REPORT NUMBER: NCAP-CAL-25-007

NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

Hyundai Motor Group Metaplant America LLC
2026 Hyundai Ioniq 9
5 Door SUV

NHTSA No: O20264203

PREPARED BY:
CALSPAN CORPORATION
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June 5, 2026

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 Safety Administration, in response to Contract Number 693JJ919D000005.

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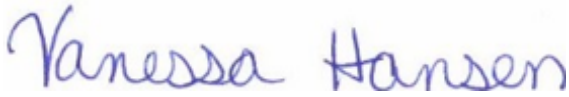
Prepared by: Date: June 5, 2026

Matthew Pronko, Test Engineer

Approved by:  Date: June 5, 2026

Vanessa Hansen, Operations Manager

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

Date: _____

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16. Abstract

A 56.30 km/h (35 mph), NCAP frontal rigid barrier impact test was conducted on a 2026 Hyundai Ioniq 9 5 Door SUV in accordance with the specifications of the Office of Crashworthiness Standards Laboratory Procedure for NCAP Full Frontal Rigid Barrier Impact Testing. This test was conducted to obtain data related to FMVSS Nos. 208, 212, 219 (partial), 301, and 305 performance. The test was conducted at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on October 2, 2025.

The impact velocity of the vehicle was 56.36 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 491 mm at vehicle centerline 4. The test vehicle's occupant performance data is as follows:

Measurement Description	Units	Driver ATD (Serial No. 065)		Passenger ATD (Serial No. 137)	
		Threshold	Result	Threshold	Result
Head Injury Criteria (HIC15)		700	224.666	700	292.005
Maximum Chest Compression	mm	63	-21.944	52	-14.929
Nij		1	0.282	1	0.291
Neck Tension	N	4170	1123.441	2620	409.566
Neck Compression	N	4000	-66.085	2520	-430.363
Left Femur Force	N	10008	-996.096	6805	-2441.218
Right Femur Force	N	10008	-1879.874	6805	-1305.366

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SECTION 1

PURPOSE AND SUMMARY OF THE TEST

PURPOSE

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

The 56.3 km/h frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Procedure for NCAP Full Frontal Rigid Barrier Impact Testing dated May 2018.

SUMMARY

A load cell barrier consisting of 128 load cells was impacted by a 2026 Hyundai Ioniq 9 5 Door SUV at a velocity of 56.36 km/h. The test was performed at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on October 2, 2025. 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 and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 065) and the right-front passenger (position 2) ATD (Serial No. 137) were qualified prior to this test. Certification details, along with instrumentation calibration data, can be found in Appendix C of this report.

The 230 channels of data were recorded on an on-board data acquisition system. Appendix B contains the vehicle, load cell barrier and dummy response data traces.

There was 100.0 percent windshield retention and no intrusion into the protected zone of the windshield during the event. There was a total of 0.0 grams of Stoddard solvent/electrolyte leakage after the event or during any phase of the static rollover. The maximum static crush of the vehicle was 491 mm and both driver and passenger side doors remained closed during the impact event and were operable after the impact.

The driver's visible contact points were as follows: The driver's head contacted the frontal airbag and the head restraint. The upper torso contacted the frontal airbag. Both knees contacted the knee air bag with the left knee also contacting the steering column shroud.

The passenger's visible contact points were as follows: The passenger's head contacted the frontal airbag and the head restraint. The upper torso contacted the frontal airbag. Both knees contacted the 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)	224.666	0.282	1123.441	-66.085	44.467	-21.944	-996.096	-1879.874
Passenger (5th)	292.005	0.291	409.566	-430.363	44.241	-14.929	-2441.218	-1305.366

GENERAL COMMENTS:

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

Data Anomalies:

- Engine Top X Acceleration, Questionable data spike at 70.9 ms
- Engine Bottom X Acceleration, Questionable data after 131.7 ms
- Passenger Chest X Displacement, Questionable data after 147.2 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 FMVSS 212, 219 (Partial) and 301 Data

Data Sheet No. 16 – FMVSS 301 Static Rollover Results

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

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

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

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

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

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

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle:	2026 Hyundai Ioniq 9 5 Door SUV	NHTSA No.:	O20264203
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	10/02/2025

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	O20264203
Model Year	2026
Make	Hyundai
Model	Ioniq 9
Body Style	SUV
VIN	7YAMTFS35TY002361
Body Color	Abyss Black
Odometer Reading (km /mi)	47 mi
Engine Displacement (L)	N/A
Type / No. Cylinders	Electric Vehicle
Engine Placement	N/A
Transmission Type	Automatic
Transmission Speeds	Direct Drive
Overdrive	N/A
Final Drive	All Wheel Drive
Roof Rack	No
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	Yes
Automatic Door Locks (ADLs)	Yes

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

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Hyundai Motor Group Metaplant America LLC
Date of Manufacture	APR/2025

GVWR (KG)	3320
GAWR Front (KG)	1590
GAWR Rear (KG)	1910

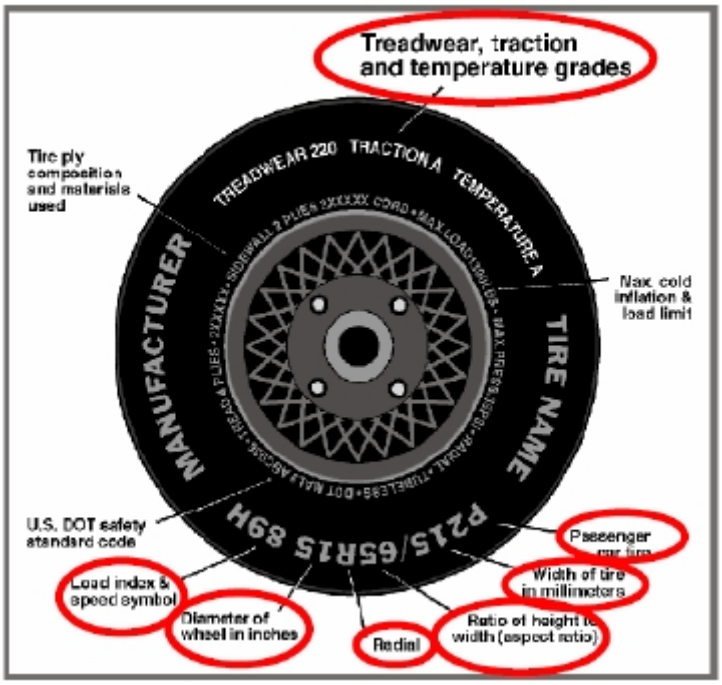
VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Split Bench	Bench	
Number of Occupants	2	3	2	7
Capacity Wt. (VCW) (kg)				560
Cargo Wt. (RCLW) (kg)				84

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

Test Vehicle:	2026 Hyundai Ioniq 9 5 Door SUV	NHTSA No.:	O20264203
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	10/02/2025

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



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	340	340
Cold Pressure (kPa)	270	275
Recommended Tire Size	255/60R19	255/60R19
Tire Size on Vehicle	255/60R19	255/60R19
Tire Manufacturer	Kumho	Kumho
Tire Model	Crugen EV	Crugen EV
Treadwear	500	500
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Steel, 2 Polyester, 1 Polyamide	2 Steel, 2 Polyester, 1 Polyamide
Load Index / Speed Symbol	113V	113V
Tire Material	Rubber	Rubber
DOT Safety Code Left	000 KMYC8E	000 KMYC8E
DOT Safety Code Right	000 KMYC8E 1225	000 KMYC8E 1225

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

Test Vehicle: 2026 Hyundai Ioniq 9 5 Door SUV
NHTSA No.: O20264203
Test Program: NCAP Frontal Barrier Impact Test
Test Date: 10/02/2025

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	620	700		659	777	
Right	kg	613	691		645	763	
Ratio	%	47.0	53.0		45.9	54.1	
Total	kg	1233	1391	2624	1304	1540	2844

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	2624	(A)
Weight of 1 P572E ATD & 1 P572O ATD	kg	142	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	84	(C)
Calculated Vehicle Target Weight (TVTW)	kg	2850	(A+B+C)

TEST VEHICLE ATTITUDES AND CG

Condition	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	957	957	990	990	1662
As Tested	mm	946	950	973	976	1698
Post-Test	mm	978	1053	975	983	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	3135
Total Vehicle Length at Left Side	mm	5015
Total Vehicle Length at Centerline	mm	5058
Total Vehicle Length at Right Side	mm	5015
Weight of Ballast in Cargo Area	kg	55
Weight of Vehicle Components Removed	kg	65
Amount of Stoddard Solvent in Fuel Tank	L	Electric Vehicle

LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT:

Trunk carpeting, third row seats

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

Test Vehicle:	2026 Hyundai Ioniq 9 5 Door SUV	NHTSA No.:	O20264203
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	10/02/2025

TARGET VEHICLE STRUCTURAL MEASUREMENT

No.	Description	Pre-Test
1	Total Length	5058
2	Total Width	1947
3*	Bumper Top Height	532
4*	Bumper Bottom Height	458
5*	Longitudinal Member Top Height	603
6	Distance Between Longitudinal Members	916
7	Longitudinal Member Width	56
8*	Engine Top Height	830
9*	Engine Bottom Height	230
10	Engine and Gearbox Width	374
11	Front Bumper-Engine Distance	604
12*	Front Shock Absorber Fixing Height	1056
13*	Bonnet Leading Edge Height	1019
14	Front Shock Absorber Fixing Width	1264
15	Front Bumper – Front Axle Distance	877
16	Front Axle – A Pillar Distance	566
17	A-Pillar – B-Pillar Distance	1119
18	B-Pillar – Rear Axle Distance	1451
19	B-Pillar – C-Pillar Distance	1177
20*	Roof Sill Bottom Height	1659
21*	Roof Sill Top Height	1700
22*	Floor Sill Bottom Height	429
23*	Floor Sill Top Height	465

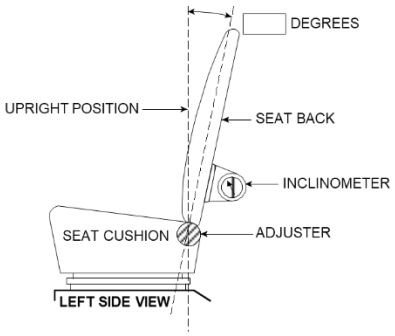
*Height Measurements are taken from the ground
Note: All measurements are in millimeters

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

Test Vehicle:	2026 Hyundai Ioniq 9 5 Door SUV	NHTSA No.:	O20264203
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	10/02/2025

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.



FRONT SEAT ASSEMBLY

Seating Position	Degrees
Driver Seat Back Angle	0.0
Passenger Seat Back Angle	-3.5

SEAT FORE / AFT POSITIONS

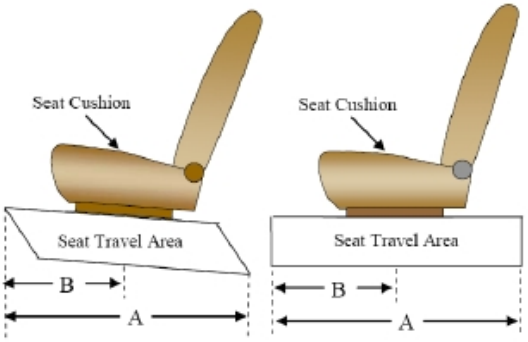
The driver's seat was positioned at the mid-point of fore/aft travel at its lowest position. The passenger's seat was positioned at the most forward position of fore/aft travel. Zero is defined as the forward most position.

Seating Position	Total Fore / Aft Travel	Placed in Position #
Driver Seat	327	163.5
Passenger Seat	260	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

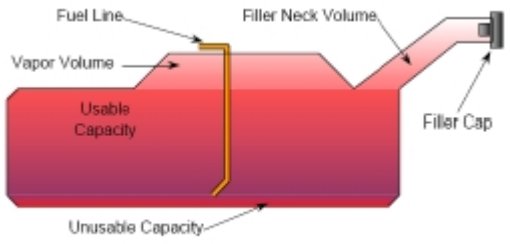
Test Vehicle:	2026 Hyundai Ioniq 9 5 Door SUV	NHTSA No.:	O20264203
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	10/02/2025

FUEL TANK CAPACITY

Description	Liters
Usable Capacity of “Standard Tank”	
Usable Capacity of “Optional Tank”	
92%-94% of Usable Capacity	
Actual Amount of Solvent Used	Electric Vehicle
1/3 of Usable Capacity	

FUEL PUMP

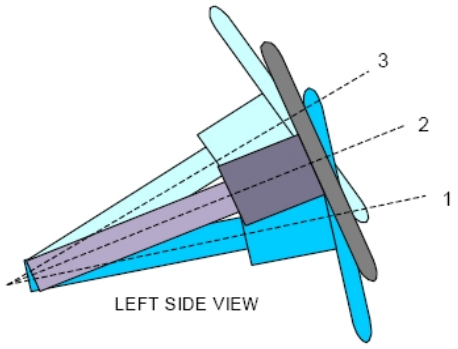
The vehicle is equipped with an electric charge port on the right rear of the vehicle.



VEHICLE FUEL TANK ASSEMBLY

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.



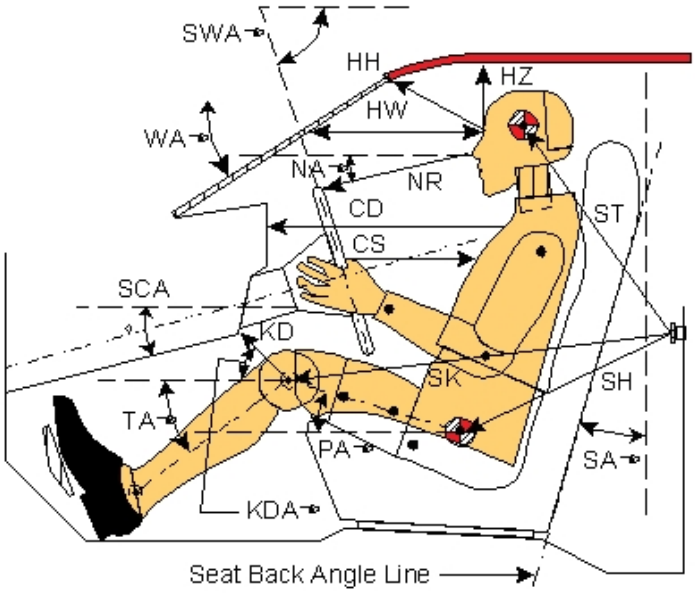
STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONS

Description	Degrees	Fore / Aft Position (mm)
Lowermost position No. 1	26.0	
Geometric center position No. 2	28.5	
Uppermost position No. 3	31.0	
Telescoping Steering Wheel Travel		56
Test Position	28.5	28

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle:	2026 Hyundai Ioniq 9 5 Door SUV	NHTSA No.:	O20264203
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	10/02/2025

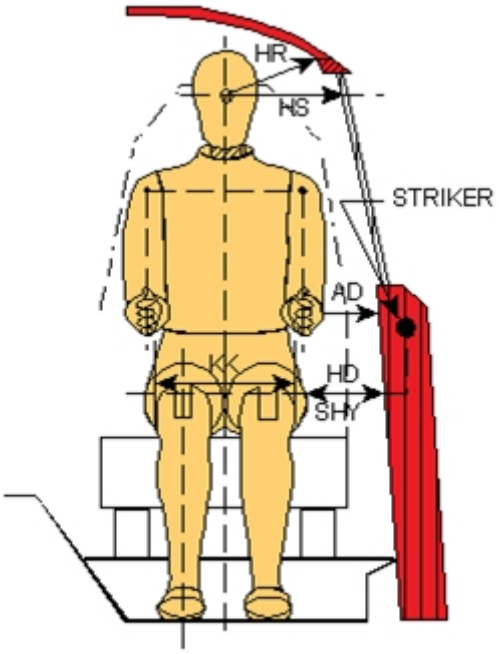


Left Side View

Code	Measurement Description	Driver (SN: 065)		Passenger (SN: 137)	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		63.5		
SWA°	Steering Wheel Angle		28.5		
SCA°	Steering Column Angle		61.5		
SA°	Seat Back Angle (on headrest post)		0.0		-3.5
HZ	Head to Roof (Z)	216	90	210	90
HH	Head to Header	341	38.5	277	46.0
HW	Head to Windshield	761	0.0	645	0.2
NR	Nose to Rim / Dash	395	3.7	457	33.8
CD	Chest to Dash	613		372	
CS	Chest to Steering Hub	324	5.6		
RA	Rim to Abdomen	209	0.0		
KDL	Left Knee to Dash	212	27.2	116	29.3
KDR	Right Knee to Dash	200	26.8	116	29.7
PA°	Pelvic Angle		24.6		19.9
TA°	Tibia Angle		33.2		47.6
SK	Striker to Knee	608	12.5	770	12.5
ST	Striker to Head	440	65.9	452	54.9
SH	Striker to H-Point	315	47.5	460	24.3

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle:	2026 Hyundai Ioniq 9 5 Door SUV	NHTSA No.:	O20264203
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	10/02/2025

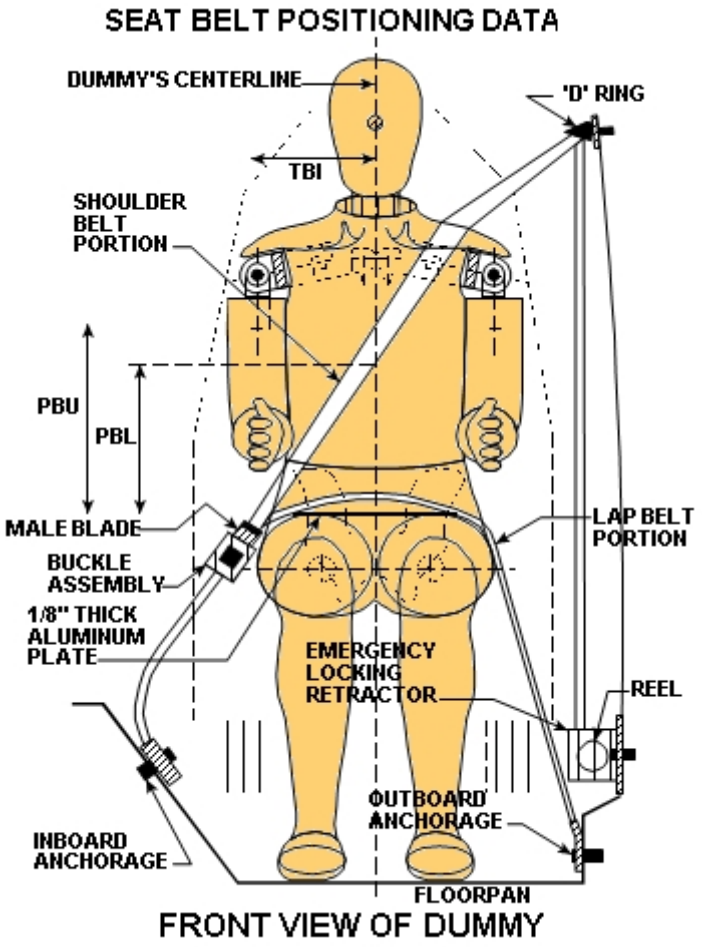


Front View

Code	Description	Driver (mm)	Passenger (mm)
AD	Arm to Door	159	85
HD	H-Point to Door	172	188
HR	Head to Side Header	260	280
HS	Head to Side Window	372	400
KK	Knee to Knee	306	165
SHY	Striker to H-Point (Y Direction)	260	272
AA	Ankle to Ankle	325	170

DATA SHEET NO. 5
SEAT BELT POSITIONING DATA

Test Vehicle:	2026 Hyundai Ioniq 9 5 Door SUV	NHTSA No.:	O20264203
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	10/02/2025



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU — Top surface of reference to belt upper edge	mm	348	296
PBL — Top surface of reference to belt lower edge	mm	258	210

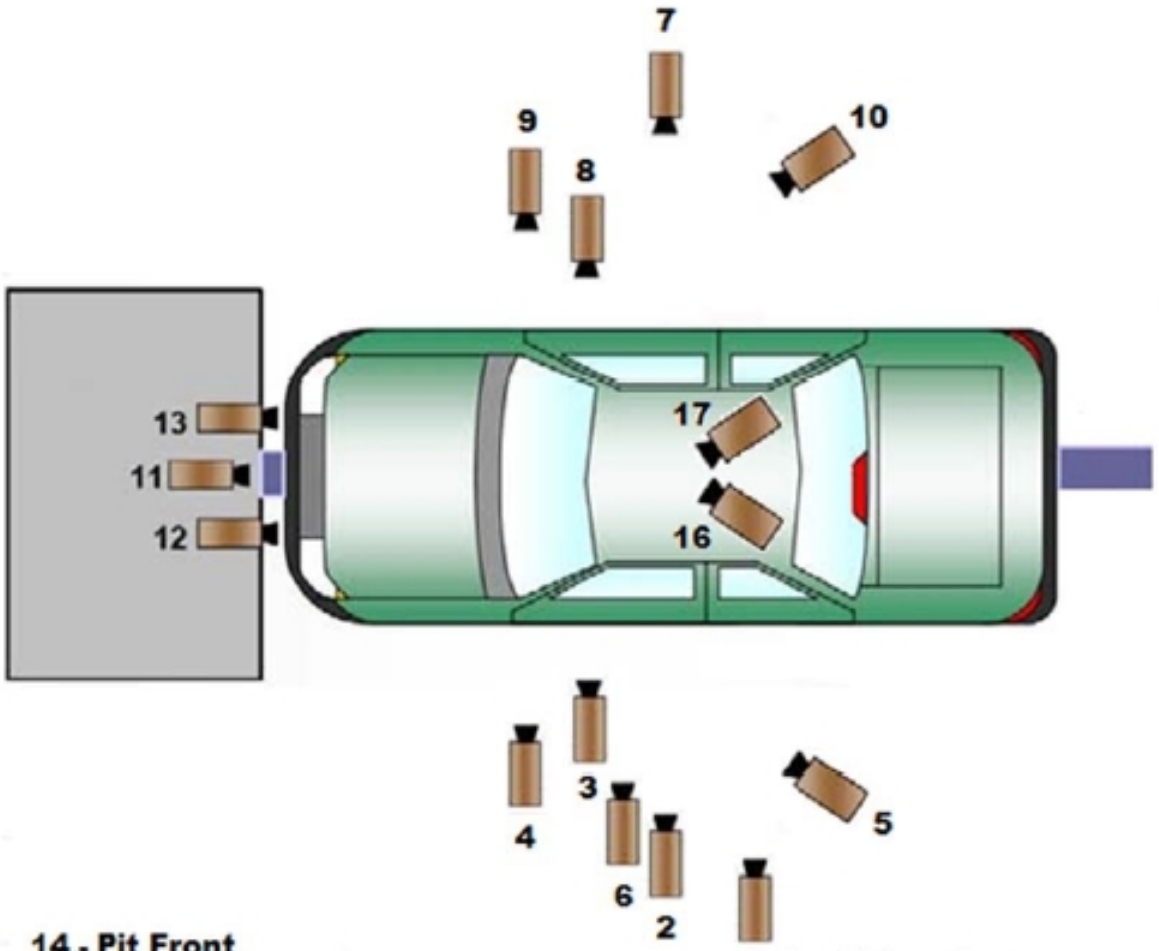
BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	940	1026
Lap Belt Length as measured on ATD	mm	675	823
Remainder of belt on reel	mm	1015	781
Total belt length for continuous webbing systems	mm	2630	2630

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

Test Vehicle:	2026 Hyundai Ioniq 9 5 Door SUV	NHTSA No.:	O20264203
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	10/02/2025

CAMERA POSITIONS FOR FRONTAL IMPACTS



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

Test Vehicle: 2026 Hyundai Ioniq 9 5 Door SUV NHTSA No.: O20264203
Test Program: NCAP Frontal Barrier Impact Test Test Date: 10/02/2025

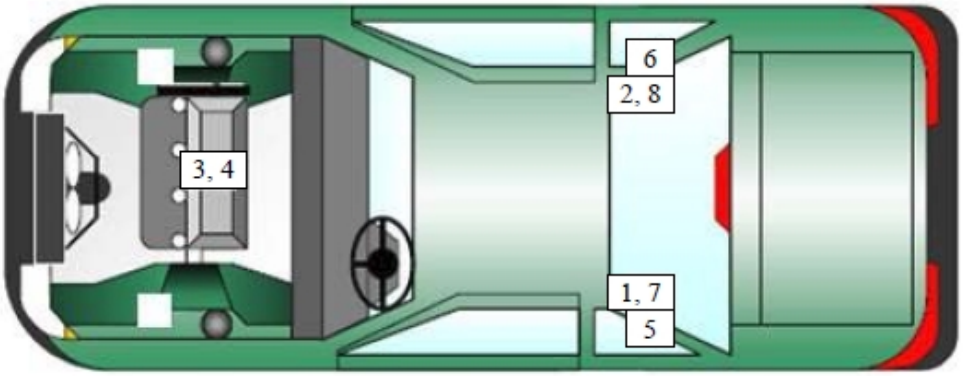
CAMERA LOCATIONS

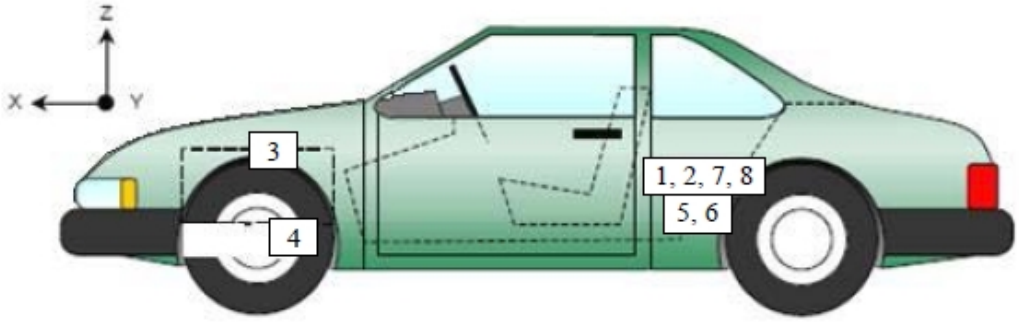
No.	Camera View	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall				Zoom	60
2	Left Overall	-2251	-8000	-1510	24	1000
3	Driver Close-Up	-1230	-7080	-1400	50	1000
4	Left Front Half	-830	-7160	-1400	28	1000
5	Left Angle	-4230	-4690	-2400	50	1000
6	Steering Column	-1510	-7075	-2400	75	1000
7	Right Overall	-3900	8200	-1550	24	1000
8	Passenger Close-Up	-2475	8370	-1570	50	1000
9	Right Front Half	-1395	8130	-1500	28	1000
10	Right Angle	-4500	4700	-2400	50	1000
11	Windshield	1811	0	-3850	12.5	1000
12	Driver Windshield	1600	-400	-2100	25	1000
13	Passenger Windshield	1600	400	-2100	25	1000
14	Pit Front	-720	0	1997	12.5	1000
15	Pit Rear	-3205	0	1997	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:	2026 Hyundai Ioniq 9 5 Door SUV	NHTSA No.:	O20264203
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	10/02/2025





VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Accelerometer – X Direction	2207	-357	202
2	Right Rear Accelerometer – X Direction	2201	417	201
3	Engine Top X	4273	25	-235
4	Engine Bottom X	4223	-76	368
5	Left Rear Accelerometer – Z Direction	2207	-357	202
6	Right Rear Accelerometer – Z Direction	2201	417	201
7	Left Rear Accelerometer – X Direction Redundant	2197	-355	202
8	Right Rear Accelerometer – X Direction Redundant	2192	415	201

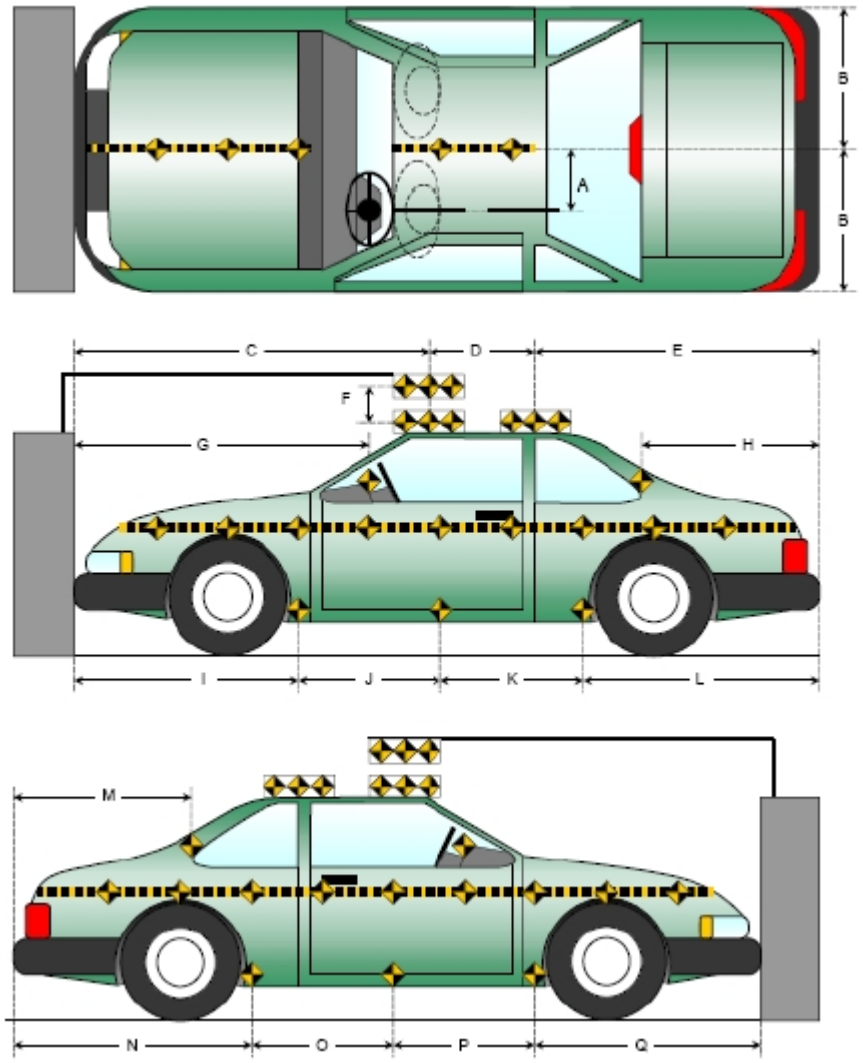
Reference Points:
X – Rear Surface of Vehicle (+ forward)
Y – Vehicle Centerline (+ to right)
Z – Ground Plane (+ down)

DATA SHEET NO. 8
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle:	2026 Hyundai Ioniq 9 5 Door SUV	NHTSA No.:	O20264203
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	10/02/2025

Item	Value
A	365
B	974
C	3068
D	608
E	1382
F	302
G	1694
H	1244
I	1404
J	1046
K	1039
L	1569
M	1248
N	1569
O	1038
P	1047
Q	1404

All units in millimeters



DATA SHEET NO. 9
LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle:	2026 Hyundai Ioniq 9 5 Door SUV	NHTSA No.:	O20264203
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	10/02/2025

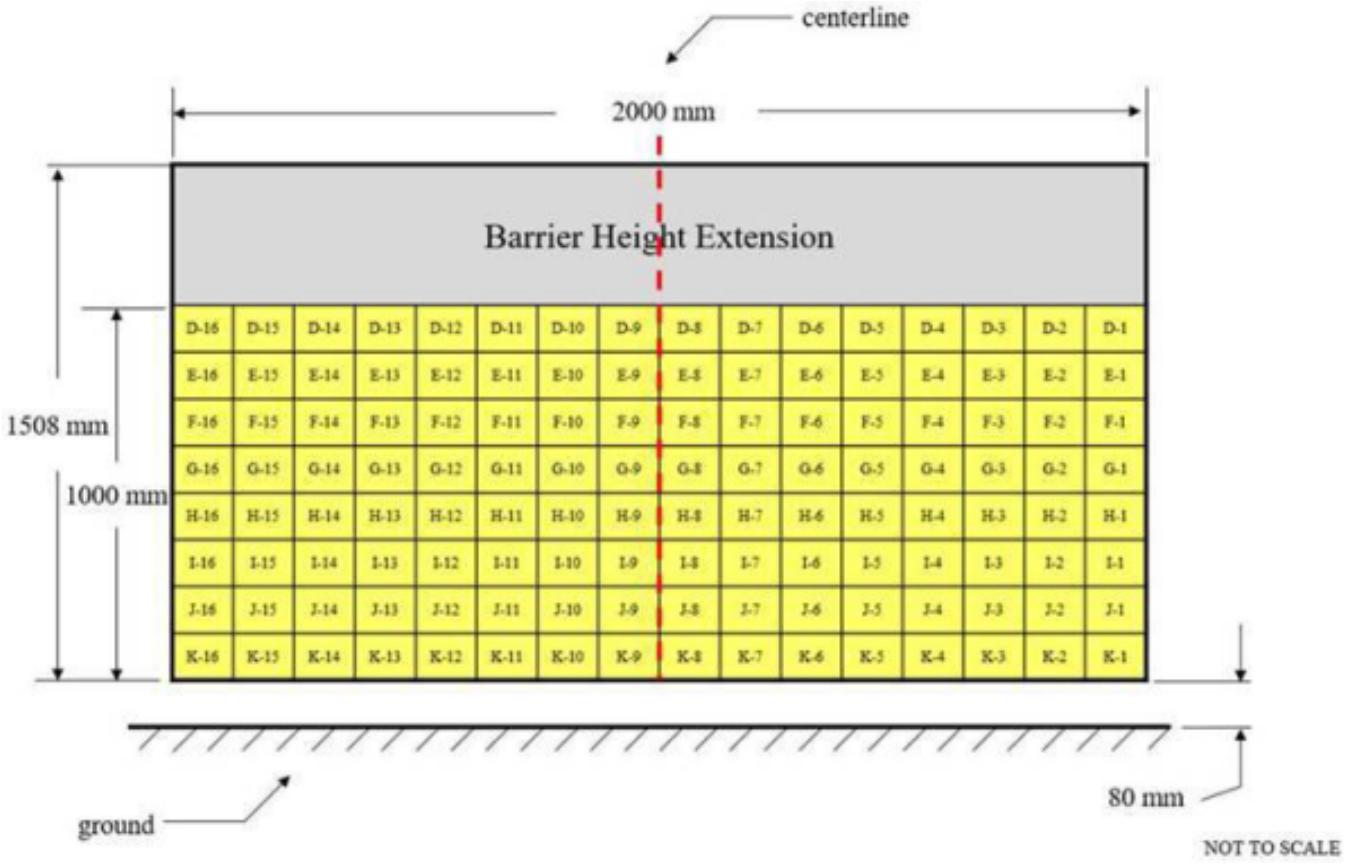


Figure 1 - Load Cell Locations on a 128-Load Cell Barrier with Plywood Height Extension*
Please note above diagram is not actual representation of load cell barrier used.

DATA SHEET NO. 10
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle:	2026 Hyundai Ioniq 9 5 Door SUV	NHTSA No.:	O20264203
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	10/02/2025

INSTRUMENTATION

Instrumentation	Number of Channels Collected
Driver Dummy Accelerometers	47
Passenger Dummy Accelerometers	47
Vehicle Structure Accelerometers	8
Load Cell Barrier	128
Total	230

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: 2026 Hyundai Ioniq 9 5 Door SUV NHTSA No.: O20264203
Test Program: NCAP Frontal Barrier Impact Test Test Date: 10/02/2025

TEST DUMMY INFORMATION AND CONTACT LOCATIONS

Description	Driver	Passenger
Dummy Type / Serial No.	Hybrid III 50th Male / SN: 065	Hybrid III 5th Female / SN: 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 Airbag & Steering Column Shroud	Glove Box
Right Knee Contact	Knee Airbag	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	Cracks throughout
Window Damage	None
Other	None

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	1677
Center	mm	1684
Right Side	mm	1665
Average	mm	1675

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

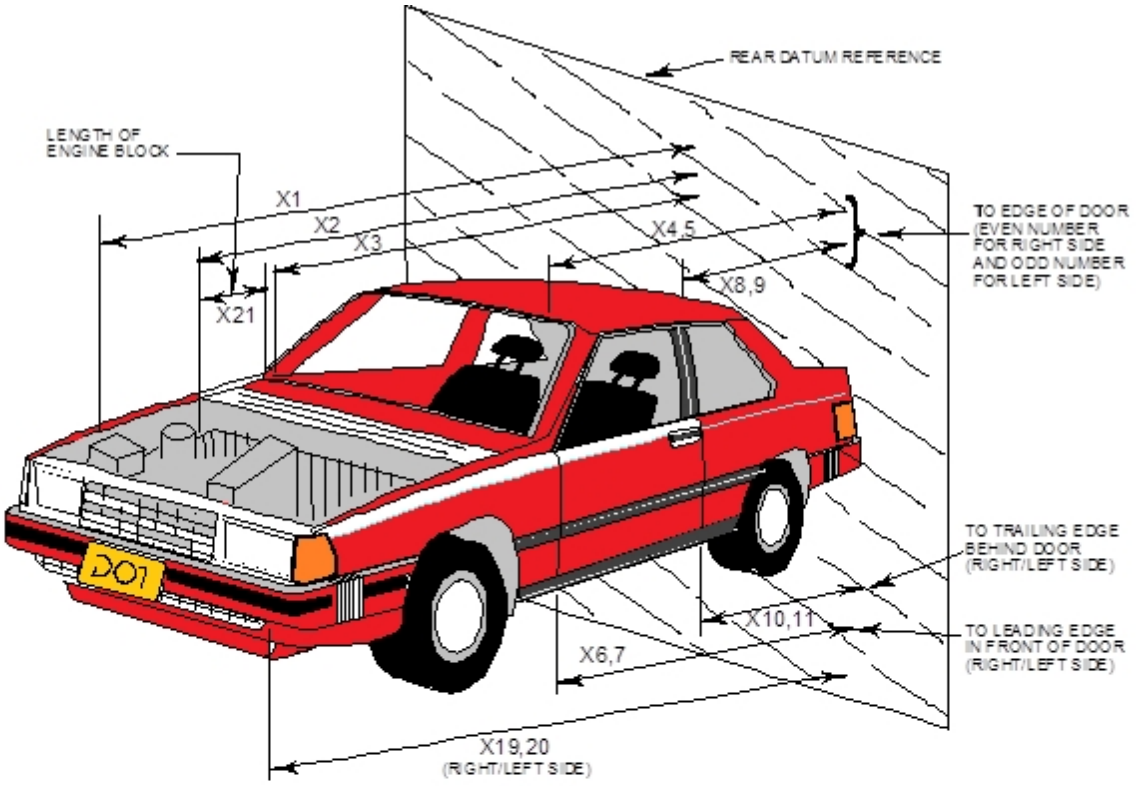
Test Vehicle: 2026 Hyundai Ioniq 9 5 Door SUV NHTSA No.: O20264203
Test Program: NCAP Frontal Barrier Impact Test Test Date: 10/02/2025

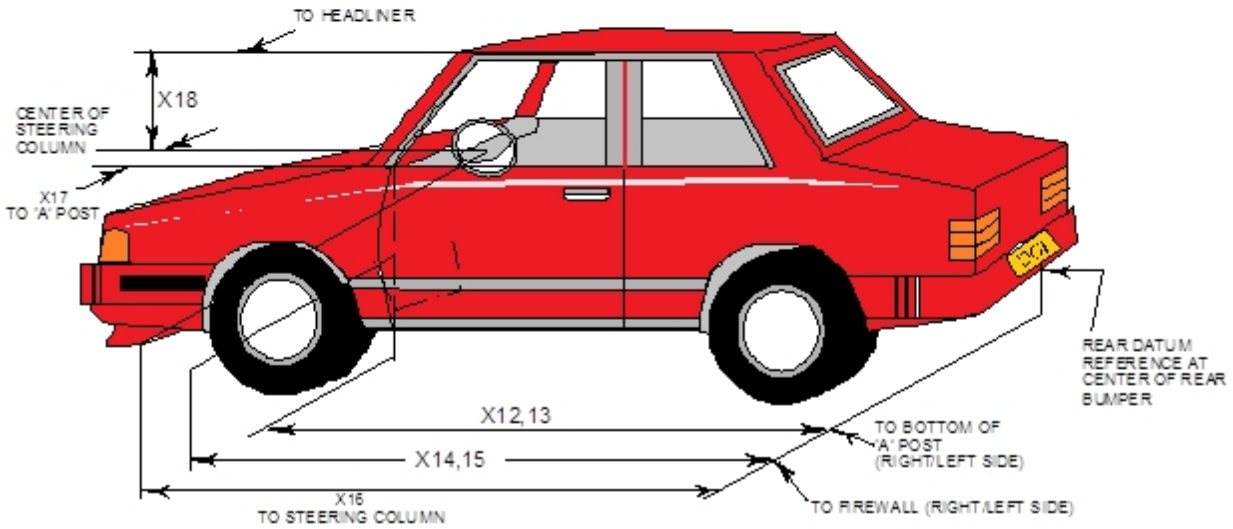
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

DATA SHEET NO. 12
VEHICLE PROFILE MEASUREMENTS

Test Vehicle:	2026 Hyundai Ioniq 9 5 Door SUV	NHTSA No.:	O20264203
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	10/02/2025





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

Test Vehicle: 2026 Hyundai Ioniq 9 5 Door SUV NHTSA No.: O20264203
Test Program: NCAP Frontal Barrier Impact Test Test Date: 10/02/2025

No.	Measurement Description	Pre-Test	Post-Test	Change
1	Total Length of Vehicle at Centerline	5058	4567	-491
2	Rear Surface of Vehicle (RSOV) to Front of Engine	4454	4197	-257
3	RSOV to Firewall	4126	4087	-39
4	RSOV to Upper Leading Edge of Right Door	3612	3605	-7
5	RSOV to Upper Leading Edge of Left Door	3615	3614	-1
6	RSOV to Lower Leading Edge of Right Door	3582	3573	-9
7	RSOV to Lower Leading Edge of Left Door	3581	3579	-2
8	RSOV to Upper Trailing Edge of Right Door	2493	2489	-4
9	RSOV to Upper Trailing Edge of Left Door	2496	2495	-1
10	RSOV to Lower Trailing Edge of Right Door	2521	2516	-5
11	RSOV to Lower Trailing Edge of Left Door	2519	2518	-1
12	RSOV to Bottom of “A” Post of Right Side	3709	3705	-4
13	RSOV to Bottom of “A” Post of Left Side	3710	3709	-1
14	RSOV to Firewall, Right Side	4087	4049	-38
15	RSOV to Firewall, Left Side	4080	4036	-44
16	RSOV to Steering Column	3171	3220	49
17	Center of Steering Column to “A” Post	307	291	-16
18	Center of Steering Column to Headliner	421	434	13
19	RSOV to Right Side of Front Bumper	5036	4551	-485
20	RSOV to Left Side of Front Bumper	5037	4586	-451
21	Length of Engine Block	256	256	0
RD	RSOV to Right Side of Dash Panel	3372	3368	-4
CD	RSOV to Center of Dash Panel	3332	3321	-11
LD	RSOV to Left Side of Dash Panel	3369	3369	0

All Dimensions in mm

DATA SHEET NO. 13
ACCIDENT INVESTIGATION DIVISION DATA

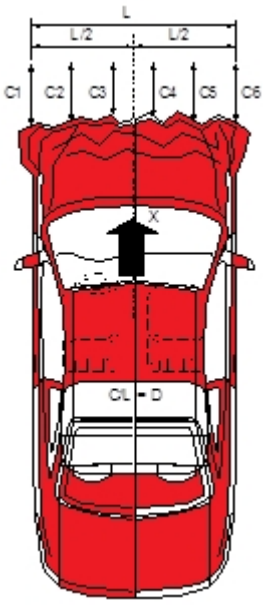
Test Vehicle:	2026 Hyundai Ioniq 9 5 Door SUV	NHTSA No.:	O20264203
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	10/02/2025

VEHICLE INFORMATION

VIN:	7YAMTFS35TY002361	Wheelbase (mm):	3135
Vehicle Size Category:	MPV	Test Weight (kg):	2844

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):	56.36
Velocity Change (km/h):	69.9
Time of Separation (ms):	205



CRUSH PROFILE

Collision Deformation Classification:	12FDEW2
Midpoint of Damage:	C4
Damage Region Length (mm):	1688
Impact Mode:	Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Crush
C1	Crush Zone 1 at Left Side	mm	4882	4571	311
C2	Crush Zone 2 at Left Side	mm	5035	4598	437
C3	Crush Zone 3 at Left Side	mm	5052	4580	472
C4	Crush Zone 4 at Right Side	mm	5052	4571	481
C5	Crush Zone 5 at Right Side	mm	5033	4568	465
C6	Crush Zone 6 at Right Side	mm	4876	4517	359
L	C1 to C6	mm	1614	1688	-74

DATA SHEET NO. 14
VEHICLE INTRUSION MEASUREMENTS

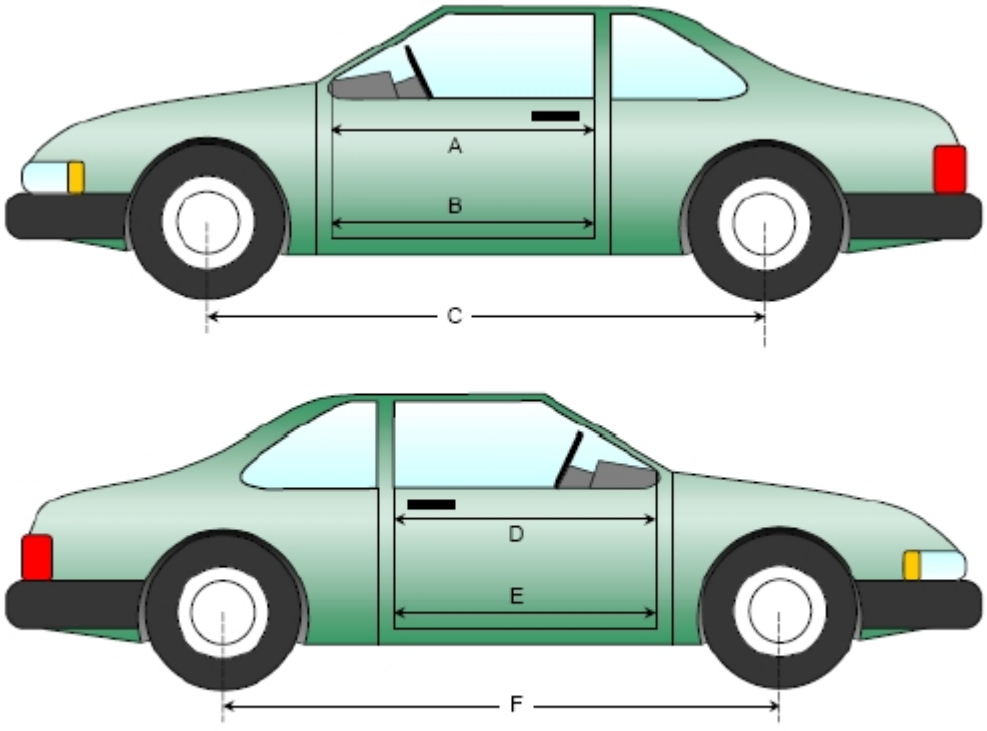
Test Vehicle:	2026 Hyundai Ioniq 9 5 Door SUV	NHTSA No.:	O20264203
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	10/02/2025

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Change
A	Left Side Upper	mm	988	989	1
B	Left Side Lower	mm	906	907	1
D	Right Side Upper	mm	988	990	2
E	Right Side Lower	mm	903	904	1

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Change
C	Left Side Wheelbase	mm	3135	3026	-109
F	Right Side Wheelbase	mm	3135	3027	-108



Left & Right Side Views

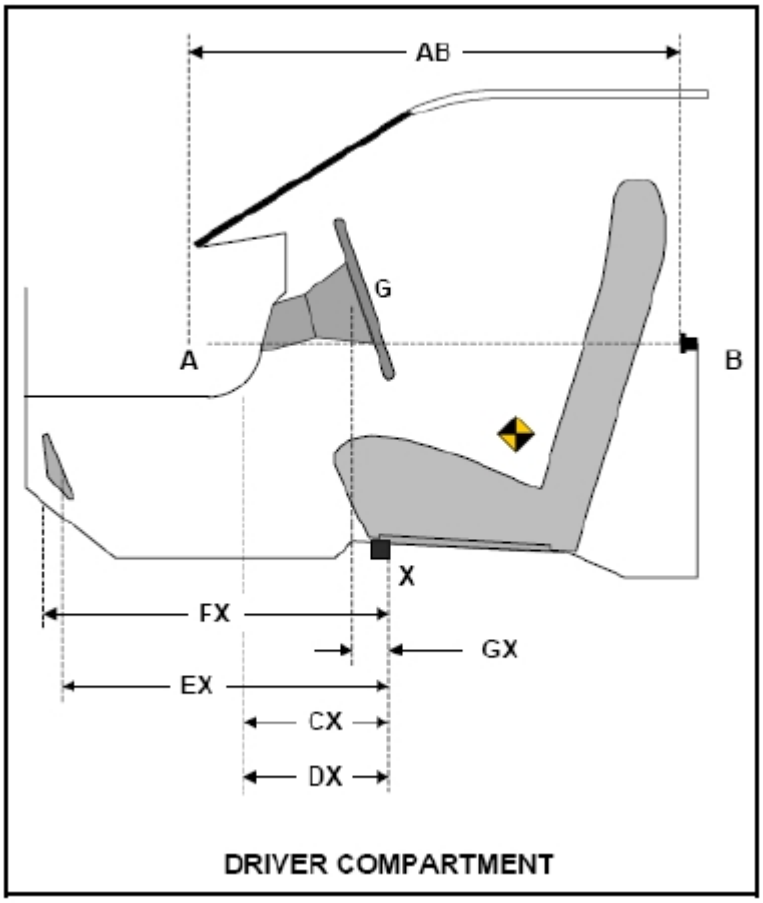
DATA SHEET NO.14 … (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle:	2026 Hyundai Ioniq 9 5 Door SUV	NHTSA No.:	O20264203
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	10/02/2025

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Change
AB	Door Opening (Inside Window Jam)	mm	738	740	2
CX	Left Knee Bolster to X	mm	259	256	-3
DX	Right Knee Bolster to X	mm	253	244	-9
EX	Brake Pedal to X	mm	485	448	-37
FX	Foot Rest to X	mm	467	456	-11
GX	Center of Steering Column Wheel Hub to X	mm	-10	41	51

X = Front of Seat Track (Stationary)



DRIVER COMPARTMENT

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

Test Vehicle:	2026 Hyundai Ioniq 9 5 Door SUV	NHTSA No.:	O20264203
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	10/02/2025

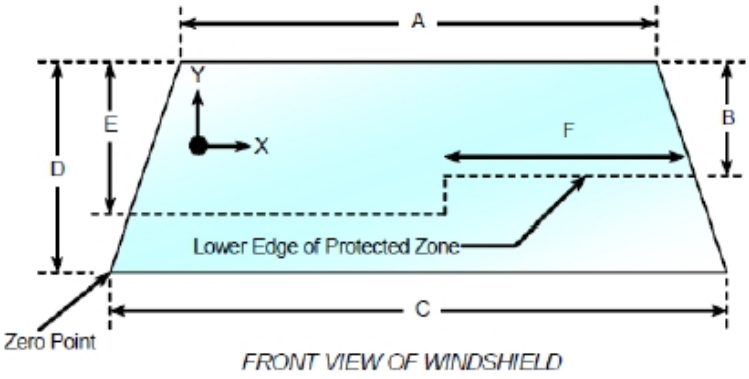
Windshield Mounting Details: A trim surrounds the top and side of windshield while a plastic shroud is on the bottom.

