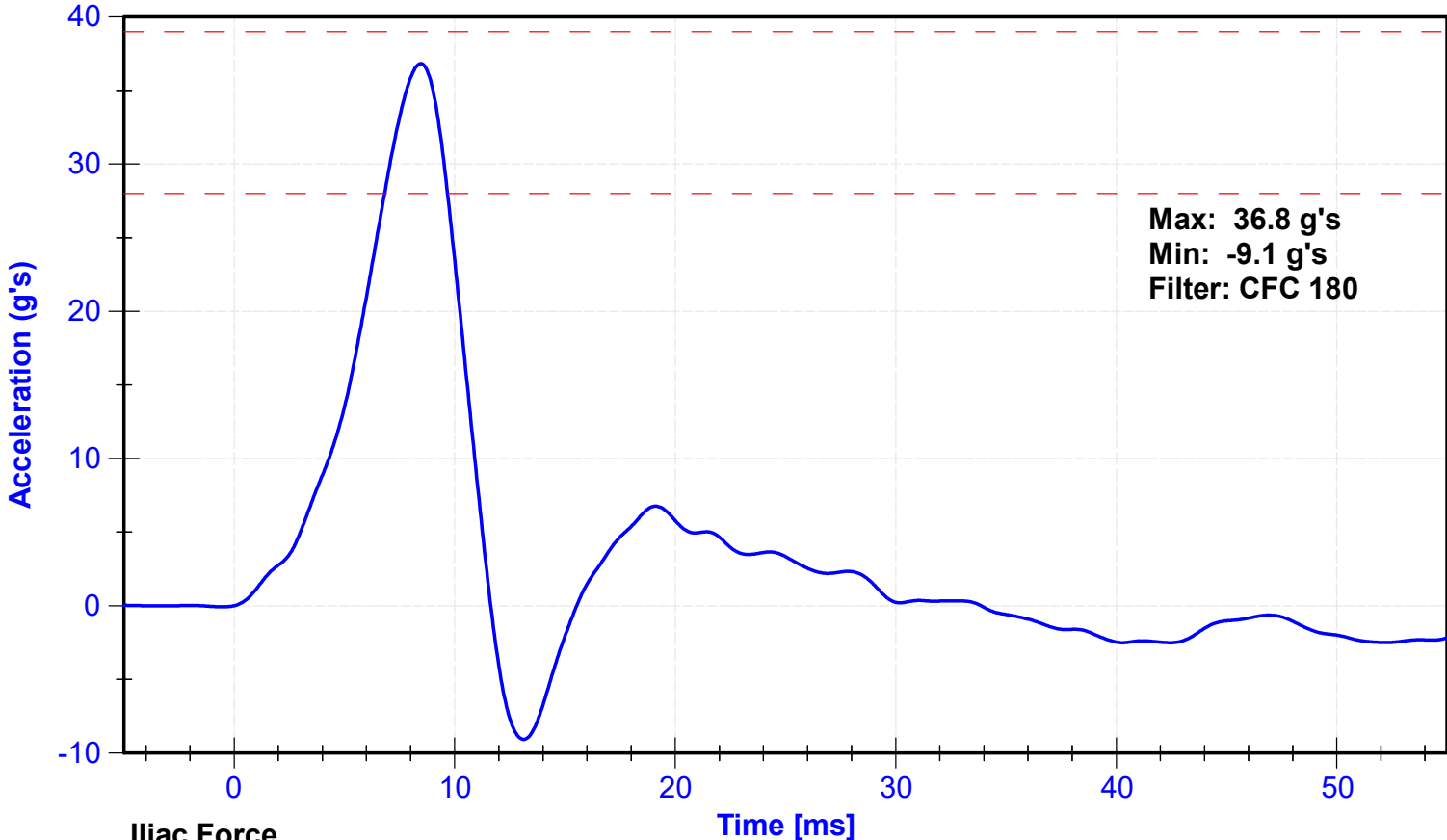
**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	P51736	10/25/2022	4/23/2023
Pelvis Y Accelerometer	Endevco	P51731	10/3/2022	4/1/2023
Iliac Load Cell	Denton	280-FY	8/11/2022	8/11/2023

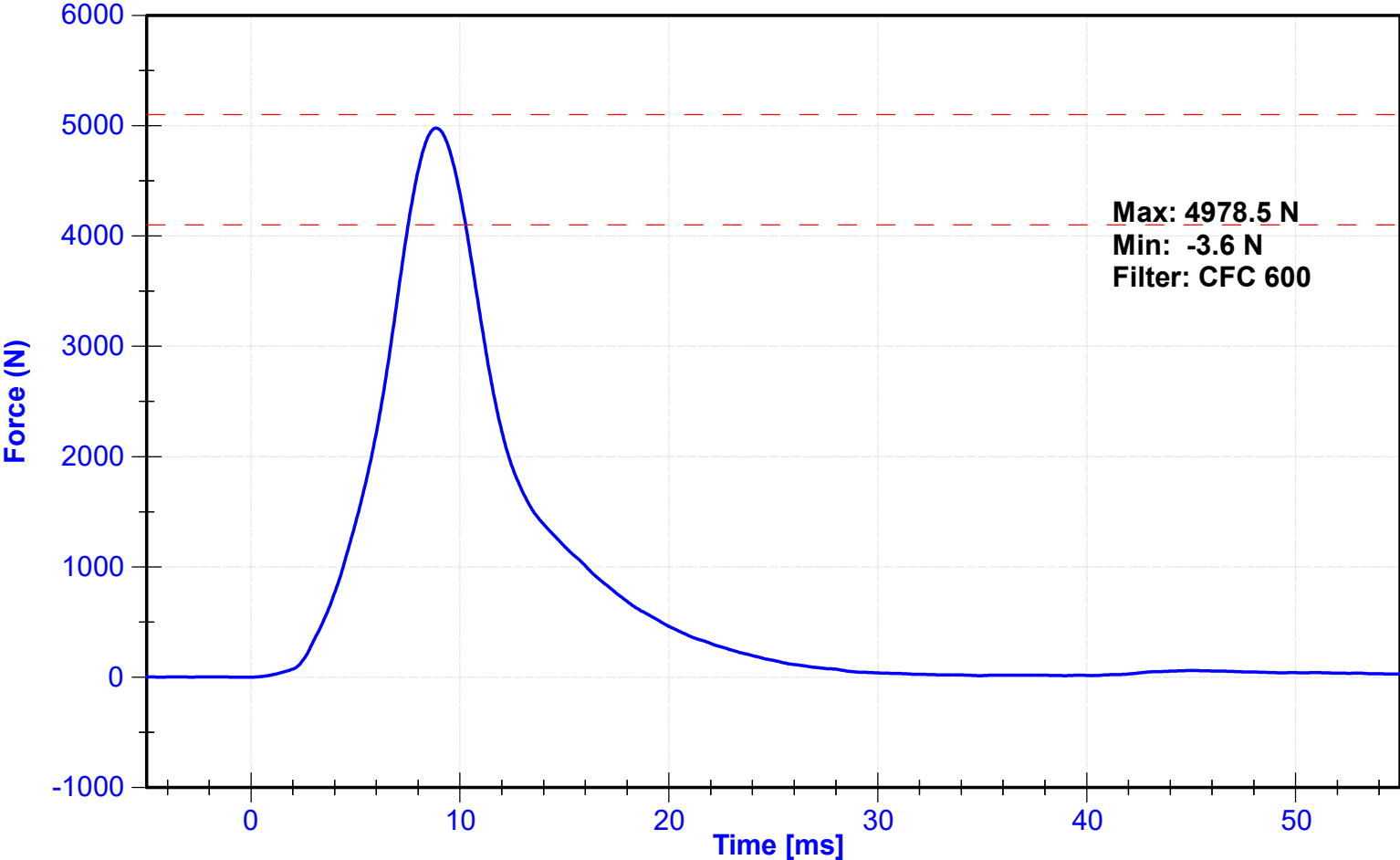
**Probe Acceleration**



### Lateral Pelvis Acceleration



### Iliac Force



**CALIBRATION TEST RESULTS**

**POST-TEST**

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

**SERIAL NO:F033**

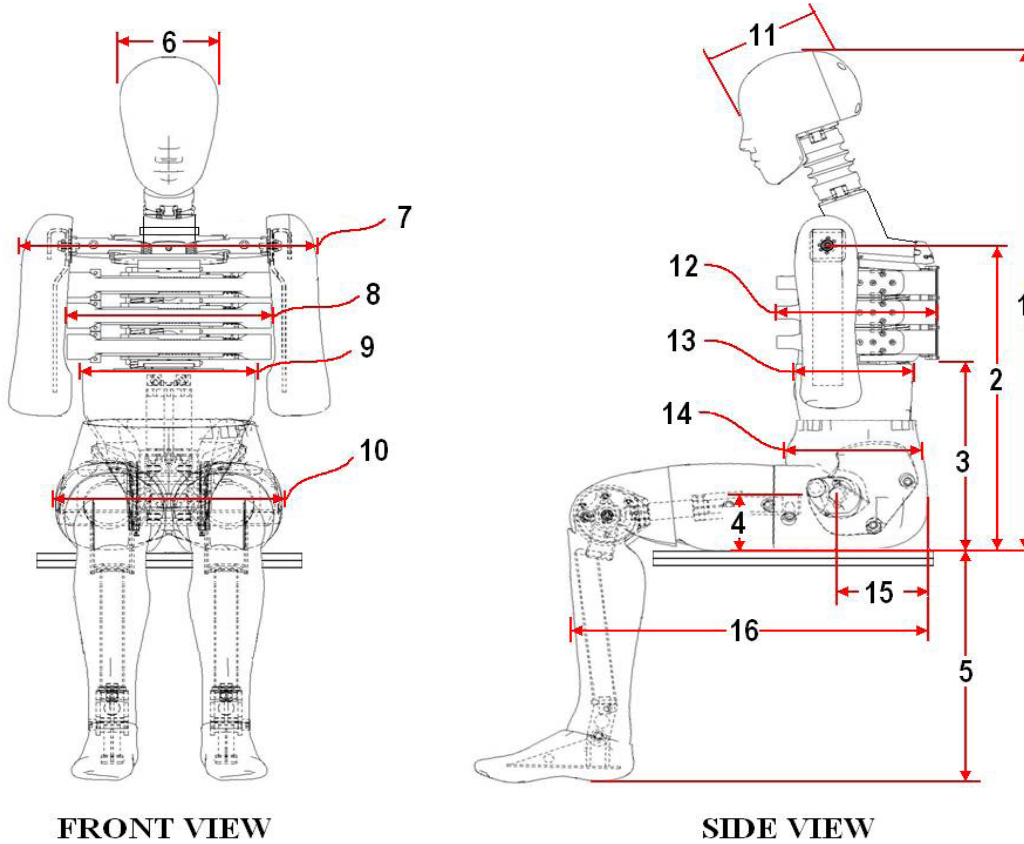
**(CONFIGURED FOR LEFT SIDE It**

External Measurements - EuroSID-2re

Technician: K. Brogan

Date: 12/19/2022

Dummy Serial Number: F033



FRONT VIEW

SIDE VIEW

Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	908	Pass
2	Seat to Shoulder Joint	558	572	567	Pass
3	Seat to Lower Face of Thoracic Spine Box	346	356	350	Pass
4	Seat to Hip Joint (center of bolt)	97	103	99	Pass
5	Sole to Seat, Sitting	333	451	420	Pass
6	Head Width	152	158	157	Pass
7	Shoulder/Arm Width	461	479	469	Pass
8	Thorax Width	322	332	329	Pass
9	Abdomen Width	273	287	280	Pass
10	Pelvis Lap Width	359	373	365	Pass
11	Head Depth	196	206	203	Pass
12	Thorax Depth	262	272	268	Pass
13	Abdomen Depth	194	204	200	Pass
14	Pelvis Depth	235	245	240	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150	160	157	Pass
16	Back of Buttocks to Front Knee	597	615	606	Pass

ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

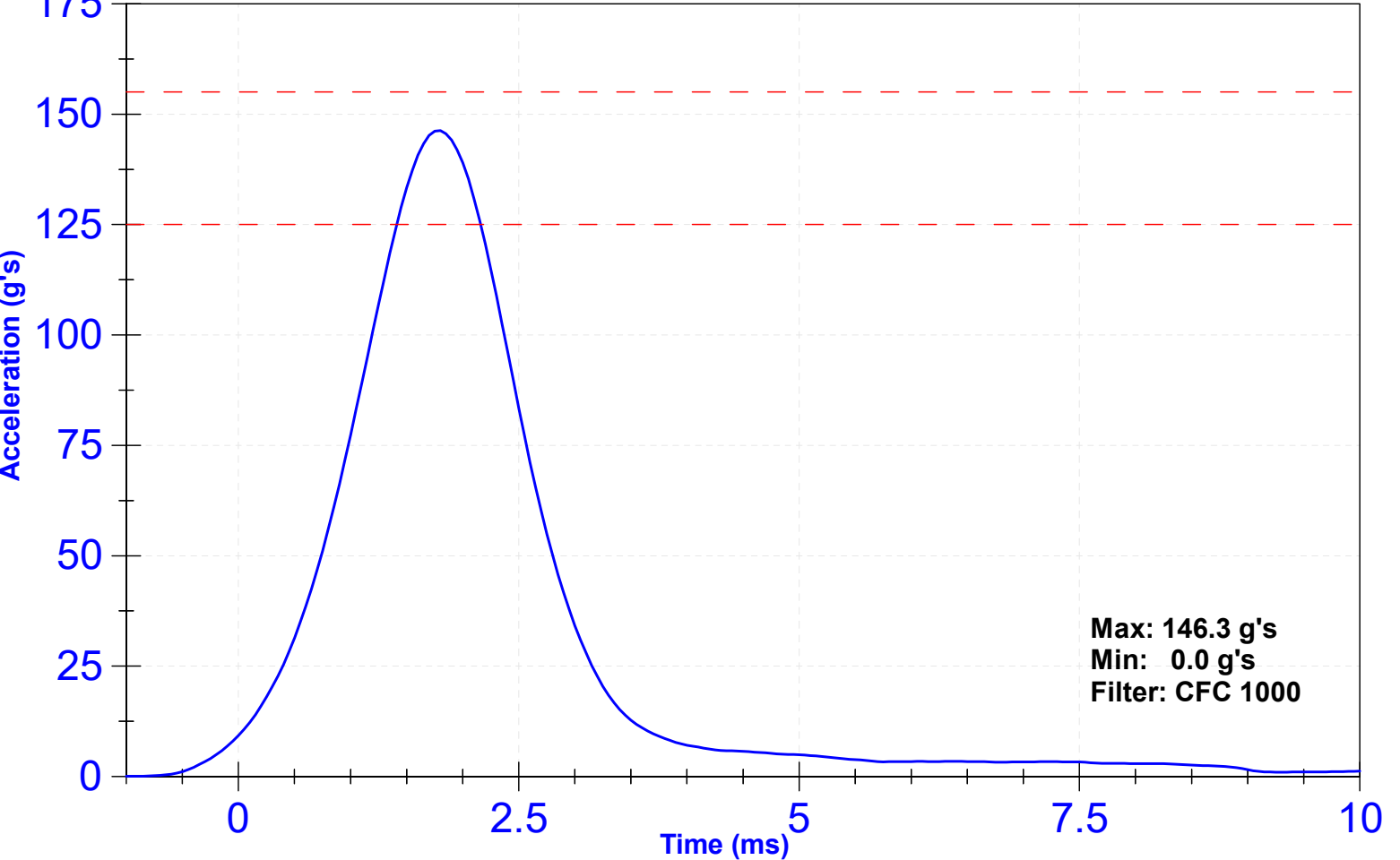
**Results**

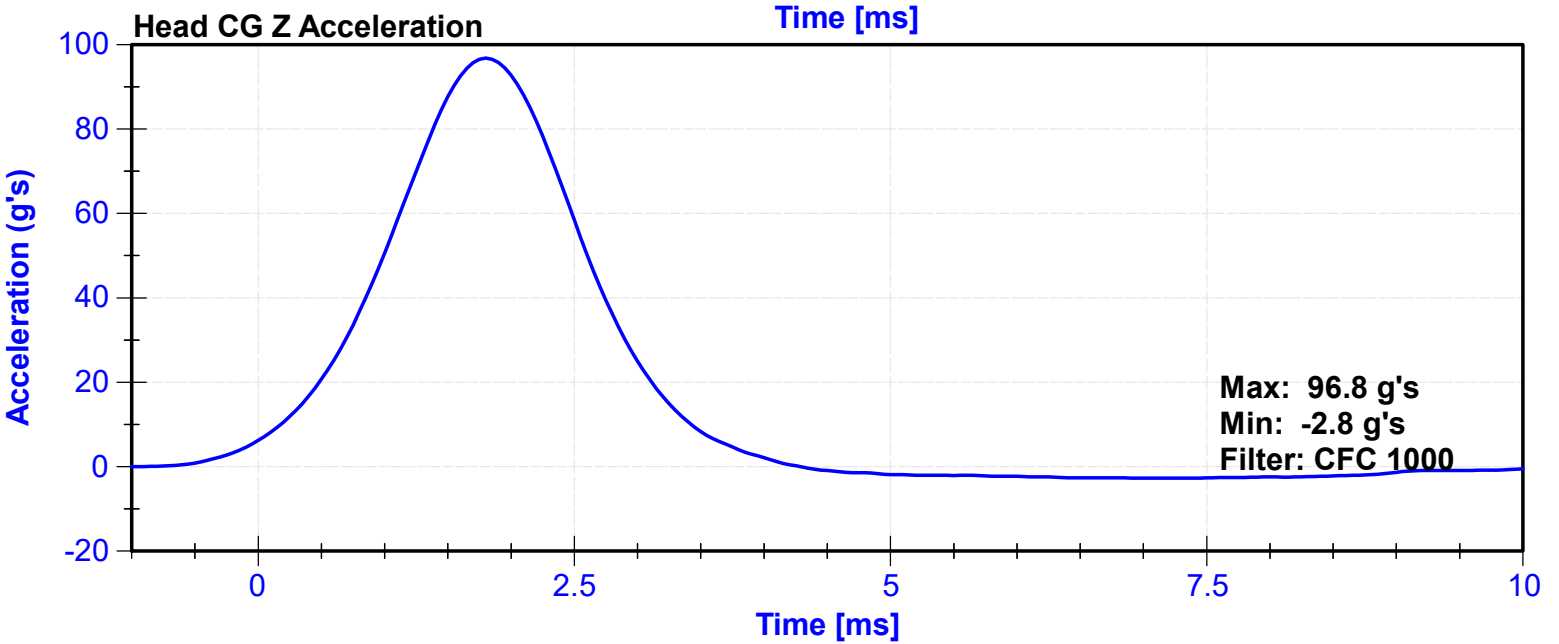
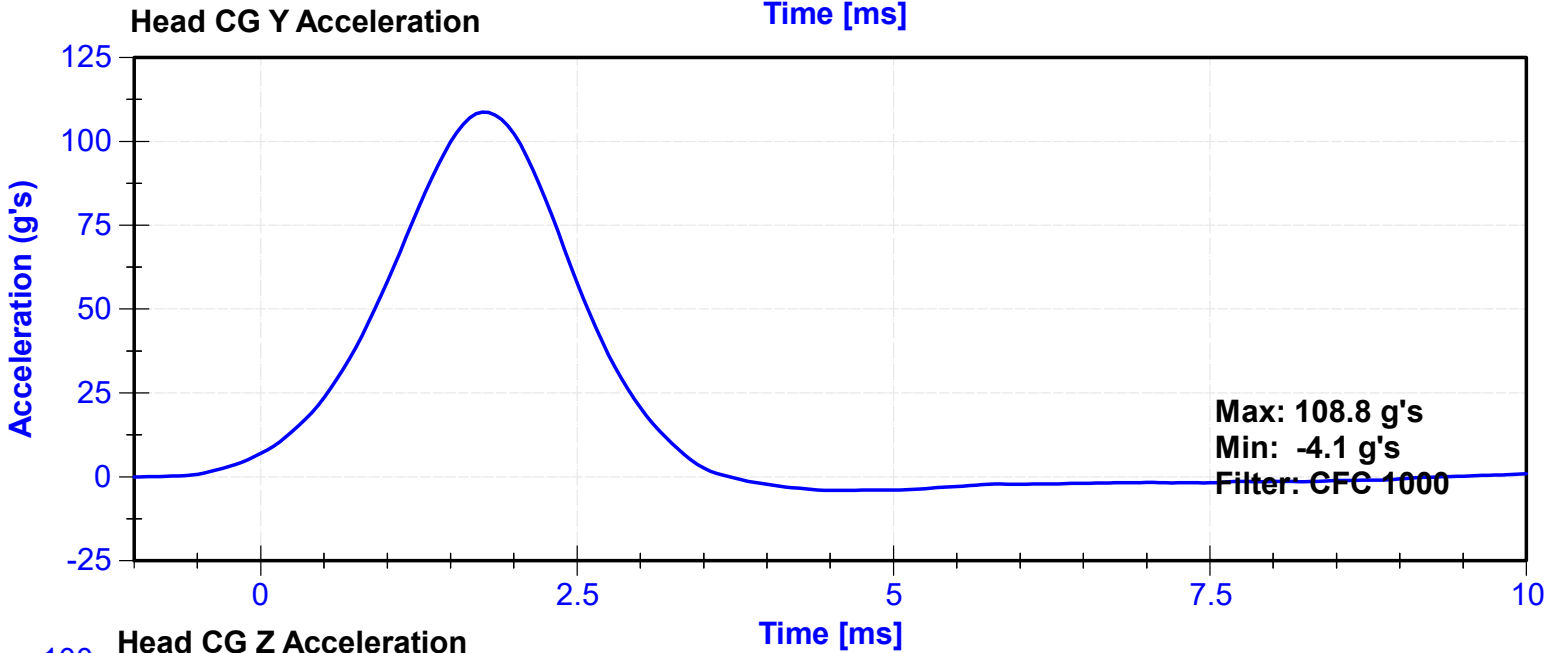
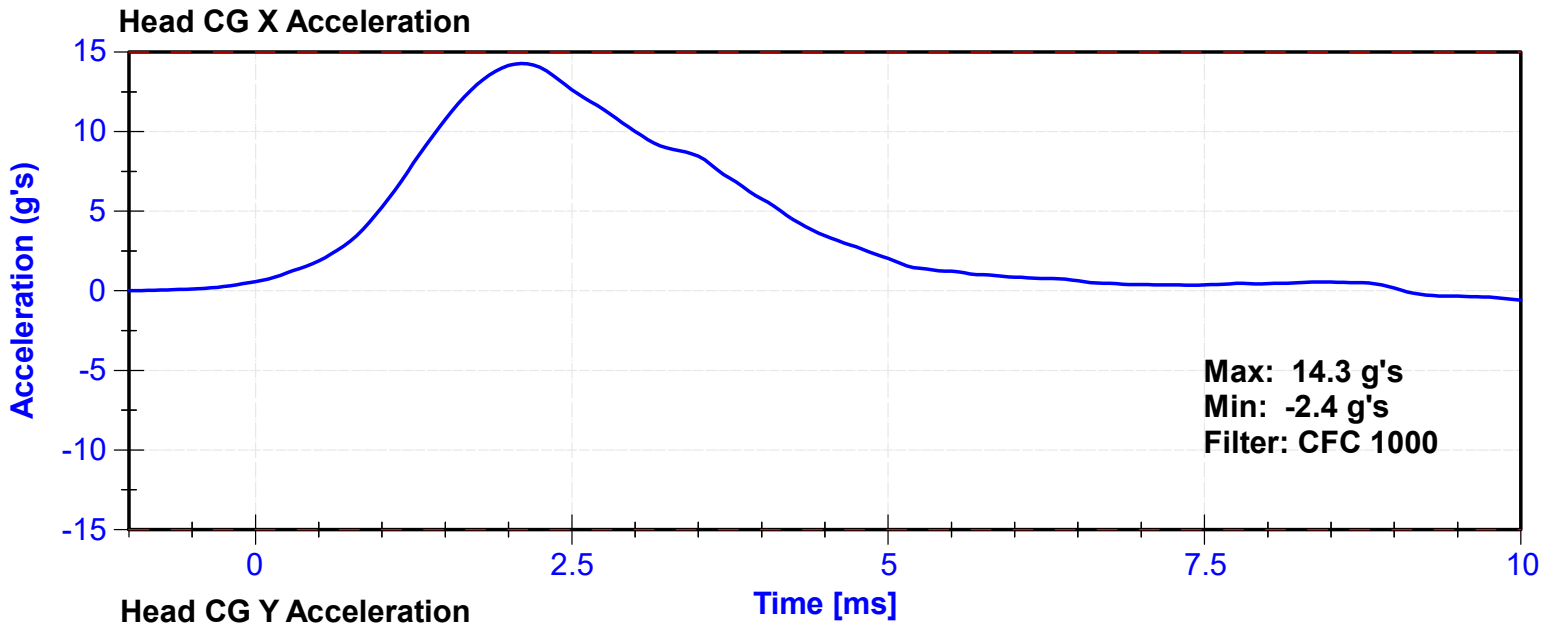
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	21	Pass
Resultant Acceleration	125	155	g's	146.3	Pass
Oscillation	0	15	%	2.36	Pass
Fore-Aft Acceleration	-15	15	g's	14.3	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	P63861	7/21/2022	1/17/2023
Y Accelerometer	Endevco	P49216	7/21/2022	1/17/2023
Z Accelerometer	Endevco	P51303	7/21/2022	1/17/2023

**Resultant Acceleration**





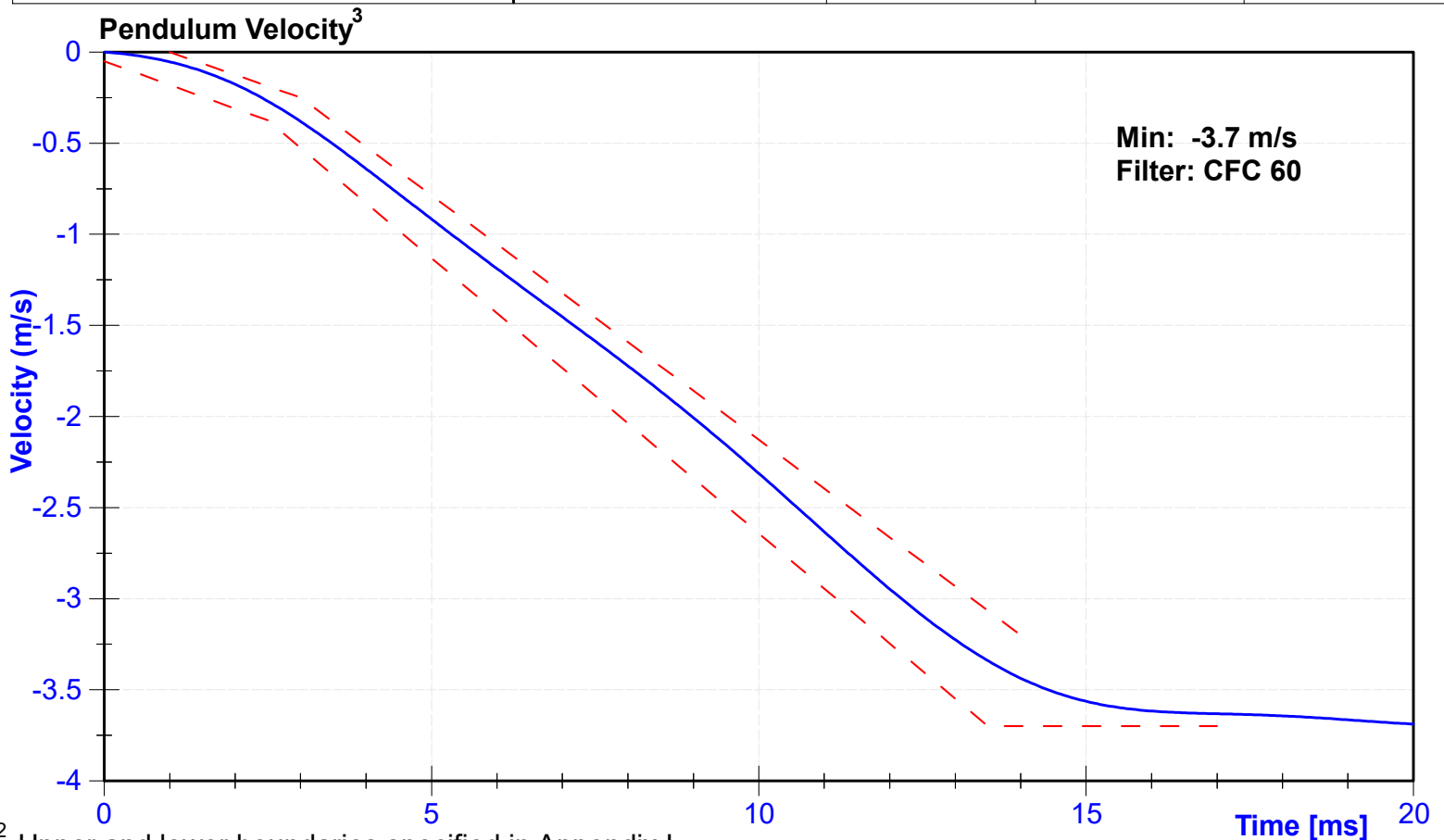
ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	F033	Laboratory Supervisor	C. Mantell

