

REPORT NUMBER: NCAP-CAL-23-009

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

**Hyundai Motor Company
2023 Genesis GV70
5 Door SUV**

NHTSA No: M20234204

**PREPARED BY:
CALSPAN CORPORATION
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February 1, 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**

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Quinn Porzio, 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: _____

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		6. Performing Organization Code CAL																												
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16. Abstract A 32.20 km/h (20 mph), 75° oblique impact Side NCAP Test was conducted on the subject 2023 Genesis GV70 5 Door SUV in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP Pole Laboratory Test Procedure for the generation of consumer information on vehicle side pole crash protection. This test was conducted at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on August 3, 2023. The impact velocity of the vehicle was 32.07 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 352 mm located at level 3. The test vehicle's occupant performance data is as follows:																														
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="width: 60%;">Measurement Description</th> <th colspan="3" style="text-align: center;">Driver ATD (SID-IIs) (Serial No.300)</th> </tr> <tr> <th style="width: 10%;">Units</th> <th style="width: 15%;">Threshold</th> <th style="width: 15%;">Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC36)</td> <td></td> <td style="text-align: center;">1000</td> <td style="text-align: center;">285.934</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td style="text-align: center;">G</td> <td style="text-align: center;">82</td> <td style="text-align: center;">37.797</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td style="text-align: center;">N</td> <td style="text-align: center;">5525</td> <td style="text-align: center;">2613.146</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td style="text-align: center;">mm</td> <td style="text-align: center;">38</td> <td style="text-align: center;">25.883</td> </tr> <tr> <td>Maximum Abdominal Rib Deflection</td> <td style="text-align: center;">mm</td> <td style="text-align: center;">45*</td> <td style="text-align: center;">23.985</td> </tr> </tbody> </table>				Measurement Description	Driver ATD (SID-IIs) (Serial No.300)			Units	Threshold	Result	Head Injury Criteria (HIC36)		1000	285.934	Resultant Lower Spine Acceleration	G	82	37.797	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2613.146	Maximum Thoracic Rib Deflection	mm	38	25.883	Maximum Abdominal Rib Deflection	mm	45*	23.985
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The two doors on the struck side of 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 New Car Assessment Program (NCAP) Side Impact Pole Part 572V SID-IIs		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division 1200 New Jersey Ave. Washington, D.C. 20590																												
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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 Genesis GV70 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 Genesis GV70 5 Door SUV. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.07 km/h. The test was conducted by Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on August 3, 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	285.934
Resultant Lower Spine Acceleration	G	82	37.797
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2613.146
Maximum Thoracic Rib Deflection	mm	38	25.883
Maximum Abdominal Rib Deflection	mm	45*	23.985

*Proposed IARV

Supplemental restraint information was recorded as follows:

SUPPLEMENTAL RESTRAINT INFORMATION

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

GENERAL COMMENTS:

1. P1 serial number - 300
2. During pre-test vehicle preparation, it was discovered that the frontal test vehicle windshield was damaged during vehicle delivery, so the COR requested that the frontal and side pole test vehicles be swapped. Since a camera mount was already installed on the side pole test vehicle hood, it was necessary to also swap the hoods. The hoods from the frontal and side test vehicle were identical except for color and were swapped/reinstalled following vehicle manufacturer specifications.

Data Anomalies:

- Left Lower B-Pillar Y Acceleration, Exceeded calibration range at 101.6 ms
- Left Middle B-Pillar Y Acceleration, Exceeded calibration range at 16.4 ms
- Front Seat Track Y Acceleration, Questionable data shift after 32.8 ms
- Driver Abdomen Upper Rib Y Displacement, Questionable data after 238 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 Genesis GV70 5 Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20234204
 Test Date: 08/03/2023

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20234204
Model Year	2023
Make	Genesis
Model	GV70
Body Style	SUV
VIN	KMUMADTBXPU127096
Body Color	Barossa Burgundy
Odometer Reading (km/mi)	12 miles
Engine Displacement (L)	2.5
Type / No. Cylinders	I4
Engine Placement	Inline
Transmission Type	Automatic
Transmission Speeds	8-speed
Overdrive	Yes
Final Drive	AWD
Roof Rack	Yes - Removed
Sunroof / T-Top	Yes
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	Yes

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

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Hyundai Motor Company	GVWR (KG)	2495
Date of Manufacture	MAR/2023	GVWR Front (KG)	1245
Vehicle Type	MPV	GVWR Rear (KG)	1420

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)				462	(A)
DSC x 68.0 kg				340	(B)
Cargo Weight (RCLW) (kg)				122	(A-B)

VEHICLE SEAT TYPE

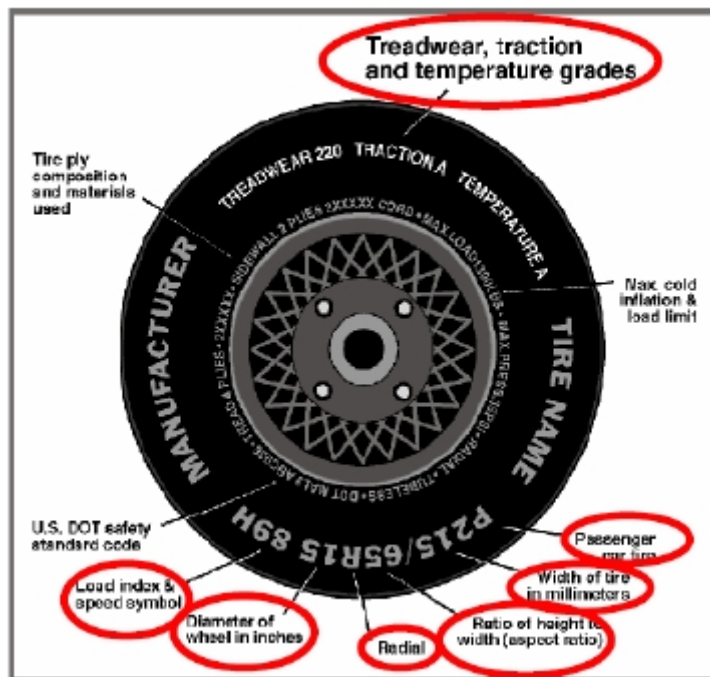
Seating Location	Type Of Seat Pan				Type Of Seat Back		
	Bucket	Bench	Split Bench	Contour	Fixed	Adjustable	
						W/ Lever	W/ Knob
Front	X						X
Rear or Second Row Seat			X			X	
Third Row Seat	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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

Test Vehicle: 2023 Genesis GV70 5 Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20234204
 Test Date: 08/03/2023

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)	340	340
Cold Pressure (kPa)	230	250
Recommended Tire Size	235/55R19	235/55R19
Tire Size on Vehicle	235/55R19	235/55R19
Tire Manufacturer	Michelin	Michelin
Tire Model	Primacy Tour	Primacy Tour
Treadwear	540	540
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel, 1 Polyamide	2 Polyester, 2 Steel, 1 Polyamide
Load Index / Speed Symbol	105W	105W
Tire Material	Rubber	Rubber
DOT Safety Code Left	OC8F04AX0223	OC8F04AX0223
DOT Safety Code Right	OC8F04AX0223	OC8F04AX0223

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

Test Vehicle: 2023 Genesis GV70 5 Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20234204
 Test Date: 08/03/2023

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	312	311	311	301
Tire Placard	kPa	230	230	250	250
Owner's Manual	kPa	230	230	250	250
As Tested	kPa	230	230	250	250

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Rear	Total	Total	Front	Rear	Total
Left	kg	501	486		530	550		507	578	
Right	kg	514	466		516	537		520	528	
Ratio	%	51.6	48.4		49.0	51.0		48.1	51.9	
Totals	kg	1015	952	1967	1046	1087	2133	1027	1106	2133

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1967	(A)
Actual Weight of 1 P572V (SID-IIs) ATD Used	kg	50	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	122	(C)
Calculated Vehicle Target Weight (TVTW)	kg	2139	(A+B+C)

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

Yes No

TEST VEHICLE ATTITUDES AND CG

Measurement Description	Units	As Delivered	As Tested	Fully Loaded	Meets Rqmt***
Driver Door Sill Angle (front-to-rear)*	Deg	+0.15	+0.10	+0.10	Yes
Front Passenger Sill Angle (front-to-rear)*	Deg	-0.40	-0.30	-0.30	Yes
Front Bumper-Line Angle (left-to-right)**	Deg	-0.20	-0.35	-0.35	Yes
Rear Bumper-Line Angle (left-to-right)**	Deg	-1.35	-1.35	-0.85	Yes
Vehicle CG (Aft of Front Axle)	mm	1391	1465	1490	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	-2	-11	-14	

* 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 Genesis GV70 5 Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20234204
 Test Date: 08/03/2023

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Trunk carpeting	16
Spare tire	16
Jack	4
Right Rear window	3
Ballast / Equipment Added	102

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

TEST SURFACE MARKING

	Distance from 75° Impact Location Line (mm)
Fore 25 mm target	960
Aft 25 mm target	957

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

Test Vehicle: 2023 Genesis GV70 5 Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20234204
 Test Date: 08/03/2023

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	19.1	9.9	14.5
Front Passenger Seat	19.8	11.0	15.4
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	14.5	50	Max	71	80	85
			Mid	36	44	50
			Min	2	8	15
Front Passenger Seat	15.4	44	Max	64	69	75
			Mid	33	39	44
			Min	2	7	14
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 Genesis GV70 5 Door SUV
 Test Program: NCAP Side Pole Impact Test

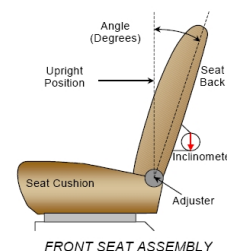
NHTSA No.: M20234204
 Test Date: 08/03/2023

SEAT FORE / AFT POSITION

Seat	Total Fore / Aft Travel		Test Position from Forward most Position	
	mm	Detents*	mm	Detents*
Driver Seat	260	Power	0	Power
Front Passenger Seat	250	Power	0	Power
Front Center Seat				
Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed	Fixed

SEAT BACK ANGLE ADJUSTMENT

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



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detents*
Driver Seat w/Seated Dummy	68.2	Power	9.80	Power
Front Passenger Seat	68.3	Power	9.80	Power
Front Center Seat				
Struck Side Rear Seat	21.7	12 (0-11)	11.9	4
Non-Struck Side Rear Seat	21.8	12 (0-11)	11.6	4
Rear Center Seat	21.7	12 (0-11)	11.9	4

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)	Uppermost

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)	Lowest

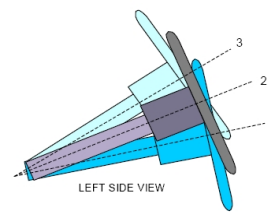
DATA SHEET NO. 2 ... (CONTINUED)
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle: 2023 Genesis GV70 5 Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20234204
 Test Date: 08/03/2023

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.

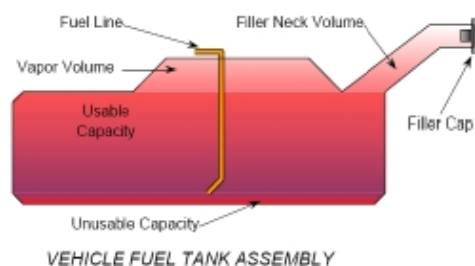


	Degrees	Fore / Aft Position (mm)
Lowermost - Position No. 1	22.0	
Geometric center - Position No. 2	24.1	
Uppermost - Position No. 3	26.2	
Telescoping Steering Wheel Travel		58
Test Position	24.1	29

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.



FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank" - see Form No. 1	66
Usable Capacity of "Optional Tank" - see Form No. 1	-
Usable Capacity of "Standard Tank" - see Owner's Manual	66
Usable Capacity of "Optional Tank" - see Owner's Manual	-
93% of Usable Capacity	61.4
Actual Amount of Solvent Used in Test	61.4
1/3 of Usable Capacity	22

Is the Actual Amount of Solvent Used in the test equal to 93% ±1% of the Usable

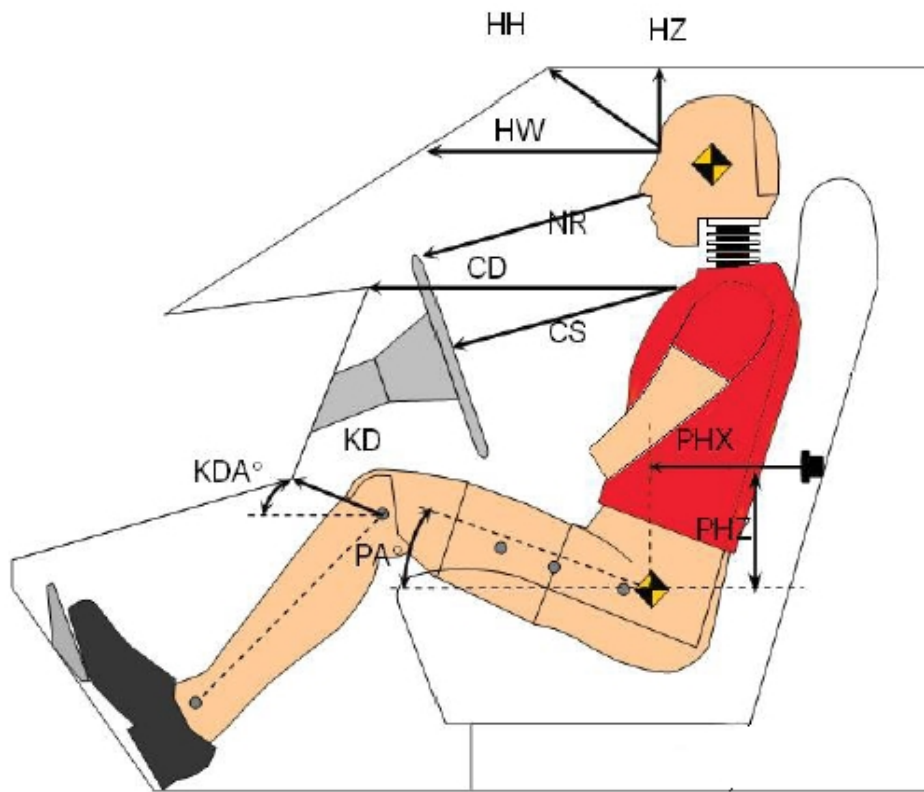
Capacity stated in Form No. 1?

Yes No

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

Test Vehicle: 2023 Genesis GV70 5 Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20234204
 Test Date: 08/03/2023



Left Side View

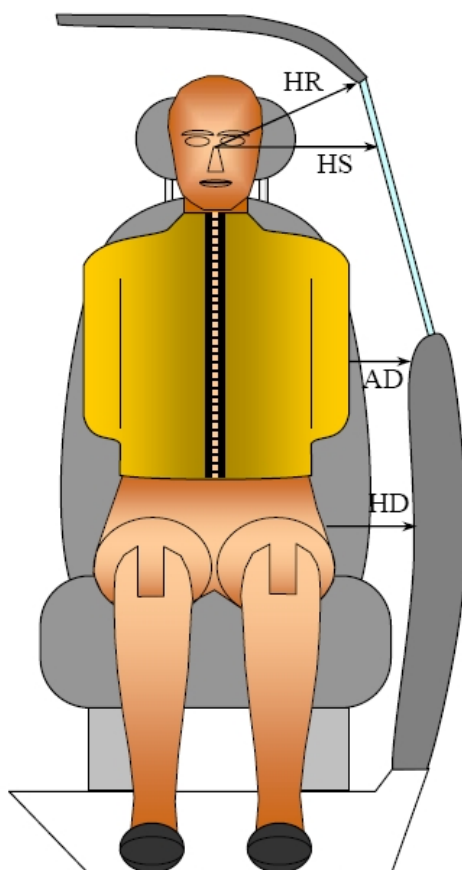
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Description	Driver (Serial No. 300)	
		Length (mm)	Angle (°)
HH	Head to Header	257	
HW	Head to Windshield	542	
HZ	Head to Roof Liner	194	
NR	Nose to Rim	222	
CD	Chest to Dash	394	
CS	Chest to Steering Wheel	153	
KD(L) / KDA(L)°	Left Knee to Dash	124	27.5
KD(R) / KDA(R)°	Right Knee to Dash	101	26.0
PAX°	Pelvic Tilt Angle (X-Axis)		18.9
PAY°	Pelvic Tilt Angle (Y-Axis)		0.1
PHX	Hip Point to Striker (X-Axis)	306	
PHZ	Hip Point to Striker (Z-Axis)	170	

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

Test Vehicle: 2023 Genesis GV70 5 Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20234204
 Test Date: 08/03/2023



FRONT VIEW OF DUMMY

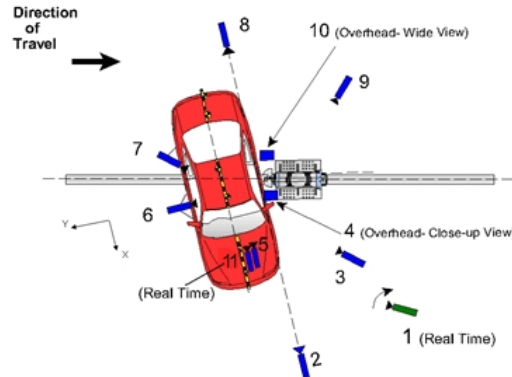
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver – Length (Serial No. 300)
HR	Head to Side Header	mm	253
HS	Head to Side Window	mm	376
AD	Arm to Door	mm	174
HD	H-Point to Door	mm	232

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

Test Vehicle: 2023 Genesis GV70 5 Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20234204
 Test Date: 08/03/2023



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	7671	0	-1553	28	1000
3	Impact side 45° - forward pole view	4897	-1198	-1488	24	1000
4	Overhead Close-up view of impact	0	0	-9375	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	-8714	0	-1469	28	1000
9	Impact side 45° - rearward pole view	-4437	-3815	-1468	24	1000
10	Overhead wide - view of impact	0	0	-9375	12.5	1000
11	Real-time (24 - 30 fps) - dummy front view				Zoom	60

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

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

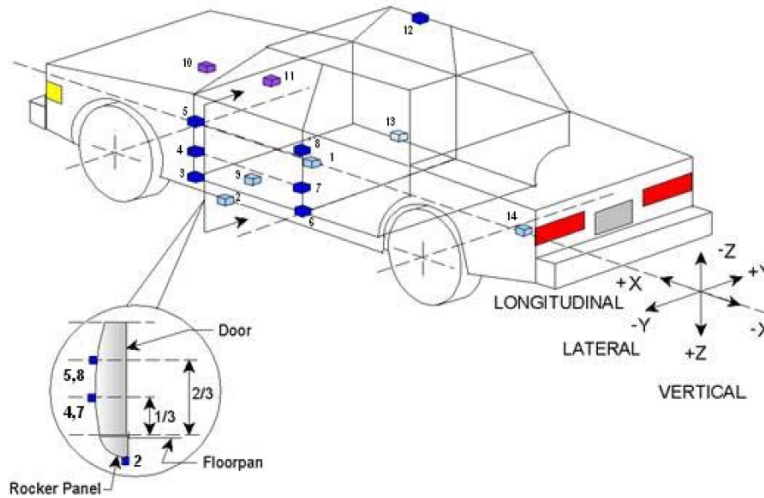
INSTRUMENTATION

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

DATA SHEET NO. 6
TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2023 Genesis GV70 5 Door SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20234204
Test Date: 08/03/2023



TEST VEHICLE ACCELEROMETER LOCATIONS

No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2103	-13	4
2	Left Floor Sill	2819	-695	91
3	A-Pillar Sill	3178	-658	60
4	A-Pillar Low	3318	-657	-128
5	A-Pillar Mid	3109	-687	-633
6	B-Pillar Sill	1996	-692	80
7	B-Pillar Low	2181	-710	-37
8	B-Pillar Mid	2091	-694	-578
9	Driver Seat Track	2387	-601	62
10	Engine Top	3806	-122	-449
11	Firewall	3415	241	-321
12	Right Roof	2213	631	-1104
13	Right Floor Sill	2741	695	103
14	Rear Floor Pan	813	-46	-64

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 Genesis GV70 5 Door SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20234204
Test Date: 08/03/2023

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 Genesis GV70 5 Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20234204
 Test Date: 08/03/2023

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Driver Seat Dummy (SID-IIs)
Face	Curtain Airbag & Front Center Airbag
Top of Head	Curtain Airbag, Front Center Airbag & Headrest
Left Side of Head	Curtain Airbag
Back of Head	Headrest & Curtain Airbag
Left Shoulder	Torso/Pelvis Airbag
Upper Torso	Seatback
Lower Torso	Seatback & Torso/Pelvis Airbag
Left Hip	Seat Pan & 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)	0	0	0	0	0

POST-TEST SEAT PERFORMANCE

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

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

Test Vehicle: 2023 Genesis GV70 5 Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20234204
 Test Date: 08/03/2023

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	A-Pillar, B-Pillar, & C-Pillar buckled
Sill Separation	175 mm of separation at rear door & 290 mm at impact location
Windshield Damage	Separation along A-Pillar, roof near A-pillar, & cracked throughout
Side Window Damage	Driver window shattered
Other Notable Effects	Sunroof separated from roof on impact side

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

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

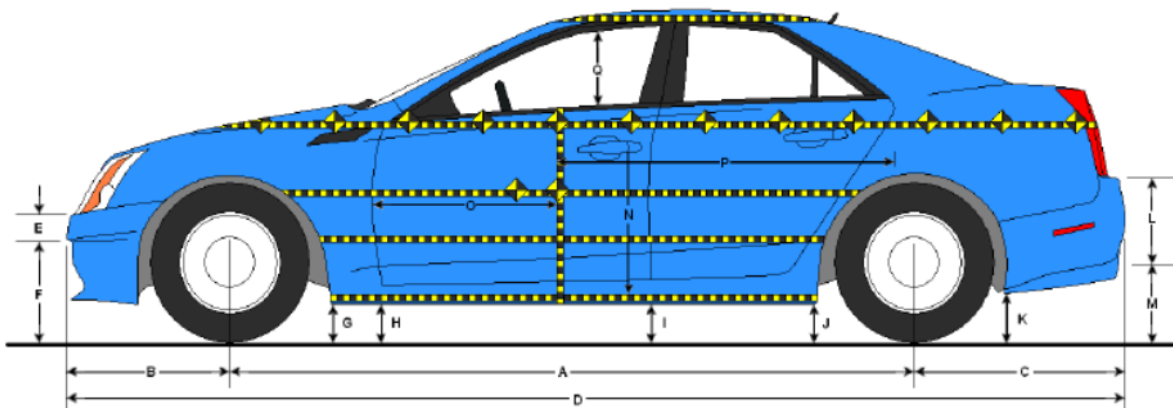
Measured Parameter	Units	Tolerance	Value
Vertical Impact Ref Line - Aft of Front Axle, Intended Impact Pt	mm		1271
Actual Impact Point - Aft of Front Axle	mm		1275
Horizontal Offset (+ forward / - rearward)	mm	+/- 38*	-4
Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion	deg	75 +/- 3	75
Trap No. 1 Velocity - Primary	kph	31.4 to 33.0	32.07
Trap No. 2 Velocity - Redundant	kph	31.4 to 33.0	32.05

*Of Intended Impact Point

**DATA SHEET NO. 9
TEST VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2023 Genesis GV70 5 Door SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20234204
Test Date: 08/03/2023



LEFT SIDE VIEW

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

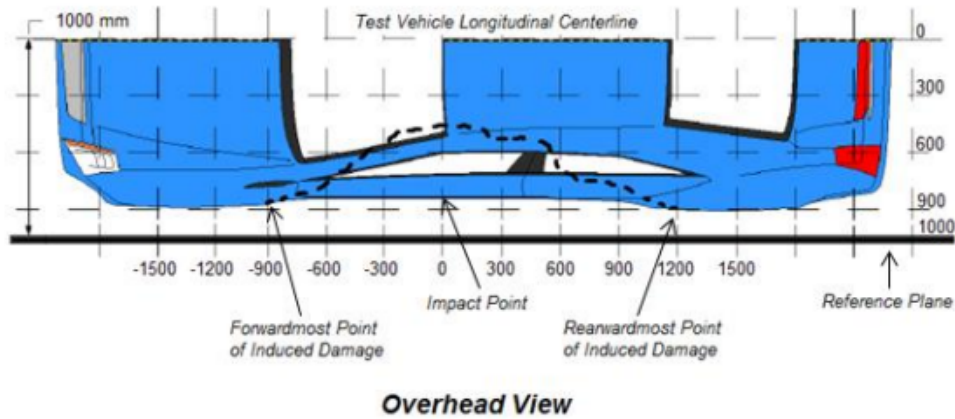
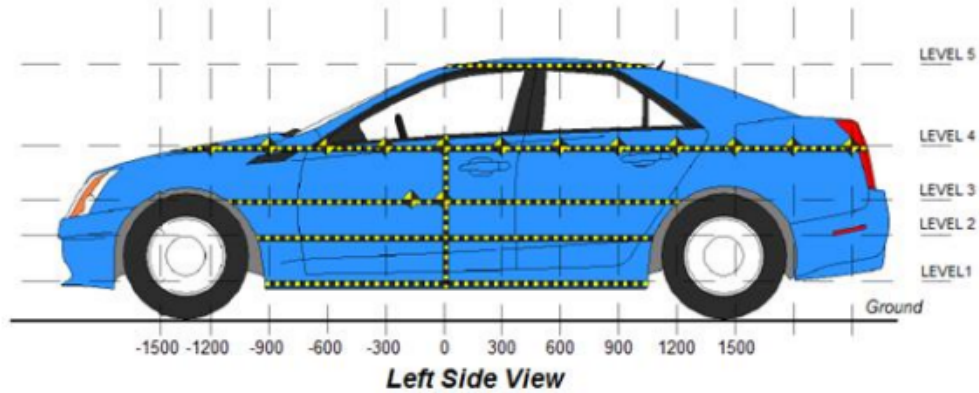
No.	Measurement Description	Pre-Test	Post-Test	Change
A	Vehicle Wheelbase	2874	2818	-56
B	Front Axle to FSOV	839	872	33
C	Rear Axle to RSOV	1000	1000	0
D	Total Length at Centerline	4712	4690	-22
E	Front Bumper Thickness	150	150	0
F	Front Bumper Bottom to Ground	494	527	33
G	Sill Height at Front Wheel Well	211	200	-11
H	Sill Height at Front Door Leading Edge	212	192	-20
I	Sill Height at B Pillar	220	232	12
J1	Sill Height at Rear Wheel Well	213	229	16
J2	Pinch Weld Height at Rear Wheel Well	208	224	16
K	Sill Height Aft of Rear Wheel Well	272	276	4
L	Rear Bumper Thickness	160	160	0
M	Rear Bumper Bottom to Ground	476	465	-11
N	Sill Height to Bottom of Front Window Sill	884	900	16
O	Front Door Leading Edge to Impact CL	654	569	-85
P	Rear Door Trailing Edge to Impact CL	1492	1422	-70
Q	Front Window Opening	419	406	-13
R	Right Side Length	4635	4635	0
S	Left Side Length	4635	4593	-42
T	Vehicle Width at B-Pillars	1891	1782	-109
U	Front Wheel Track Width	1644	1636	-8
V	Rear Wheel Track Width	1660	1662	2

* All measurements in mm with tolerance of ± 3 mm

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

Test Vehicle: 2023 Genesis GV70 5 Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20234204
 Test Date: 08/03/2023



MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	319	291	0
2	Driver H-Point	mm	715	342	150
3	Mid-Door	mm	804	352	150
4	Window Sill	mm	1089	298	0
5	Window Top	mm	1585	109	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 Genesis GV70 5 Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20234204
 Test Date: 08/03/2023

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

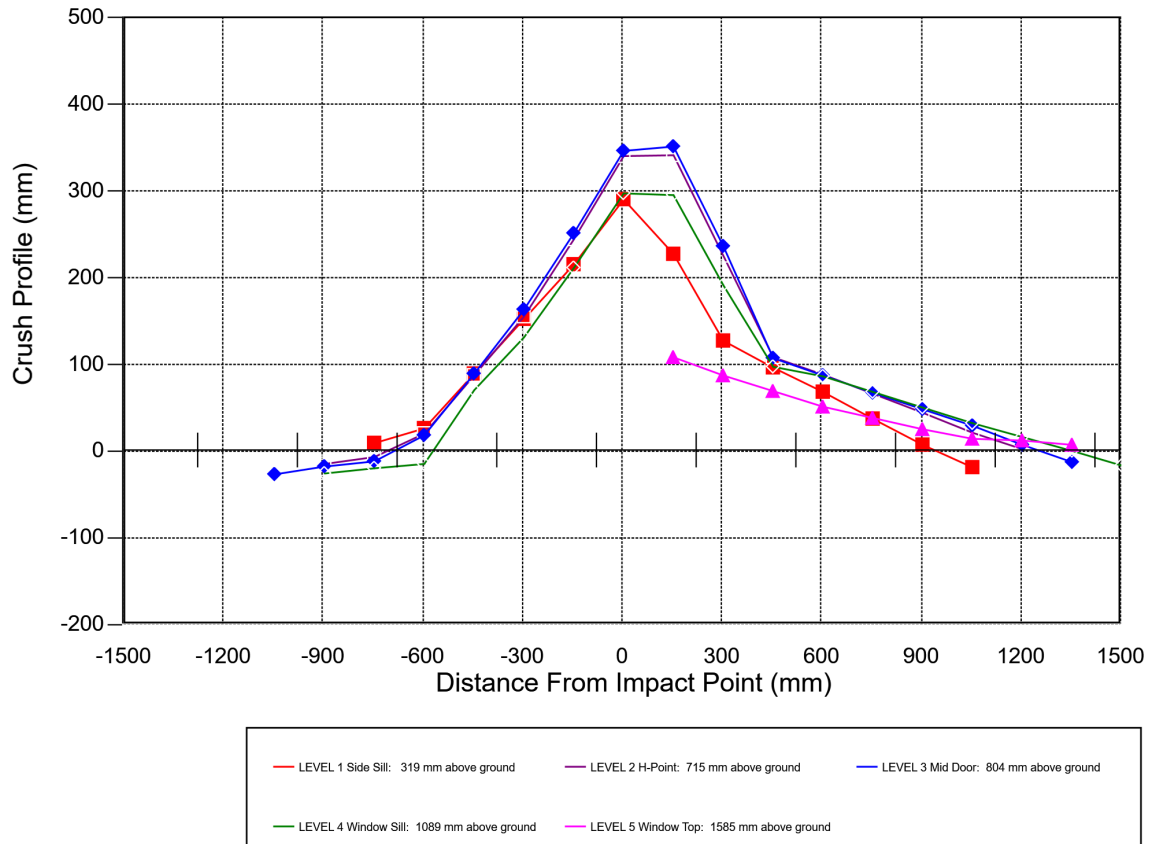
	Pre-Test					Post-Test					Crush				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1500															
-1350															
-1200															
-1050			957					983					-26		
-900		951	952	822			965	969	847			-14	-17	-25	
-750	914	943	943	837		904	949	954	856		10	-6	-11	-19	
-600	913	935	939	850		886	914	920	864		27	21	19	-14	
-450	912	933	939	896		822	845	849	825		90	88	90	71	
-300	910	933	941	871		757	777	777	739		153	156	164	132	
-150	907	934	941	876		691	689	689	664		216	245	252	212	
0	902	935	941	882		611	594	594	584		291	341	347	298	
150	899	935	941	882	626	671	593	589	586	517	228	342	352	296	109
300	894	935	941	885	640	766	709	704	693	552	128	226	237	192	88
450	889	933	938	882	642	792	824	830	784	572	97	109	108	98	70
600	884	931	935	880	640	815	842	847	793	588	69	89	88	87	52
750	881	930	932	877	637	843	863	864	808	598	38	67	68	69	39
900	882	932	933	876	629	874	887	884	825	603	8	45	49	51	26
1050	892	943	941	873	617	910	921	911	840	602	-18	22	30	33	15
1200		955	954	876	601		952	946	859	588		3	8	17	13
1350			957	880	575			969	879	567			-12	1	8
1500				881					897					-16	

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 Genesis GV70 5 Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20234204
 Test Date: 08/03/2023



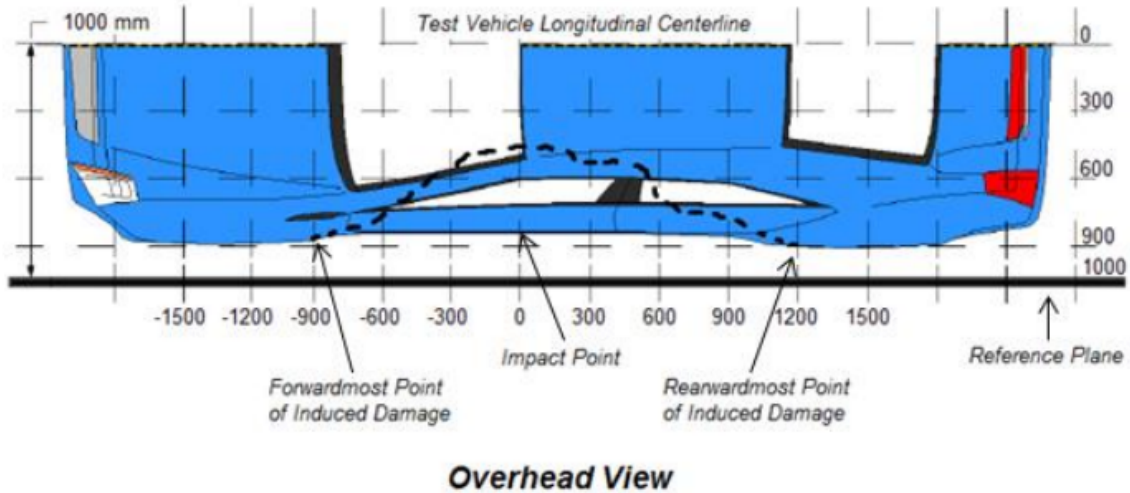
Vehicle Exterior Crush Measurements - Visual Representation

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

Test Vehicle: 2023 Genesis GV70 5 Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20234204
 Test Date: 08/03/2023

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



VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	-1050	3	17	43	-26
2	-570	3	94	61	33
3	-90	3	349	59	290
4	390	3	220	61	159
5	870	3	120	67	53
6	1350	3	31	43	-12

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

Test Vehicle: 2023 Genesis GV70 5 Door SUV
 Test Program: NCAP Side Pole Impact Test

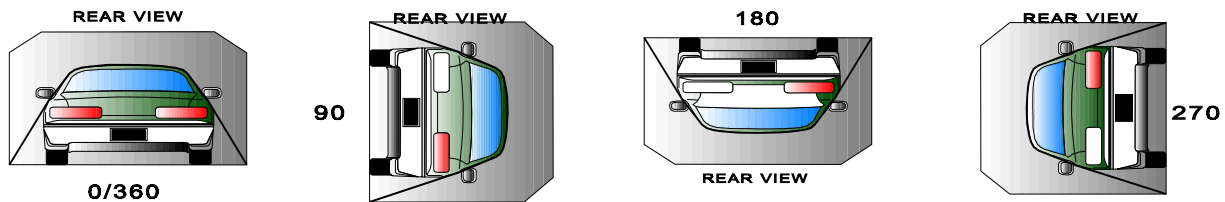
NHTSA No.: M20234204
 Test Date: 08/03/2023

Test Time: 9:45 AM

Temperature: 21 °C

- A. From impact until vehicle motion ceases: _____ 0 oz
 (Maximum allowable is 1 oz.)
- B. For the 5-minute period after motion ceases: _____ 0 oz
 (Maximum allowable is 5 oz.)
- C. For the following 25 minutes: _____ 0 oz
 (Maximum allowable is 1 oz.)

D. Spillage Detail: No Spillage Occurred



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	68	300	368
90° to 180°	65	300	365
180° to 270°	66	300	366
270° to 360°	70	300	370

FMVSS 301 SPILLAGE TABLE

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

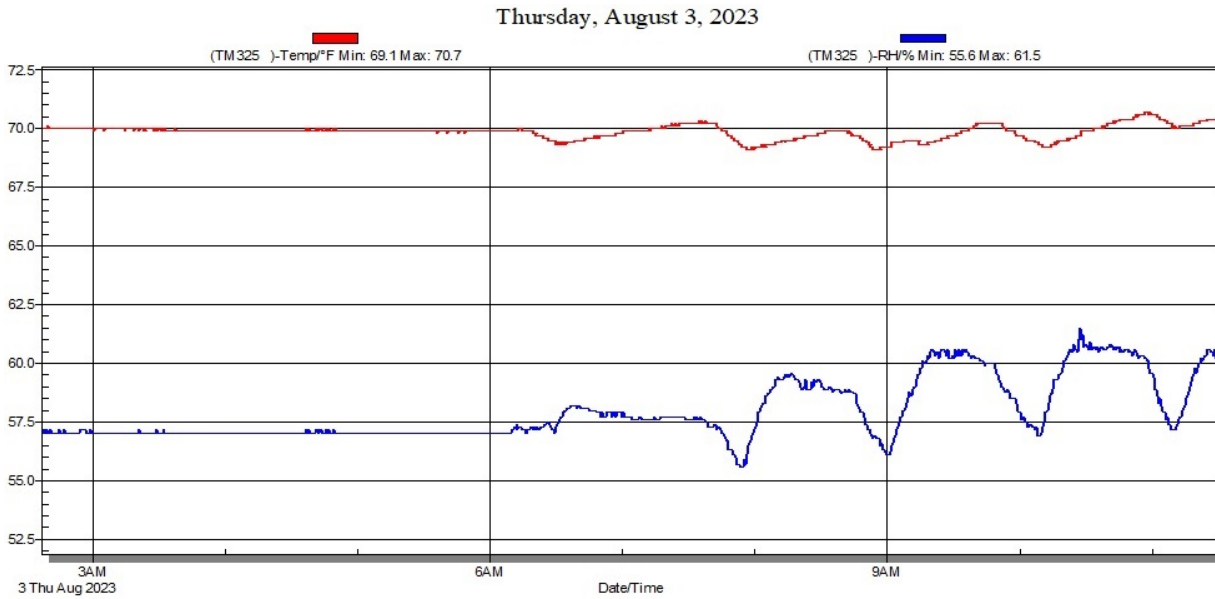
SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0° to 90°	No Spillage Occurred
90° to 180°	No Spillage Occurred
180° to 270°	No Spillage Occurred
270° to 360°	No Spillage Occurred

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

Test Vehicle: 2023 Genesis GV70 5 Door SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20234204
Test Date: 08/03/2023