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

Temperature of windshield molding during test: 21 °C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2445.0	2445.0	100.0%
Right Side	2445.0	2445.0	100.0%
Total	4890	4890	100.0%



FRONT VIEW OF WINDSHIELD

Item	Units	Value
A	mm	1350
B	mm	639
C	mm	1640
D	mm	950
E	mm	635
F	mm	465

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:	2026 Hyundai Ioniq 9 5 Door SUV	NHTSA No.:	O20264203
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	10/02/2025

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 21°C Test Time: 11:43 AM

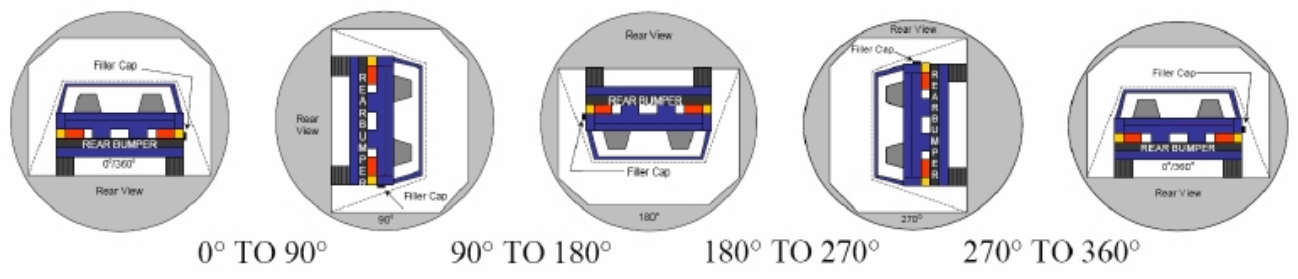
STODDARD SOLVENT SPILLAGE MEASUREMENTS

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

D. Spillage Detail: Electric Vehicle

DATA SHEET NO. 16
FMVSS 301 STATIC ROLLOVER RESULTS

Test Vehicle:	2026 Hyundai Ioniq 9 5 Door SUV	NHTSA No.:	O20264203
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	10/02/2025



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: Electric Vehicle

SOLVENT COLLECTION TIME TABLE IN SECONDS

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

FMVSS 301 SPILLAGE TABLE

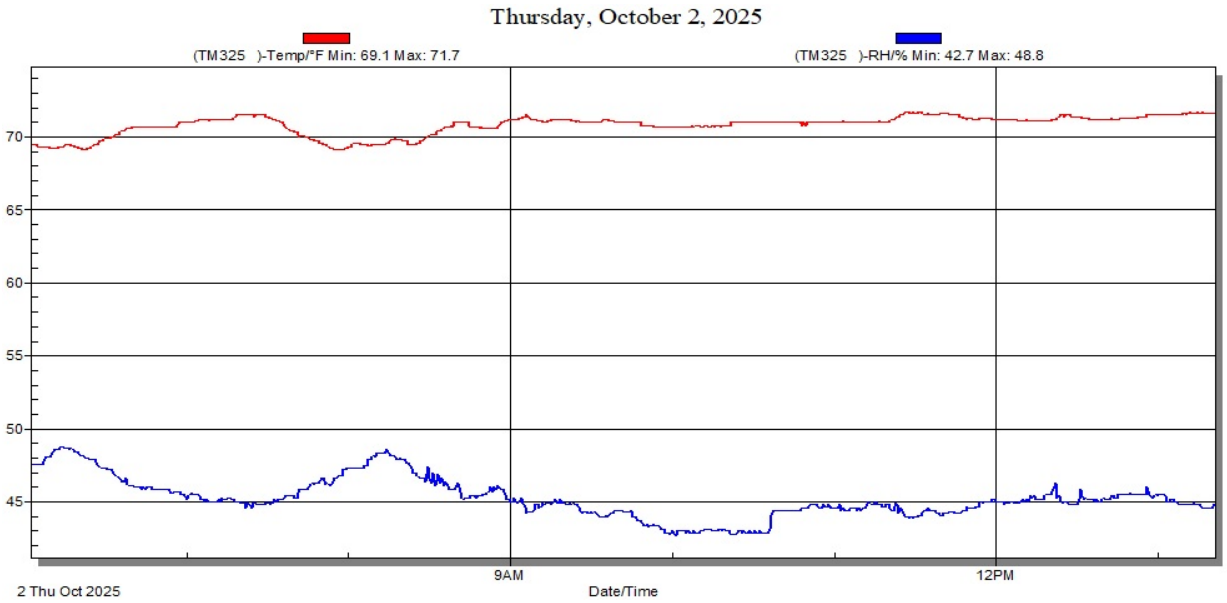
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° to 90°				
90° to 180°				
180° to 270°				
270° to 360°				

SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 17
DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART

Test Vehicle:	2026 Hyundai Ioniq 9 5 Door SUV	NHTSA No.:	O20264203
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	10/02/2025



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

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

Test Vehicle: 2026 Hyundai Ioniq 9 5 Door SUV NHTSA No.: O20264203
Test Program: NCAP Frontal Barrier Impact Test Test Date: 10/02/2025

ELECTRIC VEHICLE PROPULSION SYSTEM

Measured Parameter	Value
Type of Electric Vehicle (Electric/Gas-Electric Hybrid/Fuel Cell-Electric Hybrid)	Electric
Propulsion Battery Type	Lithium-Ion
Nominal Voltage (Volts)	610
Is this Vehicle equipped with an Automatic Propulsion Battery Disconnect?	Yes
Physical Location of Automatic Propulsion Battery Disconnect, if applicable	BMS inside high voltage battery
Auxiliary Battery Type	Lead Acid

PROPULSION BATTERY SYSTEM DATA (COTR SUPPLIED)

Measured Parameter	Value
Electrolyte Fluid Type	LiPF6 salt, Carbonate solvent
Electrolyte Fluid Specific Gravity	1.21g/cm3
Electrolyte Fluid Kinematic Viscosity (centistokes)	3.87cP @ 25˚C
Electrolyte Fluid Color	Transparent & Pale Yellow
Propulsion Battery Coolant Type, Color and Specific Gravity (if applicable)	Applied (Water-cooled type)
Location of Battery Modules (Inside or Outside of Passenger Compartment?)	Outside

PROPULSION BATTERY STATE OF CHARGE

Measured Parameter	Units	Value
For all battery types: Voltage Range corresponding to **useable energy** of the battery:		
Minimum State of Charge	V	420
Maximum State of Charge	V	722.4
95% of Maximum	V	686.3
Test Voltage *	V	691.0
For batteries that are rechargeable ONLY by an energy source on the vehicle: Voltage range corresponding to **useable energy** of the battery:		
Minimum State of Charge	V	
Maximum State of Charge	V	
95% of Maximum	V	
Test Voltage *	V	

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

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

Test Vehicle:	2026 Hyundai Ioniq 9 5 Door SUV	NHTSA No.:	O20264203
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	10/02/2025

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

Measured Parameter	Value
Details of Vehicle Chassis Ground Points & Locations	Attached to vehicle chasis
Details of Propulsion Battery Components	Battery located underneath the vehicle

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

Test Vehicle:	2026 Hyundai Ioniq 9 5 Door SUV	NHTSA No.:	O20264203
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	10/02/2025

VOLTMETER INFORMATION

Measured Parameter	Units	Value
Make & Model		Fluke 1587
Serial No.		49210189
Internal Impedance Value	MΩ	10
Resolution	V	0.001
Last Calibration Date		04/22/2025

NOTES:

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

PROPULSION BATTERY VOLTAGE, RESISTANCE & ELECTRICAL ISOLATION MEASUREMENTS & CALCULATIONS

Measured Parameter	Symbol	Units	Value
Normal operating voltage range specified by the manufacturer	V_b	V	420-722.4
Propulsion Battery Voltage: (ready to drive position)	V_b	V	691.0
Propulsion Battery to Vehicle Chassis	V_1	V	432.5
Propulsion Battery to Vehicle Chassis	V_2	V	422.0
Propulsion Battery to Vehicle Chassis Across Known Resistor	R_o	Ω	403,700
Propulsion Battery to Vehicle Chassis with R_o installed	V_1'	V	81.5
Propulsion Battery to Vehicle Chassis with R_o installed	V_2'	V	82.9
$R_{i1}= R_o*(1+V_2/V_1)*[(V_1-V_1')/V_1']$	R_{i1}	Ω	3,435,059
$R_{i2}= R_o*(1+V_1/V_2)*[(V_2-V_2')/V_2']$	R_{i2}	Ω	3,343,733
Lesser value of R_{i1} and R_{i2}	R_i	Ω	3,343,733
Electrical Isolation Value (Minimum E.I. Value is 500 Ω/V)	R_i/V_b	Ω/V	4,839

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

NOTES:

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

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

Test Vehicle: 2026 Hyundai Ioniq 9 5 Door SUV NHTSA No.: O20264203
Test Program: NCAP Frontal Barrier Impact Test Test Date: 10/02/2025

VOLTMETER INFORMATION

Measured Parameter	Units	Value
Make & Model		Fluke 1587
Serial No.		49210189
Internal Impedance Value	MΩ	10
Resolution	V	0.001
Last Calibration Date		04/22/2025

NOTES:

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

ELECTRICAL ISOLATION MEASUREMENTS & IMPACT CALCULATIONS

Parameter	Value	Units		Value		Value	
V_b =	0.1	V	Time:	0	Minutes	34	Seconds
V_1 =	0.0	V	Time:	0	Minutes	41	Seconds
V_2 =	0.0	V	Time:	0	Minutes	46	Seconds
$R_{o\ =}$	403,700	Ω					
V_1' =	0.0	V	Time:	0	Minutes	51	Seconds
V_2' =	0.0	Ω	Time:	0	Minutes	57	Seconds
R_{i1} =	Zero Volts	Ω	Time:	0	Minutes	51	Seconds
R_{i2} =	Zero Volts	Ω	Time:	0	Minutes	57	Seconds
R_i =	Zero Volts	Ω/V	Time:	0	Minutes	57	Seconds
R_i/V_b =	Zero Volts	Ω/V	Time:	0	Minutes	57	Seconds

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

NOTES:

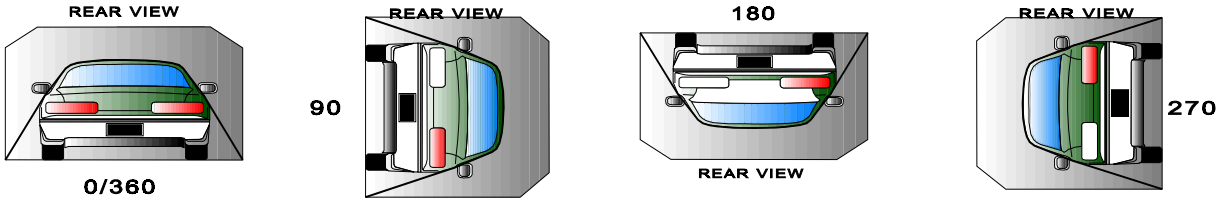
- *$R_{i1}= R_o*(1+V_2/V_1)*[(V_1-V_1')/V_1']$, $R_{i2}= R_o*(1+V_1/V_2)*[(V_2-V_2')/V_2']$, R_i = Lesser value of R_{i1} and R_{i2}*
- *If measured voltage is zero and results in a division by zero, record "Zero Volts." This "zero voltage" condition is considered as being compliant*
- *Minimum Electrical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

PROPULSION BATTERY SYSTEM COMPONENTS

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

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

Test Vehicle:	2026 Hyundai Ioniq 9 5 Door SUV	NHTSA No.:	O20264203
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	10/02/2025



Rear View

DETERMINATION OF PROPULSION BATTERY ELECTROLYTE COLLECTION TIME PERIOD

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

ACTUAL TEST VEHICLE PROPULSION BATTERY ELECTROLYTE SPILLAGE

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

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

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

VOLTMETER INFORMATION

Measured Parameter	Units	Value
Make & Model		Fluke 1587
Serial No.		49210189
Internal Impedance Value	MΩ	10
Resolution	V	0.001
Last Calibration Date		04/22/2025

NOTES:

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

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

Test Vehicle: 2026 Hyundai Ioniq 9 5 Door SUV NHTSA No.: O20264203
Test Program: NCAP Frontal Barrier Impact Test Test Date: 10/02/2025

ELECTRICAL ISOLATION MEASUREMENTS & CALCULATIONS

Parameter	Rollover Stage	Value	Units	Ro=200,500 Ω	Minutes	Seconds
V_b =	90°	0.0	V	Time:	3	21
	180°	0.0	V		9	37
	270°	0.0	V		16	17
	360°	0.0	V		23	31
V_1 =	90°	0.0	V	Time:	3	23
	180°	0.0	V		9	49
	270°	0.0	V		16	18
	360°	0.0	V		23	32
V_2 =	90°	0.0	V	Time:	3	24
	180°	0.0	V		9	51
	270°	0.0	V		16	18
	360°	0.0	V		23	34
V_1' =	90°	0.0	V	Time:	3	25
	180°	0.0	V		9	54
	270°	0.0	V		16	19
	360°	0.0	V		23	34
V_2' =	90°	0.0	Ω	Time:	3	26
	180°	0.0	Ω		9	59
	270°	0.0	Ω		16	19
	360°	0.0	Ω		23	35
R_{i1} =	90°	Zero Volts	Ω	Time:	3	25
	180°	Zero Volts	Ω		9	54
	270°	Zero Volts	Ω		16	19
	360°	Zero Volts	Ω		23	34
R_{i2} =	90°	Zero Volts	Ω	Time:	3	26
	180°	Zero Volts	Ω		9	59
	270°	Zero Volts	Ω		16	19
	360°	Zero Volts	Ω		23	35
R_i =	90°	Zero Volts	Ω/V	Time:	3	26
	180°	Zero Volts	Ω/V		9	59
	270°	Zero Volts	Ω/V		16	19
	360°	Zero Volts	Ω/V		23	35
R_i/V_b =	90°	Zero Volts	Ω/V	Time:	3	26
	180°	Zero Volts	Ω/V		9	59
	270°	Zero Volts	Ω/V		16	19
	360°	Zero Volts	Ω/V		23	35

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

APPENDIX A

PHOTOGRAPHS

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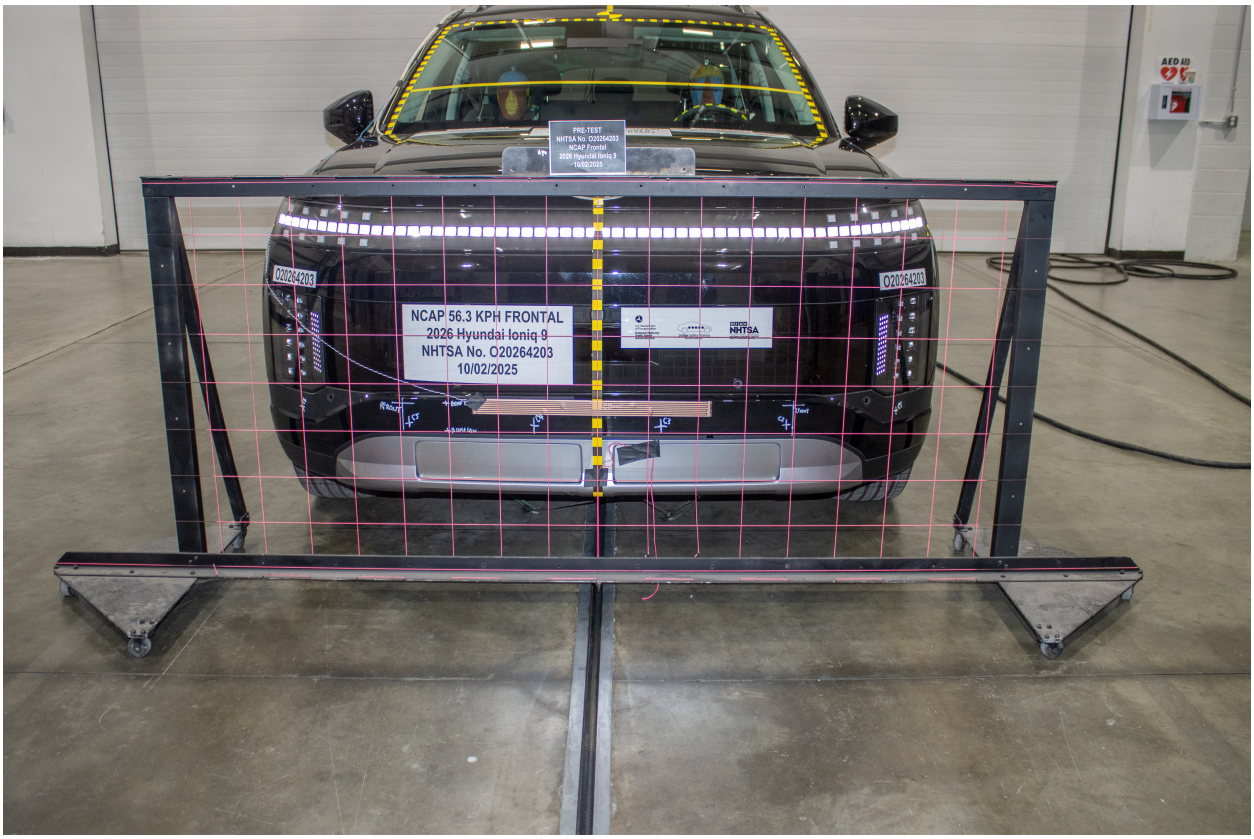

Figure A-1: Load Cell Location

Figure A-2: Pre-Test Load Cell Wall

Figure A-3: Post-Test Load Cell Wall

Figure A-4: Manufacturer's Label

Figure A-5: Tire Placard

Figure A-6: 2026 Hyundai Ioniq 9 Frontal As Delivered

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

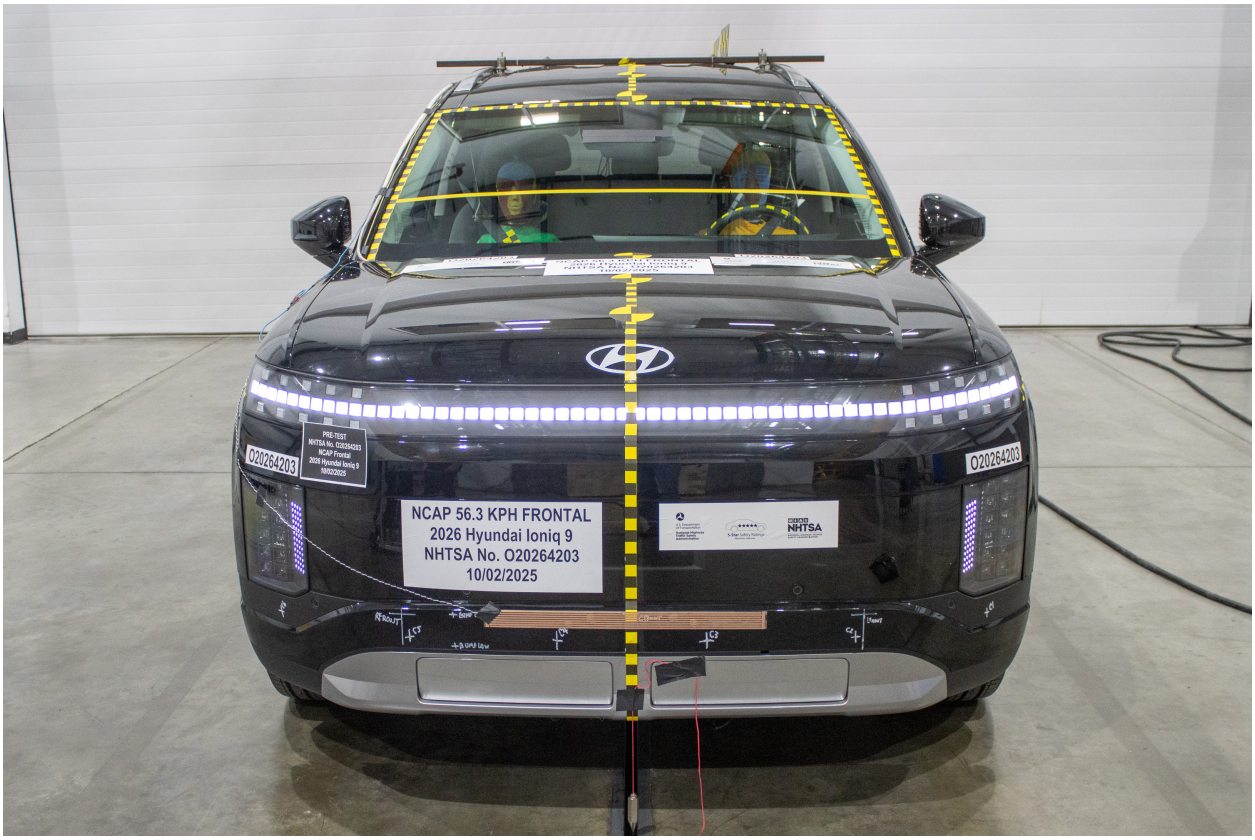

Figure A-8: Pre-Test Front View of Test Vehicle

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

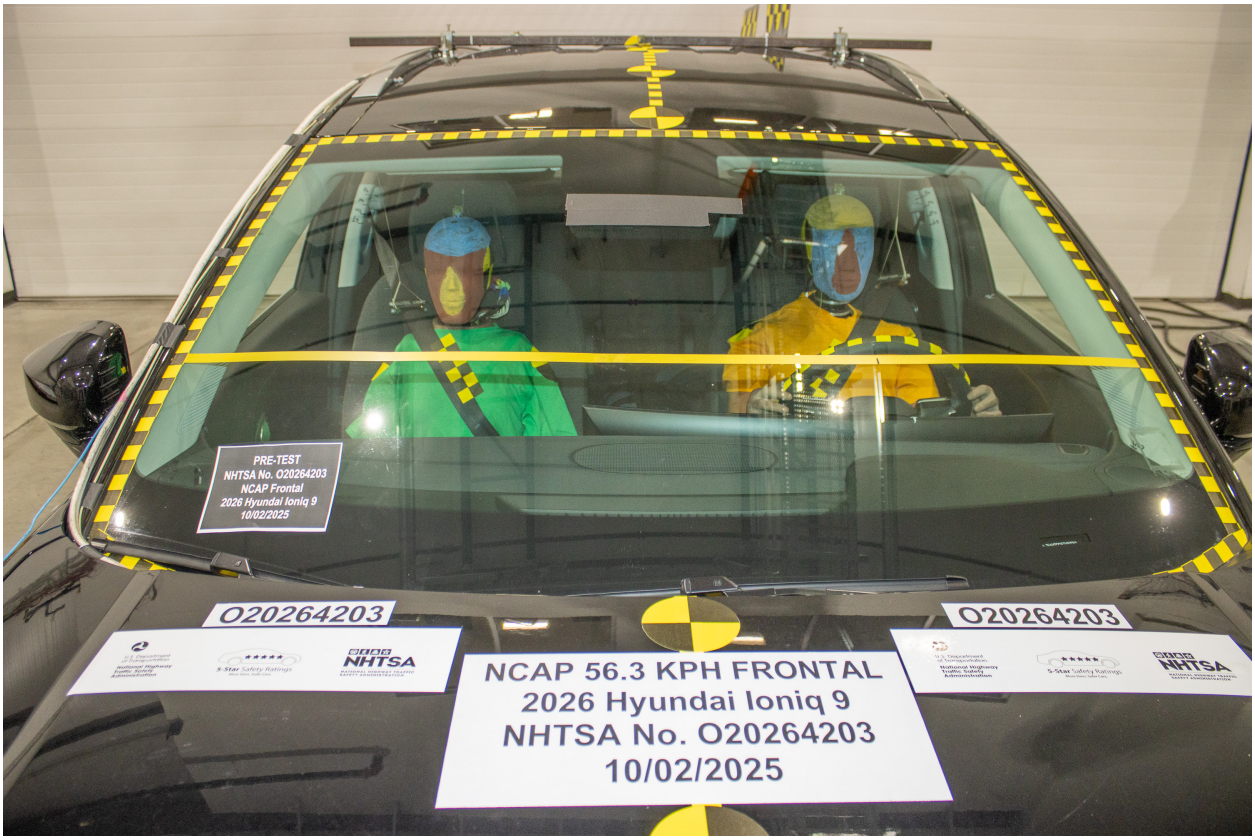

Figure A-18: Pre-Test Windshield View

Figure A-19: Post-Test Windshield View

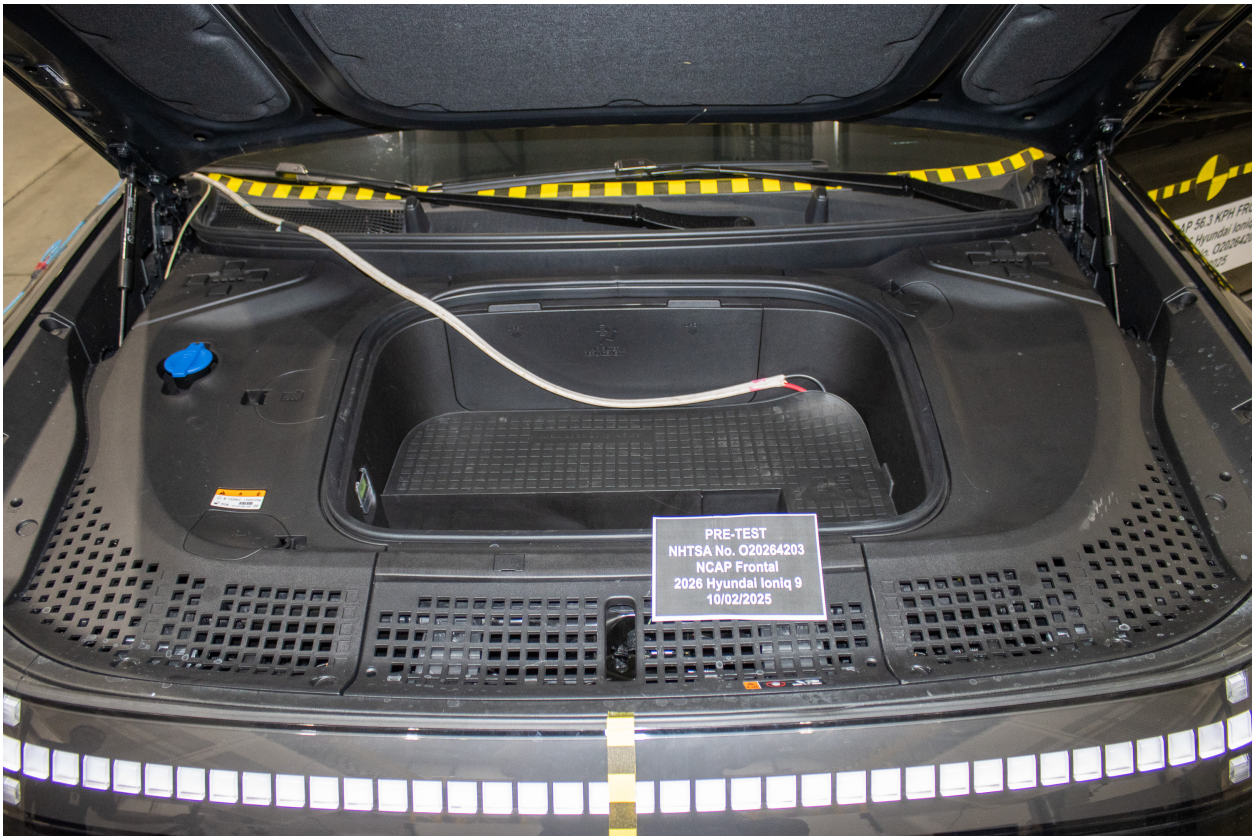

Figure A-20: Pre-Test Engine Compartment View

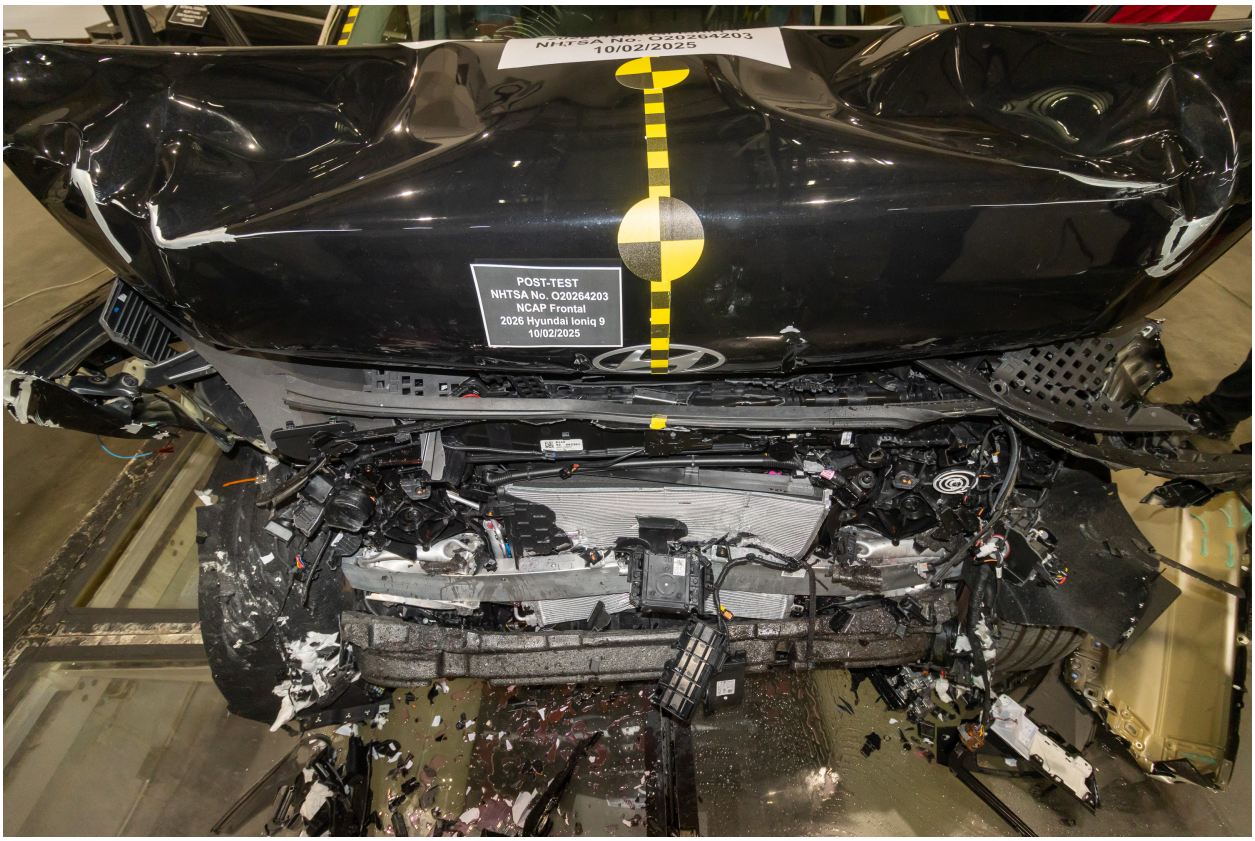

Figure A-21: Post-Test Engine Compartment View

Figure A-22: Pre-Test Charge Port View

Figure A-23: Post-Test Charge Port View

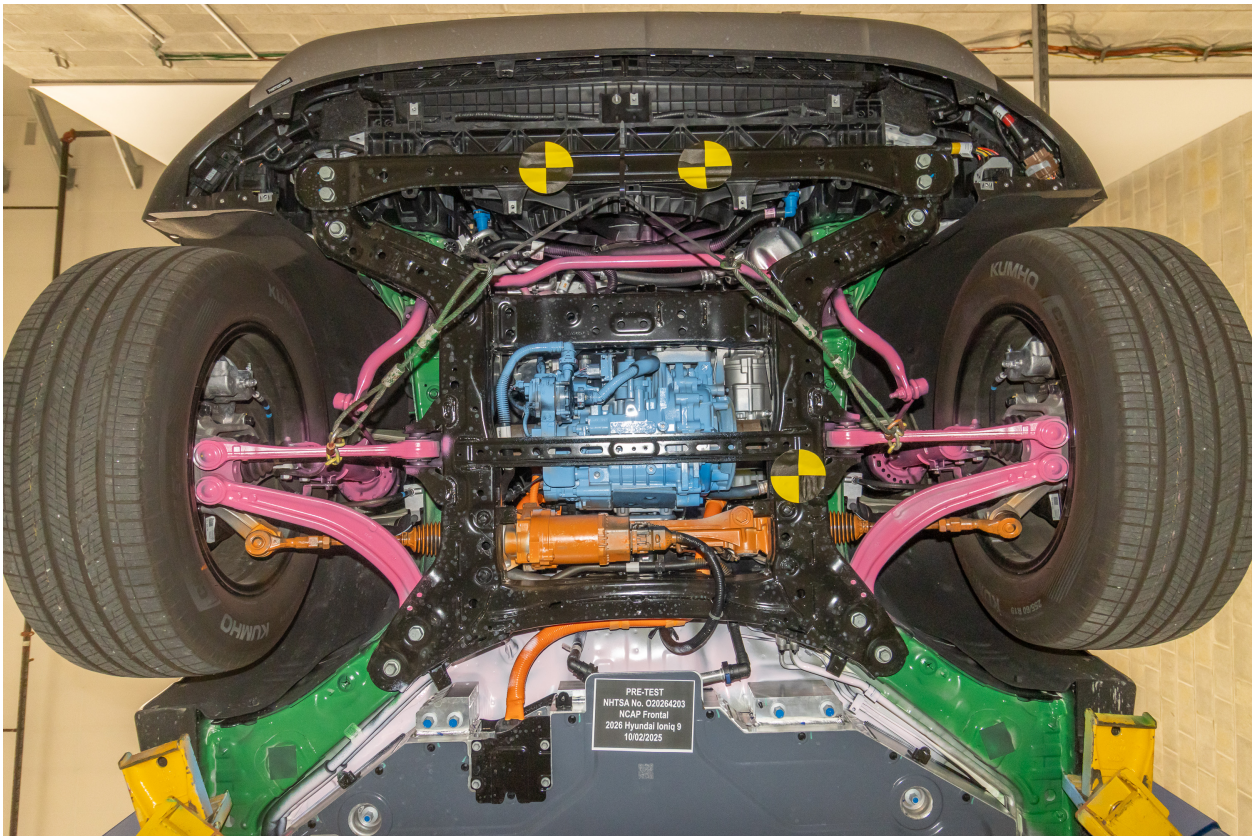

Figure A-24: Pre-Test Front Underbody View

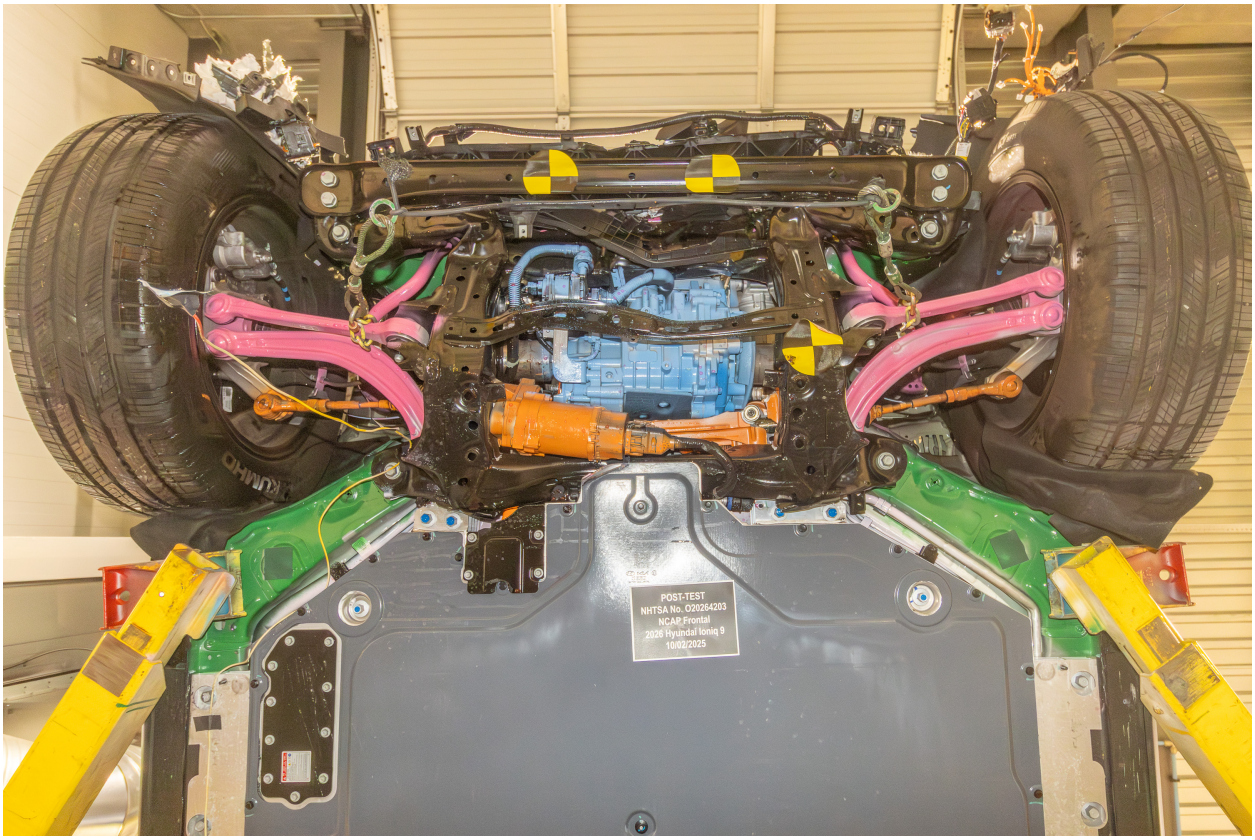

Figure A-25: Post-Test Front Underbody View

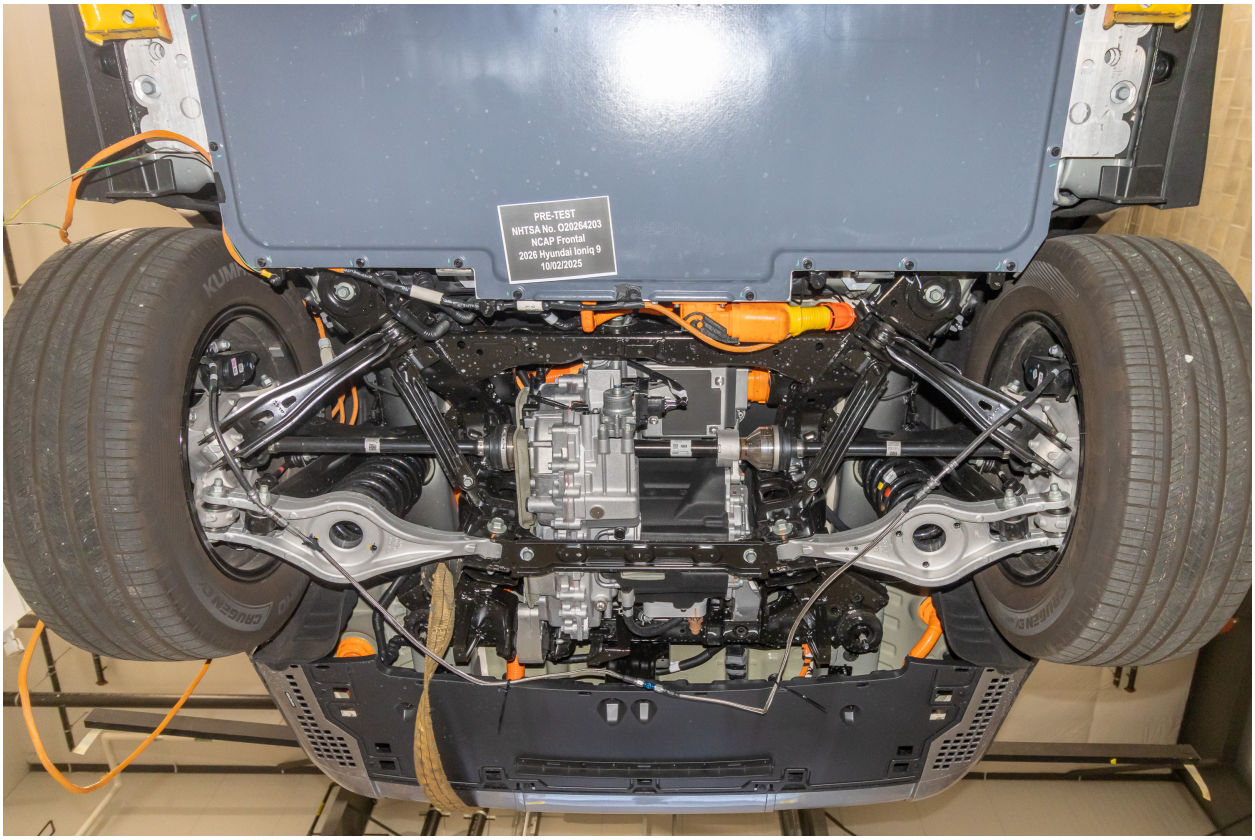

Figure A-26: Pre-Test Rear Underbody View

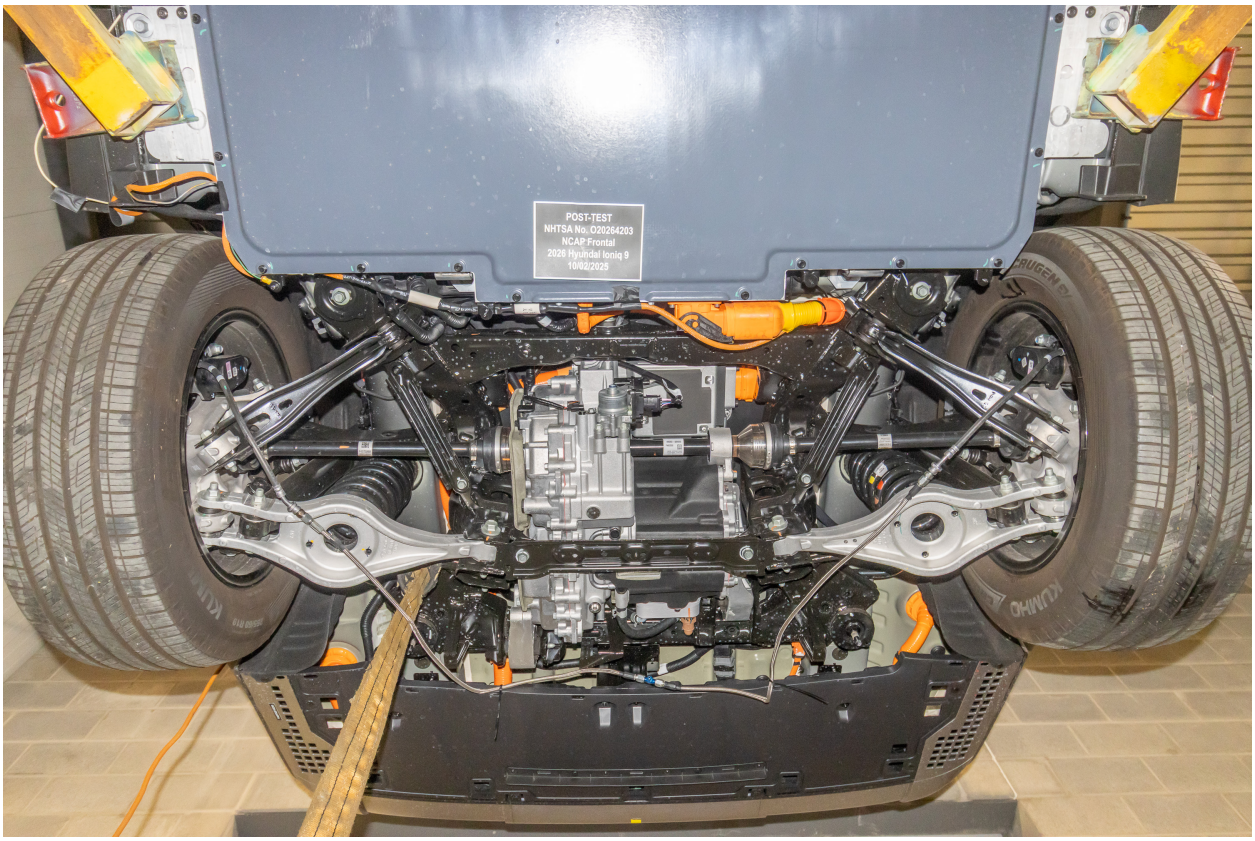

Figure A-27: Post-Test Rear Underbody View

Figure A-28: Pre-Test Dummy Cable Routing

Figure A-29: Post-Test Dummy Cable Routing

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

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

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

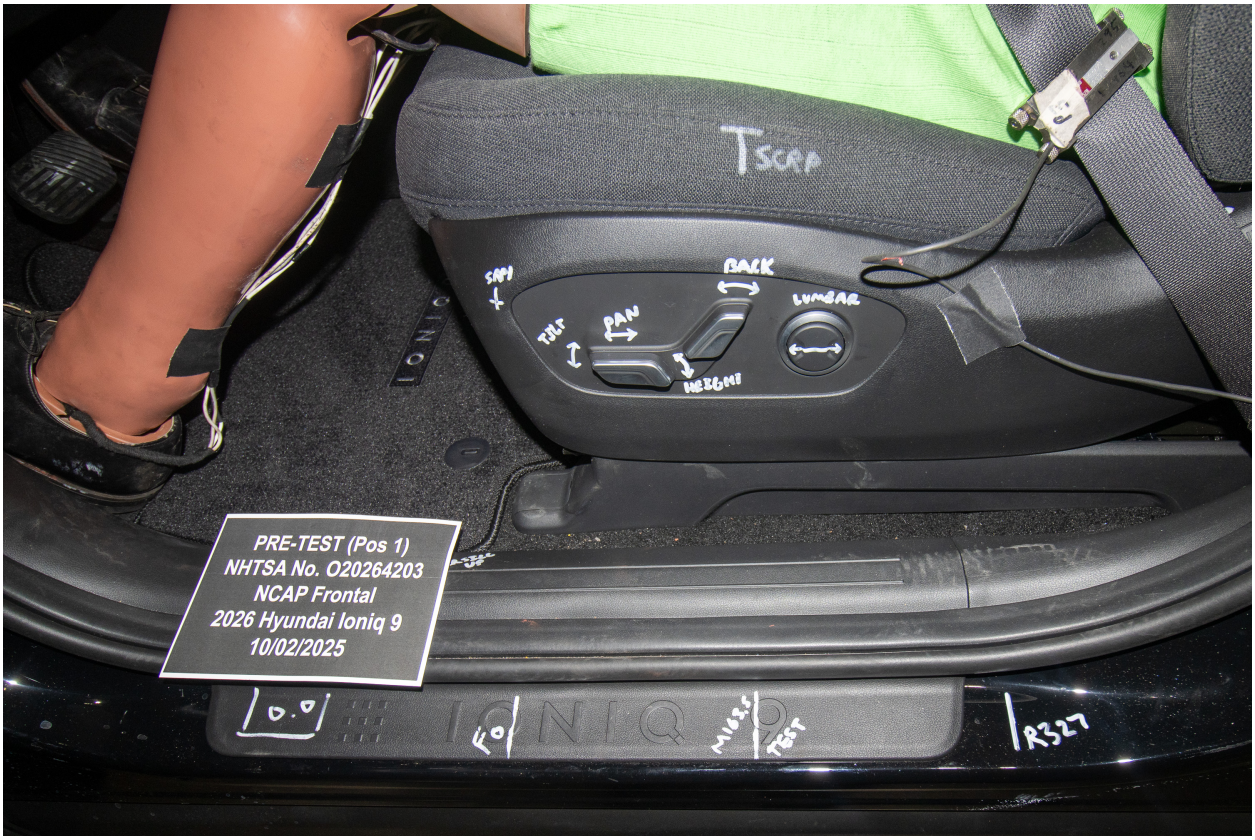

Figure A-36: Pre-Test Driver's Seat Fore-Aft Markings

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

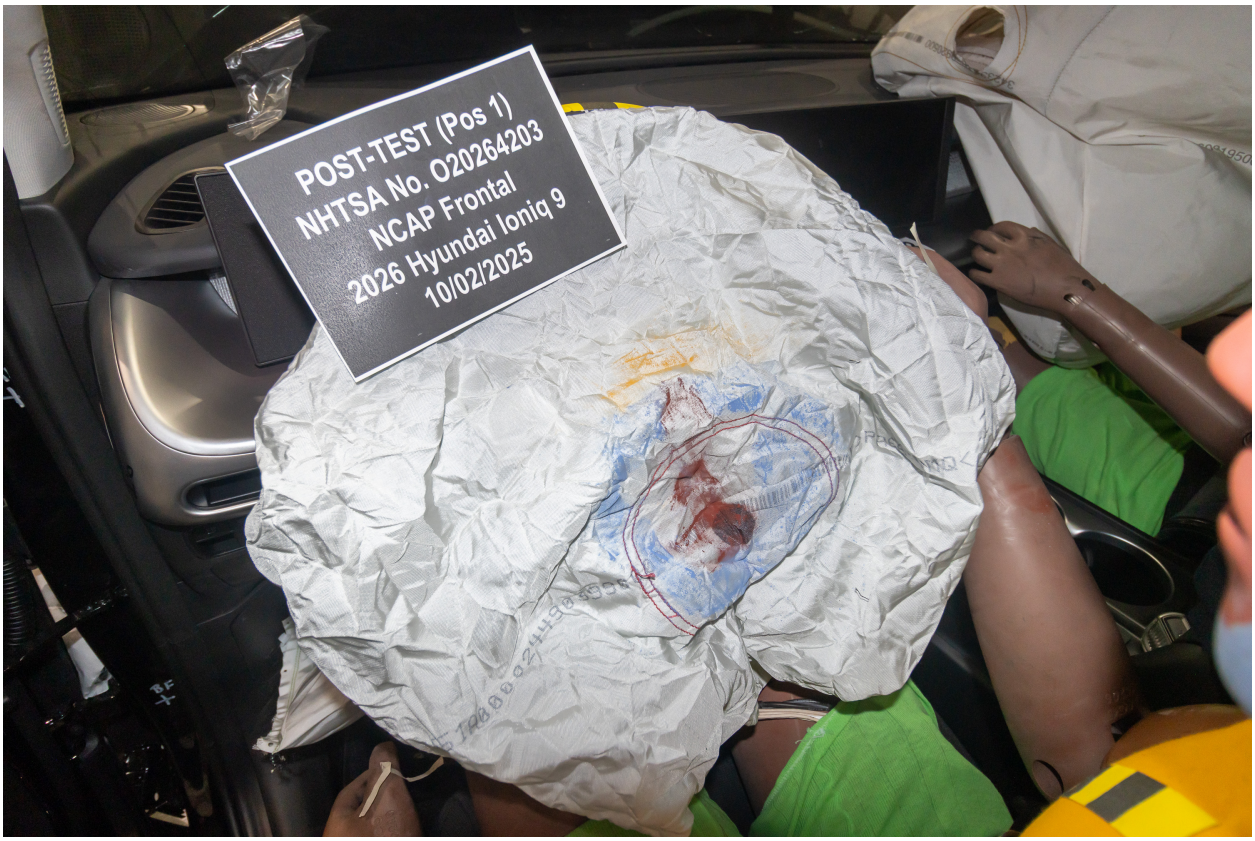

Figure A-49: Post-Test Driver Dummy Contact With Airbag

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

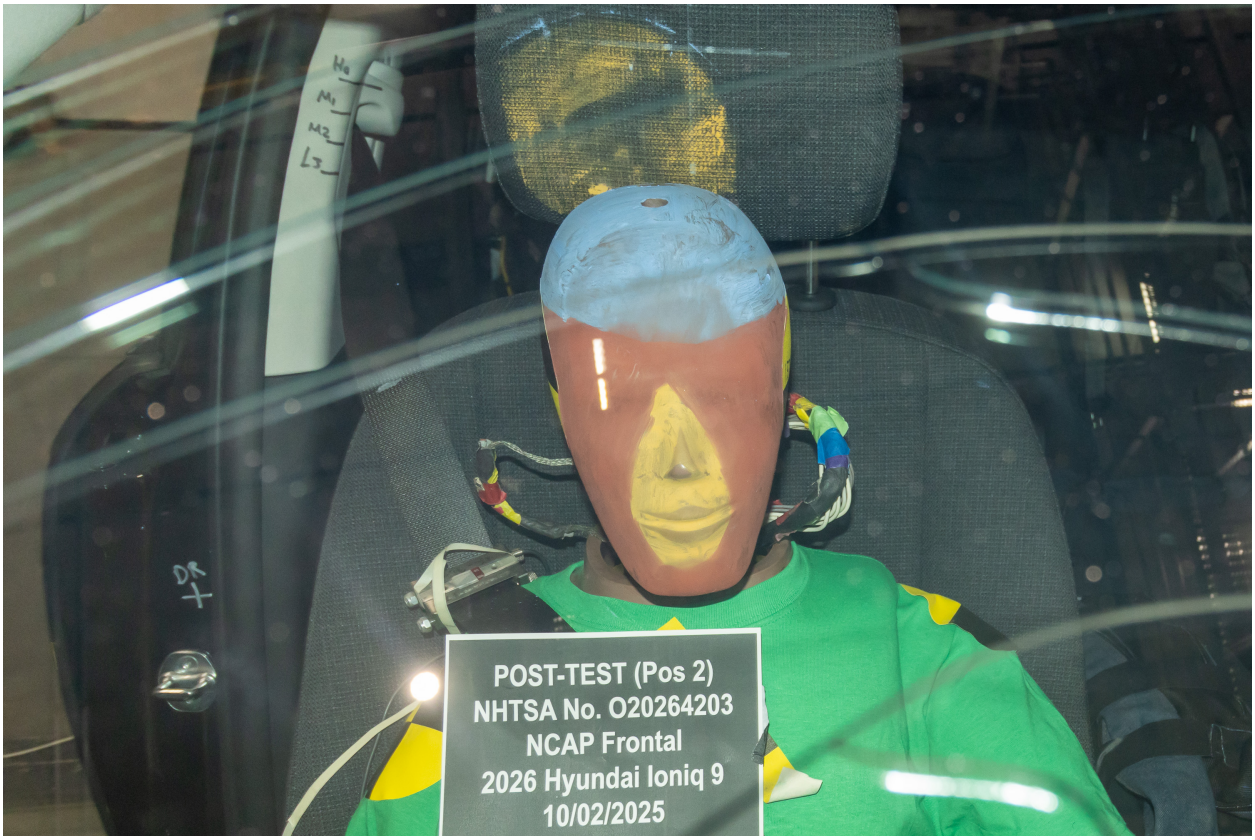

Figure A-54: Post-Test Passenger Dummy Front View

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

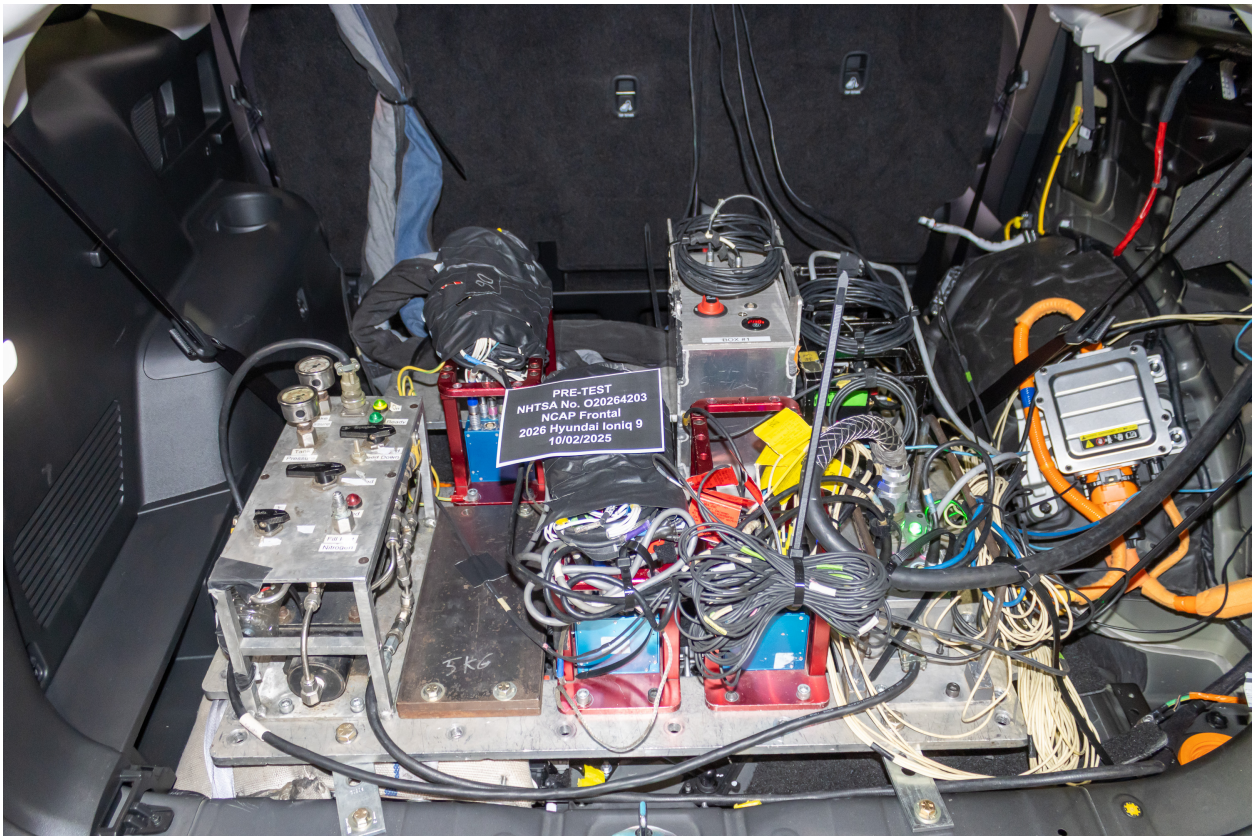

Figure A-74: Photograph of Ballast Installed in Vehicle

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 0º on Static Rollover Device

