

REPORT NUMBER: NCAP-CAL-24-001

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

**Hyundai Motor Company
2024 Genesis GV60
5 Door SUV**

NHTSA No: O20244208

**PREPARED BY:
CALSPAN CORPORATION
P.O. BOX 400
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October 30, 2024

FINAL REPORT

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

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Date: October 30, 2024

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

COTR, New Car Assessment Program
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16. Abstract A 56.30 km/h (35 mph), NCAP frontal rigid barrier impact test was conducted on a 2024 Genesis GV60 5 Door SUV in accordance with the specifications of the Office of Crashworthiness Standards Laboratory Procedure for NCAP Full Frontal Rigid Barrier Impact Testing. This test was conducted to obtain data related to FMVSS Nos. 208, 212, 219 (partial), 301, and 305 performance. The test was conducted at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on January 9, 2024. The impact velocity of the vehicle was 56.39 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 499 mm at crush zone 4. The test vehicle's occupant performance data is as follows: <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th rowspan="2">Units</th> <th colspan="2">Driver ATD (Serial No. 142)</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>151.529</td> <td>700</td> <td>270.917</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>-28.417</td> <td>52</td> <td>-21.271</td> </tr> <tr> <td>Nij</td> <td></td> <td>1</td> <td>0.233</td> <td>1</td> <td>0.338</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>4170</td> <td>1023.946</td> <td>2620</td> <td>460.207</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>4000</td> <td>-259.122</td> <td>2520</td> <td>-427.761</td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>10008</td> <td>-694.385</td> <td>6805</td> <td>-1803.952</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>10008</td> <td>-2659.029</td> <td>6805</td> <td>-2299.431</td> </tr> </tbody> </table>						Measurement Description	Units	Driver ATD (Serial No. 142)		Passenger ATD (Serial No. 137)		Threshold	Result	Threshold	Result	Head Injury Criteria (HIC15)		700	151.529	700	270.917	Maximum Chest Compression	mm	63	-28.417	52	-21.271	Nij		1	0.233	1	0.338	Neck Tension	N	4170	1023.946	2620	460.207	Neck Compression	N	4000	-259.122	2520	-427.761	Left Femur Force	N	10008	-694.385	6805	-1803.952	Right Femur Force	N	10008	-2659.029	6805	-2299.431
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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 load cell barrier consisting of 128 load cells was impacted by a 2024 Genesis GV60 5 Door SUV at a velocity of 56.39 km/h. The test was performed at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on January 9, 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, 50th percentile male anthropomorphic test device (ATD), was placed in the driver seating position and one Part 572O 5th 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 lap and shoulder belts and Passenger's Shoulder belt to measure dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 142) 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 486 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 100.0 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/electrolyte leakage after the event or during any phase of the static rollover. The maximum static crush of the vehicle was 499 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. Both knees contacted the knee air bag.

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. Both knees contacted the knee bolster.

The occupant data is summarized below.

ATD Position	HIC ₁₅	Nij	Neck Tension (N)	Neck Comp. (N)	3ms Chest Clip (Gs)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver (50th)	151.529	0.233	1023.946	-259.122	41.369	-28.417	-694.385	-2659.029
Passenger (5th)	270.917	0.338	460.207	-427.761	42.829	-21.271	-1803.952	-2299.431

GENERAL COMMENTS:

1. P1 (Driver) serial number - 142
2. P2 (Passenger) serial number - 137

Data Anomalies:

- Engine Top X Acceleration, Exceeded calibration range and saturated at 49.2 ms
- Engine Bottom X Acceleration, Questionable data after 39.1 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 FMVSS 212, 219 (Partial) and 301 Data

Data Sheet No. 16 – FMVSS 301 Static Rollover Results

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

Data Sheet No. 305-1 – General Test and Parameter Data for Indicant FMVSS No. 305 Testing

Data Sheet No. 305-2 – Pre-Impact Data for Indicant FMVSS No. 305 Testing

Data Sheet No. 305-3 – Pre-Impact Electrical Isolation Measurements and Calculations for
Indicant FMVSS No. 305 Testing

Data Sheet No. 305-4 – Post-Impact Data for Indicant FMVSS No. 305 Testing

Data Sheet No. 305-5 – Static Rollover Test Data for Indicant FMVSS No. 305 Testing

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2024 Genesis GV60 5 Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20244208
Test Date: 01/09/2024

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	O20244208	Traction Control System (TCS)	Yes
Model Year	2024	Power Steering	Yes
Make	Genesis	Power Window Auto-Reverse	Yes
Model	GV60	Driver Frontal Airbag	Yes
Body Style	5 Door SUV	Driver Curtain Airbag	Yes
VIN	KMUKCDSC9RU022340	Driver Head/Torso Airbag	No
Body Color	White	Driver Torso Airbag	No
Odometer Reading (km /mi)	29 miles	Driver Torso/Pelvis Airbag	Yes
Engine Displacement (L)	N/A	Driver Pelvis Airbag	No
Type / No. Cylinders	Electric Vehicle	Driver Knee Airbag	Yes
Engine Placement	N/A	Front Pass. Frontal Airbag	Yes
Transmission Type	Automatic	Front Pass. Curtain Airbag	Yes
Transmission Speeds	Direct Drive	Front Pass. Head/Torso Airbag	No
Overdrive	No	Front Pass. Torso Airbag	No
Final Drive	All Wheel Drive	Front Pass. Torso/Pelvis Airbag	Yes
Roof Rack	No	Front Pass. Pelvis Airbag	No
Sunroof / T-Top	No	Front Pass. Knee Airbag	No
Running Boards	No	Driver Pretensioner	Yes
Tilt Steering Wheel	Yes	Driver Load Limiter	Yes
Power Seats	Yes	Front Pass. Pretensioner	Yes
Anti-Lock Brakes (ABS)	Yes	Front Pass. Load Limiter	Yes
Automatic Door Locks (ADLs)	Yes	Other – Front Center Side Airbag	Yes

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

No

DATA FROM CERTIFICATION LABEL

Manufactured By	Hyundai Motor Company	GVWR	2595
Date of Manufacture	SEP/2023	GVWR Front	1265
		GVWR Rear	1420

VEHICLE SEATING AND WEIGHT CAPACITY DATA

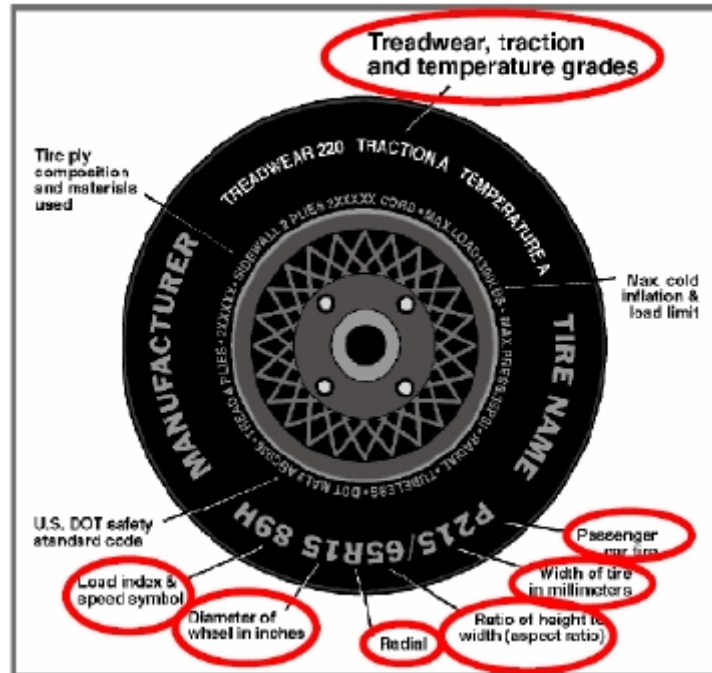
Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Split Bench	N/A	
Number of Occupants	2	3	N/A	5
Capacity Wt. (VCW) (kg)				390
Cargo Wt. (RCLW) (kg)				50
DSC x 68.0 kg				340

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

Test Vehicle: 2024 Genesis GV60 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20244208
 Test Date: 01/09/2024

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



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	340	340
Cold Pressure (kPa)	250	250
Recommended Tire Size	255/45R20	255/45R20
Tire Size on Vehicle	255/45R20	255/45R20
Tire Manufacturer	Michelin	Michelin
Tire Model	Primacy Tour A/S	Primacy Tour A/S
Treadwear	540	540
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel, 1 Polyamide	2 Polyester, 2 Steel, 1 Polyamide
Load Index / Speed Symbol	105V	105V
Tire Material	Rubber	Rubber
DOT Safety Code Left	OCAA 041X 1823	OCAA 041X 1823
DOT Safety Code Right	OCAA 041X 1823	OCAA 041X 1823

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

Test Vehicle: 2024 Genesis GV60 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20244208
 Test Date: 01/09/2024

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	537	549		581	602	
Right	kg	534	534		577	580	
Ratio	%	49.7	50.3		49.5	50.5	
Total	kg	1071	1083	2154	1158	1182	2340

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	2154	(A)
Weight of 1 P572E ATD & 1 P572O ATD	kg	142	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	50	(C)
Calculated Vehicle Target Weight (TVTW)	kg	2346	(A+B+C)

TEST VEHICLE ATTITUDES AND CG

Condition	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	849	852	863	861	2154
As Tested	mm	828	835	844	852	1468
Post-Test	mm	837	772	877	824	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2906
Total Vehicle Length at Left Side	mm	4441
Total Vehicle Length at Centerline	mm	4519
Total Vehicle Length at Right Side	mm	4441
Weight of Ballast in Cargo Area	kg	0
Weight of Vehicle Components Removed	kg	41
Amount of Stoddard Solvent in Fuel Tank	L	Electric Vehicle

LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT:

Rear tail lights, rear hatch trim, middle rear head restraint, left rear head restraint

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

Test Vehicle: 2024 Genesis GV60 5 Door SUV

NHTSA No.: O20244208

Test Program: NCAP Frontal Barrier Impact Test

Test Date: 01/09/2024

TARGET VEHICLE STRUCTURAL MEASUREMENT

No.	Description	Pre-Test
1	Total Length	4519
2	Total Width	1828
3*	Bumper Top Height	572
4*	Bumper Bottom Height	438
5*	Longitudinal Member Top Height	568
6	Distance Between Longitudinal Members	1000
7	Longitudinal Member Width	94
8*	Engine Top Height	790
9*	Engine Bottom Height	314
10	Engine and Gearbox Width	352
11	Front Bumper-Engine Distance	604
12*	Front Shock Absorber Fixing Height	964
13*	Bonnet Leading Edge Height	785
14	Front Shock Absorber Fixing Width	1204
15	Front Bumper – Front Axle Distance	832
16	Front Axle – A Pillar Distance	549
17	A-Pillar – B-Pillar Distance	1123
18	B-Pillar – Rear Axle Distance	1235
19	B-Pillar – C-Pillar Distance	926
20*	Roof Sill Bottom Height	1484
21*	Roof Sill Top Height	1520
22*	Floor Sill Bottom Height	360
23*	Floor Sill Top Height	413

*Height Measurements are taken from the ground

Note: All measurements are in millimeters

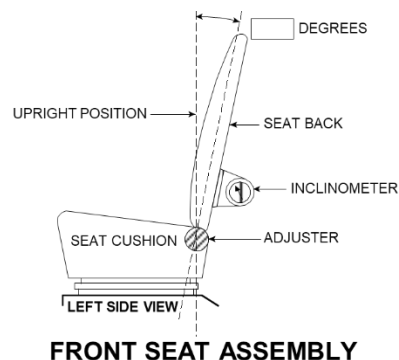
DATA SHEET NO. 2 SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

Test Vehicle: 2024 Genesis GV60 5 Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20244208
Test Date: 01/09/2024

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	0.3
Passenger Seat Back Angle	1.15

SEAT FORE / AFT POSITIONS

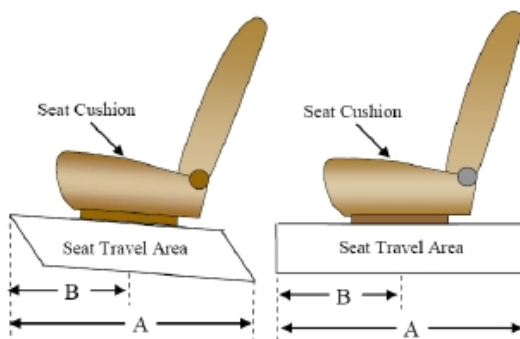
The driver's seat was positioned at the mid-point of fore/aft travel at its lowest position. The passenger's seat was positioned at the most forward position of fore/aft travel. Zero is defined as the forward most position.

Seating Position	Total Fore / Aft Travel	Placed in Position #
Driver Seat	346	173
Passenger Seat	255	0

SEAT BELT UPPER ANCHORAGE

The driver's seat belt anchorage was positioned according to the manufacturer's designated positioning for a 50th percentile adult male ATD. The passenger's seat belt anchorage was positioned according to the manufacturer's designated positioning for a 5th 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 Genesis GV60 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

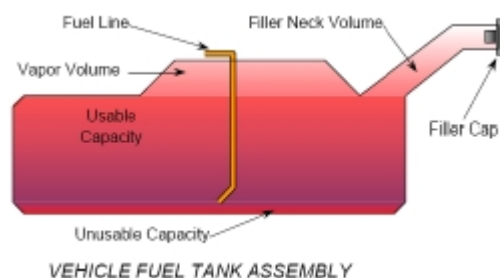
NHTSA No.: O20244208
 Test Date: 01/09/2024

FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank"	N/A
Usable Capacity of "Optional Tank"	N/A
92%-94% of Usable Capacity	N/A
Actual Amount of Solvent Used	Full Electric Vehicle
1/3 of Usable Capacity	N/A

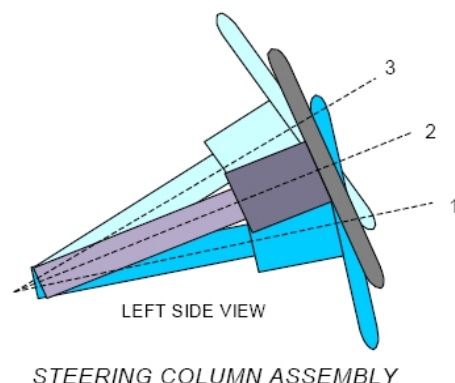
FUEL PUMP

The vehicle is a full electric vehicle and equipped with an charge port located on the right rear of the vehicle.



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.



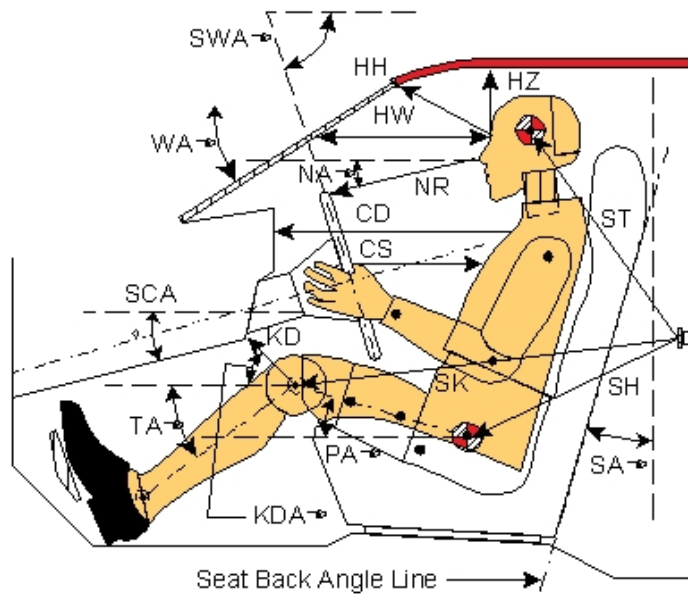
STEERING COLUMN POSITIONS

Description	Degrees	Fore / Aft Position (mm)
Lowermost position No. 1	20.0	
Geometric center position No. 2	22.5	
Uppermost position No. 3	24.9	
Telescoping Steering Wheel Travel		50
Test Position	22.5	25

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2024 Genesis GV60 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20244208
 Test Date: 01/09/2024



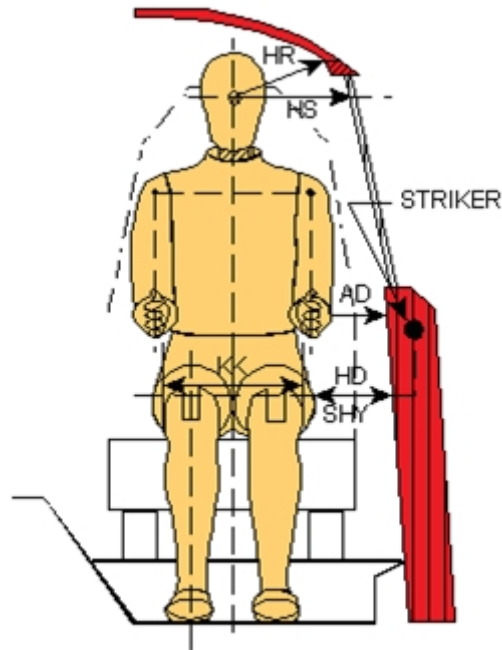
Left Side View

Code	Measurement Description	Driver (SN: 142)		Passenger (SN: 137)	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		30.9		
SWA°	Steering Wheel Angle		22.5		
SCA°	Steering Column Angle		67.5		
SA°	Seat Back Angle (on headrest post)		0.3		1.15
HZ	Head to Roof (Z)	179	90.0	246	90.0
HH	Head to Header	383	21.0	339	39.15
HW	Head to Windshield	605	0.20	658	0.00
NR	Nose to Rim / Dash	380	11.3	478	29.3
CD	Chest to Dash	560		423	
CS	Chest to Steering Hub	299	6.8		
RA	Rim to Abdomen	199	0.3		
KDL	Left Knee to Dash	212	32.6	108	35.4
KDR	Right Knee to Dash	174	19.5	125	39.6
PA°	Pelvic Angle		23.9		20.55
TA°	Tibia Angle		28.0		42.45
SK	Striker to Knee	625	13.15	701	8.5
ST	Striker to Head	430	73.1	404	57.0
SH	Striker to H-Point	330	52.55	424	30.5

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2024 Genesis GV60 5 Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20244208
Test Date: 01/09/2024



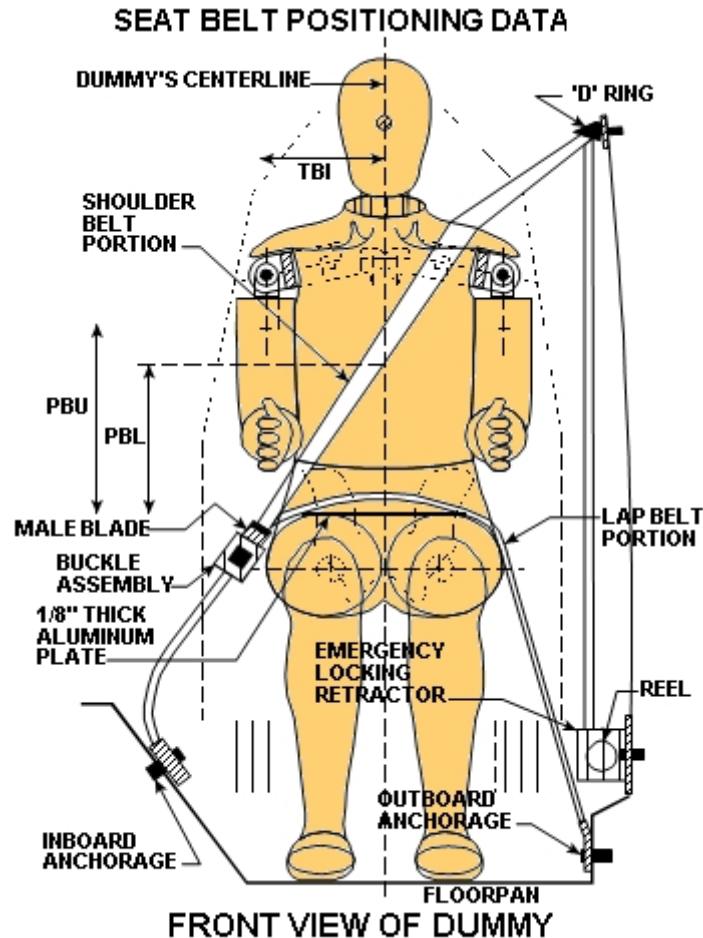
Front View

Code	Description	Driver (mm)	Passenger (mm)
AD	Arm to Door	55	76
HD	H-Point to Door	139	236
HR	Head to Side Header	225	268
HS	Head to Side Window	362	384
KK	Knee to Knee	325	214
SHY	Striker to H-Point (Y Direction)	225	312
AA	Ankle to Ankle	350	171

DATA SHEET NO. 5 SEAT BELT POSITIONING DATA

Test Vehicle: 2024 Genesis GV60 5 Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20244208
Test Date: 01/09/2024



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU — Top surface of reference to belt upper edge	mm	340	282
PBL — Top surface of reference to belt lower edge	mm	252	205

BELT LENGTH DATA

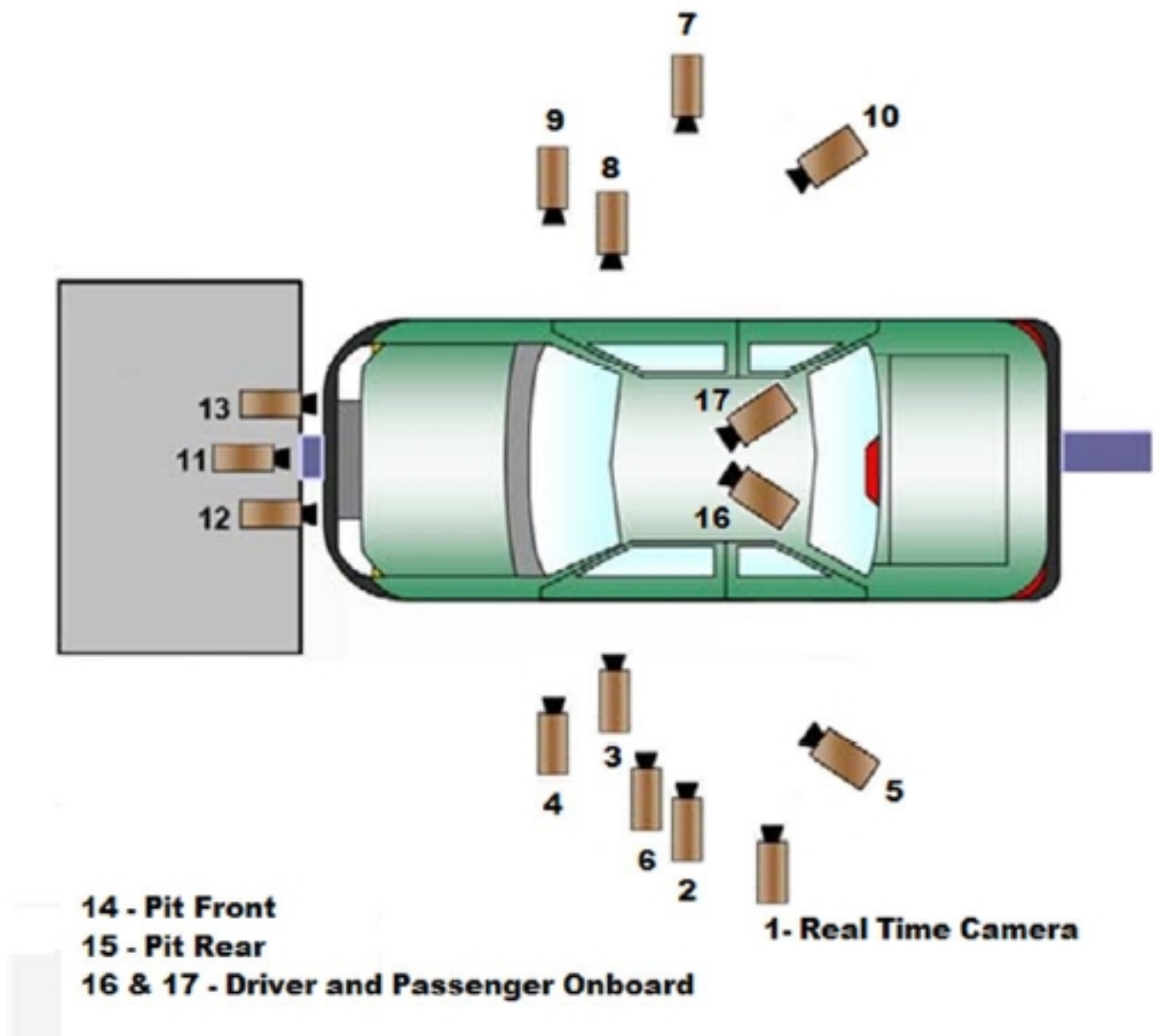
Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	867	965
Lap Belt Length as measured on ATD	mm	695	820
Remainder of belt on reel	mm	958	715
Total belt length for continuous webbing systems	mm	2520	2500

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

Test Vehicle: 2024 Genesis GV60 5 Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20244208
Test Date: 01/09/2024

CAMERA POSITIONS FOR FRONTAL IMPACTS



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

Test Vehicle: 2024 Genesis GV60 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20244208
 Test Date: 01/09/2024

CAMERA LOCATIONS

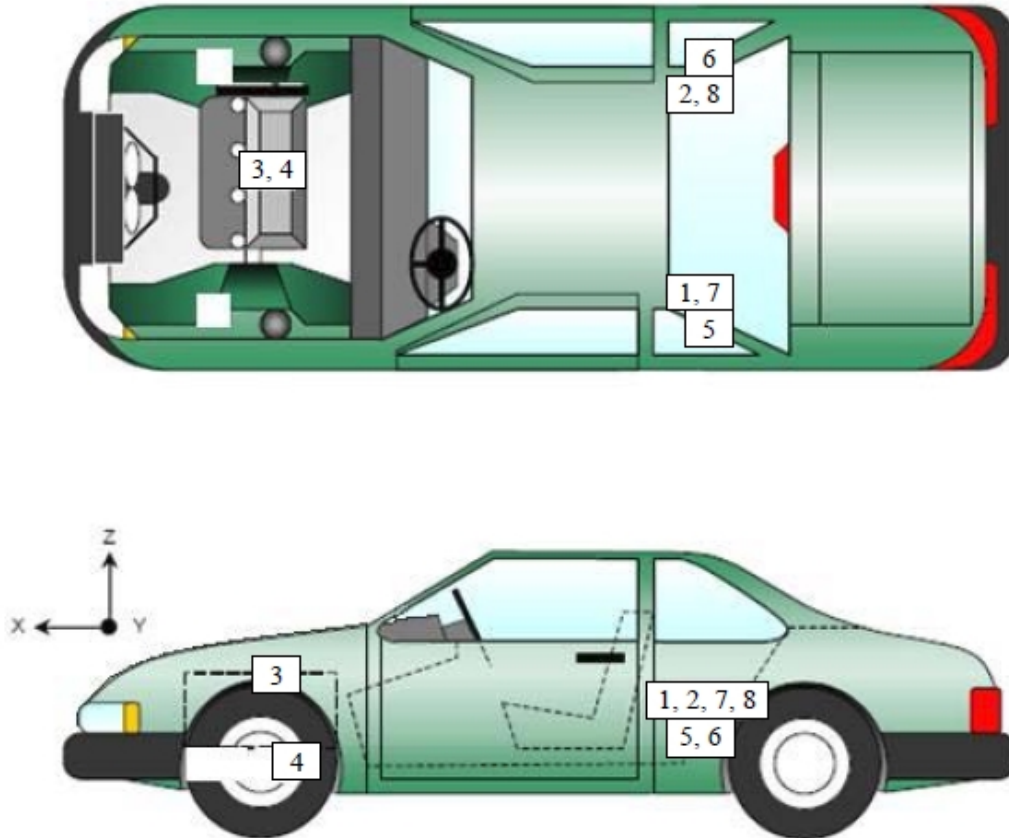
No.	Camera View	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall				Zoom	60
2	Left Overall	-1817	-7016	-1417	24	1000
3	Driver Close-Up	-1348	-6525	-1429	50	1000
4	Left Front Half	-1012	-6154	-1479	28	1000
5	Left Angle	-4841	4927	-2640	50	1000
6	Steering Column	-1795	-7596	-2298	75	1000
7	Right Overall	-1981	6932	-1531	24	1000
8	Passenger Close-Up	-1484	6589	-1473	50	1000
9	Right Front Half	-1107	6111	-1419	28	1000
10	Right Angle	-4841	-4694	-2645	50	1000
11	Windshield	1150	0	-3470	12.5	1000
12	Driver Windshield	1484	-371	-2139	25	1000
13	Passenger Windshield	1484	448	-2139	25	1000
14	Pit Front	-900	0	2342	12.5	1000
15	Pit Rear	-2566	0	2353	12.5	1000
16	Onboard Driver Airbag (Optional)				8	1000
17	Onboard Passenger Airbag (Optional)				8	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 Genesis GV60 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20244208
 Test Date: 01/09/2024



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Accelerometer – X Direction	1678	-347	312
2	Right Rear Accelerometer – X Direction	1679	378	307
3	Engine Top X	3810	21	-103
4	Engine Bottom X	4119	-16	508
5	Left Rear Accelerometer – Z Direction	1678	-347	312
6	Right Rear Accelerometer – Z Direction	1679	378	307
7	Left Rear Accelerometer – X Direction Redundant	1678	-370	314
8	Right Rear Accelerometer – X Direction Redundant	1679	402	306

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

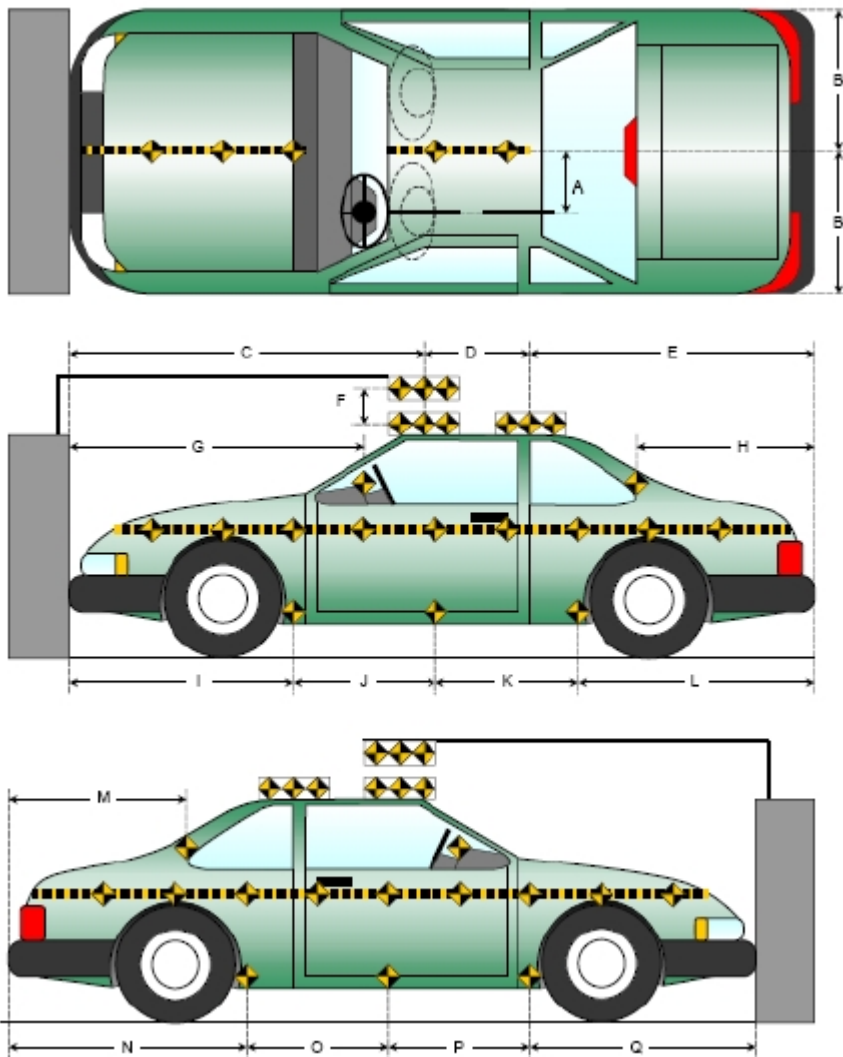
DATA SHEET NO. 8 **PHOTOGRAPHIC REFERENCE TARGET LOCATIONS**

Test Vehicle: 2024 Genesis GV60 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20244208
 Test Date: 01/09/2024

Item	Value
A	383
B	914
C	2090
D	609
E	1820
F	204
G	1726
H	1007
I	1324
J	956
K	961
L	1278
M	1006
N	1281
O	957
P	956
Q	1325

All units in millimeters



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

Test Vehicle: 2024 Genesis GV60 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20244208
 Test Date: 01/09/2024

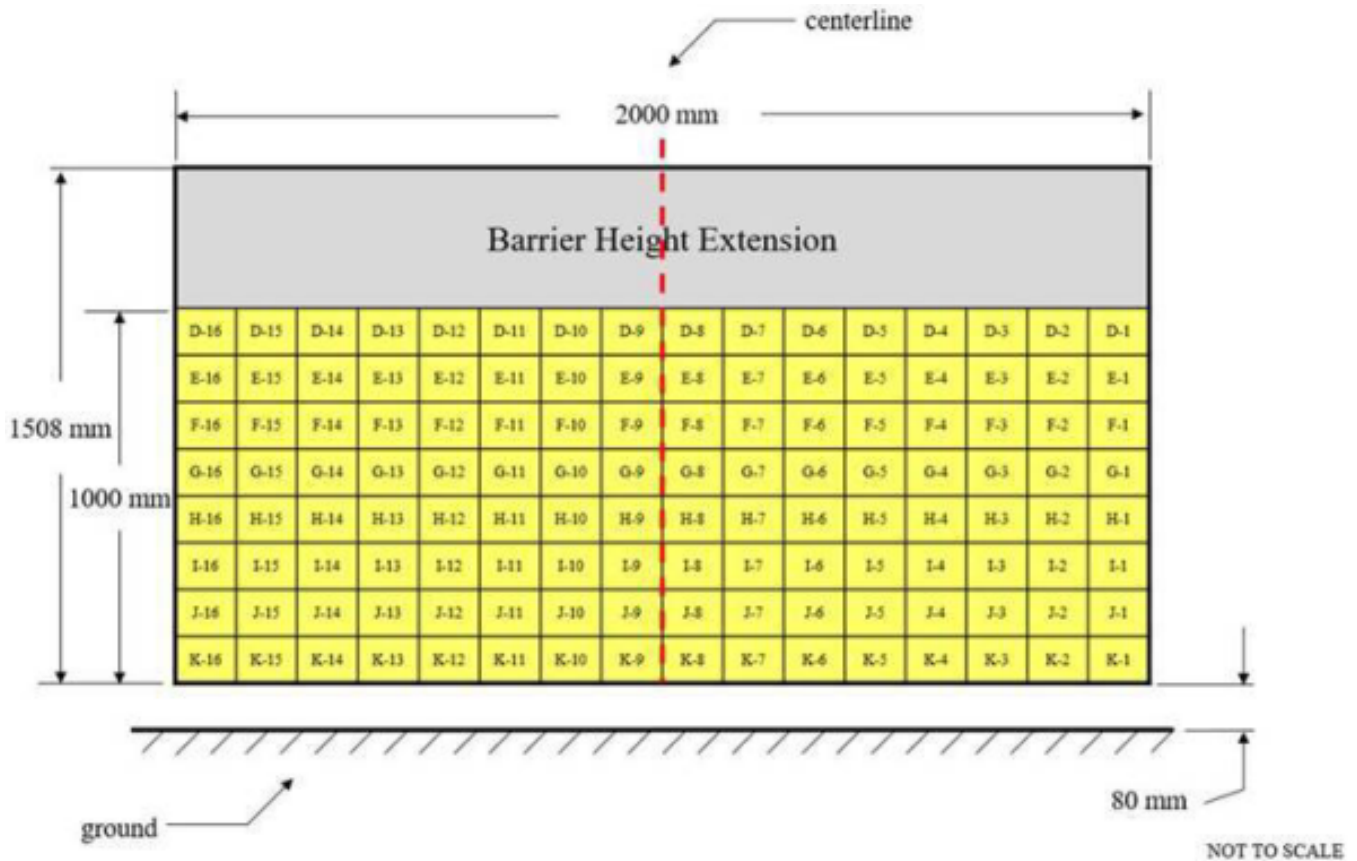


Figure 1 - Load Cell Locations on a 128-Load Cell Barrier with Plywood Height Extension*
 Please note above diagram is not actual representation of load cell barrier used.

DATA SHEET NO. 10
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2024 Genesis GV60 5 Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20244208
Test Date: 01/09/2024

INSTRUMENTATION

Instrumentation	Number of Channels Collected
Driver Dummy Accelerometers	47
Passenger Dummy Accelerometers	47
Vehicle Structure Accelerometers	8
Load Cell Barrier	384
Total	486

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 Genesis GV60 5 Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20244208
Test Date: 01/09/2024

TEST DUMMY INFORMATION AND CONTACT LOCATIONS

Description	Driver	Passenger
Dummy Type / Serial No.	P572E 50th Male / 42	P5720 5th Female / 137
Head Contact	Frontal Airbag & Head Restraint	Frontal Airbag & Head Restraint
Upper Torso Contact	Frontal Airbag	Frontal Airbag
Lower Torso Contact	None	None
Left Knee Contact	Knee Airbag	Knee Bolster
Right Knee Contact	Knee Airbag	Knee Bolster

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	Cracked Throughout
Window Damage	None
Other	None

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	1647
Center	mm	1650
Right Side	mm	1638
Average	mm	1645

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

Test Vehicle: 2024 Genesis GV60 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20244208
 Test Date: 01/09/2024

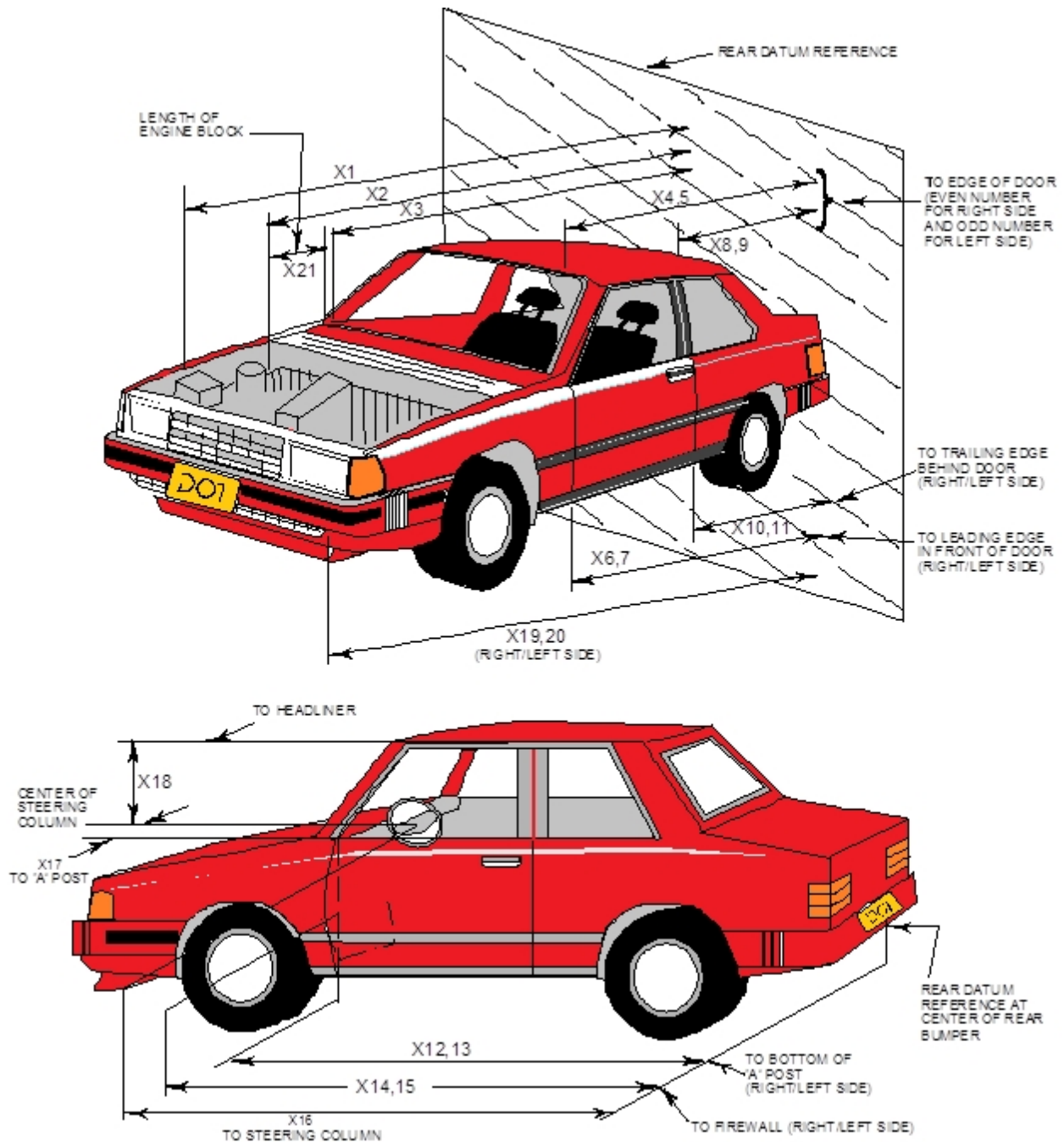
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

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

Test Vehicle: 2024 Genesis GV60 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20244208
 Test Date: 01/09/2024



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

Test Vehicle: 2024 Genesis GV60 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20244208
 Test Date: 01/09/2024

No.	Measurement Description	Pre-Test	Post-Test	Change
1	Total Length of Vehicle at Centerline	4519	4020	-499
2	Rear Surface of Vehicle (RSOV) to Front of Engine	3915	3619	-296
3	RSOV to Firewall	3376	3338	-38
4	RSOV to Upper Leading Edge of Right Door	3134	3137	3
5	RSOV to Upper Leading Edge of Left Door	3135	3138	3
6	RSOV to Lower Leading Edge of Right Door	3129	3128	-1
7	RSOV to Lower Leading Edge of Left Door	3128	3130	2
8	RSOV to Upper Trailing Edge of Right Door	2019	2022	3
9	RSOV to Upper Trailing Edge of Left Door	2018	2024	6
10	RSOV to Lower Trailing Edge of Right Door	2041	2040	-1
11	RSOV to Lower Trailing Edge of Left Door	2040	2043	3
12	RSOV to Bottom of "A" Post of Right Side	3142	3143	1
13	RSOV to Bottom of "A" Post of Left Side	3140	3140	0
14	RSOV to Firewall, Right Side	3741	3703	-38
15	RSOV to Firewall, Left Side	3736	3702	-34
16	RSOV to Steering Column	2627	2684	57
17	Center of Steering Column to "A" Post	298	293	-5
18	Center of Steering Column to Headliner	423	410	-13
19	RSOV to Right Side of Front Bumper	4473	4097	-376
20	RSOV to Left Side of Front Bumper	4473	4073	-400
21	Length of Engine Block	212	212	0
RD	RSOV to Right Side of Dash Panel	2865	2866	1
CD	RSOV to Center of Dash Panel	2849	2843	-6
LD	RSOV to Left Side of Dash Panel	2867	2869	2

All Dimensions in mm

DATA SHEET NO. 13
ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2024 Genesis GV60 5 Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20244208
Test Date: 01/09/2024

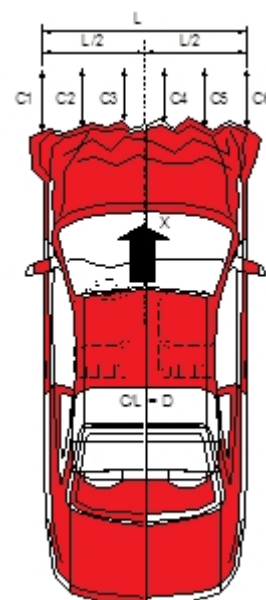
VEHICLE INFORMATION

VIN: KMUKCDSC9RU022340
Vehicle Size Category: MPV

Wheelbase (mm): 2906
Test Weight (kg): 2340

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): 56.39
Velocity Change (km/h): 68.170
Time of Separation (ms): 125



CRUSH PROFILE

Collision Deformation Classification: 12FDEW3
Midpoint of Damage: C3
Damage Region Length (mm): 1507
Impact Mode: Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Crush
C1	Crush Zone 1 at Left Side	mm	4352	3983	369
C2	Crush Zone 2 at Left Side	mm	4468	4037	431
C3	Crush Zone 3 at Left Side	mm	4507	4034	473
C4	Crush Zone 4 at Right Side	mm	4506	4026	480
C5	Crush Zone 5 at Right Side	mm	4465	4007	458
C6	Crush Zone 6 at Right Side	mm	4348	3943	405
L	C1 to C6	mm	1471	1507	-36

DATA SHEET NO. 14
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2024 Genesis GV60 5 Door SUV
Test Program: NCAP Frontal Barrier Impact Test

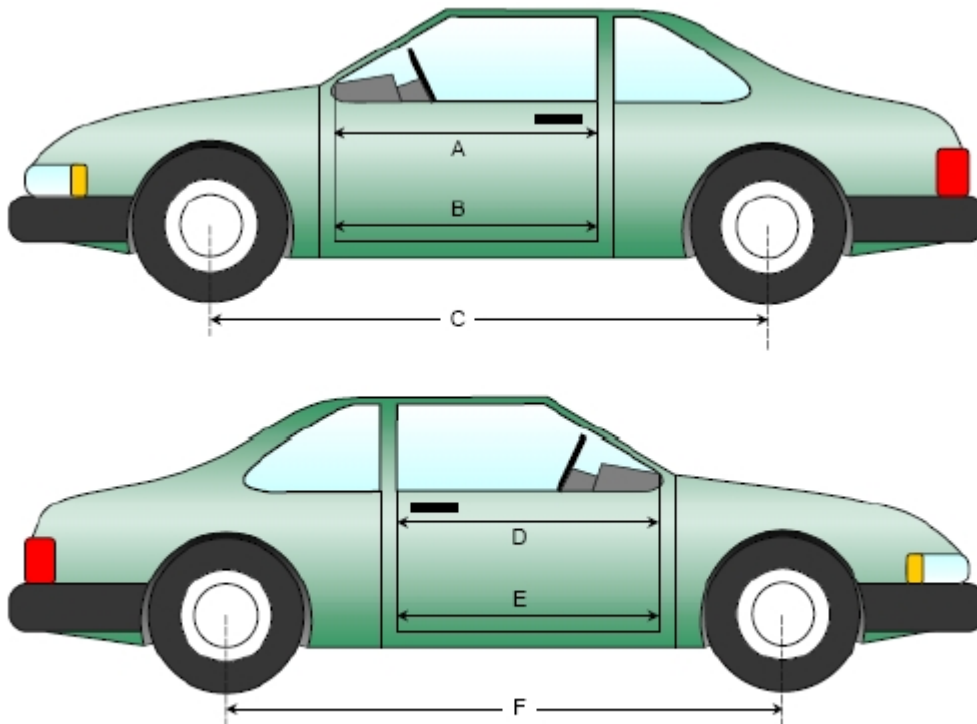
NHTSA No.: O20244208
Test Date: 01/09/2024

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Change
A	Left Side Upper	mm	978	979	1
B	Left Side Lower	mm	867	868	1
D	Right Side Upper	mm	979	979	0
E	Right Side Lower	mm	875	876	1

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Change
C	Left Side Wheelbase	mm	2906	2787	-119
F	Right Side Wheelbase	mm	2906	2744	-162



Left & Right Side Views

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

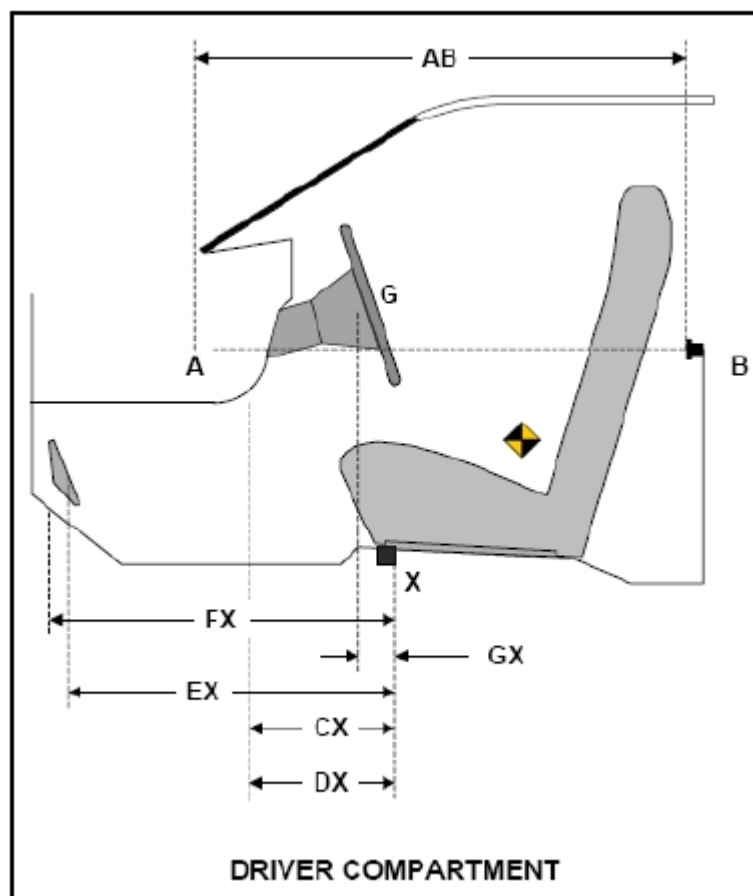
Test Vehicle: 2024 Genesis GV60 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20244208
 Test Date: 01/09/2024

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Change
AB	Door Opening (Inside Window Jam)	mm	746	745	-1
CX	Left Knee Bolster to X	mm	290	287	-3
DX	Right Knee Bolster to X	mm	281	268	-13
EX	Brake Pedal to X	mm	566	468	-98
FX	Foot Rest to X	mm	592	575	-17
GX	Center of Steering Column Wheel Hub to X	mm	27	86	59

X = Front of Seat Track (Stationary)



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

Test Vehicle: 2024 Genesis GV60 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20244208
 Test Date: 01/09/2024

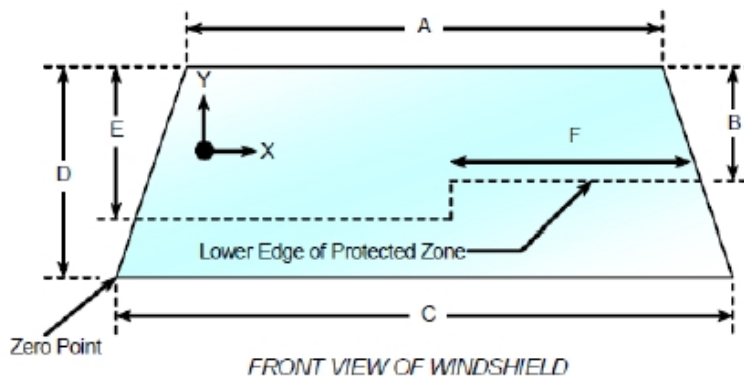
Windshield Mounting Details: A trim surrounds the top and side of windshield while a plastic shroud is on the bottom.

The standard requires that the post-test retention measurement be a minimum of 75% of the pre-test total periphery measurement for vehicles not equipped with occupant passive restraints and 50% for each side of the windshield for vehicles which are equipped with occupant passive restraints.

Temperature of windshield molding during test: 21 °C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2285.0	2285.0	100.0%
Right Side	2285.0	2285.0	100.0%
Total	4570	4570	100.0%



Item	Units	Value
A	mm	1310
B	mm	445
C	mm	1580
D	mm	840
E	mm	545
F	mm	610

AREAS OF PROTECTED ZONE FAILURES

- A. Provide coordinates of the area that the protected zone was penetrated more than .25 inches by a vehicle component other than one that is normally in contact with the windshield.
- No Penetration
- B. Provide coordinates of the area beneath the protected zone that the inner surface of the windshield was penetrated by a vehicle component.
- No Penetration

X	Y
X	Y

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

Test Vehicle:	<u>2024 Genesis GV60 5 Door SUV</u>	NHTSA No.:	<u>O20244208</u>
Test Program:	<u>NCAP Frontal Barrier Impact Test</u>	Test Date:	<u>01/09/2024</u>

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact:	21°C	Test Time:	11:54 AM
--------------------------------	-------------	------------	-----------------

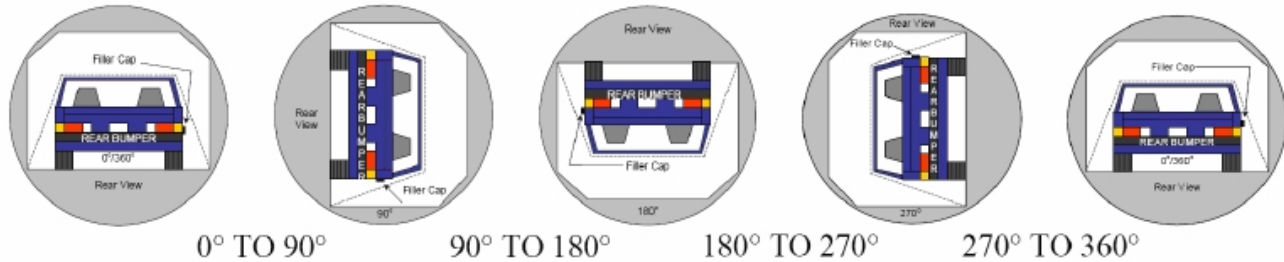
STODDARD SOLVENT SPILLAGE MEASUREMENTS

- | | | |
|--|------------|----|
| A. From impact until vehicle motion ceases
(Maximum allowable is 1 oz.) | N/A | oz |
| B. For the 5-minute period after motion ceases
(Maximum allowable is 5 oz.) | N/A | oz |
| C. For the following 25 minutes:
(Maximum allowable is 1 oz.) | N/A | oz |
| D. Spillage Detail: | N/A | |

DATA SHEET NO. 16
FMVSS 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2024 Genesis GV60 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20244208
 Test Date: 01/09/2024



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: N/A

SOLVENT COLLECTION TIME TABLE IN SECONDS

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

FMVSS 301 SPILLAGE TABLE

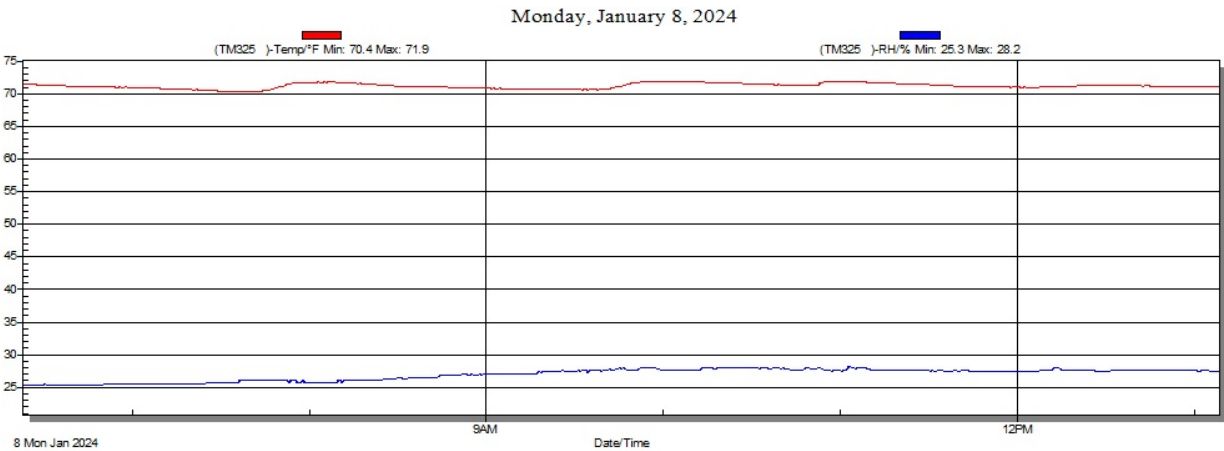
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° to 90°				
90° to 180°				
180° to 270°				
270° to 360°				

SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 17
DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART

Test Vehicle:	2024 Genesis GV60 5 Door SUV	NHTSA No.:	O20244208
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	01/09/2024



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

DATA SHEET NO. 305-1
GENERAL TEST AND VEHICLE PARAMETER DATA FOR INDICANT FMVSS NO. 305 TESTING

Test Vehicle: 2024 Genesis GV60 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20244208
 Test Date: 01/09/2024

ELECTRIC VEHICLE PROPULSION SYSTEM

Measured Parameter	Value
Type of Electric Vehicle (Electric/Gas-Electric Hybrid/Fuel Cell-Electric Hybrid)	Electric
Propulsion Battery Type	Lithium-ion Polymer
Nominal Voltage (Volts)	697
Is this Vehicle equipped with an Automatic Propulsion Battery Disconnect?	Yes
Physical Location of Automatic Propulsion Battery Disconnect, if applicable	Inside of propoulision battery (rear side)
Auxiliary Battery Type	Lead-acid battery

PROPULSION BATTERY SYSTEM DATA (COTR SUPPLIED)

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

PROPULSION BATTERY STATE OF CHARGE

Measured Parameter	Units	Value
<i>For all battery types:</i> Voltage Range corresponding to useable energy of the battery:		
Minimum State of Charge	V	480
Maximum State of Charge	V	826
95% of Maximum	V	784.7
Test Voltage *	V	786
<i>For batteries that are rechargeable ONLY by an energy source on the vehicle:</i> Voltage range corresponding to useable energy of the battery:		
Minimum State of Charge	V	
Maximum State of Charge	V	
95% of Maximum	V	
Test Voltage *	V	

* For all battery types-No less than 95% of Maximum Operating Voltage; for batteries that are rechargeable ONLY by an energy source on the vehicle-maximum practicable state of charge within normal operating range.

DATA SHEET NO. 305-2
PRE-IMPACT DATA FOR INDICANT FMVSS NO. 305 TESTING

Test Vehicle: 2024 Genesis GV60 5 Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20244208
Test Date: 01/09/2024

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

Measured Parameter	Value
Details of Vehicle Chassis Ground Points & Locations	The ground point is connected to the vehicle chassis and is located underneath the vehicle. No information provided by OEM.
Details of Propulsion Battery Components	No details provided.

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

Test Vehicle: 2024 Genesis GV60 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20244208
 Test Date: 01/09/2024

VOLTMETER INFORMATION

Measured Parameter	Units	Value
Make & Model		Fluke 1587
Serial No.		58100115
Internal Impedance Value	MΩ	10
Resolution	V	0.001
Last Calibration Date		04/28/2022

NOTES:

- The voltmeter used in this test shall measure DC values and have an internal impedance of at least 10 MΩ
- An oscilloscope meeting the above requirements may need to be used to adequately measure voltage in some vehicles.

**PROPULSION BATTERY VOLTAGE, RESISTANCE &
ELECTRICAL ISOLATION MEASUREMENTS & CALCULATIONS**

Measured Parameter	Symbol	Units	Value
Normal operating voltage range specified by the manufacturer	V_b	V	480-826
Propulsion Battery Voltage: (ready to drive position)	V_b	V	786.0
Propulsion Battery to Vehicle Chassis	V_1	V	496.0
Propulsion Battery to Vehicle Chassis	V_2	V	507.0
Propulsion Battery to Vehicle Chassis Across Known Resistor	R_o	Ω	403,700
Propulsion Battery to Vehicle Chassis with R_o installed	V_1'	V	126.3
Propulsion Battery to Vehicle Chassis with R_o installed	V_2'	V	126.7
$R_{i1} = R_o * (1 + V_2/V_1) * [(V_1 - V_1')/V_1']$	R_{i1}	Ω	2,389,594
$R_{i2} = R_o * (1 + V_1/V_2) * [(V_2 - V_2')/V_2']$	R_{i2}	Ω	2,397,184
Lesser value of R_{i1} and R_{i2}	R_i	Ω	2,389,594
Electrical Isolation Value (Minimum E.I. Value is 500 Ω/V)	R_i/V_b	Ω/V	3,040

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

NOTES:

- The measurement shall be made with the propulsion battery connected to the vehicle propulsion system, and the vehicle in the "ready-to-drive" (propulsion motor(s) activated) position.
- If the voltage measurement is not at the voltage or within the normal operating voltage range specified by the manufacturer, the battery must be charged.
- The known resistance R_o (in Ohms) should be approximately 500 times the nominal operating voltage of the vehicle (in volts) per SAE J1766
- If measured voltage is zero and results in a division by zero, record "Zero Volts." This "zero voltage" condition is considered as being compliant

DATA SHEET NO. 305-4
POST-IMPACT DATA FOR INDICANT FMVSS NO. 305 TESTING

Test Vehicle: 2024 Genesis GV60 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20244208
 Test Date: 01/09/2024

VOLTMETER INFORMATION

Measured Parameter	Units	Value
Make & Model		Fluke 1587
Serial No.		48910192
Internal Impedance Value	MΩ	10
Resolution	V	0.001
Calibration Date		03/08/2023

NOTES:

- The voltmeter used in this test shall measure DC values and have an internal impedance of at least 10 MΩ
- An oscilloscope meeting the above requirements may need to be used to adequately measure voltage in some vehicles.

ELECTRICAL ISOLATION MEASUREMENTS & IMPACT CALCULATIONS

Parameter	Value	Units		Value		Value	
V _b =	0.1	V	Time:	1	Minutes	39	Seconds
V ₁ =	3.6	V	Time:	1	Minutes	49	Seconds
V ₂ =	3.0	V	Time:	1	Minutes	58	Seconds
R _o =	404,900	Ω					
V ₁ ' =	0.3	V	Time:	2	Minutes	13	Seconds
V ₂ ' =	0.4	Ω	Time:	2	Minutes	21	Seconds
R _{i1} =	8,165,483	Ω	Time:	2	Minutes	13	Seconds
R _{i2} =	5,790,070	Ω	Time:	2	Minutes	21	Seconds
R _i =	5,790,070	Ω/V	Time:	2	Minutes	21	Seconds
R _i /V _b =	57,900,700	Ω/V	Time:	2	Minutes	21	Seconds

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

NOTES:

- $R_{i1} = R_o * (1 + V_2/V_1) * [(V_1 - V_1')/V_1]$, $R_{i2} = R_o * (1 + V_1/V_2) * [(V_2 - V_2')/V_2]$, R_i = Lesser value of R_{i1} and R_{i2}
- If measured voltage is zero and results in a division by zero, record "Zero Volts." This "zero voltage" condition is considered as being compliant
- Minimum Electrical Isolation Value is 500 Ω/V

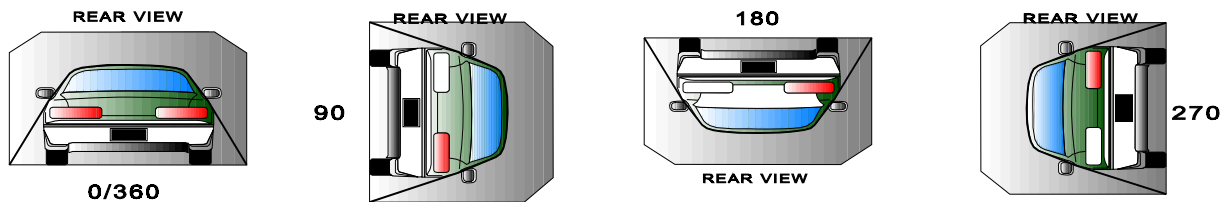
PROPULSION BATTERY SYSTEM COMPONENTS

Measured Parameter	Comments	Passed	Failed
Propulsion Battery Module movement within the passenger compartment	None	X	
Intrusion of an outside Propulsion Battery Component into the passenger compartment	None	X	
Is propulsion battery electrolyte spillage visible in the passenger compartment?	None	X	

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

Test Vehicle: 2024 Genesis GV60 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20244208
 Test Date: 01/09/2024



Rear View

DETERMINATION OF PROPULSION BATTERY ELECTROLYTE COLLECTION TIME PERIOD

Rollover Stage	Rotation Time (spec. 1 -3 min)		FMVSS 301 Hold Time	Total Time		Next Whole Minute Interval Minutes
	Minutes	Seconds		Minutes	Seconds	
0° to 90°	1	18	5	6	18	7
90° to 180°	1	10	5	6	10	7
180° to 270°	1	9	5	6	9	7
270° to 360°	1	14	5	6	14	7

ACTUAL TEST VEHICLE PROPULSION BATTERY ELECTROLYTE SPILLAGE

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

* FMVSS 305 Requirements: Maximum allowable propulsion battery electrolyte spillage is **5.0 Liters**

Is the total spillage of propulsion battery electrolyte greater than 5.0 Liters? ☐ Yes (Fail) ☒ No
 Is propulsion battery electrolyte spillage visible in the passenger compartment? ☐ Yes (Fail) ☒ No

VOLTMETER INFORMATION

Measured Parameter	Units	Value
Make & Model		Fluke 1587
Serial No.		48910192
Internal Impedance Value	MΩ	10
Resolution	V	0.001
Calibration Date		03/08/2023

NOTES:

- The voltmeter used in this test shall measure DC values and have an internal impedance of at least 10 MΩ
- An oscilloscope meeting the above requirements may need to be used to adequately measure voltage in some vehicles.

DATA SHEET NO. 305-5
STATIC ROLLOVER TEST DATA FOR INDICANT FMVSS NO. 305 TESTING (CONT'D)

Test Vehicle: 2024 Genesis GV60 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20244208
 Test Date: 01/09/2024

ELECTRICAL ISOLATION MEASUREMENTS & CALCULATIONS

Parameter	Rollover Stage	Value	Units	Ro=404,900	Minutes	Seconds
$V_b =$	90°	0.0	V	Time:	1	15
	180°	0.0	V		15	42
	270°	0.0	V		22	16
	360°	0.0	V		28	42
$V_1 =$	90°	0.1	V	Time:	1	26
	180°	0.1	V		15	52
	270°	0.0	V		22	27
	360°	0.0	V		28	50
$V_2 =$	90°	0.0	V	Time:	1	40
	180°	0.1	V		16	2
	270°	0.0	V		22	35
	360°	0.0	V		29	10
$V_1' =$	90°	0.0	V	Time:	1	47
	180°	0.0	V		16	10
	270°	0.0	V		22	46
	360°	0.0	V		29	17
$V_2' =$	90°	0.0	Ω	Time:	1	53
	180°	0.0	Ω		16	18
	270°	0.0	Ω		22	53
	360°	0.0	Ω		29	29
$R_{i1} =$	90°	Zero Volts	Ω	Time:	1	47
	180°	Zero Volts	Ω		16	10
	270°	Zero Volts	Ω		22	46
	360°	Zero Volts	Ω		29	17
$R_{i2} =$	90°	Zero Volts	Ω	Time:	1	53
	180°	Zero Volts	Ω		16	18
	270°	Zero Volts	Ω		22	53
	360°	Zero Volts	Ω		29	29
$R_i =$	90°	Zero Volts	Ω/V	Time:	1	53
	180°	Zero Volts	Ω/V		16	18
	270°	Zero Volts	Ω/V		22	53
	360°	Zero Volts	Ω/V		29	29
$R_i/V_b =$	90°	Zero Volts	Ω/V	Time:	1	53
	180°	Zero Volts	Ω/V		16	18
	270°	Zero Volts	Ω/V		22	53
	360°	Zero Volts	Ω/V		29	29

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

☒ X

Yes

☐

No (Fail)

APPENDIX A
PHOTOGRAPHS

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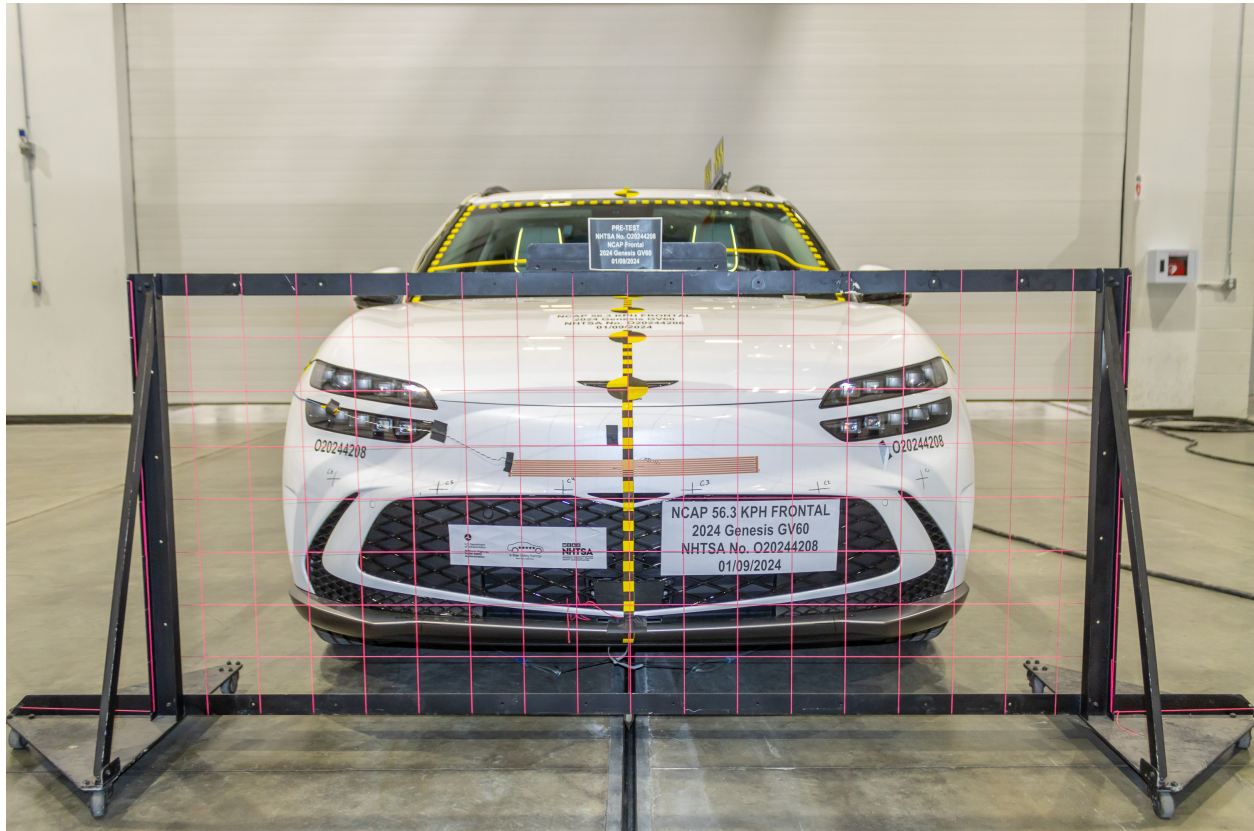


