REPORT NUMBER: SPNCAP-CAL-23-002

NEW CAR ASSESSMENT PROGRAM (NCAP)
SIDE IMPACT POLE TEST

KIA GEORGIA, INC
2023 KIA Sportage
5 Door SUV

NHTSA No: M20234207

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

January 11, 2024

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 Administration, in response to Contract Number 693JJ920D000016.

This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof.

If trade or manufacturers' names or products are mentioned it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared by: _____ Date: January 11, 2024
Quinn Porzio, Test Engineer

Approved by: _____ Date: January 11, 2024
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

1. *Report No.*	2. *Government Accession No.*	3. *Recipient's Catalog No.*
SPNCAP-CAL-23-002		

4. Title and Subtitle Final Report of New Car Assessment Program Side Impact Pole Testing of a 2023 KIA Sportage 5 Door SUV NHTSA No.: M20234207	***5. Report Date*** January 11, 2024 ***6. Performing Organization Code*** CAL
7. Author(s) Quinn Porzio, Test Engineer Matthew Pronko, Test Engineer	***8. Performing Organization Report No.*** CAL-DOT-2023-002
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 February 16, 2023 - January 11, 2024 ***14. Sponsoring Agency Code*** NRM-100

15. Supplementary Notes

16. Abstract

A 32.20 km/h (20 mph), 75° oblique impact Side NCAP Test was conducted on the subject 2023 KIA Sportage 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 February 16, 2023.

The impact velocity of the vehicle was 32.17 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 341 mm located at level 3. The test vehicle's occupant performance data is as follows:

Measurement Description	Driver ATD (SID-IIs) (Serial No.300)		
	Units	Threshold	Result
Head Injury Criteria (HIC36)		1000	293.287
Resultant Lower Spine Acceleration	G	82	43.858
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3246.580
Maximum Thoracic Rib Deflection	mm	38	19.539
Maximum Abdominal Rib Deflection	mm	45*	27.492

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

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

19. Security Class. (of this report)	***20. Security Class. (of this page)***	***21. No. of Pages***	***22. Price***
UNCLASSIFIED	UNCLASSIFIED	126	

Form DOT F1700.7 (8-72)

TABLE OF CONTENTS

Section		Page
1	Test Purpose and Procedure	1-1
2	Summary of Test Results	2-1
3	Occupant and Vehicle Information	3-1

Data Sheet		Page
1	General Test and Vehicle Parameter Data	3-2
2	Seat, Seat Belt, Steering Wheel Adjustment and Fuel Systems Data	3-6
3	Dummy Longitudinal Clearance Dimensions	3-9
4	Dummy Lateral Clearance Dimensions	3-10
5	Camera and instrumentation Data	3-11
6	Vehicle Accelerometer Data	3-12
7	Rigid Pole Load Cell Data	3-13
8	Post-Test Observations	3-14
9	Test Vehicle Profile Measurements	3-16
10	Test Vehicle Exterior Crush Measurements	3-17
11	Vehicle Damage Profile Distances	3-20
12	FMVSS No. 301 Static Rollover Results	3-21
13	Dummy / Vehicle Temperature and Humidity Stabilization Data	3-22

Appendix		Page
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 side impact test was conducted as part of the MY 2023 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. 693JJ920D000016. The purpose of this test is to generate comparative side impact performance in a 2023 KIA Sportage 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 2023 KIA Sportage 5 Door SUV. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.17 km/h. The test was conducted by Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on February 16, 2023. 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	293.287
Resultant Lower Spine Acceleration	G	82	43.858
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3246.580
Maximum Thoracic Rib Deflection	mm	38	19.539
Maximum Abdominal Rib Deflection	mm	45*	27.492

*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	No	N/A		
Side Airbag 1 - Curtain	Yes	Yes	Yes	Yes
Side Airbag 2 - Torso/Pelvis Airbag	Yes	Yes	No	N/A
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Other	N/A	N/A	N/A	N/A

GENERAL COMMENTS:

1. P1 serial number - 300

Data Anomalies:

- Left Middle A-Pillar Y Acceleration, Exceeded calibration range at 21.5 ms
- Left Middle B-Pillar Y Acceleration, Exceeded calibration range and saturated at 14.5 ms

SECTION 3

OCCUPANT AND VEHICLE INFORMATION

This section contains information reporting for the following Data Sheets:

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

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

Data Sheet No. 3 - Dummy Longitudinal Clearance Dimensions

Data Sheet No. 4 - Dummy Lateral Clearance Dimensions

Data Sheet No. 5 - Camera and instrumentation Data

Data Sheet No. 6 - Vehicle Accelerometer Data

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: 2023 KIA Sportage 5 Door SUV | NHTSA No.: M20234207
Test Program: NCAP Side Pole Impact Test | Test Date: 02/16/2023

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20234207
Model Year	2023
Make	KIA
Model	Sportage
Body Style	SUV
VIN	5XYK33AF5PG066827
Body Color	White
Odometer Reading (km/mi)	15 Miles
Engine Displacement (L)	2.5
Type / No. Cylinders	I4
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	8 Speed
Overdrive	Yes
Final Drive	Front Wheel Drive
Roof Rack	No
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	Yes

Traction Control System (TCS)	Yes
Auto-Leveling System	No
Automatic Door Locks (ADL)	Yes
Power Window Auto-Reverse	Yes
Other Optional Feature	N/A
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso / Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	No
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	KIA GEORGIA, INC
Date of Manufacture	SEP/30/22
Vehicle Type	MPV

GVWR	2120
GVWR Front	1260
GVWR Rear	1200

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)				420	(A)
DSC x 68.04 kg				340.2	(B)
Cargo Weight (RCLW) (kg)				79.8	(A-B)

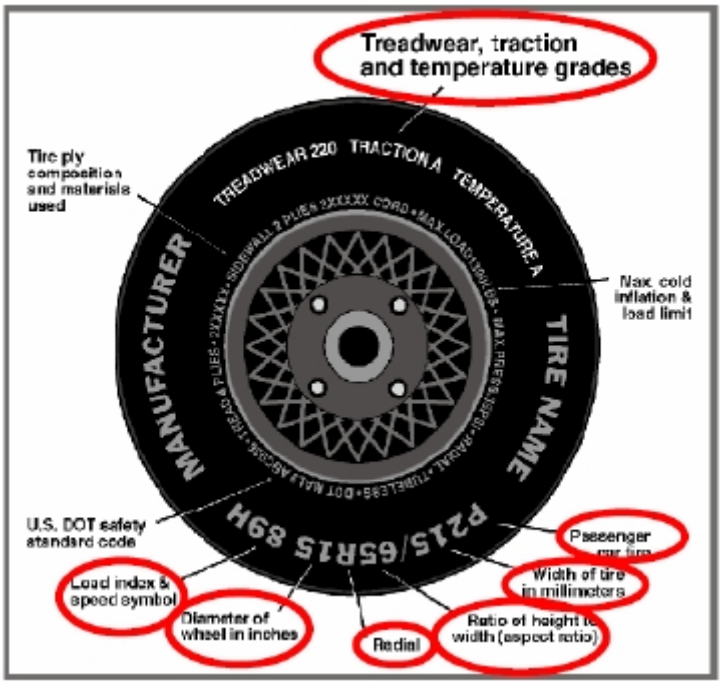
VEHICLE SEAT TYPE

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:	2023 KIA Sportage 5 Door SUV	NHTSA No.:	M20234207
Test Program:	NCAP Side Pole Impact Test	Test Date:	02/16/2023

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	Kumho	Kumho
Tire Model	Crugen HP71	Crugen HP71
Treadwear	540	540
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Steel, 2 Polyester, 1 Nylon	2 Steel, 2 Polyester, 1 Nylon
Load Index / Speed Symbol	103H	103H
Tire Material	Rubber	Rubber
DOT Safety Code Left	000CMYA8E	000CMYA8E
DOT Safety Code Right	000CMYA8E	000CMYA8E

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

Test Vehicle: 2023 KIA Sportage 5 Door SUV
NHTSA No.: M20234207
Test Program: NCAP Side Pole Impact Test
Test Date: 02/16/2023

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	245	252	257	256
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	471	329		504	365		490	383	
Right	kg	472	304		465	365		475	352	
Ratio	%	59.8	40.2		57.0	43.0		56.7	43.2	
Totals	kg	943	633	1576	969	730	1699	965	735	1700

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1576	(A)
Actual Weight of 1 P572V (SID-IIs) ATD Used	kg	50	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	79.8	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1705.8	(A+B+C)

Does the measured As Test Vehicle Weight lie within the required weight range (i.e. Calculated Test Vehicle Target Weight – 4.5 kg to – 9 kg)?

[X] **Yes** [ ] **No**

TEST VEHICLE ATTITUDES AND CG

Measurement Description	Units	As Delivered	As Tested	Fully Loaded	Meets Rqmt***
Driver Door Sill Angle (front-to-rear)*	Deg	+ 0.20	+ 0.20	+ 0.10	Yes
Front Passenger Sill Angle (front-to-rear)*	Deg	- 0.35	- 0.15	- 0.15	Yes
Front Bumper-Line Angle (left-to-right)**	Deg	- 0.20	- 0.25	- 0.65	Yes
Rear Bumper-Line Angle (left-to-right)**	Deg	- 0.15	- 0.15	- 0.05	Yes
Vehicle CG (Aft of Front Axle)	mm	1108	1185	1192	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	12	19	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:	2023 KIA Sportage 5 Door SUV	NHTSA No.:	M20234207
Test Program:	NCAP Side Pole Impact Test	Test Date:	02/16/2023

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Trunk Carpeting	3
Spare Tire	14
Jack/Tools	3
Rear Trim	8
Ballast / Equipment Added	43

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

TEST SURFACE MARKING

	Distance from 75° Impact Location Line (mm)
Fore 25 mm target	1022
Aft 25 mm target	1020

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

Test Vehicle:	2023 KIA Sportage 5 Door SUV	NHTSA No.:	M20234207
Test Program:	NCAP Side Pole Impact Test	Test Date:	02/16/2023

SEAT POSITIONING

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

SCRL ANGLE RANGE

Seat	SCRL(°)		
	Max	Min	Mid
Driver Seat	19.9	11.3	15.6
Front Passenger Seat	Fixed	Fixed	Fixed
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	15.6	50	Max	70	76	82
			Mid	37	44	50
			Min	5	11	18
Front Passenger Seat	Fixed	Fixed	Max			
			Mid			
			Min			
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

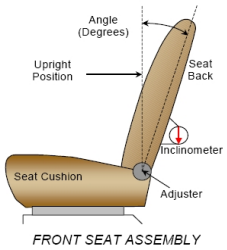
Test Vehicle:	2023 KIA Sportage 5 Door SUV	NHTSA No.:	M20234207
Test Program:	NCAP Side Pole Impact Test	Test Date:	02/16/2023

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	39 (0-38)	0	0
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 BACK ANGLE ADJUSTMENT

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



FRONT SEAT ASSEMBLY

Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detents*
Driver Seat w/Seated Dummy	64.1	Power	10.7	Power
Front Passenger Seat	58.5	30 (0-29)	9.7	5
Front Center Seat				
Struck Side Rear Seat	26.6	14 (0-13)	3.5	0
Non-Struck Side Rear Seat	26.4	14 (0-13)	3.5	0
Rear Center Seat	26.4	14 (0-13)	3.5	0

SEAT BELT ANCHORAGE ADJUSTMENT

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

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

HEAD RESTRAINT ADJUSTMENT

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

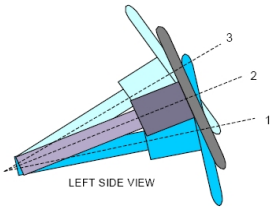
Seat	Total # of Positions	Placed in Position #
Driver Seat	6 (0-5)	Lowermost

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

Test Vehicle:	2023 KIA Sportage 5 Door SUV	NHTSA No.:	M20234207
Test Program:	NCAP Side Pole Impact Test	Test Date:	02/16/2023

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.



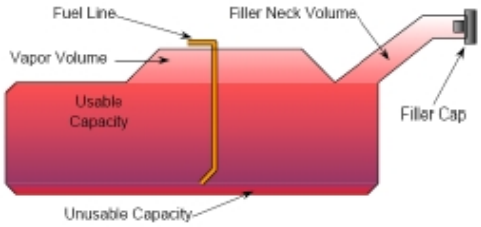
STEERING COLUMN ASSEMBLY

	Degrees	Fore / Aft Position (mm)
Lowermost - Position No. 1	23.4	
Geometric center - Position No. 2	25.9	
Uppermost - Position No. 3	28.3	
Telescoping Steering Wheel Travel		56
Test Position	26.0	28

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 left 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.



VEHICLE FUEL TANK ASSEMBLY

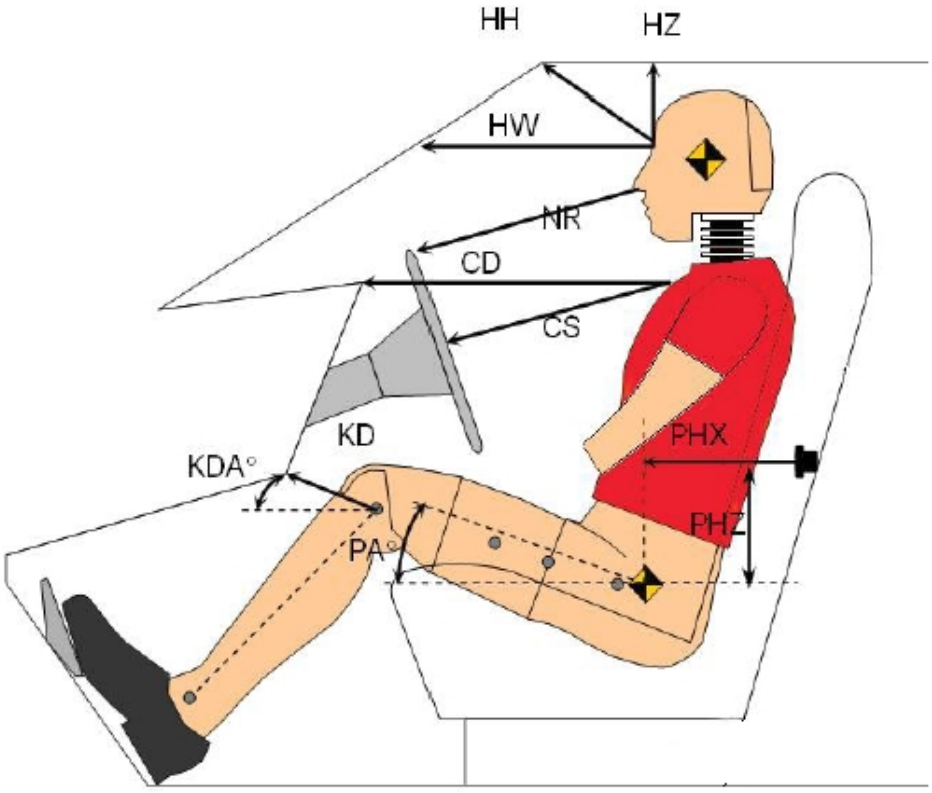
FUEL TANK CAPACITY

Description		Liters
Usable Capacity of “Standard Tank”	- see Form No. 1	54.09
Usable Capacity of “Optional Tank”	- see Form No. 1	N/A
Usable Capacity of “Standard Tank”	- see Owner’s Manual	54.09
Usable Capacity of “Optional Tank”	- see Owner’s Manual	N/A
93% of Usable Capacity		50.3
Actual Amount of Solvent Used in Test		50.3
1/3 of Usable Capacity		18.03

Is the Actual Amount of Solvent Used in the test equal to 93% ±1% of the Usable Capacity stated in Form No. 1? [X] Yes [ ] No

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle:	2023 KIA Sportage 5 Door SUV	NHTSA No.:	M20234207
Test Program:	NCAP Side Pole Impact Test	Test Date:	02/16/2023



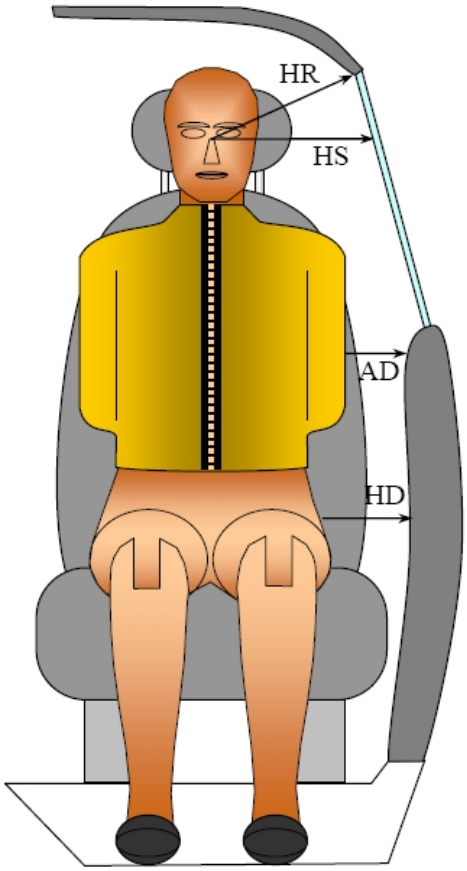
Left Side View

DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Description	Driver (Serial No. 300)	
		Length (mm)	Angle (°)
HH	Head to Header	287	
HW	Head to Windshield	637	
HZ	Head to Roof Liner	205	
NR	Nose to Rim	263	
CD	Chest to Dash	489	
CS	Chest to Steering Wheel	196	
KD(L) / KDA(L)◦	Left Knee to Dash	100	30.4
KD(R) / KDA(R)◦	Right Knee to Dash	84	31.3
PAX◦	Pelvic Tilt Angle (X-Axis)		19.1
PAY◦	Pelvic Tilt Angle (Y-Axis)		0.3
PHX	Hip Point to Striker (X-Axis)	326	
PHZ	Hip Point to Striker (Z-Axis)	224	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle:	2023 KIA Sportage 5 Door SUV	NHTSA No.:	M20234207
Test Program:	NCAP Side Pole Impact Test	Test Date:	02/16/2023



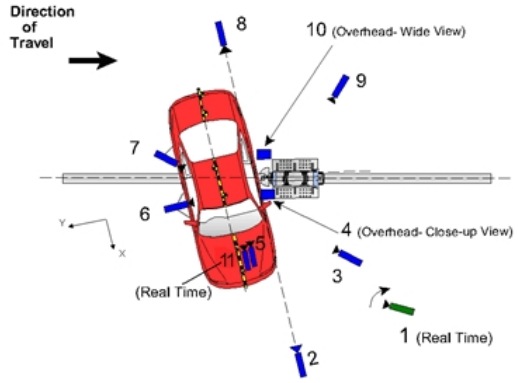
FRONT VIEW OF DUMMY

DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver – Length (Serial No. 300)
HR	Head to Side Header	mm	260
HS	Head to Side Window	mm	371
AD	Arm to Door	mm	174
HD	H-Point to Door	mm	232

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2023 KIA Sportage 5 Door SUV
NHTSA No.: M20234207
Test Program: NCAP Side Pole Impact Test
Test Date: 02/16/2023



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	30
2	Front ground level - impact view	7094	0	-1440	28	1000
3	Impact side 45º - forward pole view	4984	1238	-1456	24	1000
4	Overhead Close-up view of impact	0	0	-9220	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	-8470	0	-1408	24	1000
9	Impact side 45º - rearward pole view	-6750	1740	-1390	24	1000
10	Overhead wide - view of impact	0	-254	-9220	12.5	1000
11	Real-time (24 - 30 fps) - dummy front view				Zoom	30

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

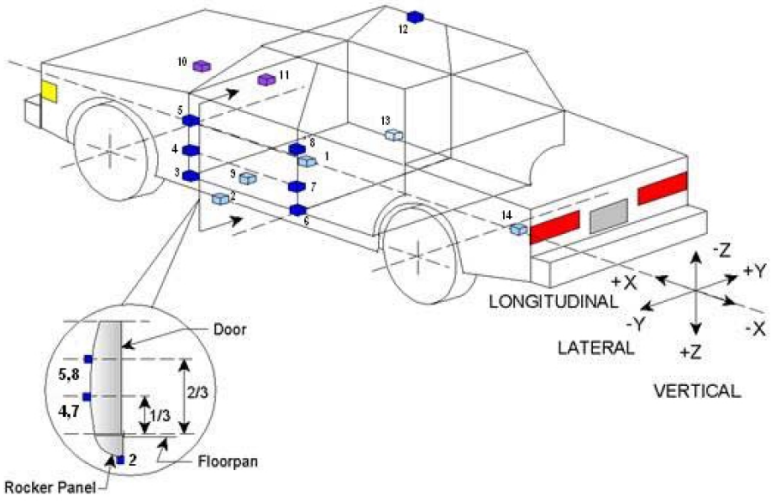
If applicable, explain why camera(s) did not operate as intended: All cameras operated as intended.

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:	2023 KIA Sportage 5 Door SUV	NHTSA No.:	M20234207
Test Program:	NCAP Side Pole Impact Test	Test Date:	02/16/2023



TEST VEHICLE ACCELEROMETER LOCATIONS

No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2111	-1	157
2	Left Floor Sill	2903	-669	145
3	A-Pillar Sill	3237	-648	115
4	A-Pillar Low	3319	-631	-99
5	A-Pillar Mid	3191	-657	-572
6	B-Pillar Sill	2041	-665	149
7	B-Pillar Low	2221	-687	-100
8	B-Pillar Mid	2118	-675	-443
9	Driver Seat Track	2393	-568	115
10	Engine Top	3938	244	-318
11	Firewall	3502	-48	-328
12	Right Roof	2290	629	-1019
13	Right Floor Sill	2925	674	138
14	Rear Floor Pan	669	41	101

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:	2023 KIA Sportage 5 Door SUV	NHTSA No.:	M20234207
Test Program:	NCAP Side Pole Impact Test	Test Date:	02/16/2023

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:	2023 KIA Sportage 5 Door SUV	NHTSA No.:	M20234207
Test Program:	NCAP Side Pole Impact Test	Test Date:	02/16/2023

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	Curain Airbag, & Head Rest
Left Shoulder	Seatback, & Torso/Pelvis Airbag
Upper Torso	Seatback
Lower Torso	Seatback
Left Hip	Seatpan & Torso/Pelvis Airbag
Left Knee	Driver 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)	N/A	N/A	N/A	N/A	N/A

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:	2023 KIA Sportage 5 Door SUV	NHTSA No.:	M20234207
Test Program:	NCAP Side Pole Impact Test	Test Date:	02/16/2023

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	A-Pillar, B-Pillar & C-Pillars buckled
Sill Separation	410 mm of separation at impact location
Windshield Damage	Cracked throughout and separated along A-Pillar
Side Window Damage	Front driver window shattered on impact
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	No	N/A		
Side Airbag 1 - Curtain	Yes	Yes	Yes	Yes
Side Airbag 2 - Torso/Pelvis Airbag	Yes	Yes	No	N/A
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Other	N/A	N/A	N/A	N/A

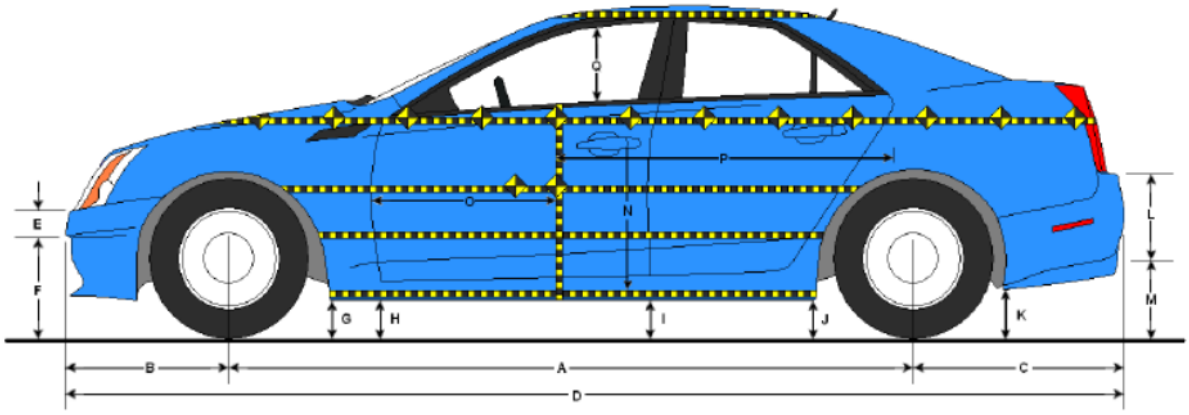
VEHICLE SPEED, VEHICLE ANGLE AT IMPACT AND IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vertical Impact Ref Line - Aft of Front Axle, Intended Impact Pt	mm		1110
Actual Impact Point - Aft of Front Axle	mm		1116
Horizontal Offset (+ forward / - rearward)	mm	+/- 38*	-6
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	32.17
Trap No. 2 Velocity - Redundant	kph	31.4 to 33.0	32.18

*Of Intended Impact Point

DATA SHEET NO. 9
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle:	2023 KIA Sportage 5 Door SUV	NHTSA No.:	M20234207
Test Program:	NCAP Side Pole Impact Test	Test Date:	02/16/2023



LEFT SIDE VIEW

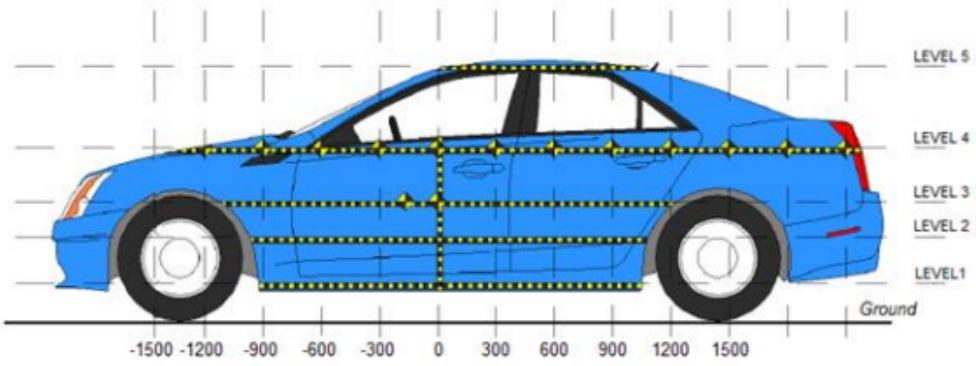
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

No.	Measurement Description	Pre-Test	Post-Test	Change
A	Vehicle Wheelbase	2758	2676	-82
B	Front Axle to FSOV	899	936	37
C	Rear Axle to RSOV	999	1011	13
D	Total Length at Centerline	4655	4623	-32
E	Front Bumper Thickness	150	150	0
F	Front Bumper Bottom to Ground	320	501	181
G	Sill Height at Front Wheel Well	252	229	-23
H	Sill Height at Front Door Leading Edge	253	225	-28
I	Sill Height at B Pillar	250	263	13
J1	Sill Height at Rear Wheel Well	252	293	41
J2	Pinch Weld Height at Rear Wheel Well	244	267	23
K	Sill Height Aft of Rear Wheel Well	283	298	15
L	Rear Bumper Thickness	110	110	0
M	Rear Bumper Bottom to Ground	467	464	-3
N	Sill Height to Bottom of Front Window Sill	905	908	3
O	Front Door Leading Edge to Impact CL	588	509	-79
P	Rear Door Trailing Edge to Impact CL	1527	1458	-69
Q	Front Window Opening	400	386	-14
R	Right Side Length	4568	4560	-8
S	Left Side Length	4568	4501	-67
T	Vehicle Width at B-Pillars	1840	1764	-76
U	Front Wheel Track width	1610	1612	2
V	Rear Wheel Track Width	1625	1624	-1

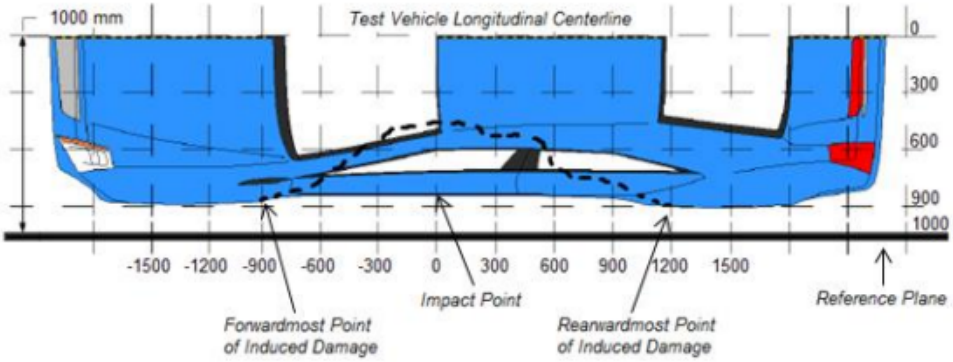
* All measurements in mm with tolerance of ± 3mm

DATA SHEET NO.10
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle:	2023 KIA Sportage 5 Door SUV	NHTSA No.:	M20234207
Test Program:	NCAP Side Pole Impact Test	Test Date:	02/16/2023



Left Side View



Overhead View

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	307	265	0
2	Driver H-Point	mm	714	337	0
3	Mid-Door	mm	756	341	0
4	Window Sill	mm	1112	278	0
5	Window Top	mm	1587	110	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: 2023 KIA Sportage 5 Door SUV NHTSA No.: M20234207
Test Program: NCAP Side Pole Impact Test Test Date: 02/16/2023

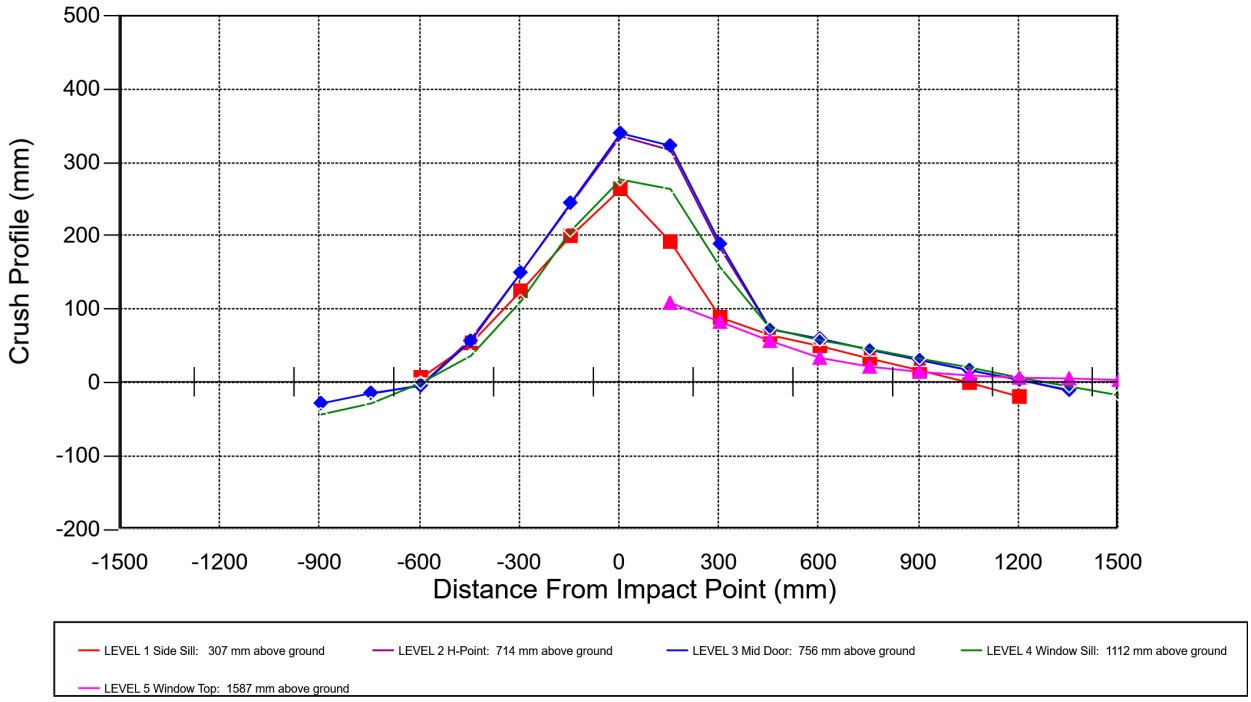
EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

	Pre-Test					Post-Test					Crush				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1500															
-1350															
-1200															
-1050															
-900			933	785				960	827				-27	-42	
-750		923	921	797			937	934	824			-14	-13	-27	
-600	875	907	906	807		867	909	909	806		8	-2	-3	1	
-450	873	901	903	814		818	840	845	776		55	61	58	38	
-300	872	902	904	821		746	751	753	709		126	151	151	112	
-150	872	904	906	828		671	660	660	620		201	244	246	208	
0	872	905	908	835		607	568	567	557		265	337	341	278	
150	871	905	908	841	605	678	587	584	576	495	193	318	324	265	110
300	870	905	907	846	628	780	721	717	688	544	90	184	190	158	84
450	870	903	907	850	630	804	829	833	775	572	66	74	74	75	58
600	870	902	905	850	628	819	841	844	791	593	51	61	61	59	35
750	871	903	903	848	625	837	857	857	801	602	34	46	46	47	23
900	875	911	907	846	620	857	879	875	812	604	18	32	32	34	16
1050	883	923	919	842	614	882	905	901	820	603	1	18	18	22	11
1200	895	934	932	851	605	913	929	927	843	597	-18	5	5	8	8
1350		934	931	867	591		944	940	871	584		-10	-9	-4	7
1500				878	568				894	563				-16	5

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:	2023 KIA Sportage 5 Door SUV	NHTSA No.:	M20234207
Test Program:	NCAP Side Pole Impact Test	Test Date:	02/16/2023

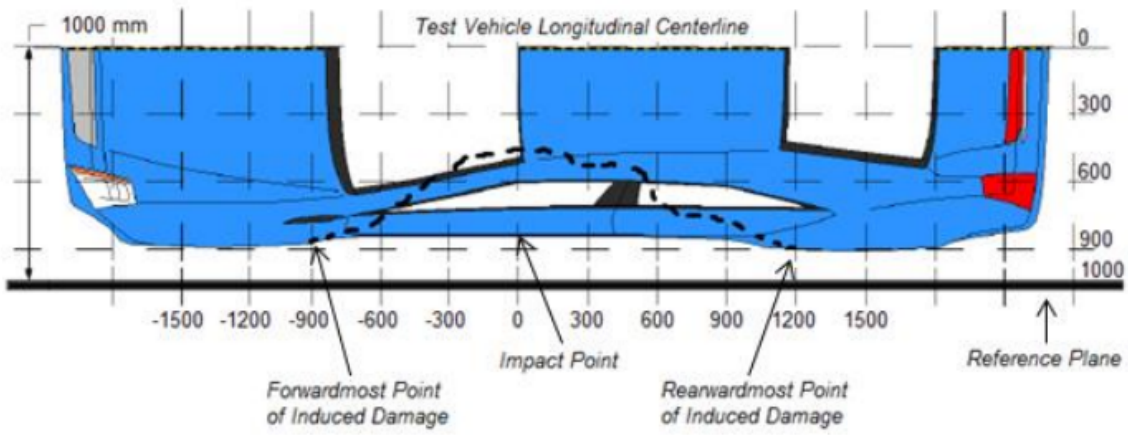


Vehicle Exterior Crush Measurements - Visual Representation

DATA SHEET NO.11
VEHICLE DAMAGE PROFILE DISTANCE

Test Vehicle:	2023 KIA Sportage 5 Door SUV	NHTSA No.:	M20234207
Test Program:	NCAP Side Pole Impact Test	Test Date:	02/16/2023

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



Overhead View

VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	-900	3	40	67	-27
2	-450	3	155	97	58
3	0	3	433	92	341
4	450	3	167	93	74
5	900	3	125	93	32
6	1350	3	60	69	-9

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

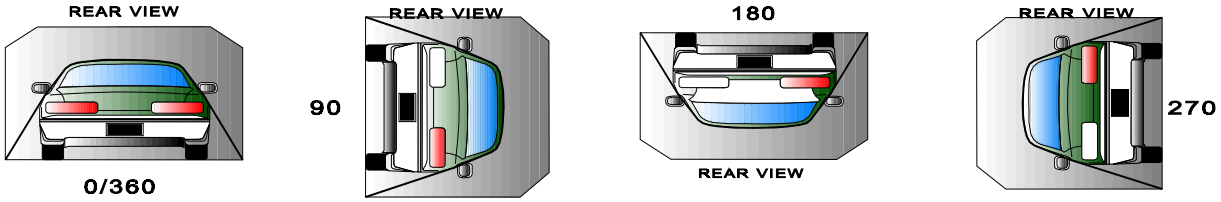
Test Vehicle:	2023 KIA Sportage 5 Door SUV	NHTSA No.:	M20234207
Test Program:	NCAP Side Pole Impact Test	Test Date:	02/16/2023
Test Time:	8:52 AM	Temperature:	21.1 °C

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 Occurred



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	70	300	370
90° to 180°	65	300	365
180° to 270°	65	300	365
270° to 360°	69	300	369

FMVSS 301 SPILLAGE TABLE

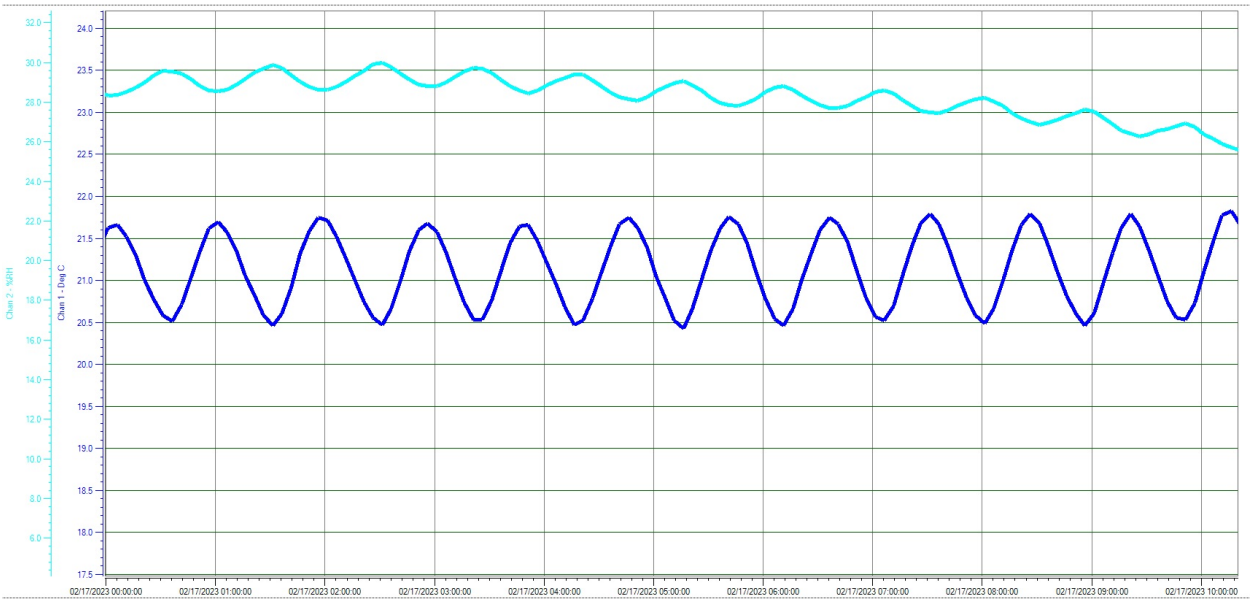
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° to 90°	0	0	0	N/A
90° to 180°	0	0	0	N/A
180° to 270°	0	0	0	N/A
270° to 360°	0	0	0	N/A

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:	2023 KIA Sportage 5 Door SUV	NHTSA No.:	M20234207
Test Program:	NCAP Side Pole Impact Test	Test Date:	02/16/2023



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

APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

Fig.	Description	Page
1	As Delivered Right Front ¾ View of Test Vehicle	A-4
2	As Delivered Left Rear ¾ View of Test Vehicle	A-4
3	Pre-Test Frontal View of Test Vehicle	A-5
4	Post-Test Frontal View of Test Vehicle	A-5
5	Pre-Test Left Front ¾ View of Test Vehicle	A-6
6	Post-Test Left Front ¾ View of Test Vehicle	A-6
7	Pre-Test Left Side View of Test Vehicle	A-7
8	Post-Test Left Side View of Test Vehicle	A-7
9	Pre-Test Left Rear ¾ View of Test Vehicle	A-8
10	Post-Test Left Rear ¾ View of Test Vehicle	A-8
11	Pre-Test Rear View of Test Vehicle	A-9
12	Post-Test Rear View of Test Vehicle	A-9
13	Pre-Test Right Side View of Test Vehicle	A-10
14	Post-Test Right Side View of Test Vehicle	A-10
15	Pre-Test Overhead View of Test Area	A-11
16	Post-Test Overhead View of Test Area	A-11
17	Pre-Test Left Side View of Pole Positioned Against Side of Vehicle	A-12
18	Pre-Test Right Side View of Pole Positioned Against Side of Vehicle	A-12
19	Pre-Test Close-Up View of Impact Point Target	A-13
20	Post-Test Close-Up View of Impact Point Target Showing Impact Location	A-13
21	Pre-Test Front Close-Up View of Dummy Head and Chest	A-14
22	Post-Test Front Close-Up View of Dummy	A-14
23	Pre-Test Left Side View of Dummy Showing Belt and Chalking	A-15
24	Pre-Test Left Side View of Dummy Shoulder and Door Top View	A-15
25	Post-Test Left Side View of Dummy Shoulder and Door Top View	A-16
26	Pre-Test Frontal View of Seat Back Prior to Dummy Positioning	A-16
27	Pre-Test Frontal Close-Up View of Dummy Head / Shoulders in Relation to Head Restraint	A-17
28	Pre-Test Frontal View of Seat Pan Prior to Dummy Positioning	A-17
29	Pre-Test Overhead View of Dummy Thighs on Seat Pan	A-18
30	Pre-Test Left Side View of Dummy's Neck Showing Position of Adjustable Neck Bracket	A-18
31	Pre-Test Left Side View of Dummy's Head Showing Dummy's Head is Level	A-19
32	Pre-Test Placement of Dummy's Feet	A-19
33	Pre-Test View of Belt Anchorage for Dummy	A-20
34	Pre-Test Left Side View of Steering Wheel	A-20
35	Pre-Test View of Disengaged Parking Brake	A-21

Fig.	Description	Page
36	Pre-Test View of Parking Brake	A-21
37	Pre-Test Close-Up Left Side View of Driver Seat Track	A-22
38	Pre-Test Close-Up Left Side View of Driver Seat Back	A-22
39	Pre-Test Close-Up View of Driver Seat Back or Head Restraint	A-23
40	Pre-Test Dummy and Door Clearance View	A-23
41	Post-Test Dummy and Door Clearance View	A-24
42	Pre-Test Right Side View of Dummy and Front Seat of Occupant Compartment	A-24
43	Post-Test Right Side View of Dummy and Front Seat of Occupant Compartment	A-25
44	Pre-Test Inner Door Panel View	A-25
45	Post-Test Inner Door Panel View Showing Dummy Contact Location	A-26
46	Post-Test Dummy Close-Up Head Contact with Vehicle Interior View	A-26
47	Post-Test Dummy Close-Up Head Contact with Side Airbag View	A-27
48	Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View	A-27
49	Post-Test Dummy Close-Up Torso Contact with Side Airbag View	A-28
50	Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View	A-28
51	Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View	A-29
52	Post-Test Dummy Close-Up Knee Contact with Vehicle Interior View	A-29
53	Pre-Test Right Side View of Dummy and Rear Seat of Occupant Compartment	A-30
54	Post-Test Inner Rear Passenger Torso Air Bag Deployment View	A-30
55	Pre-Test View of Fuel Filler Cap or Fuel Filler Neck	A-31
56	Post-Test View of Fuel Filler Cap or Fuel Filler Neck	A-31
57	Close-Up View of Vehicle’s Certification Label	A-32
58	Close-Up View of Vehicle’s Tire Information Placard or Label	A-32
59	Pre-Test Pole Barrier Front View	A-33
60	Post-Test Pole Barrier Front View	A-33
61	Pre-Test Pole Barrier Side View	A-34
62	Post-Test Pole Barrier Side View	A-34
63	Pre-Test Ballast View	A-35
64	Post-Test Primary and Redundant Speed Trap Read-Out	A-35
65	FMVSS No. 301 Static Rollover 0 Degrees	A-36
66	FMVSS No. 301 Static Rollover 90 Degrees	A-36
67	FMVSS No. 301 Static Rollover 180 Degrees	A-37
68	FMVSS No. 301 Static Rollover 270 Degrees	A-37
69	FMVSS No. 301 Static Rollover 360 Degrees	A-38
70	Impact Event	A-38
71	Monroney Label	A-39
72	Head Restraint Use and Adjustment Information from Vehicle Owner’s Manual	A-39
73	Post-Test View of Shattered Vehicle Inner Door Panel	A-41



