

REPORT NUMBER: SPNCAP-CAL-010

**NEW CAR ASSESSMENT PROGRAM (NCAP)
SIDE IMPACT POLE TEST**

**SAIC General Motors Corporation Limited for General Motors LLC
2024 Buick Envision
5 Door SUV**

NHTSA No: M20240117

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



January 2, 2025

FINAL REPORT

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

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

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Date: January 2, 2025

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Date: January 2, 2025

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

1. Report No. SPNCAP-CAL-010		2. Government Accession No.		3. Recipient's Catalog No.																												
4. Title and Subtitle Final Report of New Car Assessment Program Side Impact Pole Testing of a 2024 Buick Envision 5 Door SUV NHTSA No.: M20240117				5. Report Date January 2, 2025																												
				6. Performing Organization Code CAL																												
7. Author(s) Alexander Rudniski, Test Engineer Vanessa Hansen, Operations Manager				8. Performing Organization Report No. CAL-DOT-2024-010																												
9. Performing Organization Name and Address Calspan Corporation Transportation Test Operations P.O. Box 400 Buffalo, New York 14225				10. Work Unit No.																												
				11. Contract or Grant No. 693JJ920D000016																												
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards 1200 New Jersey Ave., SE Washington, D.C. 20590				13. Type of Report and Period Covered: Final Test Report September 11, 2024 - January 2, 2025																												
				14. Sponsoring Agency Code NRM-110																												
15. Supplementary Notes																																
16. Abstract A 32.20 km/h (20 mph), 75° oblique impact Side NCAP Test was conducted on the subject 2024 Buick Envision 5 Door SUV in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP Pole Laboratory Test Procedure for the generation of consumer information on vehicle side pole crash protection. This test was conducted at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on September 11, 2024. The impact velocity of the vehicle was 32.08 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle was 21°C. The target vehicle's maximum post-test static crush was 390 mm located at level 2. The test vehicle's occupant performance data is as follows: <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th colspan="3">Driver ATD (SID-IIs) (Serial No.300)</th> </tr> <tr> <th>Units</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC36)</td> <td></td> <td>1000</td> <td>265.843</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td>G</td> <td>82</td> <td>35.449</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td>N</td> <td>5525</td> <td>1521.584</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38</td> <td>16.009</td> </tr> <tr> <td>Maximum Abdominal Rib Deflection</td> <td>mm</td> <td>45*</td> <td>10.995</td> </tr> </tbody> </table> 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.						Measurement Description	Driver ATD (SID-IIs) (Serial No.300)			Units	Threshold	Result	Head Injury Criteria (HIC36)		1000	265.843	Resultant Lower Spine Acceleration	G	82	35.449	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	1521.584	Maximum Thoracic Rib Deflection	mm	38	16.009	Maximum Abdominal Rib Deflection	mm	45*	10.995
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17. Key Words New Car Assessment Program (NCAP) Side Impact Pole Part 572V SID-IIs				18. Distribution Statement <u>Copies of this report are available from:</u> National Highway Traffic Safety Administration Technical Information Services Division 1200 New Jersey Ave. Washington, D.C. 20590																												
19. Security Class. (of this report) UNCLASSIFIED		20. Security Class. (of this page) UNCLASSIFIED		21. No. of Pages 126	22. Price																											

Form DOT F1700.7 (8-72)

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SECTION 1

TEST PURPOSE AND PROCEDURE

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

SECTION 2

SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2024 Buick Envision 5 Door SUV. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.08 km/h. The test was conducted by Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on September 11, 2024. Pre-test and post-test photographs of the test vehicle and side impact dummy (SID-IIs) are included in Appendix A of this report.

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

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

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

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

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

INJURY READINGS

Measurement Description	Driver ATD (SID-IIs)		
	Units	IARV	Result
Head Injury Criteria (HIC36)		1000	265.843
Resultant Lower Spine Acceleration	G	82	35.449
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	1521.584
Maximum Thoracic Rib Deflection	mm	38	16.009
Maximum Abdominal Rib Deflection	mm	45*	10.995

*Proposed IARV

Supplemental restraint information was recorded as follows:

SUPPLEMENTAL RESTRAINT INFORMATION

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Front Airbag	Yes	No		
Knee Airbag	Yes	No		
Side Airbag 1 - Curtain	Yes	Yes	Yes	Yes
Side Airbag 2 - Torso Airbag	No	N/A	No	N/A
Side Airbag 3 - Torso/Pelvis Airbag	Yes	Yes	No	N/A
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Other				

GENERAL COMMENTS:

1. P1 serial number - 300

Data Anomalies:

- Front Seat Track Y Acceleration, Questionable data shift after 69.1 ms

SECTION 3

OCCUPANT AND VEHICLE INFORMATION

This section contains information reporting for the following Data Sheets:

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

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

Data Sheet No. 3 - Dummy Longitudinal Clearance Dimensions

Data Sheet No. 4 - Dummy Lateral Clearance Dimensions

Data Sheet No. 5 - Camera and Instrumentation Data

Data Sheet No. 6 - Test Vehicle Accelerometer Locations

Data Sheet No. 7- Rigid Pole Load Cell Data

Data Sheet No. 8 - Post-Test Observations

Data Sheet No. 9 - Test Vehicle Profile Measurements

Data Sheet No. 10 - Test Vehicle Exterior Crush Measurements

Data Sheet No. 11 - Vehicle Damage Profile Distances

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

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

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2024 Buick Envision 5 Door SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20240117
Test Date: 09/11/2024

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20240117
Model Year	2024
Make	Buick
Model	Envision
Body Style	SUV
VIN	LRBFZME44RD019027
Body Color	Cinnabar Metallic
Odometer Reading (km/mi)	152 mi.
Engine Displacement (L)	2.0
Type / No. Cylinders	I4
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	9-Speed
Overdrive	Yes
Final Drive	All Wheel Drive
Roof Rack	No
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	Yes
Automatic Door Locks (ADLs)	Yes

Traction Control System (TCS)	Yes
Power Steering	Yes
Power Window Auto-Reverse	Yes
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso / Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	Yes
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head / Torso Airbag	No
Rear Pass. Torso Airbag	No
Rear Pass. Torso / Pelvis Airbag	No
Rear Pass. Pelvis Airbag	No
Driver Seat Belt Pretensioner	Yes
Rear Pass. Seat Belt Pretensioner	Yes
Driver Load Limiter	Yes
Rear Pass. Load Limiter	Yes
Other Safety Restraint	N/A

Does owner's manual provide instructions to turn off automatic door locks?

No

DATA FROM CERTIFICATION LABEL

Manufactured By	SAIC General Motors Corporation Limited for General Motors LLC
Date of Manufacture	12/23

GVWR (KG)	2300
GVWR Front (KG)	1270
GVWR Rear (KG)	1225

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	3	N/A	5
Vehicle Capacity Weight (VCW) (kg)				484
DSC x 68.0 kg				340
Cargo Weight (RCLW) (kg)				136

(A)

(B)

VEHICLE SEAT TYPE

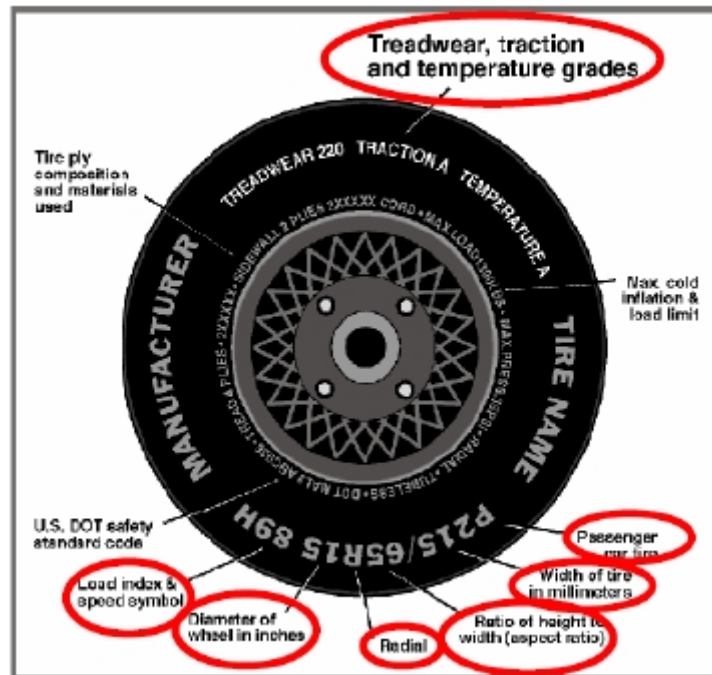
Seating Location	Type Of Seat Pan				Type Of Seat Back		
	Bucket	Bench	Split Bench	Contour	Fixed	Adjustable	
						W/ Lever	W/ Knob
Front	X						X
Rear or Second Row Seat			X		X		
Third Row seat	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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

Test Vehicle: 2024 Buick Envision 5 Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20240117
 Test Date: 09/11/2024

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



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	240	240
Recommended Tire Size	235/60R18	235/60R18
Tire Size on Vehicle	235/60R18	235/60R18
Tire Manufacturer	Continental	Continental
Tire Model	ProContact	ProContact
Treadwear	500	500
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel, 1 Polyamide	2 Polyester, 2 Steel, 1 Polyamide
Load Index / Speed Symbol	103H	103H
Tire Material	Rubber	Rubber
DOT Safety Code Left	ILF0FBBYB4423	ILF0FBBYB4423
DOT Safety Code Right	ILF0FBBYB4423	ILF0FBBYB4423

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

Test Vehicle: 2024 Buick Envision 5 Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20240117
 Test Date: 09/11/2024

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	230	229	230	230
Tire Placard	kPa	240	240	240	240
Owner's Manual	kPa	240	240	240	240
As Tested	kPa	240	240	240	240

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Rear	Total	Total	Front	Rear	Total
Left	kg	541	370		557	448		586	431	
Right	kg	520	358		521	440		510	452	
Ratio	%	59.3	40.7		54.8	45.2		55.4	44.6	
Totals	kg	1061	728	1789	1078	888	1966	1096	883	1979

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1789	(A)
Actual Weight of 1 P572V (SID-IIs) ATD Used	kg	50	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	136	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1975	(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	As Delivered	As Tested	Fully Loaded	Meets Rqmt***
Driver Door Sill Angle (front-to-rear)*	Deg	-1.05	-0.50	-0.45	Yes
Front Passenger Sill Angle (front-to-rear)*	Deg	-0.70	-0.70	-0.45	Yes
Front Bumper-Line Angle (left-to-right)**	Deg	-0.05	-0.20	-0.40	Yes
Rear Bumper-Line Angle (left-to-right)**	Deg	-0.30	-0.30	-0.20	Yes
Vehicle CG (Aft of Front Axle)	mm	1131	1255	1240	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	+15	+18	+22	

* ND = Nose Down (-), NU = Nose Up (+)

** LD = Left Down (-), LU = Left Up (+)

*** The "As Tested" vehicle attitude measurements must be equal to or between the "As Delivered" and "Fully Loaded" vehicle attitude measurements. Indicate "Yes" or "No" for Meets Requirement

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

Test Vehicle: 2024 Buick Envision 5 Door SUV	NHTSA No.: M20240117
Test Program: NCAP Side Pole Impact Test	Test Date: 09/11/2024

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Trunk Carpeting	10
Spare Tire	15
Jack	3
Tail Light	2
Ballast / Equipment Added	99

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

TEST SURFACE MARKING

	Distance from 75° Impact Location Line (mm)
Fore 25 mm target	913
Aft 25 mm target	914

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

Test Vehicle: 2024 Buick Envision 5 Door SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20240117
Test Date: 09/11/2024

SEAT POSITIONING

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

SCRL ANGLE RANGE

Seat	SCRL(°)		
	Max	Min	Mid
Driver Seat	15.7	7.4	11.6
Front Passenger Seat	15.0	10.8	12.9
Front Center Seat			
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid-Fore / Aft	Forward-Most
Driver Seat	11.6	27	Max	65	63	61
			Mid	33	30	27
			Min	1	2	4
Front Passenger Seat	12.9	11	Max	-	-	-
			Mid	-	-	-
			Min	13	12	11
Front Center Seat*			Max			
			Mid			
			Min			
Struck Side Rear Seat	Fixed	Fixed	Max			
			Mid			
			Min			
Non-Struck Side Rear Seat	Fixed	Fixed	Max			
			Mid			
			Min			
Rear Center Seat*	Fixed	Fixed	Max			
			Mid			
			Min			

**If applicable*

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

Test Vehicle: 2024 Buick Envision 5 Door SUV
 Test Program: NCAP Side Pole Impact Test

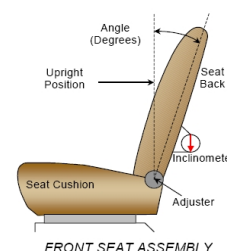
NHTSA No.: M20240117
 Test Date: 09/11/2024

SEAT FORE / AFT POSITION

Seat	Total Fore / Aft Travel		Test Position from Forward most Position	
	mm	Detents*	mm	Detents*
Driver Seat	240	Power	0	Power
Front Passenger Seat	240	25 (0-24)	0	0
Front Center Seat				

SEAT BACK ANGLE ADJUSTMENT

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



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detents*
Driver Seat w/Seated Dummy	61.0	Power	24.5	Power
Front Passenger Seat	59.4	30 (0-29)	24.5	12
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

SEAT BELT ANCHORAGE ADJUSTMENT

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

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

HEAD RESTRAINT ADJUSTMENT

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

Seat	Total # of Positions	Placed in Position #
Driver Seat	9 (0-8)	Lowermost

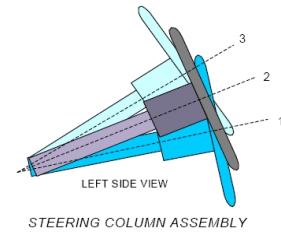
DATA SHEET NO. 2 ... (CONTINUED)
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle: 2024 Buick Envision 5 Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20240117
 Test Date: 09/11/2024

STEERING COLUMN POSITIONS

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

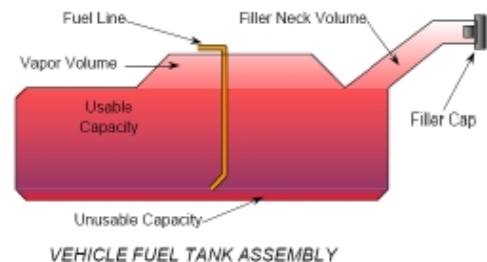


	Degrees	Fore / Aft Position (mm)
Lowermost - Position No. 1	22.8	
Geometric center - Position No. 2	25.1	
Uppermost - Position No. 3	27.3	
Telescoping Steering Wheel Travel		65
Test Position	25.1	37.5

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 fuel pump. The fuel filler neck is on the right side of the vehicle. The pump creates positive pressure in the fuel lines, pushing the gasoline to the engine. See form 1 for more information.



FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank"	60.9
Usable Capacity of "Optional Tank"	N/A
Usable Capacity of "Standard Tank" - see Owner's Manual	60.9
Usable Capacity of "Optional Tank" - see Owner's Manual	N/A
93% of Usable Capacity	56.6
Gasoline to Achieve 100% of Capacity (As delivered)	60.9
1/3 of Usable Capacity	20.3

Is the Actual Amount of Solvent Used in the test equal to 93% $\pm$ 1% of the Usable

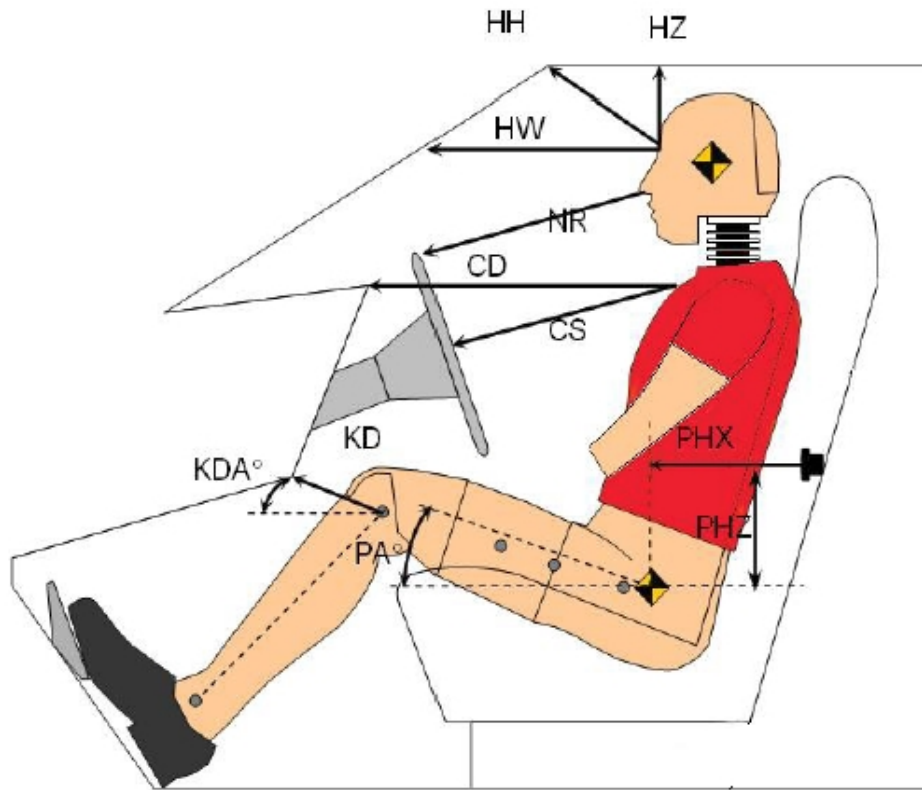
Capacity stated in Form No. 1?

☒ Yes ☐ No

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2024 Buick Envision 5 Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20240117
 Test Date: 09/11/2024



Left Side View

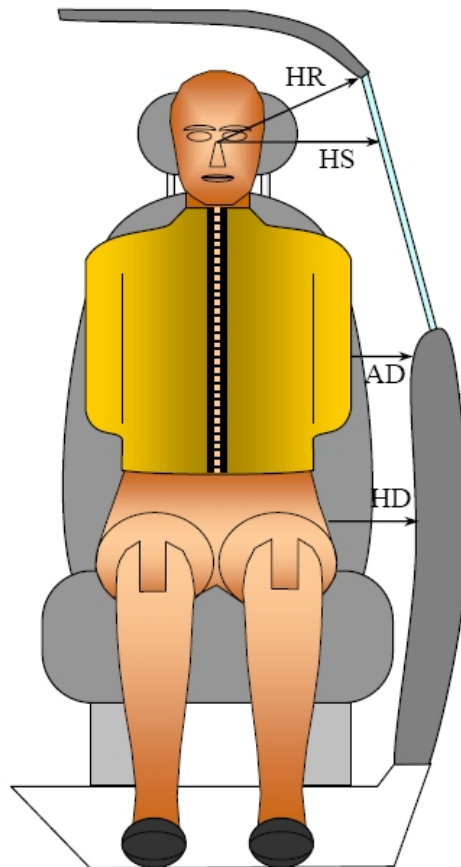
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Description	Driver (Serial No. 300)	
		Length (mm)	Angle (°)
HH	Head to Header	315	
HW	Head to Windshield	645	
HZ	Head to Roof Liner	210	
NR	Nose to Rim	263	
CD	Chest to Dash	456	
CS	Chest to Steering Wheel	207	
KD(L) / KDA(L)°	Left Knee to Dash	157	26.2
KD(R) / KDA(R)°	Right Knee to Dash	154	27.9
PAX°	Pelvic Tilt Angle (X-Axis)		19.3
PAY°	Pelvic Tilt Angle (Y-Axis)		0.2
PHX	Hip Point to Striker (X-Axis)	269	
PHZ	Hip Point to Striker (Z-Axis)	122	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2024 Buick Envision 5 Door SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20240117
Test Date: 09/11/2024



FRONT VIEW OF DUMMY

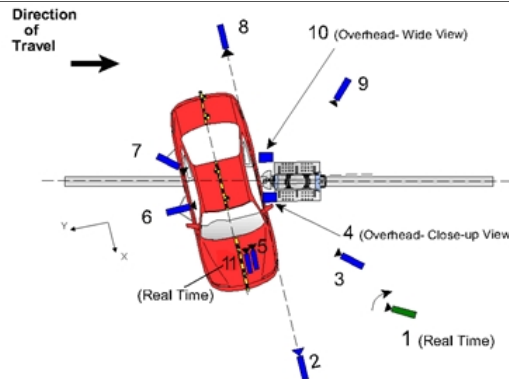
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver – Length (Serial No. 300)
HR	Head to Side Header	mm	252
HS	Head to Side Window	mm	370
AD	Arm to Door	mm	169
HD	H-Point to Door	mm	176

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

Test Vehicle: 2024 Buick Envision 5 Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20240117
 Test Date: 09/11/2024



CAMERA LOCATIONS AND DATA

No.	Camera View	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-time (24 - 30 fps) pan view of impact				Zoom	60
2	Front ground level - impact view	7711	0	-1543	28	1000
3	Impact side 45° - forward pole view	4914	1067	-1349	24	1000
4	Overhead Close-up view of impact	0	0	-8992	28	1000
5	Onboard - dummy front view				25	1000
6	Onboard - dummy side view				12.5	1000
7	Onboard - dummy rear oblique view				12.5	1000
8	Rear ground level - impact view	-811.1	0	-1430	28	1000
9	Impact side 45° - rearward pole view	-3977	3534	-1468	24	1000
10	Overhead wide - view of impact	0	-310	-8992	16	1000
11	Real-time (24 - 30 fps) - dummy front view				Zoom	60

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

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

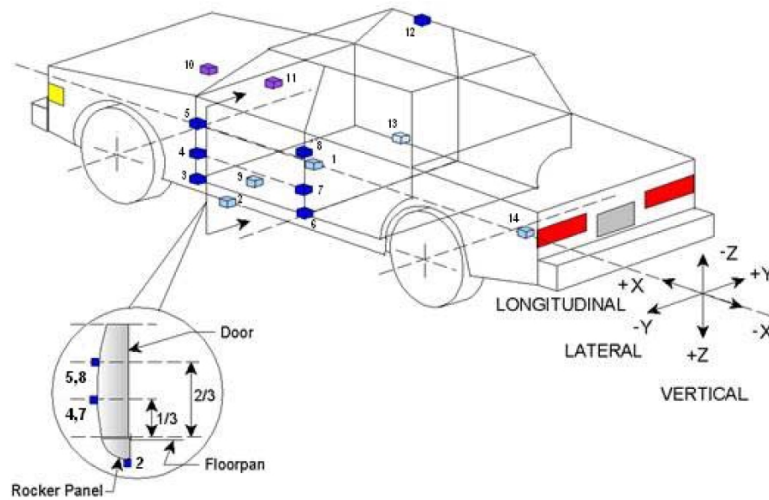
INSTRUMENTATION

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

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

Test Vehicle: 2024 Buick Envision 5 Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20240117
 Test Date: 09/11/2024



TEST VEHICLE ACCELEROMETER LOCATIONS

No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	1954	18	257
2	Left Floor Sill	2757	-690	311
3	A-Pillar Sill	3097	-647	286
4	A-Pillar Low	3165	-659	101
5	A-Pillar Mid	3029	-651	-449
6	B-Pillar Sill	2069	-644	261
7	B-Pillar Low	2140	-693	132
8	B-Pillar Mid	2029	-653	-417
9	Driver Seat Track	2233	-559	260
10	Engine Top	3881	169	-206
11	Firewall	3508	155	-195
12	Right Roof	2188	582	-917
13	Right Floor Sill	2791	688	292
14	Rear Floor Pan	680	21	118

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

DATA SHEET NO. 7
RIGID POLE LOAD CELL DATA

Test Vehicle: 2024 Buick Envision 5 Door SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20240117
Test Date: 09/11/2024

POLE BARRIER



RIGID POLE LOAD CELL LOCATION

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

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

Test Vehicle: 2024 Buick Envision 5 Door SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20240117
Test Date: 09/11/2024

TEST DUMMY INFORMATION AND CONTACT POINTS

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

POST-TEST DOOR PERFORMANCE

Description	Struck Side		Non-Struck Side		Rear Hatch/Other
	Front	Rear	Front	Rear	
Remained Closed and Operational	No	No	Yes	Yes	Yes
Total Separation from Vehicle at Hinges or Latches	No	No	No	No	No
Latch or Hinge Systems Pulled Out of Their Anchorages	No	No	No	No	No
Latch Separated from Striker	No	No	No	No	No
Jammed Shut	Yes	Yes	No	No	No
If Door Opened at Striker, Width of Opening at Striker (mm)	0	0	0	0	0

POST-TEST SEAT PERFORMANCE

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

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

Test Vehicle: 2024 Buick Envision 5 Door SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20240117
Test Date: 09/11/2024

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	Cracked throughout with separation along Driver A-pillar and roof
Side Window Damage	Cracked throughout
Other Notable Effects	None

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Driver		Struck Side Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Front Airbag	Yes	No		
Knee Airbag	Yes	No		
Side Airbag 1 - Curtain	Yes	Yes	Yes	Yes
Side Airbag 2 - Torso Airbag	No	N/A	No	N/A
Side Airbag 3 - Torso/Pelvis Airbag	Yes	Yes	No	N/A
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Other				

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

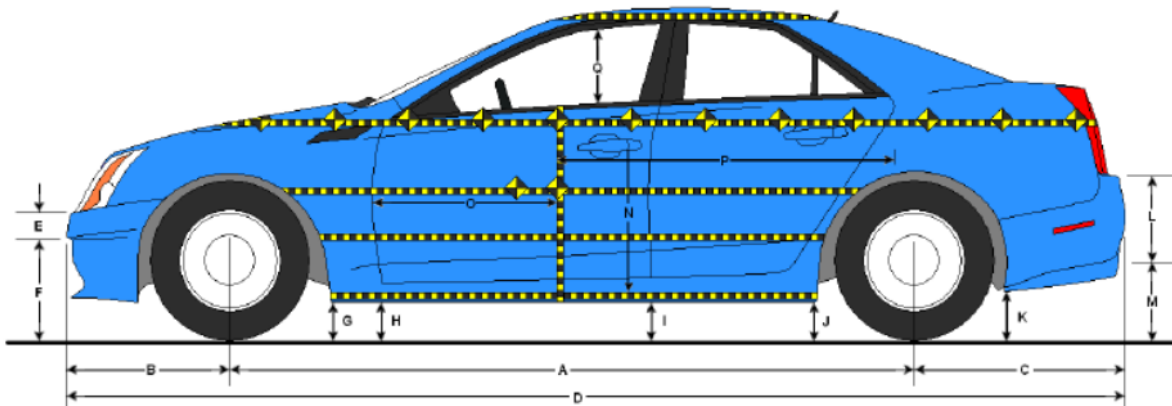
Measured Parameter	Units	Tolerance	Value
Vertical Impact Ref Line - Aft of Front Axle, Intended Impact Pt	mm		1152
Actual Impact Point - Aft of Front Axle	mm		1152
Horizontal Offset (+ forward / - rearward)	mm	+/- 38*	0
Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion	deg	75 +/- 3	75
Trap No. 1 Velocity - Primary	kph	31.4 to 33.0	32.08
Trap No. 2 Velocity - Redundant	kph	31.4 to 33.0	32.15

*Of Intended Impact Point

DATA SHEET NO. 9
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2024 Buick Envision 5 Door SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20240117
Test Date: 09/11/2024



LEFT SIDE VIEW

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

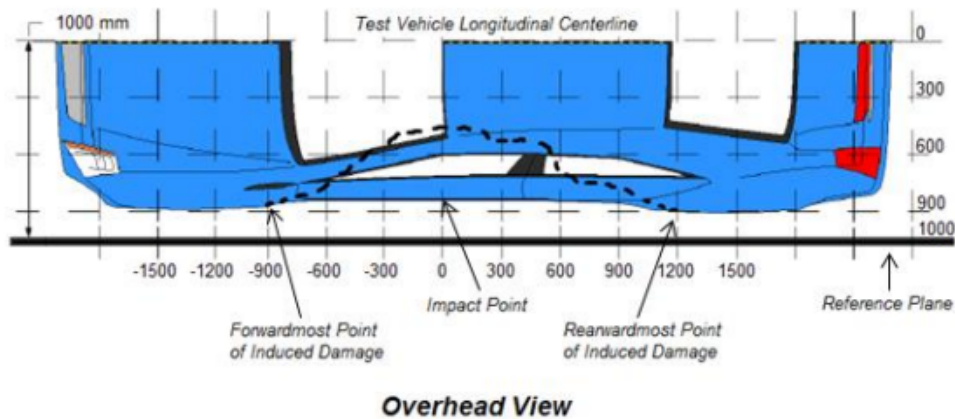
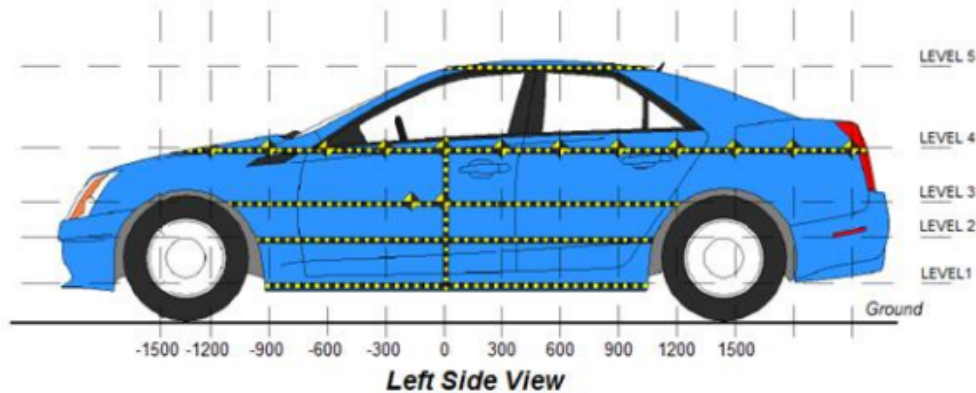
No.	Measurement Description	Pre-Test	Post-Test	Change
A	Vehicle Wheelbase	2779	2680	-99
B	Front Axle to FSOV	981	1025	44
C	Rear Axle to RSOV	882	881	-1
D	Total Length at Centerline	4642	4586	-56
E	Front Bumper Thickness	130	130	0
F	Front Bumper Bottom to Ground	455	503	48
G	Sill Height at Front Wheel Well	235	230	-5
H	Sill Height at Front Door Leading Edge	234	240	6
I	Sill Height at B Pillar	231	238	7
J1	Sill Height at Rear Wheel Well	227	246	19
J2	Pinch Weld Height at Rear Wheel Well	230	245	15
K	Sill Height Aft of Rear Wheel Well	269	280	11
L	Rear Bumper Thickness	145	145	0
M	Rear Bumper Bottom to Ground	471	466	-5
N	Sill Height to Bottom of Front Window Sill	896	897	1
O	Front Door Leading Edge to Impact CL	665	546	-119
P	Rear Door Trailing Edge to Impact CL	1540	1447	-93
Q	Front Window Opening	364	347	-17
R	Right Side Length	4522	4516	-6
S	Left Side Length	4521	4440	-81
T	Vehicle Width at B-Pillars	1860	1715	-145
U	Front Wheel Track width	1613	1608	-5
V	Rear Wheel Track Width	1616	1616	0

* All measurements in mm with tolerance of ± 3 mm

DATA SHEET NO.10 **TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2024 Buick Envision 5 Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20240117
 Test Date: 09/11/2024



MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	385	329	0
2	Driver H-Point	mm	684	390	0
3	Mid-Door	mm	756	385	0
4	Window Sill	mm	1107	319	0
5	Window Top	mm	1578	118	150

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

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

Test Vehicle: 2024 Buick Envision 5 Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20240117
 Test Date: 09/11/2024

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

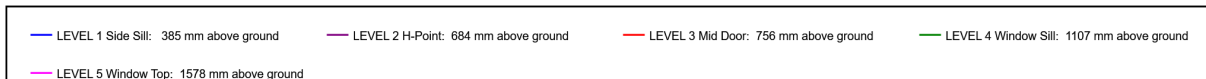
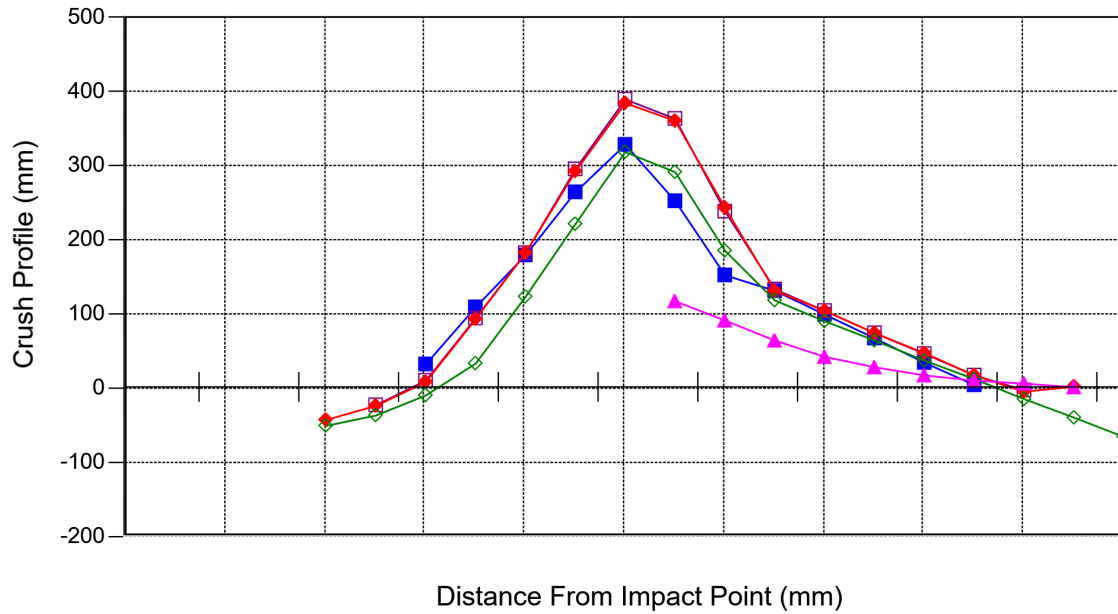
	Pre-Test					Post-Test					Crush				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1500															
-1350															
-1200															
-1050															
-900			940	811				982	861				-42	-50	
-750		935	935	815			957	958	851			-22	-23	-36	
-600	903	919	919	821		870	908	910	830		33	11	9	-9	
-450	884	913	916	822		774	818	822	788		110	95	94	34	
-300	887	914	915	828		707	731	732	704		180	183	183	124	
-150	890	919	915	832		625	623	622	610		265	296	293	222	
0	893	923	916	836		564	533	531	517		329	390	385	319	
150	896	926	919	840	611	643	562	558	548	493	253	364	361	292	118
300	899	929	923	843	620	746	690	679	657	528	153	239	244	186	92
450	901	929	924	844	622	769	795	792	725	557	132	134	132	119	65
600	904	930	926	844	623	804	825	821	753	580	100	105	105	91	43
750	905	930	927	845	620	837	855	852	780	591	68	75	75	65	29
900	903	931	929	844	609	868	884	881	806	591	35	47	48	38	18
1050	902	932	931	844	596	897	914	913	831	585	5	18	18	13	11
1200		934	936	856	578		936	940	870	571		-2	-4	-14	7
1350			940	861	548			937	900	546			3	-39	2
1500				863					928					-65	

NOTE: Pre-test measurements are taken when the vehicle is in the “As Tested” weight condition. Vehicle measurements forward of the vertical impact reference line are negative. The crush profile grid is established prior to the test based on an estimated impact point. The final distance from impact is determined after the final dummy positioning and the pole is aligned with the center of gravity of the dummy’s head.

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

Test Vehicle: 2024 Buick Envision 5 Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20240117
 Test Date: 09/11/2024



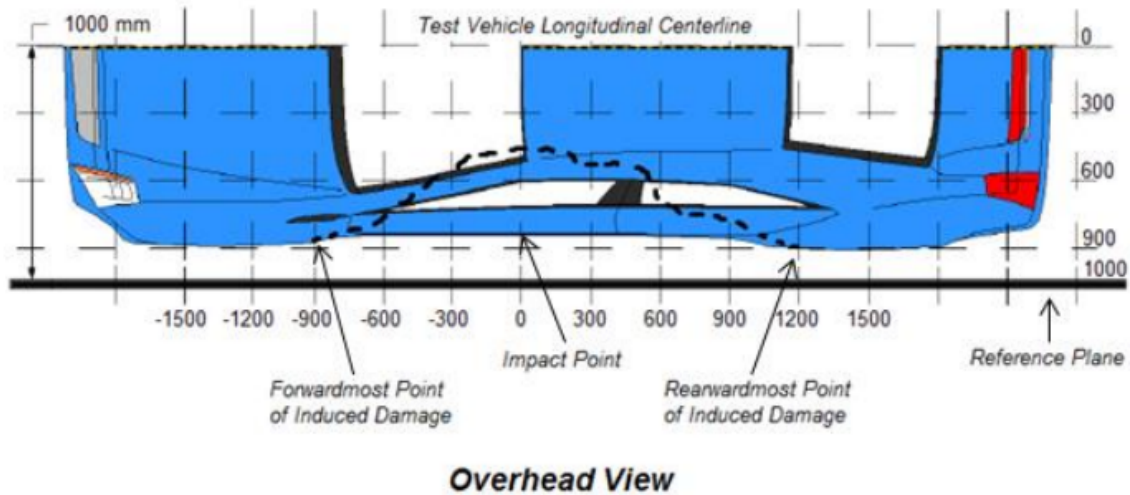
Vehicle Exterior Crush Measurements - Visual Representation

DATA SHEET NO.11 **VEHICLE DAMAGE PROFILE DISTANCES**

Test Vehicle: 2024 Buick Envision 5 Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20240117
 Test Date: 09/11/2024

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	-900	3	18	60	-42
2	-450	3	178	84	94
3	0	3	469	84	385
4	450	3	208	76	132
5	900	3	119	71	48
6	1350	3	63	60	3

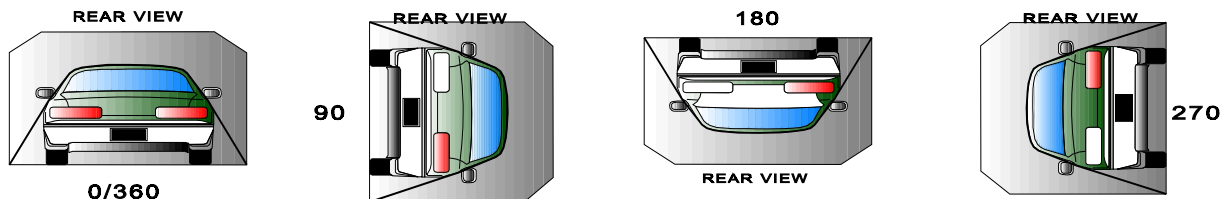
DATA SHEET NO.12
FMVSS NO.301 STATIC ROLLOVER RESULTS

Test Vehicle: 2024 Buick Envision 5 Door SUV NHTSA No.: M20240117
 Test Program: NCAP Side Pole Impact Test Test Date: 09/11/2024

Test Time: 8:59 AM Temperature: 21 °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.)