**Results**

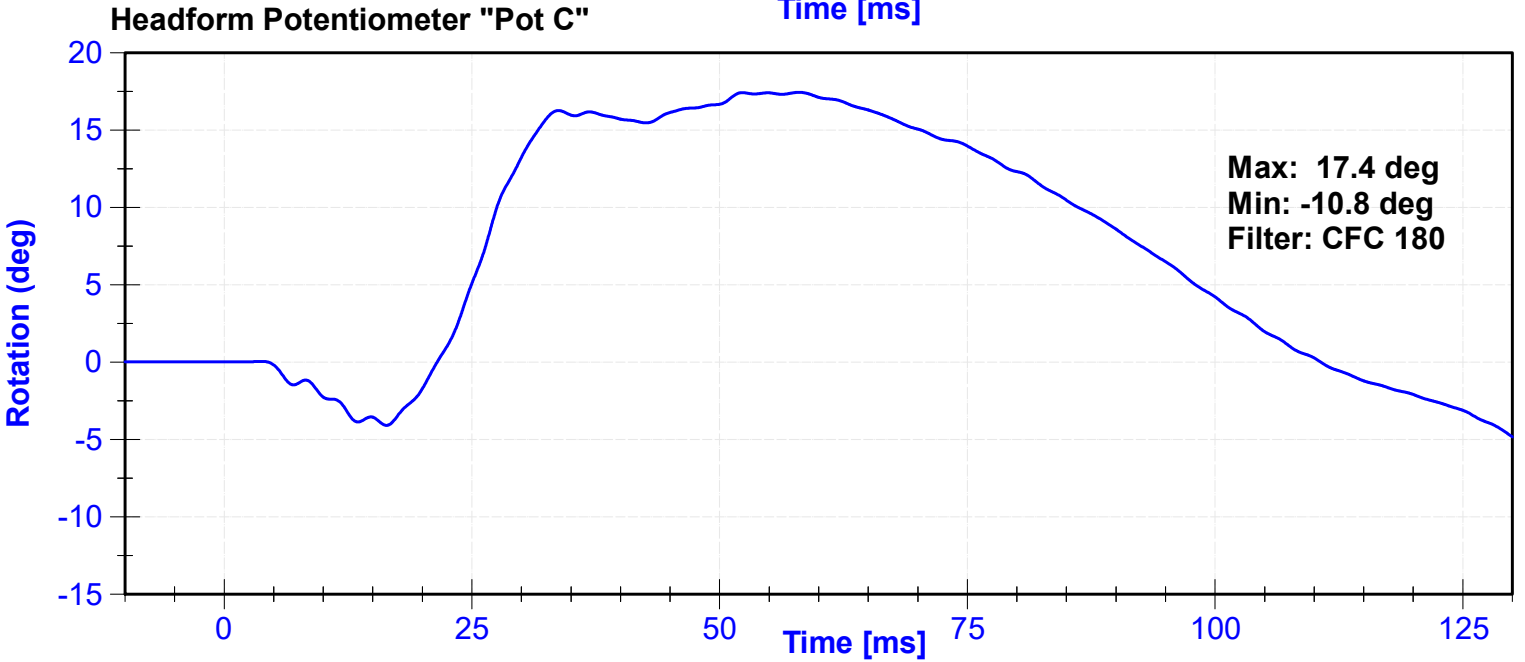
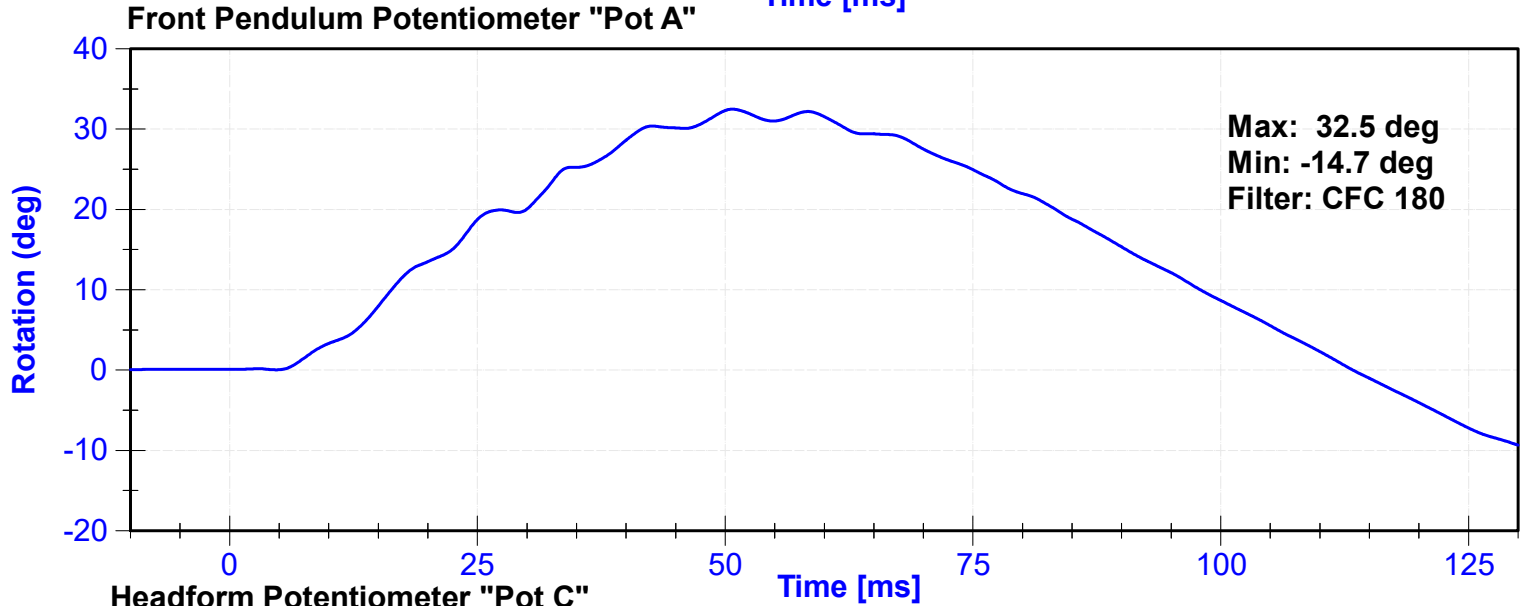
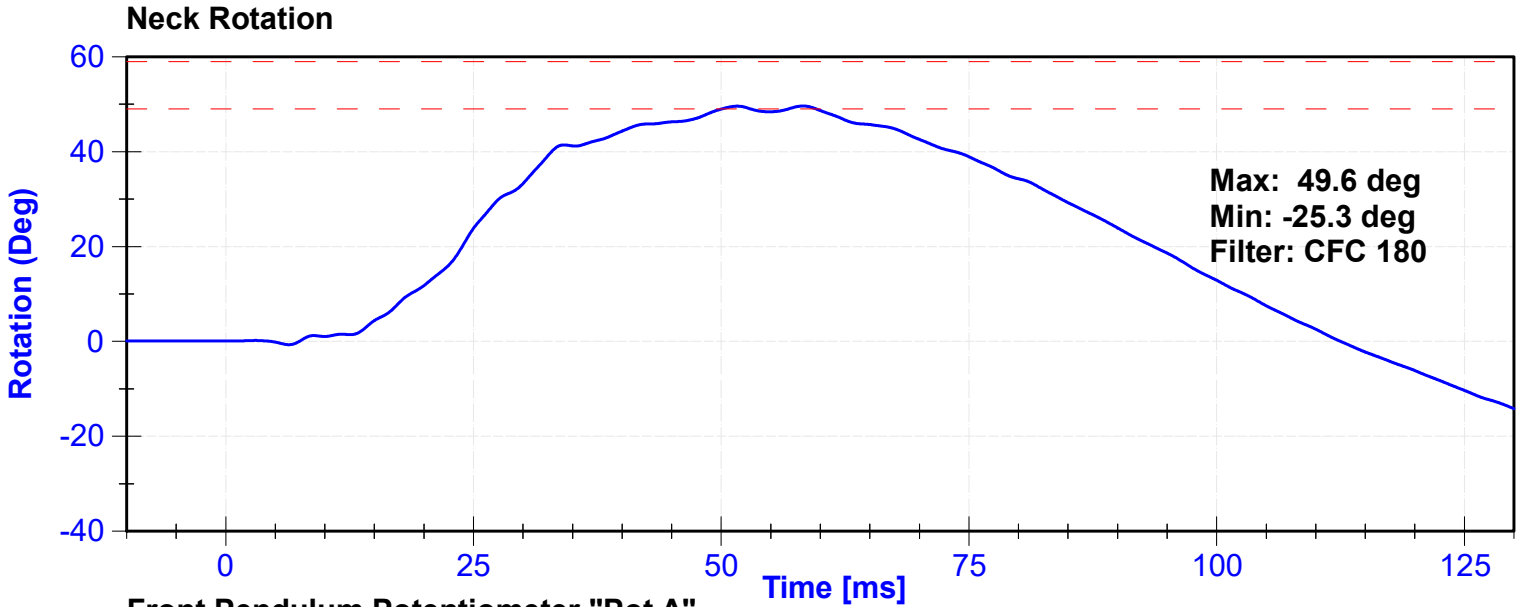
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	21	Pass
Velocity	3.3	3.5	m/s	3.41	Pass
Lateral Neck Rotation	49	59	deg	49.6	Pass
Time at Maximum Rotation	54	66	ms	58.3	Pass
Time of Rotation Decay from Maximum	53	88	ms	54.3	Pass
Pendulum Velocity Overall Corridor	Lower Boundary <sup>1</sup>	Upper Boundary <sup>2</sup>	m/s	See Plot <sup>3</sup>	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16503	10/26/2022	10/26/2023
Front Pendulum Potentiometer	Sfernice	094	10/5/2022	10/5/2023
Headform Potentiometer	Sfernice	095	10/5/2022	10/5/2023



<sup>1,2</sup> Upper and lower boundaries specified in Appendix I



# Appendix I

<sup>2</sup> Upper Boundary Corridor		<sup>1</sup> Lower Boundary Corridor	
Time (ms)	Velocity (m/s)	Time (ms)	Velocity (m/s)
1.0	0.00	0.0	-0.05
3.0	-0.25	2.5	-0.375
14.0	-3.20	13.5	-3.7
		17.0	-3.7

ATD Manufacturer	FTSS	Test Technician	D. Sakona
ATD Serial Number	F033	Laboratory Supervisor	C. Mantell

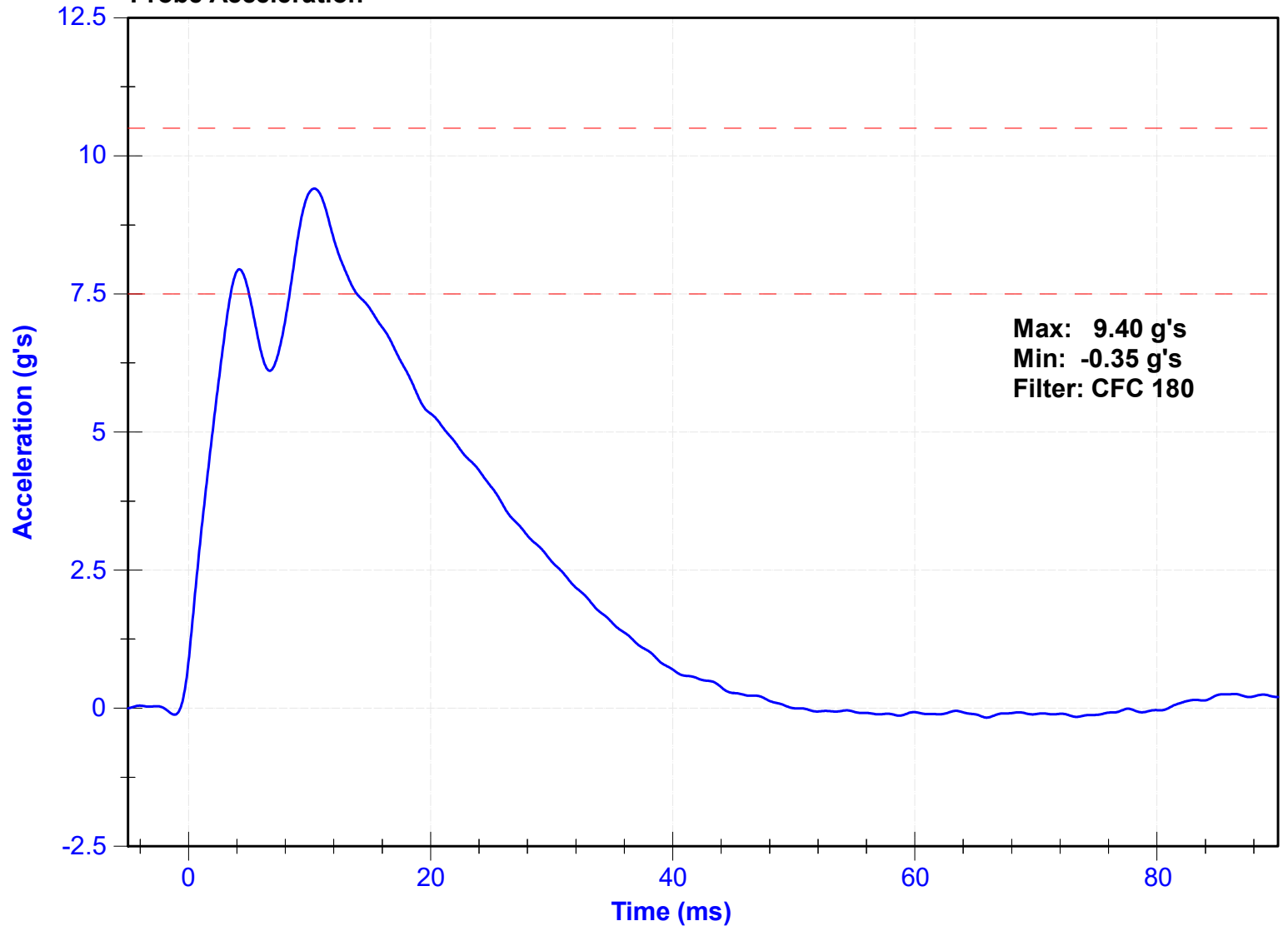
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	20.5	Pass
Velocity	4.2	4.4	m/s	4.34	Pass
Probe Acceleration	7.5	10.5	g's	9.40	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	18494	11/5/2022	5/4/2023

**Probe Acceleration**



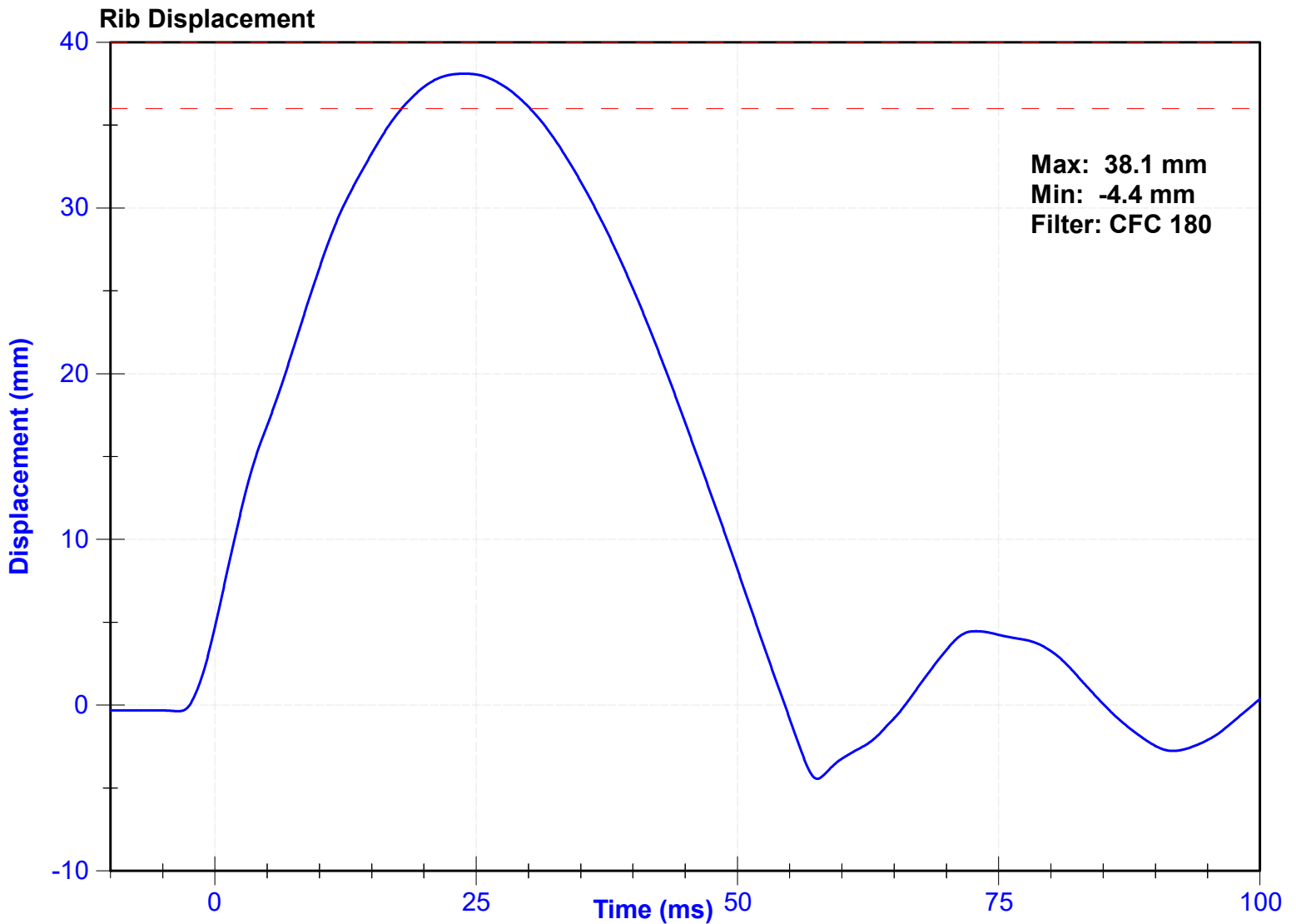
ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	21	Pass
Rib Displacement	36	40	mm	38.1	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	179GFE	7/25/2022	1/23/2023



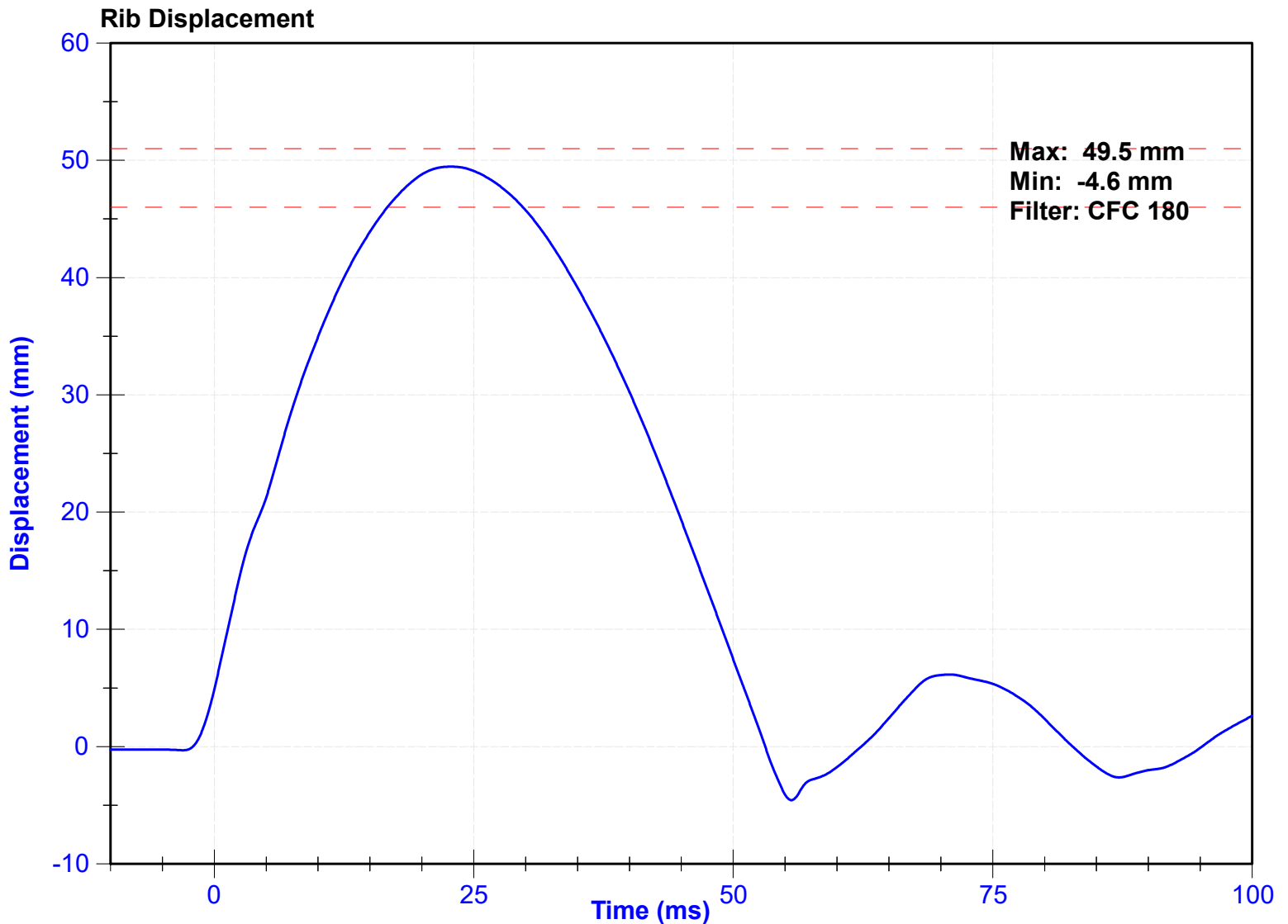
ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	21	Pass
Rib Displacement	46	51	mm	49.5	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	179GFE	7/25/2022	1/23/2023



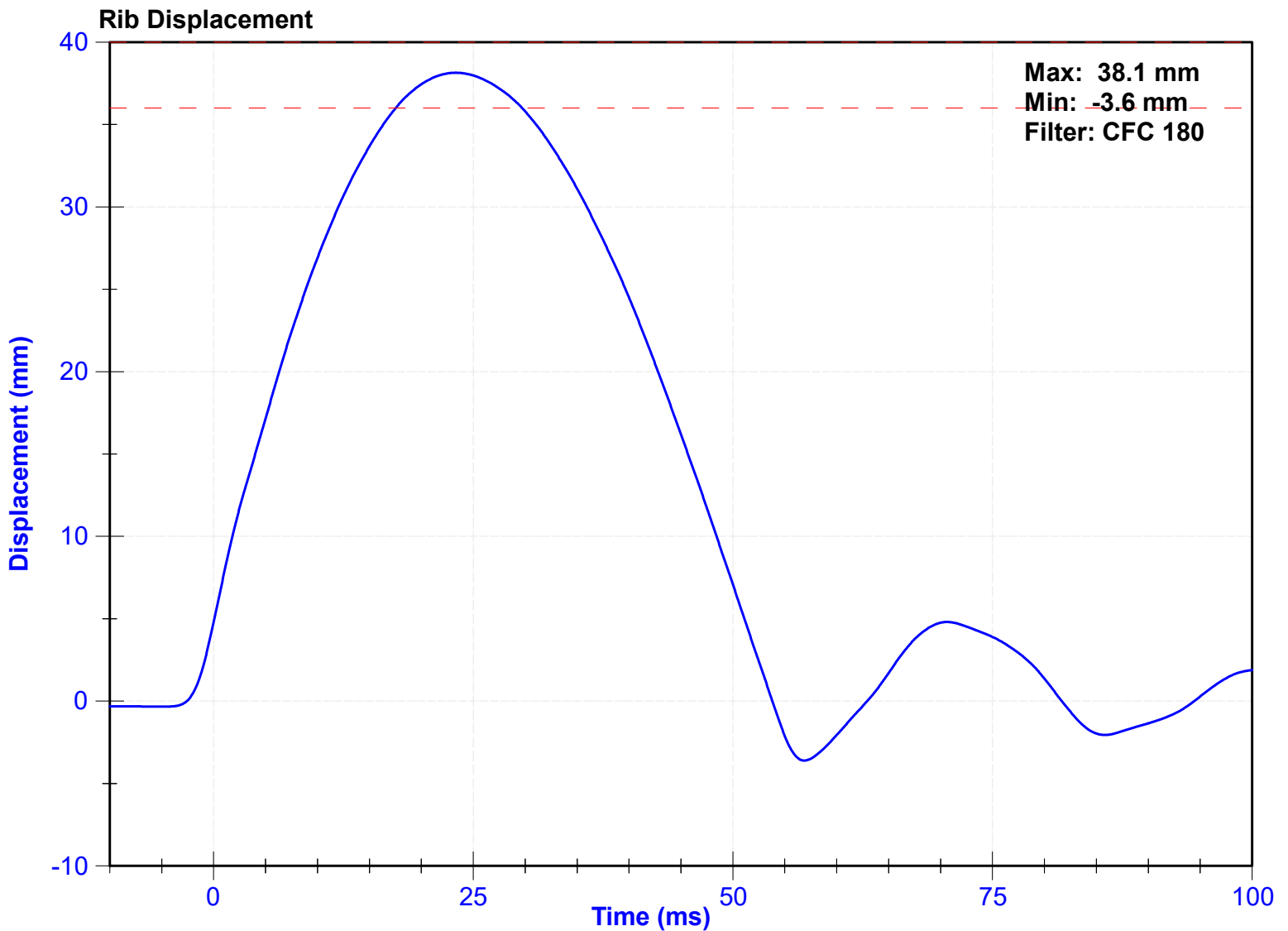
ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	21	Pass
Rib Displacement	36	40	mm	38.1	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	185GFE	7/21/2022	1/19/2023



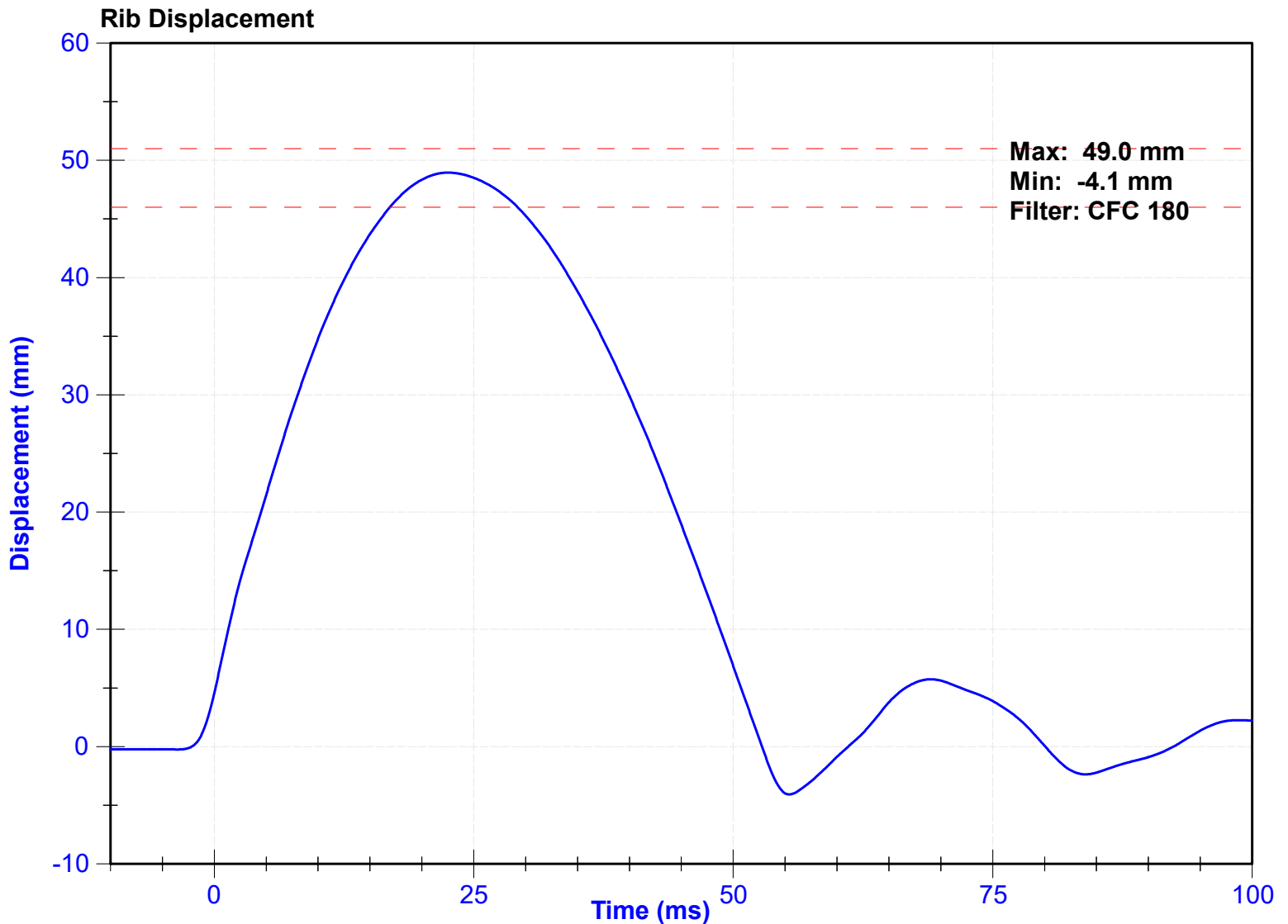
ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	21	Pass
Rib Displacement	46	51	mm	49.0	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	185GFE	7/21/2022	1/19/2023



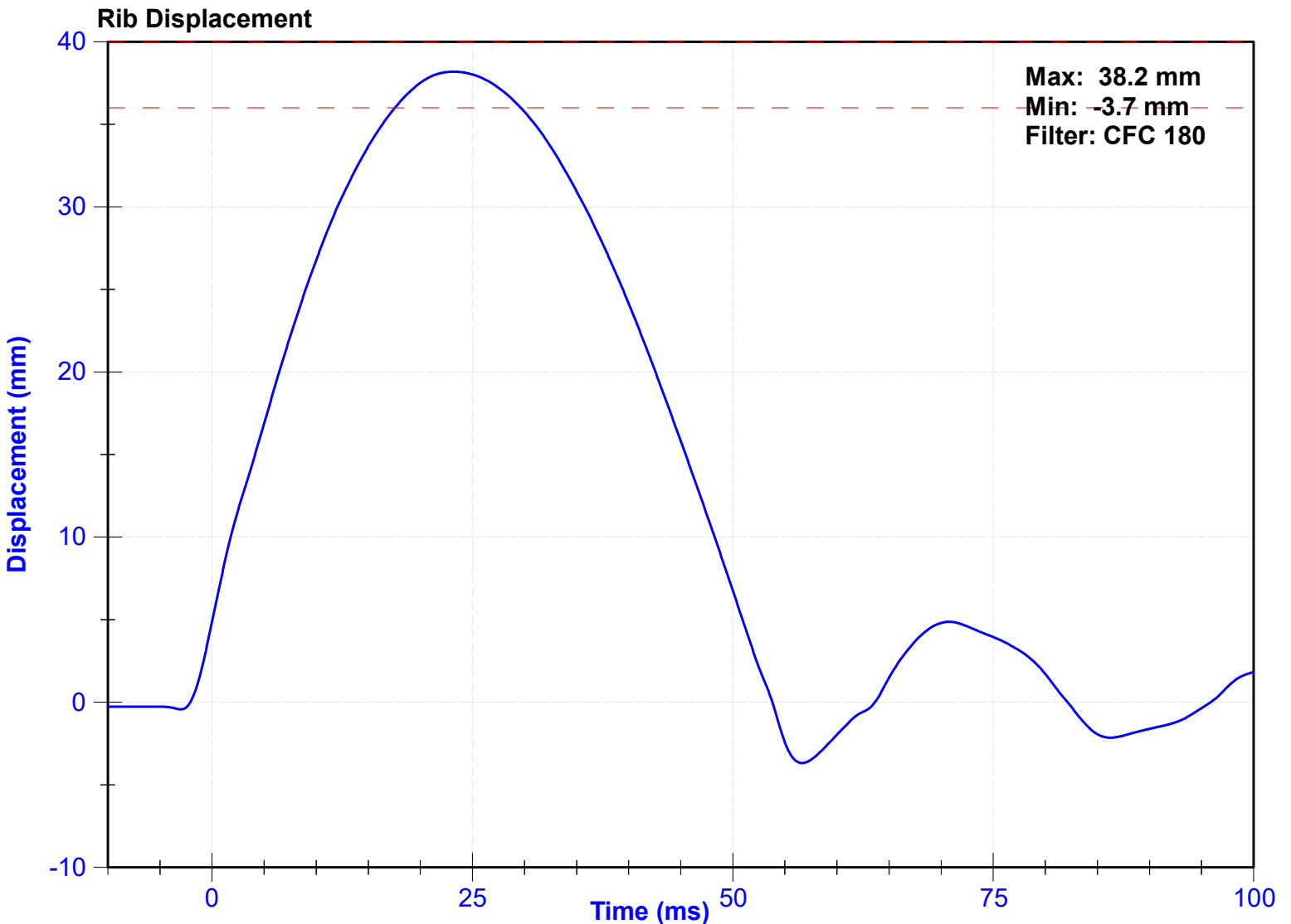
ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	21	Pass
Rib Displacement	36	40	mm	38.2	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	178GFE	7/21/2022	1/19/2023