Figure A-1: Load Cell Location

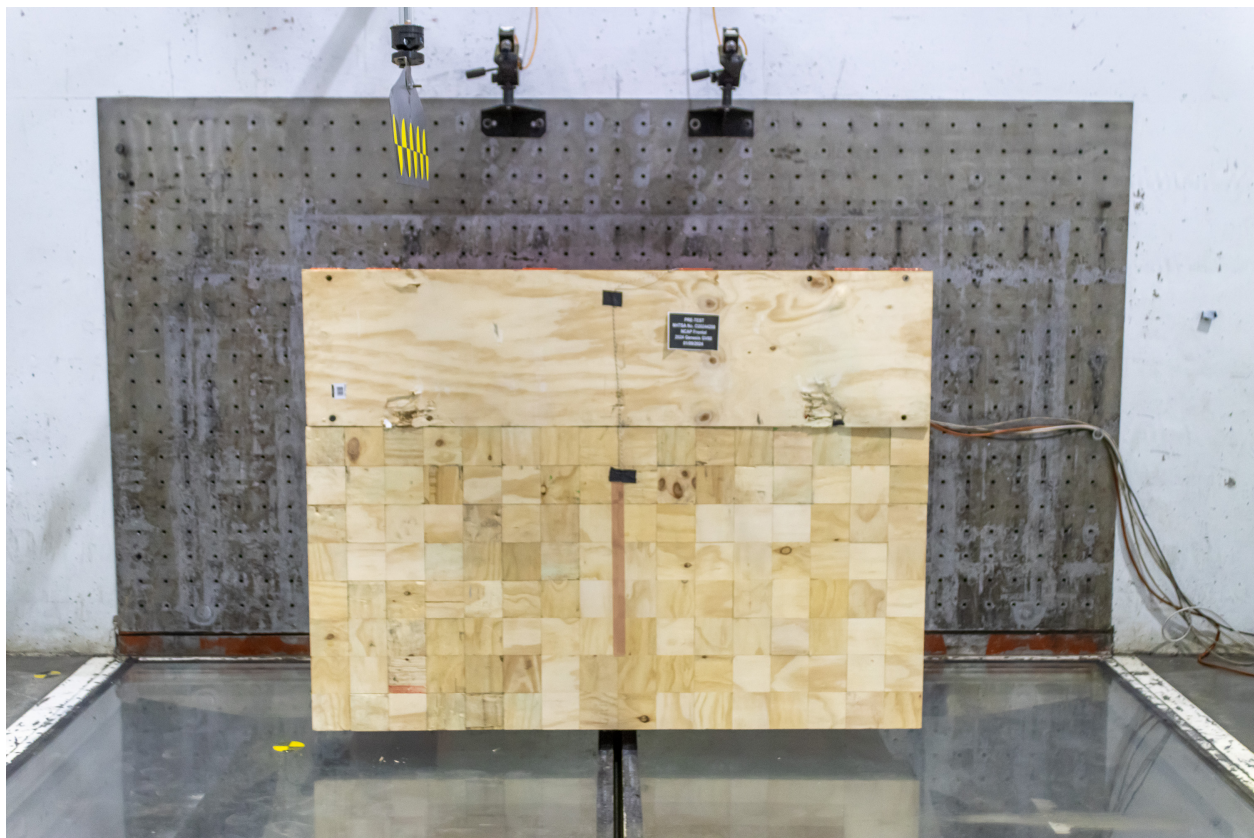


Figure A-2: Pre-Test Load Cell Wall



Figure A-3: Post-Test Load Cell Wall



Figure A-4: Manufacturer's Label



Figure A-5: Tire Placard



Figure A-6: 2024 Genesis GV60 Frontal As Delivered



O20244208

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

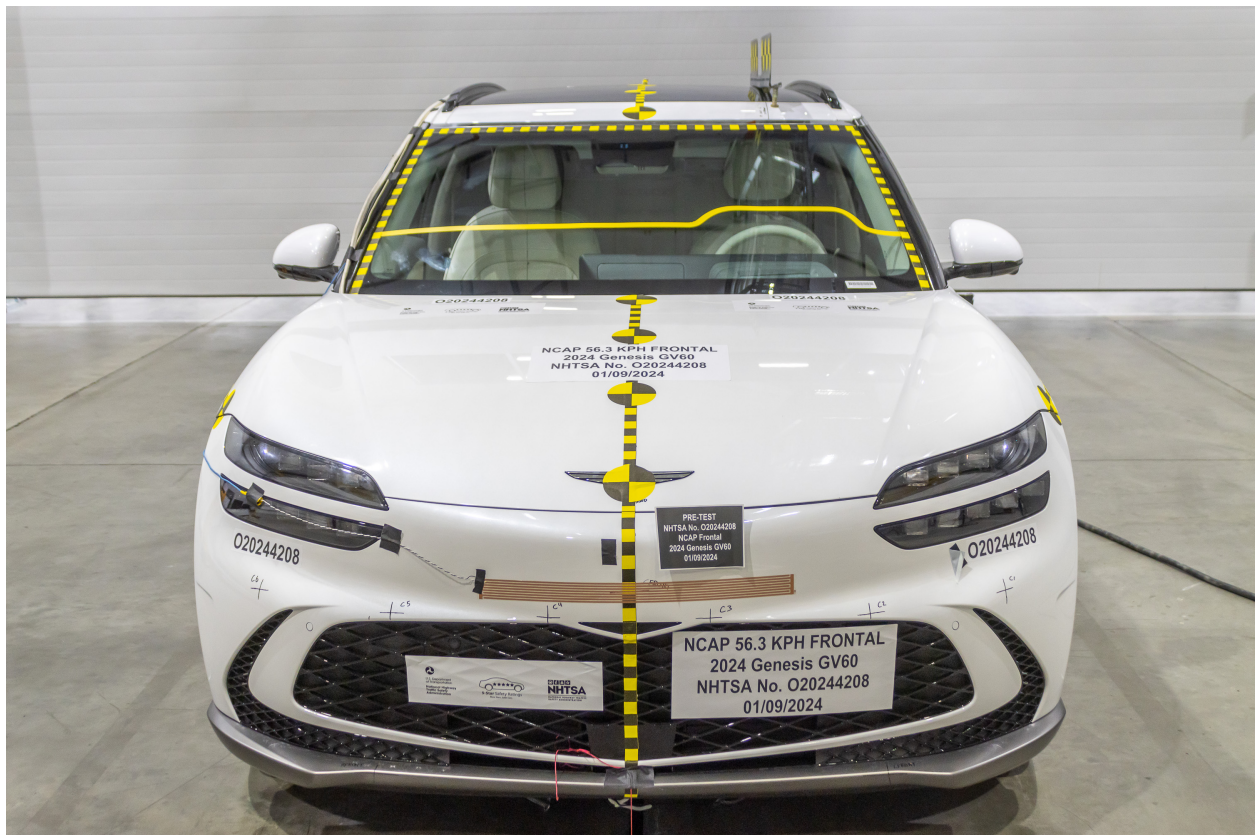


Figure A-8: Pre-Test Front View of Test Vehicle



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

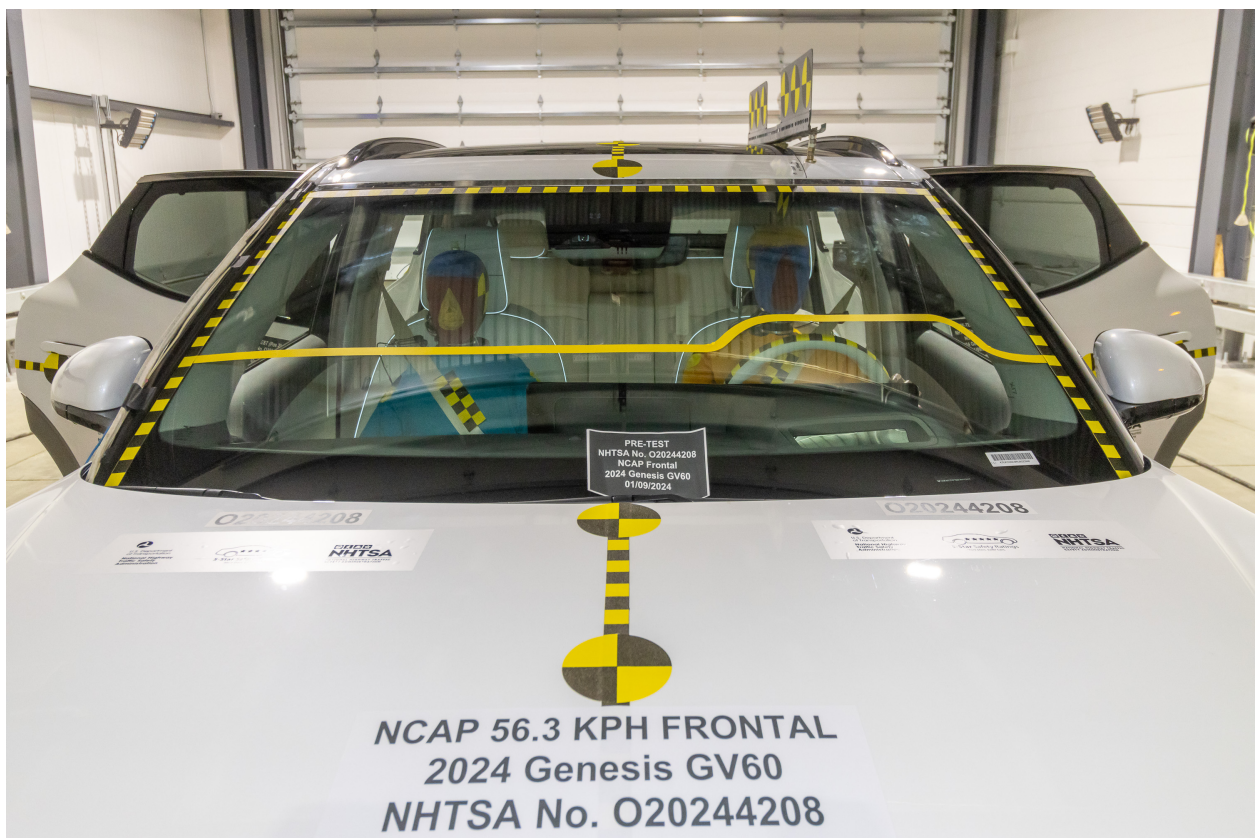


Figure A-18: Pre-Test Windshield View



Figure A-19: Post-Test Windshield View



Figure A-20: Pre-Test Engine Compartment View

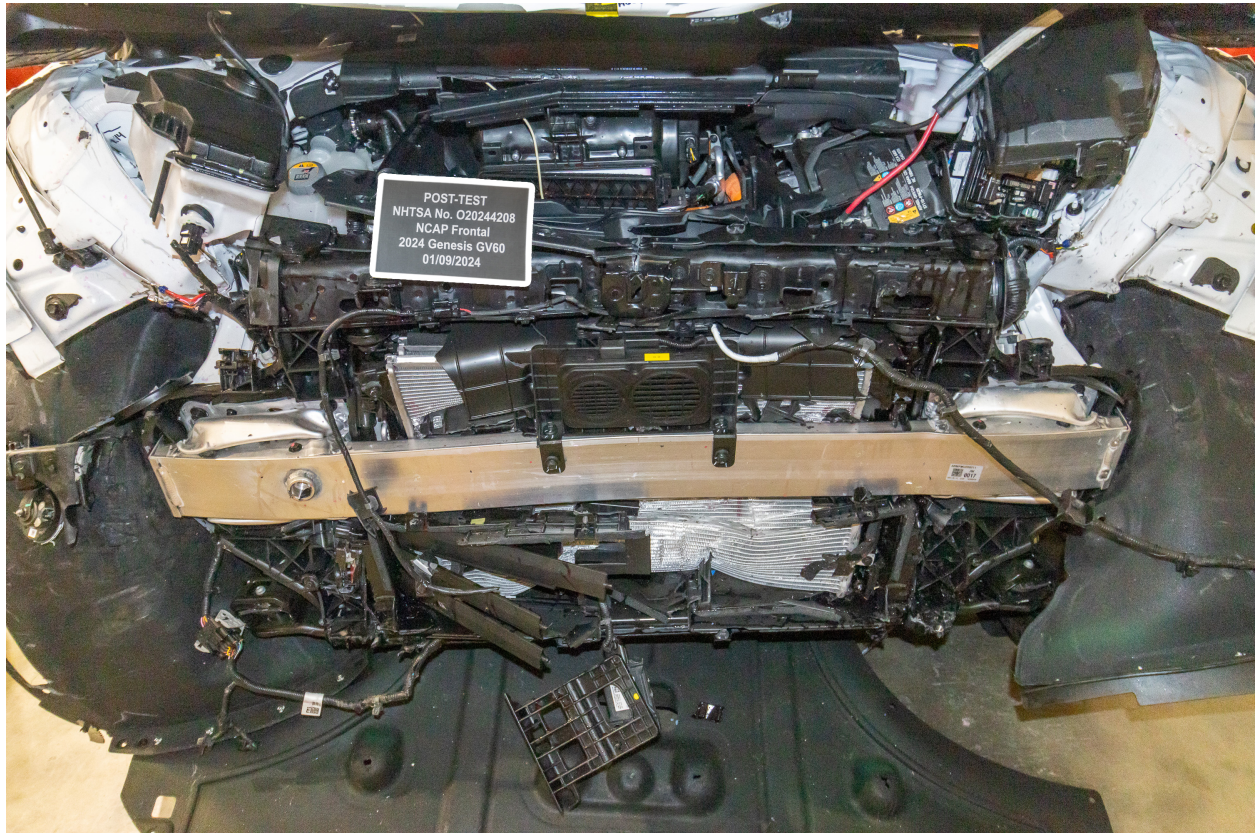


Figure A-21: Post-Test Engine Compartment View



Figure A-22: Pre-Test Charge Port View



Figure A-23: Post-Test Charge Port View

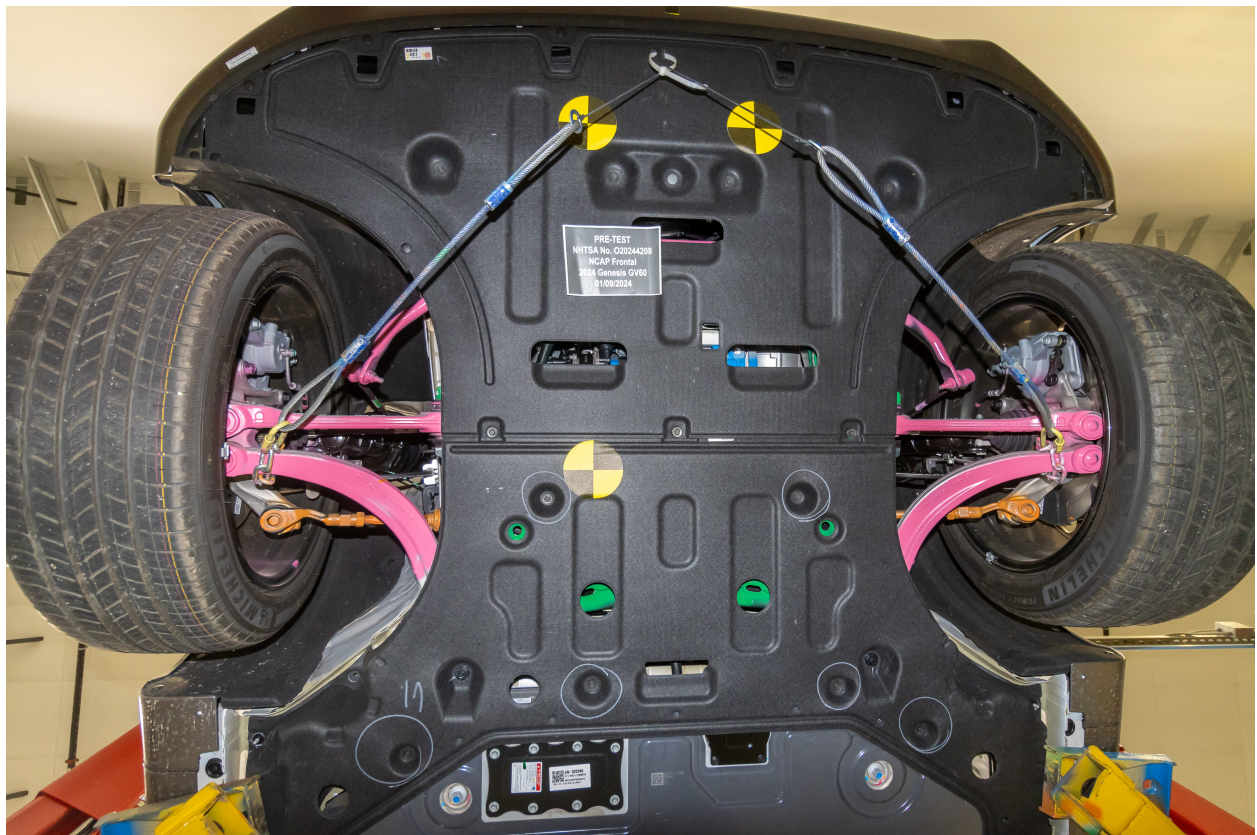


Figure A-24: Pre-Test Front Underbody View

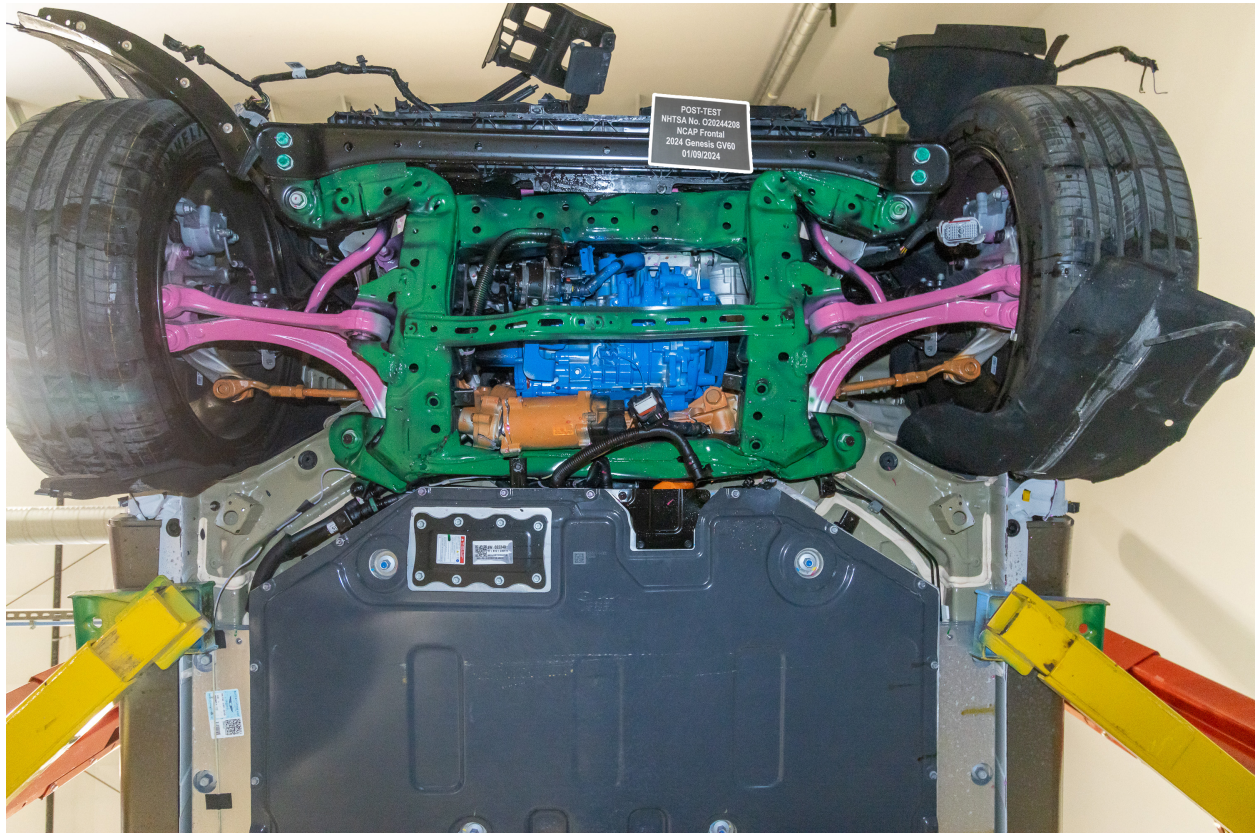


Figure A-25: Post-Test Front Underbody View

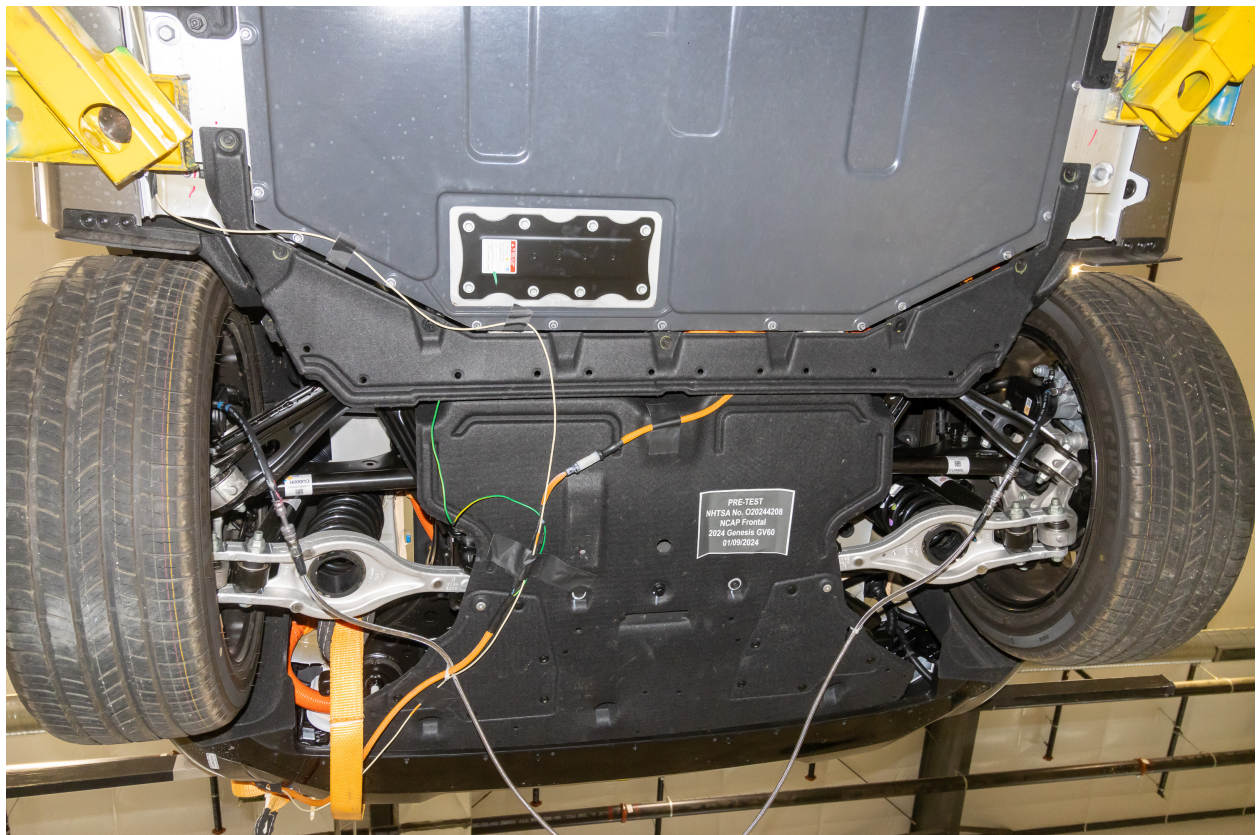


Figure A-26: Pre-Test Rear Underbody View

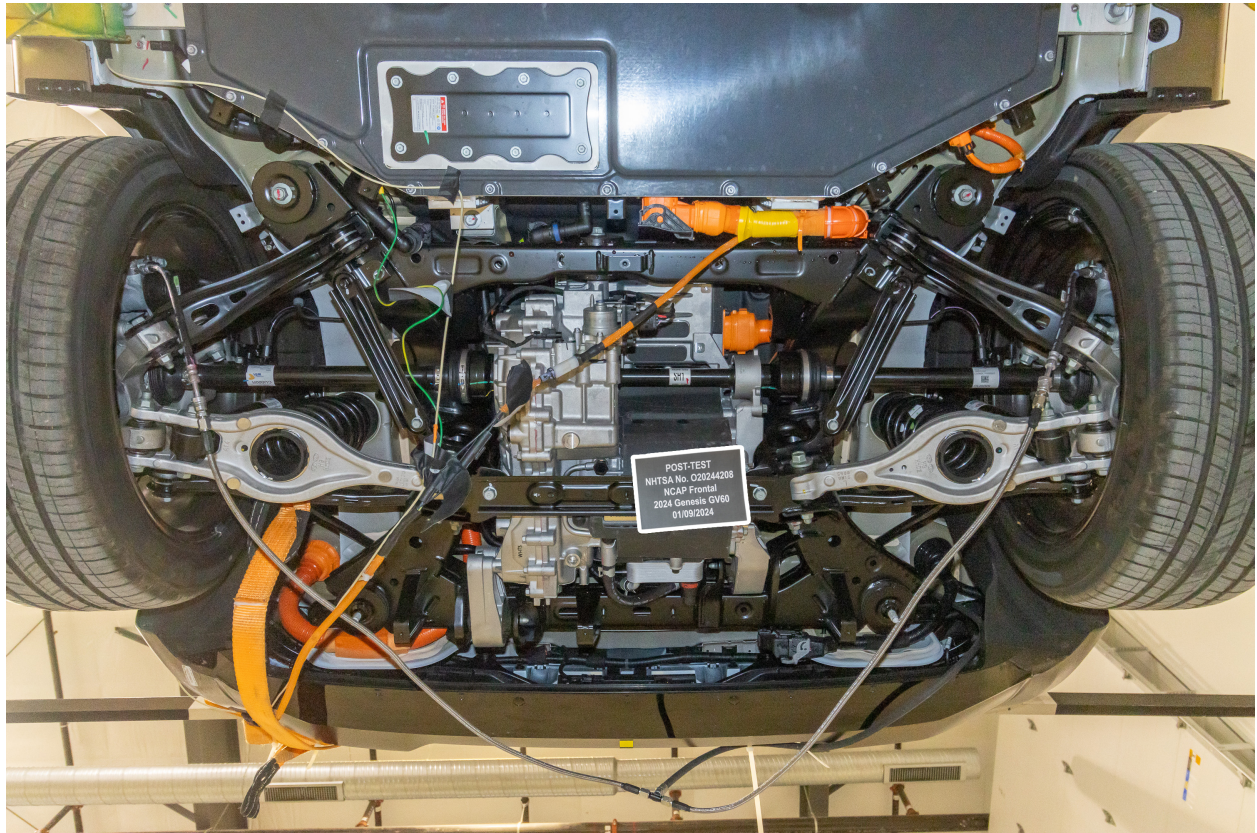


Figure A-27: Post-Test Rear Underbody View



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



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

Photo Not Available

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



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

Photo Not Available

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

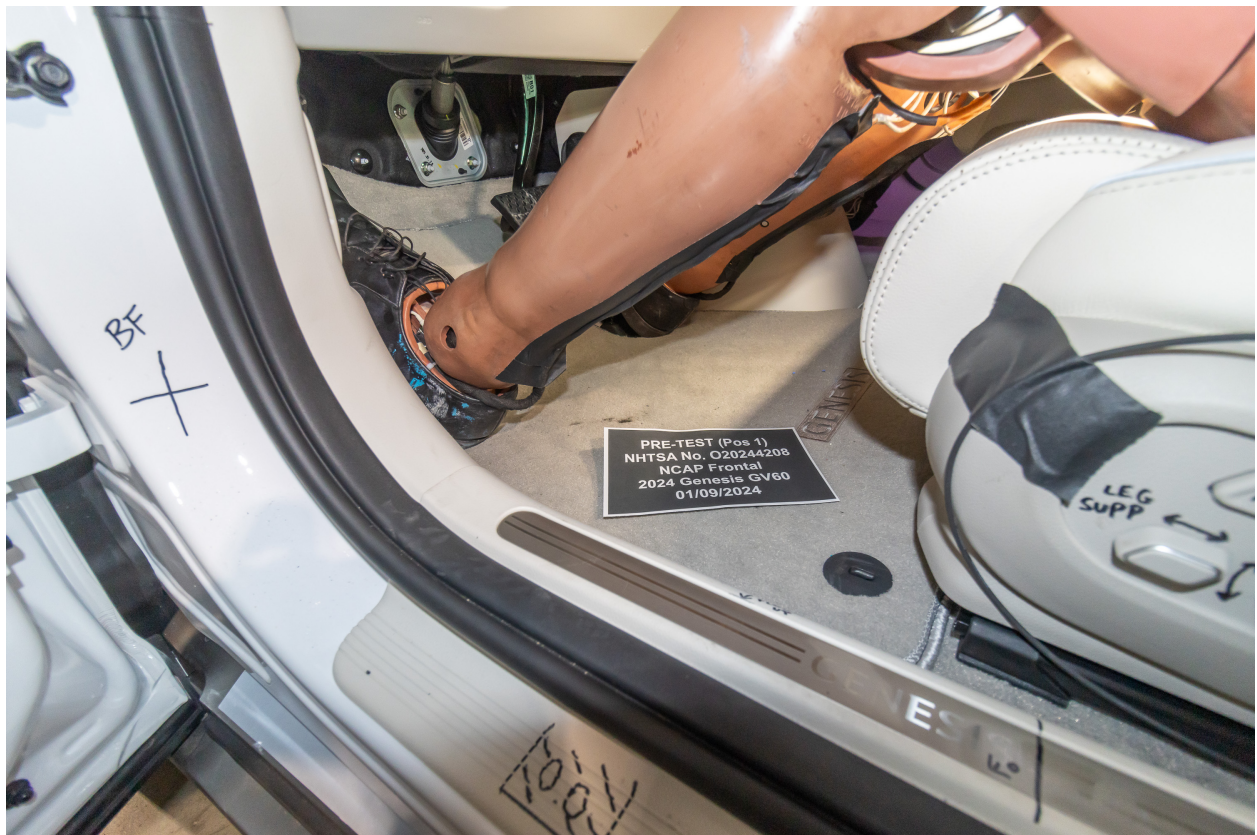


Figure A-42: Pre-Test Driver Dummy Feet



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

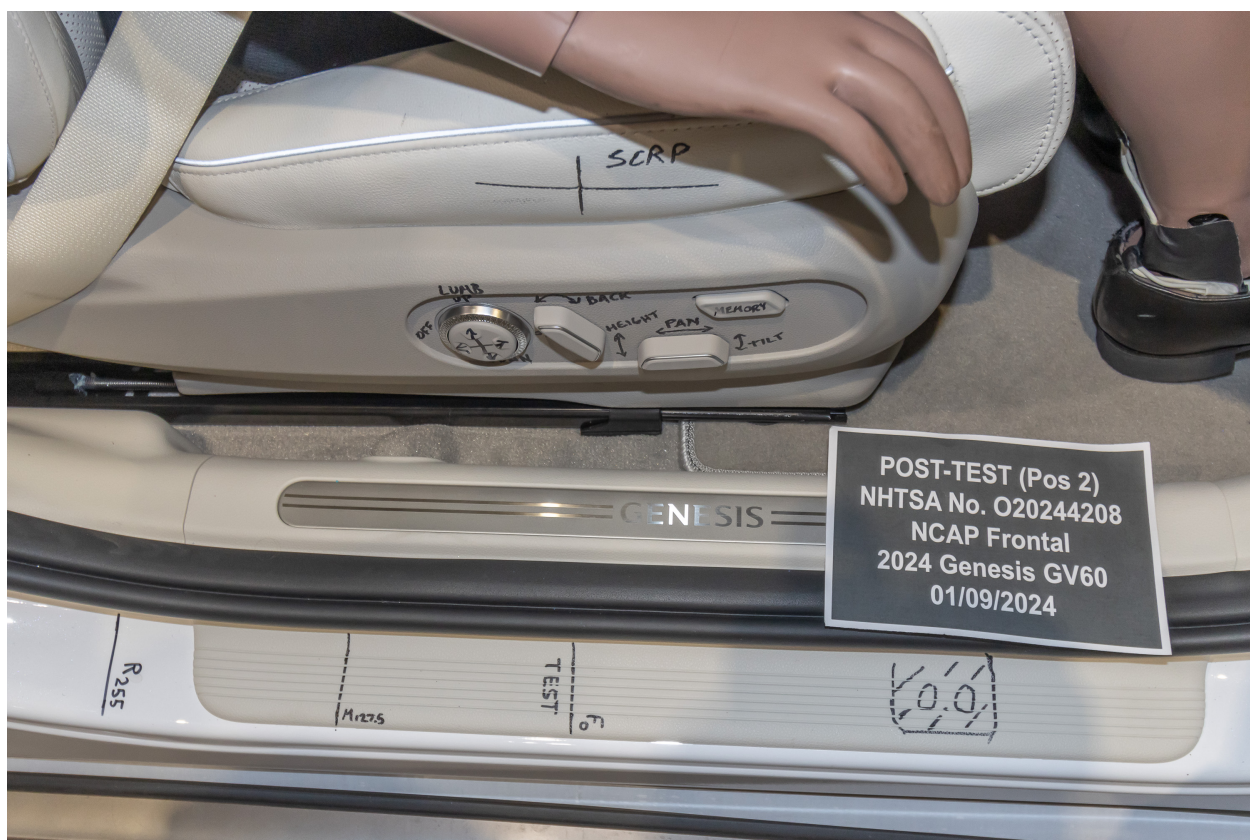


Figure A-60: Post-Test Passenger's Seat Fore-Aft Markings

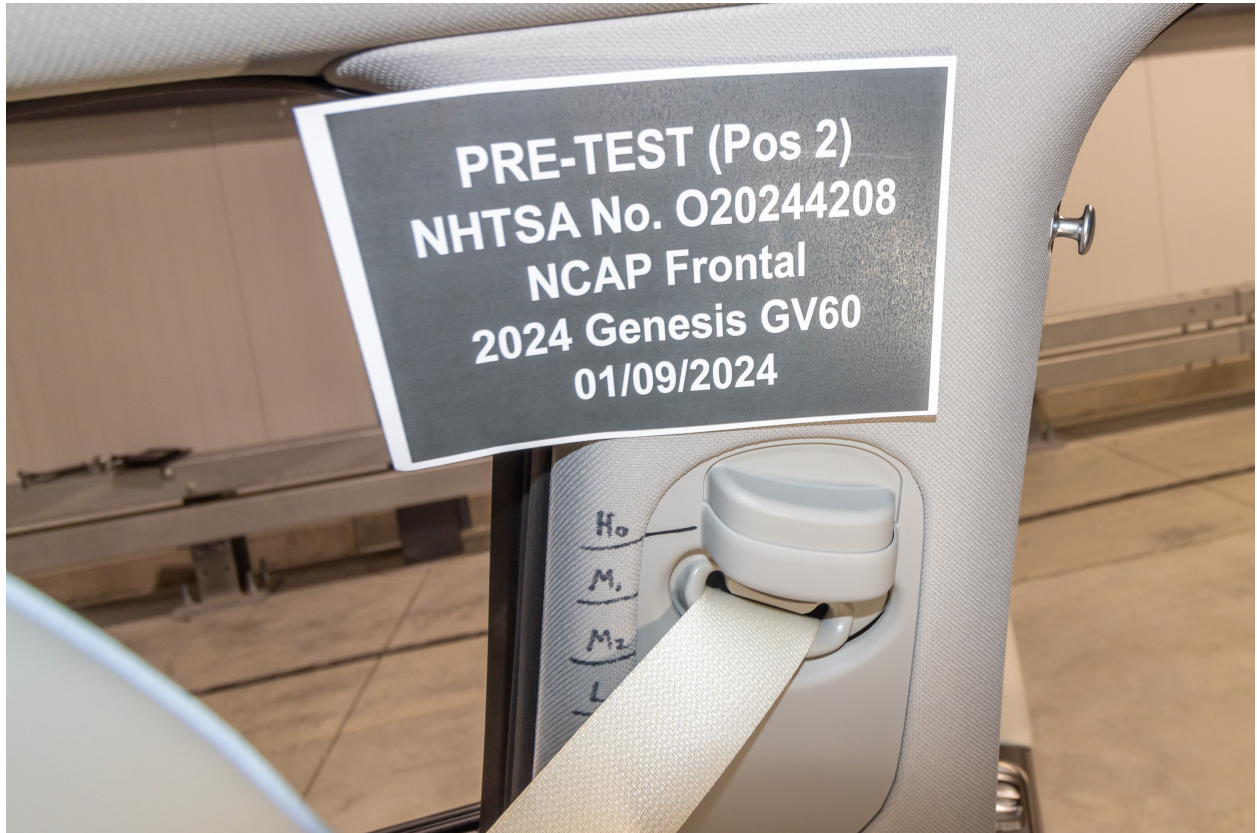


Figure A-61: Pre-Test View of Belt Anchorage for Passenger Dummy



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

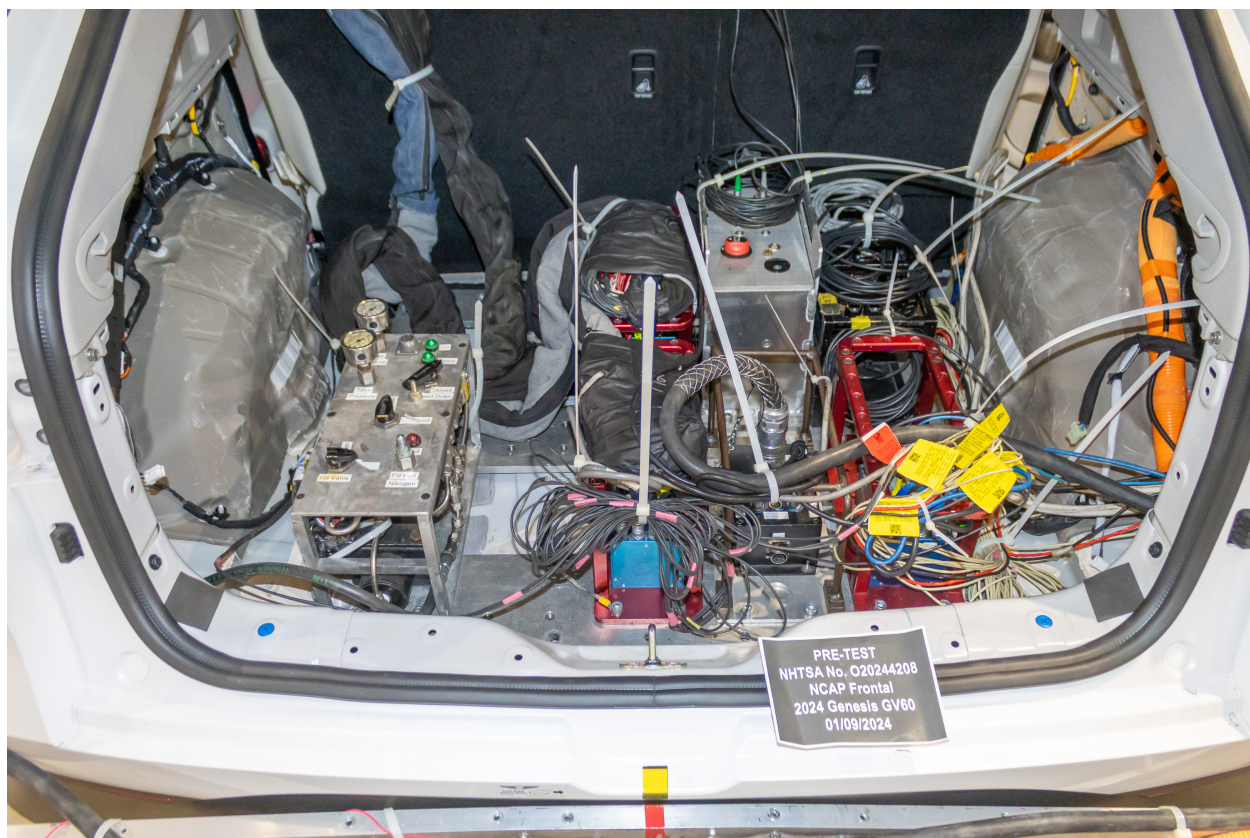


Figure A-74: Photograph of Ballast Installed in Vehicle

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

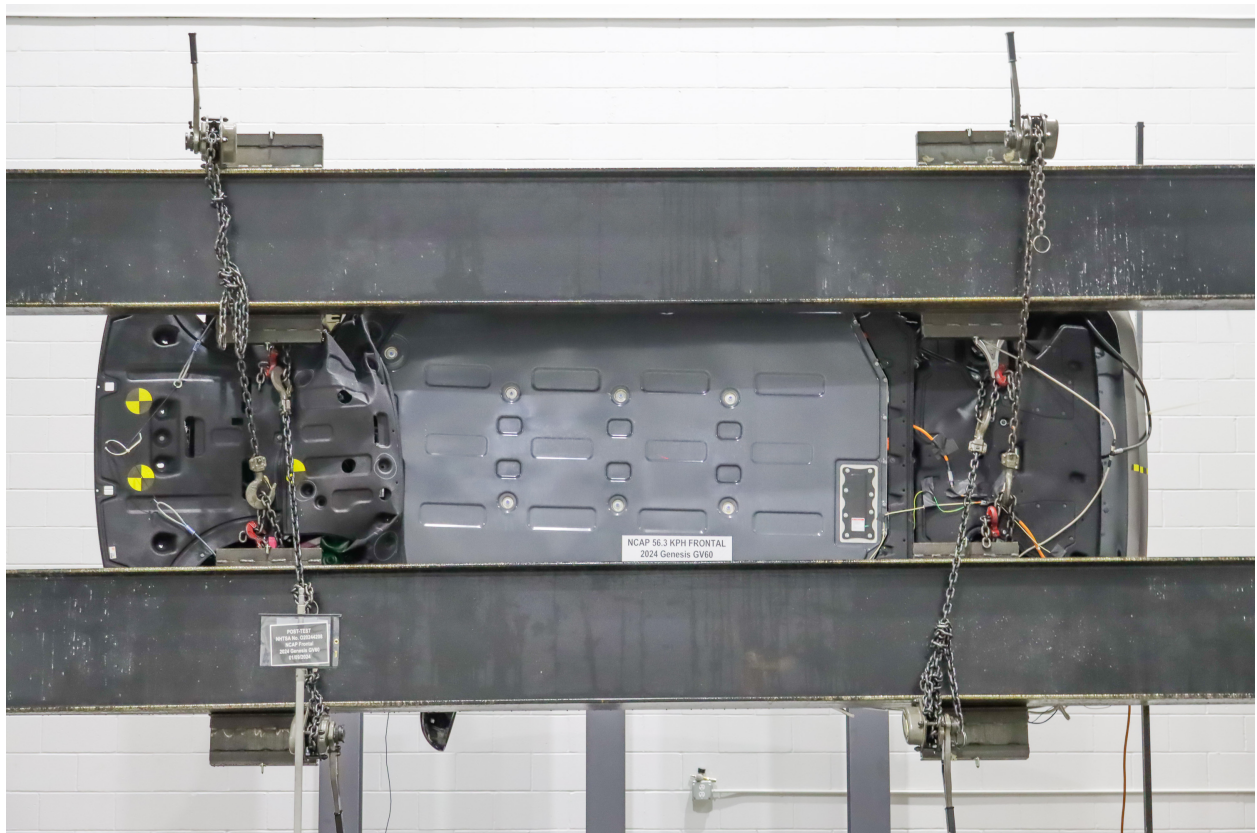


Figure A-78: Vehicle at 90° on Static Rollover Device

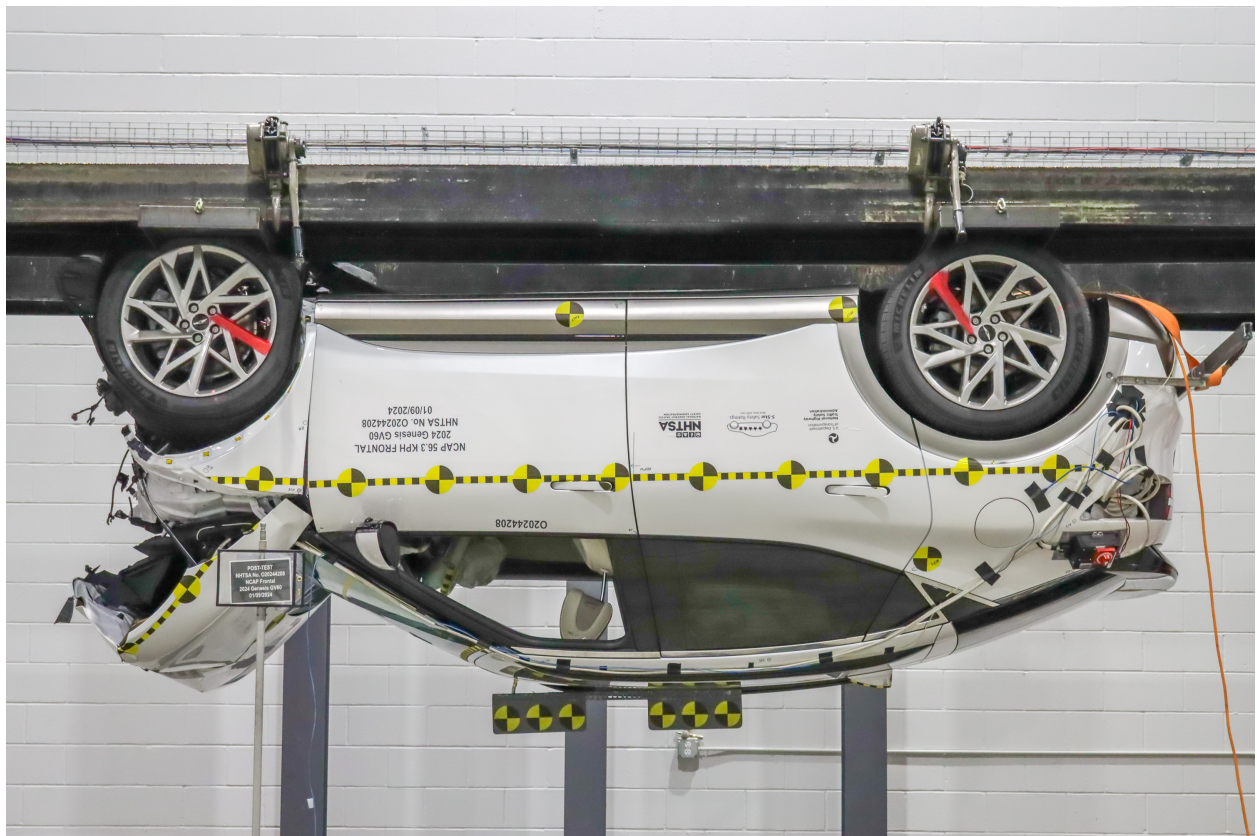


Figure A-79: Vehicle at 180° on Static Rollover Device



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



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



Figure A-82: 2024 Genesis GV60 Frontal Impact Event

2024 GV60 ADVANCED 20"

THE GENESIS EXPERIENCE

- 3 Yr / 36K Complimentary Maintenance
- 3 Yr / 36K Complimentary Service Valet*
- 3 Yr Complimentary Map Care*
- Complimentary Genesis Connected Services*
- * Exclusions may apply, see retailer for details

STANDARD FEATURES:

ADVANCED SAFETY TECHNOLOGY

- Forward Collision Avoidance Assist
- Lane Keeping Assist
- Lane Following Assist
- Driver Attention Warning
- Blind-Spot Collision-Avoidance Assist
- Blind-Spot View Monitor
- Rear Cross-Traffic Collision-Avoidance Assist
- Parking Distance Warning
- Parking Collision-Avoidance Assist
- Safe Exit Assist
- Advanced Rear Occupant Alert

POWERTRAIN TECHNOLOGY

- 74 kW Front / 160kW Rear Electric Motors
- 77.4 kWh Battery

EXTERIOR

- 20-Inch Alloy Wheels
- Vision Roof w/ Power Shade
- Power Hands-Free Smart Liftgate w/ Auto Open
- High Beam Assist

COMFORT & CONVENIENCE

- Leather Seating Surfaces
- Aluminum Trim
- Leatherette Wrapped Instrument Panel
- Power Front Seats with 4-Way Power Lumbar
- Driver's Seat with Power Cushion Extension
- Heated & Ventilated Front Seats
- Heated Steering Wheel
- Manual Rear Door Shades / Cargo Cover
- Smart Cruise Control
- Highway Driving Assist
- Surround View Monitor

COMFORT & CONVENIENCE(cont.)

- Remote Smart Parking Assist
- Head-Up Display
- 12.3" Digital Instrument Cluster
- Vehicle-to-Load Charging

MULTIMEDIA & TECHNOLOGY

- 12.3" Navigation System w/AM/FM/HD Radio*
- SiriusXM® Radio w/ 90-day trial subscription; Not Available in AK & HI
- Bang & Olufsen® Premium Audio
- Active Noise Control
- Apple CarPlay® & Android Auto (TM)
- Genesis Connected Services
- Wireless Device Charger
- Fingerprint Authentication
- Face Connect

Additional Standard Features

- Carpeted Floor Mats

Full Battery Charge

GENESIS WARRANTY

- 5-year/60,000-mile New Vehicle Warranty*
- 10-year/100,000-mile Powertrain Warranty*
- 10-year/100,000-mile Electric Vehicle System Warranty*
- 7-year/Unlimited-mile Anti-perforation Warranty*
- * Limited warranties, see dealer for details

Manufacturer's Suggested Retail Price: \$60,550.00

ADDED FEATURES:

- *UVUNI WHITE(UVH) Paint \$575.00

Accessories

- *Cargo Net \$50.00
- *First Aid Kit \$45.00
- *Roof Rack Cross Bars \$450.00
- *Wheel Locks \$85.00

SOLD TO: W1704
GENESIS OF WAUKESHA
1583 EAST MORELAND BOULEVARD
WAUKESHA WI 53186

SHIPPED TO: W1704

VIN:	ENGINE:	EXTERIOR COLOR:	INTERIOR/SEAT COLOR:
KMKUCDCS9RU022340	EM18P8P1381D	UVUNI WHITE	ASH GRAY/GLACIER

MODEL:	PORT OF ENTRY:	TRANSPORT:	ACCESSORY WEIGHT:
W0422AEZ	TC	TRUCK	19 lbs. / 8 kgs.

EMISSIONS:
This vehicle meets emissions requirements in all 50 states and is a CARB certified Zero Emission

Fuel Economy and Environment

Electric Vehicle

Fuel Economy

95 **MPGe** Large Cars range from 14 to 140 MPGe. The best vehicle rates 140 MPGe.

combined city/hwy 103 86 35
city highway kW-hrs per 100 miles

Driving Range
Kilometers (estimated vehicle can travel about) **248** miles

Charge Time: 7.2 hours (240V)

You Save

\$5,750
in fuel costs
over 5 years
compared to the
average new vehicle.

Annual fuel cost

\$800

Fuel Economy & Greenhouse Gas Rating (tailpipe only)

Best 10 Worst 10

This vehicle emits 0 grams CO₂ per mile. The best emits 0 grams per mile (tailpipe only). Does not include emission from generating electricity. Learn more at fuelconomy.gov

Smog Rating (tailpipe only)

Best 10 Worst 10

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 28 MPGe and costs \$5,750 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$0.15 per kWh. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fuelconomy.gov
Calculate personalized estimates and compare vehicles

GOVERNMENT 5-STAR SAFETY RATINGS

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).
www.safercar.gov or 1-888-327-4235

Manufacturer's suggested retail price includes manufacturer's recommended pre-delivery service. Gasoline license and title fees state and local taxes and dealer installed options and accessories are not included in the manufacturer's suggested retail price. This label has been affixed to this vehicle by Genesis Motor America, pursuant to the requirements of 15 U.S.C. 1221 et seq which prohibits its removal or alteration prior to delivery to the ultimate purchaser.

Scan this QR code for general model information and options

PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS CARLINE: U.S./CANADIAN PARTS CONTENT: 1 %
MAJOR SOURCES OF FOREIGN PARTS CONTENT: KOREA: 90 %
FOR THIS VEHICLE: FINAL ASSEMBLY POINT: ULSAN, KOREA
COUNTRY OF ORIGIN:
ENGINE: KOREA TRANSMISSION: KOREA
Note: Parts content does not include final assembly, distribution, or other non-parts costs.

Figure A-83: Monroney Label Photograph



Figure 305-1: Auxiliary Power Module Warning Label



Figure 305-2: Power Inverter Warning Label



Figure 305-3 First Responder Warning Label

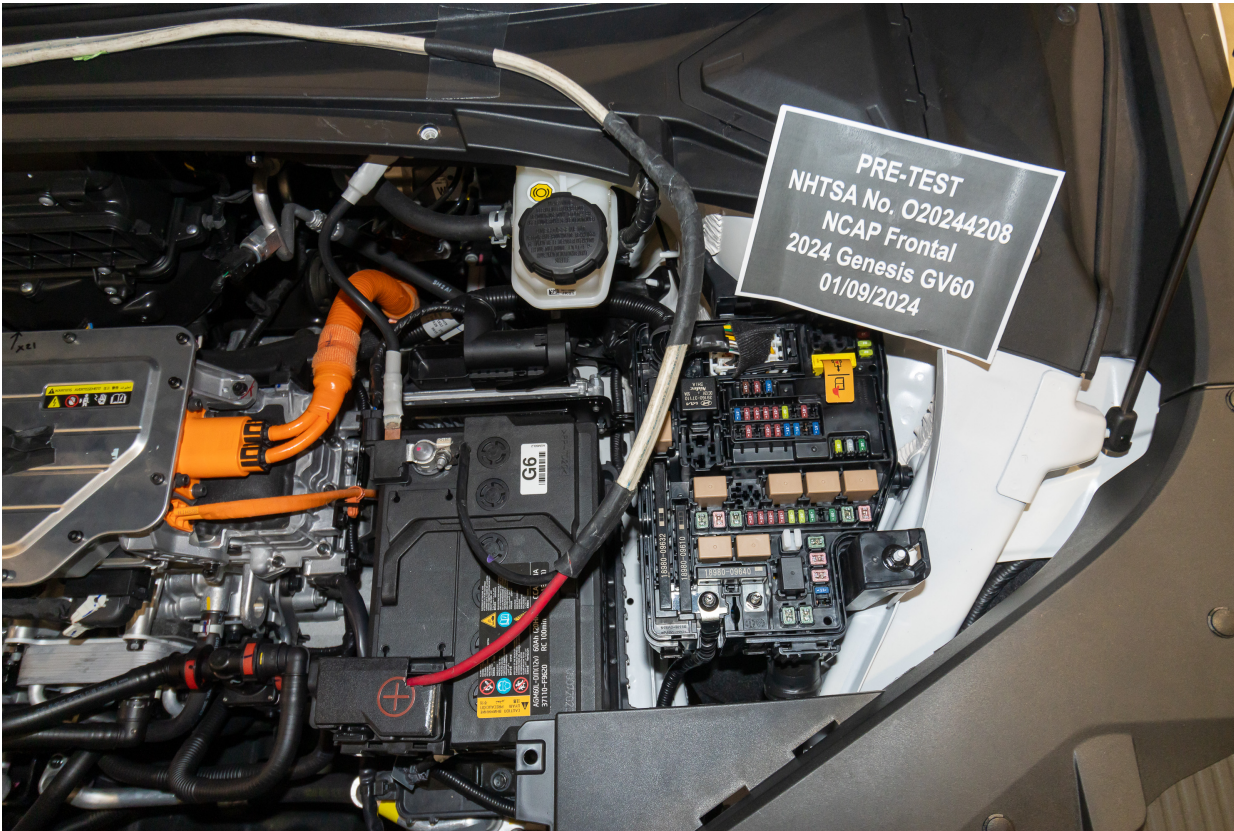


Figure 305-4: First Responder Warning Label Location

Photo Not Applicable

Figure 305-5: Other Vehicle Label Related to Electric Propulsion System



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



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

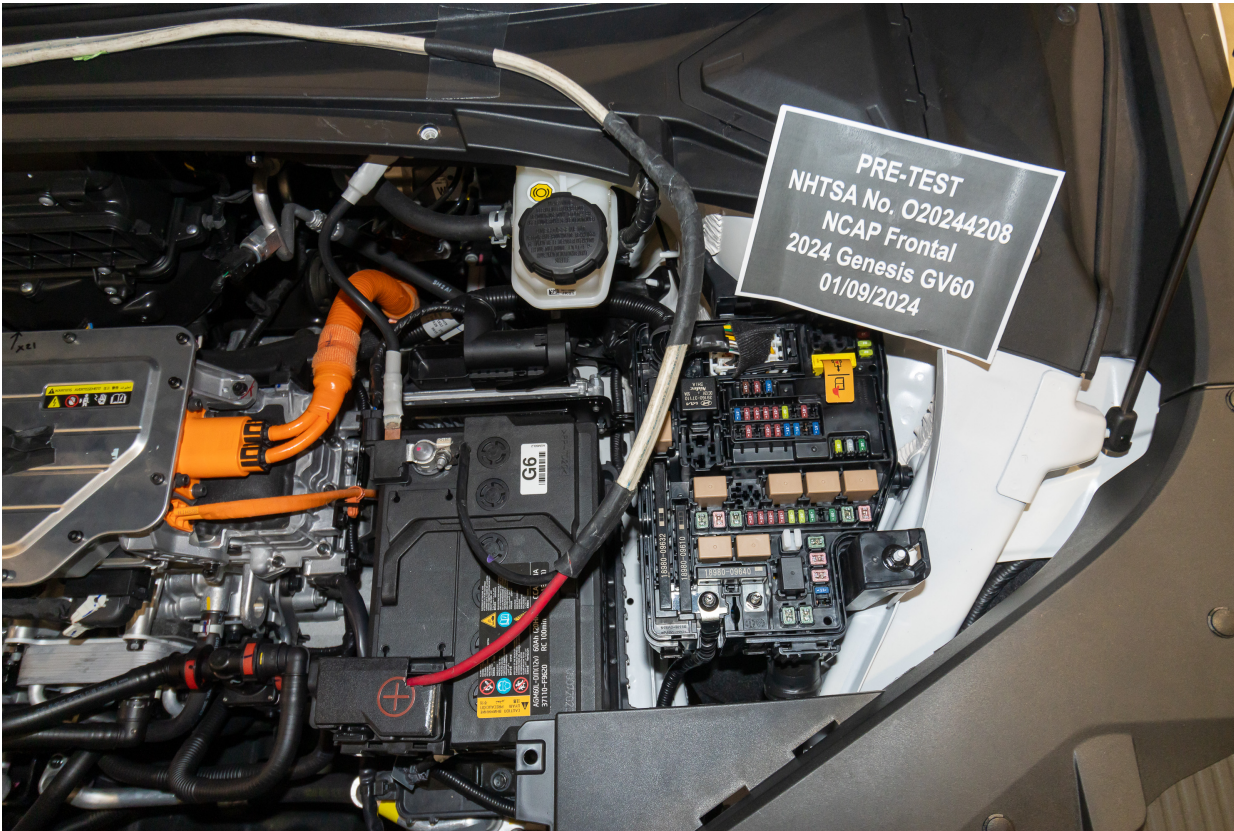


Figure 305-8: Manual High Voltage Service Disconnect Removed Location

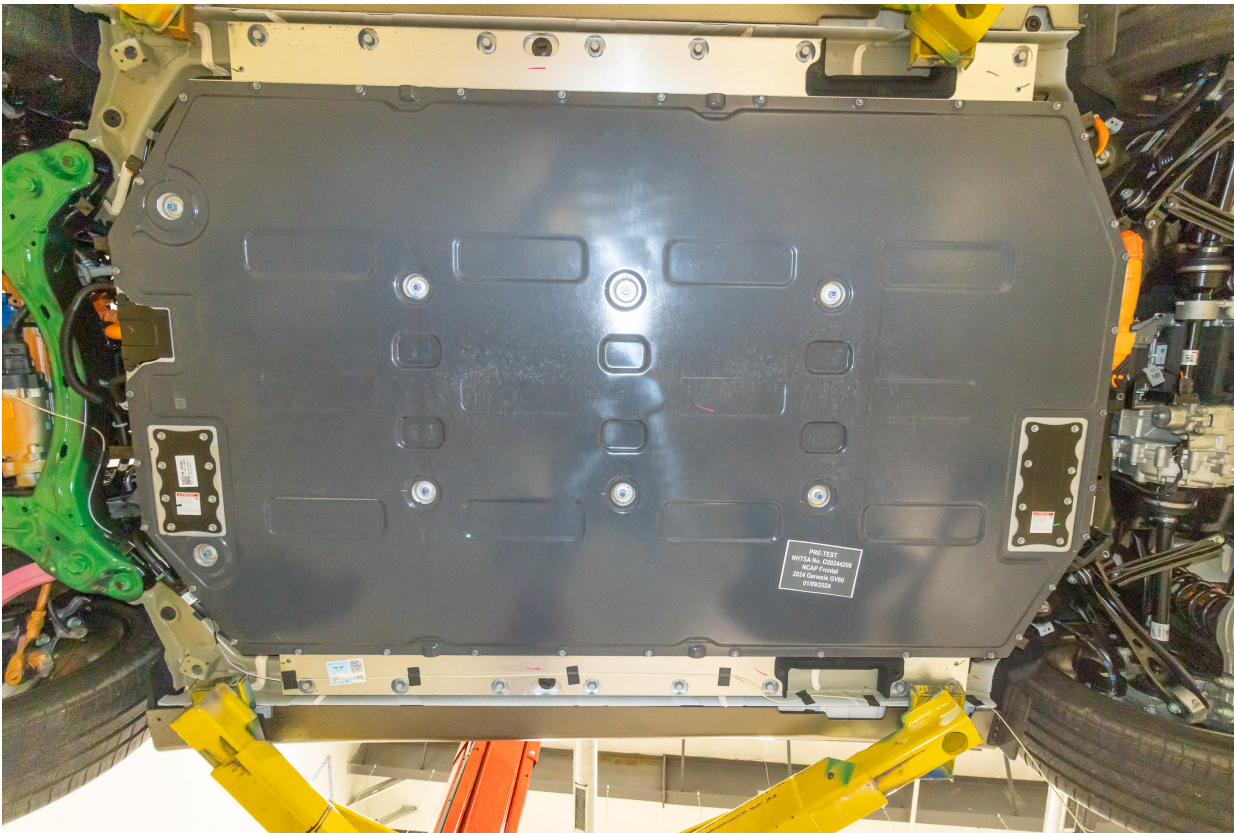


Figure 305-9: Pre-Impact View of Propulsion Battery



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



Figure 305-11: Post-Impact Rear View of Propulsion Battery (if any part of it is visible)

Photo Not Applicable

Figure 305-12: Pre-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules

Photo Not Applicable

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

Photo Not Applicable

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

Photo Not Applicable

Figure 305-15: Post-Impact View of Propulsion Battery Module(s)

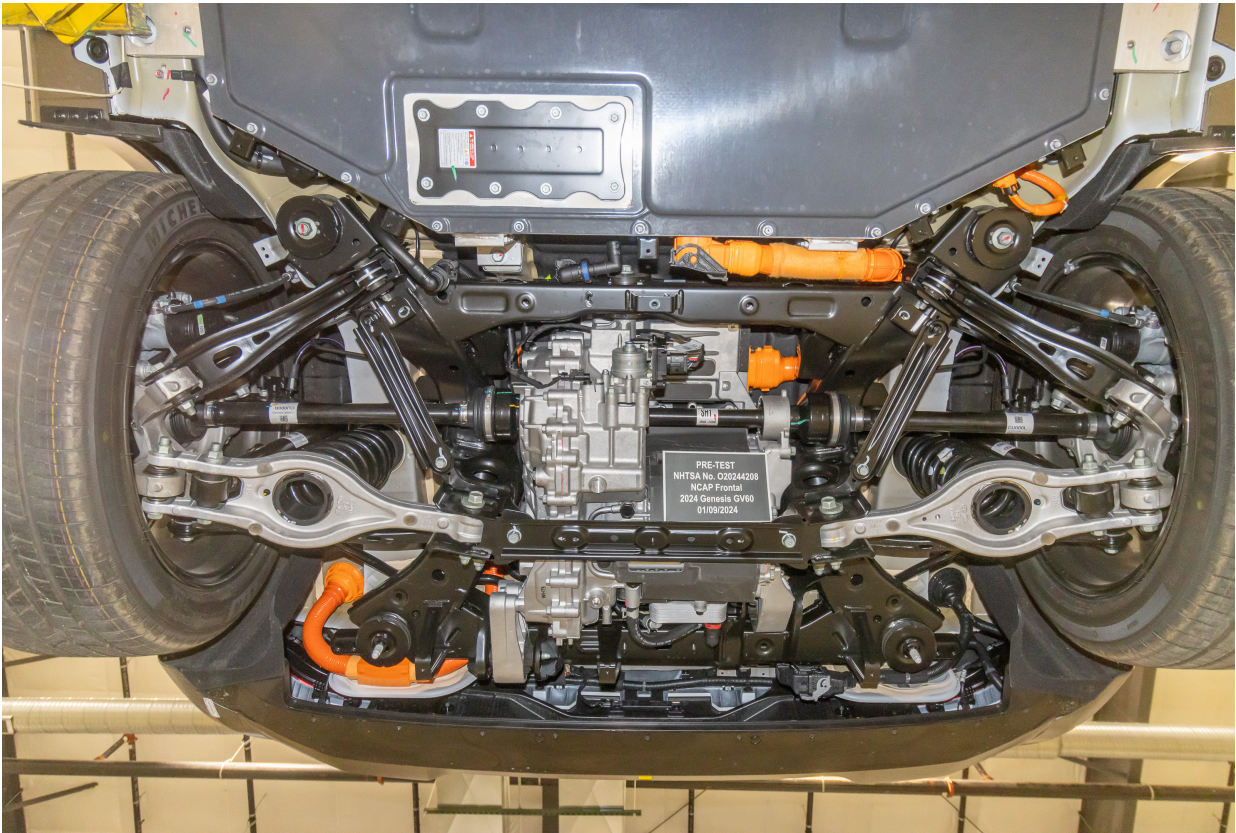


Figure 305-16: Pre-Impact View of Electric Propulsion Drive

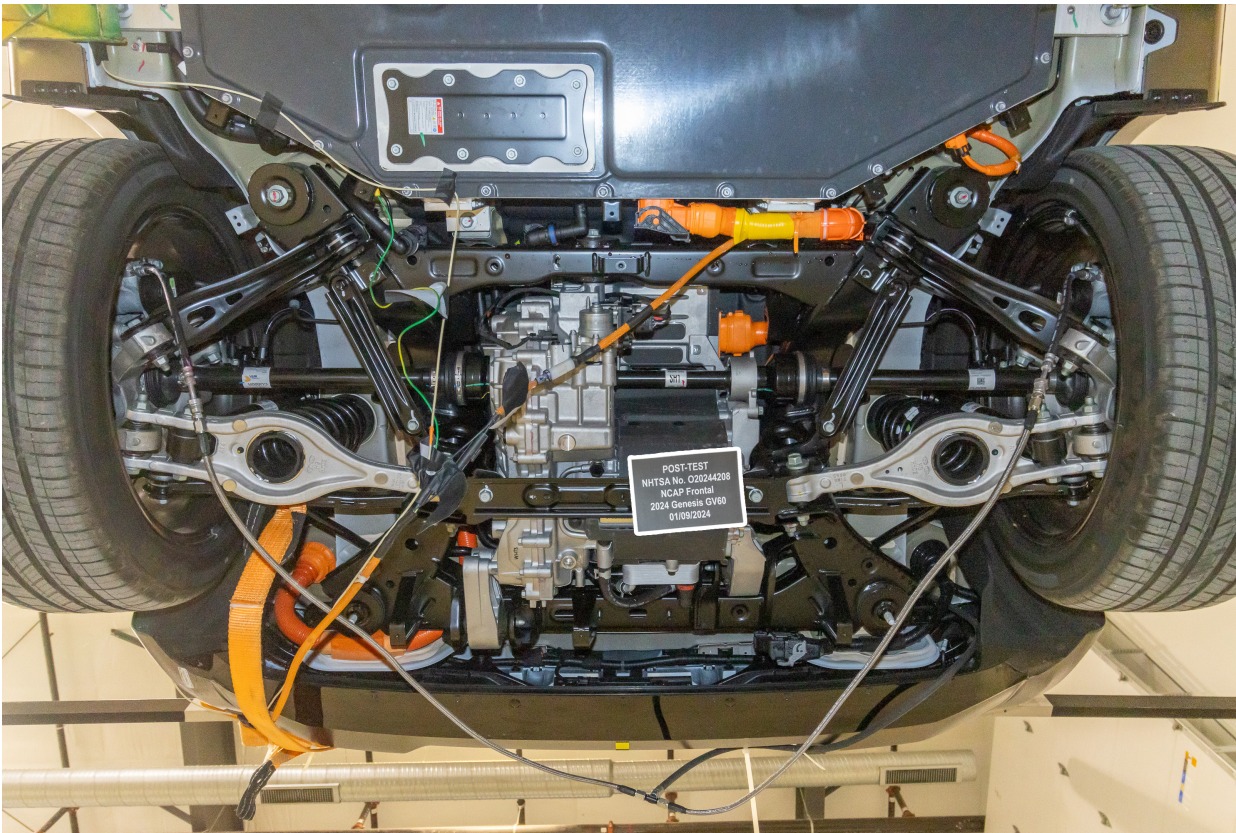


Figure 305-17: Post-Impact View of Electric Propulsion Drive



Figure 305-18: Pre-Impact View of High Voltage Interconnects

Photo Not Applicable

Figure 305-19: Pre-Impact View of Propulsion Battery Venting System

Photo Not Applicable

Figure 305-20: Pre-Impact View of Other Visible Electric Propulsion Components



Figure 305-21: Pre-Impact View of Ground Lead Attached

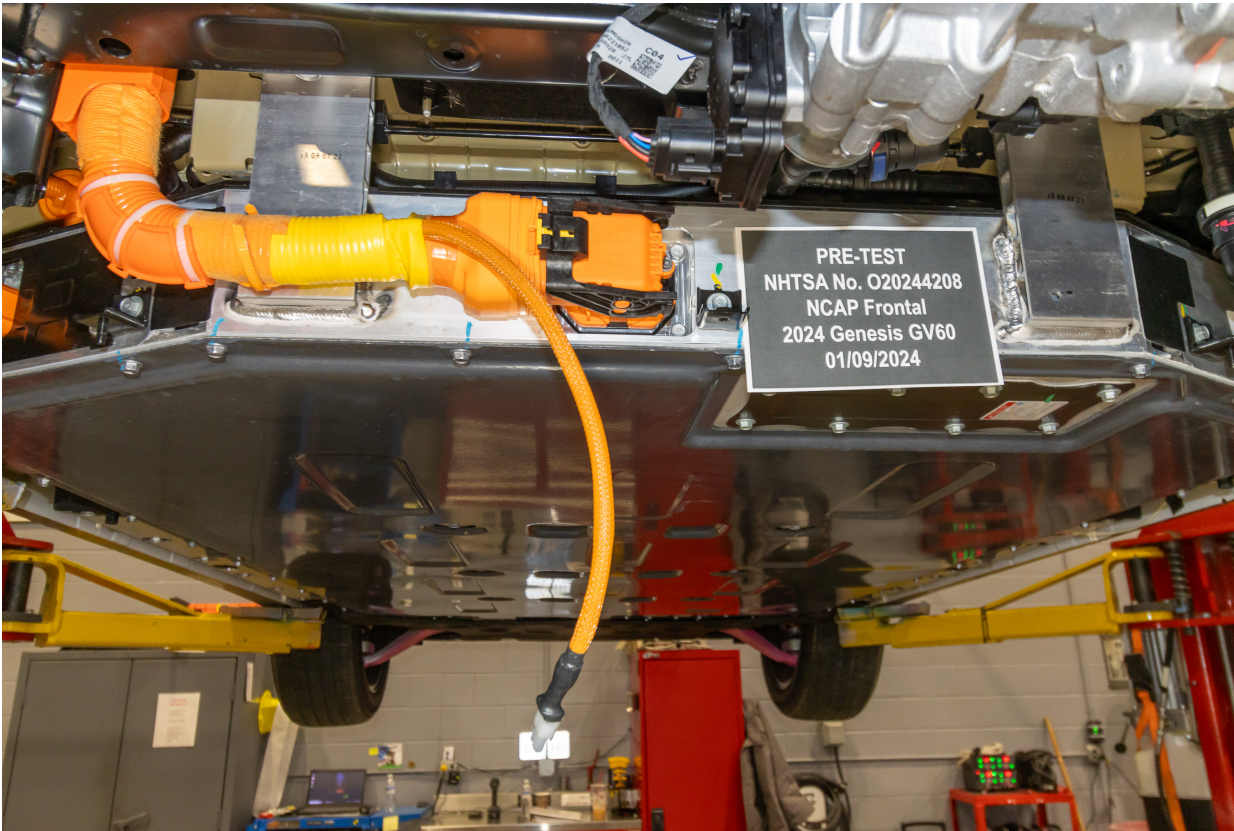


Figure 305-22: Pre-Impact View of High Voltage Leads Attached



Figure 305-23: Pre-Impact Close Up View of High Voltage Leads Attached



Figure 305-24: Pre-Impact View of Installed Test Interface Port

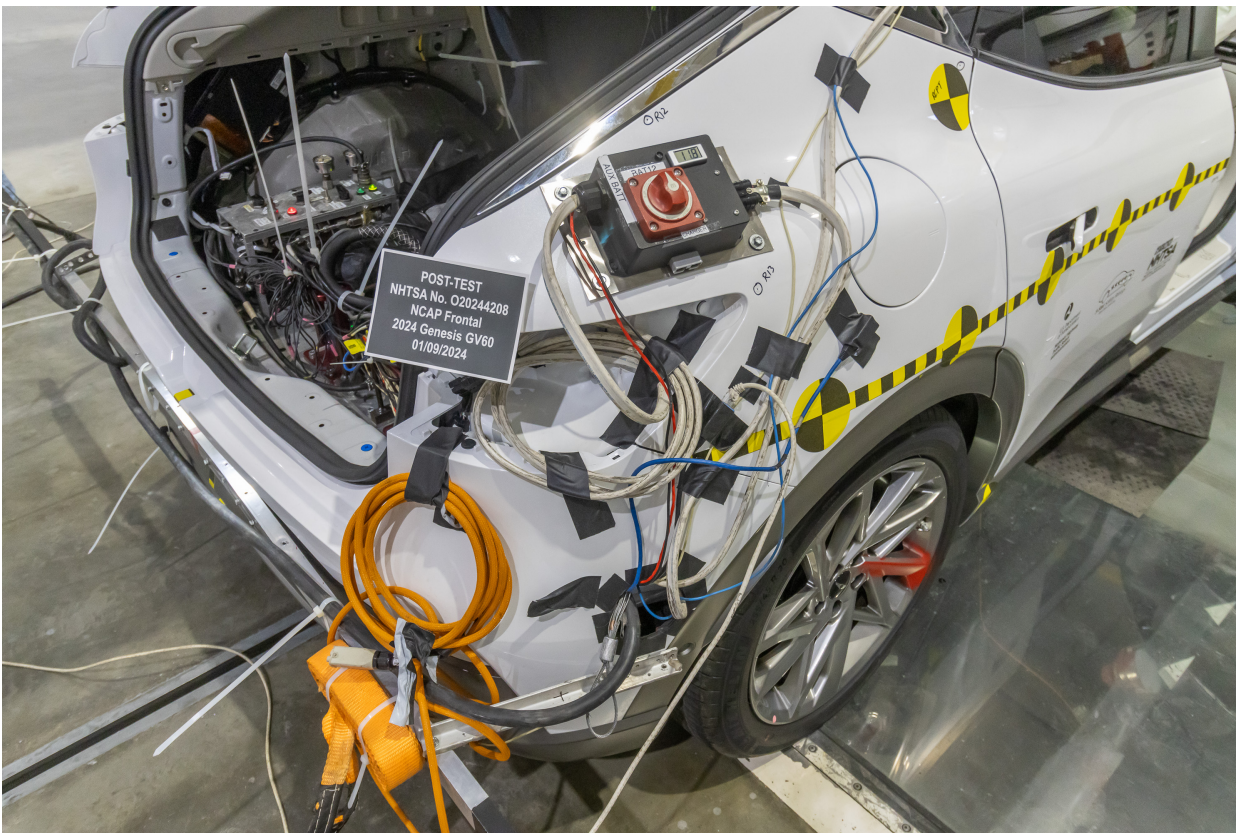


Figure 305-25: Post-Impact View of Installed Test Interface Port

Photo Not Applicable

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

Photo Not Applicable

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

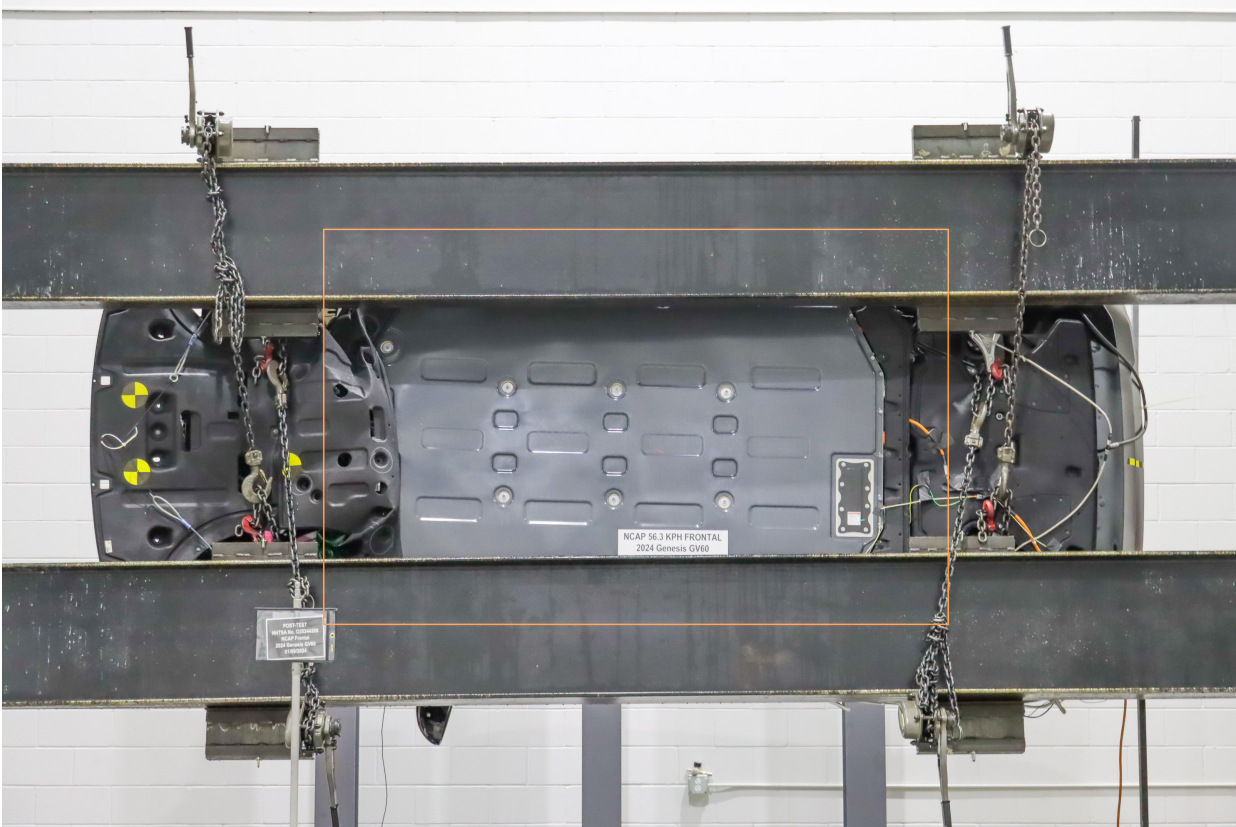


Figure 305-28: FMVSS No. 305 Static Rollover 90 Degrees

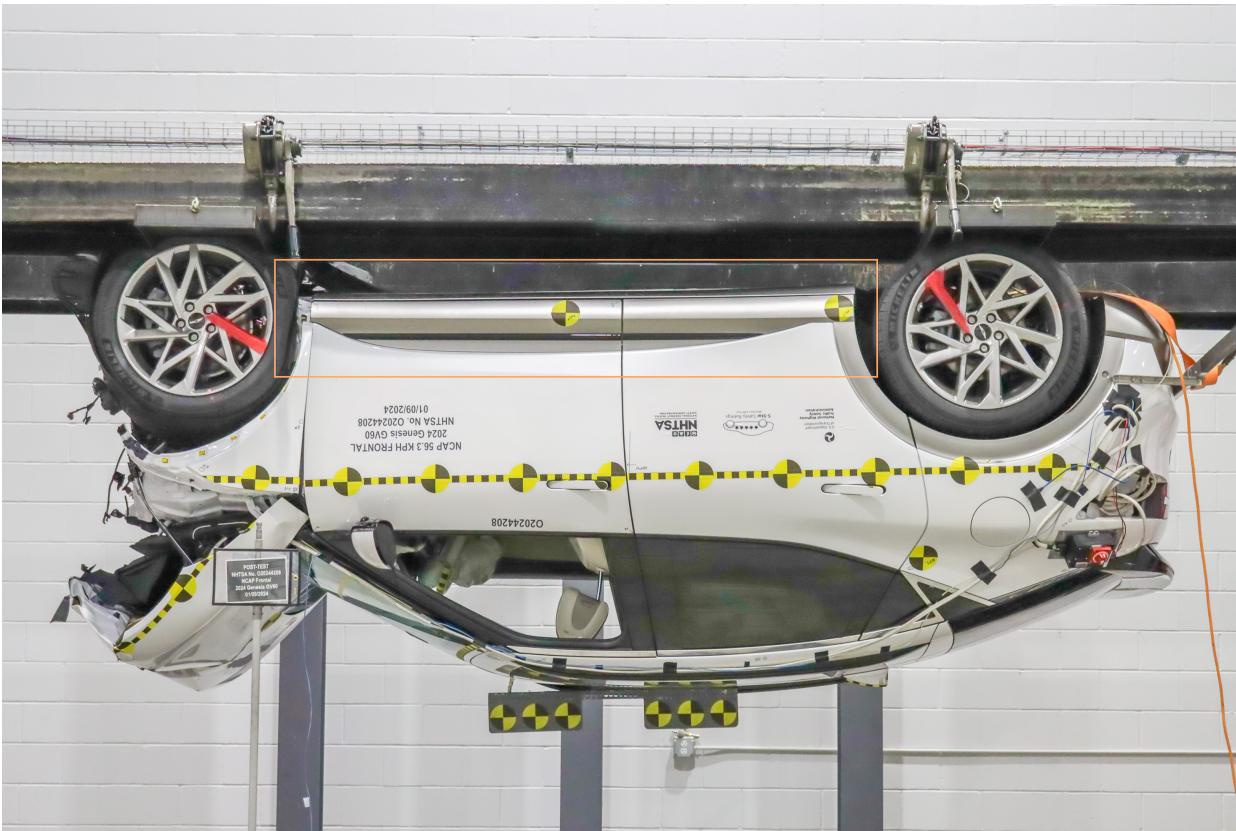


Figure 305-29: FMVSS No. 305 Static Rollover 180 Degrees



Figure 305-30: FMVSS No. 305 Static Rollover 270 Degrees



Figure 305-31: FMVSS No. 305 Static Rollover 360 Degrees



Figure 305-32: Pre-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery



Figure 305-33: Post-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery

Photo Not Applicable

Figure 305-34: Post-Impact Propulsion Battery System Mounting and-or Intrusion Failure(s)

Photo Not Applicable

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

Photo Not Applicable

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

Photo Not Applicable

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

Photo Not Applicable

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

Photo Not Applicable

Figure 305-39: Pre-Test Charging Port View

Photo Not Applicable

Figure 305-40: Post-Test Charging Port View

APPENDIX B

VEHICLE AND DUMMY RESPONSE DATA TRACES

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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
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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

