

REPORT NUMBER: SPNCAP-CAL-23-002

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

**KIA GEORGIA, INC.
2023 KIA Sportage
5 Door SUV**

NHTSA No: M20234206

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



January 5, 2024

FINAL REPORT

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

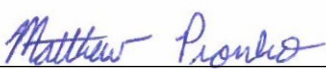
This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Administration, in response to Contract Number 693JJ920D000016.

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Date: January 5, 2024

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

Date: _____

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15. Supplementary Notes																																																									
16. Abstract A 56.30 km/h (35 mph), NCAP frontal rigid barrier impact test was conducted on a 2023 KIA Sportage 5 Door SUV in accordance with the specifications of the Office of Crashworthiness Standards Laboratory Procedure for NCAP Full Frontal Rigid Barrier Impact Testing. The test was conducted at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on February 17, 2023. The impact velocity of the vehicle was 56.18 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 484 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>299.076</td> <td>700</td> <td>307.172</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>-23.626</td> <td>52</td> <td>-10.295</td> </tr> <tr> <td>Nij</td> <td></td> <td>1</td> <td>0.245</td> <td>1</td> <td>0.309</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>4170</td> <td>1169.357</td> <td>2620</td> <td>787.794</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>4000</td> <td>-64.142</td> <td>2520</td> <td>-512.888</td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>10008</td> <td>-212.227</td> <td>6805</td> <td>-1298.622</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>10008</td> <td>-685.722</td> <td>6805</td> <td>-902.569</td> </tr> </tbody> </table> The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.						Measurement Description	Units	Driver ATD (Serial No. 142)		Passenger ATD (Serial No. 137)		Threshold	Result	Threshold	Result	Head Injury Criteria (HIC15)		700	299.076	700	307.172	Maximum Chest Compression	mm	63	-23.626	52	-10.295	Nij		1	0.245	1	0.309	Neck Tension	N	4170	1169.357	2620	787.794	Neck Compression	N	4000	-64.142	2520	-512.888	Left Femur Force	N	10008	-212.227	6805	-1298.622	Right Femur Force	N	10008	-685.722	6805	-902.569
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17. Key Words 56.3 km/h (35 mph) Full Frontal Rigid Barrier Impact Test New Car Assessment Program (NCAP)				18. Distribution Statement <u>Copies of this report are available from:</u> National Highway Traffic Safety Administration Technical Information Services Division 1200 New Jersey Ave, SE Washington, DC 20590																																																					
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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. 693JJ920D000016. 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 2023 KIA Sportage 5 Door SUV at a velocity of 56.18 km/h. The test was performed at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on February 17, 2023. 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 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 484 mm and both driver and passenger side doors remained closed during the impact event and were operable after the impact.

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

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

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)	299.076	0.245	1169.357	-64.142	43.547	-23.626	-212.227	-685.722
Passenger (5th)	307.172	0.309	787.794	-512.888	49.512	-10.295	-1298.622	-902.569

GENERAL COMMENTS:

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

Data Anomalies:

- Engine Top X Acceleration, Exceeded calibration range at 26.2 ms

SECTION 2

OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

This section contains information reporting for the following Data Sheets:

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

Data Sheet No. 2 – Seat Adjustment, Fuel System, and Steering Wheel Data

Data Sheet No. 3 – Dummy Longitudinal Clearance Dimensions

Data Sheet No. 4 – Dummy Lateral Clearance Dimensions

Data Sheet No. 5 – Seat Belt Positioning Data

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

Data Sheet No. 7 – Vehicle Accelerometer Locations

Data Sheet No. 8 – Photographic Reference Target Locations

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

Data Sheet No. 10 – Test Vehicle Summary of Results

Data Sheet No. 11 – Post-Test Observations

Data Sheet No. 12 – Vehicle Profile Measurements

Data Sheet No. 13 – Accident Investigation Division Data

Data Sheet No. 14 – Vehicle Intrusion Measurements

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

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

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

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2023 KIA Sportage 5 Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20234206
Test Date: 02/17/2023

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20234206	Traction Control System (TCS)	Yes
Model Year	2023	Power Steering	Yes
Make	KIA	Power Window Auto-Reverse	Yes
Model	Sportage	Driver Frontal Airbag	Yes
Body Style	SUV	Driver Curtain Airbag	Yes
VIN	5XYK6CAF3PG082127	Driver Head/Torso Airbag	No
Body Color	White	Driver Torso Airbag	No
Odometer Reading (km /mi)	16 Miles	Driver Torso/Pelvis Airbag	Yes
Engine Displacement (L)	2.5	Driver Pelvis Airbag	No
Type / No. Cylinders	I4	Driver Knee Airbag	No
Engine Placement	Transverse	Front Pass. Frontal Airbag	Yes
Transmission Type	Automatic	Front Pass. Curtain Airbag	Yes
Transmission Speeds	8-Speed	Front Pass. Head/Torso Airbag	No
Overdrive	Yes	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 –	N/A

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

No

DATA FROM CERTIFICATION LABEL

Manufactured By	KIA GEORGIA, INC.	GVWR	2200
Date of Manufacture	NOV/19/22	GVWR Front	1260
		GVWR Rear	1200

VEHICLE SEATING AND WEIGHT CAPACITY DATA

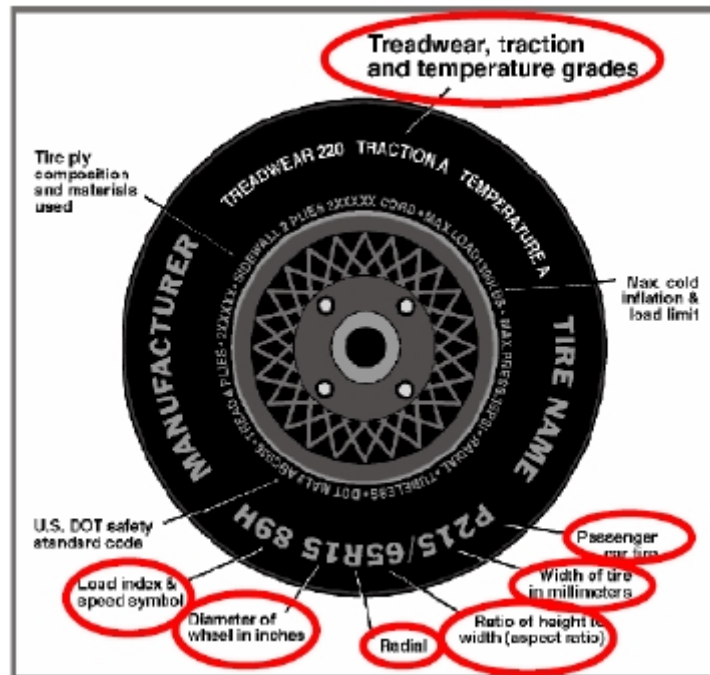
Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Split Bench	N/A	
Number of Occupants	2	3	N/A	5
Capacity Wt. (VCW) (kg)				420
Cargo Wt. (RCLW) (kg)				79.8

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

Test Vehicle: 2023 KIA Sportage 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20234206
 Test Date: 02/17/2023

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



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	240	240
Recommended Tire Size	235/55R19	235/55R19
Tire Size on Vehicle	235/55R19	235/55R19
Tire Manufacturer	Kumho	Kumho
Tire Model	Crugen HP71	Crugen HP71
Treadwear	540	540
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Steel, 2 Polyester, 1 Nylon	2 Steel, 2 Polyester, 1 Nylon
Load Index / Speed Symbol	101H	101H
Tire Material	Rubber	Rubber
DOT Safety Code Left	000JTYA8E	000JTYA8E
DOT Safety Code Right	000JTYA8E	000JTYA8E

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

Test Vehicle: 2023 KIA Sportage 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20234206
 Test Date: 02/17/2023

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	490	348		525	435	
Right	kg	483	333		505	404	
Ratio	%	58.8	41.2		55.1	44.9	
Total	kg	973	681	1654	1030	839	1869

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1654	(A)
Weight of 1 P572E ATD & 1 P572O ATD	kg	142	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	79.8	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1875.8	(A+B+C)

TEST VEHICLE ATTITUDES AND CG

Condition	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	873	874	887	894	1136
As Tested	mm	863	867	862	867	1238
Post-Test	mm	1009	952	867	847	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2758
Total Vehicle Length at Left Side	mm	4588
Total Vehicle Length at Centerline	mm	4657
Total Vehicle Length at Right Side	mm	4588
Weight of Ballast in Cargo Area	kg	21.3
Weight of Vehicle Components Removed	kg	30
Amount of Stoddard Solvent in Fuel Tank	L	50.30

LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT:

Trunk Carpeting, Spare Tire, Jack, Plastic Trim, and tool kit.

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

Test Vehicle: 2023 KIA Sportage 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20234206
 Test Date: 02/17/2023

TARGET VEHICLE STRUCTURAL MEASUREMENT

No.	Description	Pre-Test
1	Total Length	4657
2	Total Width	1841
3*	Bumper Top Height	638
4*	Bumper Bottom Height	508
5*	Longitudinal Member Top Height	640
6	Distance Between Longitudinal Members	1046
7	Longitudinal Member Width	52
8*	Engine Top Height	918
9*	Engine Bottom Height	268
10	Engine and Gearbox Width	442
11	Front Bumper-Engine Distance	691
12*	Front Shock Absorber Fixing Height	1002
13*	Bonnet Leading Edge Height	918
14	Front Shock Absorber Fixing Width	1178
15	Front Bumper – Front Axle Distance	900
16	Front Axle – A Pillar Distance	555
17	A-Pillar – B-Pillar Distance	1049
18	B-Pillar – Rear Axle Distance	1152
19	B-Pillar – C-Pillar Distance	1017
20*	Roof Sill Bottom Height	1580
21*	Roof Sill Top Height	1627
22*	Floor Sill Bottom Height	434
23*	Floor Sill Top Height	483

*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

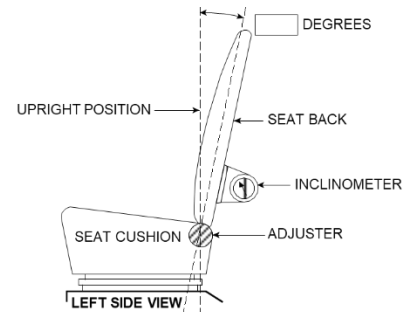
Test Vehicle: 2023 KIA Sportage 5 Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20234206
Test Date: 02/17/2023

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	6.7
Passenger Seat Back Angle	-9.4



FRONT SEAT ASSEMBLY

SEAT FORE / AFT POSITIONS

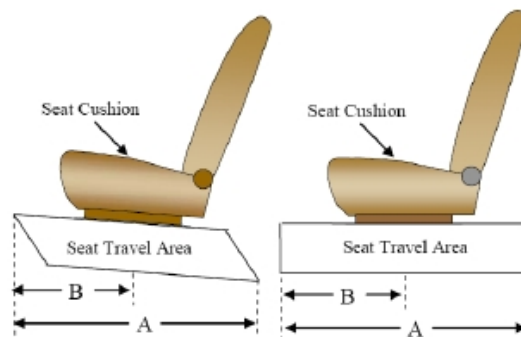
The driver's seat was positioned at the mid-point of fore/aft travel at its lowest position. The passenger's seat was positioned at the most forward position of fore/aft travel. Zero is defined as the forward most position.

Seating Position	Total Fore / Aft Travel	Placed in Position #
Driver Seat	311	155
Passenger Seat	240	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: 2023 KIA Sportage 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

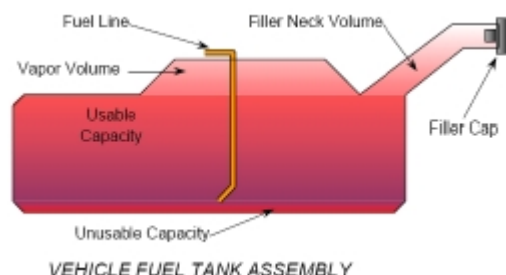
NHTSA No.: M20234206
 Test Date: 02/17/2023

FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank"	54.09
Usable Capacity of "Optional Tank"	N/A
92%-94% of Usable Capacity	49.76 - 50.84
Actual Amount of Solvent Used	50.3
1/3 of Usable Capacity	18.03

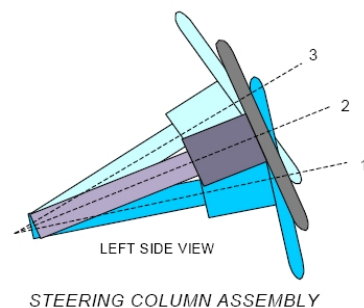
FUEL PUMP

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



STEERING COLUMN ADJUSTMENT

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



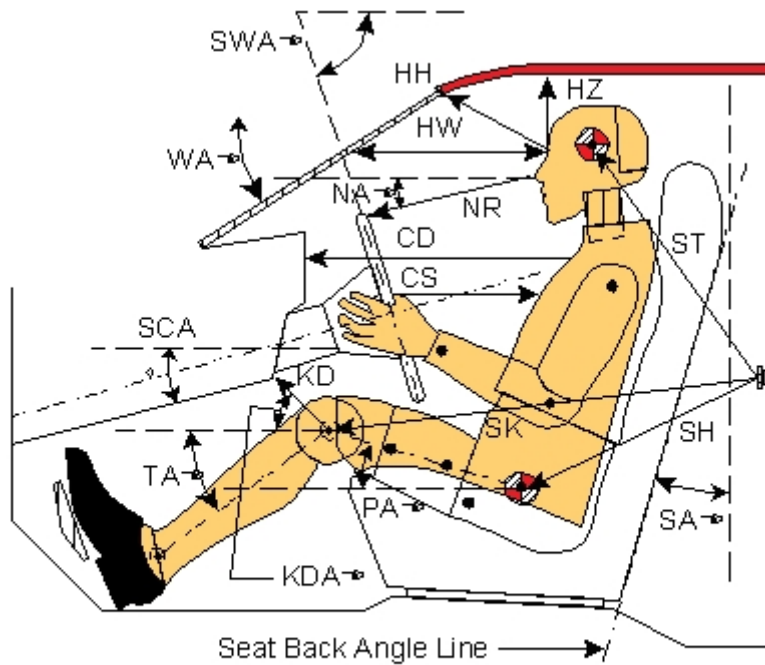
STEERING COLUMN POSITIONS

Description	Degrees	Fore / Aft Position (mm)
Lowermost position No. 1	23.8	
Geometric center position No. 2	26.3	
Uppermost position No. 3	28.8	
Telescoping Steering Wheel Travel		55
Test Position	26.3	75

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2023 KIA Sportage 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20234206
 Test Date: 02/17/2023



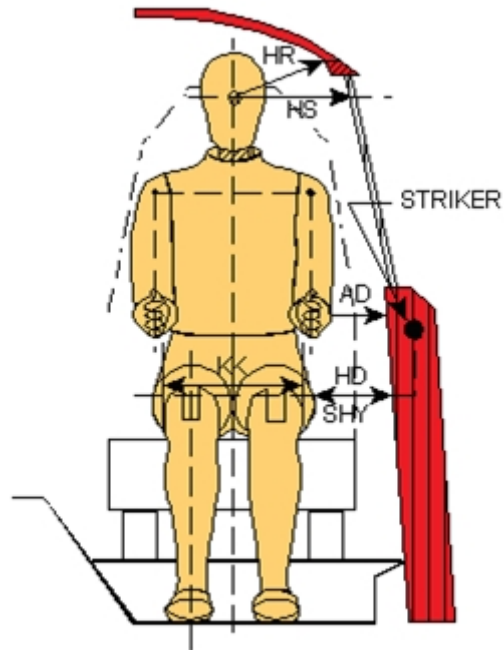
Left Side View

Code	Measurement Description	Driver (SN: 142)		Passenger (SN: 137)	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		30.8		
SWA°	Steering Wheel Angle		26.3		
SCA°	Steering Column Angle		63.7		
SA°	Seat Back Angle (on headrest post)		6.7		-9.4
HZ	Head to Roof (Z)	205	90.0	238	90.0
HH	Head to Header	258	26.3	338	50.2
HW	Head to Windshield	727	0.3	680	0.0
NR	Nose to Rim / Dash	408	10.6	465	24.4
CD	Chest to Dash	604		394	
CS	Chest to Steering Hub	313	3.6		
RA	Rim to Abdomen	208	0.0		
KDL	Left Knee to Dash	177	28.2	116	27.8
KDR	Right Knee to Dash	155	16.7	128	30.2
PA°	Pelvic Angle		23.1		21.0
TA°	Tibia Angle		33.2		42.2
SK	Striker to Knee	608	20.5	730	16.6
ST	Striker to Head	385	70.5	356	53.5
SH	Striker to H-Point	330	58.7	440	39.2

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2023 KIA Sportage 5 Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20234206
Test Date: 02/17/2023



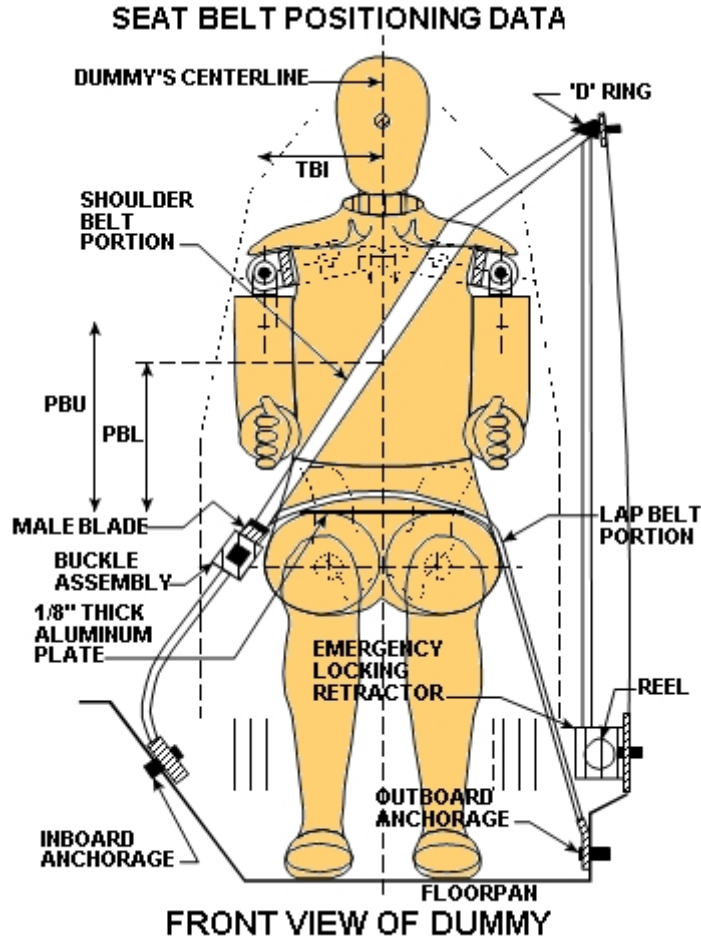
Front View

Code	Description	Driver (mm)	Passenger (mm)
AD	Arm to Door	70	79
HD	H-Point to Door	145	240
HR	Head to Side Header	232	275
HS	Head to Side Window	347	374
KK	Knee to Knee	310	214
SHY	Striker to H-Point (Y Direction)	245	295
AA	Ankle to Ankle	343	165

DATA SHEET NO. 5
SEAT BELT POSITIONING DATA

Test Vehicle: 2023 KIA Sportage 5 Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20234206
Test Date: 02/17/2023



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU — Top surface of reference to belt upper edge	mm	305	315
PBL — Top surface of reference to belt lower edge	mm	216	230

BELT LENGTH DATA

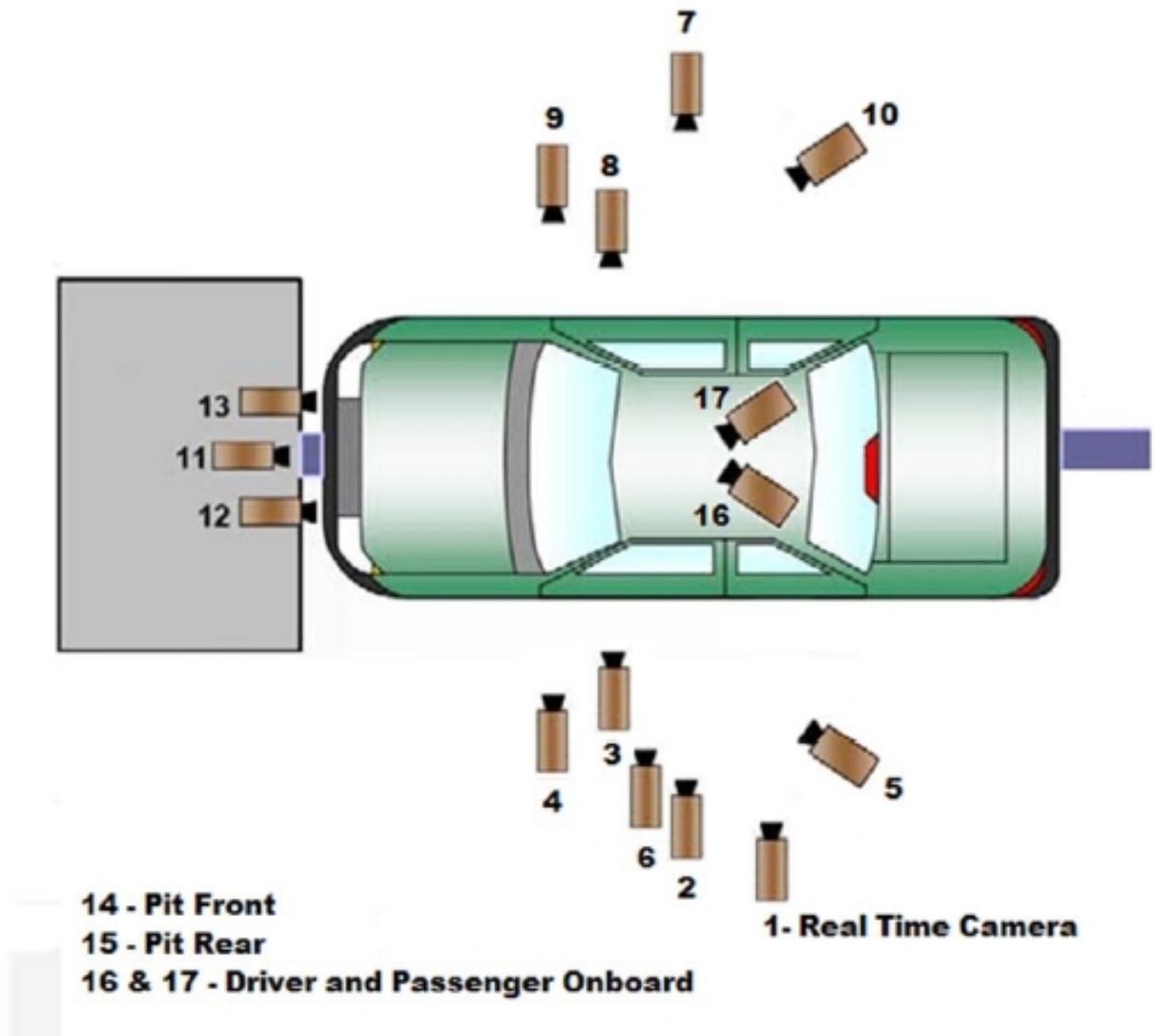
Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	874	965
Lap Belt Length as measured on ATD	mm	525	865
Remainder of belt on reel	mm	951	900
Total belt length for continuous webbing systems	mm	2350	2730

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

Test Vehicle: 2023 KIA Sportage 5 Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20234206
Test Date: 02/17/2023

CAMERA POSITIONS FOR FRONTAL IMPACTS



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

Test Vehicle: 2023 KIA Sportage 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20234206
 Test Date: 02/17/2023

CAMERA LOCATIONS

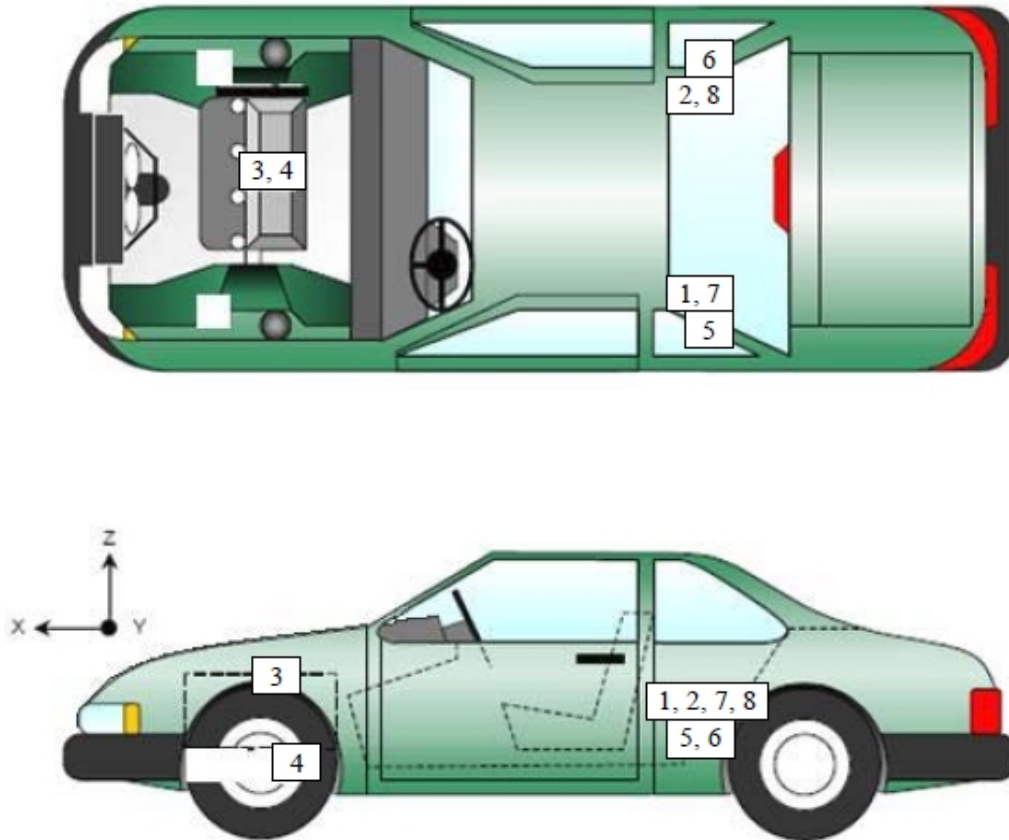
No.	Camera View	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall	-	-	-	Zoom	30
2	Left Overall	-2125	-7769	-1463	24	1000
3	Driver Close-Up	-1400	-6825	-1421	50	1000
4	Left Front Half	-907	-6642	-1509	28	1000
5	Left Angle	-4169	-5022	-2459	50	1000
6	Steering Column	-1764	-8002	-2340	75	1000
7	Right Overall	-2293	7439	-1916	24	1000
8	Passenger Close-Up	-1502	6656	-1516	50	1000
9	Right Front Half	-1147	6318	-1411	28	1000
10	Right Angle	-4055	4824	-2499	50	1000
11	Windshield	1181	0	-4150	12.5	1000
12	Driver Windshield	946	-400	-1600	25	1000
13	Passenger Windshield	946	400	-1600	25	1000
14	Pit Front	-1165	0	2538	12.5	1000
15	Pit Rear	-2910	0	2627	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: 2023 KIA Sportage 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20234206
 Test Date: 02/17/2023



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Accelerometer – X Direction	1841	-350	174
2	Right Rear Accelerometer – X Direction	1840	289	154
3	Engine Top X	4060	228	-300
4	Engine Bottom X	4116	-61	260
5	Left Rear Accelerometer – Z Direction	1841	-350	174
6	Right Rear Accelerometer – Z Direction	1840	289	154
7	Left Rear Accelerometer – X Direction Redundant	1841	-361	175
8	Right Rear Accelerometer – X Direction Redundant	1840	297	155

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

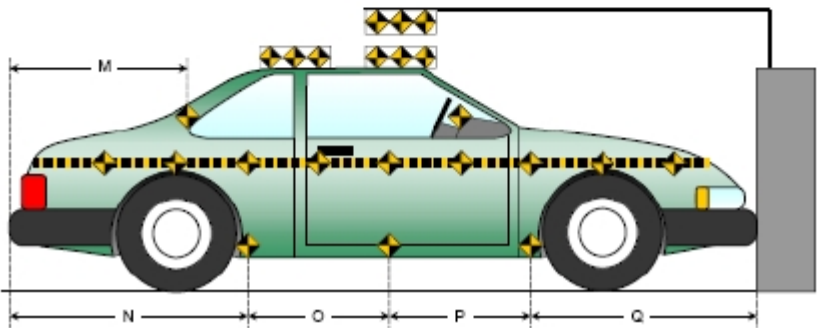
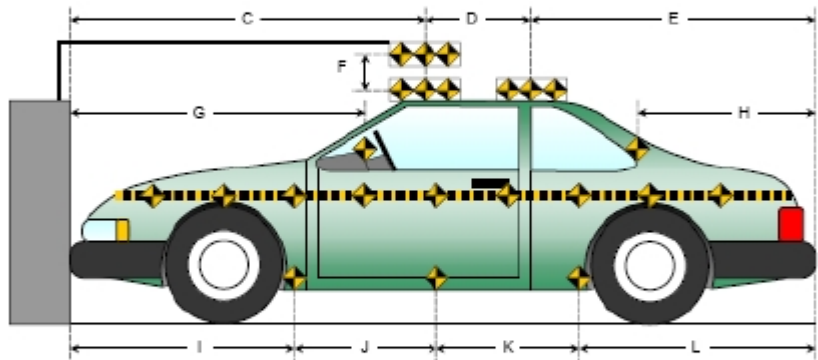
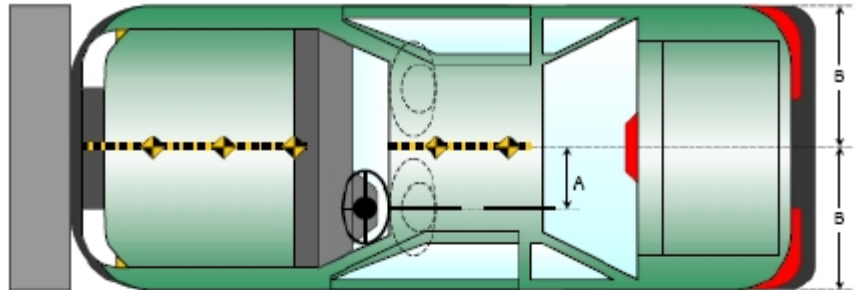
DATA SHEET NO. 8
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2023 KIA Sportage 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20234206
 Test Date: 02/17/2023

Item	Value
A	376
B	921
C	2541
D	609
E	1507
F	159
G	1714
H	1126
I	1384
J	896
K	891
L	1486
M	1123
N	1486
O	889
P	900
Q	1382

All units in millimeters



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

Test Vehicle: 2023 KIA Sportage 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20234206
 Test Date: 02/17/2023

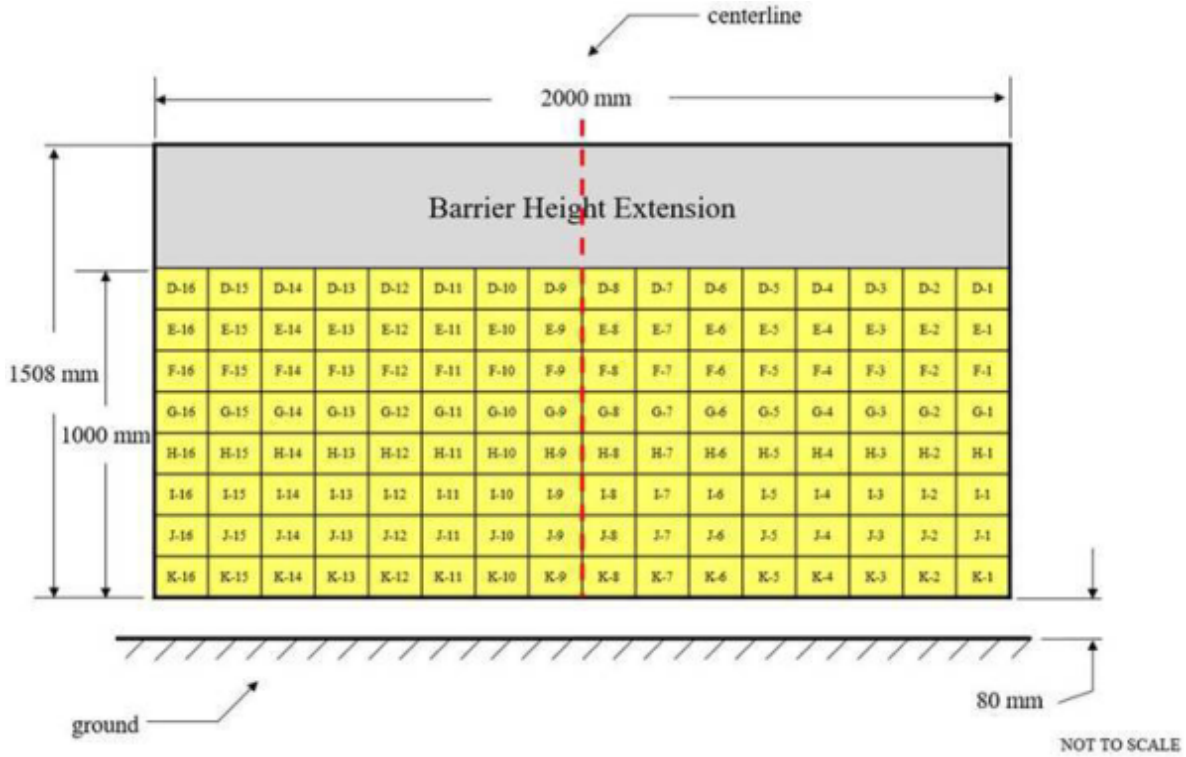


Figure 1 - Load Cell Locations on a 128-Load Cell Barrier with Plywood Height Extension*
 Please note above diagram is not actual representation of load cell barrier used.

DATA SHEET NO. 10
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2023 KIA Sportage 5 Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20234206
Test Date: 02/17/2023

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: 2023 KIA Sportage 5 Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20234206
Test Date: 02/17/2023

TEST DUMMY INFORMATION AND CONTACT LOCATIONS

Description	Driver	Passenger
Dummy Type / Serial No.	H3 50th Male/142	H3 5th Female/137
Head Contact	Frontal Airbag & Headrest	Frontal Airbag & Headrest
Upper Torso Contact	Frontal Airbag	Frontal Airbag
Lower Torso Contact	None	None
Left Knee Contact	Knee Bolster & Column Lever	Glove Box
Right Knee Contact	Knee Bolster & Steering Column	Glove Box

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 due to passenger airbag deployment
Window Damage	None
Other	None

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	1563
Center	mm	1594
Right Side	mm	1648
Average	mm	1601

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

Test Vehicle: 2023 KIA Sportage 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20234206
 Test Date: 02/17/2023

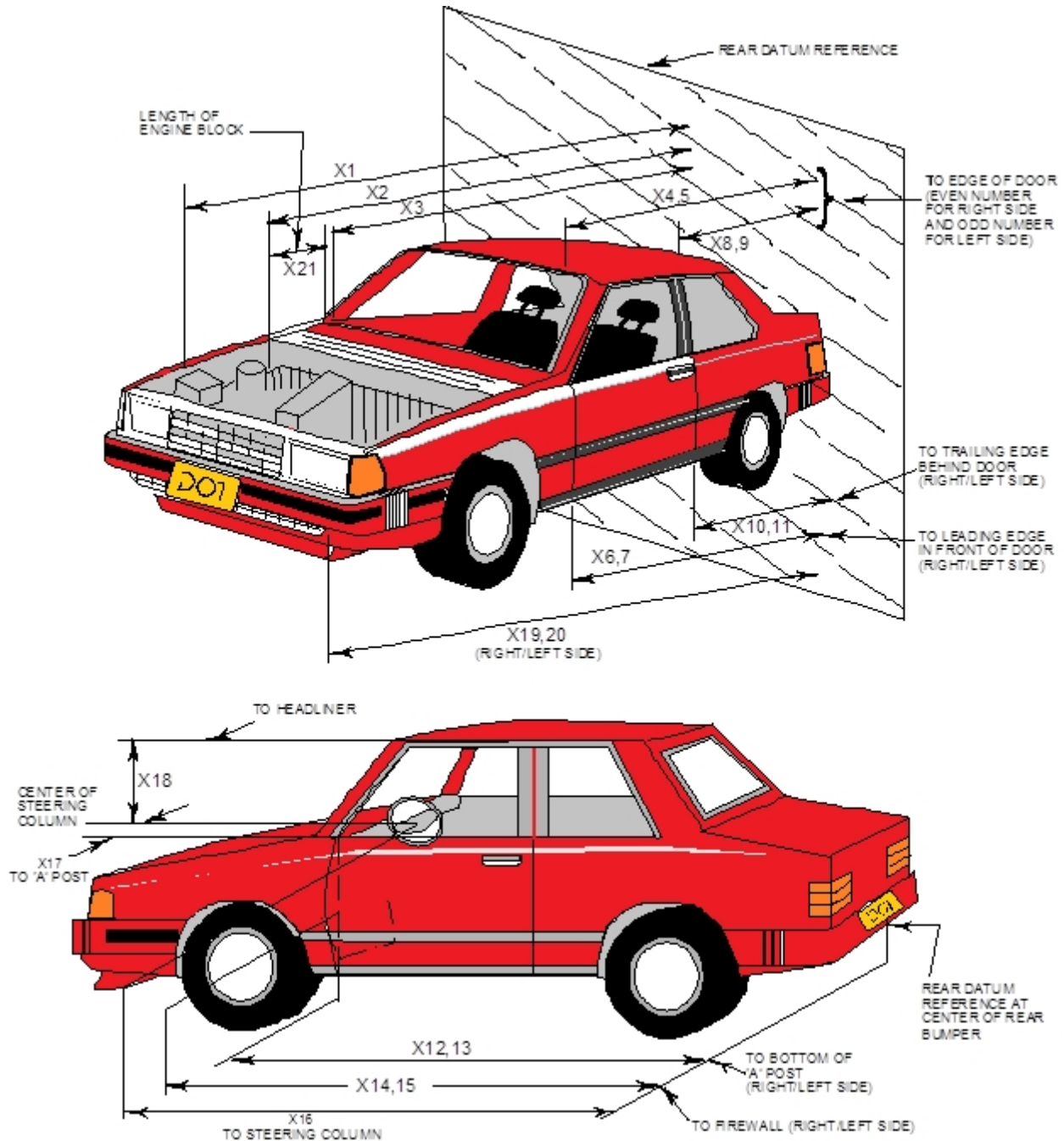
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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	Yes	No	Yes	No
Knee Airbag	No	N/A	No	N/A
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Other	N/A	N/A	N/A	N/A

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

Test Vehicle: 2023 KIA Sportage 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20234206
 Test Date: 02/17/2023



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

Test Vehicle: 2023 KIA Sportage 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20234206
 Test Date: 02/17/2023

No.	Measurement Description	Pre-Test	Post-Test	Change
1	Total Length of Vehicle at Centerline	4657	4174	-483
2	Rear Surface of Vehicle (RSOV) to Front of Engine	3966	3788	-178
3	RSOV to Firewall	3497	3471	-26
4	RSOV to Upper Leading Edge of Right Door	3201	3201	0
5	RSOV to Upper Leading Edge of Left Door	3202	3204	2
6	RSOV to Lower Leading Edge of Right Door	3199	3199	0
7	RSOV to Lower Leading Edge of Left Door	3201	3205	4
8	RSOV to Upper Trailing Edge of Right Door	2152	2152	0
9	RSOV to Upper Trailing Edge of Left Door	2153	2154	1
10	RSOV to Lower Trailing Edge of Right Door	2179	2180	1
11	RSOV to Lower Trailing Edge of Left Door	2180	2184	4
12	RSOV to Bottom of "A" Post of Right Side	3383	3382	-1
13	RSOV to Bottom of "A" Post of Left Side	3383	3383	0
14	RSOV to Firewall, Right Side	3655	3634	-21
15	RSOV to Firewall, Left Side	3655	3628	-27
16	RSOV to Steering Column	2777	2832	55
17	Center of Steering Column to "A" Post	290	281	-9
18	Center of Steering Column to Headliner	436	437	1
19	RSOV to Right Side of Front Bumper	4629	4149	-480
20	RSOV to Left Side of Front Bumper	4630	4167	-463
21	Length of Engine Block	169	169	0
RD	RSOV to Right Side of Dash Panel	2996	2995	-1
CD	RSOV to Center of Dash Panel	2941	2938	-3
LD	RSOV to Left Side of Dash Panel	2997	2999	2

All Dimensions in mm

DATA SHEET NO. 13
ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2023 KIA Sportage 5 Door SUV
Test Program: NCAP Frontal Barrier Impact Test

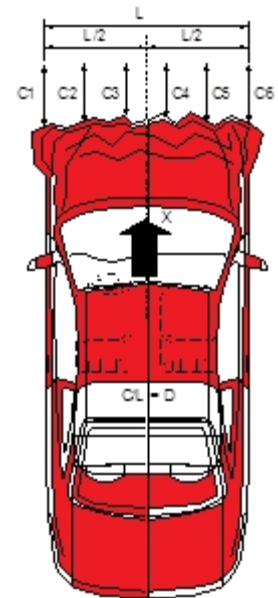
NHTSA No.: M20234206
Test Date: 02/17/2023

VEHICLE INFORMATION

VIN: 5XYK6CAF3PG082127 Wheelbase (mm): 2758
Vehicle Size Category: MPV Test Weight (kg): 1869

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): 56.18
Velocity Change (km/h): 66.63
Time of Separation (ms): 145



CRUSH PROFILE

Collision Deformation Classification: 12FDEW3
Midpoint of Damage: C3
Damage Region Length (mm): 1558
Impact Mode: Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Crush
C1	Crush Zone 1 at Left Side	mm	4454	4123	331
C2	Crush Zone 2 at Left Side	mm	4632	4170	462
C3	Crush Zone 3 at Left Side	mm	4654	4172	482
C4	Crush Zone 4 at Right Side	mm	4654	4170	484
C5	Crush Zone 5 at Right Side	mm	4634	4158	476
C6	Crush Zone 6 at Right Side	mm	4462	4033	429
L	C1 to C6	mm	1510	1558	-48

DATA SHEET NO. 14
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2023 KIA Sportage 5 Door SUV
Test Program: NCAP Frontal Barrier Impact Test

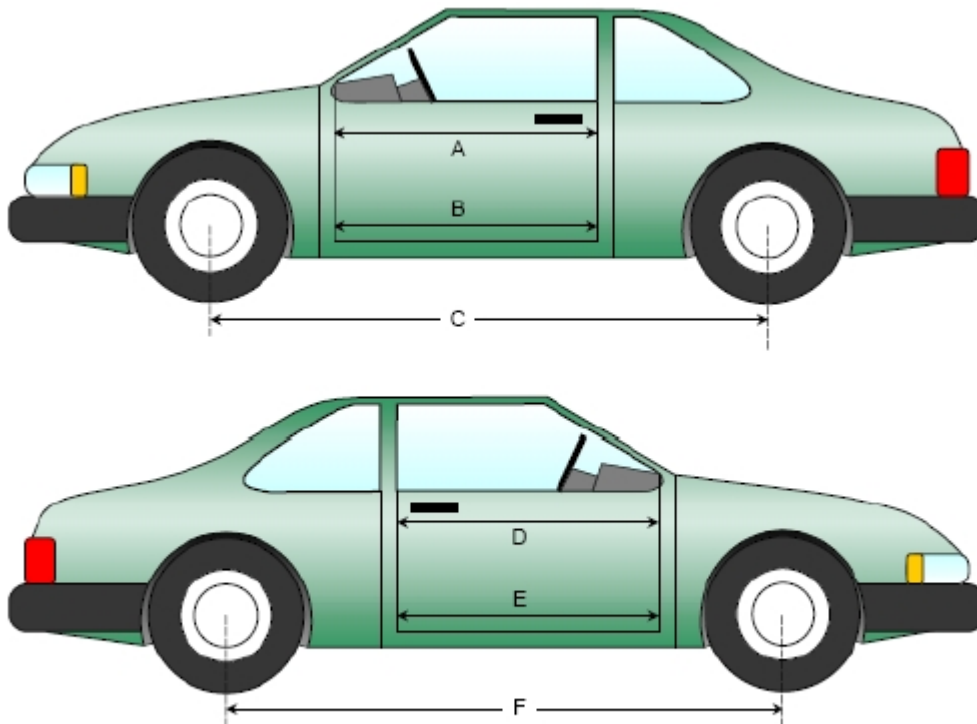
NHTSA No.: M20234206
Test Date: 02/17/2023

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Change
A	Left Side Upper	mm	966	967	1
B	Left Side Lower	mm	847	848	1
D	Right Side Upper	mm	967	967	0
E	Right Side Lower	mm	856	856	0

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Change
C	Left Side Wheelbase	mm	2758	2686	-72
F	Right Side Wheelbase	mm	2758	2687	-71



Left & Right Side Views

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

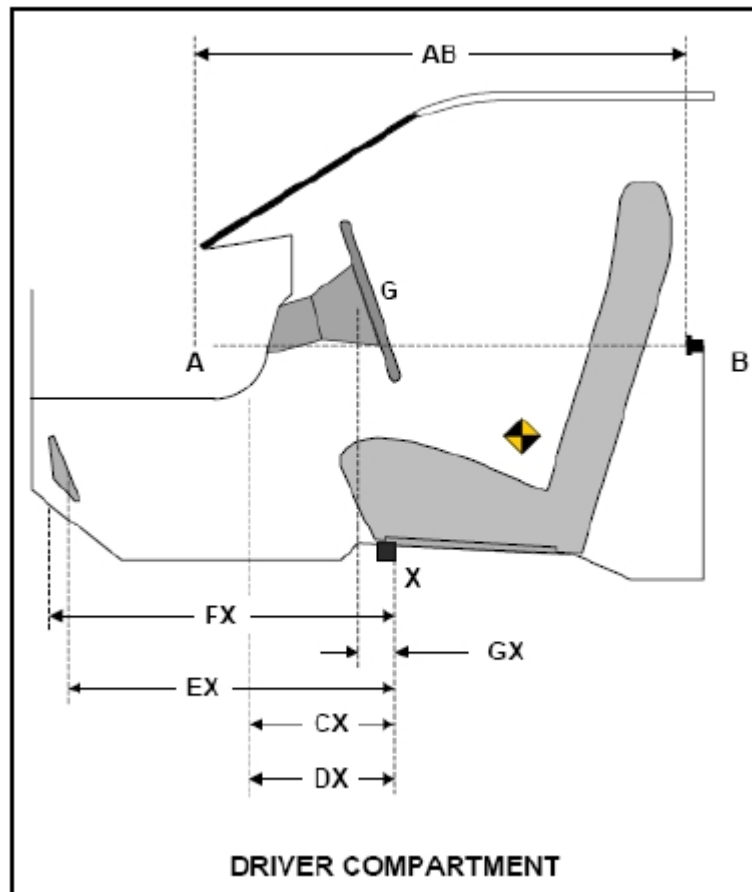
Test Vehicle: 2023 KIA Sportage 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20234206
 Test Date: 02/17/2023

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Change
AB	Door Opening (Inside Window Jam)	mm	822	824	2
CX	Left Knee Bolster to X	mm	257	259	2
DX	Right Knee Bolster to X	mm	267	266	-1
EX	Brake Pedal to X	mm	526	517	-9
FX	Foot Rest to X	mm	510	500	-10
GX	Center of Steering Column Wheel Hub to X	mm	33	90	57

X = Front of Seat Track (Stationary)



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

Test Vehicle: 2023 KIA Sportage 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20234206
 Test Date: 02/17/2023

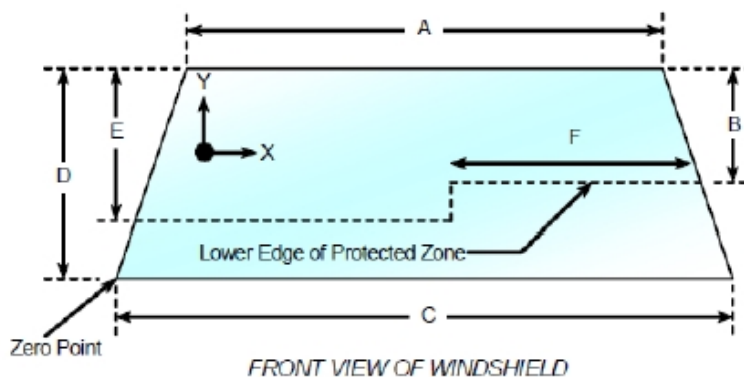
Windshield Mounting Details: A 0.8 mm trim surrounds the top and side of windshield while a plastic shroud is on the bottom.

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	2254.0	2254.0	100.0
Right Side	2254.0	2254.0	100.0
Total	4508	4508	100.0



Item	Units	Value
A	mm	1265
B	mm	612
C	mm	1495
D	mm	874
E	mm	602
F	mm	519

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>2023 KIA Sportage 5 Door SUV</u>	NHTSA No.:	<u>M20234206</u>
Test Program:	<u>NCAP Frontal Barrier Impact Test</u>	Test Date:	<u>02/17/2023</u>

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact:	21°C	Test Time:	10:47 AM
--------------------------------	-------------	------------	-----------------

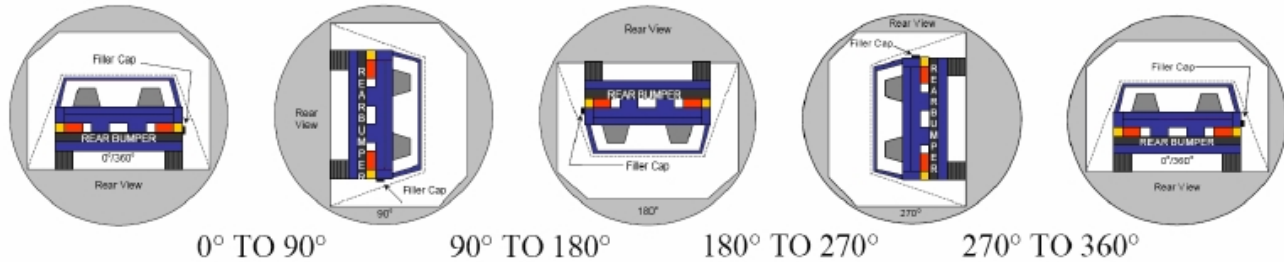
STODDARD SOLVENT SPILLAGE MEASUREMENTS

- | | | |
|--|-----------------------------|----|
| A. From impact until vehicle motion ceases
(Maximum allowable is 1 oz.) | 0 | oz |
| B. For the 5-minute period after motion ceases
(Maximum allowable is 5 oz.) | 0 | oz |
| C. For the following 25 minutes:
(Maximum allowable is 1 oz.) | 0 | oz |
| D. Spillage: | No Spillage Occurred | |

DATA SHEET NO. 16
FMVSS 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2023 KIA Sportage 5 Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20234206
 Test Date: 02/17/2023



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

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	69	300	369
90° to 180°	67	300	367
180° to 270°	63	300	363
270° to 360°	68	300	368

FMVSS 301 SPILLAGE TABLE

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

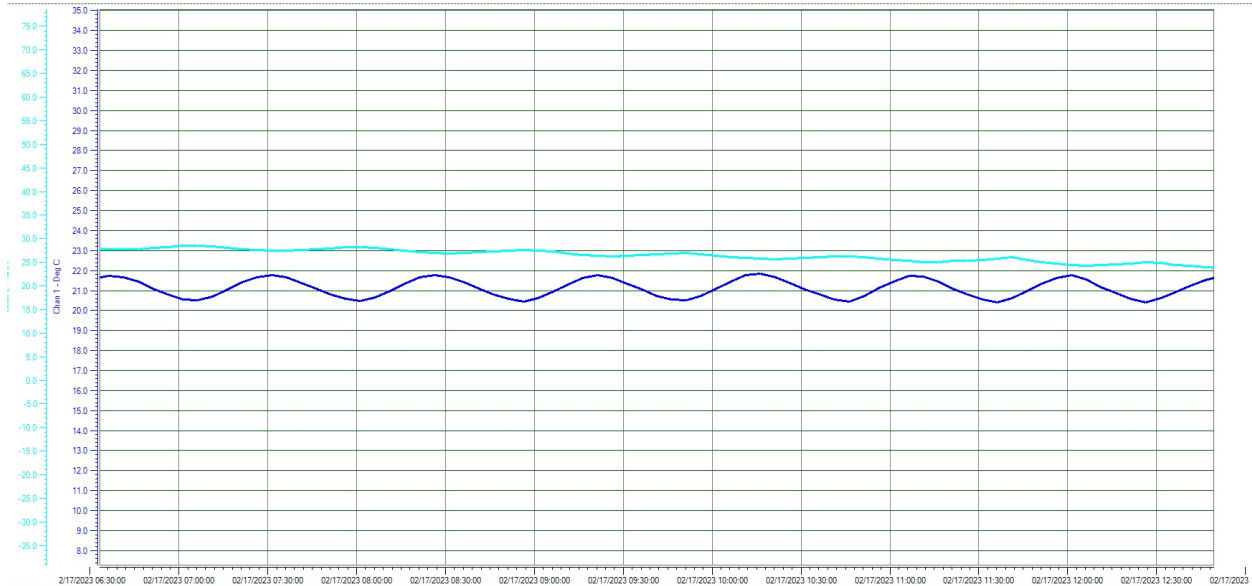
SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 17
DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART

Test Vehicle: 2023 KIA Sportage 5 Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20234206
Test Date: 02/17/2023



