

**REPORT NUMBER: NCAP-CAL-24-008**

**NEW CAR ASSESSMENT PROGRAM (NCAP)  
FRONTAL BARRIER IMPACT TEST**

**General Motors LLC  
2024 Chevrolet Silverado 2500  
4 Door Truck**

**NHTSA No: M20240100**

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



**January 3, 2025**

**FINAL REPORT**

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

This final test report was prepared for the U.S. Department of Transportation, National Highway Safety Traffic Administration, in response to Contract Number 693JJ919D000005.

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Vanessa Hansen, Operations Manager

**FINAL REPORT ACCEPTANCE BY OCWS:**

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

Date: \_\_\_\_\_

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

Date: \_\_\_\_\_

## TECHNICAL REPORT DOCUMENTATION PAGE

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<b>15. Supplementary Notes</b>																																																							
<b>16. Abstract</b> A 56.30 km/h (35 mph), NCAP frontal rigid barrier impact test was conducted on a 2024 Chevrolet Silverado 2500 4 Door Truck in accordance with the specifications of the Office of Crashworthiness Standards Laboratory Procedure for NCAP Full Frontal Rigid Barrier Impact Testing. The test was conducted at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on November 13, 2024.  The impact velocity of the vehicle was 56.47 km/h, and the ambient temperature at the barrier face at the time of impact was 21°C. The target vehicle post-test maximum crush was 684 mm at vehicle centerline. The test vehicle's occupant performance data is as follows:																																																							
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th rowspan="2">Units</th> <th colspan="2">Driver ATD (Serial No. 065)</th> <th colspan="2">Passenger ATD (Serial No. 137)</th> </tr> <tr> <th>Threshold</th> <th>Result</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC15)</td> <td></td> <td>700</td> <td>216.357</td> <td>700</td> <td>316.552</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>-21.163</td> <td>52</td> <td>-14.320</td> </tr> <tr> <td>Nij</td> <td></td> <td>1</td> <td>0.238</td> <td>1</td> <td>0.363</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>4170</td> <td>1120.374</td> <td>2620</td> <td>631.684</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>4000</td> <td>-200.567</td> <td>2520</td> <td>-344.680</td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>10008</td> <td>-140.562</td> <td>6805</td> <td>-931.372</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>10008</td> <td>-103.510</td> <td>6805</td> <td>-1091.221</td> </tr> </tbody> </table>				Measurement Description	Units	Driver ATD (Serial No. 065)		Passenger ATD (Serial No. 137)		Threshold	Result	Threshold	Result	Head Injury Criteria (HIC15)		700	216.357	700	316.552	Maximum Chest Compression	mm	63	-21.163	52	-14.320	Nij		1	0.238	1	0.363	Neck Tension	N	4170	1120.374	2620	631.684	Neck Compression	N	4000	-200.567	2520	-344.680	Left Femur Force	N	10008	-140.562	6805	-931.372	Right Femur Force	N	10008	-103.510	6805	-1091.221
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<b>17. Key Words</b> 56.3 km/h (35 mph) Full Frontal Rigid Barrier Impact Test New Car Assessment Program (NCAP)		<b>18. Distribution Statement</b> <u>Copies of this report are available from:</u> National Highway Traffic Safety Administration Technical Information Services Division 1200 New Jersey Ave, SE Washington, DC 20590																																																					
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## TABLE OF CONTENTS

<u>Section</u>		<u>Page</u>
1	Purpose and Summary of the Test	1-1
2	Occupant and Vehicle Information / Data Sheets	2-1
<u>Data Sheet</u>		<u>Page</u>
1	General Test and Vehicle Parameter Data	2-2
2	Seat Adjustment, Fuel System, and Steering Wheel Data	2-6
3	Dummy Longitudinal Clearance Dimensions	2-8
4	Dummy Lateral Clearance Dimensions	2-9
5	Seat Belt Positioning Data	2-10
6	High-Speed Camera Locations and Data	2-11
7	Vehicle Accelerometer Locations	2-13
8	Photographic Reference Target Locations	2-14
9	Load Cell Locations on Fixed Barrier	2-15
10	Test Vehicle Summary of Results	2-16
11	Post-Test Observations	2-17
12	Vehicle Profile Measurements	2-18
13	Accident Investigation Division Data	2-21
14	Vehicle Intrusion Measurements	2-22
15	Summary of Indicant FMVSS No.212 and FMVSS No.219 (Partial) Data	2-24
16	FMVSS 301 Barrier Impact & Static Rollover Results	2-26
17	Dummy/Vehicle Temperature Stabilization Chart	2-27
<u>Appendix</u>		<u>Page</u>
A	Photographs	A-1
B	Dummy Response Data Traces	B-1
C	Dummy Calibration and Performance Verification Data	C-1
D	Test Equipment and Instrumentation Calibration	D-1

## SECTION 1

### PURPOSE AND SUMMARY OF TEST

#### PURPOSE

This 56.3 km/h frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. 693JJ919D000005. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for consumer information purposes.

The 56.3 km/h frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Procedure for NCAP Full Frontal Rigid Barrier Impact Testing.

#### SUMMARY

A rigid barrier was impacted by a 2024 Chevrolet Silverado 2500 4 Door Truck at a velocity of 56.47 km/h. The test was performed at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on November 13, 2024. Pre- and post-test photographs of the vehicle and dummies to document the test can be found in Appendix A. One real-time camera and 16 high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in Data Sheet 6 of this report.

One Part 572E, 50<sup>th</sup> percentile male anthropomorphic test device (ATD), was placed in the driver seating position and one Part 572O 5<sup>th</sup> percentile female ATD was placed in the right-front passenger seating position according to dummy placement instructions specified in the Laboratory Procedure for NCAP Full Frontal Rigid Barrier Impact Testing. Both ATDs were fully instrumented with head, chest and pelvis tri-axial accelerometers, chest displacement potentiometers, upper neck transducers, femur load cells, and lower leg instrumentation. Seat belt load cells were installed on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 065) and the right-front passenger (position 2) ATD (Serial No. 137) were qualified prior to this test. Certification details, along with instrumentation calibration data, can be found in Appendix C of this report.

The 102 channels of data were recorded on an on-board data acquisition system. Appendix B contains the vehicle, load cell barrier and dummy response data traces.

There was 100 percent windshield retention and no intrusion into the protected zone of the windshield during the event. There was a total of 0.0 grams of Stoddard solvent leakage after the event or during any phase of the static rollover. The maximum static crush of the vehicle was 684 mm and both driver and passenger side doors remained closed during the impact event and were operable after the impact.

The driver's visible contact points were as follows: The driver's head contacted the frontal airbag and the head restraint. The upper torso contacted the frontal airbag. The driver's right knee contacted the knee bolster.

The passenger's visible contact points were as follows: The passenger's head contacted the frontal airbag and the head restraint. The upper torso contacted the frontal airbag. The passenger's left knee contacted the glove box.

The occupant data is summarized below.

ATD Position	HIC <sub>15</sub>	Nij	Neck Tension (N)	Neck Comp. (N)	3ms Chest Clip (Gs)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver (50th)	216.357	0.238	1120.374	-200.567	37.794	-21.163	-140.562	-103.510
Passenger (5th)	316.552	0.363	631.684	-344.680	38.290	-14.320	-931.372	-1091.221

**GENERAL COMMENTS:**

1. P1 (Driver) serial number - 065
2. P2 (Passenger) serial number - 137

**Data Anomalies:**

- Engine Top X Acceleration, Exceeded calibration range at 51.4 ms

## **SECTION 2**

### **OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS**

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 Adjustment, Fuel System, and Steering Wheel Data

Data Sheet No. 3 – Dummy Longitudinal Clearance Dimensions

Data Sheet No. 4 – Dummy Lateral Clearance Dimensions

Data Sheet No. 5 – Seat Belt Positioning Data

Data Sheet No. 6 – High-Speed Camera Locations and Data

Data Sheet No. 7 – Vehicle Accelerometer Locations

Data Sheet No. 8 – Photographic Reference Target Locations

Data Sheet No. 9 – Load Cell Locations on Fixed Barrier

Data Sheet No. 10 – Test Vehicle Summary of Results

Data Sheet No. 11 – Post-Test Observations

Data Sheet No. 12 – Vehicle Profile Measurements

Data Sheet No. 13 – Accident Investigation Division Data

Data Sheet No. 14 – Vehicle Intrusion Measurements

Data Sheet No. 15 – Summary of Indicant FMVSS No. 212 and FMVSS No. 219 (Partial)

Data Sheet No. 16 – FMVSS 301 Barrier Impact and Static Rollover Results

Data Sheet No. 17 – Dummy/Vehicle Temperature Stabilization Chart

**DATA SHEET NO. 1  
GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2024 Chevrolet Silverado 2500 4 Door Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20240100  
 Test Date: 11/13/2024

**TEST VEHICLE INFORMATION AND OPTIONS**

NHTSA No.	M20240100
Model Year	2024
Make	Chevrolet
Model	Silverado 2500
Body Style	Crew Cab Truck
VIN	1GC1YLE77RF391937
Body Color	Summit White
Odometer Reading (km /mi)	25 miles
Engine Displacement (L)	6.6
Type / No. Cylinders	V8
Engine Placement	Inline
Transmission Type	Automatic
Transmission Speeds	10-speed
Overdrive	Yes
Final Drive	4 Wheel Drive
Roof Rack	No
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes
Automatic Door Locks (ADLs)	Yes

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

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

**DATA FROM CERTIFICATION LABEL**

Manufactured By	General Motors LLC
Date of Manufacture	04/24

GVWR (KG)	4536
GAWR Front (KG)	2722
GAWR Rear (KG)	2898

**VEHICLE SEATING AND WEIGHT CAPACITY DATA**

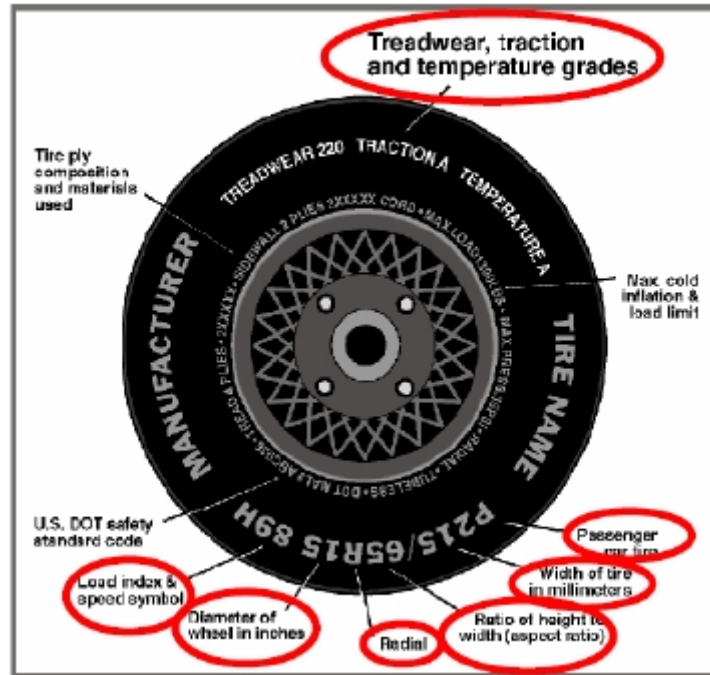
Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Split Bench	N/A	
Number of Occupants	3	3	N/A	6
Capacity Wt. (VCW) (kg)				1267
Cargo Wt. (RCLW) (kg)				136

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

Test Vehicle: 2024 Chevrolet Silverado 2500 4 Door Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20240100  
 Test Date: 11/13/2024

Collect items circled in red, tire manufacturer, and tire name.



**VEHICLE TIRE INFORMATION**

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	550	550
Cold Pressure (kPa)	480	550
Recommended Tire Size	LT265/70R17EQ	LT265/70R17EQ
Tire Size on Vehicle	LT265/70R17	LT265/70R17
Tire Manufacturer	Firestone	Firestone
Tire Model	Transforce AT	Transforce AT
Treadwear	N/A	N/A
Traction	N/A	N/A
Temperature Grades	N/A	N/A
Tire Plies Sidewall	2 Polyester, 2 Steel, 1 Nylon	2 Polyester, 2 Steel, 1 Nylon
Tire Plies Body	2 Polyester	2 Polyester
Load Index / Speed Symbol	121/118Q	121/118Q
Tire Material	Rubber	Rubber
DOT Safety Code Left	AH9K82 0724	AH9K82 0724
DOT Safety Code Right	AH9K82 0624	AH9K82 0624

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

Test Vehicle: 2024 Chevrolet Silverado 2500 4 Door Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20240100  
 Test Date: 11/13/2024

**TEST VEHICLE WEIGHTS**

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	939.5	708.5		1001.5	784	
Right	kg	935.5	660		984.5	744	
Ratio	%	57.8	42.2		56.5	43.5	
Total	kg	1875	1368.5	3243.5	1986	1528	3514

**TARGET TEST WEIGHT CALCULATION**

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	3243.5	(A)
Weight of 1 P572E ATD & 1 P572O ATD	kg	142	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	136	(C)
Calculated Vehicle Target Weight (TVTW)	kg	3521.5	(A+B+C)

**TEST VEHICLE ATTITUDES AND CG**

Condition	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	1080	1096	1107	1122	1845
As Tested	mm	1067	1084	1092	1111	1901
Post-Test	mm	1024	1081	1079	1122	

**GENERAL TEST VEHICLE DATA**

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	4374
Total Vehicle Length at Left Side	mm	6686
Total Vehicle Length at Centerline	mm	6763
Total Vehicle Length at Right Side	mm	6686
Weight of Ballast in Cargo Area	kg	51.7
Weight of Vehicle Components Removed	kg	0
Amount of Stoddard Solvent in Fuel Tank	L	126.8

**LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT:**

None.

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

Test Vehicle: 2024 Chevrolet Silverado 2500 4 Door Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20240100  
 Test Date: 11/13/2024

**TARGET VEHICLE STRUCTURAL MEASUREMENT**

No.	Description	Pre-Test
1	Total Length	6763
2	Total Width	2036
3*	Bumper Top Height	743
4*	Bumper Bottom Height	617
5*	Longitudinal Member Top Height	674
6	Distance Between Longitudinal Members	906
7	Longitudinal Member Width	83
8*	Engine Top Height	1176
9*	Engine Bottom Height	384
10	Engine and Gearbox Width	611
11	Front Bumper-Engine Distance	1023
12*	Front Shock Absorber Fixing Height	771
13*	Bonnet Leading Edge Height	1260
14	Front Shock Absorber Fixing Width	1005
15	Front Bumper – Front Axle Distance	1032
16	Front Axle – A Pillar Distance	589
17	A-Pillar – B-Pillar Distance	1195
18	B-Pillar – Rear Axle Distance	2590
19	B-Pillar – C-Pillar Distance	1045
20*	Roof Sill Bottom Height	1946
21*	Roof Sill Top Height	1974
22*	Floor Sill Bottom Height	645
23*	Floor Sill Top Height	661

\*Height Measurements are taken from the ground  
 Note: All measurements are in millimeters

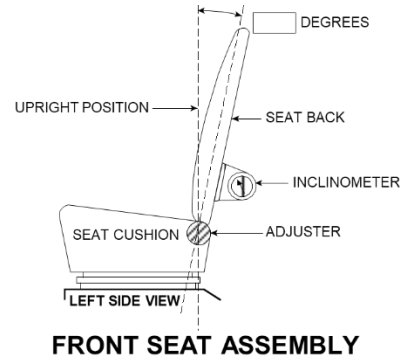
**DATA SHEET NO. 2**  
**SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA**

Test Vehicle: 2024 Chevrolet Silverado 2500 4 Door Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20240100  
 Test Date: 11/13/2024

**NOMINAL DESIGN RIDING POSITION**

The driver's seat back was set to the manufacturer's designated angle. The passenger's seat back was positioned in a similar manner as the driver's seat back. Seat back angles are measured at the headrest post bezel using a digital inclinometer.



Seating Position	Degrees
Driver Seat Back Angle	11.6
Passenger Seat Back Angle	16.3

**SEAT FORE / AFT POSITIONS**

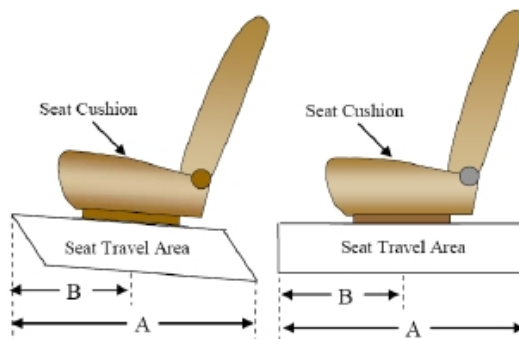
The driver's seat was positioned at the mid-point of fore/aft travel at its lowest position. The passenger's seat was positioned at the most forward position of fore/aft travel. Zero is defined as the forward most position.

Seating Position	Total Fore / Aft Travel	Placed in Position #
Driver Seat	27 (0-26)	13
Passenger Seat	27 (0-26)	0

**SEAT BELT UPPER ANCHORAGE**

The driver's seat belt anchorage was positioned according to the manufacturer's designated positioning for a 50<sup>th</sup> percentile adult male ATD. The passenger's seat belt anchorage was positioned according to the manufacturer's designated positioning for a 5<sup>th</sup> percentile adult female ATD. For this test zero is defined as the uppermost position.

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



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

Test Vehicle: 2024 Chevrolet Silverado 2500 4 Door Truck  
 Test Program: NCAP Frontal Barrier Impact Test

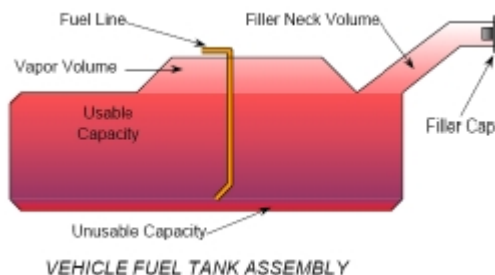
NHTSA No.: M20240100  
 Test Date: 11/13/2024

**FUEL TANK CAPACITY**

Description	Liters
Usable Capacity of "Standard Tank"	136.3
Usable Capacity of "Optional Tank"	N/A
92%-94% of Usable Capacity	125.4 - 128.1
Actual Amount of Solvent Used	126.8
1/3 of Usable Capacity	45.4

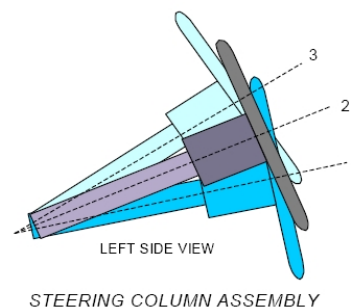
**FUEL PUMP**

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.



**STEERING COLUMN ADJUSTMENT**

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. For angular measurements, a digital inclinometer was used to measure a plate which was placed across the steering wheel rim. A tape measure was used to measure the telescoping steering wheel travel.



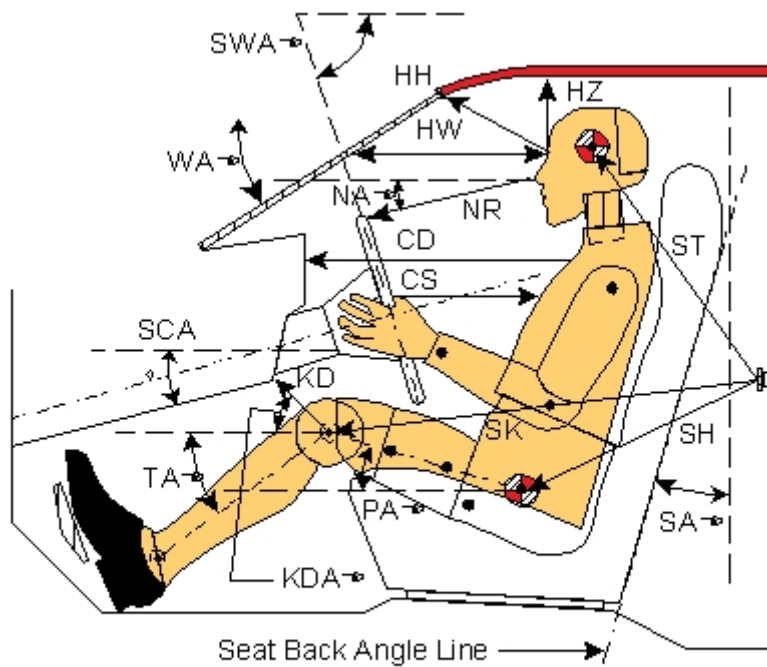
**STEERING COLUMN POSITIONS**

Description	Degrees	Fore / Aft Position (mm)
Lowermost position No. 1	19.9	
Geometric center position No. 2	21.9	
Uppermost position No. 3	24.0	
Telescoping Steering Wheel Travel		Fixed
Test Position	21.9	Fixed

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

Test Vehicle: 2024 Chevrolet Silverado 2500 4 Door Truck  
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20240100  
Test Date: 11/13/2024



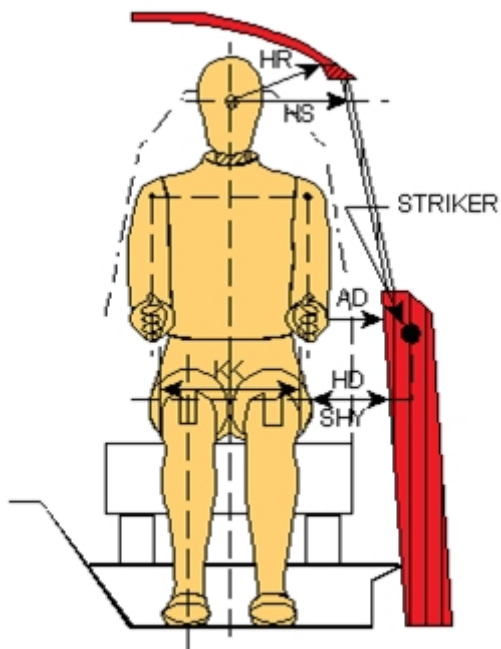
**Left Side View**

Code	Measurement Description	Driver (SN: 065)		Passenger (SN: 137)	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
<b>WA°</b>	Windshield Angle		32.4		
<b>SWA°</b>	Steering Wheel Angle		21.9		
<b>SCA°</b>	Steering Column Angle		68.1		
<b>SA°</b>	Seat Back Angle (on headrest post)		11.6		16.3
<b>HZ</b>	Head to Roof (Z)	275	90	330	90
<b>HH</b>	Head to Header	519	20.6	412	47.0
<b>HW</b>	Head to Windshield	762	0.0	750	0.2
<b>NR</b>	Nose to Rim / Dash	461	11.8	482	15.9
<b>CD</b>	Chest to Dash	613		451	
<b>CS</b>	Chest to Steering Hub	392	9.1		
<b>RA</b>	Rim to Abdomen	248	1.2		
<b>KDL</b>	Left Knee to Dash	201	20.5	106	37.4
<b>KDR</b>	Right Knee to Dash	184	21.9	112	37.1
<b>PA°</b>	Pelvic Angle		24.25		20.0
<b>TA°</b>	Tibia Angle		41.8		50.9
<b>SK</b>	Striker to Knee	587	4.0	725	4.2
<b>ST</b>	Striker to Head	593	84.0	530	64.0
<b>SH</b>	Striker to H-Point	216	32.9	415	17.6

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

Test Vehicle: 2024 Chevrolet Silverado 2500 4 Door Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20240100  
 Test Date: 11/13/2024



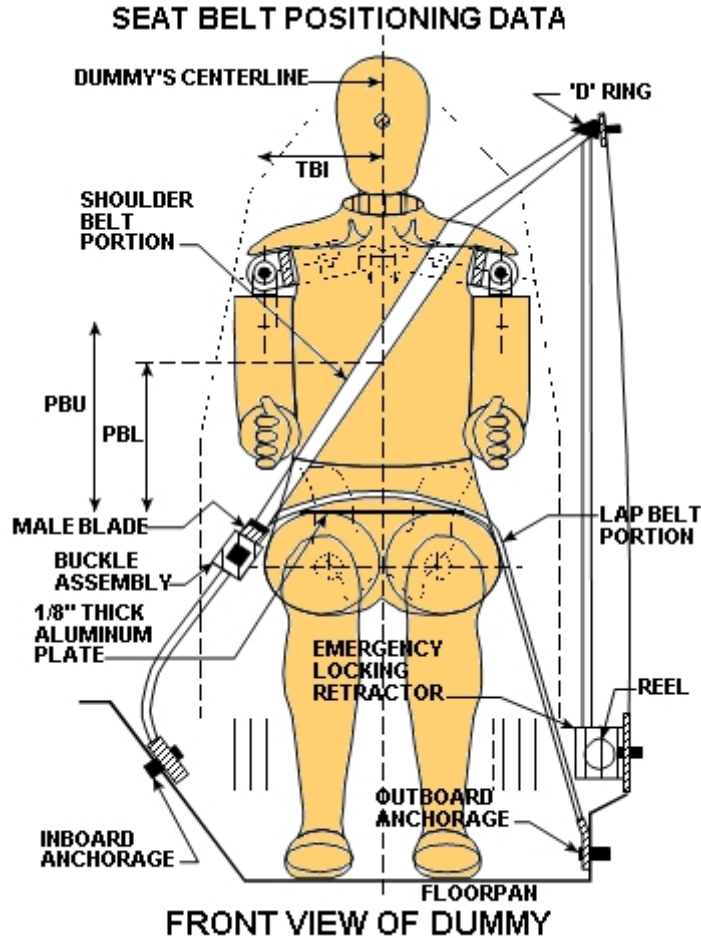
**Front View**

Code	Description	Driver (mm)	Passenger (mm)
AD	Arm to Door	165	94
HD	H-Point to Door	158	186
HR	Head to Side Header	248	306
HS	Head to Side Window	353	382
KK	Knee to Knee	335	216
SHY	Striker to H-Point (Y Direction)	265	300
AA	Ankle to Ankle	350	165

**DATA SHEET NO. 5  
SEAT BELT POSITIONING DATA**

Test Vehicle: 2024 Chevrolet Silverado 2500 4 Door Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20240100  
 Test Date: 11/13/2024



**SEAT BELT POSITIONING MEASUREMENTS**

Measurement Description	Units	Driver	Passenger
PBU — Top surface of reference to belt upper edge	mm	360	300
PBL — Top surface of reference to belt lower edge	mm	280	200

**BELT LENGTH DATA**

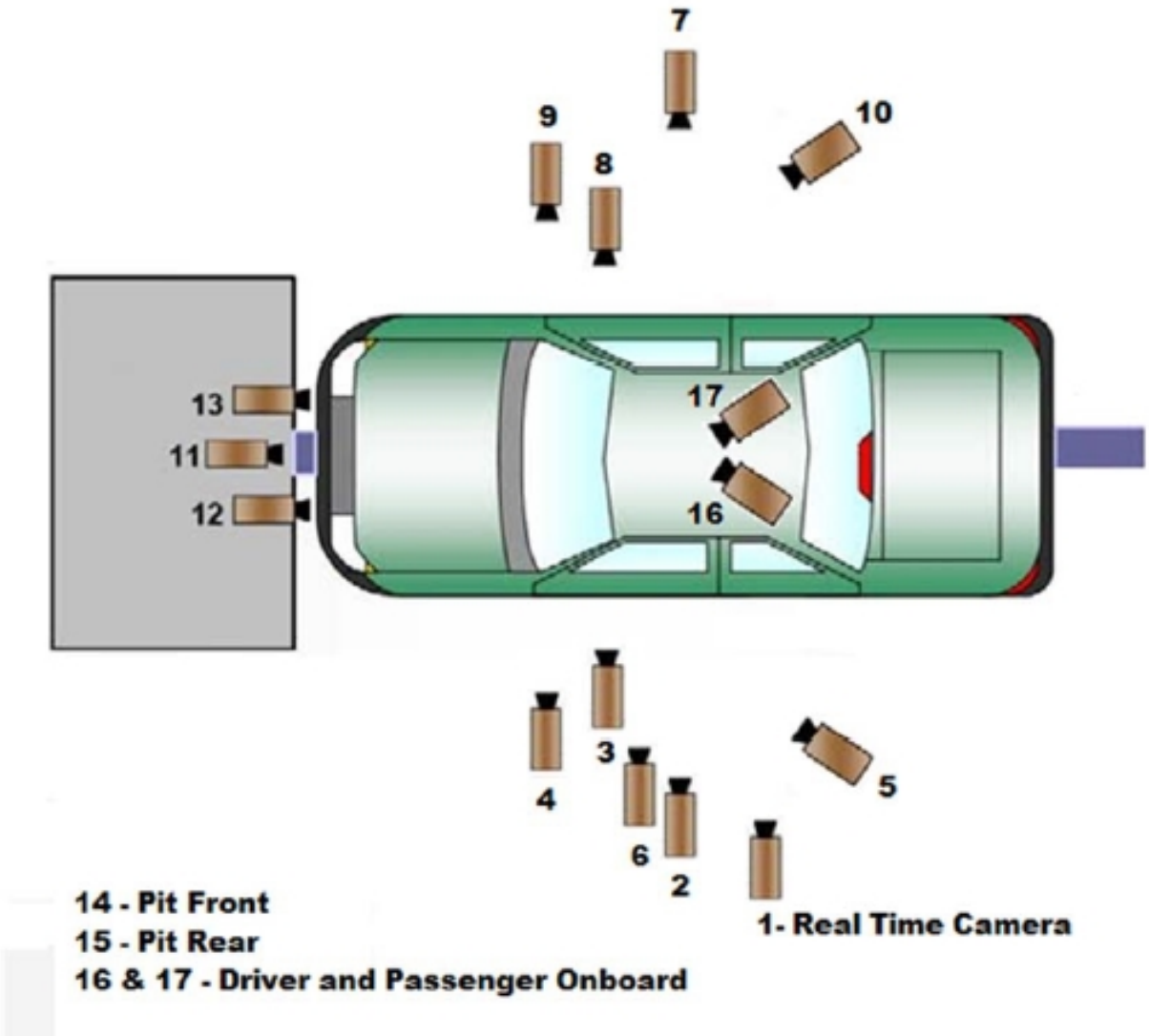
Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	830	940
Lap Belt Length as measured on ATD	mm	650	715
Remainder of belt on reel	mm	1150	925
Total belt length for continuous webbing systems	mm	2630	2580

**DATA SHEET NO. 6  
HIGH-SPEED CAMERA LOCATIONS AND DATA**

Test Vehicle: 2024 Chevrolet Silverado 2500 4 Door Truck  
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20240100  
Test Date: 11/13/2024

**CAMERA POSITIONS FOR FRONTAL IMPACTS**



**DATA SHEET NO. 6 ... (CONTINUED)**  
**HIGH-SPEED CAMERA LOCATIONS AND DATA**

Test Vehicle: 2024 Chevrolet Silverado 2500 4 Door Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20240100  
 Test Date: 11/13/2024

**CAMERA LOCATIONS**

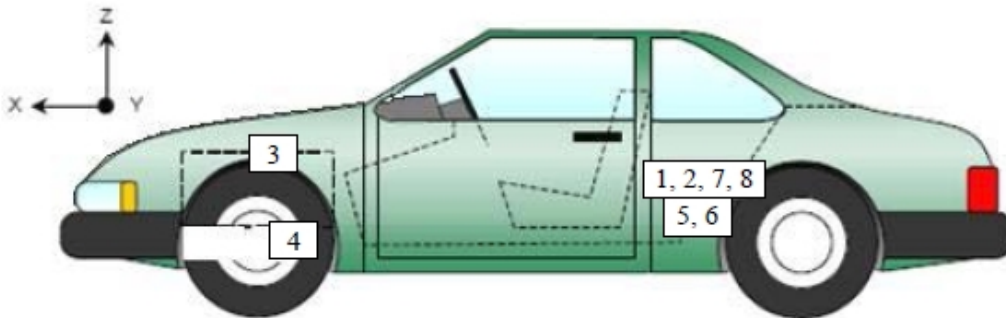
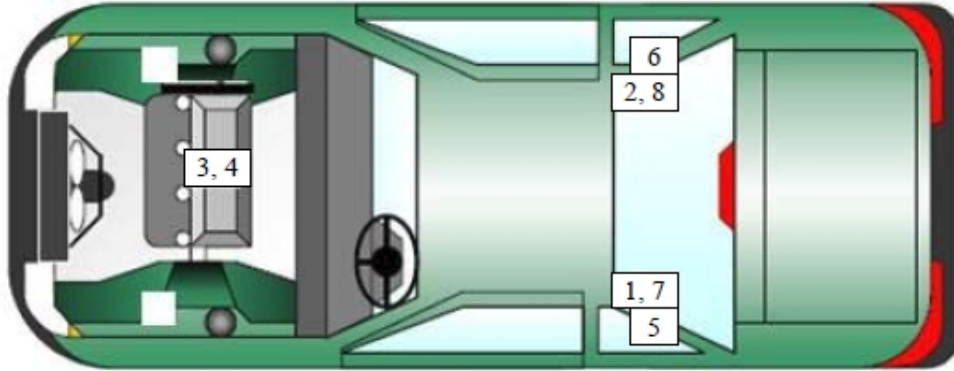
No.	Camera View	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall				Zoom	60
2	Left Overall	-3196	9774	-1610	24	1000
3	Driver Close-Up	-1622	7256	-1724	50	1000
4	Left Front Half	-1114	7035	-1538	28	1000
5	Left Angle	-3432	4689	-2621	50	1000
6	Steering Column	-1648	7532	-2408	75	1000
7	Right Overall	-3392	-9535	-1567	24	1000
8	Passenger Close-Up	-1732	-6812	-1906	50	1000
9	Right Front Half	-1318	-6820	-1455	28	1000
10	Right Angle	-3423	-4690	-2638	50	1000
11	Windshield	0	0	-4371	12.5	1000
12	Driver Windshield	-409	394	-2284	12.5	1000
13	Passenger Windshield	-409	-415	-2284	12.5	1000
14	Pit Front	-1389	0	2199	12.5	1000
15	Pit Rear	-4446	0	2132	12.5	1000
16	Onboard Driver Airbag (Optional)					1000
17	Onboard Passenger Airbag (Optional)					1000

\* COORDINATES:      +X = forward of impact plane  
                              +Y = right of monorail center  
                              +Z = into ground

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

Test Vehicle: 2024 Chevrolet Silverado 2500 4 Door Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20240100  
 Test Date: 11/13/2024



**VEHICLE ACCELEROMETER PRE-TEST LOCATIONS**

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Accelerometer – X Direction	2948	-476	-339
2	Right Rear Accelerometer – X Direction	2940	496	-343
3	Engine Top X	5728	39	-644
4	Engine Bottom X	5324	27	157
5	Left Rear Accelerometer – Z Direction	2948	-476	-339
6	Right Rear Accelerometer – Z Direction	2940	496	-343
7	Left Rear Accelerometer – X Direction Redundant	2968	-475	-334
8	Right Rear Accelerometer – X Direction Redundant	2957	495	-338

*Reference Points:*      X – Rear Surface of Vehicle (+ forward)  
                                   Y – Vehicle Centerline (+ to right)  
                                   Z – Ground Plane (+ down)

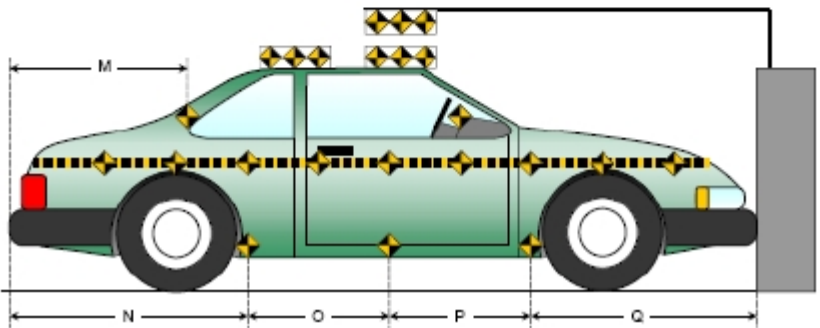
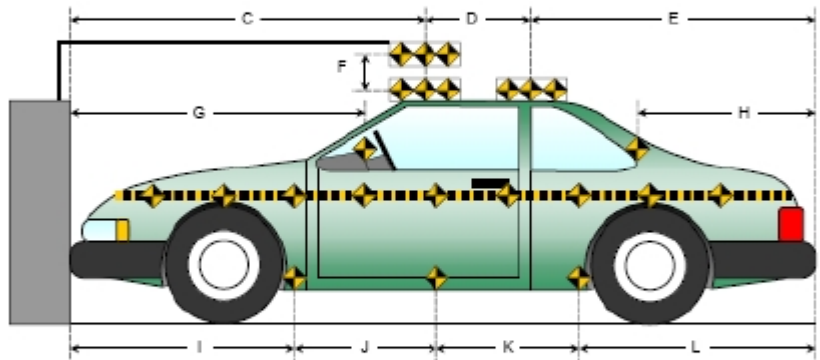
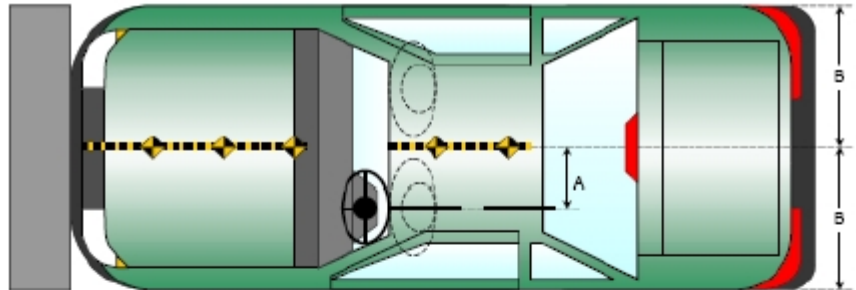
**DATA SHEET NO. 8**  
**PHOTOGRAPHIC REFERENCE TARGET LOCATIONS**

Test Vehicle: 2024 Chevrolet Silverado 2500 4 Door Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20240100  
 Test Date: 11/13/2024

Item	Value
A	440
B	1018
C	2124
D	860
E	3779
F	337
G	1999
H	2844
I	1690
J	1075
K	1074
L	2924
M	2844
N	2921
O	1076
P	1072
Q	1694

All units in millimeters



**DATA SHEET NO. 9**  
**LOAD CELL LOCATIONS ON FIXED BARRIER**

Test Vehicle: 2024 Chevrolet Silverado 2500 4 Door Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20240100  
 Test Date: 11/13/2024

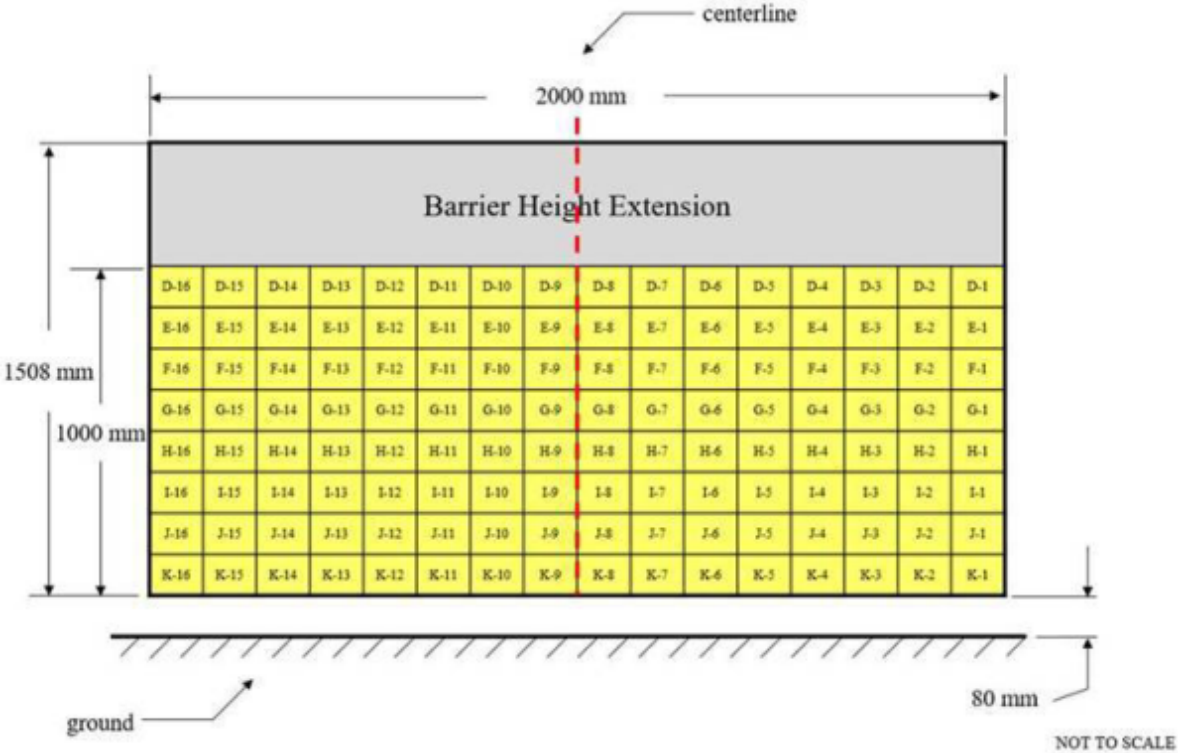


Figure 1 - Load Cell Locations on a 128-Load Cell Barrier with Plywood Height Extension\*  
 Please note above diagram is not actual representation of load cell barrier used.

**DATA SHEET NO. 10**  
**TEST VEHICLE SUMMARY OF RESULTS**

Test Vehicle: 2024 Chevrolet Silverado 2500 4 Door Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20240100  
 Test Date: 11/13/2024

**INSTRUMENTATION**

Instrumentation	Number of Channels Collected
Driver Dummy Accelerometers	47
Passenger Dummy Accelerometers	47
Vehicle Structure Accelerometers	8
Load Cell Barrier	0
Total	102

**CAMERA COVERAGE**

Type of Camera	Number Used in this Test
High-Speed Vehicle Onboard	2
High-Speed Offboard	14
Real-Time Panning	1
Total	17

**DATA SHEET NO. 11  
POST-TEST OBSERVATIONS**

Test Vehicle: 2024 Chevrolet Silverado 2500 4 Door Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20240100  
 Test Date: 11/13/2024

**TEST DUMMY INFORMATION AND CONTACT LOCATIONS**

Description	Driver	Passenger
Dummy Type / Serial No.	H3 50th male/065	H3 5th Female/137
Head Contact	Frontal Airbag & Headrest	Frontal Airbag & Headrest
Upper Torso Contact	Frontal Airbag	Frontal Airbag
Lower Torso Contact	None	None
Left Knee Contact	None	Glove Box
Right Knee Contact	Knee Bolster	None

**DOOR OPENING AND SEAT TRACK INFORMATION**

Description	Driver	Passenger	Other
Locked / Unlocked Doors	Unlocked	Unlocked	
Front Door Opening	Closed & Operational	Closed & Operational	
Rear Door Opening	Closed & Operational	Closed & Operational	
Trunk/Hatch/Tailgate Opening			Closed & Operational
Seat Track Shift (mm)	0	0	
Seat Back Movement from Initial Position	None	None	

**POST-TEST STRUCTURAL OBSERVATIONS**

Critical Areas of Performance	Observations and Conclusions
Windshield Damage	None
Window Damage	None
Other	None

**VEHICLE REBOUND FROM BARRIER**

Measured Parameter	Units	Value
Left Side	mm	273
Center	mm	306
Right Side	mm	282
Average	mm	287

**DATA SHEET NO. 11 ... (CONTINUED)  
POST-TEST OBSERVATIONS**

Test Vehicle: 2024 Chevrolet Silverado 2500 4 Door Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20240100  
 Test Date: 11/13/2024

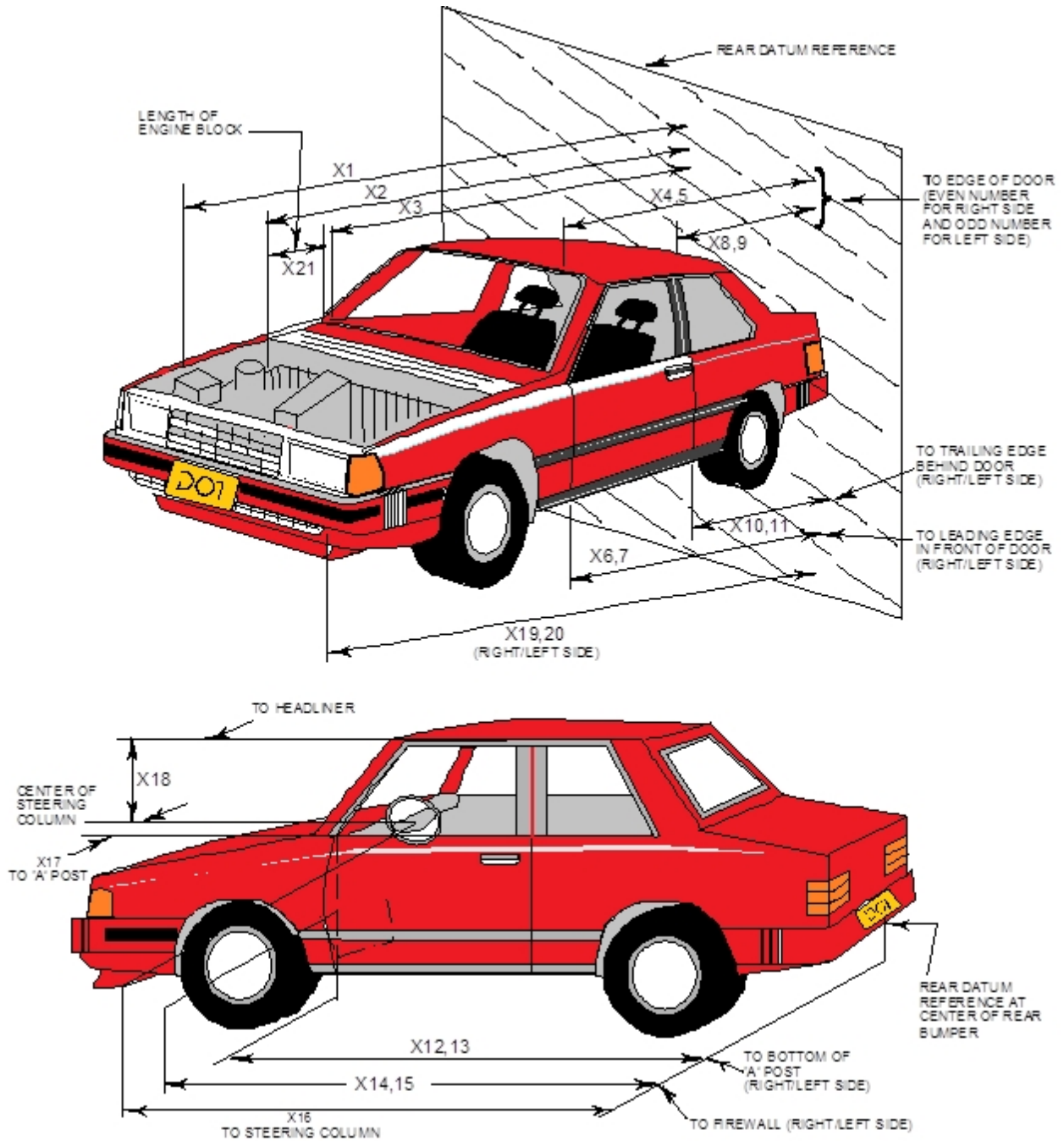
**SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION**

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

**DATA SHEET NO. 12**  
**VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2024 Chevrolet Silverado 2500 4 Door Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20240100  
 Test Date: 11/13/2024



**DATA SHEET NO. 12 ... (CONTINUED)  
VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2024 Chevrolet Silverado 2500 4 Door Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20240100  
 Test Date: 11/13/2024

No.	Measurement Description	Pre-Test	Post-Test	Change
1	Total Length of Vehicle at Centerline	6763	6079	-684
2	Rear Surface of Vehicle (RSOV) to Front of Engine	5740	5639	-101
3	RSOV to Firewall	5527	5514	-13
4	RSOV to Upper Leading Edge of Right Door	5140	5129	-11
5	RSOV to Upper Leading Edge of Left Door	5135	5122	-13
6	RSOV to Lower Leading Edge of Right Door	5034	5036	2
7	RSOV to Lower Leading Edge of Left Door	5031	5034	3
8	RSOV to Upper Trailing Edge of Right Door	3949	3936	-13
9	RSOV to Upper Trailing Edge of Left Door	3947	3931	-16
10	RSOV to Lower Trailing Edge of Right Door	3921	3924	3
11	RSOV to Lower Trailing Edge of Left Door	3919	3920	1
12	RSOV to Bottom of "A" Post of Right Side	5117	5102	-15
13	RSOV to Bottom of "A" Post of Left Side	5117	5098	-19
14	RSOV to Firewall, Right Side	5487	5459	-28
15	RSOV to Firewall, Left Side	5523	5494	-29
16	RSOV to Steering Column	4597	4666	69
17	Center of Steering Column to "A" Post	288	288	0
18	Center of Steering Column to Headliner	462	482	20
19	RSOV to Right Side of Front Bumper	6718	6116	-602
20	RSOV to Left Side of Front Bumper	6719	6100	-619
21	Length of Engine Block	408	408	0
RD	RSOV to Right Side of Dash Panel	4870	4858	-12
CD	RSOV to Center of Dash Panel	4716	4704	-12
LD	RSOV to Left Side of Dash Panel	4869	4853	-16

All Dimensions in mm

**DATA SHEET NO. 13**  
**ACCIDENT INVESTIGATION DIVISION DATA**

Test Vehicle: 2024 Chevrolet Silverado 2500 4 Door Truck  
Test Program: NCAP Frontal Barrier Impact Test

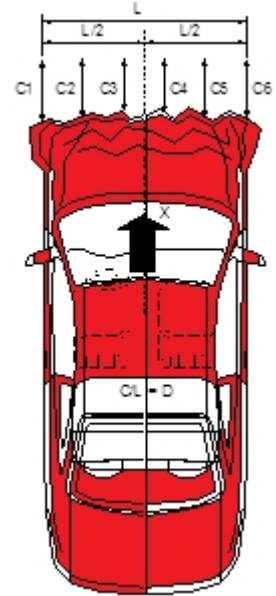
NHTSA No.: M20240100  
Test Date: 11/13/2024

**VEHICLE INFORMATION**

VIN: 1GC1YLE77RF391937 Wheelbase (mm): 4374  
Vehicle Size Category: Truck Test Weight (kg): 3514

**ACCELEROMETER DATA**

Accelerometer Locations: Please See Data Sheet No. 7  
Cal. Procedure / Interval: Calspan Procedure / 6 month  
Integration Algorithm: Trapezoidal  
Linearity: > 99%  
Impact Velocity (km/h): 56.47  
Velocity Change (km/h): 62.29  
Time of Separation (ms): 118



**CRUSH PROFILE**

Collision Deformation Classification: 12FDEW3  
Midpoint of Damage: C3  
Damage Region Length (mm): 1724  
Impact Mode: Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Crush
C1	Crush Zone 1 at Left Side	mm	6563	6116	447
C2	Crush Zone 2 at Left Side	mm	6716	6099	617
C3	Crush Zone 3 at Left Side	mm	6755	6094	661
C4	Crush Zone 4 at Right Side	mm	6755	6095	660
C5	Crush Zone 5 at Right Side	mm	6716	6115	601
C6	Crush Zone 6 at Right Side	mm	6562	6140	422
L	C1 to C6	mm	1731	1724	7

**DATA SHEET NO. 14**  
**VEHICLE INTRUSION MEASUREMENTS**

Test Vehicle: 2024 Chevrolet Silverado 2500 4 Door Truck  
 Test Program: NCAP Frontal Barrier Impact Test

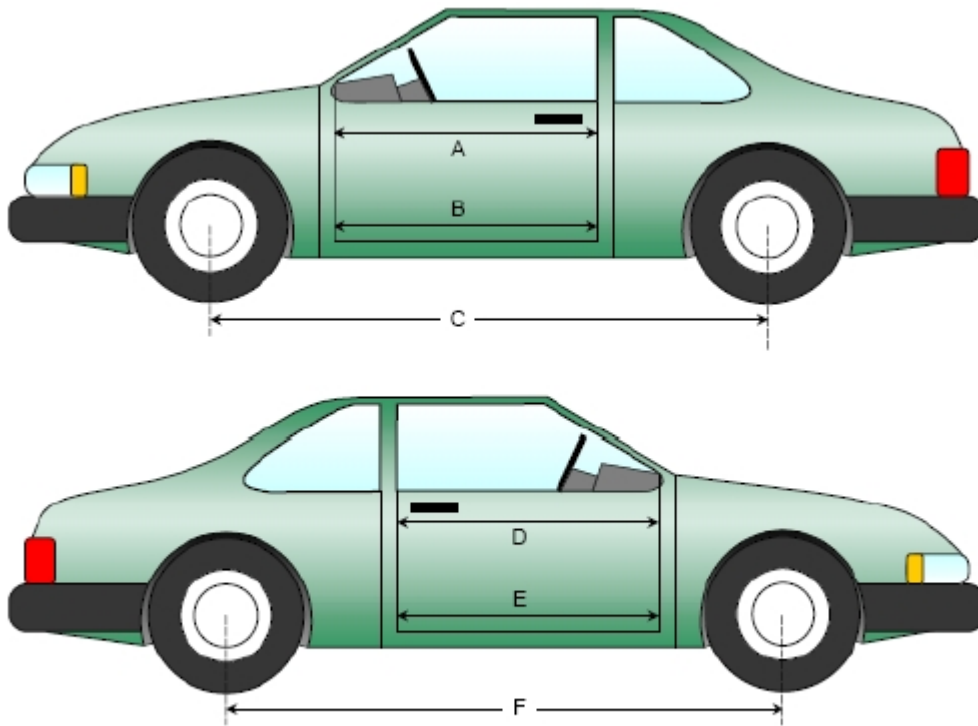
NHTSA No.: M20240100  
 Test Date: 11/13/2024

**DOOR OPENING WIDTH**

Item	Description	Units	Pre-Test	Post-Test	Change
A	Left Side Upper	mm	1070	1071	1
B	Left Side Lower	mm	970	970	0
D	Right Side Upper	mm	1068	1069	1
E	Right Side Lower	mm	968	968	0

**WHEELBASE MEASUREMENTS**

Item	Description	Units	Pre-Test	Post-Test	Change
C	Left Side Wheelbase	mm	4374	4236	-138
F	Right Side Wheelbase	mm	4374	4255	-119



**Left & Right Side Views**

**DATA SHEET NO.14 ... (CONTINUED)  
VEHICLE INTRUSION MEASUREMENTS**

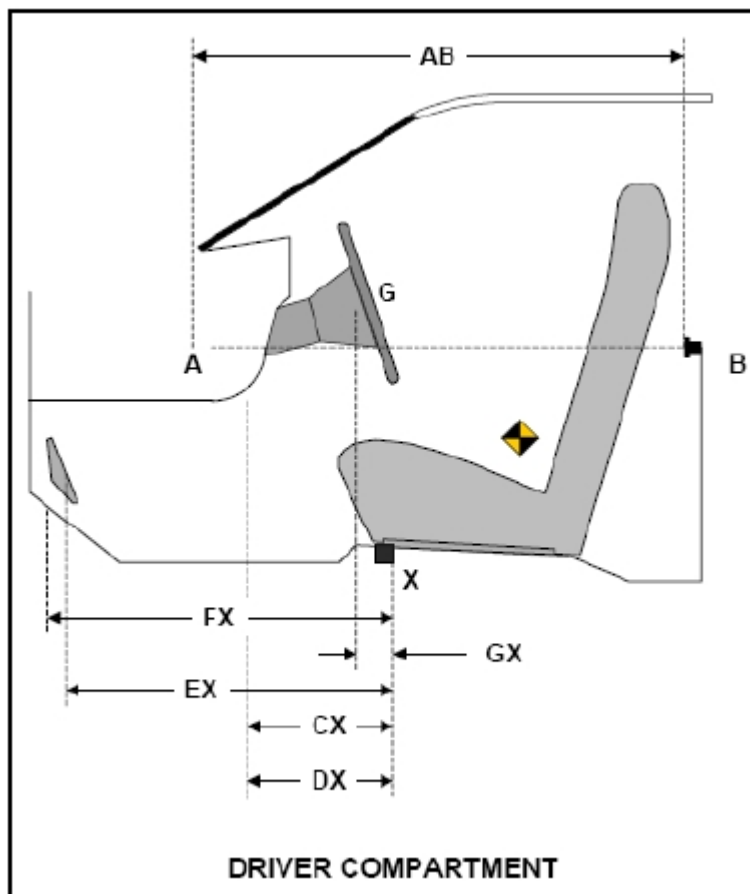
Test Vehicle: 2024 Chevrolet Silverado 2500 4 Door Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20240100  
 Test Date: 11/13/2024

**DRIVER COMPARTMENT INTRUSION**

Item	Description	Units	Pre-Test	Post-Test	Change
AB	Door Opening (Inside Window Jam)	mm	788	778	-10
CX	Left Knee Bolster to X	mm	361	356	-5
DX	Right Knee Bolster to X	mm	358	353	-5
EX	Brake Pedal to X	mm	553	538	-15
FX	Foot Rest to X	mm	604	602	-2
GX	Center of Steering Column Wheel Hub to X	mm	119	193	74

*X = Front of Seat Track (Stationary)*





**DATA SHEET NO. 15 ... (CONTINUED)**  
**SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA**

Test Vehicle: 2024 Chevrolet Silverado 2500 4 Door Truck  
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20240100  
Test Date: 11/13/2024

**FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA**

Temperature at Time of Impact: 21°C

Test Time: 9:43AM

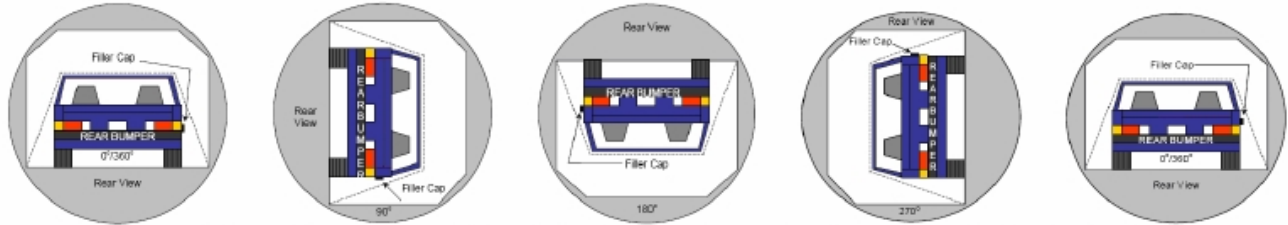
**STODDARD SOLVENT SPILLAGE MEASUREMENTS**

- 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: No Spillage Occured

**DATA SHEET NO. 16  
FMVSS 301 STATIC ROLLOVER RESULTS**

Test Vehicle: 2024 Chevrolet Silverado 2500 4 Door Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20240100  
 Test Date: 11/13/2024



0° TO 90°                      90° TO 180°                      180° TO 270°                      270° TO 360°

1. The specified fixture rollover rate for each 90° of rotation is 60 to 180 seconds.
2. The position hold time at each position is 300 seconds (minimum).
3. Details of Stoddard Solvent Spillage: No Spillage Occured

**SOLVENT COLLECTION TIME TABLE IN SECONDS**

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

**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**

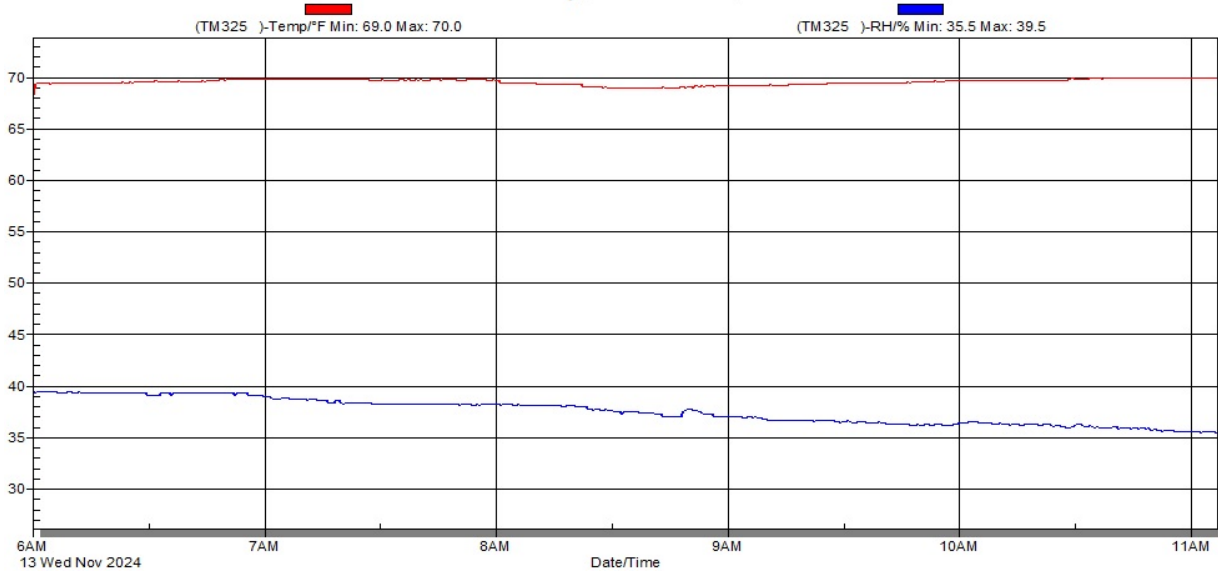
Test Phase	Spillage Location
0° to 90°	None
90° to 180°	None
180° to 270°	None
270° to 360°	None

**DATA SHEET NO. 17**  
**DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART**

Test Vehicle: 2024 Chevrolet Silverado 2500 4 Door Truck  
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20240100  
Test Date: 11/13/2024

Wednesday, November 13, 2024



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

**APPENDIX A**  
**PHOTOGRAPHS**

## TABLE OF PHOTOGRAPHS

<b>Fig.</b>	<b>Description</b>	<b>Page</b>
1	Load Cell Location	A-5
2	Pre-Test Load Cell Wall	A-5
3	Post-Test Load Cell Wall	A-6
4	Manufacturer's Label	A-6
5	Tire Placard	A-7
6	2024 Chevrolet Silverado 2500 Frontal As Delivered	A-7
7	Left Rear 3-4 View, as Received	A-8
8	Pre-Test Front View of Test Vehicle	A-8
9	Post-Test Front View of Test Vehicle	A-9
10	Pre-Test Left View of Test Vehicle	A-9
11	Post-Test Left View of Test Vehicle	A-10
12	Pre-Test Right View of Test Vehicle	A-10
13	Post-Test Right View of Test Vehicle	A-11
14	Pre-Test Right Front 3-4 View	A-11
15	Post-Test Right Front 3-4 View	A-12
16	Pre-Test Left Rear 3-4 View	A-12
17	Post-Test Left Rear 3-4 View	A-13
18	Pre-Test Windshield View	A-13
19	Post-Test Windshield View	A-14
20	Pre-Test Engine Compartment View	A-14
21	Post-Test Engine Compartment View	A-15
22	Pre-Test Fuel Filler Cap View	A-15
23	Post-Test Fuel Filler Cap View	A-16
24	Pre-Test Front Underbody View <sup>1</sup>	A-16
25	Post-Test Front Underbody View <sup>1</sup>	A-17
26	Pre-Test Rear Underbody View <sup>1</sup>	A-17
27	Post-Test Rear Underbody View <sup>1</sup>	A-18
28	Pre-Test Dummy Cable Routing	A-18
29	Post-Test Dummy Cable Routing	A-19
30	Pre-Test Driver Dummy Front View	A-19
31	Post-Test Driver Dummy Front View	A-20
32	Pre-Test Driver Dummy Window View	A-20
33	Post-Test Driver Dummy Window View	A-21
34	Pre-Test Driver Dummy and Vehicle Interior View	A-21
35	Post-Test Driver Dummy and Vehicle Interior View	A-22

<b>Fig.</b>	<b>Description</b>	<b>Page</b>
36	Pre-Test Driver's Seat Fore-Aft Markings	A-22
37	Post-Test Driver's Seat Fore-Aft Markings	A-23
38	Pre-Test View of Belt Anchorage for Driver Dummy	A-23
39	Post-Test View of Belt Anchorage for Driver Dummy	A-24
40	Pre-Test View of Belt Buckle and Latch Plate for Driver Dummy	A-24
41	Post-Test View of Belt Buckle and Latch Plate for Driver Dummy	A-25
42	Pre-Test Driver Dummy Feet	A-25
43	Post-Test Driver Dummy Feet	A-26
44	Pre-Test Driver's Side Knee Bolster	A-26
45	Post-Test Driver's Side Knee Bolster	A-27
46	Pre-Test Driver's Side Floorpan	A-27
47	Post-Test Driver's Side Floorpan	A-28
48	Post-Test Driver Dummy Face	A-28
49	Post-Test Driver Dummy Contact With Airbag	A-29
50	Post-Test Driver Dummy Contact With Headrest	A-29
51	Pre-Test View of the Steering Wheel	A-30
52	Post-Test View of the Steering Wheel	A-30
53	Pre-Test Passenger Dummy Front View	A-31
54	Post-Test Passenger Dummy Front View	A-31
55	Pre-Test Passenger Dummy Window View	A-32
56	Post-Test Passenger Dummy Window View	A-32
57	Pre-Test Passenger Dummy and Vehicle Interior View	A-33
58	Post-Test Passenger Dummy and Vehicle Interior View	A-33
59	Pre-Test Passenger's Seat Fore-Aft Markings	A-34
60	Post-Test Passenger's Seat Fore-Aft Markings	A-34
61	Pre-Test View of Belt Anchorage for Passenger Dummy	A-35
62	Post-Test View of Belt Anchorage for Passenger Dummy	A-35
63	Pre-Test View of Belt Buckle and Latch Plate for Passenger Dummy	A-36
64	Post-Test View of Belt Buckle and Latch Plate for Passenger Dummy	A-36
65	Pre-Test Passenger Dummy Feet	A-37
66	Post-Test Passenger Dummy Feet	A-37
67	Pre-Test Passenger's Side Knee Bolster	A-38
68	Post-Test Passenger's Side Knee Bolster	A-38
69	Pre-Test Passenger's Side Floorpan	A-39
70	Post-Test Passenger's Side Floorpan	A-39
71	Post-Test Passenger Dummy Face	A-40

<b>Fig.</b>	<b>Description</b>	<b>Page</b>
72	Post-Test Passenger Dummy Contact With Airbag	A-40
73	Post-Test Passenger Dummy Contact With Headrest	A-41
74	Photograph of Ballast Installed in Vehicle	A-41
75	Post-Test Stoddard Solvent Spillage Location View, if Required	A-42
76	Post-Test Speed Trap Read-Out	A-42
77	Vehicle at 0° on Static Rollover Device	A-43
78	Vehicle at 90° on Static Rollover Device	A-43
79	Vehicle at 180° on Static Rollover Device	A-44
80	Vehicle at 270° on Static Rollover Device	A-44
81	Vehicle at 360° on Static Rollover Device	A-45
82	2024 Chevrolet Silverado 2500 Frontal Impact Event	A-45
83	Monroney Label Photograph	A-46

**<sup>1</sup>NOTE:** *The underbody views should include the following vehicle components: fuel pump, fuel lines, sender unit, fuel tank filler pipe and any other visible system components.*