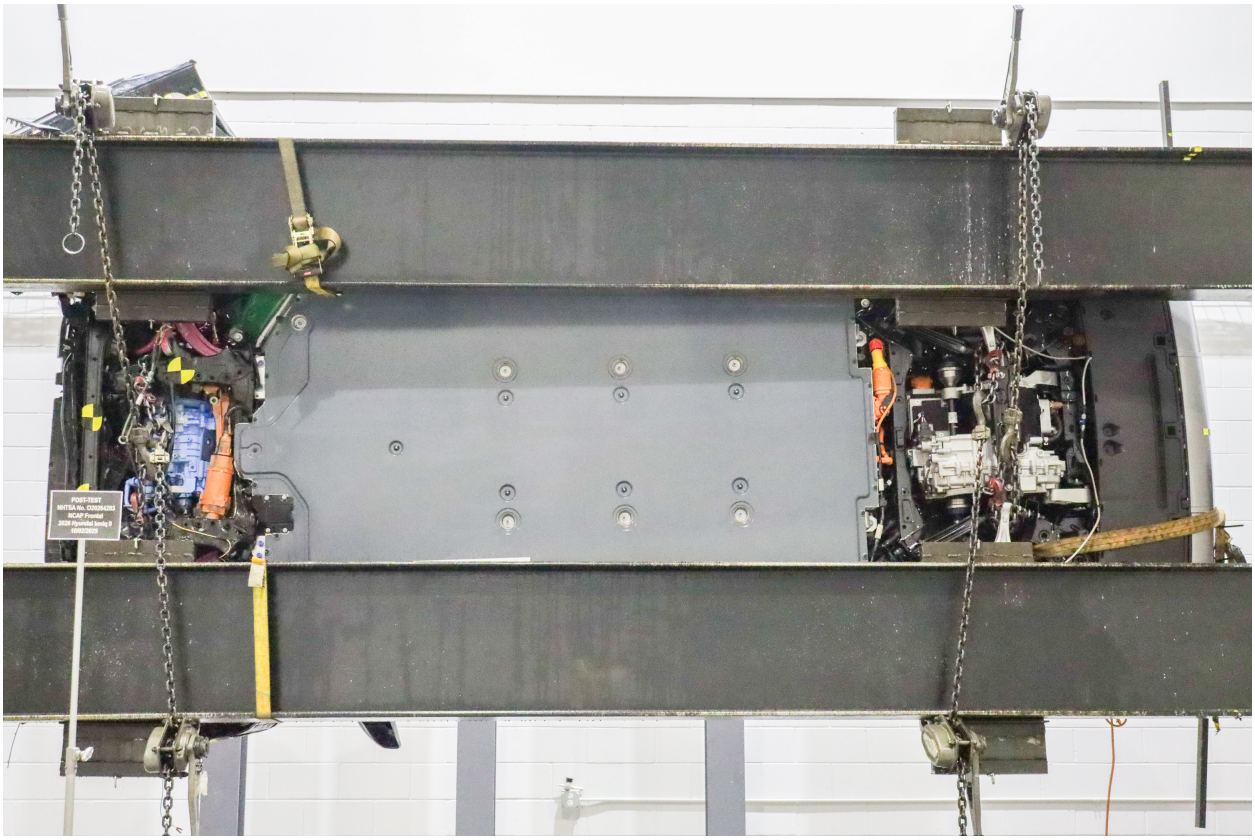

Figure A-78: Vehicle at 90º on Static Rollover Device

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

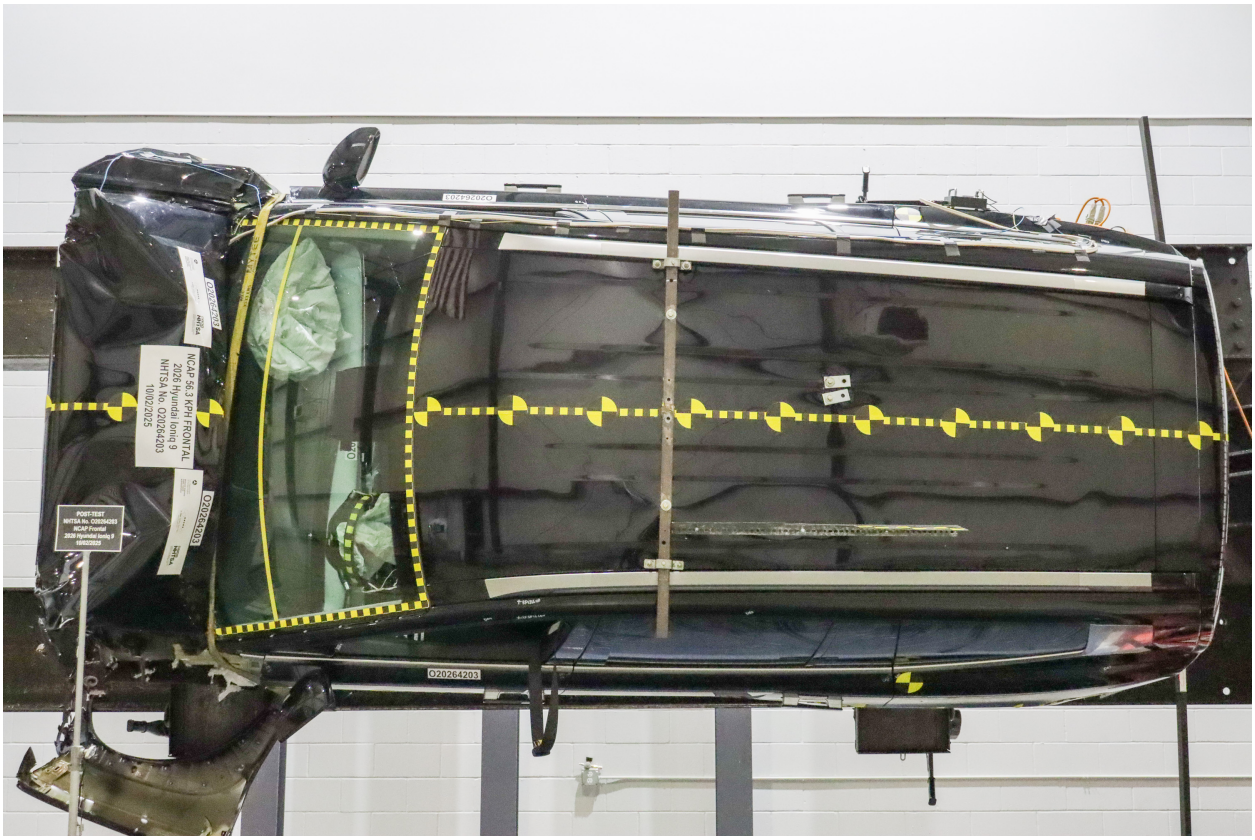

Figure A-80: Vehicle at 270º on Static Rollover Device

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

Figure A-82: 2026 Hyundai Ioniq Frontal Impact Event

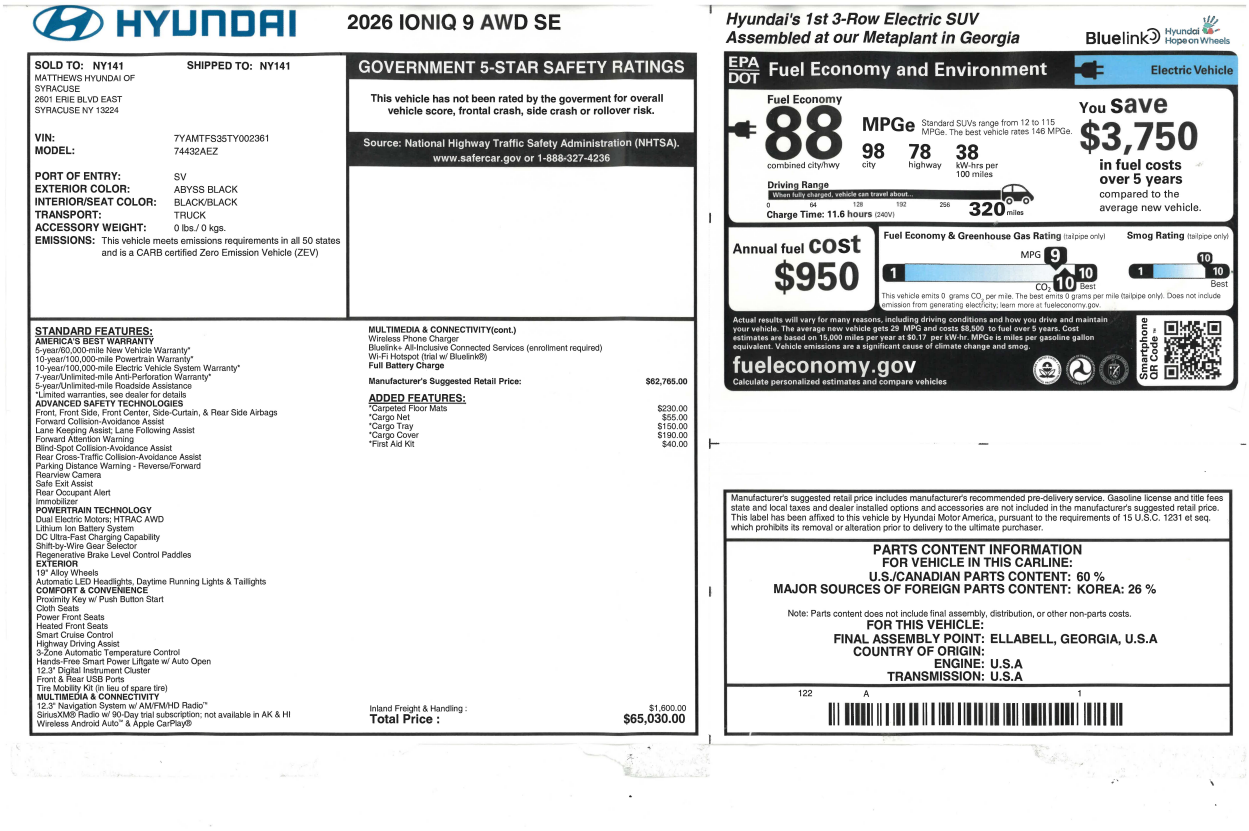

Figure A-83: Monroney Label Photograph

Photo Not Applicable

Figure 305-1: Auxiliary Power Module Warning Label

Photo Not Applicable

Figure 305-2: Power Inverter Warning Label

Figure 305-3 First Responder Warning Label

Figure 305-4: First Responder Warning Label Location

Photo Not Applicable

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

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

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

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

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

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

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

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

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

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

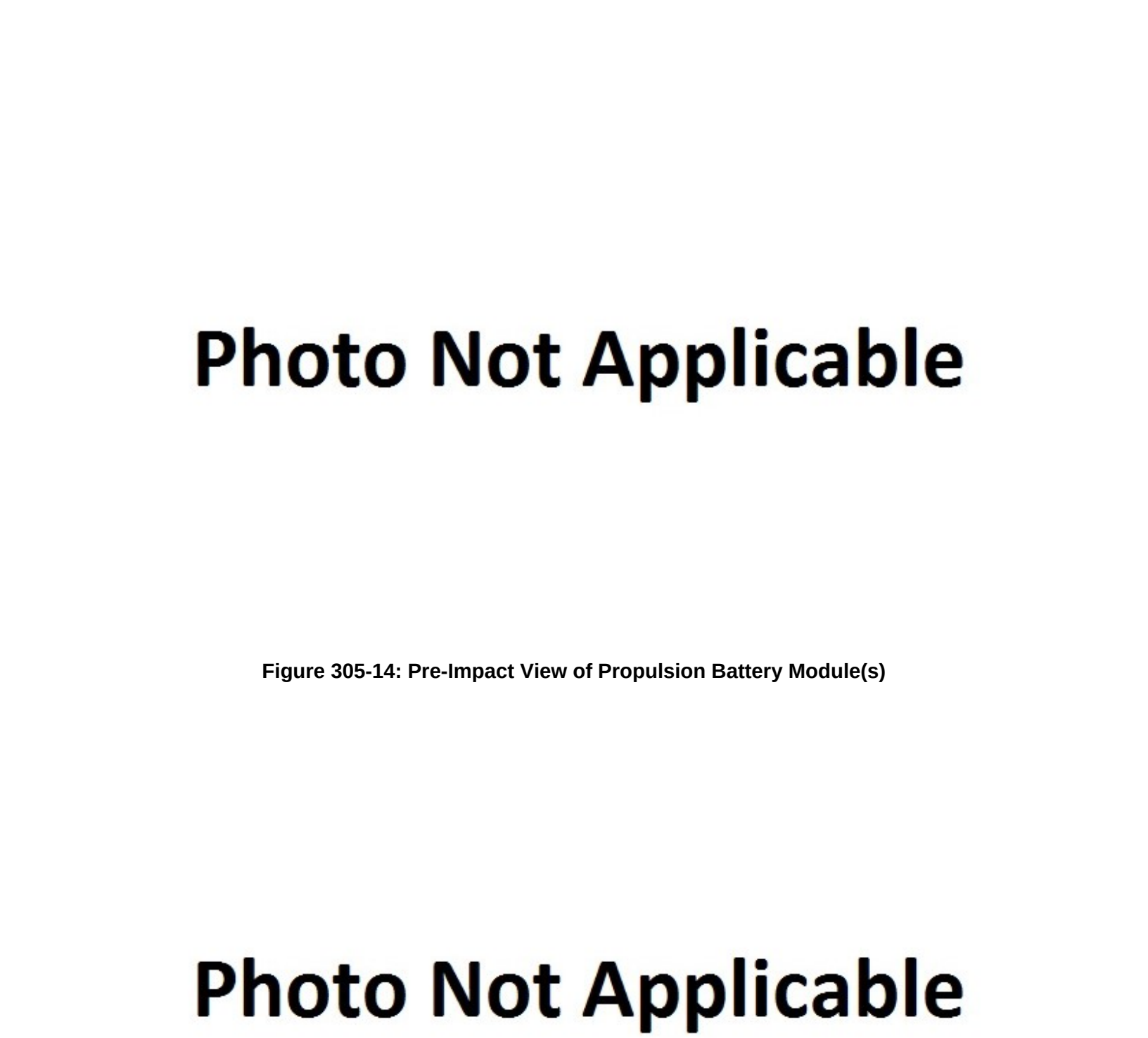

Figure 305-15: Post-Impact View of Propulsion Battery Module(s)

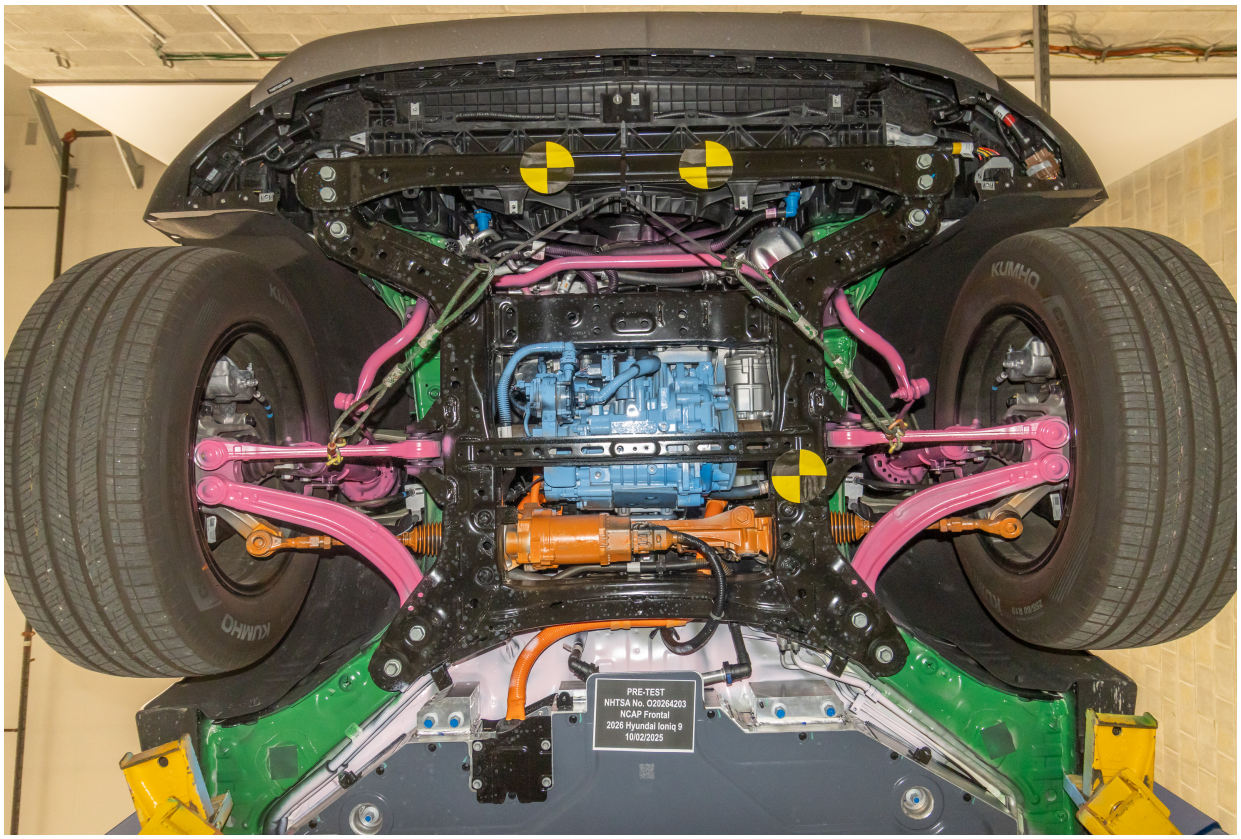

Figure 305-16: Pre-Impact View of Electric Propulsion Drive

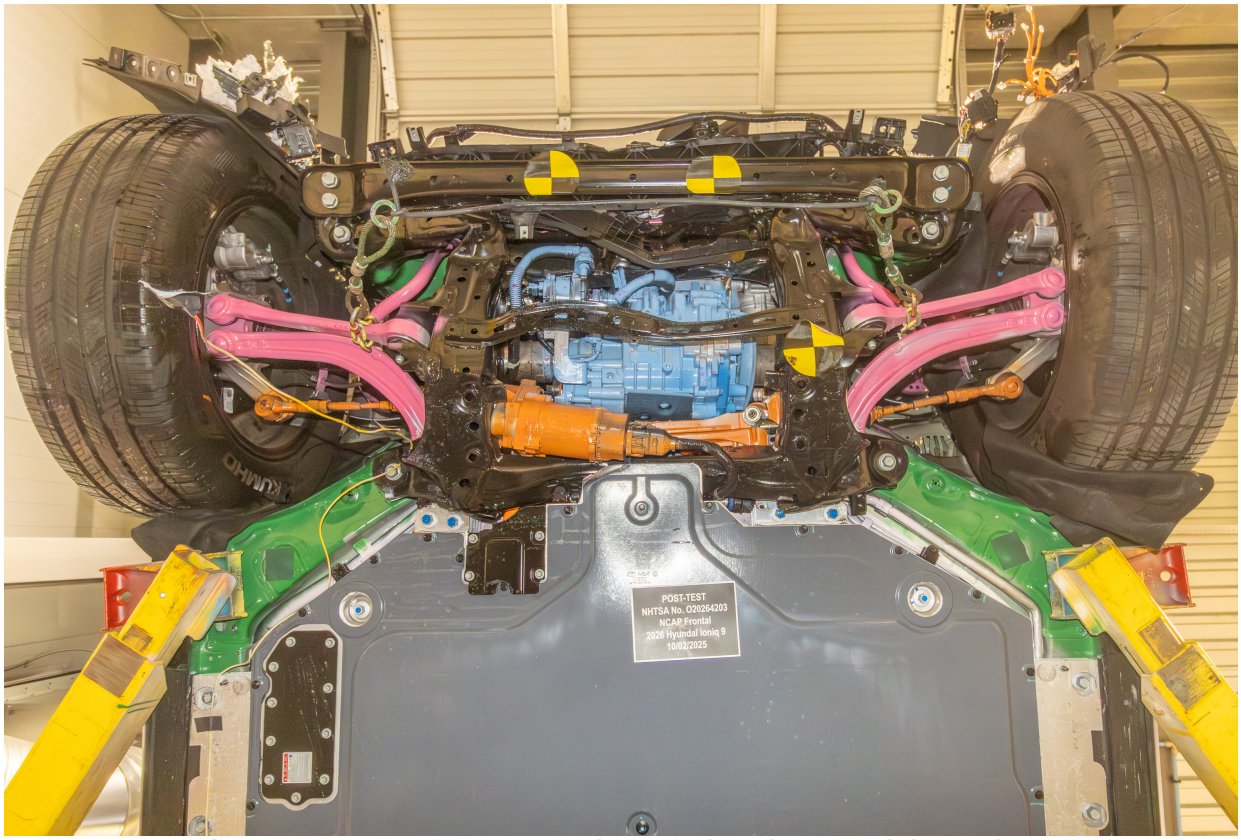

Figure 305-17: Post-Impact View of Electric Propulsion Drive

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

Photo Not Applicable

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

Photo Not Applicable

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

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

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

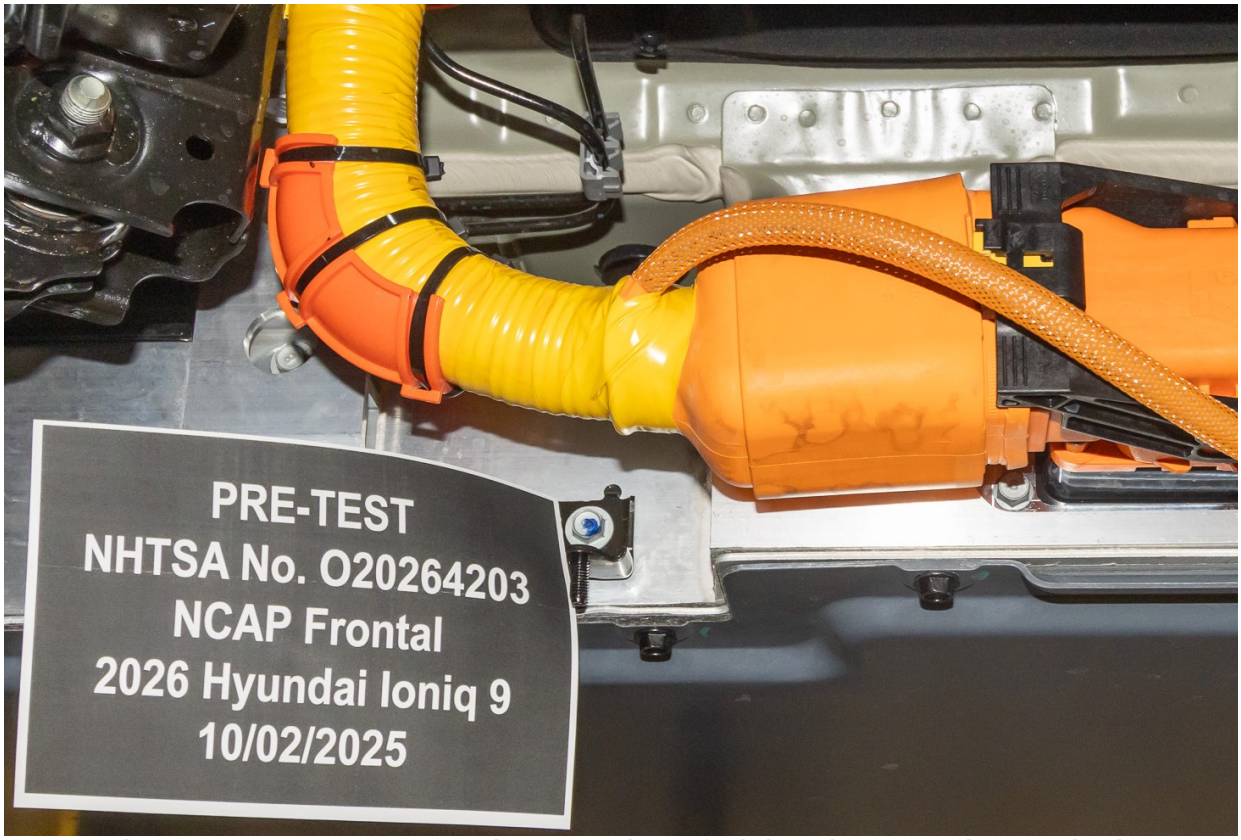

Figure 305-23: Pre-Impact Close Up View of High Voltage Leads Attached

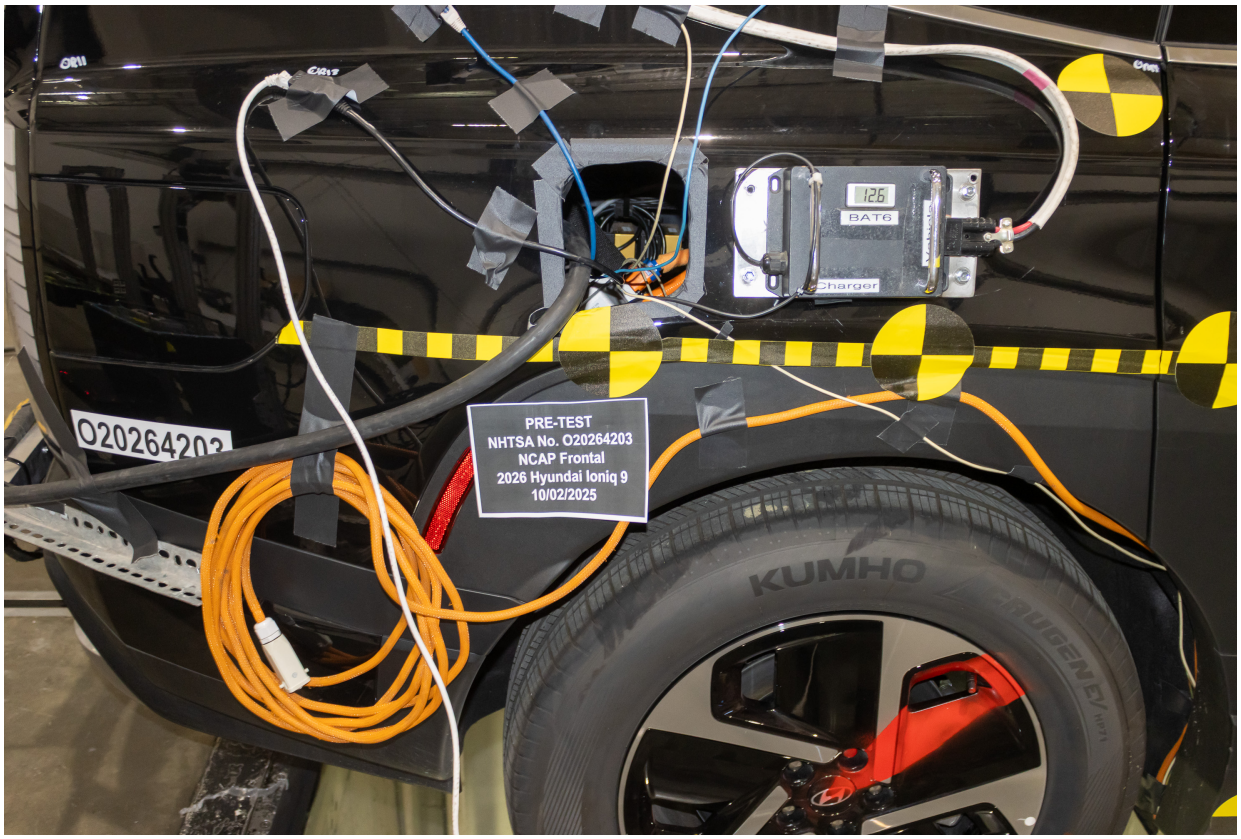

Figure 305-24: Pre-Impact View of Installed Test Interface Port

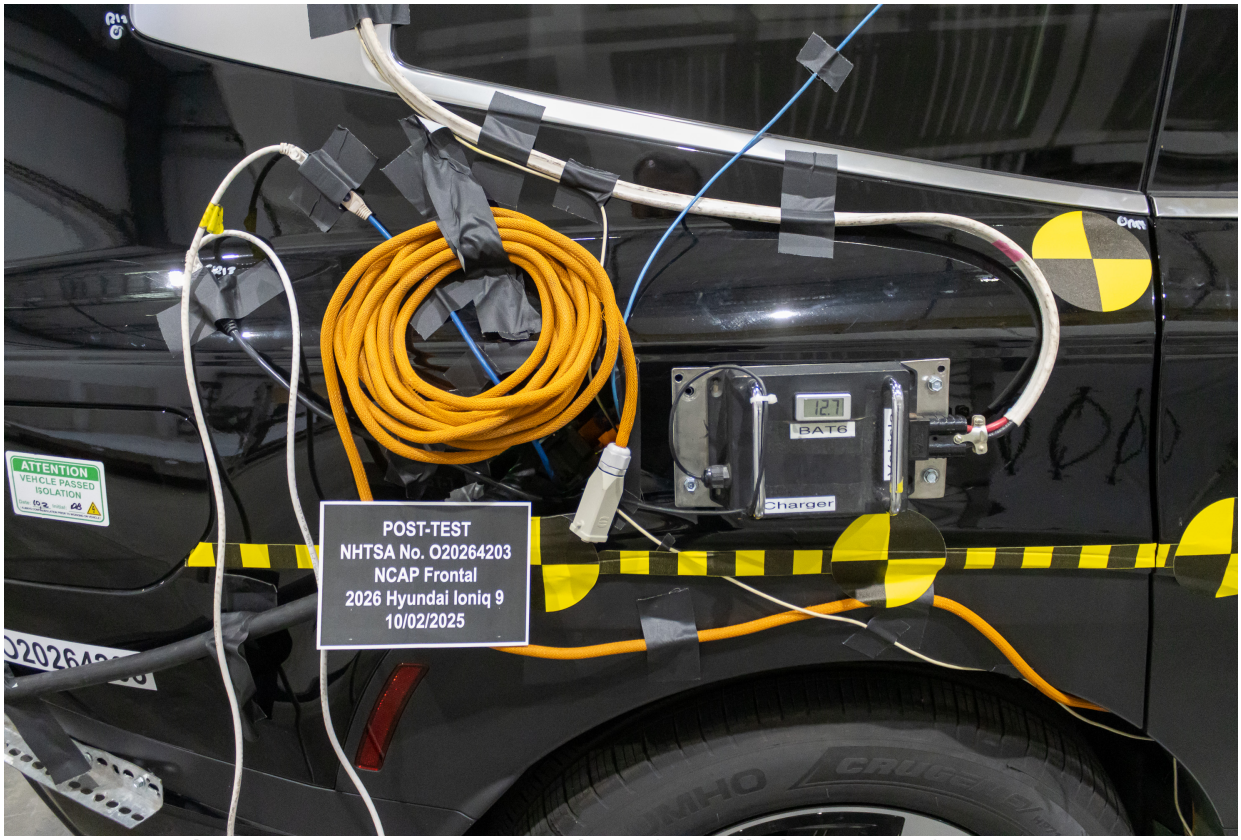

Figure 305-25: Post-Impact View of Installed Test Interface Port

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

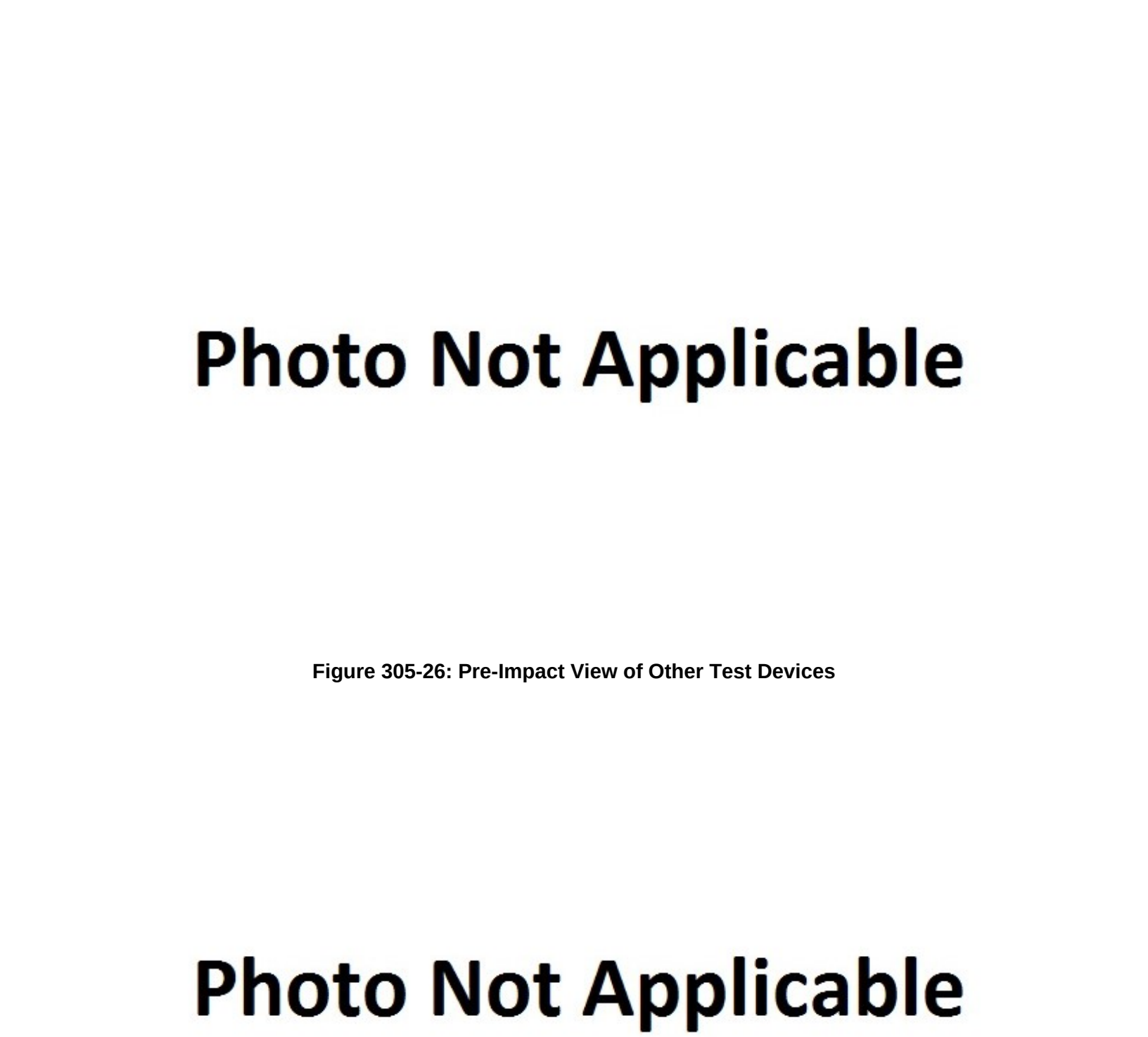

Figure 305-27: Post-Impact View of Other Test Devices

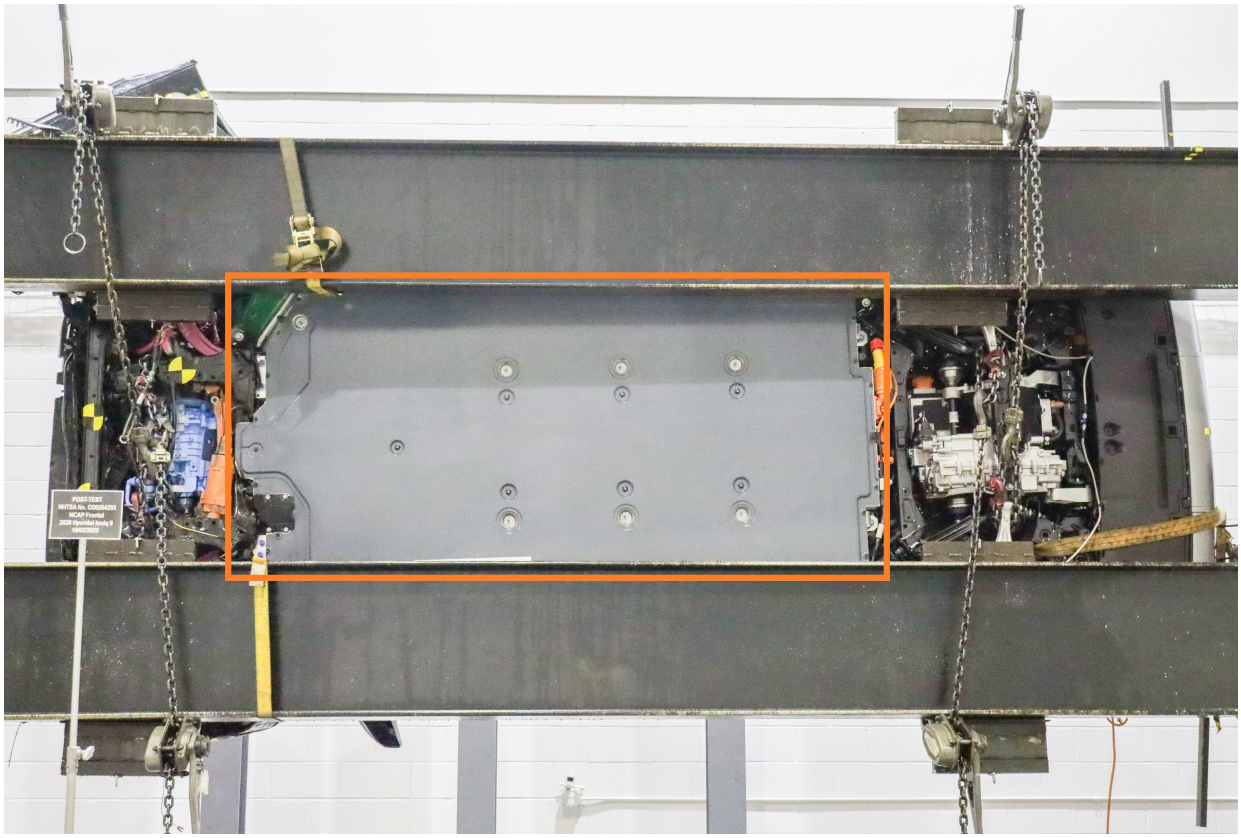

Figure 305-28: FMVSS No. 305 Static Rollover 90 Degrees

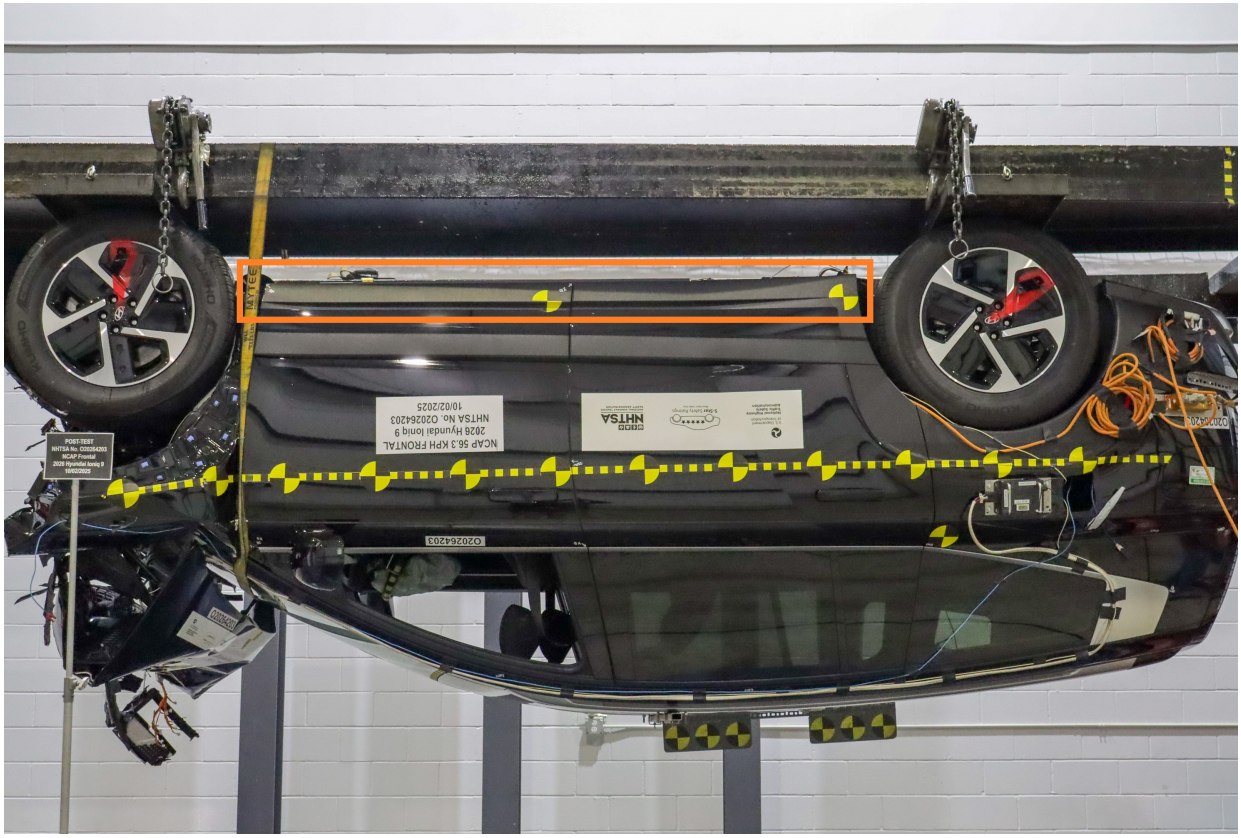

Figure 305-29: FMVSS No. 305 Static Rollover 180 Degrees

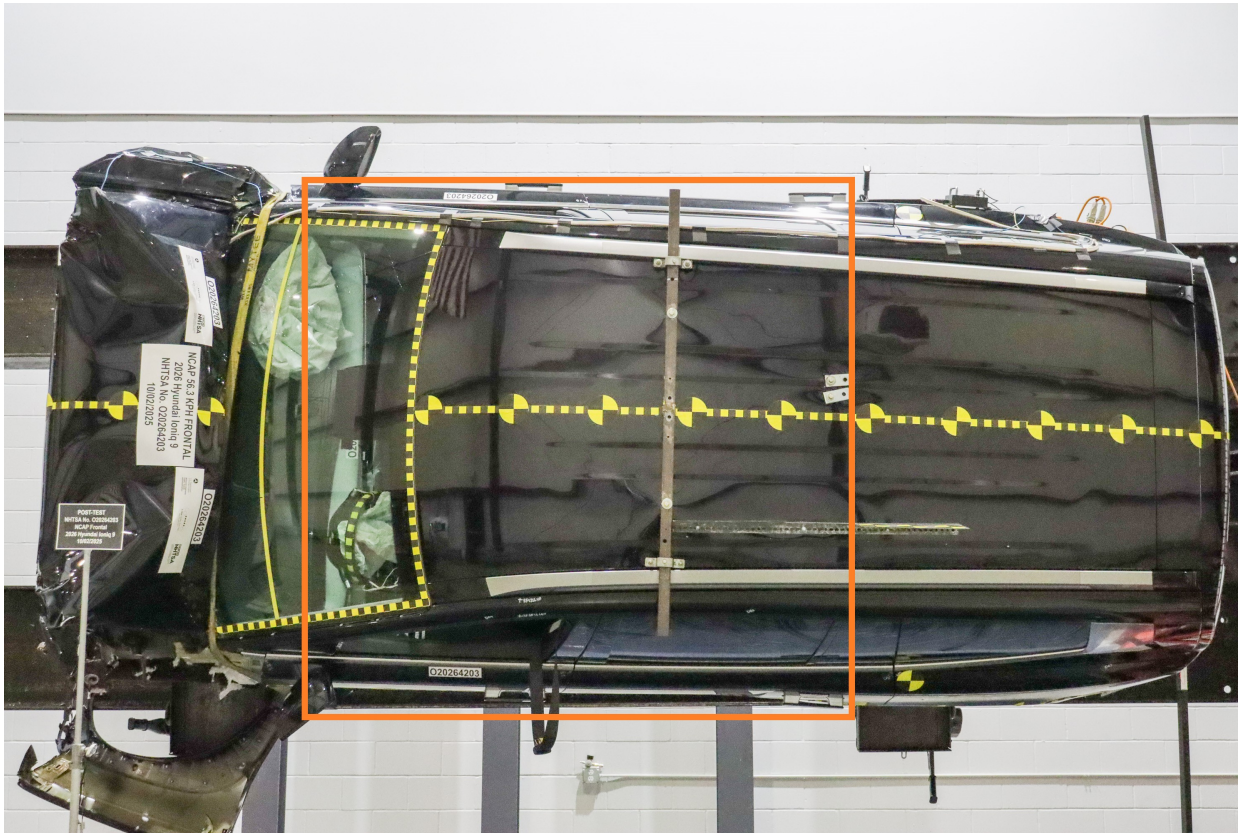

Figure 305-30: FMVSS No. 305 Static Rollover 270 Degrees

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

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

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

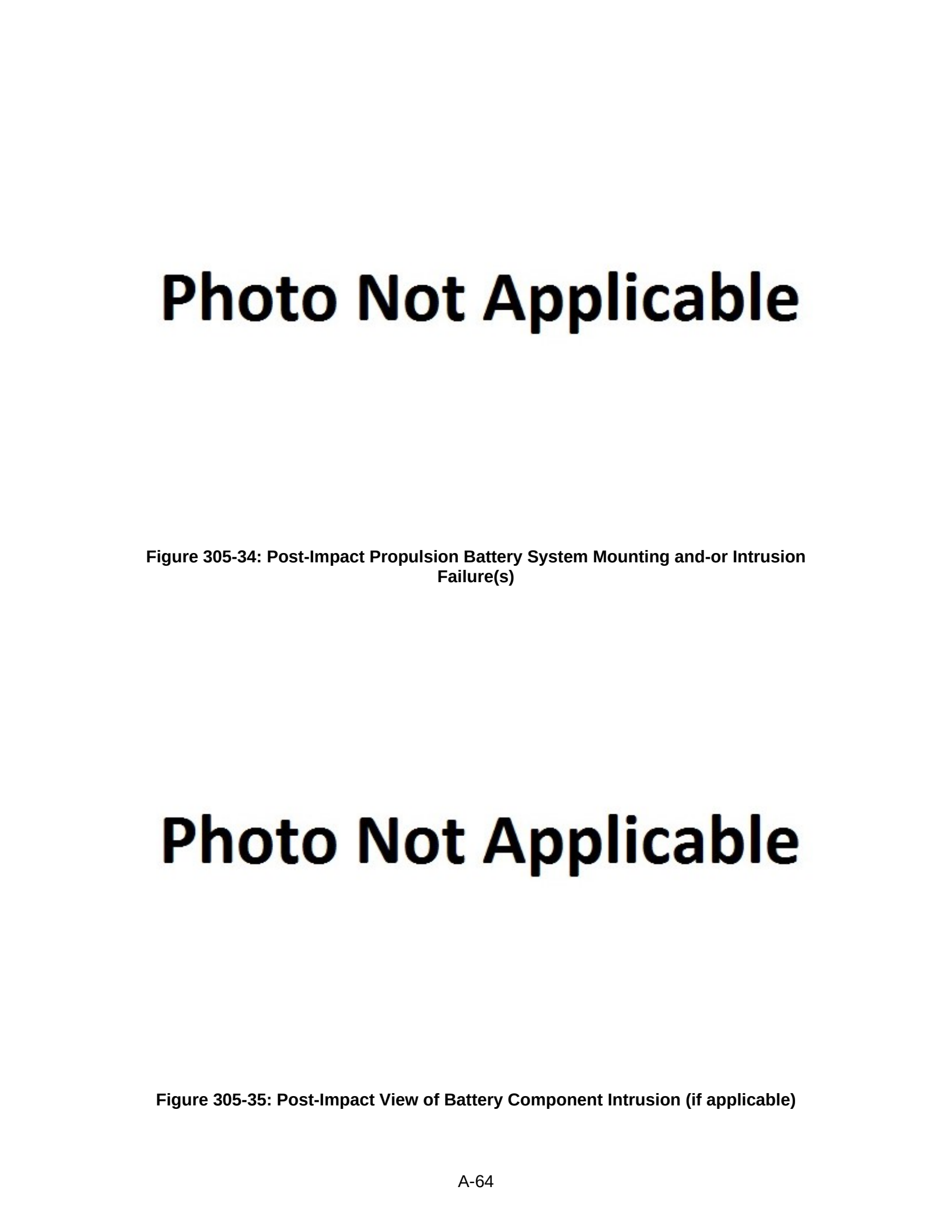

Figure 305-34: Post-Impact Propulsion Battery System Mounting and-or Intrusion Failure(s)

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

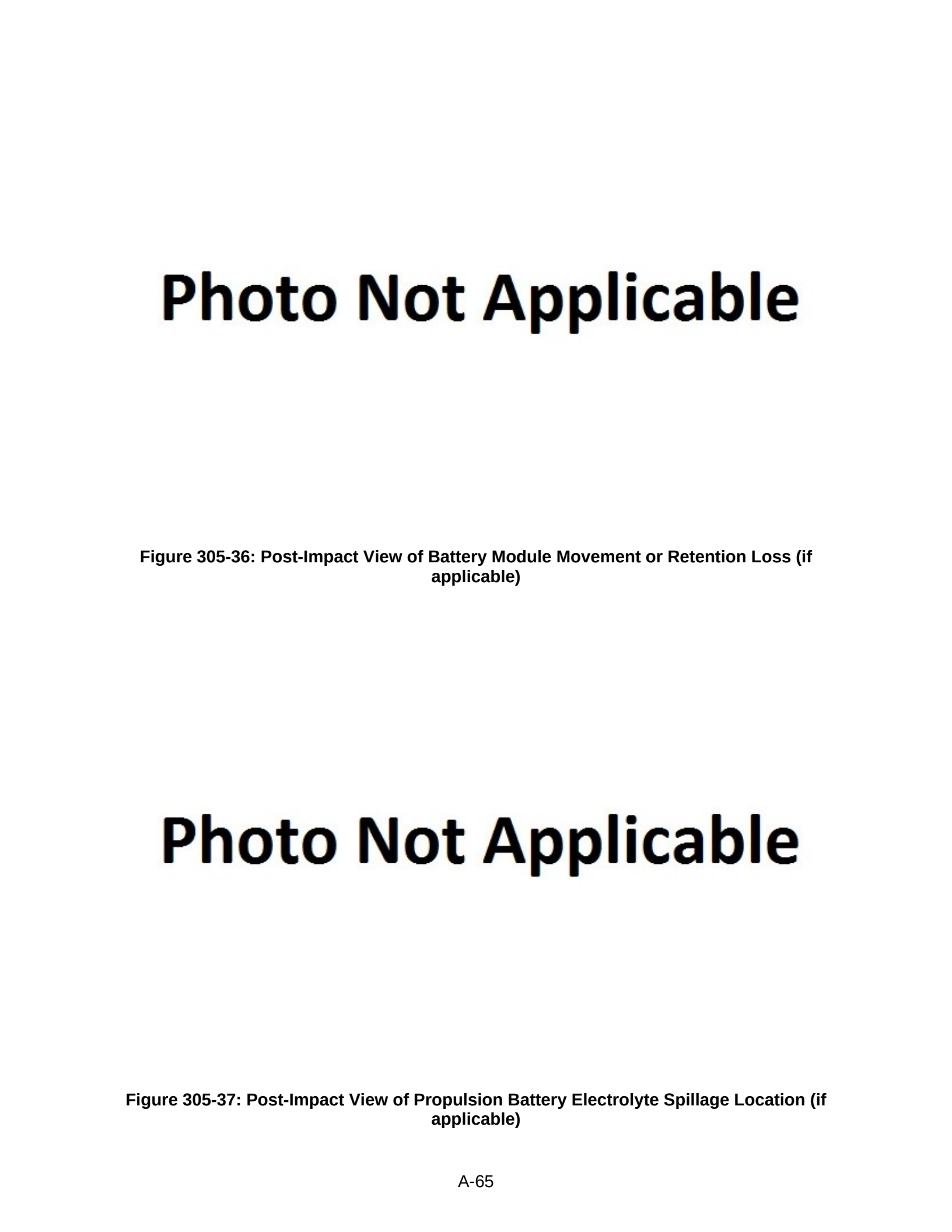

Figure 305-36: Post-Impact View of Battery Module Movement or Retention Loss (if applicable)