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

APPENDIX A
PHOTOGRAPHS

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M20234204

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



M20234204

Figure A-2: As Delivered Left Rear 3/4 View of Test Vehicle



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

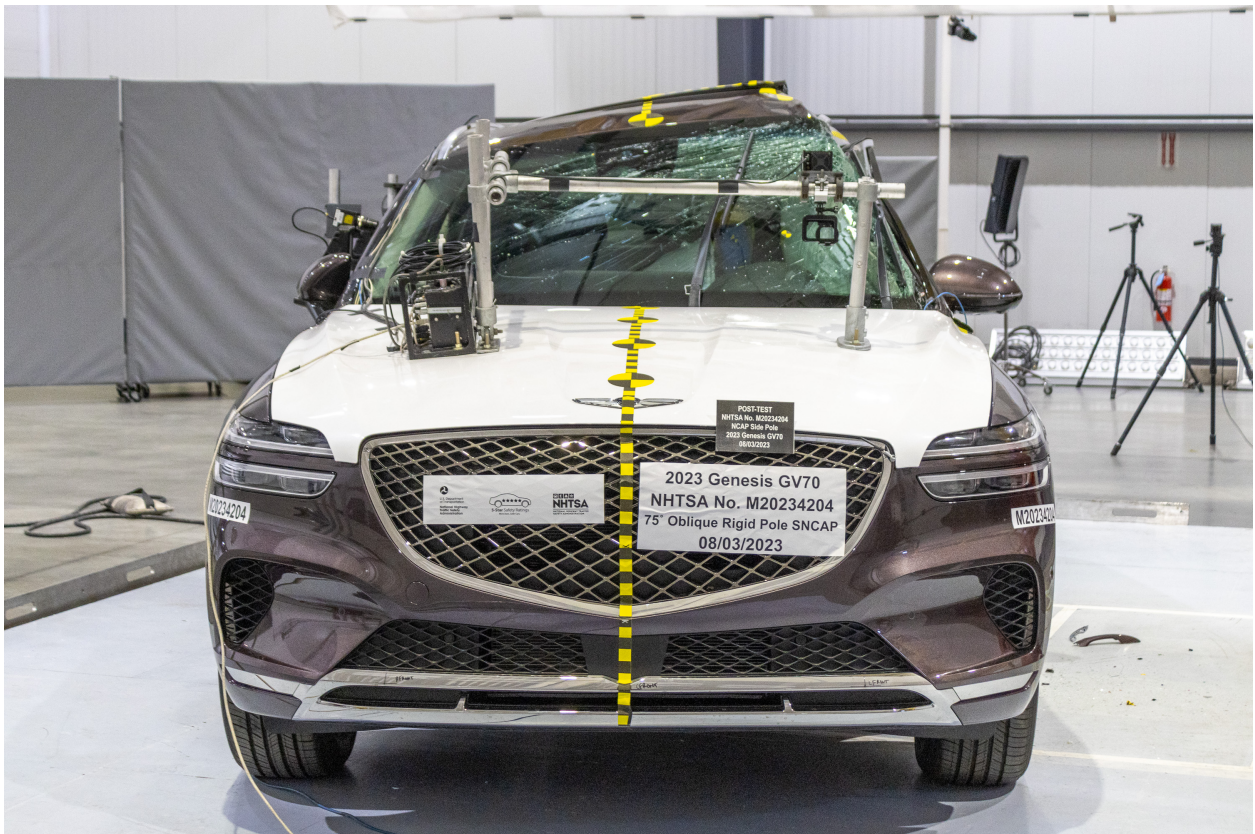


Figure A-4: Post-Test Frontal View of Test Vehicle



Figure A-5: Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle



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



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



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



Figure A-9: Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



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

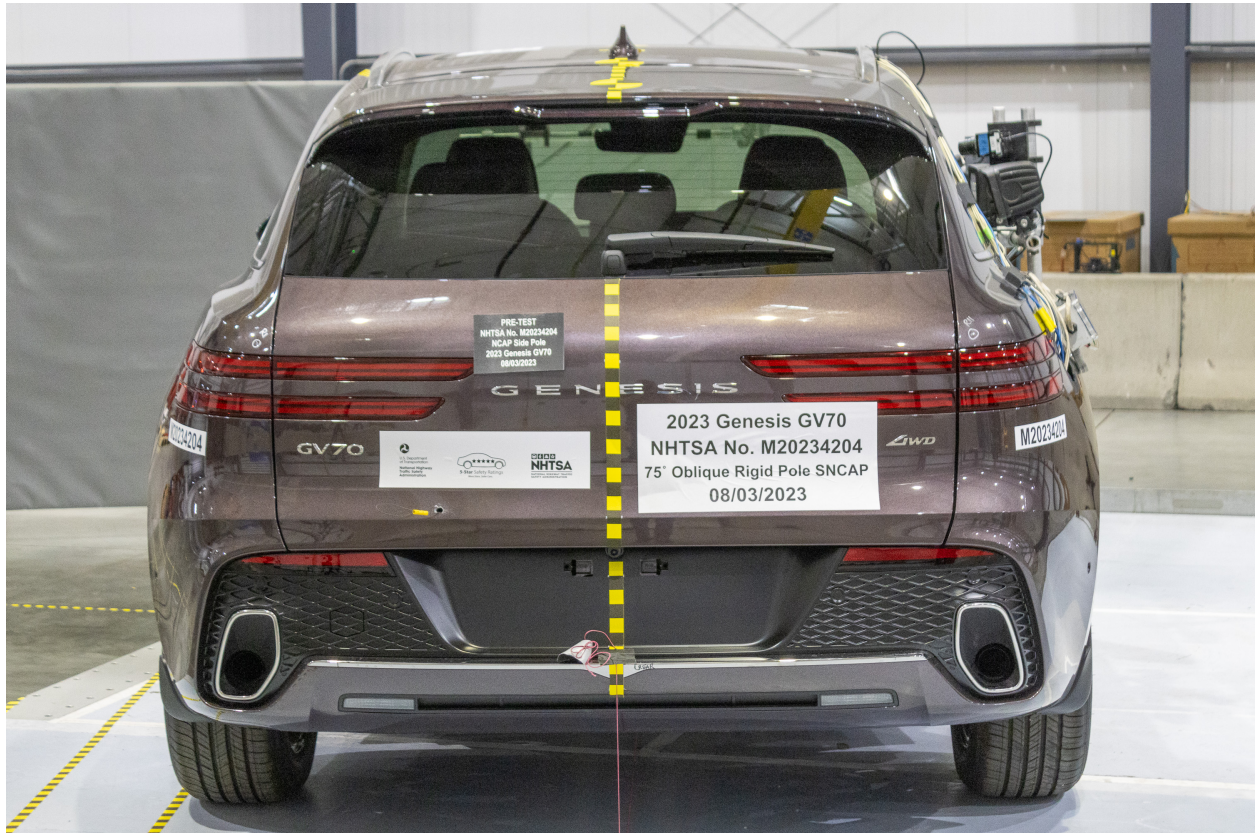


Figure A-11: Pre-Test Rear View of Test Vehicle

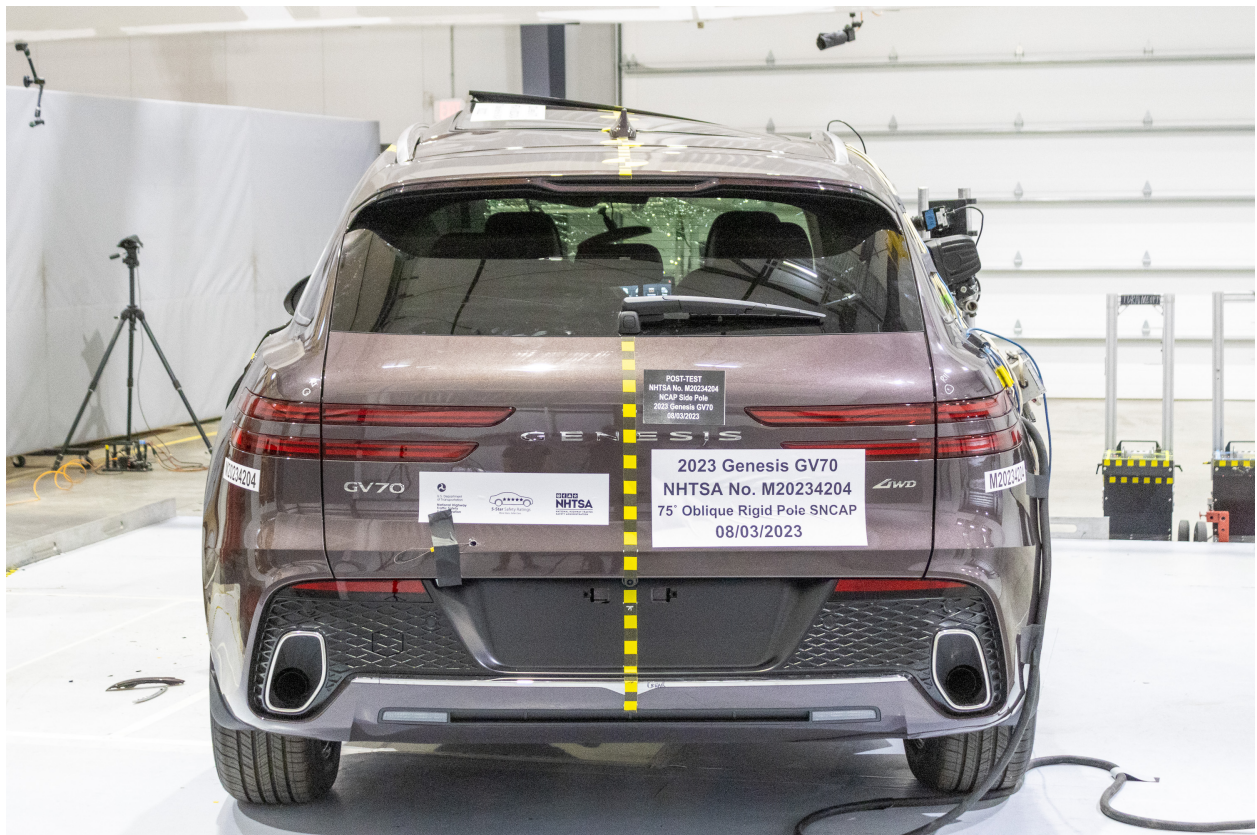


Figure A-12: Post-Test Rear View of Test Vehicle



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

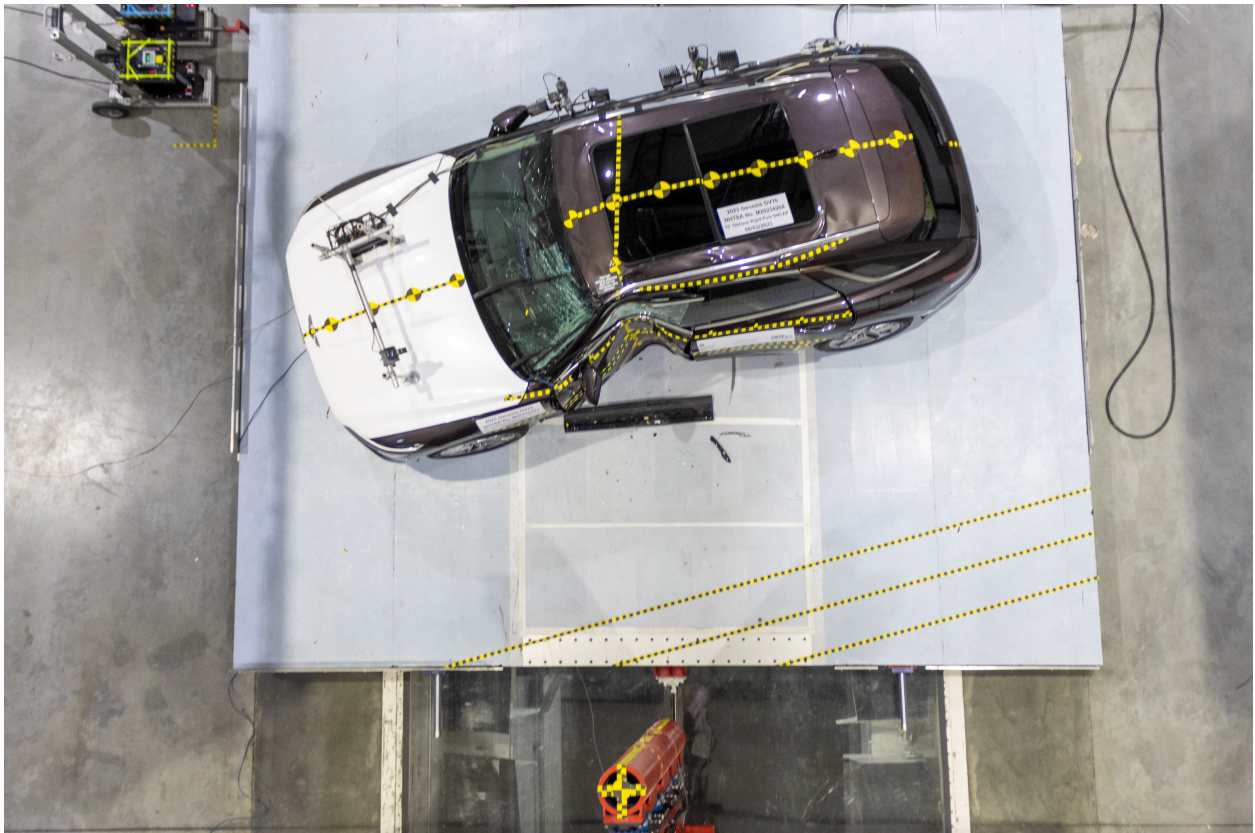


Figure A-16: Post-Test Overhead View of Test Area



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



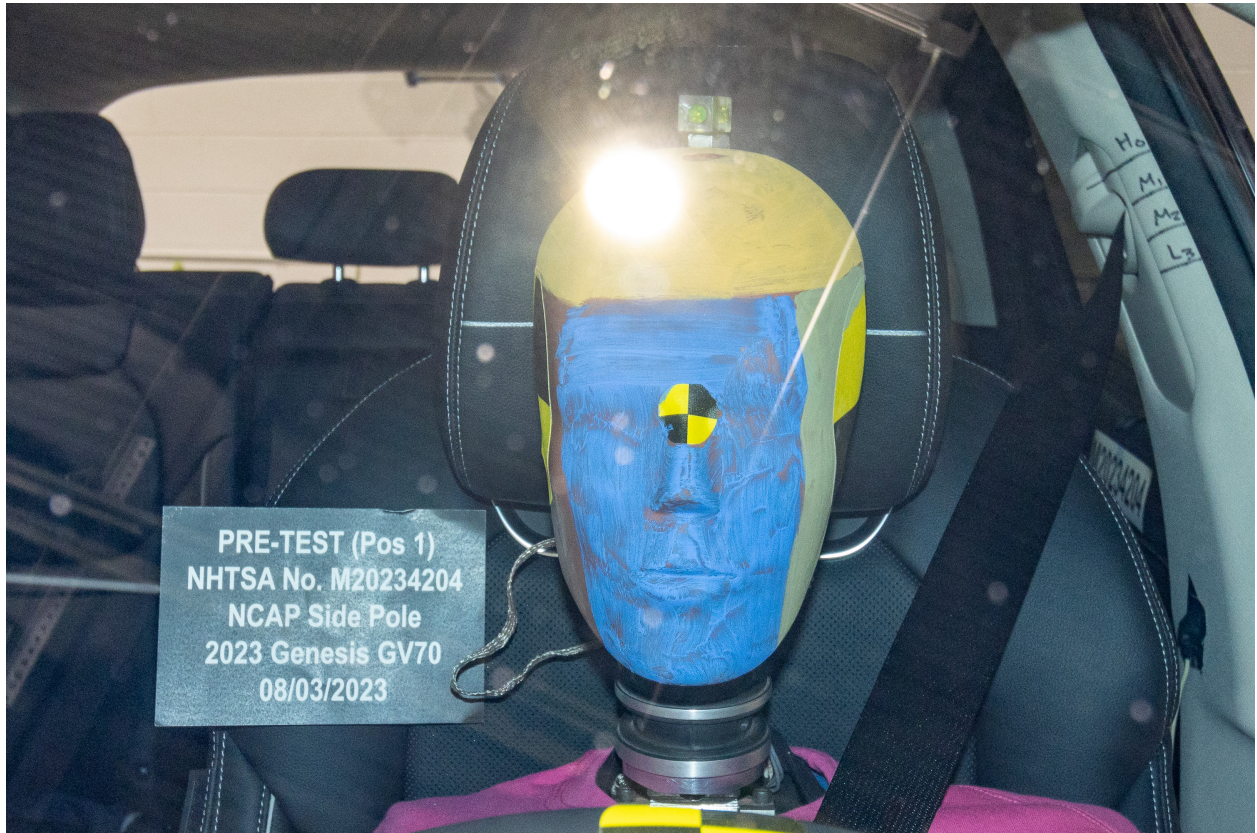
Figure A-24: Pre-Test Left Side View of Dummy Shoulder and Door Top View



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



PRE-TEST (Pos 1)
NHTSA No. M20234204
NCAP Side Pole
2023 Genesis GV70
08/03/2023

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



PRE-TEST (Pos 1)
NHTSA No. M20234204
NCAP Side Pole
2023 Genesis GV70
08/03/2023

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

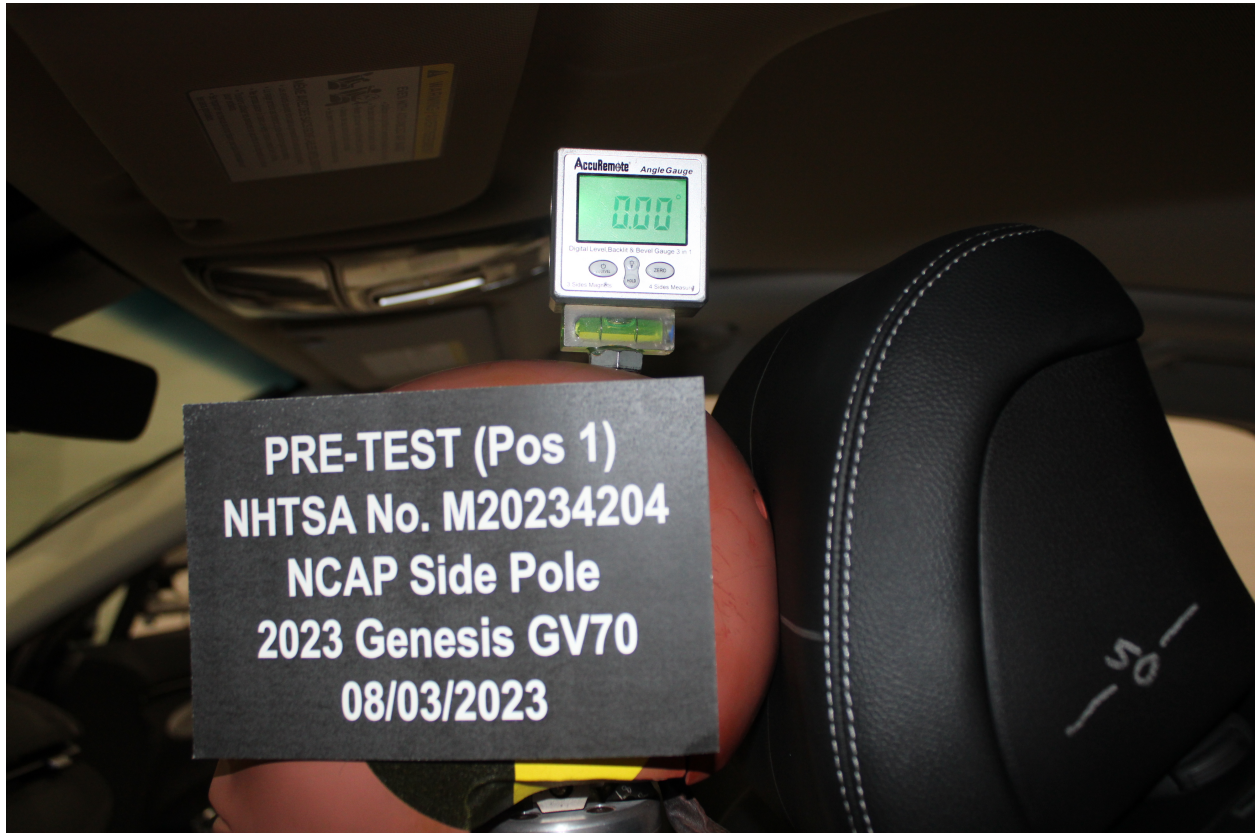


Figure A-31: Pre-Test Left Side View of Dummy's Head Showing Dummy's Head is Level



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

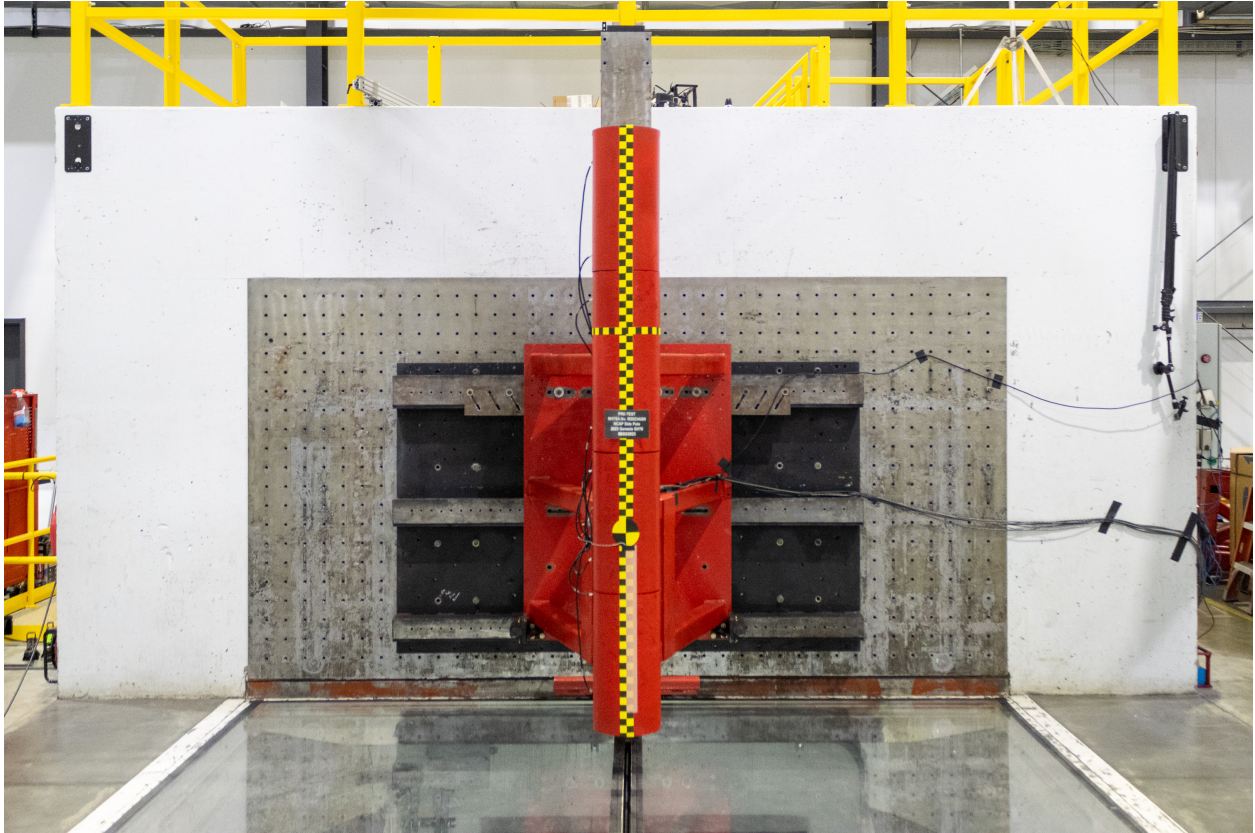


Figure A-59: Pre-Test Pole Barrier Front View



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

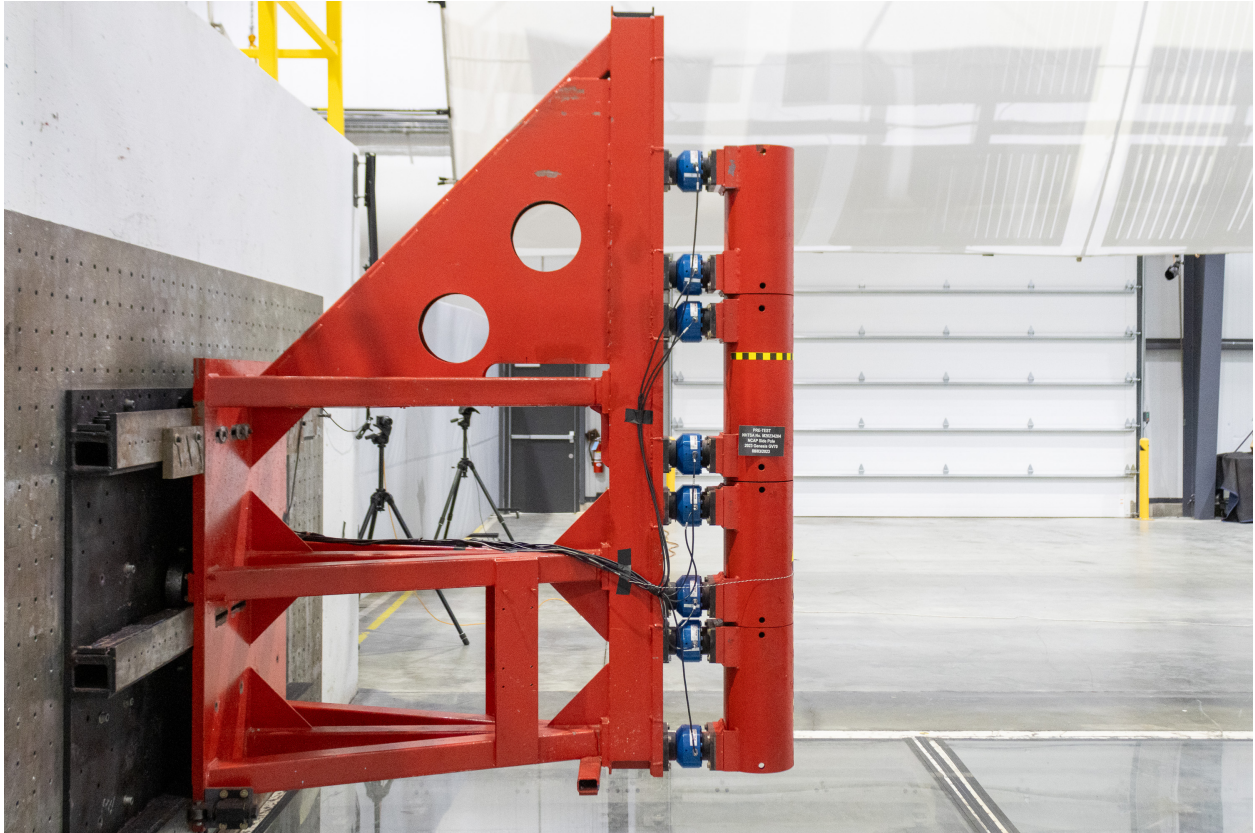


Figure A-61: Pre-Test Pole Barrier Side View

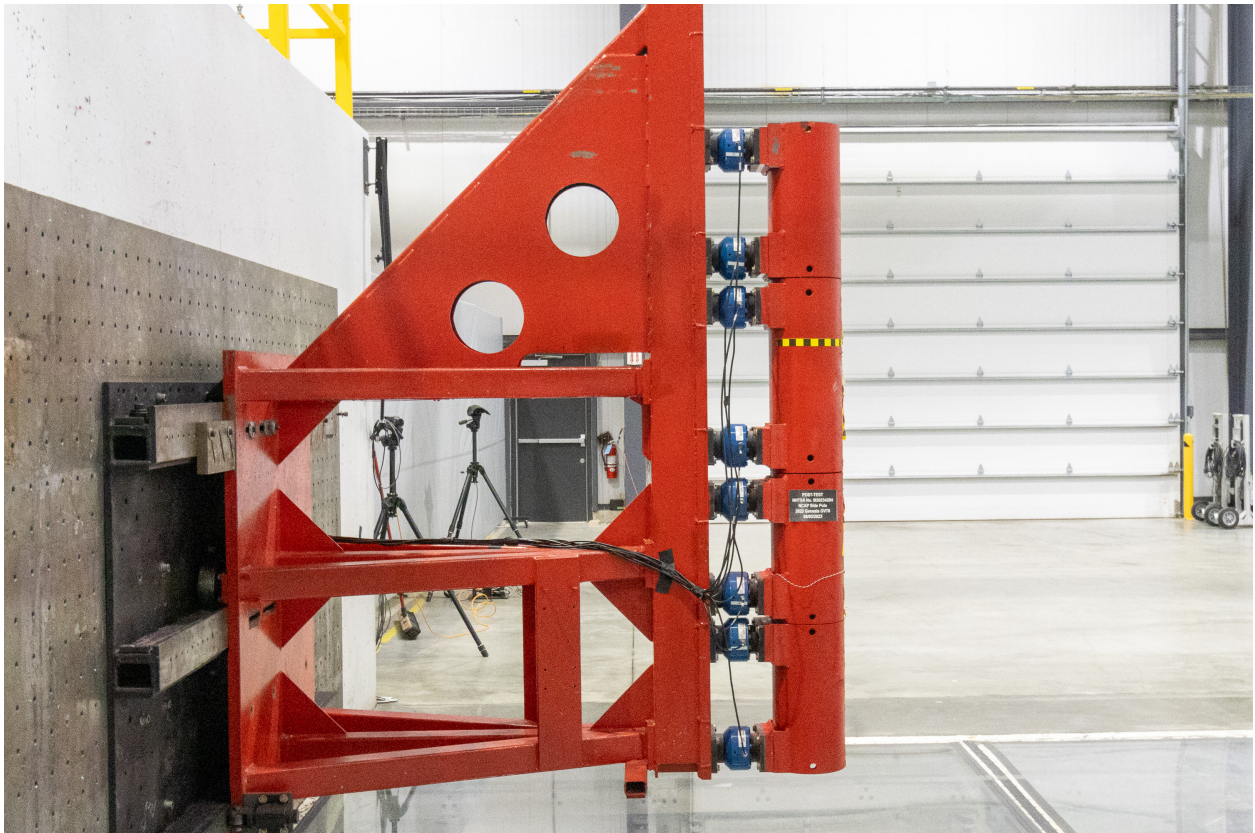


Figure A-62: Post-Test Pole Barrier Side View



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

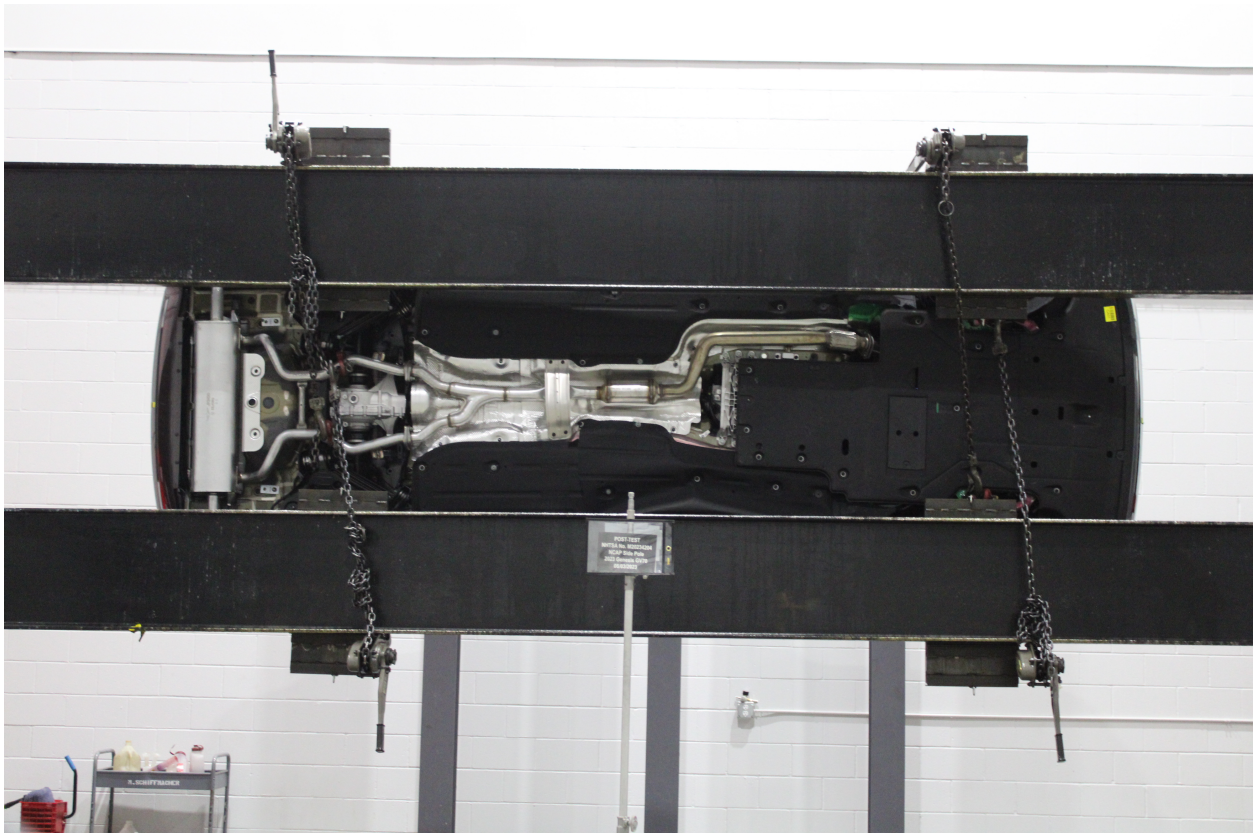


Figure A-66: FMVSS No. 301 Static Rollover 90 Degrees

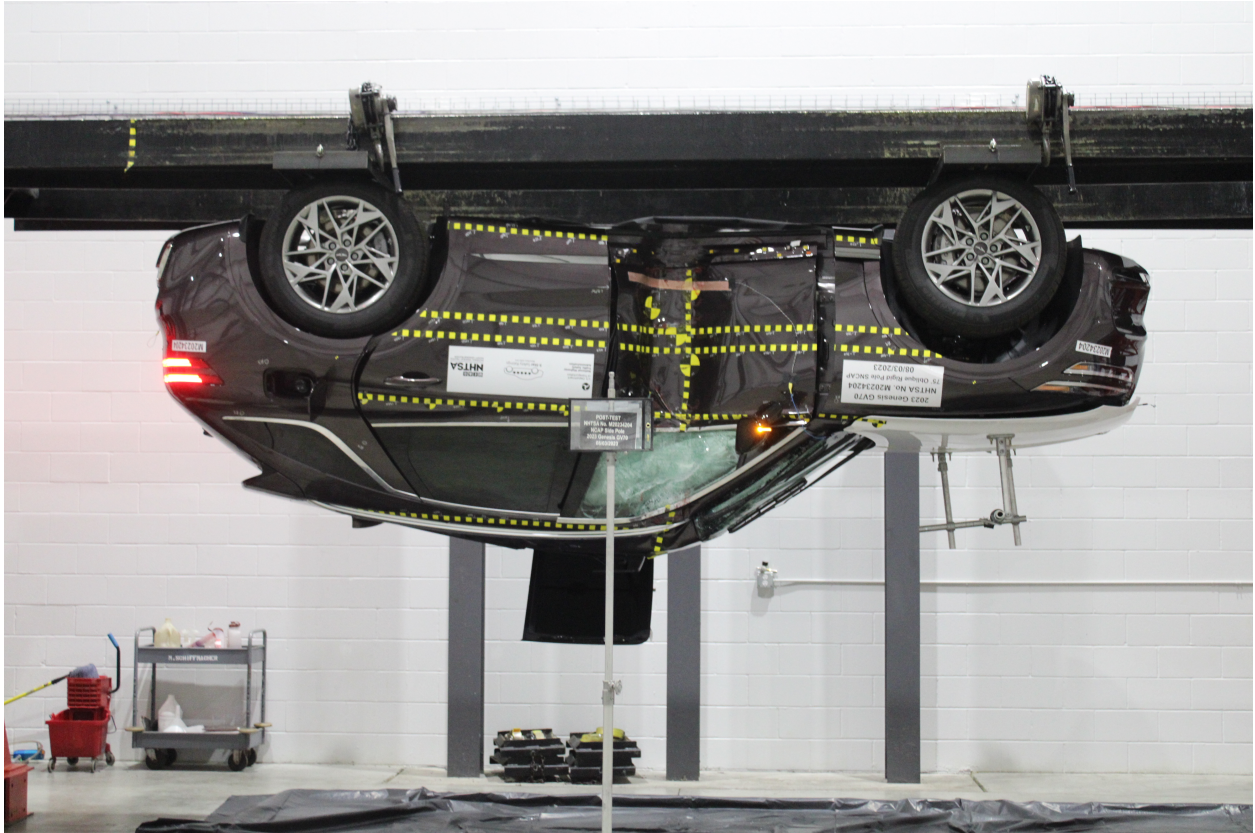


Figure A-67: FMVSS No. 301 Static Rollover 180 Degrees



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



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

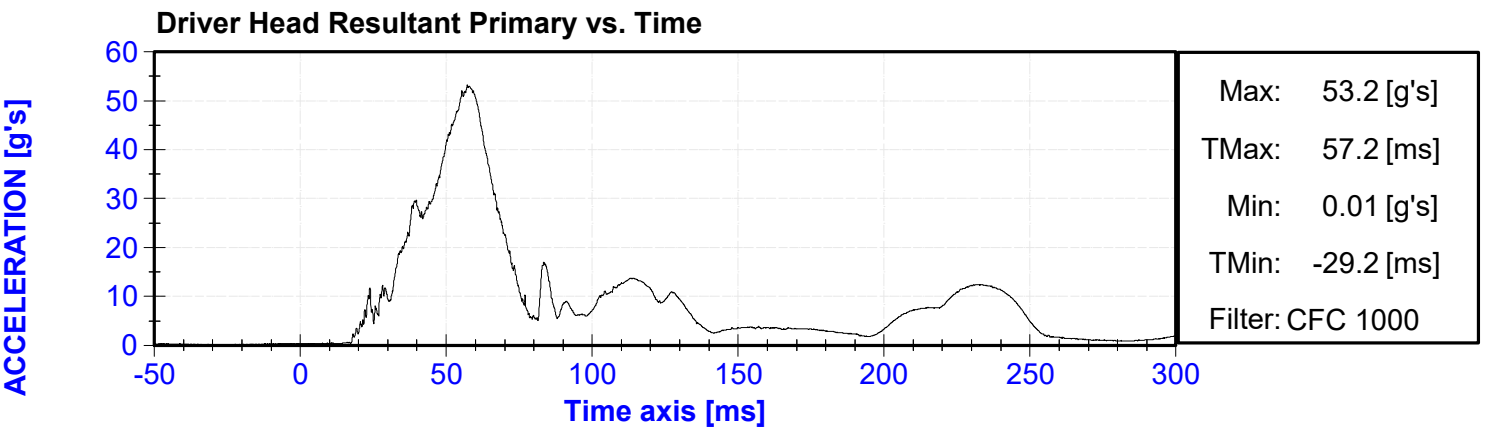
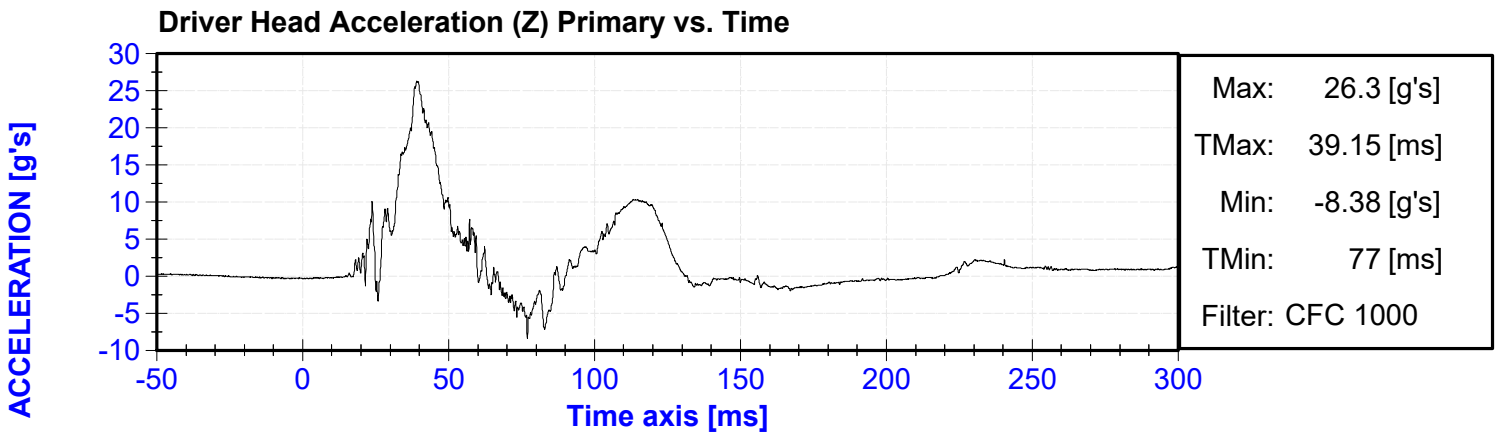
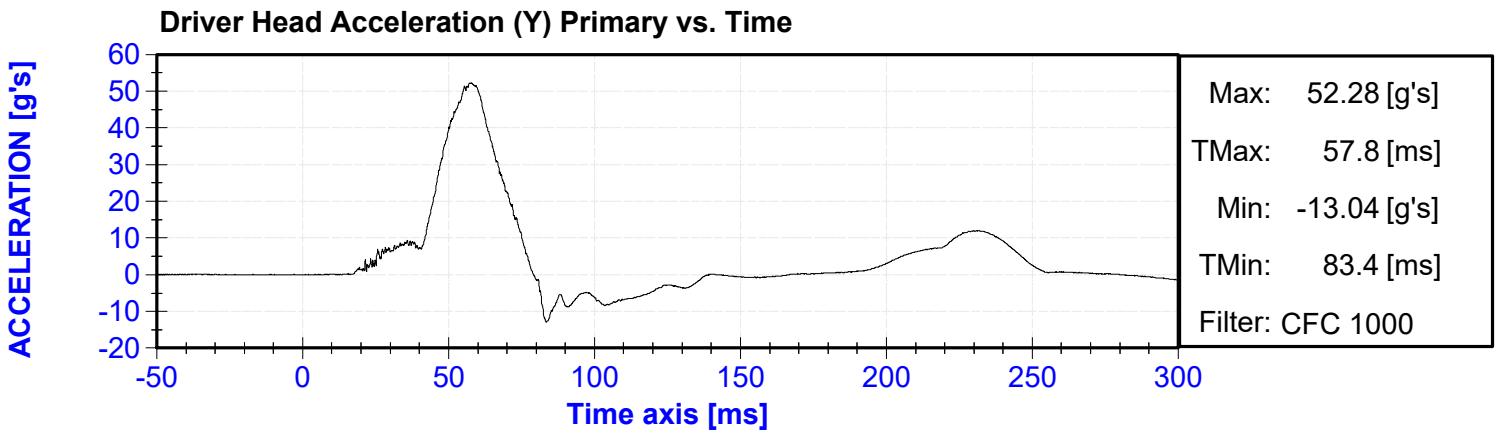
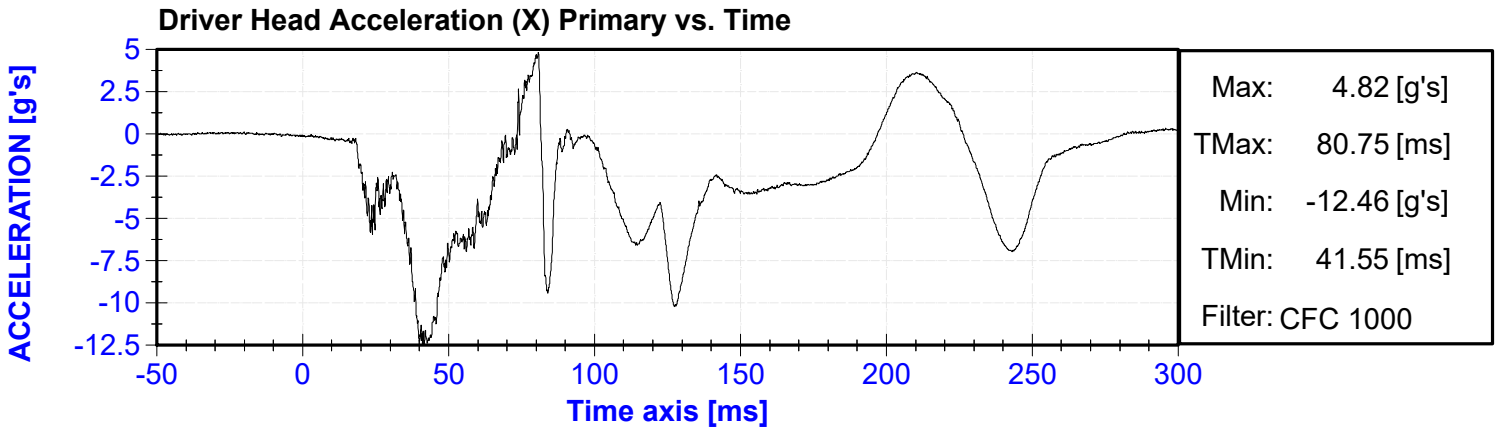
Driver Head Acceleration Redundant (X)
Driver Head Acceleration Redundant (Y)
Driver Head Acceleration Redundant (Z)
Driver Upper Thorax Rib Deflection (Y)
Driver Middle Thorax Rib Deflection (Y)
Driver Lower Thorax Rib Deflection (Y)
Driver Upper Abdomen Rib Deflection (Y)
Driver Lower Abdomen Rib Deflection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

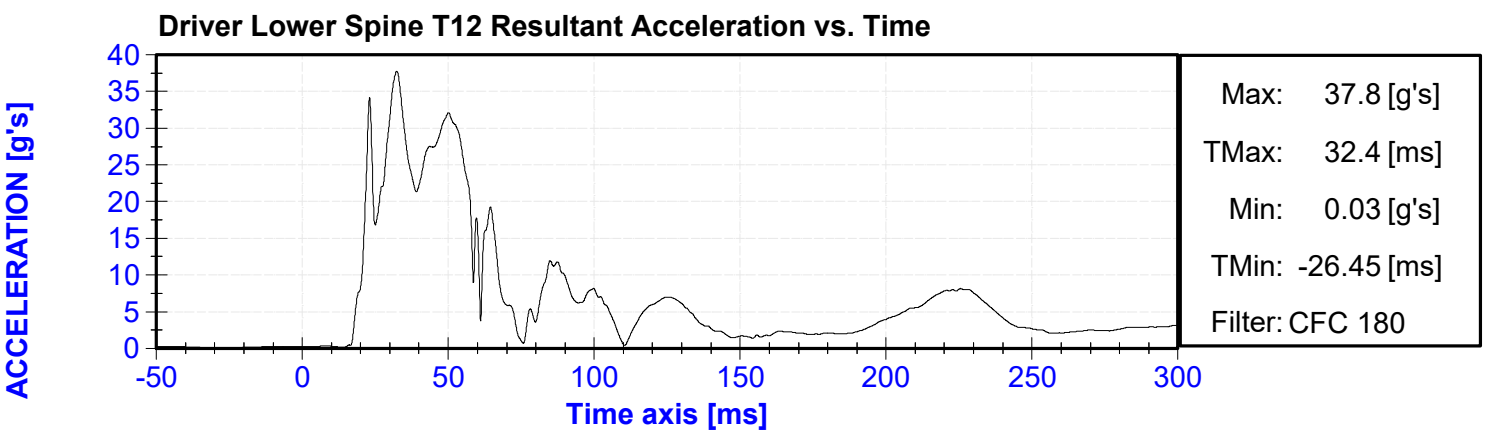
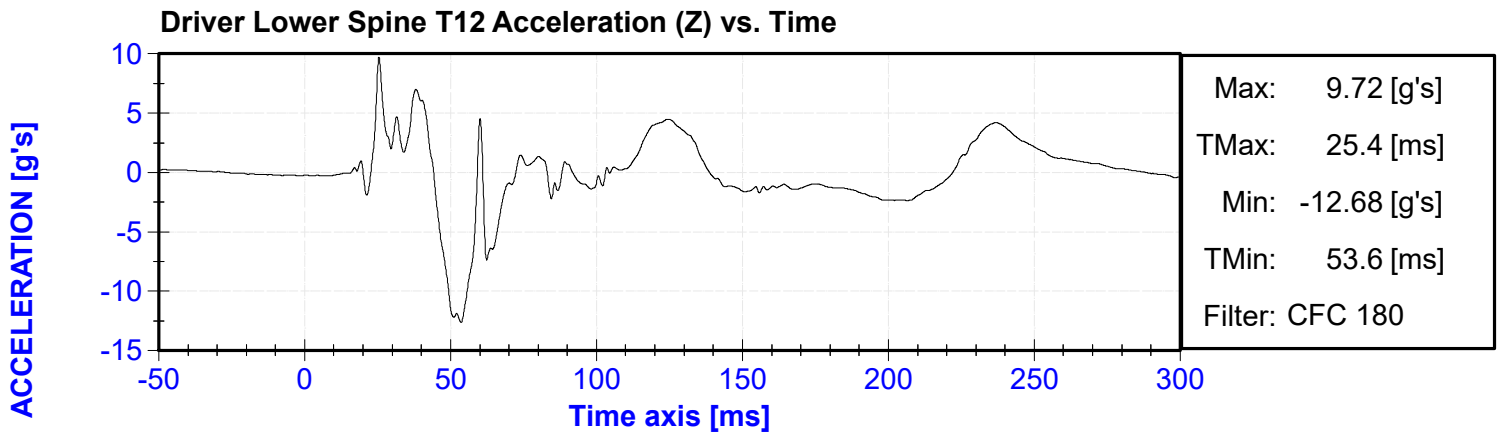
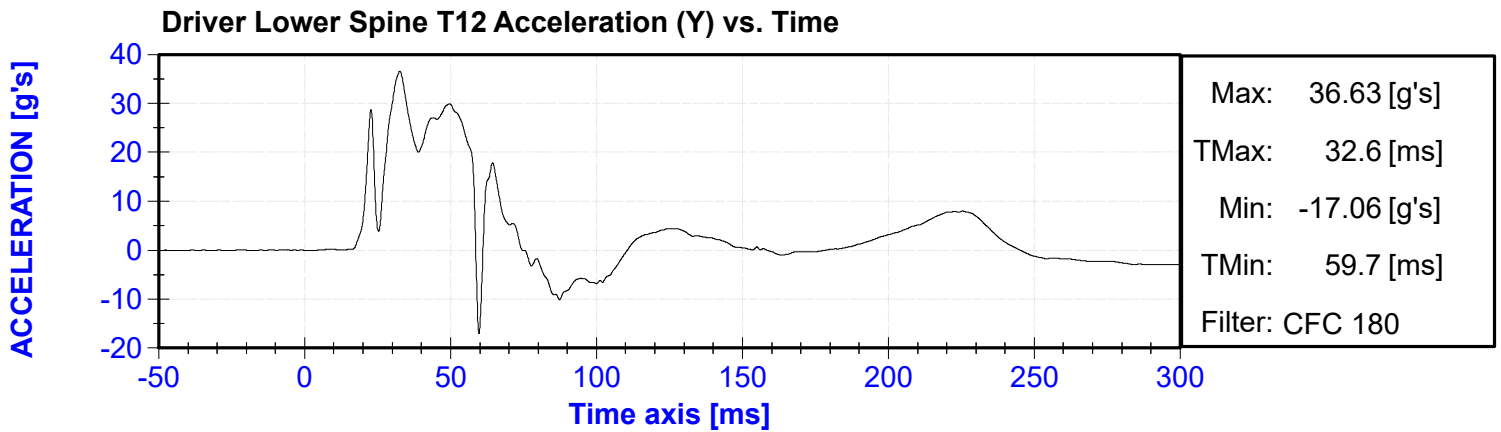
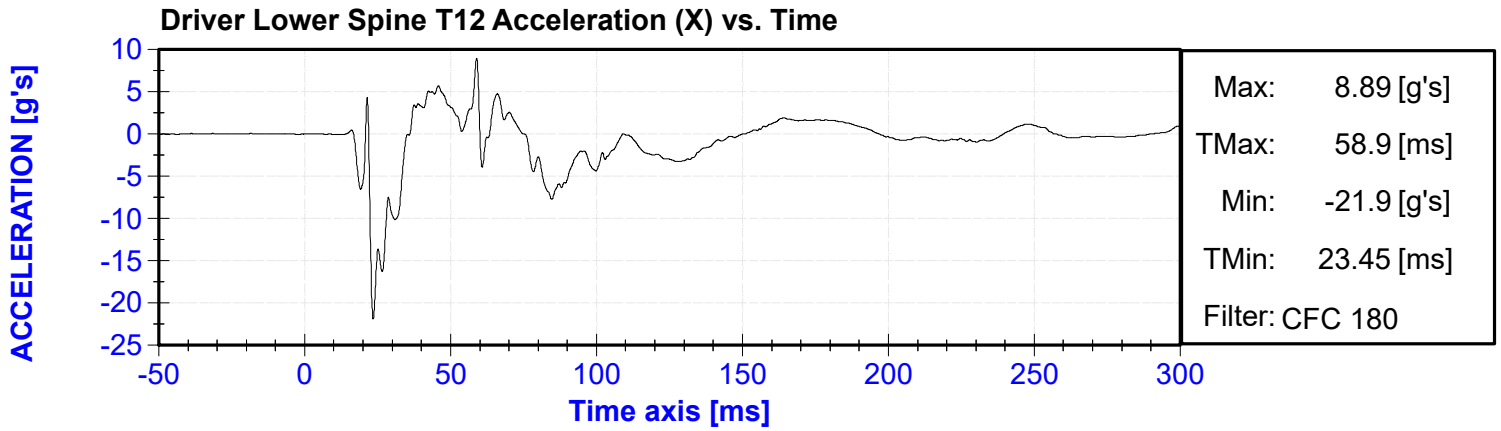
Vehicle Instrumentation Data