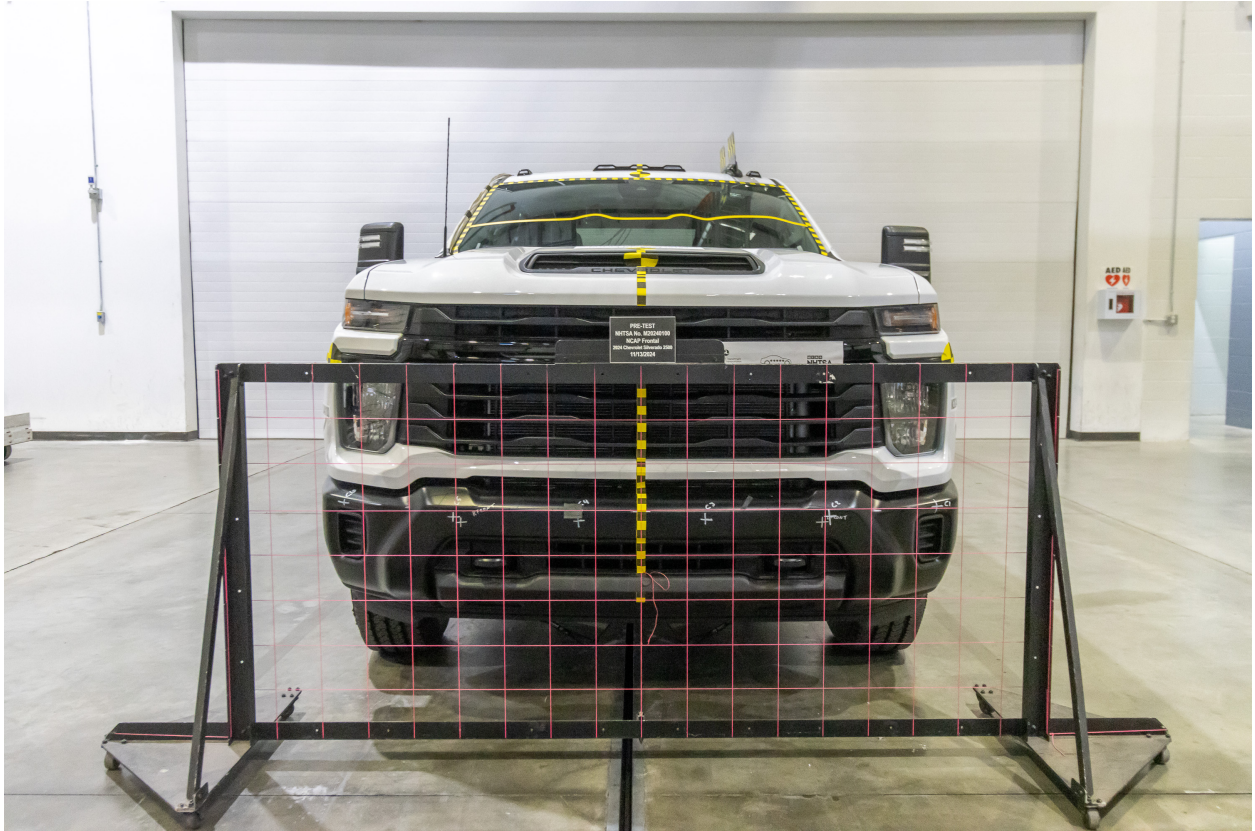


Figure A-1: Load Cell Location



Figure A-2: Pre-Test Load Cell Wall



Figure A-3: Post-Test Load Cell Wall



Figure A-4: Manufacturer's Label

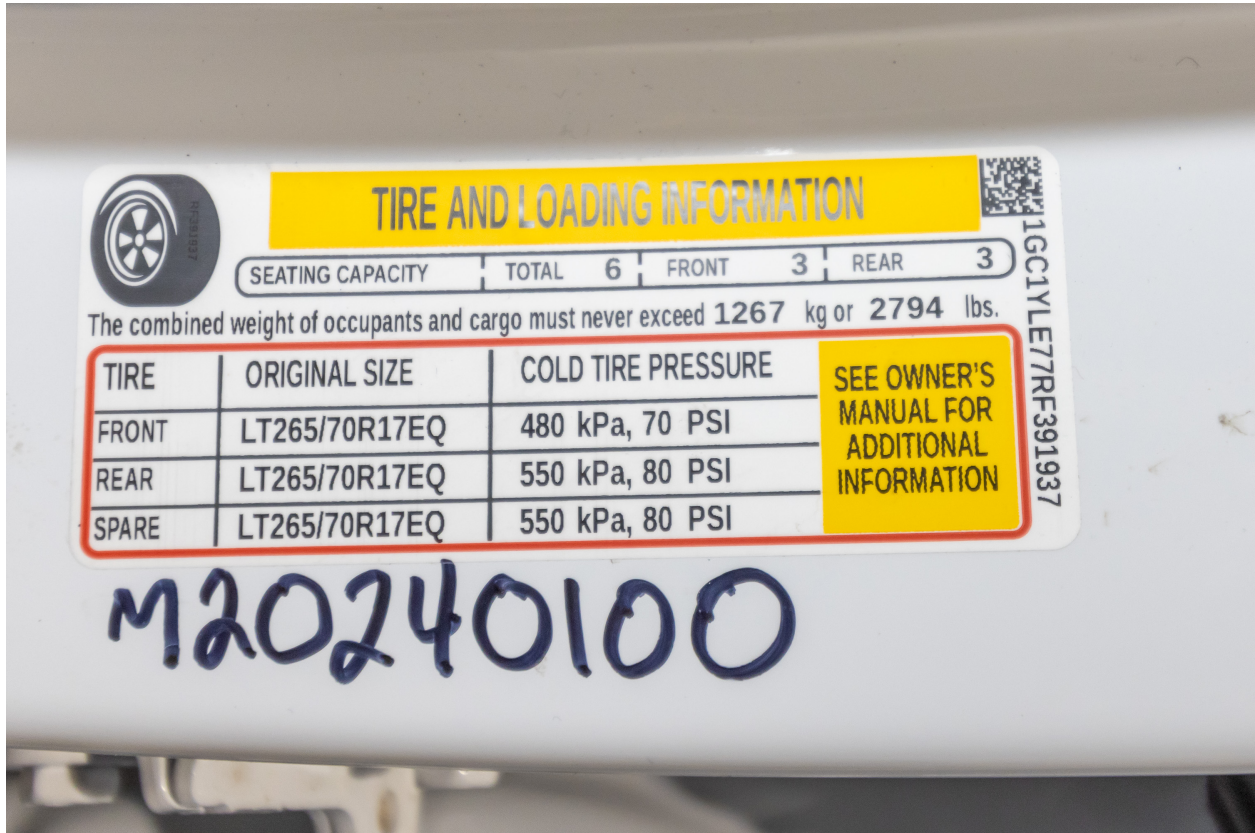


Figure A-5: Tire Placard



Figure A-6: 2024 Chevrolet Silverado 2500 Frontal As Delivered



**Figure A-7: Left Rear 3-4 View, As Received**



**Figure A-8: Pre-Test Front View of Test Vehicle**



**Figure A-9: Post-Test Front View of Test Vehicle**



**Figure A-10: Pre-Test Left View of Test Vehicle**



**Figure A-11: Post-Test Left View of Test Vehicle**



**Figure A-12: Pre-Test Right View of Test Vehicle**



**Figure A-13: Post-Test Right View of Test Vehicle**



**Figure A-14: Pre-Test Right Front 3-4 View**



**Figure A-15: Post-Test Right Front 3-4 View**



**Figure A-16: Pre-Test Left Rear 3-4 View**



**Figure A-17: Post-Test Left Rear 3-4 View**



**Figure A-18: Pre-Test Windshield View**



**Figure A-19: Post-Test Windshield View**



**Figure A-20: Pre-Test Engine Compartment View**



**Figure A-21: Post-Test Engine Compartment View**



**Figure A-22: Pre-Test Fuel Filler Cap View**



Figure A-23: Post-Test Fuel Filler Cap View



Figure A-24: Pre-Test Front Underbody View

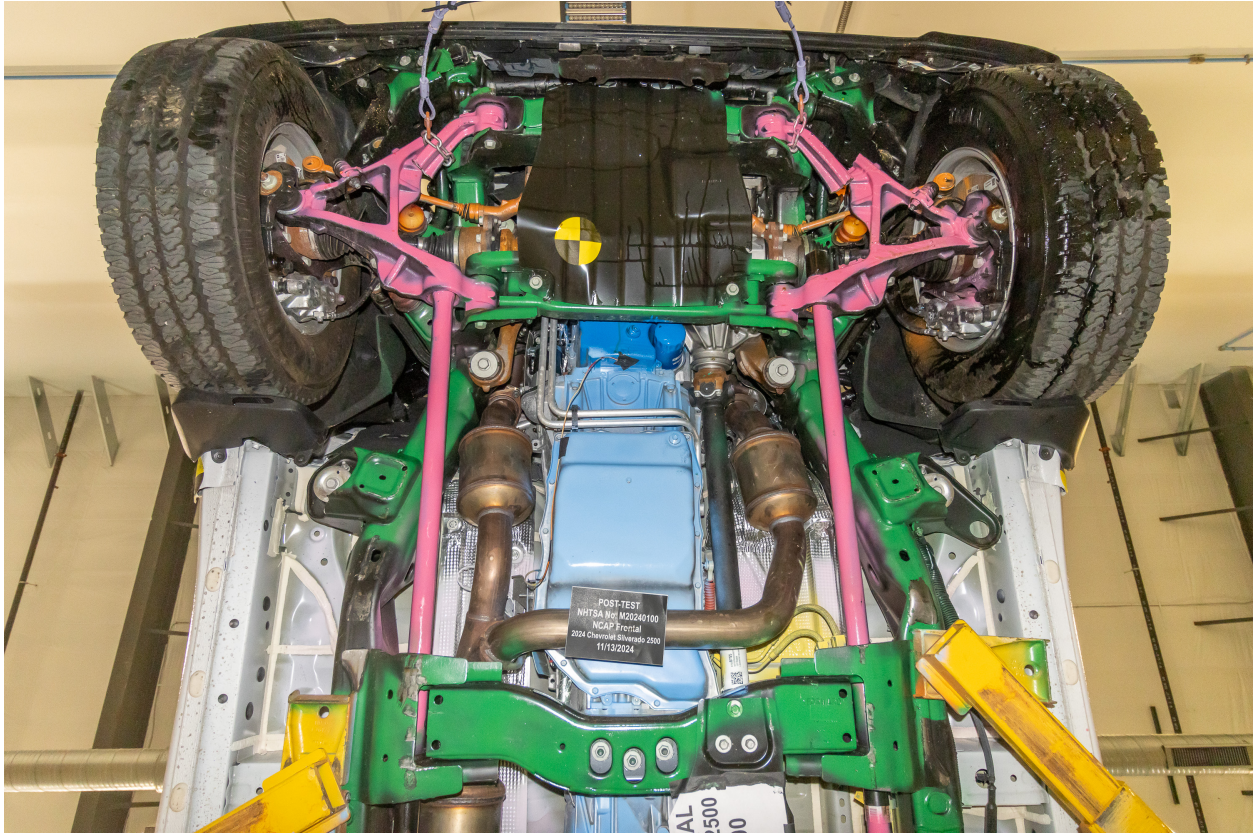
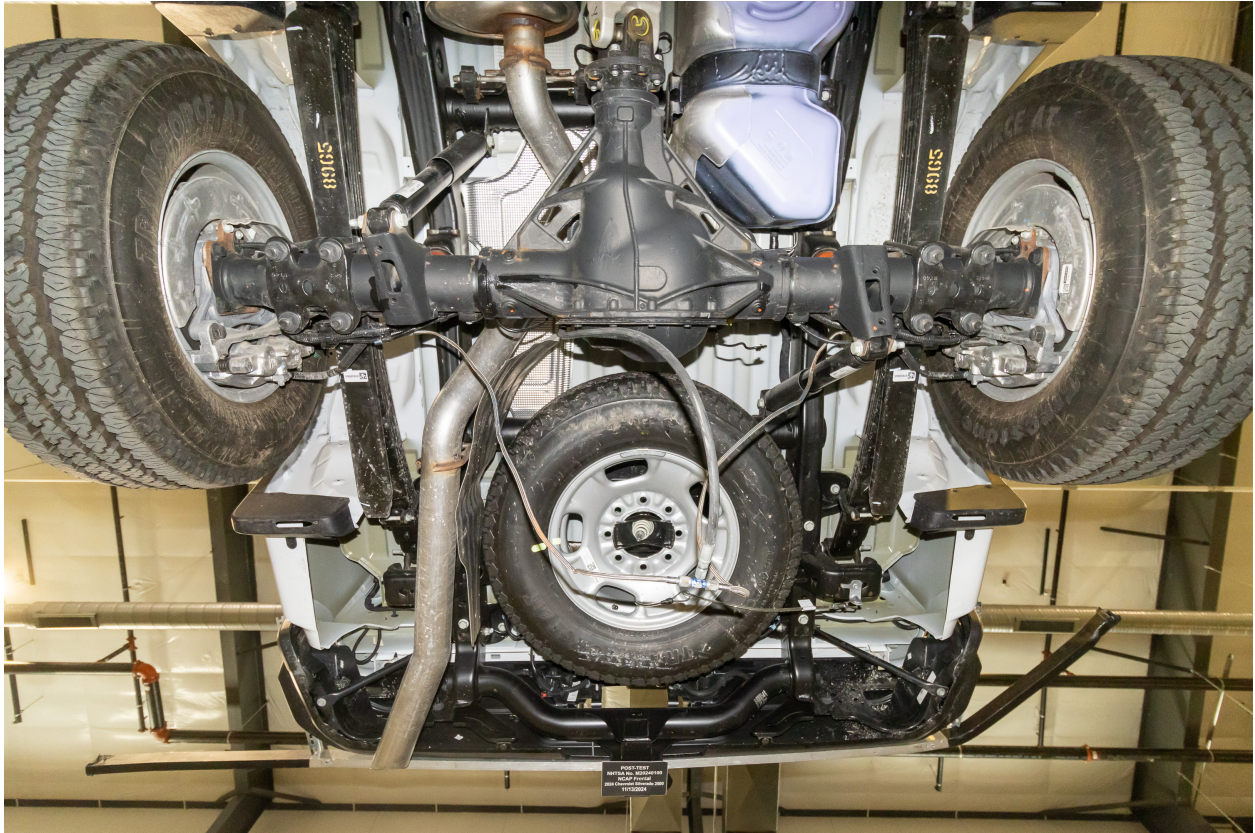


Figure A-25: Post-Test Front Underbody View



Figure A-26: Pre-Test Rear Underbody View



**Figure A-27: Post-Test Rear Underbody View**



**Figure A-28: Pre-Test Dummy Cable Routing**



**Figure A-29: Post-Test Dummy Cable Routing**



**Figure A-30: Pre-Test Driver Dummy Front View**



POST-TEST (Pos 1)  
NHTSA No. M20240100  
NCAP Frontal  
2024 Chevrolet Silverado 2500  
11/13/2024

**Figure A-31: Post-Test Driver Dummy Front View**



M20240  
PRE-TEST (Pos 1)  
NHTSA No. M20240100  
NCAP Frontal  
2024 Chevrolet Silverado 2500  
11/13/2024

**Figure A-32: Pre-Test Driver Dummy Window View**



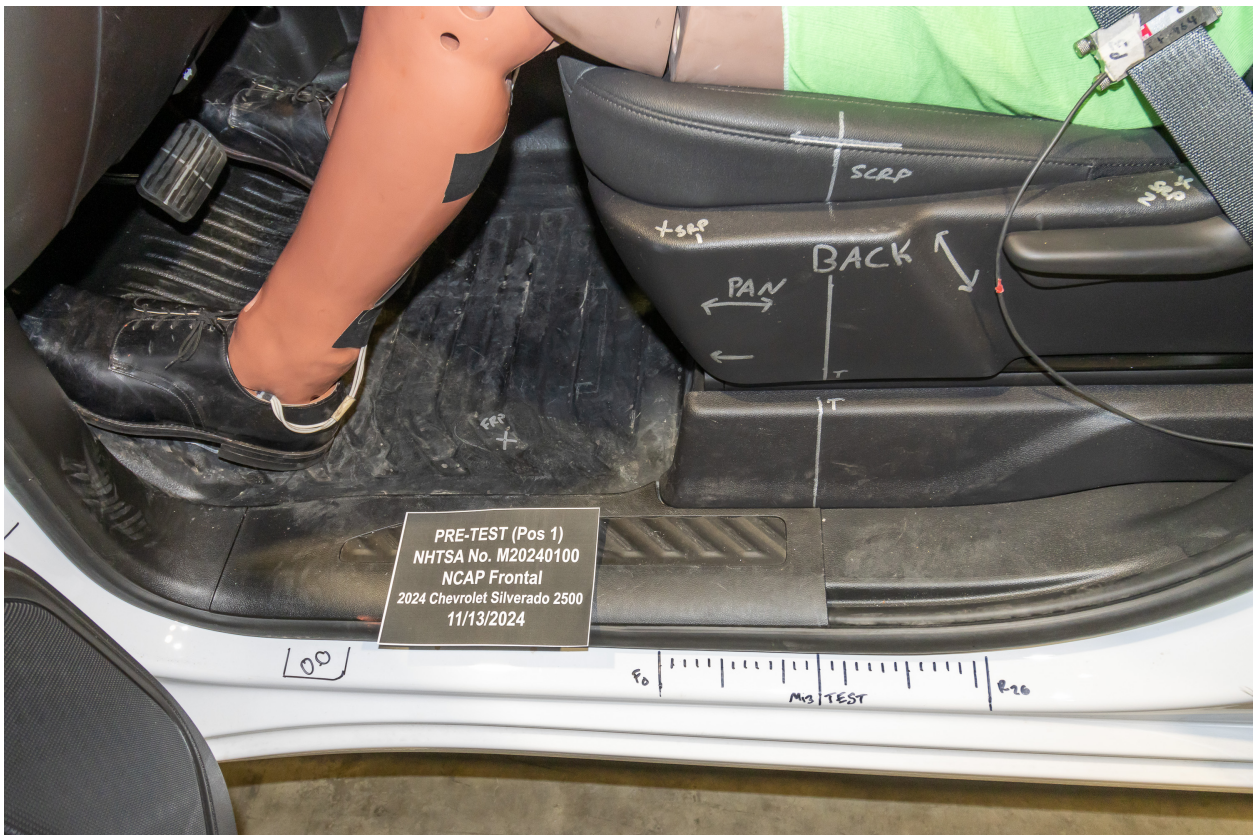
**Figure A-33: Post-Test Driver Dummy Window View**



**Figure A-34: Pre-Test Driver Dummy and Vehicle Interior View**



**Figure A-35: Post-Test Driver Dummy and Vehicle Interior View**



**Figure A-36: Pre-Test Driver's Seat Fore-Aft Markings**



Figure A-37: Post-Test Driver's Seat Fore-Aft Markings

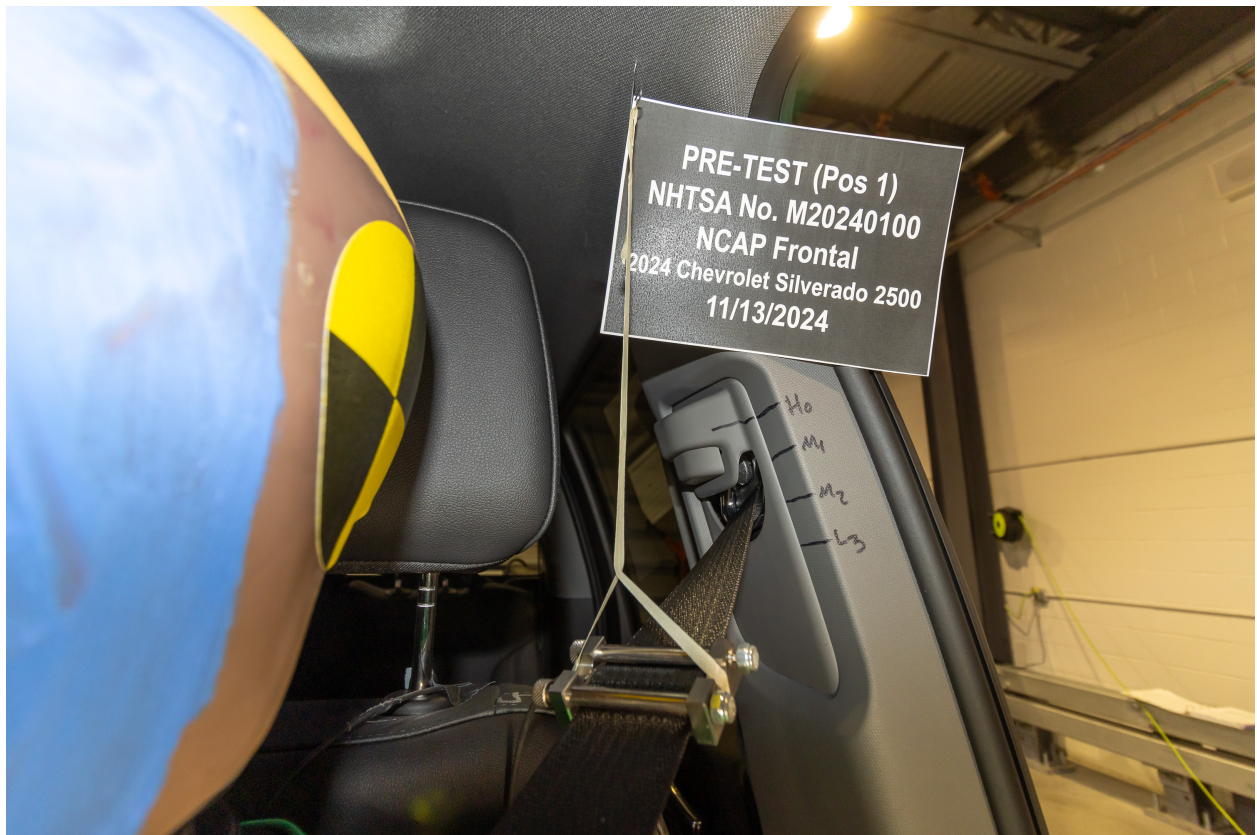
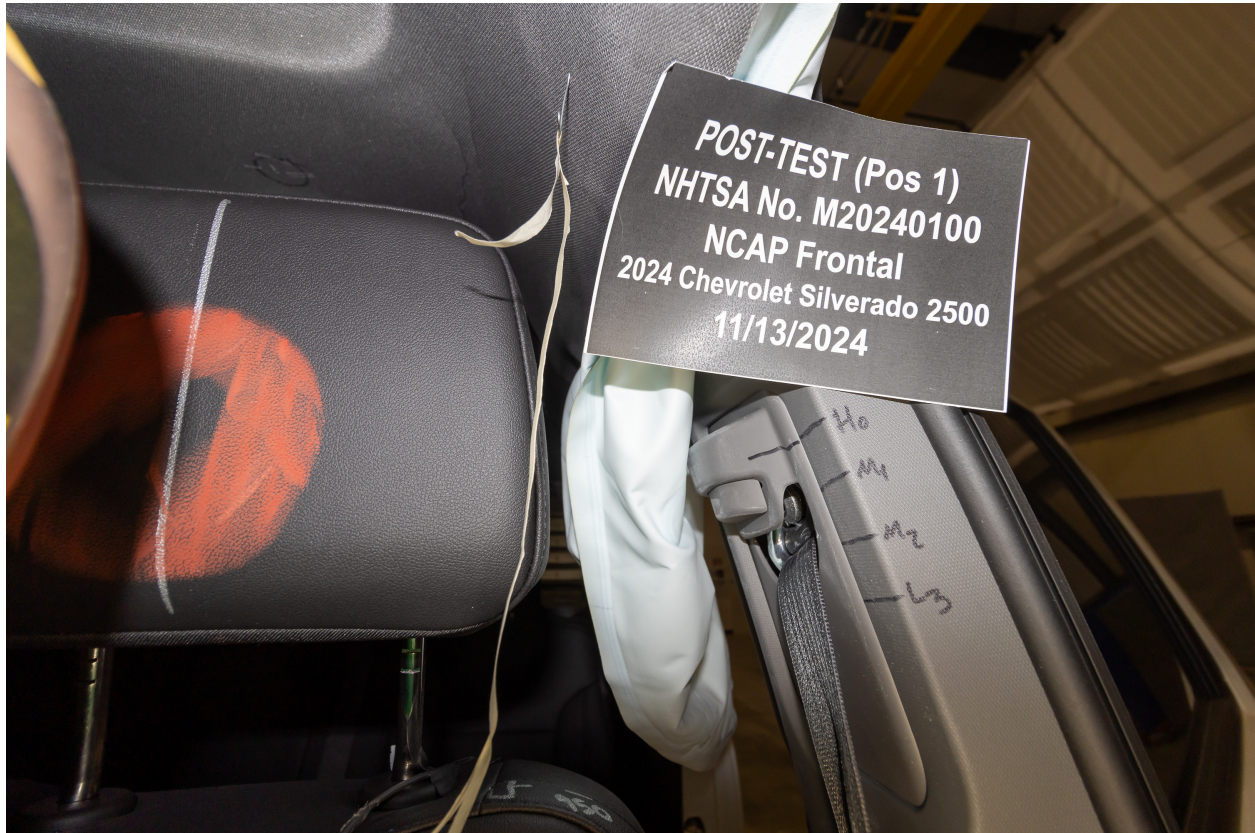


Figure A-38: Pre-Test View of Belt Anchorage for Driver Dummy



**Figure A-39: Post-Test View of Belt Anchorage for Driver Dummy**



**Figure A-40: Pre-Test View of Belt Buckle and Latch Plate for Driver Dummy**



**Figure A-41: Post-Test View of Belt Buckle and Latch Plate for Driver Dummy**



**Figure A-42: Pre-Test Driver Dummy Feet**



Figure A-43: Post-Test Driver Dummy Feet



Figure A-44: Pre-Test Driver's Side Knee Bolster



Figure A-45: Post-Test Driver's Side Knee Bolster



Figure A-46: Pre-Test Driver's Side Floorpan



**Figure A-47: Post-Test Driver's Side Floorpan**



**Figure A-48: Post-Test Driver Dummy Face**



**Figure A-49: Post-Test Driver Dummy Contact With Airbag**



**Figure A-50: Post-Test Driver Dummy Contact With Headrest**



**Figure A-51: Pre-Test View of the Steering Wheel**



**Figure A-52: Post-Test View of the Steering Wheel**



**Figure A-53: Pre-Test Passenger Dummy Front View**



**Figure A-54: Post-Test Passenger Dummy Front View**



**Figure A-55: Pre-Test Passenger Dummy Window View**



**Figure A-56: Post-Test Passenger Dummy Window View**



**Figure A-57: Pre-Test Passenger Dummy and Vehicle Interior View**



**Figure A-58: Post-Test Passenger Dummy and Vehicle Interior View**



**Figure A-59: Pre-Test Passenger's Seat Fore-Aft Markings**



**Figure A-60: Post-Test Passenger's Seat Fore-Aft Markings**



Figure A-61: Pre-Test View of Belt Anchorage for Passenger Dummy



Figure A-62: Post-Test View of Belt Anchorage for Passenger Dummy



**Figure A-63: Pre-Test View of Belt Buckle and Latch Plate for Passenger Dummy**



**Figure A-64: Post-Test View of Belt Buckle and Latch Plate for Passenger Dummy**



**Figure A-65: Pre-Test Passenger Dummy Feet**



**Figure A-66: Post-Test Passenger Dummy Feet**



**Figure A-67: Pre-Test Passenger's Side Knee Bolster**



**Figure A-68: Post-Test Passenger's Side Knee Bolster**



Figure A-69: Pre-Test Passenger's Side Floorpan



Figure A-70: Post-Test Passenger's Side Floorpan



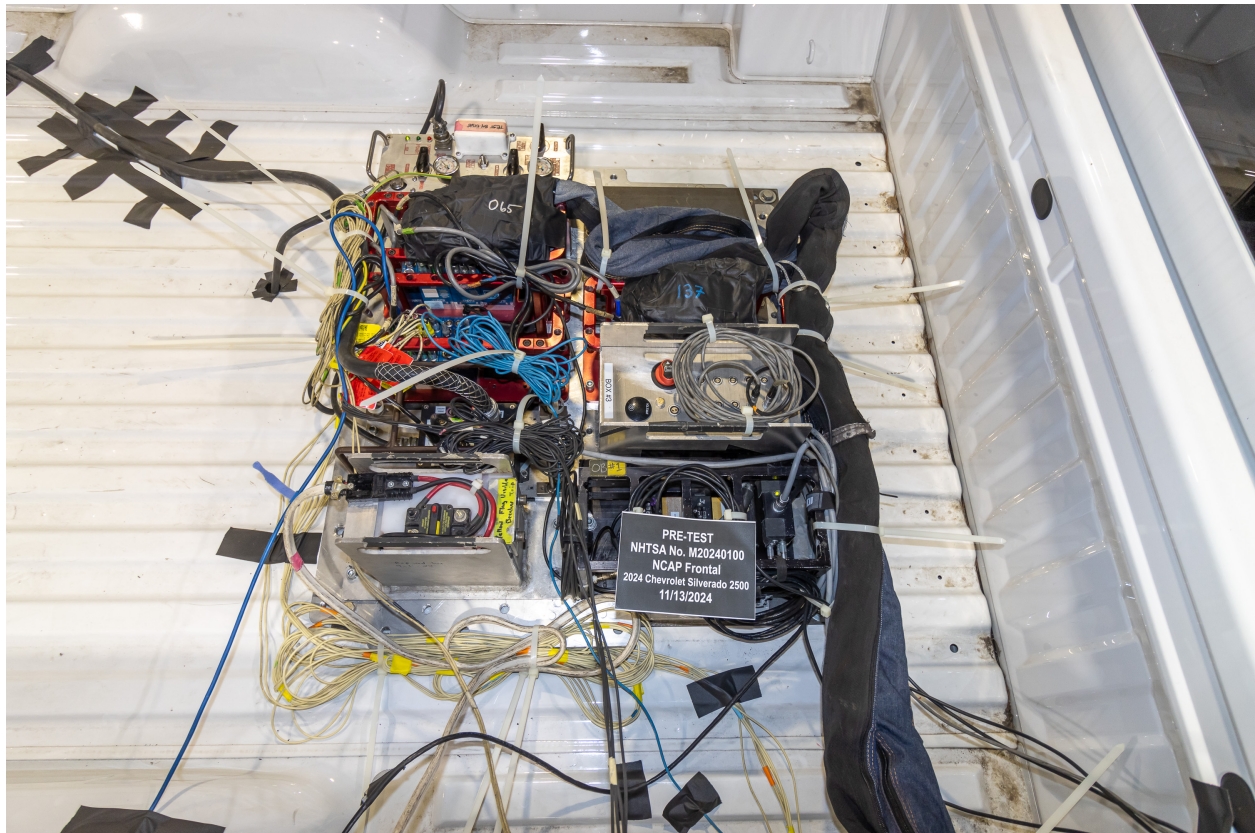
**Figure A-71: Post-Test Passenger Dummy Face**



**Figure A-72: Post-Test Passenger Dummy Contact With Airbag**



**Figure A-73: Post-Test Passenger Dummy Contact With Headrest**



**Figure A-74: Photograph of Ballast Installed in Vehicle**

# Photo Not Applicable

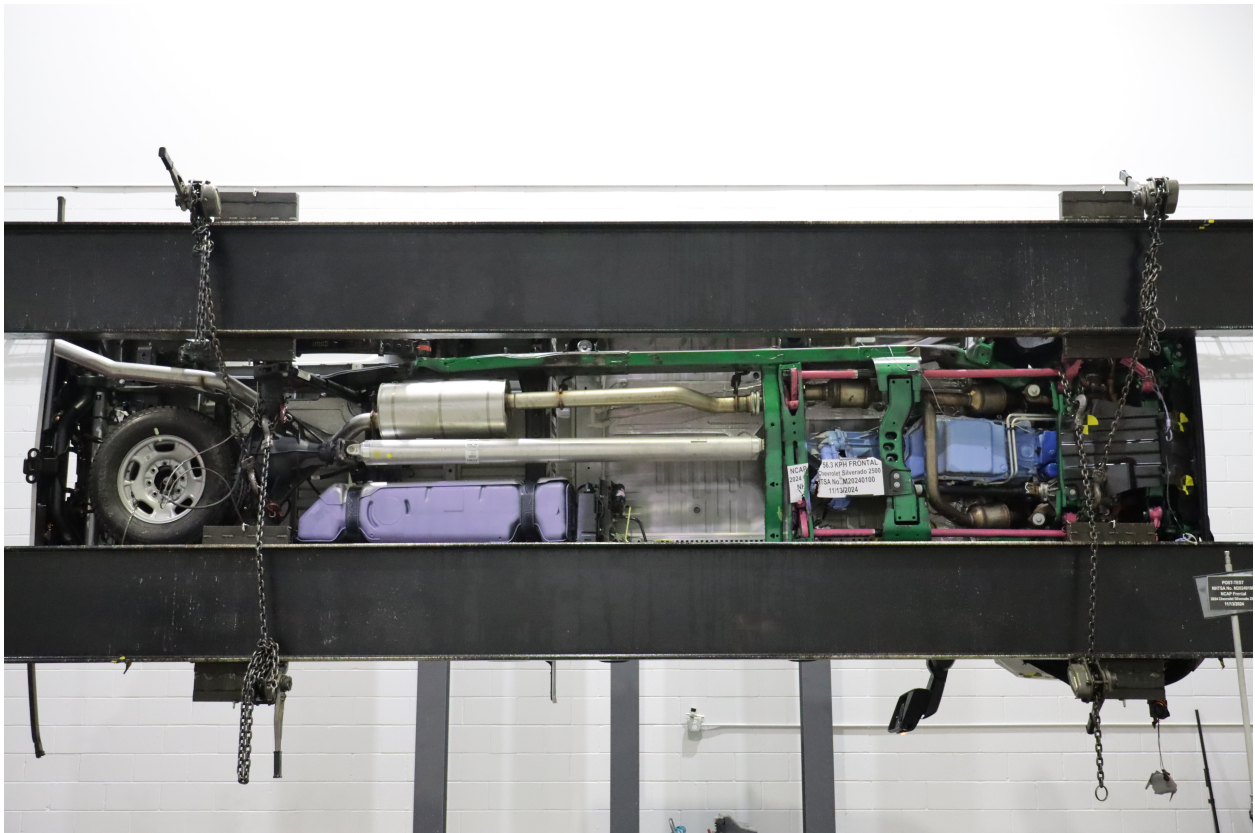
Figure A-75: Post-Test Stoddard Solvent Spillage Location View, If Required



Figure A-76: Post-Test Speed Trap Read-Out



**Figure A-77: Vehicle at 0° on Static Rollover Device**



**Figure A-78: Vehicle at 90° on Static Rollover Device**



**Figure A-79: Vehicle at 180° on Static Rollover Device**



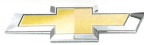
**Figure A-80: Vehicle at 270° on Static Rollover Device**



**Figure A-81: Vehicle at 360° on Static Rollover Device**



**Figure A-82: 2024 Chevrolet Silverado Frontal Impact Event**



CHEVROLET

2024 SILVERADO 2500 CREW CAB WT 4WD

EXTERIOR: SUMMIT WHITE  
INTERIOR: JET BLACK

ENGINE: 6.6L V8 GASOLINE  
TRANS: ALLISON 10-SPEED AUTO

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- 5 YEAR / 60,000 MILE\* POWERTRAIN LIMITED WARRANTY, ROADSIDE ASSISTANCE & COURTESY TRANSPORTATION
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- SEE CHEVROLET.COM OR DEALER FOR TERMS, DETAILS & LIMITS

SAFETY & SECURITY

- AUTOMATIC EMERGENCY BRAKING
- FORWARD COLLISION ALERT
- FRONT PEDESTRIAN BRAKING
- LANE DEPARTURE WARNING
- FOLLOWING DISTANCE INDICATOR
- INTELLIBEAM

- REAR VISION CAMERA
- BUCKLE TO DRIVE
- TEEN DRIVER MODE

PERFORMANCE & MECHANICAL

- ELECTRONIC TRANSFER CASE
- INDEPENDENT FRONT SUSPENSION
- MULTI-LEAF REAR SPRING SUSP
- TRAILERING PACKAGE WITH HITCH GUIDANCE

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- CHEVROLET INFOTAINMENT 3
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- ADDITIONAL FEATURES FOR COMPATIBLE PHONES INCLUDE: BLUETOOTH AUDIO STREAMING VOICE COMMAND PASSTHROUGH TO PHONE, WIRELESS APPLE CARPLAY AND ANDROID AUTO CAPABLE
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- REMOTE KEYLESS ENTRY
- PUSH BUTTON START

INTERIOR

- AIR CONDITIONING
- FRONT 40/20/40 BENCH SEATS
- W/ UNDER SEAT STORAGE
- 60/40 REAR FOLDING BENCH SEAT
- POWER DOOR LOCKS
- POWER WINDOWS

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OPTIONS INSTALLED BY THE MANUFACTURER (MAY REPLACE STANDARD EQUIPMENT SHOWN)  
WT CONVENIENCE PACKAGE: 1,010.00

- EZ LIFT, POWER LOCK & RELEASE TAILGATE
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- REAR-WINDOW DEFOGGER
- CRUISE CONTROL
- TRAILERING MIRRORS, HEATED & POWER-ADJUSTABLE
- SNOW PLOW PREP/CAMPER PACKAGE: 300.00
- 220 AMP ALTERNATOR
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- SKID PLATES
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- TRAILER BRAKE CONTROLLER 275.00
- 120V INTERIOR AND CARGO BED POWER OUTLET
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- UPPITTER SWITCH KIT (5) (CUSTOMER RESPONSIBLE FOR INSTALLATION) 150.00
- BACK UP ALARM 138.00
- LED ROOF MARKER LAMPS 55.00
- LOWERED GVWR:10,000LBS(4536 KG) INC.

REAR AXLE: 3.73 RATIO	INC.
17" PAINTED STEEL WHEELS	INC.
<b>TOTAL OPTIONS</b>	<b>\$2,353.00</b>
<b>TOTAL VEHICLE &amp; OPTIONS</b>	<b>\$53,253.00</b>
DESTINATION CHARGE	1,995.00
<b>TOTAL VEHICLE PRICE*</b>	<b>\$55,248.00</b>

California Air Resources Board

Gasoline Vehicle

Environmental Performance

These ratings are not directly comparable to the U.S. EPA/DOT light-duty vehicle label ratings. For information on how to compare, please see [www.arb.ca.gov/ep\\_label](http://www.arb.ca.gov/ep_label).

Protect the environment. Choose vehicles with **higher ratings**:

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Smog Rating (tailpipe only)



Vehicle emissions are a primary contributor to climate change and smog. Ratings are determined by the California Air Resources Board based on this vehicle's measured emissions.



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This vehicle has not been rated by the government for overall vehicle score, frontal crash, side crash or rollover risk.

Source: National Highway Traffic Safety Administration (NHTSA)  
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FF  
2GA4147949

Figure A-83: Monroney Label Photograph

**APPENDIX B**  
**VEHICLE AND DUMMY RESPONSE DATA TRACES**

## Table of Data Plots

Fig.	Description	Page
Plot 1	Driver Head X Acceleration vs. Time Primary	B-5
Plot 2	Driver Head Y Acceleration vs. Time Primary	B-5
Plot 3	Driver Head Z Acceleration vs. Time Primary	B-5
Plot 4	Driver Head Resultant Acceleration vs. Time Primary	B-5
Plot 5	Driver Chest X Deflection vs. Time	B-6
Plot 6	Driver Chest X Acceleration vs. Time Primary	B-6
Plot 7	Driver Chest Y Acceleration vs. Time Primary	B-6
Plot 8	Driver Chest Z Acceleration vs. Time Primary	B-6
Plot 9	Driver Chest Resultant Acceleration vs. Time Primary	B-7
Plot 10	Driver Upper Neck Force X vs. Time Primary	B-7
Plot 11	Driver Upper Neck Force Z vs. Time Primary	B-7
Plot 12	Driver Upper Neck Moment Y vs. Time Primary	B-7
Plot 13	Driver Nij vs. Time Primary	B-8
Plot 14	Driver Left Femur Force vs. Time	B-8
Plot 15	Driver Right Femur Force vs. Time	B-8
Plot 16	Passenger Head X Acceleration vs. Time Primary	B-8
Plot 17	Passenger Head Y Acceleration vs. Time Primary	B-9
Plot 18	Passenger Head Z Acceleration vs. Time Primary	B-9
Plot 19	Passenger Head Resultant Acceleration vs. Time Primary	B-9
Plot 20	Passenger Chest X Deflection vs. Time	B-9
Plot 21	Passenger Chest X Acceleration vs. Time Primary	B-10
Plot 22	Passenger Chest Y Acceleration vs. Time Primary	B-10
Plot 23	Passenger Chest Z Acceleration vs. Time Primary	B-10
Plot 24	Passenger Chest Resultant Acceleration vs. Time Primary	B-10
Plot 25	Passenger Upper Neck Force X vs. Time Primary	B-11
Plot 26	Passenger Upper Neck Force Z vs. Time Primary	B-11
Plot 27	Passenger Upper Neck Moment Y vs. Time Primary	B-11
Plot 28	Passenger Nij vs. Time Primary	B-11
Plot 29	Passenger Left Femur Force vs. Time	B-12
Plot 30	Passenger Right Femur Force vs. Time	B-12

**The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at [www.NHTSA.gov](http://www.NHTSA.gov)**

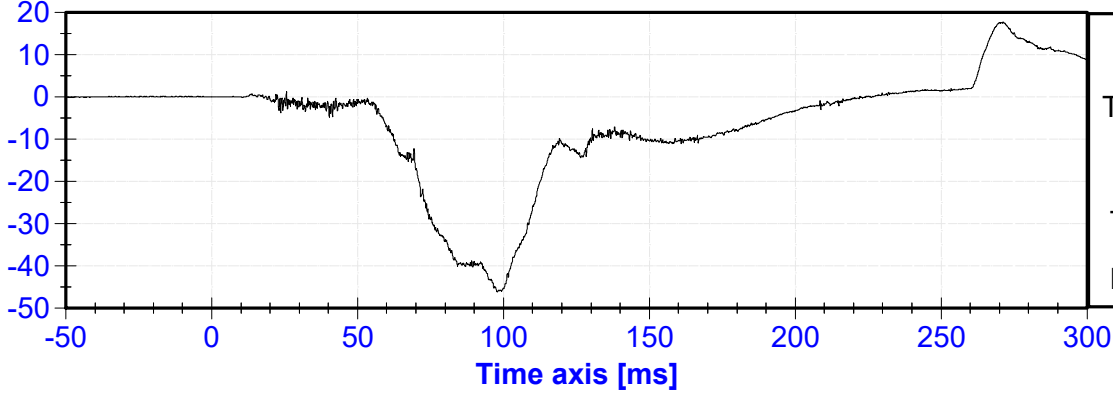
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 Driver Chest Z Acceleration Redundant  
 Driver Pelvis X  
 Driver Pelvis Y  
 Driver Pelvis Z  
 Driver Left Femur Redundant  
 Driver Right Femur Redundant  
 Driver Left Upper Tibia Moment X  
 Driver Left Upper Tibia Moment Y

Driver Left Upper Tibia Force Z  
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Driver Right Lower Tibia Moment X  
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Driver Right Lower Tibia Force Z  
Driver Left Foot Fore Z  
Driver Left Foot Aft X  
Driver Left Foot Aft Z  
Driver Right Foot Fore Z  
Driver Right Foot Aft X  
Driver Right Foot Aft Z  
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Driver Lap Belt Force  
Driver Head Angular Velocity X  
Driver Head Angular Velocity Y  
Driver Head Angular Velocity Z  
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Passenger Head Y Acceleration Redundant  
Passenger Head Z Acceleration Redundant  
Passenger Upper Neck Force X  
Passenger Upper Neck Force Z  
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Passenger Chest X Acceleration Redundant  
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Passenger Right Foot Fore Z  
Passenger Right Foot Aft X  
Passenger Right Foot Aft Z  
Passenger Shoulder Belt Force  
Passenger Lap Belt Force  
Passenger Head Angular Velocity X  
Passenger Head Angular Velocity Y  
Passenger Head Angular Velocity Z  
Left Rear Seat Crossmember X  
Left Rear Seat Crossmember Z  
Right Rear Seat Crossmember X  
Right Rear Seat Crossmember Z  
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Right Rear Seat Crossmember X Redundant  
Vehicle Engine Top X  
Vehicle Engine Bottom X  
Load Cell Barrier Forces and Moments

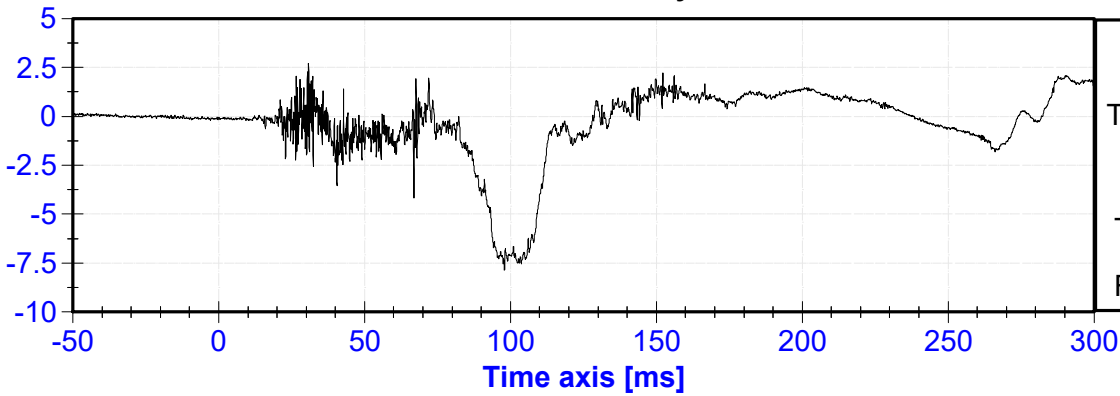
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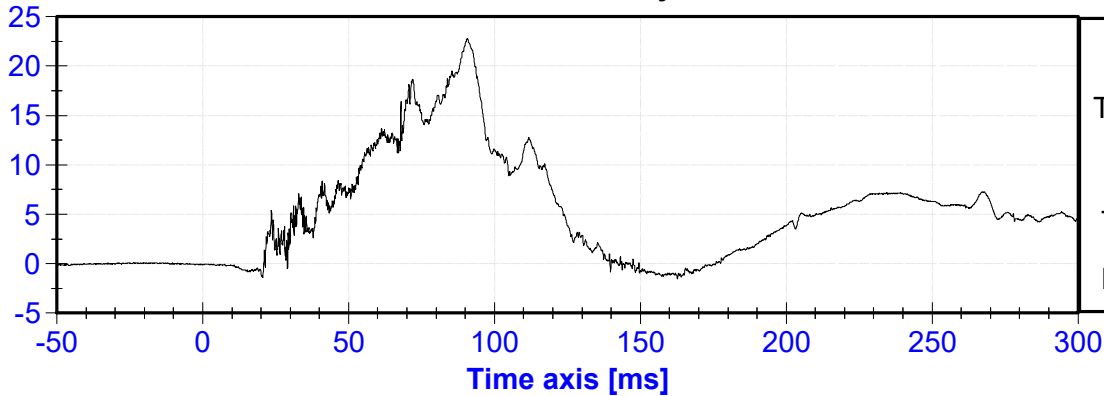
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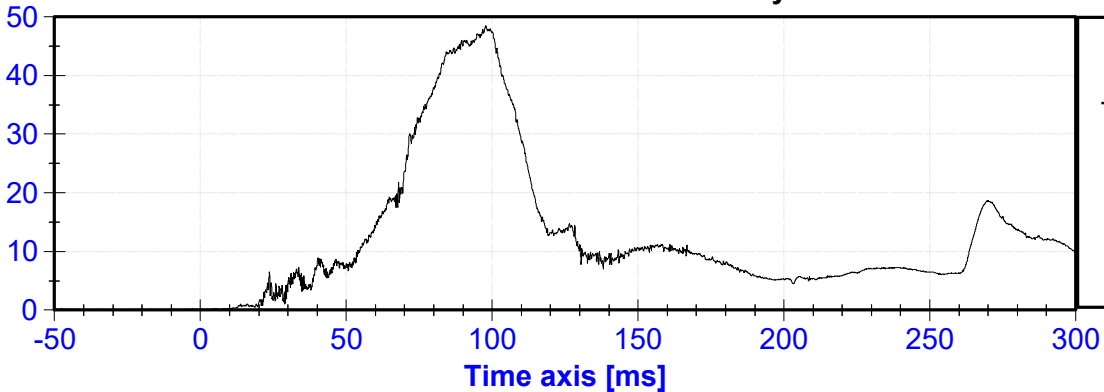
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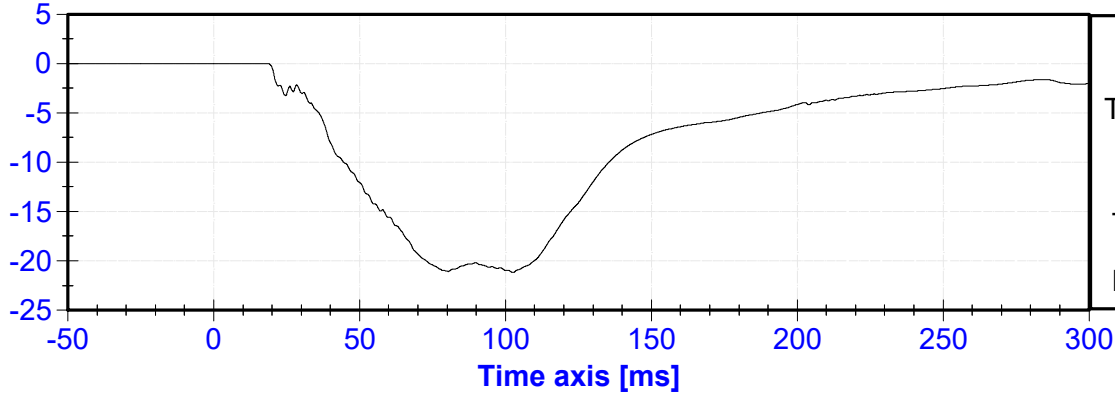
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Driver Head Resultant Acceleration vs. Time Primary



DISPLACEMENT [mm]

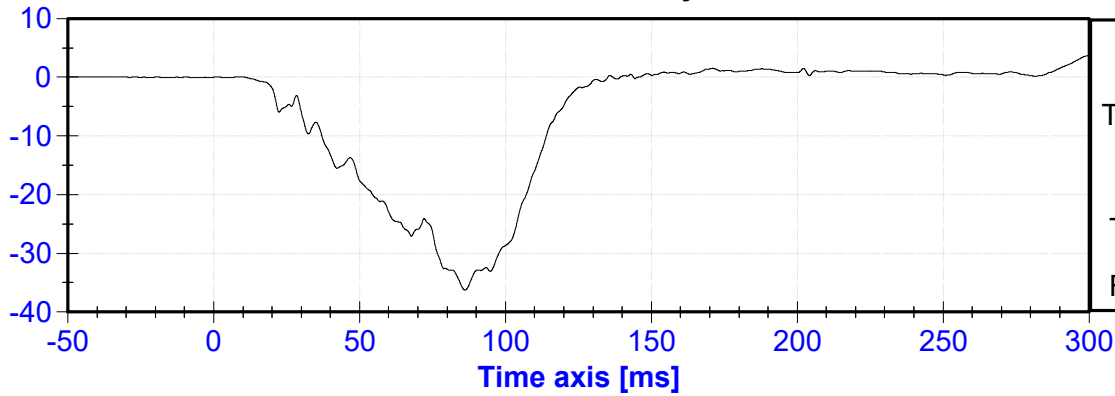
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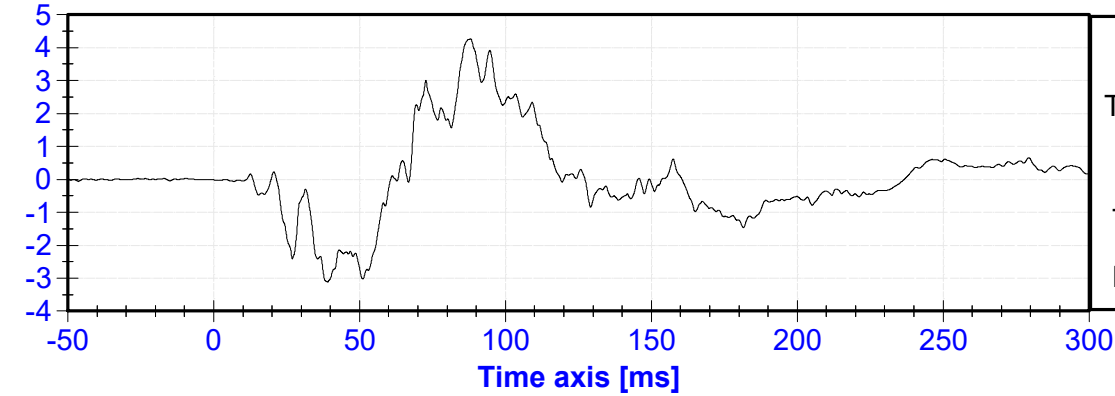
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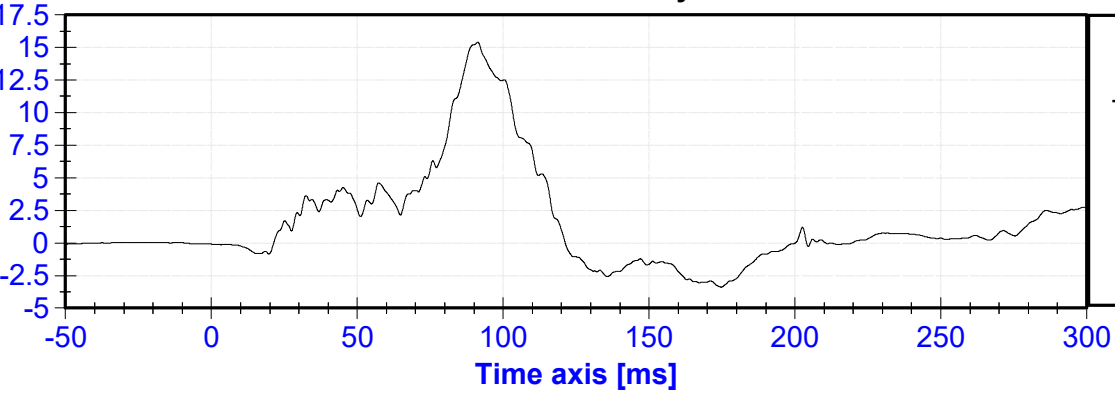
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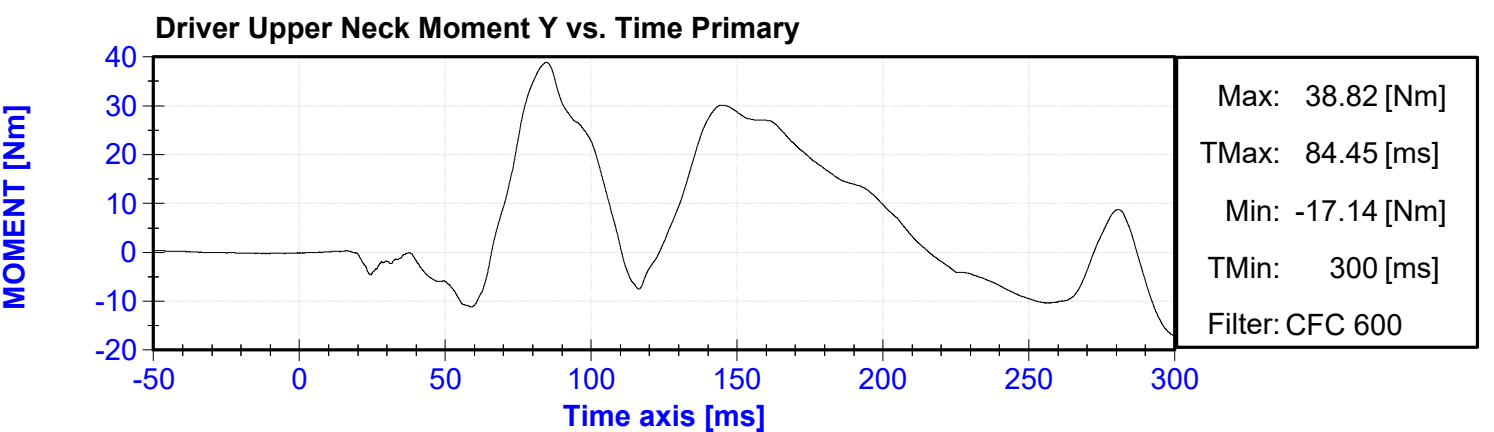
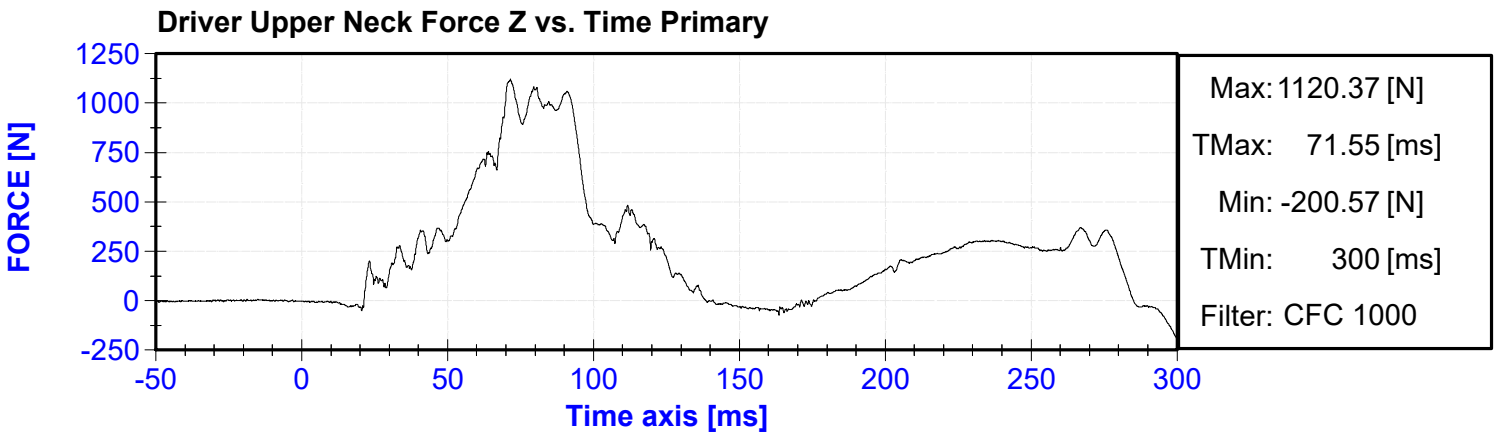
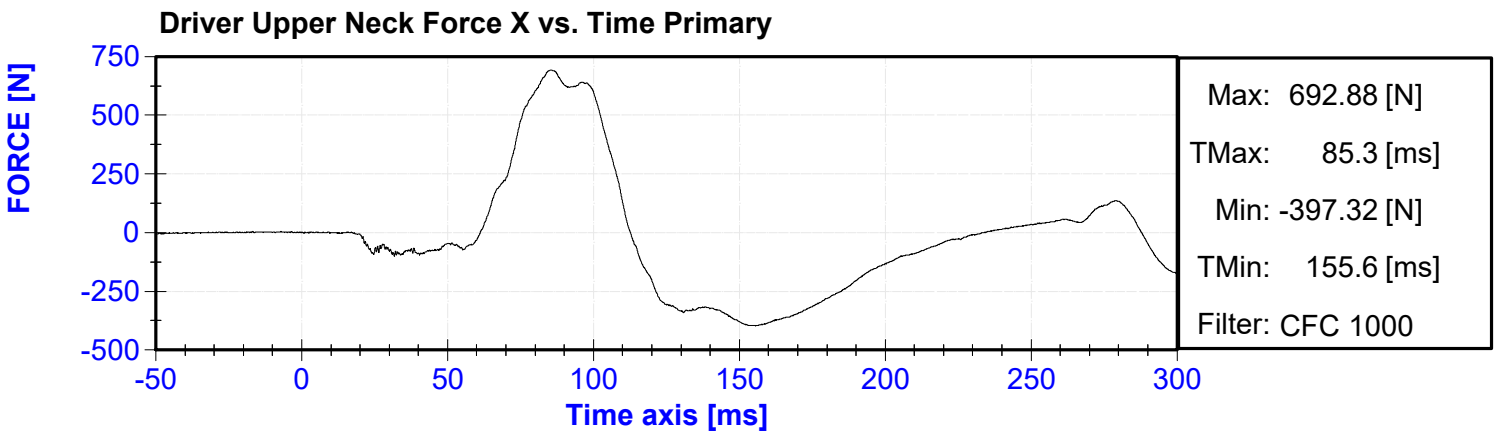
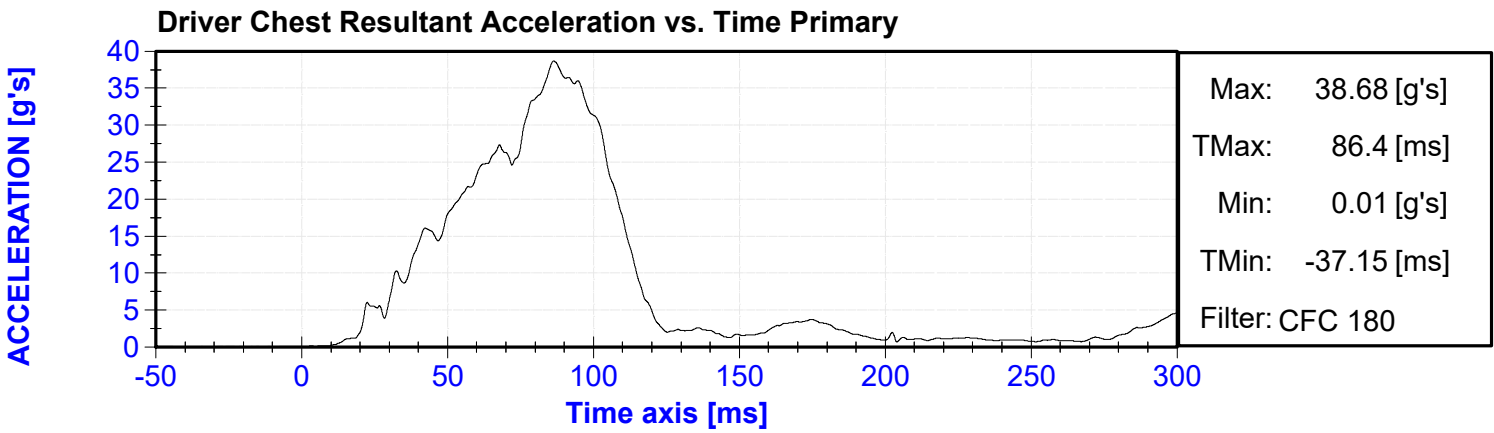
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Driver Chest Z Acceleration vs. Time Primary

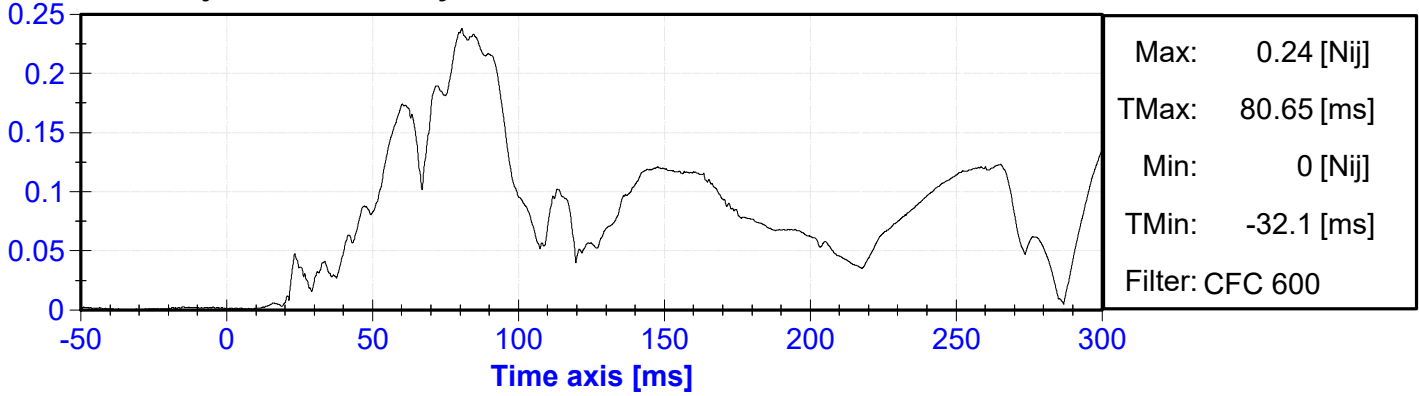


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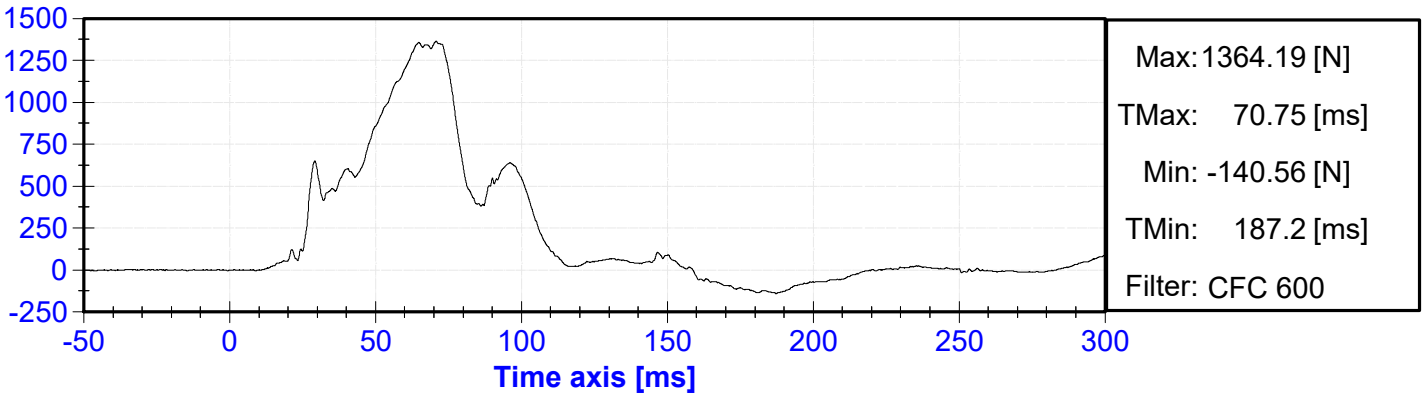
NECK INJURY CRITERIA

Driver Nij vs. Time Primary



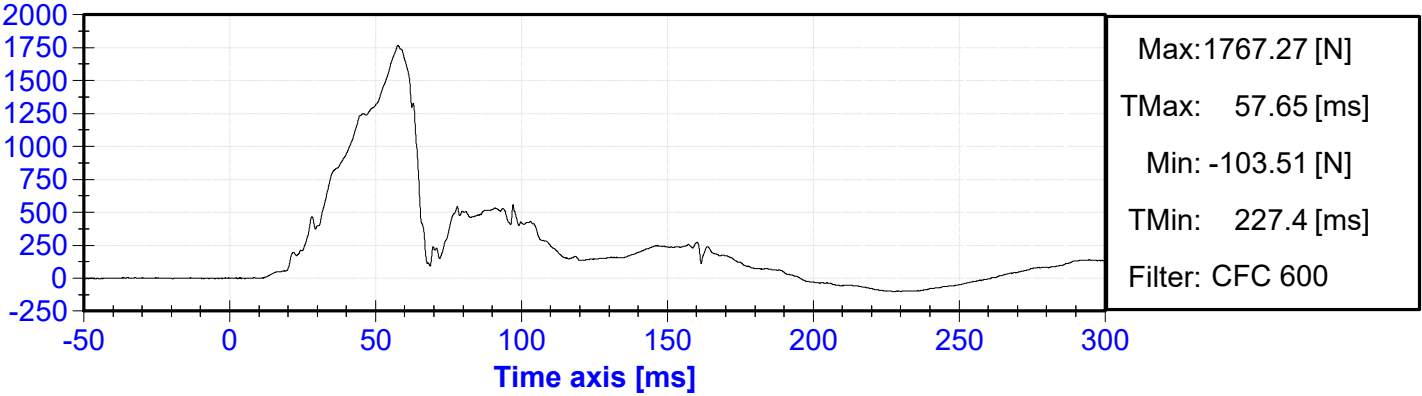
FORCE [N]

Driver Left Femur Force vs. Time



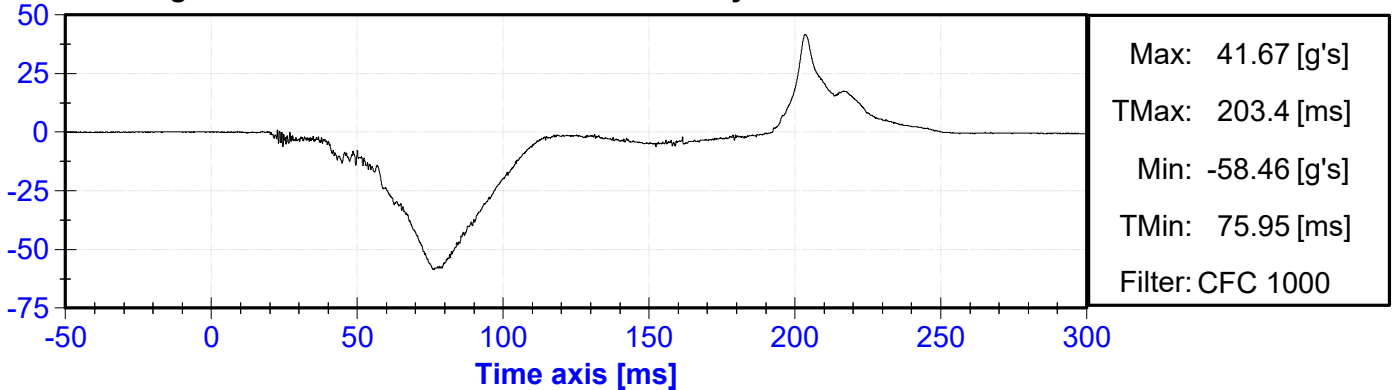
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Driver Right Femur Force vs. Time



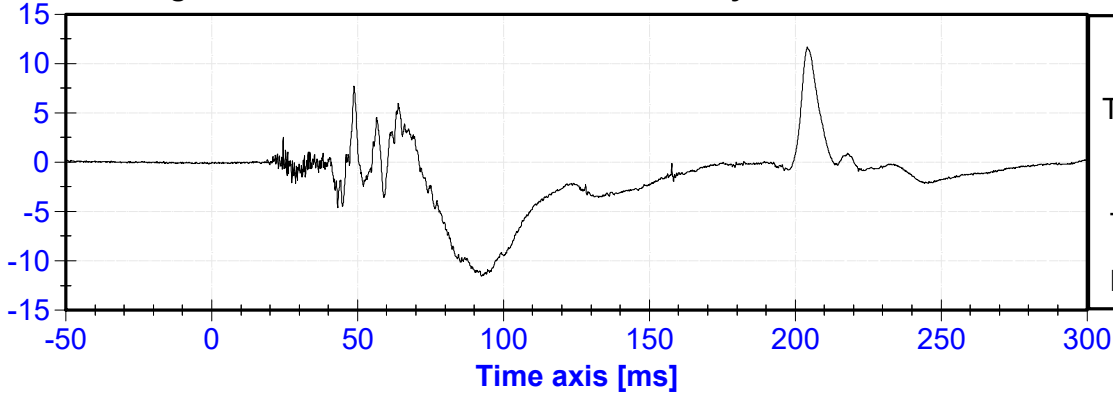
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Passenger Head X Acceleration vs. Time Primary



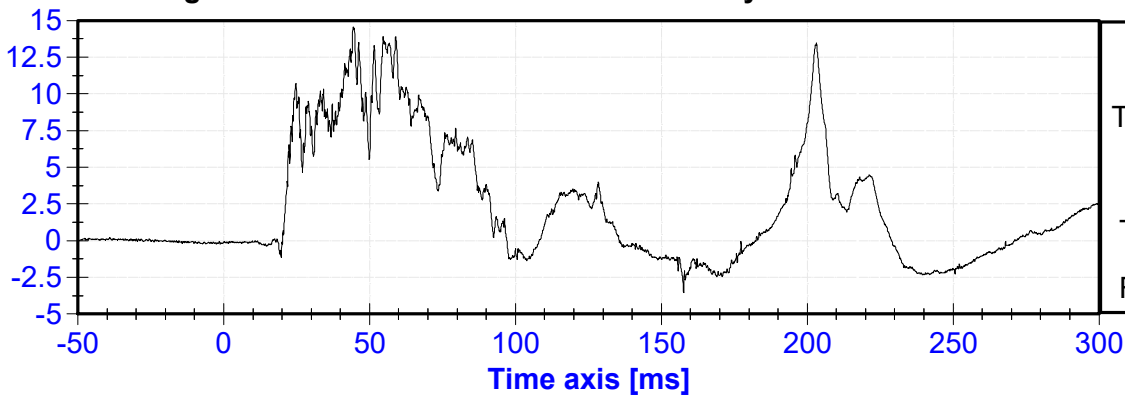
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Passenger Head Y Acceleration vs. Time Primary



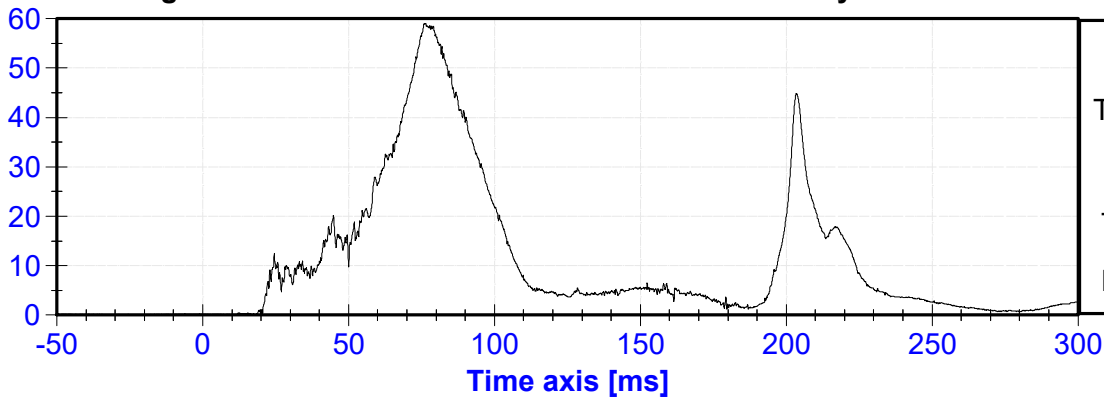
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Passenger Head Z Acceleration vs. Time Primary



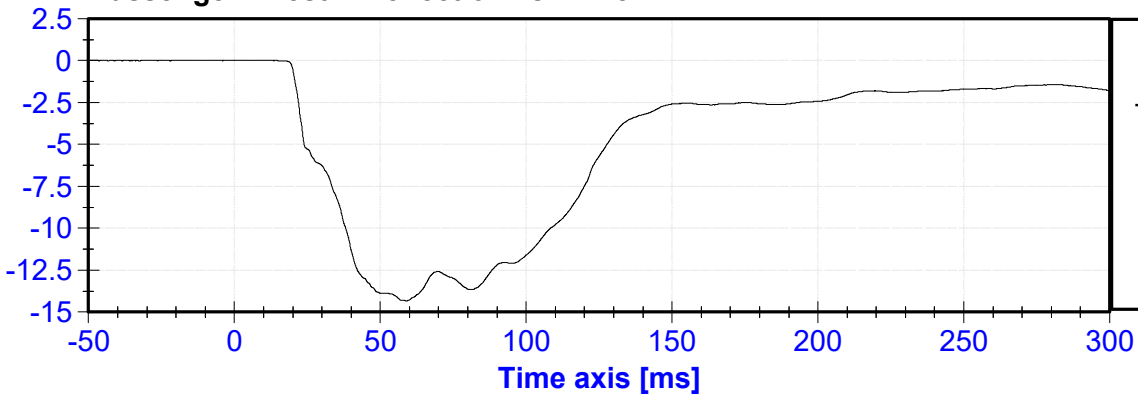
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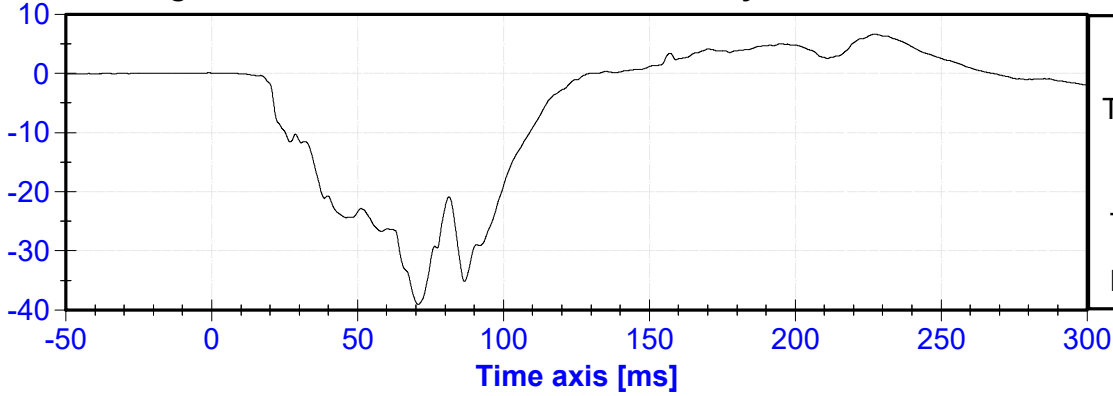
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Passenger Chest X Deflection vs. Time