D. Spillage Detail: No Spillage



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	68	300	368
90° to 180°	68	300	368
180° to 270°	68	300	368
270° to 360°	68	300	368

FMVSS 301 SPILLAGE TABLE

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

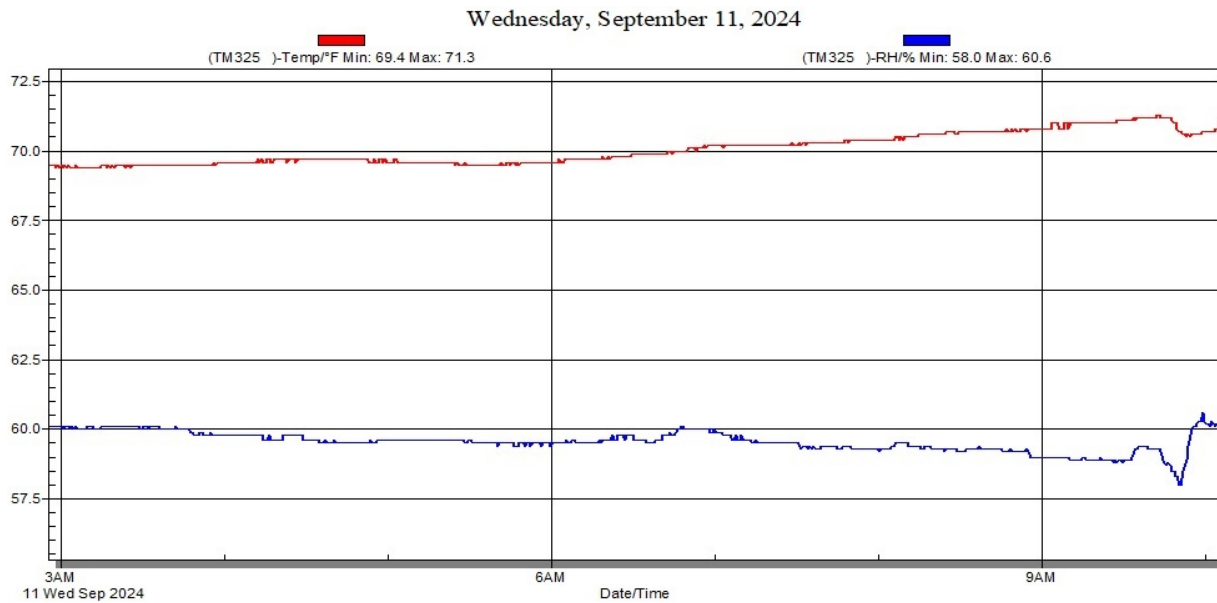
SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0° to 90°	None
90° to 180°	None
180° to 270°	None
270° to 360°	None

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

Test Vehicle: 2024 Buick Envision 5 Door SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20240117
Test Date: 09/11/2024



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

APPENDIX A
PHOTOGRAPHS

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Figure A-1: As Delivered Right Front $\frac{3}{4}$ View of Test Vehicle



Figure A-2: As Delivered Left Rear $\frac{3}{4}$ 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

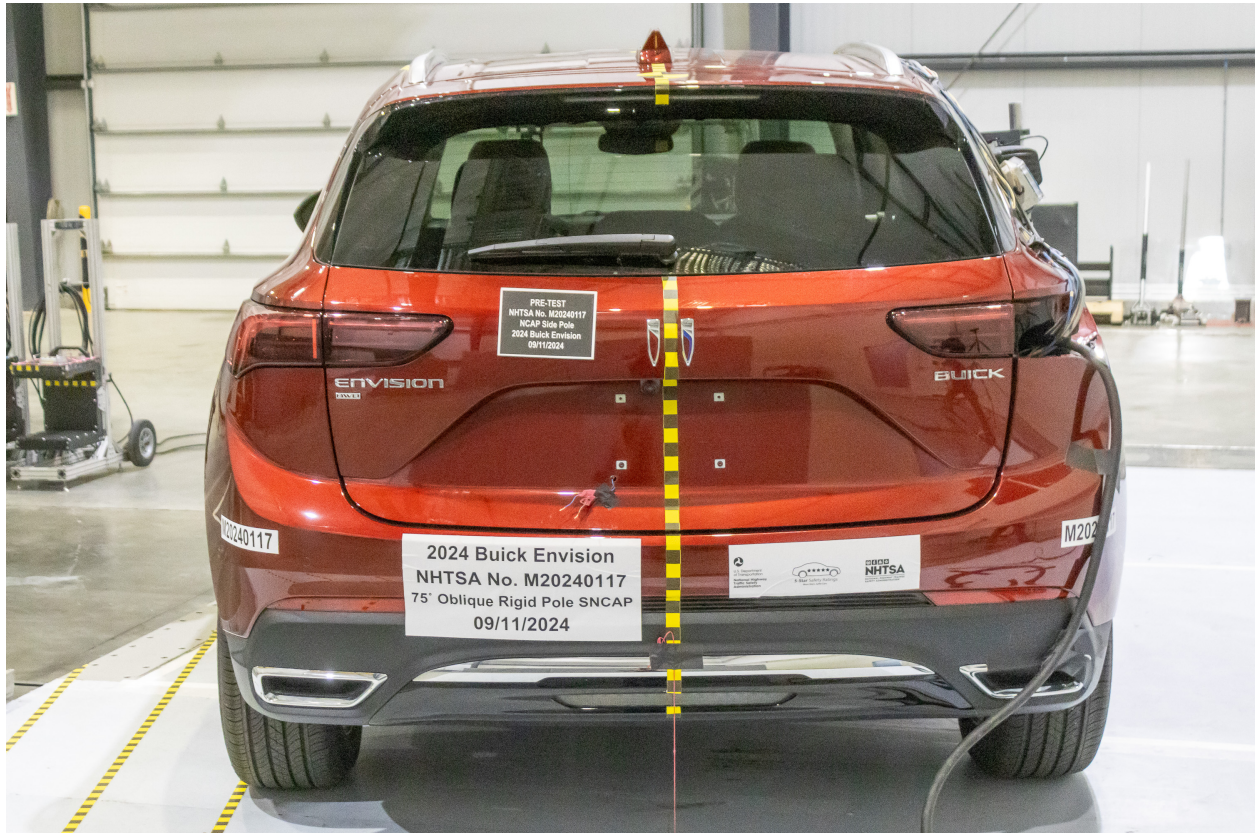


Figure A-11: Pre-Test Rear View of Test Vehicle



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



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



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



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

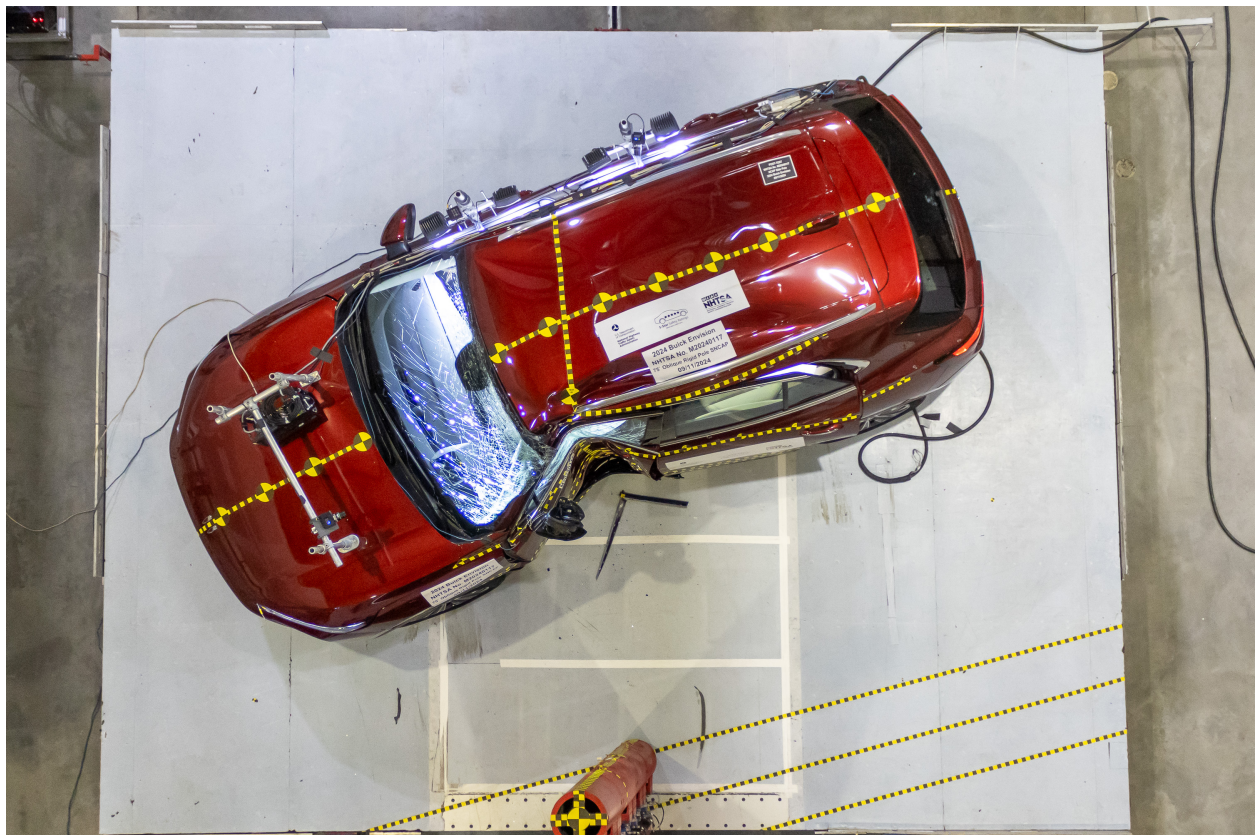


Figure A-16: Post-Test Overhead View of Test Area



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



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



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

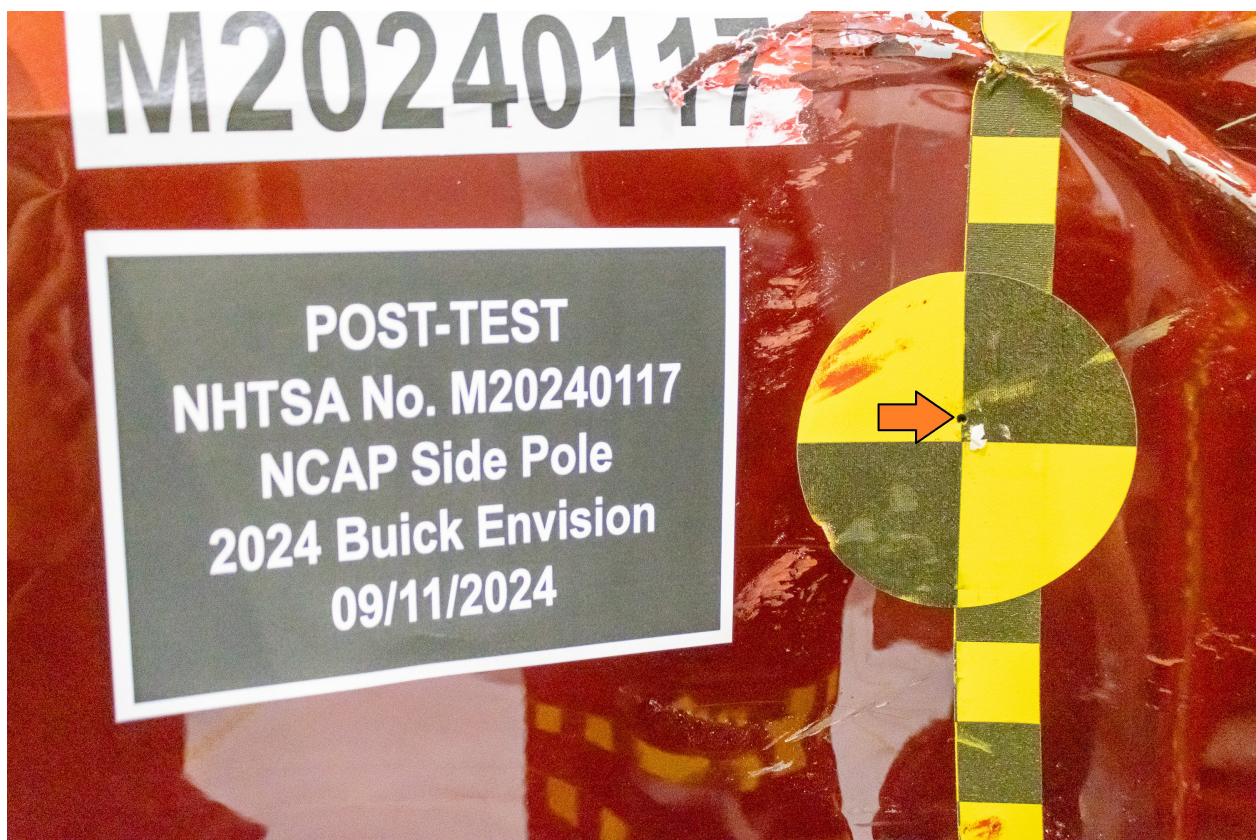


Figure A-20: Post-Test Close-Up View of Impact Point Target Showing Impact Location



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



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



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



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



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



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

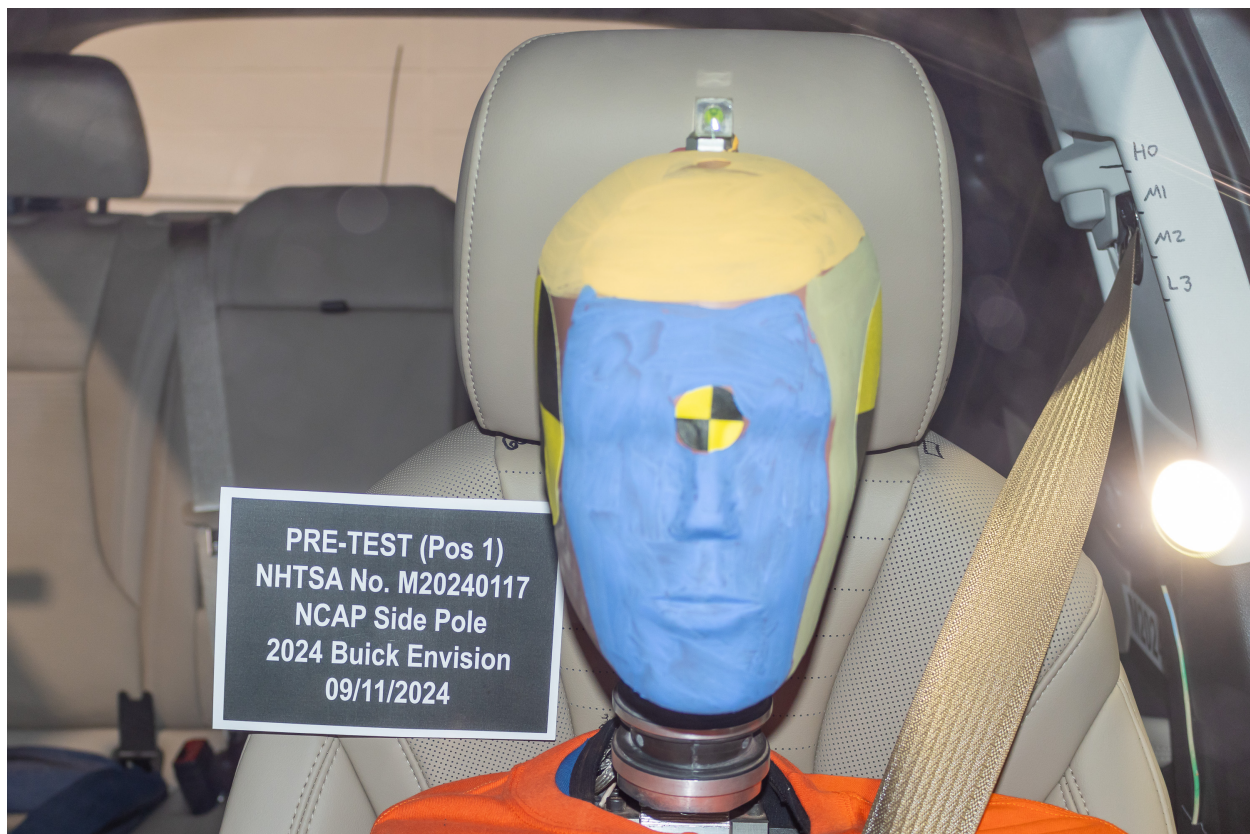


Figure A-27: Pre-Test Frontal Close-Up View of Dummy Head / Shoulders in Relation to Head Restraint



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

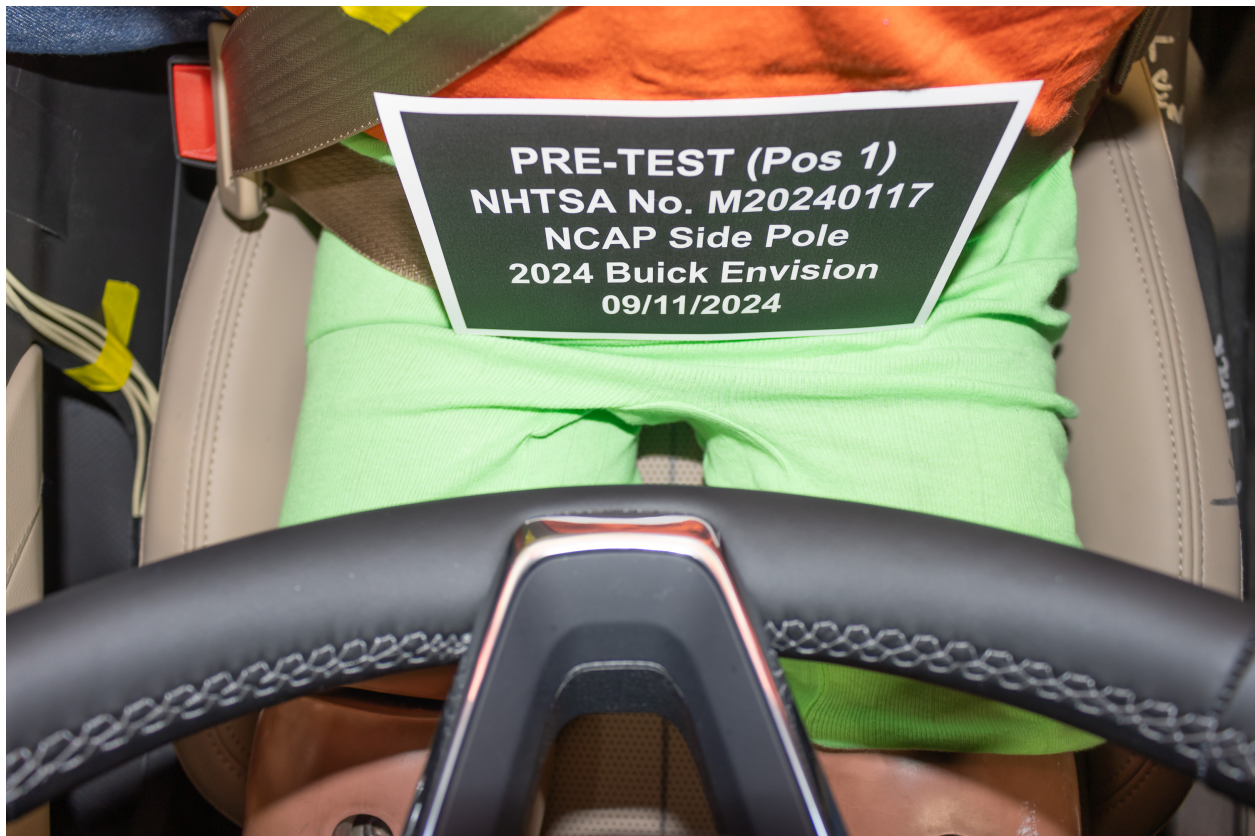


Figure A-29: Pre-Test Overhead View of Dummy Thighs on Seat Pan



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

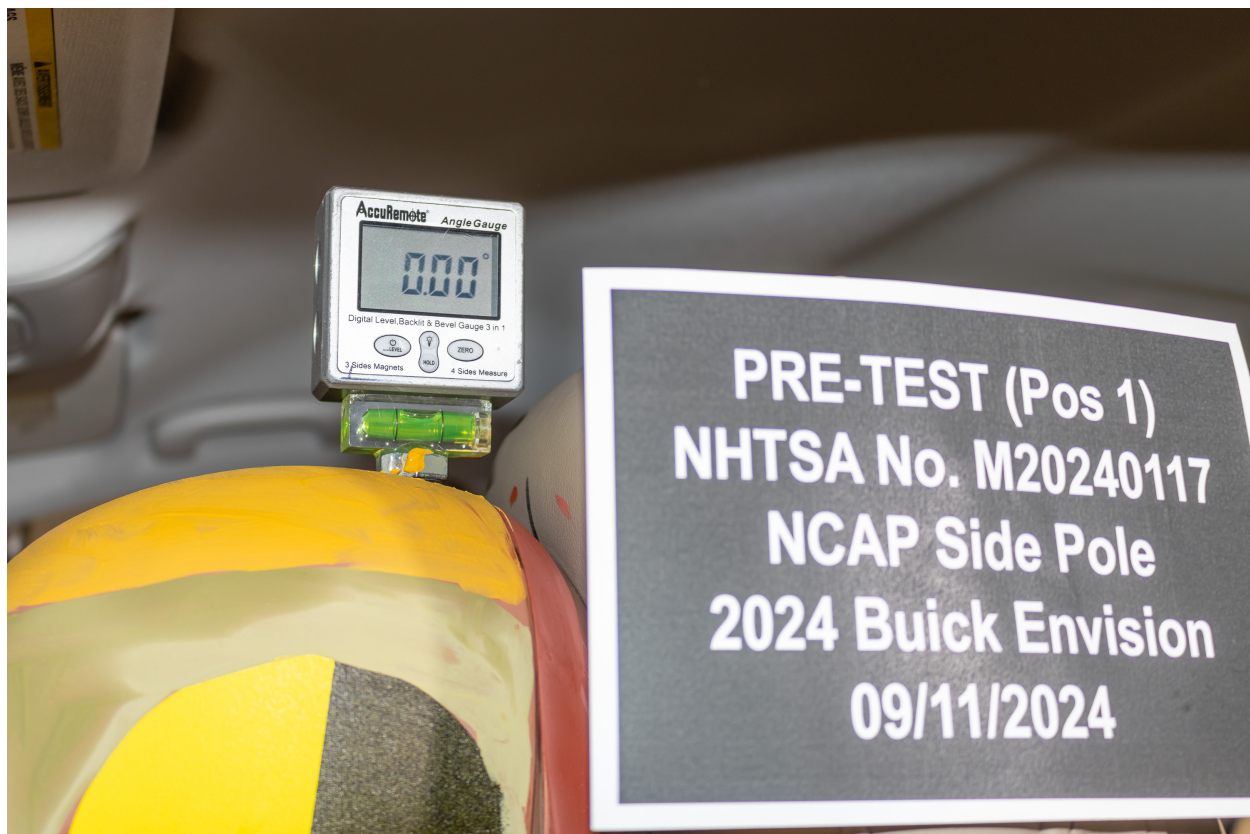


Figure A-31: Pre-Test Left Side View of Dummy's Head Showing Dummy's Head is Level