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

APPENDIX A
PHOTOGRAPHS

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



Figure A-1: Load Cell Location



Figure A-2: Pre-Test Load Cell Wall



Figure A-3: Post-Test Load Cell Wall



Figure A-4: Manufacturer's Label

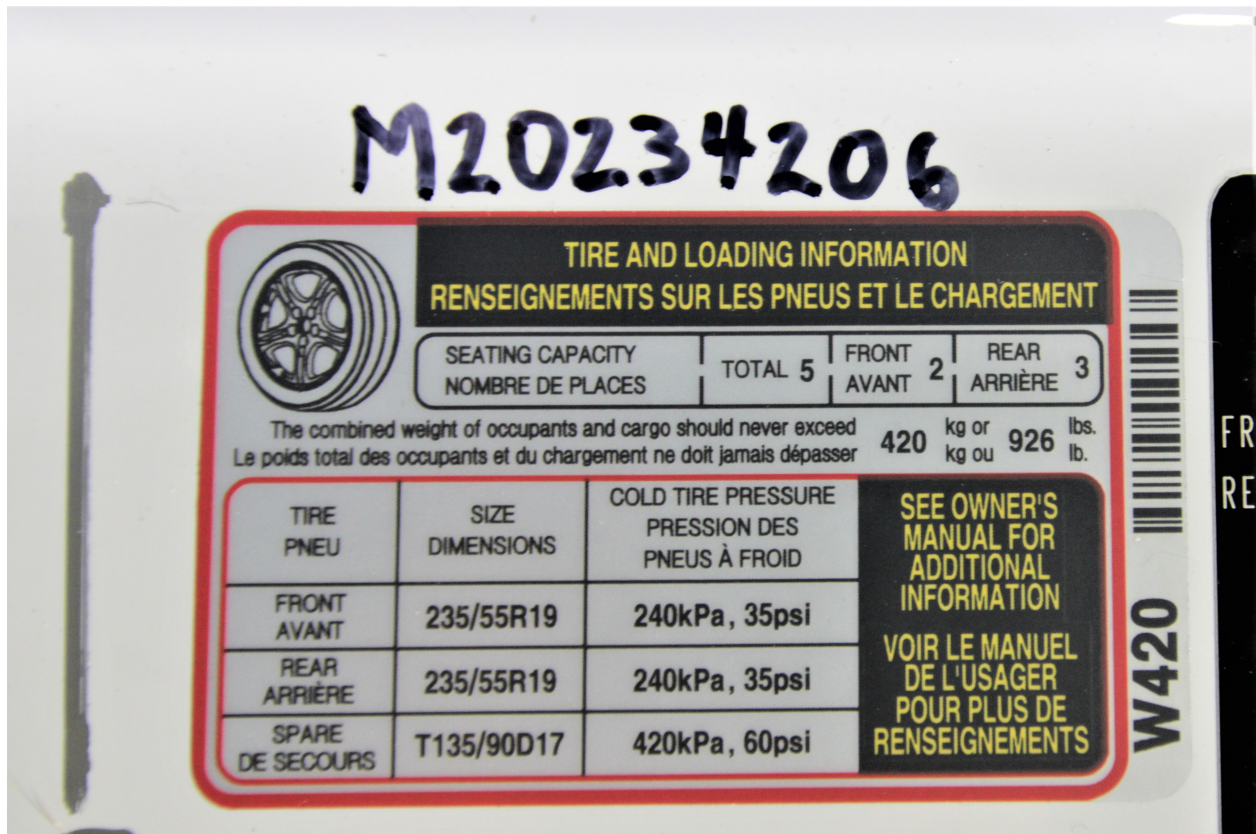


Figure A-5: Tire Placard



Figure A-6: 2023 KIA Sportage Frontal As Delivered



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



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



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



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



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



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



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



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



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



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



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



Figure A-18: Pre-Test Windshield View



Figure A-19: Post-Test Windshield View

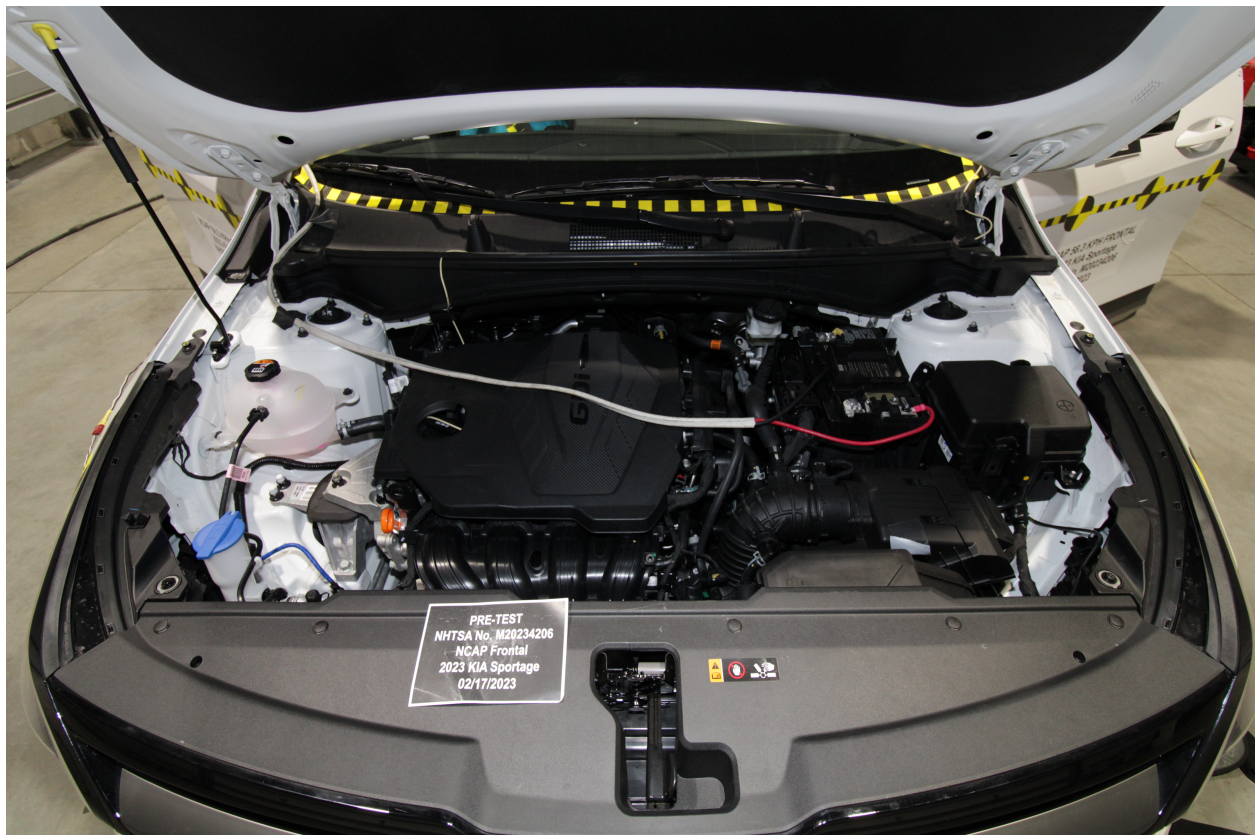


Figure A-20: Pre-Test Engine Compartment View

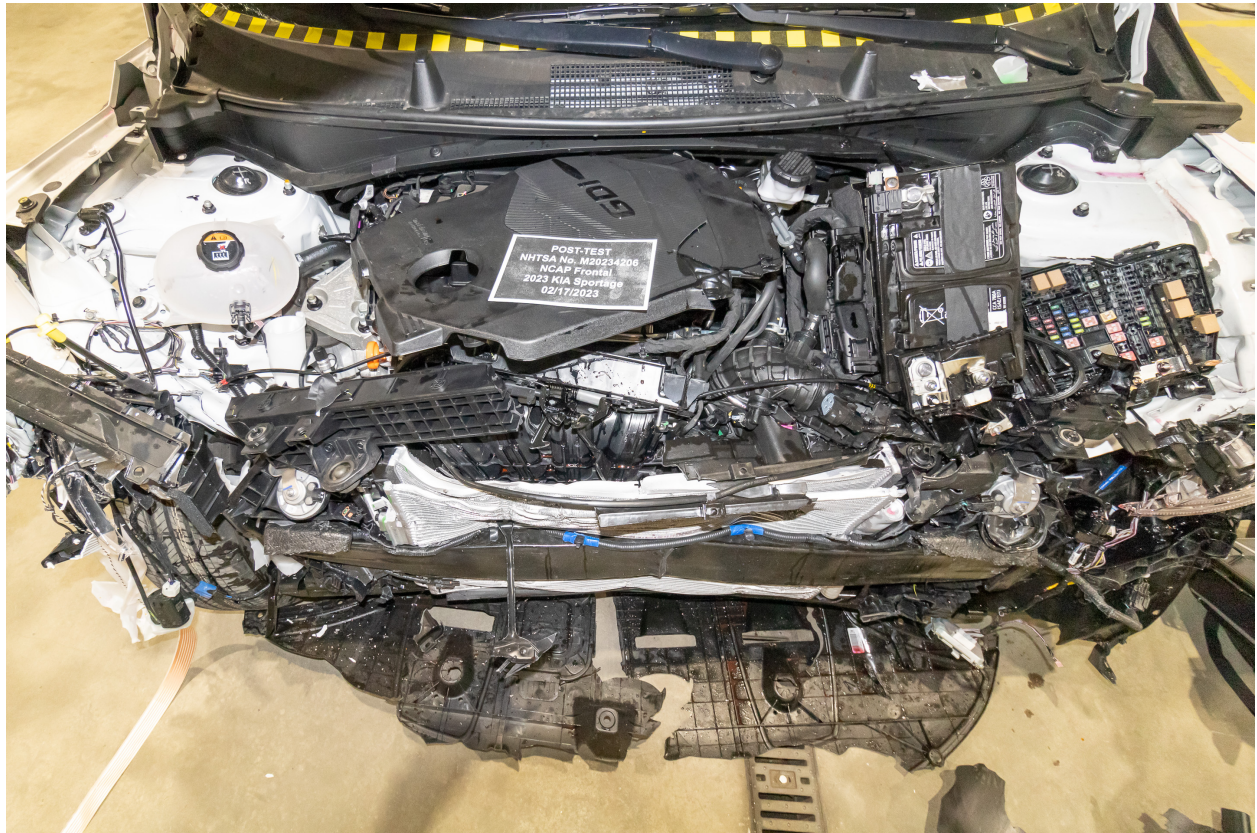


Figure A-21: Post-Test Engine Compartment View



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



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



Figure A-24: Pre-Test Front Underbody View

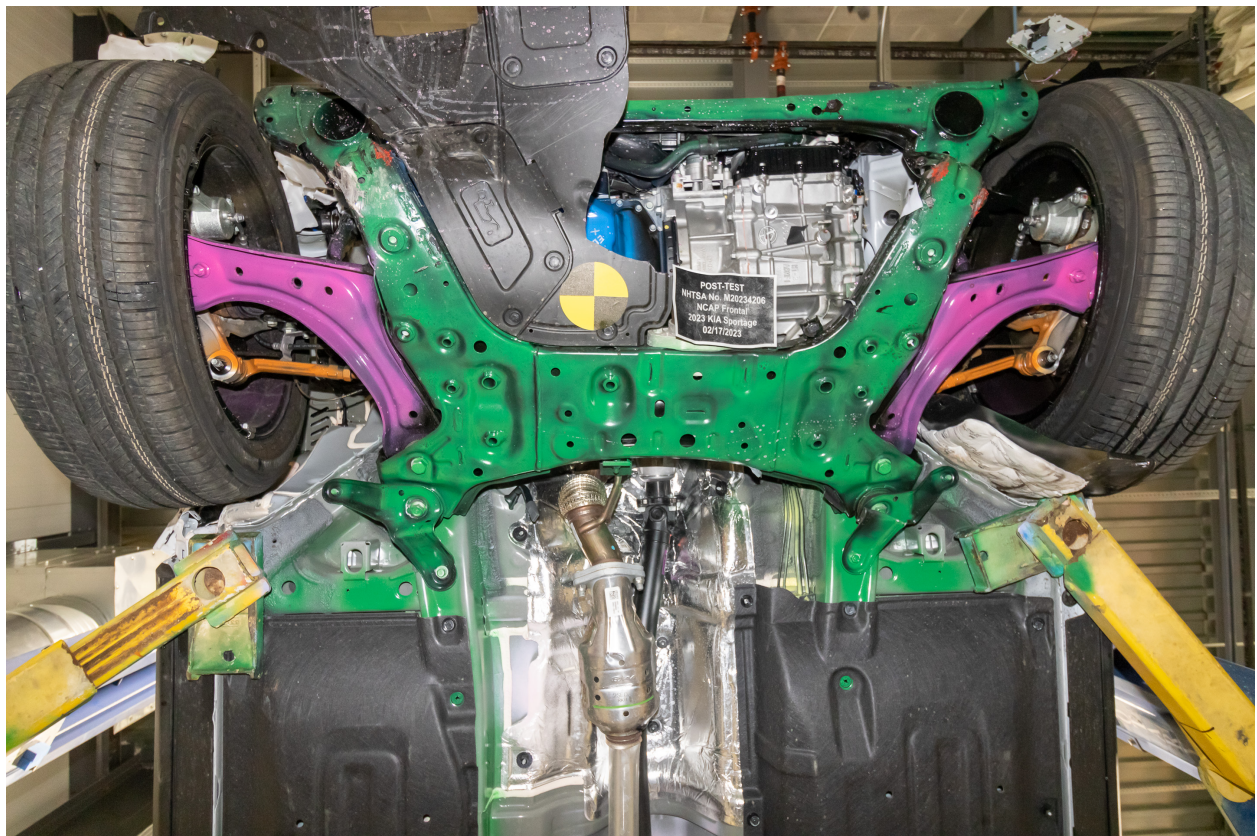


Figure A-25: Post-Test Front Underbody View

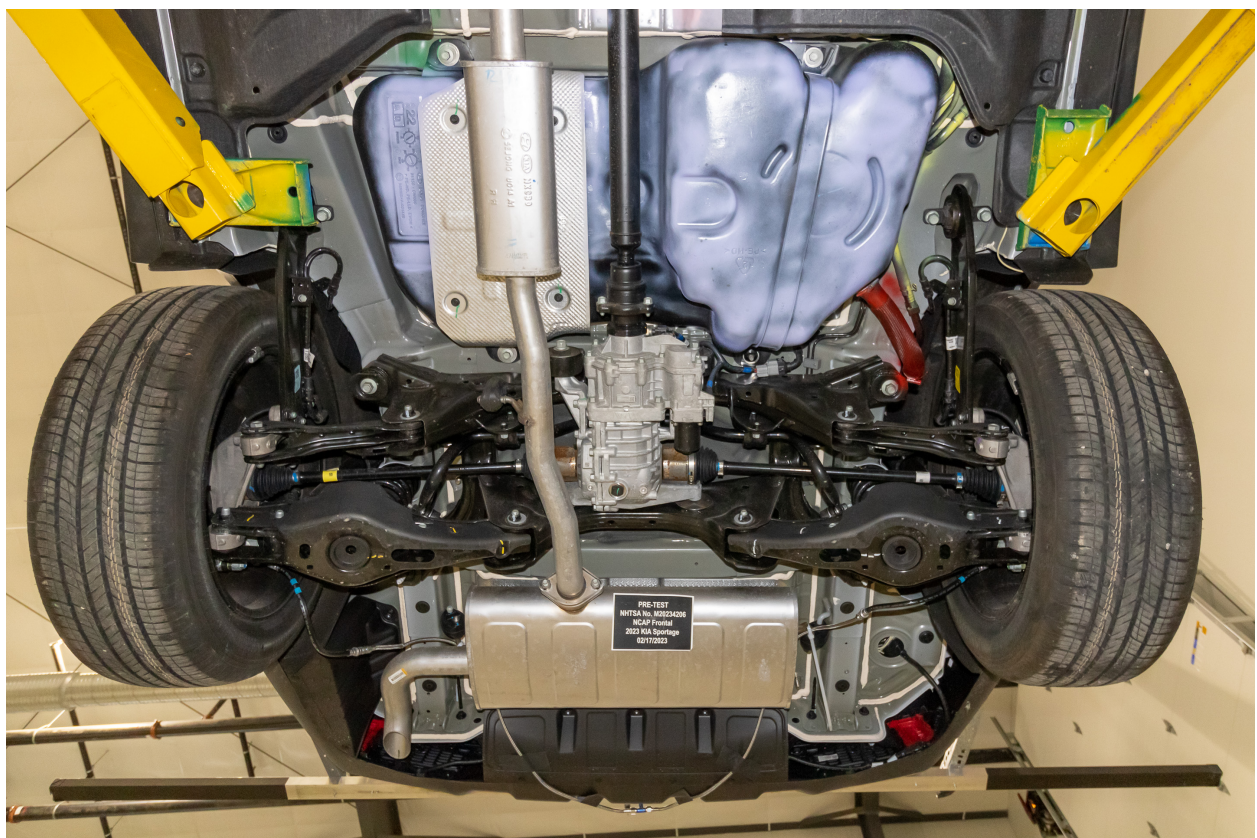


Figure A-26: Pre-Test Rear Underbody View

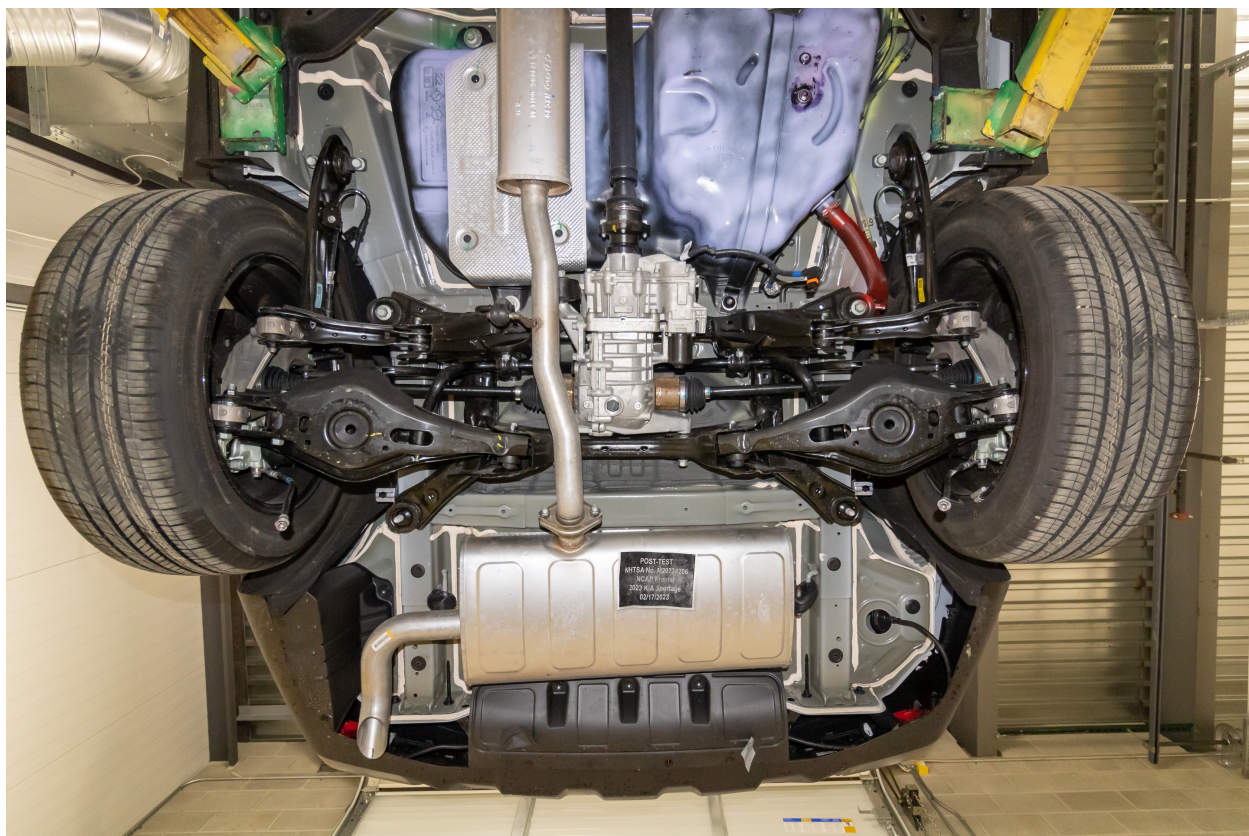


Figure A-27: Post-Test Rear Underbody View



Figure A-28: Pre-Test Dummy Cable Routing



Figure A-29: Post-Test Dummy Cable Routing



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



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



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



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



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



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



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



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



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



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

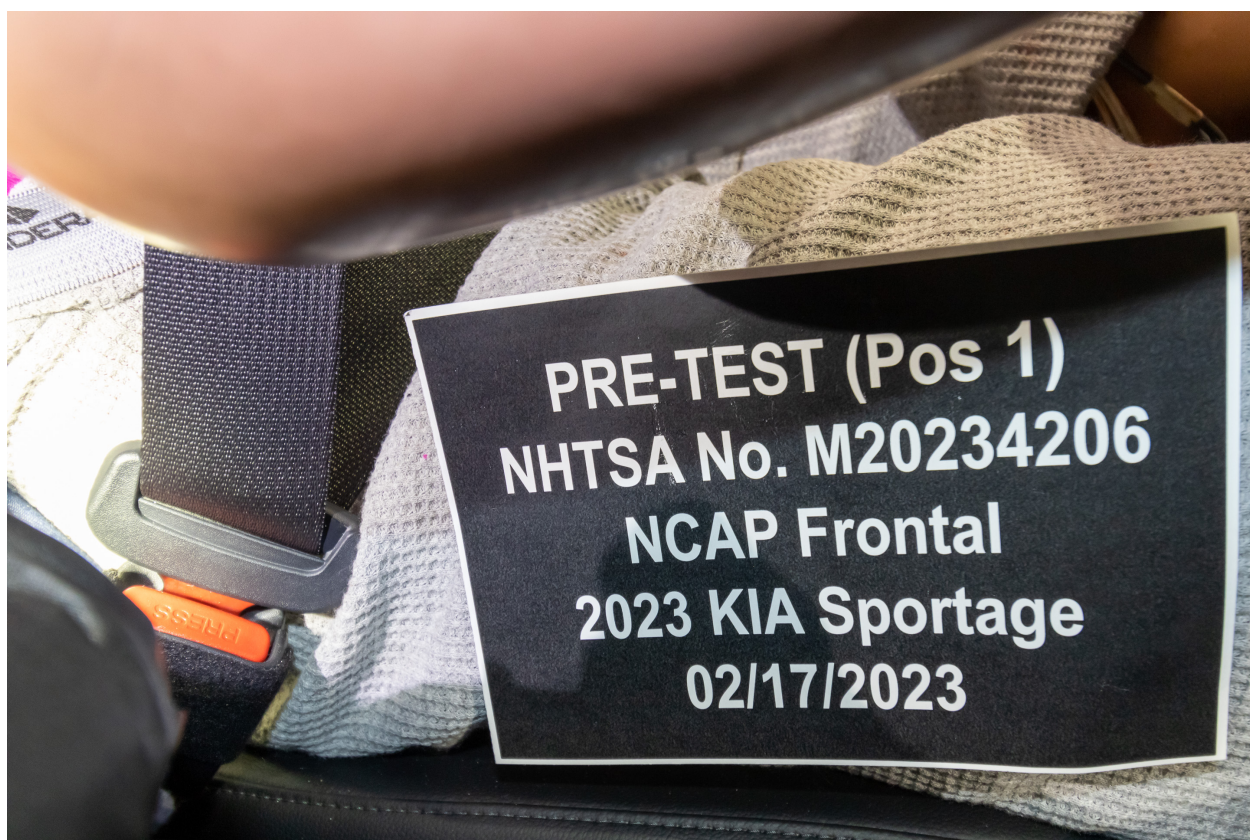


Figure A-40: Pre-Test View of Belt Buckle and Latch Plate for Driver Dummy



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



Figure A-42: Pre-Test Driver Dummy Feet



Figure A-43: Post-Test Driver Dummy Feet



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



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



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



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



Figure A-48: Post-Test Driver Dummy Face



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



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



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



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



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



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



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



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



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



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



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

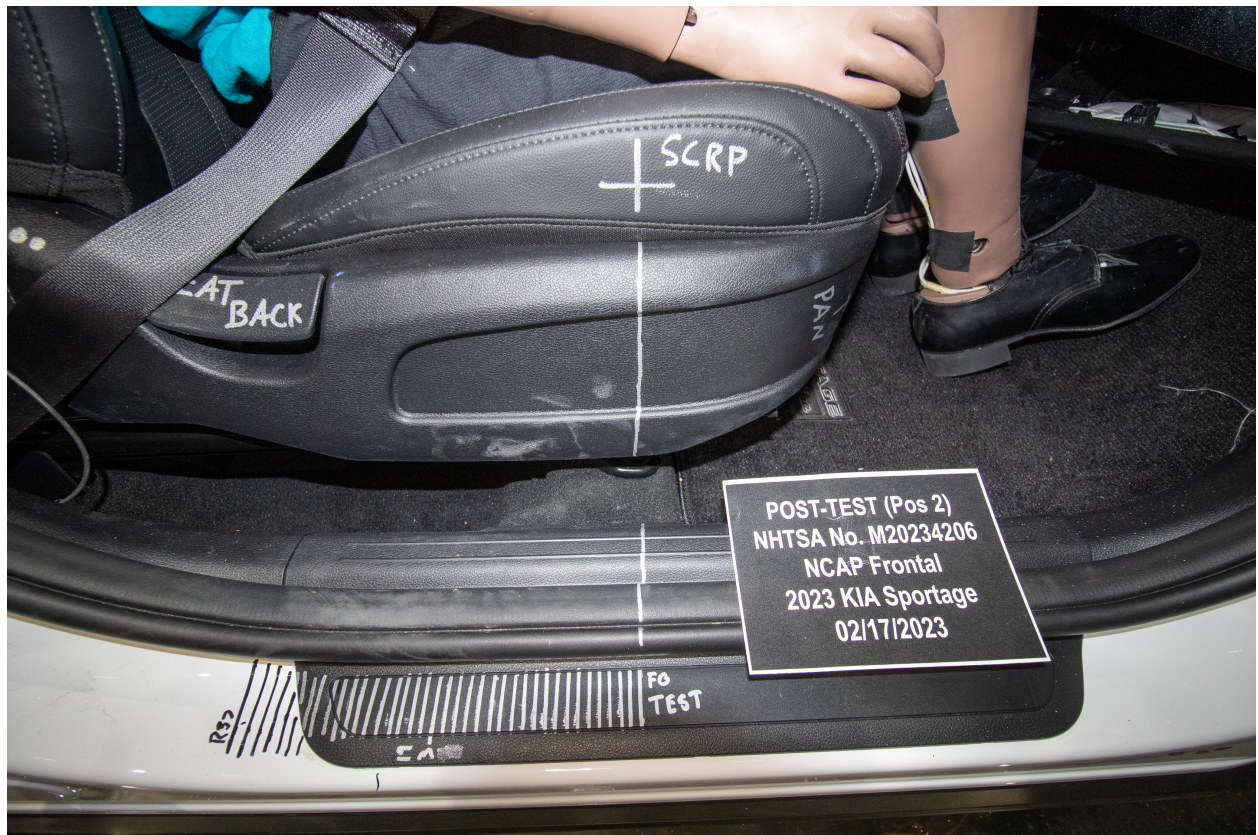


Figure A-60: Post-Test Passenger's Seat Fore-Aft Markings



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



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



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



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



Figure A-65: Pre-Test Passenger Dummy Feet



Figure A-66: Post-Test Passenger Dummy Feet



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



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



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



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



Figure A-71: Post-Test Passenger Dummy Face



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



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

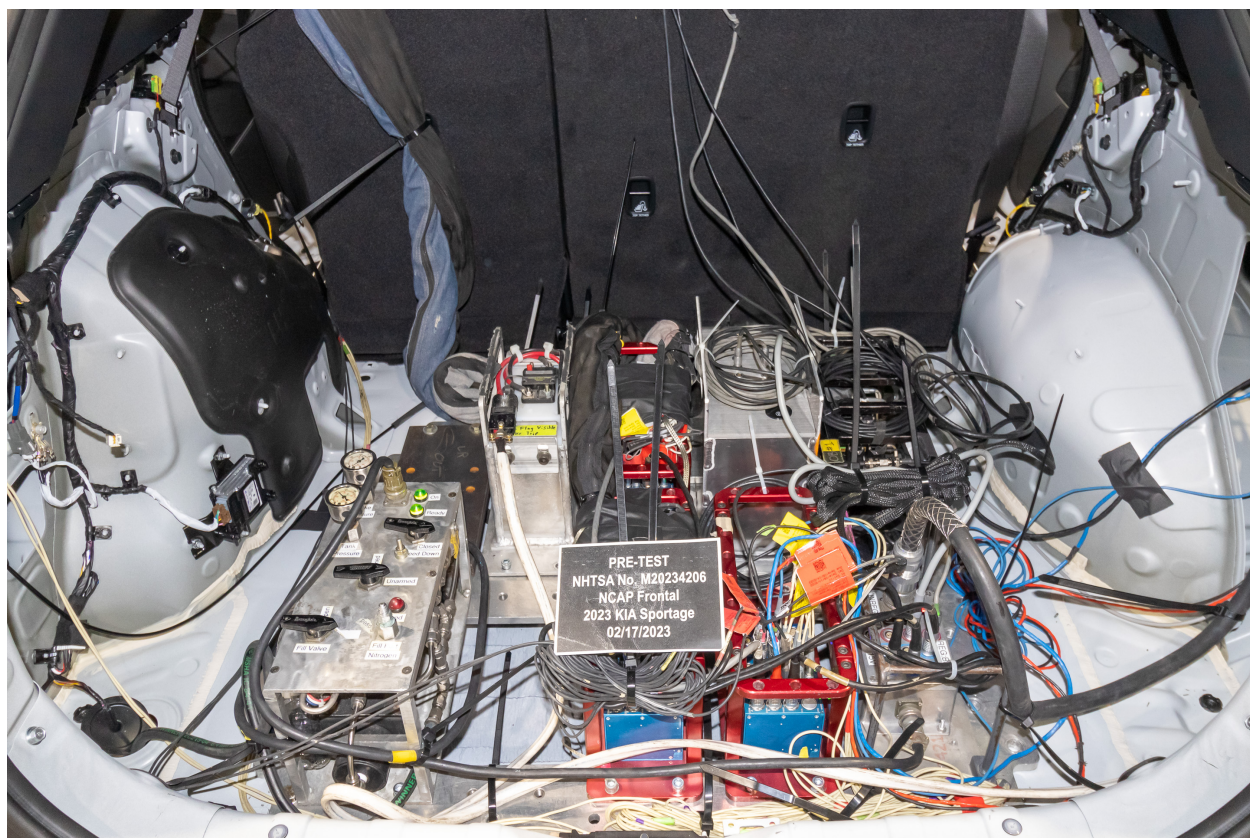


Figure A-74: Photograph of Ballast Installed in Vehicle

Photo Not Applicable

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



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



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

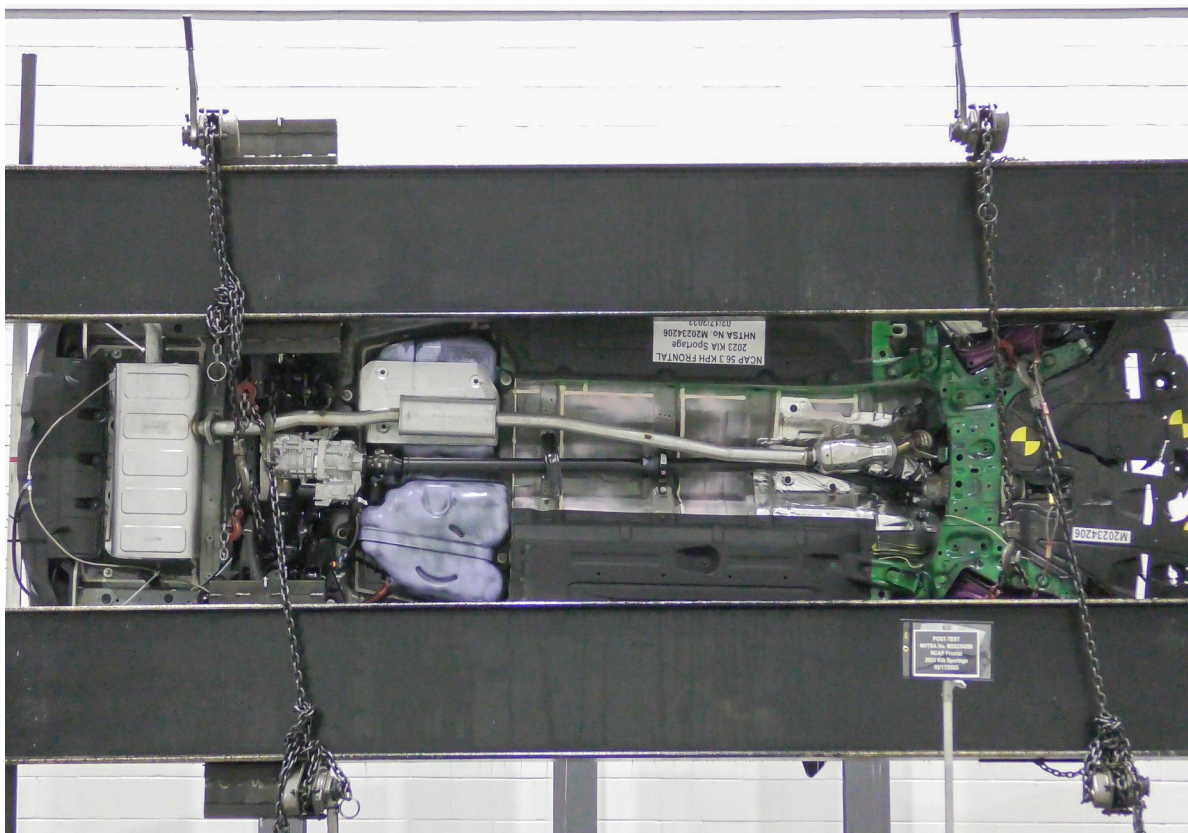


Figure A-78: Vehicle at 90° on Static Rollover Device

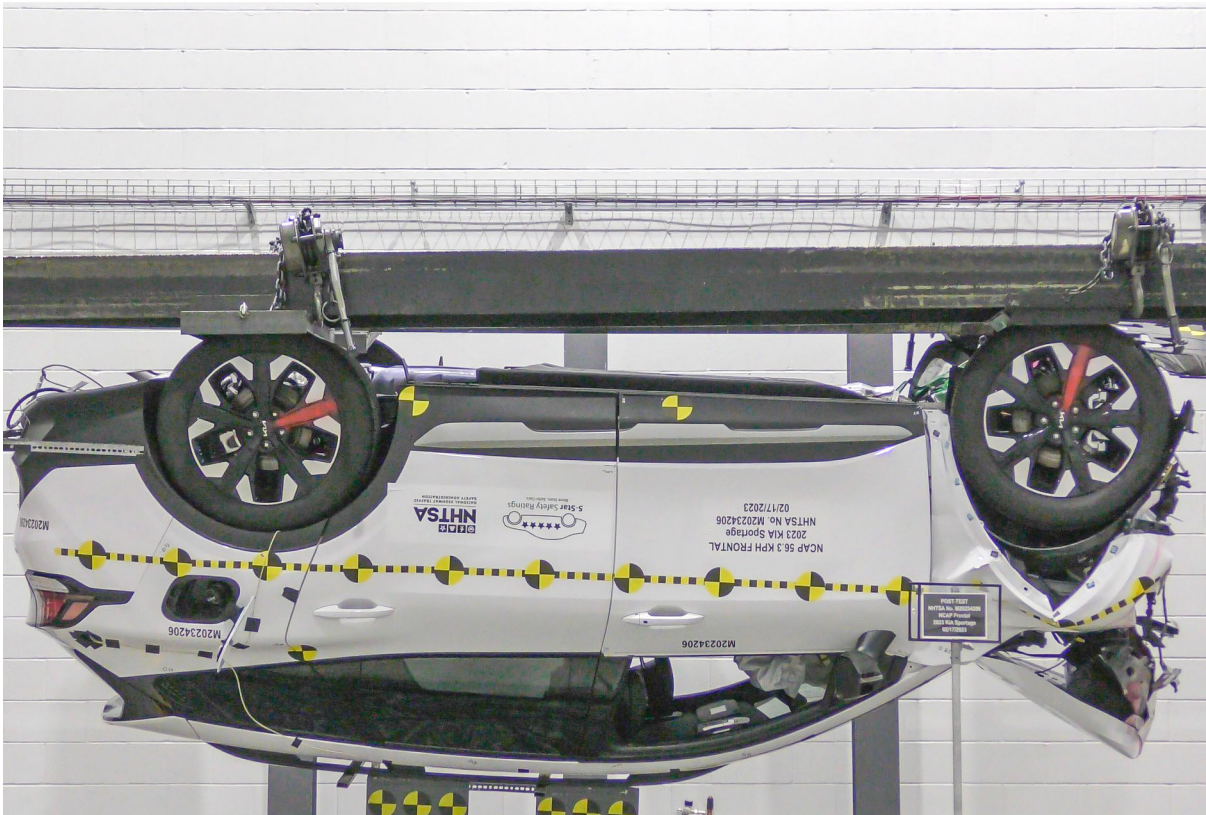


Figure A-79: Vehicle at 180° on Static Rollover Device



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



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



Figure A-82: 2023 KIA Sportage Frontal Impact Event

2023 SPORTAGE X-LINE AWD MODEL/OPT. CODE: 42452 / 010 EXTERIOR COLOR: GLACIAL WHITE PEARL INTERIOR COLOR: BLACK VEHICLE ID NUMBER: 5XYK6CAF3PG082127 PORT OF ENTRY: WEST POINT	Sold To: W032 Rosen Kia 5565 S. 27TH STREET MILWAUKEE WI 53221	Ship To: W032  #1 Brand in Dependability Awarded to Kia 															
STANDARD FEATURES MECHANICAL 2.5L Gas Direct Injection (GDI) 4-Cyl Engine 8-Speed Automatic Transmission Drive Mode Select All-Wheel Drive w/ Center-Locking Differential KIA DRIVE WISE DRIVER-ASSIST TECHNOLOGY Forward Collision-Avoidance Assist Lane Departure Warning & Lane Keeping Assist Driver Attention Warning w/Leading Vehicle Departure Alert Parking Distance Warning - Reverse Blind-Spot Collision-Avoidance Assist Rear Cross-Traffic Collision-Avoidance Assist Safe Exit Warning SAFETY Dual Front Advanced Airbags Dual Front Seat-Mounted Side & Full-Length Curtain Airbags Electronic Stability Control Downhill Brake Control & Hill-Start Assist Control INTERIOR, COMFORT & CONVENIENCE Navigation System w/ 12.3" Touchscreen Android Auto and Apple CarPlay Kia Connect w/ Free 12-Mo. Trial* Where Available** SIRIUSXM® w/Free 3-Mo. Subscription* Dual Automatic Climate Control w/ Auto Defogger Smart Key w/ Push Button & Remote Start Wireless Charger (Front) / Front & Rear USB Charge Ports Power Adj. Driver's Seat w/ Power Lumbar Support SynTex Seating Material w/ Heated Front Seats 60/40 Split-Folding and Reclining Rear Seats Leather-Wrapped Steering Wheel Compact Spare Tire Rear Occupant Alert EXTERIOR 19" Gloss Black Alloy Wheels LED Headlights / Tail Lights / Daytime Running Lights Heated Outside Mirrors w/ LED Turn Signals Roof Rails, Rear Spoiler and Rear Privacy Glass WARRANTY 10 Year/100,000 Mile Limited Powertrain Warranty 5 Year/60,000 Mile Limited Basic Warranty 5 Year/60,000 Mile Roadside Assistance	MANUFACTURER'S SUGGESTED RETAIL PRICE ▶ \$ 30,790.00 ADDITIONAL INSTALLED EQUIPMENT: (In addition to or in place of standard features) Glacial White Pearl Paint Carpeted Floor Mats, X-Line Cargo Net Hybrid (w/ Audio) Wheel Locks \$395.00 \$155.00 \$50.00 \$60.00 MSRP INCLUDING OPTIONS \$ 31,450.00 INLAND FREIGHT AND HANDLING \$ 1,295.00 TOTAL MANUFACTURER'S SUGGESTED RETAIL PRICE ▶ \$ 32,745.00 TOTAL ADDITIONAL WEIGHT: 8.4	 Fuel Economy and Environment Fuel Economy  25 MPG combined city/hwy 23 city 28 highway 4.0 gallons per 100 miles Annual fuel Cost \$1,750 Fuel Economy & Greenhouse Gas Rating (tailpipe only)  5 (Best) Smog Rating (tailpipe only)  5 (Best) you spend \$750 more in fuel costs over 5 years compared to the average new vehicle. Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 28 MPG and costs \$8,000 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$2.25 per gallon. MPG is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog. fuel economy.gov Calculate personalized estimates and compare vehicles GOVERNMENT 5-STAR SAFETY RATINGS Overall Vehicle Score Not Rated Based on the combined rating of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight. <table border="1"> <tr> <td>Frontal</td> <td>Driver</td> <td>Not Rated</td> </tr> <tr> <td>Crash</td> <td>Passenger</td> <td>Not Rated</td> </tr> <tr> <td>Side</td> <td>Front seat</td> <td>Not Rated</td> </tr> <tr> <td>Crash</td> <td>Rear seat</td> <td>Not Rated</td> </tr> <tr> <td>Rollover</td> <td></td> <td>Not Rated</td> </tr> </table> Star ratings based on the risk of injury in a single-vehicle crash. Star ratings range from 1 to 5 stars (★★★★★) with 5 being the highest. Source: National Highway Traffic Safety Administration (NHTSA). www.safercar.gov or 1-888-327-4236 PARTS CONTENT INFORMATION FOR VEHICLES IN THIS CAR LINE U.S./CANADIAN PARTS CONTENT: 50 % MAJOR SOURCES OF FOREIGN PARTS: KOREA: 35% NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS. FOR THIS VEHICLE FINAL ASSEMBLY POINT: WEST POINT, GA, USA COUNTRY OF ORIGIN ENGINE: USA TRANSMISSION: U	Frontal	Driver	Not Rated	Crash	Passenger	Not Rated	Side	Front seat	Not Rated	Crash	Rear seat	Not Rated	Rollover		Not Rated
Frontal	Driver	Not Rated															
Crash	Passenger	Not Rated															
Side	Front seat	Not Rated															
Crash	Rear seat	Not Rated															
Rollover		Not Rated															
*Additional terms and conditions apply. **Kia Connect may be currently unavailable for Model Year 2022 and newer vehicles sold or purchased in Massachusetts; please see owners.kia.com for updates on availability. NOTE: When you purchase this vehicle, Kia America, Inc. collects personal information you provide to the dealership. For information on our collection and use of personal information and your rights, please see our Privacy Policy on www.kia.com.		Manufacturer's suggested retail price includes Manufacturer's recommended pre-delivery service. License and title fees, state and local taxes and other dealer installed options and accessories are not included in the manufacturer's suggested retail price.															

Figure A-83: Monroney Label Photograph

APPENDIX B

VEHICLE & 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
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Plot 10	Driver Upper Neck Force X 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

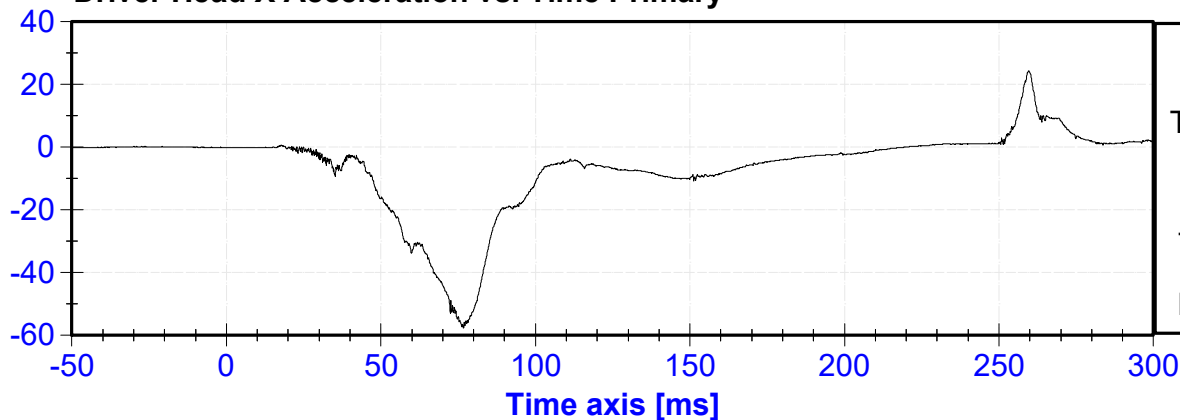
The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at www.NHTSA.gov

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

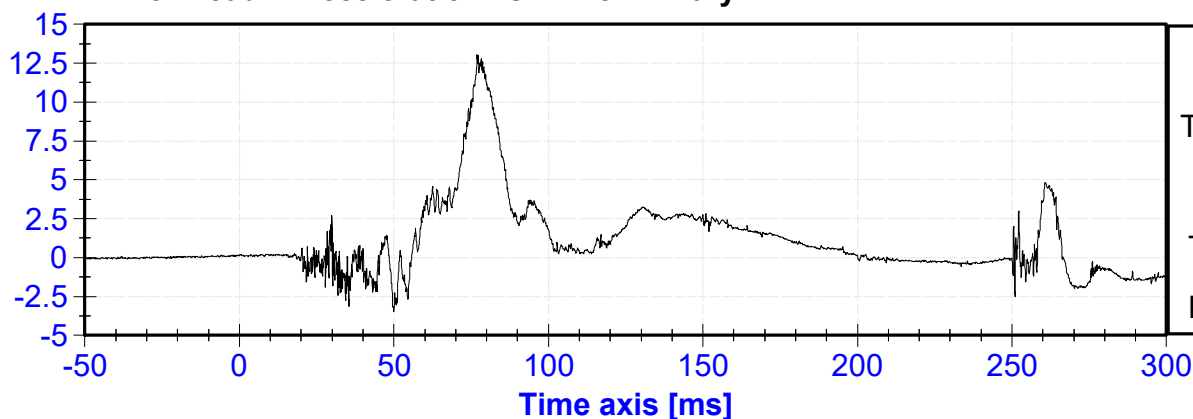
Driver Left Upper Tibia Force Z
Driver Left Lower Tibia Moment X
Driver Left Lower Tibia Moment Y
Driver Left Lower Tibia Force Z
Driver Right Upper Tibia Moment X
Driver Right Upper Tibia Moment Y
Driver Right Upper Tibia Force Z
Driver Right Lower Tibia Moment X
Driver Right Lower Tibia Moment Y
Driver 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 Foot Fore Z
Passenger Right Foot Aft X
Passenger Right Foot Aft Z
Passenger Shoulder Belt Force
Passenger Lap Belt Force
Passenger Head Angular Velocity X
Passenger Head Angular Velocity Y
Passenger Head Angular Velocity Z
Left Rear Seat Crossmember X
Left Rear Seat Crossmember Z
Right Rear Seat Crossmember X
Right Rear Seat Crossmember Z
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

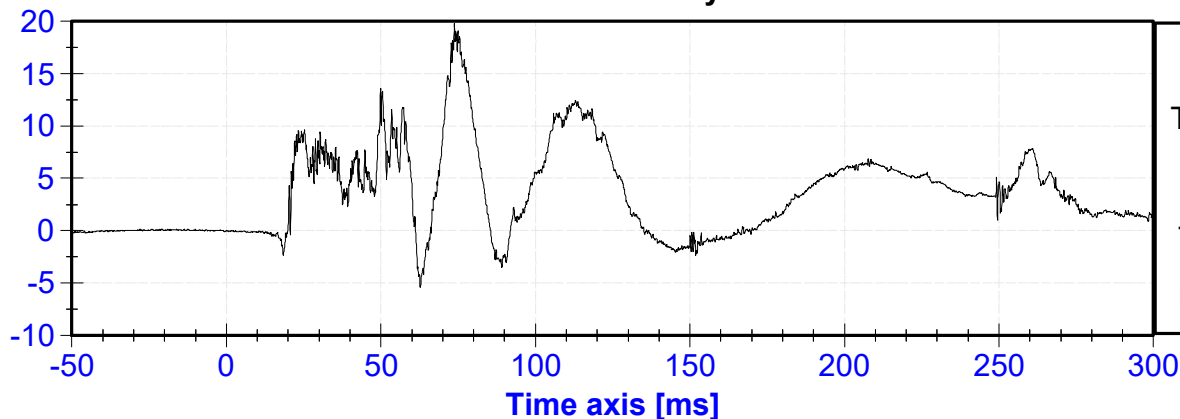
Driver Head X Acceleration vs. Time Primary



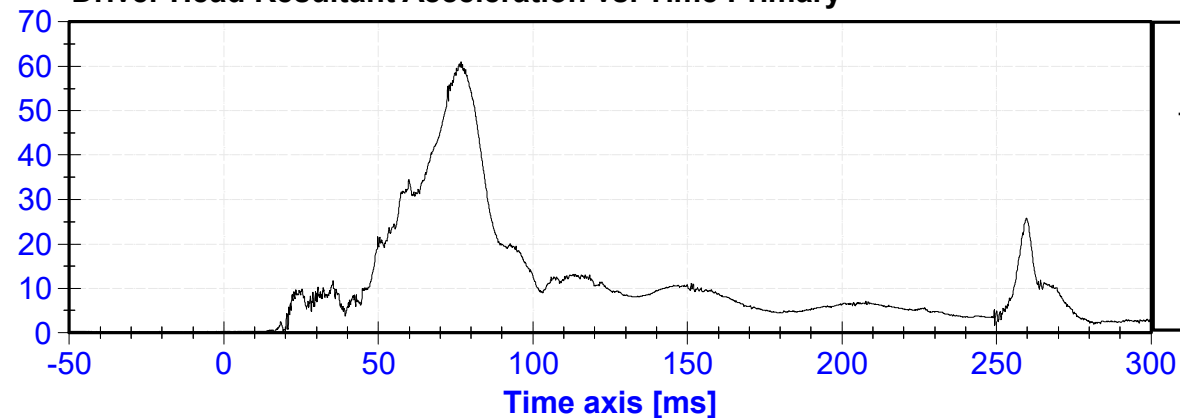
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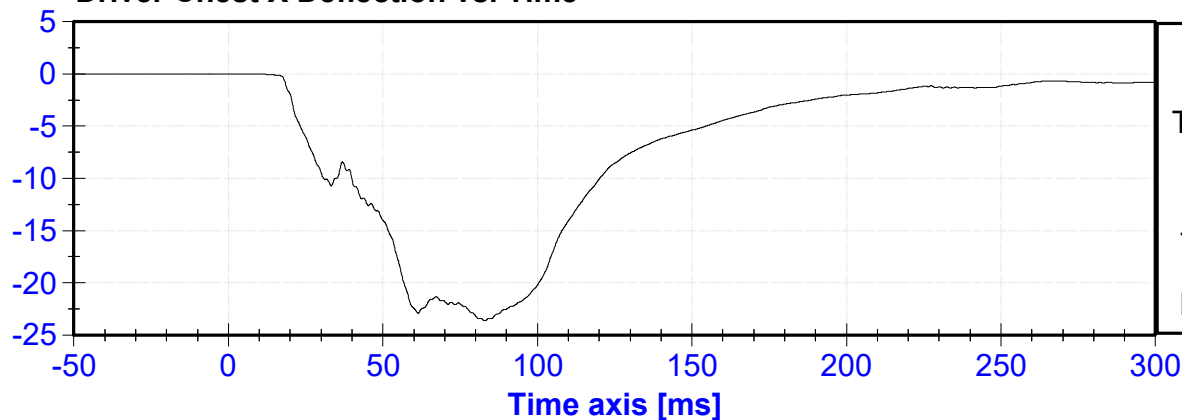
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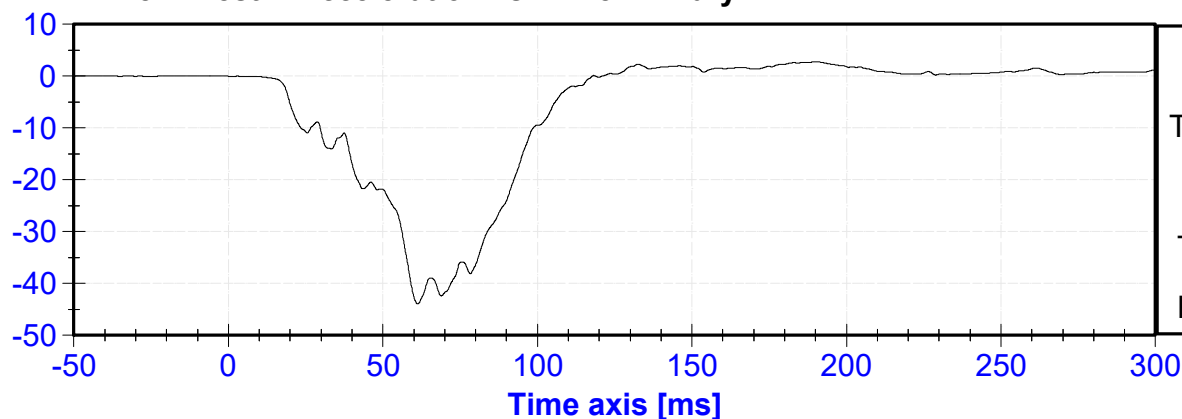
Driver Head Resultant Acceleration vs. Time Primary



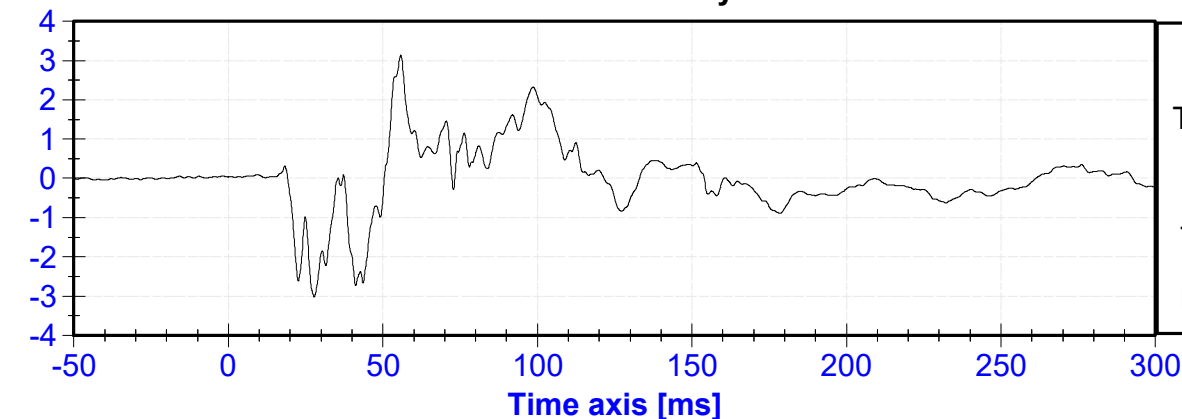
Driver Chest X Deflection vs. Time



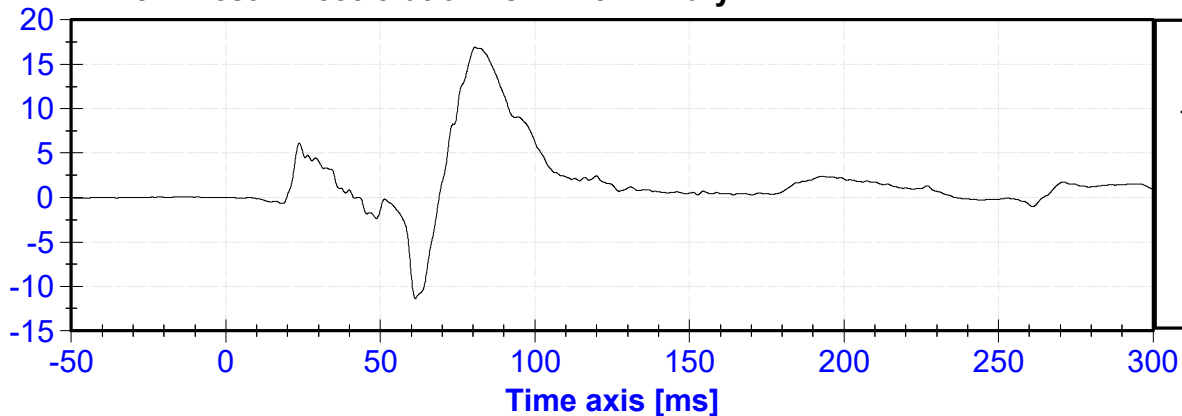
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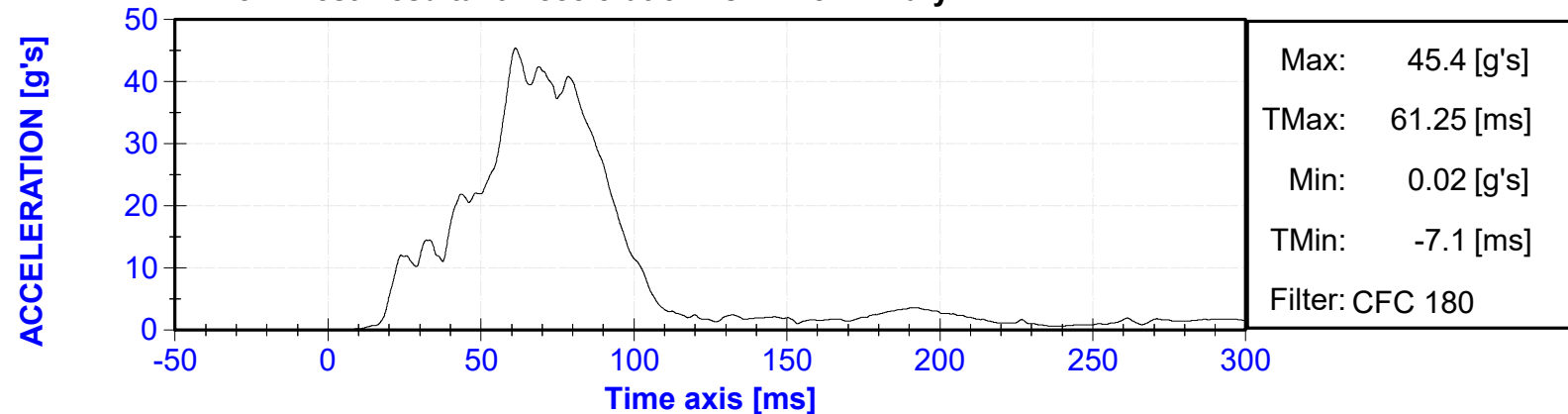
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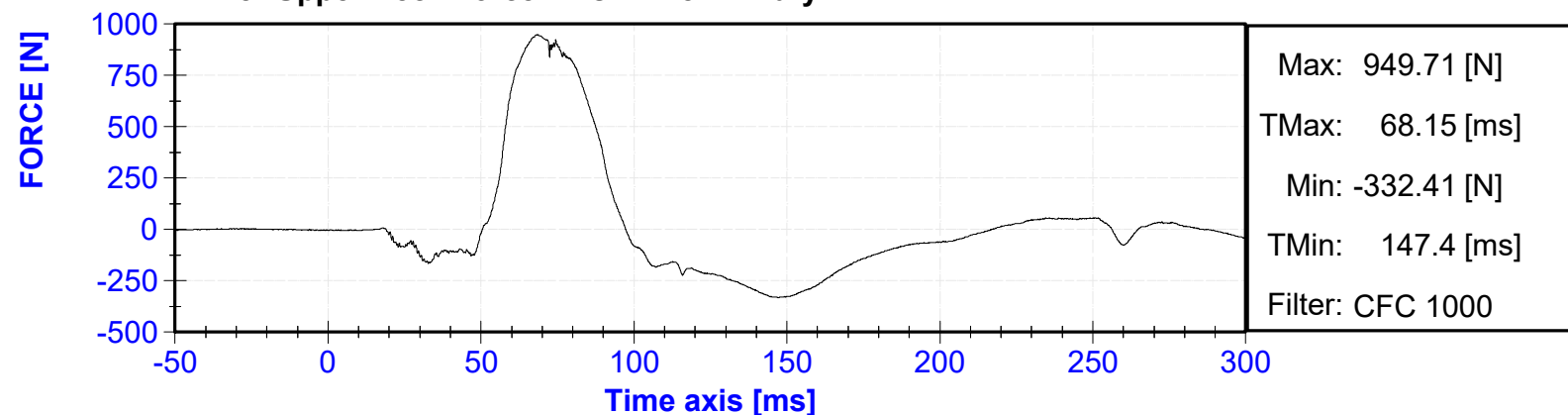
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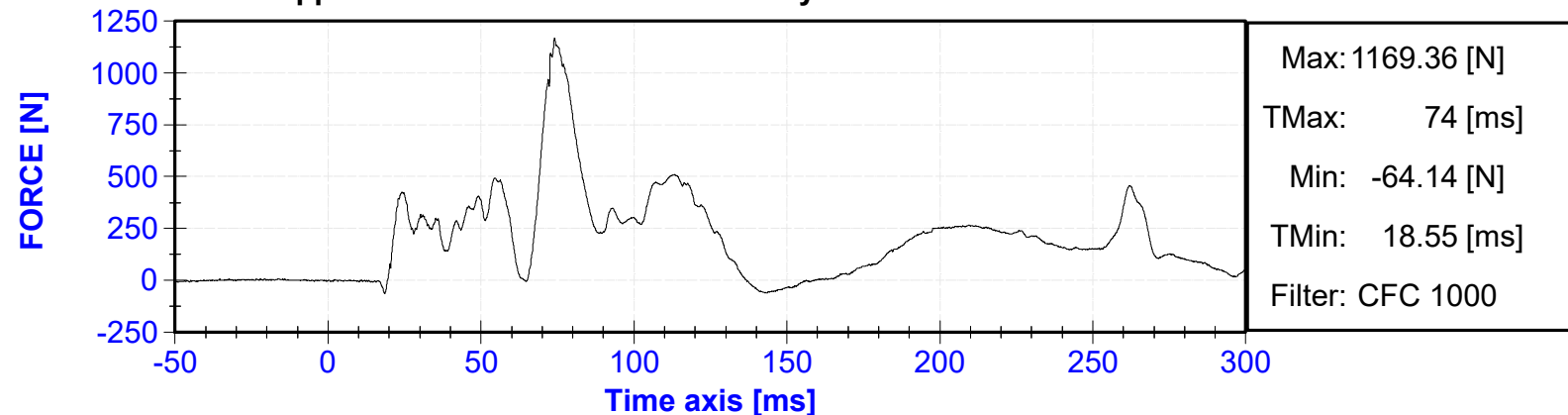
Driver Chest Resultant Acceleration vs. Time Primary



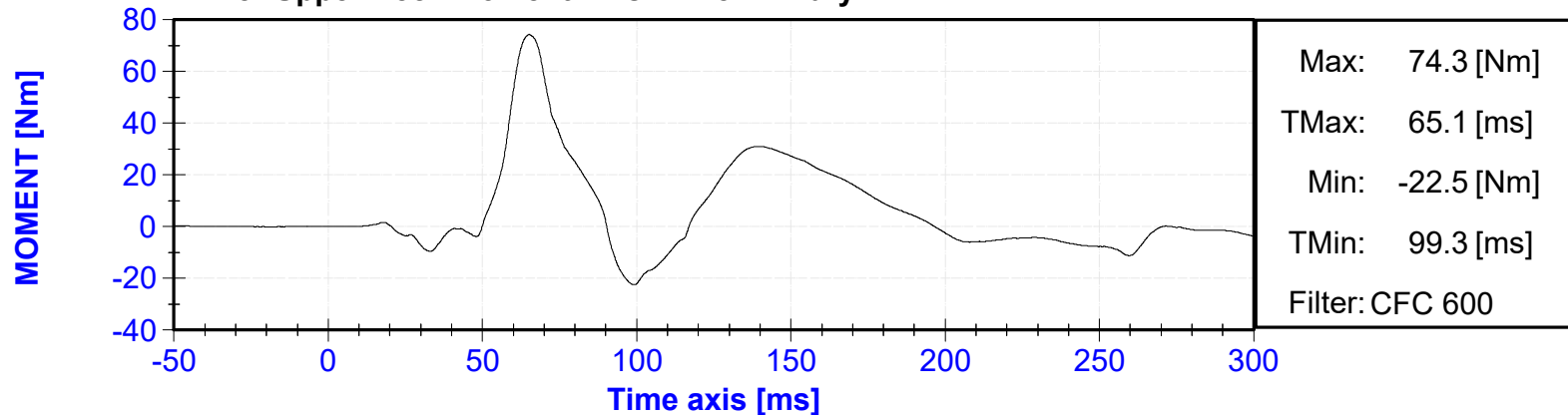
Driver Upper Neck Force X vs. Time Primary



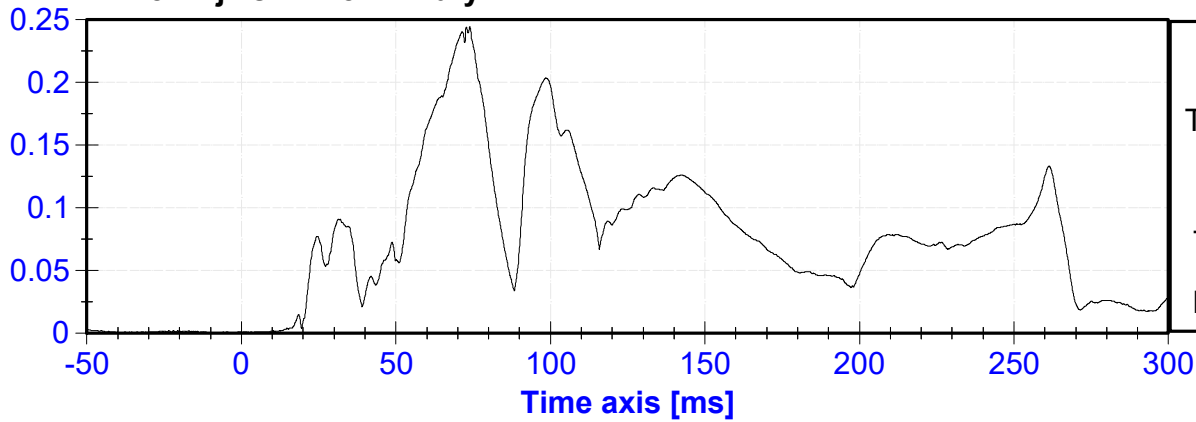
Driver Upper Neck Force Z vs. Time Primary



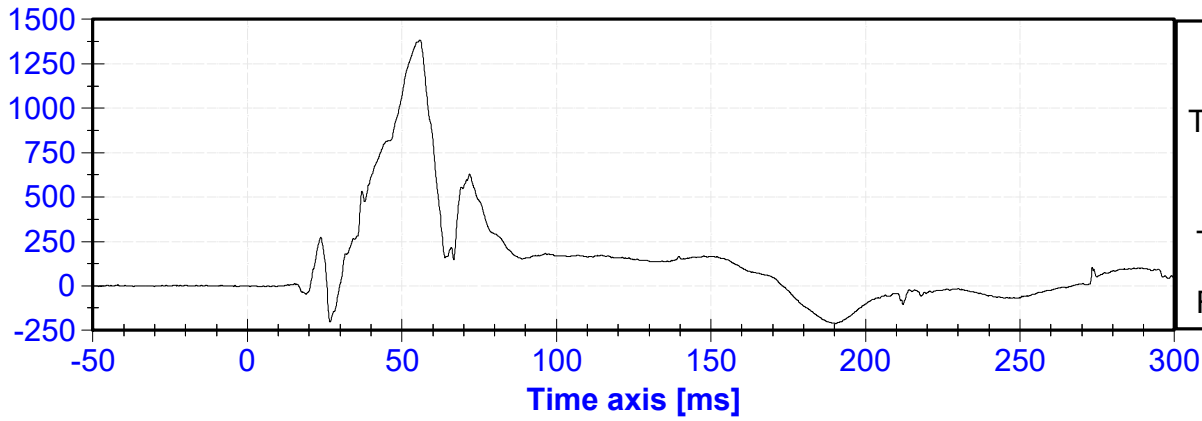
Driver Upper Neck Moment Y vs. Time Primary



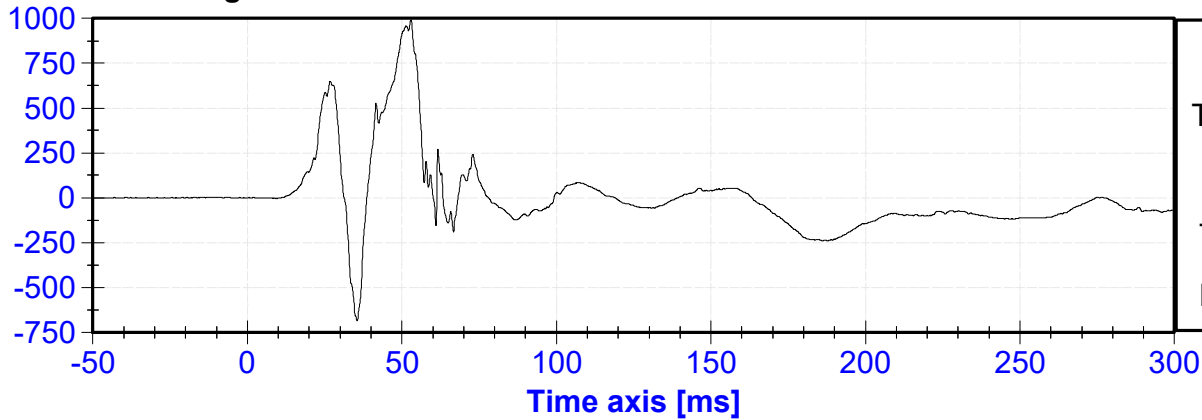
Driver Nij vs. Time Primary



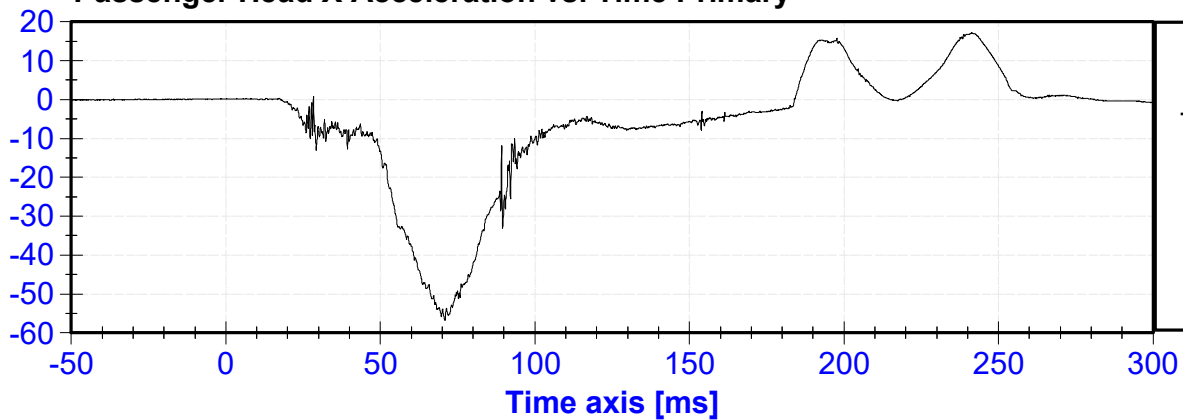
Driver Left Femur Force vs. Time



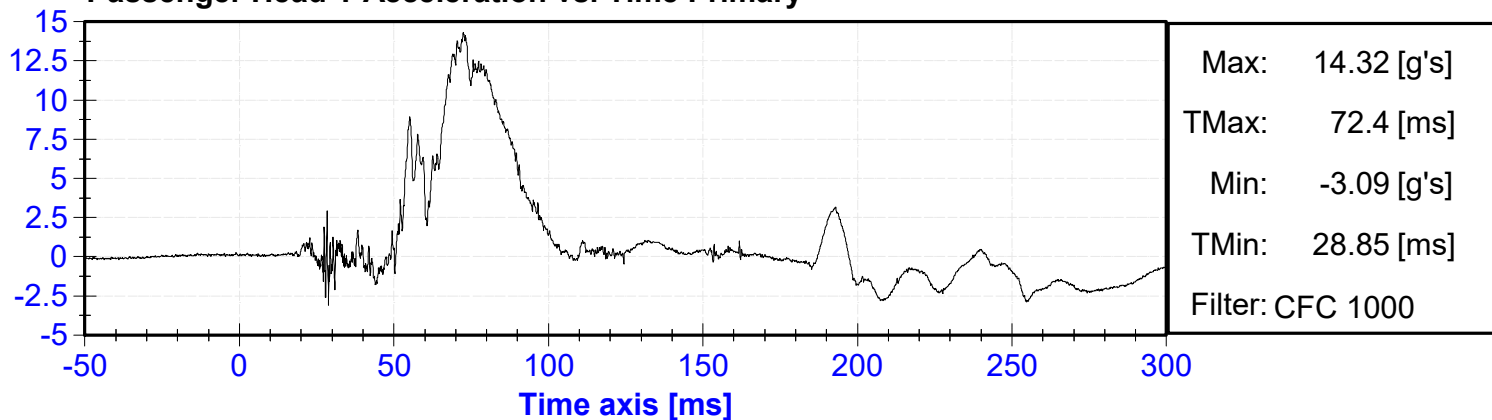
Driver Right Femur Force vs. Time



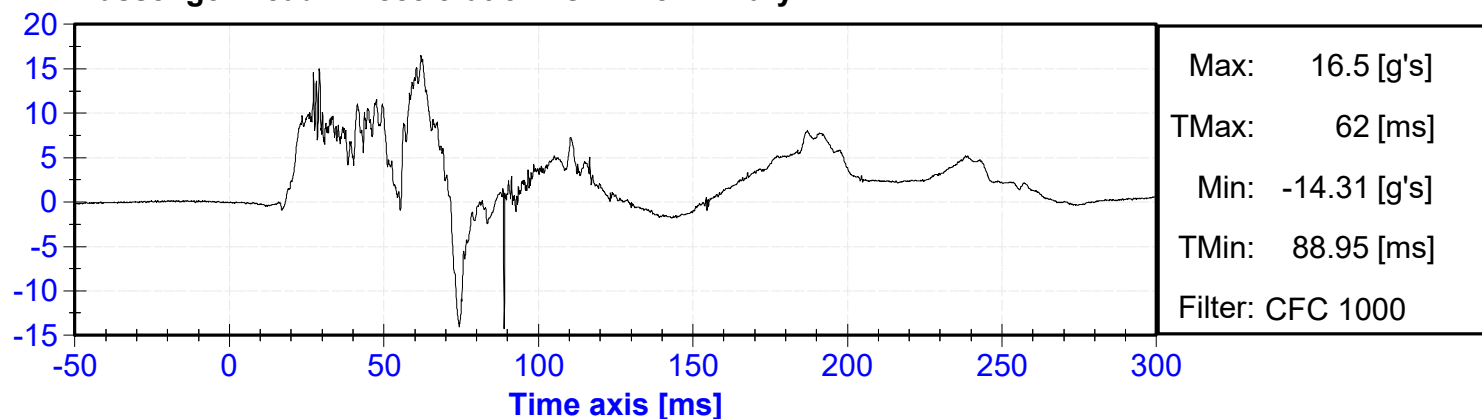
Passenger Head X Acceleration vs. Time Primary



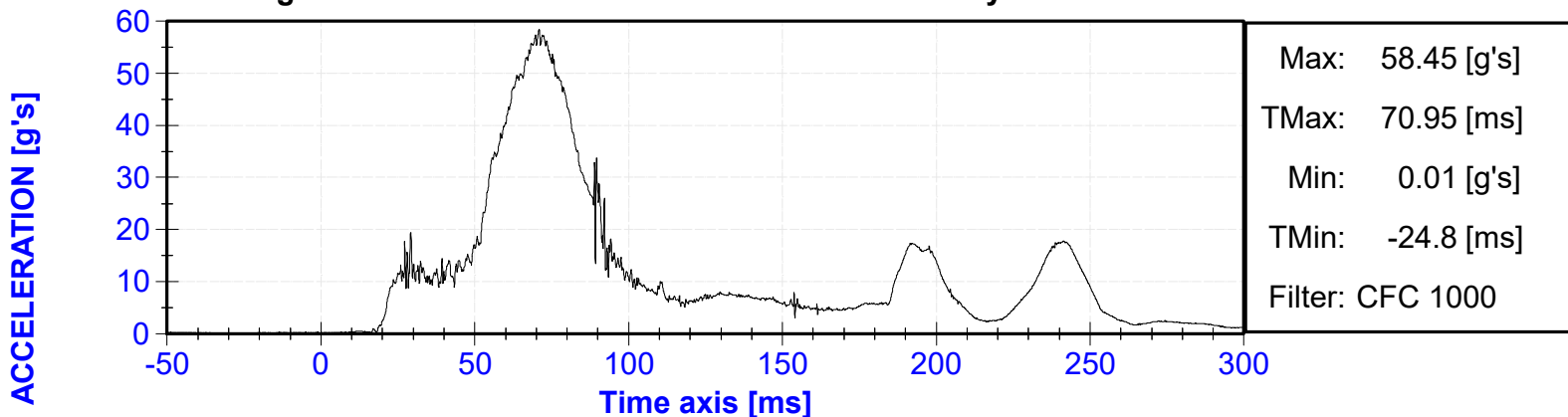
Passenger Head Y Acceleration vs. Time Primary



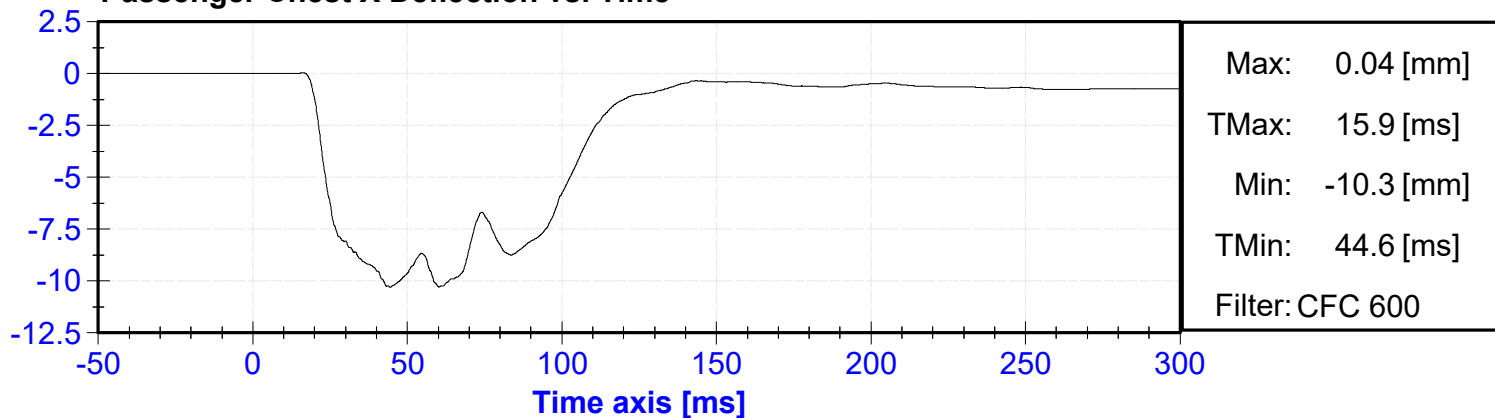
Passenger Head Z Acceleration vs. Time Primary



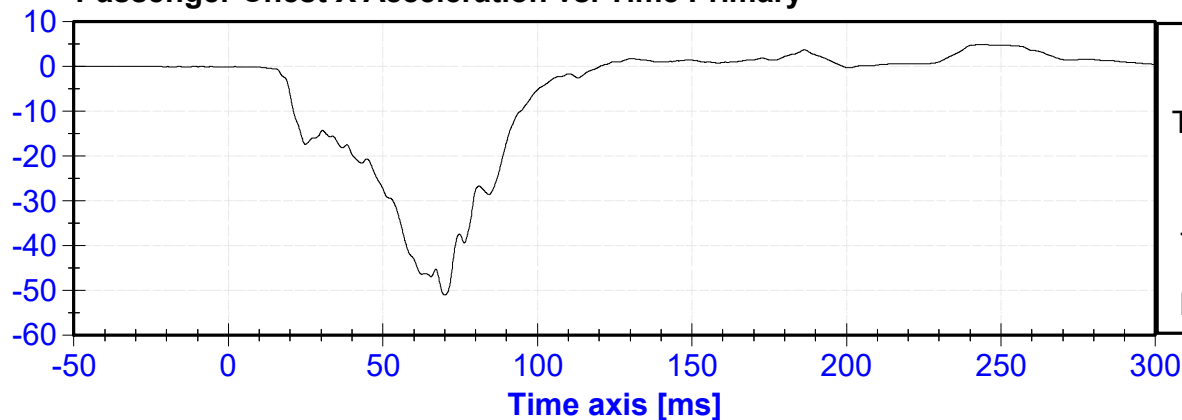
Passenger Head Resultant Acceleration vs. Time Primary



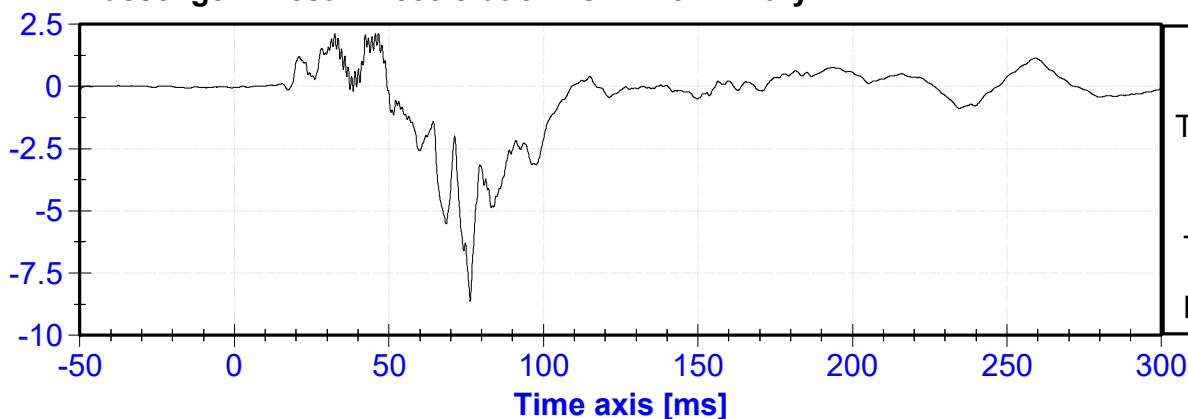
Passenger Chest X Deflection vs. Time



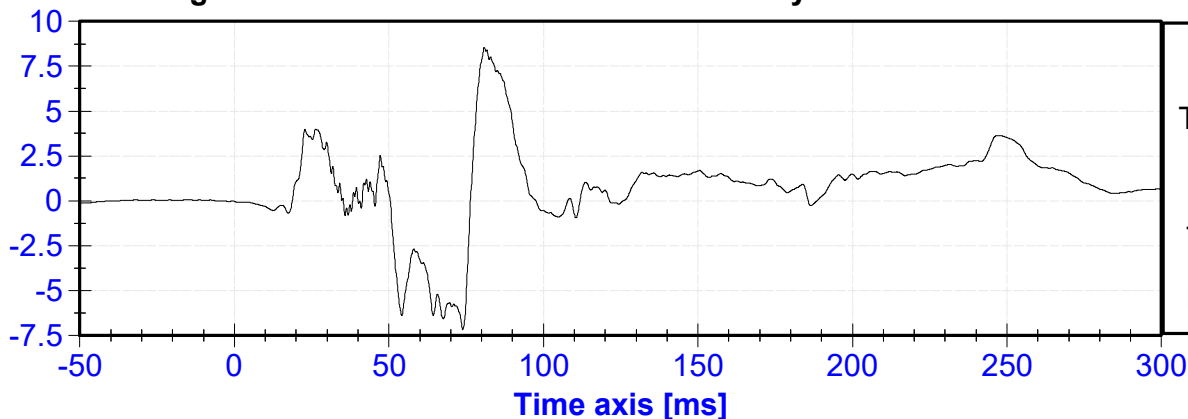
Passenger Chest X Acceleration vs. Time Primary



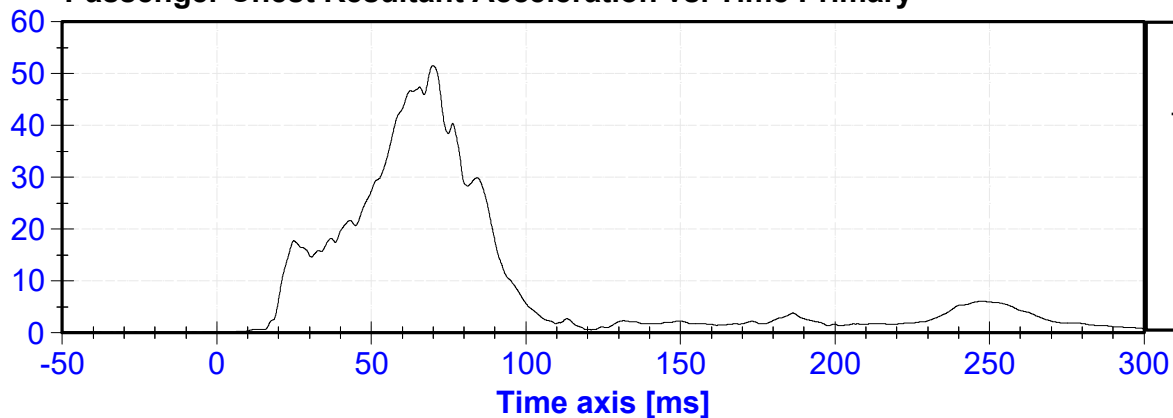
Passenger Chest Y Acceleration vs. Time Primary



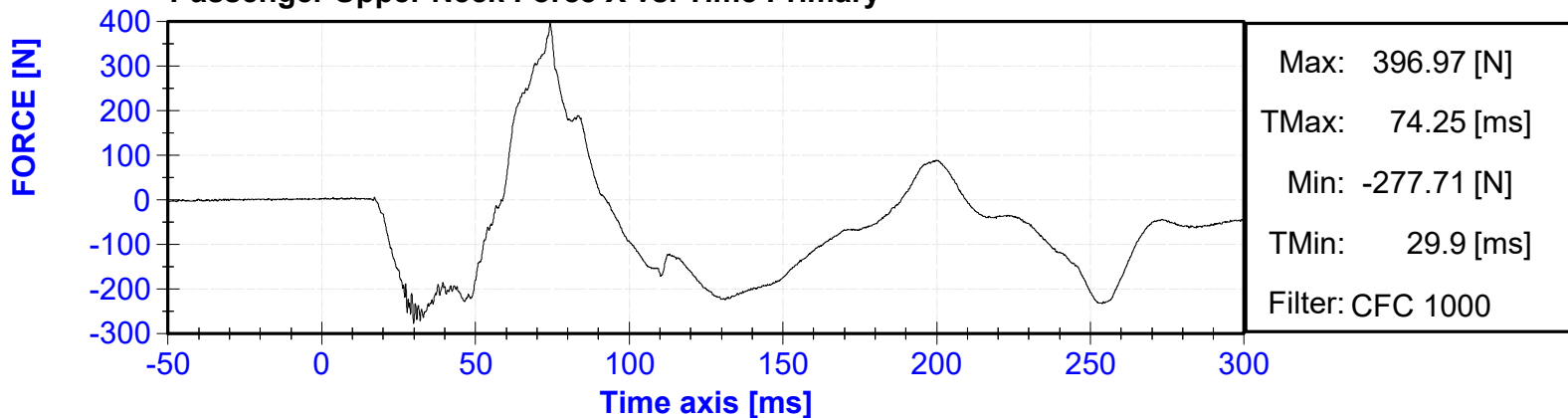
Passenger Chest Z Acceleration vs. Time Primary



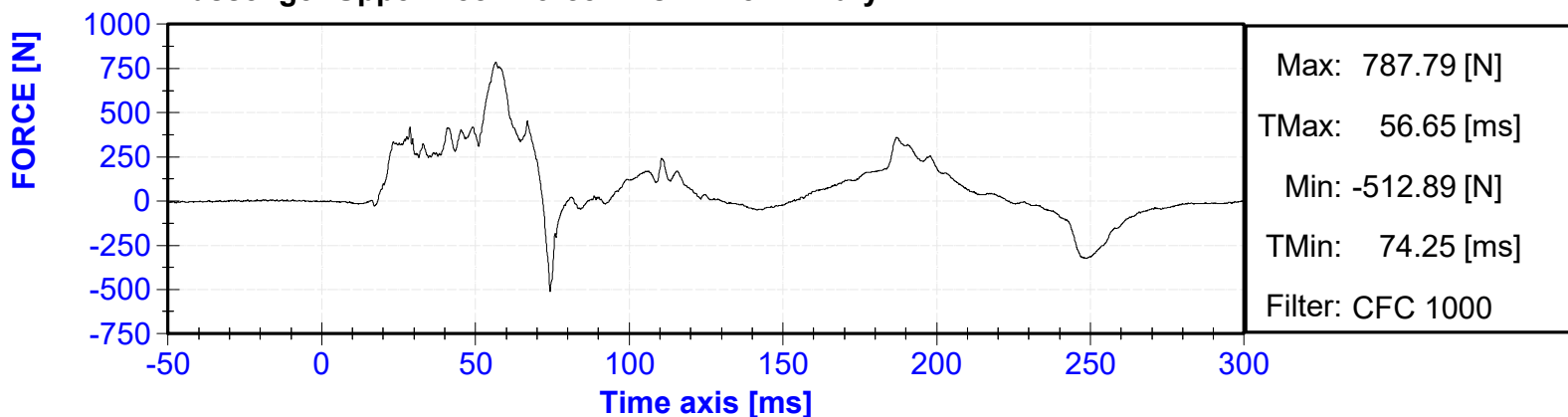
Passenger Chest Resultant Acceleration vs. Time Primary