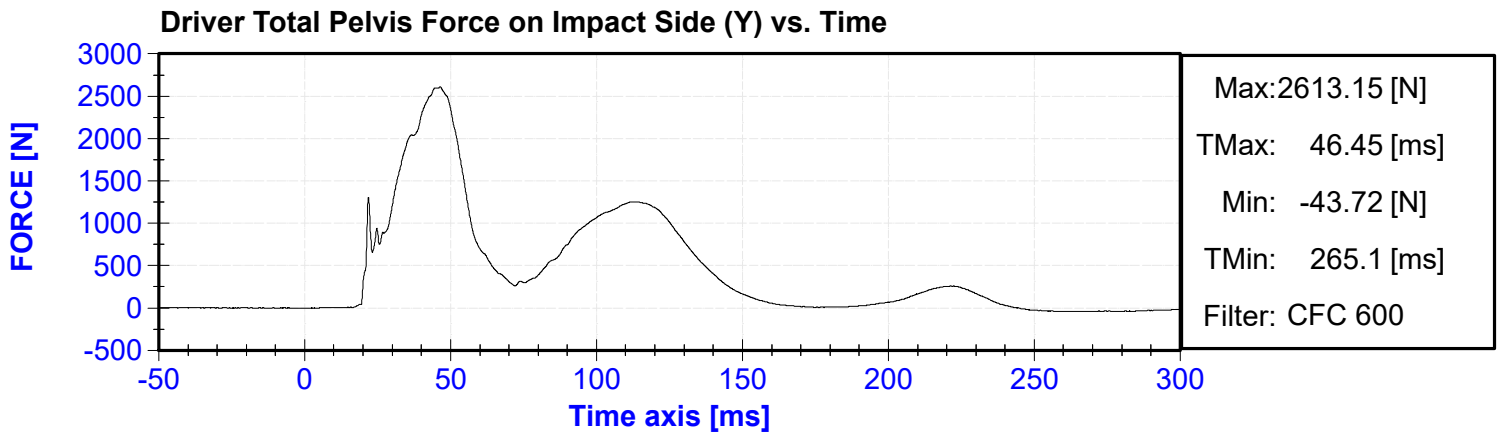
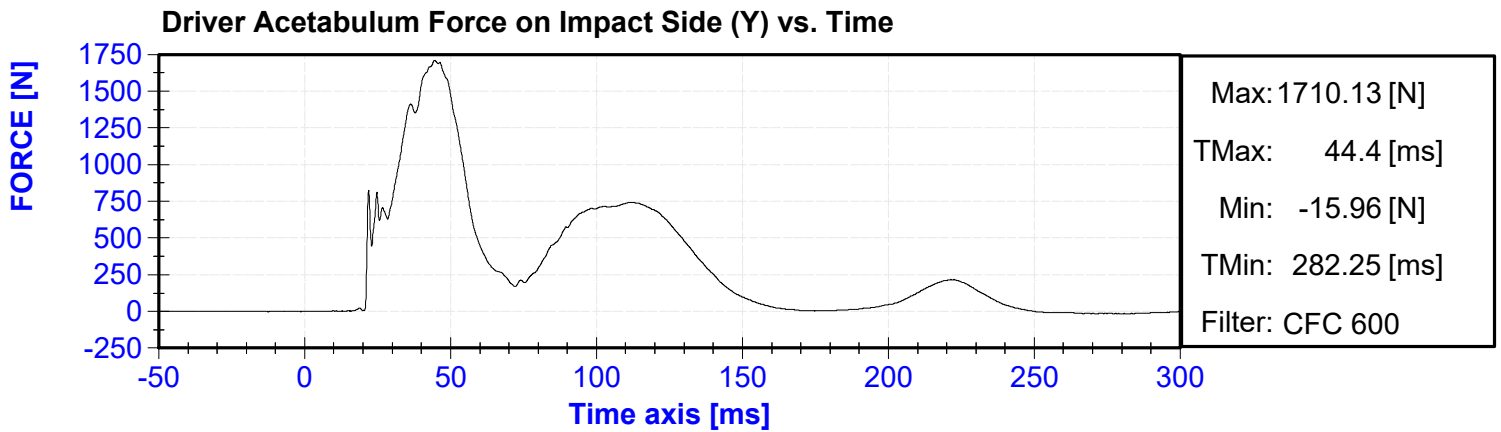
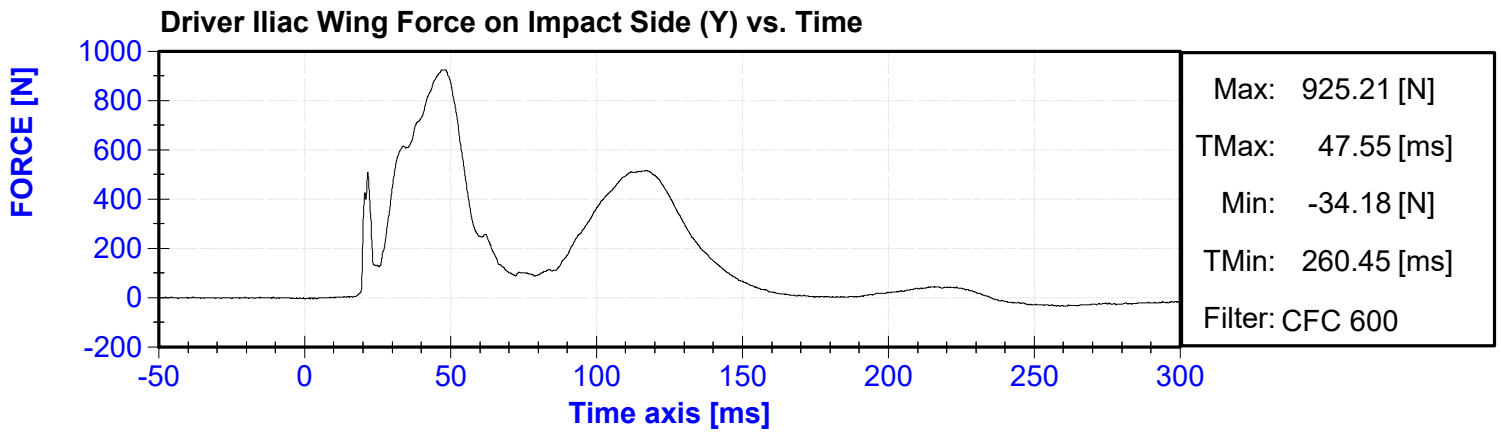
Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Left Floor Sill Acceleration (Y)
Left A-Pillar Sill Acceleration (Y)
Left Lower A-Pillar Acceleration (Y)
Left Mid A-Pillar Acceleration (Y)
Left B-Pillar Sill Acceleration (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)







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)

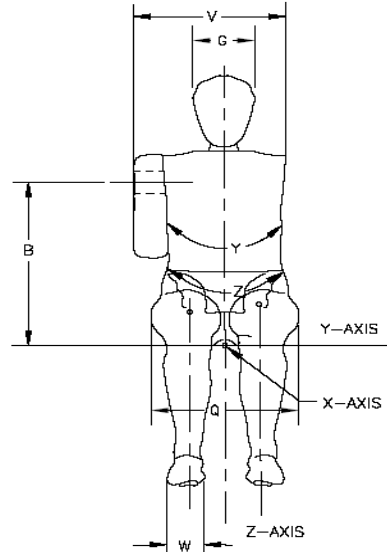
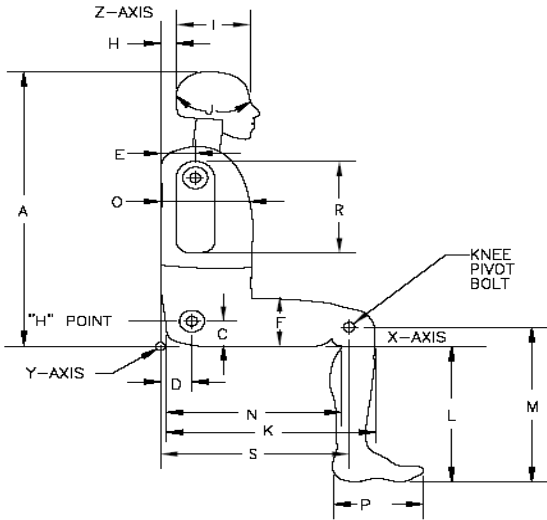


External Measurements - SID-IIs

Technician: K. Brogan

Date: 07/13/2023

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	443	Pass
C	H-point Height	79	89	85	Pass
D	H-point from seatback	141	151	144	Pass
E	Shoulder Pivot from Backline	97	107	101	Pass
F	Thigh Clearance	119	135	123	Pass
G	Head Breadth	140	148	142	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	181	Pass
J	Head Circumference	541	551	545	Pass
K	Buttock to Knee Length	514	540	529	Pass
L	Popliteal Height	343	369	356	Pass
M	Knee Pivot to floor height	392	409	401	Pass
N	Buttock Popliteal Length	416	442	430	Pass
O	Chest Depth w/o jacket	195	211	198	Pass
P	Foot Length	216	232	221	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	317	Pass
R	Arm Length	249	259	252	Pass
S	Knee Joint to seatback	477	493	482	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	779	Pass

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

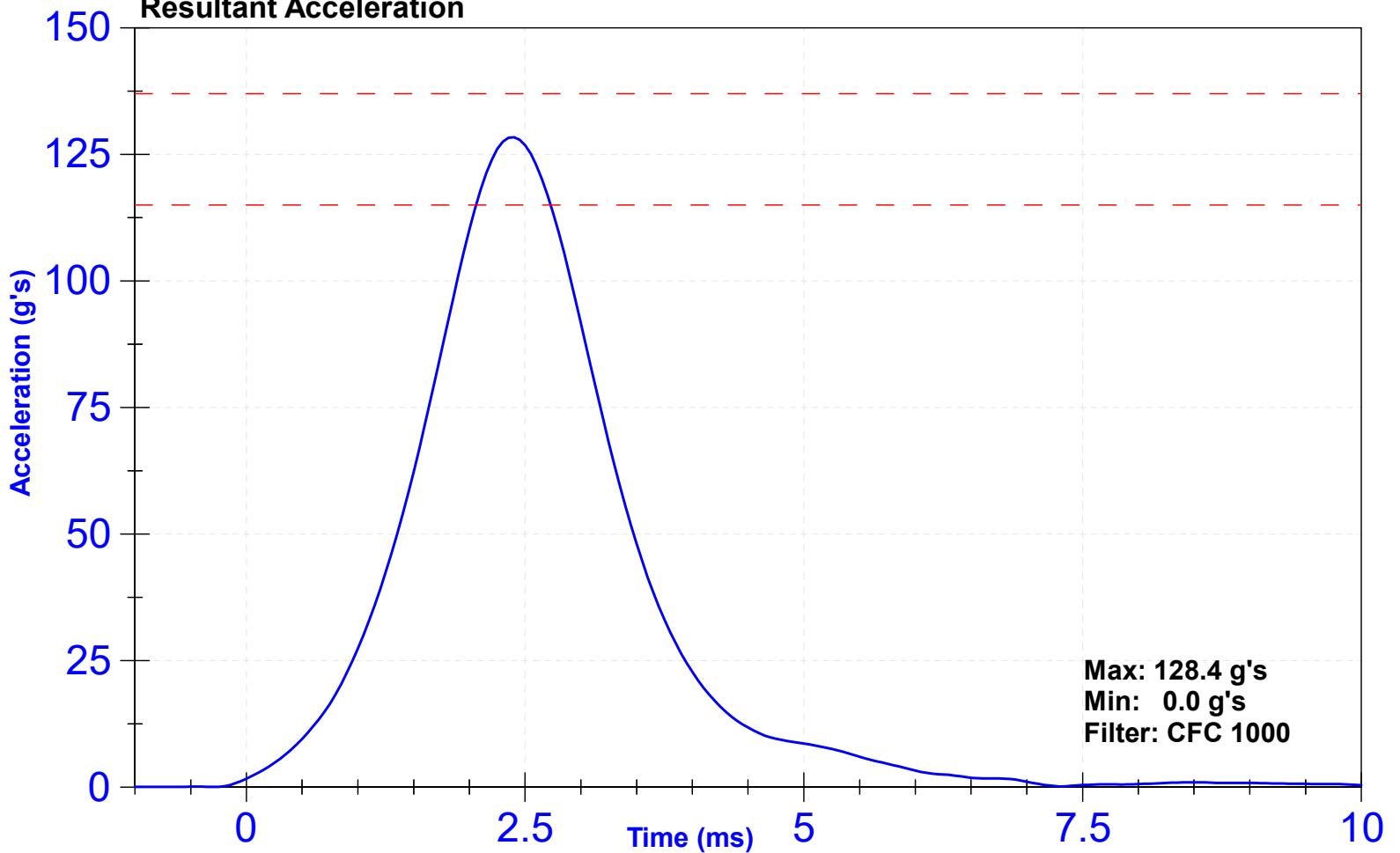
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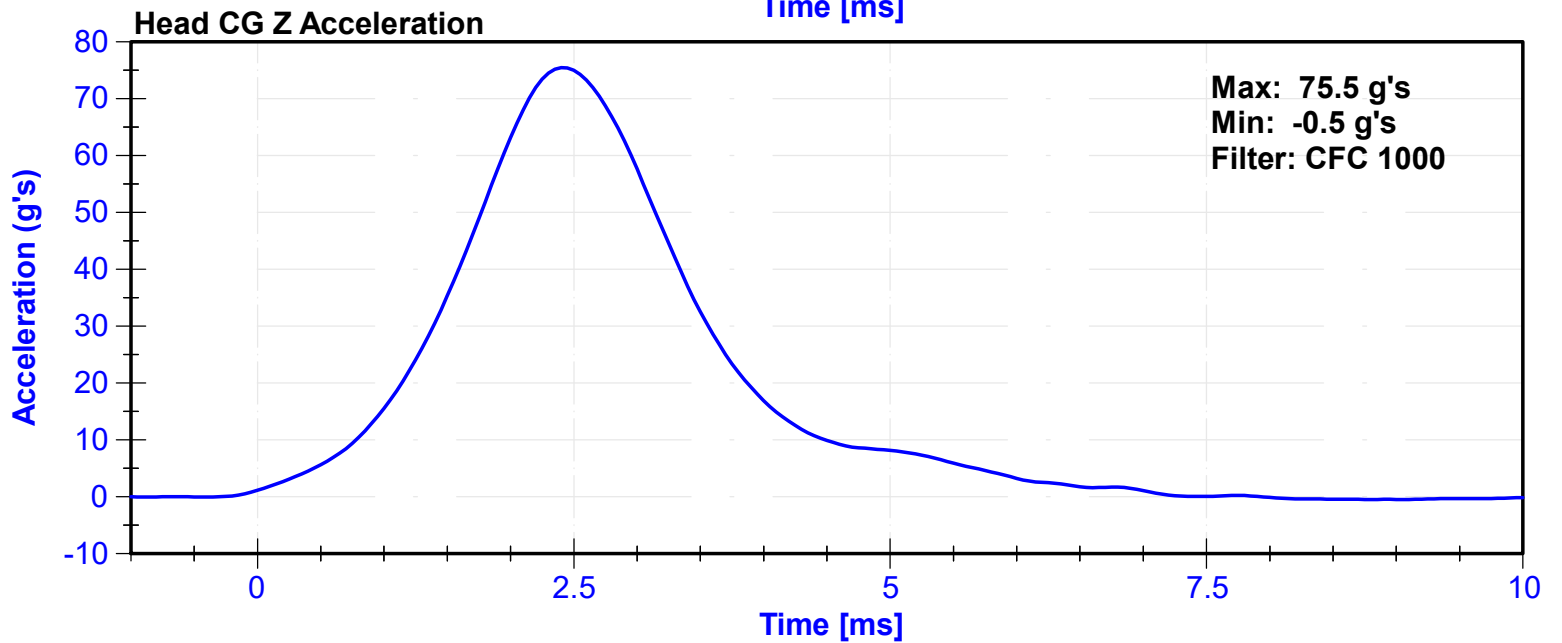
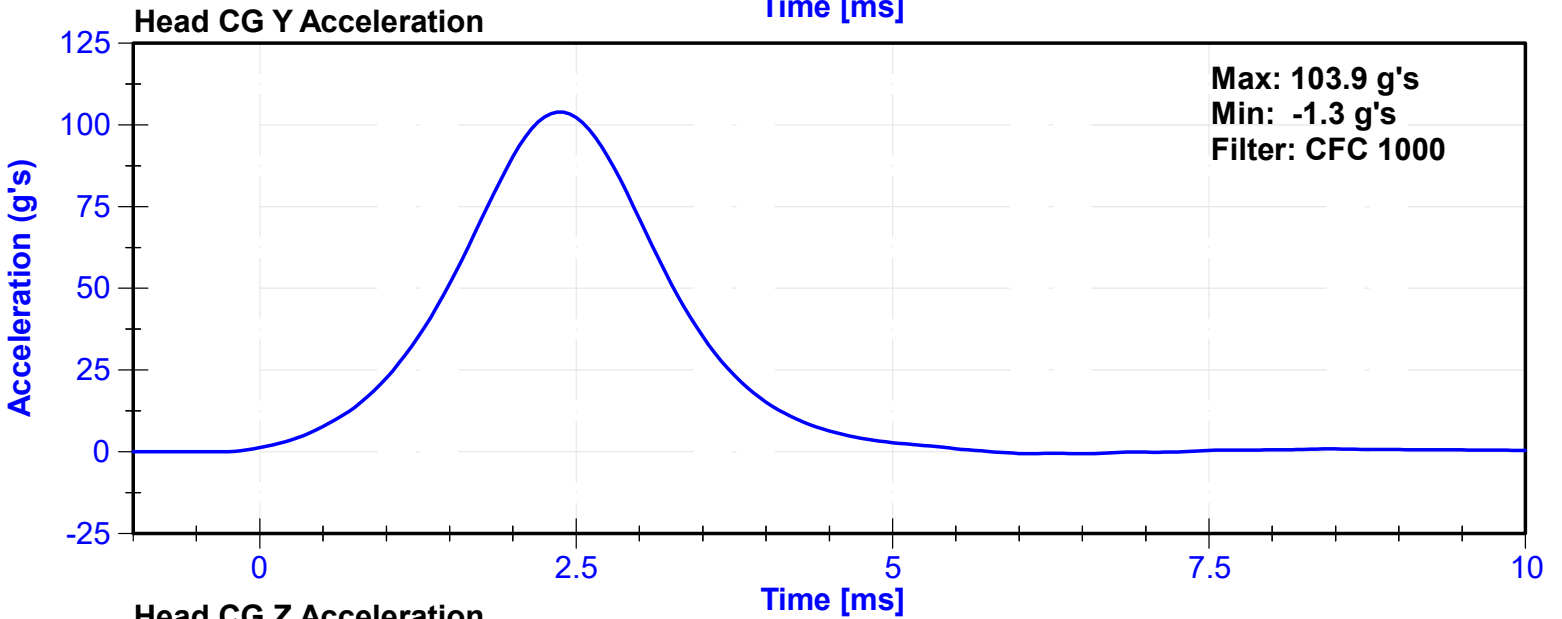
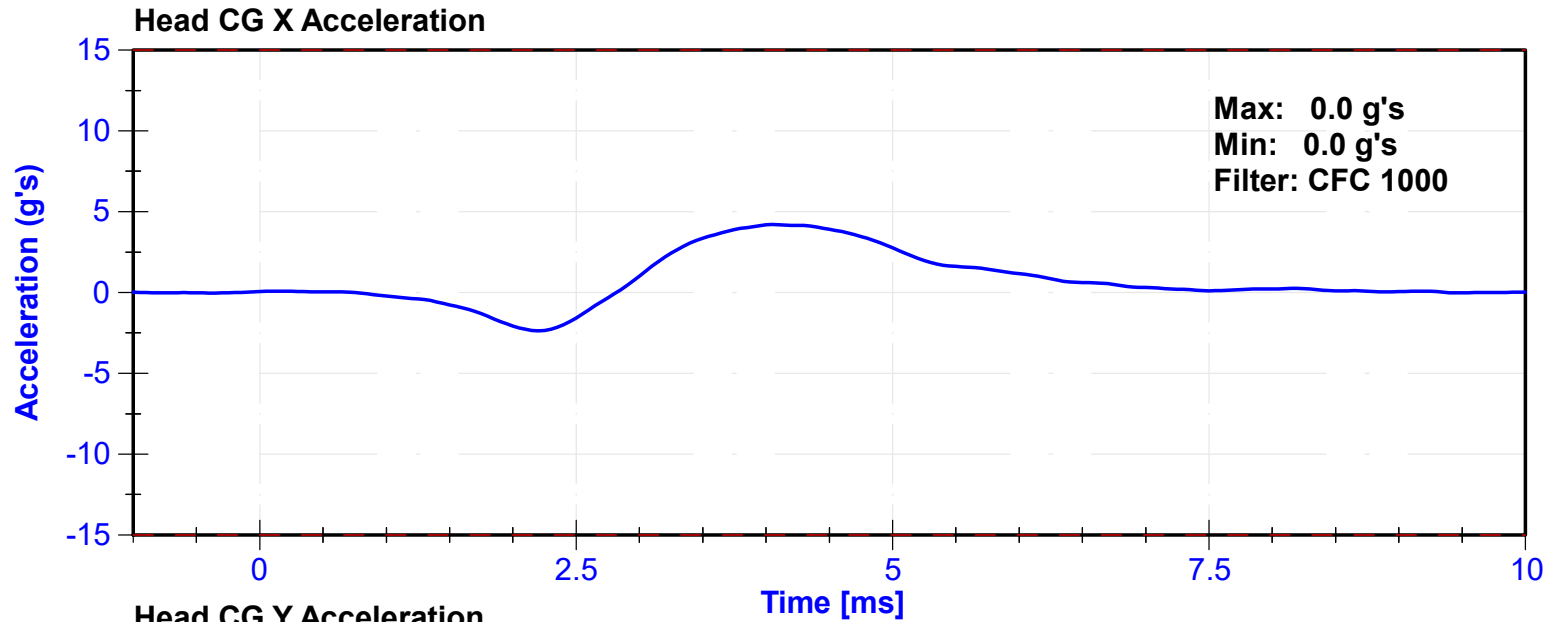
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22	Pass
Humidity	10	70	%	60	Pass
Resultant Acceleration	115	137	g's	128.4	Pass
Oscillation	0	15	%	1.3	Pass
Fore-Aft Acceleration	-15	15	g's	0.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibratio Date	Calibratio Due Date
X Accelerometer	Endevco	P59018	4/4/2023	10/1/2023
Y Accelerometer	Endevco	P79189	4/4/2023	10/1/2023
Z Accelerometer	Endevco	P79587	4/4/2023	10/1/2023

Resultant Acceleration





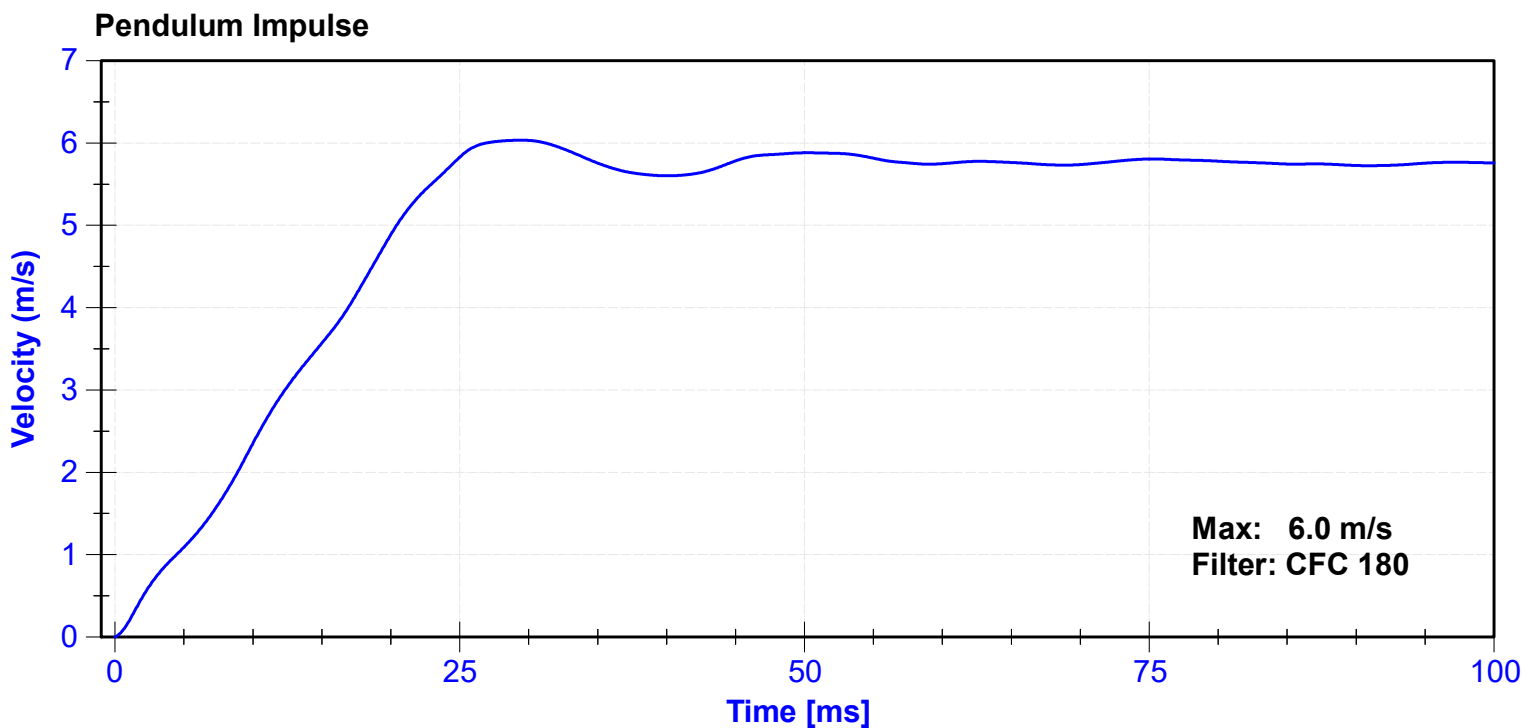
ATD Manufacturer	FTSS	Test Technician	D. Sakona
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

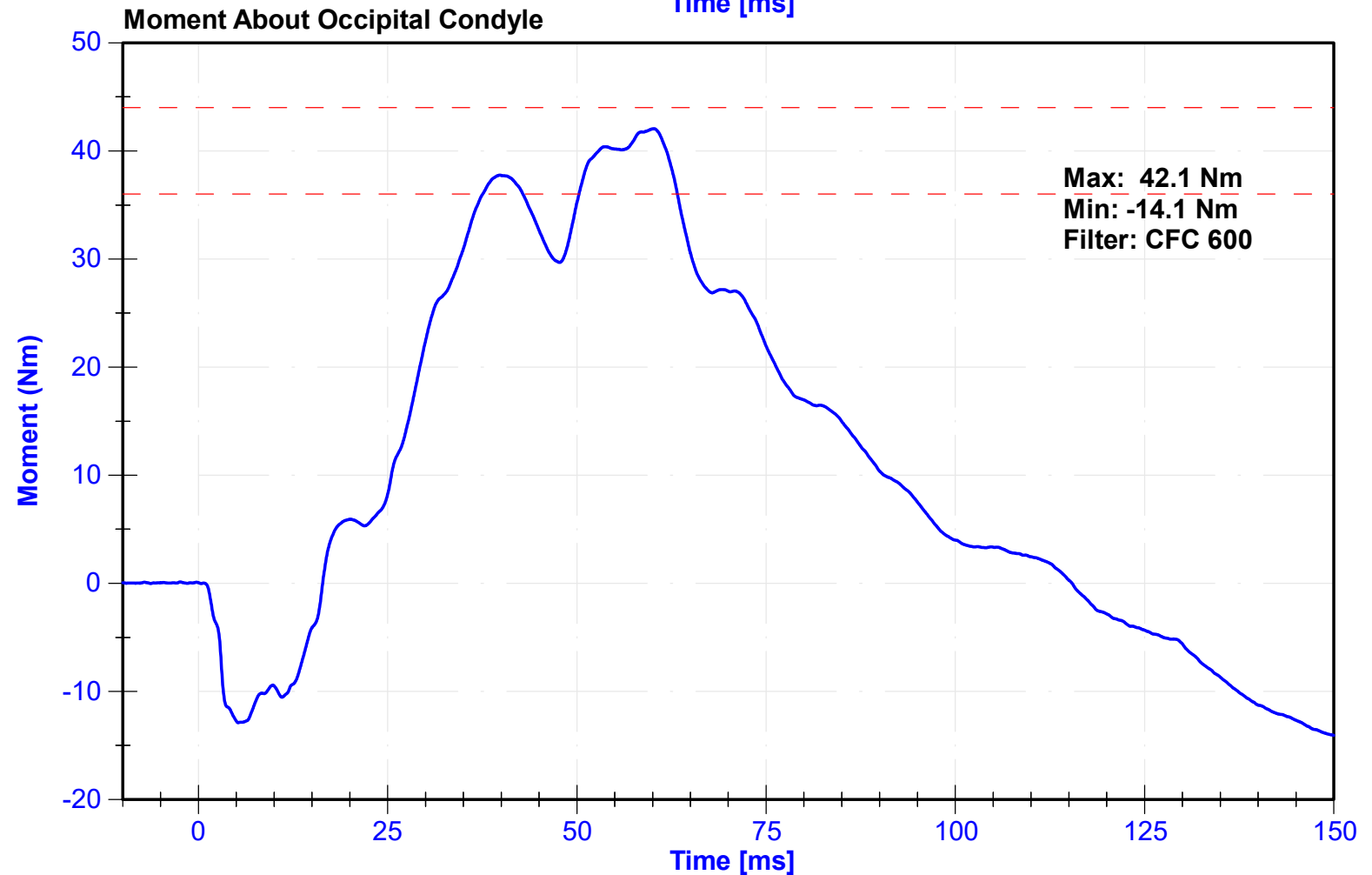
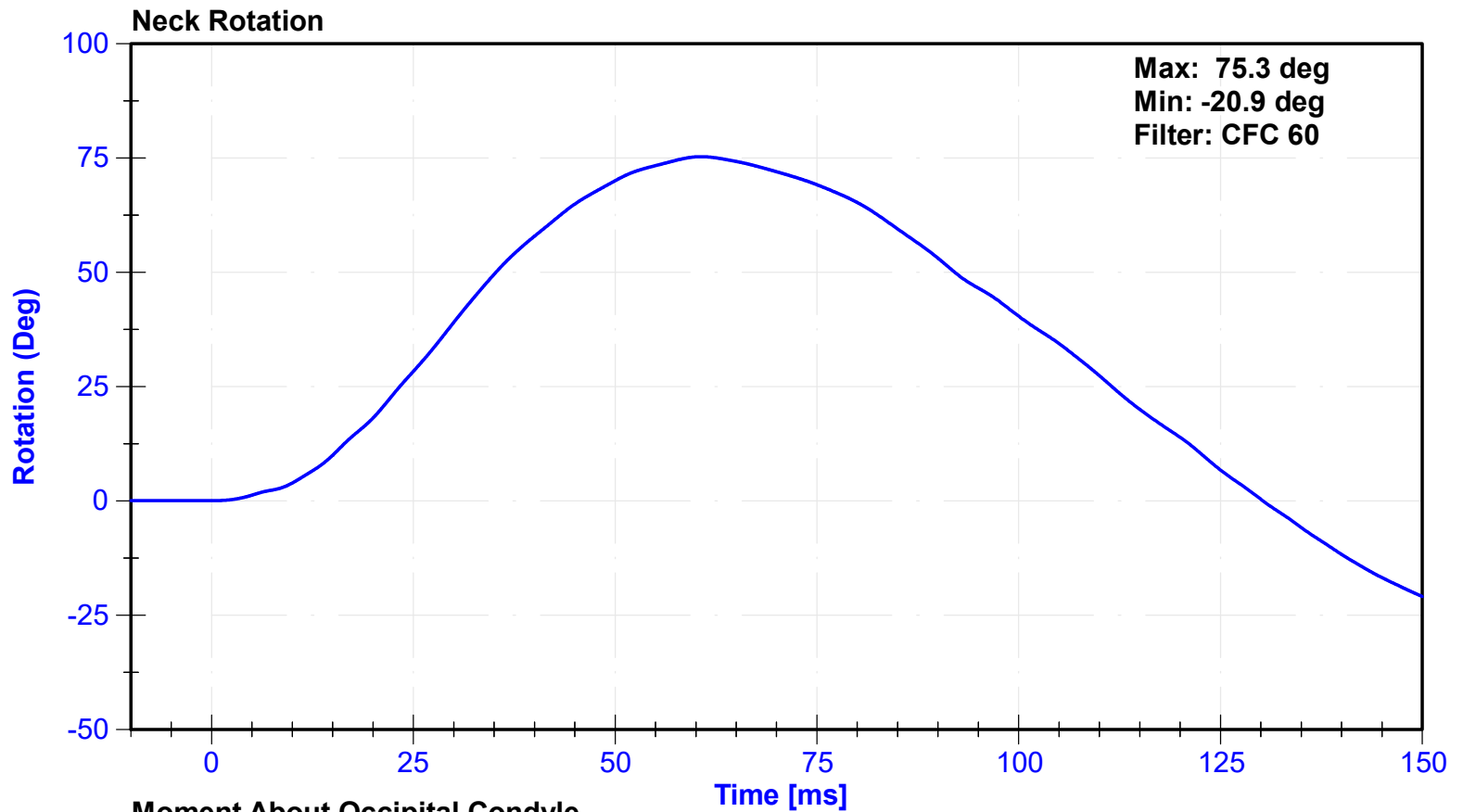
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.0	Pass
Humidity	10	70	%	59	Pass
Velocity	5.51	5.63	m/s	5.607	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.35	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.57	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.89	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.83	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	6.03	Pass
Neck Rotation	71	81	deg	75.3	Pass
Time at Maximum Rotation	50	70	ms	60.7	Pass
Moment about the OC	36	44	Nm	42.1	Pass
Moment Decay to 0 Nm	102	126	ms	115.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	7231C-750	10/31/2022	10/31/2023
Pendulum Potentiometer	Servo	4961	11/11/2022	11/11/2023
Condyle Potentiometer	Servo	DS185	11/11/2022	11/11/2023
Upper Neck Load Cell	Denton	1716ATF_2184-FY	5/18/2023	5/17/2024





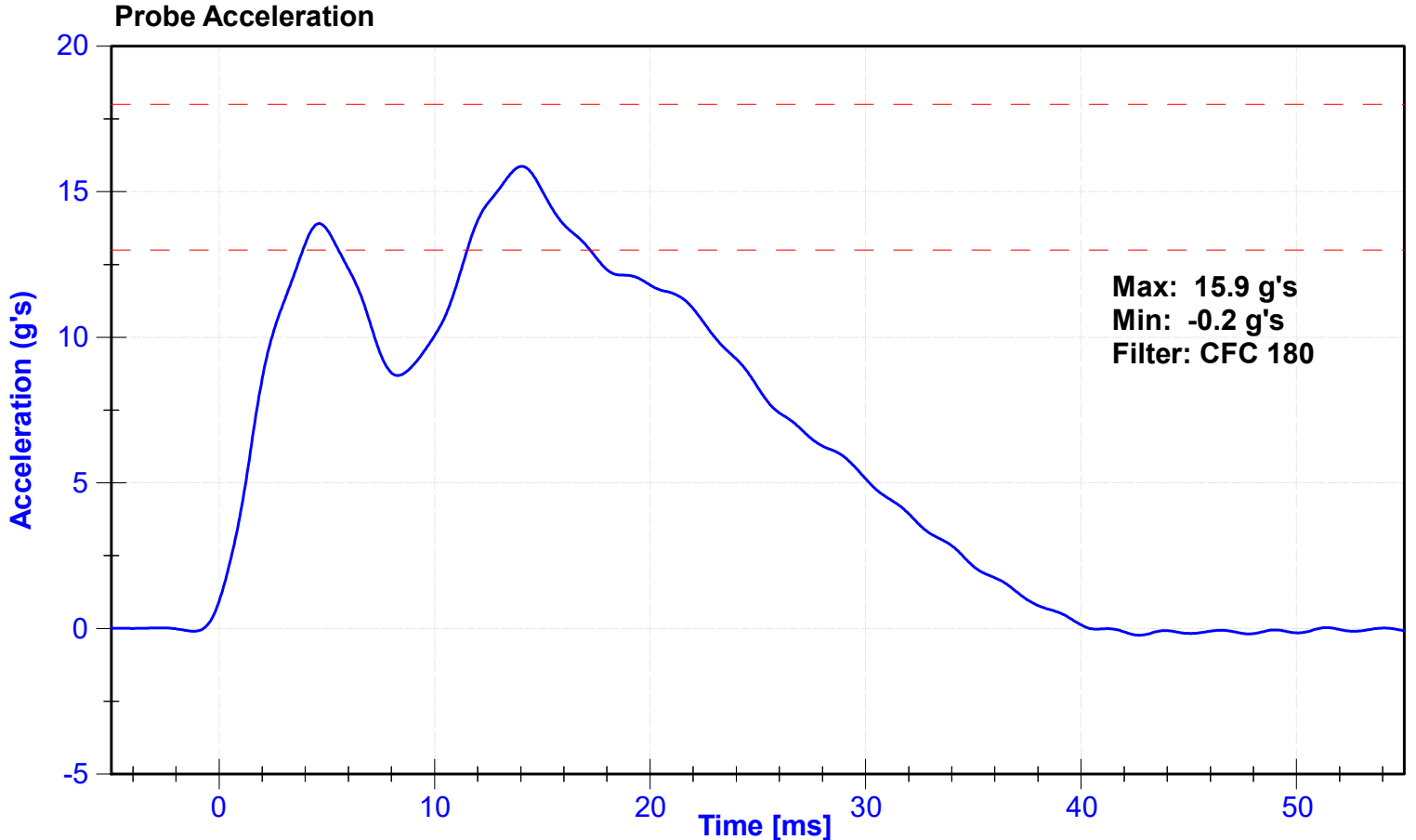
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ATD Serial Number	300	Laboratory Supervisor	C. Mantell

Results

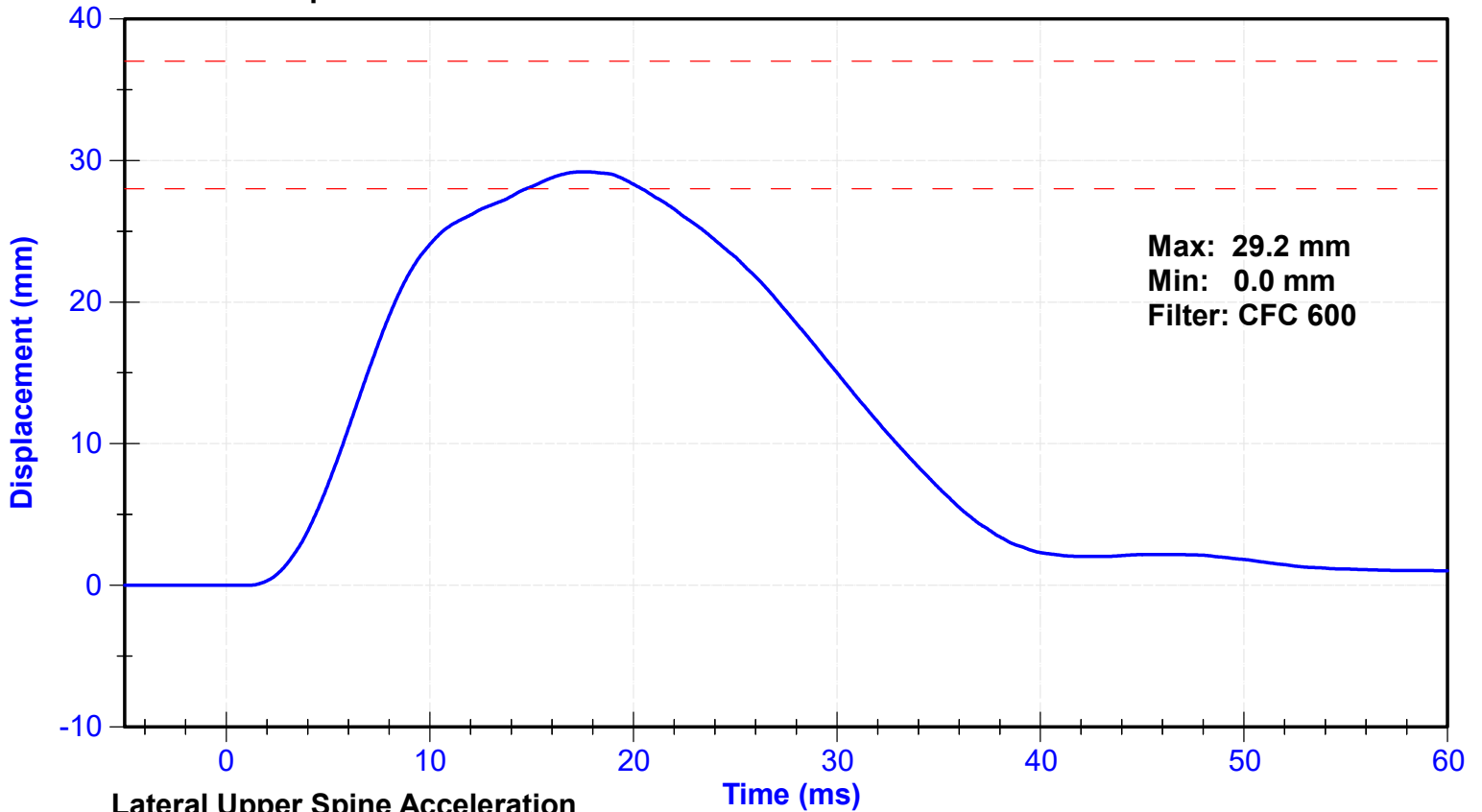
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.1	Pass
Humidity	10	70	%	58	Pass
Velocity	4.2	4.4	m/s	4.30	Pass
Probe Acceleration	13	18	g's	15.9	Pass
Shoulder Deflection	28	37	mm	29.2	Pass
Lateral Upper Spine Acceleration	17	22	g's	19.0	Pass