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



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



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



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



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



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



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



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



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



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

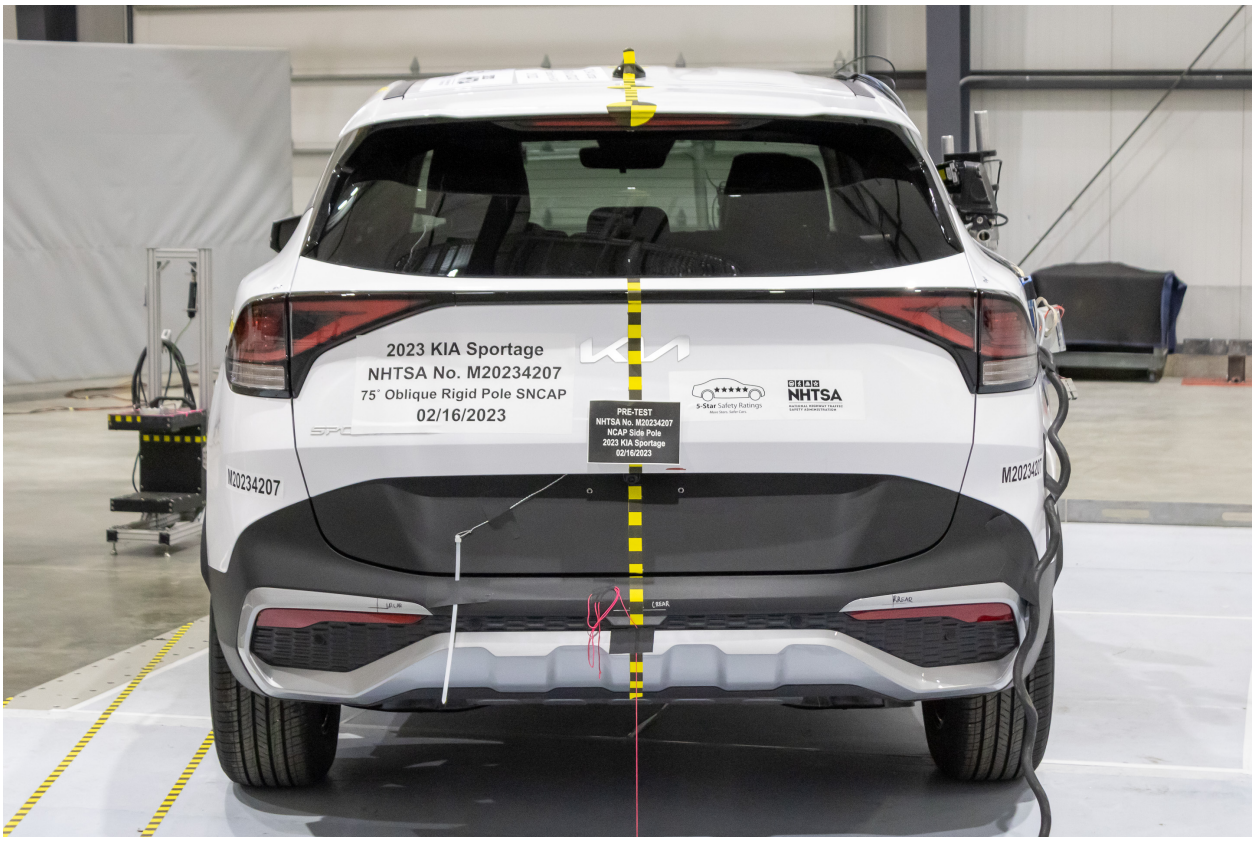


Figure A-11: Pre-Test Rear View of Test Vehicle

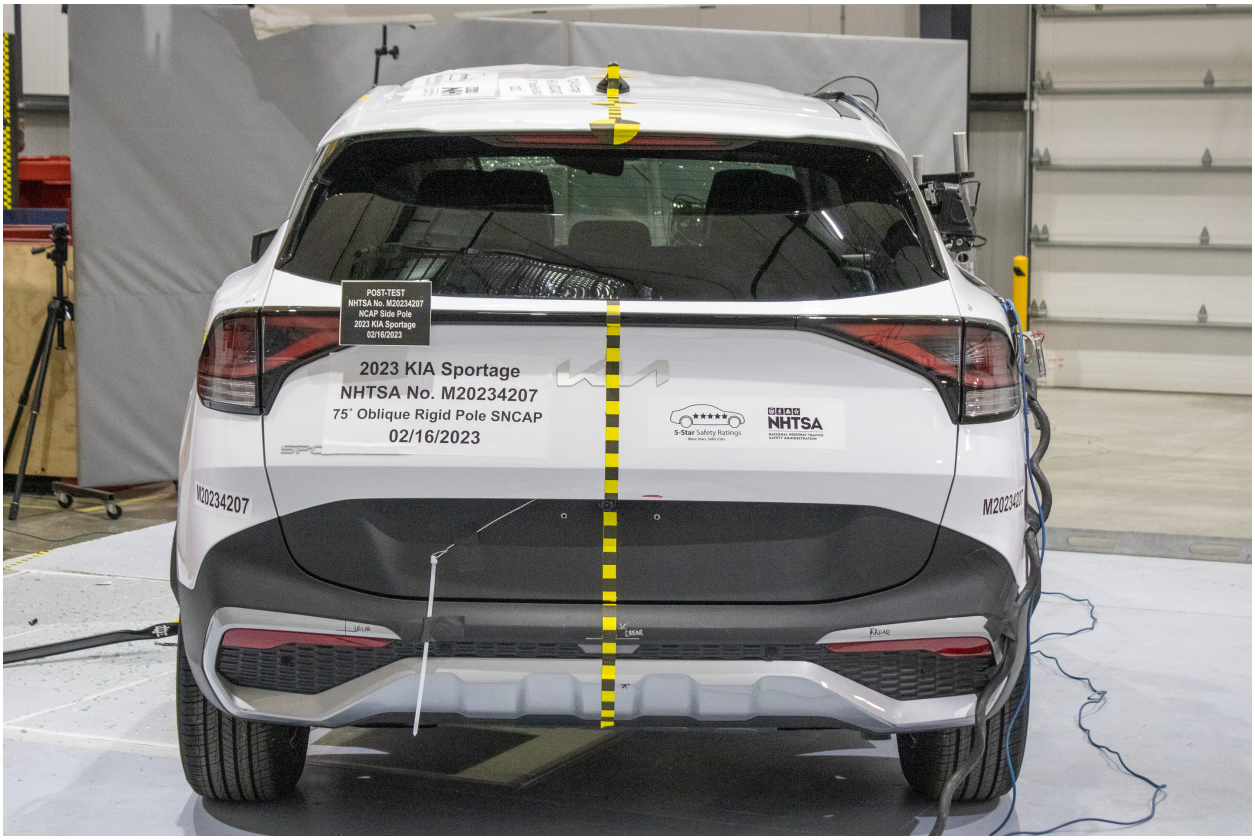


Figure A-12: Post-Test Rear View of Test Vehicle



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



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

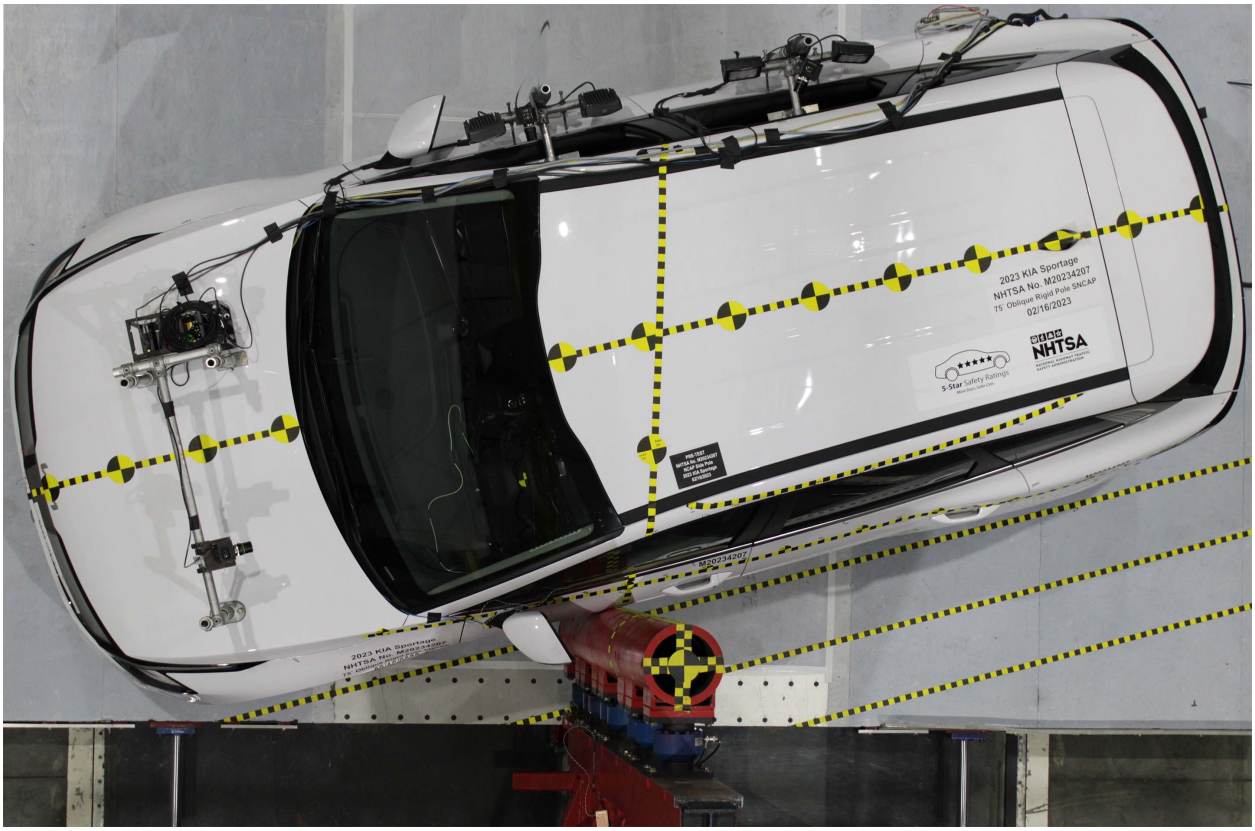


Figure A-15: Pre-Test Overhead View of Test Area

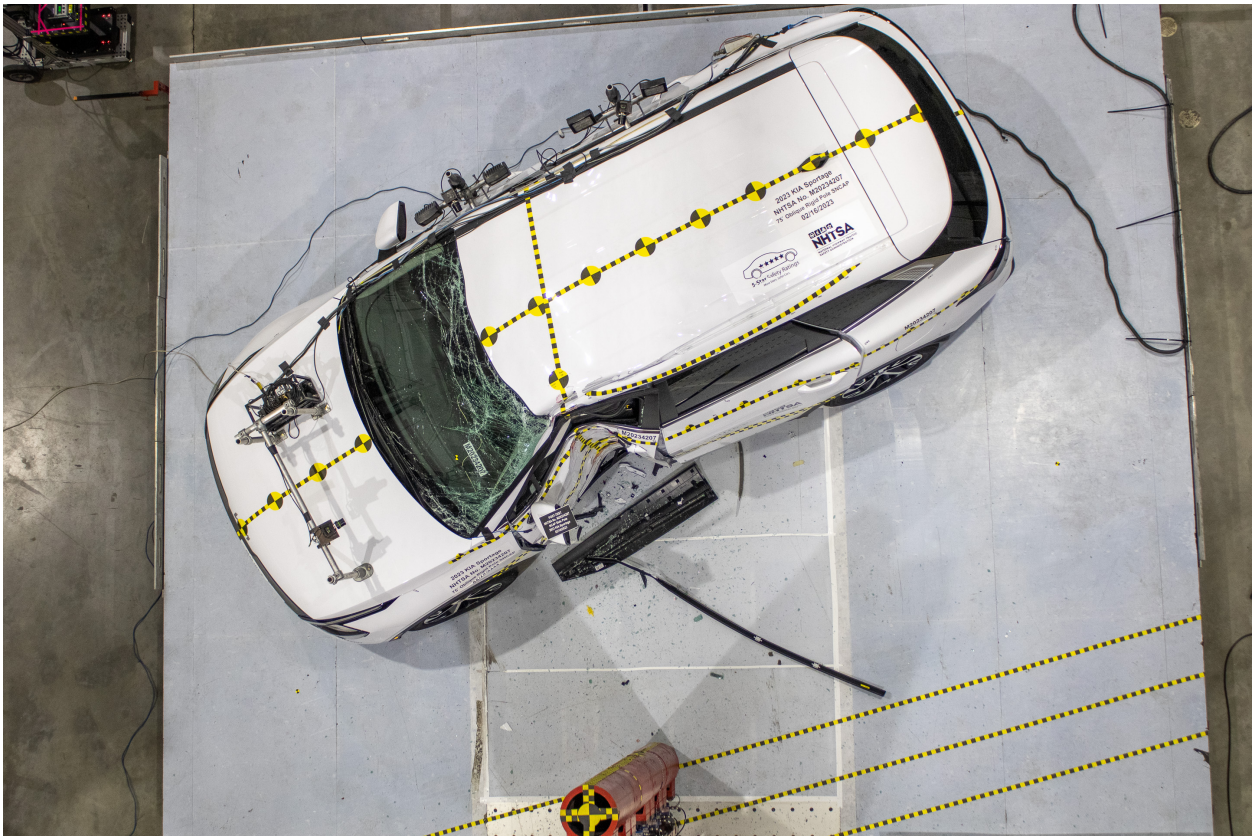


Figure A-16: Post-Test Overhead View of Test Area



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



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



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



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



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



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



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



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



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



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

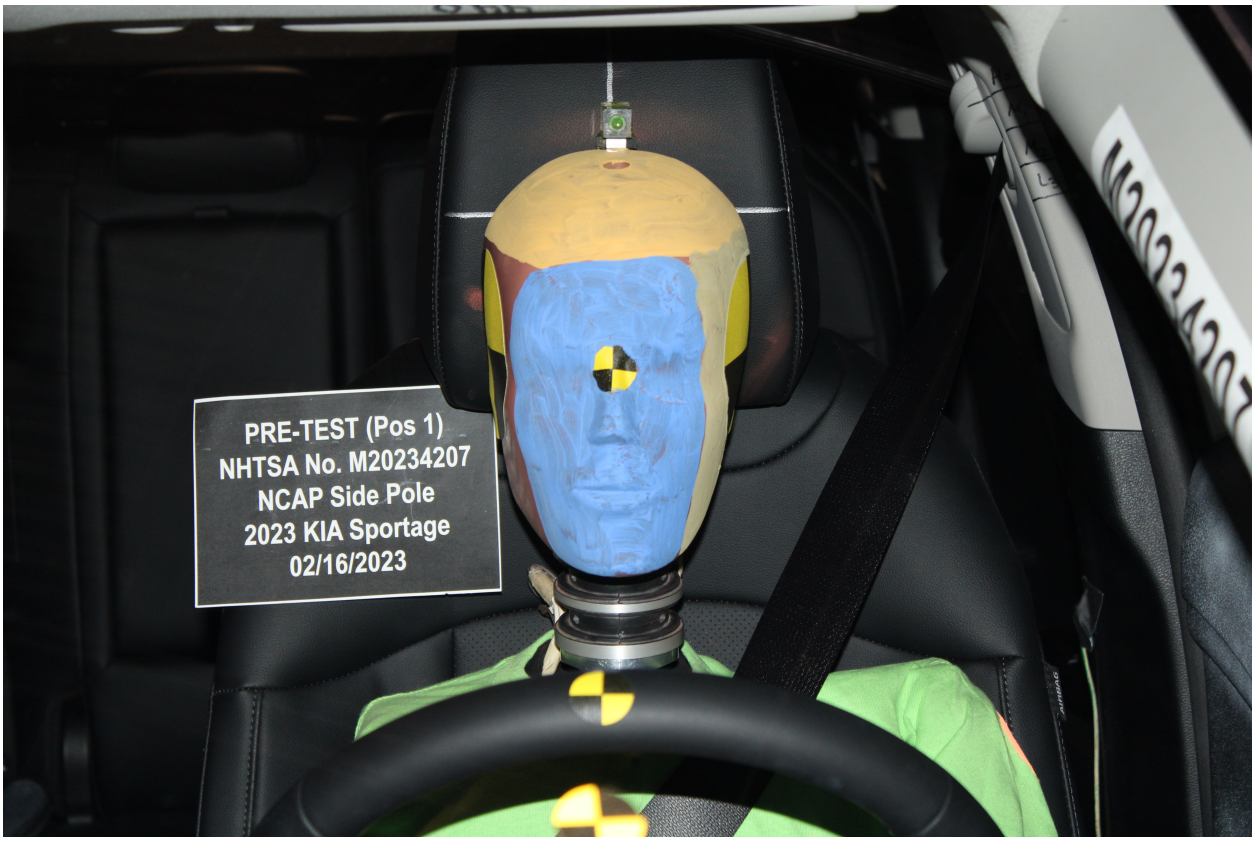


Figure A-27: Pre-Test Frontal Close-Up View of Dummy Head / Shoulders in Relation to Head Restraint



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



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

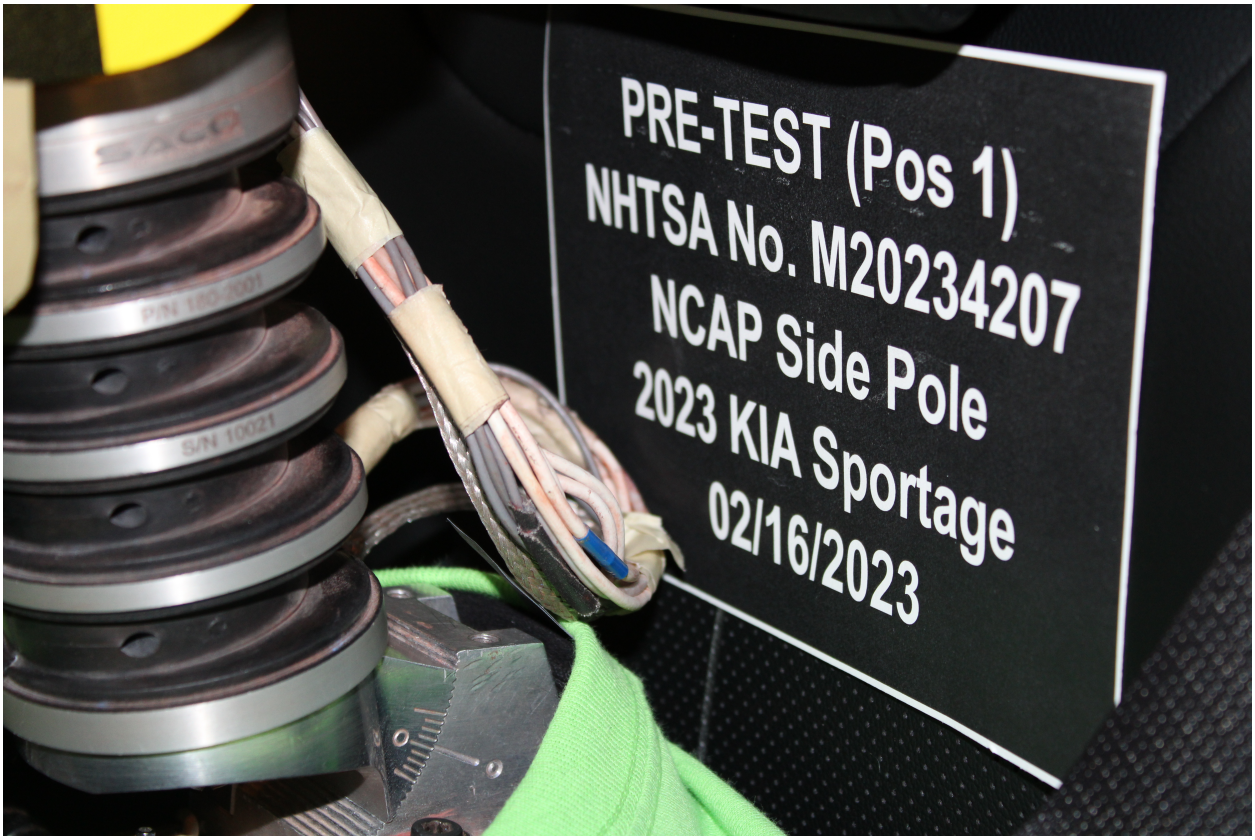


Figure A-30: Pre-Test Left Side View of Dummy's Neck Showing Position of Adjustable Neck Bracket



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



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



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



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



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



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

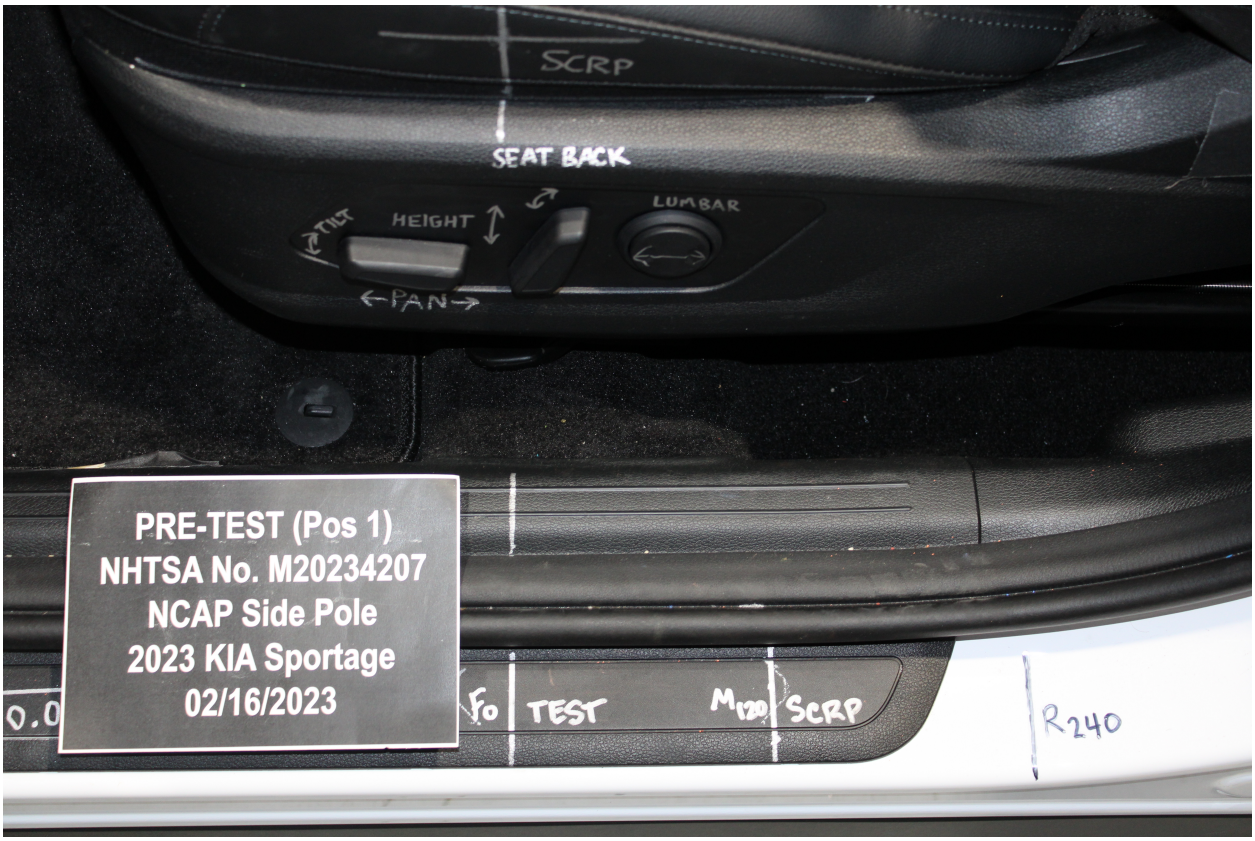


Figure A-37: Pre-Test Close-Up Left Side View of Driver Seat Track



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



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



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



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



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



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



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



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

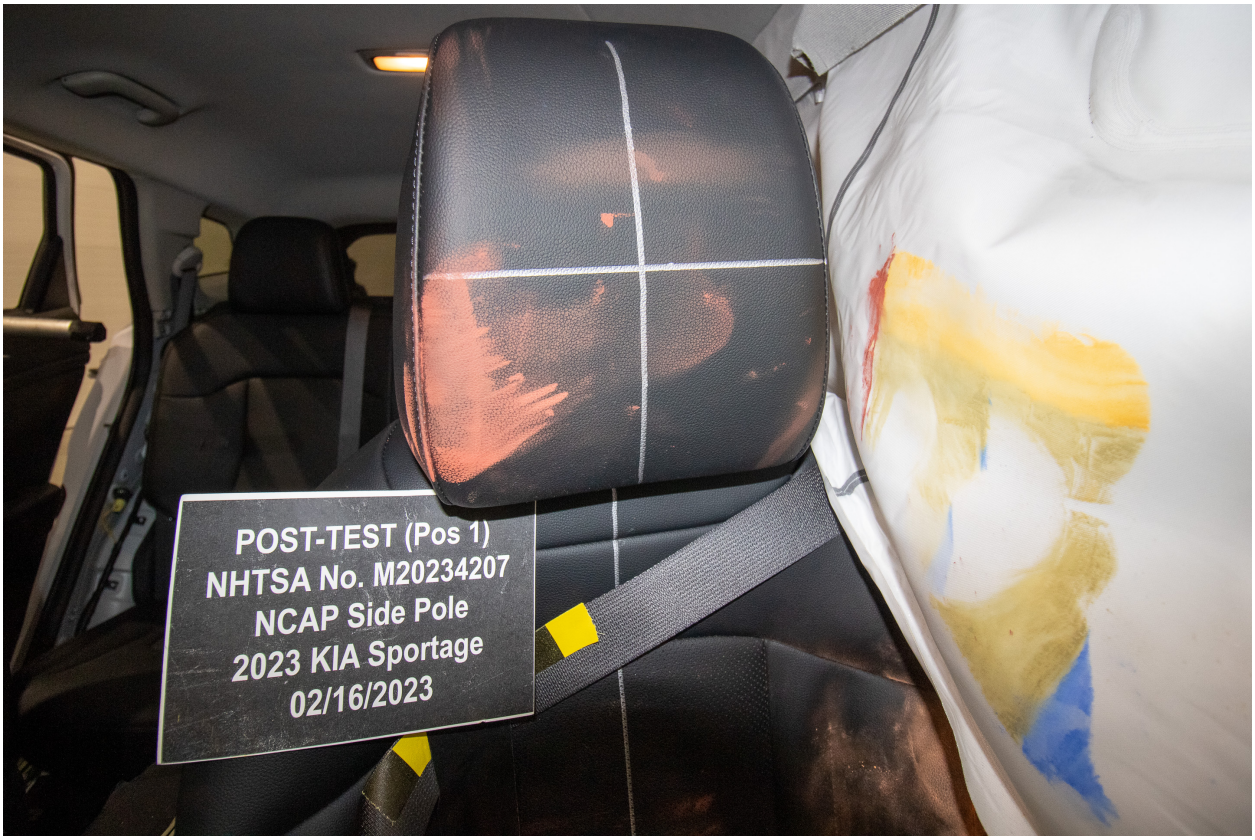


Figure A-46: Post-Test Dummy Close-Up Head Contact with Vehicle Interior View



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



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



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

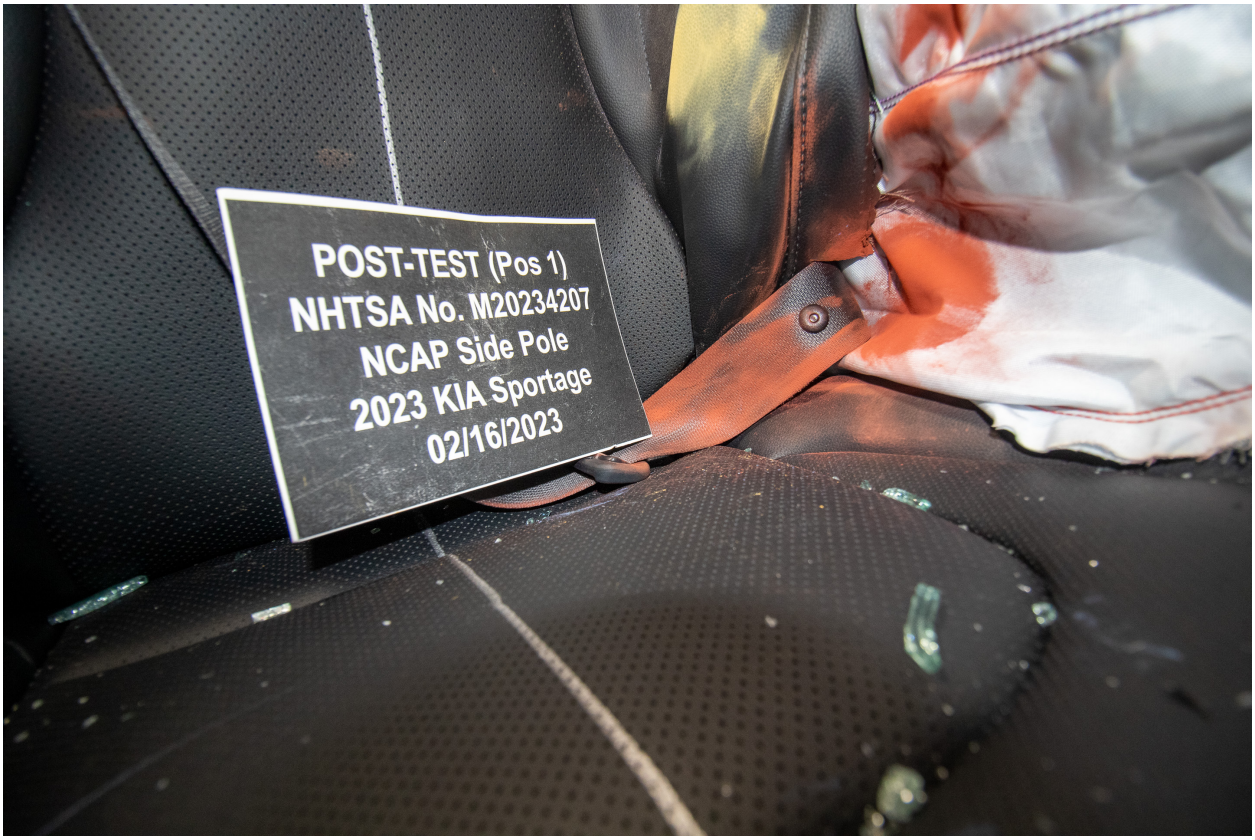


Figure A-50: Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View



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



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



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



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



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



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



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



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



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



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

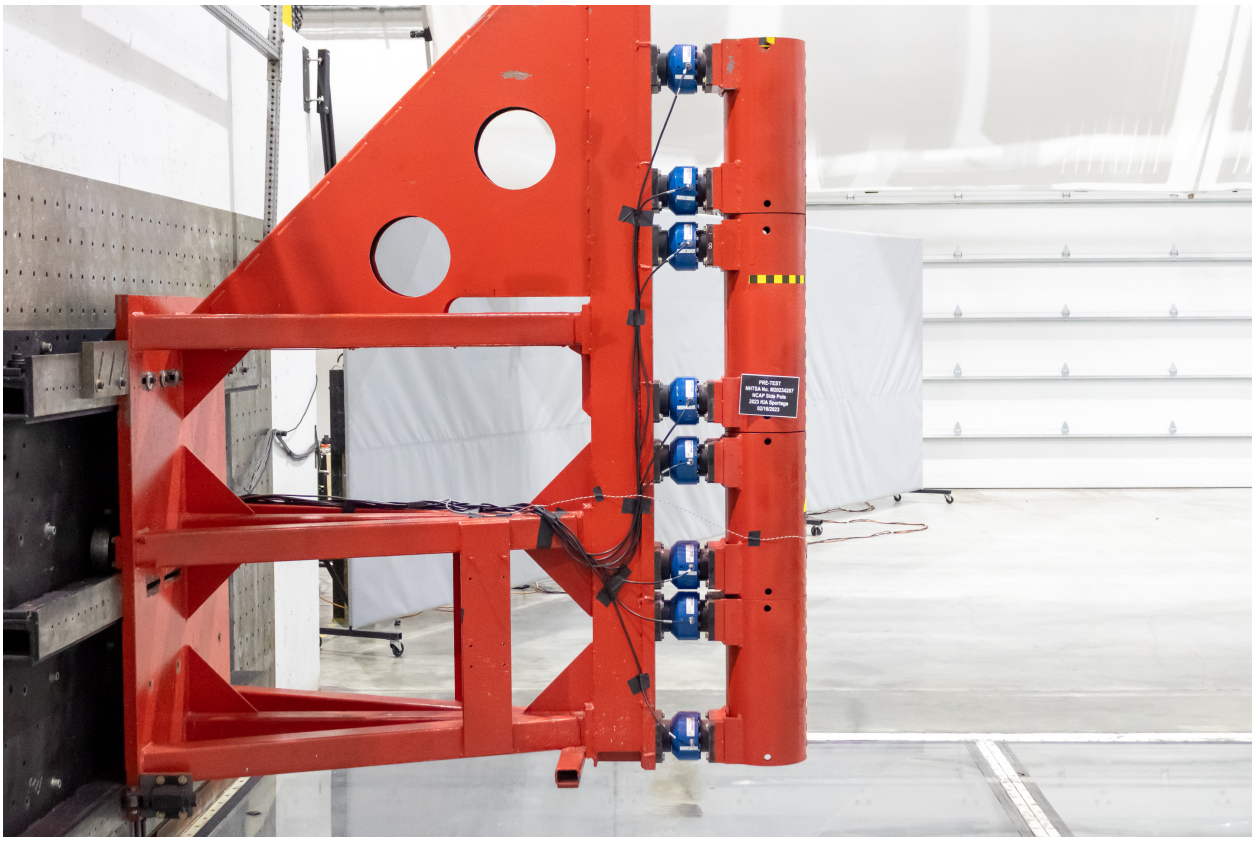


Figure A-61: Pre-Test Pole Barrier Side View

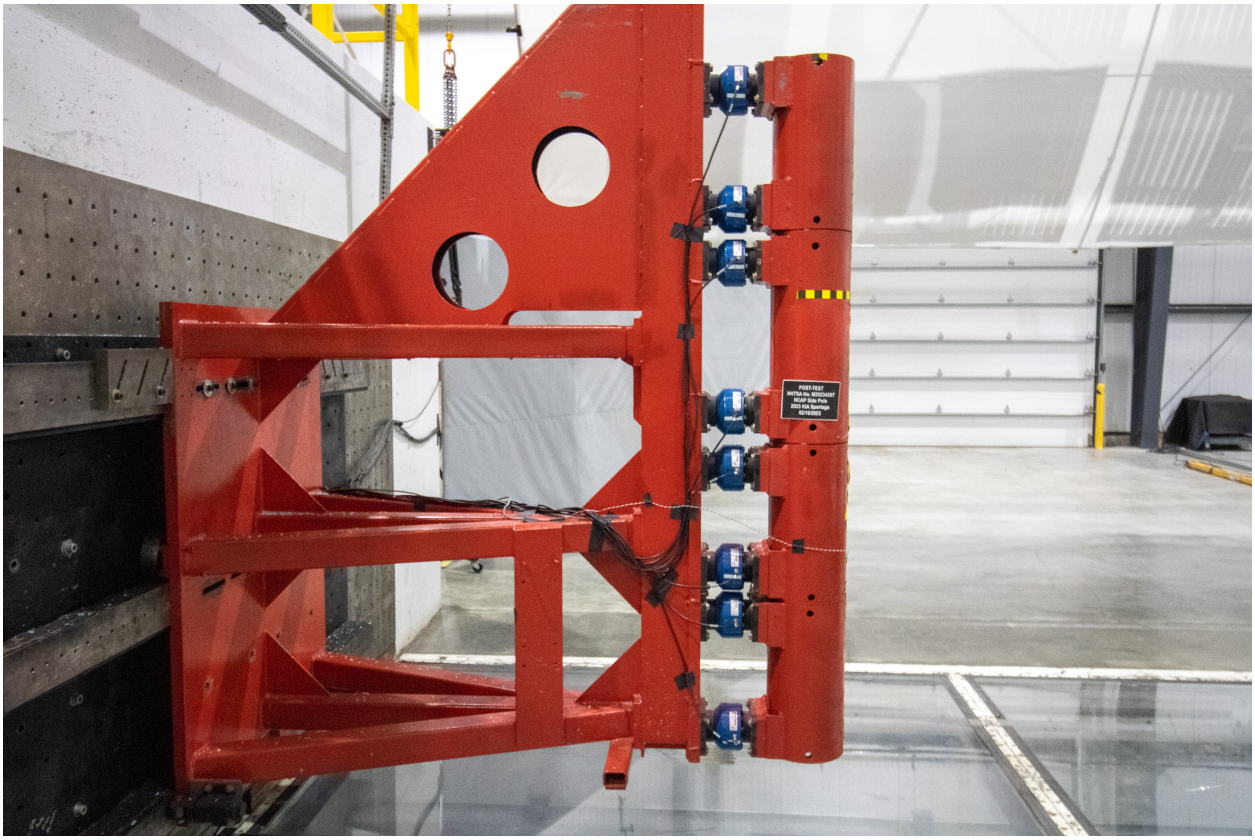


Figure A-62: Post-Test Pole Barrier Side View

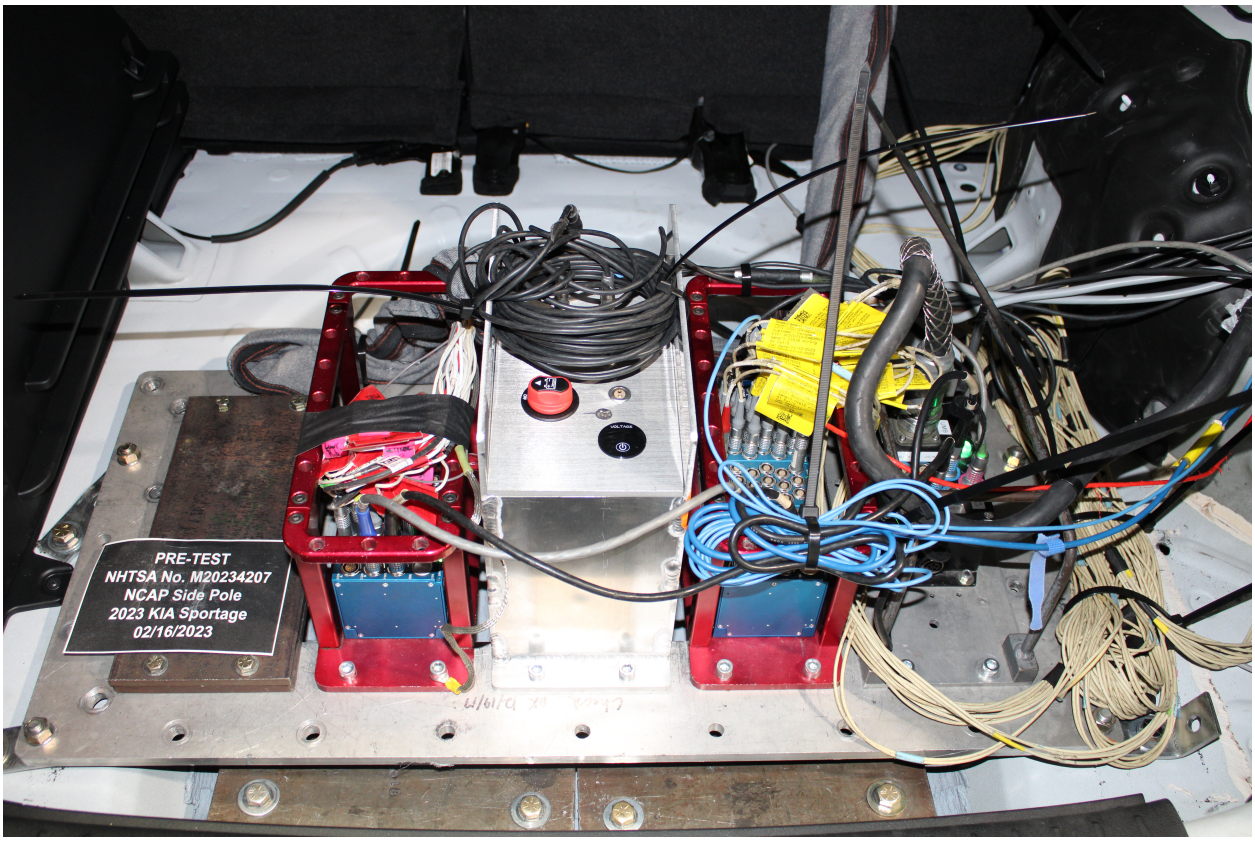


Figure A-63: Pre-Test Ballast View



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



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

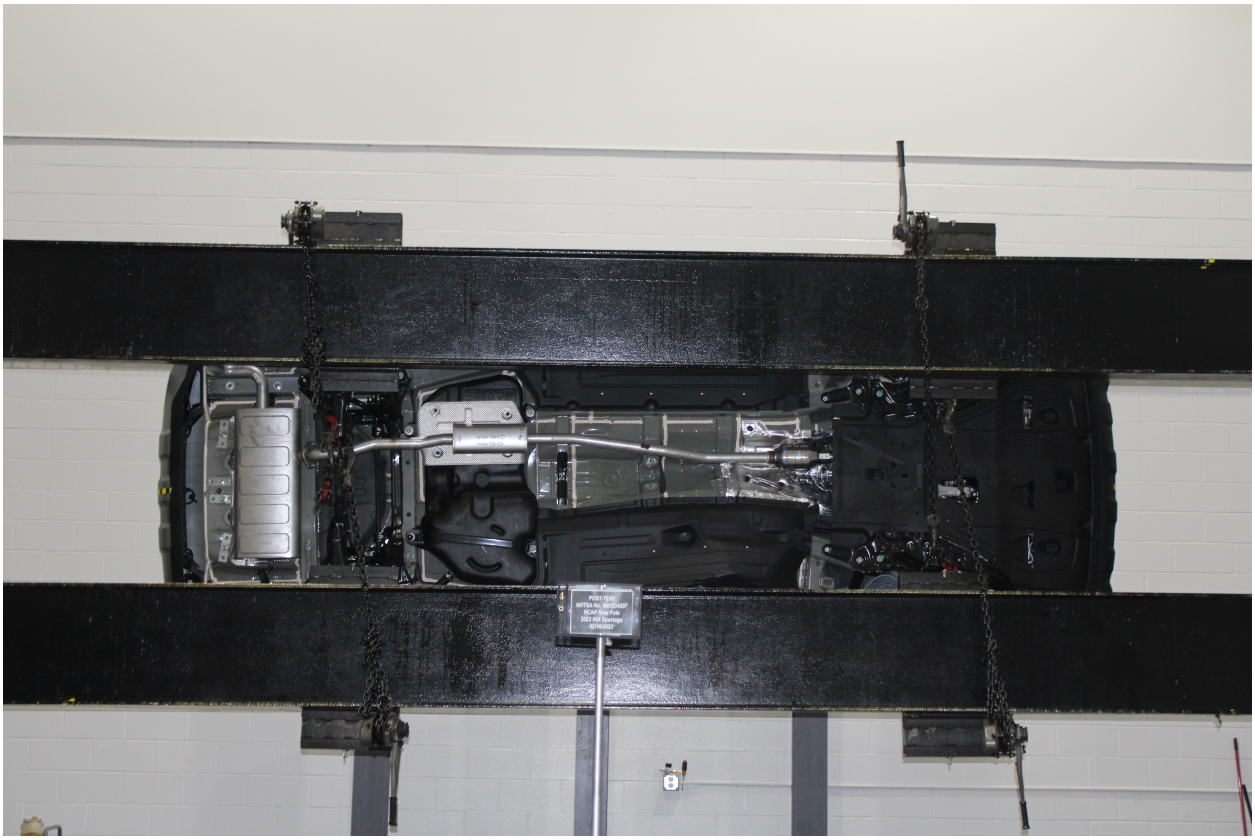


Figure A-66: FMVSS No. 301 Static Rollover 90 Degrees

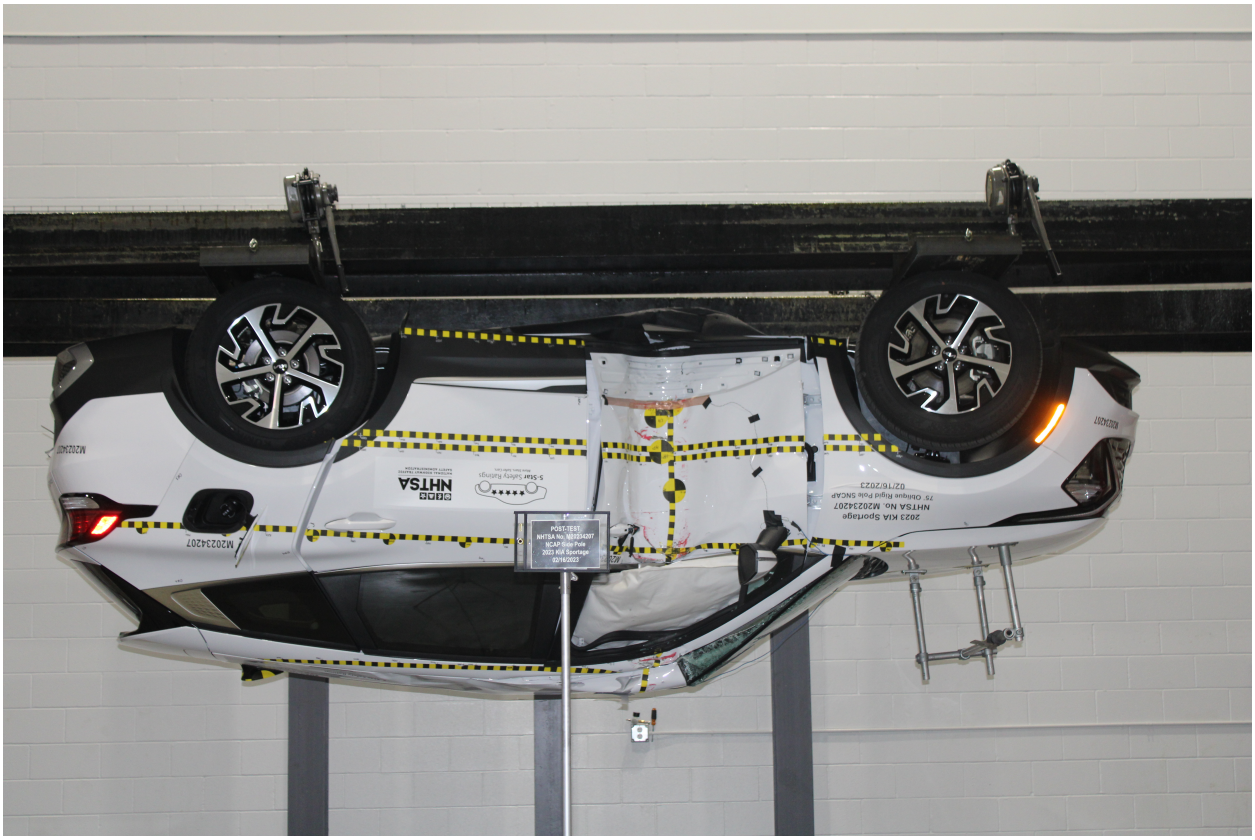


Figure A-67: FMVSS No. 301 Static Rollover 180 Degrees

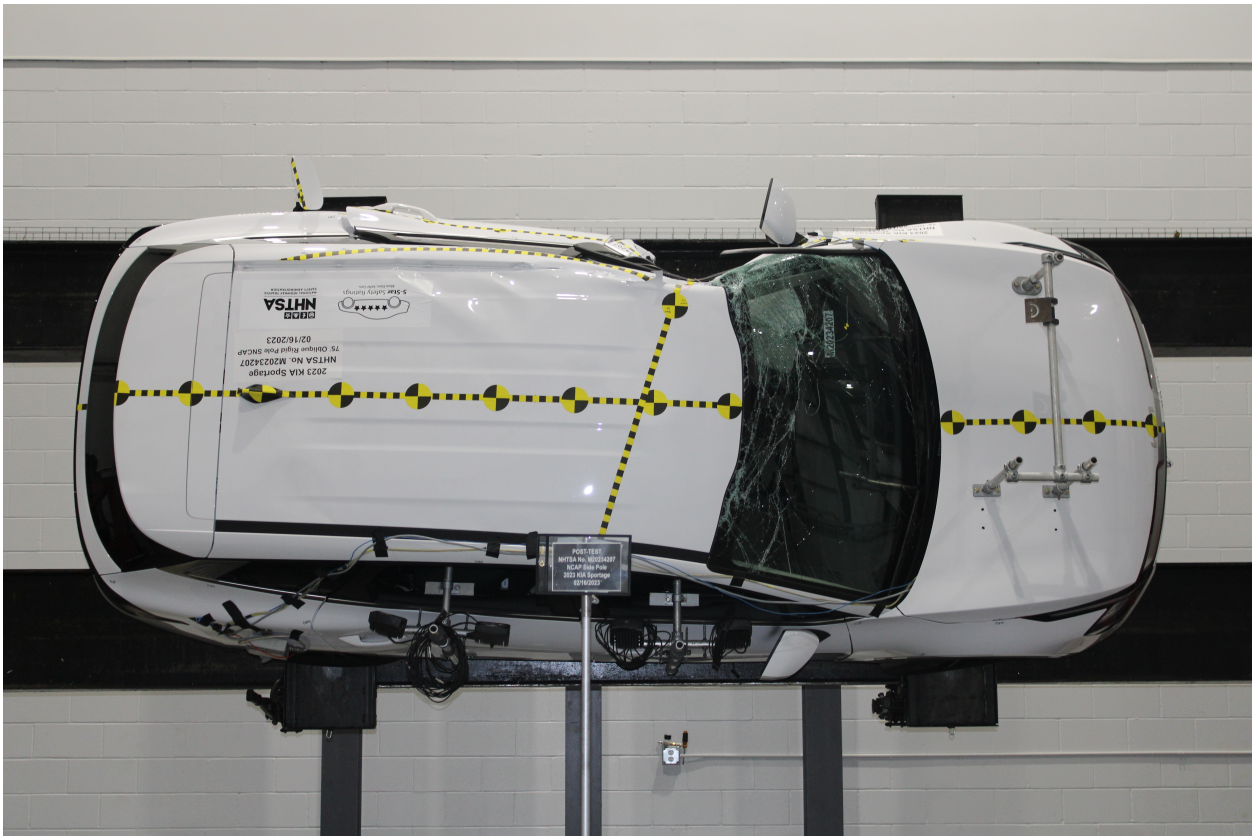


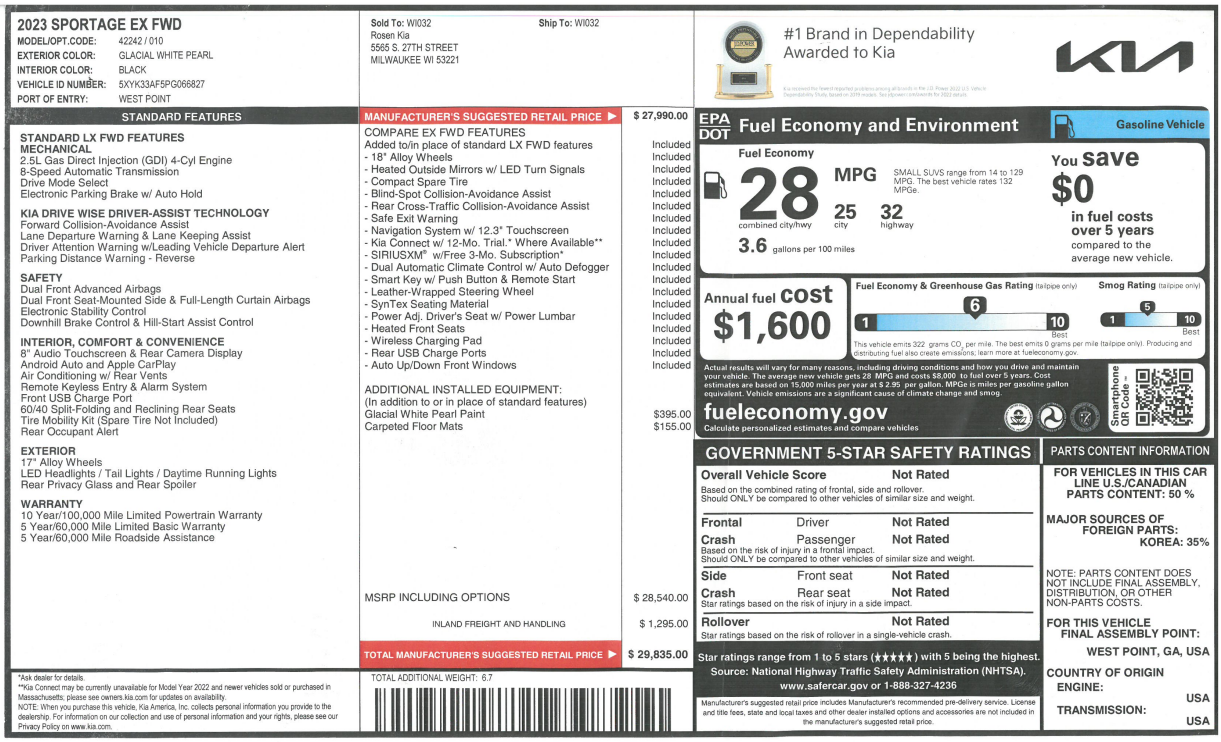
Figure A-68: FMVSS No. 301 Static Rollover 270 Degrees



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



Figure A-70: Impact Event



2023 SPORTAGE EX FWD
MODEL/OPT.CODE: 42242 / 010
EXTERIOR COLOR: GLACIAL WHITE PEARL
INTERIOR COLOR: BLACK
VEHICLE ID NUMBER: 5XYK33AF5PG066827
PORT OF ENTRY: WEST POINT

Sold To: WI032
Rosen Kia
5565 S. 27TH STREET
MILWAUKEE WI 53221

Ship To: WI032

#1 Brand in Dependability
Awarded to Kia

STANDARD FEATURES

STANDARD LX FWD FEATURES
MECHANICAL
2.5L Gas Direct Injection (GDI) 4-Cyl Engine
8-Speed Automatic Transmission
Drive Mode Select
Electronic Parking Brake w/ Auto Hold

KIA DRIVE WISE DRIVER-ASSIST TECHNOLOGY
Forward Collision-Avoidance Assist
Lane Departure Warning & Lane Keeping Assist
Driver Attention Warning w/Leading Vehicle Departure Alert
Parking Distance Warning - Reverse

SAFETY
Dual Front Advanced Airbags
Dual Front Seat-Mounted Side & Full-Length Curtain Airbags
Electronic Stability Control
Downhill Brake Control & Hill-Start Assist Control

INTERIOR, COMFORT & CONVENIENCE
8" Audio Touchscreen & Rear Camera Display
Android Auto and Apple CarPlay
Air Conditioning w/ Rear Vents
Remote Keyless Entry & Alarm System
Front USB Charge Port
60/40 Split-Folding and Reclining Rear Seats
Tire Mobility Kit (Spare Tire Not Included)
Rear Occupant Alert

EXTERIOR
17" Alloy Wheels
LED Headlights / Tail Lights / Daytime Running Lights
Rear Privacy Glass and Rear Spoiler

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

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

MANUFACTURER'S SUGGESTED RETAIL PRICE ▶	$ 27,990.00
COMPARE EX FWD FEATURES	
Added to/in place of standard LX FWD features	Included
- 18" Alloy Wheels	Included
- Heated Outside Mirrors w/ LED Turn Signals	Included
- Compact Spare Tire	Included
- Blind-Spot Collision-Avoidance Assist	Included
- Rear Cross-Traffic Collision-Avoidance Assist	Included
- Safe Exit Warning	Included
- Navigation System w/ 12.3" Touchscreen	Included
- Kia Connect w/ 12-Mo. Trial.* Where Available**	Included
- SIRIUSXM® w/Free 3-Mo. Subscription*	Included
- Dual Automatic Climate Control w/ Auto Defogger	Included
- Smart Key w/ Push Button & Remote Start	Included
- Leather-Wrapped Steering Wheel	Included
- SynTex Seating Material	Included
- Power Adj. Driver's Seat w/ Power Lumbar	Included
- Heated Front Seats	Included
- Wireless Charging Pad	Included
- Rear USB Charge Ports	Included
- Auto Up/Down Front Windows	Included
ADDITIONAL INSTALLED EQUIPMENT: (In addition to or in place of standard features)	
Glacial White Pearl Paint	$395.00
Carpeted Floor Mats	$155.00
MSRP INCLUDING OPTIONS	$ 28,540.00
INLAND FREIGHT AND HANDLING	$ 1,295.00
TOTAL MANUFACTURER'S SUGGESTED RETAIL PRICE ▶	$ 29,835.00

TOTAL ADDITIONAL WEIGHT: 6.7

EPA DOT Fuel Economy and Environment — Gasoline Vehicle

Fuel Economy
28 MPG combined city/hwy
25 city
32 highway
3.6 gallons per 100 miles
SMALL SUVS range from 14 to 129 MPG. The best vehicle rates 132 MPGe.