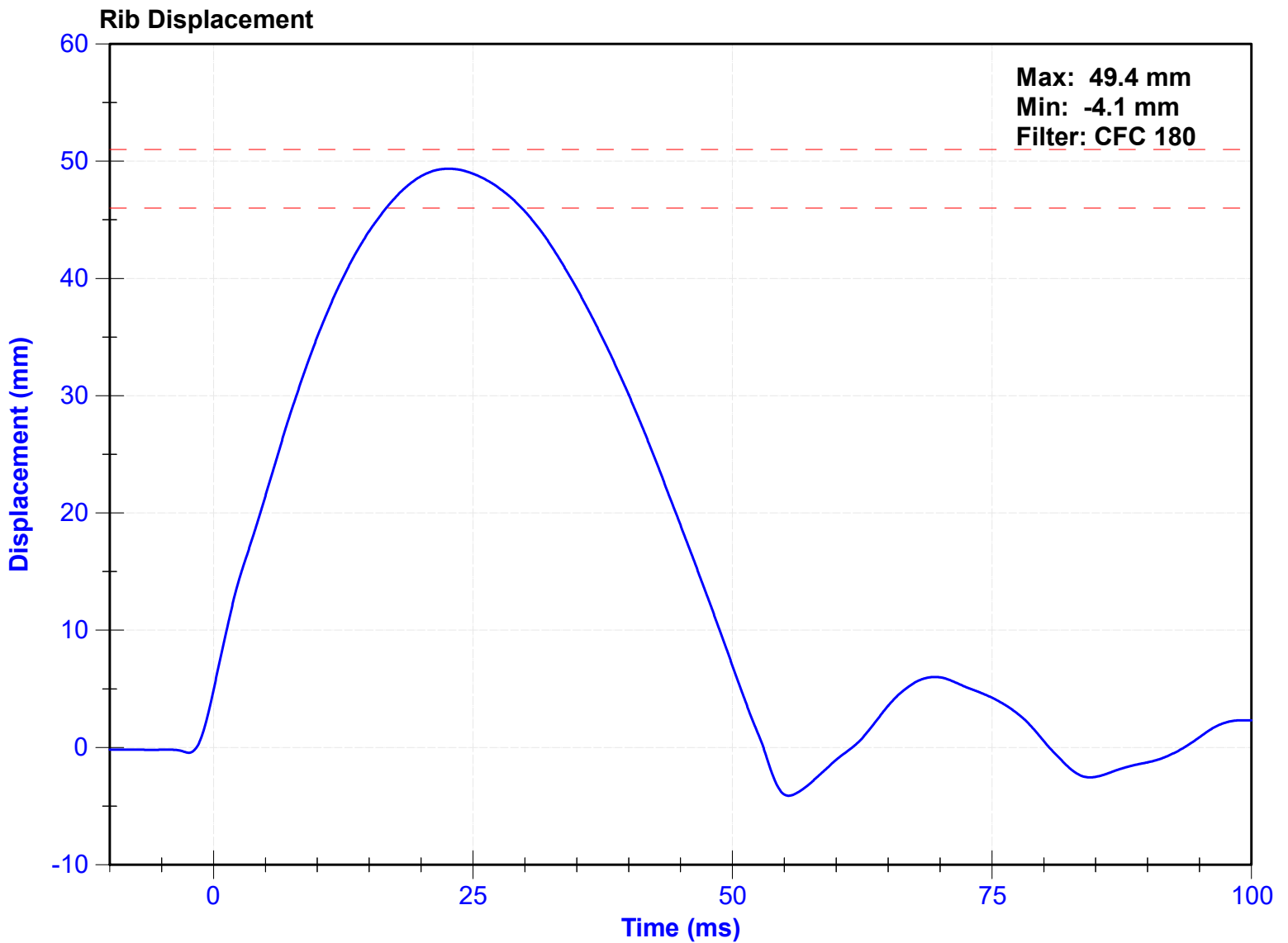
ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	21	Pass
Rib Displacement	46	51	mm	49.4	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	178GFE	7/21/2022	1/19/2023



ATD Manufacturer	FTSS	Test Technician	D. Sakona
ATD Serial Number	F033	Laboratory Supervisor	C. Mantell

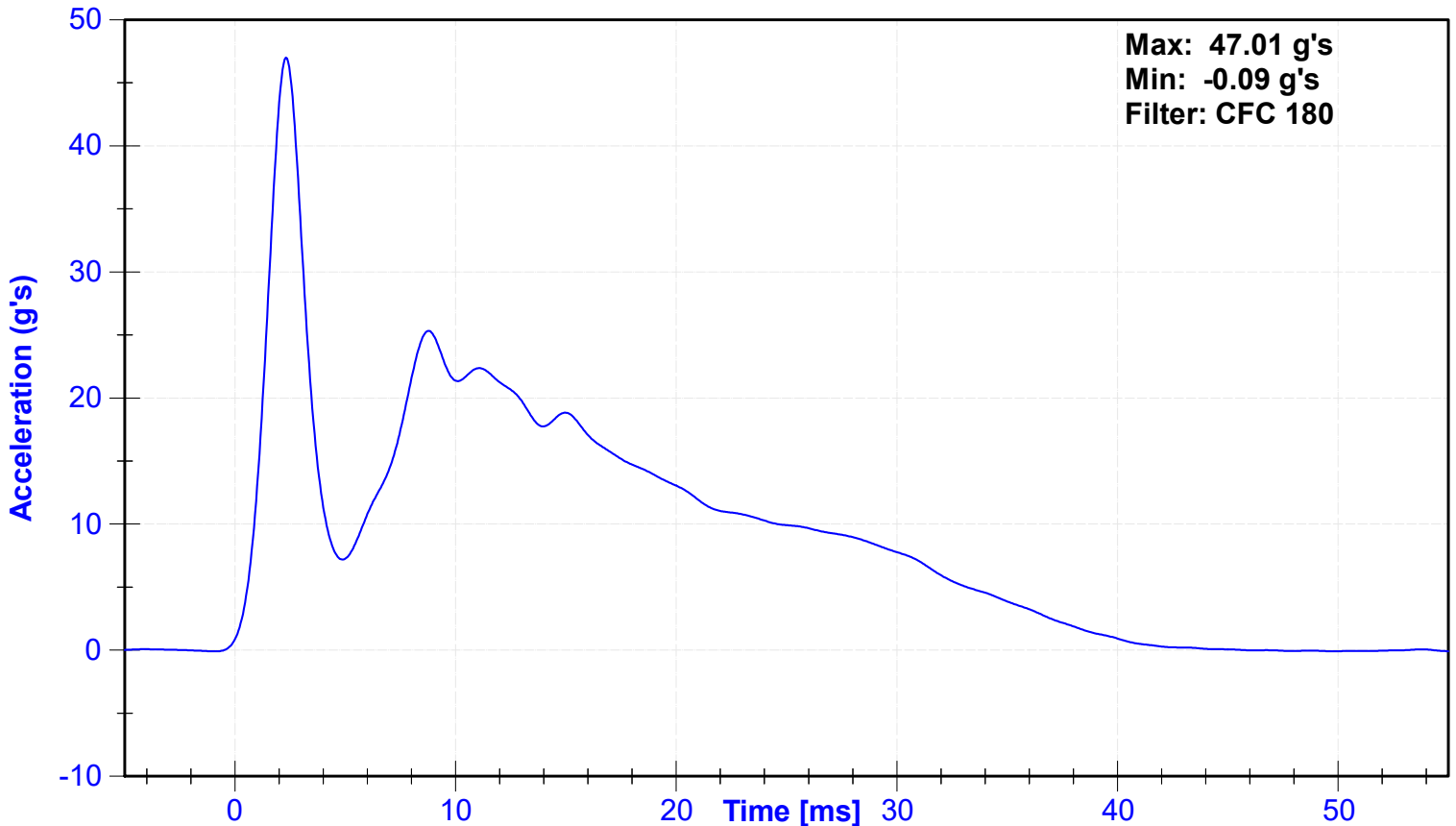
**Results**

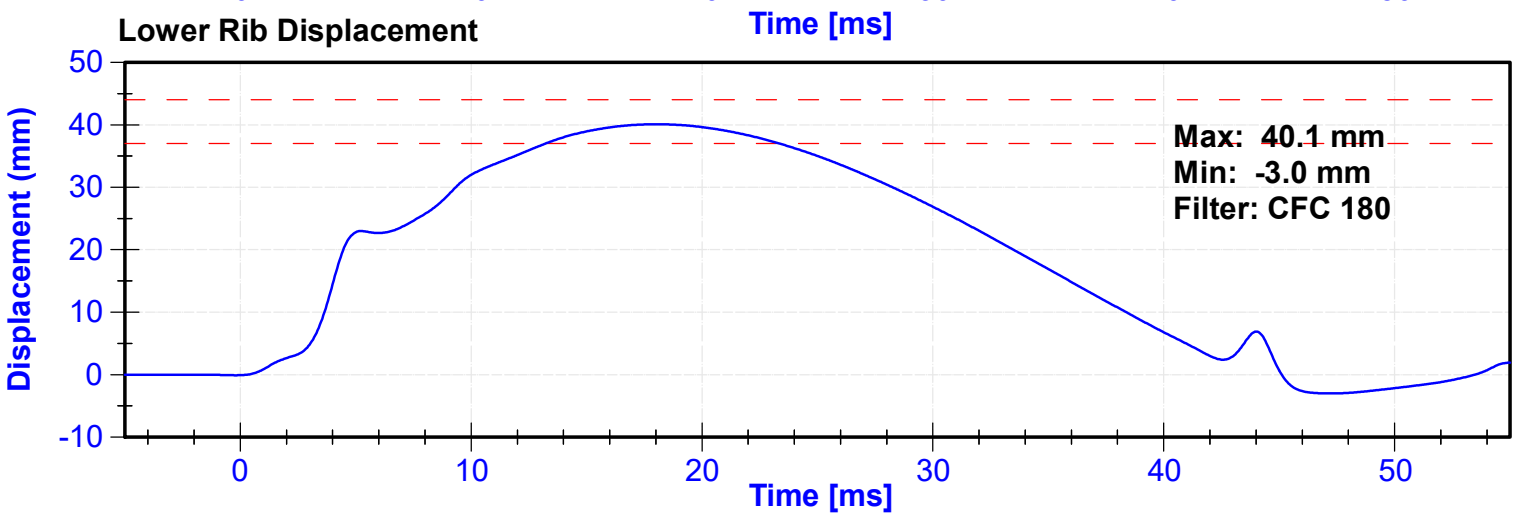
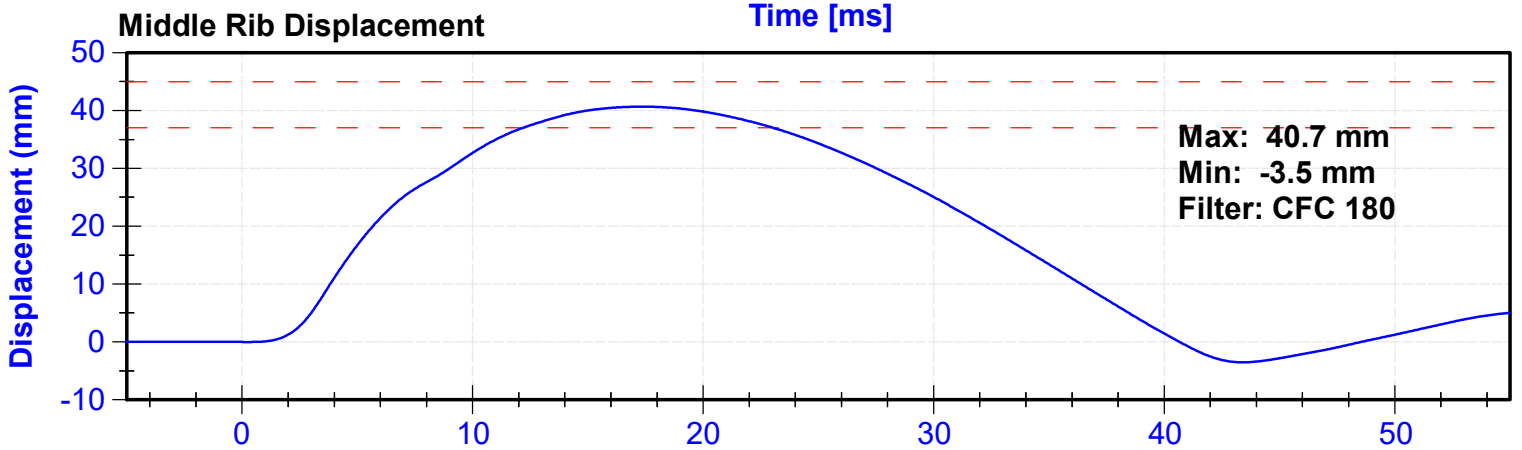
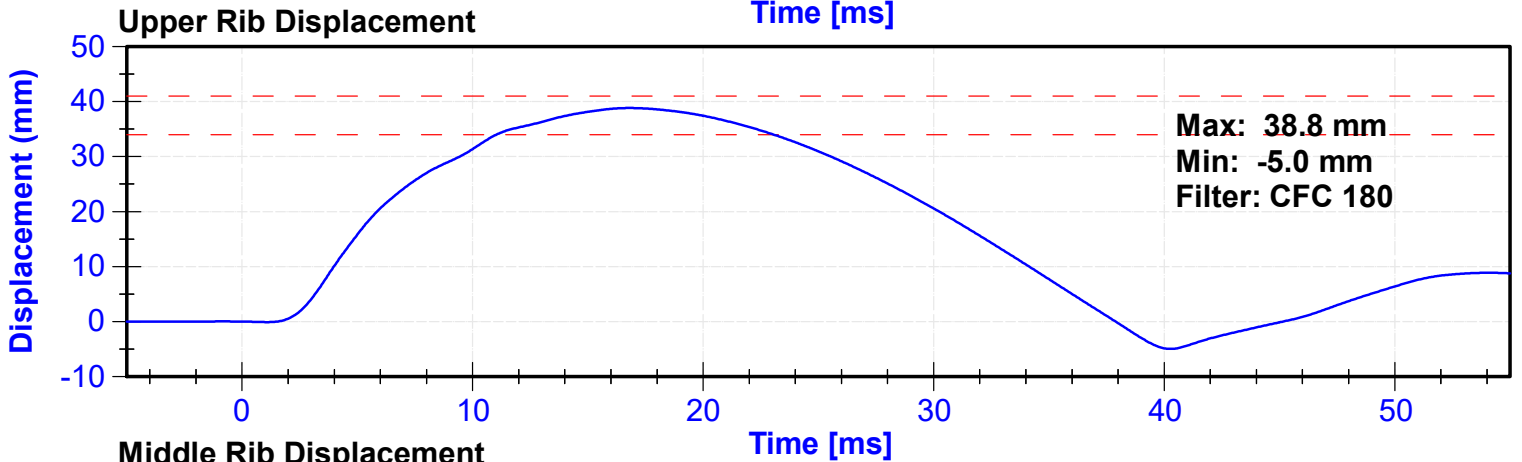
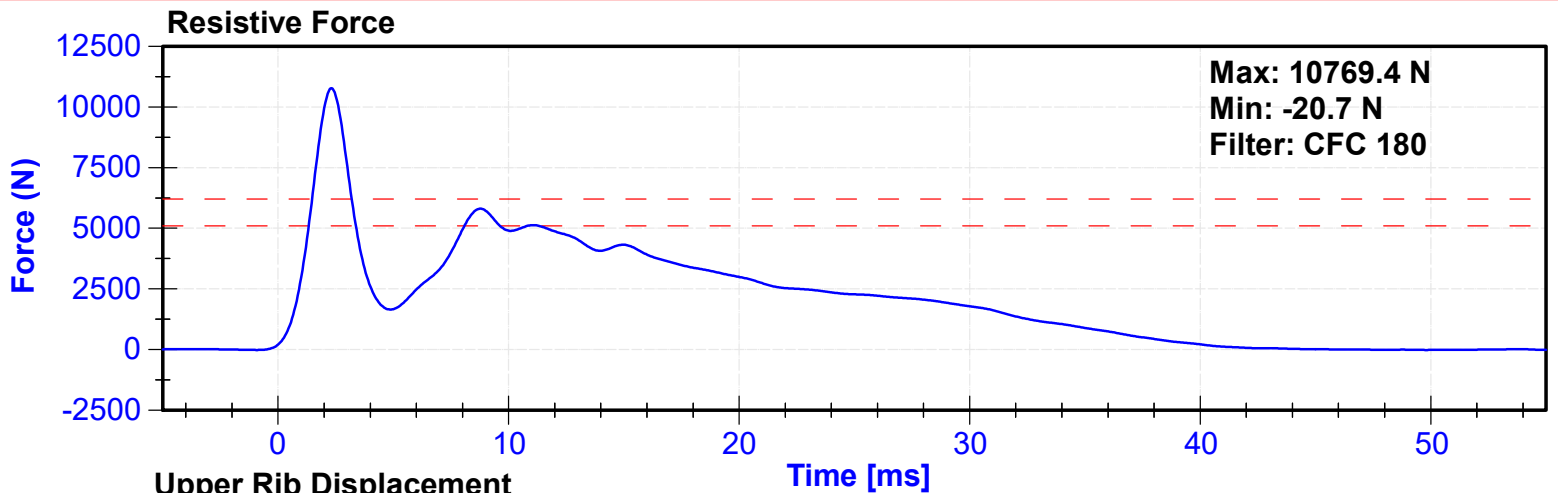
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	20.5	Pass
Velocity	5.4	5.6	m/s	5.52	Pass
Resistive Force after 6ms	5100	6200	N	5804.9	Pass
Upper Thorax Rib Deflection	34	41	mm	38.8	Pass
Mid Thorax Rib Deflection	37	45	mm	40.7	Pass
Lower Thorax Rib Deflection	37	44	mm	40.1	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	18494	11/5/2022	5/4/2023
Upper Thorax Rib Potentiometer	Honeywell	179GFE	7/25/2022	1/23/2023
Middle Thorax Rib Potentiometer	Honeywell	185GFE	7/21/2022	1/19/2023
Lower Thorax Rib Potentiometer	Honeywell	178GFE	7/21/2022	1/19/2023

**Probe Acceleration**





ATD Manufacturer	FTSS	Test Technician	Z.Schneider
ATD Serial Number	F033	Laboratory Supervisor	C. Mantell

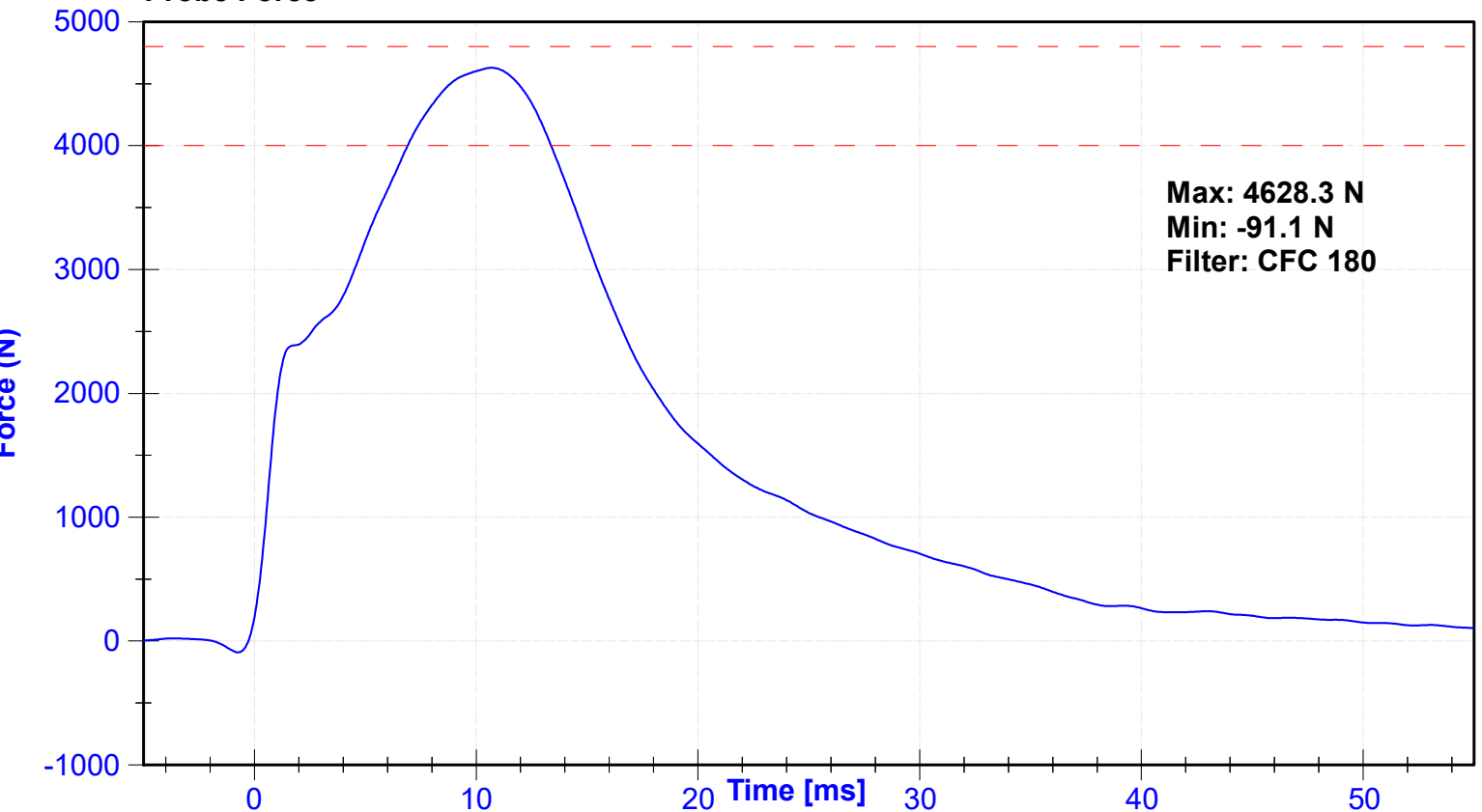
**Results**

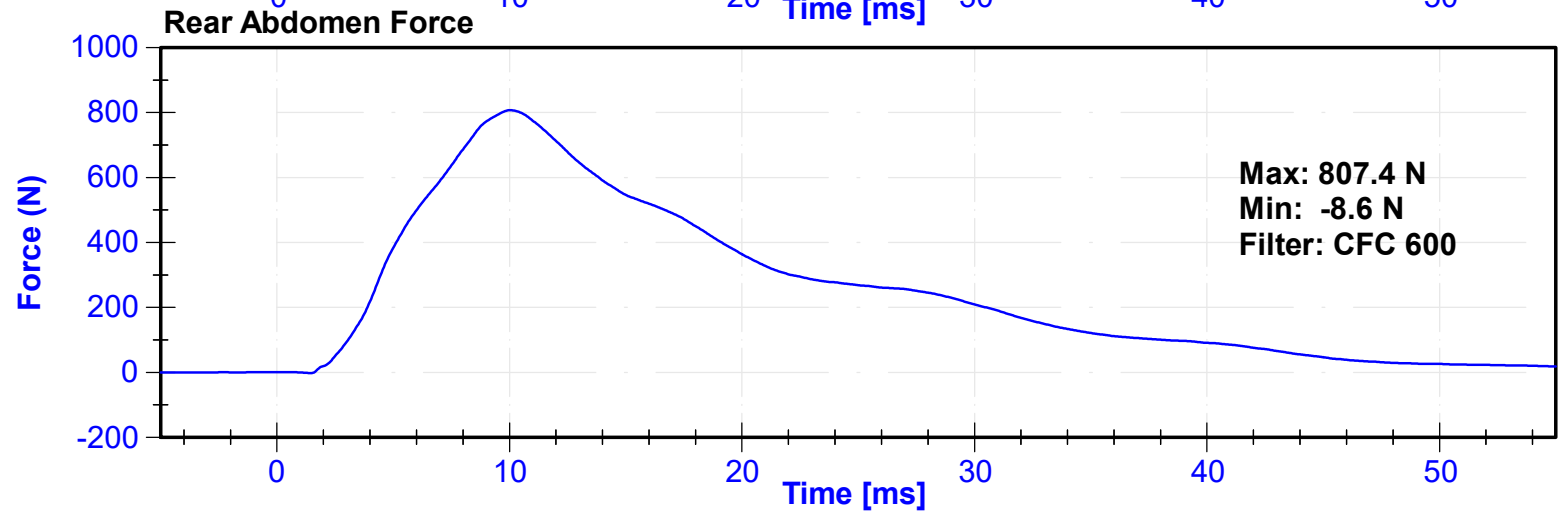
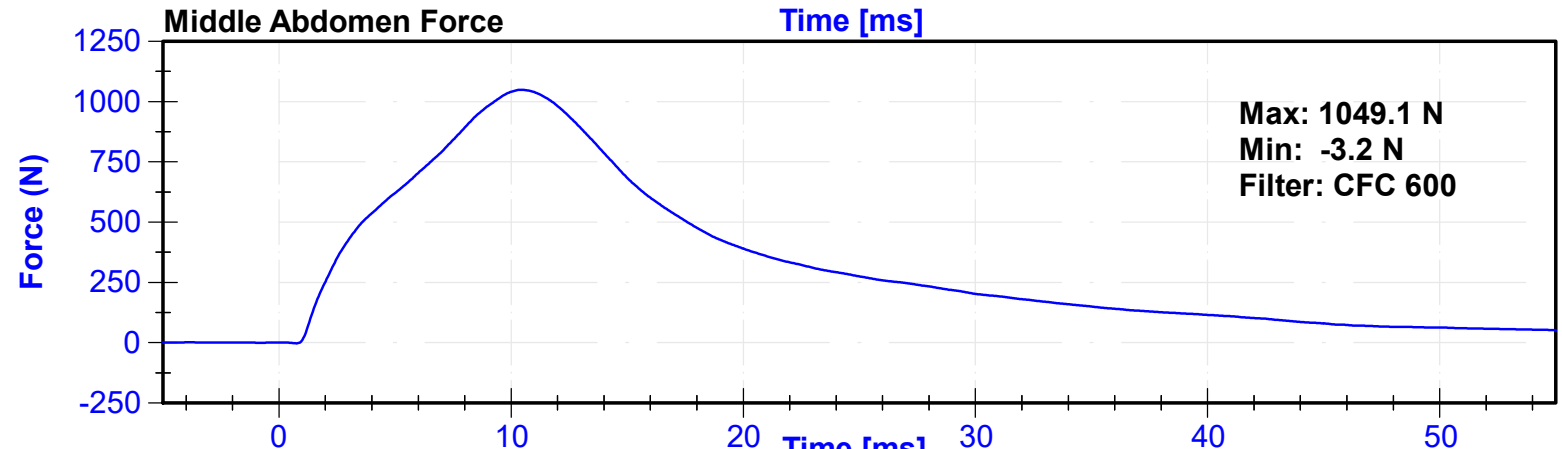
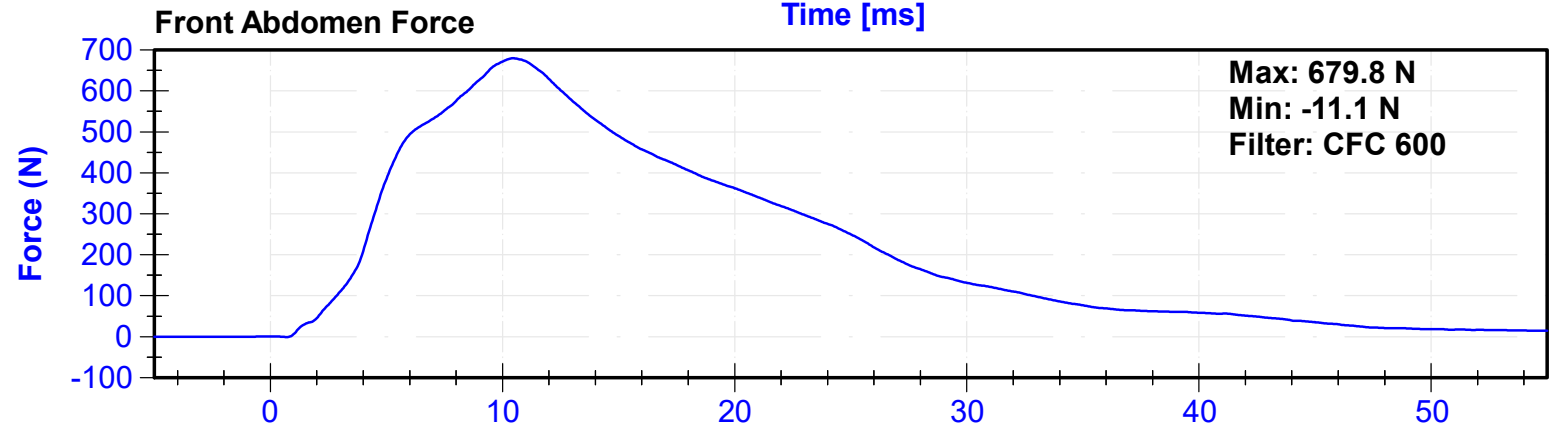
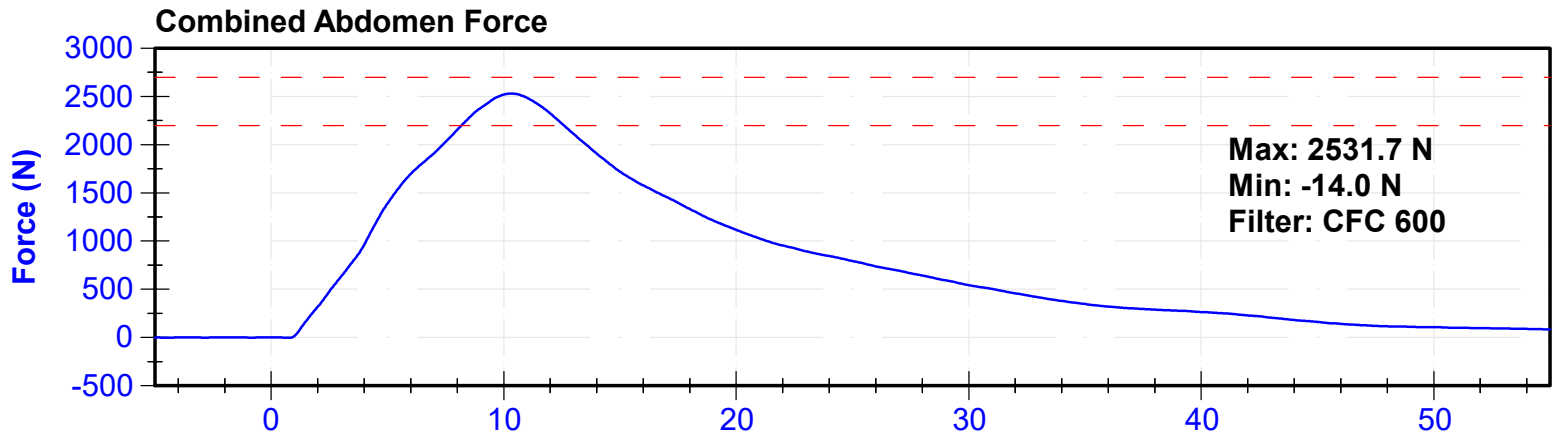
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	20.5	Pass
Velocity	3.9	4.1	m/s	4.06	Pass
Combined Abdomen Force	2200	2700	N	2531.7	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	10.30	Pass
Resistive Probe Force	4000	4800	N	4628.3	Pass
Time at Peak Resistive Force	10.6	13.0	ms	10.70	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18494	11/5/2022	5/4/2023
Front Abdomen Load Cell	Denton	1509	8/12/2022	8/12/2023
Middle Abdomen Load Cell	Denton	1508	8/12/2022	8/12/2023
Rear Abdomen Load Cell	Denton	1507	8/12/2022	8/12/2023

**Probe Force**





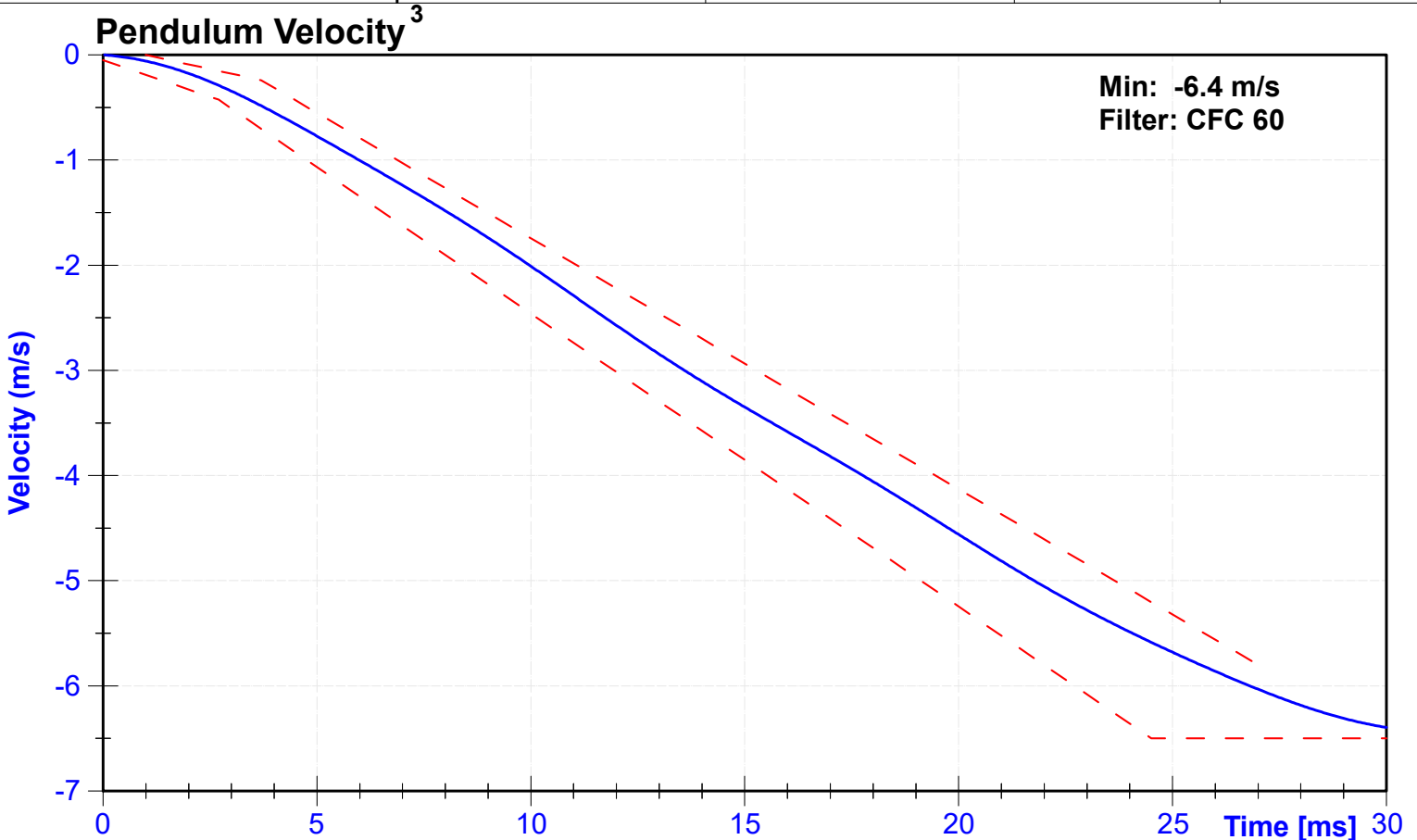
ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	F033	Laboratory Supervisor	C. Mantell