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

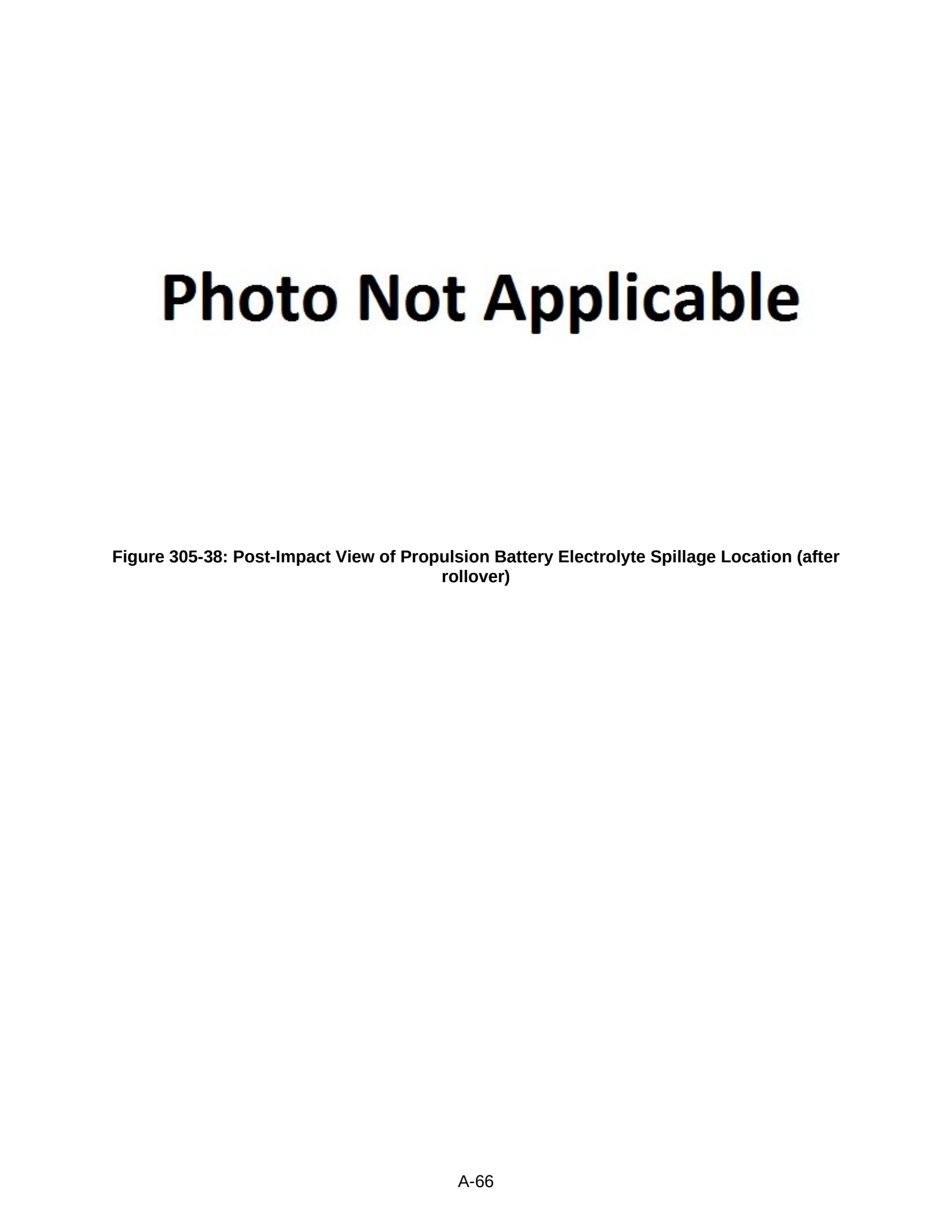

Figure 305-38: Post-Impact View of Propulsion Battery Electrolyte Spillage Location (after rollover)

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA TRACES

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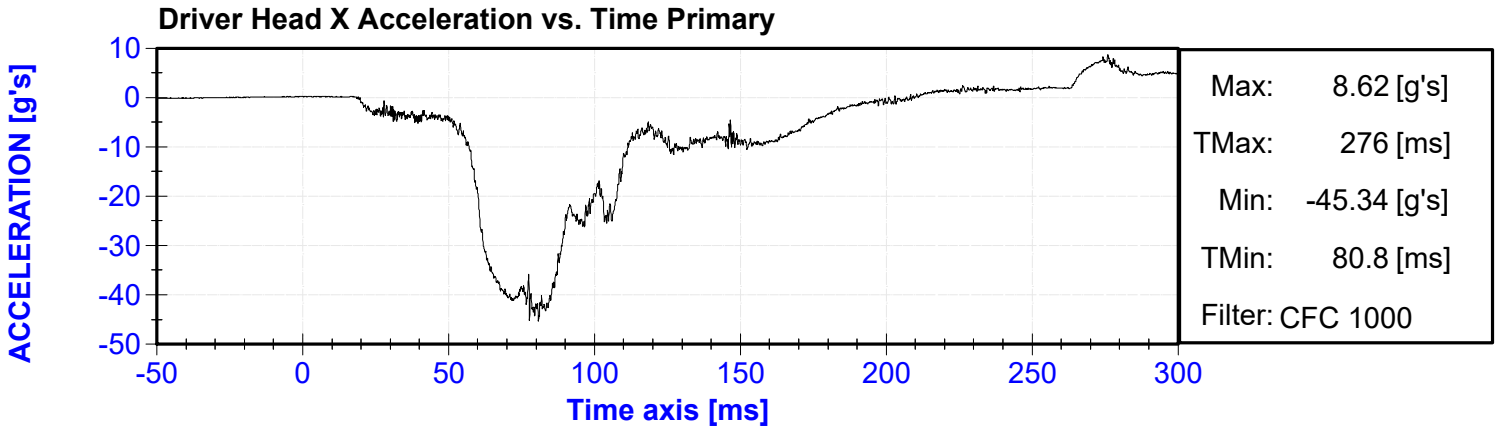
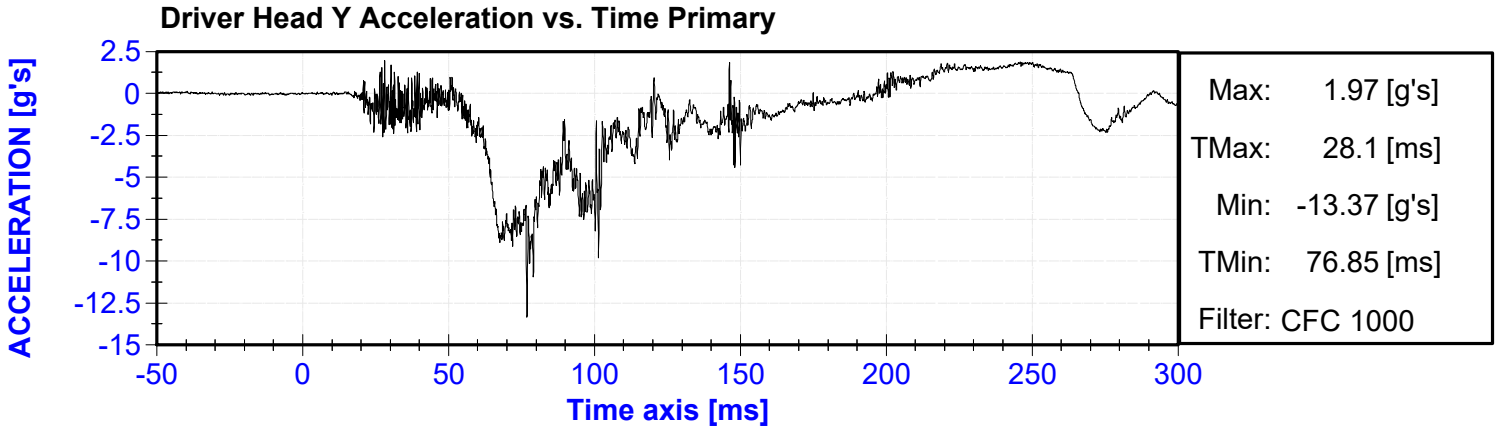
The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at www.NHTSA.gov

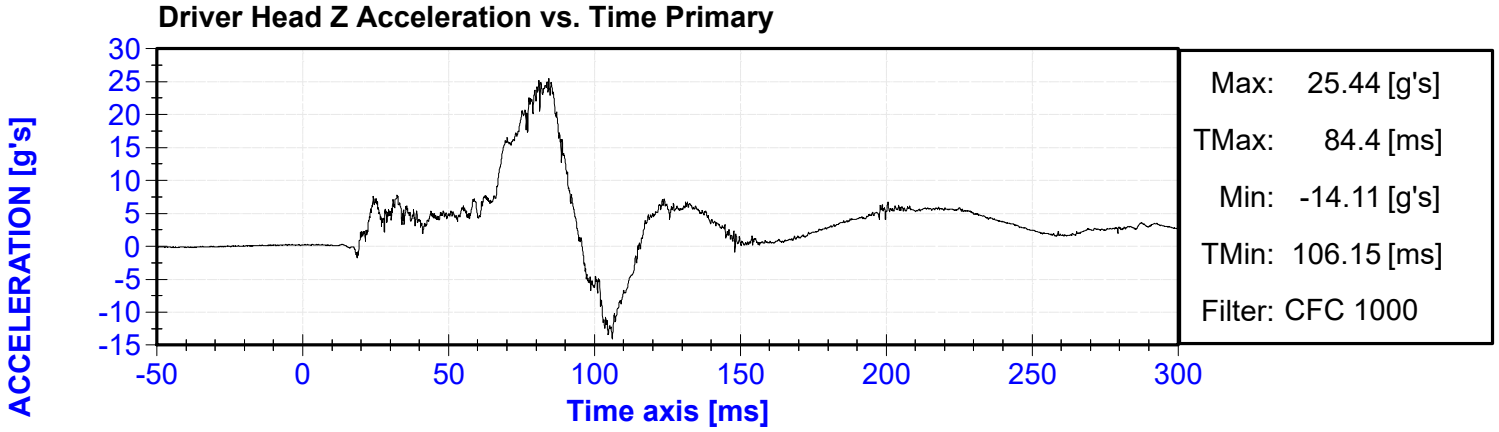
Driver Head X Acceleration Redundant
Driver Head Y Acceleration Redundant
Driver Head Z Acceleration Redundant
Driver Upper Neck Force Y
Driver Upper Neck Moment X
Driver Upper Neck Moment Z
Driver Chest X Acceleration Redundant
Driver Chest Y Acceleration Redundant
Driver Chest Z Acceleration Redundant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

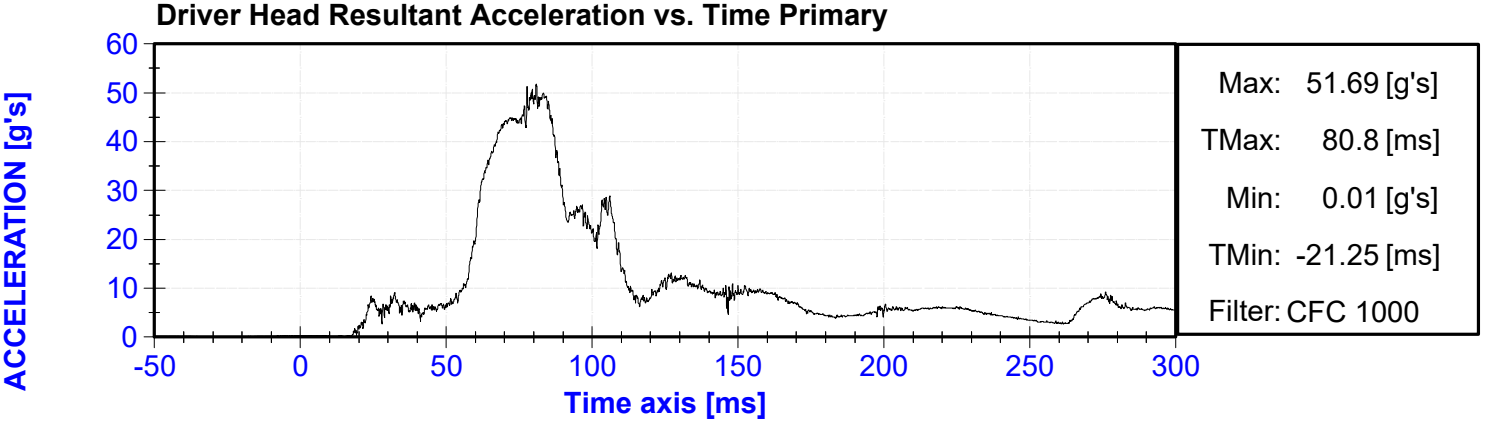
Driver Left Upper Tibia Force Z
Driver Left Lower Tibia Moment X
Driver Left Lower Tibia Moment Y
Driver Left Lower Tibia Force Z
Driver Right Upper Tibia Moment X
Driver Right Upper Tibia Moment Y
Driver Right Upper Tibia Force Z
Driver Right Lower Tibia Moment X
Driver Right Lower Tibia Moment Y
Driver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

Passenger Right Food Fore Z
Passenger Right Foot Aft X
Passenger Right Foot Aft Z
Passenger Shoulder Belt Force
Passenger Lap Belt Force
Passenger Head Angular Velocity X
Passenger Head Angular Velocity Y
Passenger Head Angular Velocity Z
Left Rear Seat Crossmember X
Left Rear Seat Crossmember Z
Right Rear Seat Crossmember X
Right Rear Seat Crossmember Z
Left Rear Seat Crossmember X Redundant
Right Rear Seat Crossmember X Redundant
Vehicle Engine Top X
Vehicle Engine Bottom X
Load Cell Barrier Forces and Moments

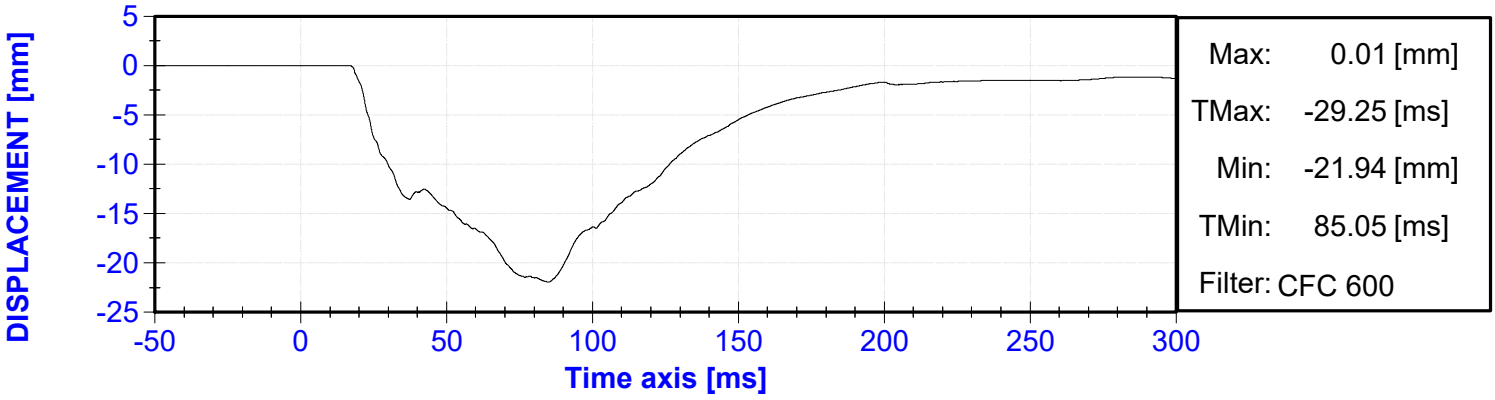

Driver Head X Acceleration vs. Time Primary
ACCELERATION [g's]
Time axis [ms]
Max: 8.62 [g's]
TMax: 276 [ms]
Min: -45.34 [g's]
TMin: 80.8 [ms]
Filter: CFC 1000


Driver Head Y Acceleration vs. Time Primary
ACCELERATION [g's]
Time axis [ms]
Max: 1.97 [g's]
TMax: 28.1 [ms]
Min: -13.37 [g's]
TMin: 76.85 [ms]
Filter: CFC 1000

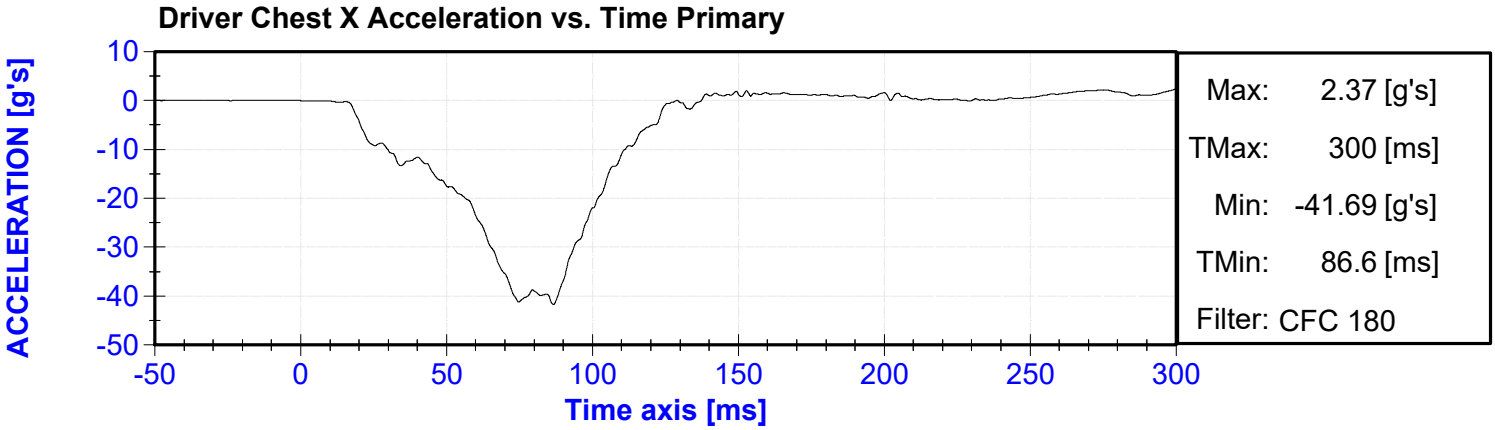

Driver Head Z Acceleration vs. Time Primary
ACCELERATION [g's]
Time axis [ms]
Max: 25.44 [g's]
TMax: 84.4 [ms]
Min: -14.11 [g's]
TMin: 106.15 [ms]
Filter: CFC 1000


Driver Head Resultant Acceleration vs. Time Primary
ACCELERATION [g's]
Time axis [ms]
Max: 51.69 [g's]
TMax: 80.8 [ms]
Min: 0.01 [g's]
TMin: -21.25 [ms]
Filter: CFC 1000

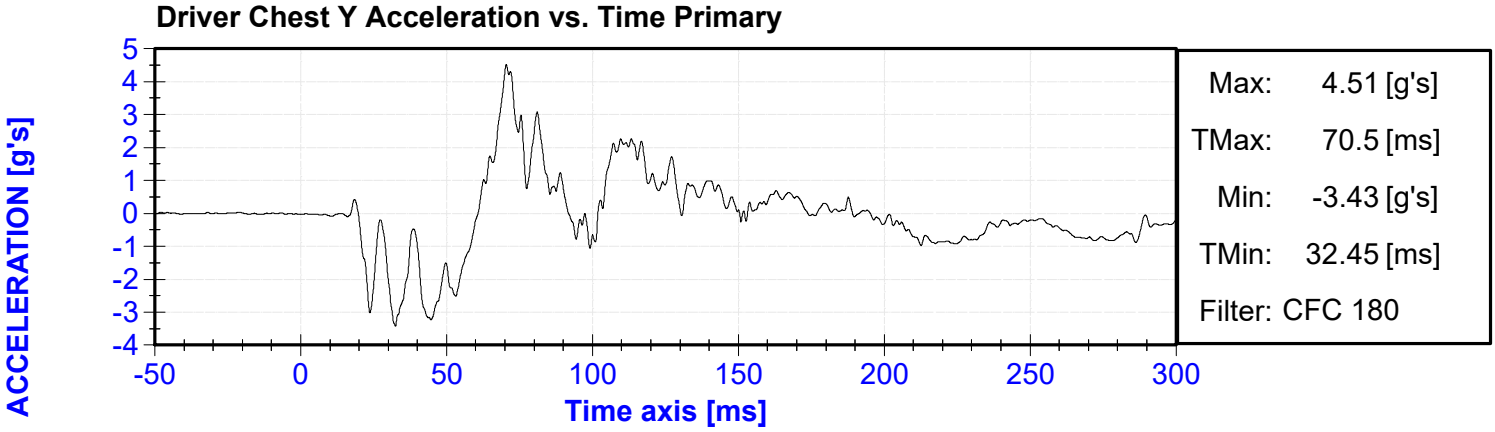
Driver Chest X Deflection vs. Time



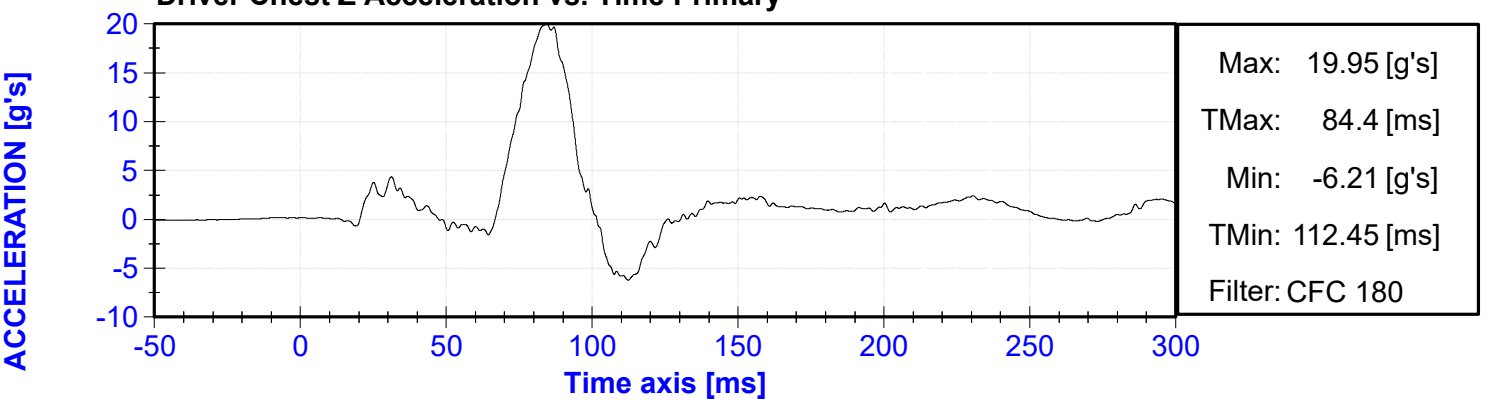
Driver Chest X Acceleration vs. Time Primary



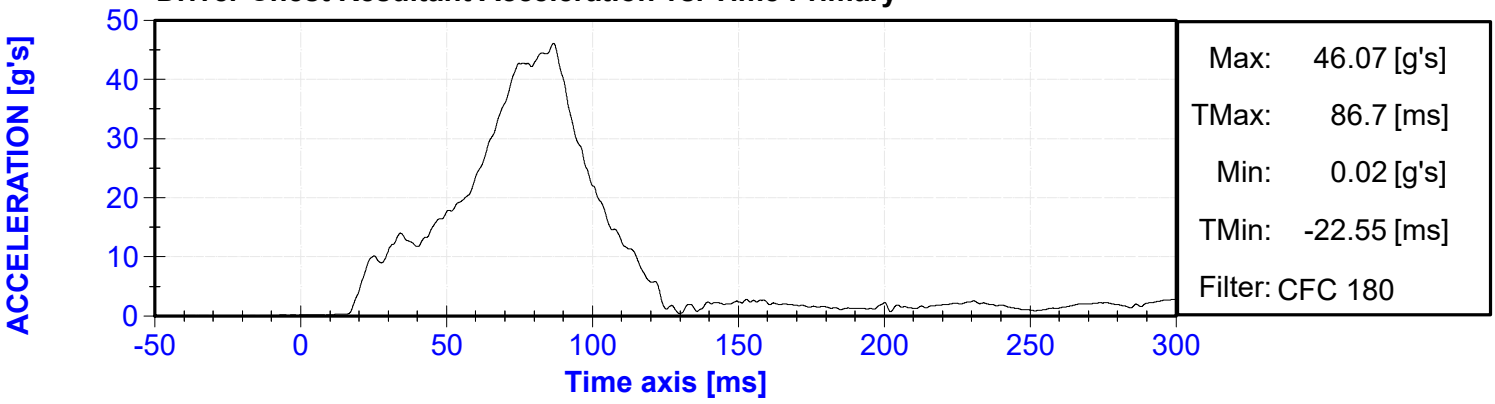
Driver Chest Y Acceleration vs. Time Primary



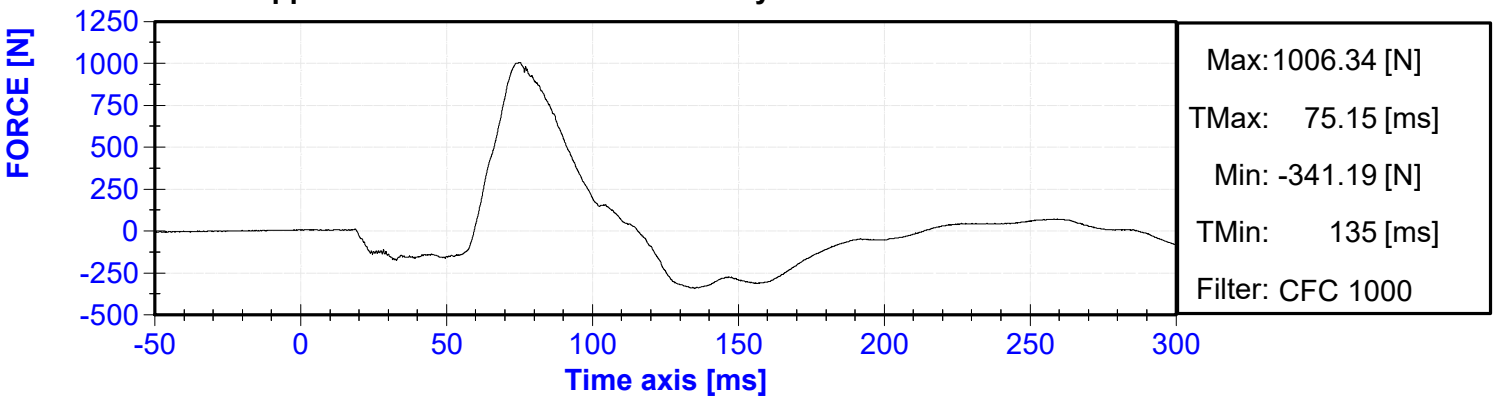
Driver Chest Z Acceleration vs. Time Primary



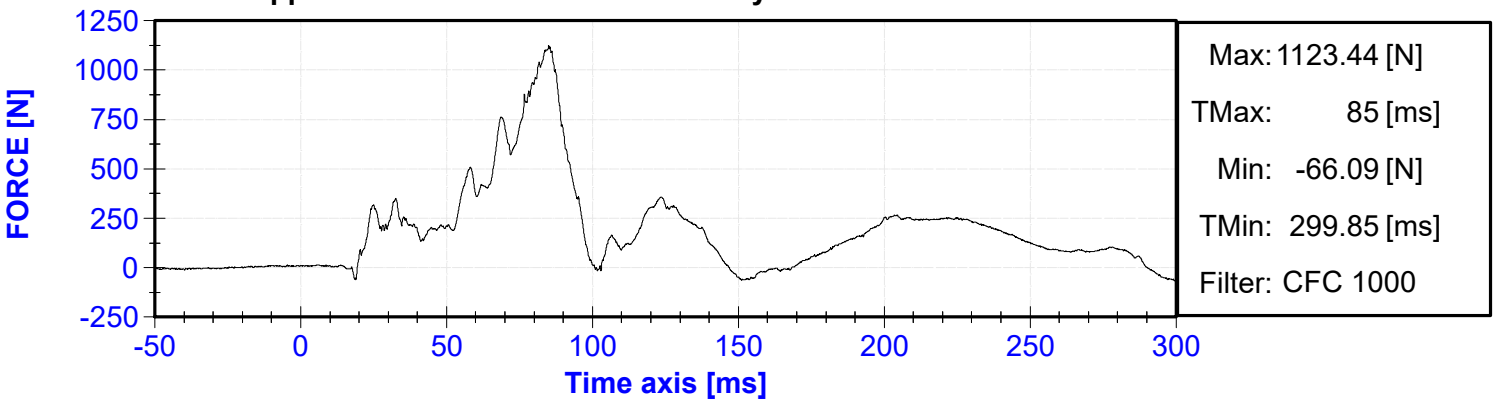
Driver Chest Resultant Acceleration vs. Time Primary



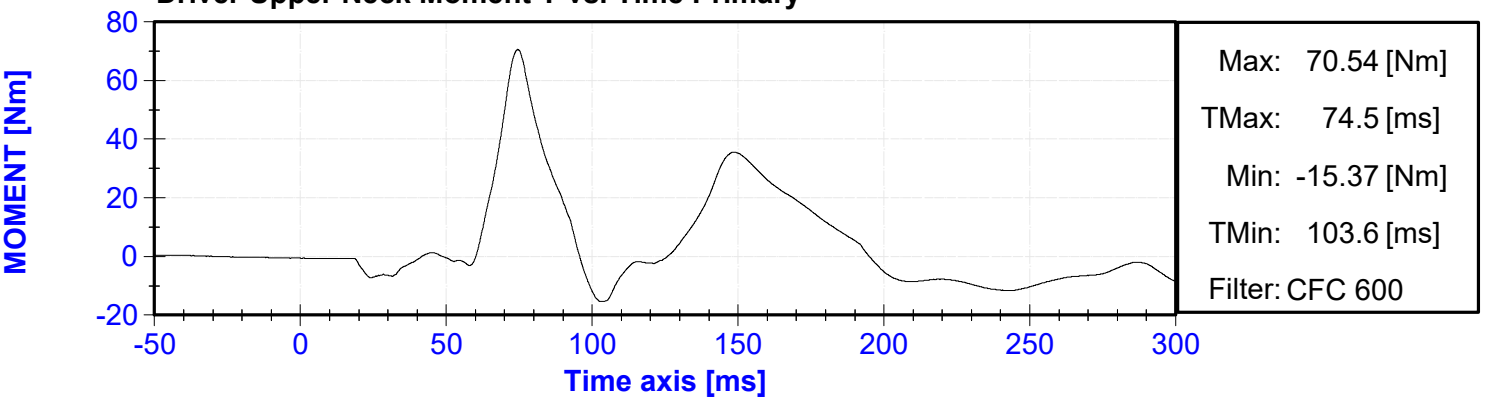
Driver Upper Neck Force X vs. Time Primary

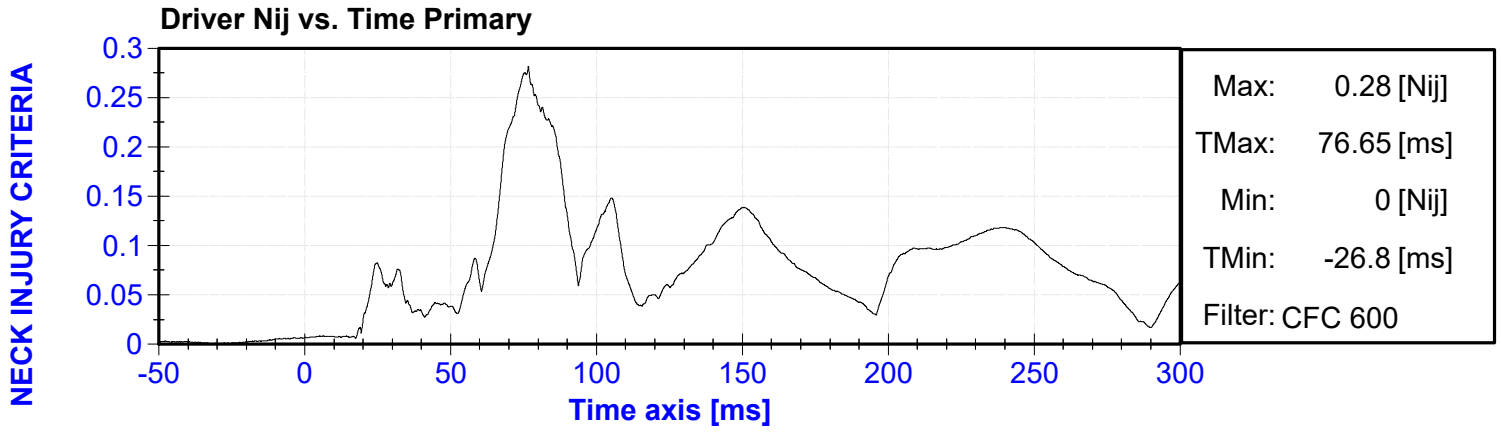


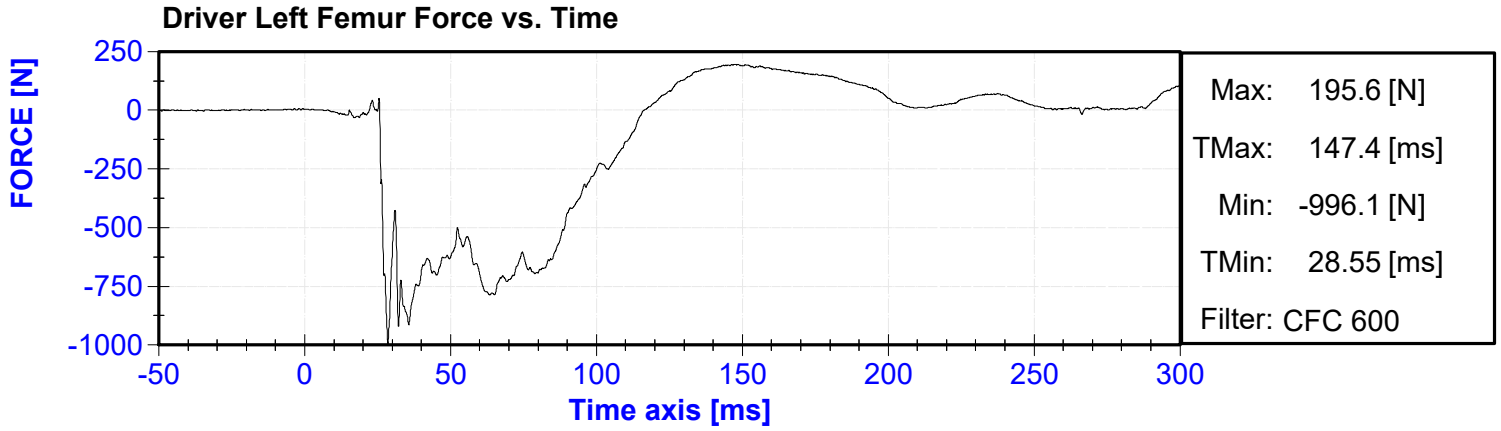
Driver Upper Neck Force Z vs. Time Primary

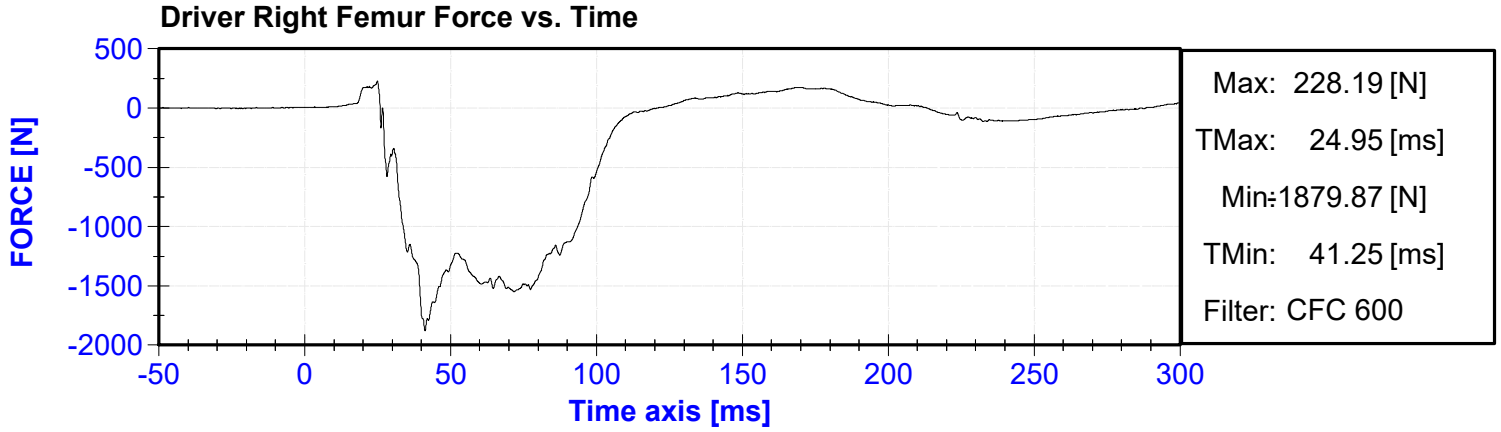


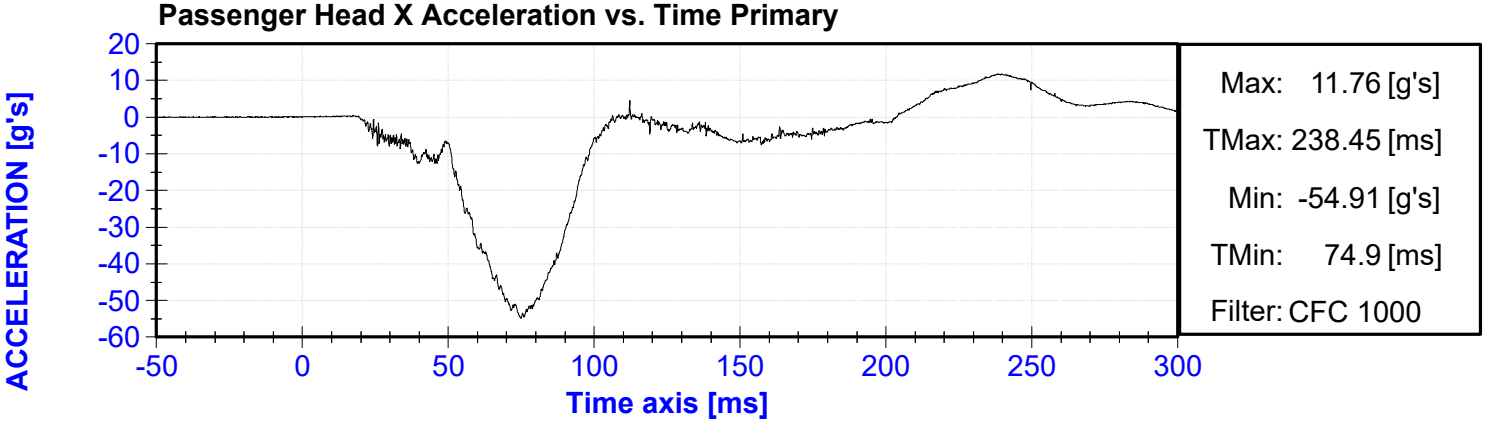
Driver Upper Neck Moment Y vs. Time Primary



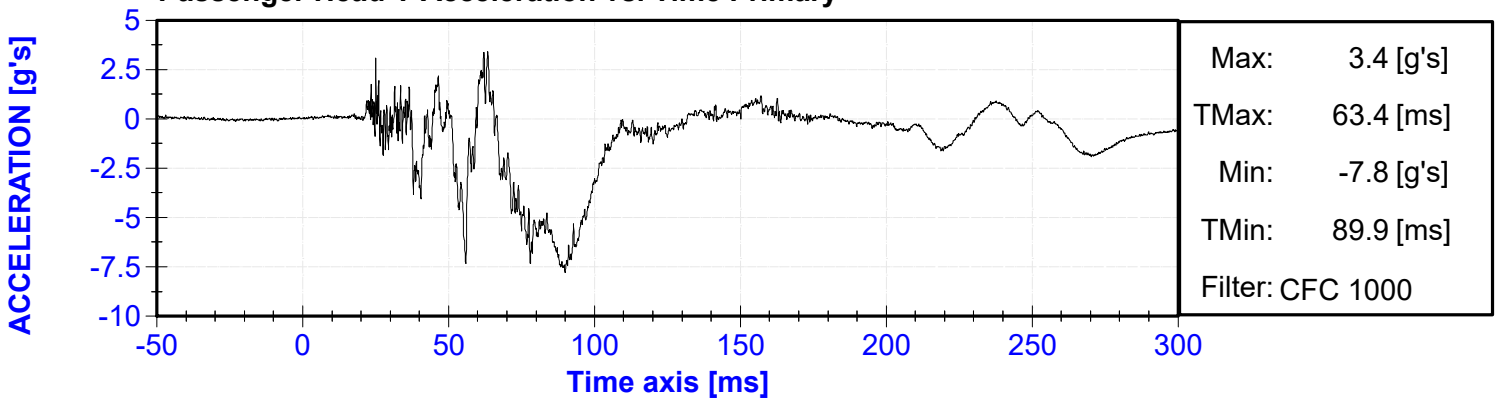

Driver Nij vs. Time Primary
NECK INJURY CRITERIA
0.3
0.25
0.2
0.15
0.1
0.05
0
-50
0
50
100
150
200
250
300
Time axis [ms]
Max: 0.28 [Nij]
TMax: 76.65 [ms]
Min: 0 [Nij]
TMin: -26.8 [ms]
Filter: CFC 600


Driver Left Femur Force vs. Time
FORCE [N]
250
0
-250
-500
-750
-1000
-50
0
50
100
150
200
250
300
Time axis [ms]
Max: 195.6 [N]
TMax: 147.4 [ms]
Min: -996.1 [N]
TMin: 28.55 [ms]
Filter: CFC 600

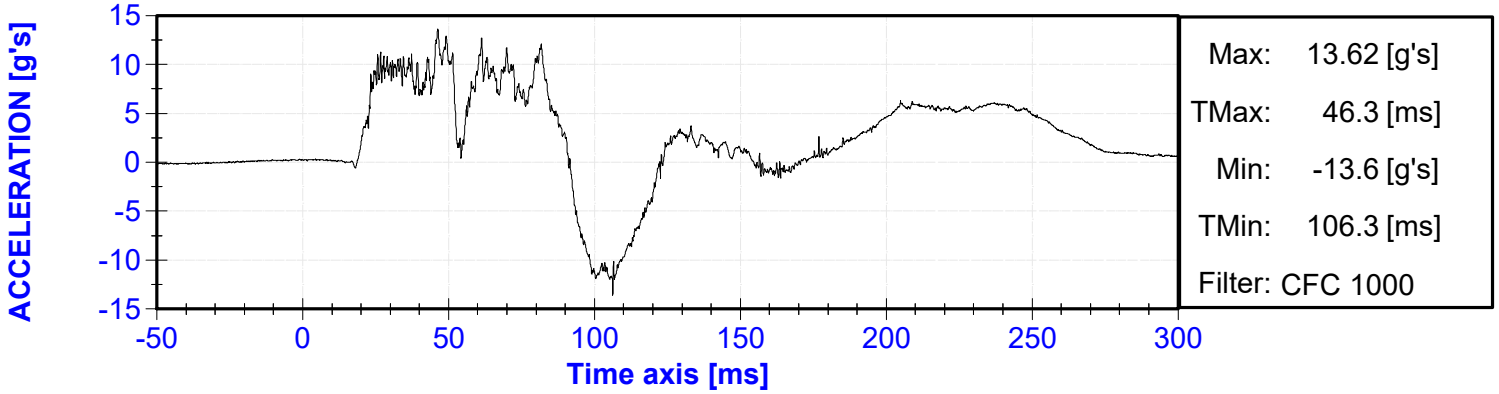

Driver Right Femur Force vs. Time
FORCE [N]
500
0
-500
-1000
-1500
-2000
-50
0
50
100
150
200
250
300
Time axis [ms]
Max: 228.19 [N]
TMax: 24.95 [ms]
Min: -1879.87 [N]
TMin: 41.25 [ms]
Filter: CFC 600


Passenger Head X Acceleration vs. Time Primary
ACCELERATION [g's]
20
10
0
-10
-20
-30
-40
-50
-60
-50
0
50
100
150
200
250
300
Time axis [ms]
Max: 11.76 [g's]
TMax: 238.45 [ms]
Min: -54.91 [g's]
TMin: 74.9 [ms]
Filter: CFC 1000

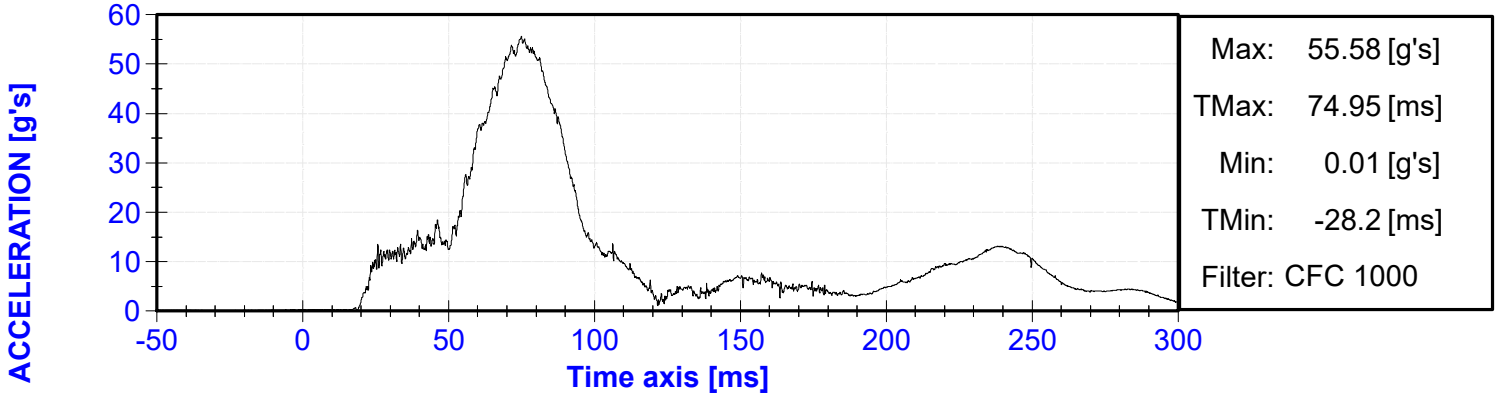
Passenger Head Y Acceleration vs. Time Primary



Passenger Head Z Acceleration vs. Time Primary

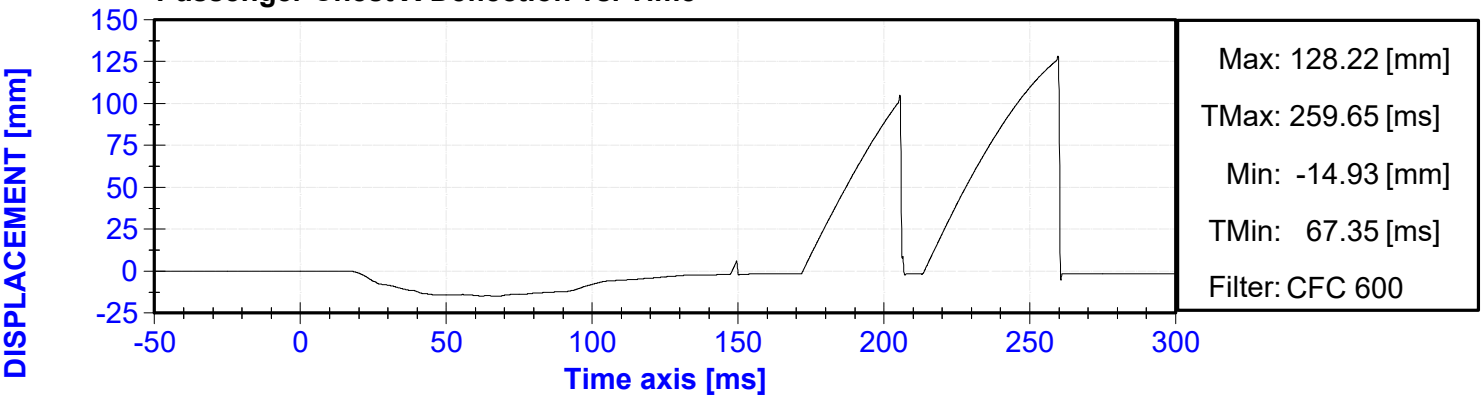


Passenger Head Resultant Acceleration vs. Time Primary

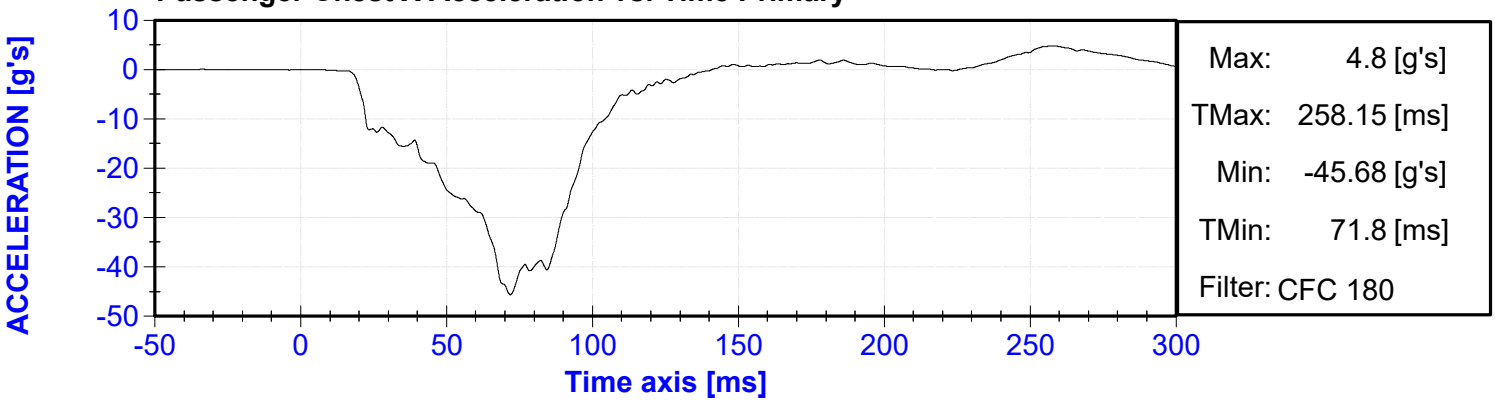


Passenger Chest X Deflection vs. Time

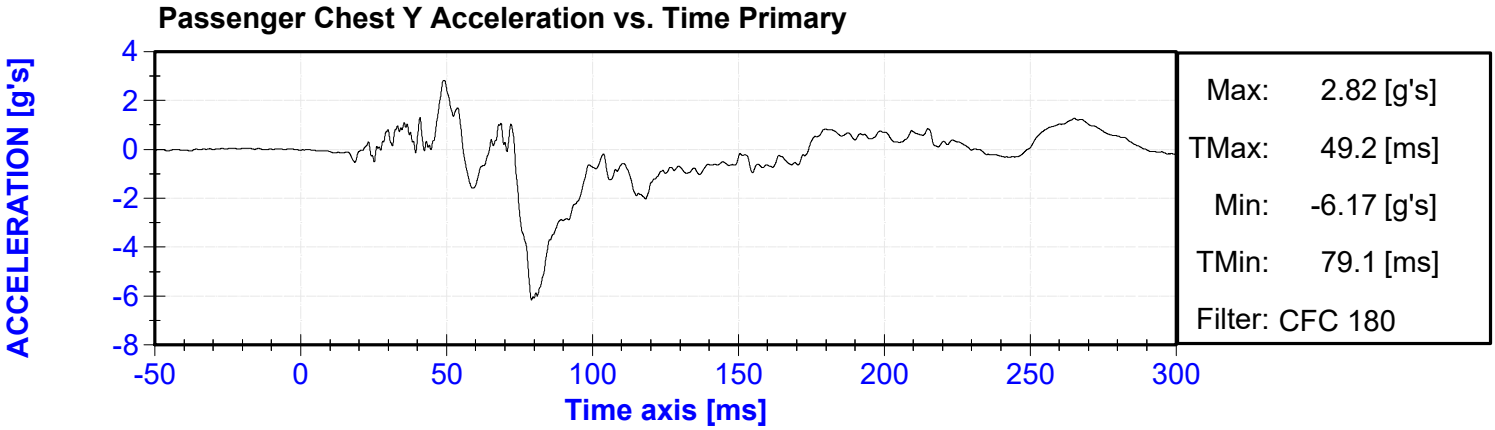
Questionable data after 147.2 ms



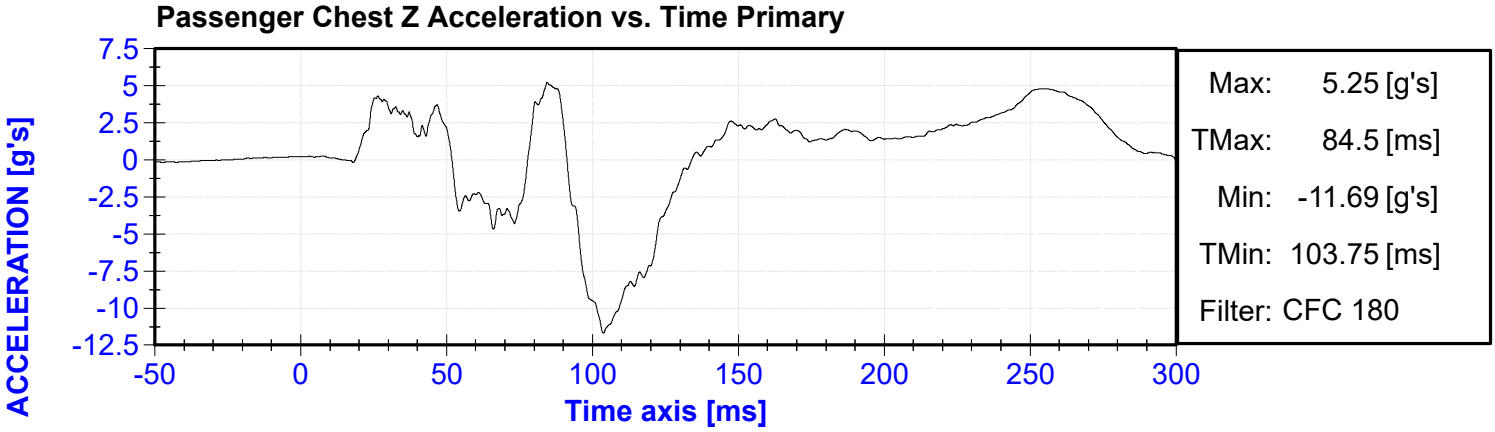
Passenger Chest X Acceleration vs. Time Primary