You save $0 in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost $1,600

Fuel Economy & Greenhouse Gas Rating (tailpipe only): 6 (1–10, Best)
Smog Rating (tailpipe only): 5 (1–10, Best)
This vehicle emits 322 grams CO_2 per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions; learn more at fueleconomy.gov.

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 28 MPG and costs $8,000 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at $ 2.95 per gallon. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fueleconomy.gov
Calculate personalized estimates and compare vehicles

Smartphone QR Code

GOVERNMENT 5-STAR SAFETY RATINGS

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

Frontal Crash: Driver Not Rated; Passenger Not Rated
Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.

Side Crash: Front seat Not Rated; Rear seat Not Rated
Star ratings based on the risk of injury in a side impact.

Rollover: Not Rated
Star ratings based on the risk of rollover in a single-vehicle crash.

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

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

PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS CAR LINE U.S./CANADIAN PARTS CONTENT: 50 %

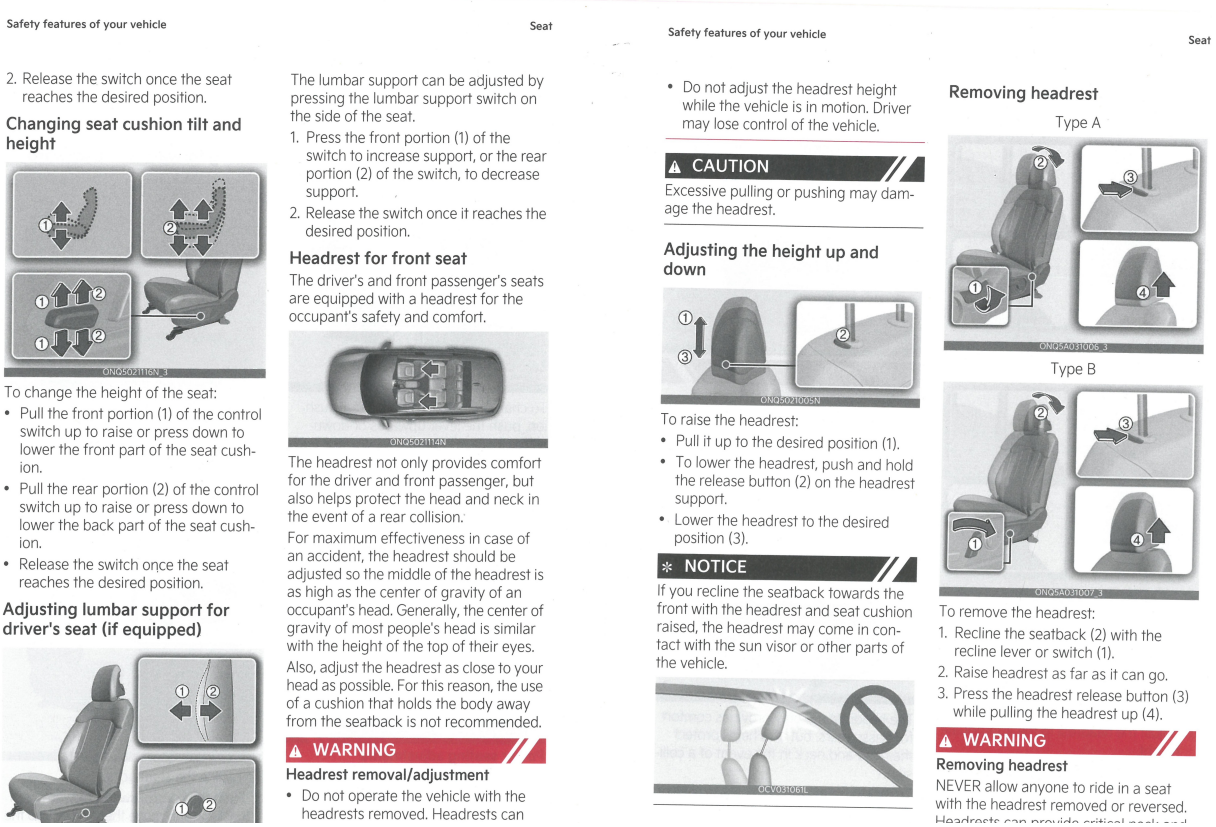
MAJOR SOURCES OF FOREIGN PARTS: KOREA: 35%

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

FOR THIS VEHICLE FINAL ASSEMBLY POINT: WEST POINT, GA, USA

COUNTRY OF ORIGIN
ENGINE: USA
TRANSMISSION: USA

Figure A-71: Monroney Label



Safety features of your vehicle — Seat

2. Release the switch once the seat reaches the desired position.

Changing seat cushion tilt and height

To change the height of the seat:
- Pull the front portion (1) of the control switch up to raise or press down to lower the front part of the seat cushion.
- Pull the rear portion (2) of the control switch up to raise or press down to lower the back part of the seat cushion.
- Release the switch once the seat reaches the desired position.

Adjusting lumbar support for driver's seat (if equipped)

The lumbar support can be adjusted by pressing the lumbar support switch on the side of the seat.
1. Press the front portion (1) of the switch to increase support, or the rear portion (2) of the switch, to decrease support.
2. Release the switch once it reaches the desired position.

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 as high as 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

Safety features of your vehicle — Seat

- 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

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

✻ NOTICE

If you 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

Type A

Type B

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

Removing headrest

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

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



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

APPENDIX B
VEHICLE & DUMMY RESPONSE DATA TRACES

Table of Data Plots
Driver Dummy Instrumentation Plots

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

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

Additional Driver Dummy Instrumentation Data

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

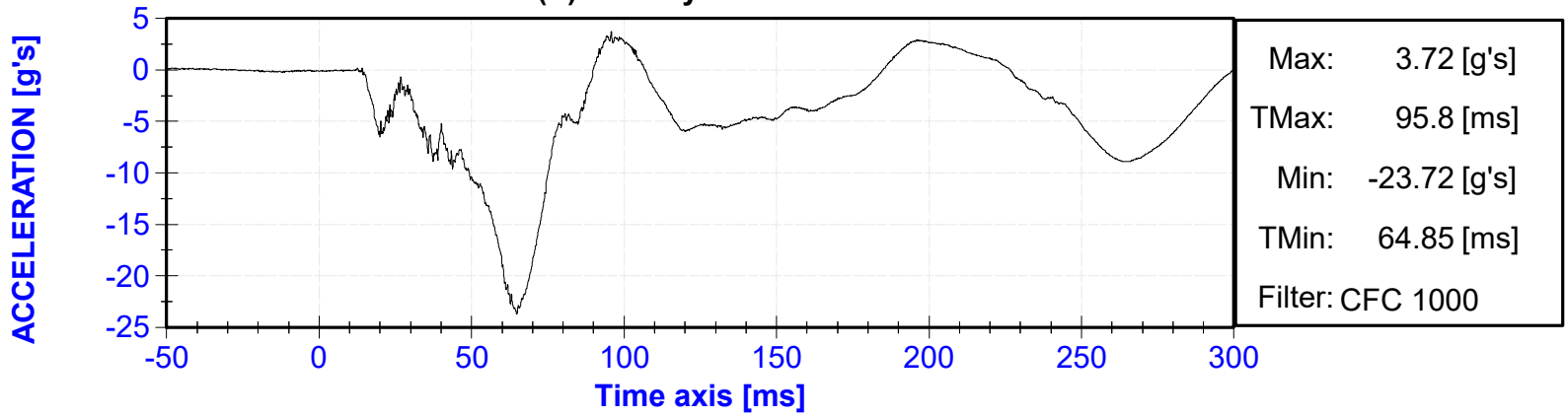
Vehicle Instrumentation Data

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

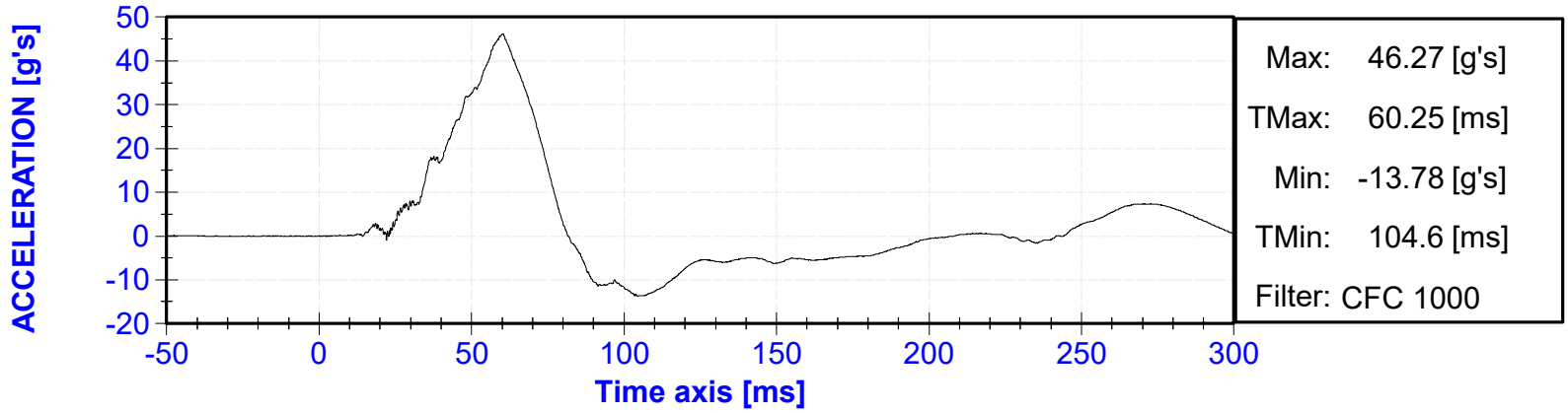
Pole Instrumentation Data

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

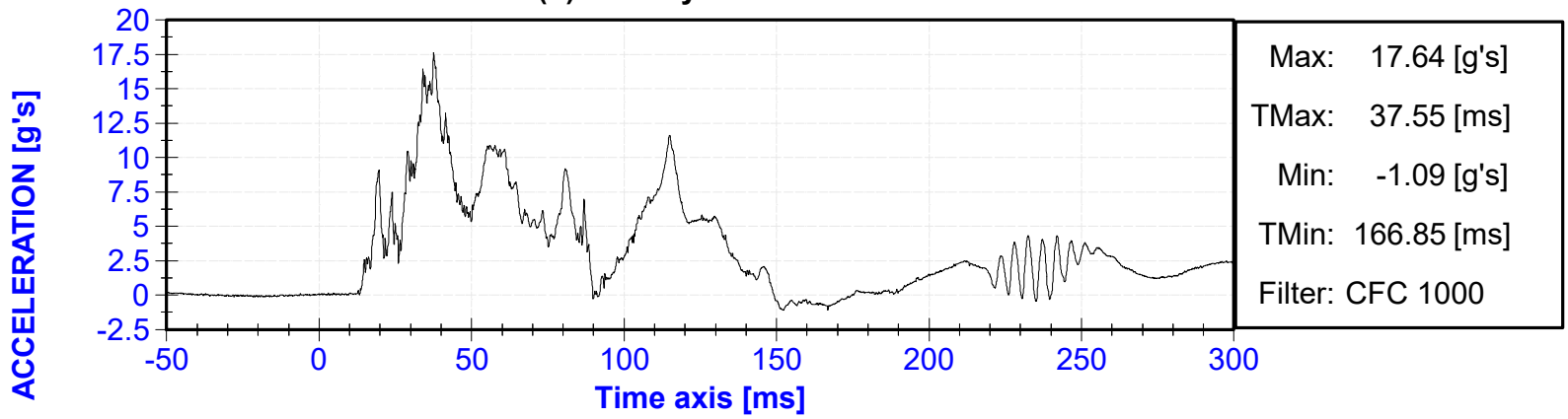
Driver Head Acceleration (X) Primary vs. Time



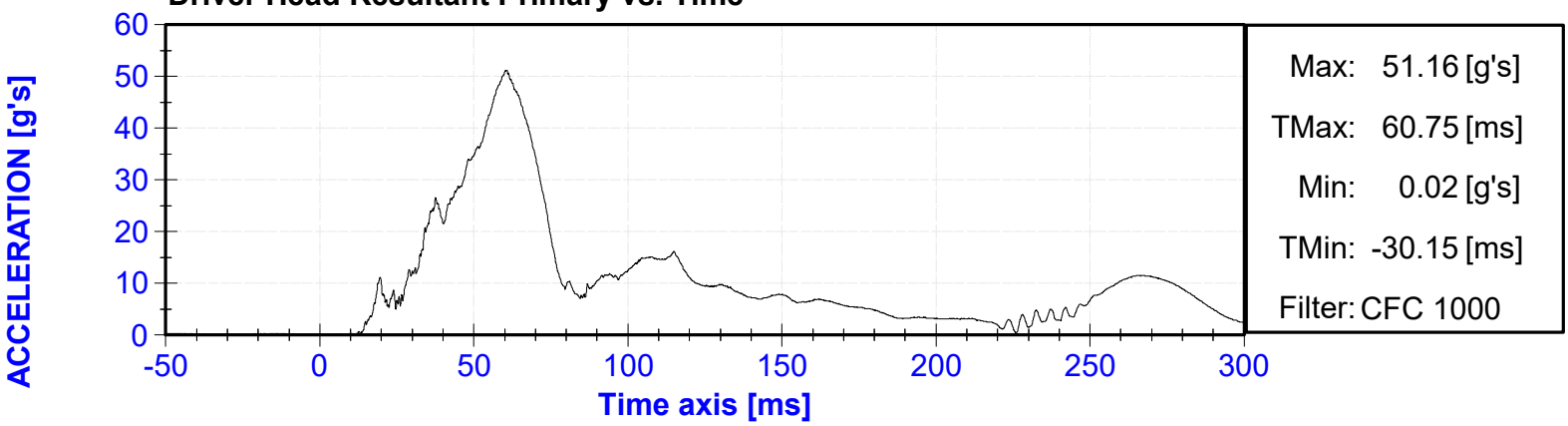
Driver Head Acceleration (Y) Primary vs. Time



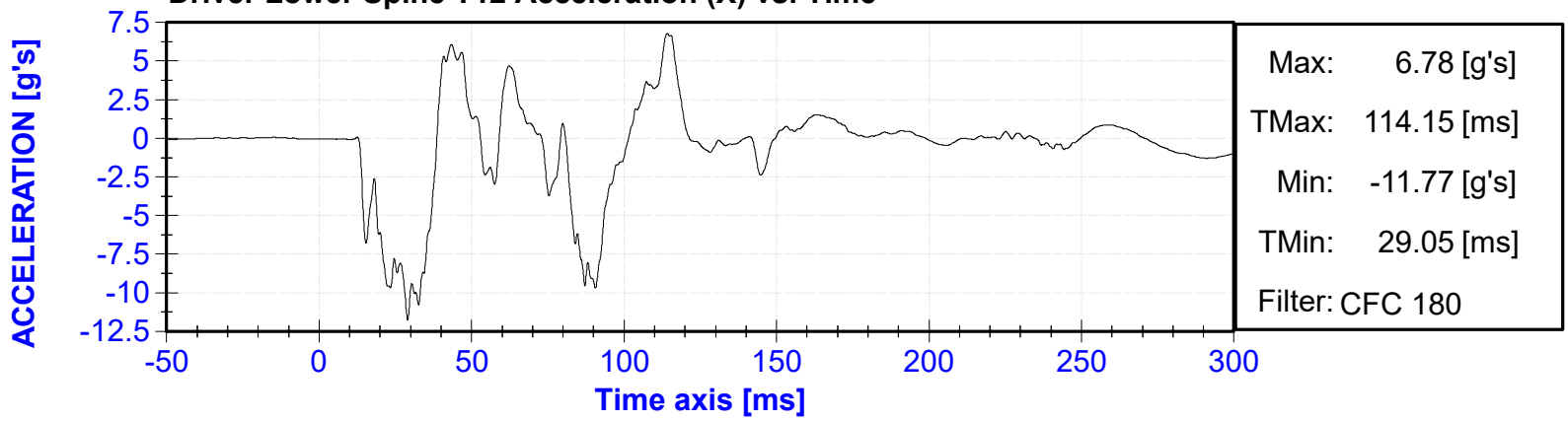
Driver Head Acceleration (Z) Primary vs. Time



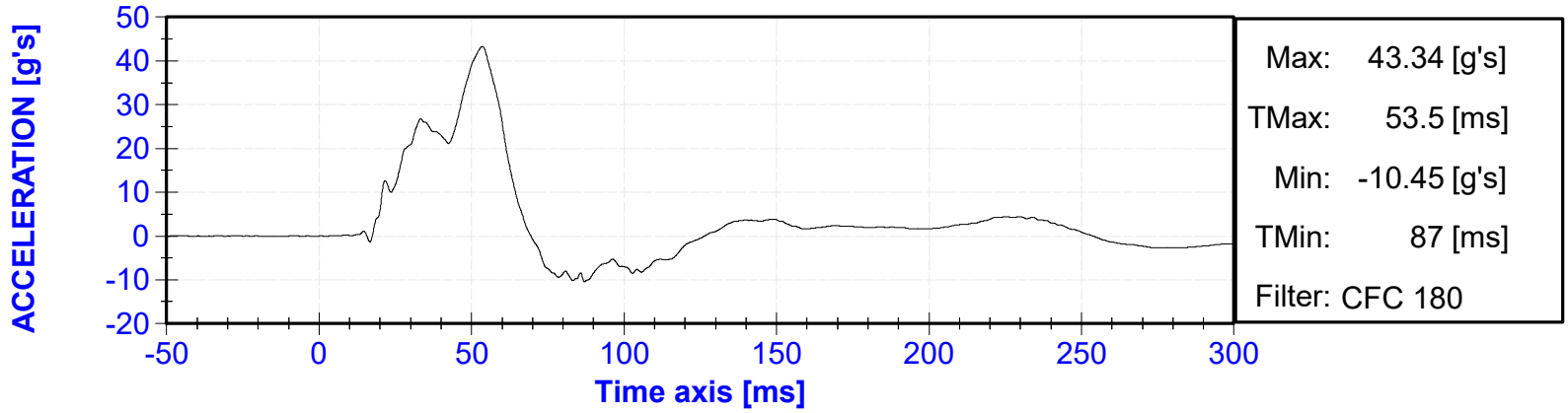
Driver Head Resultant Primary vs. Time



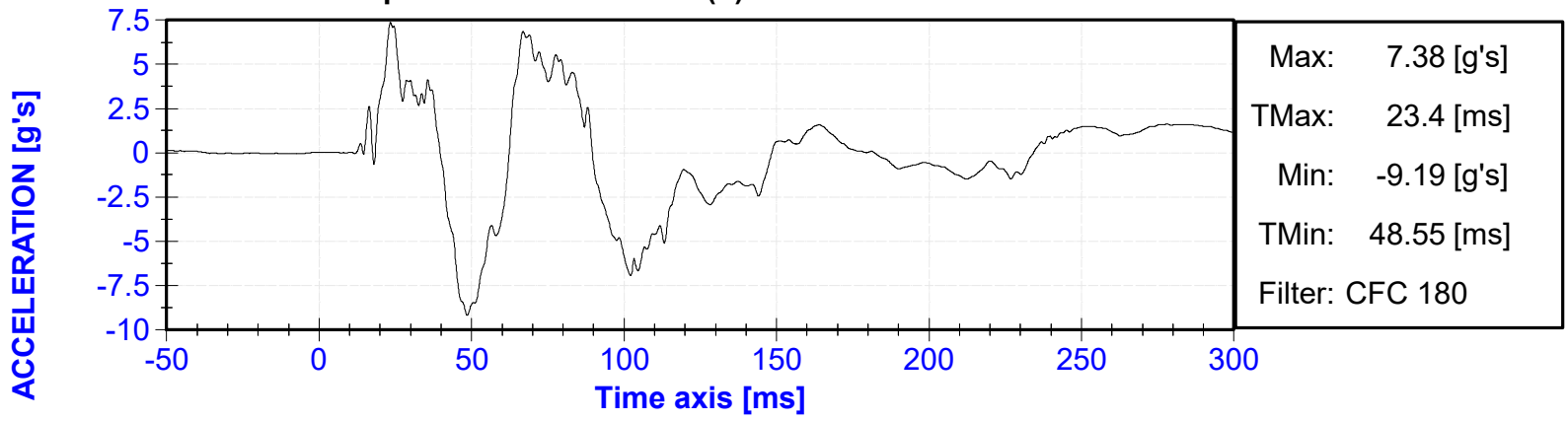
Driver Lower Spine T12 Acceleration (X) vs. Time



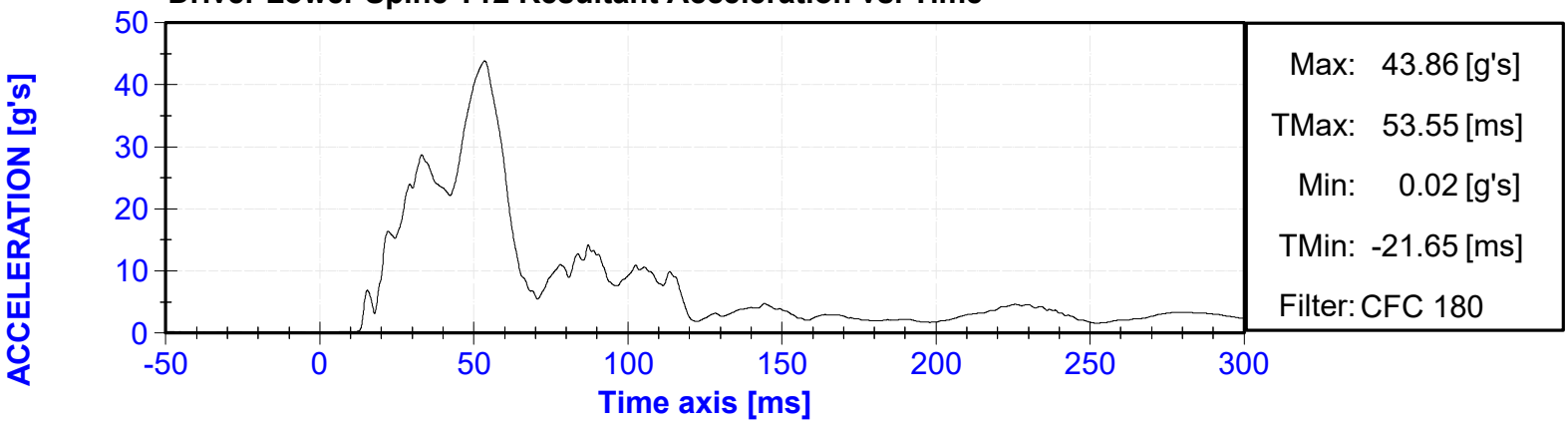
Driver Lower Spine T12 Acceleration (Y) vs. Time



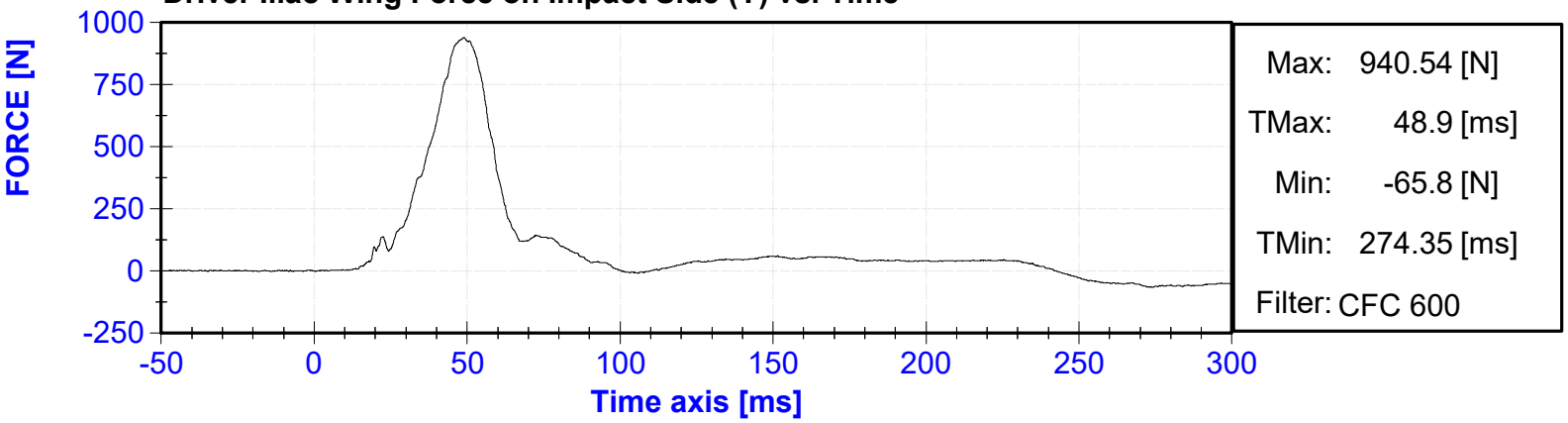
Driver Lower Spine T12 Acceleration (Z) vs. Time



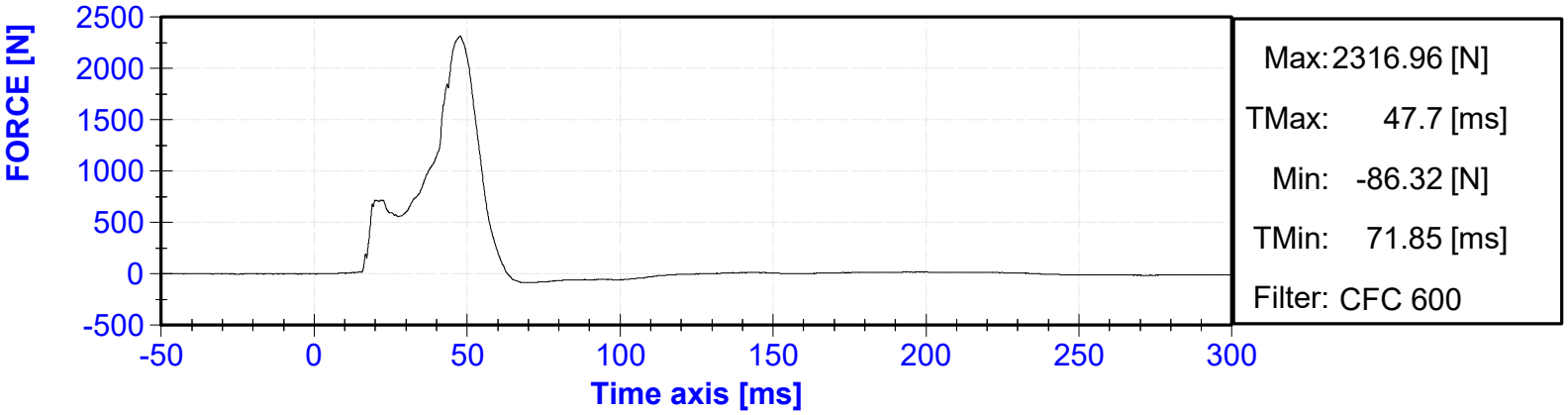
Driver Lower Spine T12 Resultant Acceleration vs. Time



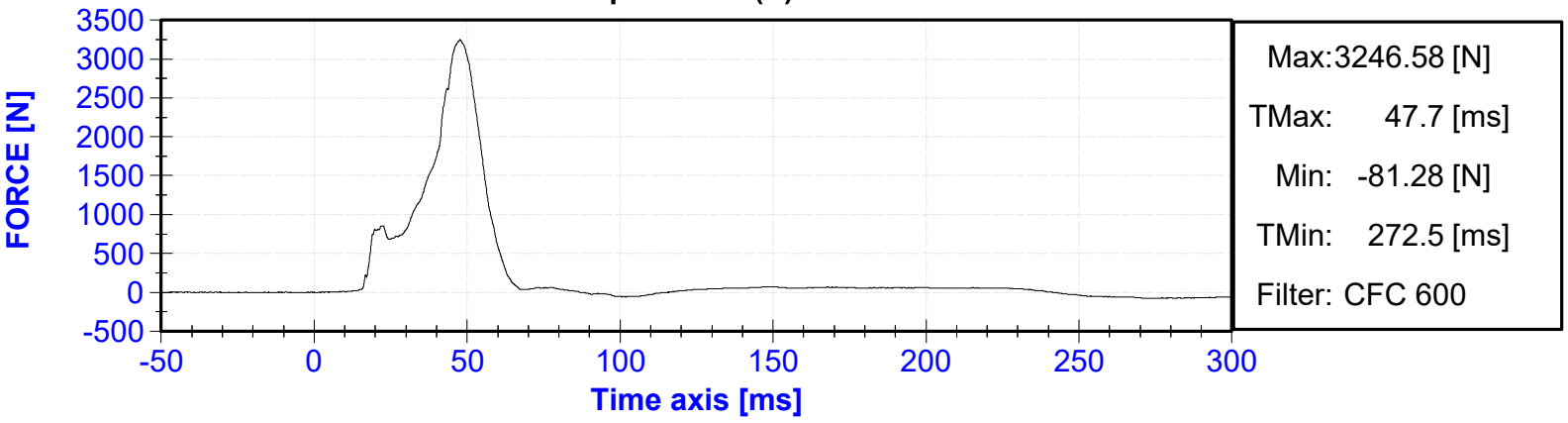
Driver Iliac Wing Force on Impact Side (Y) vs. Time



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



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



APPENDIX C

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

SID-IIS 5TH PERCENTILE FEMALE - DRIVER ATD

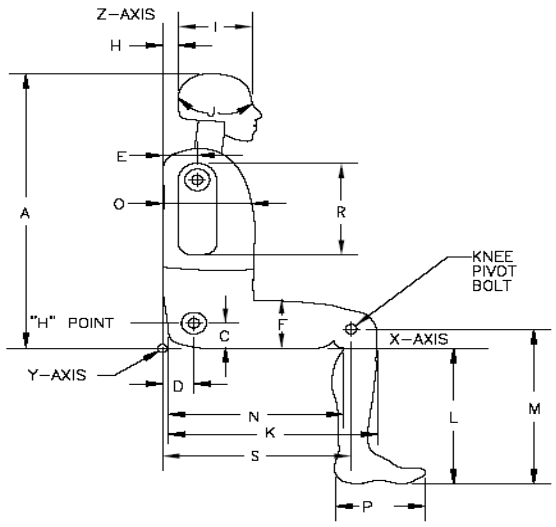
SERIAL NO:300

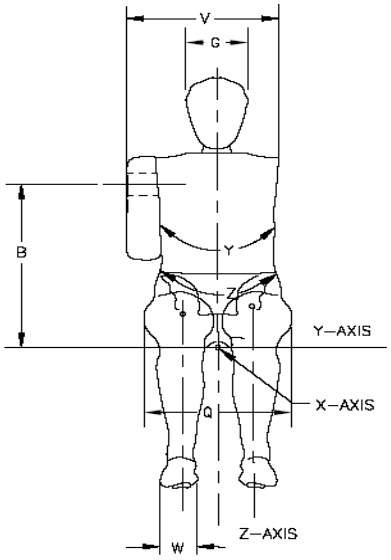
(CONFIGURED FOR LEFT SIDE IMPACT)

External Measurements - SID-IIs

Technician: K. Brogan Date: 02/13/2023

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	84	Pass
D	H-point from seatback	141	151	145	Pass
E	Shoulder Pivot from Backline	97	107	103	Pass
F	Thigh Clearance	119	135	122	Pass
G	Head Breadth	140	148	144	Pass
H	Head Back from Backline	40	46	42	Pass
I	Head Depth	178	188	184	Pass
J	Head Circumference	541	551	547	Pass
K	Buttock to Knee Length	514	540	529	Pass
L	Popliteal Height	343	369	357	Pass
M	Knee Pivot to floor height	392	409	402	Pass
N	Buttock Popliteal Length	416	442	432	Pass
O	Chest Depth w/o jacket	195	211	200	Pass
P	Foot Length	216	232	223	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	318	Pass
R	Arm Length	249	259	253	Pass
S	Knee Joint to seatback	477	493	488	Pass
V	Shoulder Width	341	357	350	Pass
W	Foot Width	78	94	85	Pass
Y	Chest Circumference w/jacket	851	881	878	Pass
Z	Waist Circumference	761	791	777	Pass

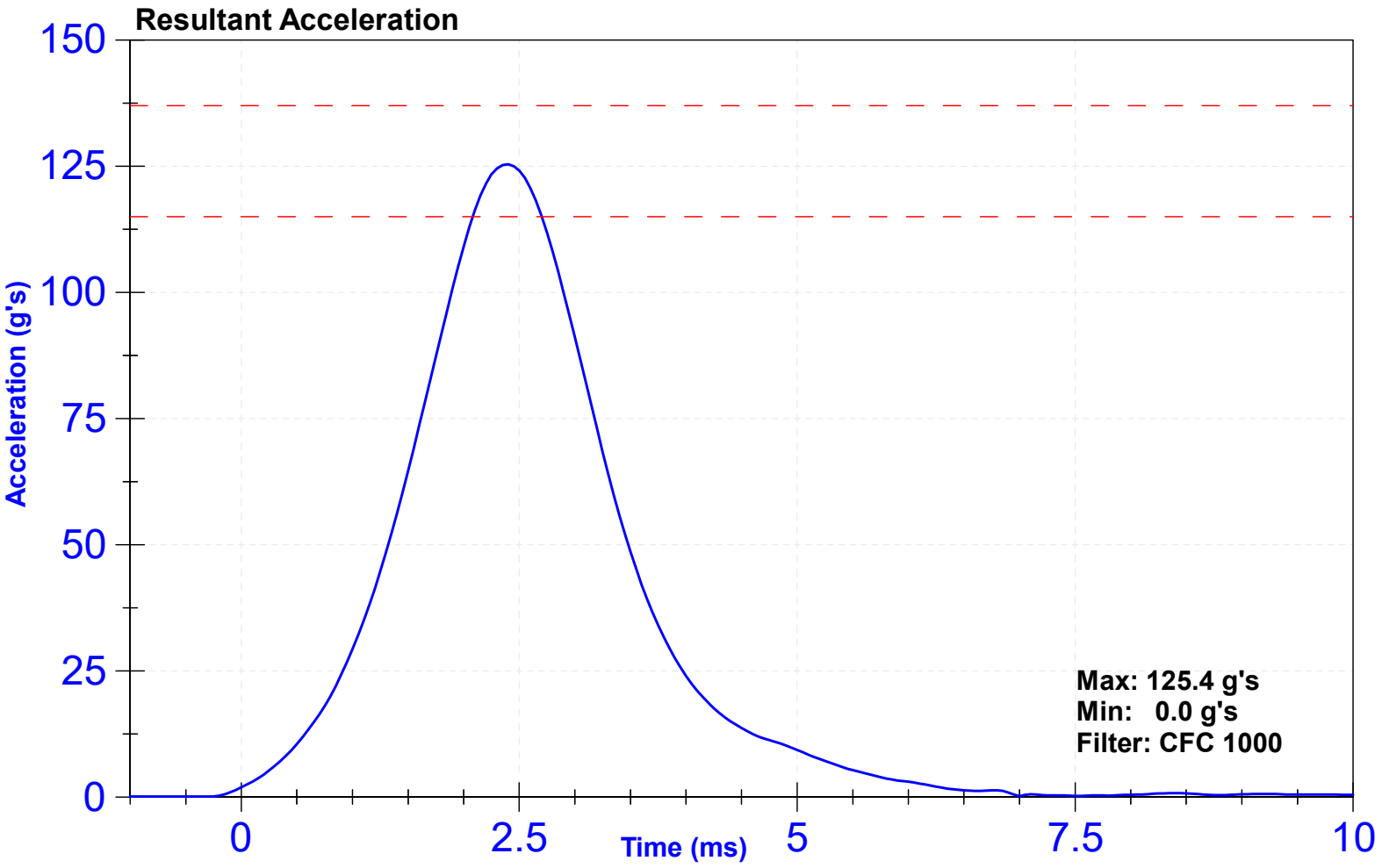
ATD Manufacturer	FTSS	Test Technician	T. Roseman
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

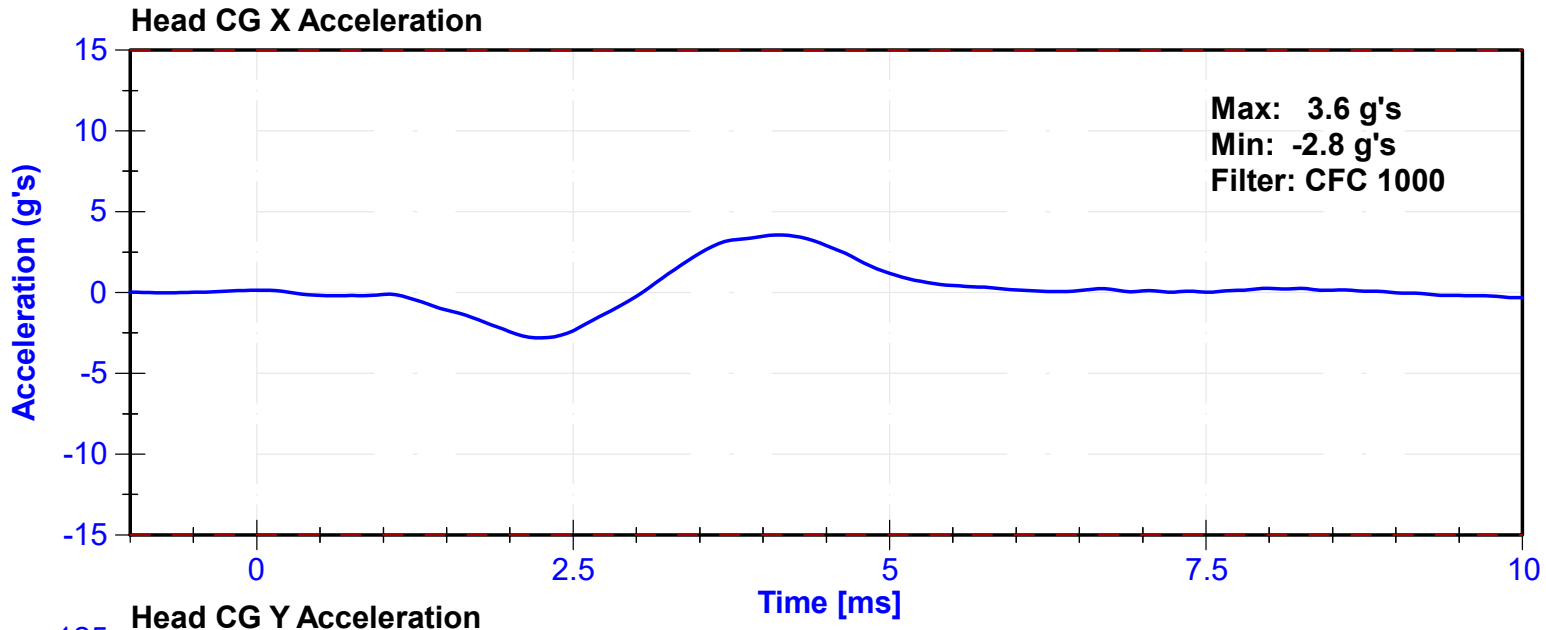
Results

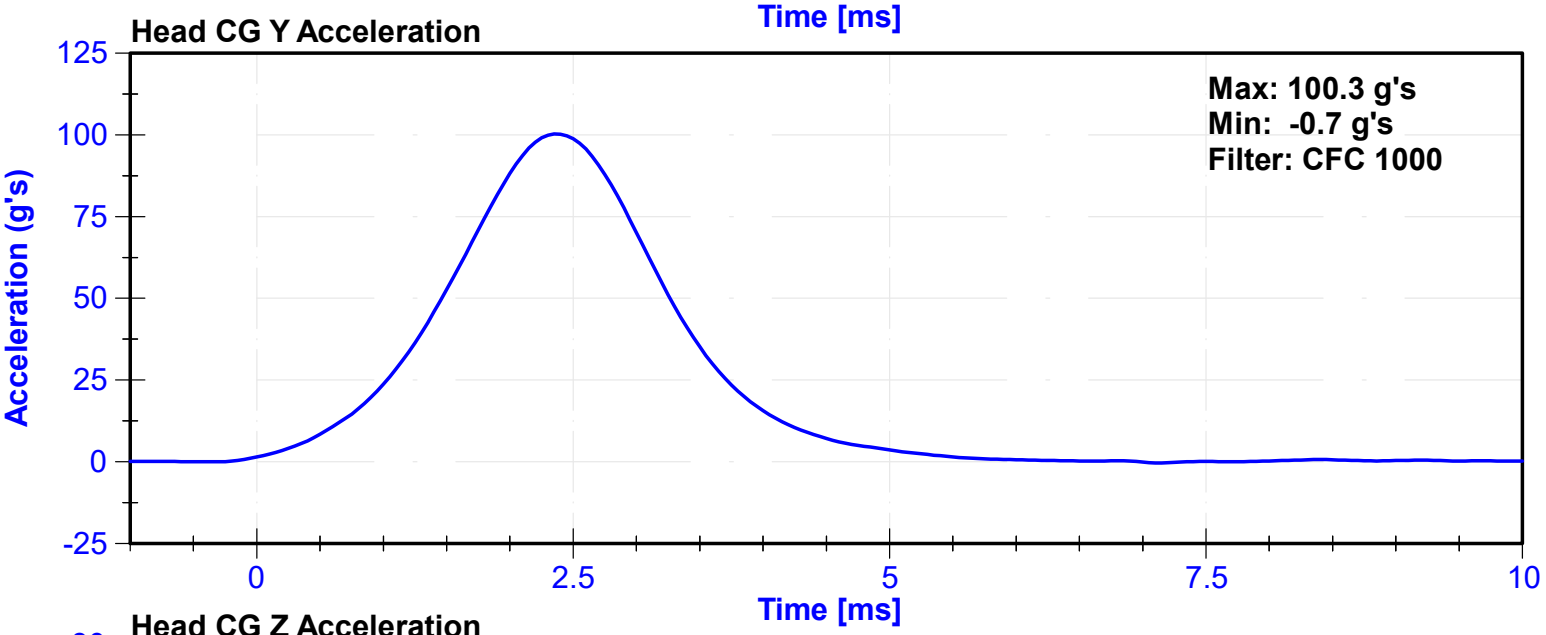
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.8	Pass
Humidity	10	70	%	22.5	Pass
Resultant Acceleration	115	137	g's	125.4	Pass
Oscillation	0	15	%	1.0	Pass
Fore-Aft Acceleration	-15	15	g's	3.6	Pass

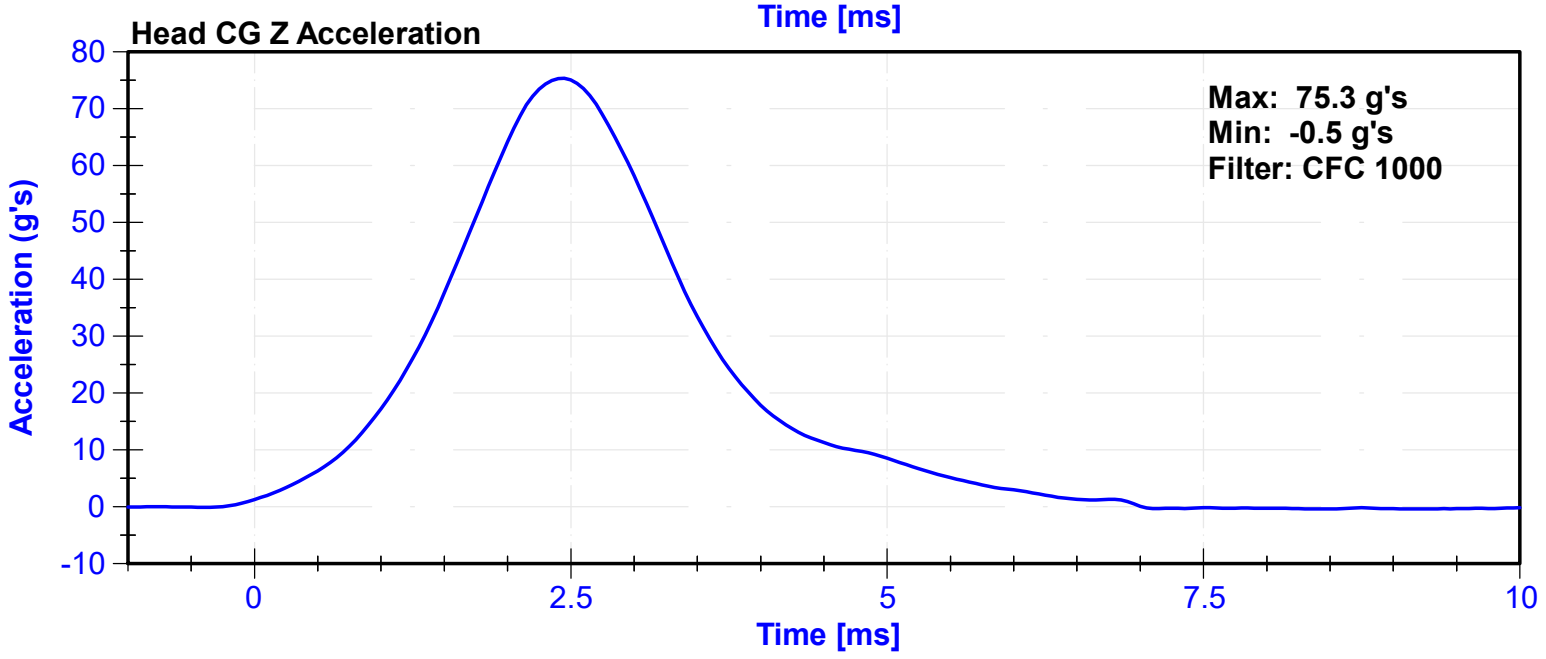
Transducer Calibrations

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




Head CG X Acceleration
Max: 3.6 g's
Min: -2.8 g's
Filter: CFC 1000
Acceleration (g's)
Time [ms]


Head CG Y Acceleration
Max: 100.3 g's
Min: -0.7 g's
Filter: CFC 1000
Acceleration (g's)
Time [ms]


Head CG Z Acceleration
Max: 75.3 g's
Min: -0.5 g's
Filter: CFC 1000
Acceleration (g's)
Time [ms]