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

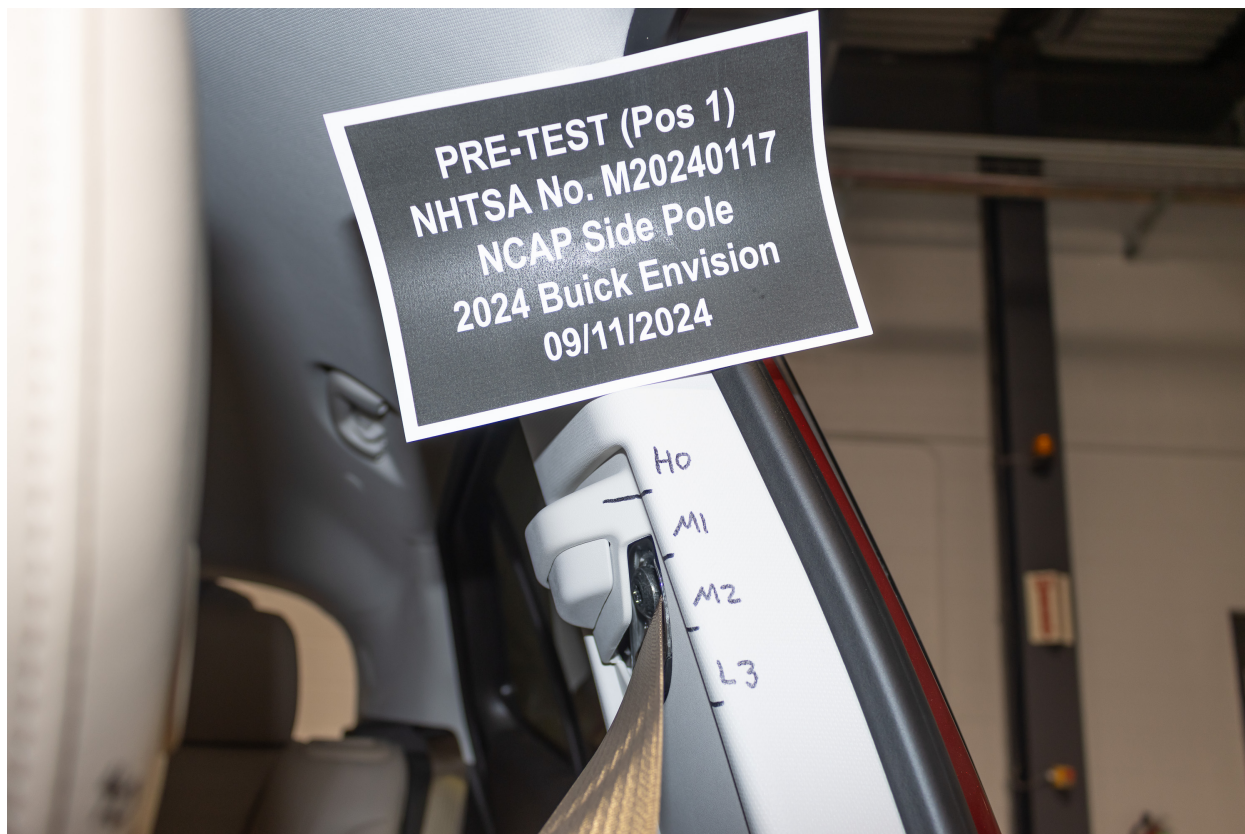


Figure A-33: Pre-Test View of Belt Anchorage for Dummy

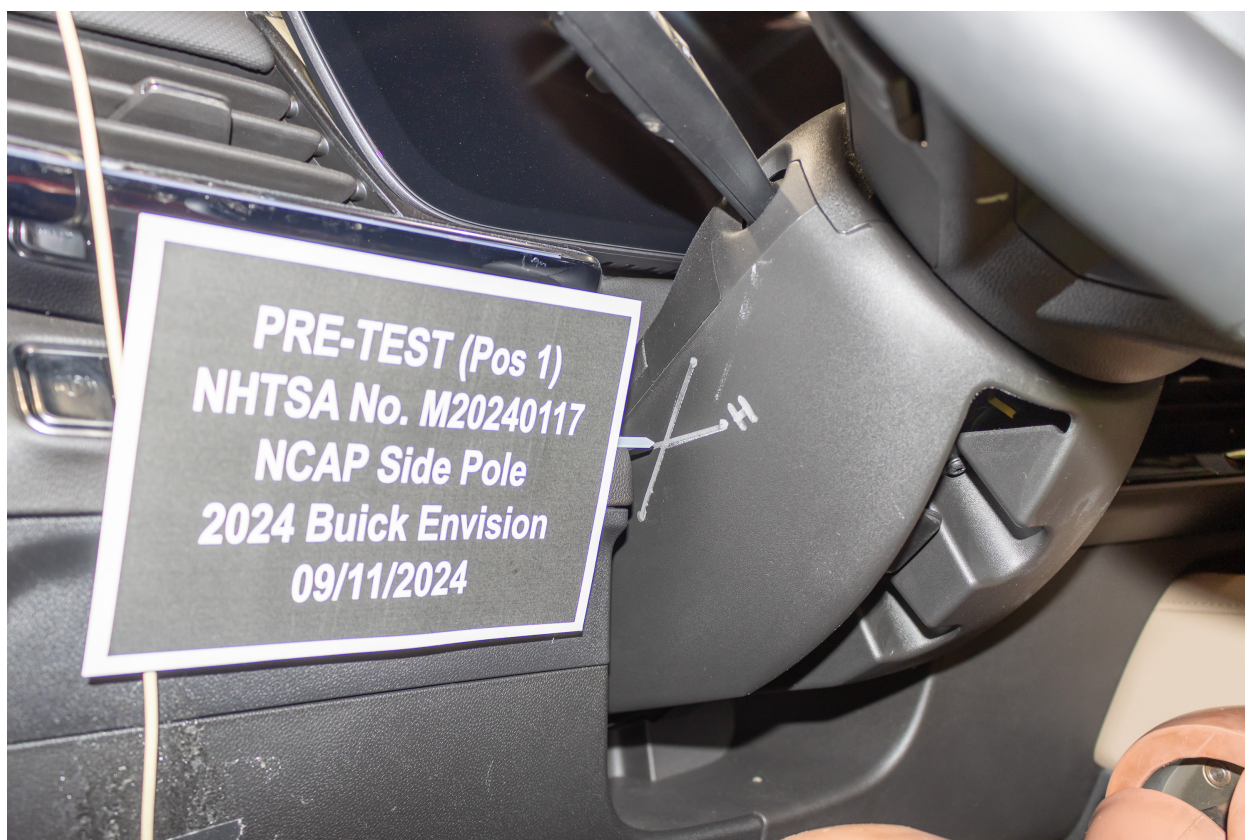


Figure A-34: Pre-Test Left Side View of Steering Wheel

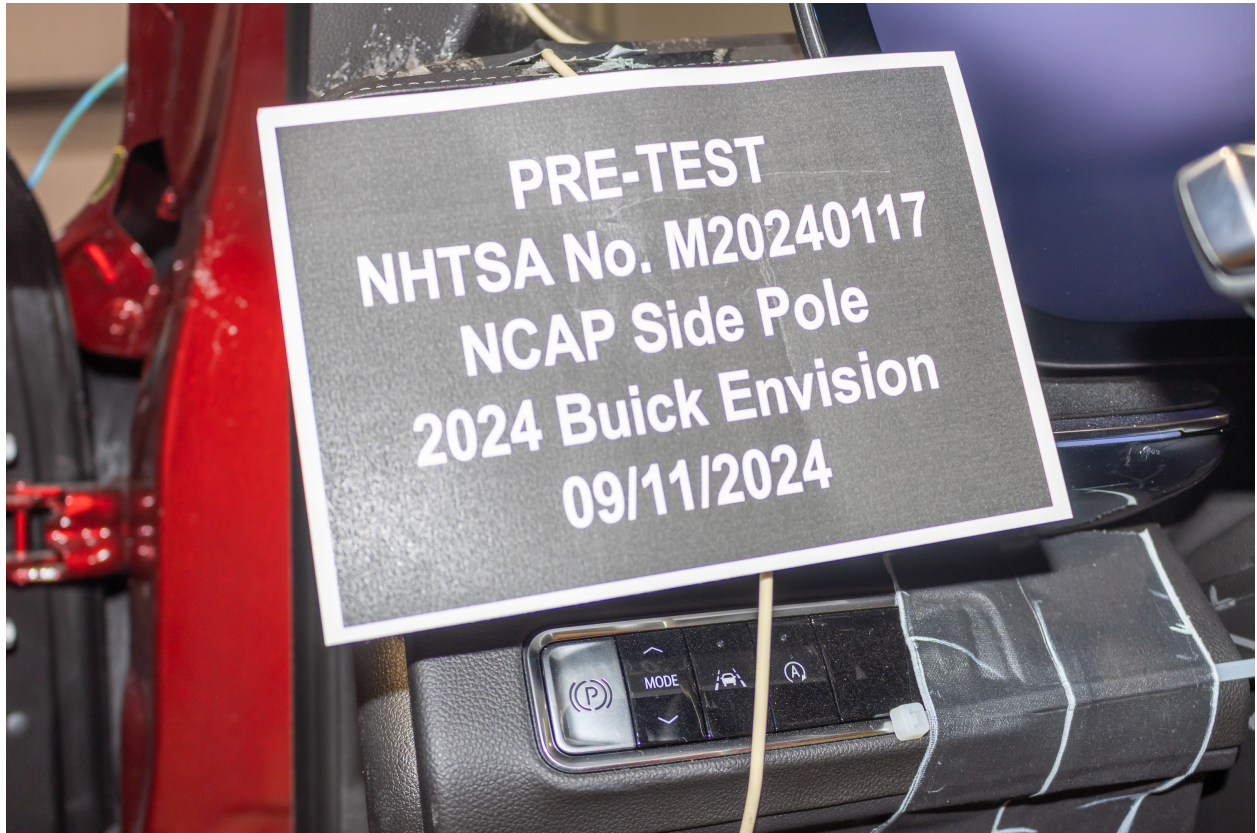


Figure A-35: Pre-Test View of Disengaged Parking Brake



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



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

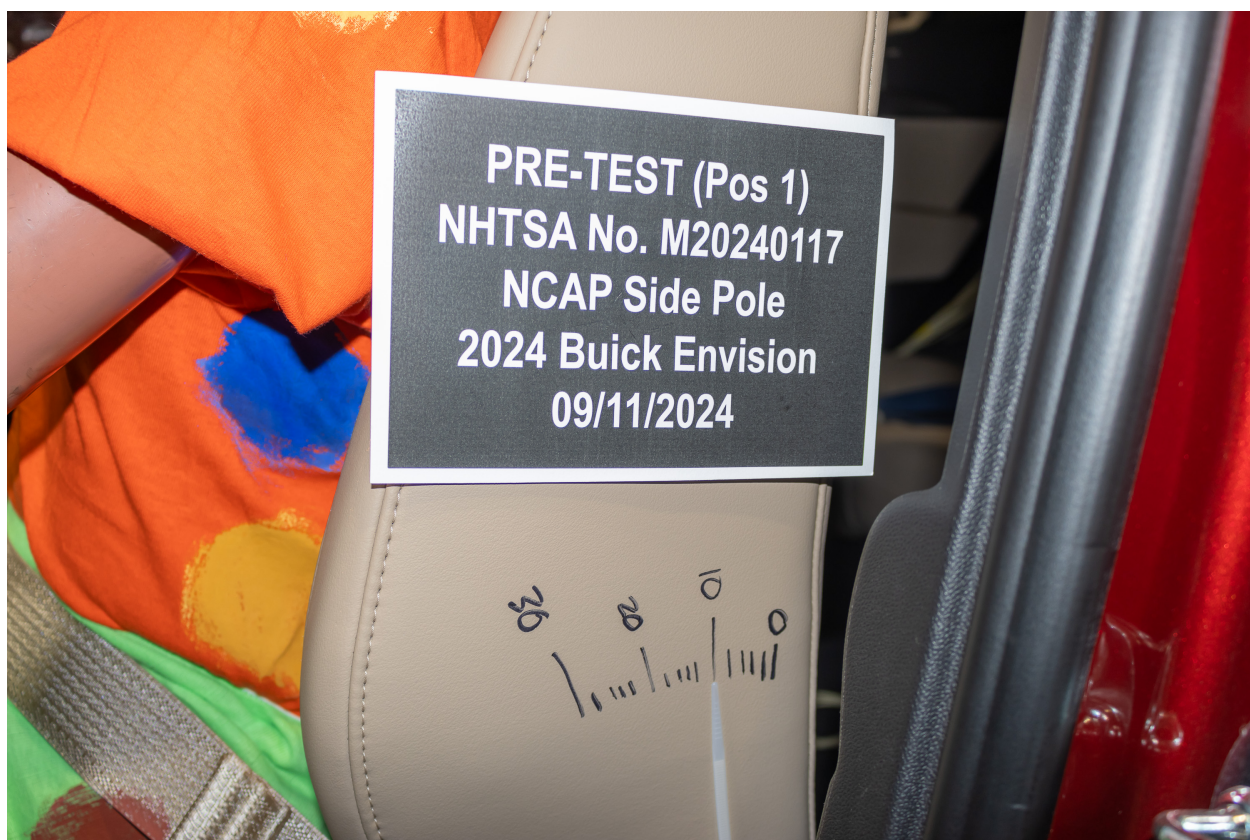


Figure A-38: Pre-Test Close-Up Left Side View of Driver Seat Back

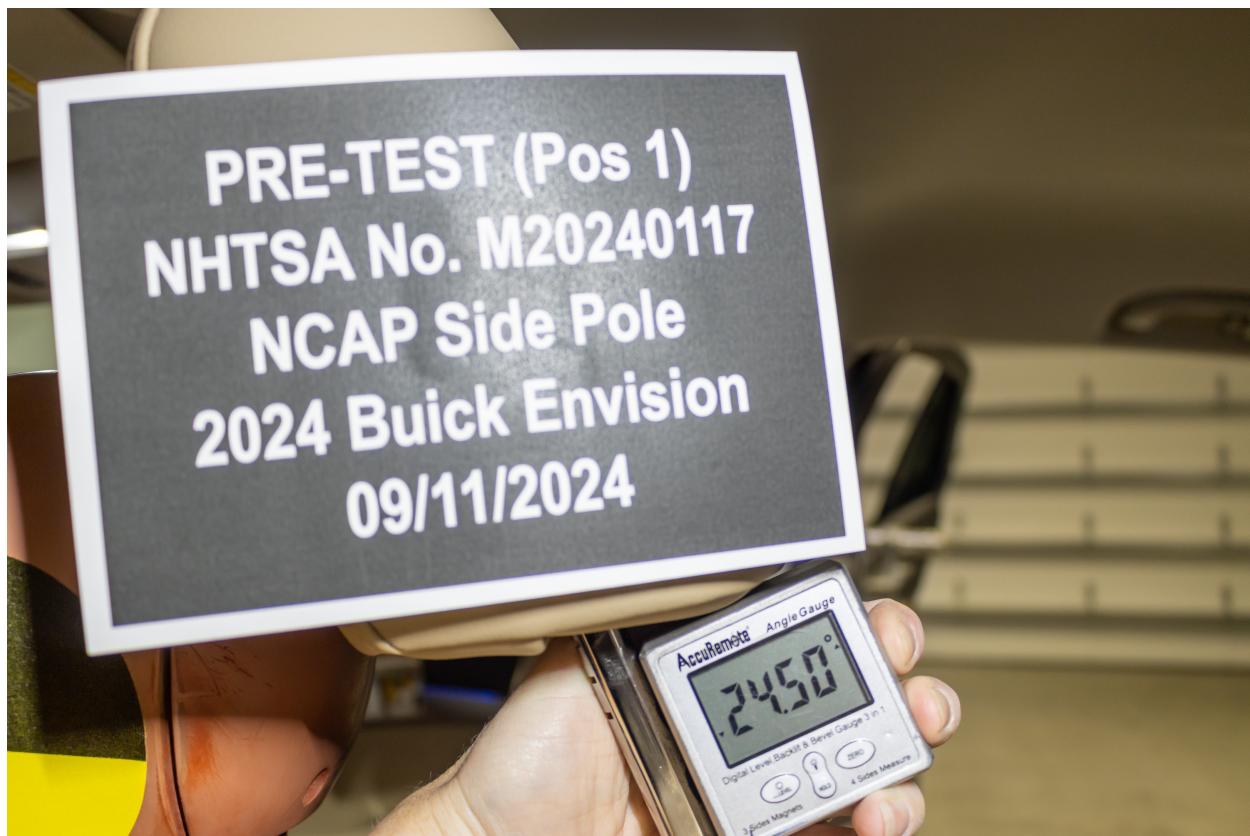


Figure A-39: Pre-Test Close-Up View of Driver Seat Back or Head Restraint



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



Figure A-55: Pre-Test View of Fuel Filler Cap or Fuel Filler Neck

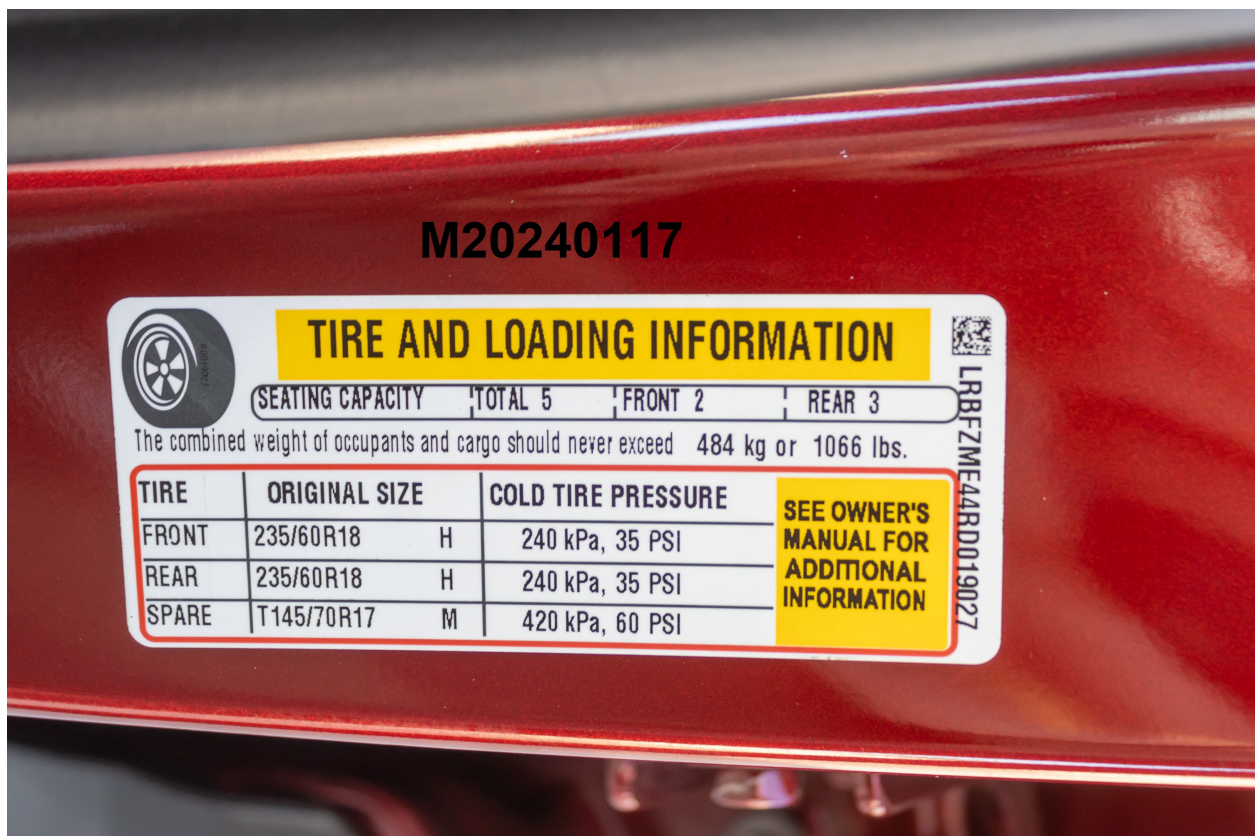


Figure A-56: Post-Test View of Fuel Filler Cap or Fuel Filler Neck



M20240117

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



M20240117

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



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



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

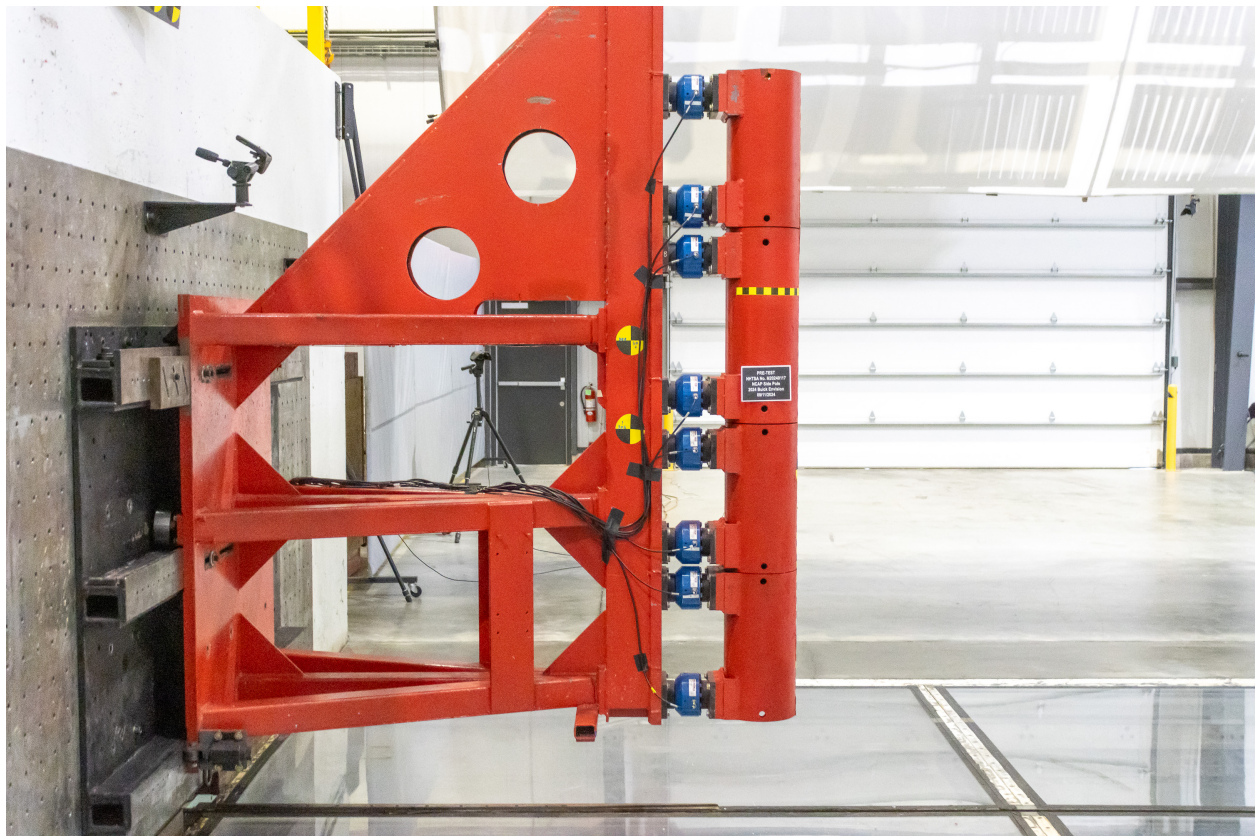


Figure A-61: Pre-Test Pole Barrier Side View

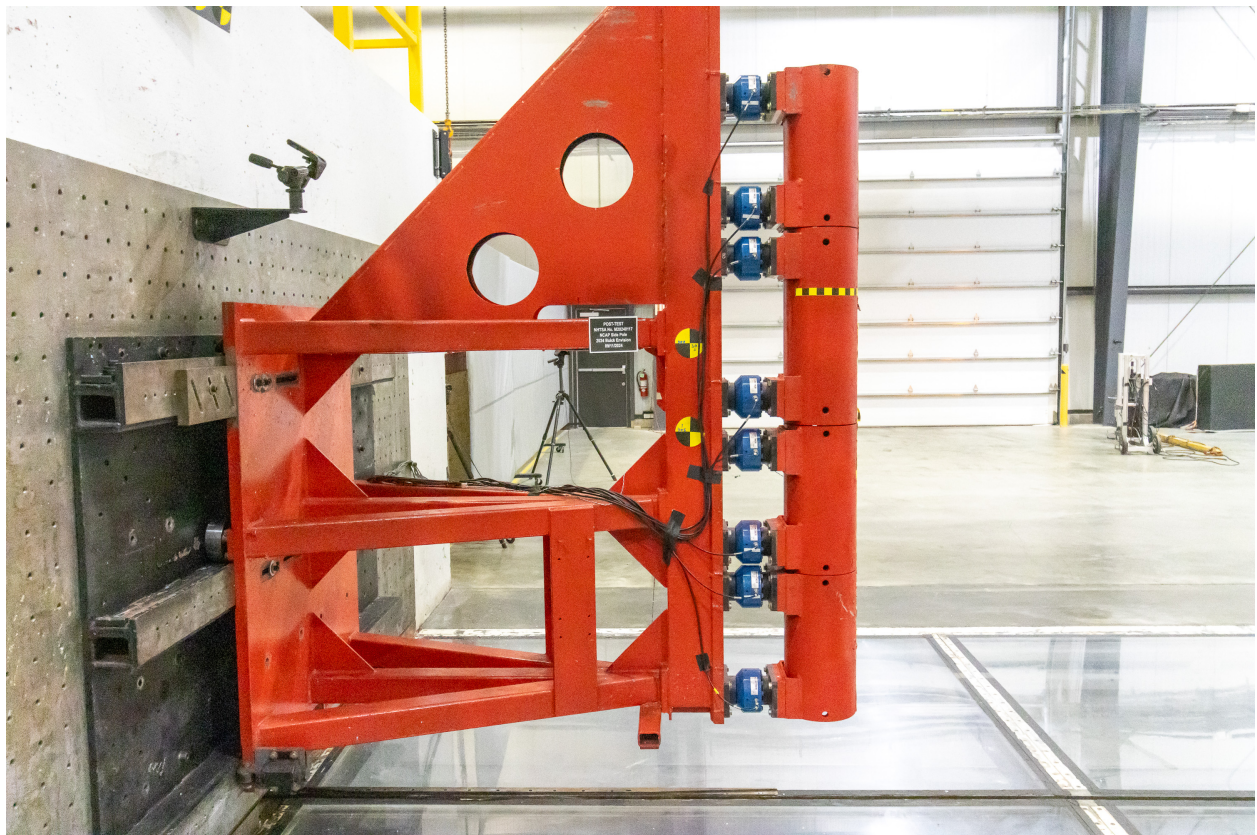


Figure A-62: Post-Test Pole Barrier Side View

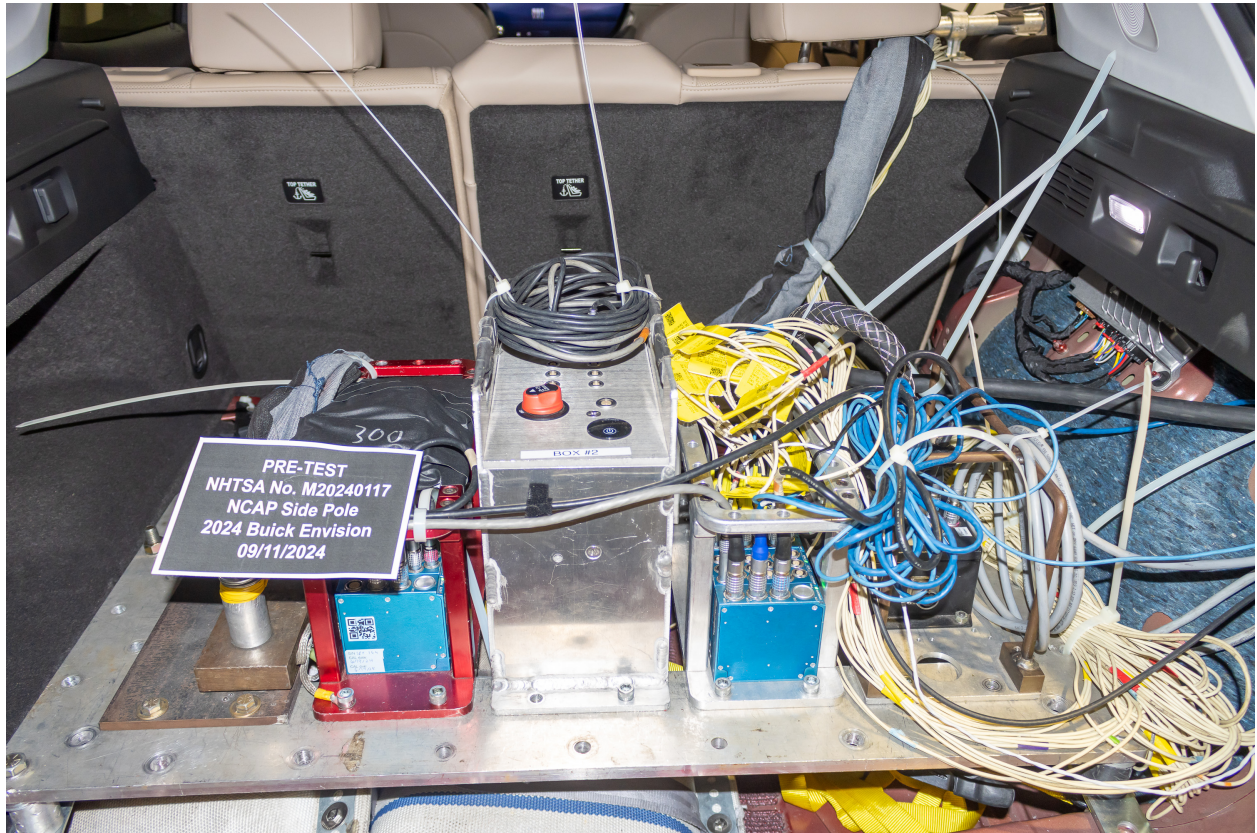


Figure A-63: Pre-Test Ballast View



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



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



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

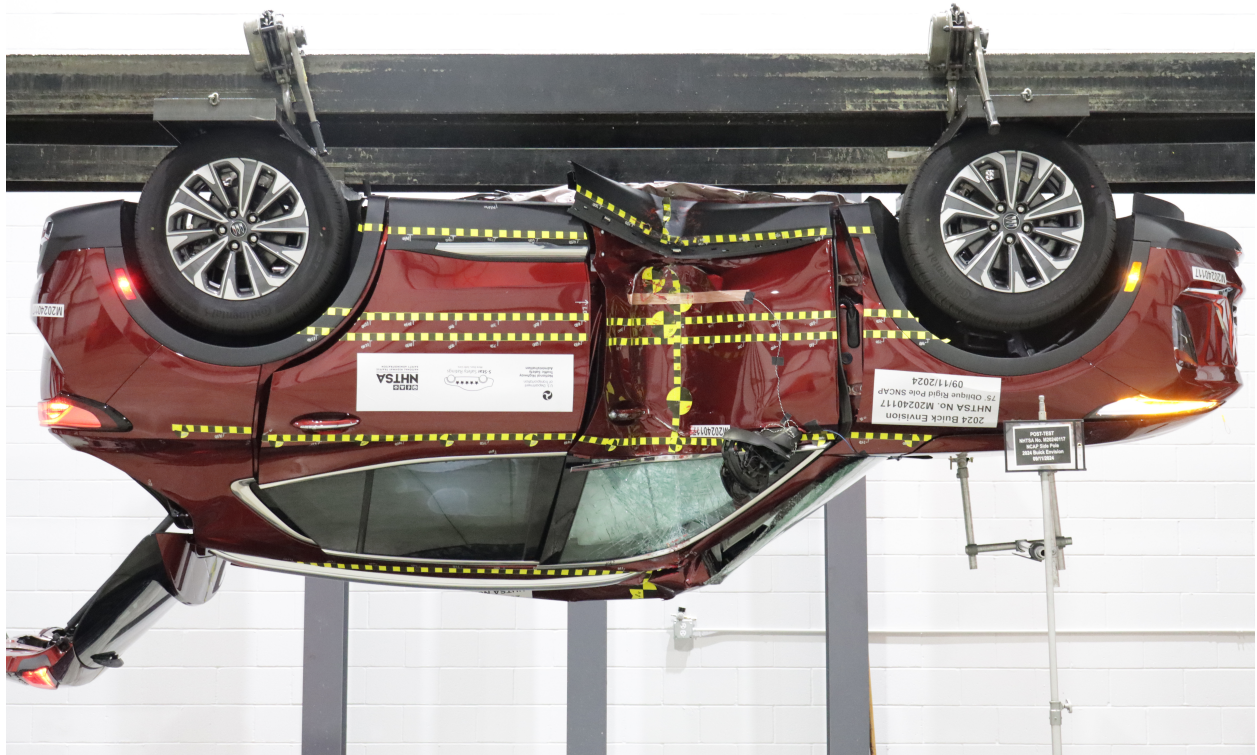


Figure A-67: FMVSS No. 301 Static Rollover 180 Degrees

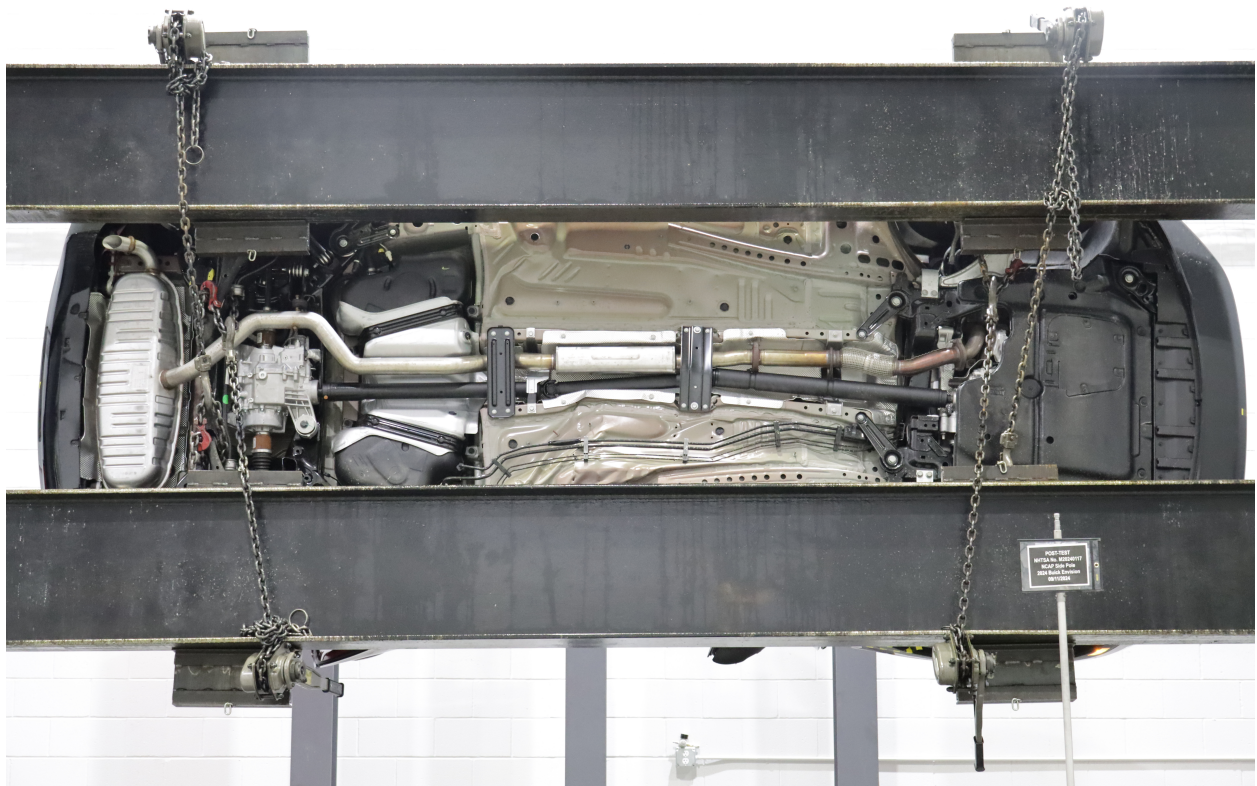


Figure A-68: FMVSS No. 301 Static Rollover 270 Degrees



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



Figure A-70: Impact Event



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

APPENDIX B

VEHICLE AND DUMMY RESPONSE DATA TRACES

Table of Data Plots

Driver Dummy Instrumentation Plots

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

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

Additional Driver Dummy Instrumentation Data

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

Vehicle Instrumentation Data

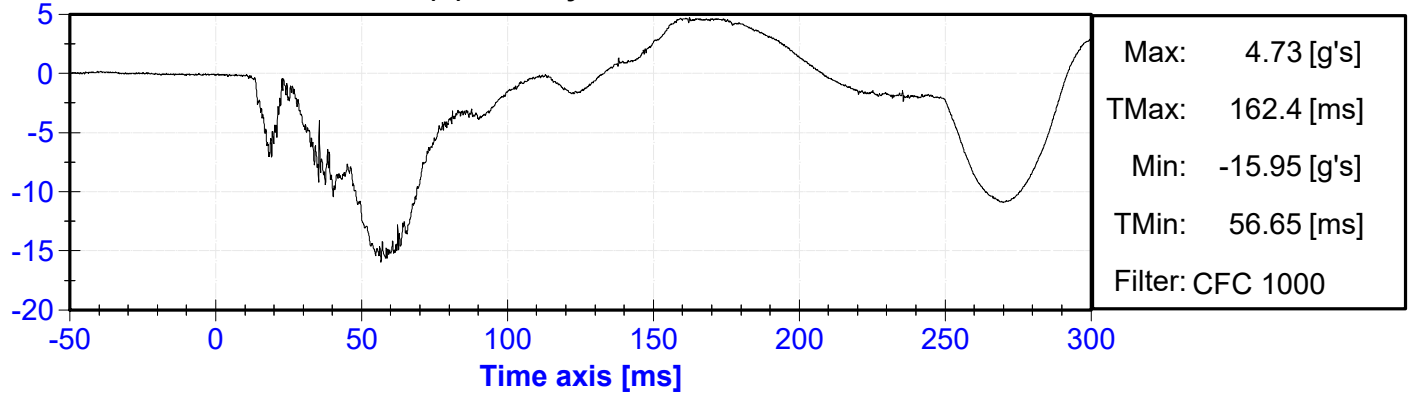
Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Left Floor Sill Acceleration (Y)
Left A-Pillar Sill Acceleration (Y)
Left Lower A-Pillar Acceleration (Y)
Left Mid A-Pillar Acceleration (Y)
Left B-Pillar Sill Acceleration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

Pole Instrumentation Data

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

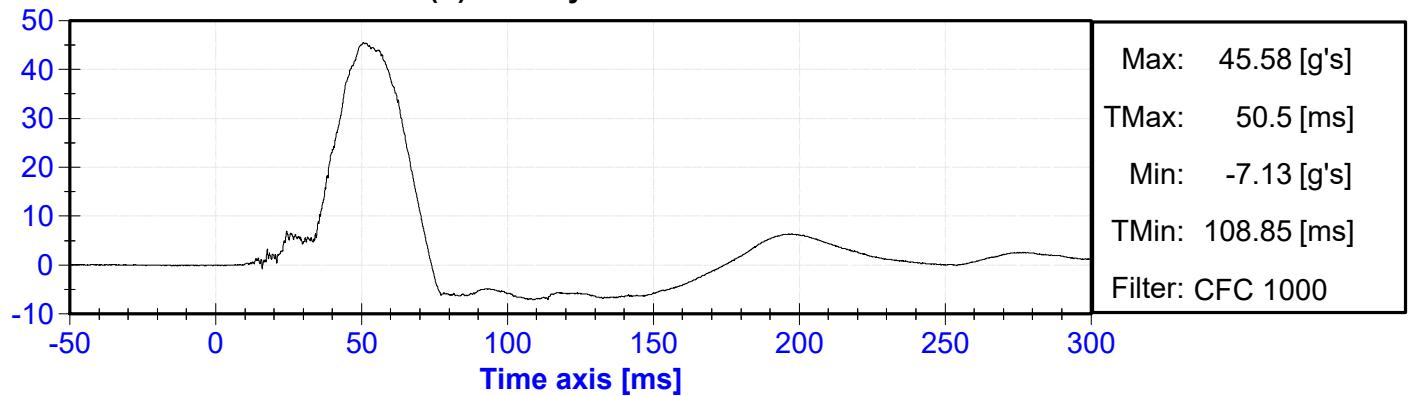
ACCELERATION [g's]

Driver Head Acceleration (X) Primary vs. Time



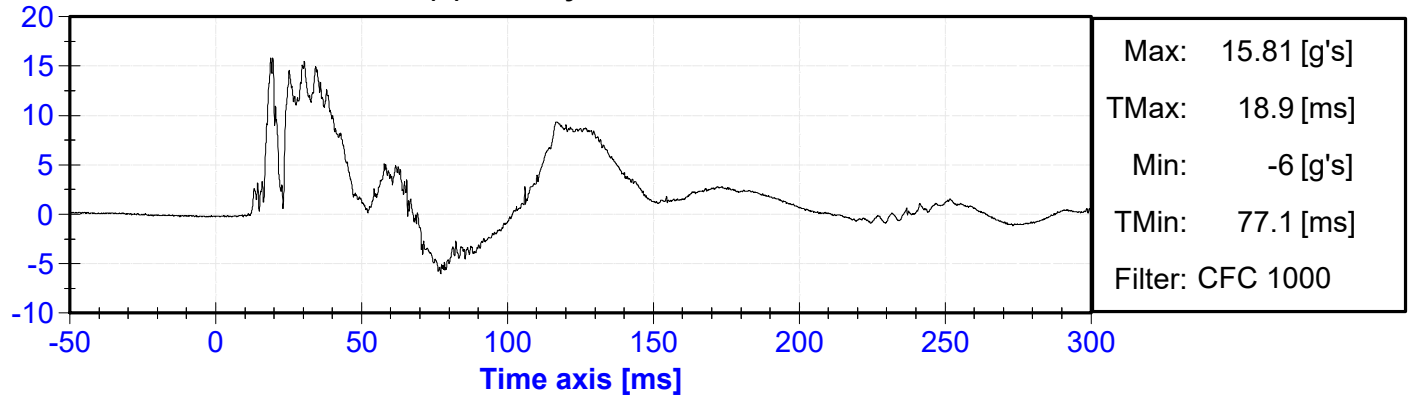
ACCELERATION [g's]

Driver Head Acceleration (Y) Primary vs. Time



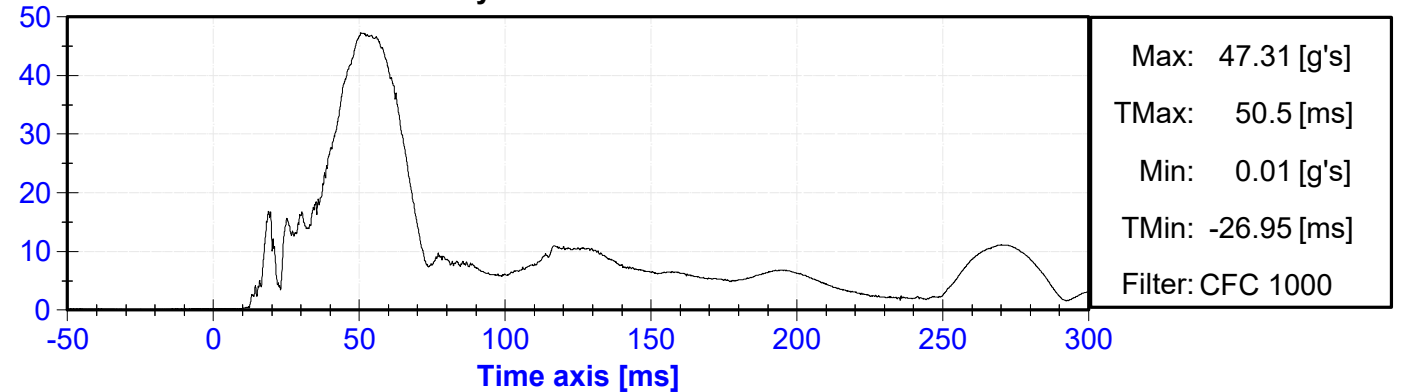
ACCELERATION [g's]

Driver Head Acceleration (Z) Primary vs. Time



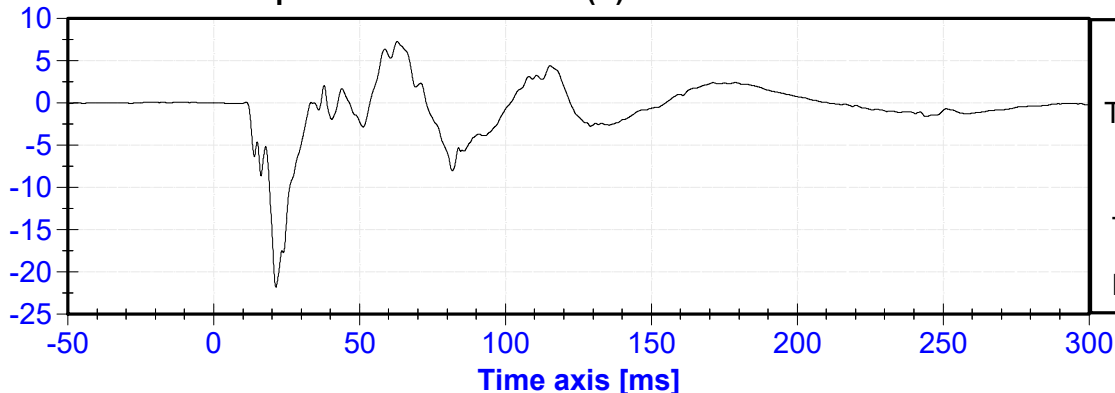
ACCELERATION [g's]

Driver Head Resultant Primary vs. Time



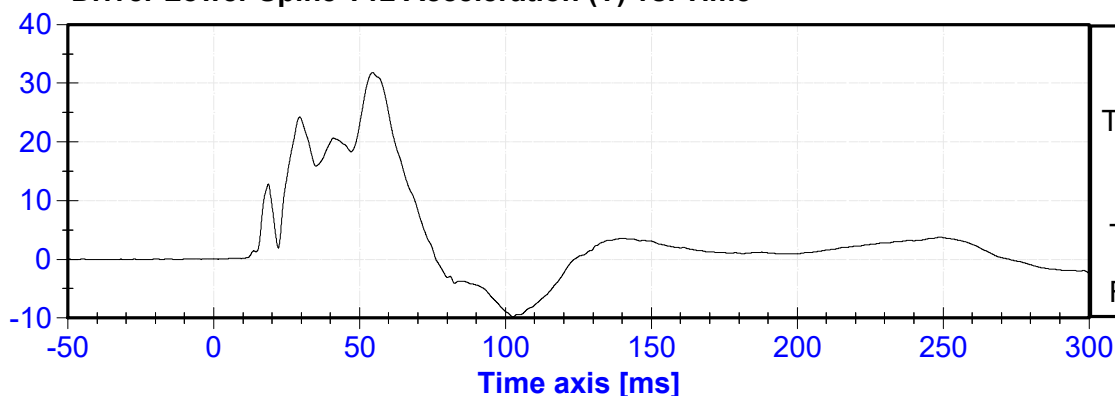
ACCELERATION [g's]

Driver Lower Spine T12 Acceleration (X) vs. Time



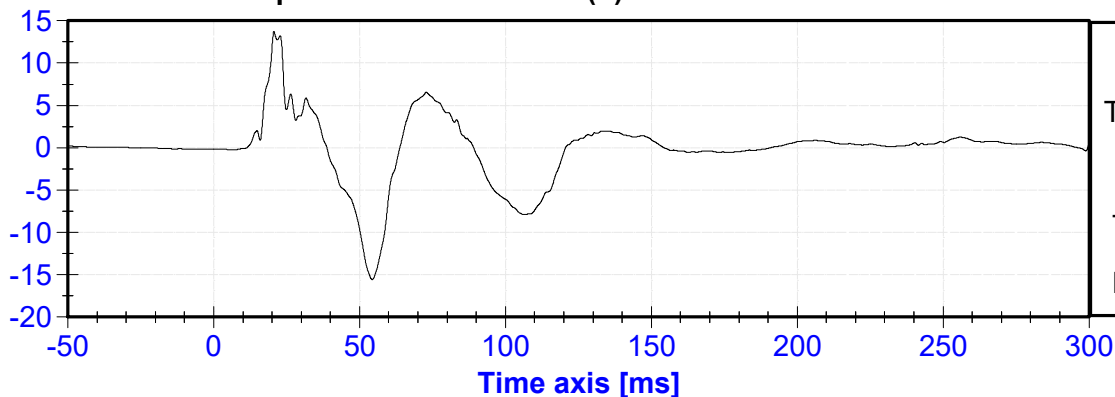
ACCELERATION [g's]

Driver Lower Spine T12 Acceleration (Y) vs. Time



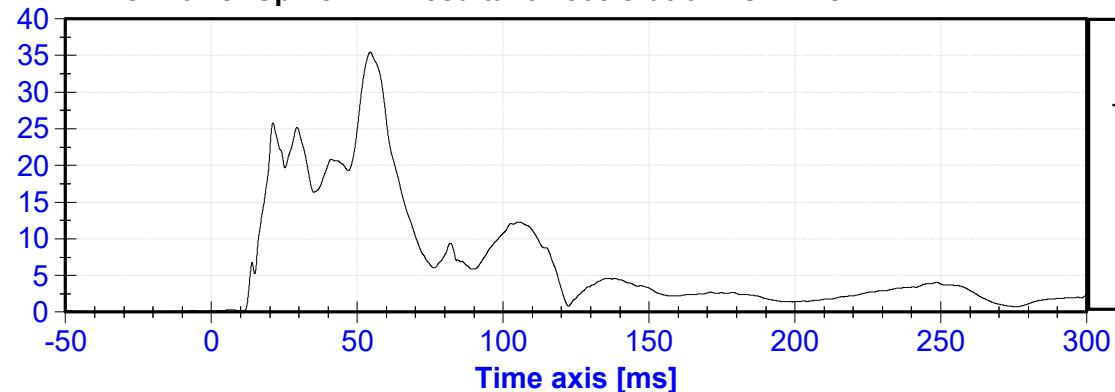
ACCELERATION [g's]

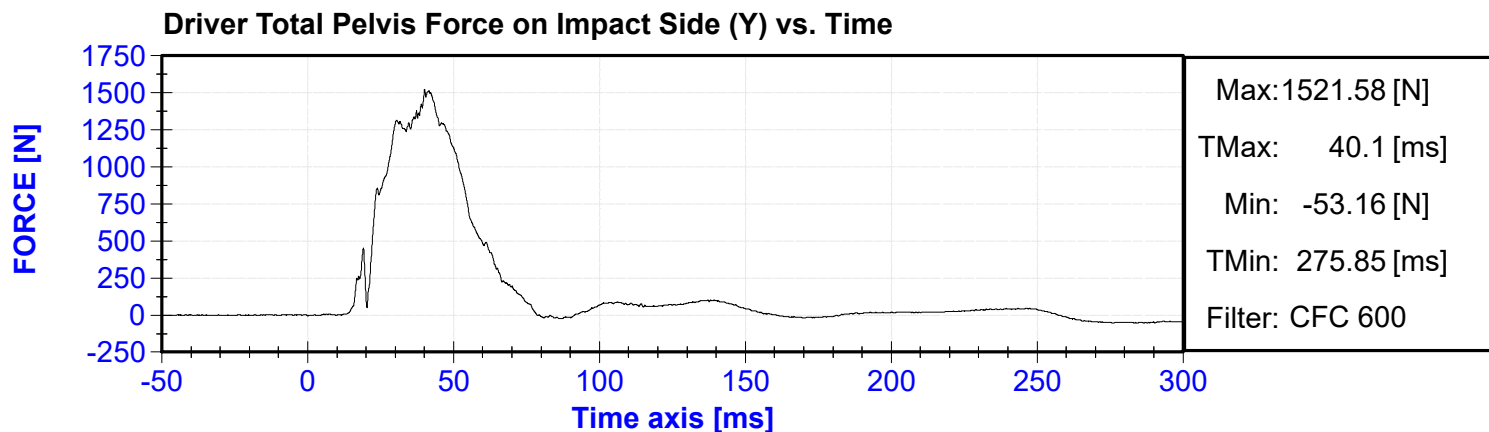
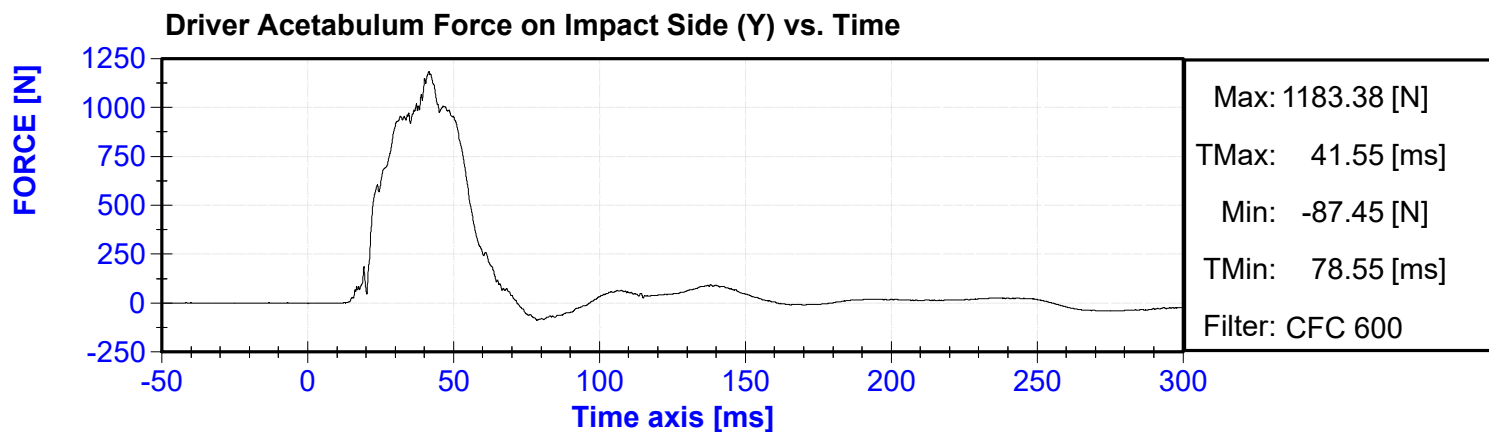
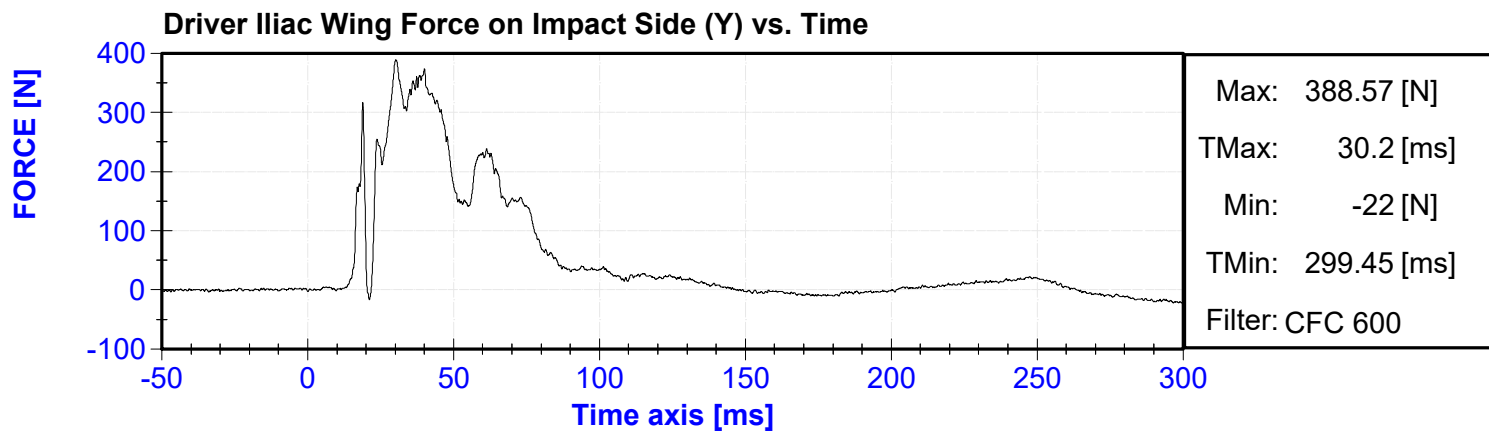
Driver Lower Spine T12 Acceleration (Z) vs. Time



ACCELERATION [g's]

Driver Lower Spine T12 Resultant Acceleration vs. Time





APPENDIX C

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

SID-IIS 5TH PERCENTILE FEMALE - DRIVER ATD

SERIAL NO:300

(CONFIGURED FOR LEFT SIDE IMPACT)

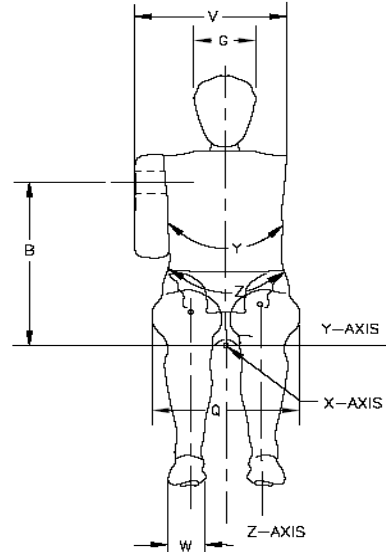
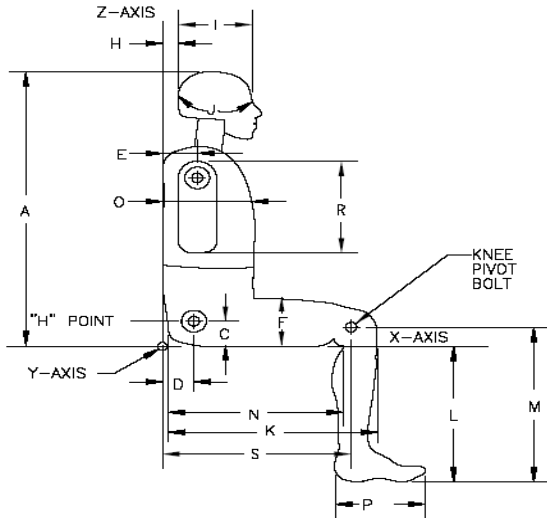


External Measurements - SID-IIs

Technician: J. Rios

Date: 8/29/2024

Dummy Serial Number: 300



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

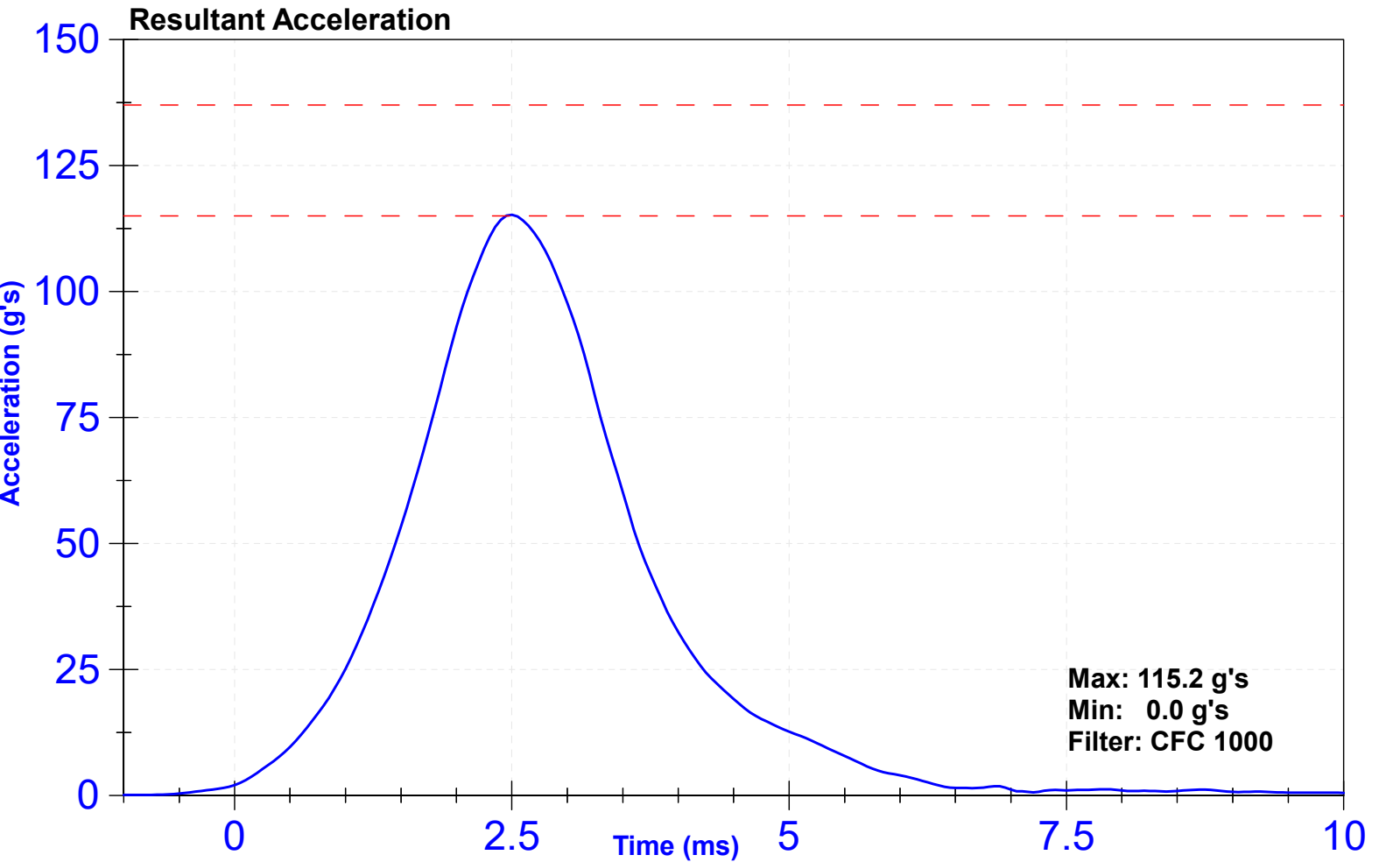
ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

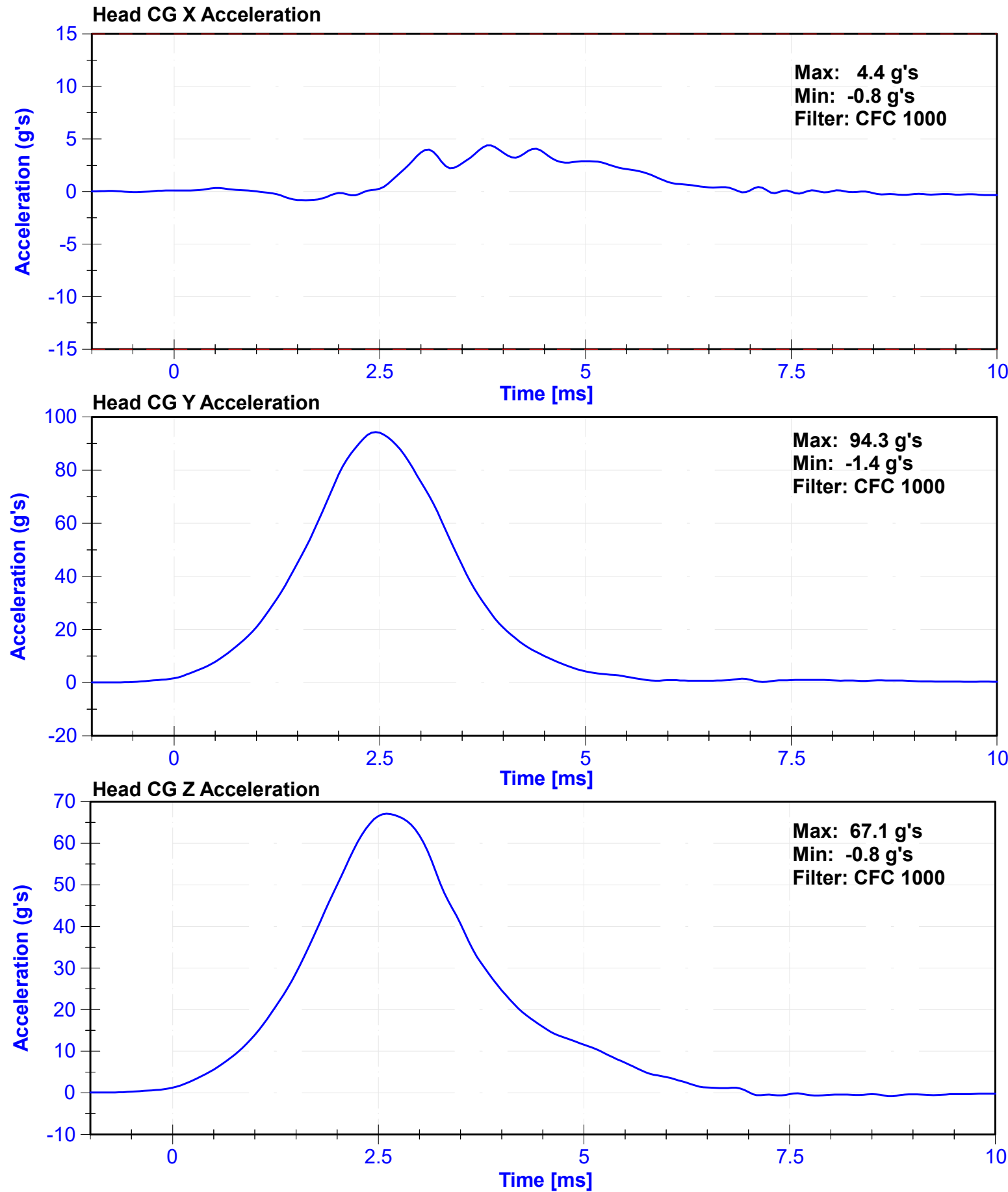
Results

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

Transducer Calibrations

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





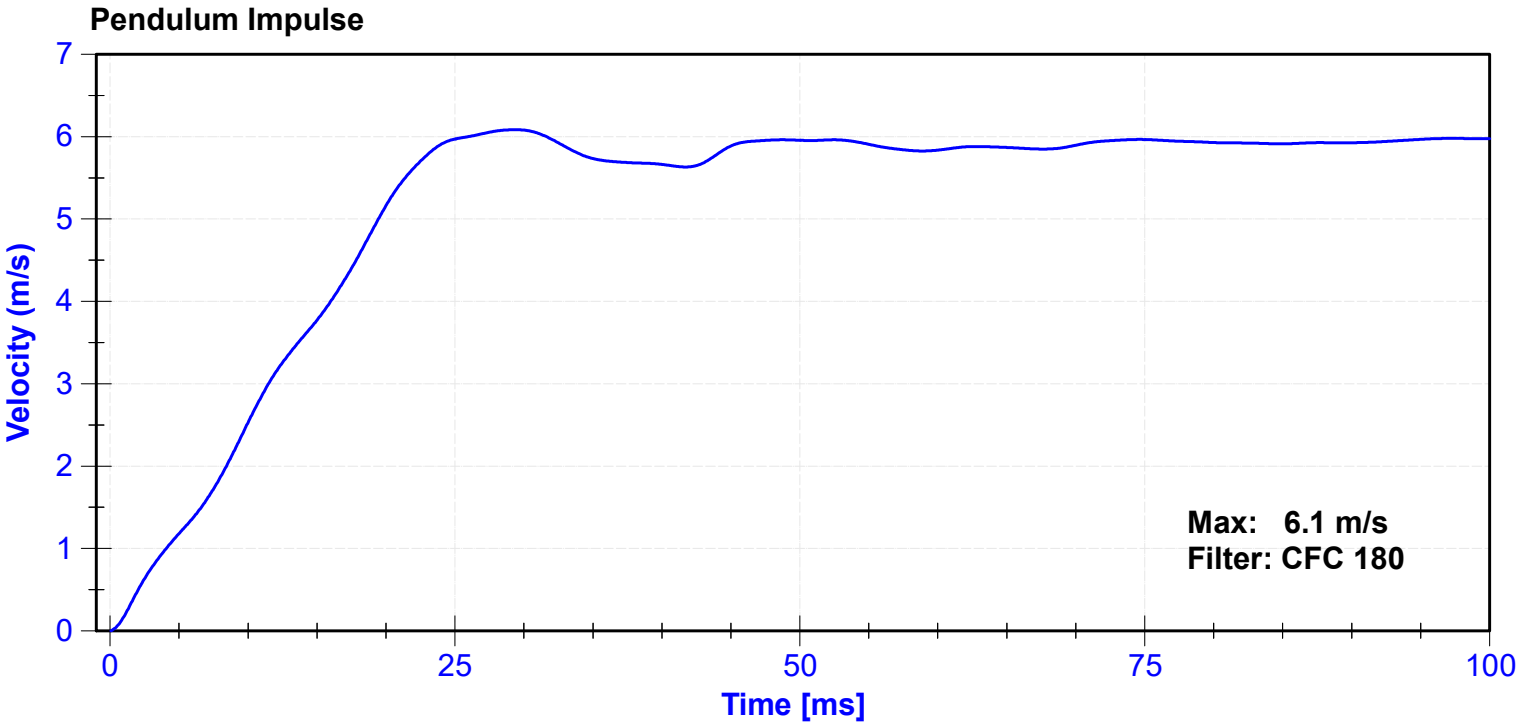
ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