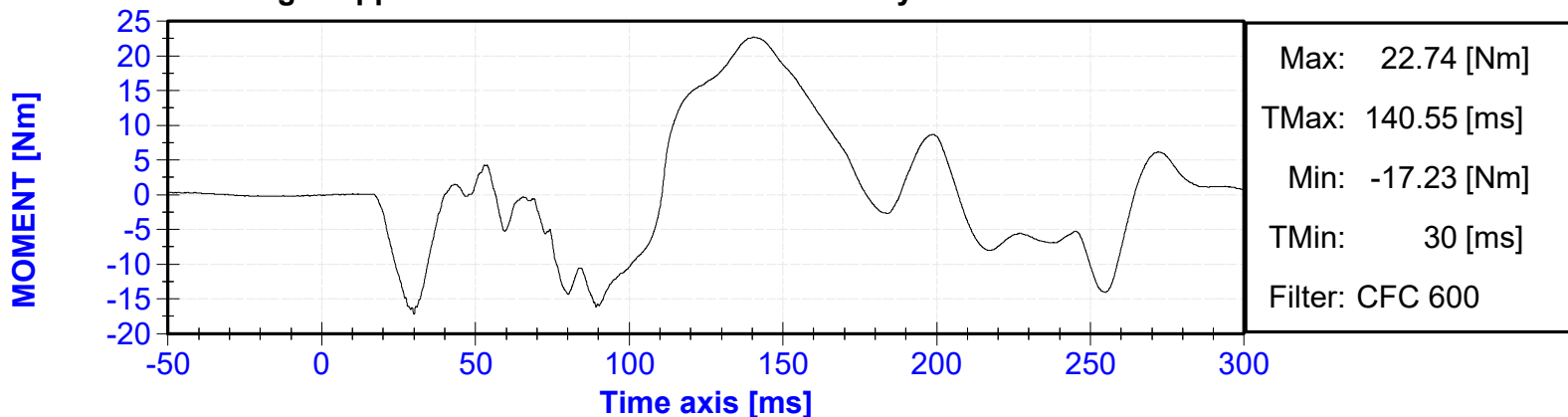
Passenger Upper Neck Force X vs. Time Primary



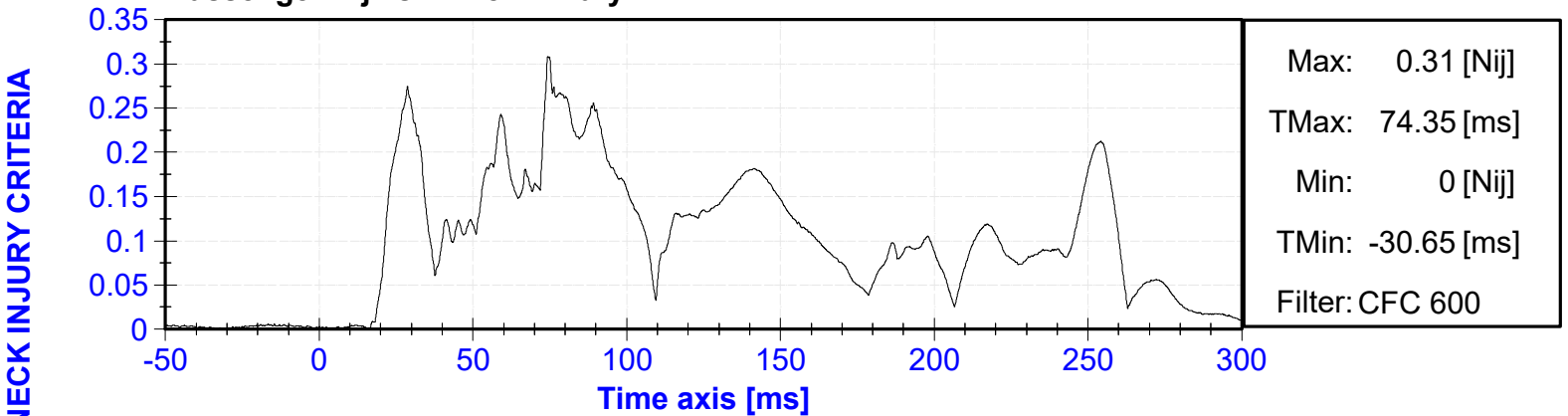
Passenger Upper Neck Force Z vs. Time Primary



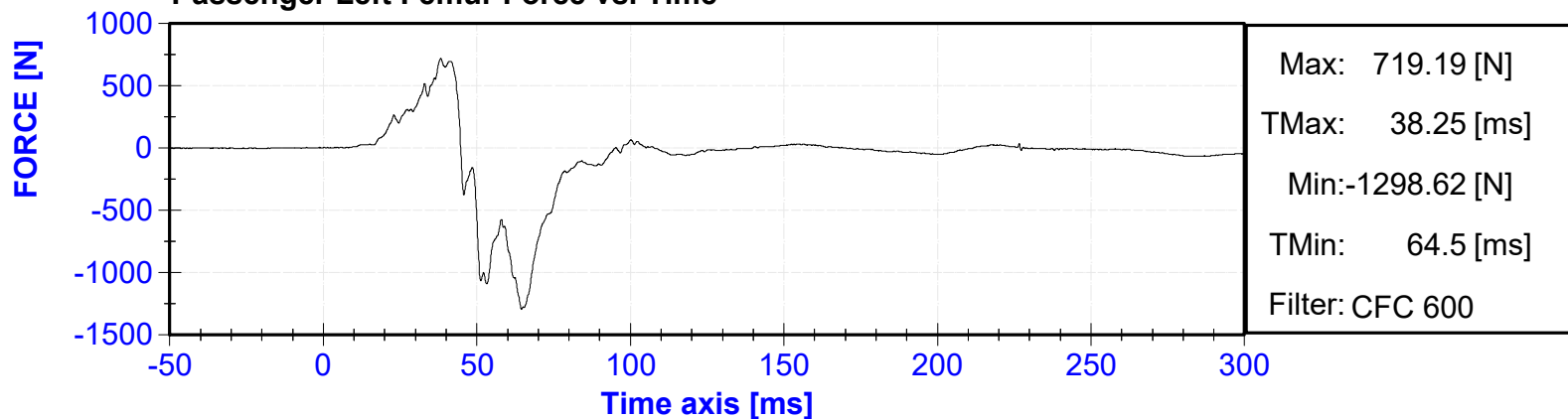
Passenger Upper Neck Moment Y vs. Time Primary



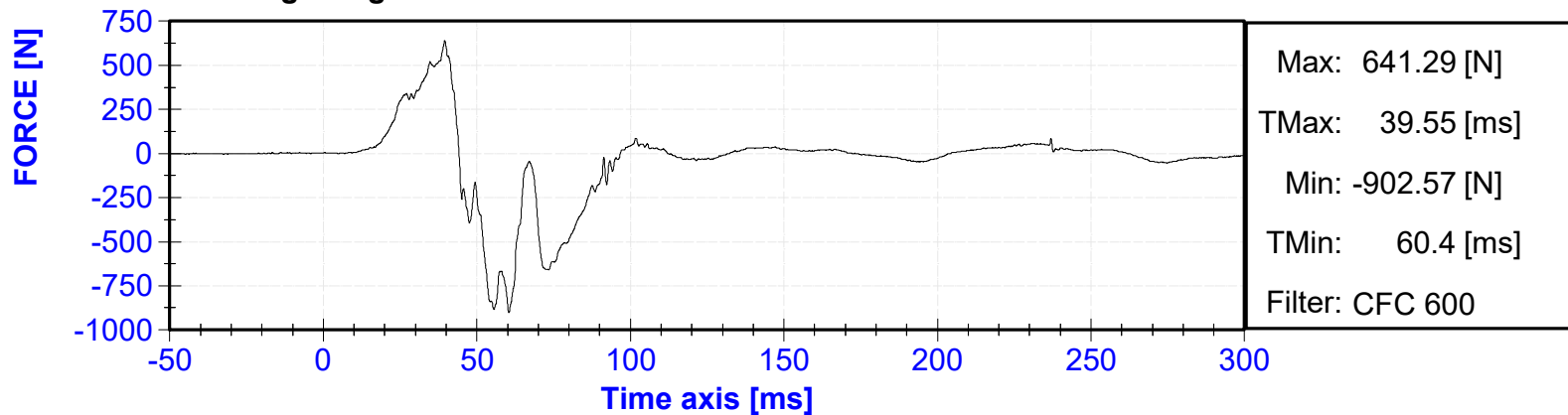
Passenger Nij vs. Time Primary



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

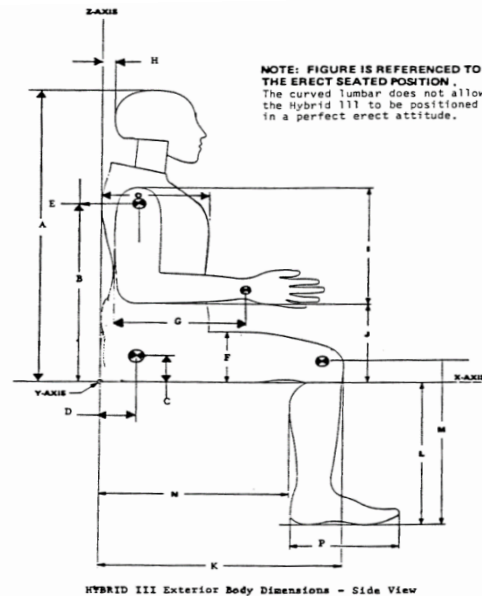
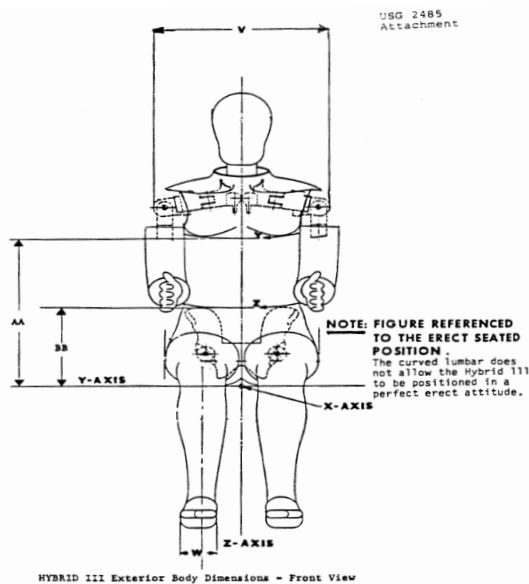


External Measurements - Hybrid 3 - 50th Male

Technician: **K. Brogan**

Date: **02/07/2023**

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	3.5	Pass
F	Thigh Clearance	5.5	6.1	5.8	Pass
G	Back of Elbow to Wrist Pivot	11.4	12.0	11.6	Pass
H	Head Back to Backline	1.6	1.8	1.7	Pass
I	Shoulder to Elbow Length	13.0	13.6	13.2	Pass
J	Elbow Rest Height	7.5	8.3	7.9	Pass
K	Buttock to Knee Length	22.8	23.8	23.4	Pass
L	Popliteal Height	16.9	17.9	17.3	Pass
M	Knee Pivot Height	19.1	19.7	19.5	Pass
N	Buttock Popliteal Length	17.8	18.8	18.3	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	39.1	Pass
Z	Waist Circumference	32.9	34.1	33.4	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

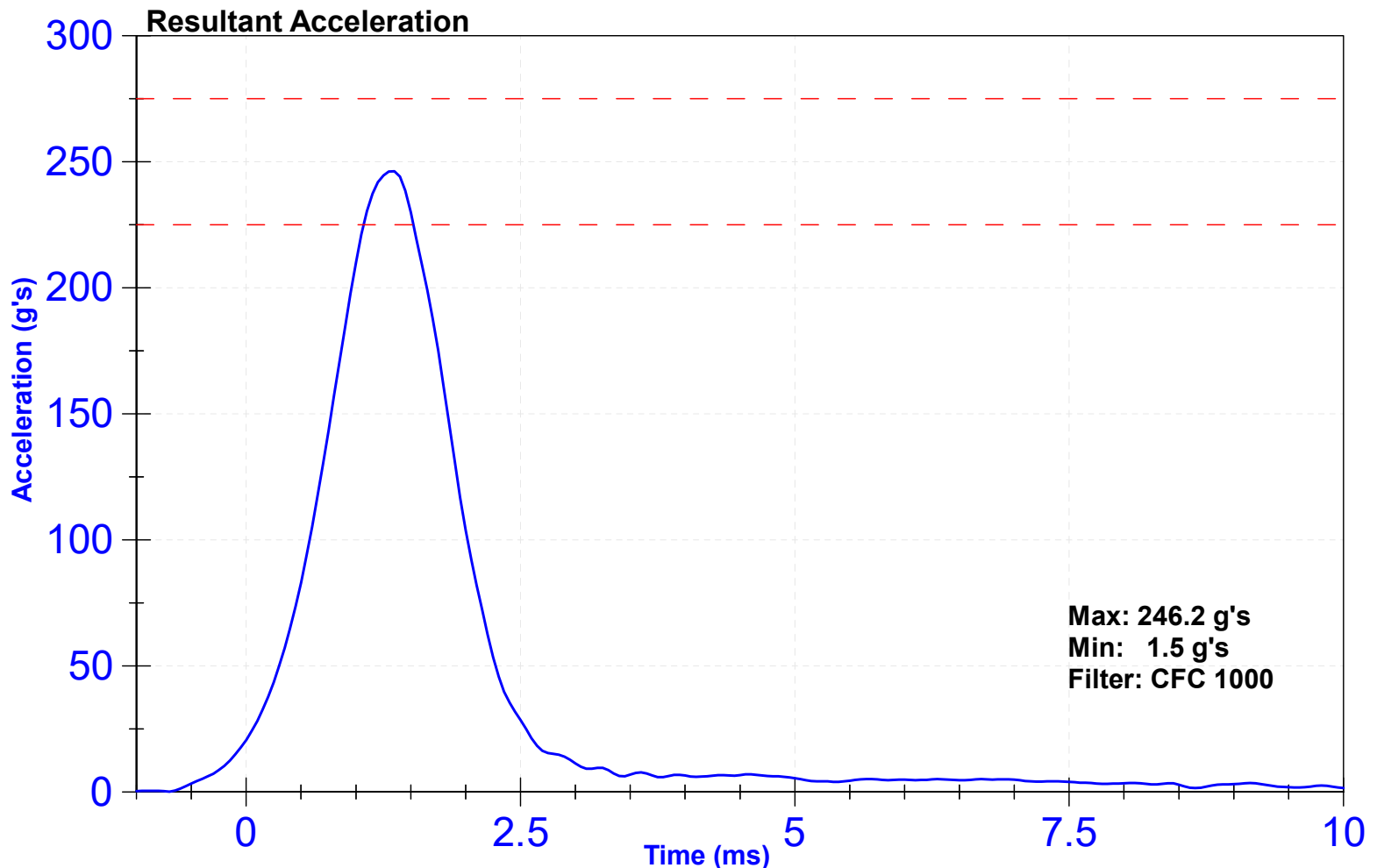
ATD Manufacturer	Humanetics	Test Technician	T. Roseman
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

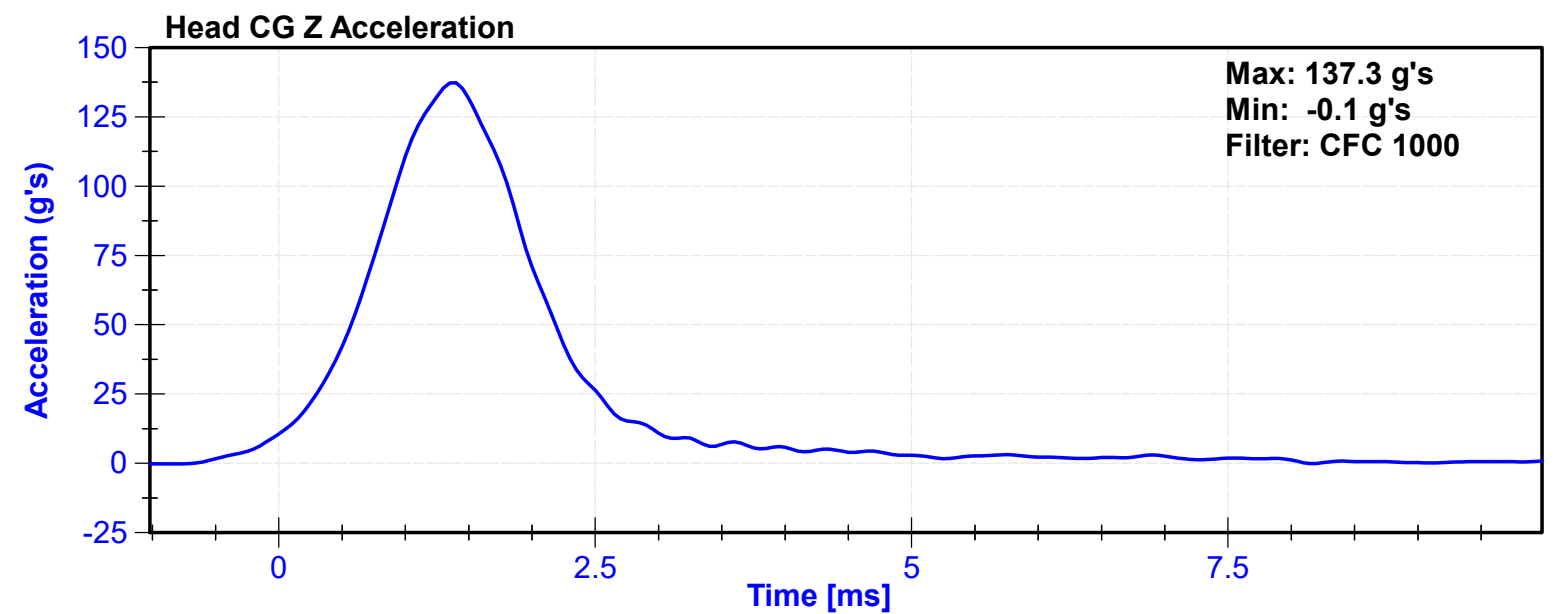
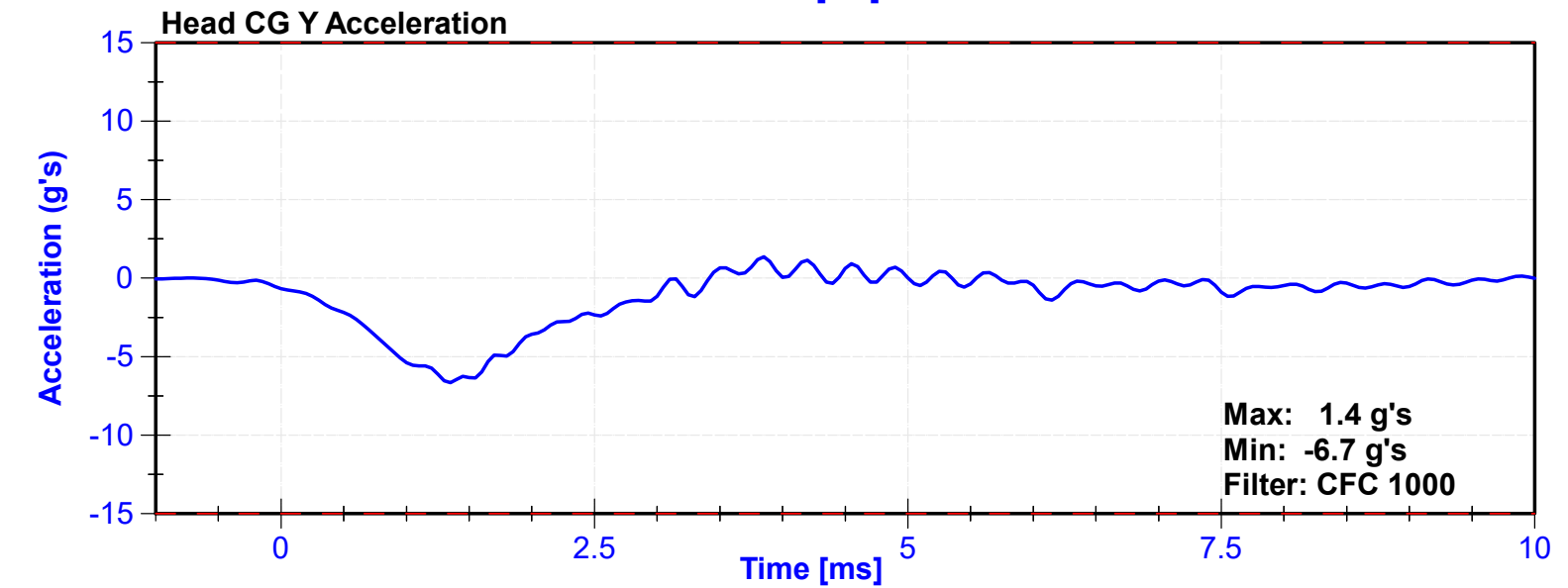
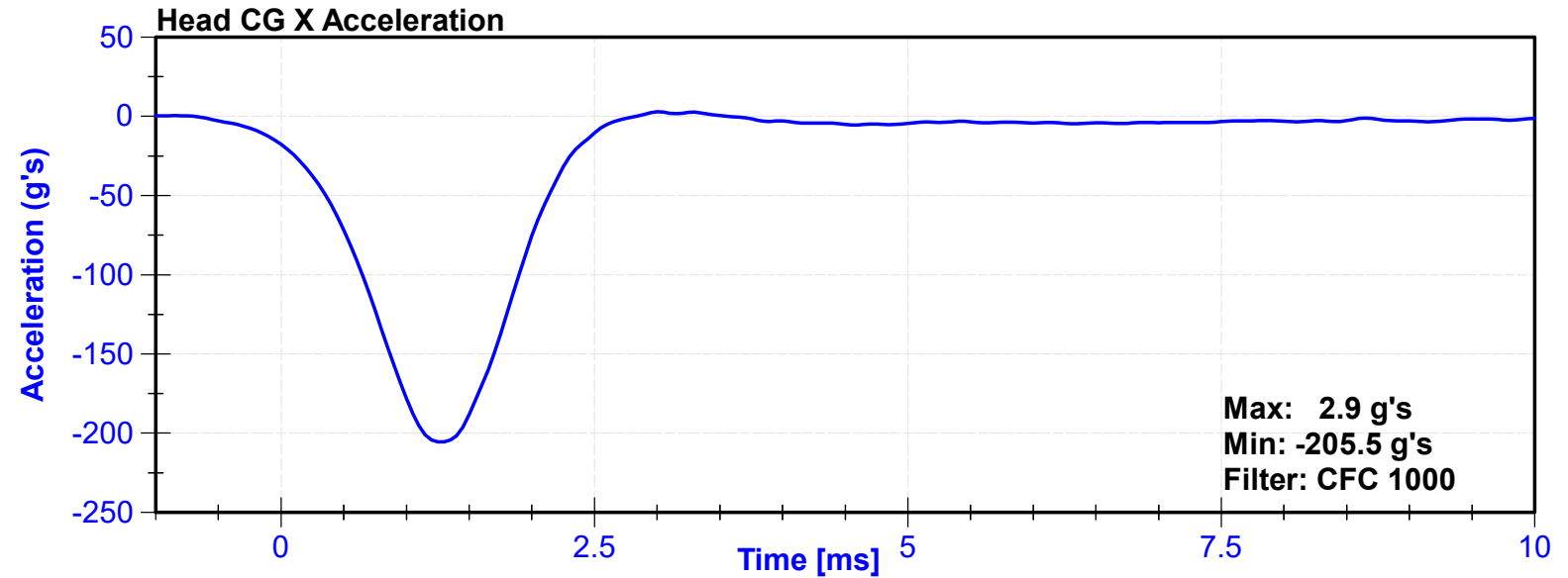
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.0	Pass
Humidity	10	70	%	13.3	Pass
Resultant Acceleration	225	275	g's	246.2	Pass
Oscillation	0	10	%	3.8	Pass
Lateral Acceleration	-15	15	g's	-6.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	P51681	9/30/2022	3/29/2023
Y Accelerometer	Endevco	P64151	9/30/2022	3/29/2023
Z Accelerometer	Endevco	P52114	9/30/2022	3/29/2023





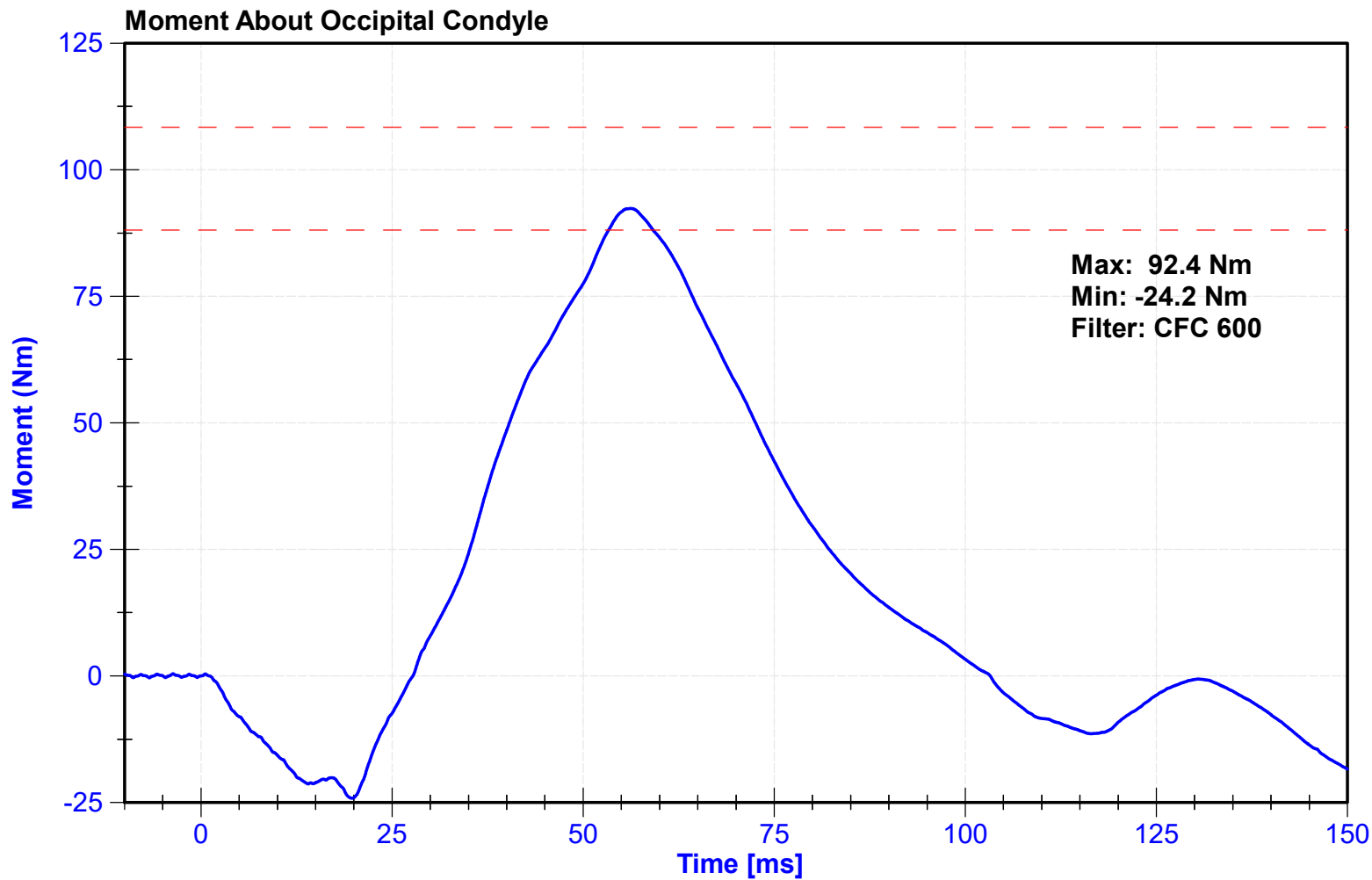
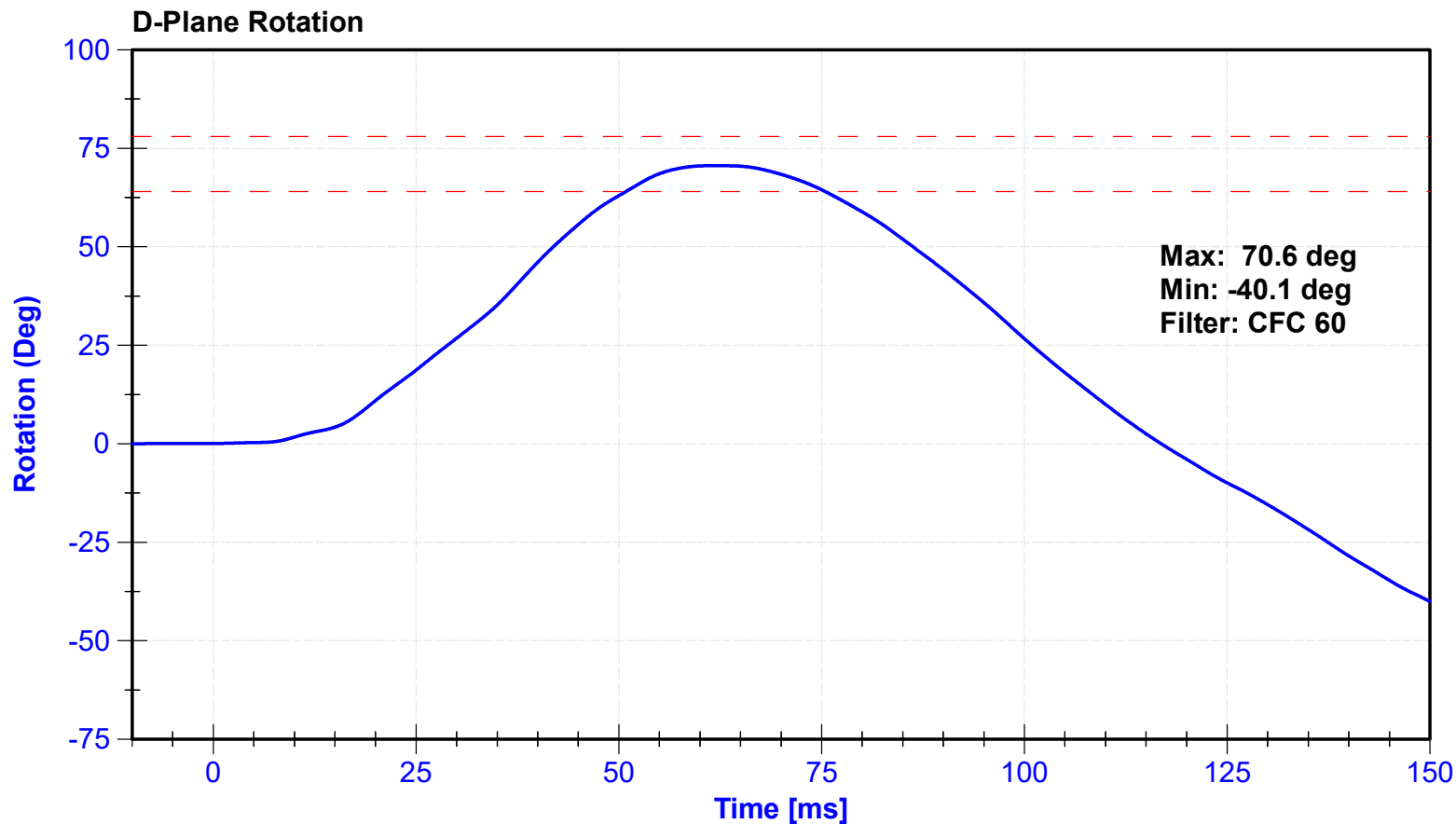
ATD Manufacturer	Humanetics	Test Technician	T. Roseman
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

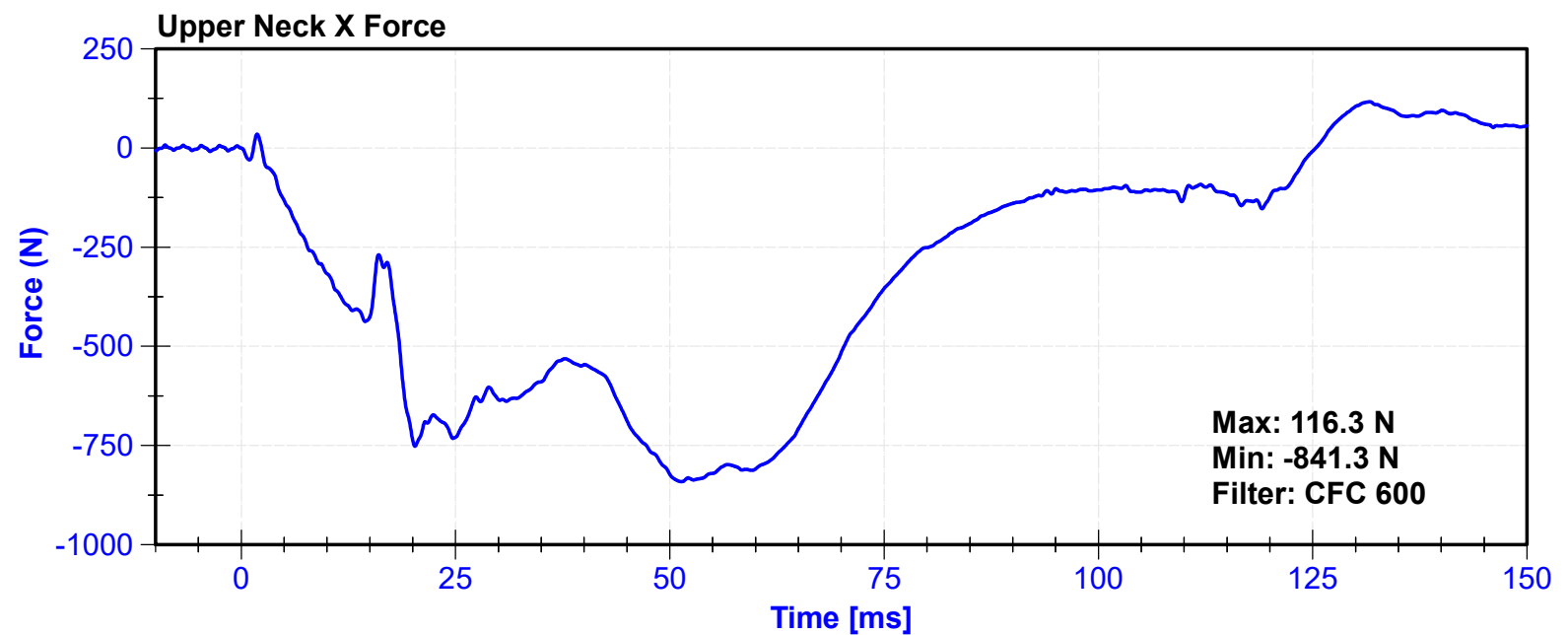
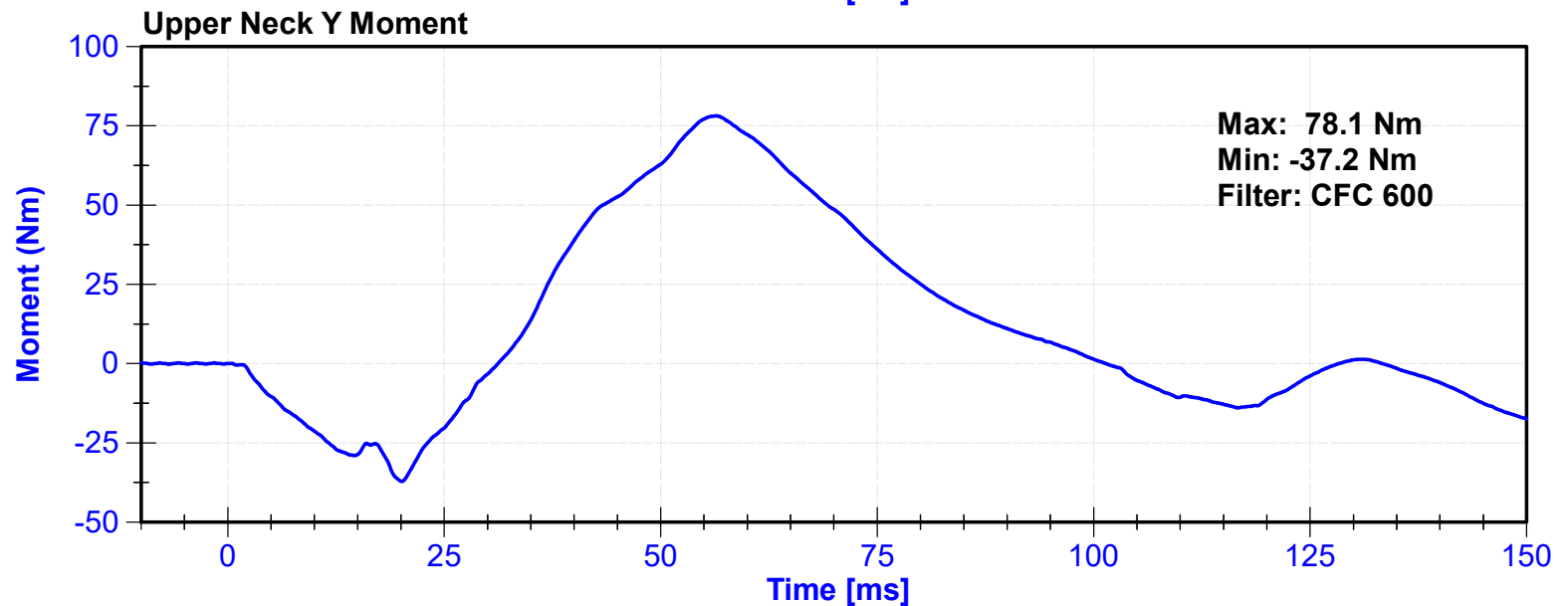
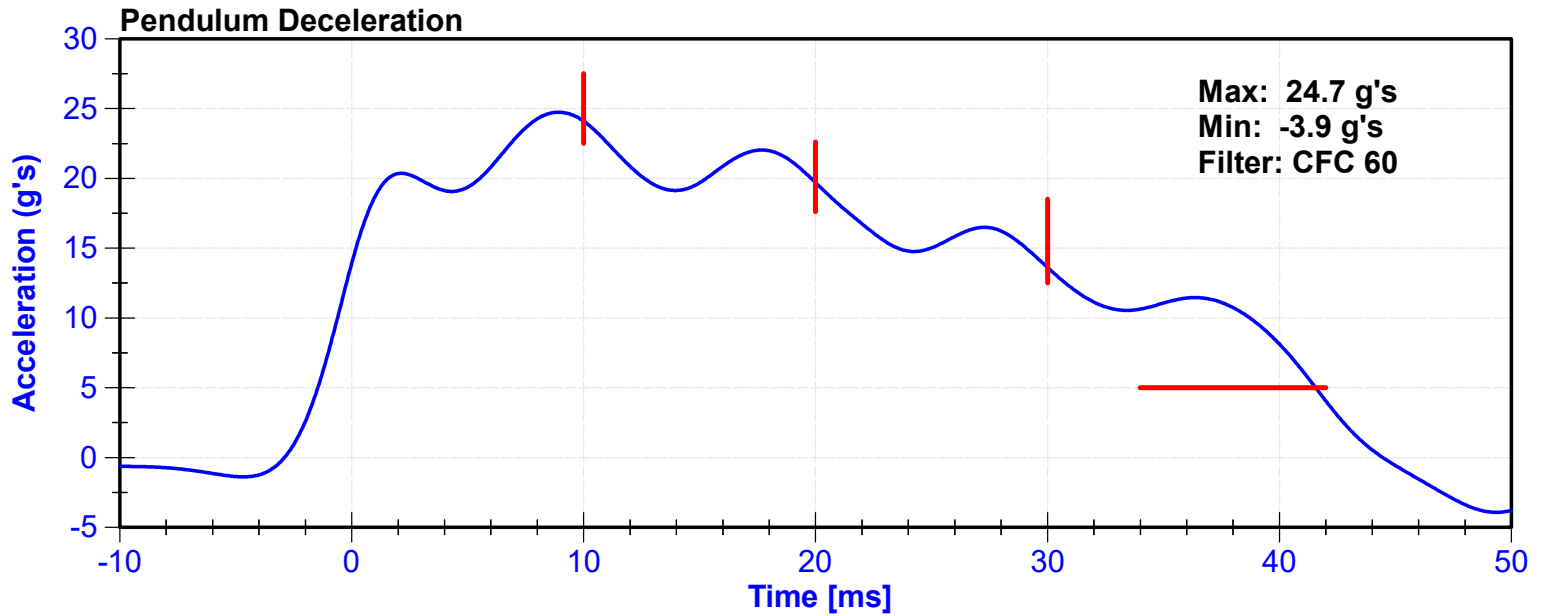
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	22.1	Pass
Velocity	6.89	7.13	m/s	6.935	Pass
Pendulum Deceleration at 10ms	22.5	27.5	g's	24.09	Pass
Pendulum Deceleration at 20ms	17.6	22.6	g's	19.68	Pass
Pendulum Deceleration at 30ms	12.5	18.5	g's	13.62	Pass
Max. Pendulum Deceleration After 30ms	0	29	g's	24.7	Pass
Pendulum Deceleration Time to 5 g's	34	42	ms	41.6	Pass
Maximum D Plane Rotation	64	78	deg	70.6	Pass
Time to Maximum Rotation	57	64	ms	61.5	Pass
Rotation Decay to Zero	113	127	ms	116.9	Pass
Moment About Occipital Condyle	88.1	108.4	Nm	92.36	Pass
Time to Maximum Moment	47	58	ms	56.3	Pass
Moment Decay to Zero	97	107	ms	103.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	7231C-750	10/31/2022	4/29/2023
Pendulum Potentiometer	ETI	LABPOT1	5/9/2022	5/9/2023
Condyle Potentiometer	ETI	LABPOT2	5/9/2022	5/9/2023
Upper Neck Load Cell	Denton	2187-FX	6/13/2022	6/13/2023





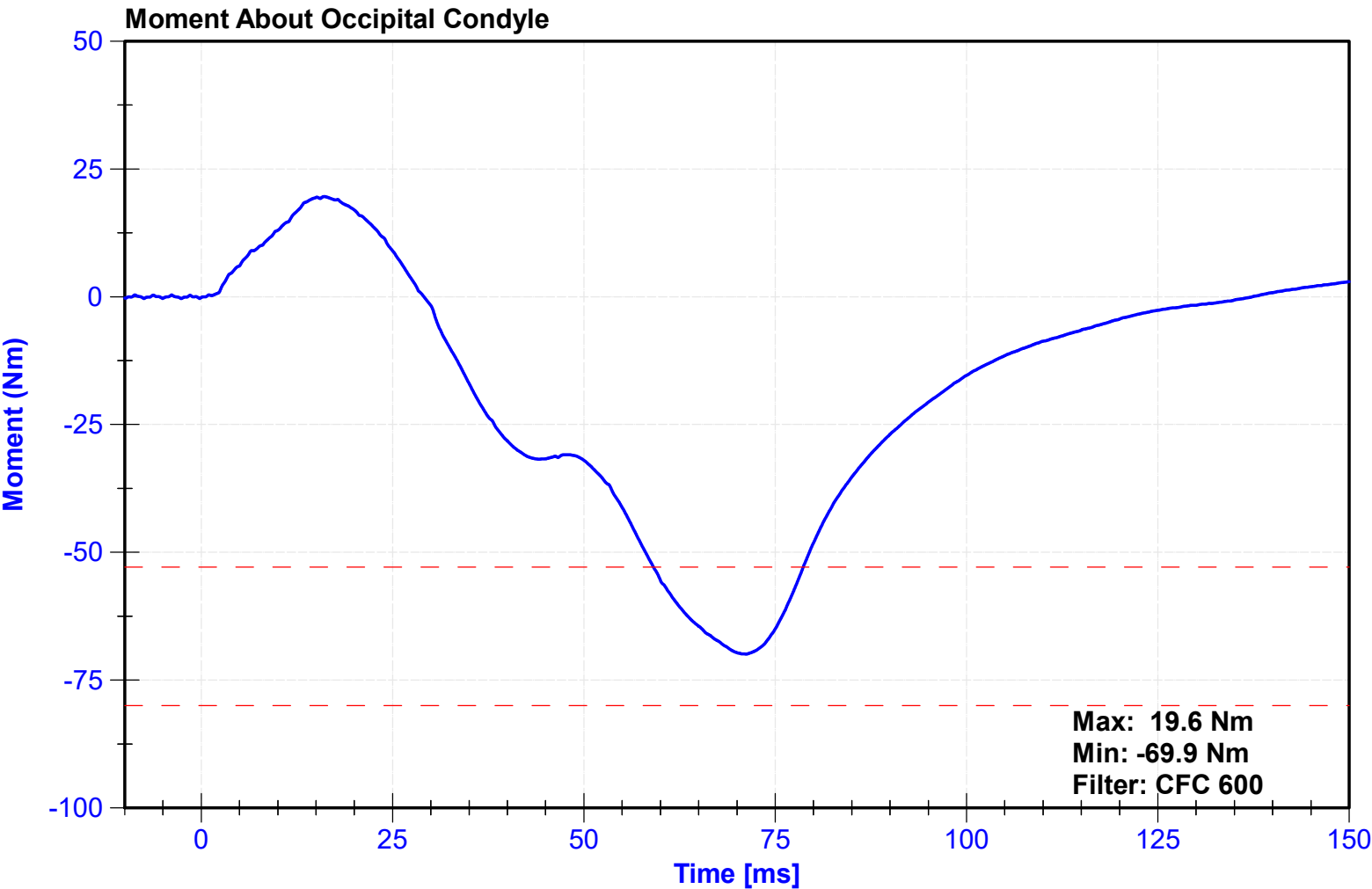
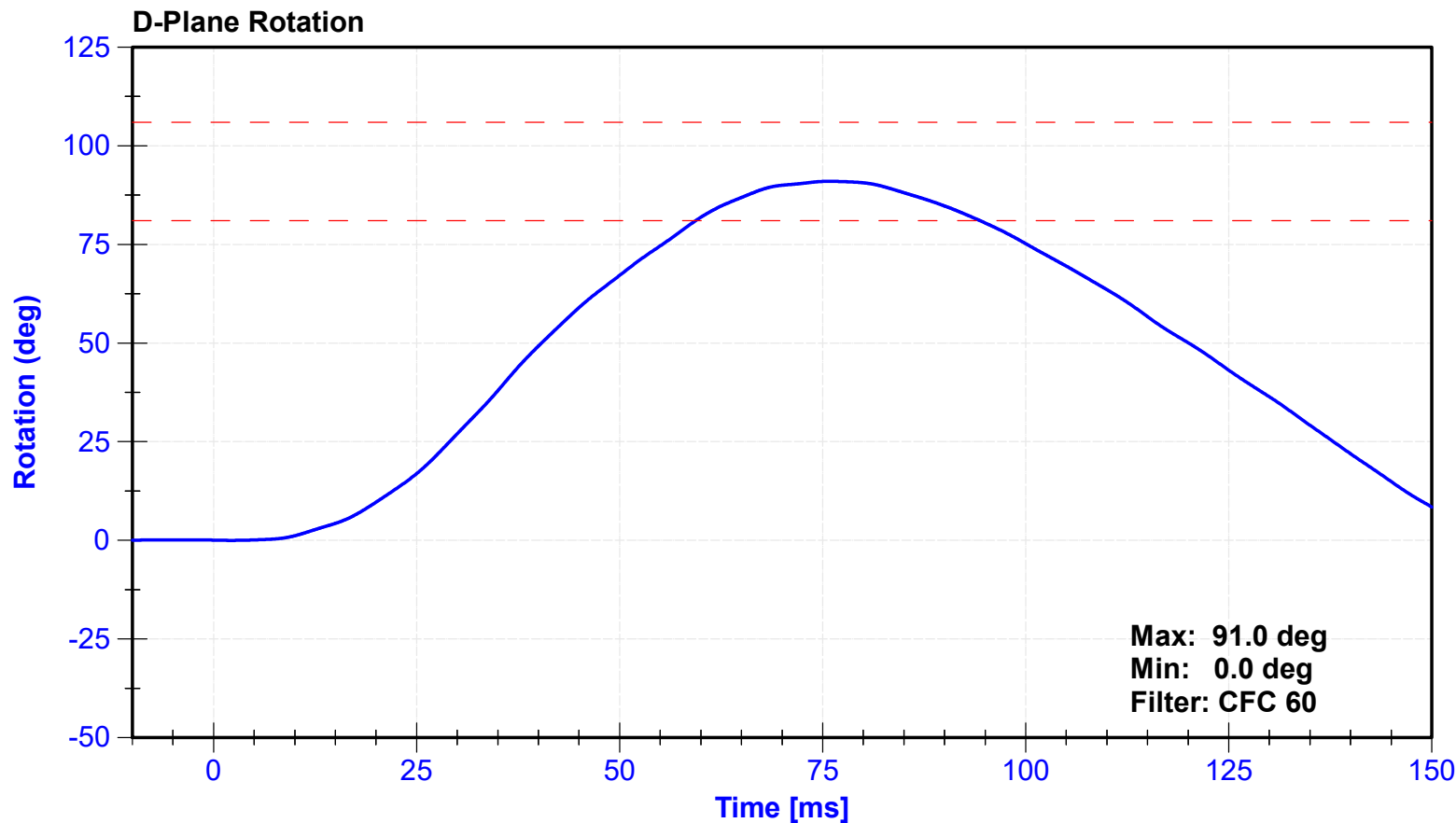
ATD Manufacturer	Humanetics	Test Technician	T. Roseman
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

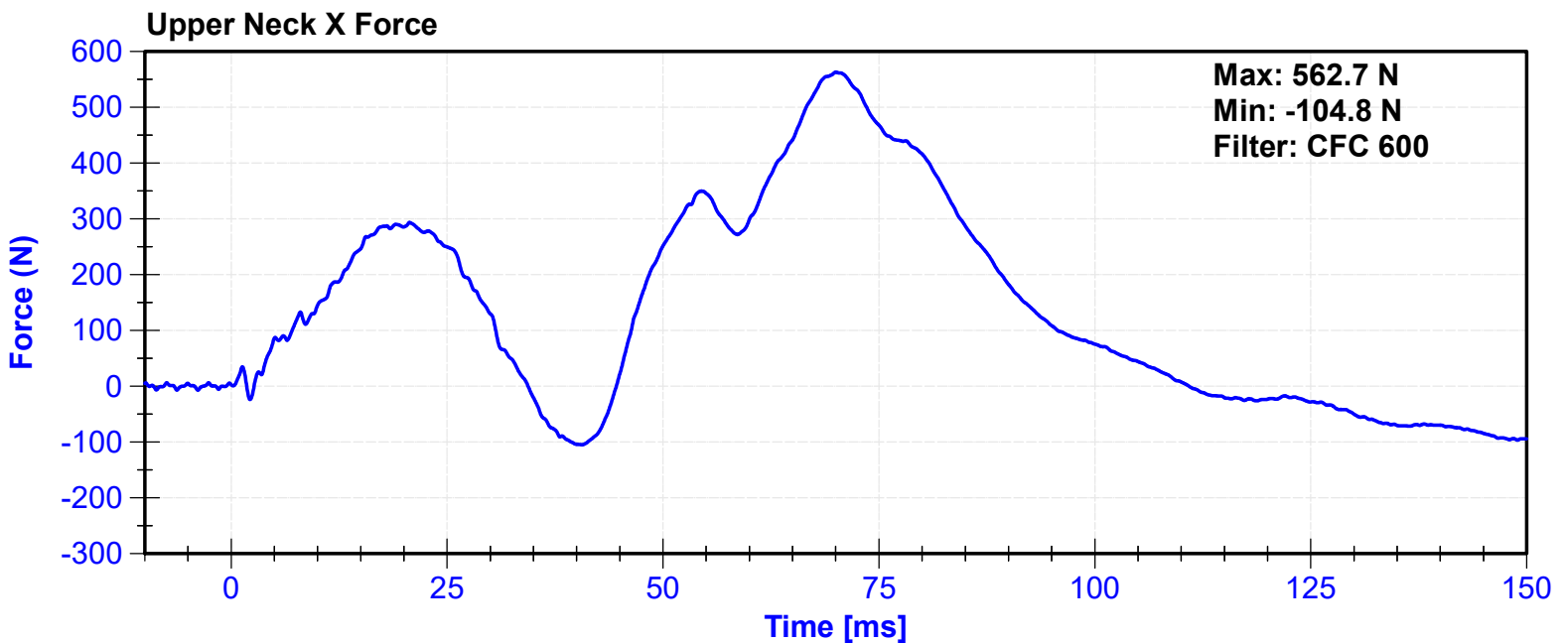
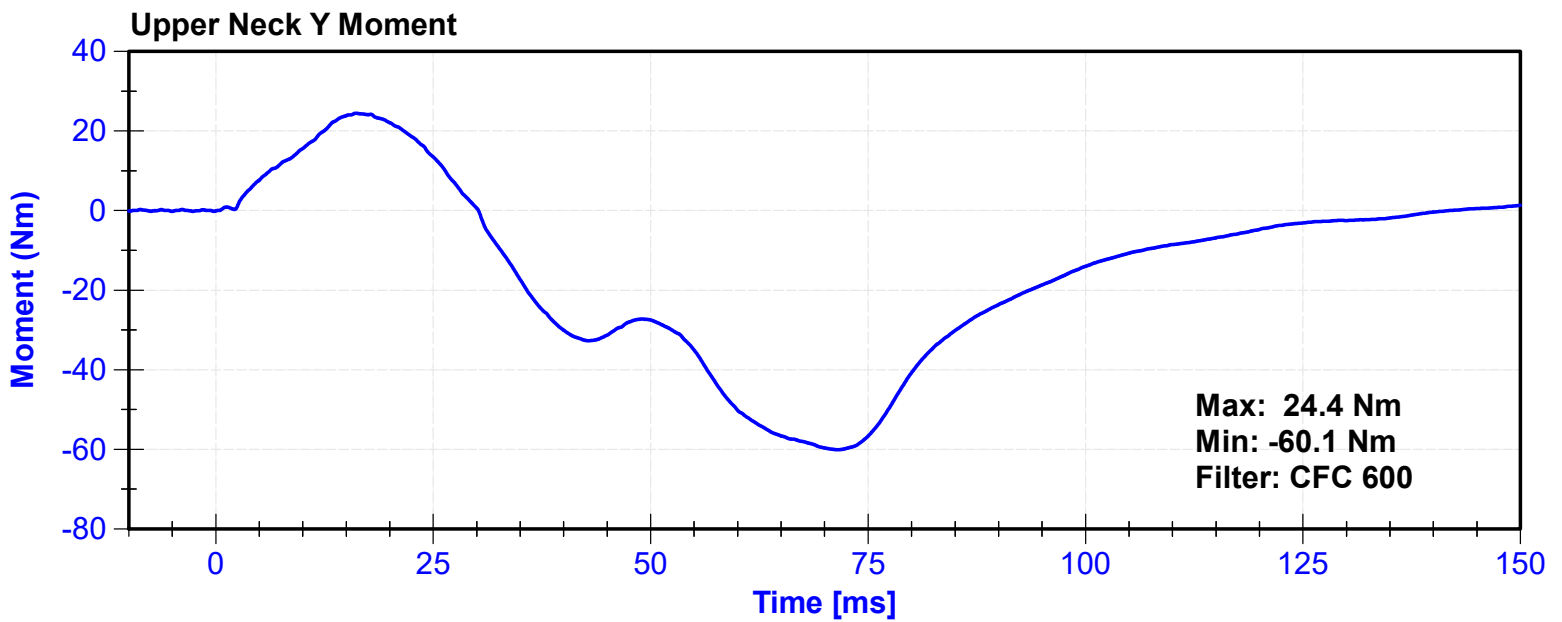
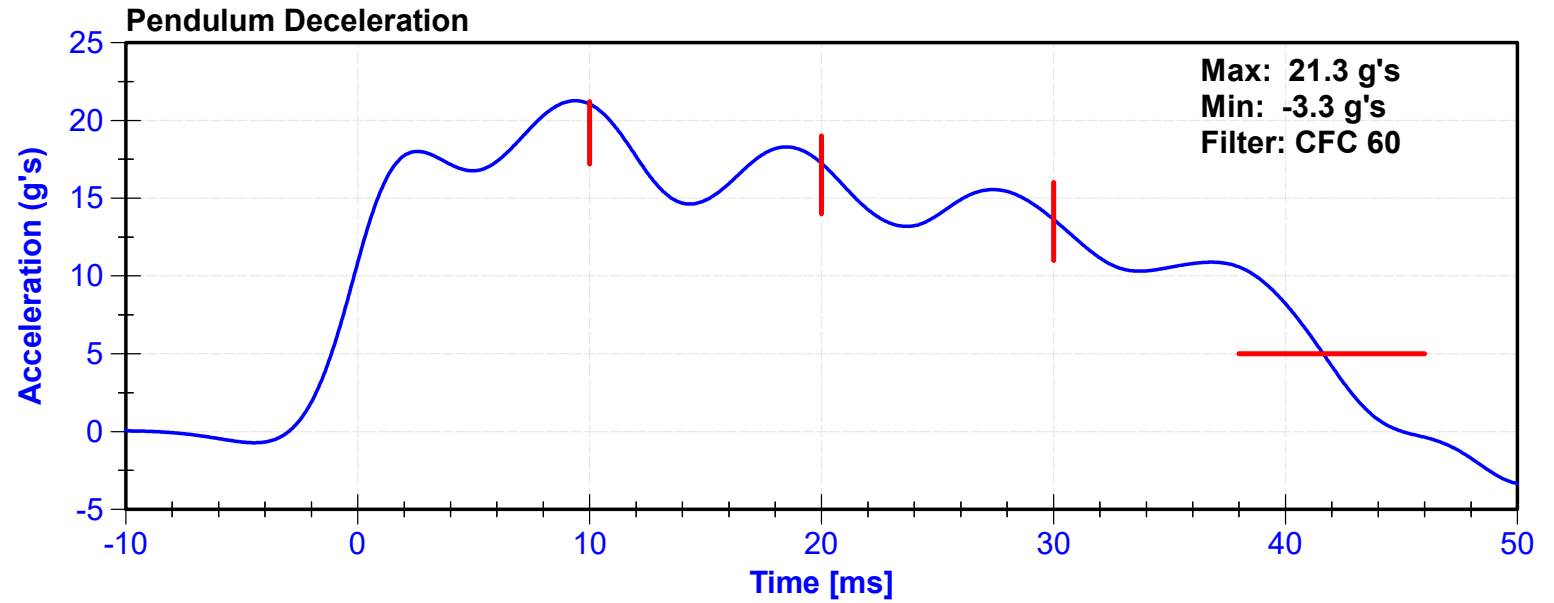
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	22.1	Pass
Velocity	5.94	6.19	m/s	6.045	Pass
Pendulum Deceleration at 10ms	17.2	21.2	g's	21.04	Pass
Pendulum Deceleration at 20ms	14	19	g's	17.2	Pass
Pendulum Deceleration at 30ms	11	16	g's	13.6	Pass
Max. Pendulum Deceleration After 30ms	0	22	g's	21.3	Pass
Pendulum Deceleration Time to 5 g's	38	46	ms	41.6	Pass
Maximum D Plane Rotation	81	106	deg	91.0	Pass
Time to Maximum Rotation	72	82	ms	75.9	Pass
Rotation Decay to Zero	147	174	ms	156.3	Pass
Minimum Moment About OC	-80	-52.9	Nm	-69.93	Pass
Time to Minimum Moment	65	79	ms	71.1	Pass
Moment Decay to Zero	120	148	ms	137.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16650	10/31/2022	4/29/2023
Pendulum Potentiometer	ETI	LABPOT1	5/9/2022	5/9/2023
Condyle Potentiometer	ETI	LABPOT2	5/9/2022	5/9/2023
Upper Neck Load Cell	Denton	2187-FX	6/13/2022	6/13/2023





ATD Manufacturer	Humanetics	Test Technician	T. Roseman
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

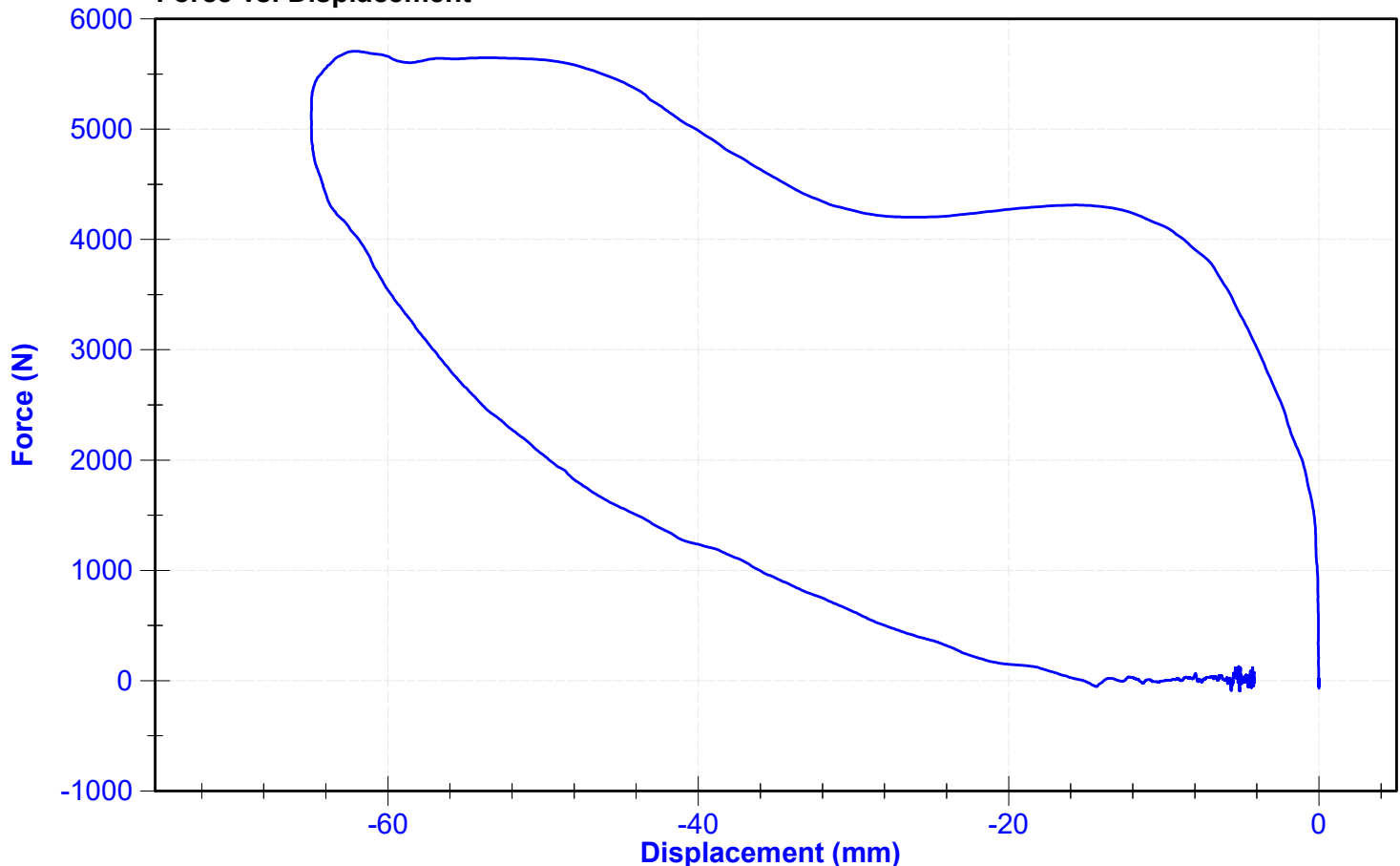
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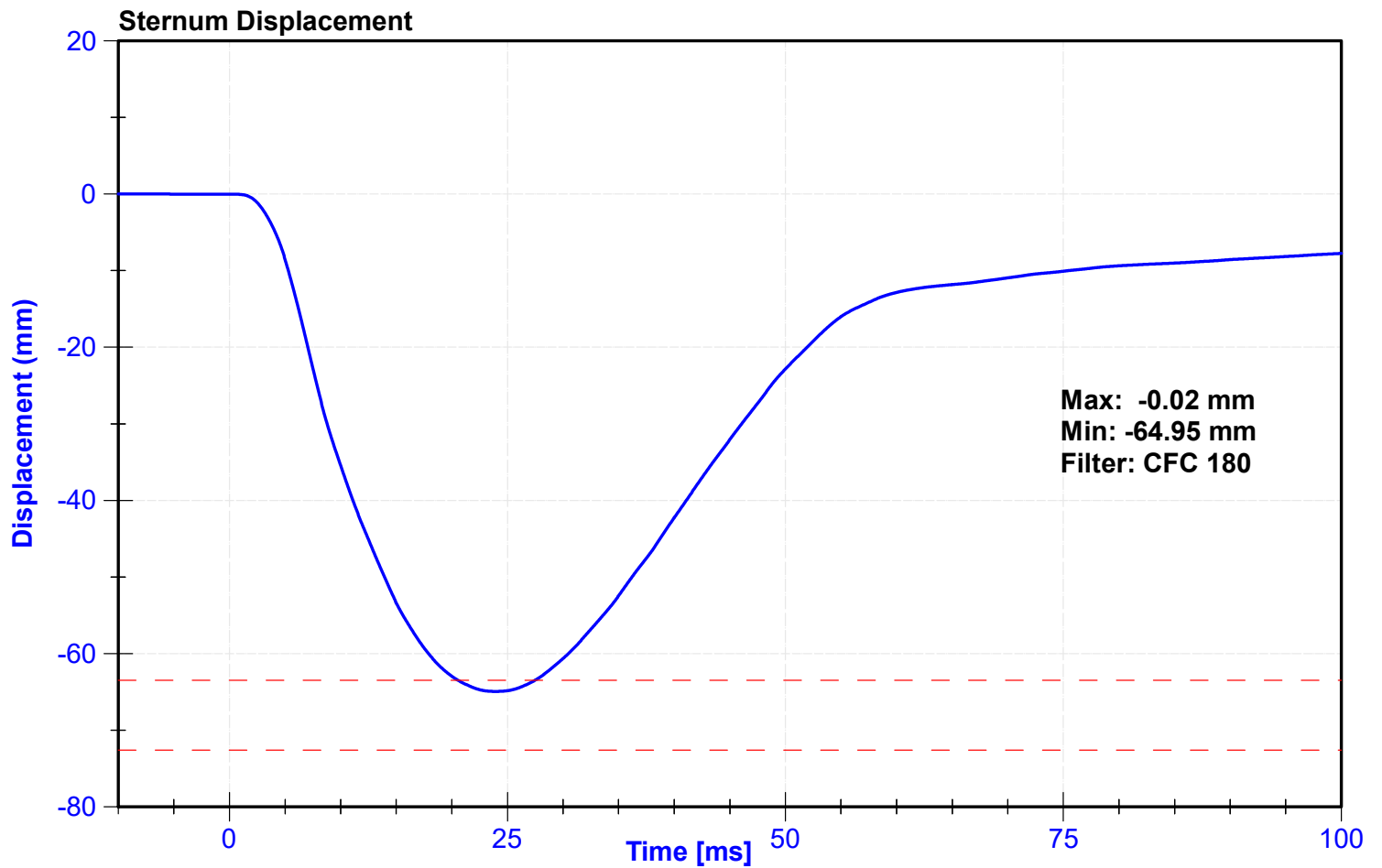
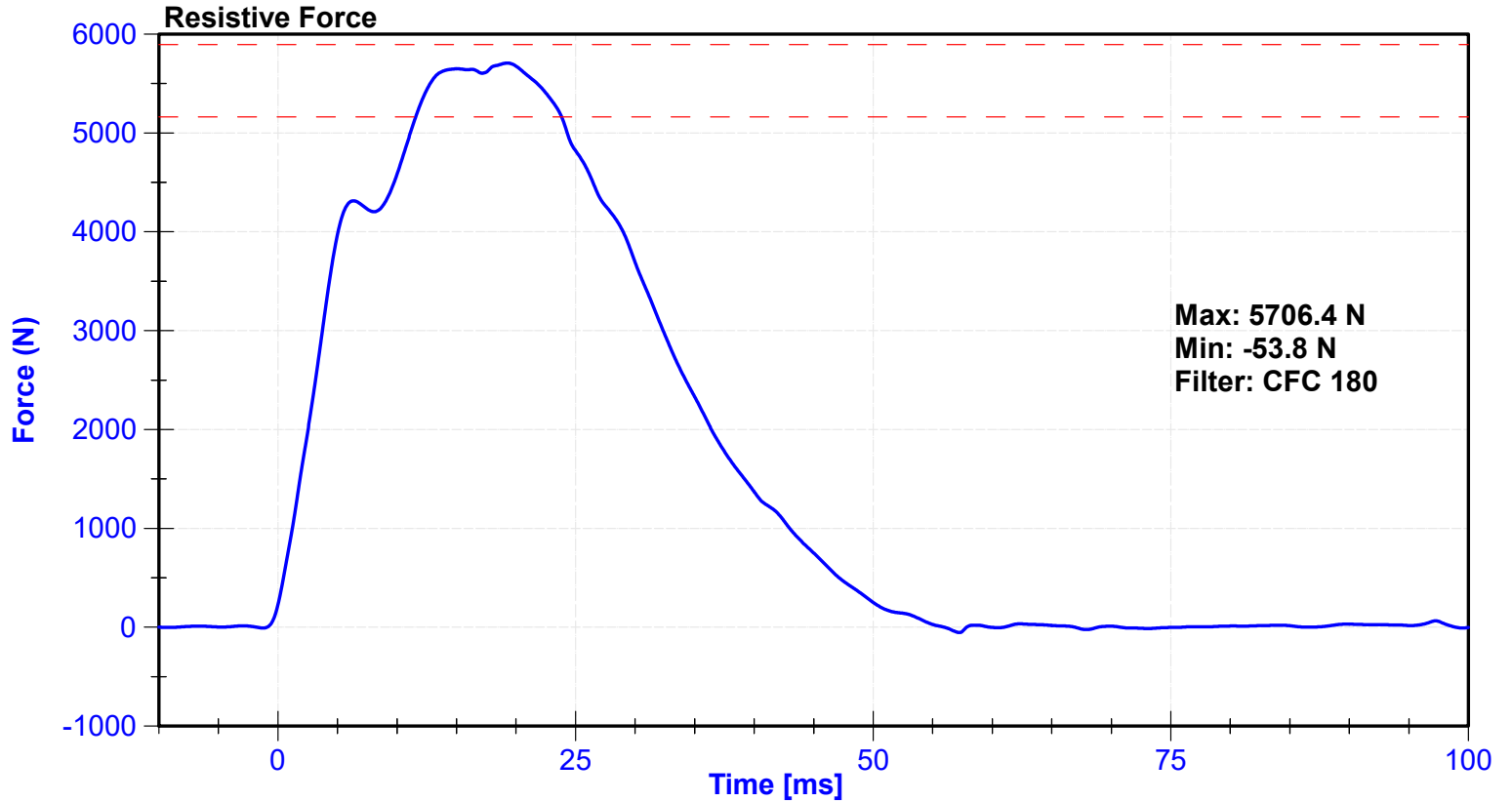
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	19.2	Pass
Velocity	6.59	6.83	m/s	6.745	Pass
Chest Displacement	-72.6	-63.5	mm	-64.95	Pass
Resistive Force	5160	5894	N	5706.4	Pass
Hysteresis	69	85	%	74.4	Pass