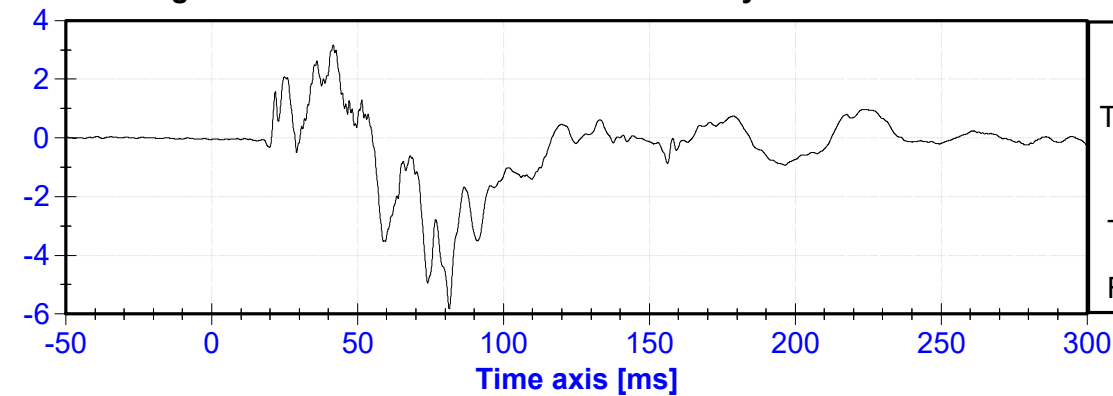
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Passenger Chest X Acceleration vs. Time Primary



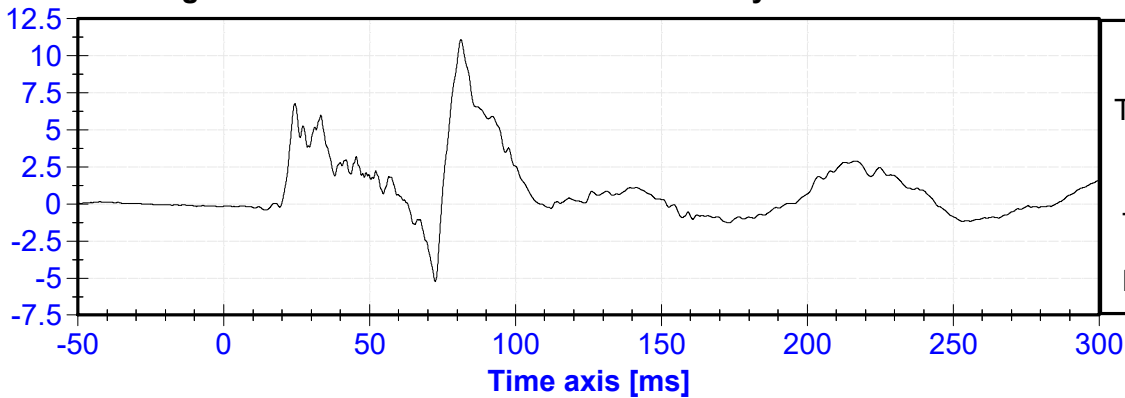
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Passenger Chest Y Acceleration vs. Time Primary



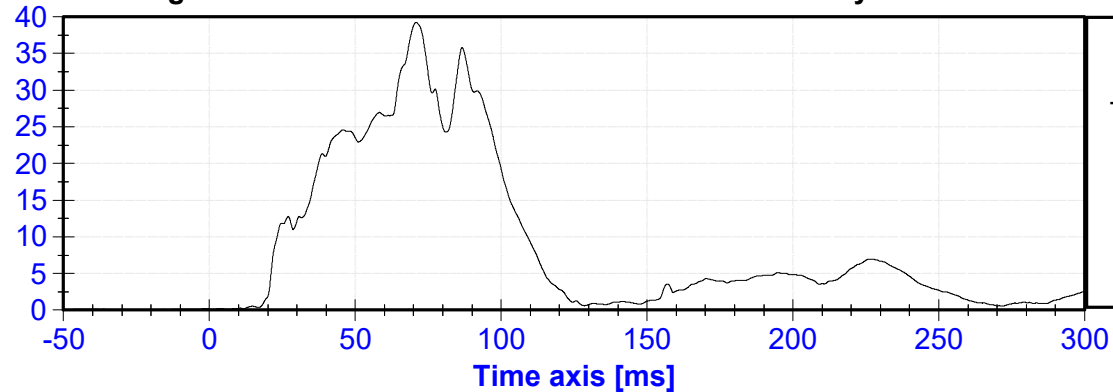
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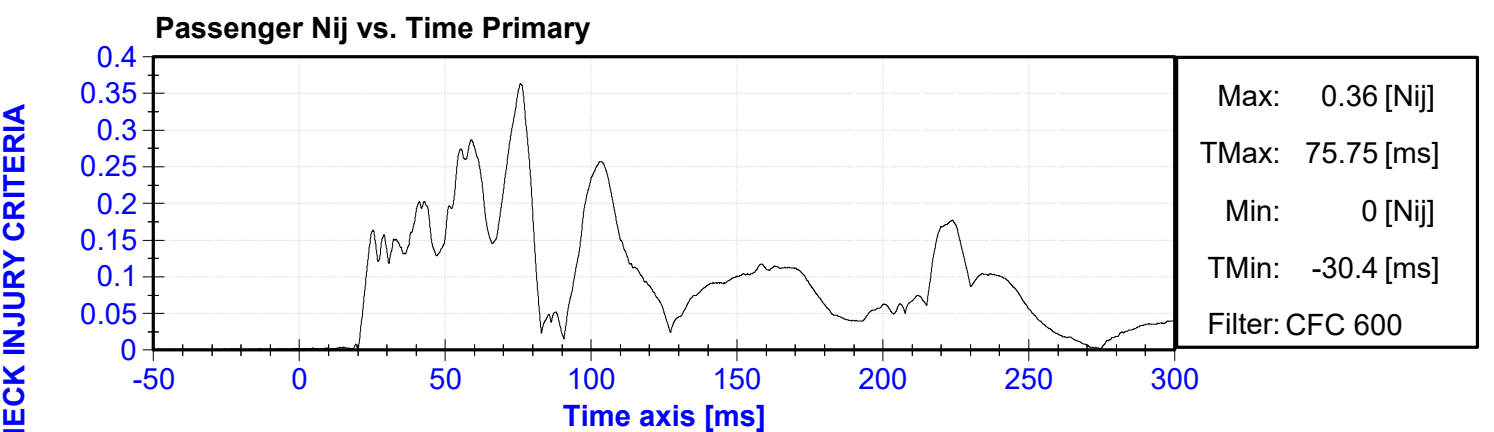
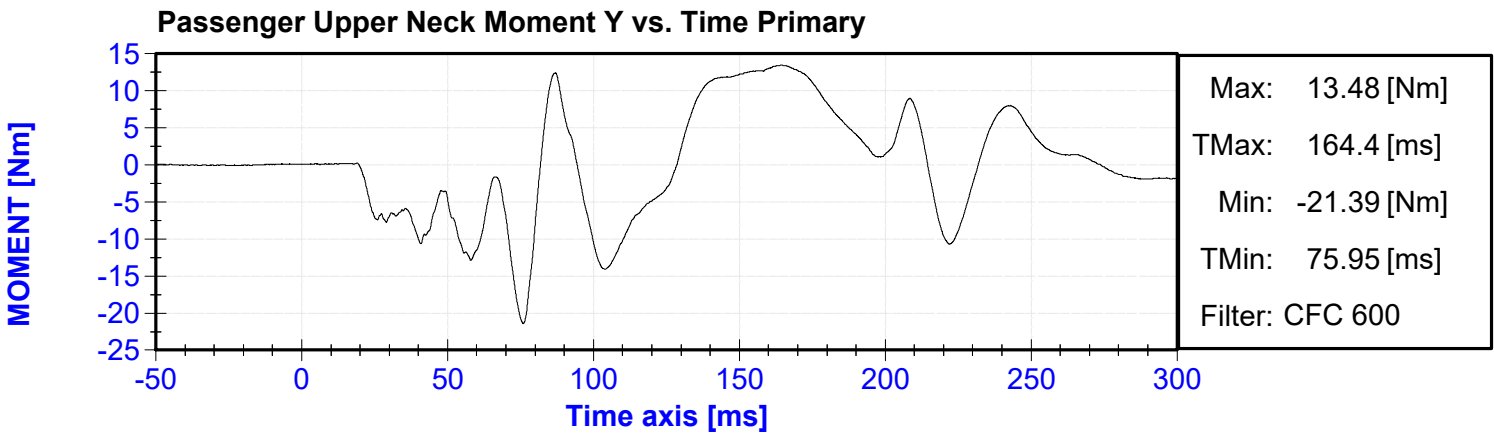
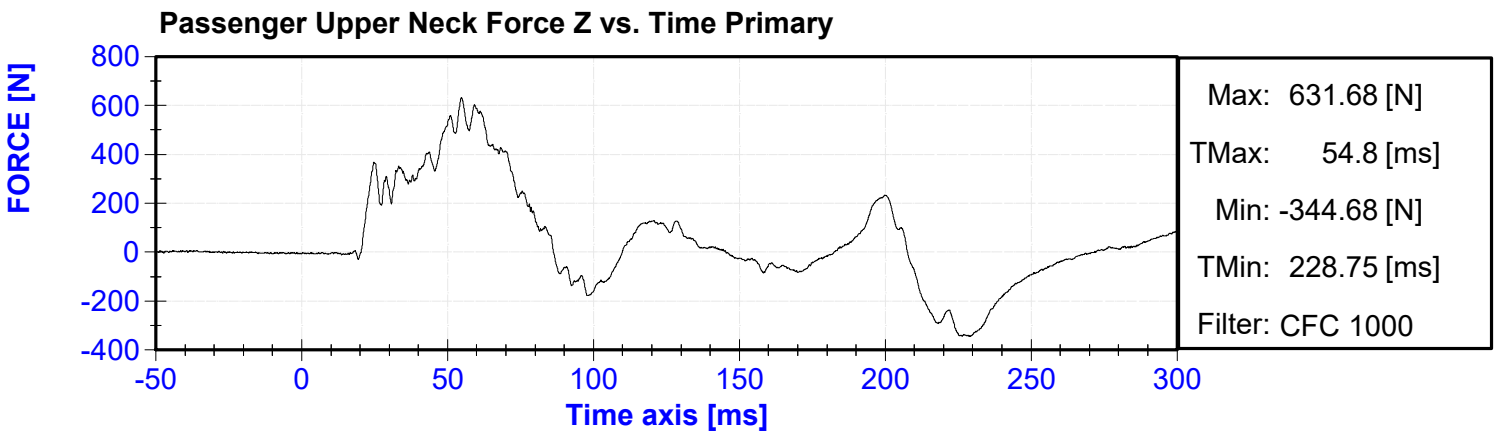
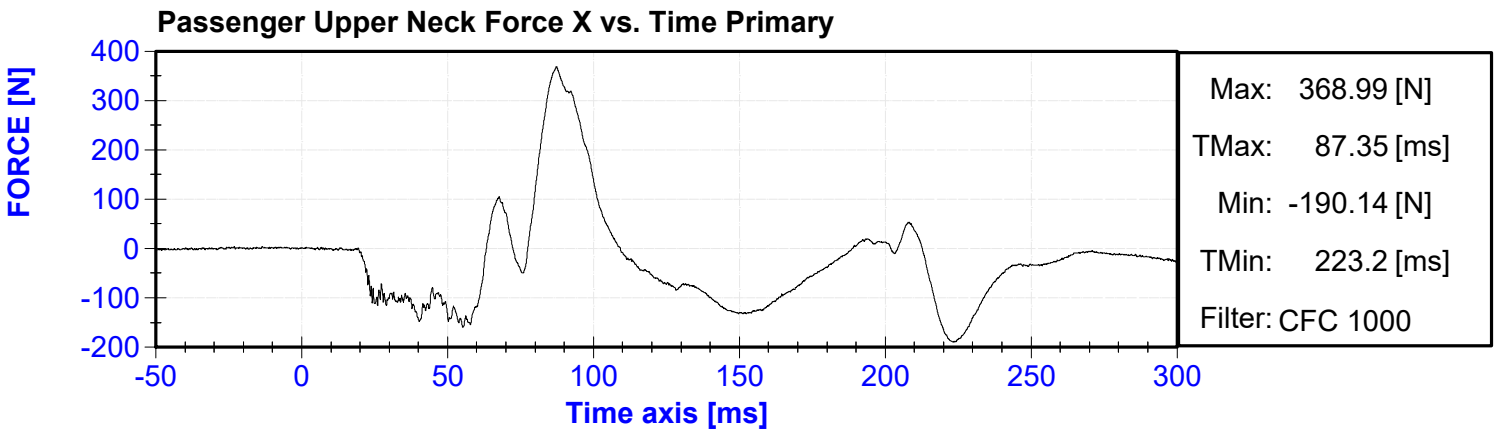
Passenger Chest Z Acceleration vs. Time Primary

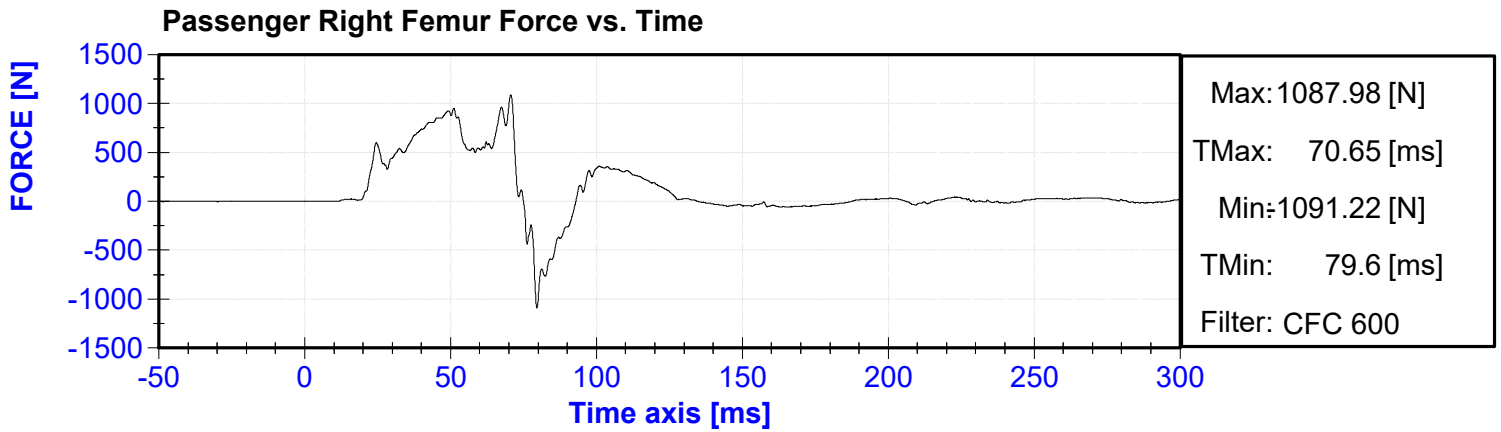
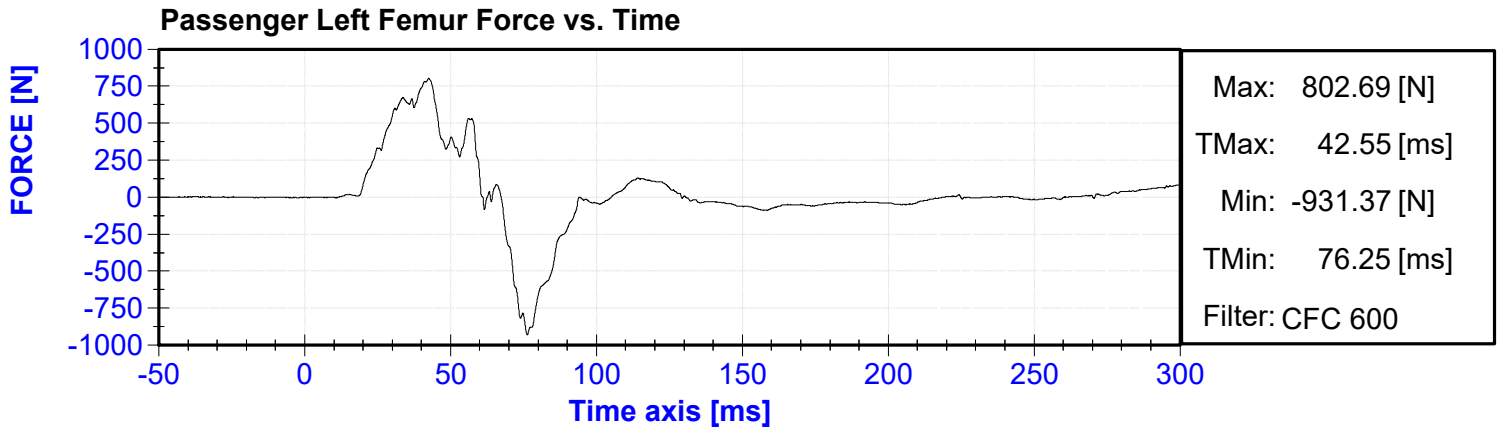


ACCELERATION [g's]

Passenger Chest Resultant Acceleration vs. Time Primary







## APPENDIX C

### DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA

**CALIBRATION TEST RESULTS**

**PRE-TEST**

**HYBRID III 50<sup>TH</sup> PERCENTILE MALE - DRIVER ATD**

**SERIAL NO: 065**

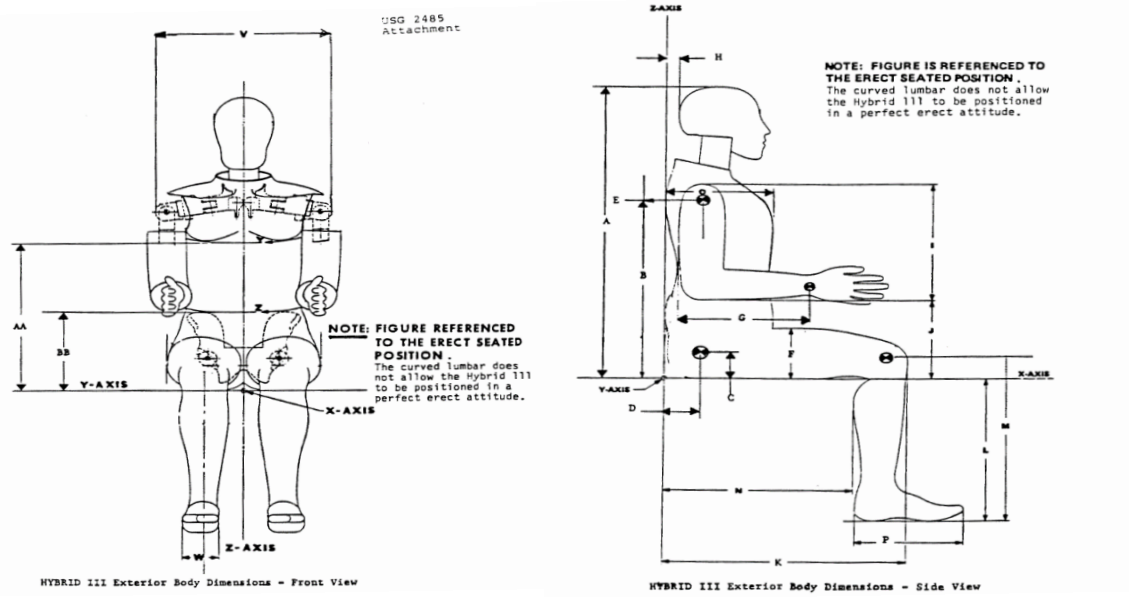


External Measurements - Hybrid 3 - 50th Male

Technician: J. Rios

Date: 11/12/2024

Dummy Serial Number: 065



Symbol	Description	Specification (in)		Result (in)	Pass/Fail
A	Sitting Height	34.6	35.0	34.6	Pass
B	Shoulder Pivot Height	19.9	20.5	20.2	Pass
C	H-Point Height	3.3	3.5	3.5	Pass
D	H-Point from Backline	5.3	5.5	5.5	Pass
E	Shoulder Pivot from Backline	3.3	3.7	3.6	Pass
F	Thigh Clearance	5.5	6.1	5.9	Pass
G	Back of Elbow to Wrist Pivot	11.4	12.0	11.8	Pass
H	Head Back to Backline	1.6	1.8	1.6	Pass
I	Shoulder to Elbow Length	13.0	13.6	13.5	Pass
J	Elbow Rest Height	7.5	8.3	7.7	Pass
K	Buttock to Knee Length	22.8	23.8	23.6	Pass
L	Popliteal Height	16.9	17.9	17.3	Pass
M	Knee Pivot Height	19.1	19.7	19.4	Pass
N	Buttock Popliteal Length	17.8	18.8	18.2	Pass
O	Chest Depth without Jacket	8.4	9.0	8.8	Pass
P	Foot Length (right)	9.9	10.5	10.3	Pass
V	Shoulder Breadth	16.3	17.2	16.9	Pass
W	Foot Breadth	3.6	4.2	3.9	Pass
Y	Chest Circumference with Jacket	38.2	39.4	39.0	Pass
Z	Waist Circumference	32.9	34.1	33.6	Pass
AA	Reference Location (Chest Circumference)	16.9	17.1	17.0	Pass
BB	Reference Location (Waist Circumference)	8.9	9.1	9.0	Pass

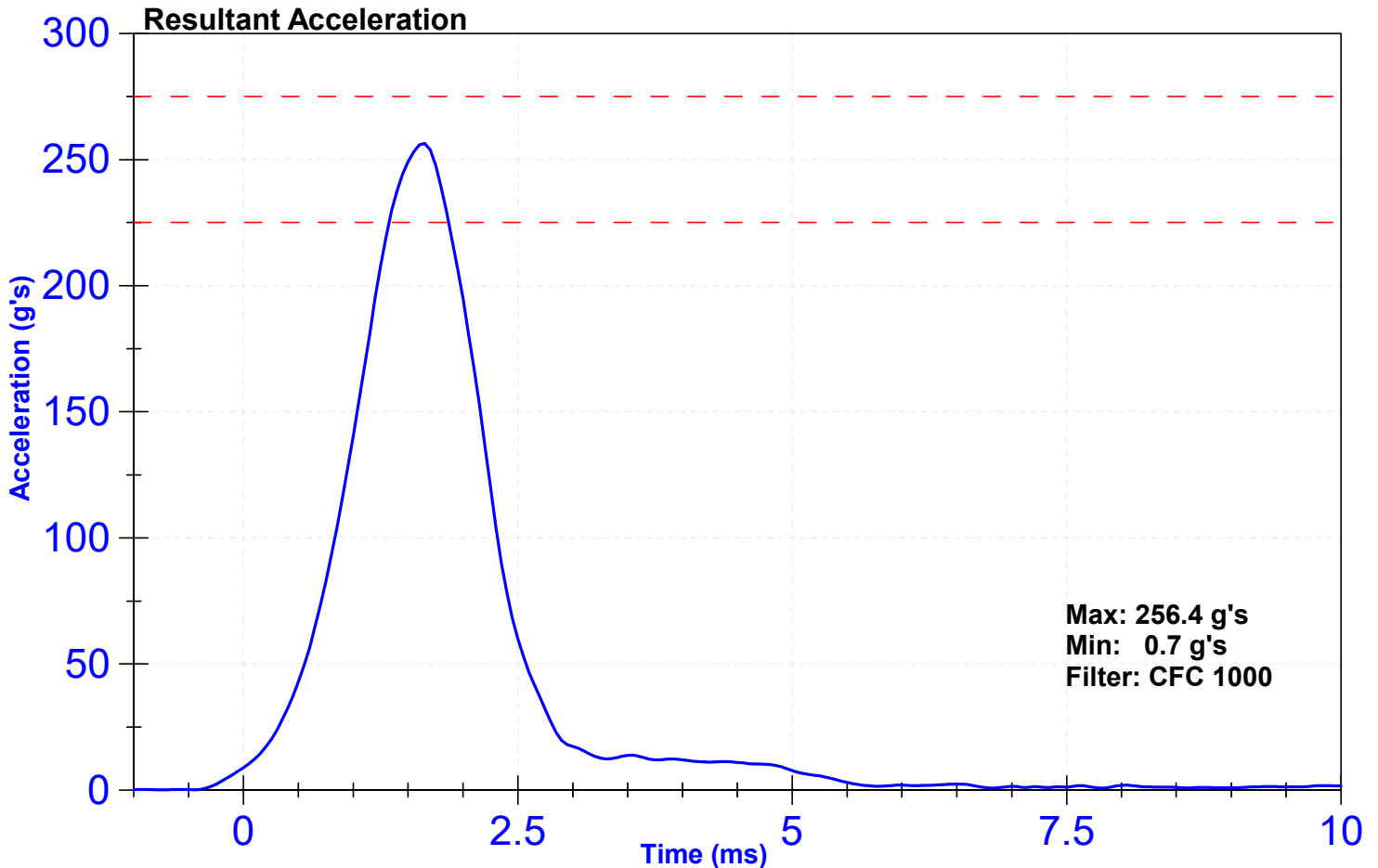
ATD Manufacturer	Humanetics	Test Technician	J. Kinderman
ATD Serial Number	065	Laboratory Supervisor	C. Mantell

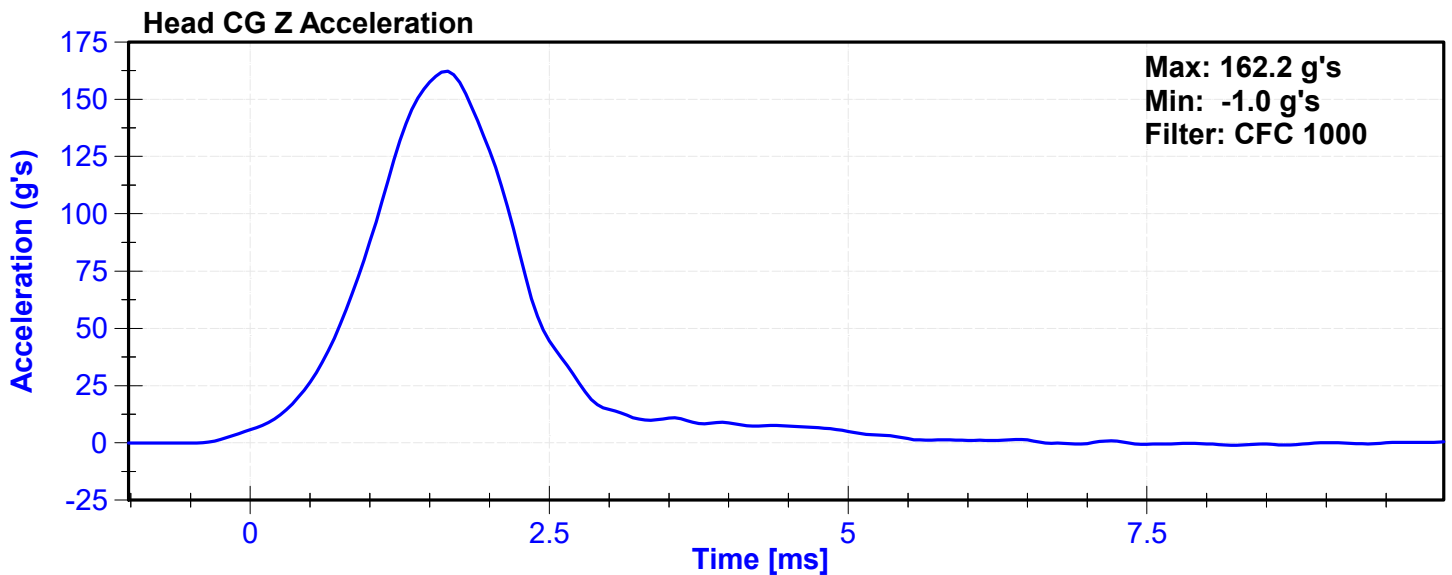
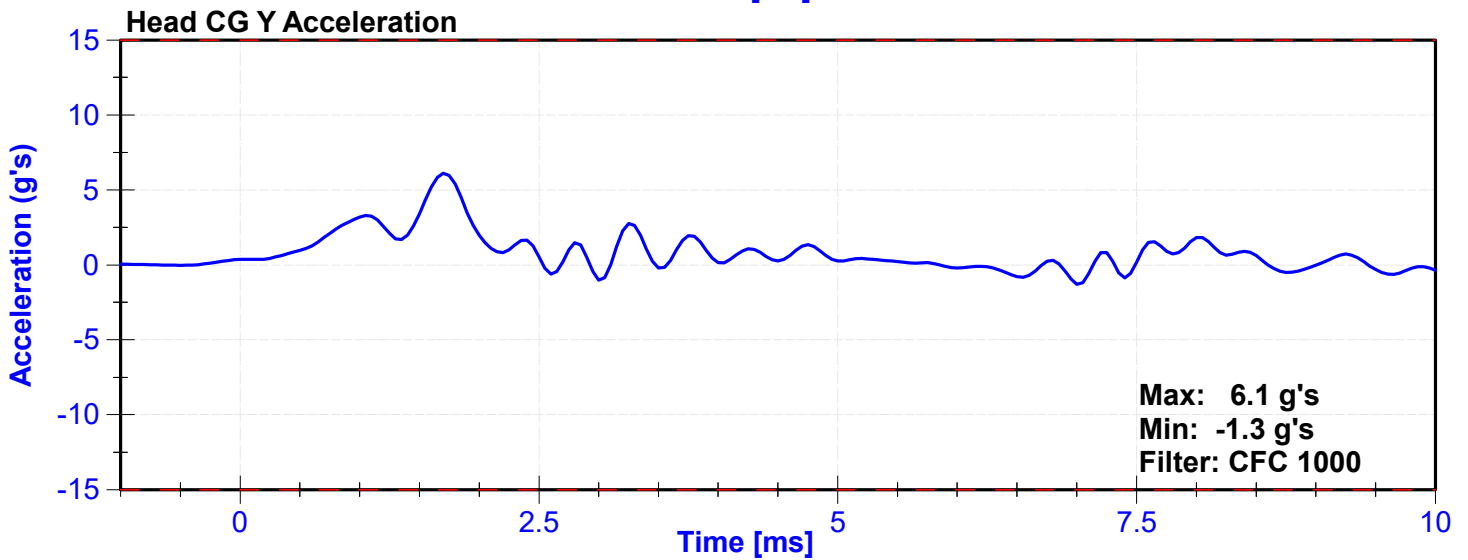
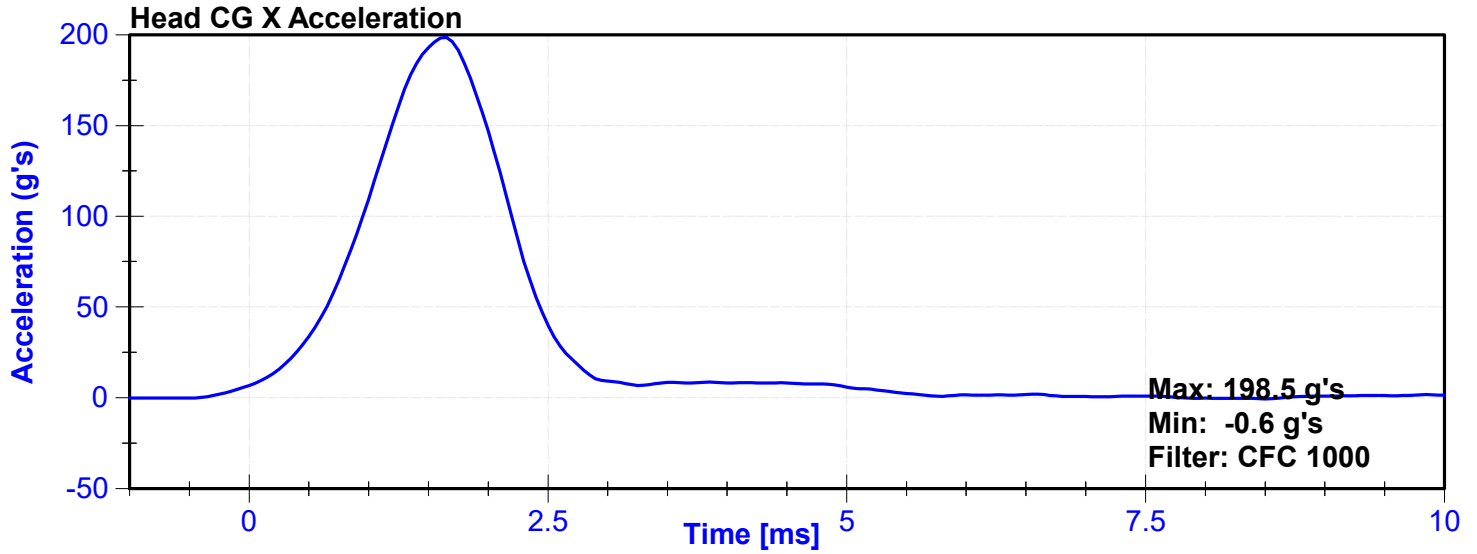
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.9	Pass
Humidity	10	70	%	40	Pass
Resultant Acceleration	225	275	g's	256.4	Pass
Oscillation	0	10	%	5.3	Pass
Lateral Acceleration	-15	15	g's	6.1	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	P52152	10/31/2024	4/29/2025
Y Accelerometer	Endevco	P58888	10/31/2024	4/29/2025
Z Accelerometer	Endevco	P58911	10/31/2024	4/29/2025





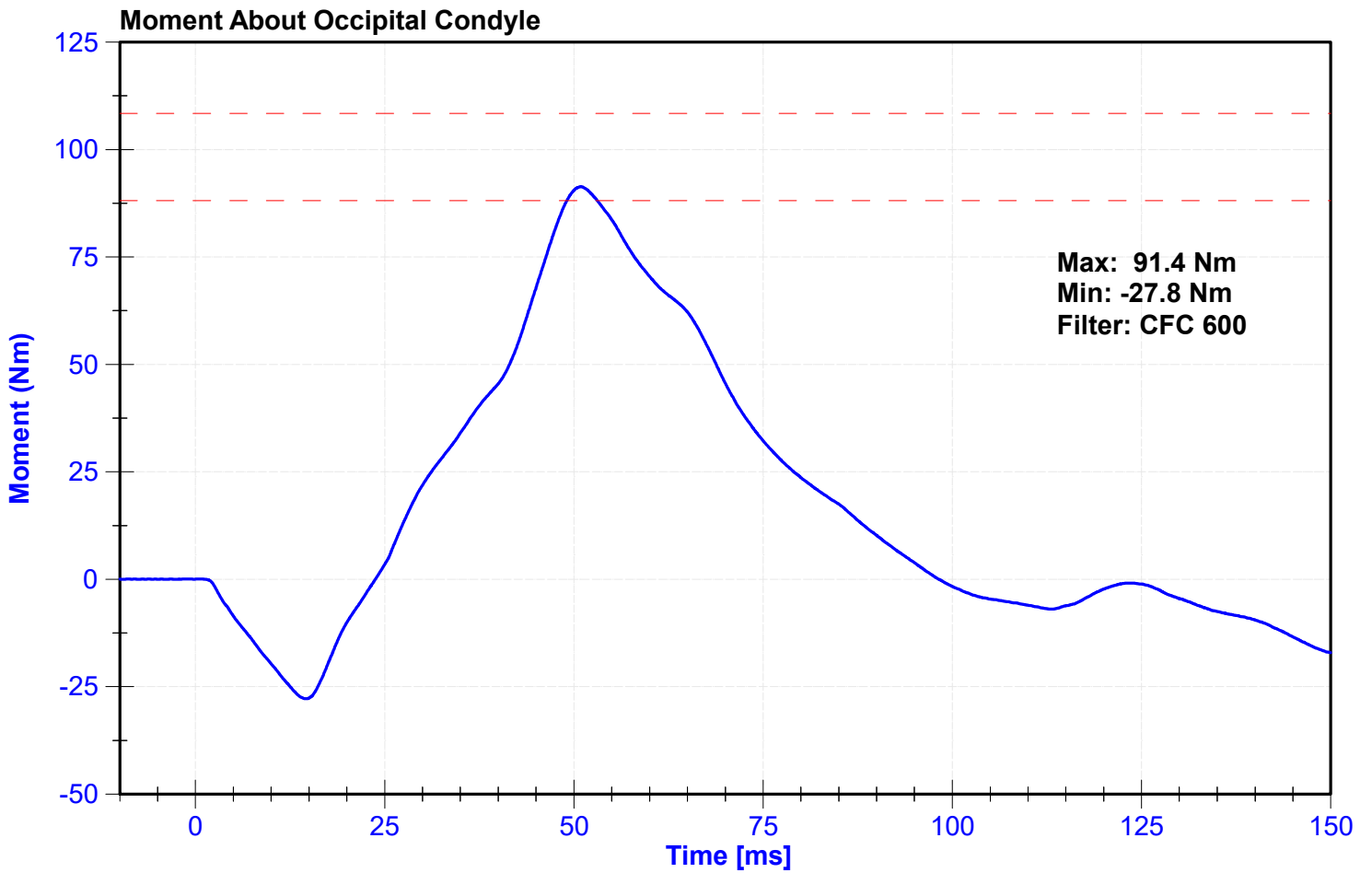
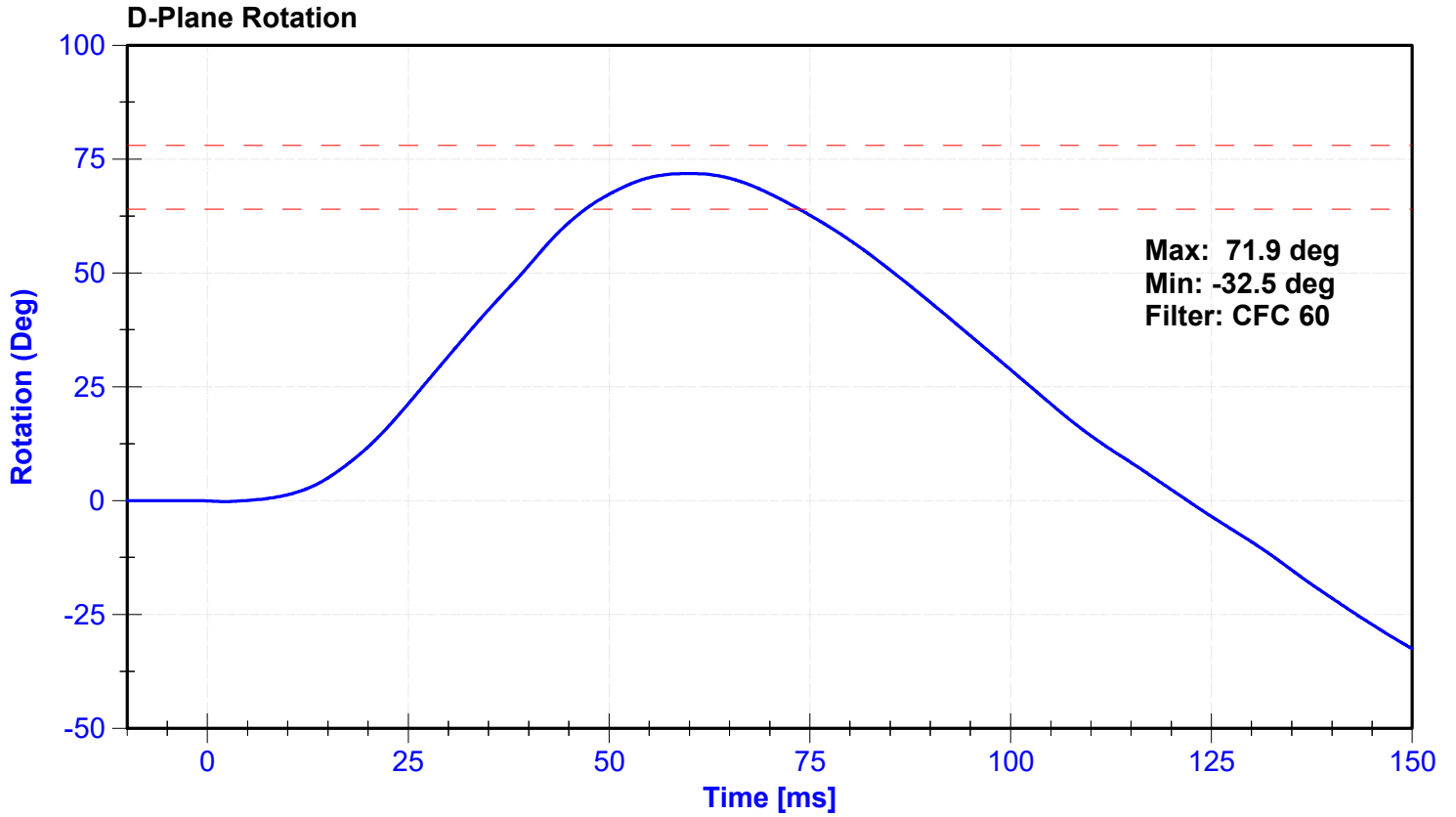
ATD Manufacturer	Humanetics	Test Technician	J. Kinderman
ATD Serial Number	065	Laboratory Supervisor	C. Mantell

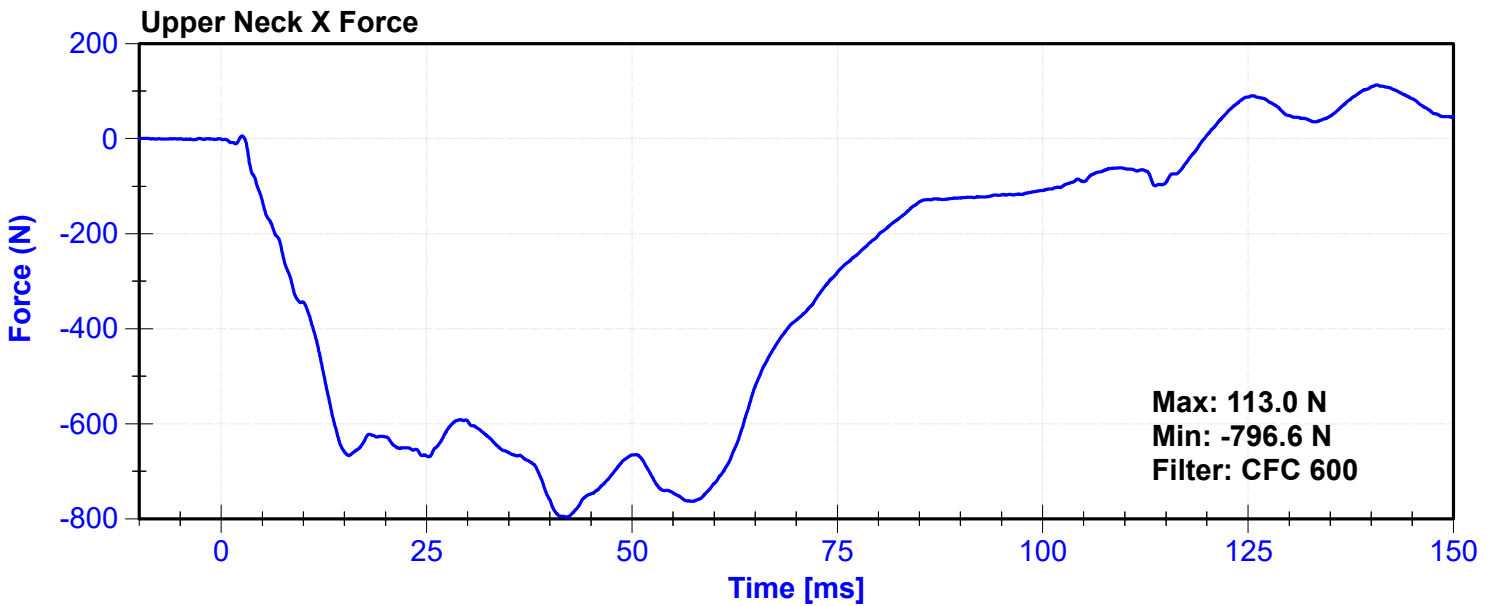
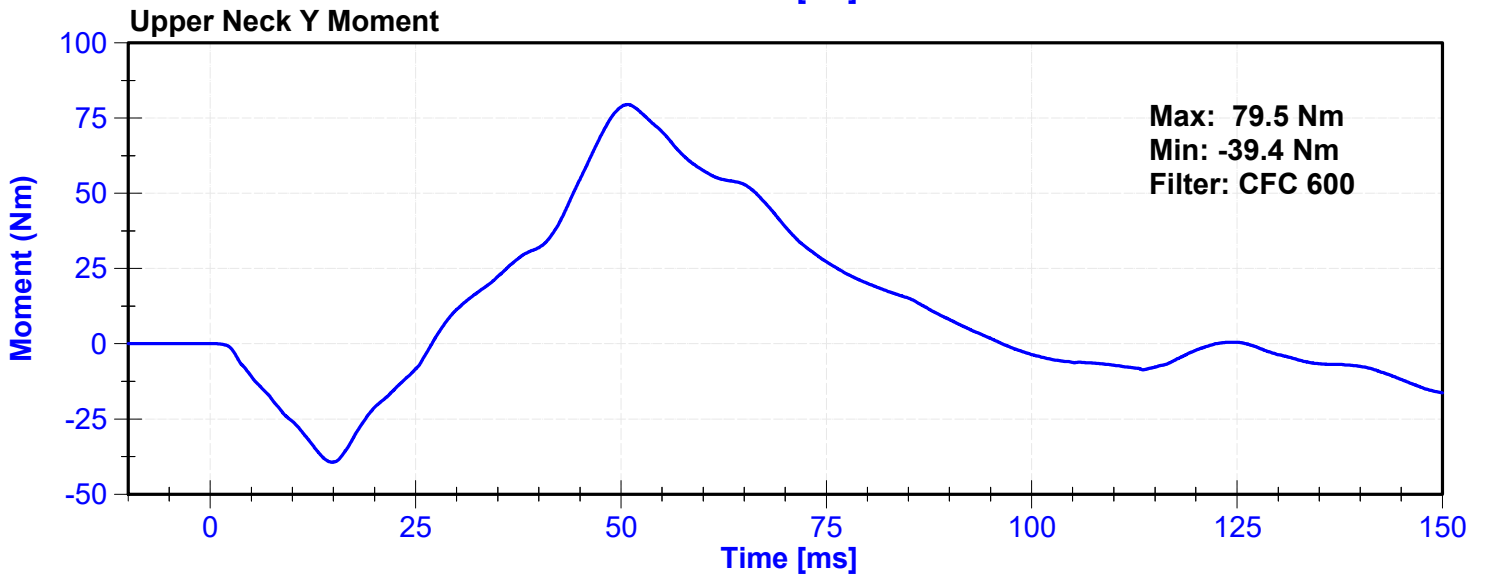
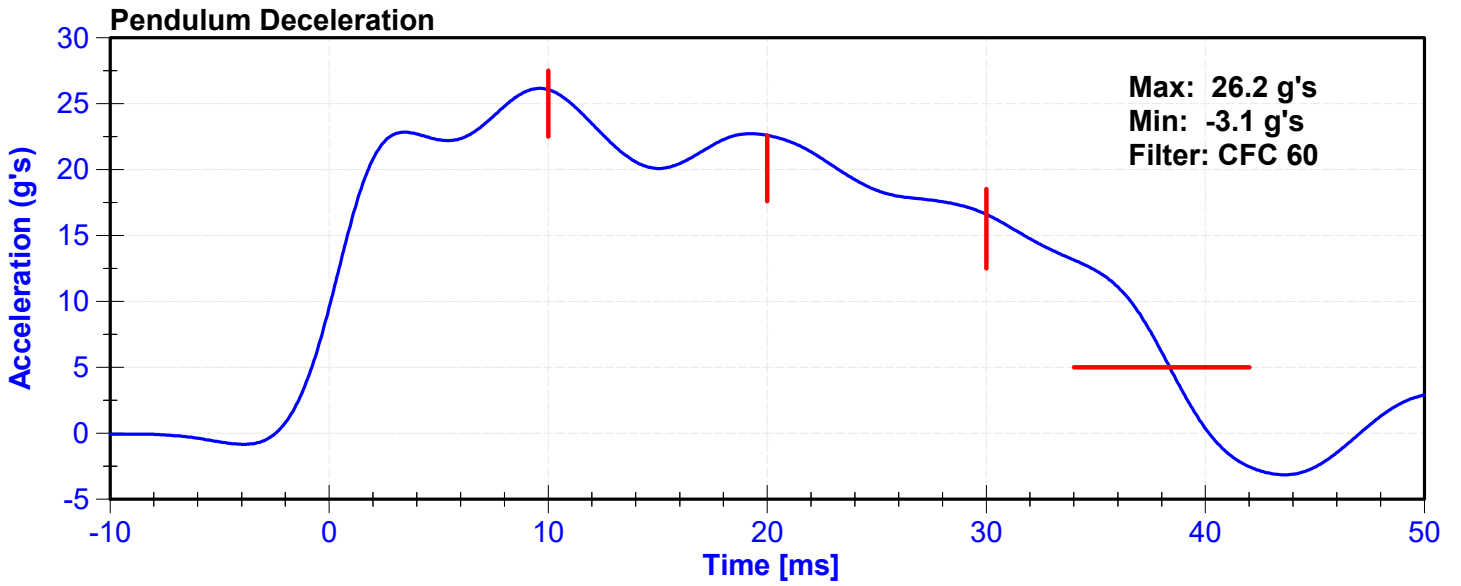
**Results**

<b>Test Parameter</b>	<b>Minimum Specification</b>	<b>Maximum Specification</b>	<b>Unit</b>	<b>Result</b>	<b>Pass/Fail</b>
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	50	Pass
Velocity	6.89	7.13	m/s	6.936	Pass
Pendulum Deceleration at 10ms	22.5	27.5	g's	26.06	Pass
Pendulum Deceleration at 20ms	17.6	22.6	g's	22.59	Pass
Pendulum Deceleration at 30ms	12.5	18.5	g's	16.60	Pass
Max. Pendulum Deceleration After 30ms	0	29	g's	26.2	Pass
Pendulum Deceleration Time to 5 g's	34	42	ms	38.4	Pass
Maximum D Plane Rotation	64	78	deg	71.9	Pass
Time to Maximum Rotation	57	64	ms	60.0	Pass
Rotation Decay to Zero	113	127	ms	122.1	Pass
Moment About Occipital Condyle	88.1	108.4	Nm	91.36	Pass
Time to Maximum Moment	47	58	ms	50.9	Pass
Moment Decay to Zero	97	107	ms	98.3	Pass

**Transducer Calibrations**

<b>Channel</b>	<b>Manufacturer</b>	<b>Serial Number</b>	<b>Calibration Date</b>	<b>Calibration Due Date</b>
Pendulum Accelerometer	Endevco	C16503	10/30/2024	4/28/2025
Pendulum Potentiometer	ETI	LABPOT1	5/7/2024	5/7/2025
Condyle Potentiometer	ETI	LABPOT2	5/7/2024	5/7/2025
Upper Neck Load Cell	Humanetics	851-FX	5/22/2024	5/22/2025





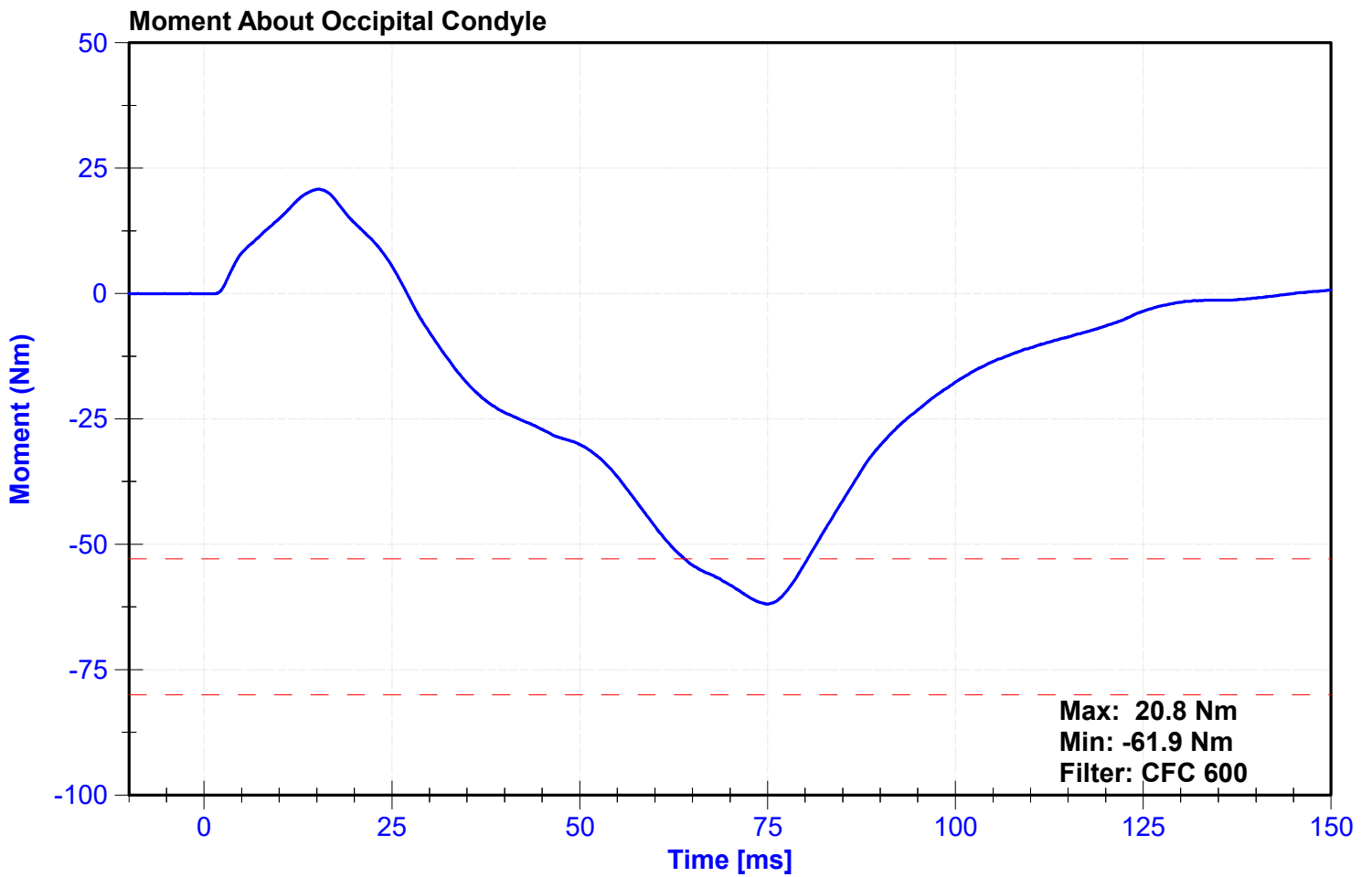
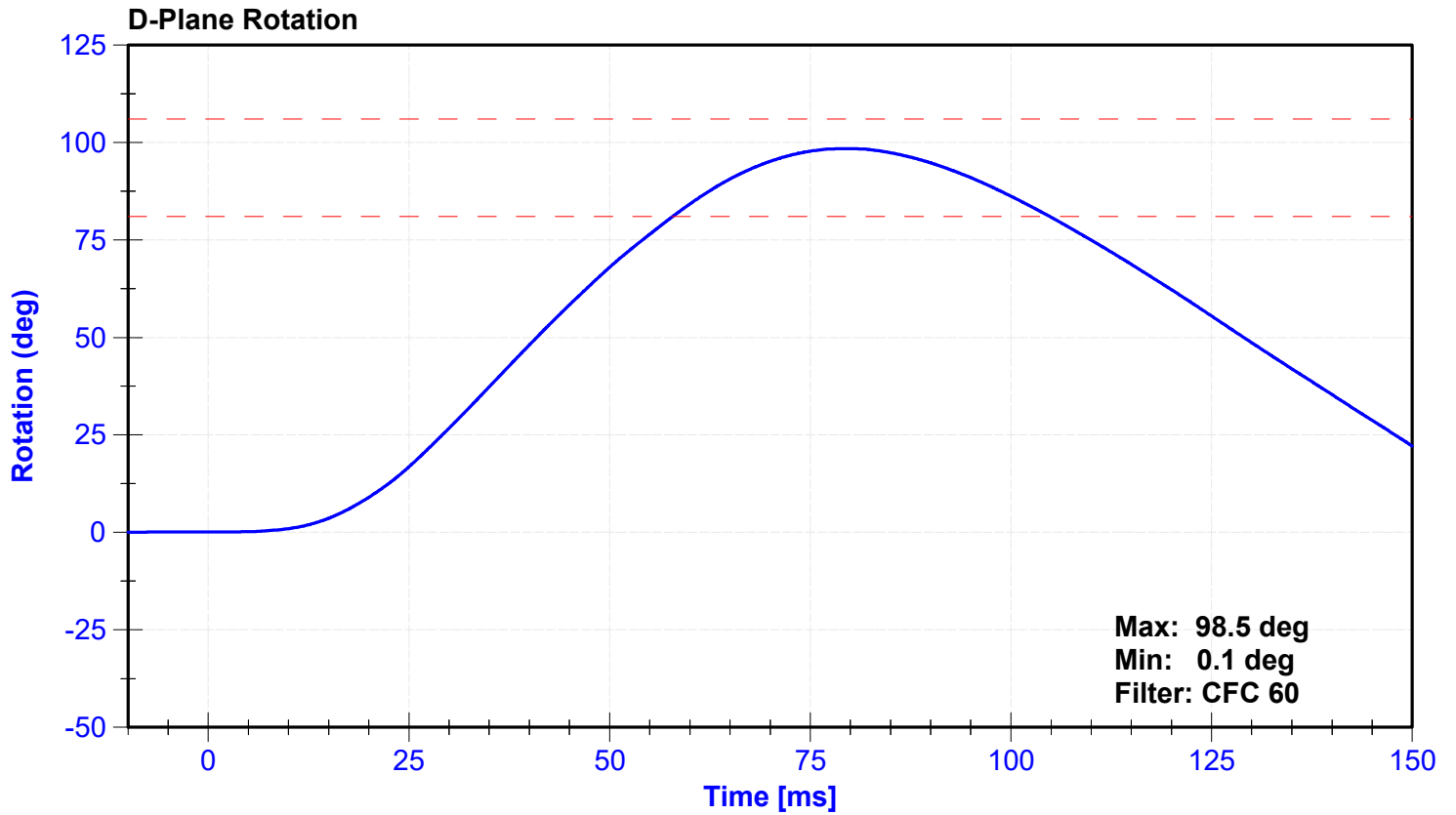
ATD Manufacturer	Humanetics	Test Technician	J. Kinderman
ATD Serial Number	065	Laboratory Supervisor	C. Mantell

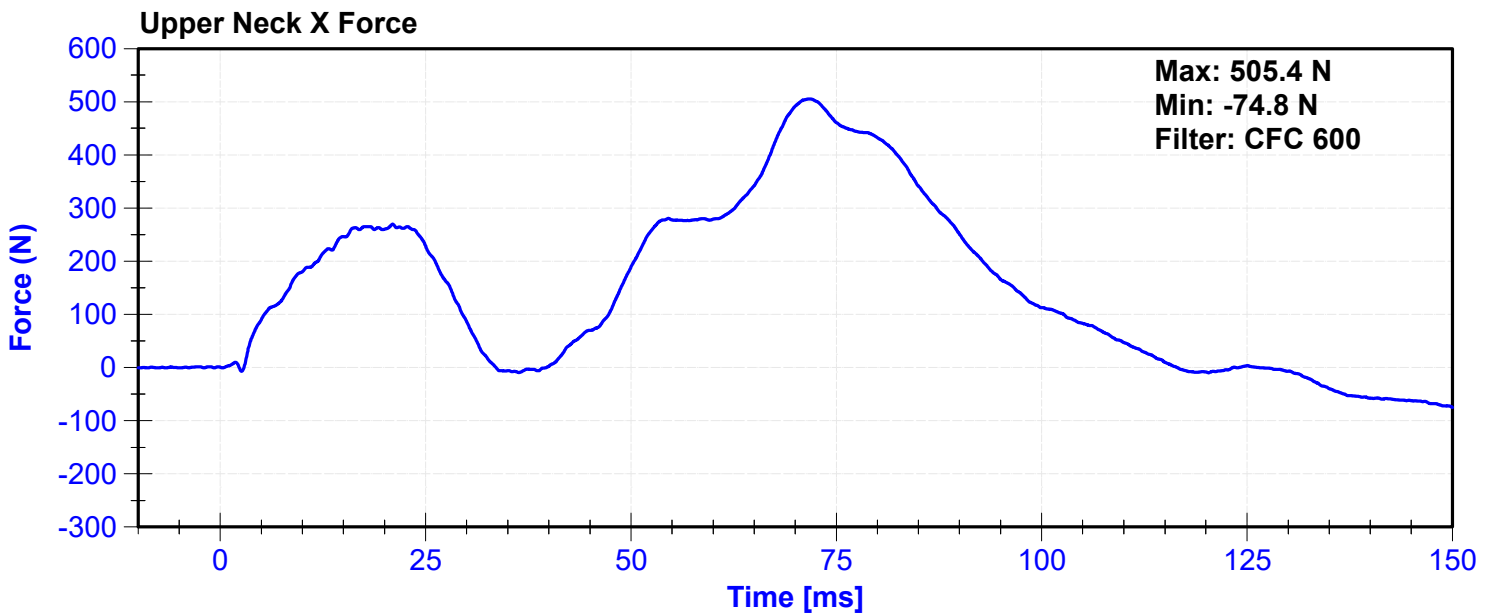
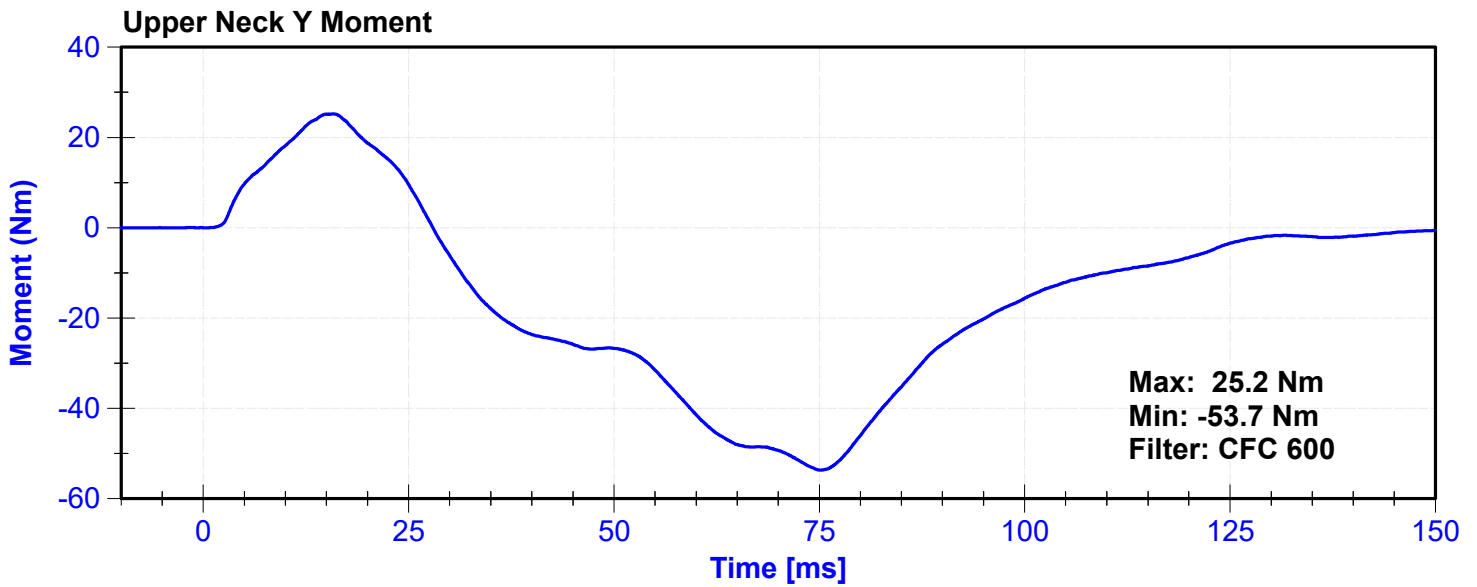
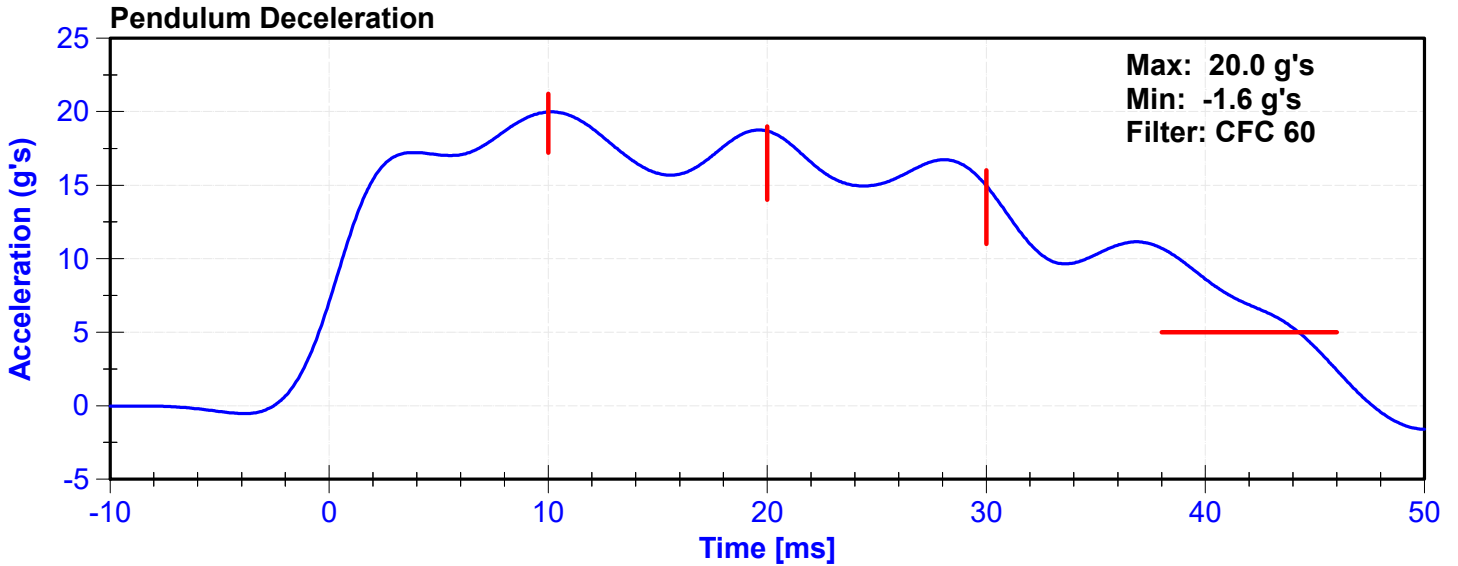
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	50	Pass
Velocity	5.94	6.19	m/s	6.040	Pass
Pendulum Deceleration at 10ms	17.2	21.2	g's	19.98	Pass
Pendulum Deceleration at 20ms	14	19	g's	18.7	Pass
Pendulum Deceleration at 30ms	11	16	g's	15.0	Pass
Max. Pendulum Deceleration After 30ms	0	22	g's	20.0	Pass
Pendulum Deceleration Time to 5 g's	38	46	ms	44.3	Pass
Maximum D Plane Rotation	81	106	deg	98.5	Pass
Time to Maximum Rotation	72	82	ms	79.6	Pass
Rotation Decay to Zero	147	174	ms	166.8	Pass
Minimum Moment About OC	-80	-52.9	Nm	-61.88	Pass
Time to Minimum Moment	65	79	ms	74.9	Pass
Moment Decay to Zero	120	148	ms	145.0	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16503	10/30/2024	4/28/2025
Pendulum Potentiometer	ETI	SP22G_LABPOT1	5/7/2024	5/7/2025
Condyle Potentiometer	ETI	SP22G_LABPOT2	5/7/2024	5/7/2025
Upper Neck Load Cell	Humanetics	851-FX	5/22/2024	5/22/2025





ATD Manufacturer	Humanetics	Test Technician	J. Kinderman
ATD Serial Number	065	Laboratory Supervisor	C. Mantell