**Results**

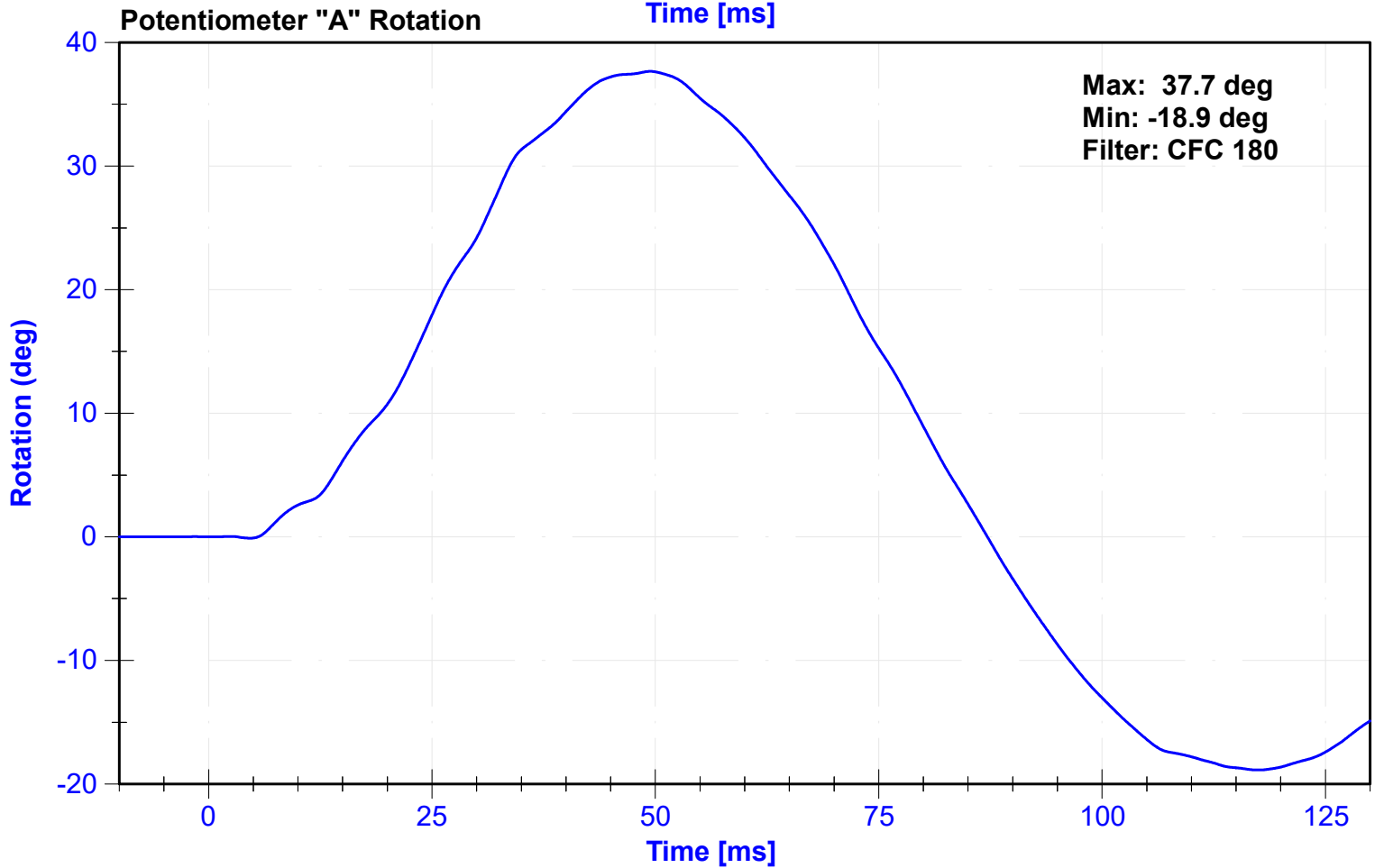
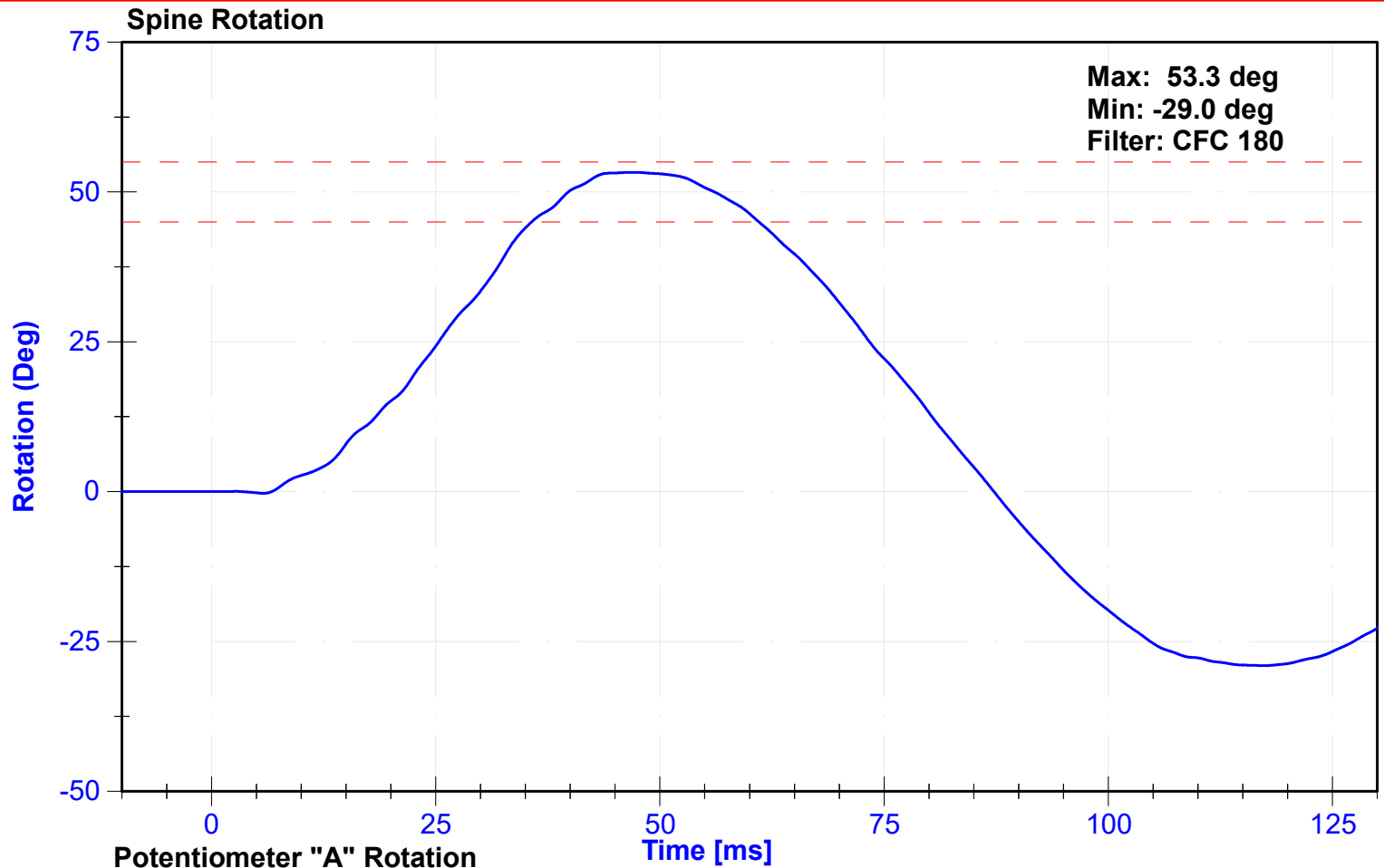
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	21	Pass
Velocity	5.95	6.15	m/s	6.067	Pass
Lateral Spine Rotation	45	55	deg	53.3	Pass
Time at Maximum Rotation	39	53	ms	47.2	Pass
Time of Decay to Zero Degrees	37	57	ms	40.1	Pass
Pendulum Velocity Overall Corridor	Lower Boundary <sup>1</sup>	Upper Boundary <sup>2</sup>	m/s	See Plot <sup>3</sup>	Pass

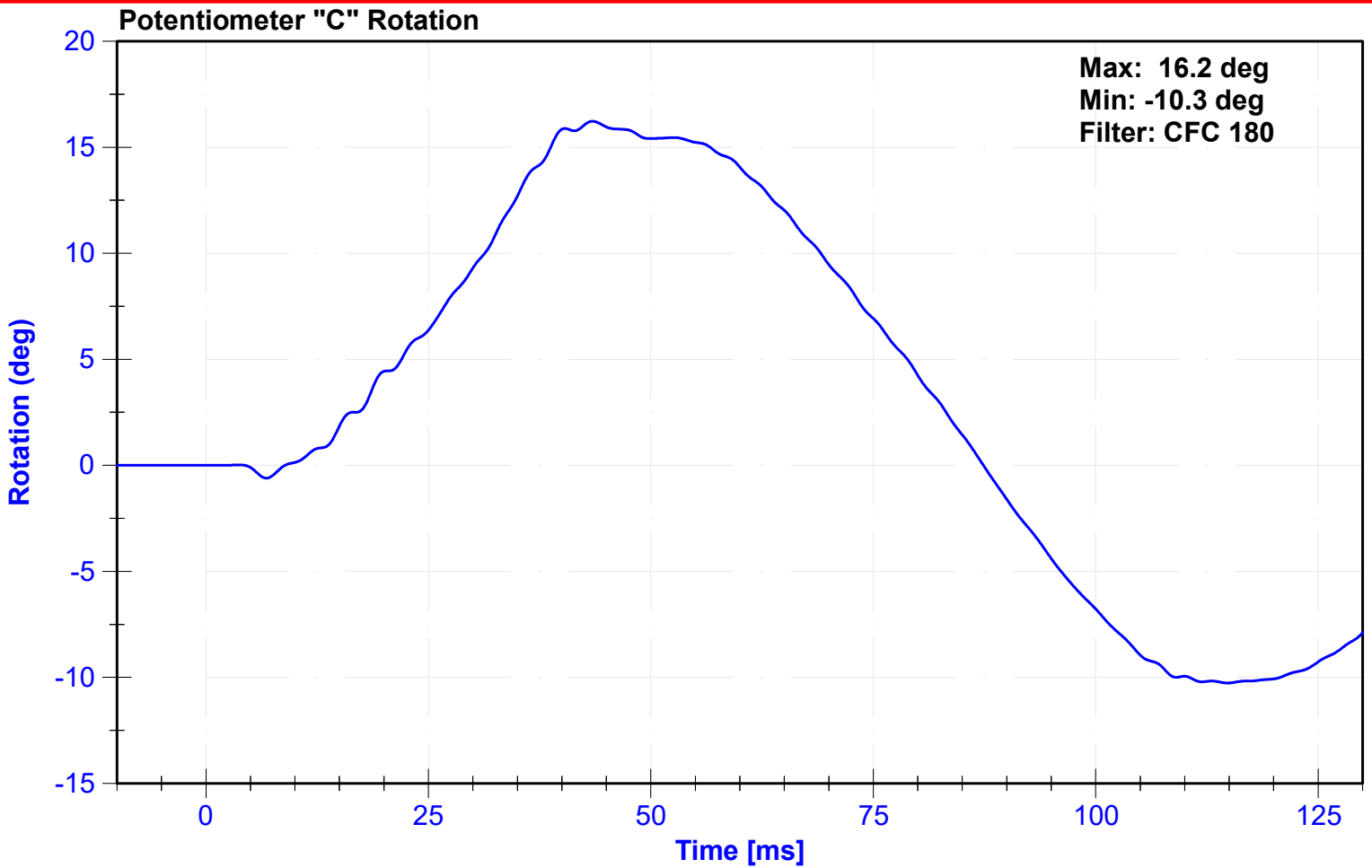
**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16503	10/26/2022	10/26/2023
Pendulum "A" Potentiometer	Sfernice	094	10/5/2022	10/5/2023
Condyle "B" Potentiometer	Sfernice	095	10/5/2022	10/5/2023



<sup>1,2</sup> Upper and lower boundaries specified in Appendix I





## Appendix I

<sup>2</sup> Upper Boundary Corridor		<sup>1</sup> Lower Boundary Corridor	
Time (ms)	Velocity (m/s)	Time (ms)	Velocity (m/s)
1.0	0.00	0.0	-0.05
3.7	-0.24	2.7	-0.425
27.0	-5.80	24.5	-6.5
		30.0	-6.5

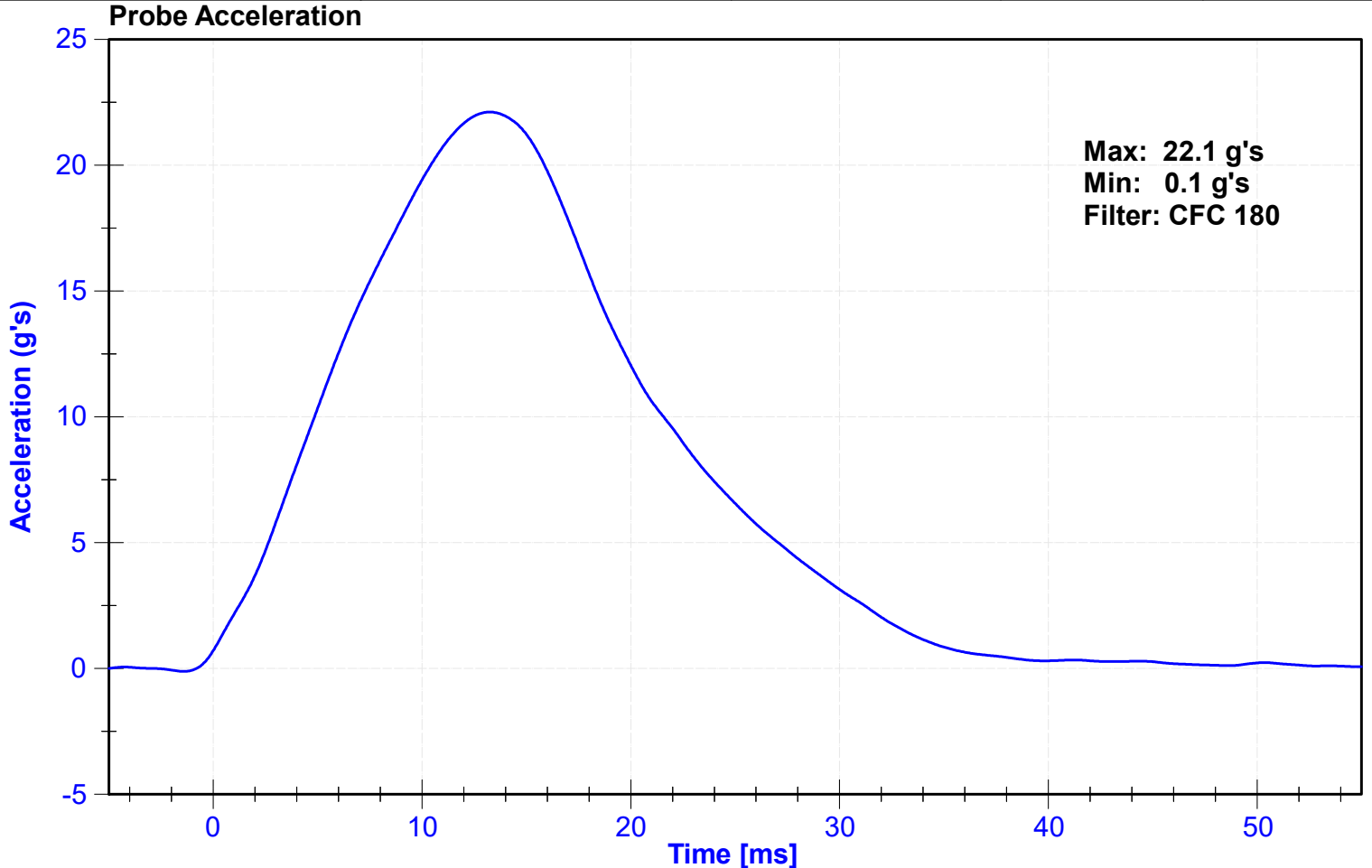
ATD Manufacturer	FTSS	Test Technician	D. Sakona
ATD Serial Number	F033	Laboratory Supervisor	C. Mantell

**Results**

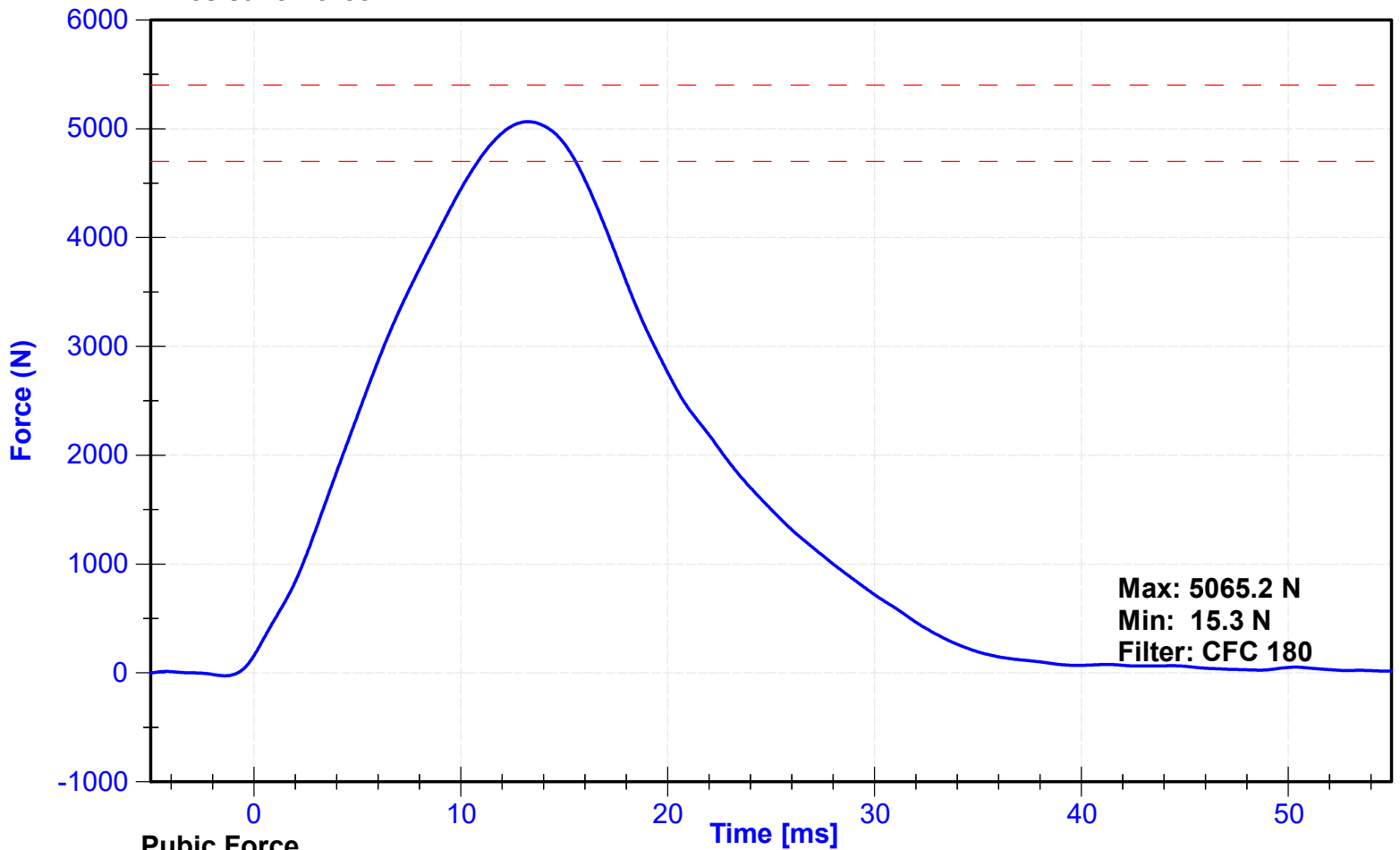
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	20.5	Pass
Velocity	4.2	4.4	m/s	4.31	Pass
Resistive Force	4700	5400	N	5065.2	Pass
Time at Peak Resistive Force	11.8	16.1	ms	13.25	Pass
Pubic Force	-1590	-1230	N	-1244.4	Pass
Time at Peak Pubic Force	12.2	17.0	ms	13.80	Pass

**Transducer Calibrations**

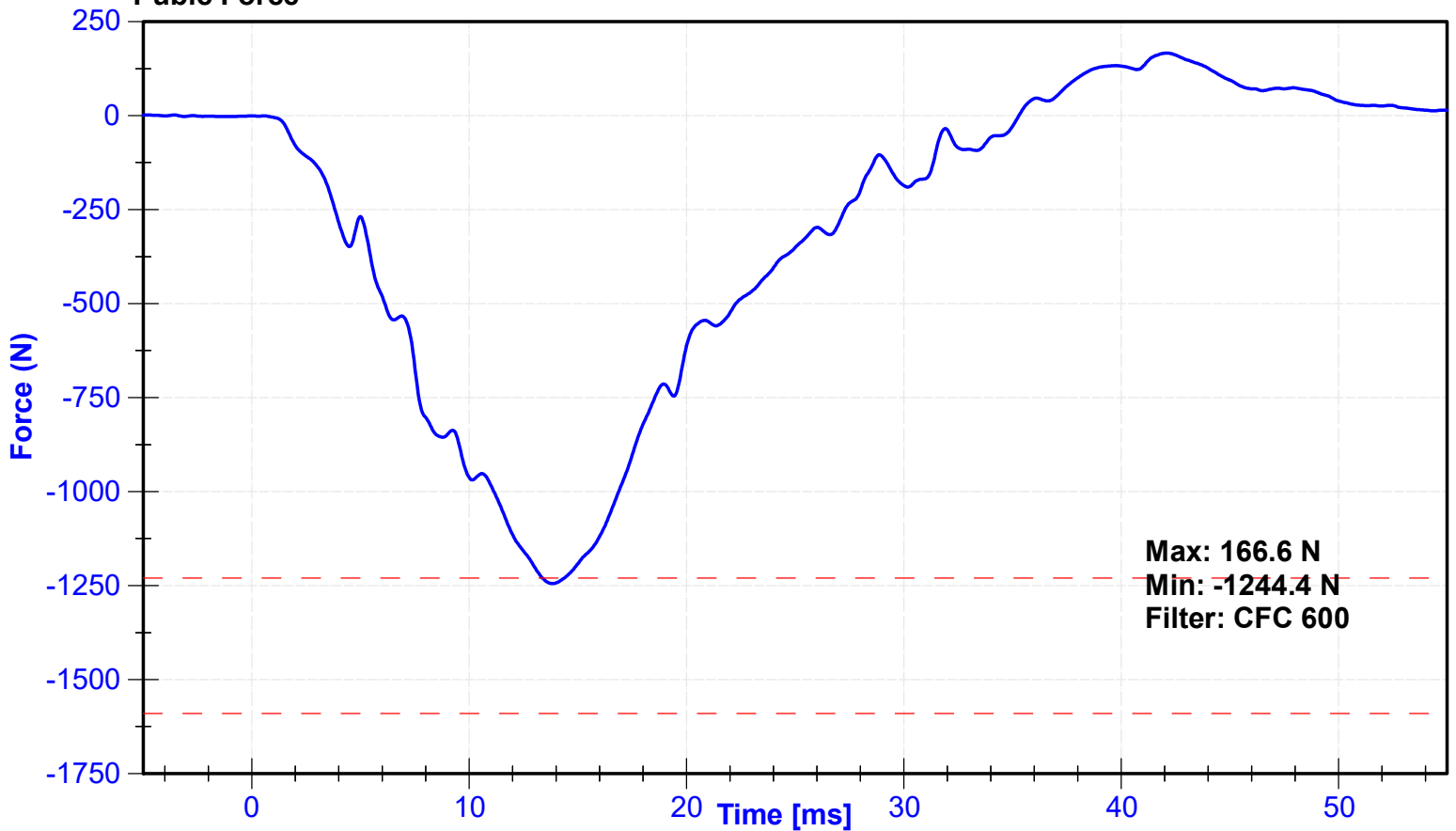
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18494	11/5/2022	5/4/2023
Pubic Load Cell	Denton	459-FY	6/14/2022	6/14/2023



### Resistive Force



### Pubic Force



**CALIBRATION TEST RESULTS**

**POST-TEST**

**SID-IIS 5<sup>TH</sup> PERCENTILE FEMALE – PASSENGER ATD**

**SERIAL NO:300**

**(CONFIGURED FOR LEFT SIDE IMPACT)**

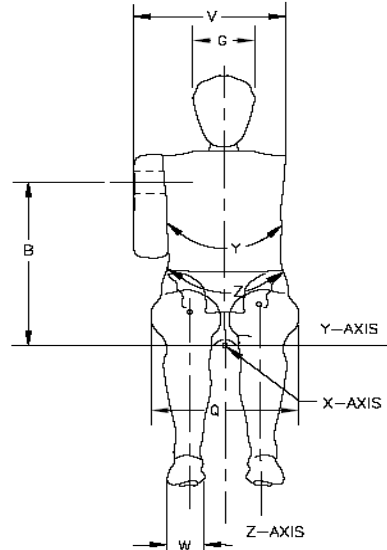
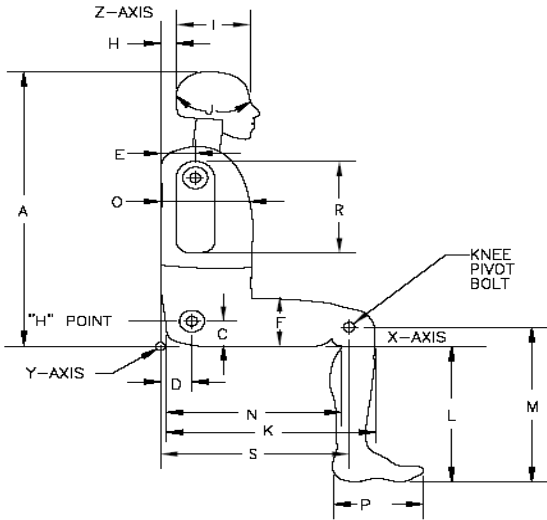


External Measurements - SID-IIs

Technician: K. Brogan

Date: 01/10/2023

Dummy Serial Number: 300



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	782	Pass
B	Shoulder Pivot Height	437	453	444	Pass
C	H-point Height	79	89	85	Pass
D	H-point from seatback	141	151	147	Pass
E	Shoulder Pivot from Backline	97	107	105	Pass
F	Thigh Clearance	119	135	125	Pass
G	Head Breadth	140	148	143	Pass
H	Head Back from Backline	40	46	42	Pass
I	Head Depth	178	188	185	Pass
J	Head Circumference	541	551	547	Pass
K	Buttock to Knee Length	514	540	528	Pass
L	Popliteal Height	343	369	359	Pass
M	Knee Pivot to floor height	392	409	401	Pass
N	Buttock Popliteal Length	416	442	432	Pass
O	Chest Depth w/o jacket	195	211	201	Pass
P	Foot Length	216	232	223	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	317	Pass
R	Arm Length	249	259	252	Pass
S	Knee Joint to seatback	477	493	487	Pass
V	Shoulder Width	341	357	350	Pass
W	Foot Width	78	94	86	Pass
Y	Chest Circumference w/jacket	851	881	877	Pass
Z	Waist Circumference	761	791	775	Pass

ATD Manufacturer	FTSS	Test Technician	D. Sakona
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