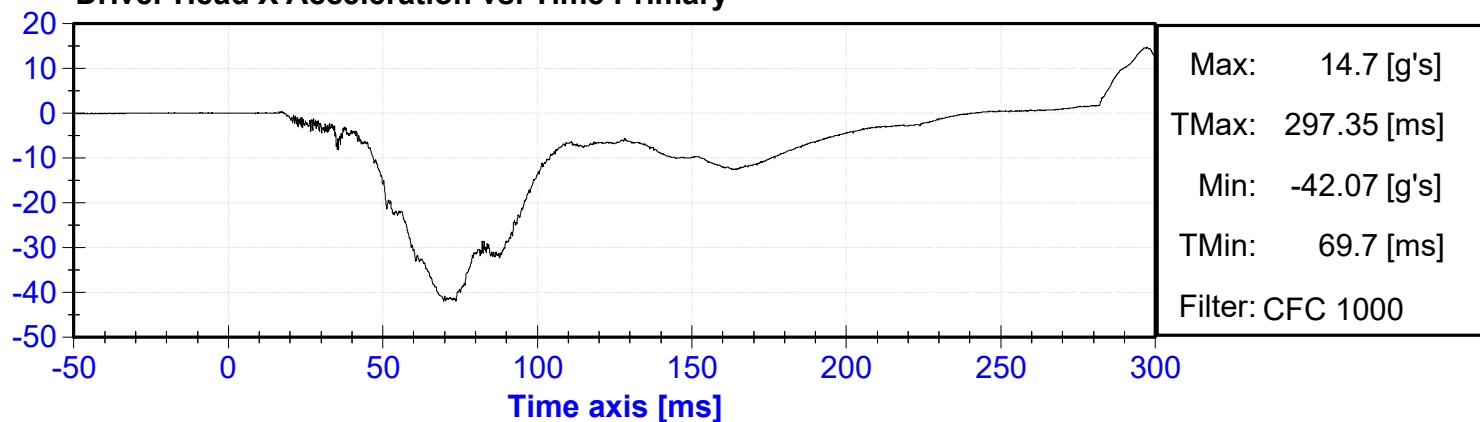
The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at www.NHTSA.gov

Driver Head X Acceleration Redundant
 Driver Head Y Acceleration Redundant
 Driver Head Z Acceleration Redundant
 Driver Upper Neck Force Y
 Driver Upper Neck Moment X
 Driver Upper Neck Moment Z
 Driver Chest X Acceleration Redundant
 Driver Chest Y Acceleration Redundant
 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

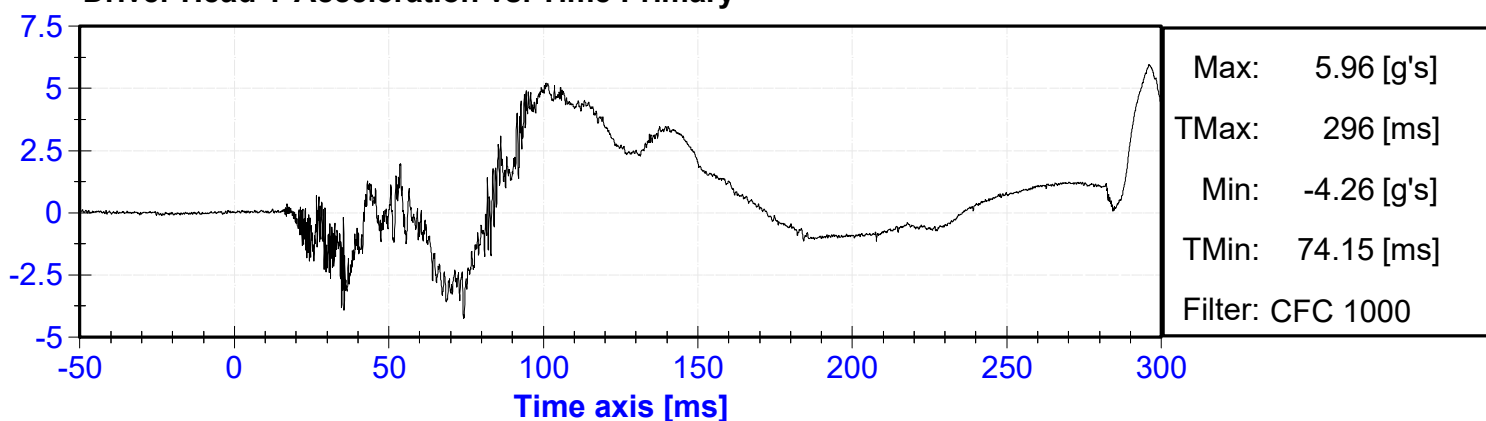
Driver Left Upper Tibia Force Z
Driver Left Lower Tibia Moment X
Driver Left Lower Tibia Moment Y
Driver Left Lower Tibia Force Z
Driver Right Upper Tibia Moment X
Driver Right Upper Tibia Moment Y
Driver Right Upper Tibia Force Z
Driver Right Lower Tibia Moment X
Driver Right Lower Tibia Moment Y
Driver 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
Driver Shoulder Belt Force
Driver Lap Belt Force
Driver Head Angular Velocity X
Driver Head Angular Velocity Y
Driver Head Angular Velocity Z
Passenger Head X Acceleration Redundant
Passenger Head Y Acceleration Redundant
Passenger Head Z Acceleration Redundant
Passenger Upper Neck Force X
Passenger Upper Neck Force Z
Passenger Upper Neck Moment Y
Passenger Chest X Acceleration Redundant
Passenger Chest Y Acceleration Redundant
Passenger Chest Z Acceleration Redundant
Passenger Pelvis X
Passenger Pelvis Y
Passenger Pelvis Z
Passenger Left Femur Redundant
Passenger Right Femur Redundant
Passenger Left Upper Tibia Moment X
Passenger Left Upper Tibia Moment Y
Passenger Left Upper Tibia Force Z
Passenger Left Lower Tibia Moment X
Passenger Left Lower Tibia Moment Y
Passenger Left Lower Tibia Force Z
Passenger Right Upper Tibia Moment X
Passenger Right Upper Tibia Moment Y
Passenger Right Upper Tibia Force Z
Passenger Right Lower Tibia Moment X
Passenger Right Lower Tibia Moment Y
Passenger Right Lower Tibia Force Z
Passenger Left Foot Fore Z
Passenger Left Foot Aft X
Passenger Left Foot Aft Z

Passenger Right Food 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
Left Rear Seat Crossmember X Redundant
Right Rear Seat Crossmember X Redundant
Vehicle Engine Top X
Vehicle Engine Bottom X
Load Cell Barrier Forces and Moments

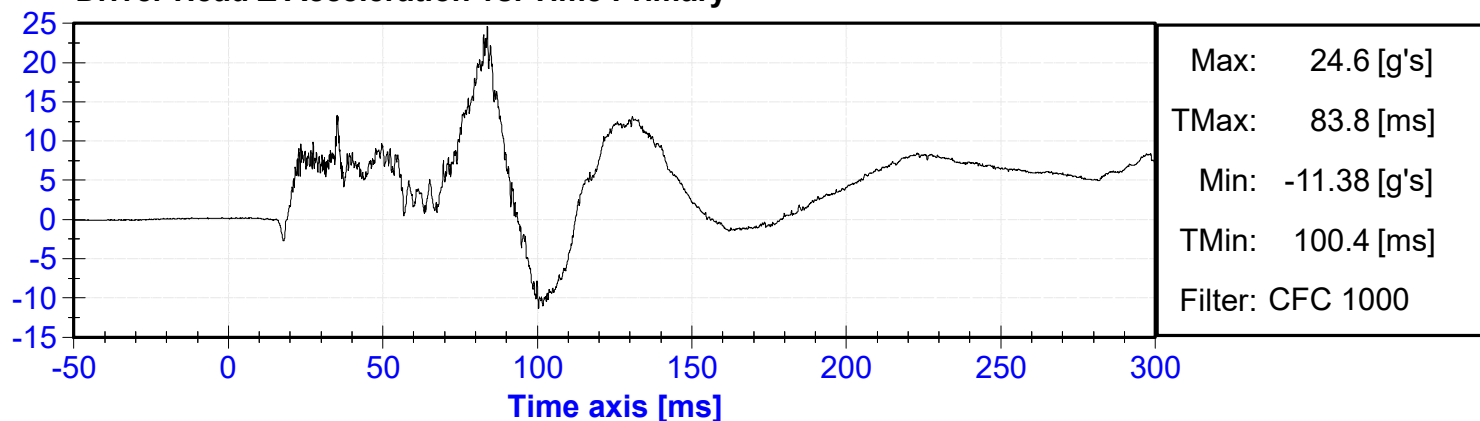
Driver Head X Acceleration vs. Time Primary



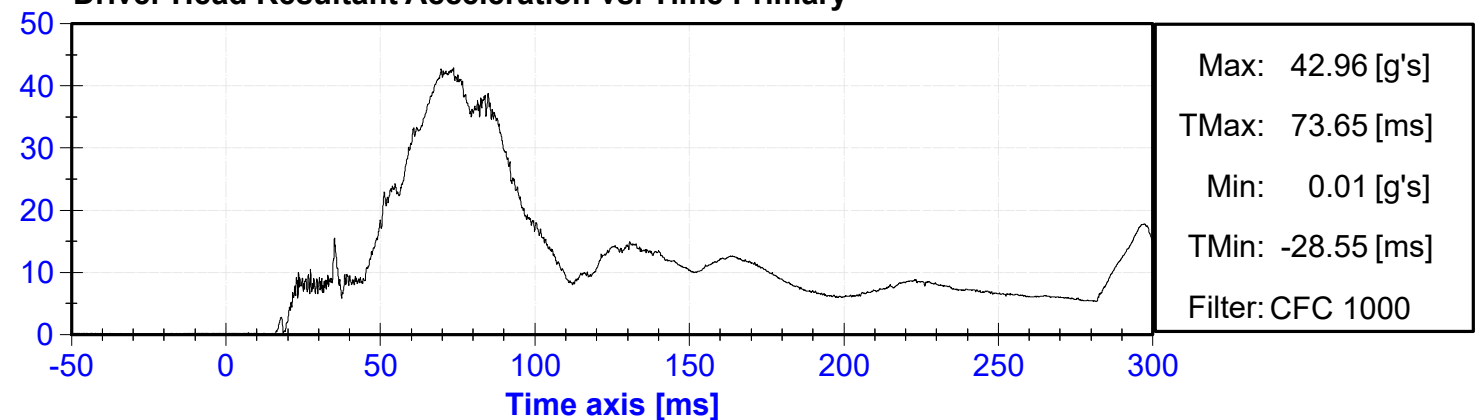
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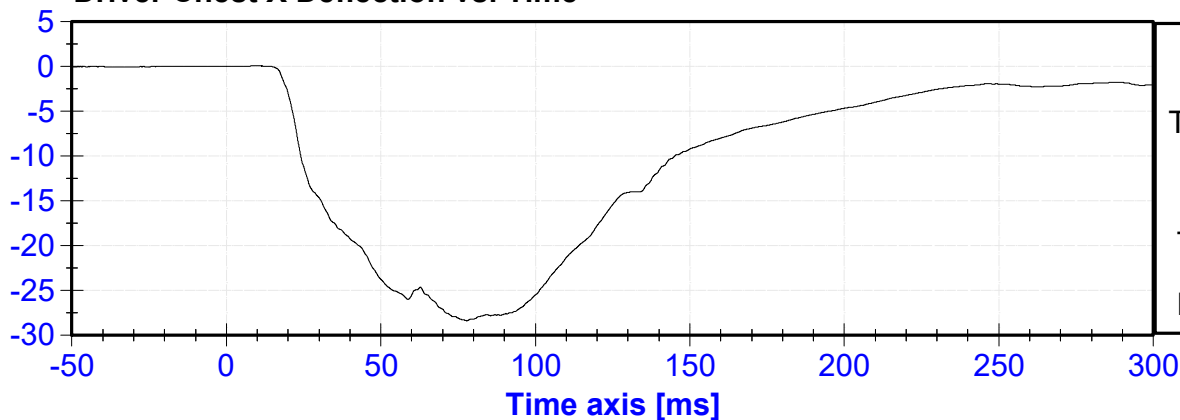
Driver Head Z Acceleration vs. Time Primary



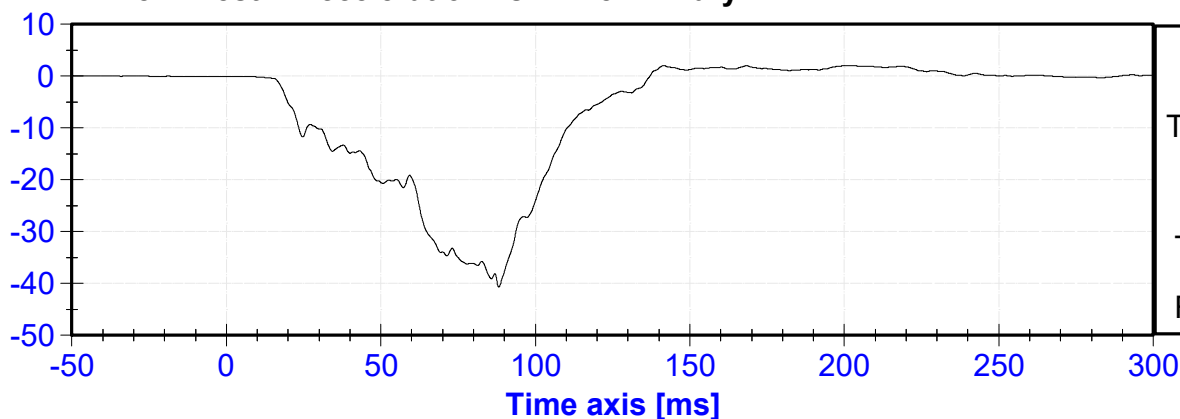
Driver Head Resultant Acceleration vs. Time Primary



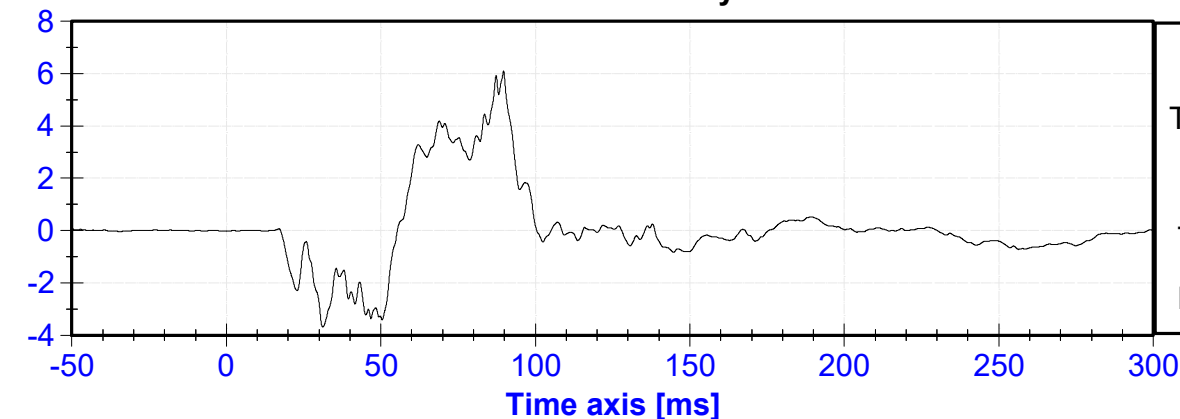
Driver Chest X Deflection vs. Time



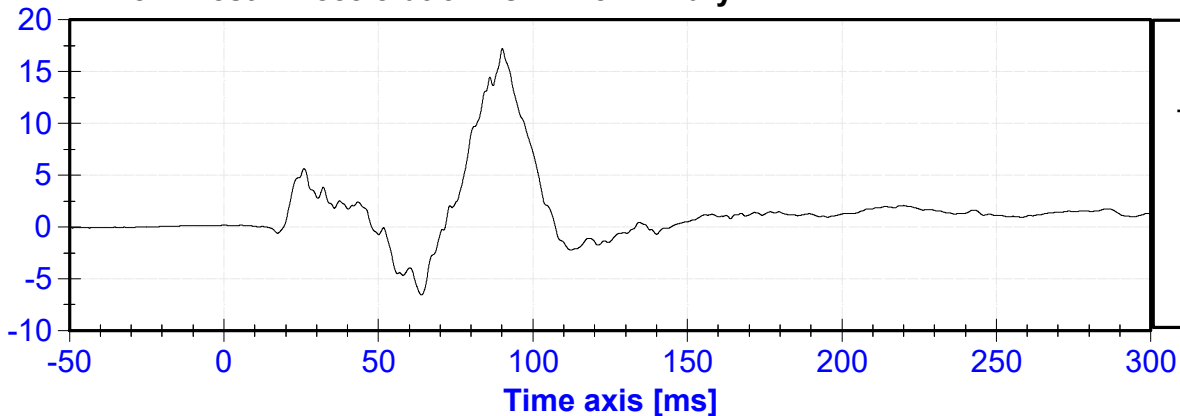
Driver Chest X Acceleration vs. Time Primary



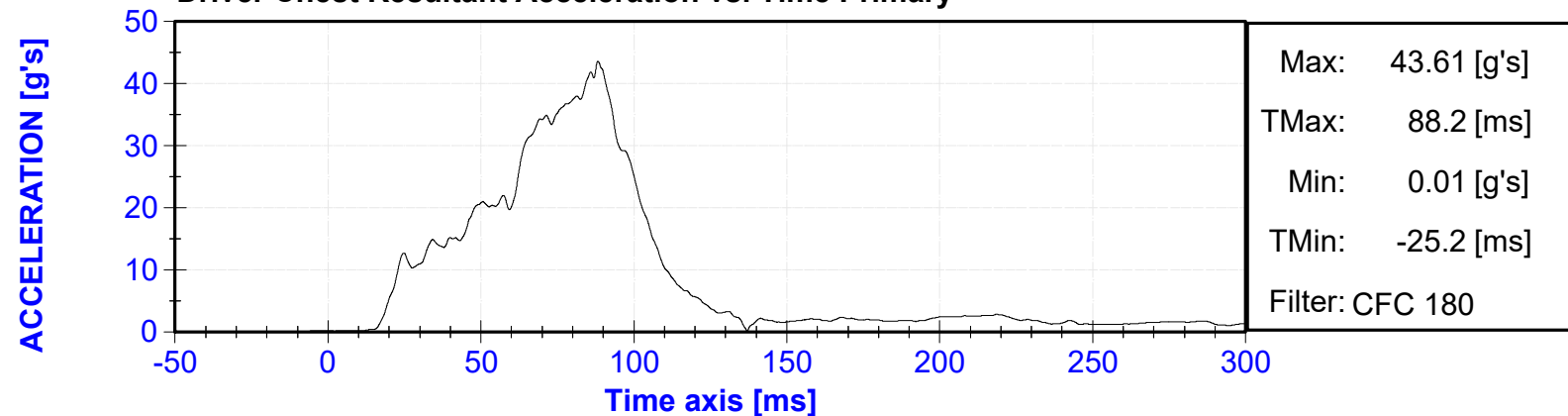
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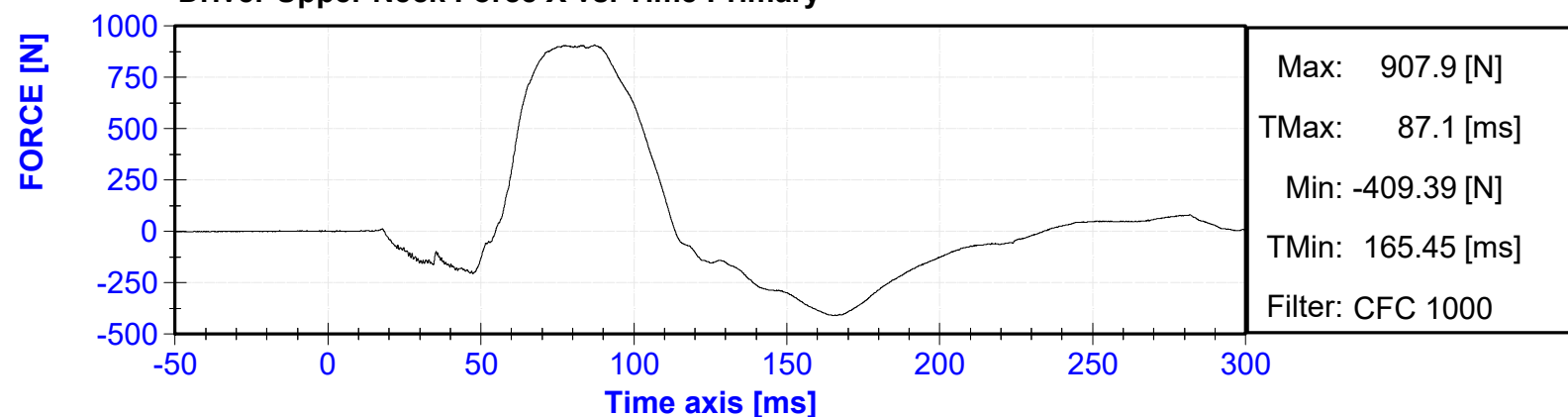
Driver Chest Z Acceleration vs. Time Primary



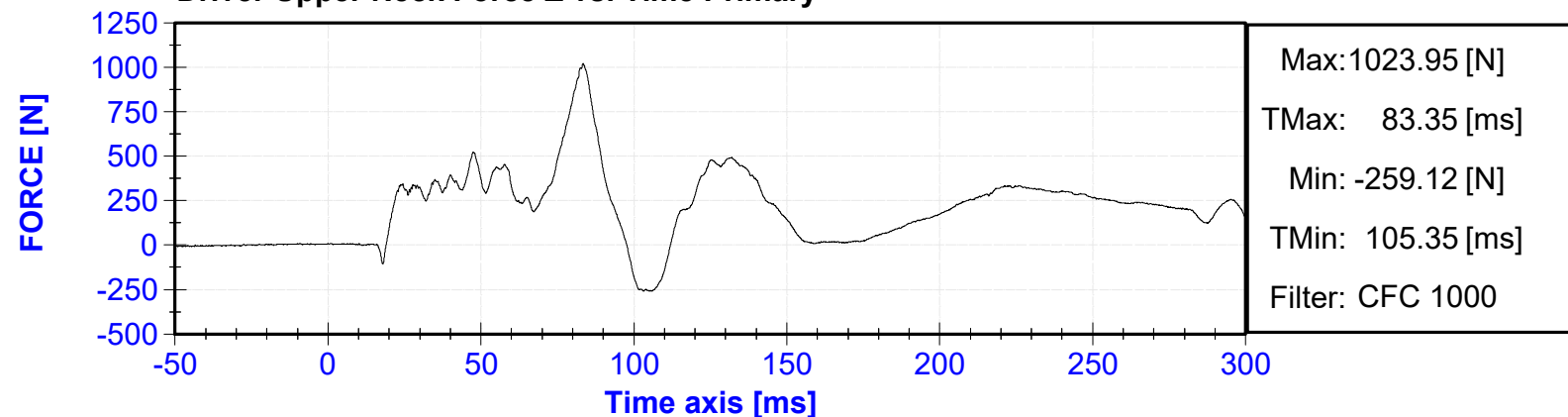
Driver Chest Resultant Acceleration vs. Time Primary



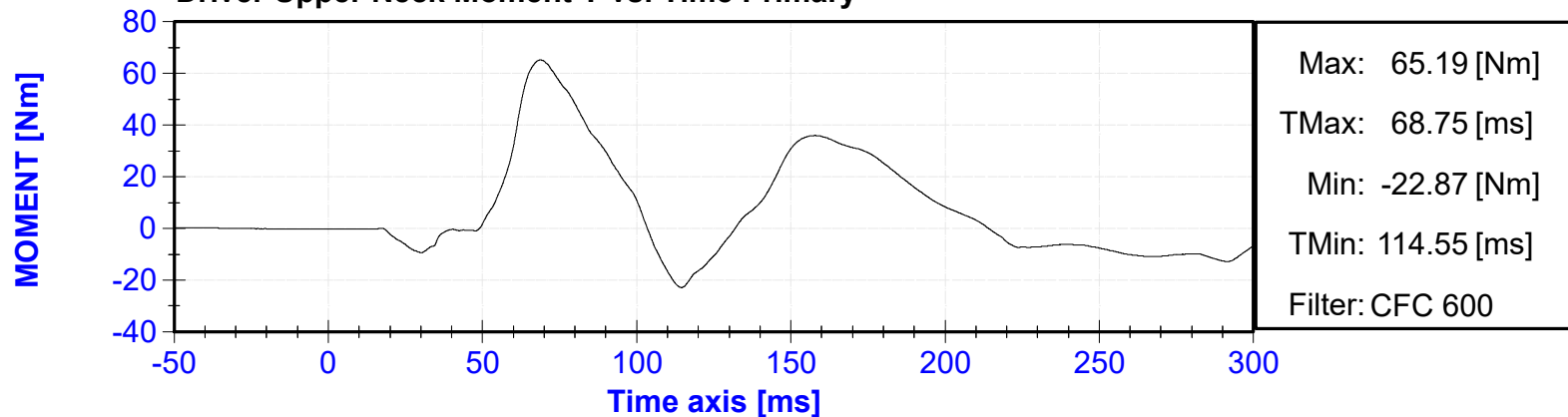
Driver Upper Neck Force X vs. Time Primary



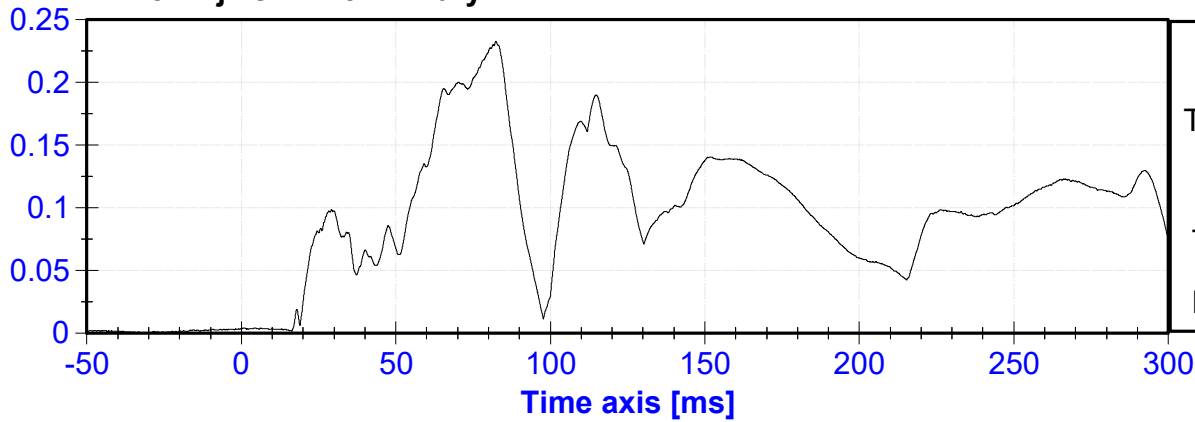
Driver Upper Neck Force Z vs. Time Primary



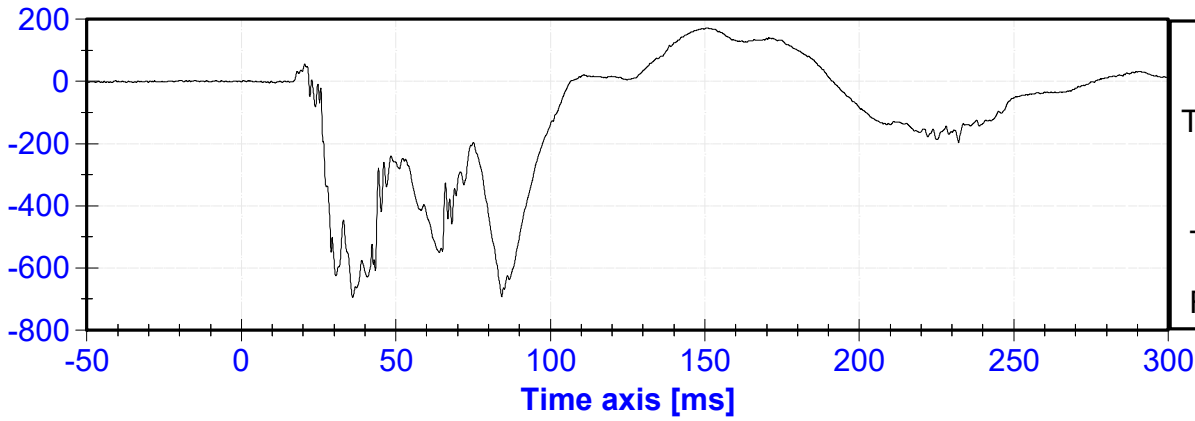
Driver Upper Neck Moment Y vs. Time Primary



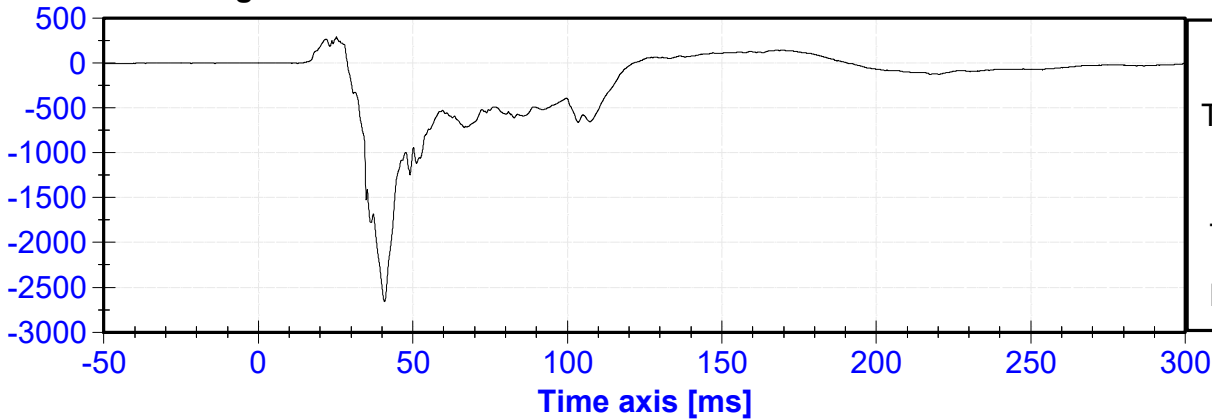
Driver Nij vs. Time Primary



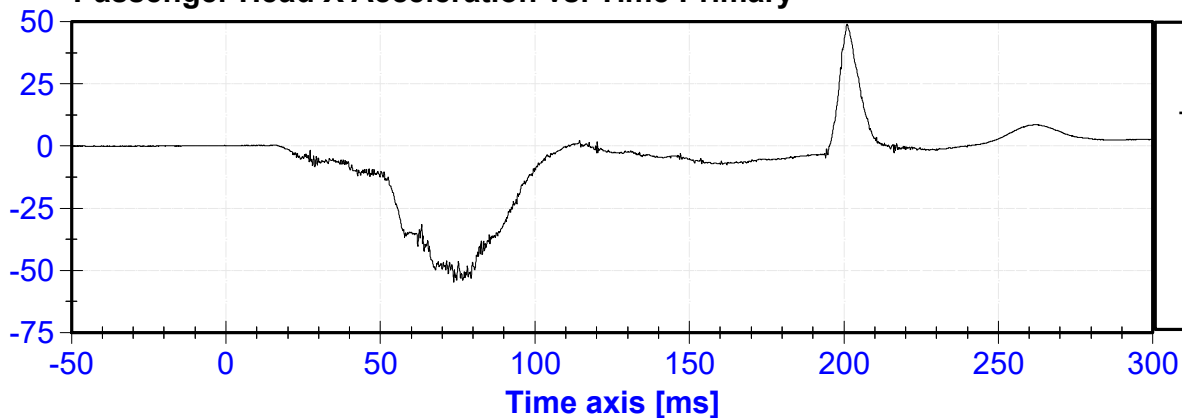
Driver Left Femur Force vs. Time



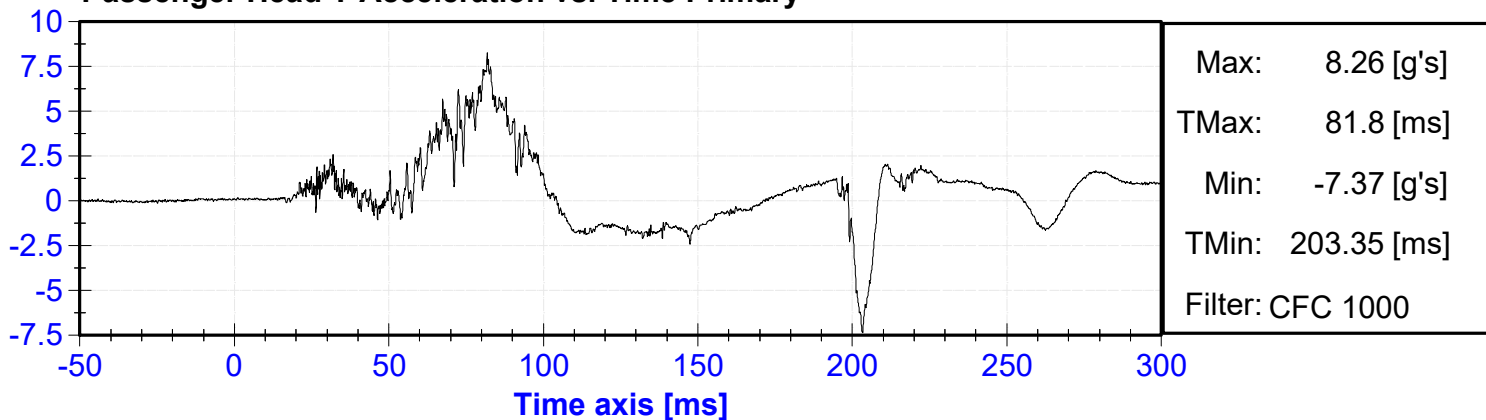
Driver Right Femur Force vs. Time



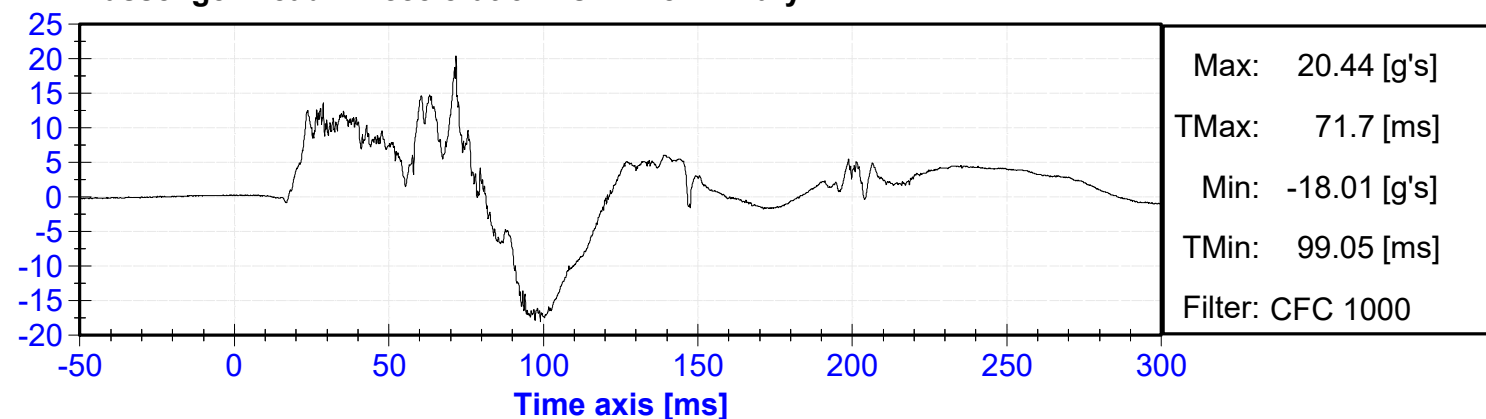
Passenger Head X Acceleration vs. Time Primary



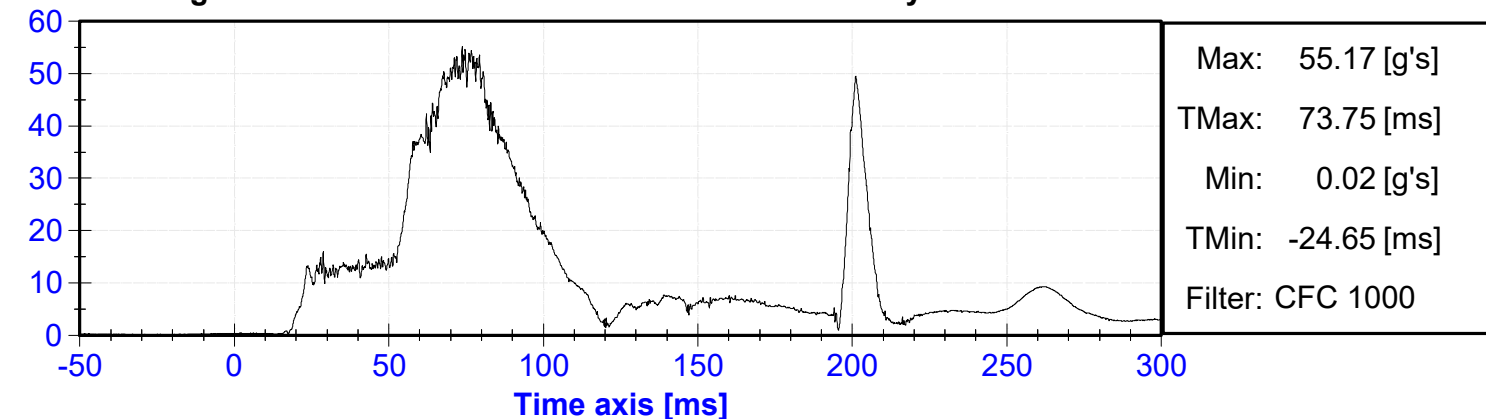
Passenger Head Y Acceleration vs. Time Primary



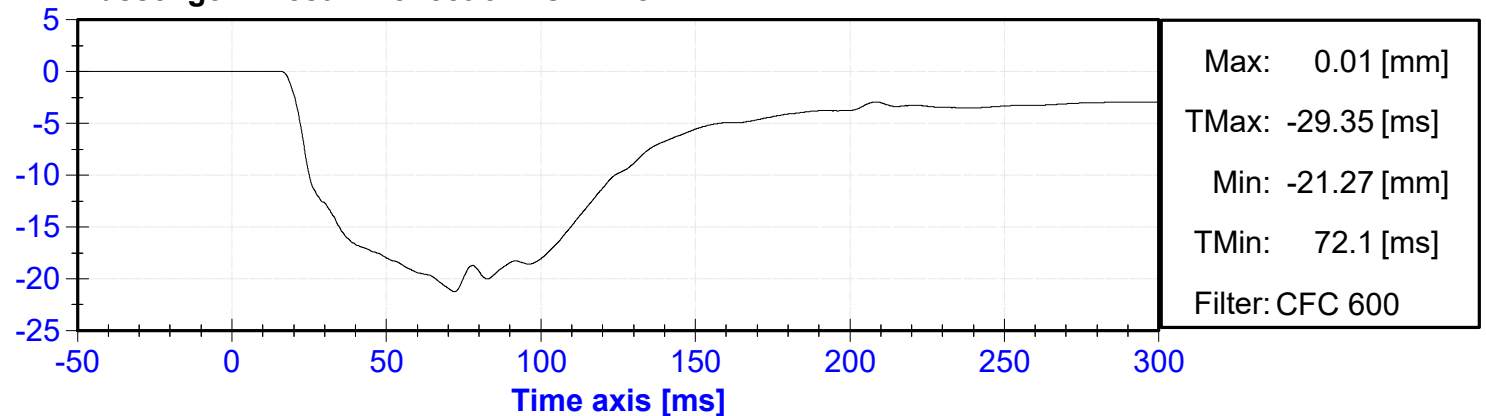
Passenger Head Z Acceleration vs. Time Primary



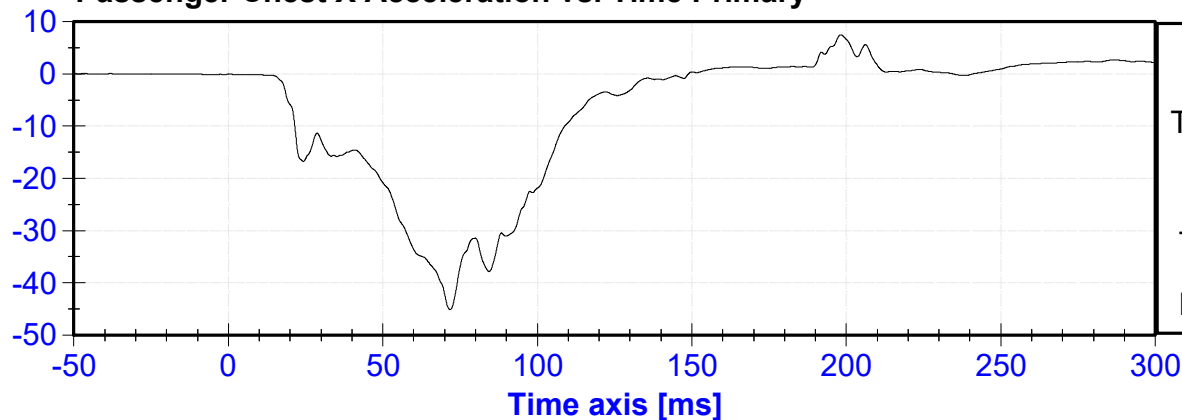
Passenger Head Resultant Acceleration vs. Time Primary



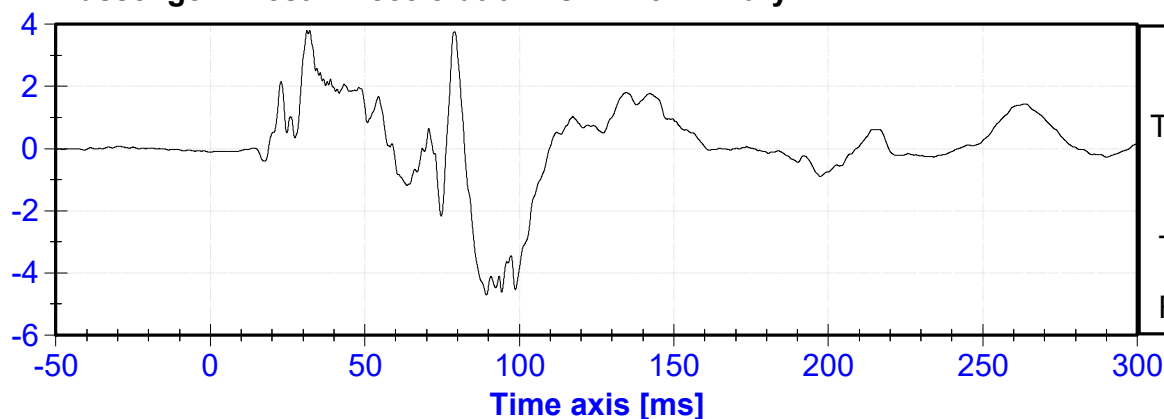
Passenger Chest X Deflection vs. Time



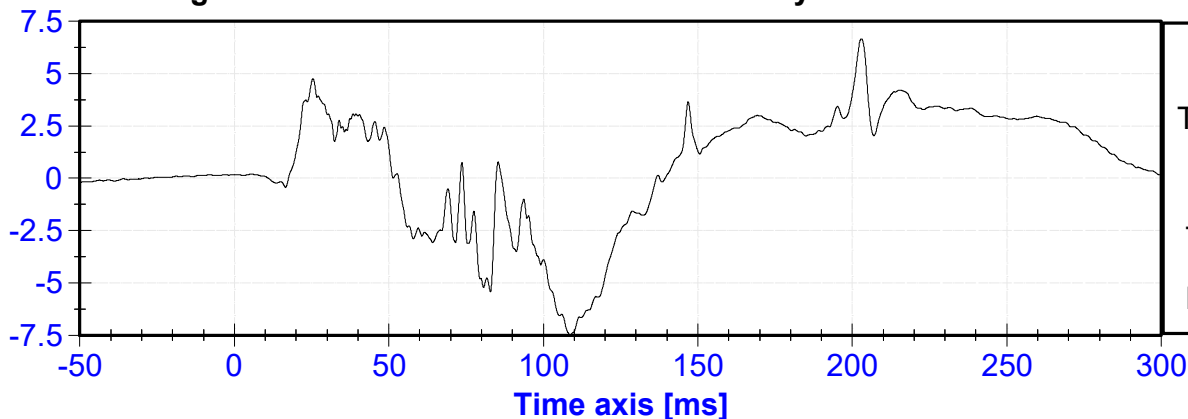
Passenger Chest X Acceleration vs. Time Primary



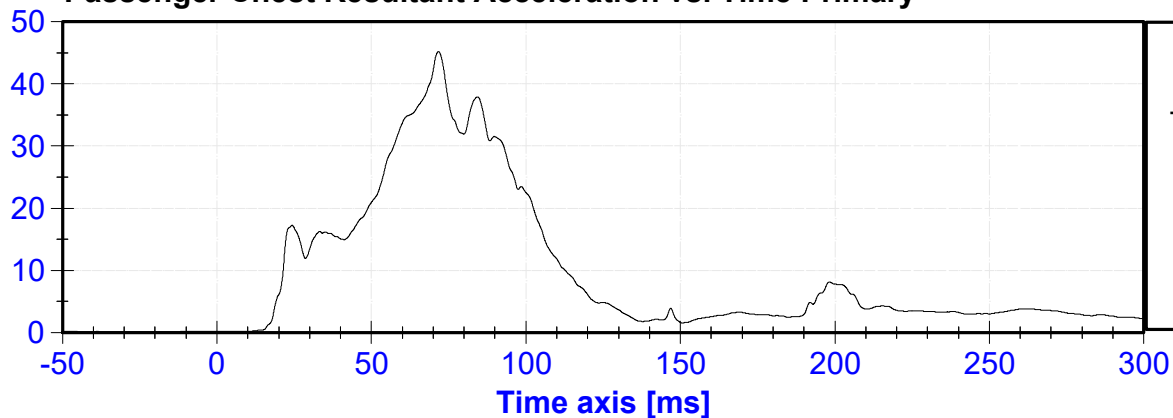
Passenger Chest Y Acceleration vs. Time Primary



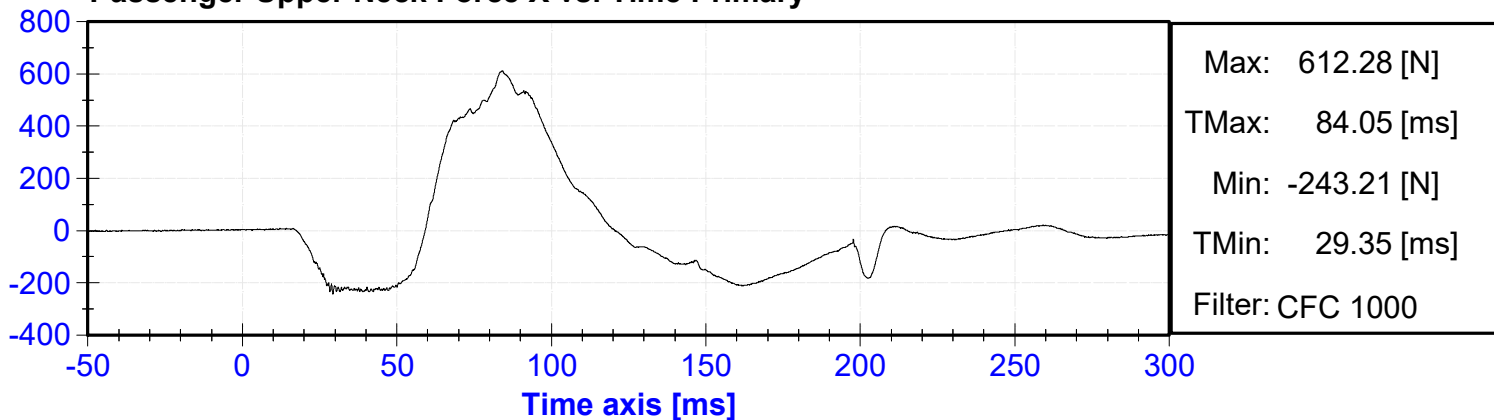
Passenger Chest Z Acceleration vs. Time Primary



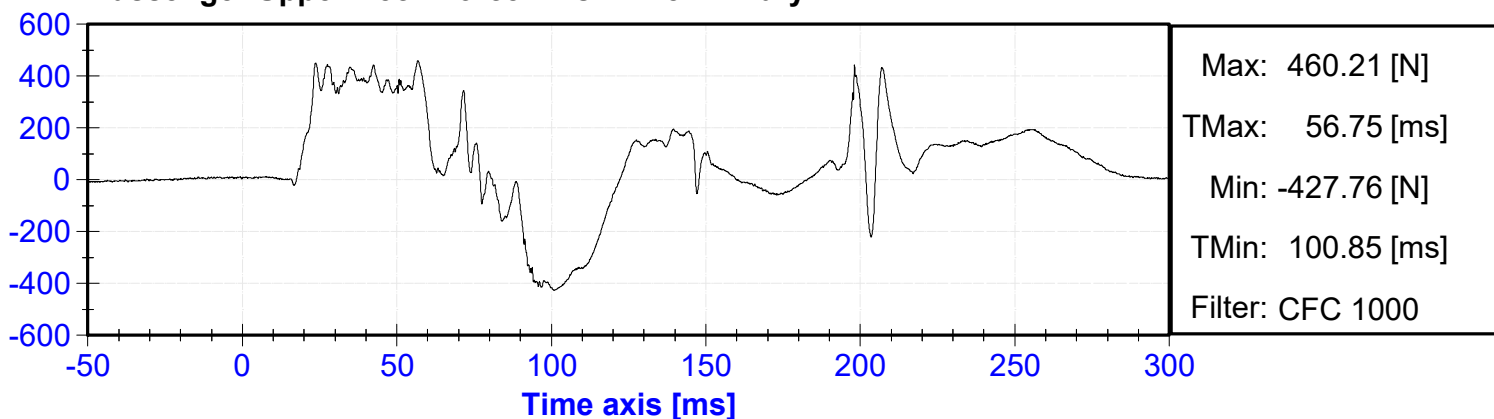
Passenger Chest Resultant Acceleration vs. Time Primary



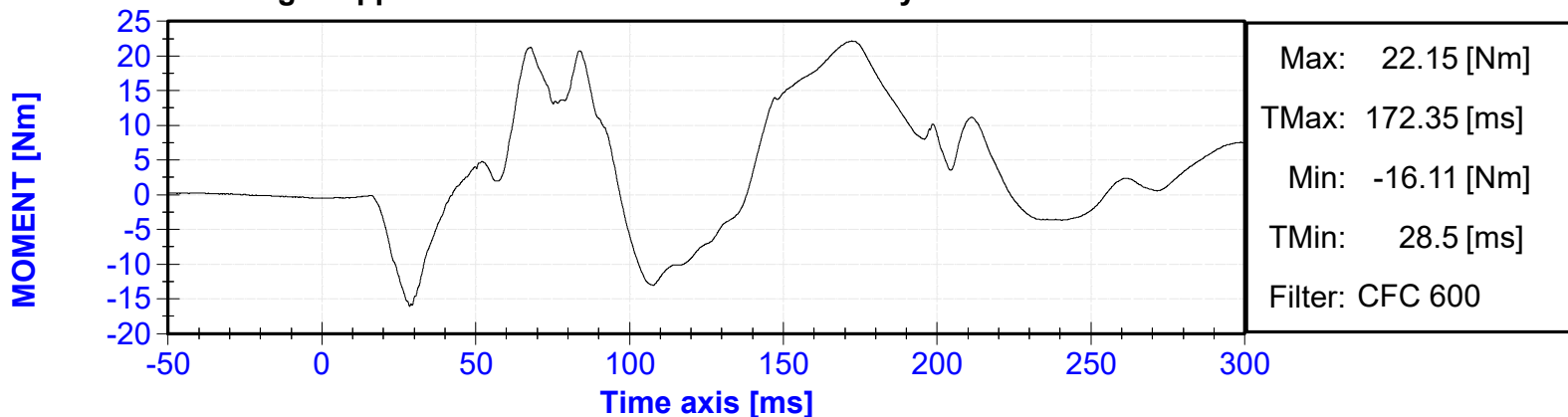
Passenger Upper Neck Force X vs. Time Primary



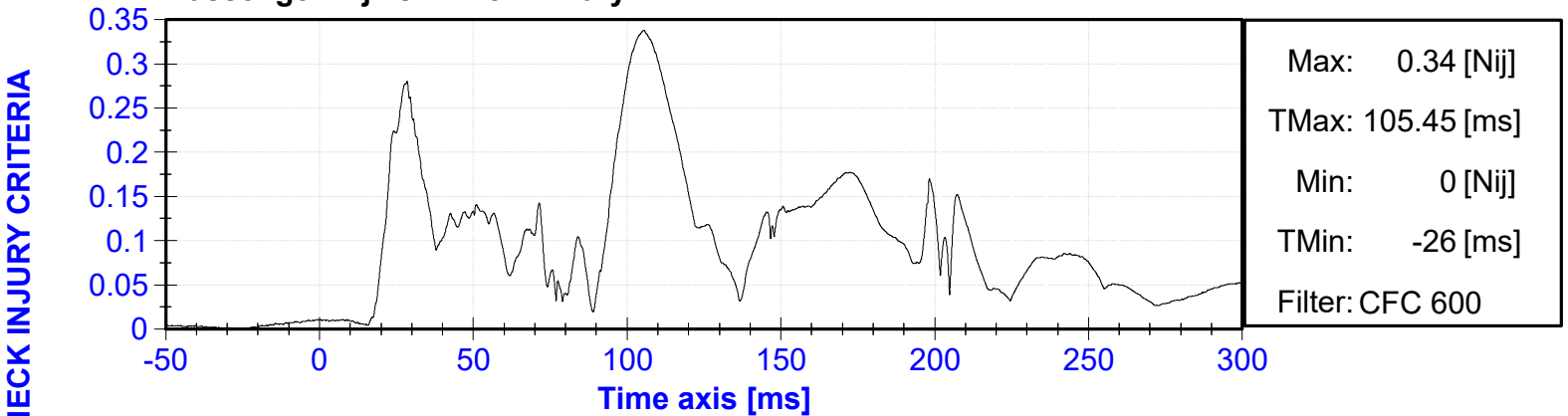
Passenger Upper Neck Force Z vs. Time Primary



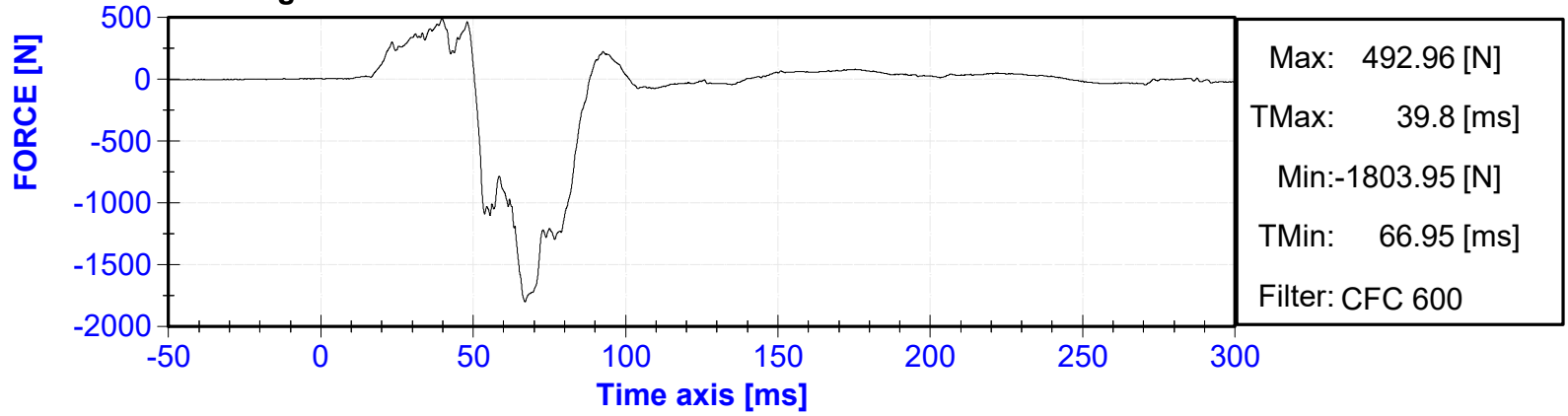
Passenger Upper Neck Moment Y vs. Time Primary



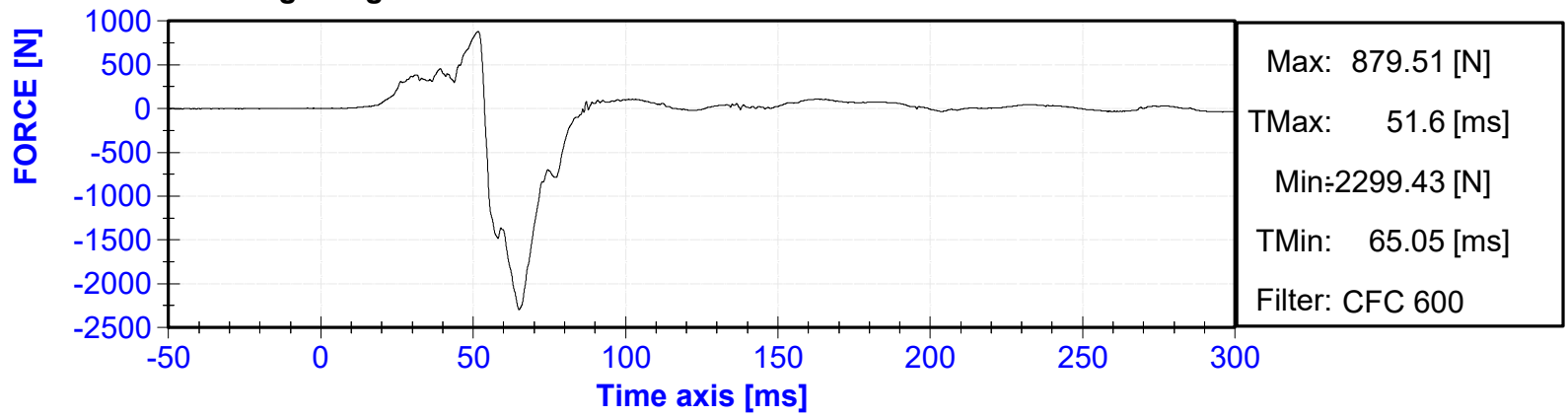
Passenger Nij vs. Time Primary



Passenger Left Femur Force vs. Time



Passenger Right Femur Force vs. Time



APPENDIX C

DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

HYBRID III 50TH PERCENTILE MALE - DRIVER ATD

SERIAL NO: 142

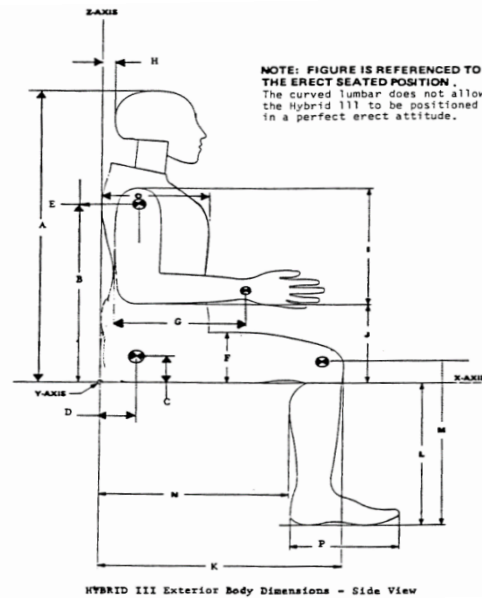
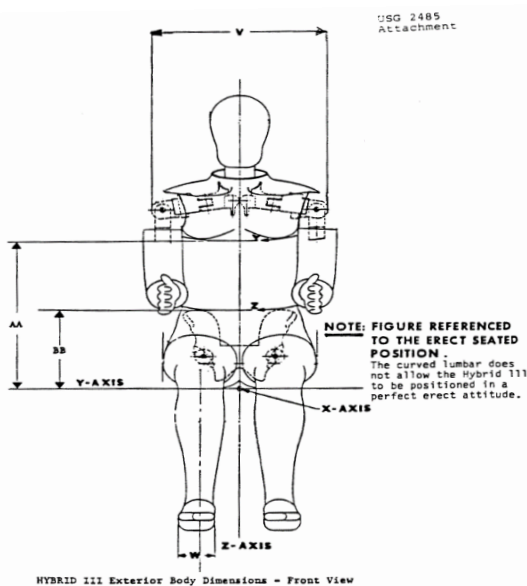


External Measurements - Hybrid 3 - 50th Male

Technician: K. Brogan

Date: 01/15/2024

Dummy Serial Number: 142



Symbol	Description	Specification (in)		Result (in)	Pass/Fail
A	Sitting Height	34.6	35.0	34.8	Pass
B	Shoulder Pivot Height	19.9	20.5	20.2	Pass
C	H-Point Height	3.3	3.5	3.4	Pass
D	H-Point from Backline	5.3	5.5	5.4	Pass
E	Shoulder Pivot from Backline	3.3	3.7	3.4	Pass
F	Thigh Clearance	5.5	6.1	6.0	Pass
G	Back of Elbow to Wrist Pivot	11.4	12.0	11.8	Pass
H	Head Back to Backline	1.6	1.8	1.7	Pass
I	Shoulder to Elbow Length	13.0	13.6	13.4	Pass
J	Elbow Rest Height	7.5	8.3	7.9	Pass
K	Buttock to Knee Length	22.8	23.8	23.5	Pass
L	Popliteal Height	16.9	17.9	17.5	Pass
M	Knee Pivot Height	19.1	19.7	19.5	Pass
N	Buttock Popliteal Length	17.8	18.8	18.4	Pass
O	Chest Depth without Jacket	8.4	9.0	8.8	Pass
P	Foot Length (right)	9.9	10.5	10.2	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	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	9.0	Pass

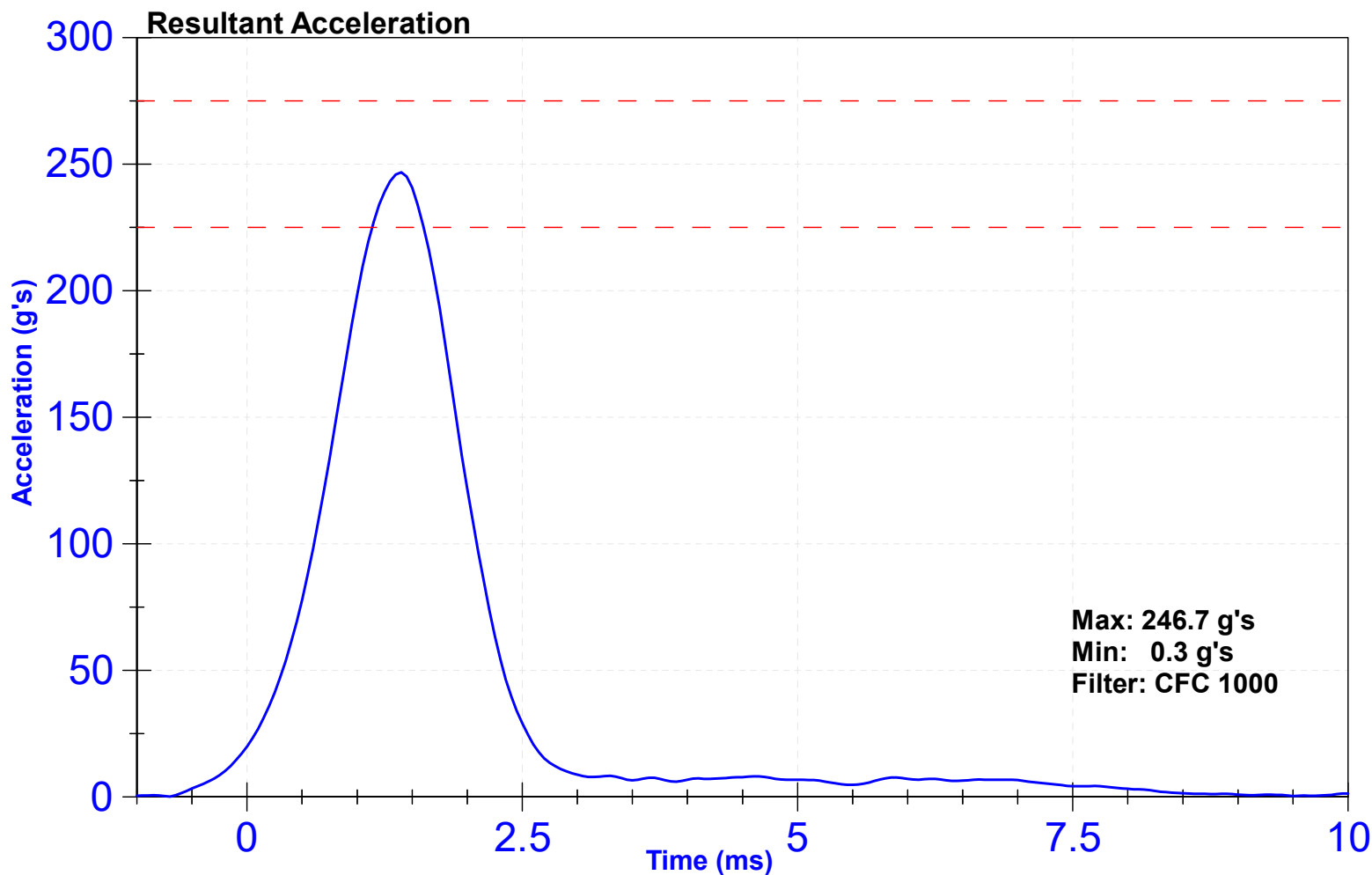
ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	142	Laboratory Supervisor	C.Mantel

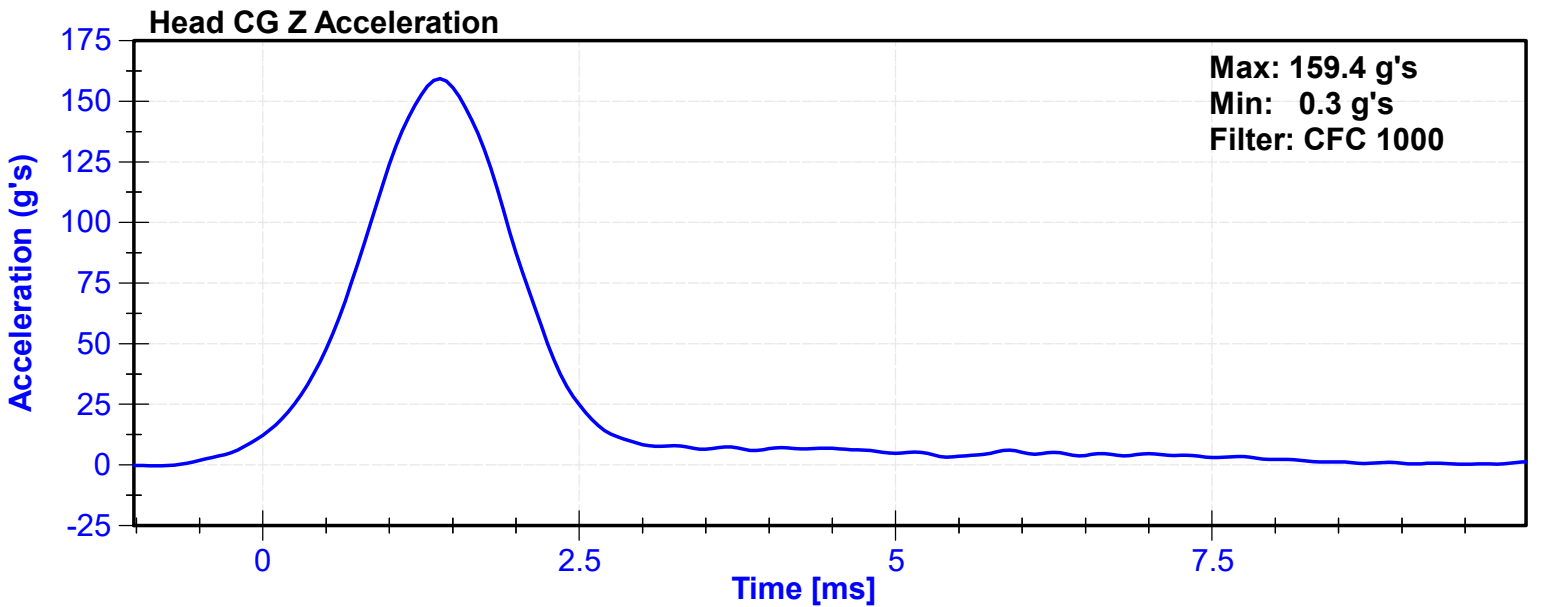
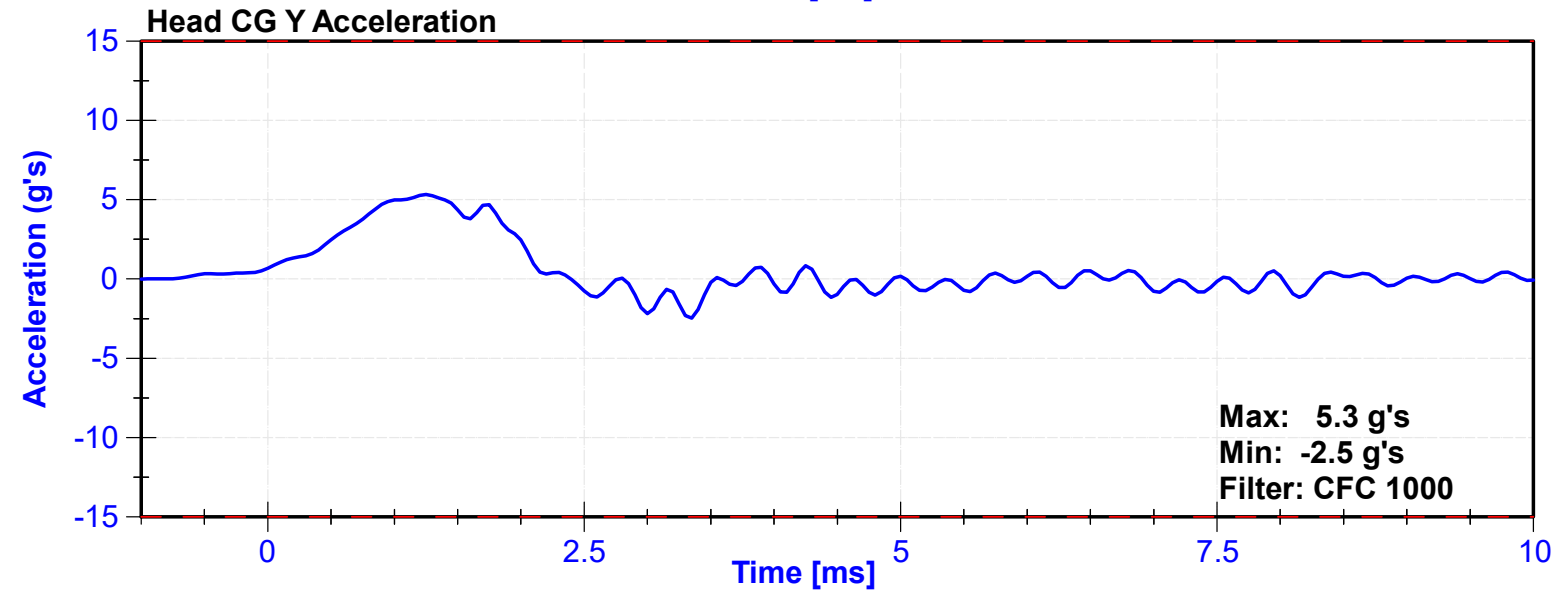
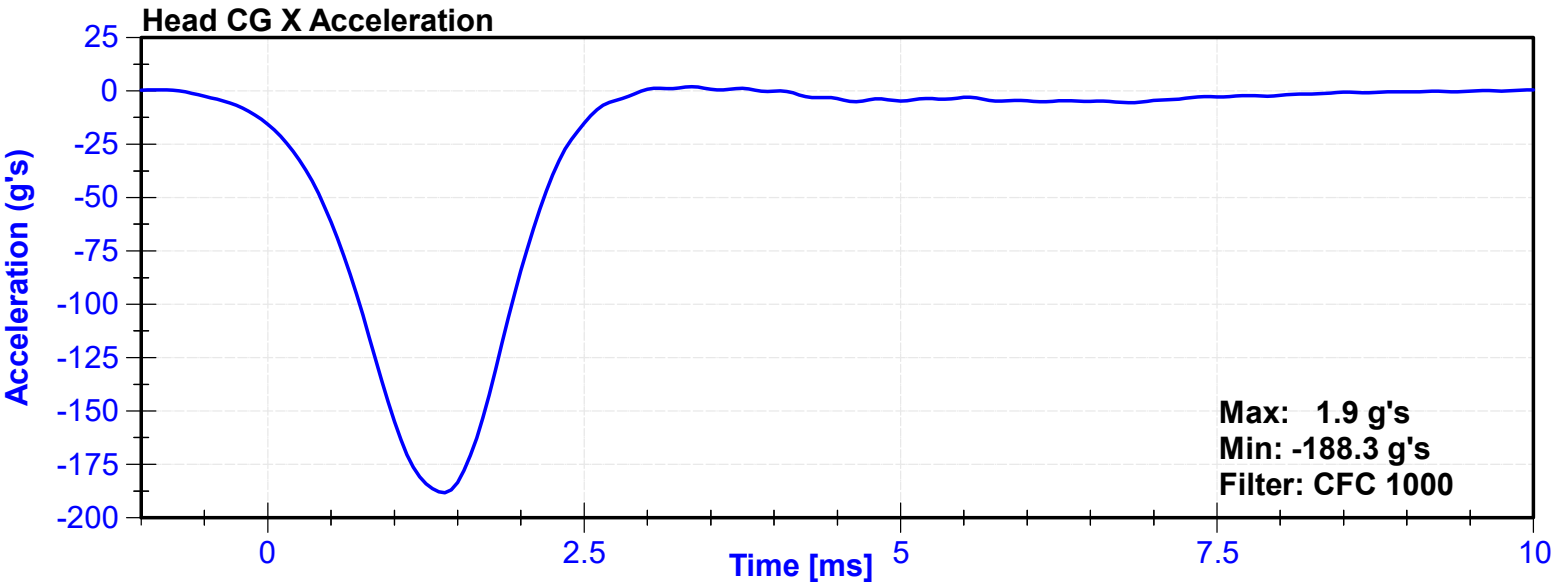
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.9	Pass
Humidity	10	70	%	25	Pass
Resultant Acceleration	225	275	g's	246.7	Pass
Oscillation	0	10	%	3.3	Pass
Lateral Acceleration	-15	15	g's	5.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	P51681	11/17/2023	5/15/2024
Y Accelerometer	Endevco	P64151	11/17/2023	5/15/2024
Z Accelerometer	Endevco	P52114	11/17/2023	5/15/2024