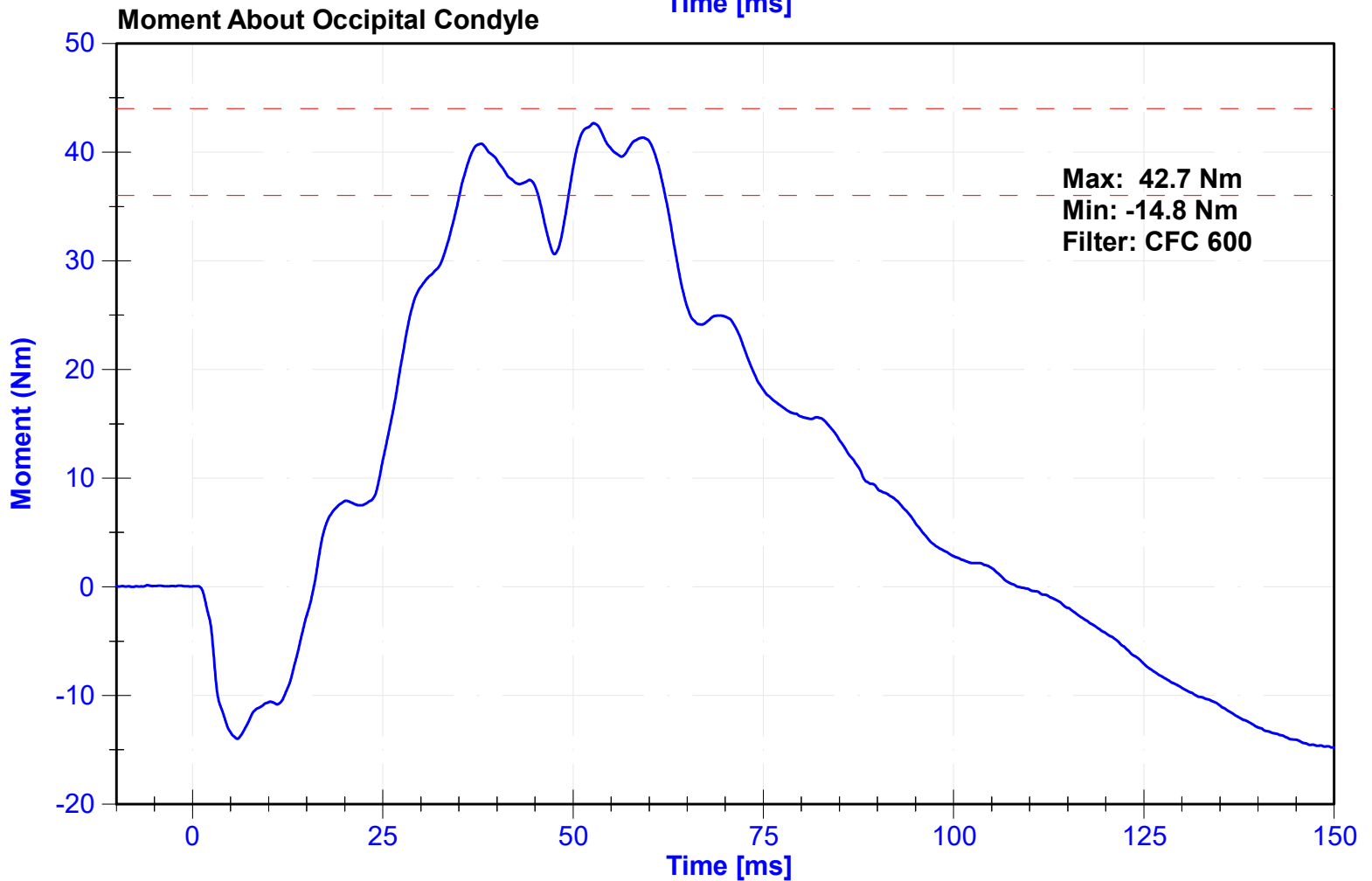
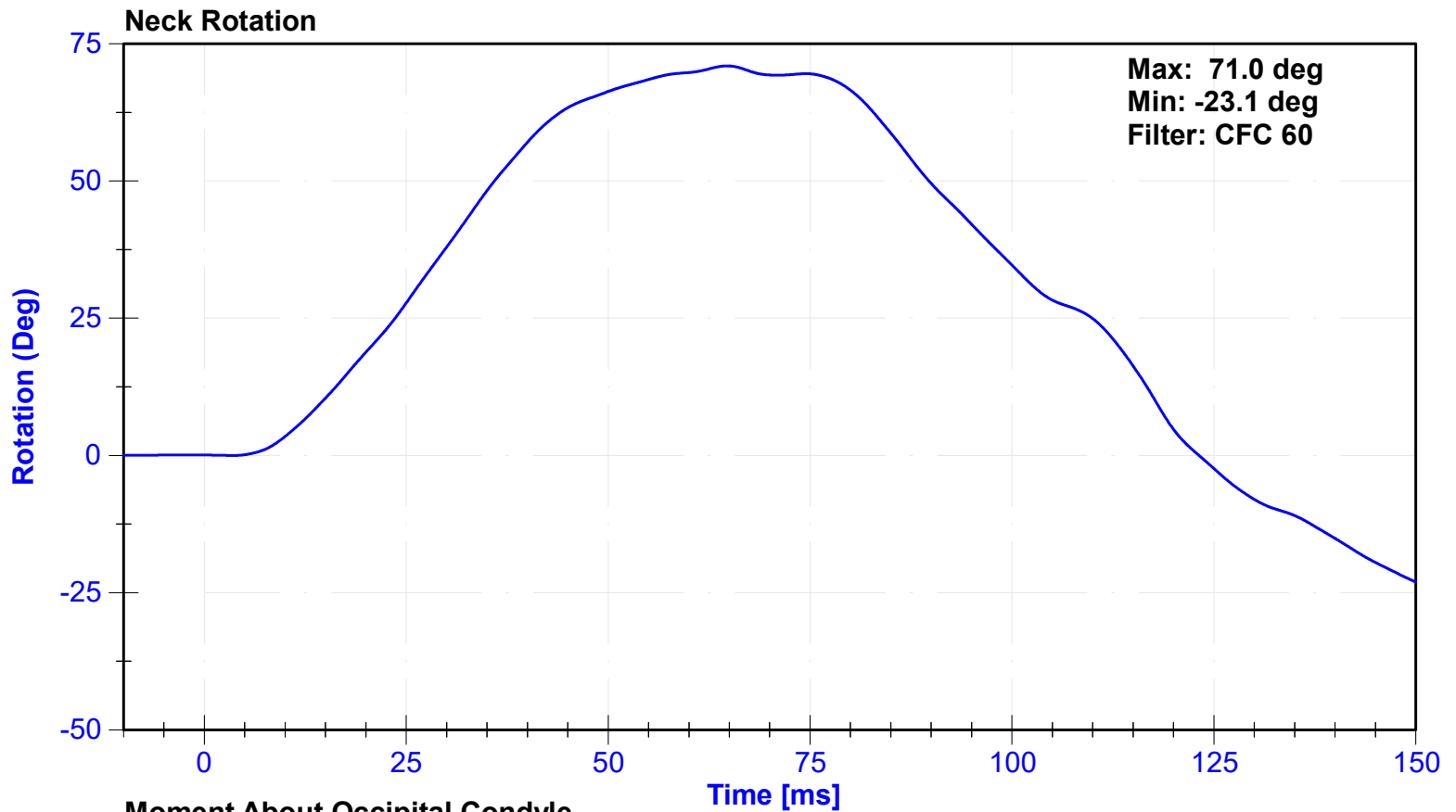
Results

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

Transducer Calibrations

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





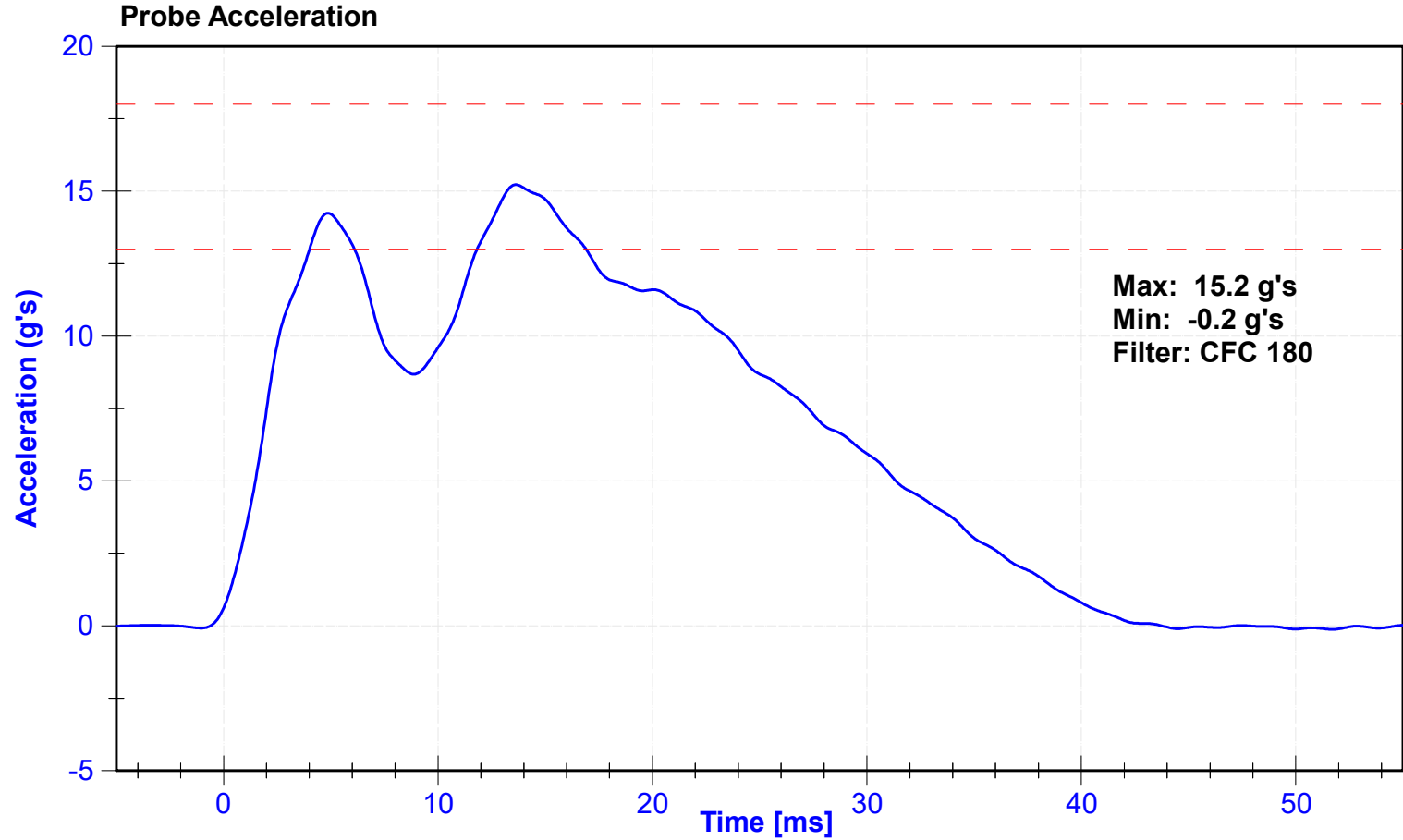
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ATD Serial Number	300	Laboratory Supervisor	C. Mantell

Results

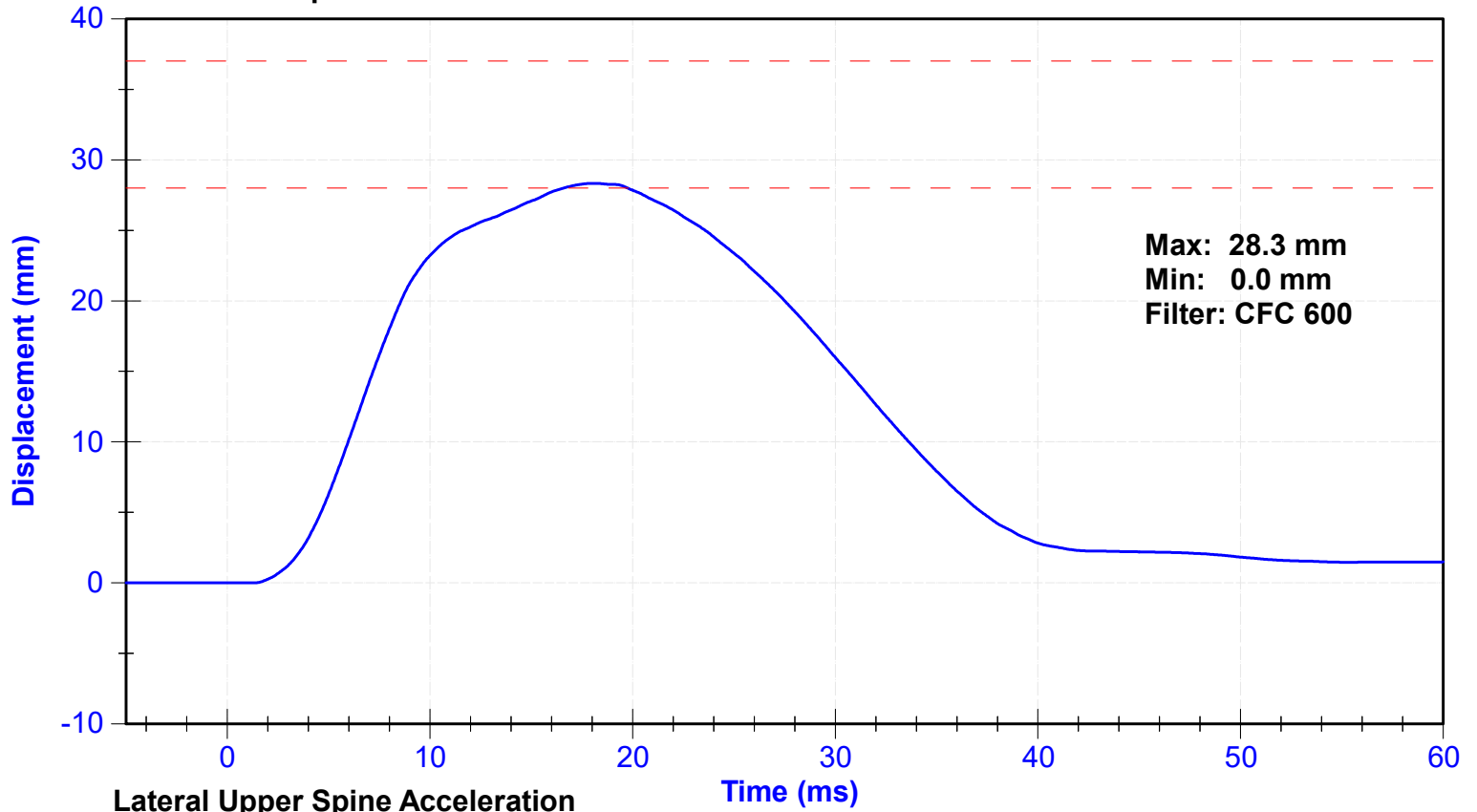
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	62	Pass
Velocity	4.2	4.4	m/s	4.29	Pass
Probe Acceleration	13	18	g's	15.2	Pass
Shoulder Deflection	28	37	mm	28.3	Pass
Lateral Upper Spine Acceleration	17	22	g's	18.1	Pass

Transducer Calibrations

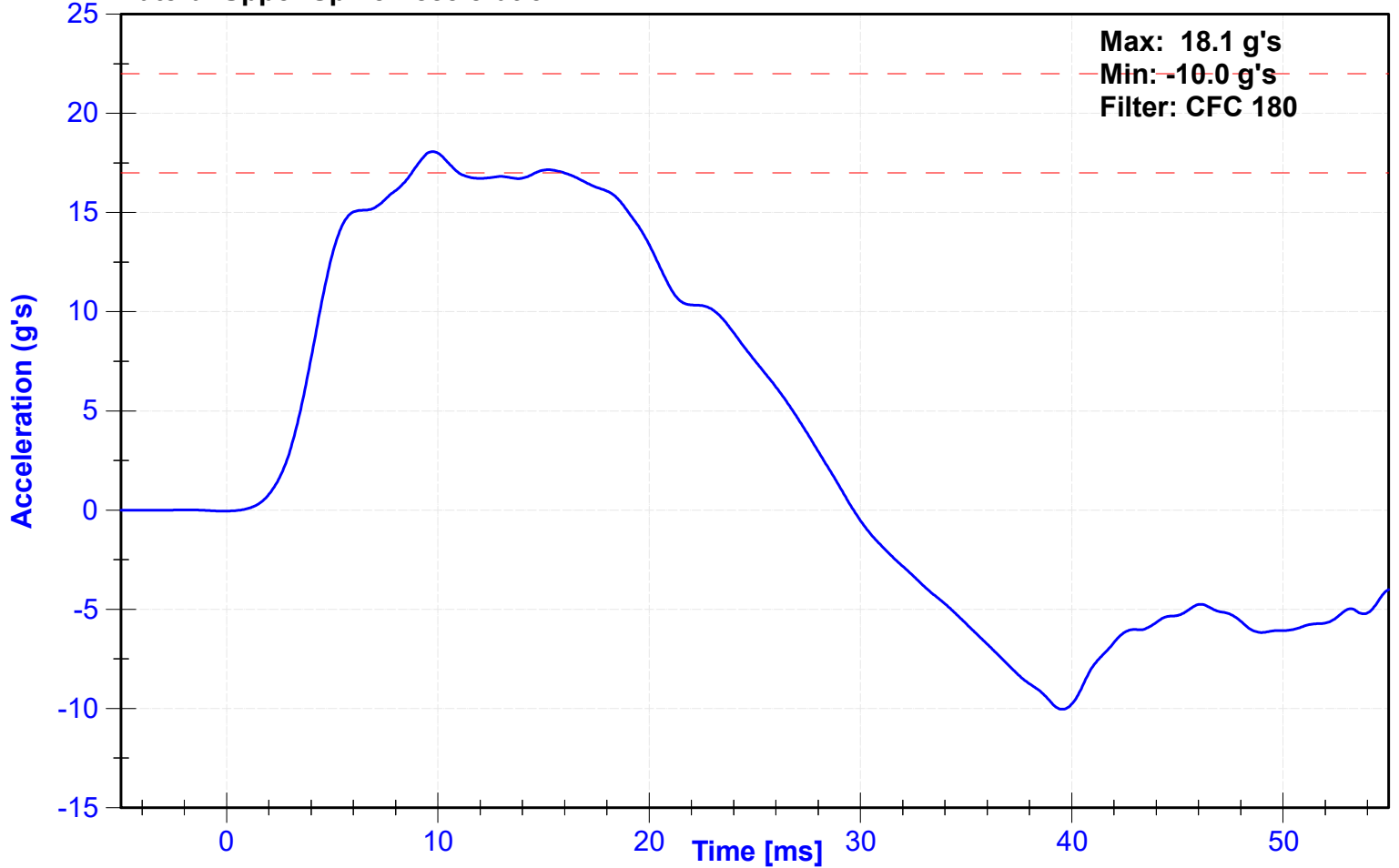
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18527	8/2/2024	1/29/2025
Shoulder Potentiometer	Servo	053GFE	5/9/2024	11/7/2024
Upper Spine Y Accelerometer	Endevco	T20880	5/9/2024	11/5/2024



Shoulder Displacement



Lateral Upper Spine Acceleration



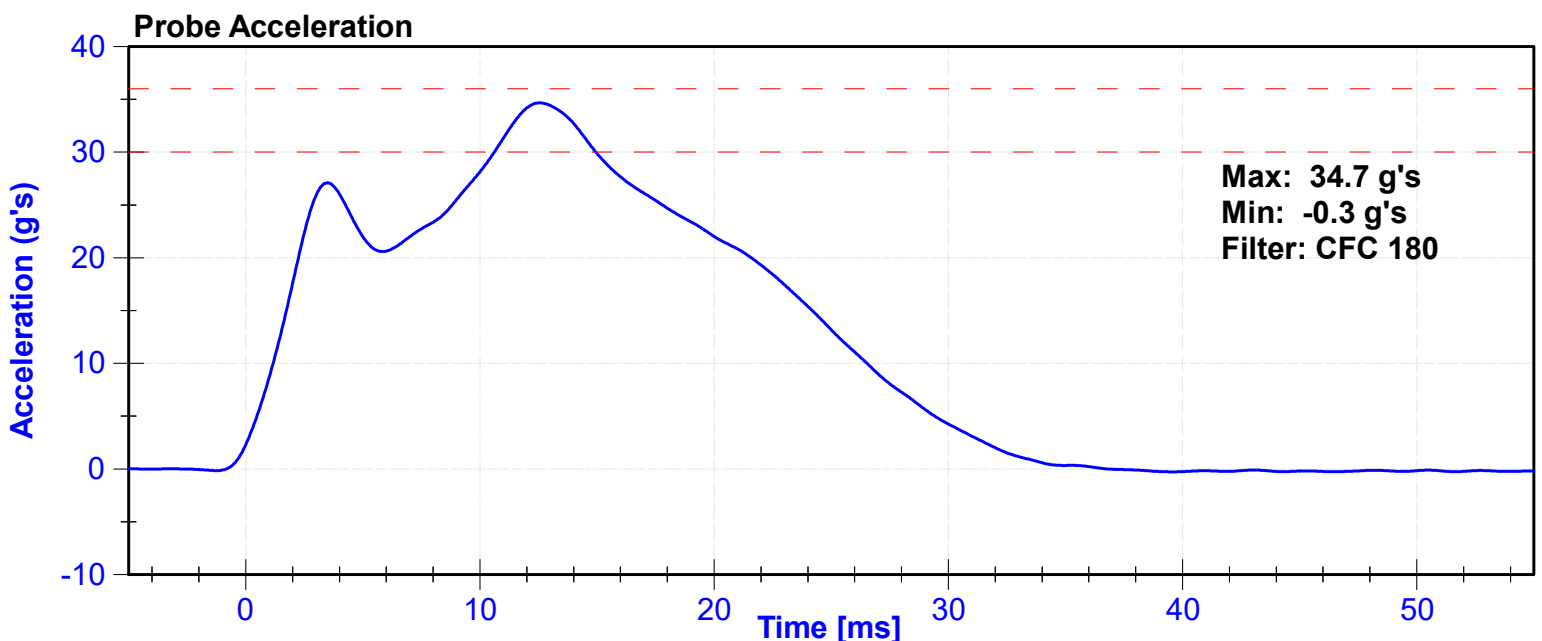
ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

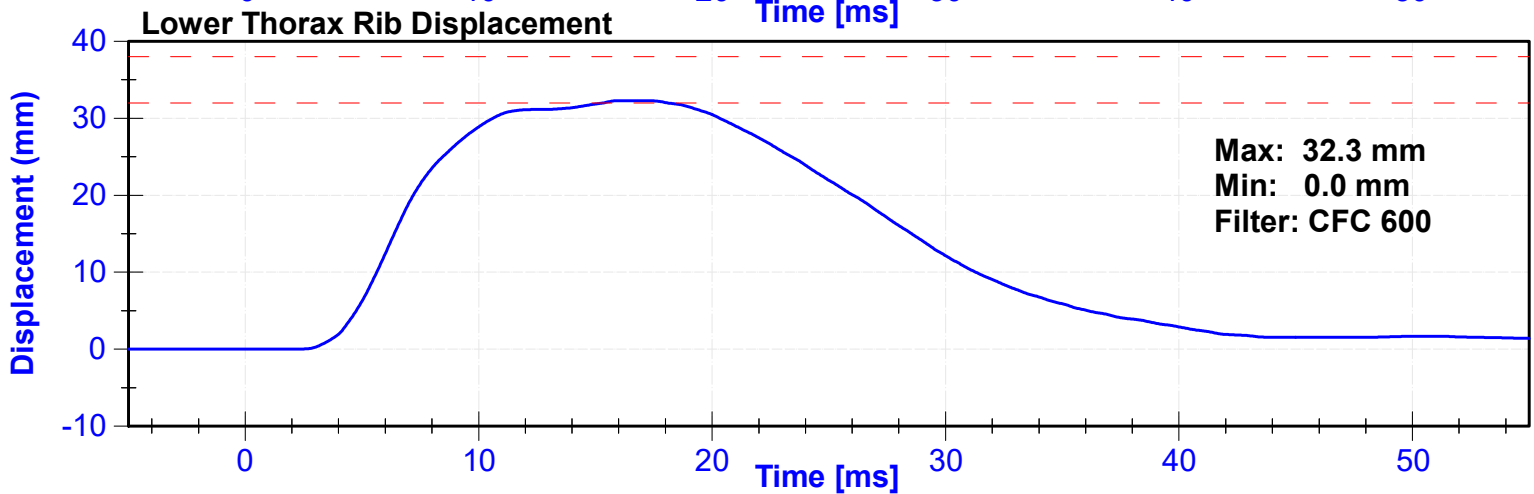
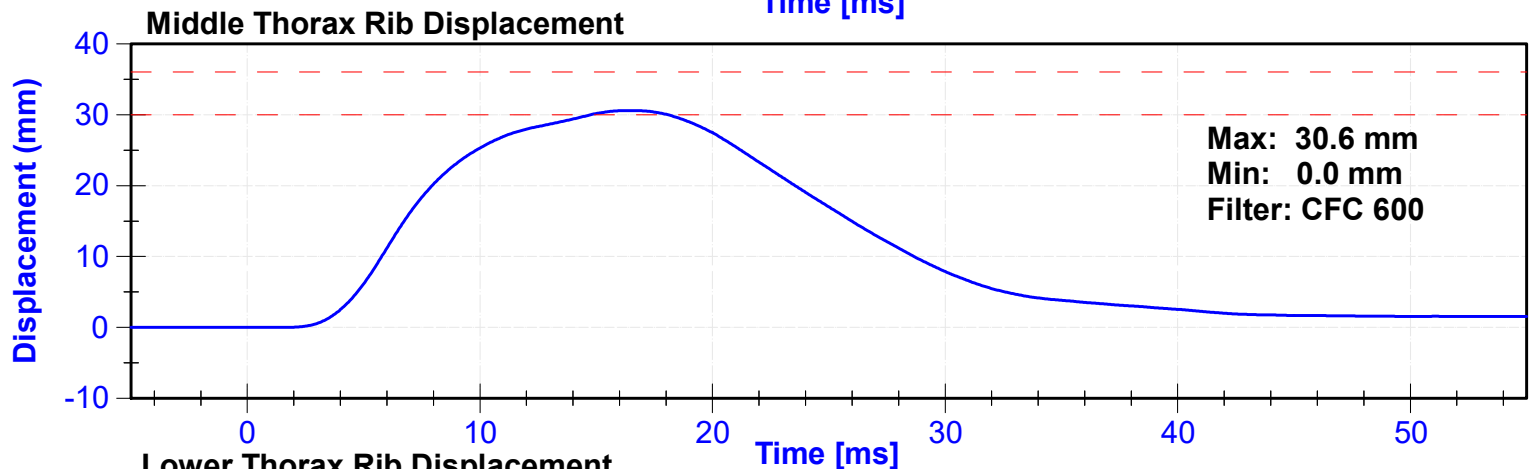
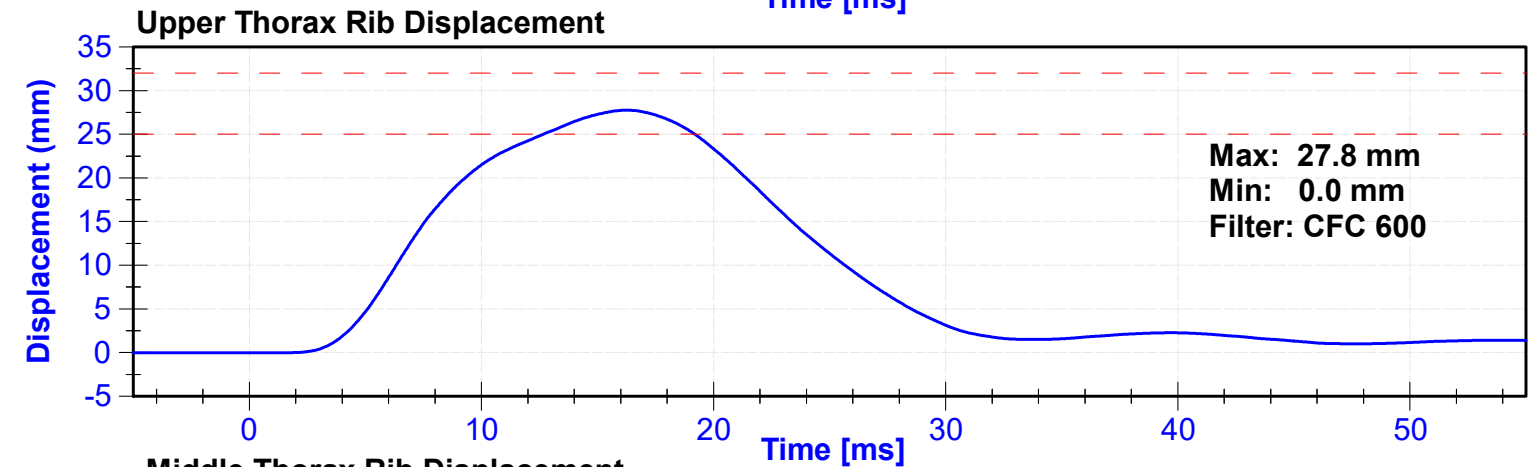
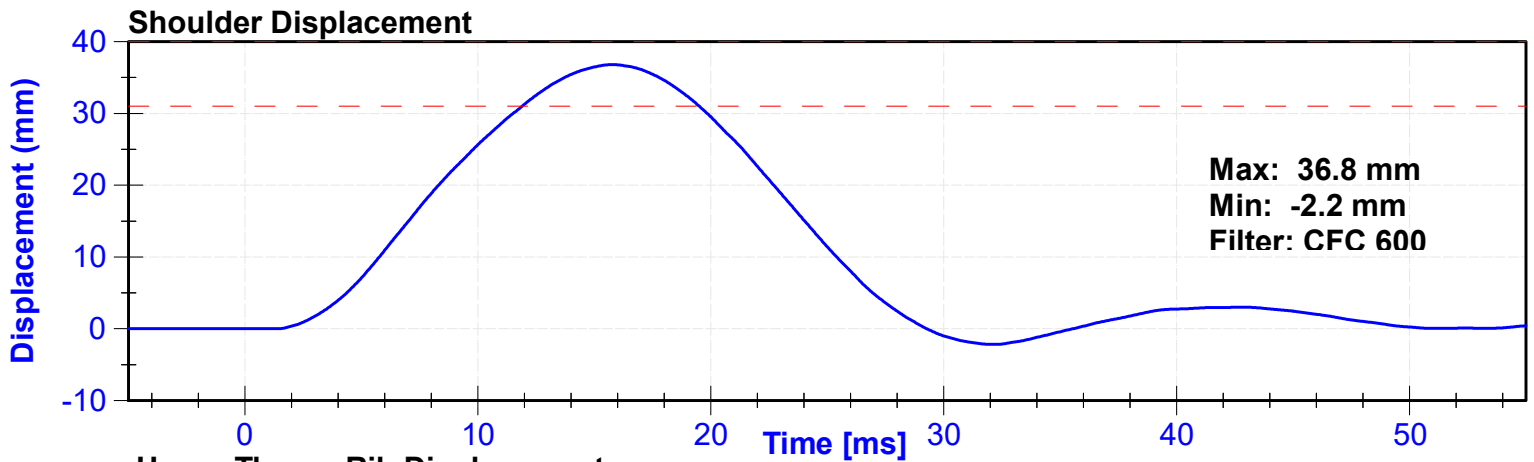
Results

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

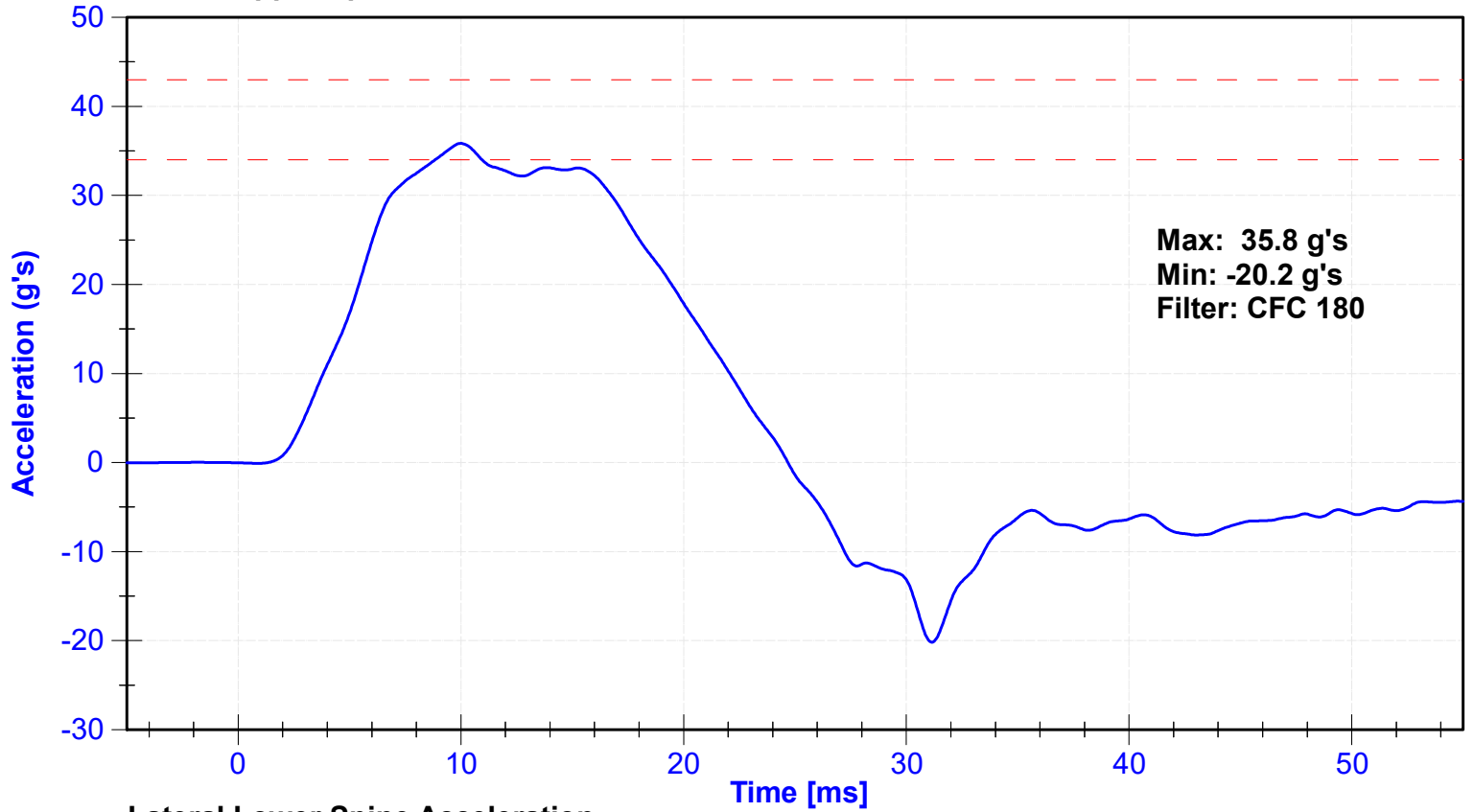
Transducer Calibrations

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

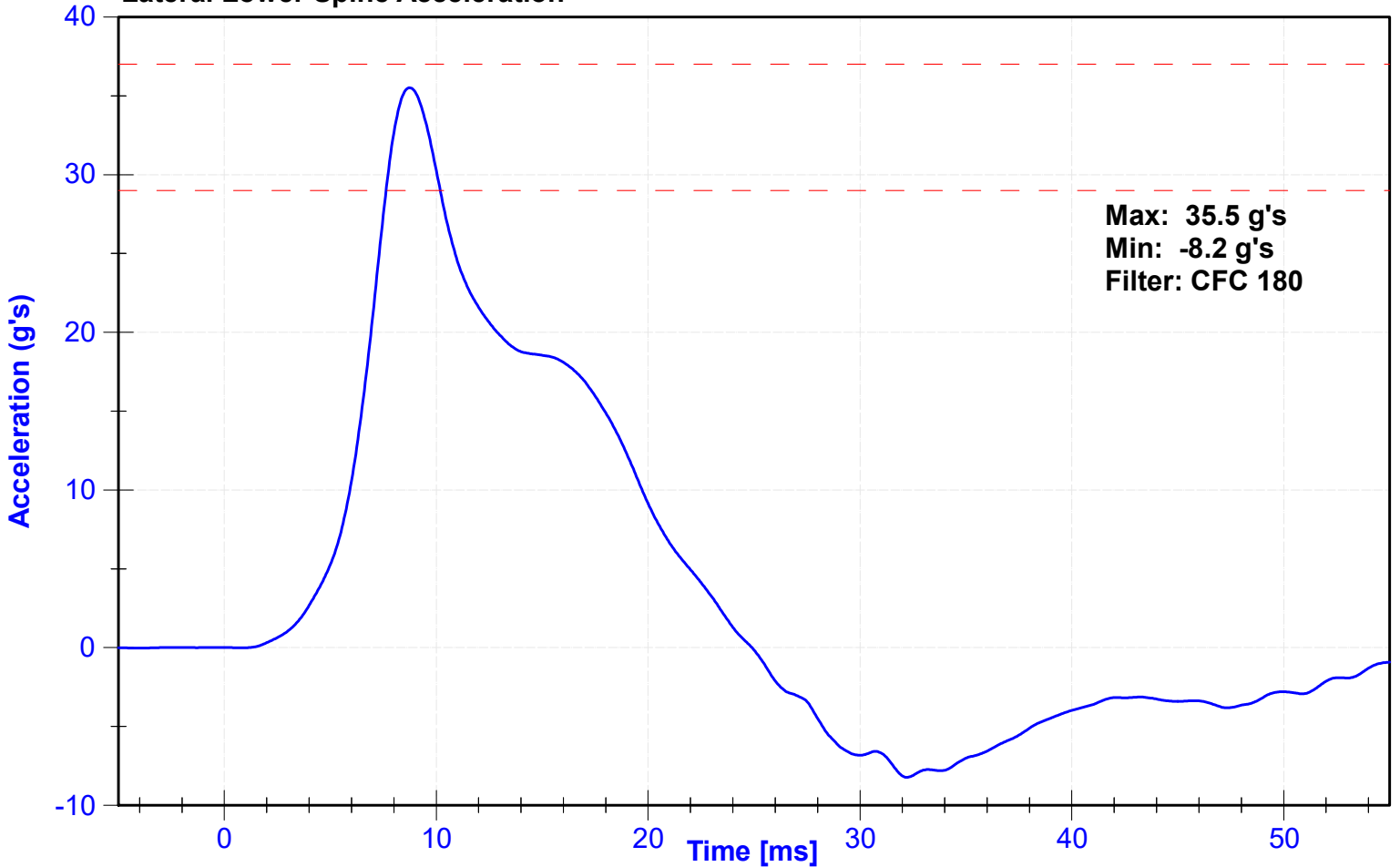




Lateral Upper Spine Acceleration



Lateral Lower Spine Acceleration



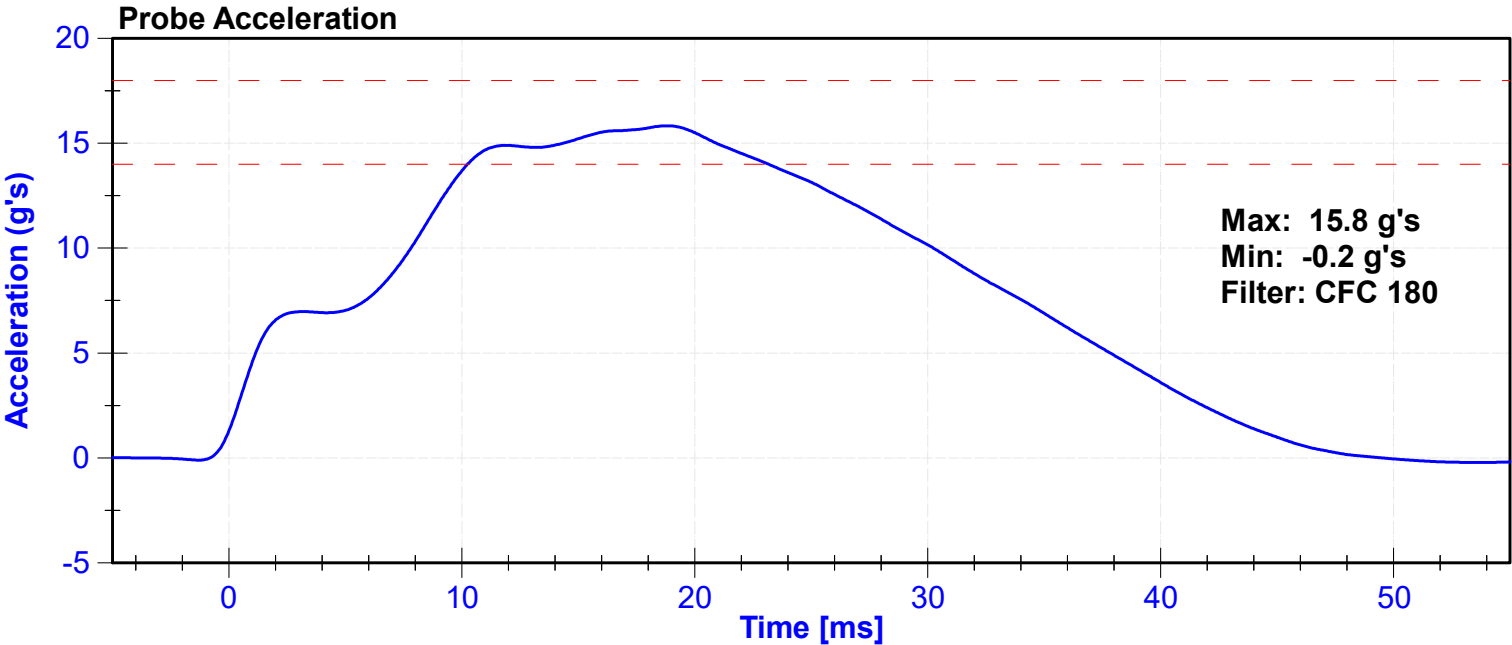
ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