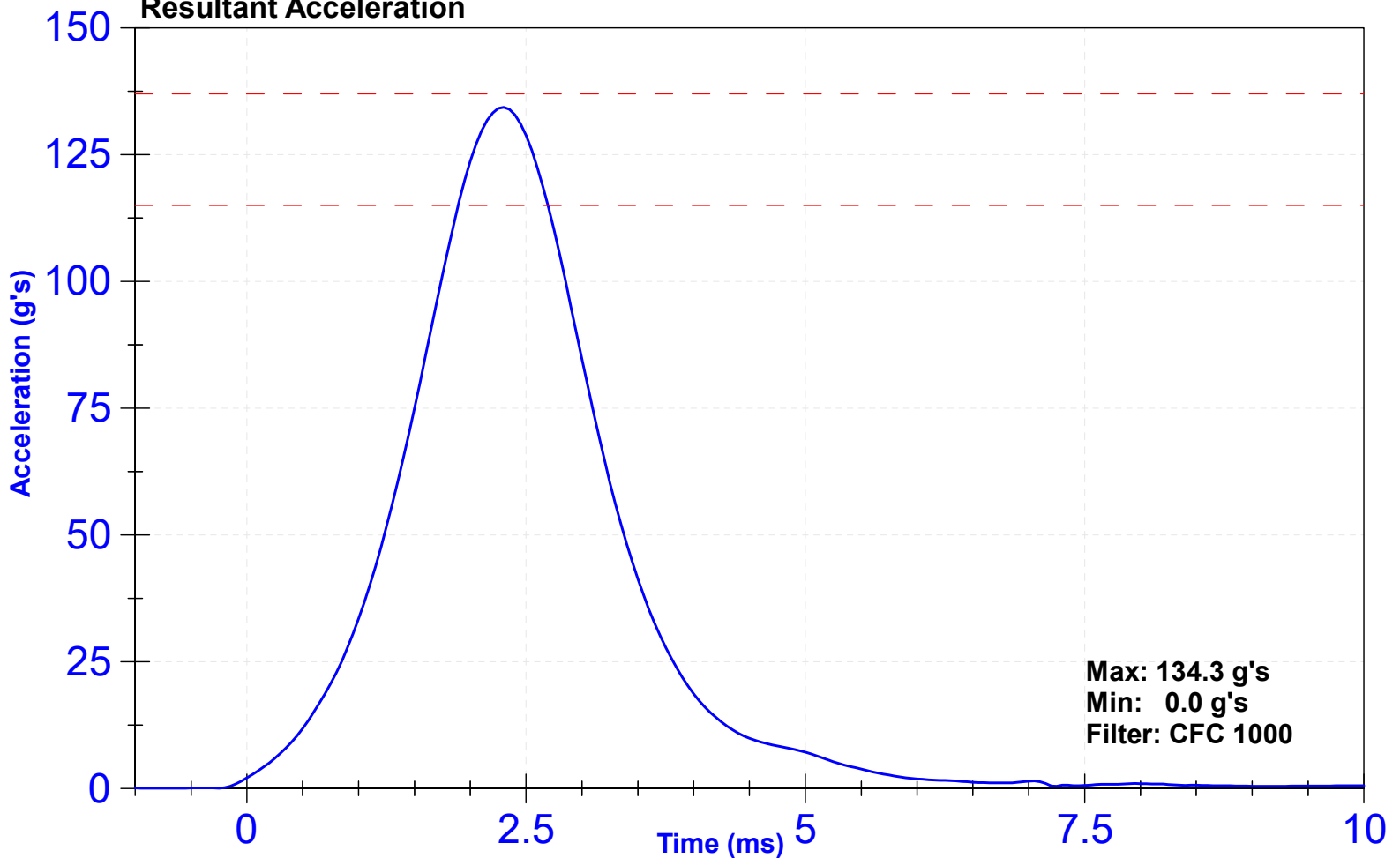
**Results**

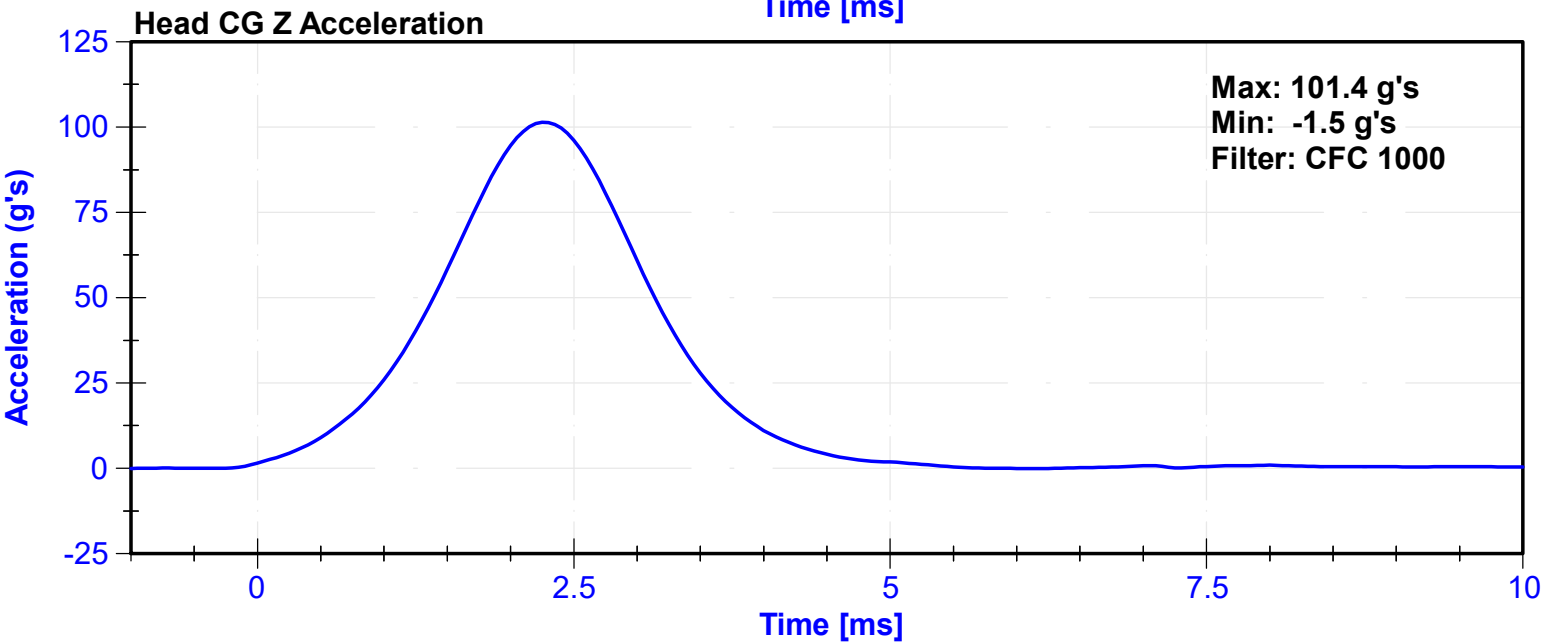
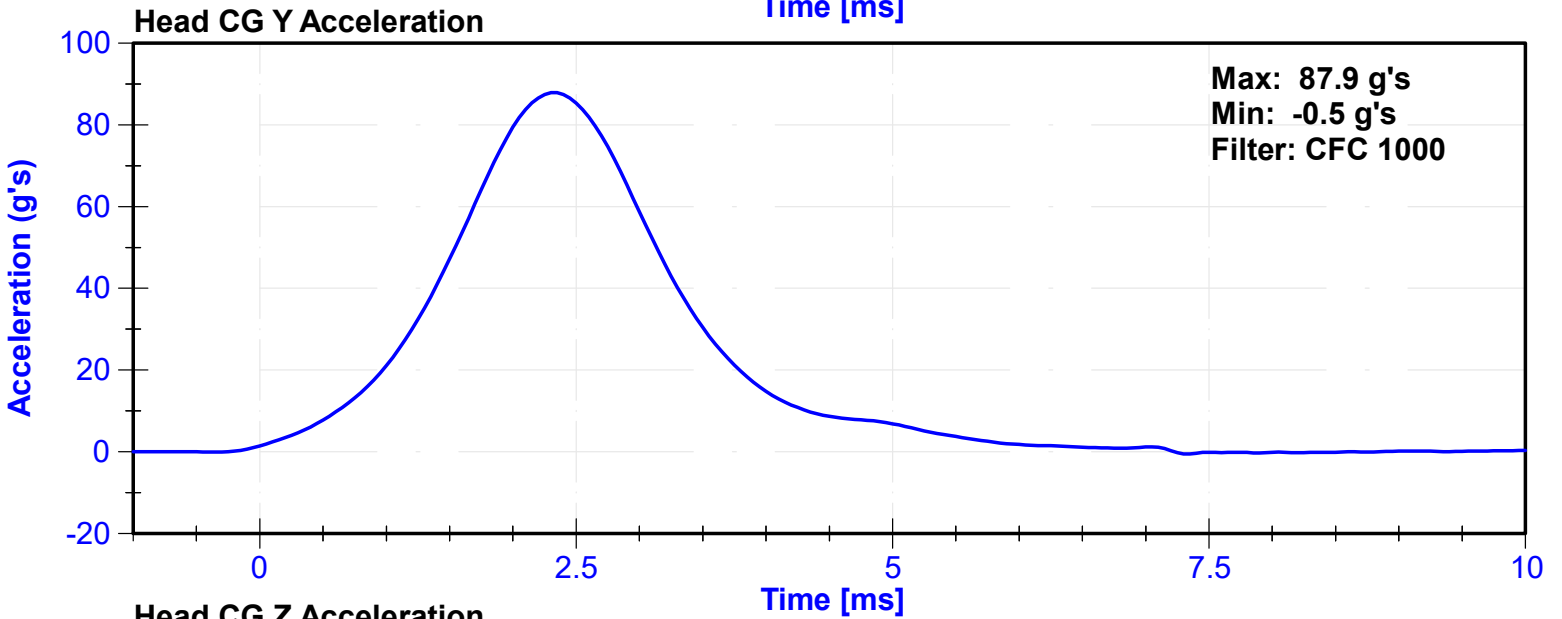
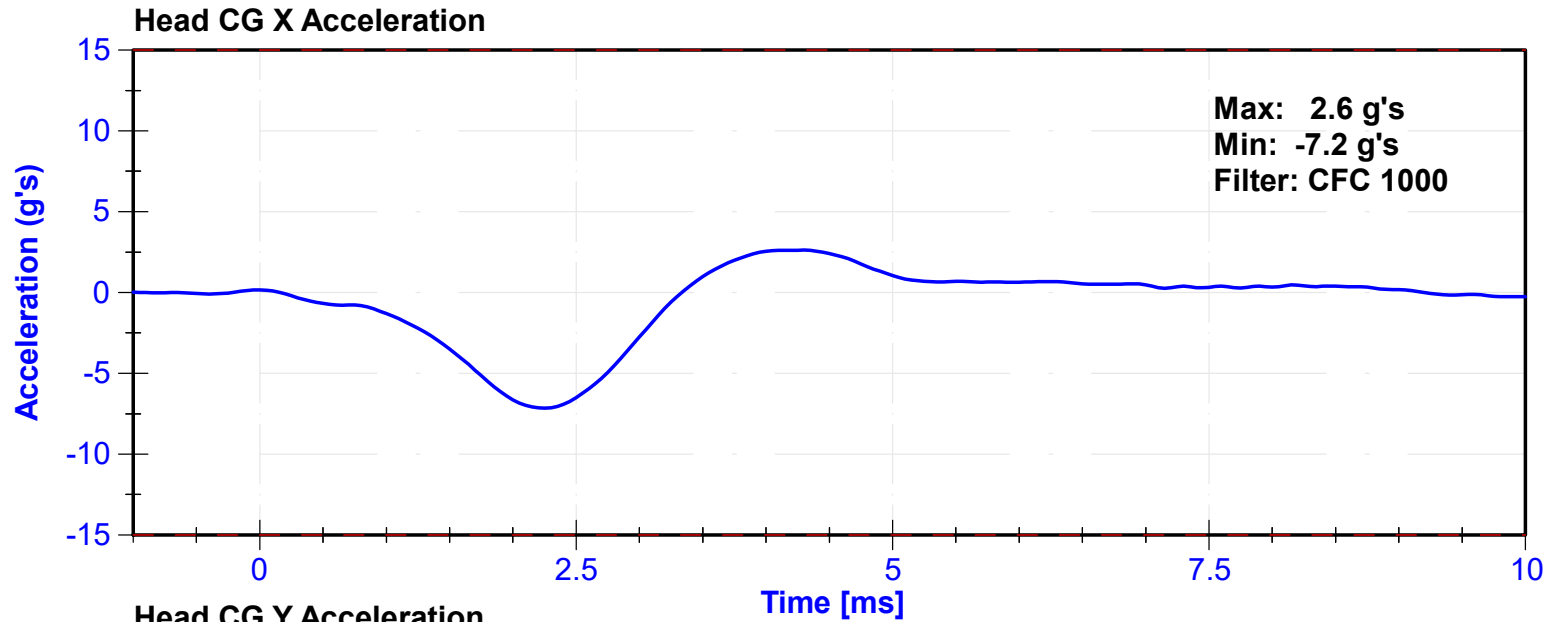
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	22.5	Pass
Resultant Acceleration	115	137	g's	134.3	Pass
Oscillation	0	15	%	1.1	Pass
Fore-Aft Acceleration	-15	15	g's	-7.2	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibratio Date	Calibratio Due Date
X Accelerometer	Endevco	P59018	10/3/2022	4/1/2023
Y Accelerometer	Endevco	P58777	10/3/2022	4/1/2023
Z Accelerometer	Endevco	P79189	10/3/2022	4/1/2023

**Resultant Acceleration**





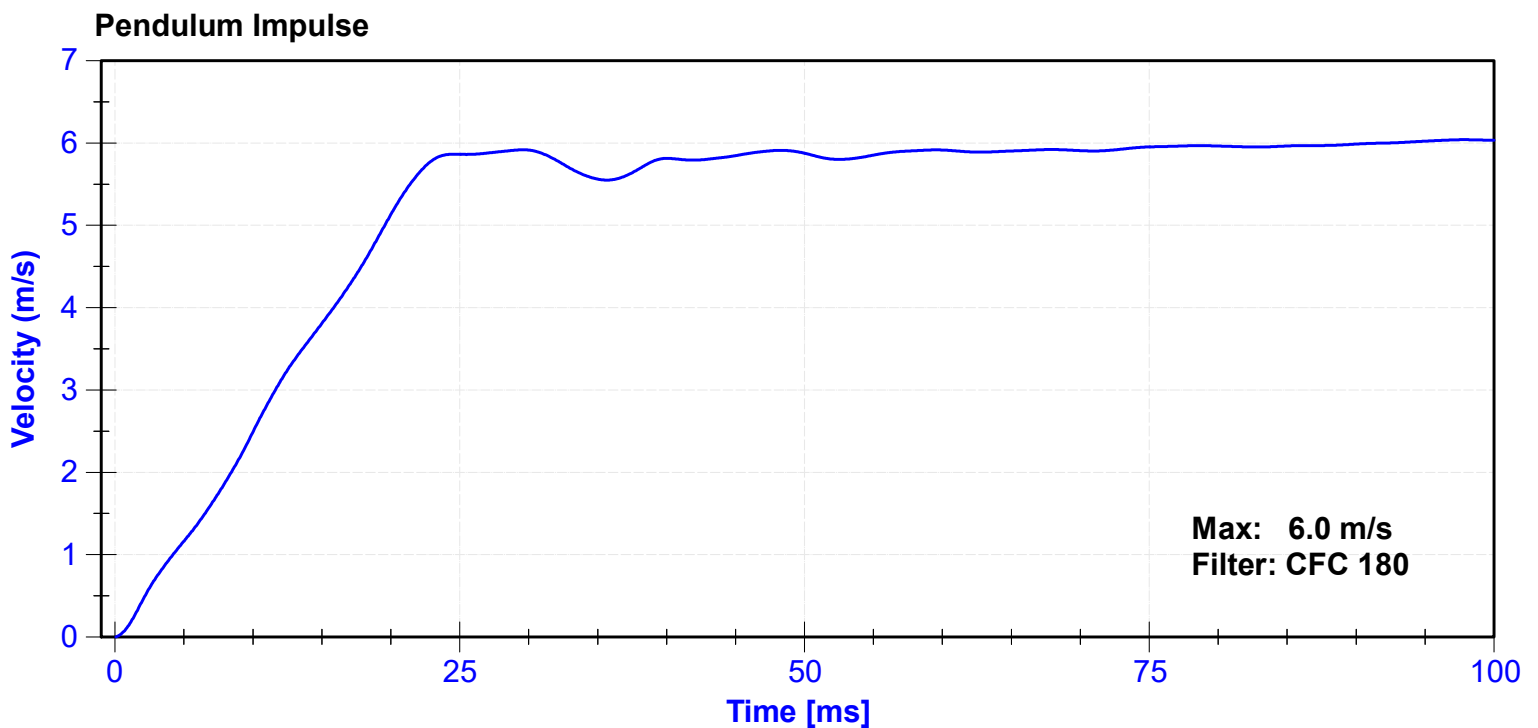
ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

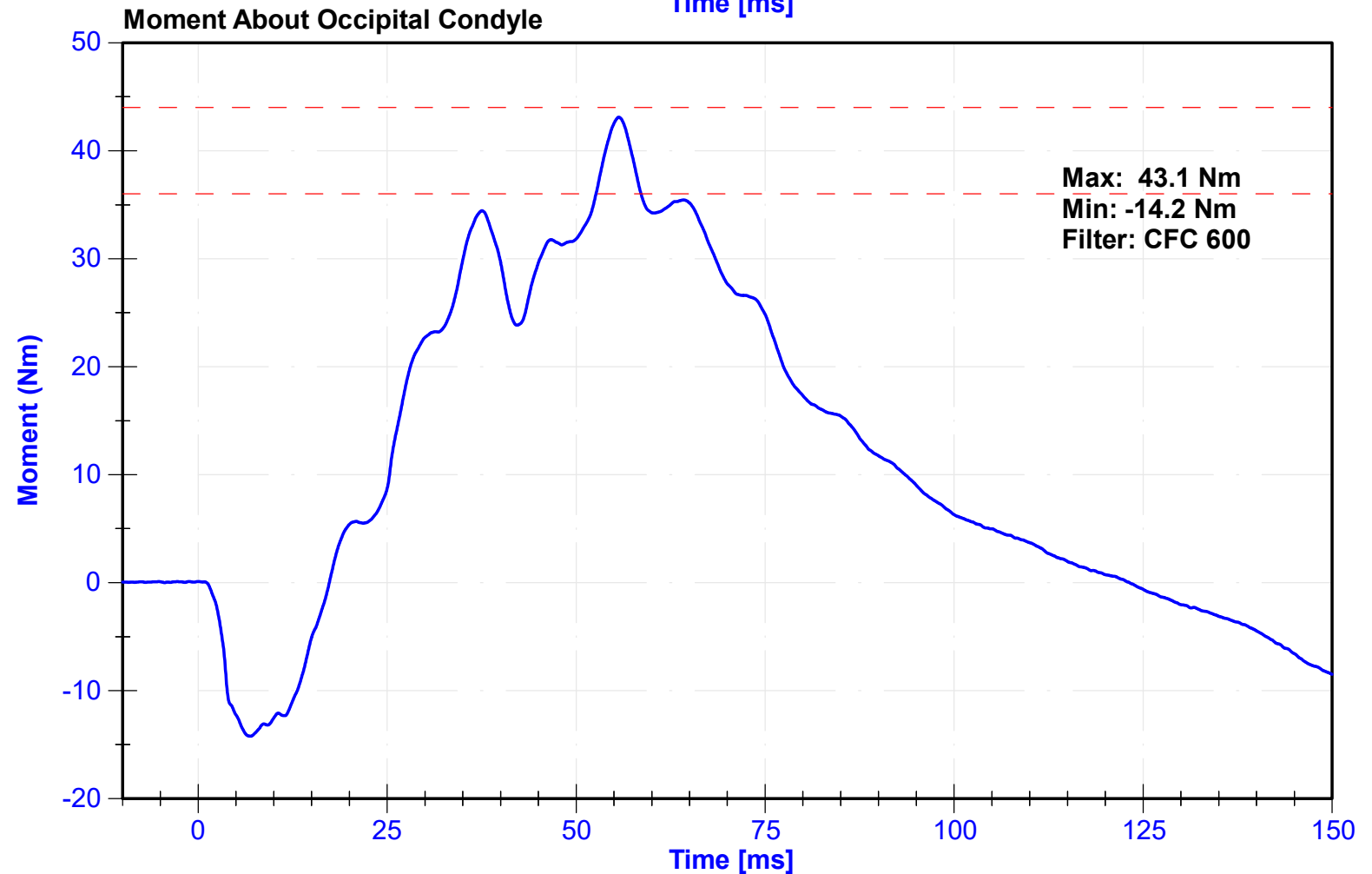
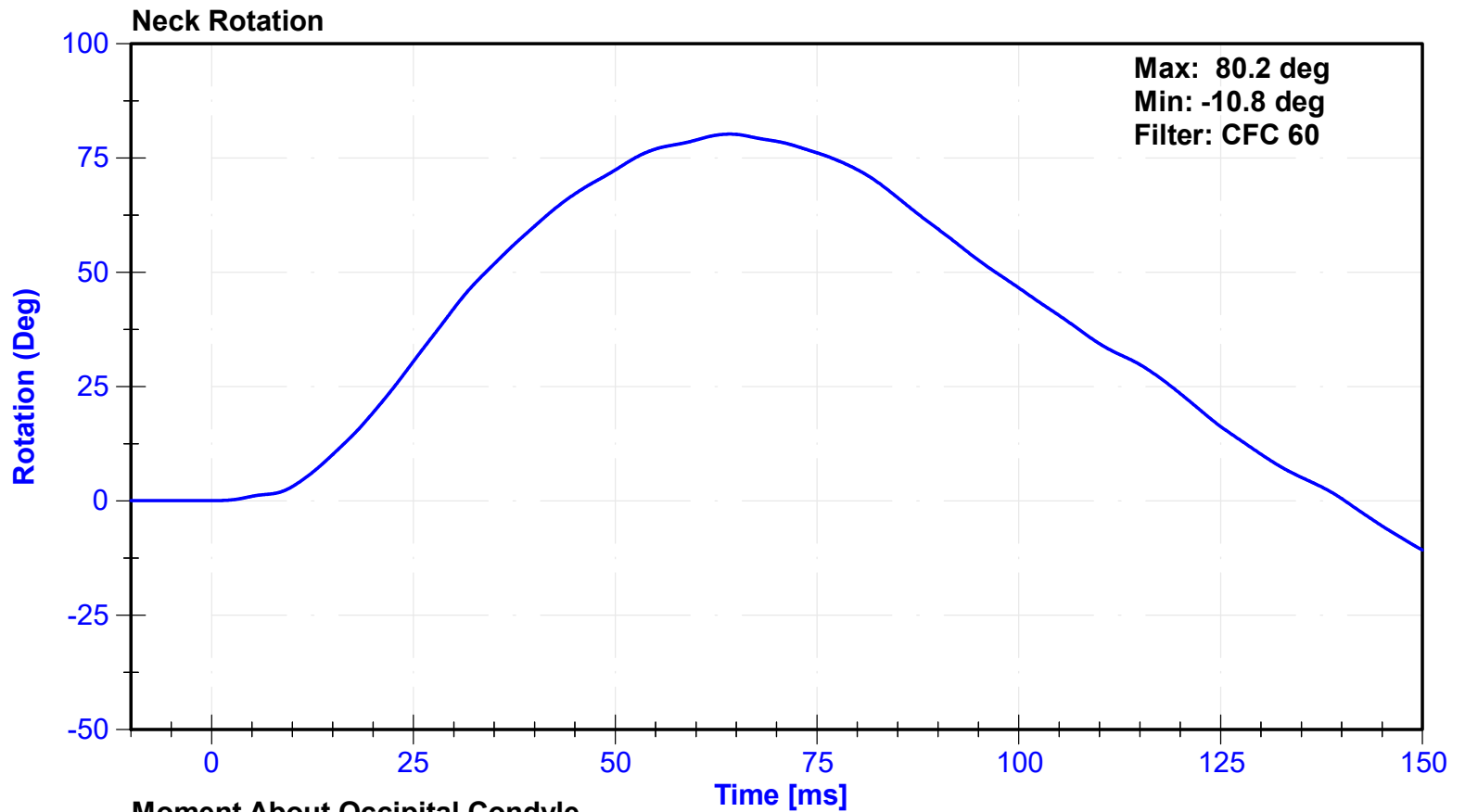
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	21	Pass
Velocity	5.51	5.63	m/s	5.519	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.49	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.81	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	5.13	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.86	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	6.04	Pass
Neck Rotation	71	81	deg	80.2	Pass
Time at Maximum Rotation	50	70	ms	64.2	Pass
Moment about the OC	36	44	Nm	43.1	Pass
Moment Decay to 0 Nm	102	126	ms	123.2	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	7231C-750	10/26/2022	10/26/2023
Pendulum Potentiometer	Servo	4961	11/11/2022	11/11/2023
Condyle Potentiometer	Servo	DS185	11/11/2022	11/11/2023
Upper Neck Load Cell	Denton	1716A-1037-FY	8/12/2022	8/12/2023





ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

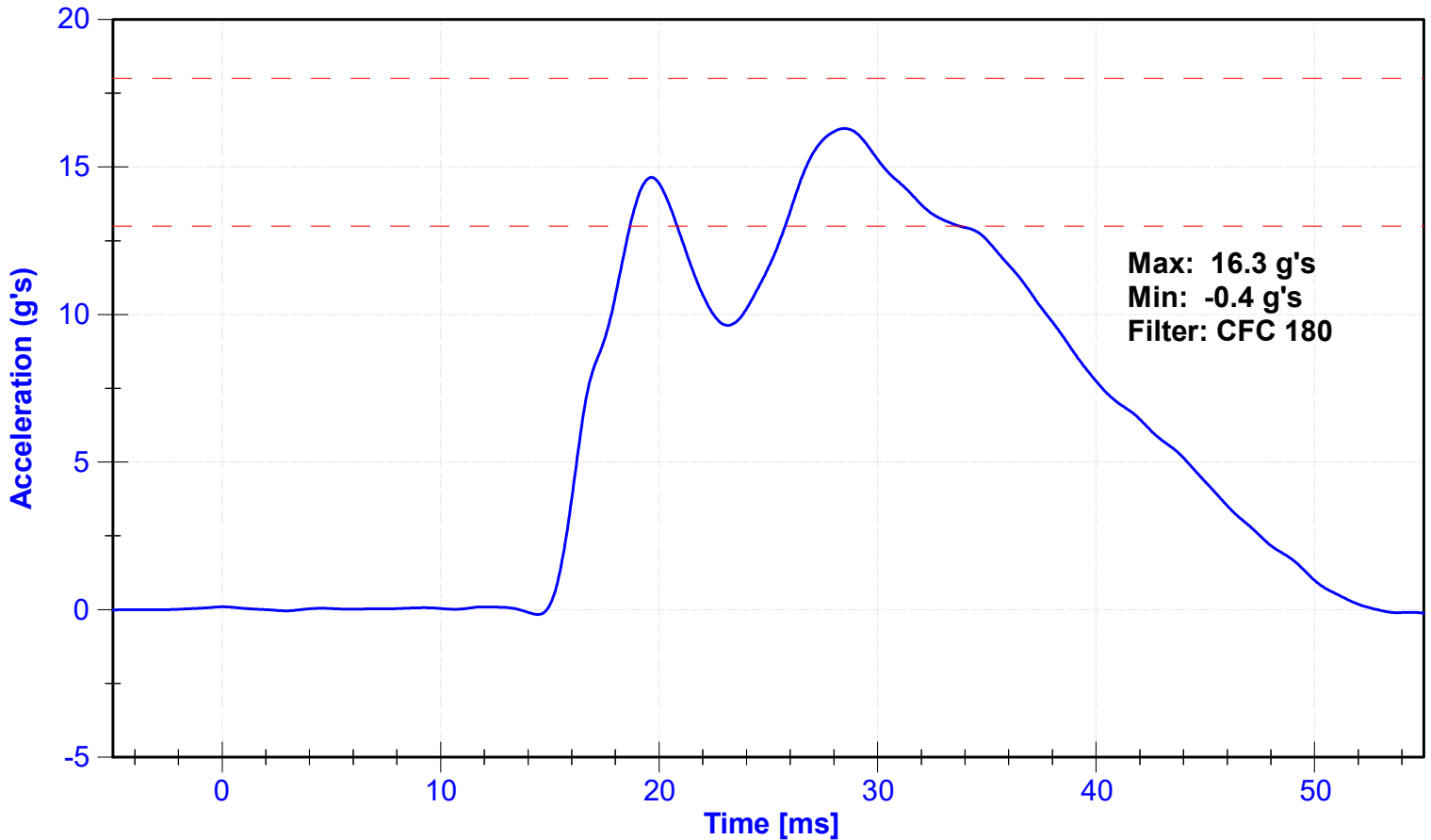
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	24	Pass
Velocity	4.2	4.4	m/s	4.34	Pass
Probe Acceleration	13	18	g's	16.3	Pass
Shoulder Deflection	28	37	mm	28.0	Pass
Lateral Upper Spine Acceleration	17	22	g's	20.1	Pass

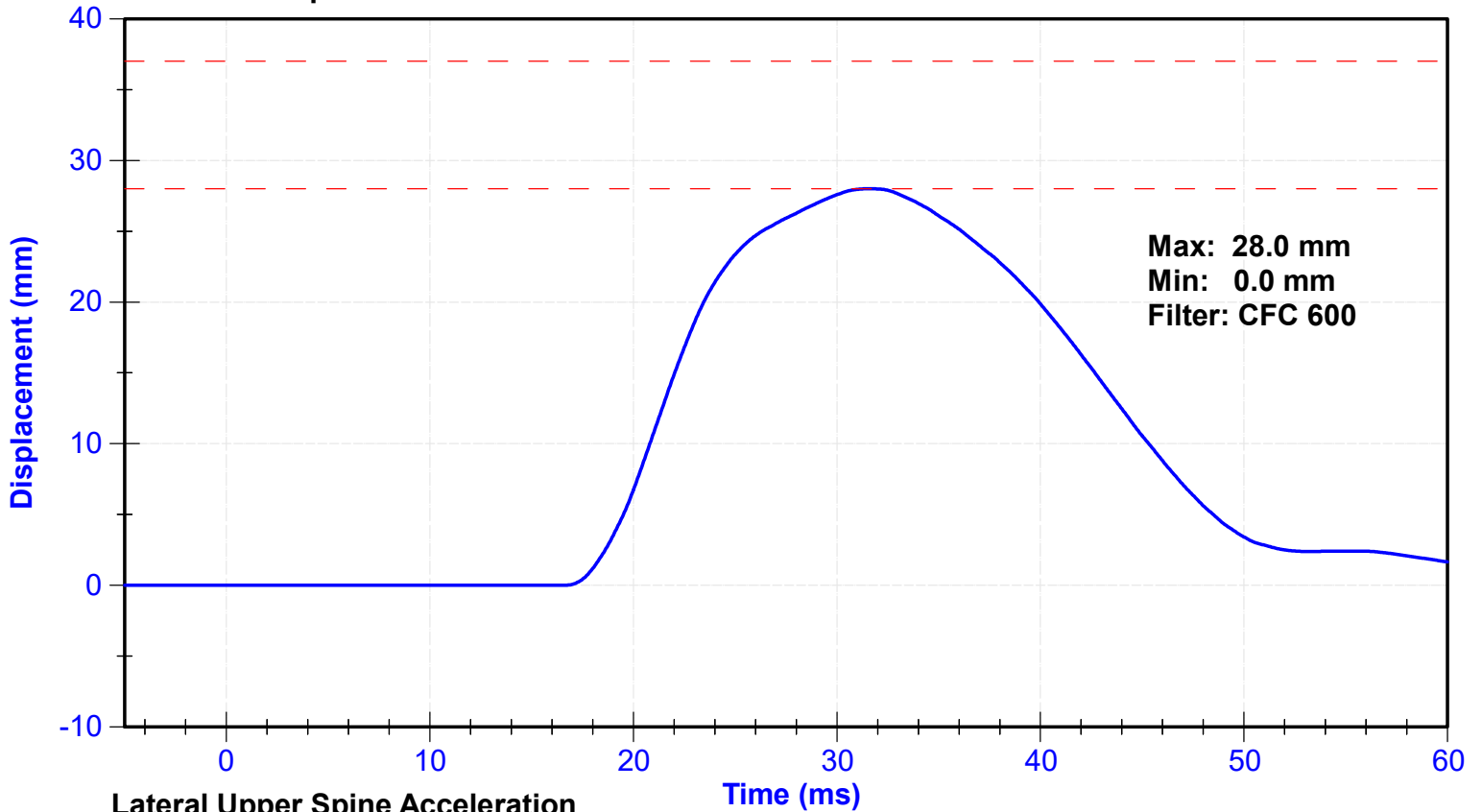
**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18494	11/5/2022	5/4/2023
Shoulder Potentiometer	Servo	053GFE	10/4/2022	4/4/2023
Upper Spine Y Accelerometer	Endevco	T20880	10/3/2022	4/1/2023