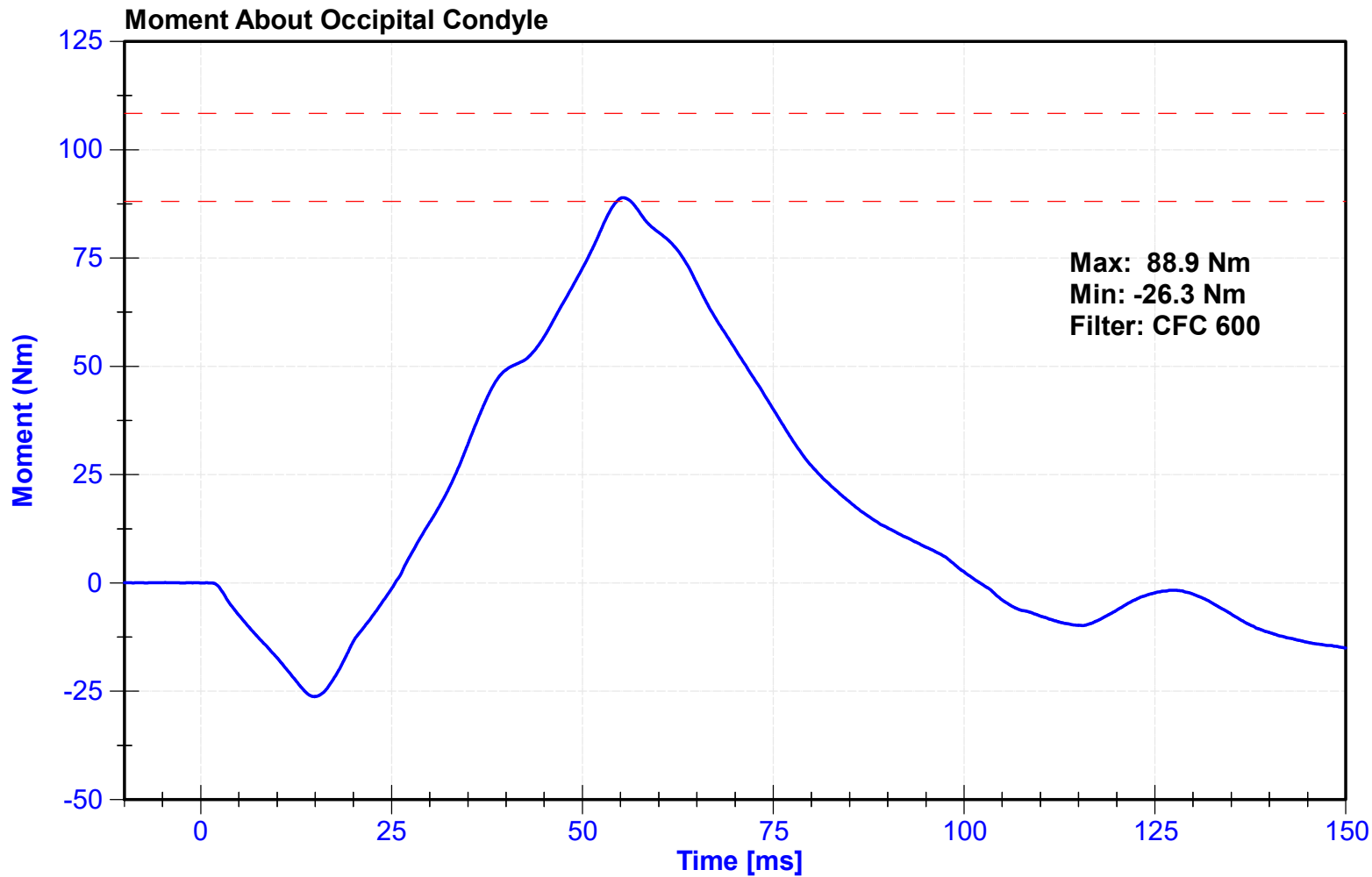
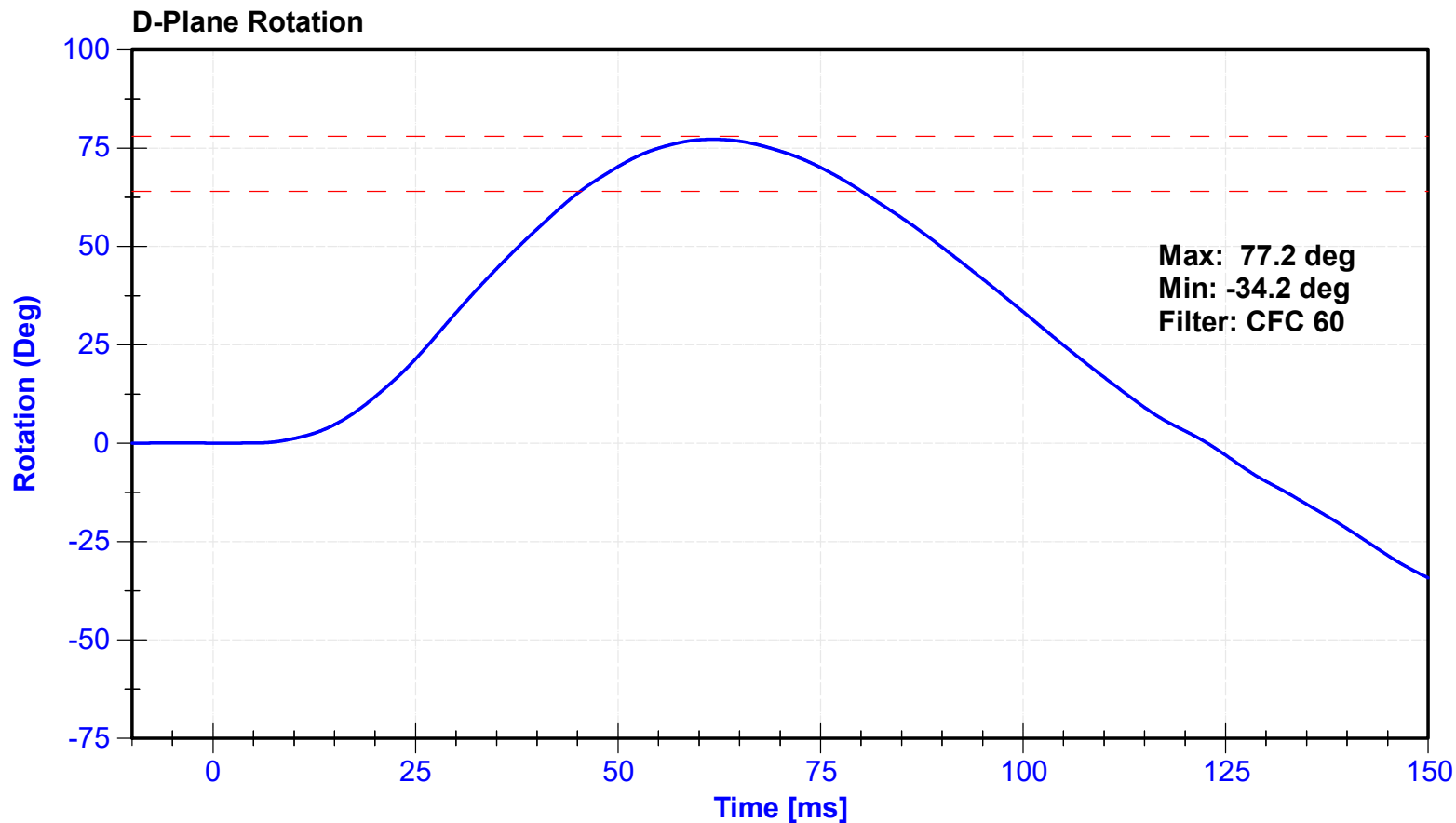
ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	142	Laboratory Supervisor	C. Mantell

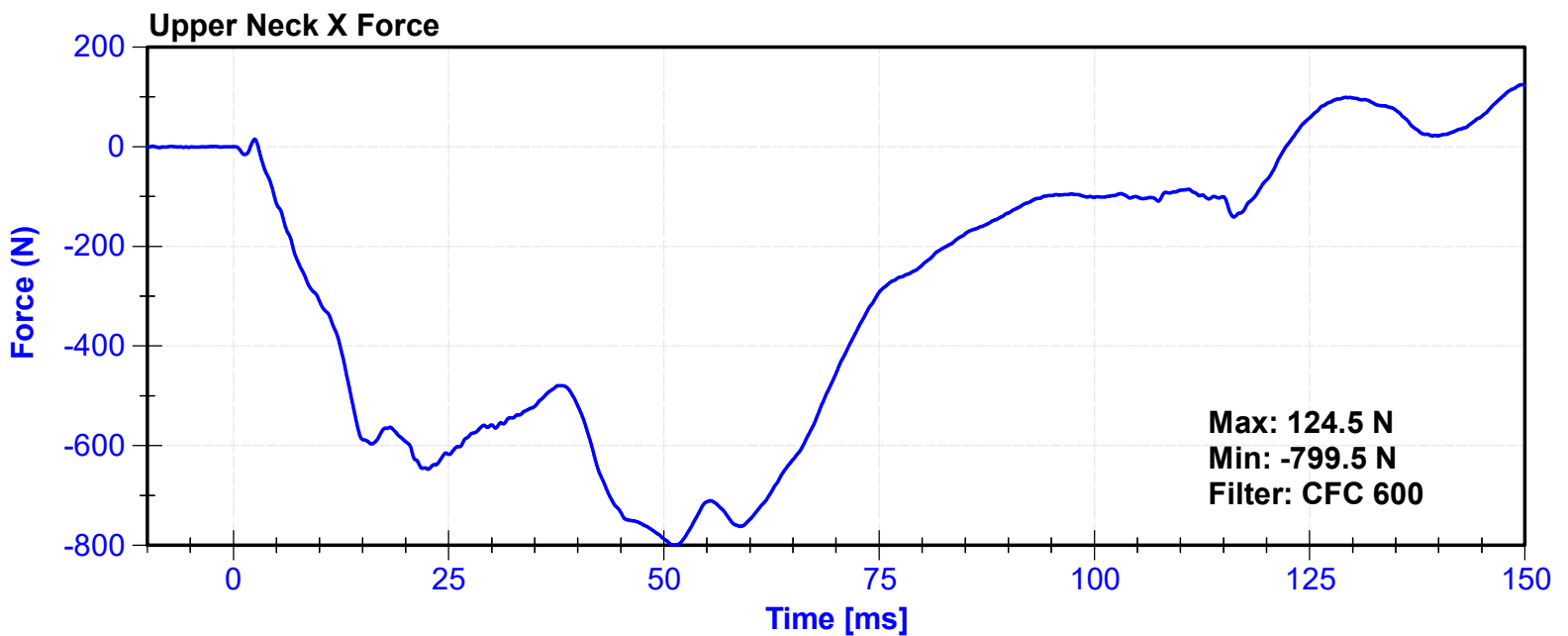
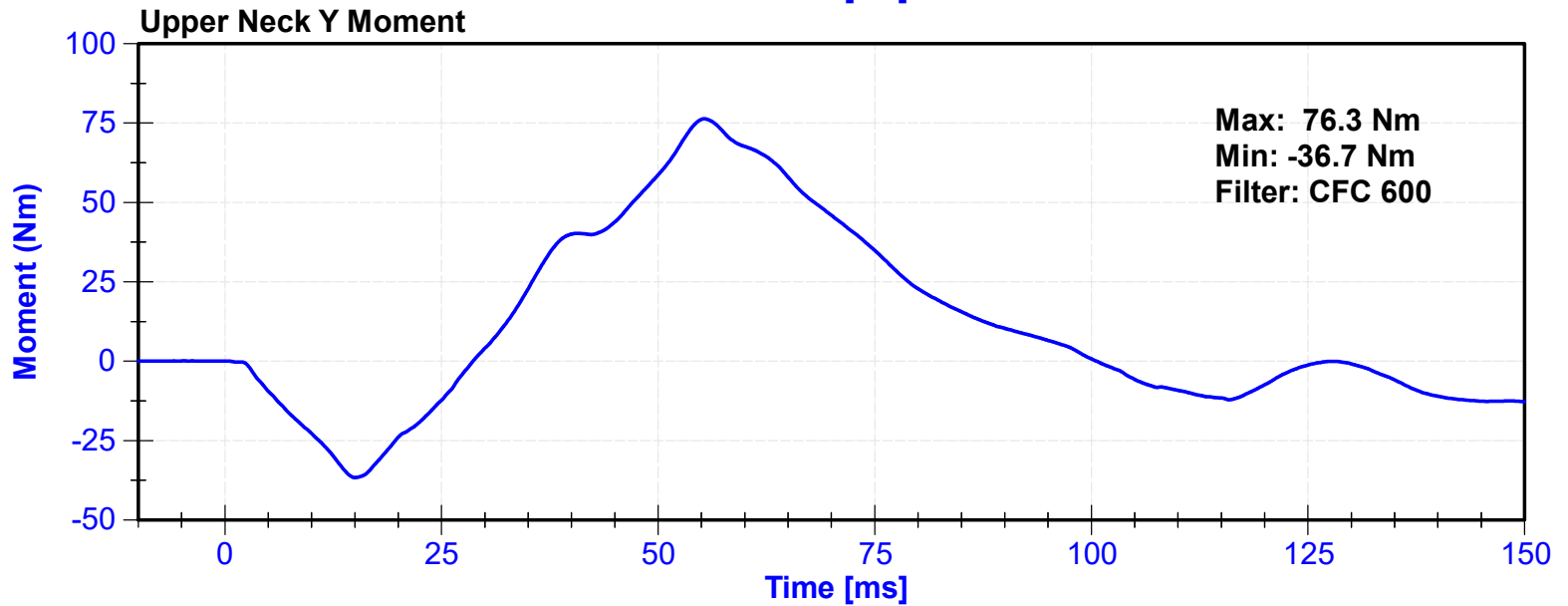
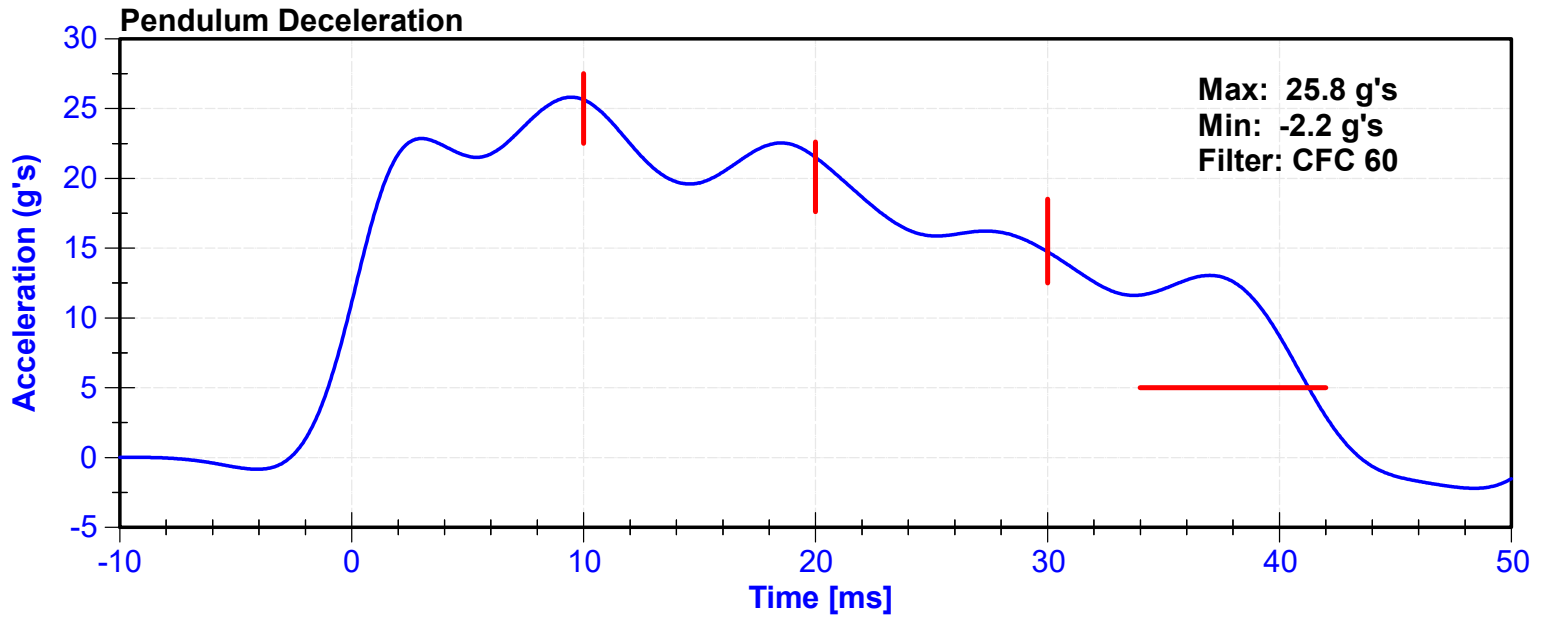
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	25	Pass
Velocity	6.89	7.13	m/s	6.912	Pass
Pendulum Deceleration at 10ms	22.5	27.5	g's	25.62	Pass
Pendulum Deceleration at 20ms	17.6	22.6	g's	21.49	Pass
Pendulum Deceleration at 30ms	12.5	18.5	g's	14.74	Pass
Max. Pendulum Deceleration After 30ms	0	29	g's	25.8	Pass
Pendulum Deceleration Time to 5 g's	34	42	ms	41.3	Pass
Maximum D Plane Rotation	64	78	deg	77.2	Pass
Time to Maximum Rotation	57	64	ms	61.7	Pass
Rotation Decay to Zero	113	127	ms	122.8	Pass
Moment About Occipital Condyle	88.1	108.4	Nm	88.95	Pass
Time to Maximum Moment	47	58	ms	55.3	Pass
Moment Decay to Zero	97	107	ms	102.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	7231C-750	10/31/2023	4/28/2024
Pendulum Potentiometer	ETI	LABPOT1	5/5/2023	5/4/2024
Condyle Potentiometer	ETI	LABPOT2	7/19/2023	7/18/2024
Upper Neck Load Cell	Humanetics	851-FX	5/18/2023	5/17/2024





ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	142	Laboratory Supervisor	C. Mantell

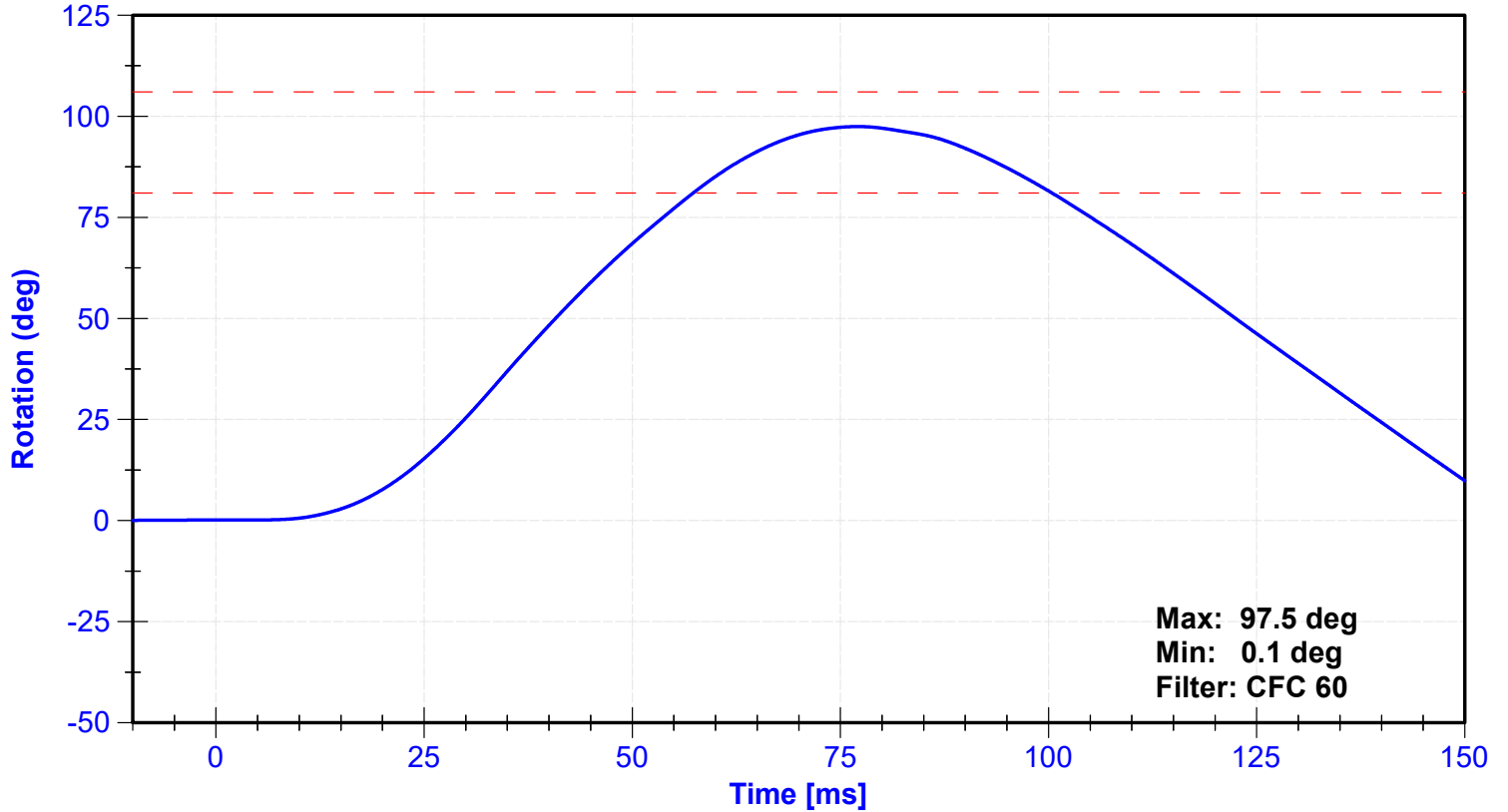
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	25	Pass
Velocity	5.94	6.19	m/s	5.987	Pass
Pendulum Deceleration at 10ms	17.2	21.2	g's	20.46	Pass
Pendulum Deceleration at 20ms	14	19	g's	18.0	Pass
Pendulum Deceleration at 30ms	11	16	g's	14.8	Pass
Max. Pendulum Deceleration After 30ms	0	22	g's	20.5	Pass
Pendulum Deceleration Time to 5 g's	38	46	ms	43.3	Pass
Maximum D Plane Rotation	81	106	deg	97.5	Pass
Time to Maximum Rotation	72	82	ms	77.1	Pass
Rotation Decay to Zero	147	174	ms	157.0	Pass
Minimum Moment About OC	-80	-52.9	Nm	-67.76	Pass
Time to Minimum Moment	65	79	ms	71.5	Pass
Moment Decay to Zero	120	148	ms	141.3	Pass

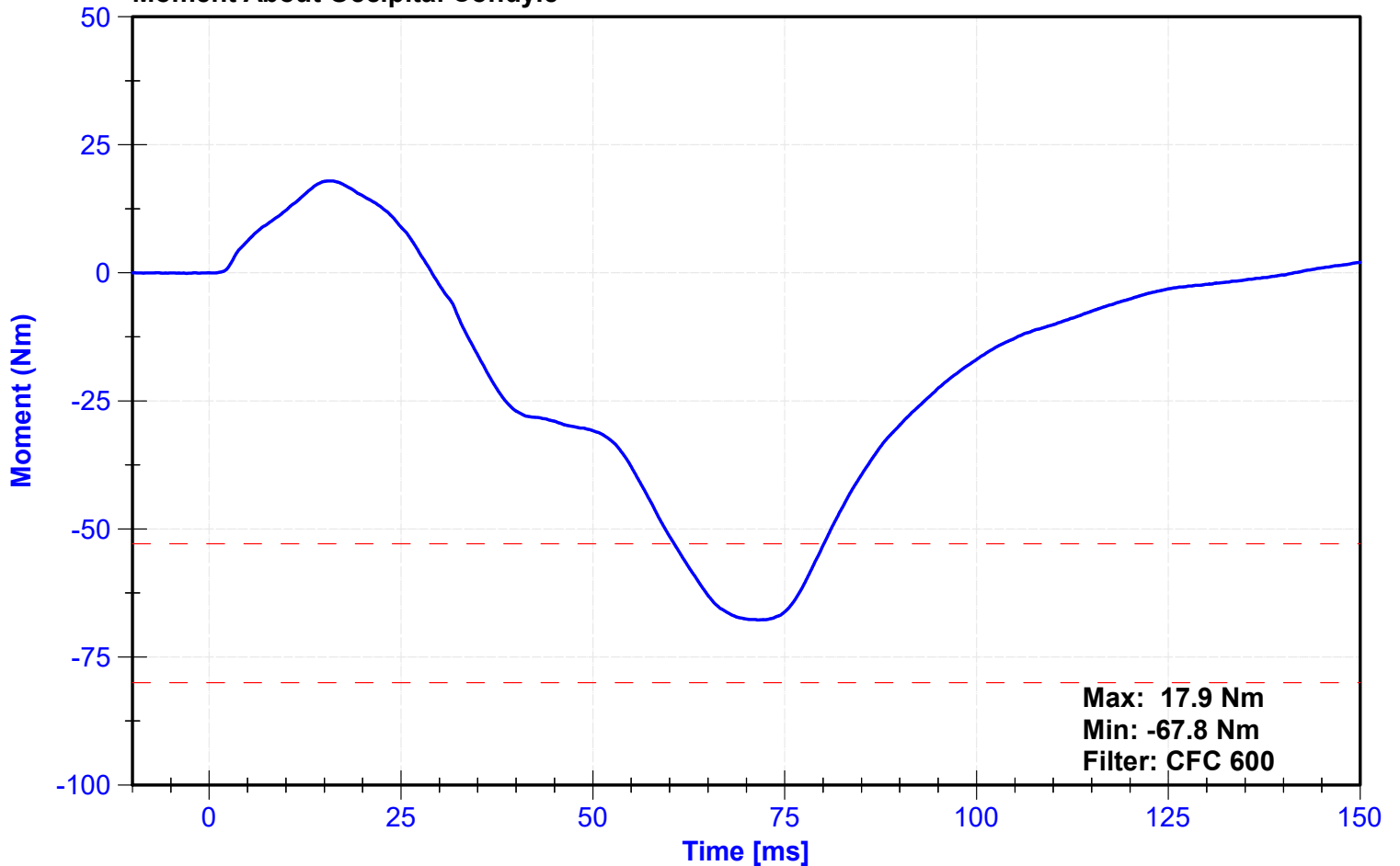
Transducer Calibrations

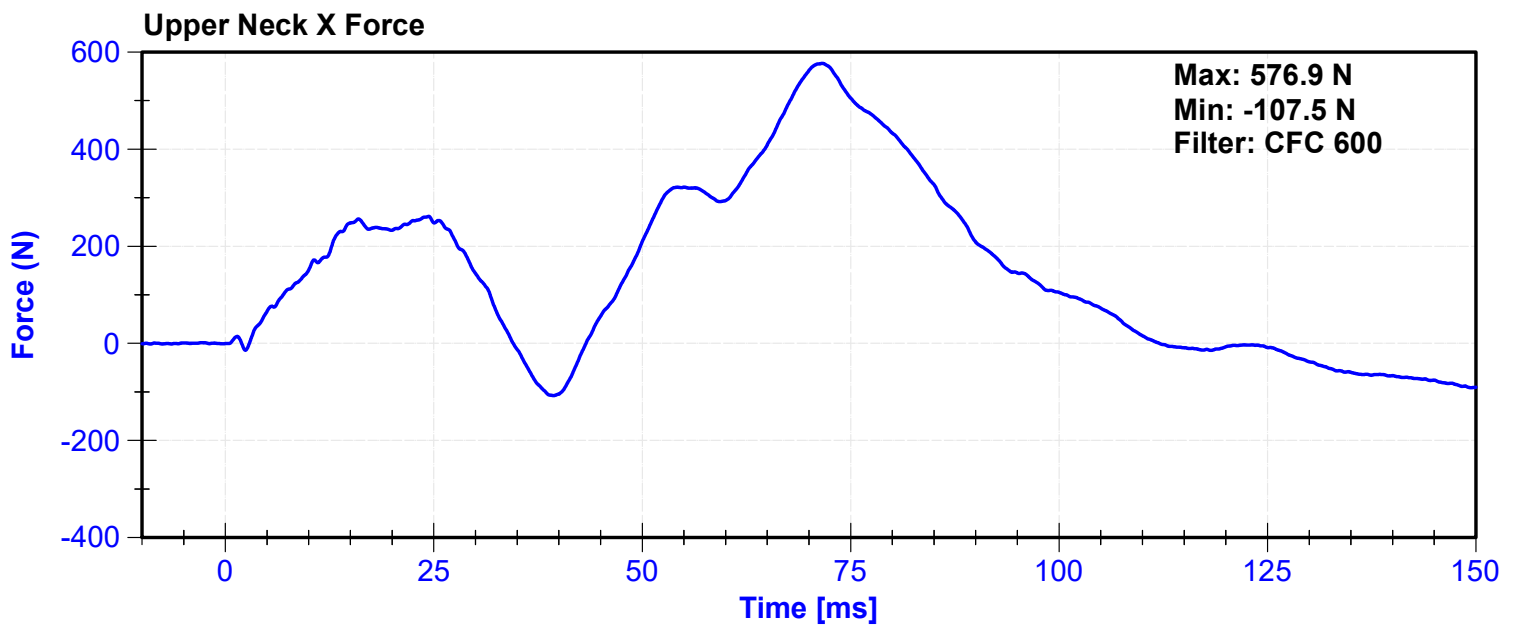
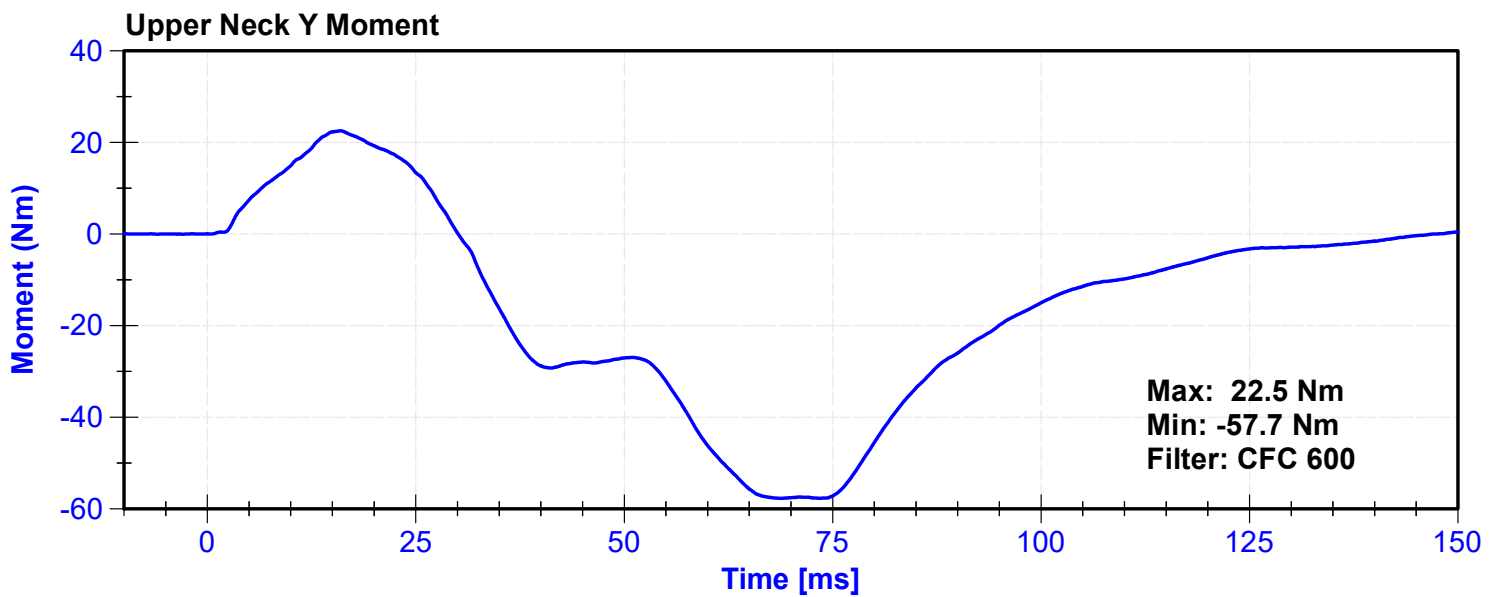
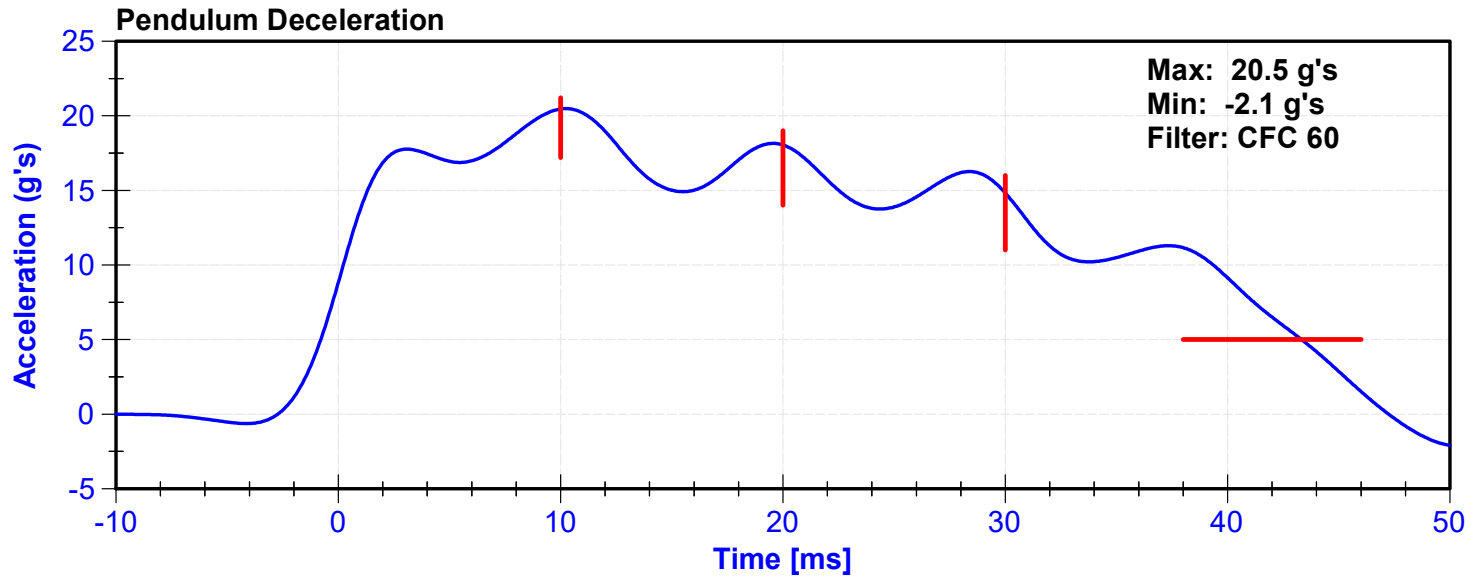
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16503	10/31/2023	4/28/2024
Pendulum Potentiometer	ETI	LABPOT1	5/5/2023	5/4/2024
Condyle Potentiometer	ETI	LABPOT2	7/19/2023	7/18/2024
Upper Neck Load Cell	Humanetics	851-FX	5/18/2023	5/17/2024

D-Plane Rotation



Moment About Occipital Condyle





ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	142	Laboratory Supervisor	C. Mantell

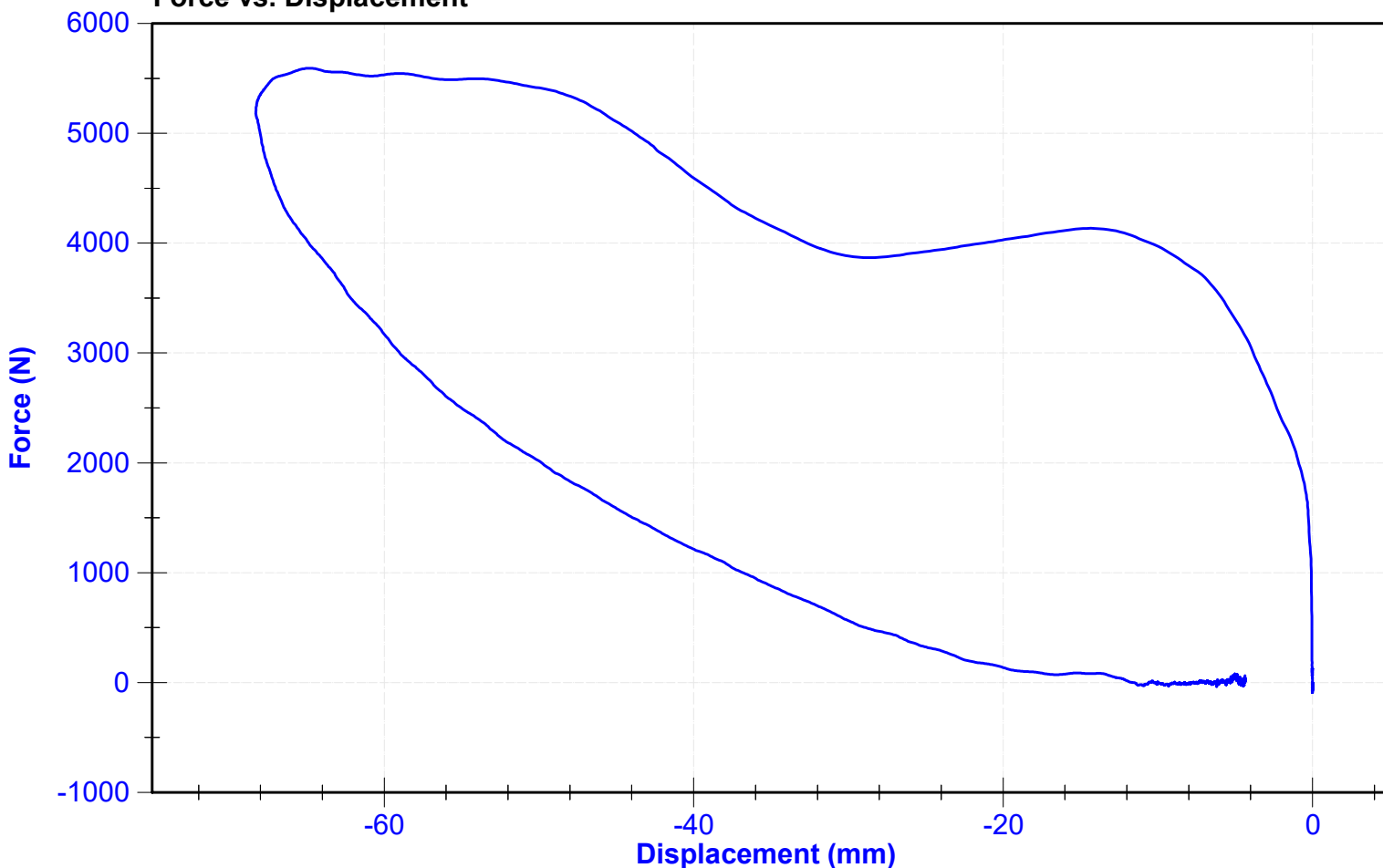
Results

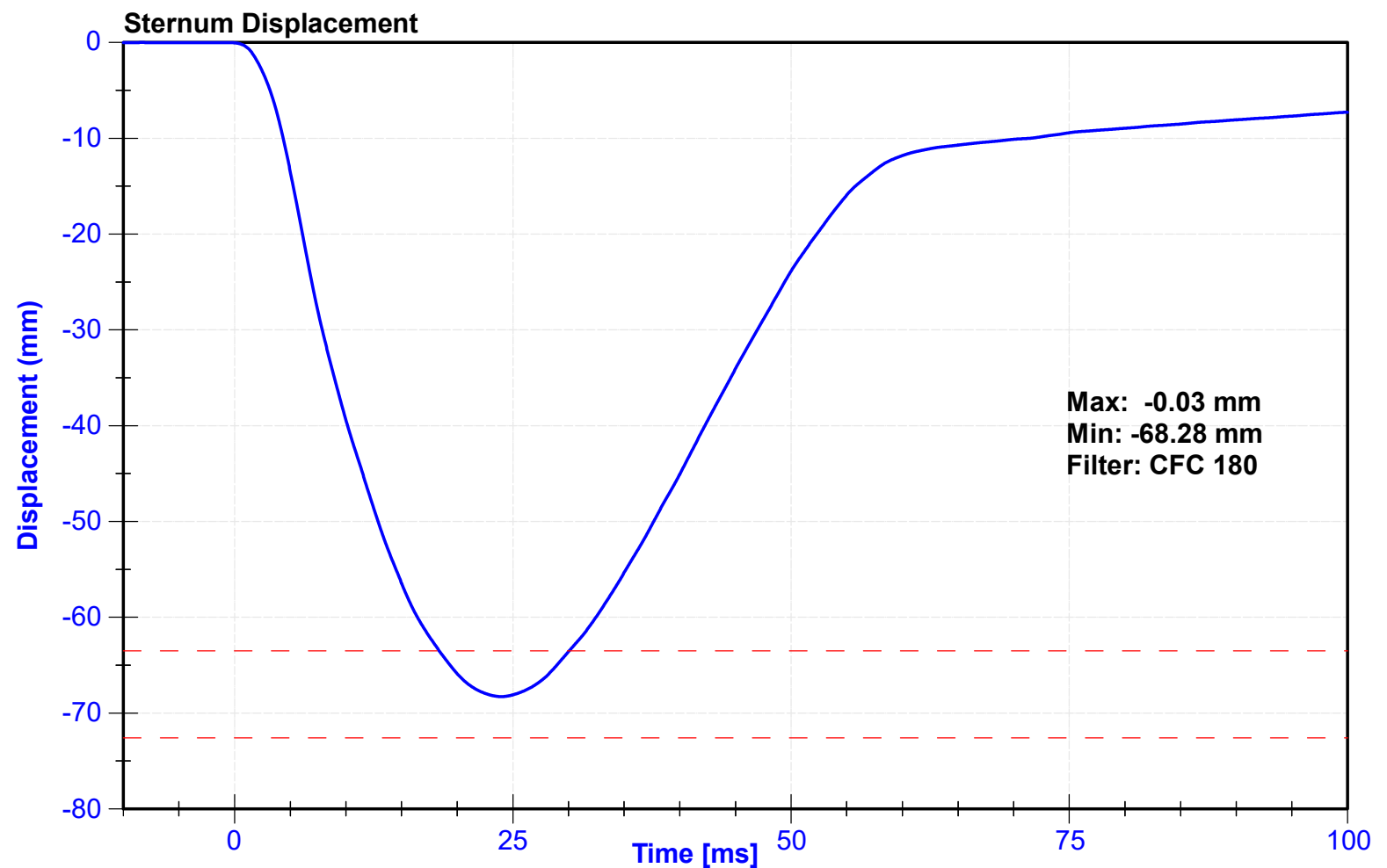
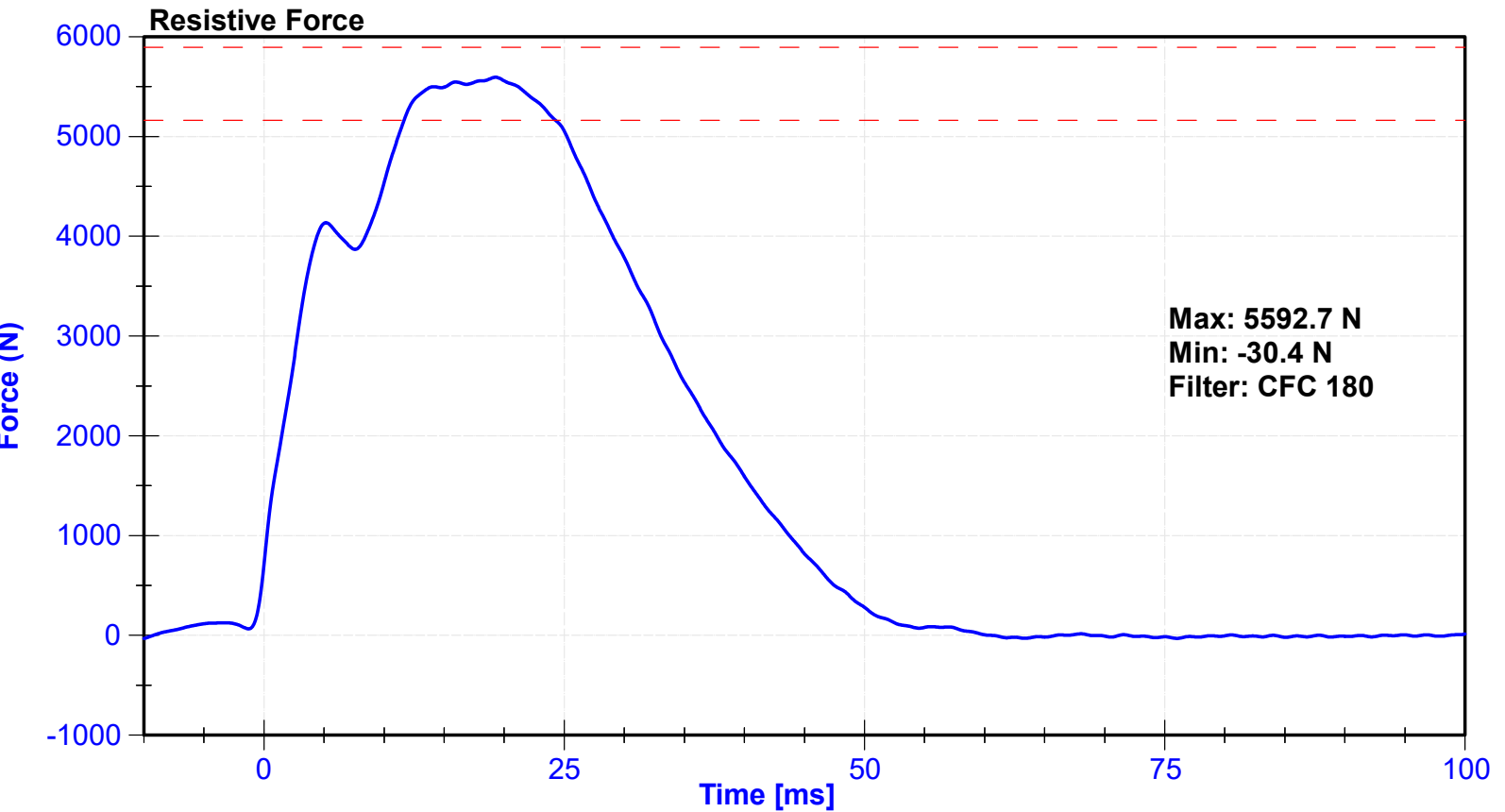
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	17	Pass
Velocity	6.59	6.83	m/s	6.700	Pass
Chest Displacement	-72.6	-63.5	mm	-68.28	Pass
Resistive Force	5160	5894	N	5592.7	Pass
Hysteresis	69	85	%	71.5	Pass

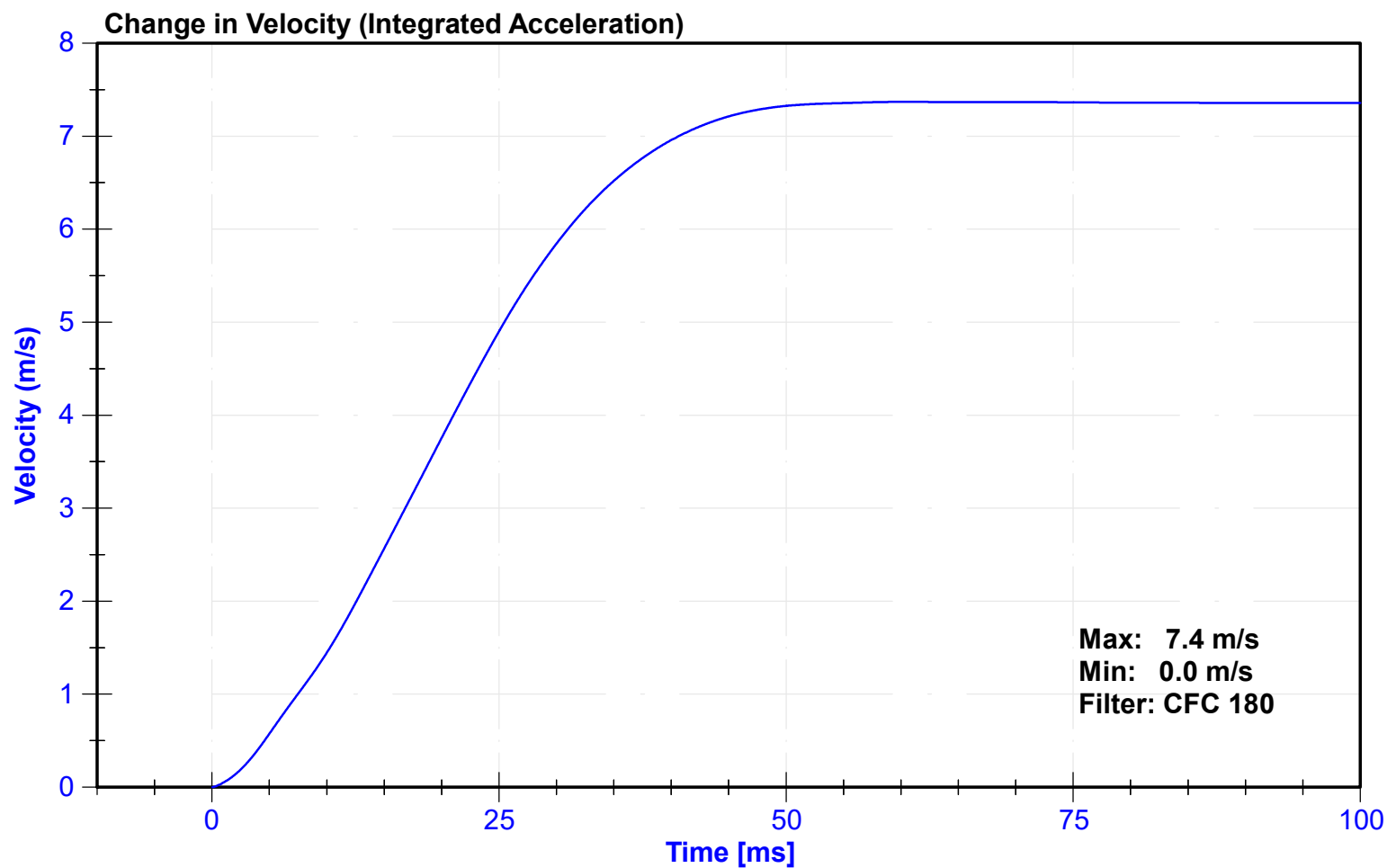
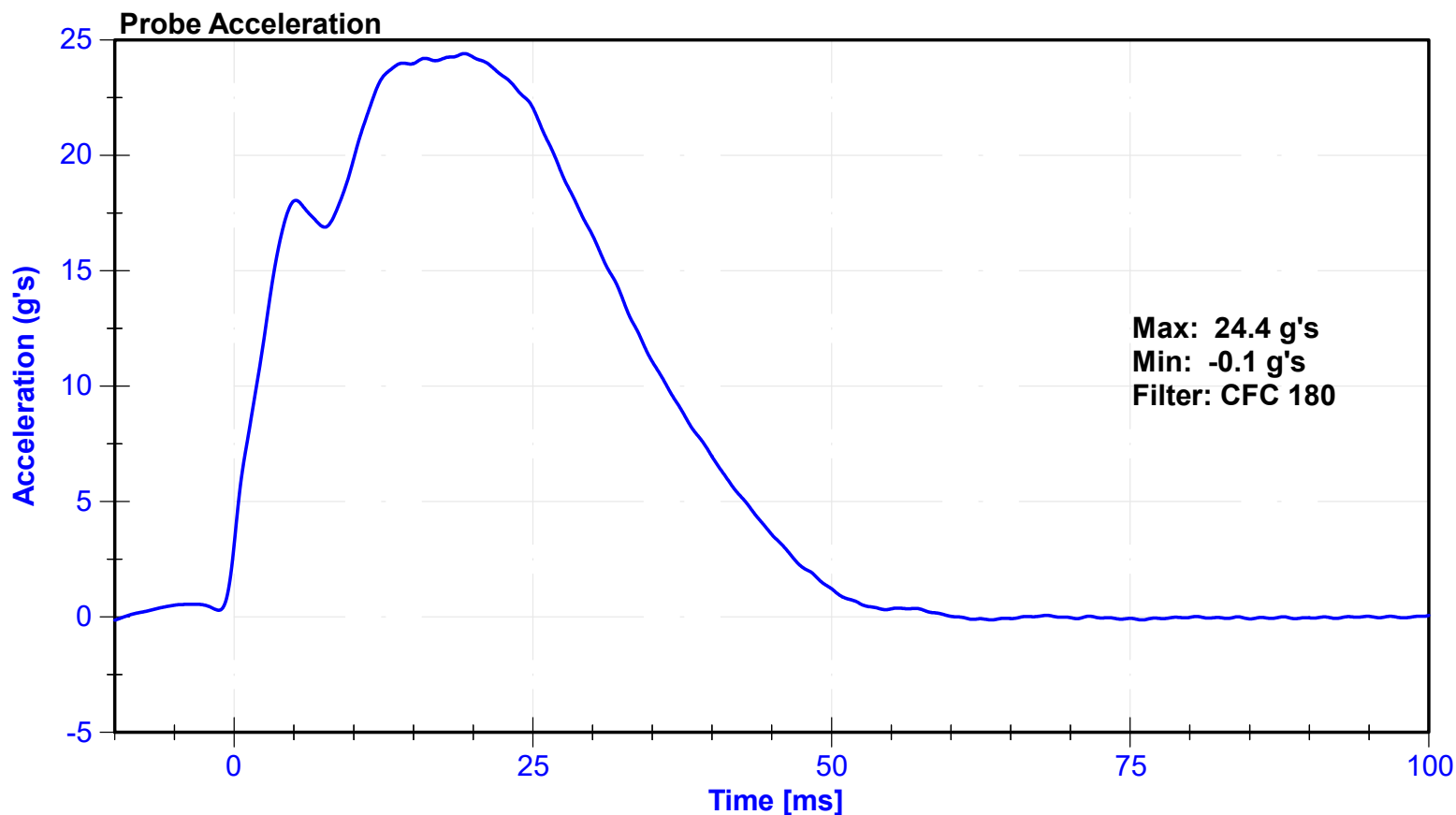
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18587	11/20/2023	11/19/2024
Chest Potentiometer	JDK	0075	12/18/2023	6/17/2024

Force vs. Displacement







ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	142	Laboratory Supervisor	C. Mantell

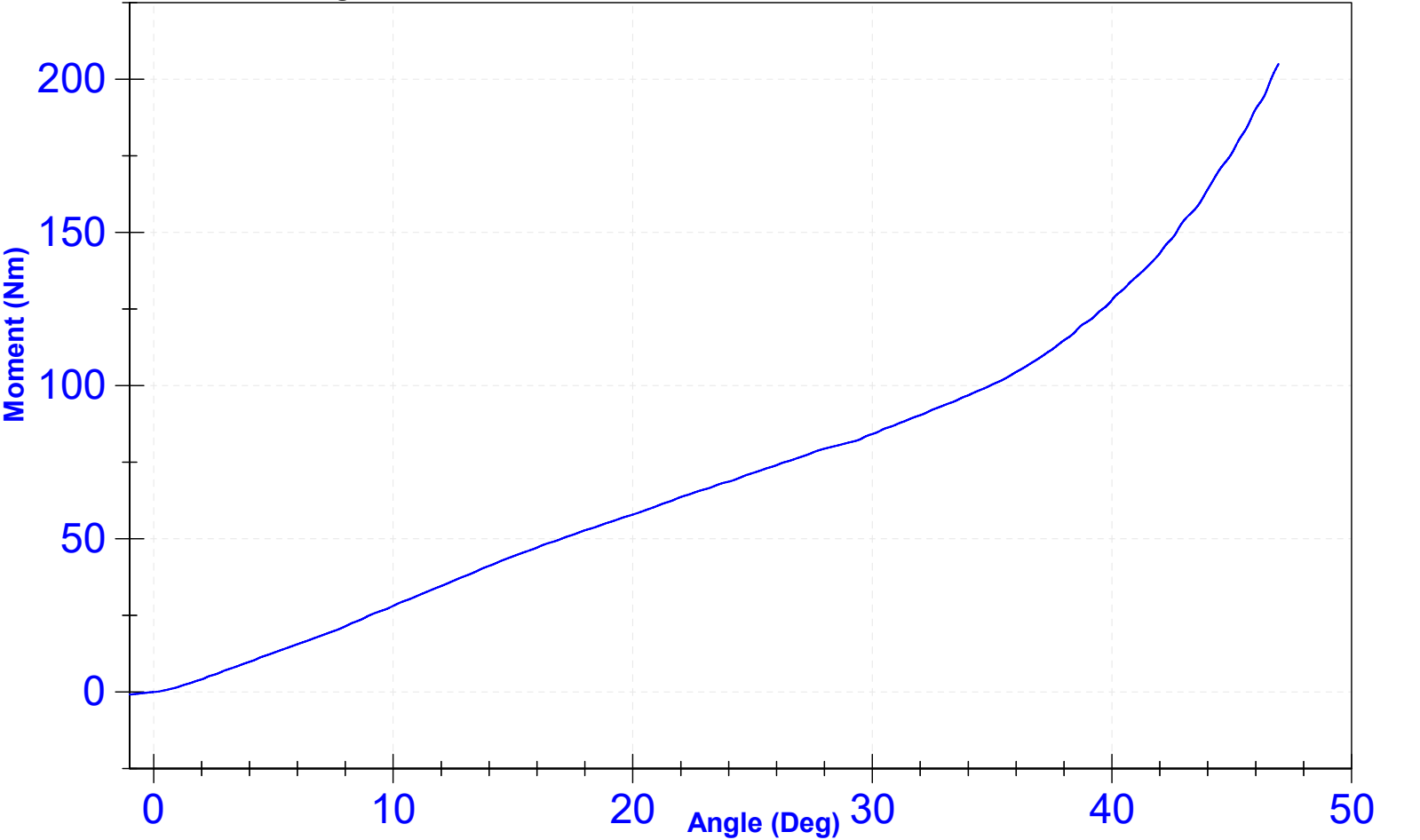
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.9	Pass
Humidity	10	70	%	25	Pass
Average Velocity	5	10	deg/s	7.3	Pass
Angle at 203Nm	40	50	deg	46.8	Pass
Moment at 30 degrees	0	94.9	Nm	84.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	ETI SP22	DS-0008	10/6/2023	10/5/2024
Load Cell	PCB 2301-02	2301-02_115	2023-10-30	2024-10-29

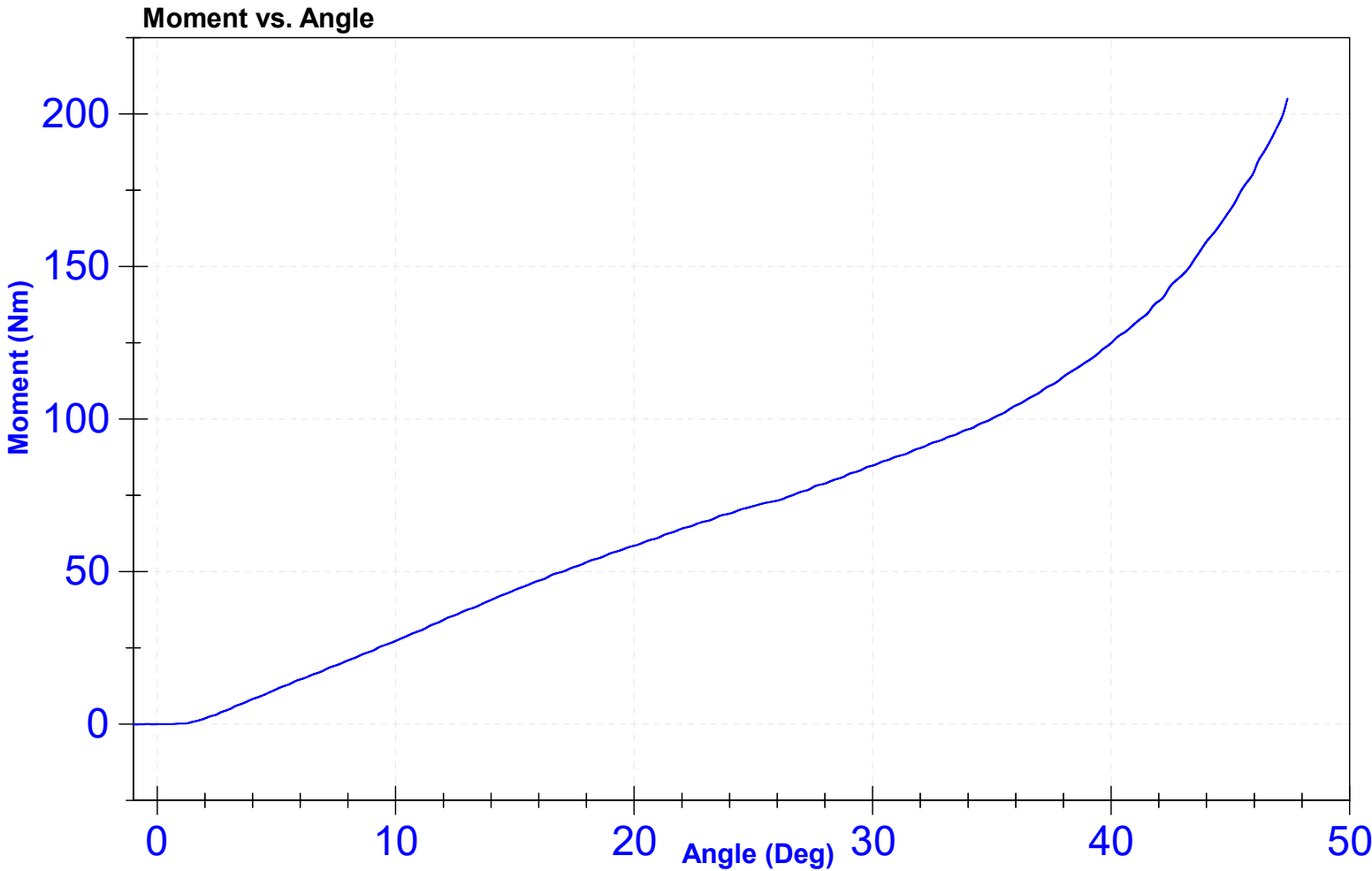
Moment vs. Angle



ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	142	Laboratory Supervisor	C. Mantell

Test Parameter	Results		Unit	Result	Pass/Fail
	Minimum Specification	Maximum Specification			
Temperature	18.9	25.6	°C	20.9	Pass
Humidity	10	70	%	25	Pass
Average Velocity	5	10	deg/s	7.1	Pass
Angle at 203Nm	40	50	deg	47.3	Pass
Moment at 30 degrees	0	94.9	Nm	84.7	Pass

Transducer Calibrations				
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	ETI SP22	DS-0008	10/6/2023	10/5/2024
Load Cell	PCB 2301-02	2301-02_115	2023-10-30	2024-10-29



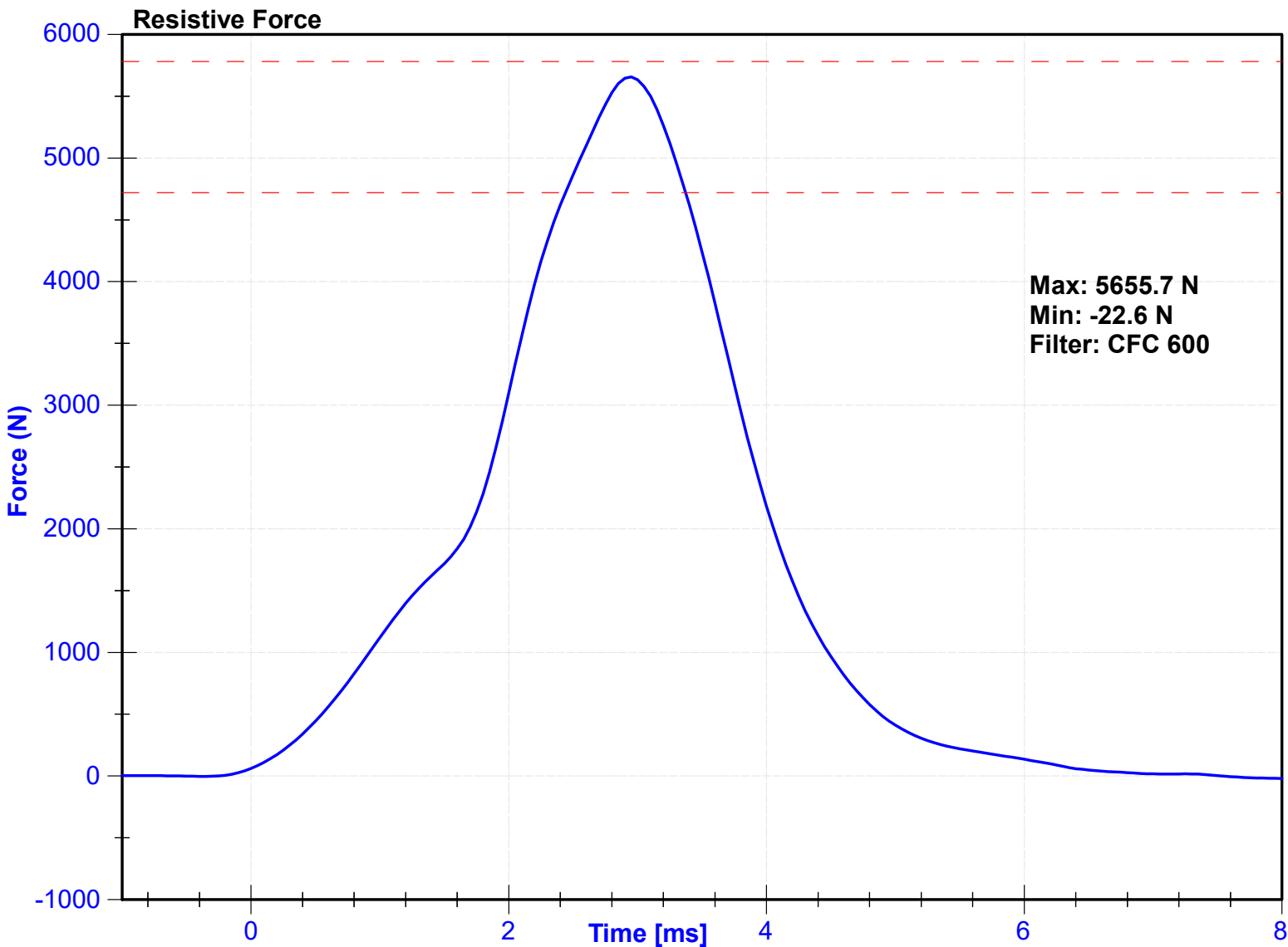
ATD Manufacturer	Humanetics	Test Technician	J. Kinderman
ATD Serial Number	142	Laboratory Supervisor	C. Mantell

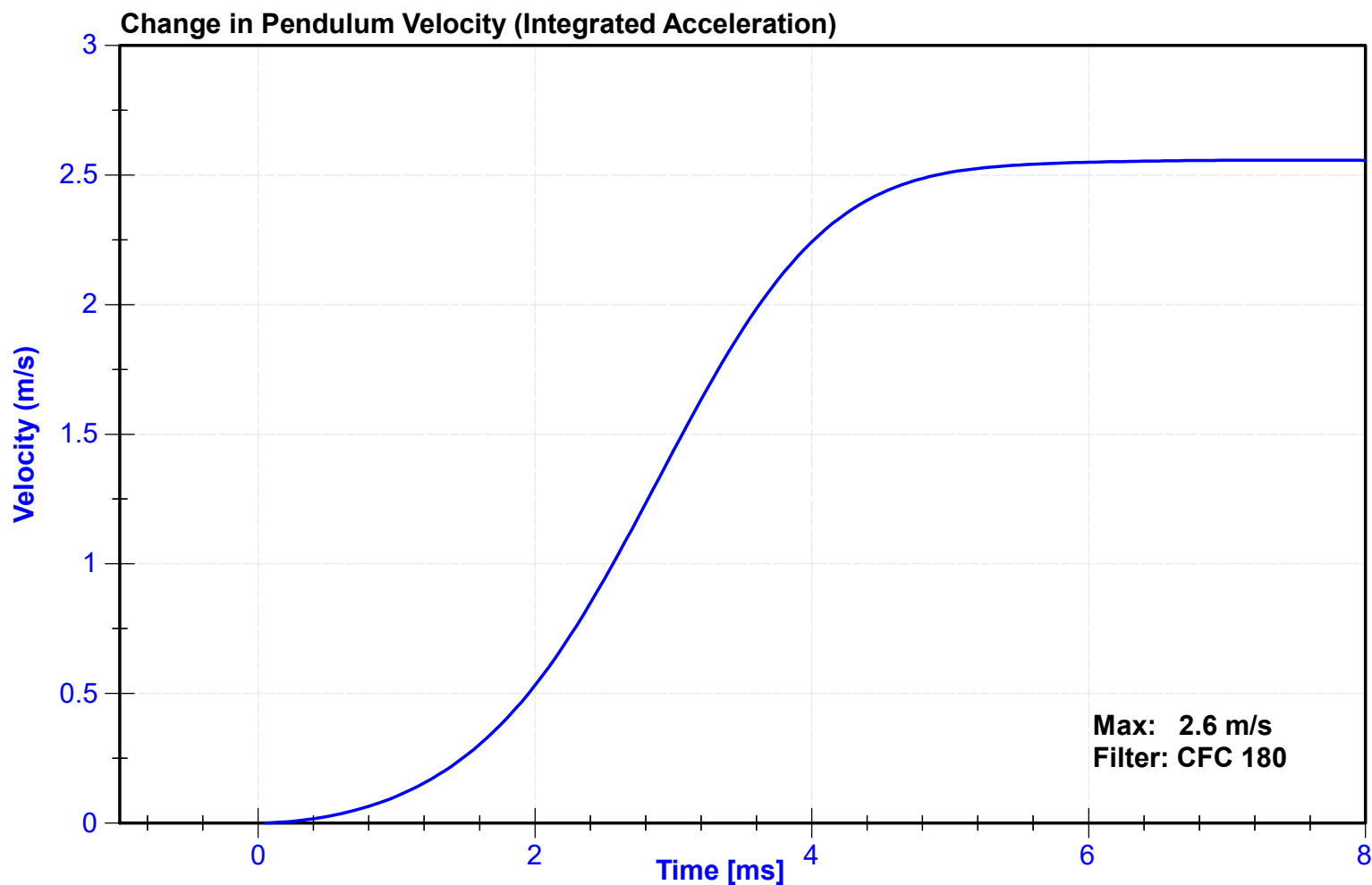
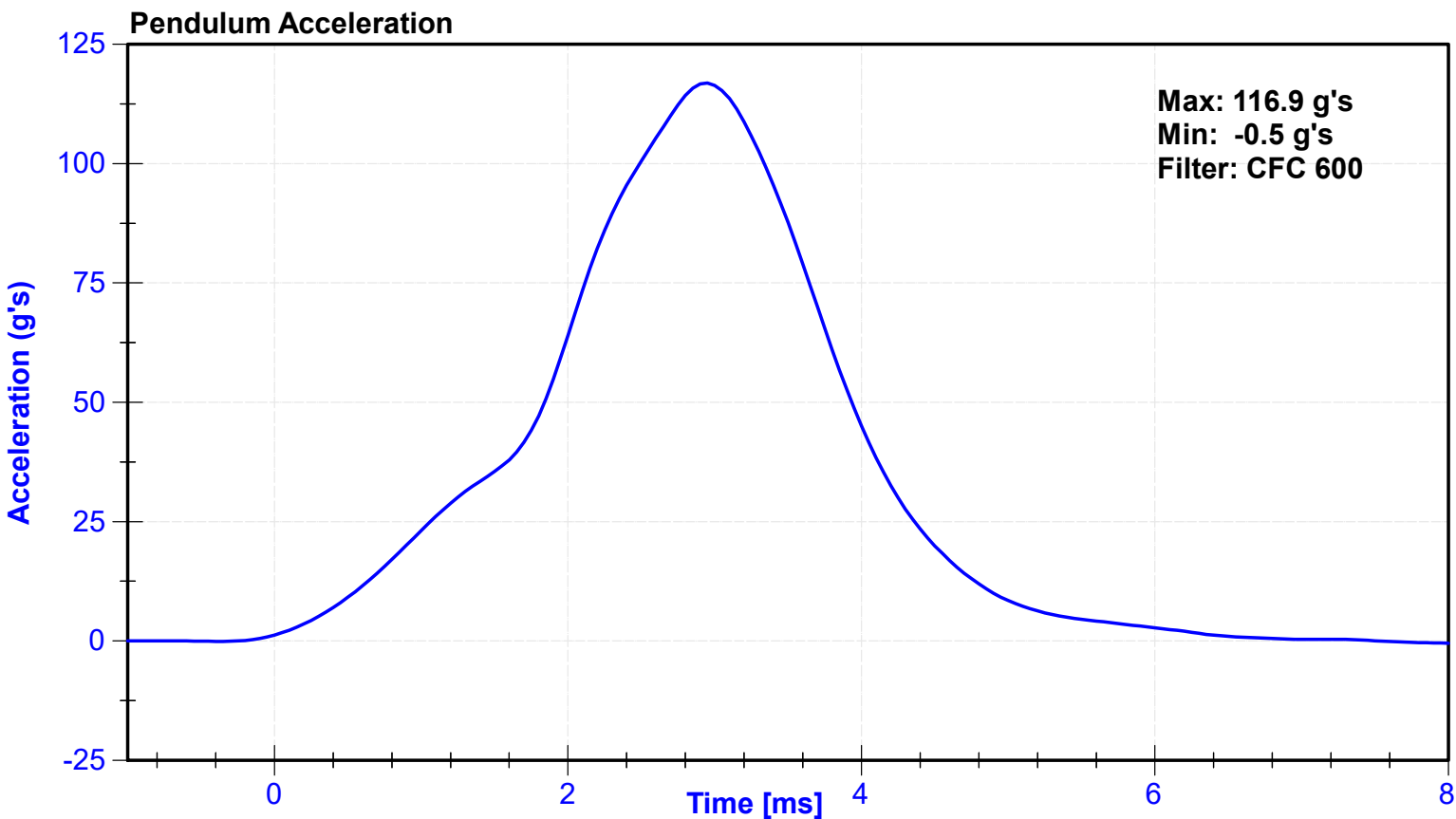
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.5	Pass
Humidity	10	70	%	53	Pass
Velocity	2.07	2.13	m/s	2.075	Pass
Maximum Resistive Force	4720	5780	N	5655.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18619	9/29/2023	3/27/2024





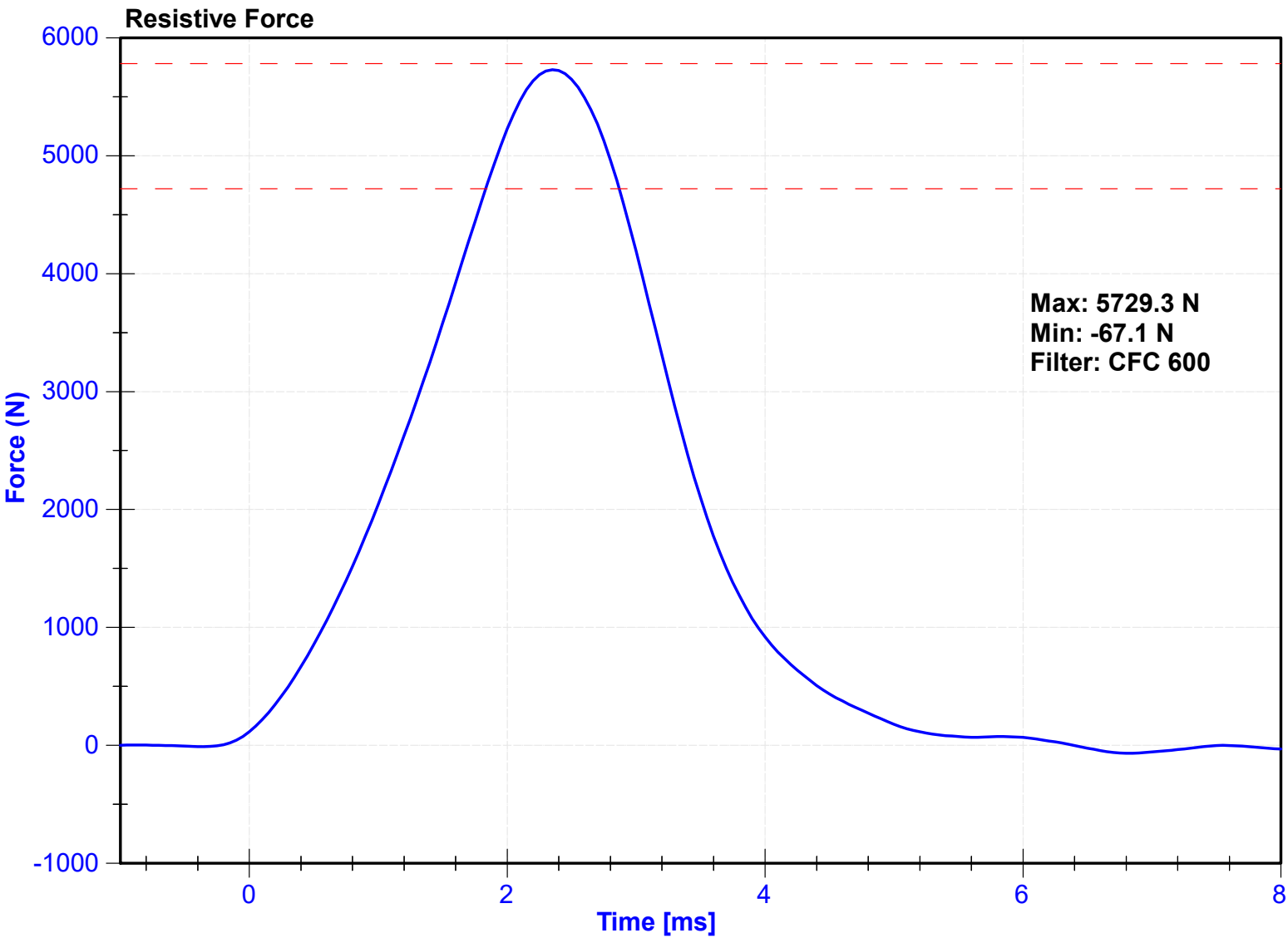
ATD Manufacturer	Humanetics	Test Technician	J. Kinderman
ATD Serial Number	142	Laboratory Supervisor	C. Mantell