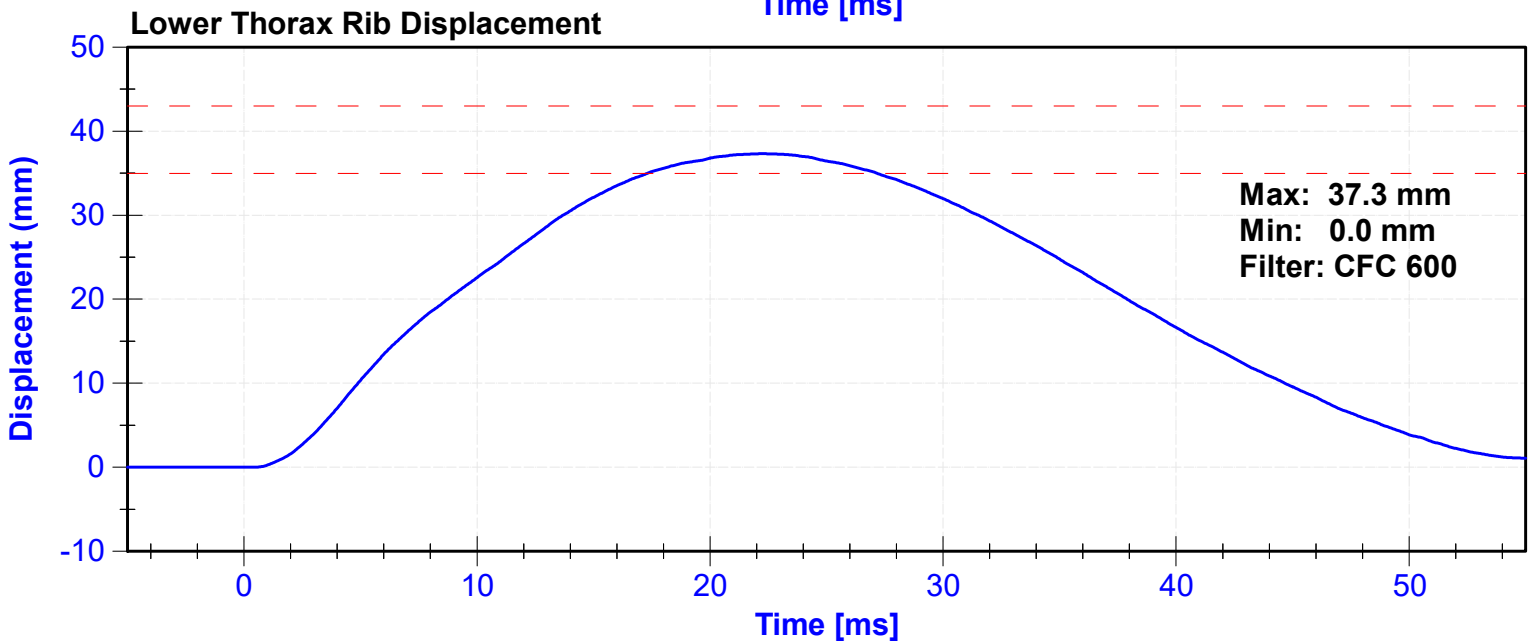
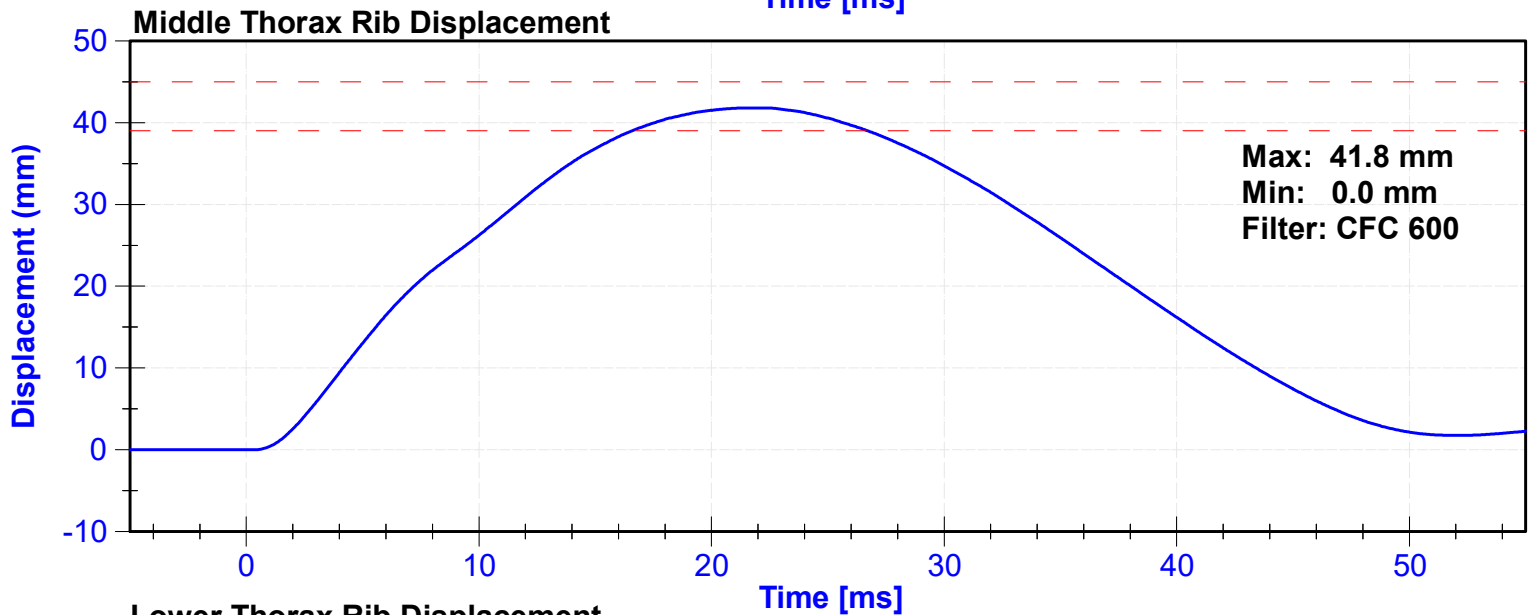
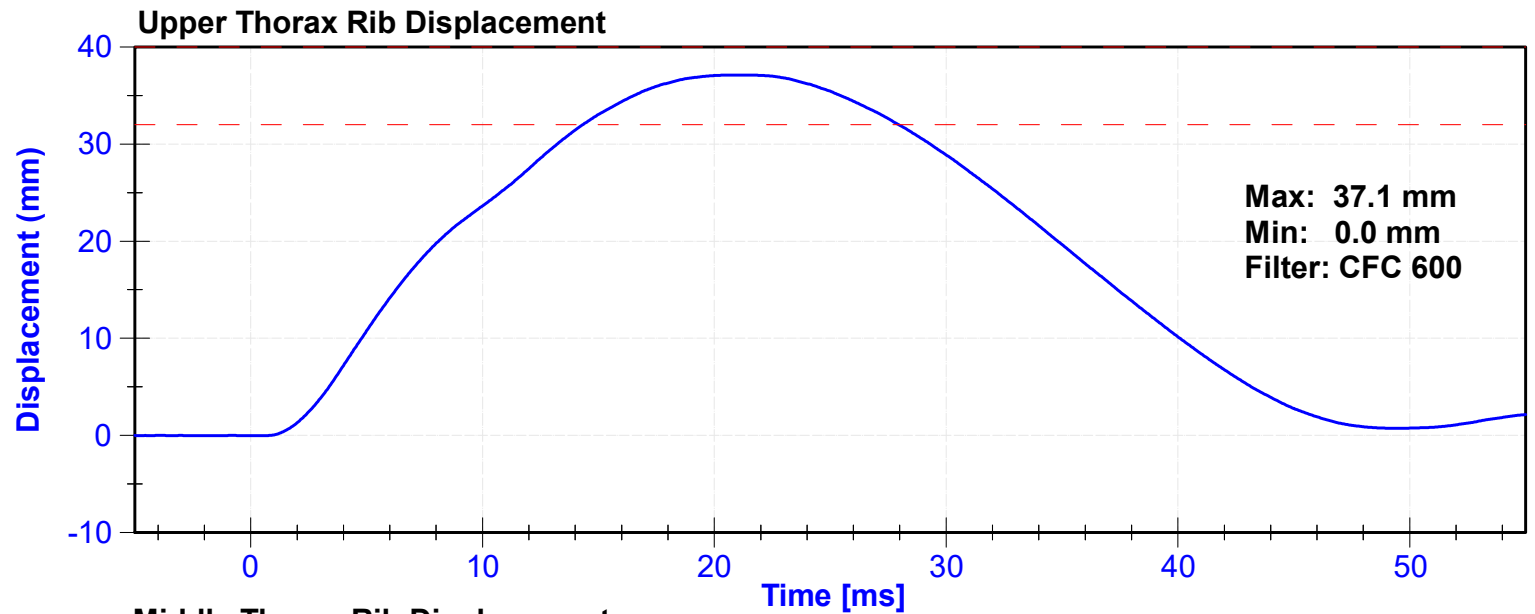
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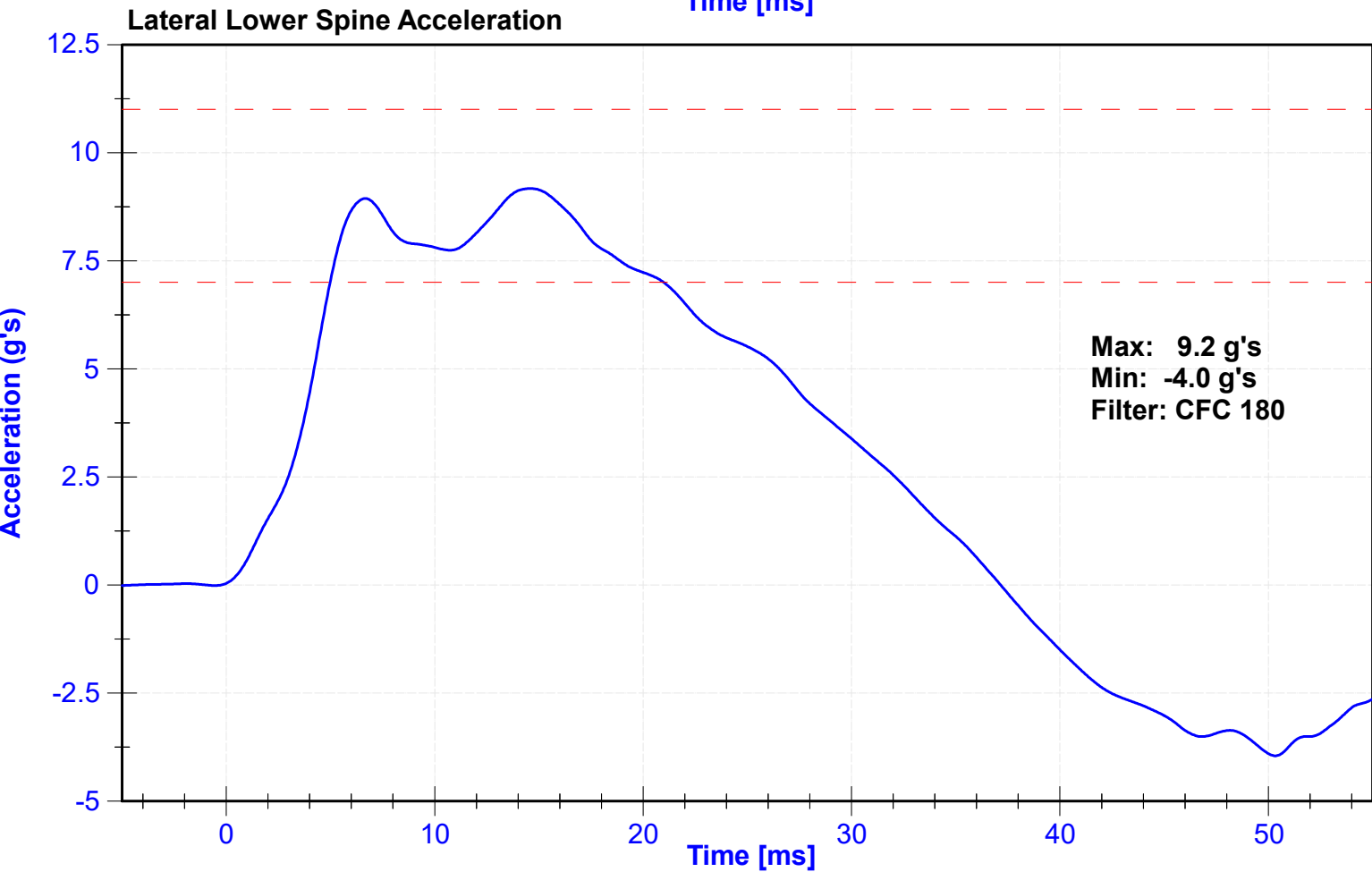
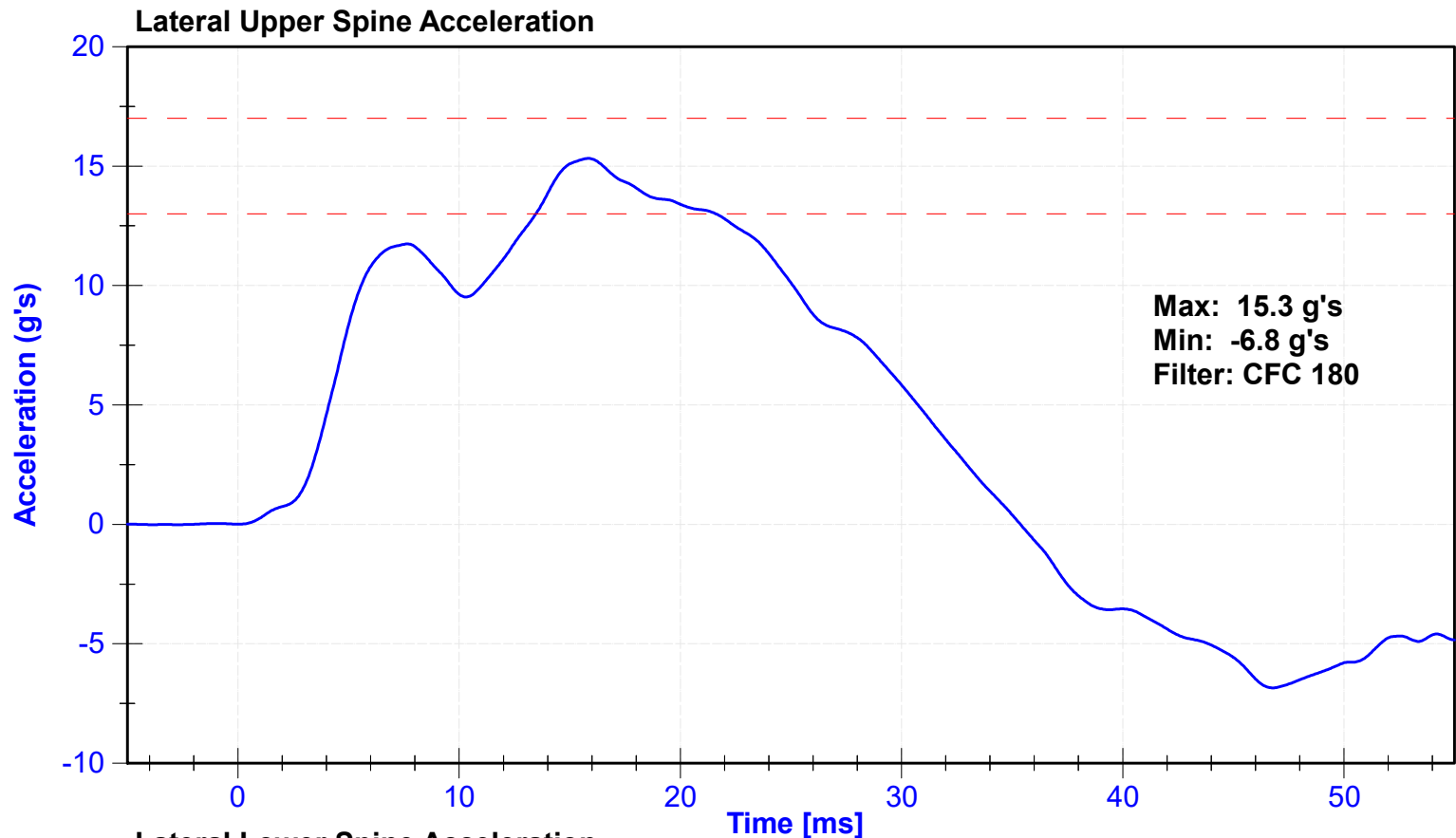
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	62	Pass
Velocity	4.2	4.4	m/s	4.29	Pass
Probe Acceleration	14	18	g's	15.8	Pass
Lateral Upper Spine Acceleration	13	17	g's	15.3	Pass
Lateral Lower Spine Acceleration	7	11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

Transducer Calibrations

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







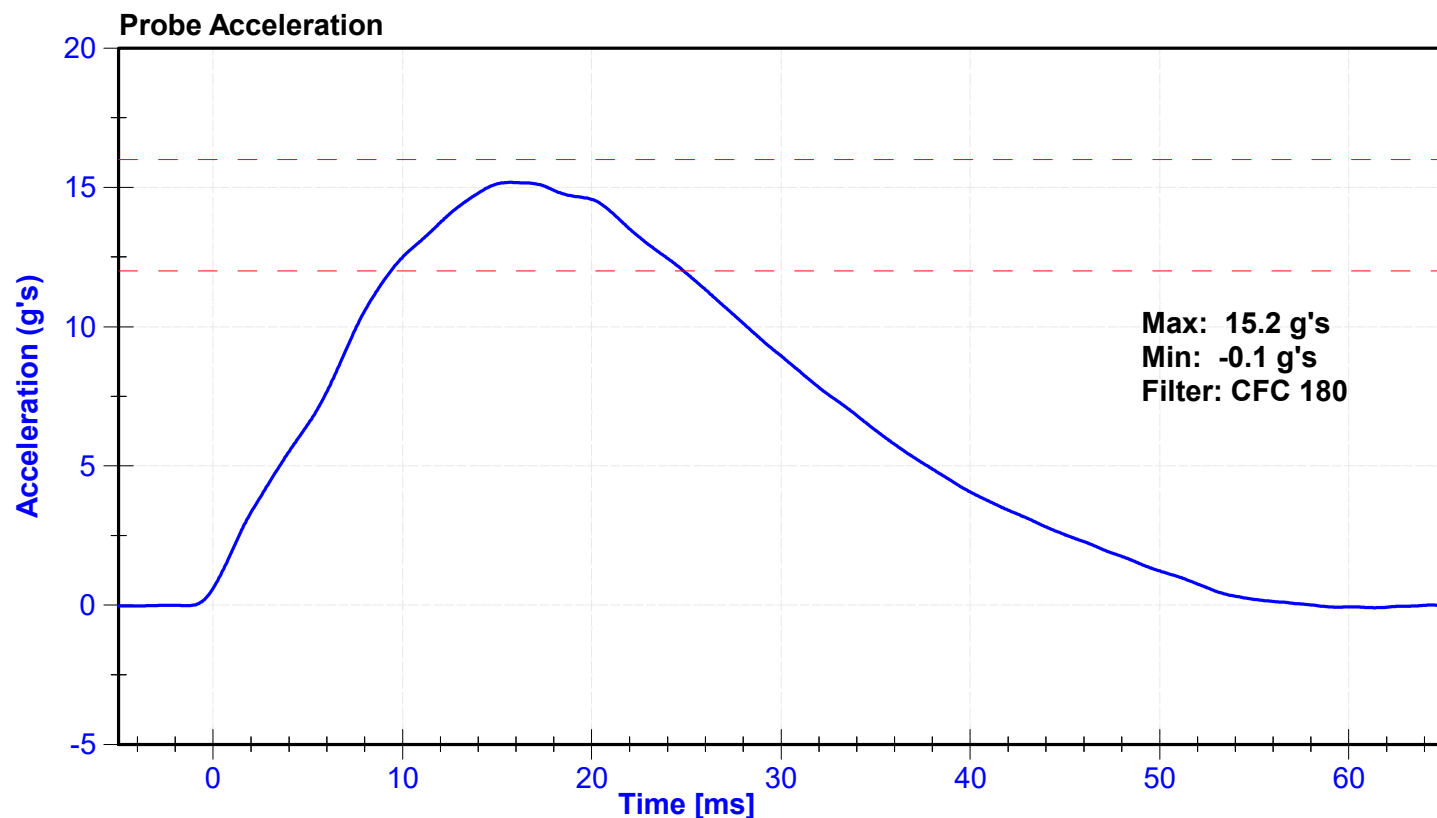
ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

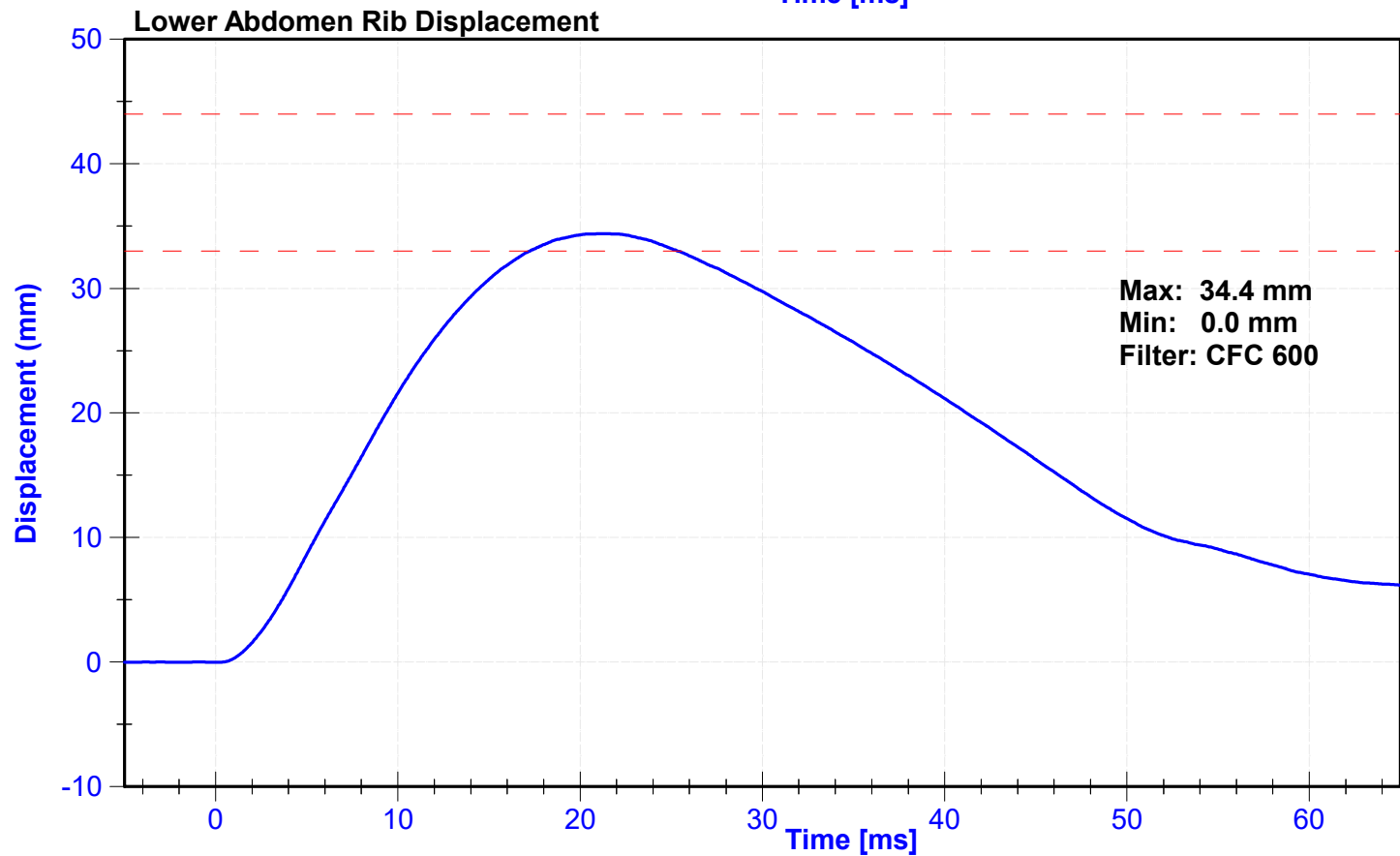
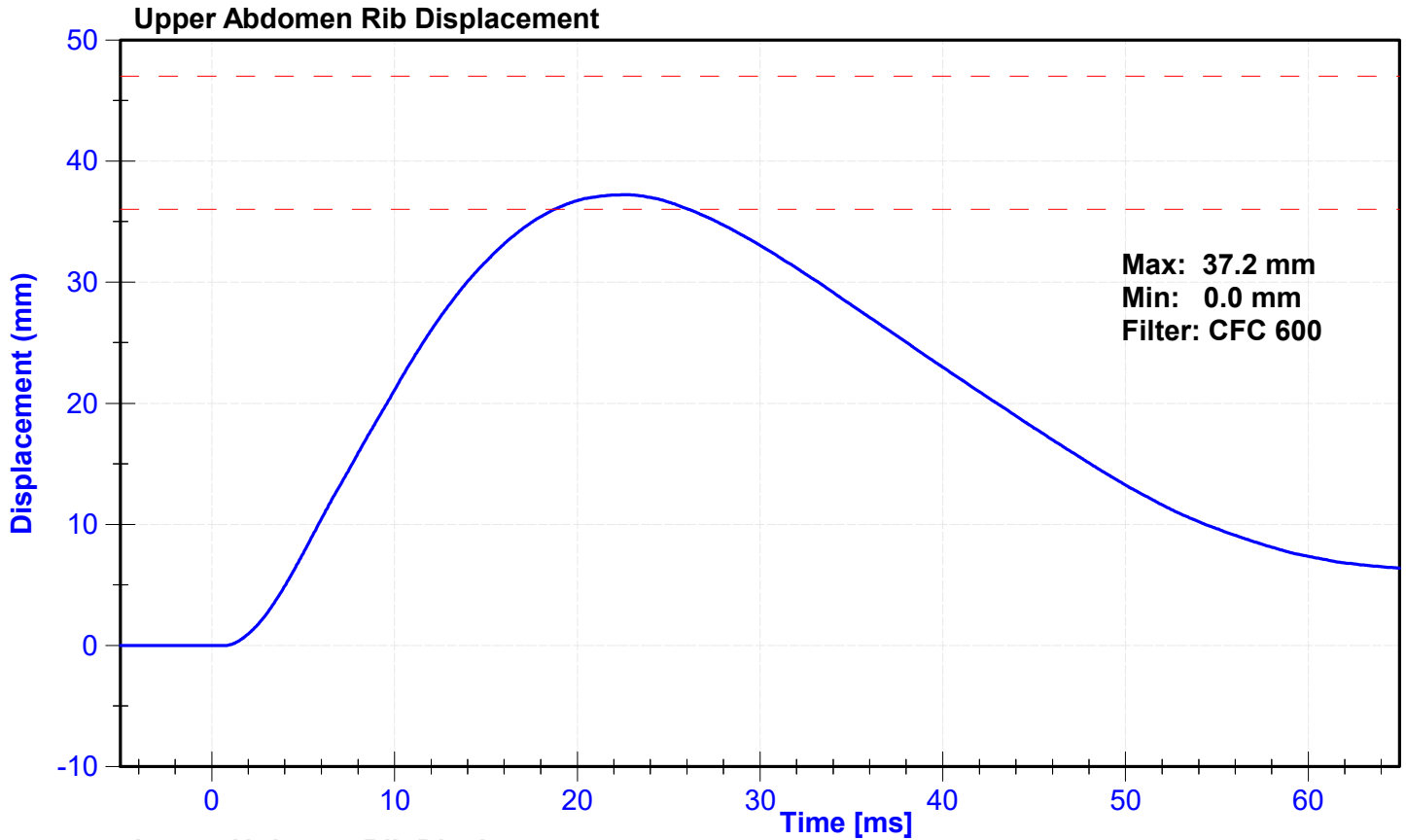
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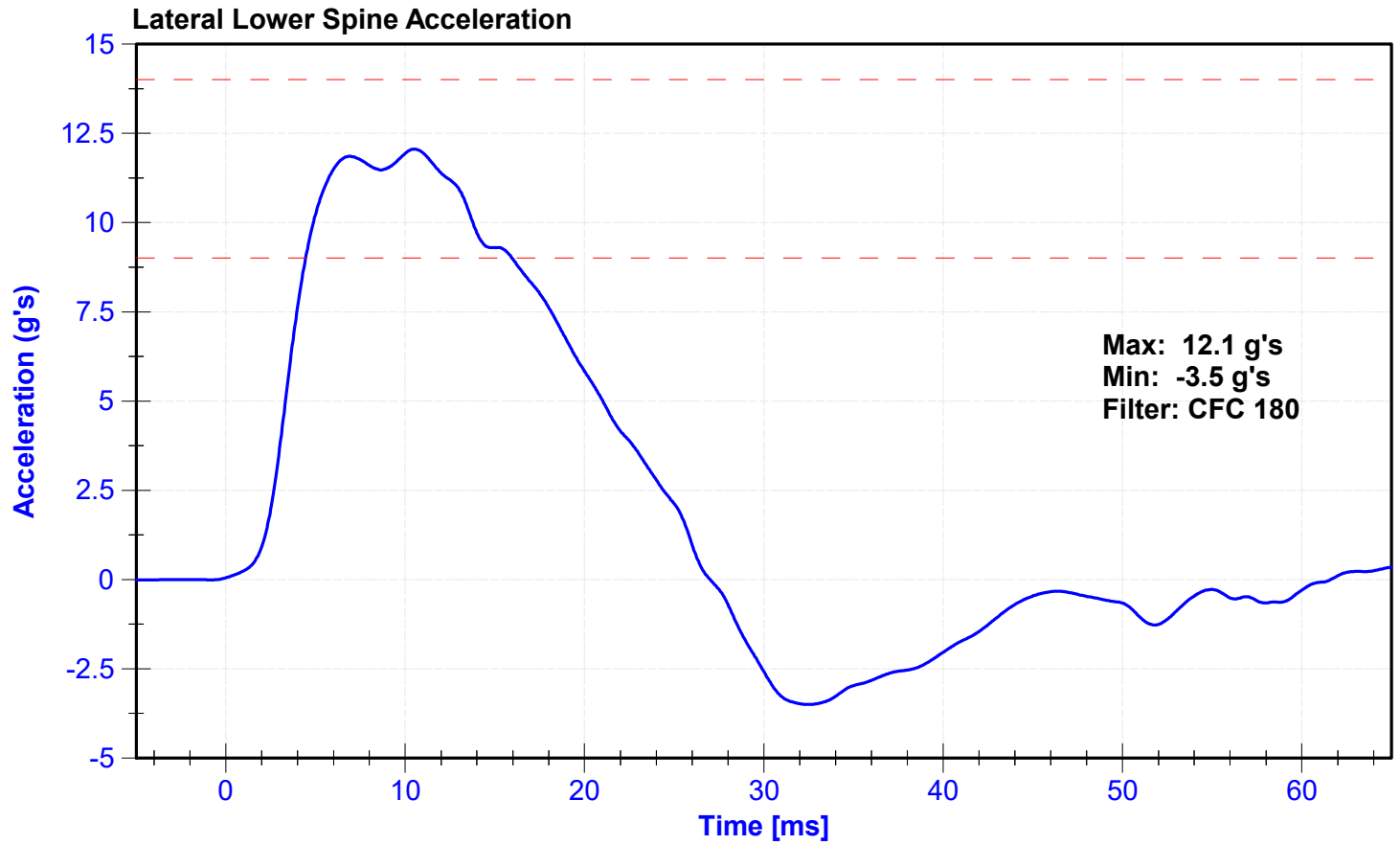
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	62	Pass
Velocity	4.2	4.4	m/s	4.28	Pass
Probe Acceleration	12	16	g's	15.2	Pass
Lateral Lower Spine Acceleration	9	14	g's	12.1	Pass
Upper Abdomen Rib Deflection	36	47	mm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

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	18527	8/2/2024	1/29/2025
Lower Spine Y Accelerometer	Endevco	P52071	5/9/2024	11/5/2024
Upper Abdomen Rib Potentiometer	Servo	074GFE	5/28/2024	11/28/2024
Lower Abdomen Rib Potentiometer	Servo	075GFE	5/9/2024	11/5/2024







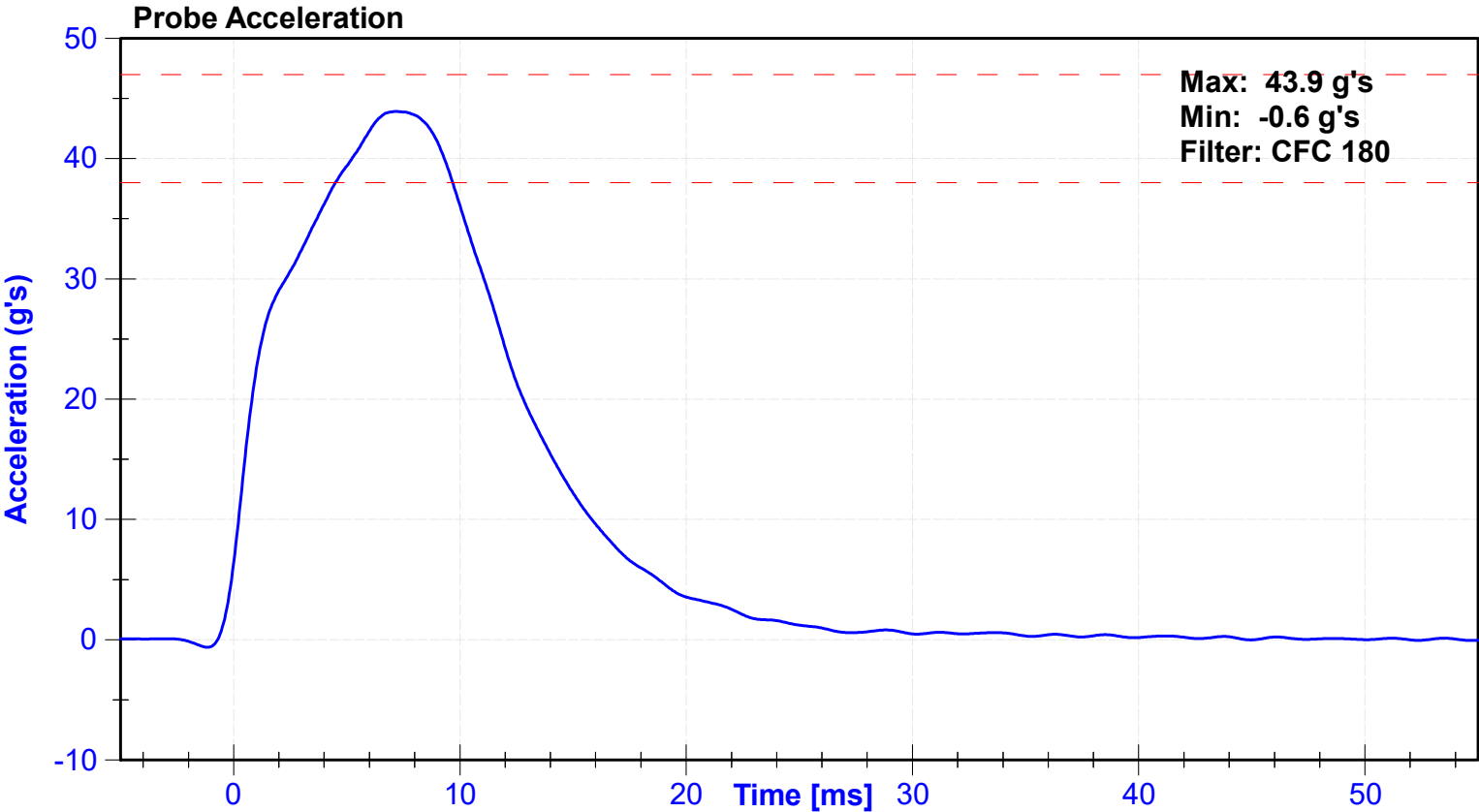
ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

Results

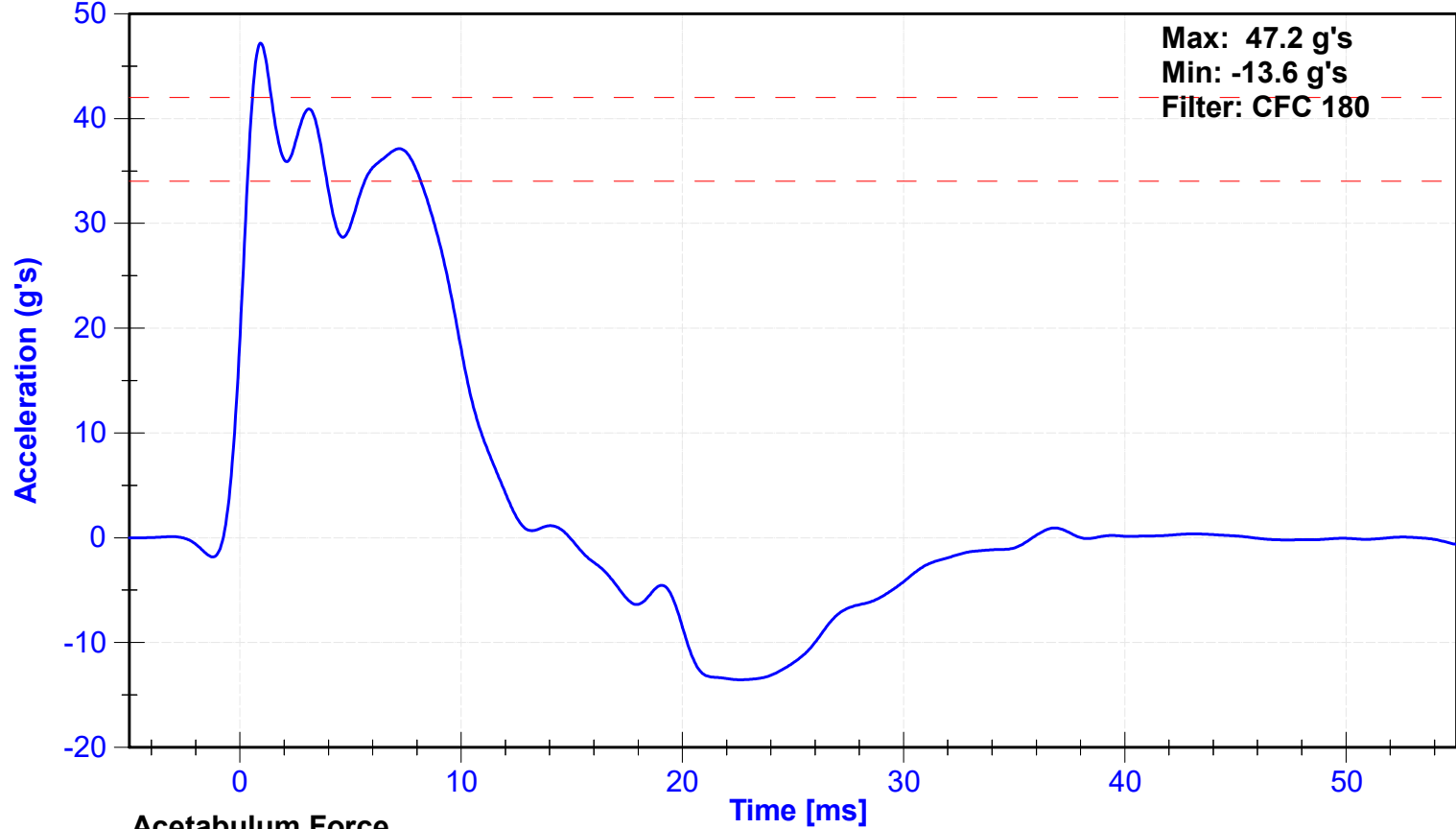
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	62	Pass
Velocity	6.6	6.8	m/s	6.66	Pass
Probe Acceleration	38	47	g's	43.9	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	37.1	Pass
Acetabulum Force	3600	4300	N	3871.0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

Transducer Calibrations

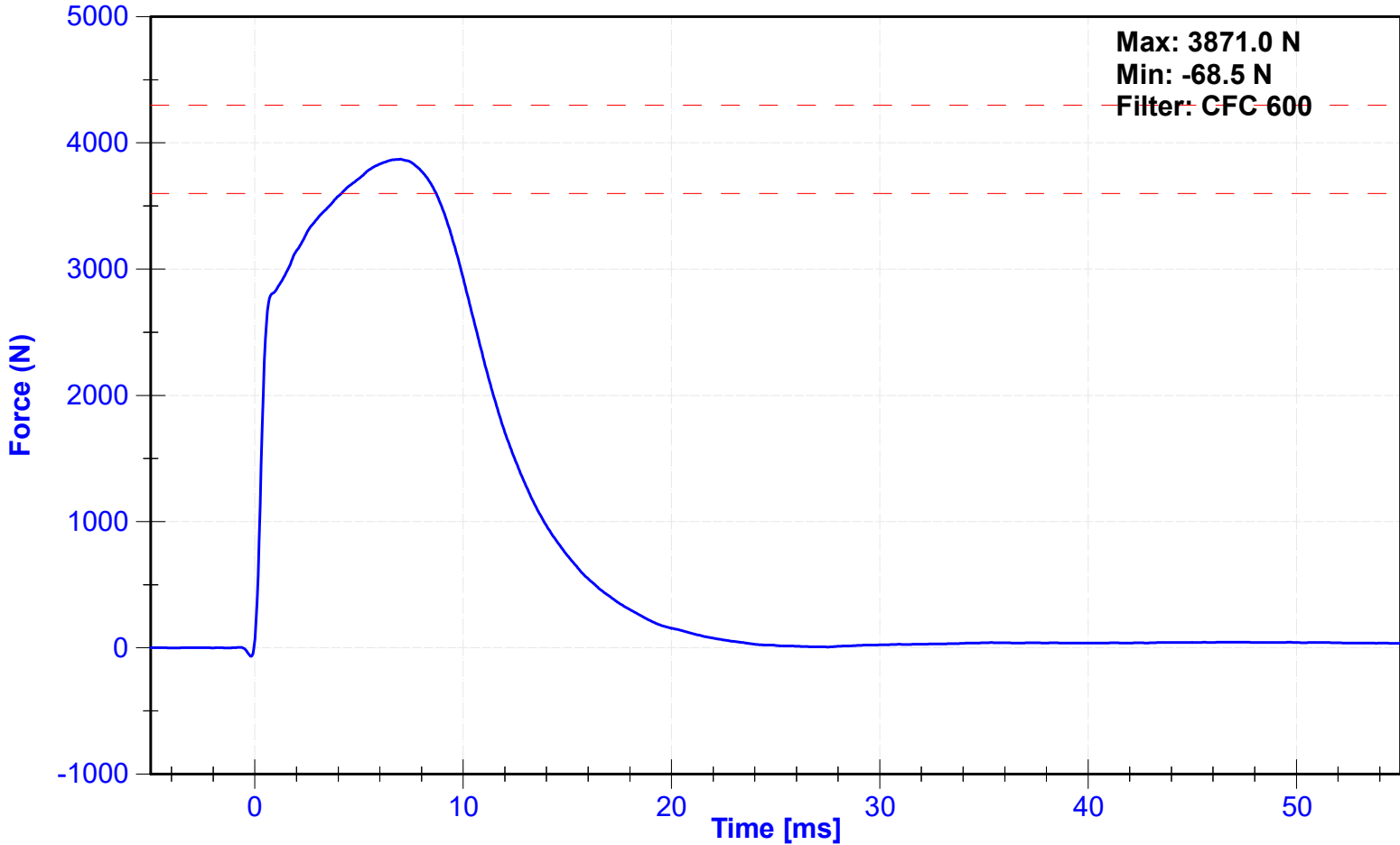
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18527	8/2/2024	1/29/2025
Pelvis Y Accelerometer	Endevco	P51731	5/9/2024	11/5/2024
Acetabulum Load Cell	Denton	275-FY	7/12/2024	7/12/2025
Certification Plug	SACO			N/A
Crash Test Plug	SACO			N/A



Lateral Pelvis Acceleration



Acetabulum Force



Cart

8/29/24

SID-ILS Pelvis Plug Certification Test

Plug S/N 16439

Test Number 23008

Report Number 23066

Test Date 5/23/2022 11:35:28 AM

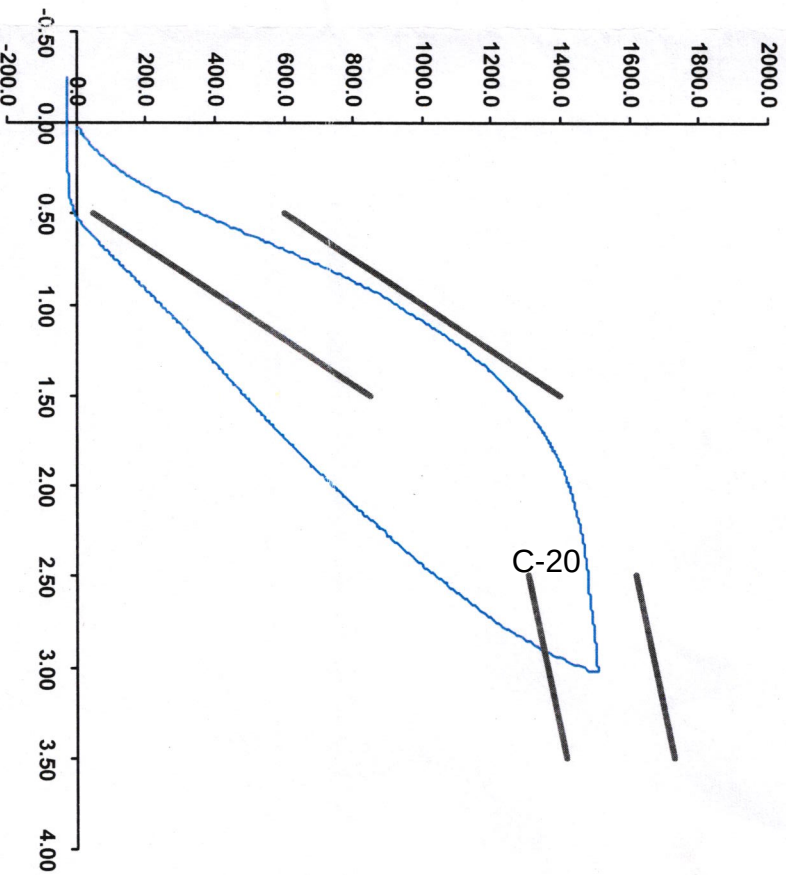
Force (-N) vs Extension (-mm)

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:



Operator

Part Number 180-4450

Template No 107 23-May-22
SACO Research

By: *[Signature]*

Date: 5/23/2022

Impact

8/29/24

SID-IIs Pelvis Plug Certification Test

Plug S/N 16482

Test Number 23265

Report Number 23322

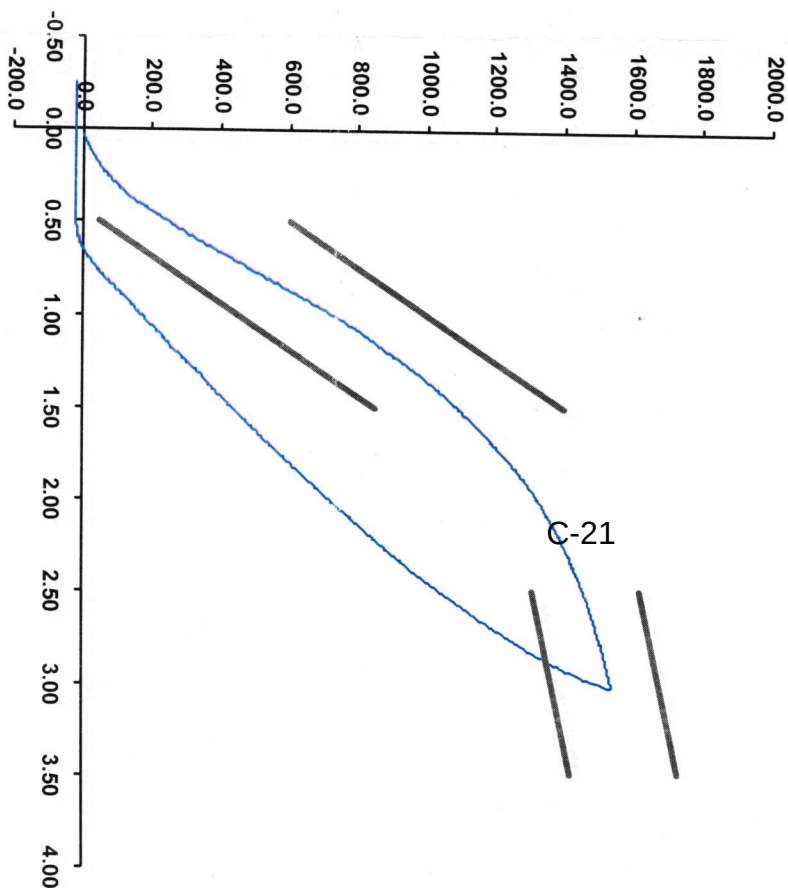
Test Date 7/14/2022 12:15:46 PM

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



Operator

Part Number 180-4450

Template No 107

14-Jul-22

SACO Research

By: DC

Date: 7/14/22

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

Non Impact 8/29/24

SID-ILIS Pelvis Plug Certification Test

Plug S/N 15623

Test Number 20478

Report Number 20532

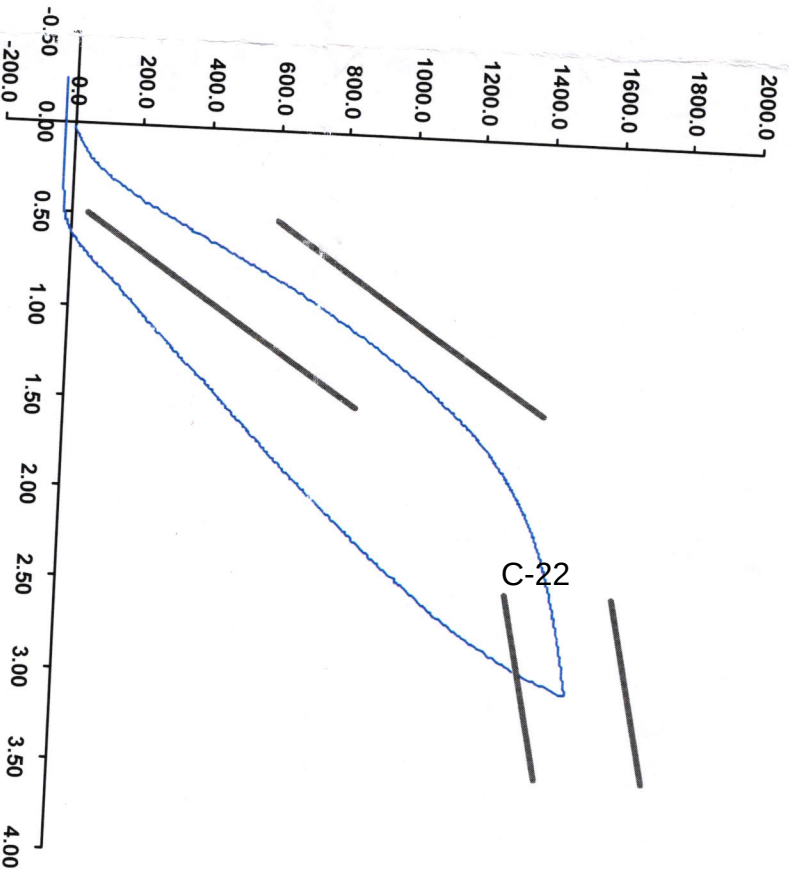
Test Date 10/7/2021 1:54:28 PM

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



Operator

Part Number 180-4450

Template No 107 07-Oct-21
SACO Research

By: DC

Date: 10/7/21

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

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

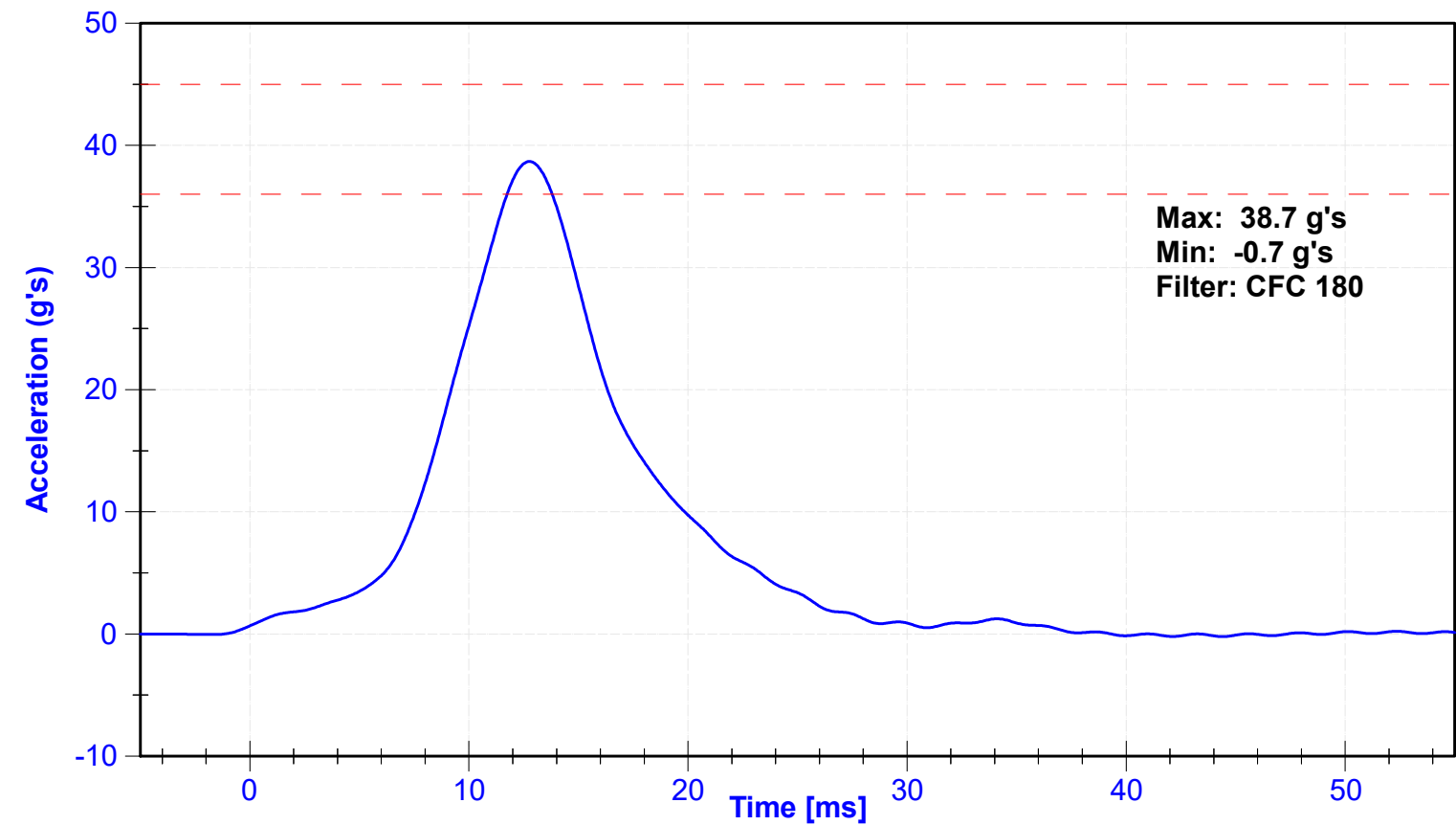
Results

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

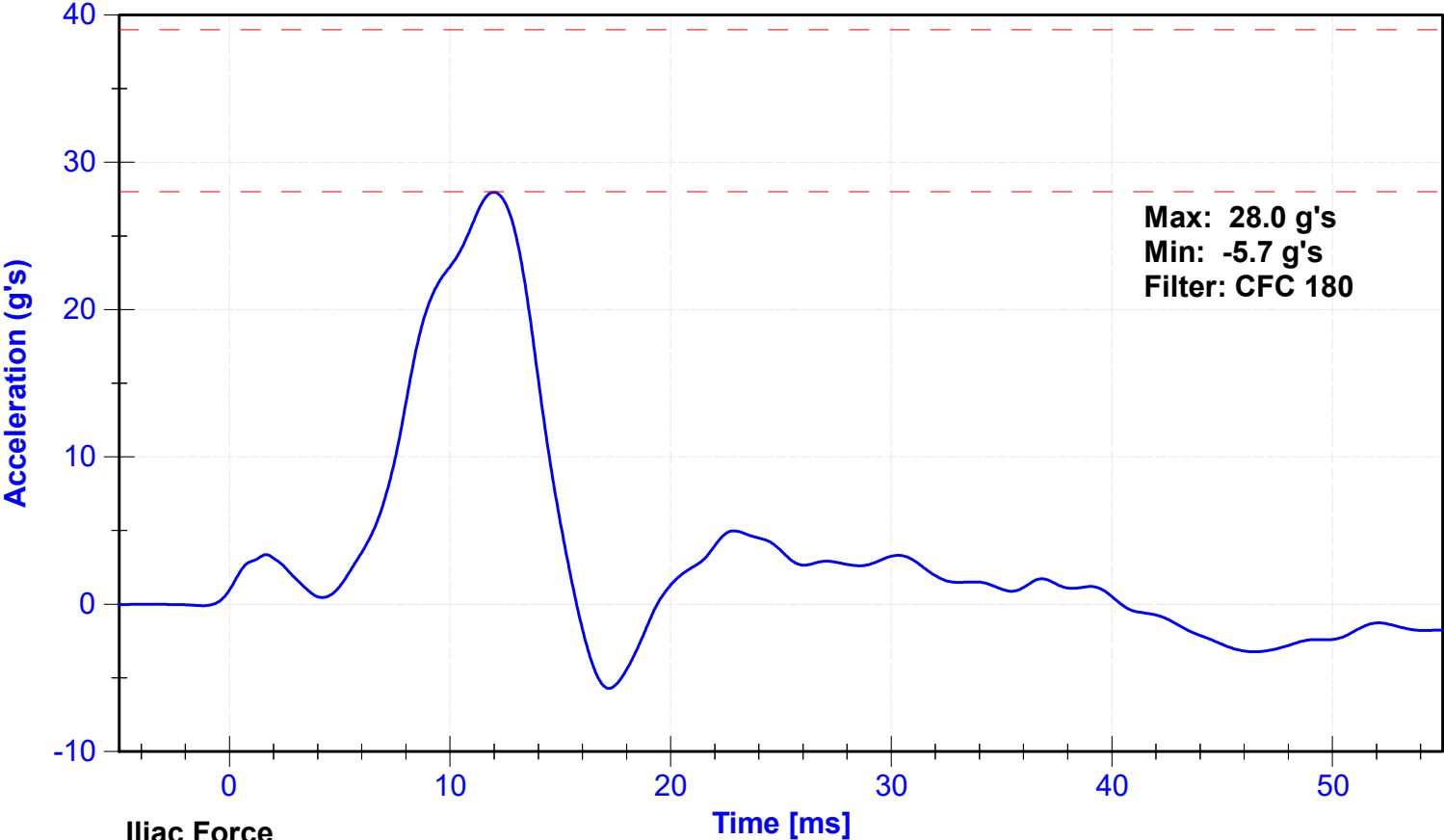
Transducer Calibrations

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

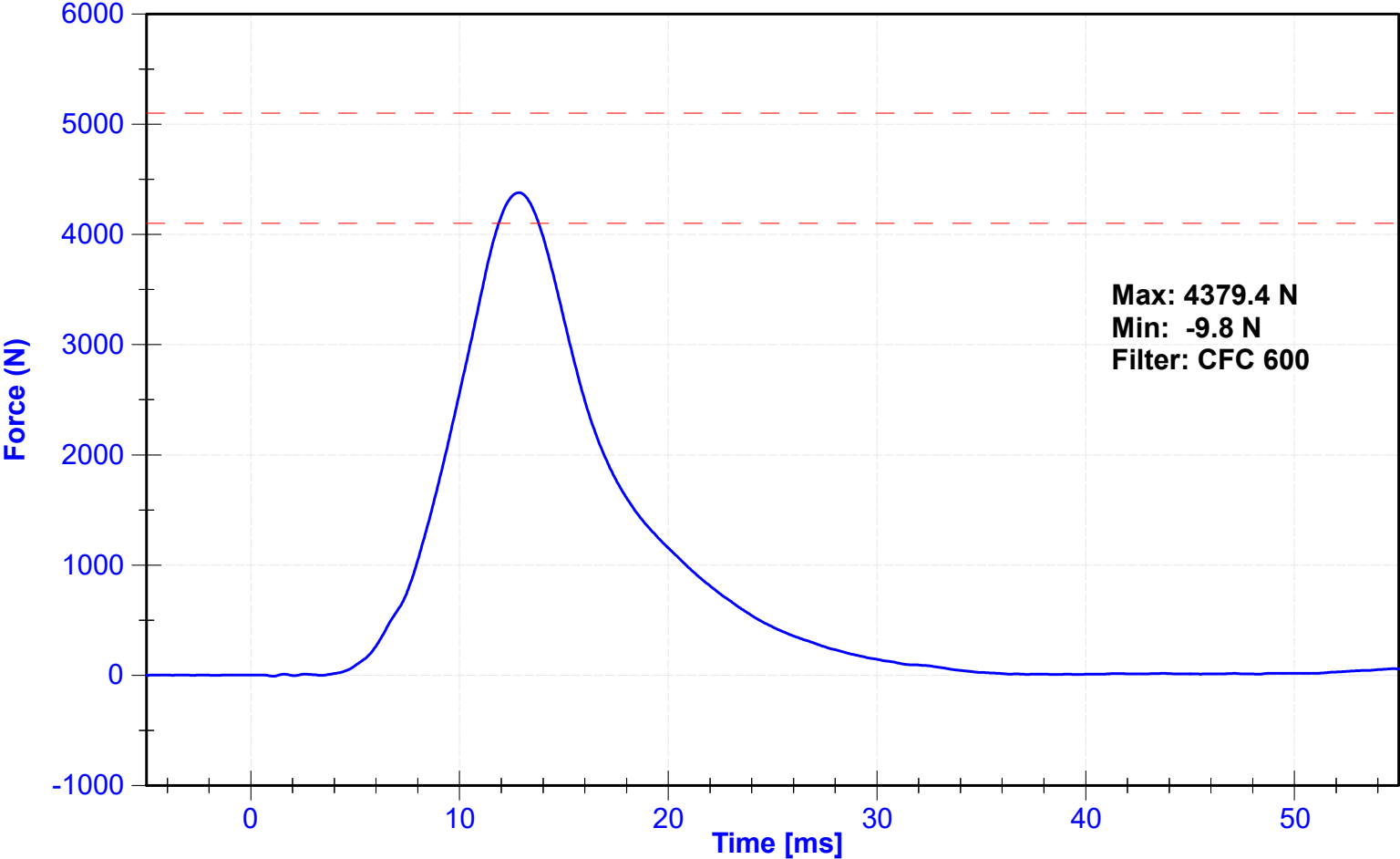
Probe Acceleration



Lateral Pelvis Acceleration



Iliac Force



CALIBRATION TEST RESULTS

POST-TEST

SID-IIS 5TH PERCENTILE FEMALE - DRIVER ATD

SERIAL NO:300

(CONFIGURED FOR LEFT SIDE IMPACT)

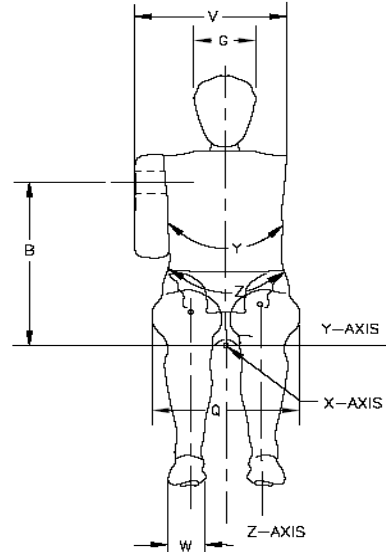
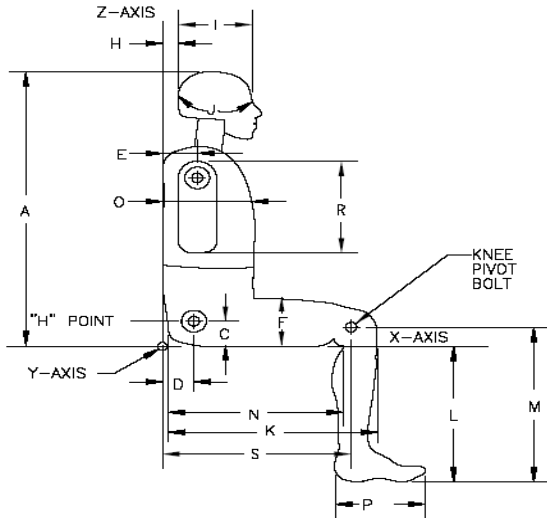


External Measurements - SID-IIs

Technician: J. Rios

Date: 9/13/2024

Dummy Serial Number: 300



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	780	Pass
B	Shoulder Pivot Height	437	453	446	Pass
C	H-point Height	79	89	83	Pass
D	H-point from seatback	141	151	145	Pass
E	Shoulder Pivot from Backline	97	107	101	Pass
F	Thigh Clearance	119	135	127	Pass
G	Head Breadth	140	148	145	Pass
H	Head Back from Backline	40	46	44	Pass
I	Head Depth	178	188	181	Pass
J	Head Circumference	541	551	547	Pass
K	Buttock to Knee Length	514	540	530	Pass
L	Popliteal Height	343	369	355	Pass
M	Knee Pivot to floor height	392	409	398	Pass
N	Buttock Popliteal Length	416	442	431	Pass
O	Chest Depth w/o jacket	195	211	202	Pass
P	Foot Length	216	232	224	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	319	Pass
R	Arm Length	249	259	255	Pass
S	Knee Joint to seatback	477	493	484	Pass
V	Shoulder Width	341	357	350	Pass
W	Foot Width	78	94	86	Pass
Y	Chest Circumference w/jacket	851	881	874	Pass
Z	Waist Circumference	761	791	774	Pass

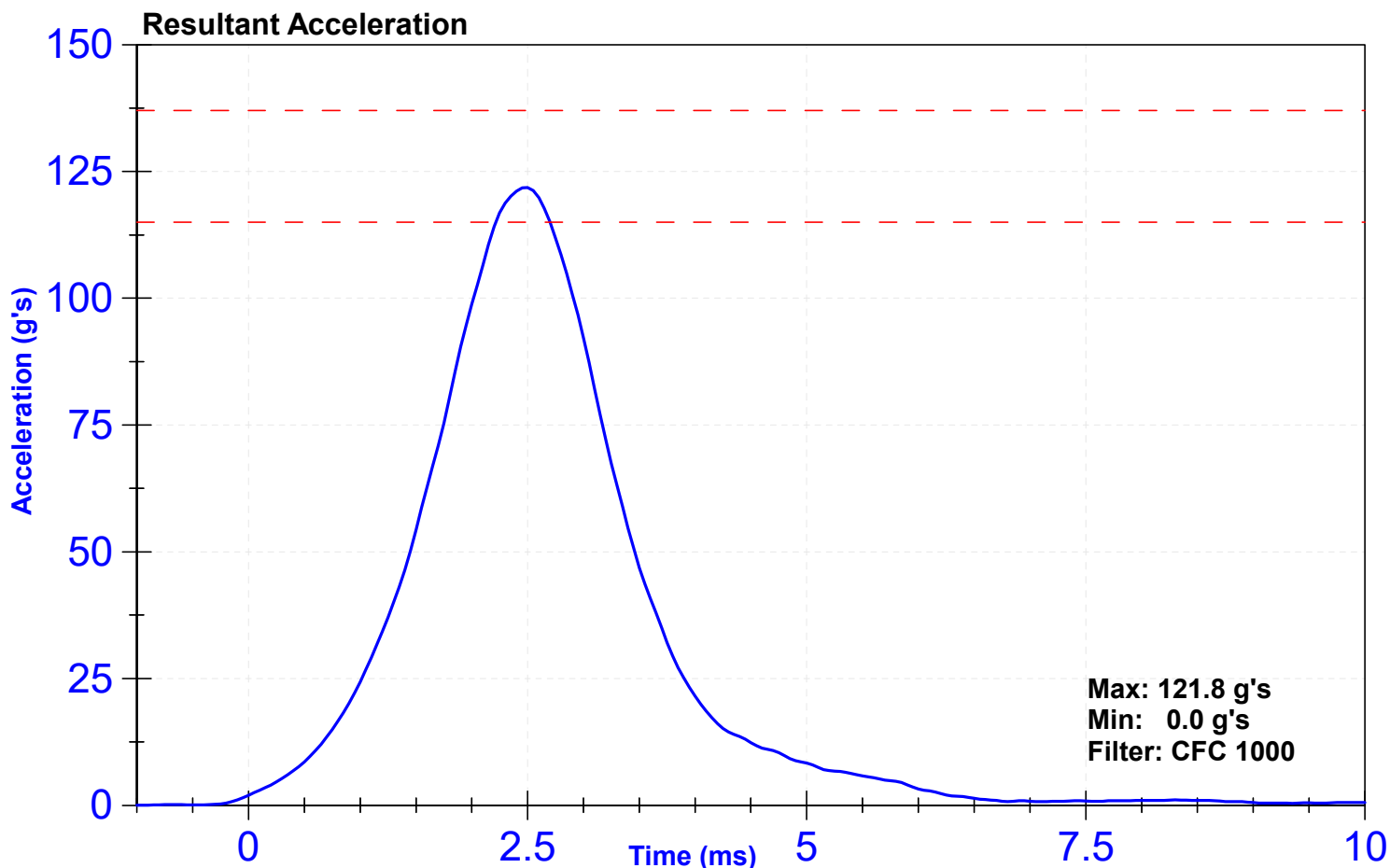
ATD Manufacturer	FTSS	Test Technician	J.Kinderman
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

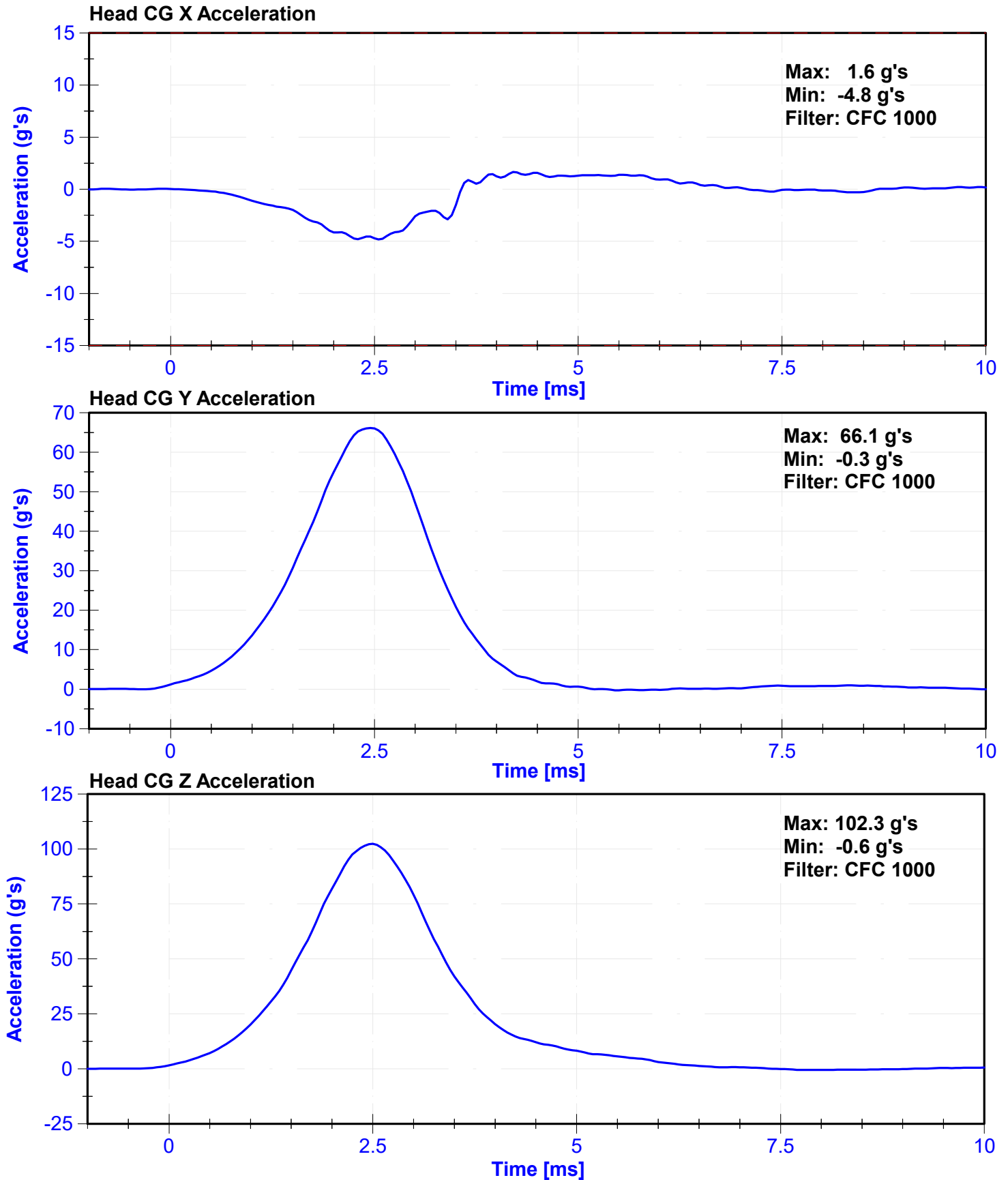
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	60	Pass
Resultant Acceleration	115	137	g's	121.8	Pass
Oscillation	0	15	%	0.8	Pass
Fore-Aft Acceleration	-15	15	g's	-4.8	Pass

Transducer Calibrations

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





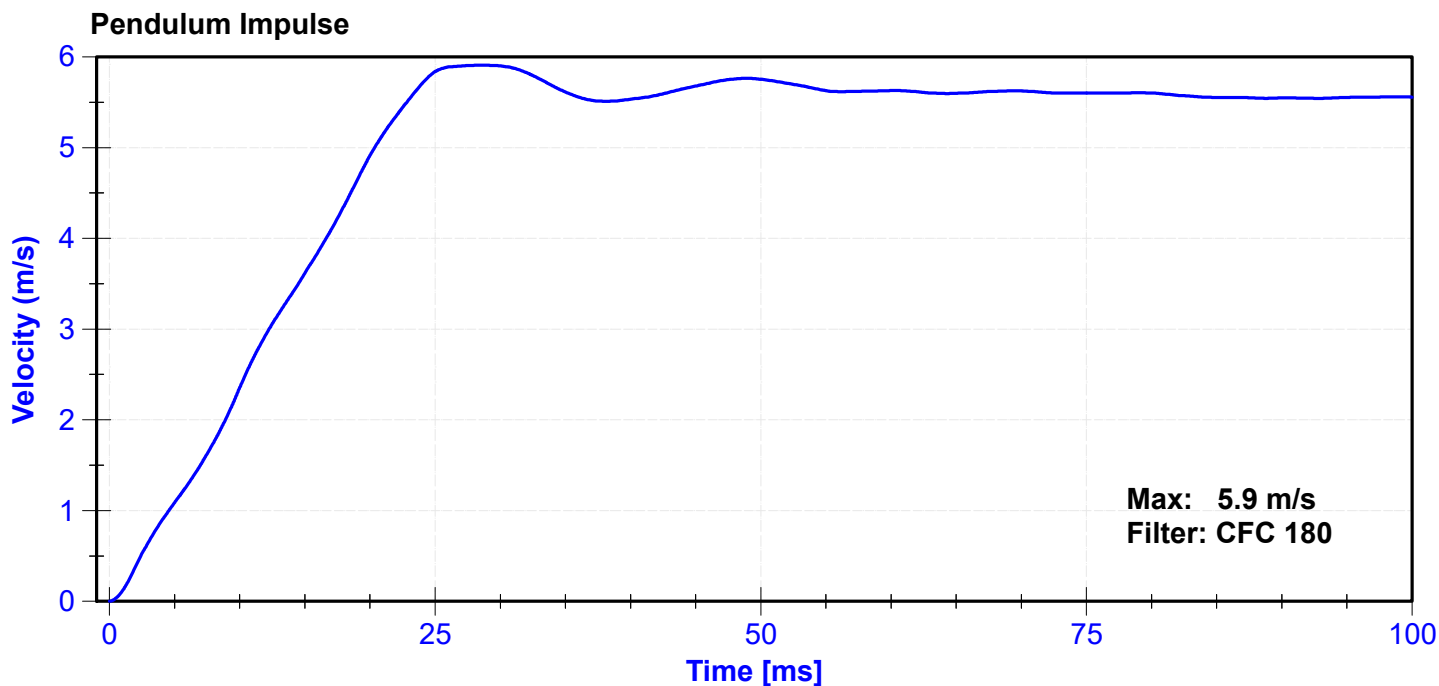
ATD Manufacturer	FTSS	Test Technician	J. Kinderman
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

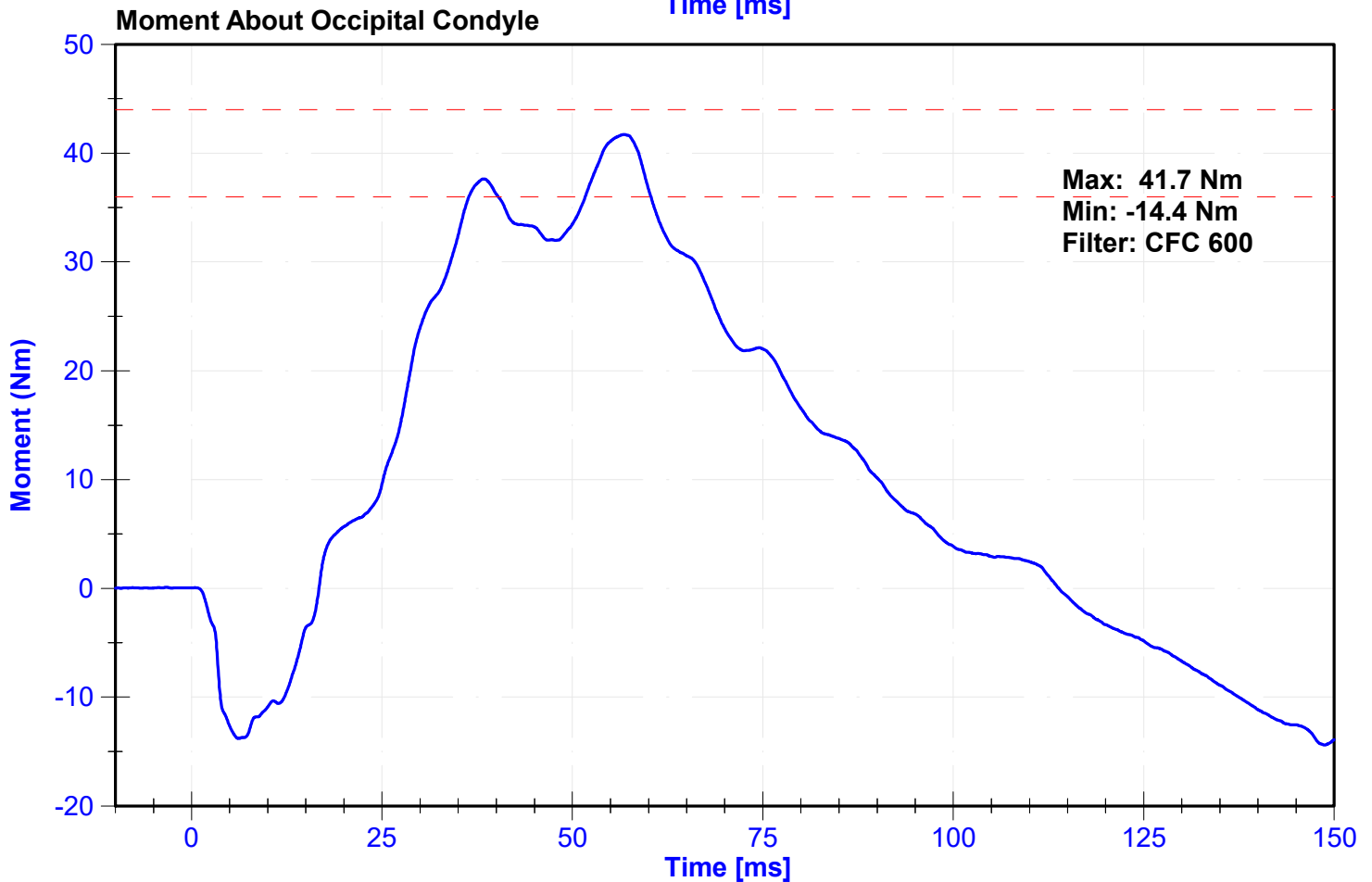
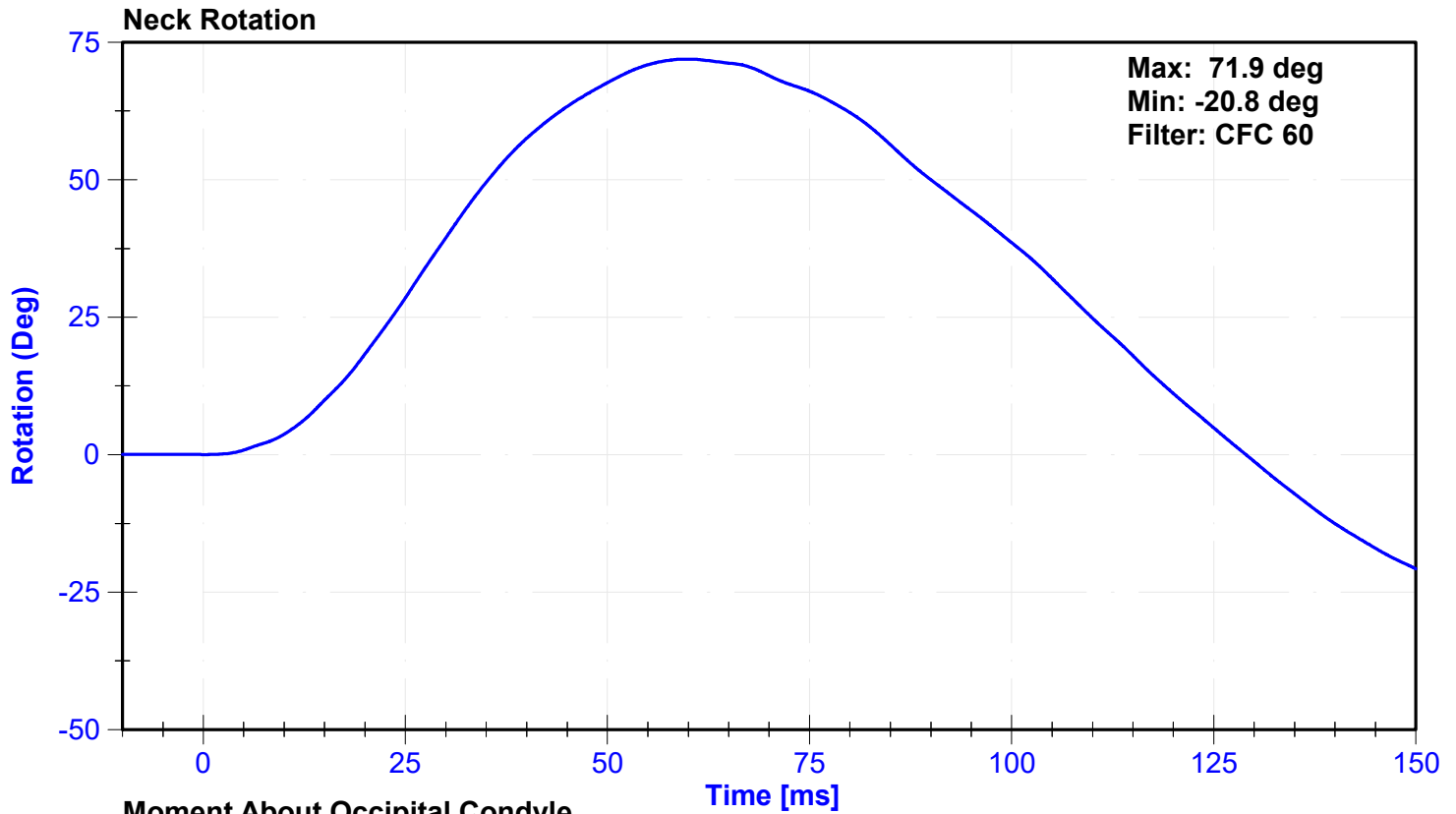
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	60	Pass
Velocity	5.51	5.63	m/s	5.557	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.36	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.62	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.91	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.84	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.91	Pass
Neck Rotation	71	81	deg	71.9	Pass
Time at Maximum Rotation	50	70	ms	59.8	Pass
Moment about the OC	36	44	Nm	41.7	Pass
Moment Decay to 0 Nm	102	126	ms	113.9	Pass

Transducer Calibrations

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





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

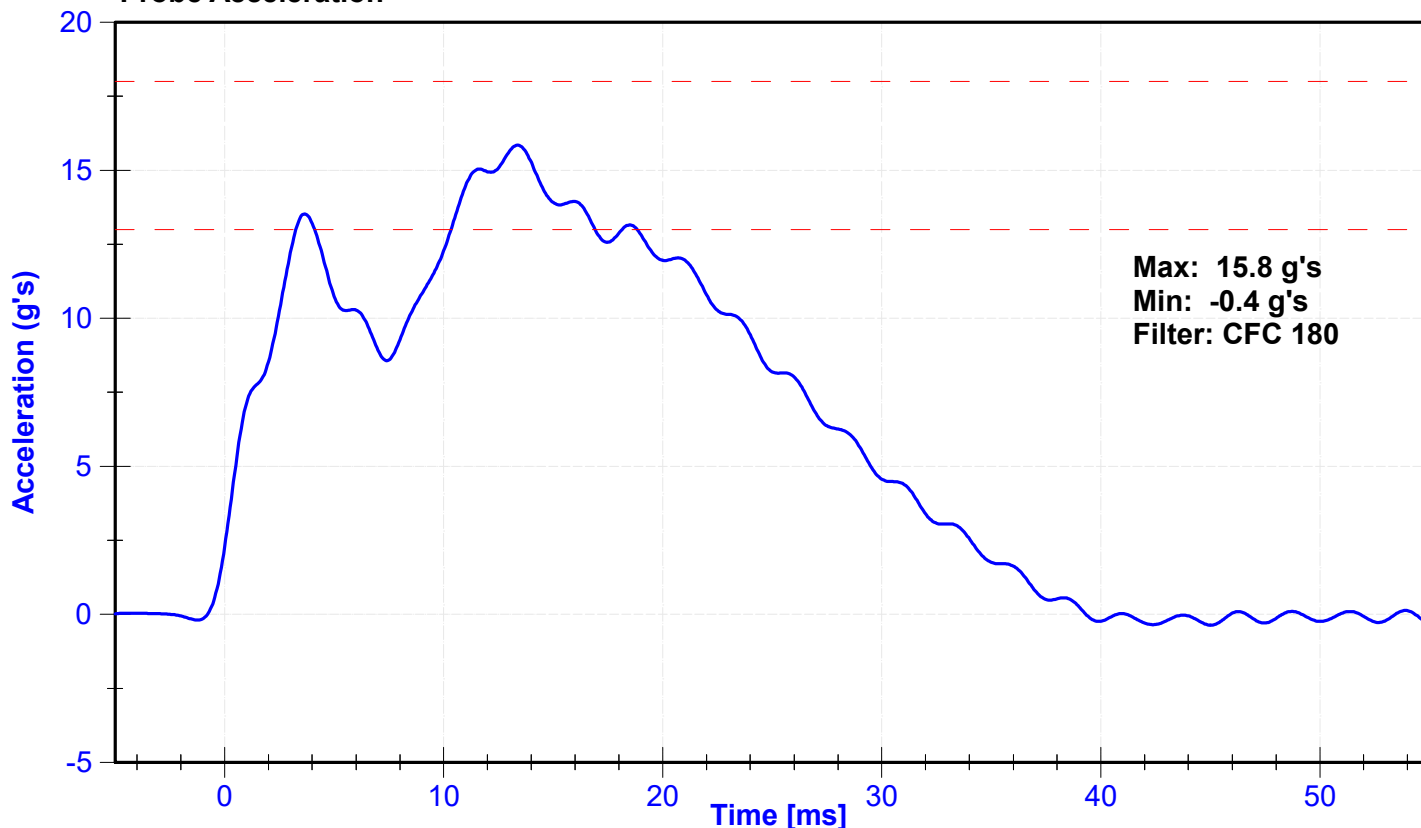
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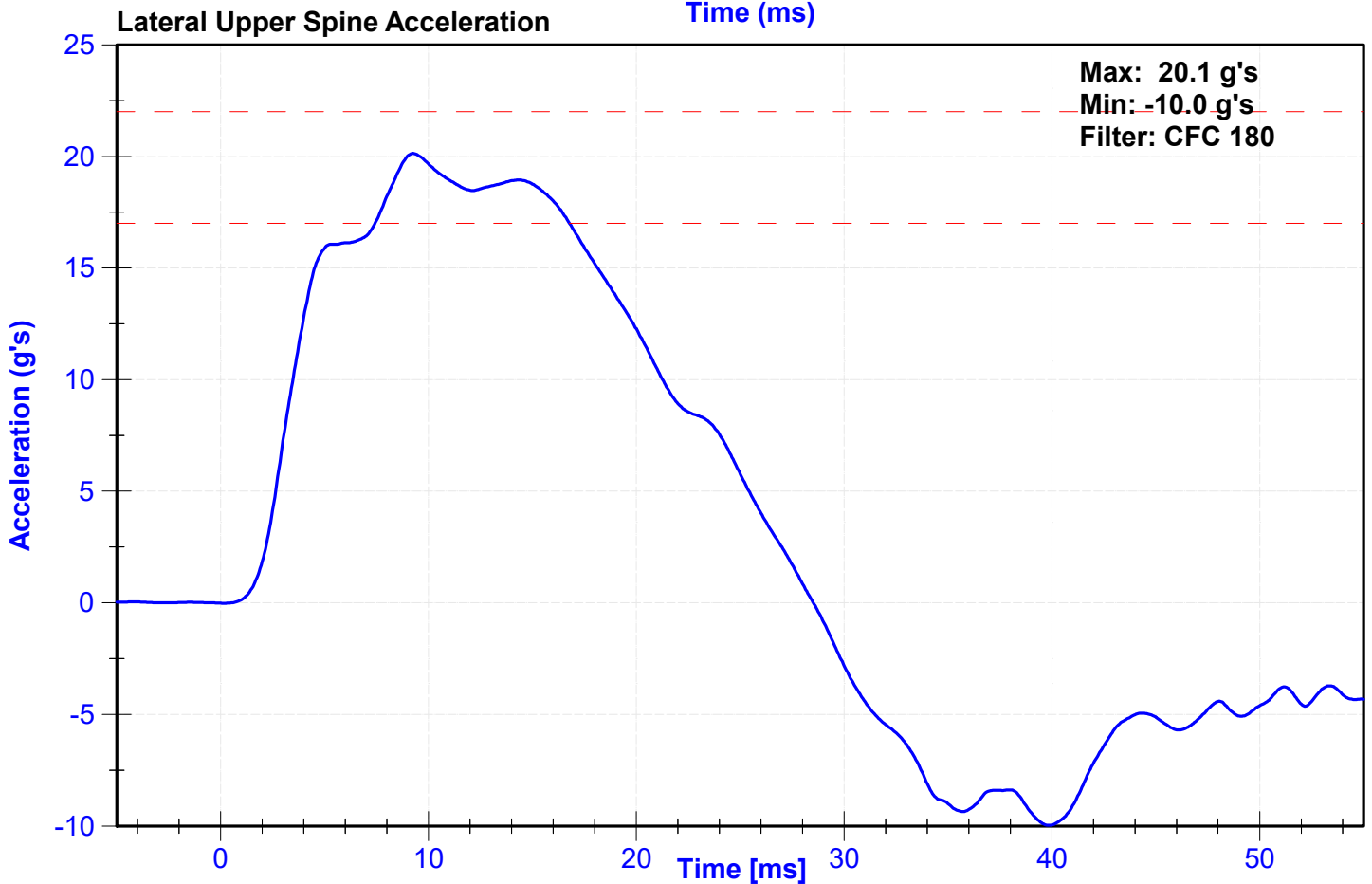
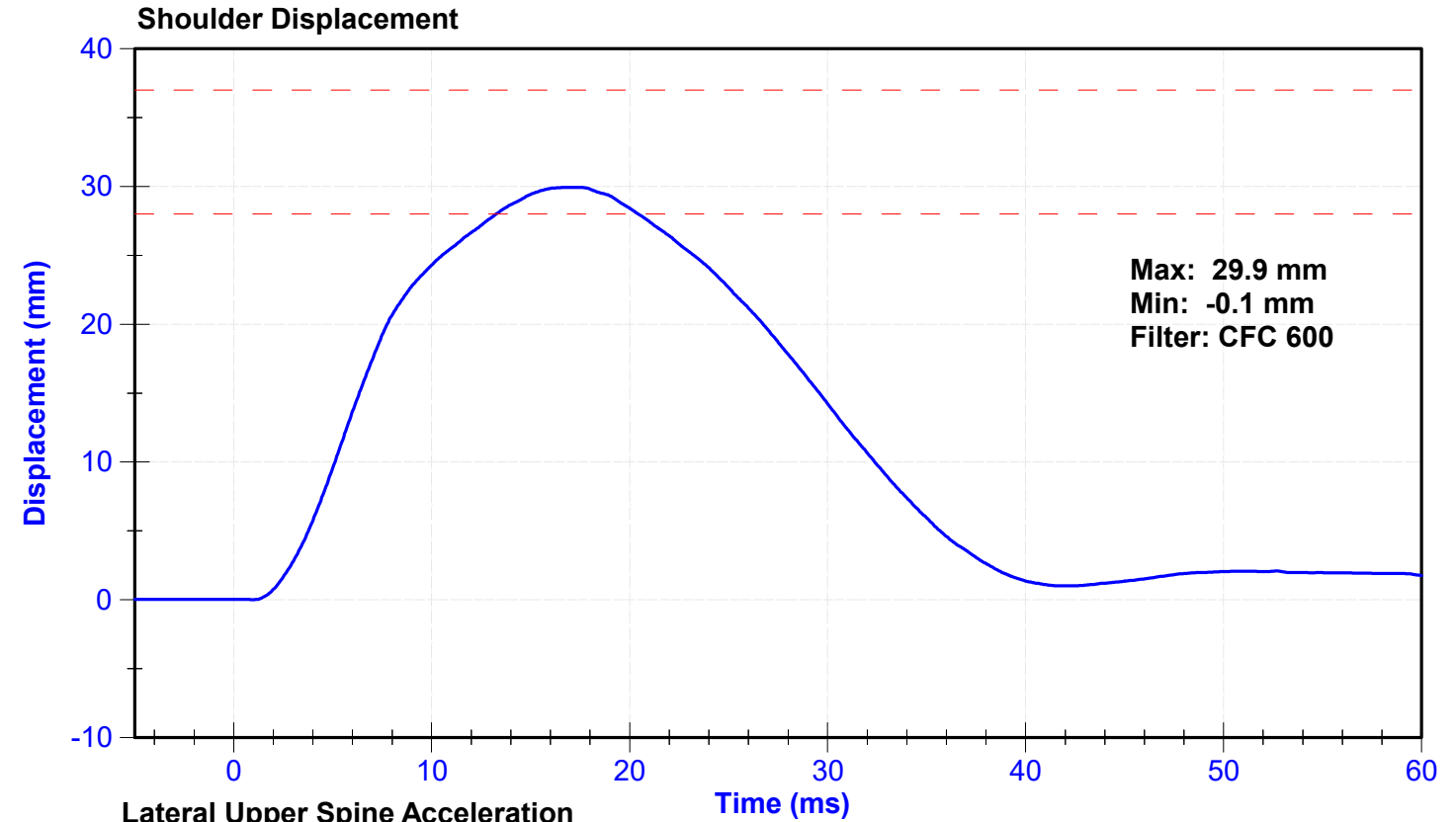
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	57	Pass
Velocity	4.2	4.4	m/s	4.28	Pass
Probe Acceleration	13	18	g's	15.8	Pass
Shoulder Deflection	28	37	mm	29.9	Pass
Lateral Upper Spine Acceleration	17	22	g's	20.1	Pass