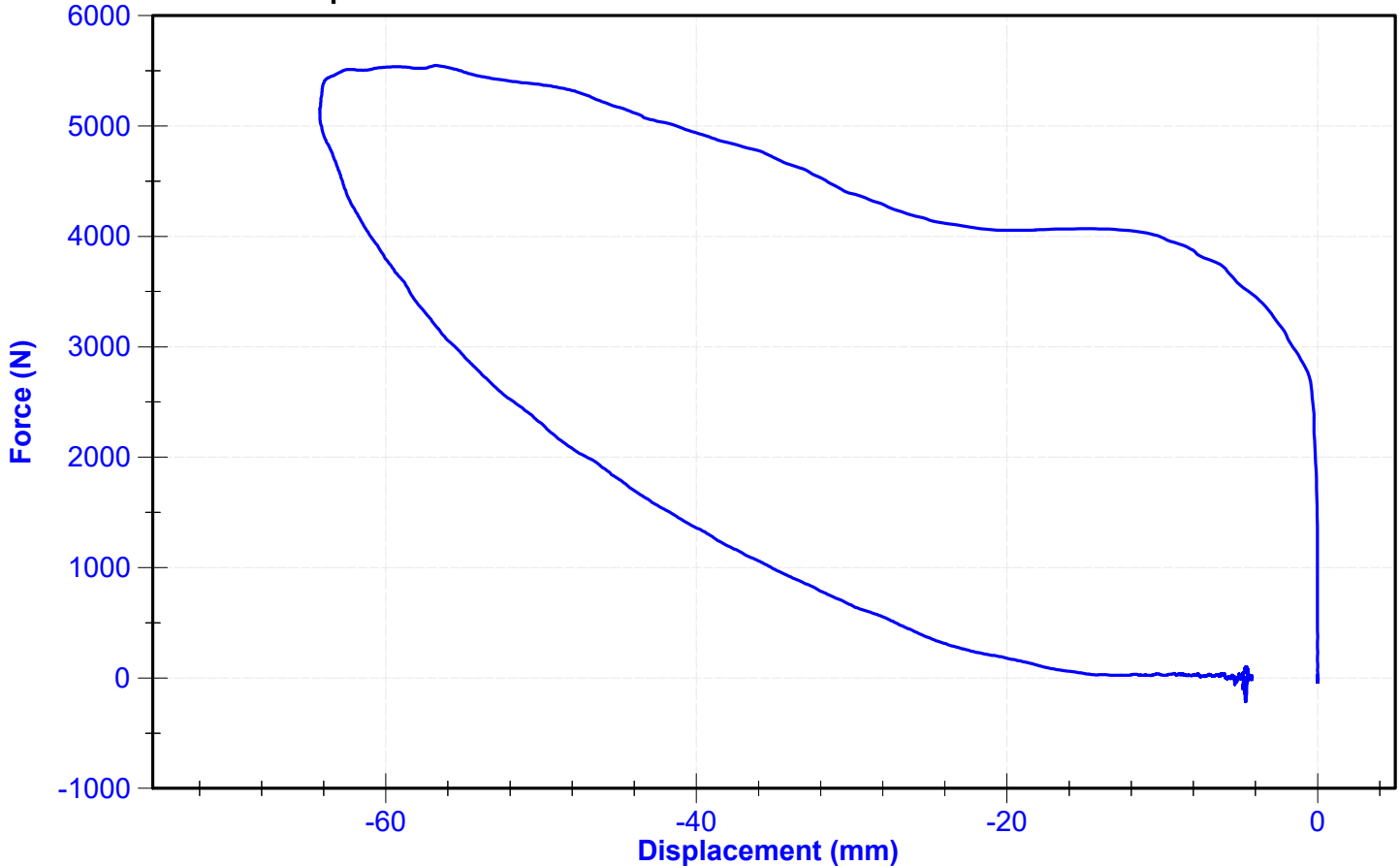
**Results**

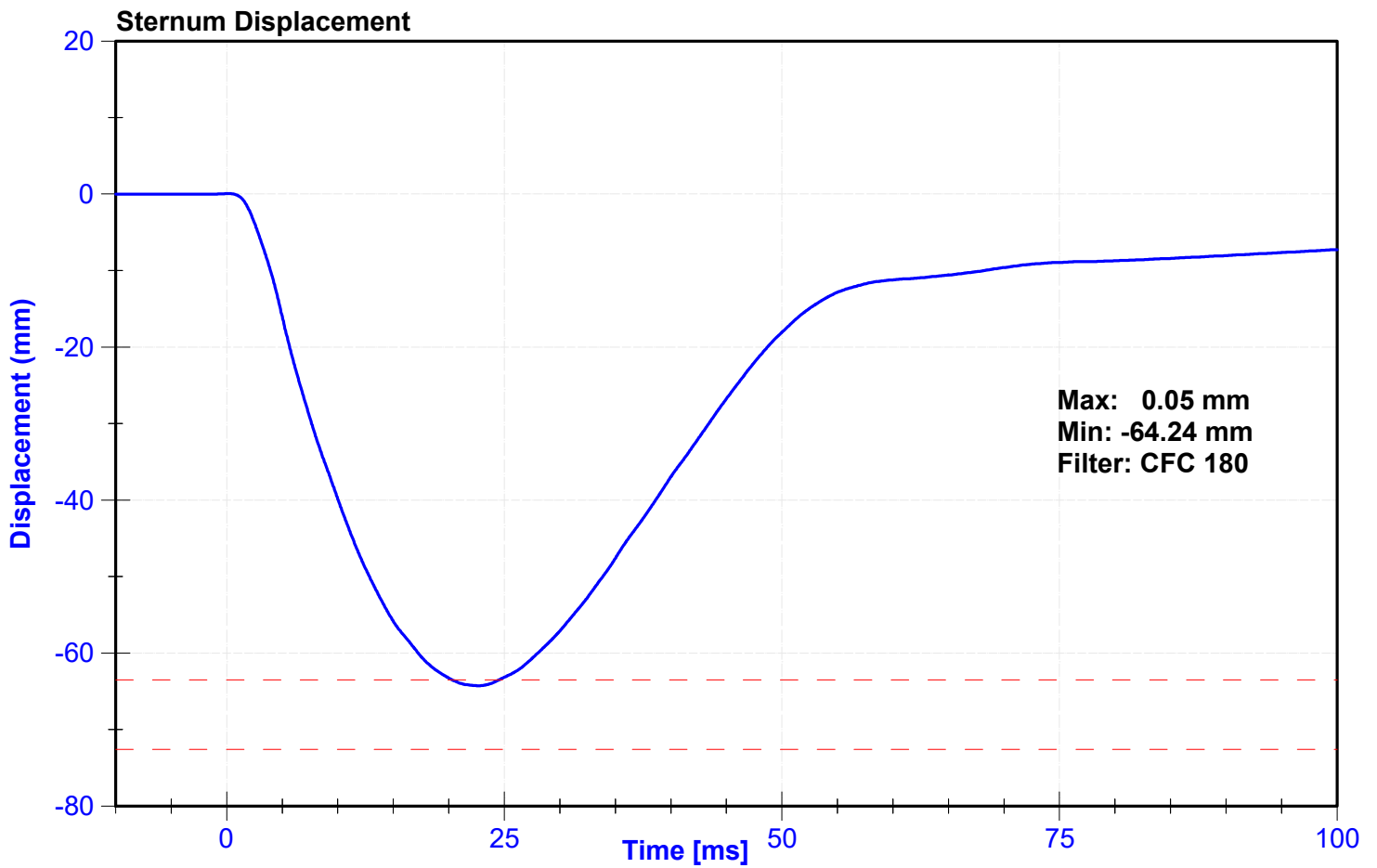
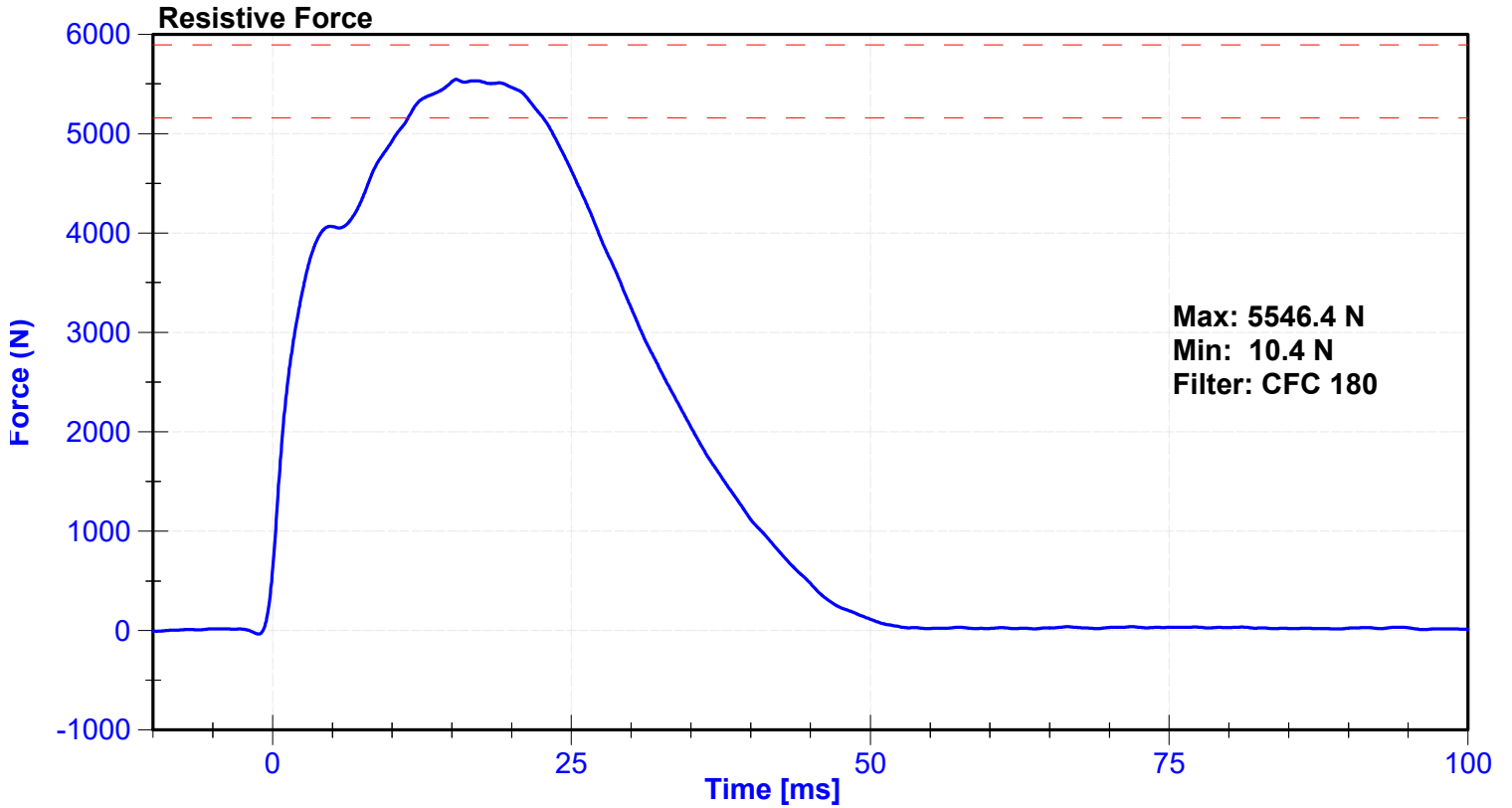
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	34	Pass
Velocity	6.59	6.83	m/s	6.668	Pass
Chest Displacement	-72.6	-63.5	mm	-64.24	Pass
Resistive Force	5160	5894	N	5546.4	Pass
Hysteresis	69	85	%	72.5	Pass

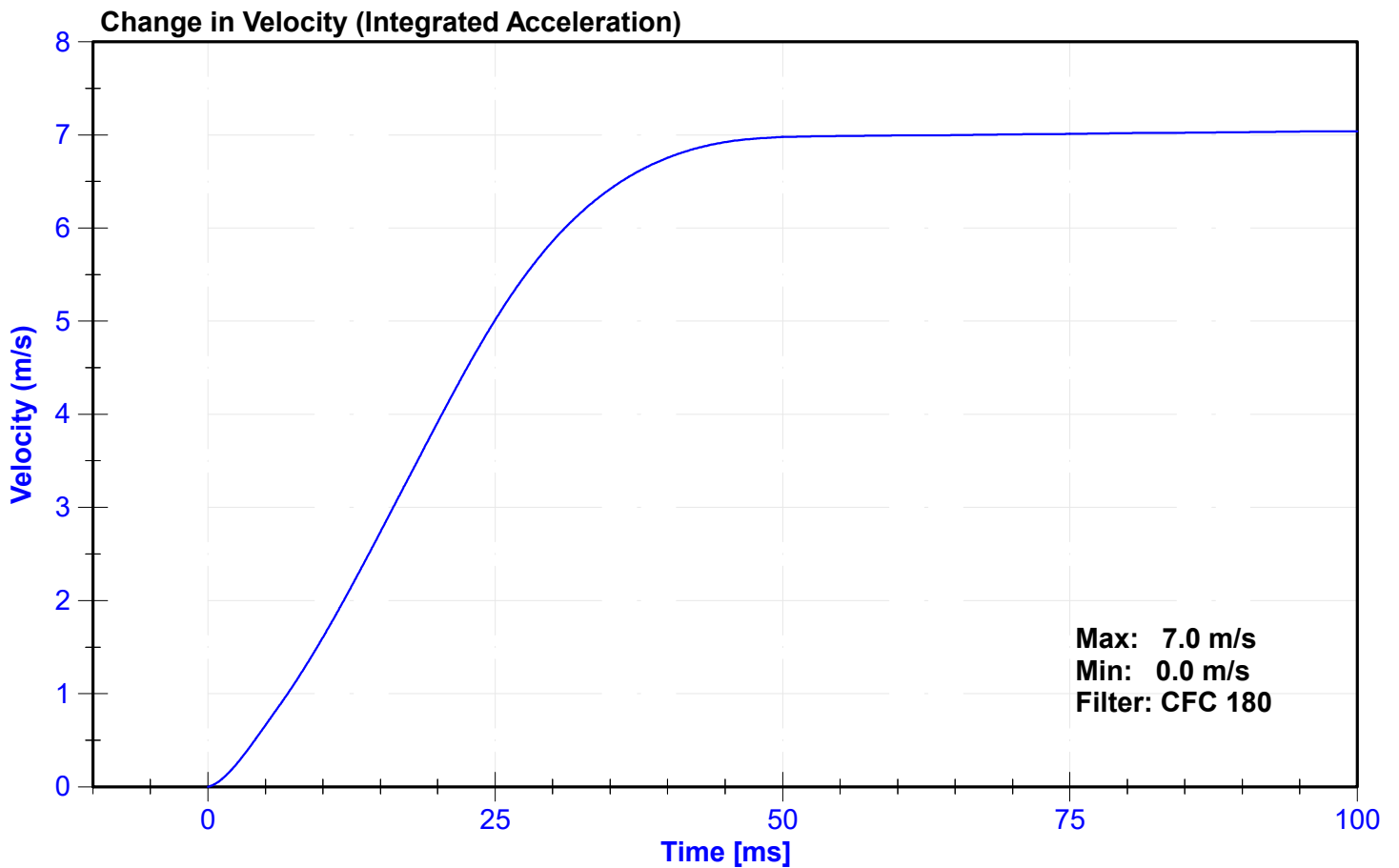
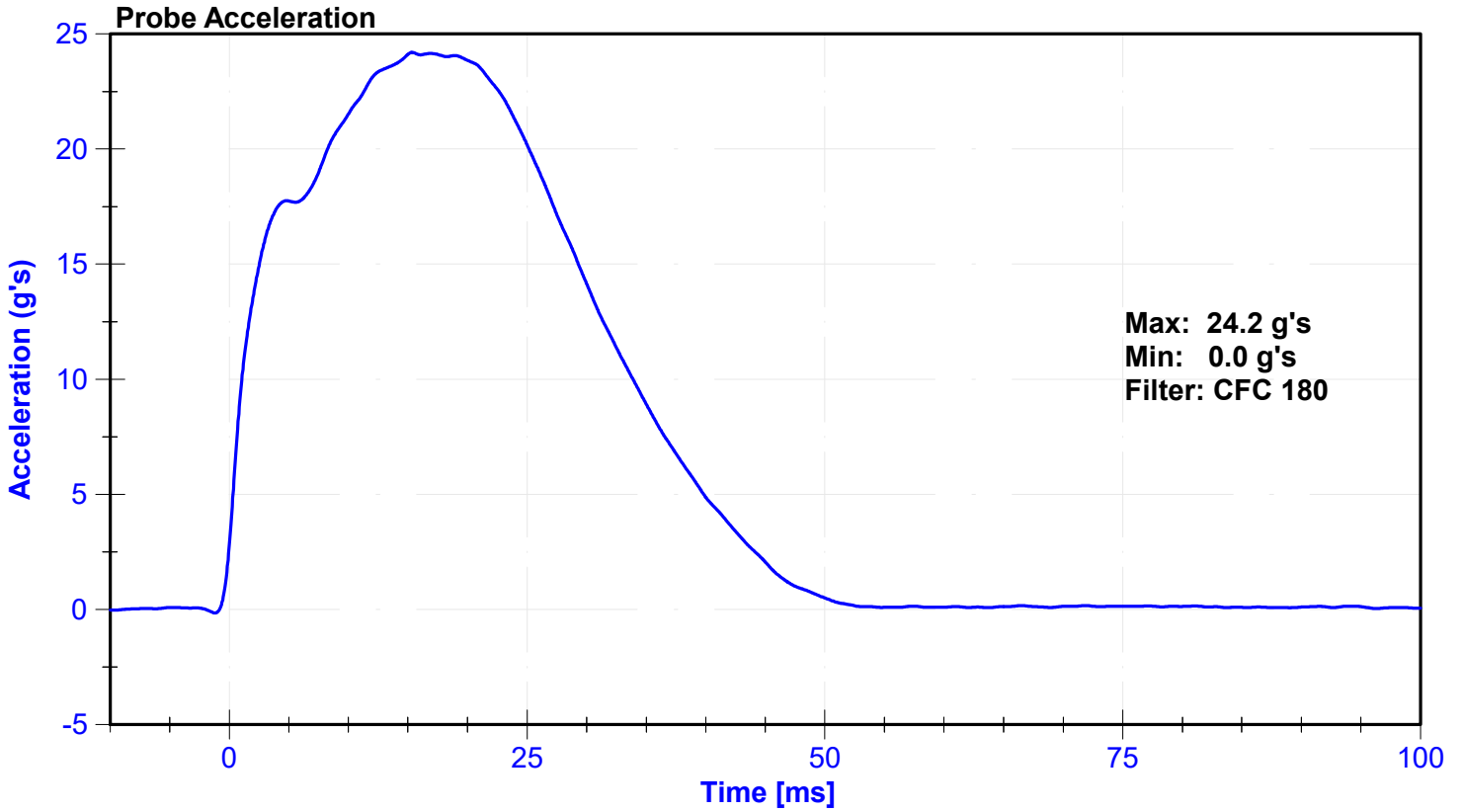
**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18599	9/13/2024	3/12/2025
Chest Potentiometer	Servo	1046	10/31/2024	5/1/2025

**Force vs. Displacement**







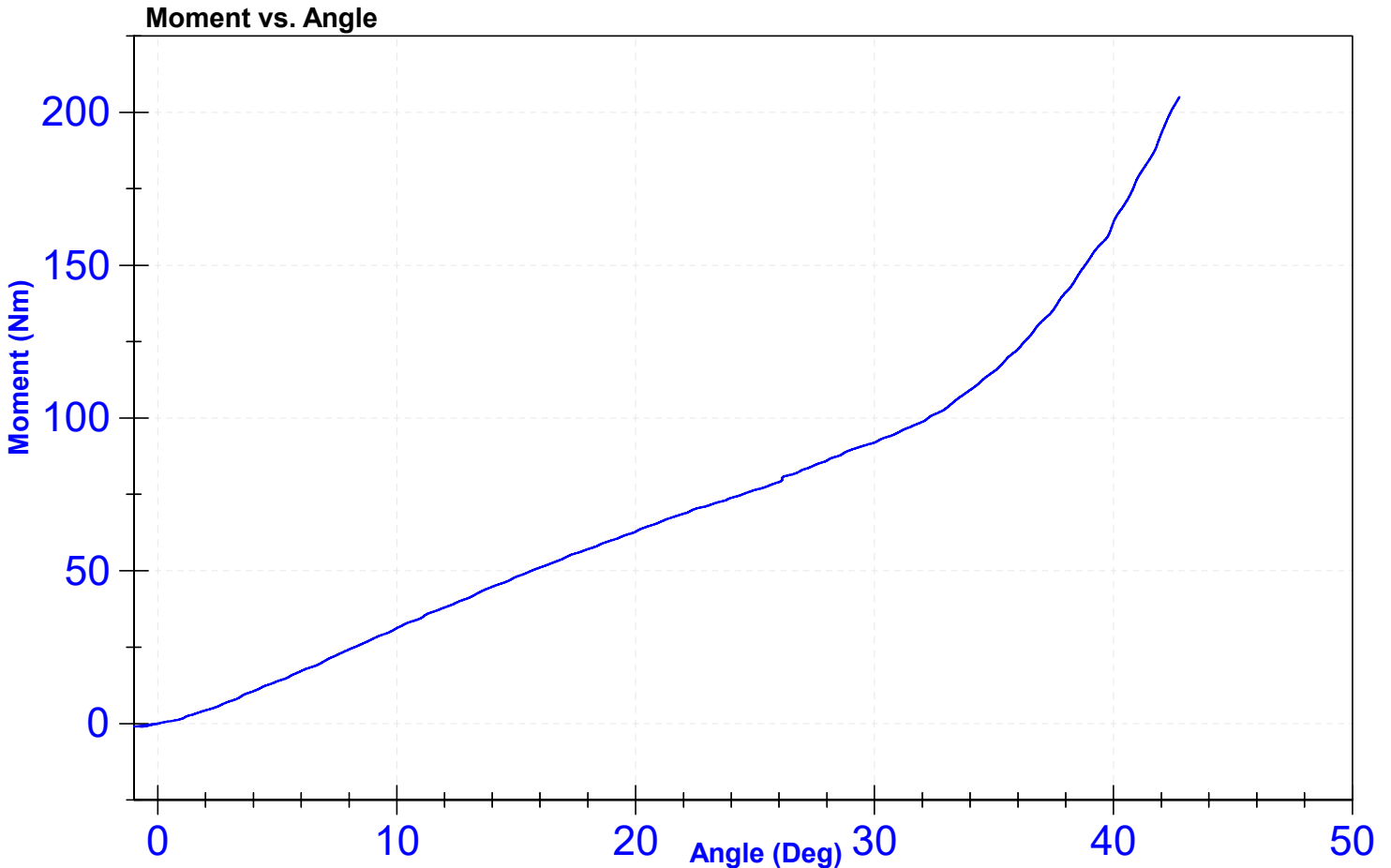
ATD Manufacturer	Humanetics	Test Technician	J. Kinderman
ATD Serial Number	065	Laboratory Supervisor	C. Mantell

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.6	Pass
Humidity	10	70	%	27	Pass
Average Velocity	5	10	deg/s	7.1	Pass
Angle at 203Nm	40	50	deg	42.6	Pass
Moment at 30 degrees	0	94.9	Nm	91.9	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	ETI SP22	DS-0008	9/23/2024	9/23/2025
Load Cell	PCB 2301-02A	694	2024-01-31	2025-01-30



ATD Manufacturer	Humanetics	Test Technician	J. Kinderman
ATD Serial Number	065	Laboratory Supervisor	C. Mantell

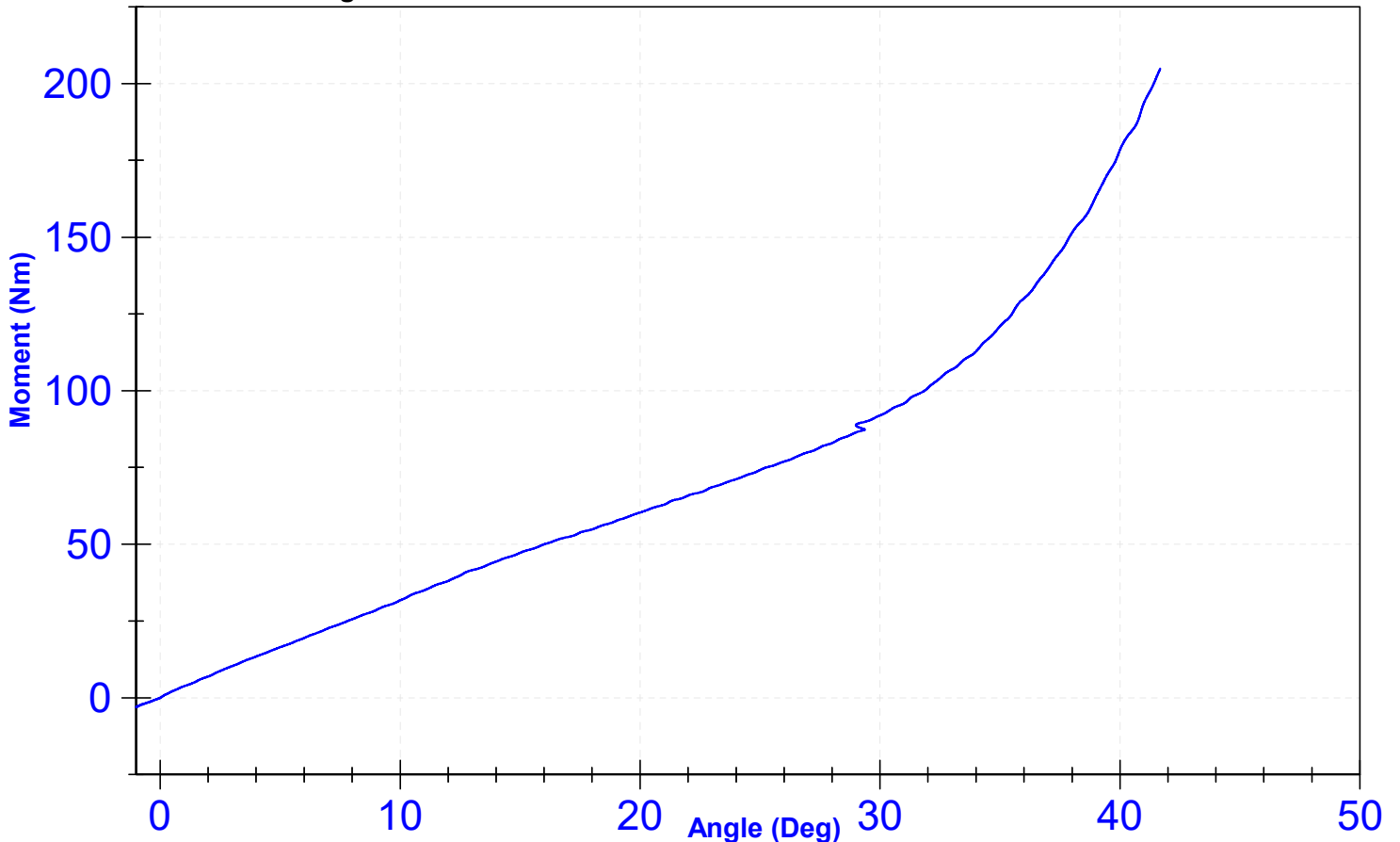
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.6	Pass
Humidity	10	70	%	40	Pass
Average Velocity	5	10	deg/s	7.2	Pass
Angle at 203Nm	40	50	deg	41.6	Pass
Moment at 30 degrees	0	94.9	Nm	92.0	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	ETI SP22	DS-0008	9/23/2024	9/23/2025
Load Cell	PCB 2301-02A	694	2024-01-31	2025-01-30

**Moment vs. Angle**



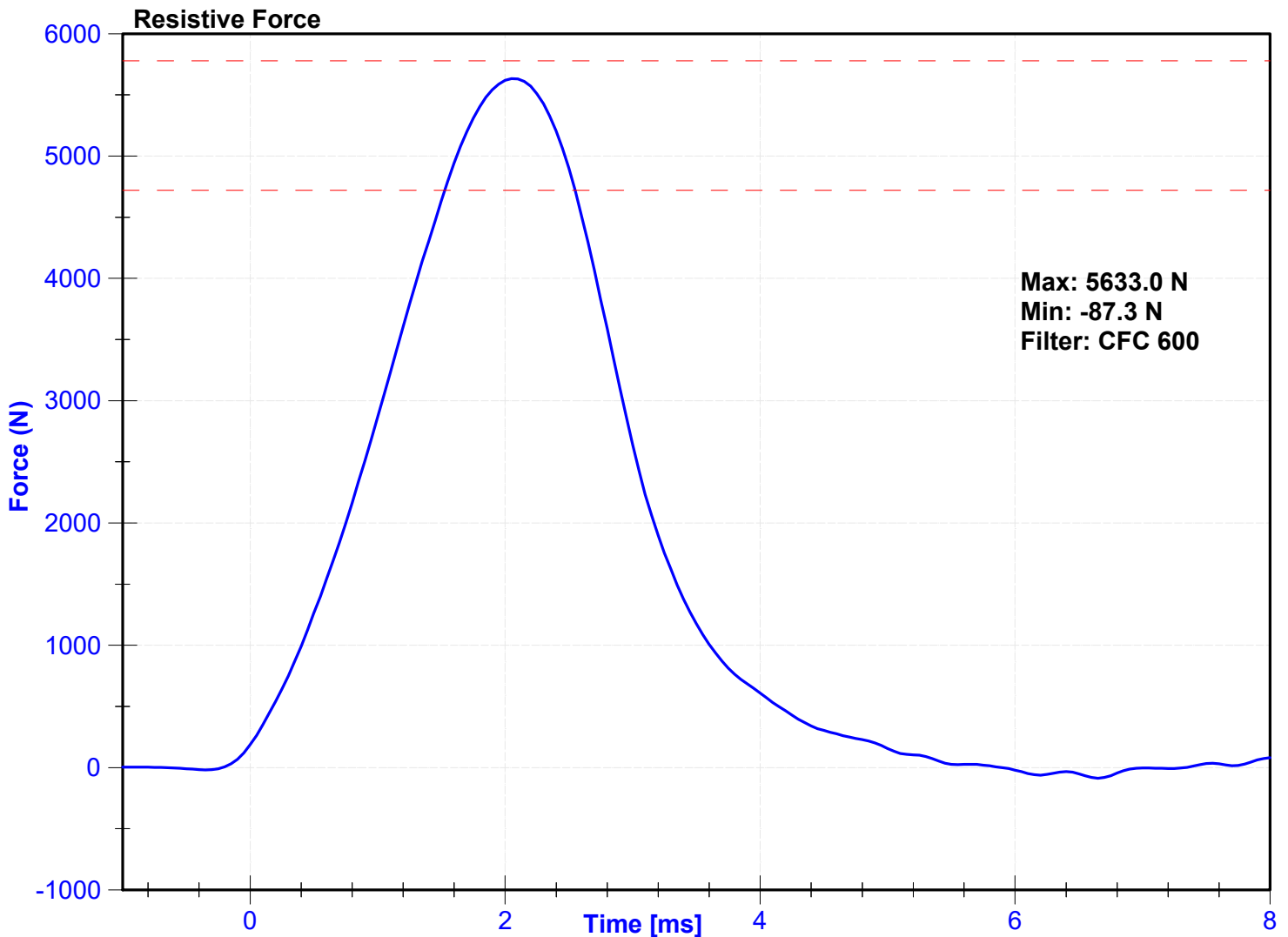
ATD Manufacturer	Humanetics	Test Technician	J. Kinderman
ATD Serial Number	065	Laboratory Supervisor	C. Mantell

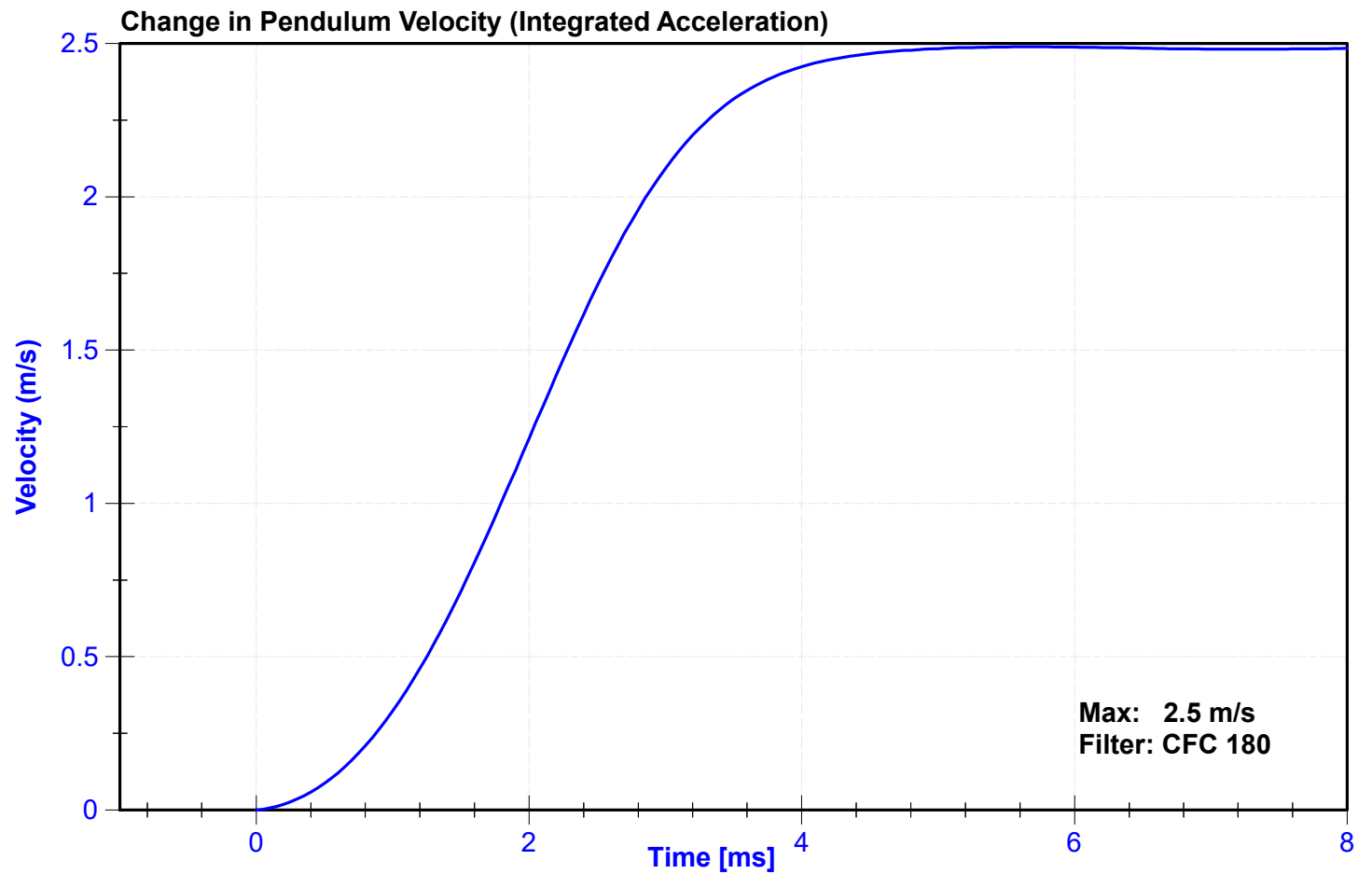
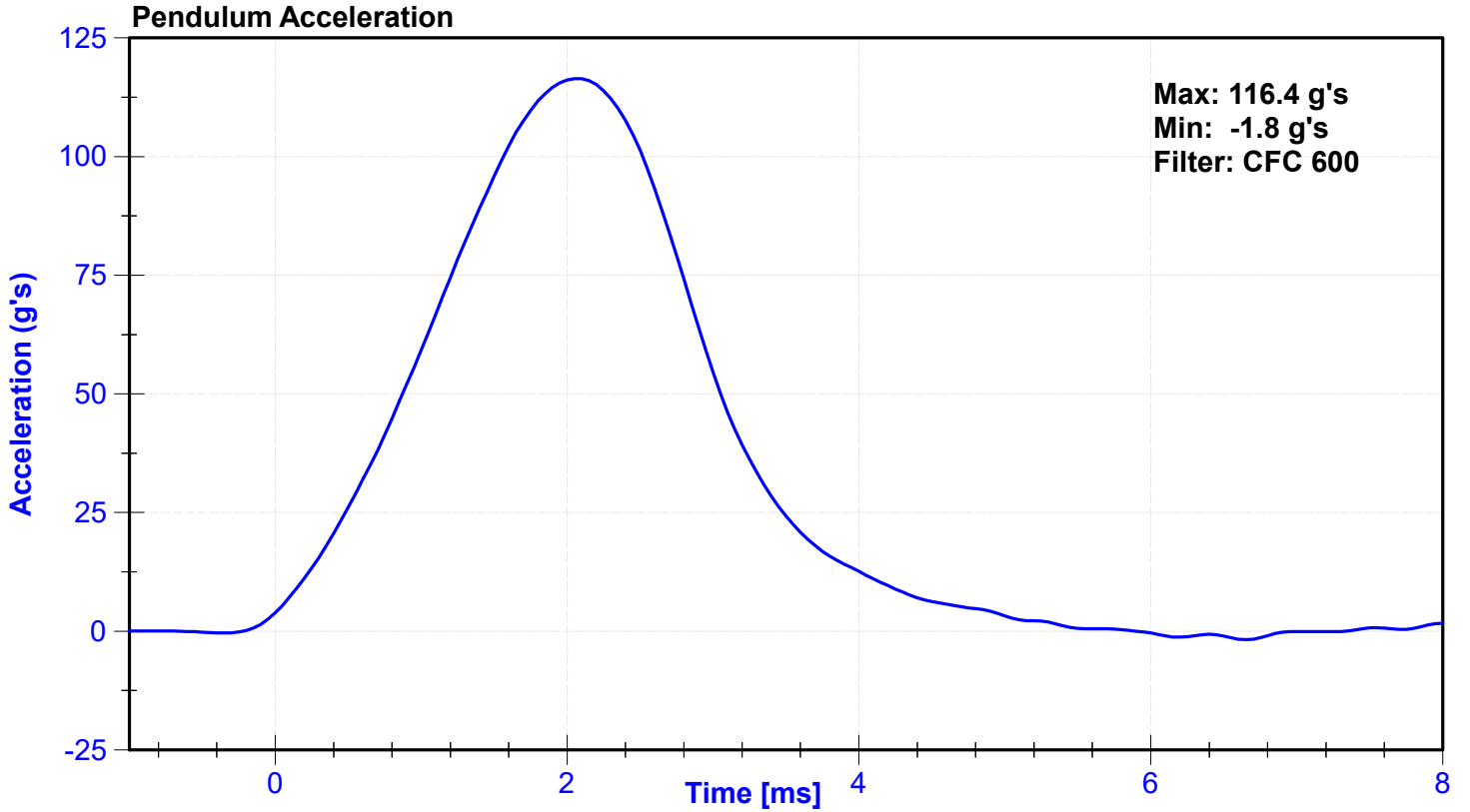
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.1	Pass
Humidity	10	70	%	35	Pass
Velocity	2.07	2.13	m/s	2.078	Pass
Maximum Resistive Force	4720	5780	N	5633.0	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18527	8/2/2024	1/29/2025





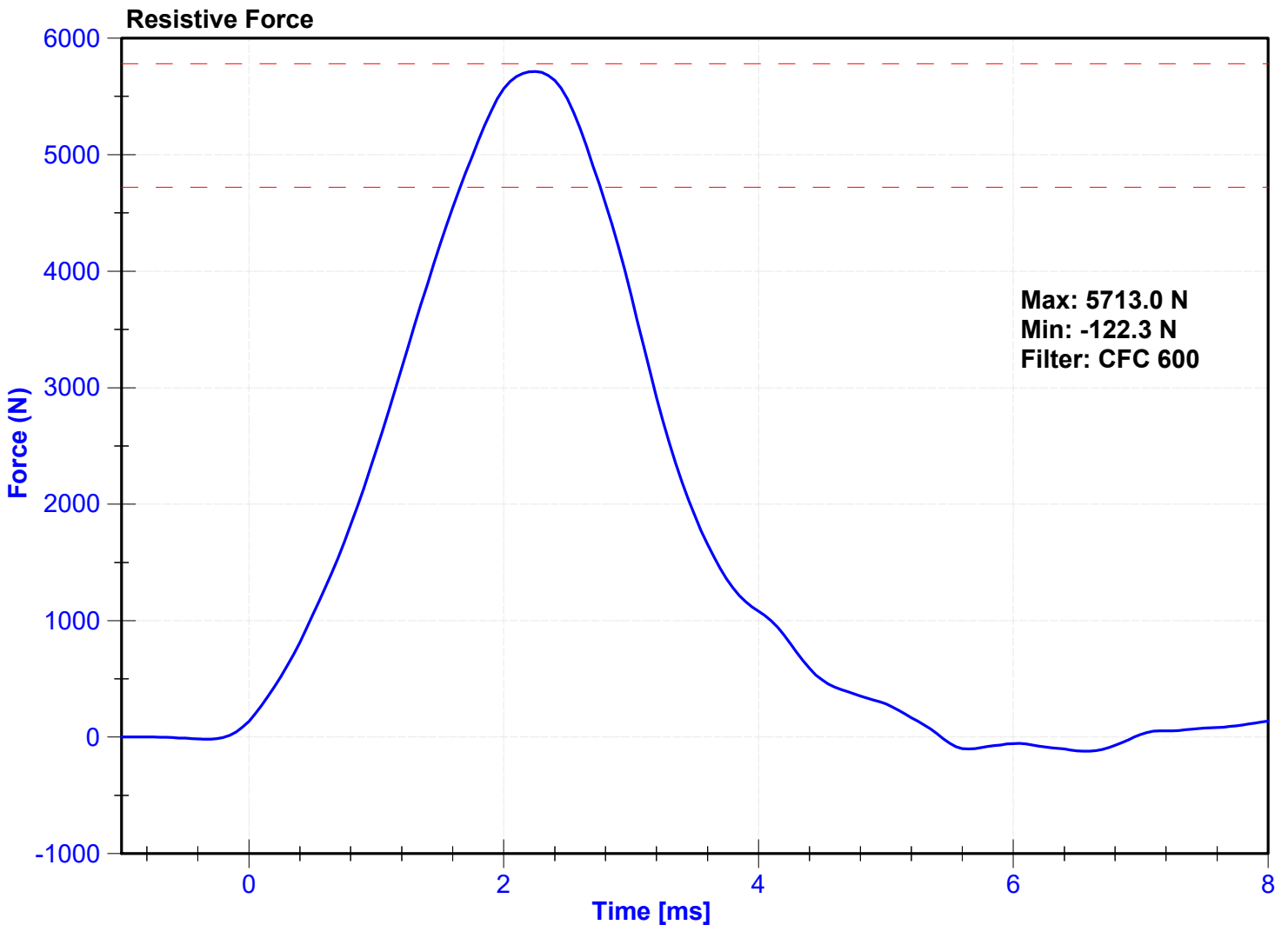
ATD Manufacturer	Humanetics	Test Technician	J. Kinderman
ATD Serial Number	065	Laboratory Supervisor	C. Mantell

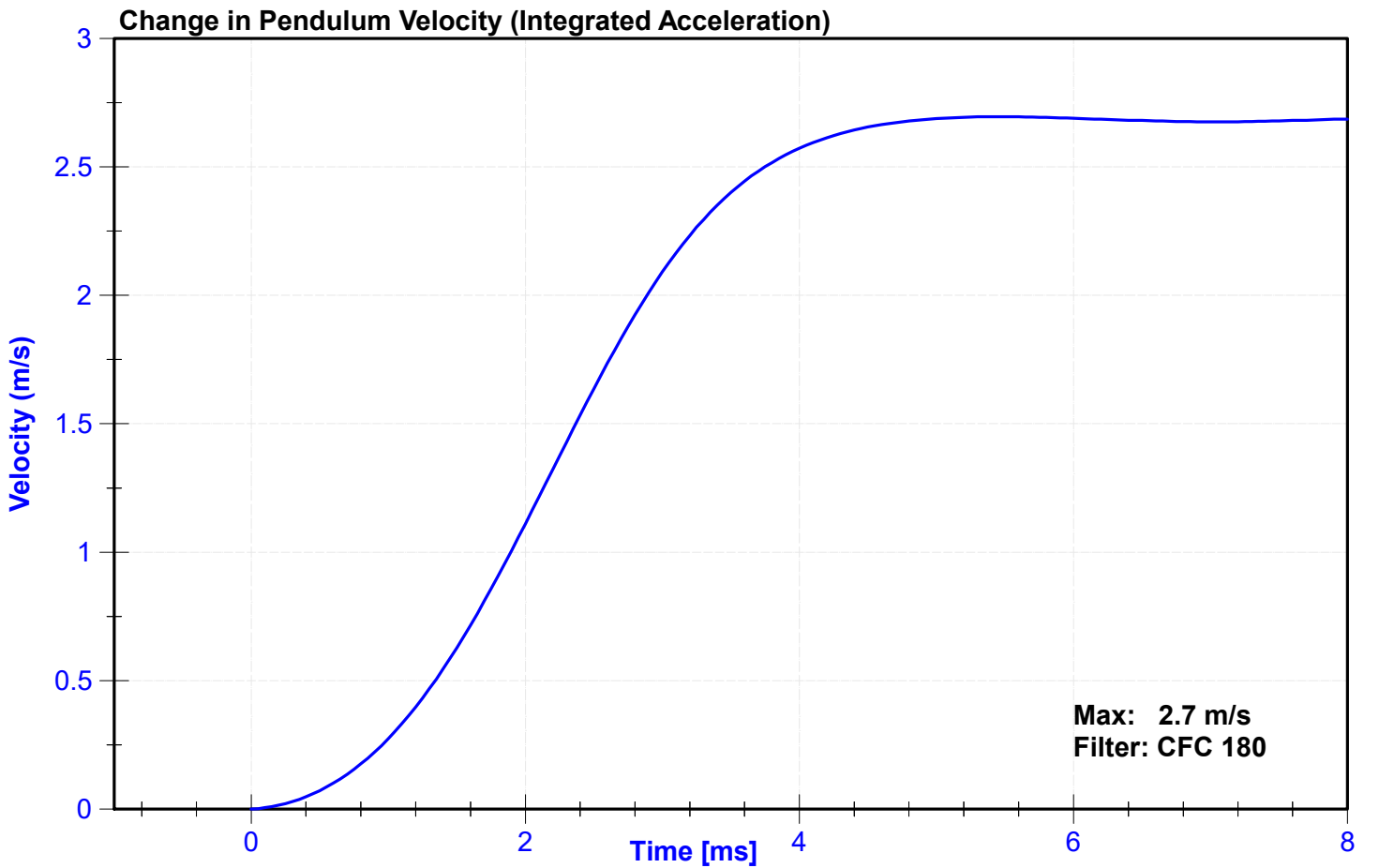
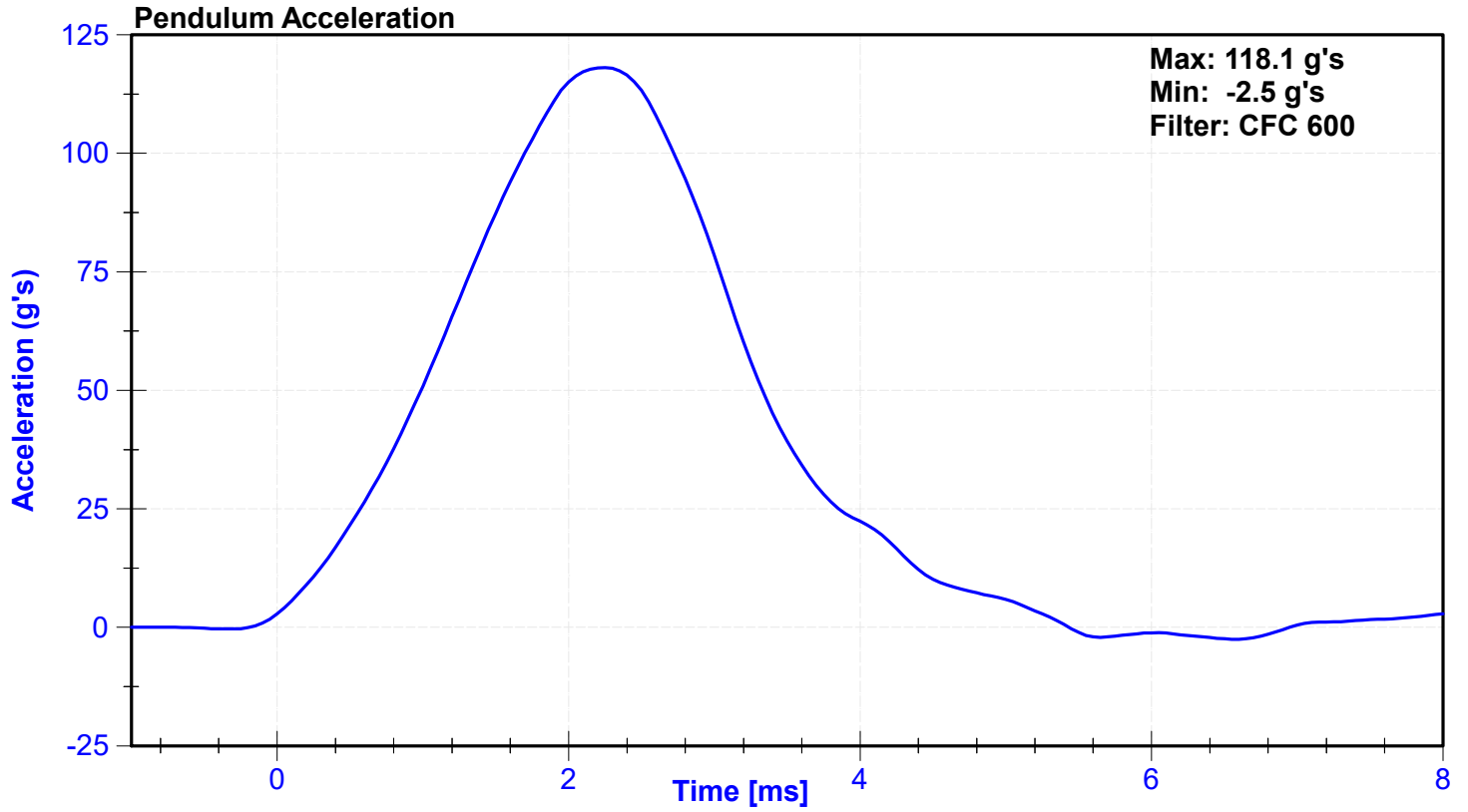
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.1	Pass
Humidity	10	70	%	35	Pass
Velocity	2.07	2.13	m/s	2.079	Pass
Maximum Resistive Force	4720	5780	N	5713.0	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18527	8/2/2024	1/29/2025





**CALIBRATION TEST RESULTS**

**PRE-TEST**

**HYBRID III 5<sup>TH</sup> PERCENTILE - PASSENGER ATD**

**SERIAL NO: 137**

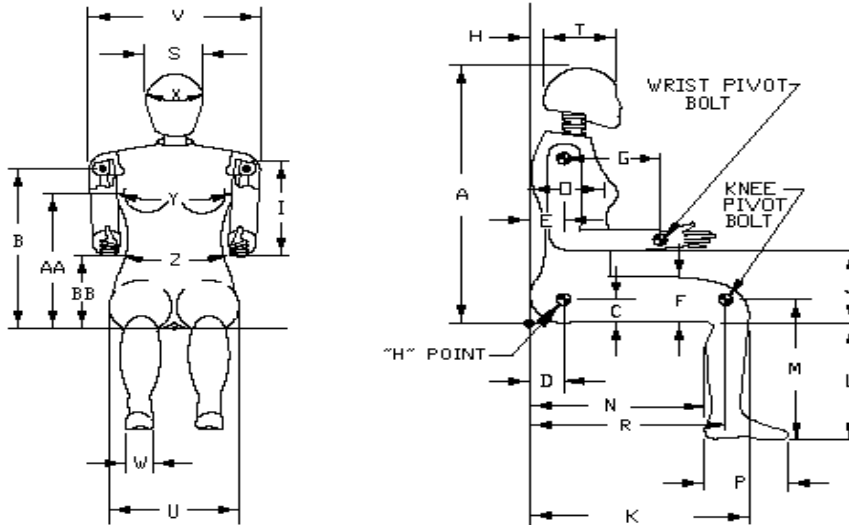


External Measurements - Hybrid 3 - 5th Female

Technician: J. Rios

Date: 09/24/2024

Dummy Serial Number: 137



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	775	800	789	Pass
B	Shoulder Pivot Height	432	457	431	Pass
C	H-Point Height	81	86	85	Pass
D	H-Point from Backline	145	150	148	Pass
E	Shoulder Pivot from Backline	69	84	74	Pass
F	Thigh Clearance	119	135	120	Pass
G	Back of Elbow to Wrist Pivot	244	259	251	Pass
H	Head Back to Backline	43	48	45	Pass
I	Shoulder to Elbow Length	277	297	282	Pass
J	Elbow Rest Height	183	203	195	Pass
K	Buttock to Knee Length	521	546	532	Pass
L	Popliteal Height	356	376	369	Pass
M	Knee Pivot Height	394	419	409	Pass
N	Buttock Popliteal Length	414	439	425	Pass
O	Chest Depth without Jacket	175	191	184	Pass
P	Foot Length (right)	219	234	225	Pass
R	Buttock To Knee Pivot Length	457	483	467	Pass
S	Head Breadth	137	147	144	Pass
T	Head Depth	178	188	184	Pass
U	Hip Breadth	300	315	309	Pass
V	Shoulder Breadth	351	366	360	Pass
W	Foot Breadth	79	94	86	Pass
X	Head Circumference	528	549	537	Pass
Y	Chest Circumference with Jacket	851	881	862	Pass
Z	Waist Circumference	460	790	607	Pass
AA	Reference Location (Chest Circumference)	333	358	339	Pass
BB	Reference Location (Waist Circumference)	160	170	167	Pass

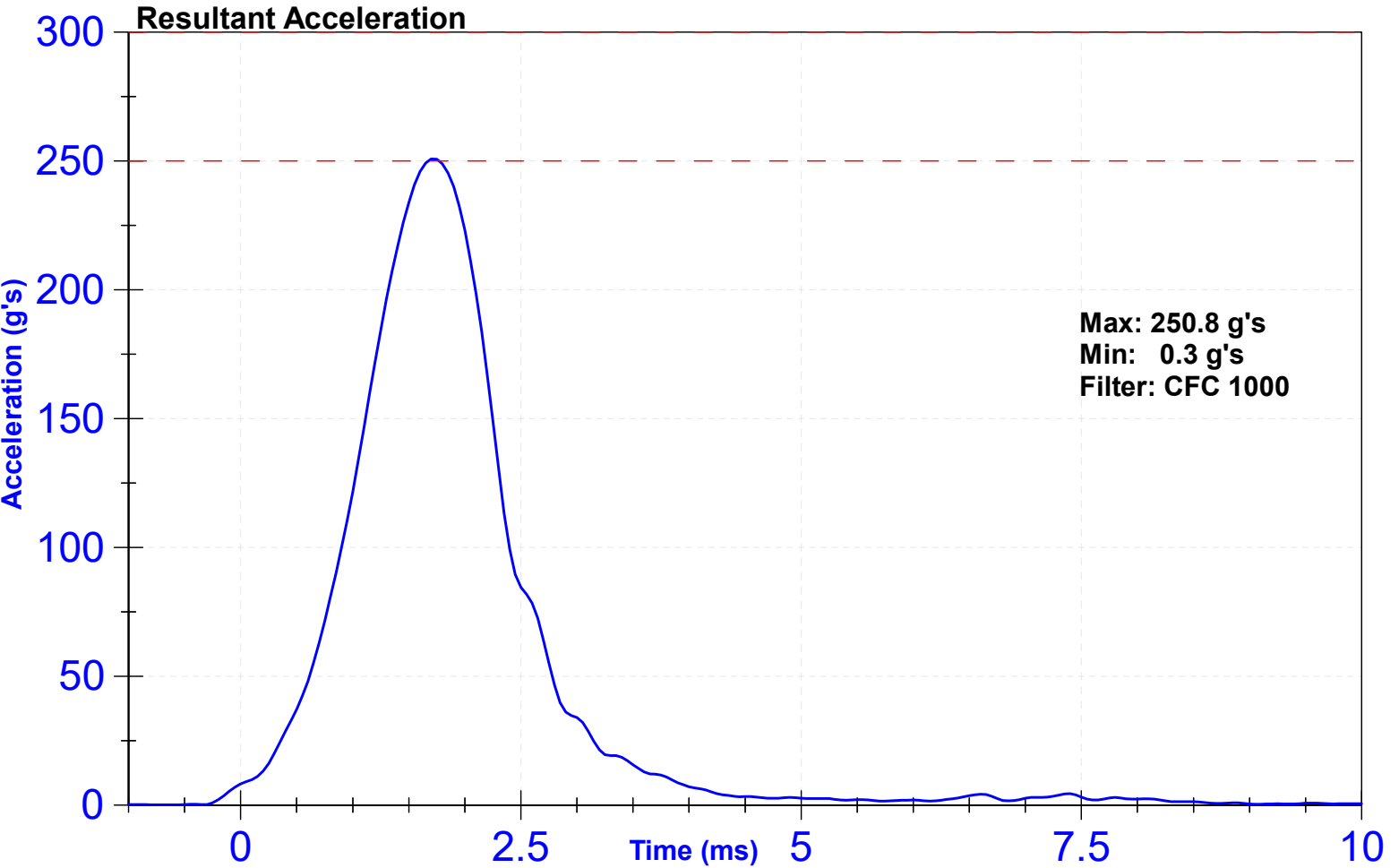
ATD Manufacturer	Humanetics	Test Technician	K. Konieczny
ATD Serial Number	137	Laboratory Supervisor	C. Mantell

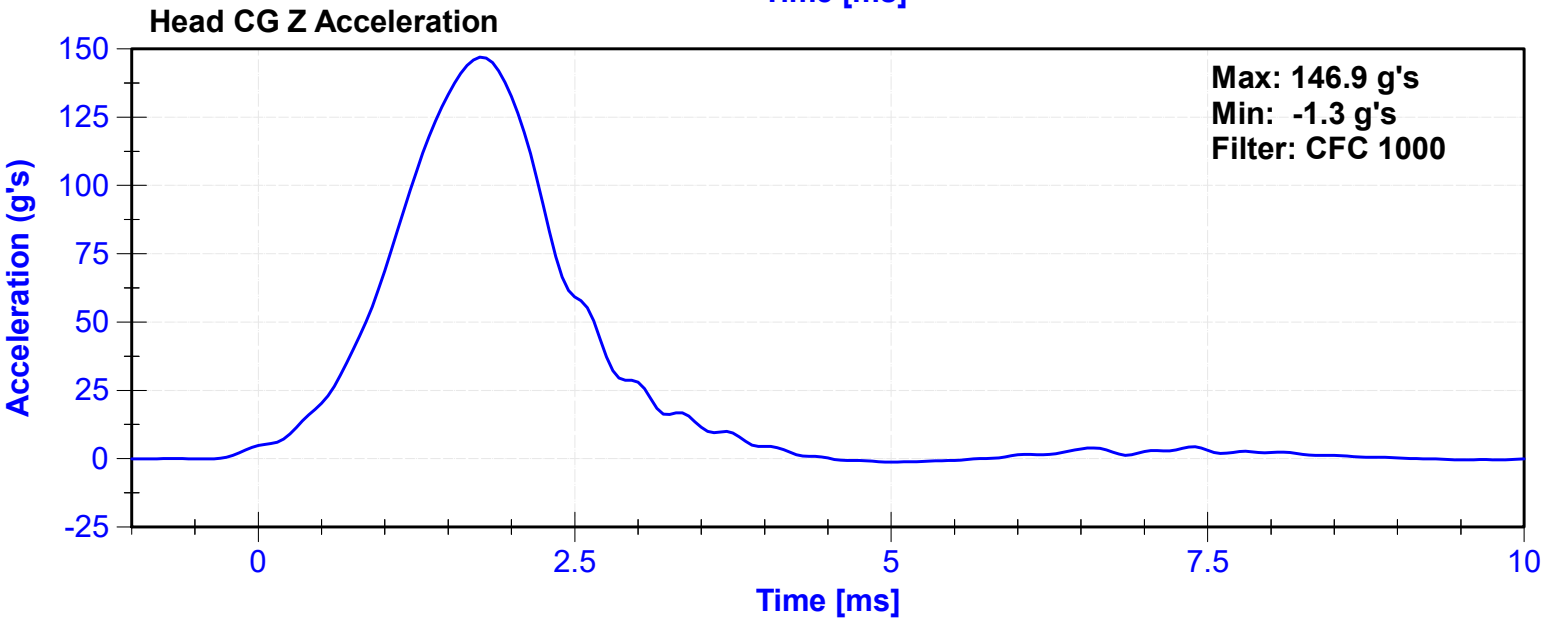
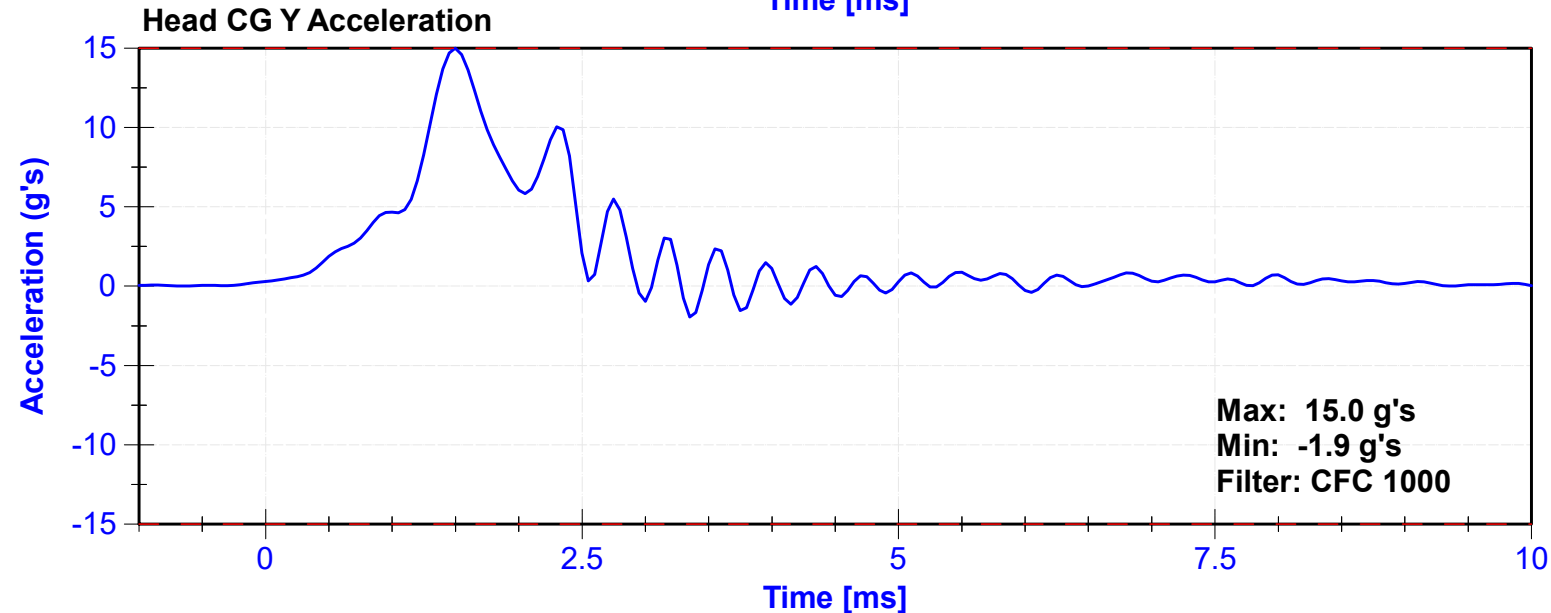
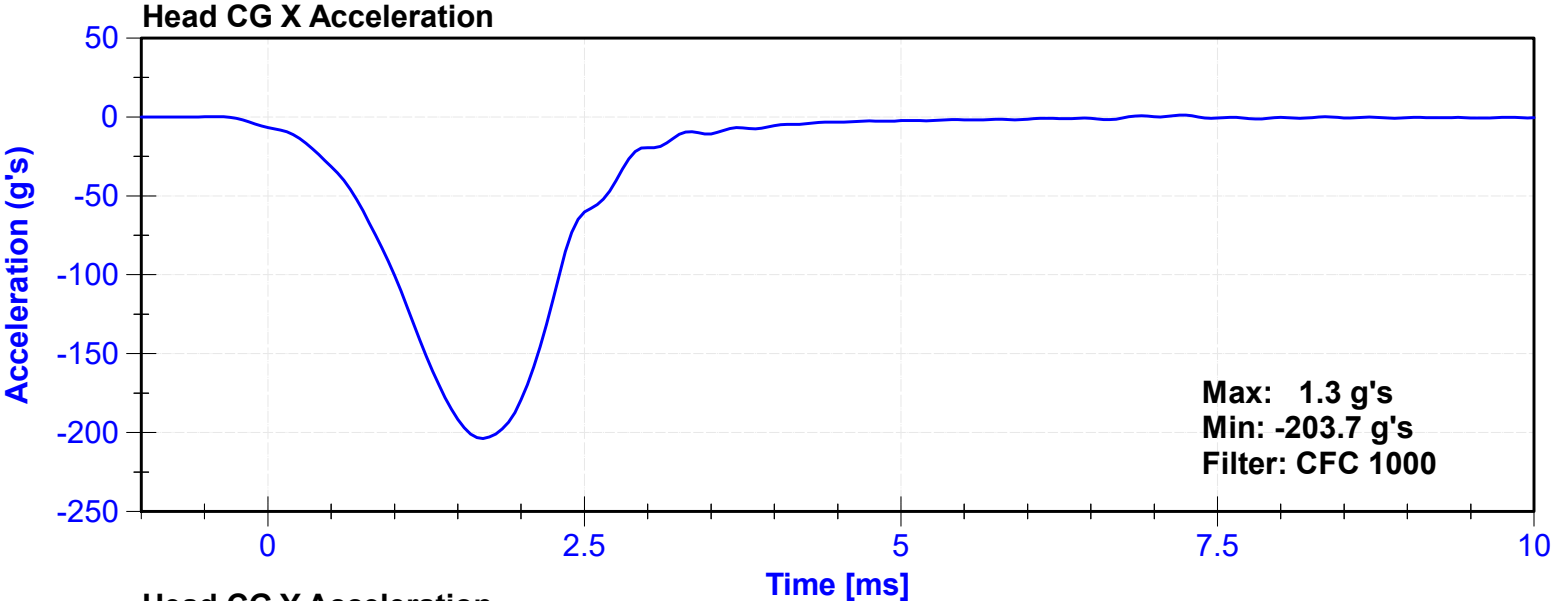
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.9	Pass
Humidity	10	70	%	57	Pass
Resultant Acceleration	250	300	g's	250.8	Pass
Oscillation	0	10	%	1.7	Pass
Lateral Acceleration	-15	15	g's	15.0	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	P79417	8/19/2024	2/15/2025
Y Accelerometer	Endevco	P83335	8/19/2024	2/15/2025
Z Accelerometer	Endevco	P64149	8/19/2024	2/15/2025





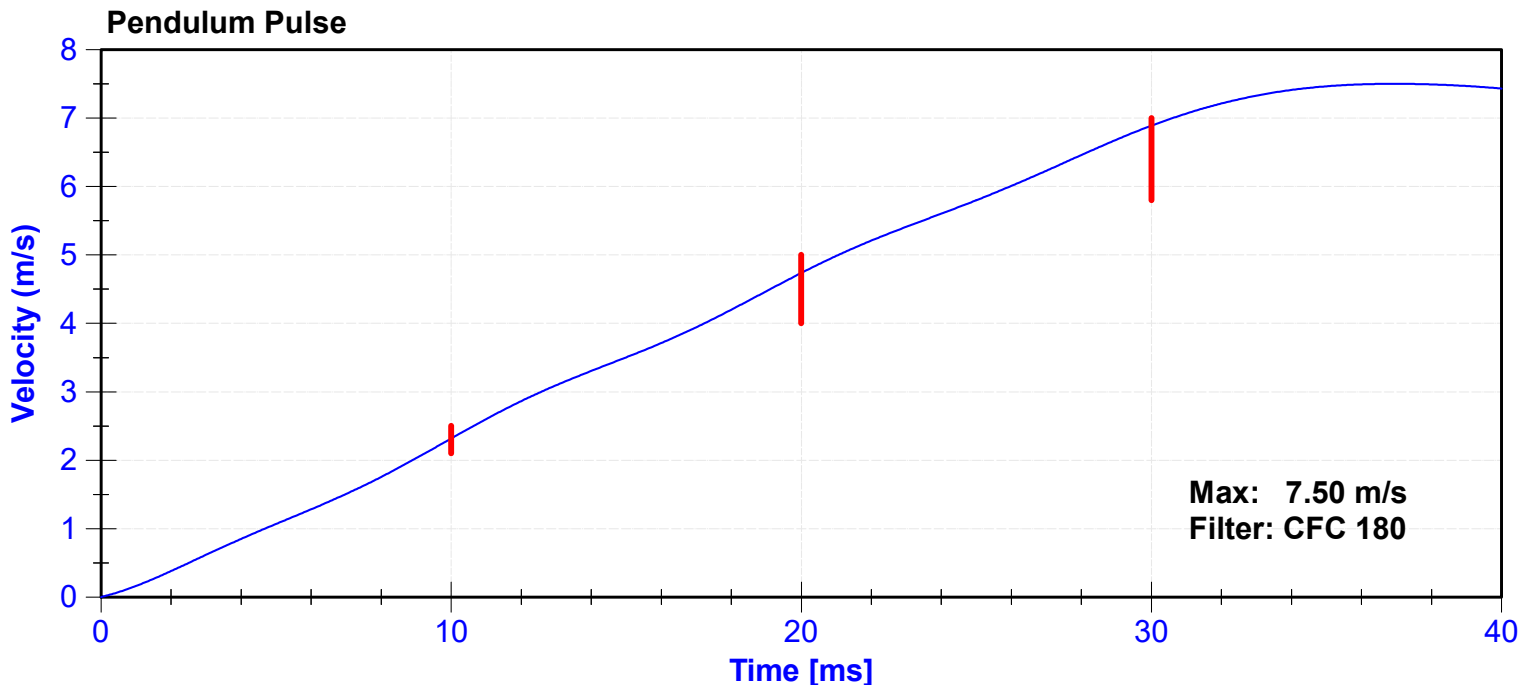
ATD Manufacturer	Humanetics	Test Technician	K. Konieczny
ATD Serial Number	137	Laboratory Supervisor	C. Mantell

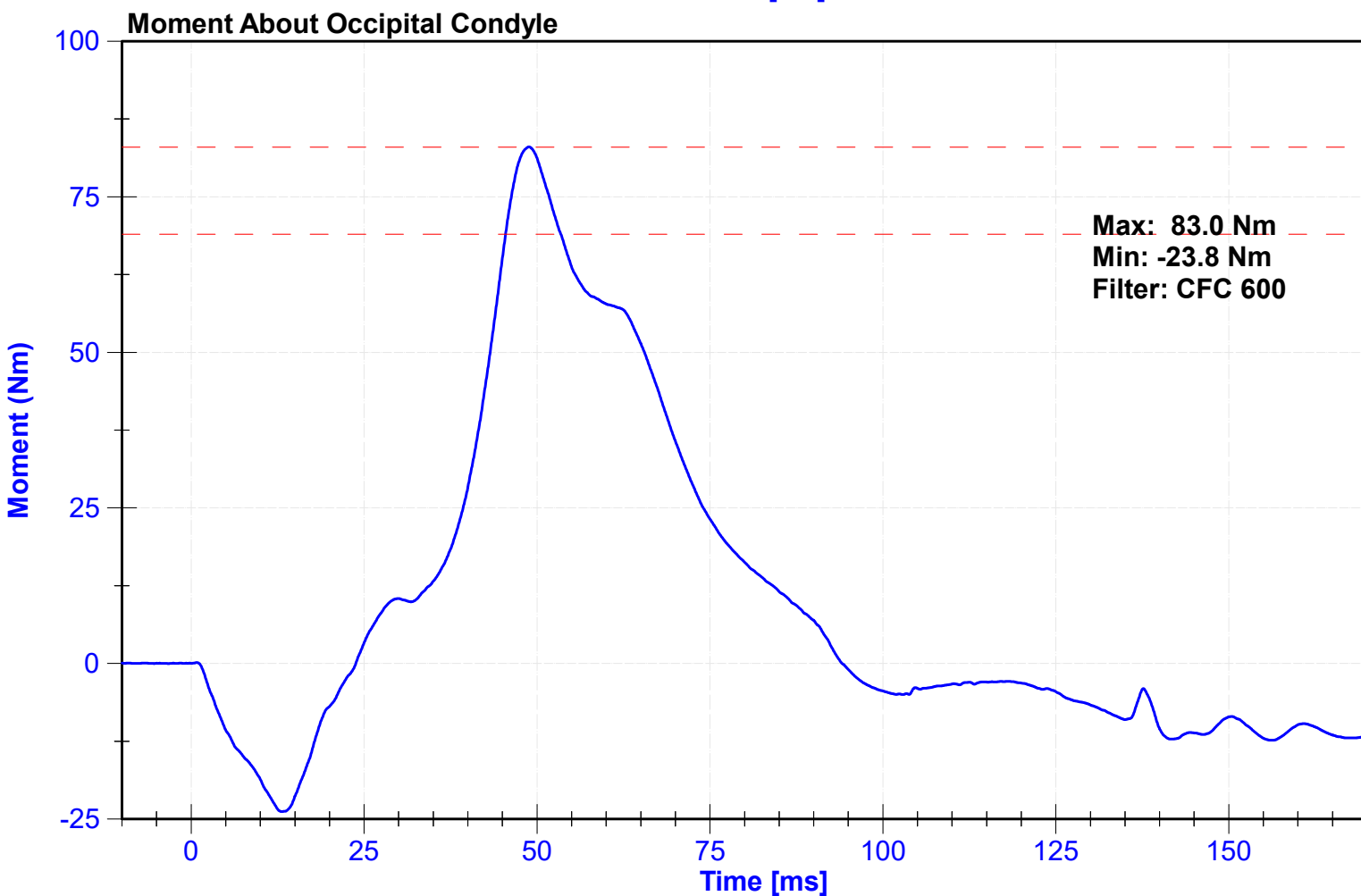
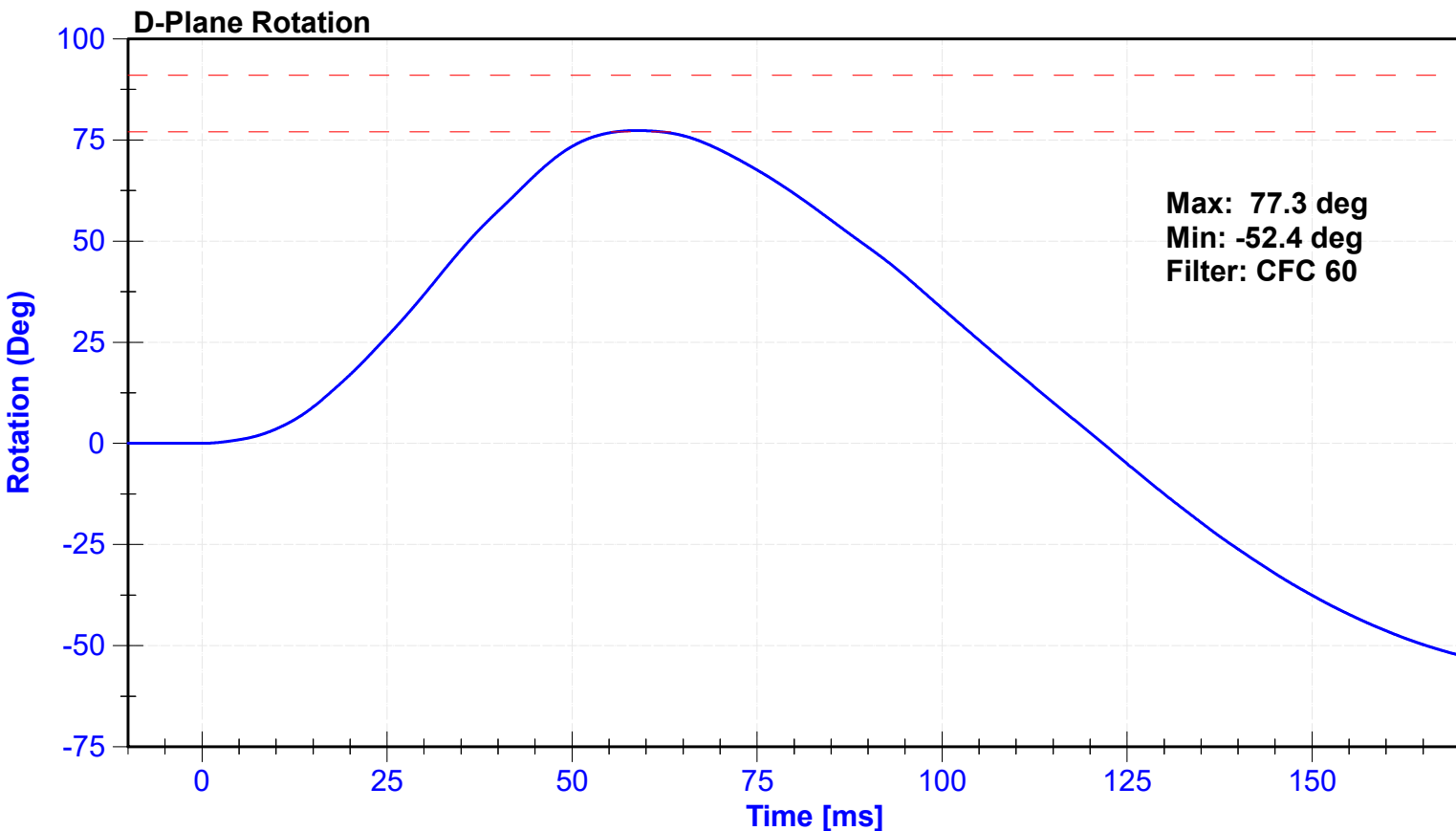
**Results**