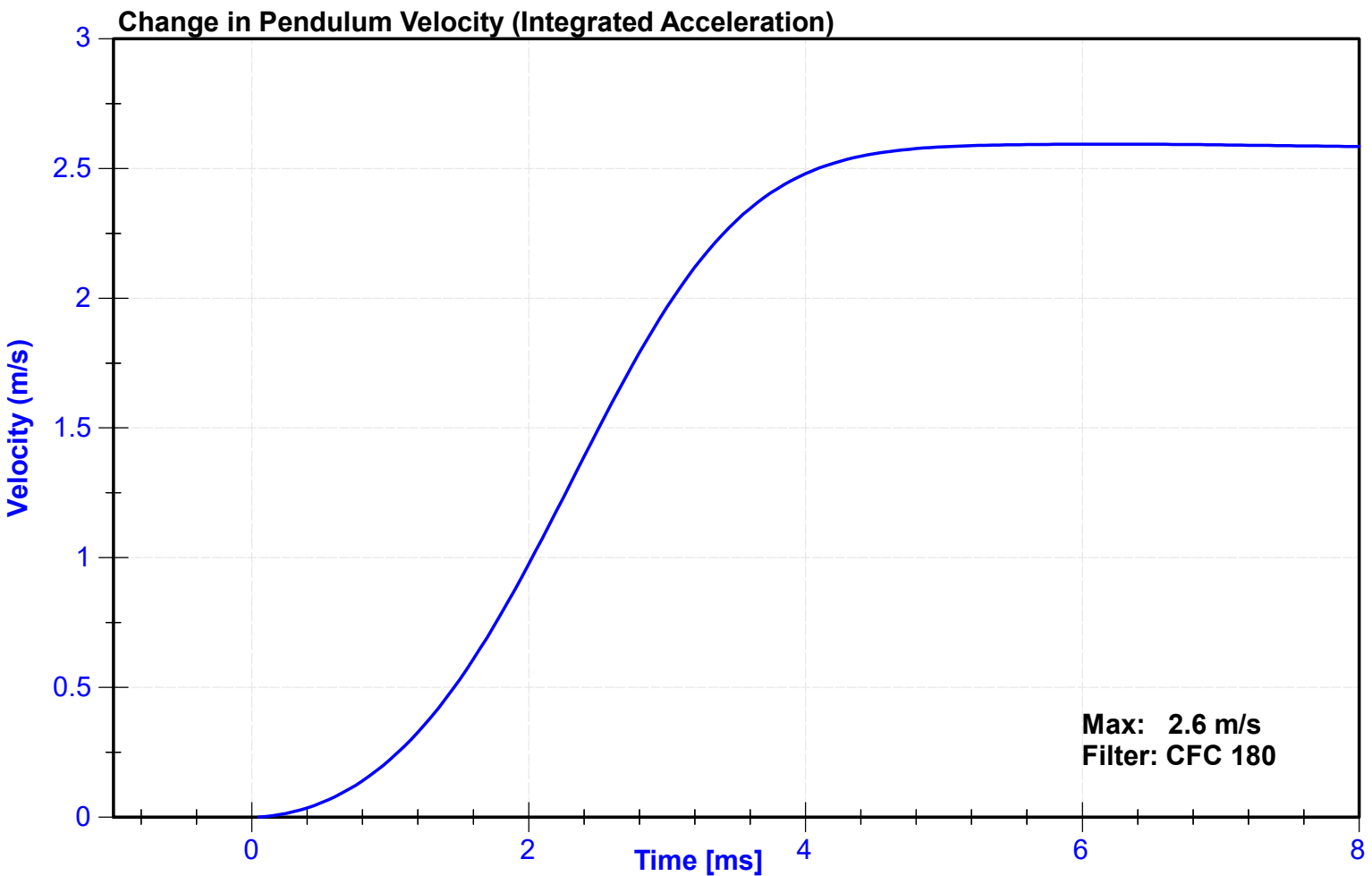
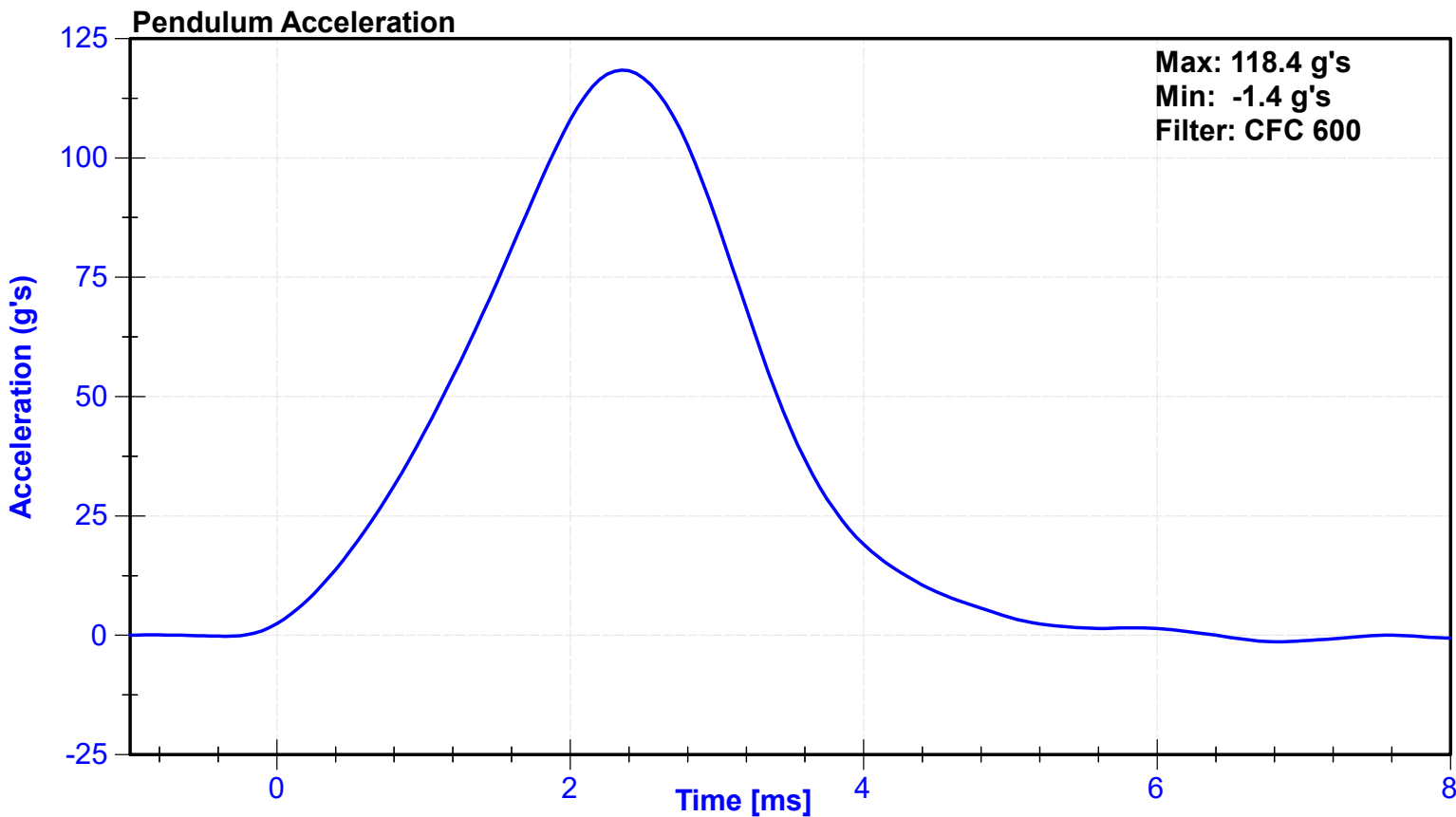
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.5	Pass
Humidity	10	70	%	53	Pass
Velocity	2.07	2.13	m/s	2.127	Pass
Maximum Resistive Force	4720	5780	N	5729.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18619	9/29/2023	3/27/2024





CALIBRATION TEST RESULTS

PRE-TEST

HYBRID III 5TH PERCENTILE - PASSENGER ATD

SERIAL NO: 137

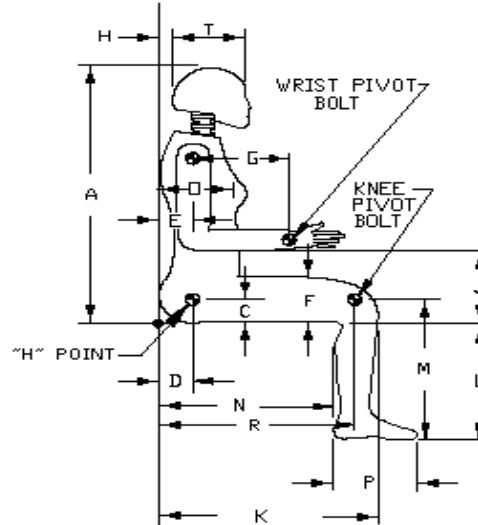
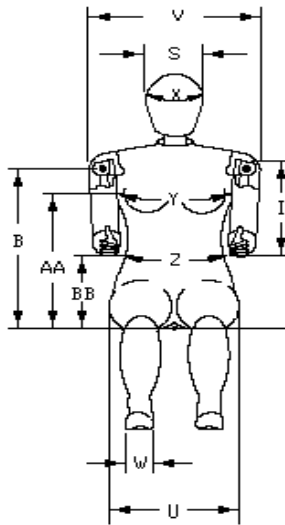


External Measurements - Hybrid 3 - 5th Female

Technician: K. Brogan

Date: 01/13/2024

Dummy Serial Number: 137



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	775	800	785	Pass
B	Shoulder Pivot Height	432	457	445	Pass
C	H-Point Height	81	86	84	Pass
D	H-Point from Backline	145	150	148	Pass
E	Shoulder Pivot from Backline	69	84	78	Pass
F	Thigh Clearance	119	135	129	Pass
G	Back of Elbow to Wrist Pivot	244	259	252	Pass
H	Head Back to Backline	43	48	45	Pass
I	Shoulder to Elbow Length	277	297	287	Pass
J	Elbow Rest Height	183	203	199	Pass
K	Buttock to Knee Length	521	546	535	Pass
L	Popliteal Height	356	376	369	Pass
M	Knee Pivot Height	394	419	409	Pass
N	Buttock Popliteal Length	414	439	429	Pass
O	Chest Depth without Jacket	175	191	185	Pass
P	Foot Length (right)	219	234	230	Pass
R	Buttock To Knee Pivot Length	457	483	466	Pass
S	Head Breadth	137	147	142	Pass
T	Head Depth	178	188	182	Pass
U	Hip Breadth	300	315	311	Pass
V	Shoulder Breadth	351	366	360	Pass
W	Foot Breadth	79	94	86	Pass
X	Head Circumference	528	549	538	Pass
Y	Chest Circumference with Jacket	851	881	872	Pass
Z	Waist Circumference	460	790	651	Pass
AA	Reference Location (Chest Circumference)	333	358	346	Pass
BB	Reference Location (Waist Circumference)	160	170	167	Pass

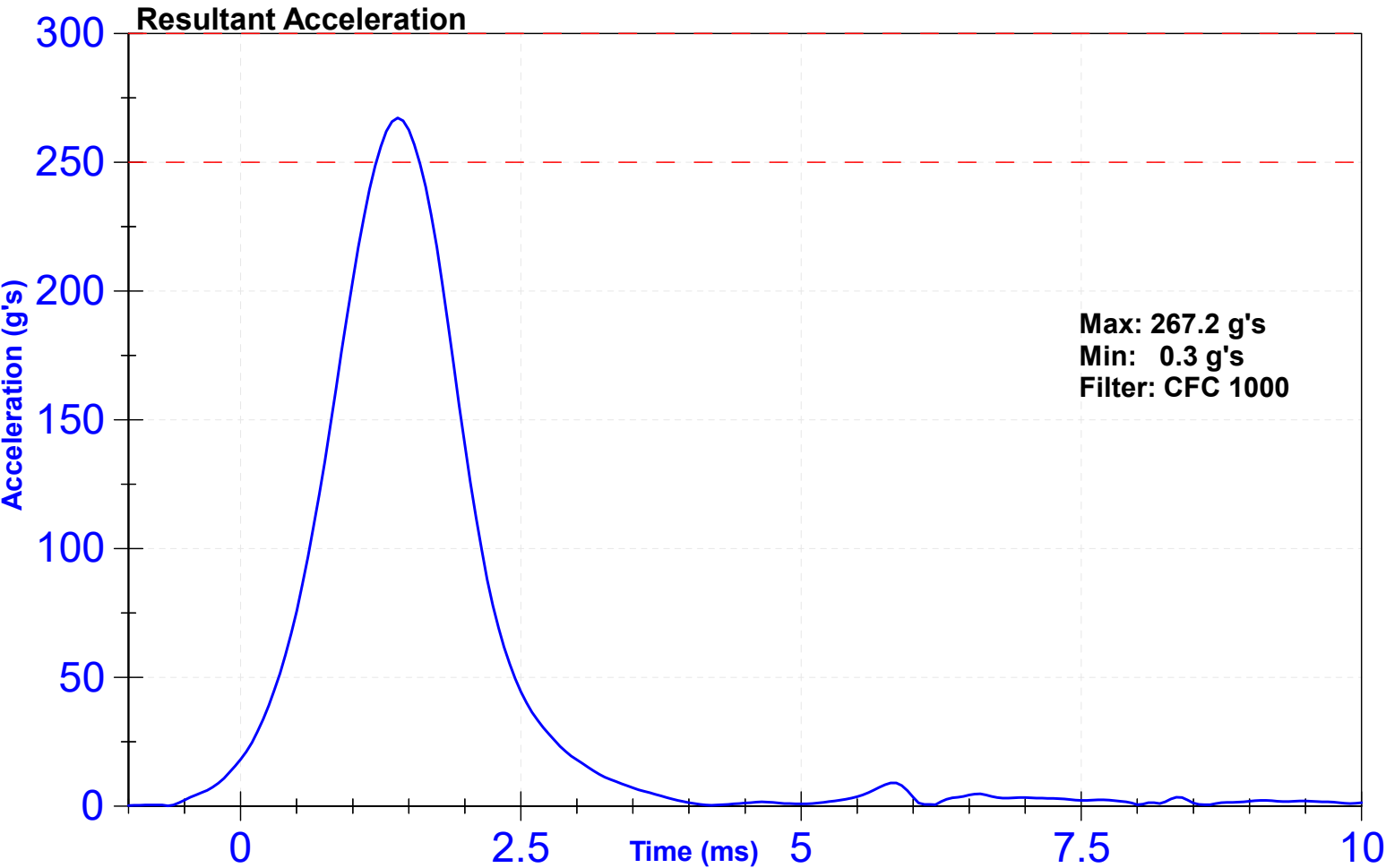
ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	137	Laboratory Supervisor	C. Mantell

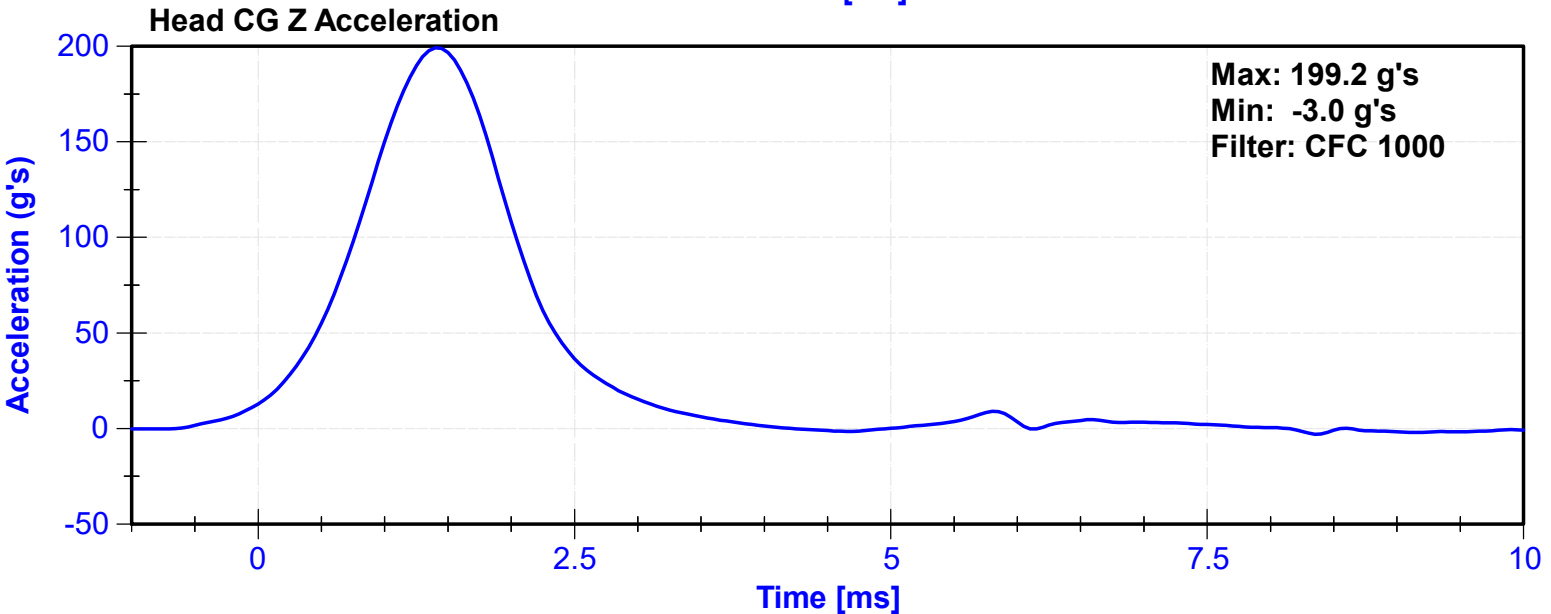
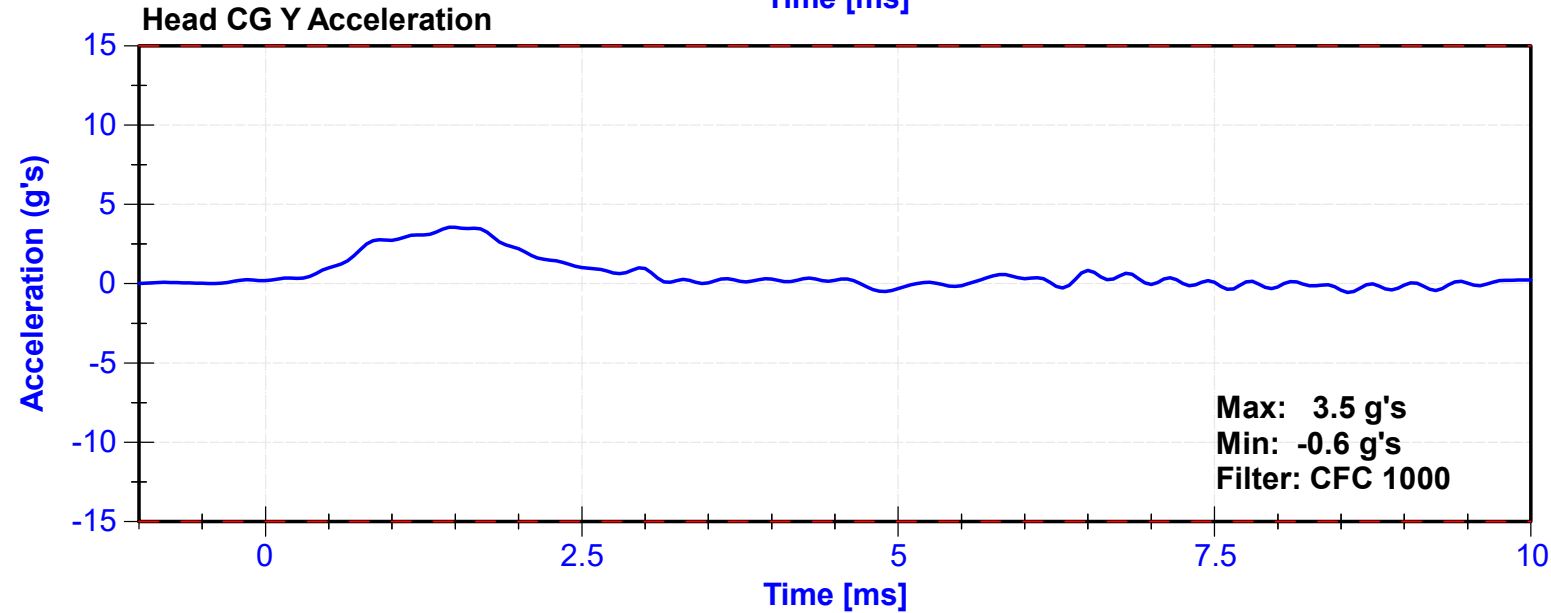
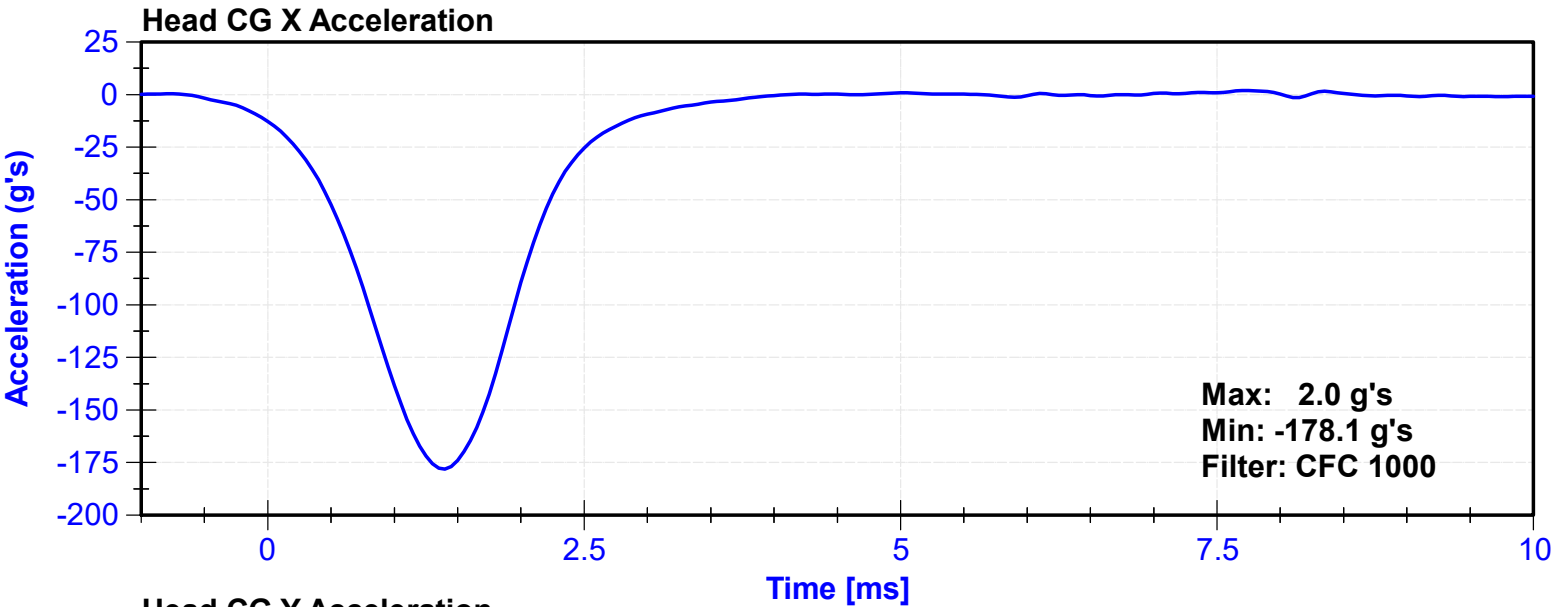
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.9	Pass
Humidity	10	70	%	25	Pass
Resultant Acceleration	250	300	g's	267.2	Pass
Oscillation	0	10	%	3.3	Pass
Lateral Acceleration	-15	15	g's	3.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	P79417	1/4/2024	7/2/2024
Y Accelerometer	Endevco	P83335	1/4/2024	7/2/2024
Z Accelerometer	Endevco	P64149	1/4/2024	7/2/2024





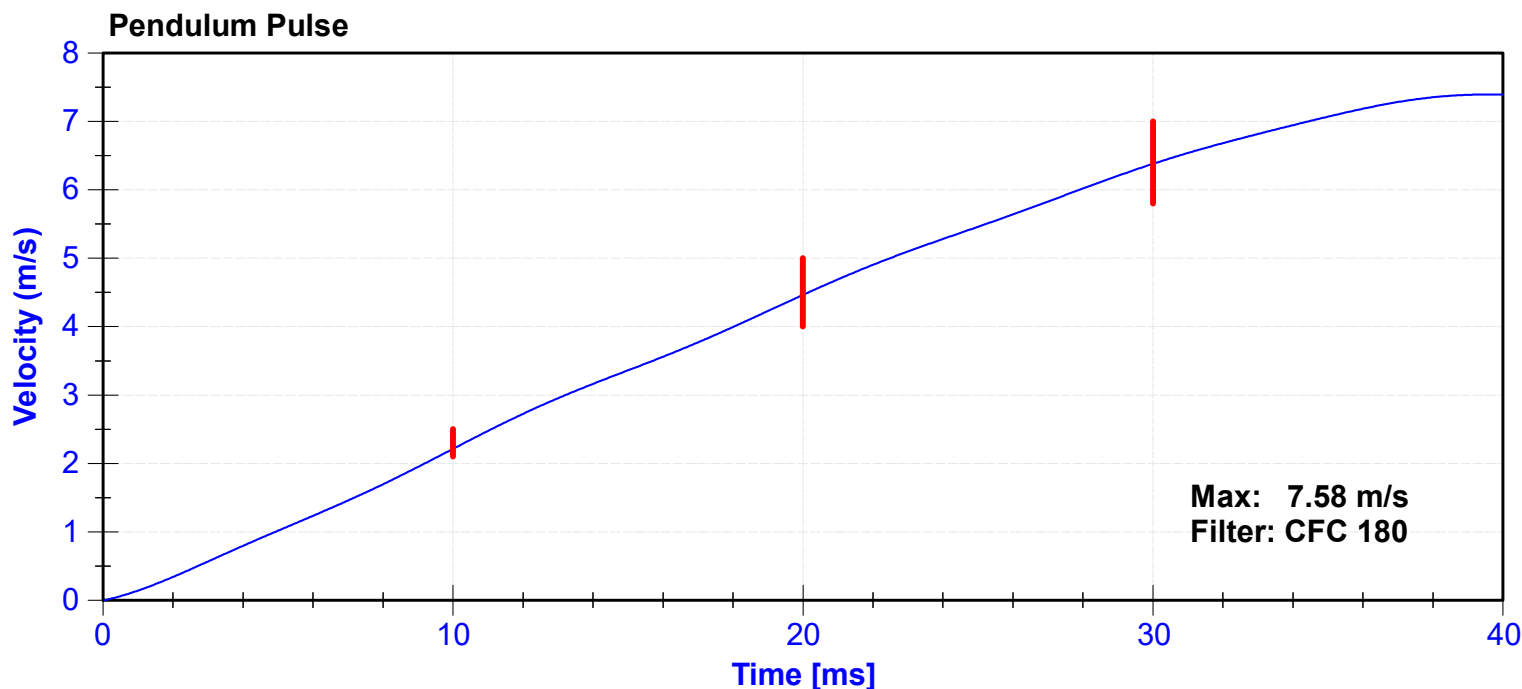
ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	137	Laboratory Supervisor	C. Mantell

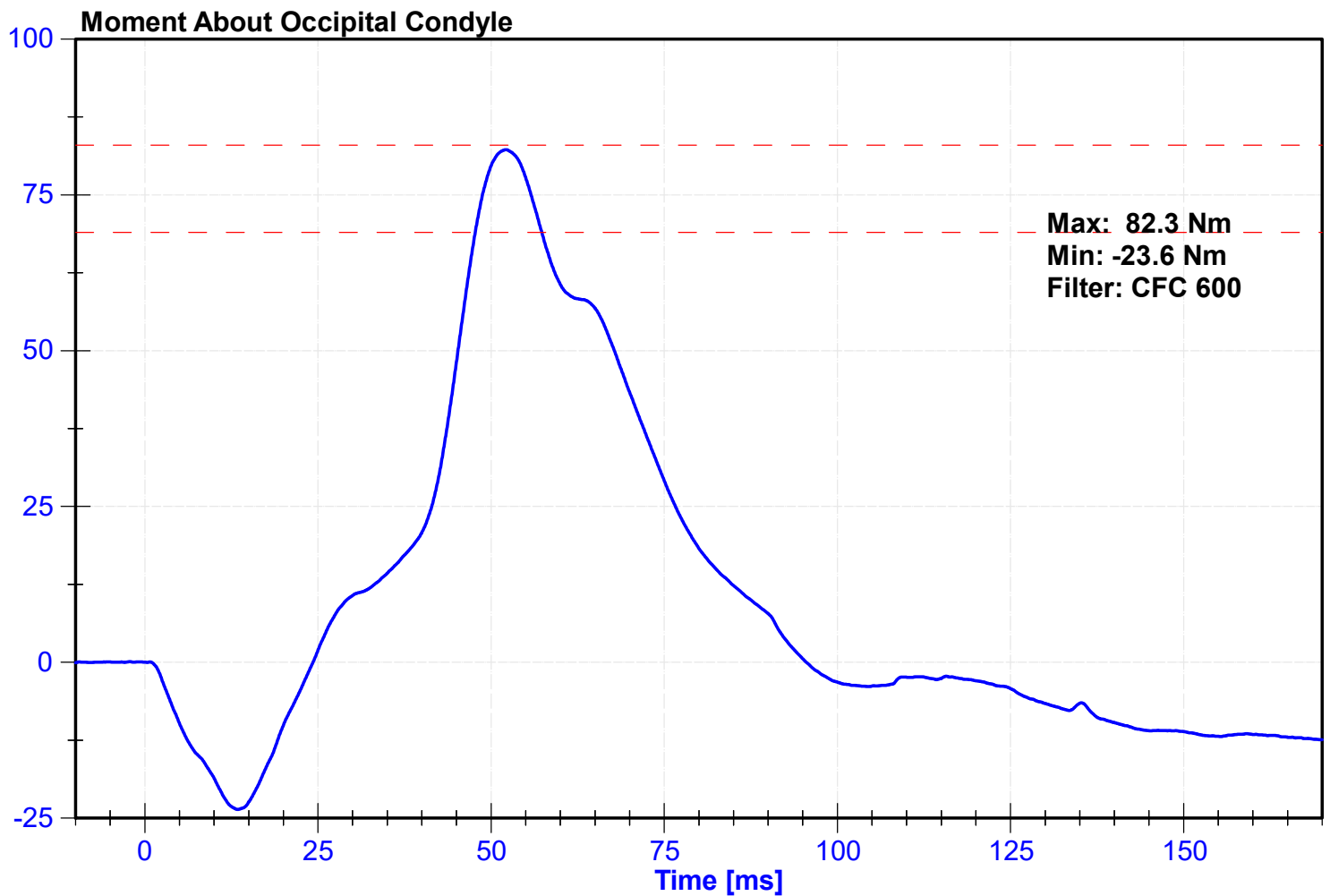
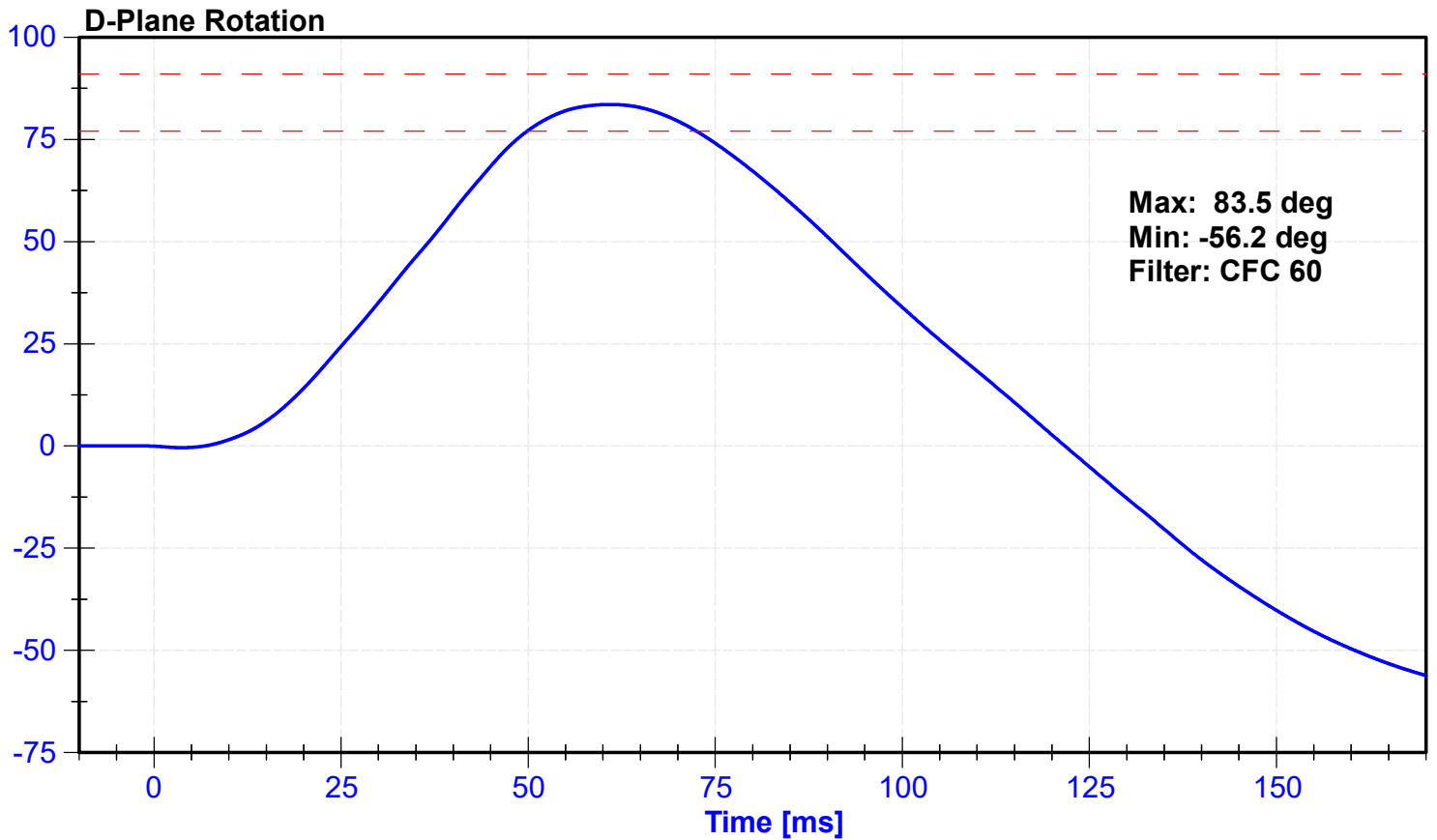
Results

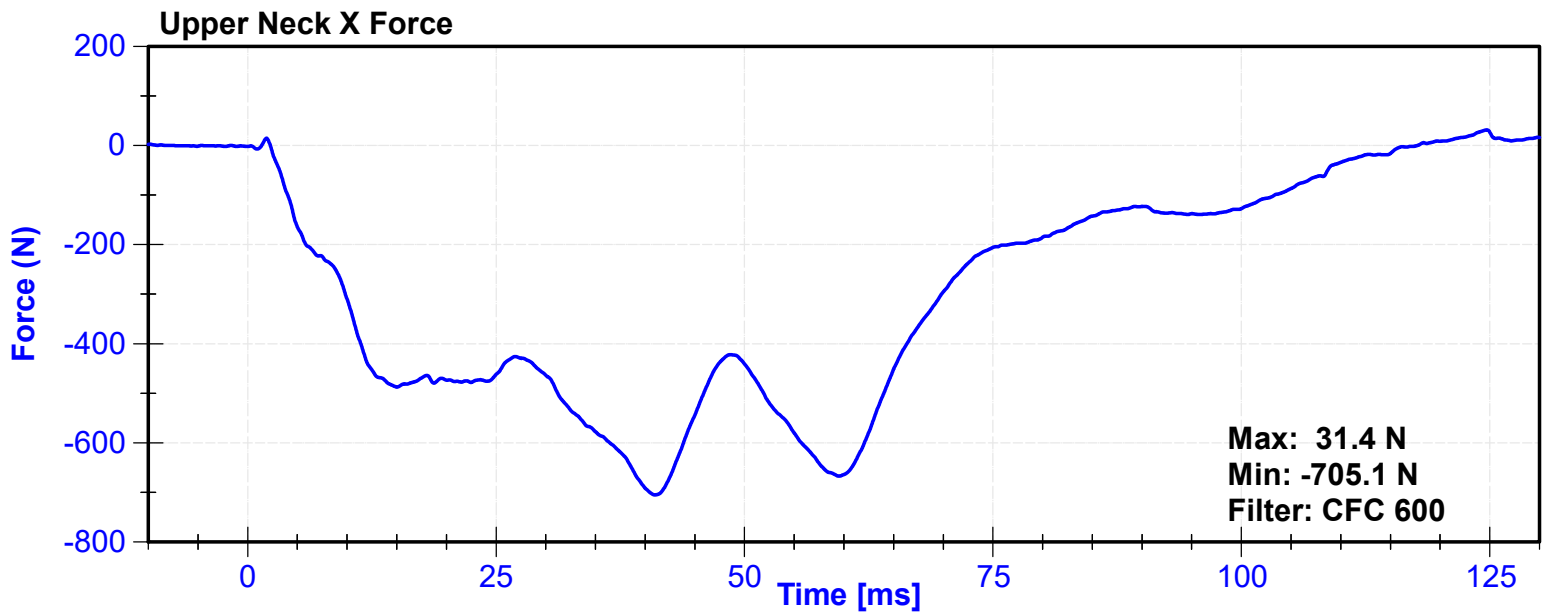
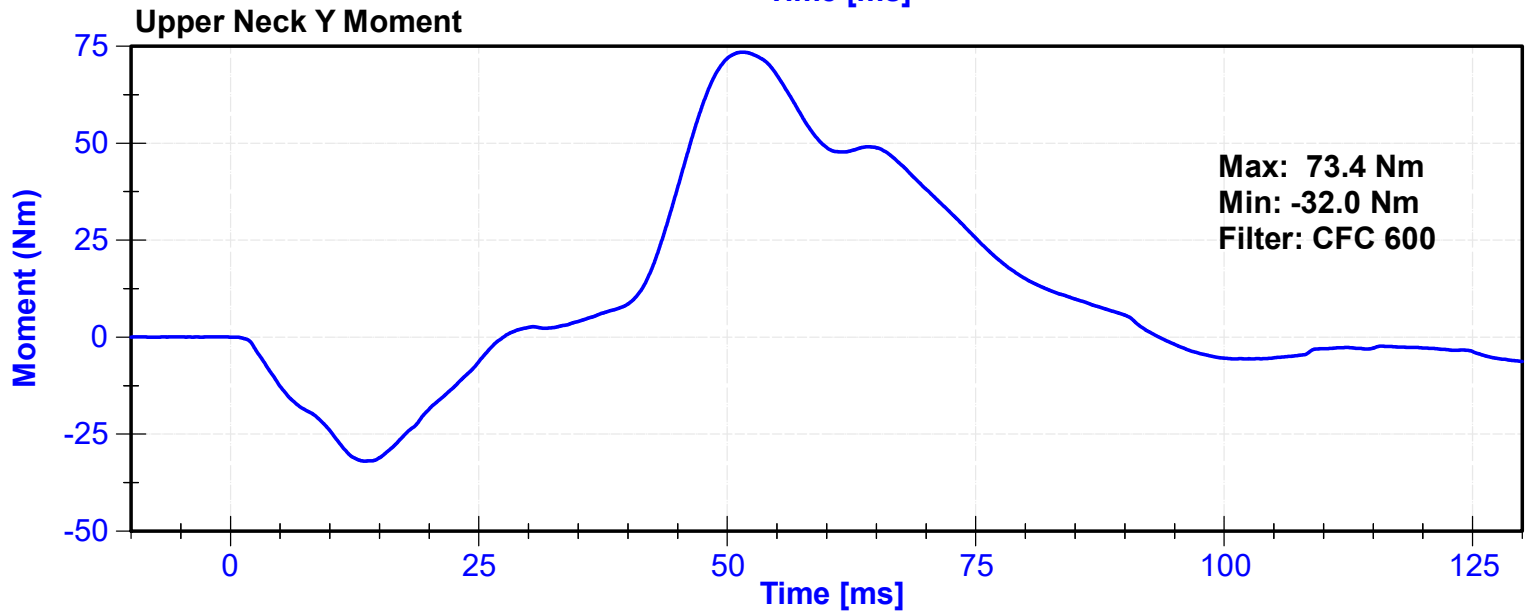
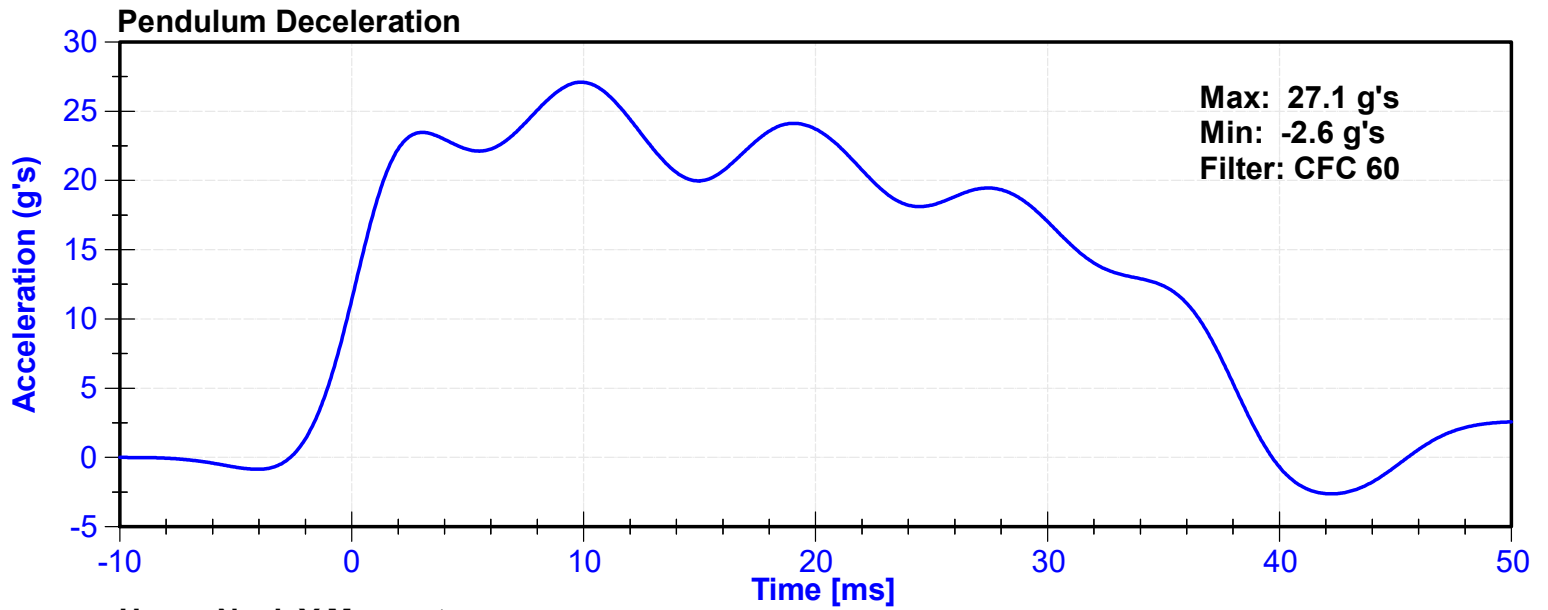
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	25	Pass
Velocity	6.89	7.13	m/s	7.027	Pass
Pendulum Impulse at 10ms	2.1	2.5	m/s	2.21	Pass
Pendulum Impulse at 20ms	4.0	5.0	m/s	4.46	Pass
Pendulum Impulse at 30ms	5.8	7.0	m/s	6.38	Pass
Max D Plane Rotation	77	91	deg	83.5	Pass
Max Moment During Rotation Interval	69	83	Nm	82.3	Pass
Moment Decay to 10.0 Nm	80	100	ms	87.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	7231C-750	10/31/2023	4/28/2024
Pendulum Potentiometer	ETI	LABPOT1	5/5/2023	5/4/2024
Condyle Potentiometer	ETI	LABPOT2	7/19/2023	7/18/2024
Upper Neck Load Cell	Denton	2207-FX	6/23/2023	6/22/2024







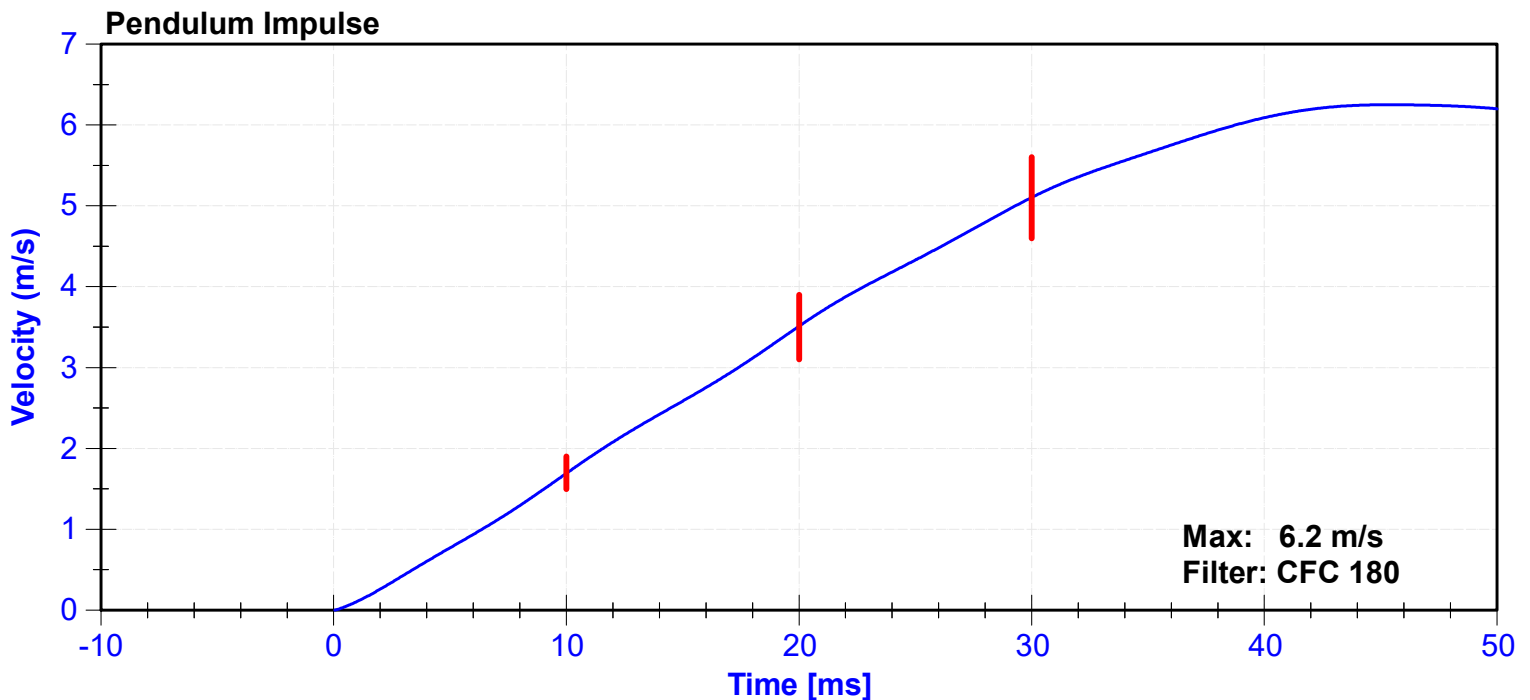
ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	137	Laboratory Supervisor	C. Mantell

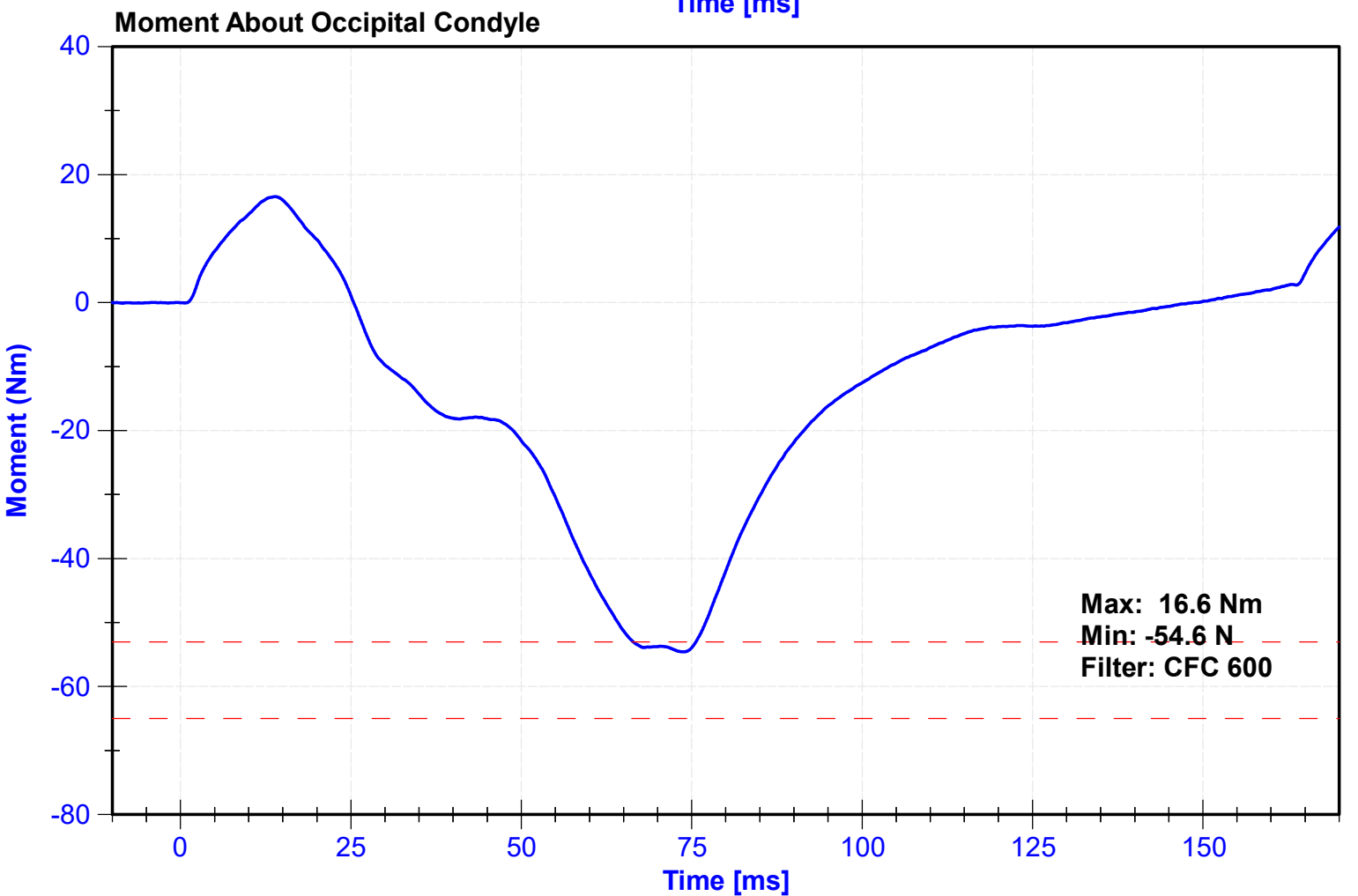
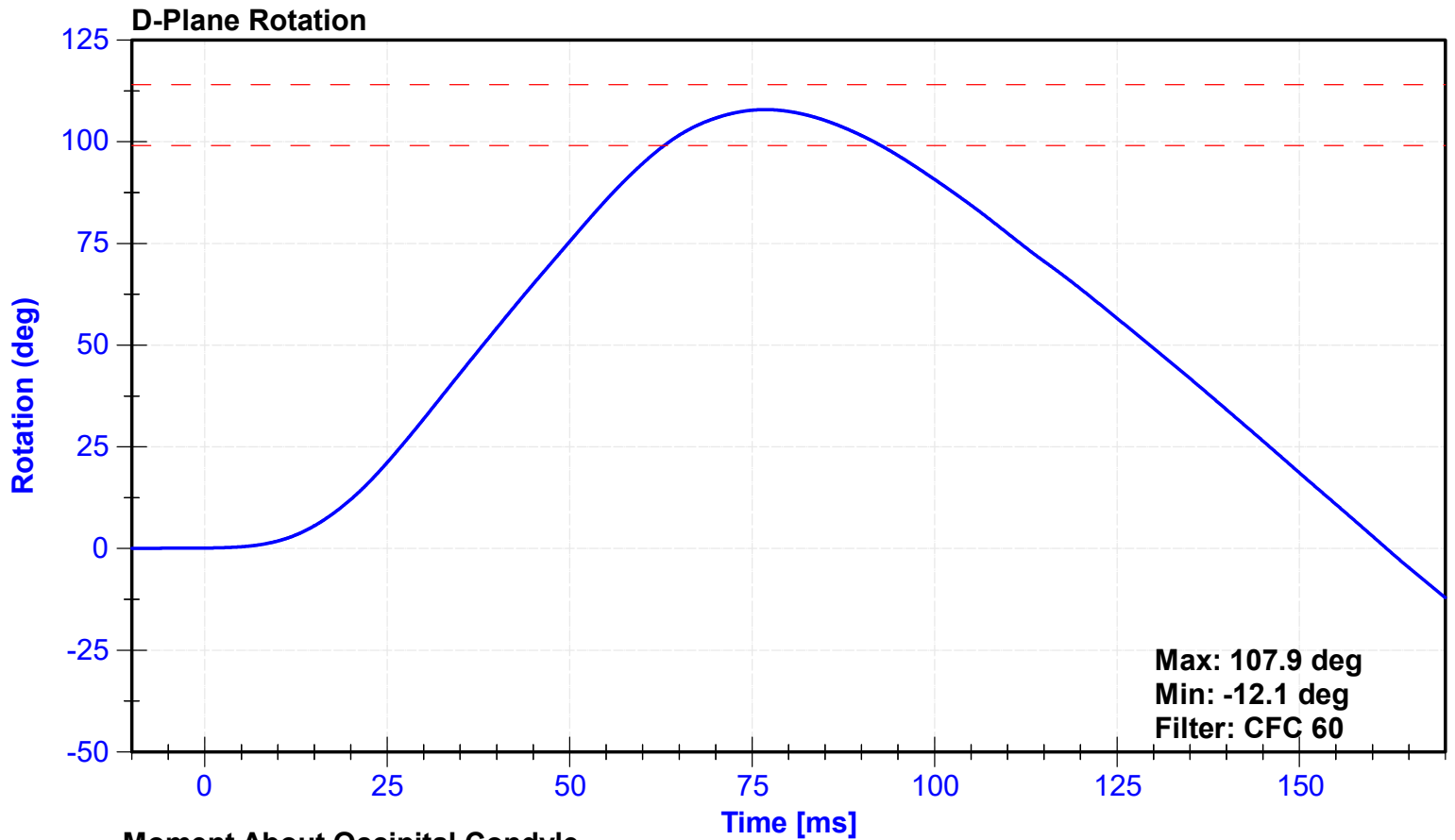
Results

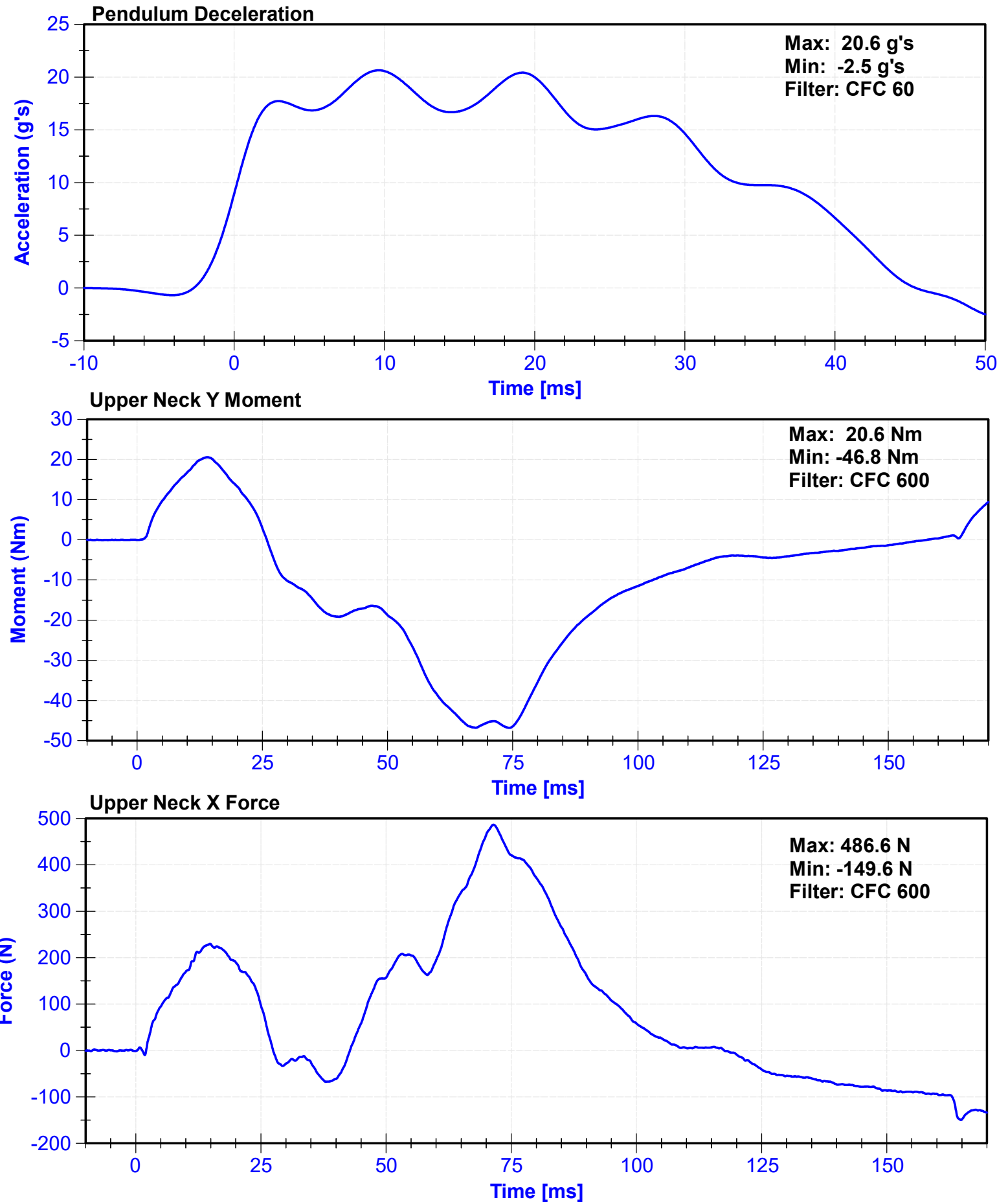
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	25	Pass
Velocity	5.95	6.19	m/s	6.065	Pass
Pendulum Impulse at 10ms	1.5	1.9	m/s	1.69	Pass
Pendulum Impulse at 20ms	3.1	3.9	m/s	3.51	Pass
Pendulum Impulse at 30ms	4.6	5.6	m/s	5.10	Pass
D Plane Rotation	99	114	deg	107.9	Pass
Moment During Rotation Interval	-65	-53	Nm	-54.6	Pass
Moment Decay to -10Nm	94	114	ms	104.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16503	10/31/2023	4/28/2024
Pendulum Potentiometer	ETI	LABPOT1	5/5/2023	5/4/2024
Condyle Potentiometer	ETI	LABPOT2	7/19/2023	7/18/2024
Upper Neck Load Cell	Denton	2207-FX	6/23/2023	6/22/2024



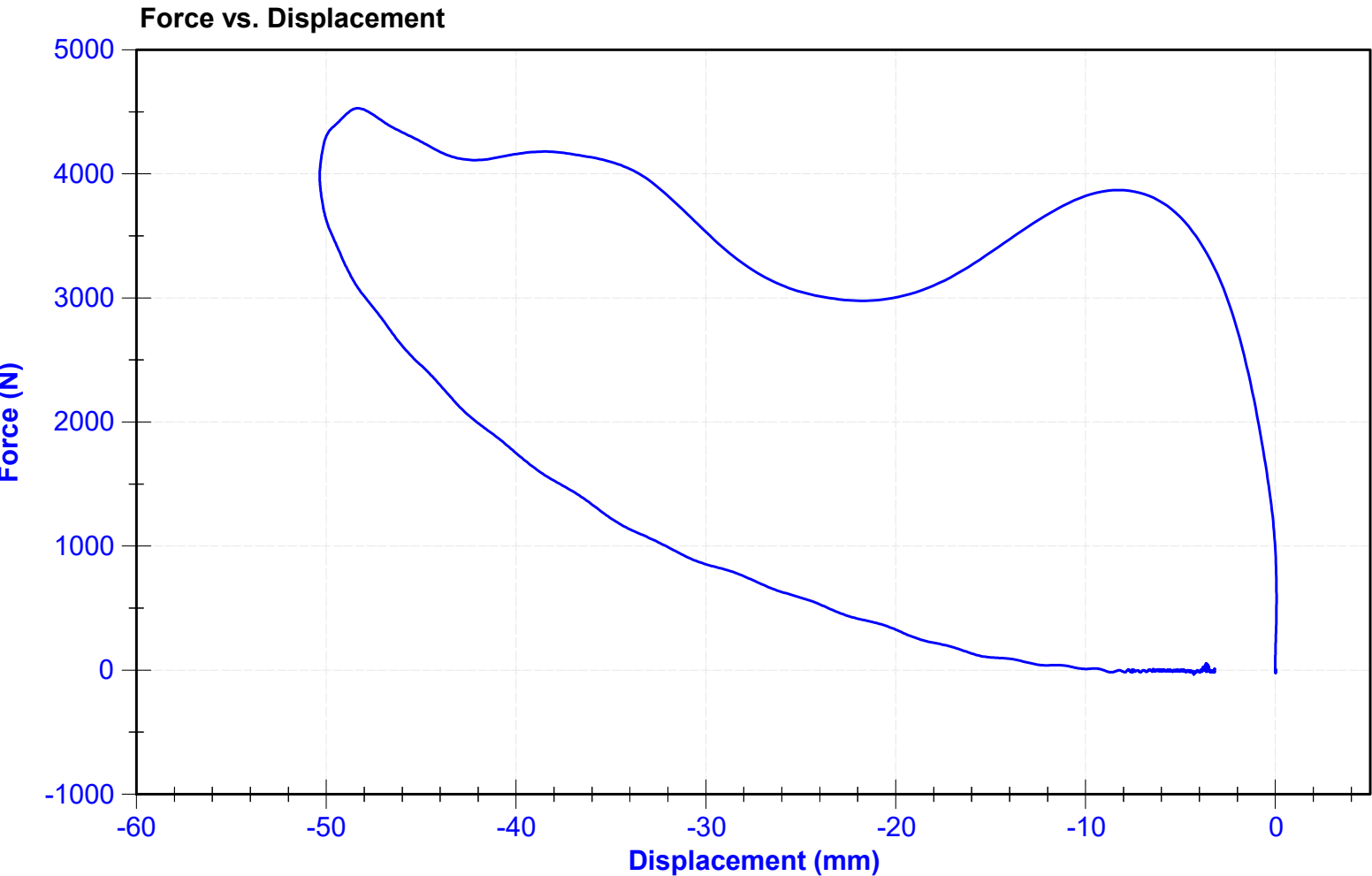


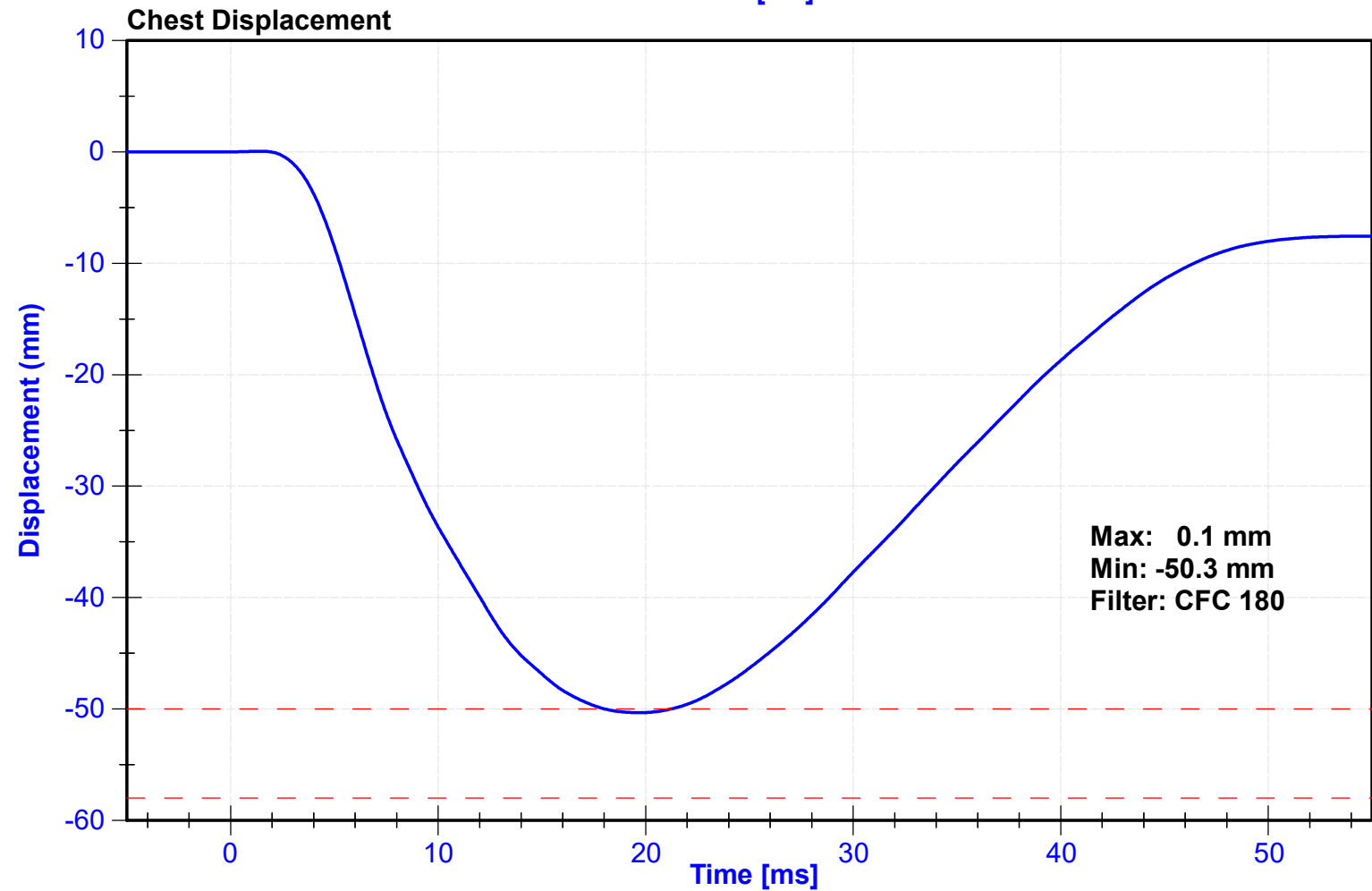
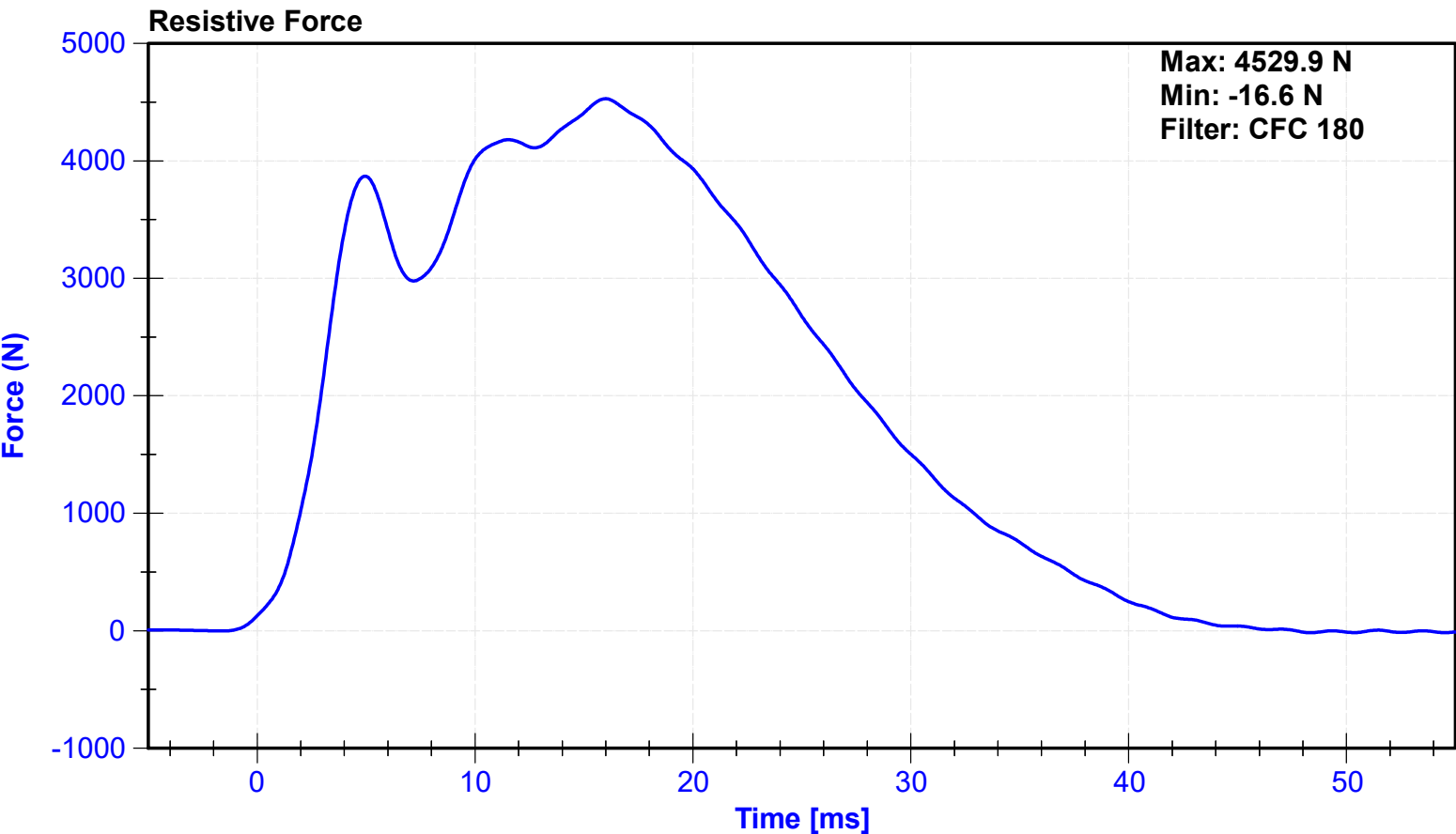


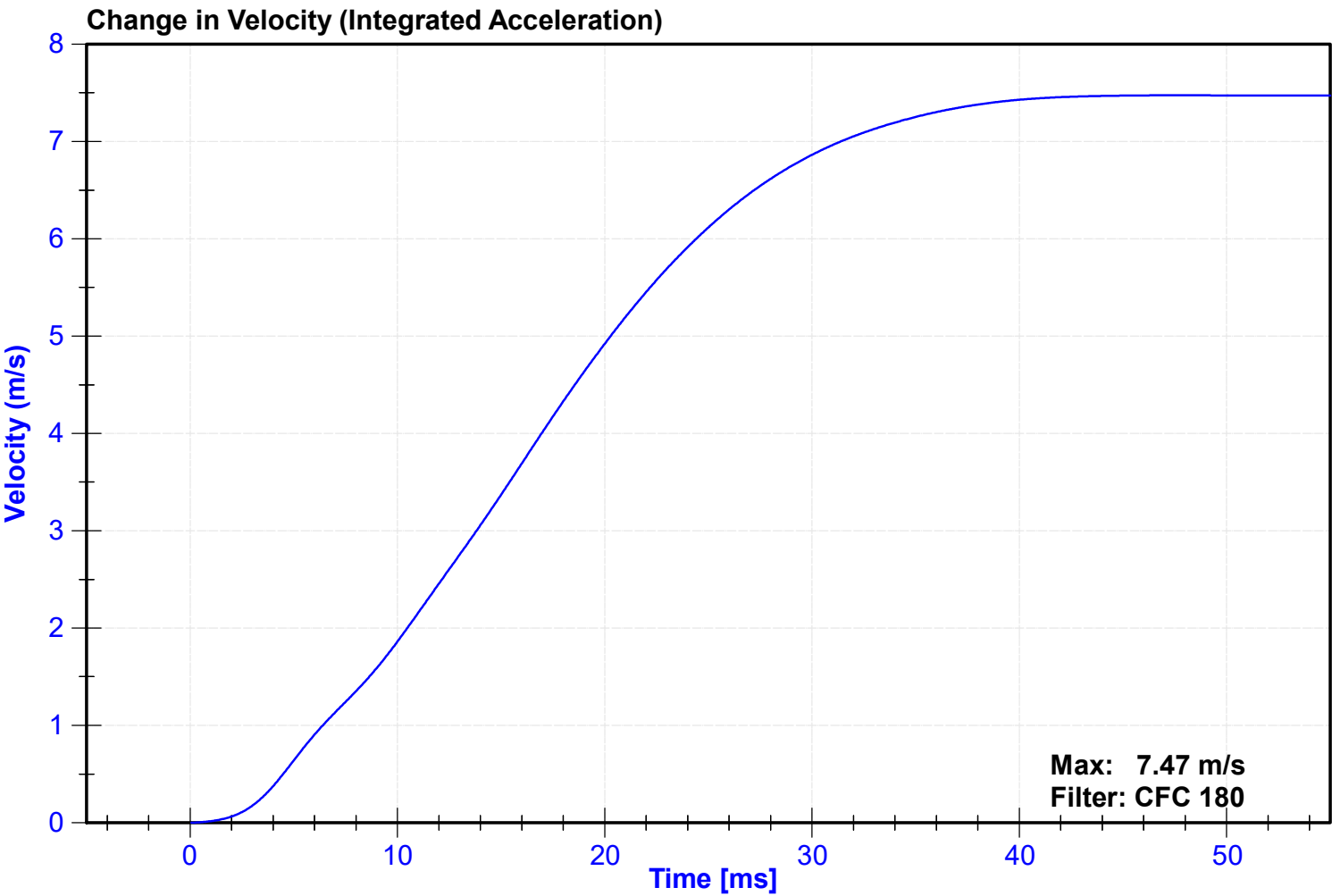
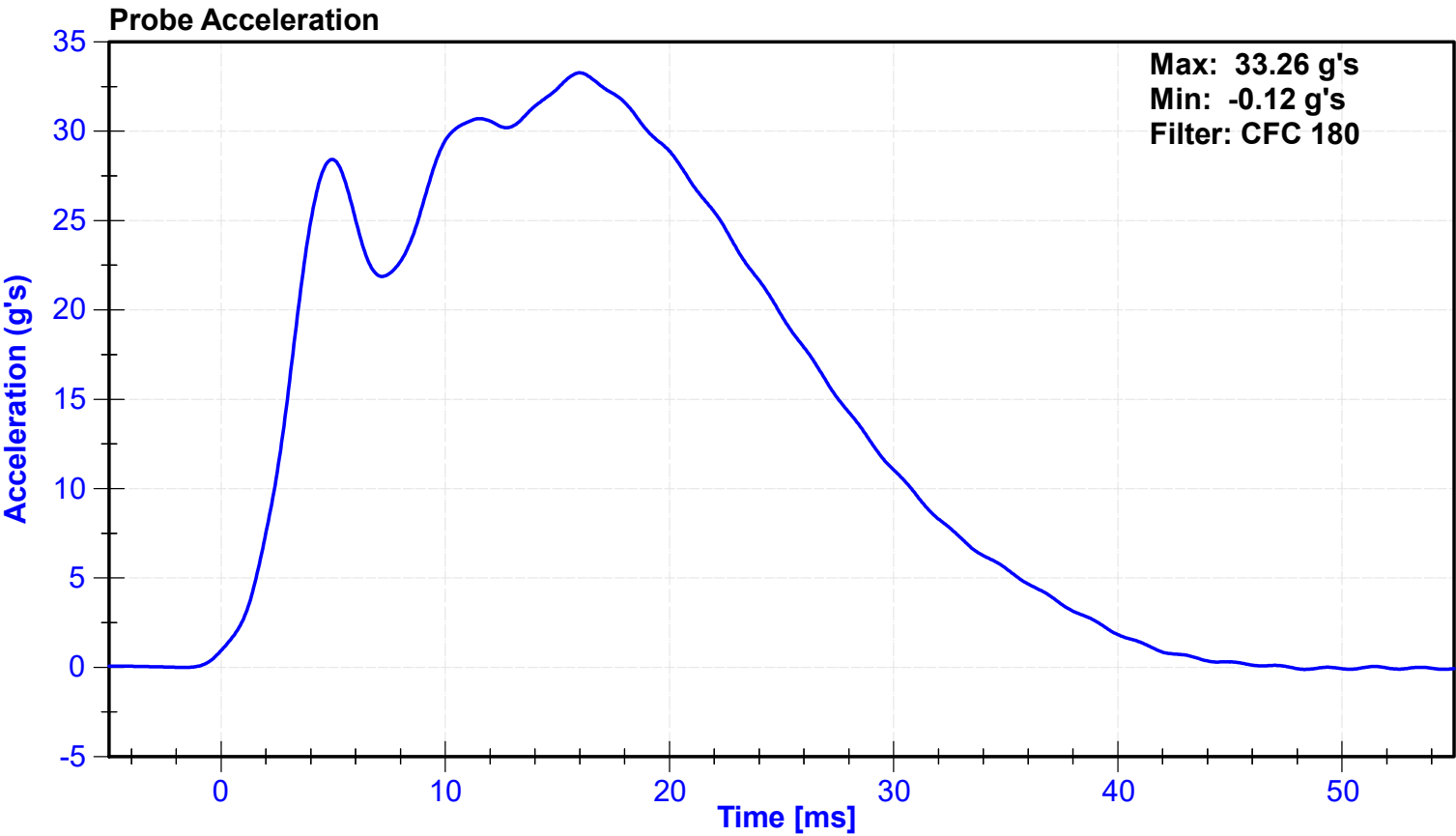
ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	137	Laboratory Supervisor	C. Mantel

Test Parameter	Results		Unit	Result	Pass/Fail
	Minimum Specification	Maximum Specification			
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	25	Pass
Velocity	6.59	6.83	m/s	6.723	Pass
Chest Deflection	-58	-50	mm	-50.3	Pass
Maximum Resistive Force (50 to 58mm)	3900	4400	N	4304.3	Pass
Maximum Resistive Force (18 to 50mm)	0	4600	N	4529.9	Pass
Hysteresis	69	85	%	74.7	Pass

Transducer Calibrations				
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18587	11/20/2023	11/19/2024
Chest Potentiometer	Servo	0720	1/5/2024	7/5/2024