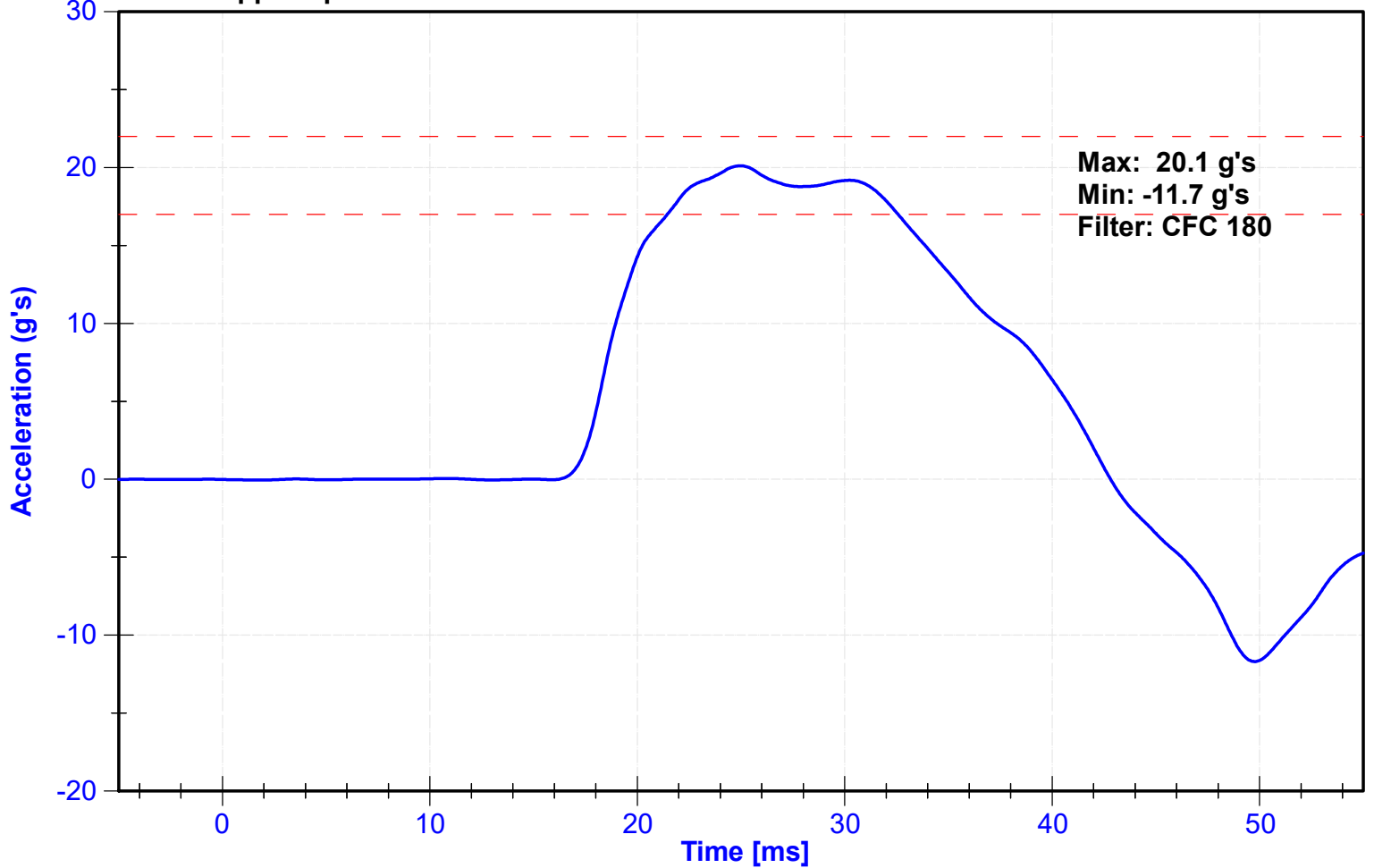
**Probe Acceleration**



### Shoulder Displacement



### Lateral Upper Spine Acceleration



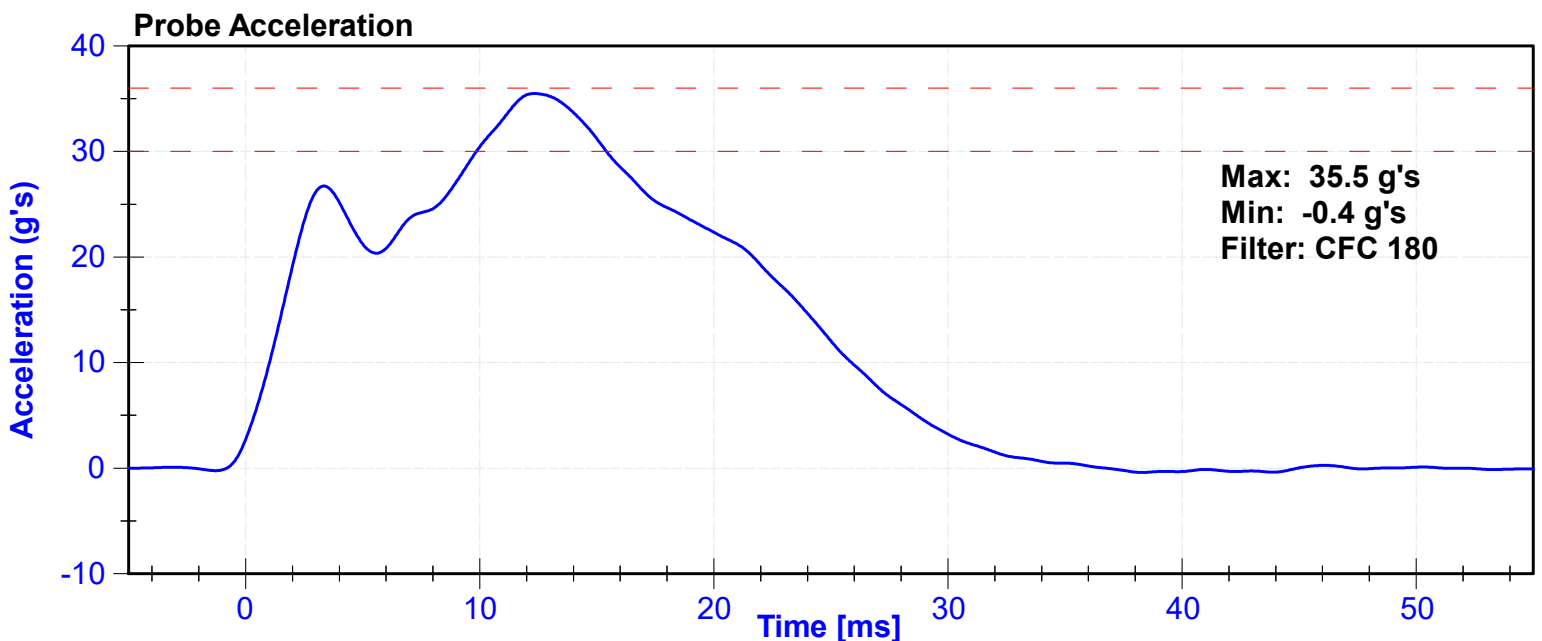
ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

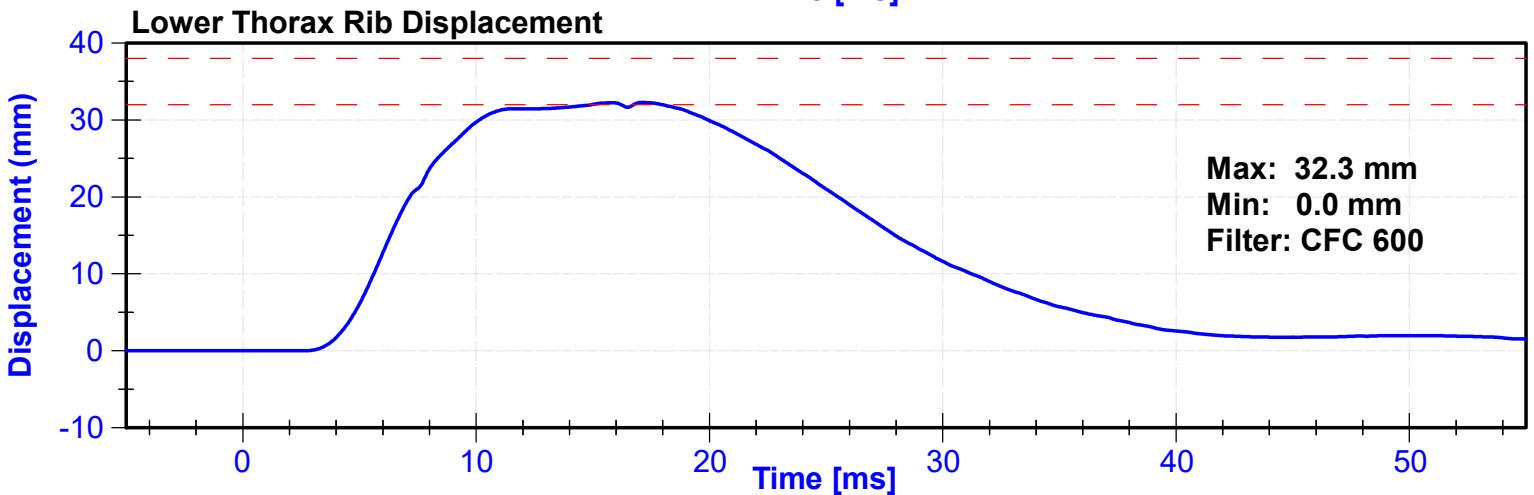
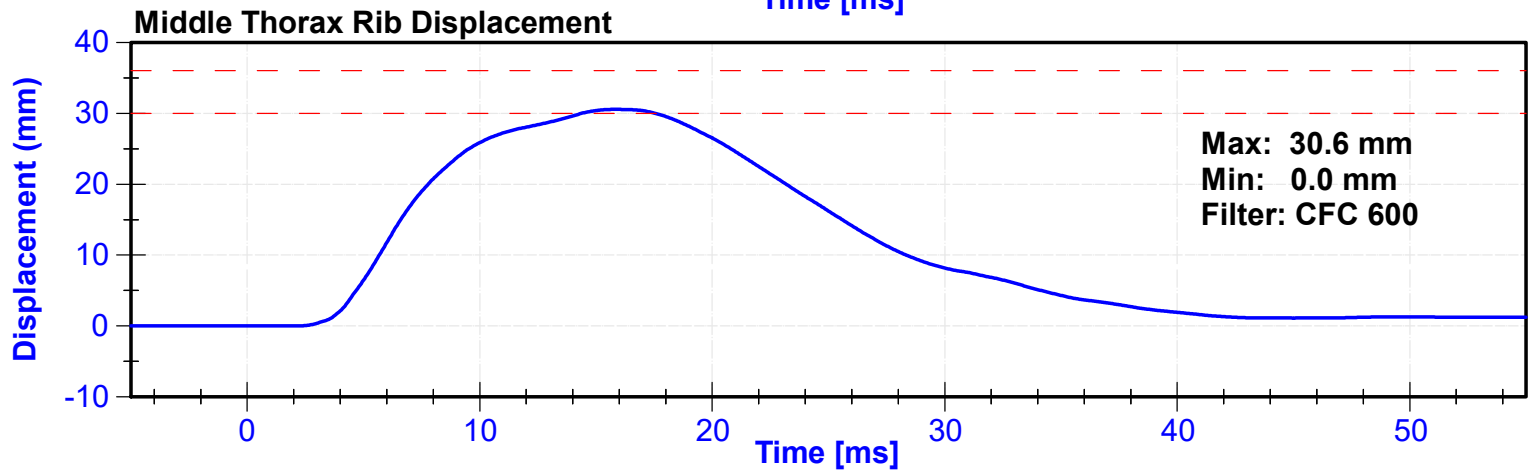
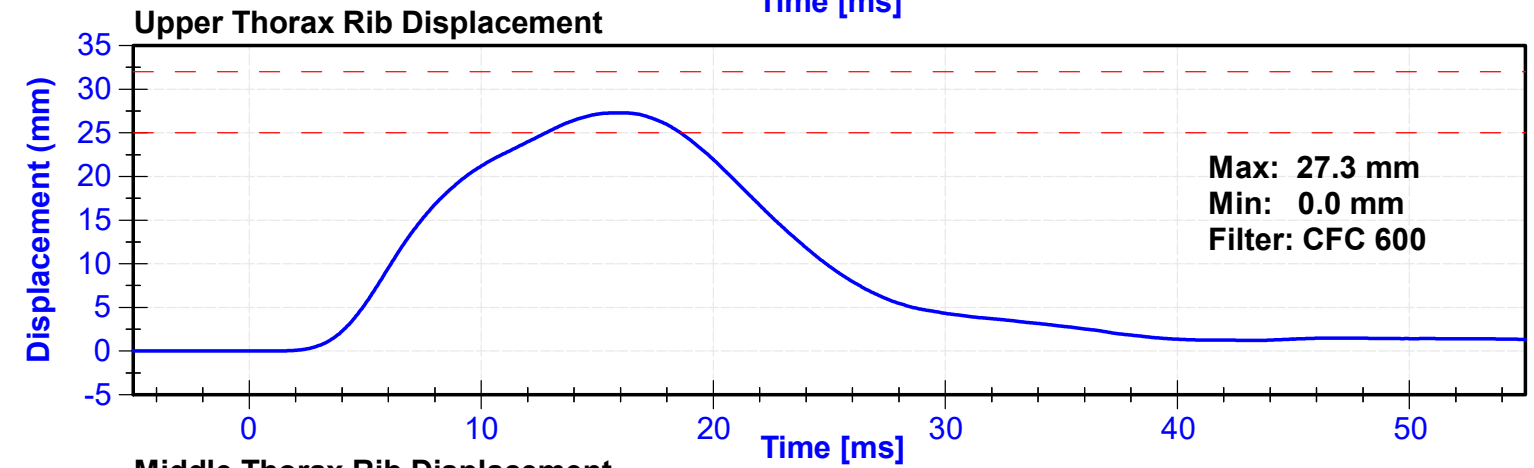
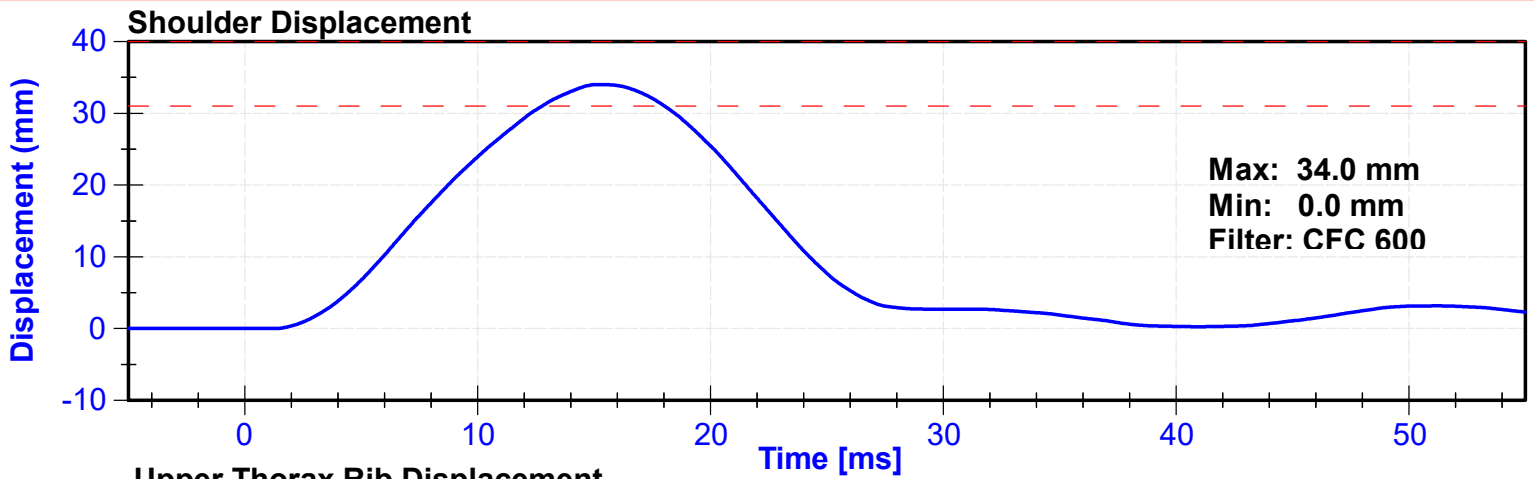
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	24	Pass
Velocity	6.6	6.8	m/s	6.78	Pass
Probe Acceleration after 5 ms	30	36	g's	35.5	Pass
Lateral Upper Spine Acceleration	34	43	g's	38.1	Pass
Lateral Lower Spine Acceleration	29	37	g's	36.7	Pass
Shoulder Deflection	31	40	mm	34.0	Pass
Upper Thorax Rib Deflection	25	32	mm	27.3	Pass
Mid Thorax Rib Deflection	30	36	mm	30.6	Pass
Lower Thorax Rib Deflection	32	38	mm	32.3	Pass

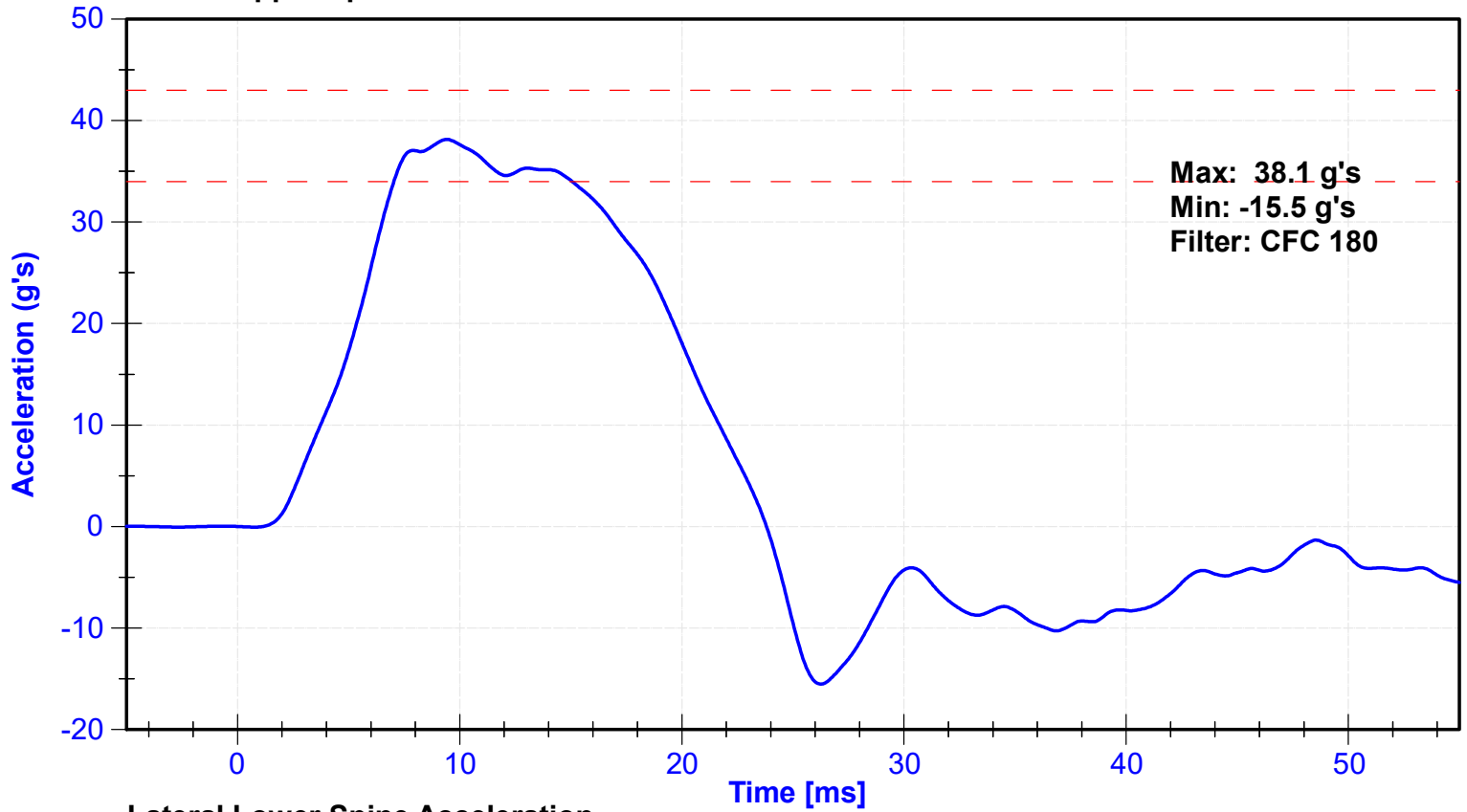
**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18494	11/5/2022	5/4/2023
Upper Spine T1 Y Accelerometer	Endevco	T20880	10/3/2022	4/1/2023
Upper Spine T12 Y Accelerometer	Endevco	P52071	10/3/2022	4/1/2023
Shoulder Potentiometer	Servo	053GFE	10/4/2022	4/4/2023
Upper Thorax Rib Potentiometer	Servo	2316GFE	10/4/2022	4/4/2023
Middle Thorax Rib Potentiometer	Servo	040GFE	10/4/2022	4/4/2023
Lower Thorax Rib Potentiometer	Servo	1156GFE	10/4/2022	4/4/2023

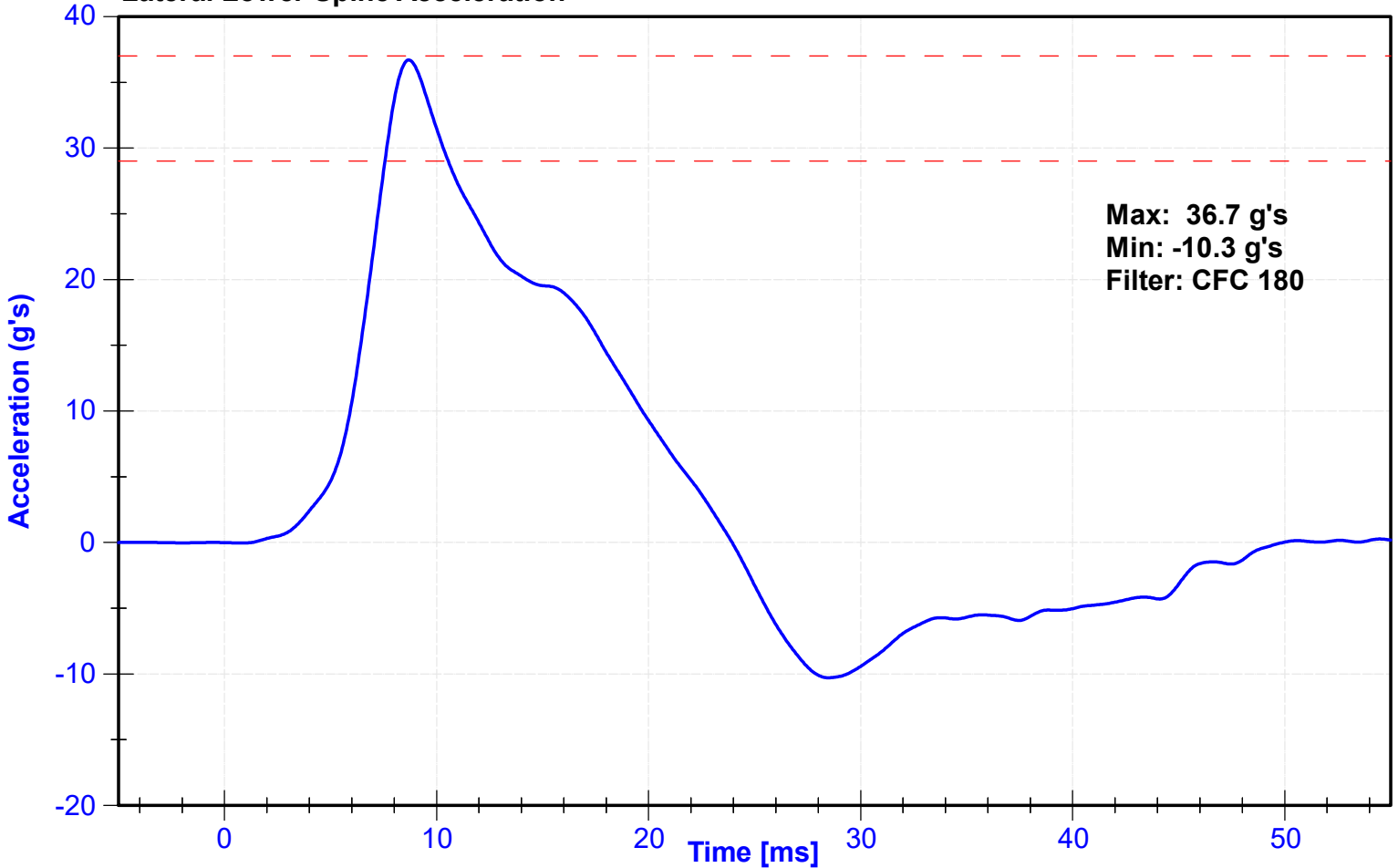




### Lateral Upper Spine Acceleration



### Lateral Lower Spine Acceleration



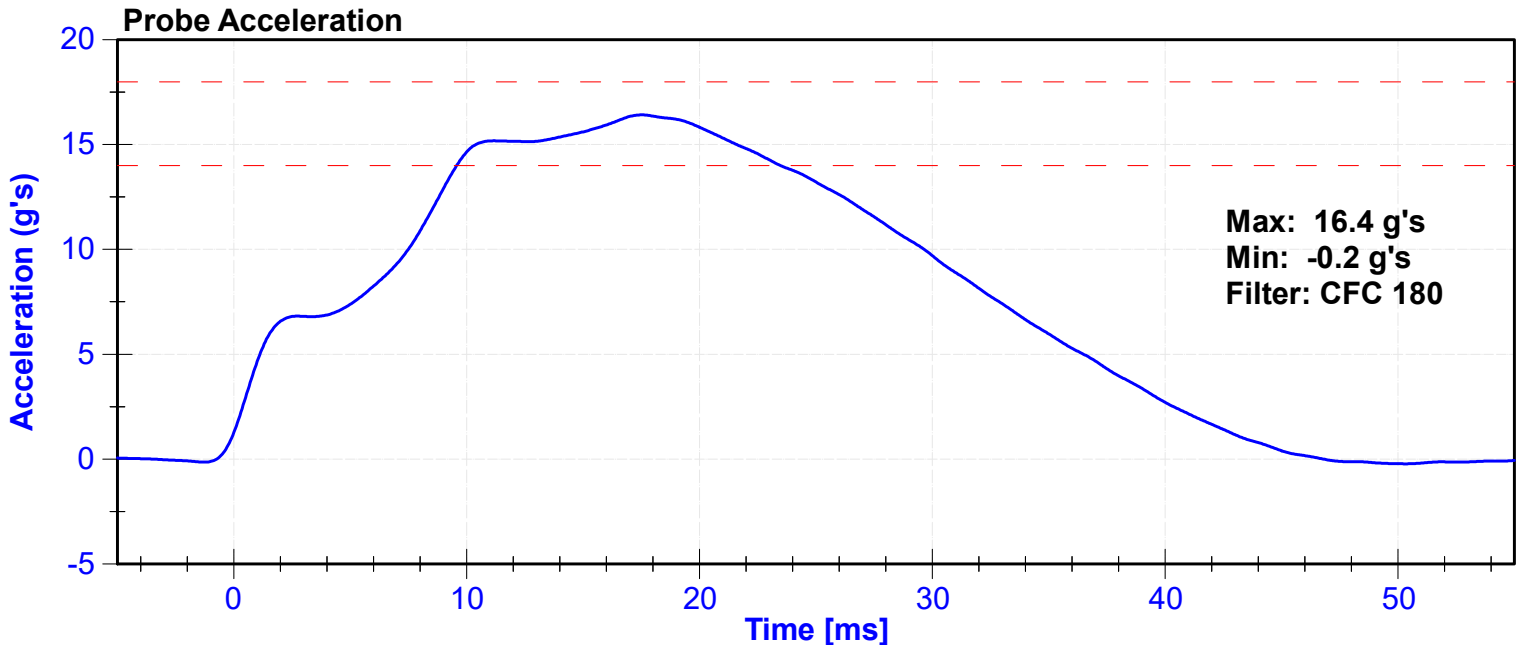
ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

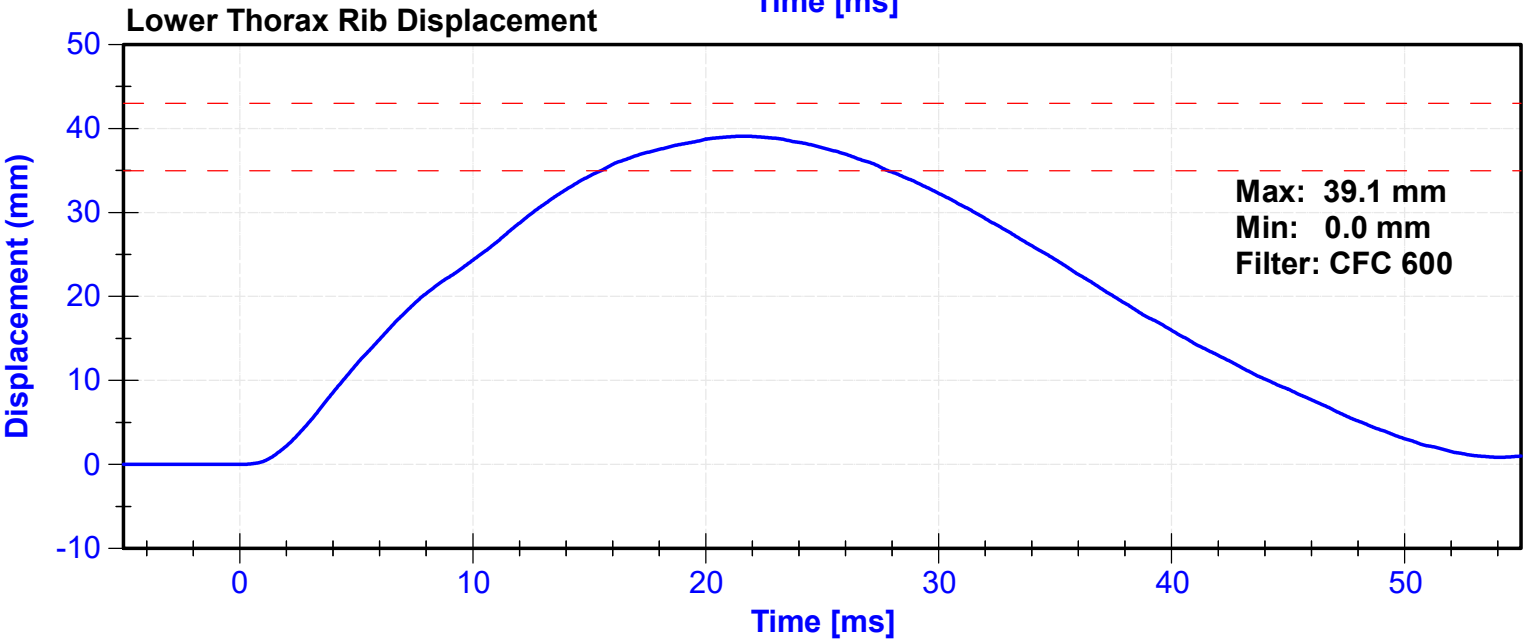
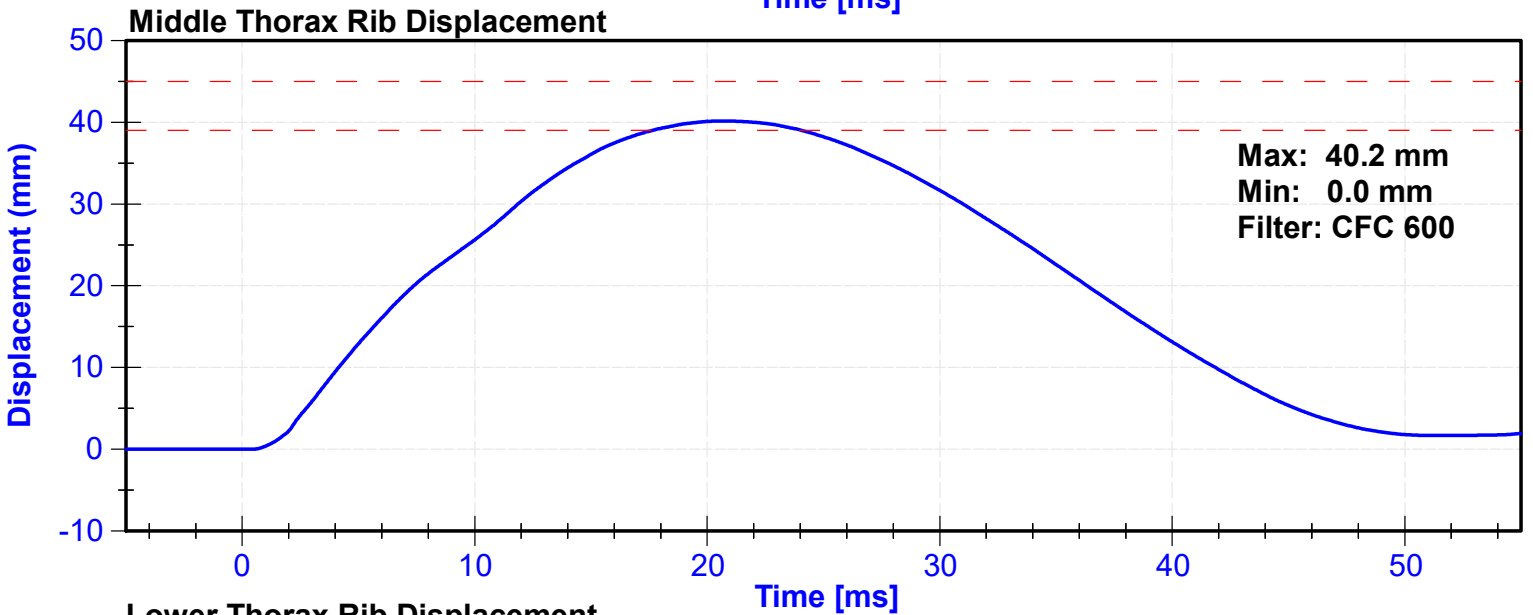
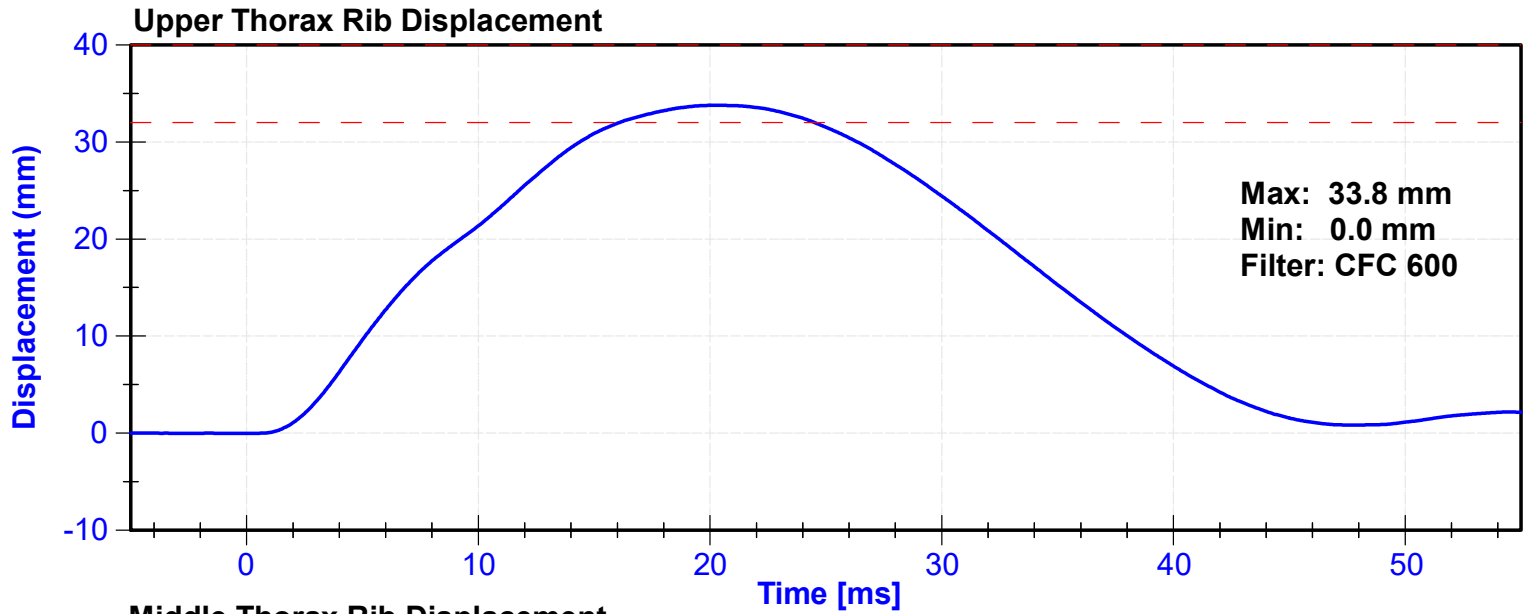
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	24	Pass
Velocity	4.2	4.4	m/s	4.34	Pass
Probe Acceleration	14	18	g's	16.4	Pass
Lateral Upper Spine Acceleration	13	17	g's	15.5	Pass
Lateral Lower Spine Acceleration	7	11	g's	10.1	Pass
Upper Thorax Rib Deflection	32	40	mm	33.8	Pass
Middle Thorax Rib Deflection	39	45	mm	40.2	Pass
Lower Thorax Rib Deflection	35	43	mm	39.1	Pass