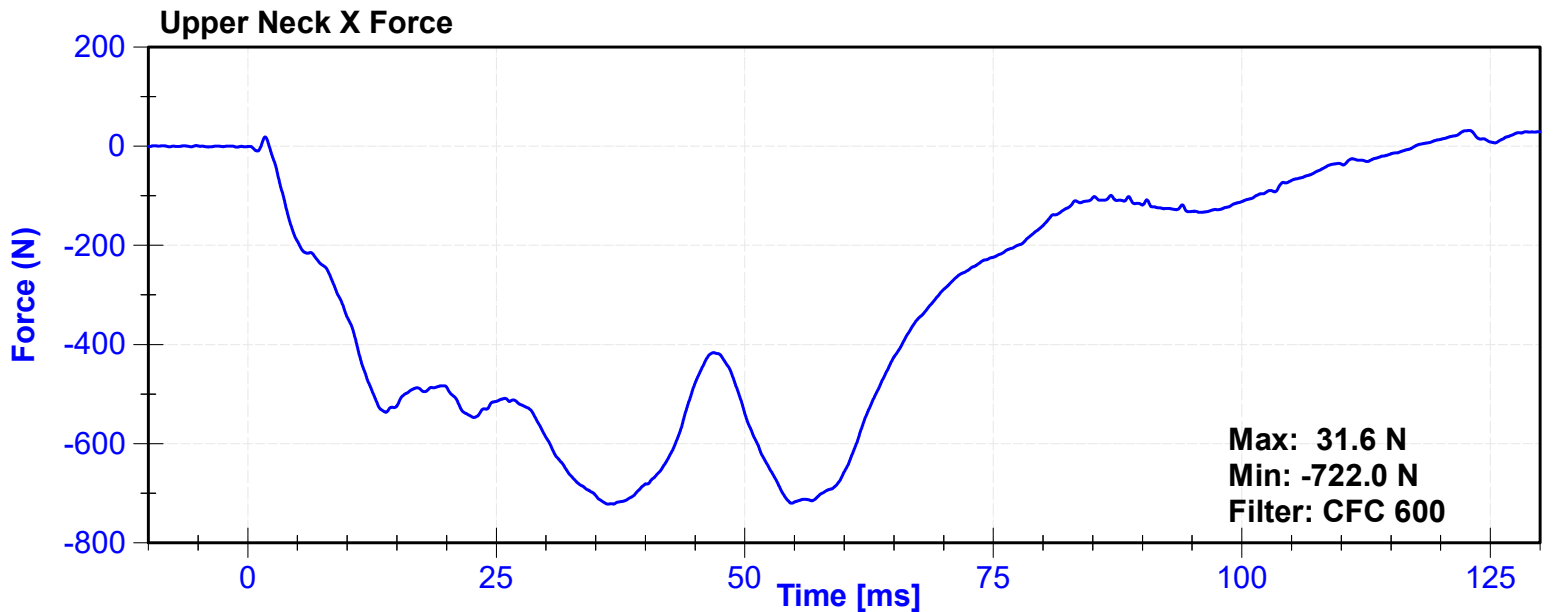
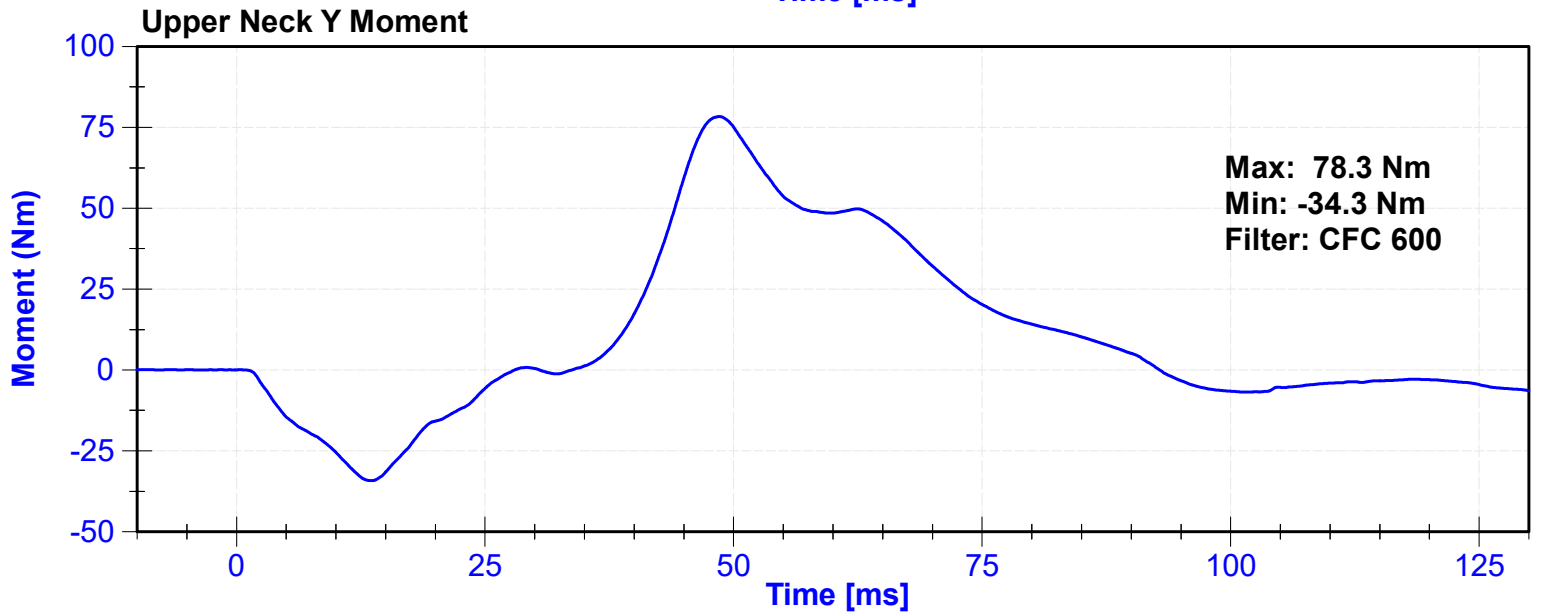
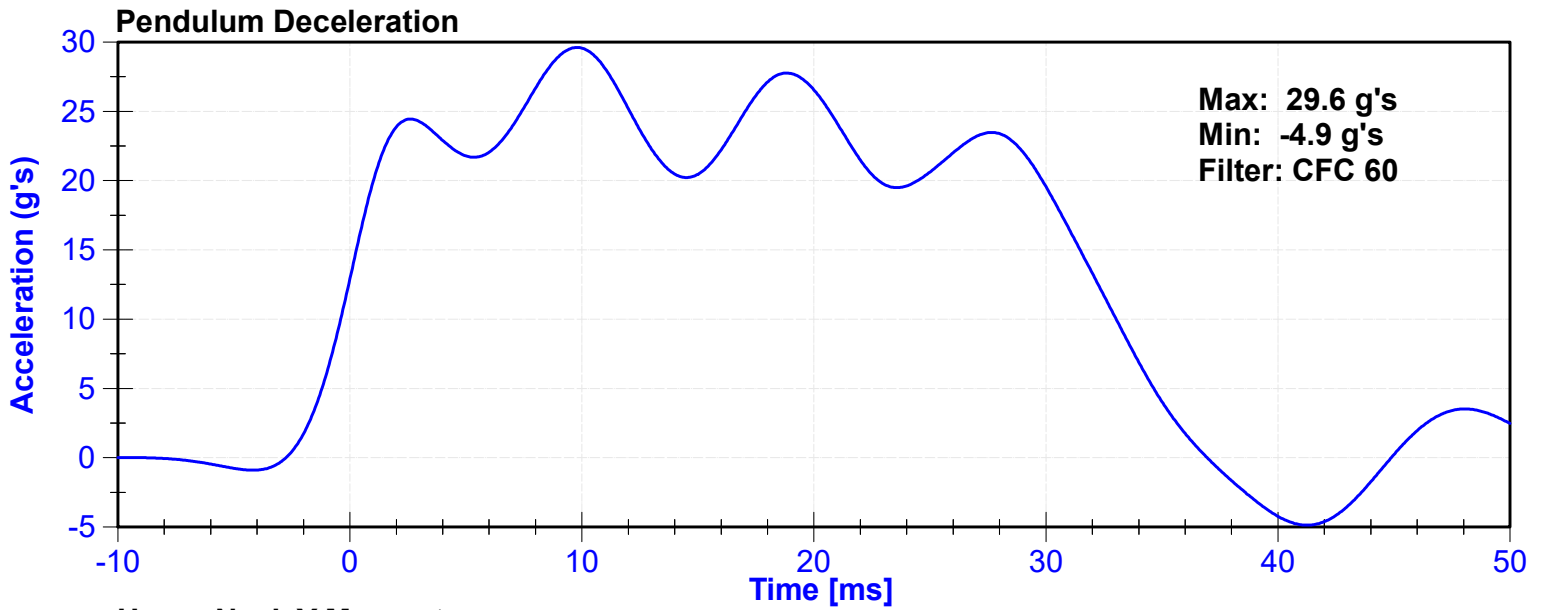
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	63	Pass
Velocity	6.89	7.13	m/s	7.092	Pass
Pendulum Impulse at 10ms	2.1	2.5	m/s	2.32	Pass
Pendulum Impulse at 20ms	4.0	5.0	m/s	4.74	Pass
Pendulum Impulse at 30ms	5.8	7.0	m/s	6.89	Pass
Max D Plane Rotation	77	91	deg	77.3	Pass
Max Moment During Rotation Interval	69	83	Nm	83.0	Pass
Moment Decay to 10.0 Nm	80	100	ms	86.7	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16650	10/31/2023	10/30/2024
Pendulum Potentiometer	ETI	SP22G_LABPOT1	5/7/2024	5/7/2025
Condyle Potentiometer	ETI	SP22G_LABPOT2	5/7/2024	5/7/2025
Upper Neck Load Cell	Denton	2184-FX	7/10/2024	7/10/2025







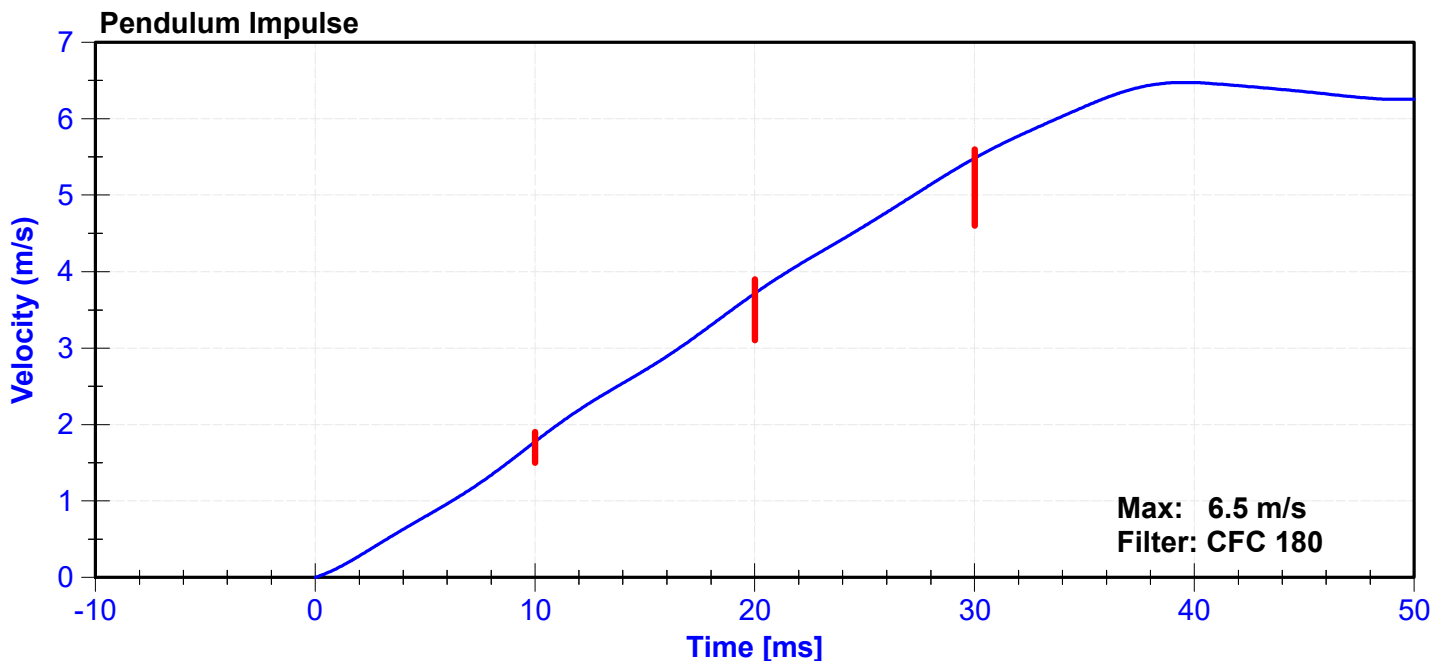
ATD Manufacturer	Humanetics	Test Technician	K. Konieczny
ATD Serial Number	137	Laboratory Supervisor	C. Mantell

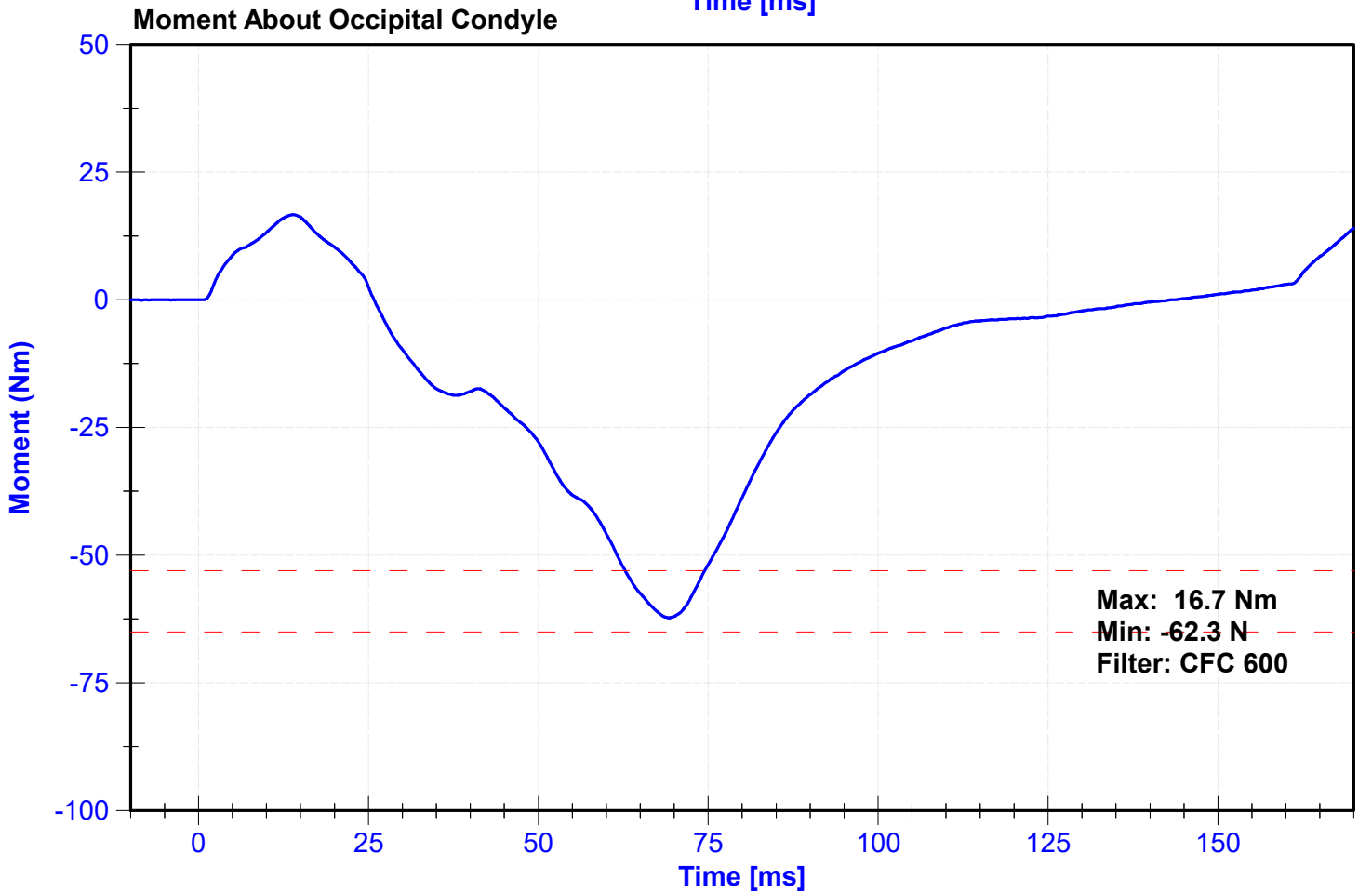
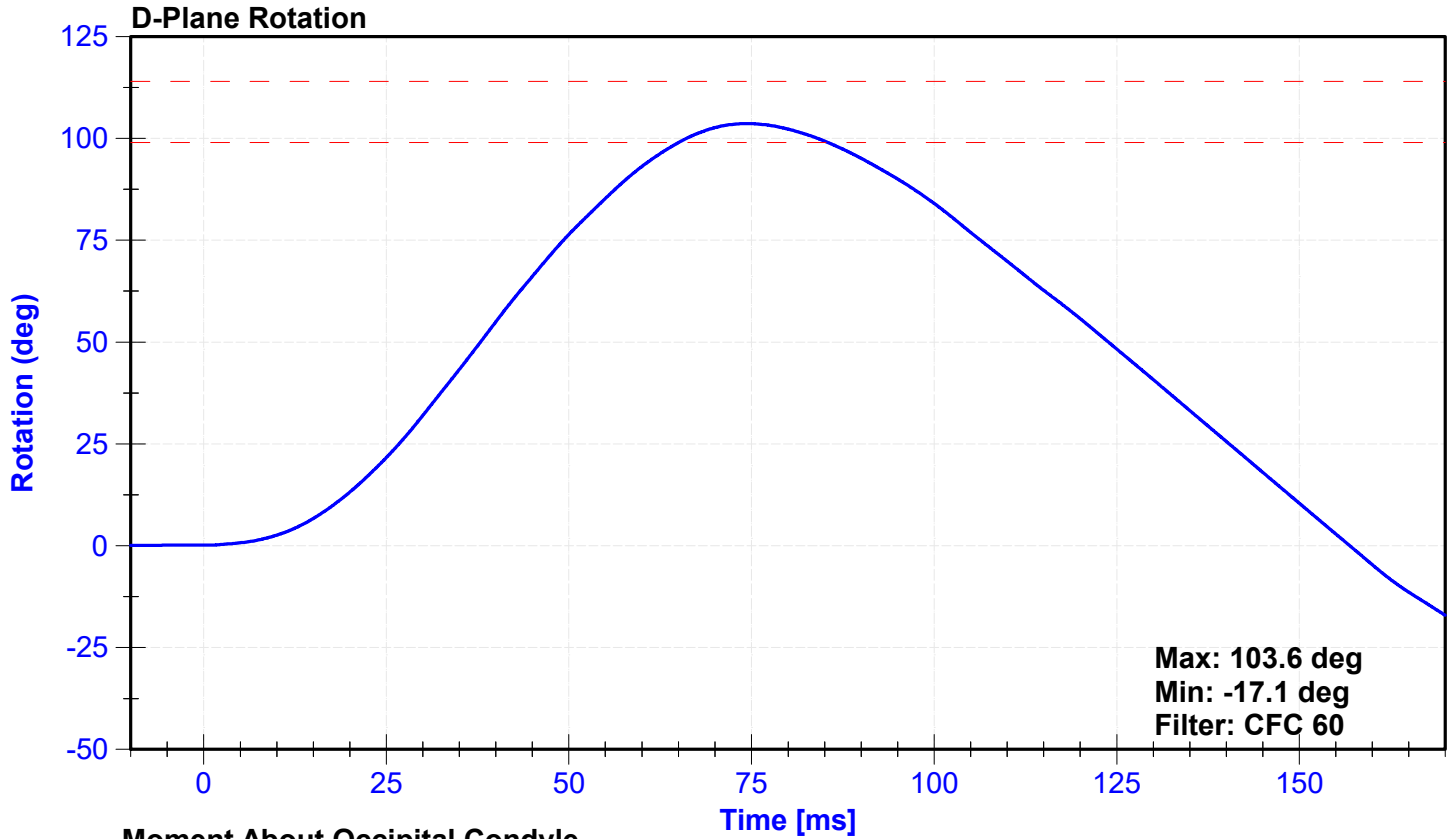
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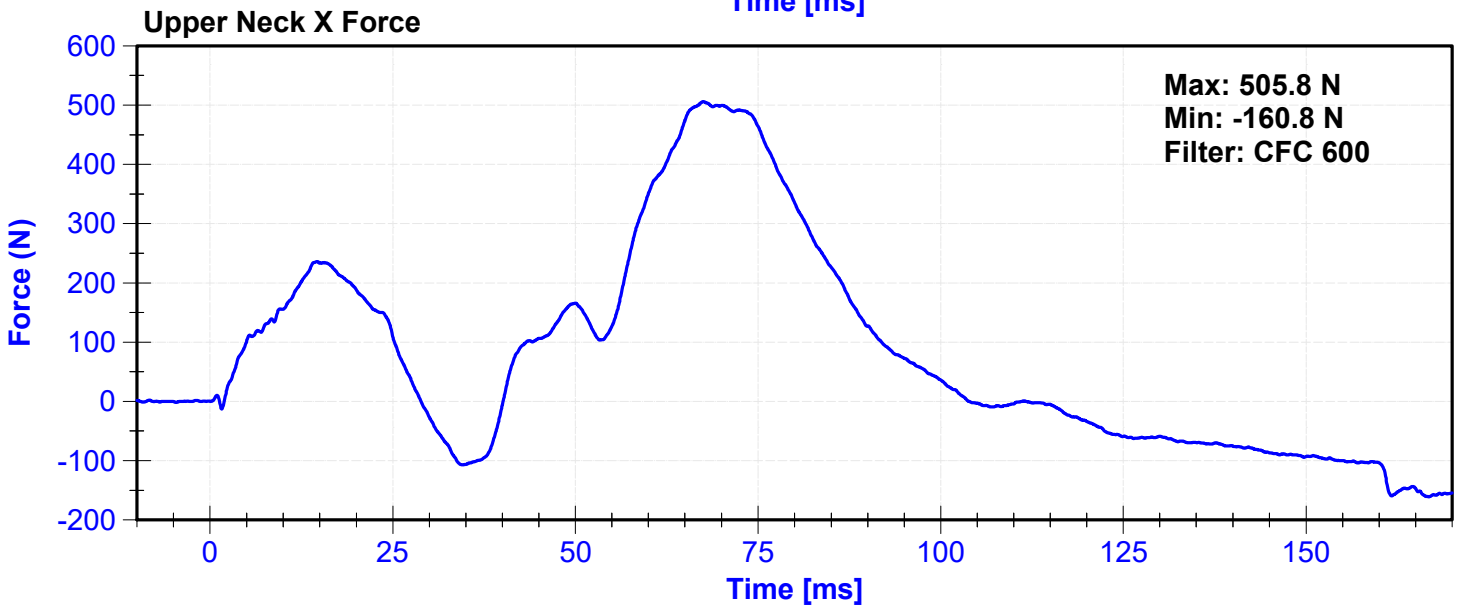
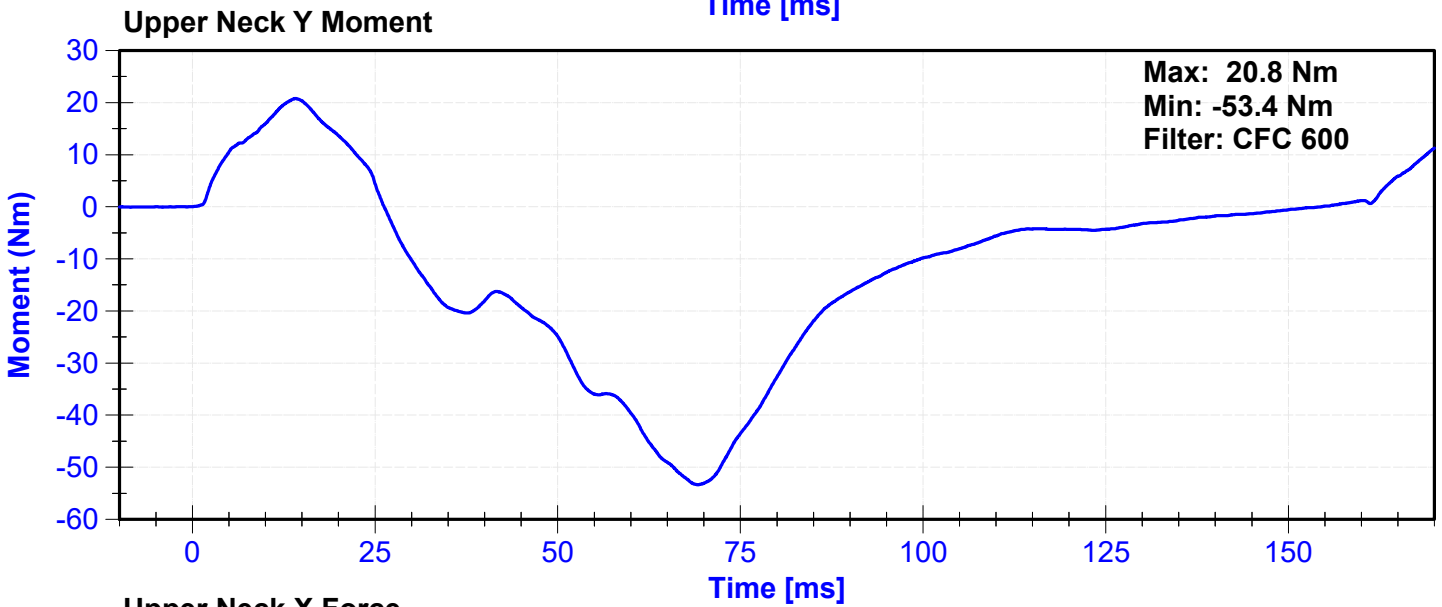
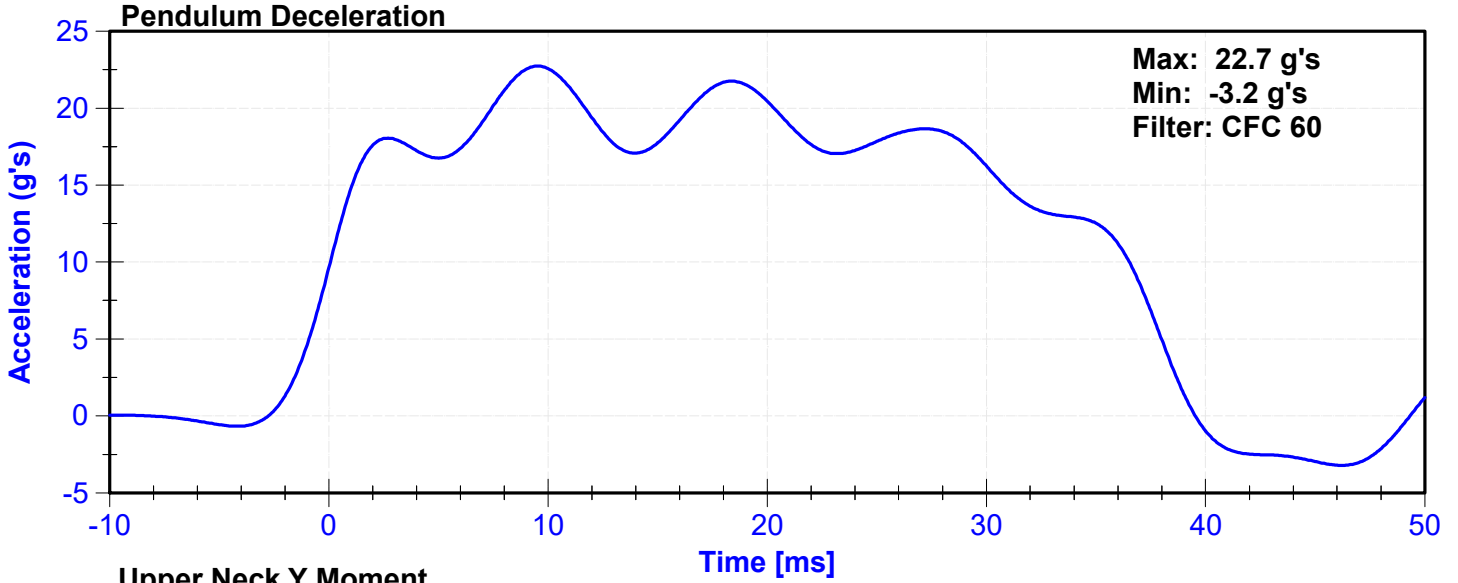
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	63	Pass
Velocity	5.95	6.19	m/s	6.144	Pass
Pendulum Impulse at 10ms	1.5	1.9	m/s	1.78	Pass
Pendulum Impulse at 20ms	3.1	3.9	m/s	3.72	Pass
Pendulum Impulse at 30ms	4.6	5.6	m/s	5.48	Pass
D Plane Rotation	99	114	deg	103.6	Pass
Moment During Rotation Interval	-65	-53	Nm	-62.3	Pass
Moment Decay to -10Nm	94	114	ms	101.0	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16650	10/31/2023	10/30/2024
Pendulum Potentiometer	ETI	SP22G_LABPOT1	5/7/2024	5/7/2025
Condyle Potentiometer	ETI	SP22G_LABPOT2	5/7/2024	5/7/2025
Upper Neck Load Cell	Denton	2184-FX	7/10/2024	7/10/2025







ATD Manufacturer	Humanetics	Test Technician	C. Mantell
ATD Serial Number	137	Laboratory Supervisor	C. Mantell

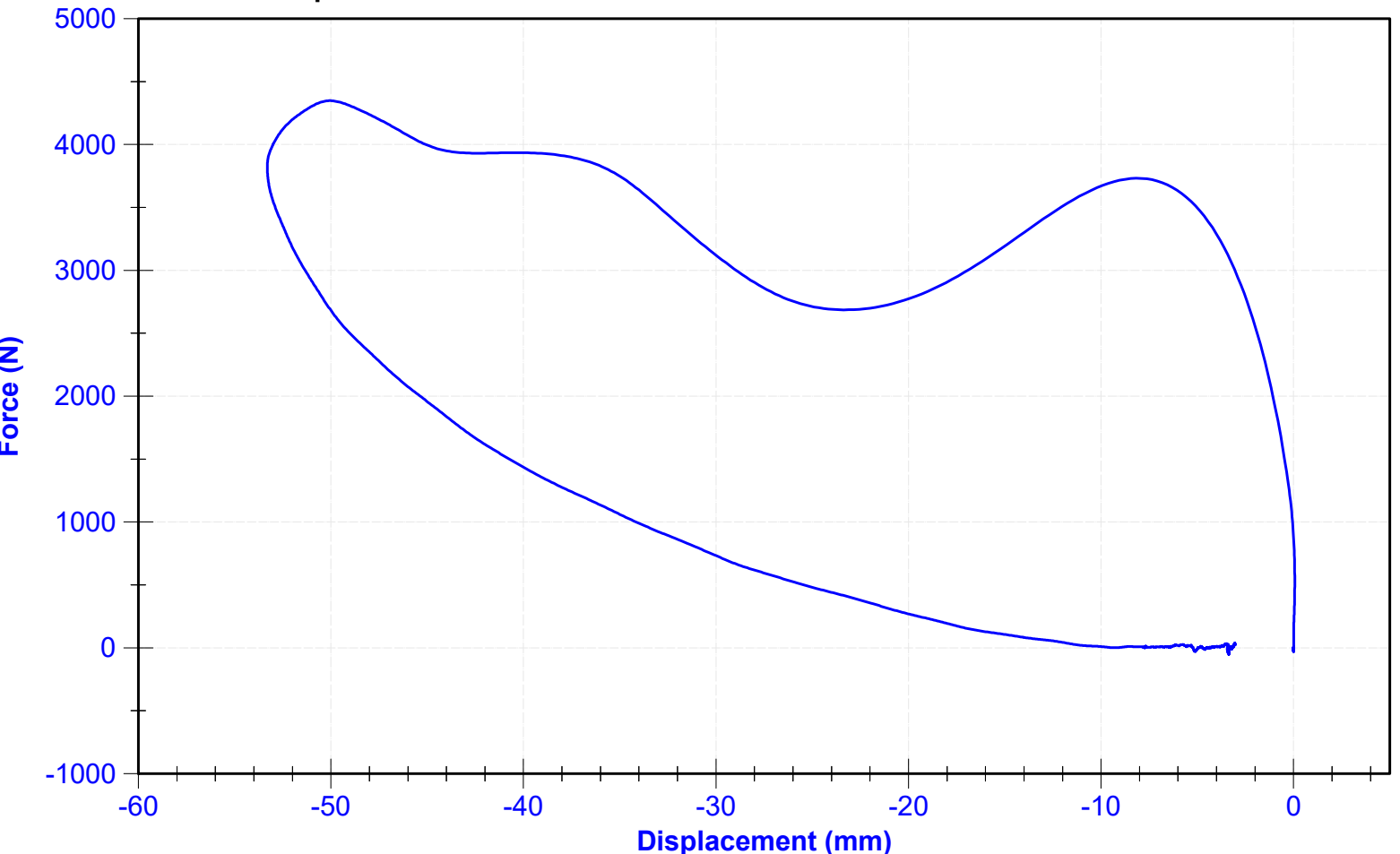
**Results**

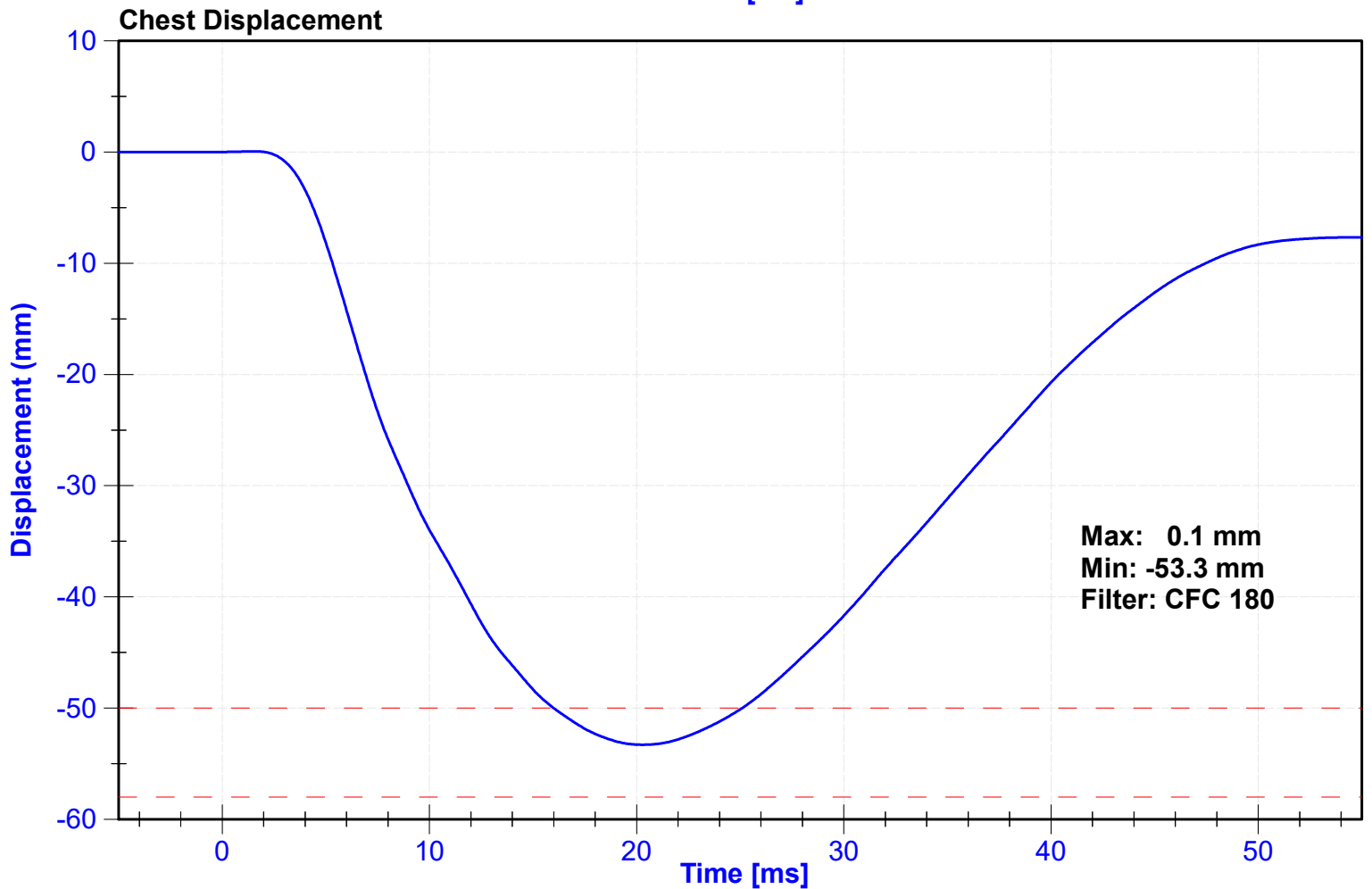
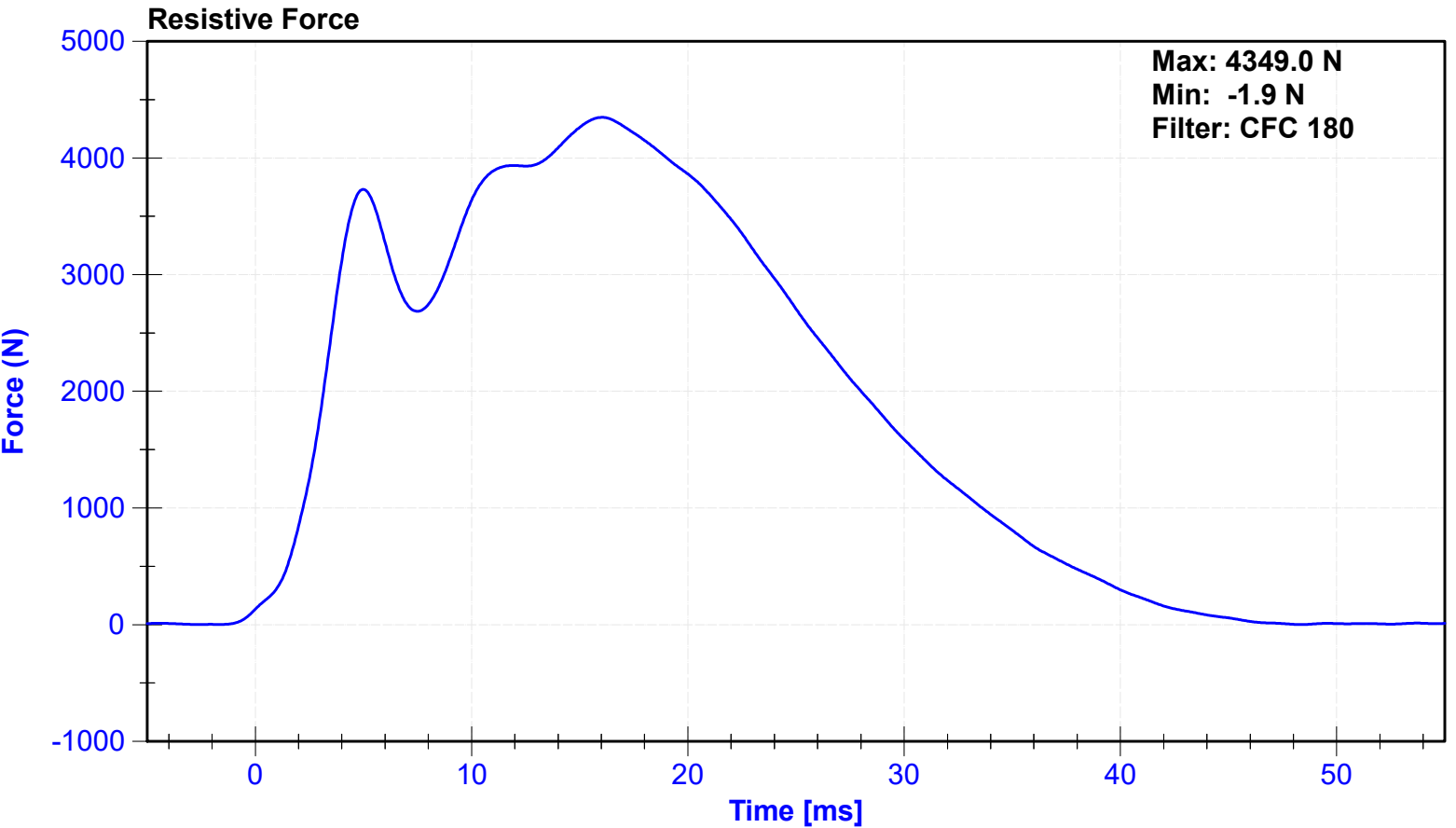
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	60	Pass
Velocity	6.59	6.83	m/s	6.719	Pass
Chest Deflection	-58	-50	mm	-53.3	Pass
Maximum Resistive Force (50 to 58mm)	3900	4400	N	4349.0	Pass
Maximum Resistive Force (18 to 50mm)	0	4600	N	4348.5	Pass
Hysteresis	69	85	%	74.3	Pass

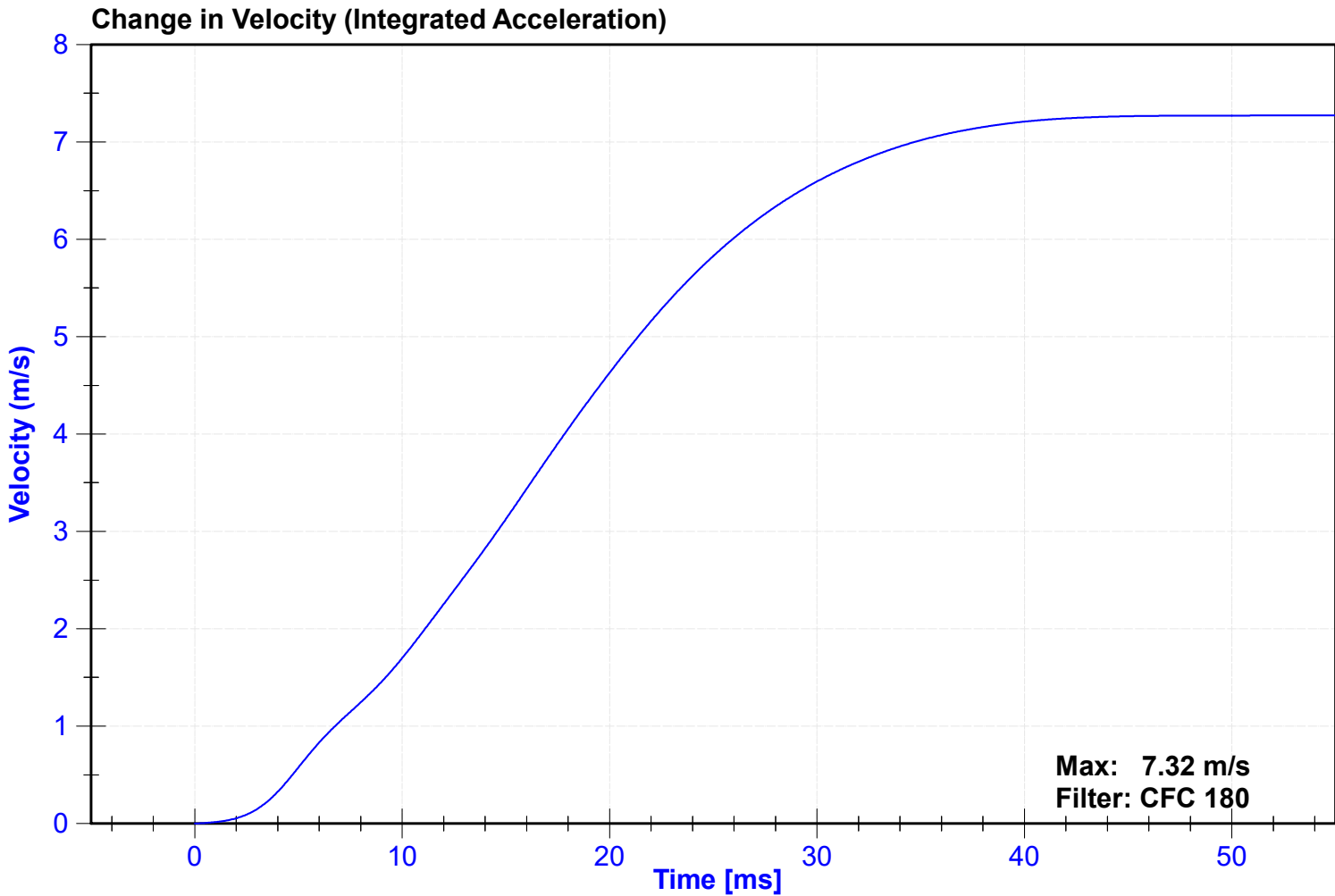
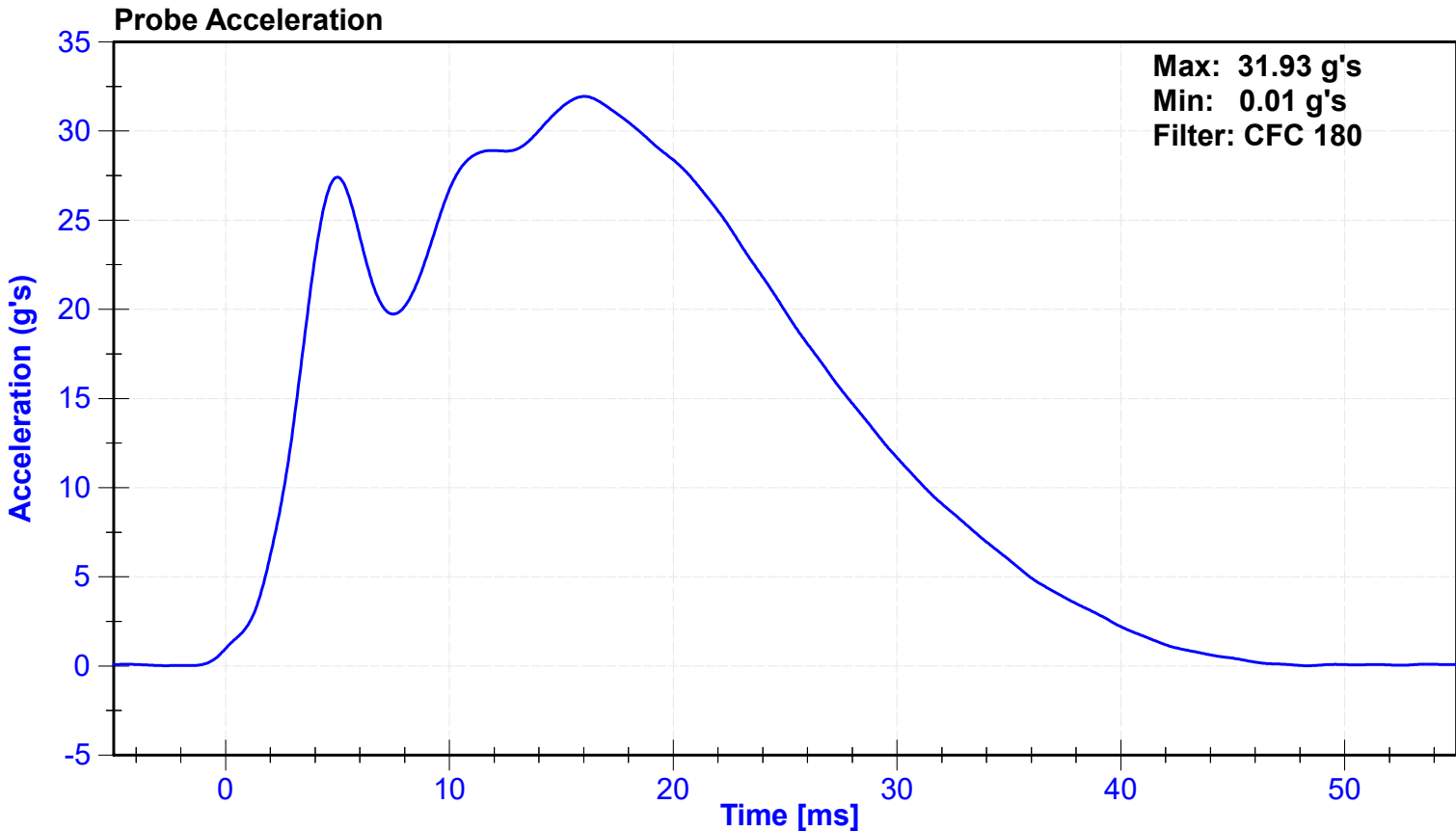
**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18599	9/13/2024	3/12/2025
Chest Potentiometer	Servo	0720	8/19/2024	2/17/2025

**Force vs. Displacement**







ATD Manufacturer	Humanetics	Test Technician	K. Konieczny
ATD Serial Number	137	Laboratory Supervisor	C. Mantell

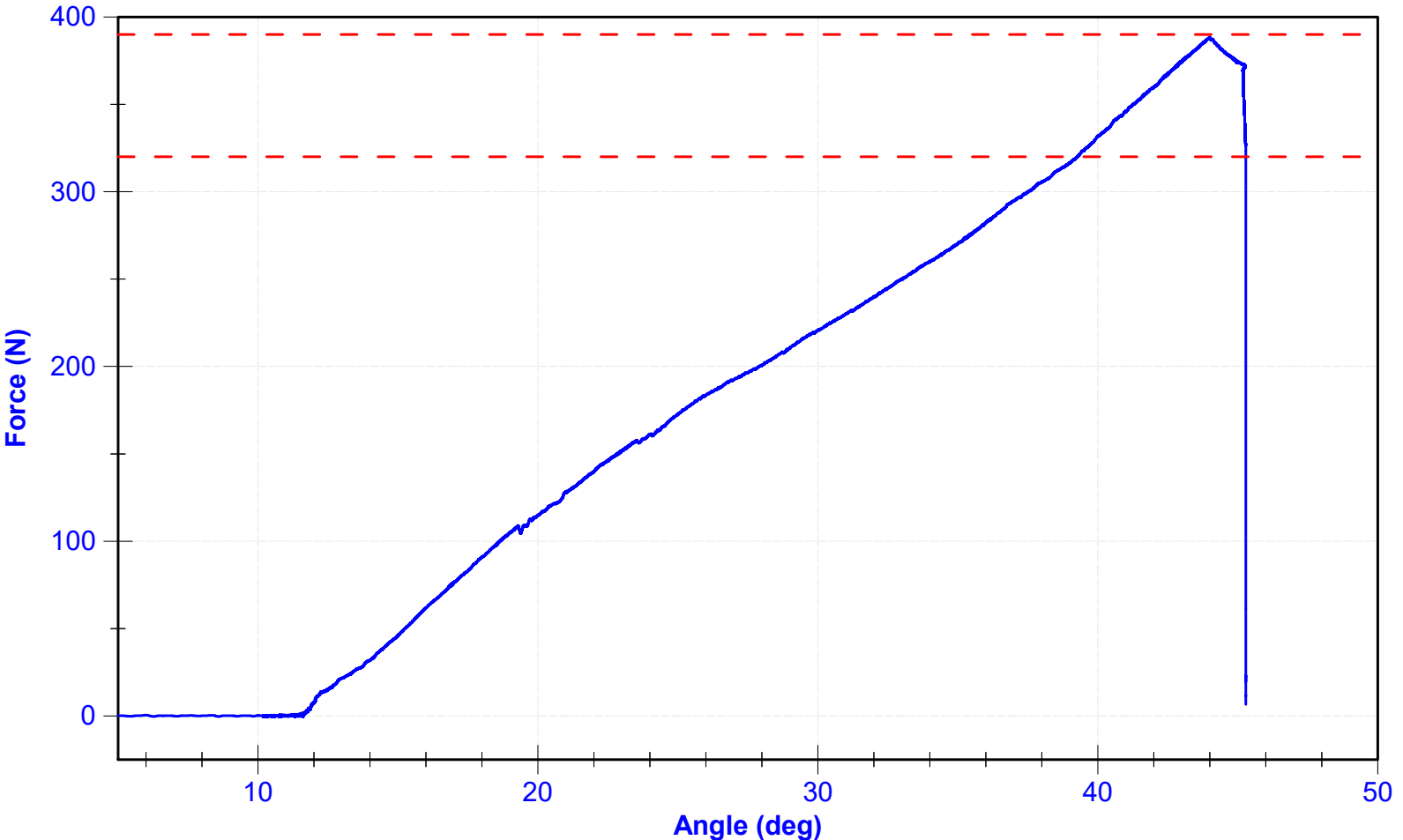
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.6	25.6	°C	20.9	Pass
Humidity	10	70	%	64	Pass
Initial Angle	0	20	deg	10.9	Pass
Force at 45 Degrees	320	390	N	388.4	Pass
Return Angle Relative to Initial	0	8	deg	6.7	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	Rieker	DS-1905226	2023-11-14	2024-11-13
Load Cell	Interface	1134516	2023-11-30	2024-11-29

**Force vs. Displacement**



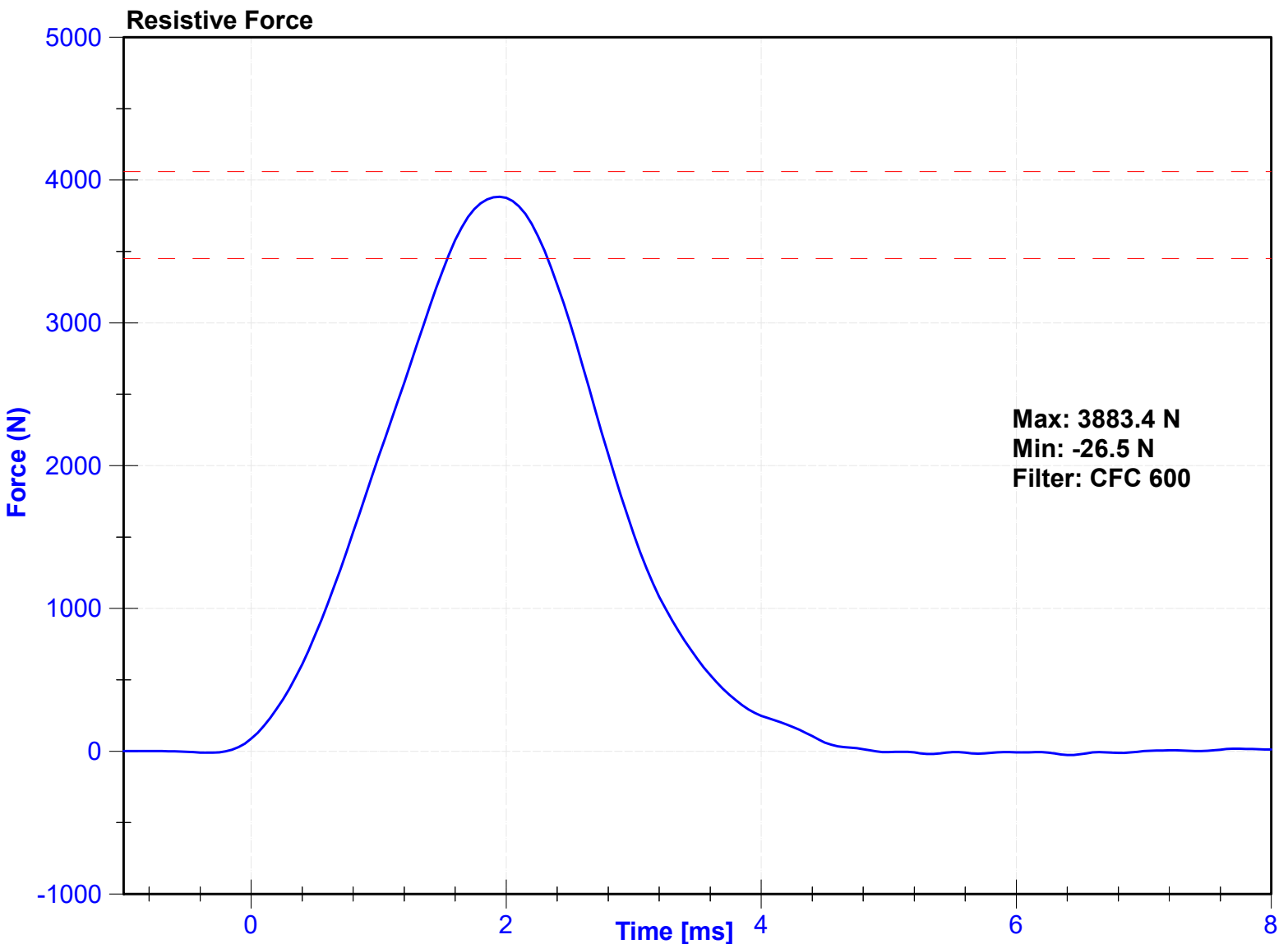
ATD Manufacturer	Humanetics	Test Technician	C. Hinkley
ATD Serial Number	137	Laboratory Supervisor	C. Mantell

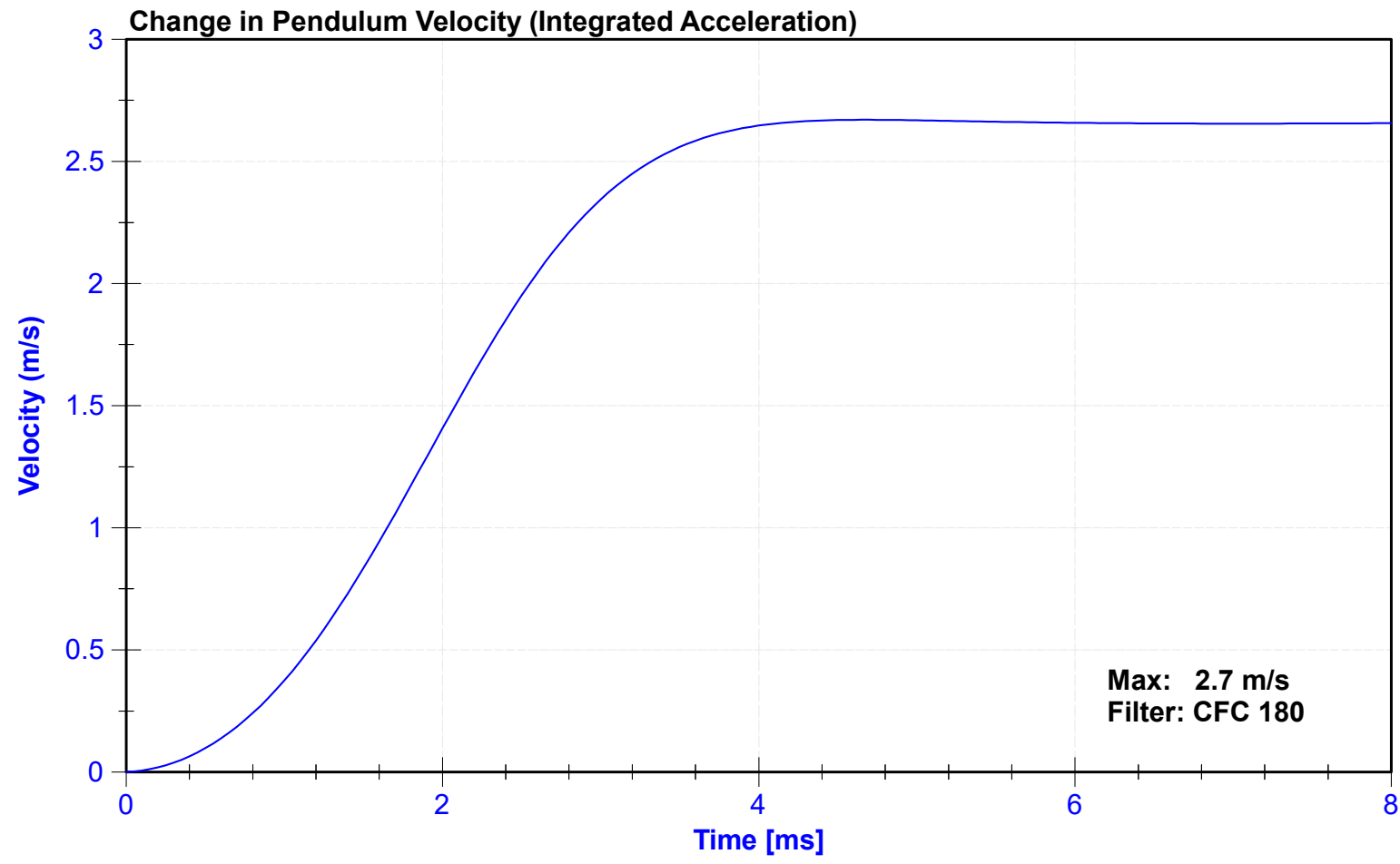
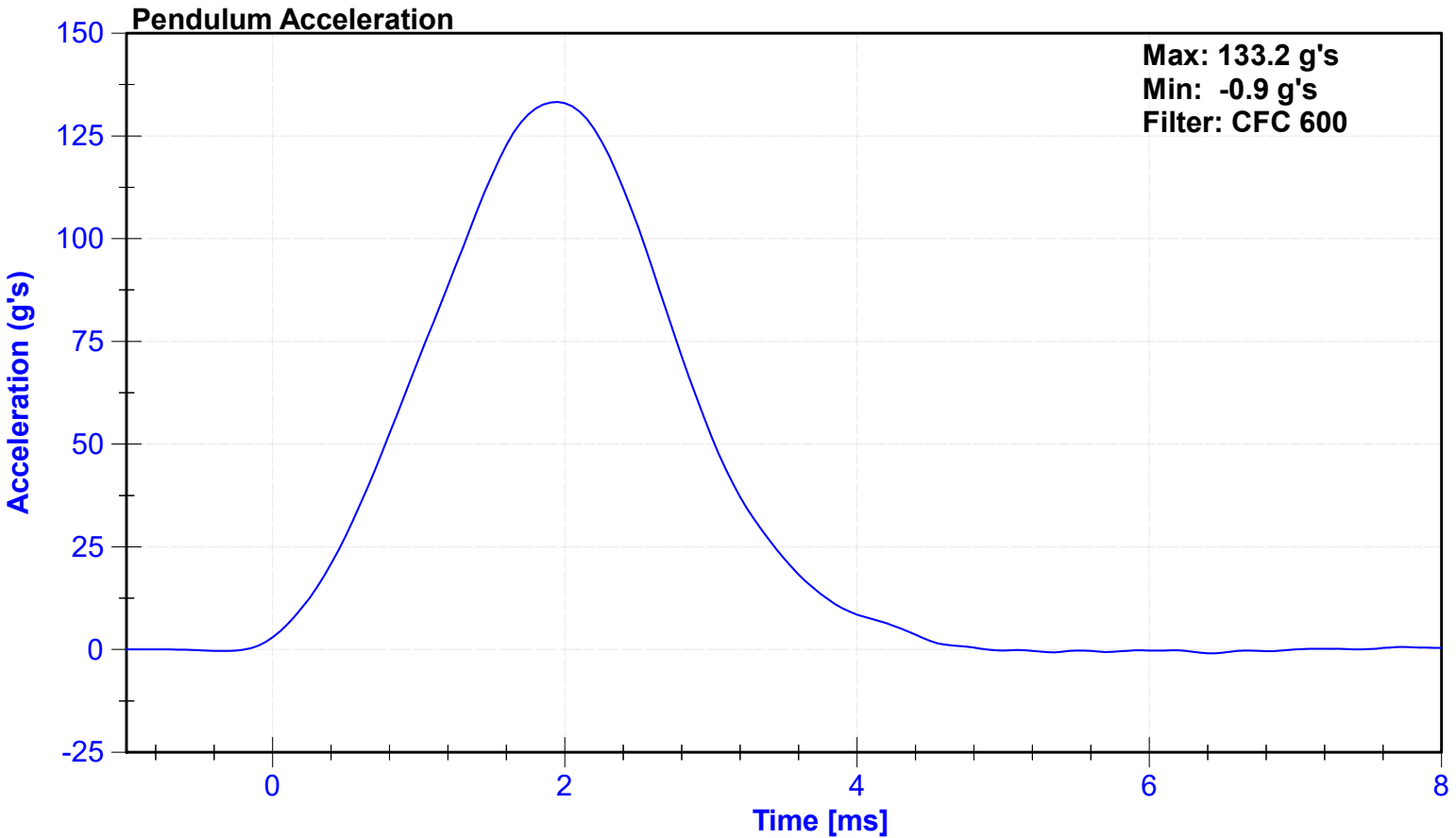
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21	Pass
Humidity	10	70	%	66	Pass
Velocity	2.07	2.13	m/s	2.079	Pass
Resistive Force	3450	4060	N	3883.4	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18599	9/13/2024	3/12/2025





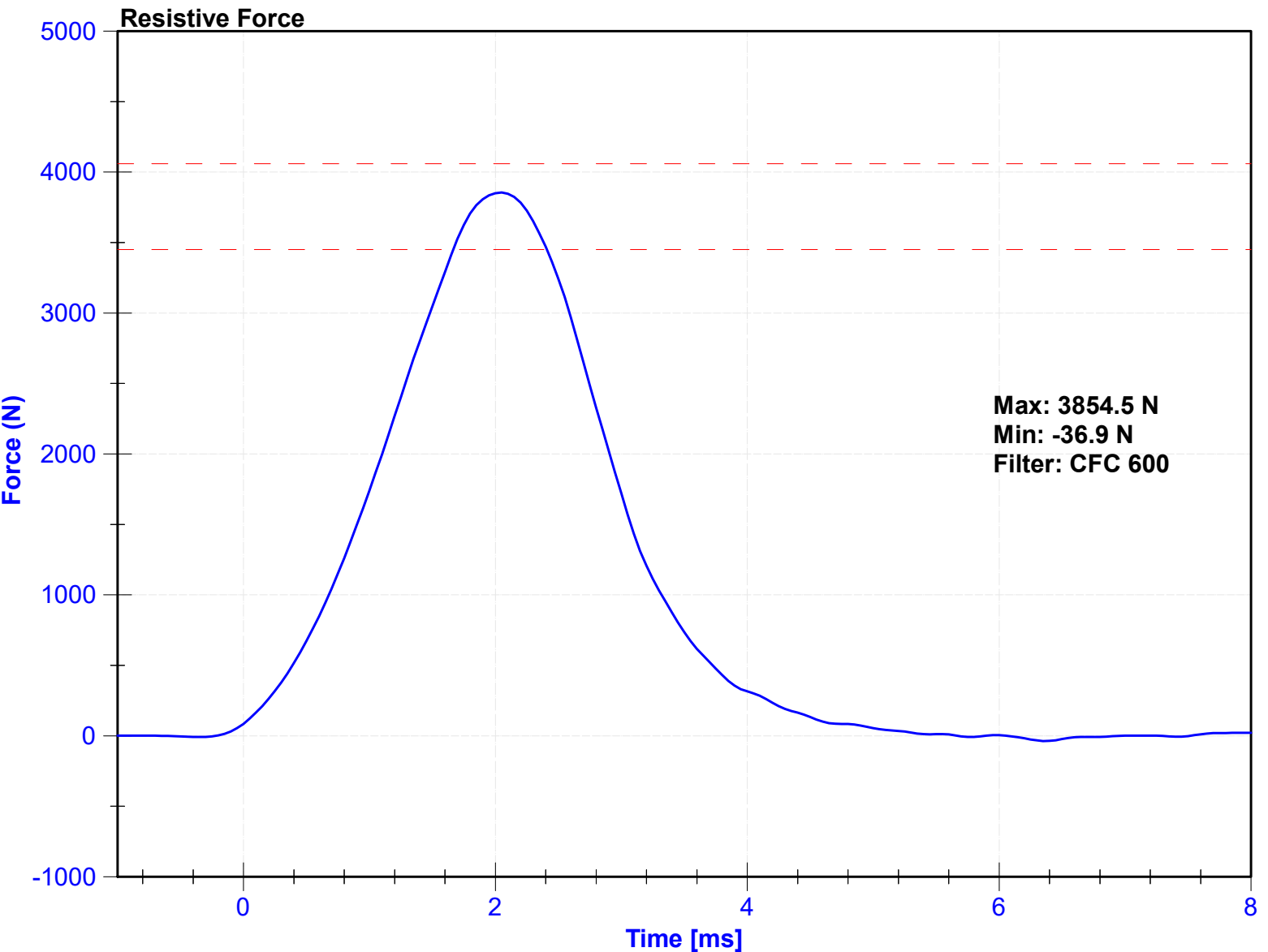
ATD Manufacturer	Humanetics	Test Technician	C. Hinkley
ATD Serial Number	137	Laboratory Supervisor	C. Mantell