Transducer Calibrations

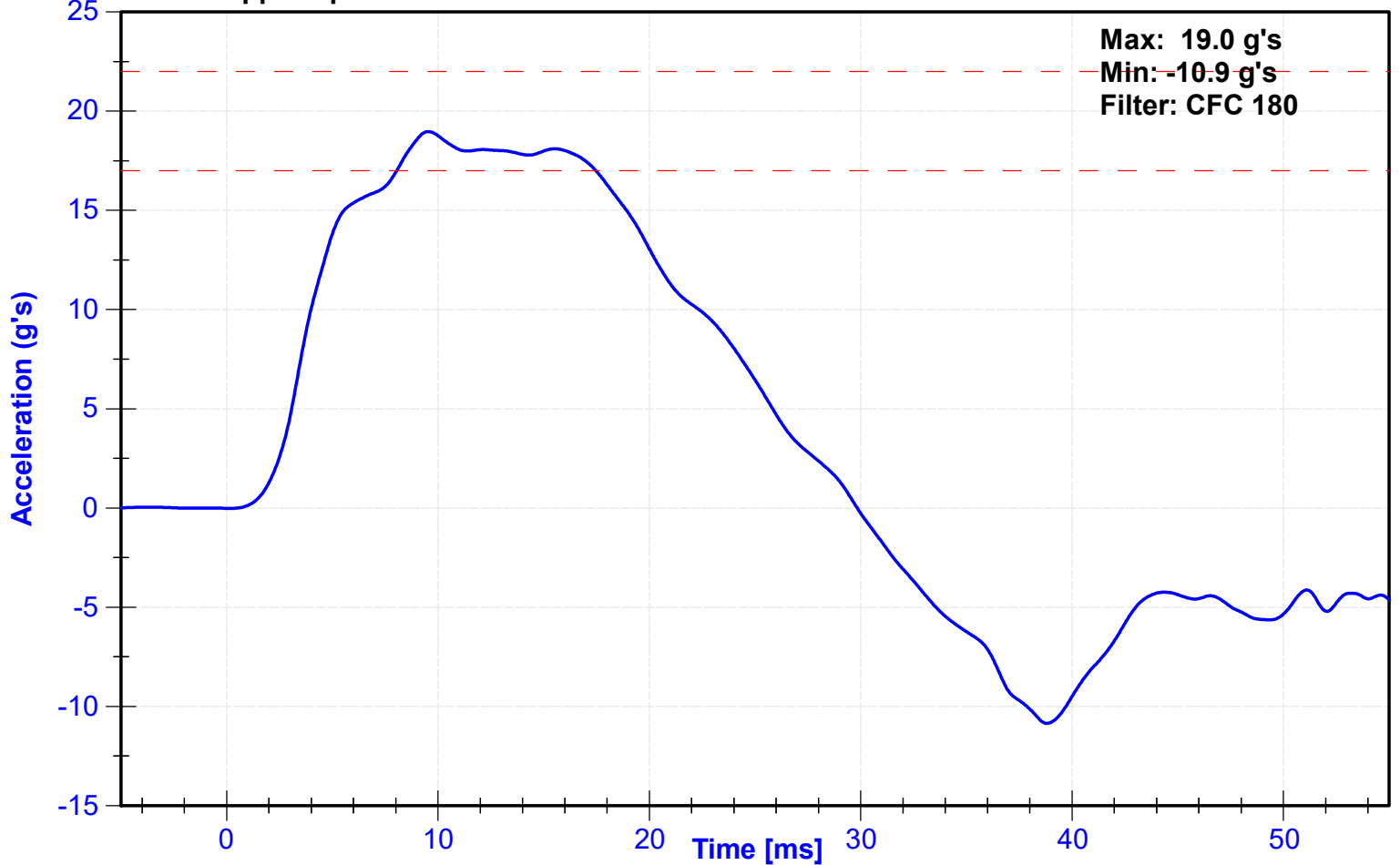
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Pendulum Accelerometer	Endevco	18546	11/19/2022	11/18/2023
Shoulder Potentiometer	Servo	053GFE	4/10/2023	10/9/2023
Upper Spine Y Accelerometer	Endevco	T20880	4/4/2023	10/1/2023



Shoulder Displacement



Lateral Upper Spine Acceleration



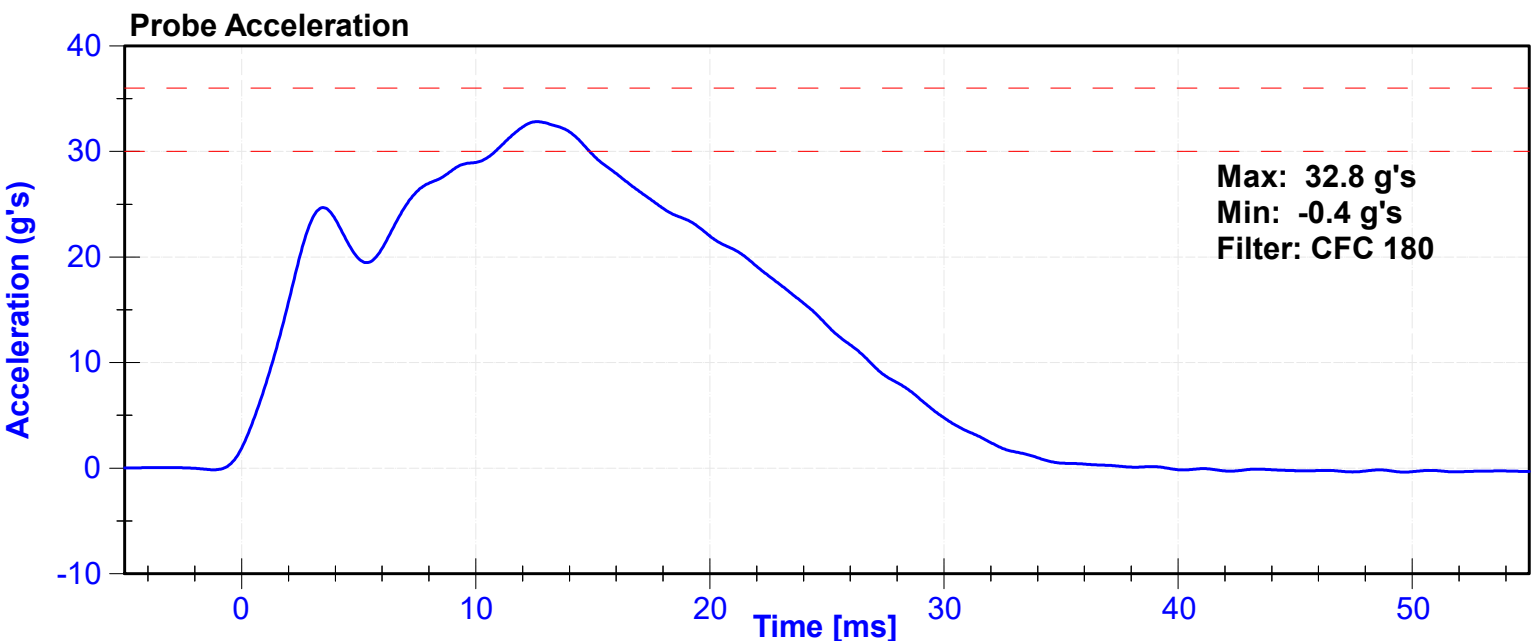
ATD Manufacturer	FTSS	Test Technician	D. Sakona
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

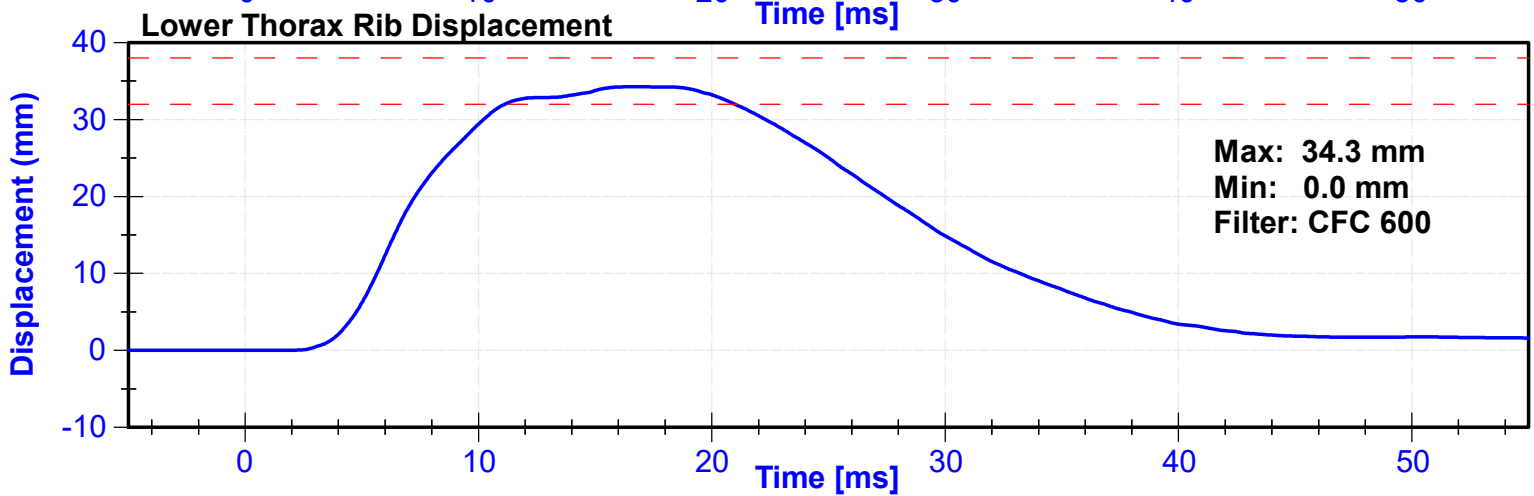
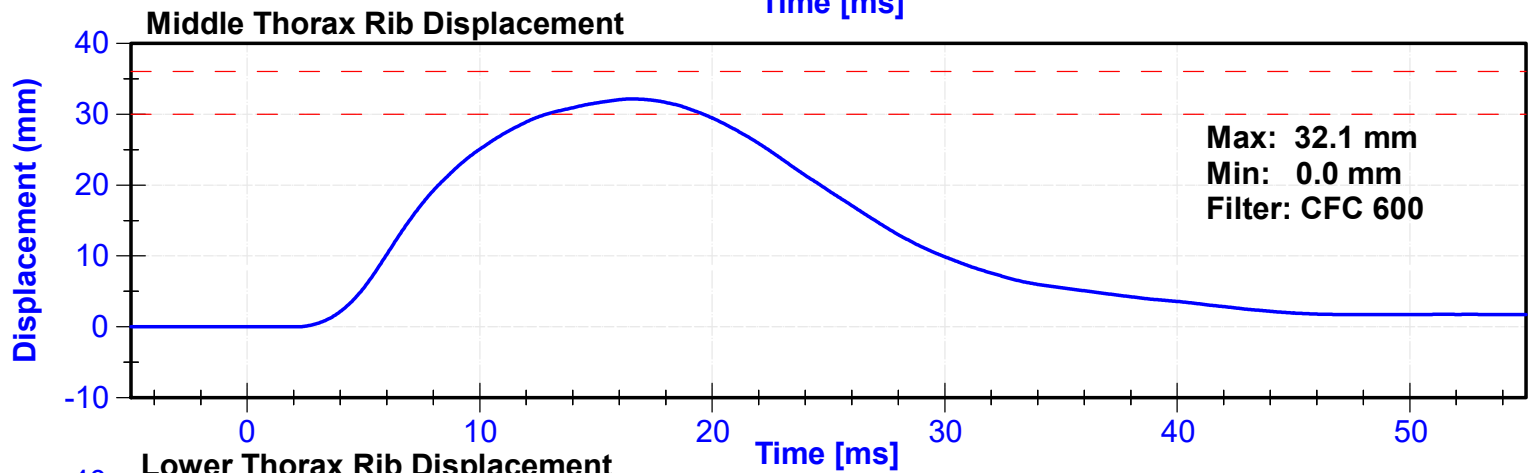
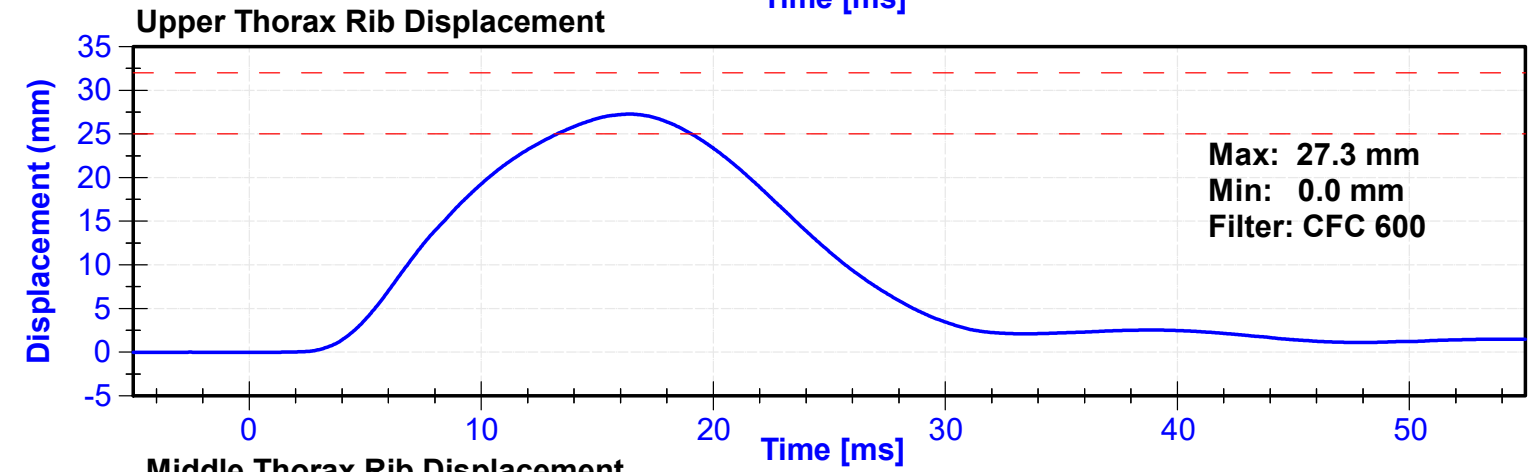
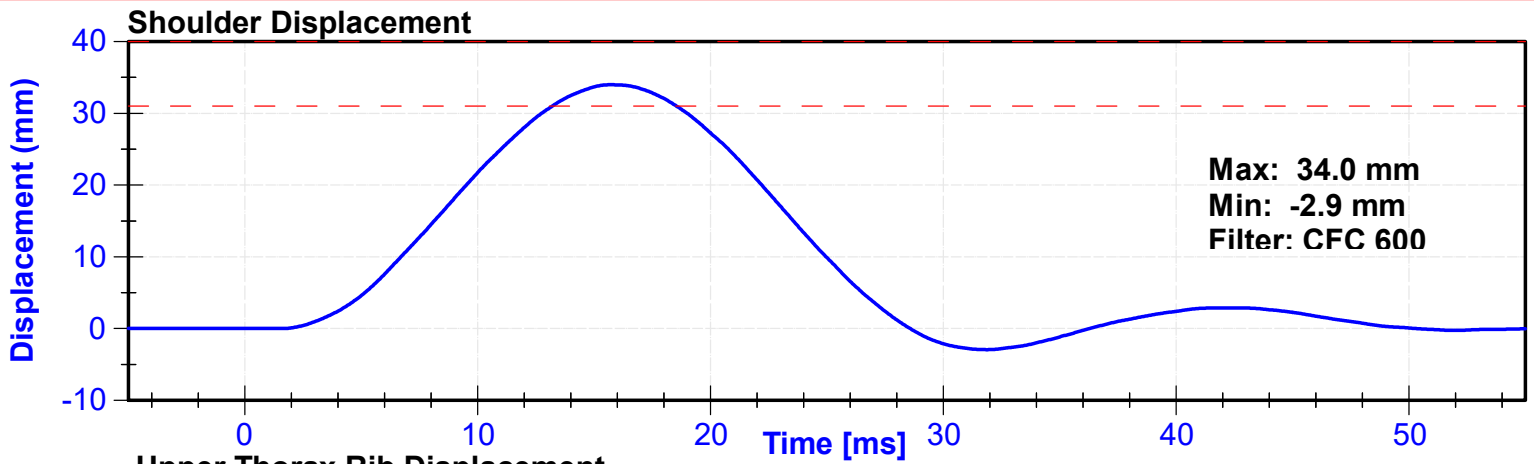
Results

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Temperature	20.6	22.2	°C	22.1	Pass
Humidity	10	70	%	58	Pass
Velocity	6.6	6.8	m/s	6.75	Pass
Probe Acceleration after 5 ms	30	36	g's	32.8	Pass
Lateral Upper Spine Acceleration	34	43	g's	37.3	Pass
Lateral Lower Spine Acceleration	29	37	g's	31.1	Pass
Shoulder Deflection	31	40	mm	34.0	Pass
Upper Thorax Rib Deflection	25	32	mm	27.3	Pass
Mid Thorax Rib Deflection	30	36	mm	32.1	Pass
Lower Thorax Rib Deflection	32	38	mm	34.3	Pass

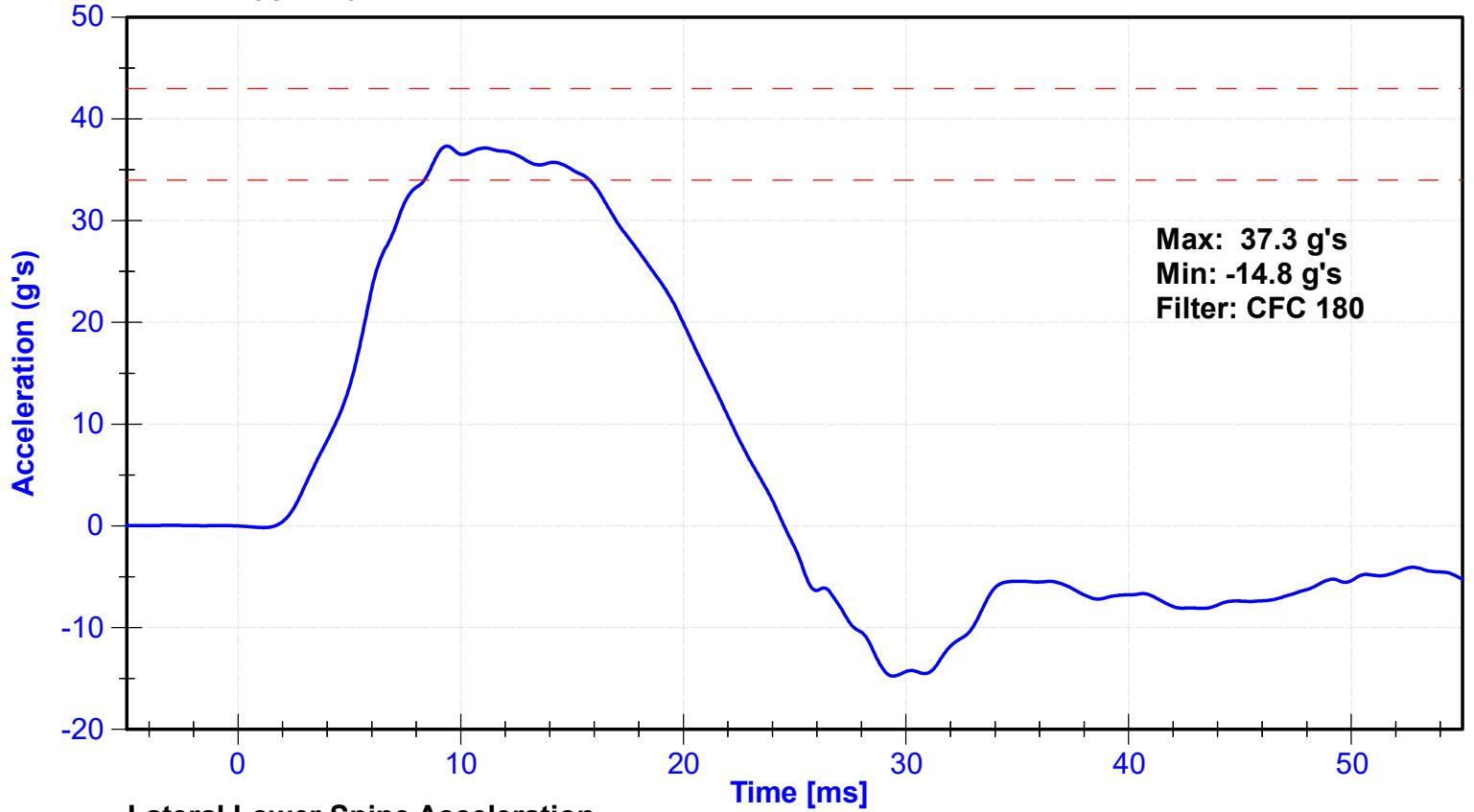
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18546	11/19/2022	11/18/2023
Upper Spine T1 Y Accelerometer	Endevco	T20880	4/4/2023	10/1/2023
Upper Spine T12 Y Accelerometer	Endevco	P52071	4/4/2023	10/1/2023
Shoulder Potentiometer	Servo	053GFE	4/10/2023	10/9/2023
Upper Thorax Rib Potentiometer	Servo	2316GFE	4/10/2023	10/9/2023
Middle Thorax Rib Potentiometer	Servo	040GFE	4/10/2023	10/9/2023
Lower Thorax Rib Potentiometer	Servo	1156GFE	4/10/2023	10/9/2023

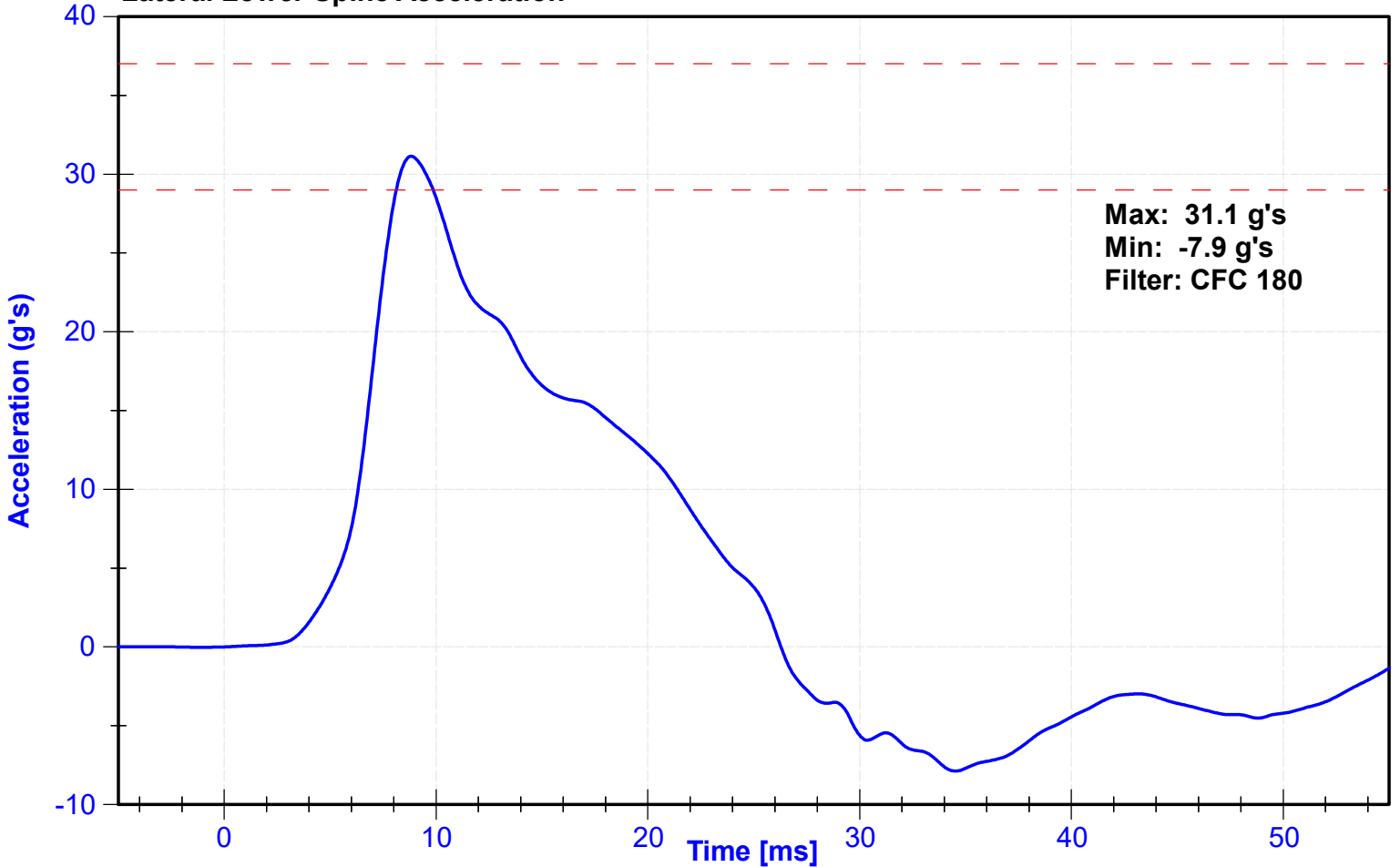




Lateral Upper Spine Acceleration



Lateral Lower Spine Acceleration



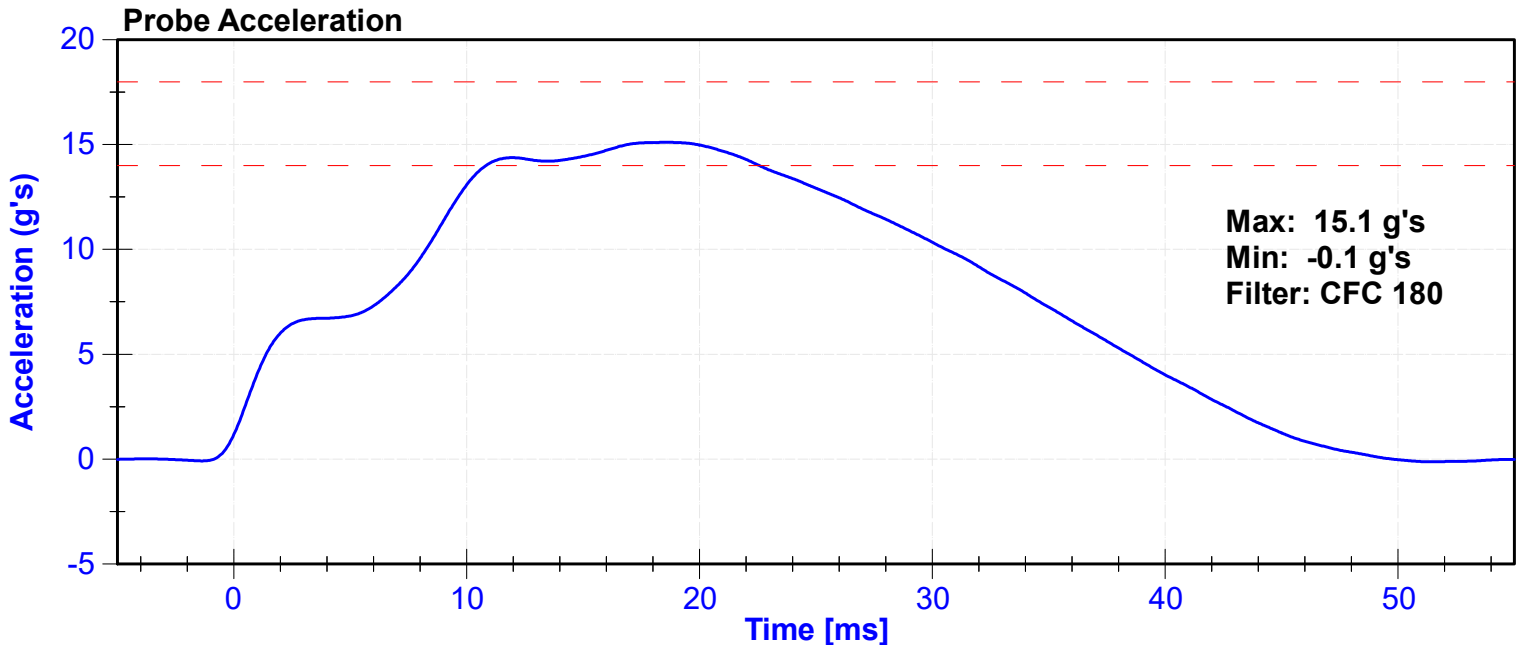
ATD Manufacturer	FTSS	Test Technician	D. Sakona
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

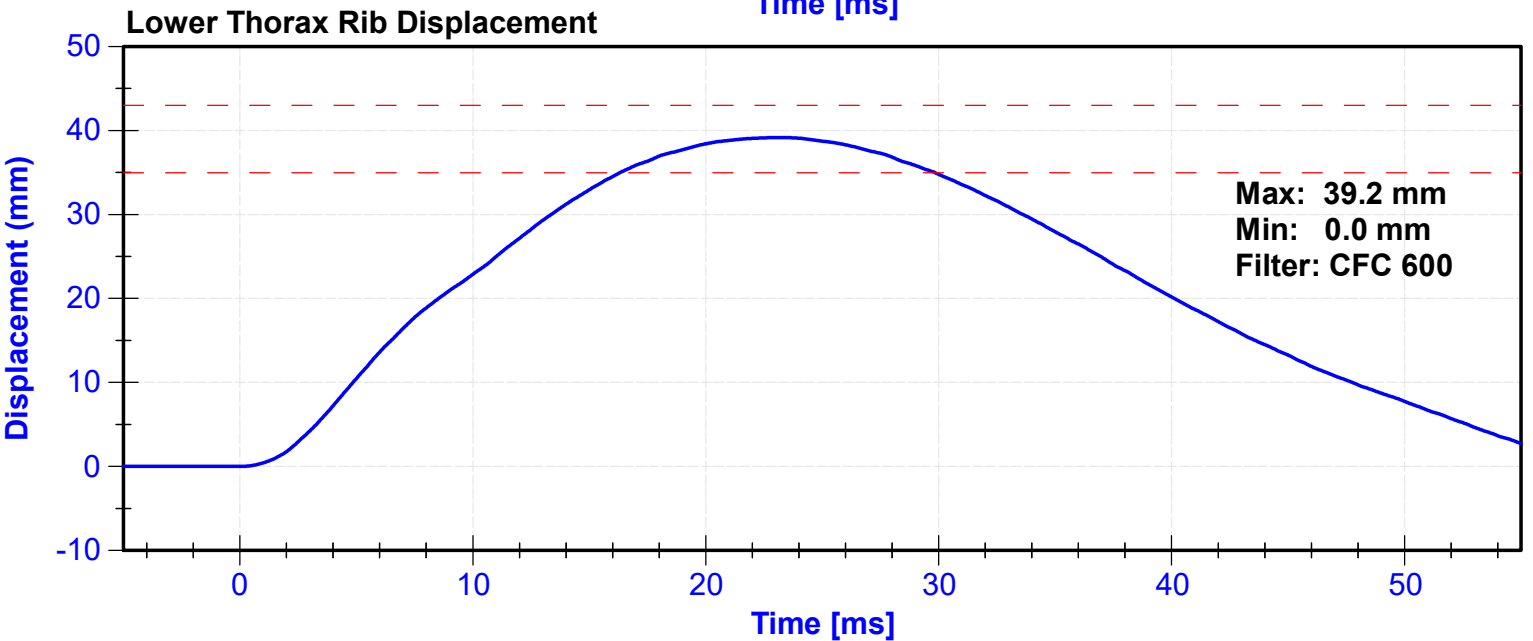
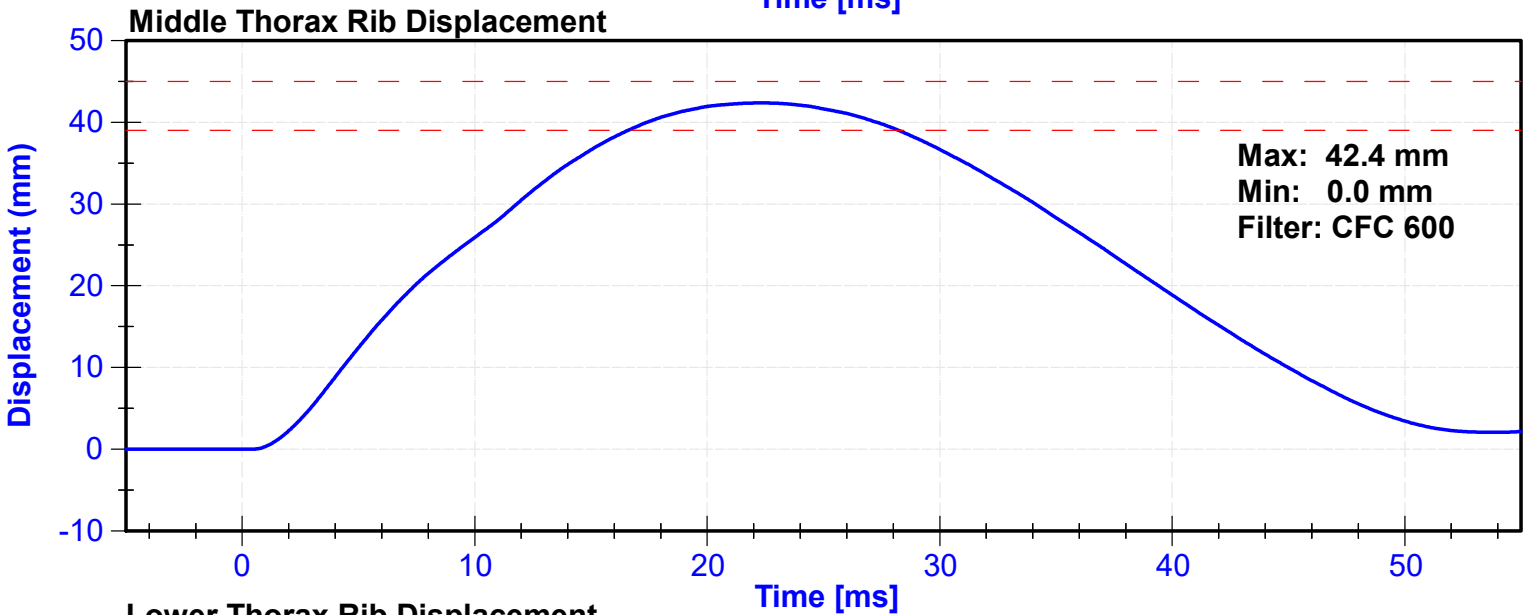
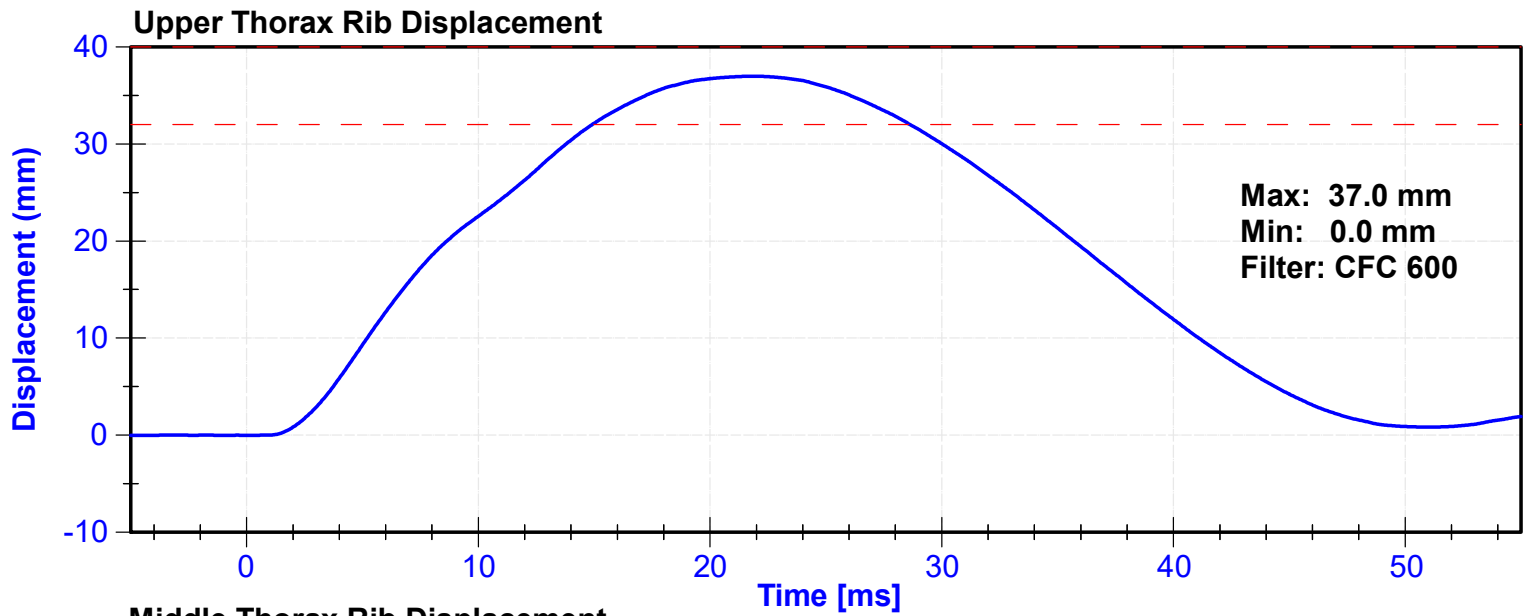
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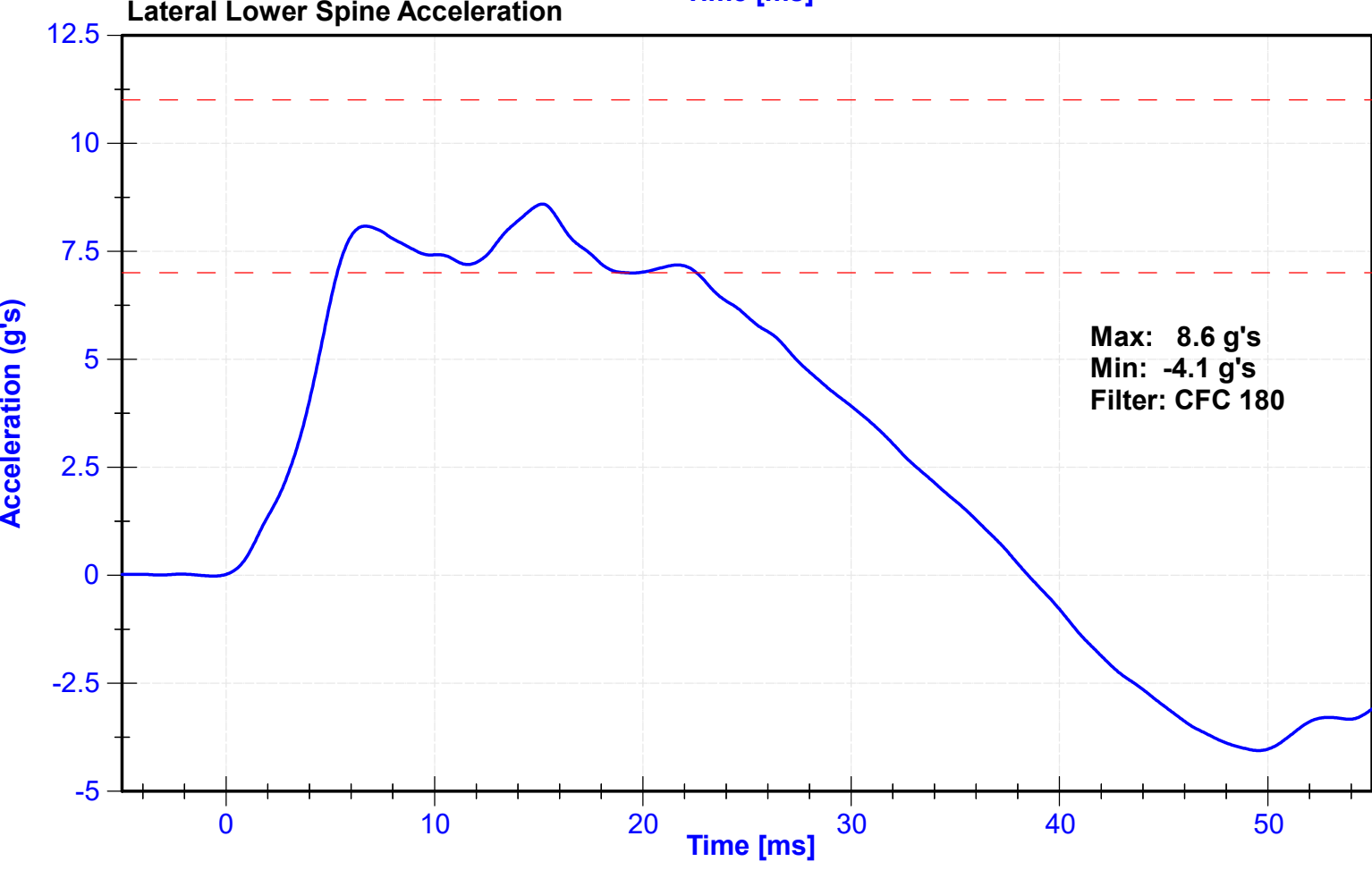
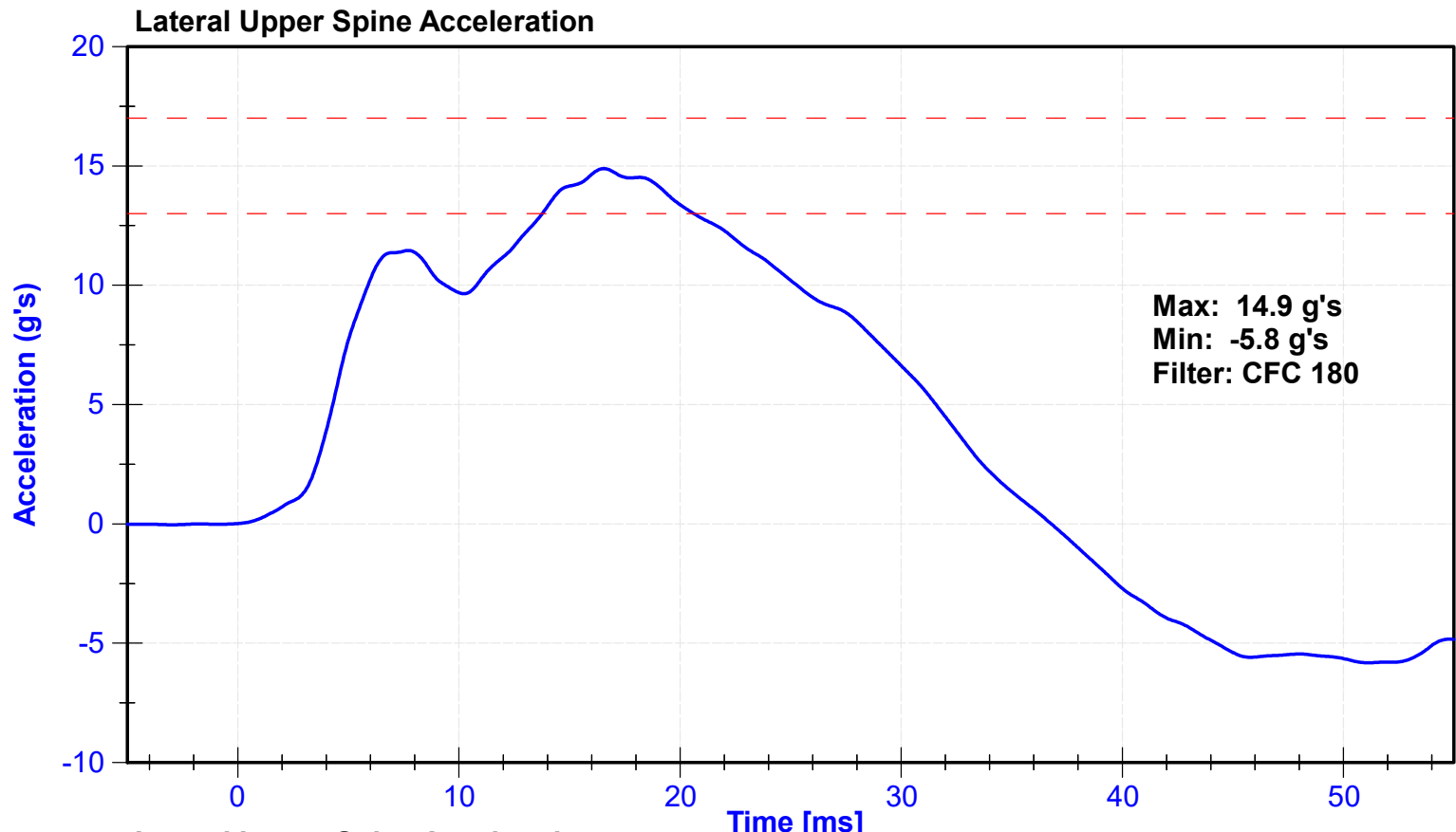
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.1	Pass
Humidity	10	70	%	58	Pass
Velocity	4.2	4.4	m/s	4.27	Pass
Probe Acceleration	14	18	g's	15.1	Pass
Lateral Upper Spine Acceleration	13	17	g's	14.9	Pass
Lateral Lower Spine Acceleration	7	11	g's	8.6	Pass
Upper Thorax Rib Deflection	32	40	mm	37.0	Pass
Middle Thorax Rib Deflection	39	45	mm	42.4	Pass
Lower Thorax Rib Deflection	35	43	mm	39.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18546	11/19/2022	11/18/2023
Upper Spine Y Accelerometer	Endevco	T20880	4/4/2023	10/1/2023
Lower Spine Y Accelerometer	Endevco	P52071	4/4/2023	10/1/2023
Upper Thorax Rib Potentiometer	Servo	2316GFE	4/10/2023	10/9/2023
Middle Thorax Rib Potentiometer	Servo	040GFE	4/10/2023	10/9/2023
Lower Thorax Rib Potentiometer	Servo	1156GFE	4/10/2023	10/9/2023