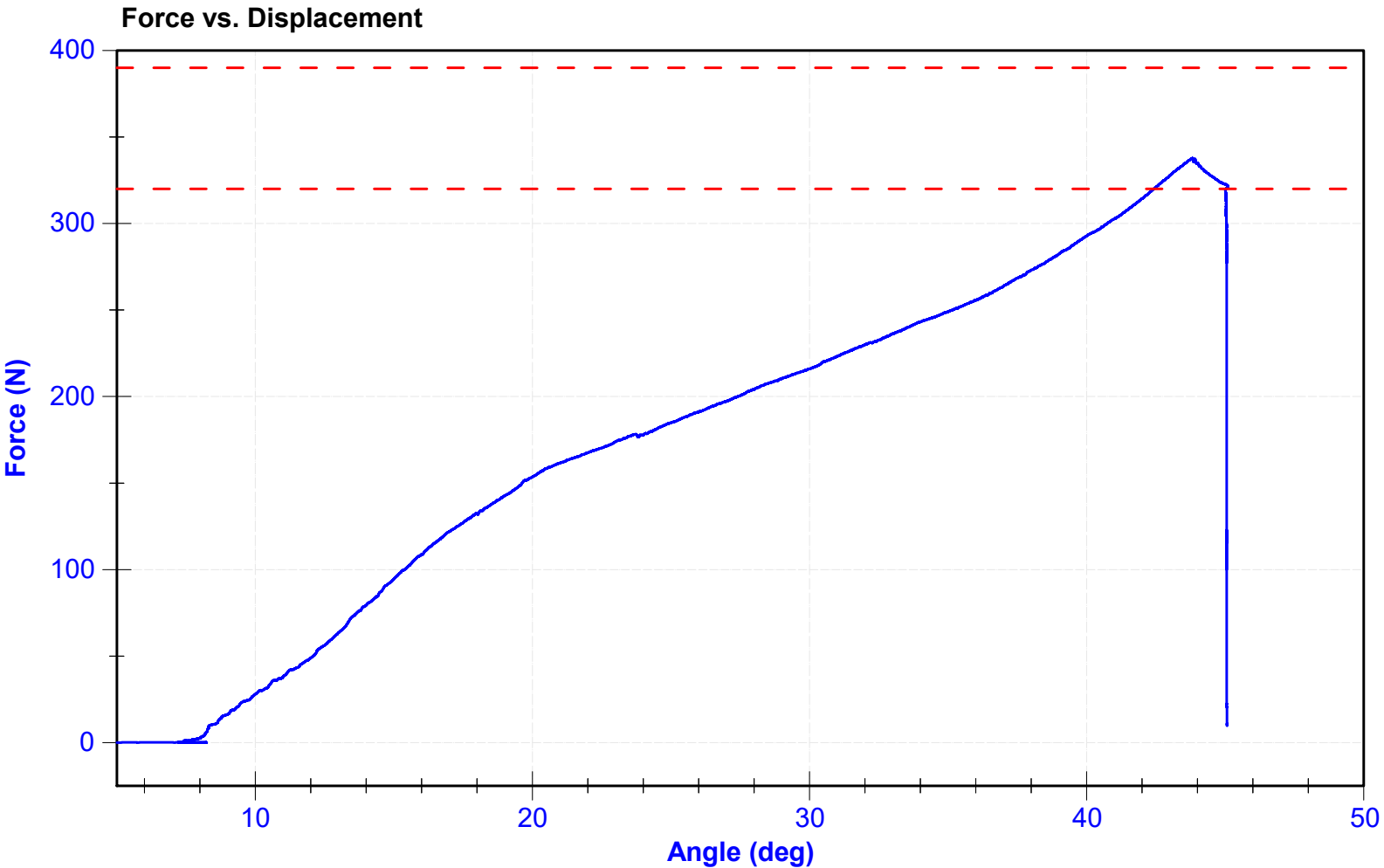
ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	137	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.6	25.6	°C	20.9	Pass
Humidity	10	70	%	25	Pass
Initial Angle	0	20	deg	7.8	Pass
Force at 45 Degrees	320	390	N	337.6	Pass
Return Angle Relative to Initial	0	8	deg	6.3	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



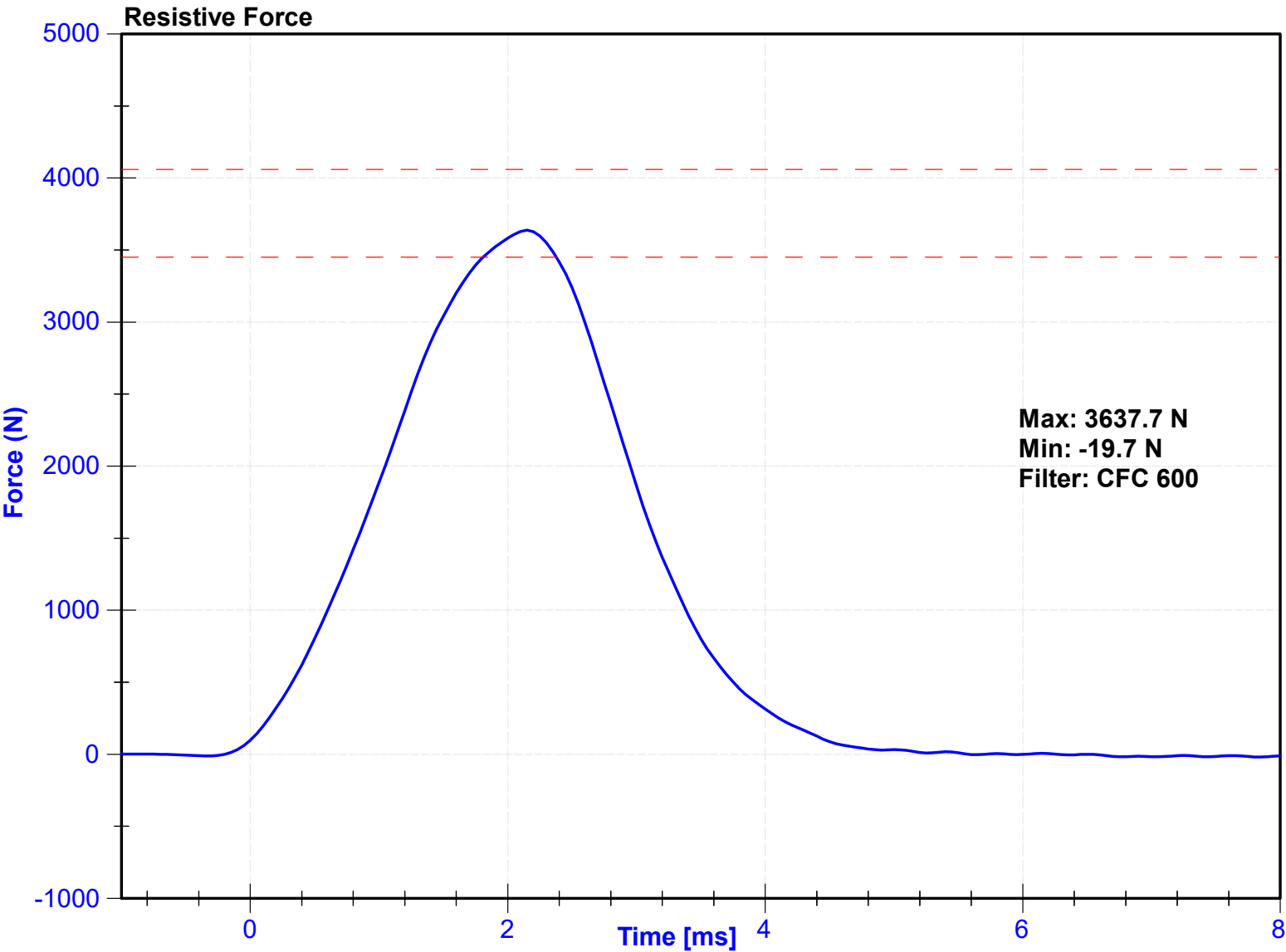
ATD Manufacturer	Humanetics	Test Technician	J. Kinderman
ATD Serial Number	137	Laboratory Supervisor	C. Mantell

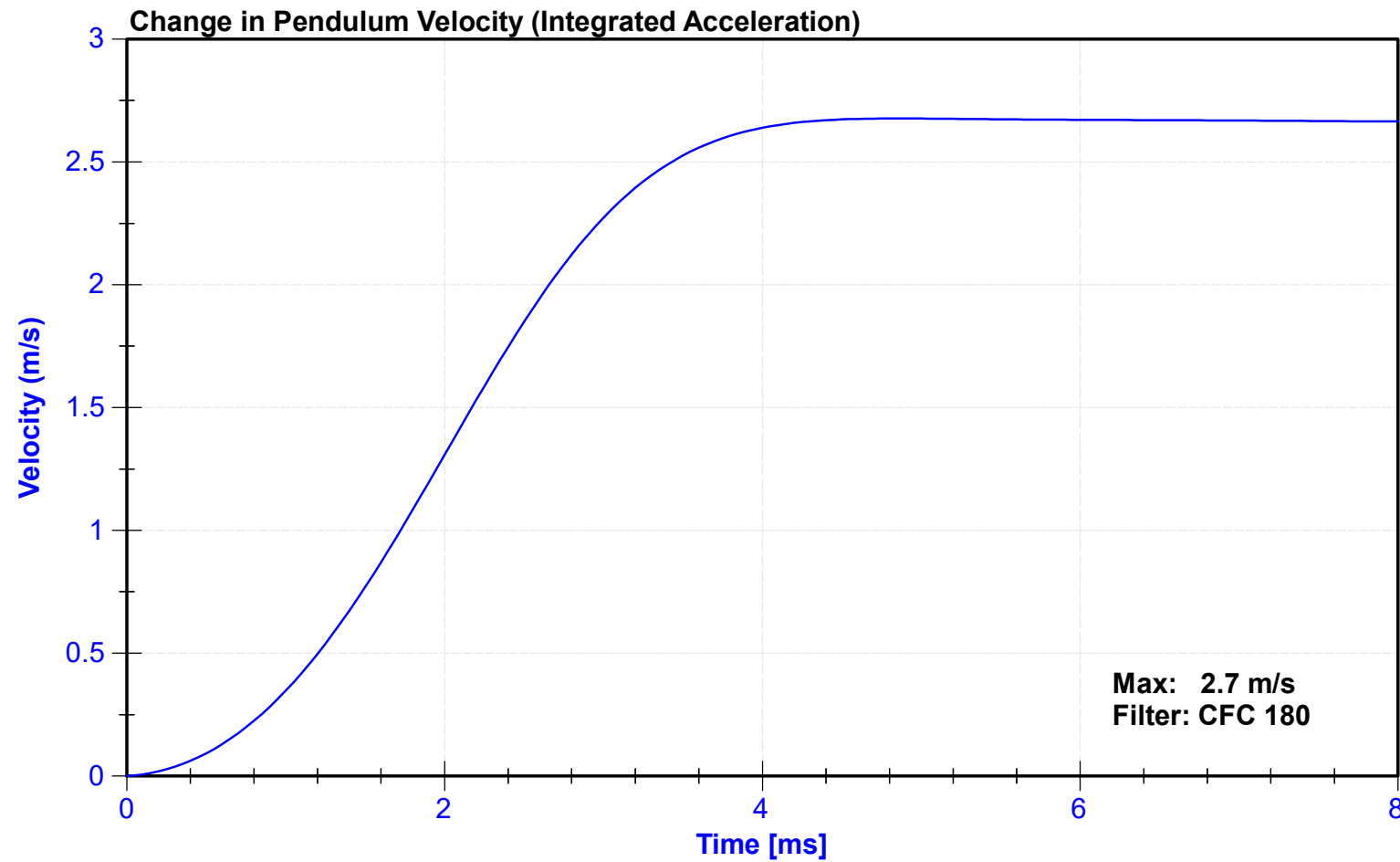
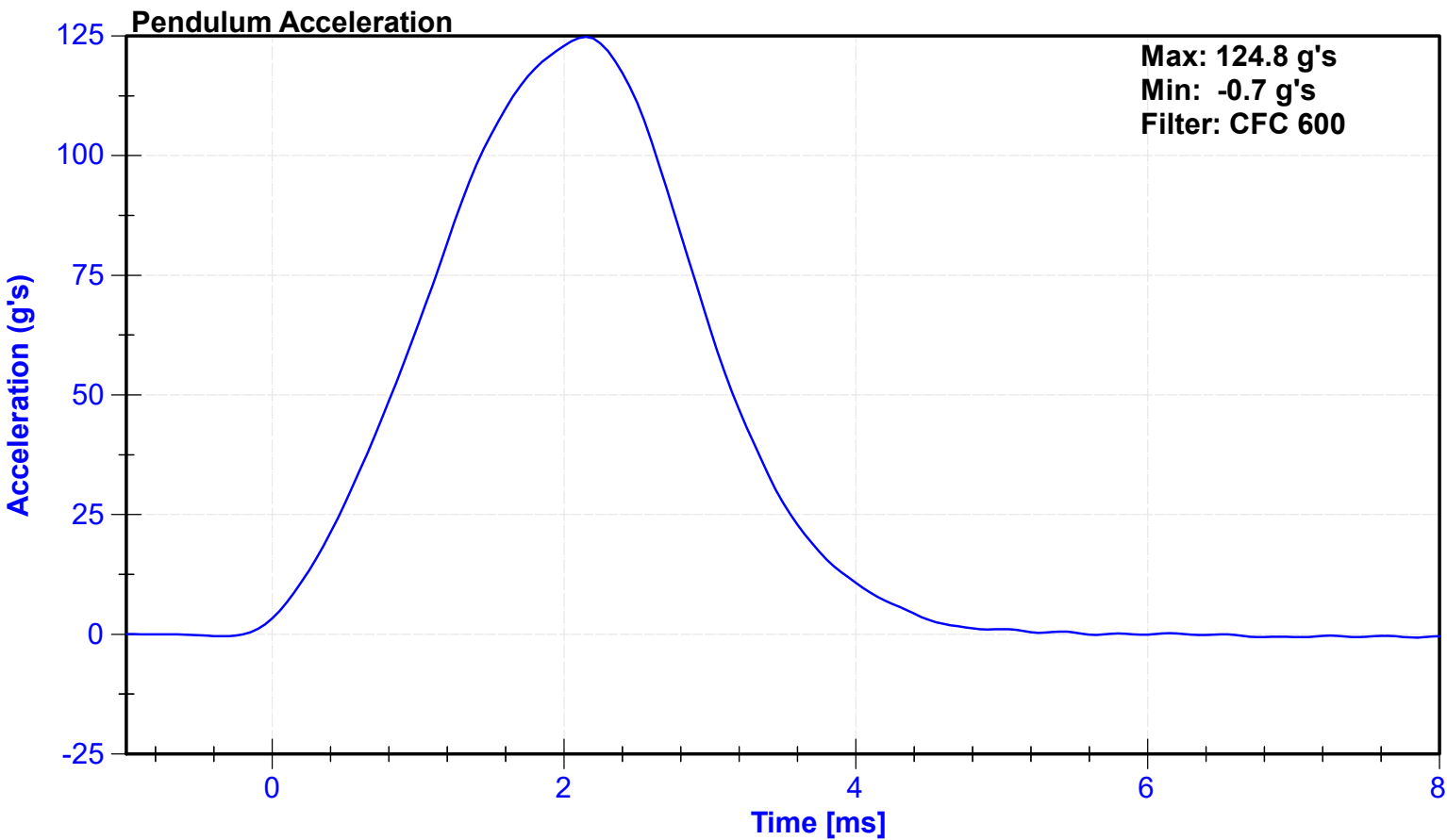
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.5	Pass
Humidity	10	70	%	53	Pass
Velocity	2.07	2.13	m/s	2.114	Pass
Resistive Force	3450	4060	N	3637.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18619	9/29/2023	3/27/2024





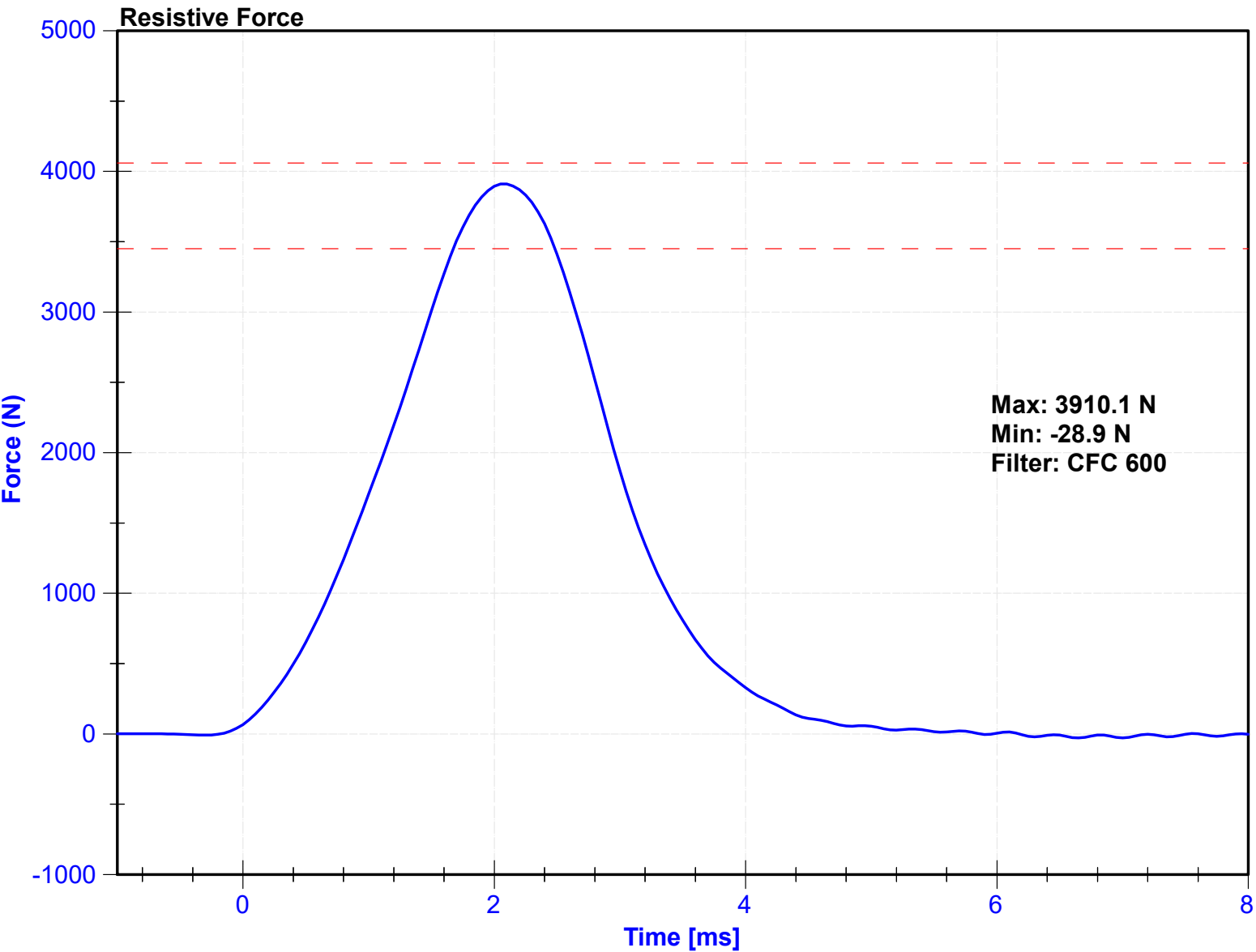
ATD Manufacturer	Humanetics	Test Technician	J. Kinderman
ATD Serial Number	137	Laboratory Supervisor	C. Mantell

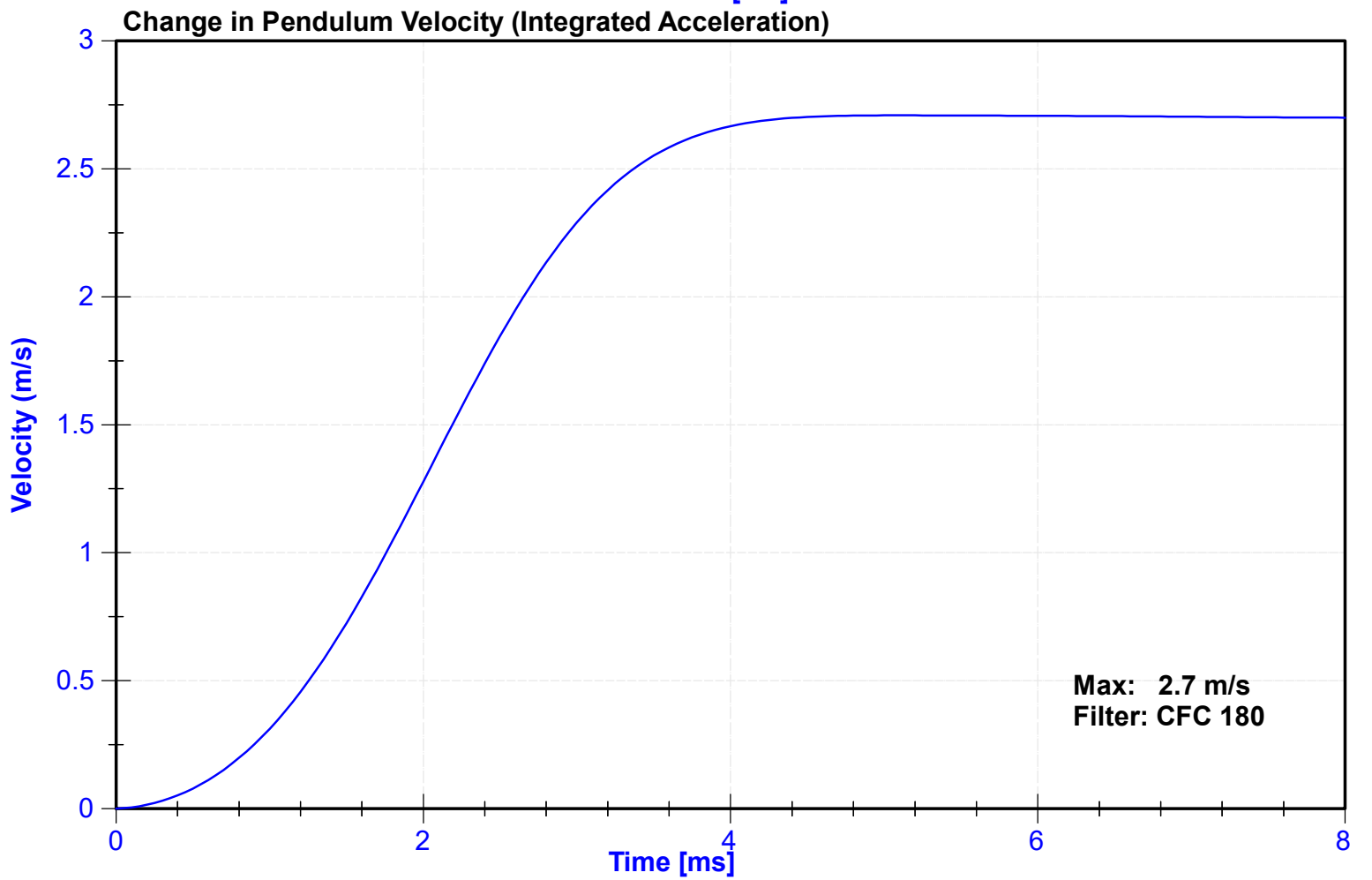
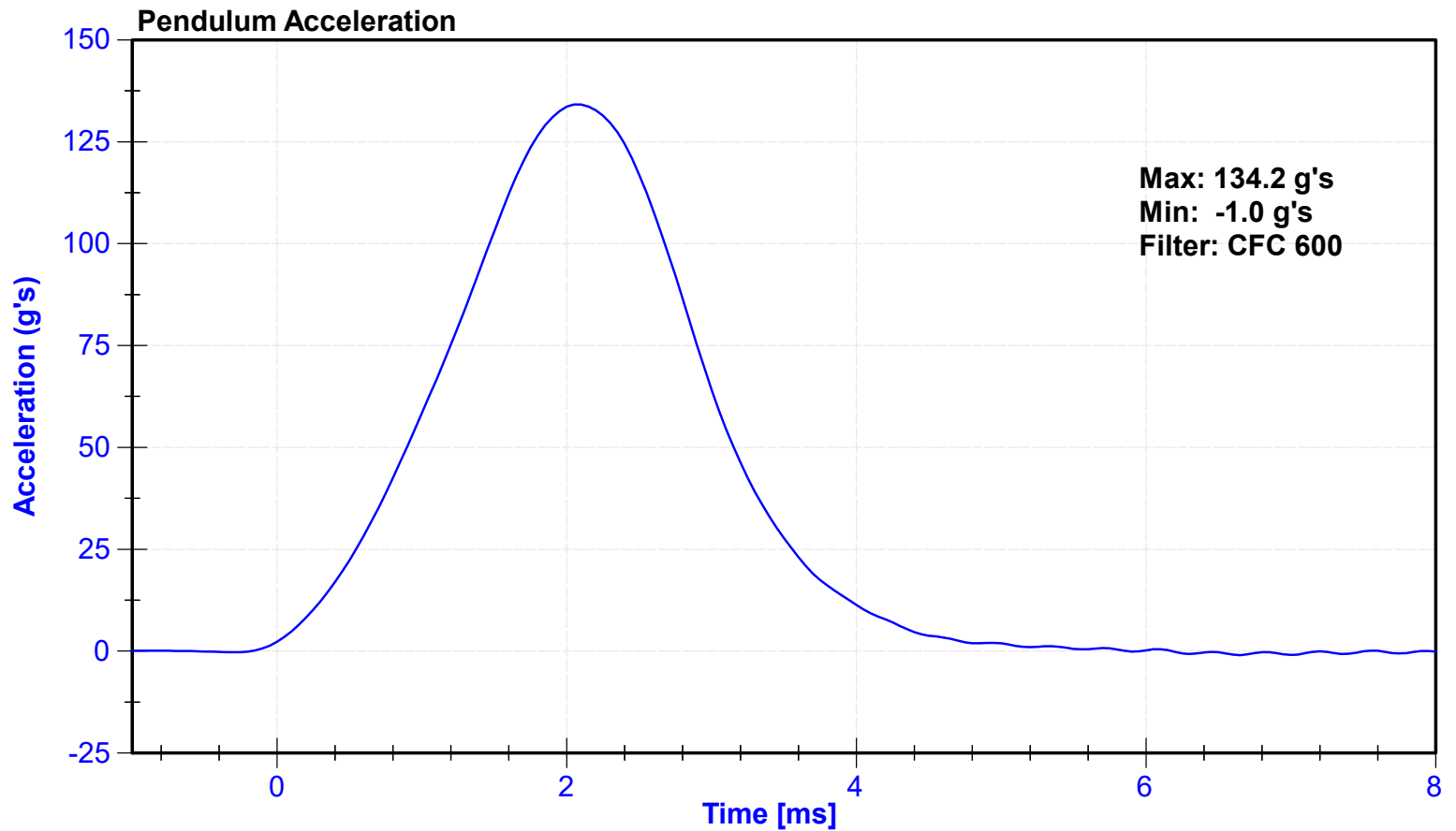
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.5	Pass
Humidity	10	70	%	53	Pass
Velocity	2.07	2.13	m/s	2.115	Pass
Resistive Force	3450	4060	N	3910.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18619	9/29/2023	3/27/2024





CALIBRATION TEST RESULTS

POST-TEST

HYBRID III 50TH PERCENTILE MALE - DRIVER ATD

SERIAL NO: 142

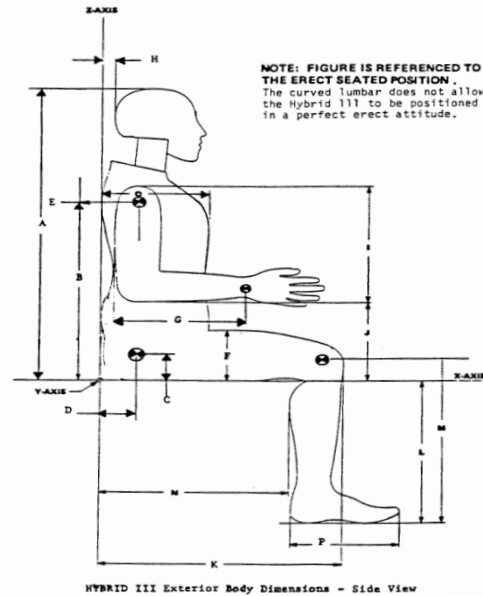
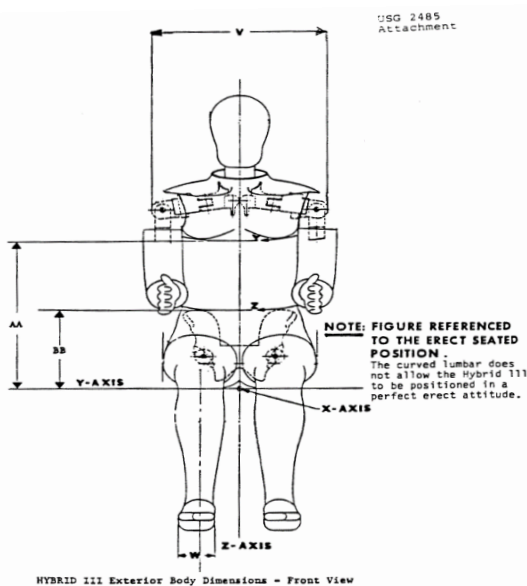


External Measurements - Hybrid 3 - 50th Male

Technician: K. Brogan

Date: 01/15/2024

Dummy Serial Number: 142



Symbol	Description	Specification (in)		Result (in)	Pass/Fail
A	Sitting Height	34.6	35.0	34.8	Pass
B	Shoulder Pivot Height	19.9	20.5	20.2	Pass
C	H-Point Height	3.3	3.5	3.4	Pass
D	H-Point from Backline	5.3	5.5	5.4	Pass
E	Shoulder Pivot from Backline	3.3	3.7	3.4	Pass
F	Thigh Clearance	5.5	6.1	6.0	Pass
G	Back of Elbow to Wrist Pivot	11.4	12.0	11.8	Pass
H	Head Back to Backline	1.6	1.8	1.7	Pass
I	Shoulder to Elbow Length	13.0	13.6	13.4	Pass
J	Elbow Rest Height	7.5	8.3	7.9	Pass
K	Buttock to Knee Length	22.8	23.8	23.5	Pass
L	Popliteal Height	16.9	17.9	17.5	Pass
M	Knee Pivot Height	19.1	19.7	19.5	Pass
N	Buttock Popliteal Length	17.8	18.8	18.4	Pass
O	Chest Depth without Jacket	8.4	9.0	8.8	Pass
P	Foot Length (right)	9.9	10.5	10.2	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	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	9.0	Pass

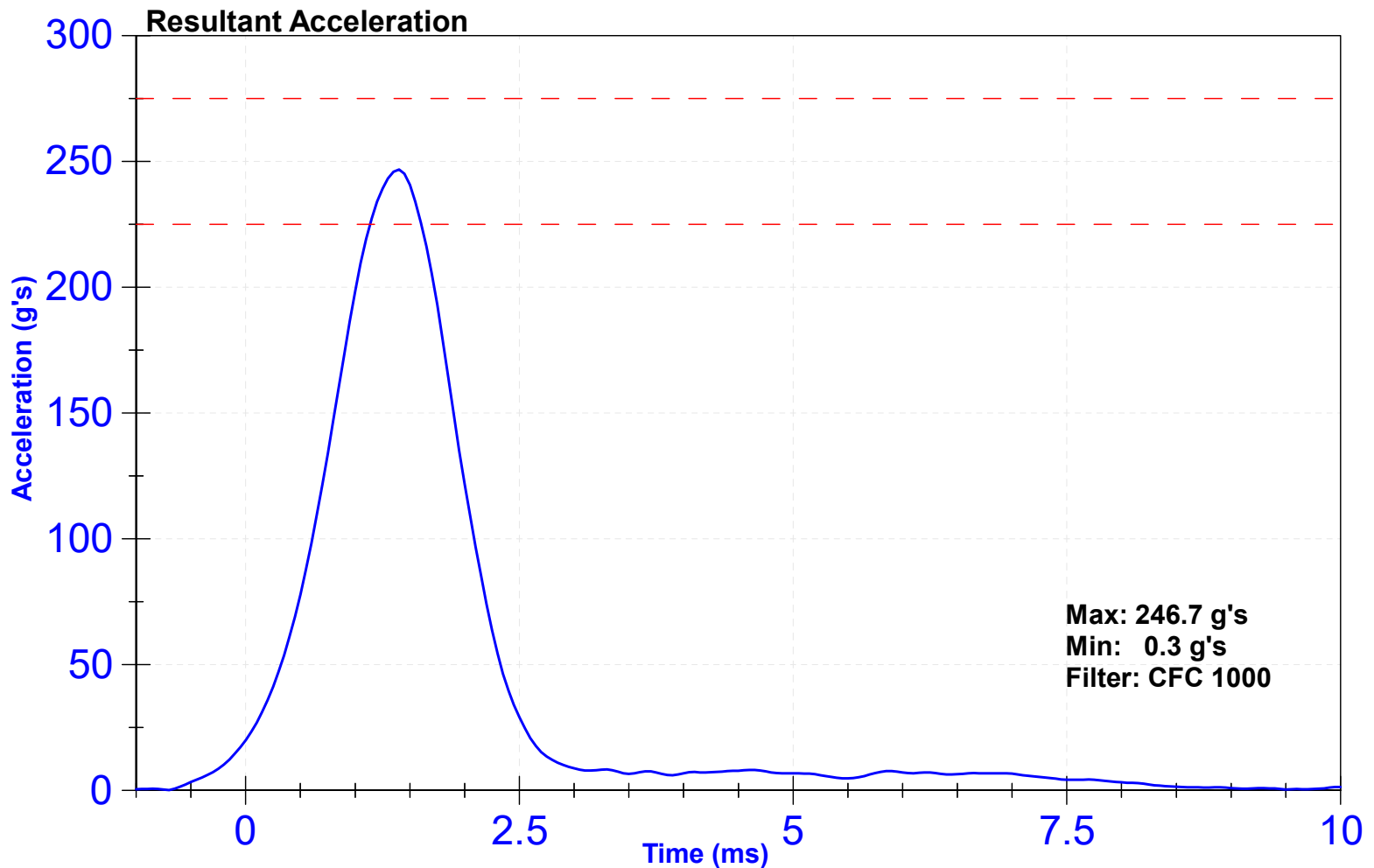
ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	142	Laboratory Supervisor	C.Mantel

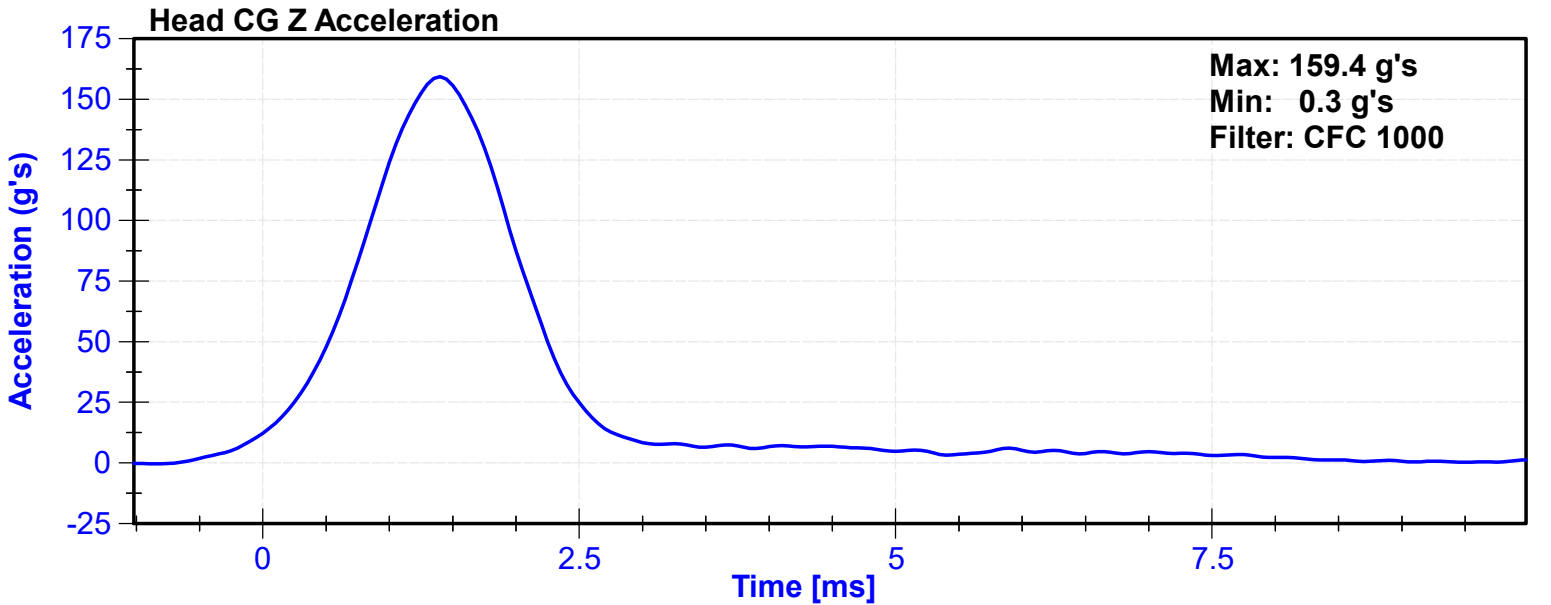
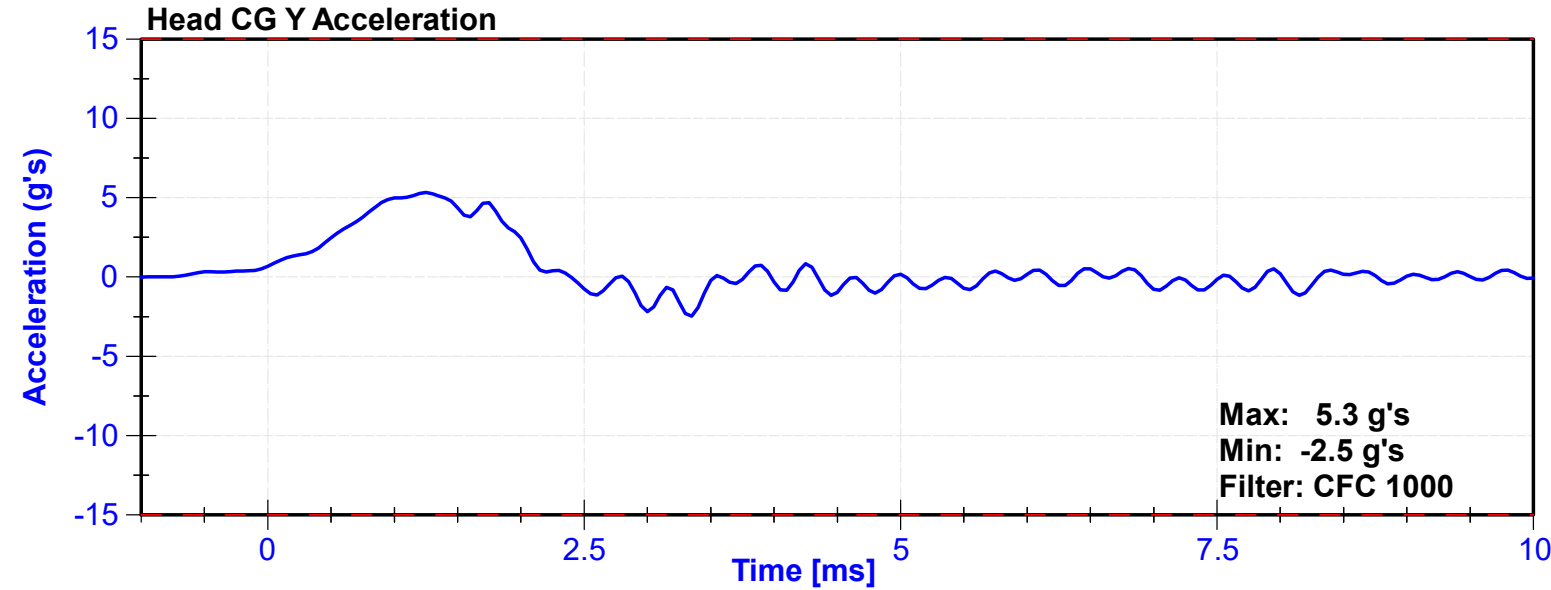
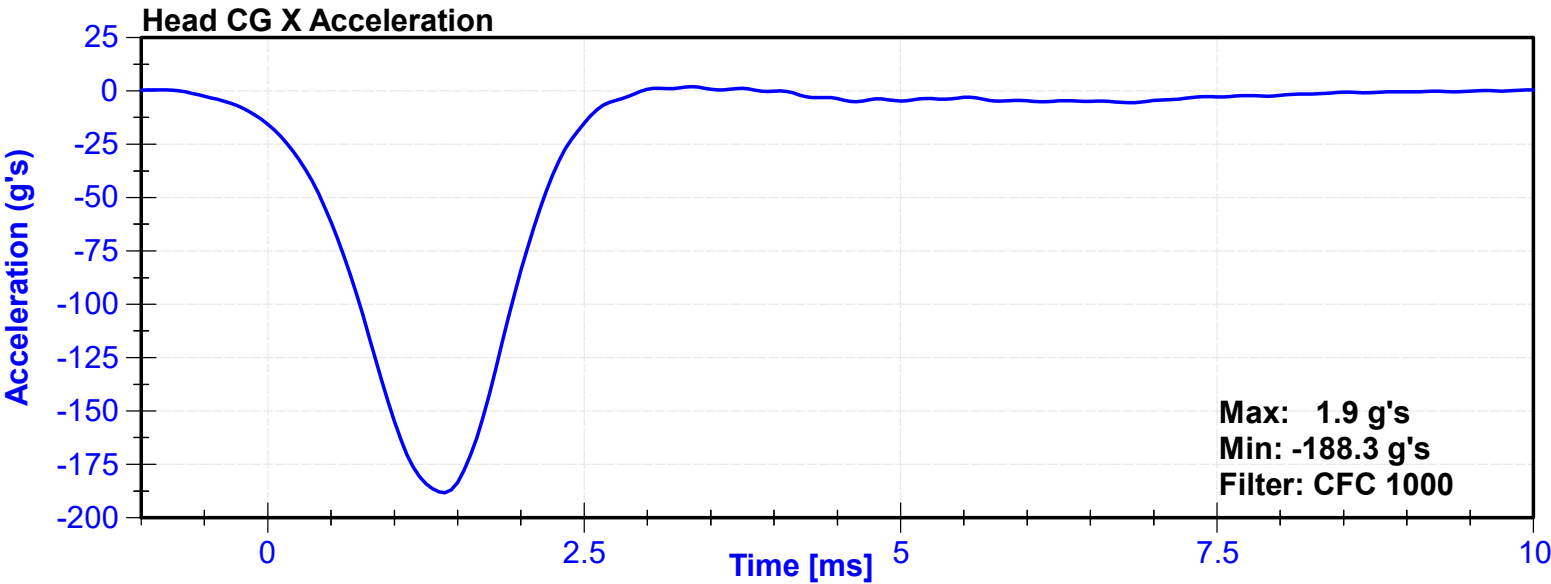
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.9	Pass
Humidity	10	70	%	25	Pass
Resultant Acceleration	225	275	g's	246.7	Pass
Oscillation	0	10	%	3.3	Pass
Lateral Acceleration	-15	15	g's	5.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	P51681	11/17/2023	5/15/2024
Y Accelerometer	Endevco	P64151	11/17/2023	5/15/2024
Z Accelerometer	Endevco	P52114	11/17/2023	5/15/2024





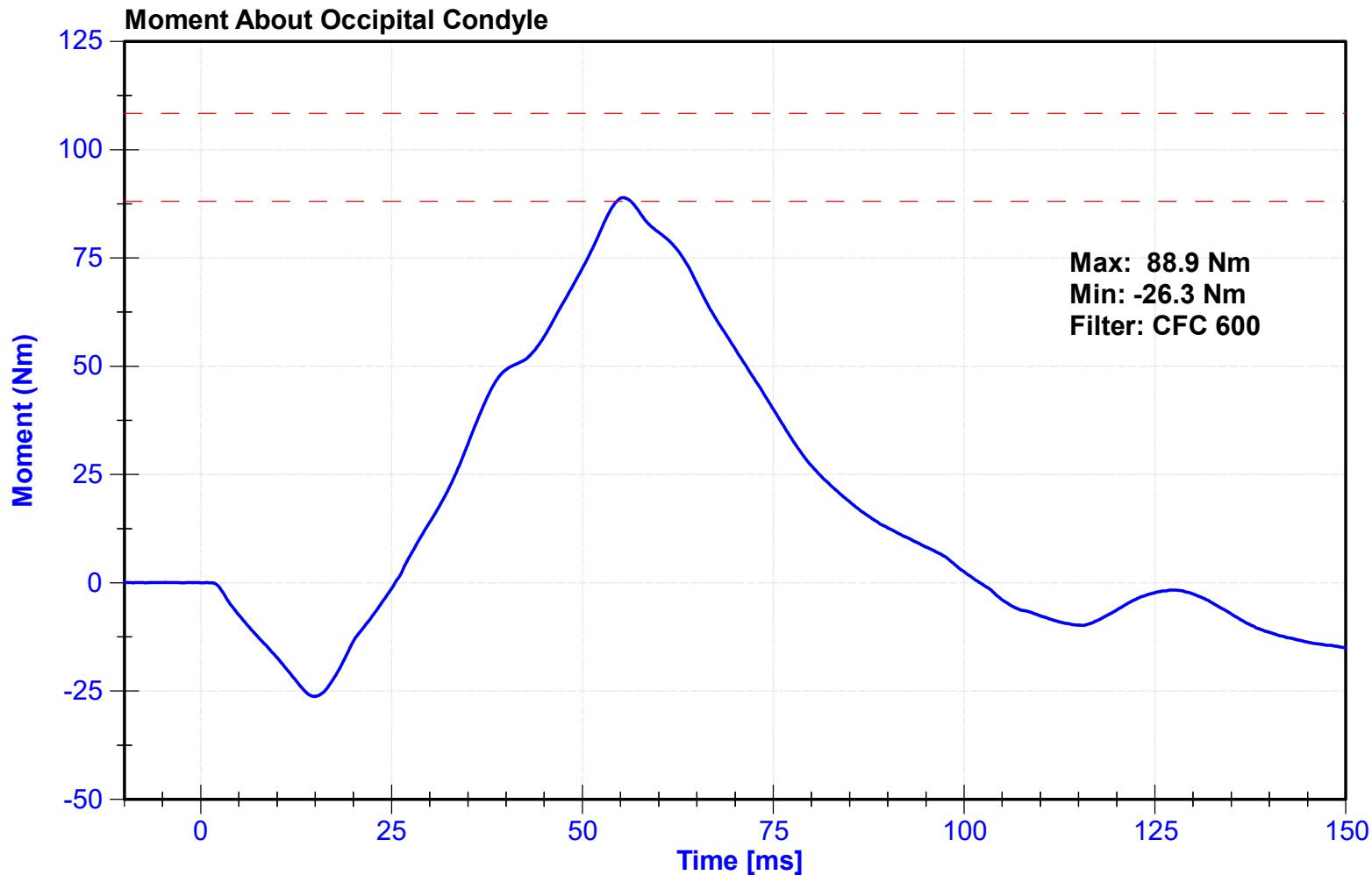
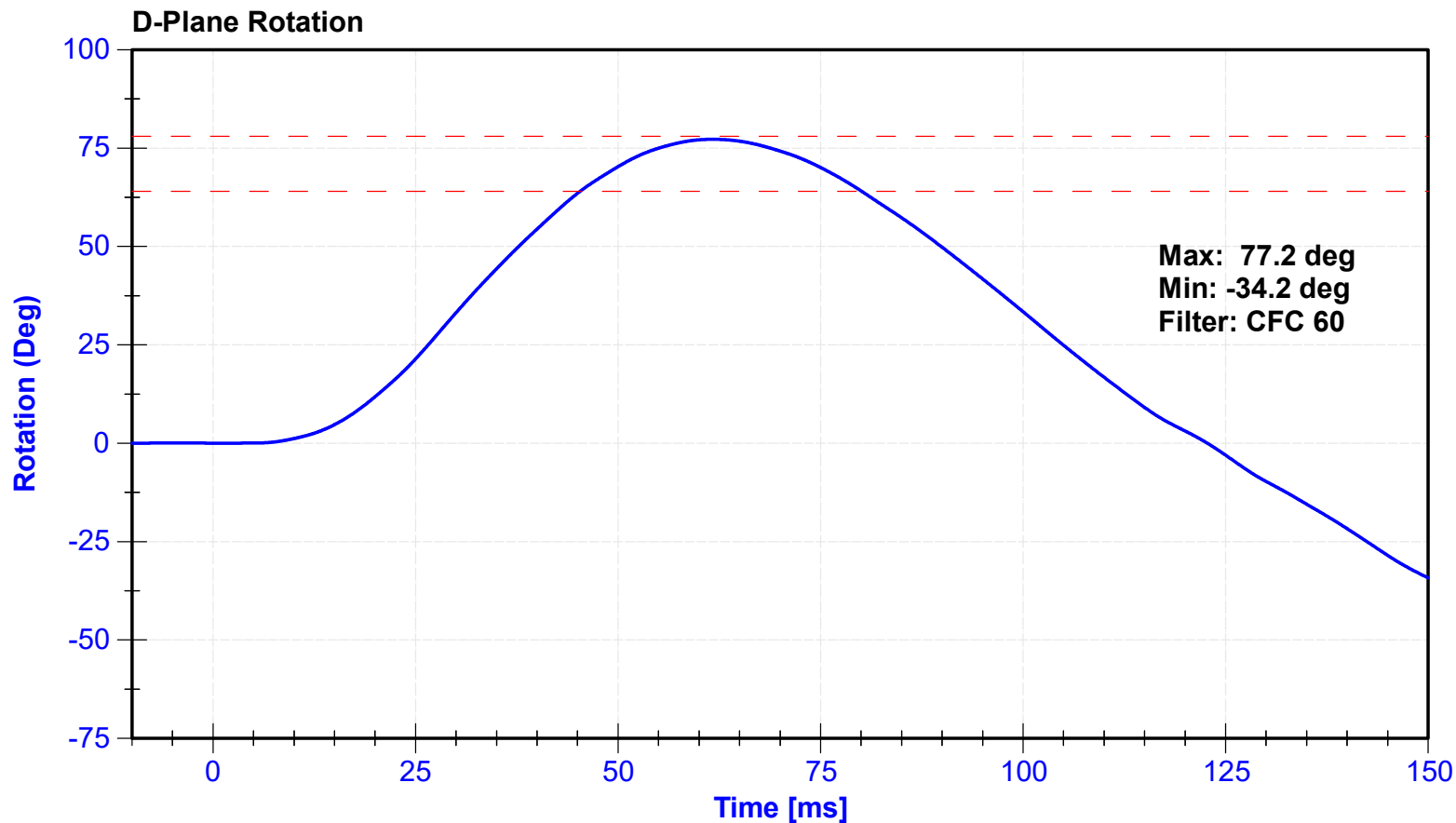
ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	142	Laboratory Supervisor	C. Mantell

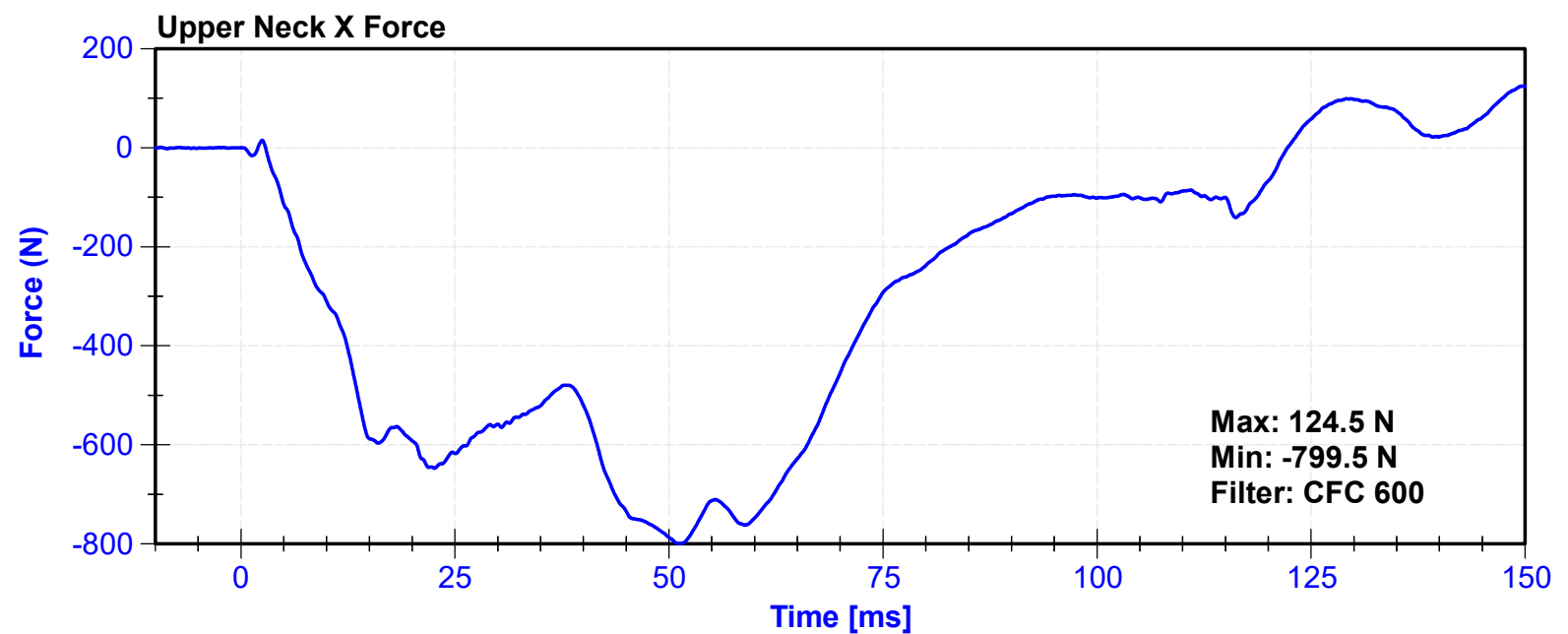
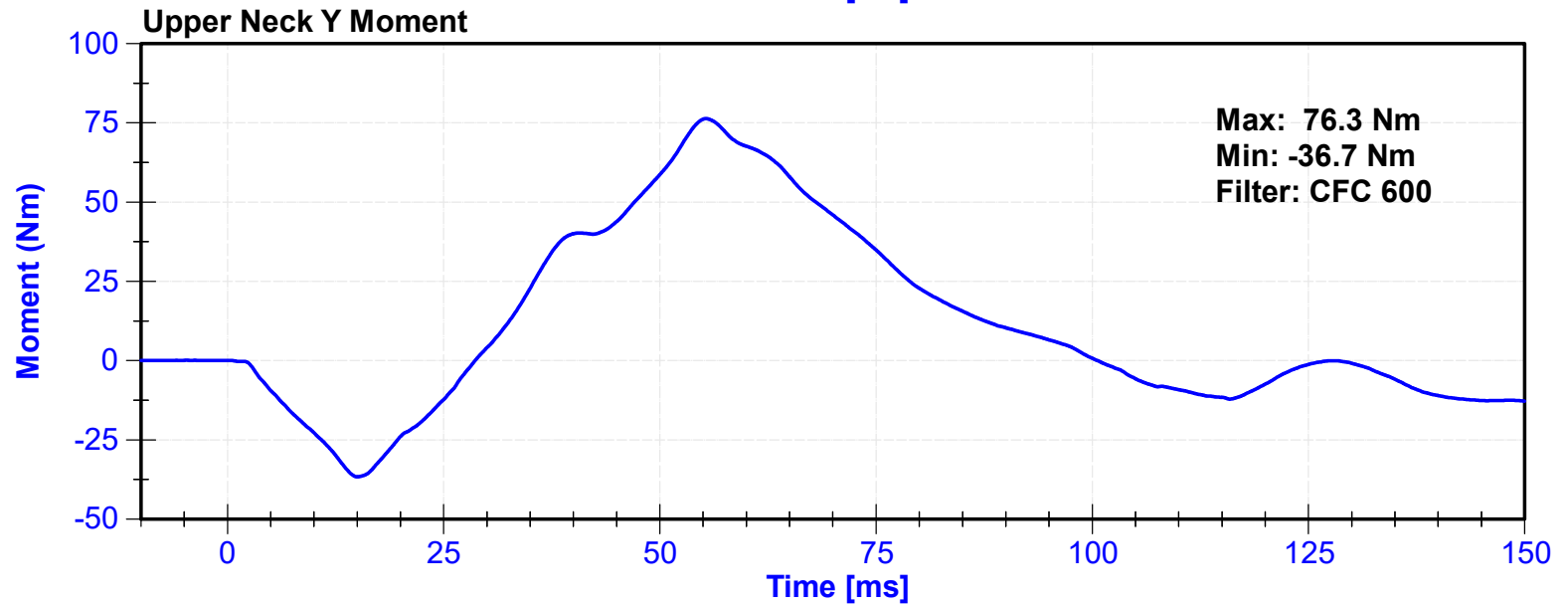
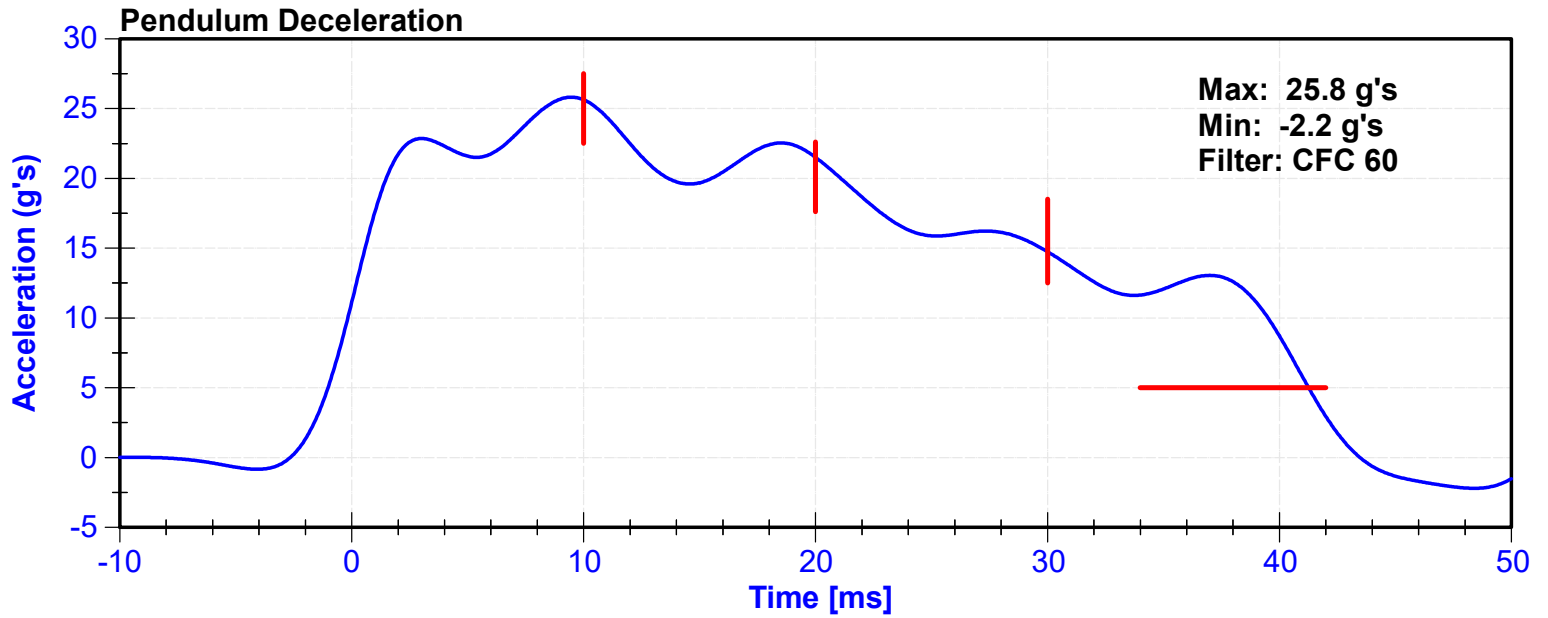
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	25	Pass
Velocity	6.89	7.13	m/s	6.912	Pass
Pendulum Deceleration at 10ms	22.5	27.5	g's	25.62	Pass
Pendulum Deceleration at 20ms	17.6	22.6	g's	21.49	Pass
Pendulum Deceleration at 30ms	12.5	18.5	g's	14.74	Pass
Max. Pendulum Deceleration After 30ms	0	29	g's	25.8	Pass
Pendulum Deceleration Time to 5 g's	34	42	ms	41.3	Pass
Maximum D Plane Rotation	64	78	deg	77.2	Pass
Time to Maximum Rotation	57	64	ms	61.7	Pass
Rotation Decay to Zero	113	127	ms	122.8	Pass
Moment About Occipital Condyle	88.1	108.4	Nm	88.95	Pass
Time to Maximum Moment	47	58	ms	55.3	Pass
Moment Decay to Zero	97	107	ms	102.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	7231C-750	10/31/2023	4/28/2024
Pendulum Potentiometer	ETI	LABPOT1	5/5/2023	5/4/2024
Condyle Potentiometer	ETI	LABPOT2	7/19/2023	7/18/2024
Upper Neck Load Cell	Humanetics	851-FX	5/18/2023	5/17/2024





ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	142	Laboratory Supervisor	C. Mantell

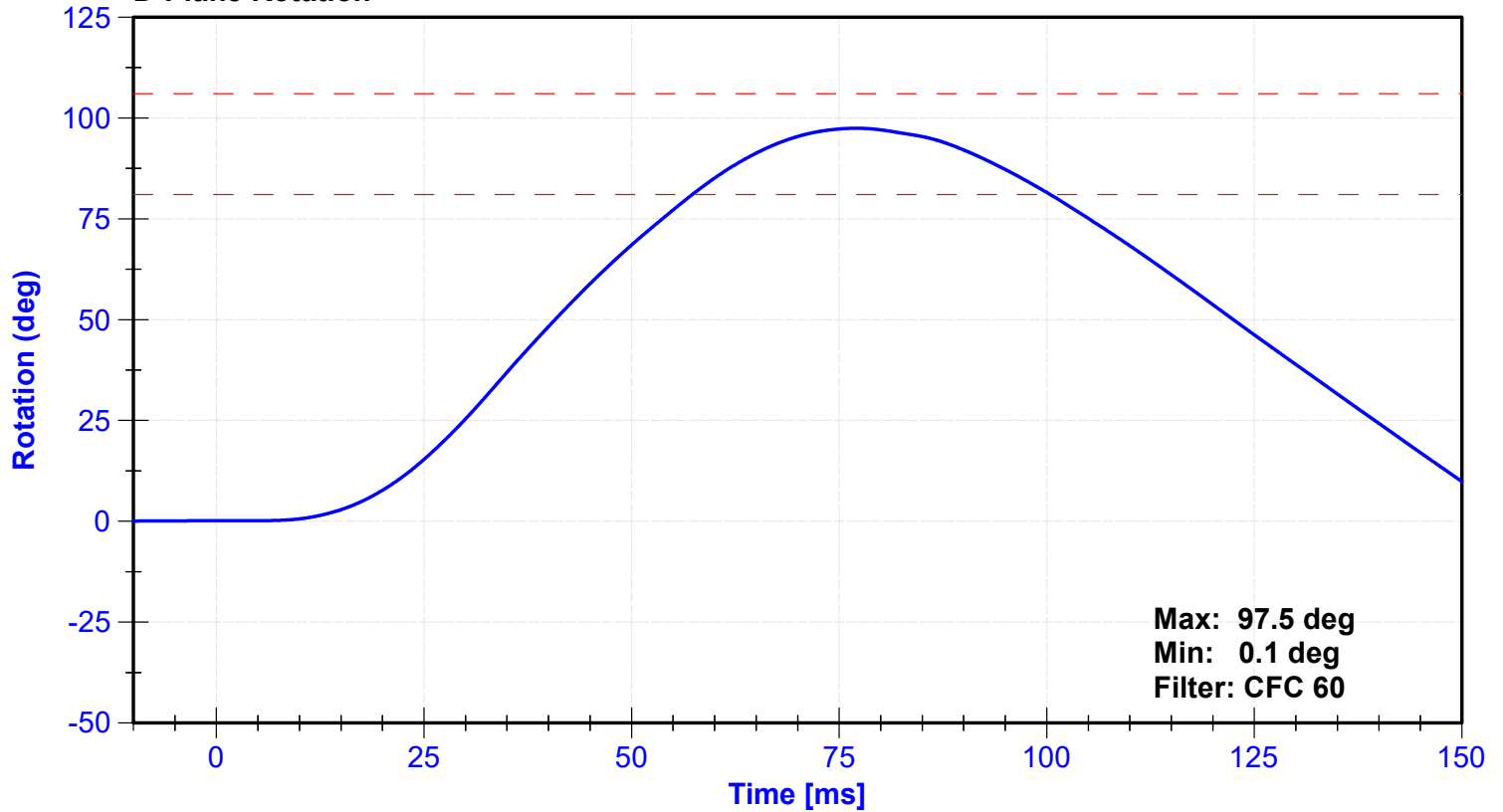
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	25	Pass
Velocity	5.94	6.19	m/s	5.987	Pass
Pendulum Deceleration at 10ms	17.2	21.2	g's	20.46	Pass
Pendulum Deceleration at 20ms	14	19	g's	18.0	Pass
Pendulum Deceleration at 30ms	11	16	g's	14.8	Pass
Max. Pendulum Deceleration After 30ms	0	22	g's	20.5	Pass
Pendulum Deceleration Time to 5 g's	38	46	ms	43.3	Pass
Maximum D Plane Rotation	81	106	deg	97.5	Pass
Time to Maximum Rotation	72	82	ms	77.1	Pass
Rotation Decay to Zero	147	174	ms	157.0	Pass
Minimum Moment About OC	-80	-52.9	Nm	-67.76	Pass
Time to Minimum Moment	65	79	ms	71.5	Pass
Moment Decay to Zero	120	148	ms	141.3	Pass

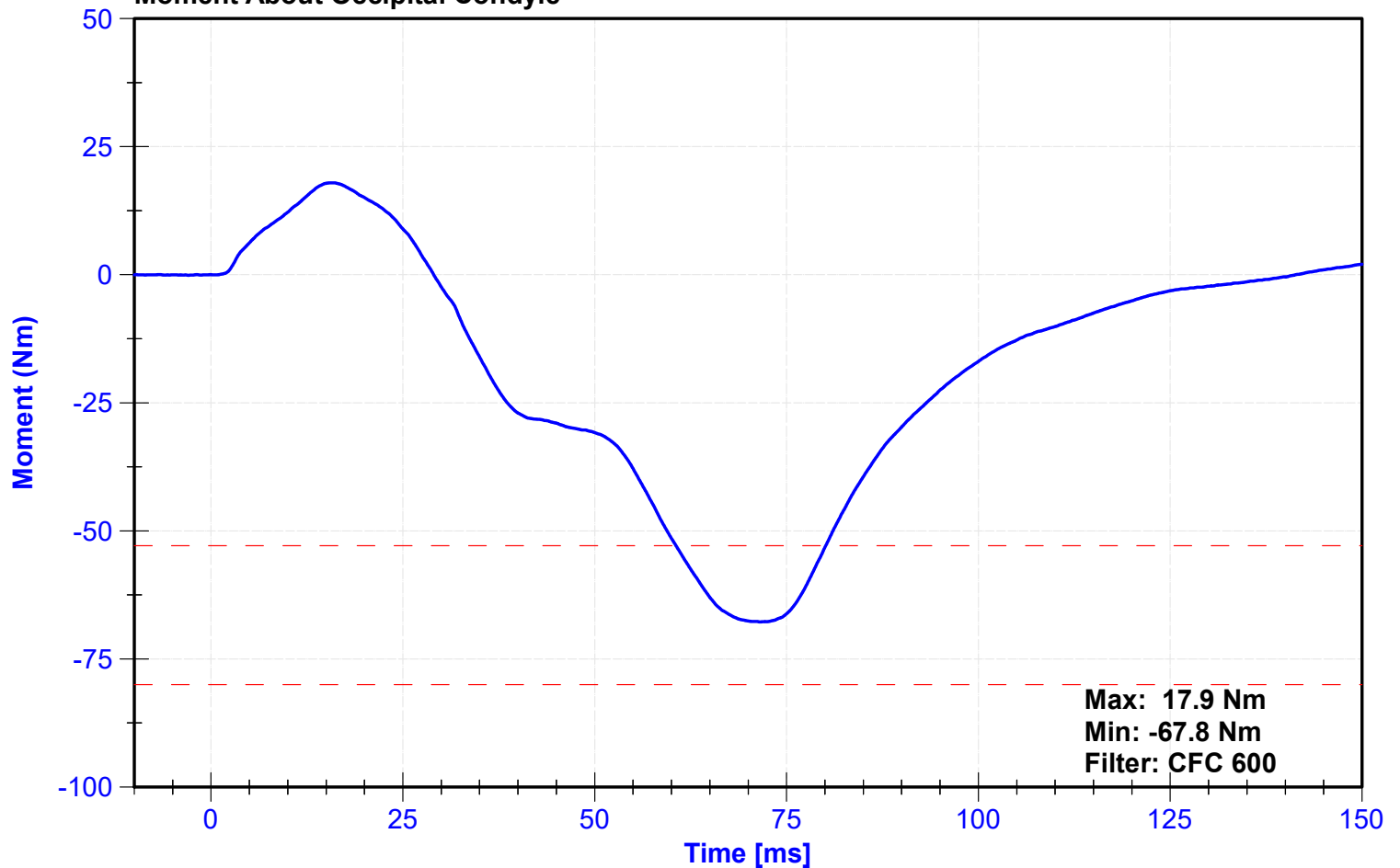
Transducer Calibrations

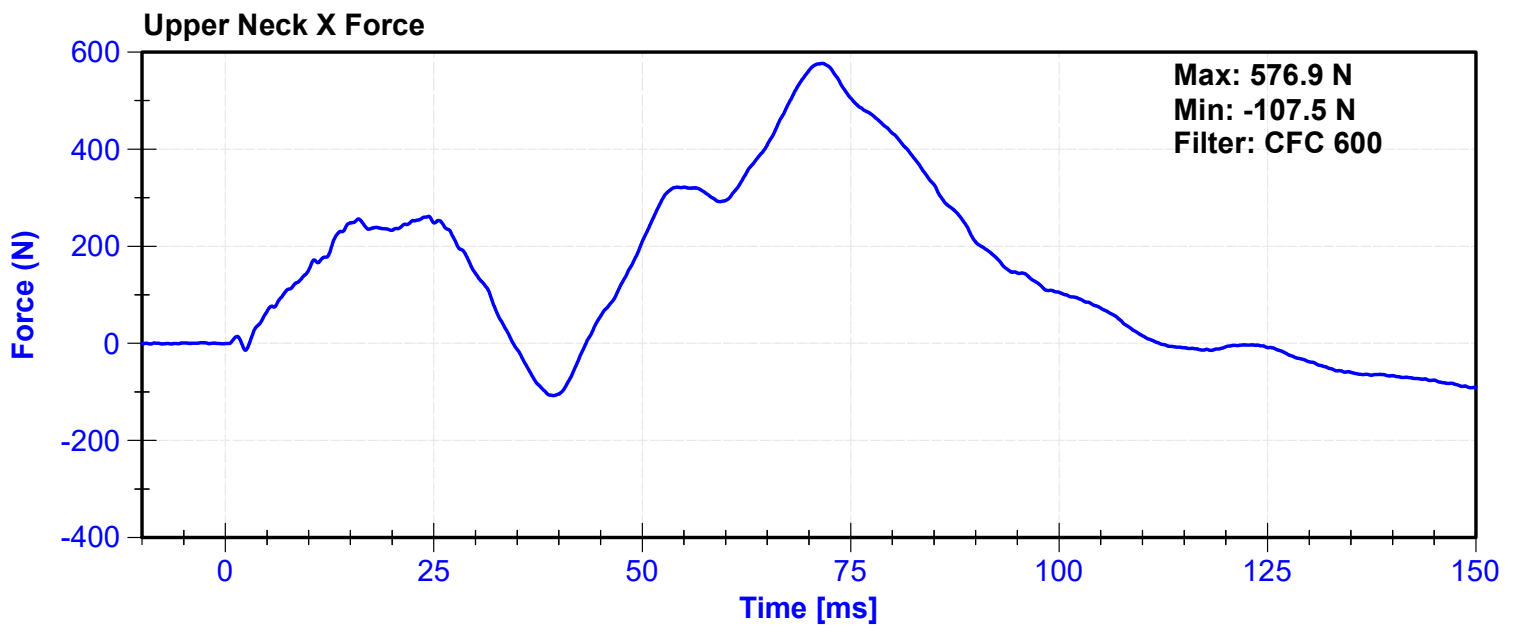
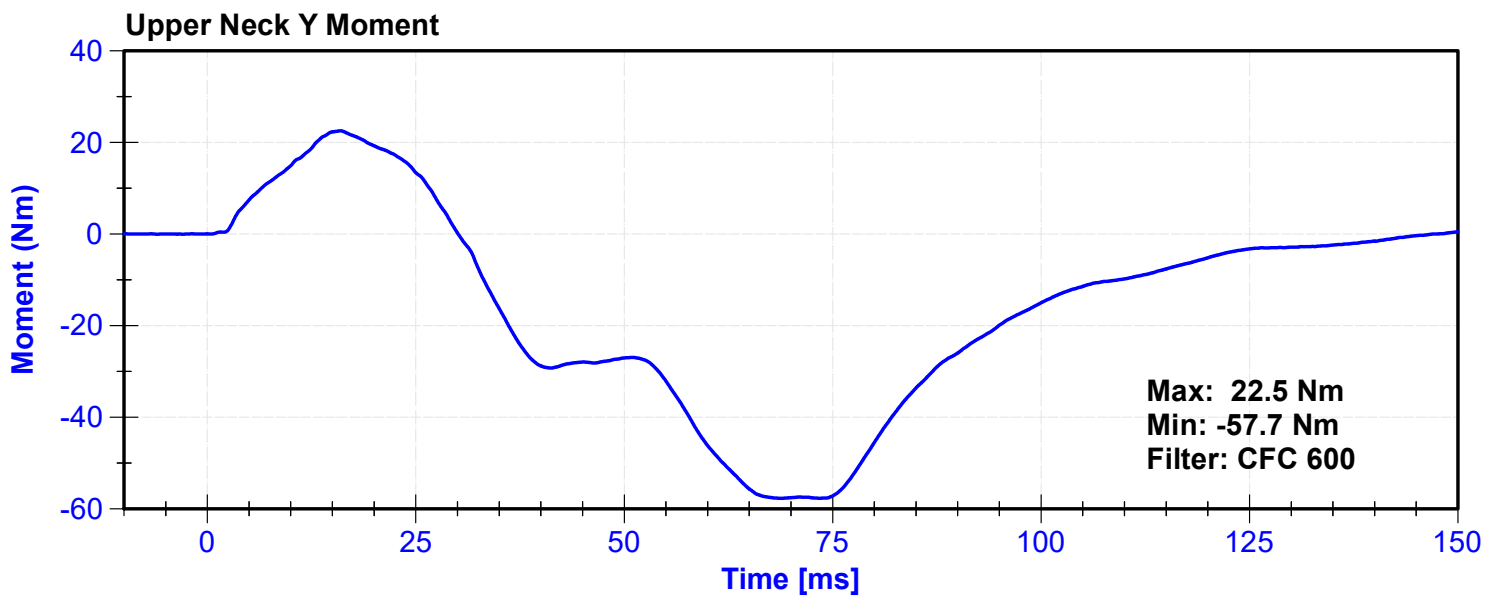
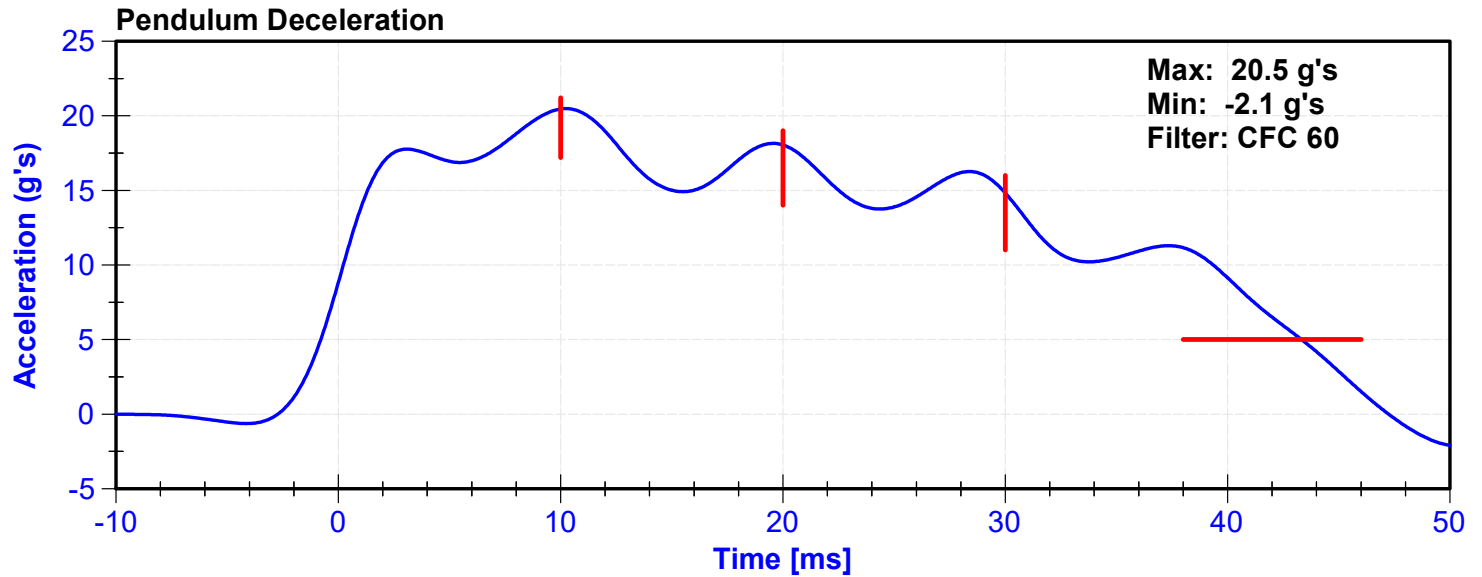
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16503	10/31/2023	4/28/2024
Pendulum Potentiometer	ETI	LABPOT1	5/5/2023	5/4/2024
Condyle Potentiometer	ETI	LABPOT2	7/19/2023	7/18/2024
Upper Neck Load Cell	Humanetics	851-FX	5/18/2023	5/17/2024