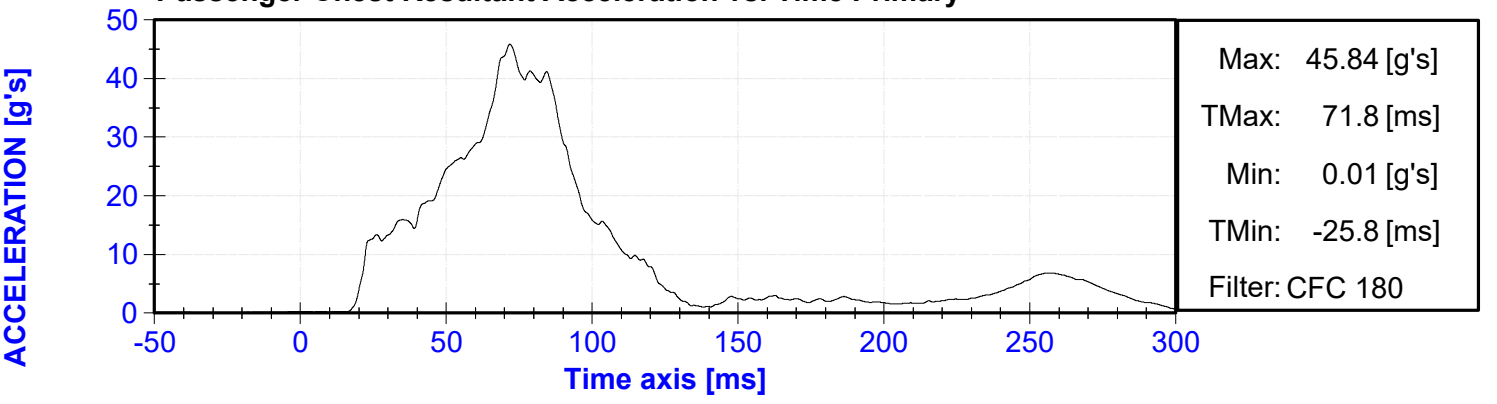
Passenger Chest Y Acceleration vs. Time Primary



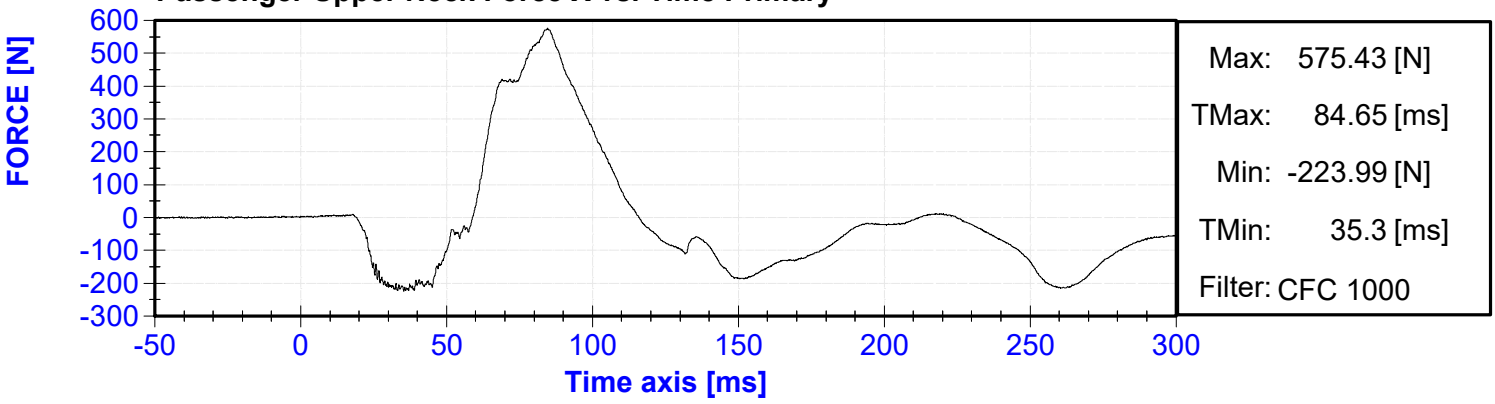
Passenger Chest Z Acceleration vs. Time Primary



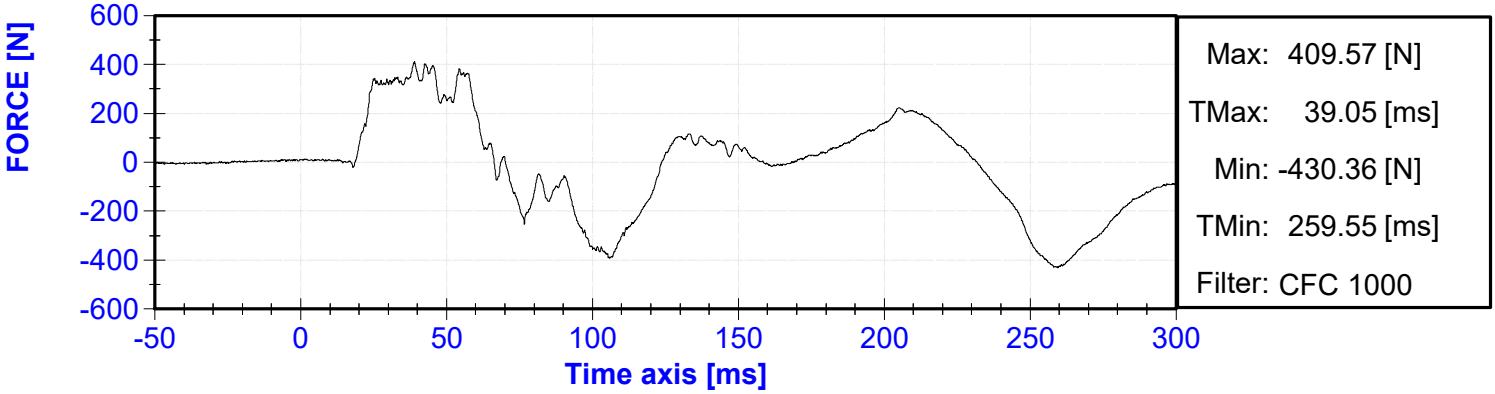
Passenger Chest Resultant Acceleration vs. Time Primary



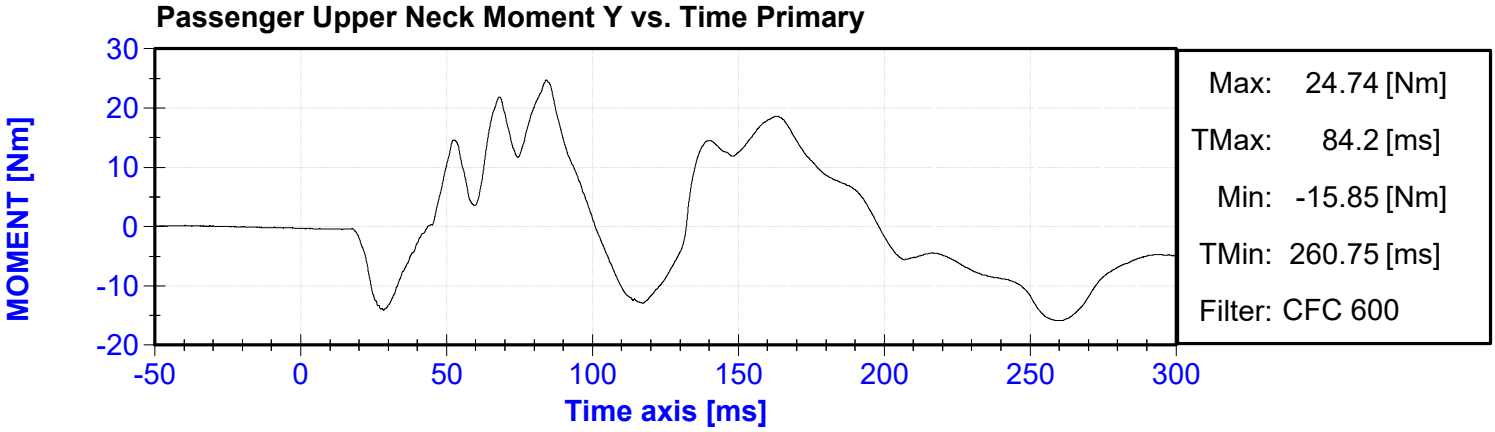
Passenger Upper Neck Force X vs. Time Primary



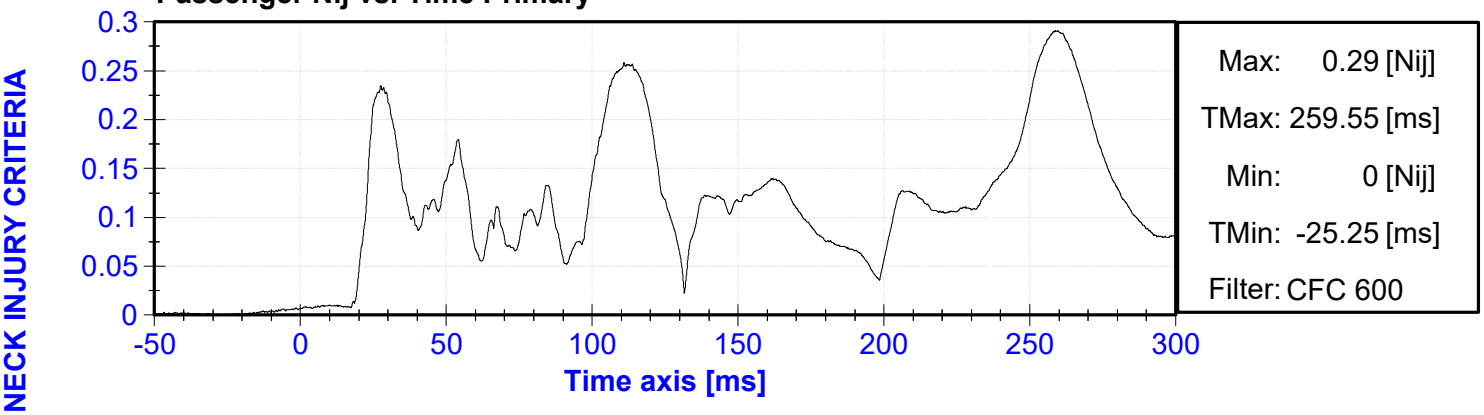
Passenger Upper Neck Force Z vs. Time Primary

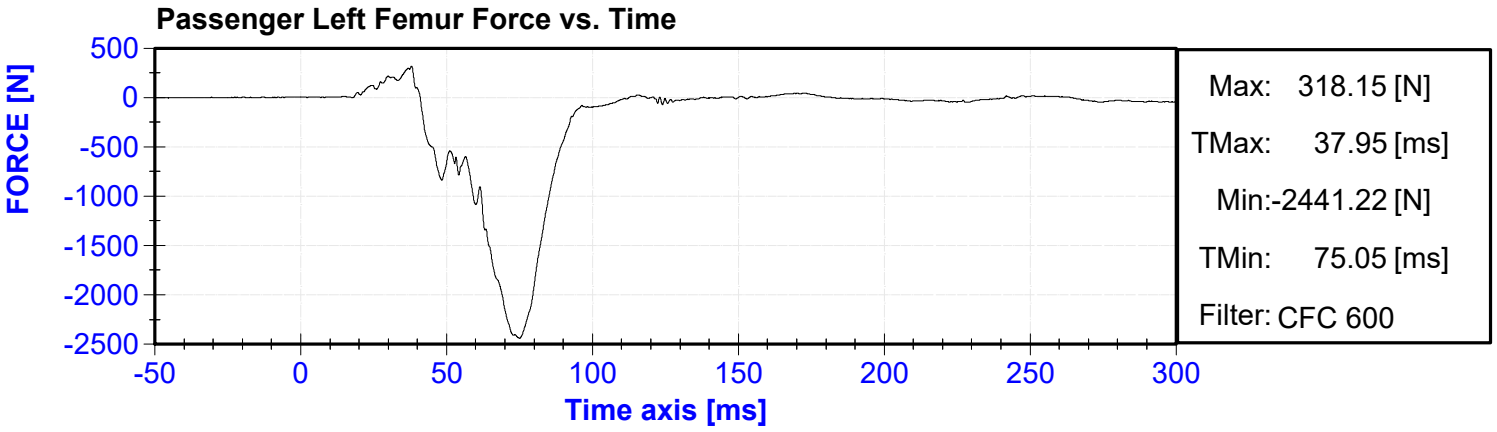


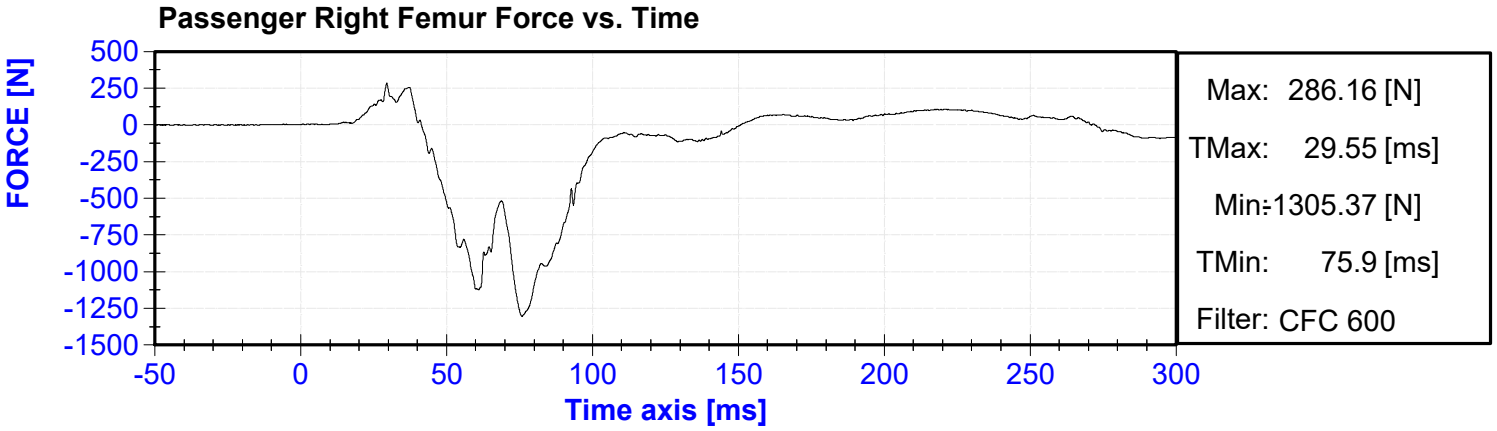
Passenger Upper Neck Moment Y vs. Time Primary



Passenger Nij vs. Time Primary




Passenger Left Femur Force vs. Time
FORCE [N]
500
0
-500
-1000
-1500
-2000
-2500
-50
0
50
100
150
200
250
300
Time axis [ms]
Max: 318.15 [N]
TMax: 37.95 [ms]
Min:-2441.22 [N]
TMin: 75.05 [ms]
Filter: CFC 600


Passenger Right Femur Force vs. Time
FORCE [N]
500
250
0
-250
-500
-750
-1000
-1250
-1500
-50
0
50
100
150
200
250
300
Time axis [ms]
Max: 286.16 [N]
TMax: 29.55 [ms]
Min:-1305.37 [N]
TMin: 75.9 [ms]
Filter: CFC 600

APPENDIX C

DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

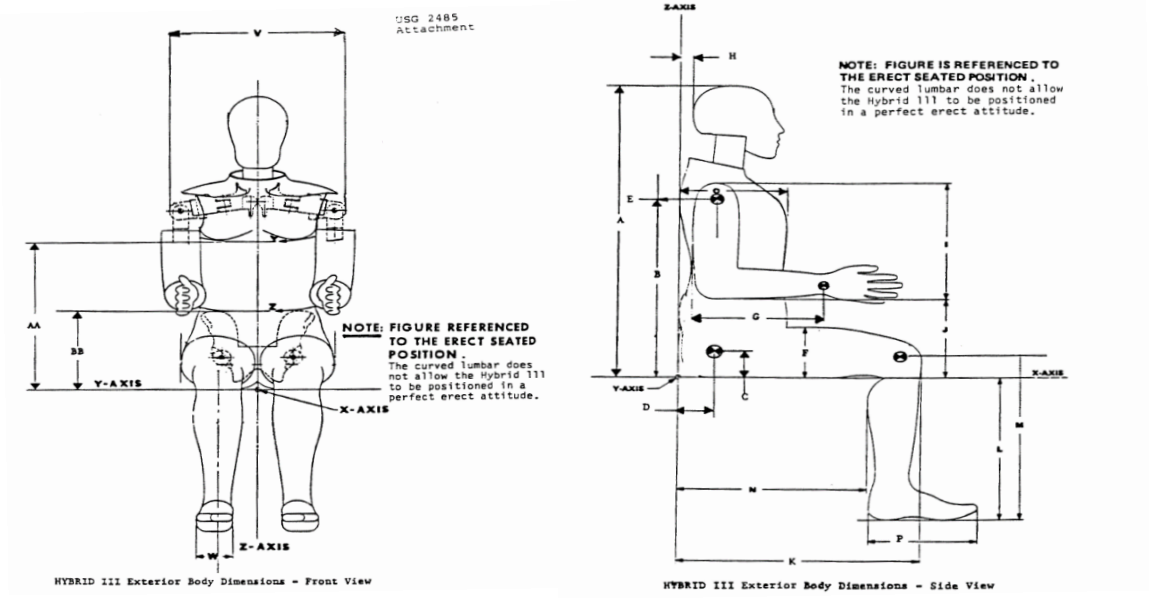
HYBRID III 50TH PERCENTILE MALE - DRIVER ATD

SERIAL NO: 065

External Measurements - Hybrid 3 - 50th Male

Technician: J. Rios Date: 09/25/2025

Dummy Serial Number: 065



Symbol	Description	Specification (in)		Result (in)	Pass/Fail
A	Sitting Height	34.6	35.0	34.7	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	5.5	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	11.9	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	23.1	Pass
L	Popliteal Height	16.9	17.9	17.4	Pass
M	Knee Pivot Height	19.1	19.7	19.4	Pass
N	Buttock Popliteal Length	17.8	18.8	18.4	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	16.6	Pass
W	Foot Breadth	3.6	4.2	3.9	Pass
Y	Chest Circumference with Jacket	38.2	39.4	38.6	Pass
Z	Waist Circumference	32.9	34.1	33.5	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

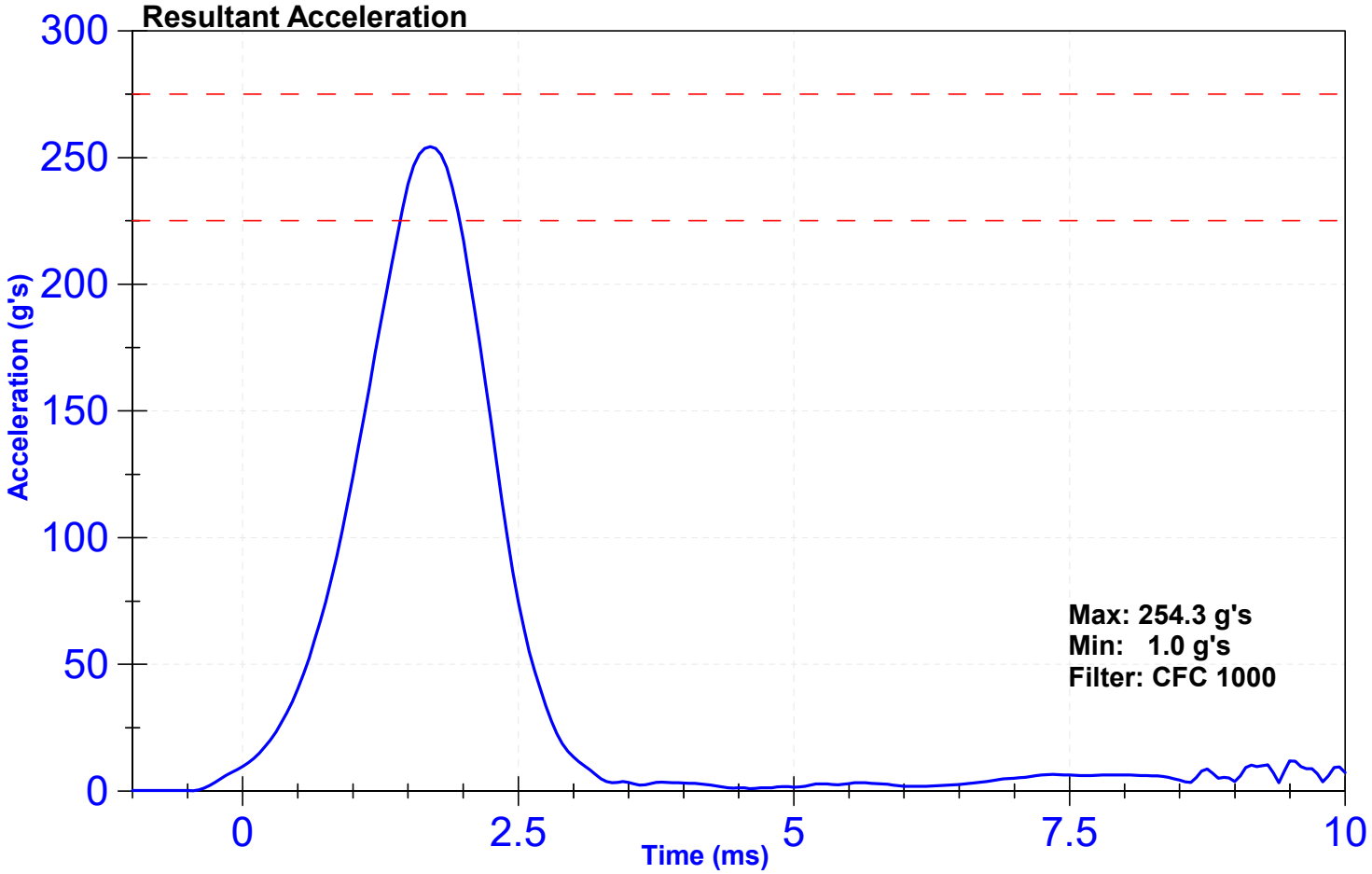
ATD Manufacturer	Humanetics	Test Technician	W. Brokx
ATD Serial Number	065	Laboratory Supervisor	J. Kinderman

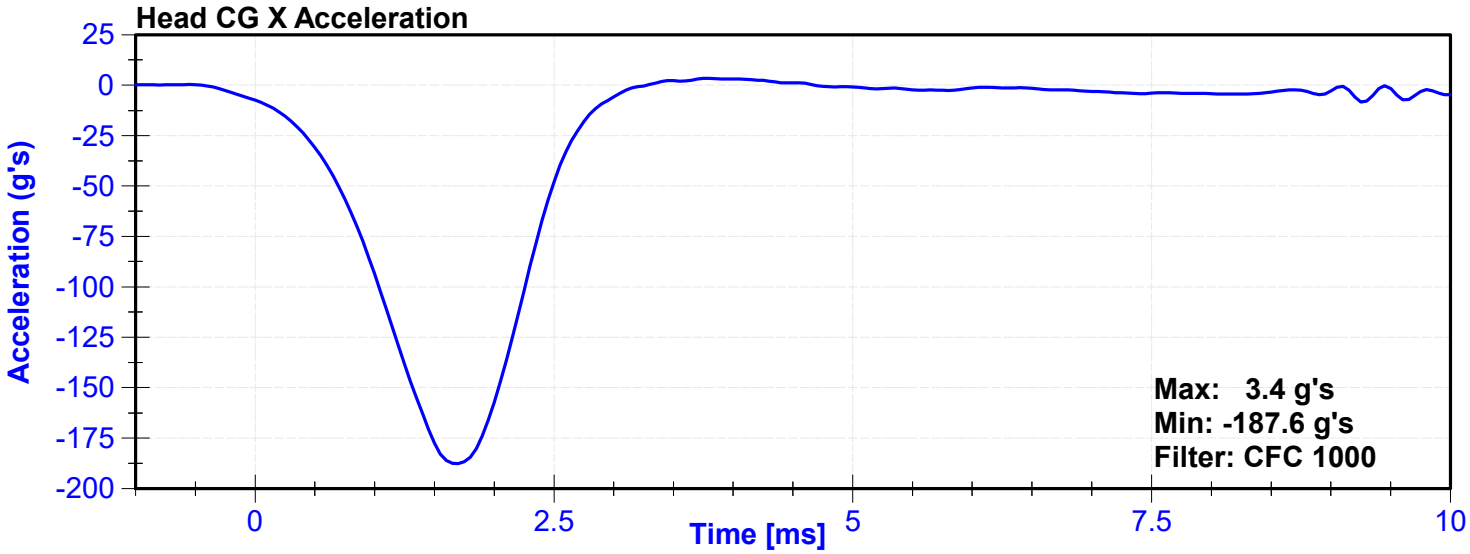
Results

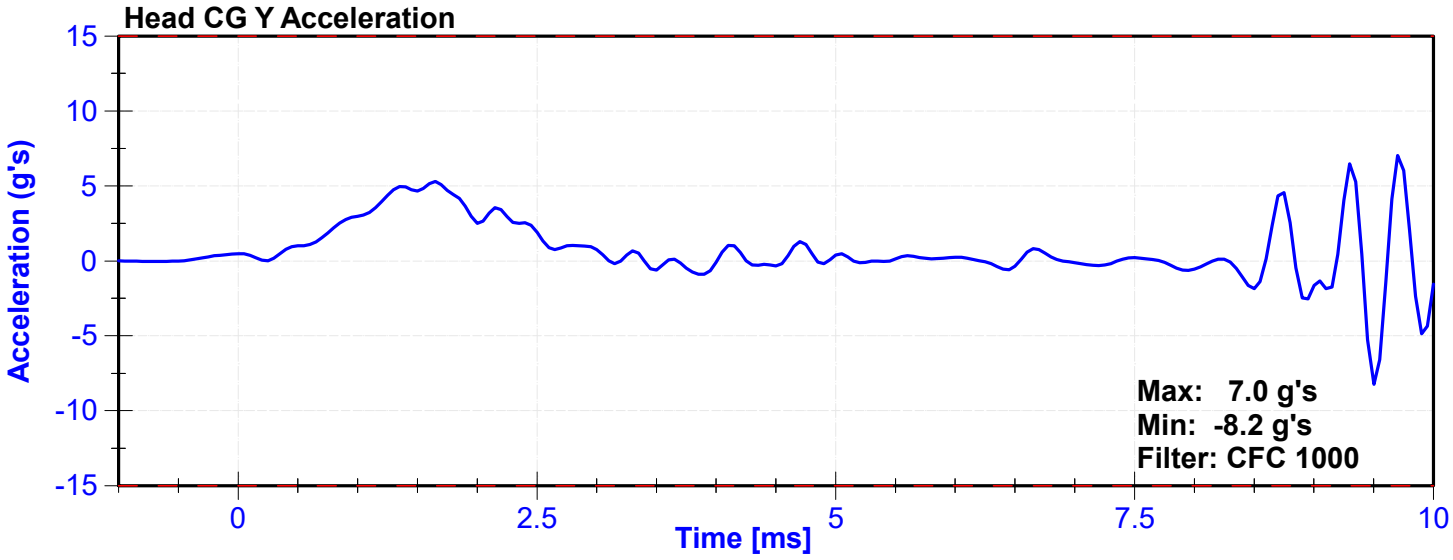
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	ºC	21.7	Pass
Humidity	10	70	%	58	Pass
Resultant Acceleration	225	275	g's	254.3	Pass
Oscillation	0	10	%	4.6	Pass
Lateral Acceleration	-15	15	g's	-8.2	Pass

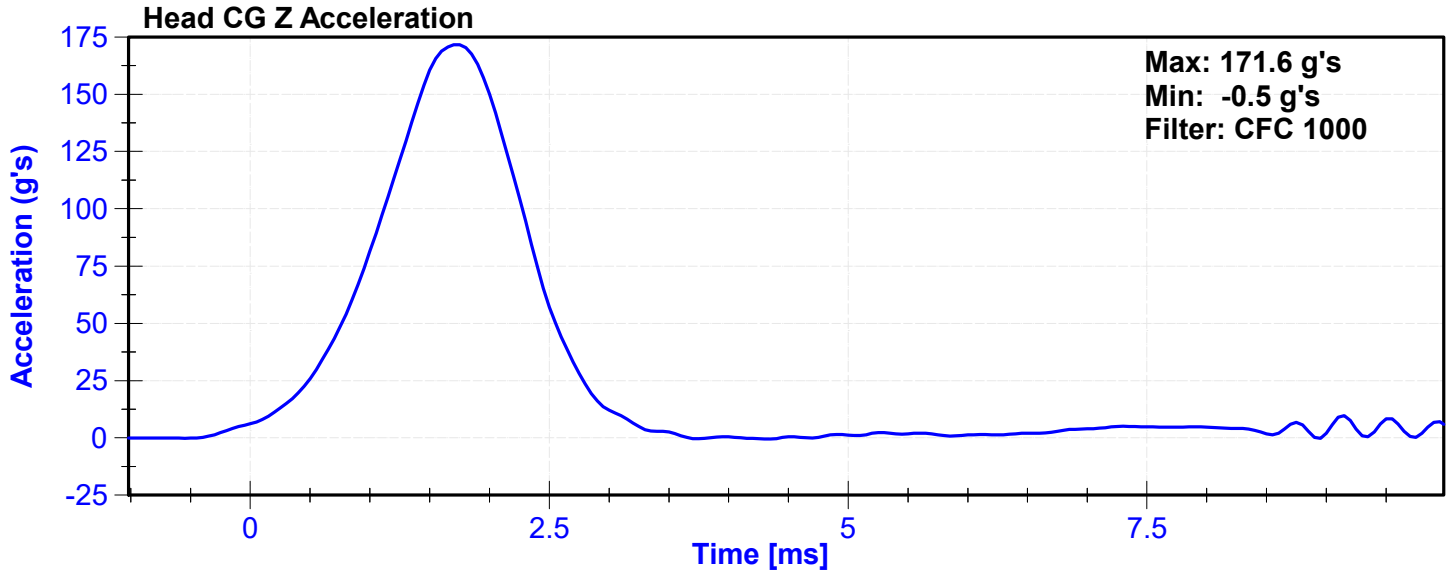
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	P52152	6/10/2025	12/7/2025
Y Accelerometer	Endevco	P58888	6/10/2025	12/7/2025
Z Accelerometer	Endevco	P58911	6/10/2025	12/7/2025




Head CG X Acceleration
Acceleration (g's)
25
0
-25
-50
-75
-100
-125
-150
-175
-200
0
2.5
5
7.5
10
Time [ms]
Max: 3.4 g's
Min: -187.6 g's
Filter: CFC 1000


Head CG Y Acceleration
Acceleration (g's)
15
10
5
0
-5
-10
-15
0
2.5
5
7.5
10
Time [ms]
Max: 7.0 g's
Min: -8.2 g's
Filter: CFC 1000


Head CG Z Acceleration
Acceleration (g's)
175
150
125
100
75
50
25
0
-25
0
2.5
5
7.5
Time [ms]
Max: 171.6 g's
Min: -0.5 g's
Filter: CFC 1000

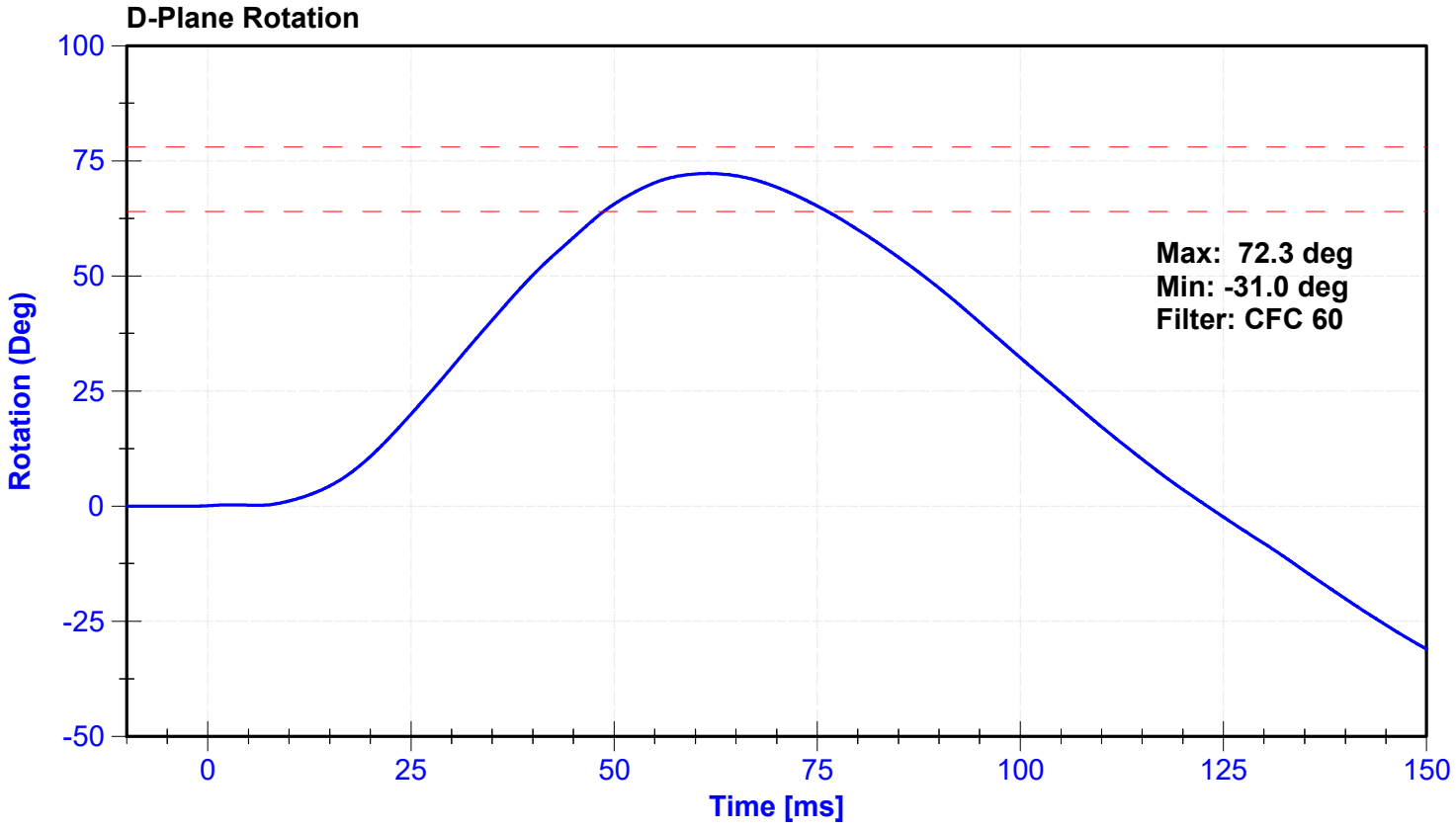
ATD Manufacturer	Humanetics	Test Technician	W. Brokx
ATD Serial Number	065	Laboratory Supervisor	J. Kinderman

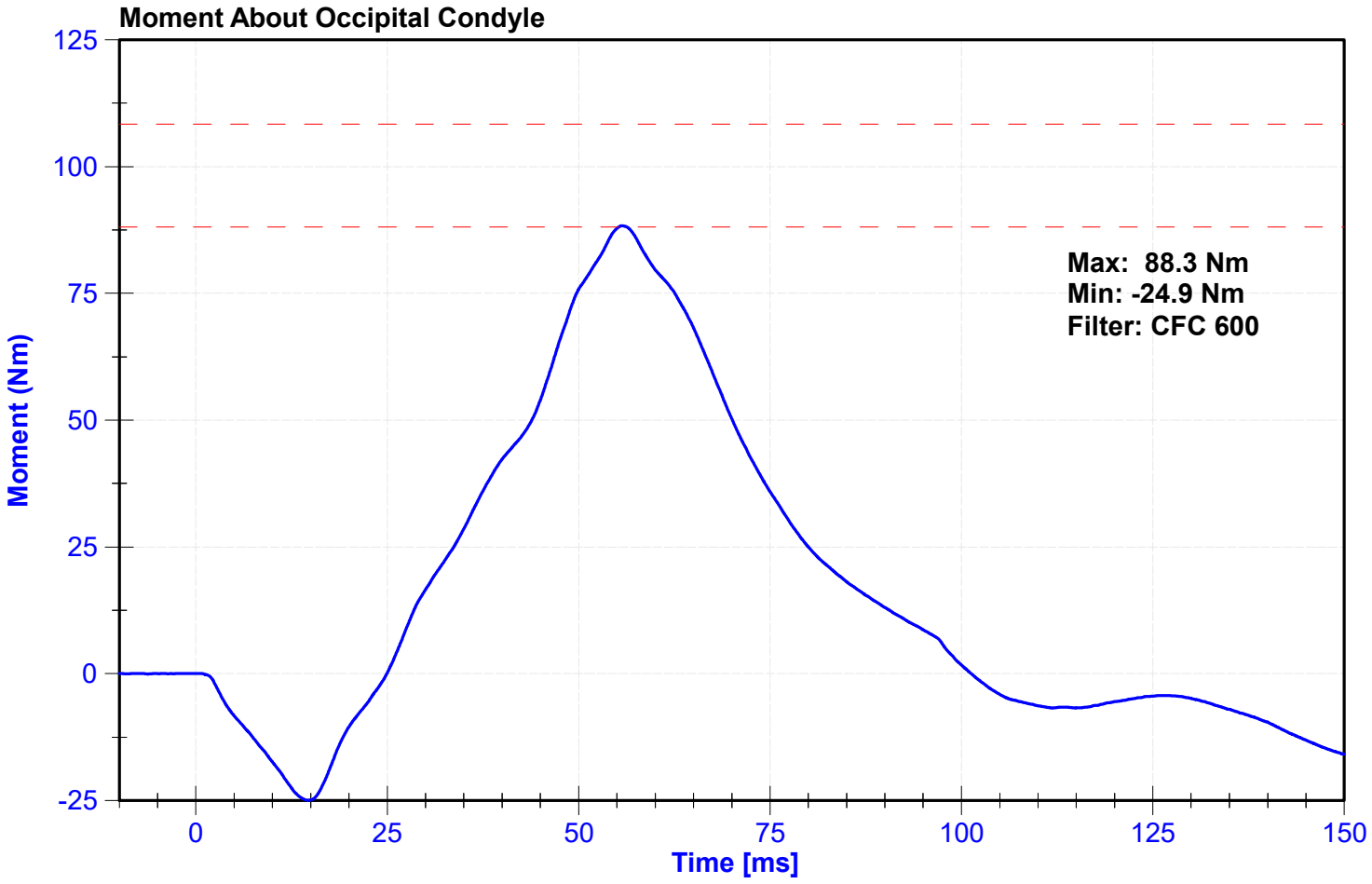
Results

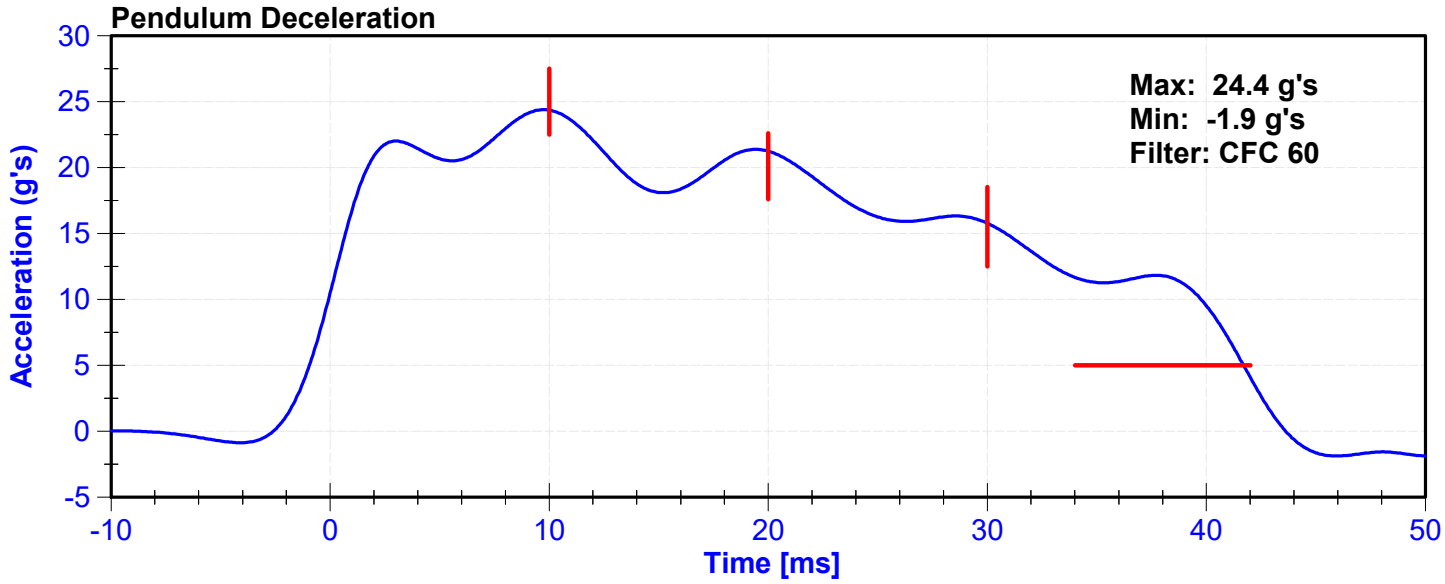
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.9	Pass
Humidity	10	70	%	57	Pass
Velocity	6.89	7.13	m/s	6.941	Pass
Pendulum Deceleration at 10ms	22.5	27.5	g's	24.35	Pass
Pendulum Deceleration at 20ms	17.6	22.6	g's	21.24	Pass
Pendulum Deceleration at 30ms	12.5	18.5	g's	15.77	Pass
Max. Pendulum Deceleration After 30ms	0	29	g's	24.4	Pass
Pendulum Deceleration Time to 5 g's	34	42	ms	41.7	Pass
Maximum D Plane Rotation	64	78	deg	72.3	Pass
Time to Maximum Rotation	57	64	ms	61.6	Pass
Rotation Decay to Zero	113	127	ms	123.0	Pass
Moment About Occipital Condyle	88.1	108.4	Nm	88.32	Pass
Time to Maximum Moment	47	58	ms	55.6	Pass
Moment Decay to Zero	97	107	ms	101.3	Pass

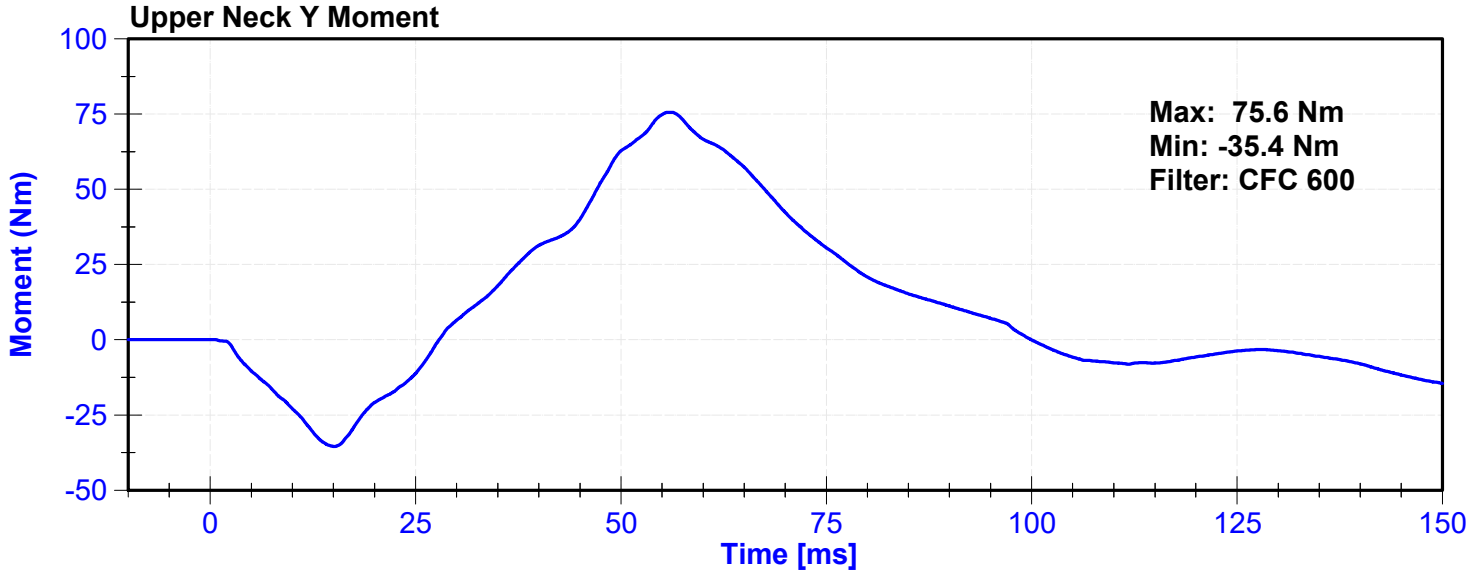
Transducer Calibrations

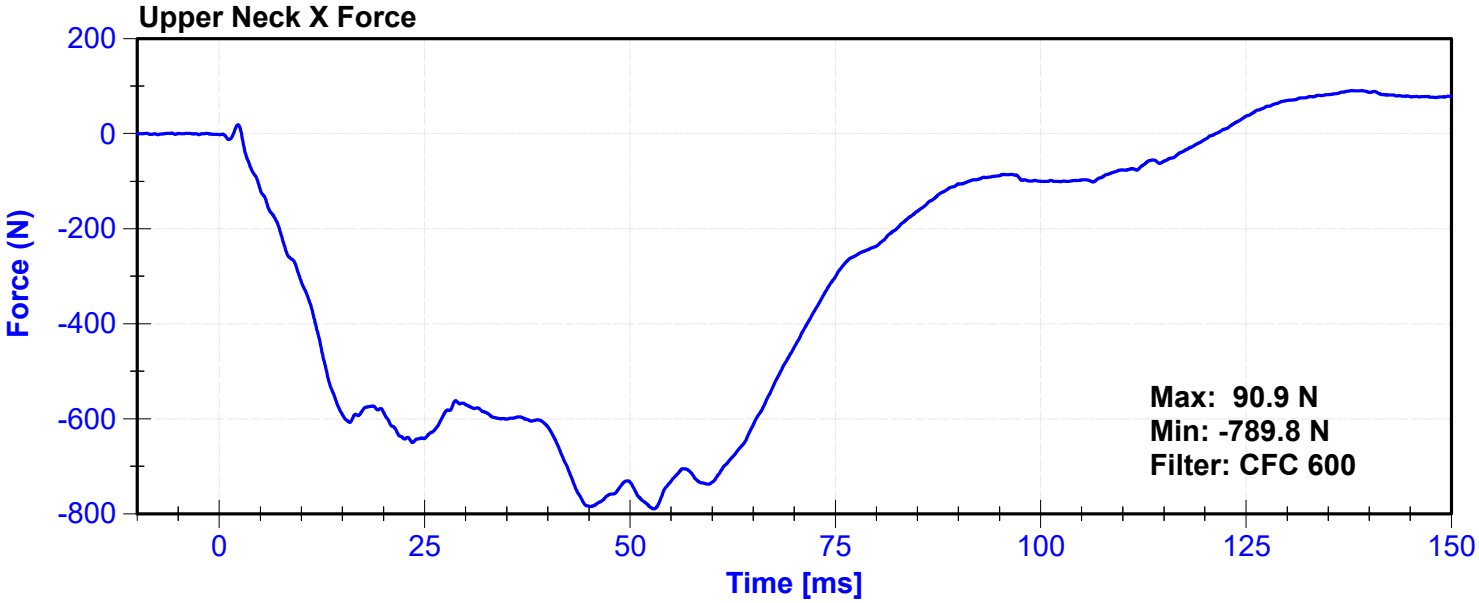
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16646	10/17/2024	10/17/2025
Pendulum Potentiometer	ETI	LABPOT1	5/14/2025	5/14/2026
Condyle Potentiometer	ETI	LABPOT2	5/14/2025	5/14/2026
Upper Neck Load Cell	Denton	2207-FX	7/7/2025	7/7/2026


D-Plane Rotation
Rotation (Deg)
100
75
50
25
0
-25
-50
0
25
50
75
100
125
150
Time [ms]
Max: 72.3 deg
Min: -31.0 deg
Filter: CFC 60


Moment About Occipital Condyle
Moment (Nm)
125
100
75
50
25
0
-25
0
25
50
75
100
125
150
Time [ms]
Max: 88.3 Nm
Min: -24.9 Nm
Filter: CFC 600


Pendulum Deceleration
Acceleration (g's)
Time [ms]
Max: 24.4 g's
Min: -1.9 g's
Filter: CFC 60


Upper Neck Y Moment
Moment (Nm)
Time [ms]
Max: 75.6 Nm
Min: -35.4 Nm
Filter: CFC 600


Upper Neck X Force
Force (N)
Time [ms]
Max: 90.9 N
Min: -789.8 N
Filter: CFC 600

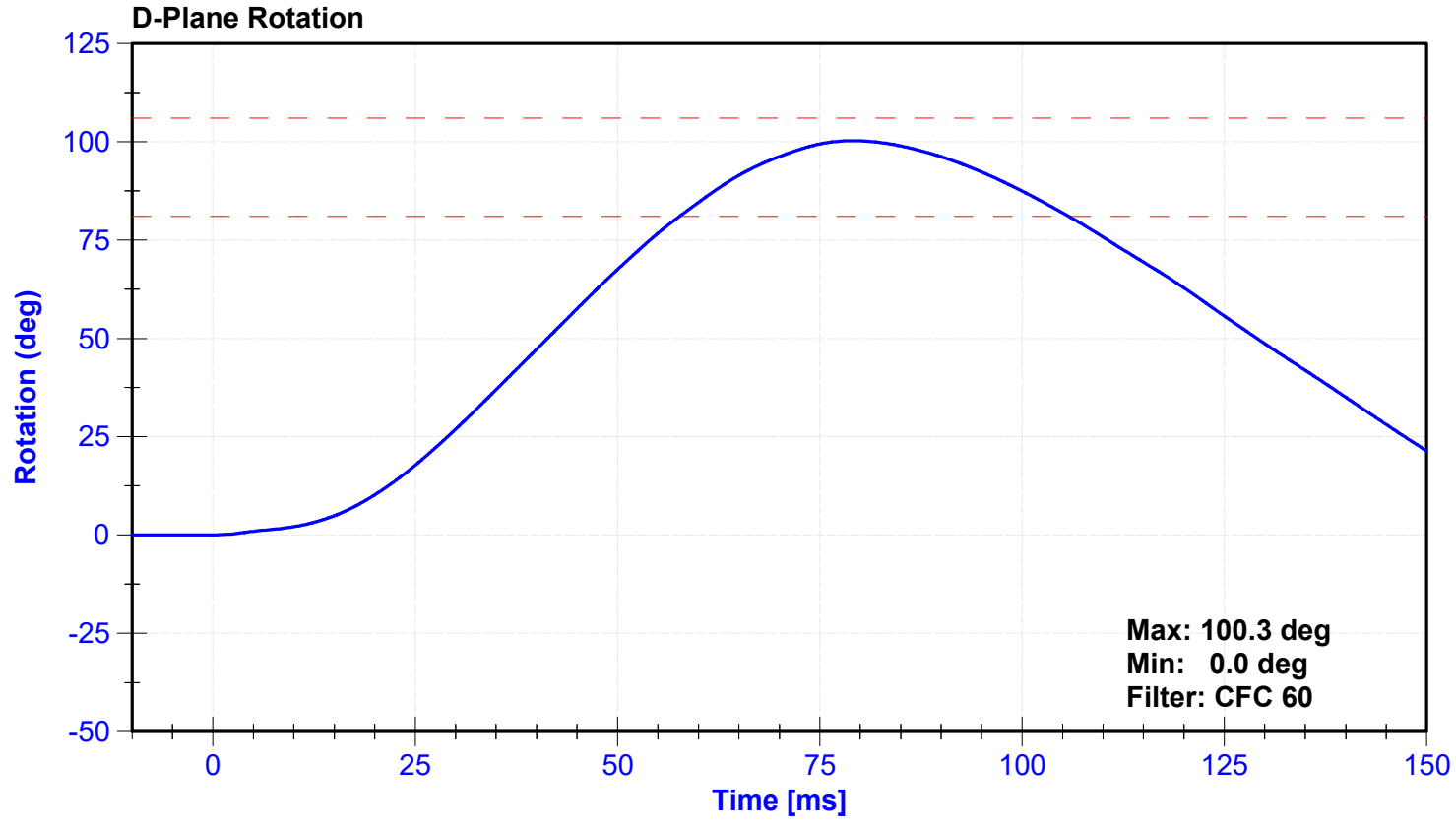
ATD Manufacturer	Humanetics	Test Technician	W. Brokx
ATD Serial Number	065	Laboratory Supervisor	J. Kinderman