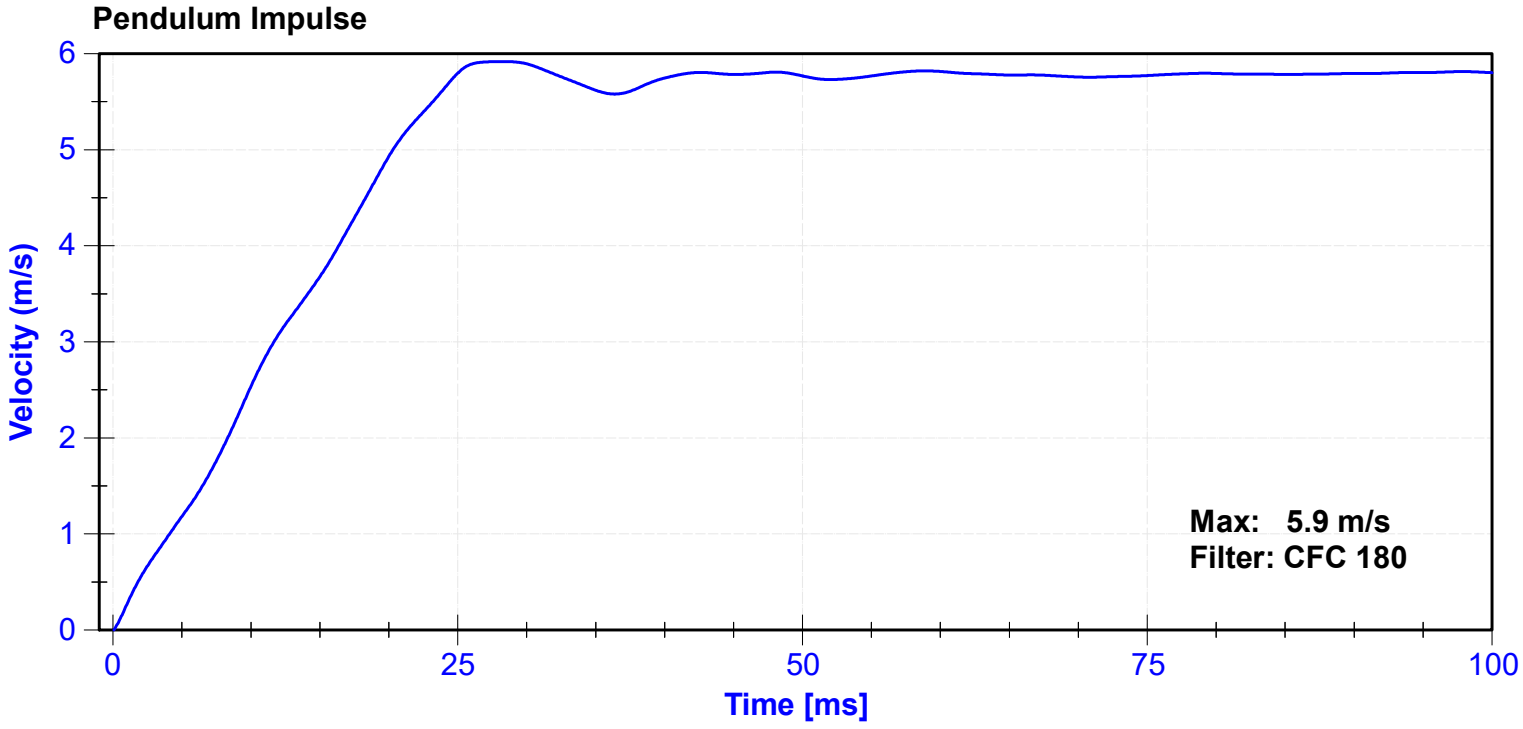
ATD Manufacturer	FTSS	Test Technician	D. Sakona
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

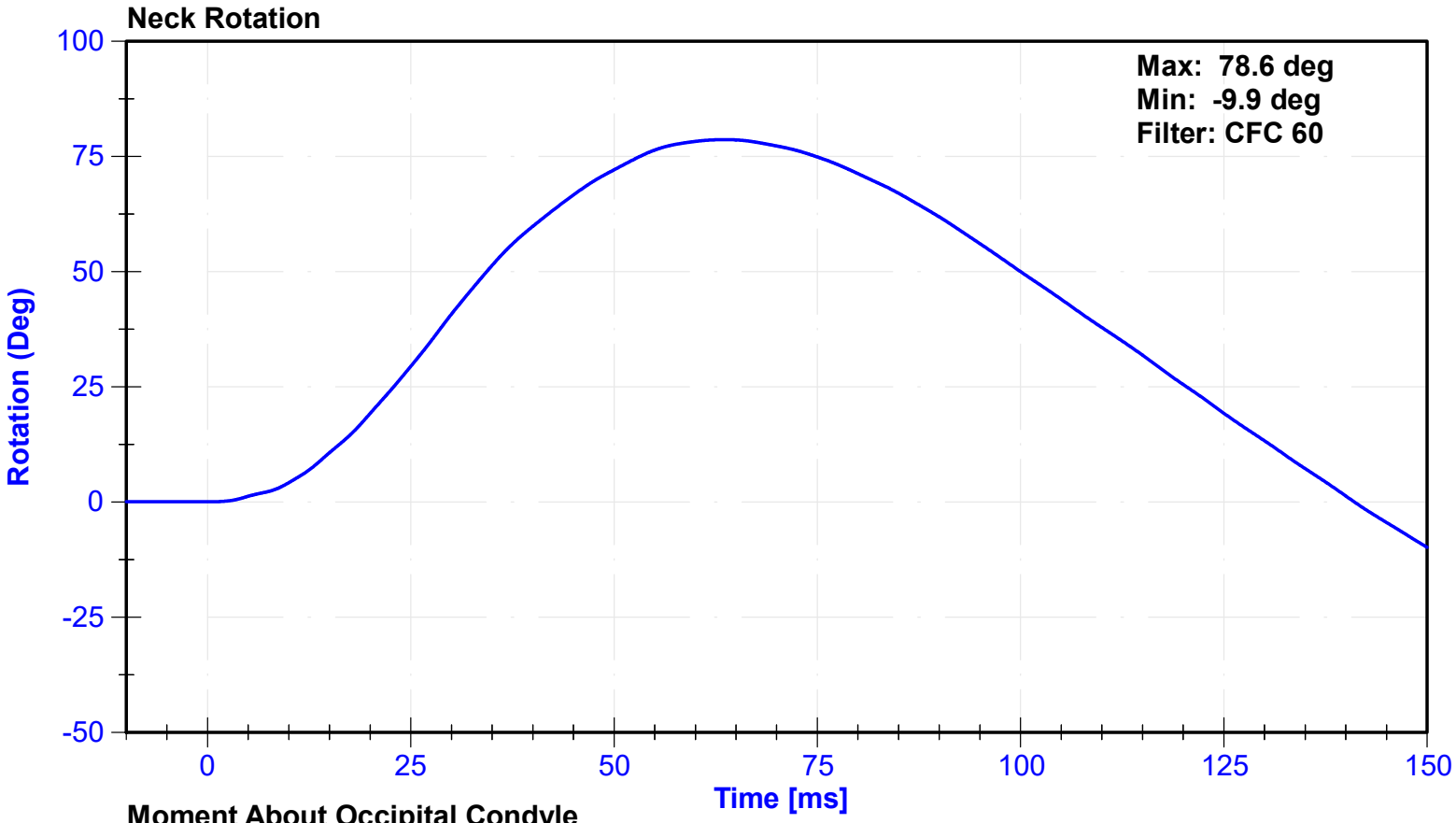
Results

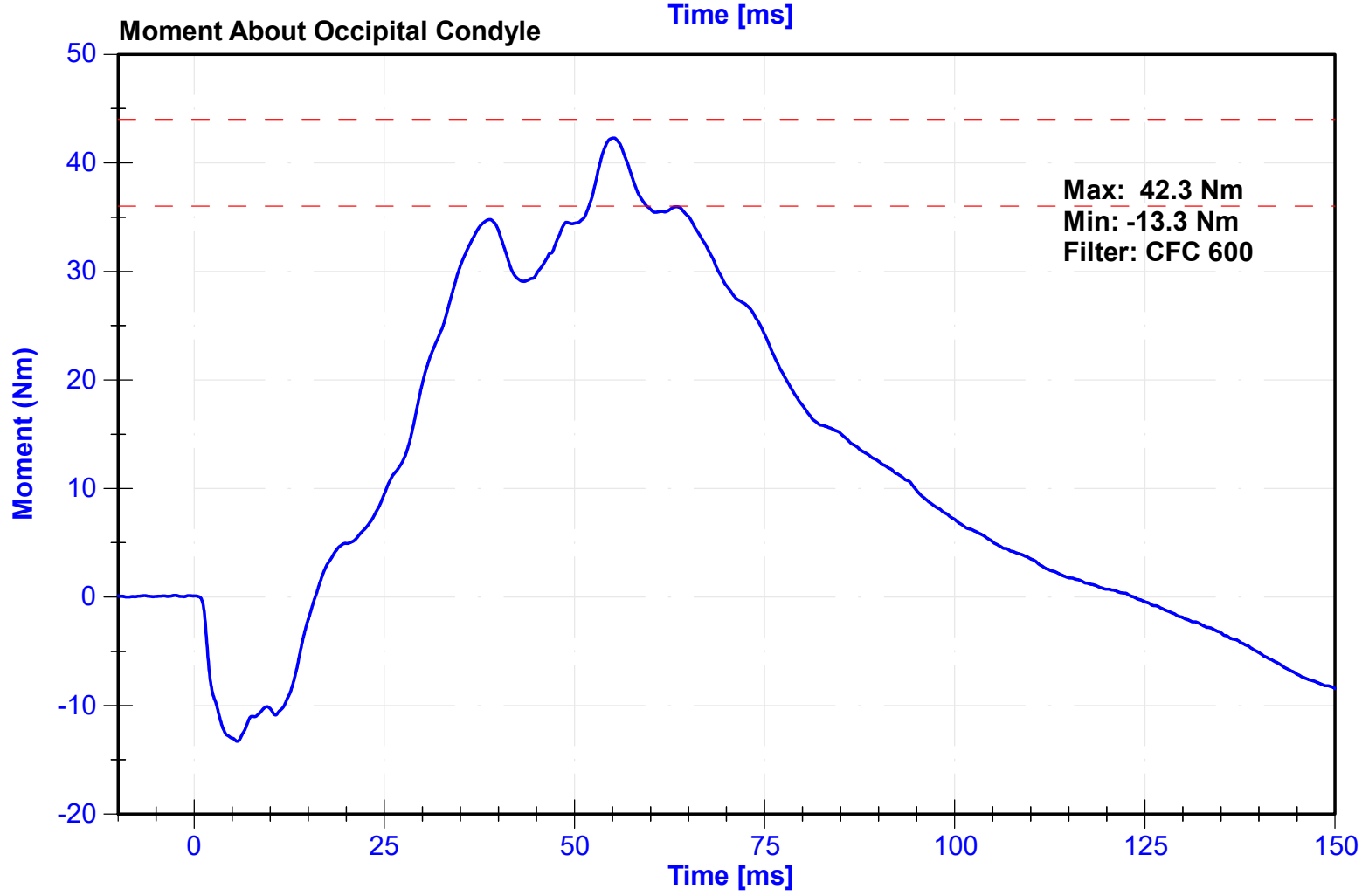
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.2	Pass
Humidity	10	70	%	19.5	Pass
Velocity	5.51	5.63	m/s	5.593	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.54	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.68	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.93	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.80	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.92	Pass
Neck Rotation	71	81	deg	78.6	Pass
Time at Maximum Rotation	50	70	ms	63.6	Pass
Moment about the OC	36	44	Nm	42.3	Pass
Moment Decay to 0 Nm	102	126	ms	123.5	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	Humanetics	1716A_1872-FY	6/13/2022	6/13/2023




Neck Rotation
Max: 78.6 deg
Min: -9.9 deg
Filter: CFC 60
Rotation (Deg)
100
75
50
25
0
-25
-50
0
25
50
75
100
125
150
Time [ms]


Moment About Occipital Condyle
Max: 42.3 Nm
Min: -13.3 Nm
Filter: CFC 600
Moment (Nm)
50
40
30
20
10
0
-10
-20
0
25
50
75
100
125
150
Time [ms]

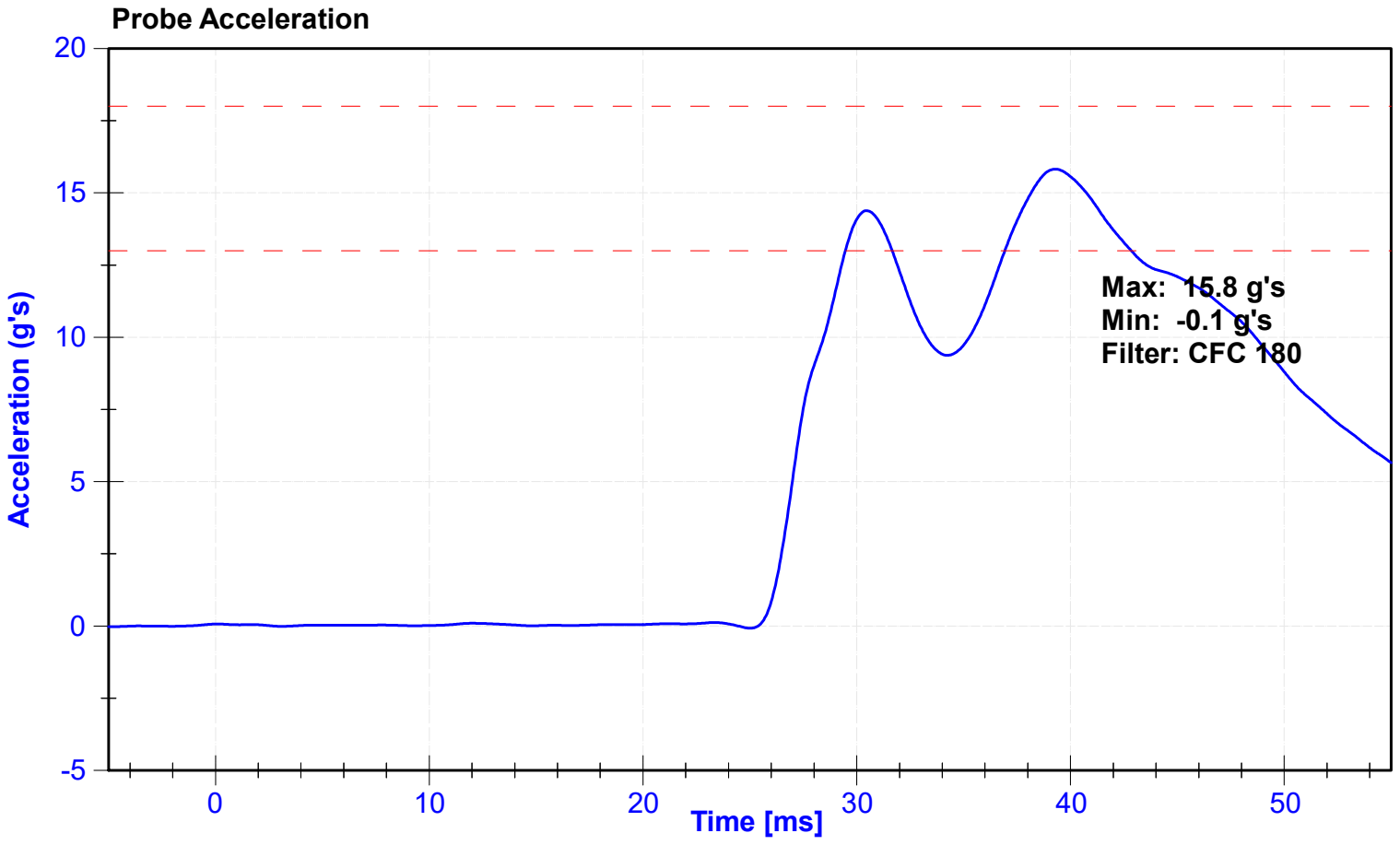
ATD Manufacturer	FTSS	Test Technician	D. Sakona
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

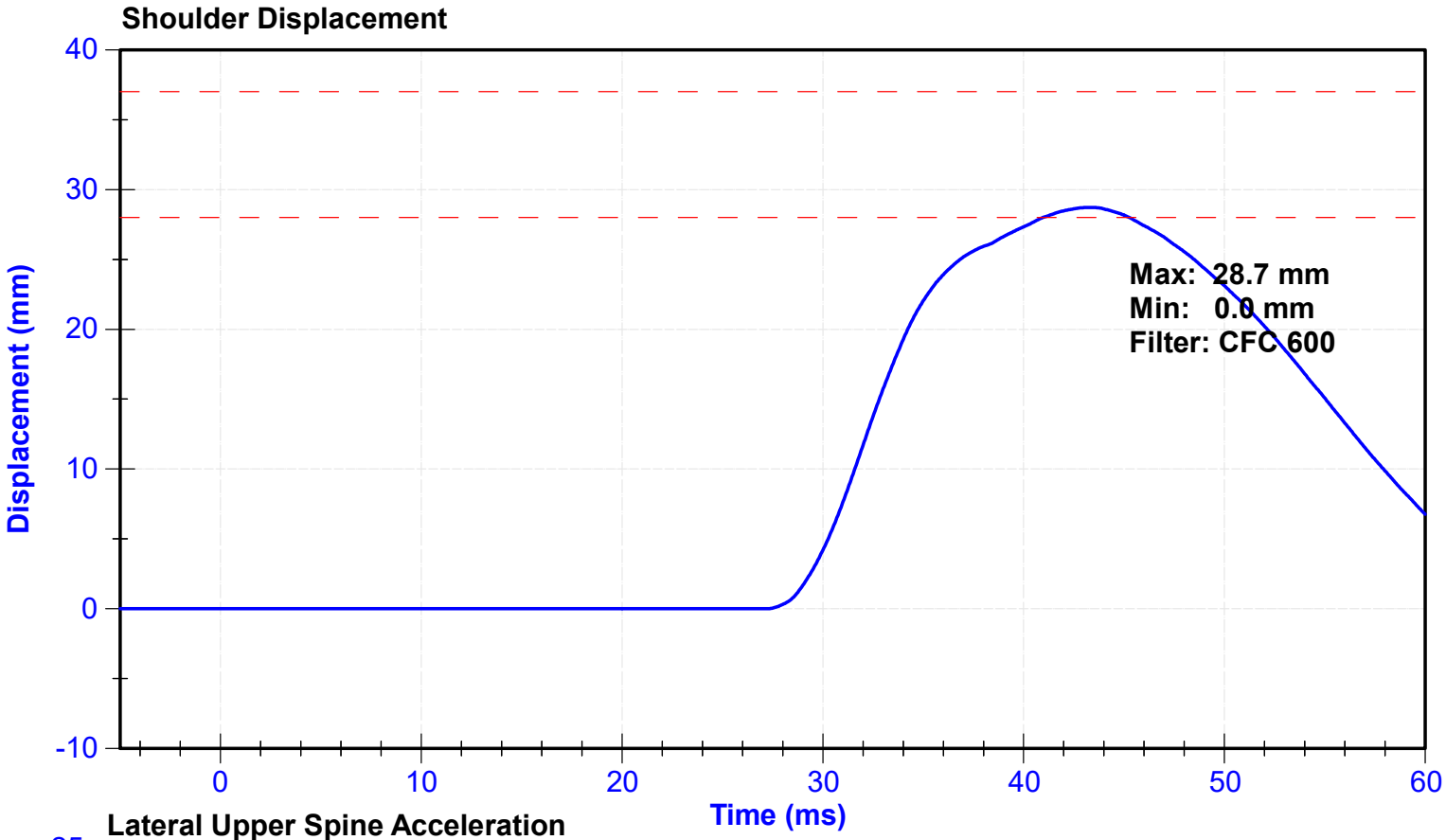
Results

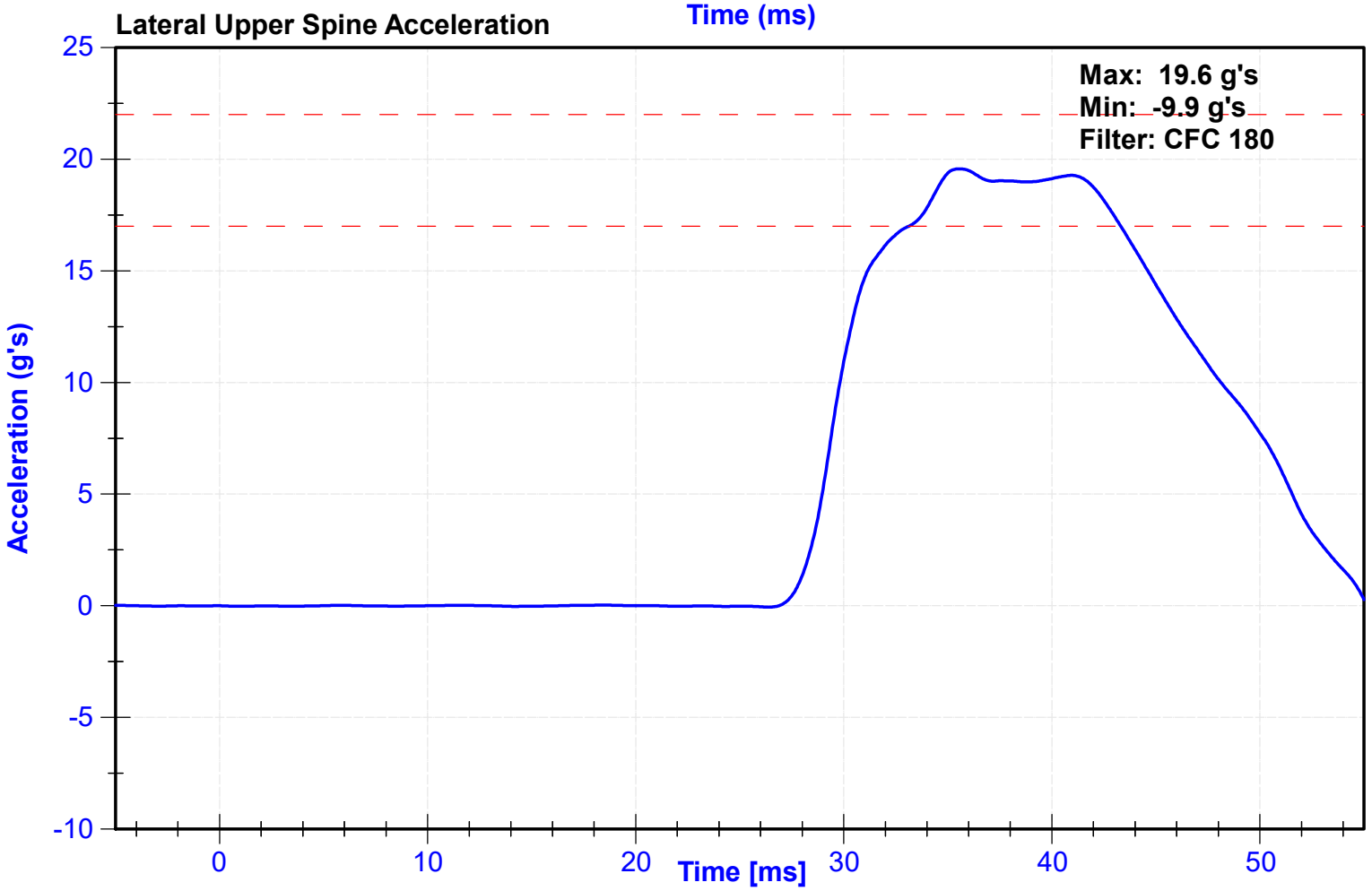
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.2	Pass
Humidity	10	70	%	19.5	Pass
Velocity	4.2	4.4	m/s	4.33	Pass
Probe Acceleration	13	18	g's	15.8	Pass
Shoulder Deflection	28	37	mm	28.7	Pass
Lateral Upper Spine Acceleration	17	22	g's	19.6	Pass

Transducer Calibrations

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




Shoulder Displacement
Displacement (mm)
40
30
20
10
0
-10
0
10
20
30
40
50
60
Time (ms)
Max: 28.7 mm
Min: 0.0 mm
Filter: CFC 600


Lateral Upper Spine Acceleration
Acceleration (g's)
25
20
15
10
5
0
-5
-10
0
10
20
30
40
50
Time [ms]
Max: 19.6 g's
Min: -9.9 g's
Filter: CFC 180

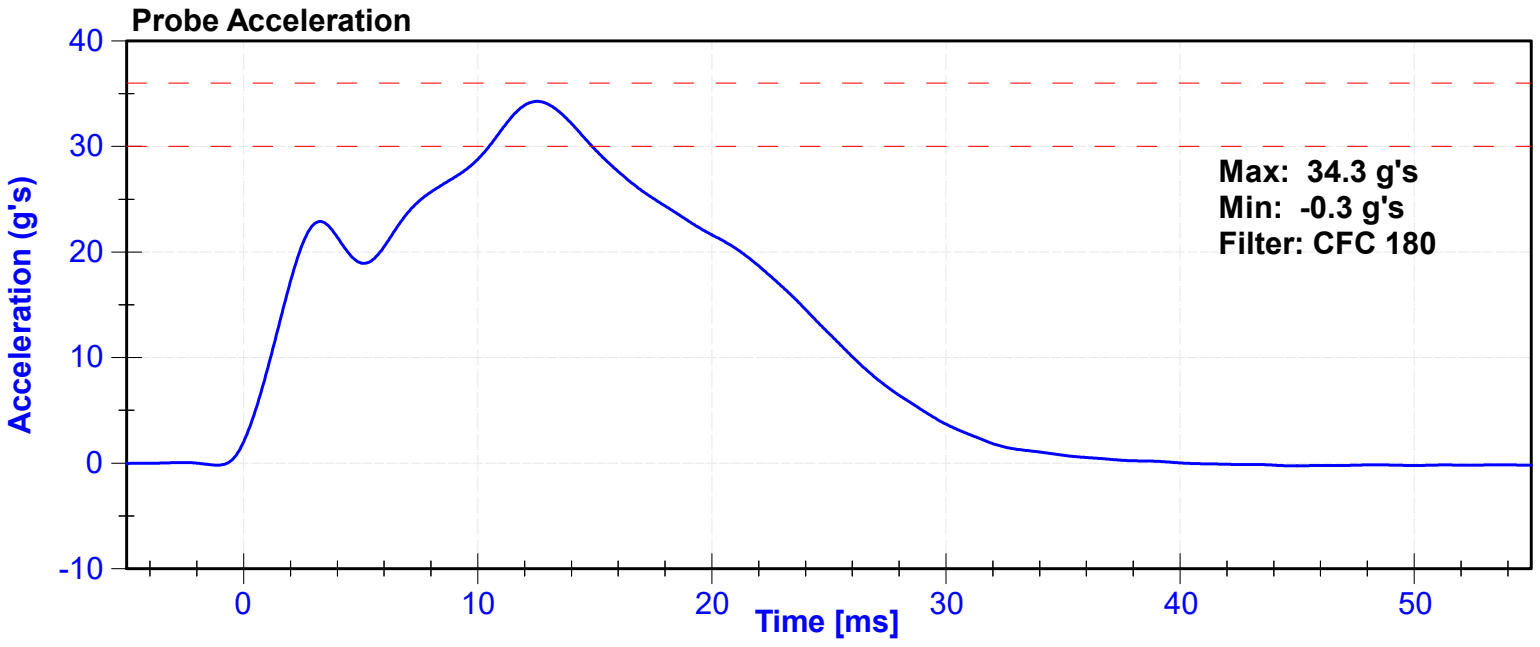
ATD Manufacturer	FTSS	Test Technician	D. Sakona
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

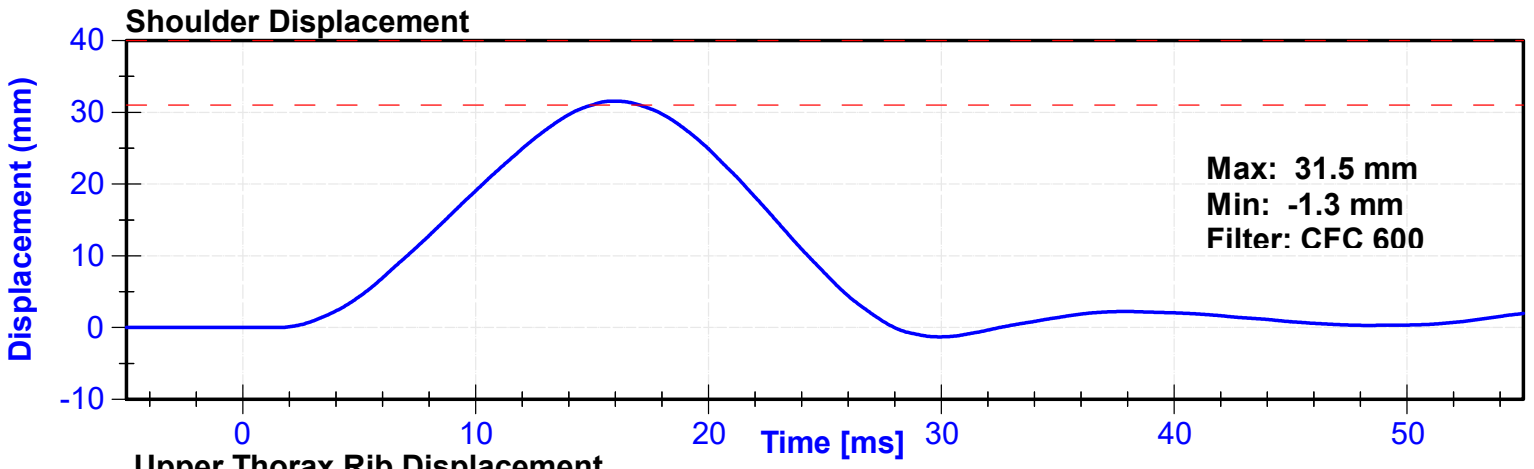
Results

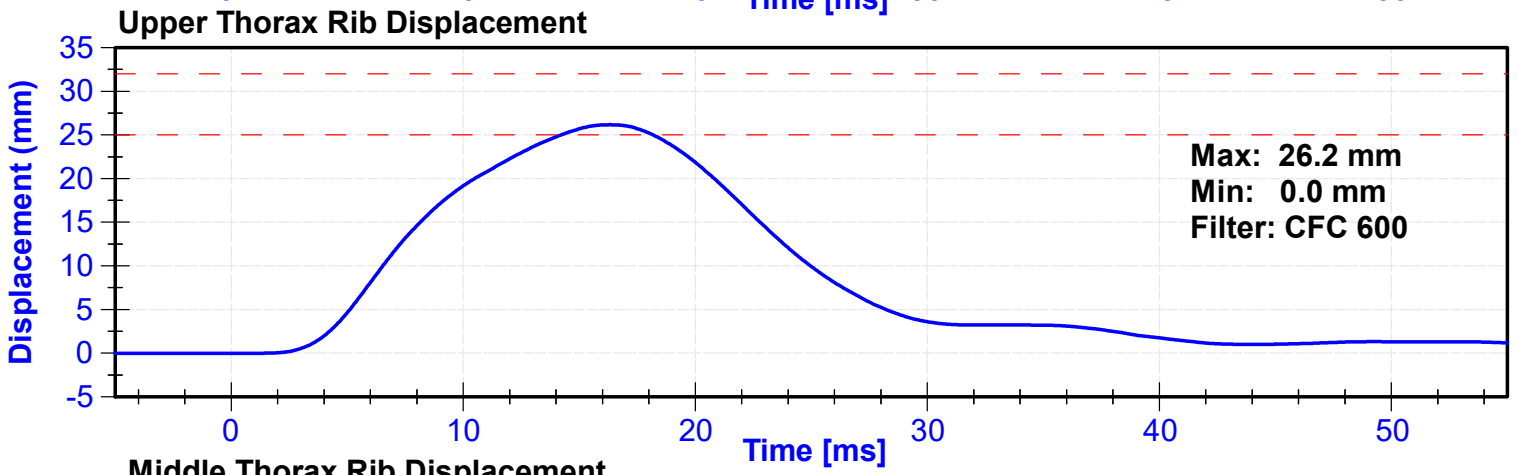
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.2	Pass
Humidity	10	70	%	19.5	Pass
Velocity	6.6	6.8	m/s	6.67	Pass
Probe Acceleration after 5 ms	30	36	g's	34.3	Pass
Lateral Upper Spine Acceleration	34	43	g's	37.1	Pass
Lateral Lower Spine Acceleration	29	37	g's	32.9	Pass
Shoulder Deflection	31	40	mm	31.5	Pass
Upper Thorax Rib Deflection	25	32	mm	26.2	Pass
Mid Thorax Rib Deflection	30	36	mm	30.8	Pass
Lower Thorax Rib Deflection	32	38	mm	33.4	Pass

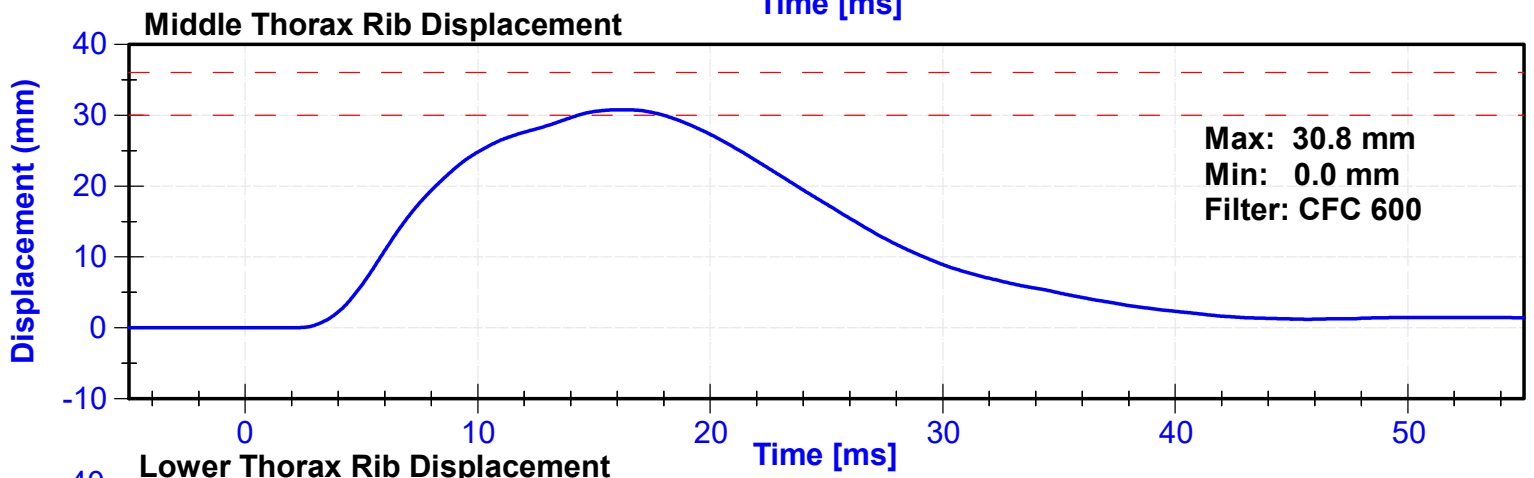
Transducer Calibrations

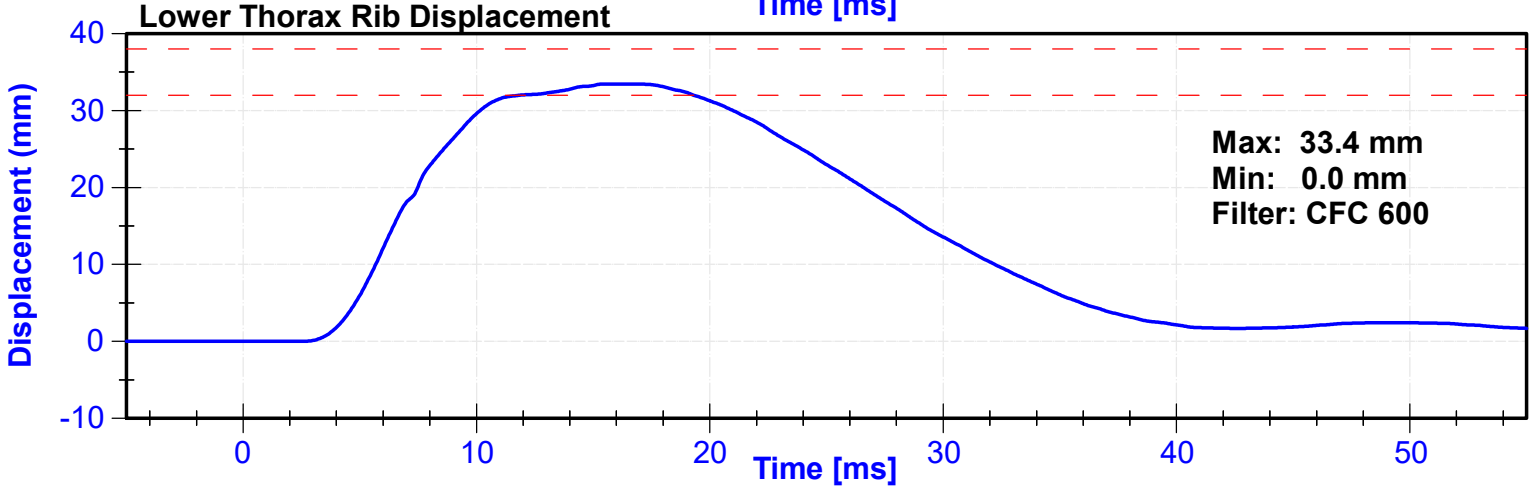
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	P51736	10/25/2022	10/25/2023
Upper Spine T1 Y Accelerometer	Endevco	T20880	10/3/2022	4/1/2023
Upper Spine T12 Y Accelerometer	Endevco	P52071	10/3/2022	4/1/2023
Shoulder Potentiometer	Servo	053GFE	10/4/2022	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

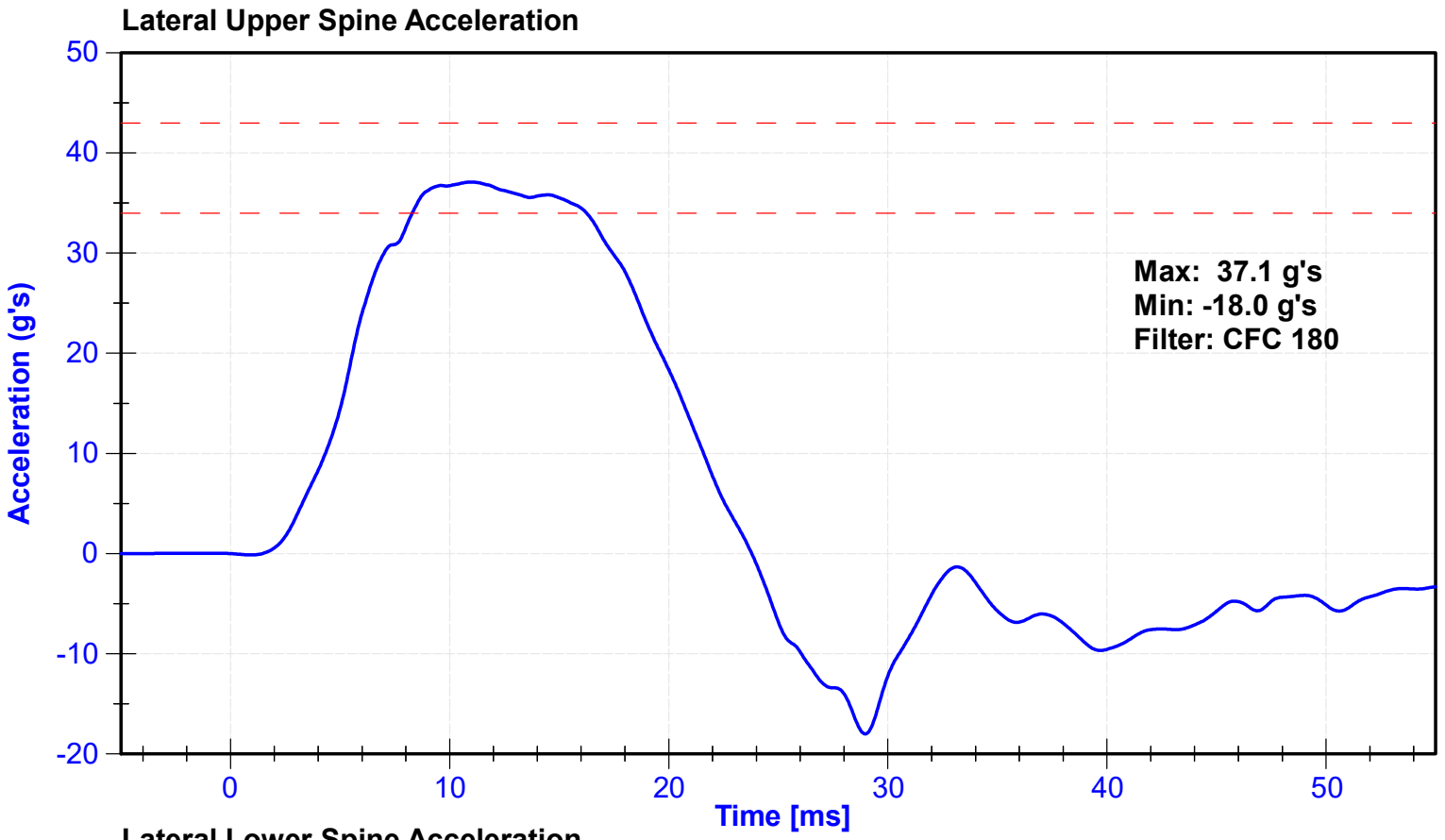


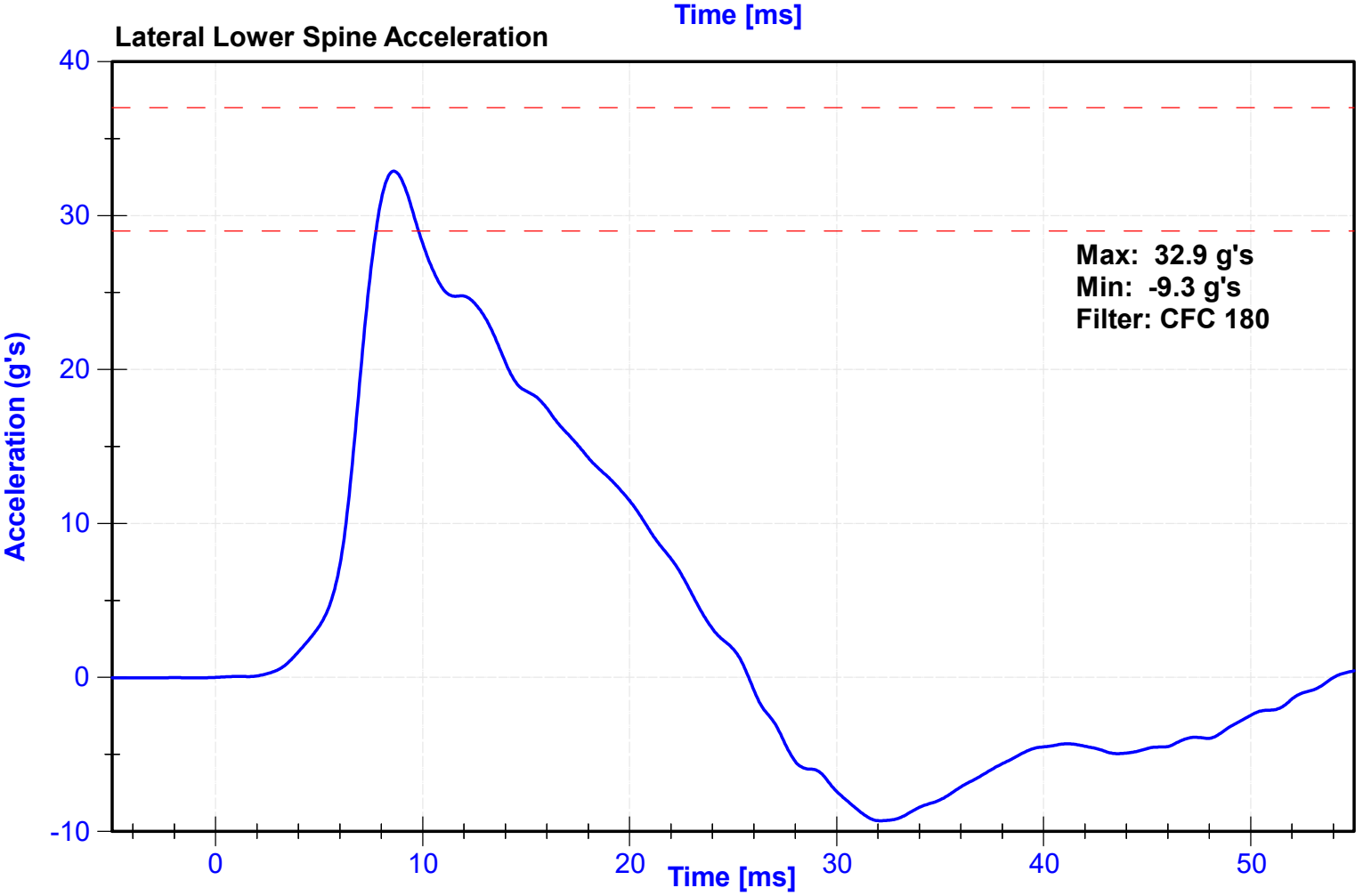

Shoulder Displacement
Displacement (mm)
Time [ms]
Max: 31.5 mm
Min: -1.3 mm
Filter: CFC 600


Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 26.2 mm
Min: 0.0 mm
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 30.8 mm
Min: 0.0 mm
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 33.4 mm
Min: 0.0 mm
Filter: CFC 600


Lateral Upper Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 37.1 g's
Min: -18.0 g's
Filter: CFC 180


Lateral Lower Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 32.9 g's
Min: -9.3 g's
Filter: CFC 180

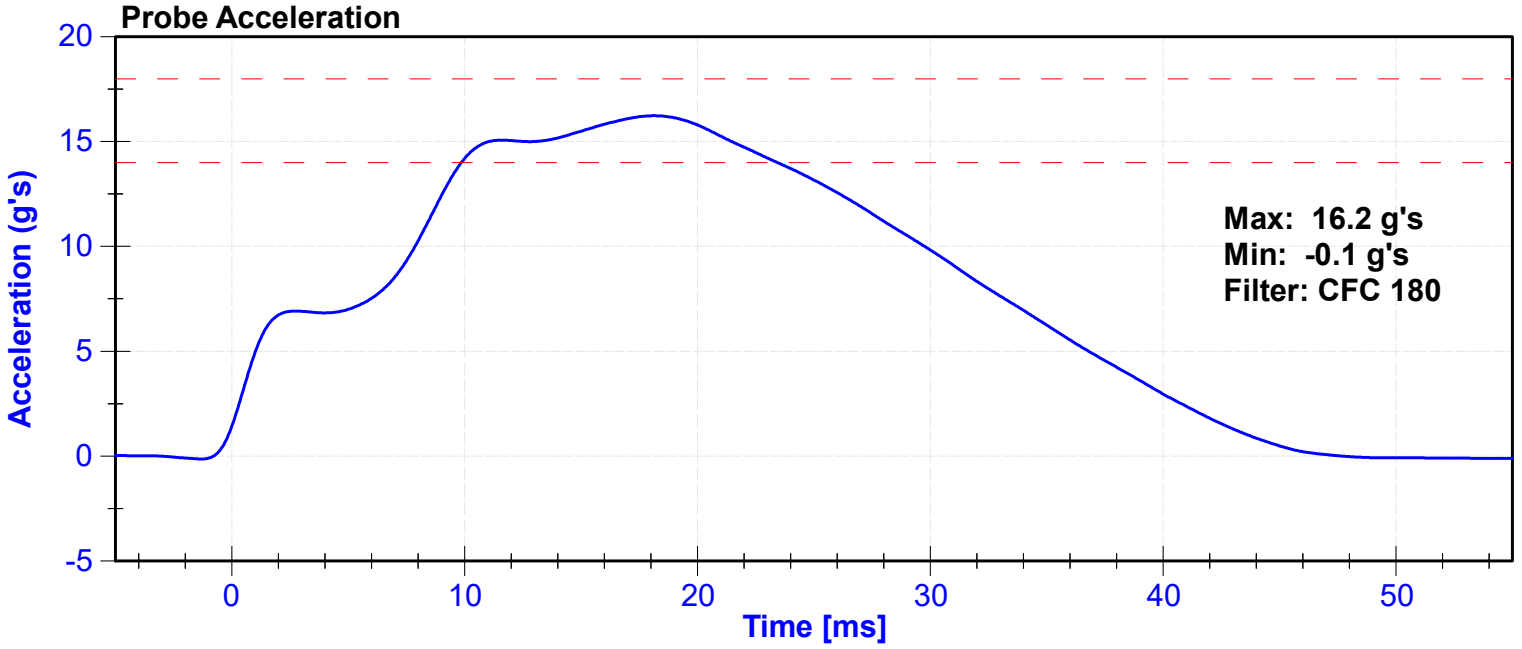
ATD Manufacturer	FTSS	Test Technician	D. Sakona
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