Transducer Calibrations

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

Probe Acceleration





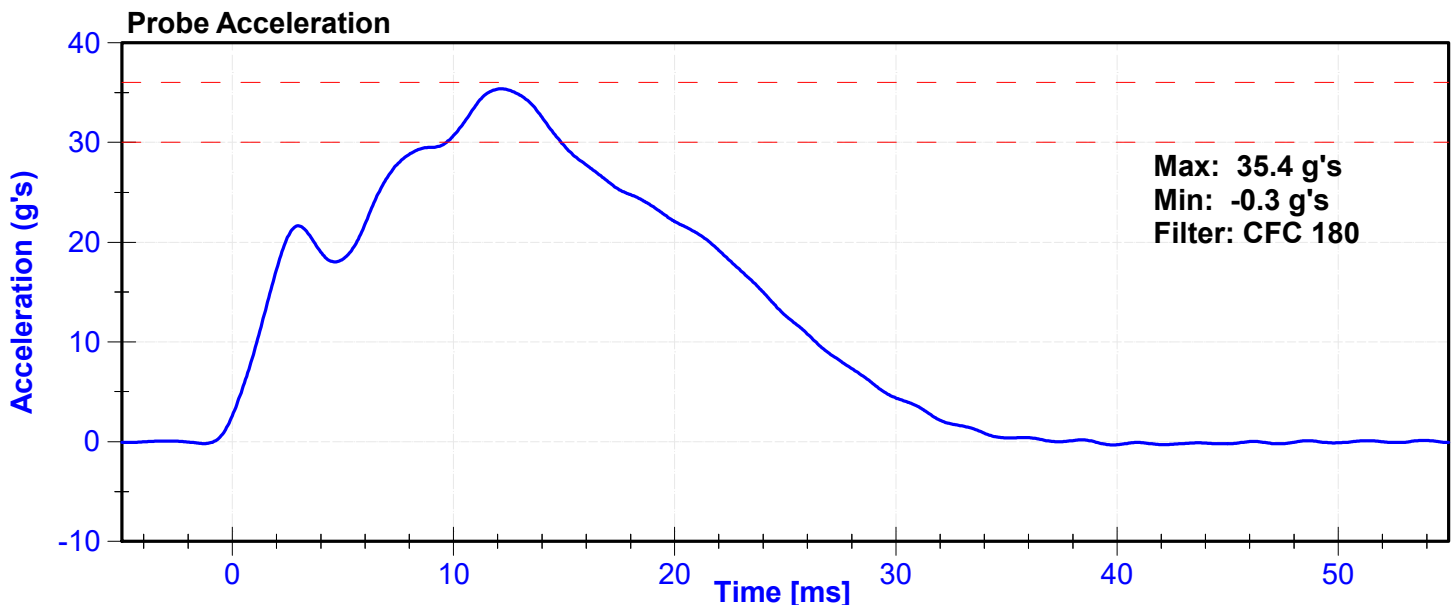
ATD Manufacturer	FTSS	Test Technician	J. Rios
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

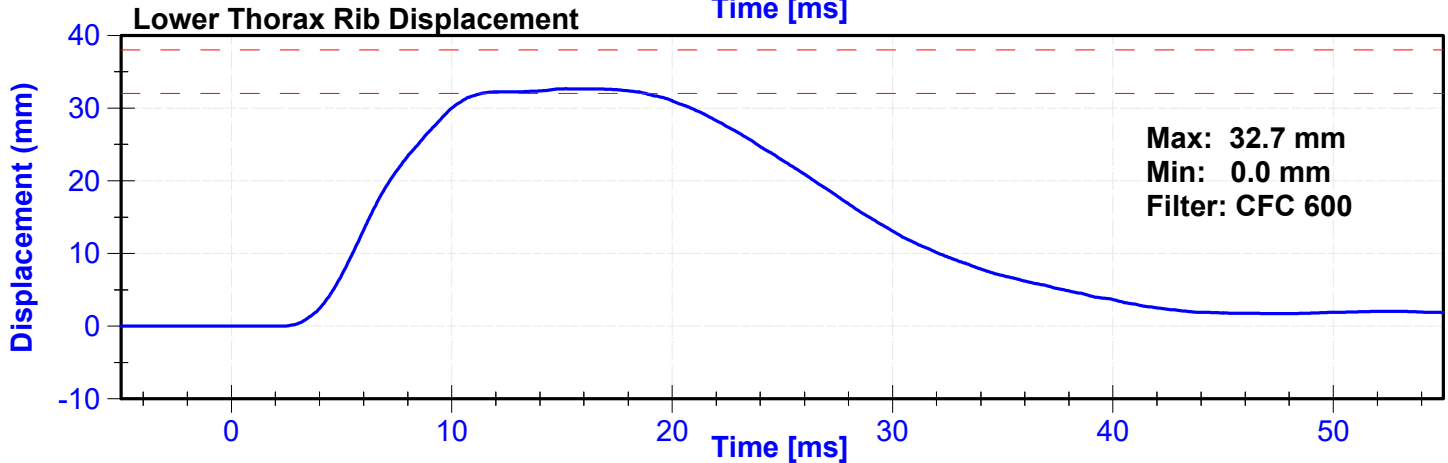
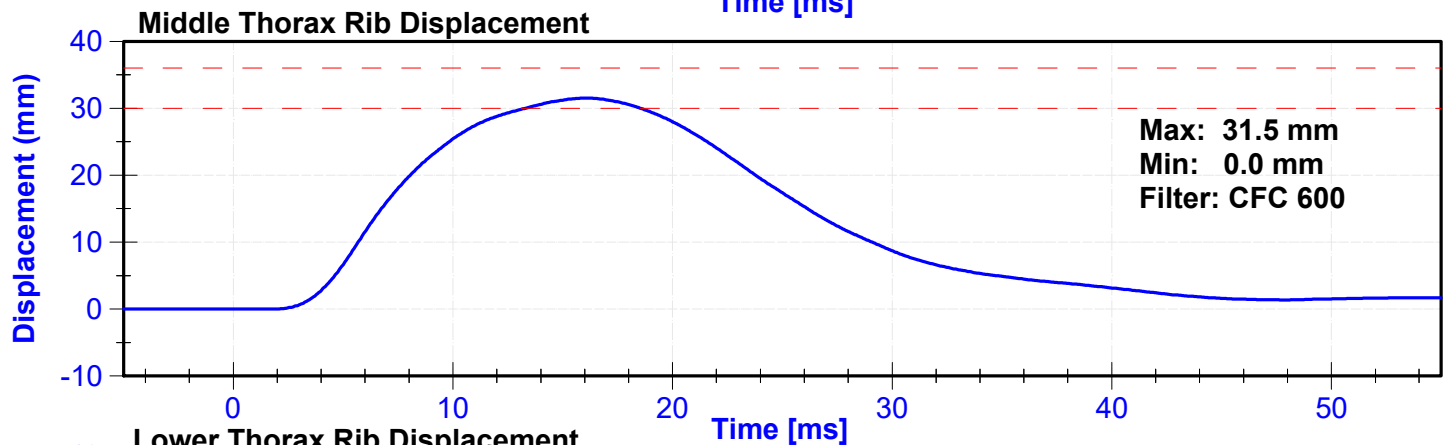
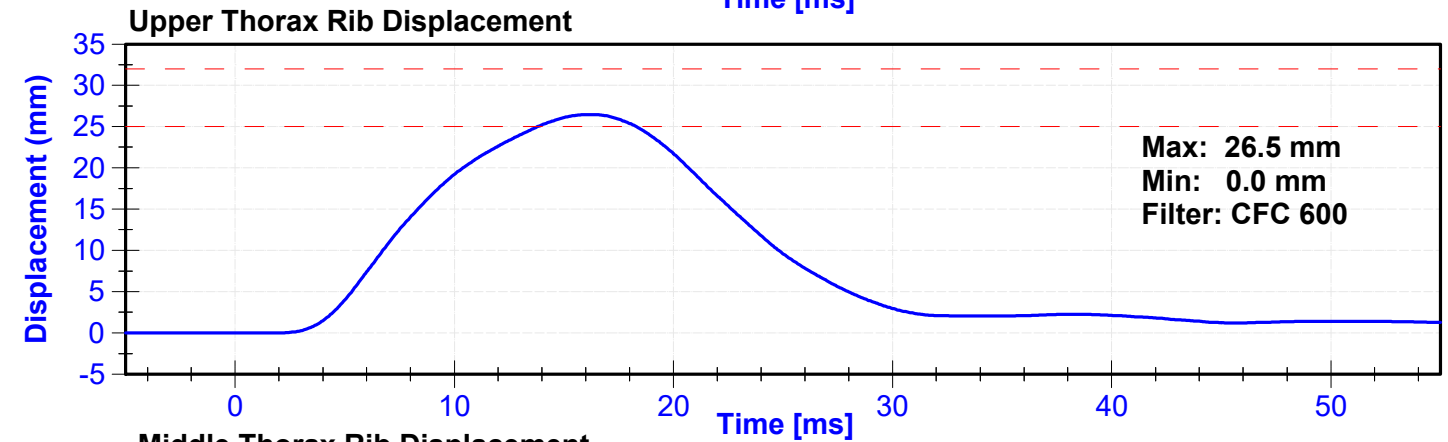
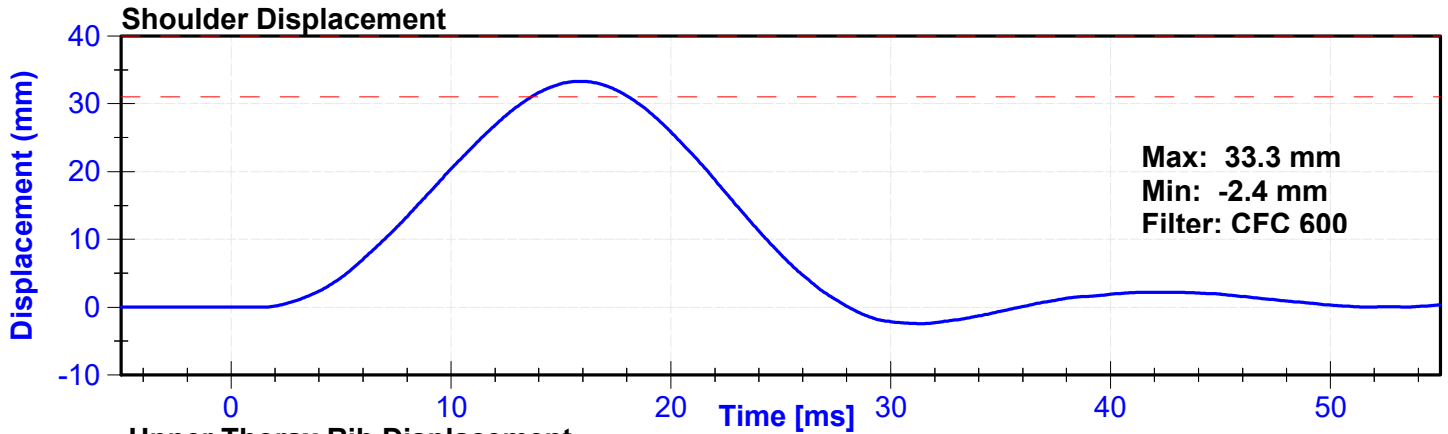
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	57	Pass
Velocity	6.6	6.8	m/s	6.66	Pass
Probe Acceleration after 5 ms	30	36	g's	35.4	Pass
Lateral Upper Spine Acceleration	34	43	g's	36.5	Pass
Lateral Lower Spine Acceleration	29	37	g's	34.9	Pass
Shoulder Deflection	31	40	mm	33.3	Pass
Upper Thorax Rib Deflection	25	32	mm	26.5	Pass
Mid Thorax Rib Deflection	30	36	mm	31.5	Pass
Lower Thorax Rib Deflection	32	38	mm	32.7	Pass

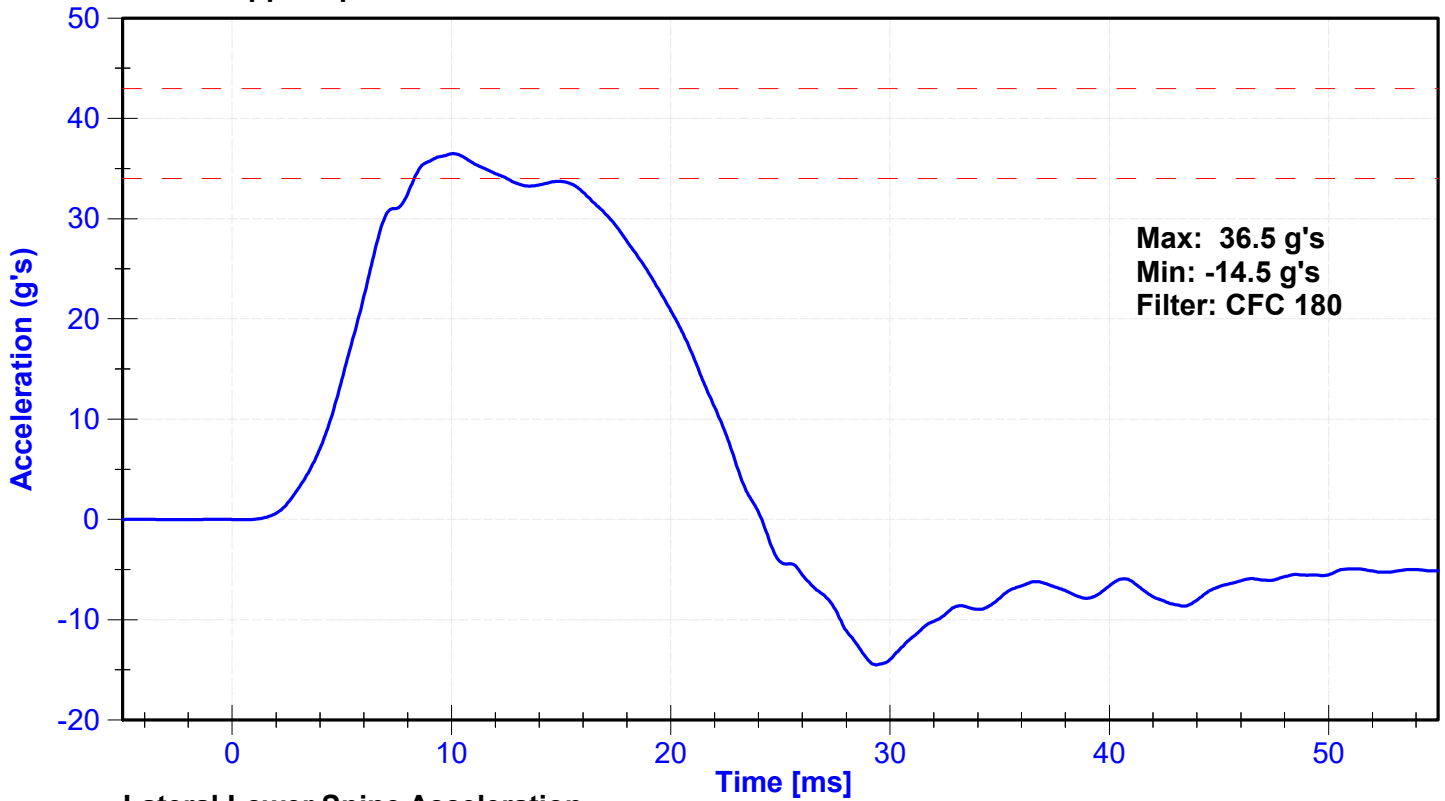
Transducer Calibrations

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

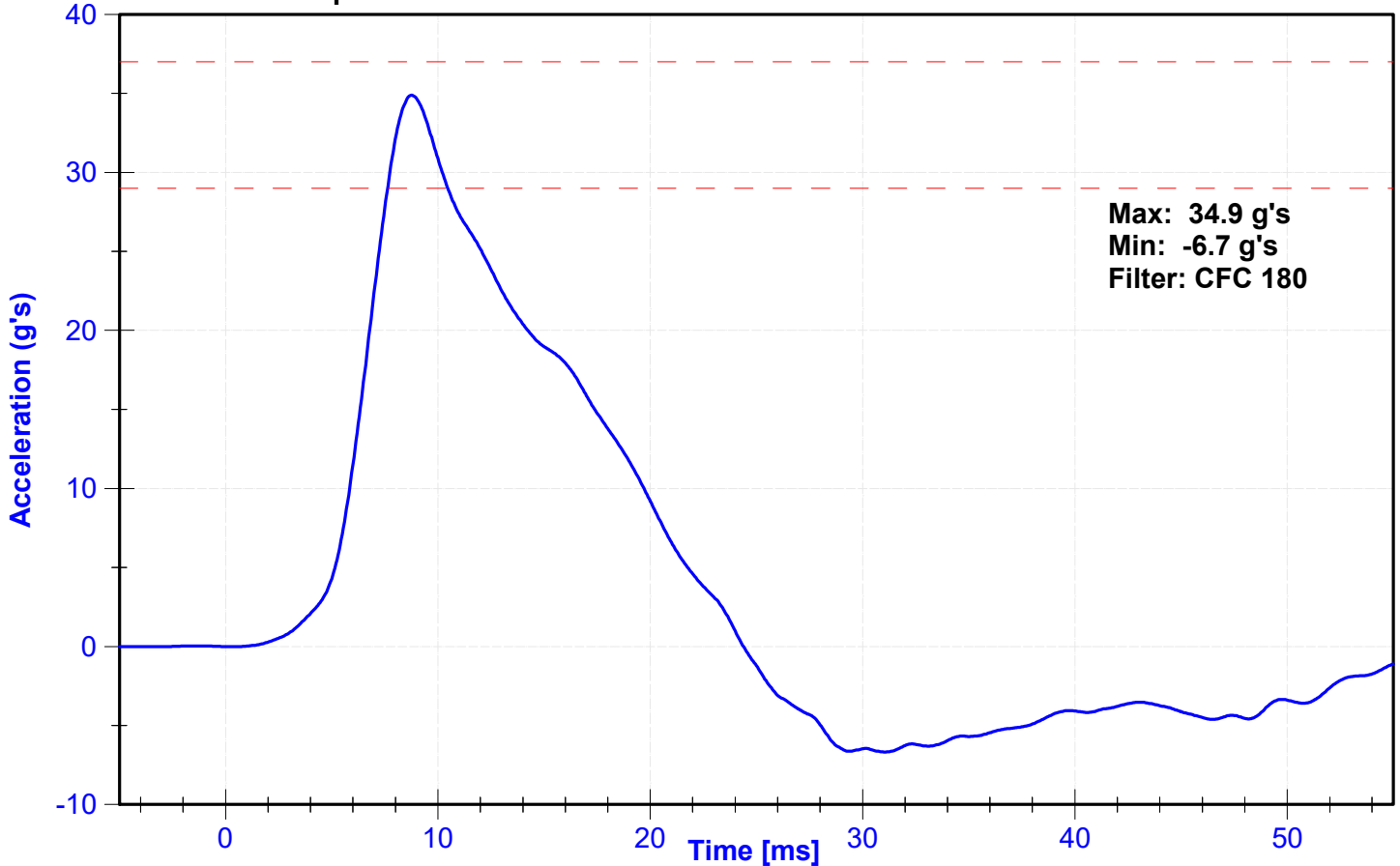




Lateral Upper Spine Acceleration



Lateral Lower Spine Acceleration



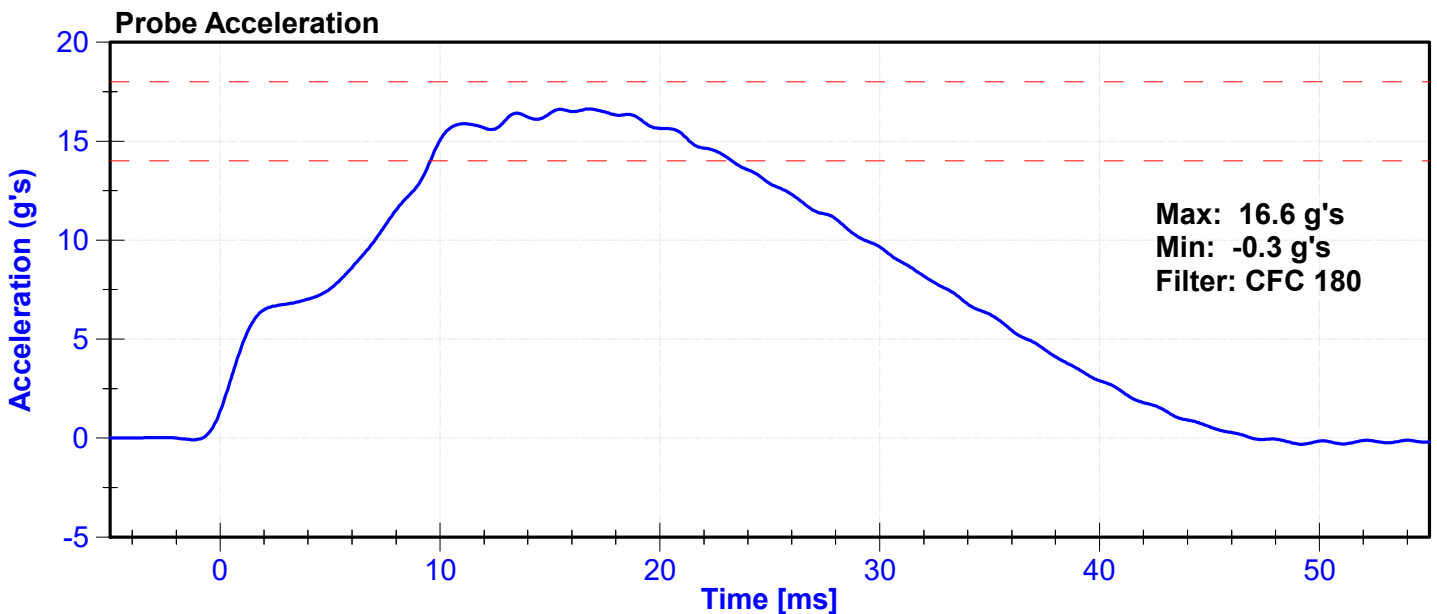
ATD Manufacturer	FTSS	Test Technician	J. Rios
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

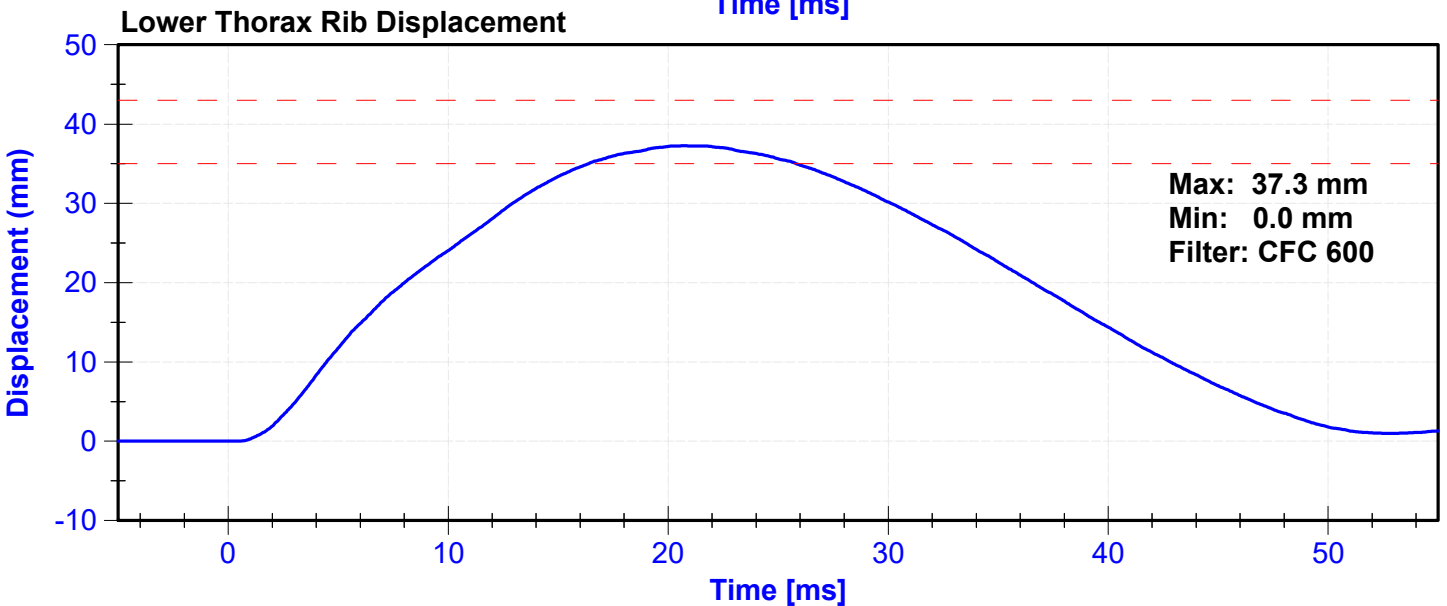
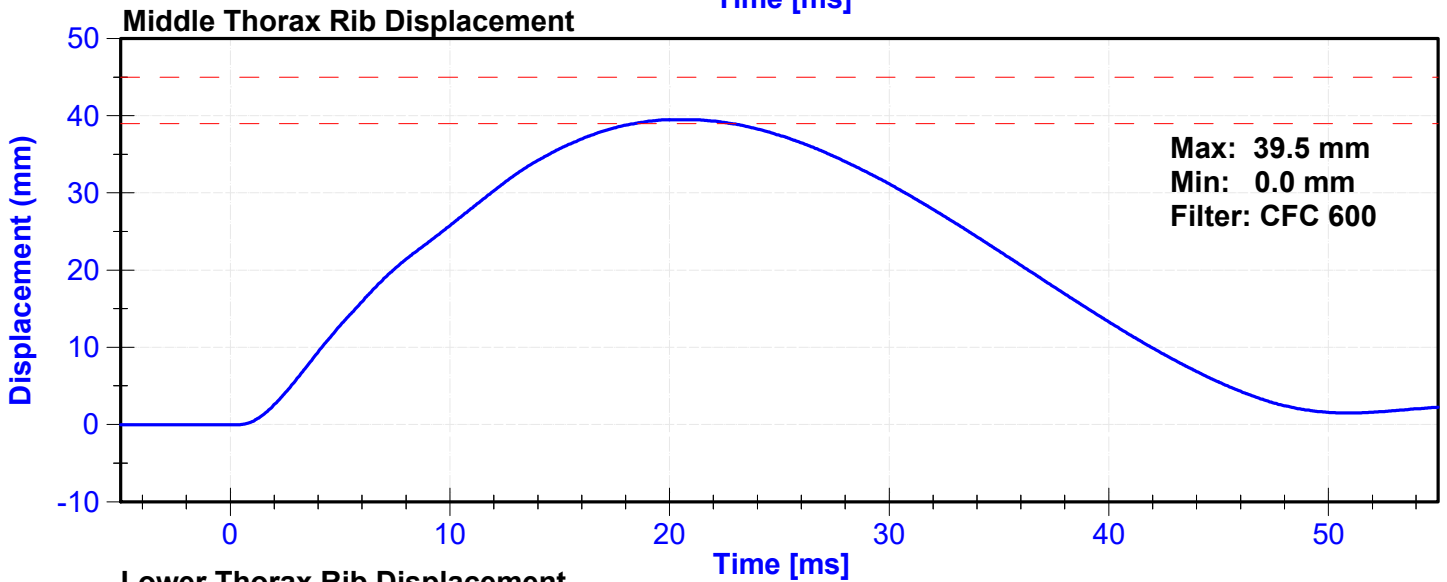
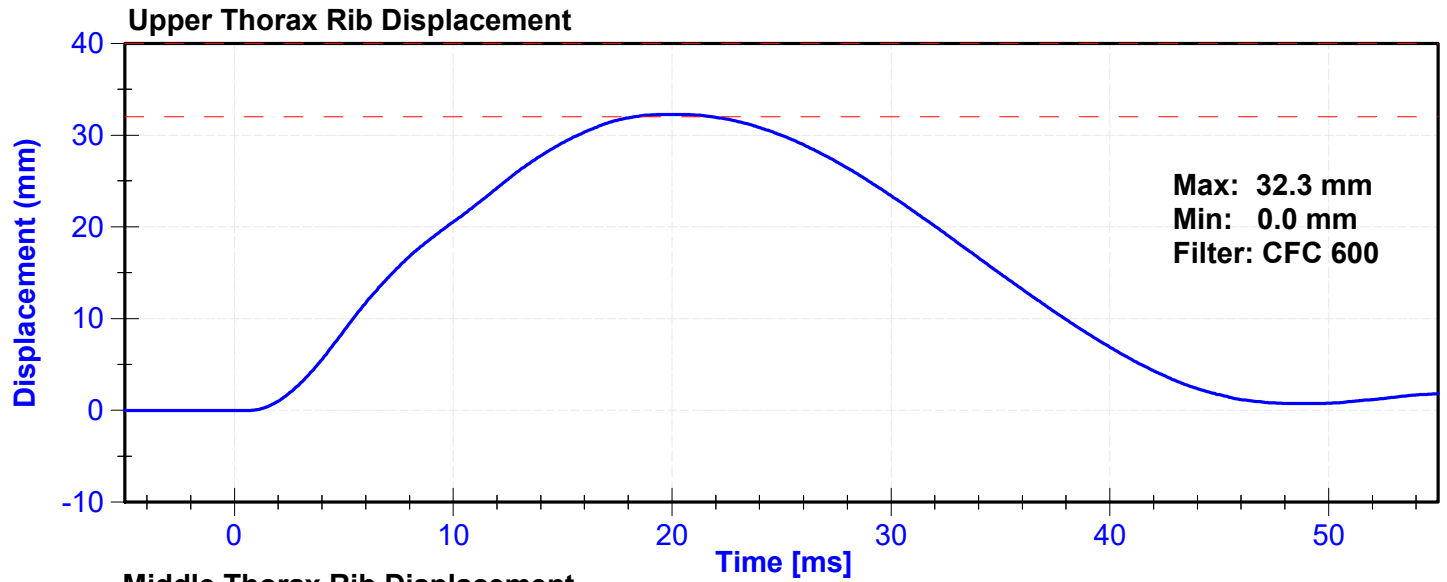
Results

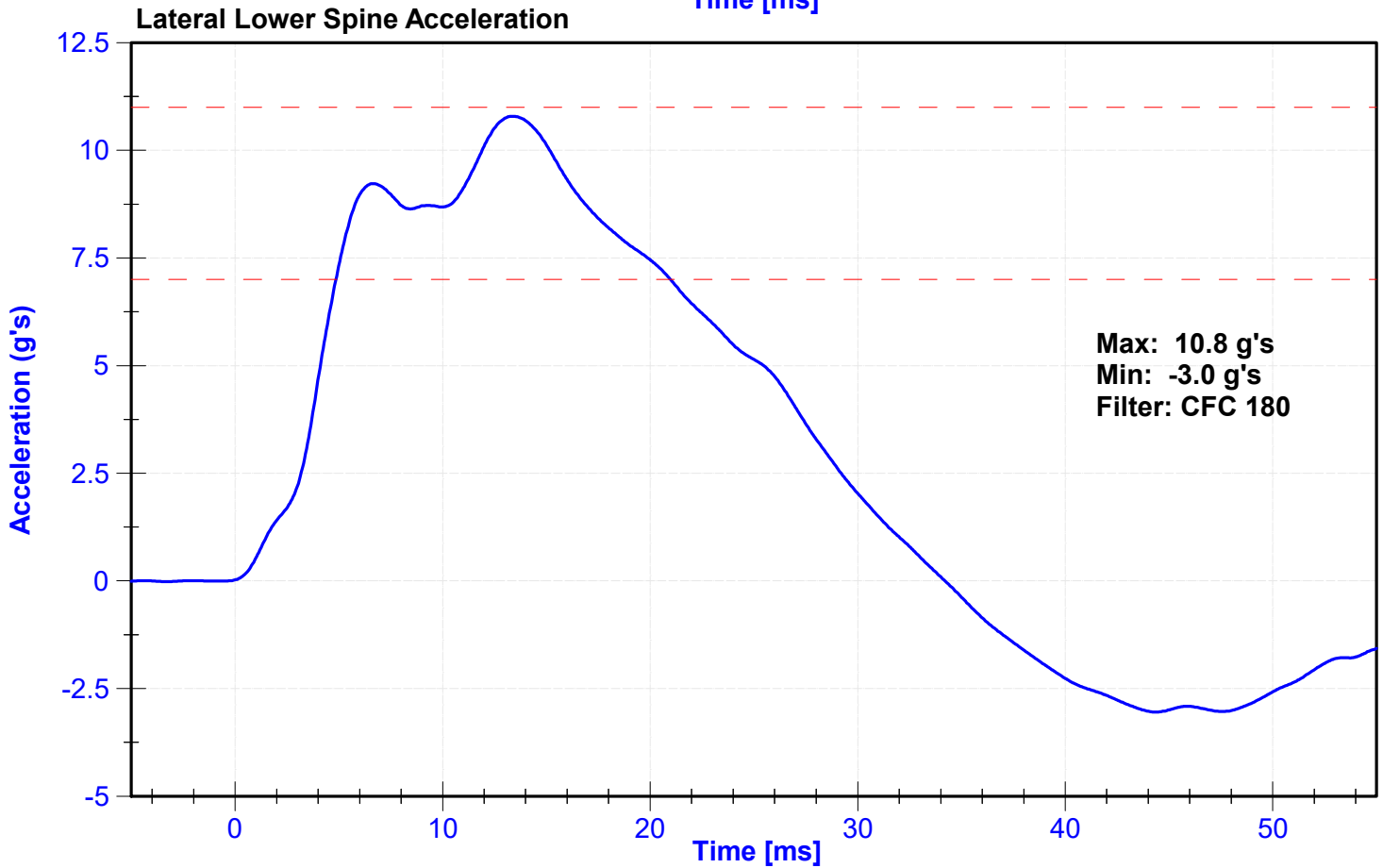
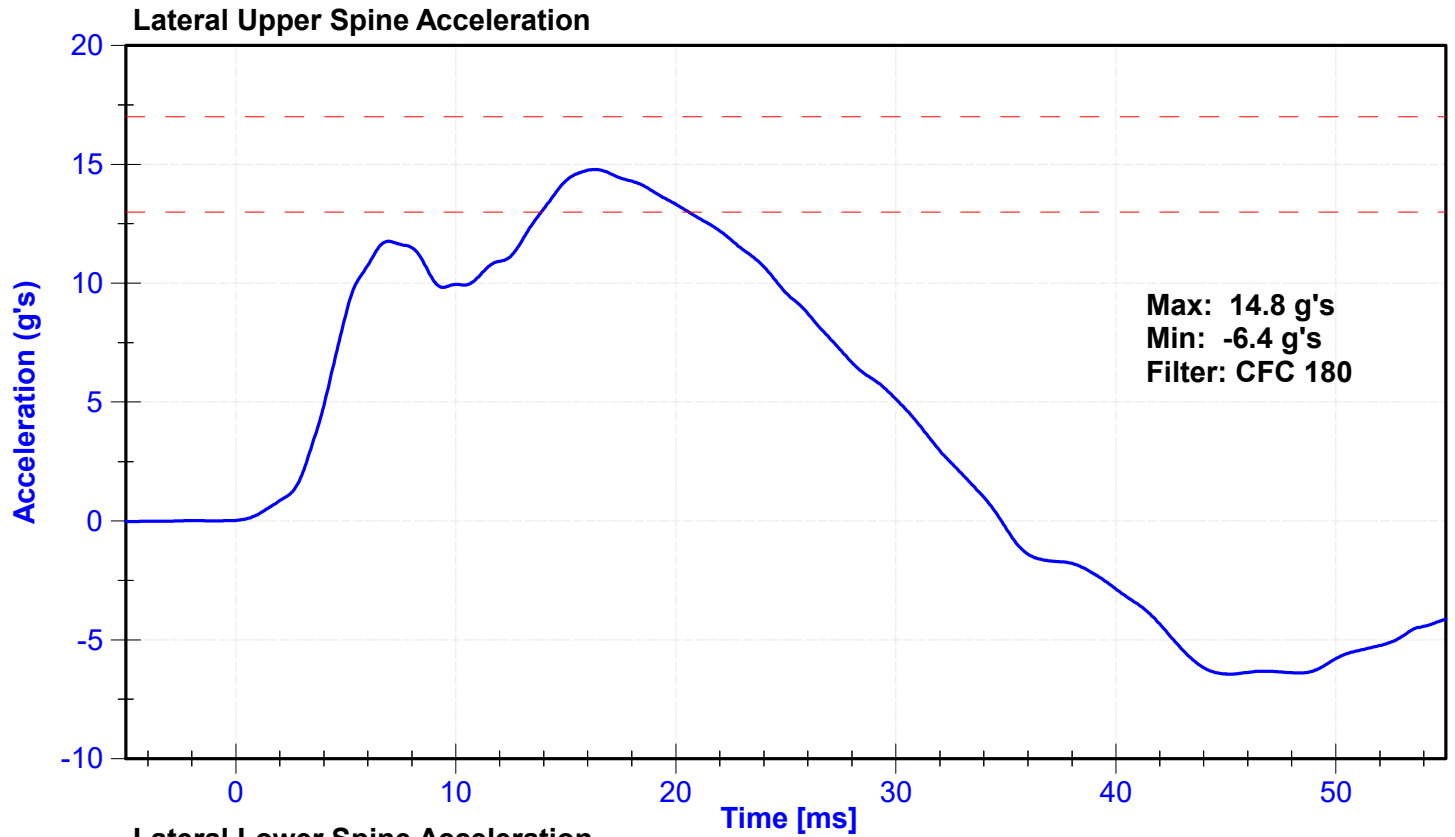
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	57	Pass
Velocity	4.2	4.4	m/s	4.28	Pass
Probe Acceleration	14	18	g's	16.6	Pass
Lateral Upper Spine Acceleration	13	17	g's	14.8	Pass
Lateral Lower Spine Acceleration	7	11	g's	10.8	Pass
Upper Thorax Rib Deflection	32	40	mm	32.3	Pass
Middle Thorax Rib Deflection	39	45	mm	39.5	Pass
Lower Thorax Rib Deflection	35	43	mm	37.3	Pass