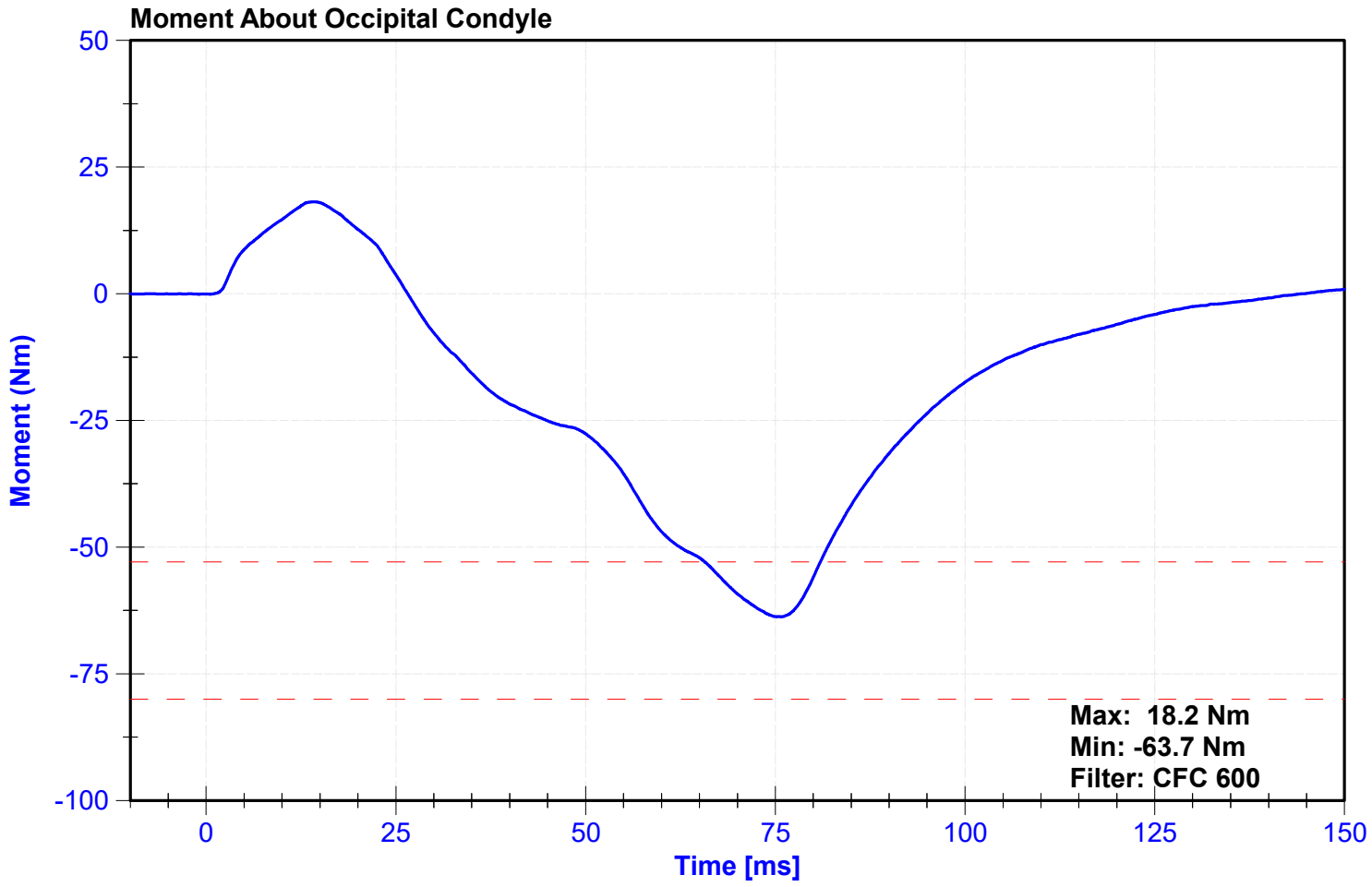
Results

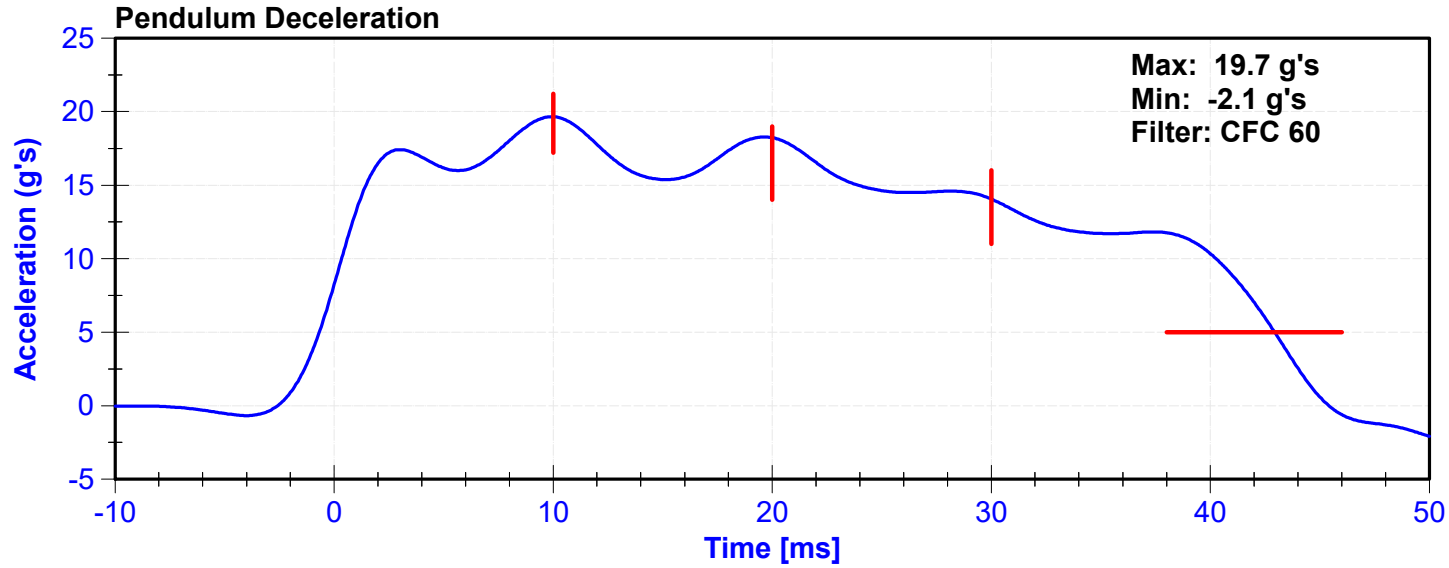
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.9	Pass
Humidity	10	70	%	57	Pass
Velocity	5.94	6.19	m/s	6.006	Pass
Pendulum Deceleration at 10ms	17.2	21.2	g's	19.65	Pass
Pendulum Deceleration at 20ms	14	19	g's	18.2	Pass
Pendulum Deceleration at 30ms	11	16	g's	14.1	Pass
Max. Pendulum Deceleration After 30ms	0	22	g's	19.7	Pass
Pendulum Deceleration Time to 5 g's	38	46	ms	42.9	Pass
Maximum D Plane Rotation	81	106	deg	100.3	Pass
Time to Maximum Rotation	72	82	ms	79.1	Pass
Rotation Decay to Zero	147	174	ms	166.2	Pass
Minimum Moment About OC	-80	-52.9	Nm	-63.73	Pass
Time to Minimum Moment	65	79	ms	75.8	Pass
Moment Decay to Zero	120	148	ms	144.2	Pass

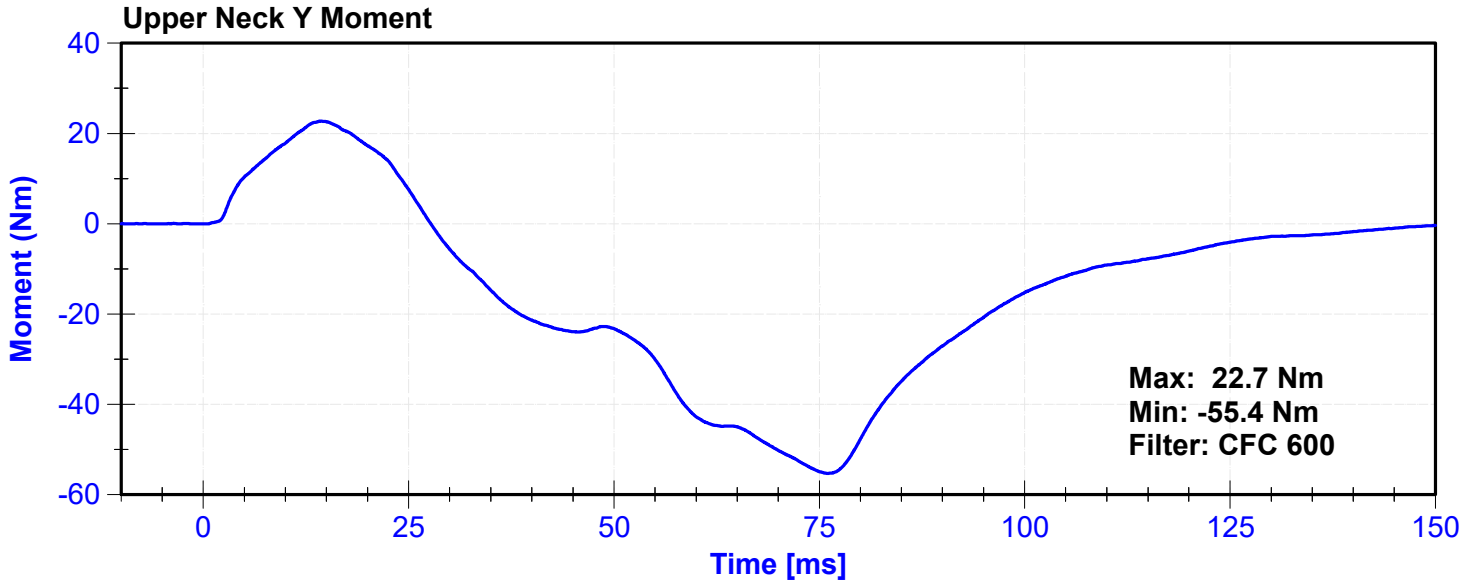
Transducer Calibrations

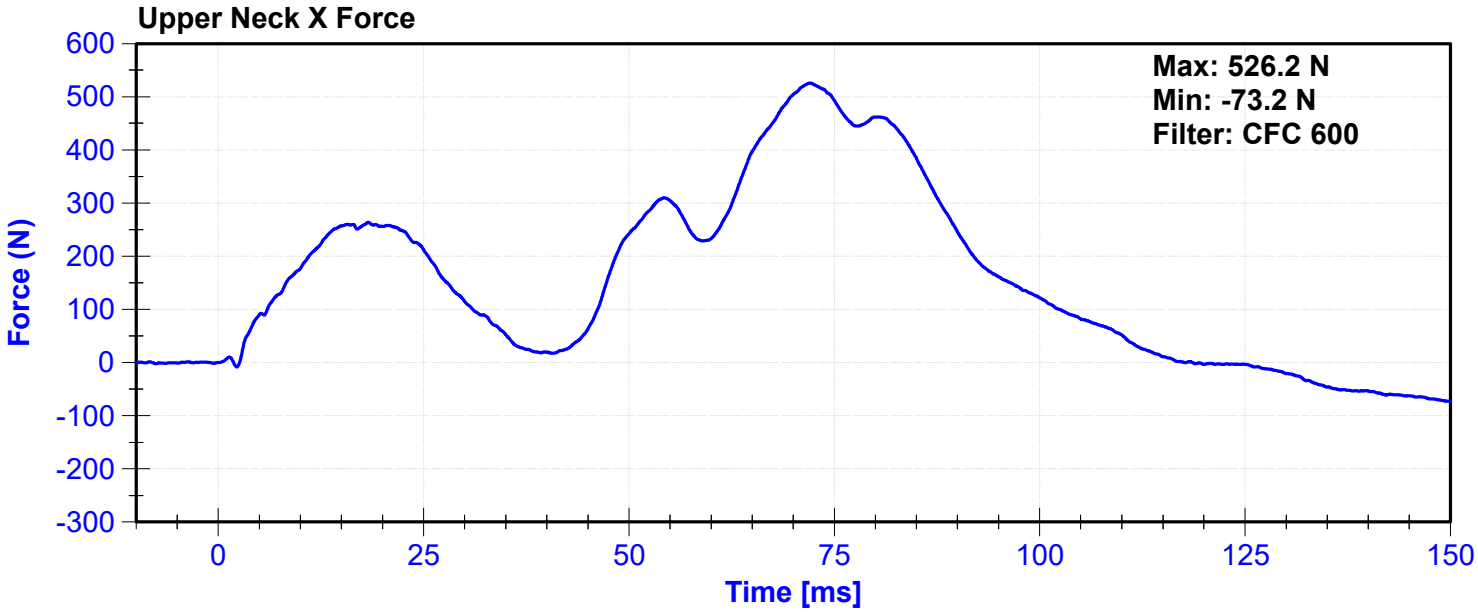
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16646	10/17/2024	10/17/2025
Pendulum Potentiometer	ETI	SP22G_LABPOT1	5/14/2025	5/14/2026
Condyle Potentiometer	ETI	SP22G_LABPOT2	5/14/2025	5/14/2026
Upper Neck Load Cell	Denton	2207-FX	7/7/2025	7/7/2026


D-Plane Rotation
Rotation (deg)
125
100
75
50
25
0
-25
-50
0
25
50
75
100
125
150
Time [ms]
Max: 100.3 deg
Min: 0.0 deg
Filter: CFC 60


Moment About Occipital Condyle
Moment (Nm)
50
25
0
-25
-50
-75
-100
0
25
50
75
100
125
150
Time [ms]
Max: 18.2 Nm
Min: -63.7 Nm
Filter: CFC 600


Pendulum Deceleration
Max: 19.7 g's
Min: -2.1 g's
Filter: CFC 60
Acceleration (g's)
25
20
15
10
5
0
-5
-10
0
10
20
30
40
50
Time [ms]


Upper Neck Y Moment
Max: 22.7 Nm
Min: -55.4 Nm
Filter: CFC 600
Moment (Nm)
40
20
0
-20
-40
-60
0
25
50
75
100
125
150
Time [ms]


Upper Neck X Force
Max: 526.2 N
Min: -73.2 N
Filter: CFC 600
Force (N)
600
500
400
300
200
100
0
-100
-200
-300
0
25
50
75
100
125
150
Time [ms]

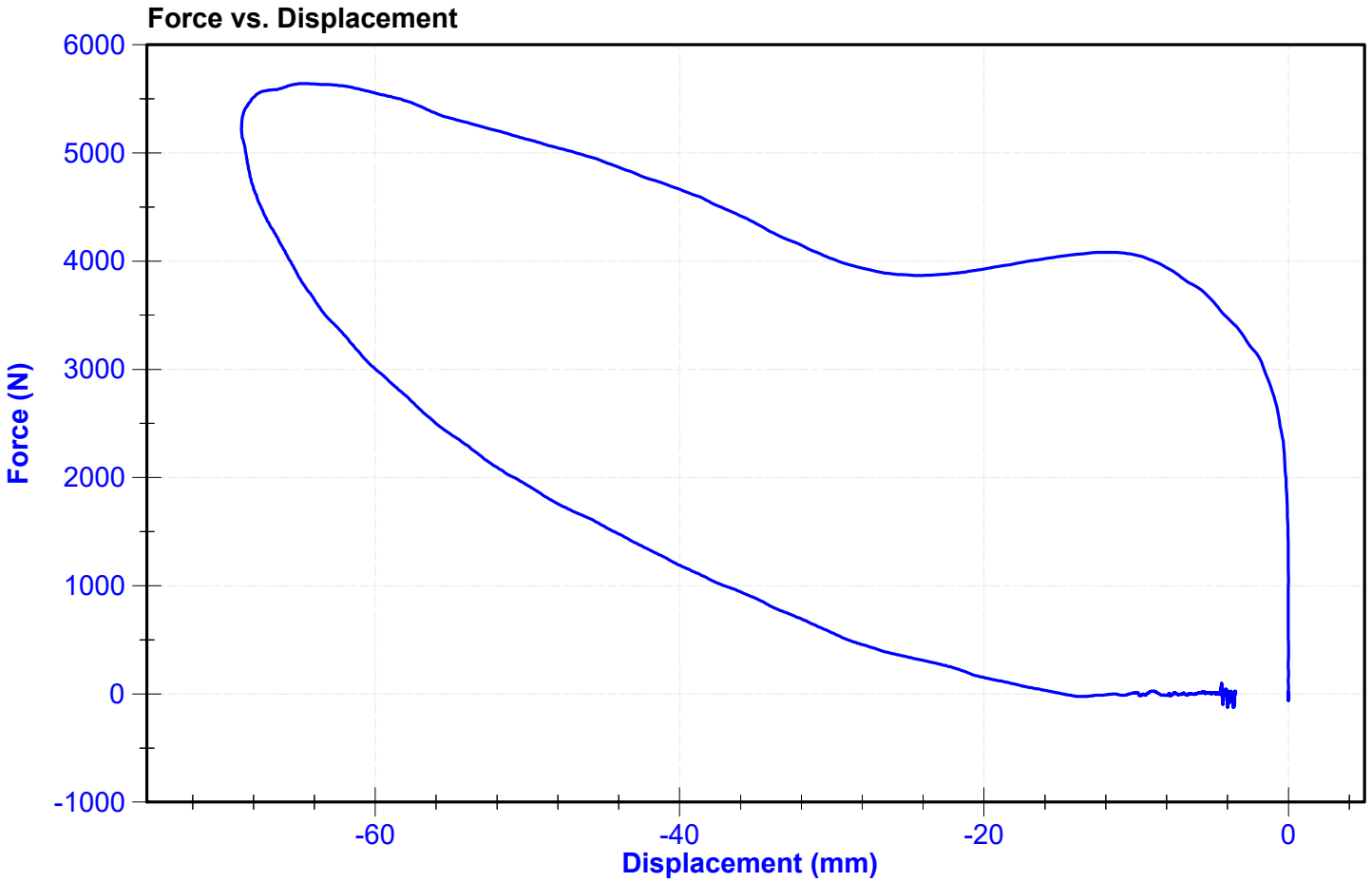
ATD Manufacturer	Humanetics	Test Technician	W. Brokx
ATD Serial Number	065	Laboratory Supervisor	J. Kinderman

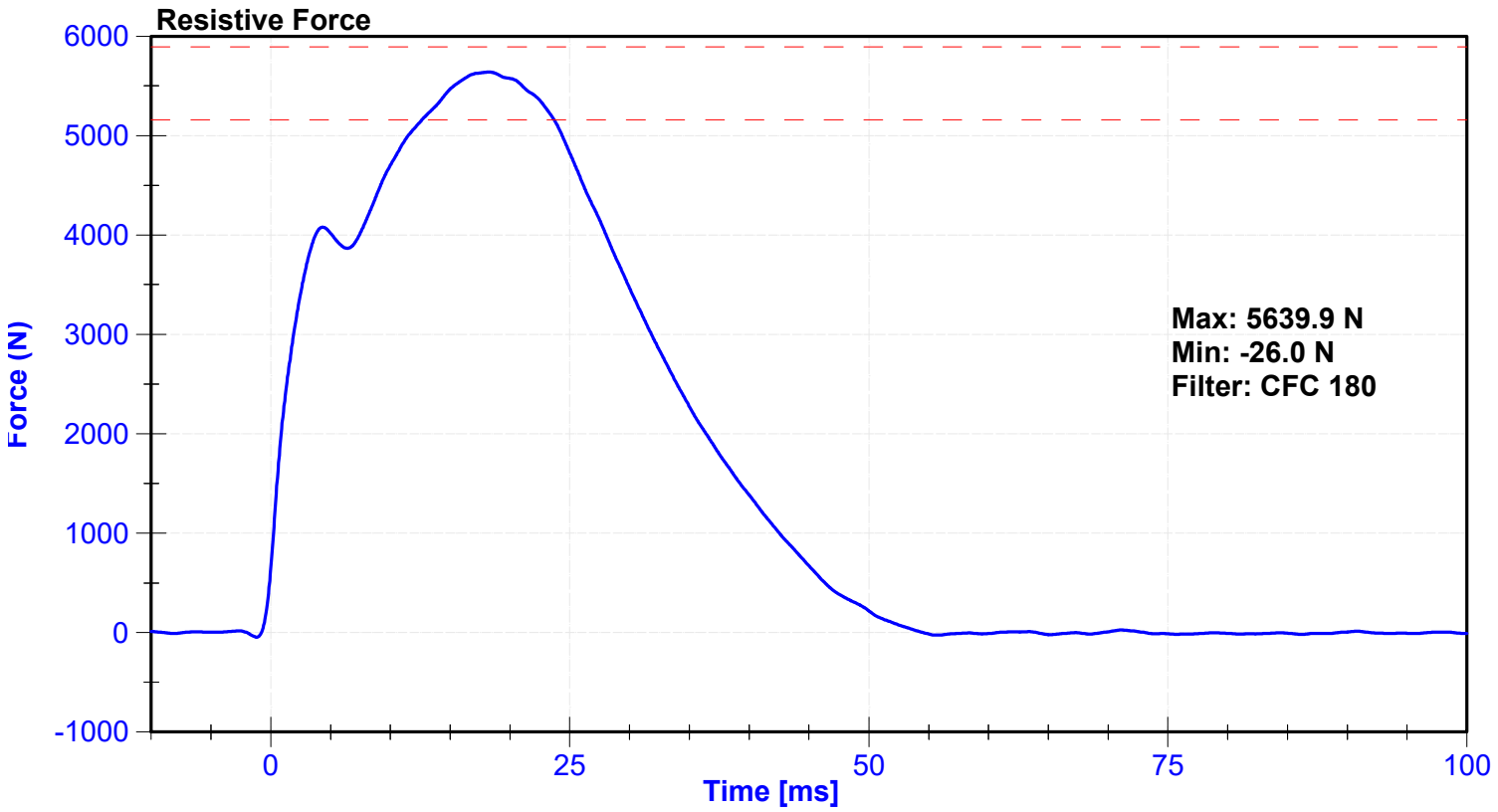
Results

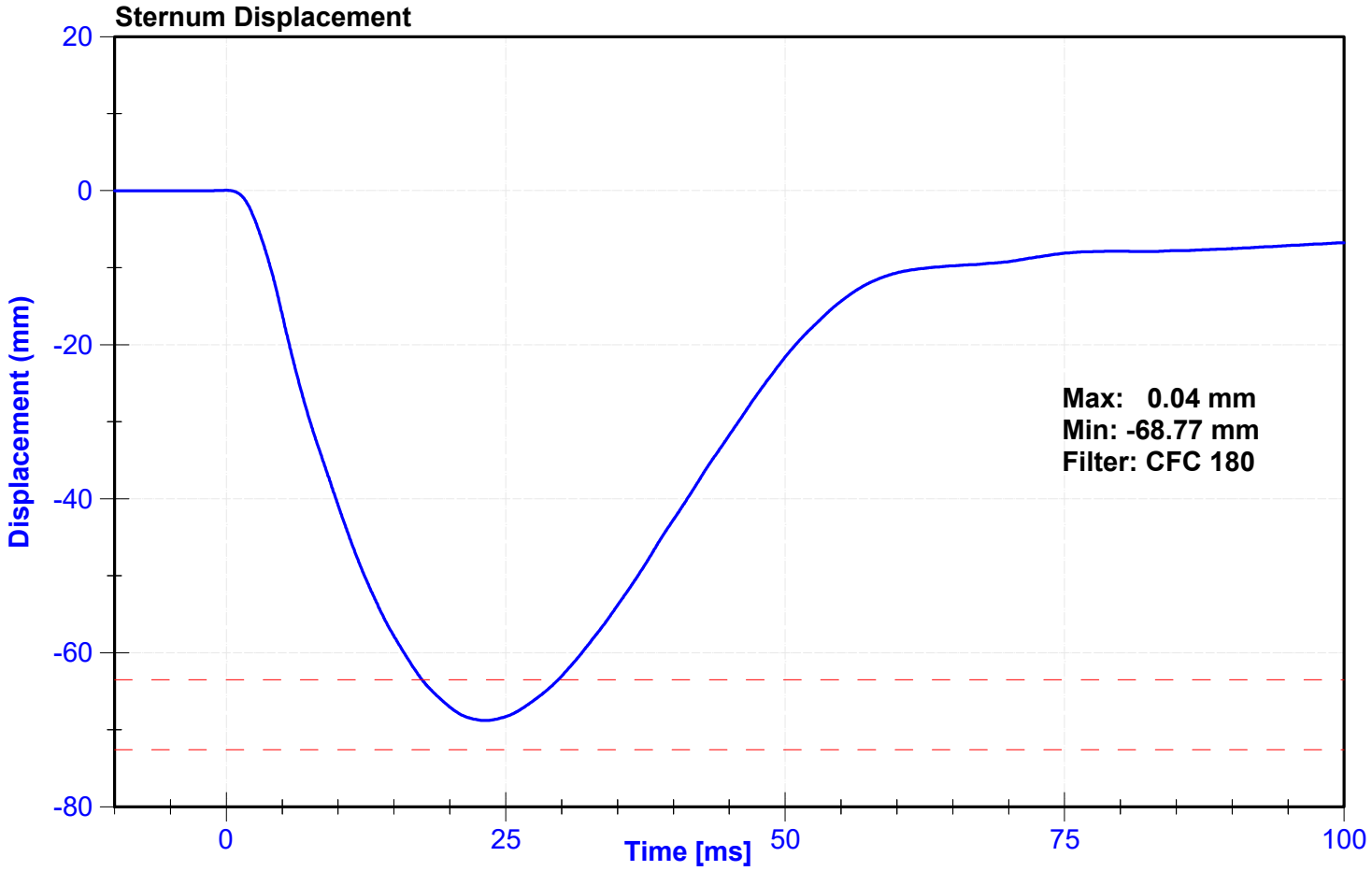
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.3	Pass
Humidity	10	70	%	51	Pass
Velocity	6.59	6.83	m/s	6.674	Pass
Chest Displacement	-72.6	-63.5	mm	-68.77	Pass
Resistive Force	5160	5894	N	5639.9	Pass
Hysteresis	69	85	%	72.3	Pass

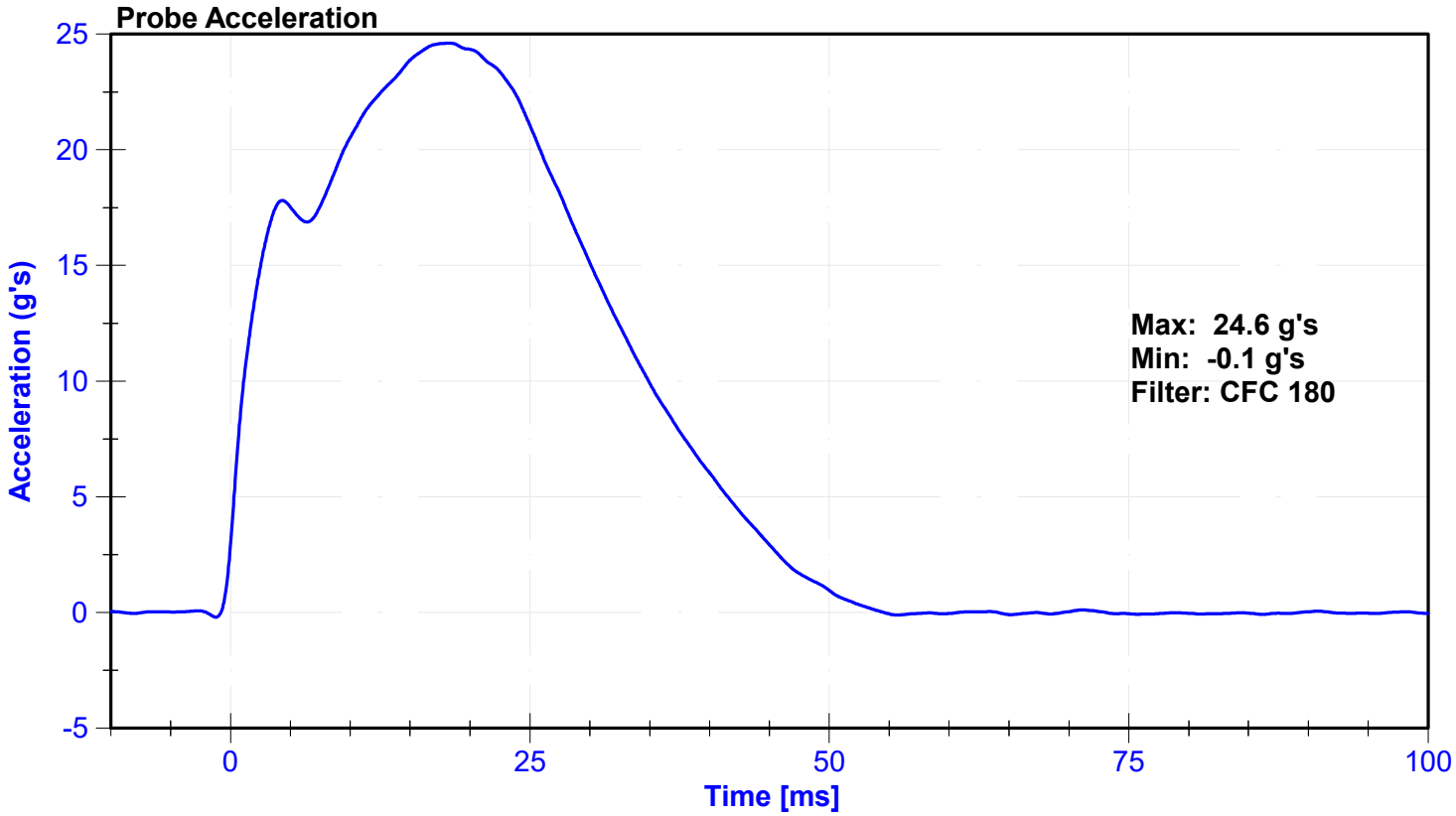
Transducer Calibrations

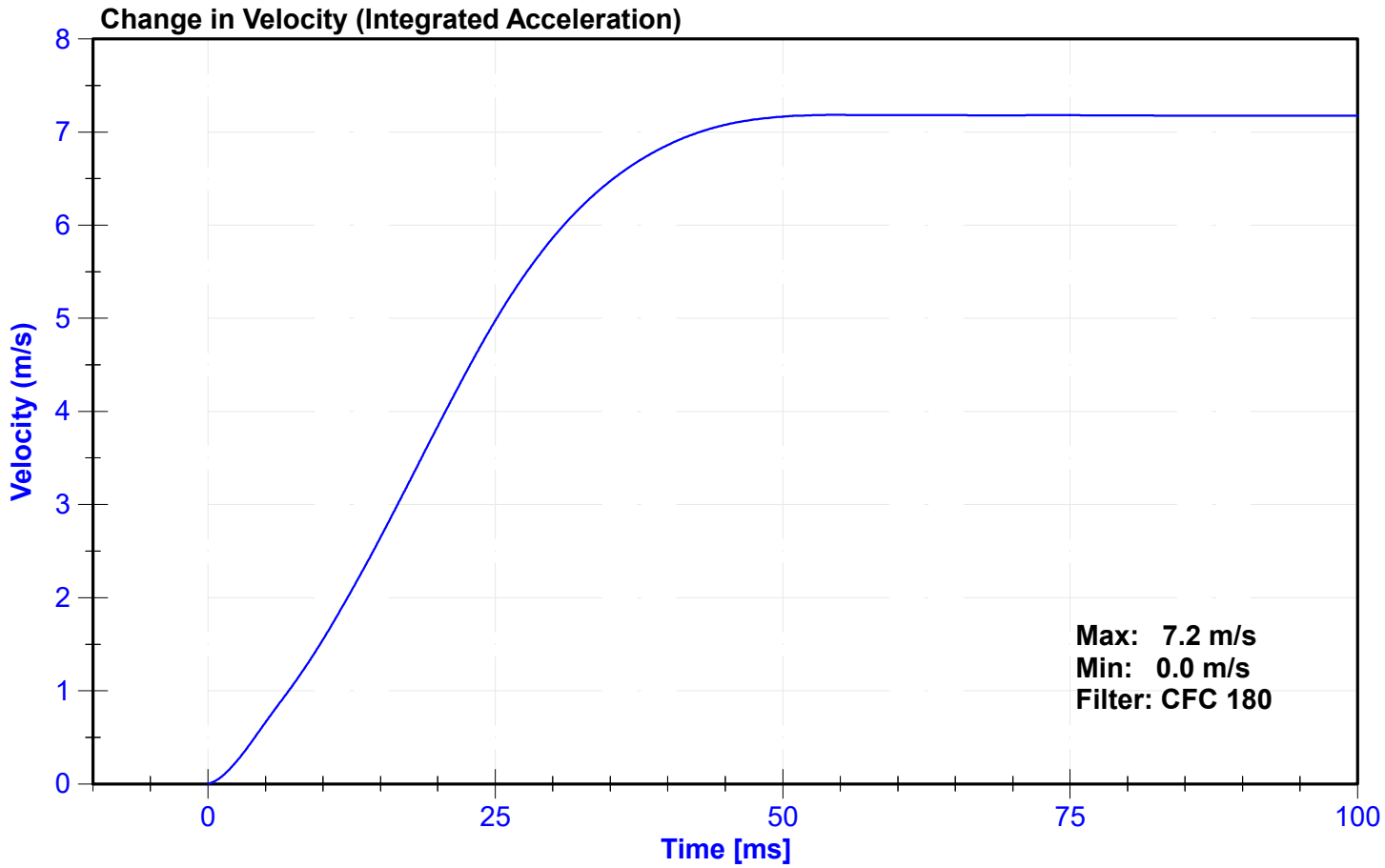
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18566	5/7/2025	11/3/2025
Chest Potentiometer	Servo	1046	6/10/2025	12/9/2025




Resistive Force
Force (N)
6000
5000
4000
3000
2000
1000
0
-1000
0
25
50
75
100
Time [ms]
Max: 5639.9 N
Min: -26.0 N
Filter: CFC 180


Sternum Displacement
Displacement (mm)
20
0
-20
-40
-60
-80
0
25
50
75
100
Time [ms]
Max: 0.04 mm
Min: -68.77 mm
Filter: CFC 180


Probe Acceleration
Acceleration (g's)
25
20
15
10
5
0
-5
0
25
50
75
100
Time [ms]
Max: 24.6 g's
Min: -0.1 g's
Filter: CFC 180


Change in Velocity (Integrated Acceleration)
Velocity (m/s)
8
7
6
5
4
3
2
1
0
0
25
50
75
100
Time [ms]
Max: 7.2 m/s
Min: 0.0 m/s
Filter: CFC 180

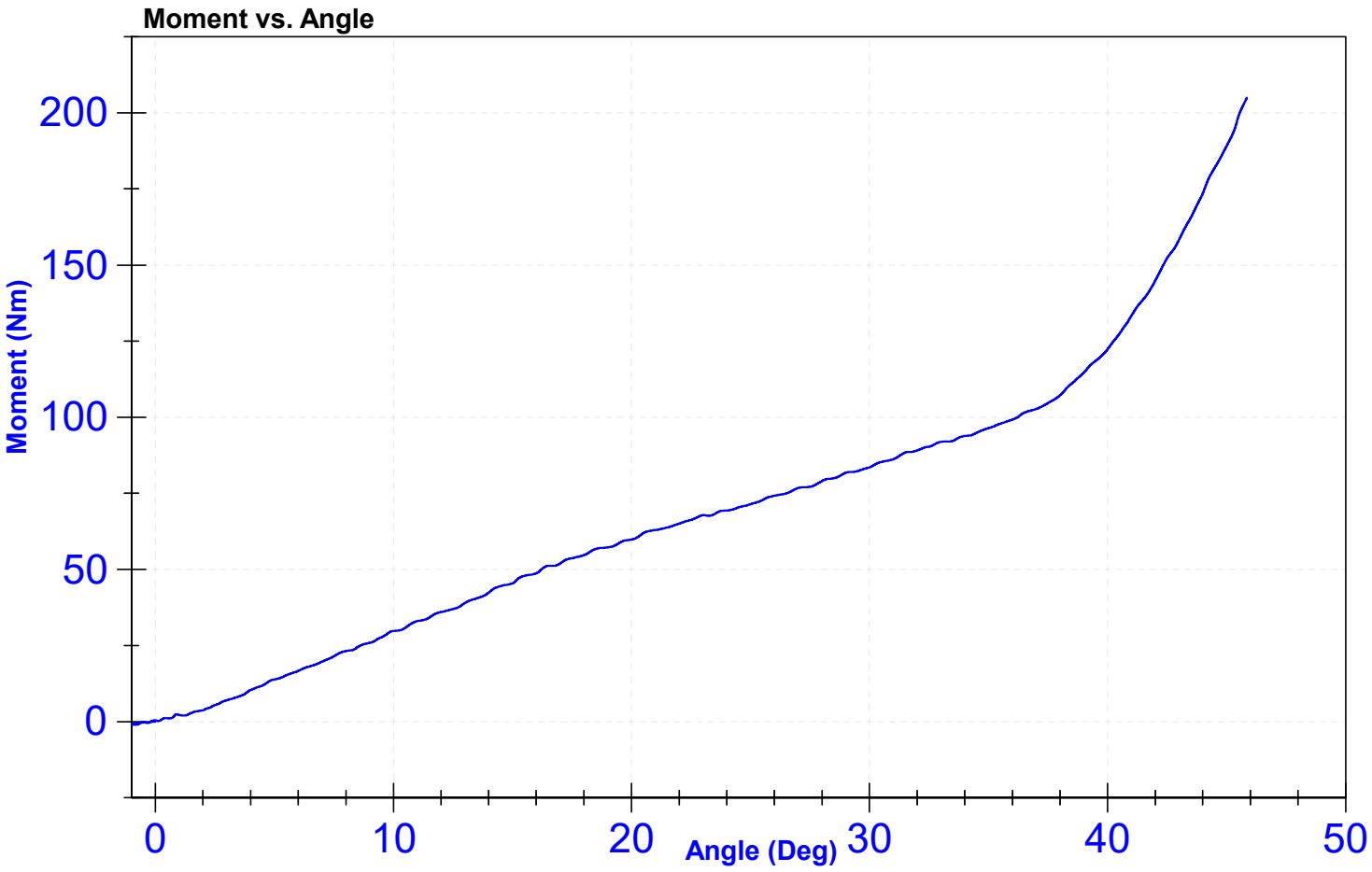
ATD Manufacturer	Humanetics	Test Technician	W. Brokx
ATD Serial Number	065	Laboratory Supervisor	J. Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	ºC	21.5	Pass
Humidity	10	70	%	62	Pass
Average Velocity	5	10	deg/s	7.4	Pass
Angle at 203Nm	40	50	deg	45.7	Pass
Moment at 30 degrees	0	94.9	Nm	83.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	ETI SP22	DS0008	9/23/2024	9/23/2025
Load Cell	PCB 2301-02	115	2024-11-11	2025-11-11



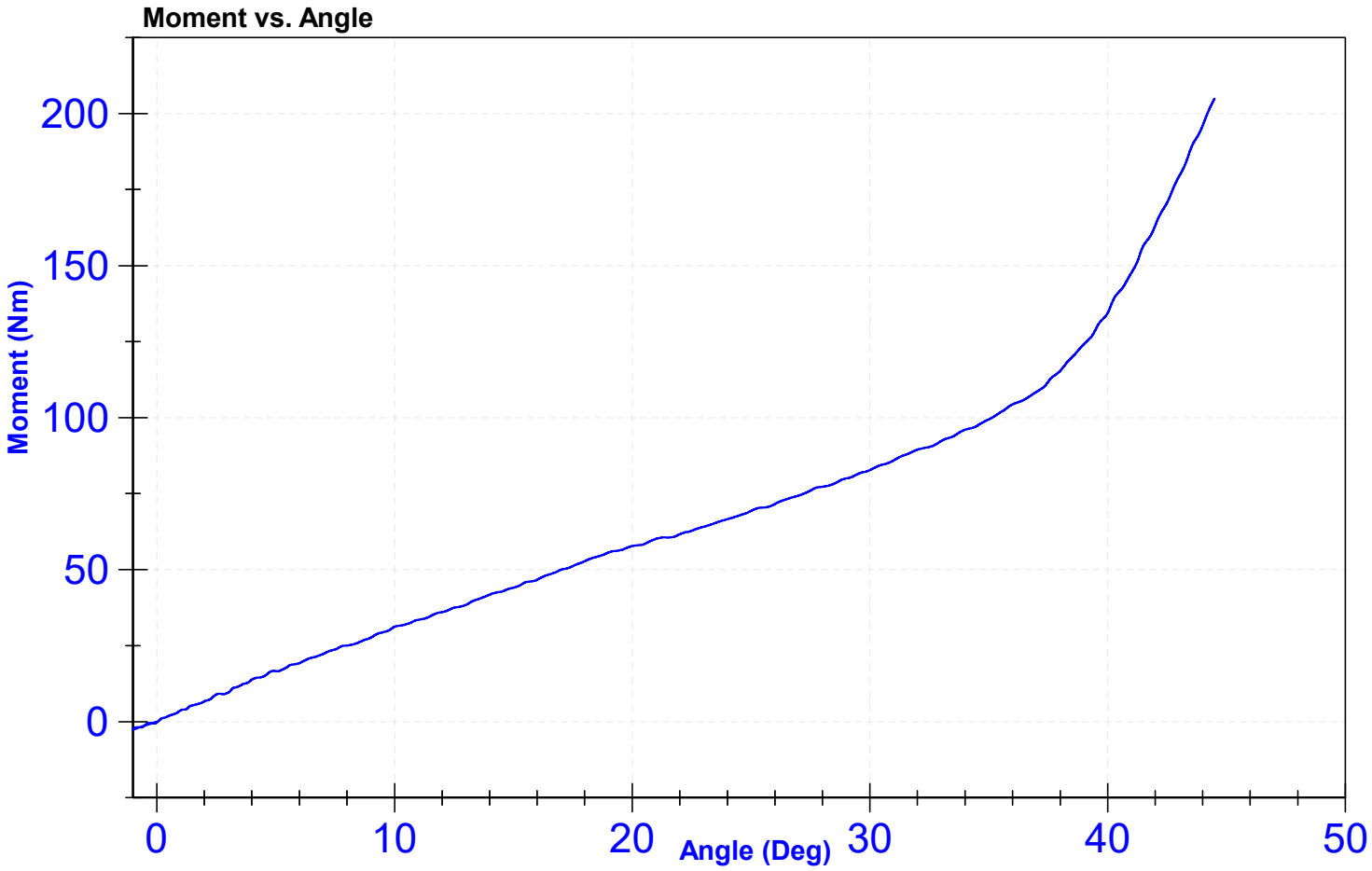
ATD Manufacturer	Humanetics	Test Technician	W. Brokx
ATD Serial Number	065	Laboratory Supervisor	J. Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	ºC	21.5	Pass
Humidity	10	70	%	62	Pass
Average Velocity	5	10	deg/s	7.5	Pass
Angle at 203Nm	40	50	deg	44.4	Pass
Moment at 30 degrees	0	94.9	Nm	82.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	ETI SP22	DS0008	9/23/2024	9/23/2025
Load Cell	PCB 2301-02	115	2024-11-11	2025-11-11



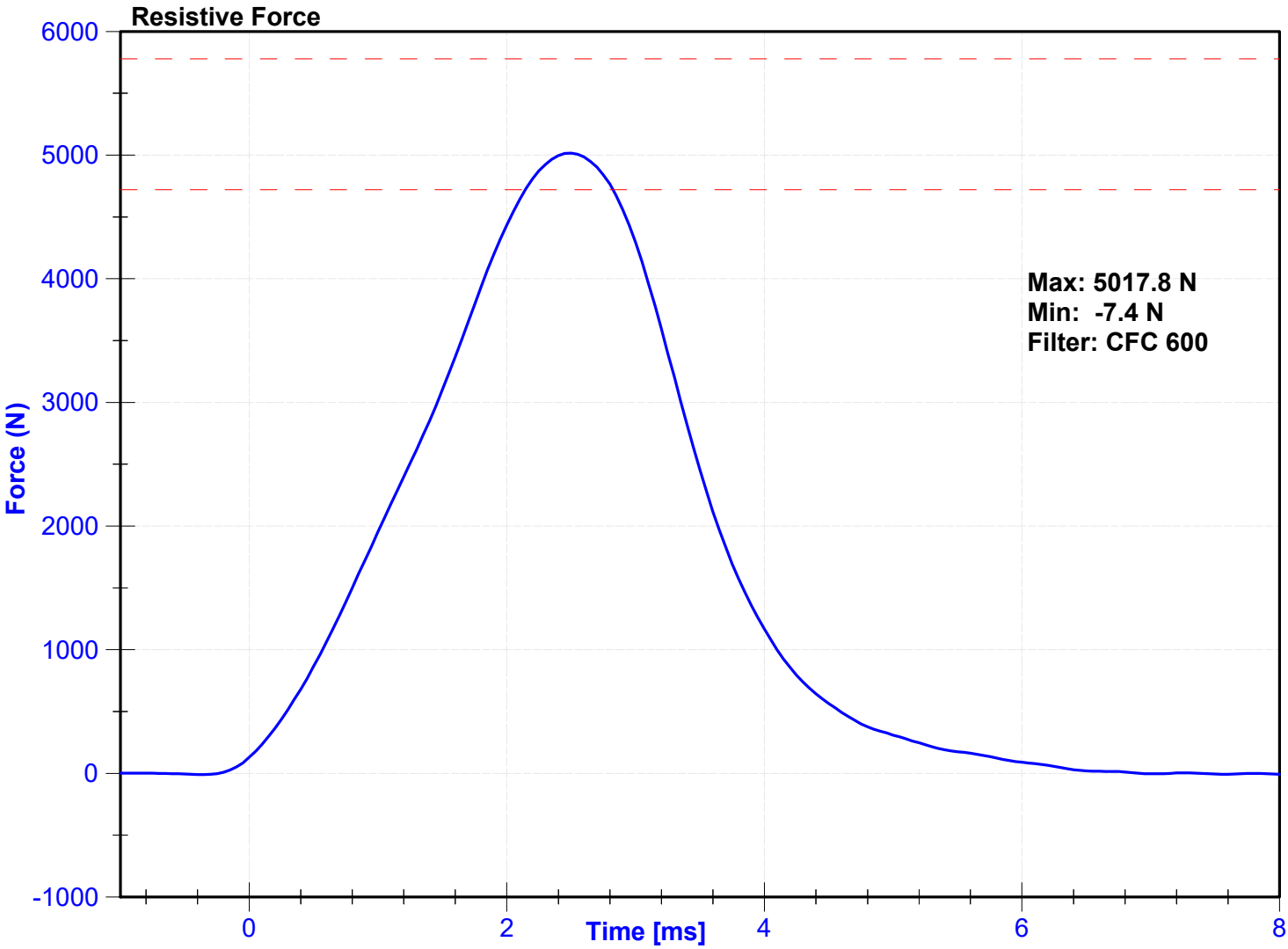
ATD Manufacturer	Humanetics	Test Technician	W. Brokx
ATD Serial Number	065	Laboratory Supervisor	J. Kinderman

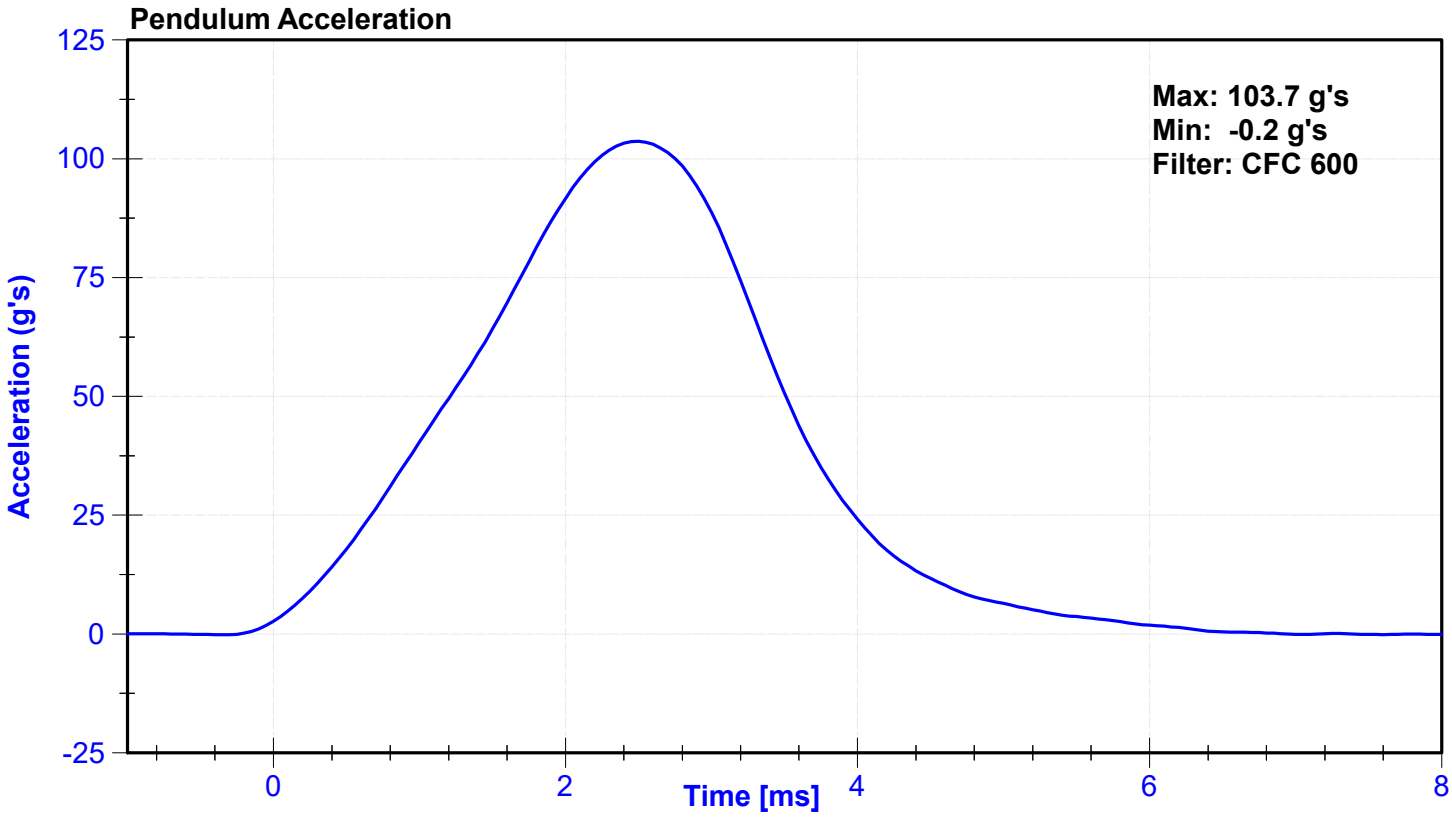
Results

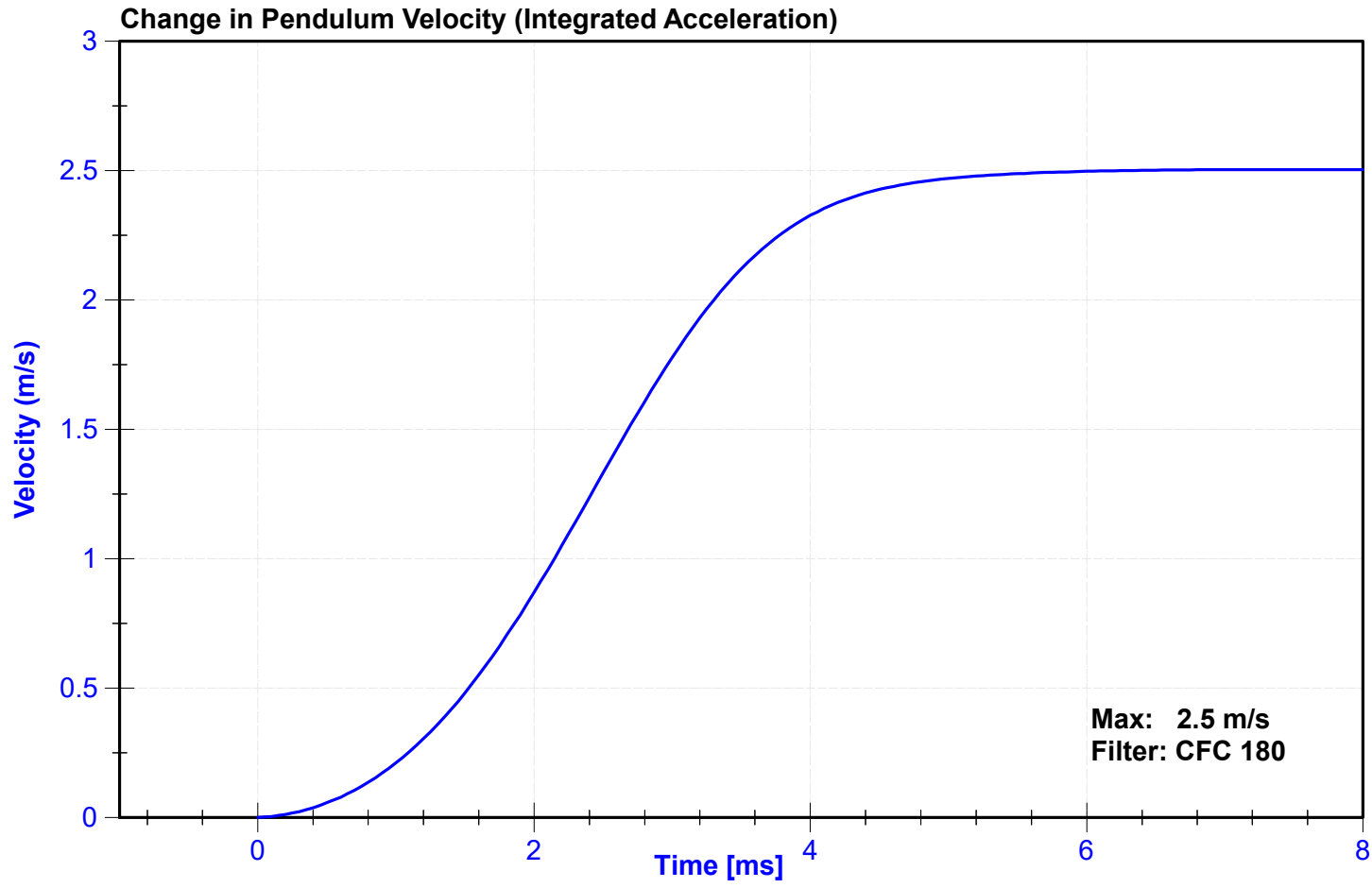
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	ºC	21.5	Pass
Humidity	10	70	%	52	Pass
Velocity	2.07	2.13	m/s	2.099	Pass
Maximum Resistive Force	4720	5780	N	5017.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18566	5/7/2025	11/3/2025




Pendulum Acceleration
Max: 103.7 g's
Min: -0.2 g's
Filter: CFC 600
Acceleration (g's)
125
100
75
50
25
0
-25
0
2
4
6
8
Time [ms]


Change in Pendulum Velocity (Integrated Acceleration)
Max: 2.5 m/s
Filter: CFC 180
Velocity (m/s)
3
2.5
2
1.5
1
0.5
0
0
2
4
6
8
Time [ms]