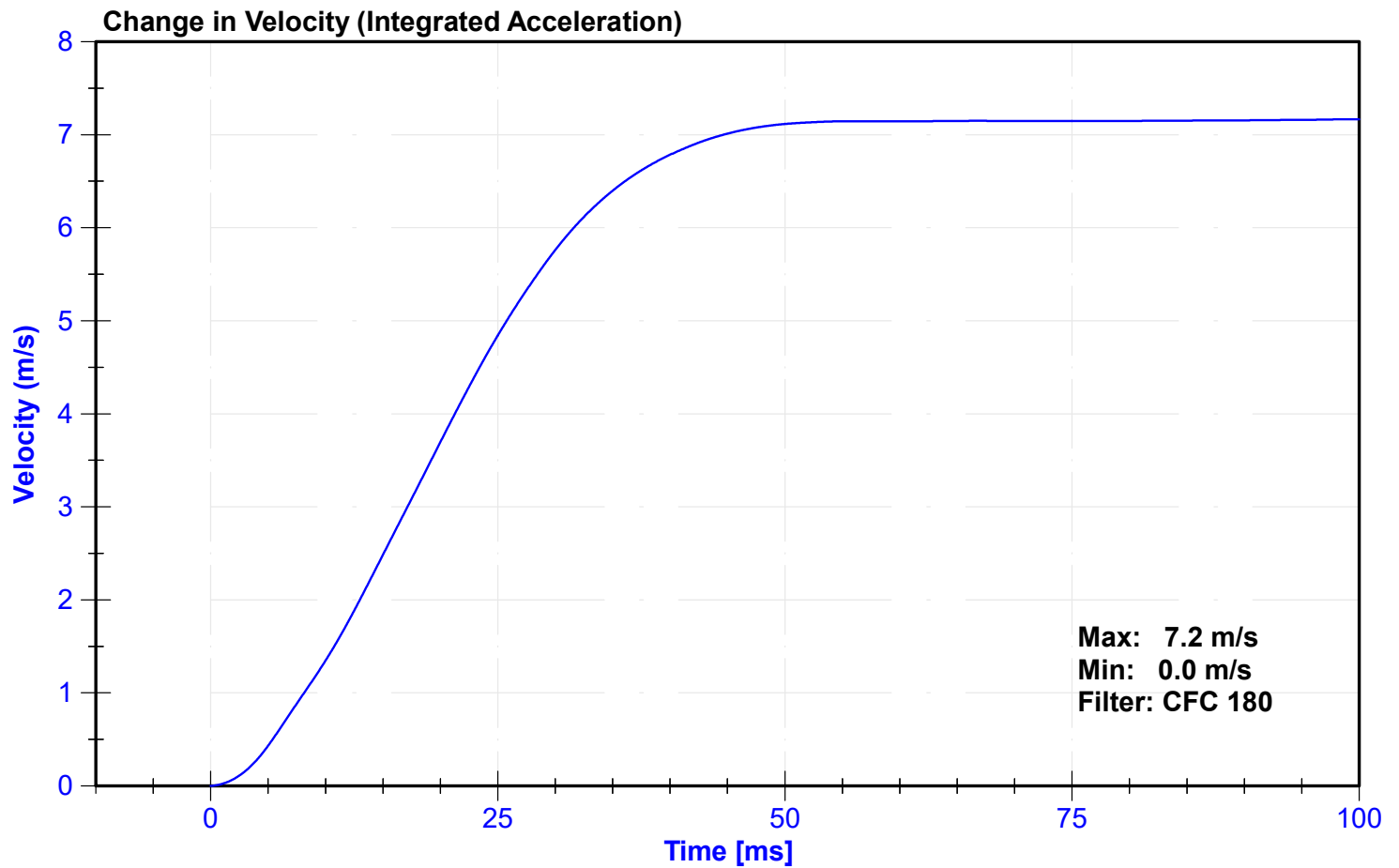
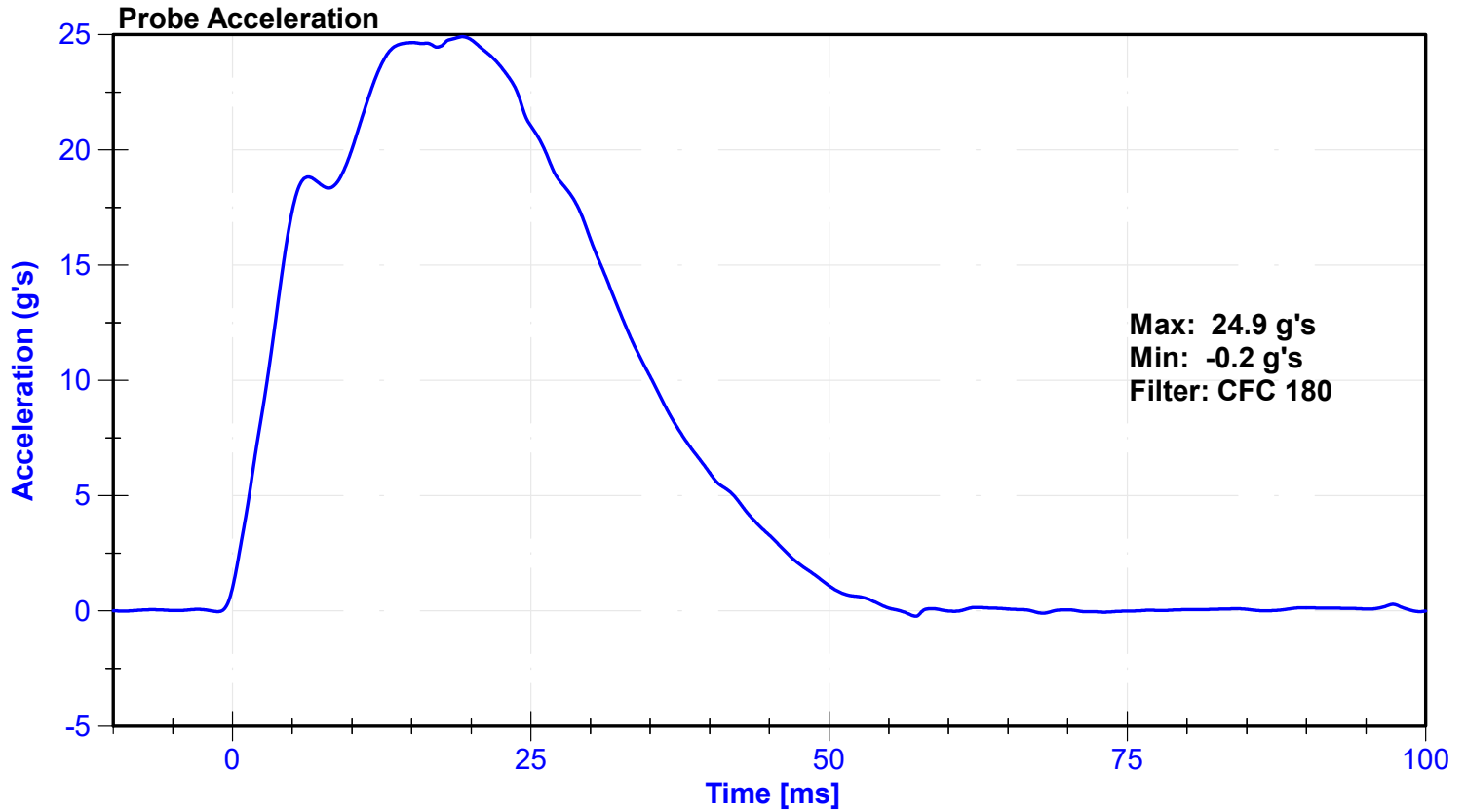
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18546	11/19/2022	5/18/2023
Chest Potentiometer	JDK	0075	10/3/2022	4/3/2023

Force vs. Displacement







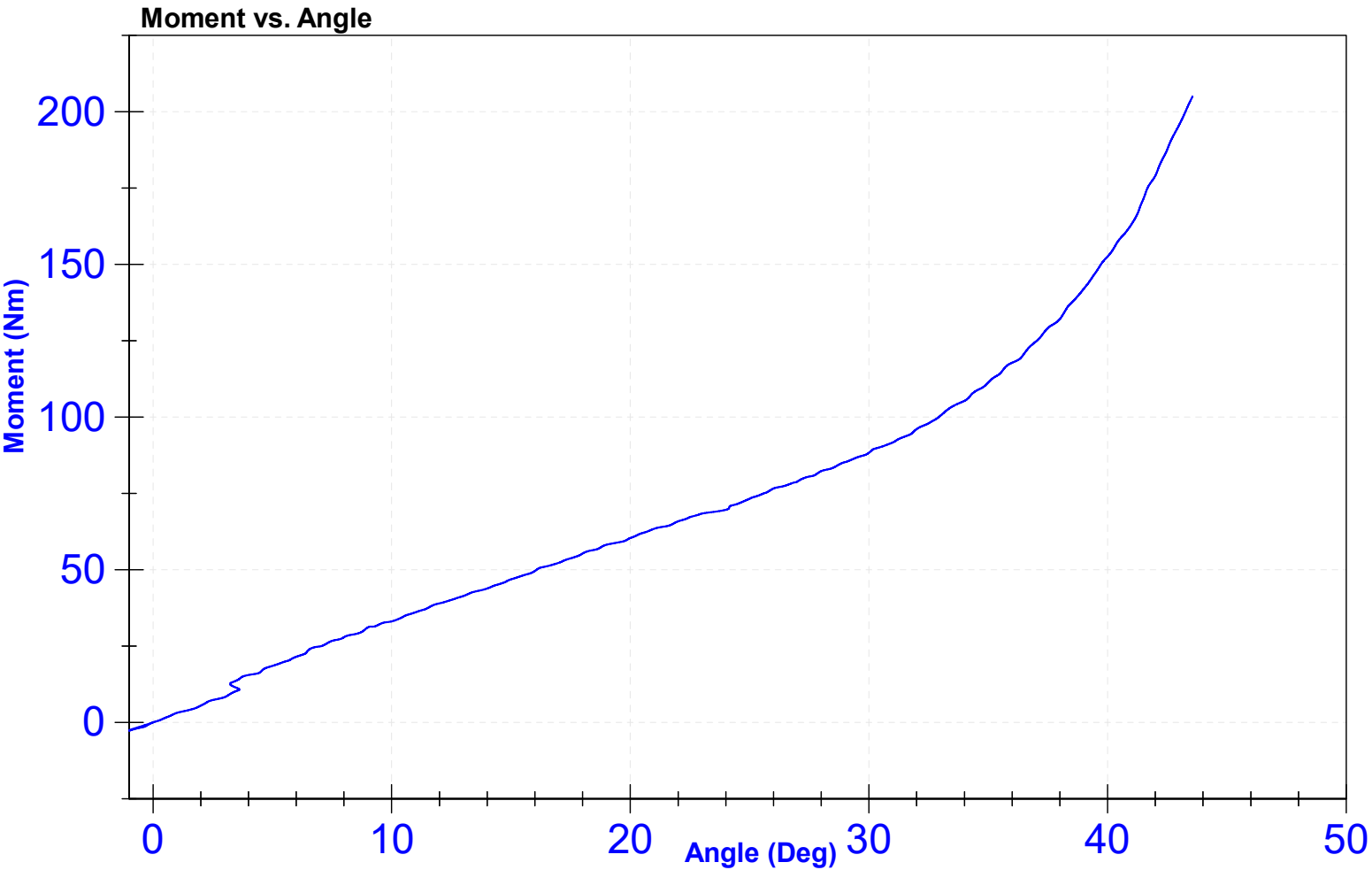
ATD Manufacturer	Humanetics	Test Technician	T. Roseman
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.2	Pass
Humidity	10	70	%	21.0	Pass
Average Velocity	5	10	deg/s	7.3	Pass
Angle at 203Nm	40	50	deg	43.4	Pass
Moment at 30 degrees	0	94.9	Nm	88.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	ETI SP22	DS-0008	10/4/2022	10/4/2023
Load Cell	PCB 2301-02	2301-02_115	2022-09-06	2023-09-06

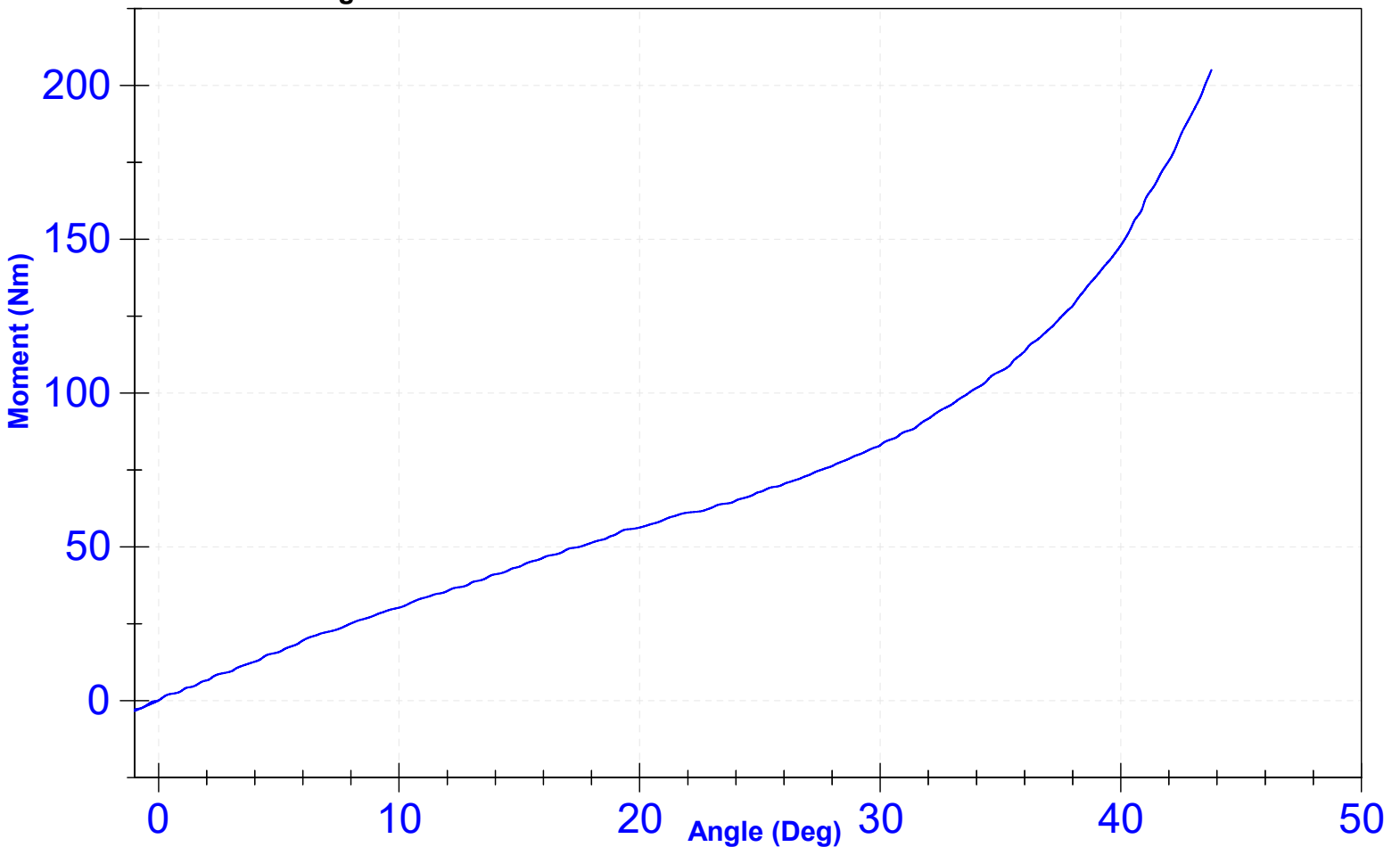


ATD Manufacturer	Humanetics	Test Technician	T. Roseman
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

Test Parameter	Results		Unit	Result	Pass/Fail
	Minimum Specification	Maximum Specification			
Temperature	18.9	25.6	°C	21.2	Pass
Humidity	10	70	%	21.0	Pass
Average Velocity	5	10	deg/s	7.5	Pass
Angle at 203Nm	40	50	deg	43.7	Pass
Moment at 30 degrees	0	94.9	Nm	83.0	Pass

Transducer Calibrations				
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	ETI SP22	DS-0008	10/4/2022	10/4/2023
Load Cell	PCB 2301-02	2301-02_115	2022-09-06	2023-09-06

Moment vs. Angle



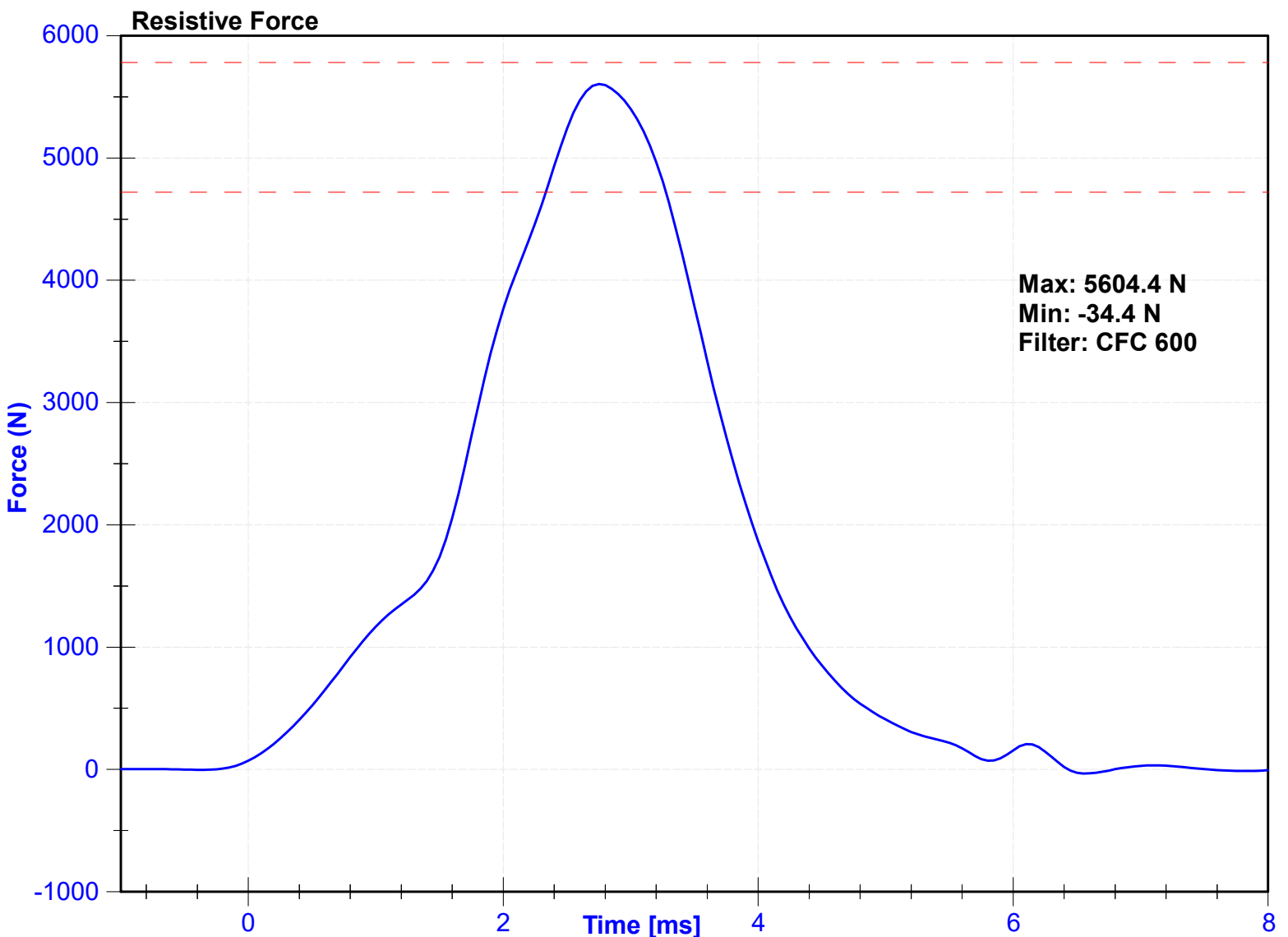
ATD Manufacturer	Humanetics	Test Technician	Z.Schneider
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

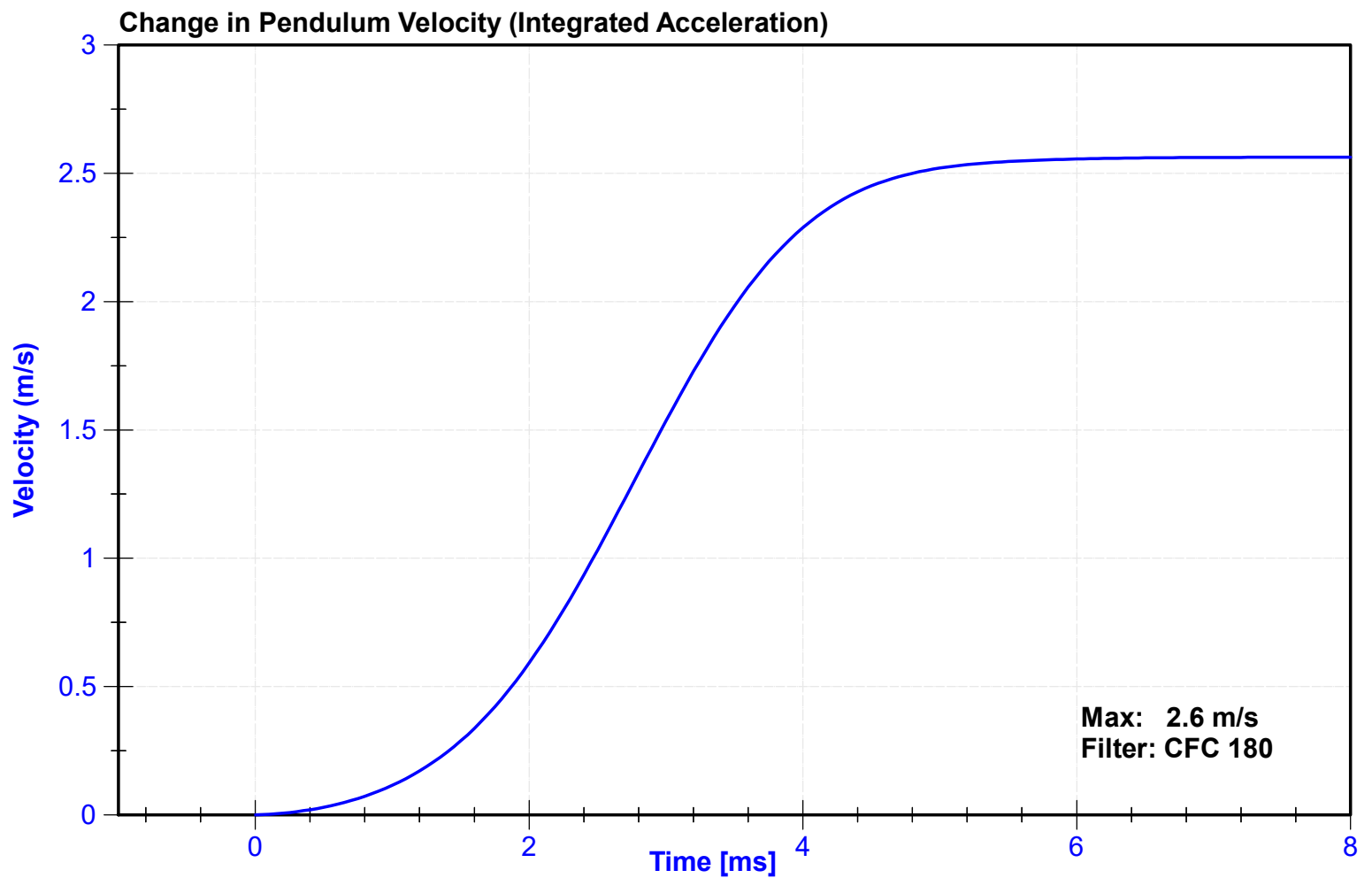
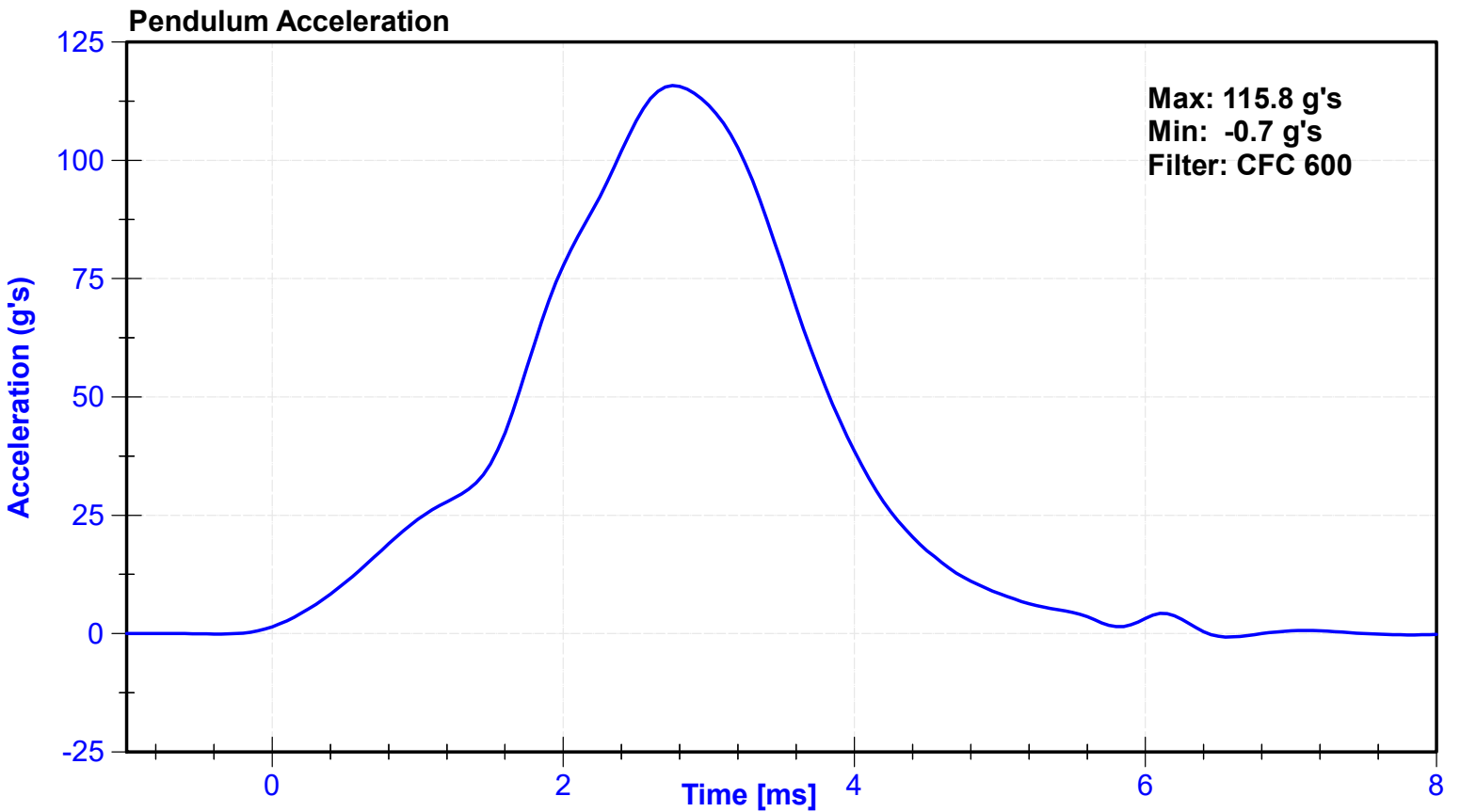
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21	Pass
Humidity	10	70	%	13	Pass
Velocity	2.07	2.13	m/s	2.073	Pass
Maximum Resistive Force	4720	5780	N	5604.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18546	11/19/2022	5/18/2023





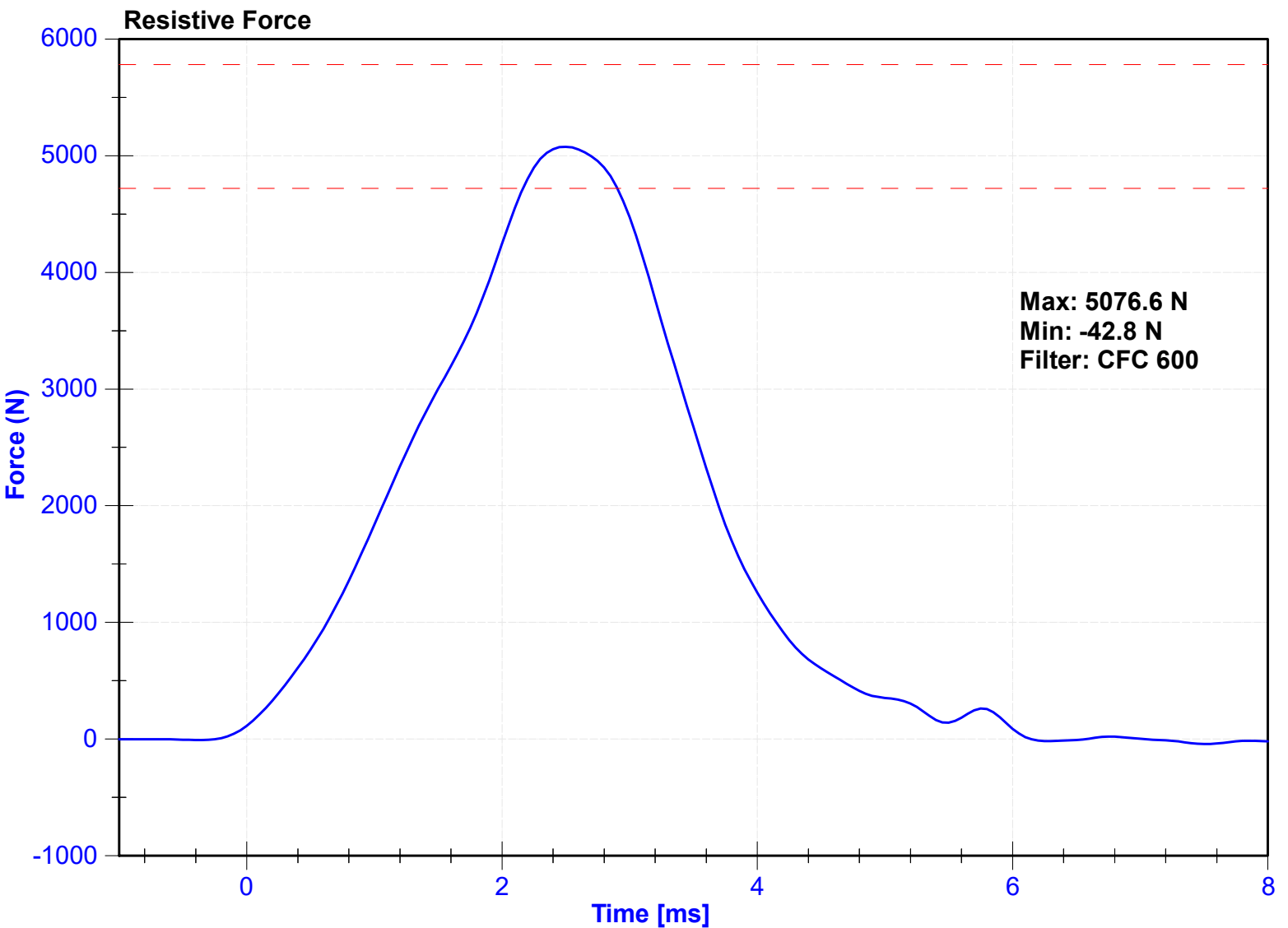
ATD Manufacturer	Humanetics	Test Technician	Z.Schneider
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

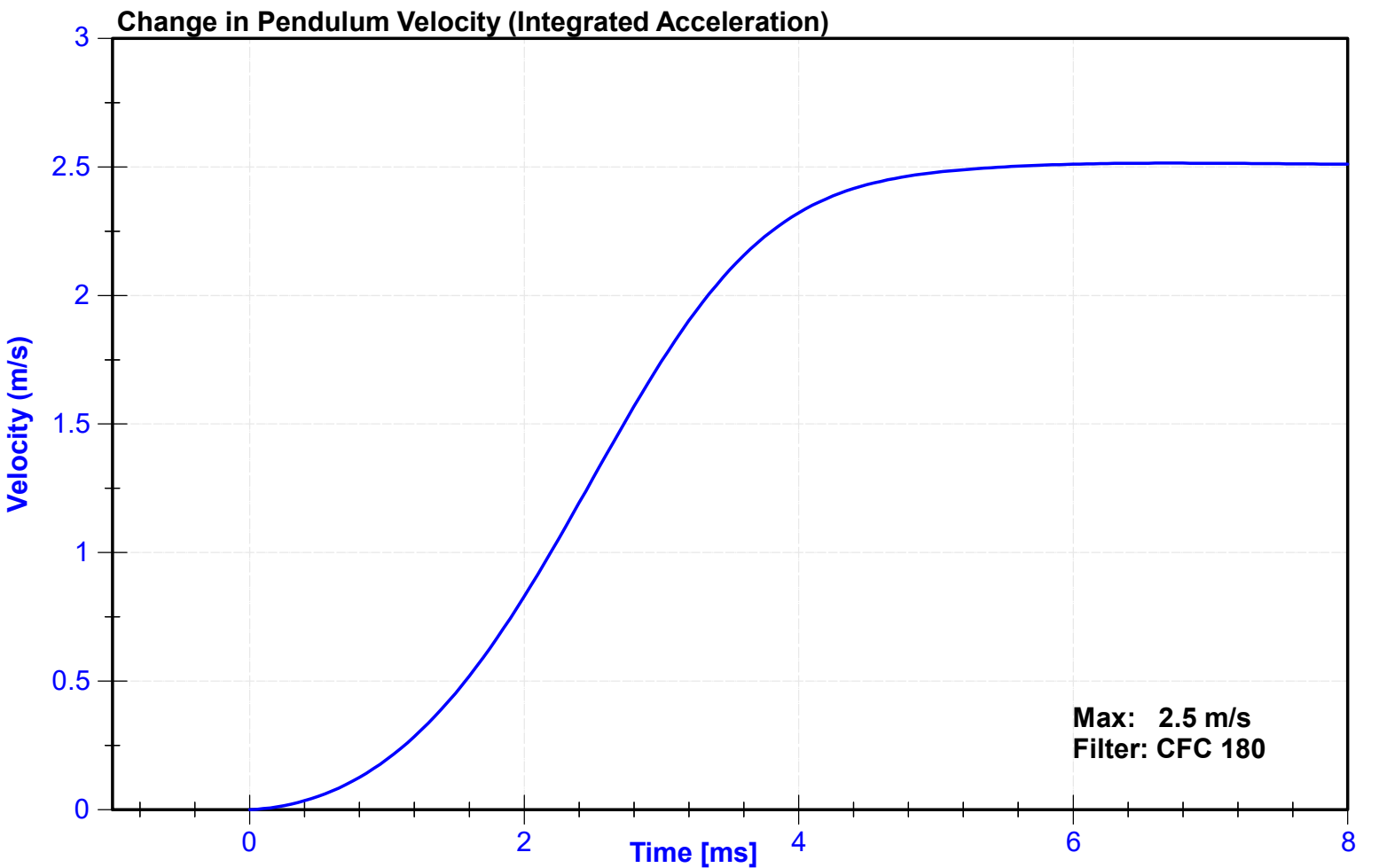
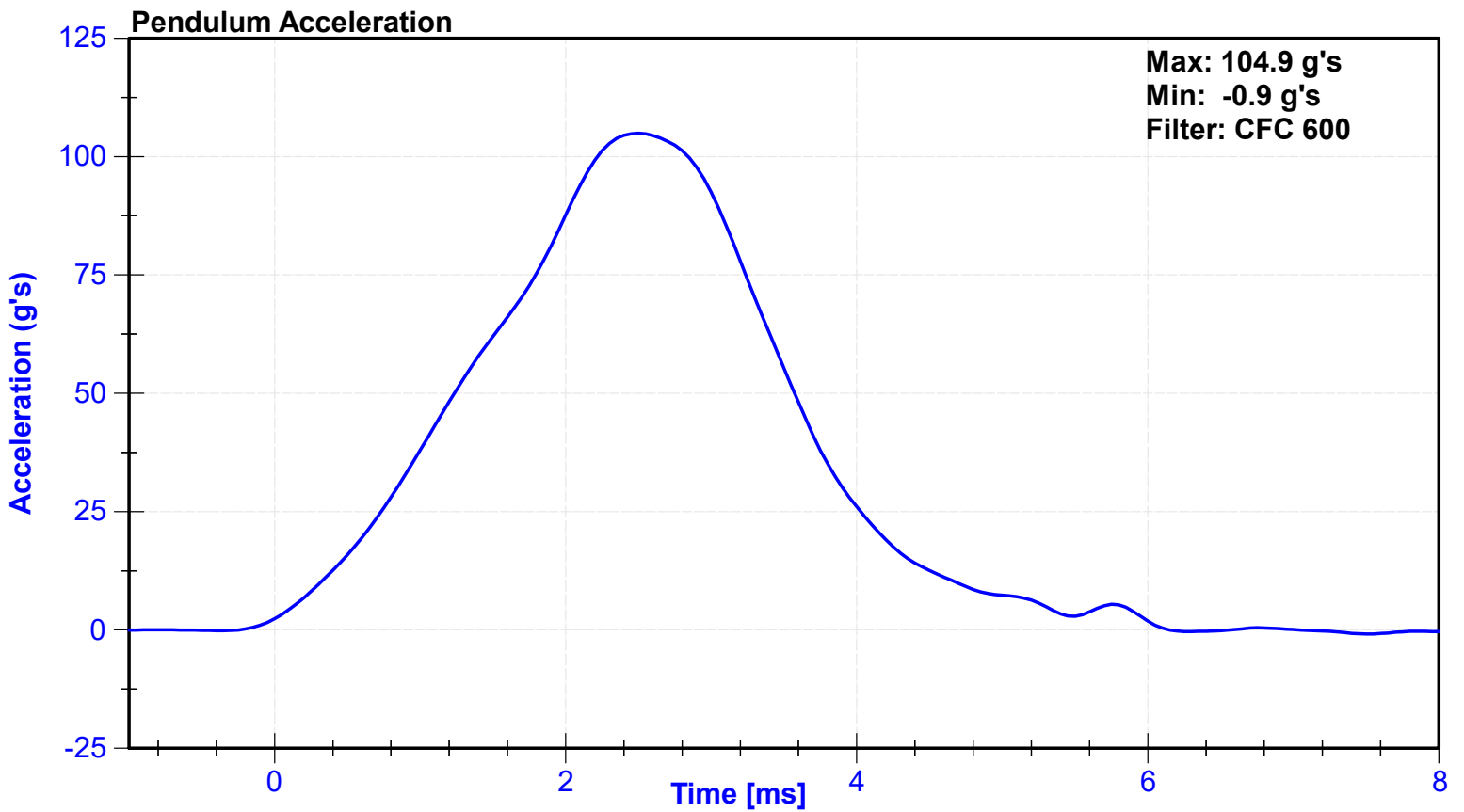
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21	Pass
Humidity	10	70	%	13	Pass
Velocity	2.07	2.13	m/s	2.072	Pass
Maximum Resistive Force	4720	5780	N	5076.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18546	11/19/2022	5/18/2023





CALIBRATION TEST RESULTS

PRE-TEST

HYBRID III 5TH PERCENTILE - PASSENGER ATD

SERIAL NO: 137

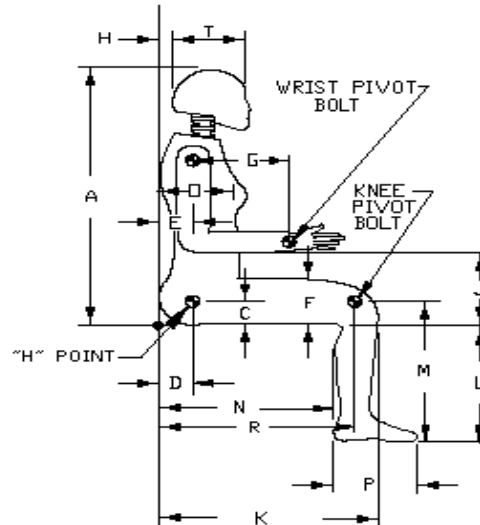
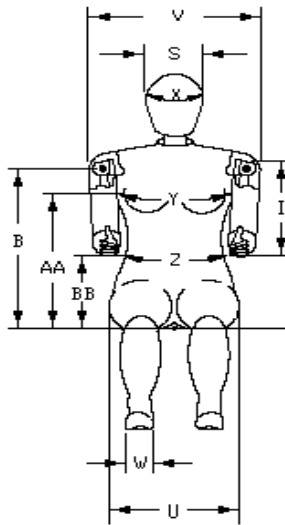


External Measurements - Hybrid 3 - 5th Female

Technician: K. Brogan

Date: 02/03/2023

Dummy Serial Number: 137



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	775	800	787	Pass
B	Shoulder Pivot Height	432	457	445	Pass
C	H-Point Height	81	86	84	Pass
D	H-Point from Backline	145	150	146	Pass
E	Shoulder Pivot from Backline	69	84	75	Pass
F	Thigh Clearance	119	135	128	Pass
G	Back of Elbow to Wrist Pivot	244	259	251	Pass
H	Head Back to Backline	43	48	45	Pass
I	Shoulder to Elbow Length	277	297	286	Pass
J	Elbow Rest Height	183	203	195	Pass
K	Buttock to Knee Length	521	546	536	Pass
L	Popliteal Height	356	376	368	Pass
M	Knee Pivot Height	394	419	407	Pass
N	Buttock Popliteal Length	414	439	426	Pass
O	Chest Depth without Jacket	175	191	182	Pass
P	Foot Length (right)	219	234	230	Pass
R	Buttock To Knee Pivot Length	457	483	465	Pass
S	Head Breadth	137	147	143	Pass
T	Head Depth	178	188	181	Pass
U	Hip Breadth	300	315	311	Pass
V	Shoulder Breadth	351	366	359	Pass
W	Foot Breadth	79	94	85	Pass
X	Head Circumference	528	549	543	Pass
Y	Chest Circumference with Jacket	851	881	872	Pass
Z	Waist Circumference	460	790	652	Pass
AA	Reference Location (Chest Circumference)	333	358	345	Pass
BB	Reference Location (Waist Circumference)	160	170	165	Pass

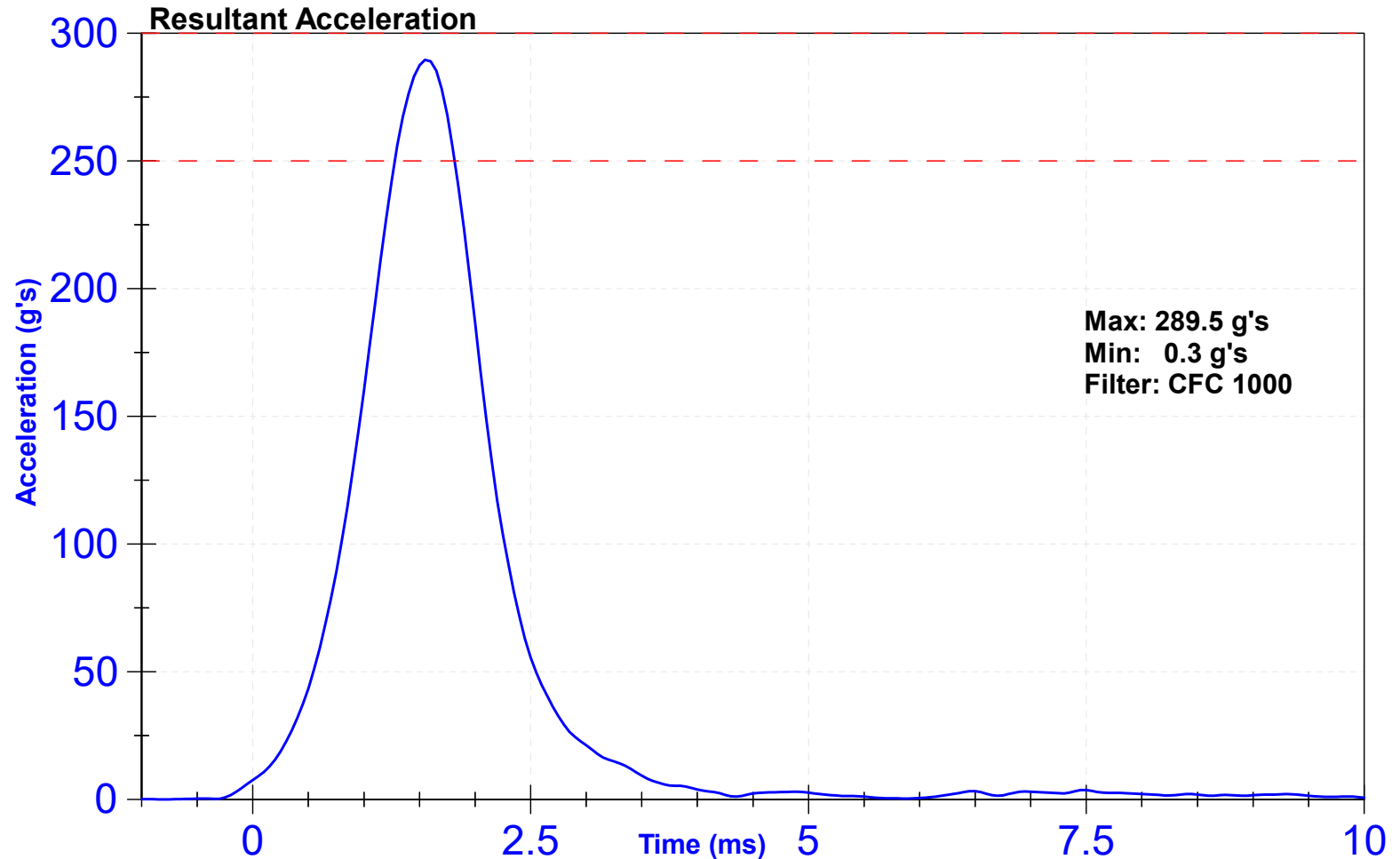
ATD Manufacturer	Humanetics	Test Technician	T. Roseman
ATD Serial Number	137	Laboratory Supervisor	K. Brogan

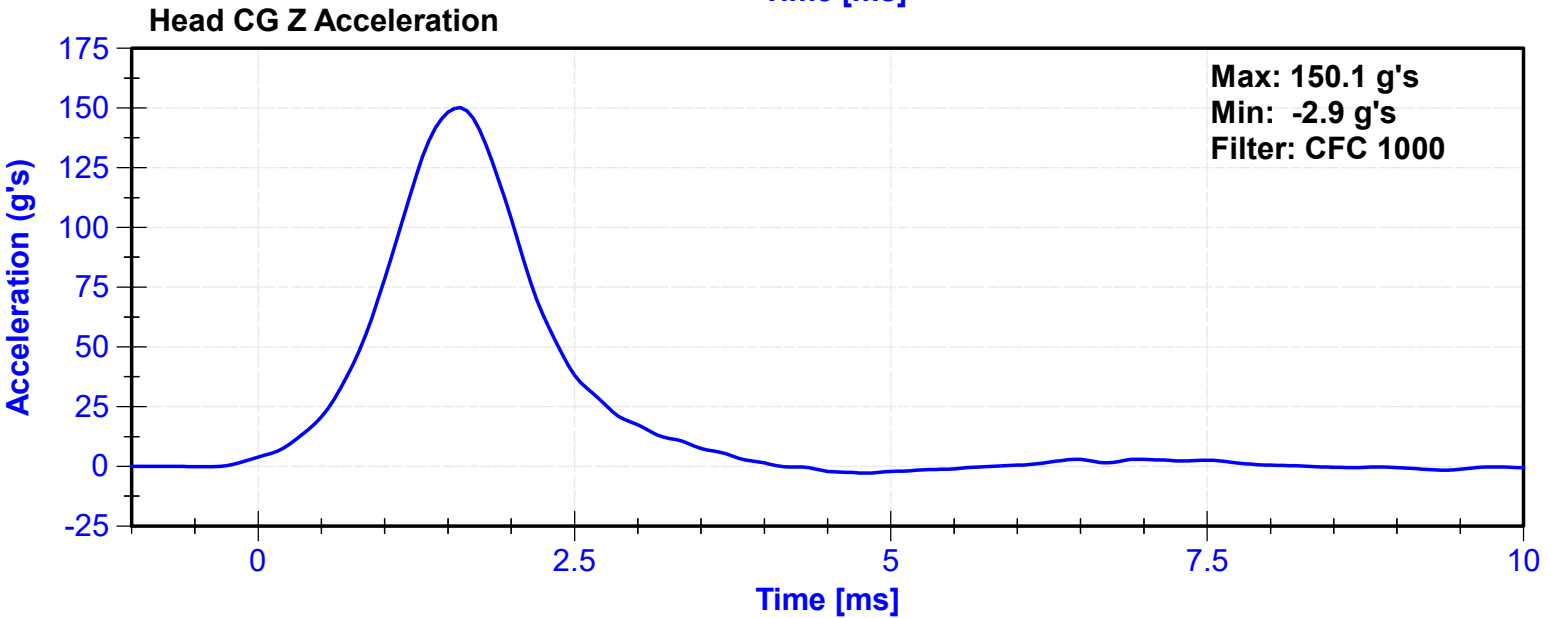
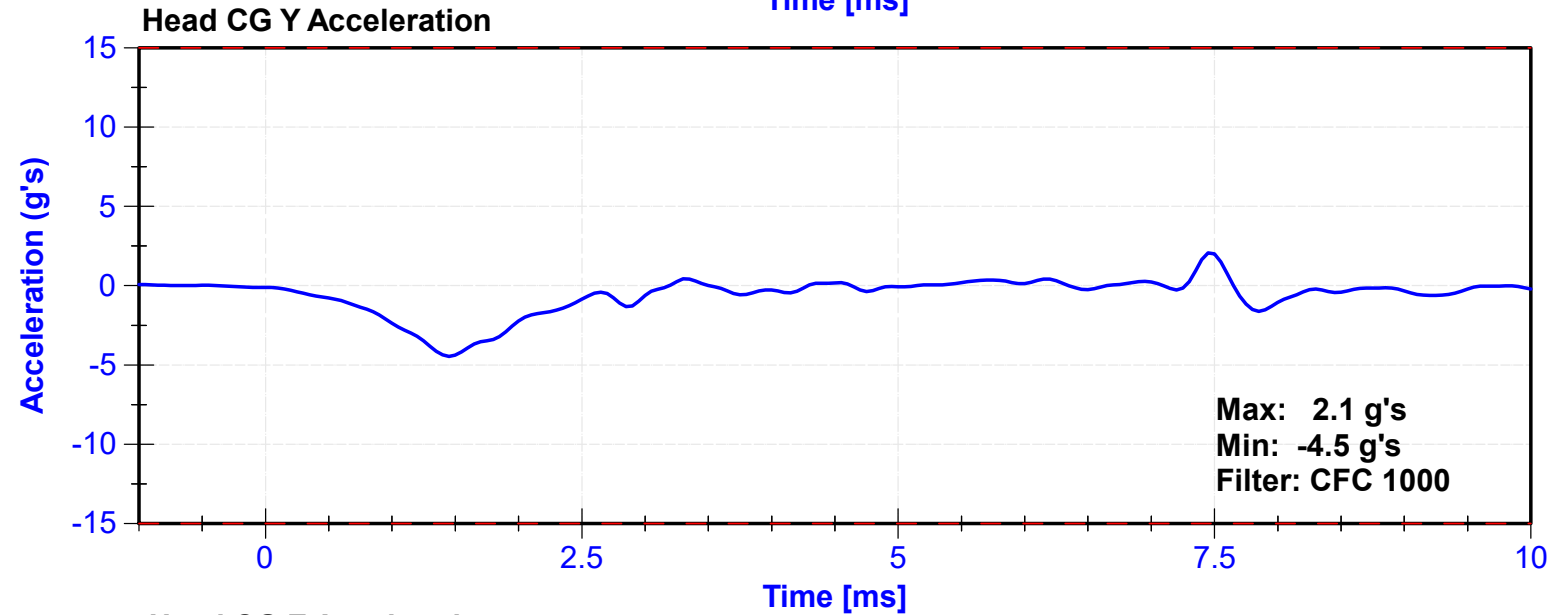
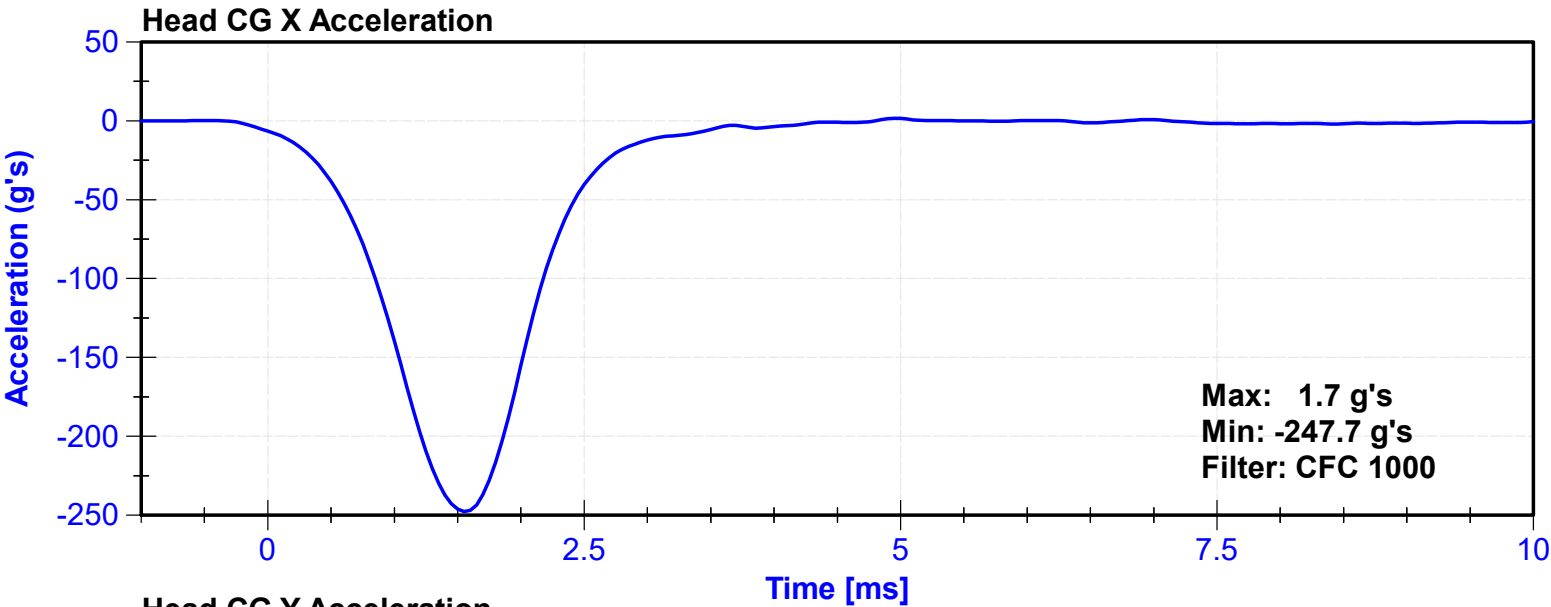
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.1	Pass
Humidity	10	70	%	13.2	Pass
Resultant Acceleration	250	300	g's	289.5	Pass
Oscillation	0	10	%	1.2	Pass
Lateral Acceleration	-15	15	g's	-4.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	P79417	12/13/2022	6/11/2023
Y Accelerometer	Endevco	P83335	12/13/2022	6/11/2023
Z Accelerometer	Endevco	P64149	12/12/2022	6/10/2023





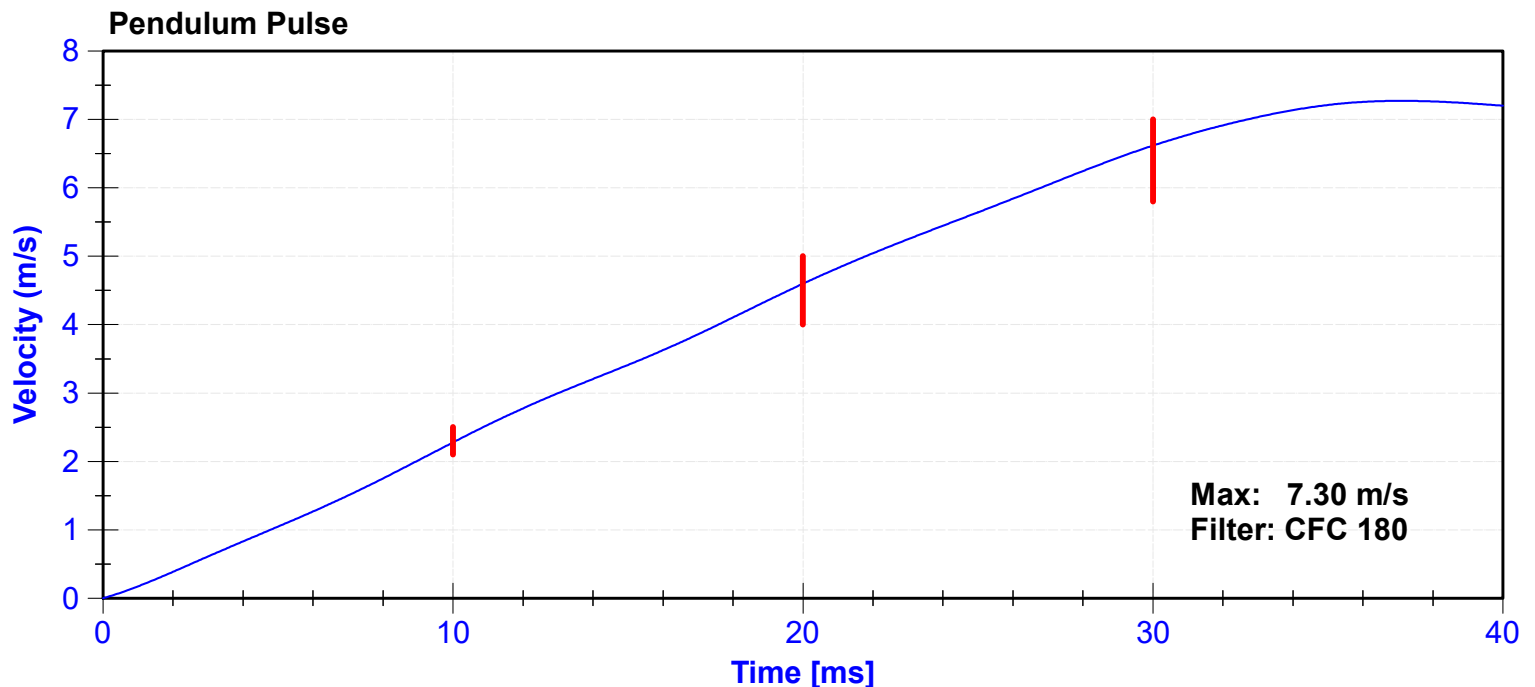
ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	137	Laboratory Supervisor	K. Brogan

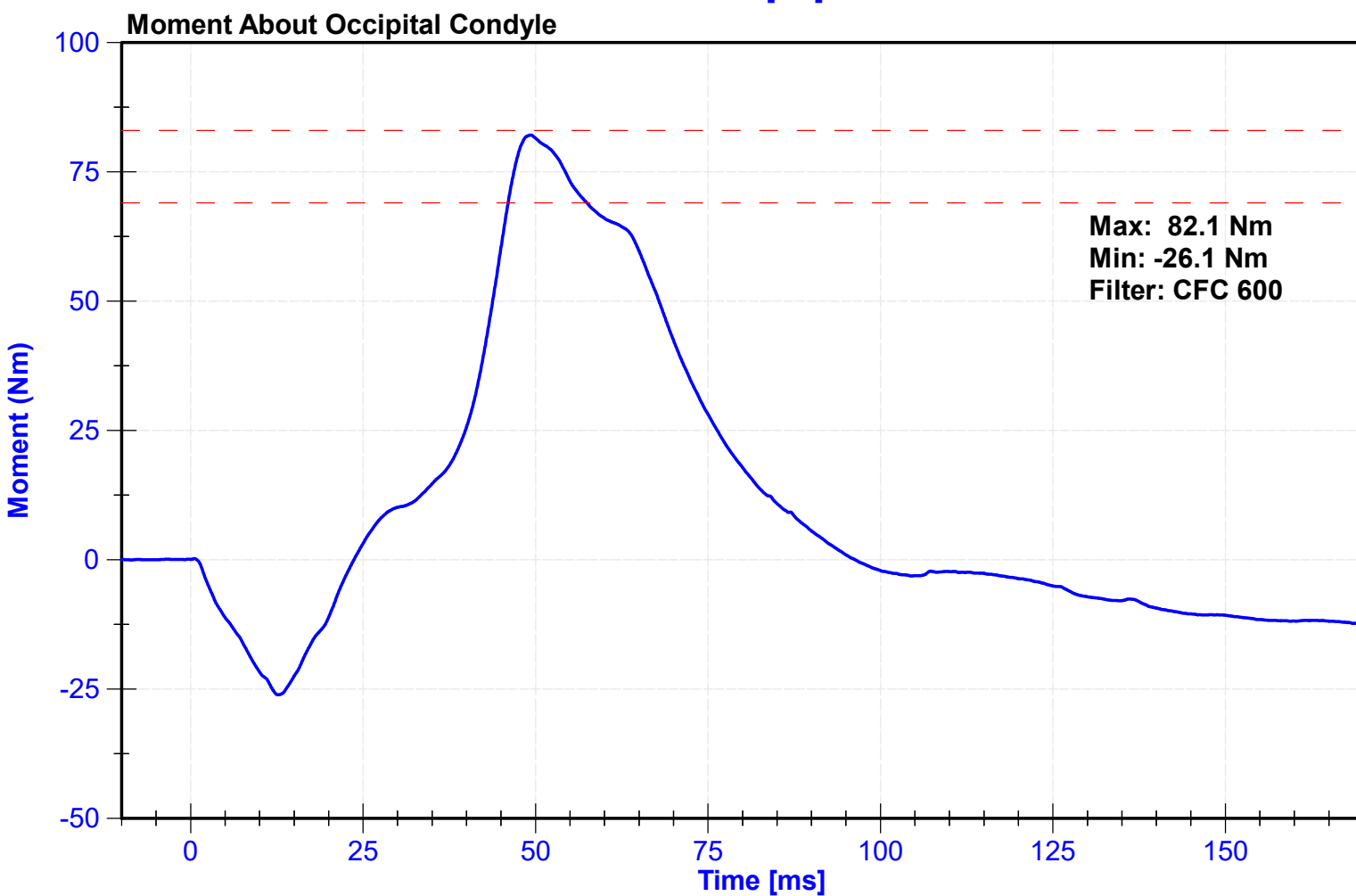
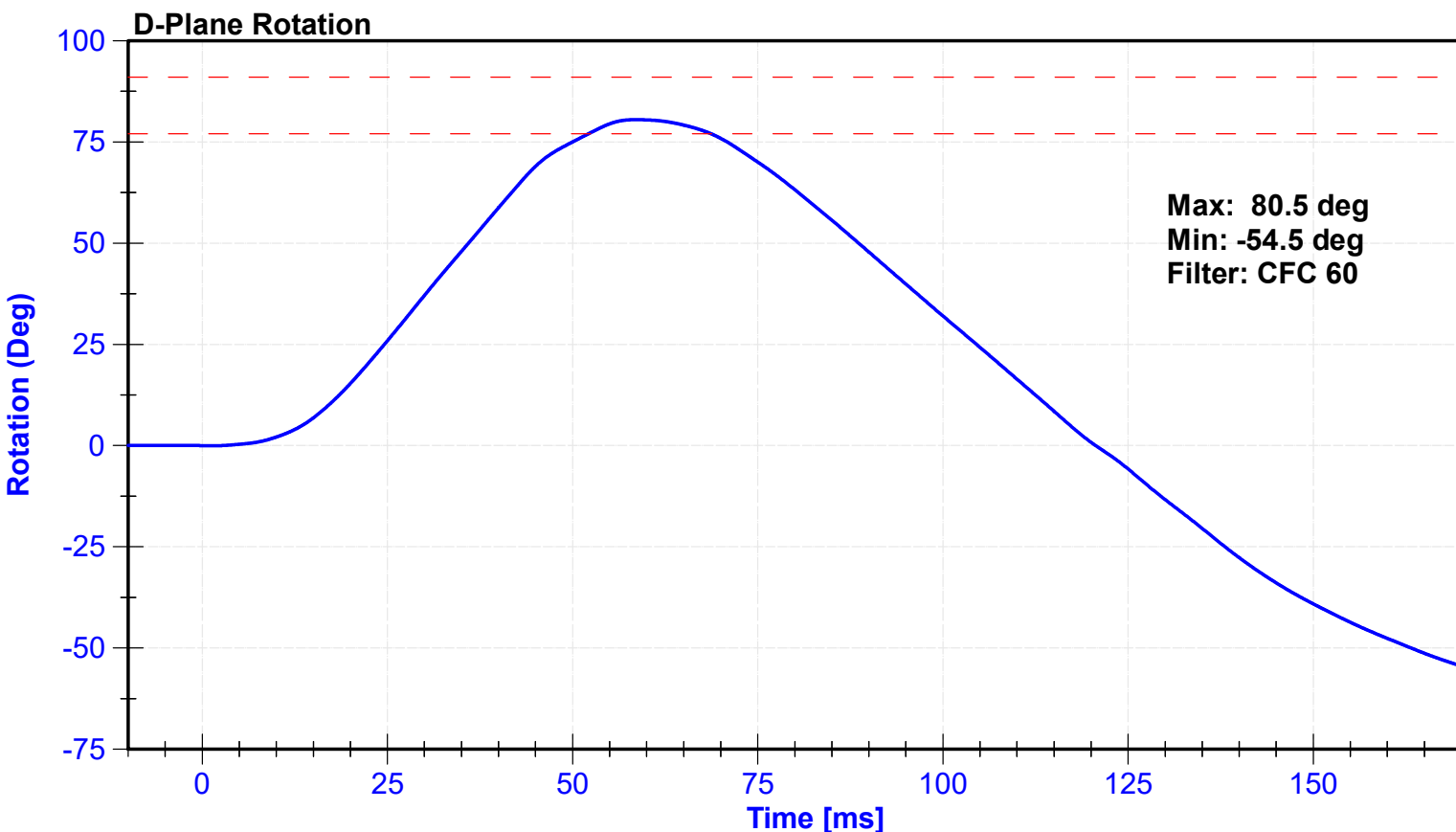
Results