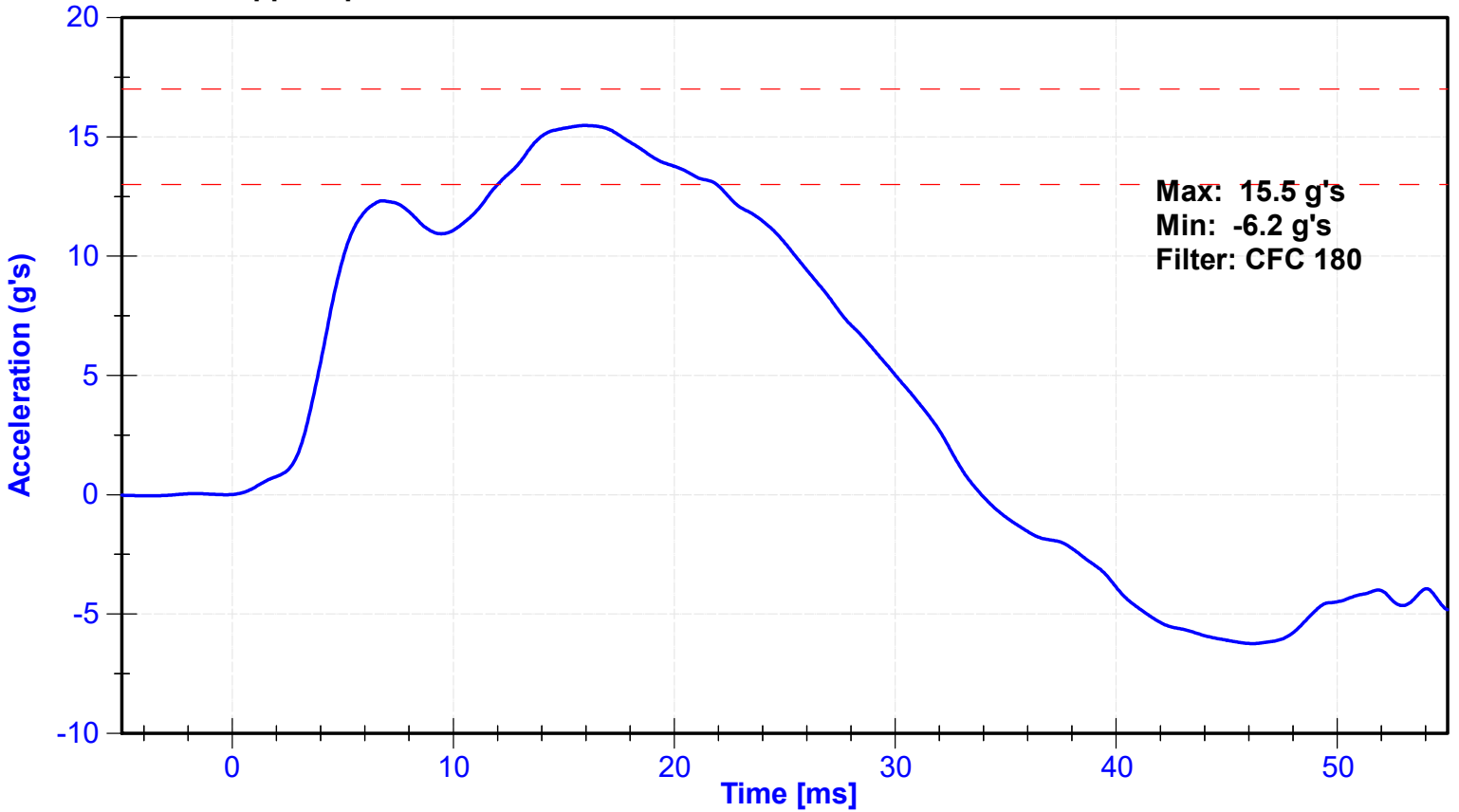
**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18494	11/5/2022	5/4/2023
Upper Spine Y Accelerometer	Endevco	T20880	10/3/2022	4/1/2023
Lower Spine Y Accelerometer	Endevco	P52071	10/3/2022	4/1/2023
Upper Thorax Rib Potentiometer	Servo	2316GFE	10/4/2022	4/4/2023
Middle Thorax Rib Potentiometer	Servo	040GFE	10/4/2022	4/4/2023
Lower Thorax Rib Potentiometer	Servo	1156GFE	10/4/2022	4/4/2023

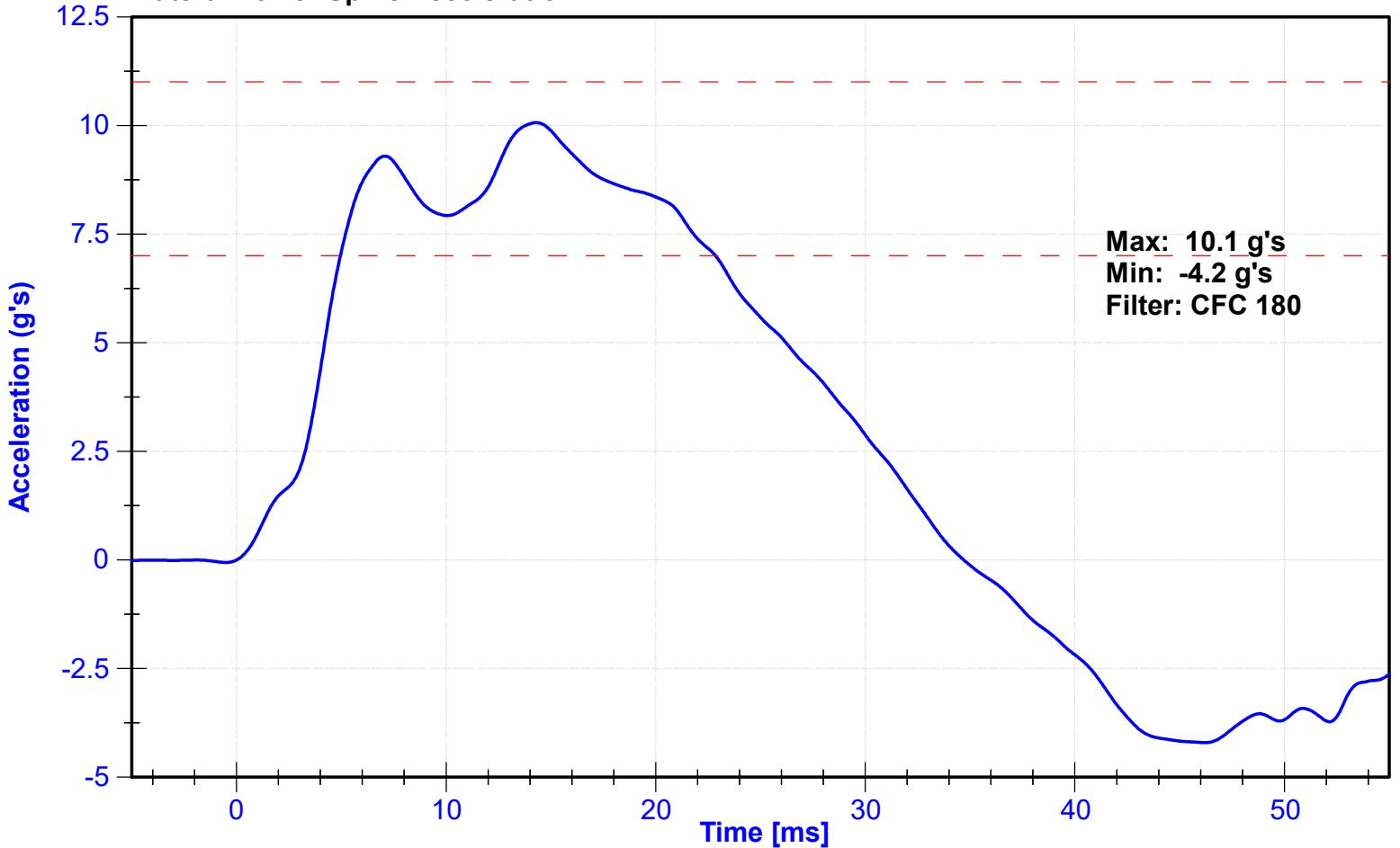




### Lateral Upper Spine Acceleration



### Lateral Lower Spine Acceleration



ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

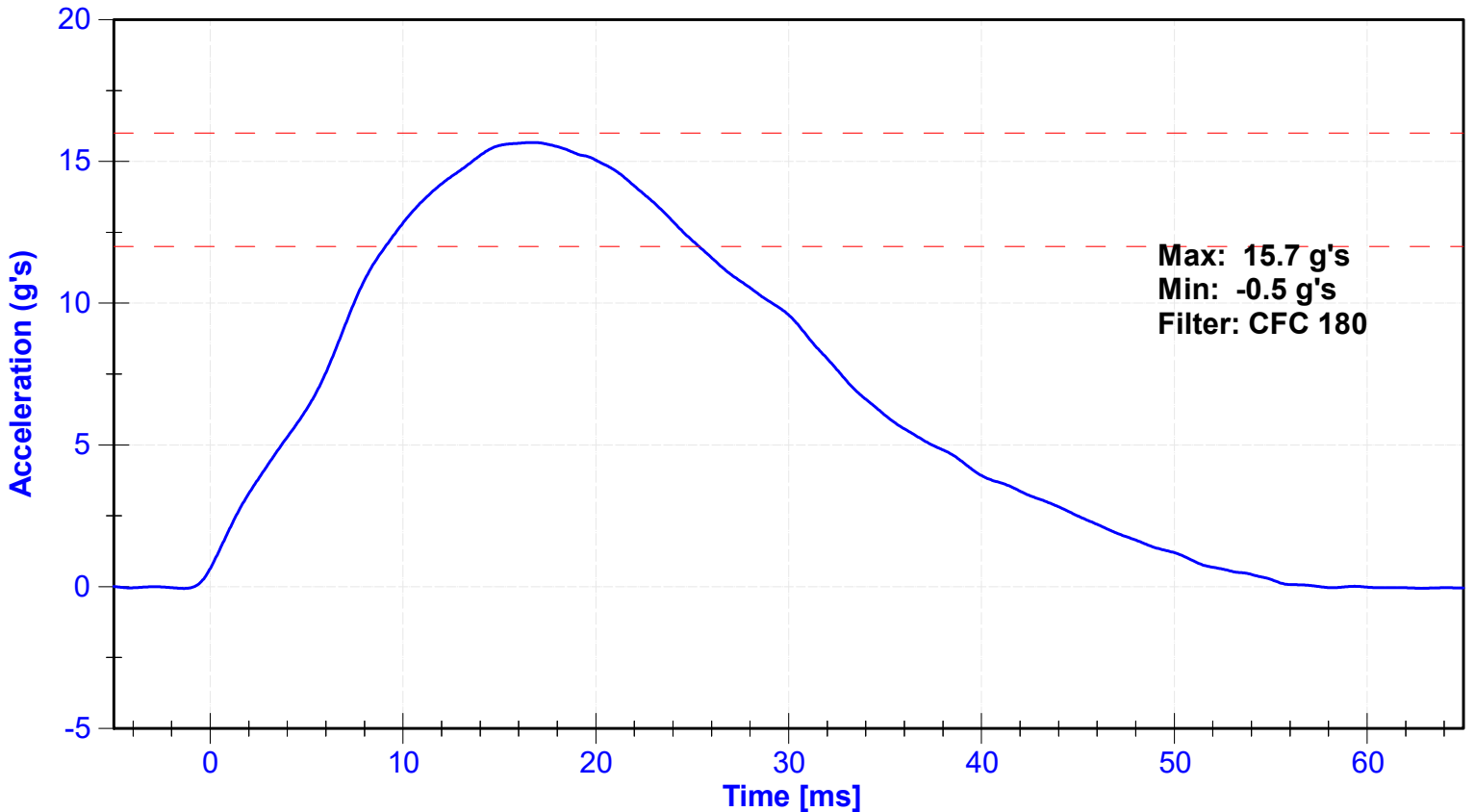
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	24	Pass
Velocity	4.2	4.4	m/s	4.34	Pass
Probe Acceleration	12	16	g's	15.7	Pass
Lateral Lower Spine Acceleration	9	14	g's	13.1	Pass
Upper Abdomen Rib Deflection	36	47	mm	36.3	Pass
Lower Abdomen Rib Deflection	33	44	mm	38.3	Pass

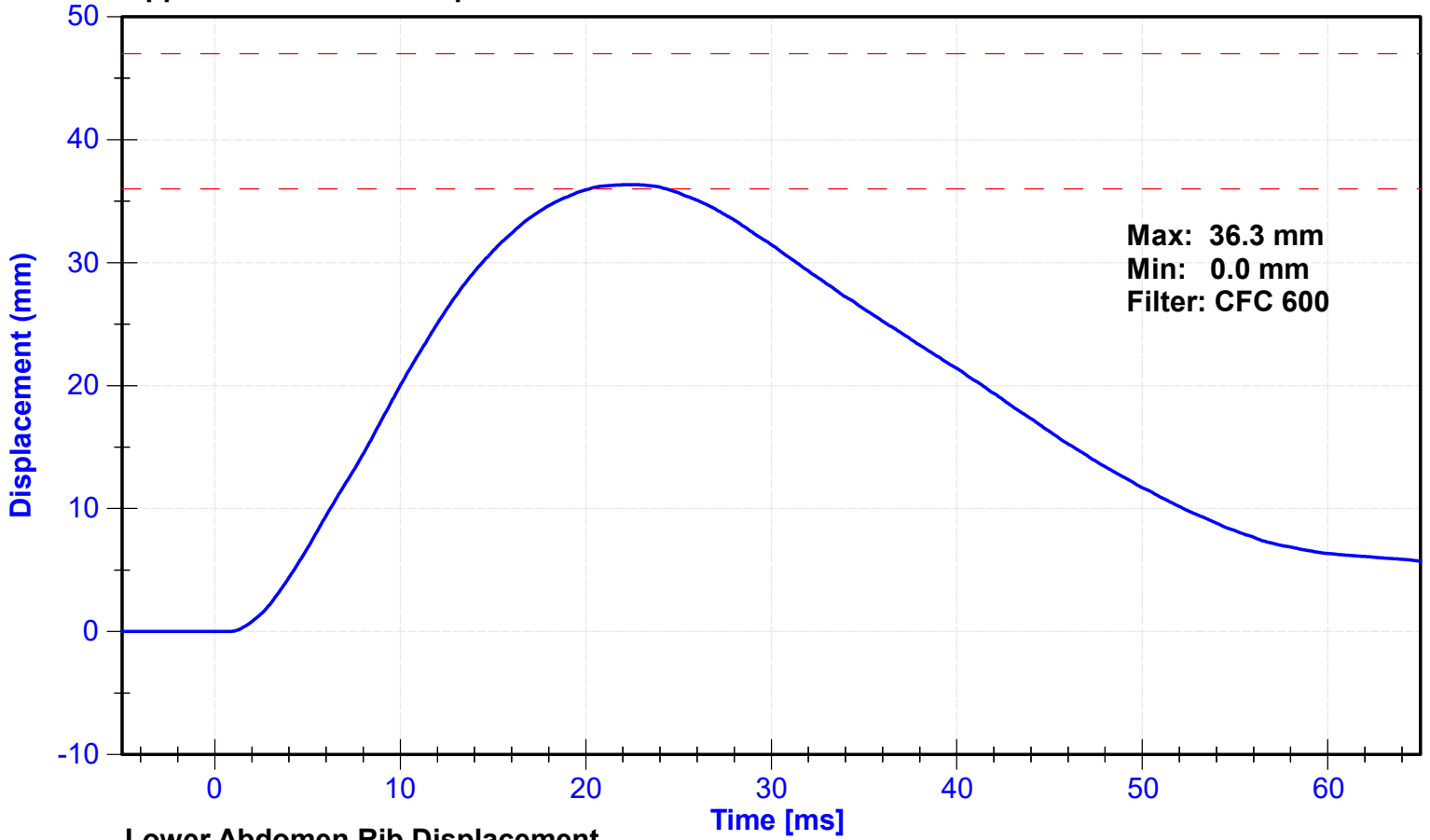
**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	18494	11/5/2022	5/4/2023
Lower Spine Y Accelerometer	Endevco	P52071	10/3/2022	4/1/2023
Upper Abdomen Rib Potentiometer	Servo	307GFE	10/4/2022	4/4/2023
Lower Abdomen Rib Potentiometer	Servo	308GFE	10/4/2022	4/4/2023

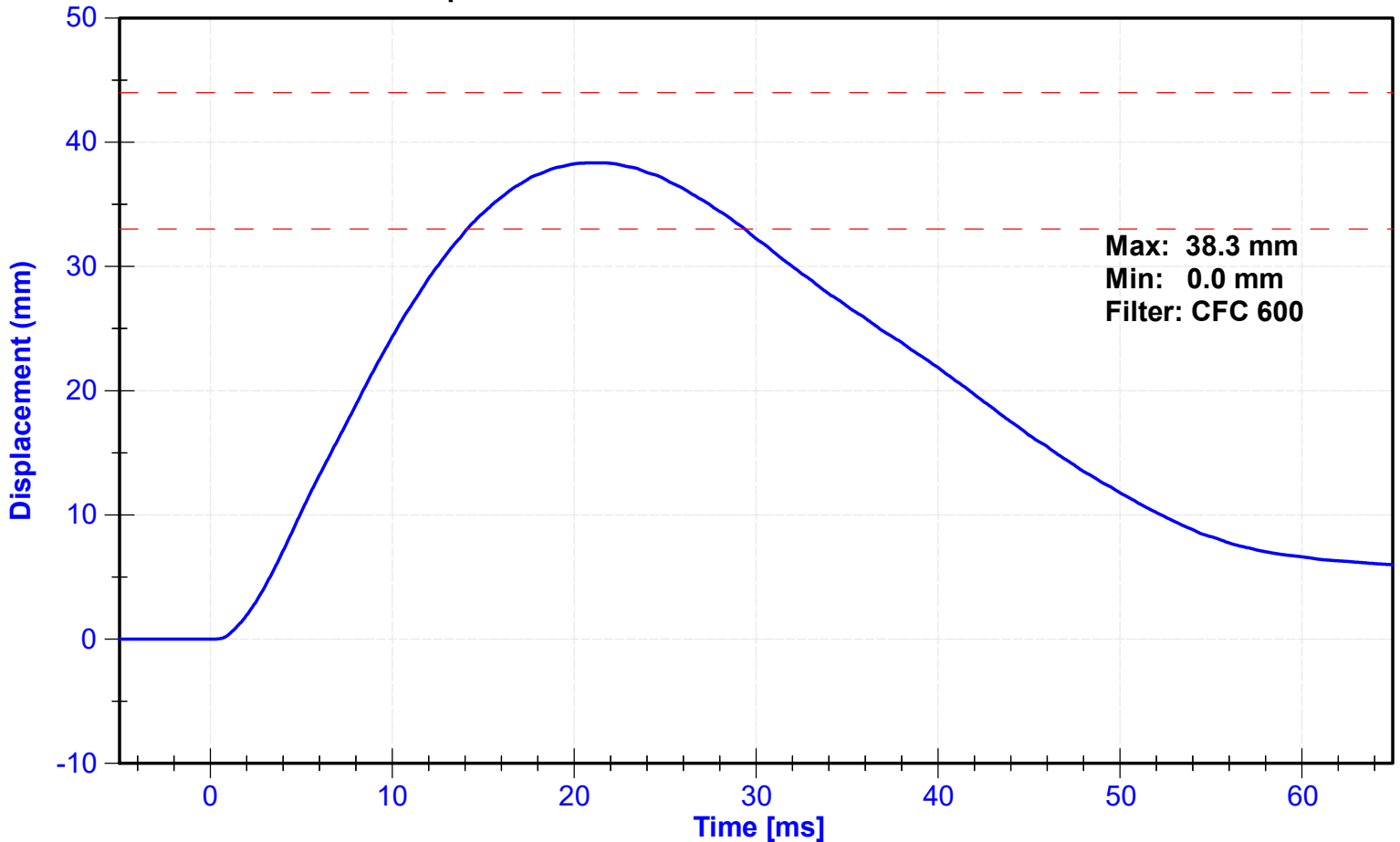
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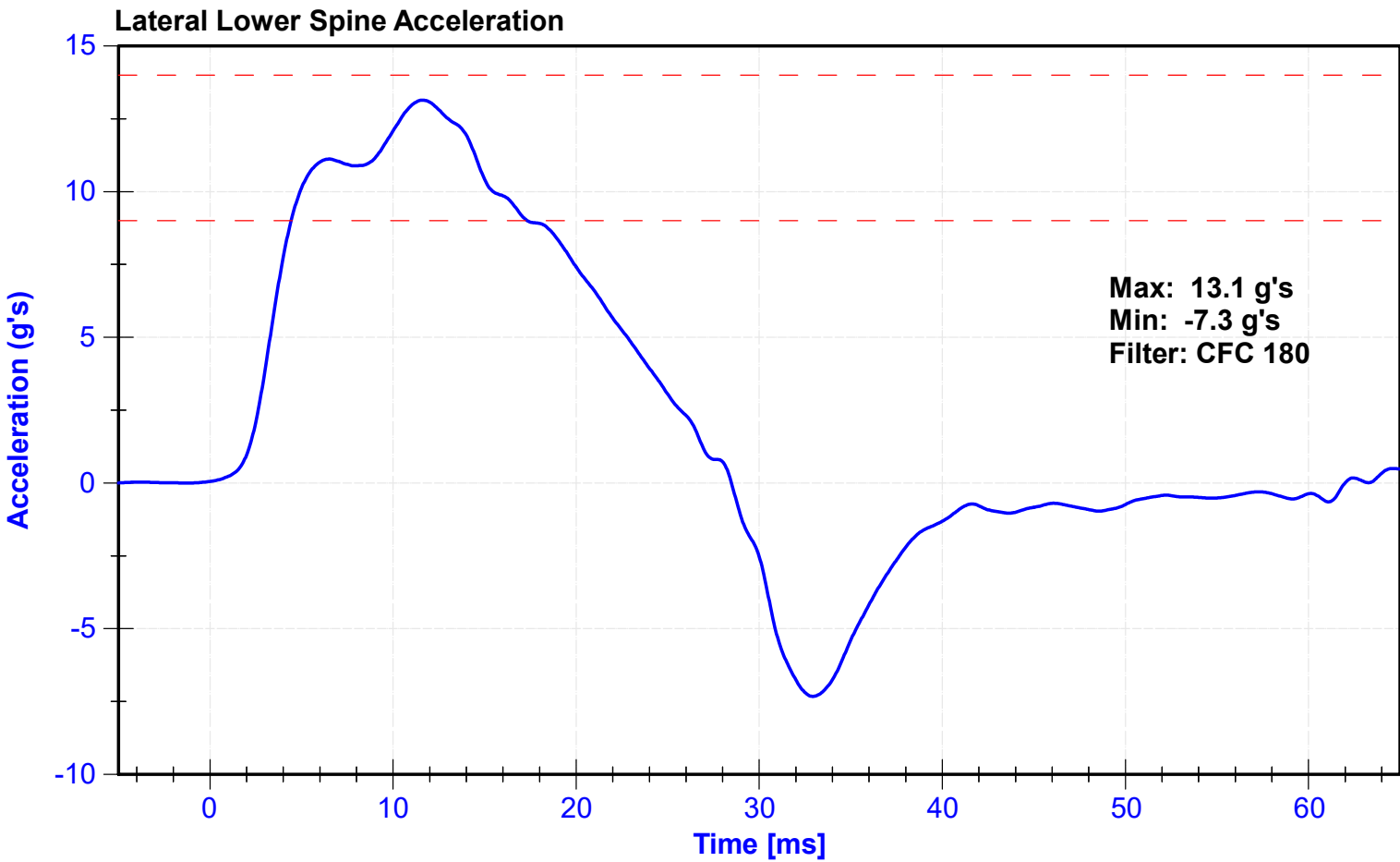


### Upper Abdomen Rib Displacement



### Lower Abdomen Rib Displacement





ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

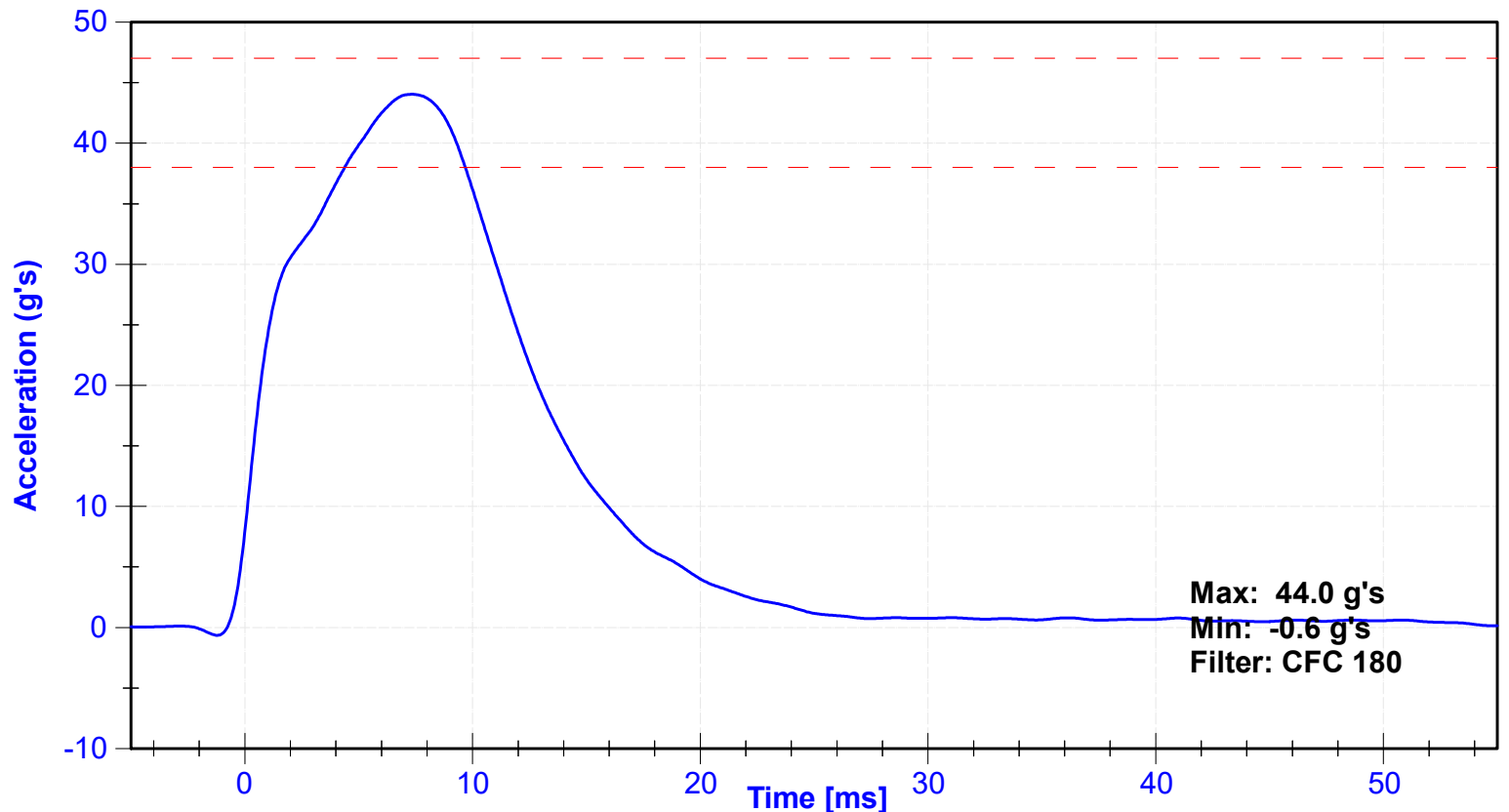
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	24	Pass
Velocity	6.6	6.8	m/s	6.77	Pass
Probe Acceleration	38	47	g's	44.0	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	40.4	Pass
Acetabulum Force	3600	4300	N	3982.1	Pass