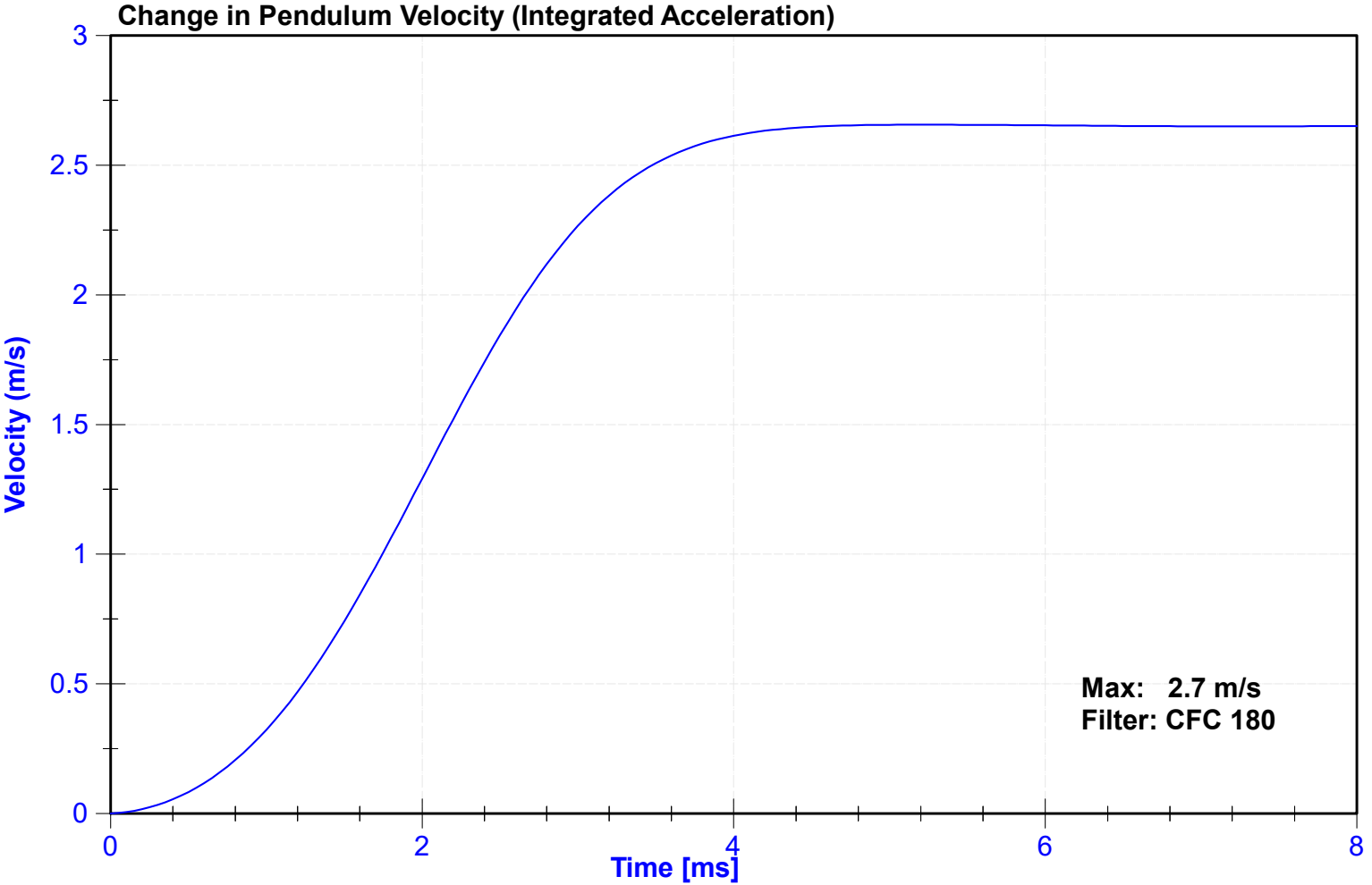
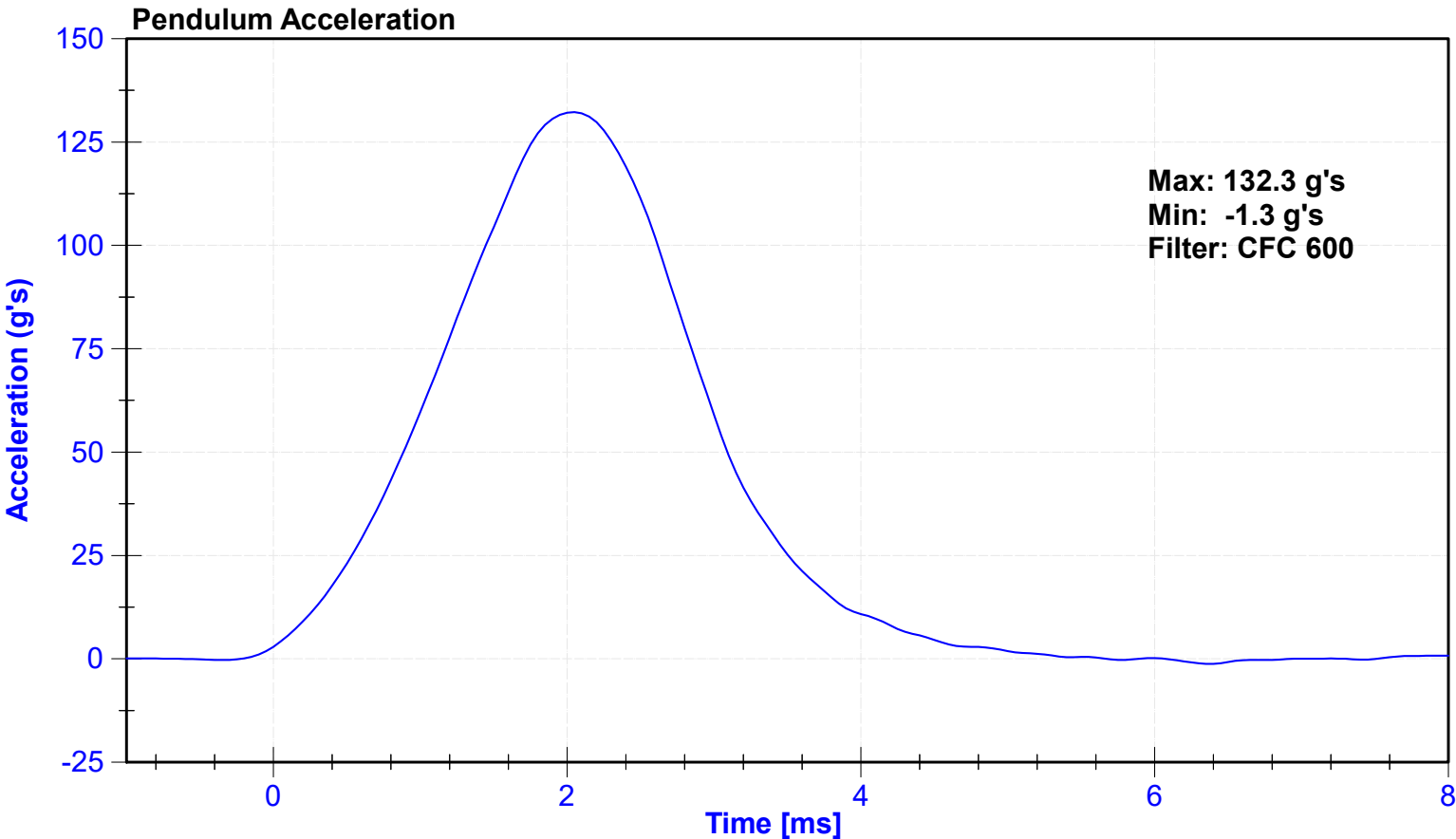
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21	Pass
Humidity	10	70	%	66	Pass
Velocity	2.07	2.13	m/s	2.082	Pass
Resistive Force	3450	4060	N	3854.5	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18599	9/13/2024	3/12/2025





**CALIBRATION TEST RESULTS**

**POST-TEST**

**HYBRID III 50<sup>TH</sup> PERCENTILE MALE - DRIVER ATD**

**SERIAL NO: 065**

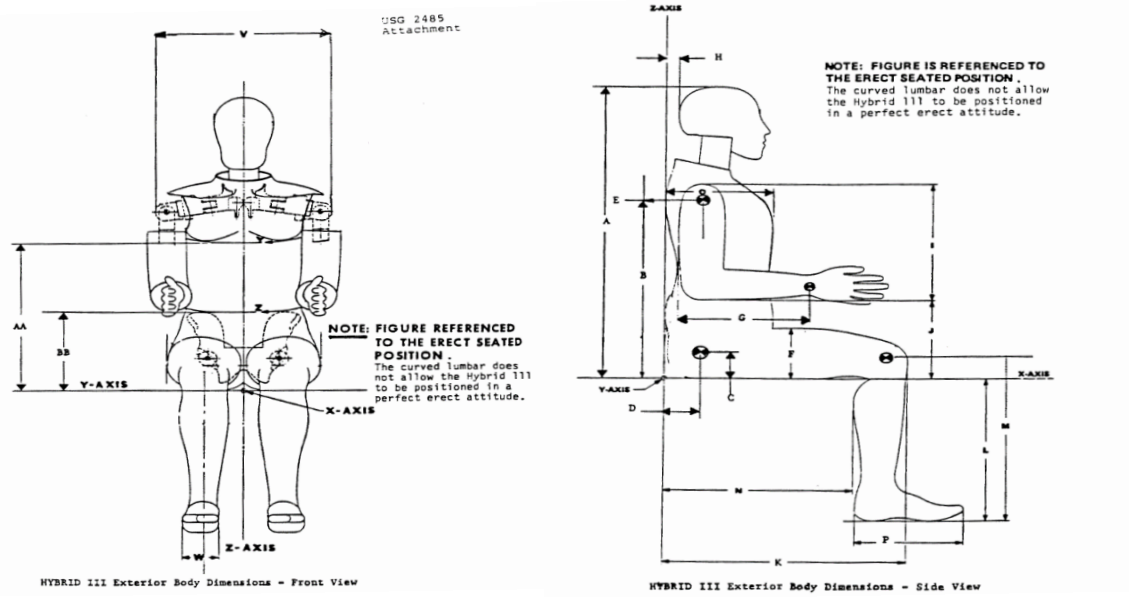


External Measurements - Hybrid 3 - 50th Male

Technician: J. Rios

Date: 11/18/2024

Dummy Serial Number: 065



Symbol	Description	Specification (in)		Result (in)	Pass/Fail
A	Sitting Height	34.6	35.0	34.9	Pass
B	Shoulder Pivot Height	19.9	20.5	20.0	Pass
C	H-Point Height	3.3	3.5	3.4	Pass
D	H-Point from Backline	5.3	5.5	5.5	Pass
E	Shoulder Pivot from Backline	3.3	3.7	3.4	Pass
F	Thigh Clearance	5.5	6.1	5.9	Pass
G	Back of Elbow to Wrist Pivot	11.4	12.0	11.6	Pass
H	Head Back to Backline	1.6	1.8	1.6	Pass
I	Shoulder to Elbow Length	13.0	13.6	13.2	Pass
J	Elbow Rest Height	7.5	8.3	7.7	Pass
K	Buttock to Knee Length	22.8	23.8	23.1	Pass
L	Popliteal Height	16.9	17.9	17.3	Pass
M	Knee Pivot Height	19.1	19.7	19.6	Pass
N	Buttock Popliteal Length	17.8	18.8	18.2	Pass
O	Chest Depth without Jacket	8.4	9.0	8.7	Pass
P	Foot Length (right)	9.9	10.5	10.3	Pass
V	Shoulder Breadth	16.3	17.2	16.5	Pass
W	Foot Breadth	3.6	4.2	3.9	Pass
Y	Chest Circumference with Jacket	38.2	39.4	38.8	Pass
Z	Waist Circumference	32.9	34.1	33.6	Pass
AA	Reference Location (Chest Circumference)	16.9	17.1	17.0	Pass
BB	Reference Location (Waist Circumference)	8.9	9.1	8.9	Pass

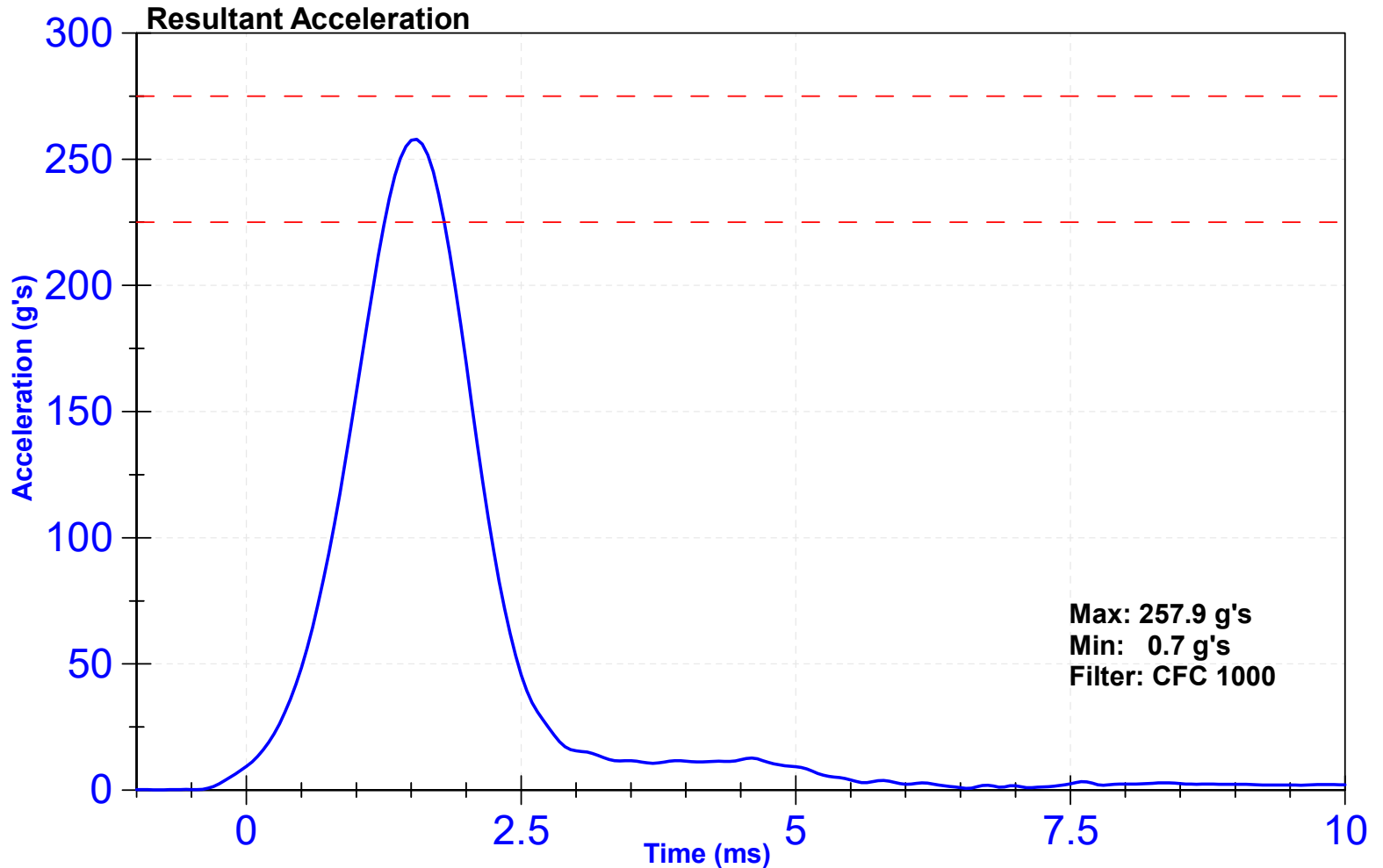
ATD Manufacturer	Humanetics	Test Technician	CL
ATD Serial Number	065	Laboratory Supervisor	ZP

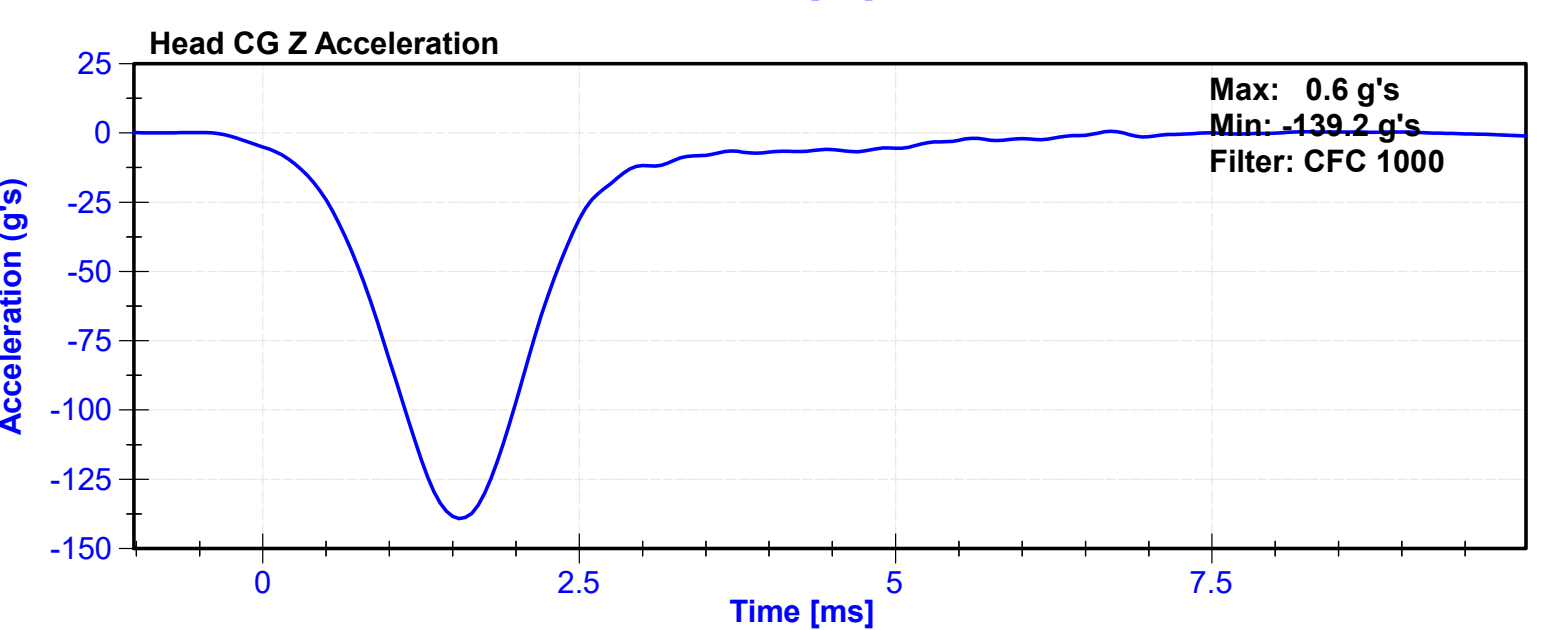
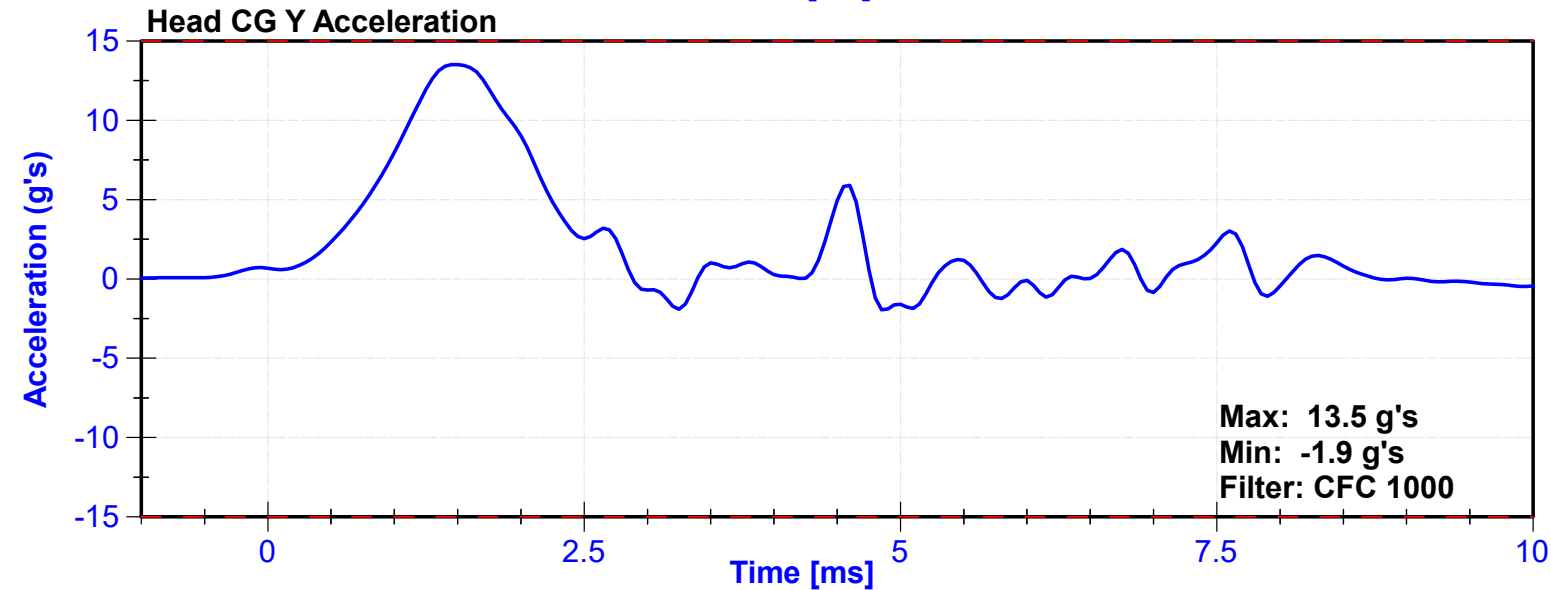
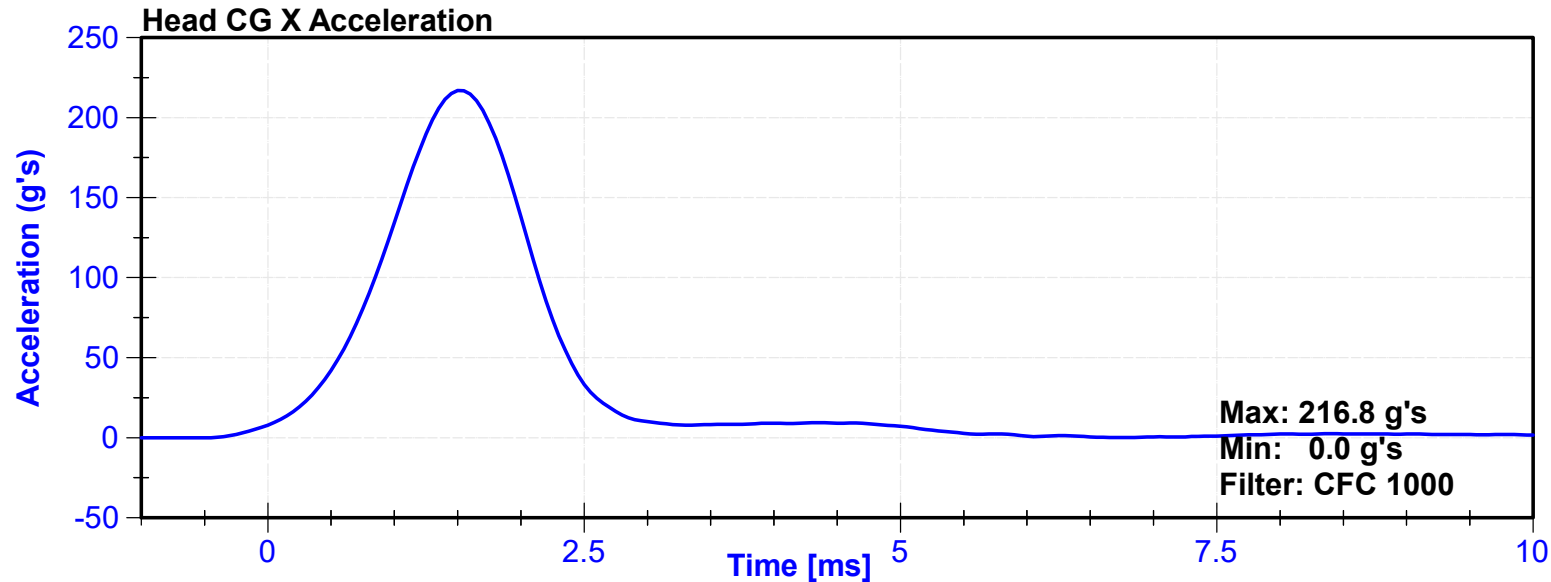
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.8	Pass
Humidity	10	70	%	48.1	Pass
Resultant Acceleration	225	275	g's	257.9	Pass
Oscillation	0	10	%	4.9	Pass
Lateral Acceleration	-15	15	g's	13.5	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	P52383	9/9/2024	3/8/2025
Y Accelerometer	Measurement Specialties	A341256	9/9/2024	3/8/2025
Z Accelerometer	Endevco	P71303	9/9/2024	3/8/2025





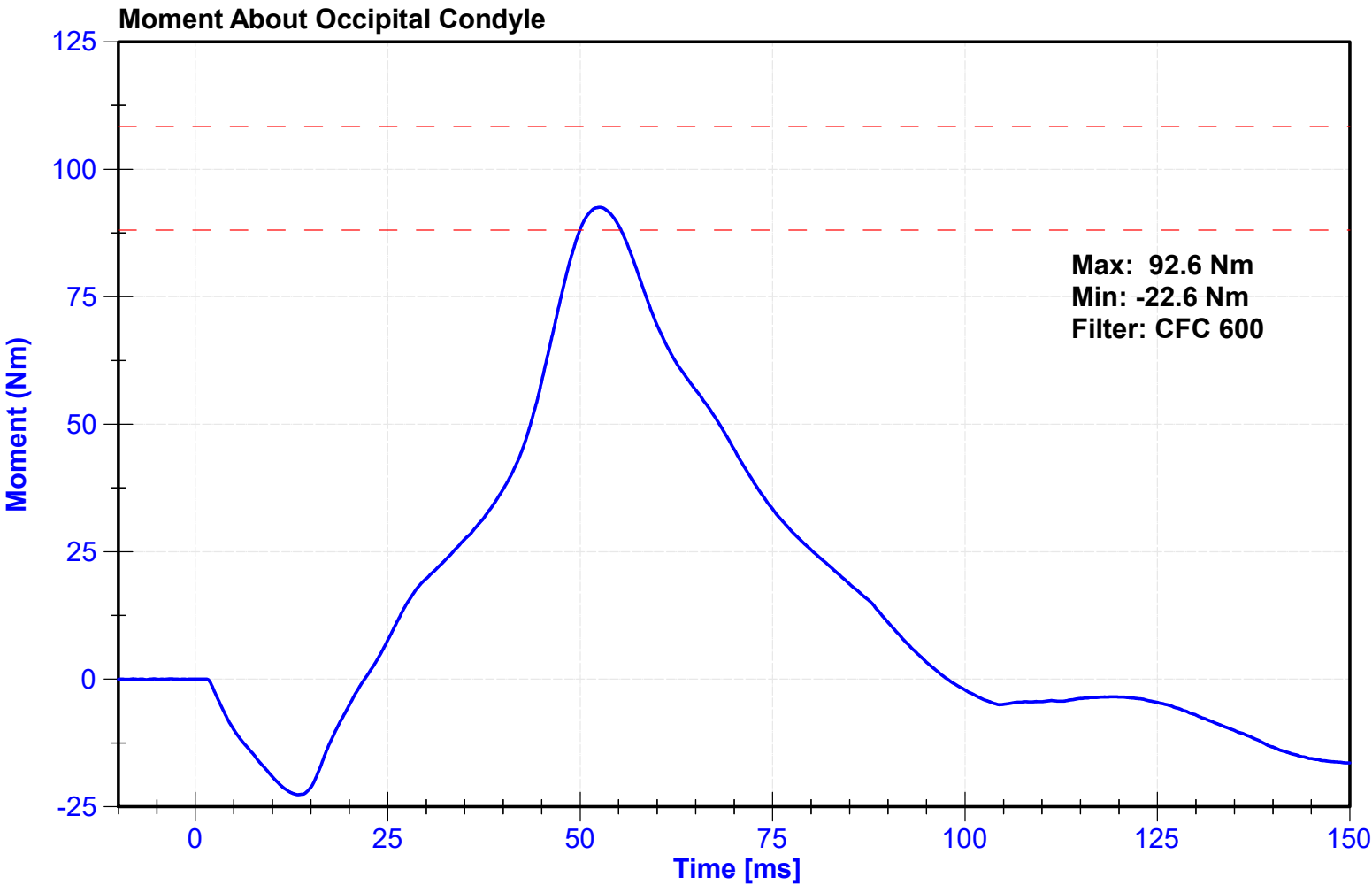
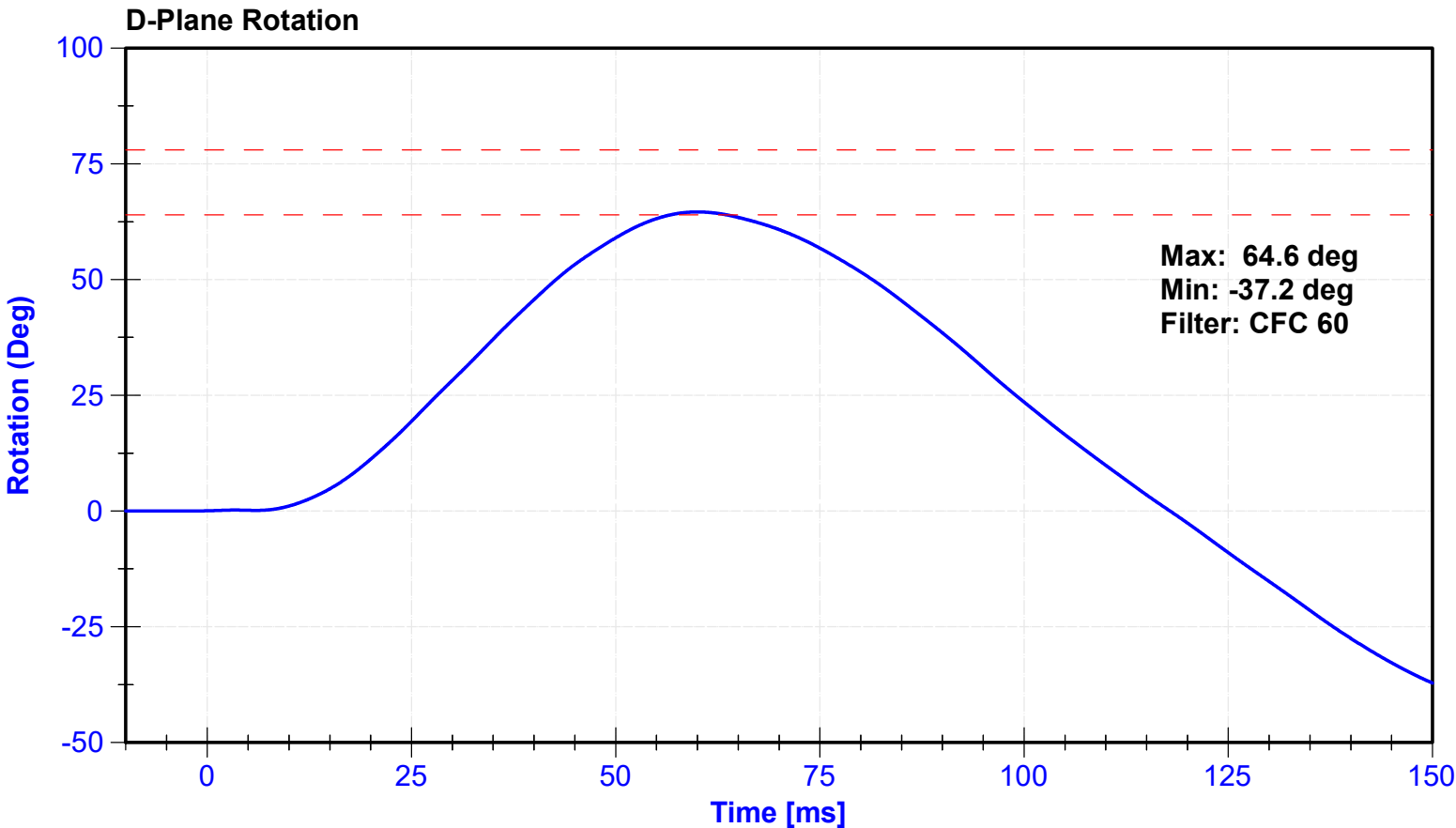
ATD Manufacturer	Humaetics	Test Technician	CL
ATD Serial Number	065	Laboratory Supervisor	ZP

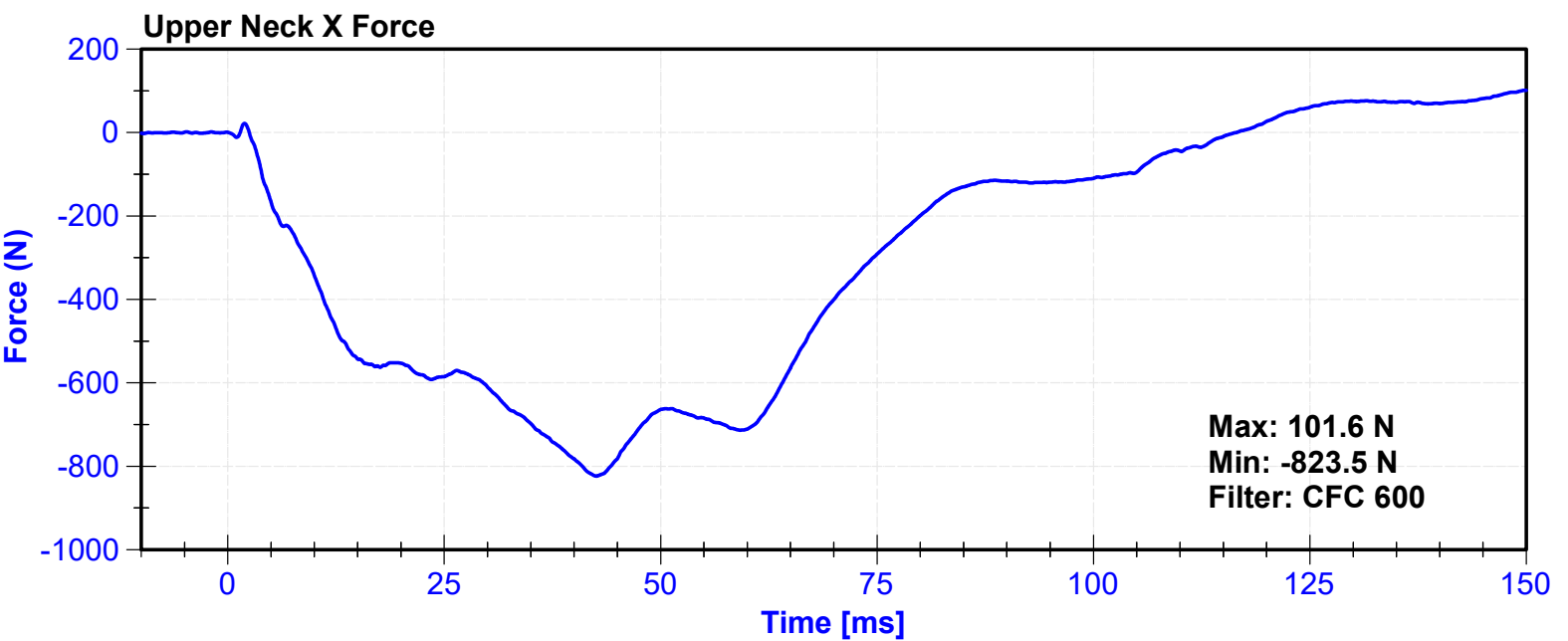
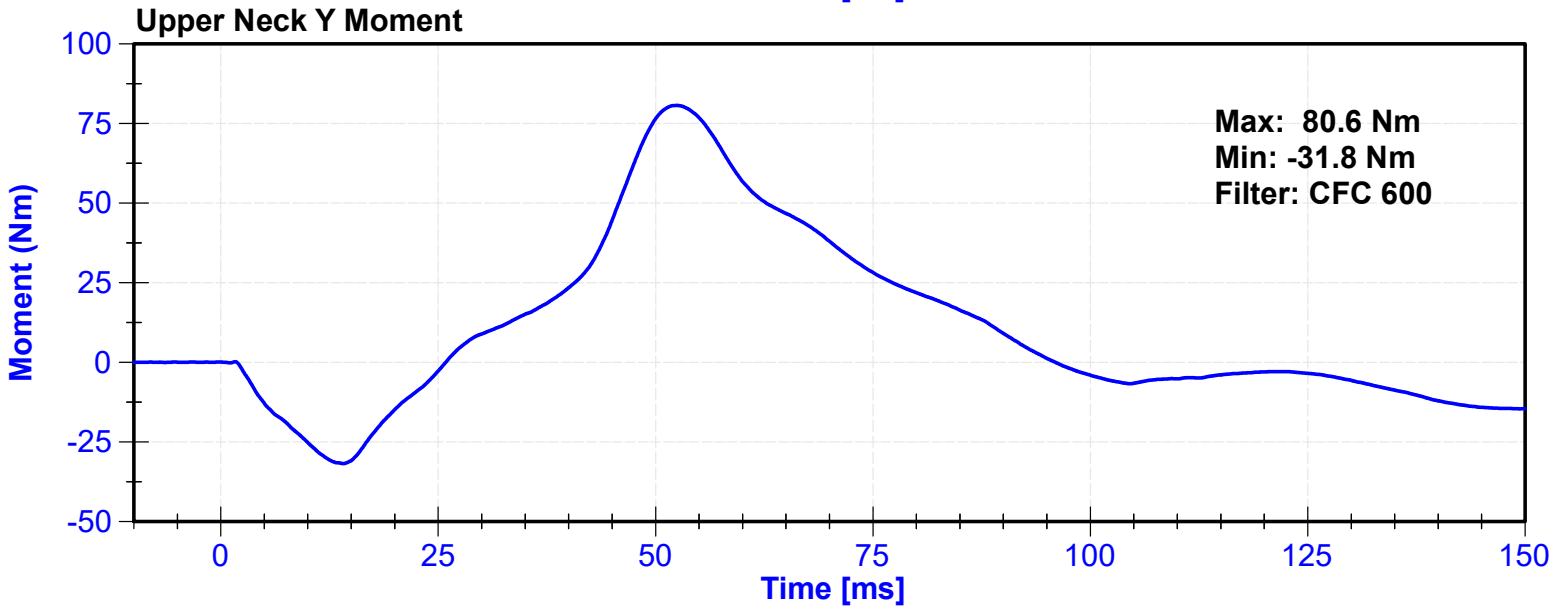
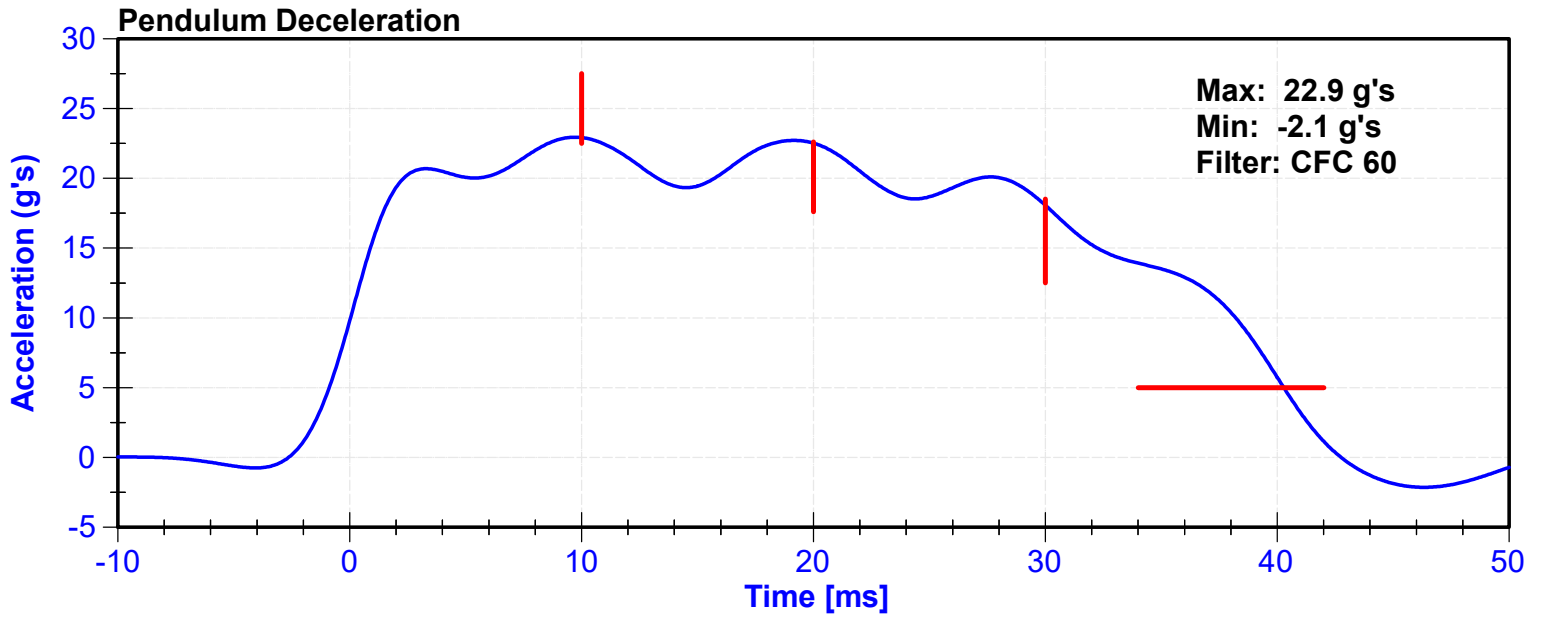
**Results**

<b>Test Parameter</b>	<b>Minimum Specification</b>	<b>Maximum Specification</b>	<b>Unit</b>	<b>Result</b>	<b>Pass/Fail</b>
Temperature	20.6	22.2	°C	21.2	Pass
Humidity	10	70	%	40.7	Pass
Velocity	6.89	7.13	m/s	7.047	Pass
Pendulum Deceleration at 10ms	22.5	27.5	g's	22.91	Pass
Pendulum Deceleration at 20ms	17.6	22.6	g's	22.51	Pass
Pendulum Deceleration at 30ms	12.5	18.5	g's	18.06	Pass
Max. Pendulum Deceleration After 30ms	0	29	g's	22.9	Pass
Pendulum Deceleration Time to 5 g's	34	42	ms	40.3	Pass
Maximum D Plane Rotation	64	78	deg	64.6	Pass
Time to Maximum Rotation	57	64	ms	60.0	Pass
Rotation Decay to Zero	113	127	ms	117.9	Pass
Moment About Occipital Condyle	88.1	108.4	Nm	92.56	Pass
Time to Maximum Moment	47	58	ms	52.5	Pass
Moment Decay to Zero	97	107	ms	97.8	Pass

**Transducer Calibrations**

<b>Channel</b>	<b>Manufacturer</b>	<b>Serial Number</b>	<b>Calibration Date</b>	<b>Calibration Due Date</b>
Pendulum Accelerometer	Endevco	C16678	8/29/2024	2/25/2025
Pendulum Potentiometer	ETI	1412	12/18/2023	12/17/2024
Condyle Potentiometer	ETI	1911	12/18/2023	12/17/2024
Upper Neck Load Cell	Humanetics	851-FX	5/22/2024	5/22/2025





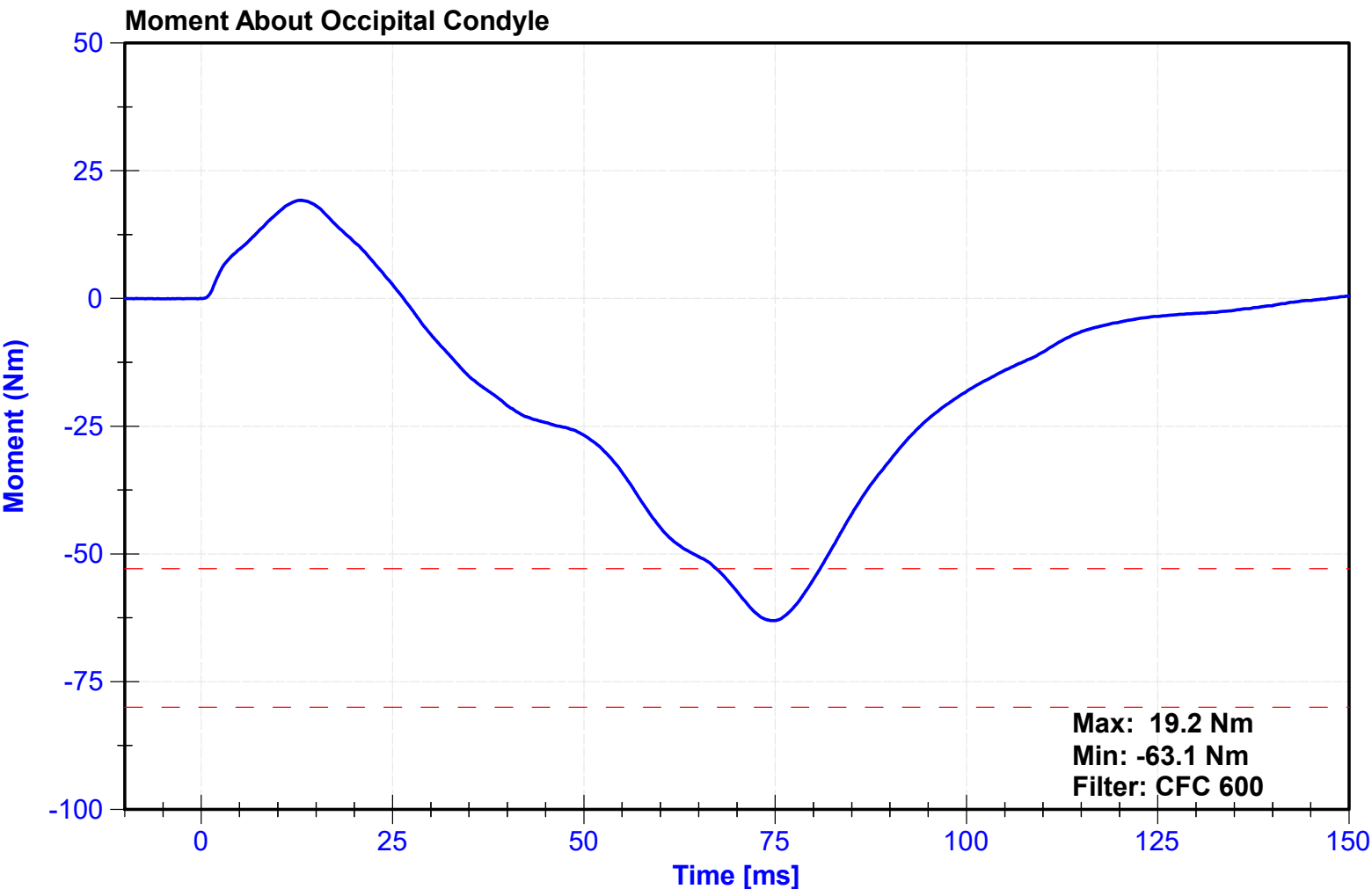
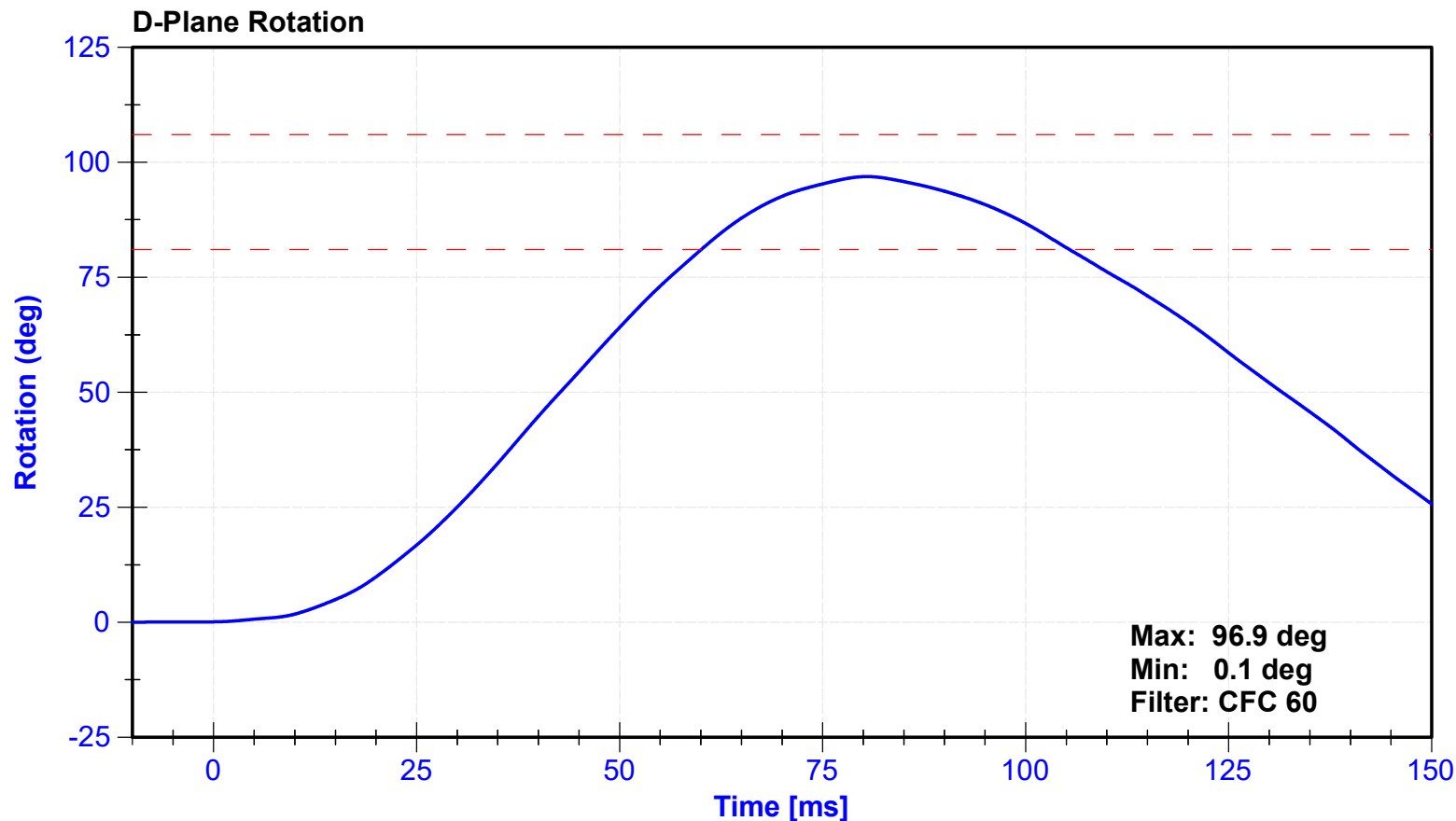
ATD Manufacturer	Humanetics	Test Technician	CL
ATD Serial Number	065	Laboratory Supervisor	ZP

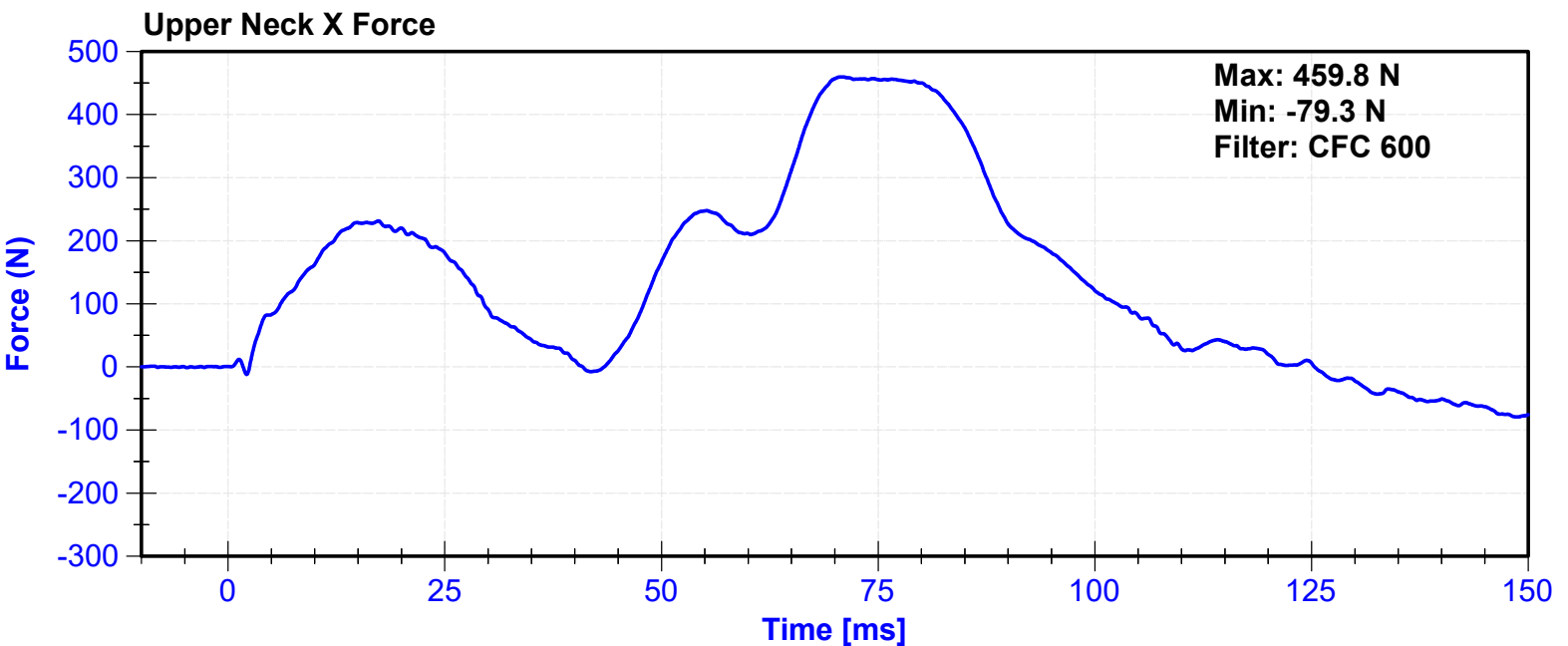
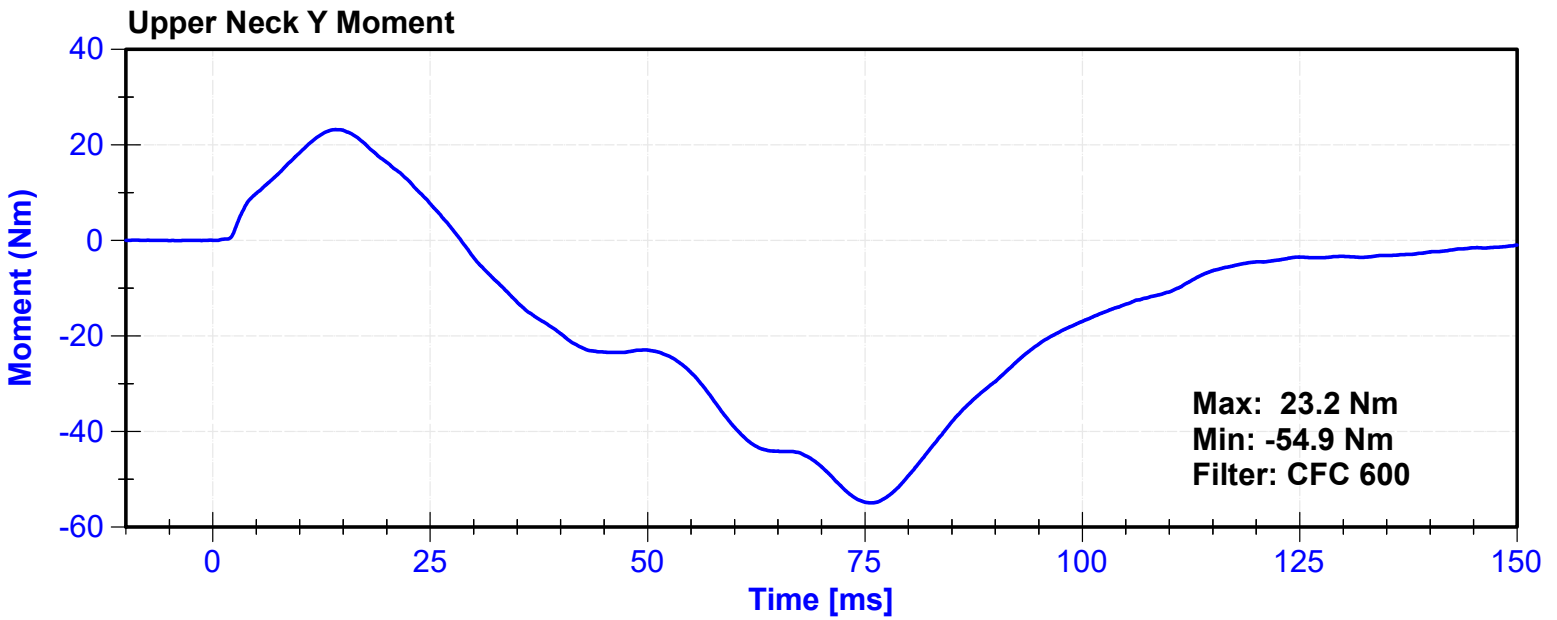
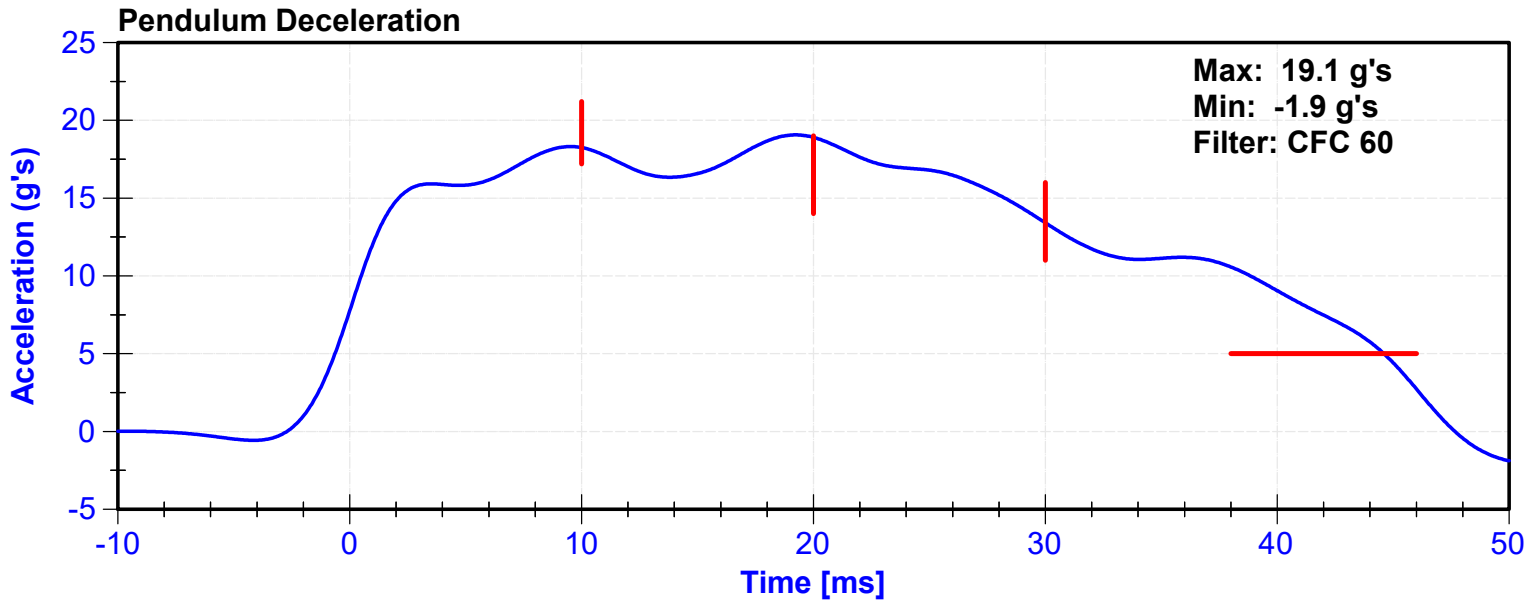
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.2	Pass
Humidity	10	70	%	40.7	Pass
Velocity	5.94	6.19	m/s	6.093	Pass
Pendulum Deceleration at 10ms	17.2	21.2	g's	18.25	Pass
Pendulum Deceleration at 20ms	14	19	g's	18.9	Pass
Pendulum Deceleration at 30ms	11	16	g's	13.4	Pass
Max. Pendulum Deceleration After 30ms	0	22	g's	19.1	Pass
Pendulum Deceleration Time to 5 g's	38	46	ms	44.6	Pass
Maximum D Plane Rotation	81	106	deg	96.9	Pass
Time to Maximum Rotation	72	82	ms	80.5	Pass
Rotation Decay to Zero	147	174	ms	170.4	Pass
Minimum Moment About OC	-80	-52.9	Nm	-63.05	Pass
Time to Minimum Moment	65	79	ms	74.7	Pass
Moment Decay to Zero	120	148	ms	147.2	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16678	8/29/2024	2/25/2025
Pendulum Potentiometer	ETI	SP22G_1412	12/18/2023	12/17/2024
Condyle Potentiometer	ETI	SP22G_1911	12/18/2023	12/17/2024
Upper Neck Load Cell	Humanetics	851-FX	5/22/2024	5/22/2025





ATD Manufacturer	Humanetics	Test Technician	CL
ATD Serial Number	065	Laboratory Supervisor	ZP

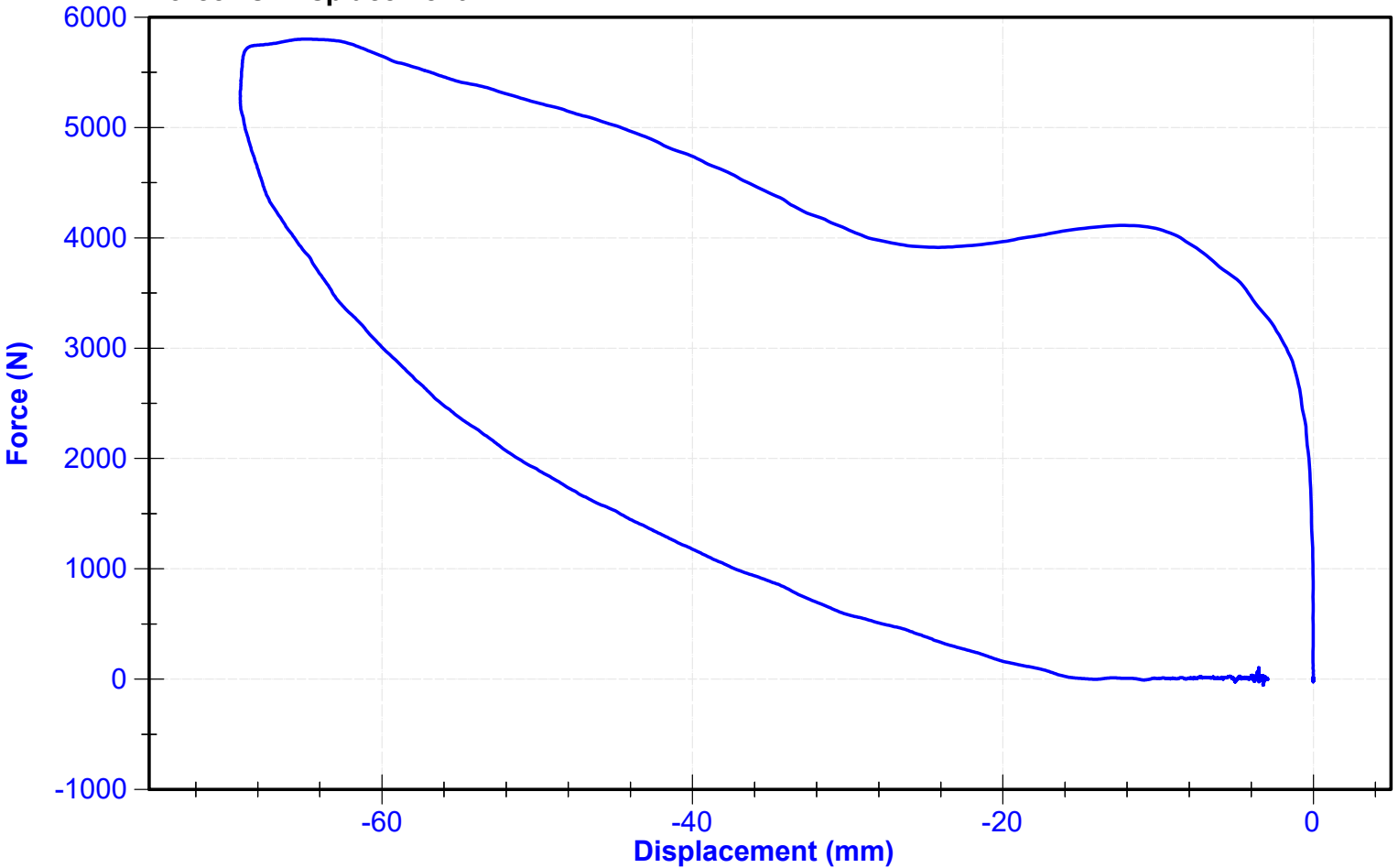
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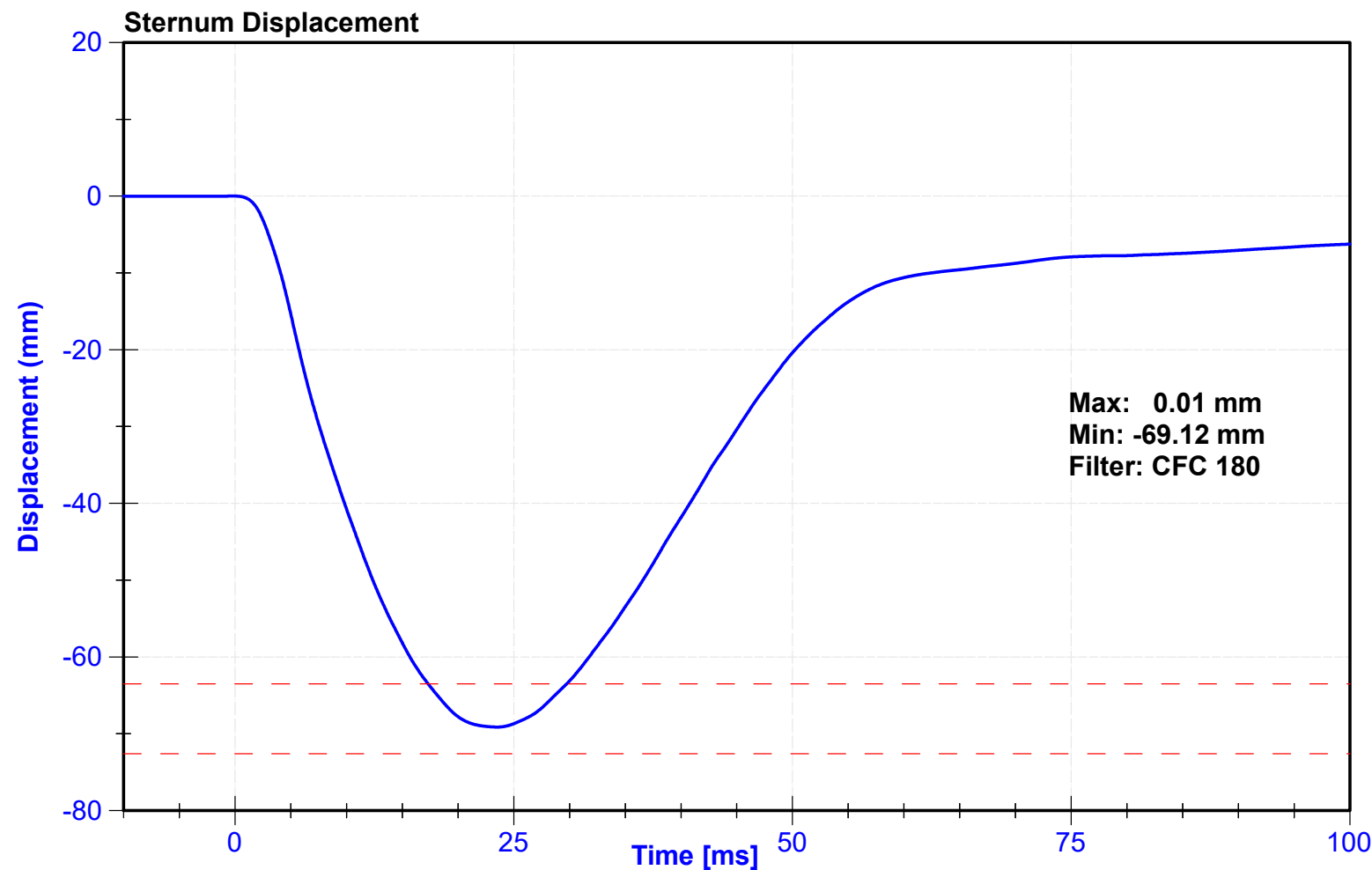
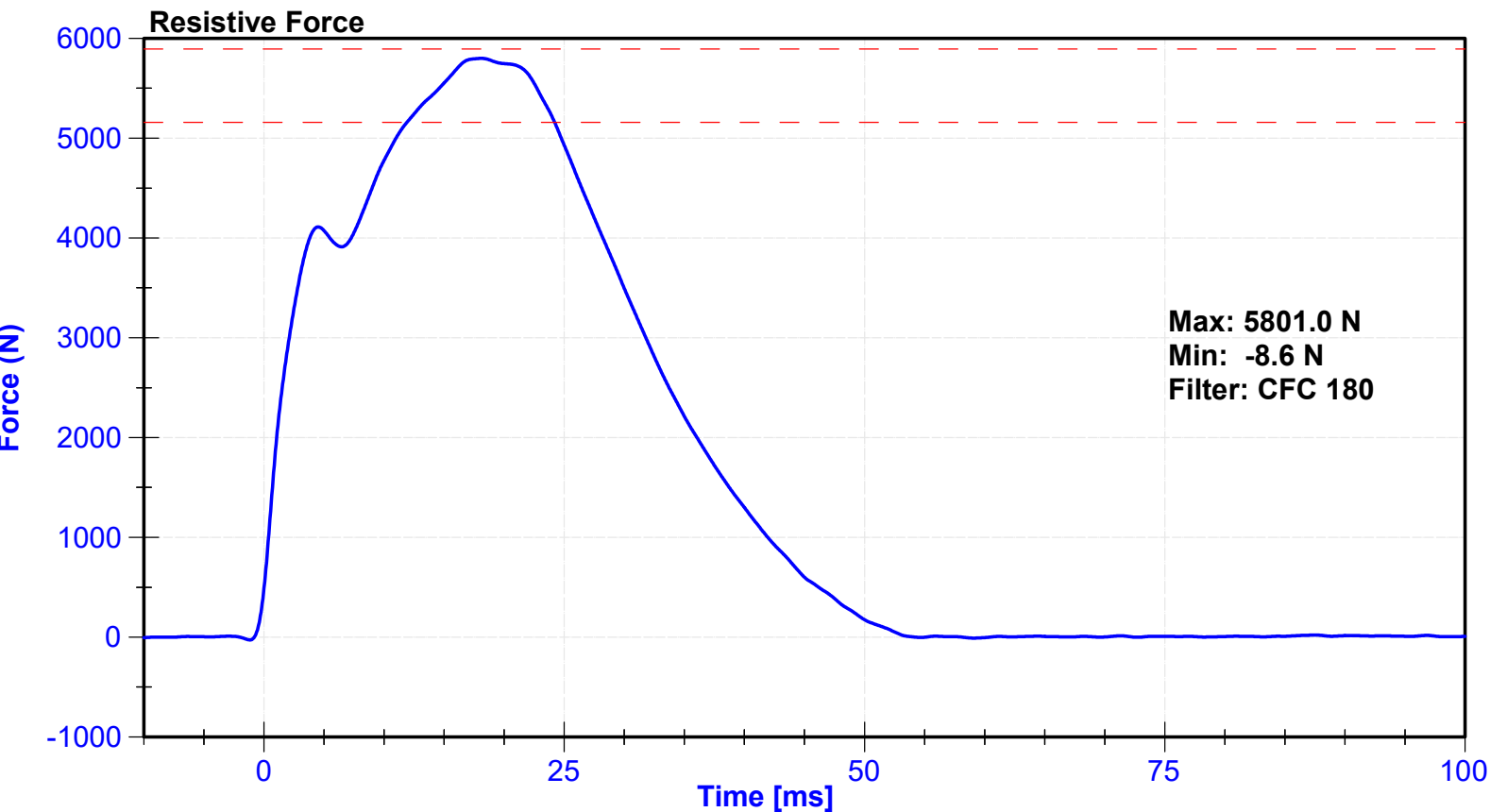
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	44.7	Pass
Velocity	6.59	6.83	m/s	6.728	Pass
Chest Displacement	-72.6	-63.5	mm	-69.12	Pass
Resistive Force	5160	5894	N	5801.0	Pass
Hysteresis	69	85	%	72.3	Pass