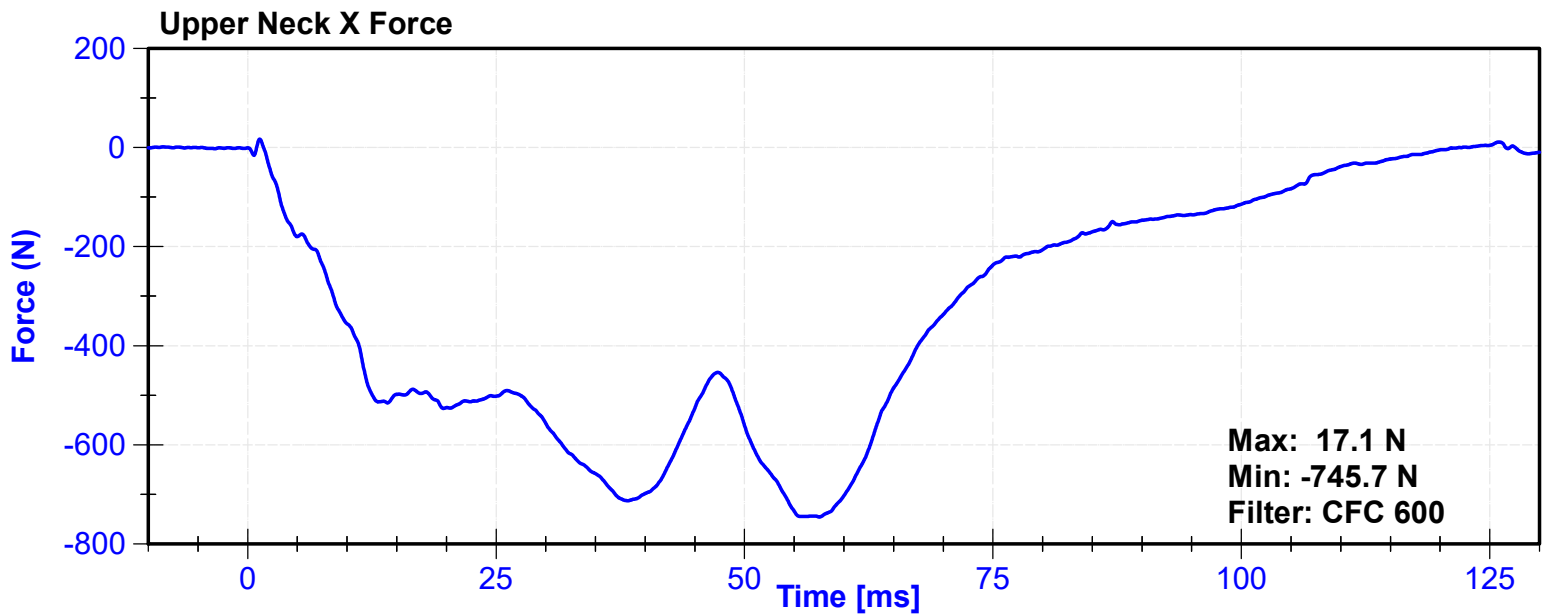
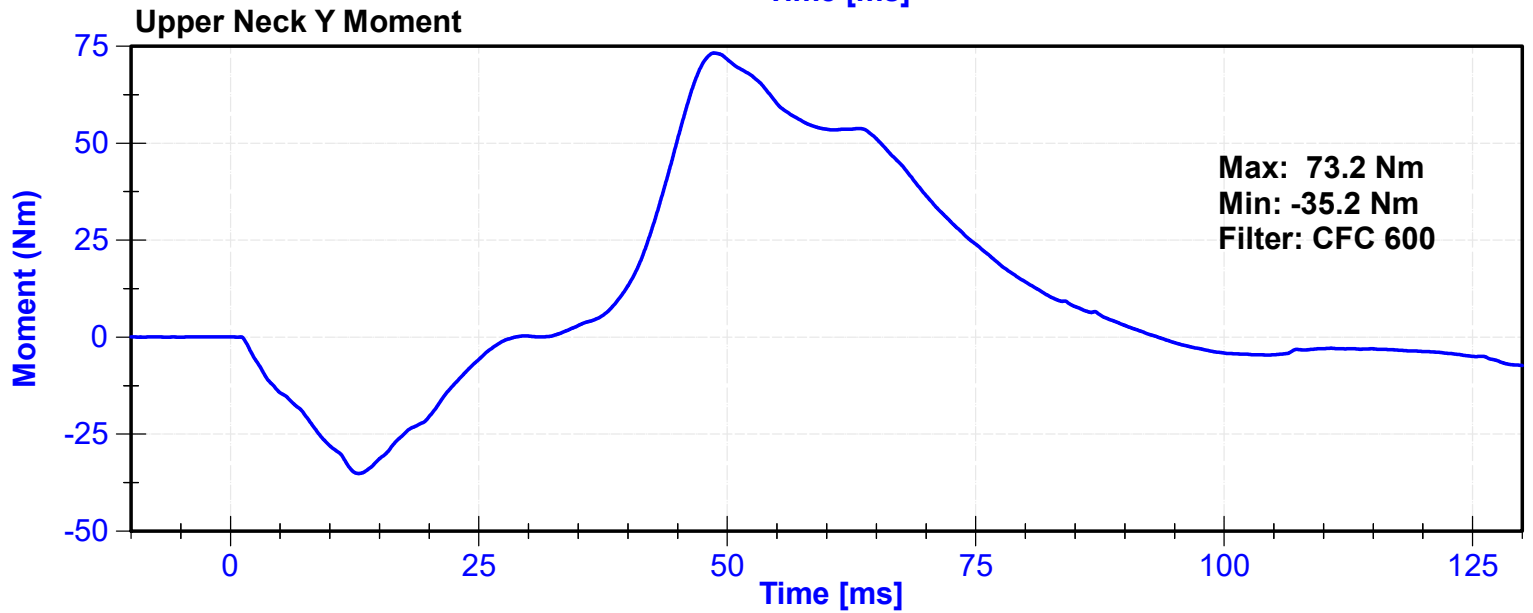
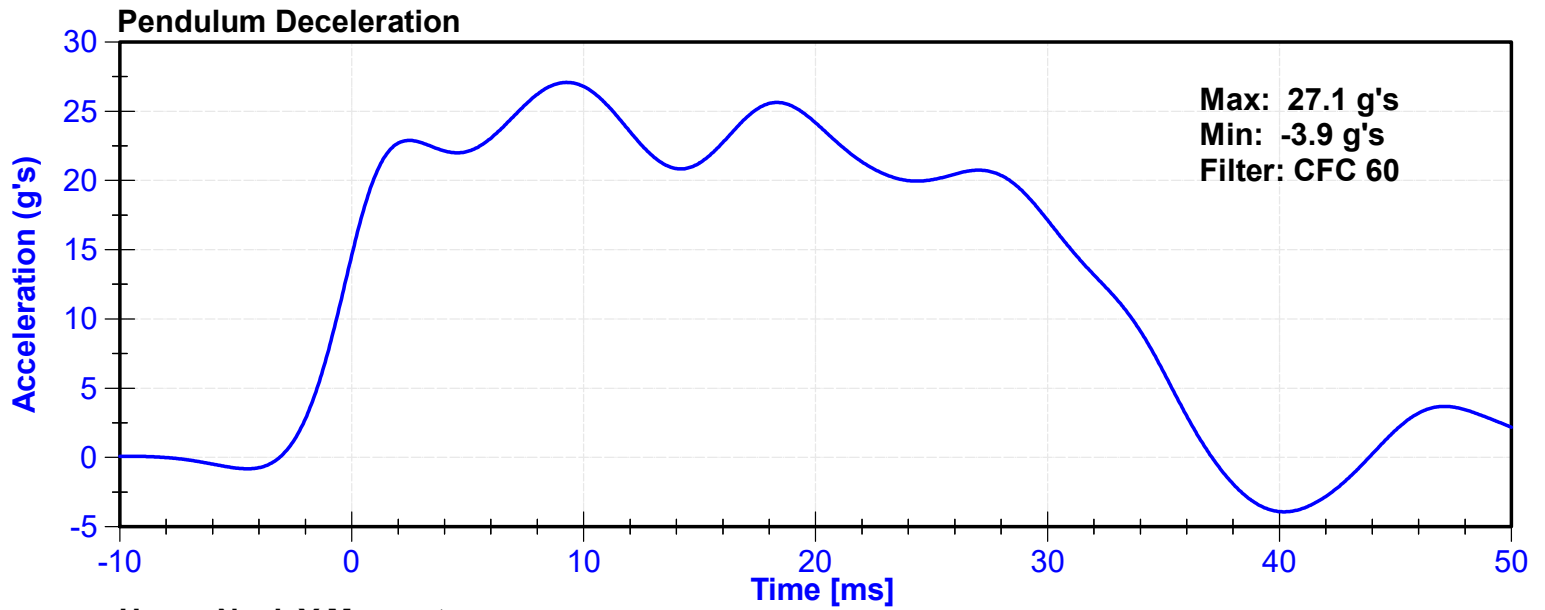
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	13.5	Pass
Velocity	6.89	7.13	m/s	7.038	Pass
Pendulum Impulse at 10ms	2.1	2.5	m/s	2.28	Pass
Pendulum Impulse at 20ms	4.0	5.0	m/s	4.60	Pass
Pendulum Impulse at 30ms	5.8	7.0	m/s	6.62	Pass
Max D Plane Rotation	77	91	deg	80.5	Pass
Max Moment During Rotation Interval	69	83	Nm	82.1	Pass
Moment Decay to 10.0 Nm	80	100	ms	85.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	7231C-750	10/26/2022	10/26/2023
Pendulum Potentiometer	ETI	LABPOT1	5/9/2022	5/9/2023
Condyle Potentiometer	ETI	LABPOT2	5/9/2022	5/9/2023
Upper Neck Load Cell	Humanetics	1916-FX	6/10/2022	6/10/2023







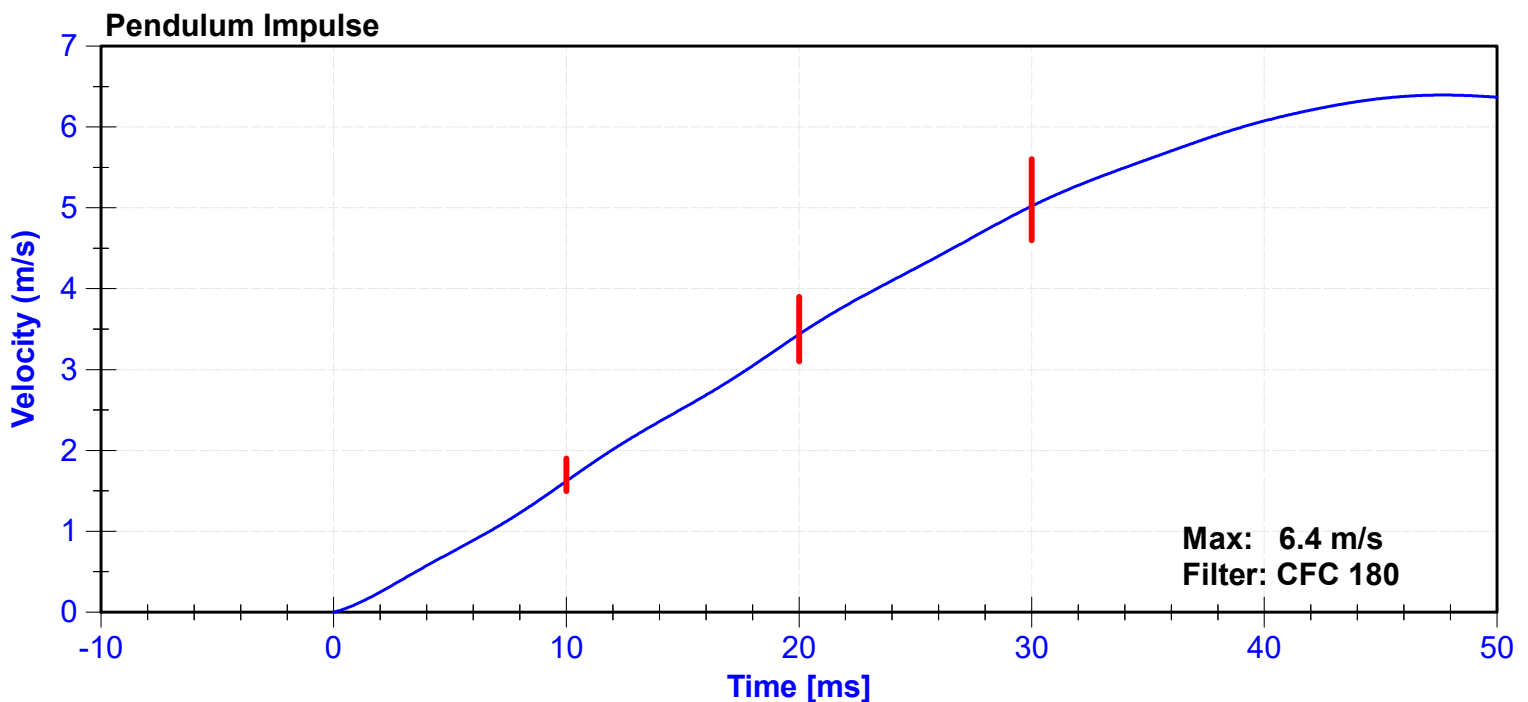
ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	137	Laboratory Supervisor	K. Brogan

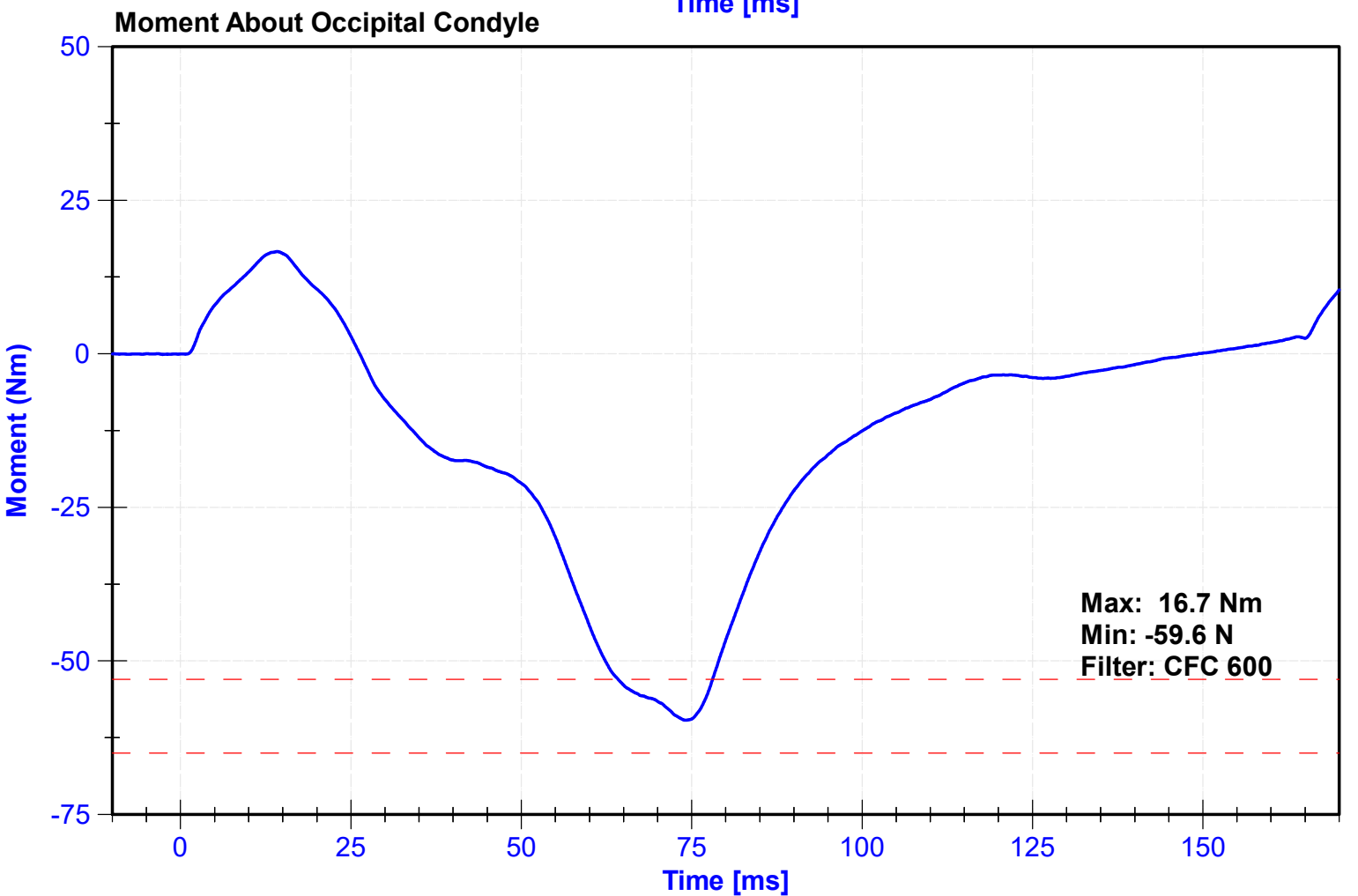
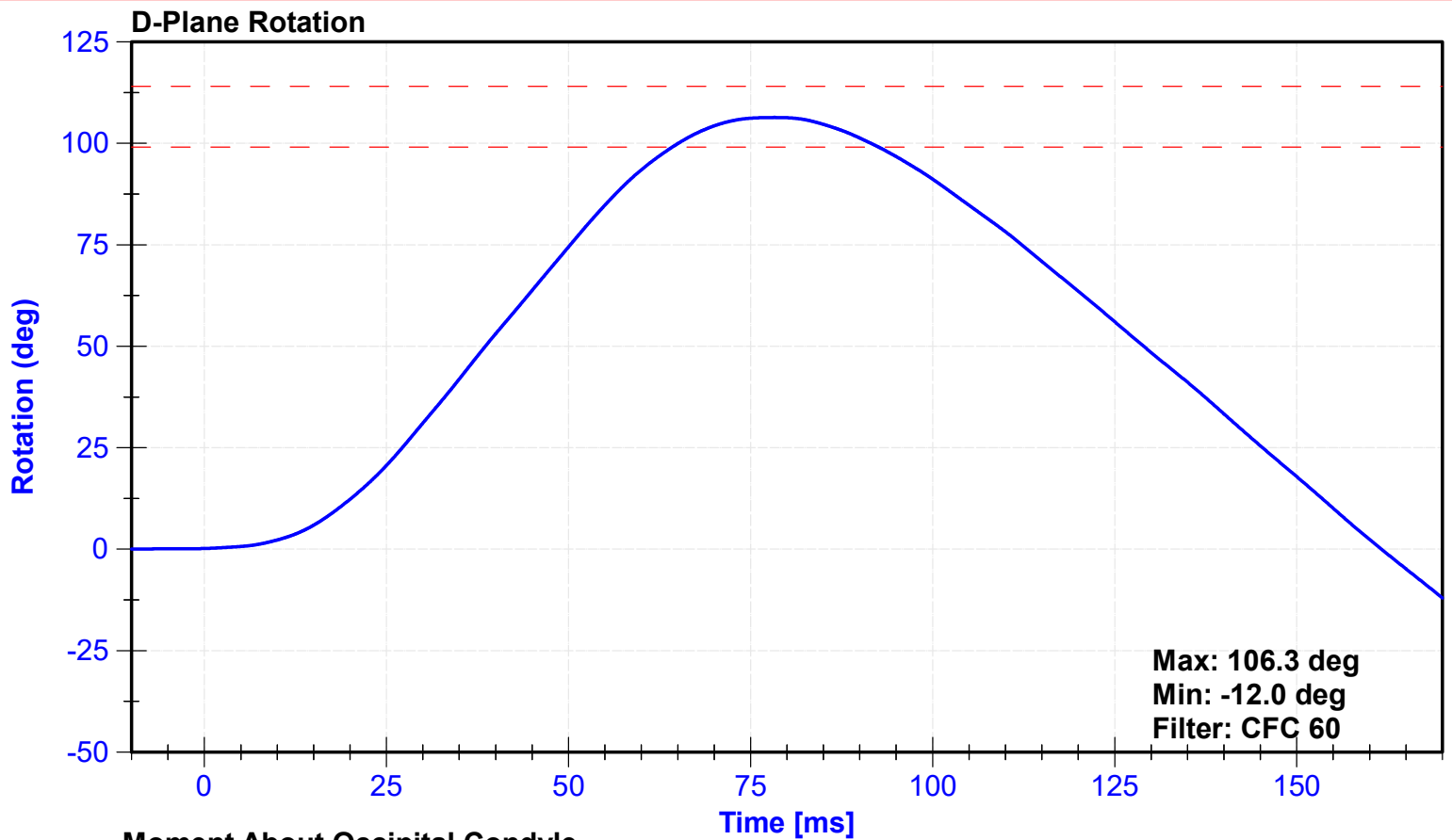
Results

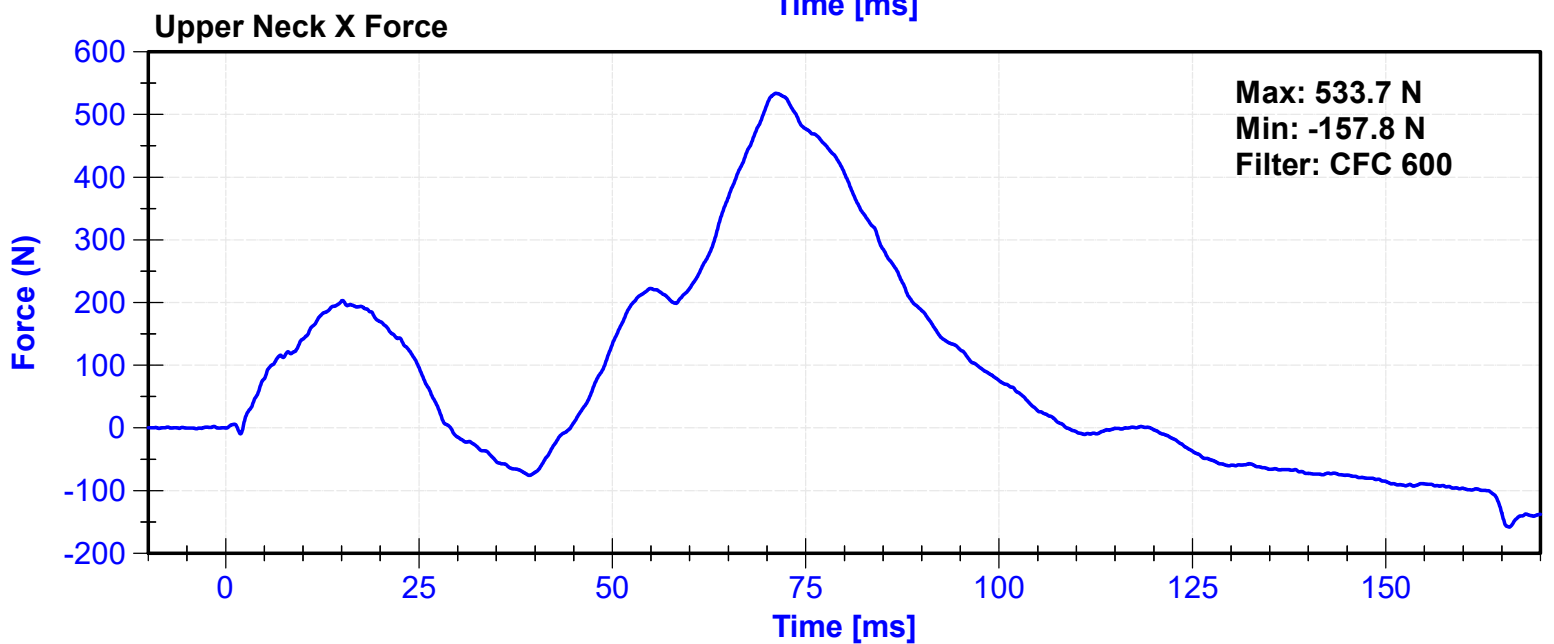
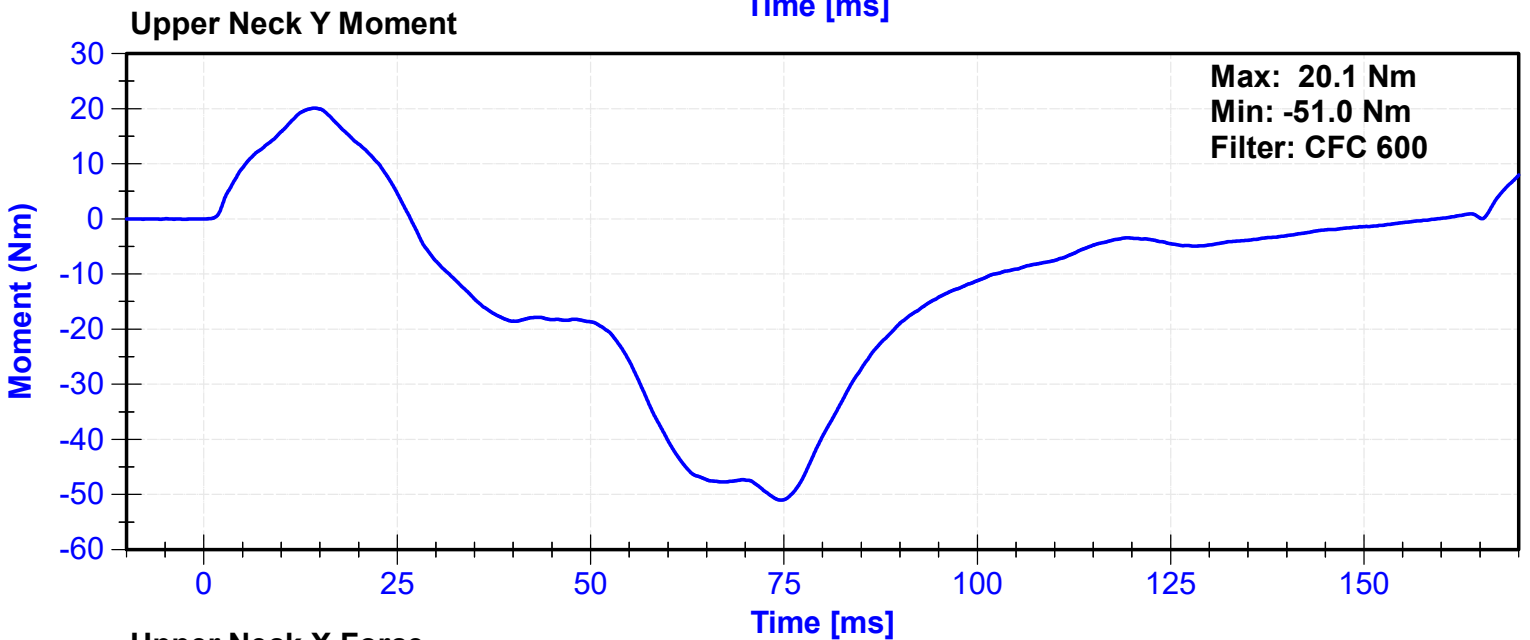
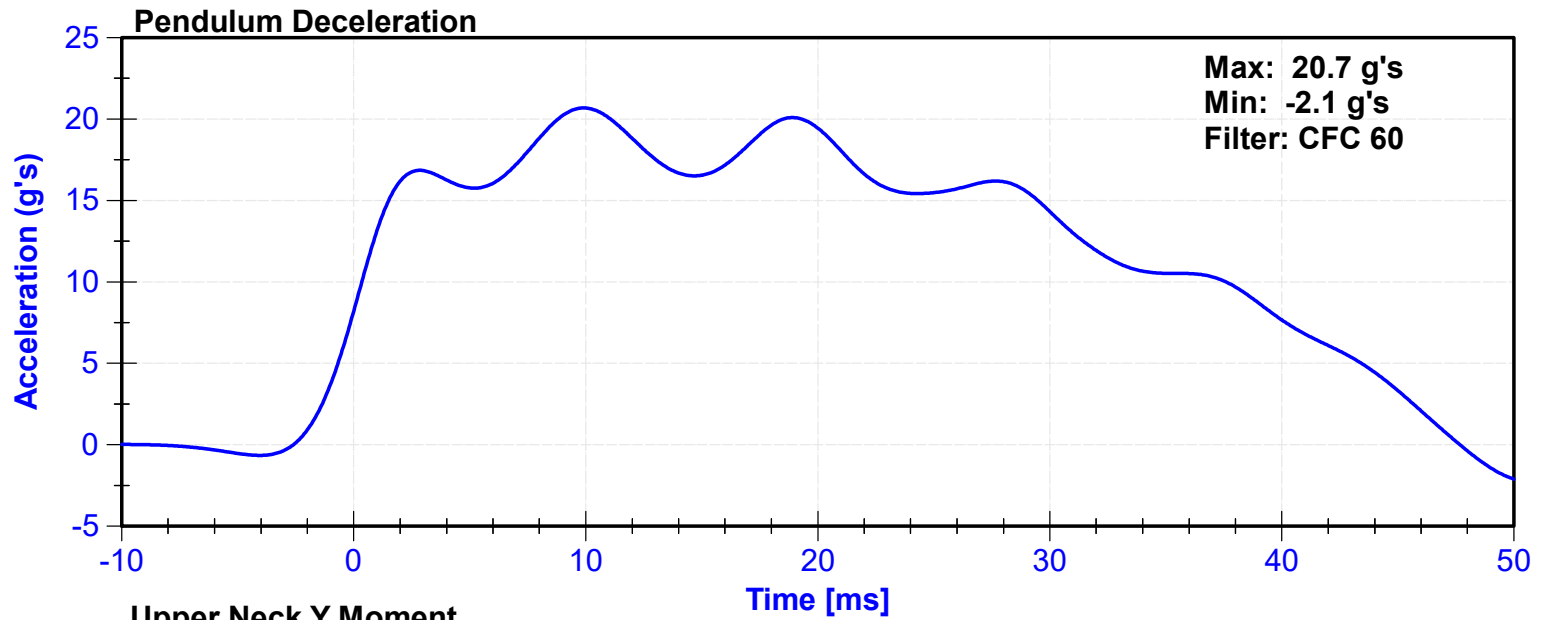
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	13.5	Pass
Velocity	5.95	6.19	m/s	6.122	Pass
Pendulum Impulse at 10ms	1.5	1.9	m/s	1.62	Pass
Pendulum Impulse at 20ms	3.1	3.9	m/s	3.44	Pass
Pendulum Impulse at 30ms	4.6	5.6	m/s	5.02	Pass
D Plane Rotation	99	114	deg	106.3	Pass
Moment During Rotation Interval	-65	-53	Nm	-59.6	Pass
Moment Decay to -10Nm	94	114	ms	104.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16503	10/26/2022	10/26/2023
Pendulum Potentiometer	ETI	LABPOT1	5/9/2022	5/9/2023
Condyle Potentiometer	ETI	LABPOT2	5/9/2022	5/9/2023
Upper Neck Load Cell	Humanetics	1916-FX	6/10/2022	6/10/2023



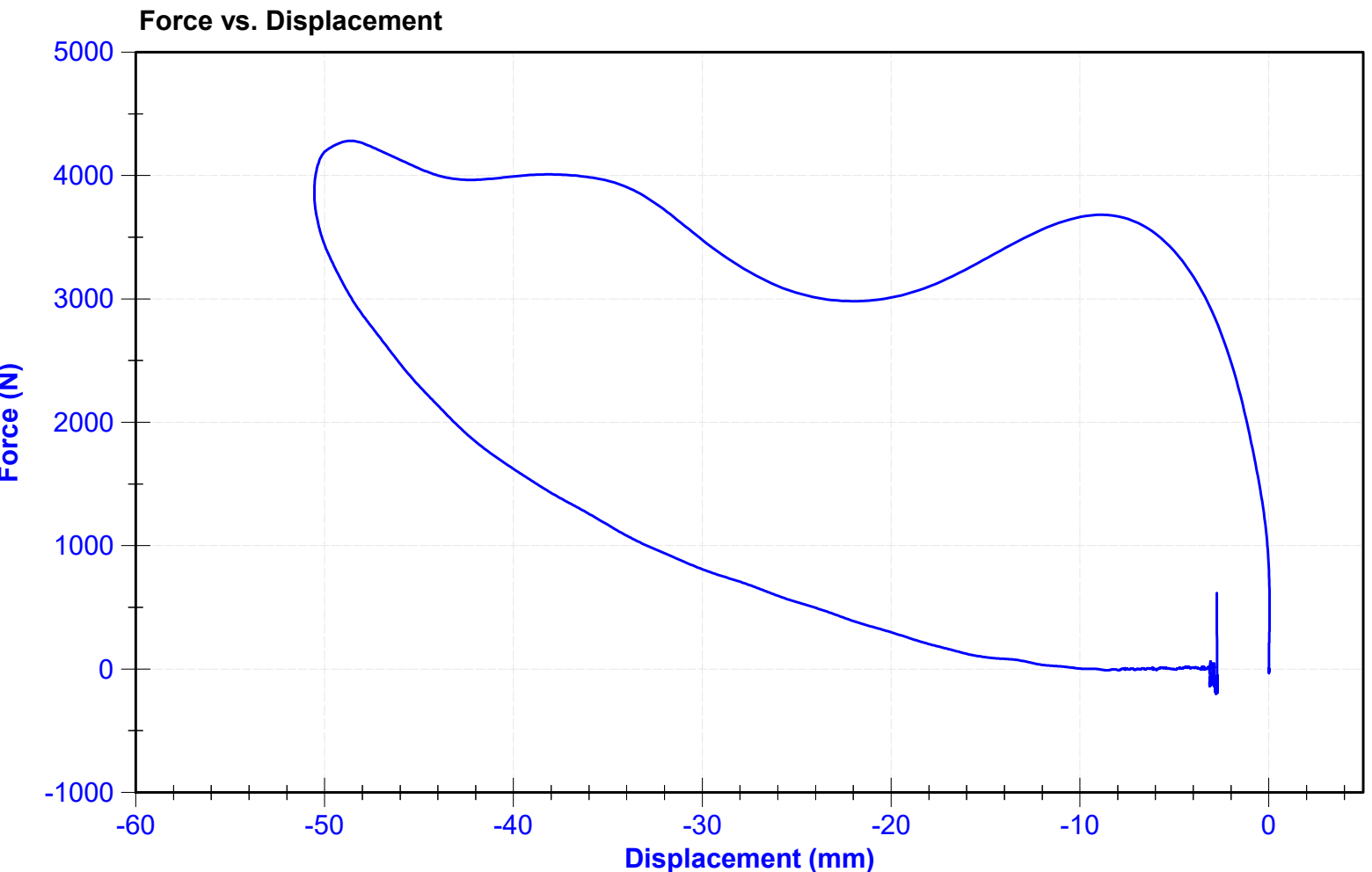


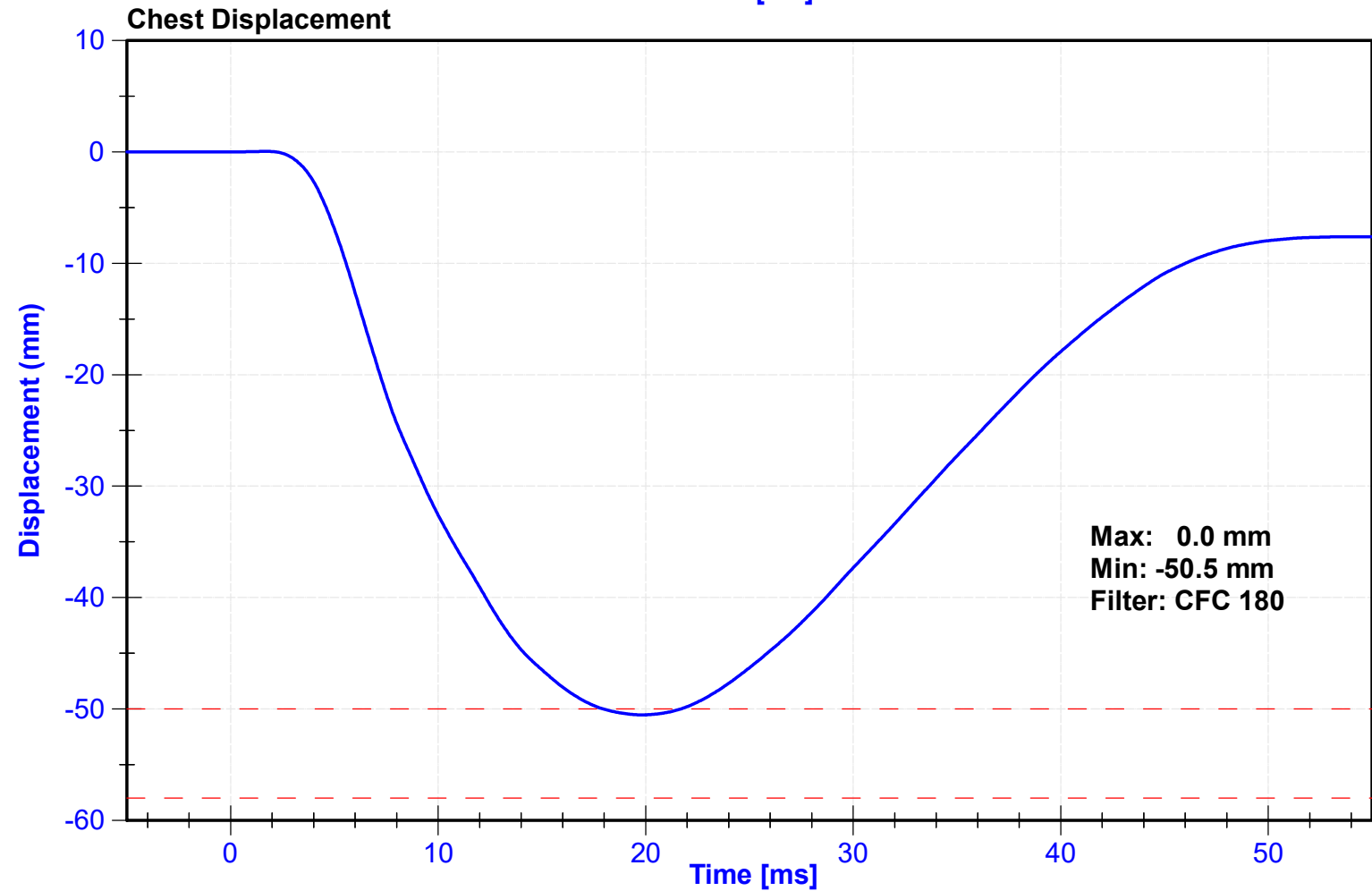
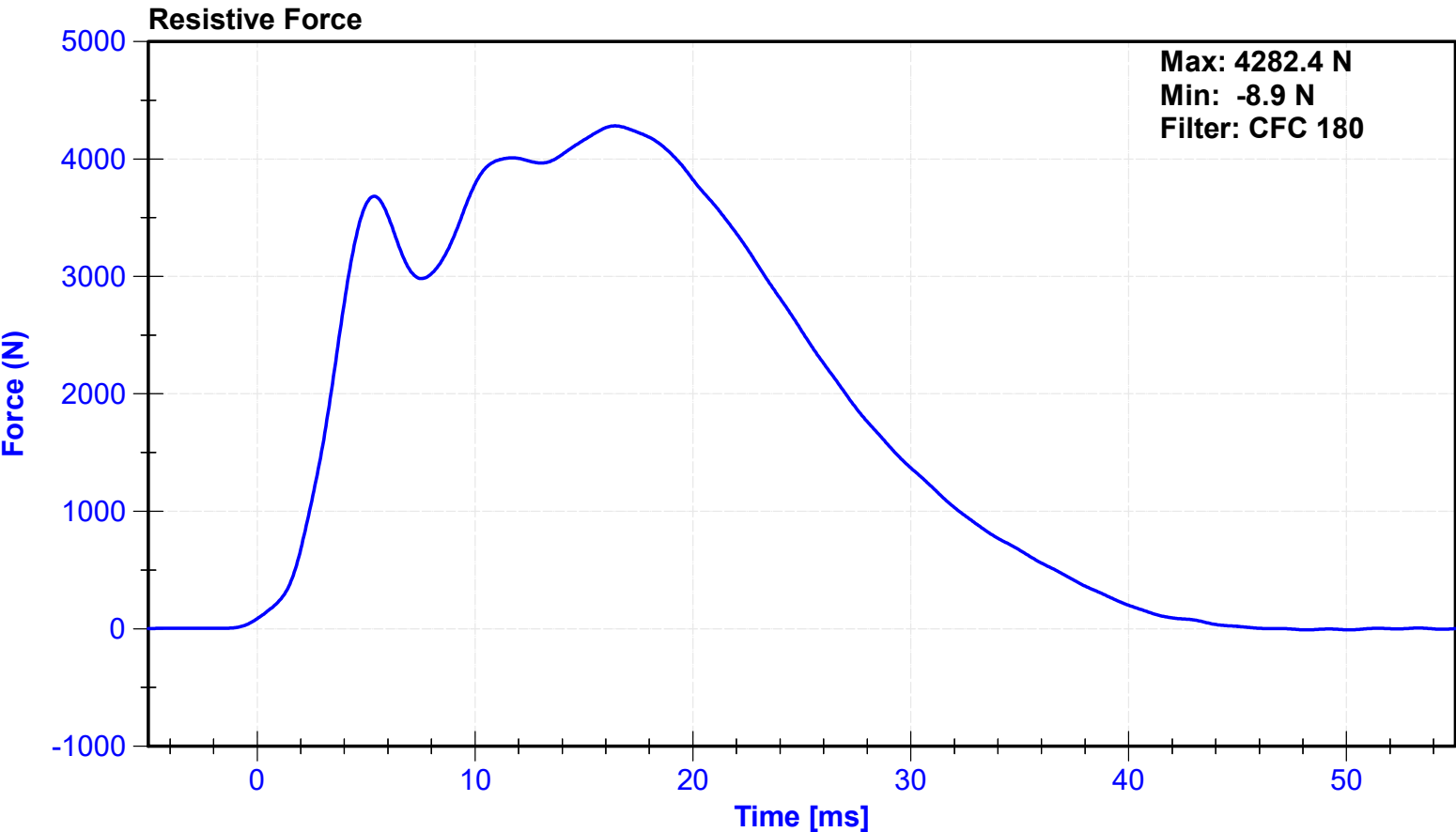


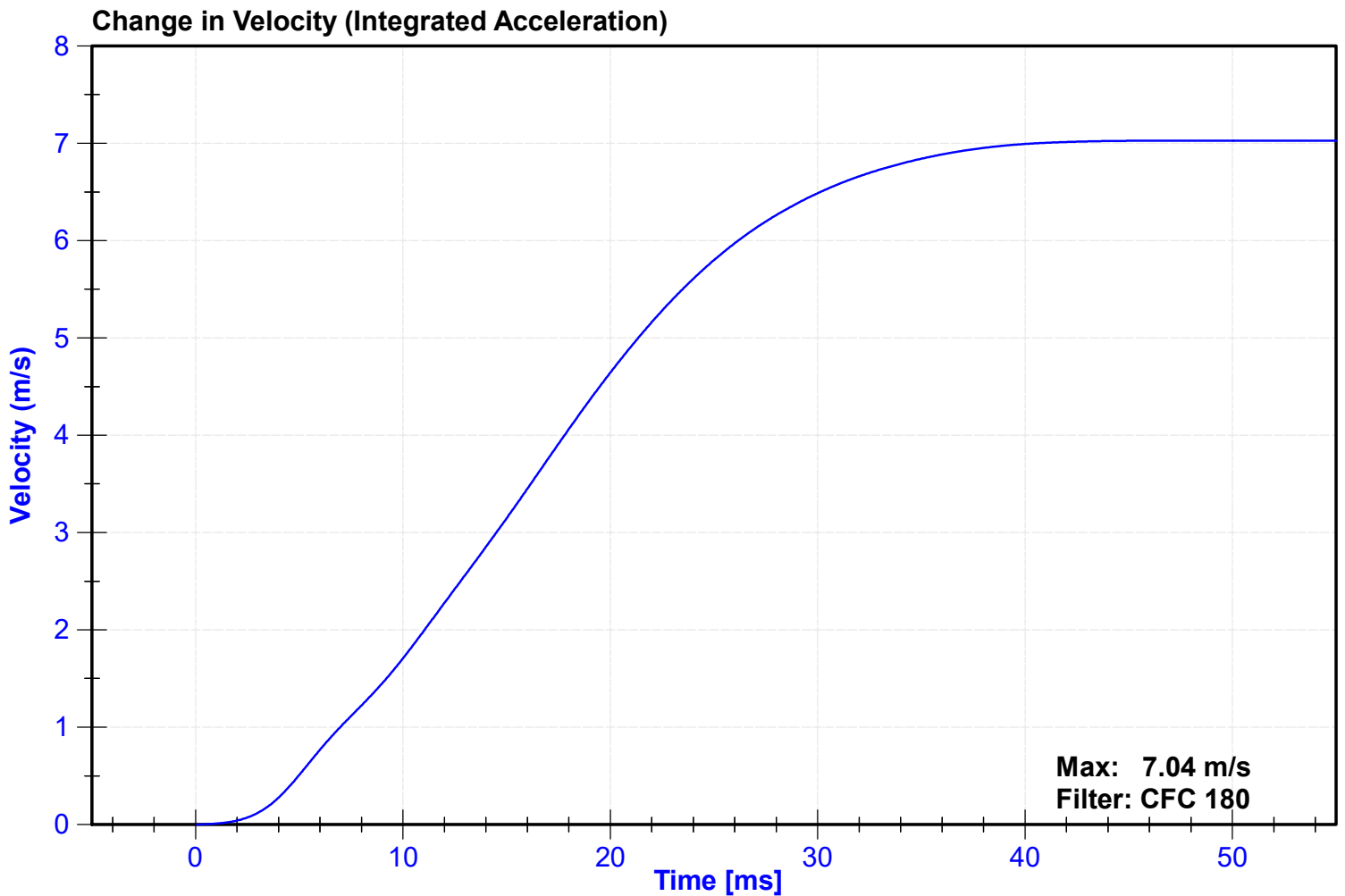
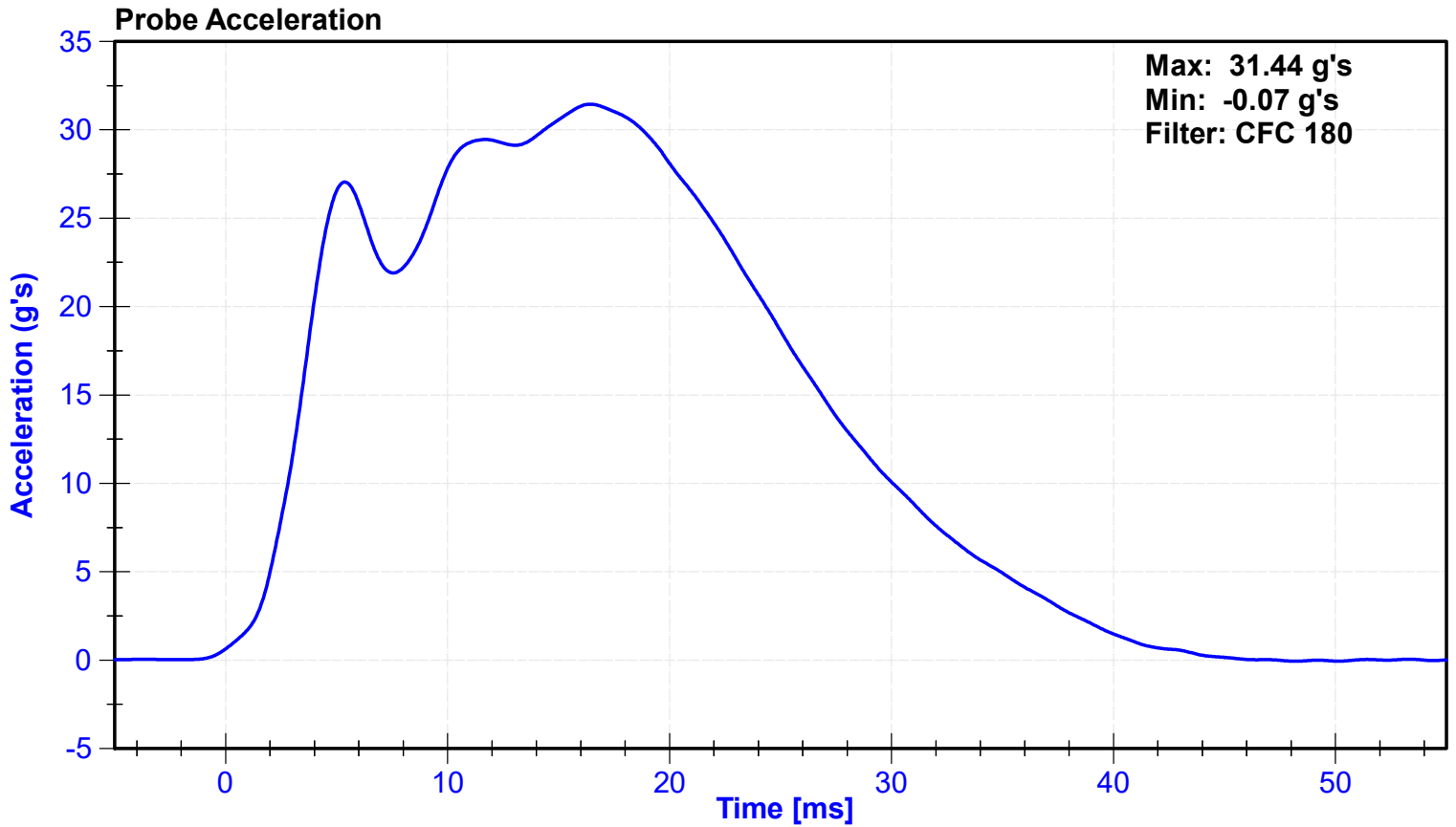
ATD Manufacturer	Humanetics	Test Technician	D. Kroll
ATD Serial Number	137	Laboratory Supervisor	C. Mantell

Test Parameter	Results				
	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	27	Pass
Velocity	6.59	6.83	m/s	6.719	Pass
Chest Deflection	-58	-50	mm	-50.5	Pass
Maximum Resistive Force (50 to 58mm)	3900	4400	N	4194.3	Pass
Maximum Resistive Force (18 to 50mm)	0	4600	N	4282.4	Pass
Hysteresis	69	85	%	75.1	Pass

Transducer Calibrations				
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18546	11/19/2022	5/18/2023
Chest Potentiometer	Servo	0720	12/12/2022	6/12/2023







ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	137	Laboratory Supervisor	K. Brogan

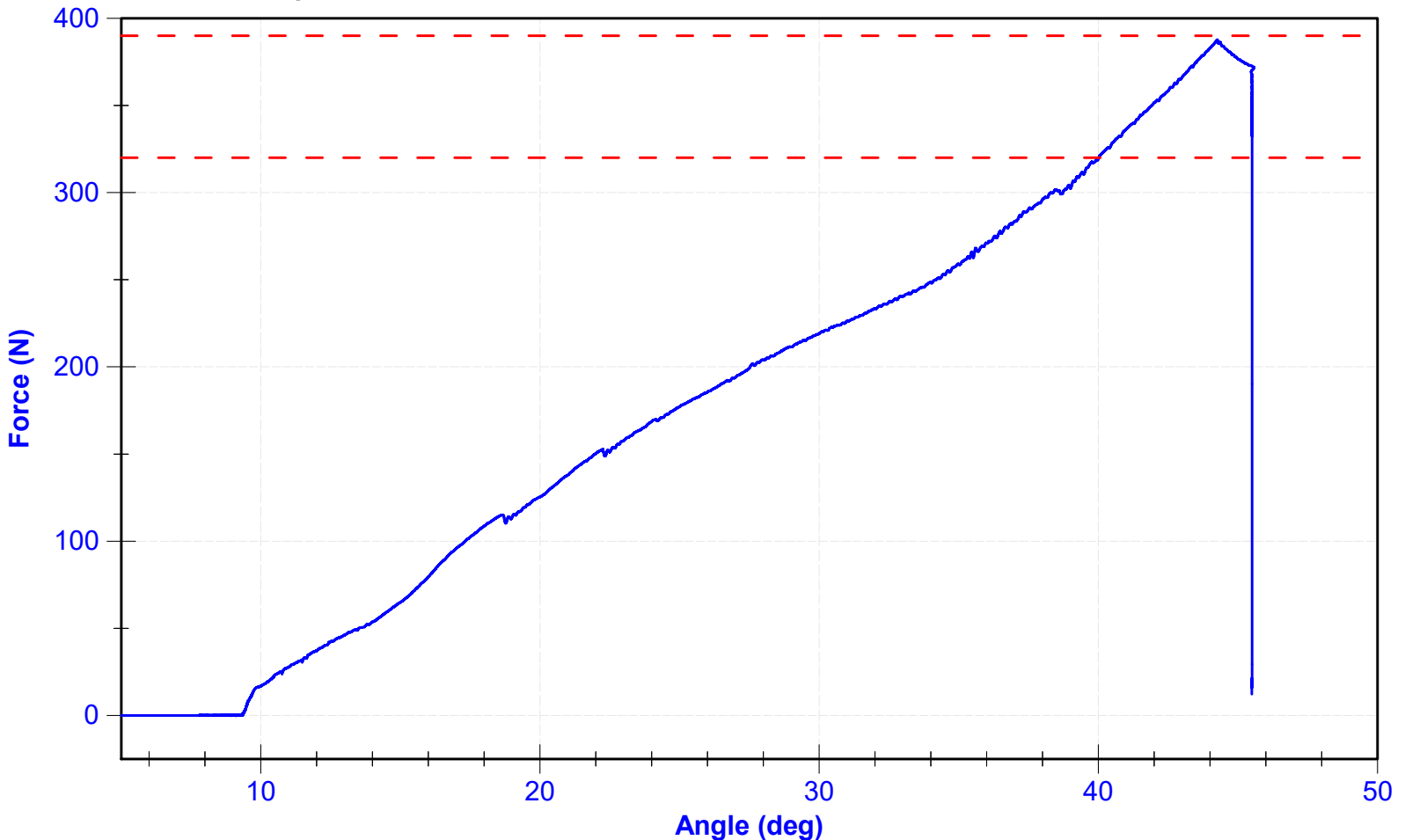
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.6	25.6	°C	21.4	Pass
Humidity	10	70	%	13,5	Pass
Initial Angle	0	20	deg	8.4	Pass
Force at 45 Degrees	320	390	N	387.7	Pass
Return Angle Relative to Initial	0	8	deg	2.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	Rieker	DS-1905226	2022-11-09	2023-11-09
Load Cell	Interface	1134516	2022-09-27	2023-09-27

Force vs. Displacement



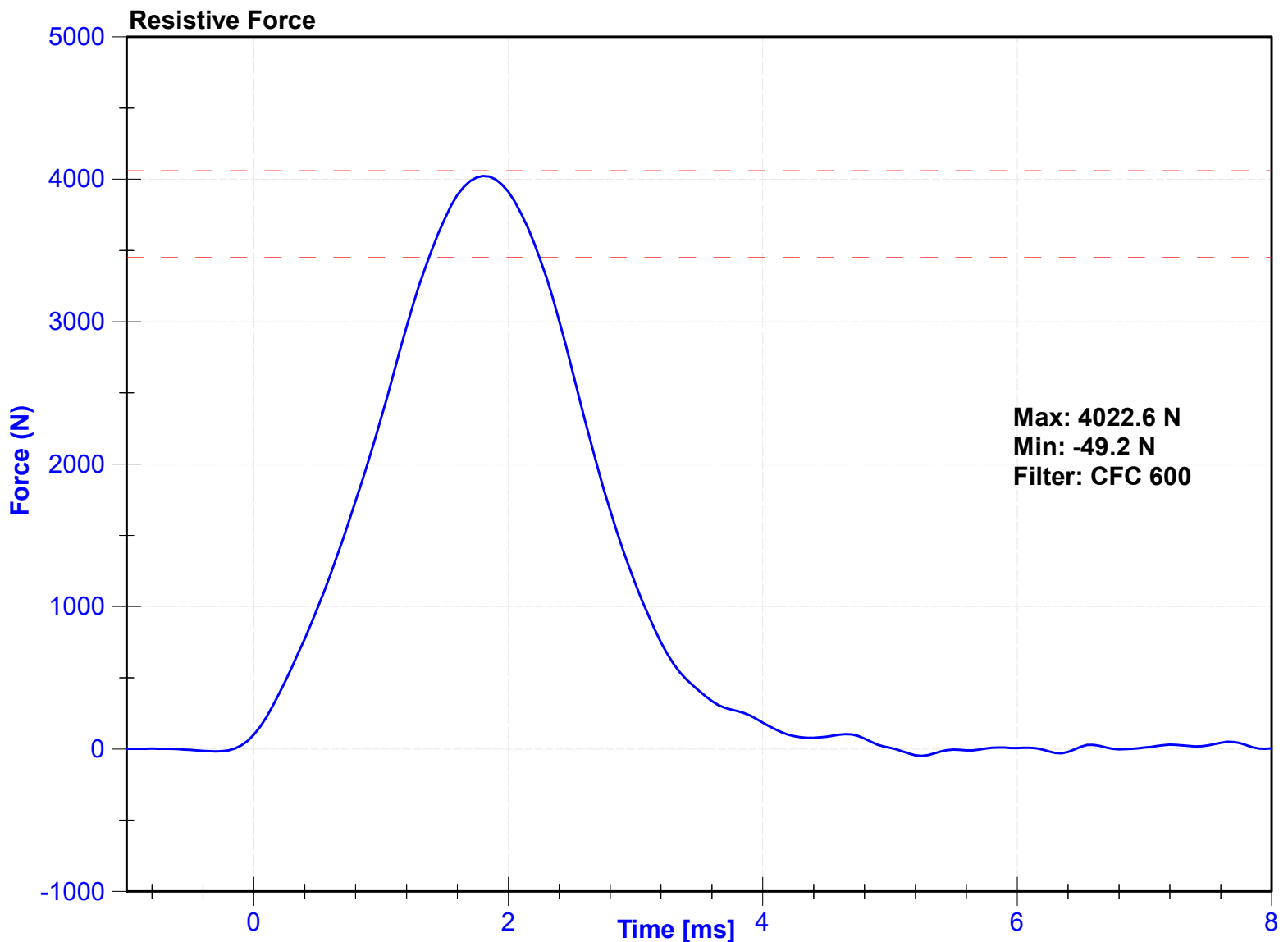
ATD Manufacturer	Humanetics	Test Technician	Z.Schneider
ATD Serial Number	137	Laboratory Supervisor	K. Brogan

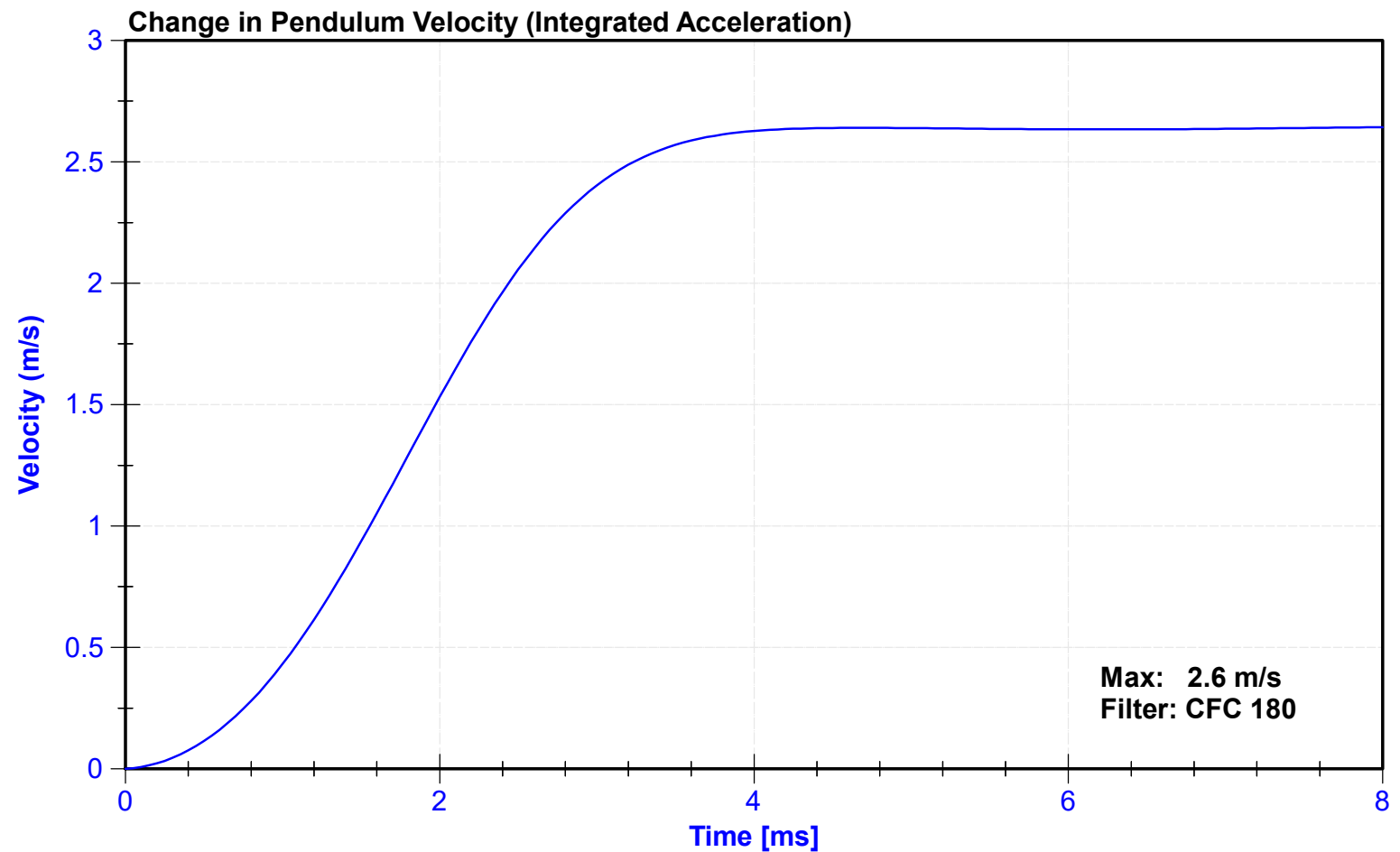
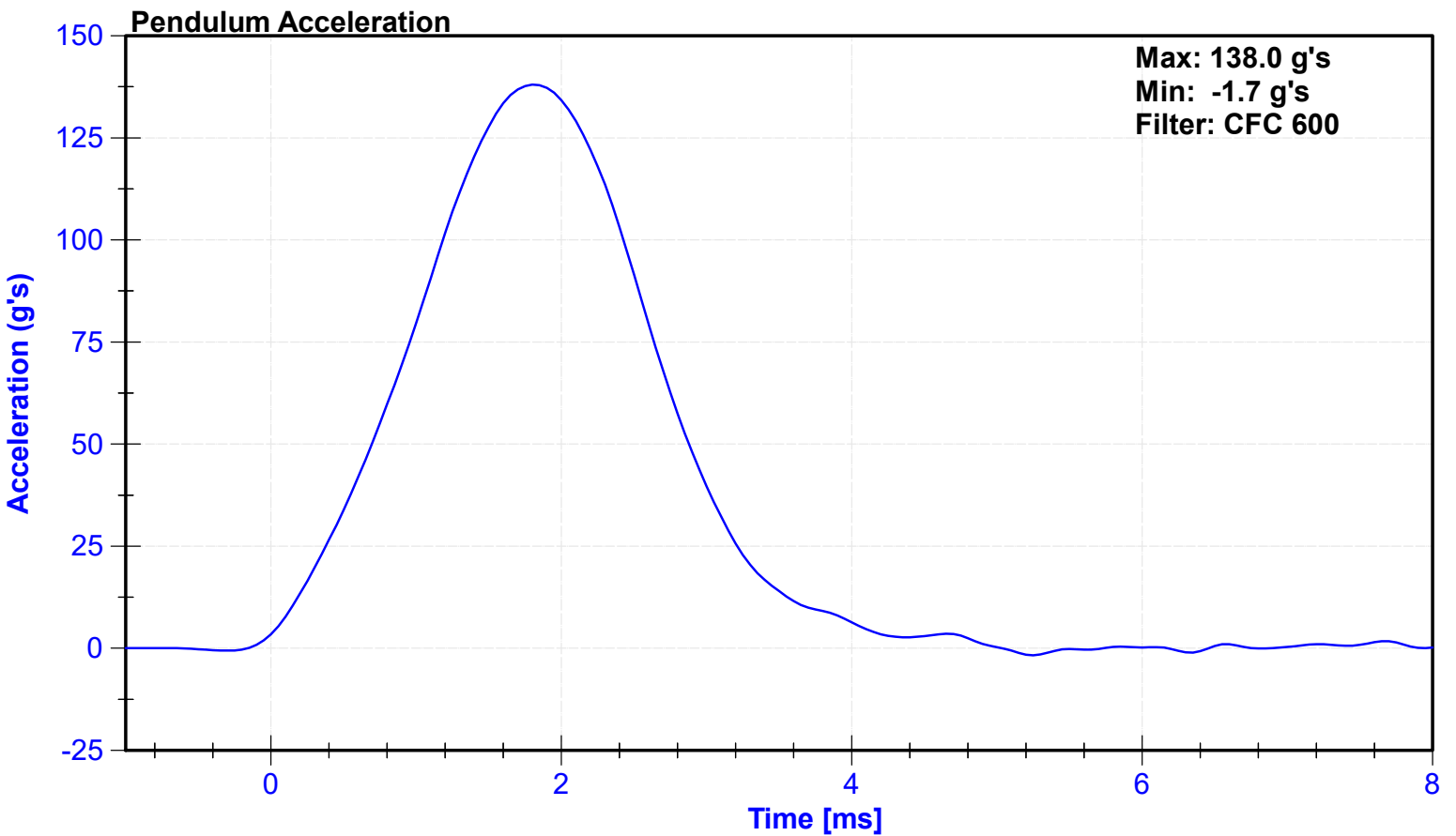
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21	Pass
Humidity	10	70	%	13	Pass
Velocity	2.07	2.13	m/s	2.074	Pass
Resistive Force	3450	4060	N	4022.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18546	11/19/2022	5/18/2023





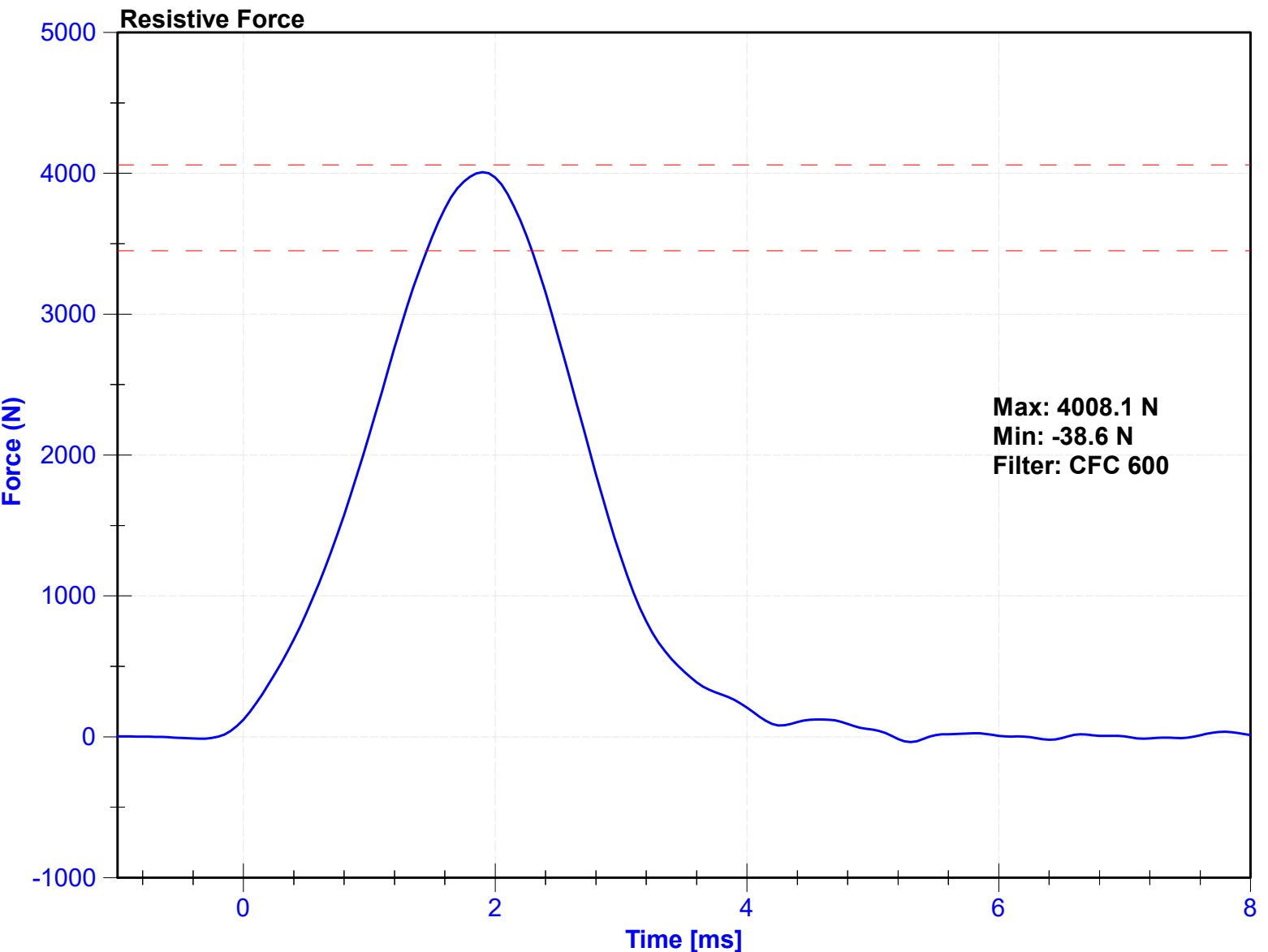
ATD Manufacturer	Humanetics	Test Technician	Z.Schneider
ATD Serial Number	137	Laboratory Supervisor	K. Brogan

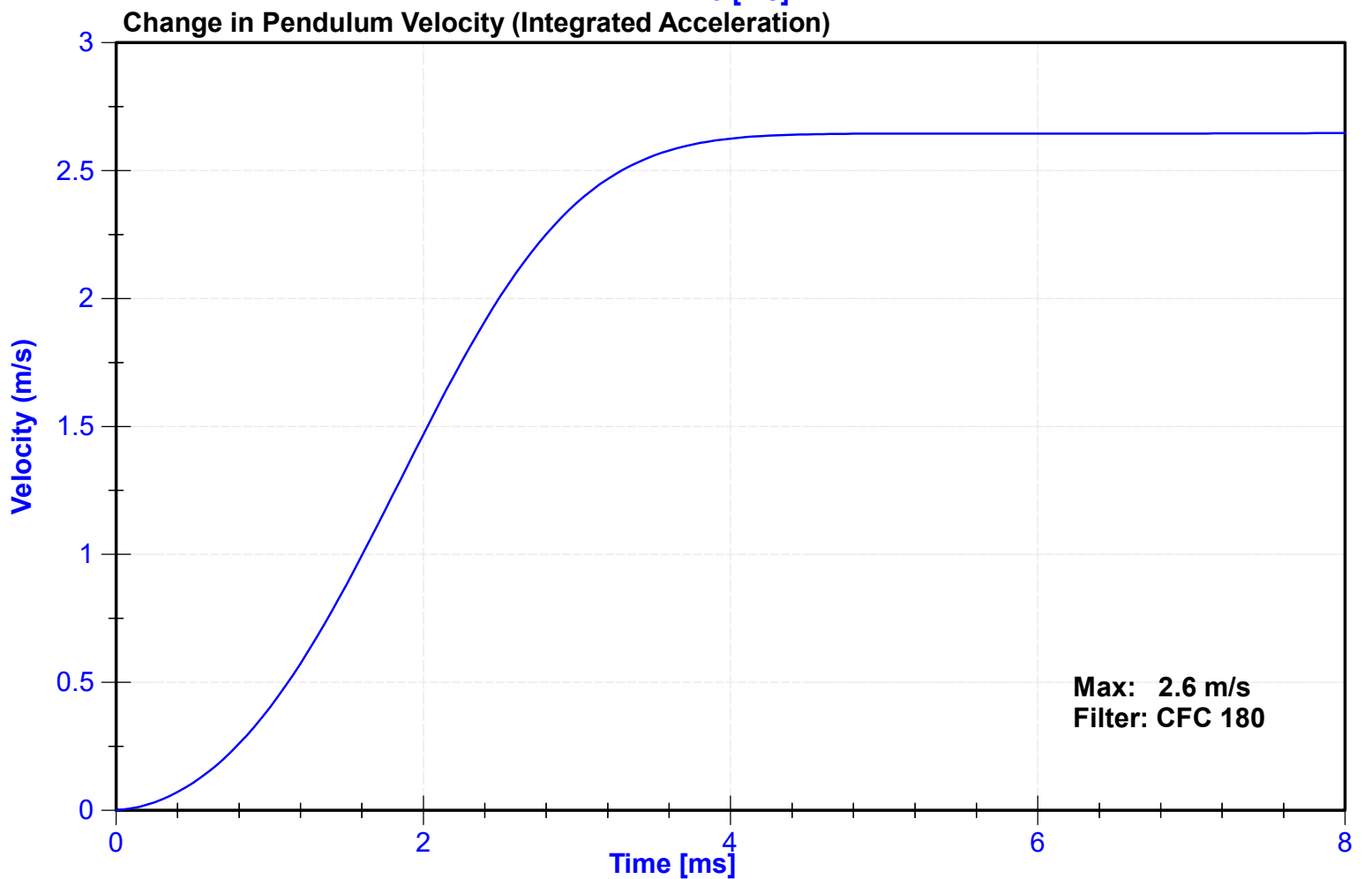
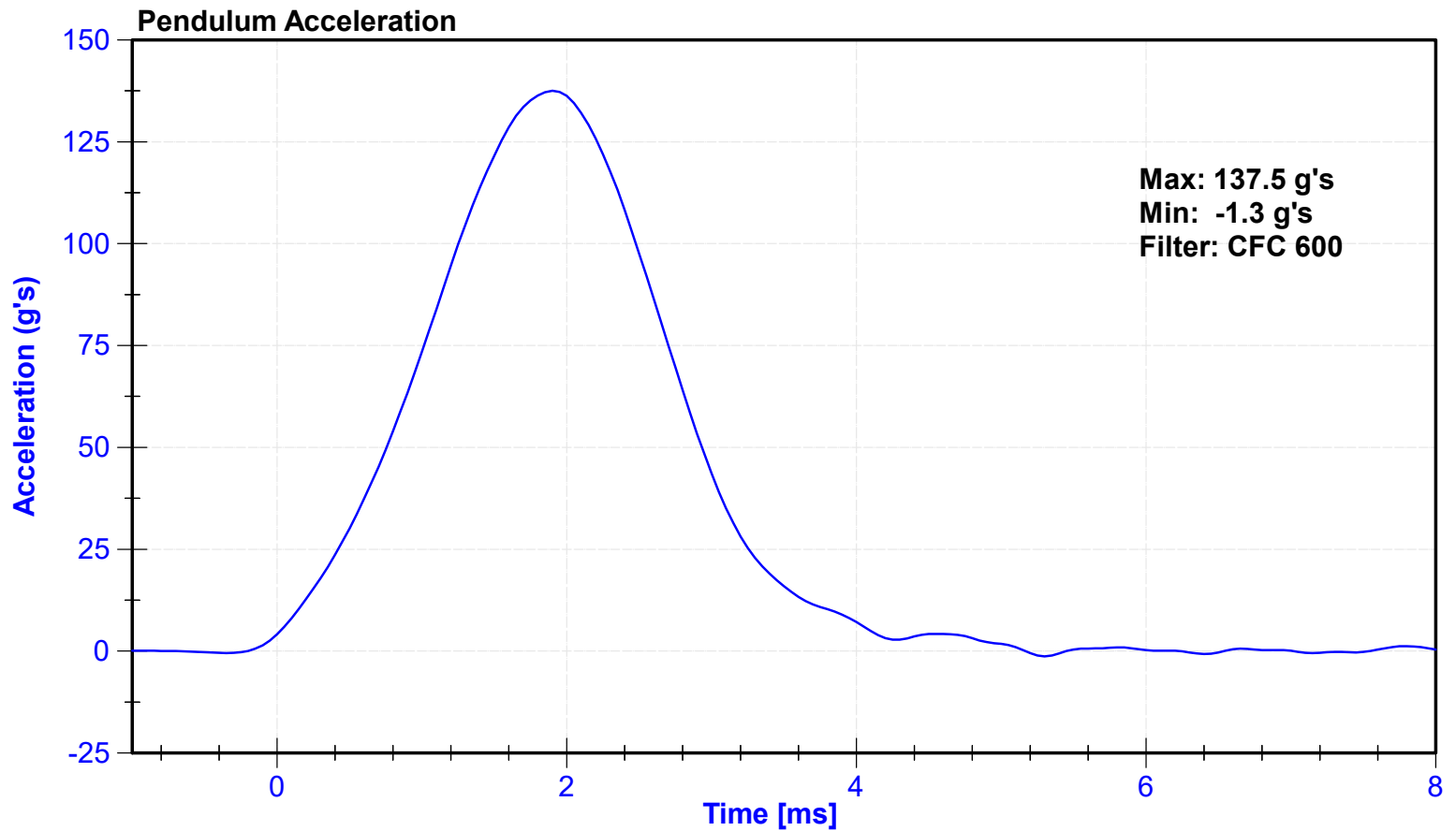
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21	Pass
Humidity	10	70	%	13	Pass
Velocity	2.07	2.13	m/s	2.077	Pass
Resistive Force	3450	4060	N	4008.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18546	11/19/2022	5/18/2023