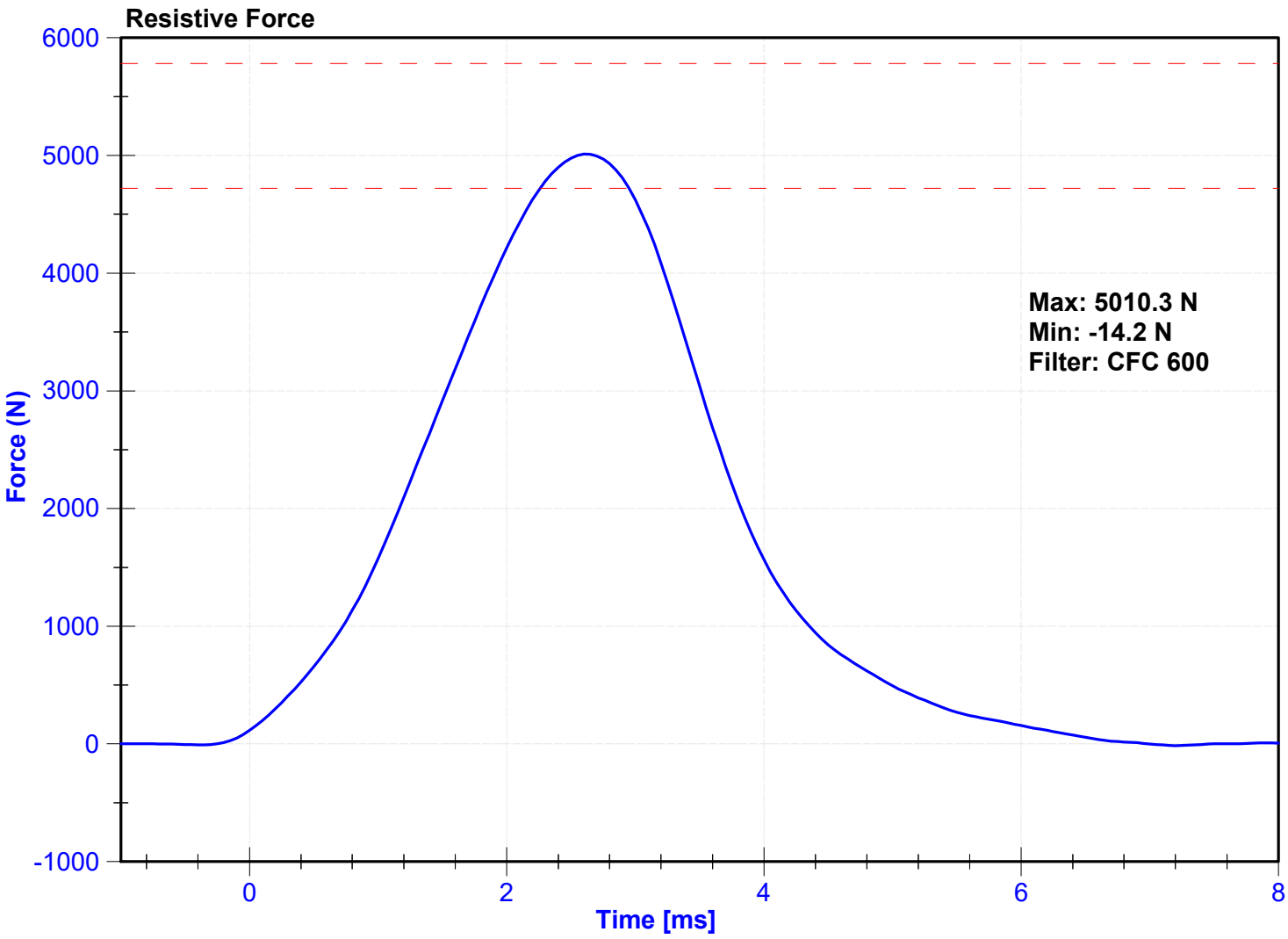
ATD Manufacturer	Humanetics	Test Technician	W. Brokx
ATD Serial Number	065	Laboratory Supervisor	J. Kinderman

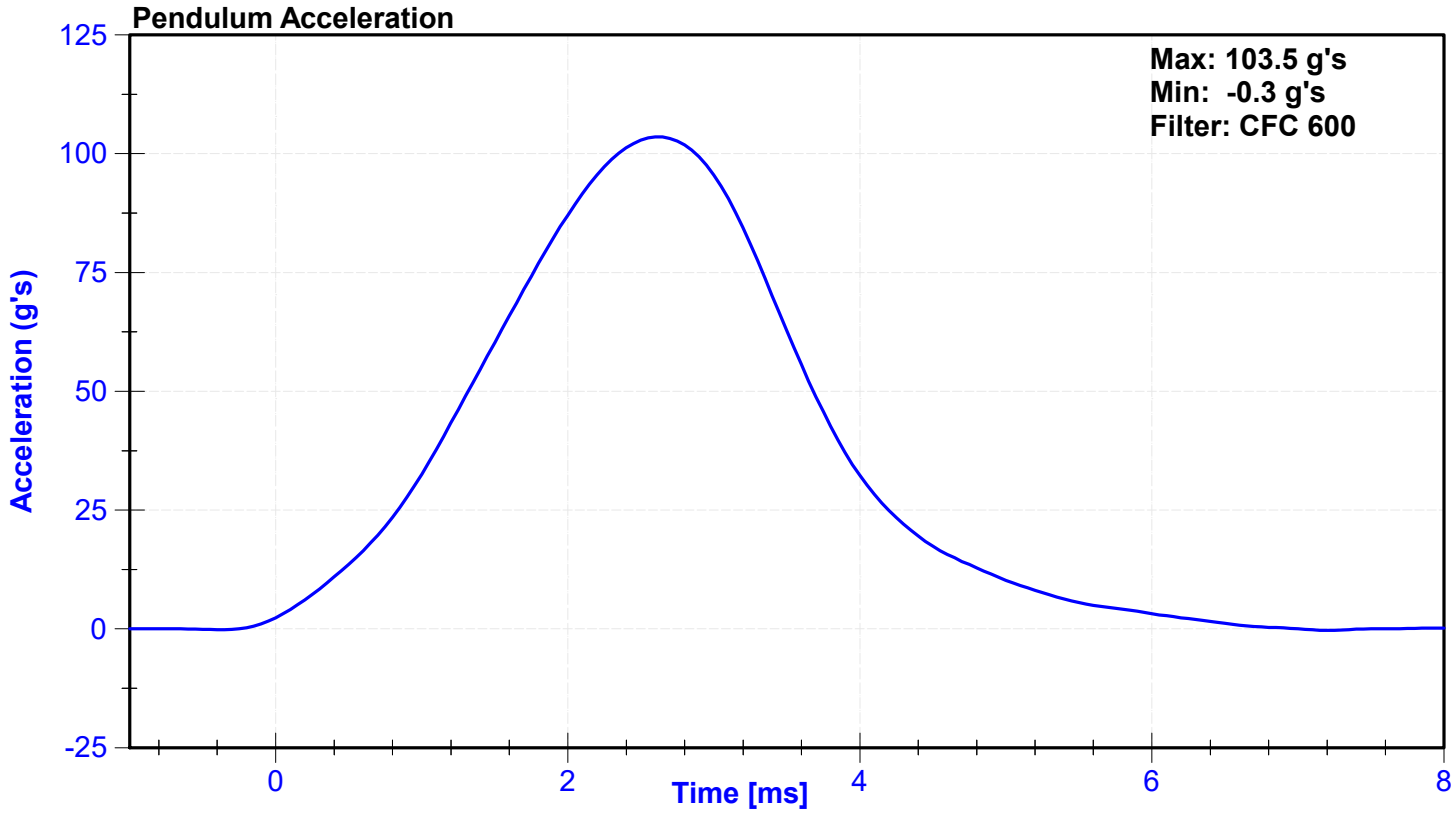
Results

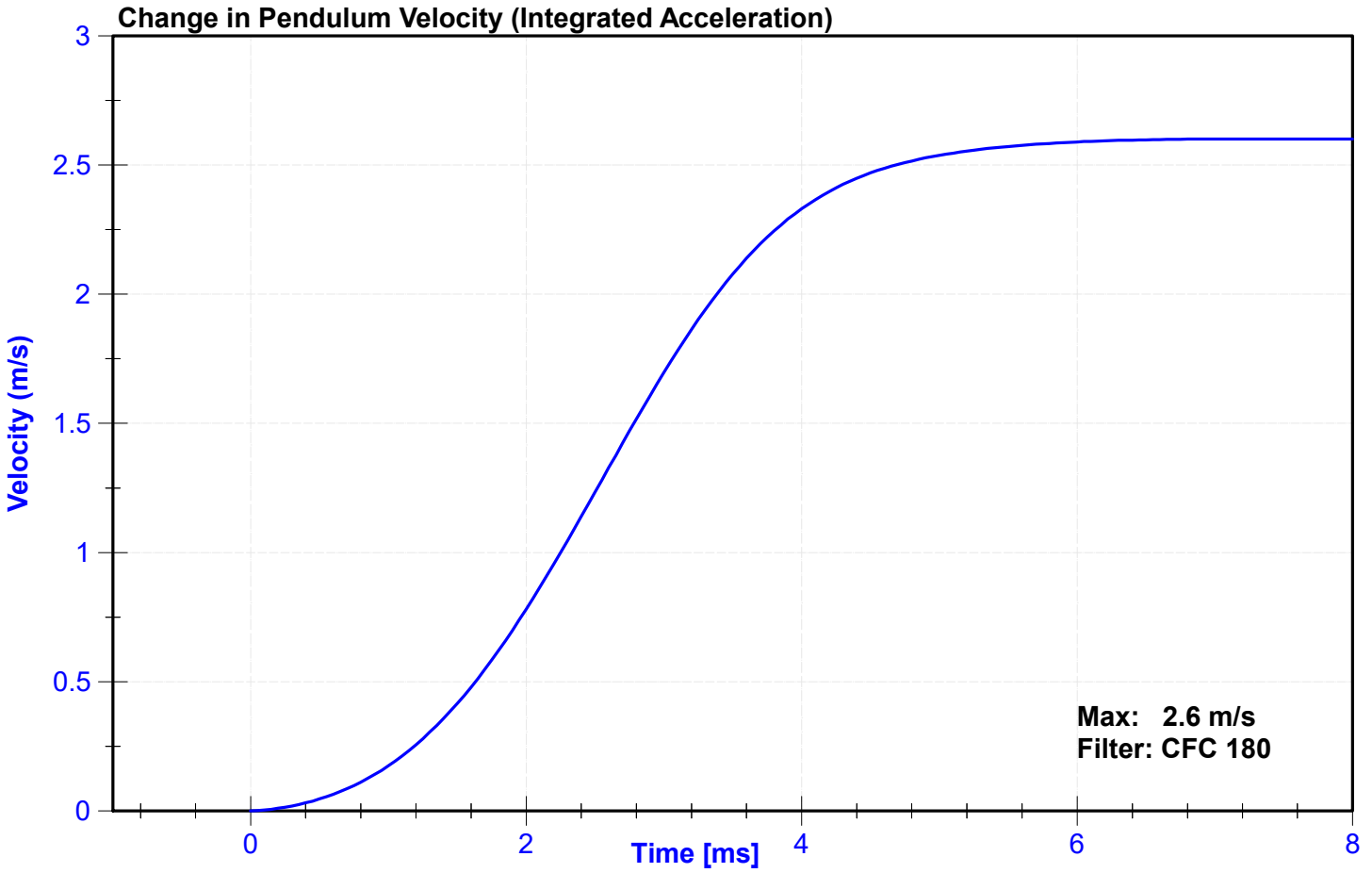
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	ºC	21.5	Pass
Humidity	10	70	%	52	Pass
Velocity	2.07	2.13	m/s	2.098	Pass
Maximum Resistive Force	4720	5780	N	5010.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18566	5/7/2025	11/3/2025




Pendulum Acceleration
Max: 103.5 g's
Min: -0.3 g's
Filter: CFC 600
Acceleration (g's)
125
100
75
50
25
0
-25
0
2
4
6
8
Time [ms]


Change in Pendulum Velocity (Integrated Acceleration)
Max: 2.6 m/s
Filter: CFC 180
Velocity (m/s)
3
2.5
2
1.5
1
0.5
0
0
2
4
6
8
Time [ms]

CALIBRATION TEST RESULTS

PRE-TEST

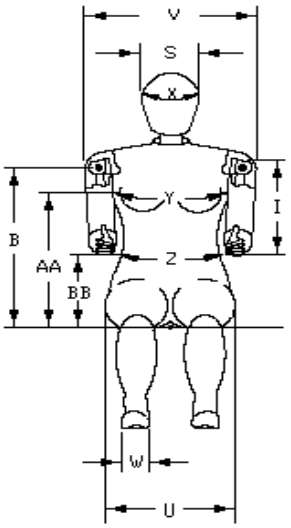
HYBRID III 5TH PERCENTILE - PASSENGER ATD

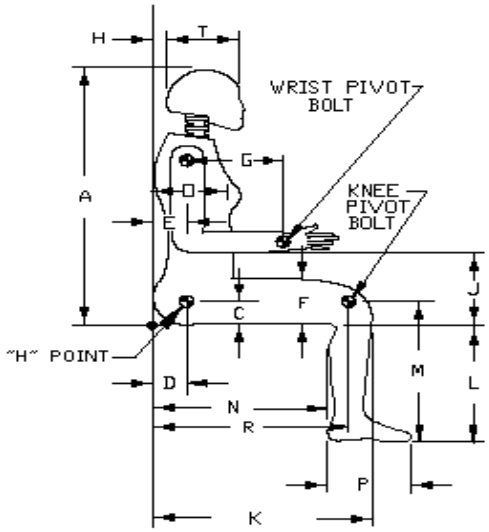
SERIAL NO: 137

External Measurements - Hybrid 3 - 5th Female

Technician: J. Rios Date: 09/25/2025

Dummy Serial Number: 137





Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	775	800	785	Pass
B	Shoulder Pivot Height	432	457	445	Pass
C	H-Point Height	81	86	85	Pass
D	H-Point from Backline	145	150	147	Pass
E	Shoulder Pivot from Backline	69	84	78	Pass
F	Thigh Clearance	119	135	132	Pass
G	Back of Elbow to Wrist Pivot	244	259	254	Pass
H	Head Back to Backline	43	48	46	Pass
I	Shoulder to Elbow Length	277	297	286	Pass
J	Elbow Rest Height	183	203	196	Pass
K	Buttock to Knee Length	521	546	539	Pass
L	Popliteal Height	356	376	362	Pass
M	Knee Pivot Height	394	419	411	Pass
N	Buttock Popliteal Length	414	439	427	Pass
O	Chest Depth without Jacket	175	191	181	Pass
P	Foot Length (right)	219	234	225	Pass
R	Buttock To Knee Pivot Length	457	483	469	Pass
S	Head Breadth	137	147	142	Pass
T	Head Depth	178	188	182	Pass
U	Hip Breadth	300	315	307	Pass
V	Shoulder Breadth	351	366	356	Pass
W	Foot Breadth	79	94	85	Pass
X	Head Circumference	528	549	539	Pass
Y	Chest Circumference with Jacket	851	881	868	Pass
Z	Waist Circumference	460	790	627	Pass
AA	Reference Location (Chest Circumference)	333	358	342	Pass
BB	Reference Location (Waist Circumference)	160	170	162	Pass

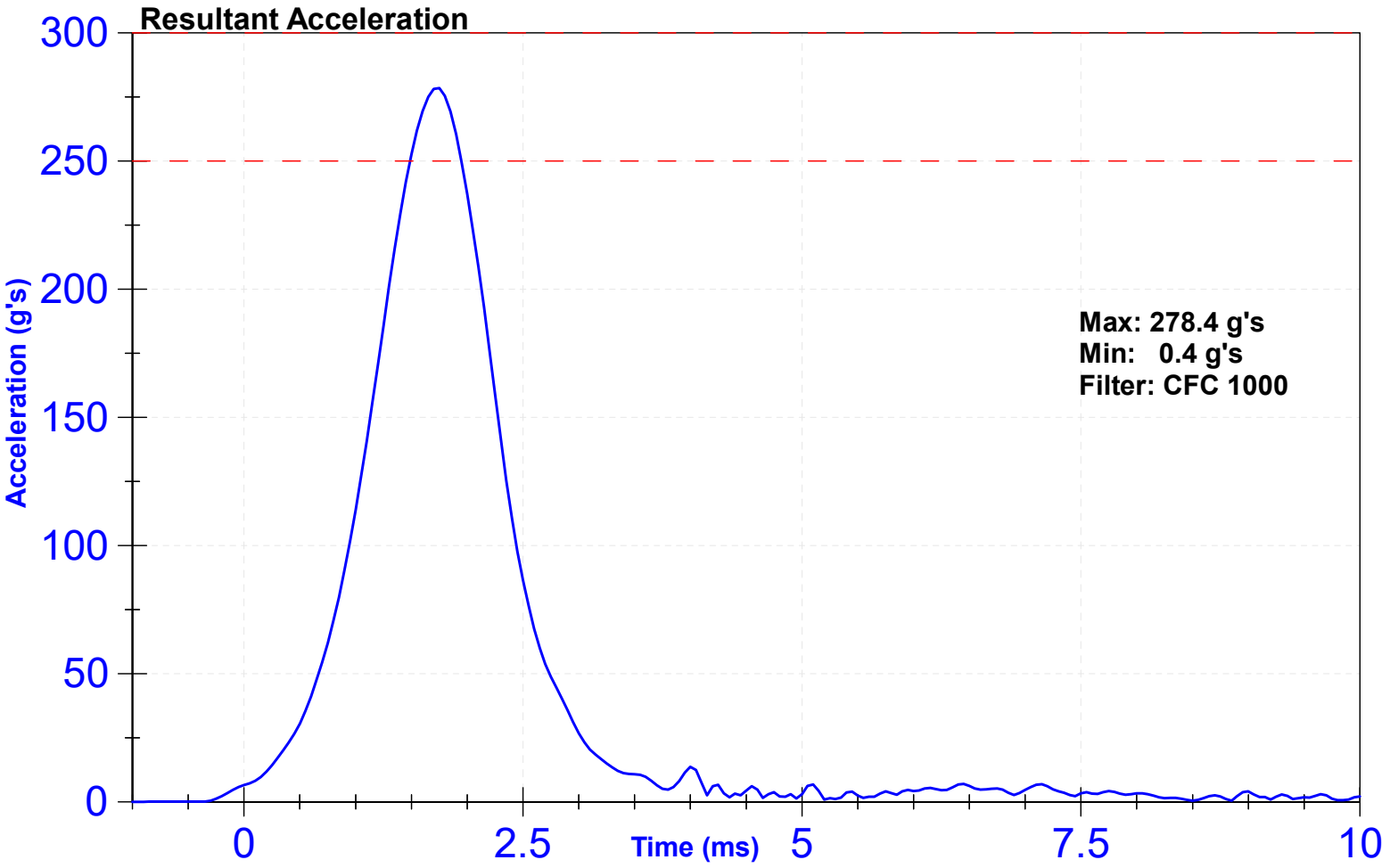
ATD Manufacturer	Humanetics	Test Technician	Z. Nyhart
ATD Serial Number	137	Laboratory Supervisor	J. Kinderman

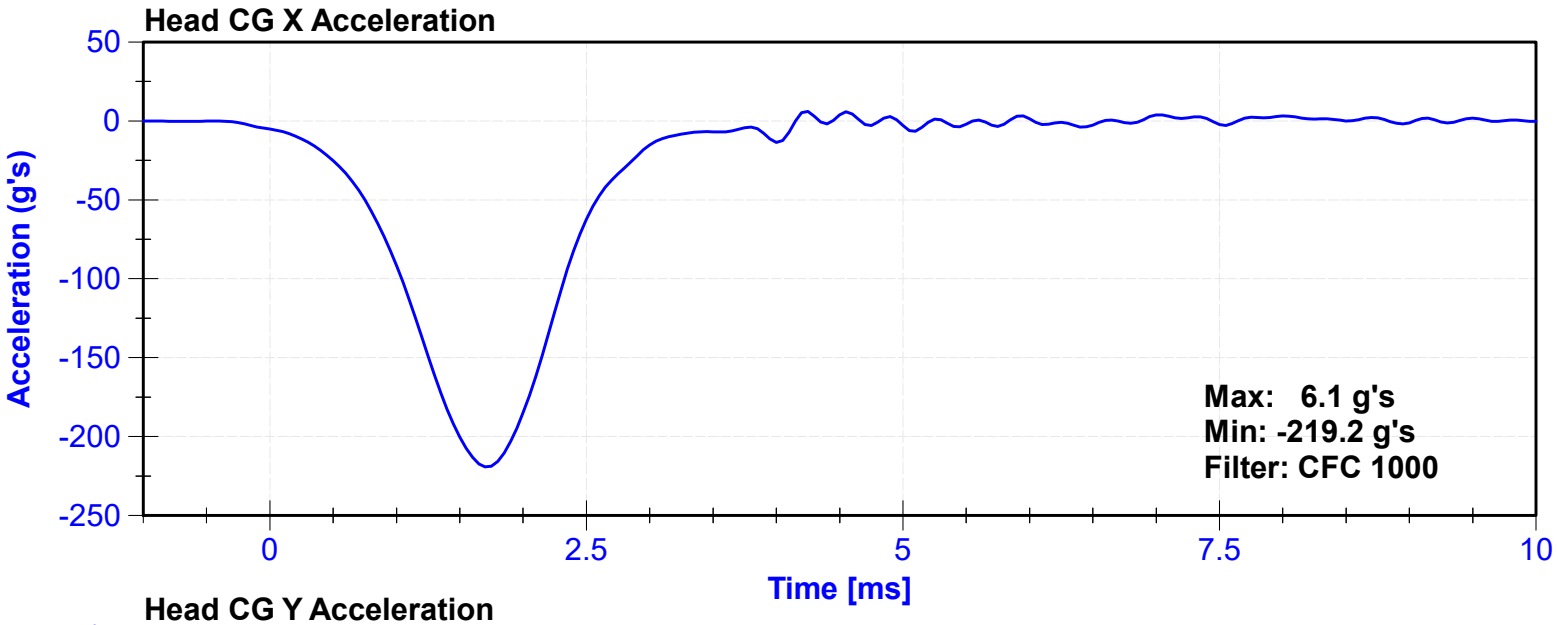
Results

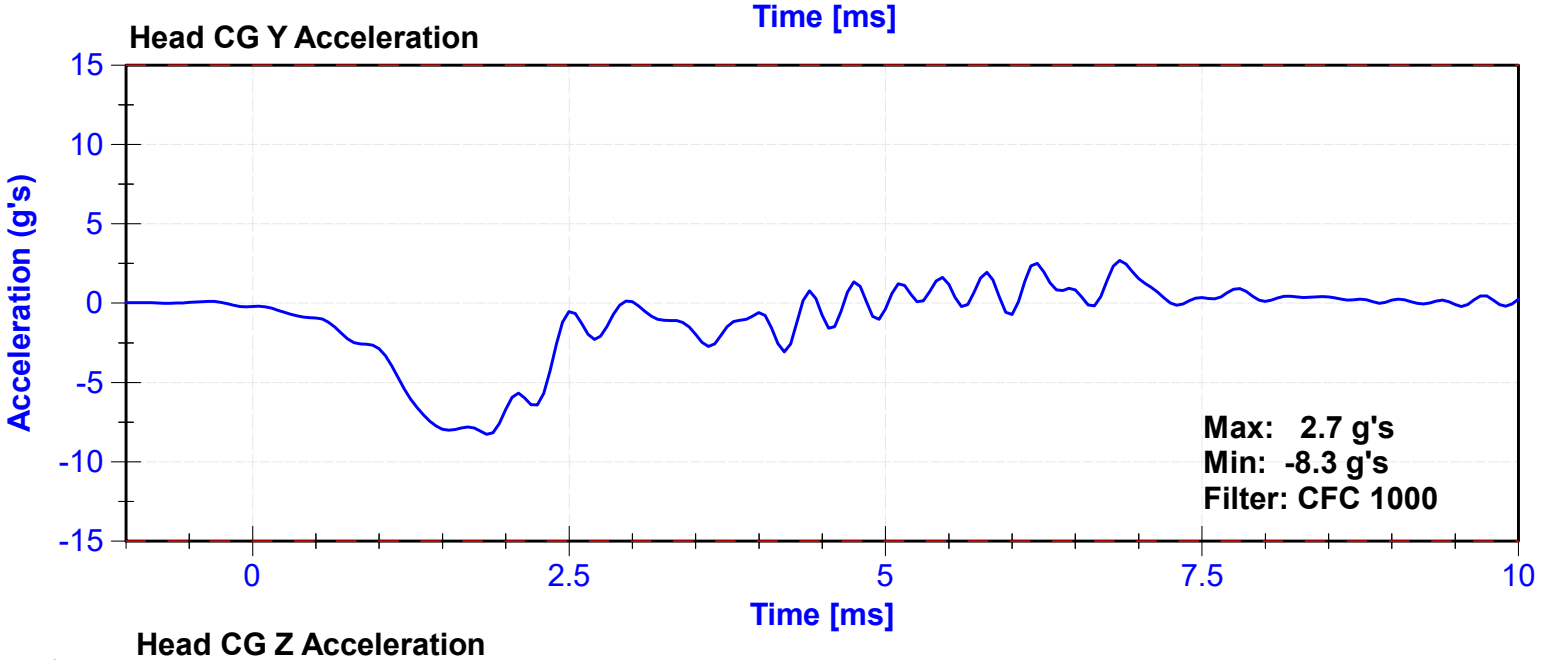
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	ºC	21.7	Pass
Humidity	10	70	%	57	Pass
Resultant Acceleration	250	300	g's	278.4	Pass
Oscillation	0	10	%	4.9	Pass
Lateral Acceleration	-15	15	g's	-8.3	Pass

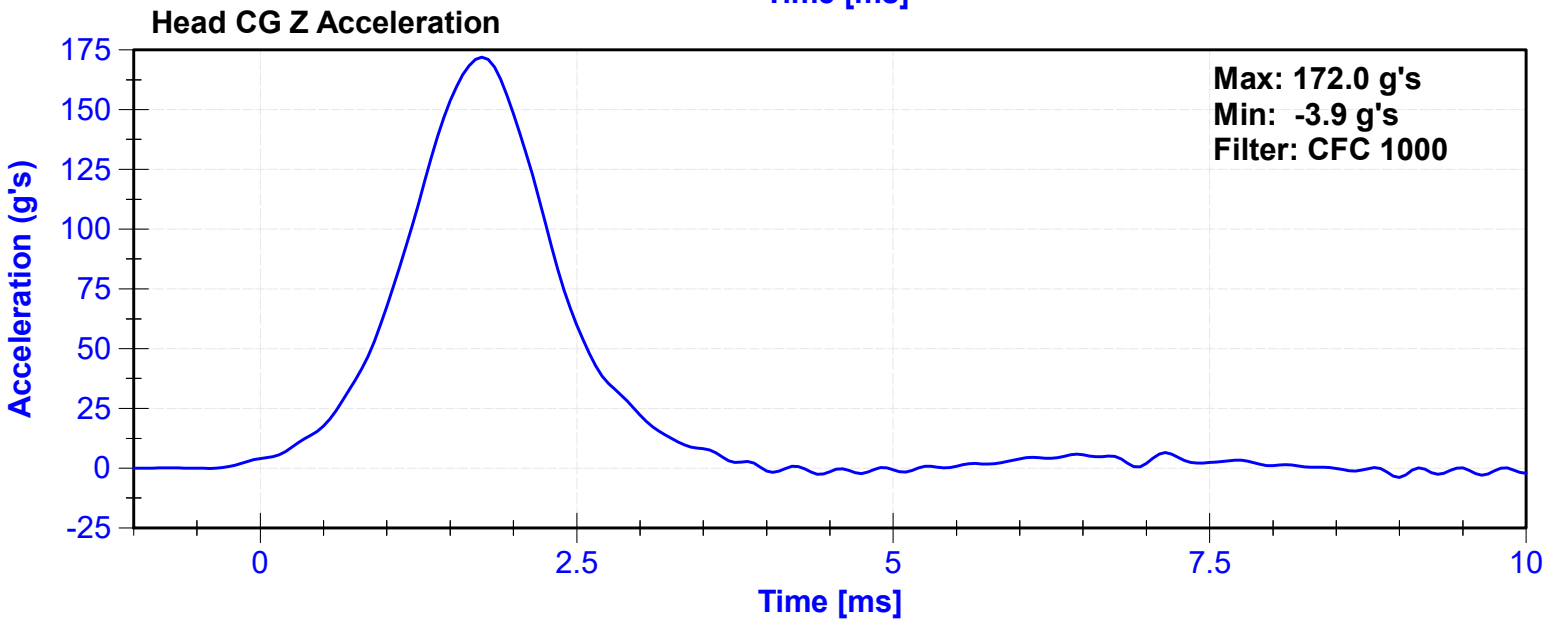
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	P79417	6/11/2025	12/8/2025
Y Accelerometer	Endevco	P83335	6/11/2025	12/8/2025
Z Accelerometer	Endevco	P64149	6/11/2025	12/8/2025




Head CG X Acceleration
Acceleration (g's)
50
0
-50
-100
-150
-200
-250
0
2.5
5
7.5
10
Time [ms]
Max: 6.1 g's
Min: -219.2 g's
Filter: CFC 1000


Head CG Y Acceleration
Acceleration (g's)
15
10
5
0
-5
-10
-15
0
2.5
5
7.5
10
Time [ms]
Max: 2.7 g's
Min: -8.3 g's
Filter: CFC 1000


Head CG Z Acceleration
Acceleration (g's)
175
150
125
100
75
50
25
0
-25
0
2.5
5
7.5
10
Time [ms]
Max: 172.0 g's
Min: -3.9 g's
Filter: CFC 1000

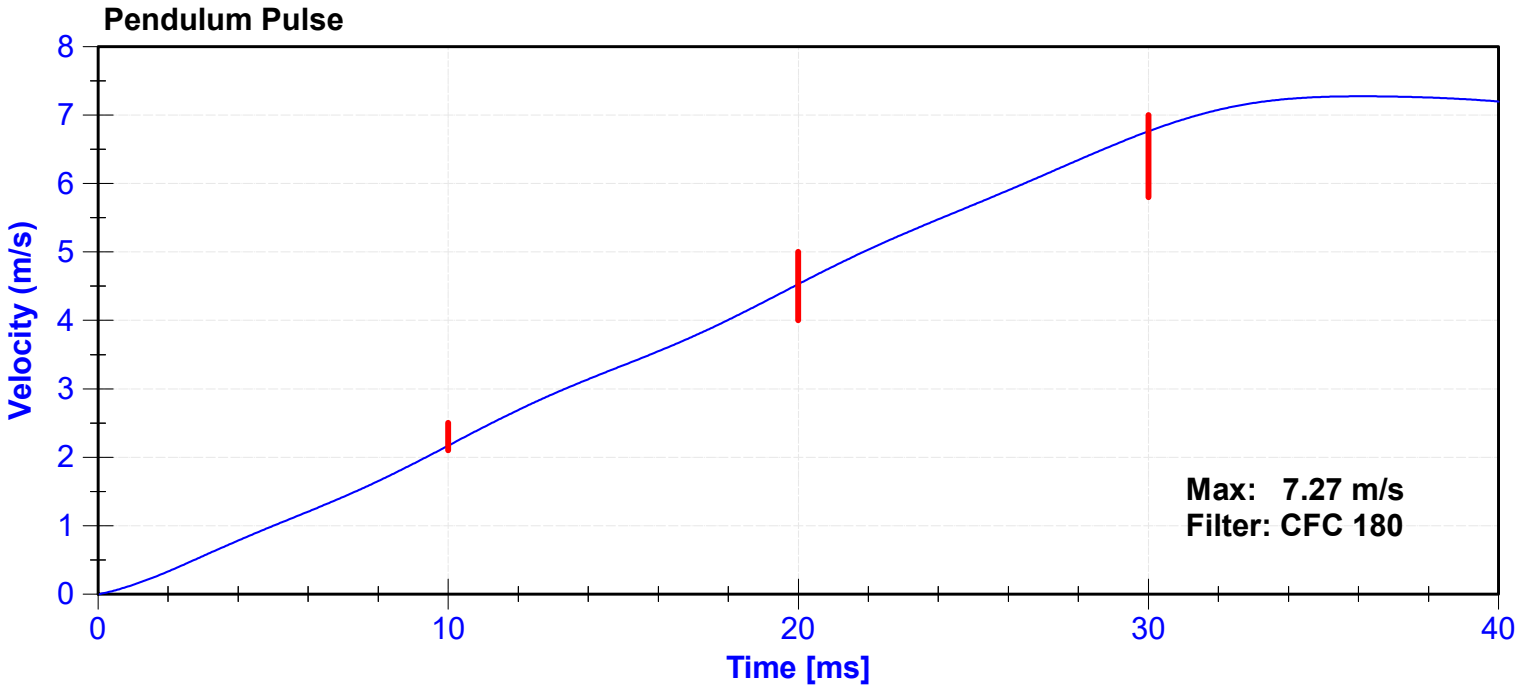
ATD Manufacturer	Humanetics	Test Technician	Z. Nyhart
ATD Serial Number	137	Laboratory Supervisor	J. Kinderman

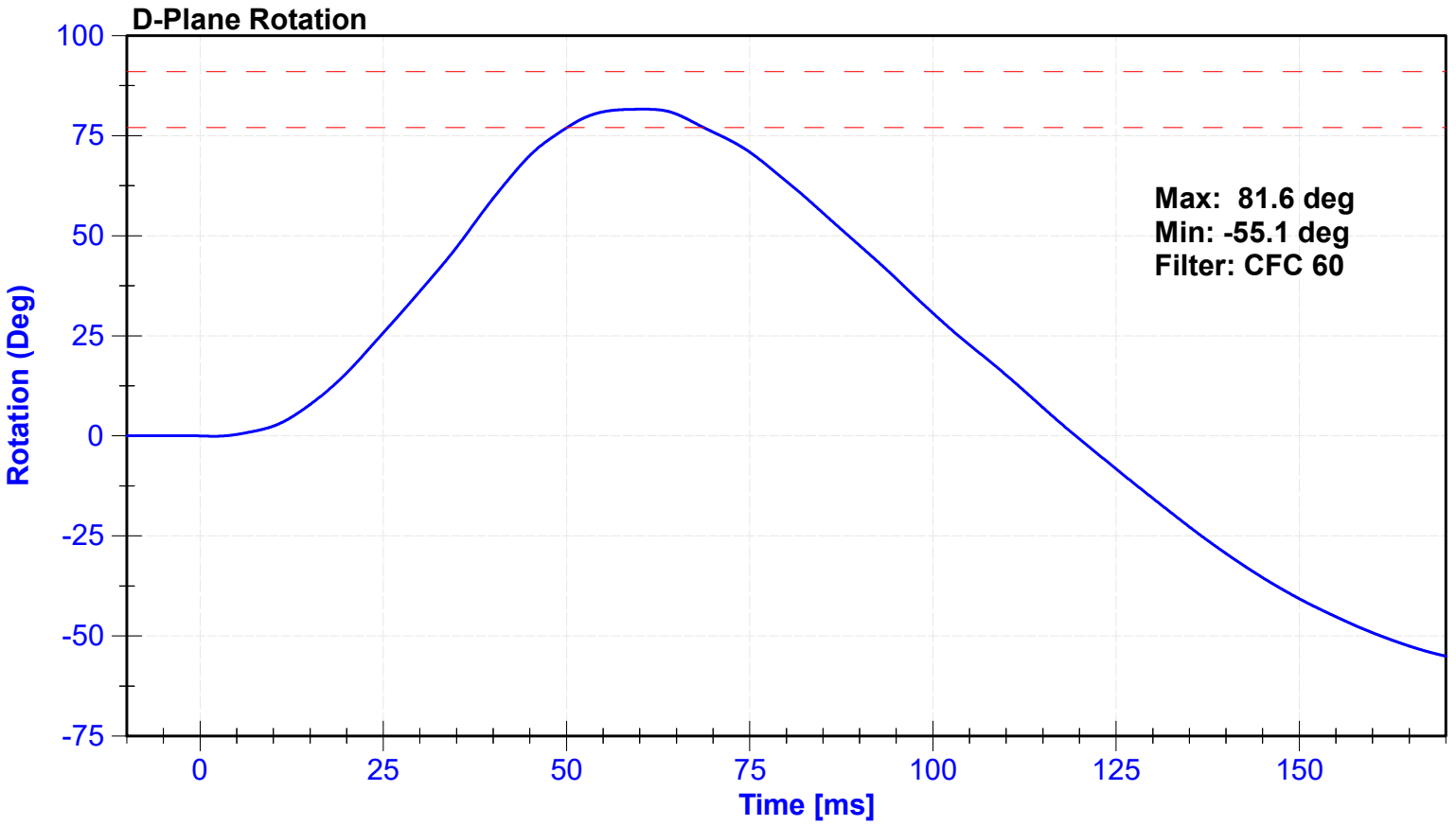
Results

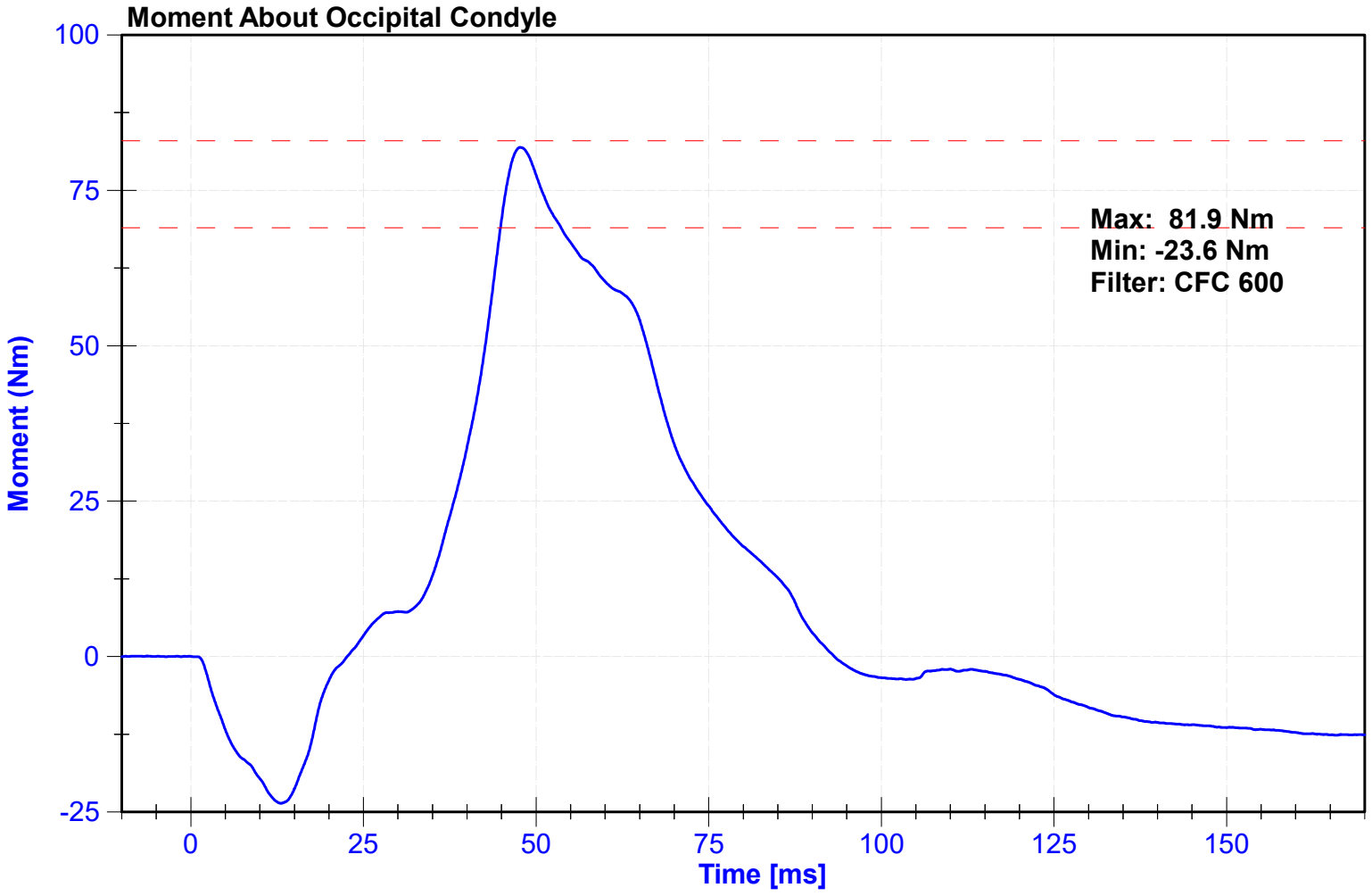
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.4	Pass
Humidity	10	70	%	59	Pass
Velocity	6.89	7.13	m/s	7.005	Pass
Pendulum Impulse at 10ms	2.1	2.5	m/s	2.17	Pass
Pendulum Impulse at 20ms	4.0	5.0	m/s	4.53	Pass
Pendulum Impulse at 30ms	5.8	7.0	m/s	6.76	Pass
Max D Plane Rotation	77	91	deg	81.6	Pass
Max Moment During Rotation Interval	69	83	Nm	81.9	Pass
Moment Decay to 10.0 Nm	80	100	ms	86.9	Pass

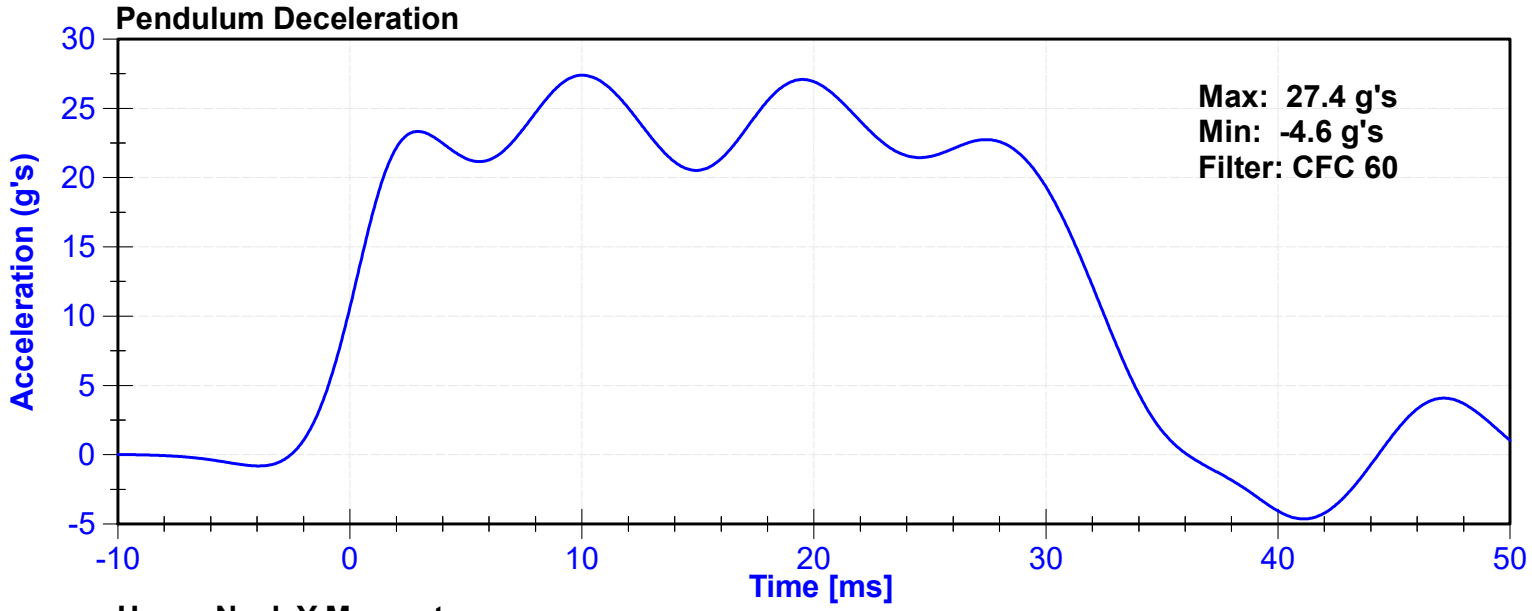
Transducer Calibrations

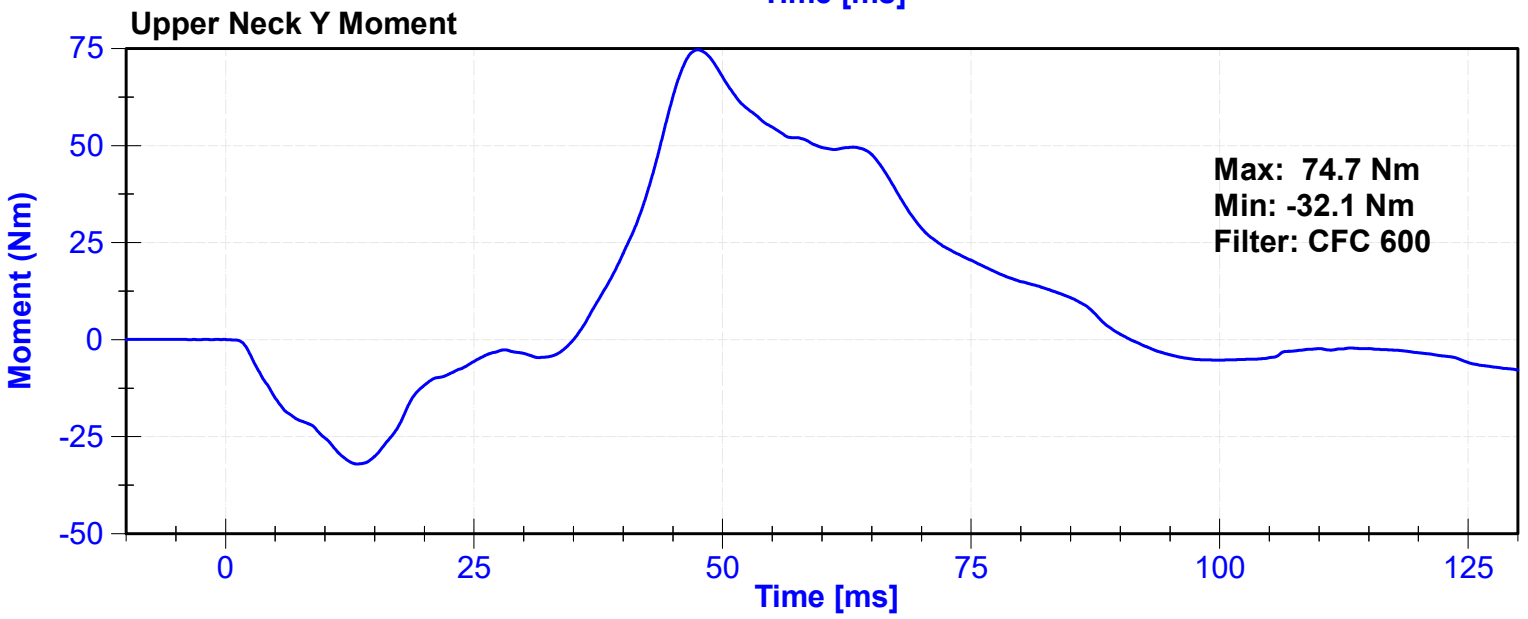
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16646	10/17/2024	10/17/2025
Pendulum Potentiometer	ETI	SP22G_LABPOT1	5/14/2025	5/14/2026
Condyle Potentiometer	ETI	SP22G_LABPOT2	5/14/2025	5/14/2026
Upper Neck Load Cell	Humanetics	1872-FX	7/7/2025	7/7/2026

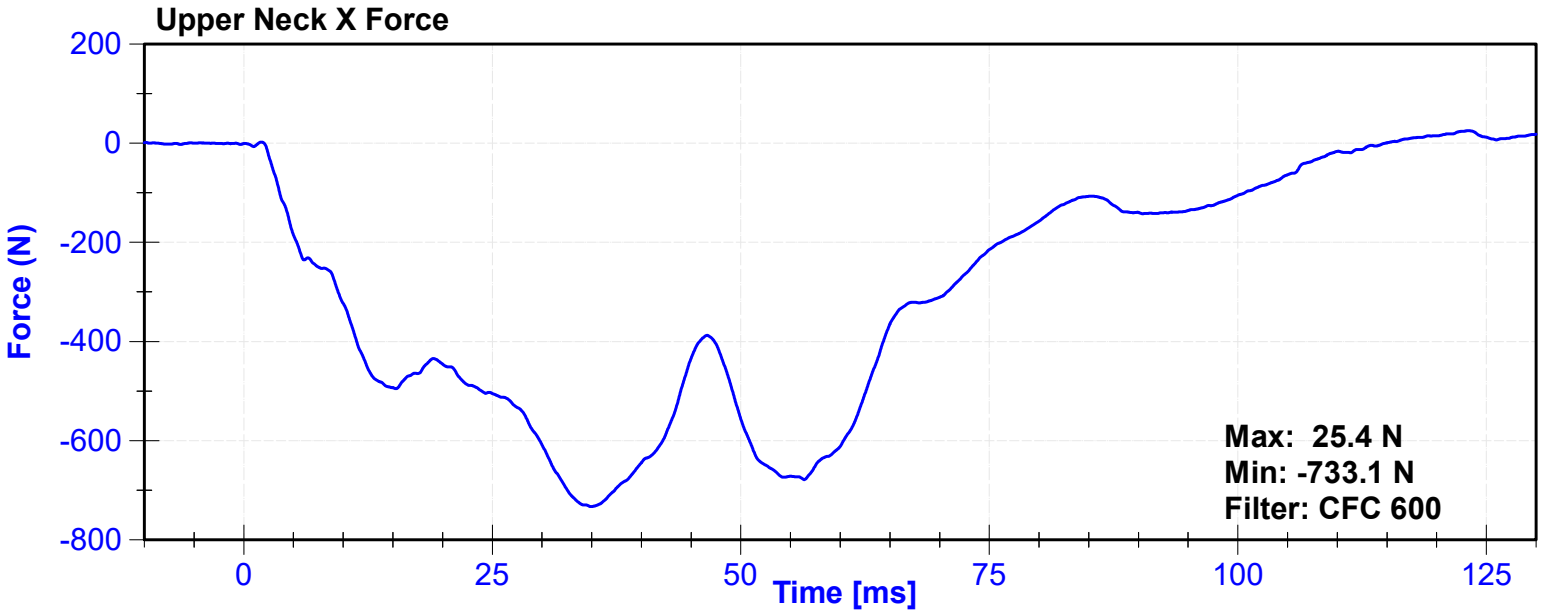



D-Plane Rotation
Max: 81.6 deg
Min: -55.1 deg
Filter: CFC 60
Rotation (Deg)
100
75
50
25
0
-25
-50
-75
0
25
50
75
100
125
150
Time [ms]


Moment About Occipital Condyle
Max: 81.9 Nm
Min: -23.6 Nm
Filter: CFC 600
Moment (Nm)
100
75
50
25
0
-25
0
25
50
75
100
125
150
Time [ms]


Pendulum Deceleration
Max: 27.4 g's
Min: -4.6 g's
Filter: CFC 60
Acceleration (g's)
Time [ms]


Upper Neck Y Moment
Max: 74.7 Nm
Min: -32.1 Nm
Filter: CFC 600
Moment (Nm)
Time [ms]


Upper Neck X Force
Max: 25.4 N
Min: -733.1 N
Filter: CFC 600
Force (N)
Time [ms]

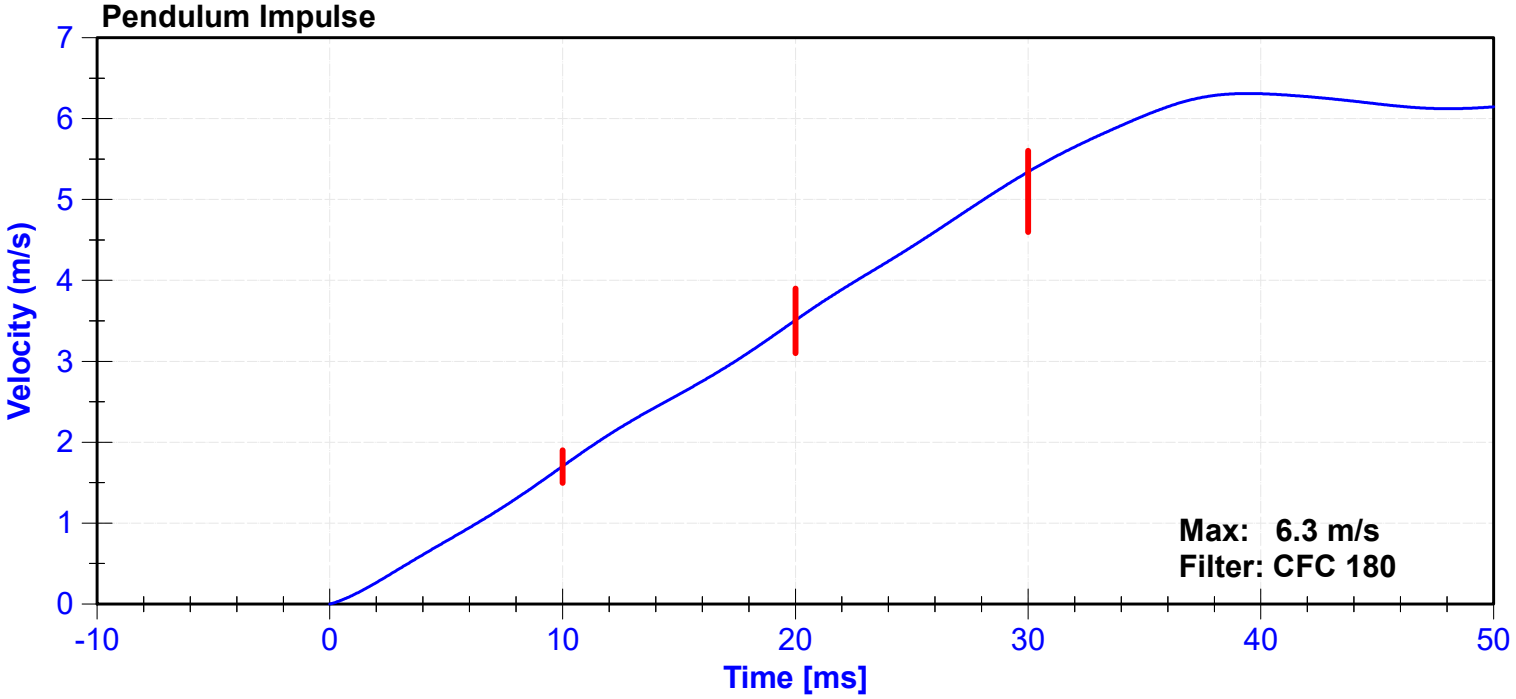
ATD Manufacturer	Humanetics	Test Technician	Z. Nyhart
ATD Serial Number	137	Laboratory Supervisor	J. Kinderman