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

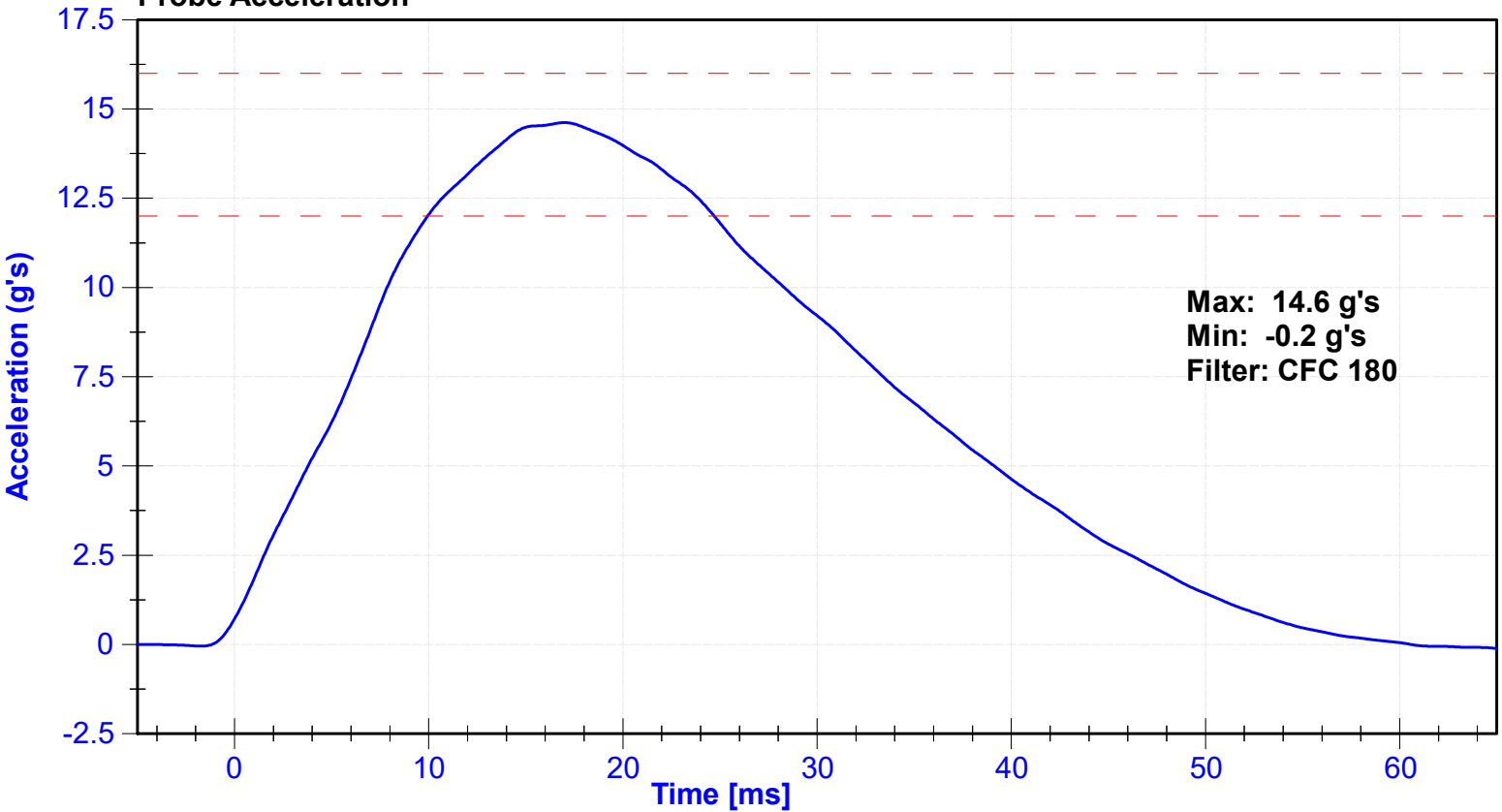
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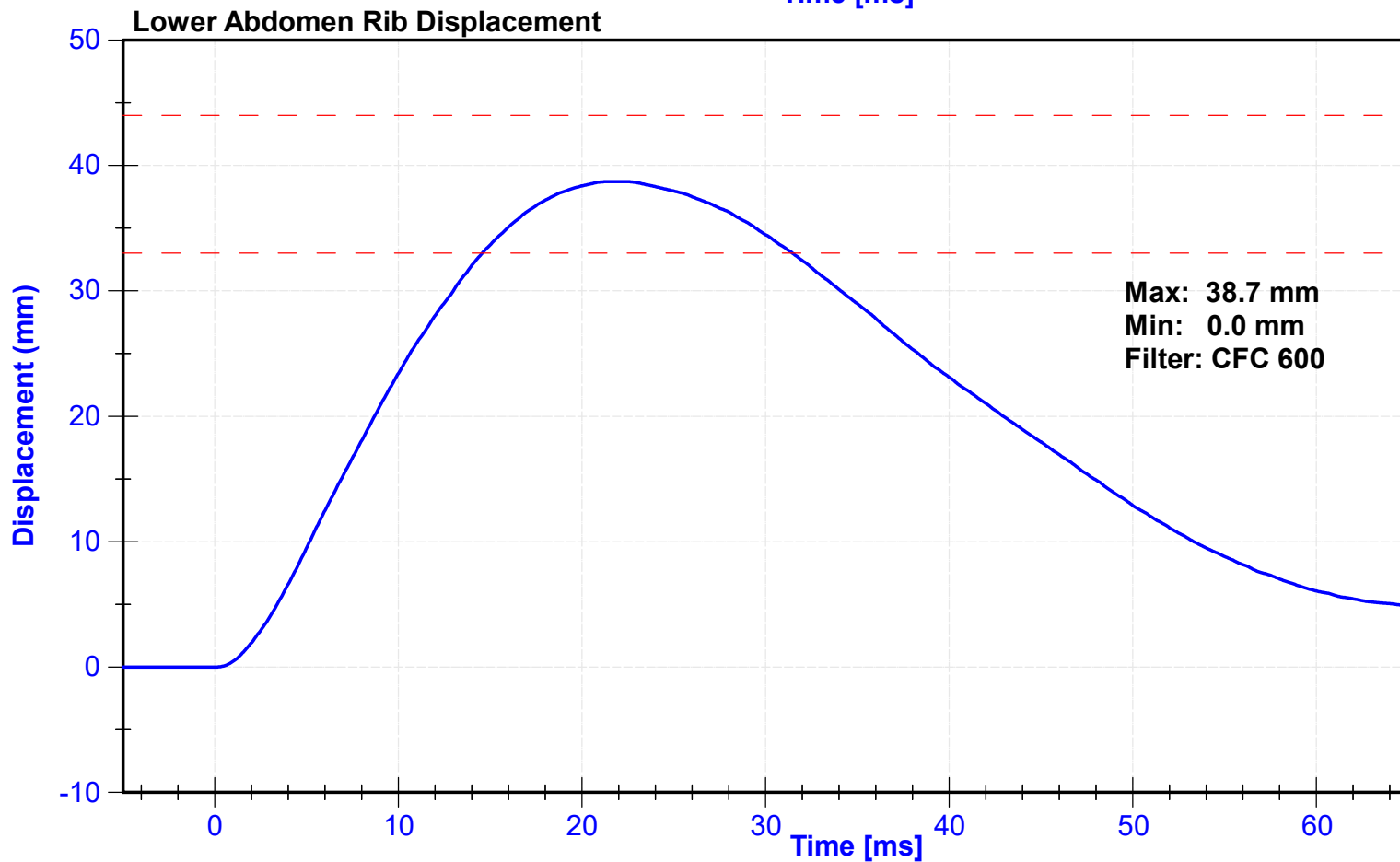
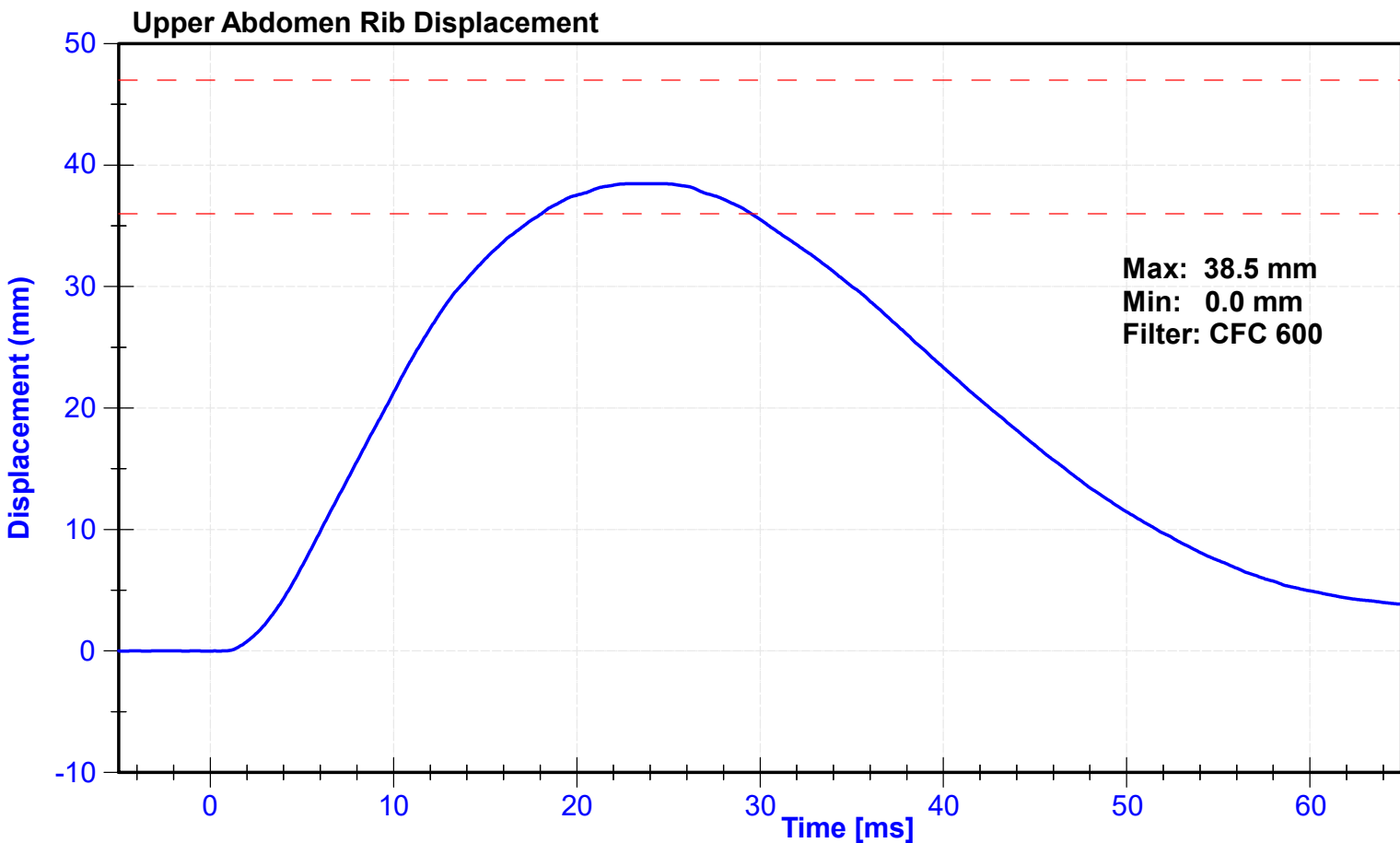
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.1	Pass
Humidity	10	70	%	58	Pass
Velocity	4.2	4.4	m/s	4.33	Pass
Probe Acceleration	12	16	g's	14.6	Pass
Lateral Lower Spine Acceleration	9	14	g's	11.2	Pass
Upper Abdomen Rib Deflection	36	47	mm	38.5	Pass
Lower Abdomen Rib Deflection	33	44	mm	38.7	Pass

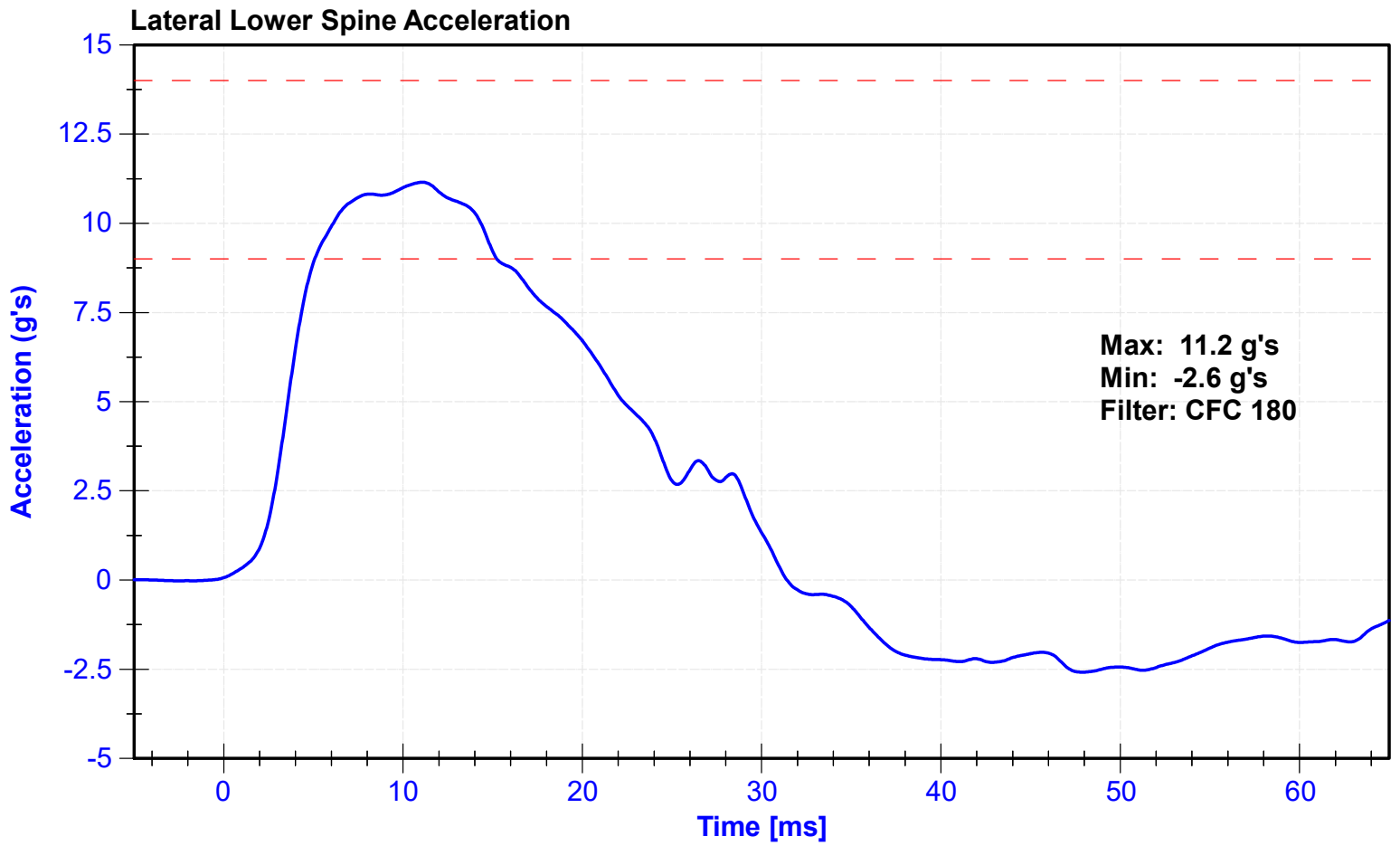
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	18546	11/19/2022	11/18/2023
Lower Spine Y Accelerometer	Endevco	P52071	4/4/2023	10/1/2023
Upper Abdomen Rib Potentiometer	Servo	307GFE	4/10/2023	10/9/2023
Lower Abdomen Rib Potentiometer	Servo	308GFE	6/14/2023	12/13/2023

Probe Acceleration







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

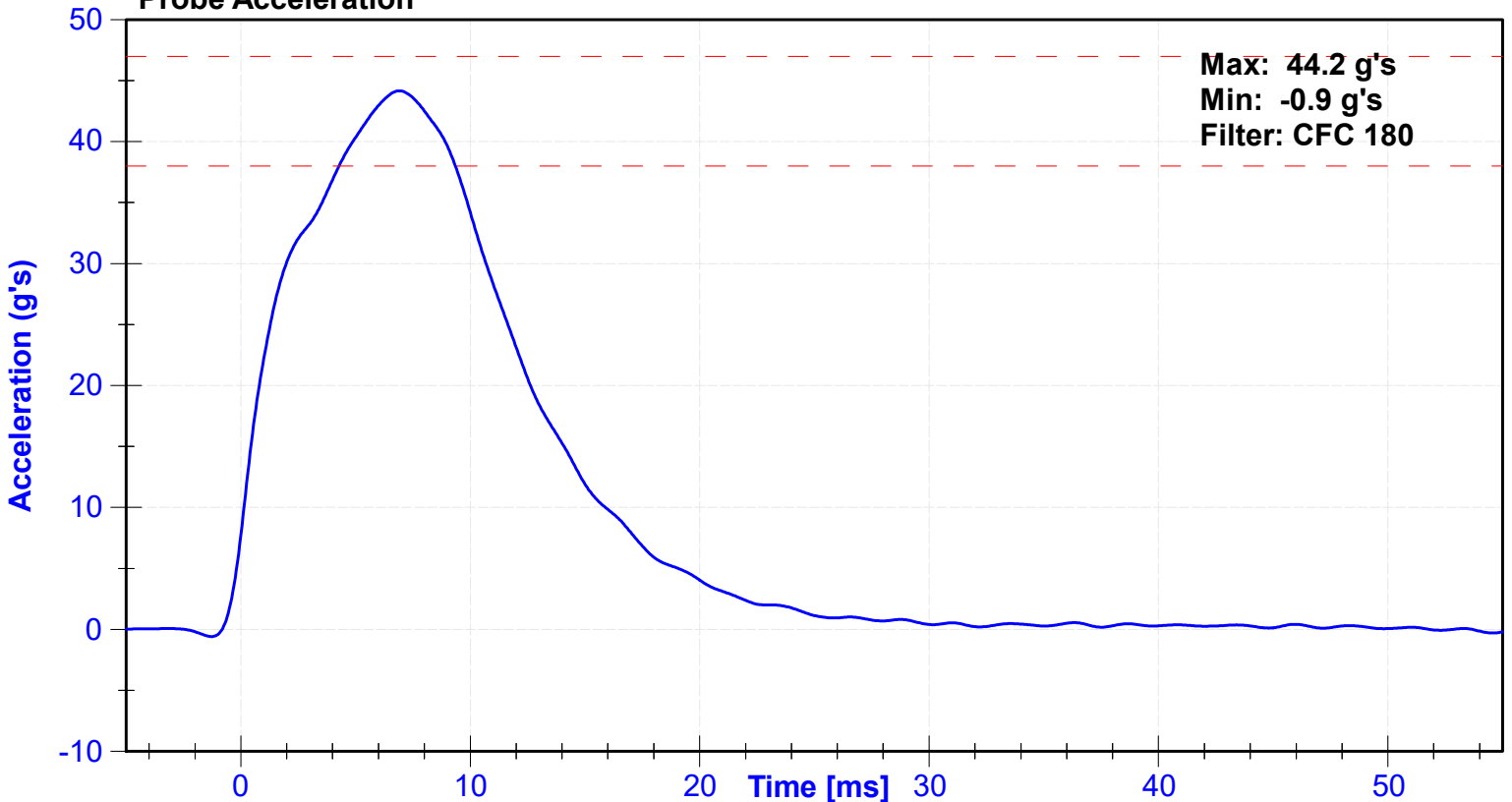
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.1	Pass
Humidity	10	70	%	58	Pass
Velocity	6.6	6.8	m/s	6.70	Pass
Probe Acceleration	38	47	g's	44.2	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	39.1	Pass
Acetabulum Force	3600	4300	N	3975.8	Pass

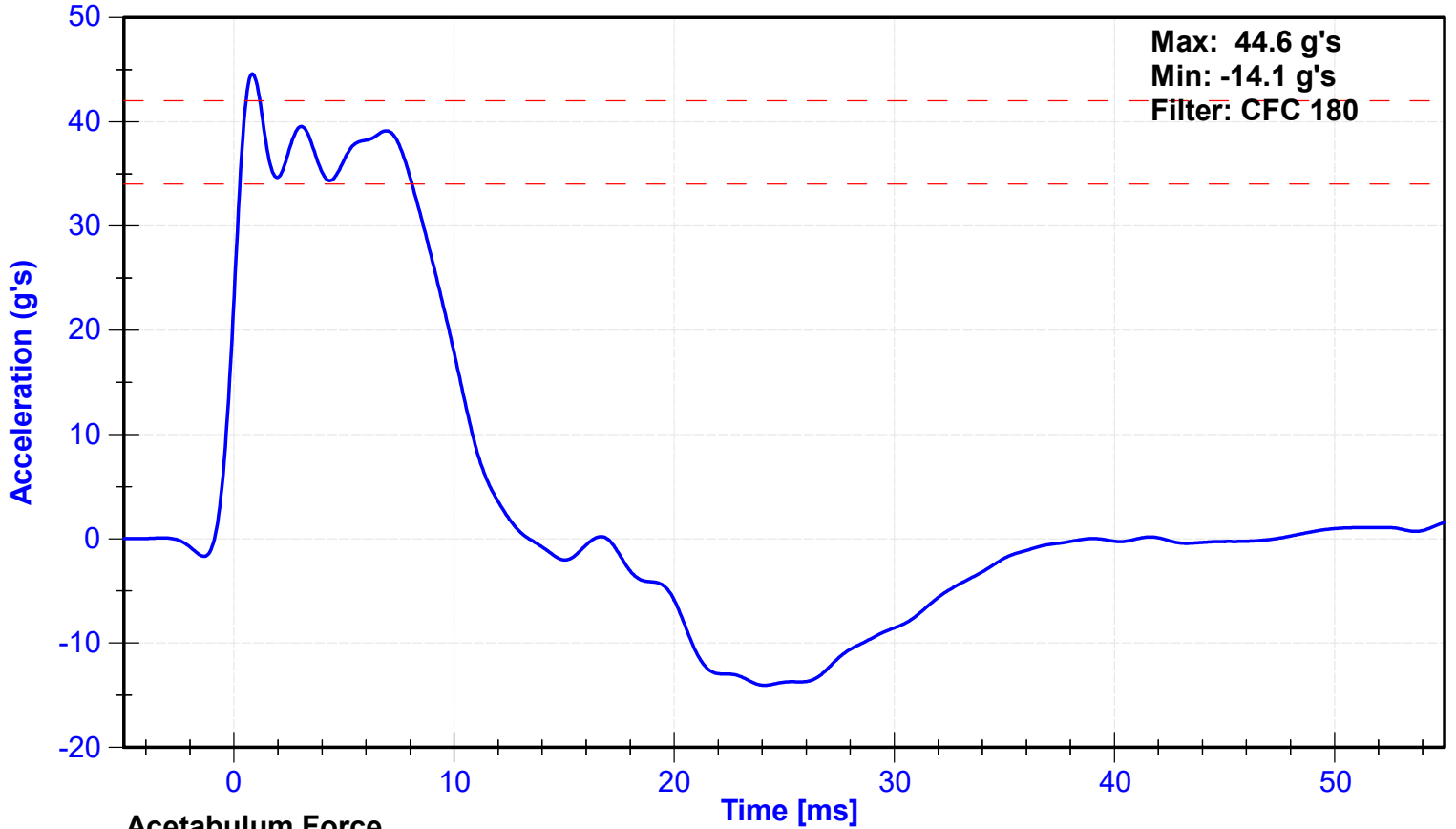
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18546	11/19/2022	11/18/2023
Pelvis Y Accelerometer	Endevco	P51731	4/4/2023	10/1/2023
Acetabulum Load Cell	Denton	267-FY	8/11/2022	8/11/2023
Certification Plug	SACO			N/A
Crash Test Plug	SACO			N/A

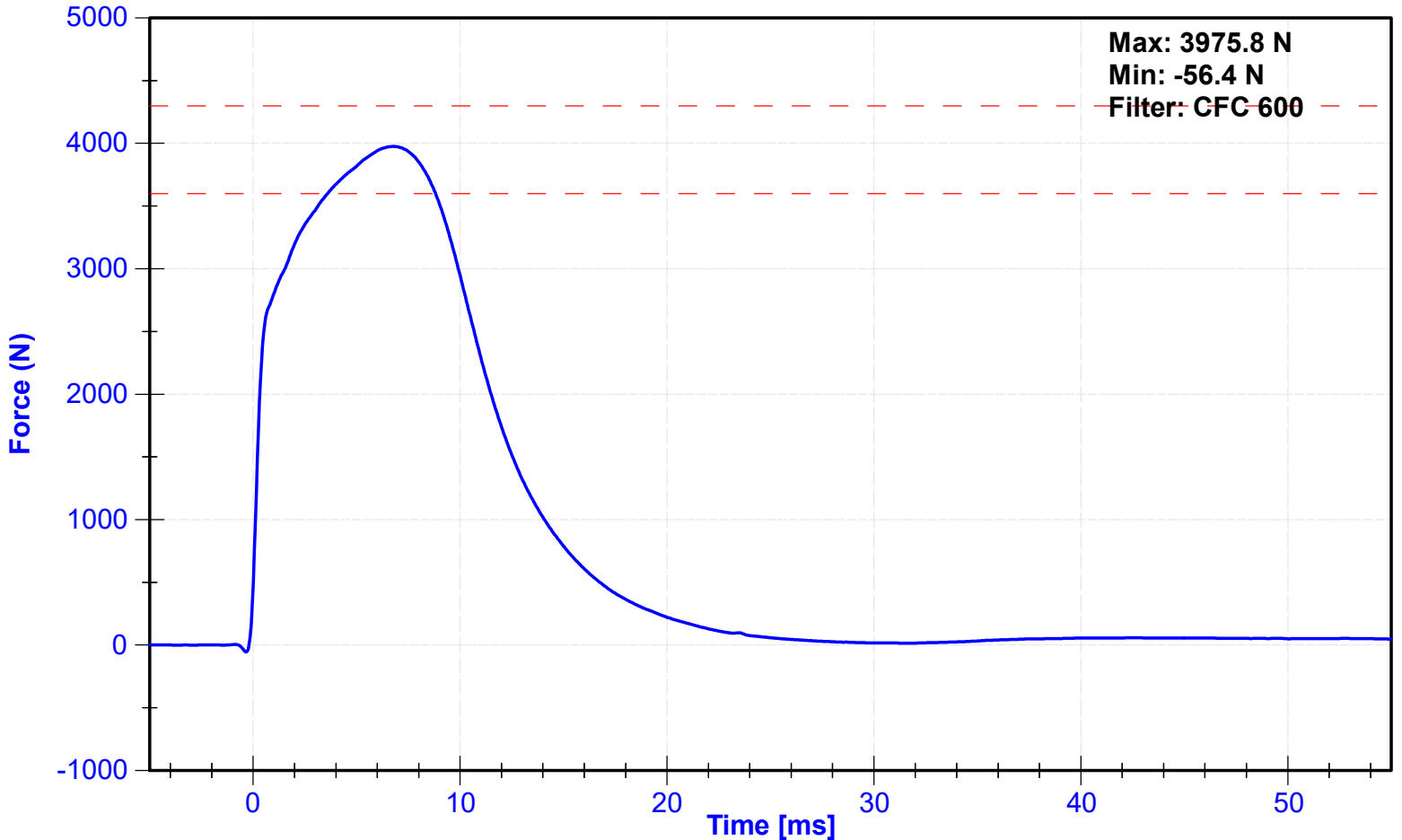
Probe Acceleration



Lateral Pelvis Acceleration



Acetabulum Force





SID-IIs Pelvis Plug Certification Test

Plug S/N 14151

Test Number 14189

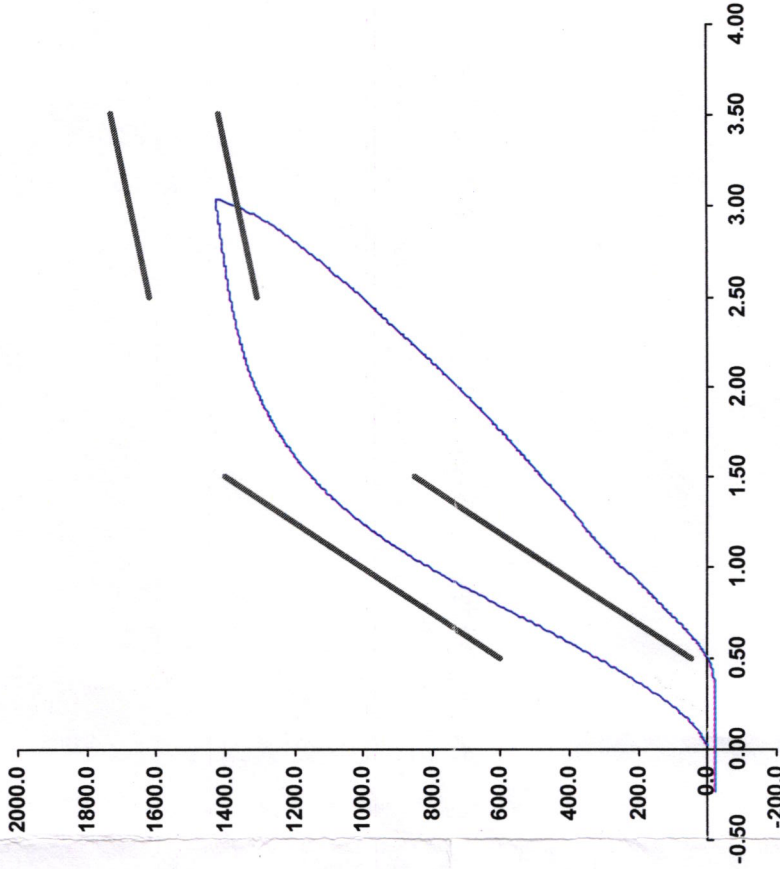
Report Number 14234

Test Date 6/28/2020 12:17:09 PM

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

Testing Machine STM-20 5965542
 Load Cell S/N (F1360947), Units (LBS) 1000
 Crosshead Speed (mm / min) or Rate 12.7
 Extension or Position Measured by XHD_100 (XHD100)

Notes:



07-13-2023
 CERTIFICATION

Operator
 Part Number 180-4450

Template No 107 28-Jun-20
 SACO Research

By: D.C Date: 6-28-2020
 SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 Fax 310-694-2082



07-13-2023
IMPACT

SID-IIs Pelvis Plug Certification Test

Plug S/N 15483

Test Number 20268

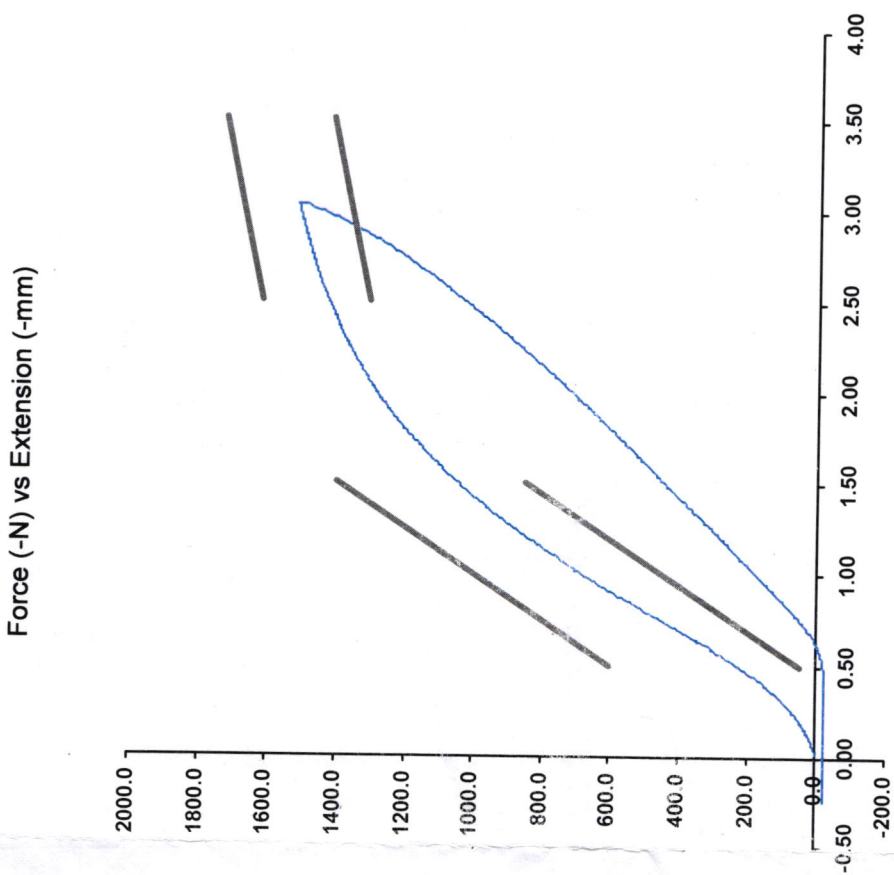
Report Number 20322

Test Date 9/28/2021 11:02:39 AM

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

Testing Machine STM-20 5965542
 Load Cell S/N (F1360947), μ Nts (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 28-Sep-21
 SACO Research

By: *DC* Date: 9/28/2021
 SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 FAX



07-02-23
NON IMPACT

SID-Ils Pelvis Plug Certification Test

Plug S/N 15607

Test Number 20462

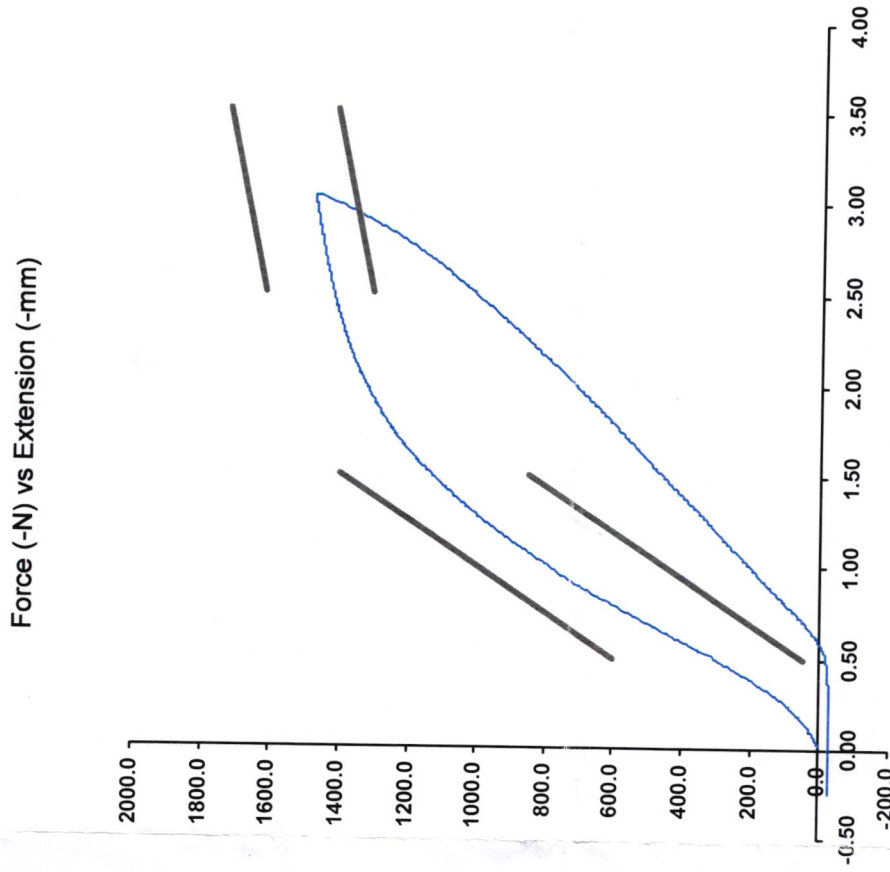
Report Number 20516

Test Date 10/7/2021 1:16:58 PM

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

Testing Machine STM-20 5965542
 Load Cell S/N (F1360947), Units (LBS) 1000
 Crosshead Speed (mm / min) or Rate 12.7
 Extension or Position Measured by XHD_100 (XHD100)

Notes:



Operator
 Part Number 180-4450

Template No 107 07-Oct-21
 SACO Research

By: DC Date: 10/7/21
 SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 FAX

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

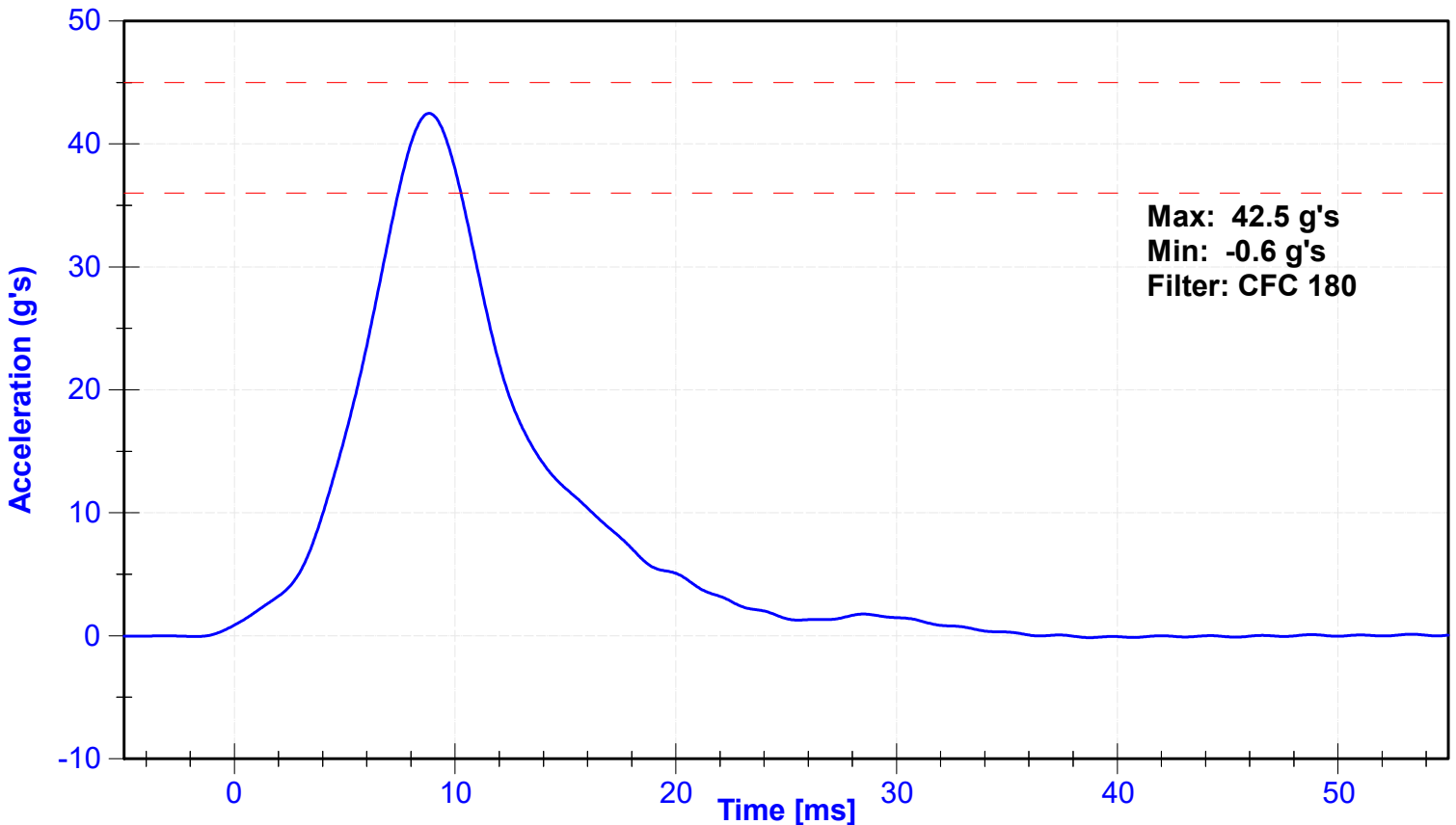
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.1	Pass
Humidity	10	70	%	58	Pass
Velocity	4.2	4.4	m/s	4.29	Pass
Probe Acceleration	36	45	g's	42.5	Pass
Lateral Pelvis Acceleration	28	39	g's	33.2	Pass
Iliac Force	4100	5100	N	4688.4	Pass

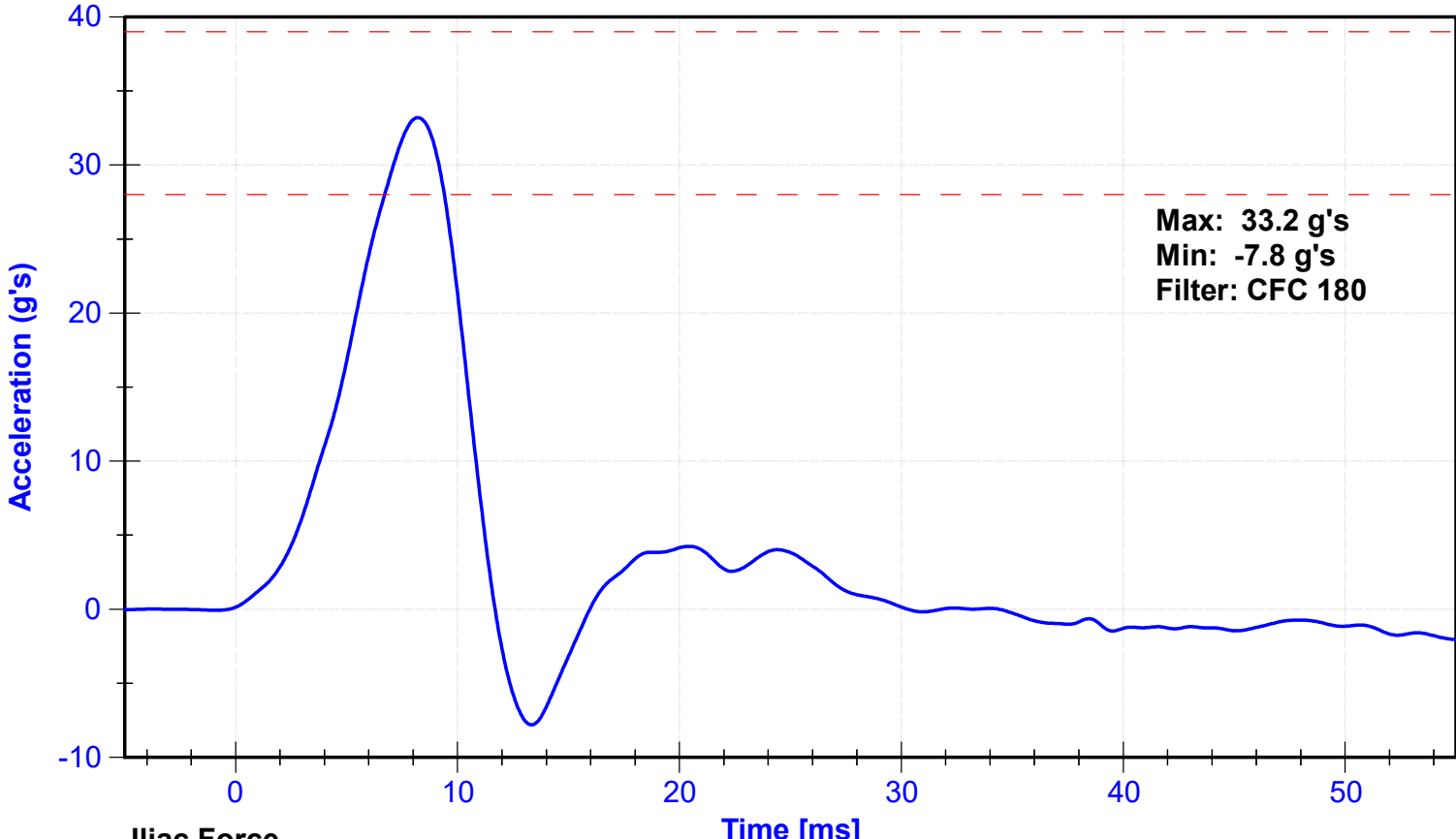
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18546	11/19/2022	11/18/2023
Pelvis Y Accelerometer	Endevco	P51731	4/4/2023	10/1/2023
Iliac Load Cell	Denton	280-FY	8/11/2022	8/11/2023