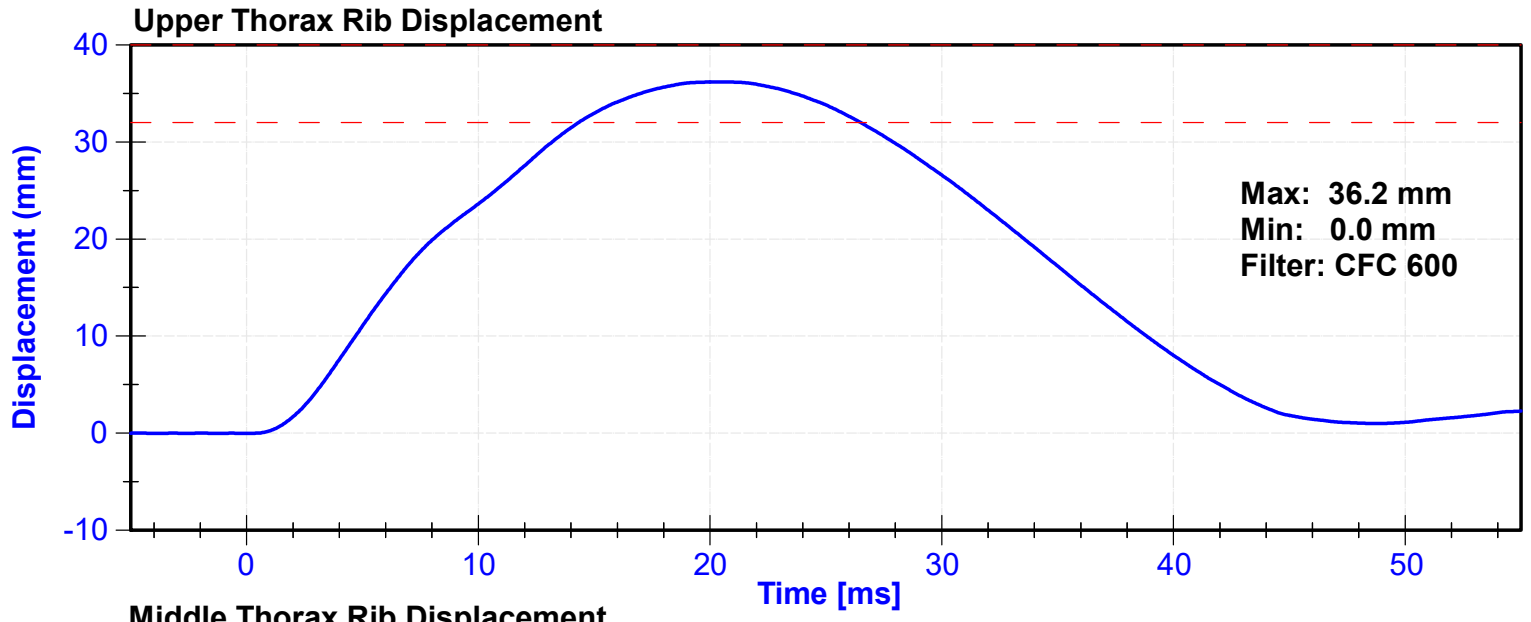
Results

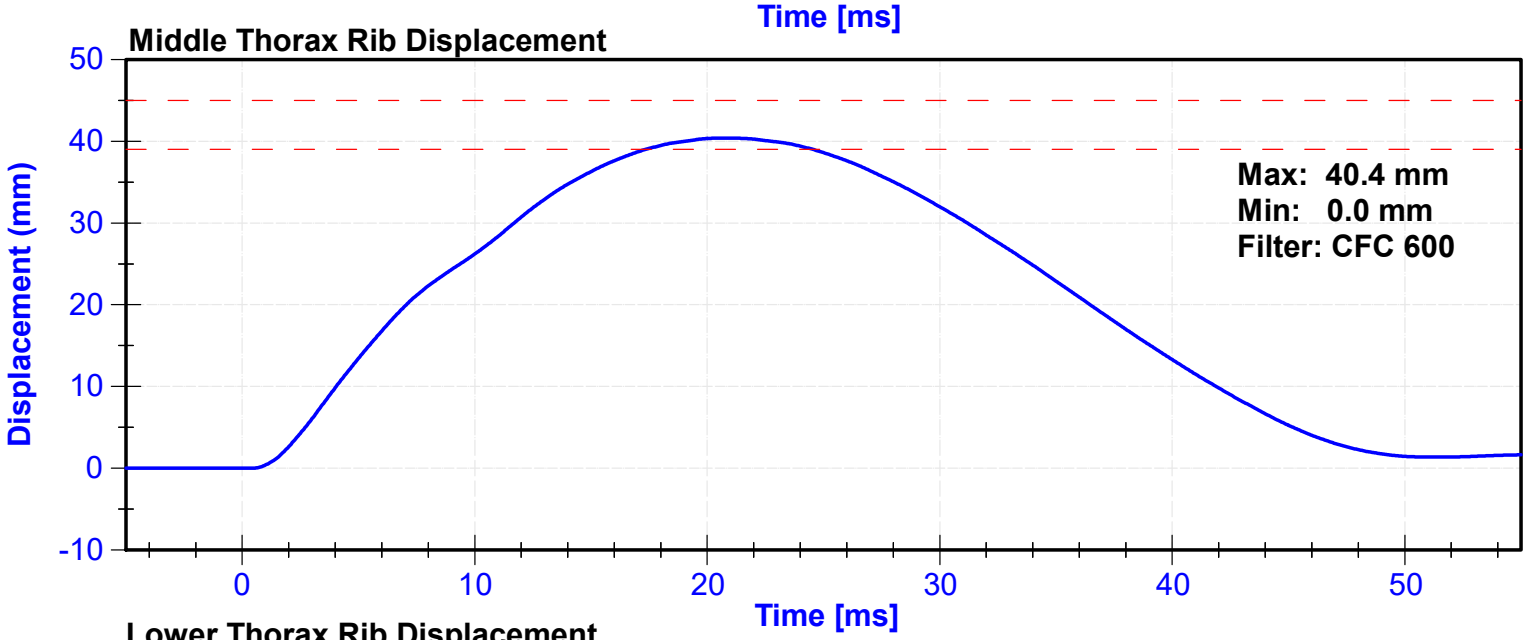
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.2	Pass
Humidity	10	70	%	19.5	Pass
Velocity	4.2	4.4	m/s	4.34	Pass
Probe Acceleration	14	18	g's	16.2	Pass
Lateral Upper Spine Acceleration	13	17	g's	15.8	Pass
Lateral Lower Spine Acceleration	7	11	g's	9.5	Pass
Upper Thorax Rib Deflection	32	40	mm	36.2	Pass
Middle Thorax Rib Deflection	39	45	mm	40.4	Pass
Lower Thorax Rib Deflection	35	43	mm	37.7	Pass

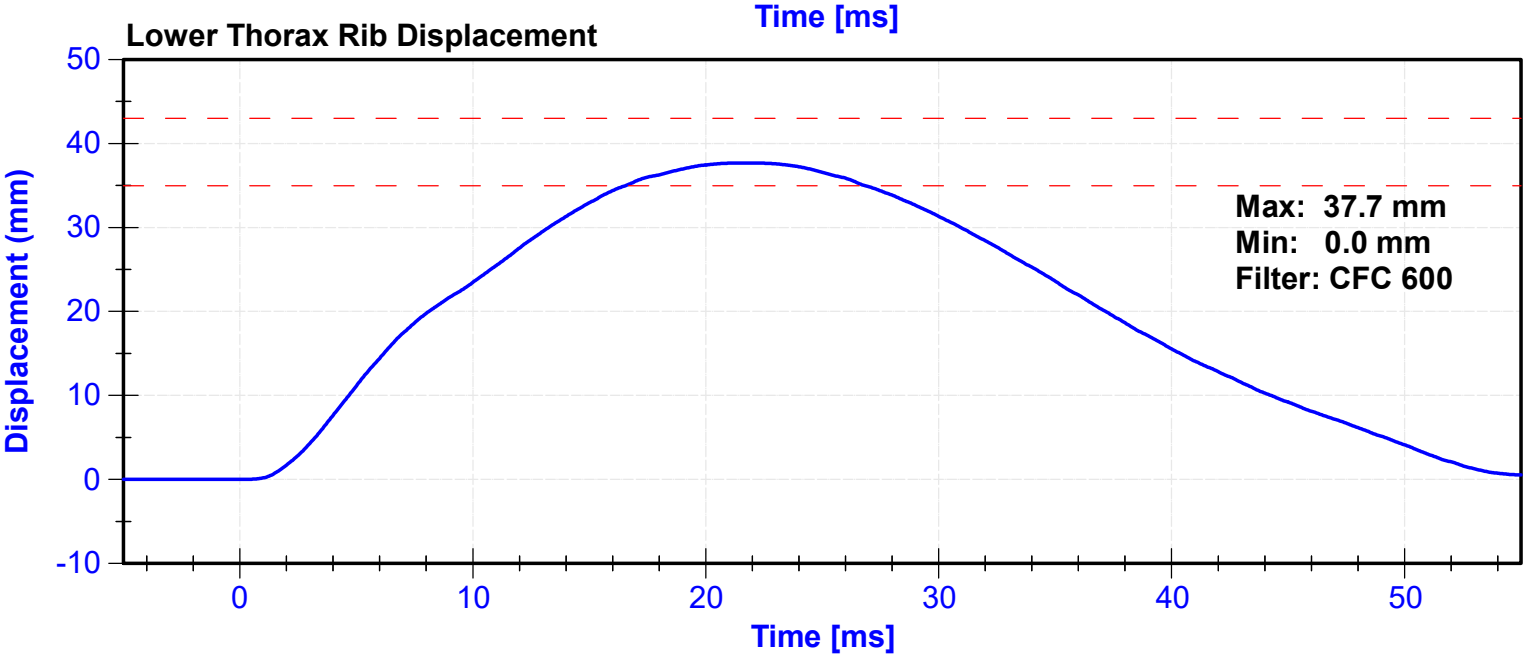
Transducer Calibrations

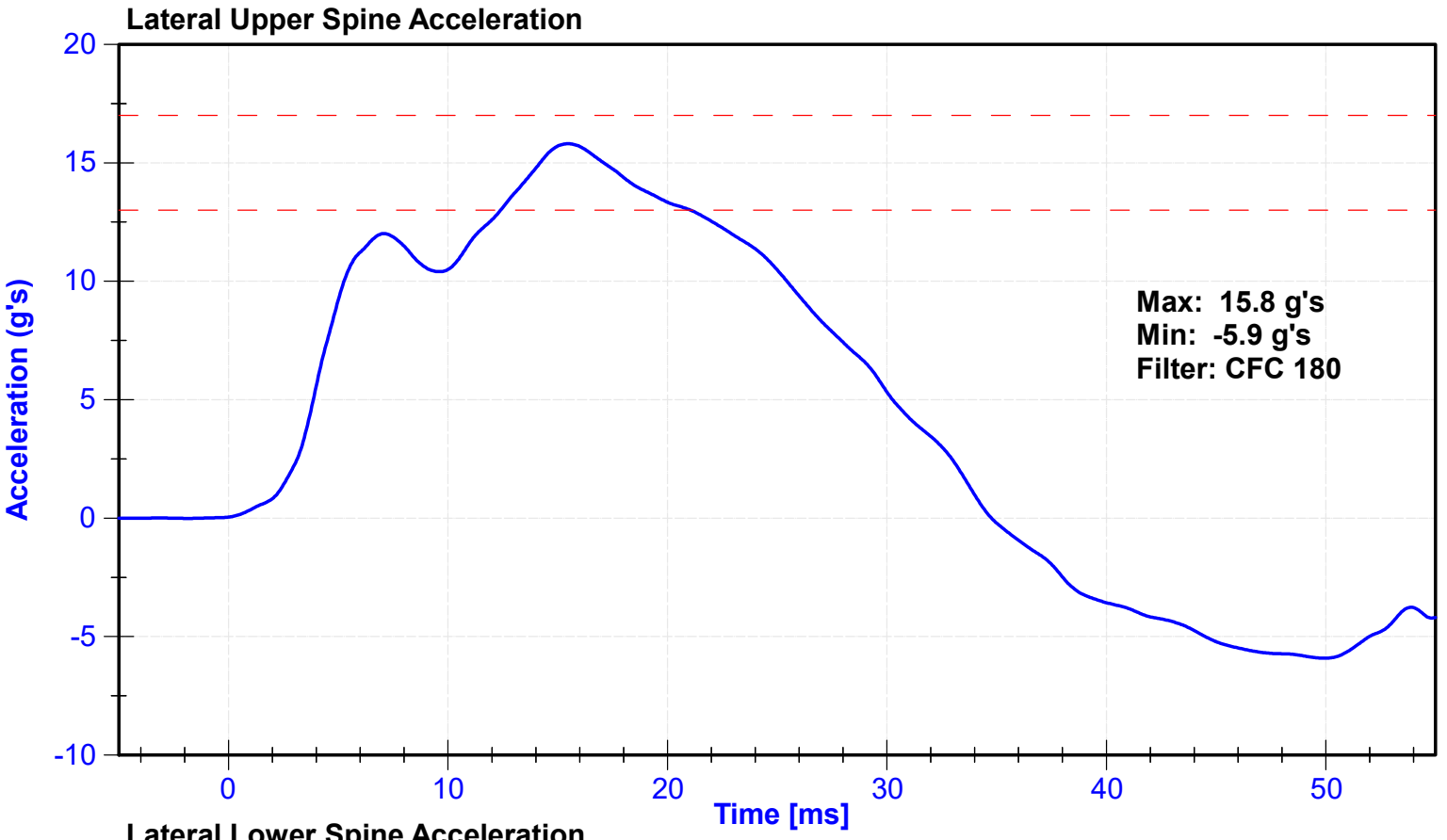
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	P51736	10/25/2022	10/25/2023
Upper Spine Y Accelerometer	Endevco	T20880	10/3/2022	4/1/2023
Lower Spine Y Accelerometer	Endevco	P52071	10/3/2022	4/1/2023
Upper Thorax Rib Potentiometer	Servo	2316GFE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

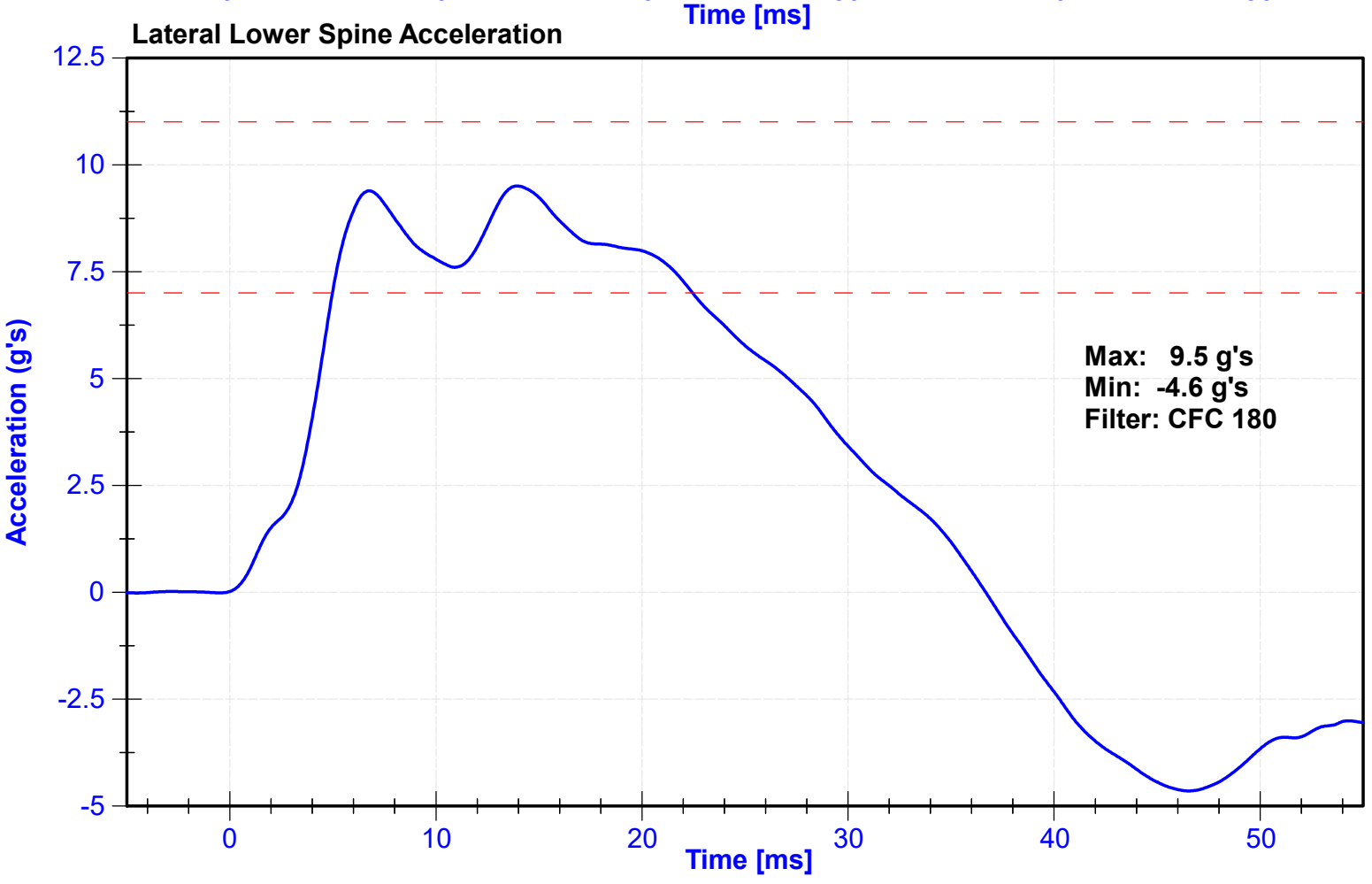



Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 36.2 mm
Min: 0.0 mm
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 40.4 mm
Min: 0.0 mm
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 37.7 mm
Min: 0.0 mm
Filter: CFC 600


Lateral Upper Spine Acceleration
Acceleration (g's)
20
15
10
5
0
-5
-10
0
10
20
30
40
50
Time [ms]
Max: 15.8 g's
Min: -5.9 g's
Filter: CFC 180


Lateral Lower Spine Acceleration
Acceleration (g's)
12.5
10
7.5
5
2.5
0
-2.5
-5
0
10
20
30
40
50
Time [ms]
Max: 9.5 g's
Min: -4.6 g's
Filter: CFC 180

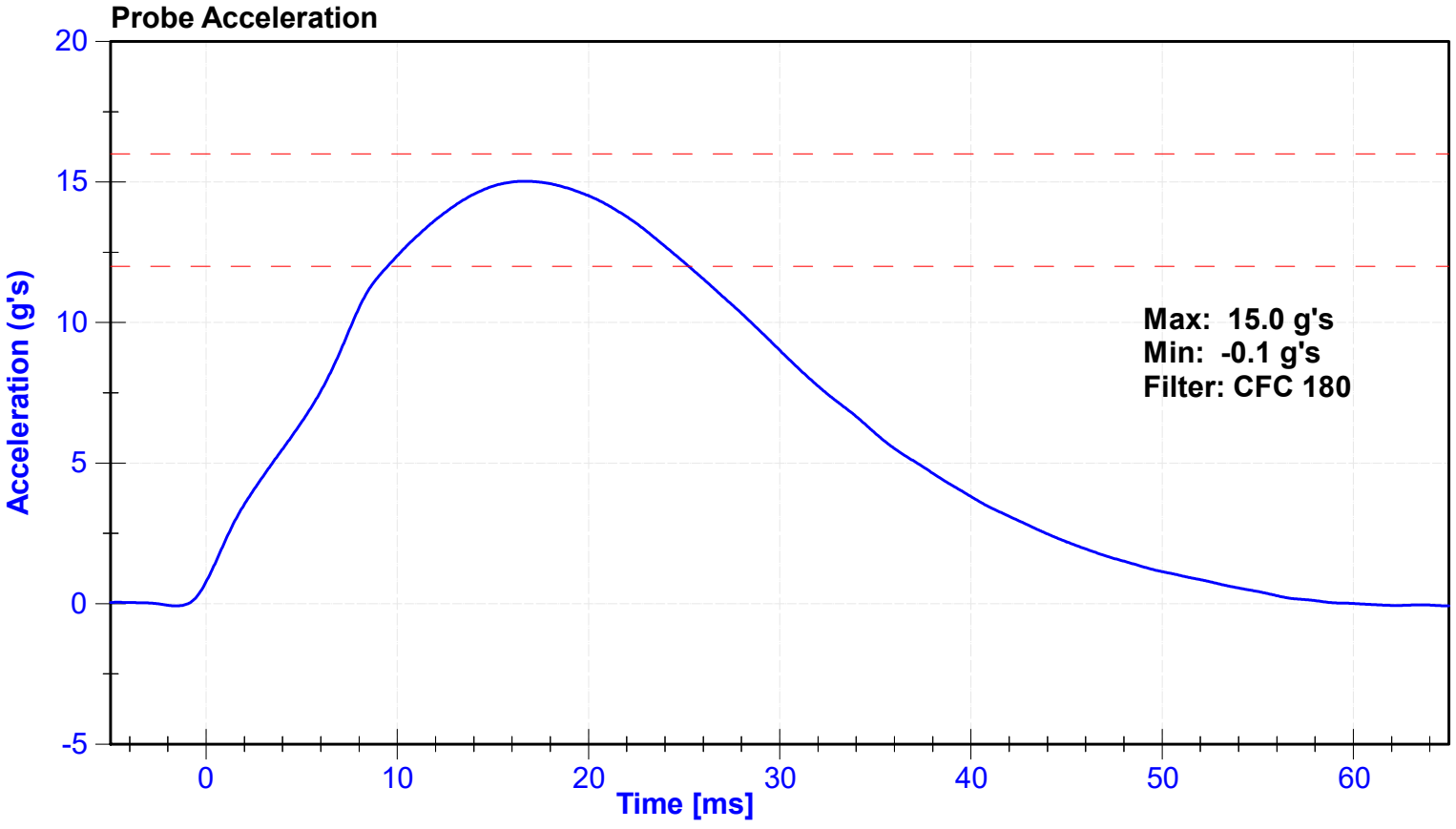
ATD Manufacturer	FTSS	Test Technician	D. Sakona
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

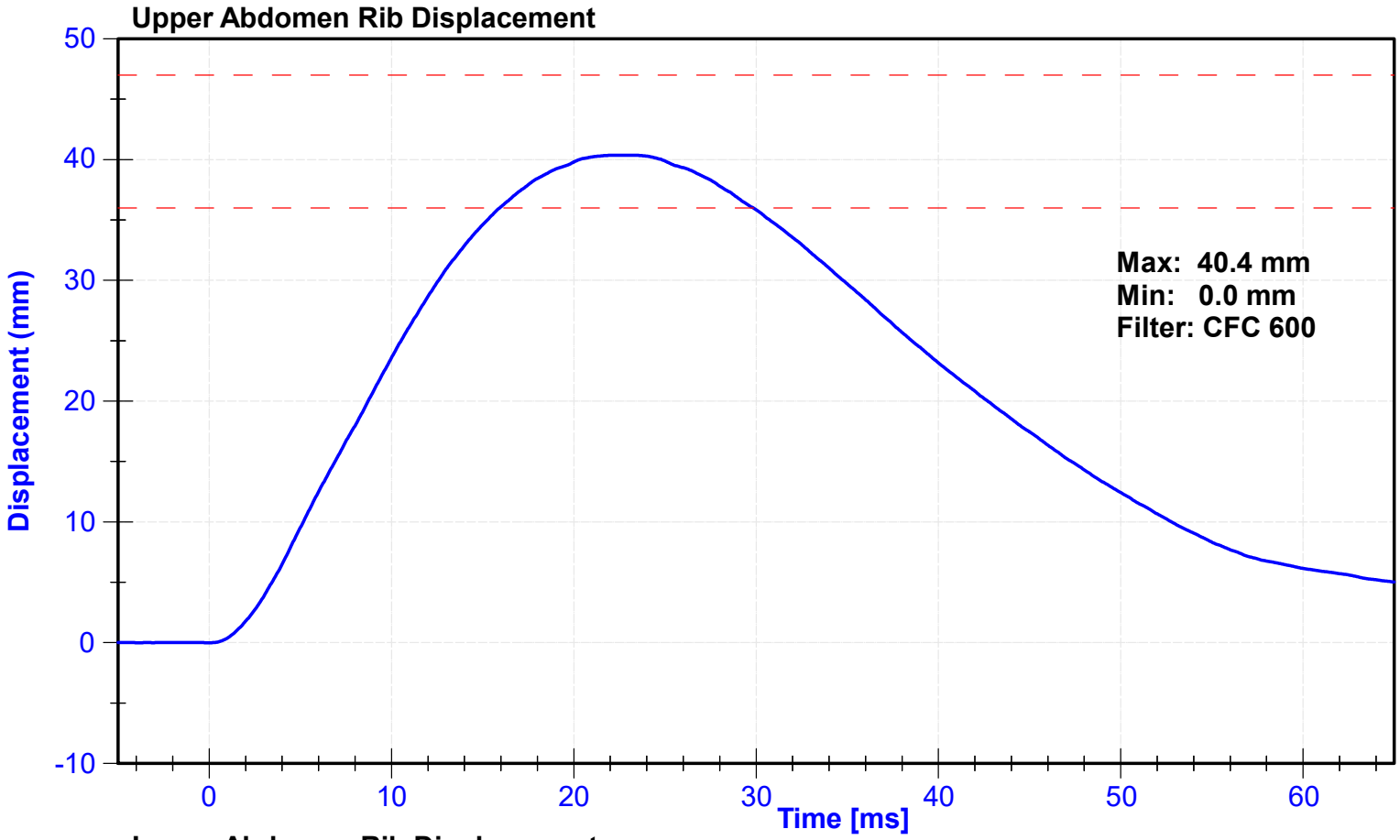
Results

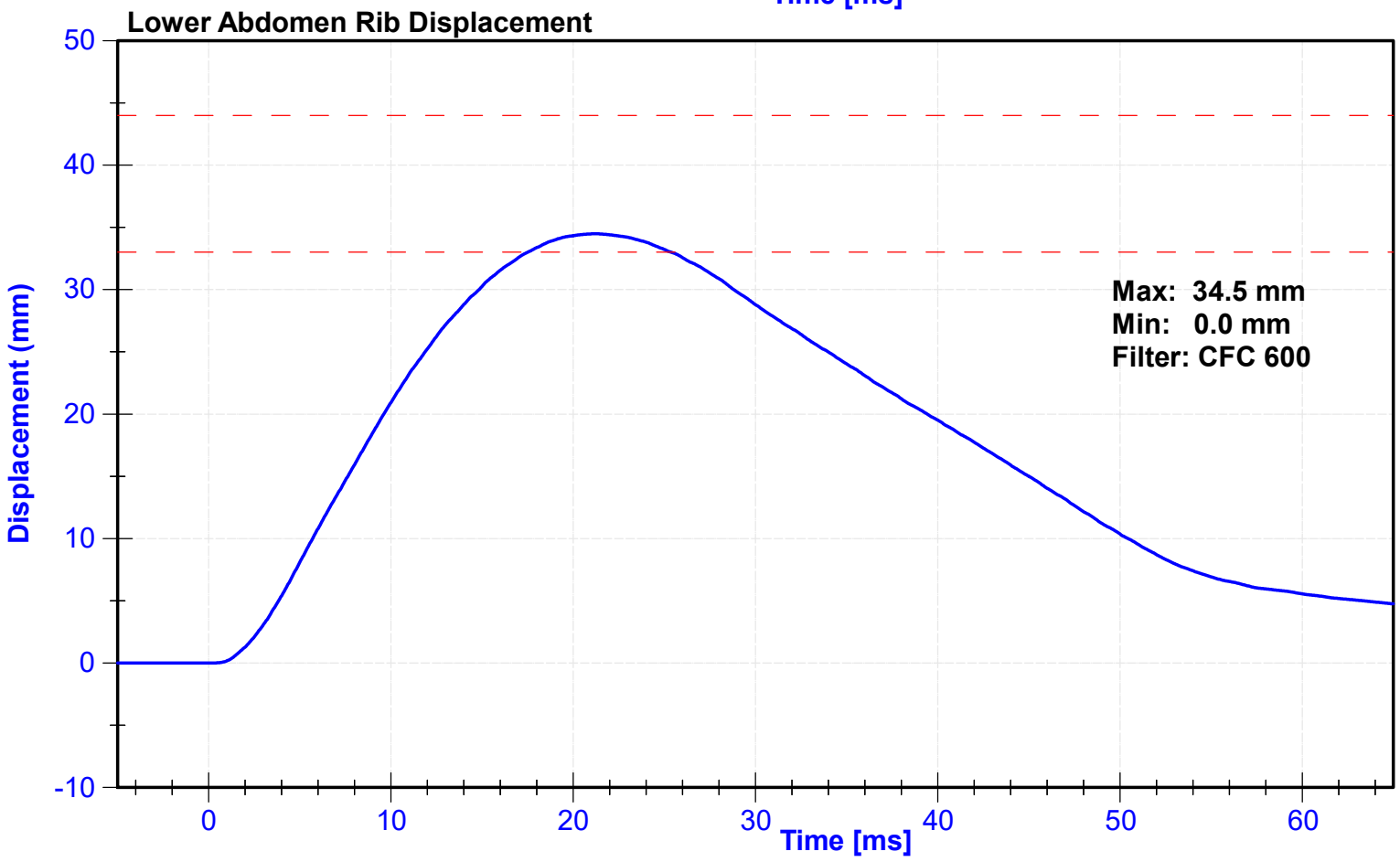
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.2	Pass
Humidity	10	70	%	19.5	Pass
Velocity	4.2	4.4	m/s	4.34	Pass
Probe Acceleration	12	16	g's	15.0	Pass
Lateral Lower Spine Acceleration	9	14	g's	12.1	Pass
Upper Abdomen Rib Deflection	36	47	mm	40.4	Pass
Lower Abdomen Rib Deflection	33	44	mm	34.5	Pass

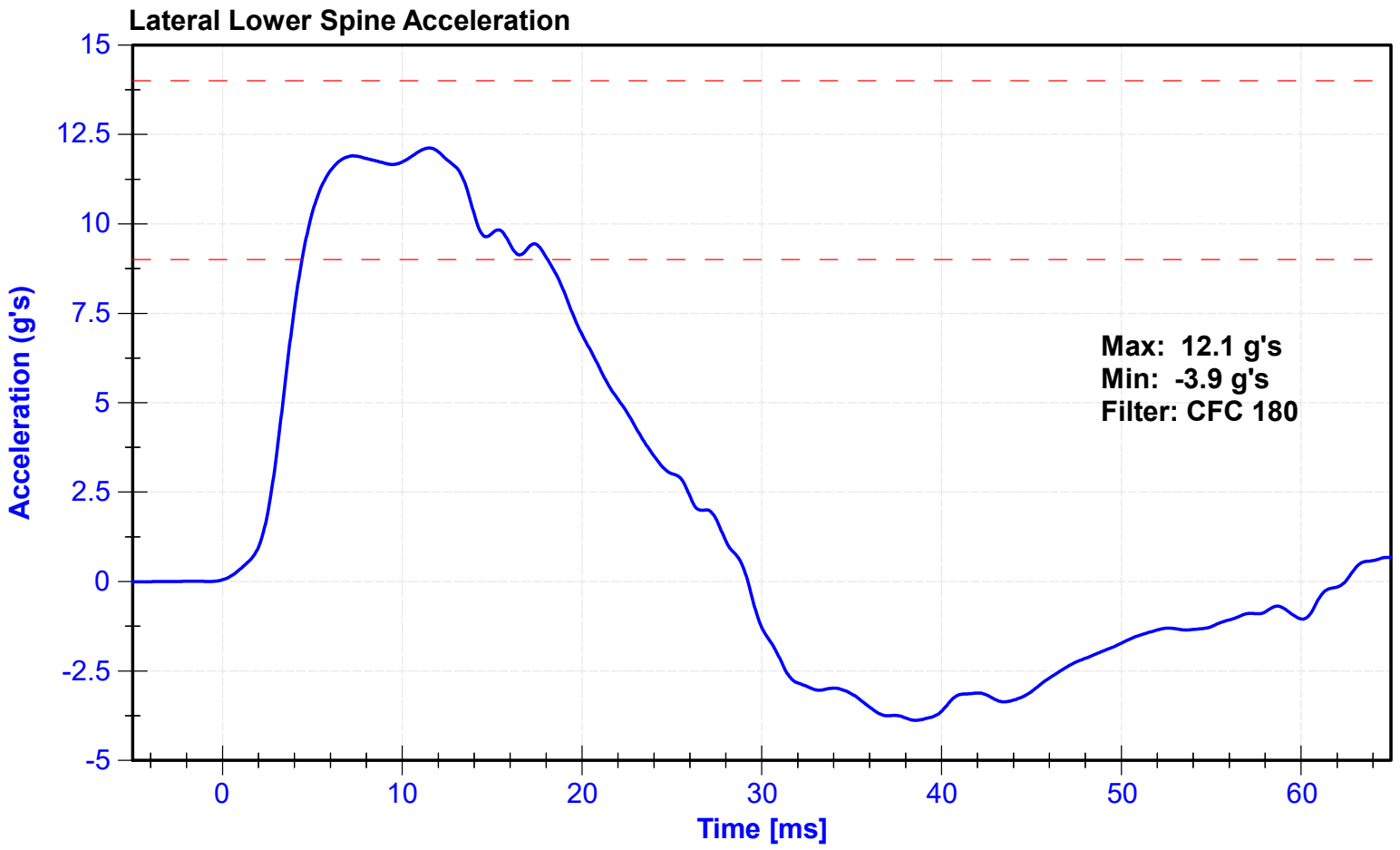
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	P51736	10/25/2022	10/25/2023
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




Upper Abdomen Rib Displacement
Displacement (mm)
50
40
30
20
10
0
-10
0
10
20
30
40
50
60
Time [ms]
Max: 40.4 mm
Min: 0.0 mm
Filter: CFC 600


Lower Abdomen Rib Displacement
Displacement (mm)
50
40
30
20
10
0
-10
0
10
20
30
40
50
60
Time [ms]
Max: 34.5 mm
Min: 0.0 mm
Filter: CFC 600


Lateral Lower Spine Acceleration
Acceleration (g's)
15
12.5
10
7.5
5
2.5
0
-2.5
-5
0
10
20
30
40
50
60
Time [ms]
Max: 12.1 g's
Min: -3.9 g's
Filter: CFC 180

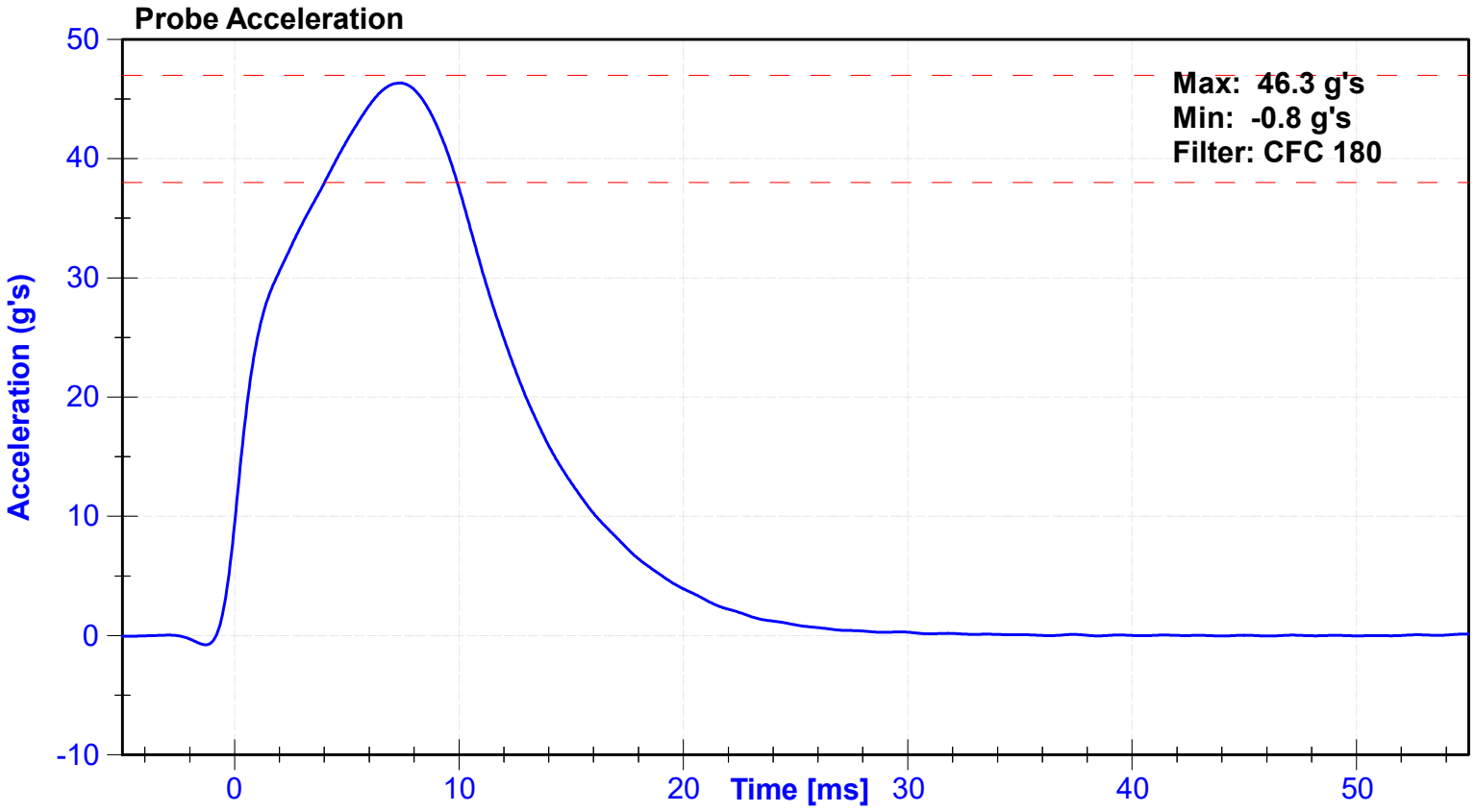
ATD Manufacturer	FTSS	Test Technician	D. Sakona
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

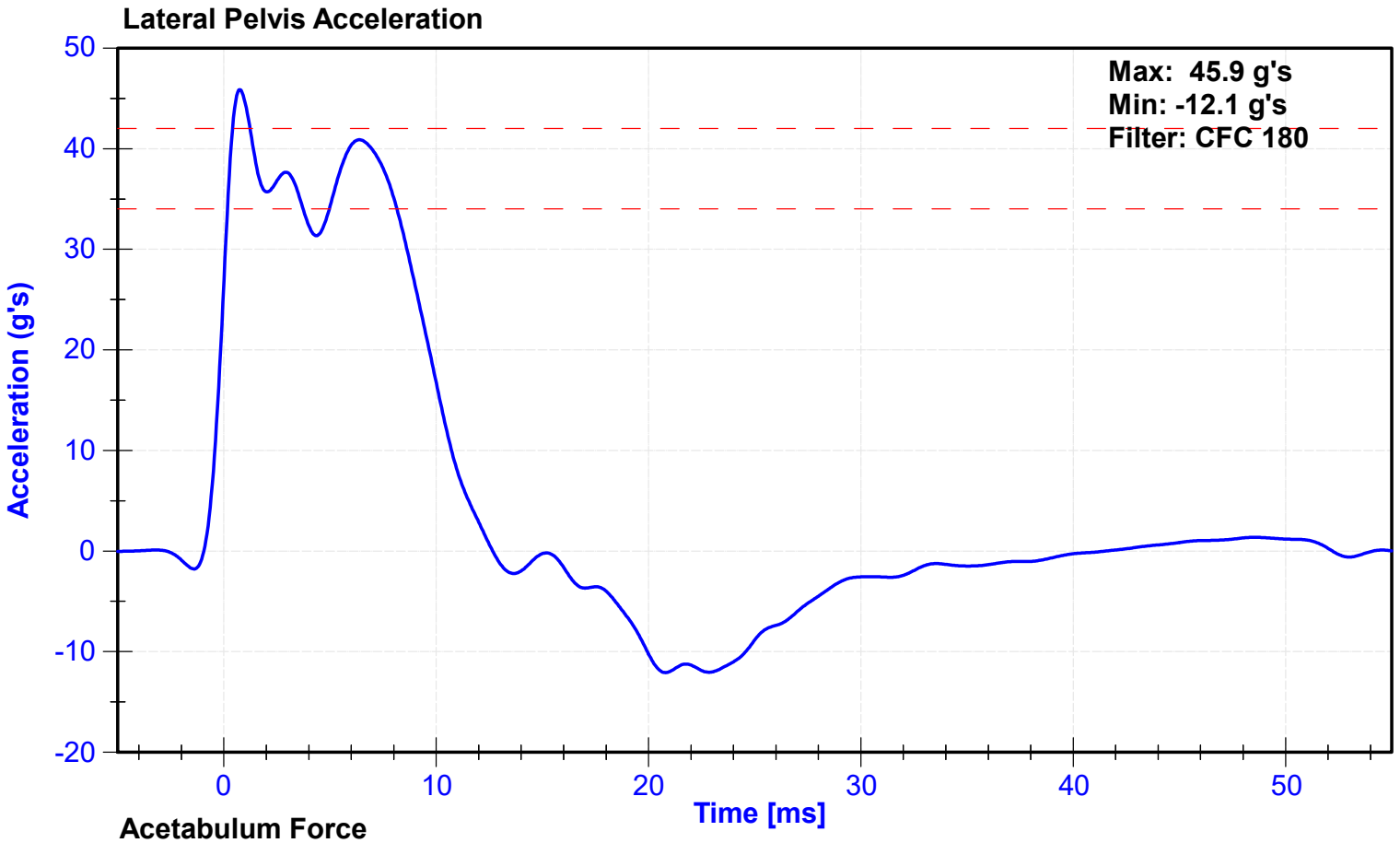
Results

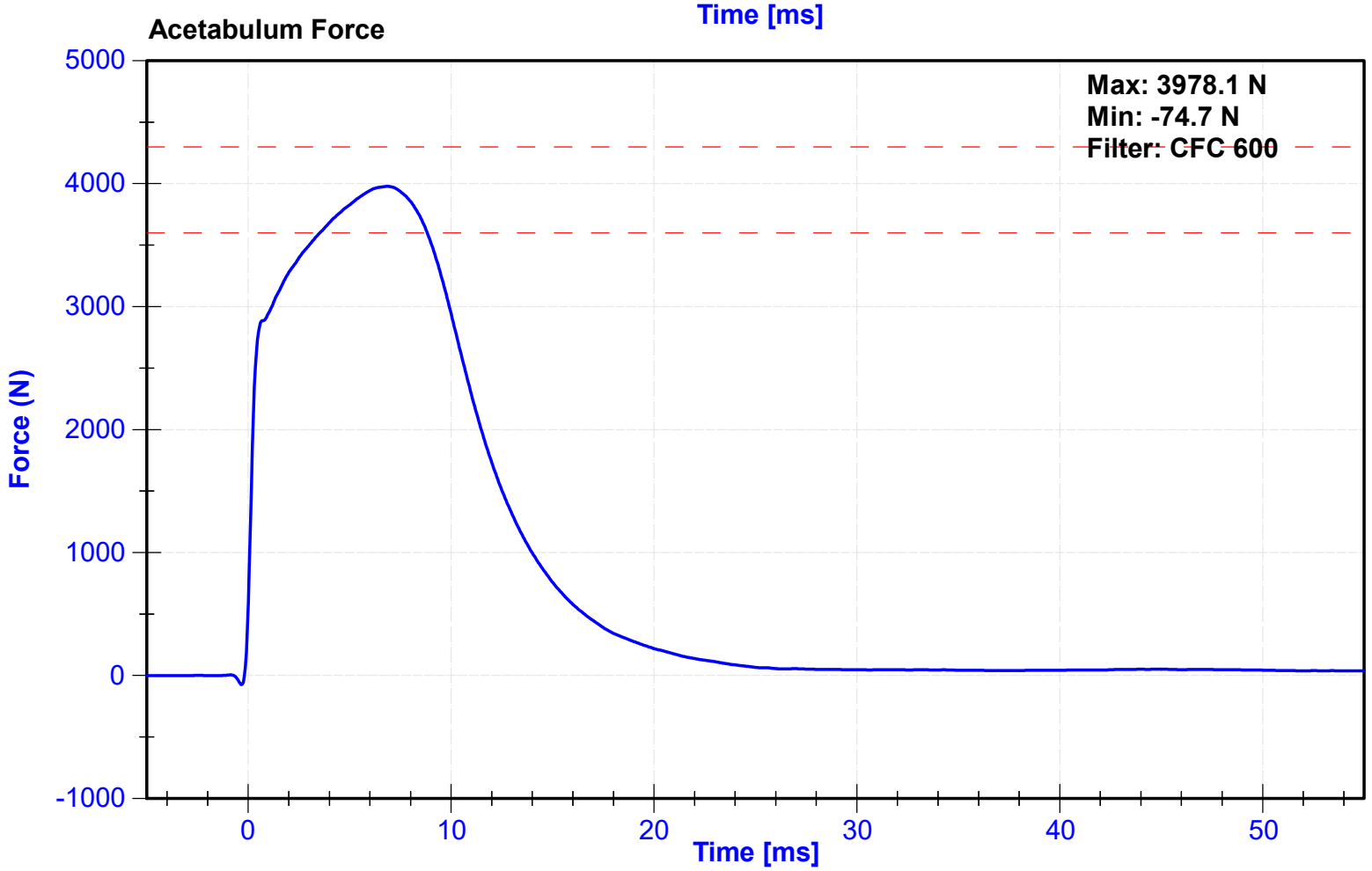
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.2	Pass
Humidity	10	70	%	19.5	Pass
Velocity	6.6	6.8	m/s	6.74	Pass
Probe Acceleration	38	47	g's	46.3	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	40.9	Pass
Acetabulum Force	3600	4300	N	3978.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	P51736	10/25/2022	10/25/2023
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




Lateral Pelvis Acceleration
Max: 45.9 g's
Min: -12.1 g's
Filter: CFC 180
Acceleration (g's)
50
40
30
20
10
0
-10
-20
0
10
20
30
40
50
Time [ms]


Acetabulum Force
Max: 3978.1 N
Min: -74.7 N
Filter: CFC 600
Force (N)
5000
4000
3000
2000
1000
0
-1000
0
10
20
30
40
50
Time [ms]

SACO RESEARCH

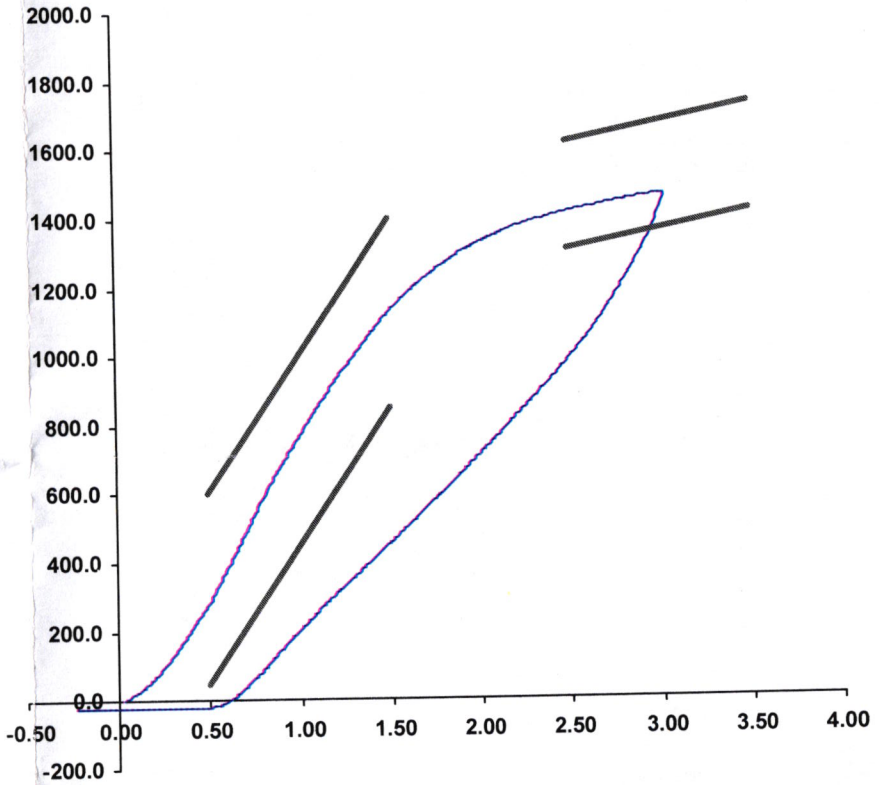
cert 2/14/23

SID-IIs Pelvis Plug Certification Test

Plug S/N 16173
Test Number 21237
Report Number 21291
Test Date 11/3/2021 8:51:24 AM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	287	50	600
Force @ 1.5 mm (N)	1,128	850	1,400
Force @ 2.5 mm (N)	1,416	1,306	1,618
Force @ 3.0 mm (N)	1,464	1,361	1,673

Force (-N) vs Extension (-mm)



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

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

Notes:

Operator

Part Number 180-4450

Template No 107 03-Nov-21
SACO Research

By : DC Date : 11/3/21

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

SACO RESEARCH

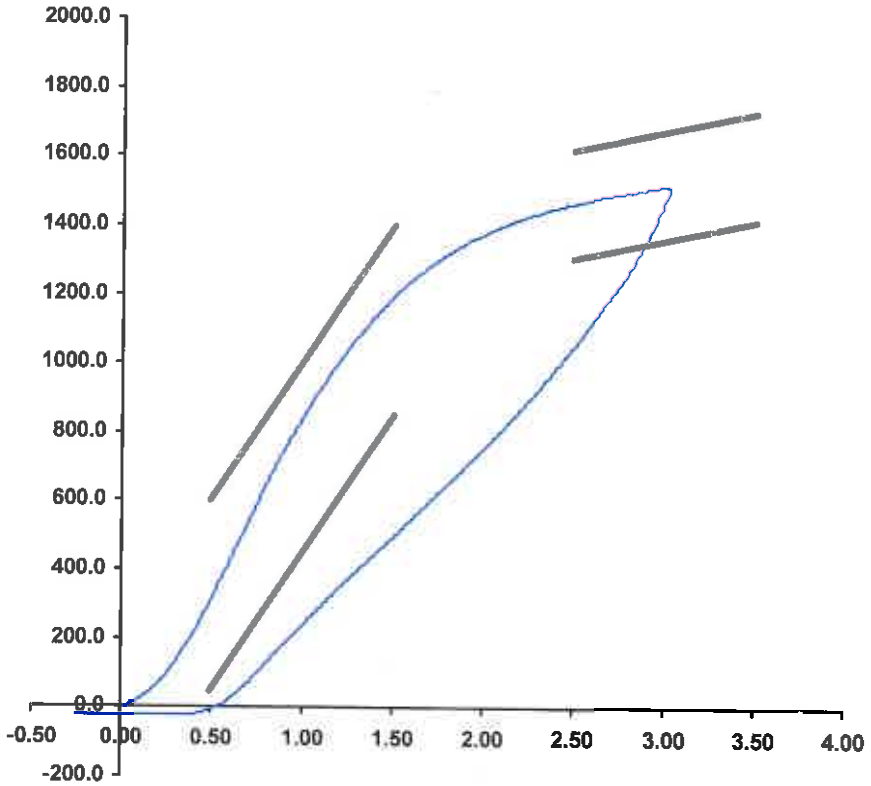
Impact

SID-IIs Pelvis Plug Certification Test

Plug S/N 15228
Test Number 17979
Report Number 18028
Test Date 3/10/2021 12:46:39 PM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	320	50	600
Force @ 1.5 mm (N)	1,195	850	1,400
Force @ 2.5 mm (N)	1,466	1,306	1,618
Force @ 3.0 mm (N)	1,516	1,361	1,673

Force (-N) vs Extension (-mm)



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

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

Notes:

Operator

Part Number 180-4450

Template No 107 10-Mar-21
SACO Research

By : DC Date : 3/10/2021

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

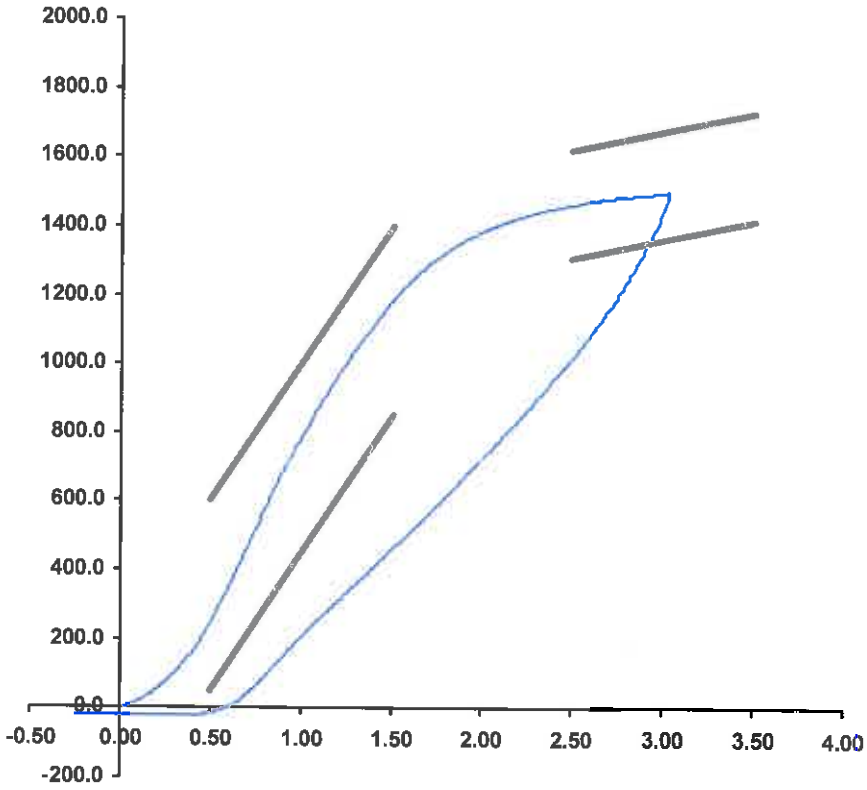
Non-Impact

SID-IIs Pelvis Plug Certification Test

Plug S/N 15430
Test Number 20091
Report Number 20145
Test Date 9/9/2021 10:07:28 AM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	254	50	600
Force @ 1.5 mm (N)	1,188	850	1,400
Force @ 2.5 mm (N)	1,464	1,306	1,618
Force @ 3.0 mm (N)	1,499	1,361	1,673

Force (-N) vs Extension (-mm)



Testing Machine STM-20 5965542
Load Cell S/N (FI360947), 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:

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

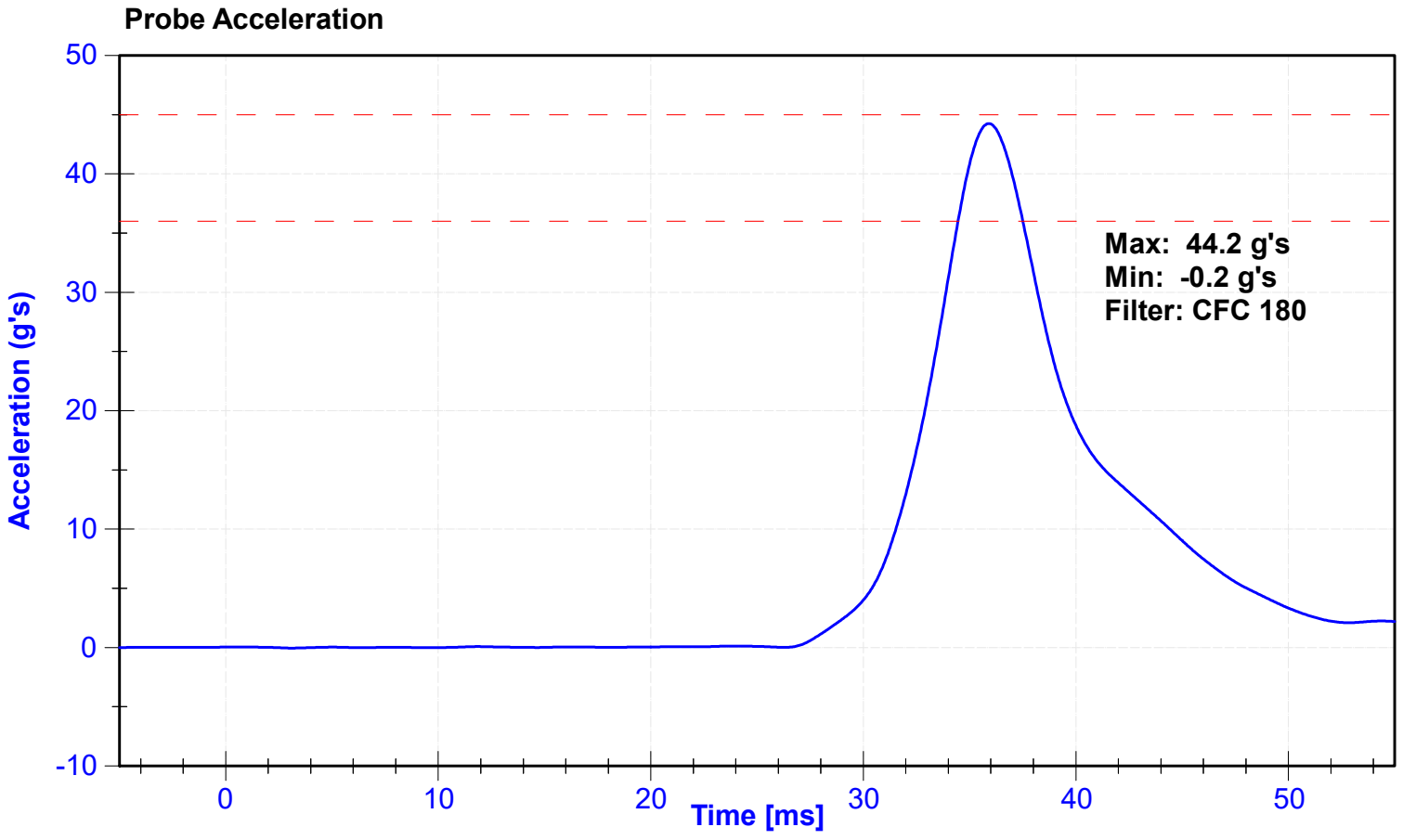
ATD Manufacturer	FTSS	Test Technician	D. Sakona
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

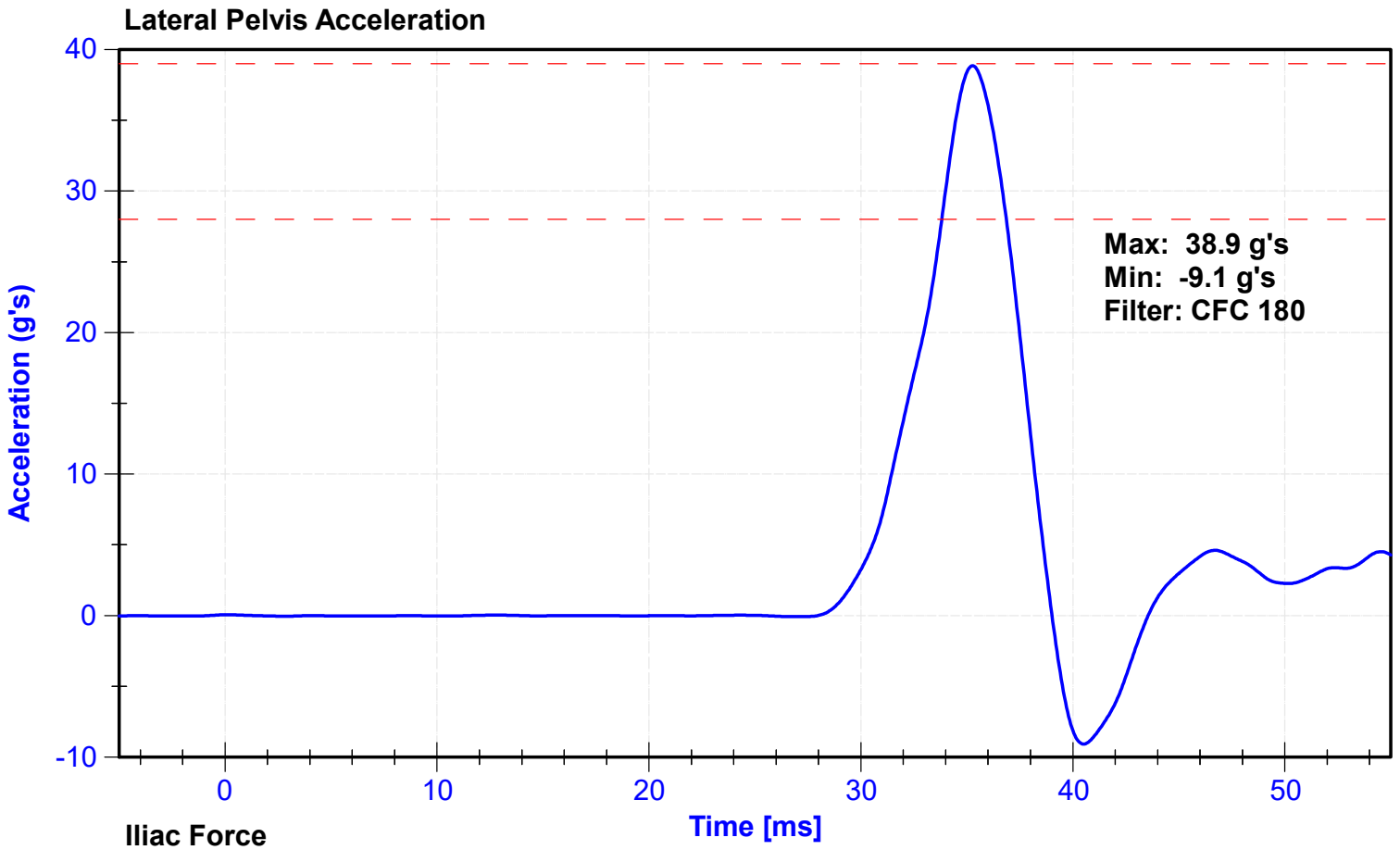
Results

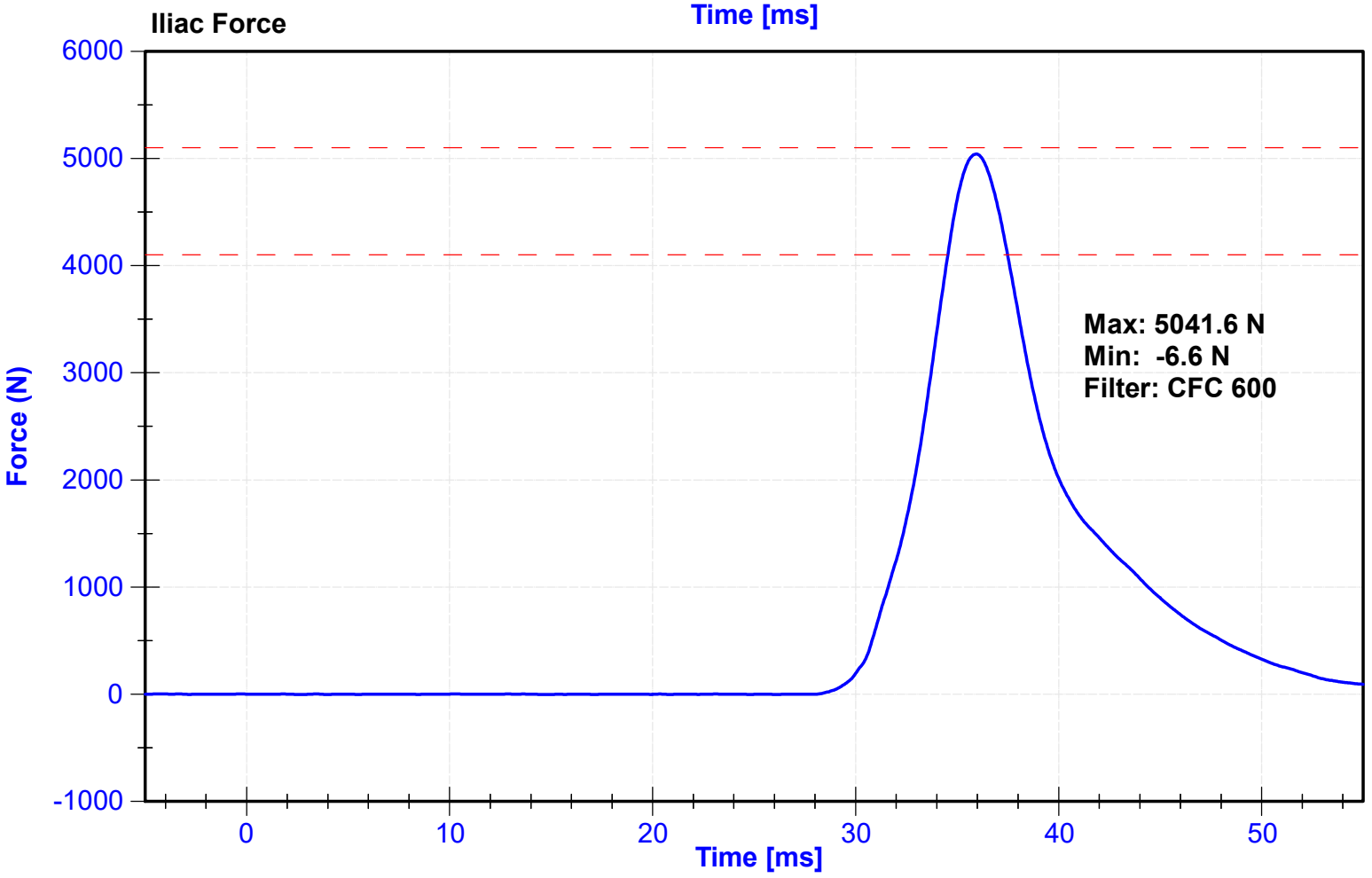
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.2	Pass
Humidity	10	70	%	19.5	Pass
Velocity	4.2	4.4	m/s	4.33	Pass
Probe Acceleration	36	45	g's	44.2	Pass
Lateral Pelvis Acceleration	28	39	g's	38.9	Pass
Iliac Force	4100	5100	N	5041.6	Pass

Transducer Calibrations

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




Lateral Pelvis Acceleration
Acceleration (g's)
40
30
20
10
0
-10
0
10
20
30
40
50
Time [ms]
Max: 38.9 g's
Min: -9.1 g's
Filter: CFC 180


Iliac Force
Force (N)
6000
5000
4000
3000
2000
1000
0
-1000
0
10
20
30
40
50
Time [ms]
Max: 5041.6 N
Min: -6.6 N
Filter: CFC 600

CALIBRATION TEST RESULTS

POST-TEST

SID-IIS 5TH PERCENTILE FEMALE - DRIVER ATD

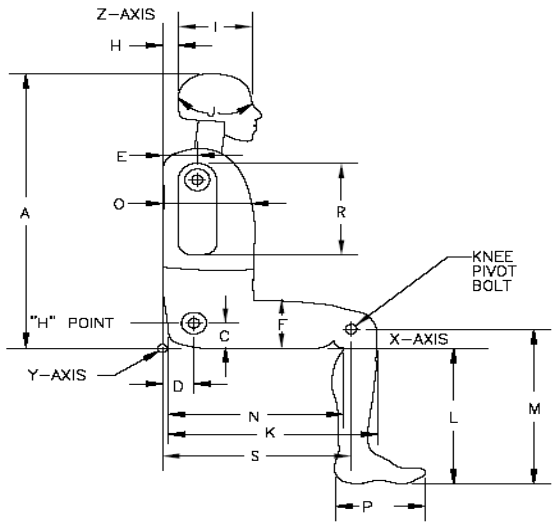
SERIAL NO:300

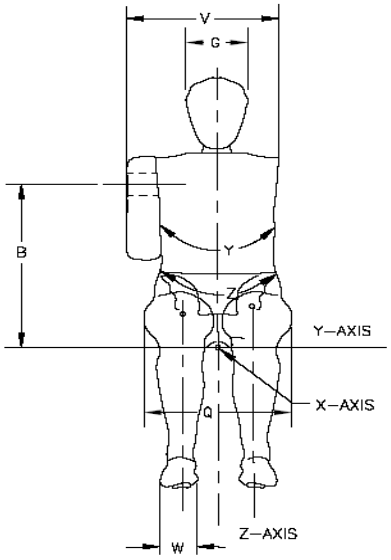
(CONFIGURED FOR LEFT SIDE IMPACT)

External Measurements - SID-IIs

Technician: K. Brogan Date: 02/17/2023

Dummy Serial Number: 300





Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	783	Pass
B	Shoulder Pivot Height	437	453	444	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	102	Pass
F	Thigh Clearance	119	135	122	Pass
G	Head Breadth	140	148	143	Pass
H	Head Back from Backline	40	46	42	Pass
I	Head Depth	178	188	183	Pass
J	Head Circumference	541	551	547	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	402	Pass
N	Buttock Popliteal Length	416	442	430	Pass
O	Chest Depth w/o jacket	195	211	200	Pass
P	Foot Length	216	232	221	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	318	Pass
R	Arm Length	249	259	253	Pass
S	Knee Joint to seatback	477	493	486	Pass
V	Shoulder Width	341	357	350	Pass
W	Foot Width	78	94	85	Pass
Y	Chest Circumference w/jacket	851	881	876	Pass
Z	Waist Circumference	761	791	777	Pass

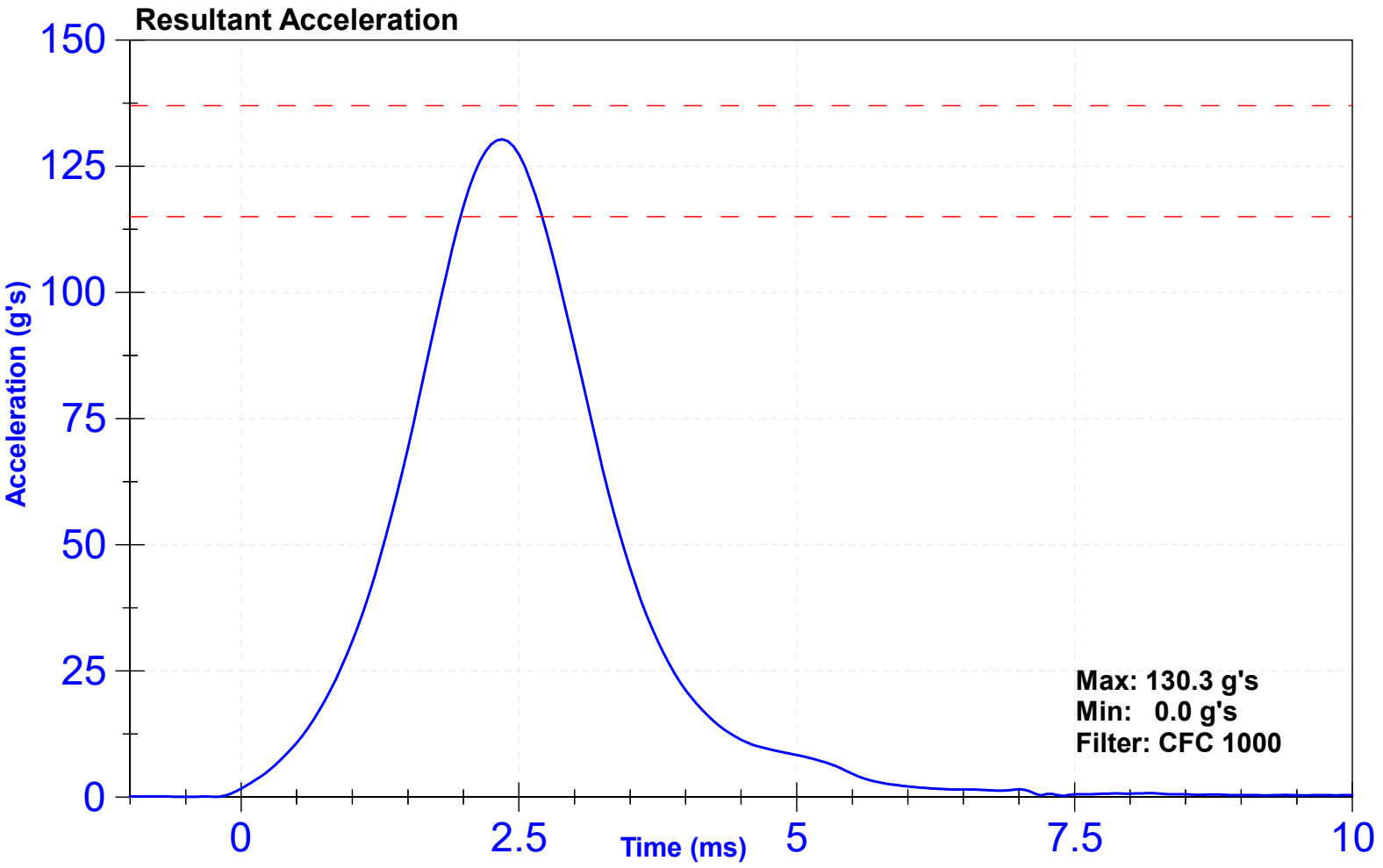
ATD Manufacturer	FTSS	Test Technician	D. Sakona
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

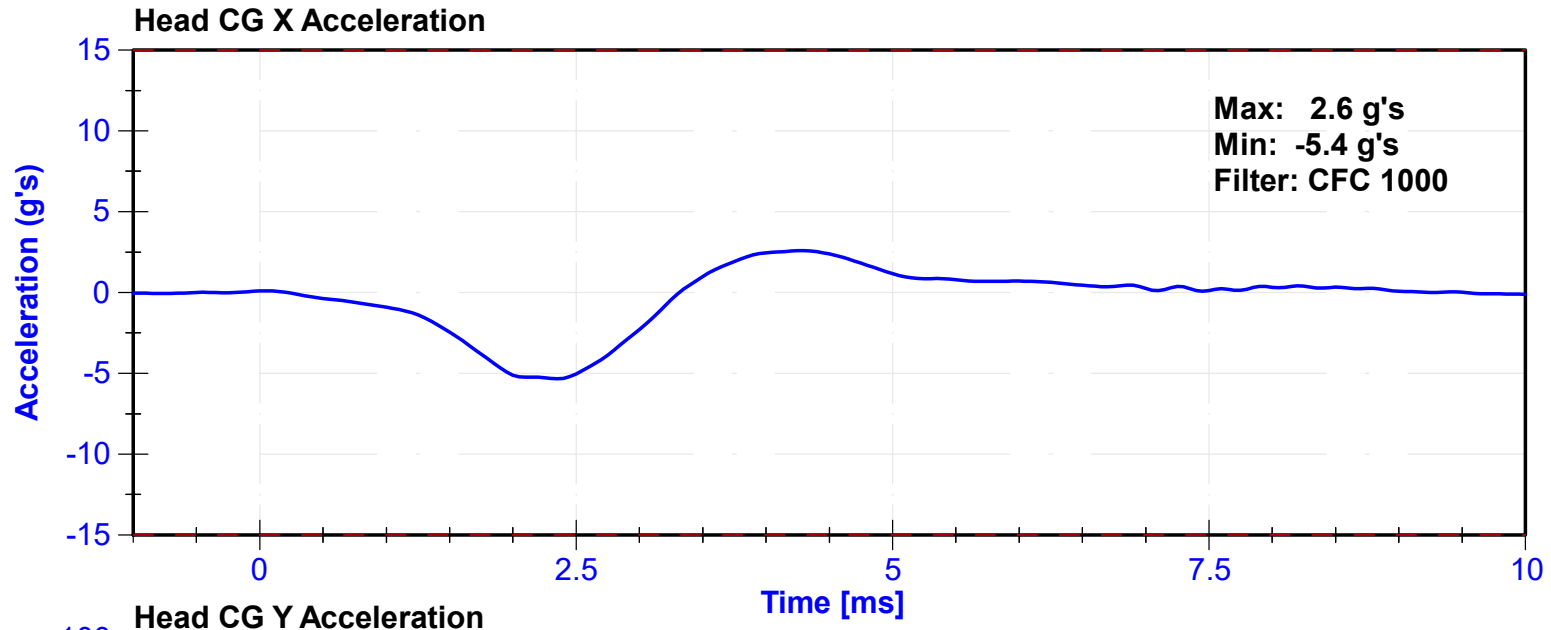
Results

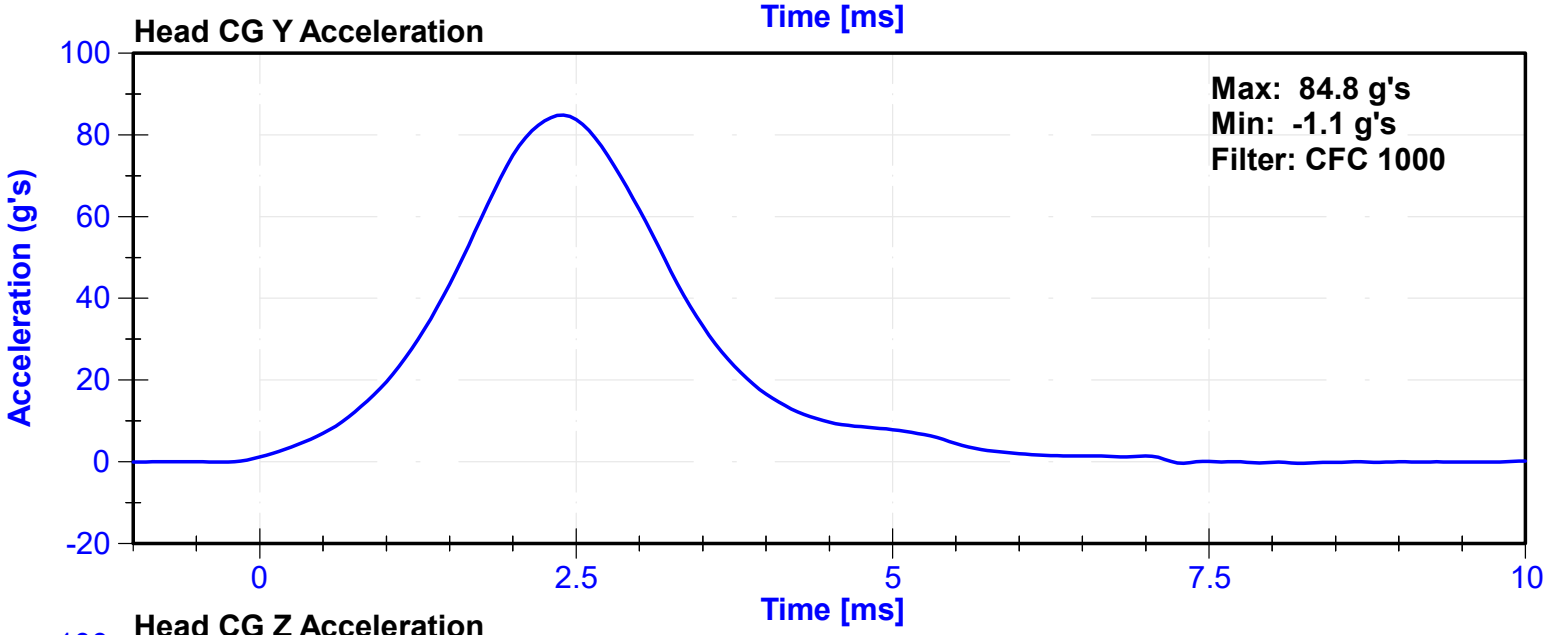
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.9	Pass
Humidity	10	70	%	26.5	Pass
Resultant Acceleration	115	137	g's	130.3	Pass
Oscillation	0	15	%	1.1	Pass
Fore-Aft Acceleration	-15	15	g's	-5.4	Pass

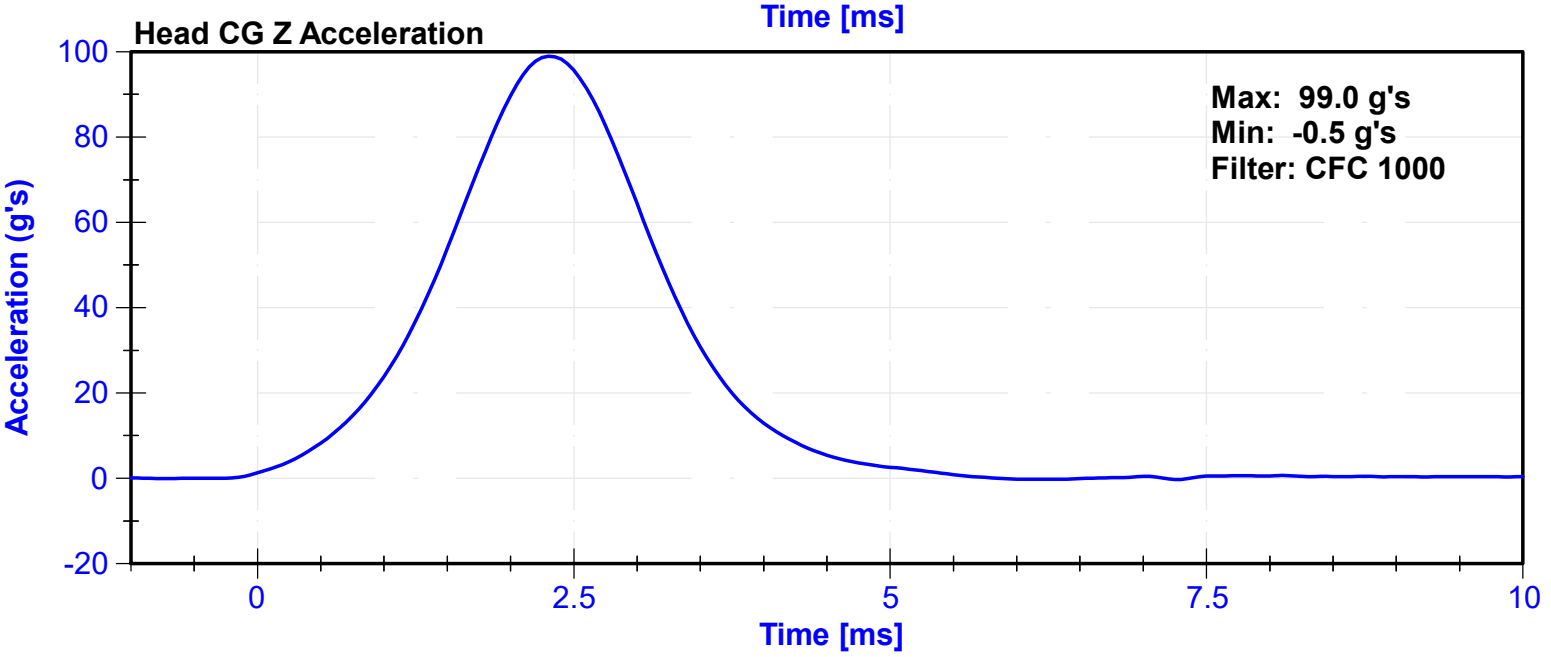
Transducer Calibrations

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




Head CG X Acceleration
Max: 2.6 g's
Min: -5.4 g's
Filter: CFC 1000
Acceleration (g's)
Time [ms]


Head CG Y Acceleration
Max: 84.8 g's
Min: -1.1 g's
Filter: CFC 1000
Acceleration (g's)
Time [ms]


Head CG Z Acceleration
Max: 99.0 g's
Min: -0.5 g's
Filter: CFC 1000
Acceleration (g's)
Time [ms]

ATD Manufacturer	FTSS	Test Technician	D. Kroll
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

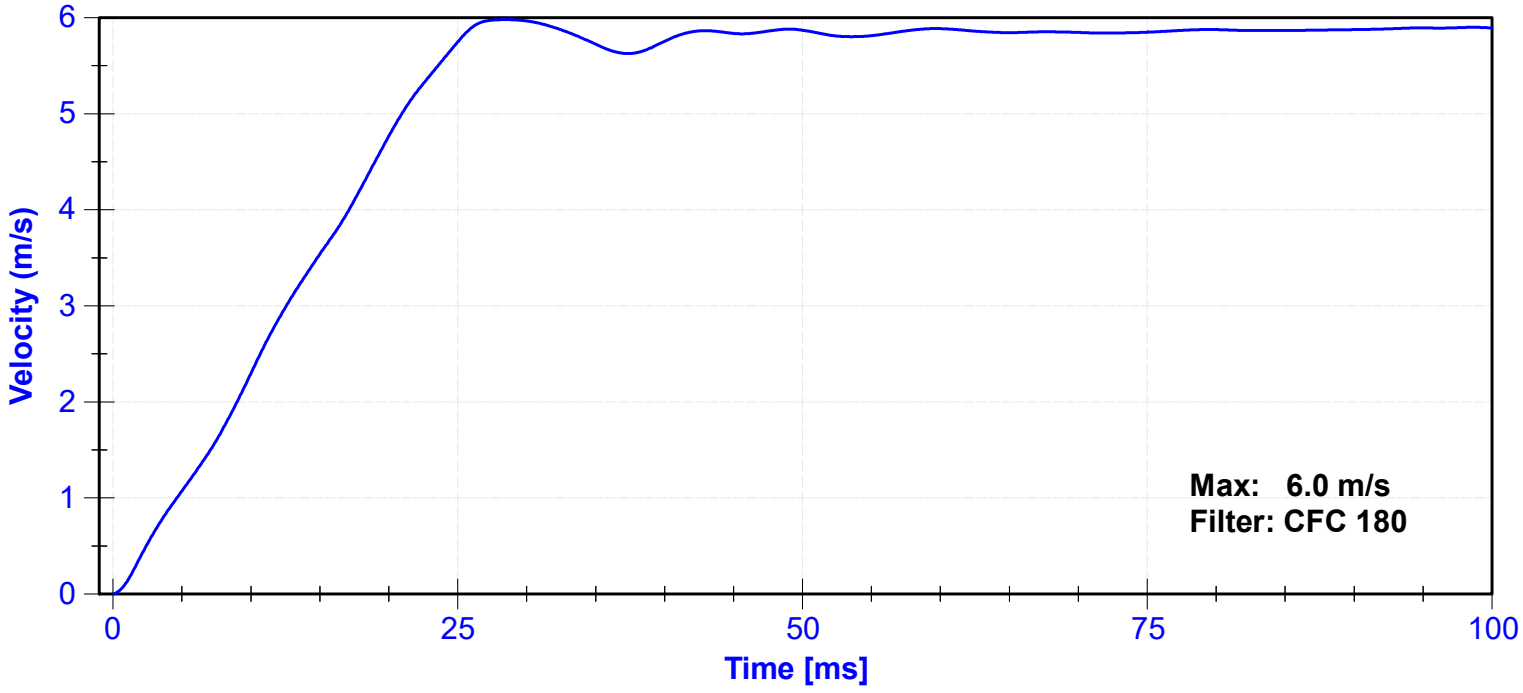
Results

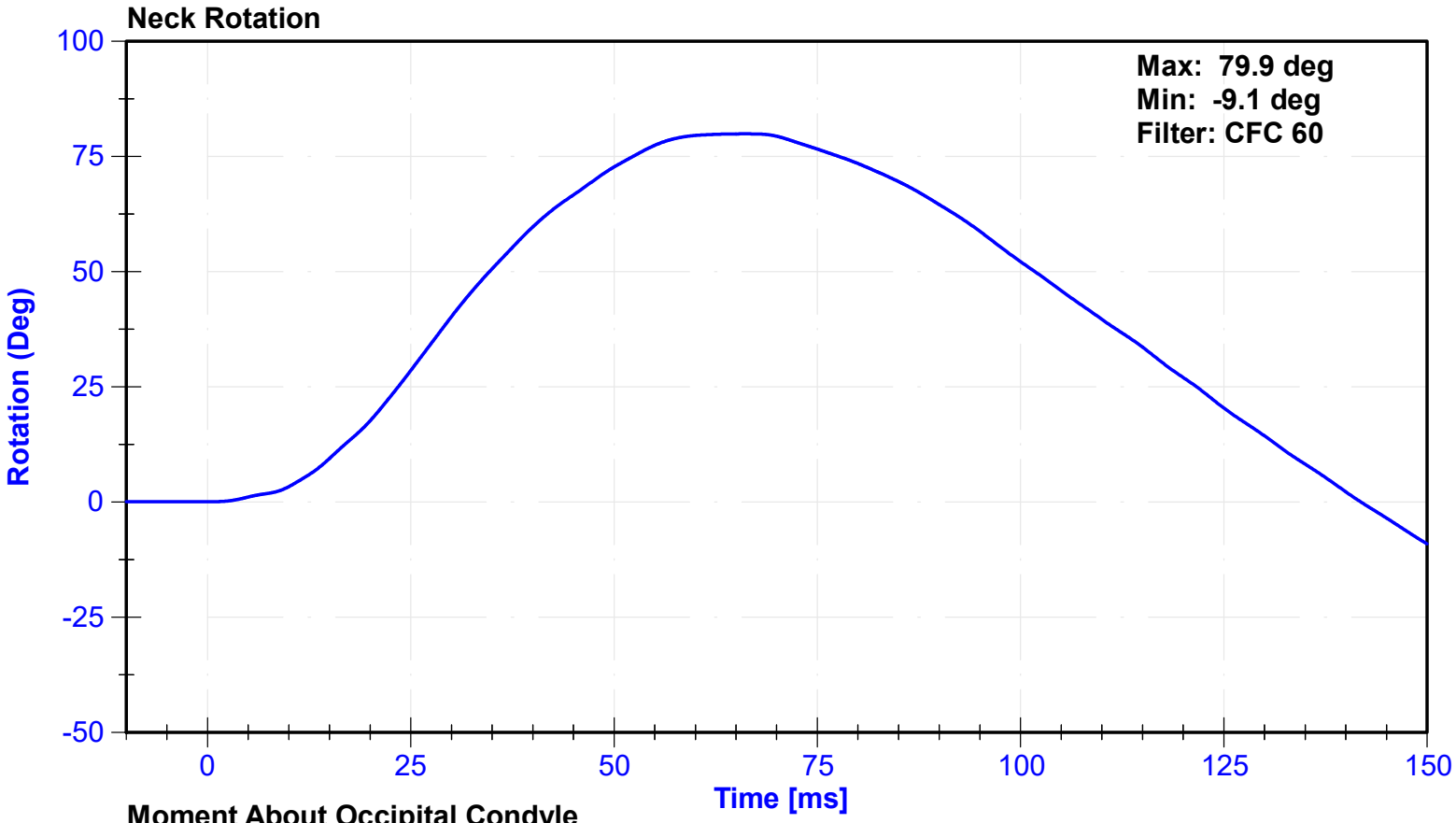
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.2	Pass
Humidity	10	70	%	22.5	Pass
Velocity	5.51	5.63	m/s	5.542	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.30	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.54	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.77	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	79.9	Pass
Time at Maximum Rotation	50	70	ms	66.0	Pass
Moment about the OC	36	44	Nm	42.1	Pass
Moment Decay to 0 Nm	102	126	ms	123.5	Pass

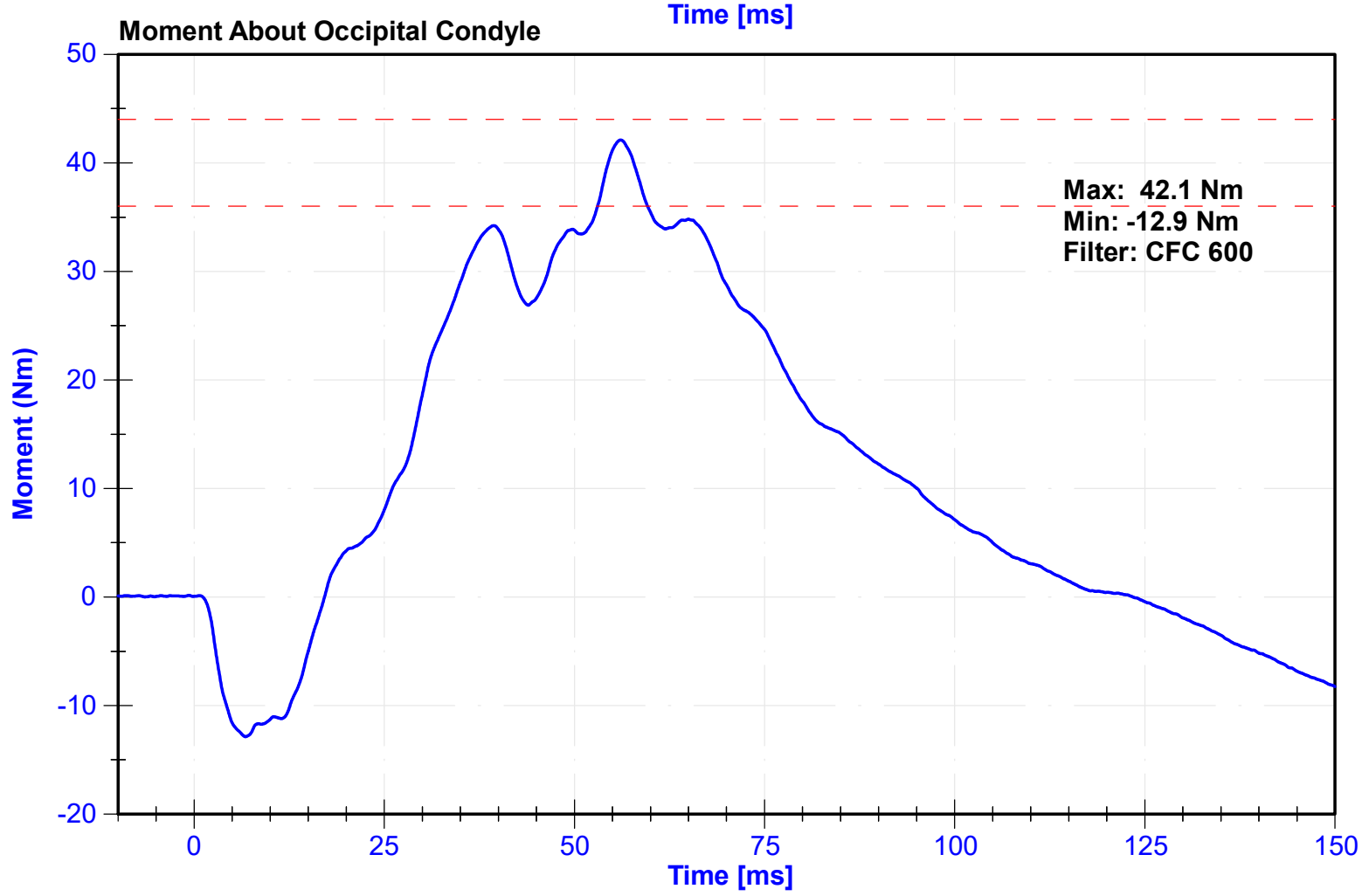
Transducer Calibrations

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	Humanetics	1716A_1872-FY	6/13/2022	6/13/2023

Pendulum Impulse




Neck Rotation
Max: 79.9 deg
Min: -9.1 deg
Filter: CFC 60
Rotation (Deg)
100
75
50
25
0
-25
-50
0
25
50
75
100
125
150
Time [ms]


Moment About Occipital Condyle
Max: 42.1 Nm
Min: -12.9 Nm
Filter: CFC 600
Moment (Nm)
50
40
30
20
10
0
-10
-20
0
25
50
75
100
125
150
Time [ms]

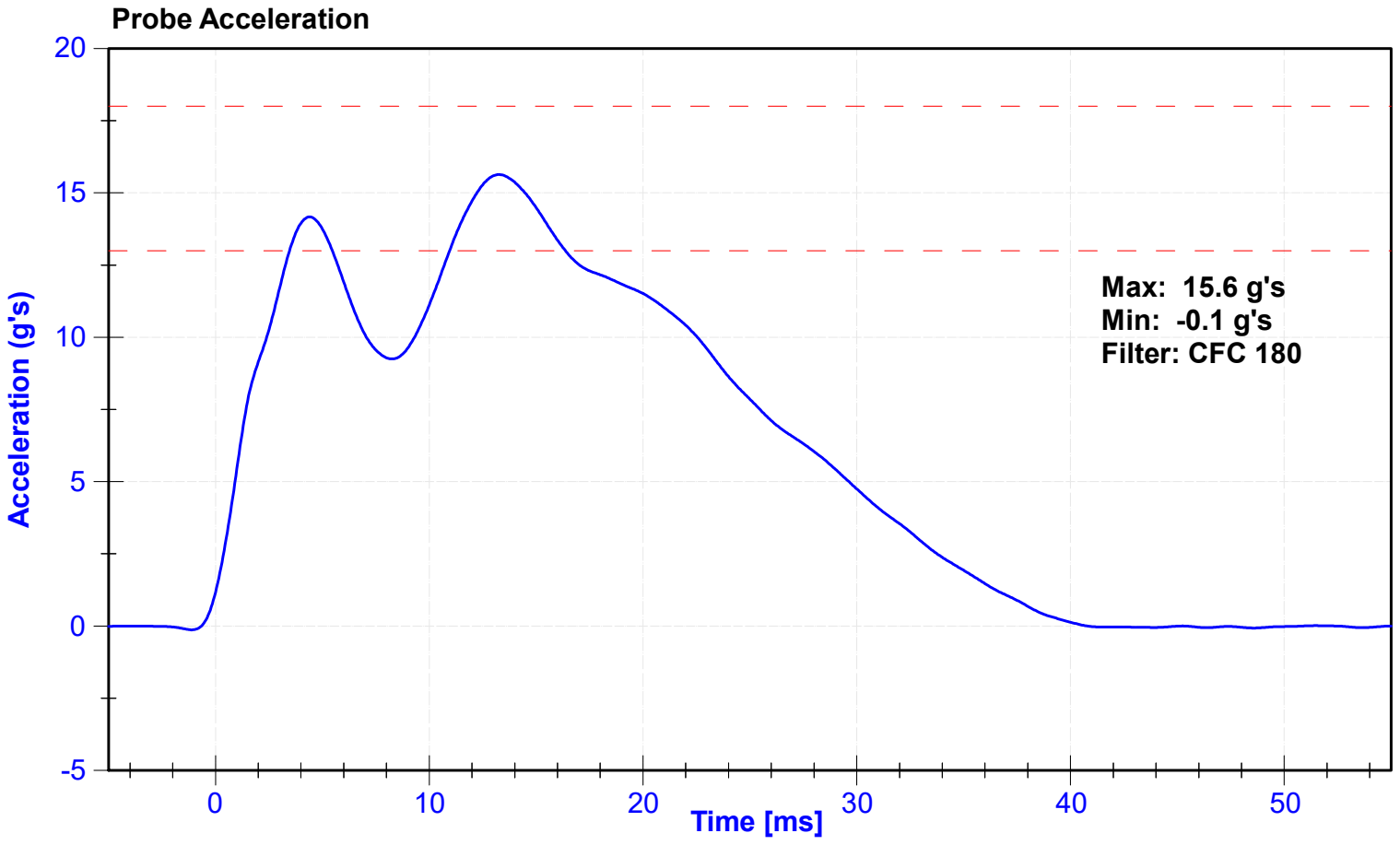
ATD Manufacturer	FTSS	Test Technician	D. Sakona
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