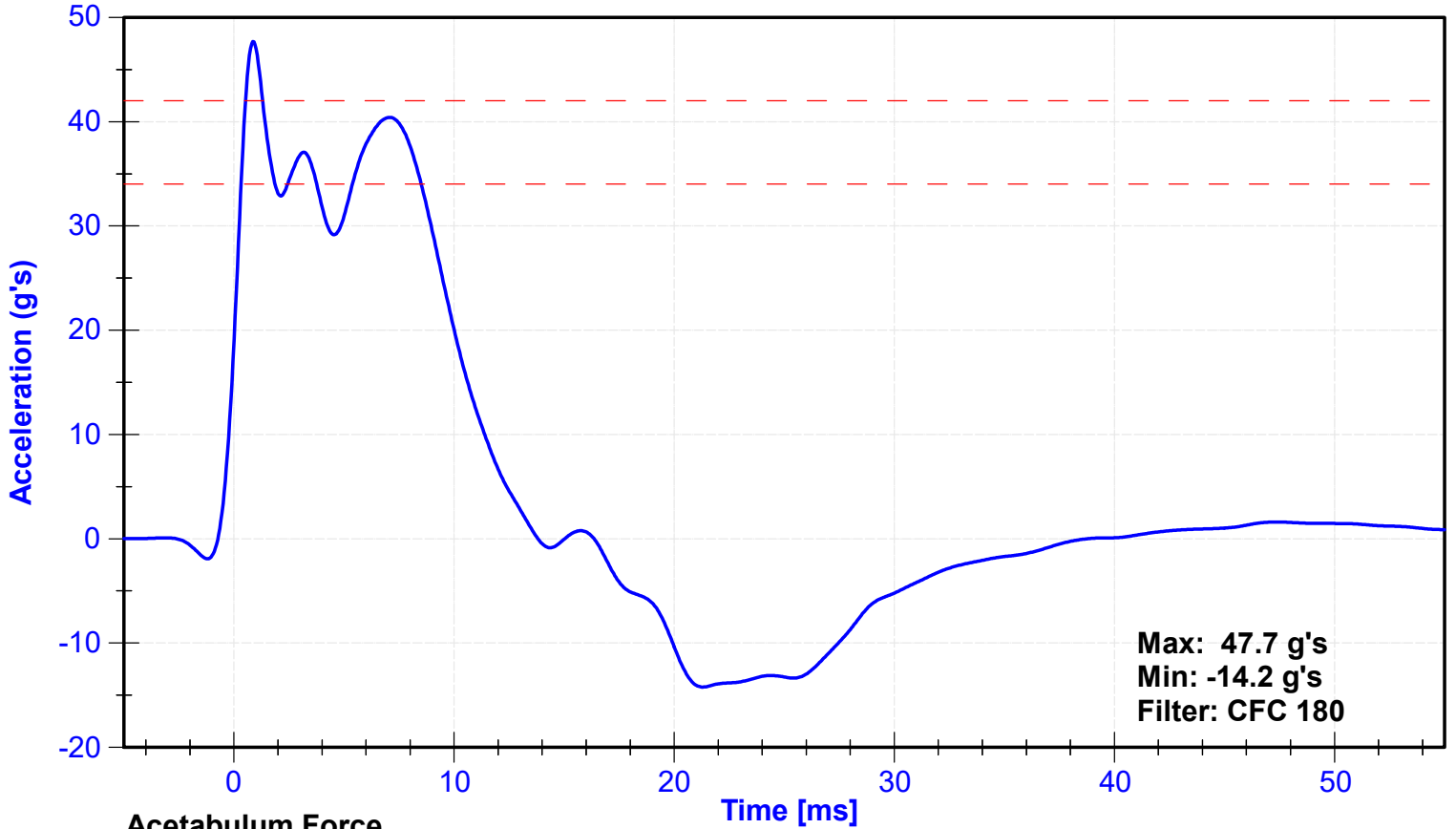
**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18494	11/5/2022	5/4/2023
Pelvis Y Accelerometer	Endevco	P51731	10/3/2022	4/1/2023
Acetabulum Load Cell	Denton	267-FY	8/11/2022	8/11/2023
Certification Plug	SACO			N/A
Crash Test Plug	SACO			N/A

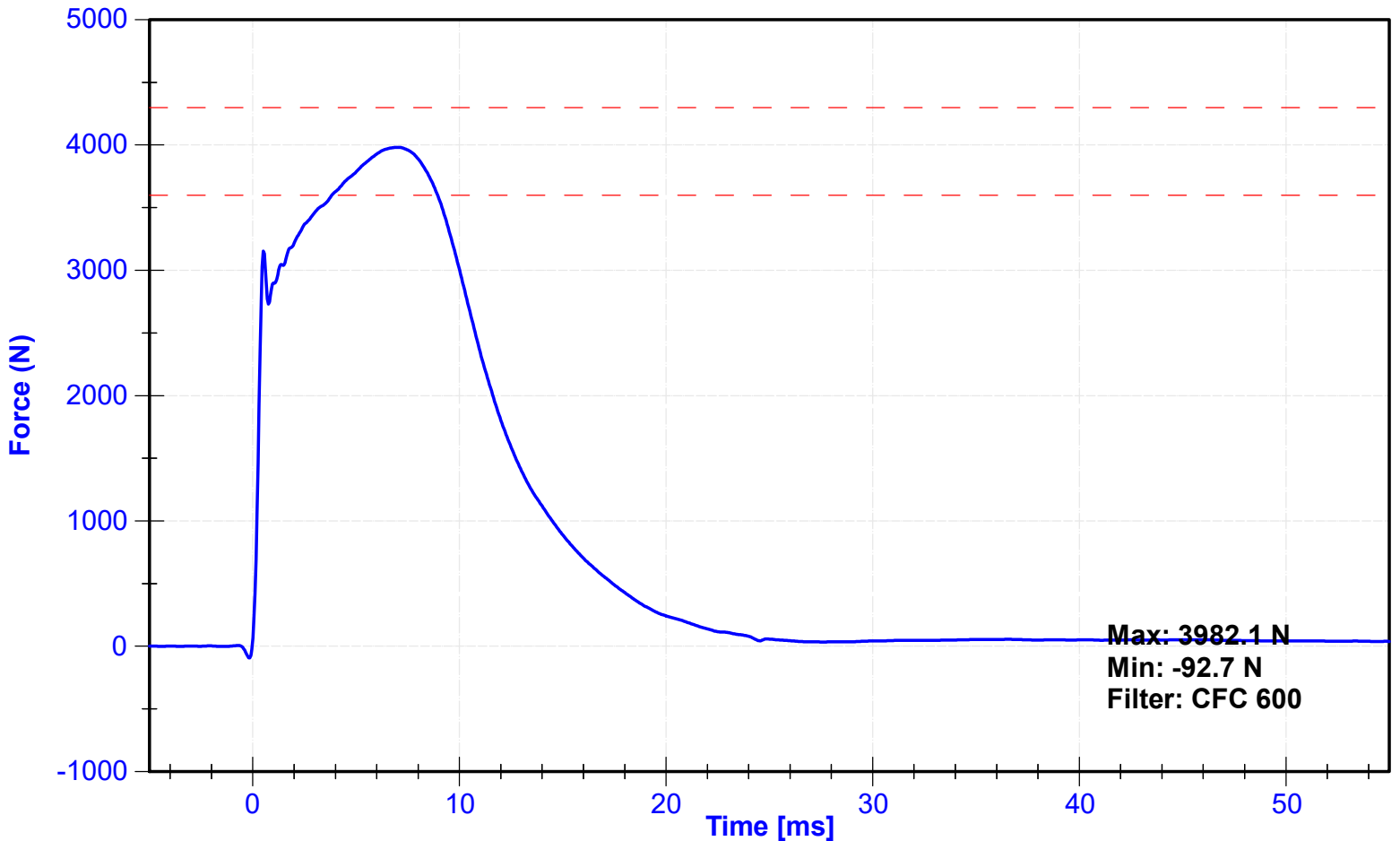
**Probe Acceleration**



### Lateral Pelvis Acceleration



### Acetabulum Force





*Cert*

**SID-IIs Pelvis Plug Certification Test**

Plug S/N 15171  
 Test Number 17887  
 Report Number 17936

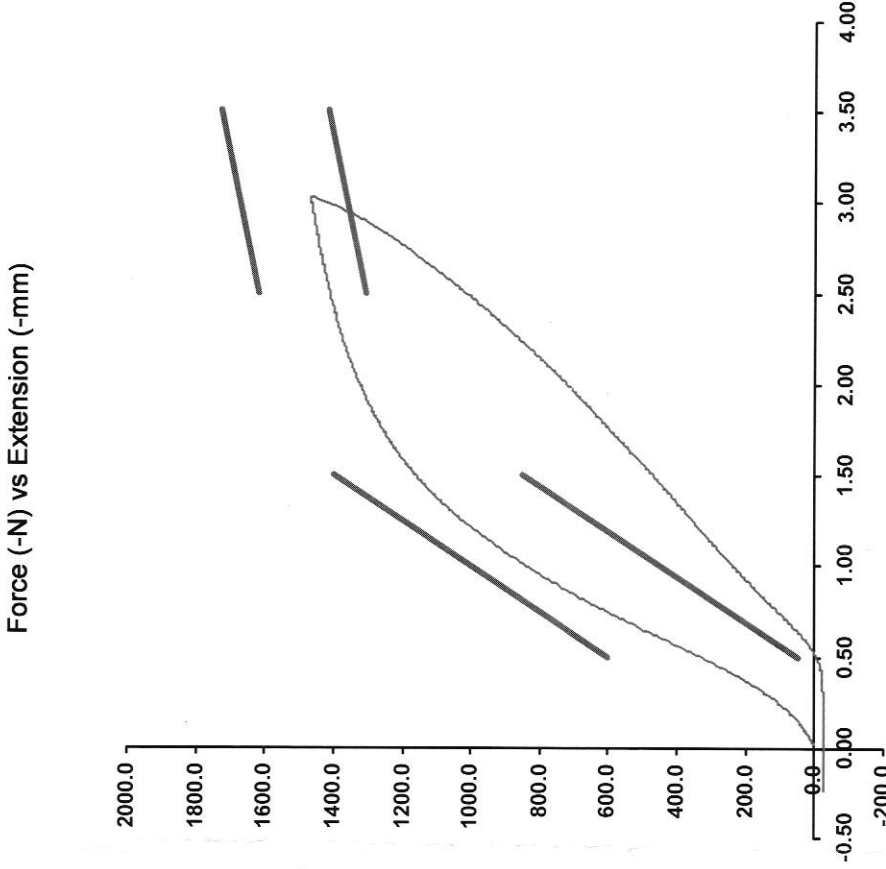
Test Date 3/8/2021 12:07:42 PM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	335	50	600
Force @ 1.5 mm (N)	1,167	850	1,400
Force @ 2.5 mm (N)	1,413	1,306	1,618
Force @ 3.0 mm (N)	1,467	1,361	1,673

Testing Machine STM-20 5965542  
 Load Cell S/N (F1360947), Units (LBS) 1000

Crosshead Speed ( mm / min ) 12.7  
 Extension or Position Measured by XHD\_100 ( XHD100 )

Notes:



Operator	
Part Number 180-4450	
Template No 107	Date: <u>3/8/2021</u>
SACO Research	By: <u>NC</u>
08-Mar-21	SACO Research 41735 Elm St, #401 Murrieta, CA 92562
	Tel 310-694-2082 FAX



*Crash*

**SID-IIs Pelvis Plug Certification Test**

Plug S/N 14838

Test Number 17270

Report Number 17317

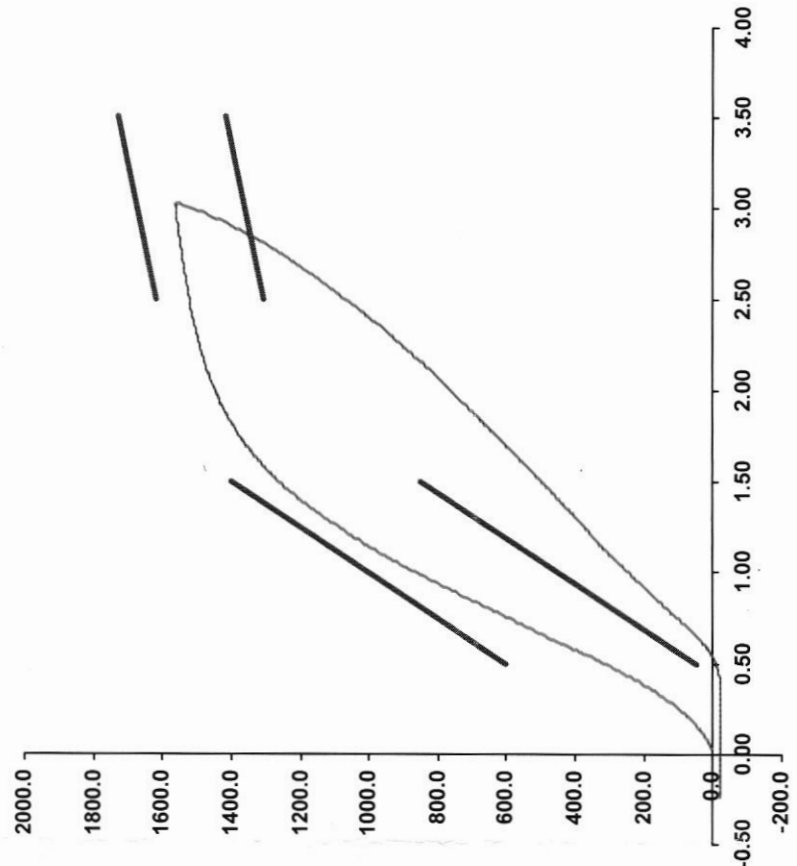
Test Date 1/28/2021 12:17:37 PM

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

Testing Machine STM-20 5965542  
 Load Cell S/N (F1360947), U<sub>g</sub> (LBS) 1000  
 Crosshead Speed ( mm / min ) or Rate 12.7  
 Extension or Position Measured by XHD\_100 ( XHD100 )

Notes:

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107 28-Jan-21

SACO Research

By: *DC* Date: 1/28/2021

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



Non-Impact

### SID-IIs Pelvis Plug Certification Test

Plug S/N 15443

Test Number 20104

Report Number 20158

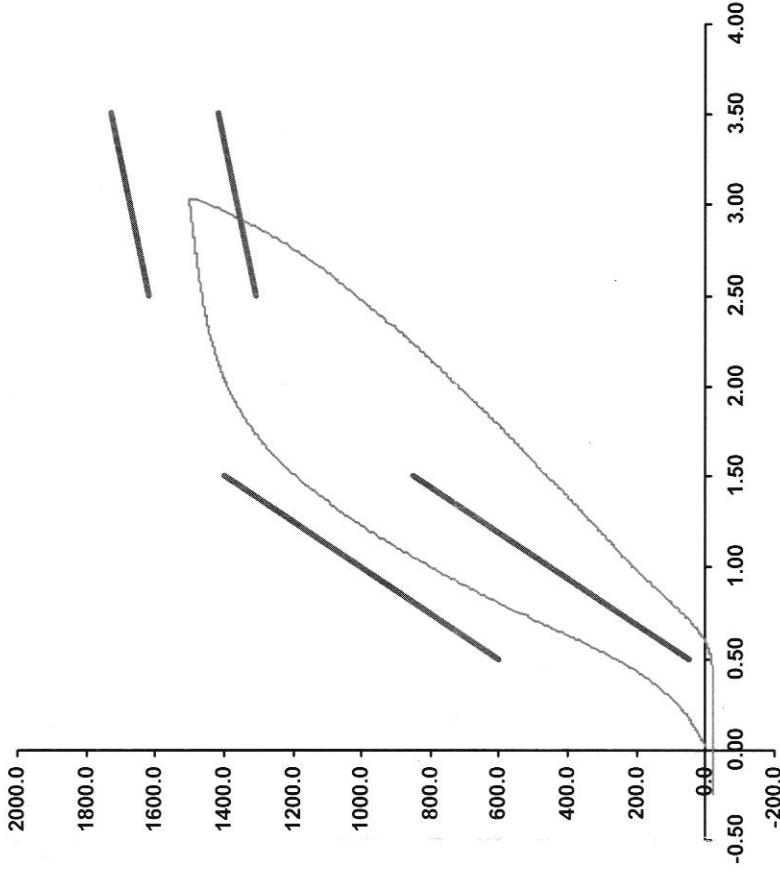
Test Date 9/9/2021 10:33:50 AM

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

Testing Machine STM-20 5965542  
 Load Cell S/N (F1360947), Units (LBS) 1000  
 Preload Value (-N) 22.24  
 Crosshead Speed (mm / min) or Rate 12.7  
 Extension or Position Measured by XHD\_100 (XHD100)

Notes:

Force (-N) vs Extension (-mm)



Operator \_\_\_\_\_

Part Number 180-4450

Template No 107 09-Sep-21

SACO Research

By: DC Date: 9/9/2021

ATD Manufacturer	FTSS	Test Technician	Z. Schneider
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

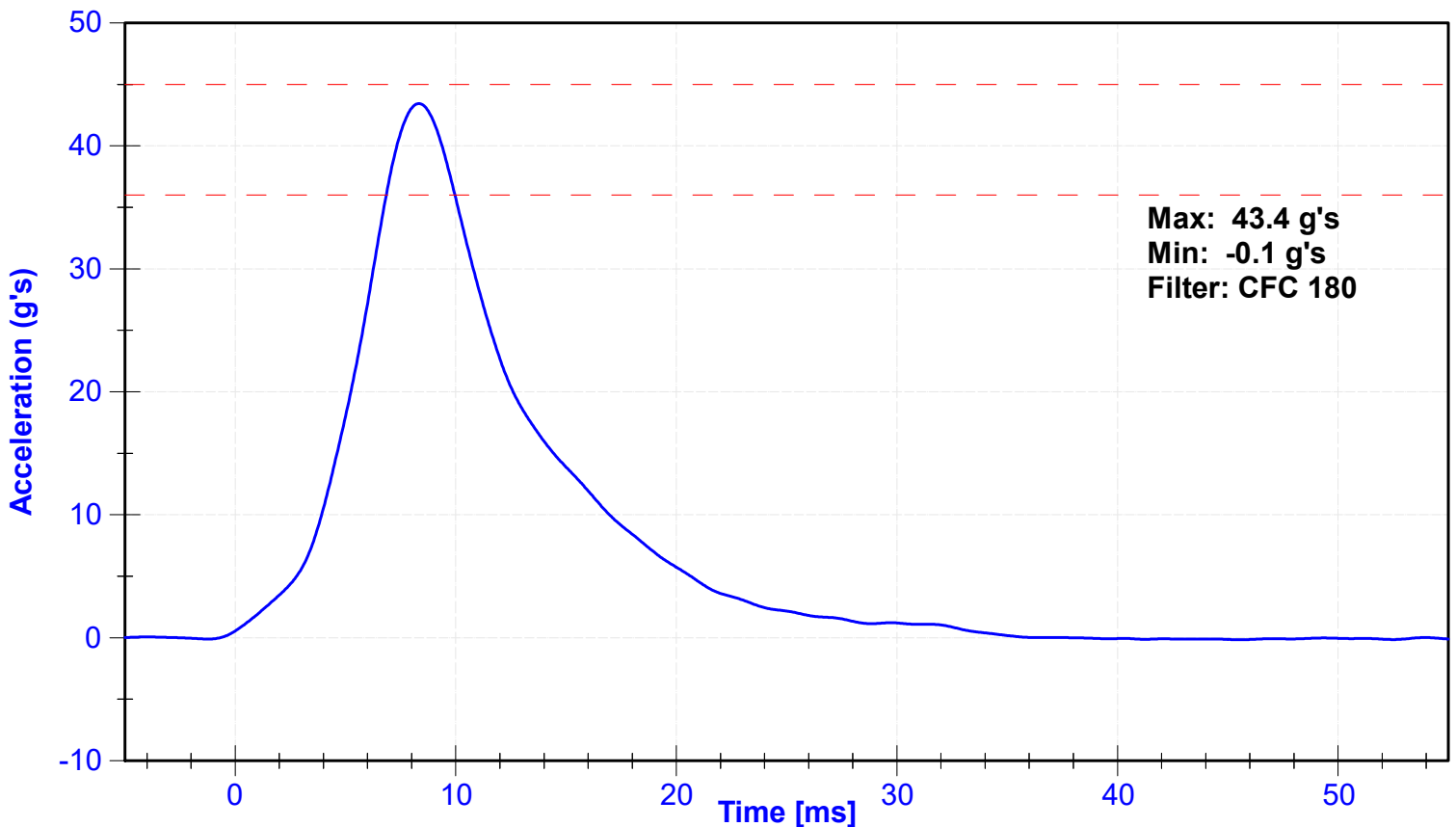
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	24	Pass
Velocity	4.2	4.4	m/s	4.34	Pass
Probe Acceleration	36	45	g's	43.4	Pass
Lateral Pelvis Acceleration	28	39	g's	36.2	Pass
Iliac Force	4100	5100	N	4591.7	Pass

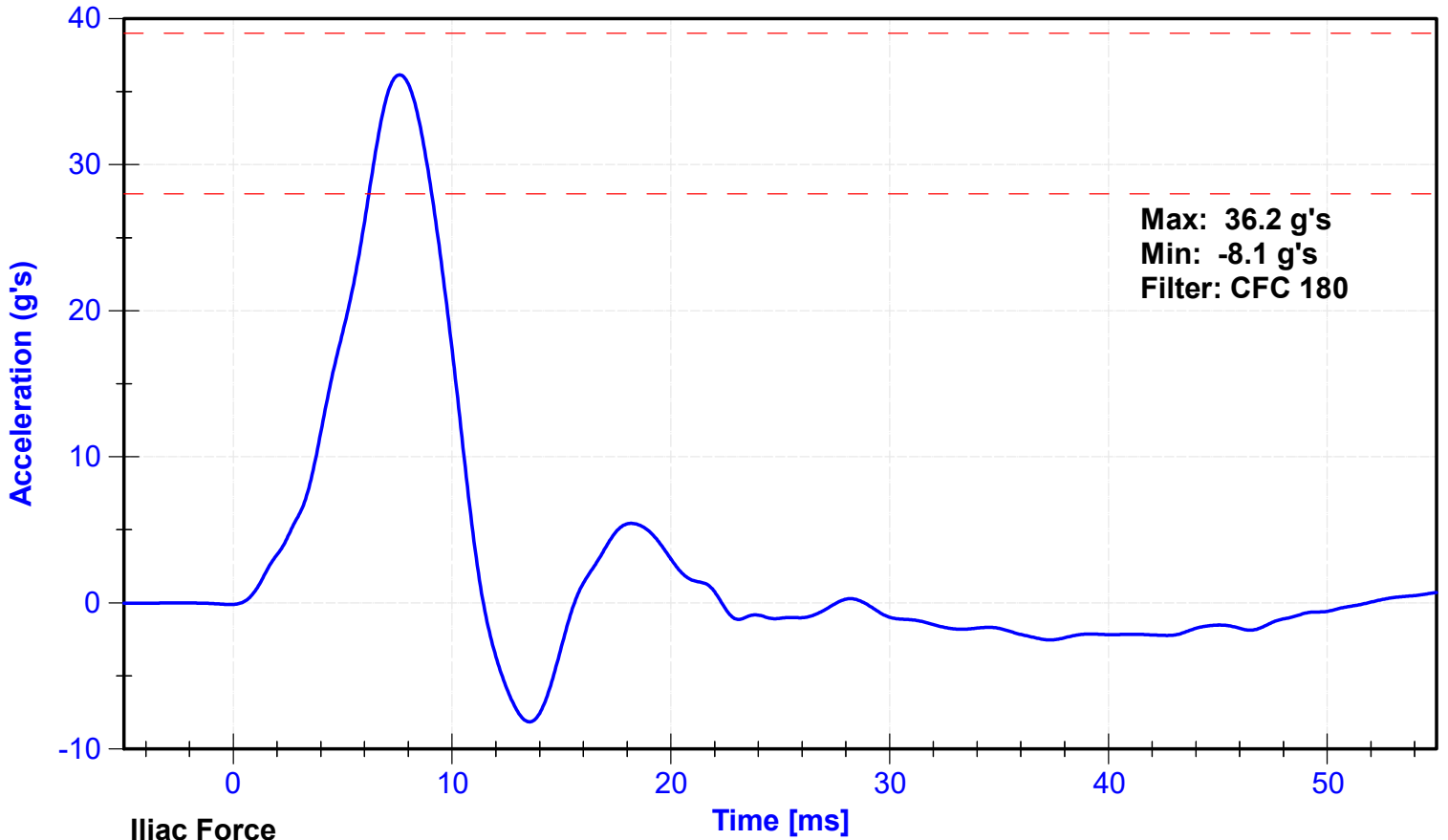
**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18494	11/5/2022	5/4/2023
Pelvis Y Accelerometer	Endevco	P51731	10/3/2022	4/1/2023
Iliac Load Cell	Denton	280-FY	8/11/2022	8/11/2023

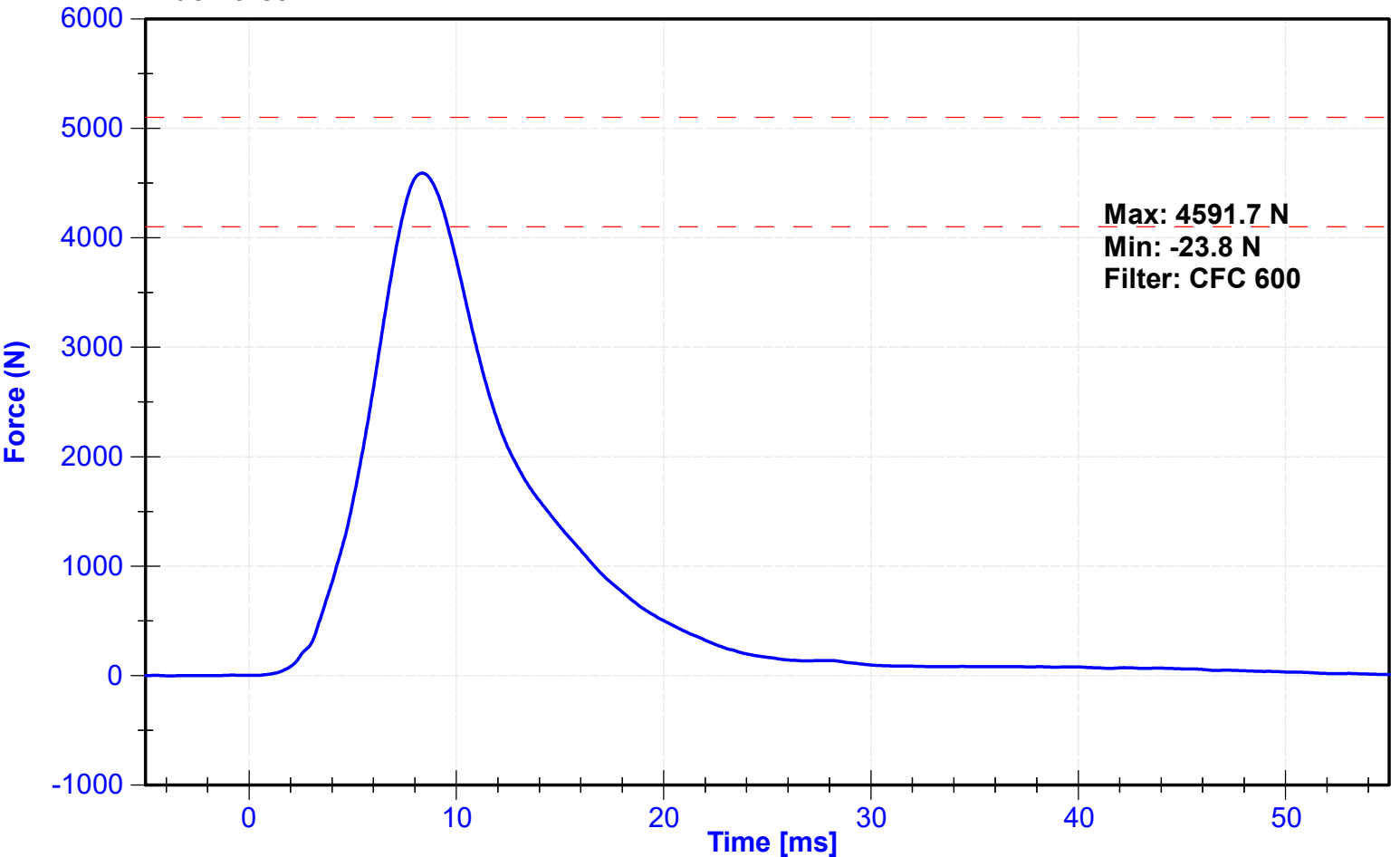
**Probe Acceleration**



### Lateral Pelvis Acceleration



### Iliac Force



## APPENDIX D

### TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

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

			ES-2re S/N _F033_		
			Serial Number	Manufacturer	Calibration Date
Head Accelerometers	Primary	X	P63861	Endevco	7/21/2022
		Y	P49216	Endevco	7/21/2022
		Z	P51303	Endevco	7/21/2022
	Redundant	X	P58868	Endevco	7/21/2022
		Y	P16755	Endevco	7/21/2022
		Z	P52132	Endevco	7/21/2022
Thorax Rib Displacement Potentiometers	Upper	Y	179GFE	Honeywell	7/25/2022
	Middle	Y	185GFE	Honeywell	7/21/2022
	Lower	Y	178GFE	Honeywell	7/21/2022
Abdomen Load Cells	Forward	Y	1509	Denton	8/12/2022
	Middle	Y	1508	Denton	8/12/2022
	Rear	Y	1507	Denton	8/12/2022
Lower Spine Accelerometers (T12)		X	P51740	Endevco	7/21/2022
		Y	P83320	Endevco	12/12/2022
		Z	P52033	Endevco	7/21/2022
Pubic Symphysis Load Cell		Y	459-FY	Denton	6/14/2022

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

			SID-IIs S/N _300_			
			Serial Number	Manufacturer	Calibration Date	
Head Accelerometers	Primary	X	P59018	Endevco	10/3/2022	
		Y	P79189	Endevco	10/3/2022	
		Z	P58777	Endevco	10/3/2022	
	Redundant	X	P68057	Endevco	10/3/2022	
		Y	P58986	Endevco	10/3/2022	
		Z	P52025	Endevco	10/3/2022	
Displacement Potentiometers	Thoracic Rib	Upper	Y	2316GFE	Servo	10/4/2022
		Middle	Y	040GFE	Servo	10/4/2022
		Lower	Y	1156GFE	Servo	10/4/2022
	Abdominal Rib	Upper	Y	307GFE	Servo	10/4/2022
		Lower	Y	308GFE	Servo	10/4/2022
Lower Spine Accelerometers (T12)		X	P64003	Endevco	10/3/2022	
		Y	P52071	Endevco	10/3/2022	
		Z	P17283	Endevco	10/3/2022	
Acetabulum Load Cell		Y	267-FY	Denton	8/11/2022	
Iliac Wing Load Cell		Y	280-FY	Denton	8/11/2022	
Pelvis Plug (struck side)			15162	SACO	10/17/2022	
Pelvis Plug (non-struck side)			15453	SACO	10/17/2022	

**TABLE 3 – Vehicle Instrumentation**

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	A350940	Measurement Specialties	9/28/2022
	Vehicle Center of Gravity	Y	A351003	Measurement Specialties	9/28/2022
	Vehicle Center of Gravity	Z	A352410	Measurement Specialties	9/28/2022
2	Right Sill at Front Seat	X	A400760	Measurement Specialties	8/23/2022
	Right Sill at Front Seat	Y	A400767	Measurement Specialties	8/23/2022
	Right Sill at Front Seat	Z	A405576	Measurement Specialties	8/23/2022
3	Right Sill at Rear Seat	X	A315829	Measurement Specialties	8/23/2022
	Right Sill at Rear Seat	Y	A350968	Measurement Specialties	8/23/2022
	Right Sill at Rear Seat	Z	A350991	Measurement Specialties	8/23/2022
4	Left Sill at Front Door	Y	A405556	Measurement Specialties	8/30/2022
5	Left Sill at Rear Door	Y	A405558	Measurement Specialties	10/4/2022
6	Left A-Post Lower	Y	A399943	Measurement Specialties	11/16/2022
7	Left A-Post Middle	Y	G22576	Endevco	10/22/2022
8	Left B-Post Lower	Y	A398646	Measurement Specialties	9/20/2022
9	Left B-Post Middle	Y	G22118	Endevco	8/11/2022
10	Front Seat Track	Y	G22607	Endevco	11/2/2022
11	Rear Seat Track or Structure	Y	A398666	Measurement Specialties	10/3/2022
12	Right Rear Occ. Compartment	Y	A431214	Measurement Specialties	10/3/2022
13	Engine Block	X	A274251	Measurement Specialties	11/3/2022
	Engine Block	Y	A431381	Measurement Specialties	11/3/2022
14	Rear Floorpan Above Axle	X	A350926	Measurement Specialties	9/16/2022
	Rear Floorpan Above Axle	Y	A350958	Measurement Specialties	9/16/2022
	Rear Floorpan Above Axle	Z	A352413	Measurement Specialties	9/16/2022

**TABLE 4 – MDB Instrumentation**

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	A398663	Measurement Specialties	11/15/2022
MDB Center of Gravity	Y	A413569	Measurement Specialties	11/15/2022
MDB Center of Gravity	Z	A413574	Measurement Specialties	11/15/2022
Left Frame at Rear Axle Centerline	X	A255878	Measurement Specialties	11/15/2022
Left Frame at Rear Axle Centerline	Y	A350971	Measurement Specialties	11/15/2022