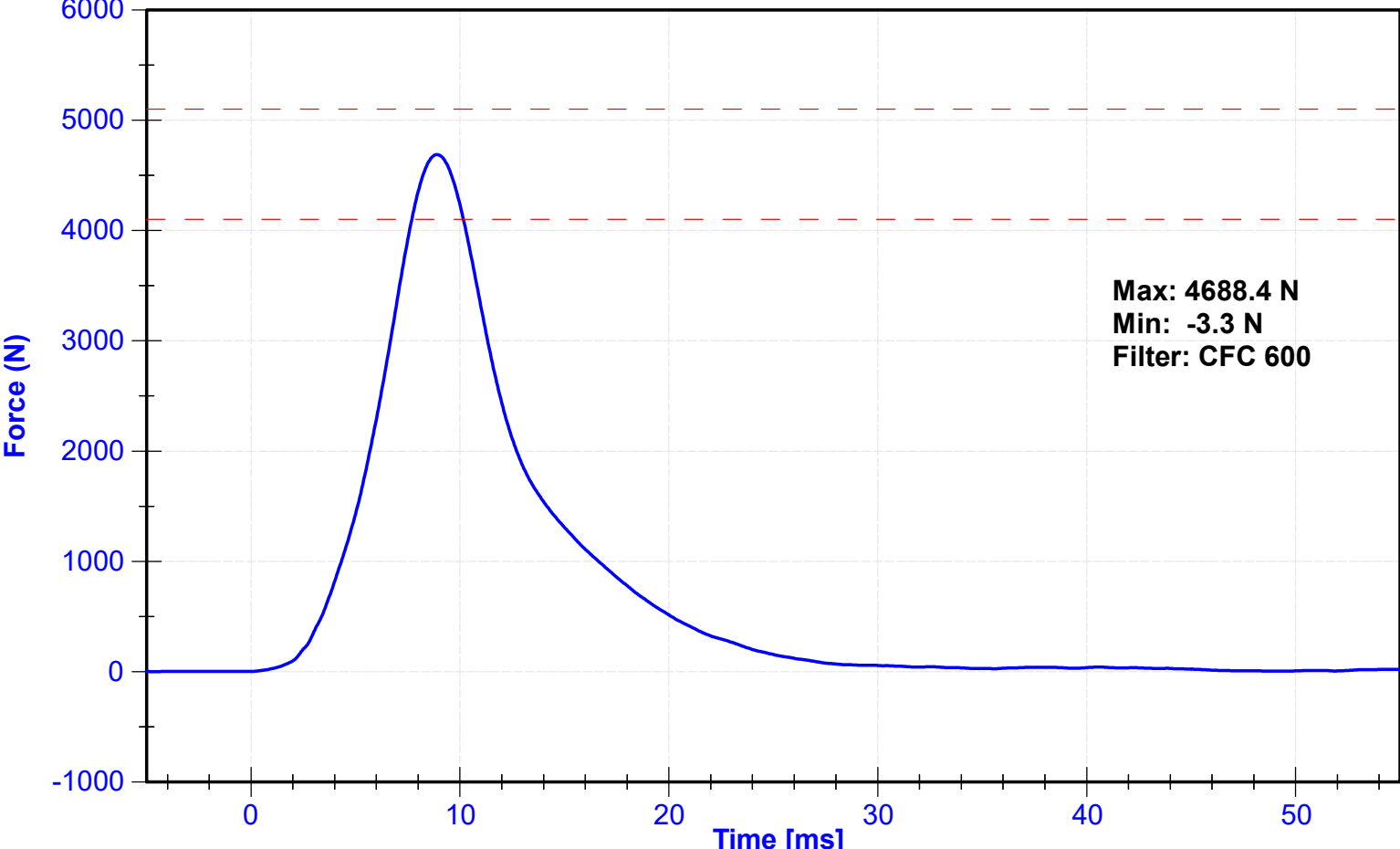
Probe Acceleration



Lateral Pelvis Acceleration



Iliac Force



CALIBRATION TEST RESULTS

POST-TEST

SID-IIS 5TH PERCENTILE FEMALE - DRIVER ATD

SERIAL NO:300

(CONFIGURED FOR LEFT SIDE IMPACT)

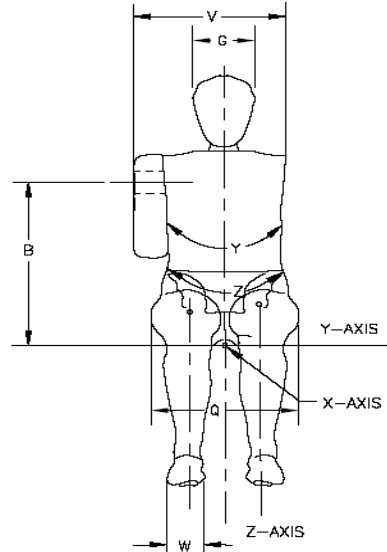
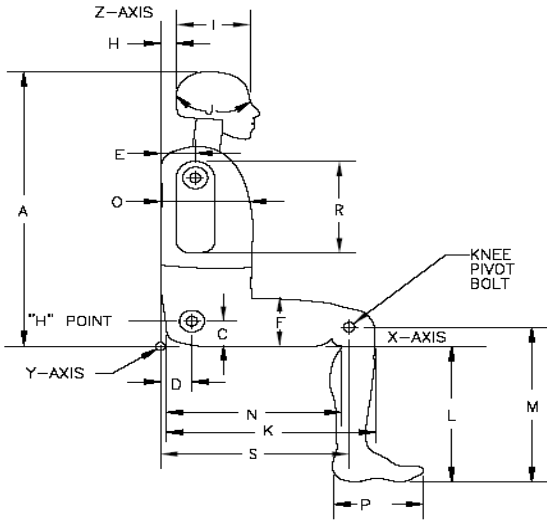


External Measurements - SID-IIs

Technician: K. Brogan

Date: 08/09/2023

Dummy Serial Number: 300



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	782	Pass
B	Shoulder Pivot Height	437	453	444	Pass
C	H-point Height	79	89	85	Pass
D	H-point from seatback	141	151	144	Pass
E	Shoulder Pivot from Backline	97	107	101	Pass
F	Thigh Clearance	119	135	124	Pass
G	Head Breadth	140	148	142	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	180	Pass
J	Head Circumference	541	551	545	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	401	Pass
N	Buttock Popliteal Length	416	442	430	Pass
O	Chest Depth w/o jacket	195	211	198	Pass
P	Foot Length	216	232	220	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	317	Pass
R	Arm Length	249	259	252	Pass
S	Knee Joint to seatback	477	493	482	Pass
V	Shoulder Width	341	357	351	Pass
W	Foot Width	78	94	85	Pass
Y	Chest Circumference w/jacket	851	881	876	Pass
Z	Waist Circumference	761	791	778	Pass

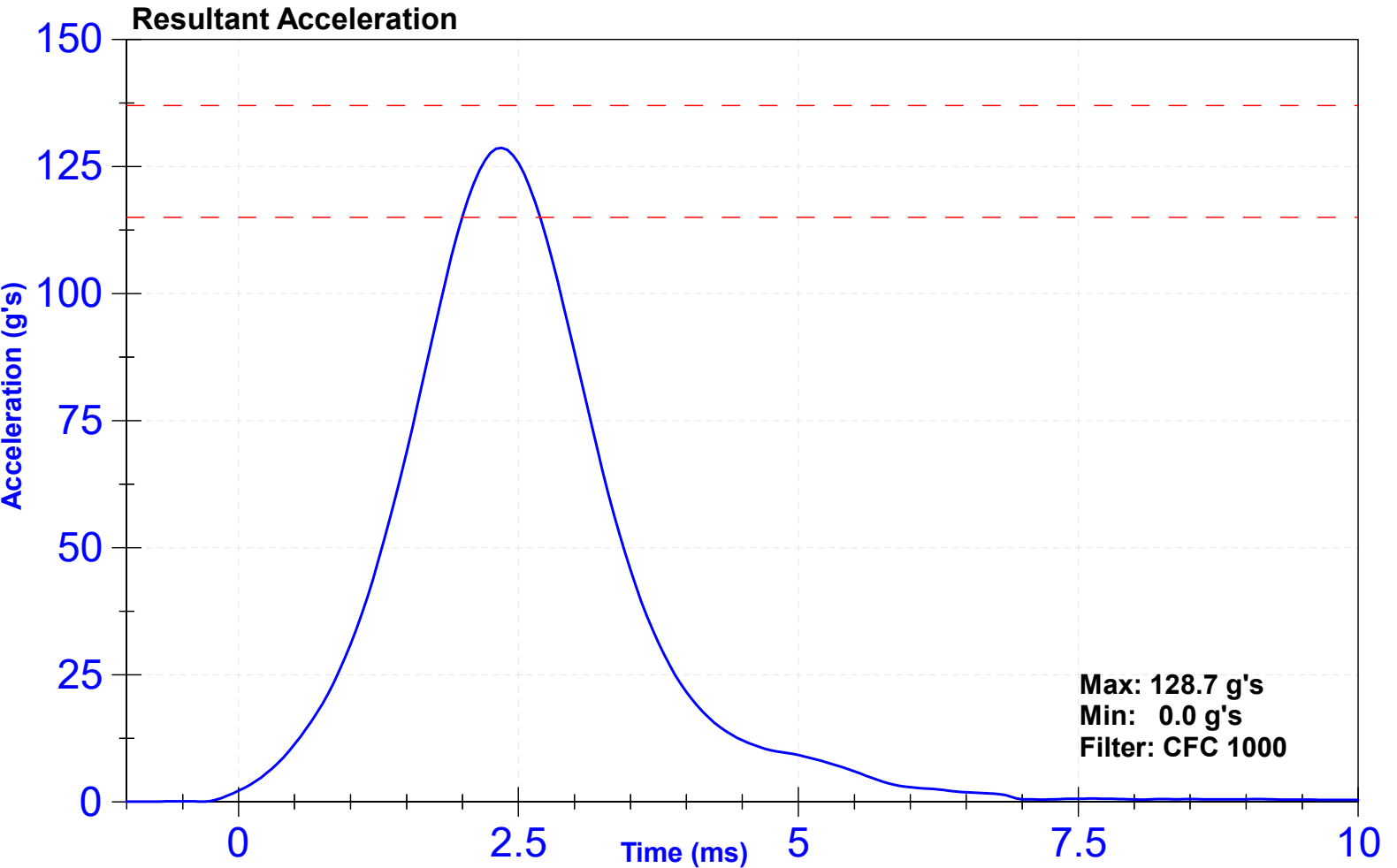
ATD Manufacturer	FTSS	Test Technician	C. Mantell
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

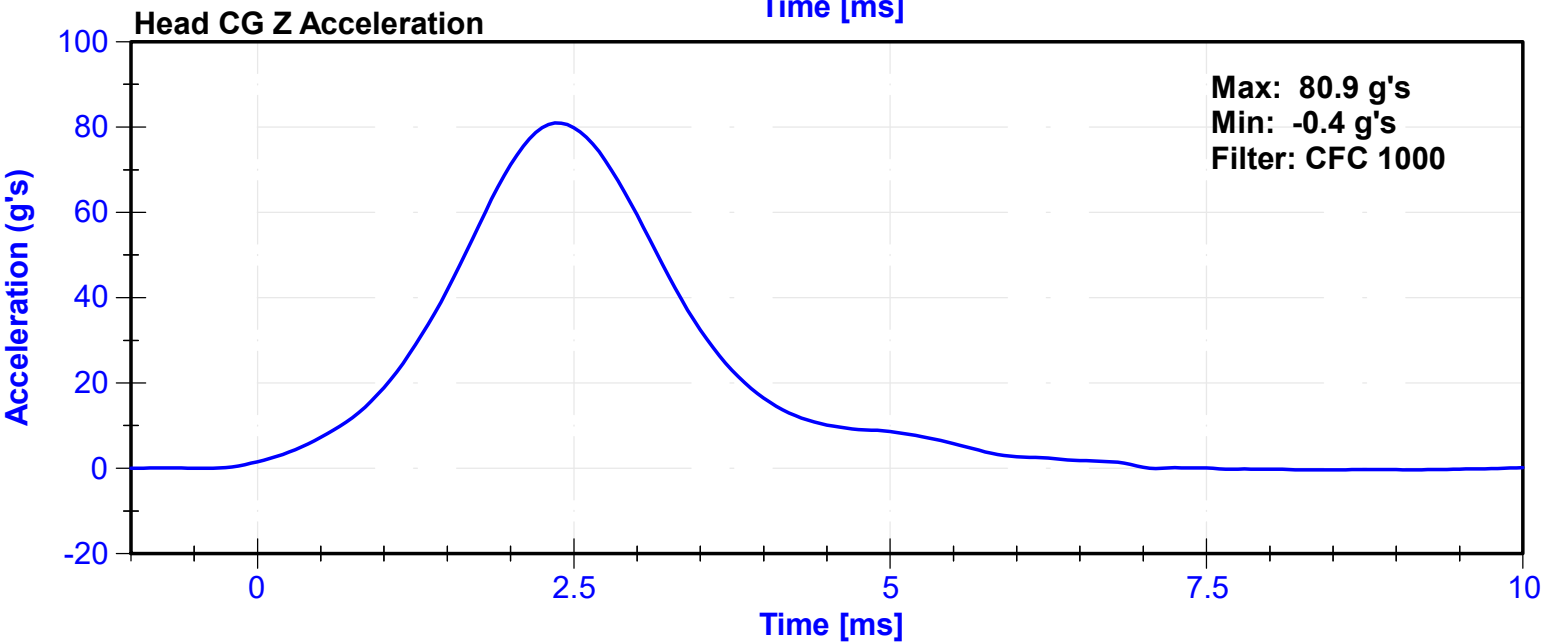
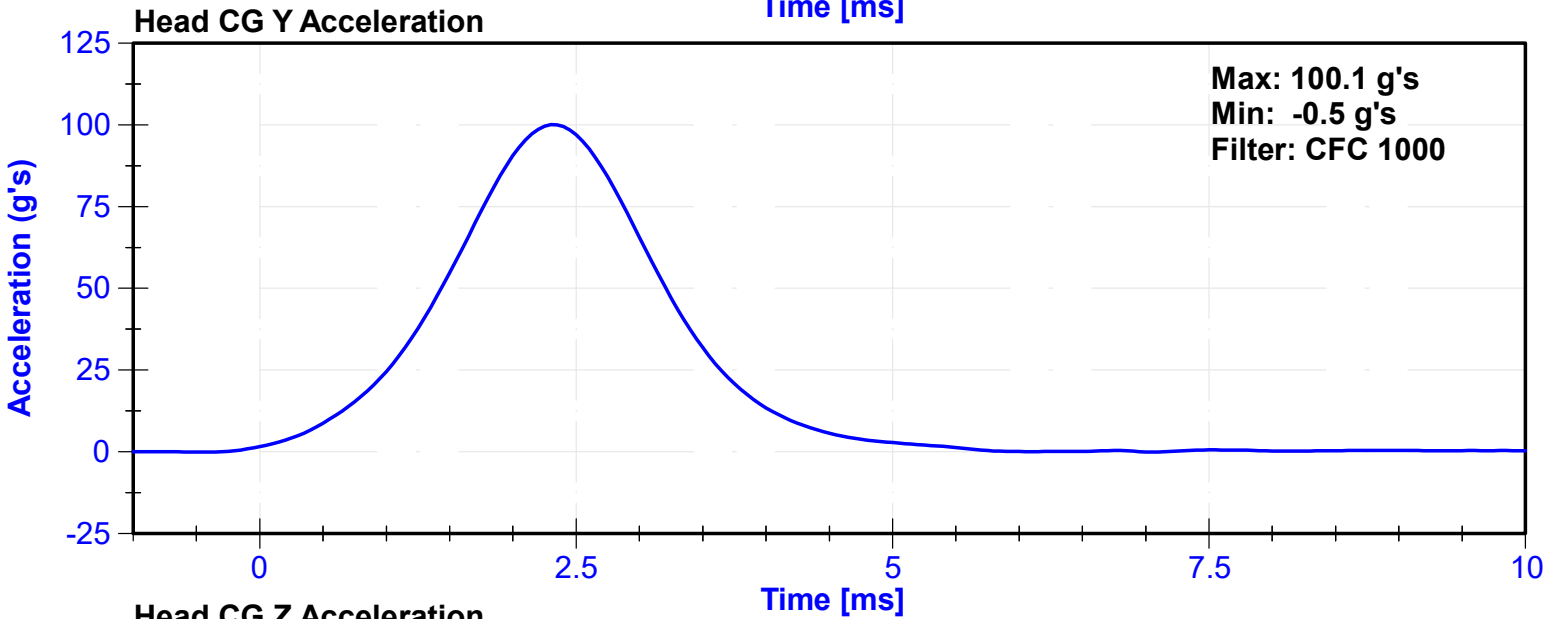
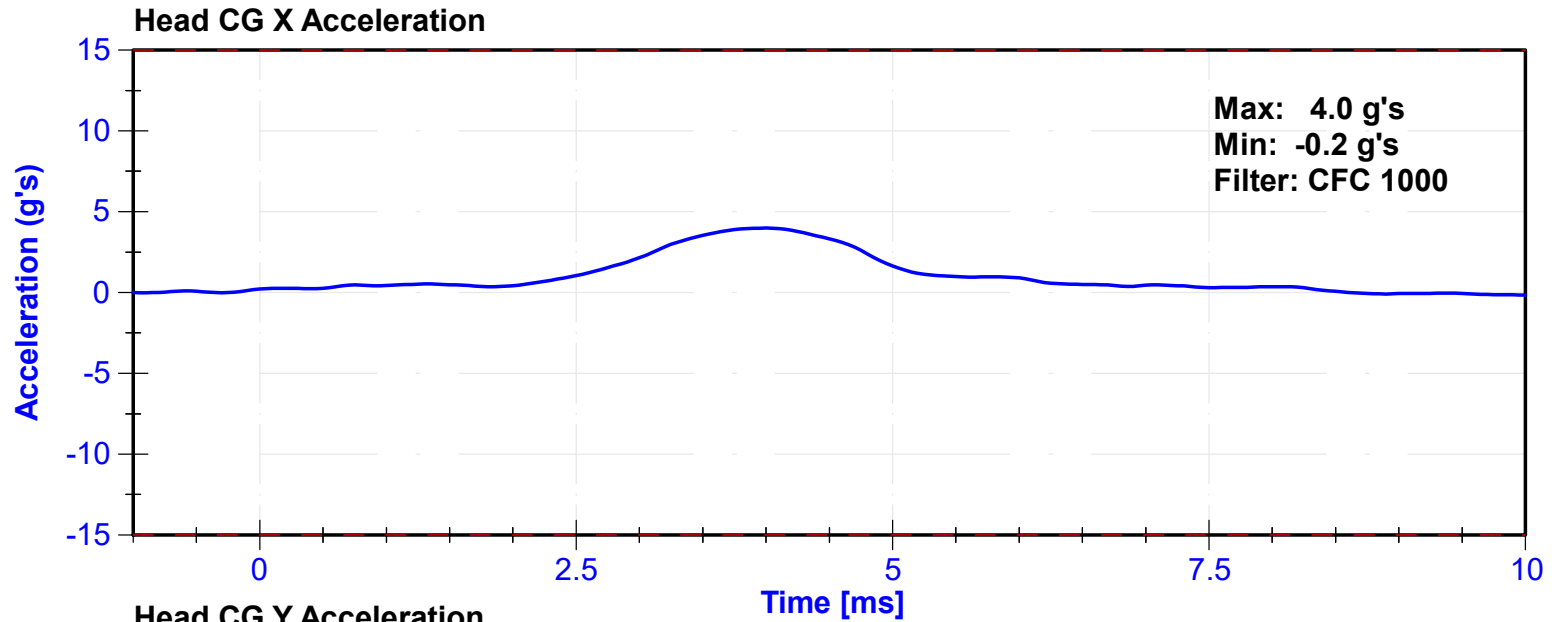
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.2	Pass
Humidity	10	70	%	61	Pass
Resultant Acceleration	115	137	g's	128.7	Pass
Oscillation	0	15	%	0.6	Pass
Fore-Aft Acceleration	-15	15	g's	4.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibratio Date	Calibratio Due Date
X Accelerometer	Endevco	P59018	4/4/2023	10/1/2023
Y Accelerometer	Endevco	P79189	4/4/2023	10/1/2023
Z Accelerometer	Endevco	P79587	4/4/2023	10/1/2023





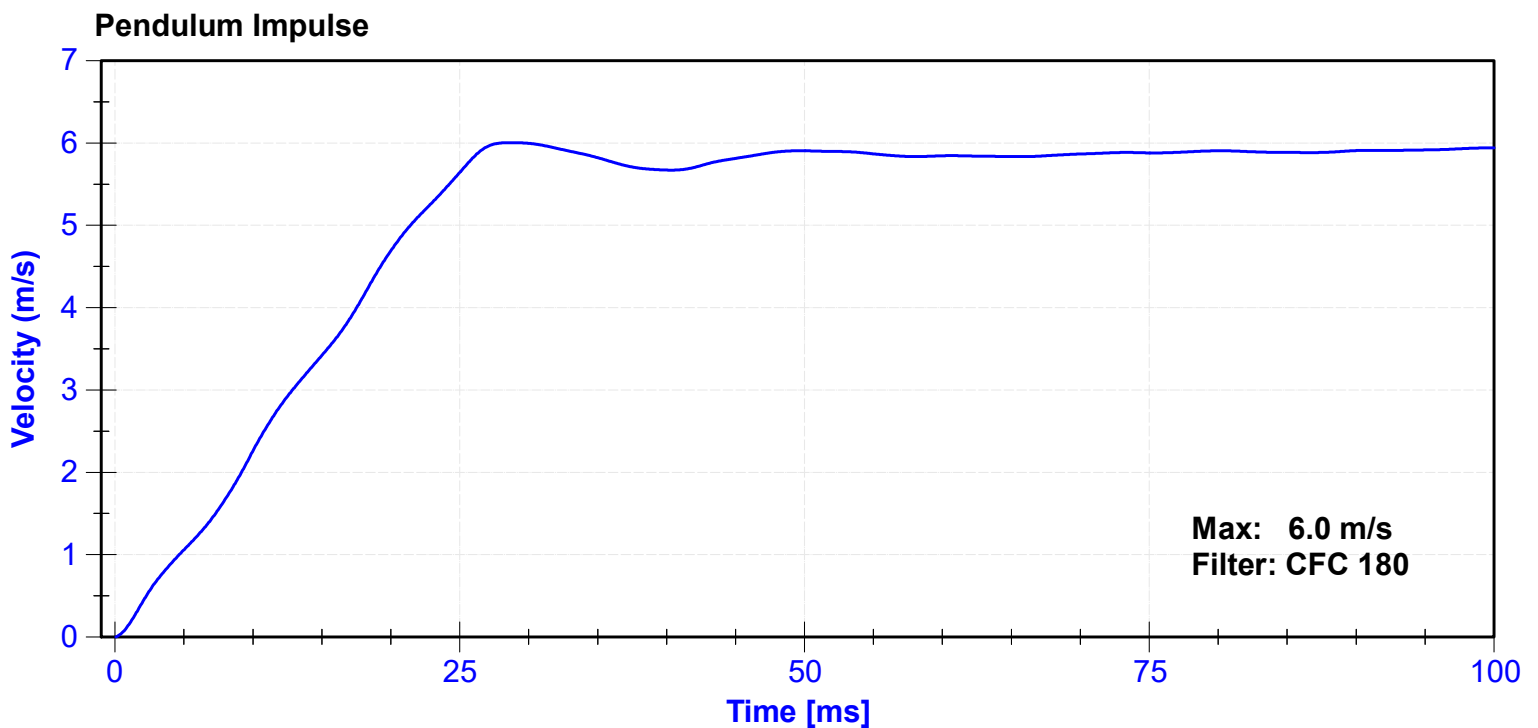
ATD Manufacturer	FTSS	Test Technician	C. Mantell
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

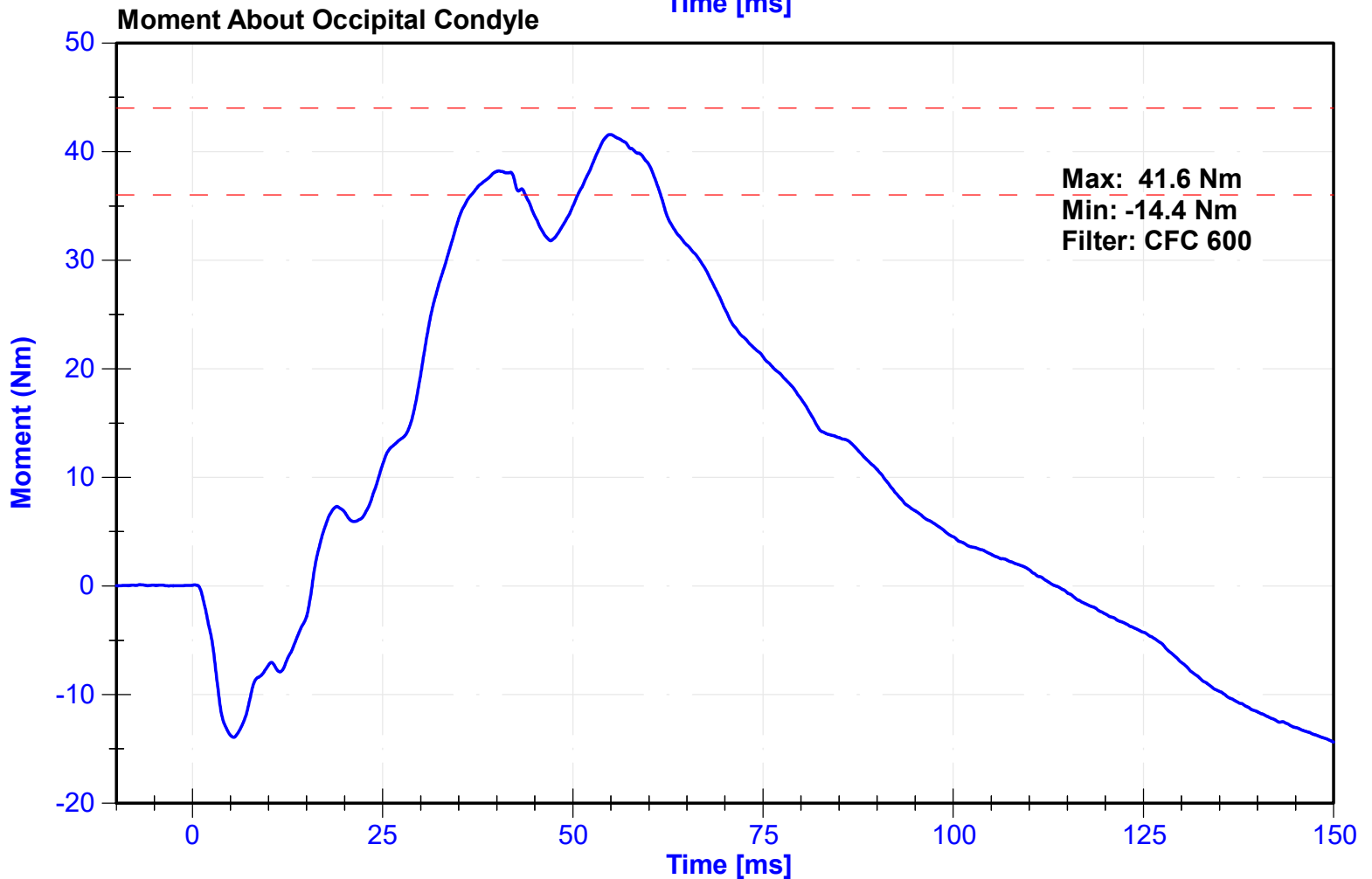
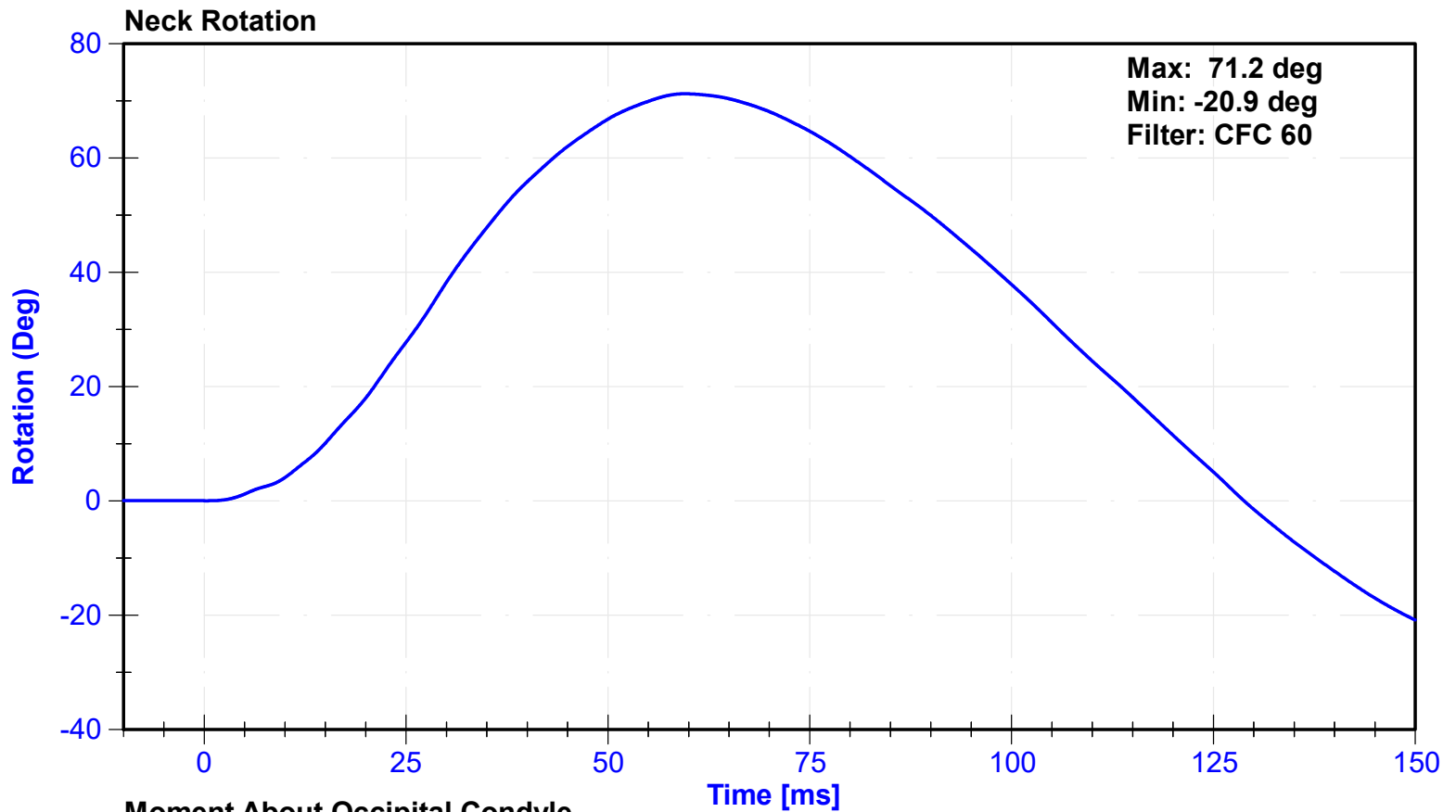
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.8	Pass
Humidity	10	70	%	61	Pass
Velocity	5.51	5.63	m/s	5.587	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.26	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.42	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.69	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.64	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	6.00	Pass
Neck Rotation	71	81	deg	71.2	Pass
Time at Maximum Rotation	50	70	ms	59.5	Pass
Moment about the OC	36	44	Nm	41.6	Pass
Moment Decay to 0 Nm	102	126	ms	113.5	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	Denton	1716ATF_2184-FY	5/18/2023	5/17/2024





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

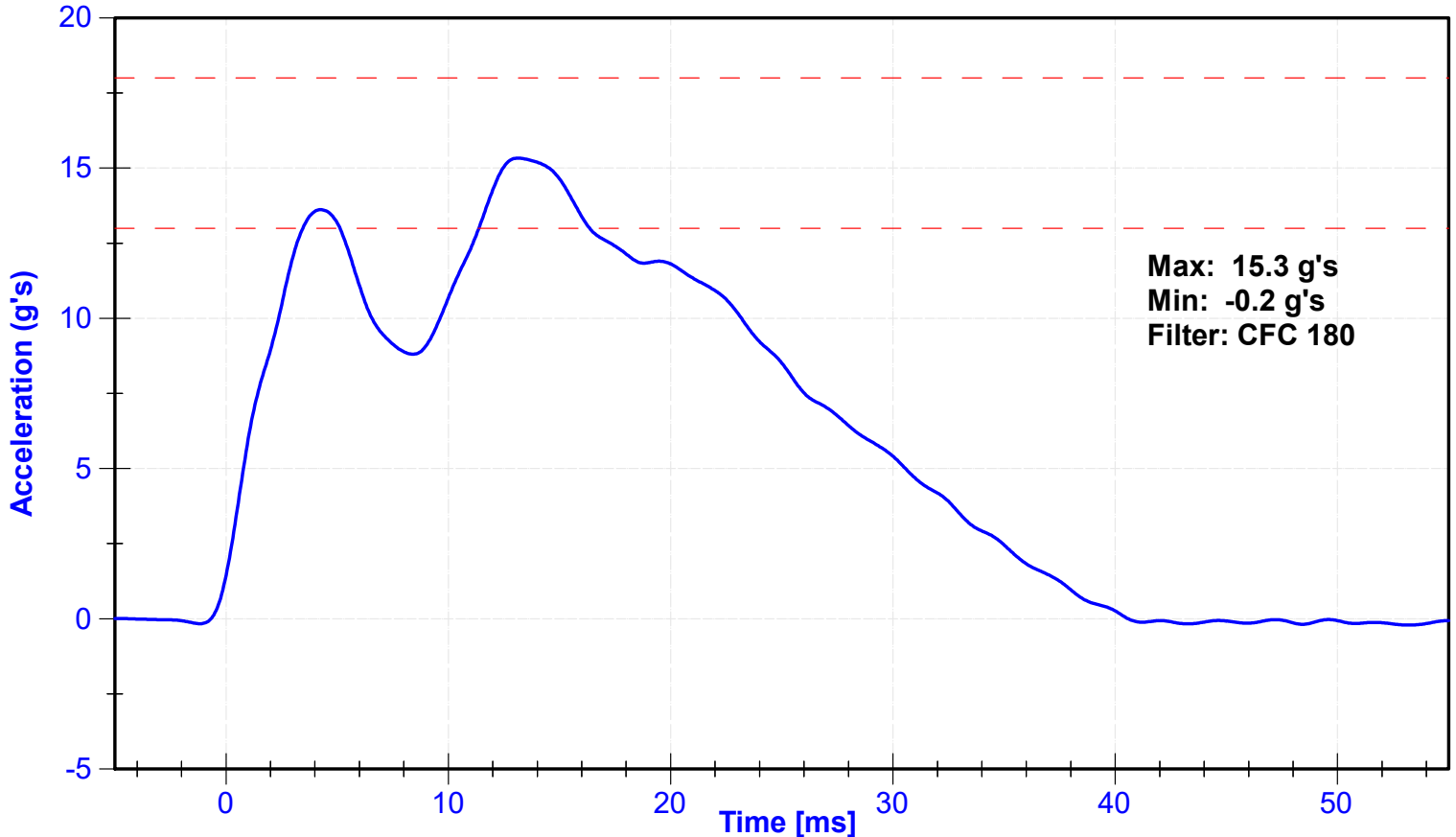
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.8	Pass
Humidity	10	70	%	62	Pass
Velocity	4.2	4.4	m/s	4.28	Pass
Probe Acceleration	13	18	g's	15.3	Pass
Shoulder Deflection	28	37	mm	30.2	Pass
Lateral Upper Spine Acceleration	17	22	g's	18.8	Pass

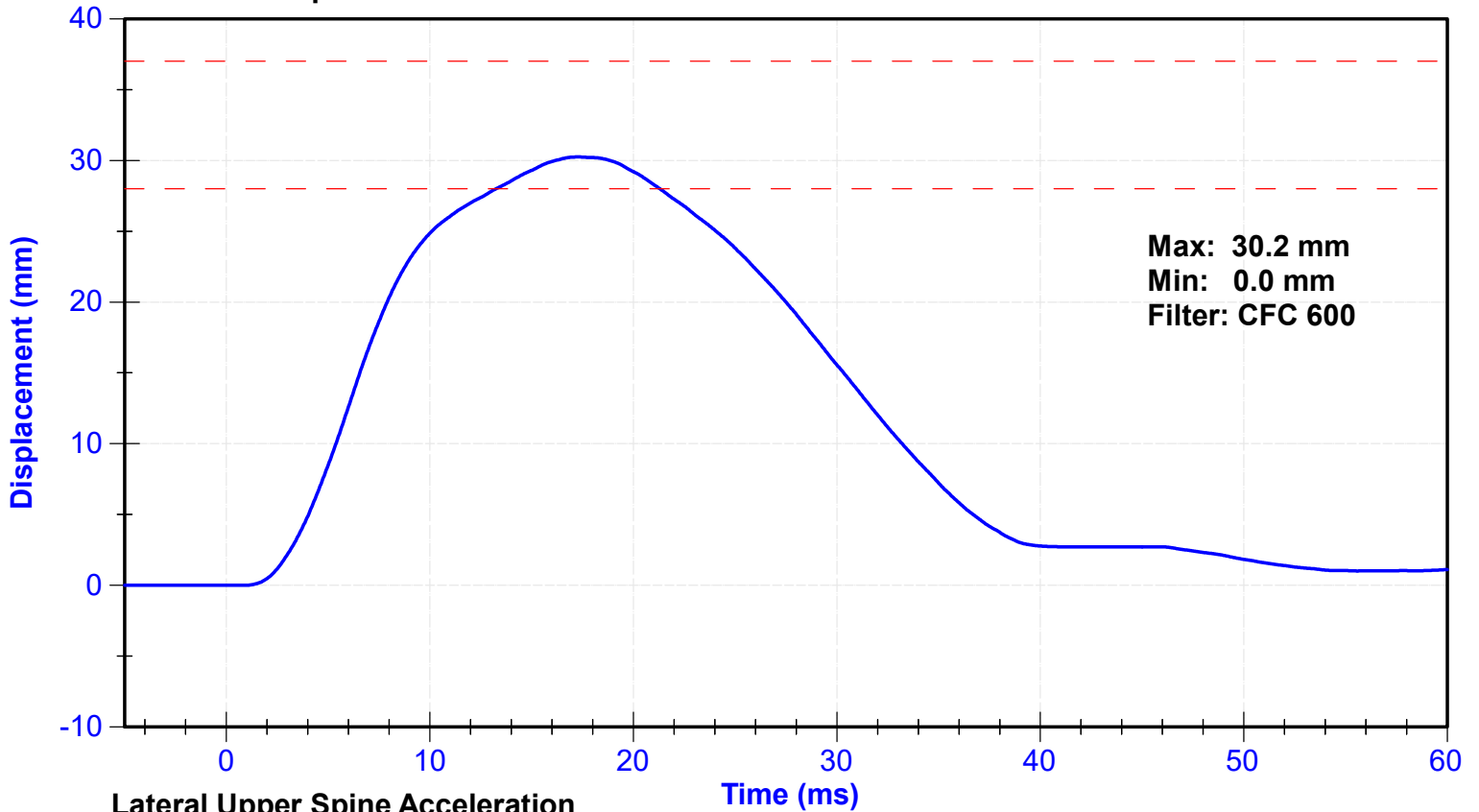
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18546	11/19/2022	11/18/2023
Shoulder Potentiometer	Servo	053GFE	4/10/2023	10/9/2023
Upper Spine Y Accelerometer	Endevco	T20880	4/4/2023	10/1/2023

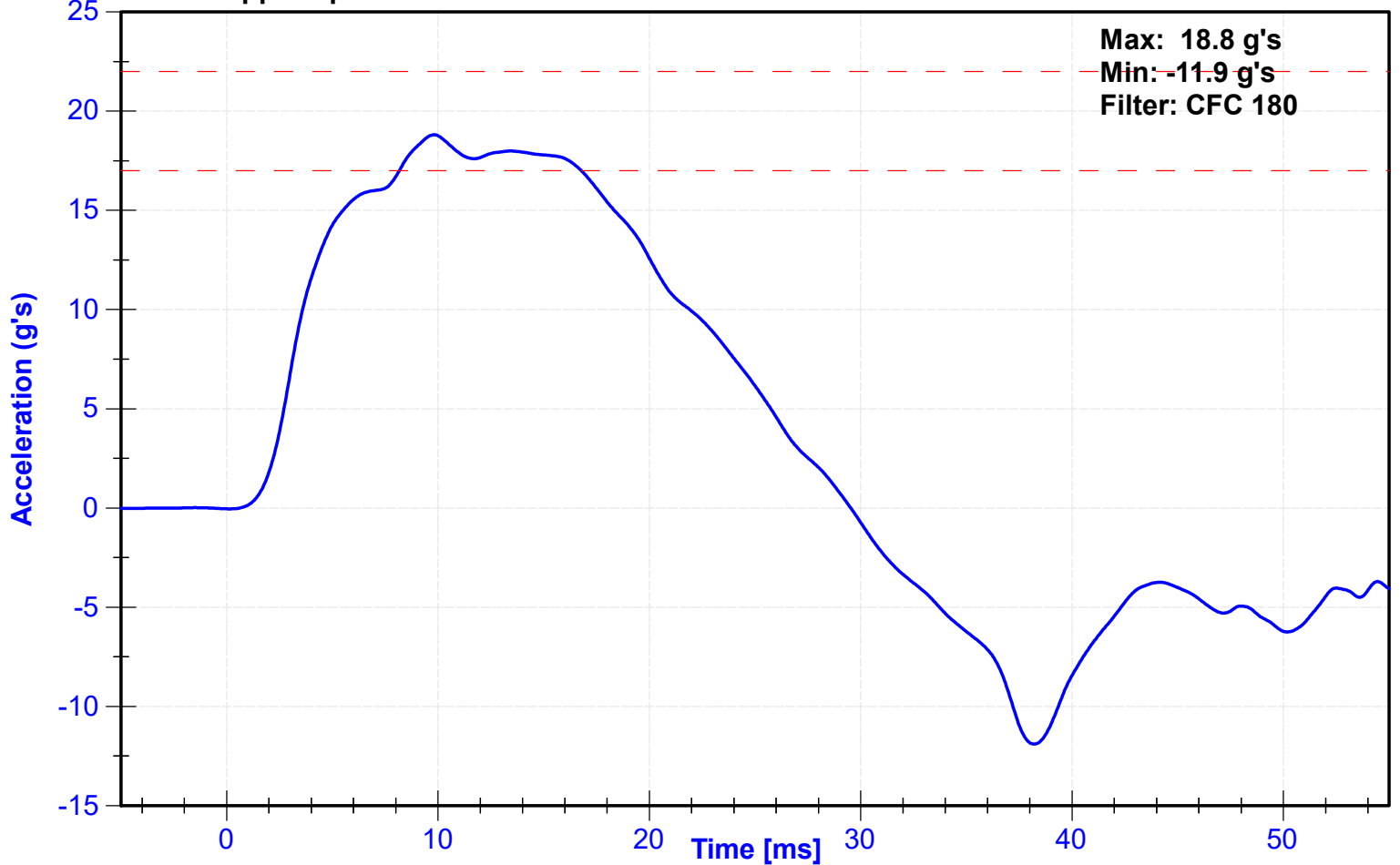
Probe Acceleration



Shoulder Displacement



Lateral Upper Spine Acceleration



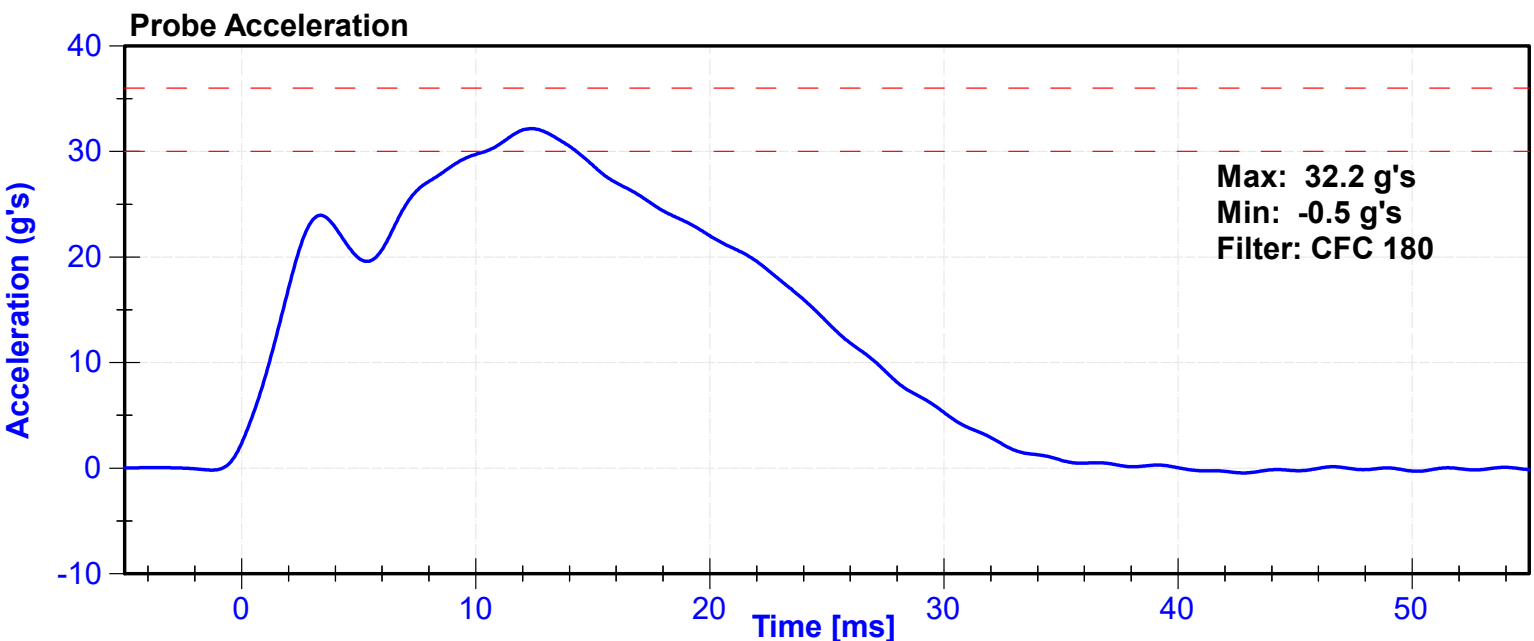
ATD Manufacturer	FTSS	Test Technician	J.Miller
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