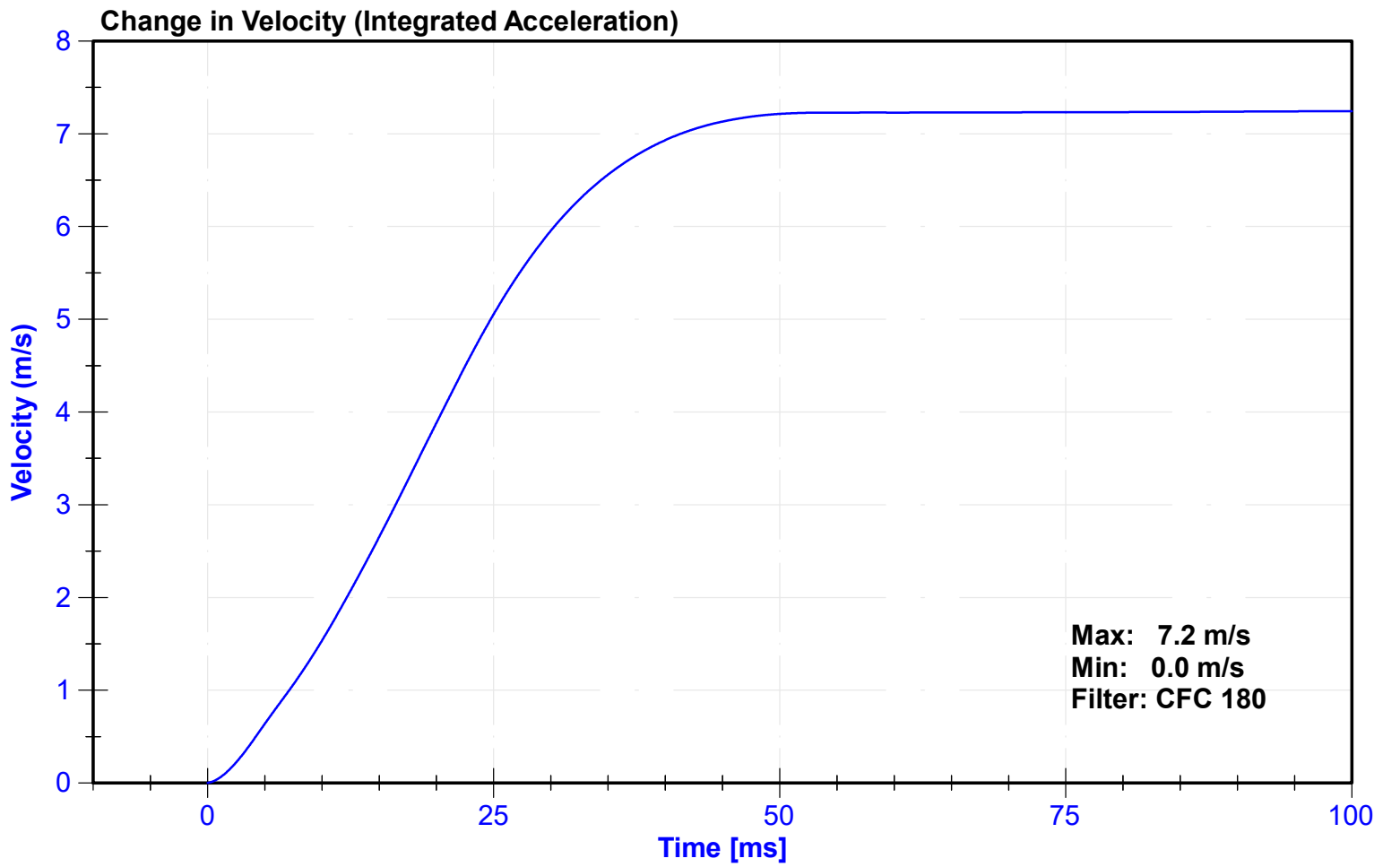
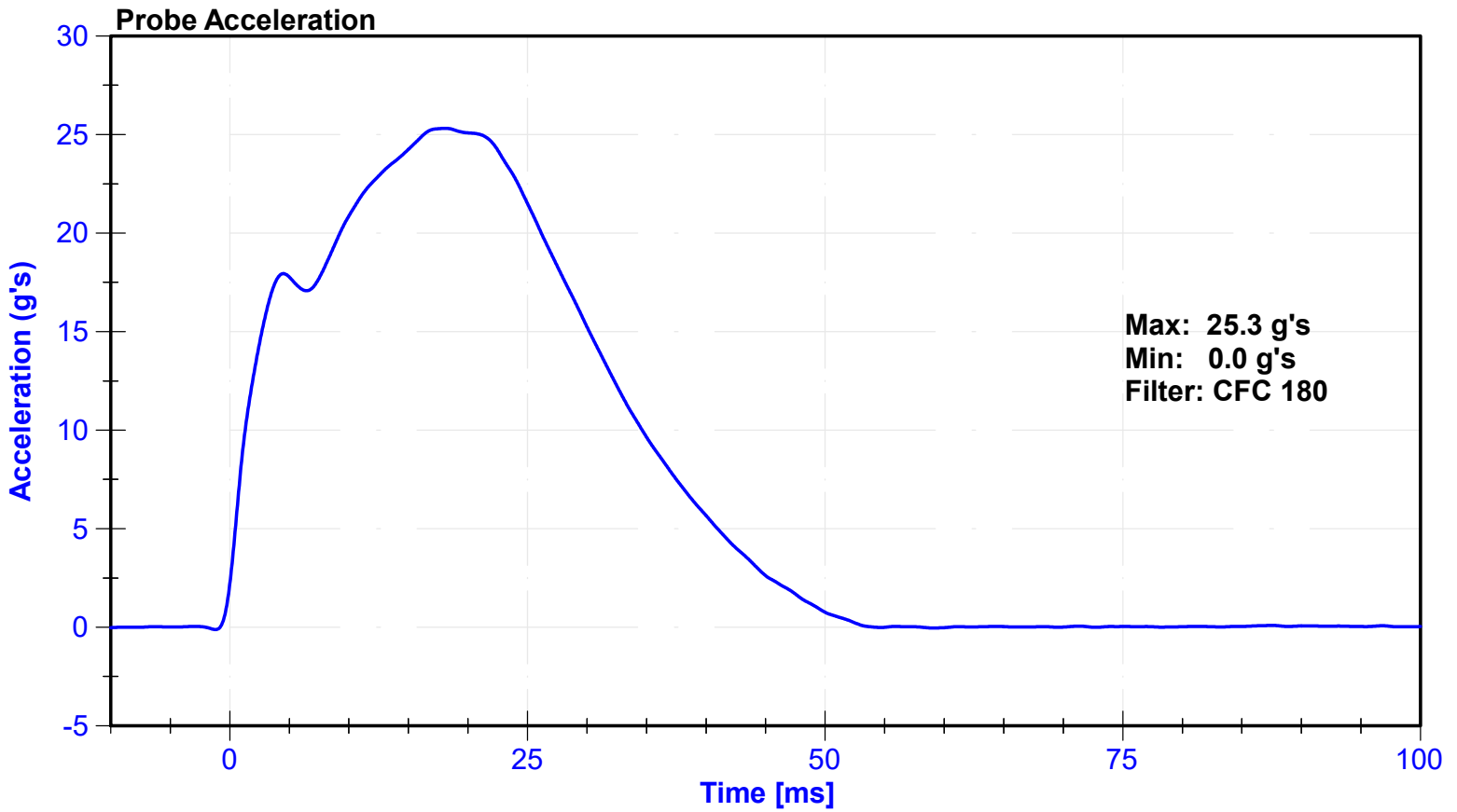
**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	P94662	10/3/2024	4/1/2025
Chest Potentiometer	Servo	1046	10/31/2024	5/1/2025

**Force vs. Displacement**







ATD Manufacturer	Humanetics	Test Technician	K. Konieczny
ATD Serial Number	065	Laboratory Supervisor	C. Mantell

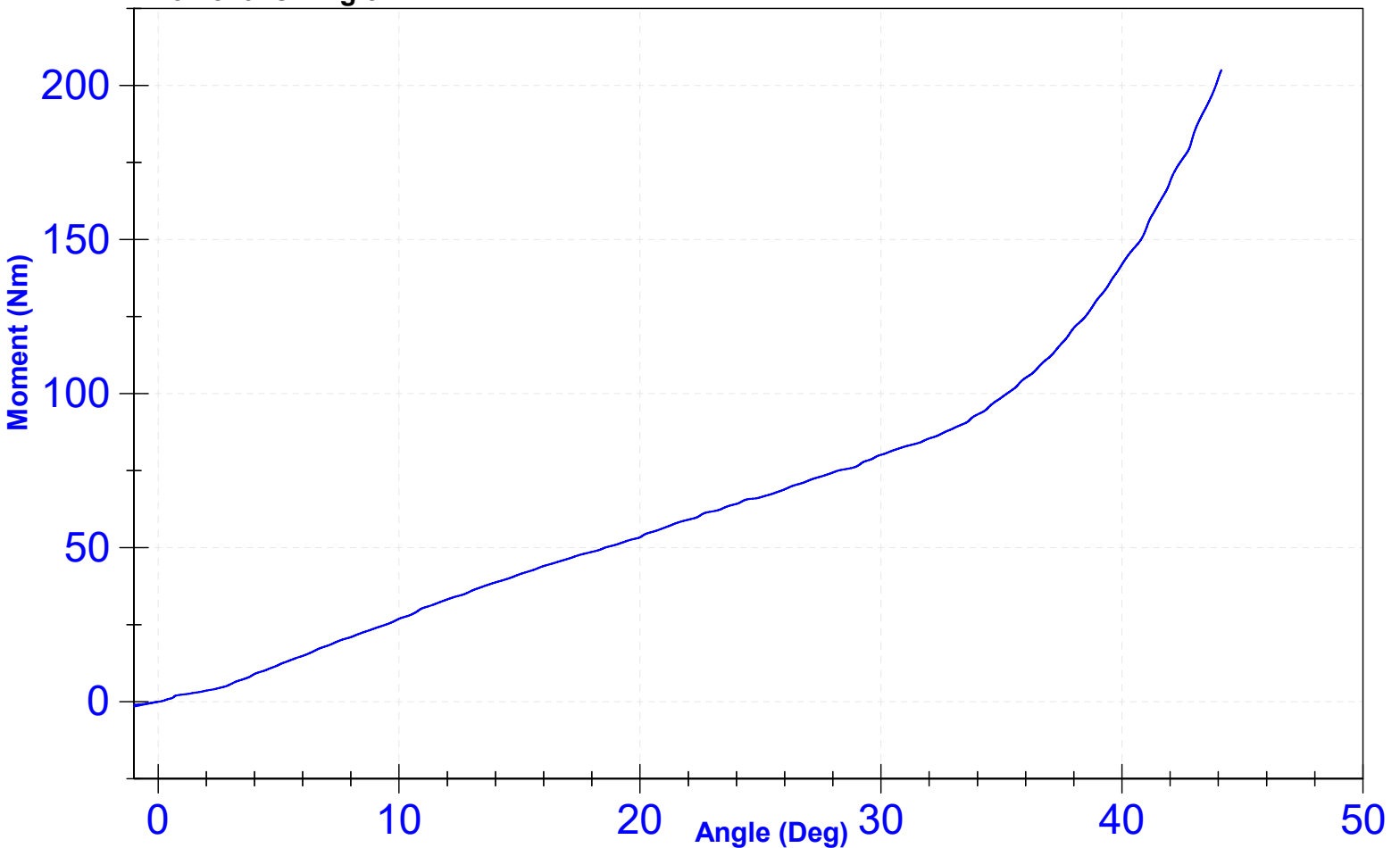
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.4	Pass
Humidity	10	70	%	39	Pass
Average Velocity	5	10	deg/s	7.3	Pass
Angle at 203Nm	40	50	deg	44.0	Pass
Moment at 30 degrees	0	94.9	Nm	80.1	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	ETI SP22	DS-0008	9/23/2024	9/23/2025
Load Cell	PCB 2301-02A	694	2024-01-31	2025-01-30

**Moment vs. Angle**

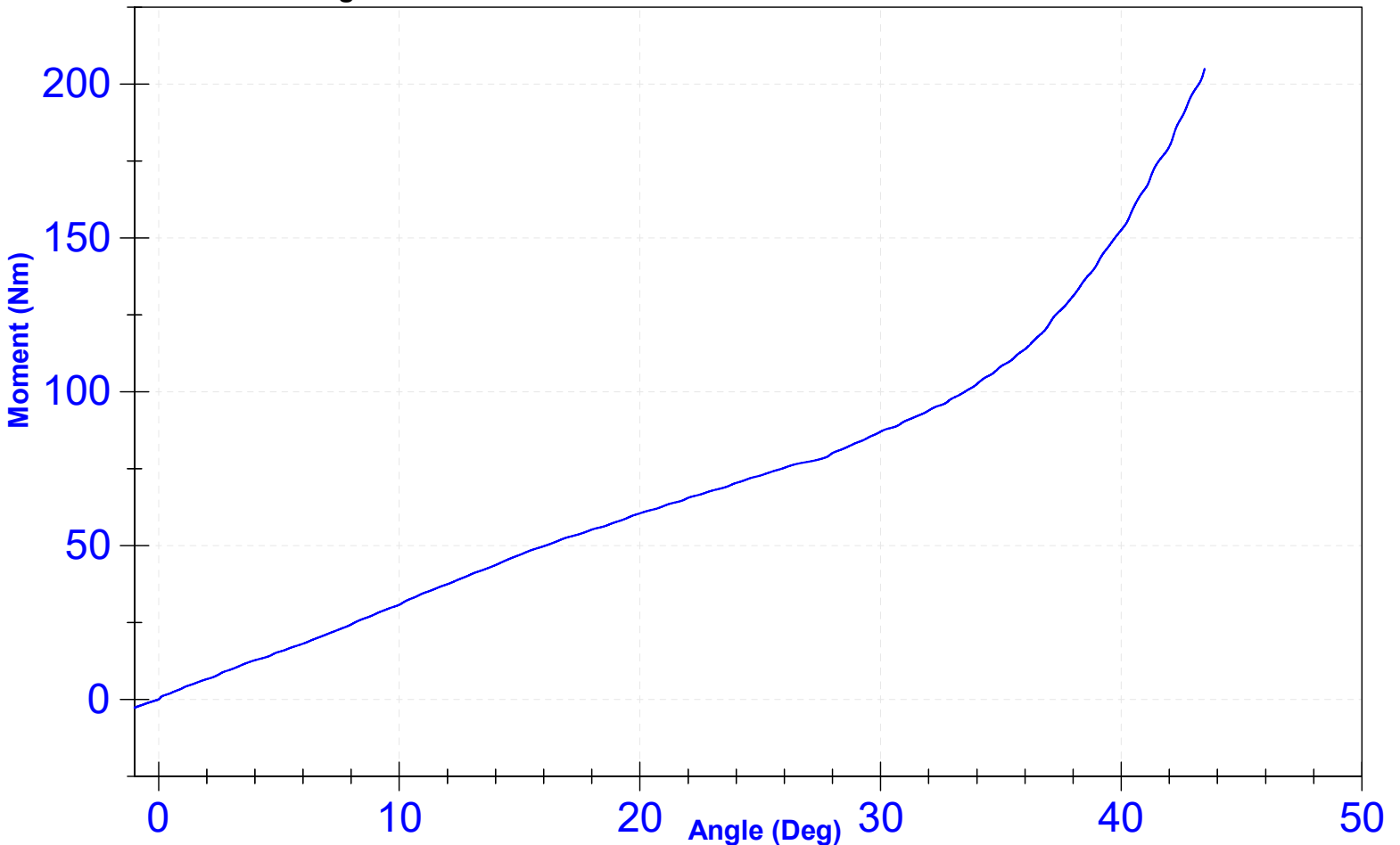


ATD Manufacturer	Humanetics	Test Technician	K. Konieczny
ATD Serial Number	065	Laboratory Supervisor	C. Mantell

Test Parameter	Results		Unit	Result	Pass/Fail
	Minimum Specification	Maximum Specification			
Temperature	18.9	25.6	°C	21.4	Pass
Humidity	10	70	%	39	Pass
Average Velocity	5	10	deg/s	7.2	Pass
Angle at 203Nm	40	50	deg	43.4	Pass
Moment at 30 degrees	0	94.9	Nm	87.0	Pass

Transducer Calibrations				
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	ETI SP22	DS-0008	9/23/2024	9/23/2025
Load Cell	PCB 2301-02A	694	2024-01-31	2025-01-30

**Moment vs. Angle**



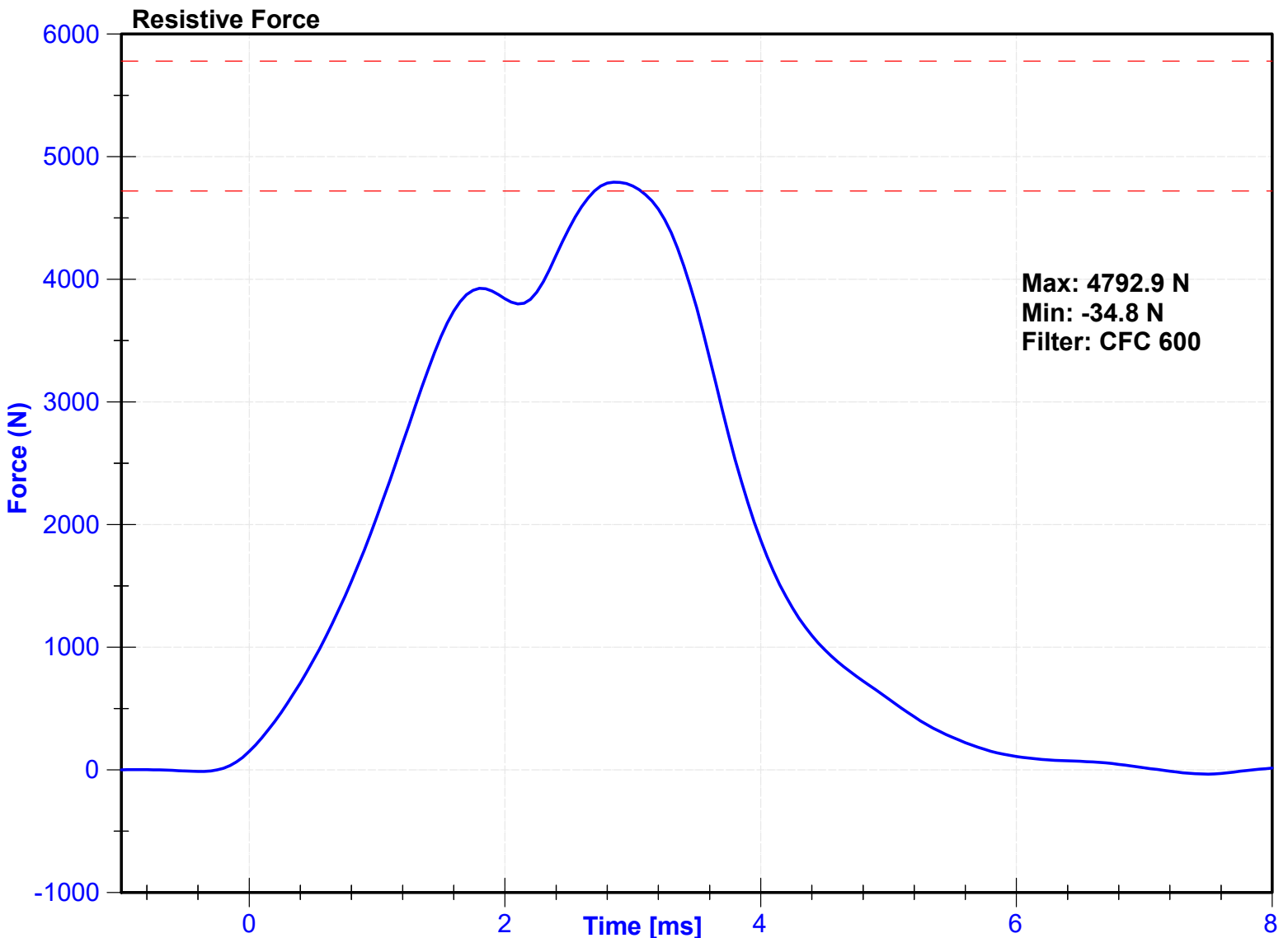
ATD Manufacturer	Humanetics	Test Technician	CL
ATD Serial Number	065	Laboratory Supervisor	ZP

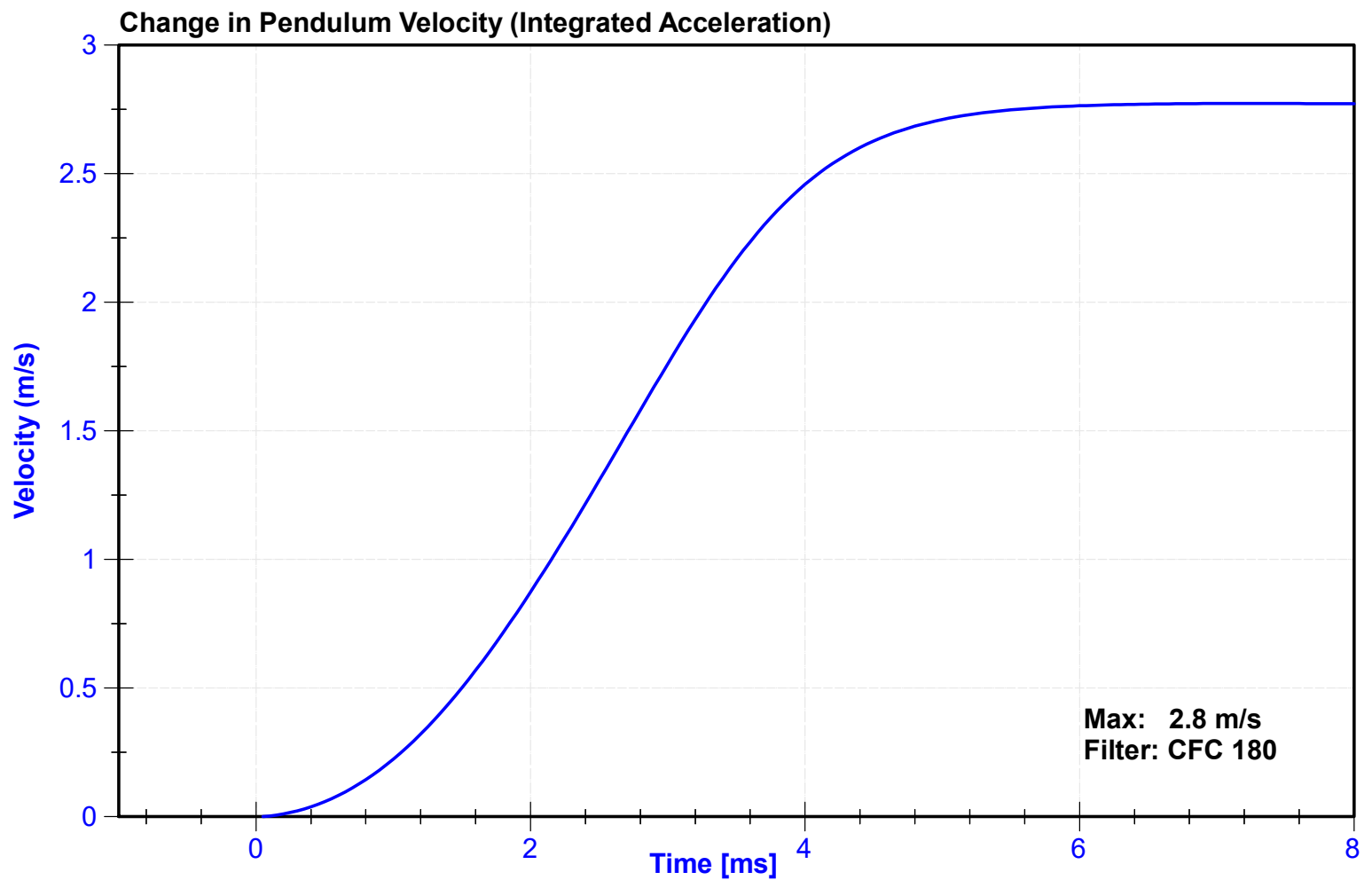
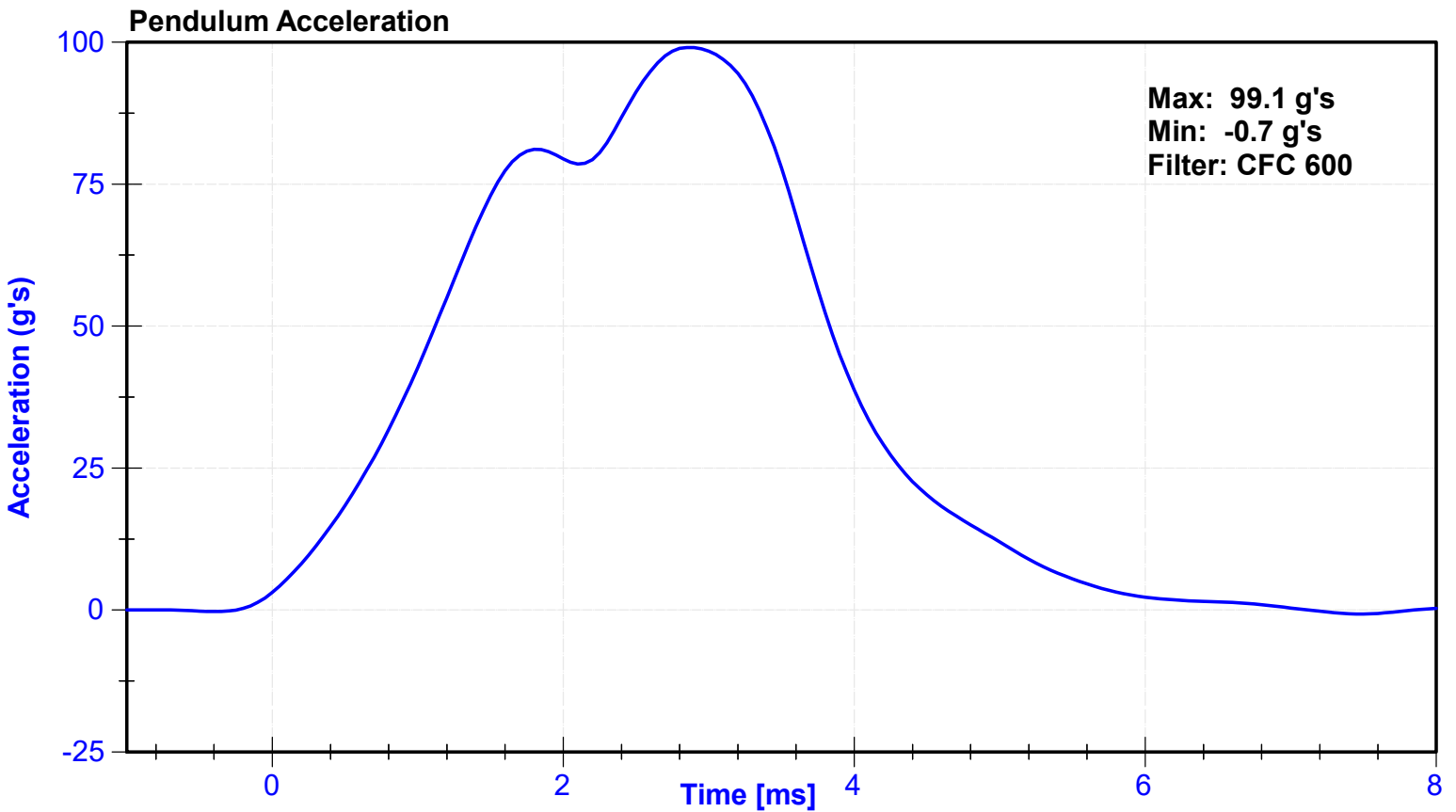
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.4	Pass
Humidity	10	70	%	44.7	Pass
Velocity	2.07	2.13	m/s	2.127	Pass
Maximum Resistive Force	4720	5780	N	4792.9	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T29720	6/12/2024	12/9/2024





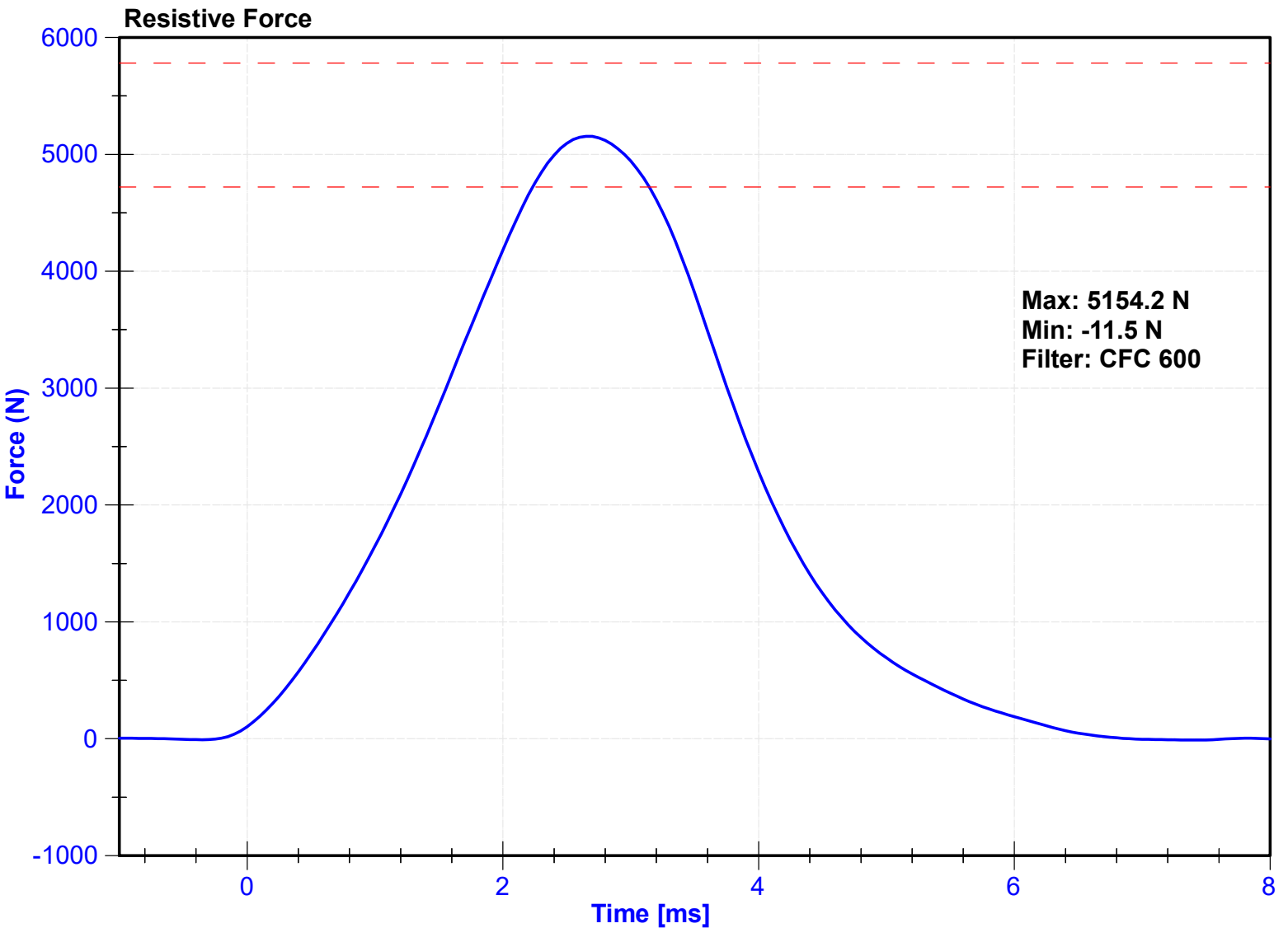
ATD Manufacturer	Humanetics	Test Technician	CL
ATD Serial Number	065	Laboratory Supervisor	ZP

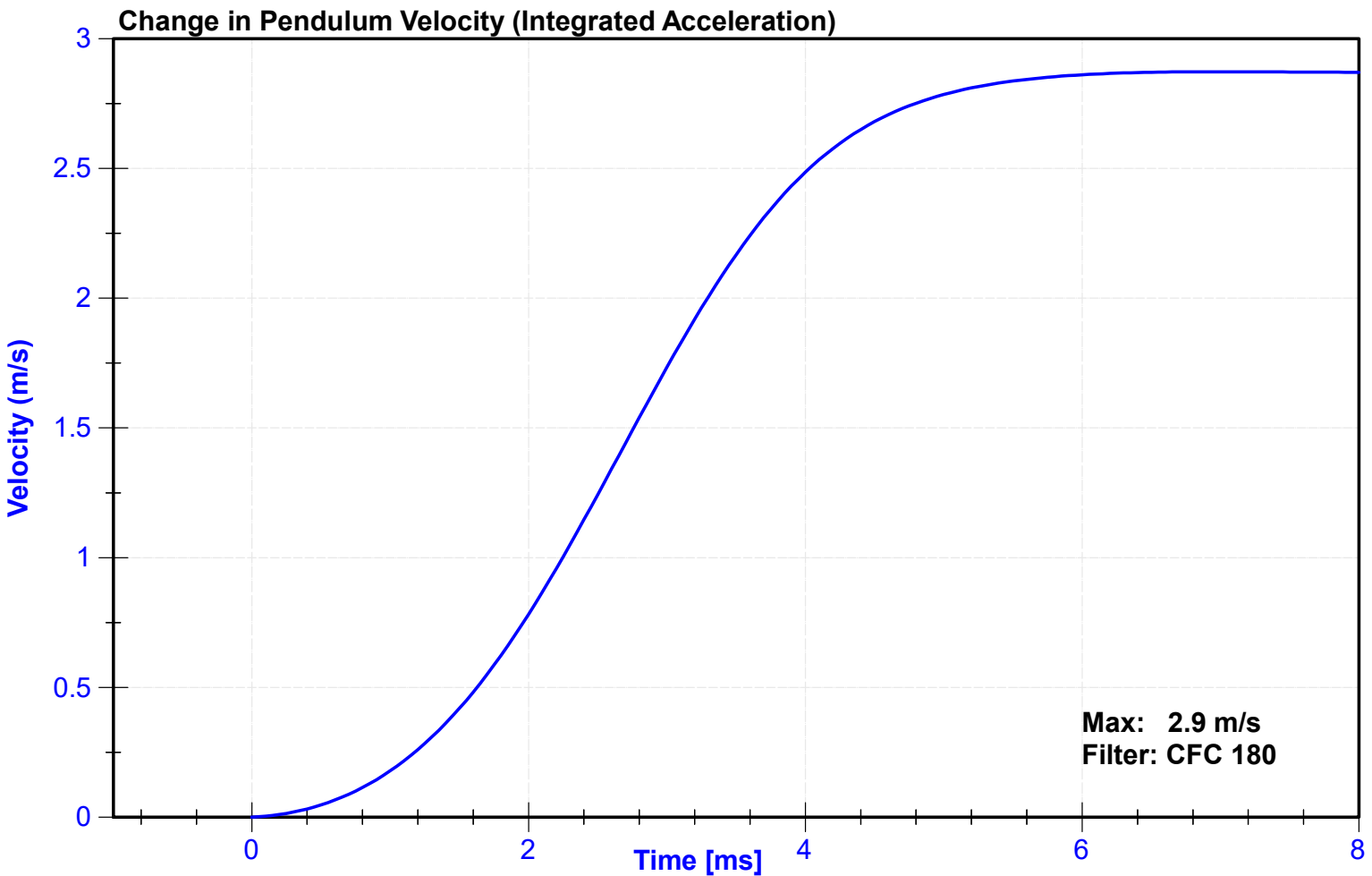
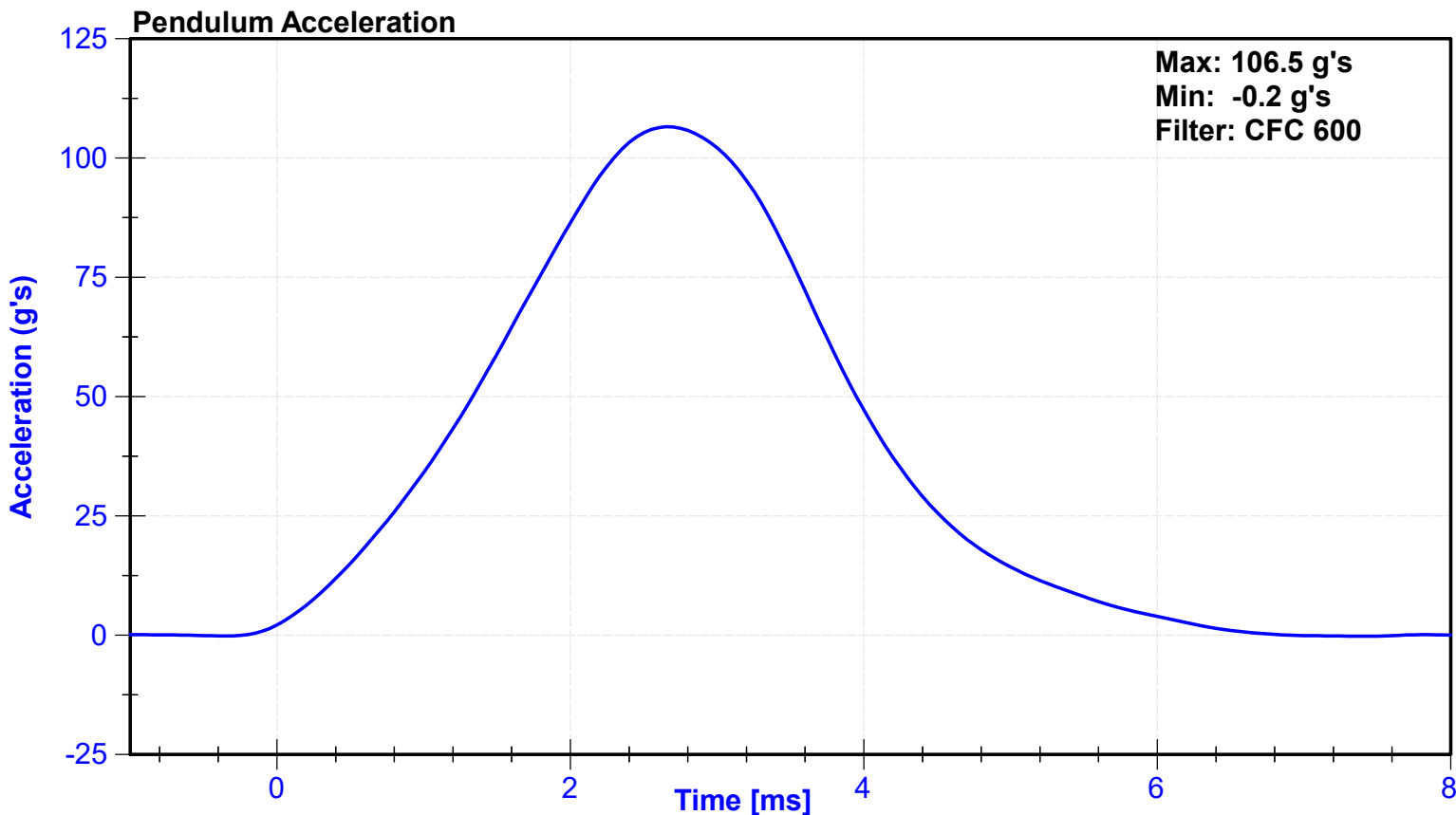
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.4	Pass
Humidity	10	70	%	44.7	Pass
Velocity	2.07	2.13	m/s	2.095	Pass
Maximum Resistive Force	4720	5780	N	5154.2	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T29720	6/12/2024	12/9/2024





**CALIBRATION TEST RESULTS**

**POST-TEST**

**HYBRID III 5<sup>TH</sup> PERCENTILE FEMALE - PASSENGER ATD**

**SERIAL NO: 137**

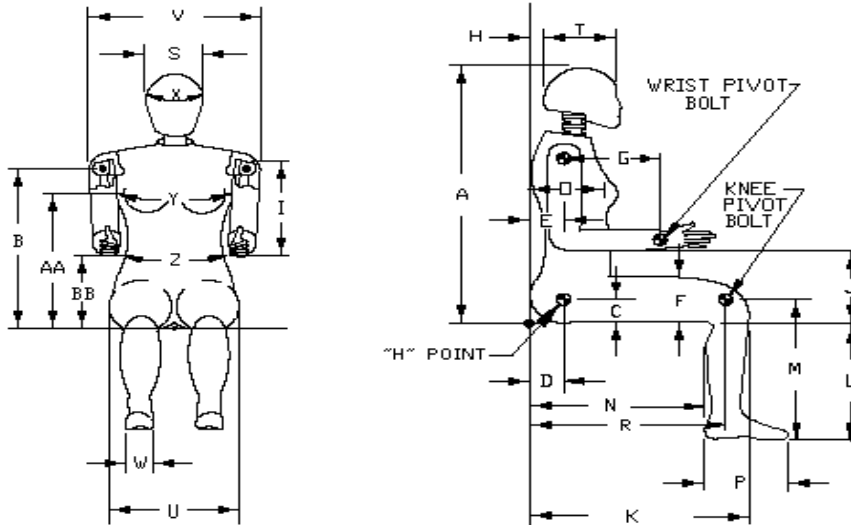


External Measurements - Hybrid 3 - 5th Female

Technician: J. Rios

Date: 11/18/2024

Dummy Serial Number: 137



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	775	800	781	Pass
B	Shoulder Pivot Height	432	457	441	Pass
C	H-Point Height	81	86	85	Pass
D	H-Point from Backline	145	150	148	Pass
E	Shoulder Pivot from Backline	69	84	74	Pass
F	Thigh Clearance	119	135	121	Pass
G	Back of Elbow to Wrist Pivot	244	259	251	Pass
H	Head Back to Backline	43	48	46	Pass
I	Shoulder to Elbow Length	277	297	282	Pass
J	Elbow Rest Height	183	203	189	Pass
K	Buttock to Knee Length	521	546	532	Pass
L	Popliteal Height	356	376	362	Pass
M	Knee Pivot Height	394	419	409	Pass
N	Buttock Popliteal Length	414	439	428	Pass
O	Chest Depth without Jacket	175	191	184	Pass
P	Foot Length (right)	219	234	227	Pass
R	Buttock To Knee Pivot Length	457	483	467	Pass
S	Head Breadth	137	147	143	Pass
T	Head Depth	178	188	184	Pass
U	Hip Breadth	300	315	311	Pass
V	Shoulder Breadth	351	366	360	Pass
W	Foot Breadth	79	94	85	Pass
X	Head Circumference	528	549	537	Pass
Y	Chest Circumference with Jacket	851	881	867	Pass
Z	Waist Circumference	460	790	607	Pass
AA	Reference Location (Chest Circumference)	333	358	341	Pass
BB	Reference Location (Waist Circumference)	160	170	167	Pass

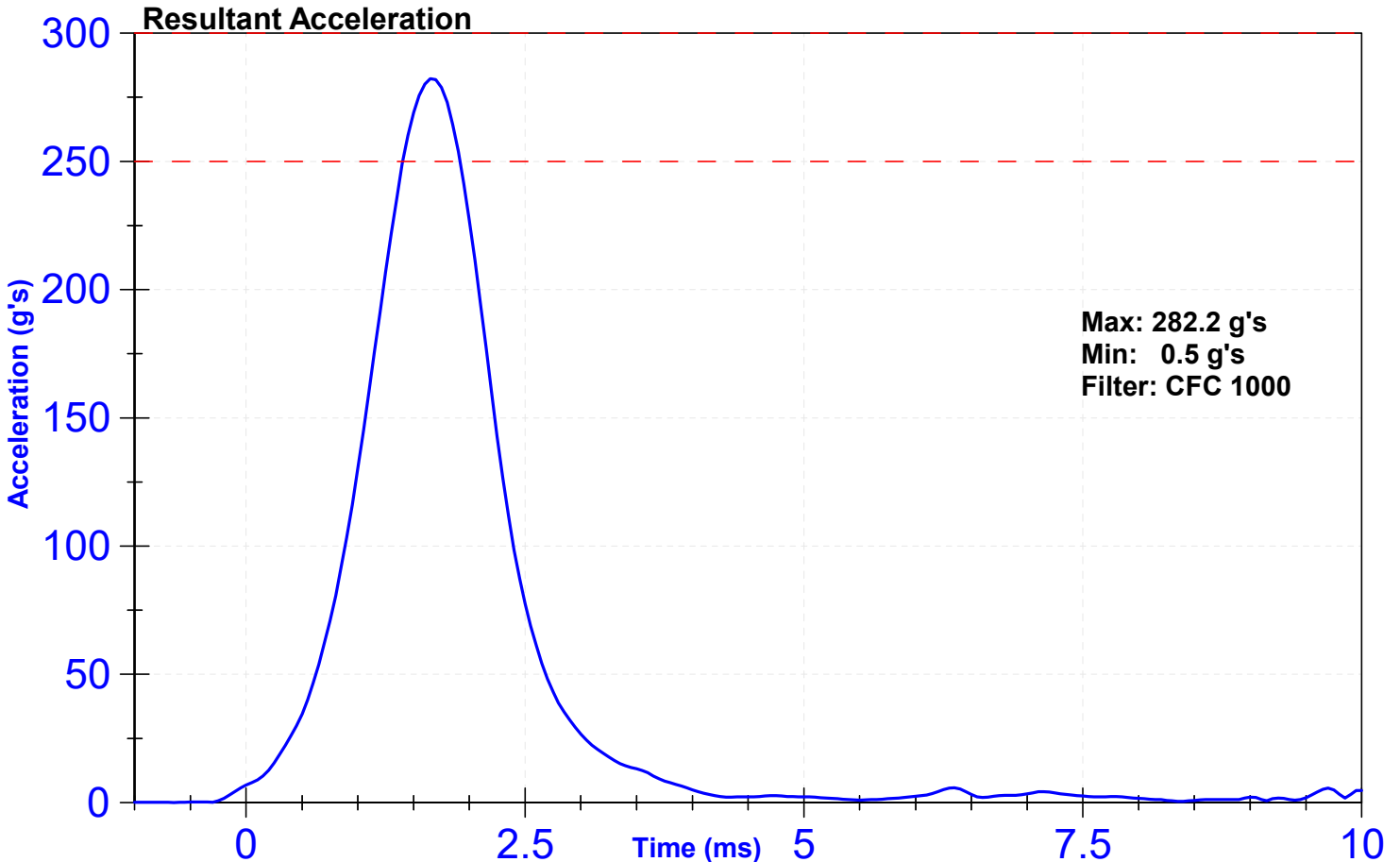
ATD Manufacturer	Humanetics	Test Technician	J. Rios
ATD Serial Number	137	Laboratory Supervisor	C. Mantell

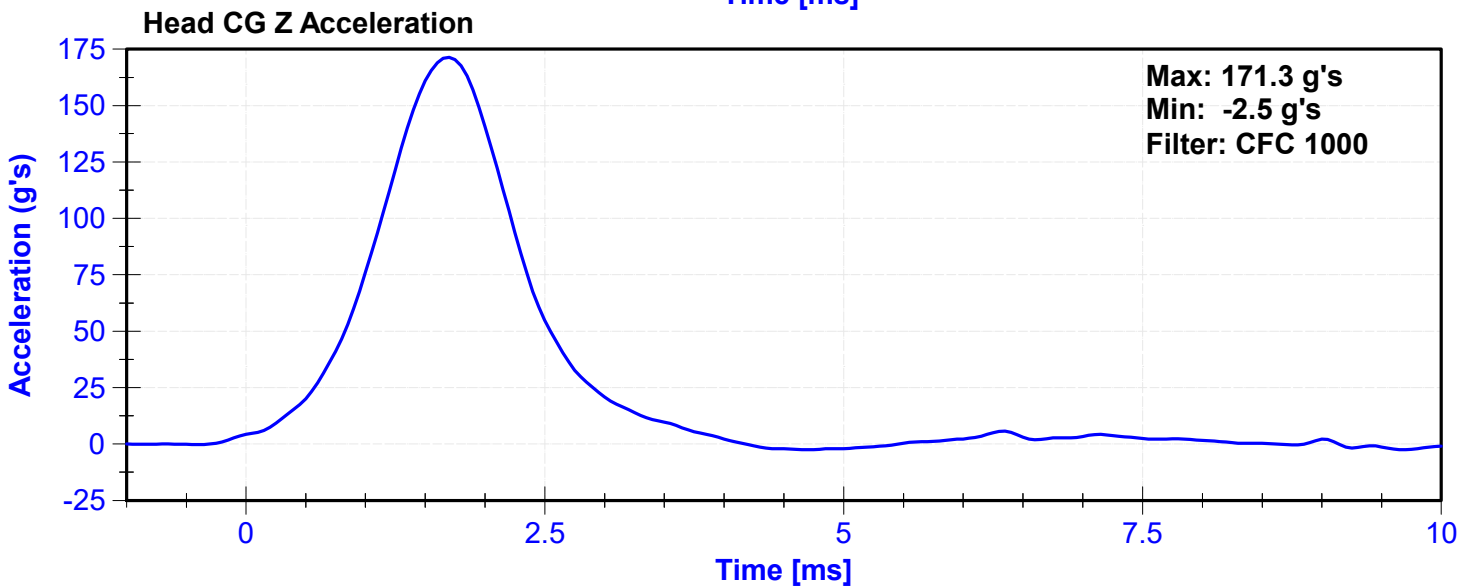
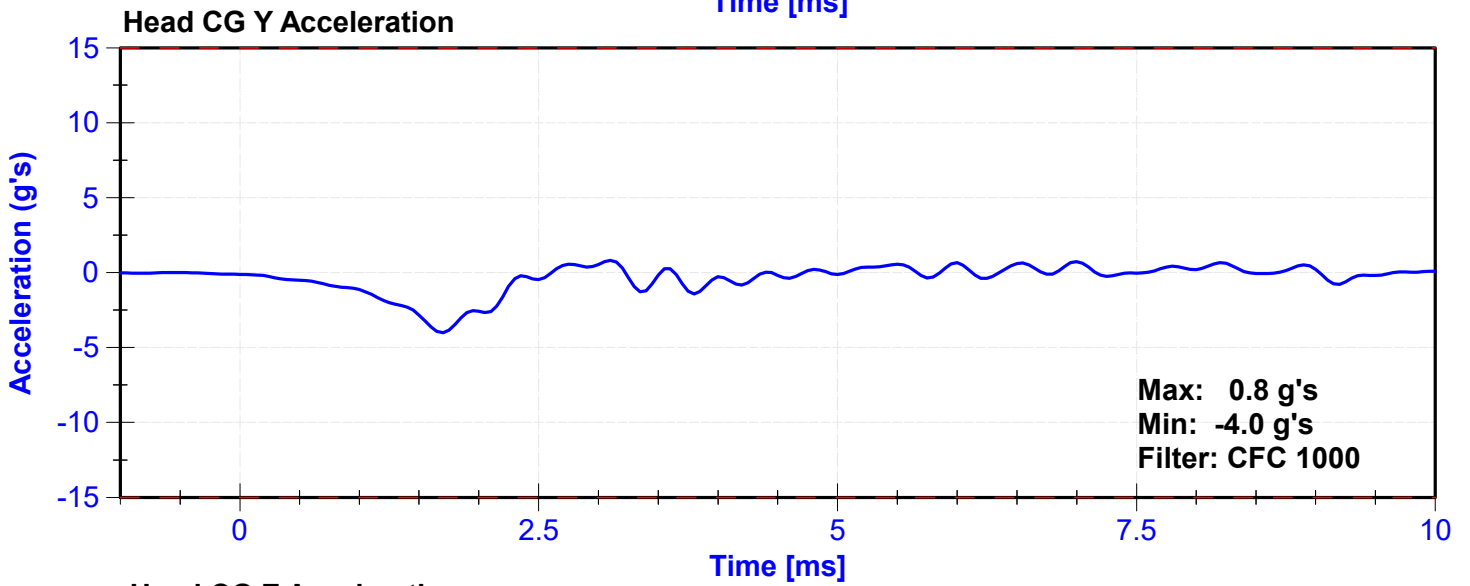
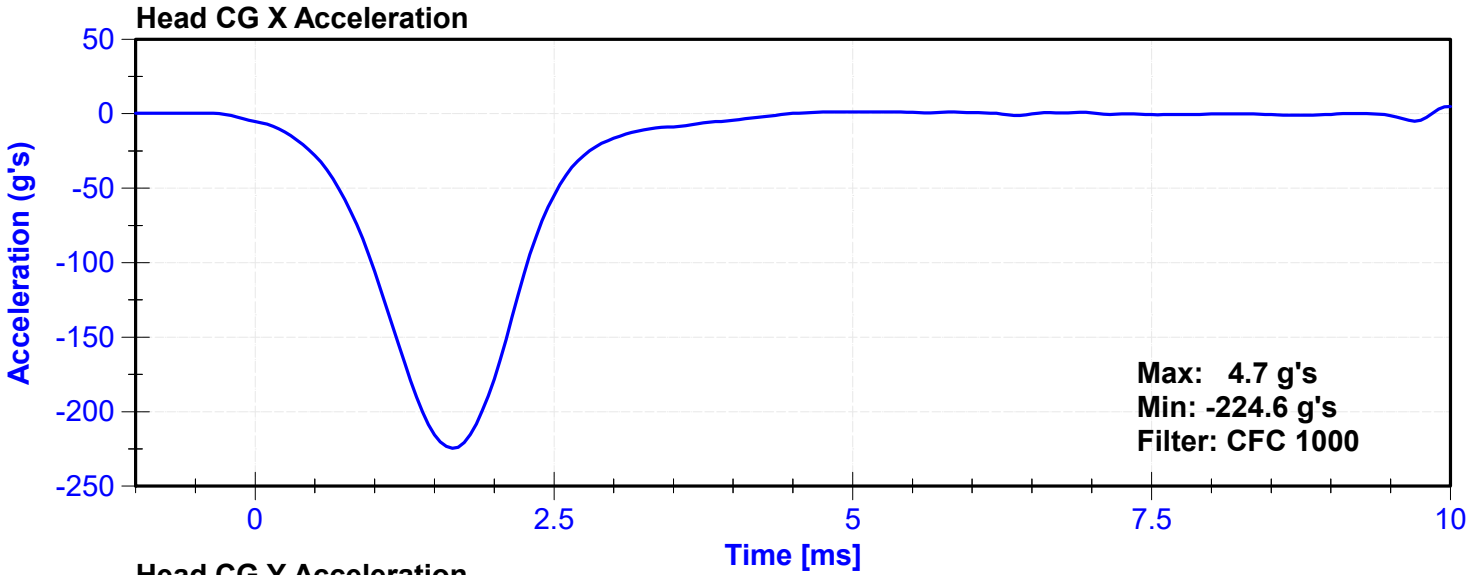
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.6	Pass
Humidity	10	70	%	35	Pass
Resultant Acceleration	250	300	g's	282.2	Pass
Oscillation	0	10	%	2.0	Pass
Lateral Acceleration	-15	15	g's	-4.0	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	P79417	8/19/2024	2/15/2025
Y Accelerometer	Endevco	P83335	8/19/2024	2/15/2025
Z Accelerometer	Endevco	P64149	8/19/2024	2/15/2025





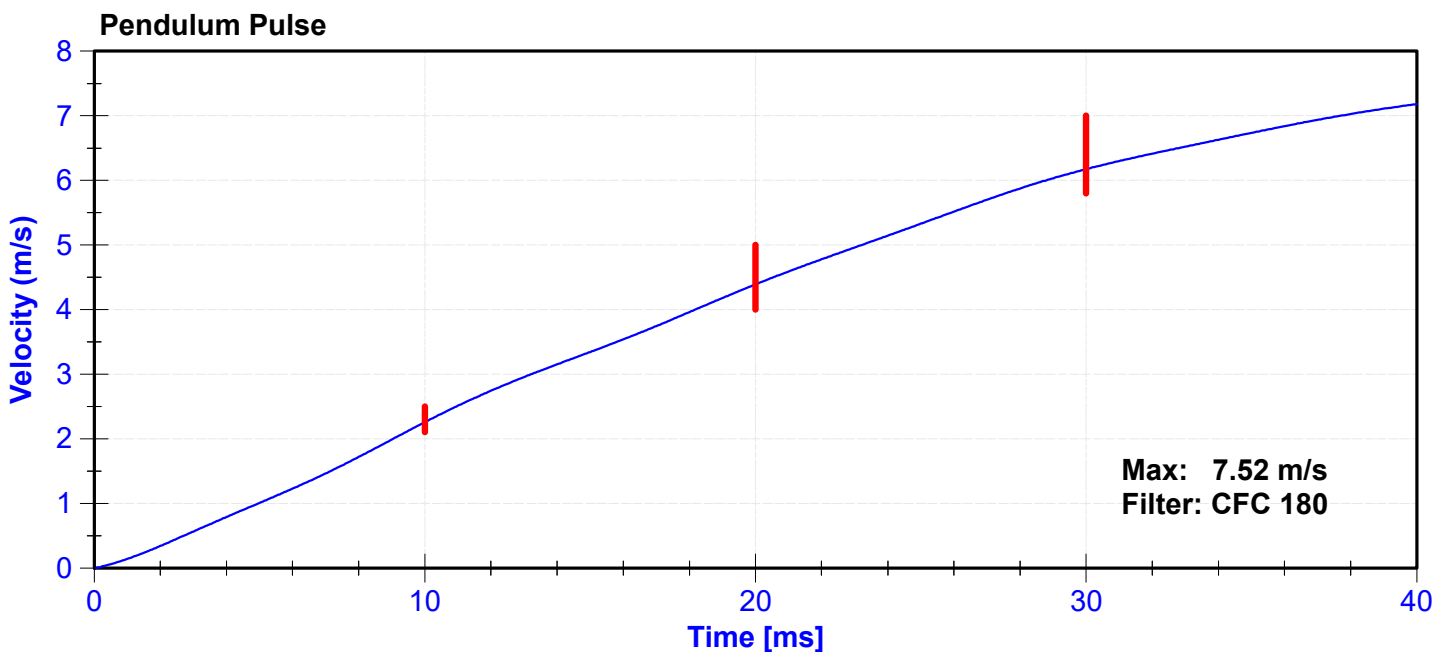
ATD Manufacturer	Humanetics	Test Technician	J. Rios
ATD Serial Number	137	Laboratory Supervisor	C. Mantell

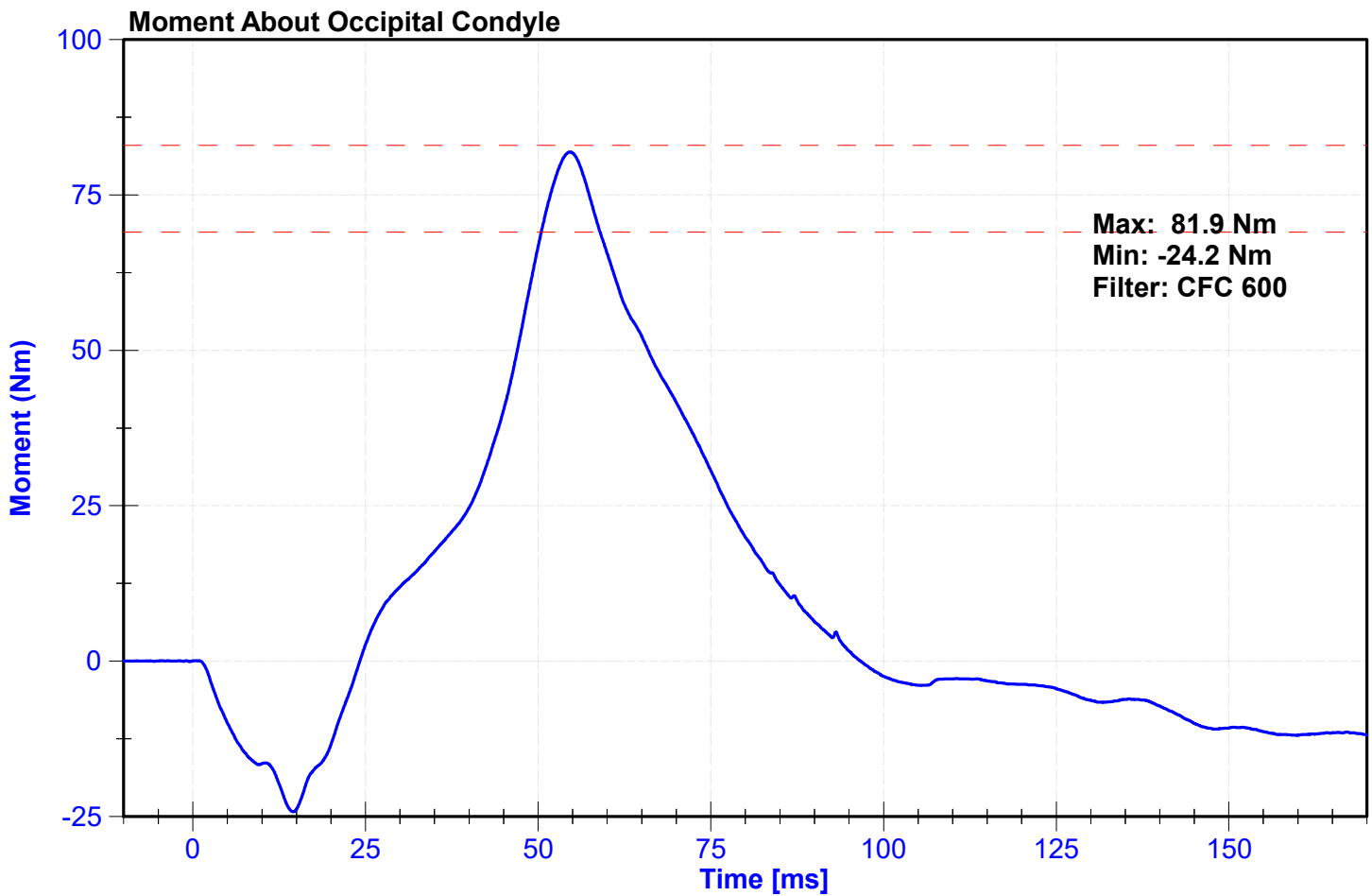
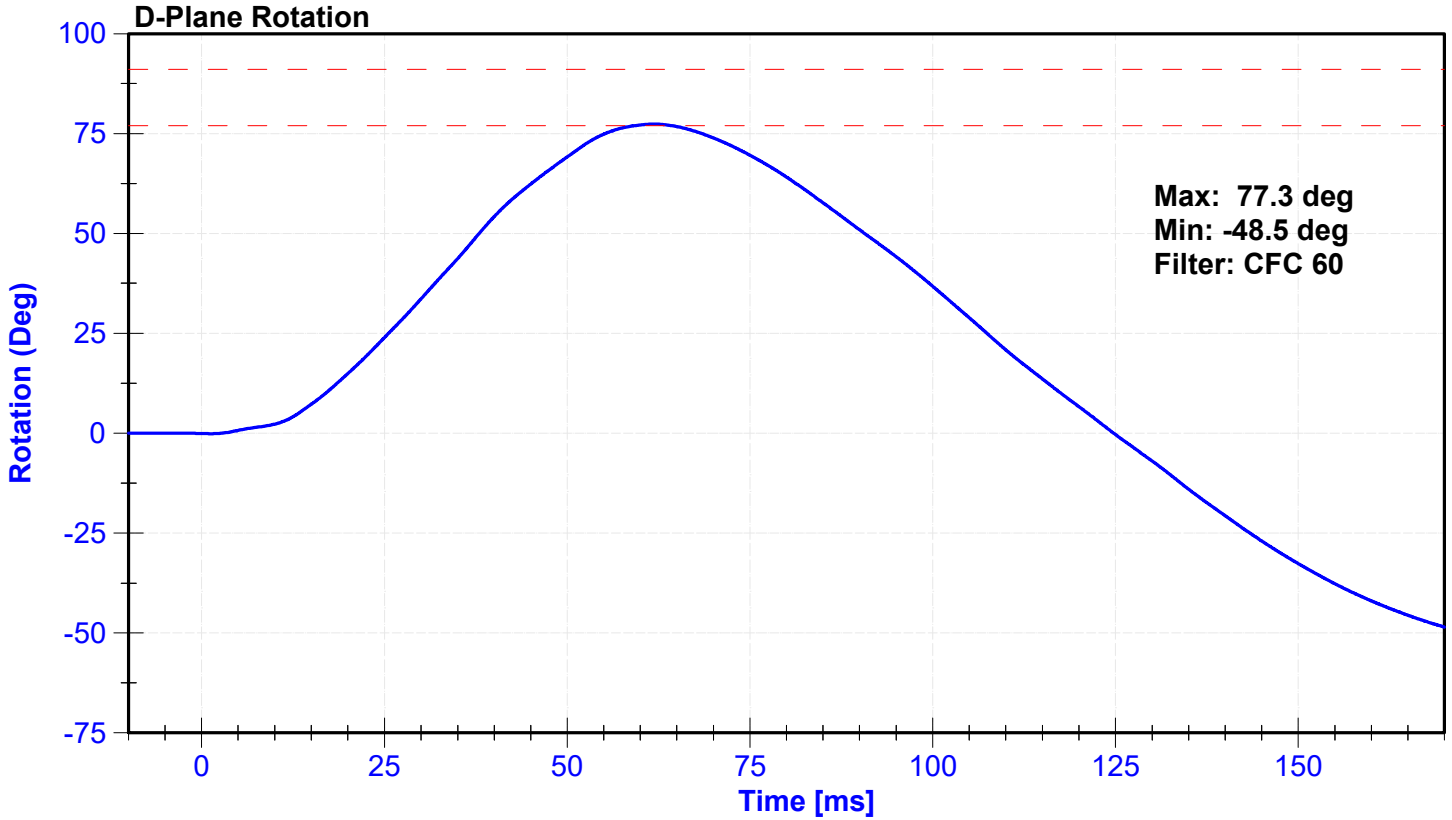
**Results**

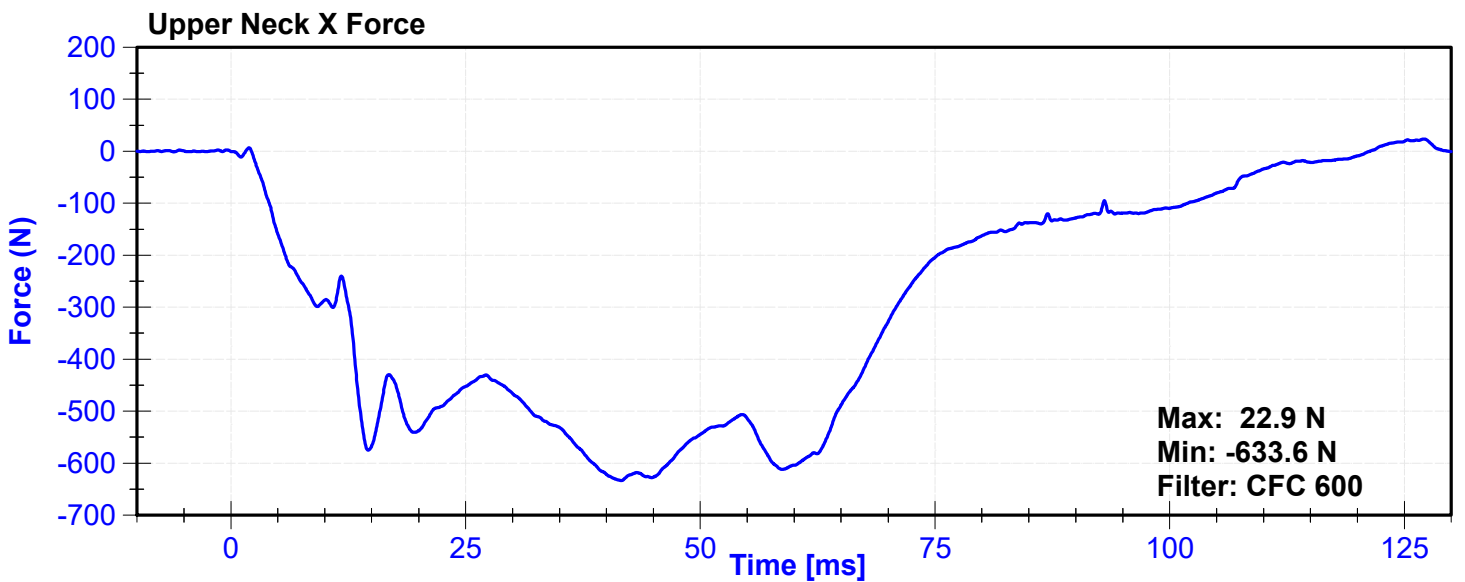
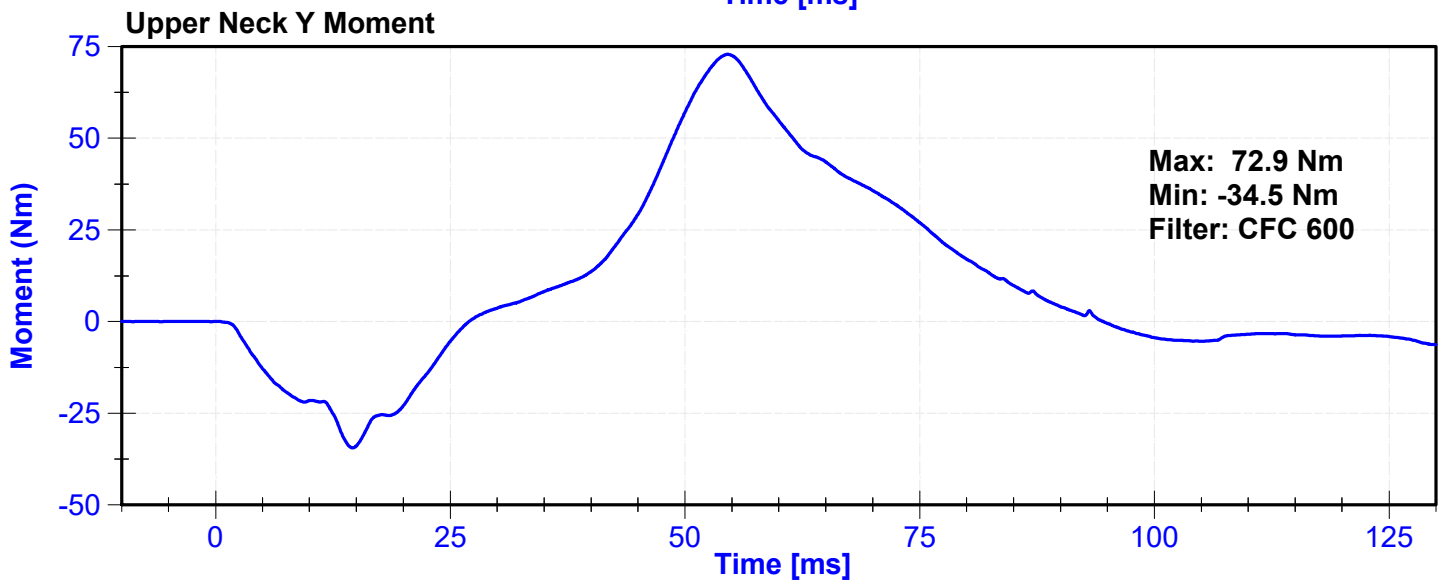
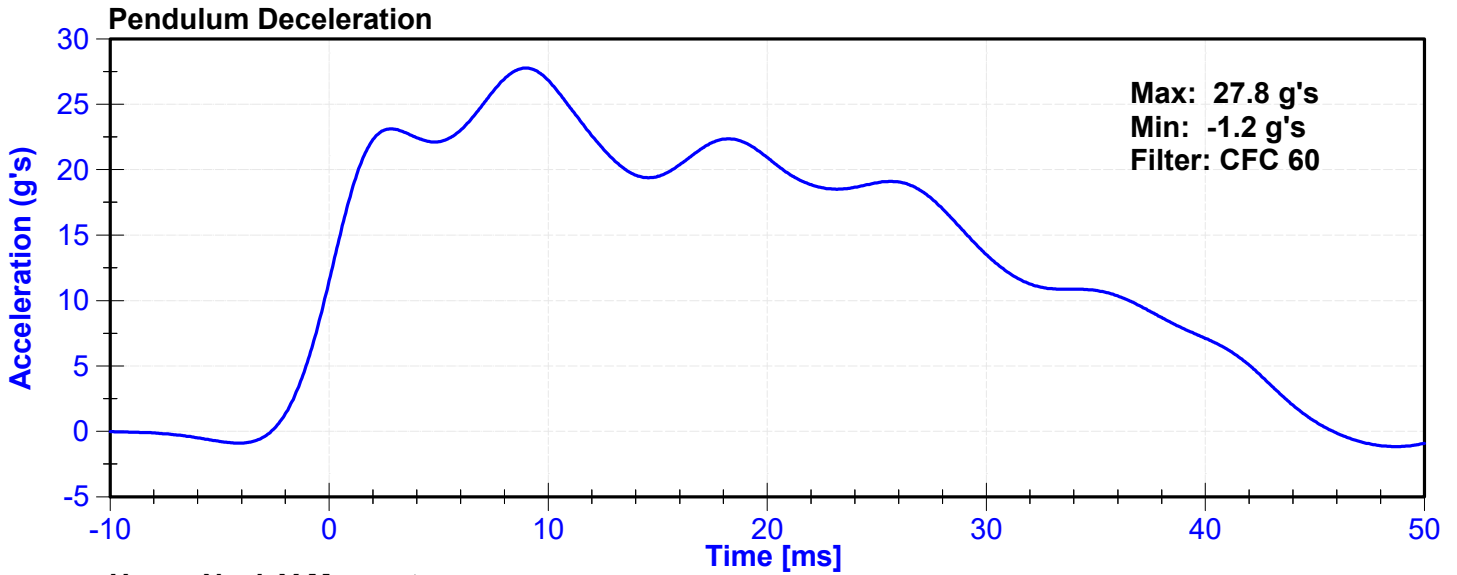
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	32	Pass
Velocity	6.89	7.13	m/s	7.033	Pass
Pendulum Impulse at 10ms	2.1	2.5	m/s	2.26	Pass
Pendulum Impulse at 20ms	4.0	5.0	m/s	4.39	Pass
Pendulum Impulse at 30ms	5.8	7.0	m/s	6.17	Pass
Max D Plane Rotation	77	91	deg	77.3	Pass
Max Moment During Rotation Interval	69	83	Nm	81.9	Pass
Moment Decay to 10.0 Nm	80	100	ms	87.4	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16503	10/30/2024	4/28/2025
Pendulum Potentiometer	ETI	SP22G_LABPOT1	5/7/2024	5/7/2025
Condyle Potentiometer	ETI	SP22G_LABPOT2	5/7/2024	5/7/2025
Upper Neck Load Cell	Denton	2184-FX	7/10/2024	7/10/2025