D-Plane Rotation



Moment About Occipital Condyle





ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	142	Laboratory Supervisor	C. Mantell

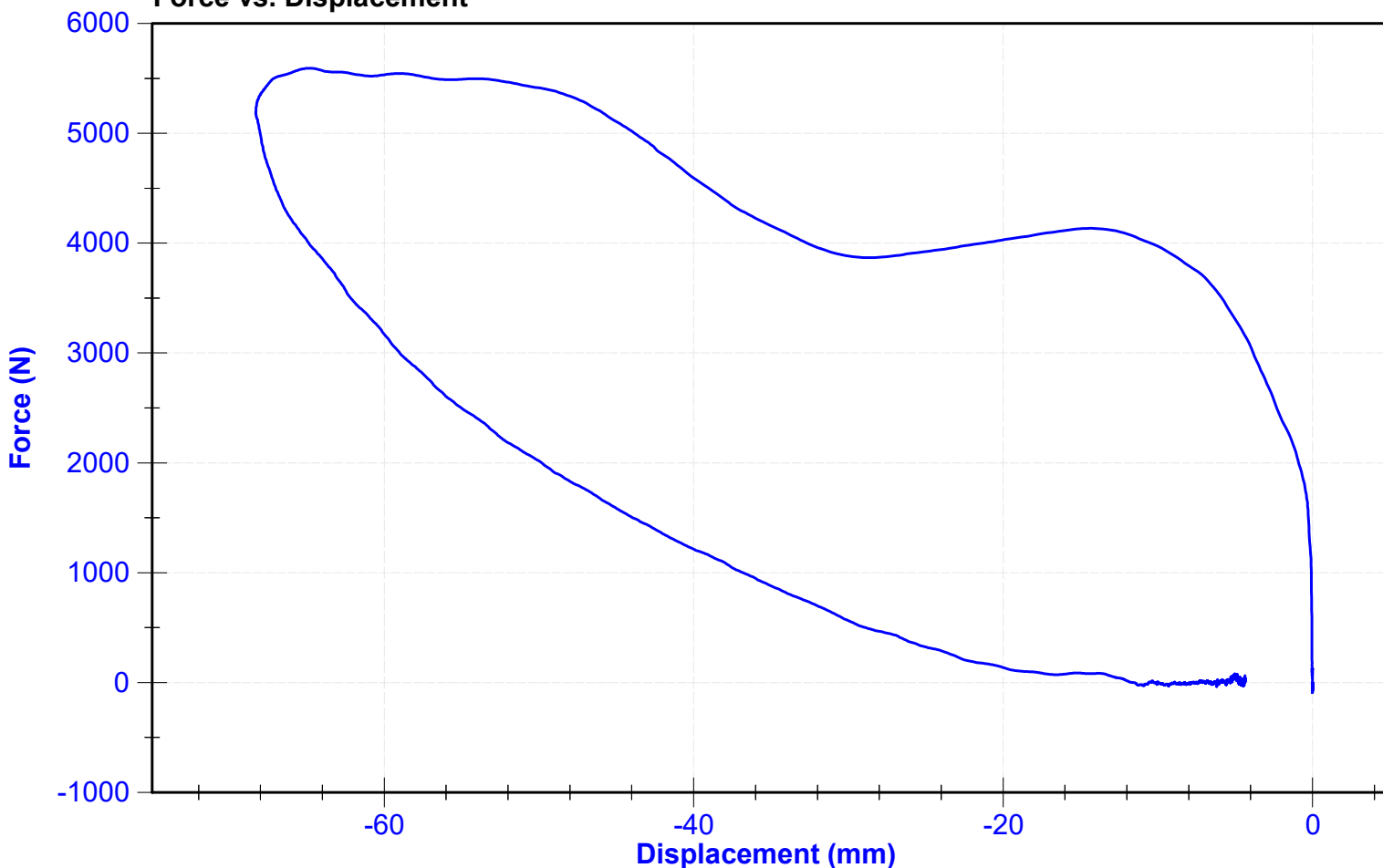
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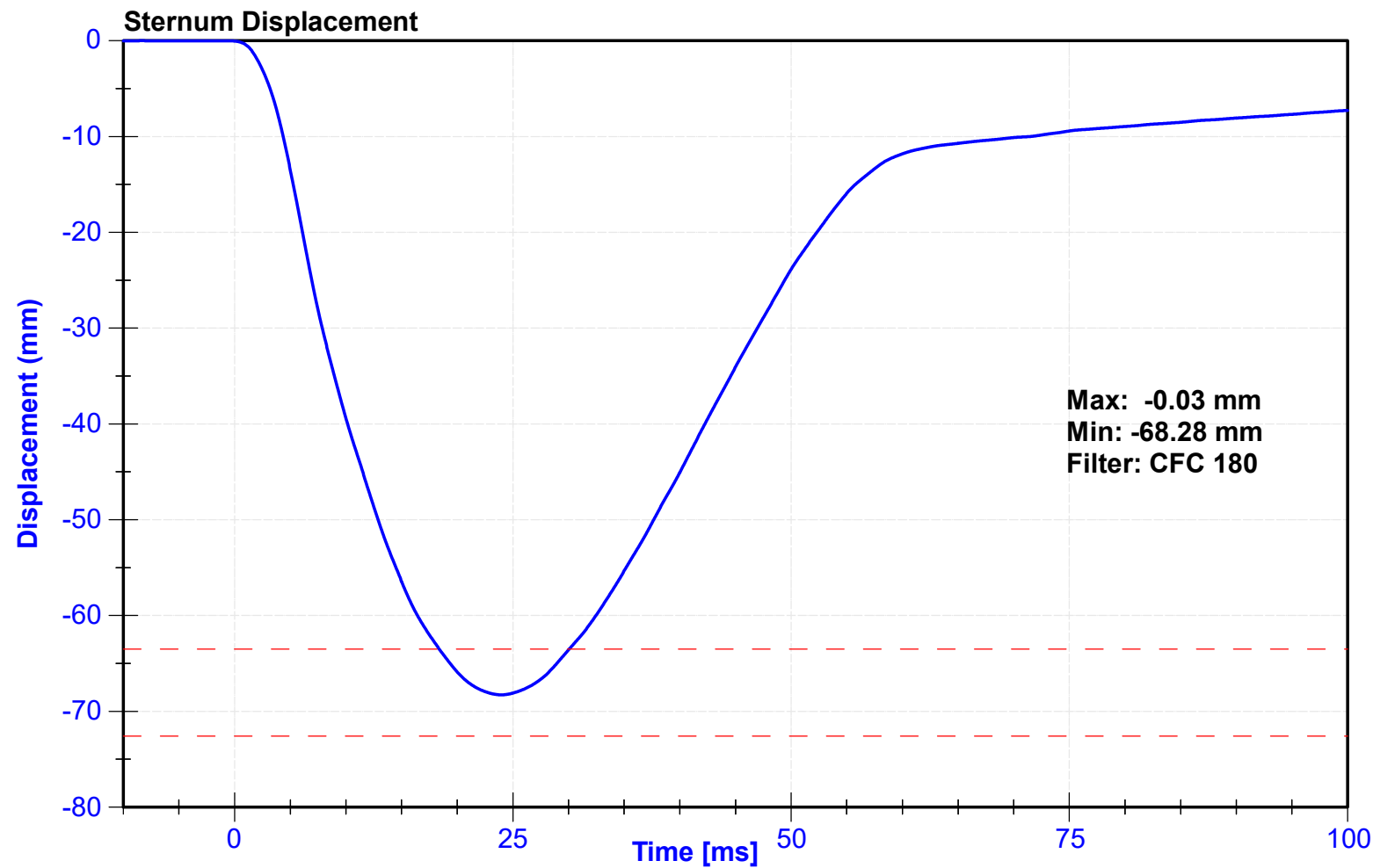
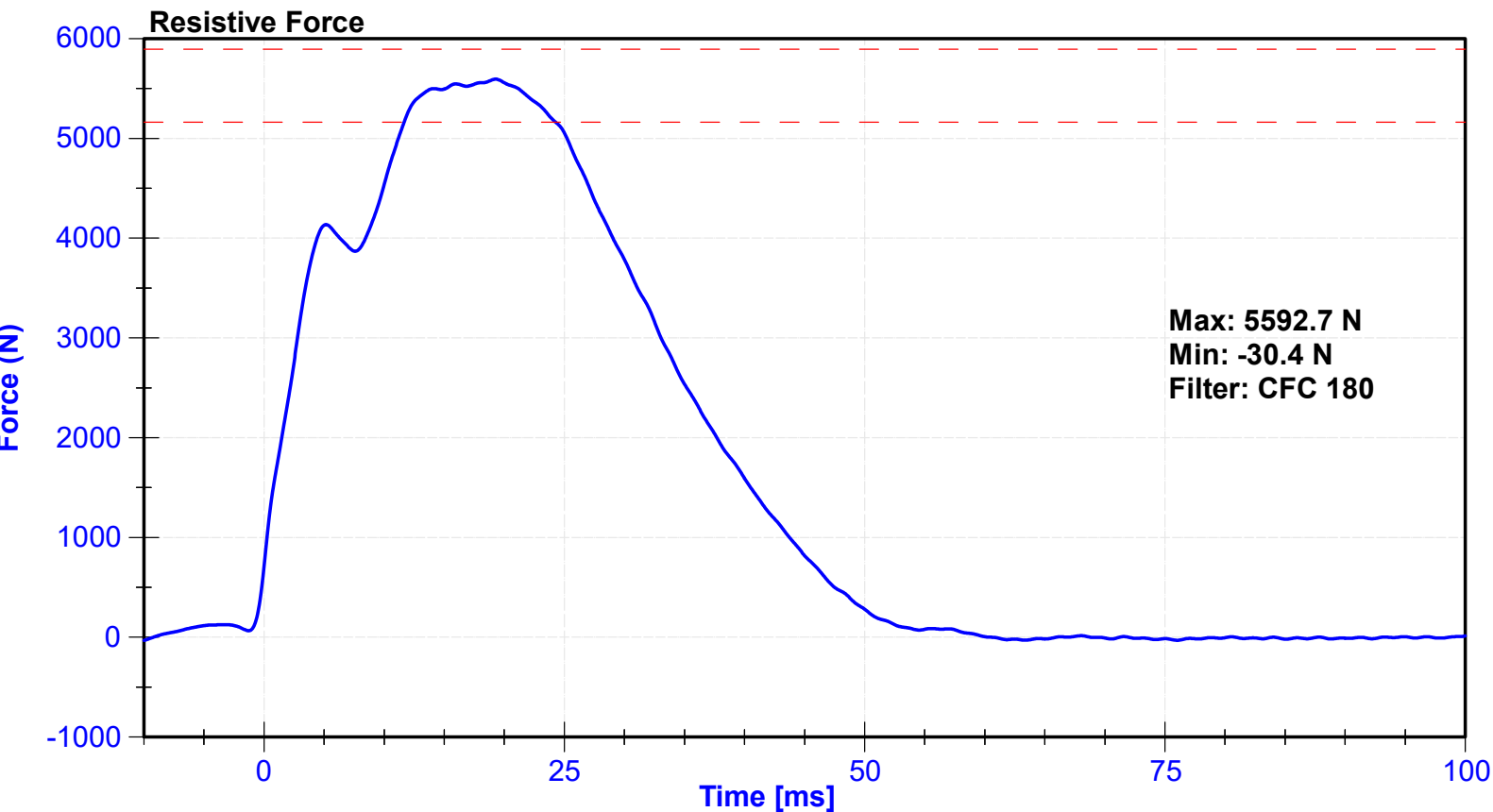
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	17	Pass
Velocity	6.59	6.83	m/s	6.700	Pass
Chest Displacement	-72.6	-63.5	mm	-68.28	Pass
Resistive Force	5160	5894	N	5592.7	Pass
Hysteresis	69	85	%	71.5	Pass

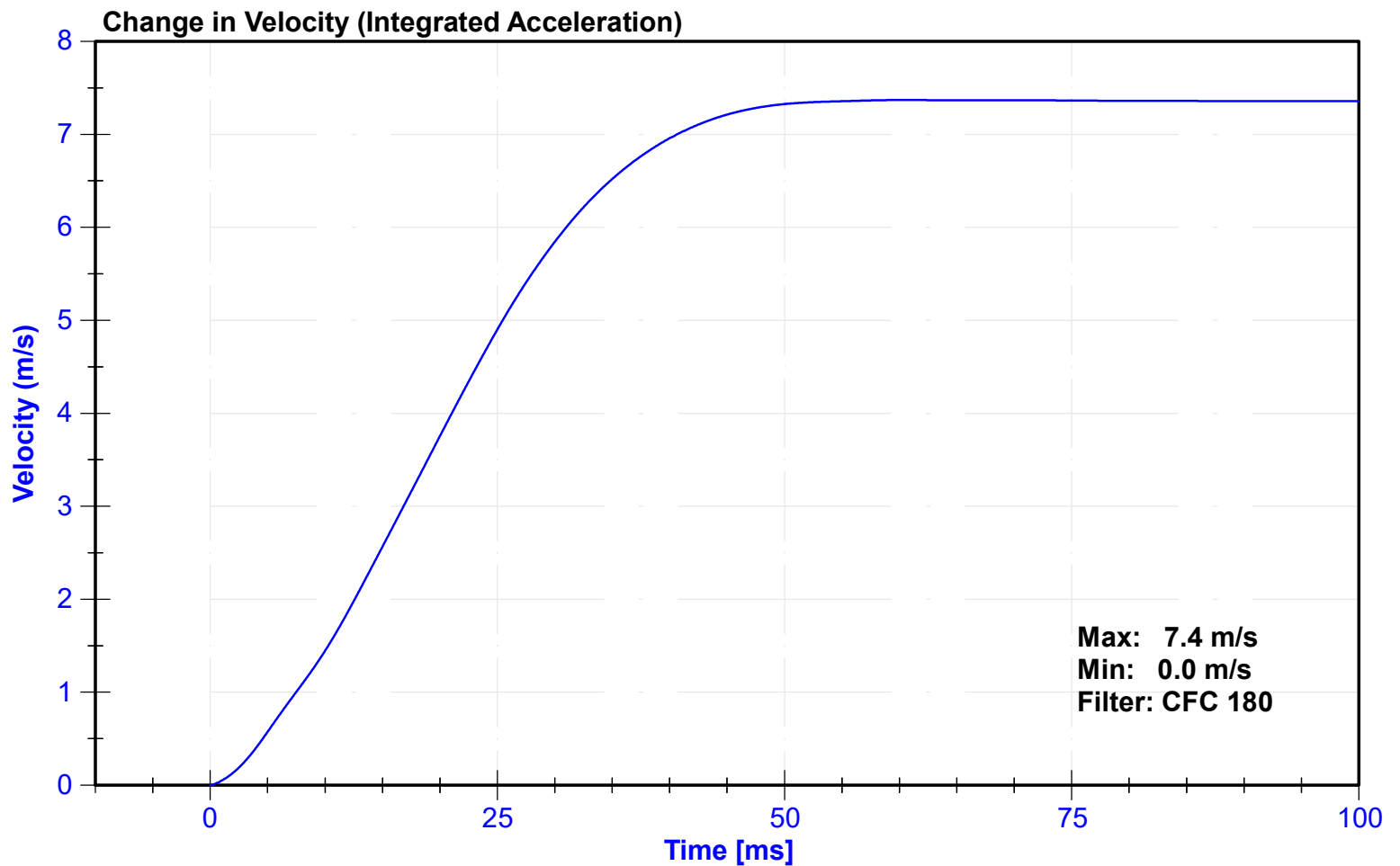
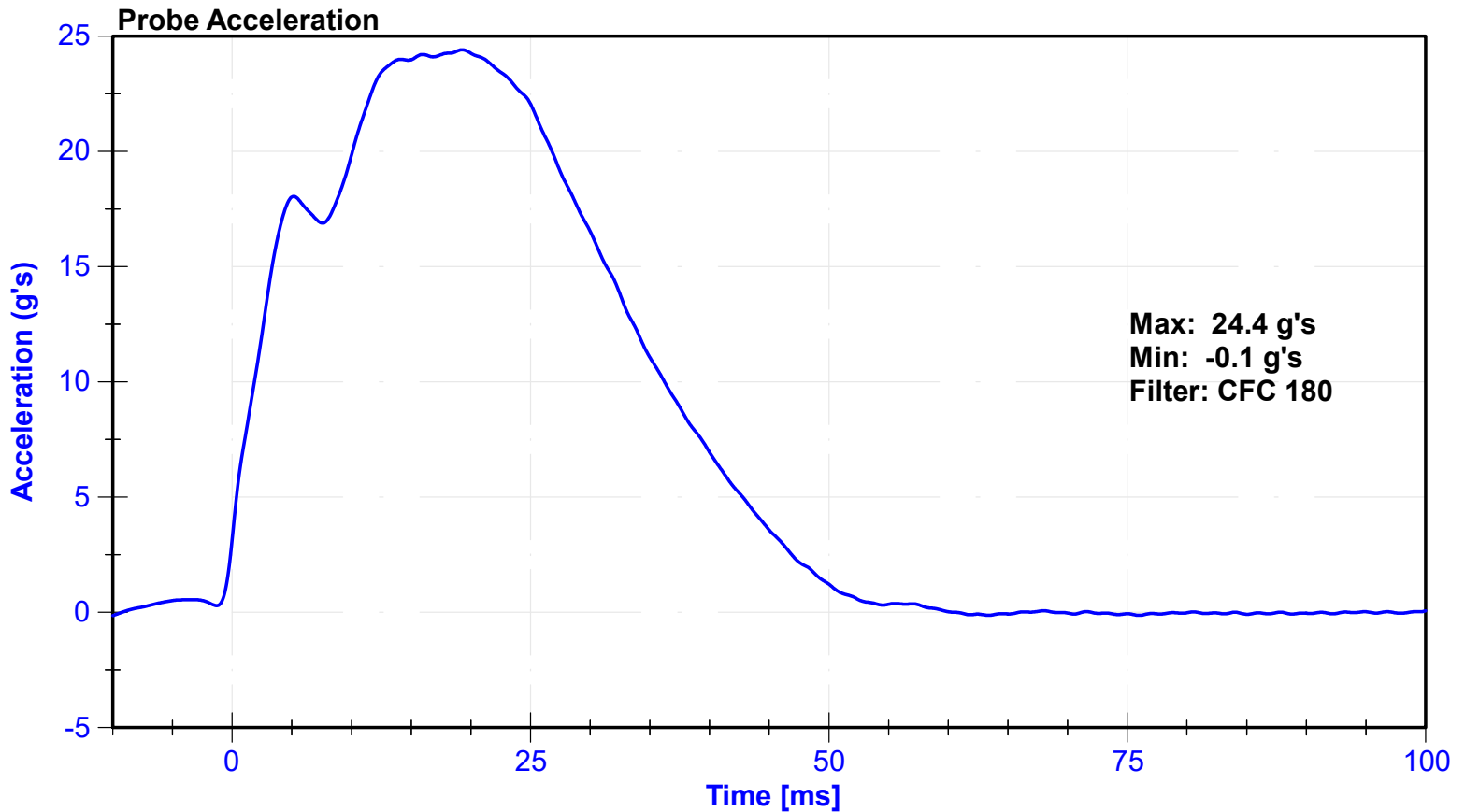
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18587	11/20/2023	11/19/2024
Chest Potentiometer	JDK	0075	12/18/2023	6/17/2024

Force vs. Displacement







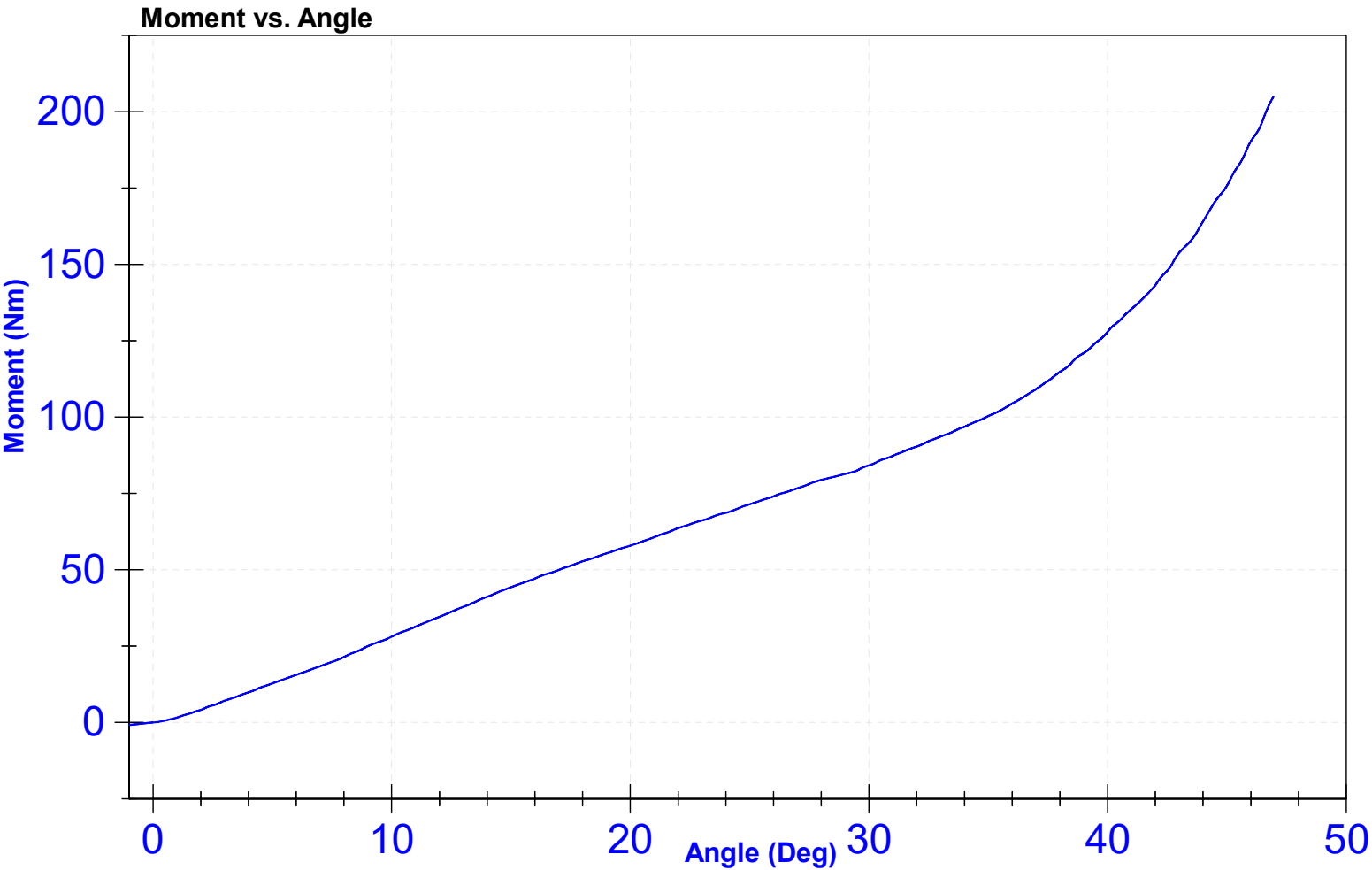
ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	142	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.9	Pass
Humidity	10	70	%	25	Pass
Average Velocity	5	10	deg/s	7.3	Pass
Angle at 203Nm	40	50	deg	46.8	Pass
Moment at 30 degrees	0	94.9	Nm	84.2	Pass

Transducer Calibrations

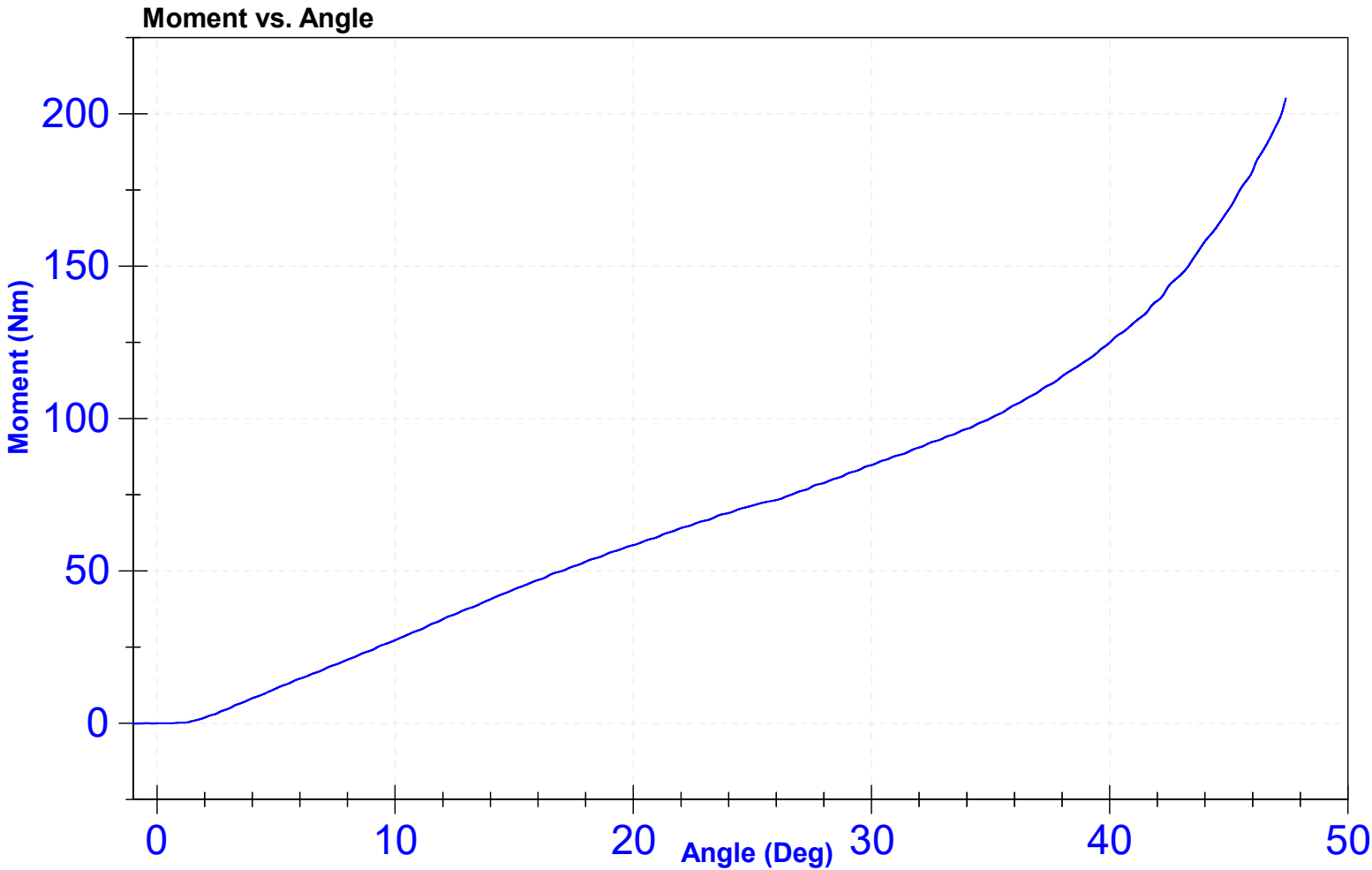
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	ETI SP22	DS-0008	10/6/2023	10/5/2024
Load Cell	PCB 2301-02	2301-02_115	2023-10-30	2024-10-29



ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	142	Laboratory Supervisor	C. Mantell

Test Parameter	Results		Unit	Result	Pass/Fail
	Minimum Specification	Maximum Specification			
Temperature	18.9	25.6	°C	20.9	Pass
Humidity	10	70	%	25	Pass
Average Velocity	5	10	deg/s	7.1	Pass
Angle at 203Nm	40	50	deg	47.3	Pass
Moment at 30 degrees	0	94.9	Nm	84.7	Pass

Transducer Calibrations				
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	ETI SP22	DS-0008	10/6/2023	10/5/2024
Load Cell	PCB 2301-02	2301-02_115	2023-10-30	2024-10-29



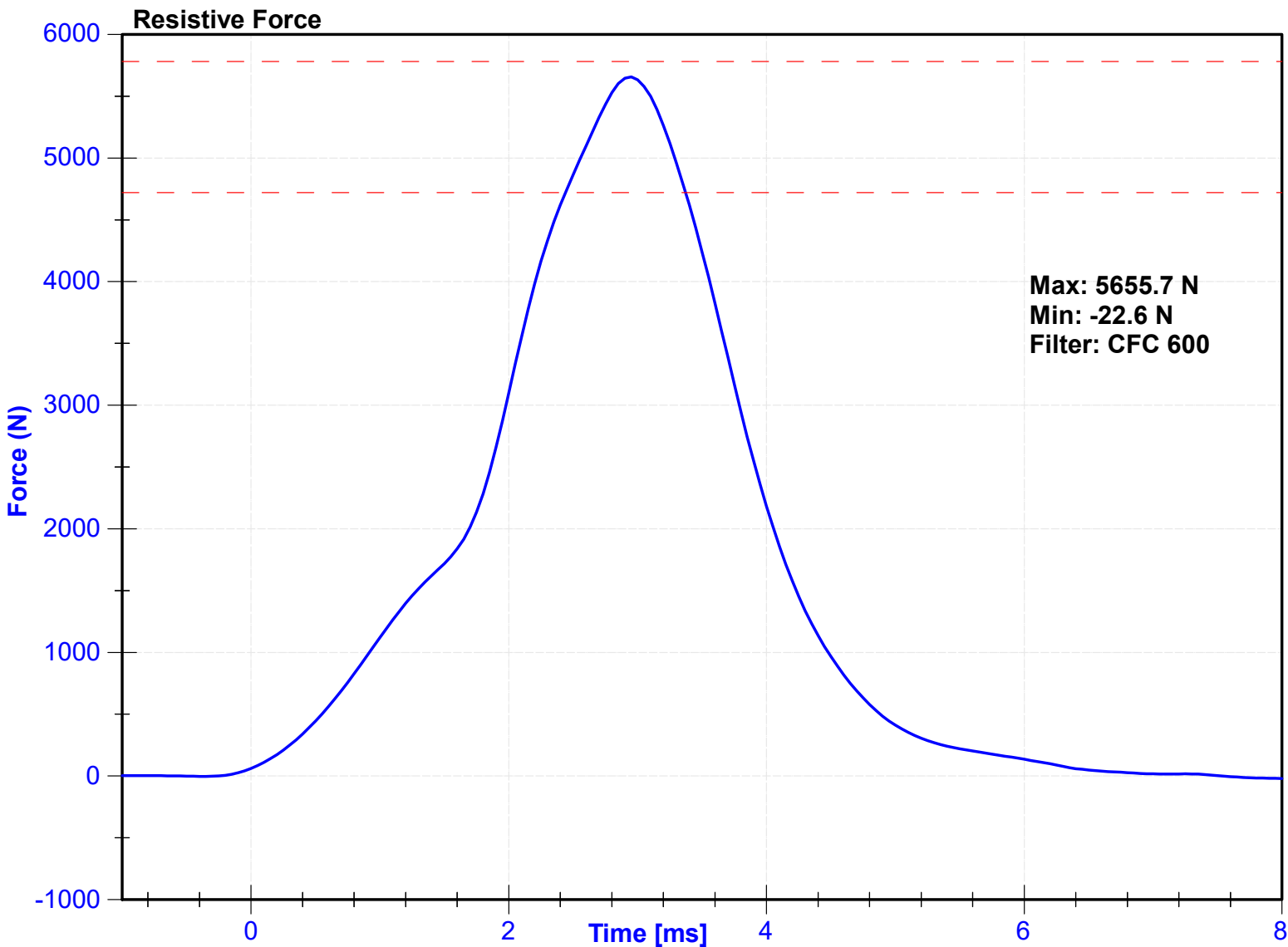
ATD Manufacturer	Humanetics	Test Technician	J. Kinderman
ATD Serial Number	142	Laboratory Supervisor	C. Mantell

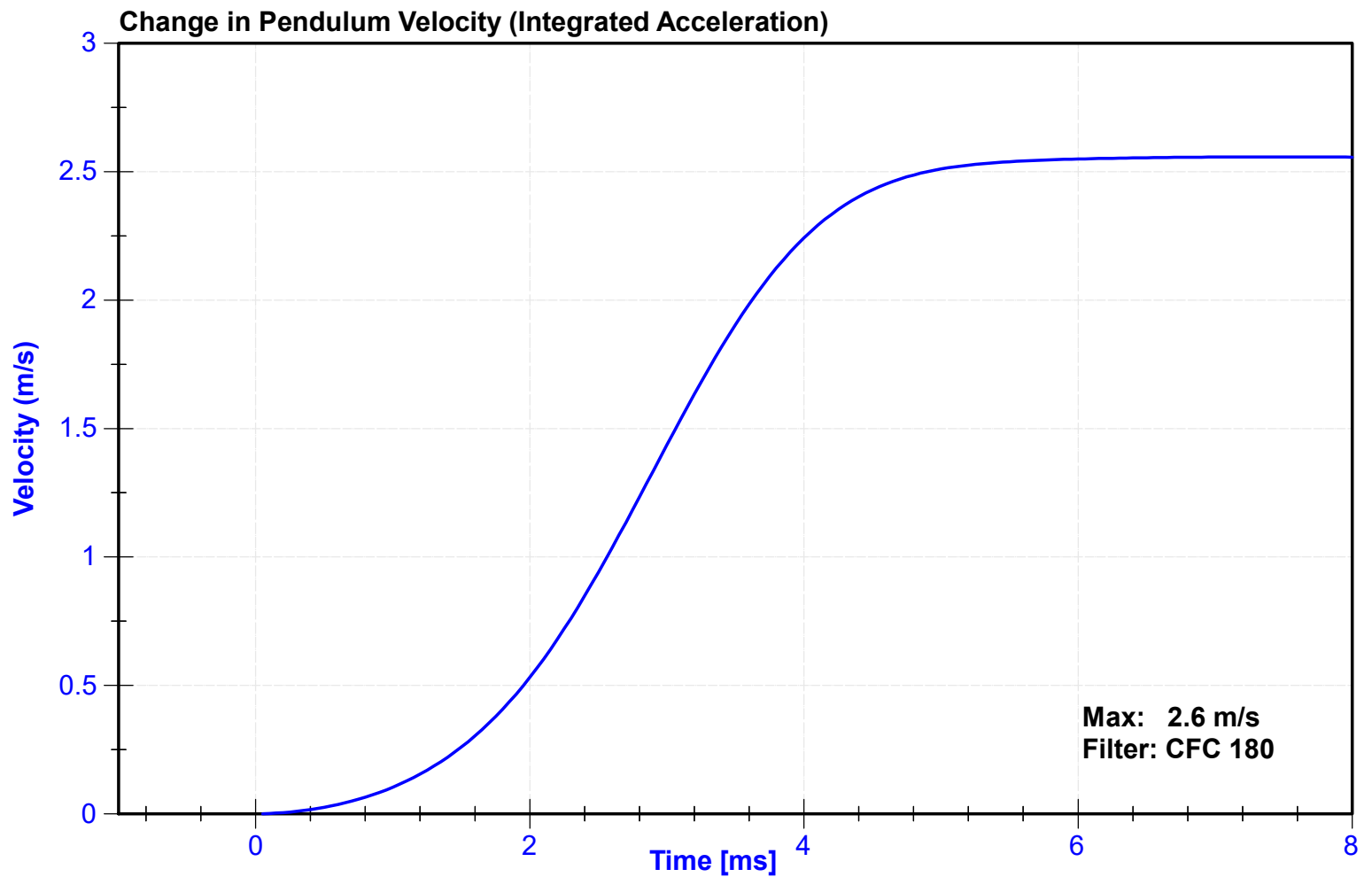
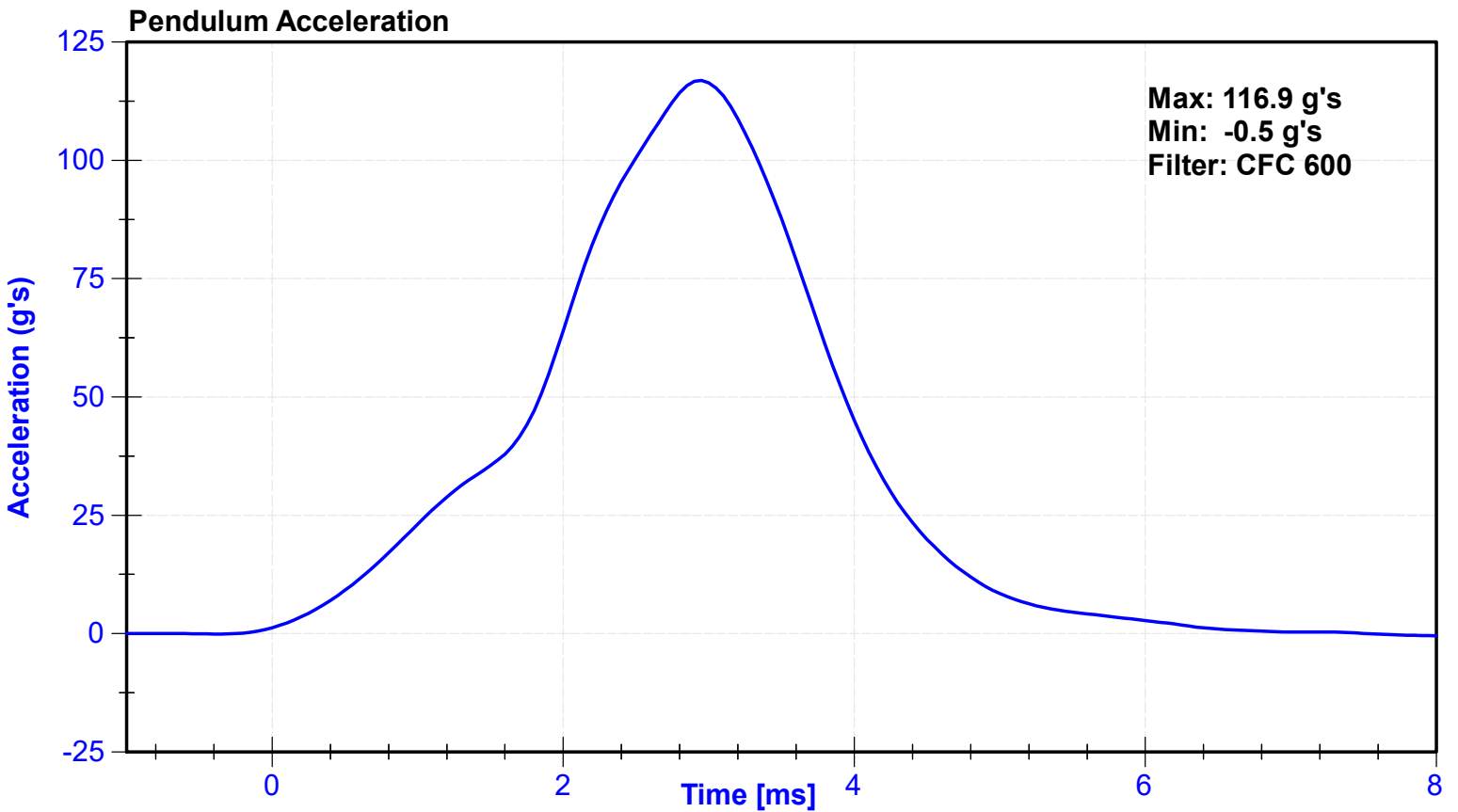
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.5	Pass
Humidity	10	70	%	53	Pass
Velocity	2.07	2.13	m/s	2.075	Pass
Maximum Resistive Force	4720	5780	N	5655.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18619	9/29/2023	3/27/2024





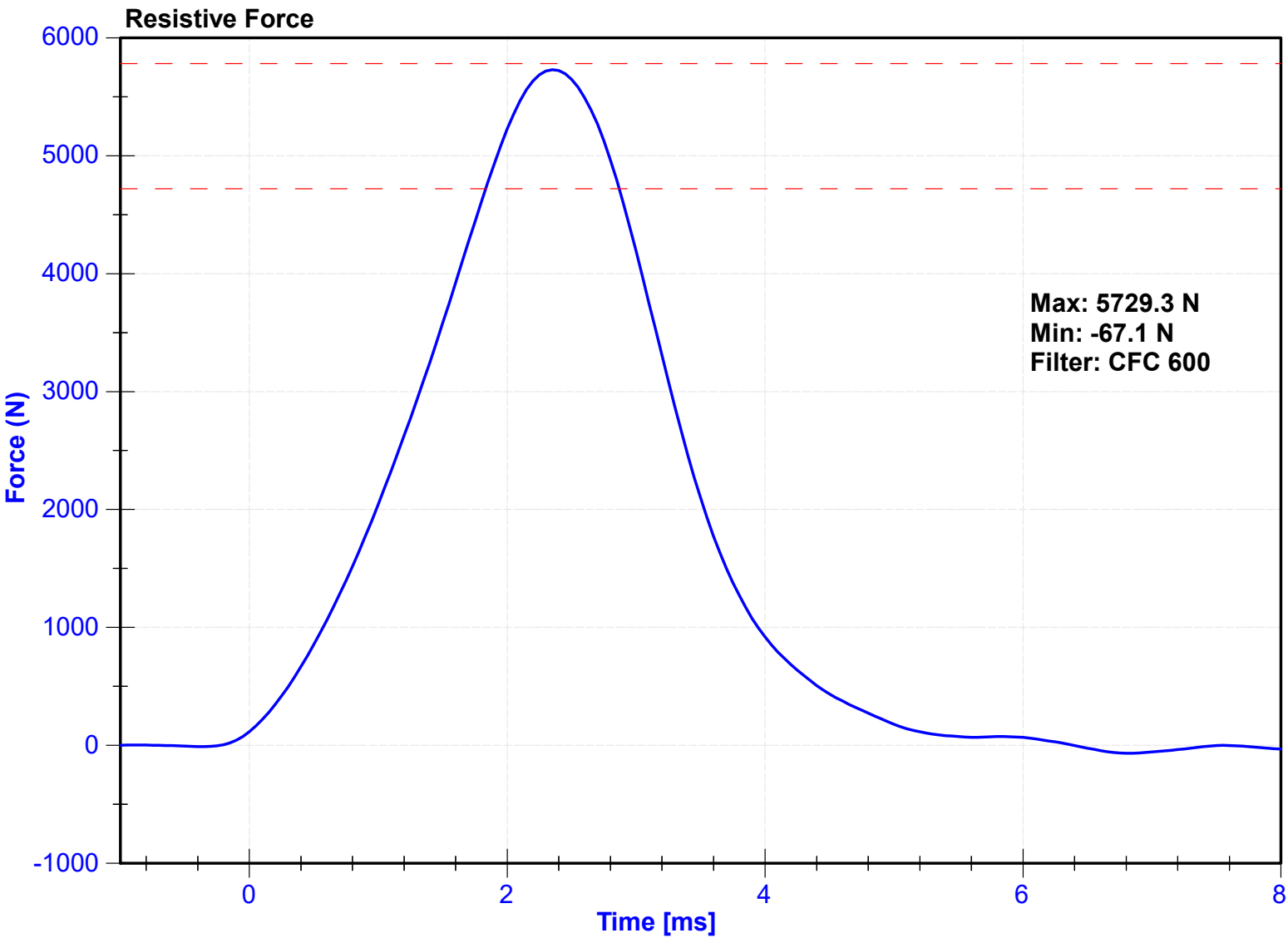
ATD Manufacturer	Humanetics	Test Technician	J. Kinderman
ATD Serial Number	142	Laboratory Supervisor	C. Mantell

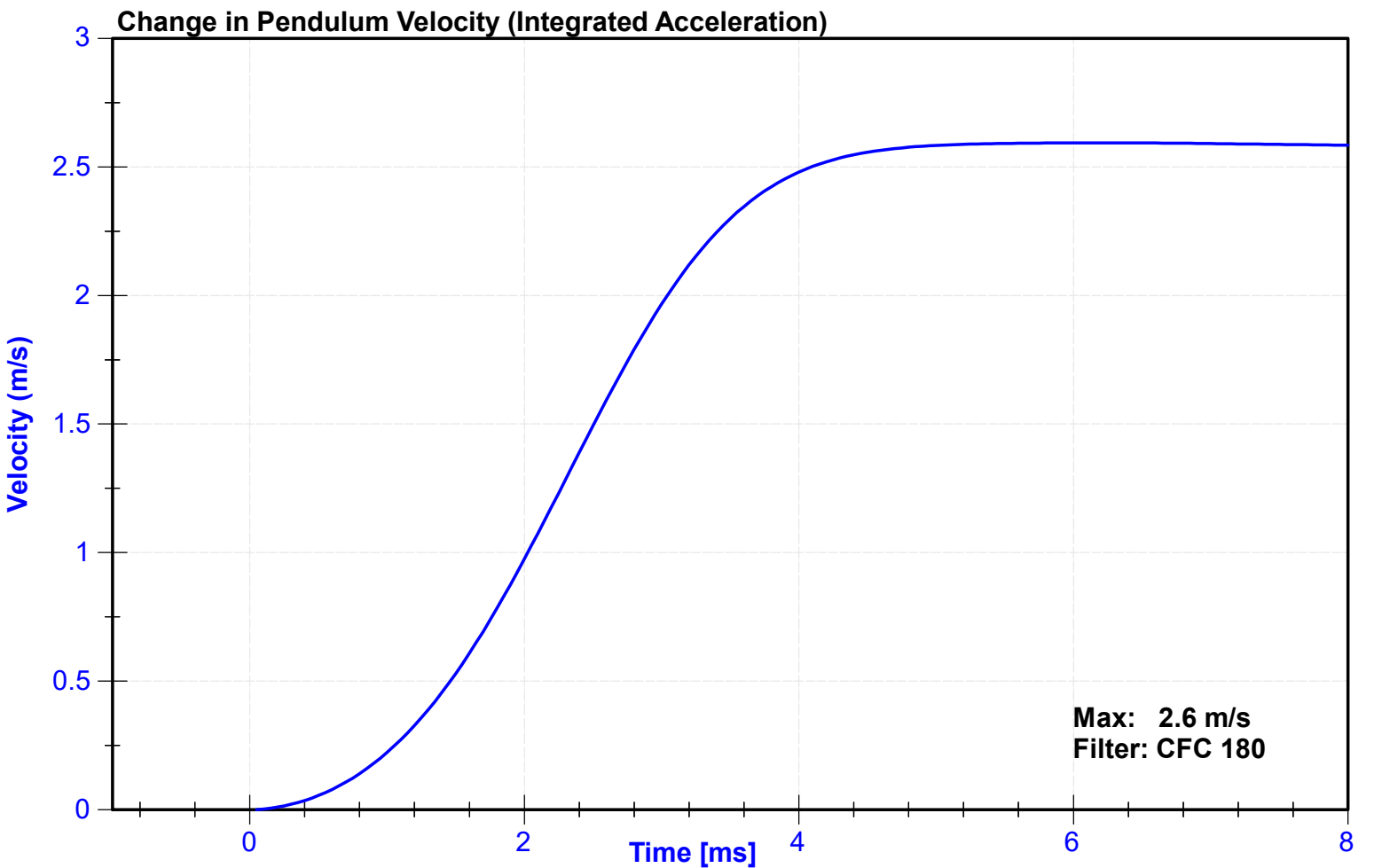
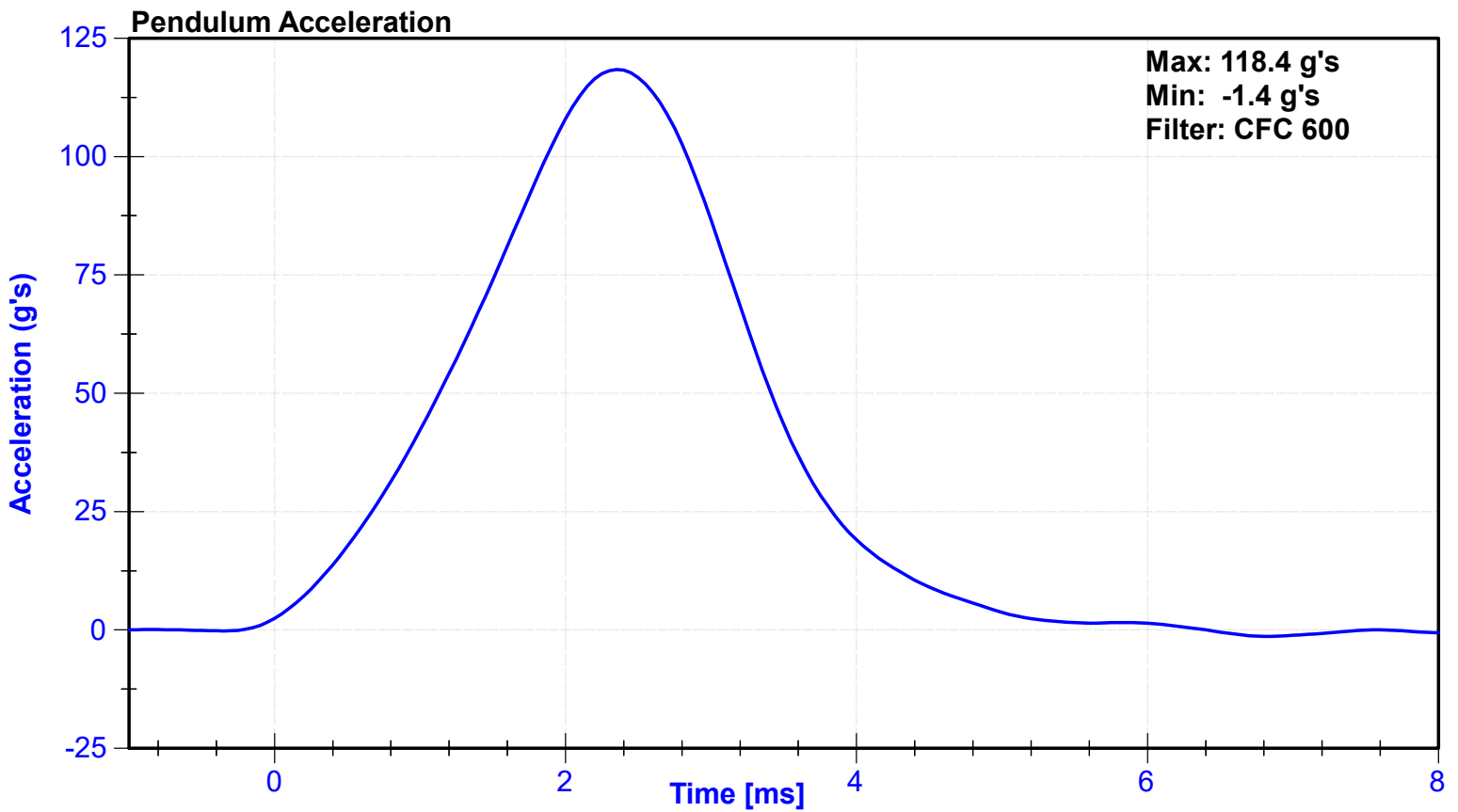
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.5	Pass
Humidity	10	70	%	53	Pass
Velocity	2.07	2.13	m/s	2.127	Pass
Maximum Resistive Force	4720	5780	N	5729.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18619	9/29/2023	3/27/2024





CALIBRATION TEST RESULTS

POST-TEST

HYBRID III 5TH PERCENTILE FEMALE - PASSENGER ATD

SERIAL NO: 137

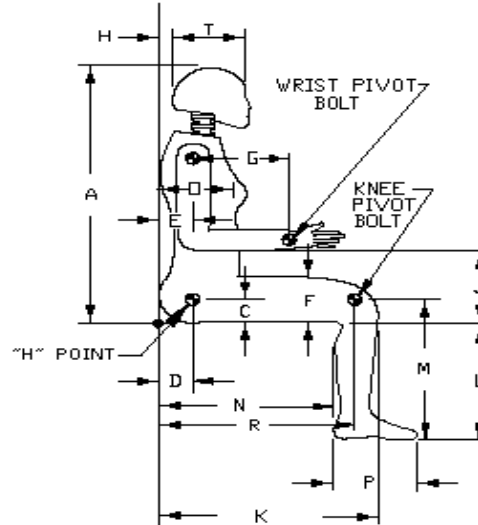
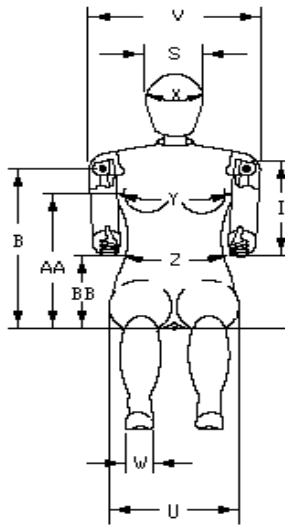


External Measurements - Hybrid 3 - 5th Female

Technician: K. Brogan

Date: 01/08/2024

Dummy Serial Number: 137



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	775	800	784	Pass
B	Shoulder Pivot Height	432	457	445	Pass
C	H-Point Height	81	86	84	Pass
D	H-Point from Backline	145	150	147	Pass
E	Shoulder Pivot from Backline	69	84	78	Pass
F	Thigh Clearance	119	135	129	Pass
G	Back of Elbow to Wrist Pivot	244	259	250	Pass
H	Head Back to Backline	43	48	45	Pass
I	Shoulder to Elbow Length	277	297	287	Pass
J	Elbow Rest Height	183	203	197	Pass
K	Buttock to Knee Length	521	546	535	Pass
L	Popliteal Height	356	376	369	Pass
M	Knee Pivot Height	394	419	409	Pass
N	Buttock Popliteal Length	414	439	427	Pass
O	Chest Depth without Jacket	175	191	185	Pass
P	Foot Length (right)	219	234	230	Pass
R	Buttock To Knee Pivot Length	457	483	466	Pass
S	Head Breadth	137	147	142	Pass
T	Head Depth	178	188	181	Pass
U	Hip Breadth	300	315	311	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	872	Pass
Z	Waist Circumference	460	790	651	Pass
AA	Reference Location (Chest Circumference)	333	358	346	Pass
BB	Reference Location (Waist Circumference)	160	170	166	Pass

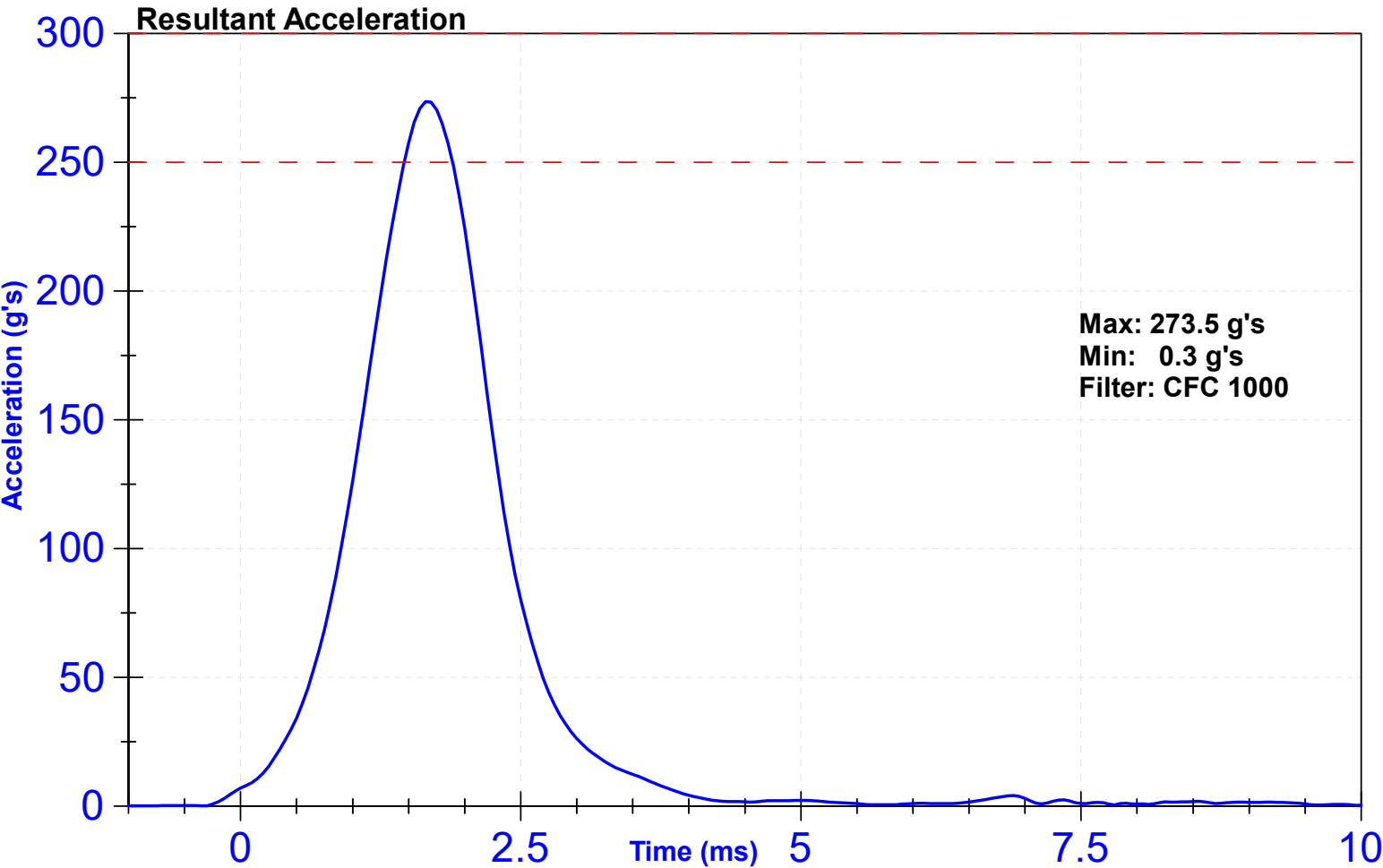
ATD Manufacturer	Humanetics	Test Technician	J. Rios
ATD Serial Number	137	Laboratory Supervisor	C. Mantell

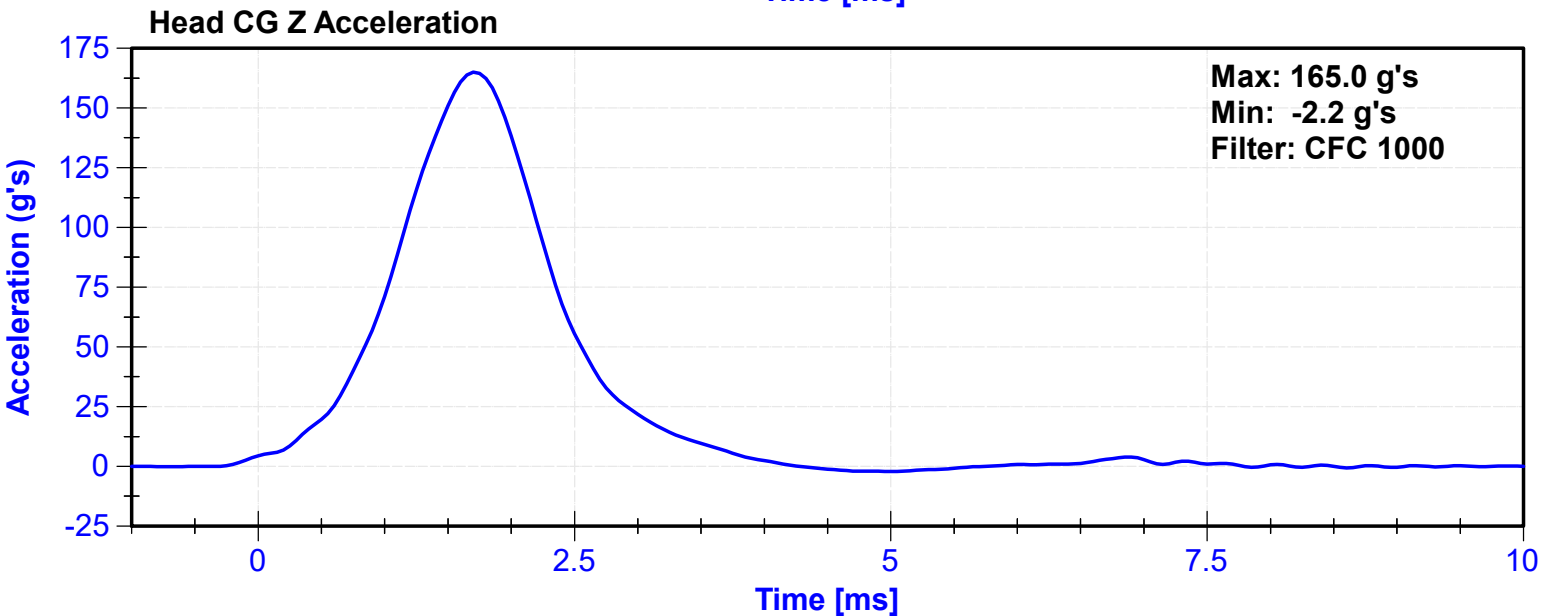
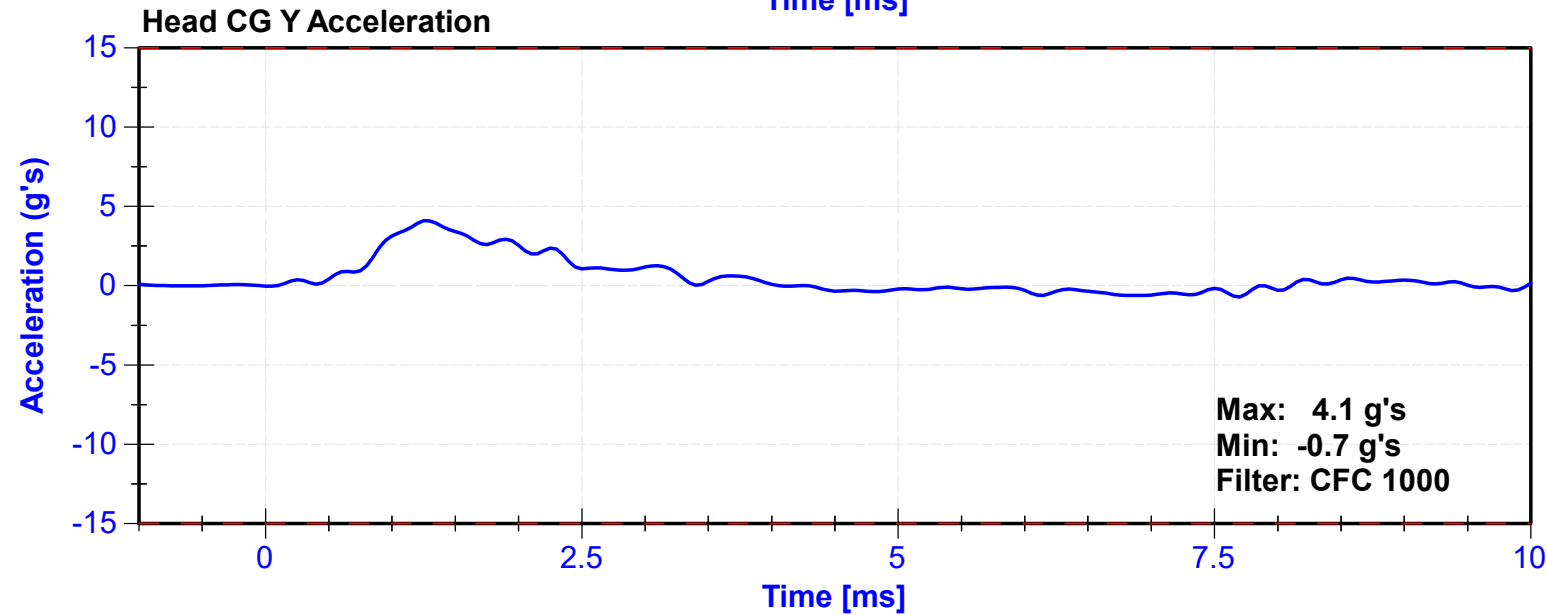
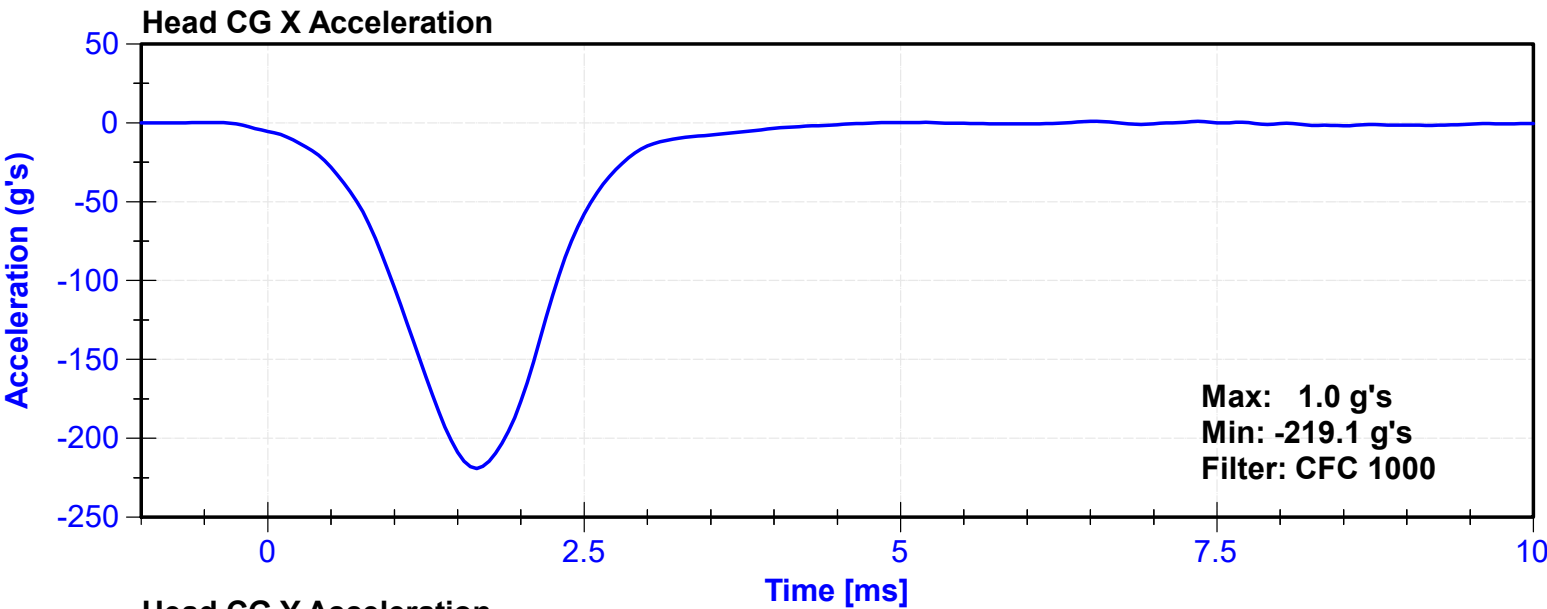
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.4	Pass
Humidity	10	70	%	62.3	Pass
Resultant Acceleration	250	300	g's	273.5	Pass
Oscillation	0	10	%	1.4	Pass
Lateral Acceleration	-15	15	g's	4.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	P79417	1/4/2024	7/2/2024
Y Accelerometer	Endevco	P83335	1/4/2024	7/2/2024
Z Accelerometer	Endevco	P64149	1/4/2024	7/2/2024





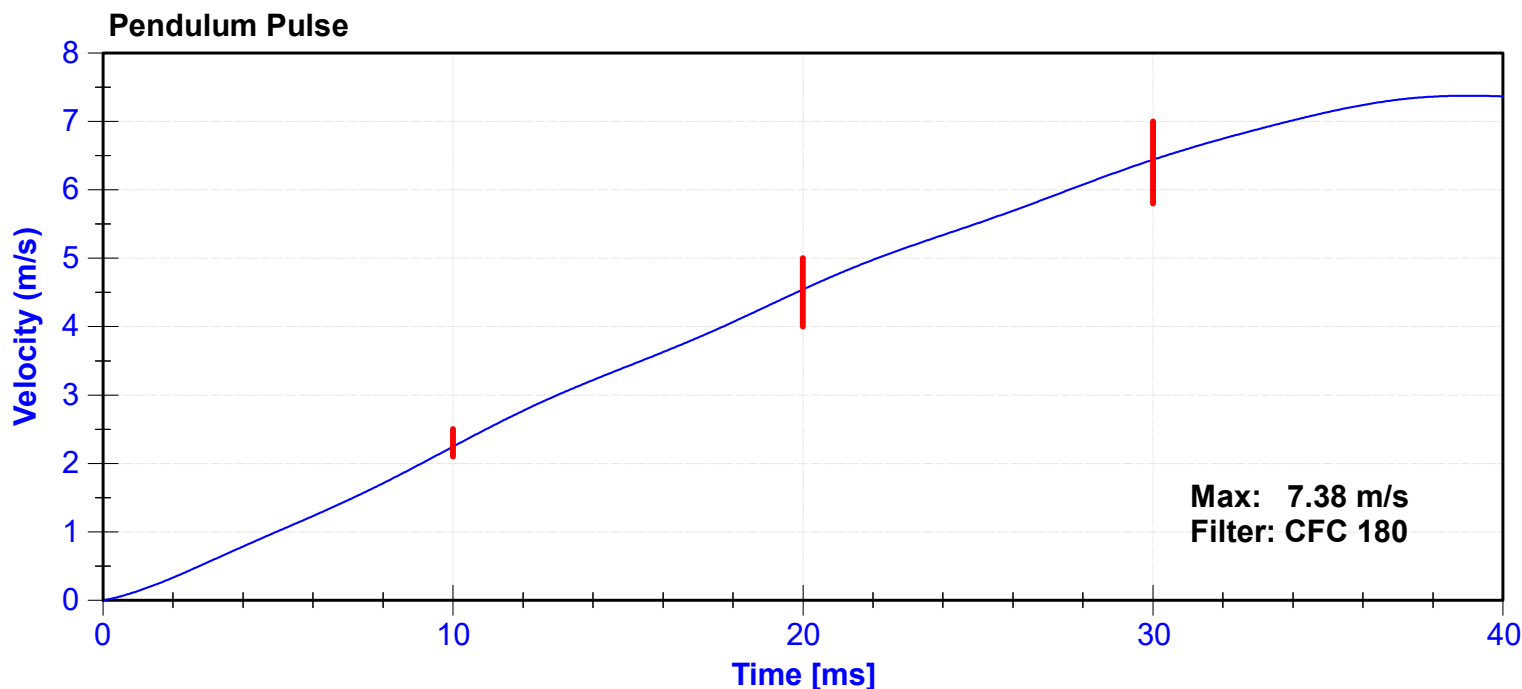
ATD Manufacturer	Humanetics	Test Technician	J. Rios
ATD Serial Number	137	Laboratory Supervisor	C. Mantell

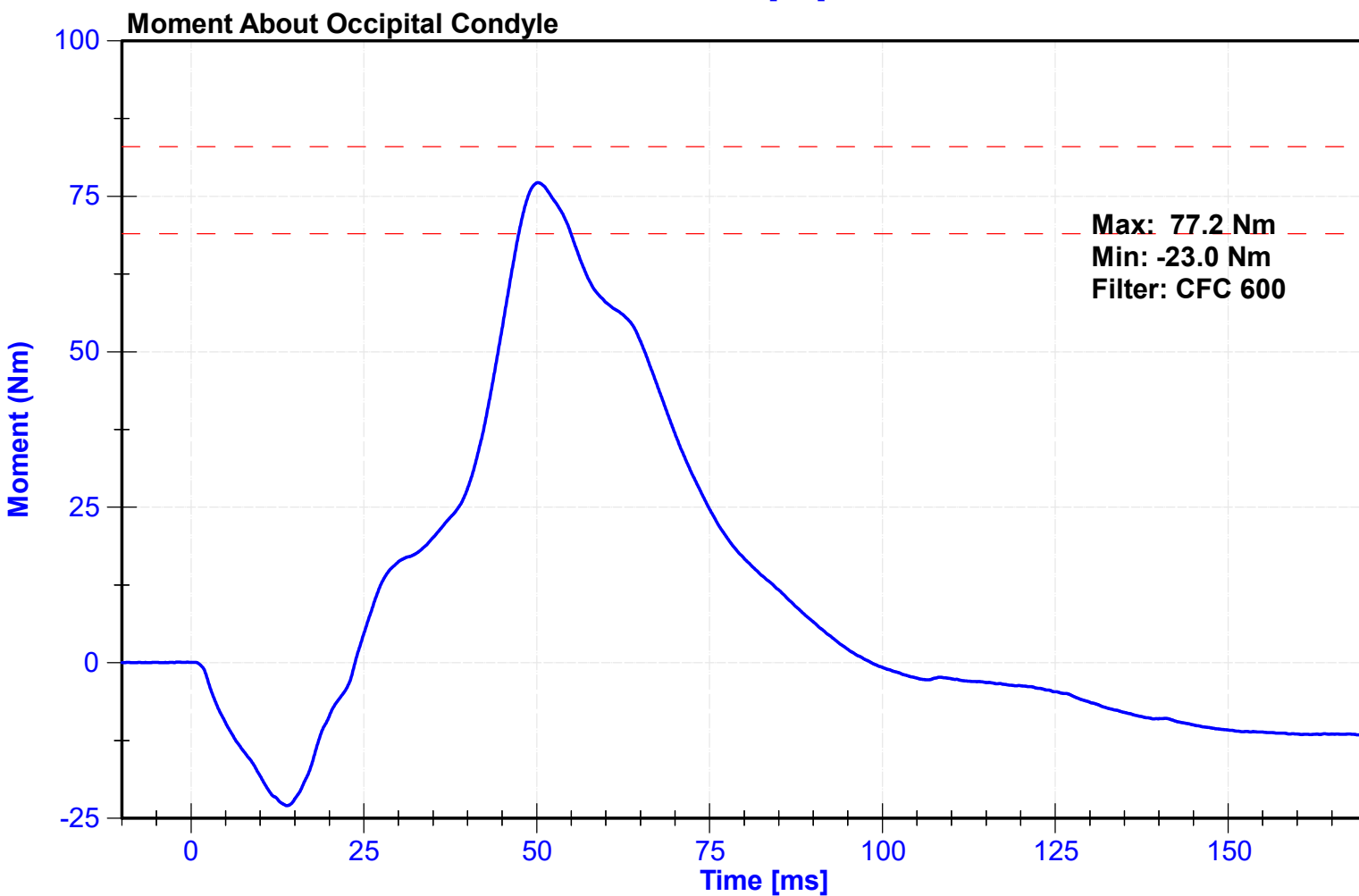
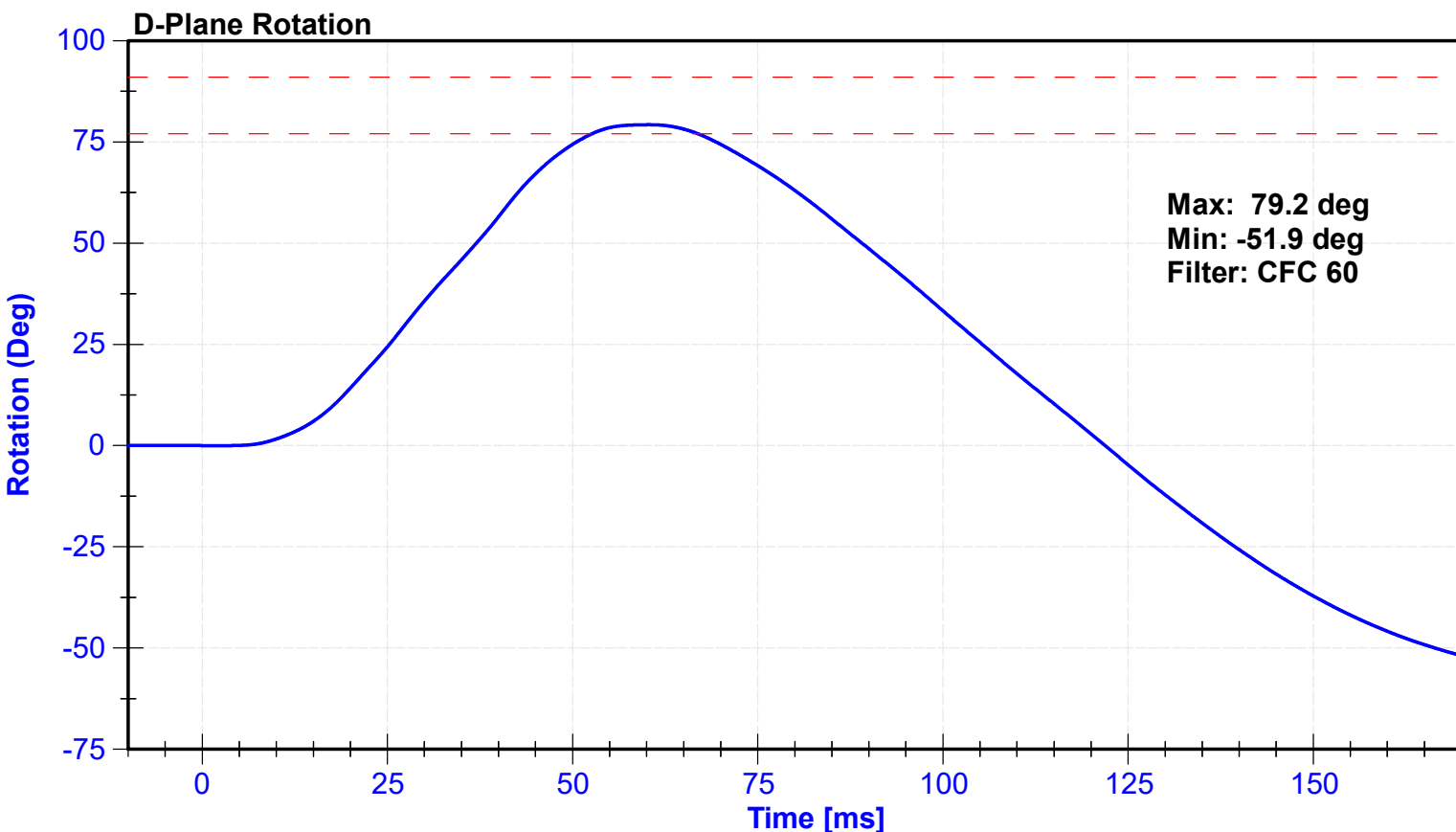
Results