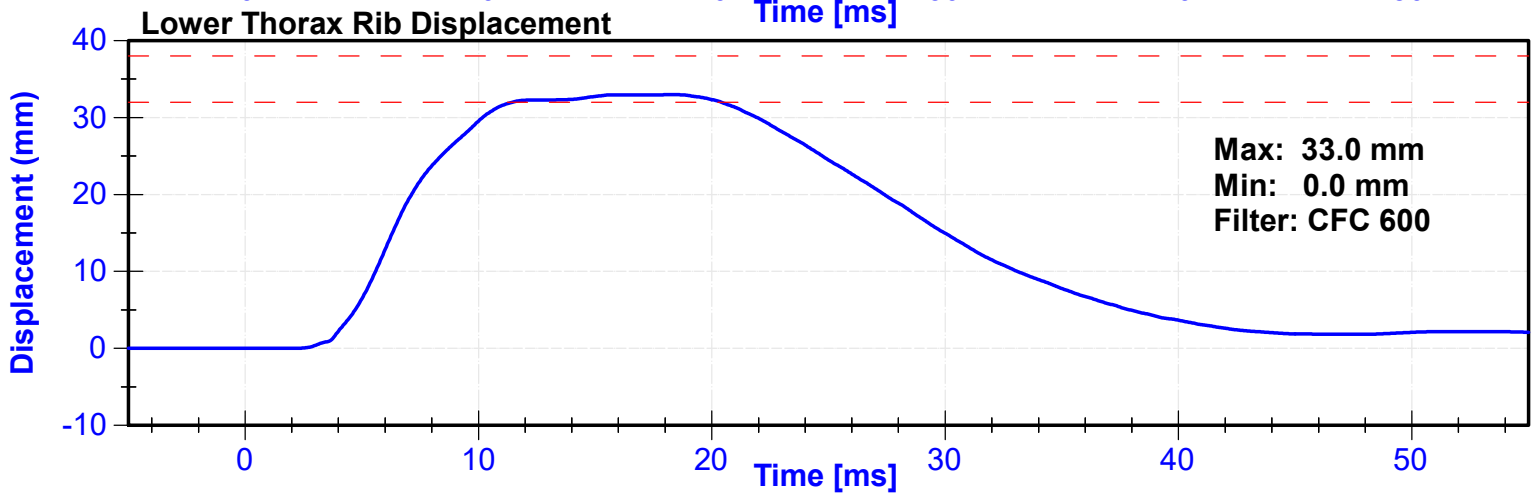
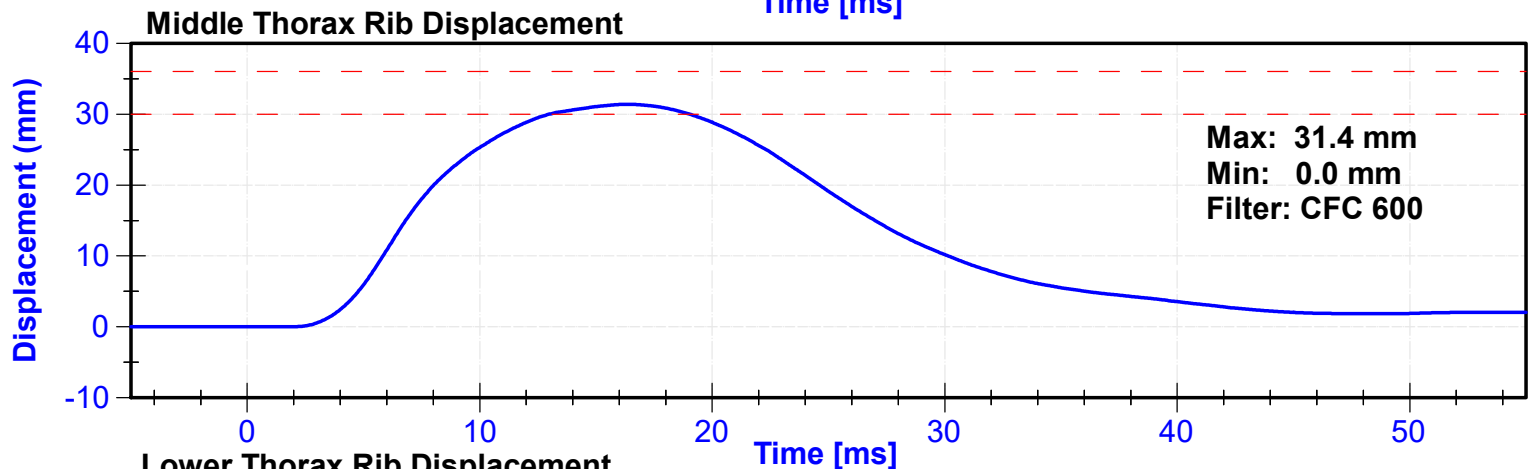
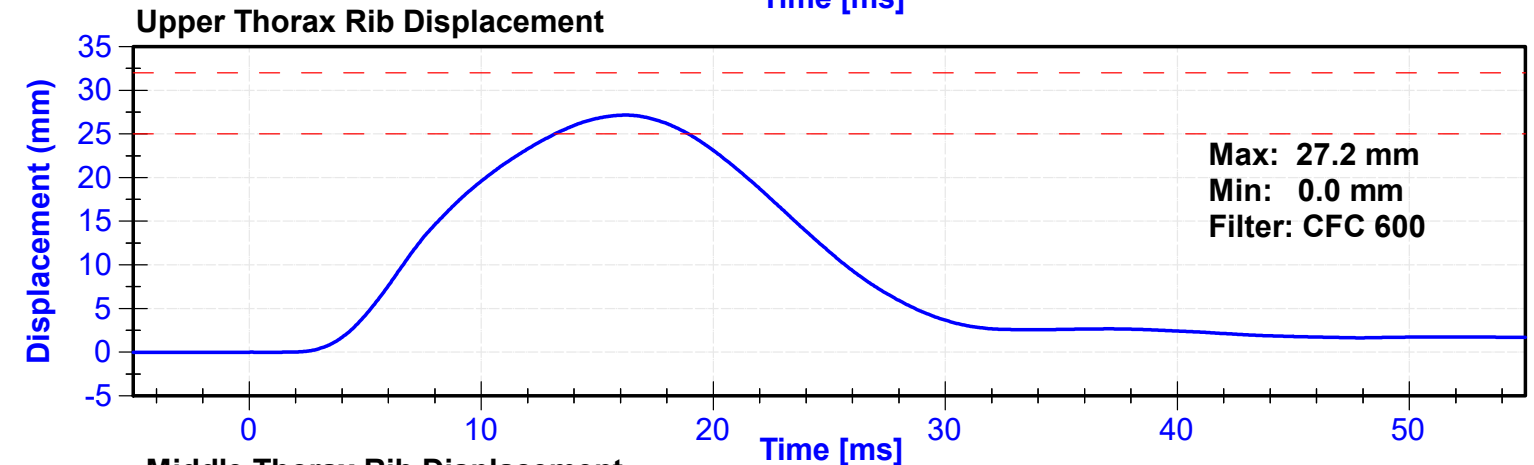
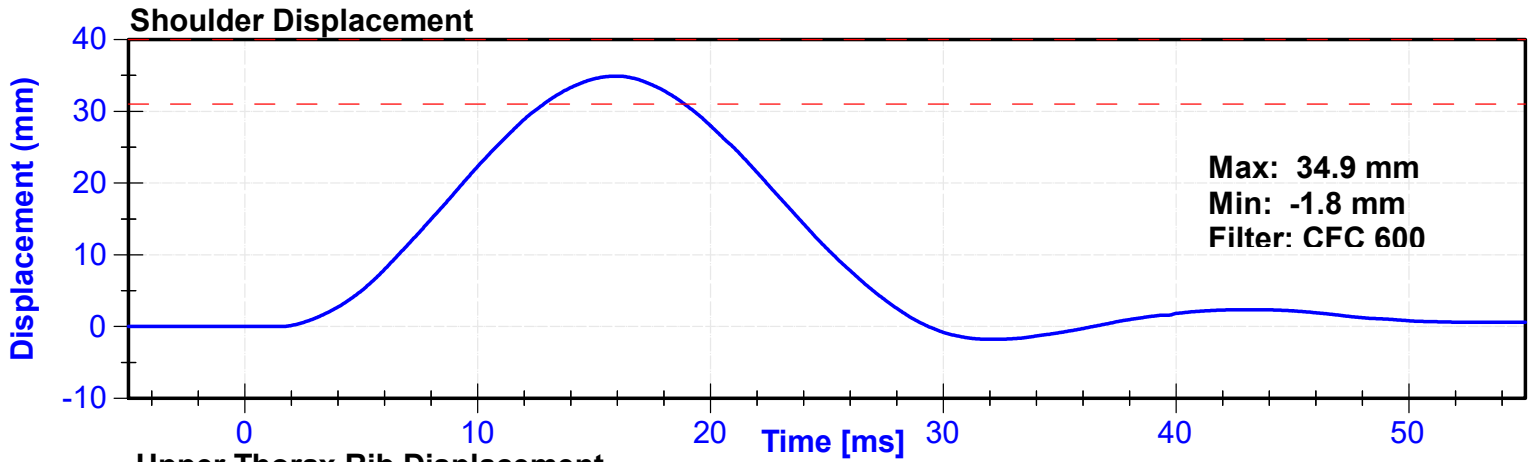
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.8	Pass
Humidity	10	70	%	62	Pass
Velocity	6.6	6.8	m/s	6.66	Pass
Probe Acceleration after 5 ms	30	36	g's	32.2	Pass
Lateral Upper Spine Acceleration	34	43	g's	36.1	Pass
Lateral Lower Spine Acceleration	29	37	g's	32.3	Pass
Shoulder Deflection	31	40	mm	34.9	Pass
Upper Thorax Rib Deflection	25	32	mm	27.2	Pass
Mid Thorax Rib Deflection	30	36	mm	31.4	Pass
Lower Thorax Rib Deflection	32	38	mm	33.0	Pass

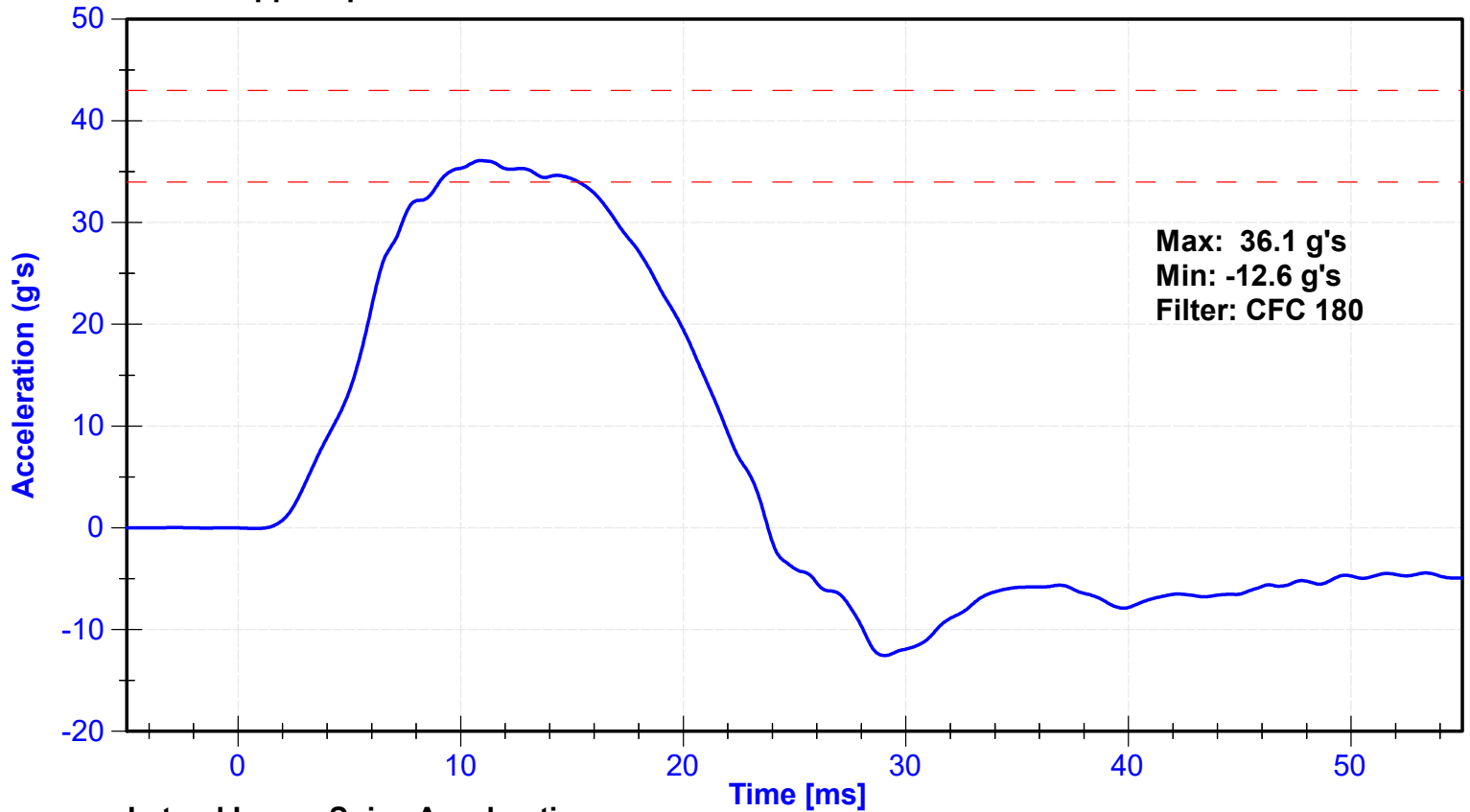
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18546	11/19/2022	11/18/2023
Upper Spine T1 Y Accelerometer	Endevco	T20880	4/4/2023	10/1/2023
Upper Spine T12 Y Accelerometer	Endevco	P52071	4/4/2023	10/1/2023
Shoulder Potentiometer	Servo	053GFE	4/10/2023	10/9/2023
Upper Thorax Rib Potentiometer	Servo	2316GFE	4/10/2023	10/9/2023
Middle Thorax Rib Potentiometer	Servo	040GFE	4/10/2023	10/9/2023
Lower Thorax Rib Potentiometer	Servo	1156GFE	4/10/2023	10/9/2023

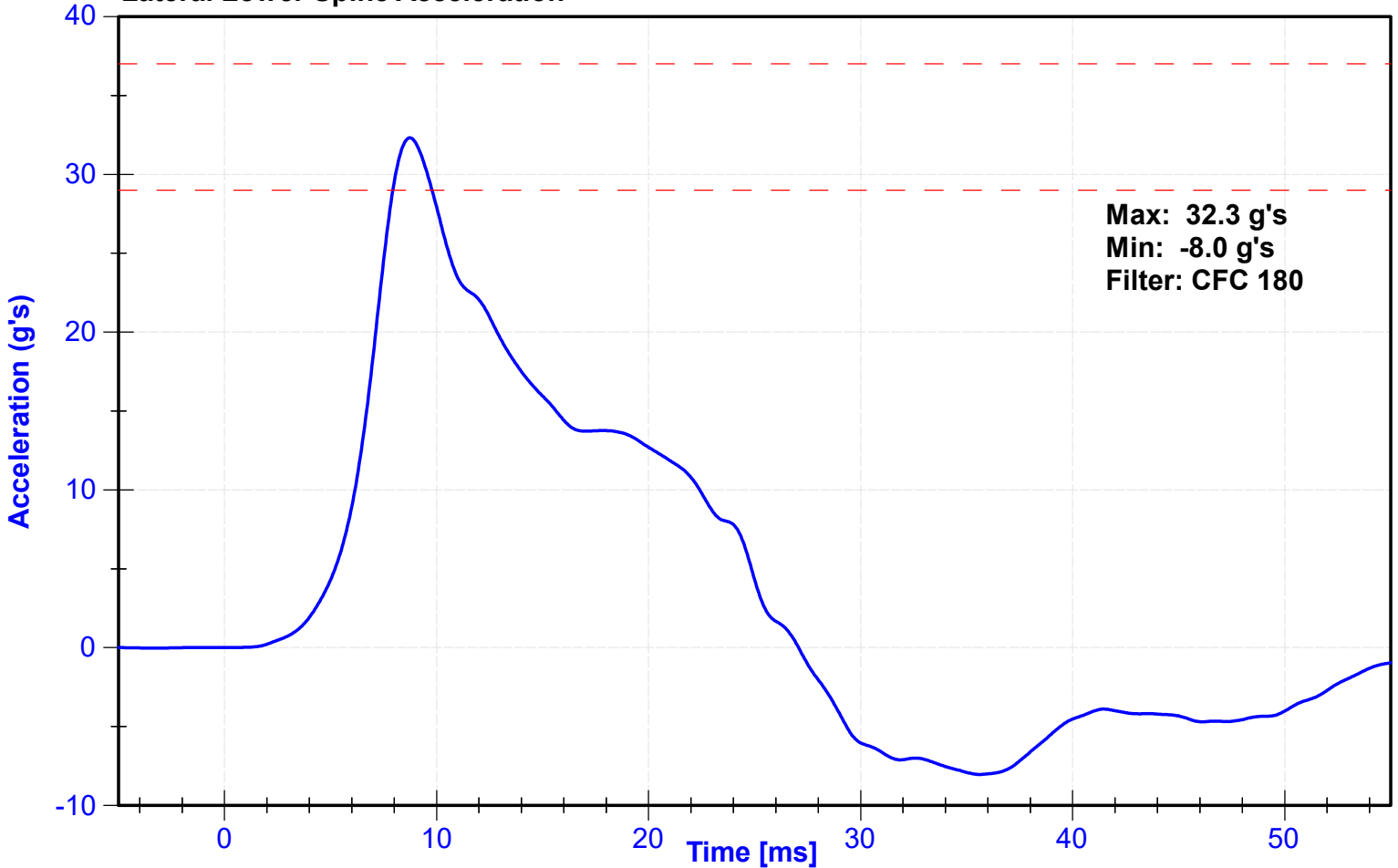




Lateral Upper Spine Acceleration



Lateral Lower Spine Acceleration



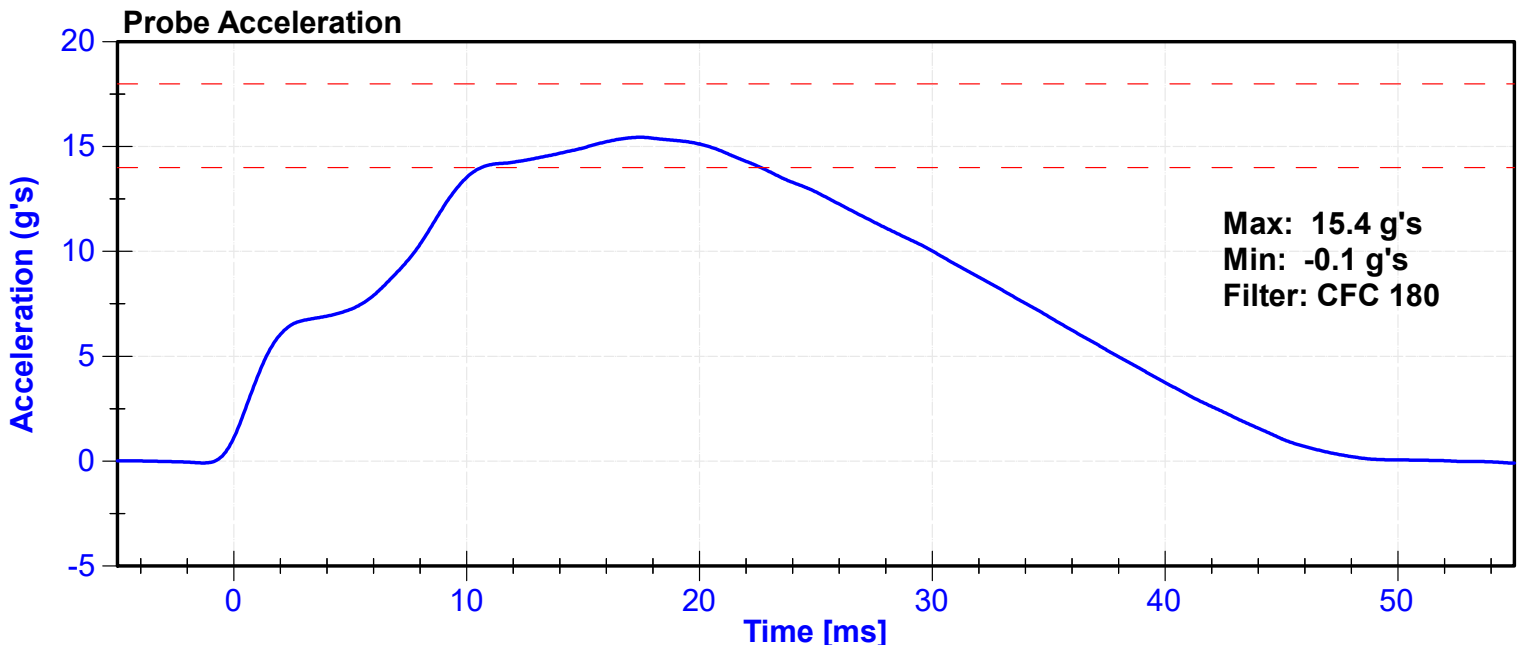
ATD Manufacturer	FTSS	Test Technician	J.Miller
ATD Serial Number	300	Laboratory Supervisor	C. Mantell

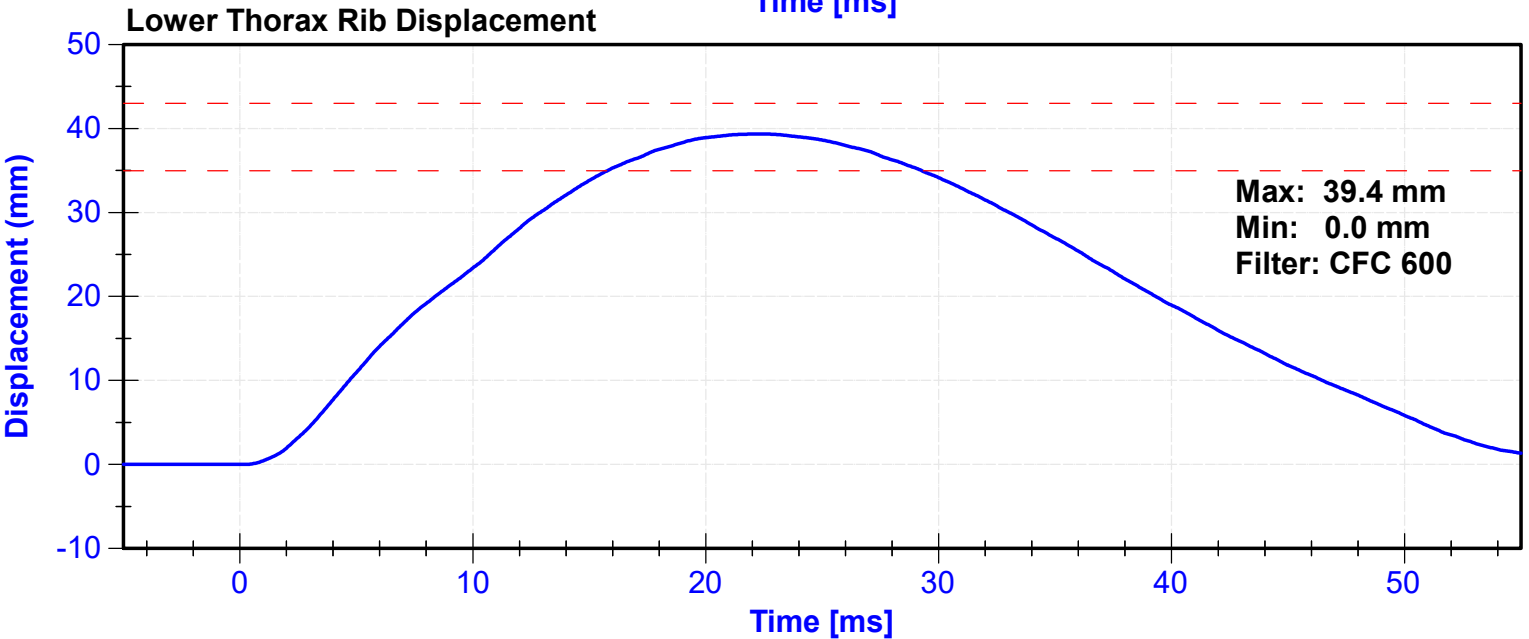
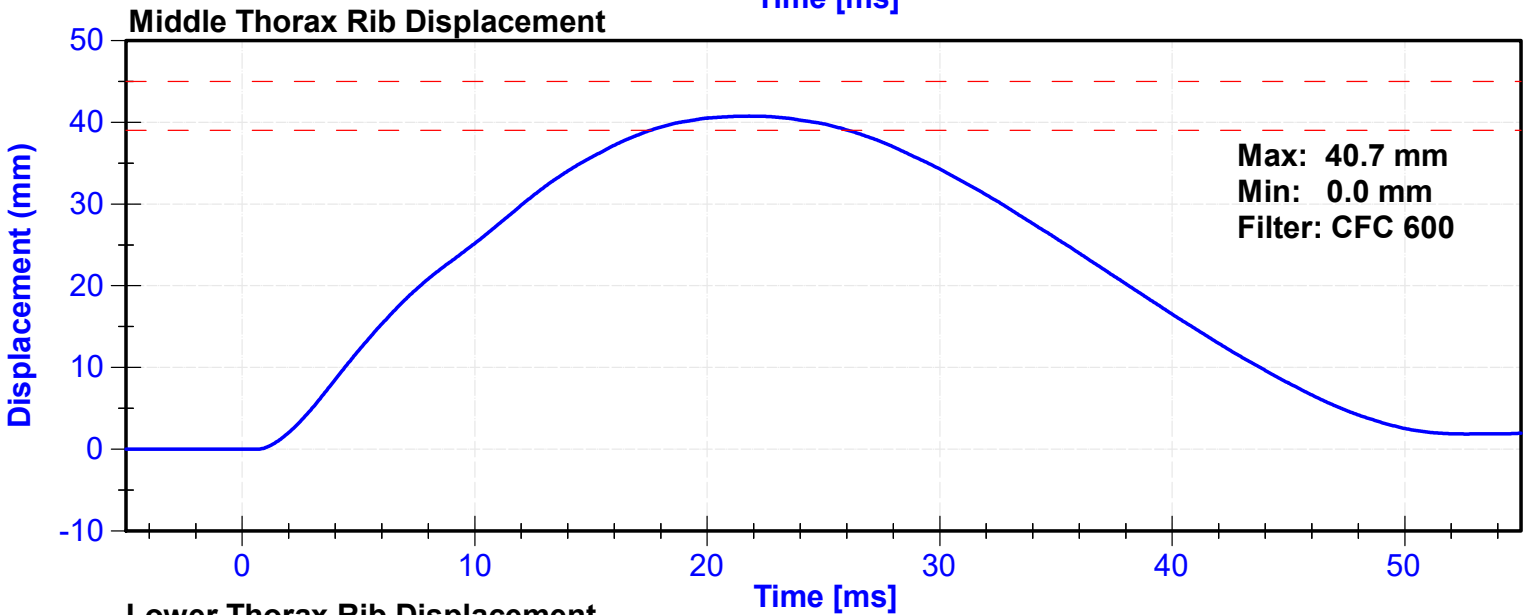
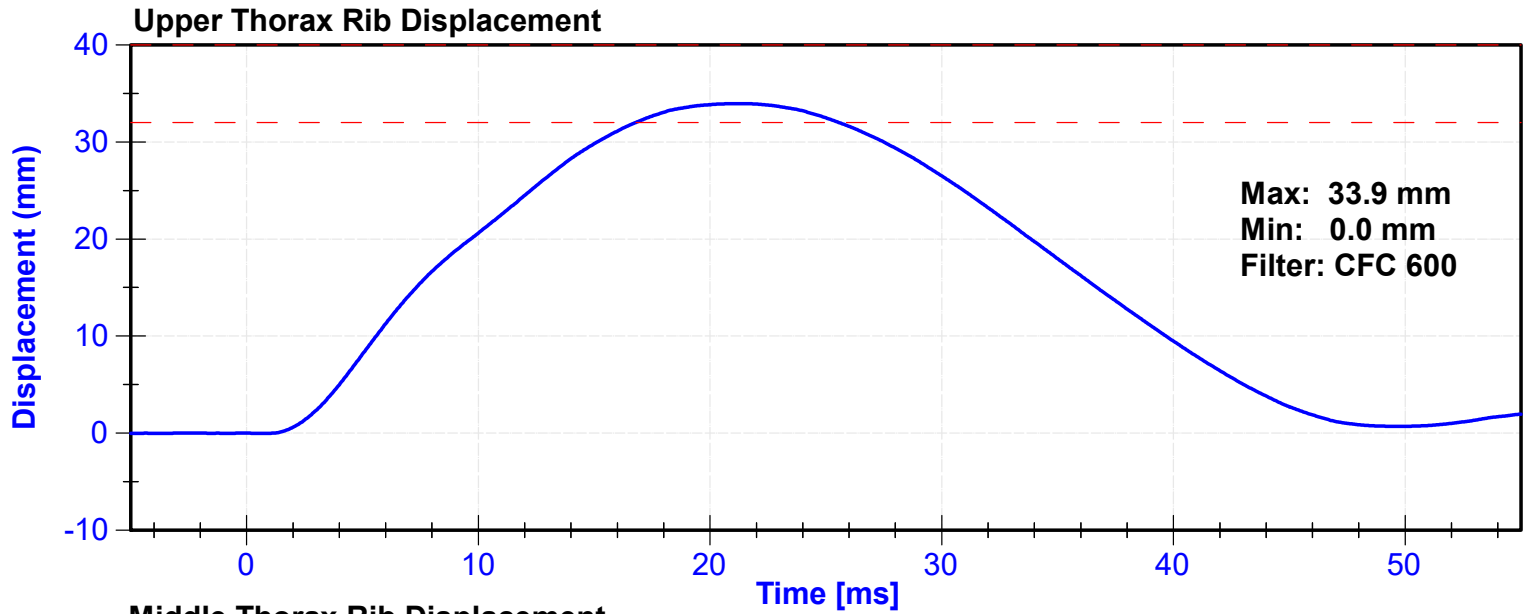
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.8	Pass
Humidity	10	70	%	64	Pass
Velocity	4.2	4.4	m/s	4.28	Pass
Probe Acceleration	14	18	g's	15.4	Pass
Lateral Upper Spine Acceleration	13	17	g's	14.4	Pass
Lateral Lower Spine Acceleration	7	11	g's	8.6	Pass
Upper Thorax Rib Deflection	32	40	mm	33.9	Pass
Middle Thorax Rib Deflection	39	45	mm	40.7	Pass
Lower Thorax Rib Deflection	35	43	mm	39.4	Pass

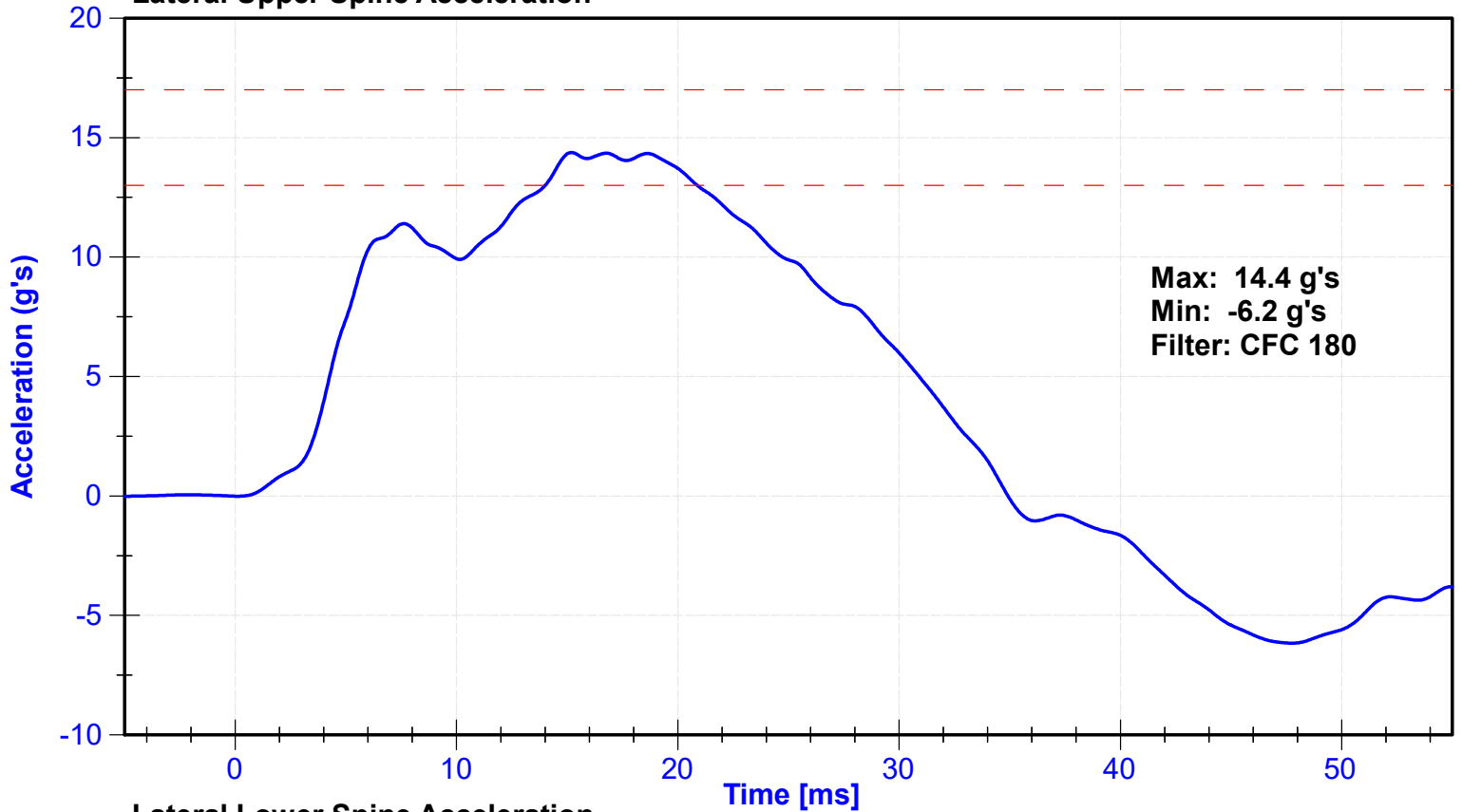
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18546	11/19/2022	11/18/2023
Upper Spine Y Accelerometer	Endevco	T20880	4/4/2023	10/1/2023
Lower Spine Y Accelerometer	Endevco	P52071	4/4/2023	10/1/2023
Upper Thorax Rib Potentiometer	Servo	2316GFE	4/10/2023	10/9/2023
Middle Thorax Rib Potentiometer	Servo	040GFE	4/10/2023	10/9/2023
Lower Thorax Rib Potentiometer	Servo	1156GFE	4/10/2023	10/9/2023

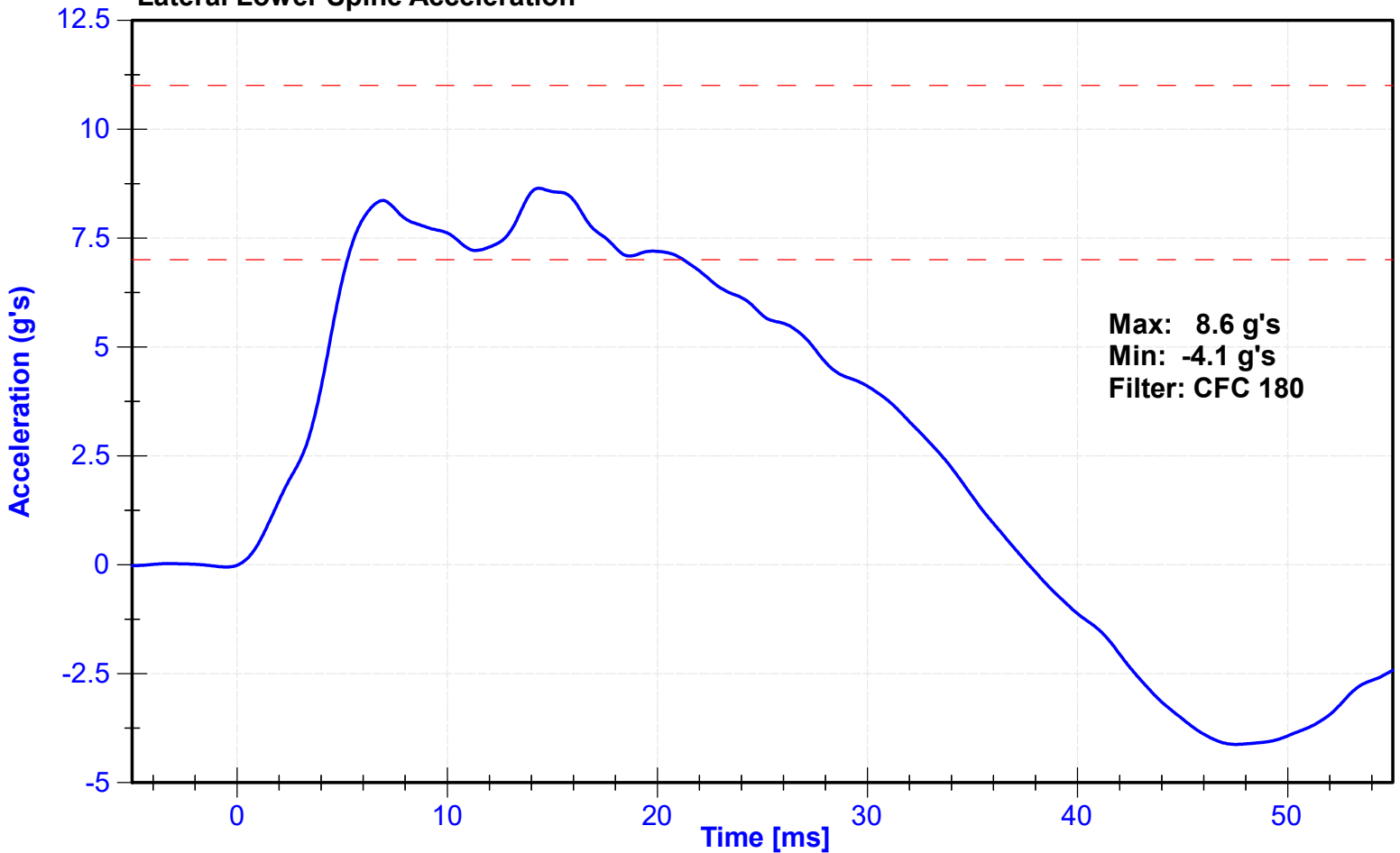




Lateral Upper Spine Acceleration



Lateral Lower Spine Acceleration



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

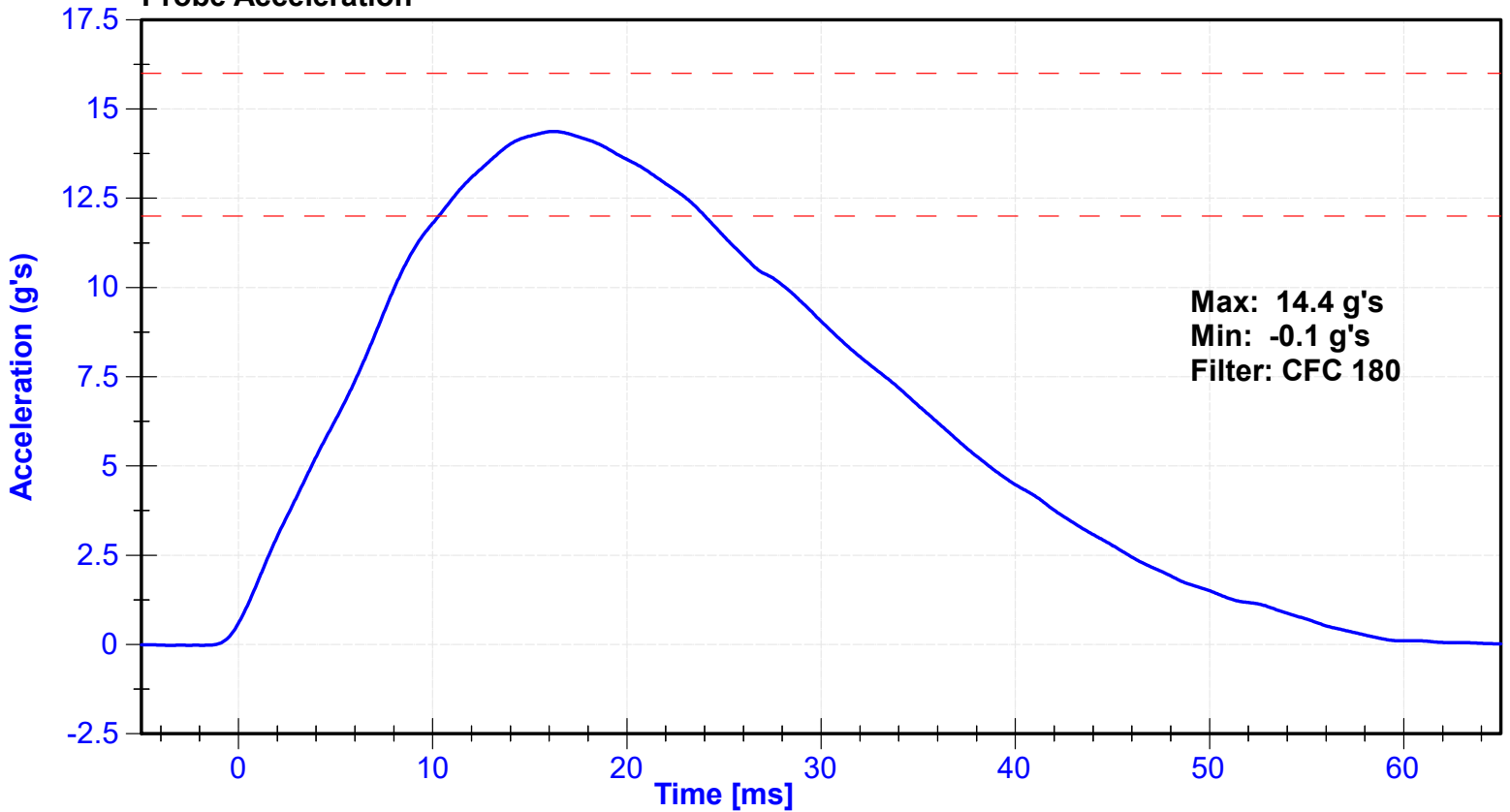
Results

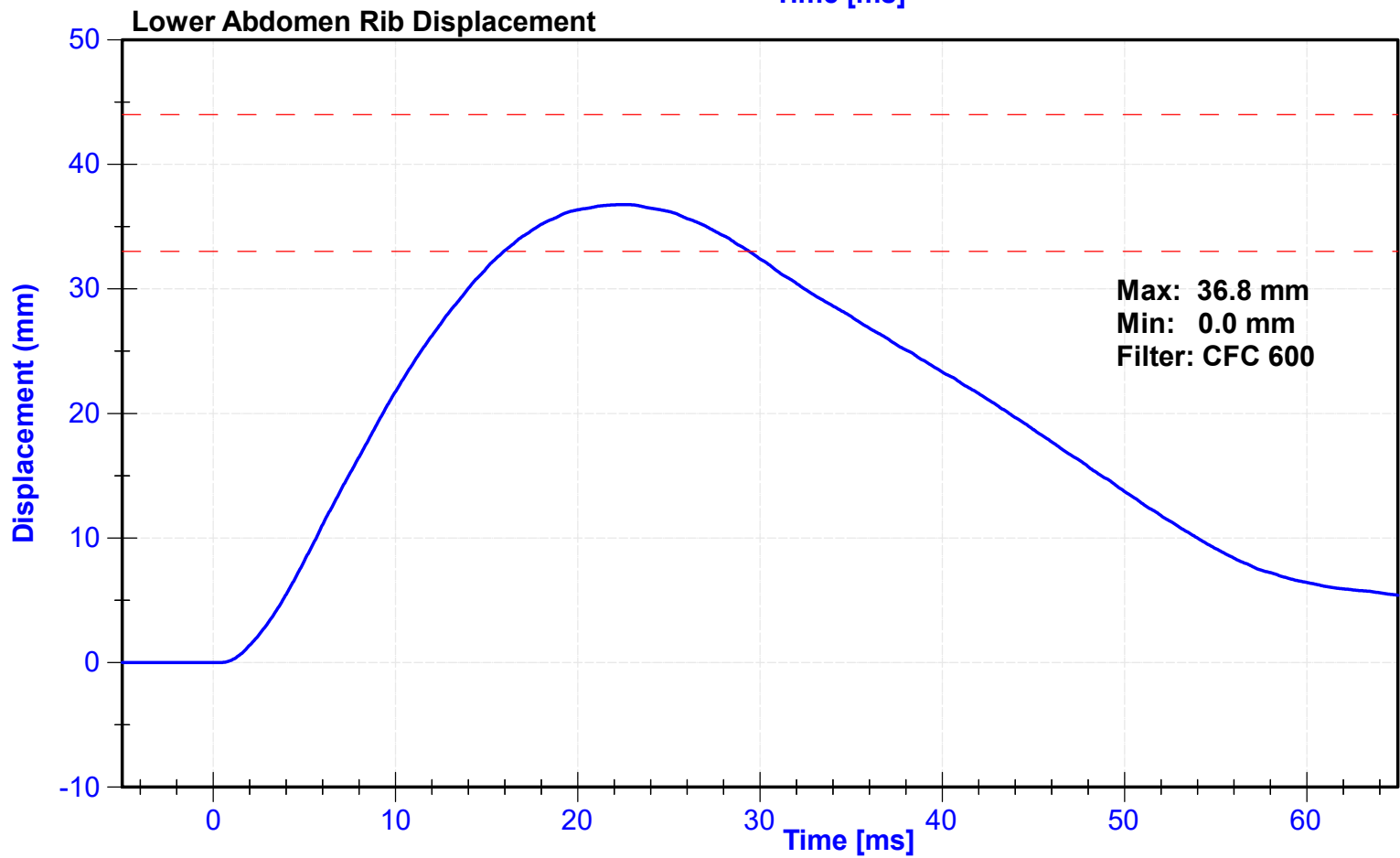
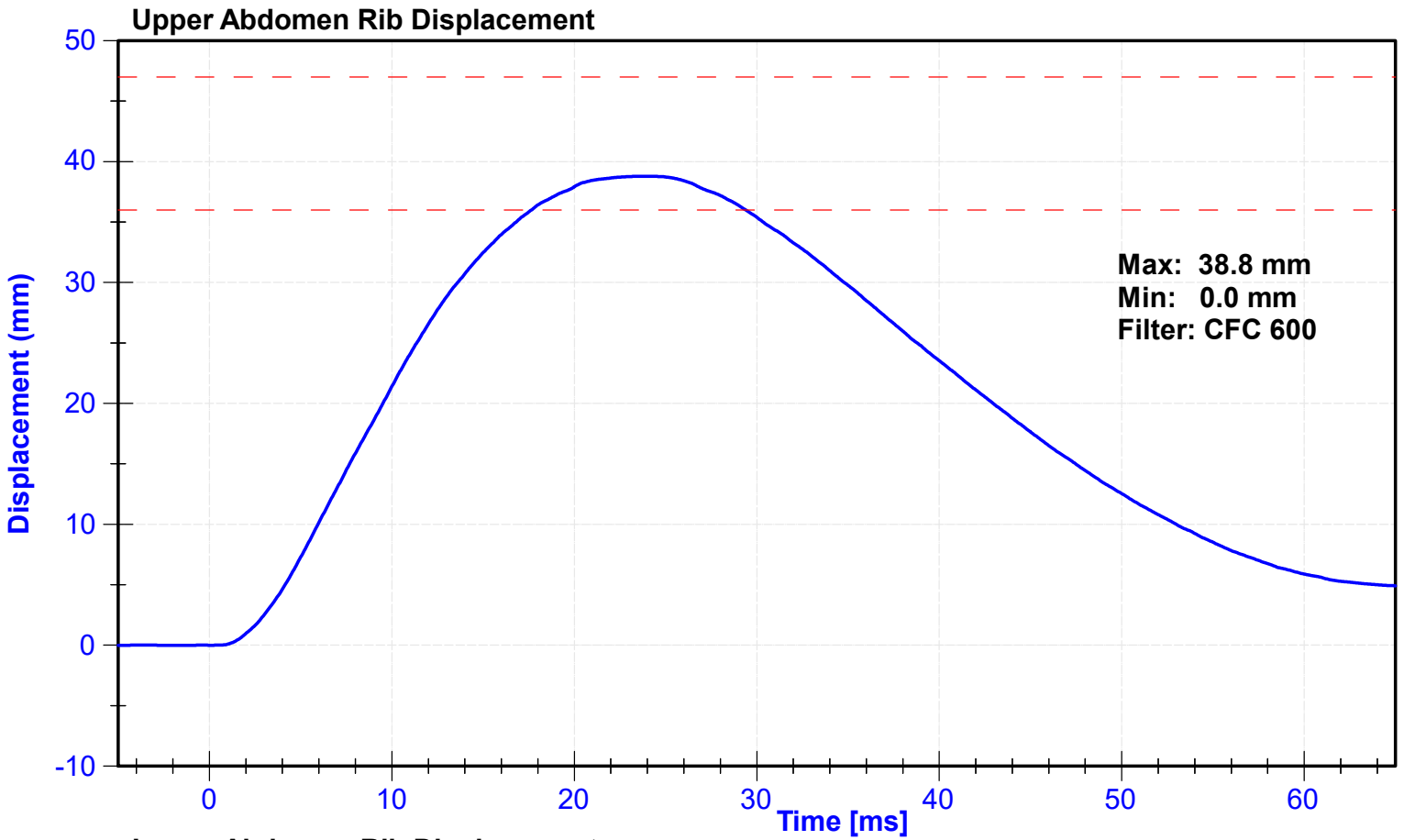
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.8	Pass
Humidity	10	70	%	62	Pass
Velocity	4.2	4.4	m/s	4.27	Pass
Probe Acceleration	12	16	g's	14.4	Pass
Lateral Lower Spine Acceleration	9	14	g's	11.2	Pass
Upper Abdomen Rib Deflection	36	47	mm	38.8	Pass
Lower Abdomen Rib Deflection	33	44	mm	36.8	Pass