Transducer Calibrations

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







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

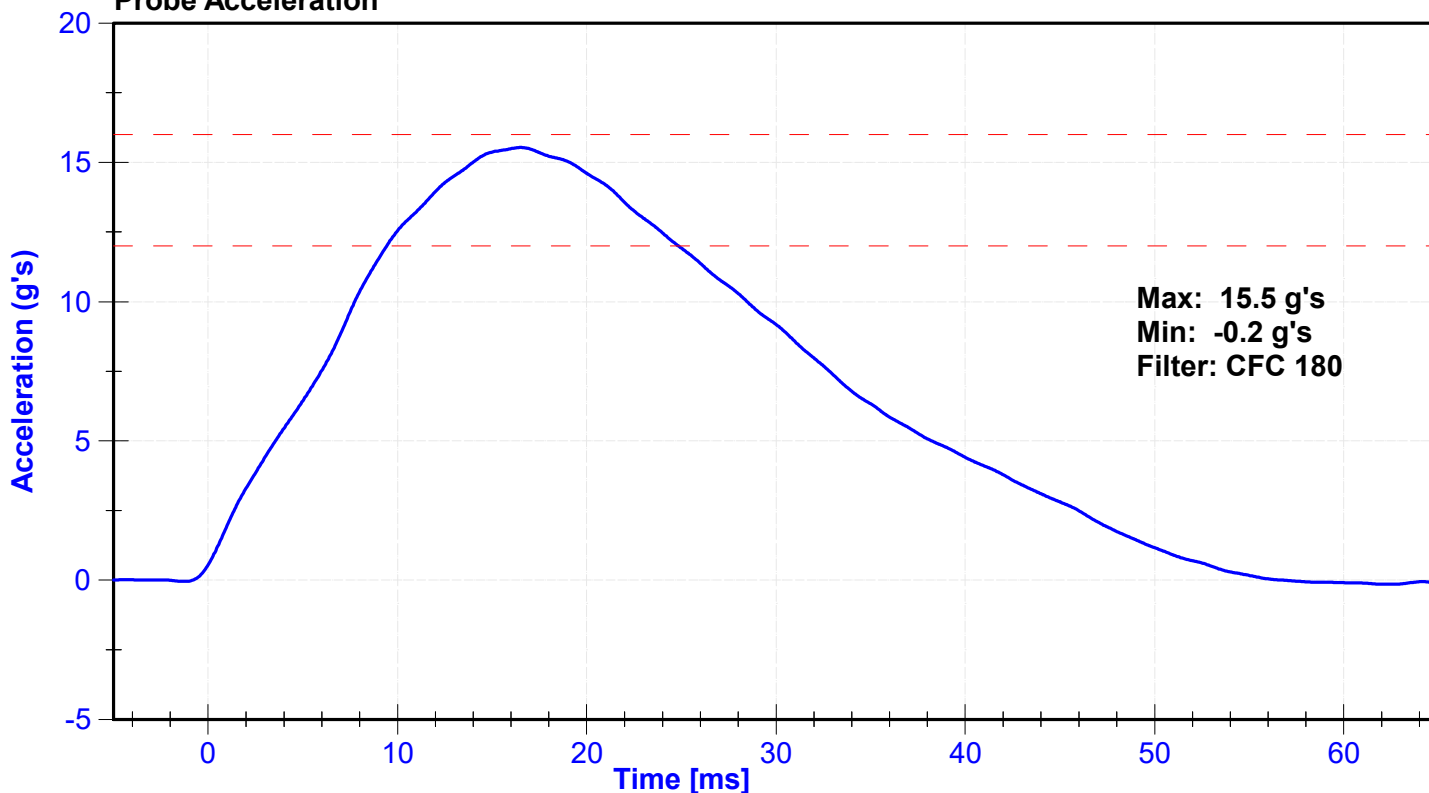
Results

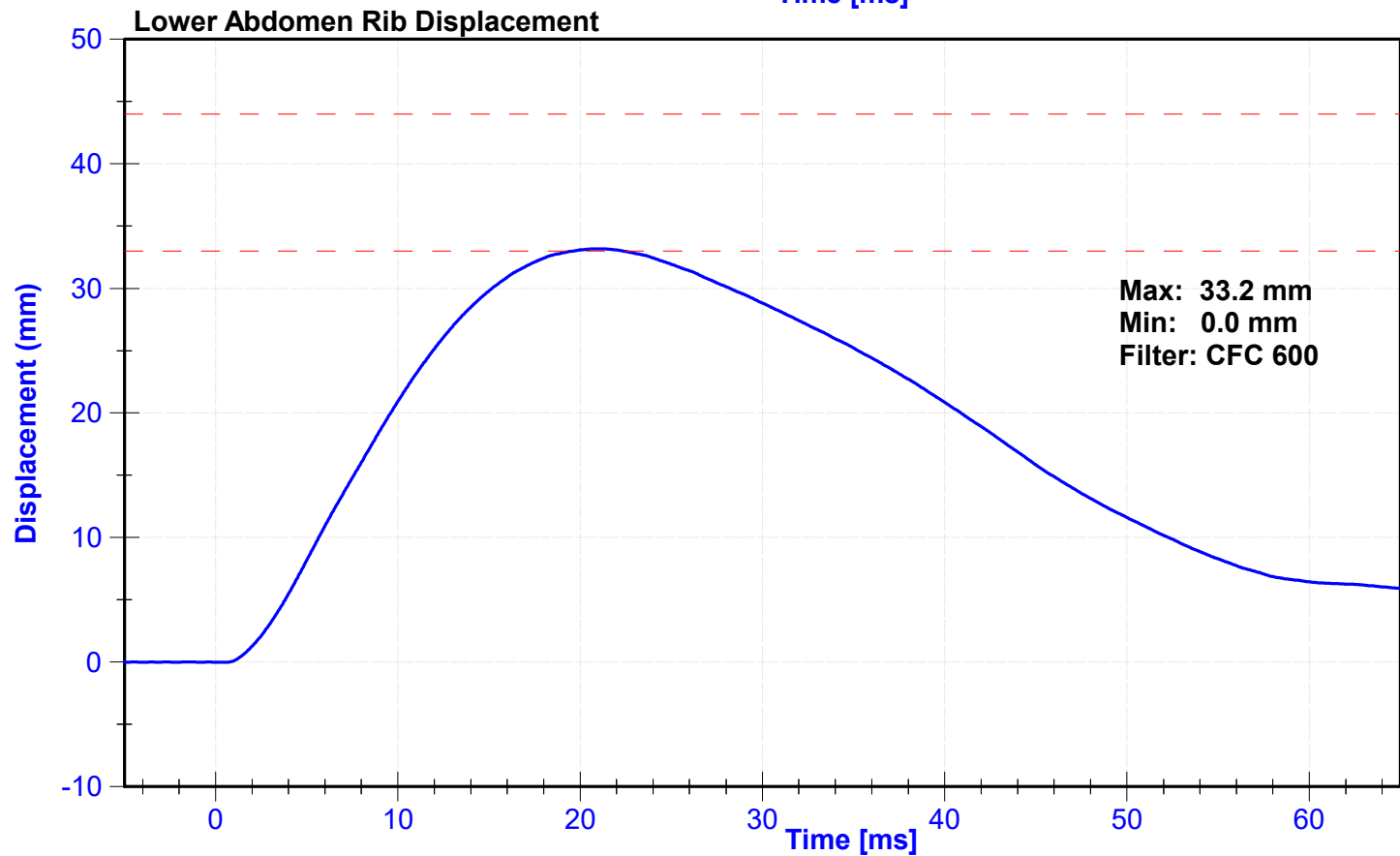
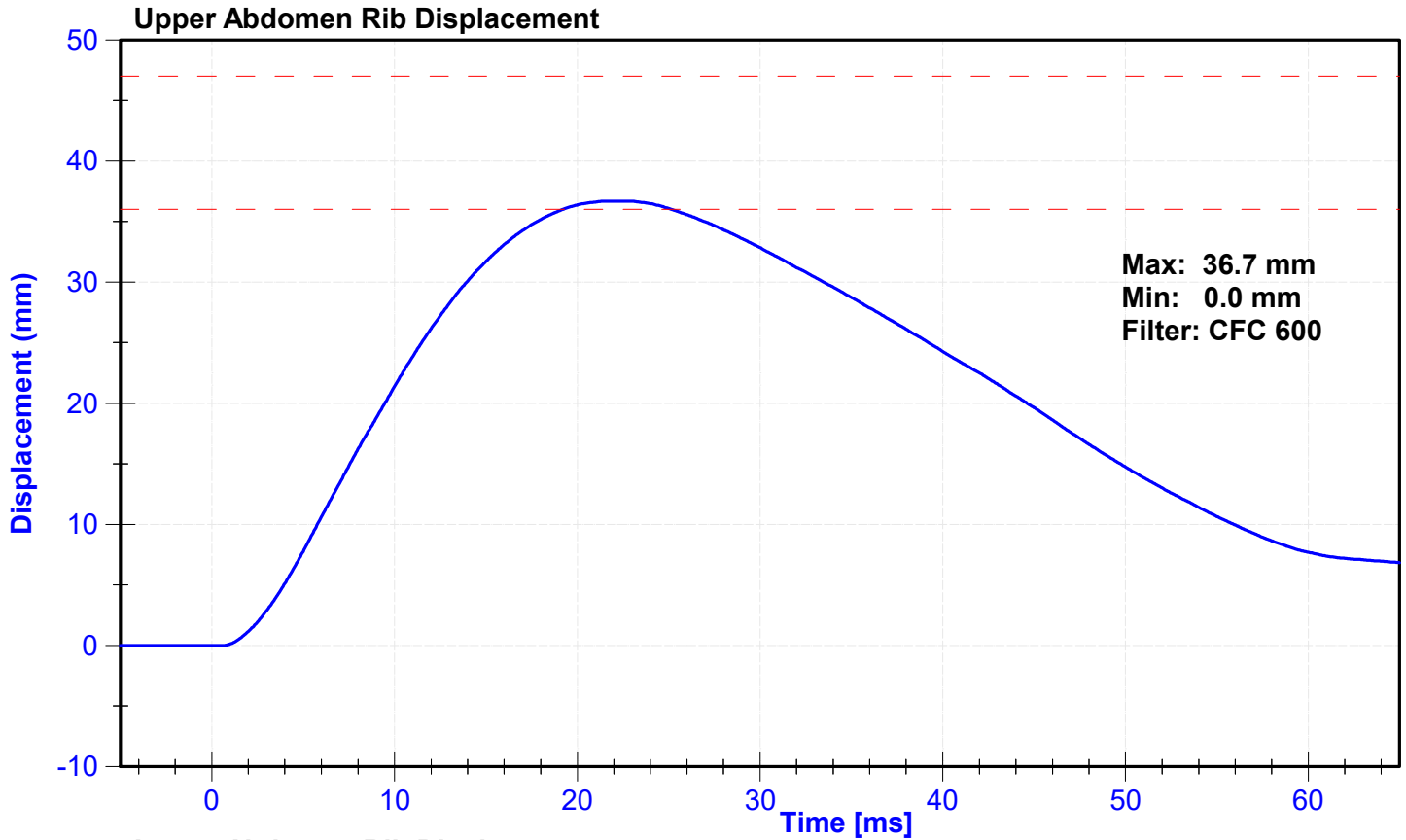
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	57	Pass
Velocity	4.2	4.4	m/s	4.27	Pass
Probe Acceleration	12	16	g's	15.5	Pass
Lateral Lower Spine Acceleration	9	14	g's	12.0	Pass
Upper Abdomen Rib Deflection	36	47	mm	36.7	Pass
Lower Abdomen Rib Deflection	33	44	mm	33.2	Pass

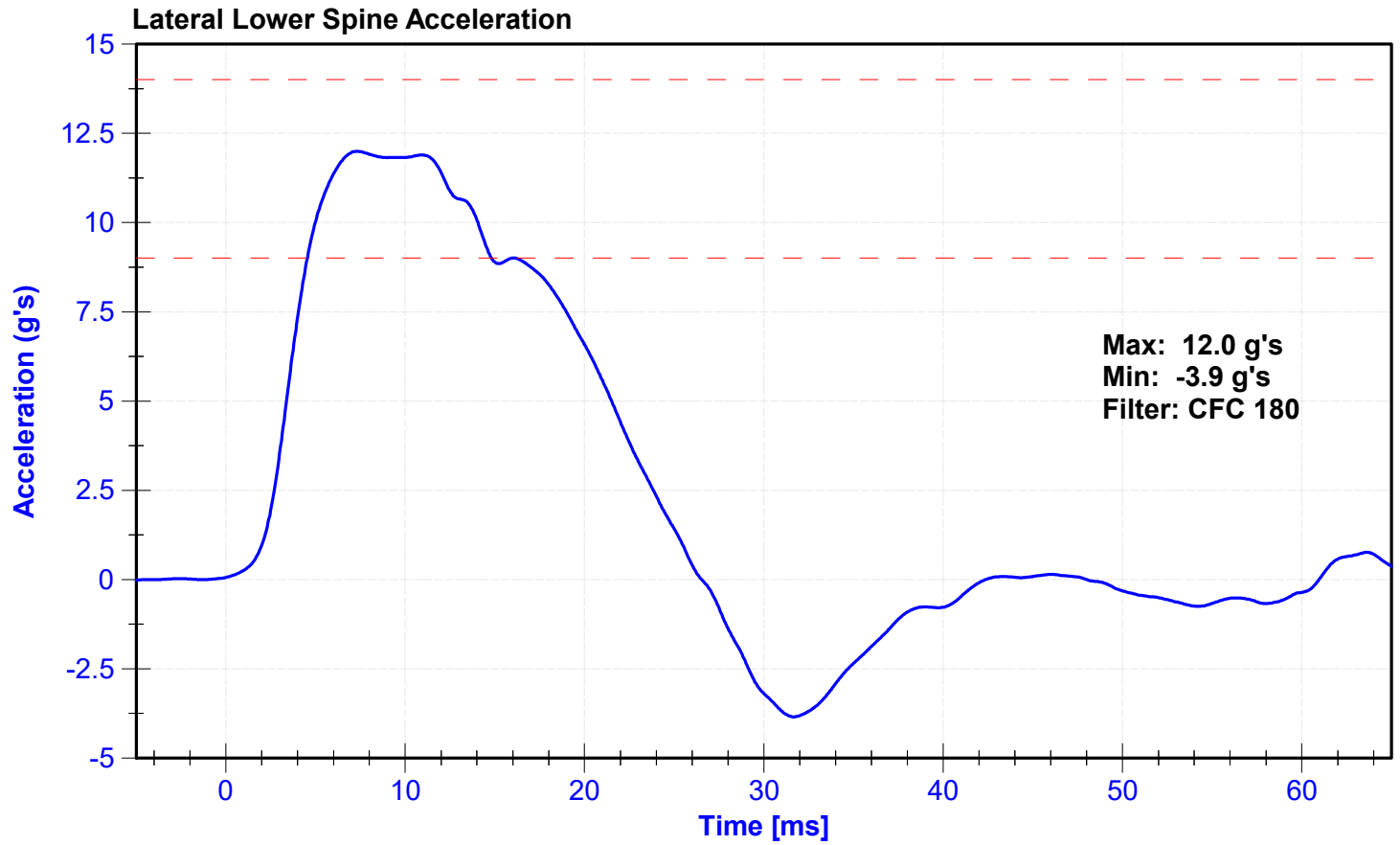
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	18527	8/2/2024	1/29/2025
Lower Spine Y Accelerometer	Endevco	P52071	5/9/2024	11/5/2024
Upper Abdomen Rib Potentiometer	Servo	074GFE	5/28/2024	11/26/2024
Lower Abdomen Rib Potentiometer	Servo	075GFE	5/28/2024	11/26/2024

Probe Acceleration







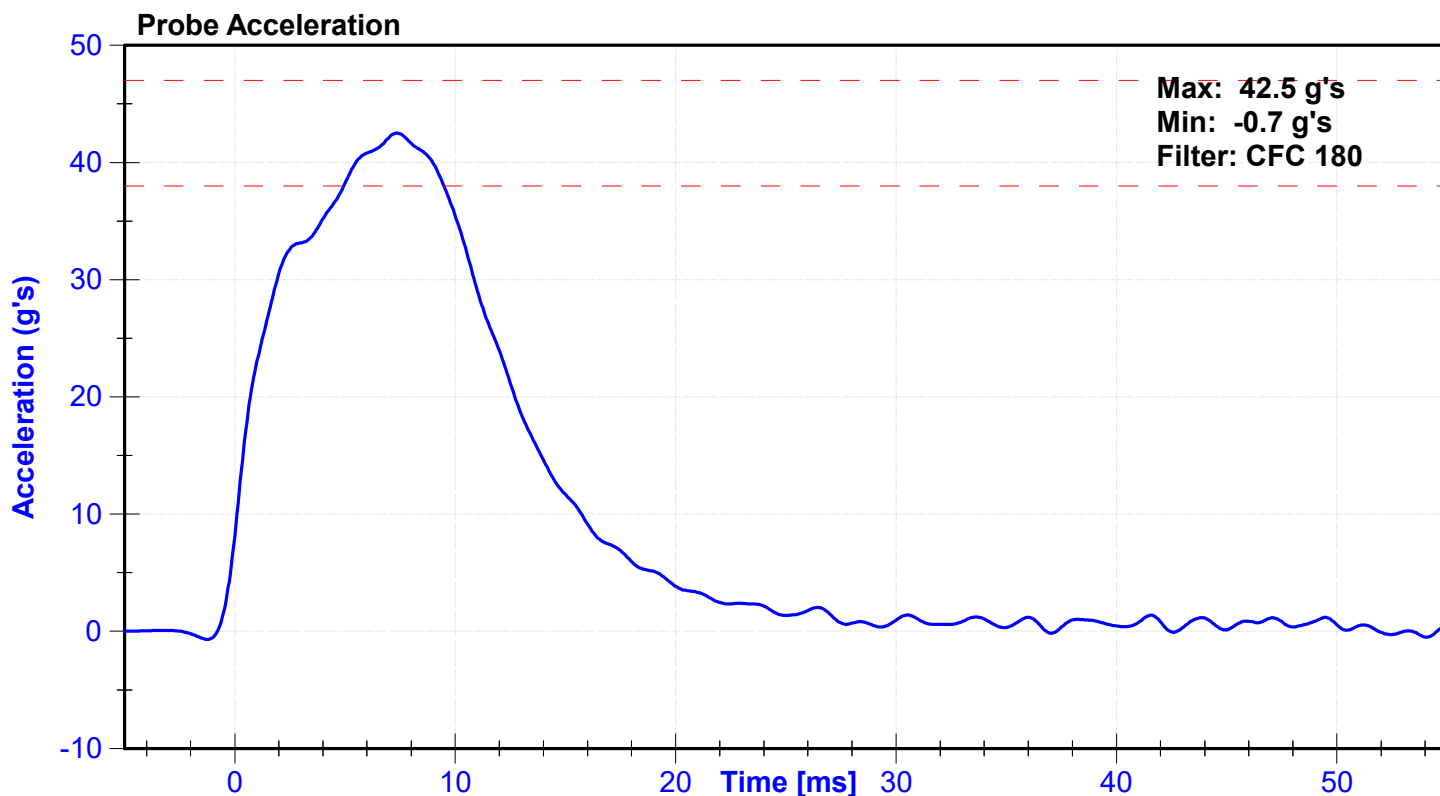
ATD Manufacturer	FTSS	Test Technician	J. Rios
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

Results

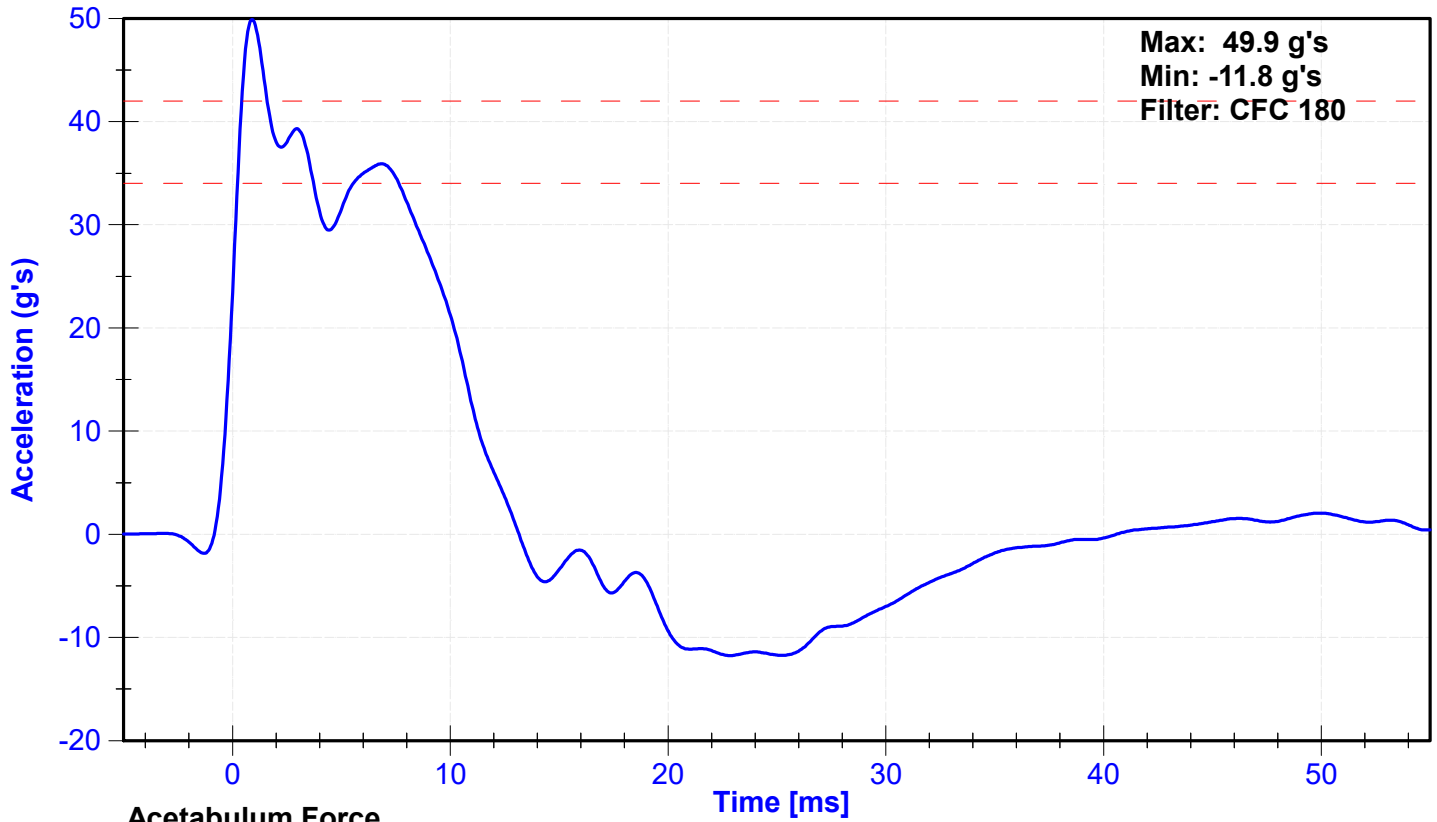
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	57	Pass
Velocity	6.6	6.8	m/s	6.66	Pass
Probe Acceleration	38	47	g's	42.5	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	35.9	Pass
Acetabulum Force	3600	4300	N	3939.0	Pass

Transducer Calibrations

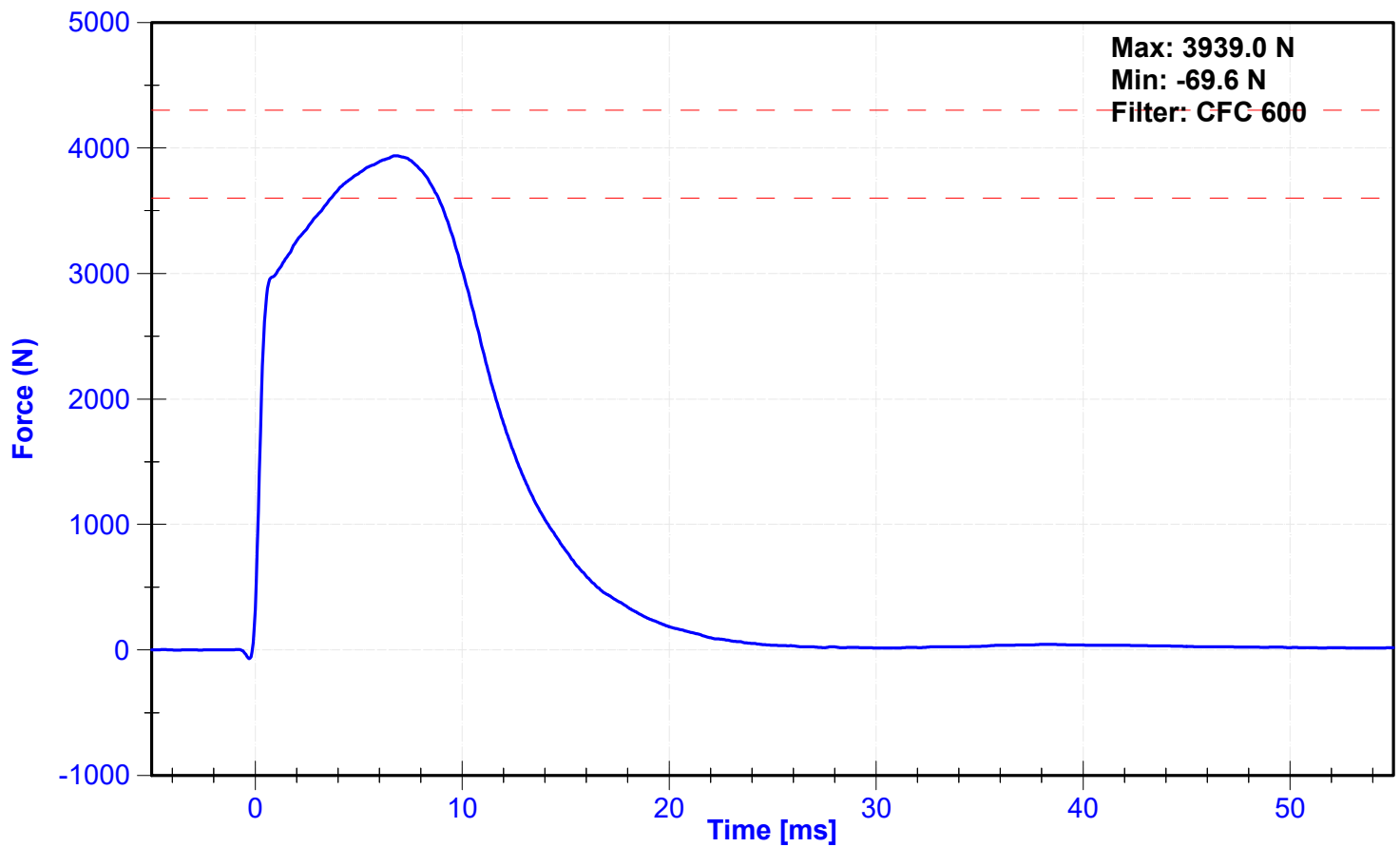
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18527	8/2/2024	1/29/2025
Pelvis Y Accelerometer	Endevco	P51731	5/9/2024	11/5/2024
Acetabulum Load Cell	Denton	275-FY	7/12/2024	7/12/2025
Certification Plug	SACO			N/A
Crash Test Plug	SACO			N/A



Lateral Pelvis Acceleration



Acetabulum Force





SID-ILS Pelvis Plug Certification Test

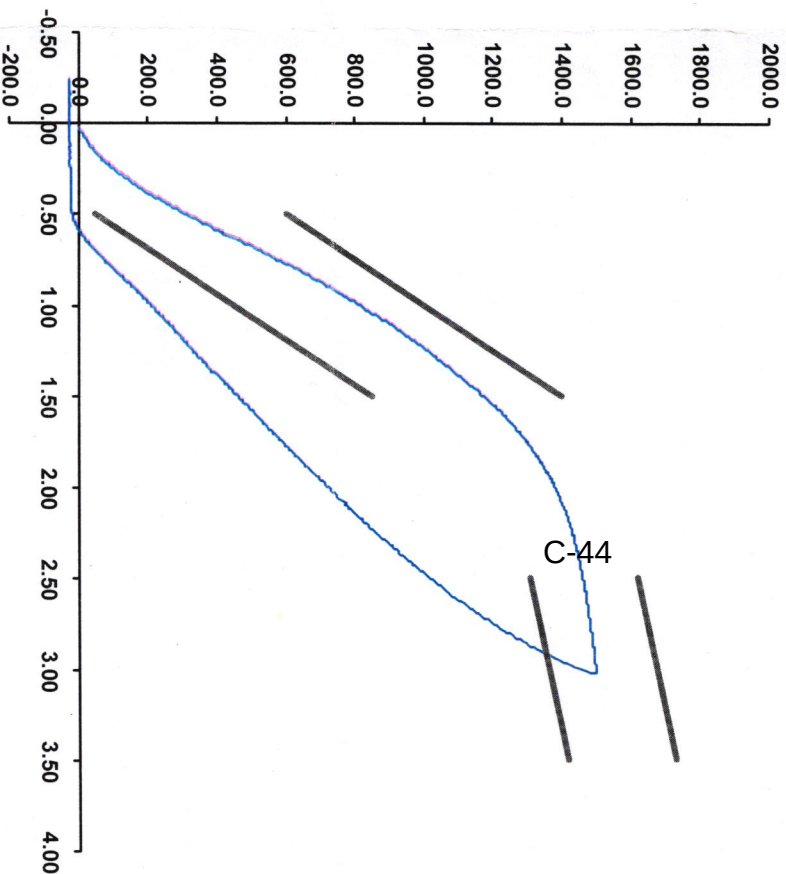
Plug S/N 16760
Test Number 23563
Report Number 23620
Test Date 7/22/2022 1:53:06 PM

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:
300 Cert Plug 9/18/2024

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107 22-Jul-22
SACO Research

By: DC Date: 7/22/22
SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 FAX



SID-11s Pelvis Plug Certification Test

Plug S/N 15783

Test Number 20683

Report Number 20737

Test Date 10/15/2021 8:22:25 AM

Force (-N) vs Extension (-mm)

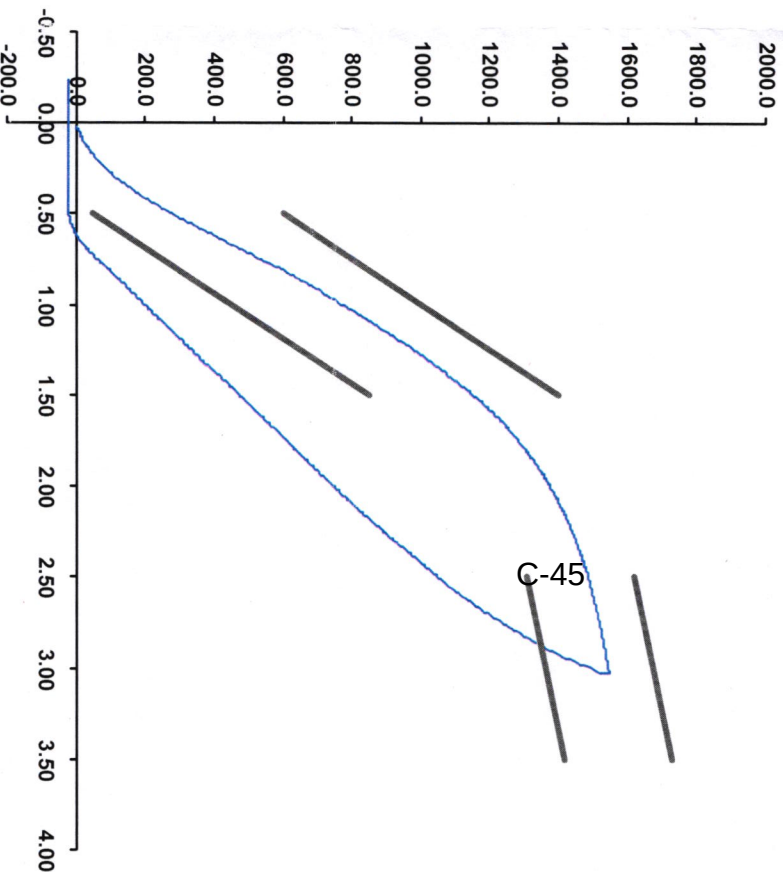
Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	50	600
Force @ 1.5 mm (N)	850	1,400
Force @ 2.5 mm (N)	1,306	1,618
Force @ 3.0 mm (N)	1,361	1,673

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:

300 Impact 9/18/2024



Operator

Part Number 180-4450

Template No 107 15-Oct-21

SACO Research

By: DE

Date: 10/15/21

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



SID-ILIs Pelvis Plug Certification Test

Plug S/N 16460

Test Number 23029

Report Number 23087

Test Date 5/23/2022 12:52:01 PM

Force (-N) vs Extension (-mm)

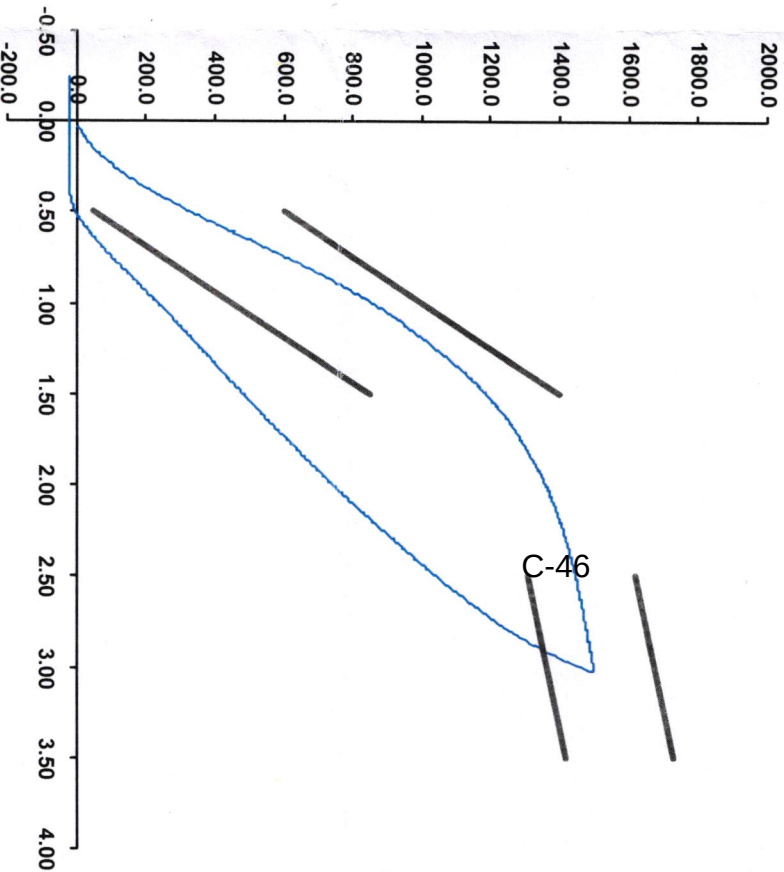
Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	50	600
Force @ 1.5 mm (N)	850	1,400
Force @ 2.5 mm (N)	1,306	1,618
Force @ 3.0 mm (N)	1,361	1,673

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:

300 Non Impact 9/12/2024



Operator

Part Number 180-4450

Template No 107 23-May-22

SACO Research

By: XC

Date: 5/23/2022

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

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

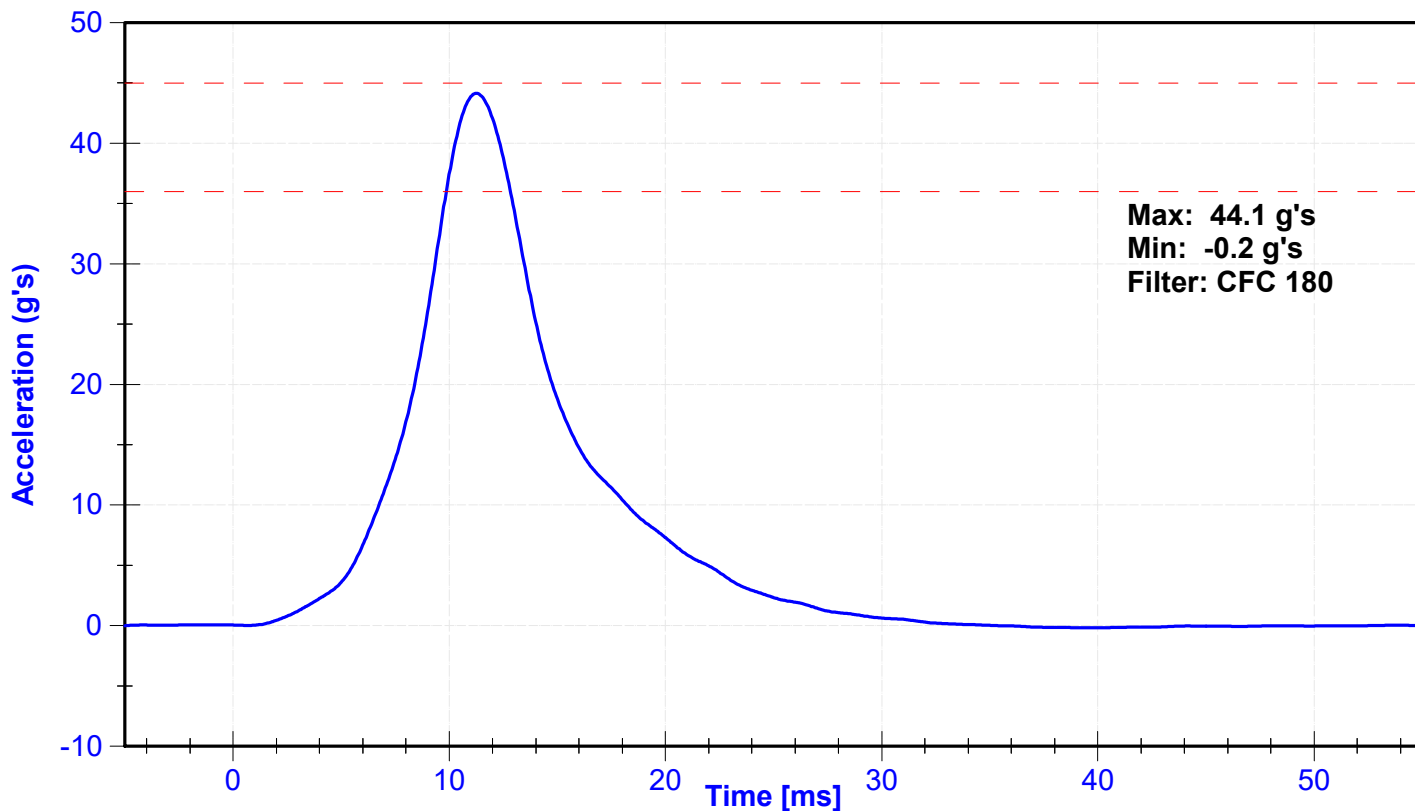
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	57	Pass
Velocity	4.2	4.4	m/s	4.26	Pass
Probe Acceleration	36	45	g's	44.1	Pass
Lateral Pelvis Acceleration	28	39	g's	33.4	Pass
Iliac Force	4100	5100	N	5005.9	Pass

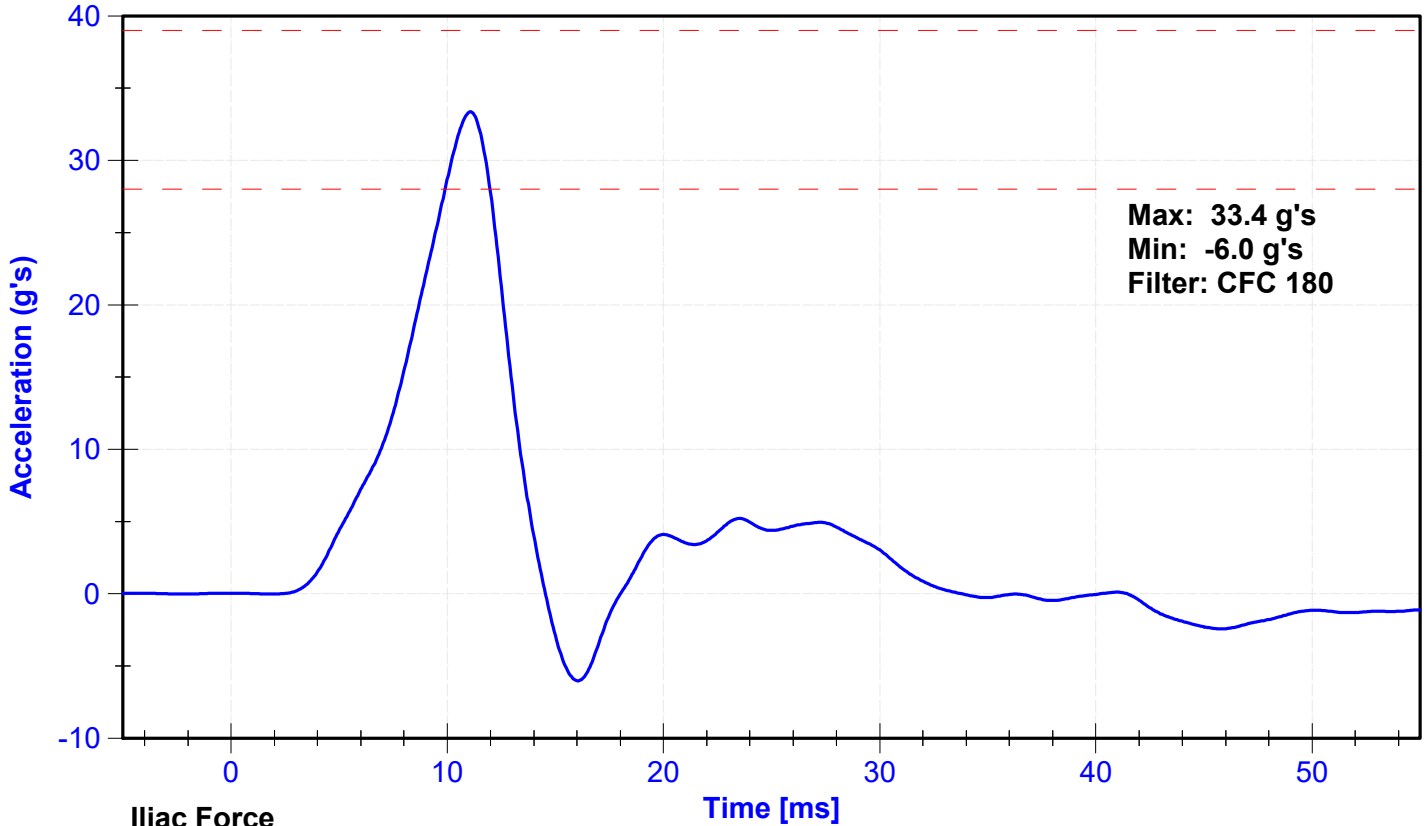
Transducer Calibrations

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

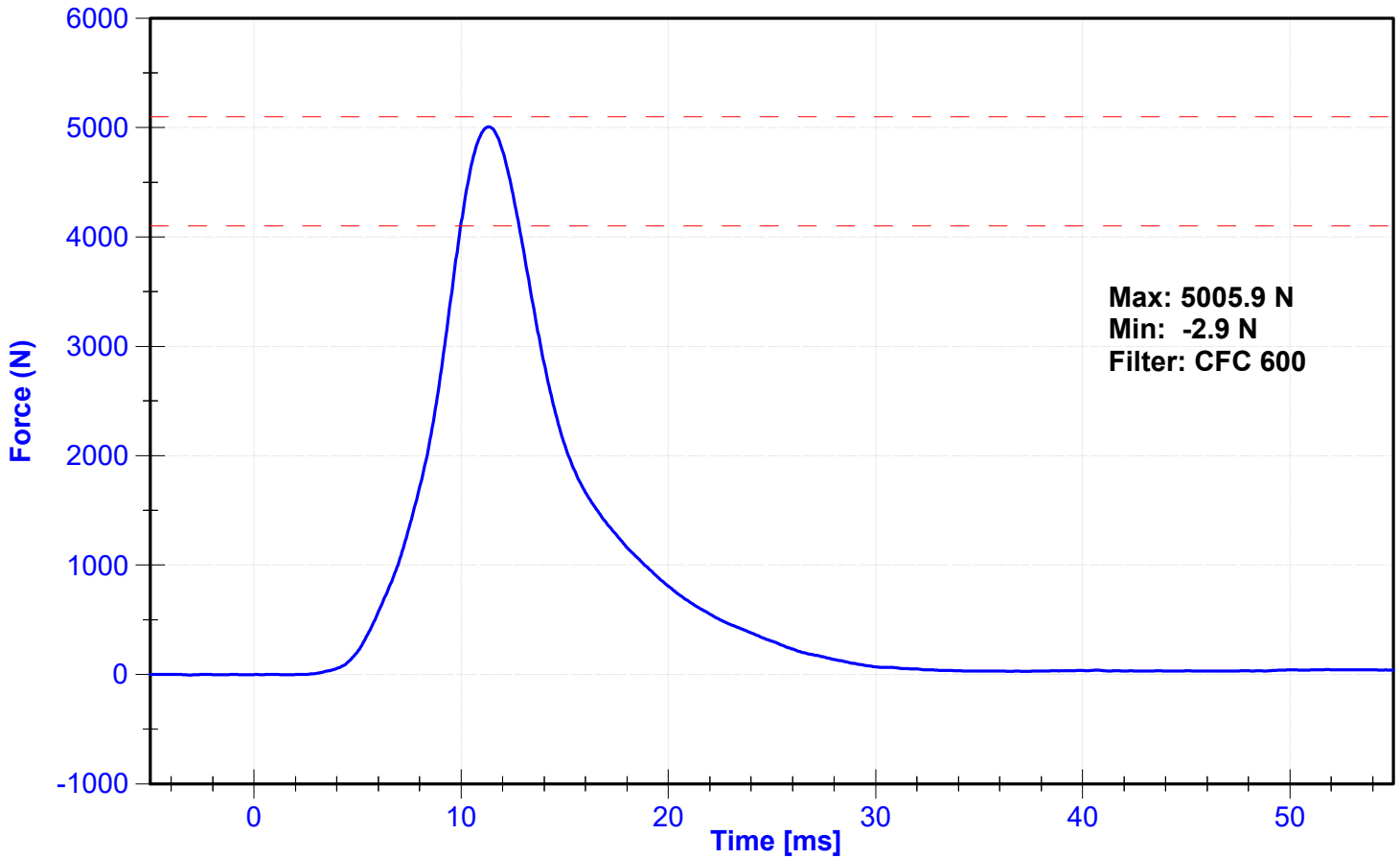
Probe Acceleration



Lateral Pelvis Acceleration



Iliac Force



APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation (SID-IIs)

			SID-IIs S/N: 300			
			Serial Number	Manufacturer	Calibration Date	
Head Accelerometers			X	P59018	Endevco	05/09/2024
			Y	P79189	Endevco	05/09/2024
			Z	P79587	Endevco	05/09/2024
Head Accelerometers - Redundant			X	P68057	Endevco	05/09/2024
			Y	P58986	Endevco	05/09/2024
			Z	P52025	Endevco	05/09/2024
Displacement Potentiometer	Shoulder		Y			
	Thoracic Rib	Upper	Y	2316GFE	Servo	05/09/2024
		Middle	Y	085GFE	Servo	05/09/2024
		Lower	Y	1156GFE	Servo	05/09/2024
	Abdominal Rib	Upper	Y	074GFE	Servo	05/28/2024
		Lower	Y	075GFE	Servo	05/09/2024
Lower Spine Accelerometers (T12)			X	P64003	Endevco	05/09/2024
			Y	P52071	Endevco	05/09/2024
			Z	P17283	Endevco	05/09/2024
Acetabulum Load Cell			Y	275-FY	Denton	07/12/2024
Lilac Wing Load Cell			Y	279-FY	Denton	12/05/2023
Pelvis Plug (Struck Side)				16482	SACO	07/14/2022
Pelvis Plug (Non-Struck Side)				15623	SACO	10/07/2021

Table 2 – Vehicle Instrumentation

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	G25247	Endevco	07/26/2024
Vehicle Center of Gravity	Y	G25265	Endevco	07/26/2024
Vehicle Center of Gravity	Z	G25268	Endevco	07/26/2024
Left Floor Sill	Y	G23670	Endevco	04/03/2024
A-Pillar Sill	Y	G24632	Endevco	05/21/2024
A-Pillar Low	Y	G24641	Endevco	05/21/2024
A-Pillar Mid	Y	G25254	Endevco	07/16/2024
B-Pillar Sill	Y	G25260	Endevco	07/23/2024
B-Pillar Low	Y	G22719	Endevco	05/07/2024
B-Pillar Mid	Y	A372850	Measurement Specialties	05/31/2024
Driver Seat	Y	G24599	Endevco	04/22/2024
Engine Top	X	A280956	Measurement Specialties	04/24/2024
Engine Top	Y	A374248	Measurement Specialties	04/24/2024
Firewall	Y	G25571	Endevco	05/09/2024
Right Roof	Y	G25856	Endevco	06/04/2024
Right Floor Sill	Y	G22770	Endevco	04/05/2024
Rear Floorpan	X	G22659	Endevco	06/05/2024
Rear Floorpan	Y	G23874	Endevco	06/05/2024

Table 3 – Pole Instrumentation

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