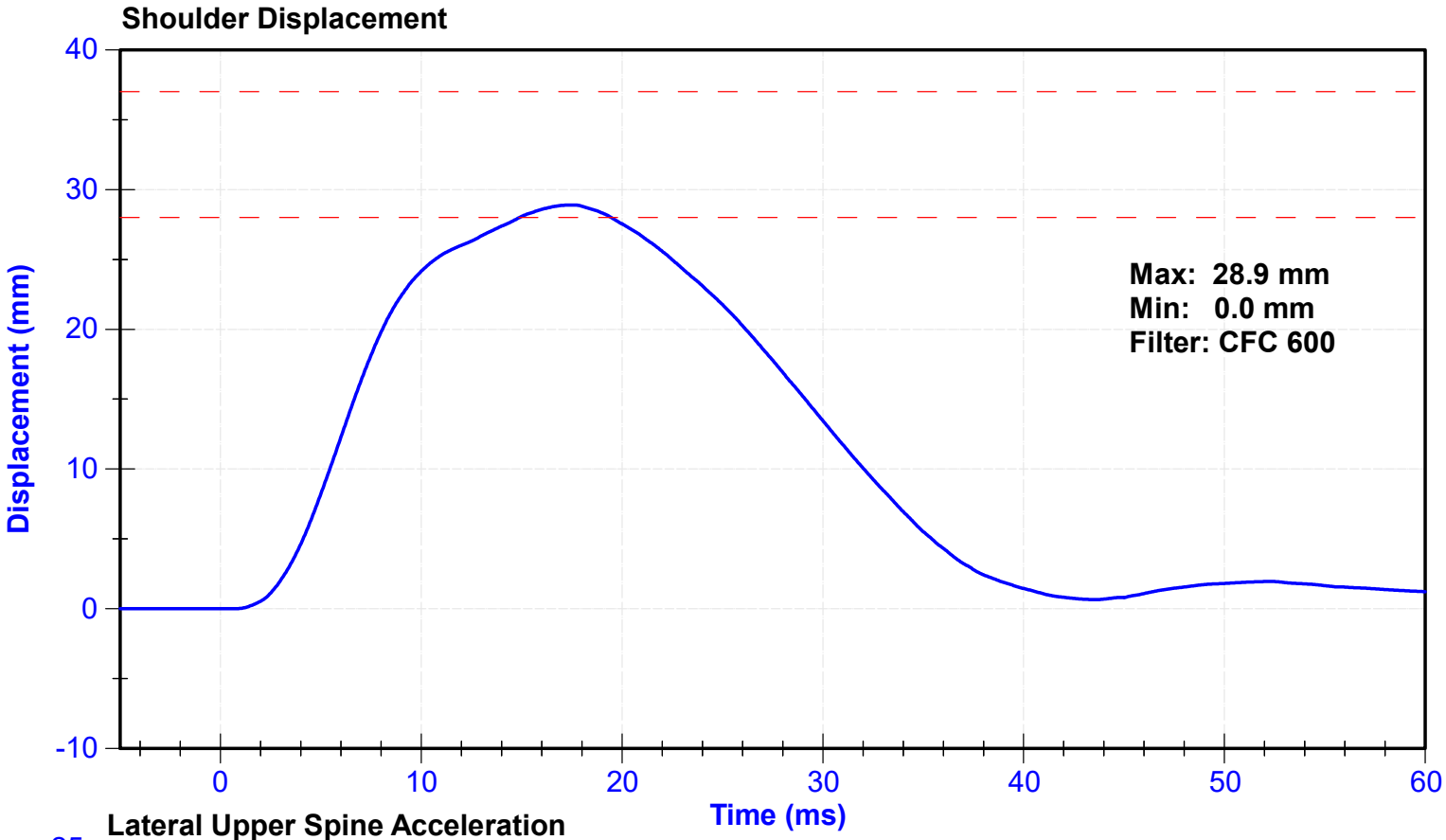
Results

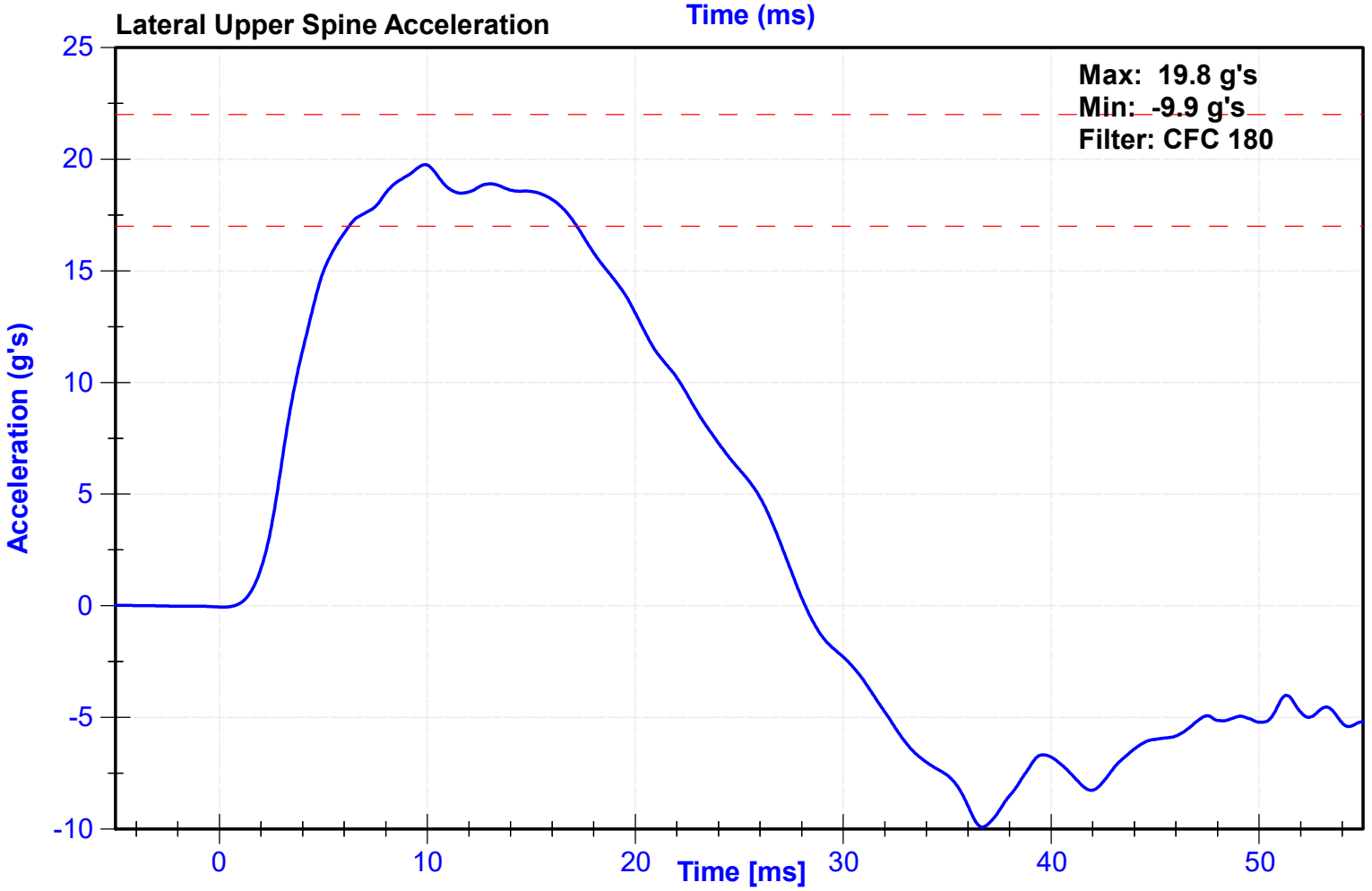
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.9	Pass
Humidity	10	70	%	26,5	Pass
Velocity	4.2	4.4	m/s	4.34	Pass
Probe Acceleration	13	18	g's	15.6	Pass
Shoulder Deflection	28	37	mm	28.9	Pass
Lateral Upper Spine Acceleration	17	22	g's	19.8	Pass

Transducer Calibrations

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




Shoulder Displacement
Displacement (mm)
40
30
20
10
0
-10
0
10
20
30
40
50
60
Time (ms)
Max: 28.9 mm
Min: 0.0 mm
Filter: CFC 600


Lateral Upper Spine Acceleration
Acceleration (g's)
25
20
15
10
5
0
-5
-10
0
10
20
30
40
50
Time [ms]
Max: 19.8 g's
Min: -9.9 g's
Filter: CFC 180

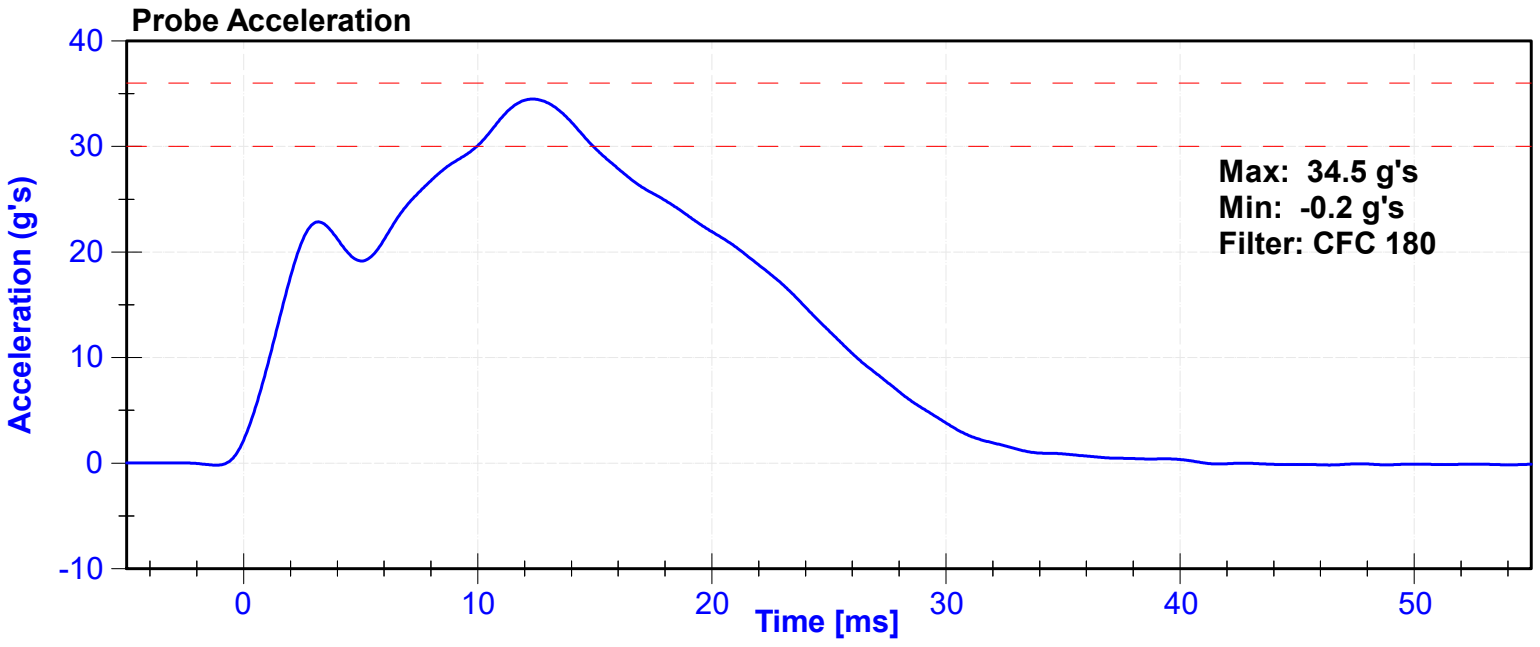
ATD Manufacturer	FTSS	Test Technician	D. Sakona
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

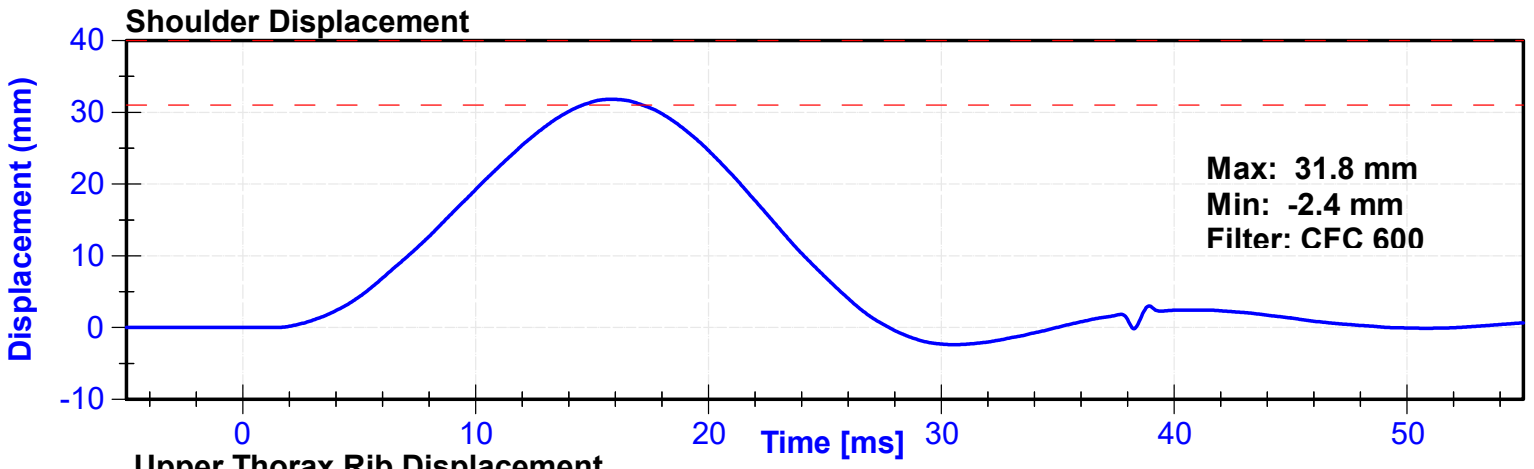
Results

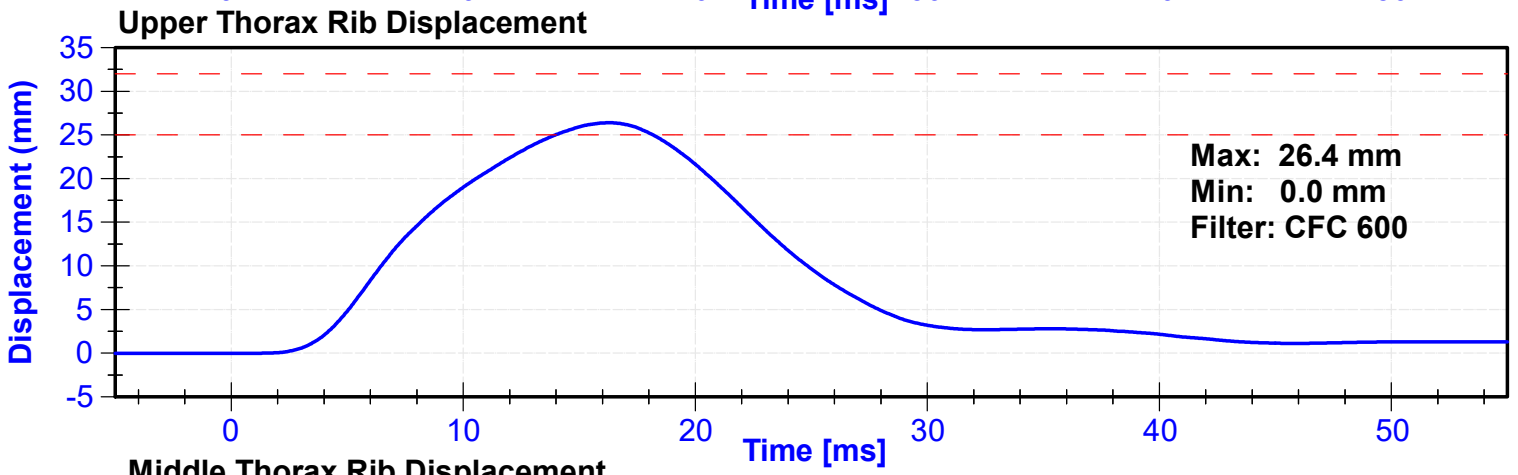
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.9	Pass
Humidity	10	70	%	26,5	Pass
Velocity	6.6	6.8	m/s	6.75	Pass
Probe Acceleration after 5 ms	30	36	g's	34.5	Pass
Lateral Upper Spine Acceleration	34	43	g's	38.0	Pass
Lateral Lower Spine Acceleration	29	37	g's	33.2	Pass
Shoulder Deflection	31	40	mm	31.8	Pass
Upper Thorax Rib Deflection	25	32	mm	26.4	Pass
Mid Thorax Rib Deflection	30	36	mm	30.9	Pass
Lower Thorax Rib Deflection	32	38	mm	34.2	Pass

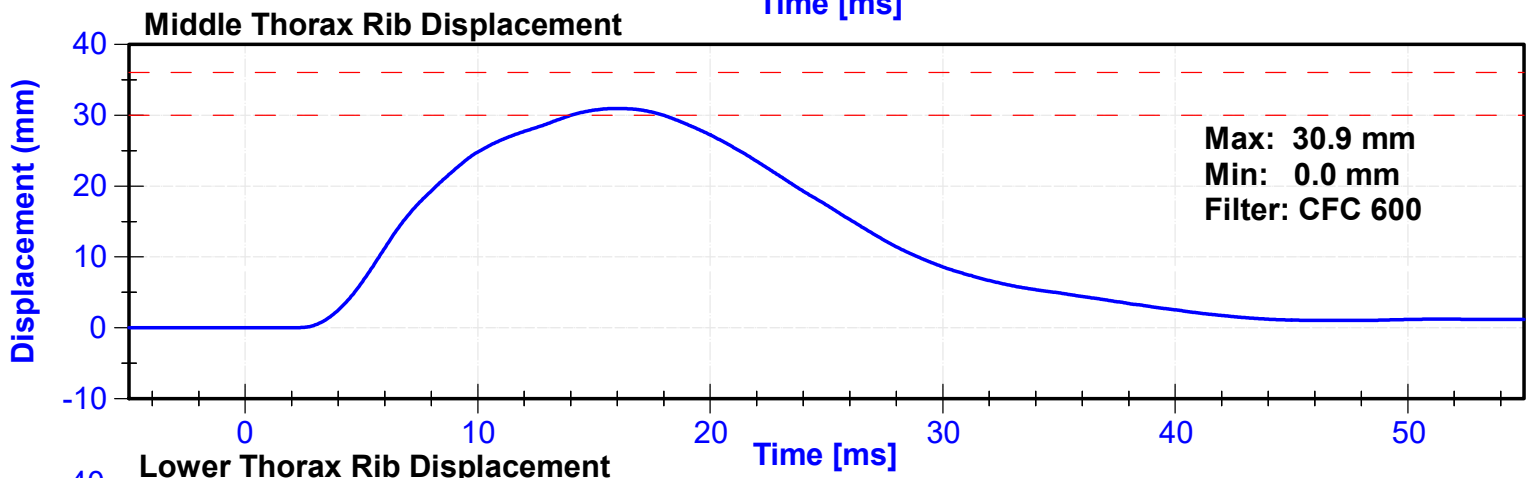
Transducer Calibrations

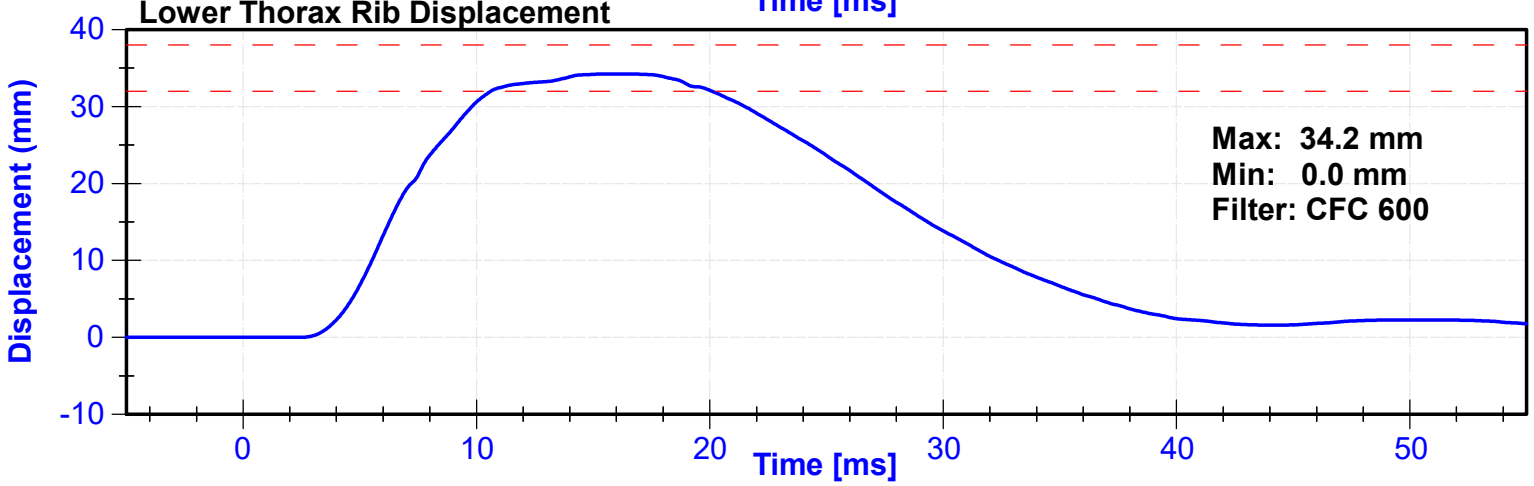
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	P51736	10/25/2022	10/25/2023
Upper Spine T1 Y Accelerometer	Endevco	T20880	10/3/2022	4/1/2023
Upper Spine T12 Y Accelerometer	Endevco	P52071	10/3/2022	4/1/2023
Shoulder Potentiometer	Servo	053GFE	10/4/2022	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

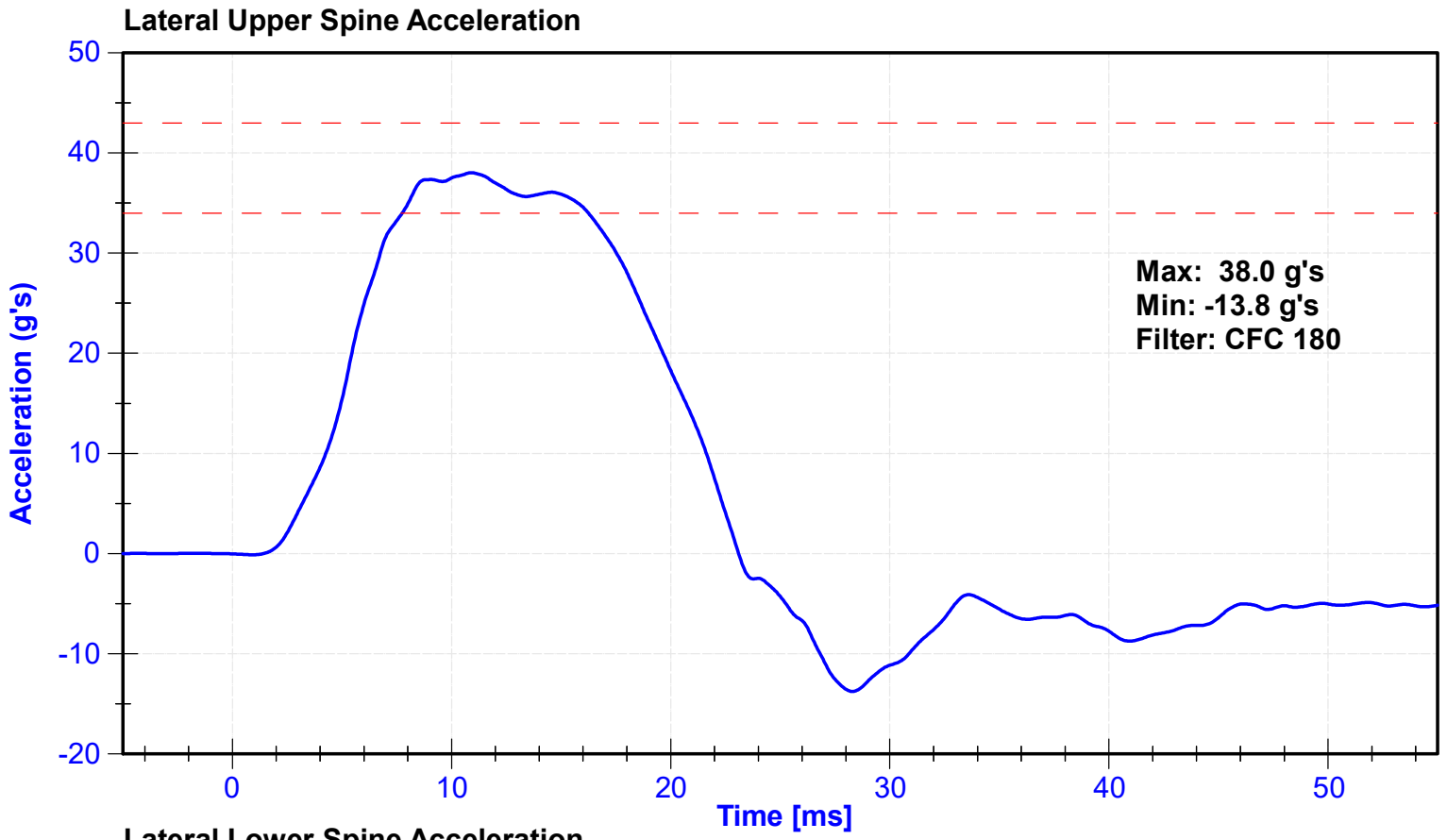


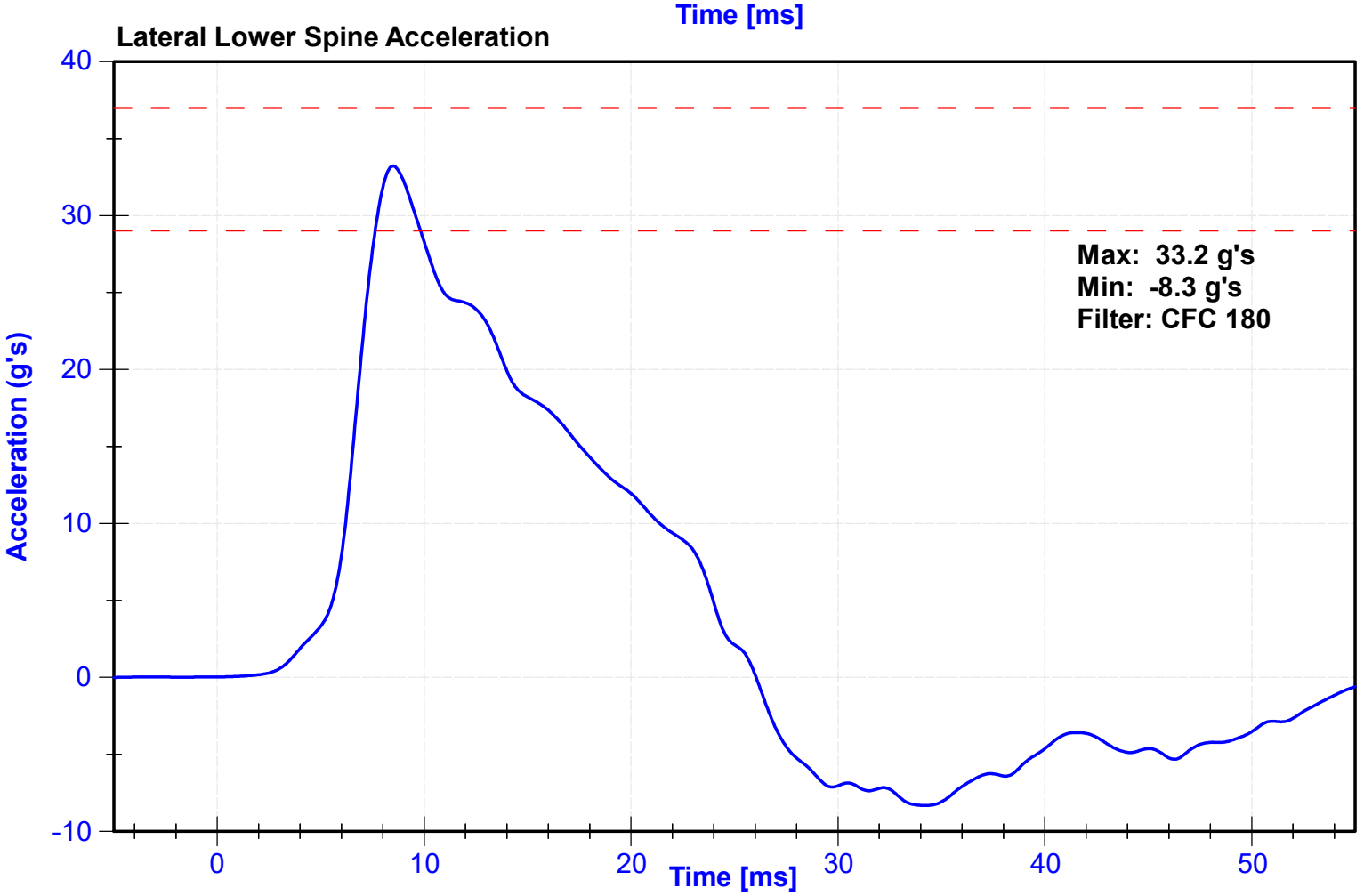

Shoulder Displacement
Displacement (mm)
Time [ms]
Max: 31.8 mm
Min: -2.4 mm
Filter: CFC 600


Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 26.4 mm
Min: 0.0 mm
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 30.9 mm
Min: 0.0 mm
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 34.2 mm
Min: 0.0 mm
Filter: CFC 600


Lateral Upper Spine Acceleration
Acceleration (g's)
50
40
30
20
10
0
-10
-20
0
10
20
30
40
50
Time [ms]
Max: 38.0 g's
Min: -13.8 g's
Filter: CFC 180


Lateral Lower Spine Acceleration
Acceleration (g's)
40
30
20
10
0
-10
0
10
20
30
40
50
Time [ms]
Max: 33.2 g's
Min: -8.3 g's
Filter: CFC 180

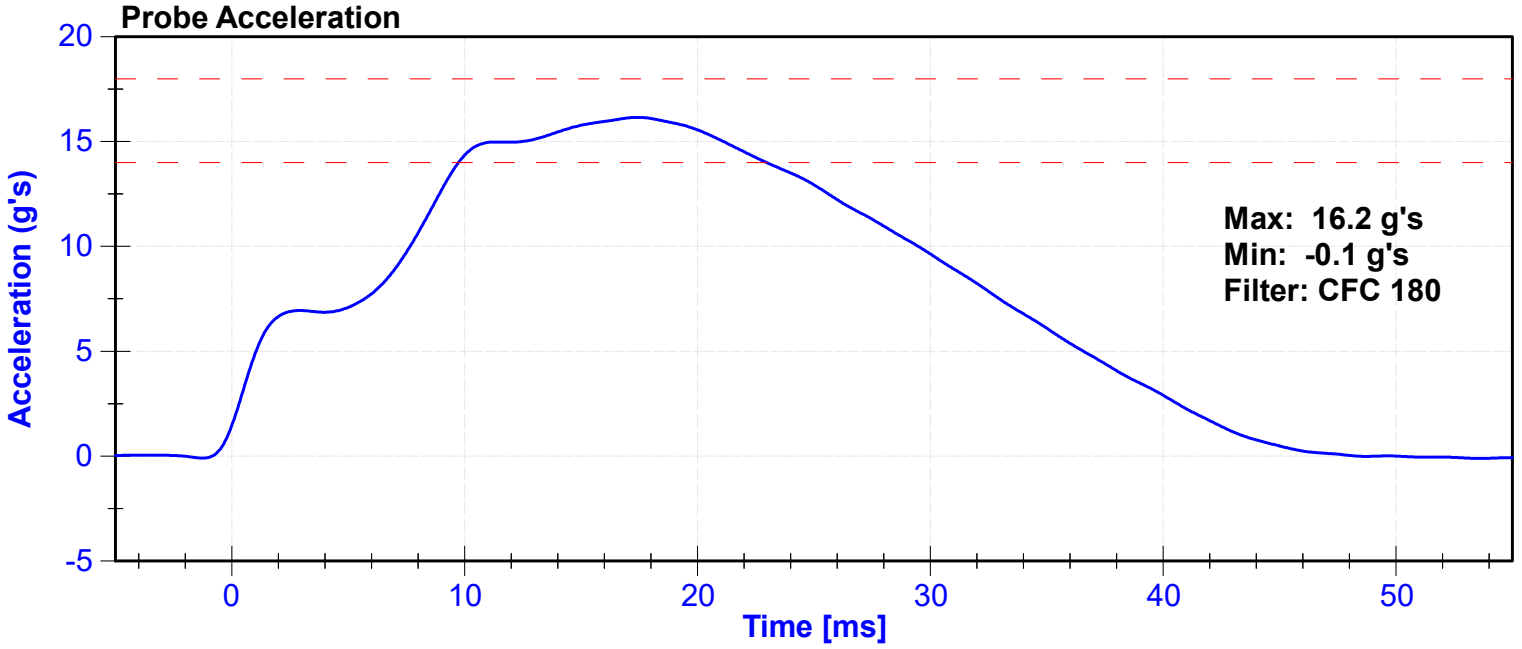
ATD Manufacturer	FTSS	Test Technician	D. Sakona
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

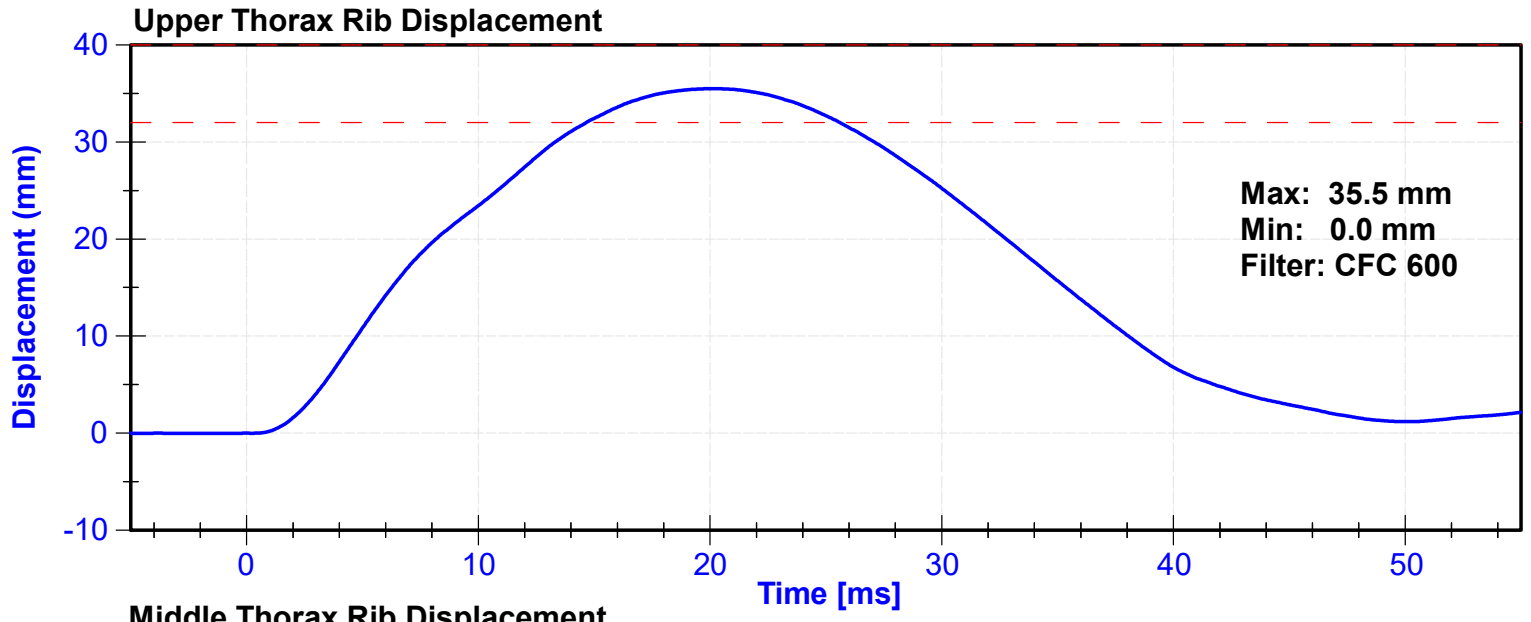
Results

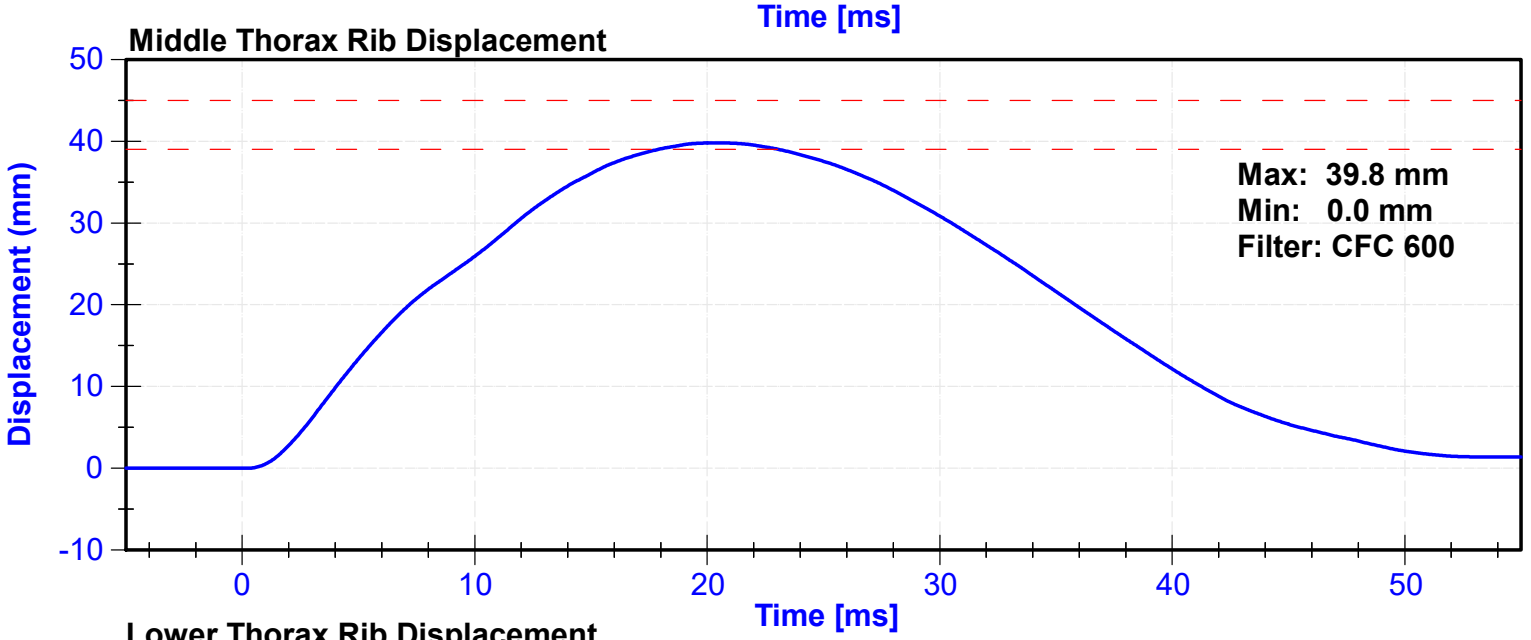
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.9	Pass
Humidity	10	70	%	26,5	Pass
Velocity	4.2	4.4	m/s	4.35	Pass
Probe Acceleration	14	18	g's	16.2	Pass
Lateral Upper Spine Acceleration	13	17	g's	15.6	Pass
Lateral Lower Spine Acceleration	7	11	g's	9.4	Pass
Upper Thorax Rib Deflection	32	40	mm	35.5	Pass
Middle Thorax Rib Deflection	39	45	mm	39.8	Pass
Lower Thorax Rib Deflection	35	43	mm	37.3	Pass

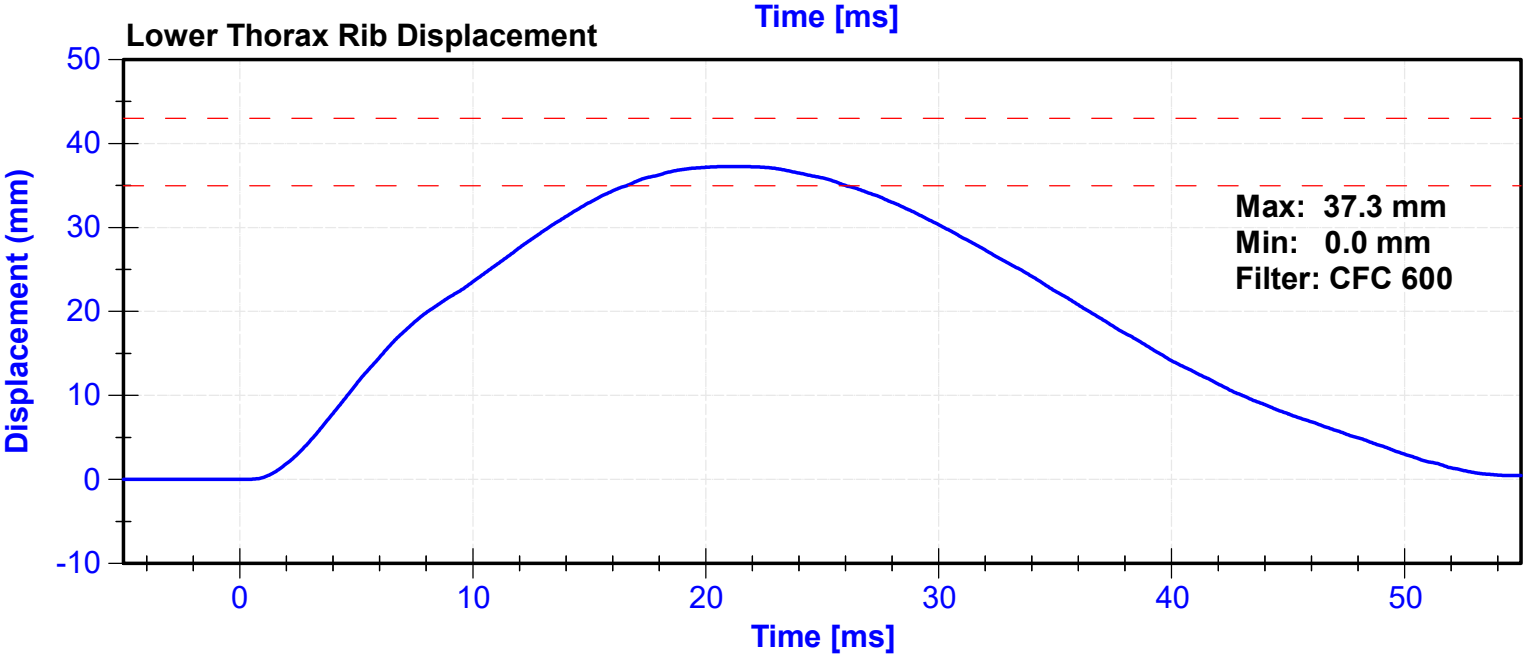
Transducer Calibrations

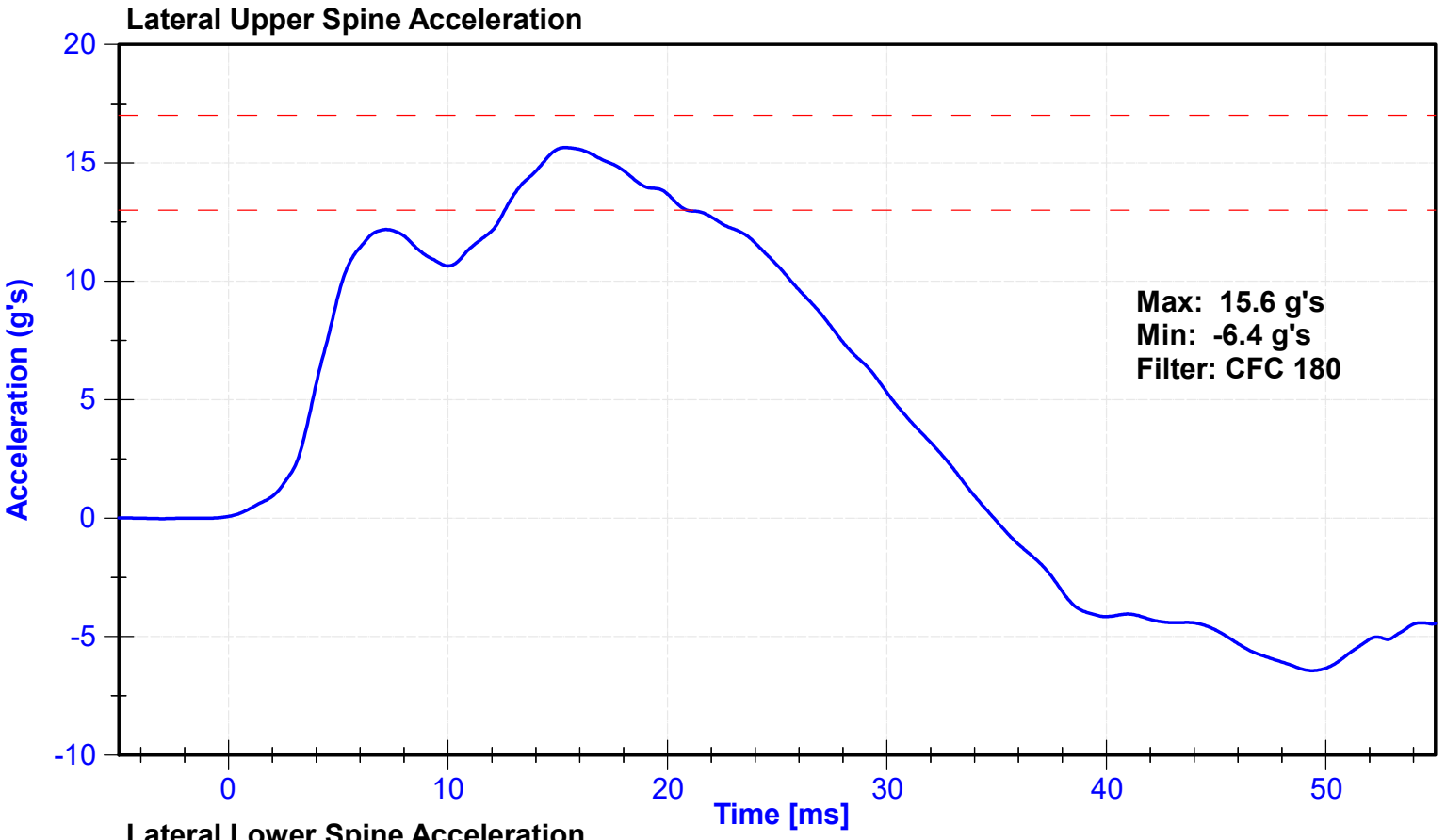
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	P51736	10/25/2022	10/25/2023
Upper Spine Y Accelerometer	Endevco	T20880	10/3/2022	4/1/2023
Lower Spine Y Accelerometer	Endevco	P52071	10/3/2022	4/1/2023
Upper Thorax Rib Potentiometer	Servo	2316GFE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

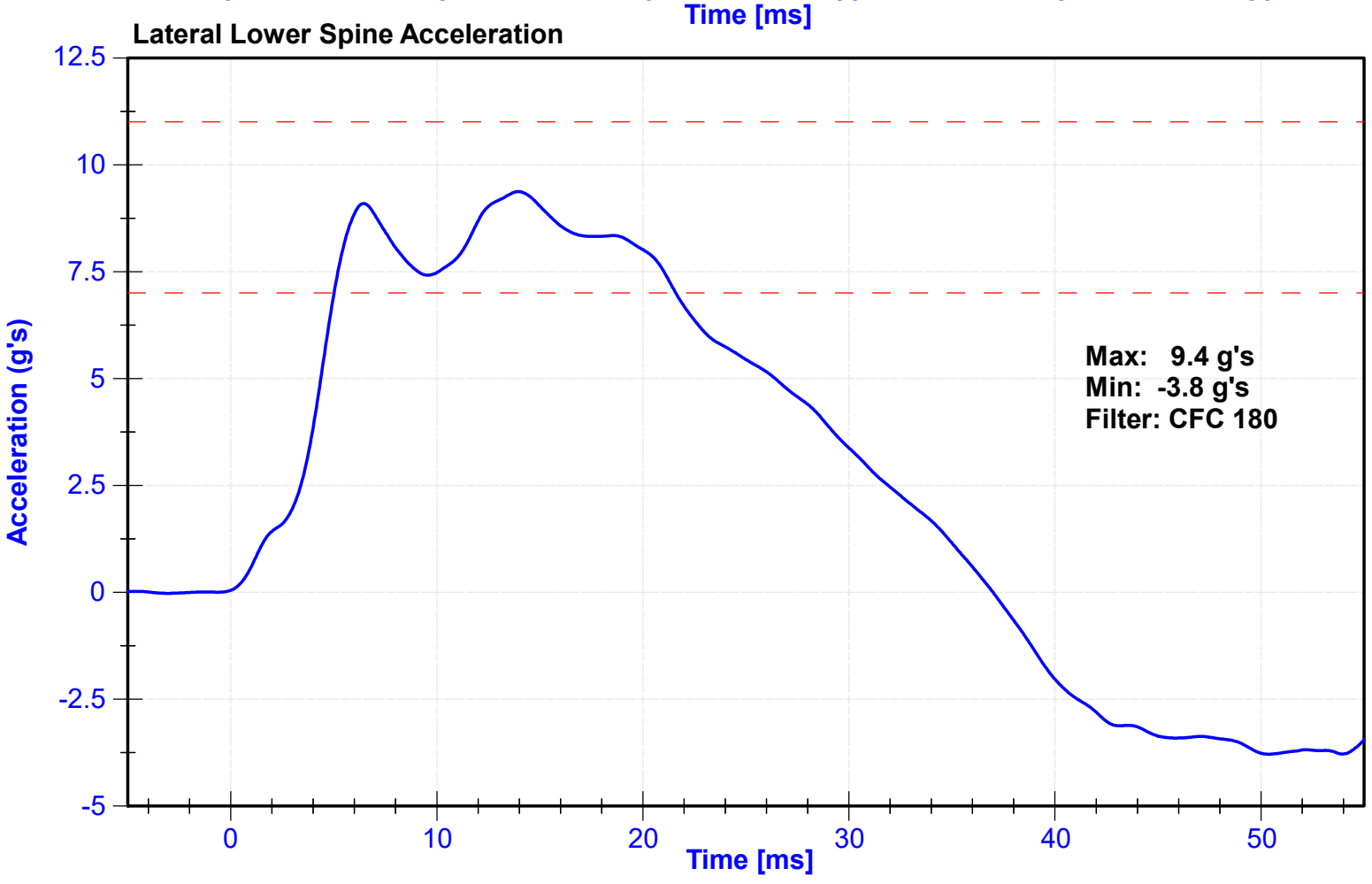



Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 35.5 mm
Min: 0.0 mm
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 39.8 mm
Min: 0.0 mm
Filter: CFC 600


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


Lateral Upper Spine Acceleration
Acceleration (g's)
20
15
10
5
0
-5
-10
0
10
20
30
40
50
Time [ms]
Max: 15.6 g's
Min: -6.4 g's
Filter: CFC 180


Lateral Lower Spine Acceleration
Acceleration (g's)
12.5
10
7.5
5
2.5
0
-2.5
-5
0
10
20
30
40
50
Time [ms]
Max: 9.4 g's
Min: -3.8 g's
Filter: CFC 180