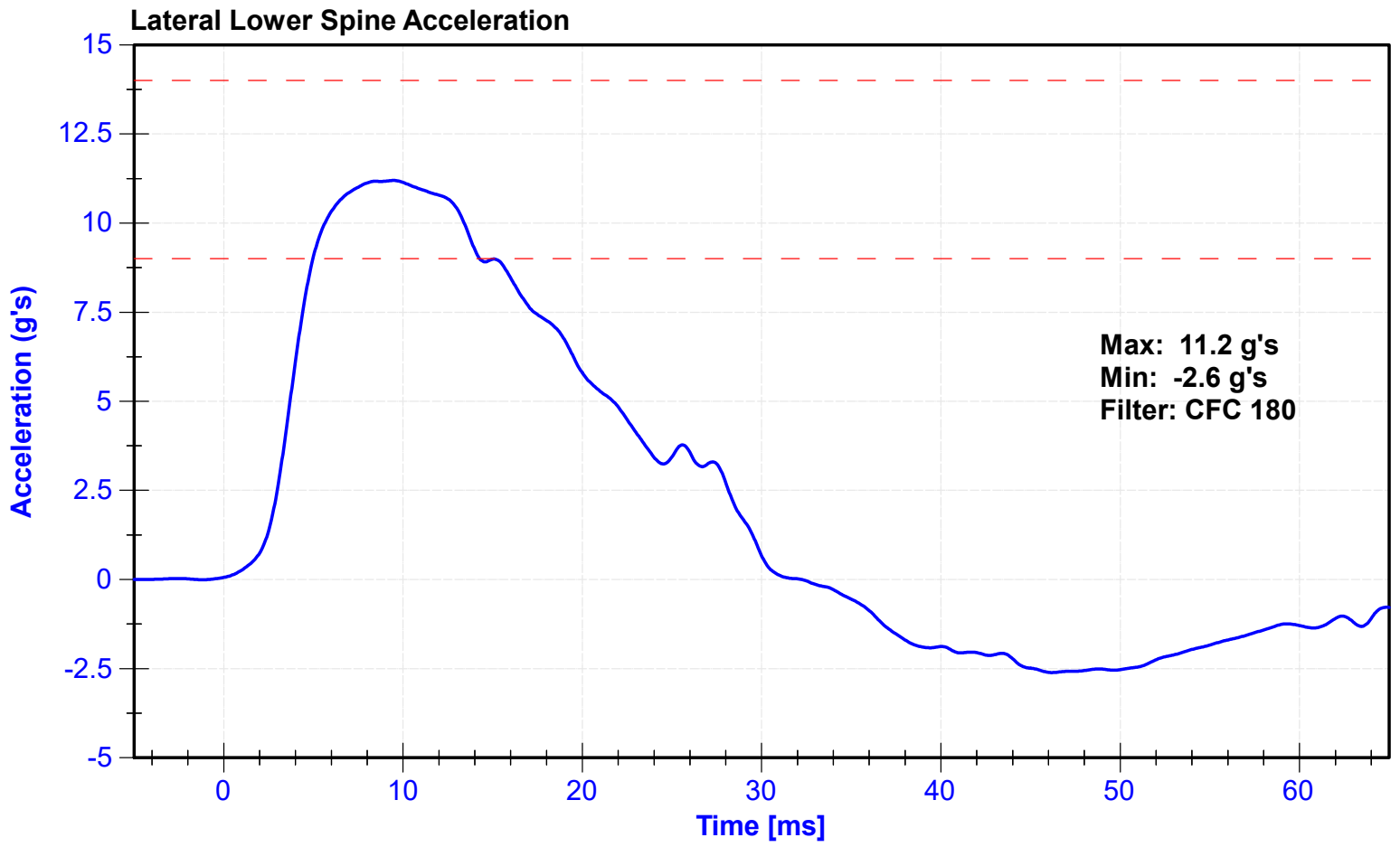
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	18546	11/19/2022	11/18/2023
Lower Spine Y Accelerometer	Endevco	P52071	4/4/2023	10/1/2023
Upper Abdomen Rib Potentiometer	Servo	307GFE	4/10/2023	10/9/2023
Lower Abdomen Rib Potentiometer	Servo	308GFE	6/14/2023	12/13/2023

Probe Acceleration







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

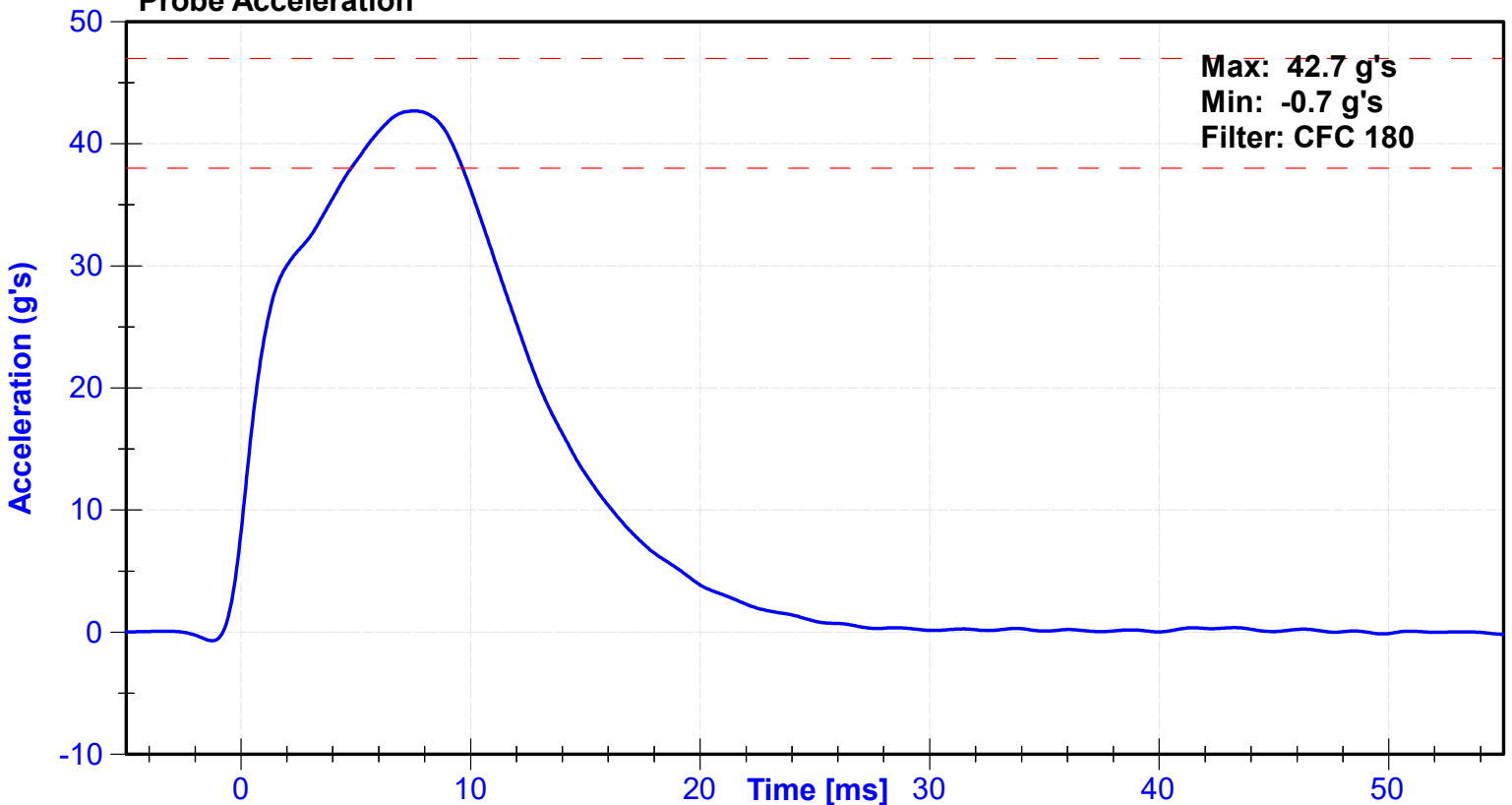
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.8	Pass
Humidity	10	70	%	62	Pass
Velocity	6.6	6.8	m/s	6.70	Pass
Probe Acceleration	38	47	g's	42.7	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	36.6	Pass
Acetabulum Force	3600	4300	N	3905.7	Pass

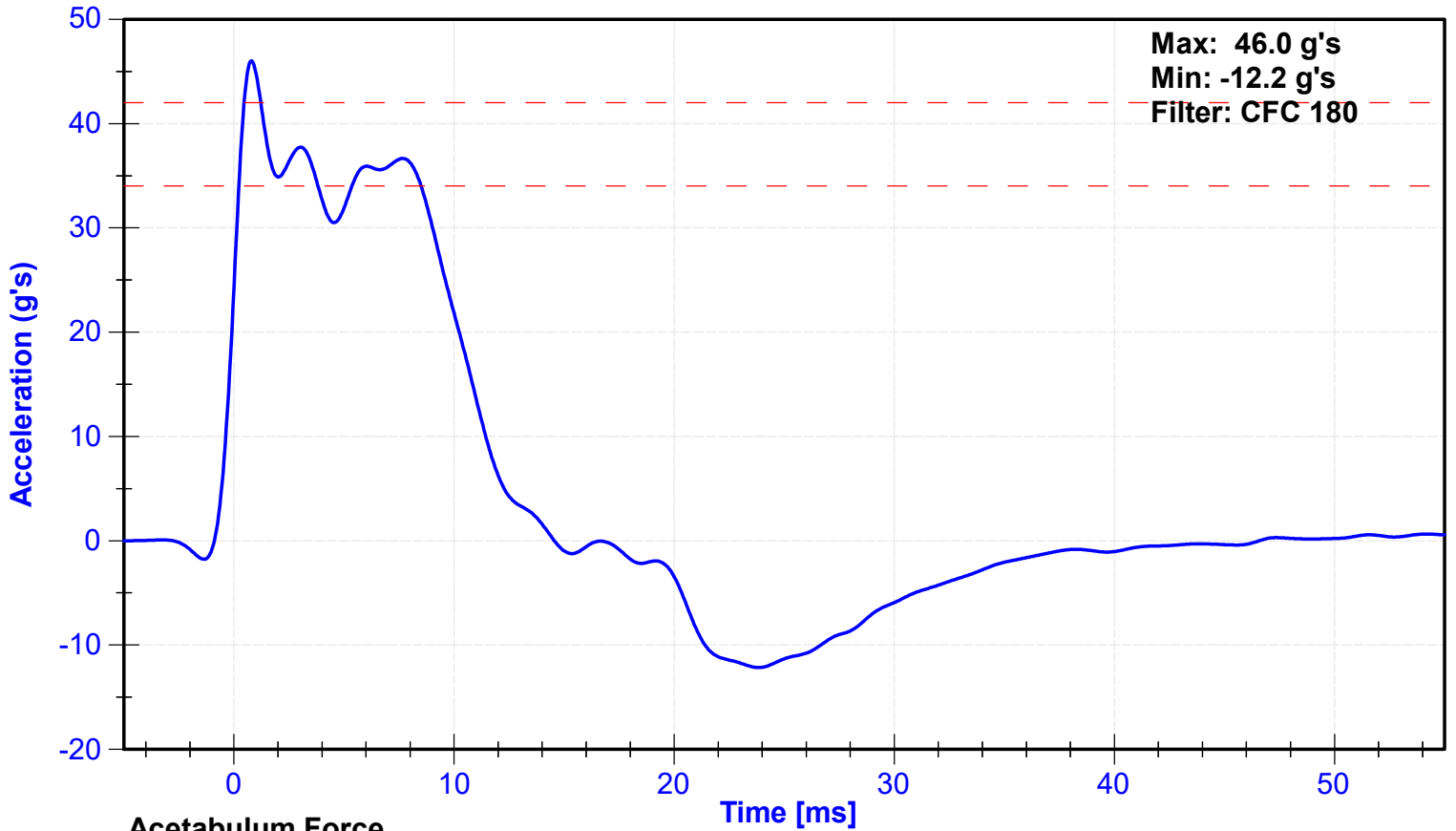
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18546	11/19/2022	11/18/2023
Pelvis Y Accelerometer	Endevco	P51731	4/4/2023	10/1/2023
Acetabulum Load Cell	Denton	267-FY	8/11/2022	8/11/2023
Certification Plug	SACO			N/A
Crash Test Plug	SACO			N/A

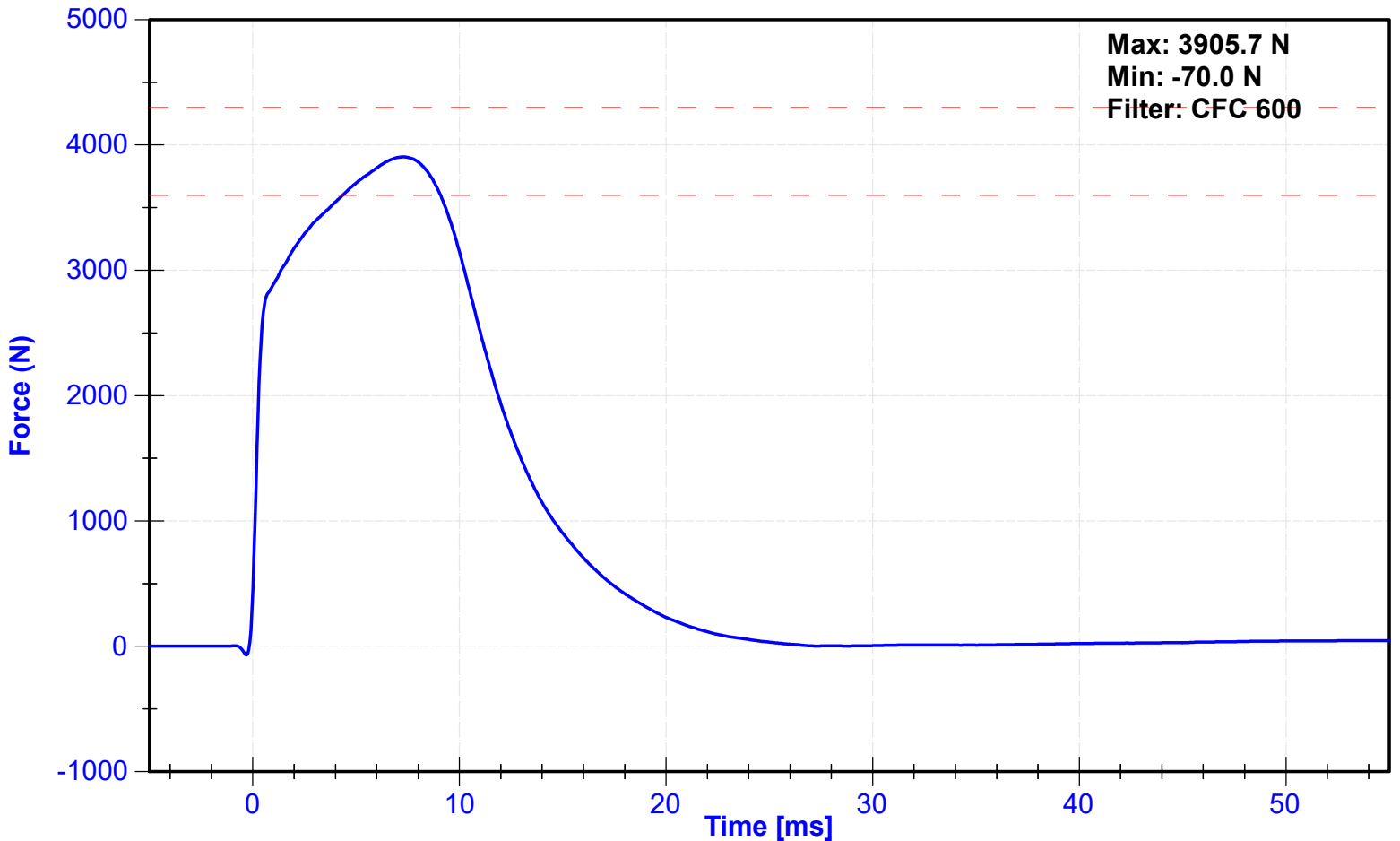
Probe Acceleration



Lateral Pelvis Acceleration



Acetabulum Force





300 8/8/23

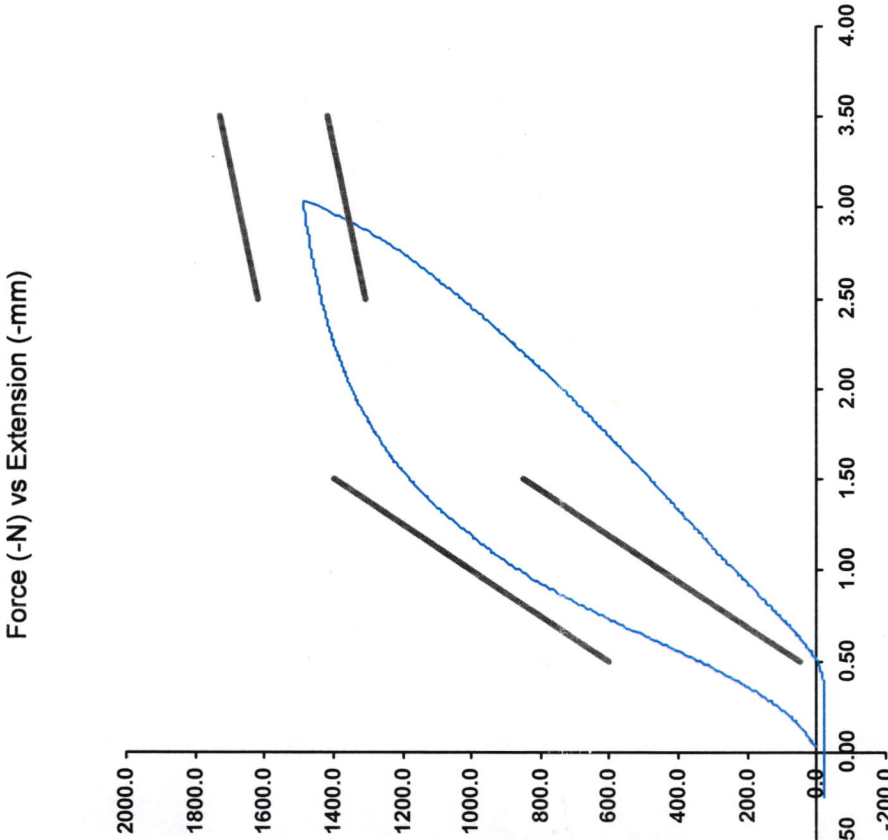
SID-IIs Pelvis Plug Certification Test

Plug S/N 16468 *CEAT 8-7-23*
 Test Number 23037
 Report Number 23095
 Test Date 5/23/2022 1:15:23 PM

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

Testing Machine STM-20 5965542
 Load Cell S/N (F1360947), Units (LBS) 1000
 Crosshead Speed (mm / min) or Rate 12.7
 Extension or Position Measured by XHD_100 (XHD100)

Notes:



Operator _____
 Part Number 180-4450

Template No 107 23-May-22
 SACO Research

By: *DC* Date: *5/23/2022*
 SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 Fax



300 8/8/23

SID-IIs Pelvis Plug Certification Test

Plug S/N 16471 *CRASH - IMPACT*

Test Number 23040

Report Number 23098

Test Date 5/23/2022 1:22:16 PM

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

Testing Machine STM-20 5965542

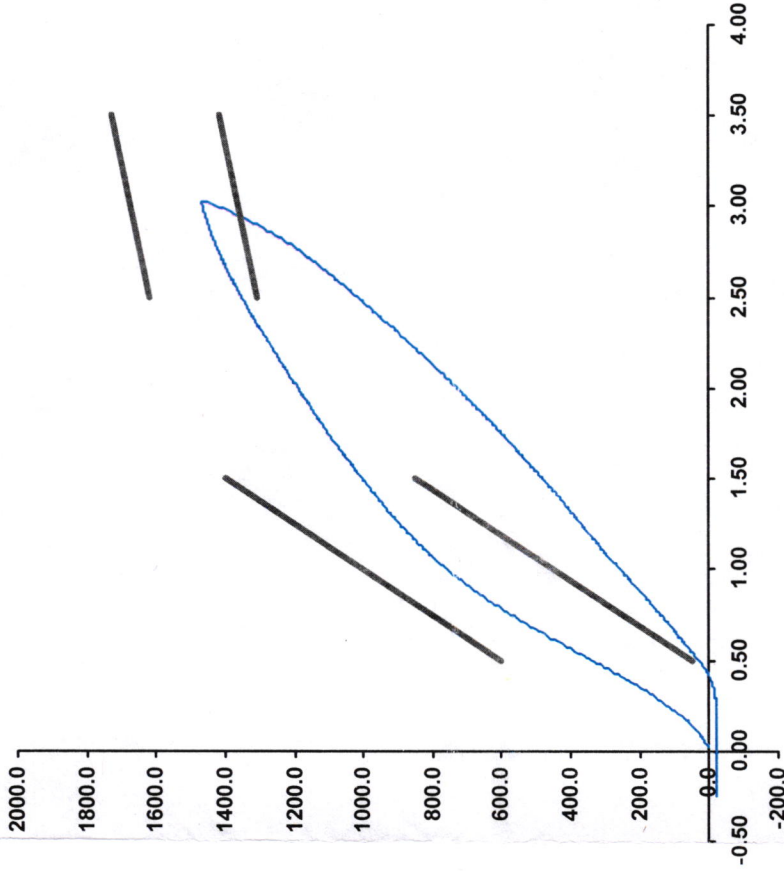
Load Cell S/N (F1360947), Units (LBS) 1000

Crosshead Speed (mm / min) or Rate 12.7

Extension or Position Measured by XHD_100 (XHD100)

Notes:

Force (-N) vs Extension (-mm)



Operator Part Number 180-4450

Template No 107 23-May-22

By: *DC* Date: *5/03/2022*



3008/8/23

SID-IIs Pelvis Plug Certification Test

Plug S/N 16549 *CRASH - NON IMPACT*

Test Number 23333

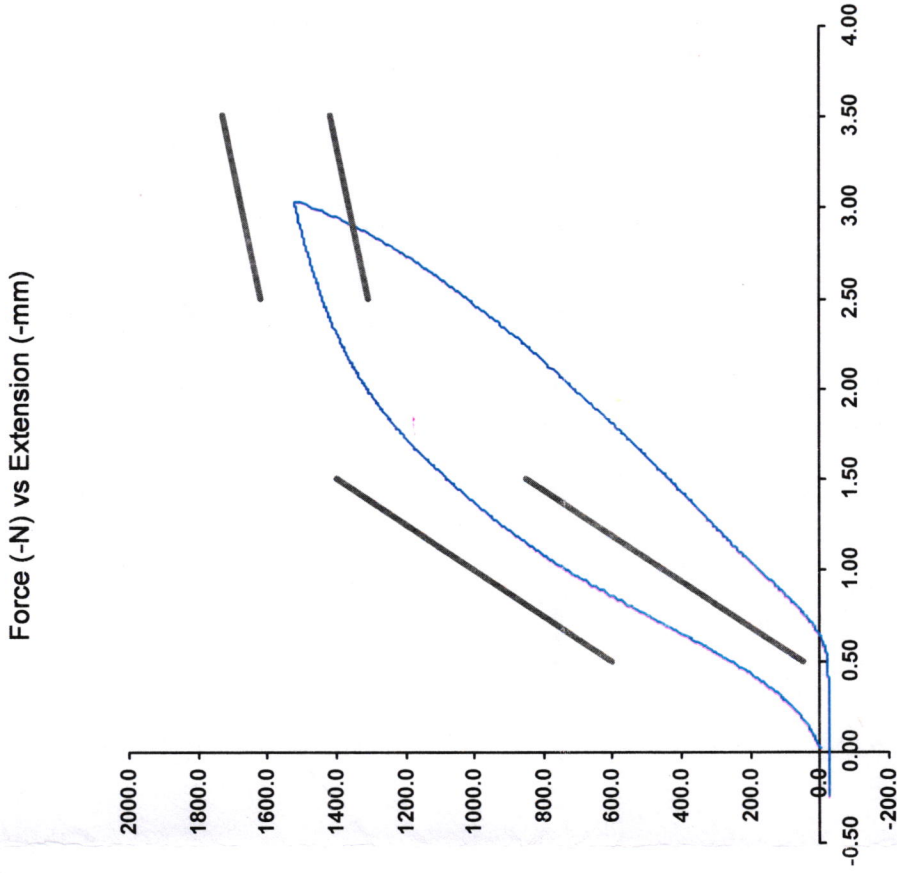
Report Number 23390

Test Date 7/15/2022 9:22:48 AM

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

Testing Machine STM-20 5965542
 Load Cell S/N (F1360947), Units (LBS) 1000
 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 15-Jul-22

SACO Research

By: DC Date: 7/15/22

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

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

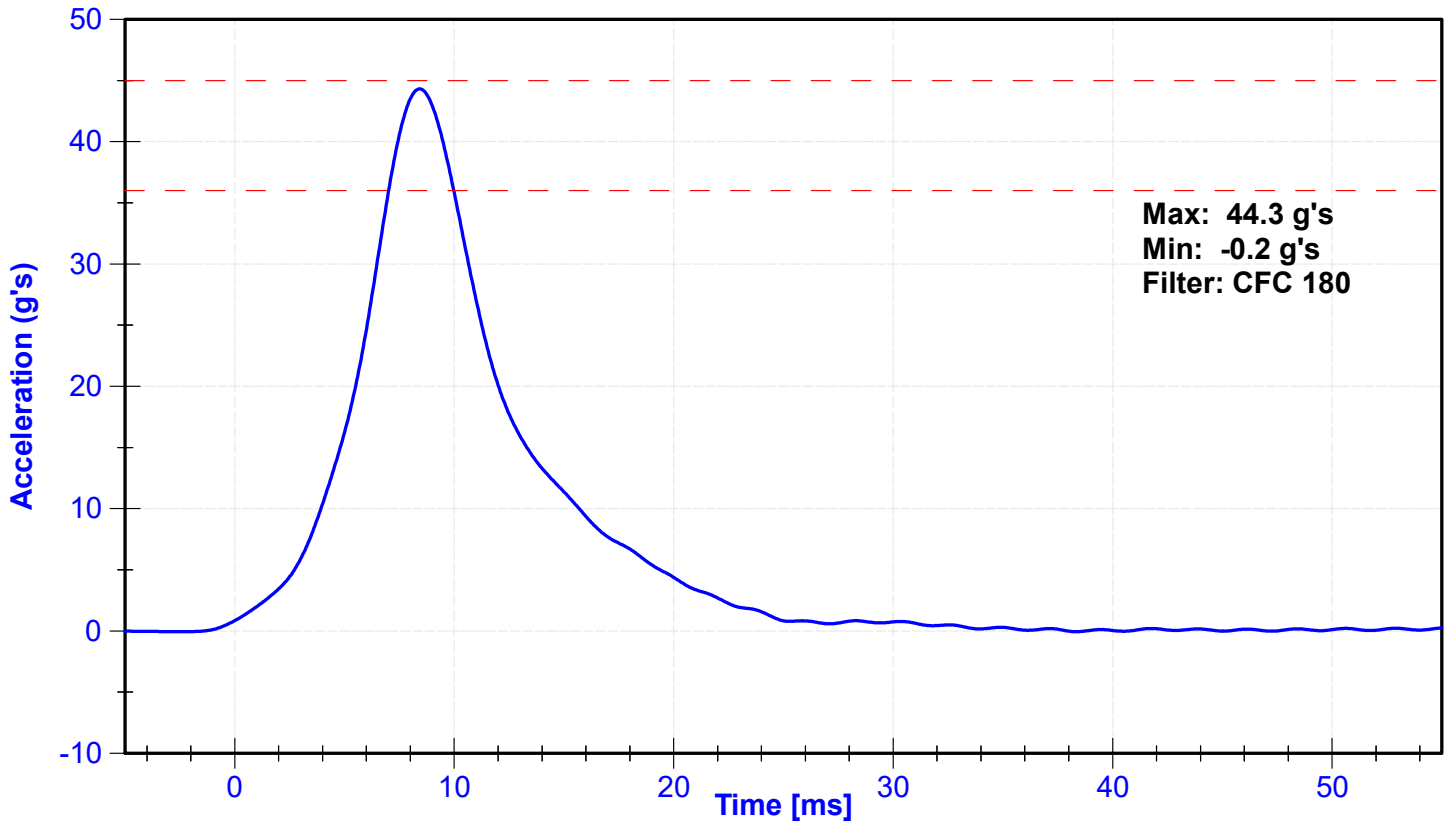
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.8	Pass
Humidity	10	70	%	60	Pass
Velocity	4.2	4.4	m/s	4.24	Pass
Probe Acceleration	36	45	g's	44.3	Pass
Lateral Pelvis Acceleration	28	39	g's	37.7	Pass
Iliac Force	4100	5100	N	4905.9	Pass

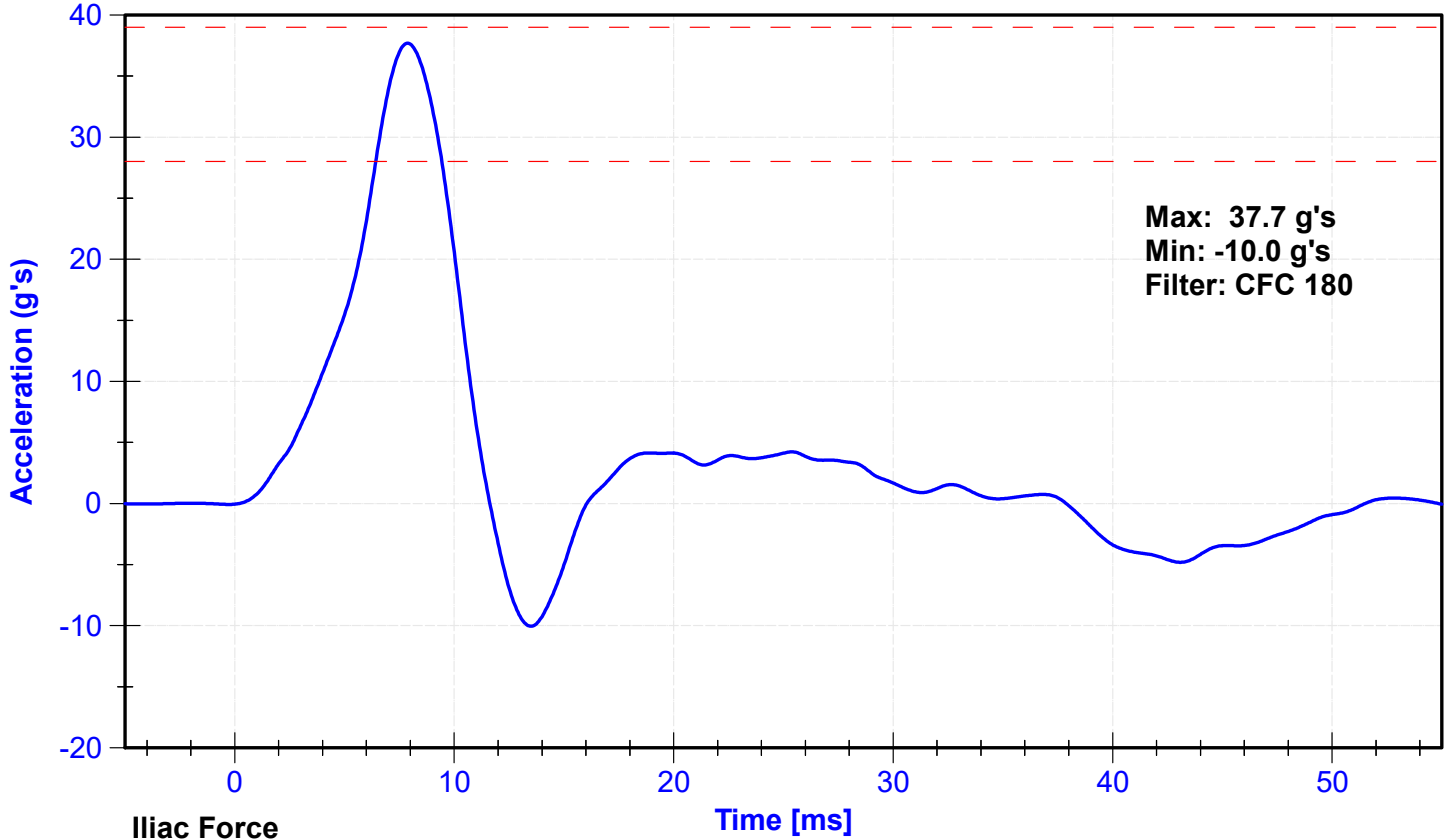
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18546	11/19/2022	11/18/2023
Pelvis Y Accelerometer	Endevco	P51731	4/4/2023	10/1/2023
Iliac Load Cell	Denton	280-FY	8/11/2022	8/11/2023

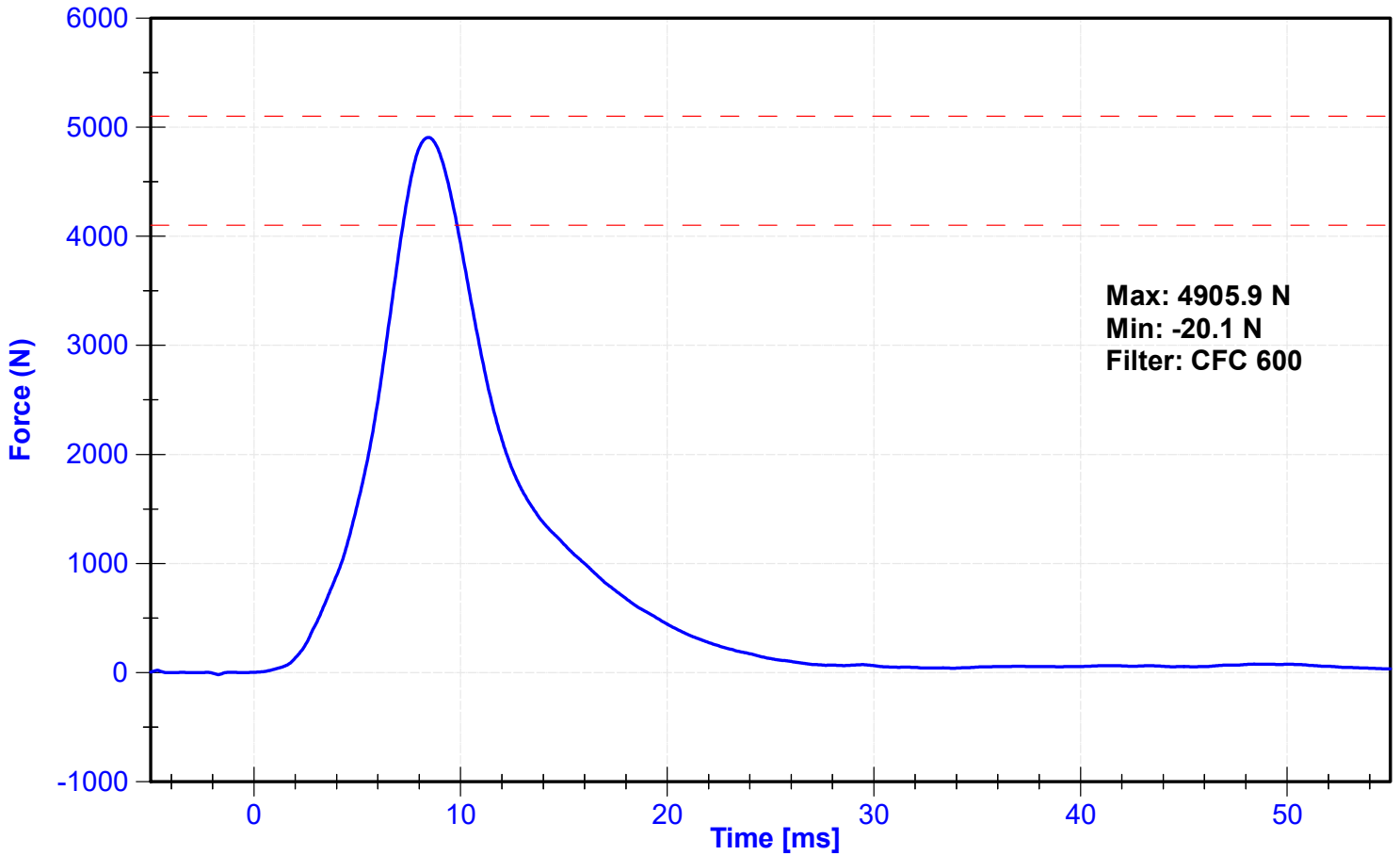
Probe Acceleration



Lateral Pelvis Acceleration



Iliac Force



APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation (SID-IIs)

			SID-IIs S/N: 300			
			Serial Number	Manufacturer	Calibration Date	
Head Accelerometers		X	P59018	Endevco	4/4/2023	
		Y	P79189	Endevco	4/4/2023	
		Z	P79587	Endevco	4/4/2023	
Head Accelerometers - Redundant		X	P68057	Endevco	4/4/2023	
		Y	P58986	Endevco	4/4/2023	
		Z	P52025	Endevco	4/4/2023	
Displacement Potentiometer	Shoulder		Y			
	Thoracic Rib	Upper	Y	2316GFE	Servo	4/10/2023
		Middle	Y	040GFE	Servo	4/10/2023
		Lower	Y	1156GFE	Servo	4/10/2023
	Abdominal Rib	Upper	Y	307GFE	Servo	4/10/2023
		Lower	Y	308GFE	Servo	6/14/2023
Lower Spine Accelerometers (T12)		X	P64003	Endevco	4/4/2023	
		Y	P52071	Endevco	4/4/2023	
		Z	P17283	Endevco	4/4/2023	
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)			15483	SACO	9/28/2021	
Pelvis Plug (Non-Struck Side)			15607	SACO	10/7/2021	

Table 2 – Vehicle Instrumentation

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	A398324	Measurement Specialties	7/19/2023
Vehicle Center of Gravity	Y	A398332	Measurement Specialties	7/19/2023
Vehicle Center of Gravity	Z	A400004	Measurement Specialties	7/19/2023
Left Floor Sill	Y	G23676	Endevco	4/28/2023
A-Pillar Sill	Y	G22106	Endevco	7/26/2023
A-Pillar Low	Y	G23672	Endevco	4/27/2023
A-Pillar Mid	Y	A352411	Measurement Specialties	7/25/2023
B-Pillar Sill	Y	A352407	Measurement Specialties	5/26/2023
B-Pillar Low	Y	G23675	Endevco	4/27/2023
B-Pillar Mid	Y	G23663	Endevco	4/28/2023
Driver Seat	Y	G22422	Endevco	6/27/2023
Engine Top	X	G23680	Endevco	6/14/2023
Engine Top	Y	A398286	Measurement Specialties	2/27/2023
Firewall	Y	A315998	Measurement Specialties	7/26/2023
Right Roof	Y	G23668	Endevco	4/28/2023
Right Floor Sill	Y	G23446	Endevco	4/26/2023
Rear Floorpan	X	A431223	Measurement Specialties	7/20/2023
Rear Floorpan	Y	A431352	Measurement Specialties	7/20/2023

Table 3 – Pole Instrumentation

Pole Instrumentation	Serial Number	Manufacturer	Calibration Date
Load Cell 1	1220AF-1277329-F0	Interface	7/18/2023
Load Cell 2	1220AF-1117017-F0	Interface	7/18/2023
Load Cell 3	1220AF-1117025-F0	Interface	7/18/2023
Load Cell 4	1220AF-1130989-F0	Interface	7/18/2023
Load Cell 5	1220AF-1281288-F0	Interface	7/18/2023
Load Cell 6	1220AF-1281285-F0	Interface	7/18/2023
Load Cell 7	1220AF-1117035-F0	Interface	7/18/2023
Load Cell 8	1220AF-1117011-F0	Interface	7/18/2023