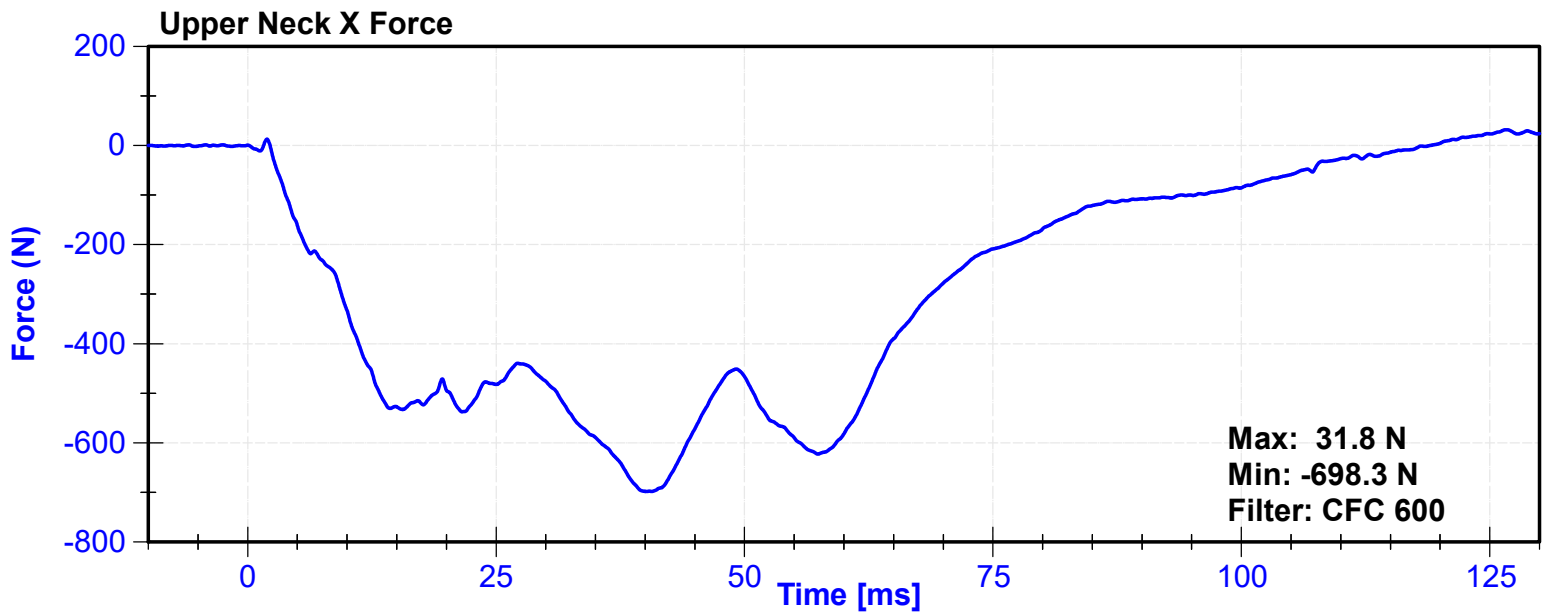
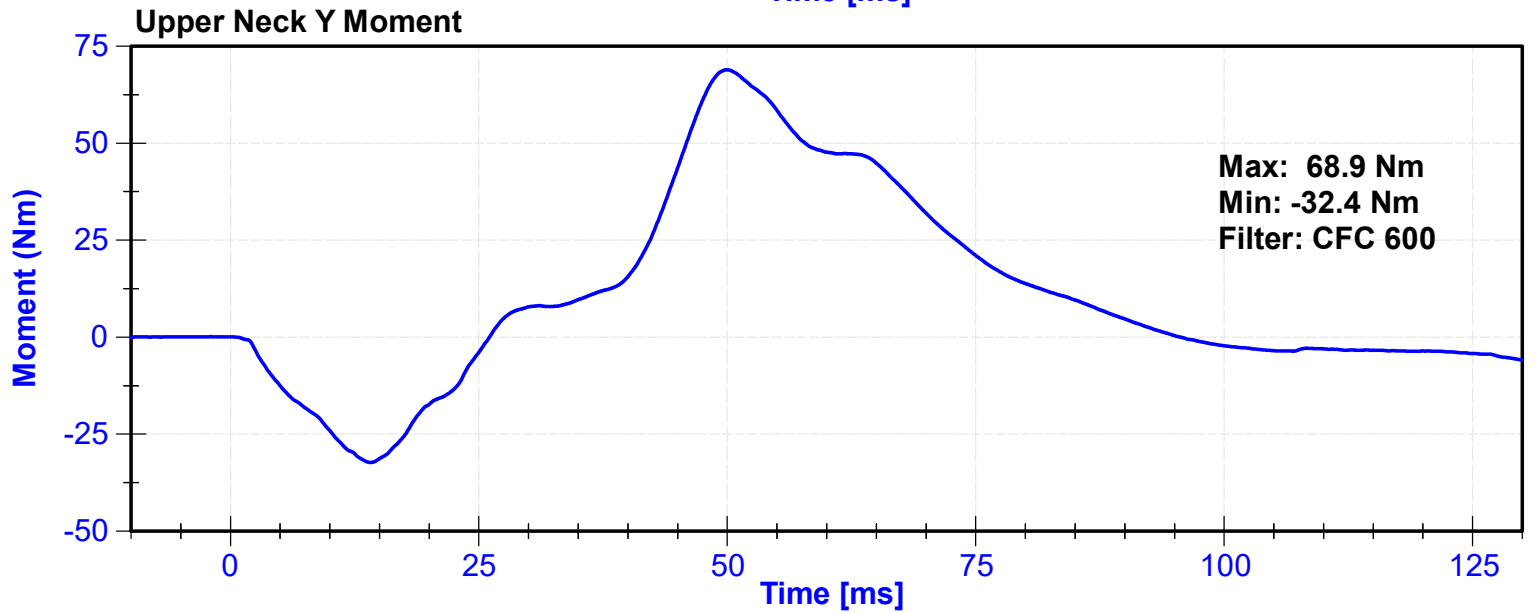
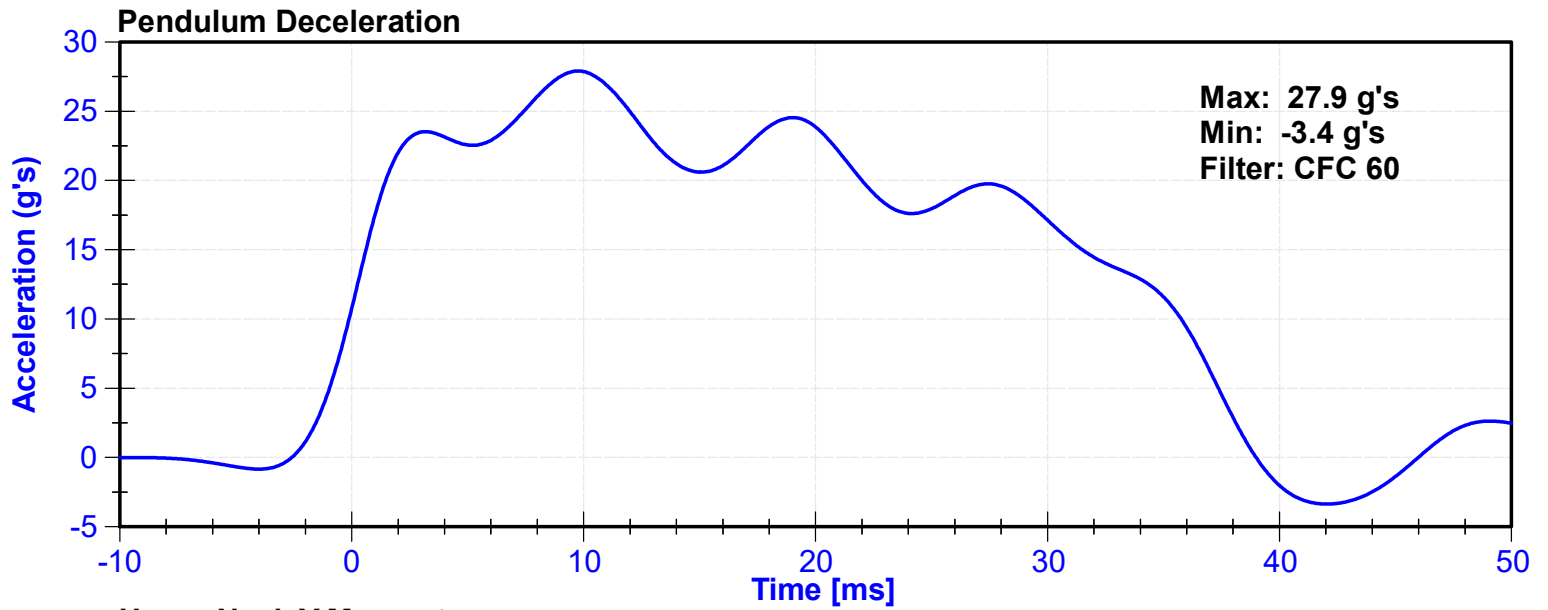
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	30	Pass
Velocity	6.89	7.13	m/s	7.020	Pass
Pendulum Impulse at 10ms	2.1	2.5	m/s	2.24	Pass
Pendulum Impulse at 20ms	4.0	5.0	m/s	4.54	Pass
Pendulum Impulse at 30ms	5.8	7.0	m/s	6.44	Pass
Max D Plane Rotation	77	91	deg	79.2	Pass
Max Moment During Rotation Interval	69	83	Nm	77.2	Pass
Moment Decay to 10.0 Nm	80	100	ms	86.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	7231C-750	10/31/2023	4/28/2024
Pendulum Potentiometer	ETI	LABPOT1	5/5/2023	5/4/2024
Condyle Potentiometer	ETI	LABPOT2	7/19/2023	7/18/2024
Upper Neck Load Cell	Denton	2207-FX	6/23/2023	6/22/2024







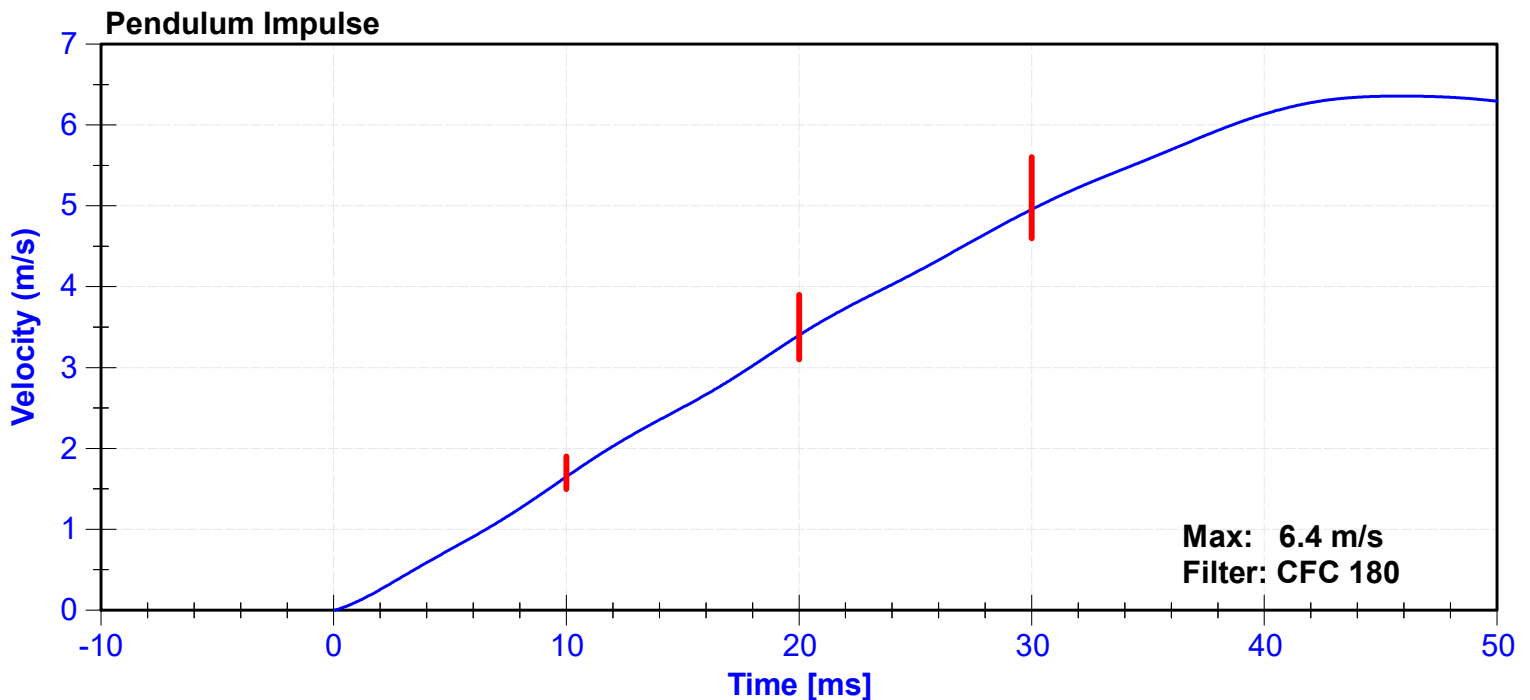
ATD Manufacturer	Humanetics	Test Technician	J. Rios
ATD Serial Number	137	Laboratory Supervisor	C. Mantell

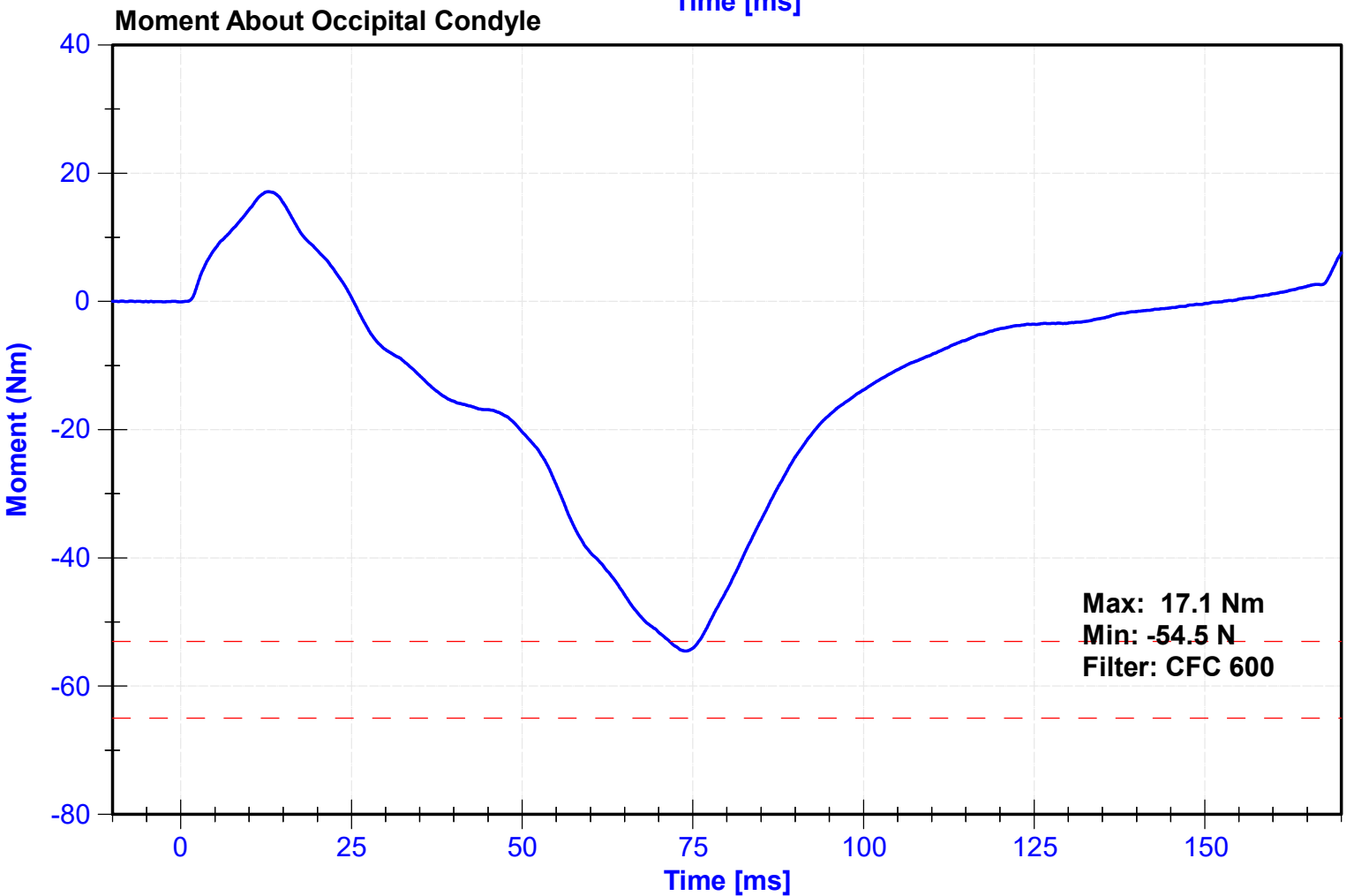
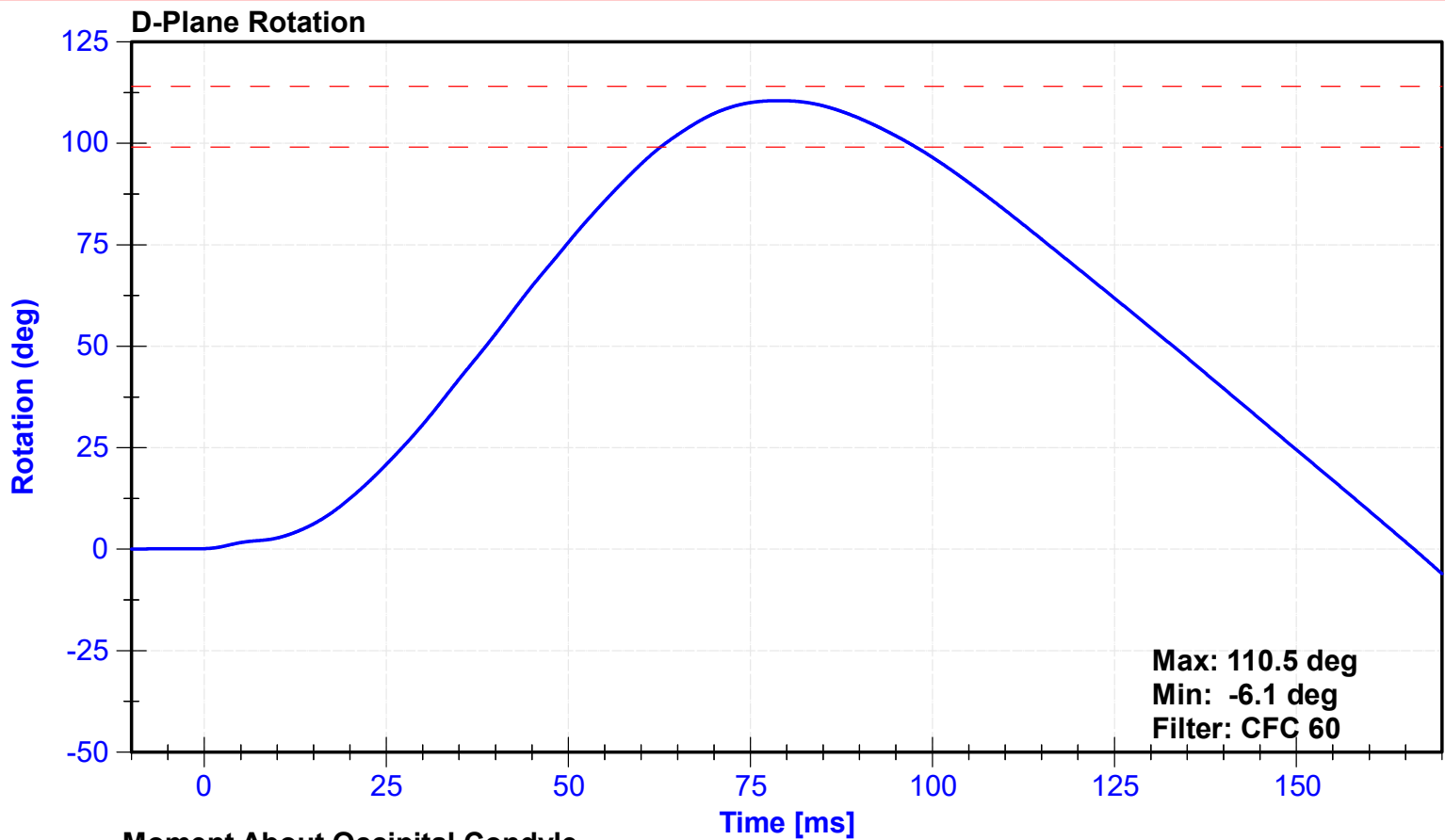
Results

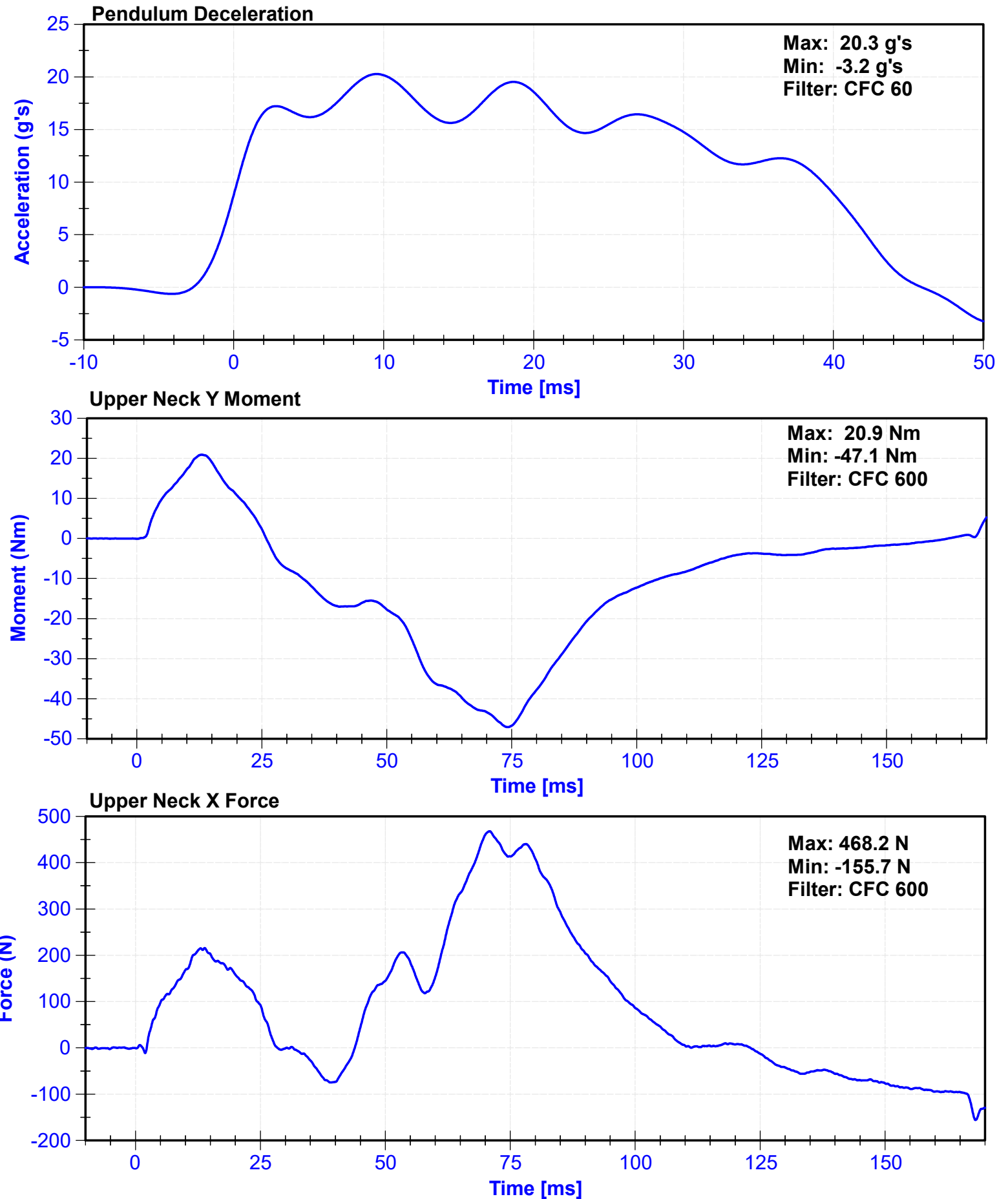
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	30	Pass
Velocity	5.95	6.19	m/s	6.058	Pass
Pendulum Impulse at 10ms	1.5	1.9	m/s	1.65	Pass
Pendulum Impulse at 20ms	3.1	3.9	m/s	3.40	Pass
Pendulum Impulse at 30ms	4.6	5.6	m/s	4.95	Pass
D Plane Rotation	99	114	deg	110.5	Pass
Moment During Rotation Interval	-65	-53	Nm	-54.5	Pass
Moment Decay to -10Nm	94	114	ms	106.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16503	10/31/2023	4/28/2024
Pendulum Potentiometer	ETI	LABPOT1	5/5/2023	5/4/2024
Condyle Potentiometer	ETI	LABPOT2	7/19/2023	7/18/2024
Upper Neck Load Cell	Denton	2207-FX	6/23/2023	6/22/2024



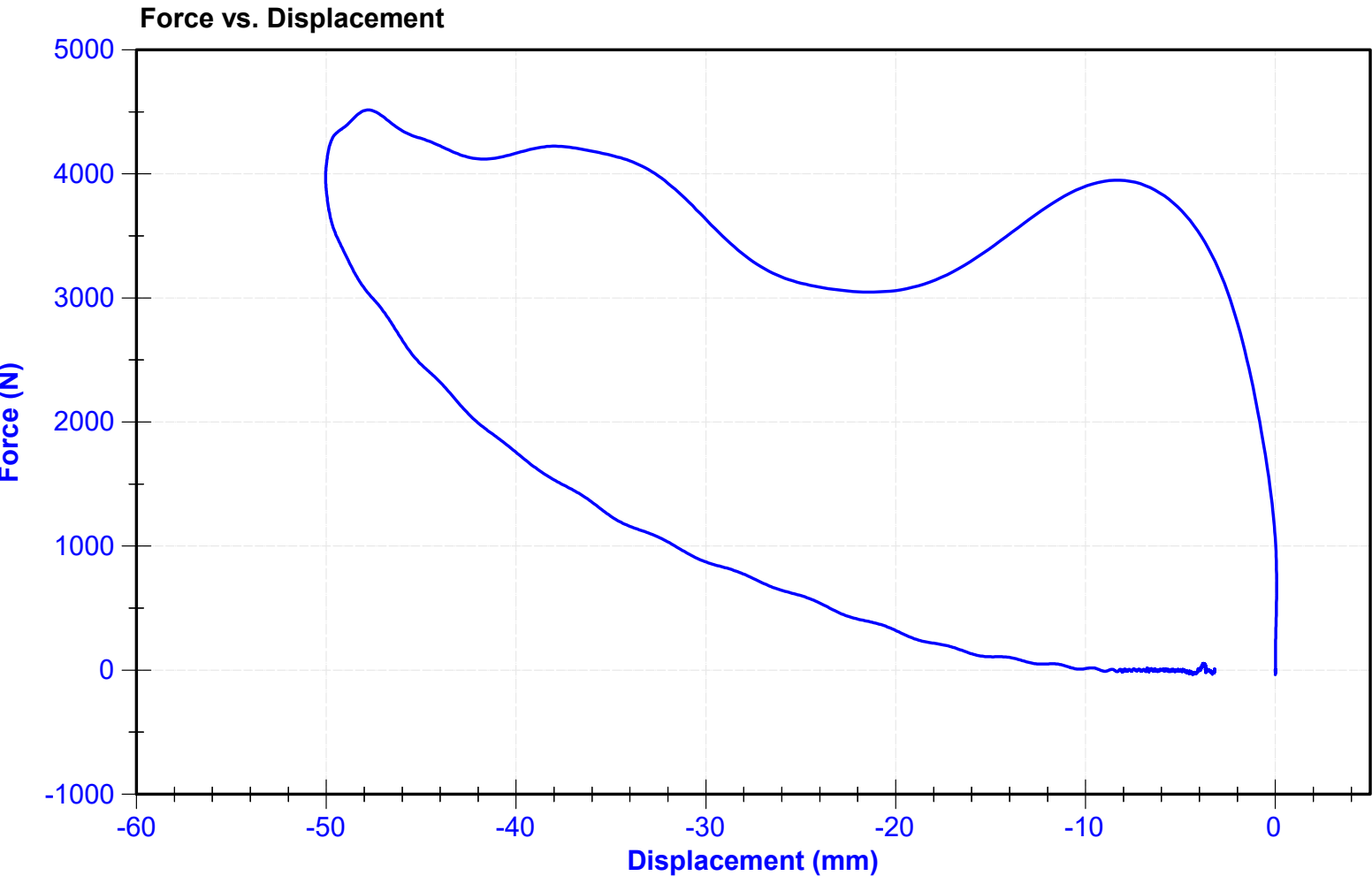


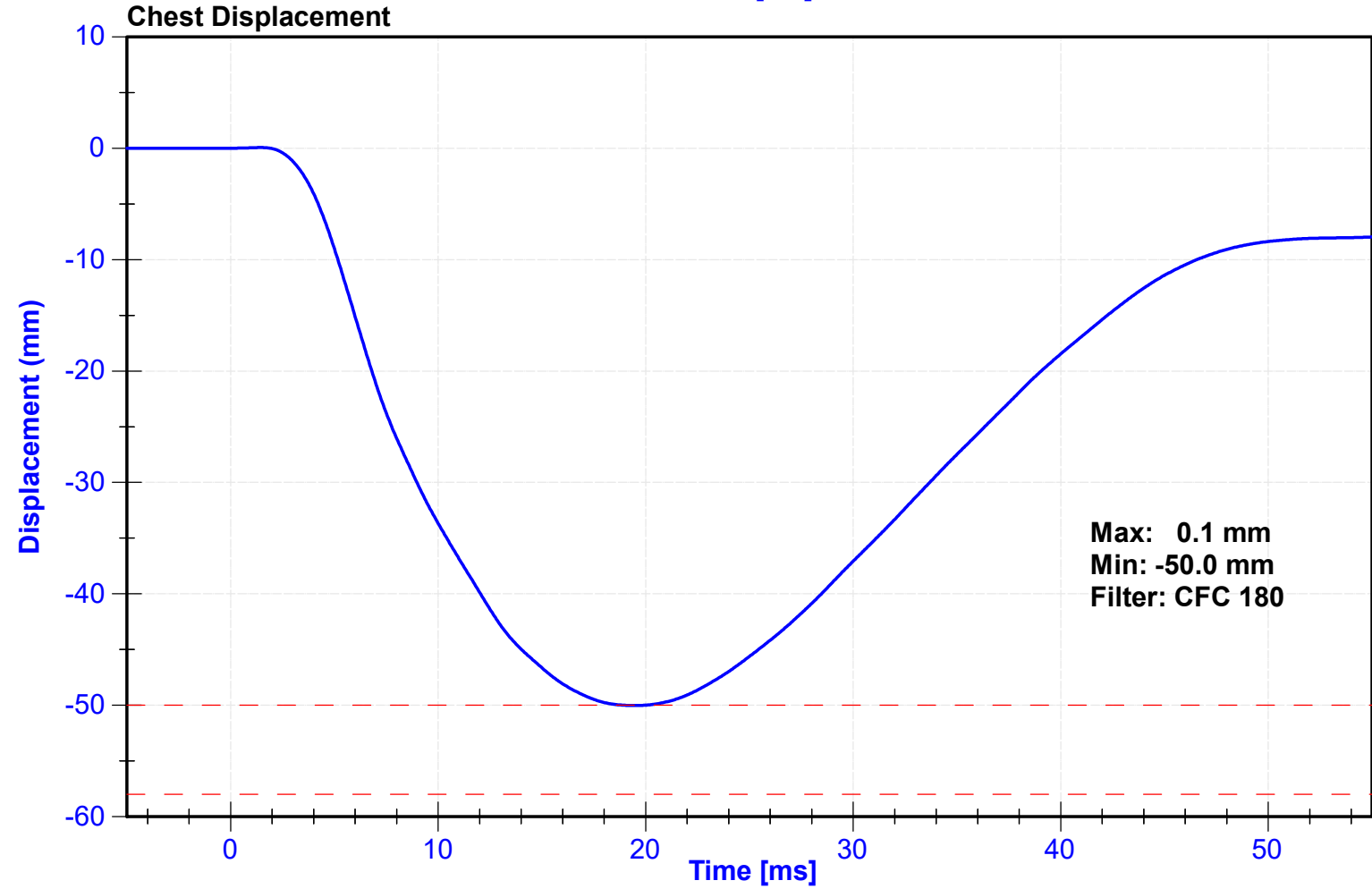
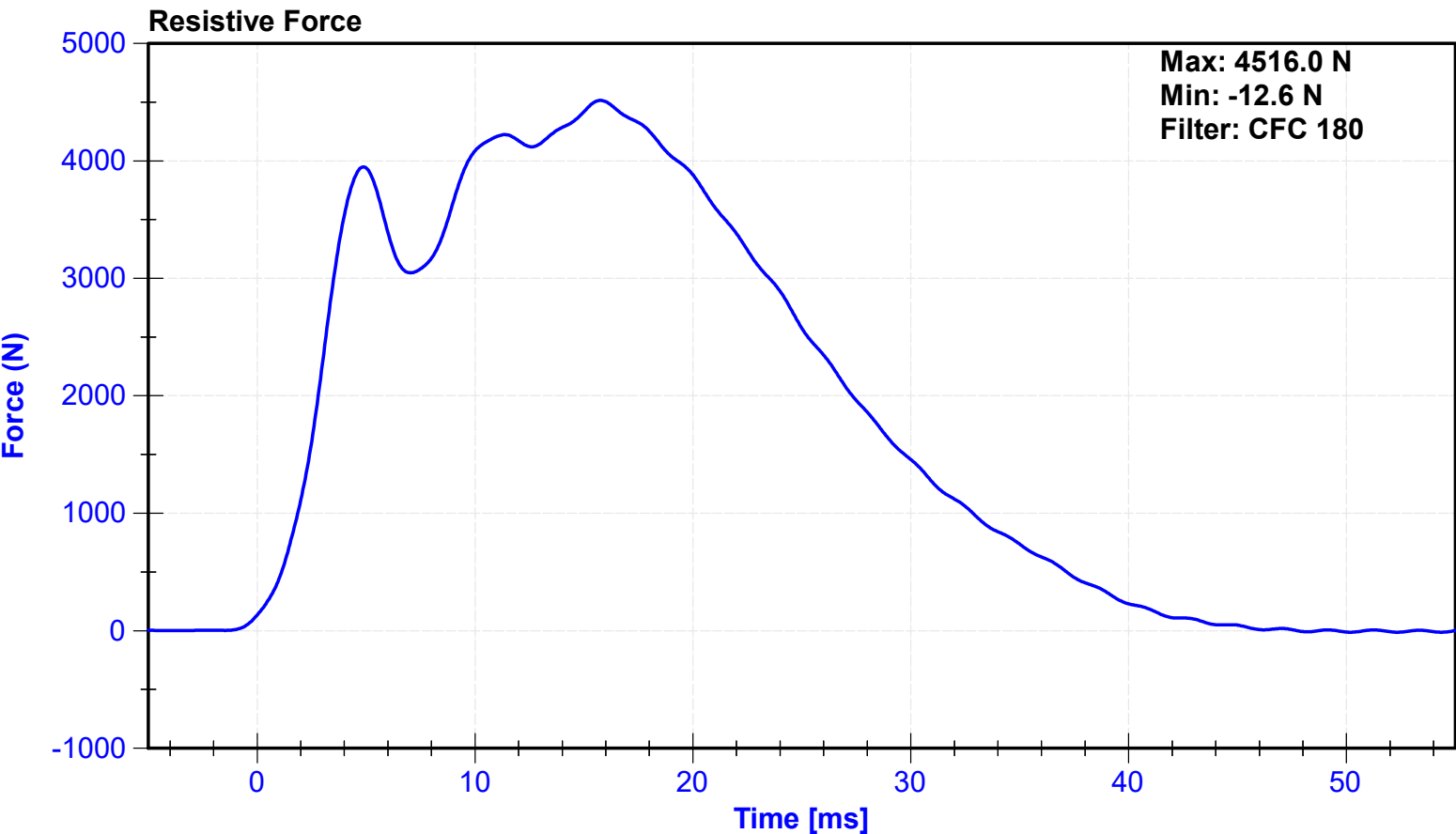


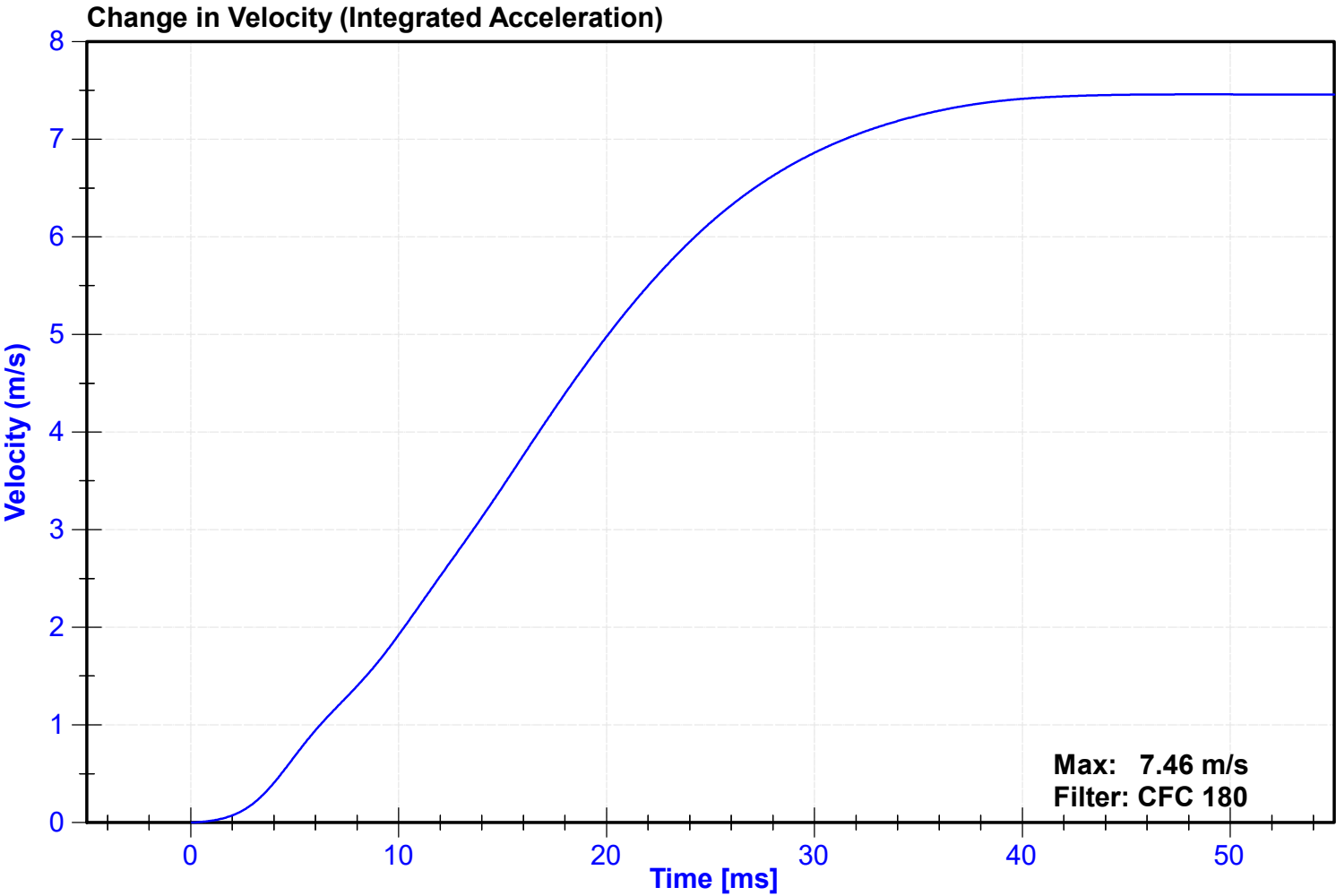
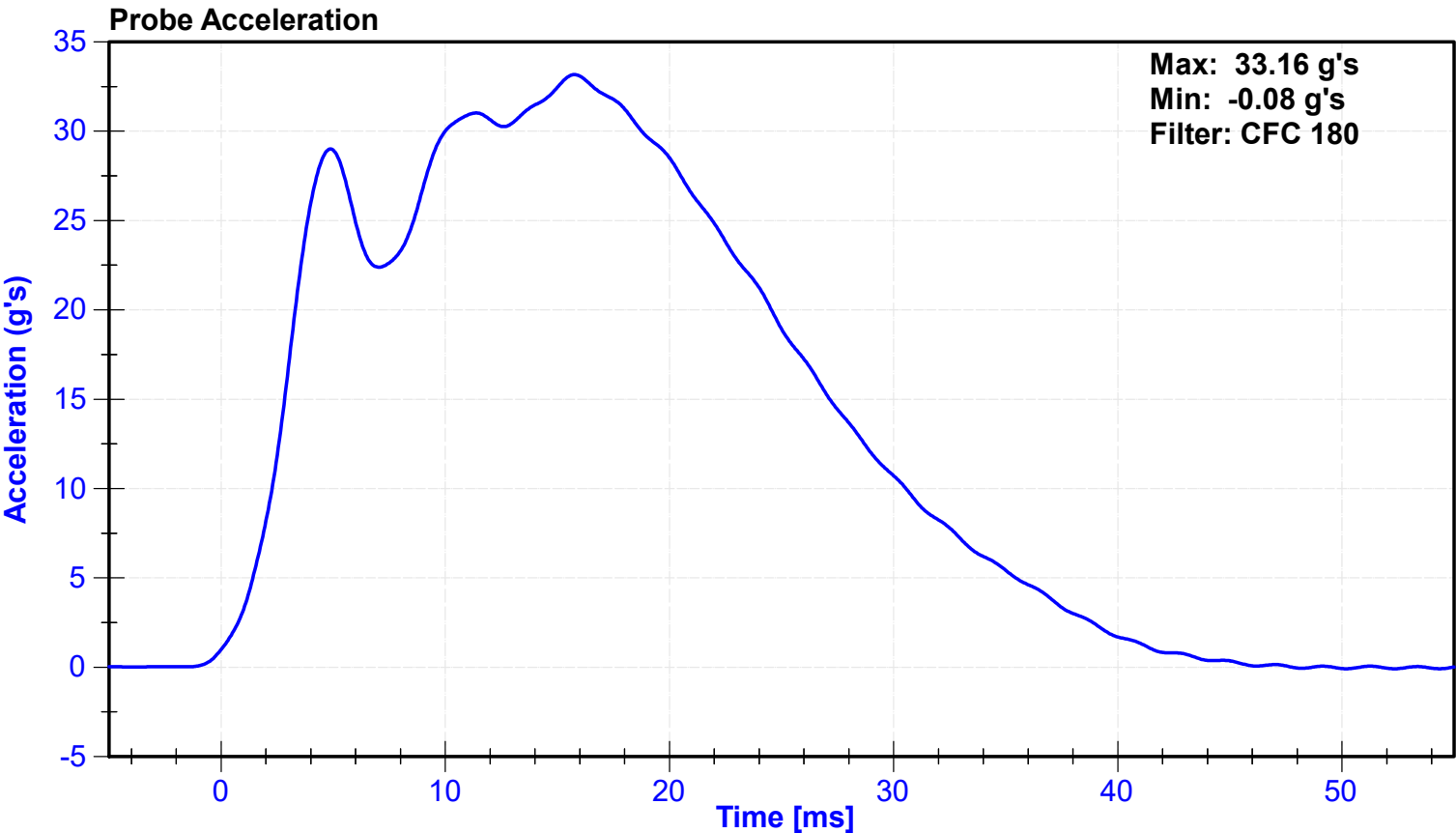
ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	137	Laboratory Supervisor	C. Mantel

Test Parameter	Results		Unit	Result	Pass/Fail
	Minimum Specification	Maximum Specification			
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	24	Pass
Velocity	6.59	6.83	m/s	6.725	Pass
Chest Deflection	-58	-50	mm	-50.0	Pass
Maximum Resistive Force (50 to 58mm)	3900	4400	N	4066.9	Pass
Maximum Resistive Force (18 to 50mm)	0	4600	N	4516.0	Pass
Hysteresis	69	85	%	75.1	Pass

Transducer Calibrations				
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18587	11/20/2023	11/19/2024
Chest Potentiometer	Servo	0720	1/5/2024	7/5/2024







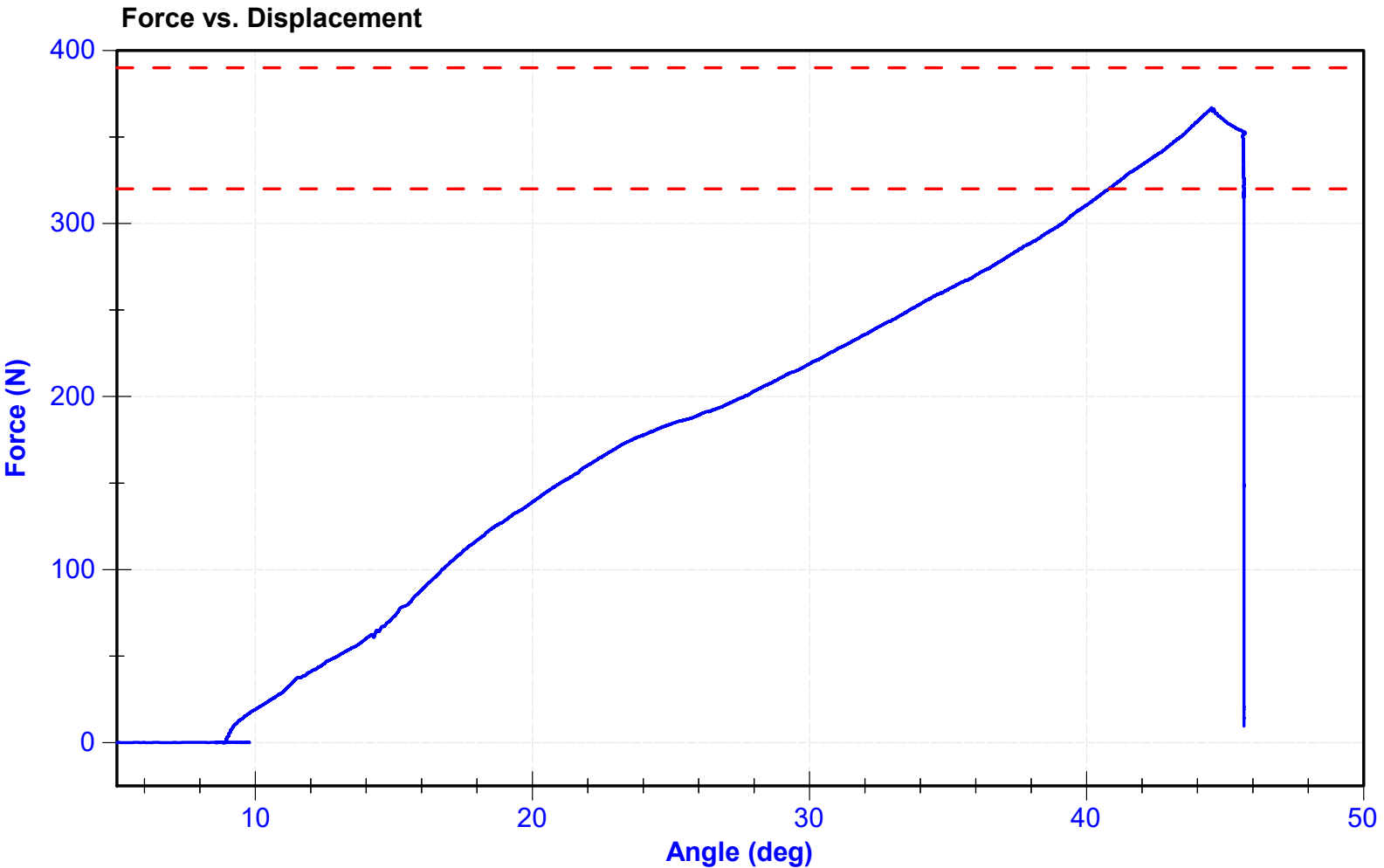
ATD Manufacturer	Humanetics	Test Technician	J. Rios
ATD Serial Number	137	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.6	25.6	°C	21.5	Pass
Humidity	10	70	%	32.5	Pass
Initial Angle	0	20	deg	8.9	Pass
Force at 45 Degrees	320	390	N	366.9	Pass
Return Angle Relative to Initial	0	8	deg	3.8	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



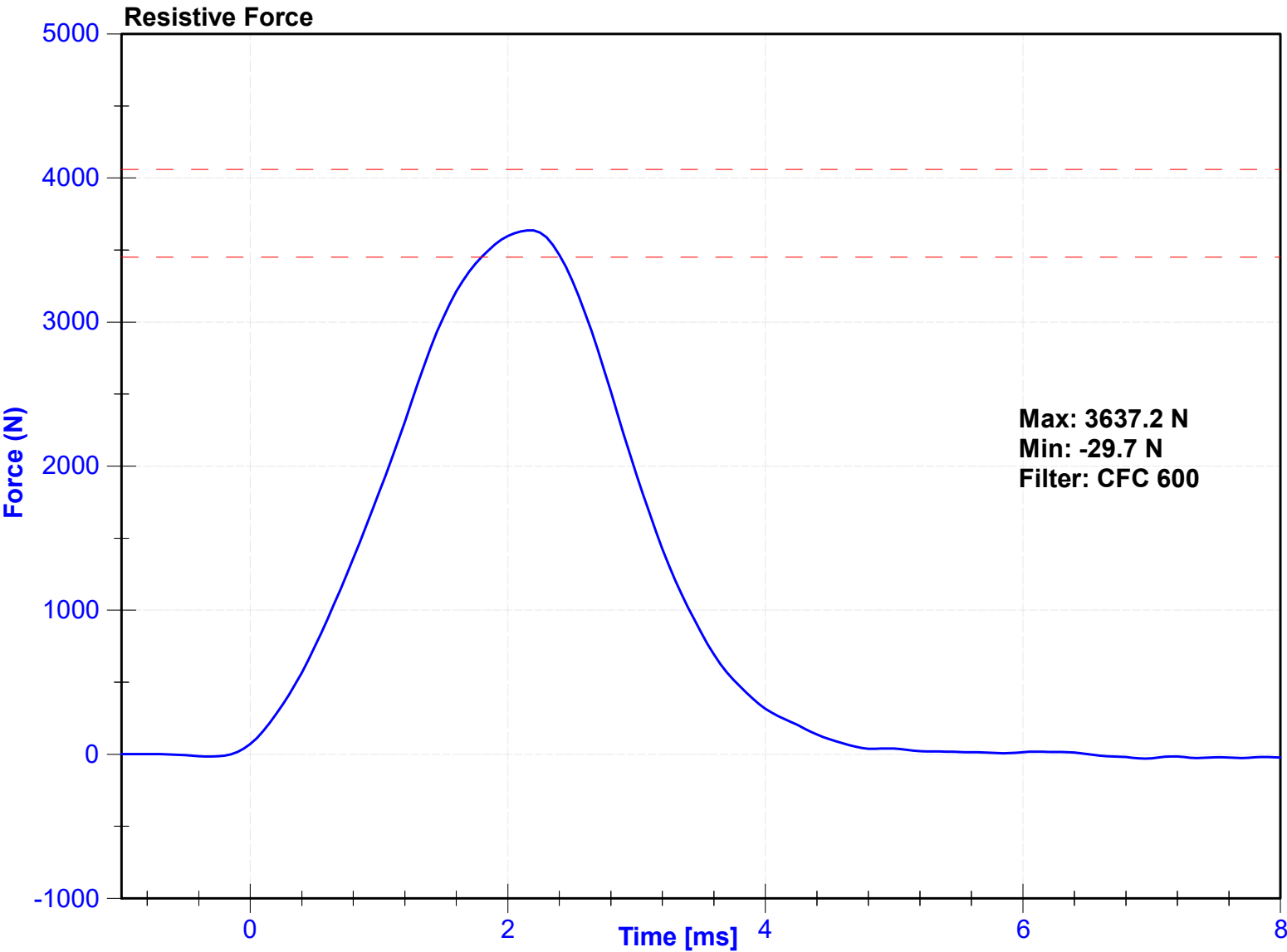
ATD Manufacturer	Humanetics	Test Technician	J. Kinderman
ATD Serial Number	137	Laboratory Supervisor	C. Mantell

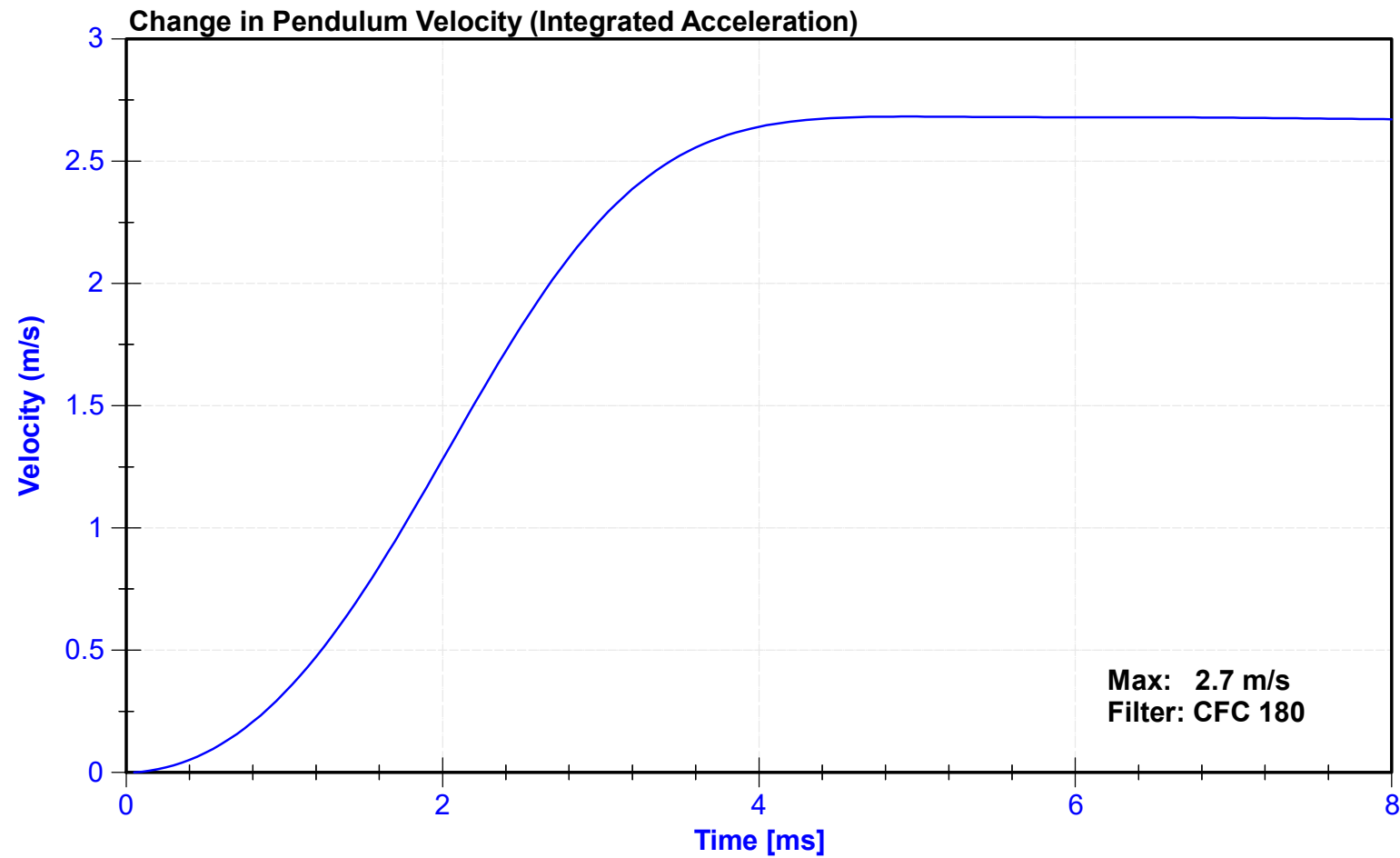
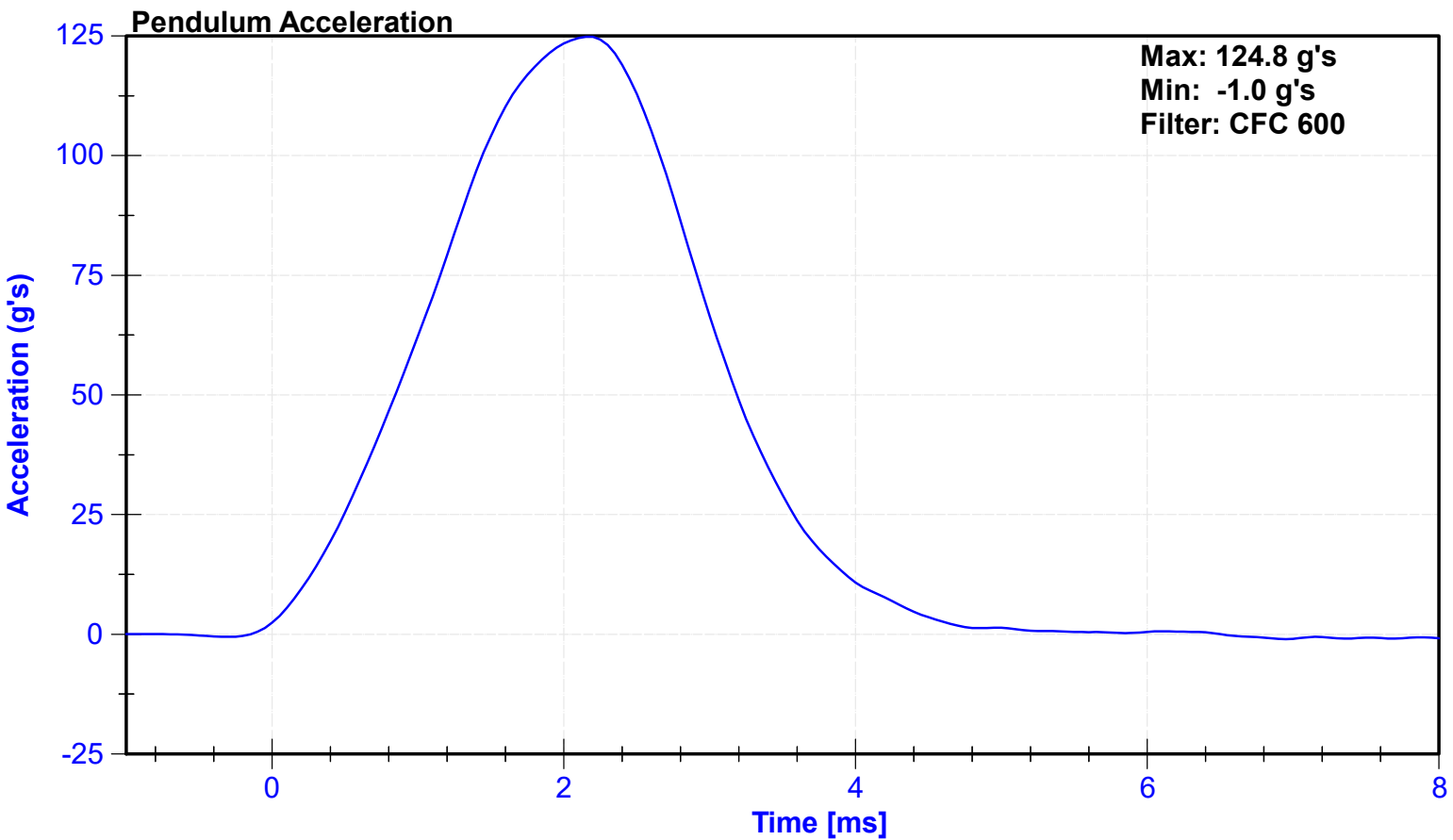
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.5	Pass
Humidity	10	70	%	53	Pass
Velocity	2.07	2.13	m/s	2.118	Pass
Resistive Force	3450	4060	N	3637.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18619	9/29/2023	3/27/2024





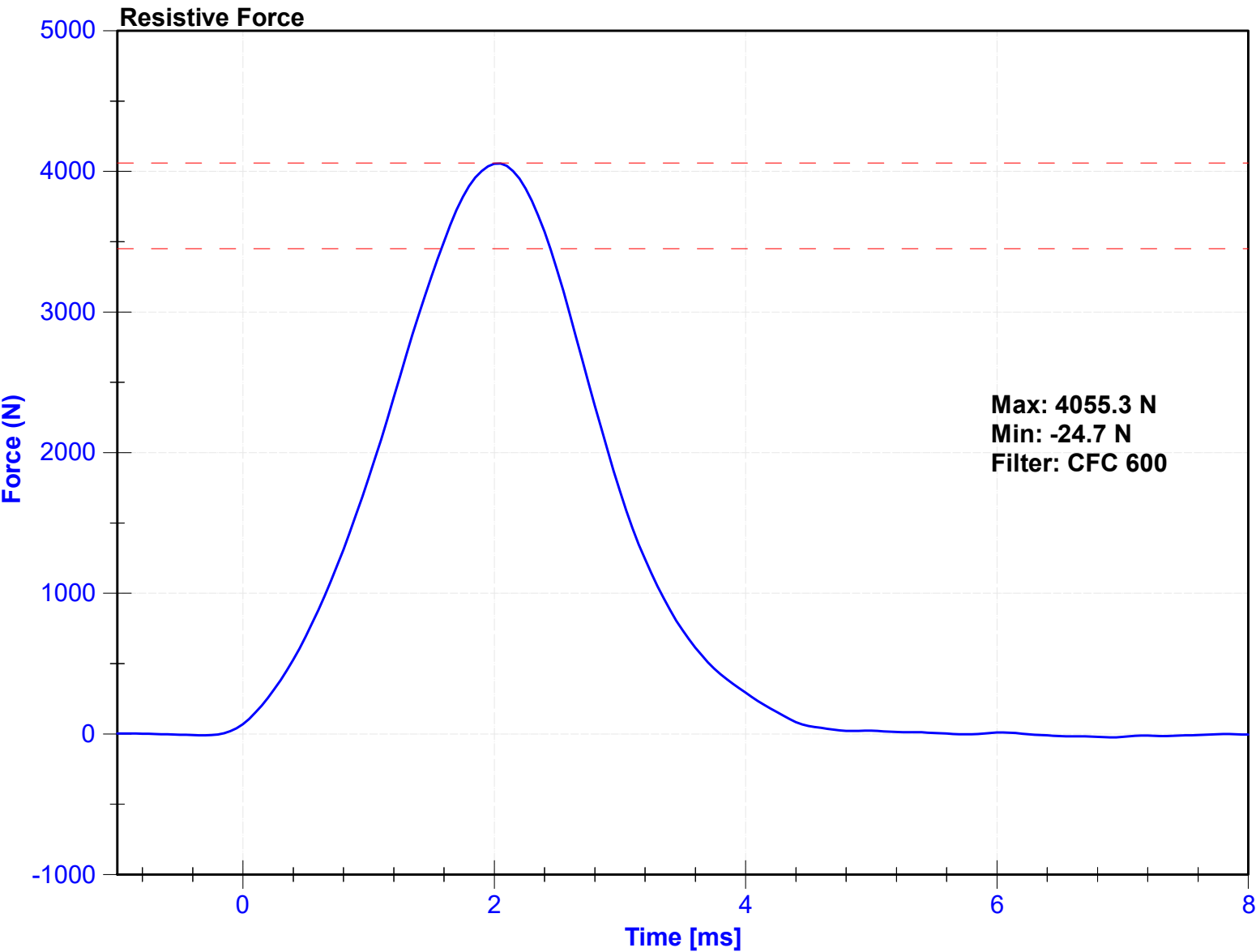
ATD Manufacturer	Humanetics	Test Technician	J. Kinderman
ATD Serial Number	137	Laboratory Supervisor	C. Mantell

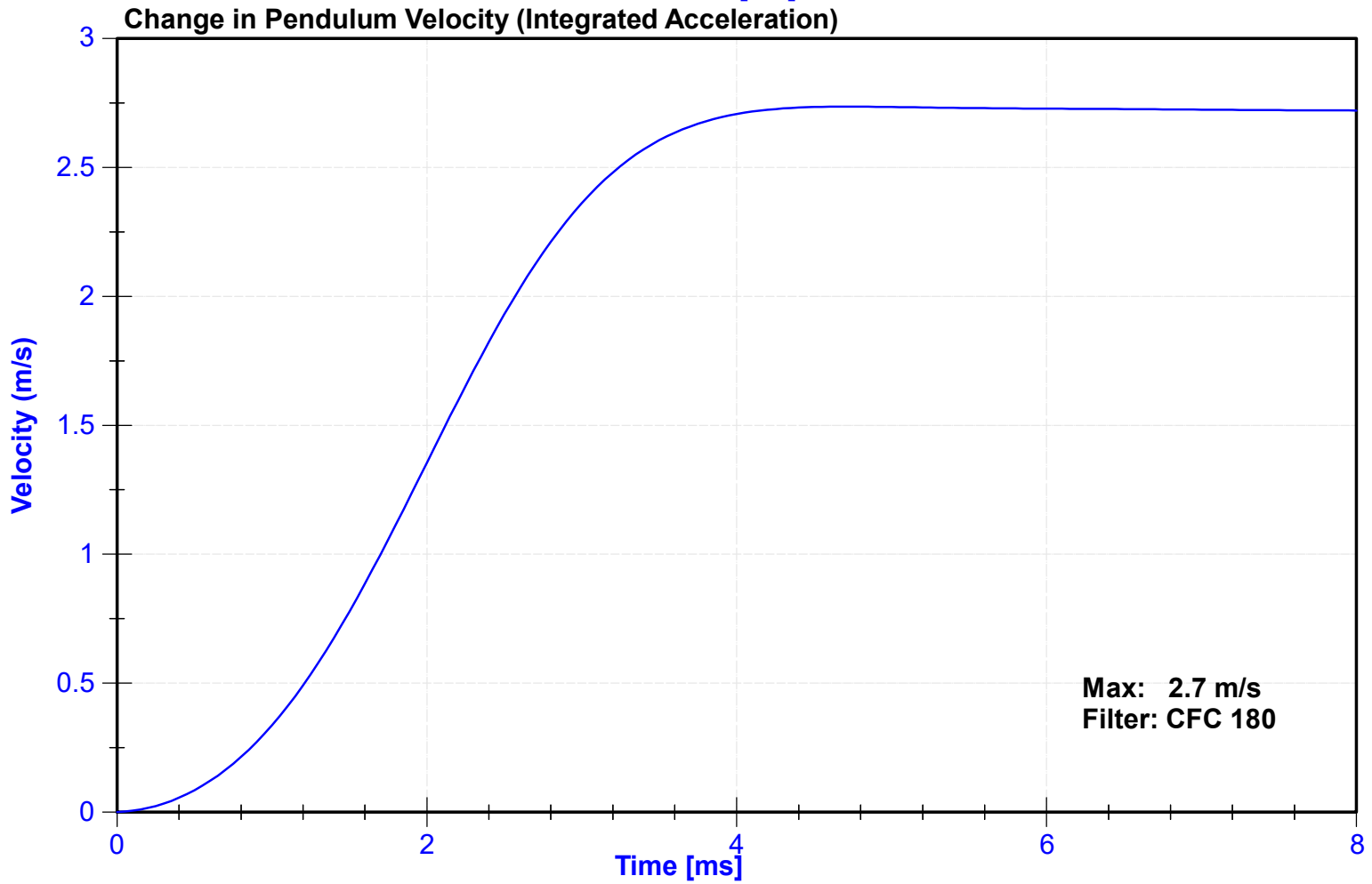
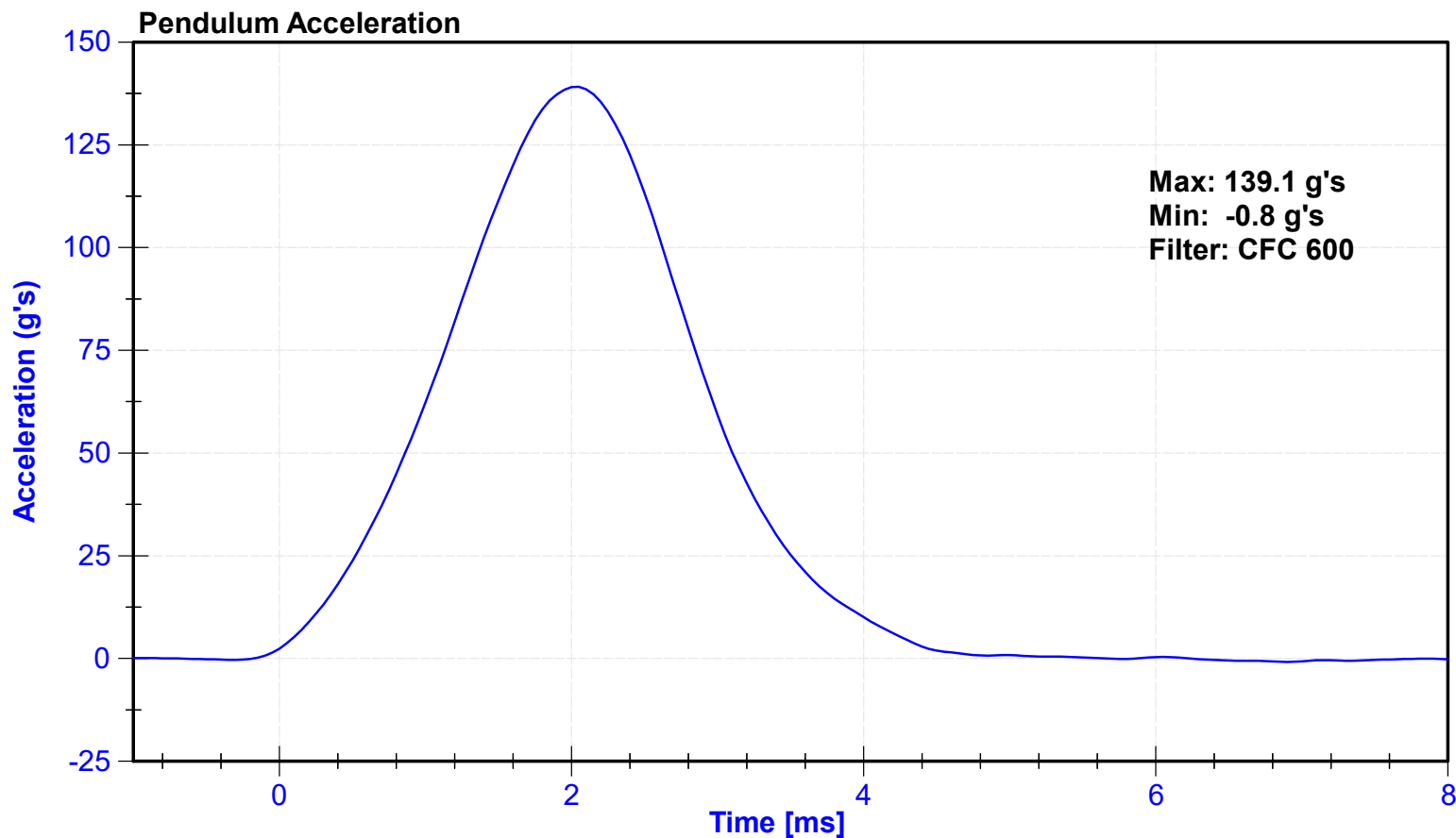
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.5	Pass
Humidity	10	70	%	53	Pass
Velocity	2.07	2.13	m/s	2.109	Pass
Resistive Force	3450	4060	N	4055.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18619	9/29/2023	3/27/2024





APPENDIX D

DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA

Table 1 – Driver Dummy Instrumentation

Instrumentation		Axis/Location	Hybrid III 50 th S/N: 142		
			Serial Number	Manufacturer	Calibration Date
Head Accelerometers	Primary	X	P51681	Endevco	11/17/2023
		Y	P64151	Endevco	11/17/2023
		Z	P52114	Endevco	11/17/2023
	Redundant	X	P52079	Endevco	11/17/2023
		Y	P58905	Endevco	11/17/2023
		Z	P63996	Endevco	11/17/2023
Head Angular Rate Sensors		X	15212	DTS ARS	11/15/2023
		Y	15695	DTS ARS	11/17/2023
		Z	7603	DTS ARS	11/15/2023
Upper Neck Load Cell		FX, Fy, Fz MX,MY, MZ	851-FX	Humanetics	05/18/2023
Chest Accelerometers	Primary	X	P51991	Endevco	11/17/2023
		Y	P51269	Endevco	11/17/2023
		Z	P49185	Endevco	11/17/2023
	Redundant	X	P68059	Endevco	11/17/2023
		Y	P51713	Endevco	11/17/2023
		Z	P78824	Endevco	11/17/2023
Chest Potentiometer		X	0075	JDK	12/18/2023
Pelvis Accelerometer		X	P58800	Endevco	11/16/2023
		Y	P52157	Endevco	11/16/2023
		Z	P83317	Endevco	11/16/2023
Femur Load Cells - Left	Primary	Z	DH3271-FZ1	Denton	05/18/2023
	Redundant	Z	DH3271-FZ2	Denton	05/18/2023
Femur Load Cells - Right	Primary	Z	DI4213-FZ1	Denton	05/18/2023
	Redundant	Z	DI4213-FZ2	Denton	05/18/2023
Tibia Load Cells - Left	Upper	MX, MY, FZ	652-FZ	Denton	05/22/2023
	Lower	MX, MY, FZ	673-FZ	Denton	05/22/2023
Tibia Load Cells – Right	Upper	MX, MY, FZ	651-FZ	Denton	05/22/2023
	Lower	MX, MY, FZ	505-FZ	Denton	05/22/2023
Foot Accelerometers - Left	Rear	X	P82756	Endevco	11/16/2023
	Front	Z	P51872	Endevco	11/16/2023
Foot Accelerometers - Right	Rear	X	P66942	Endevco	11/16/2023
	Front	Z	P58779	Endevco	11/16/2023
Seat belt Load Cells	Lap		292	GFE	02/17/2023
	Shoulder		174	GFE	02/17/2023

Table 2 – Front Passenger Dummy Instrumentation

Instrumentation		Axis/Location	Hybrid III 5 th S/N: 137		
			Serial Number	Manufacturer	Calibration Date
Head Accelerometers	Primary	X	P79417	Endevco	01/04/2024
		Y	P83335	Endevco	01/04/2024
		Z	P64149	Endevco	01/04/2024
	Redundant	X	P52008	Endevco	01/04/2024
		Y	P52045	Endevco	01/04/2024
		Z	P74774	Endevco	01/03/2024
Head Angular Rate Sensors		X	7589	DTS ARS	11/15/2023
		Y	13095	DTS ARS	11/15/2023
		Z	4718	DTS ARS	11/15/2023
Upper Neck Load Cell		FX, Fy, Fz MX,MY, MZ	2207-FX	Denton	06/23/2023
Chest Accelerometers	Primary	X	T21142	Endevco	01/03/2024
		Y	P83346	Endevco	01/04/2024
		Z	P49190	Endevco	01/04/2024
	Redundant	X	P58794	Endevco	01/03/2024
		Y	P69791	Endevco	01/03/2024
		Z	T11253	Endevco	01/04/2024
Chest Potentiometer		X	0720	Servo	01/05/2024
Pelvis Accelerometer		X	P58735	Endevco	01/03/2024
		Y	P77587	Endevco	01/03/2024
		Z	P51285	Endevco	01/03/2024
Femur Load Cells - Left	Primary	Z	DT0998-FZ1	Denton	05/18/2023
	Redundant	Z	DT0998-FZ2	Denton	05/18/2023
Femur Load Cells - Right	Primary	Z	109-FZ1	Denton	05/18/2023
	Redundant	Z	109-FZ2	Denton	05/18/2023
Tibia Load Cells - Left	Upper	MX, MY, FZ	361-FZ	Denton	05/22/2023
	Lower	MX, MY, FZ	363-FZ	Denton	05/22/2023
Tibia Load Cells – Right	Upper	MX, MY, FZ	406-FZ	Denton	05/22/2023
	Lower	MX, MY, FZ	362-FZ	Denton	05/22/2023
Foot Accelerometers - Left	Rear	X	P78959	Endevco	01/03/2024
	Front	Z	P83418	Endevco	01/04/2024
Foot Accelerometers - Right	Rear	X	P63998	Endevco	01/03/2024
	Front	Z	P80265	Endevco	01/03/2024
Seat belt Load Cells	Lap		NA	NA	NA
	Shoulder		295	GFE	02/17/2023

Table 3 – Vehicle Instrumentation

Instrumentation			Axis	Serial Number	Manufacturer	Calibration Date
Crossmember/Rear Seat Accelerometers	Left	Primary	X	A315020	Measurement Specialties	12/07/2023
			Z	A315780	Measurement Specialties	12/07/2023
		Redundant	X	G21384	Endevco	10/11/2023
	Right	Primary	X	A351007	Measurement Specialties	08/18/2023
			Z	A352409	Measurement Specialties	08/18/2023
		Redundant	X	A350921	Measurement Specialties	12/09/2023
Engine Accelerometers	Top		X	G22927	Endevco	12/04/2023
	Bottom		X	G22439	Endevco	10/25/2023