CALIBRATION TEST RESULTS

POST-TEST

HYBRID III 50TH PERCENTILE MALE - DRIVER ATD

SERIAL NO: 142

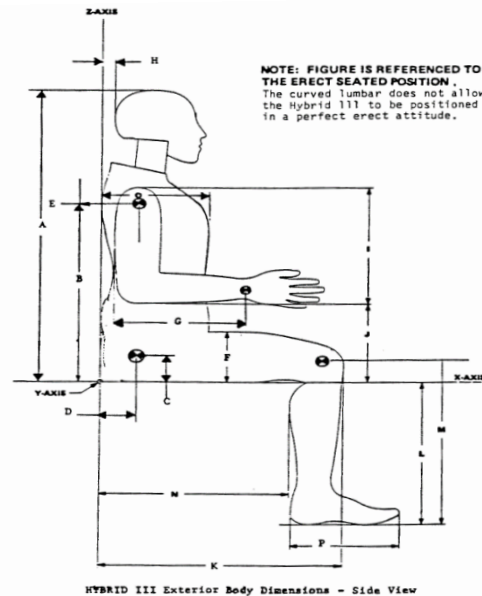
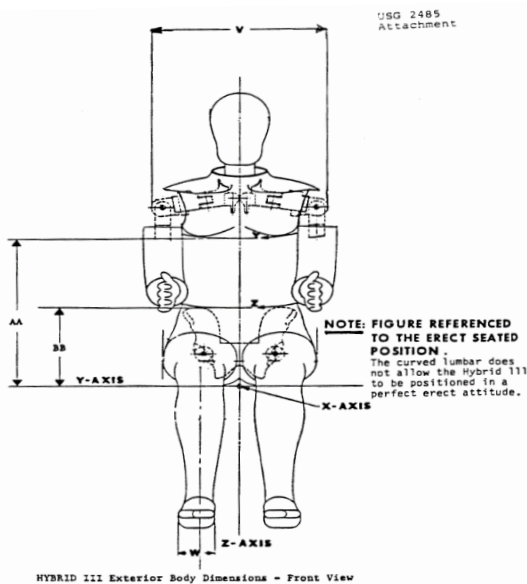


External Measurements - Hybrid 3 - 50th Male

Technician: K. Brogan

Date: 02/21/2023

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	3.6	Pass
F	Thigh Clearance	5.5	6.1	5.8	Pass
G	Back of Elbow to Wrist Pivot	11.4	12.0	11.7	Pass
H	Head Back to Backline	1.6	1.8	1.7	Pass
I	Shoulder to Elbow Length	13.0	13.6	13.3	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	17.3	Pass
M	Knee Pivot Height	19.1	19.7	19.4	Pass
N	Buttock Popliteal Length	17.8	18.8	18.3	Pass
O	Chest Depth without Jacket	8.4	9.0	8.7	Pass
P	Foot Length (right)	9.9	10.5	10.2	Pass
V	Shoulder Breadth	16.3	17.2	16.8	Pass
W	Foot Breadth	3.6	4.2	3.9	Pass
Y	Chest Circumference with Jacket	38.2	39.4	39.1	Pass
Z	Waist Circumference	32.9	34.1	33.3	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

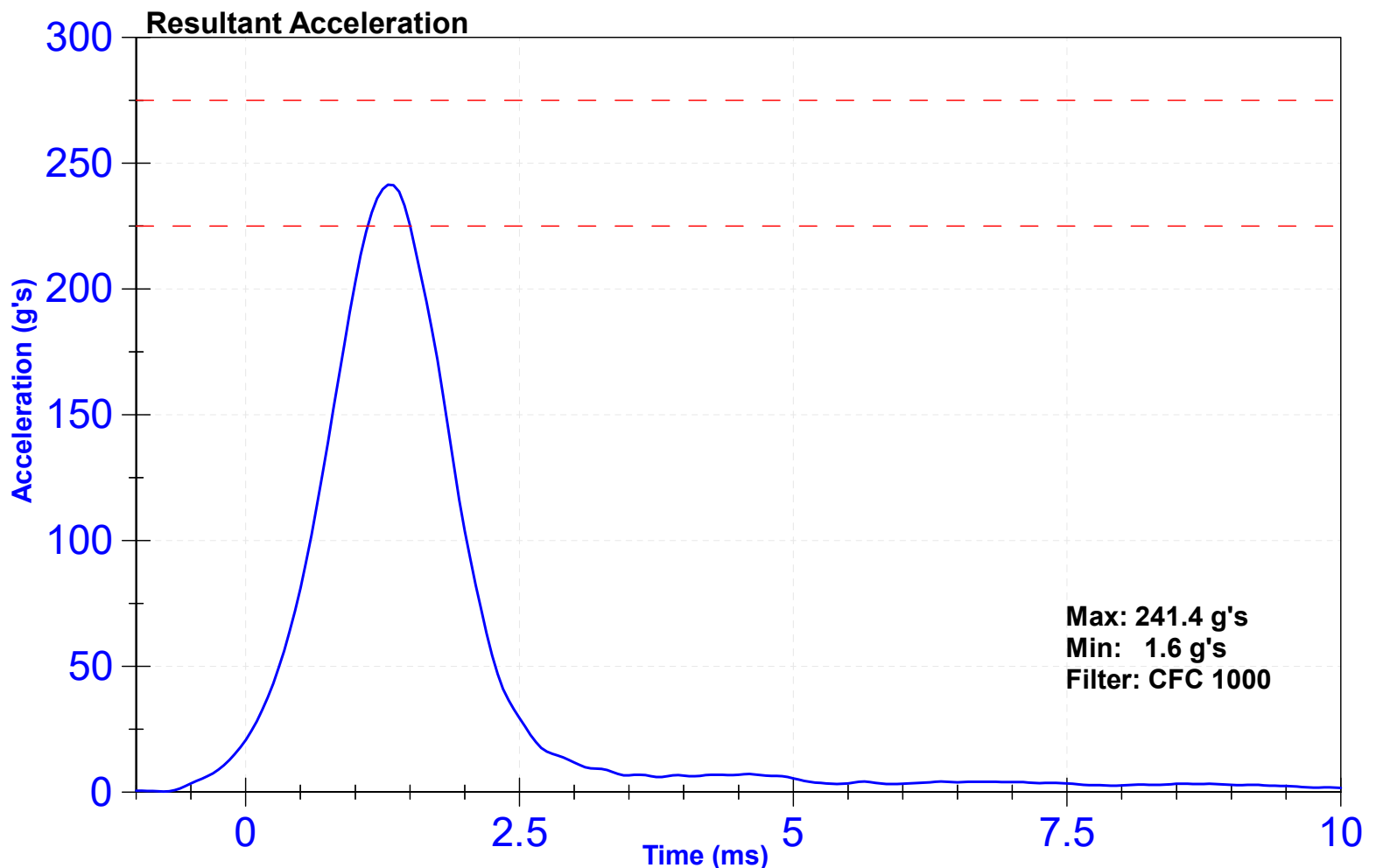
ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

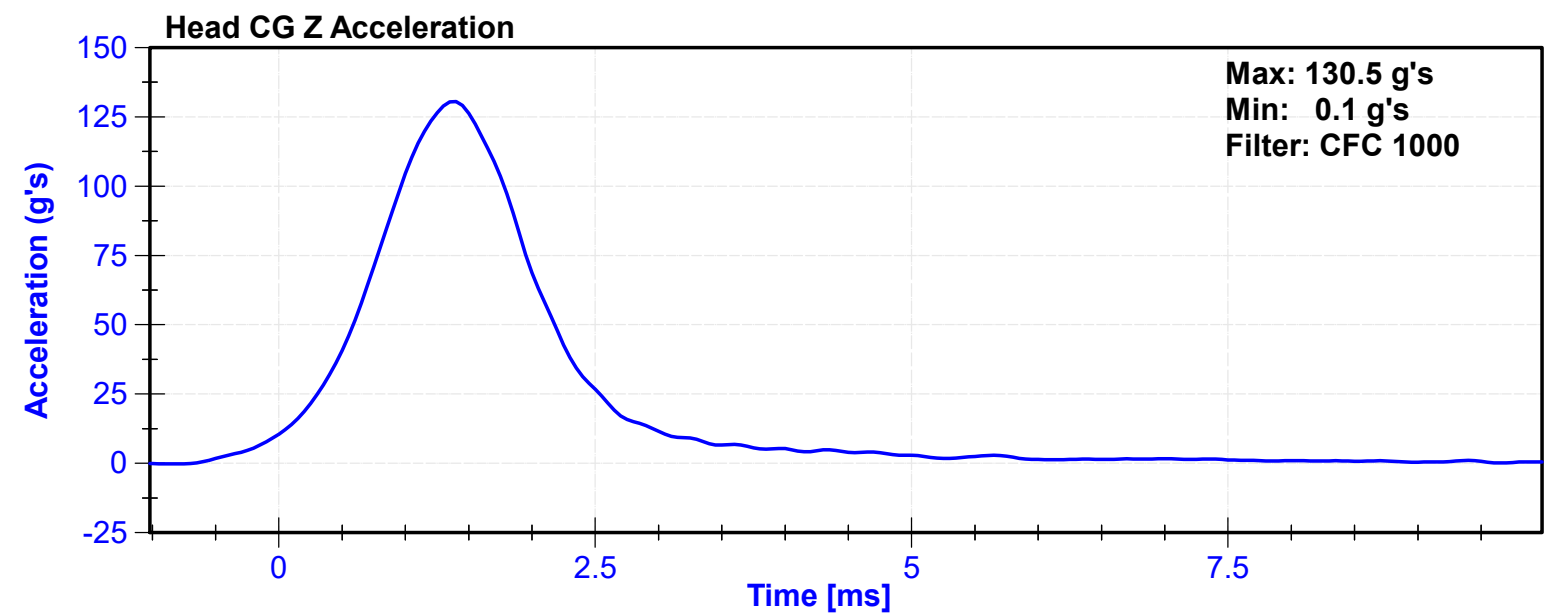
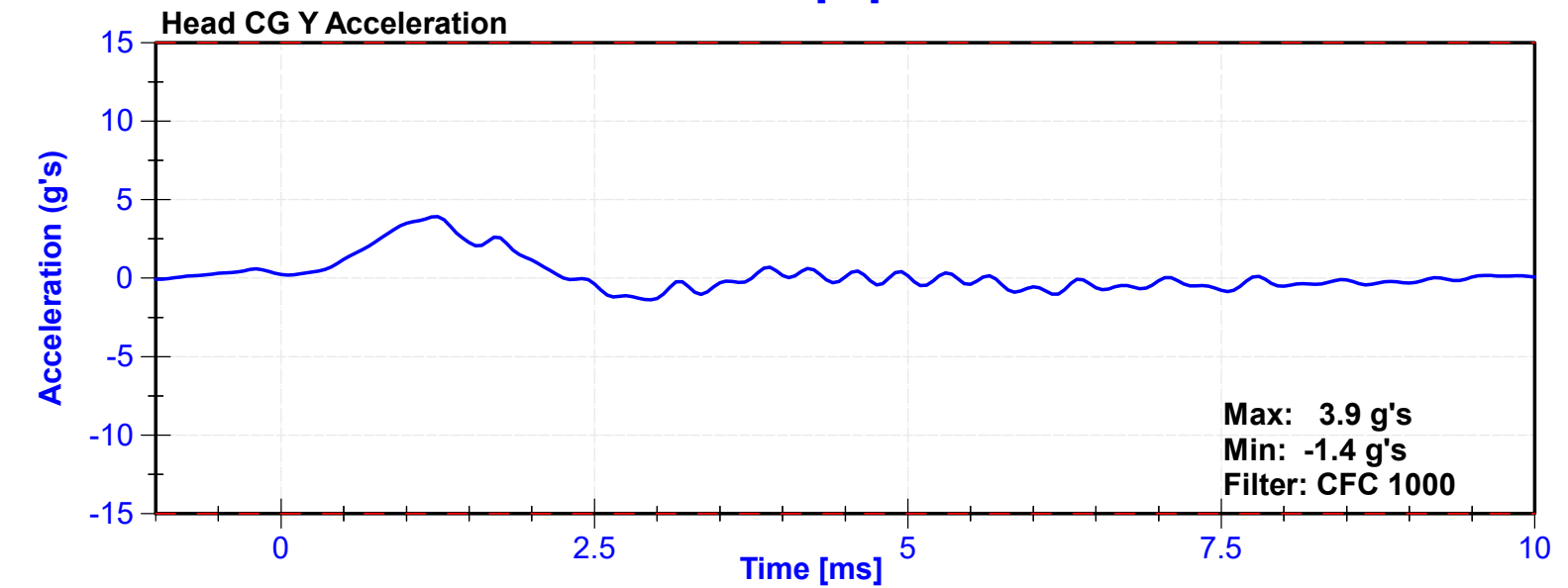
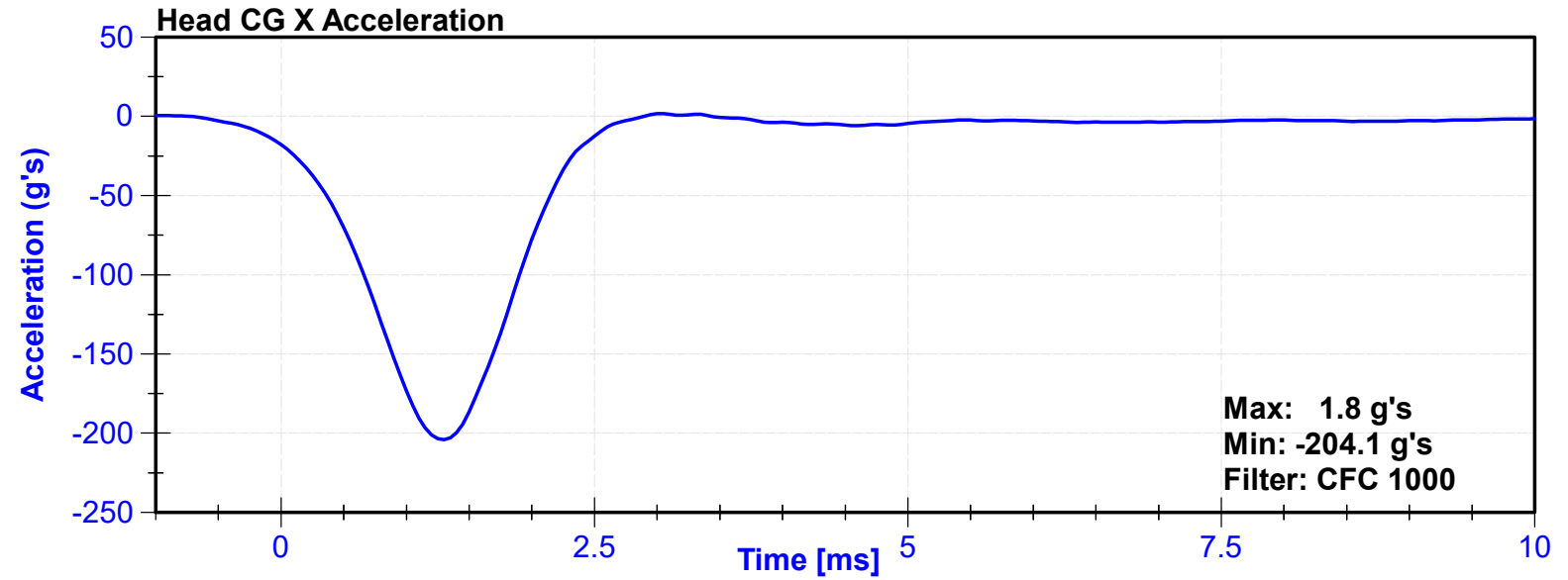
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.0	Pass
Humidity	10	70	%	23.5	Pass
Resultant Acceleration	225	275	g's	241.4	Pass
Oscillation	0	10	%	2.9	Pass
Lateral Acceleration	-15	15	g's	3.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	P51681	9/30/2022	3/29/2023
Y Accelerometer	Endevco	P64151	9/30/2022	3/29/2023
Z Accelerometer	Endevco	P52114	9/30/2022	3/29/2023





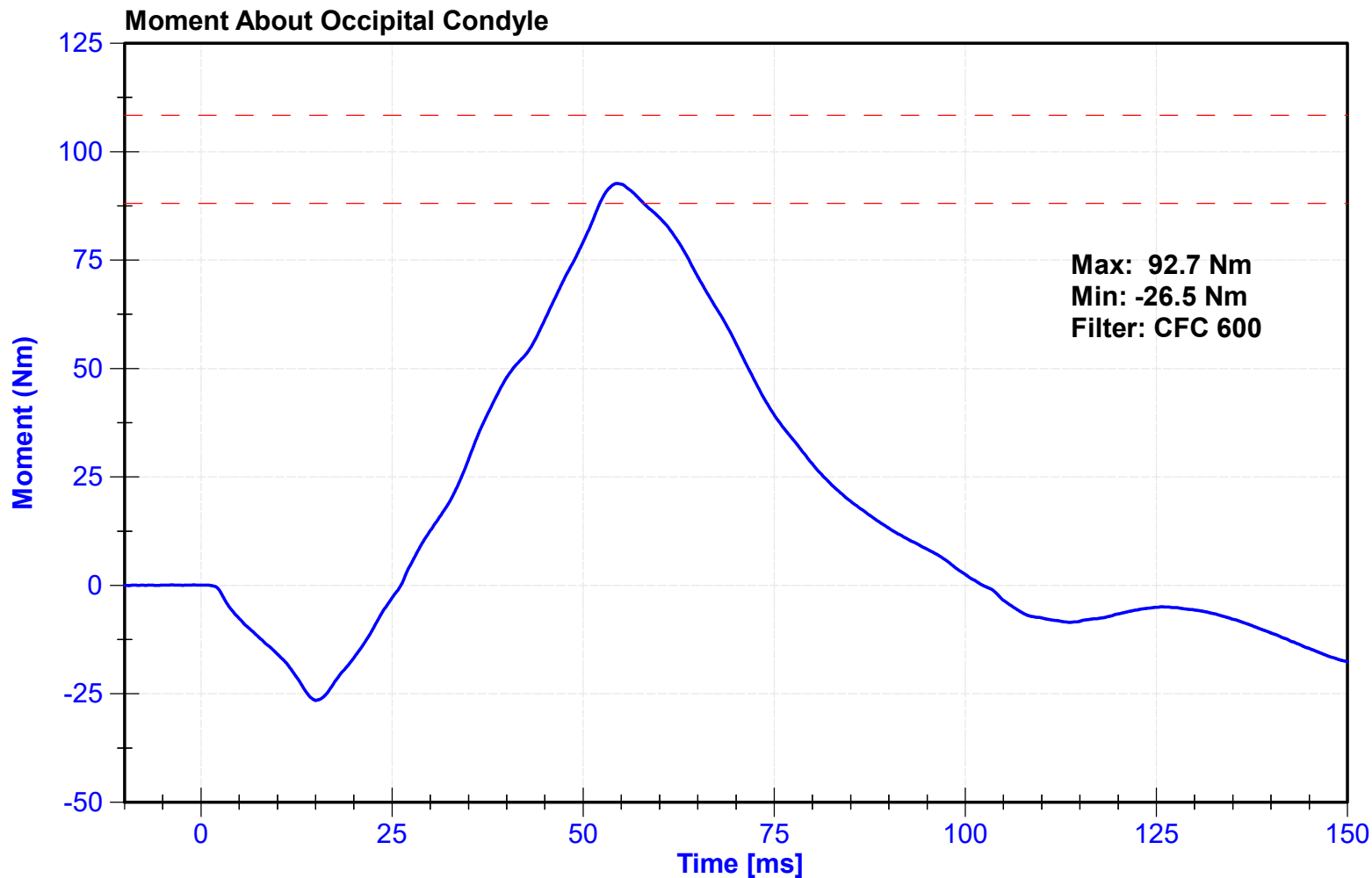
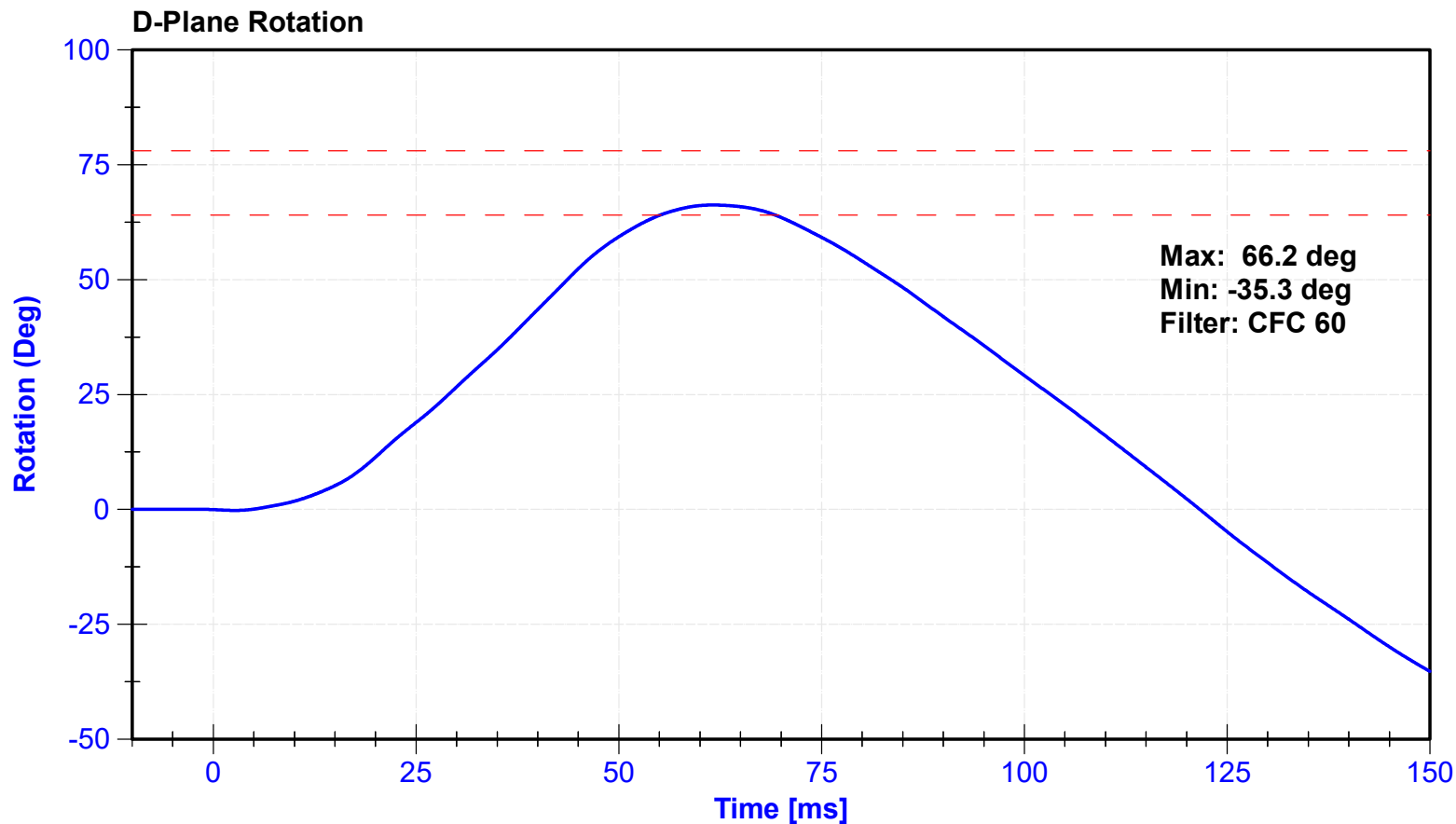
ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

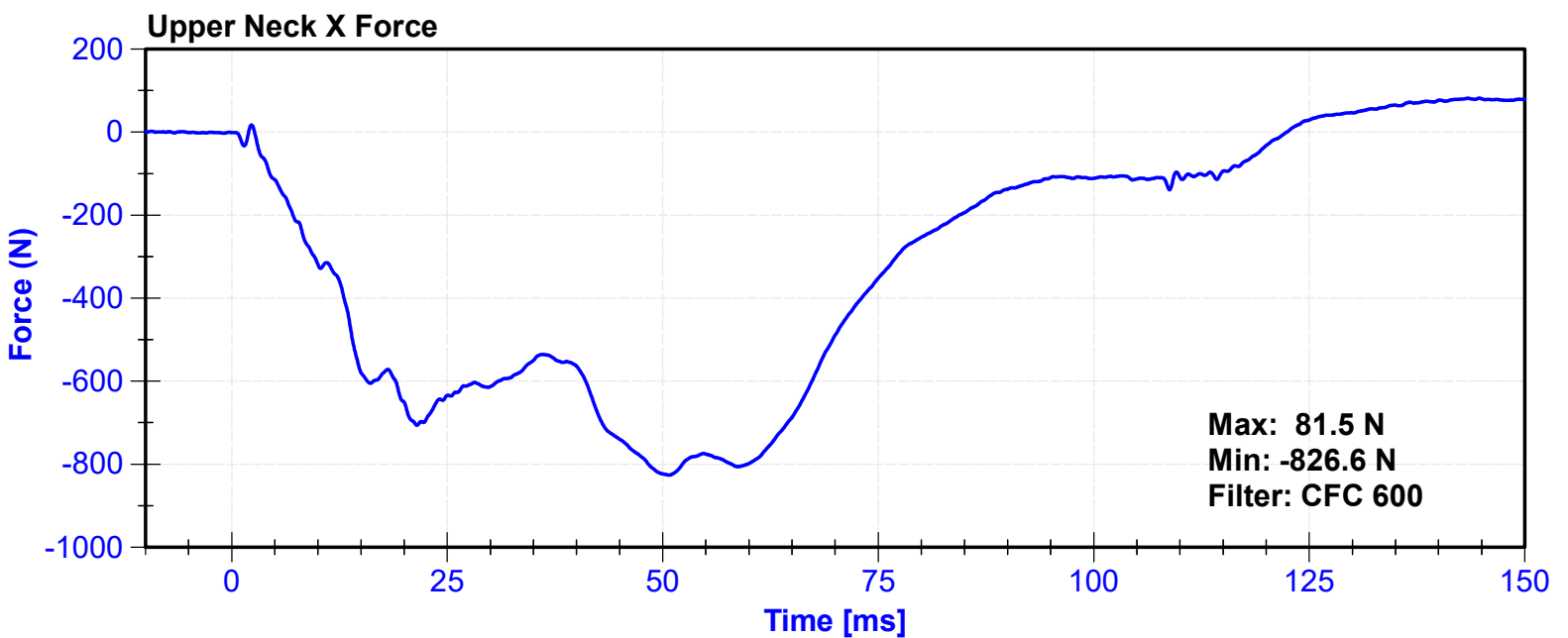
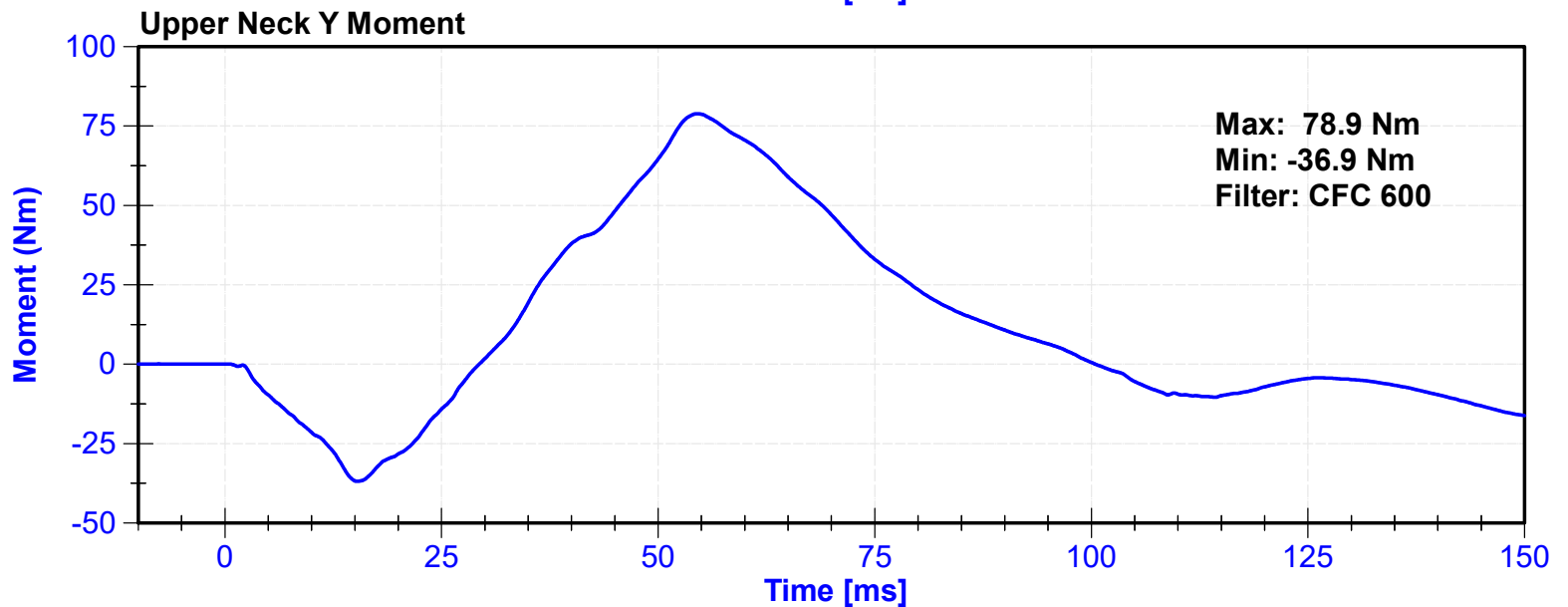
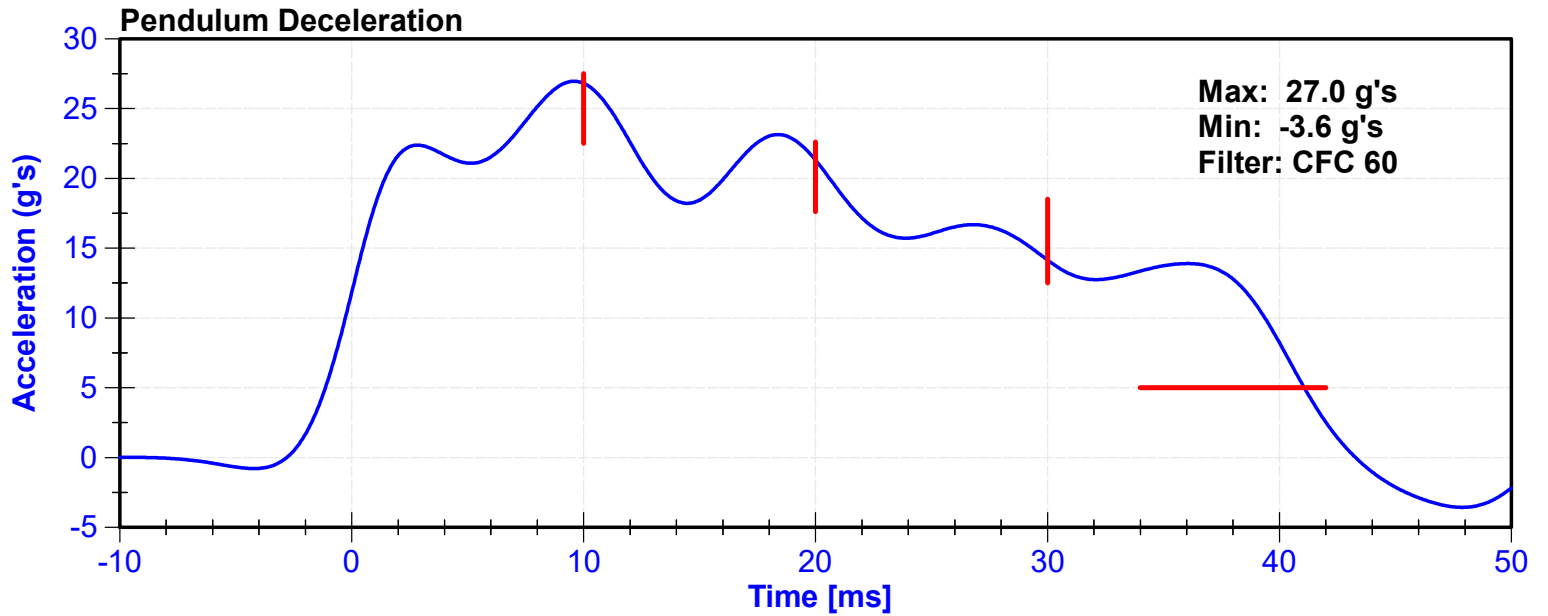
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	23.5	Pass
Velocity	6.89	7.13	m/s	6.931	Pass
Pendulum Deceleration at 10ms	22.5	27.5	g's	26.80	Pass
Pendulum Deceleration at 20ms	17.6	22.6	g's	21.29	Pass
Pendulum Deceleration at 30ms	12.5	18.5	g's	14.14	Pass
Max. Pendulum Deceleration After 30ms	0	29	g's	27.0	Pass
Pendulum Deceleration Time to 5 g's	34	42	ms	41.1	Pass
Maximum D Plane Rotation	64	78	deg	66.2	Pass
Time to Maximum Rotation	57	64	ms	61.6	Pass
Rotation Decay to Zero	113	127	ms	121.7	Pass
Moment About Occipital Condyle	88.1	108.4	Nm	92.67	Pass
Time to Maximum Moment	47	58	ms	54.4	Pass
Moment Decay to Zero	97	107	ms	102.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	7231C-750	10/31/2022	4/29/2023
Pendulum Potentiometer	ETI	LABPOT1	5/9/2022	5/9/2023
Condyle Potentiometer	ETI	LABPOT2	5/9/2022	5/9/2023
Upper Neck Load Cell	Denton	2187-FX	6/13/2022	6/13/2023





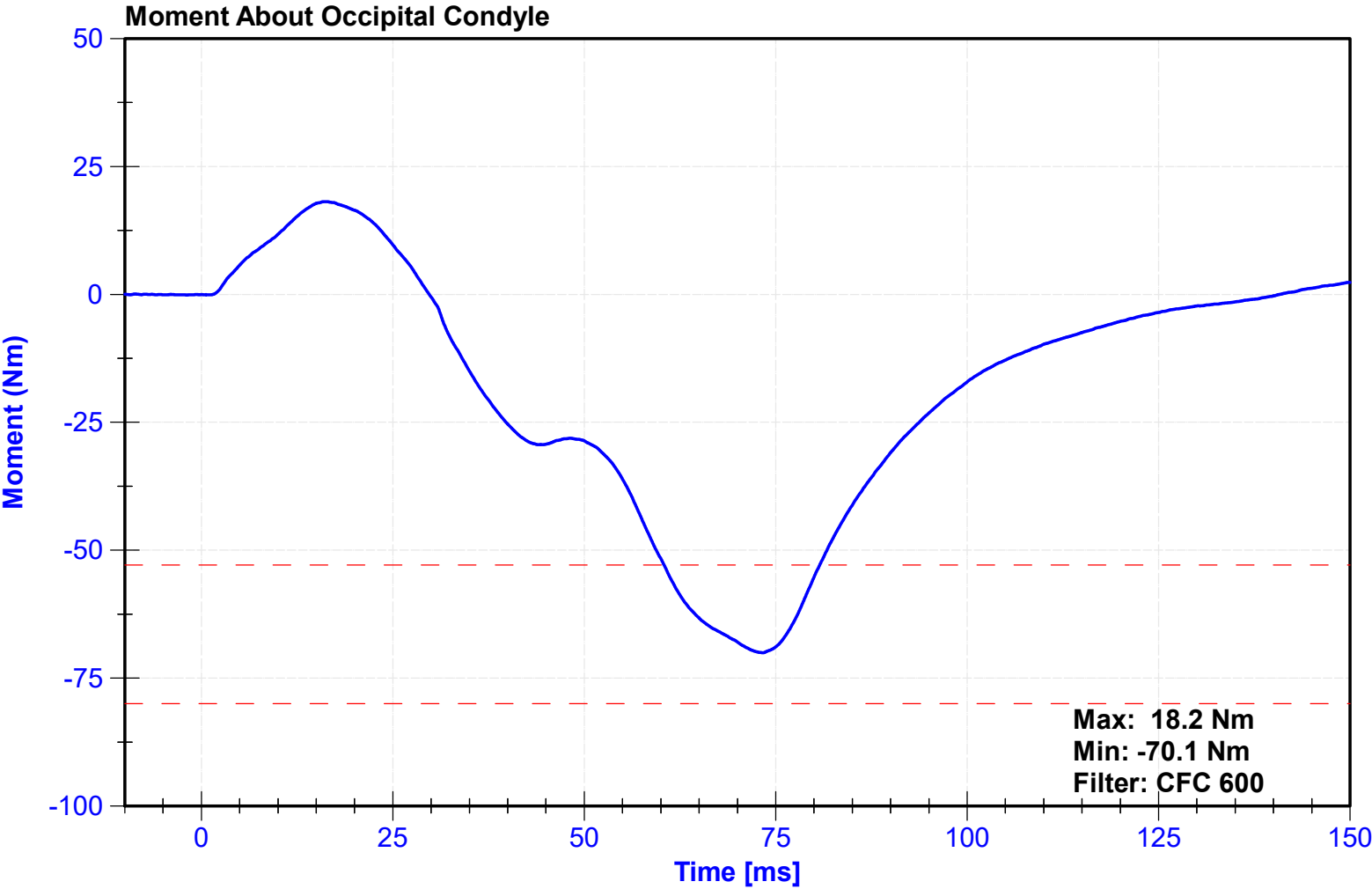
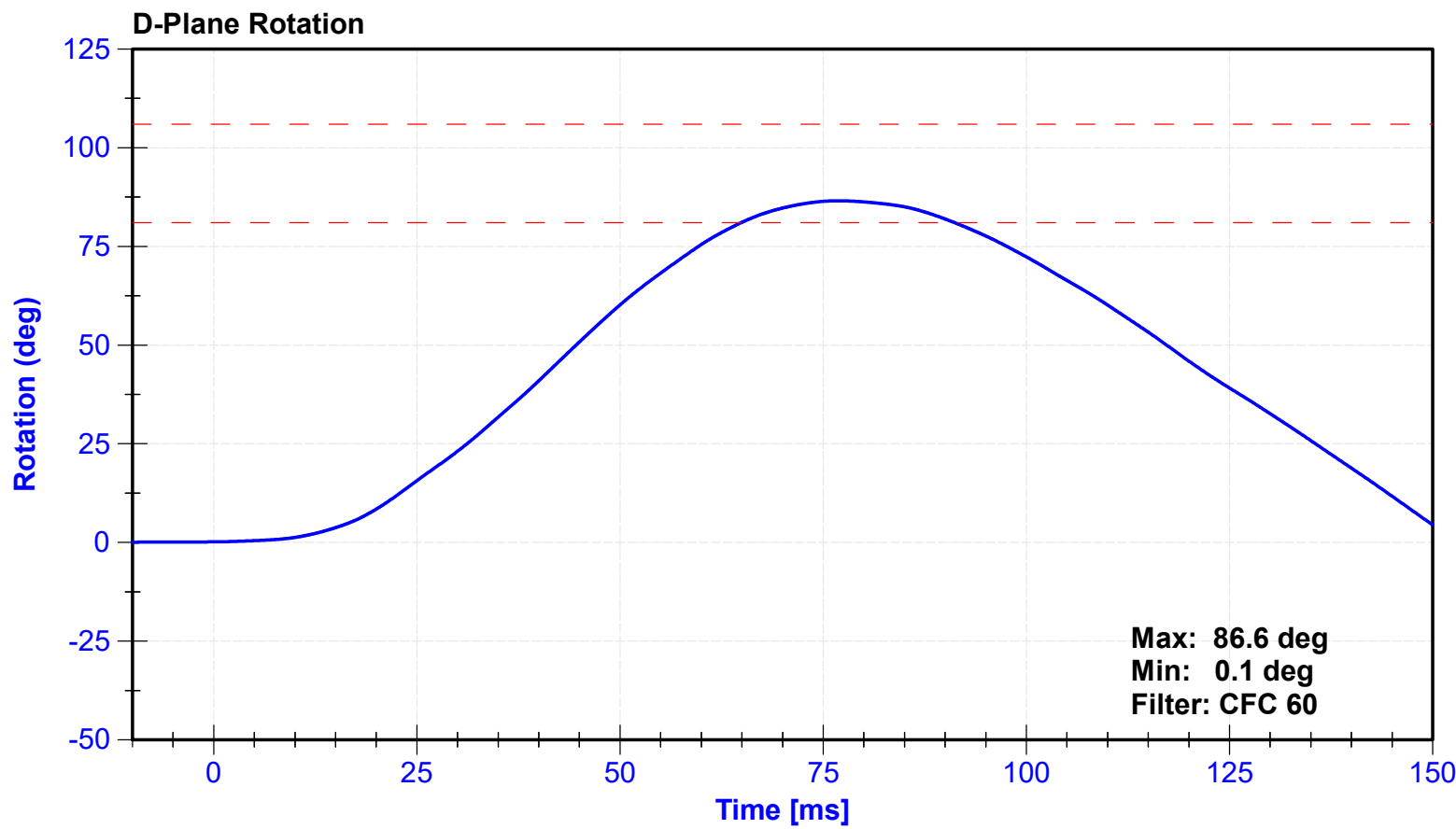
ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

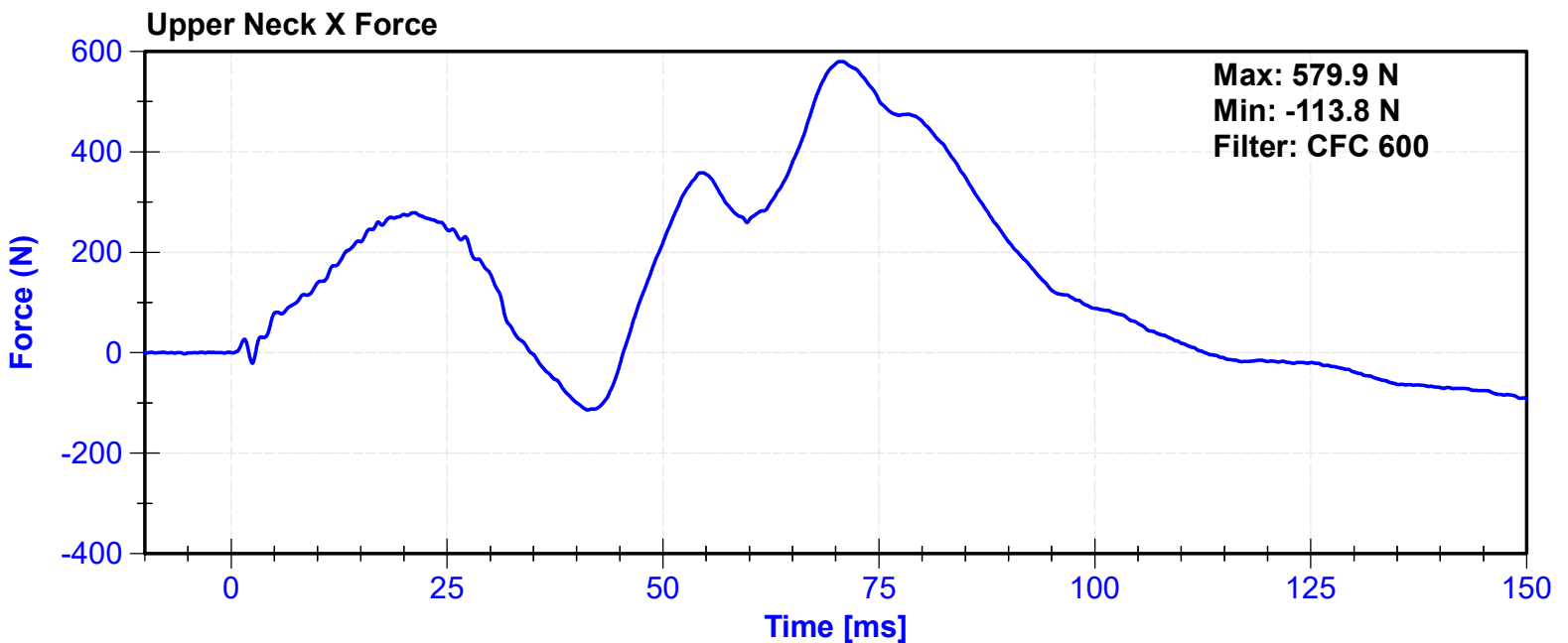
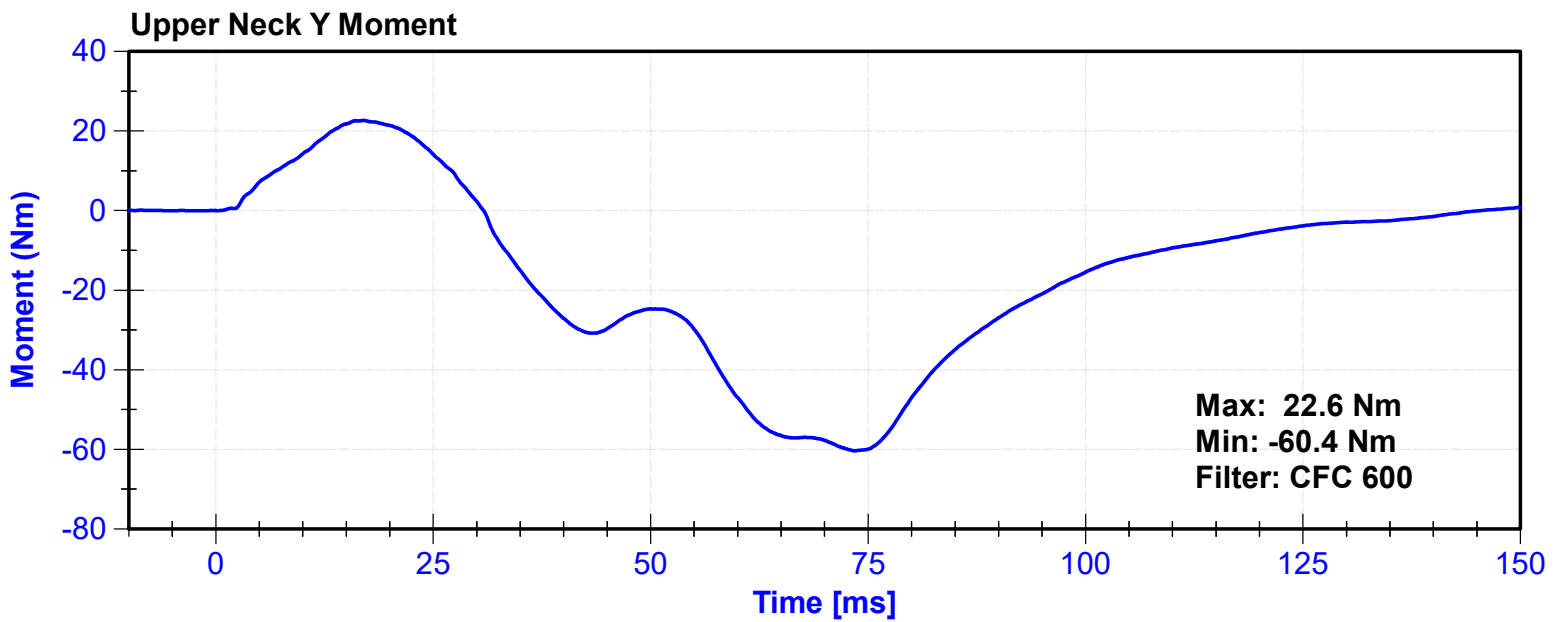
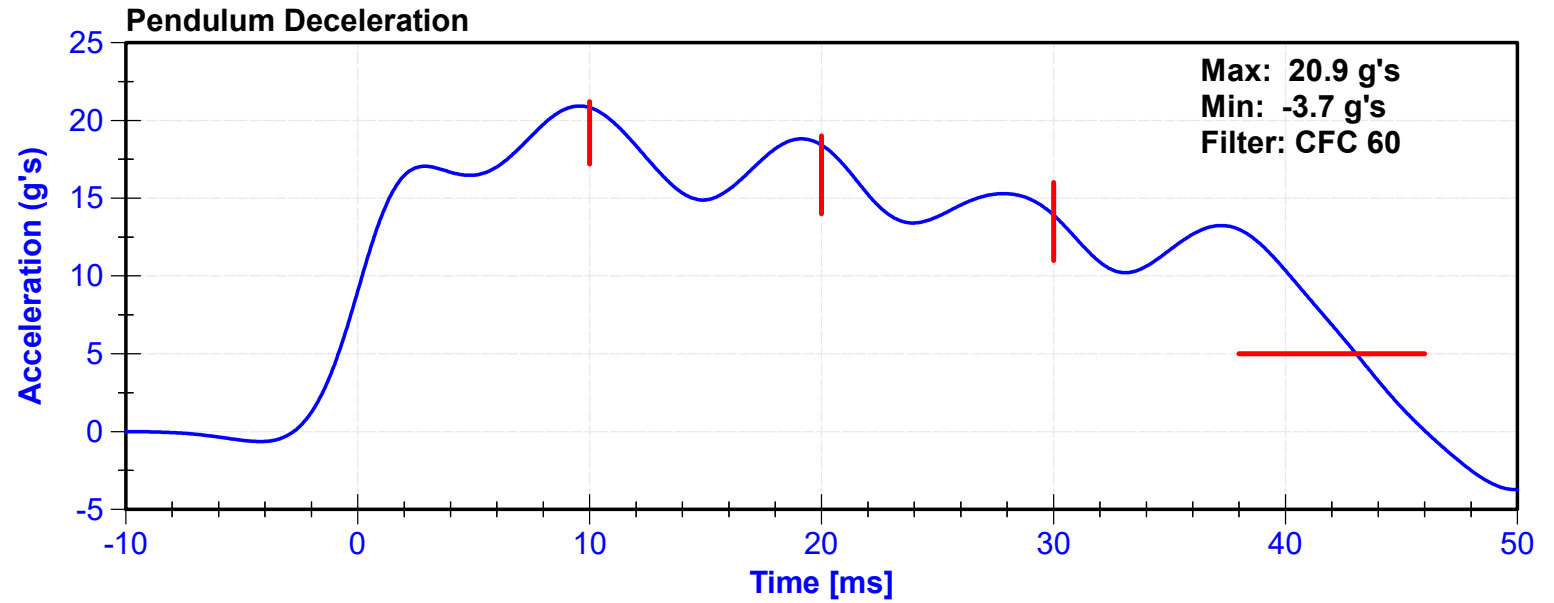
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	23.5	Pass
Velocity	5.94	6.19	m/s	6.025	Pass
Pendulum Deceleration at 10ms	17.2	21.2	g's	20.82	Pass
Pendulum Deceleration at 20ms	14	19	g's	18.4	Pass
Pendulum Deceleration at 30ms	11	16	g's	13.9	Pass
Max. Pendulum Deceleration After 30ms	0	22	g's	20.9	Pass
Pendulum Deceleration Time to 5 g's	38	46	ms	43.0	Pass
Maximum D Plane Rotation	81	106	deg	86.6	Pass
Time to Maximum Rotation	72	82	ms	76.9	Pass
Rotation Decay to Zero	147	174	ms	153.3	Pass
Minimum Moment About OC	-80	-52.9	Nm	-70.06	Pass
Time to Minimum Moment	65	79	ms	73.3	Pass
Moment Decay to Zero	120	148	ms	140.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16650	10/31/2022	4/29/2023
Pendulum Potentiometer	ETI	LABPOT1	5/9/2022	5/9/2023
Condyle Potentiometer	ETI	LABPOT2	5/9/2022	5/9/2023
Upper Neck Load Cell	Denton	2187-FX	6/13/2022	6/13/2023





ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

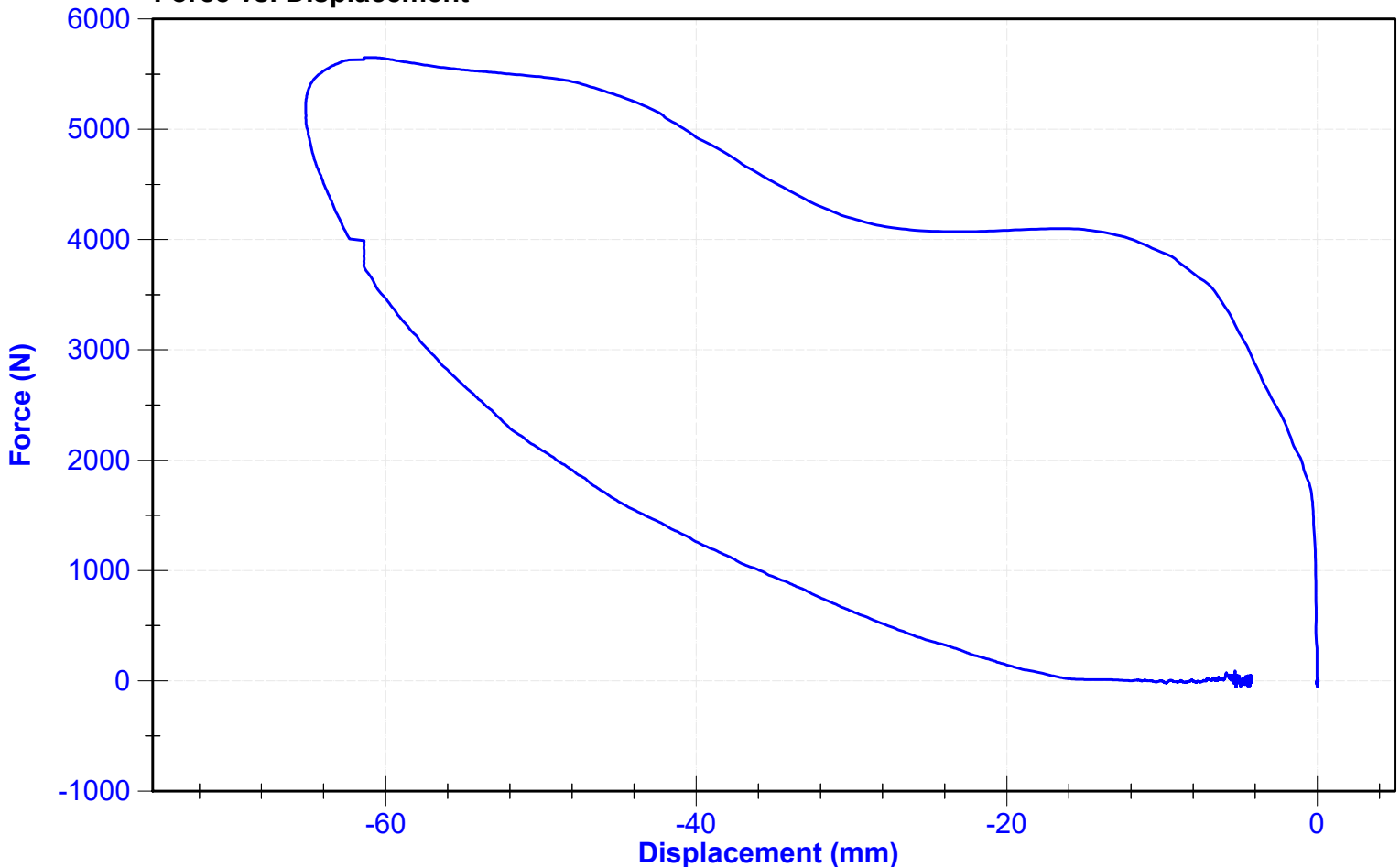
Results

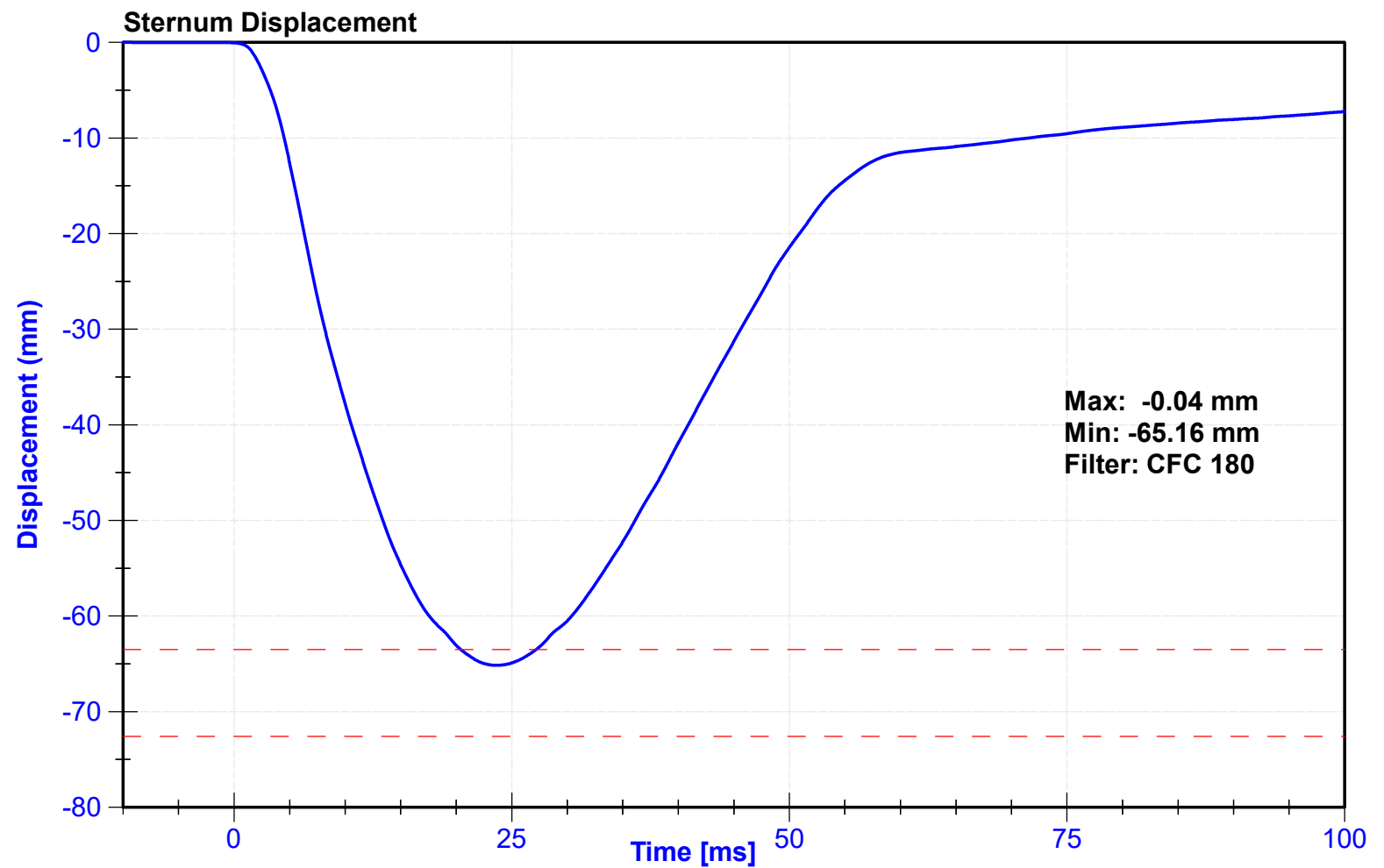
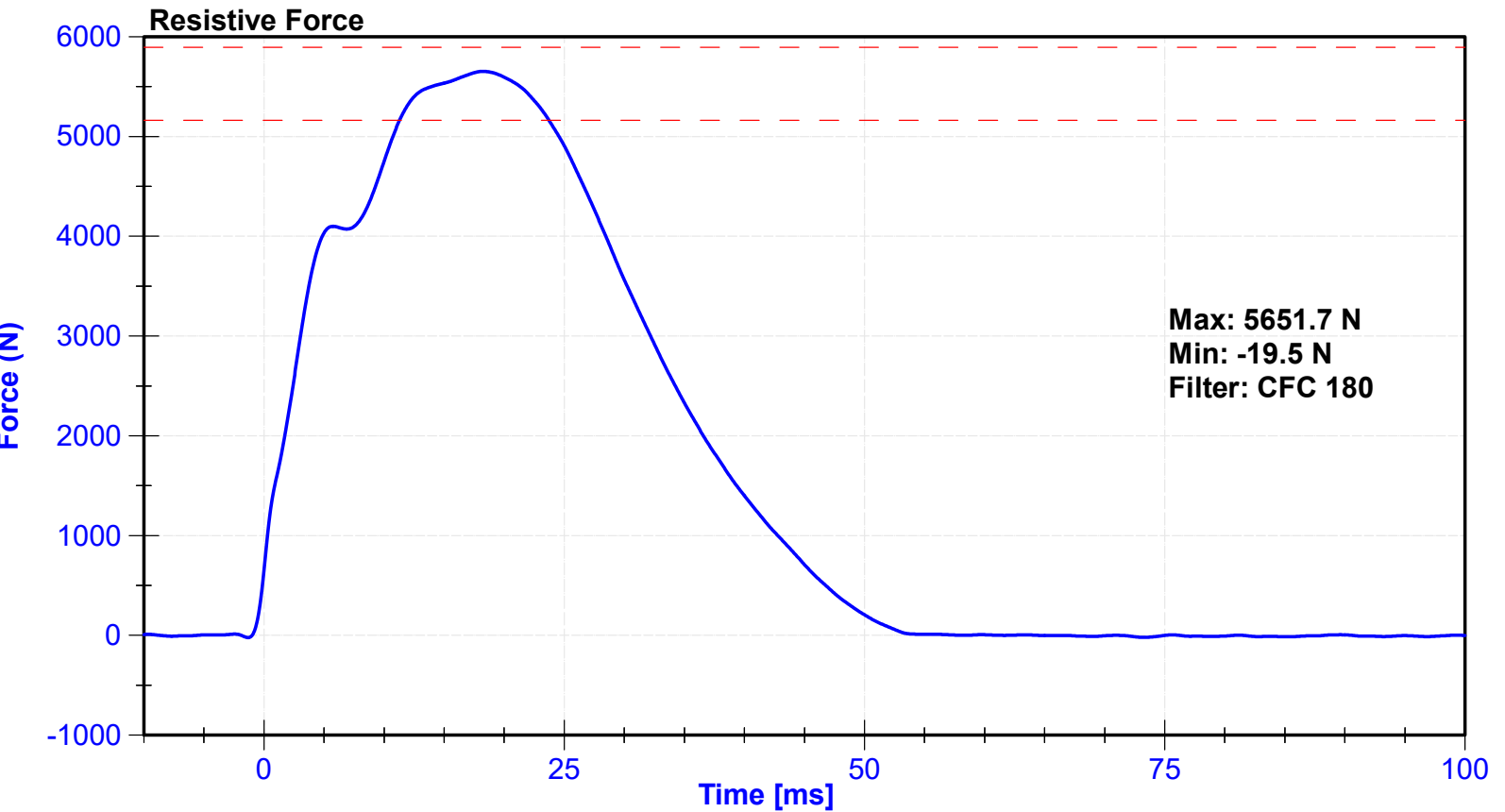
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.2	Pass
Humidity	10	70	%	25.5	Pass
Velocity	6.59	6.83	m/s	6.685	Pass
Chest Displacement	-72.6	-63.5	mm	-65.16	Pass
Resistive Force	5160	5894	N	5651.7	Pass
Hysteresis	69	85	%	73.3	Pass

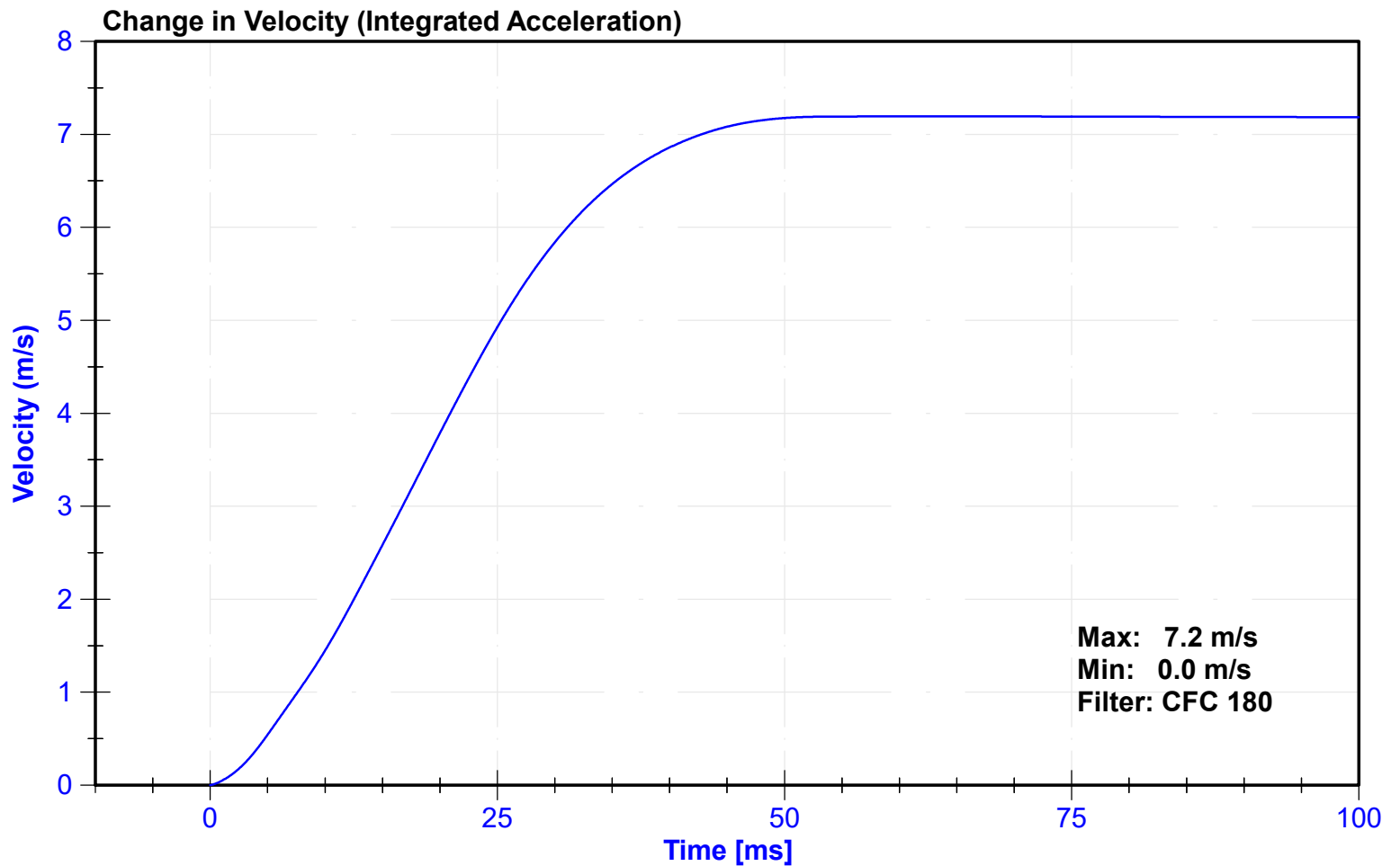
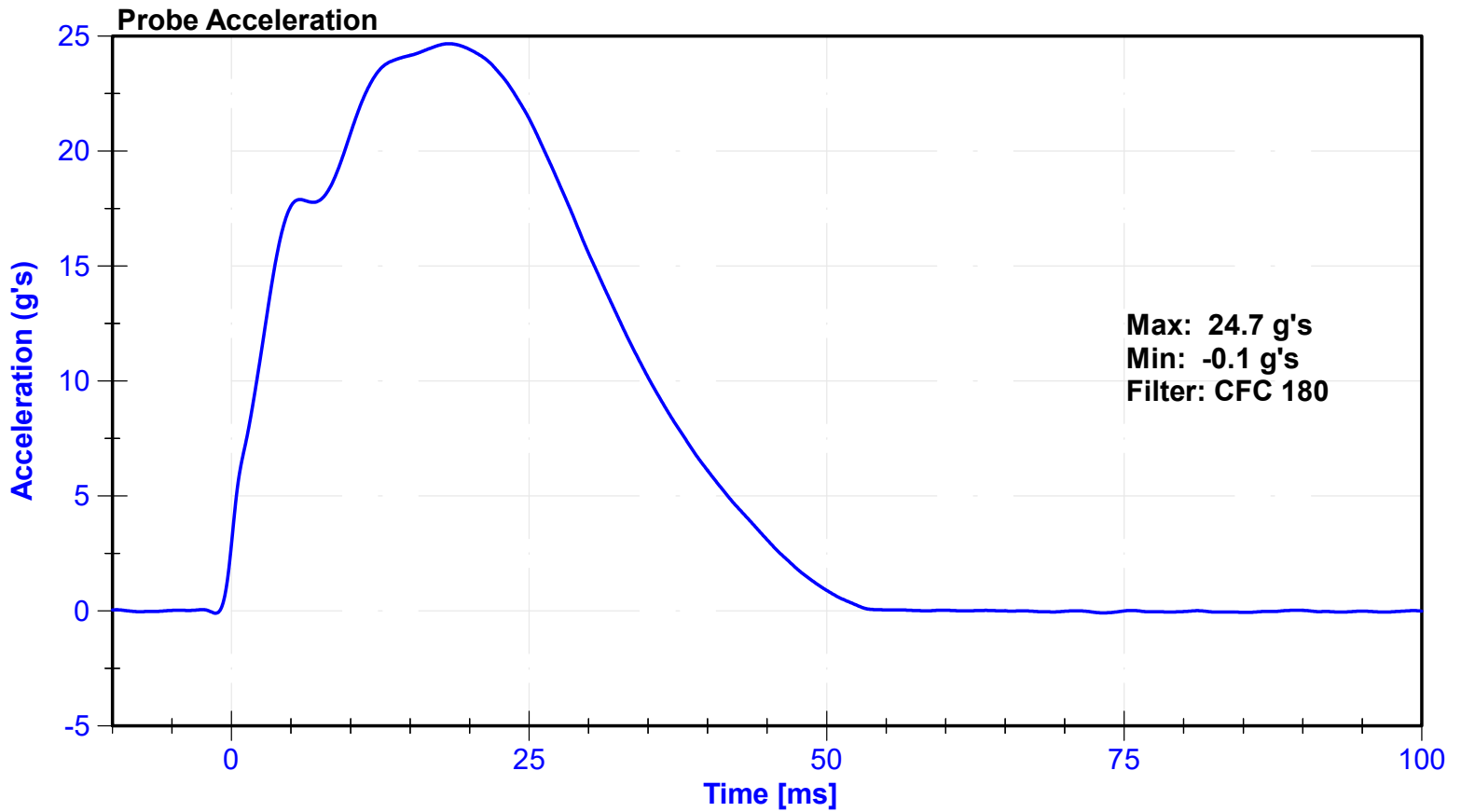
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	P51736	10/25/2022	10/25/2023
Chest Potentiometer	JDK	0075	10/3/2022	4/3/2023