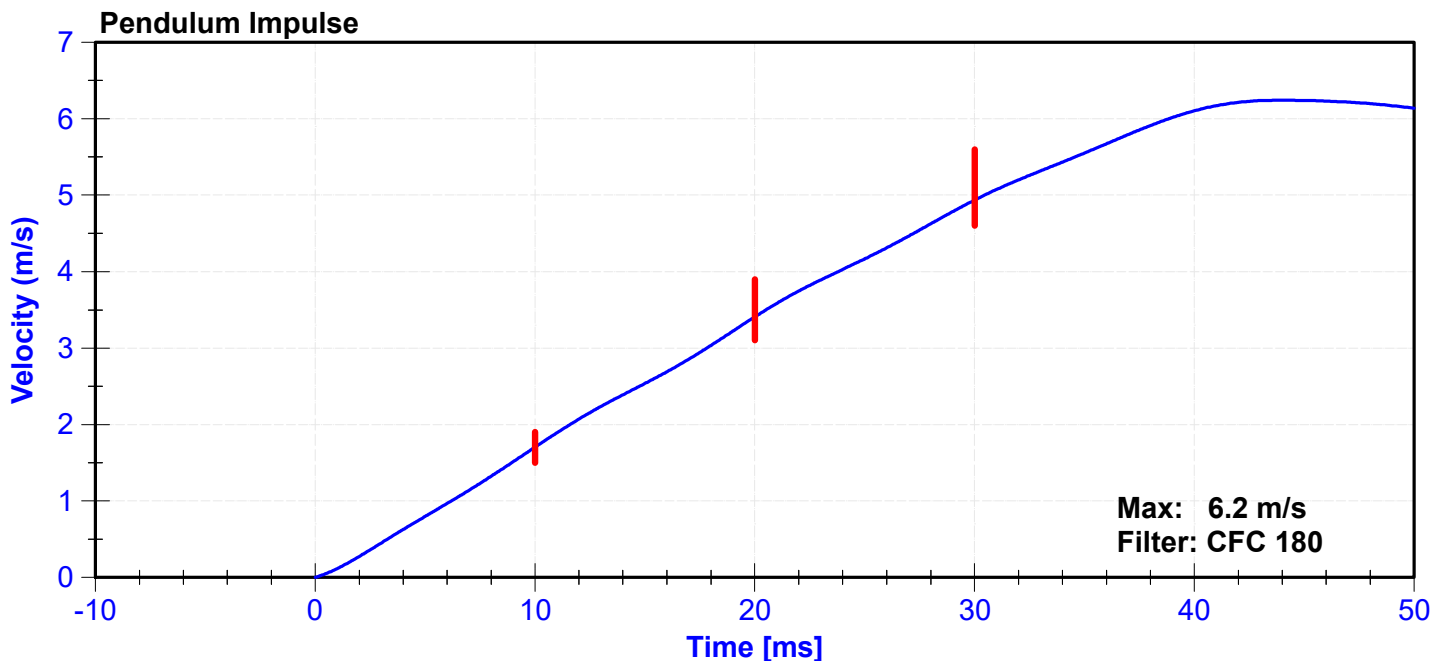
ATD Manufacturer	Humanetics	Test Technician	J. Rios
ATD Serial Number	137	Laboratory Supervisor	C. Mantell

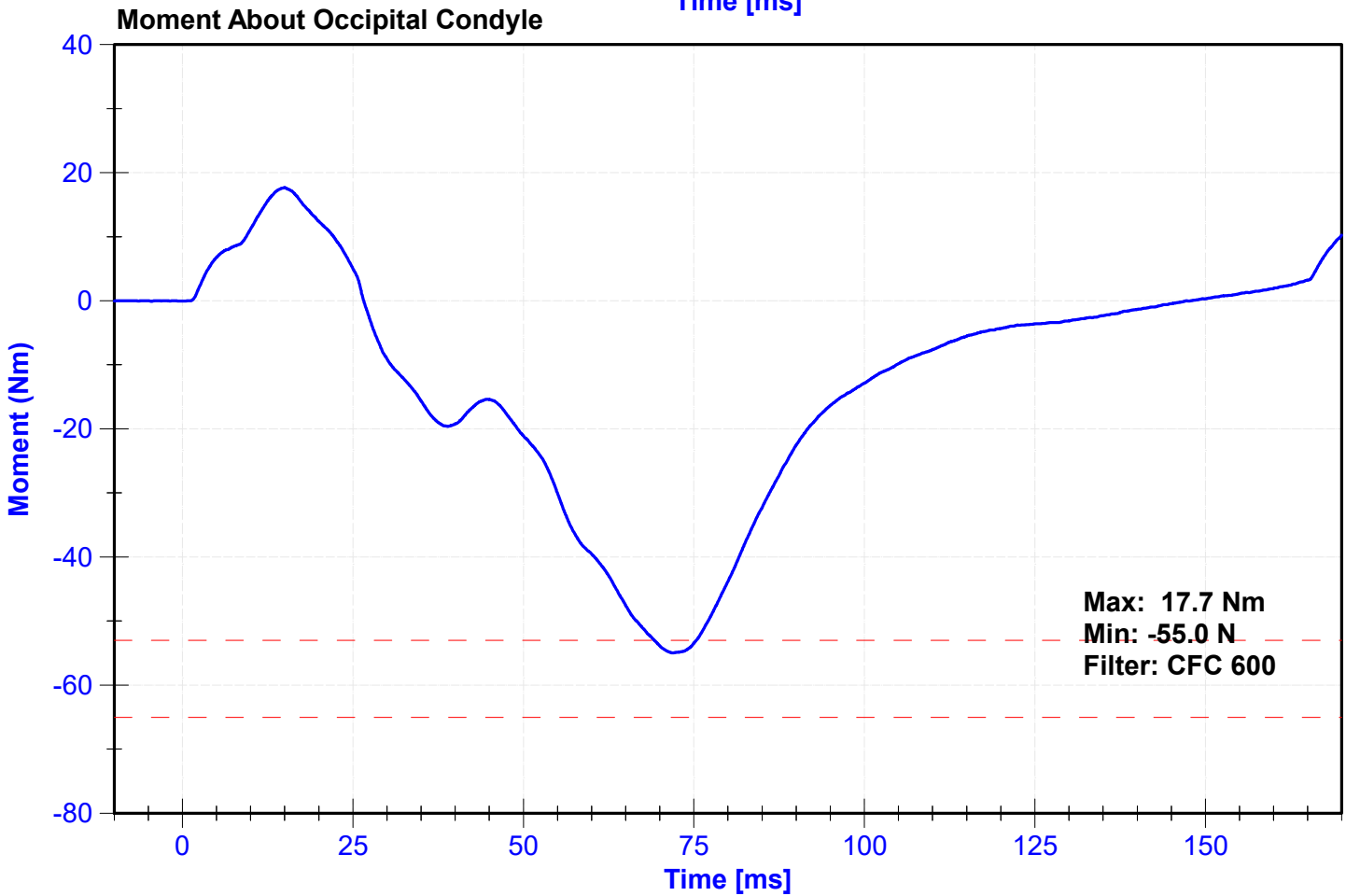
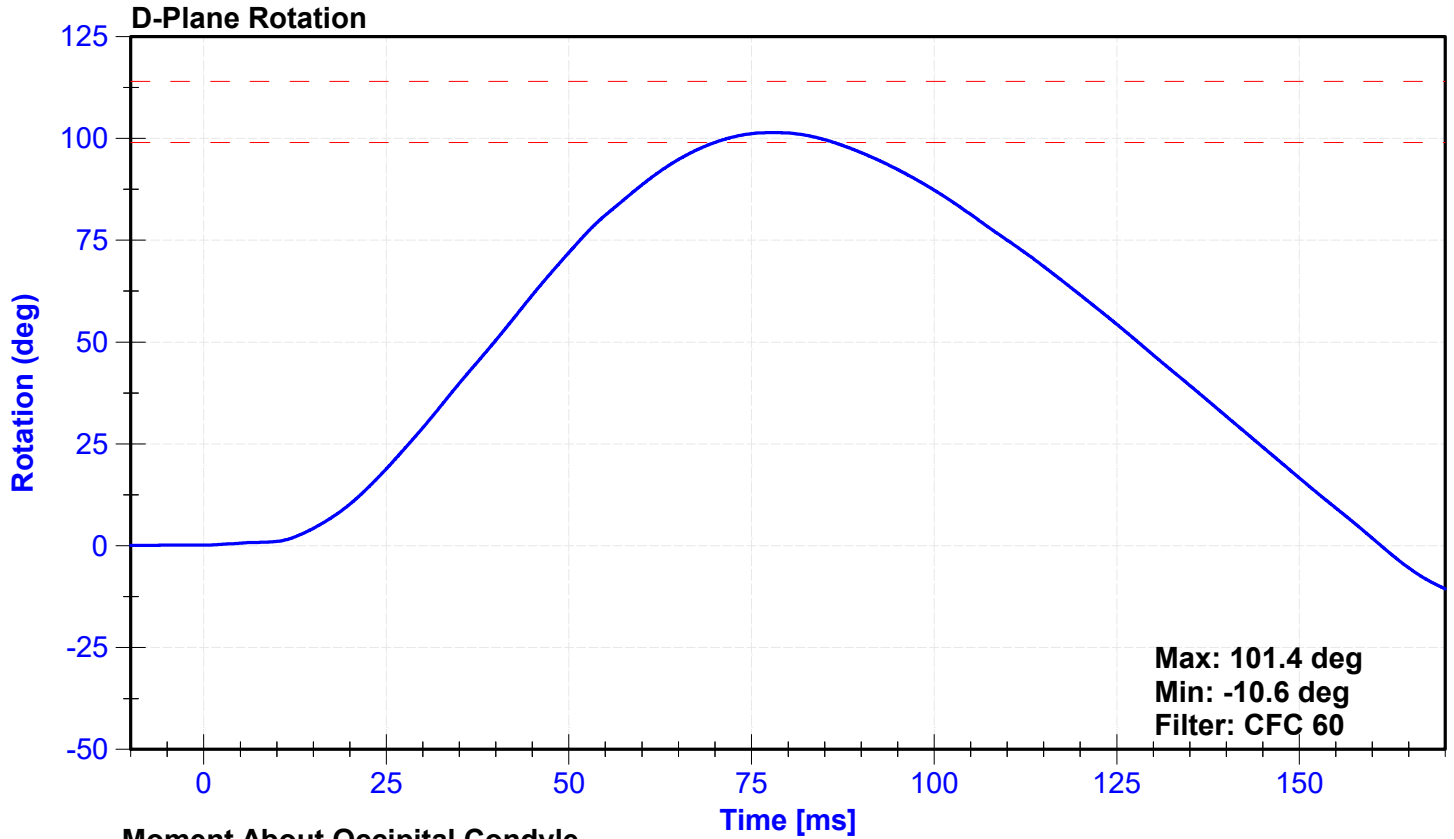
**Results**

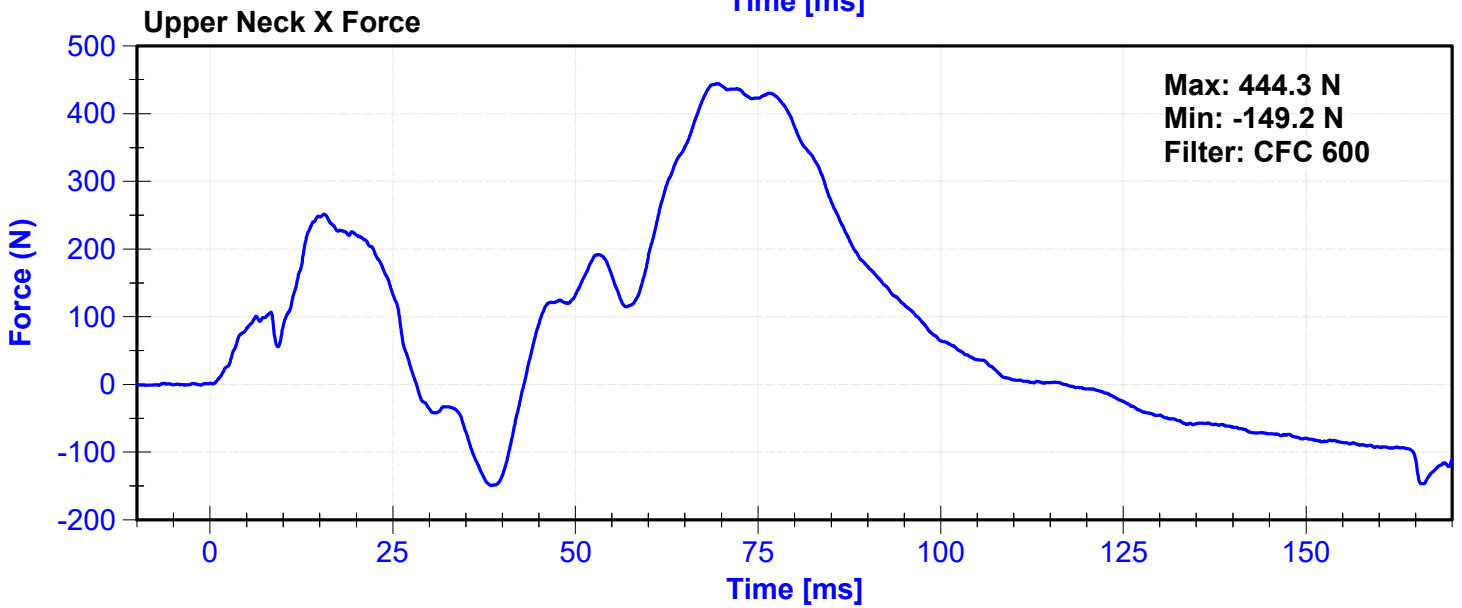
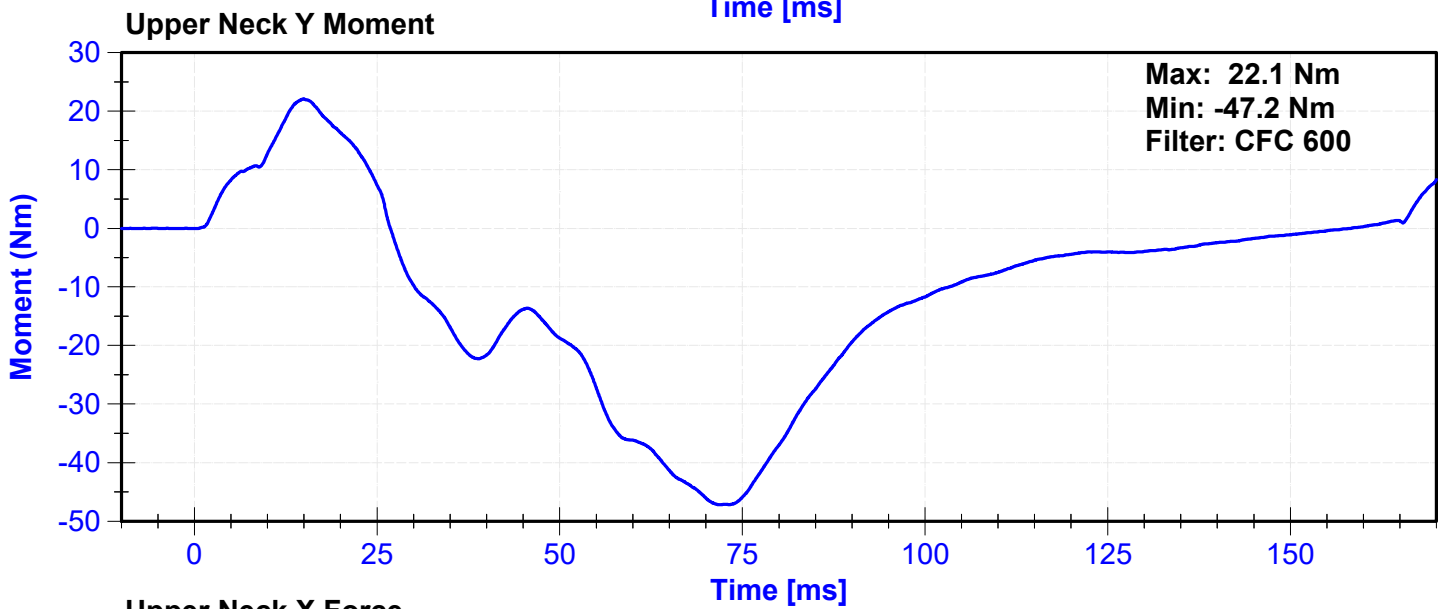
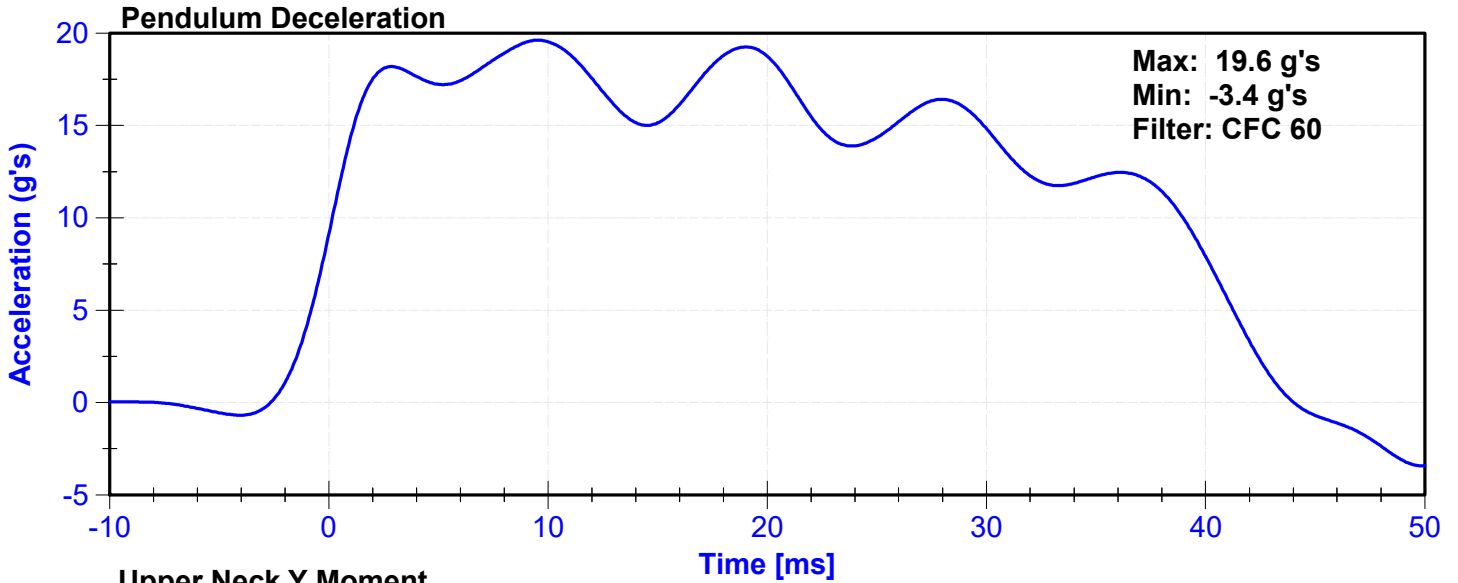
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	32	Pass
Velocity	5.95	6.19	m/s	6.012	Pass
Pendulum Impulse at 10ms	1.5	1.9	m/s	1.70	Pass
Pendulum Impulse at 20ms	3.1	3.9	m/s	3.41	Pass
Pendulum Impulse at 30ms	4.6	5.6	m/s	4.94	Pass
D Plane Rotation	99	114	deg	101.4	Pass
Moment During Rotation Interval	-65	-53	Nm	-55.0	Pass
Moment Decay to -10Nm	94	114	ms	104.7	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16503	10/30/2024	4/28/2025
Pendulum Potentiometer	ETI	SP22G_LABPOT1	5/7/2024	5/7/2025
Condyle Potentiometer	ETI	SP22G_LABPOT2	5/7/2024	5/7/2025
Upper Neck Load Cell	Denton	2184-FX	7/10/2024	7/10/2025







ATD Manufacturer	Humanetics	Test Technician	J. Rios
ATD Serial Number	137	Laboratory Supervisor	C. Mantell

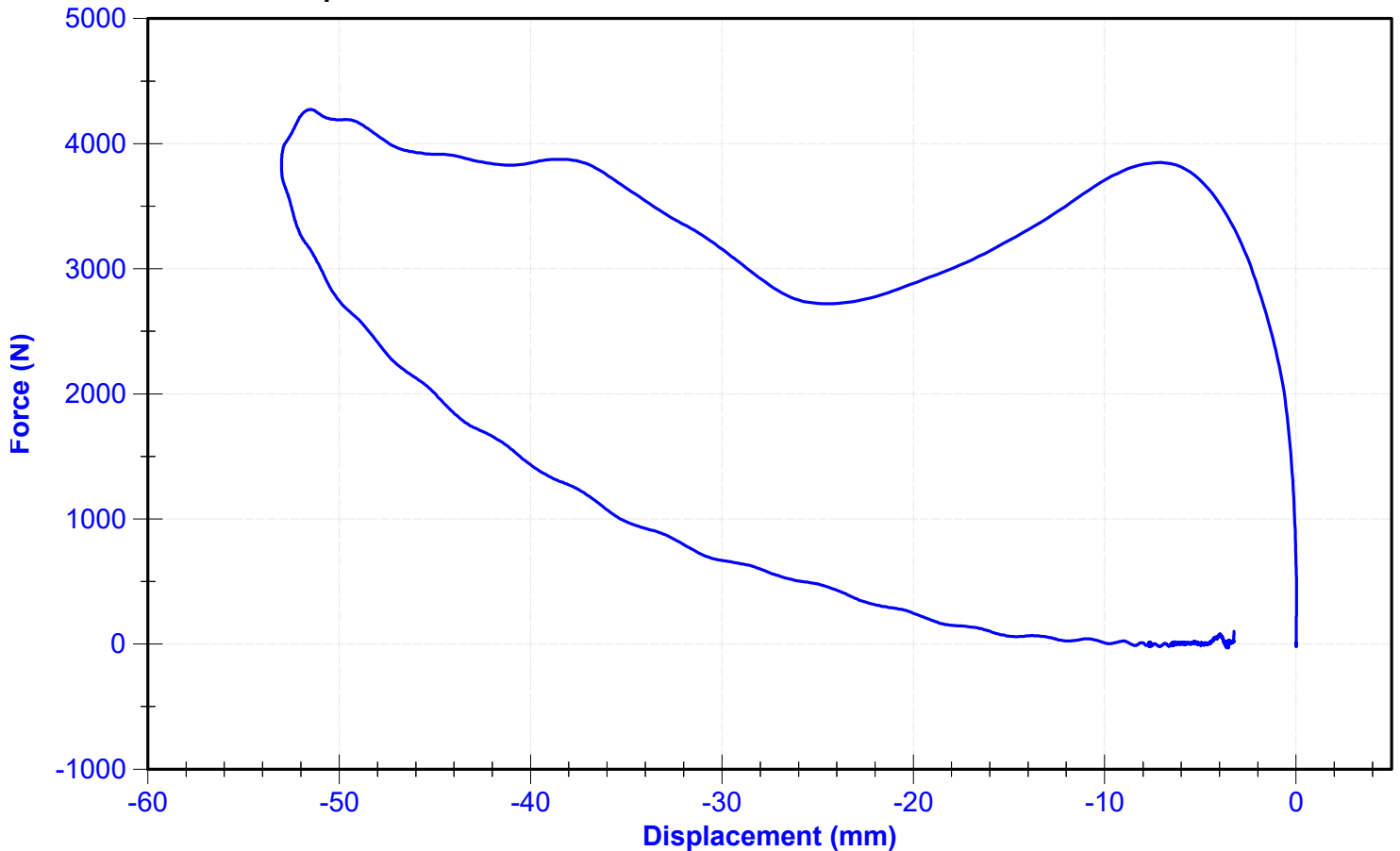
**Results**

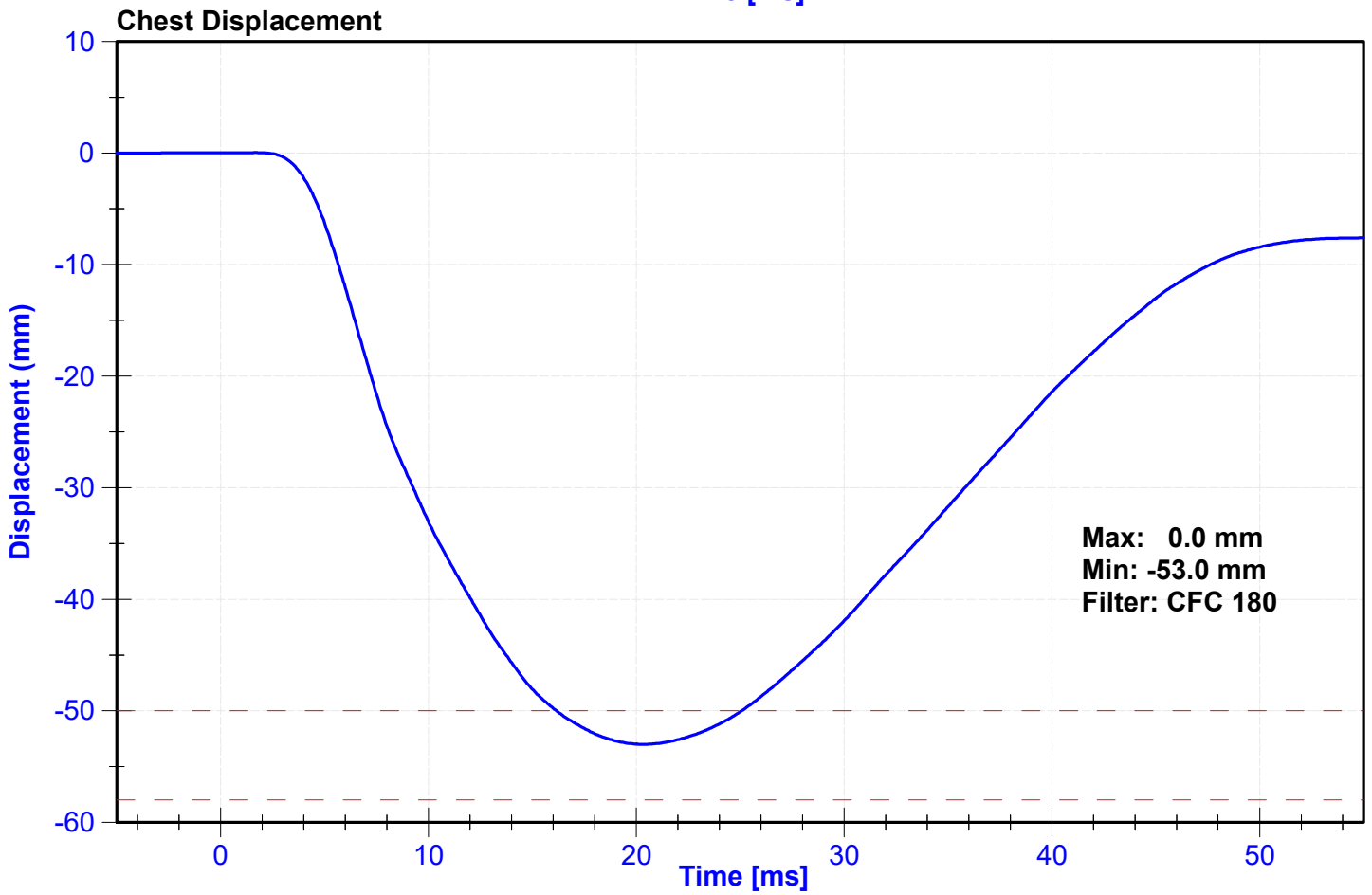
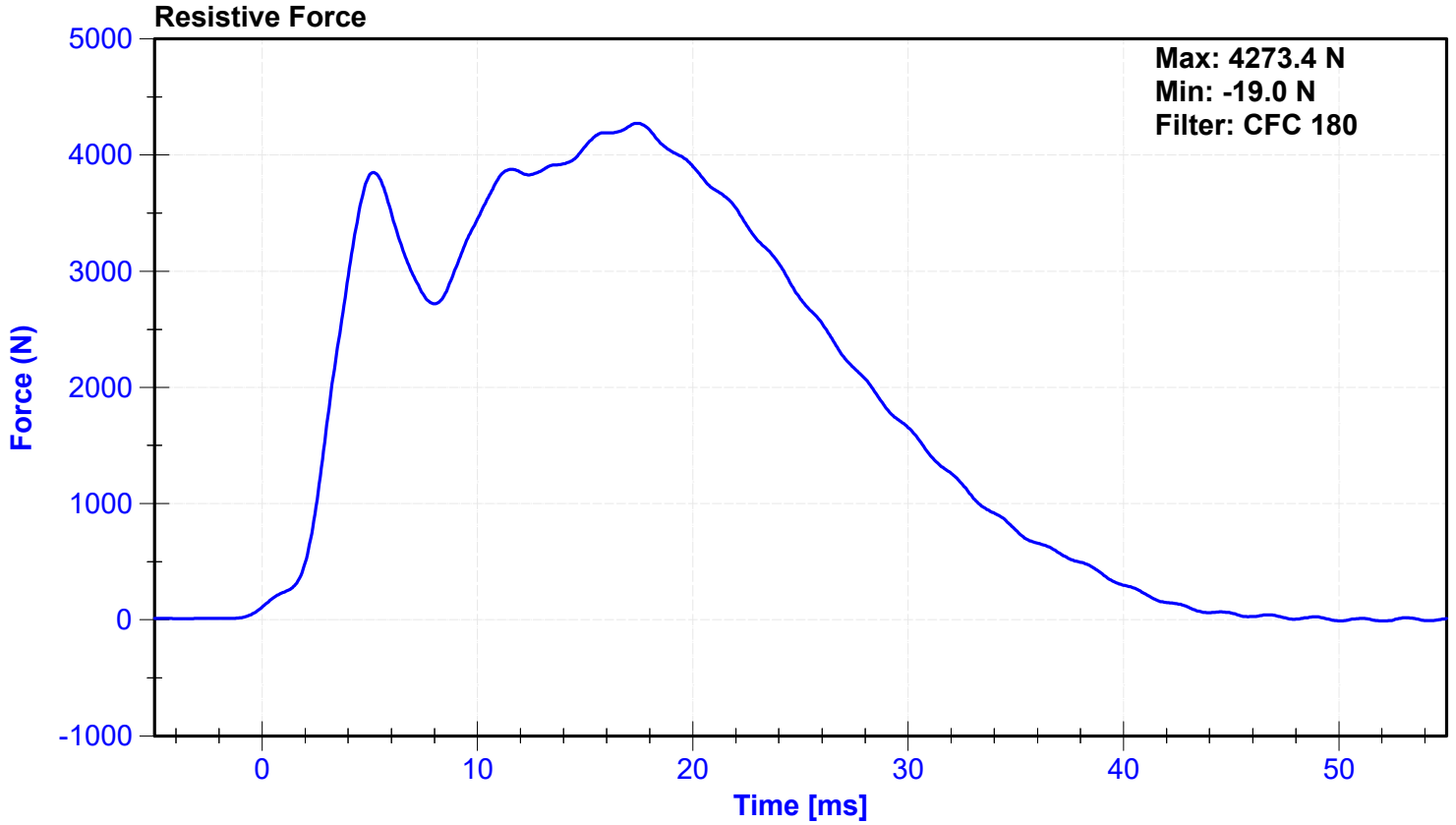
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	33	Pass
Velocity	6.59	6.83	m/s	6.692	Pass
Chest Deflection	-58	-50	mm	-53.0	Pass
Maximum Resistive Force (50 to 58mm)	3900	4400	N	4273.4	Pass
Maximum Resistive Force (18 to 50mm)	0	4600	N	4192.4	Pass
Hysteresis	69	85	%	75.0	Pass

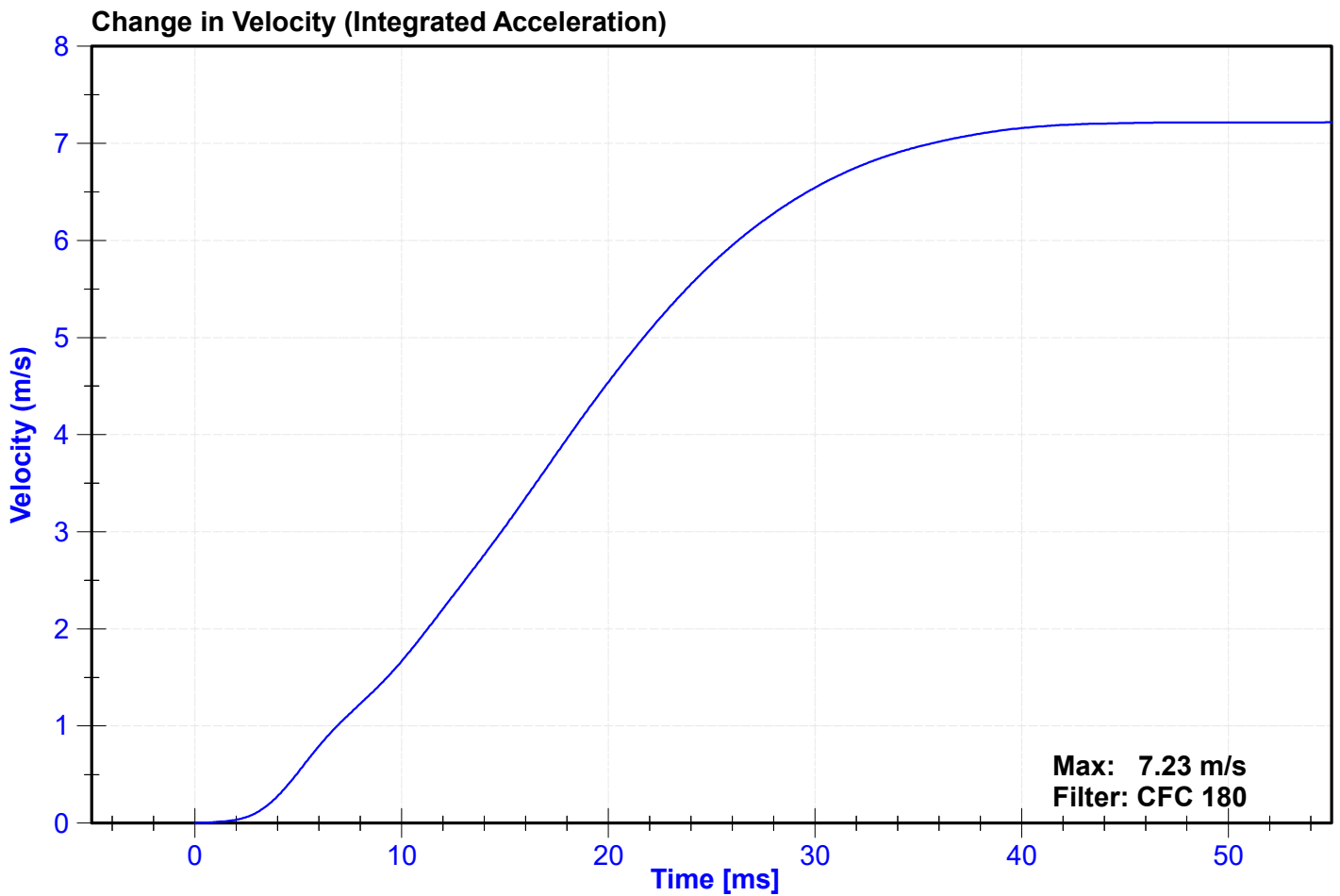
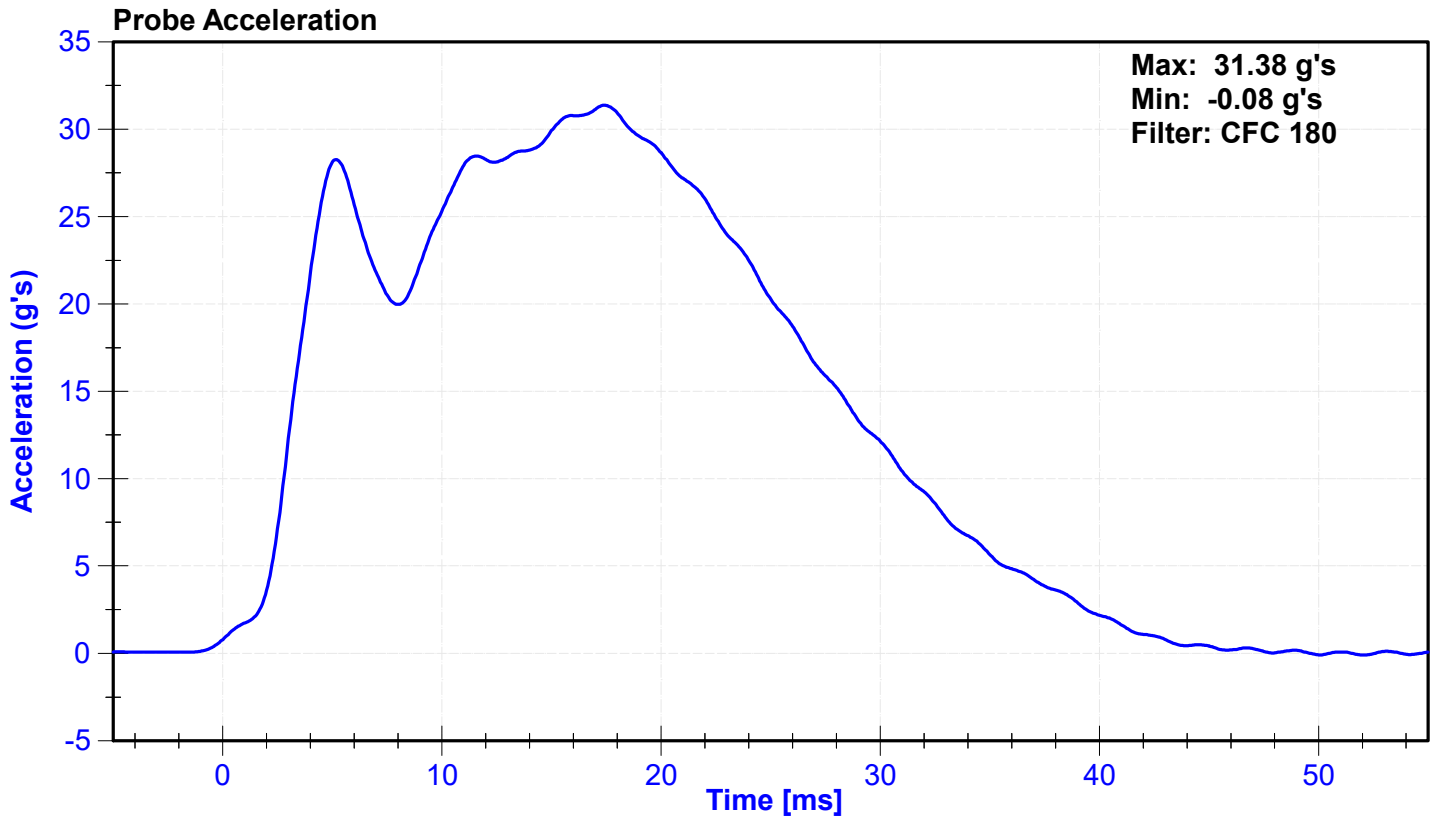
**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18527	8/2/2024	1/29/2025
Chest Potentiometer	Servo	0720	8/19/2024	2/17/2025

**Force vs. Displacement**







ATD Manufacturer	Humanetics	Test Technician	J.Kinderman
ATD Serial Number	137	Laboratory Supervisor	C. Mantell

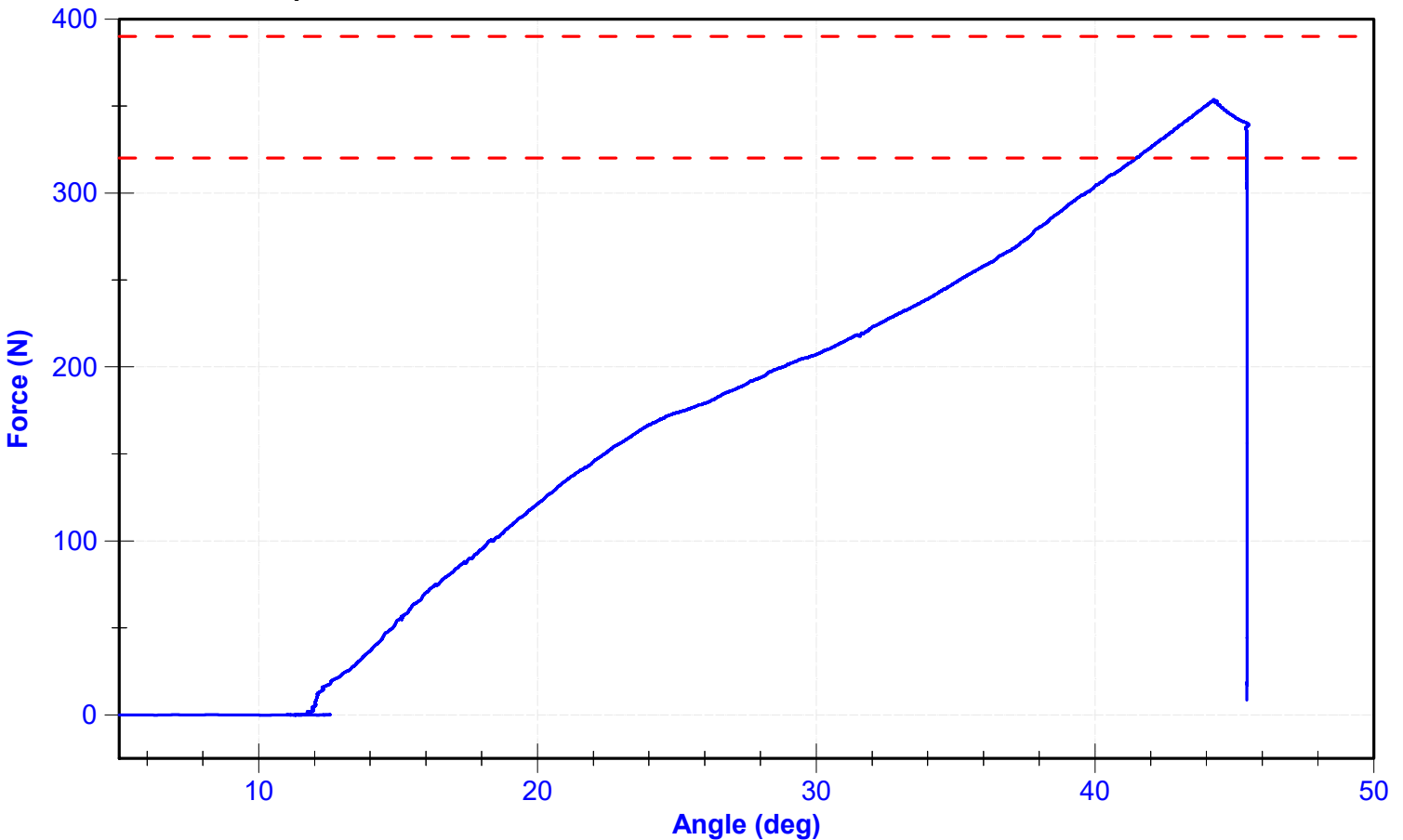
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.6	25.6	°C	21.2	Pass
Humidity	10	70	%	39	Pass
Initial Angle	0	20	deg	11.7	Pass
Force at 45 Degrees	320	390	N	353.9	Pass
Return Angle Relative to Initial	0	8	deg	4.0	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	Rieker	DS-1905226	2024-11-16	2025-11-16
Load Cell	Interface	1134516	2023-11-30	2024-11-29

**Force vs. Displacement**



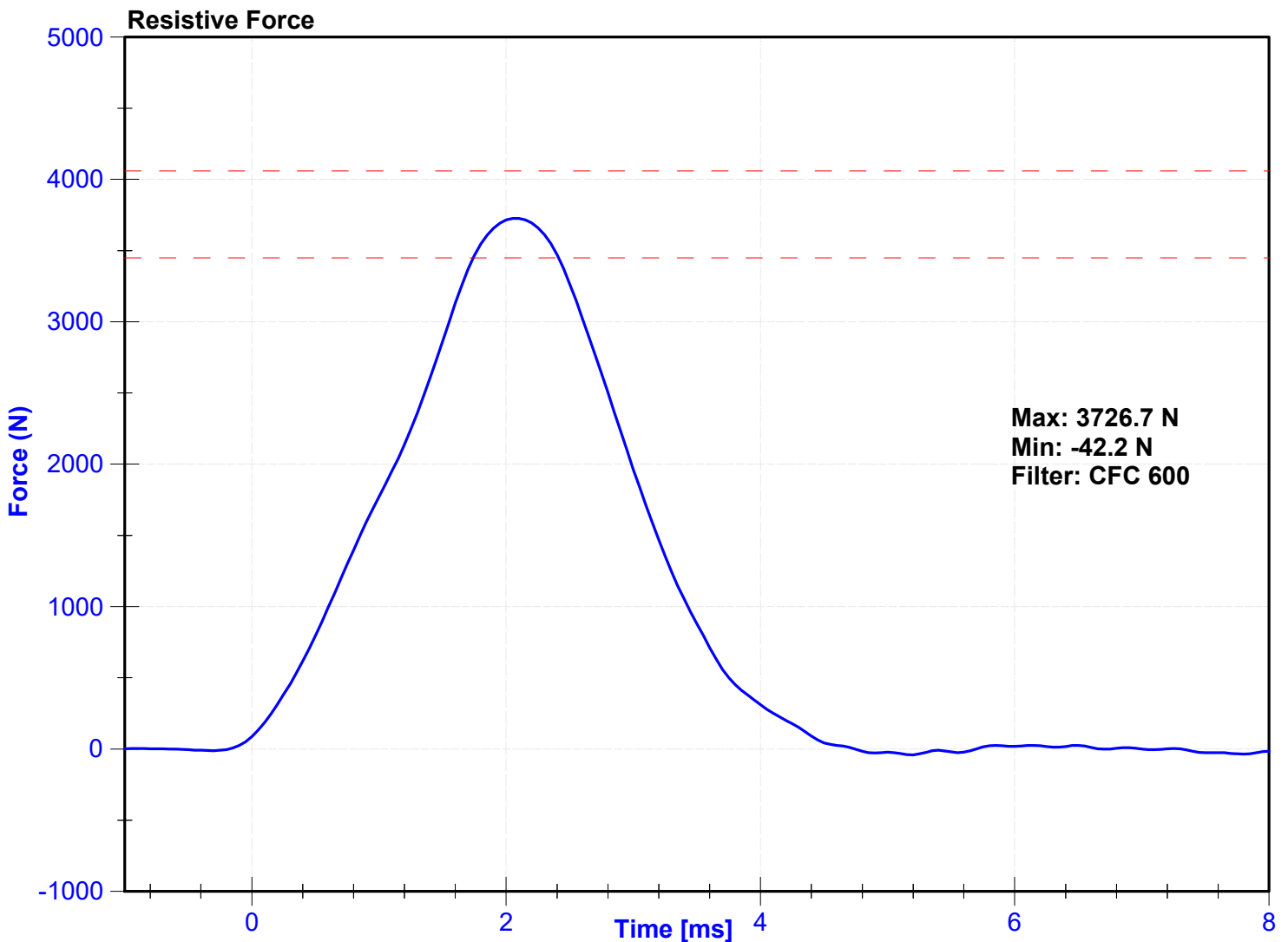
ATD Manufacturer	Humanetics	Test Technician	J. Rios
ATD Serial Number	137	Laboratory Supervisor	C. Mantell

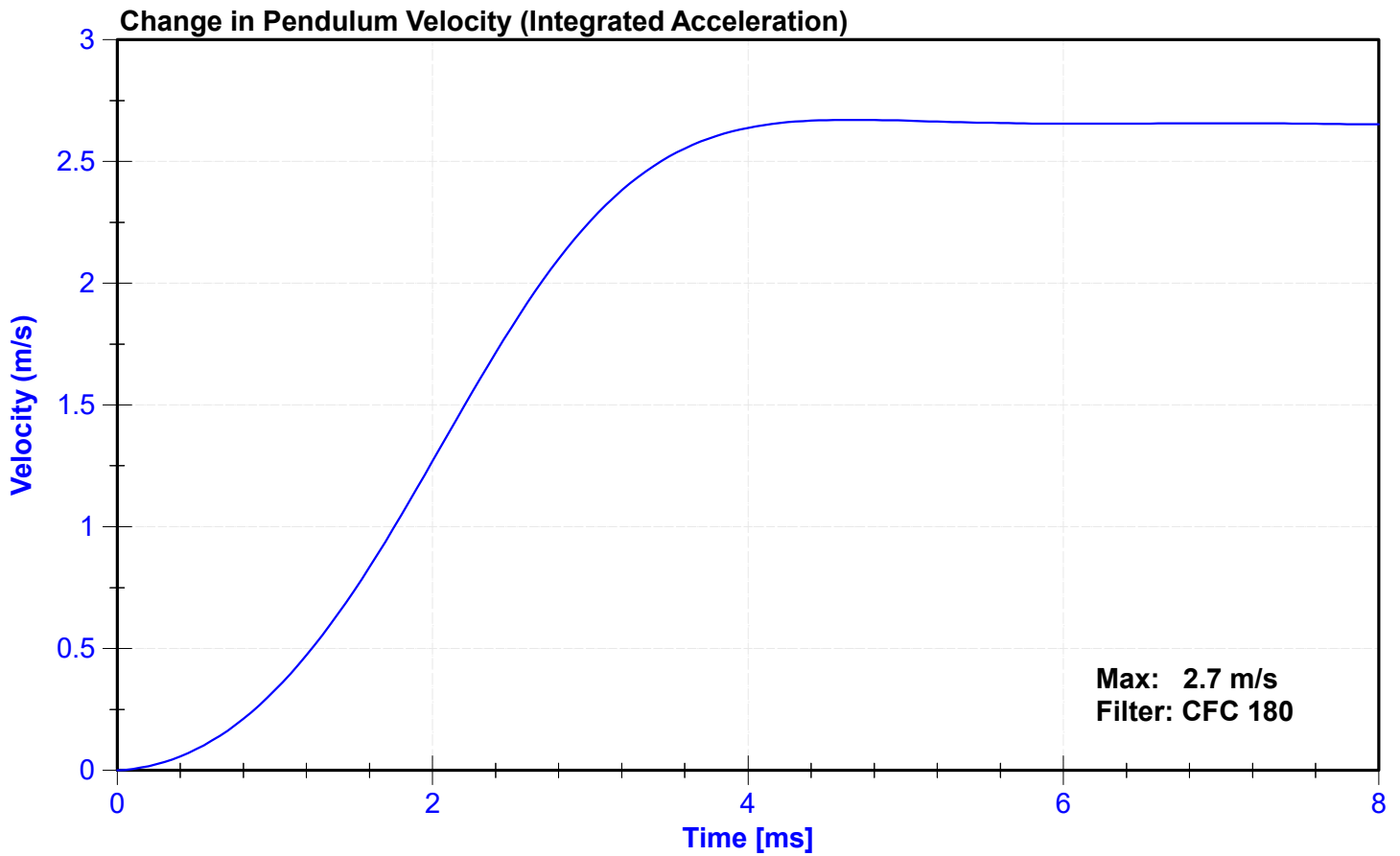
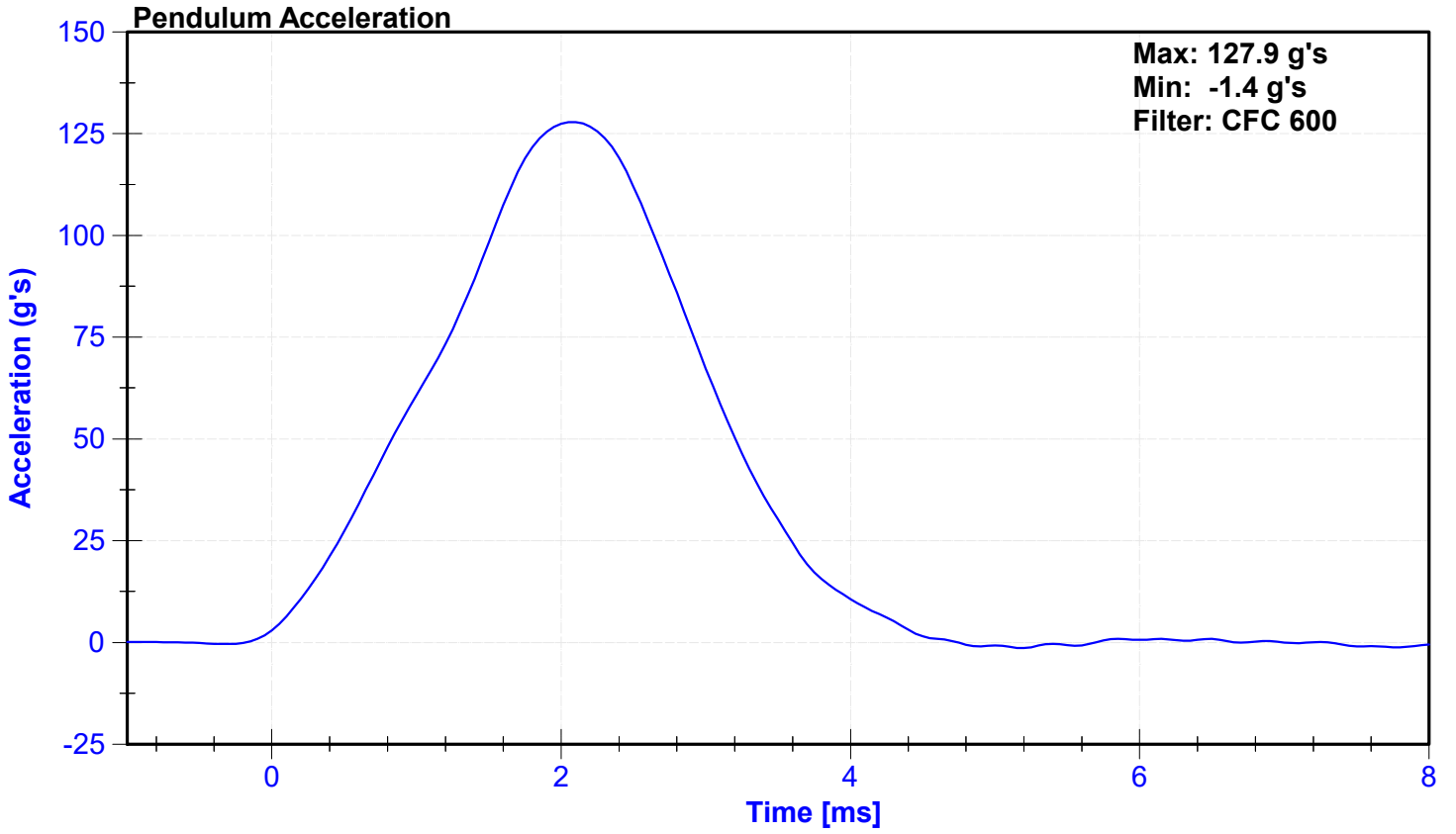
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.6	Pass
Humidity	10	70	%	35	Pass
Velocity	2.07	2.13	m/s	2.091	Pass
Resistive Force	3450	4060	N	3726.7	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18527	8/2/2024	1/29/2025





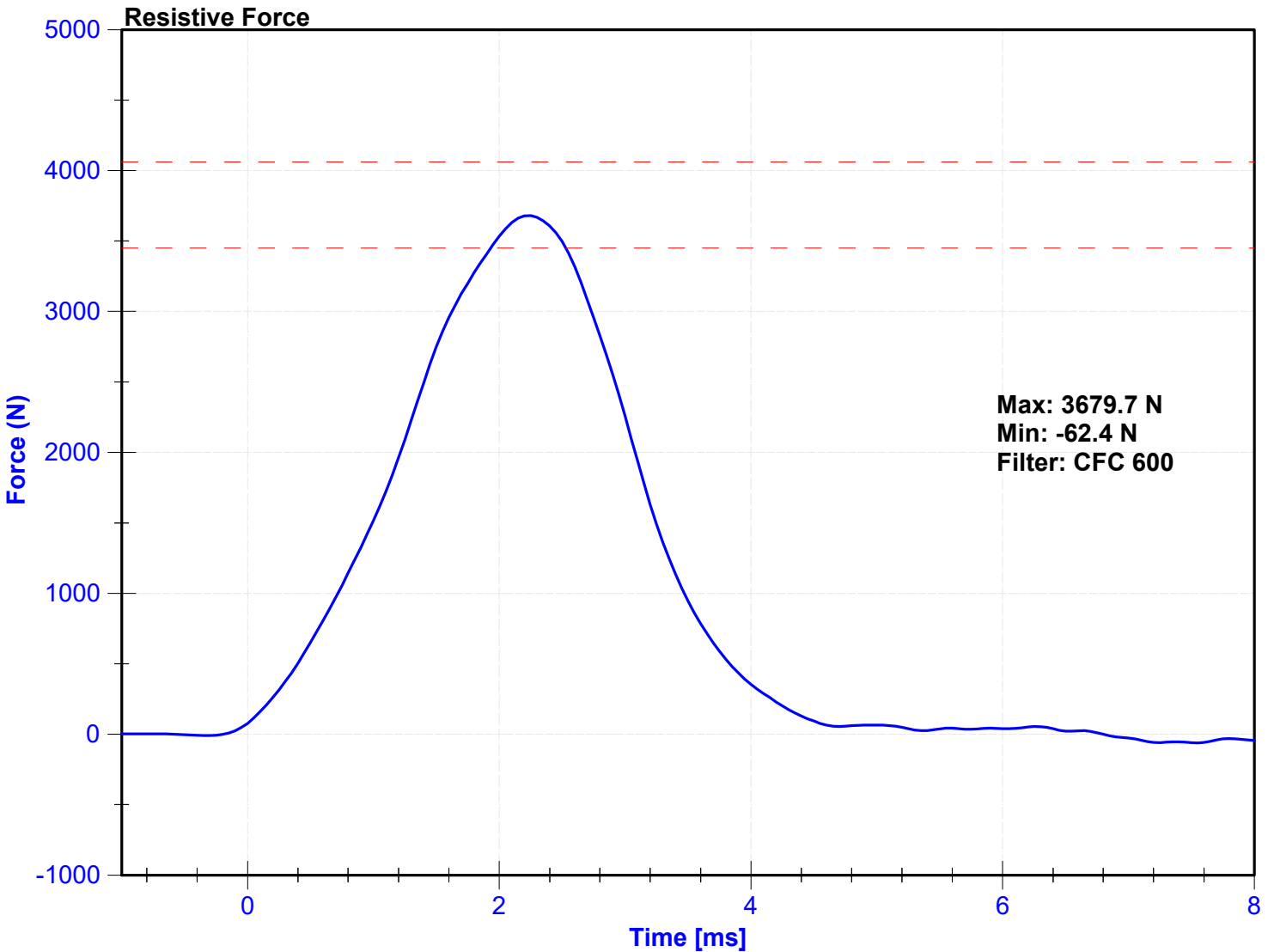
ATD Manufacturer	Humanetics	Test Technician	J. Rios
ATD Serial Number	137	Laboratory Supervisor	C. Mantell

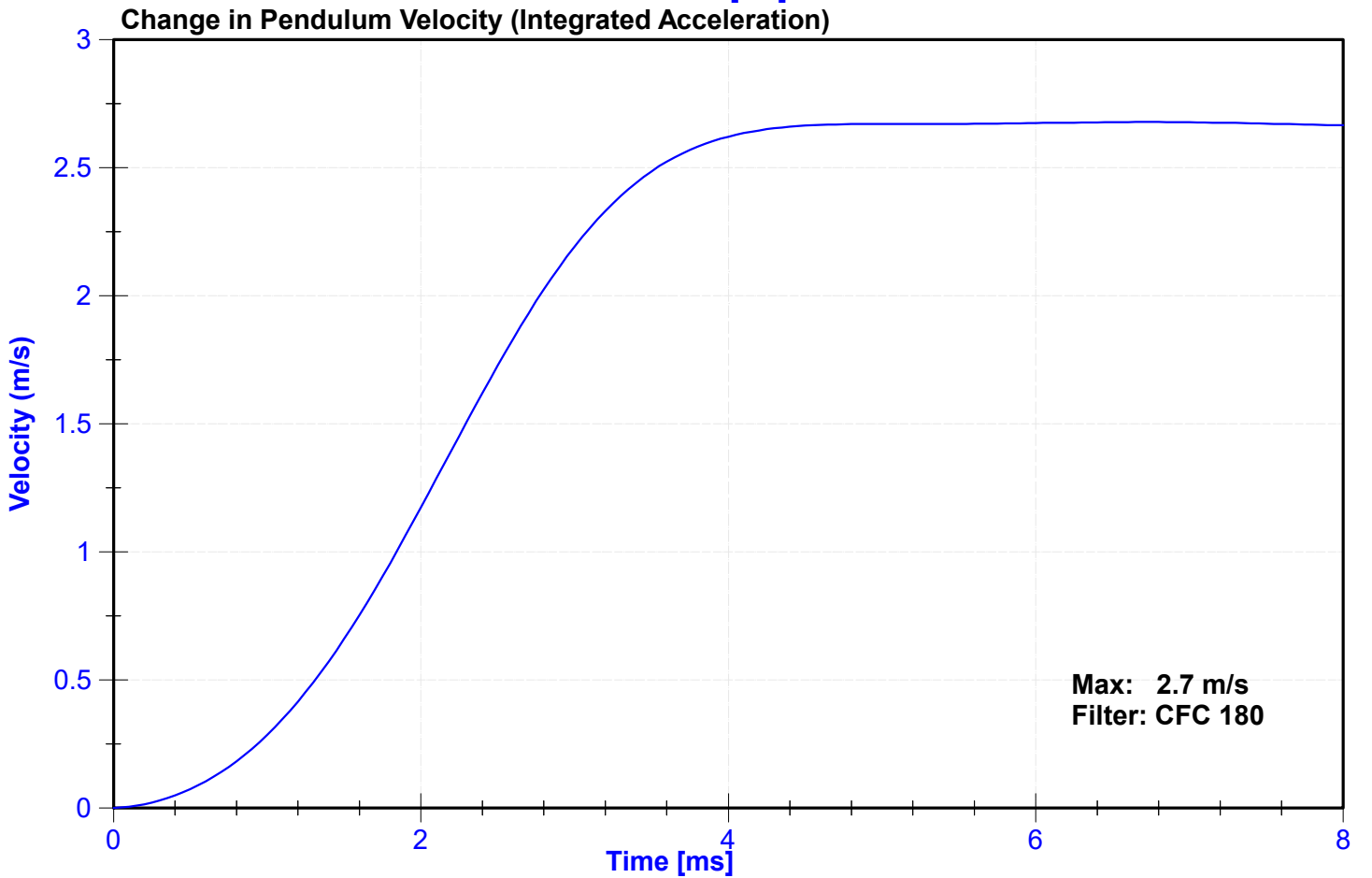
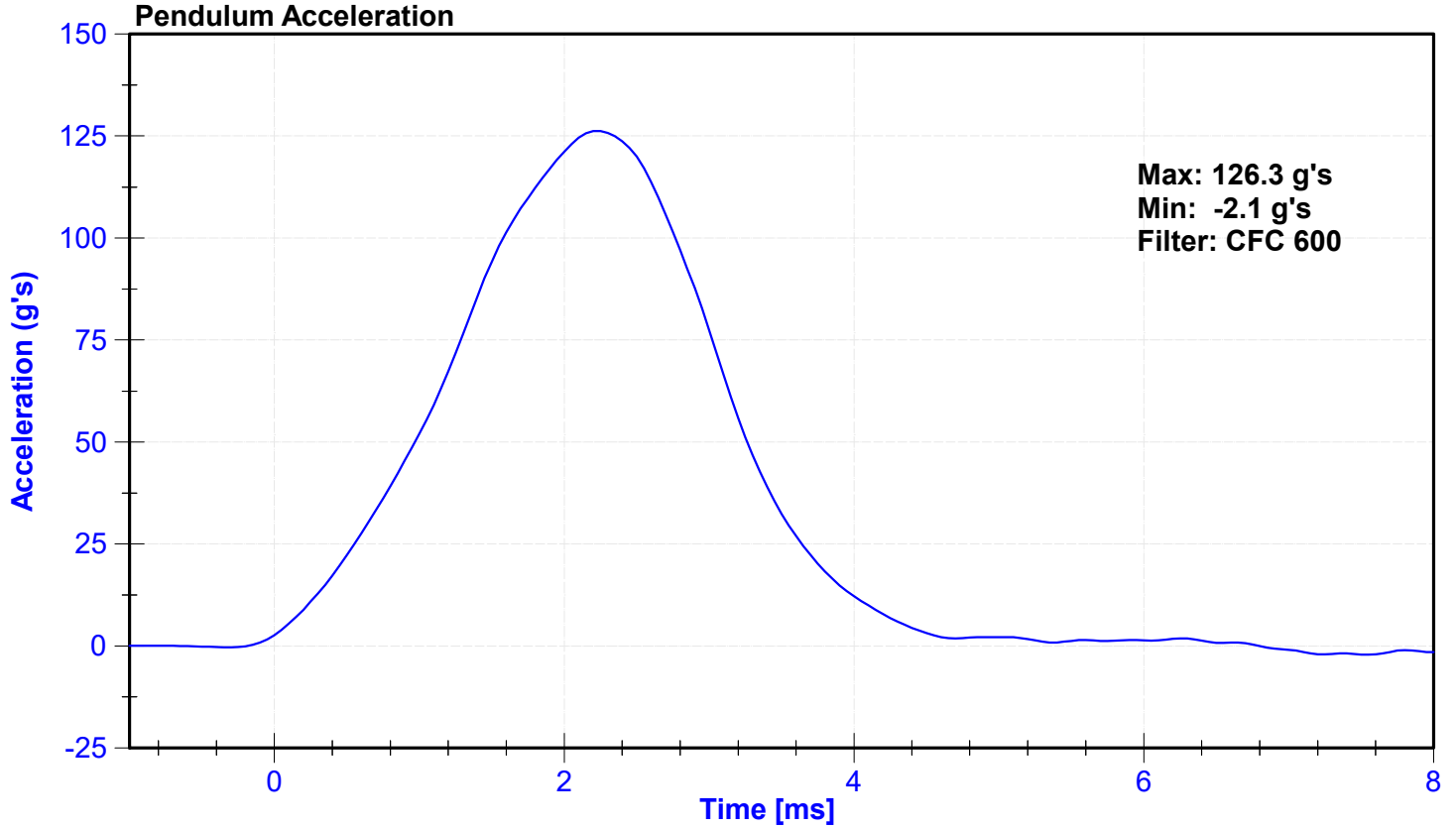
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.6	Pass
Humidity	10	70	%	35	Pass
Velocity	2.07	2.13	m/s	2.097	Pass
Resistive Force	3450	4060	N	3679.7	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18527	8/2/2024	1/29/2025





## APPENDIX D

### DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA

**Table 1 – Driver Dummy Instrumentation**

Instrumentation		Axis/Location	Hybrid III 50 <sup>th</sup> S/N: 065		
			Serial Number	Manufacturer	Calibration Date
Head Accelerometers	Primary	X	P52152	Endevco	10/31/2024
		Y	P58888	Endevco	10/31/2024
		Z	P58911	Endevco	10/31/2024
	Redundant	X	P52012	Endevco	10/31/2024
		Y	P51979	Endevco	10/31/2024
		Z	P49204	Endevco	10/31/2024
Head Angular Rate Sensors		X	21126	DTS ARS	07/31/2024
		Y	15697	DTS PRO-18K	07/31/2024
		Z	11335	DTS ARS	07/31/2024
Upper Neck Load Cell		FX, Fy, Fz MX,MY, MZ	851-FX	Humanetics	05/22/2024
Chest Accelerometers	Primary	X	P58887	Endevco	10/31/2024
		Y	P66917	Endevco	10/31/2024
		Z	P49197	Endevco	10/31/2024
	Redundant	X	P49213	Endevco	10/31/2024
		Y	P63840	Endevco	10/31/2024
		Z	P83313	Endevco	10/31/2024
Chest Potentiometer		X	1046	Servo	10/31/2024
Pelvis Accelerometer		X	P51699	Endevco	10/31/2024
		Y	P94090	Endevco	10/31/2024
		Z	P83437	Endevco	10/31/2024
Femur Load Cells - Left	Primary	Z	117-FZ1	Denton	05/22/2024
	Redundant	Z	117-FZ2	Denton	05/22/2024
Femur Load Cells - Right	Primary	Z	109-FZ1	Denton	05/22/2024
	Redundant	Z	109-FZ2	Denton	05/22/2024
Tibia Load Cells - Left	Upper	MX, MY, FZ	652-FZ	Denton	05/20/2024
	Lower	MX, MY, FZ	364-FZ	Denton	09/13/2024
Tibia Load Cells – Right	Upper	MX, MY, FZ	371-FZ	Denton	05/20/2024
	Lower	MX, MY, FZ	673-FZ	Denton	05/20/2024
Foot Accelerometers - Left	Rear	X	P69797	Endevco	10/31/2024
	Front	Z	P51729	Endevco	10/31/2024
Foot Accelerometers - Right	Rear	X	T20878	Endevco	10/31/2024
	Front	Z	P51685	Endevco	10/31/2024
Seat belt Load Cells	Lap		295	GFE	02/08/2024
	Shoulder		292	GFE	02/08/2024

**Table 2 – Front Passenger Dummy Instrumentation**

Instrumentation		Axis/Location	Hybrid III 5 <sup>th</sup> S/N: 137		
			Serial Number	Manufacturer	Calibration Date
Head Accelerometers	Primary	X	P79417	Endevco	08/19/2024
		Y	P83335	Endevco	08/19/2024
		Z	P64149	Endevco	08/19/2024
	Redundant	X	P52008	Endevco	08/19/2024
		Y	P52045	Endevco	08/19/2024
		Z	P74774	Endevco	08/19/2024
Head Angular Rate Sensors		X	15696	DTS ARS	07/31/2024
		Y	14908	DTS ARS	07/31/2024
		Z	14909	DTS ARS	07/31/2024
Upper Neck Load Cell		FX, Fy, Fz MX,MY, MZ	2184-FX	Denton	07/10/2024
Chest Accelerometers	Primary	X	P58780	Endevco	08/19/2024
		Y	P83346	Endevco	08/19/2024
		Z	P49190	Endevco	08/19/2024
	Redundant	X	P58794	Endevco	08/19/2024
		Y	P69791	Endevco	08/19/2024
		Z	T11253	Endevco	08/19/2024
Chest Potentiometer		X	0720	Servo	08/19/2024
Pelvis Accelerometer		X	P58735	Endevco	08/19/2024
		Y	P77587	Endevco	08/19/2024
		Z	P51285	Endevco	08/19/2024
Femur Load Cells - Left	Primary	Z	DT0998-FZ1	Denton	05/22/2024
	Redundant	Z	DT0998-FZ2	Denton	05/22/2024
Femur Load Cells - Right	Primary	Z	DH3271-FZ1	Denton	05/22/2024
	Redundant	Z	DH3271-FZ2	Denton	05/22/2024
Tibia Load Cells - Left	Upper	MX, MY, FZ	476-FZ	Denton	05/20/2024
	Lower	MX, MY, FZ	363-FZ	Denton	05/20/2024
Tibia Load Cells – Right	Upper	MX, MY, FZ	361-FZ	Denton	05/20/2024
	Lower	MX, MY, FZ	359-FZ	Denton	05/20/2024
Foot Accelerometers - Left	Rear	X	P78959	Endevco	08/19/2024
	Front	Z	P83418	Endevco	08/19/2024
Foot Accelerometers - Right	Rear	X	P63998	Endevco	08/19/2024
	Front	Z	P80265	Endevco	08/19/2024
Seat belt Load Cells	Lap		174	GFE	02/08/2024
	Shoulder		168	Denton	06/21/2024

**Table 3 – Vehicle Instrumentation**

Instrumentation			Axis	Serial Number	Manufacturer	Calibration Date
Crossmember/Rear Seat Accelerometers	Left	Primary	X	G25875	Endevco	06/04/2024
			Z	G26000	Endevco	07/18/2024
		Redundant	X	G25973	Endevco	07/18/2024
	Right	Primary	X	A374341	Measurement Specialties	10/15/2024
			Z	G22911	Endevco	10/11/2024
		Redundant	X	G22424	Endevco	10/15/2024
Engine Accelerometers	Top		X	G24231	Endevco	09/27/2024
	Bottom		X	G22827	Endevco	10/10/2024