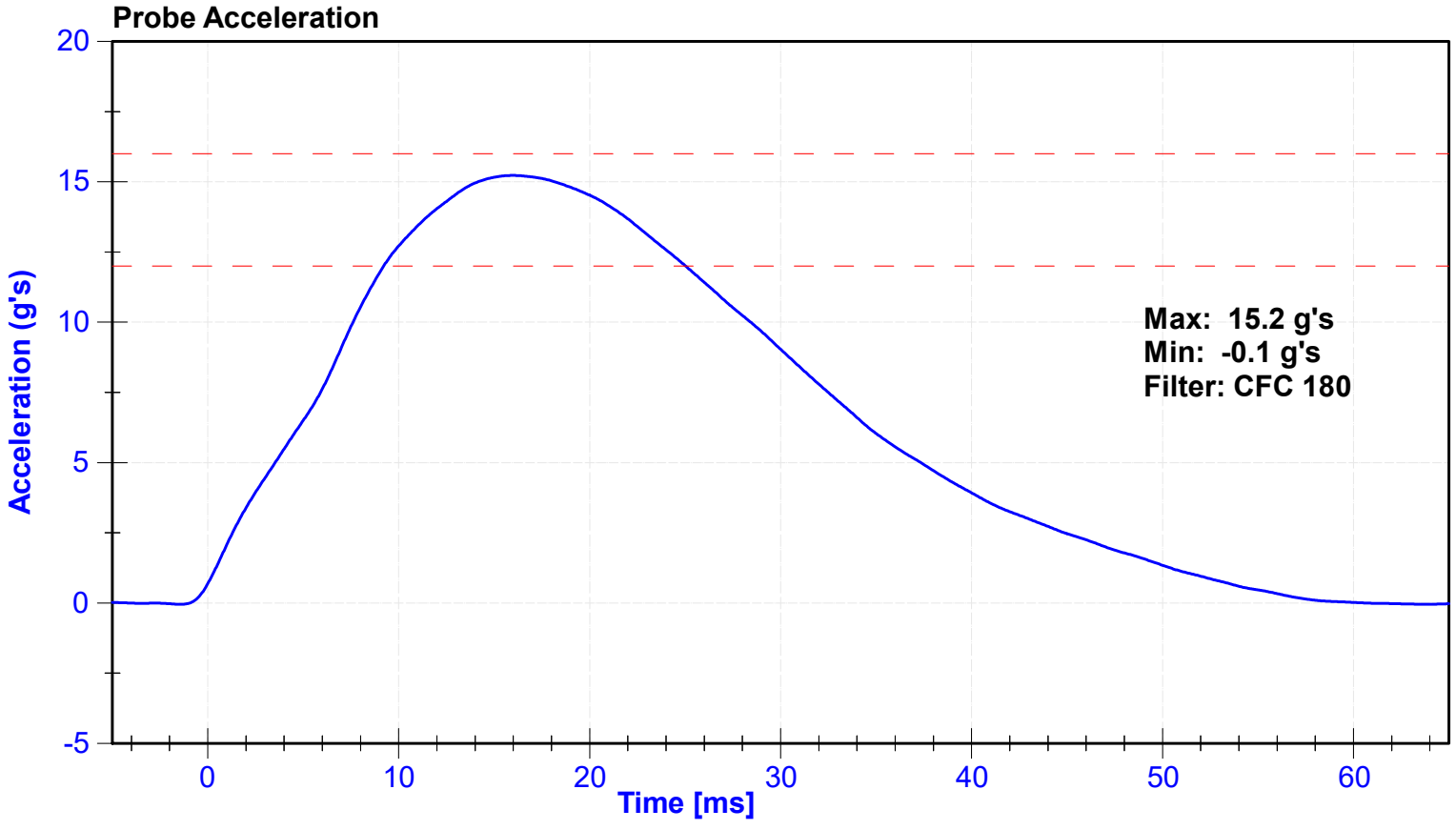
ATD Manufacturer	FTSS	Test Technician	D. Sakona
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

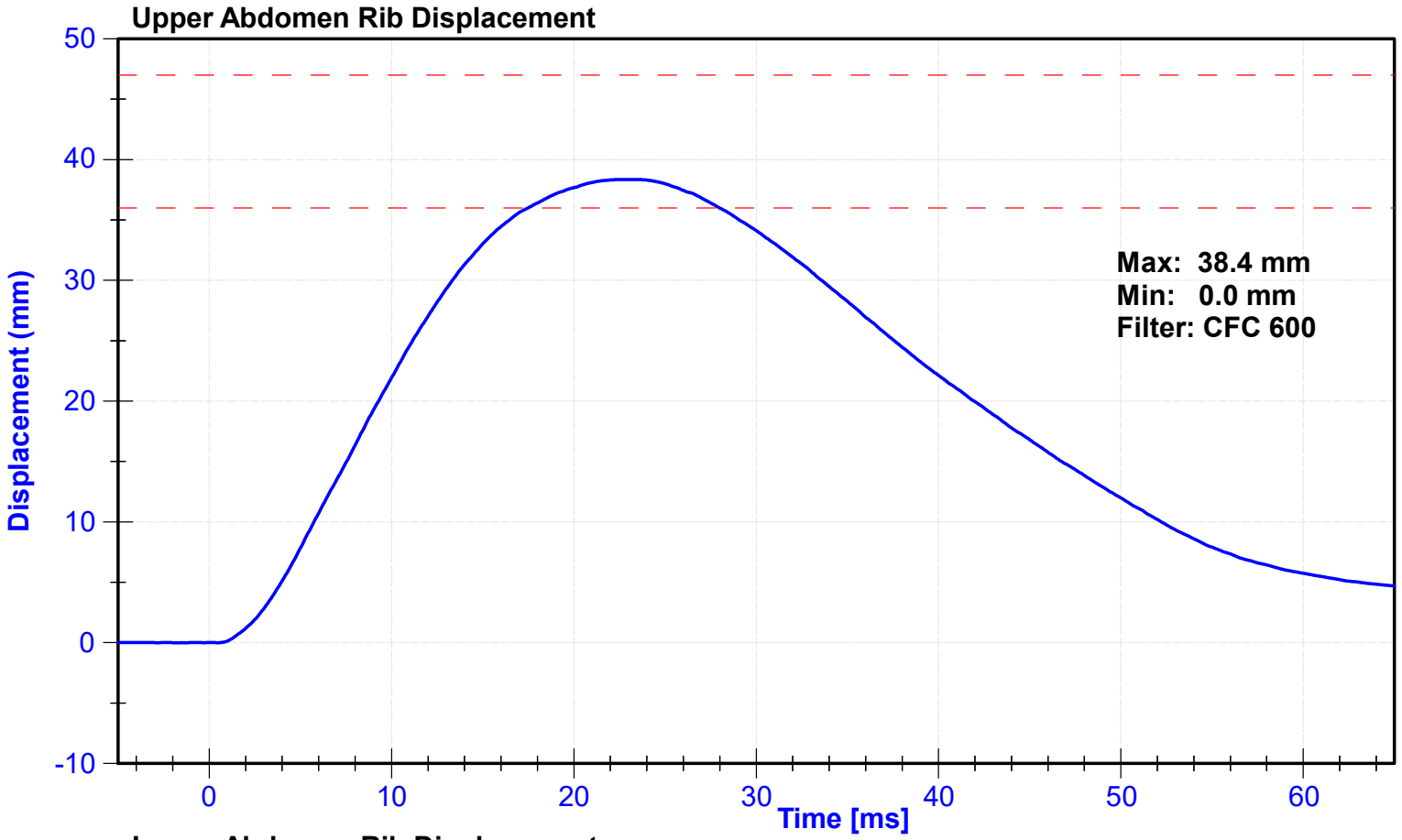
Results

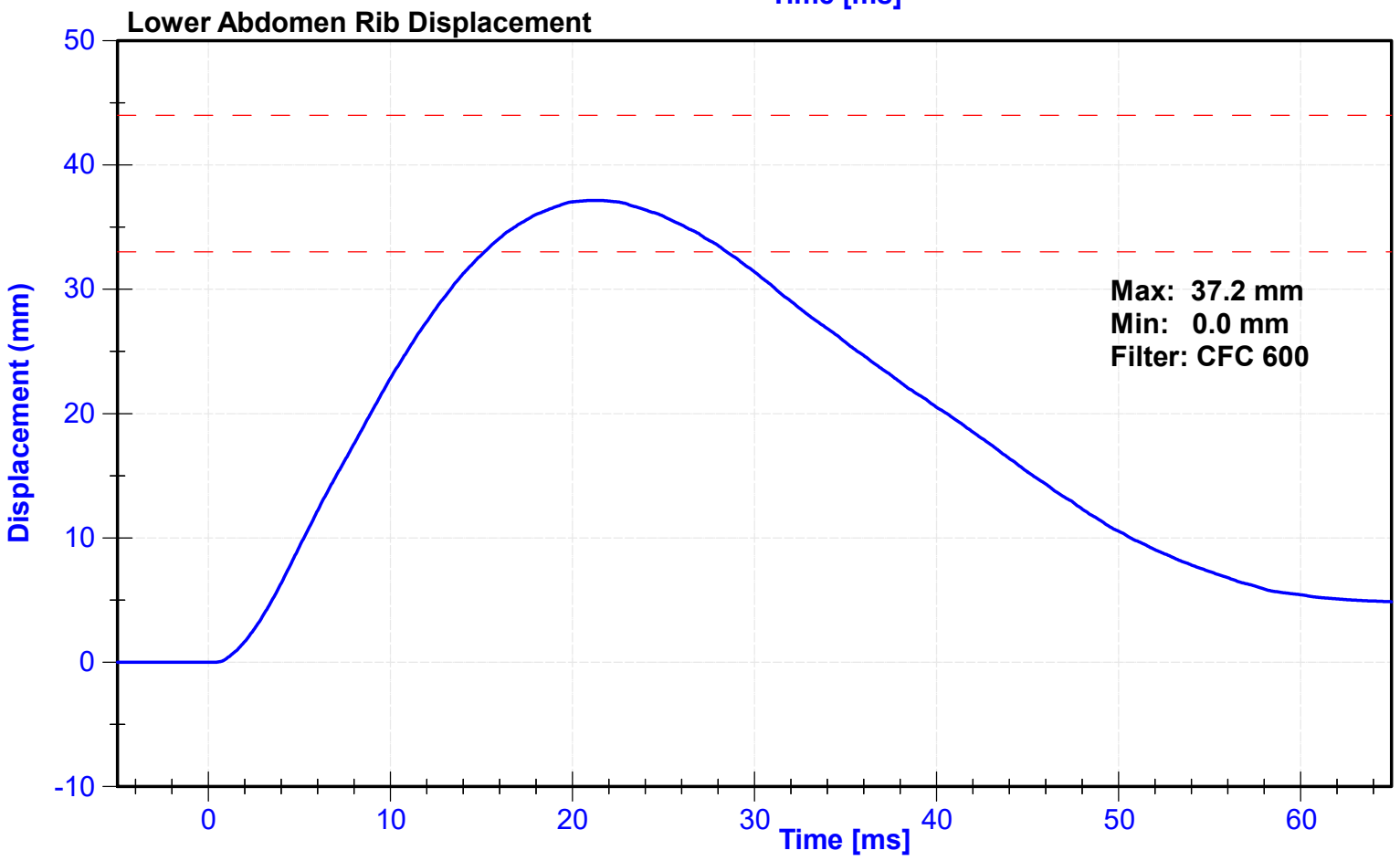
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.9	Pass
Humidity	10	70	%	26,5	Pass
Velocity	4.2	4.4	m/s	4.34	Pass
Probe Acceleration	12	16	g's	15.2	Pass
Lateral Lower Spine Acceleration	9	14	g's	12.3	Pass
Upper Abdomen Rib Deflection	36	47	mm	38.4	Pass
Lower Abdomen Rib Deflection	33	44	mm	37.2	Pass

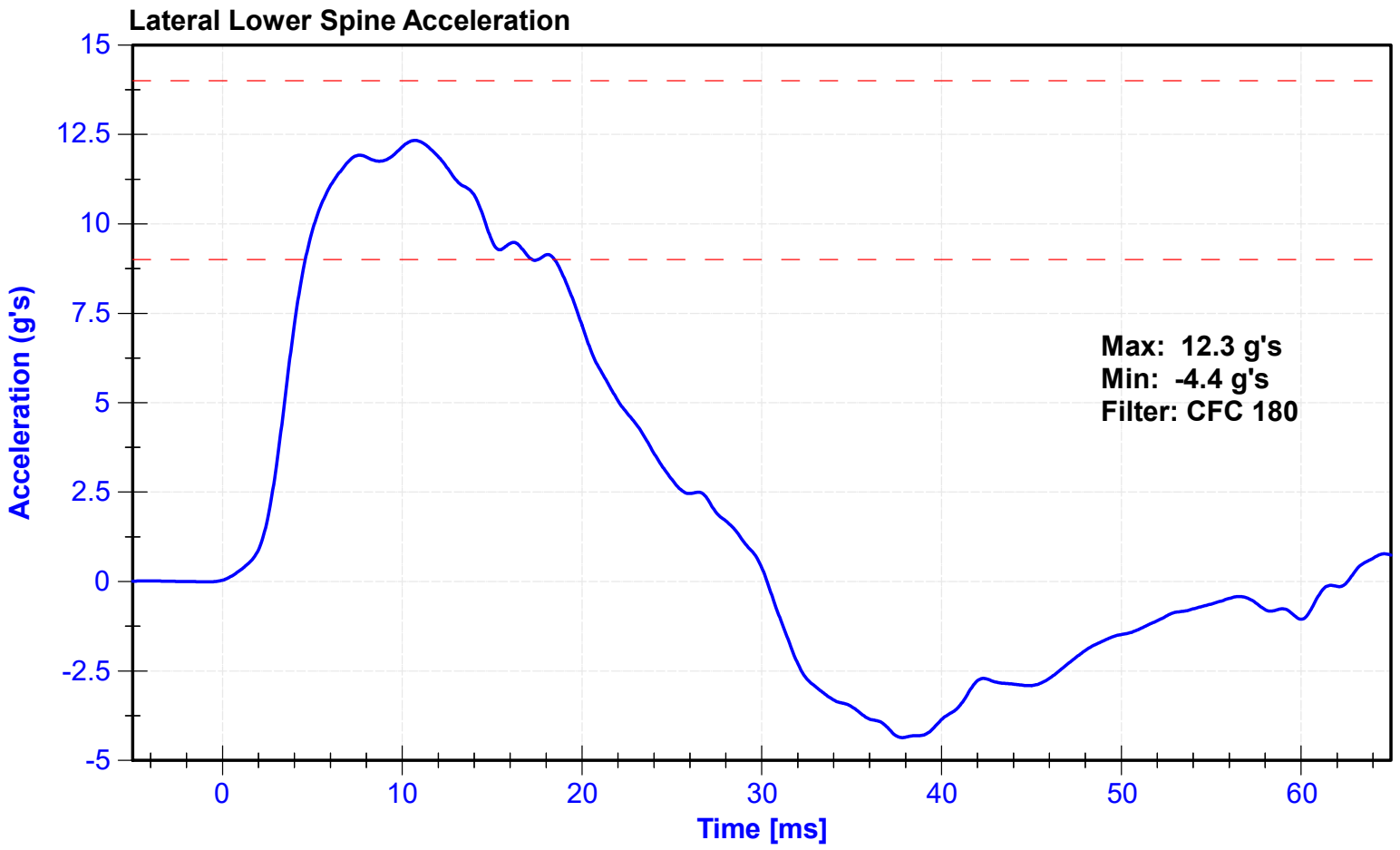
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	P51736	10/25/2022	10/25/2023
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




Upper Abdomen Rib Displacement
Displacement (mm)
50
40
30
20
10
0
-10
0
10
20
30
40
50
60
Time [ms]
Max: 38.4 mm
Min: 0.0 mm
Filter: CFC 600


Lower Abdomen Rib Displacement
Displacement (mm)
50
40
30
20
10
0
-10
0
10
20
30
40
50
60
Time [ms]
Max: 37.2 mm
Min: 0.0 mm
Filter: CFC 600


Lateral Lower Spine Acceleration
Acceleration (g's)
15
12.5
10
7.5
5
2.5
0
-2.5
-5
0
10
20
30
40
50
60
Time [ms]
Max: 12.3 g's
Min: -4.4 g's
Filter: CFC 180

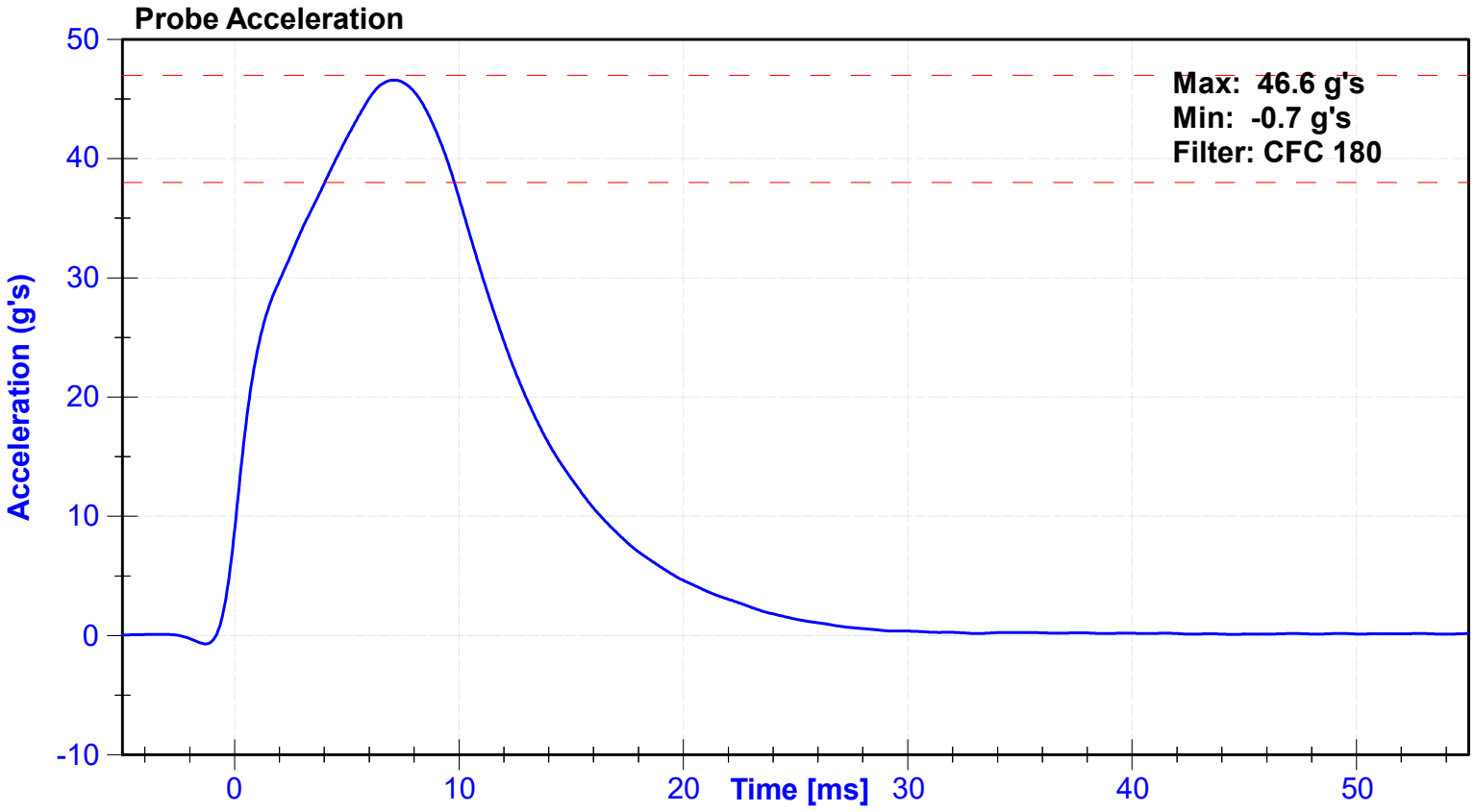
ATD Manufacturer	FTSS	Test Technician	D. Sakona
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

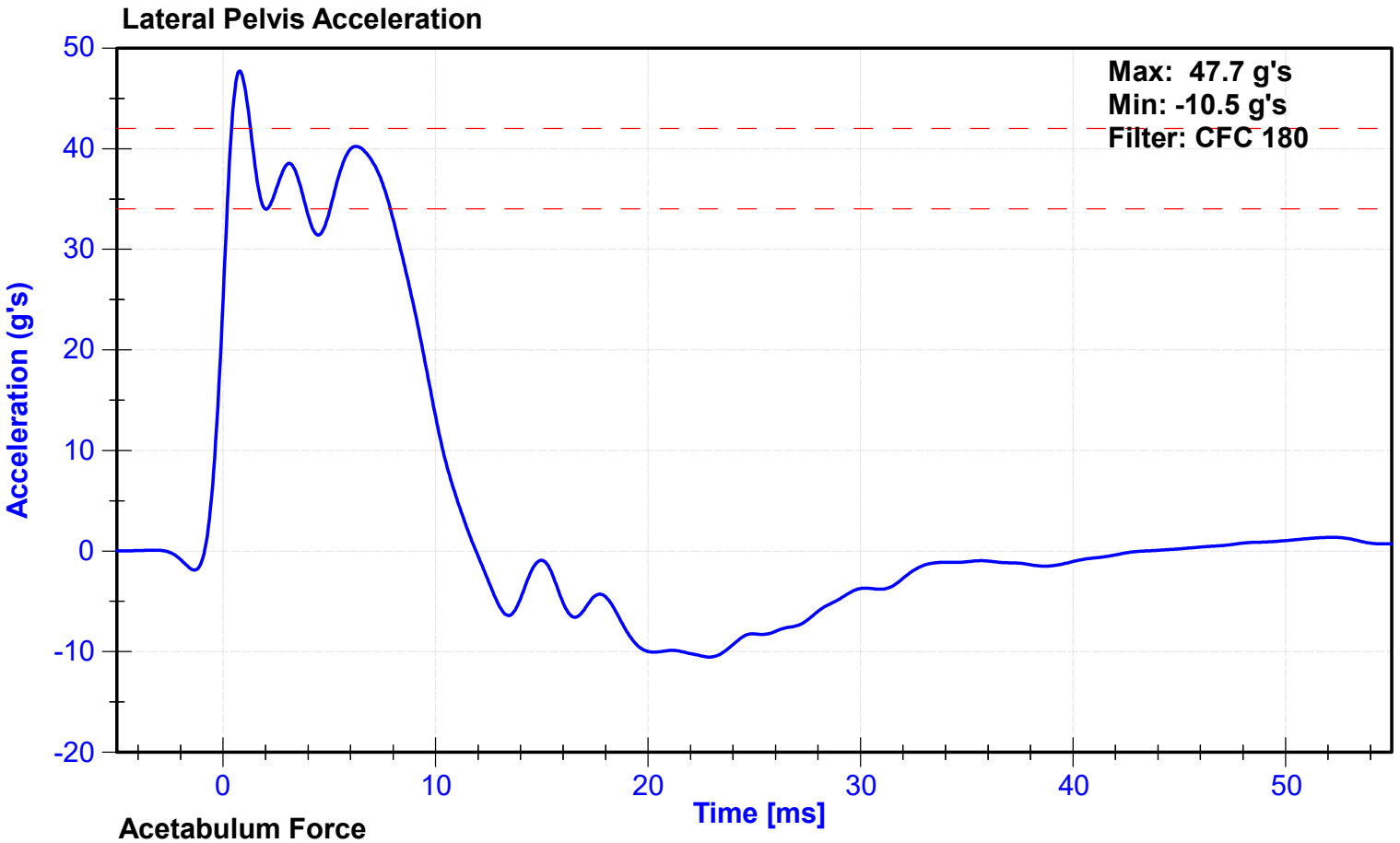
Results

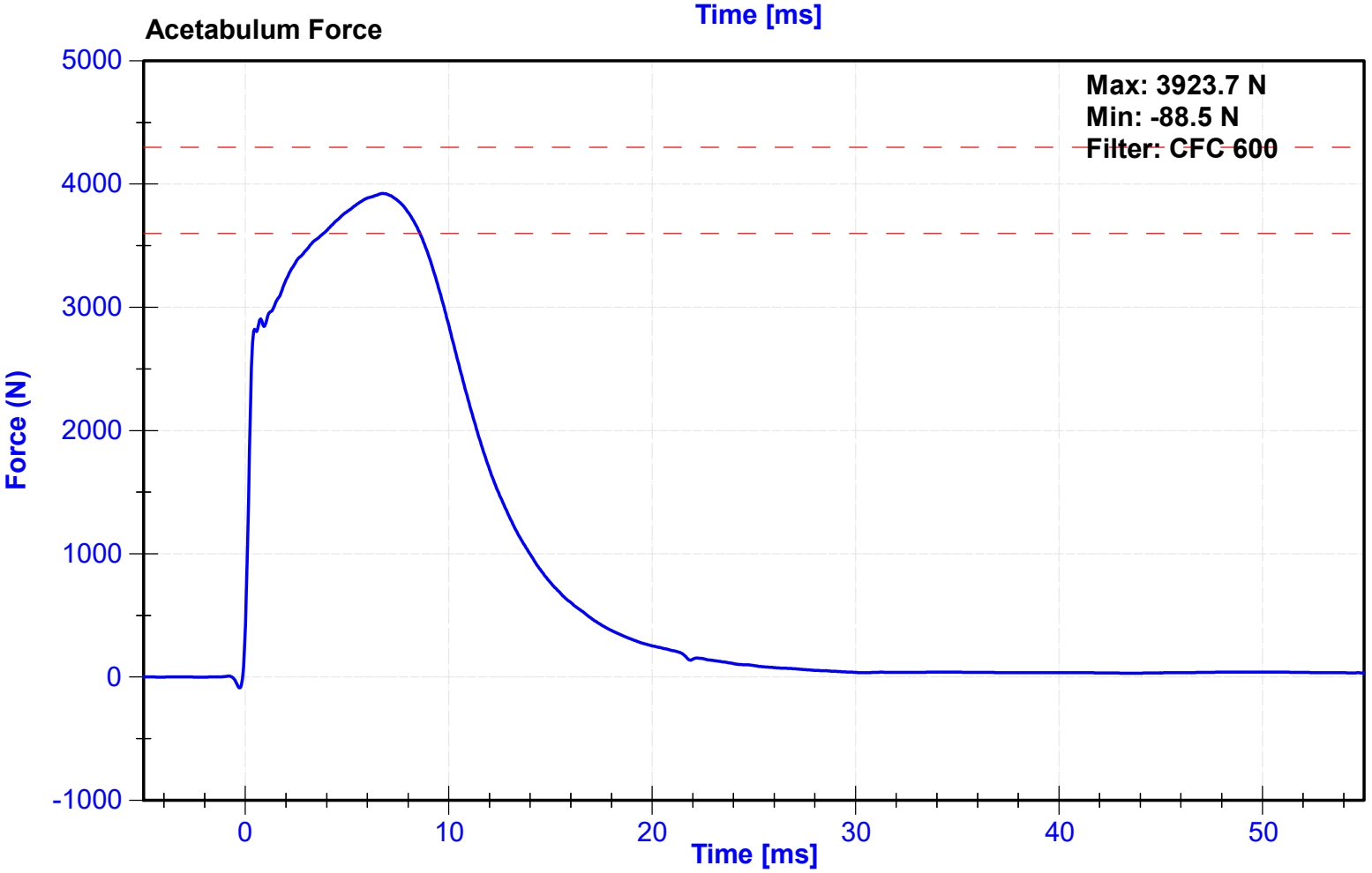
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.9	Pass
Humidity	10	70	%	26,5	Pass
Velocity	6.6	6.8	m/s	6.73	Pass
Probe Acceleration	38	47	g's	46.6	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	40.2	Pass
Acetabulum Force	3600	4300	N	3923.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	P51736	10/25/2022	10/25/2023
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




Lateral Pelvis Acceleration
Max: 47.7 g's
Min: -10.5 g's
Filter: CFC 180
Acceleration (g's)
50
40
30
20
10
0
-10
-20
0
10
20
30
40
50
Time [ms]


Acetabulum Force
Max: 3923.7 N
Min: -88.5 N
Filter: CFC 600
Force (N)
5000
4000
3000
2000
1000
0
-1000
0
10
20
30
40
50
Time [ms]

Cert prepared 2/17/23

SID-IIs Pelvis Plug Certification Test

Plug S/N 15211
Test Number 17962
Report Number 18011
Test Date 3/10/2021 11:56:43 AM

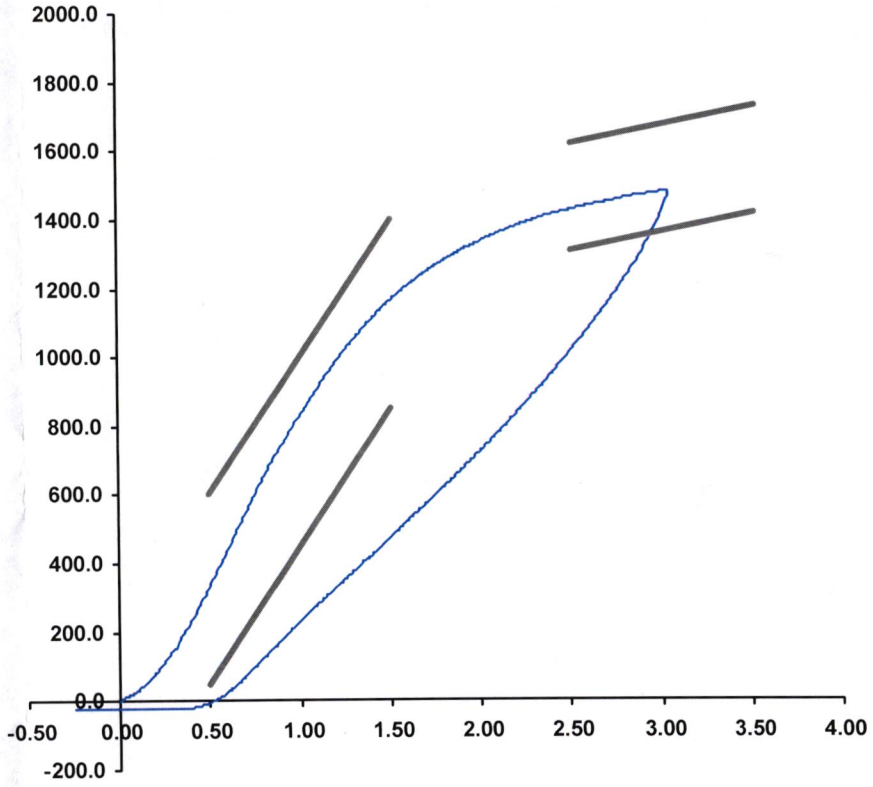
	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	336	50	600
Force @ 1.5 mm (N)	1,165	850	1,400
Force @ 2.5 mm (N)	1,430	1,306	1,618
Force @ 3.0 mm (N)	1,480	1,361	1,673

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 10-Mar-21
SACO Research

By : DC Date : 3/10/2021

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

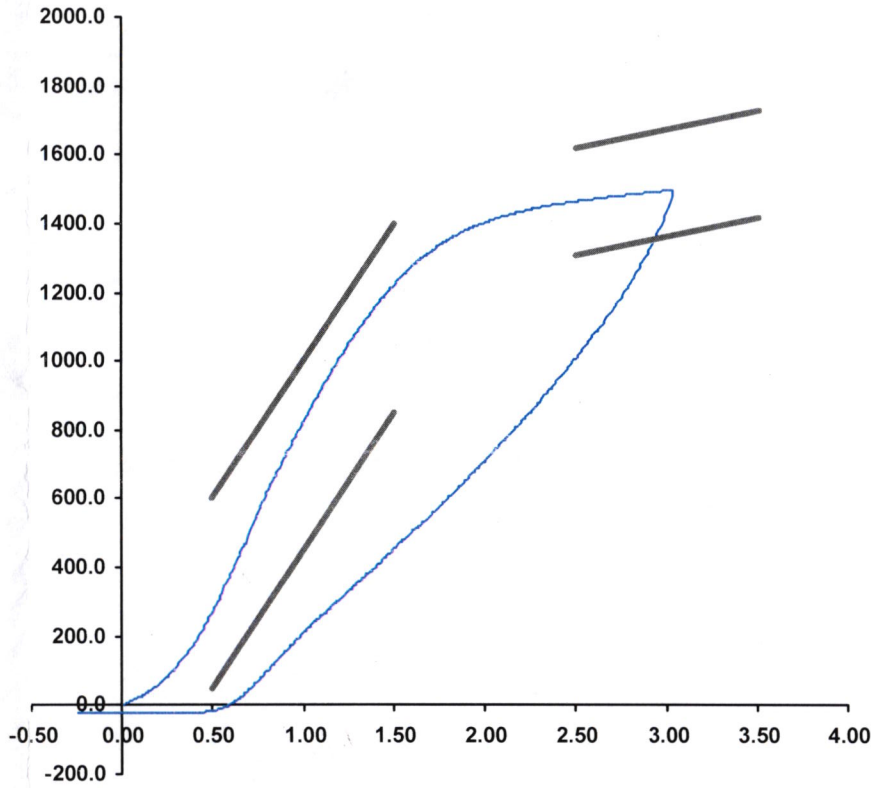
Test Impact Side
prepared 2/17/23

SID-IIs Pelvis Plug Certification Test

Plug S/N 15459
Test Number 20120
Report Number 20174
Test Date 9/9/2021 11:00:50 AM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	277	50	600
Force @ 1.5 mm (N)	1,227	850	1,400
Force @ 2.5 mm (N)	1,466	1,306	1,618
Force @ 3.0 mm (N)	1,497	1,361	1,673

Force (-N) vs Extension (-mm)



Testing Machine STM-20 5965542
Load Cell S/N (FI360947), 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:

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

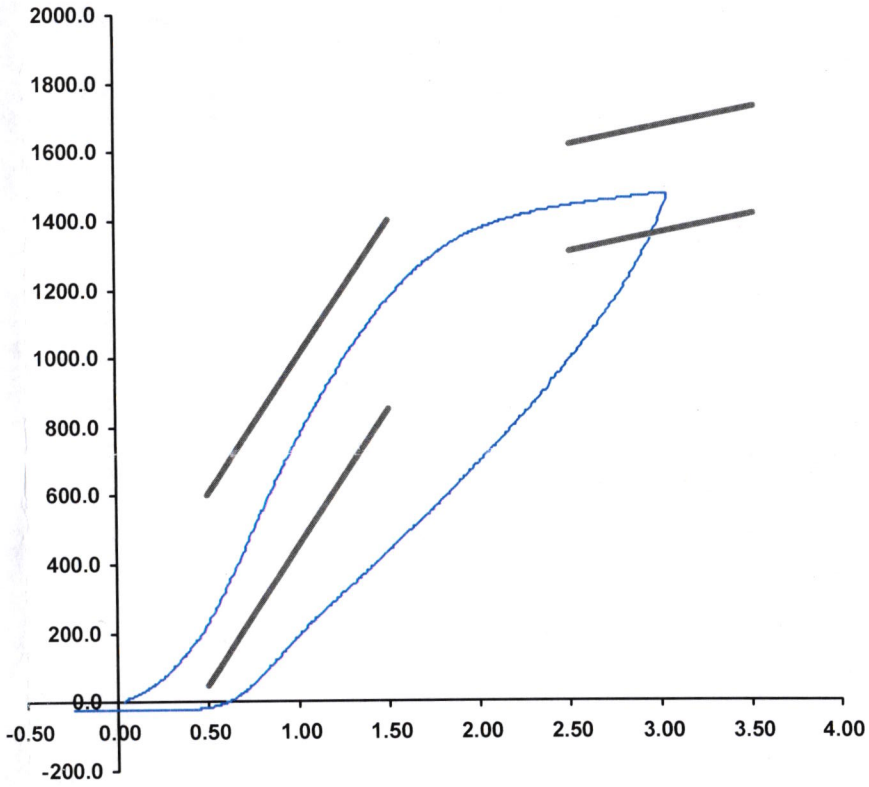
Test Non Impact
prepared 2/17/23

SID-IIs Pelvis Plug Certification Test

Plug S/N 15442
Test Number 20103
Report Number 20157
Test Date 9/9/2021 10:31:18 AM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	235	50	600
Force @ 1.5 mm (N)	1,175	850	1,400
Force @ 2.5 mm (N)	1,443	1,306	1,618
Force @ 3.0 mm (N)	1,476	1,361	1,673

Force (-N) vs Extension (-mm)



Testing Machine STM-20 5965542
Load Cell S/N (FI360947), 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:

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

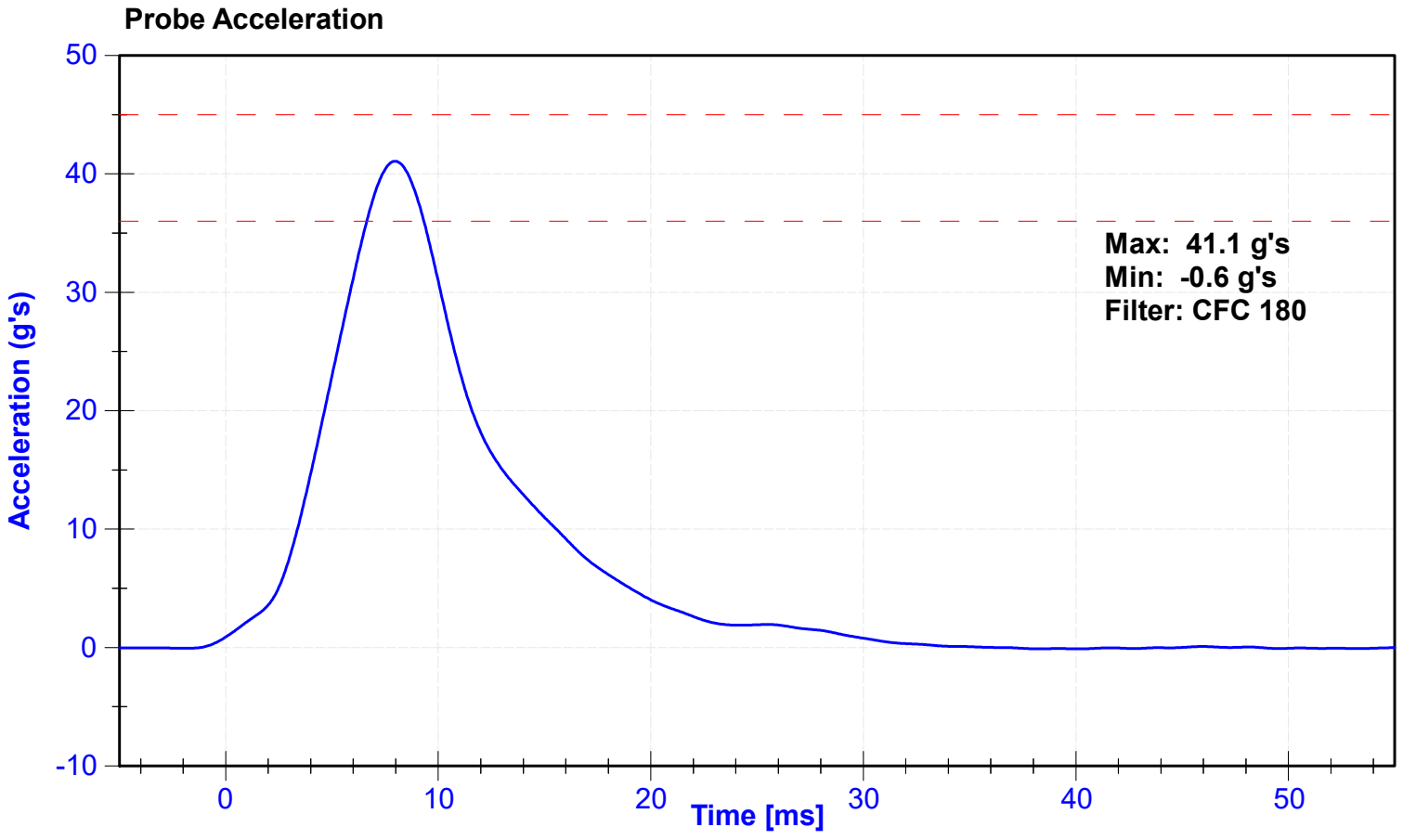
ATD Manufacturer	FTSS	Test Technician	D. Sakona
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

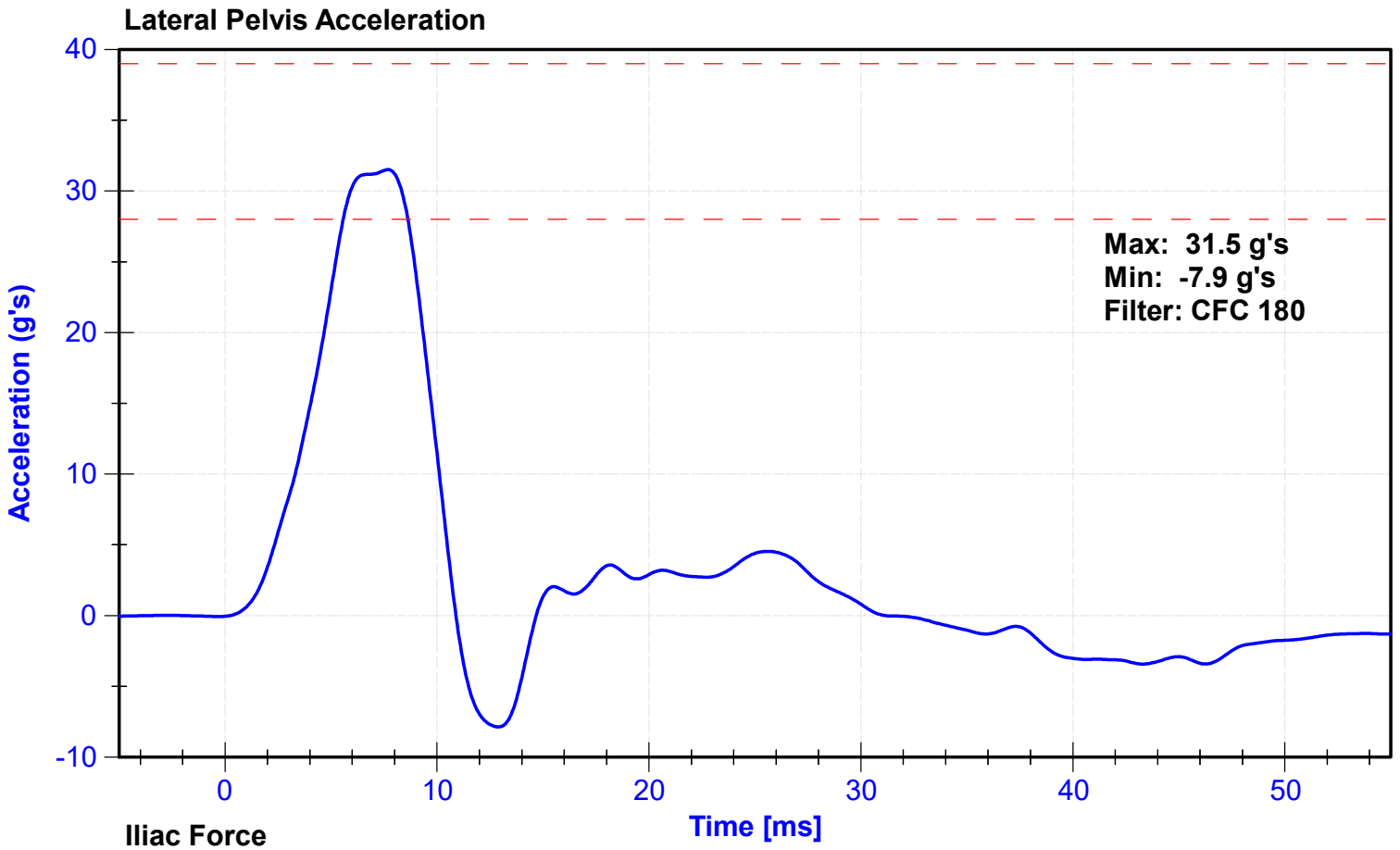
Results

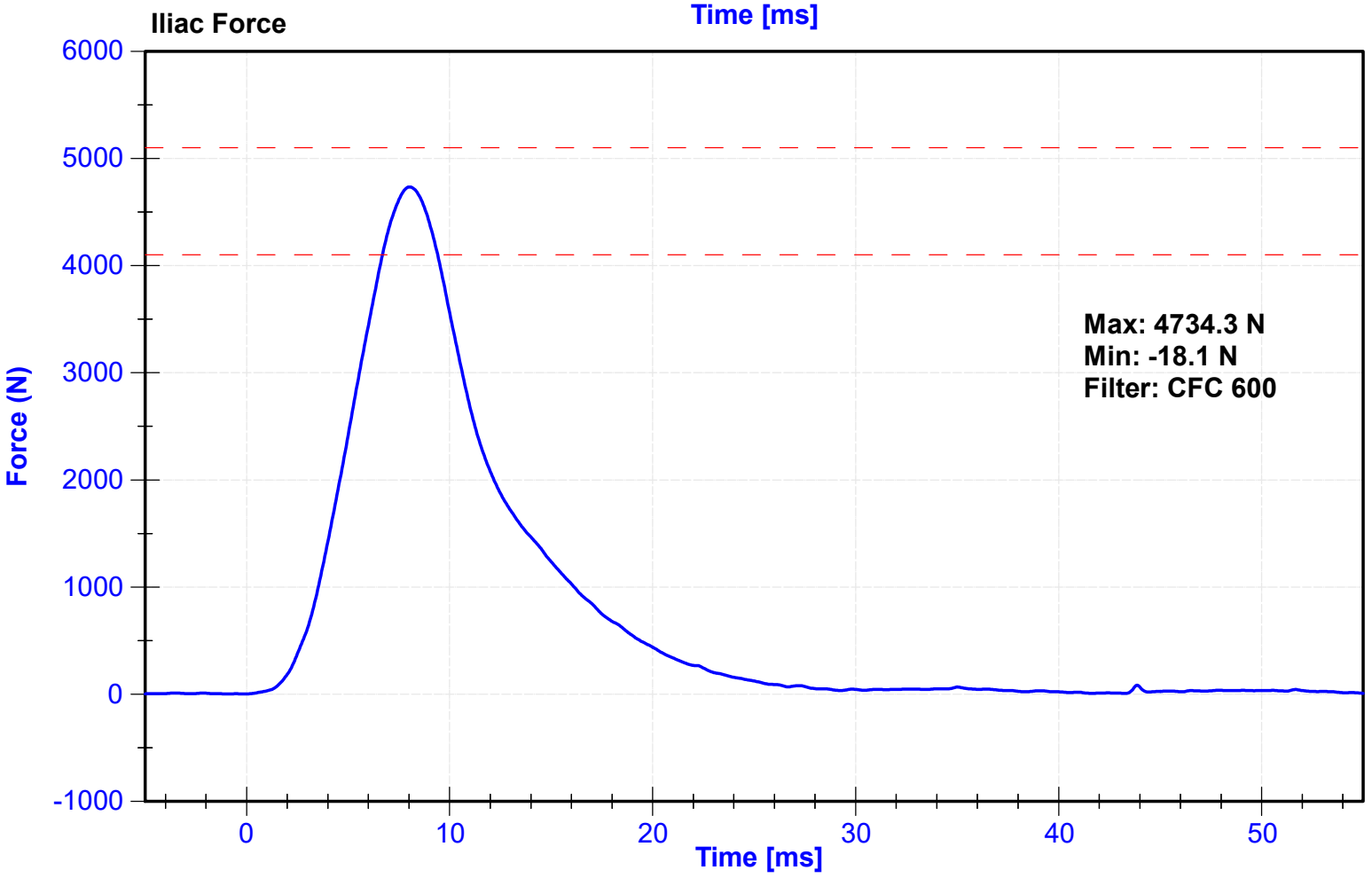
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.9	Pass
Humidity	10	70	%	26,5	Pass
Velocity	4.2	4.4	m/s	4.33	Pass
Probe Acceleration	36	45	g's	41.1	Pass
Lateral Pelvis Acceleration	28	39	g's	31.5	Pass
Iliac Force	4100	5100	N	4734.3	Pass

Transducer Calibrations

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




Lateral Pelvis Acceleration
Acceleration (g's)
40
30
20
10
0
-10
0
10
20
30
40
50
Time [ms]
Max: 31.5 g's
Min: -7.9 g's
Filter: CFC 180


Iliac Force
Force (N)
6000
5000
4000
3000
2000
1000
0
-1000
0
10
20
30
40
50
Time [ms]
Max: 4734.3 N
Min: -18.1 N
Filter: CFC 600

APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N: 300		
				Serial Number	**Manufacturer**	**Calibration Date**
Head Accelerometers			X	P59018	Endevco	10/3/2022
			Y	P79189	Endevco	10/3/2022
			Z	P58777	Endevco	10/3/2022
Head Accelerometers - Redundant			X	P68057	Endevco	10/3/2022
			Y	P58986	Endevco	10/3/2022
			Z	P52025	Endevco	10/3/2022
Displacement Potentiometer	Shoulder		Y			
	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
Lilac Wing Load Cell			Y	280-FY	Denton	8/11/2022
Pelvis Plug (Struck Side)				15228	SACO	3/10/2021
Pelvis Plug (Non-Struck Side)				15430	SACO	9/9/2021

Table 2 – Vehicle Instrumentation

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	A315809	Measurement Specialties	1/19/2023
Vehicle Center of Gravity	Y	A315845	Measurement Specialties	1/19/2023
Vehicle Center of Gravity	Z	A315946	Measurement Specialties	1/19/2023
Left Floor Sill	Y	A281038	Measurement Specialties	9/20/2022
A-Pillar Sill	Y	A372820	Measurement Specialties	11/30/2022
A-Pillar Low	Y	A280899	Measurement Specialties	11/21/2022
A-Pillar Mid	Y	A374214	Measurement Specialties	1/12/2023
B-Pillar Sill	Y	A374241	Measurement Specialties	11/7/2022
B-Pillar Low	Y	A315761	Measurement Specialties	10/10/2022
B-Pillar Mid	Y	A315179	Measurement Specialties	11/16/2022
Driver Seat	Y	A374342	Measurement Specialties	9/29/2022
Engine Top	X	A373225	Measurement Specialties	1/24/2023
Engine Top	Y	A374227	Measurement Specialties	1/24/2023
Firewall	Y	A370949	Measurement Specialties	11/3/2022
Right Roof	Y	A405590	Measurement Specialties	9/27/2022
Right Floor Sill	Y	A405588	Measurement Specialties	1/16/2023
Rear Floorpan	X	A315003	Measurement Specialties	1/27/2023
Rear Floorpan	Y	A315735	Measurement Specialties	1/27/2023

Table 3 – Pole Instrumentation

Pole Instrumentation	Serial Number	Manufacturer	Calibration Date
Load Cell 1	1220AF-1117006-F0	Interface	7/19/2022
Load Cell 2	1220AF-18870-F0	Interface	7/19/2022
Load Cell 3	1220AF-1117025-F0	Interface	7/19/2022
Load Cell 4	1220AF-1130989-F0	Interface	7/19/2022
Load Cell 5	1220AF-1117017-F0	Interface	7/19/2022
Load Cell 6	1220AF-1117019-F0	Interface	7/19/2022
Load Cell 7	1220AF-1117035-F0	Interface	7/19/2022
Load Cell 8	1220AF-1117011-F0	Interface	7/19/2022