Force vs. Displacement



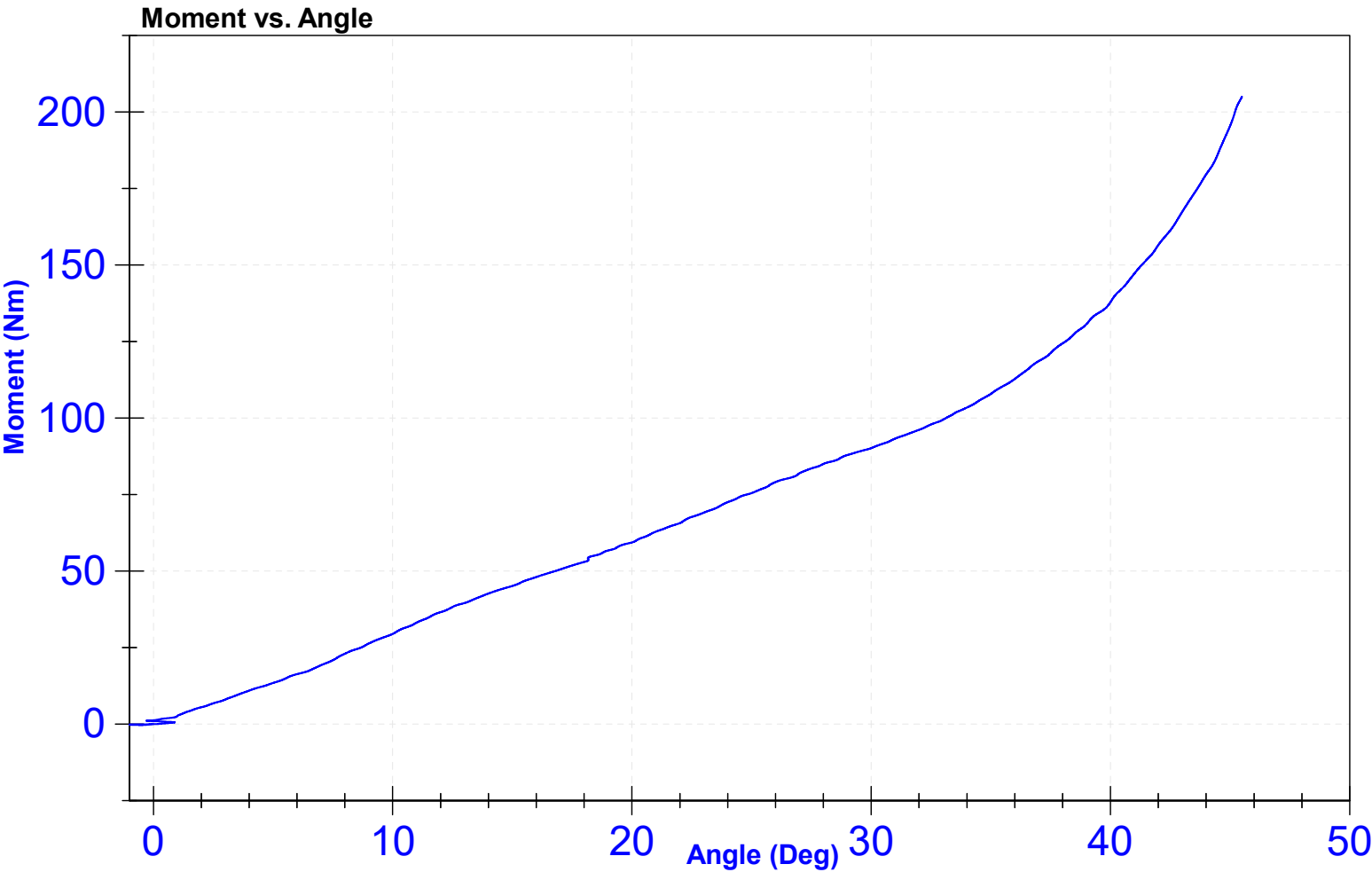




ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

Results					
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.0	Pass
Humidity	10	70	%	23.5	Pass
Average Velocity	5	10	deg/s	7.0	Pass
Angle at 203Nm	40	50	deg	45.4	Pass
Moment at 30 degrees	0	94.9	Nm	90.2	Pass

Transducer Calibrations				
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	ETI SP22	DS-0008	10/4/2022	10/4/2023
Load Cell	PCB 2301-02	2301-02_115	2022-09-06	2023-09-06

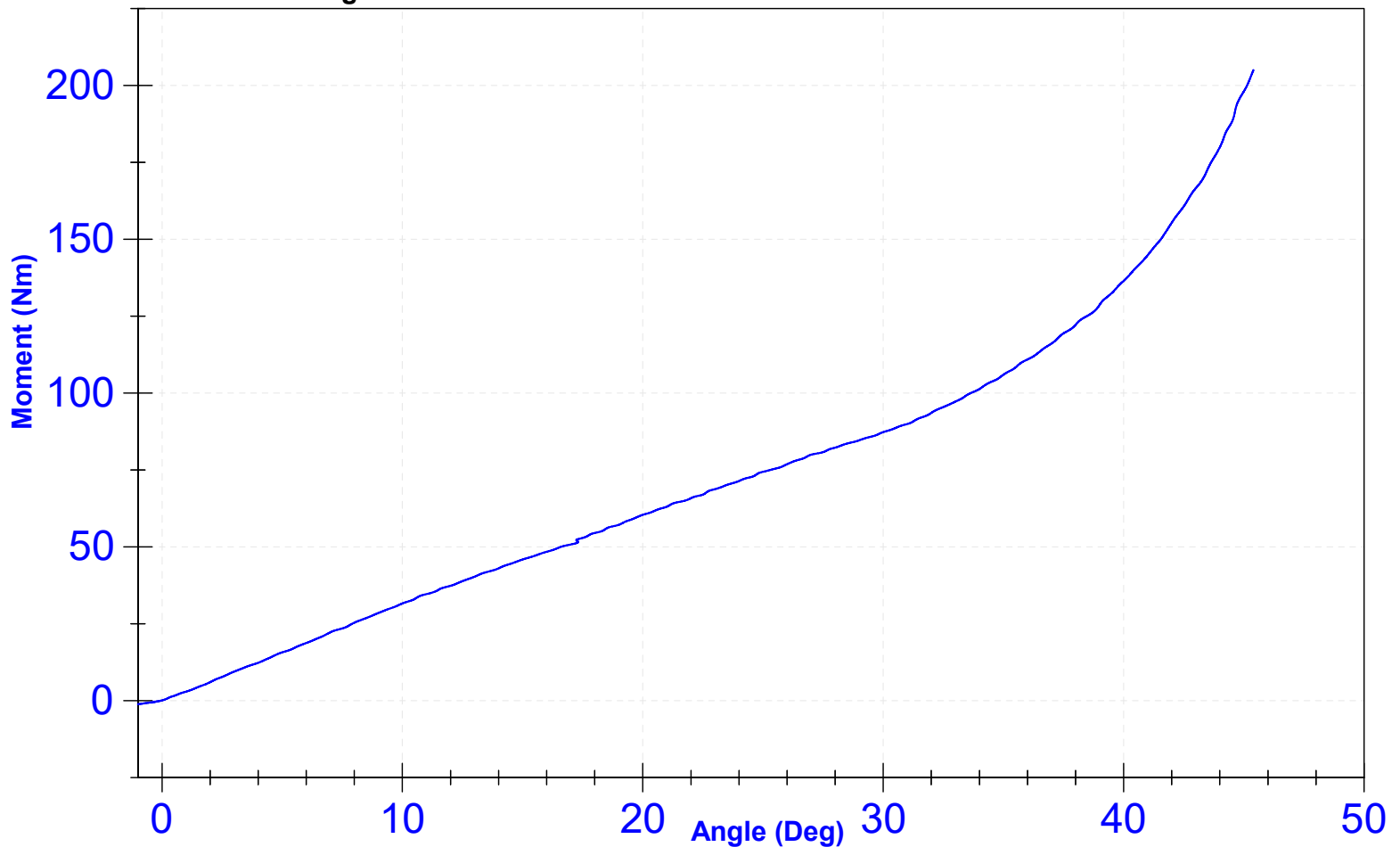


ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

Test Parameter	Results		Unit	Result	Pass/Fail
	Minimum Specification	Maximum Specification			
Temperature	18.9	25.6	°C	21.0	Pass
Humidity	10	70	%	23.5	Pass
Average Velocity	5	10	deg/s	7.3	Pass
Angle at 203Nm	40	50	deg	45.3	Pass
Moment at 30 degrees	0	94.9	Nm	87.3	Pass

Transducer Calibrations				
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	ETI SP22	DS-0008	10/4/2022	10/4/2023
Load Cell	PCB 2301-02	2301-02_115	2022-09-06	2023-09-06

Moment vs. Angle



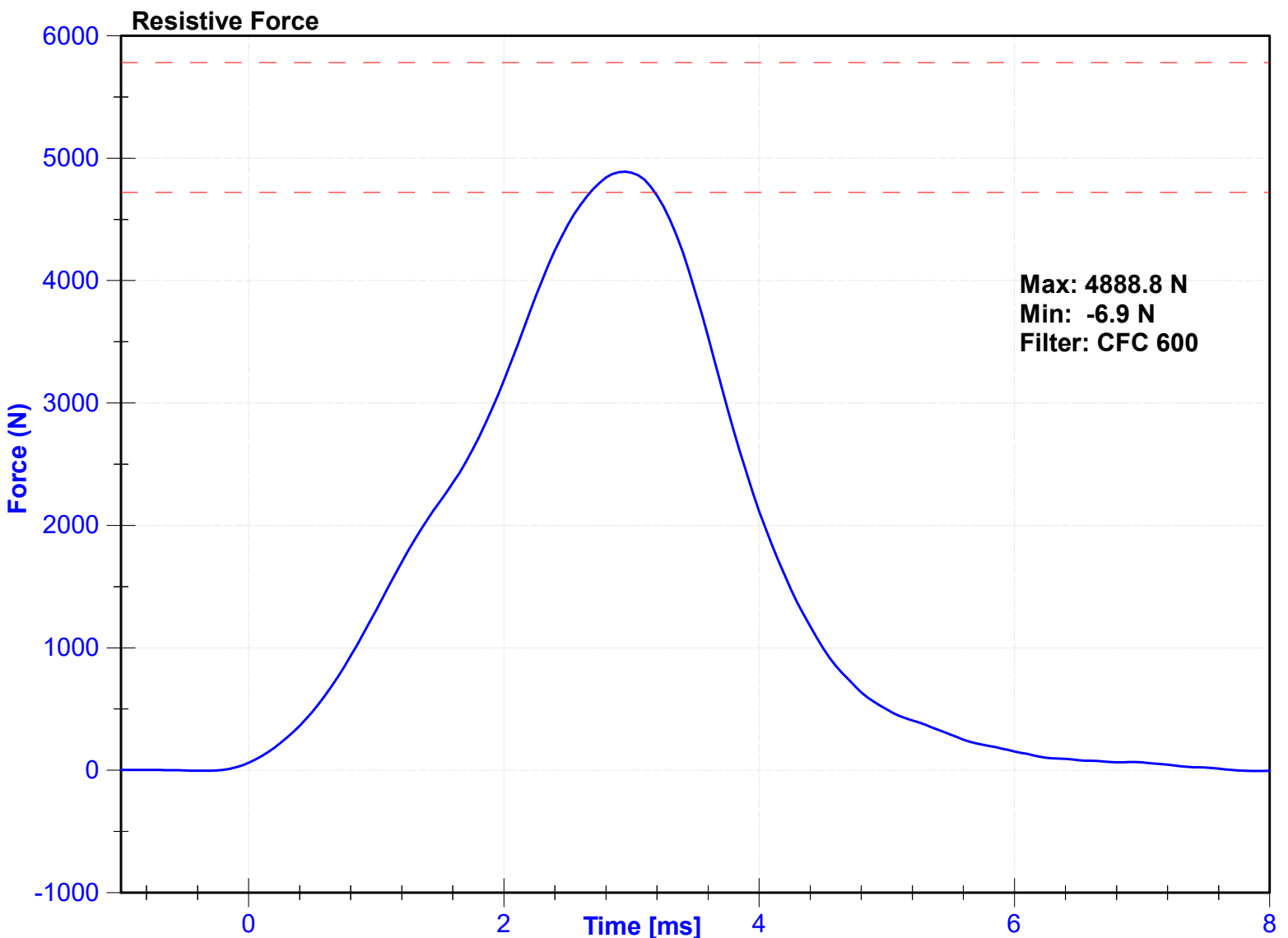
ATD Manufacturer	Humanetics	Test Technician	T. Roseman
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

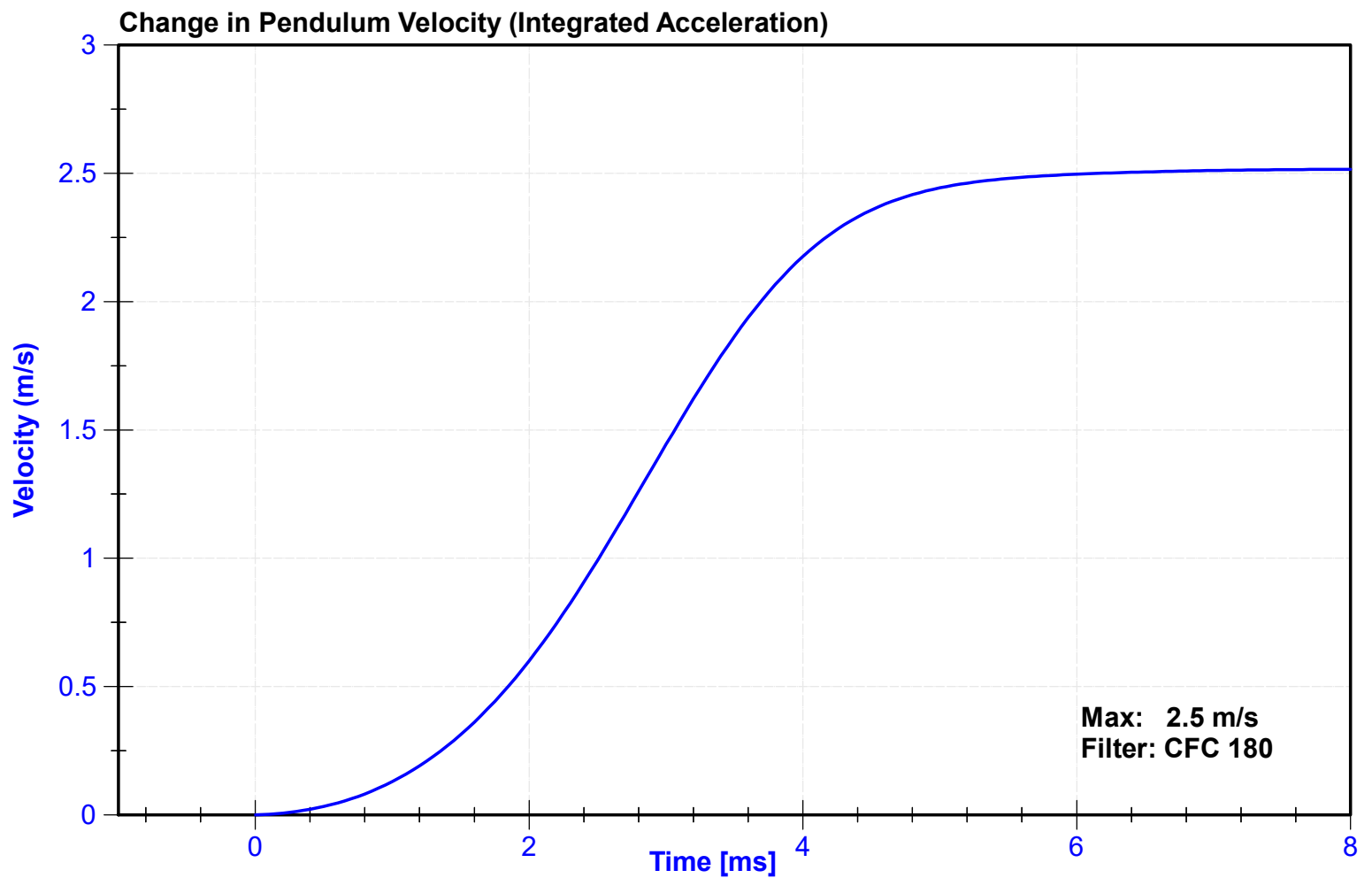
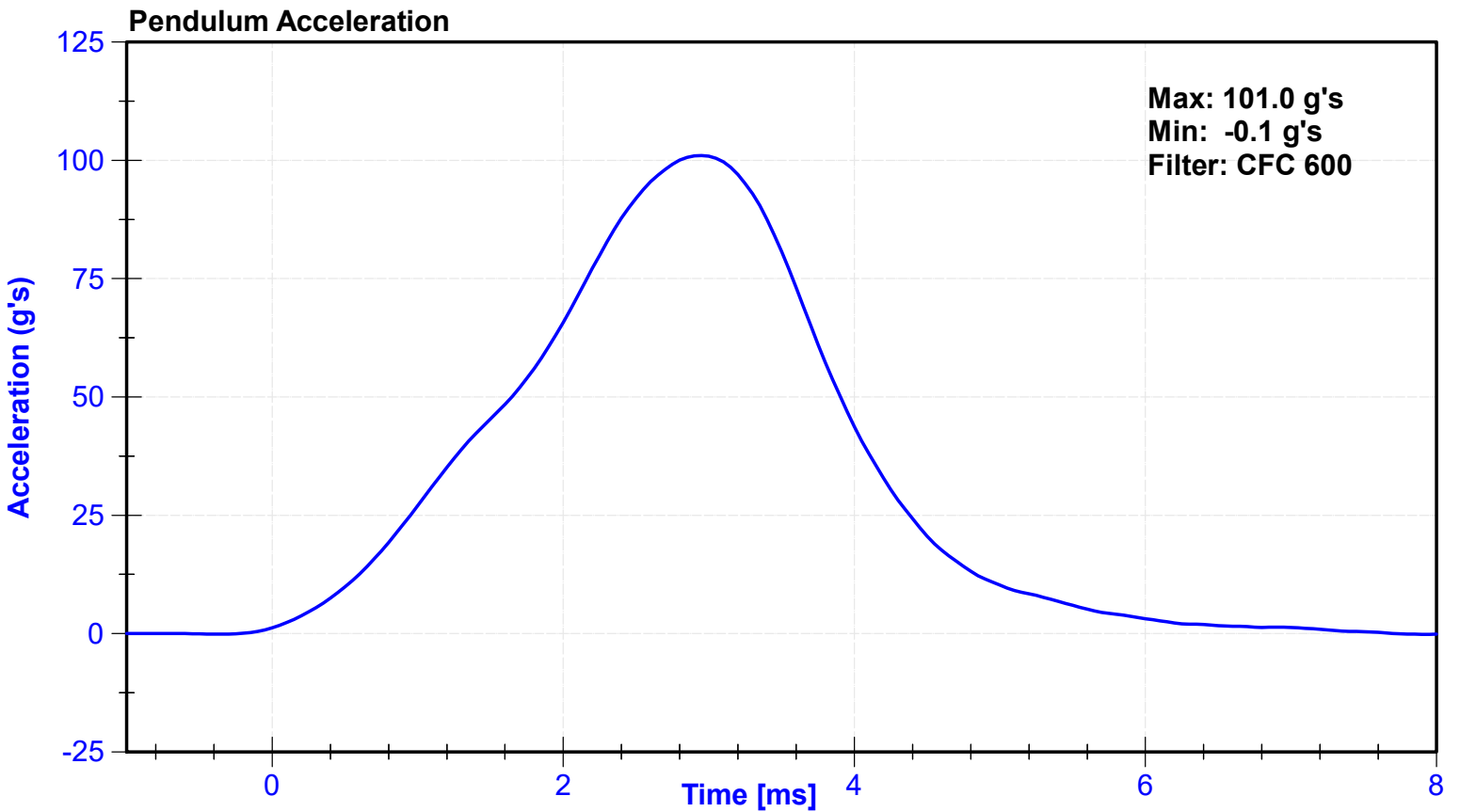
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.9	Pass
Humidity	10	70	%	24.3	Pass
Velocity	2.07	2.13	m/s	2.072	Pass
Maximum Resistive Force	4720	5780	N	4888.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18546	11/19/2022	5/18/2023





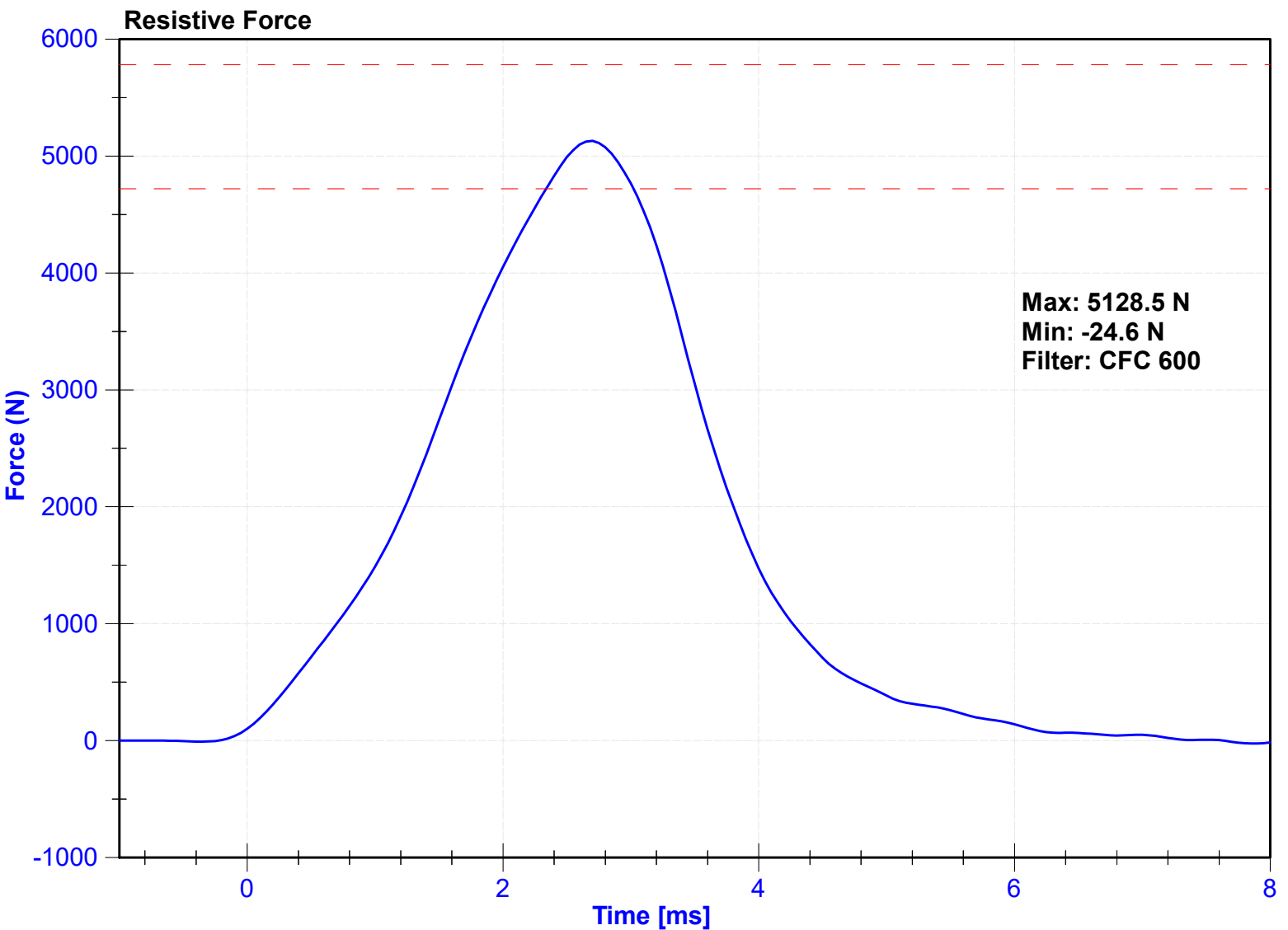
ATD Manufacturer	Humanetics	Test Technician	T. Roseman
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

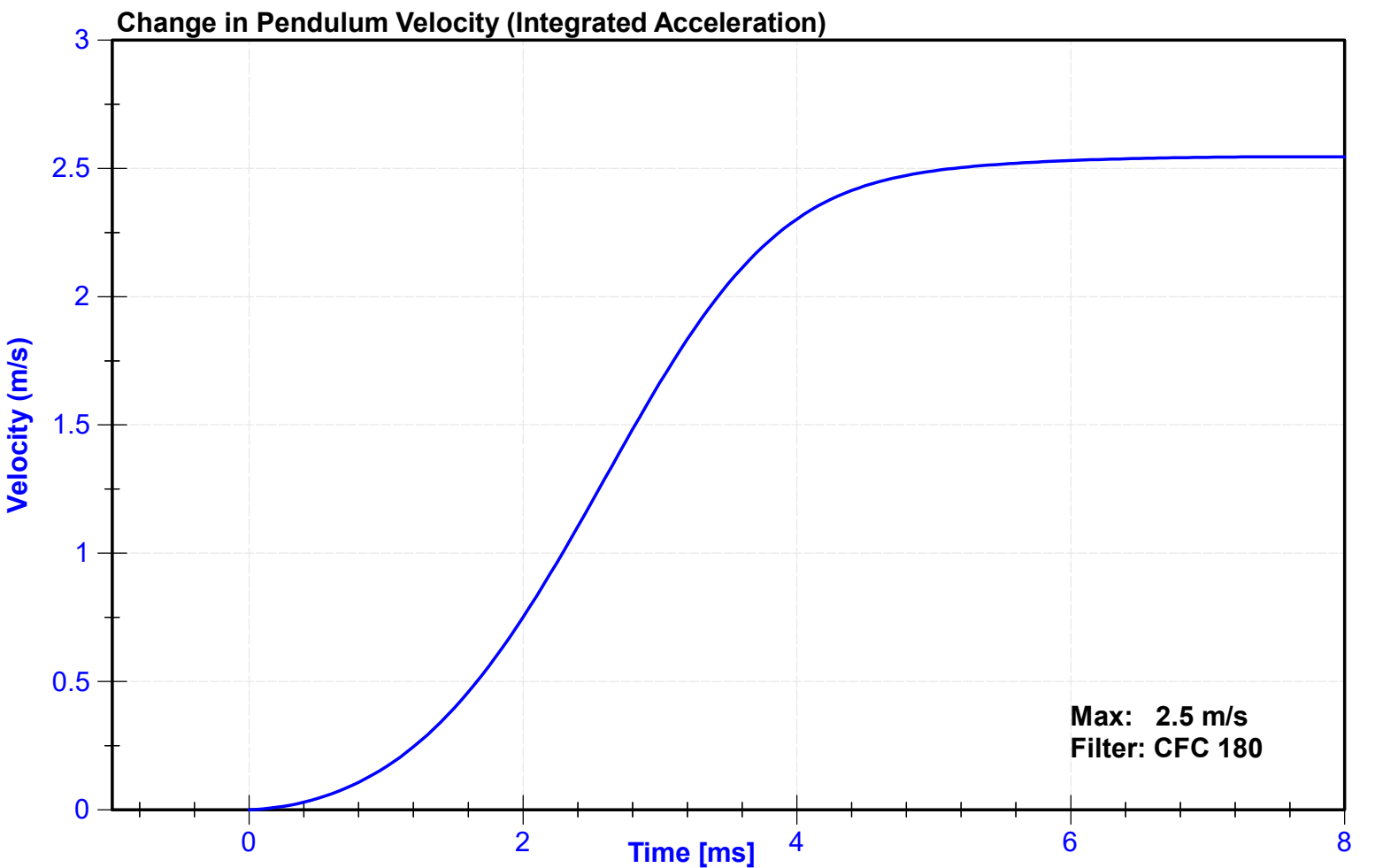
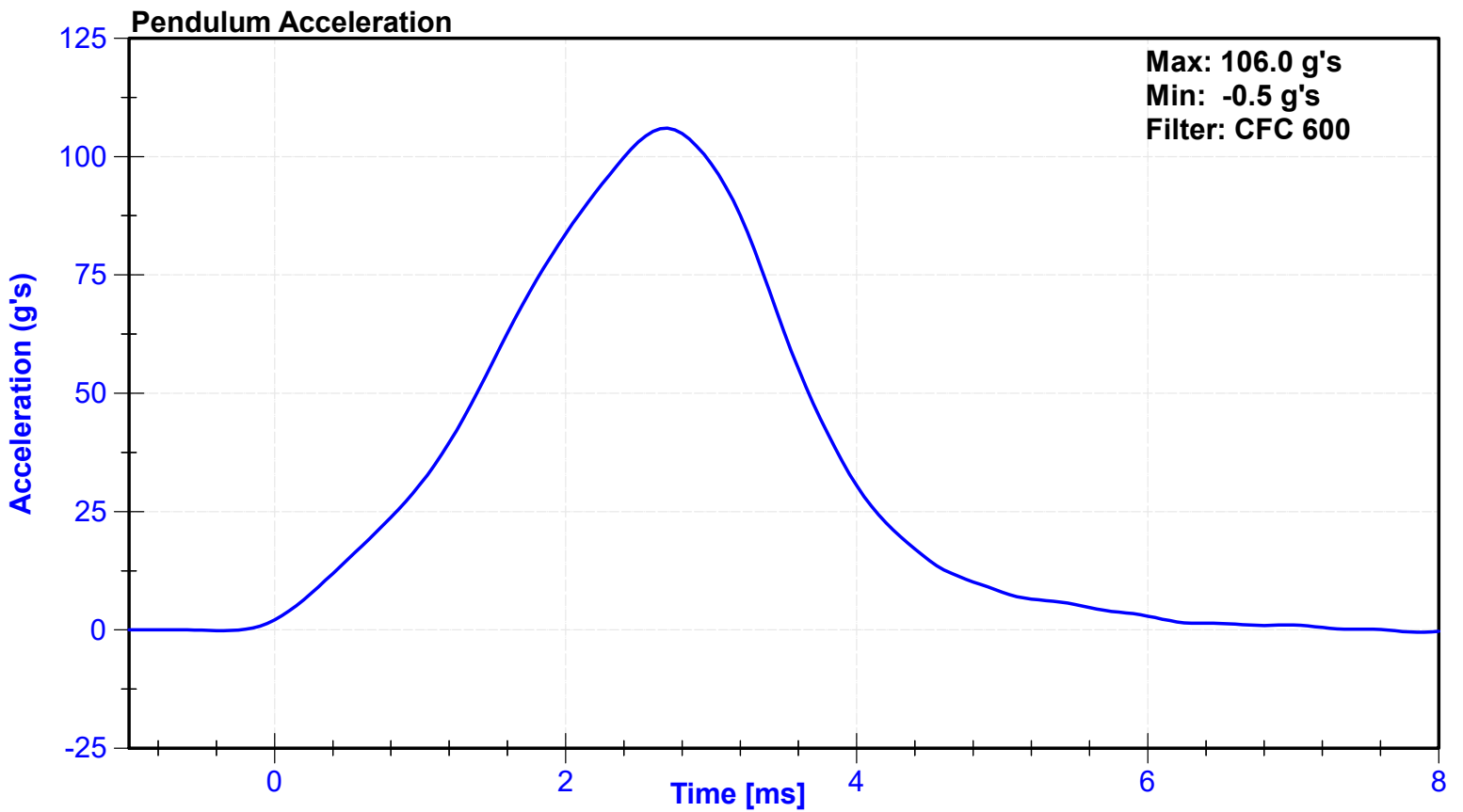
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.9	Pass
Humidity	10	70	%	24.3	Pass
Velocity	2.07	2.13	m/s	2.100	Pass
Maximum Resistive Force	4720	5780	N	5128.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18546	11/19/2022	5/18/2023





CALIBRATION TEST RESULTS

POST-TEST

HYBRID III 5TH PERCENTILE FEMALE - PASSENGER ATD

SERIAL NO: 137

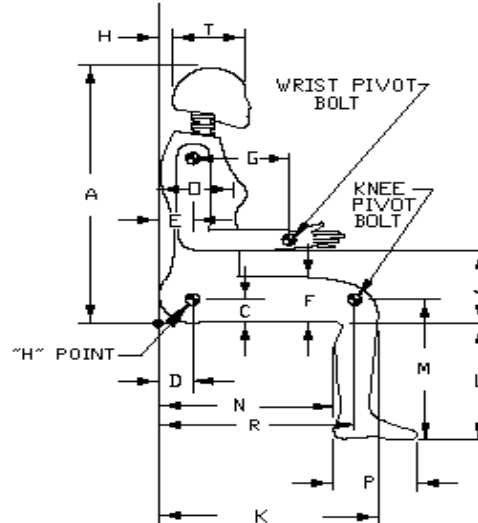
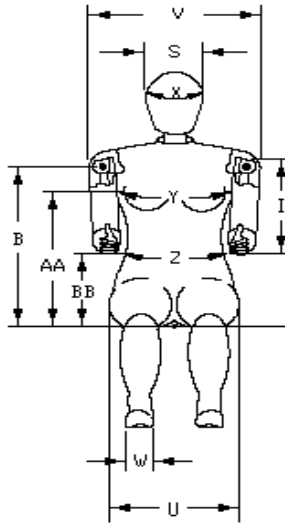


External Measurements - Hybrid 3 - 5th Female

Technician: K. Brogan

Date: 02/21/2023

Dummy Serial Number: 137



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	775	800	788	Pass
B	Shoulder Pivot Height	432	457	445	Pass
C	H-Point Height	81	86	85	Pass
D	H-Point from Backline	145	150	146	Pass
E	Shoulder Pivot from Backline	69	84	76	Pass
F	Thigh Clearance	119	135	128	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	289	Pass
J	Elbow Rest Height	183	203	195	Pass
K	Buttock to Knee Length	521	546	538	Pass
L	Popliteal Height	356	376	368	Pass
M	Knee Pivot Height	394	419	409	Pass
N	Buttock Popliteal Length	414	439	426	Pass
O	Chest Depth without Jacket	175	191	183	Pass
P	Foot Length (right)	219	234	230	Pass
R	Buttock To Knee Pivot Length	457	483	467	Pass
S	Head Breadth	137	147	143	Pass
T	Head Depth	178	188	184	Pass
U	Hip Breadth	300	315	311	Pass
V	Shoulder Breadth	351	366	358	Pass
W	Foot Breadth	79	94	85	Pass
X	Head Circumference	528	549	543	Pass
Y	Chest Circumference with Jacket	851	881	872	Pass
Z	Waist Circumference	460	790	652	Pass
AA	Reference Location (Chest Circumference)	333	358	347	Pass
BB	Reference Location (Waist Circumference)	160	170	165	Pass

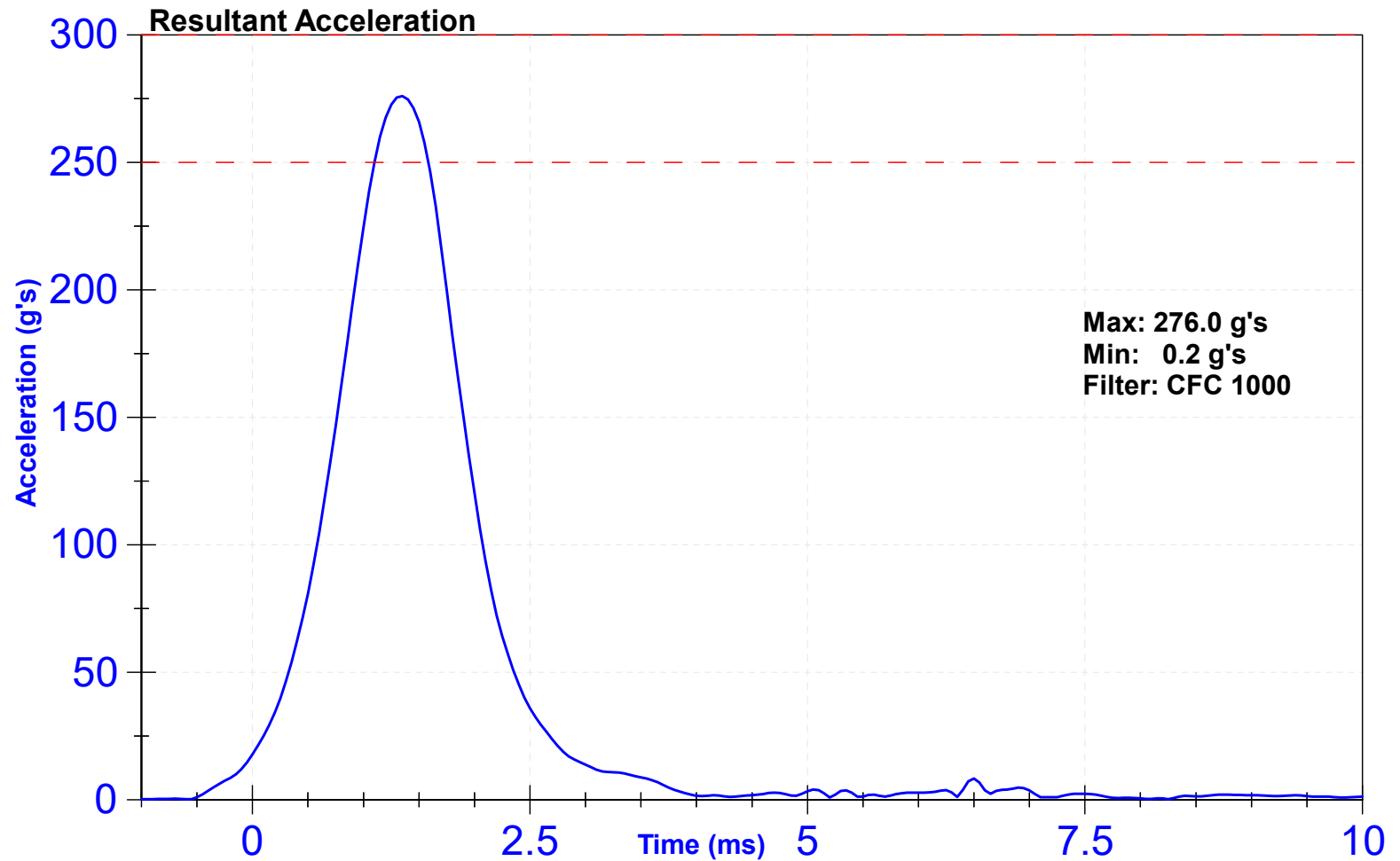
ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	137	Laboratory Supervisor	K. Brogan

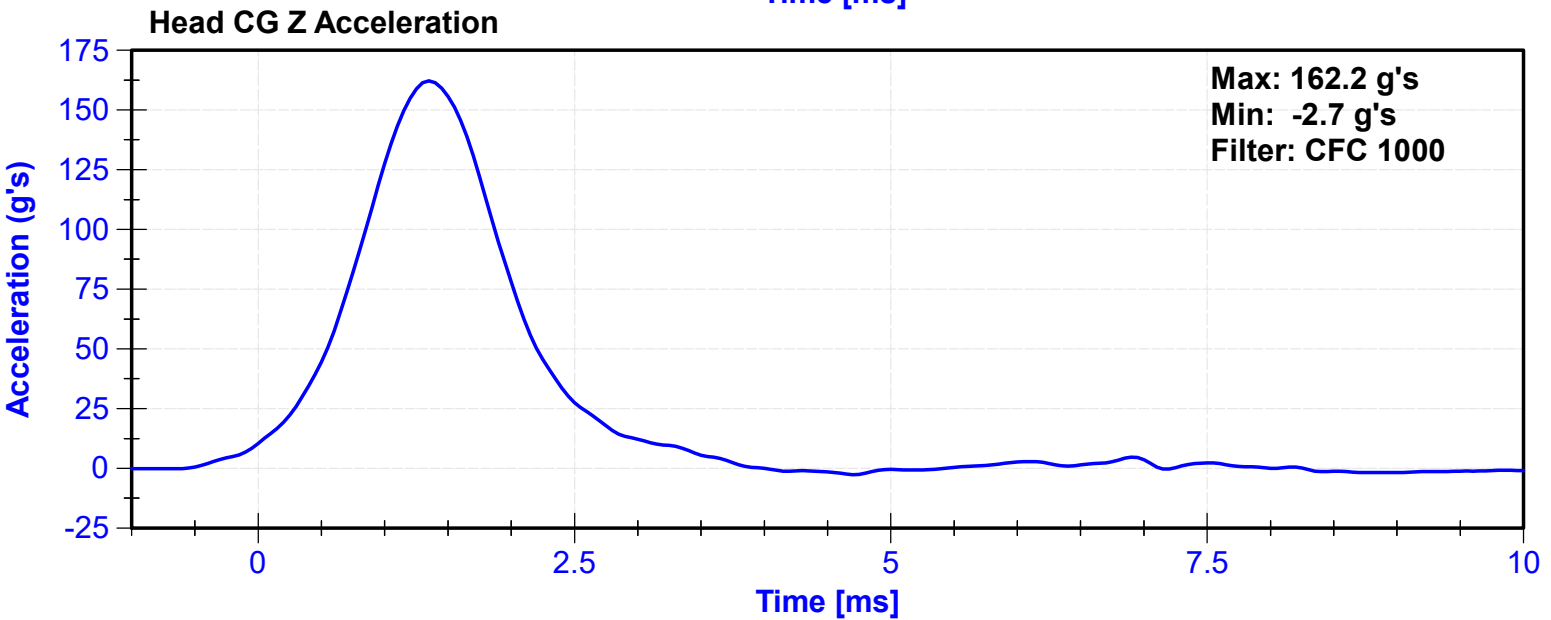
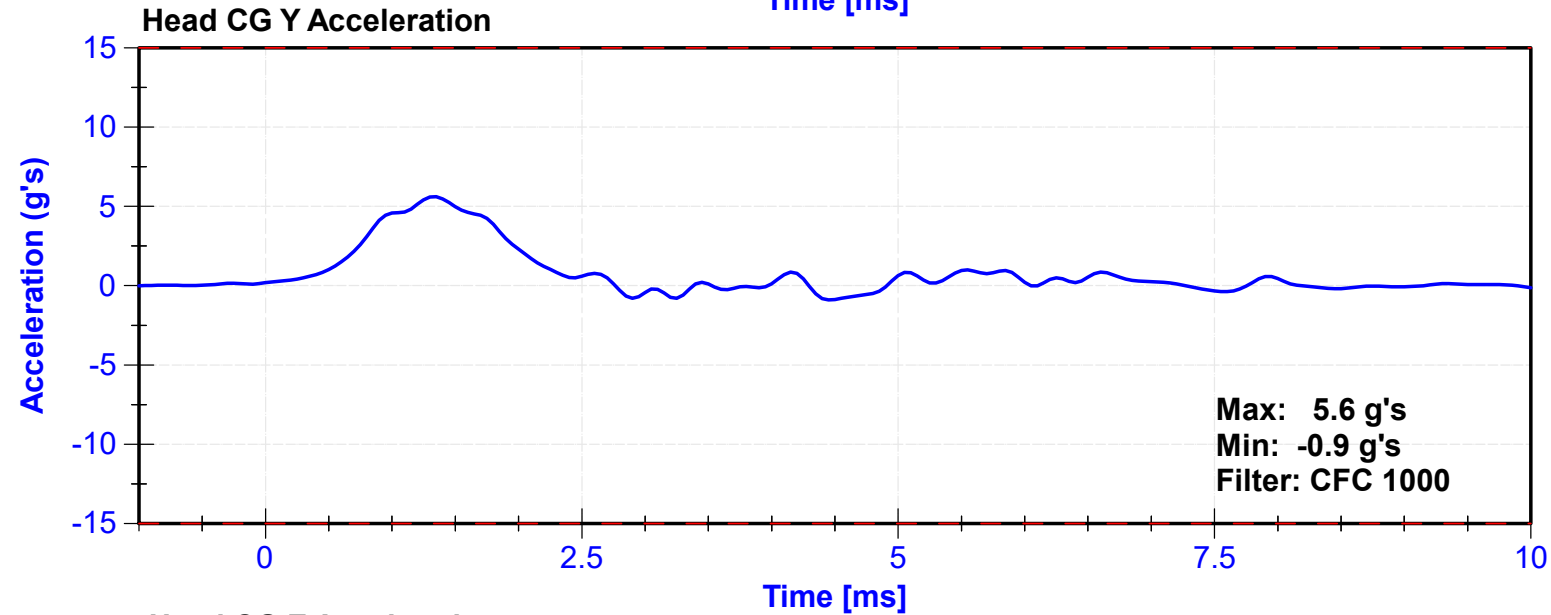
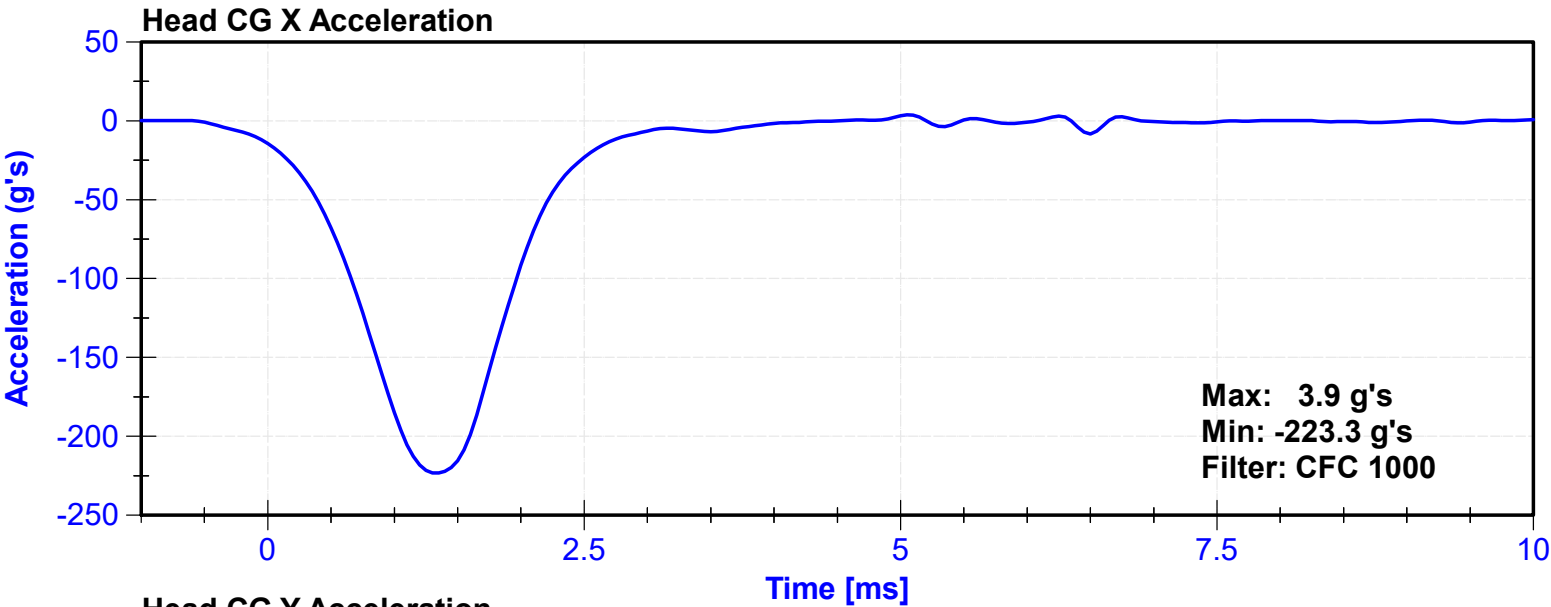
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.0	Pass
Humidity	10	70	%	23.5	Pass
Resultant Acceleration	250	300	g's	276.0	Pass
Oscillation	0	10	%	3.0	Pass
Lateral Acceleration	-15	15	g's	5.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	P79417	12/13/2022	6/11/2023
Y Accelerometer	Endevco	P83335	12/13/2022	6/11/2023
Z Accelerometer	Endevco	P64149	12/12/2022	6/10/2023





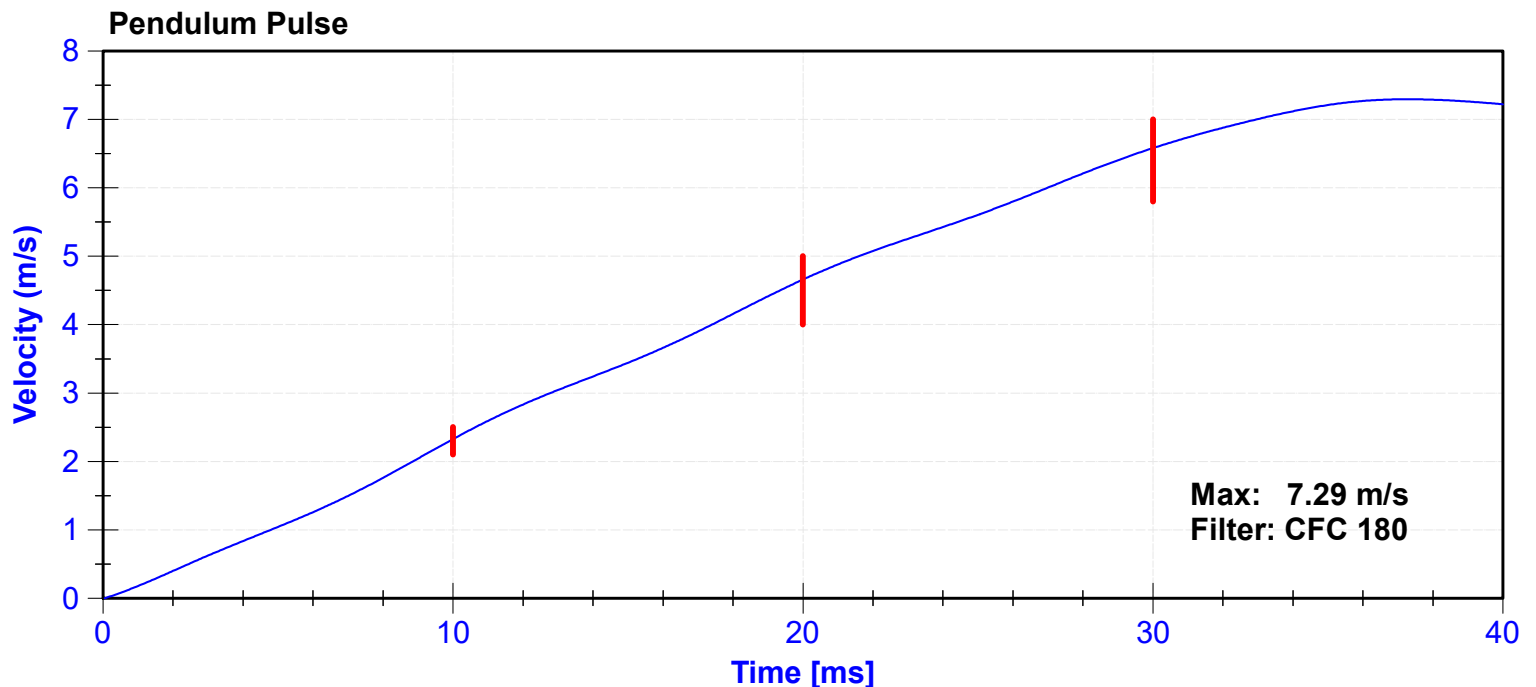
ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	137	Laboratory Supervisor	K. Brogan

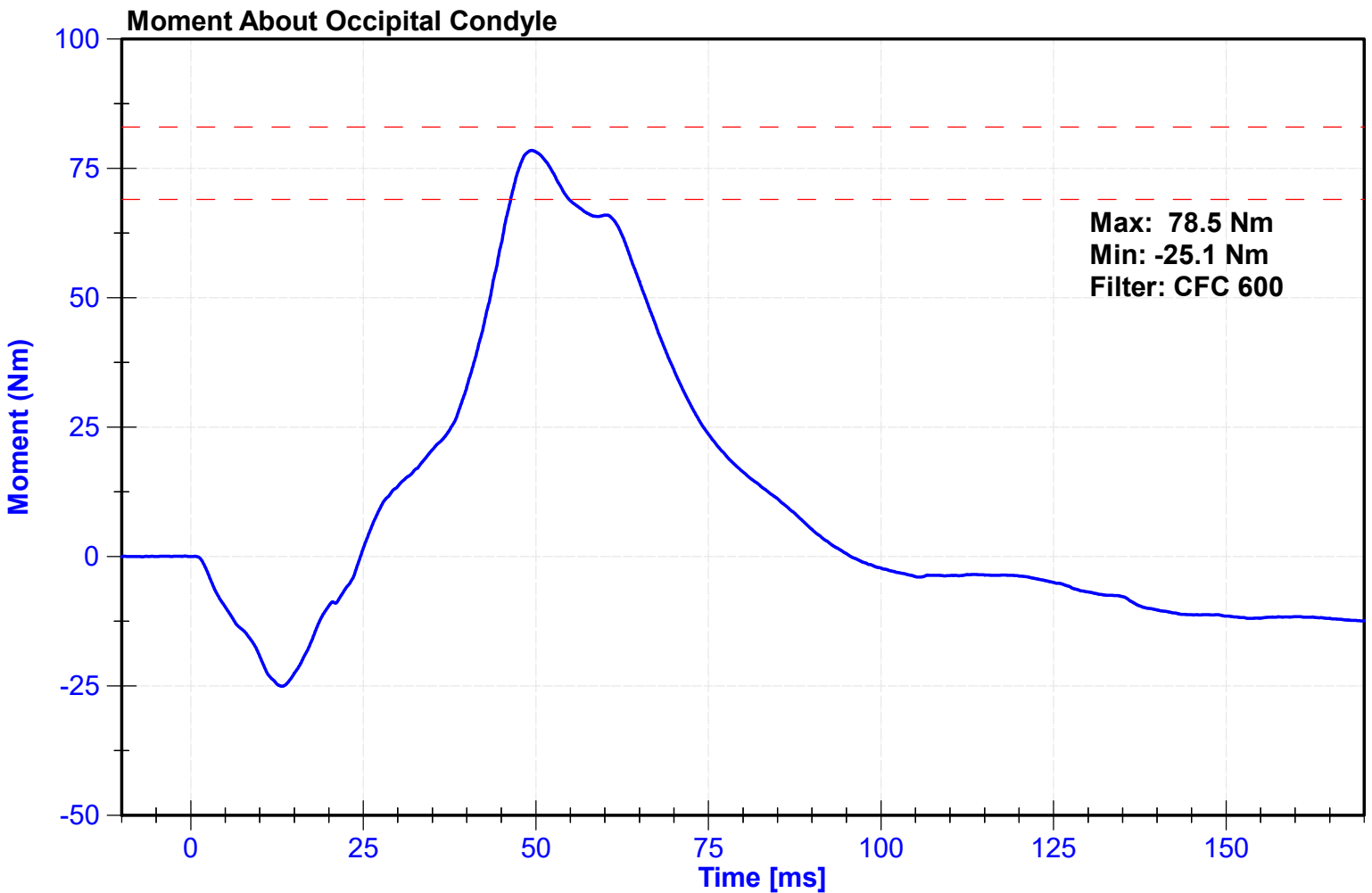
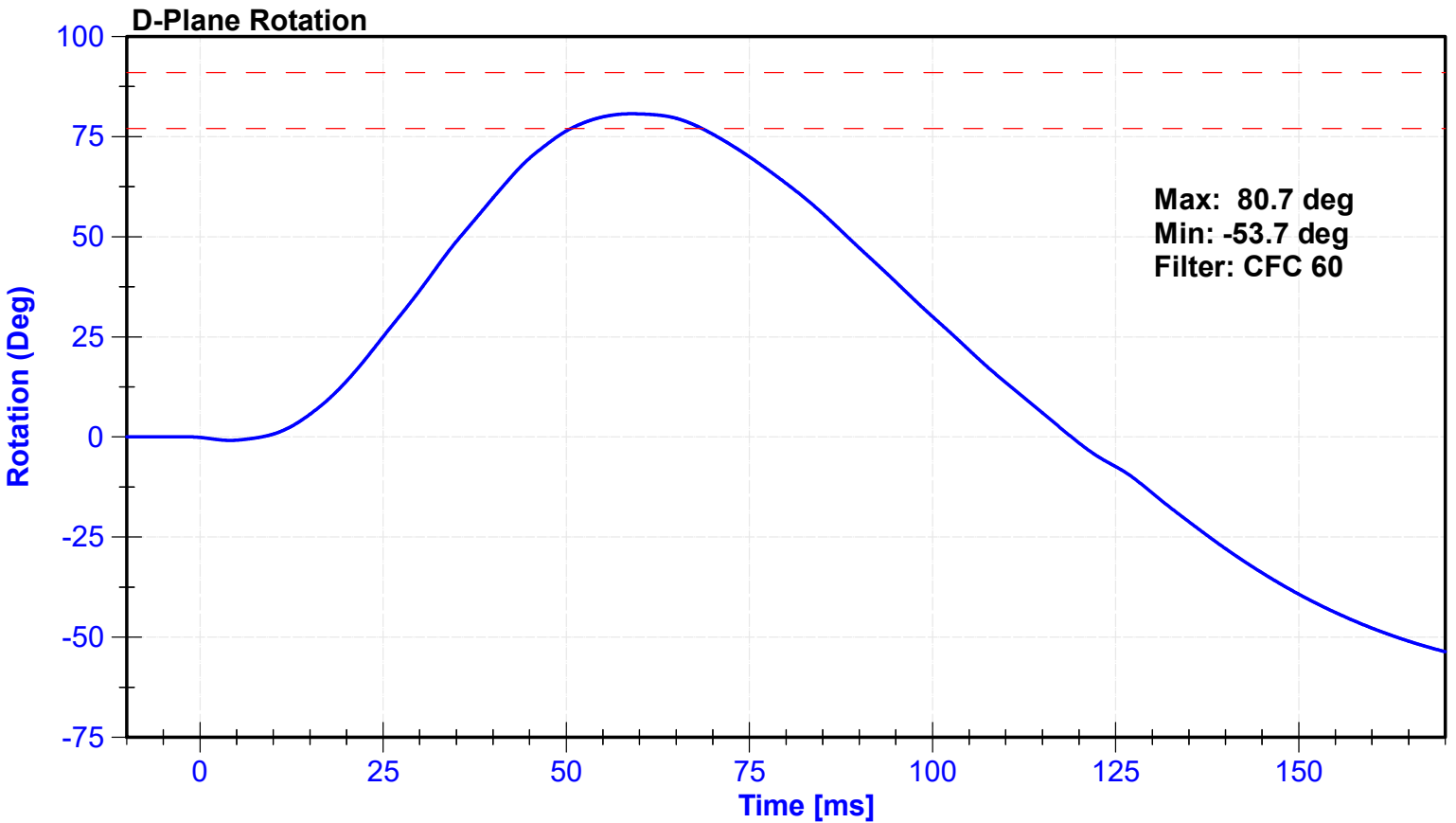
Results

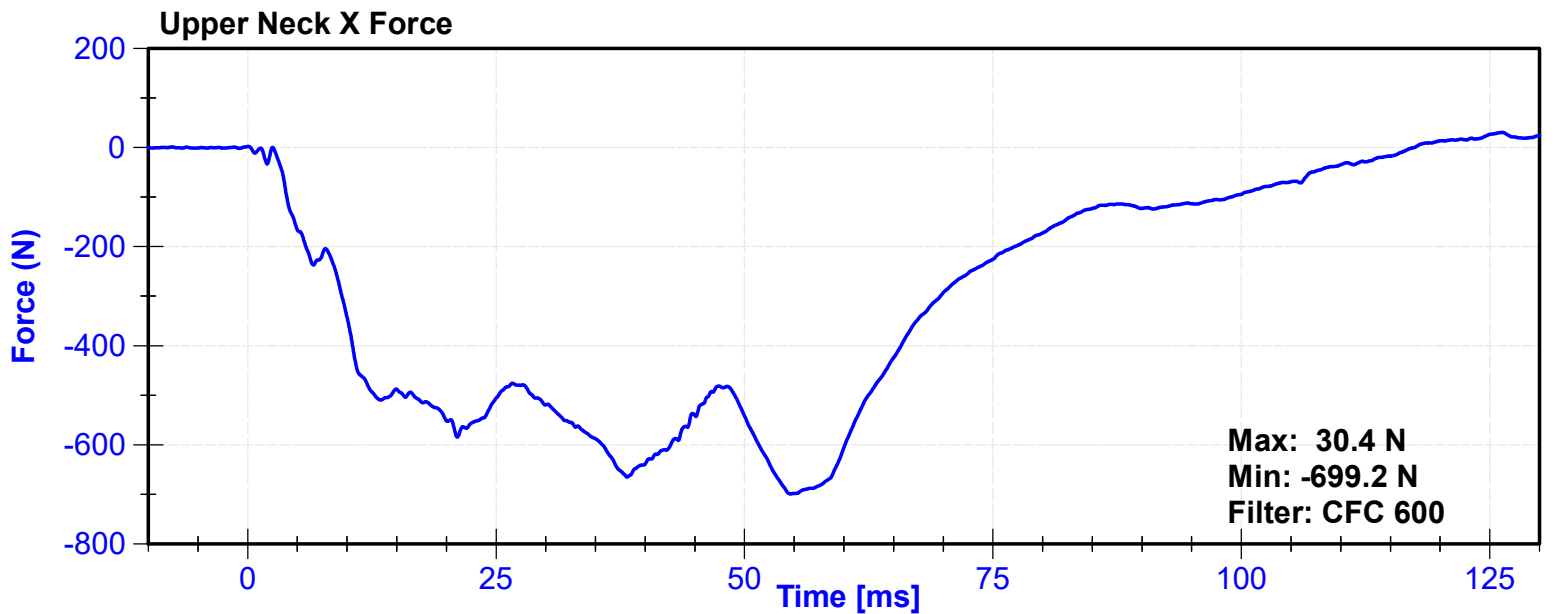
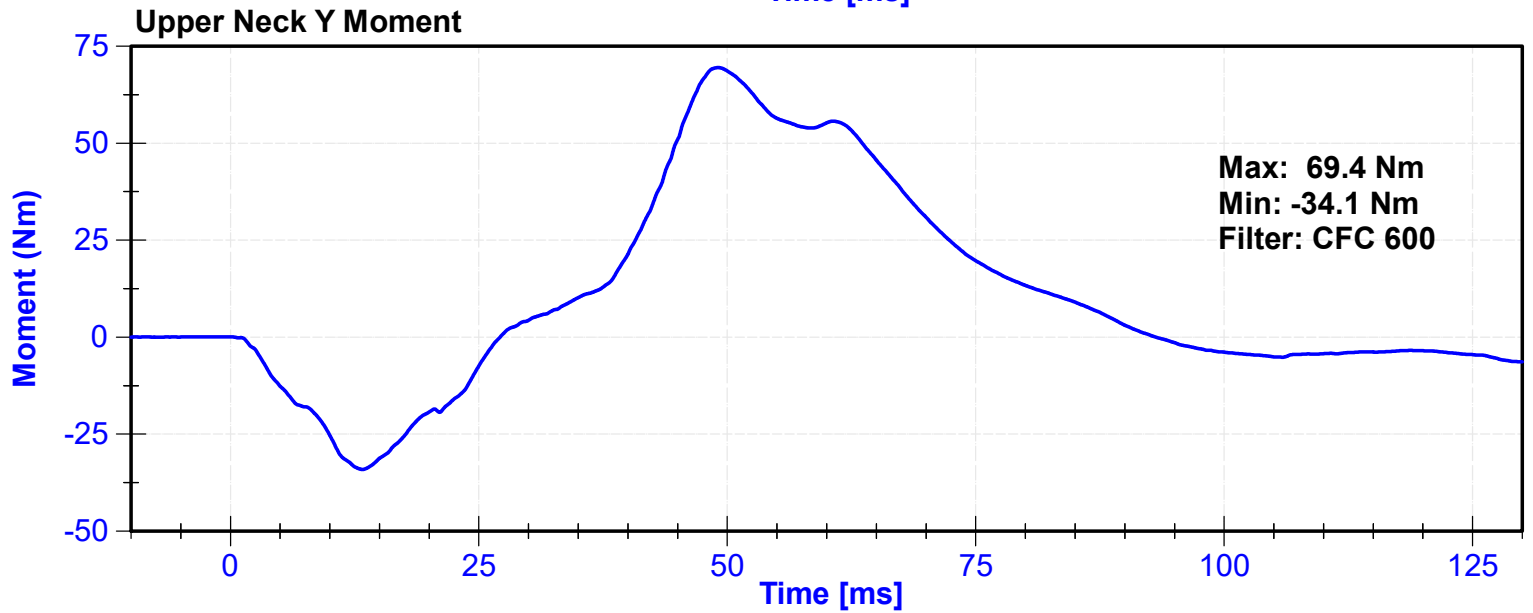
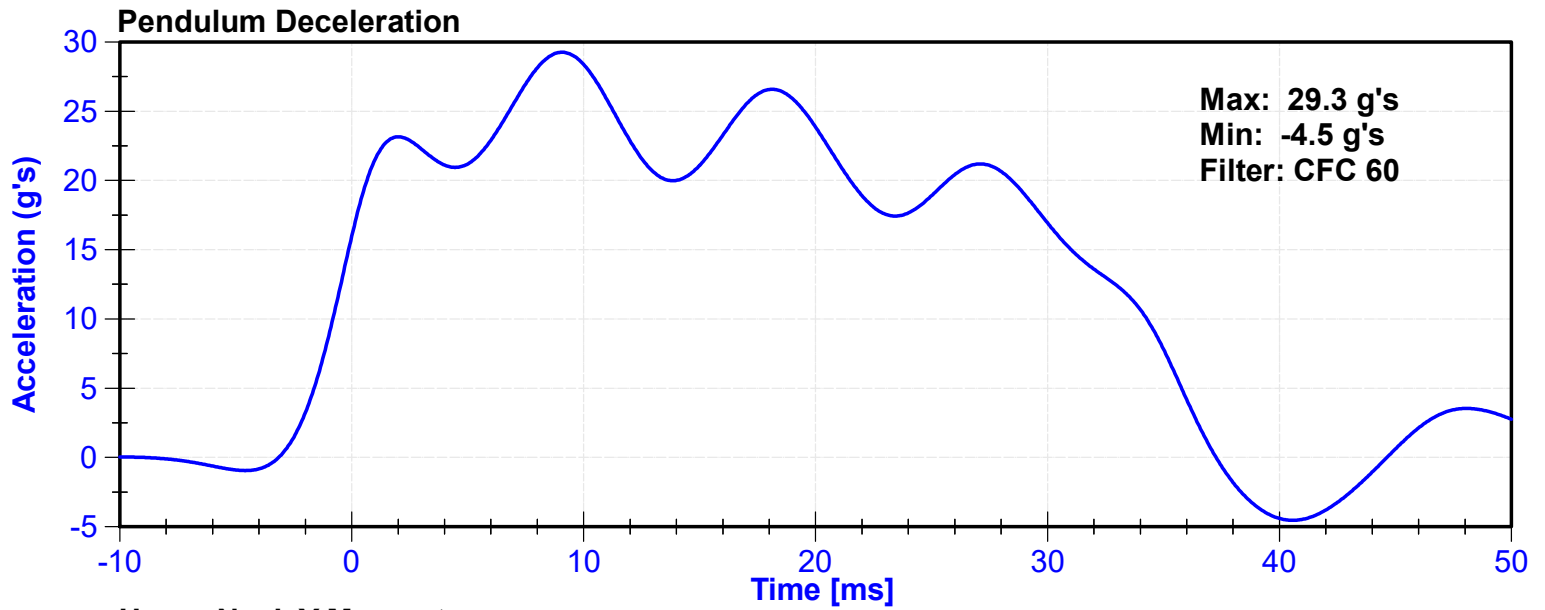
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	21.0	Pass
Velocity	6.89	7.13	m/s	6.939	Pass
Pendulum Impulse at 10ms	2.1	2.5	m/s	2.33	Pass
Pendulum Impulse at 20ms	4.0	5.0	m/s	4.66	Pass
Pendulum Impulse at 30ms	5.8	7.0	m/s	6.58	Pass
Max D Plane Rotation	77	91	deg	80.7	Pass
Max Moment During Rotation Interval	69	83	Nm	78.5	Pass
Moment Decay to 10.0 Nm	80	100	ms	86.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	7231C-750	10/31/2022	4/29/2023
Pendulum Potentiometer	ETI	LABPOT1	5/9/2022	5/9/2023
Condyle Potentiometer	ETI	LABPOT2	5/9/2022	5/9/2023
Upper Neck Load Cell	Humanetics	1916-FX	6/10/2022	6/10/2023







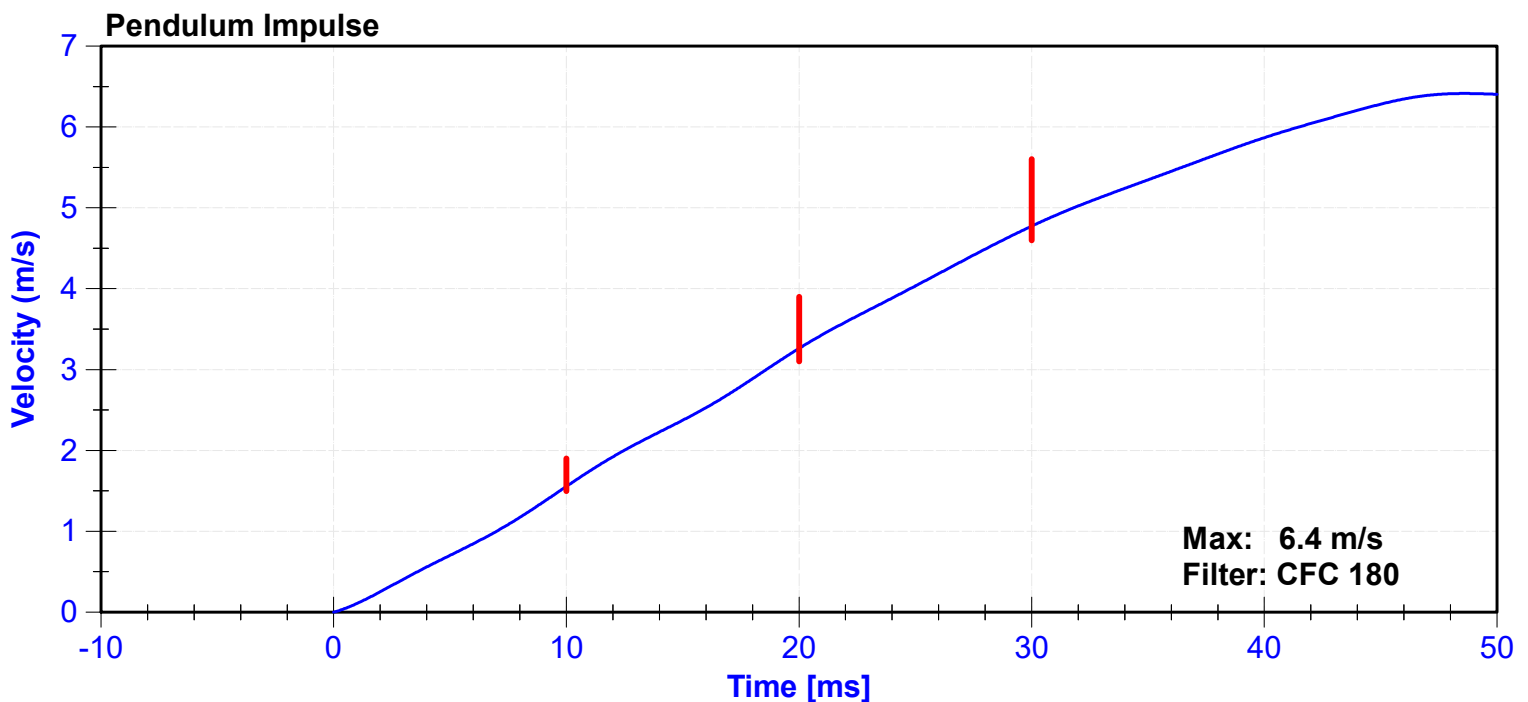
ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	137	Laboratory Supervisor	K. Brogan

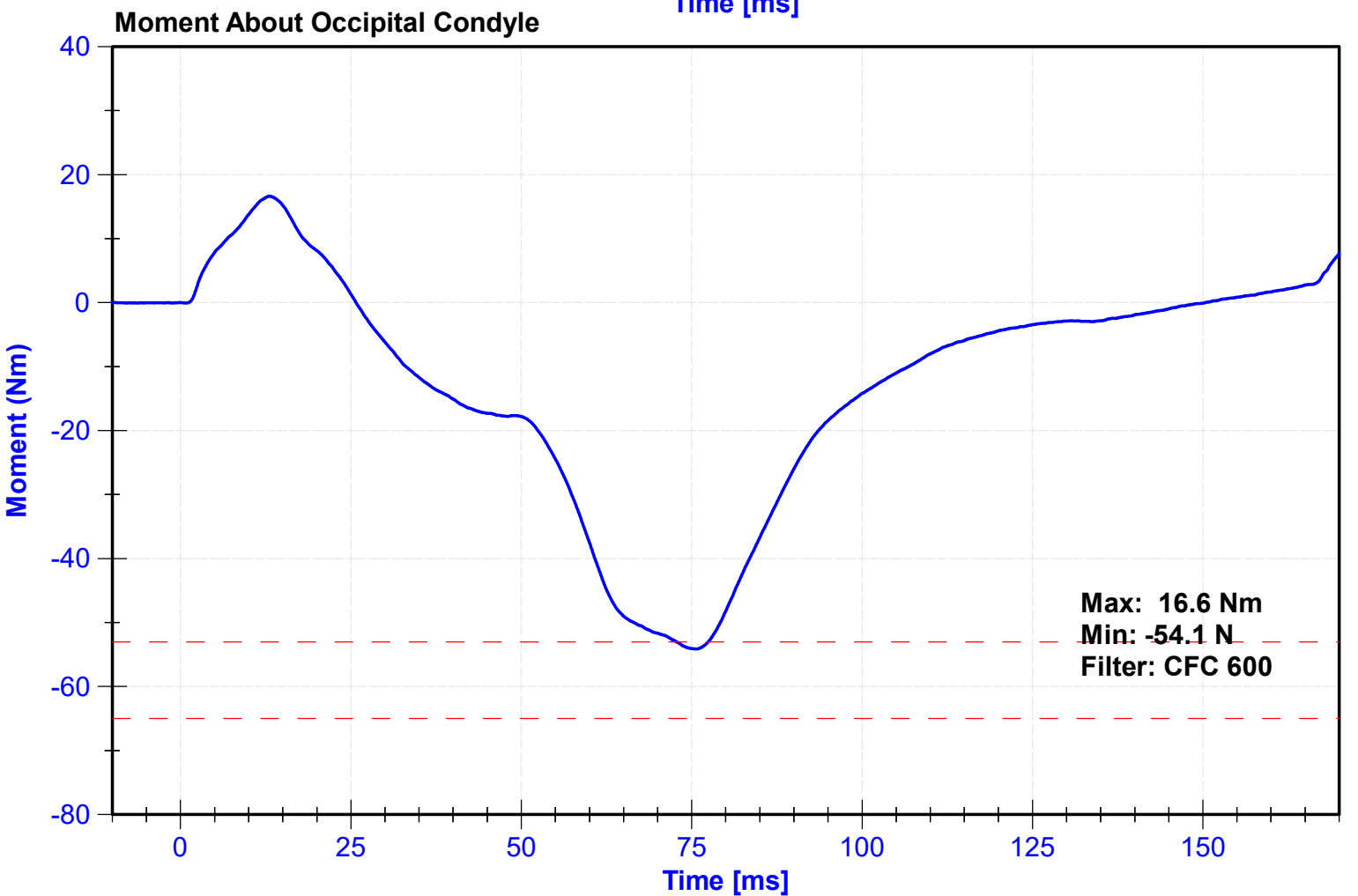
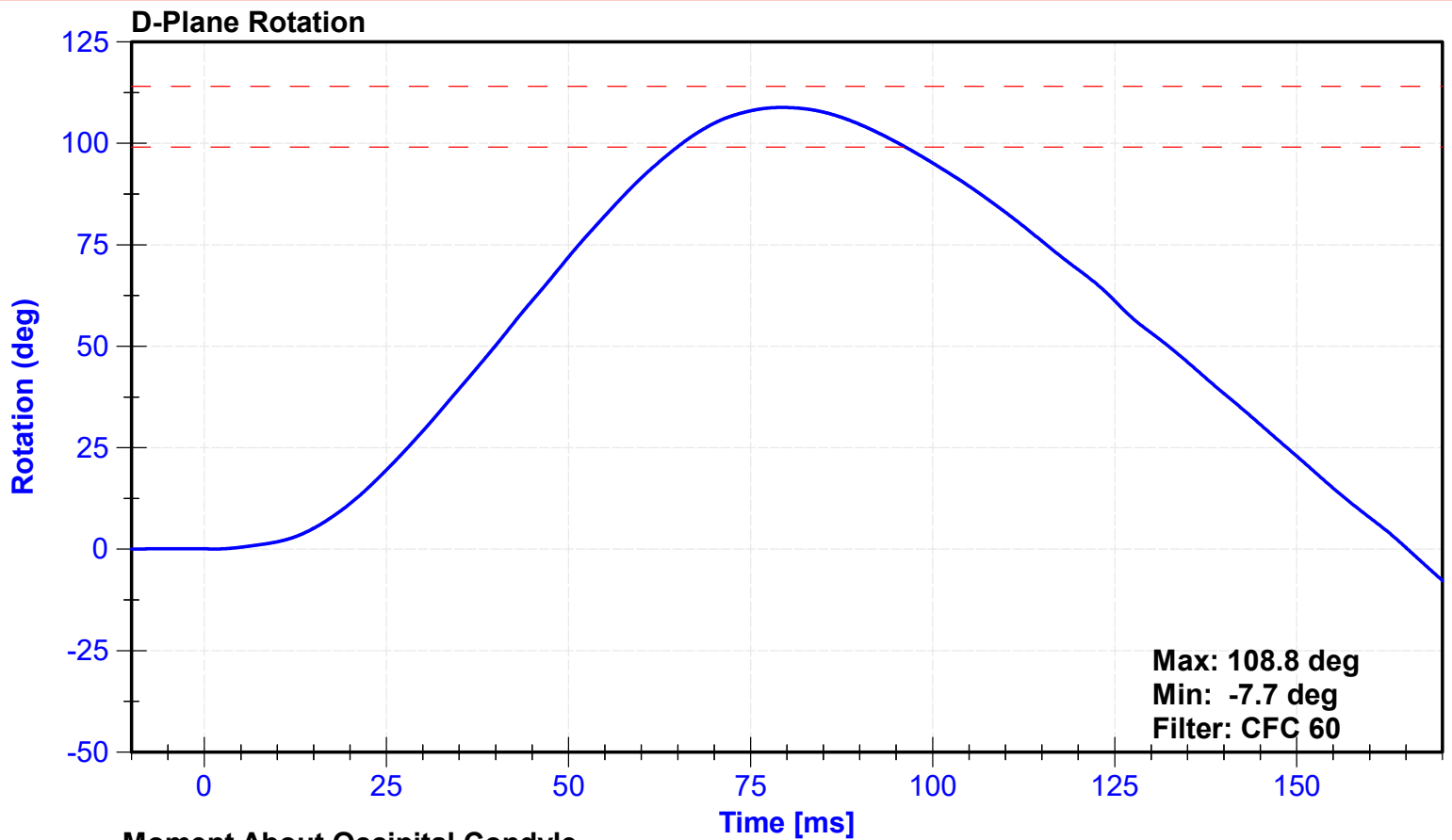
Results

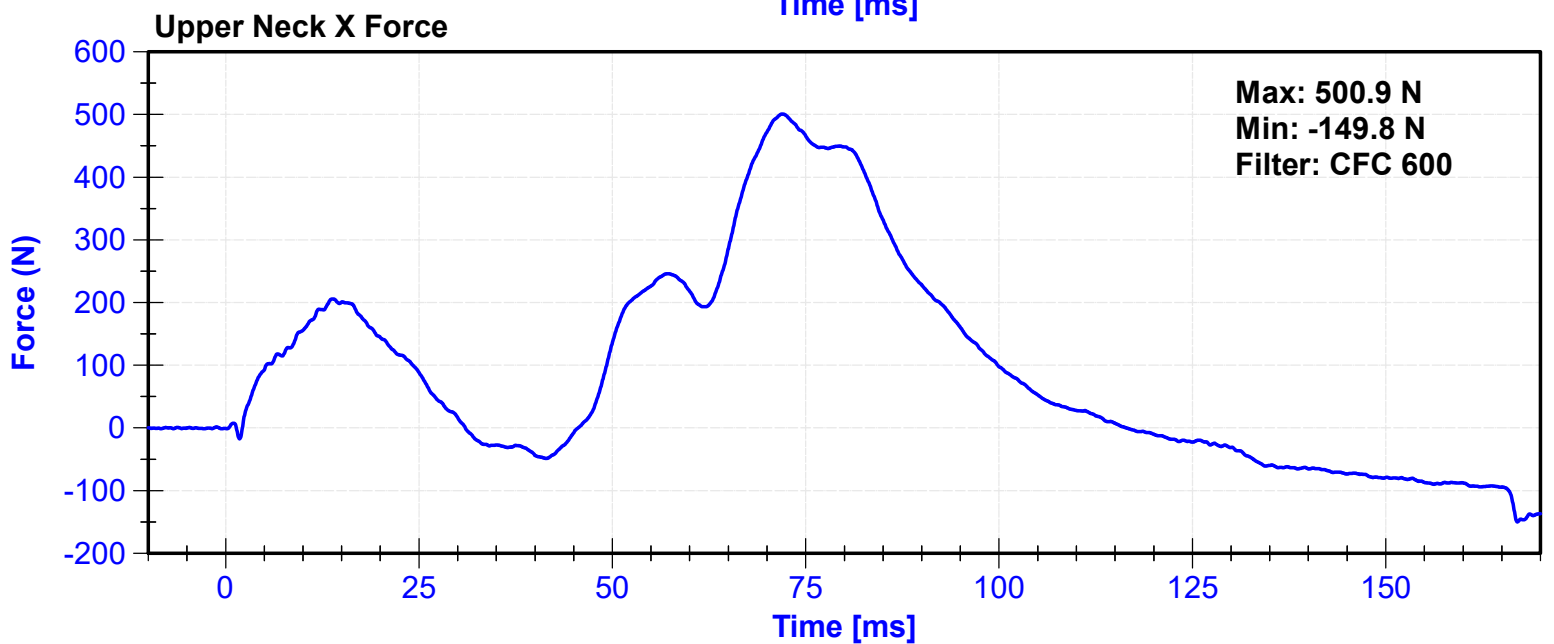
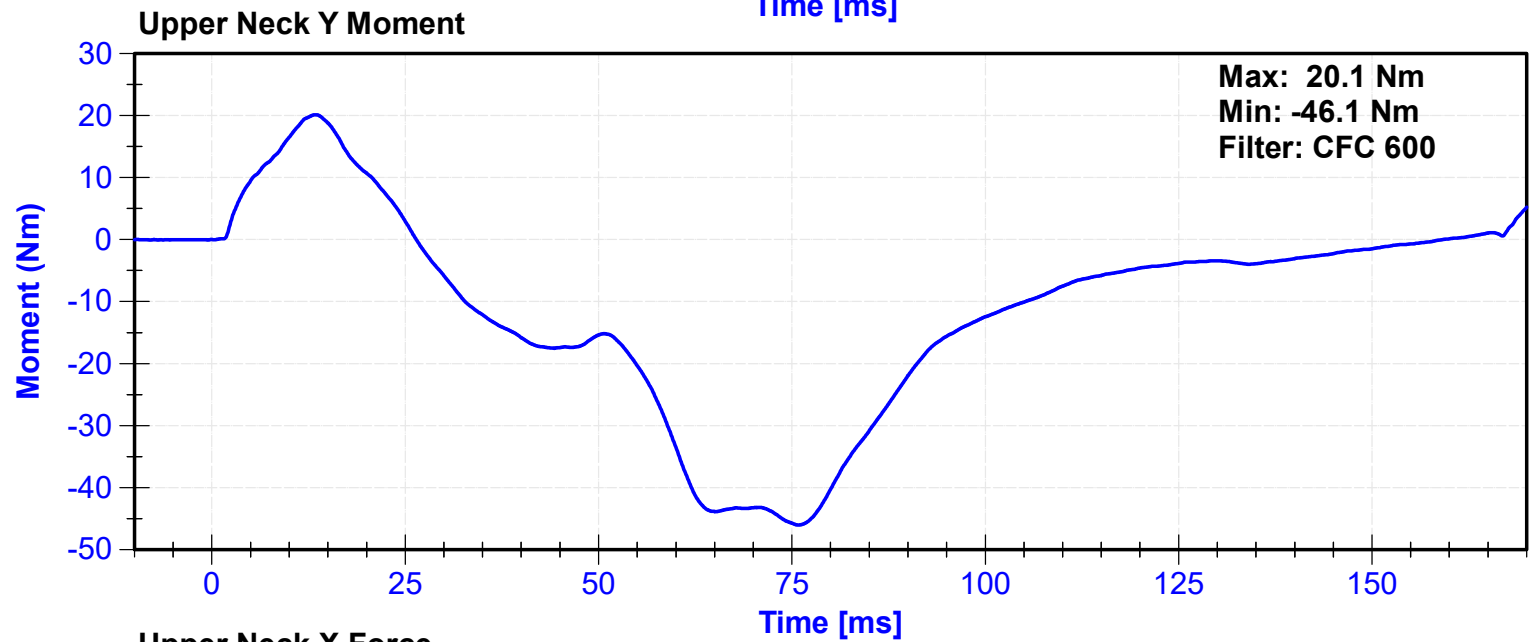
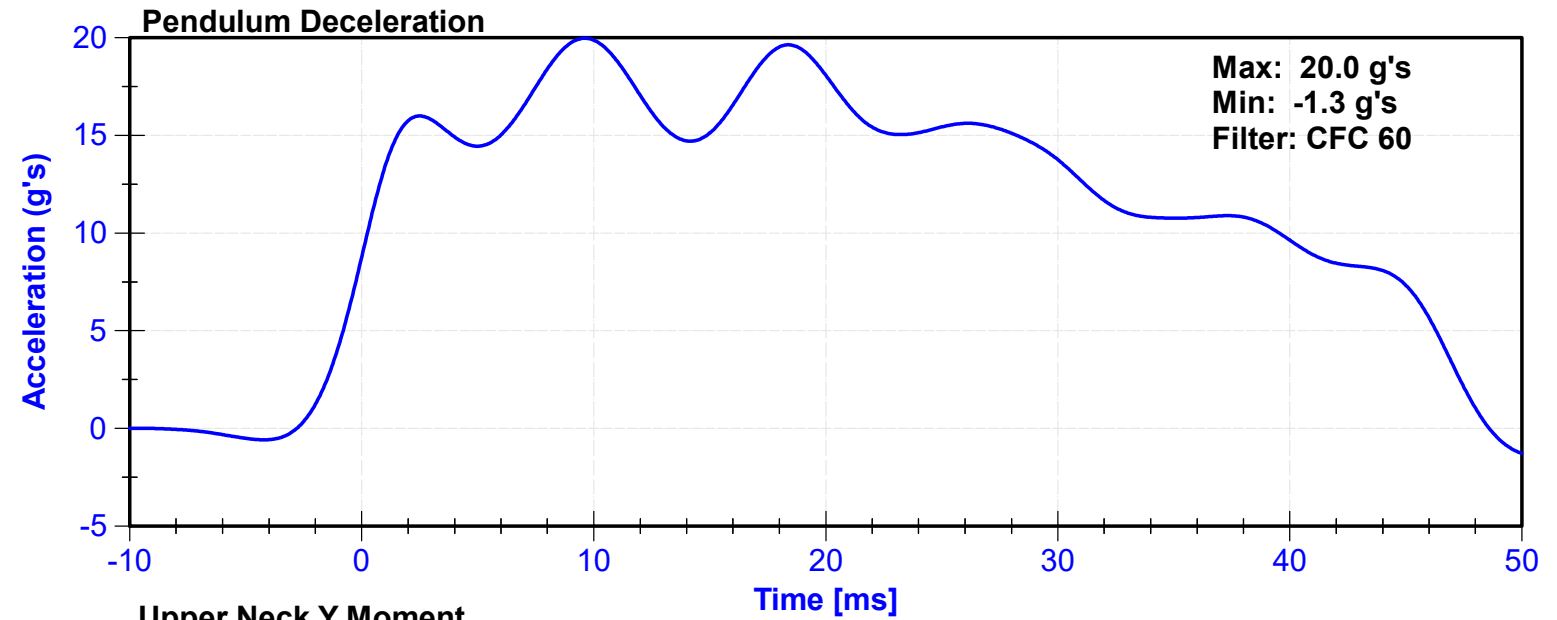
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	21.0	Pass
Velocity	5.95	6.19	m/s	6.104	Pass
Pendulum Impulse at 10ms	1.5	1.9	m/s	1.56	Pass
Pendulum Impulse at 20ms	3.1	3.9	m/s	3.26	Pass
Pendulum Impulse at 30ms	4.6	5.6	m/s	4.77	Pass
D Plane Rotation	99	114	deg	108.8	Pass
Moment During Rotation Interval	-65	-53	Nm	-54.1	Pass
Moment Decay to -10Nm	94	114	ms	106.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16650	10/31/2022	4/29/2023
Pendulum Potentiometer	ETI	LABPOT1	5/9/2022	5/9/2023
Condyle Potentiometer	ETI	LABPOT2	5/9/2022	5/9/2023
Upper Neck Load Cell	Humanetics	1916-FX	6/10/2022	6/10/2023



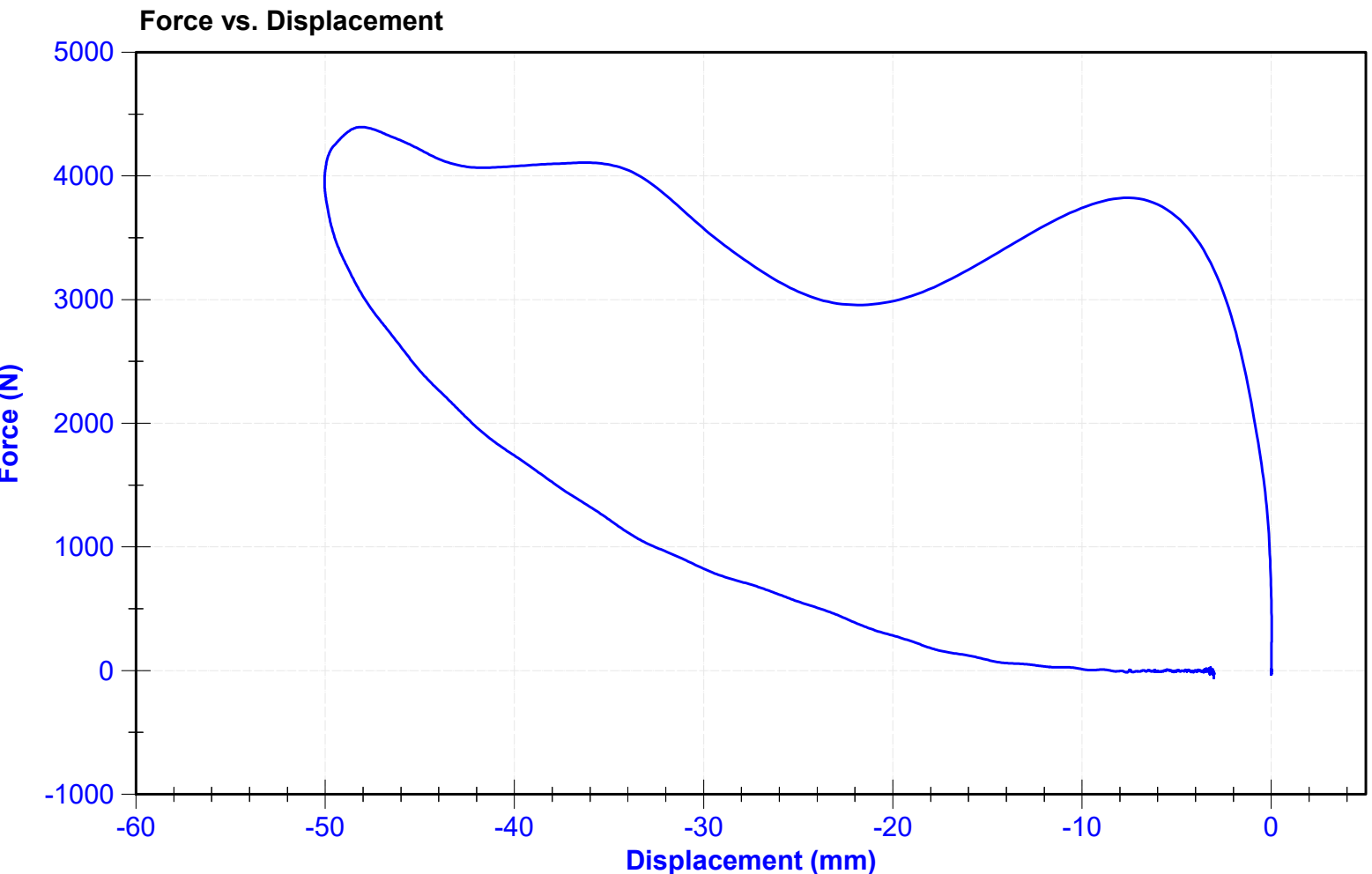


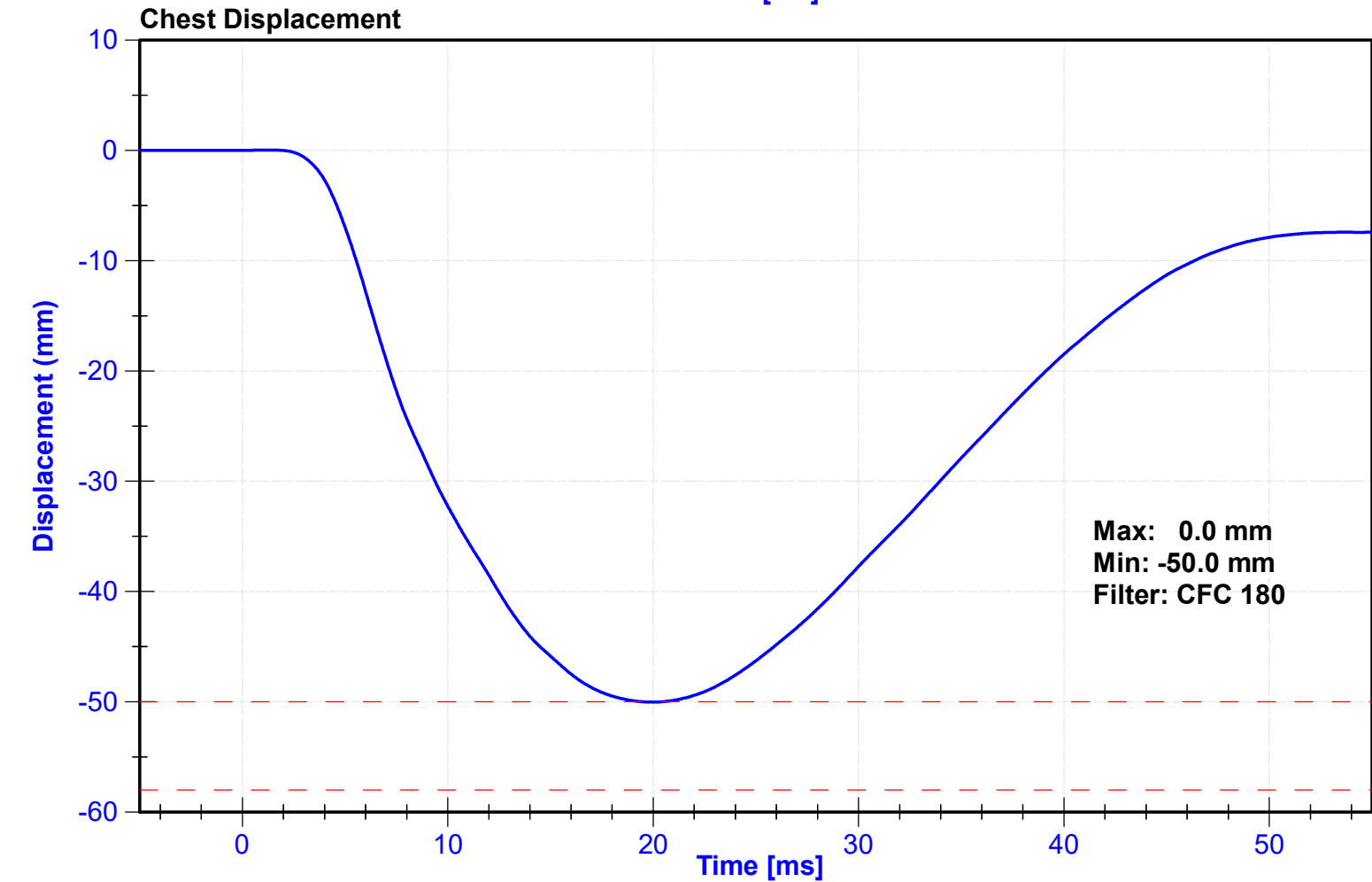
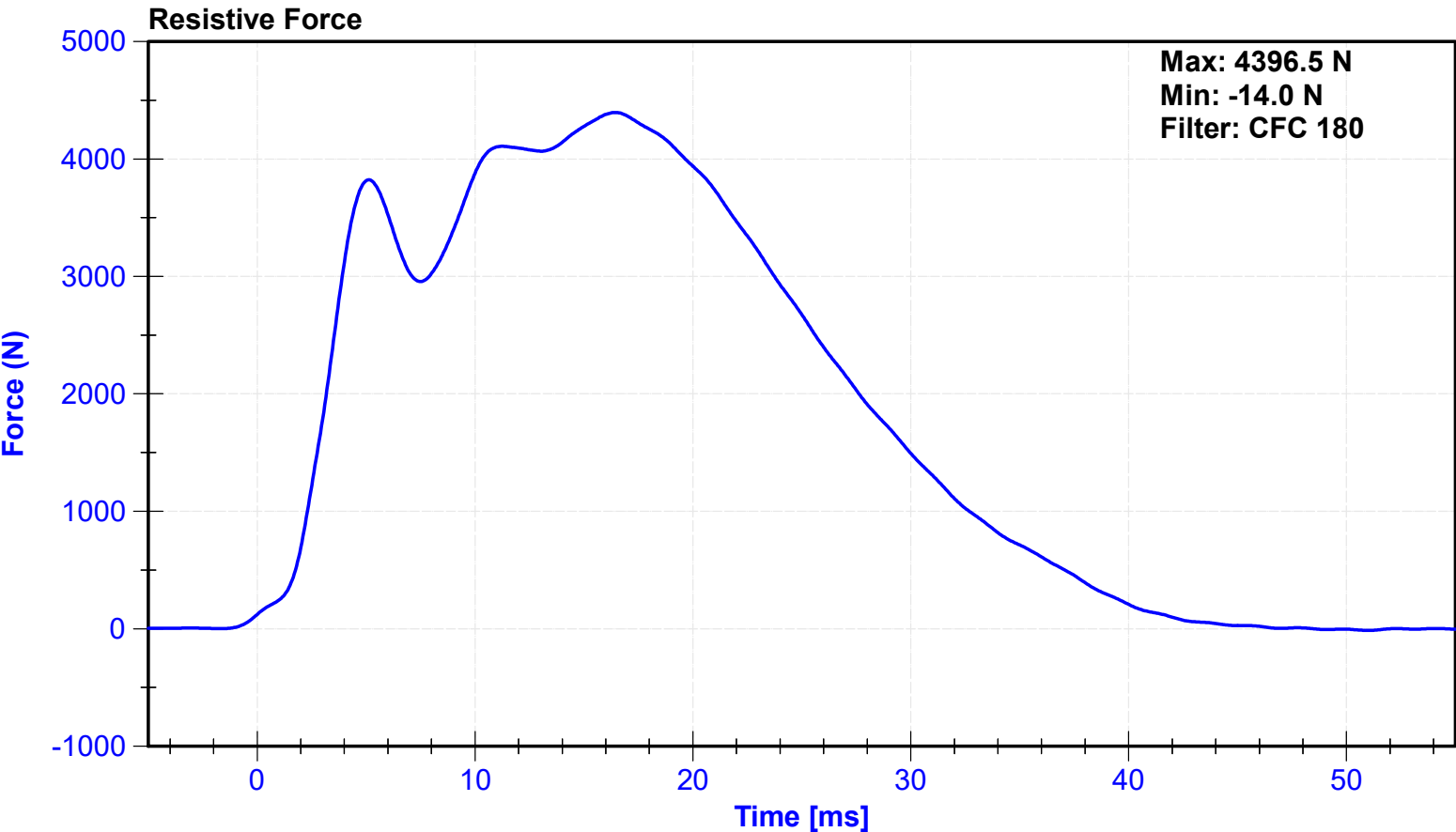


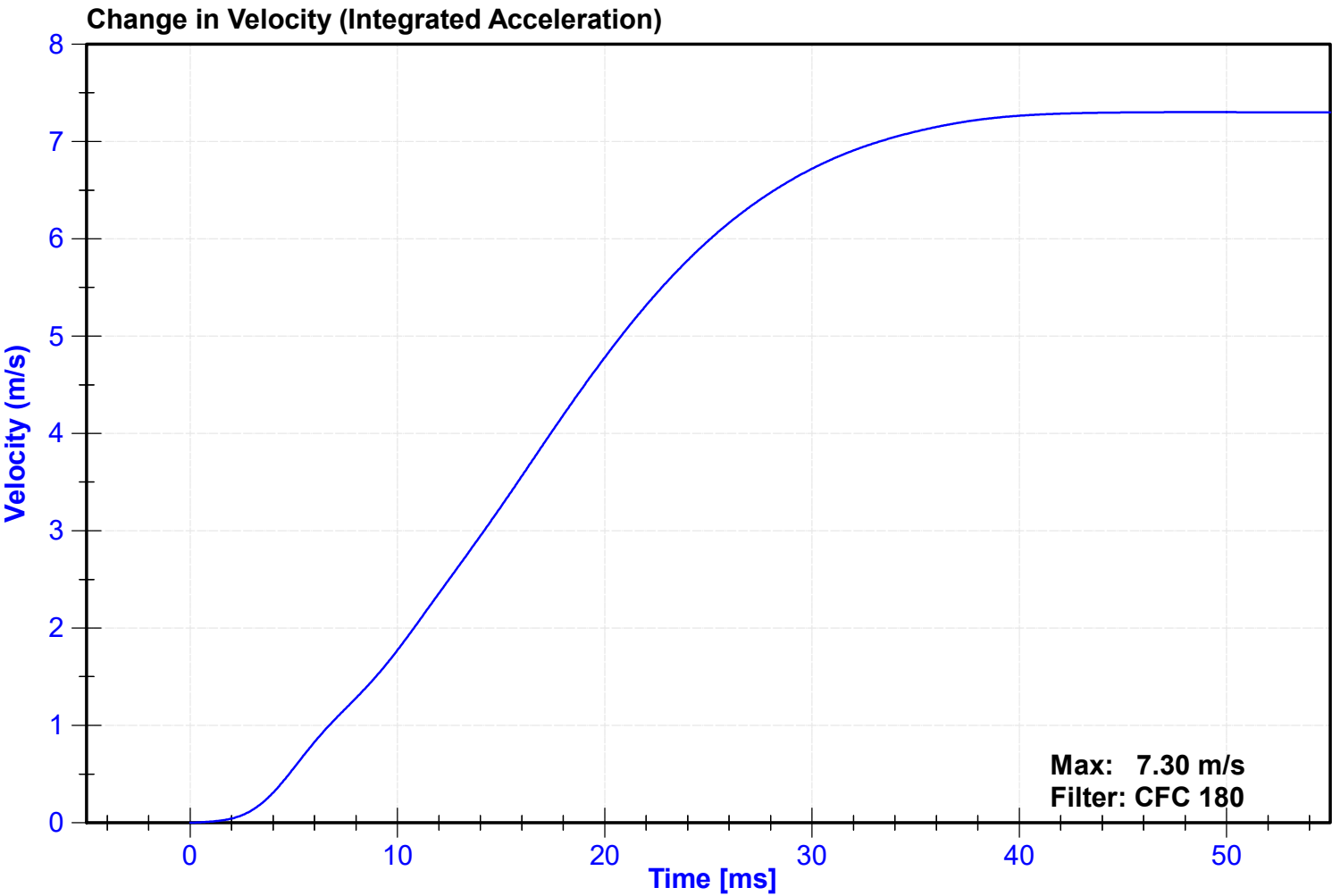
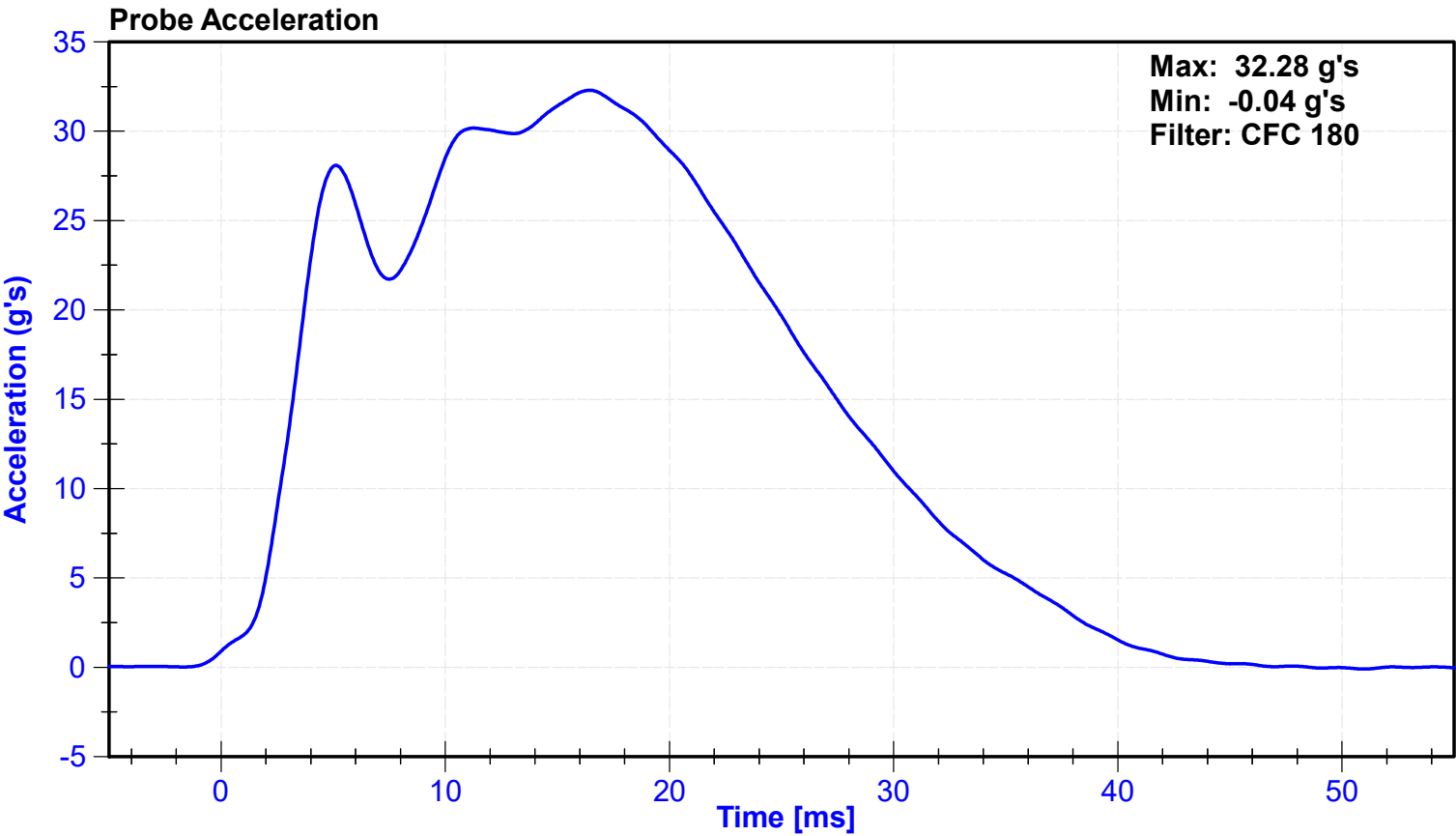
ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	137	Laboratory Supervisor	K. Brogan

Test Parameter	Results				
	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.2	Pass
Humidity	10	70	%	25.5	Pass
Velocity	6.59	6.83	m/s	6.685	Pass
Chest Deflection	-58	-50	mm	-50.0	Pass
Maximum Resistive Force (50 to 58mm)	3900	4400	N	4047.3	Pass
Maximum Resistive Force (18 to 50mm)	0	4600	N	4396.5	Pass
Hysteresis	69	85	%	75.4	Pass

Transducer Calibrations				
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	P51736	10/25/2022	10/25/2023
Chest Potentiometer	Servo	0720	12/12/2022	6/12/2023







ATD Manufacturer	Humanetics	Test Technician	T. Roseman
ATD Serial Number	137	Laboratory Supervisor	K. Brogan

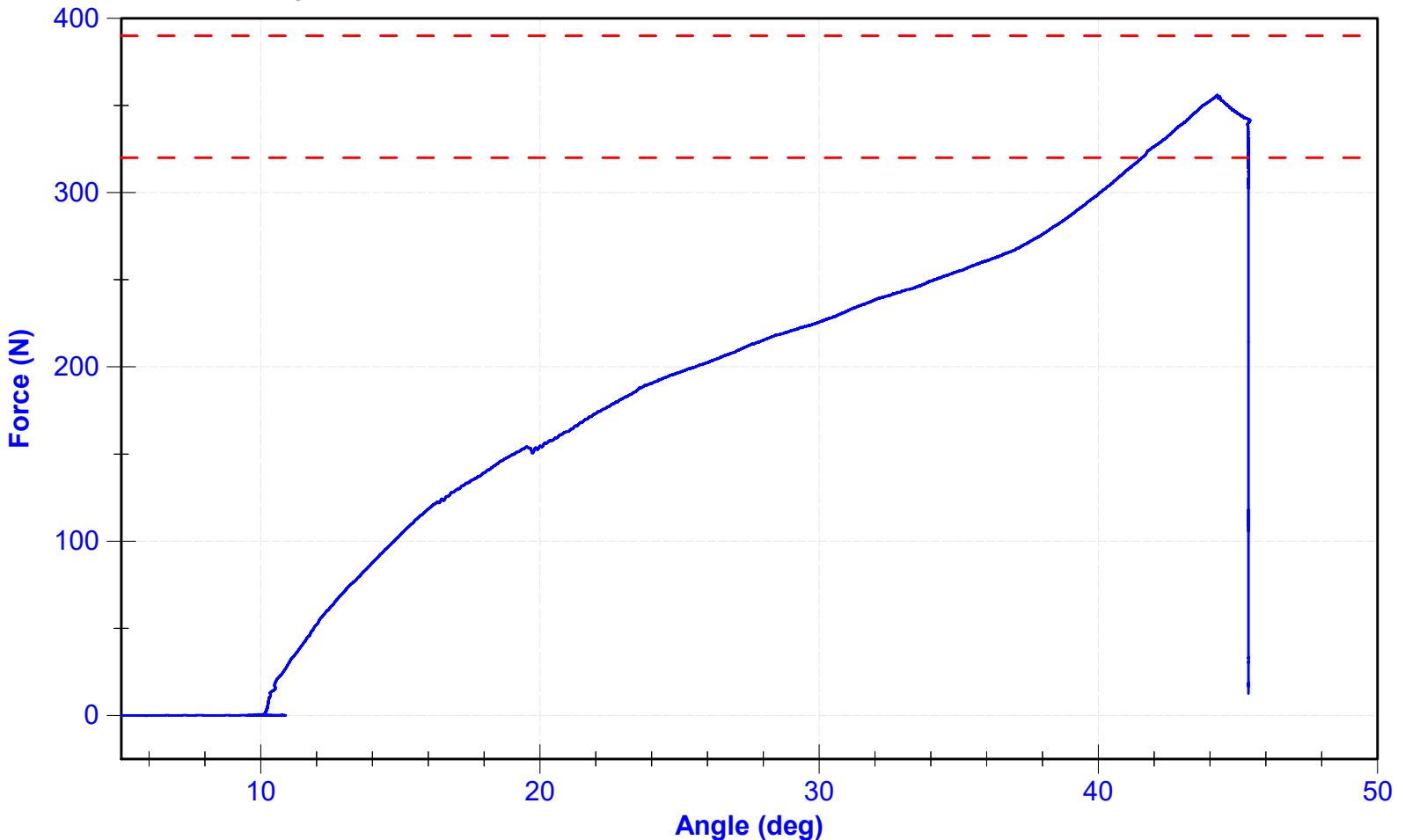
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.6	25.6	°C	21.4	Pass
Humidity	10	70	%	13.5	Pass
Initial Angle	0	20	deg	10.1	Pass
Force at 45 Degrees	320	390	N	355.9	Pass
Return Angle Relative to Initial	0	8	deg	3.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	Rieker	DS-1905226	2022-11-09	2023-11-09
Load Cell	Interface	1134516	2022-09-27	2023-09-27

Force vs. Displacement



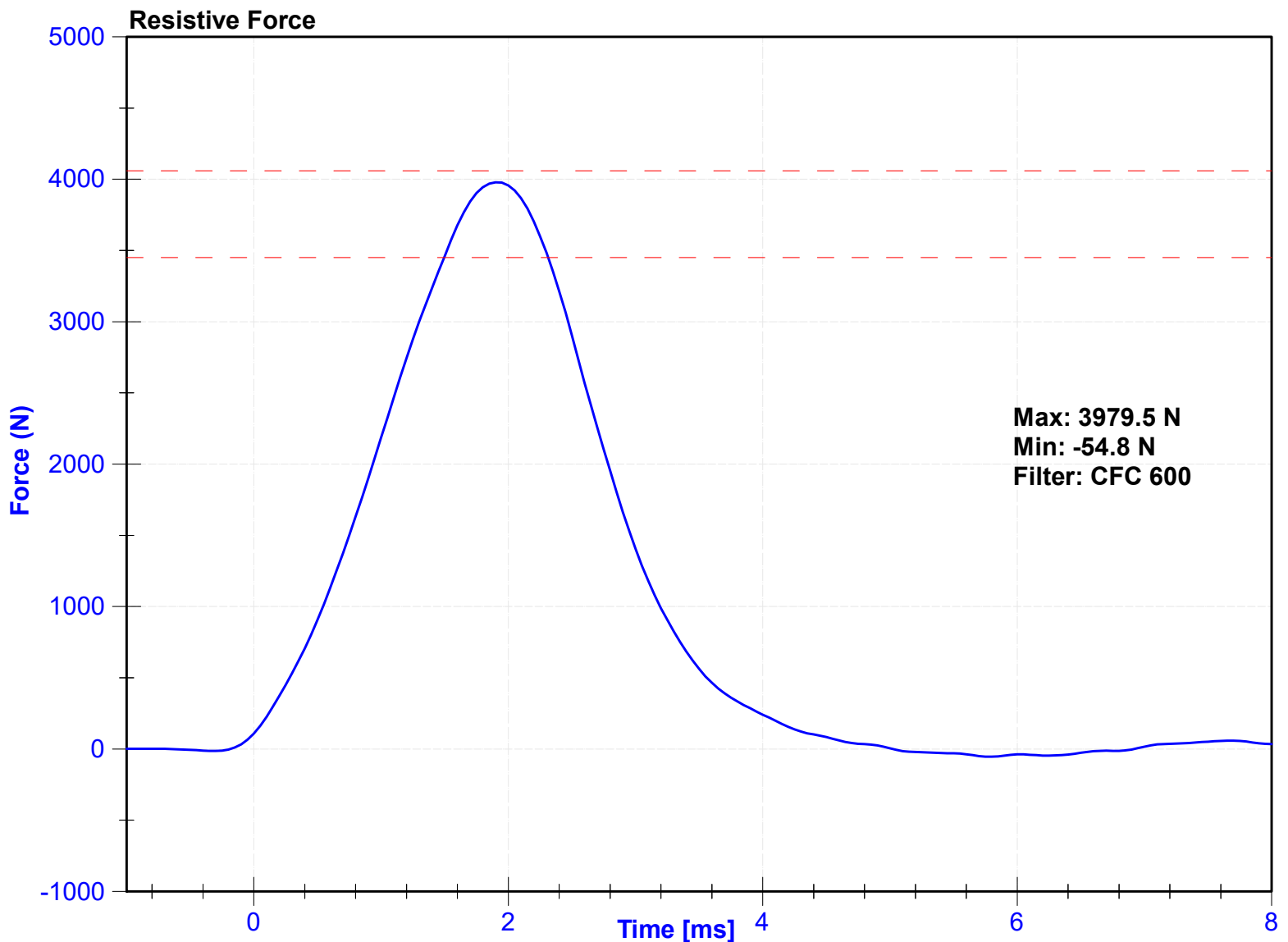
ATD Manufacturer	Humanetics	Test Technician	T. Roseman
ATD Serial Number	137	Laboratory Supervisor	K. Brogan

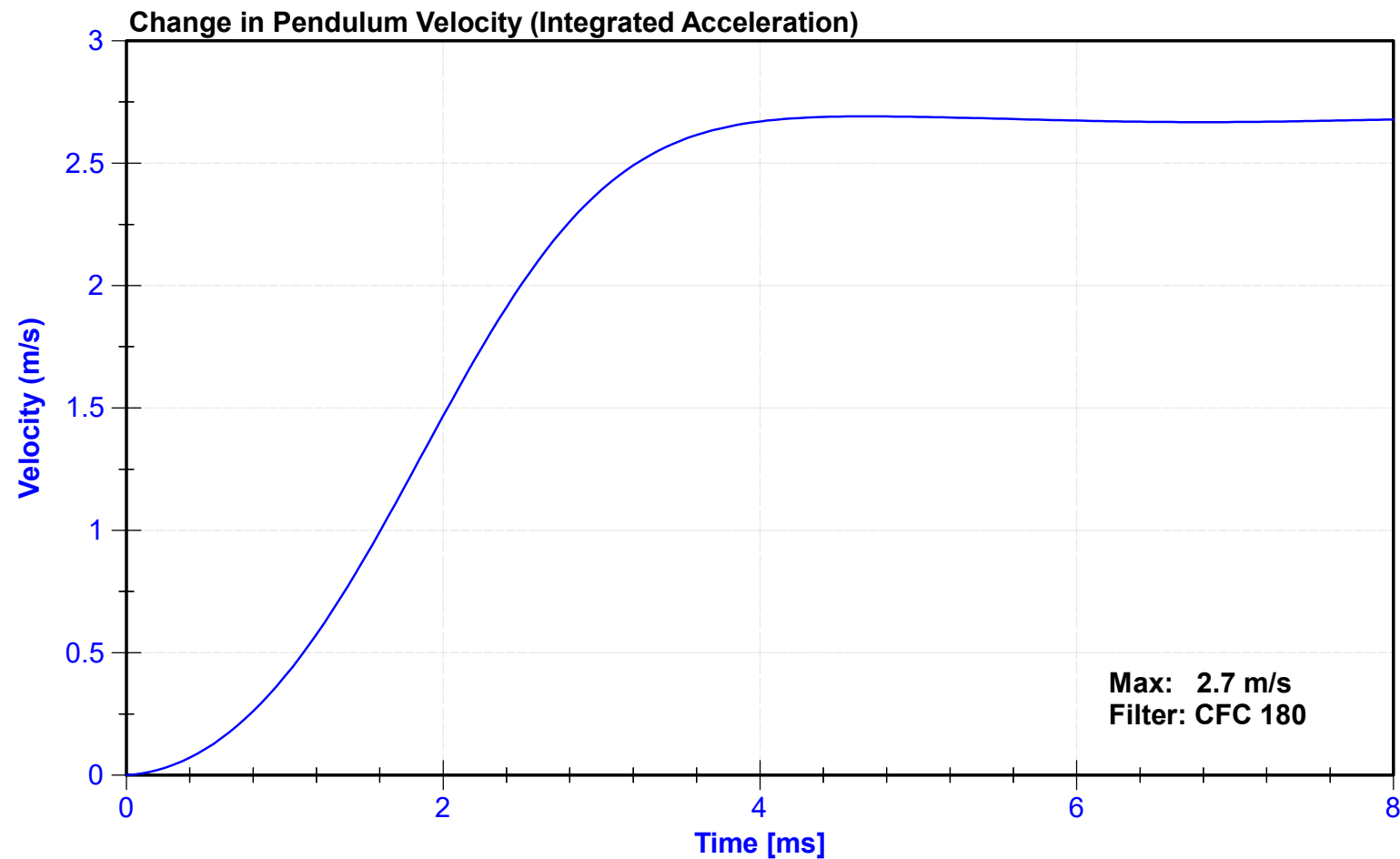
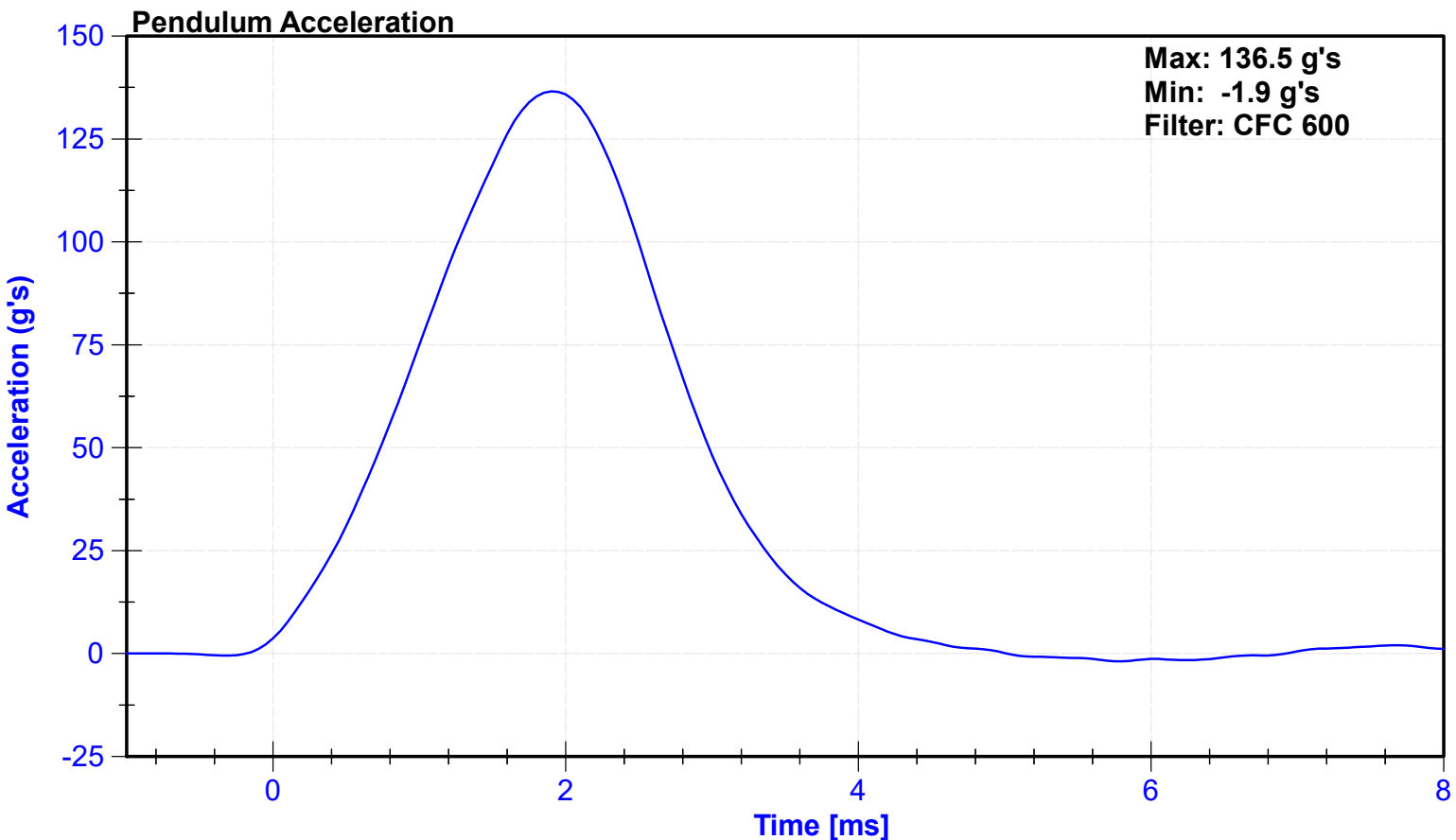
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.9	Pass
Humidity	10	70	%	24.3	Pass
Velocity	2.07	2.13	m/s	2.087	Pass
Resistive Force	3450	4060	N	3979.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18546	11/19/2022	5/18/2023





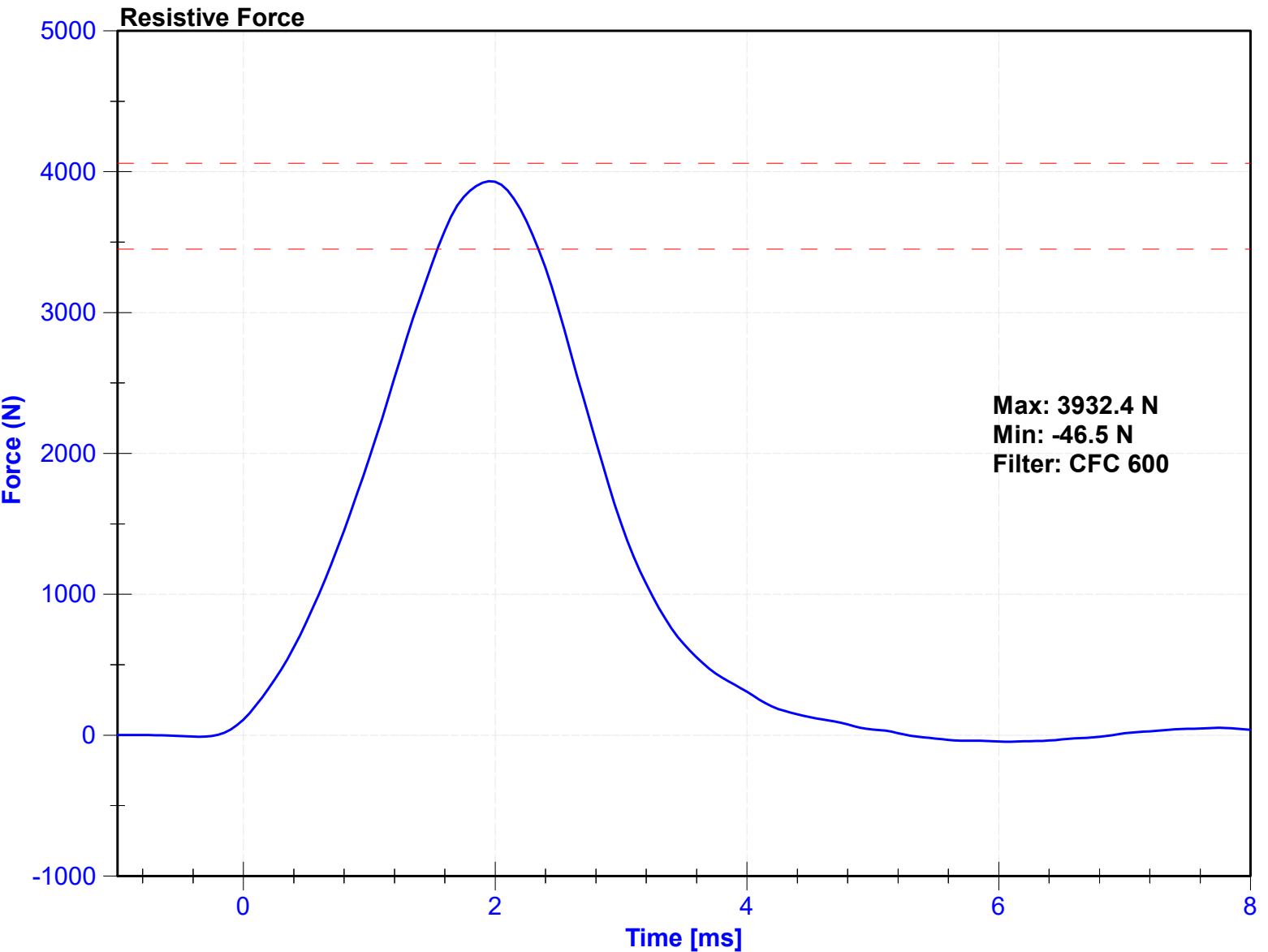
ATD Manufacturer	Humanetics	Test Technician	T. Roseman
ATD Serial Number	137	Laboratory Supervisor	K. Brogan

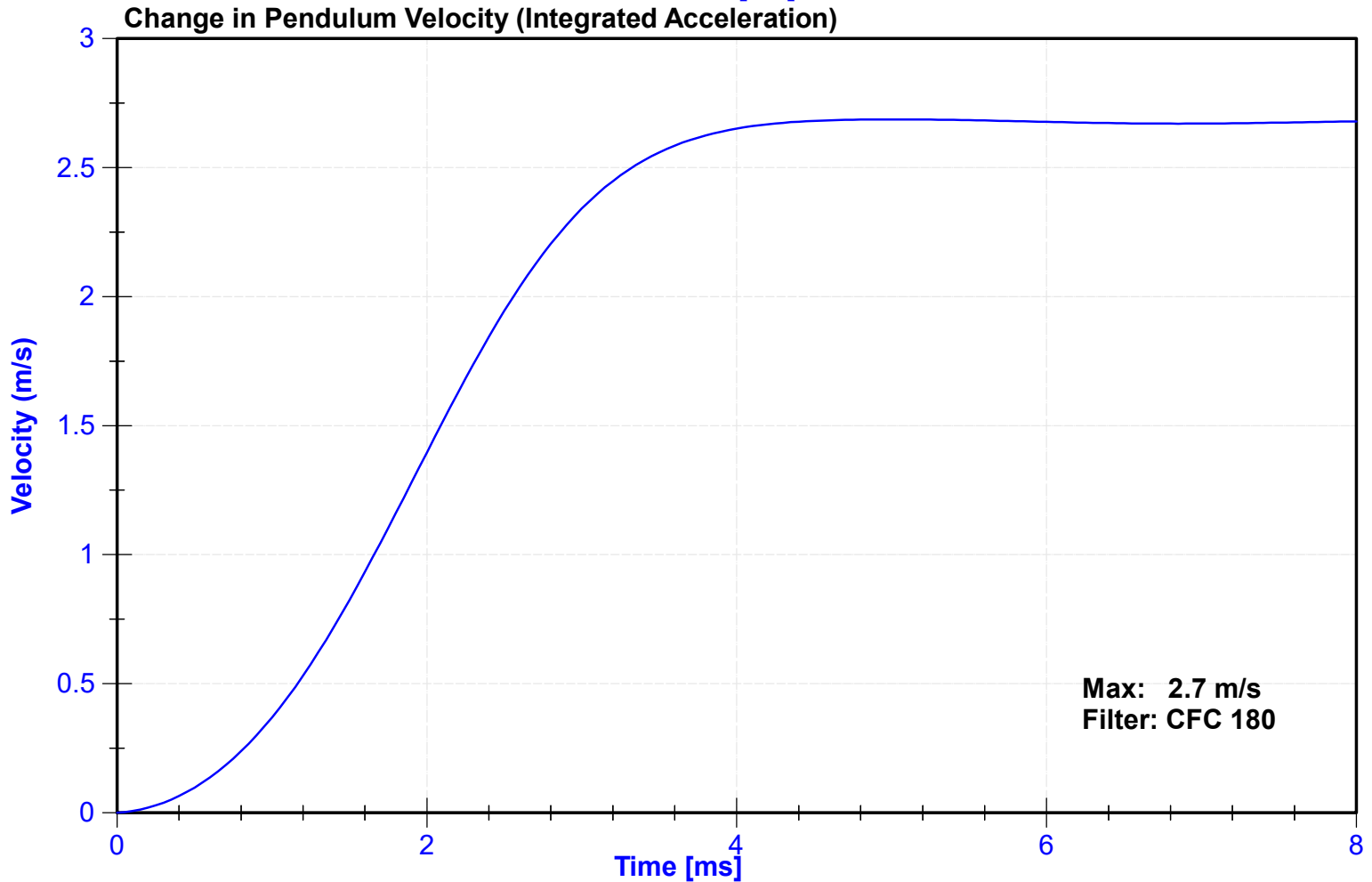
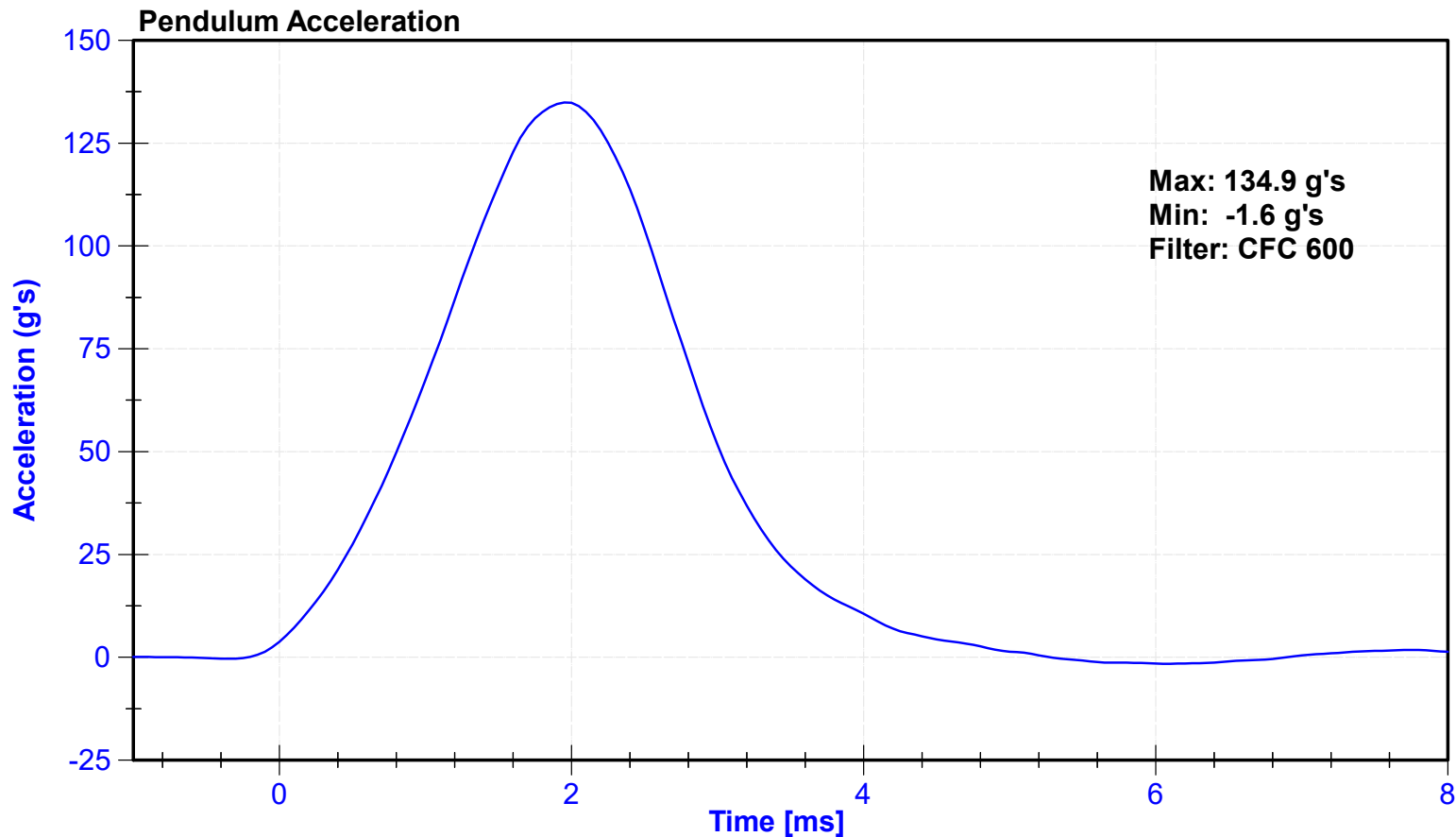
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.9	Pass
Humidity	10	70	%	24.3	Pass
Velocity	2.07	2.13	m/s	2.084	Pass
Resistive Force	3450	4060	N	3932.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18546	11/19/2022	5/18/2023





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	9/30/2022
		Y	P64151	Endevco	9/30/2022
		Z	P52114	Endevco	9/30/2022
	Redundant	X	P52079	Endevco	9/30/2022
		Y	P58905	Endevco	9/30/2022
		Z	P63996	Endevco	9/30/2022
Head Angular Rate Sensors		X	15693	DTS ARS	3/15/2022
		Y	15224	DTS ARS	3/15/2022
		Z	14919	DTS ARS	3/15/2022
Upper Neck Load Cell		FX, Fy, Fz MX,MY, MZ	2187-FX	Denton	6/13/2022
Chest Accelerometers	Primary	X	P51991	Endevco	9/30/2022
		Y	P51269	Endevco	9/30/2022
		Z	P49185	Endevco	9/30/2022
	Redundant	X	P68059	Endevco	9/30/2022
		Y	P51713	Endevco	9/30/2022
		Z	P78824	Endevco	9/30/2022
Chest Potentiometer		X	0075	JDK	10/3/2022
Pelvis Accelerometer		X	P58800	Endevco	9/30/2022
		Y	P52157	Endevco	9/30/2022
		Z	P83317	Endevco	9/30/2022
Femur Load Cells - Left	Primary	Z	DI4211-FZ1	Denton	6/14/2022
	Redundant	Z	DI4211-FZ2	Denton	6/14/2022
Femur Load Cells - Right	Primary	Z	115-FZ1	Denton	6/14/2022
	Redundant	Z	115-FZ2	Denton	6/14/2022
Tibia Load Cells - Left	Upper	MX, MY, FZ	407-FZ	Denton	6/10/2022
	Lower	MX, MY, FZ	396-FZ	Denton	6/9/2022
Tibia Load Cells – Right	Upper	MX, MY, FZ	362-FZ	Denton	6/9/2022
	Lower	MX, MY, FZ	364-FZ	Denton	6/9/2022
Foot Accelerometers - Left	Rear	X	P82756	Endevco	9/30/2022
	Front	Z	P51872	Endevco	9/30/2022
Foot Accelerometers - Right	Rear	X	P66942	Endevco	9/30/2022
	Front	Z	P58779	Endevco	9/30/2022
Seat belt Load Cells	Lap		298	GFE	6/10/2022
	Shoulder		168	GFE	6/10/2022

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	12/13/2022
		Y	P83335	Endevco	12/13/2022
		Z	P64149	Endevco	12/12/2022
	Redundant	X	P52008	Endevco	12/13/2022
		Y	P52045	Endevco	12/13/2022
		Z	P74774	Endevco	12/12/2022
Head Angular Rate Sensors		X	15217	DTS	3/15/2022
		Y	15697	DTS PRO-18K	3/16/2022
		Z	15696	DTS ARS	3/16/2022
Upper Neck Load Cell		FX, Fy, Fz MX,MY, MZ	1916-FX	Humanetics	6/10/2022
Chest Accelerometers	Primary	X	T21142	Endevco	12/12/2022
		Y	P83346	Endevco	12/12/2022
		Z	P49190	Endevco	12/12/2022
	Redundant	X	P58794	Endevco	12/12/2022
		Y	P69791	Endevco	12/12/2022
		Z	T11253	Endevco	12/12/2022
Chest Potentiometer		X	0720	Servo	12/12/2022
Pelvis Accelerometer		X	P58735	Endevco	12/12/2022
		Y	P77587	Endevco	12/12/2022
		Z	P51285	Endevco	12/12/2022
Femur Load Cells - Left	Primary	Z	135-FZ1	Denton	6/14/2022
	Redundant	Z	135-FZ2	Denton	6/14/2022
Femur Load Cells - Right	Primary	Z	136-FZ1	Denton	6/14/2022
	Redundant	Z	136-FZ2	Denton	6/14/2022
Tibia Load Cells - Left	Upper	MX, MY, FZ	364-FZ	Denton	6/10/2022
	Lower	MX, MY, FZ	398-FZ	Denton	6/8/2022
Tibia Load Cells – Right	Upper	MX, MY, FZ	368-FZ	Denton	6/10/2022
	Lower	MX, MY, FZ	490-FZ	Denton	6/8/2022
Foot Accelerometers - Left	Rear	X	P78959	Endevco	12/12/2022
	Front	Z	P83418	Endevco	12/12/2022
Foot Accelerometers - Right	Rear	X	P83428	Endevco	12/12/2022
	Front	Z	P80265	Endevco	12/12/2022
Seat belt Load Cells	Lap		278	GFE	6/14/2022
	Shoulder		290	GFE	6/14/2022

Table 3 – Vehicle Instrumentation

Instrumentation			Axis	Serial Number	Manufacturer	Calibration Date
Crossmember/Rear Seat Accelerometers	Left	Primary	X	A315860	Measurement Specialties	10/11/2022
			Z	A372822	Measurement Specialties	10/11/2022
		Redundant	X	A374350	Measurement Specialties	10/11/2022
	Right	Primary	X	A315966	Measurement Specialties	10/11/2022
			Z	A335482	Measurement Specialties	10/11/2022
		Redundant	X	A374306	Measurement Specialties	10/11/2022
Engine Accelerometers	Top		X	A431235	Measurement Specialties	11/29/2022
	Bottom		X	A280824	Measurement Specialties	1/5/2023