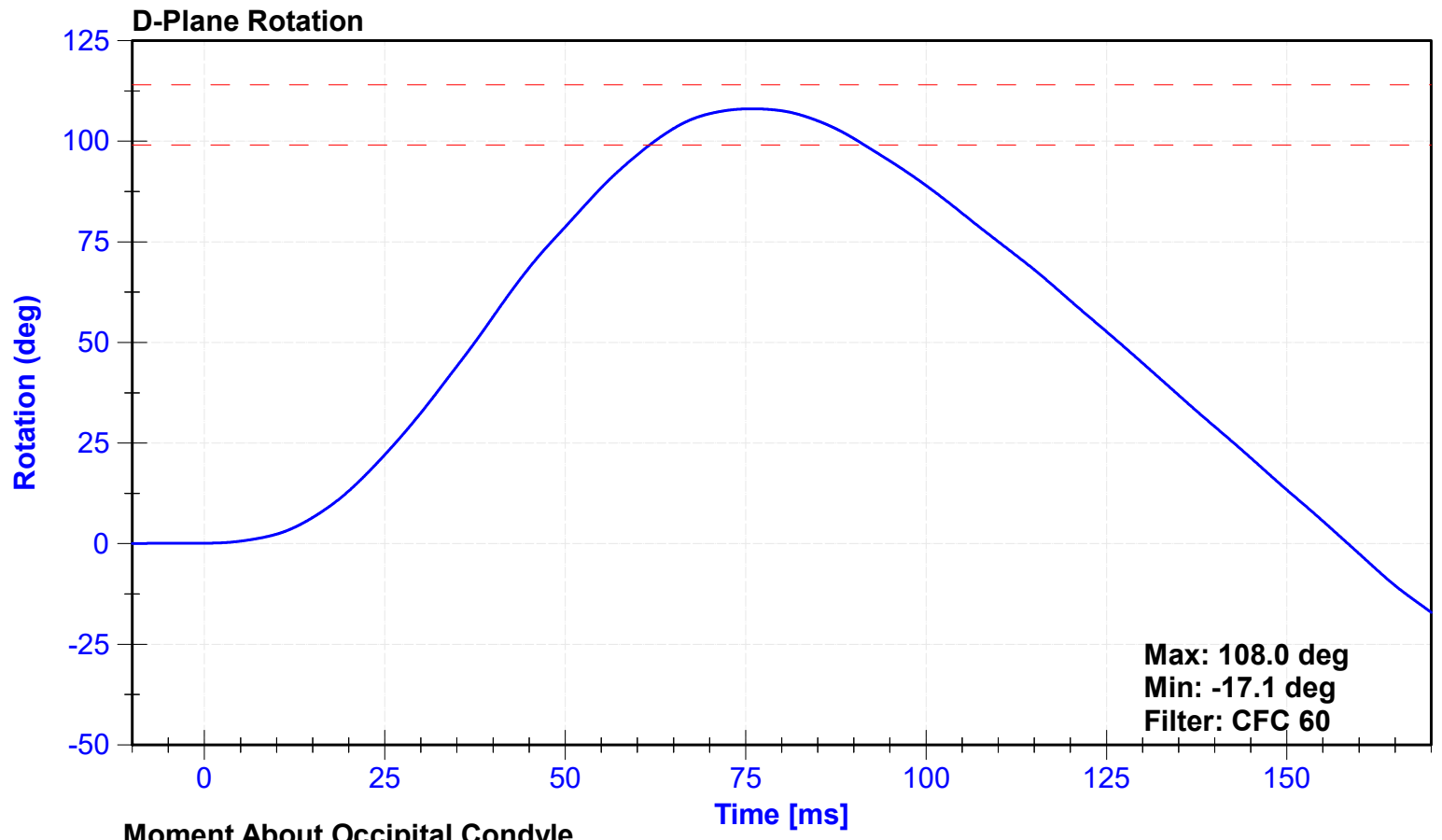
Results

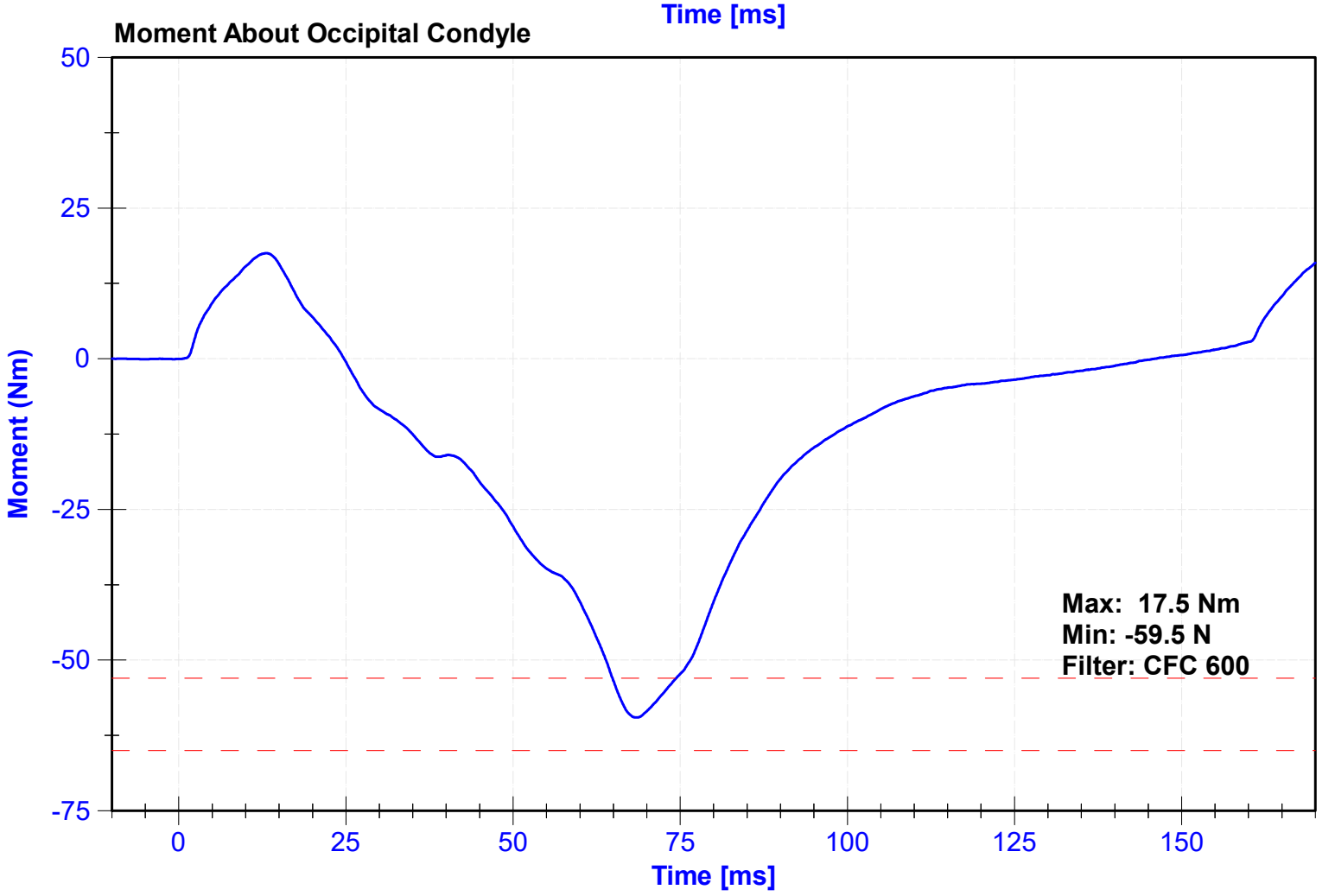
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.4	Pass
Humidity	10	70	%	59	Pass
Velocity	5.95	6.19	m/s	6.015	Pass
Pendulum Impulse at 10ms	1.5	1.9	m/s	1.70	Pass
Pendulum Impulse at 20ms	3.1	3.9	m/s	3.51	Pass
Pendulum Impulse at 30ms	4.6	5.6	m/s	5.34	Pass
D Plane Rotation	99	114	deg	108.0	Pass
Moment During Rotation Interval	-65	-53	Nm	-59.5	Pass
Moment Decay to -10Nm	94	114	ms	102.3	Pass

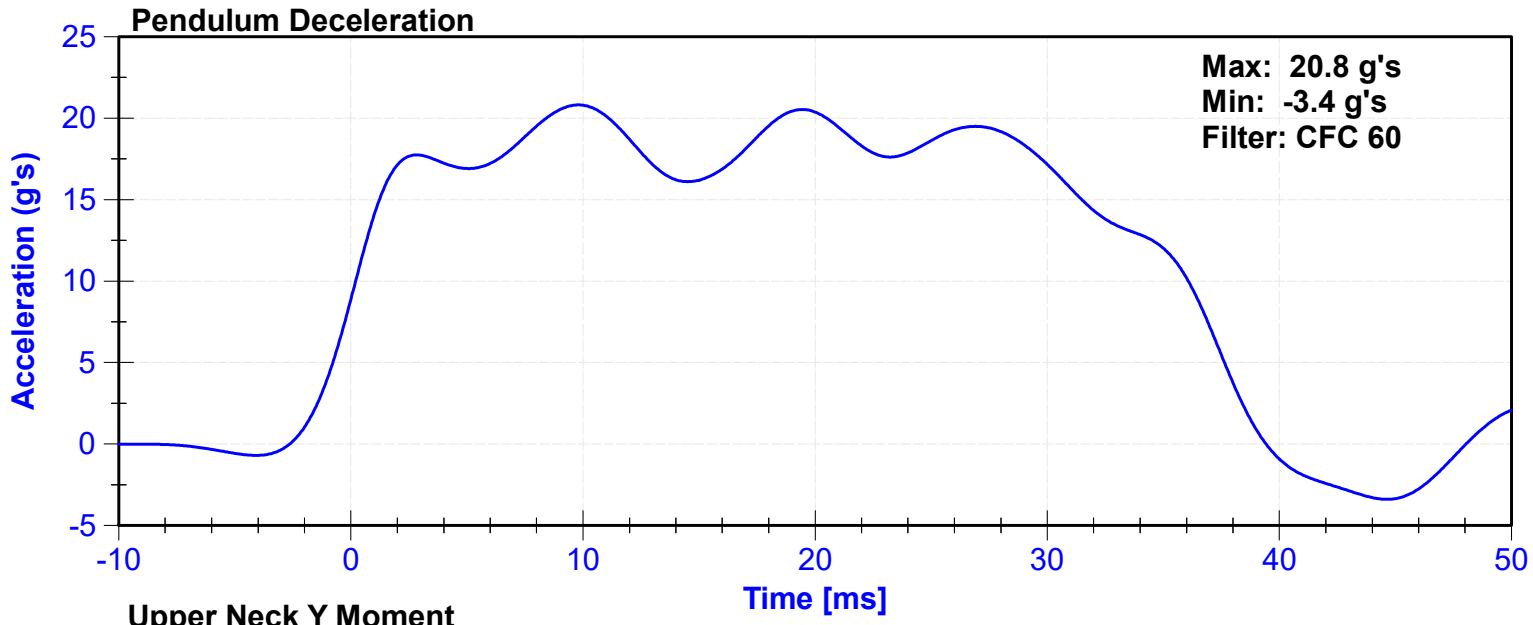
Transducer Calibrations

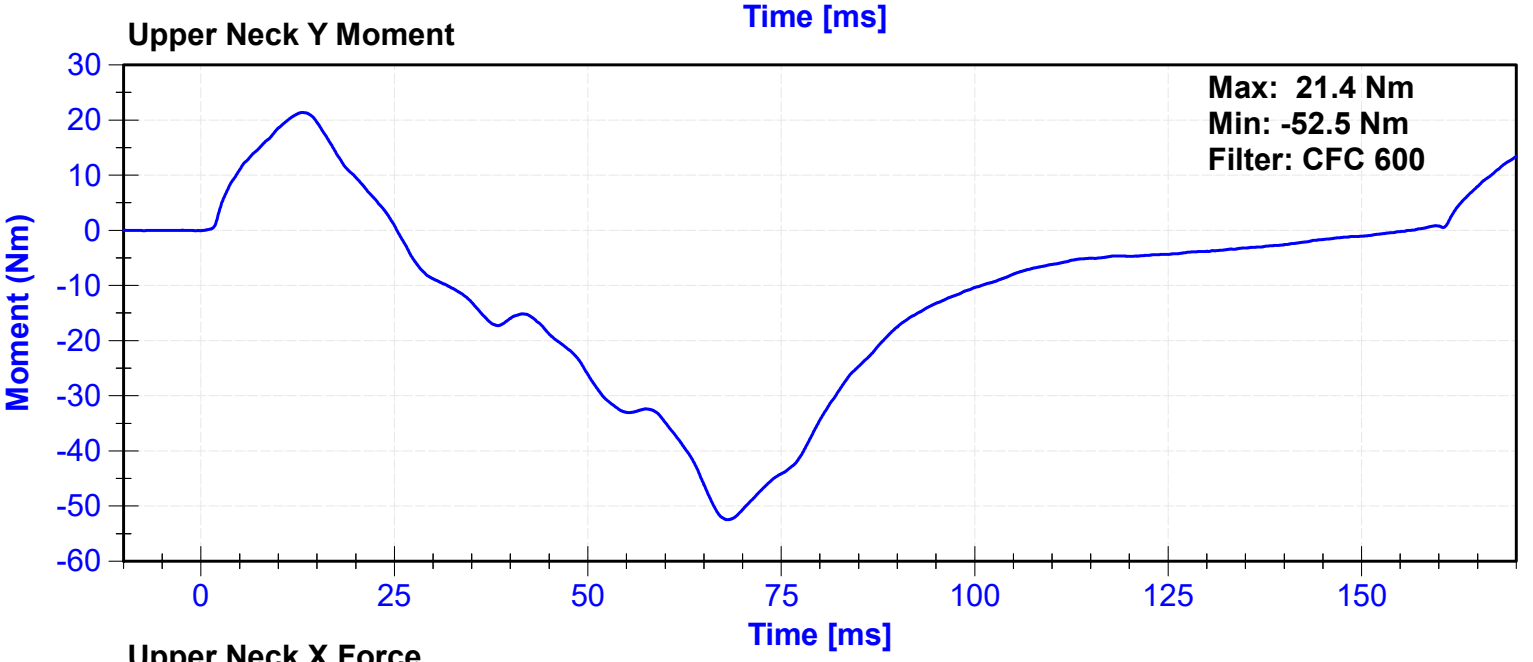
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16646	10/17/2024	10/17/2025
Pendulum Potentiometer	ETI	SP22G_LABPOT1	5/14/2025	5/14/2026
Condyle Potentiometer	ETI	SP22G_LABPOT2	5/14/2025	5/14/2026
Upper Neck Load Cell	Humanetics	1716A	7/7/2025	7/7/2026

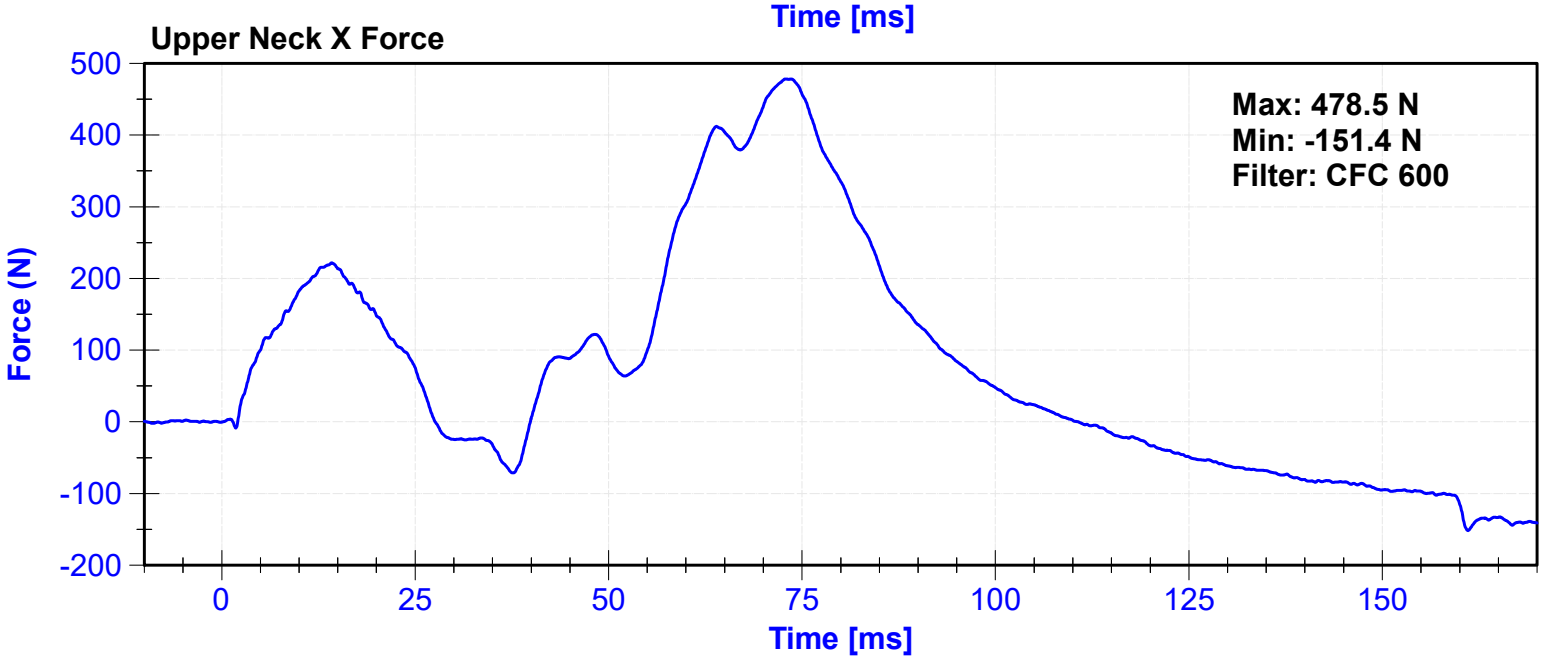



D-Plane Rotation
Rotation (deg)
125
100
75
50
25
0
-25
-50
0
25
50
75
100
125
150
Time [ms]
Max: 108.0 deg
Min: -17.1 deg
Filter: CFC 60


Moment About Occipital Condyle
Moment (Nm)
50
25
0
-25
-50
-75
0
25
50
75
100
125
150
Time [ms]
Max: 17.5 Nm
Min: -59.5 N
Filter: CFC 600


Pendulum Deceleration
Max: 20.8 g's
Min: -3.4 g's
Filter: CFC 60
Acceleration (g's)
25
20
15
10
5
0
-5
-10
0
10
20
30
40
50
Time [ms]


Upper Neck Y Moment
Max: 21.4 Nm
Min: -52.5 Nm
Filter: CFC 600
Moment (Nm)
30
20
10
0
-10
-20
-30
-40
-50
-60
0
25
50
75
100
125
150
Time [ms]


Upper Neck X Force
Max: 478.5 N
Min: -151.4 N
Filter: CFC 600
Force (N)
500
400
300
200
100
0
-100
-200
0
25
50
75
100
125
150
Time [ms]

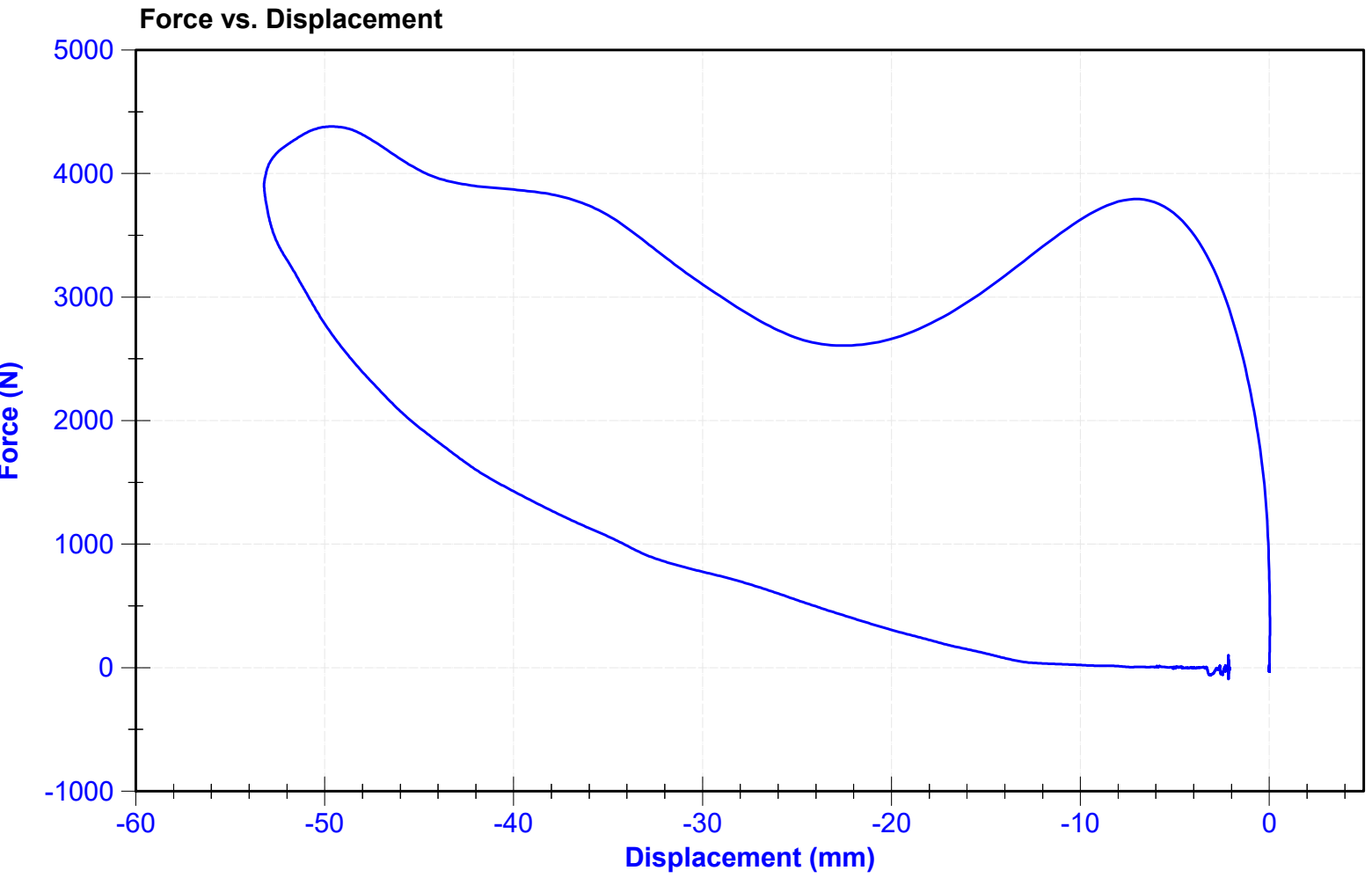
ATD Manufacturer	Humanetics	Test Technician	Z. Nyhart
ATD Serial Number	137	Laboratory Supervisor	J. Kinderman

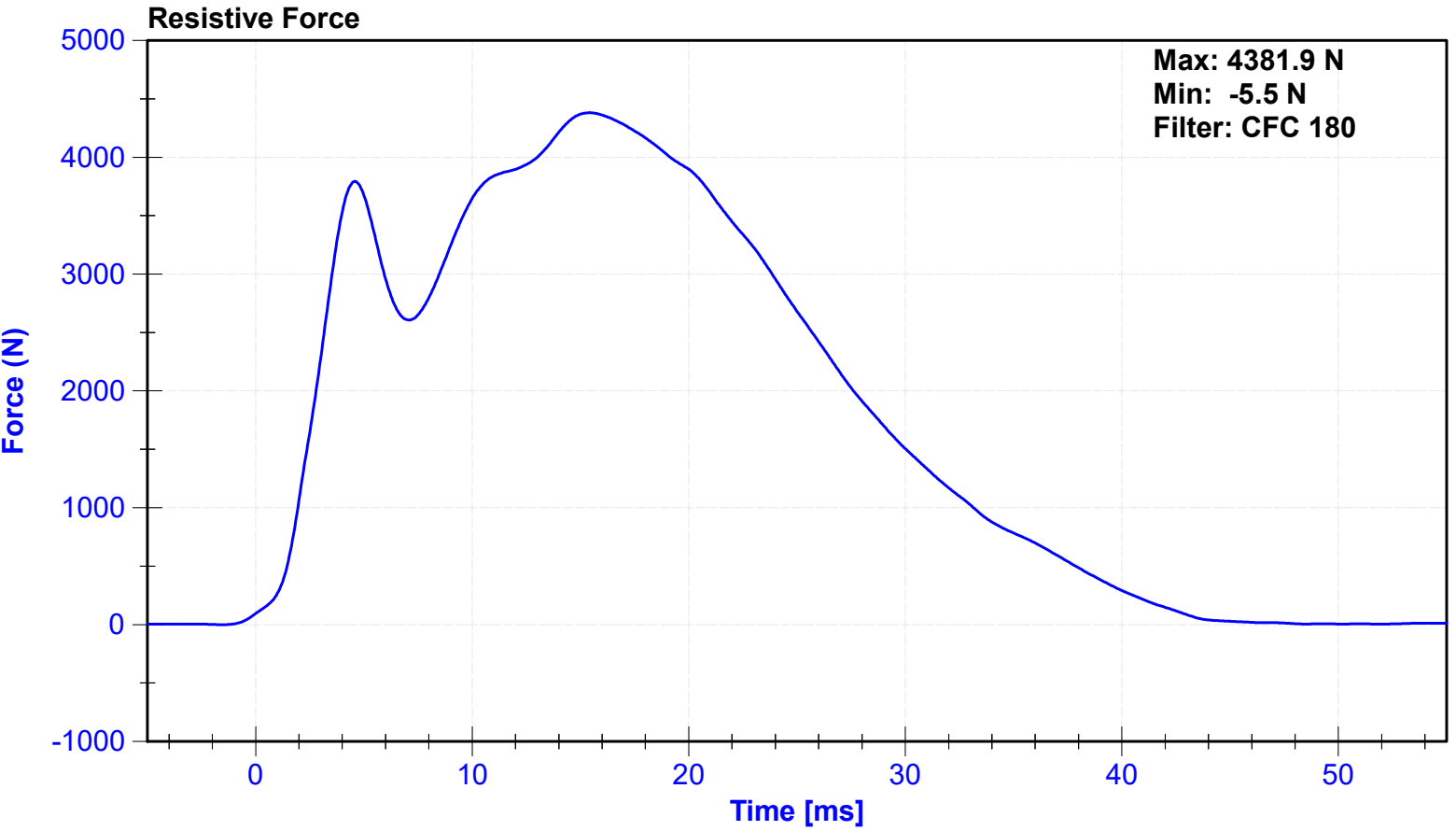
Results

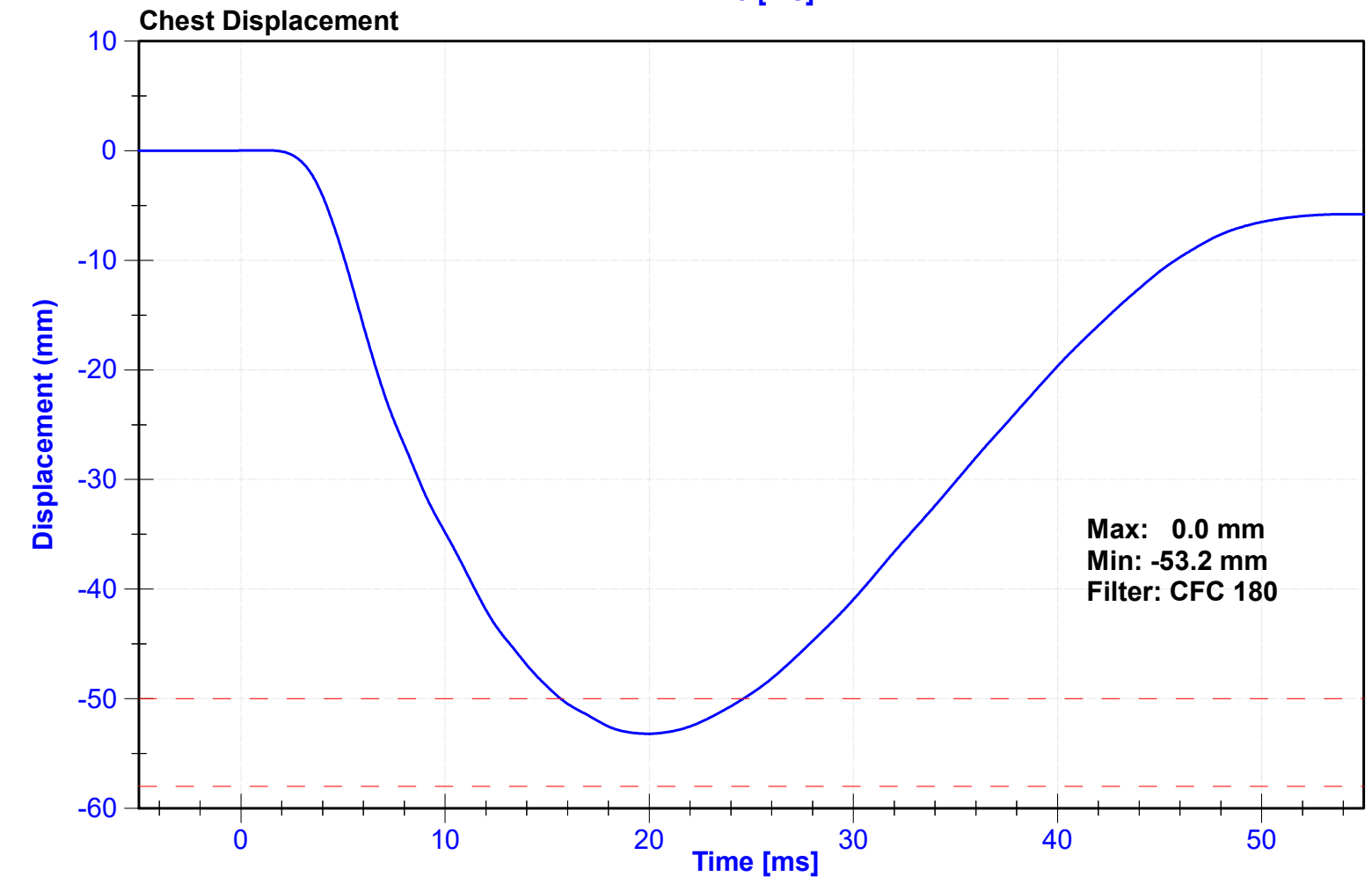
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.4	Pass
Humidity	10	70	%	61	Pass
Velocity	6.59	6.83	m/s	6.665	Pass
Chest Deflection	-58	-50	mm	-53.2	Pass
Maximum Resistive Force (50 to 58mm)	3900	4400	N	4378.1	Pass
Maximum Resistive Force (18 to 50mm)	0	4600	N	4381.9	Pass
Hysteresis	69	85	%	73.7	Pass

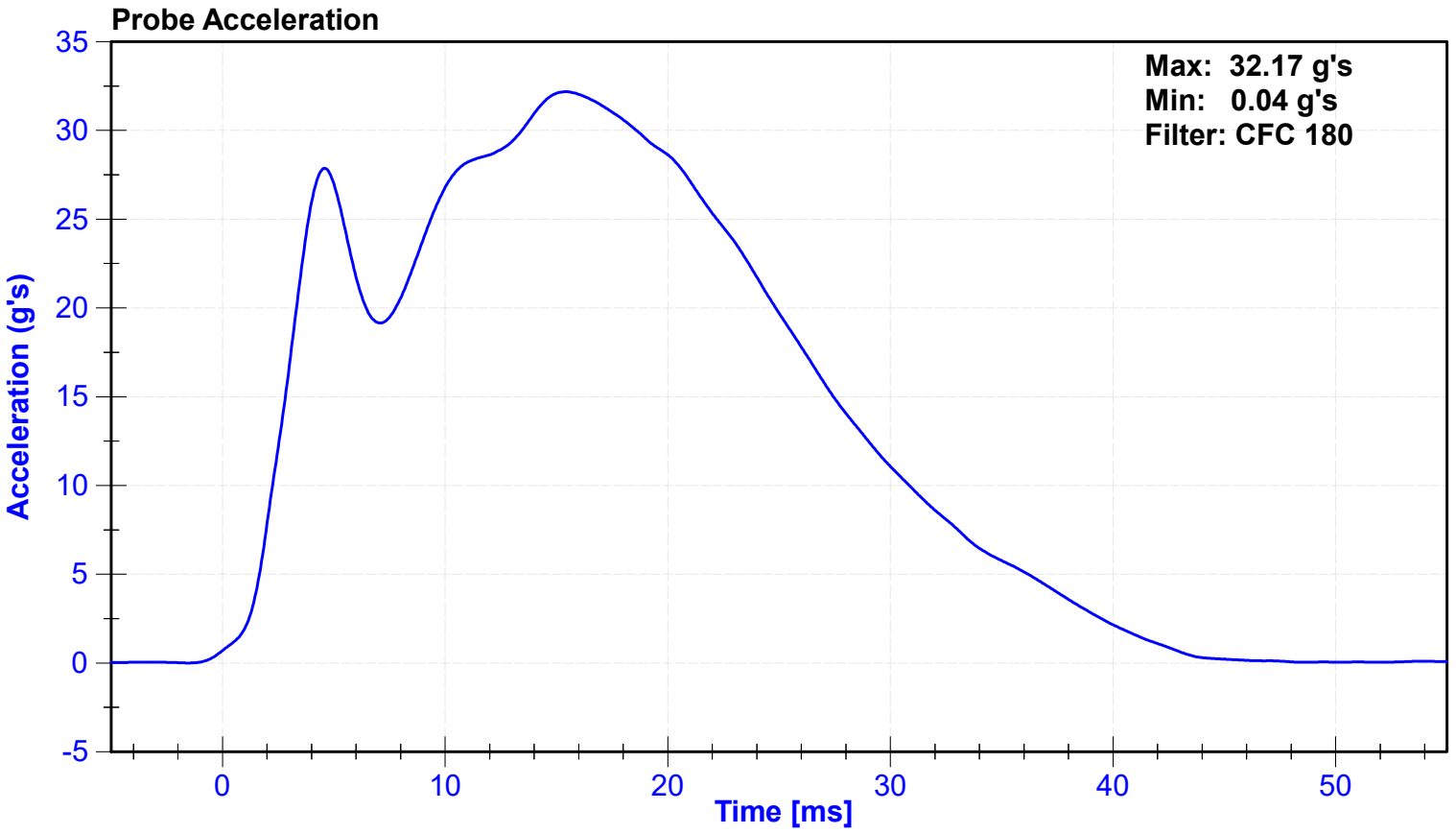
Transducer Calibrations

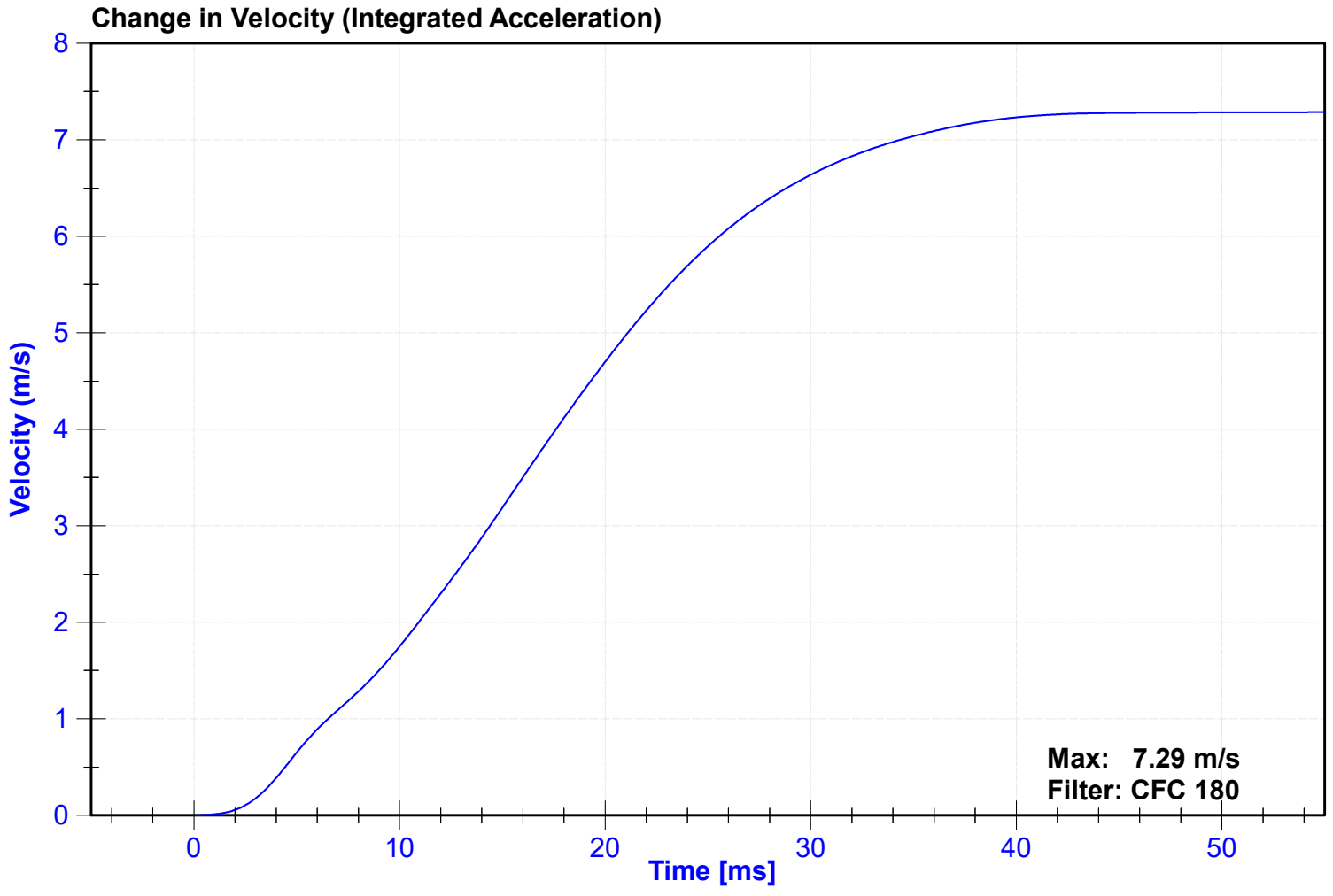
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18566	5/7/2025	11/3/2025
Chest Potentiometer	Servo	0720	6/17/2025	12/16/2025




Resistive Force
Max: 4381.9 N
Min: -5.5 N
Filter: CFC 180
Force (N)
5000
4000
3000
2000
1000
0
-1000
0
10
20
30
40
50
Time [ms]


Chest Displacement
Max: 0.0 mm
Min: -53.2 mm
Filter: CFC 180
Displacement (mm)
10
0
-10
-20
-30
-40
-50
-60
0
10
20
30
40
50
Time [ms]


Probe Acceleration
Max: 32.17 g's
Min: 0.04 g's
Filter: CFC 180
Acceleration (g's)
35
30
25
20
15
10
5
0
-5
0
10
20
30
40
50
Time [ms]


Change in Velocity (Integrated Acceleration)
Max: 7.29 m/s
Filter: CFC 180
Velocity (m/s)
8
7
6
5
4
3
2
1
0
0
10
20
30
40
50
Time [ms]

ATD Manufacturer	Humanetics	Test Technician	Z. Nyhart
ATD Serial Number	137	Laboratory Supervisor	J. Kinderman

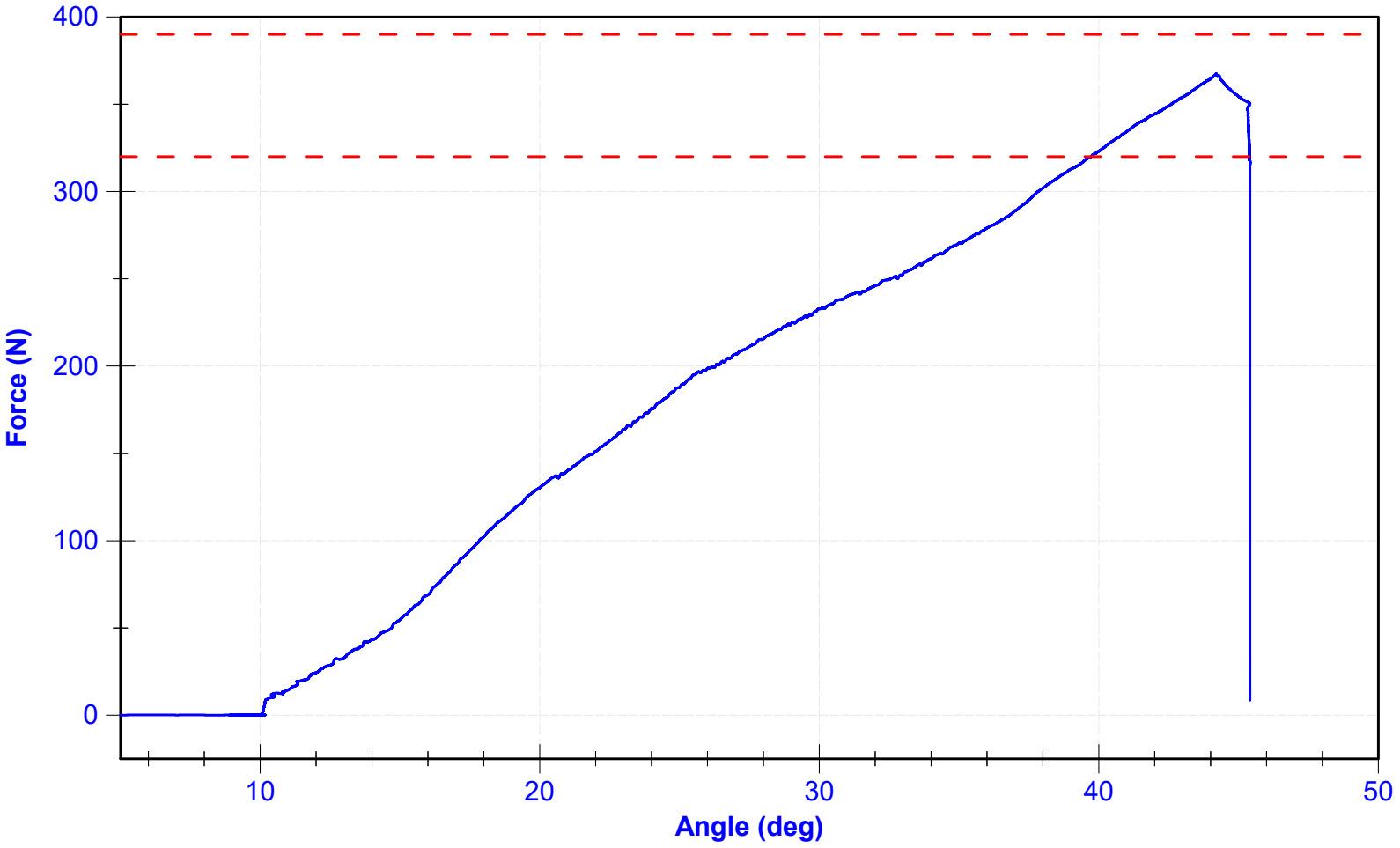
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.6	25.6	ºC	21.5	Pass
Humidity	10	70	%	63	Pass
Initial Angle	0	20	deg	9.6	Pass
Force at 45 Degrees	320	390	N	367.5	Pass
Return Angle Relative to Initial	0	8	deg	5.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	Rieker	DS-1905226	2025-08-08	2026-08-08
Load Cell	Interface	1134516	2025-02-26	2026-02-26

Force vs. Displacement



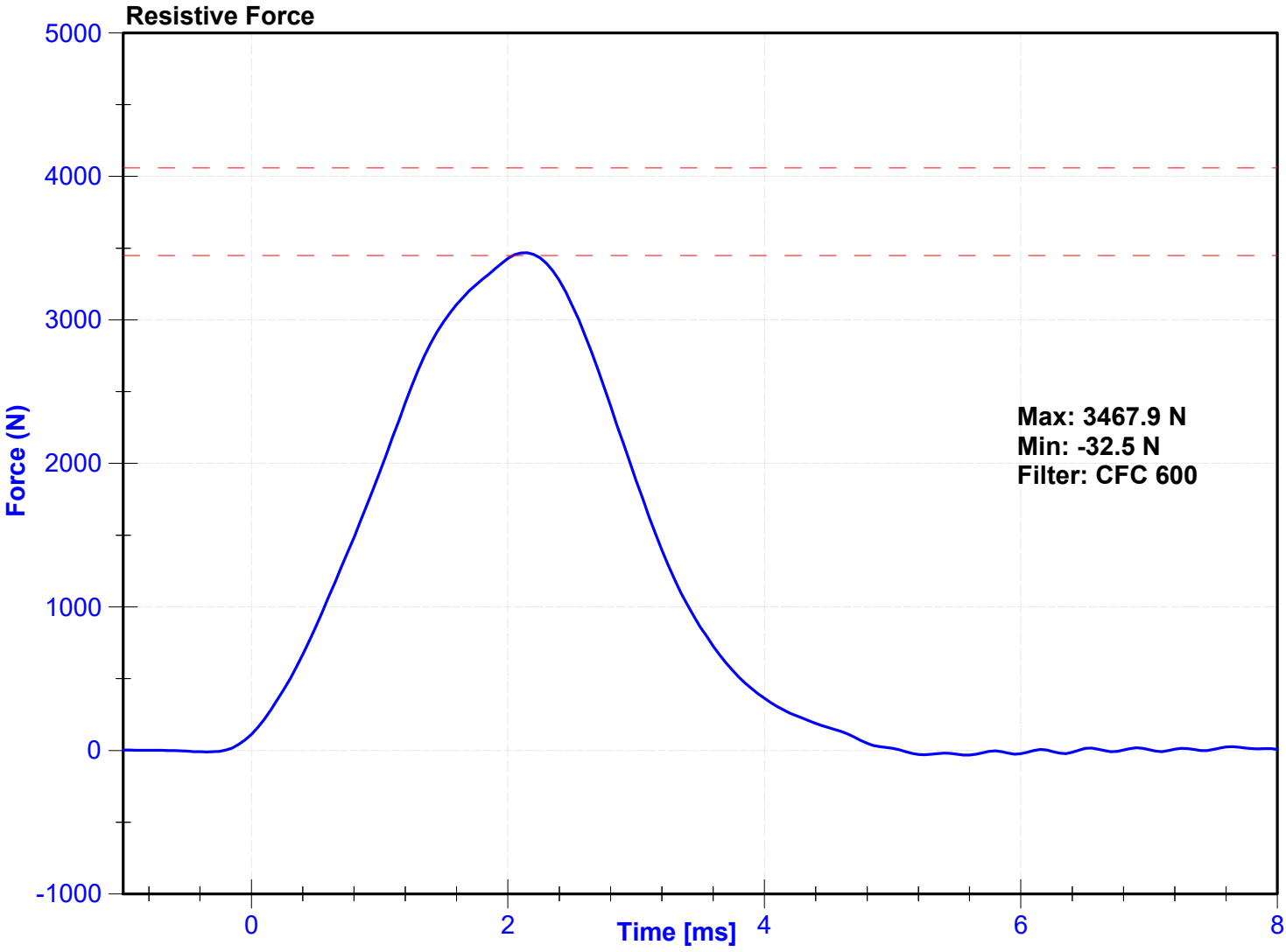
ATD Manufacturer	Humanetics	Test Technician	W. Brokx
ATD Serial Number	137	Laboratory Supervisor	J. Kinderman

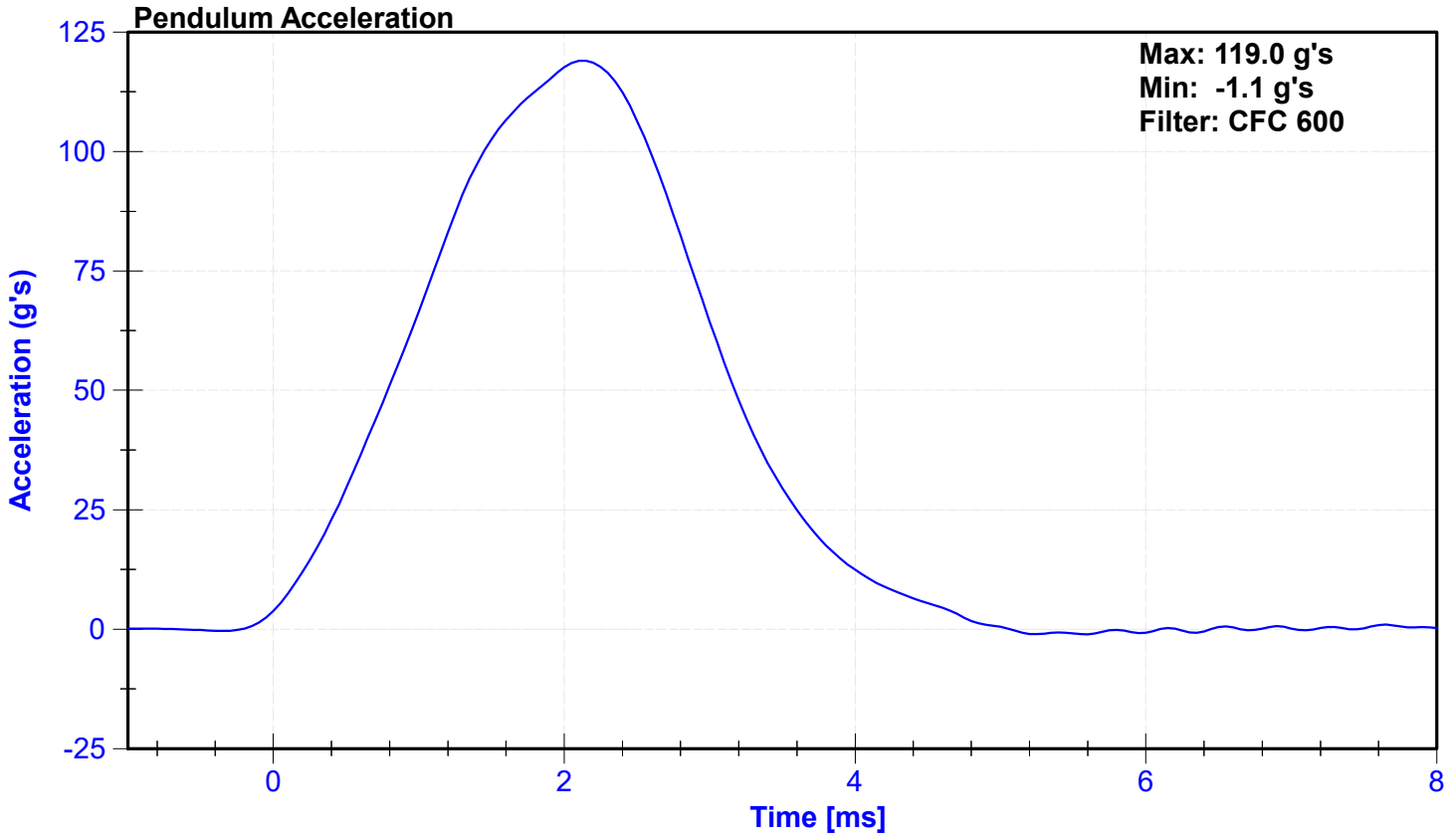
Results

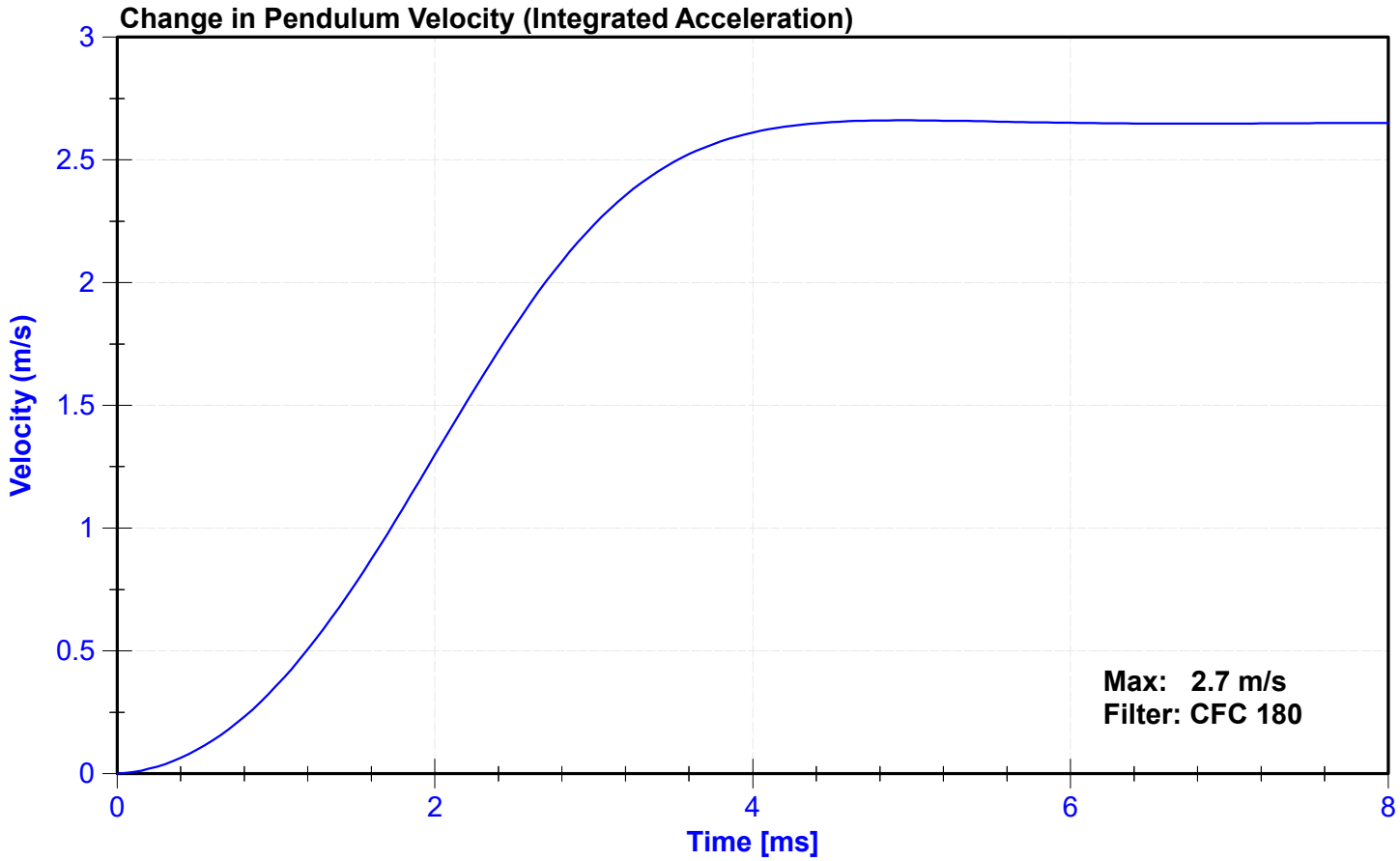
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	ºC	21.5	Pass
Humidity	10	70	%	52	Pass
Velocity	2.07	2.13	m/s	2.084	Pass
Resistive Force	3450	4060	N	3467.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18566	5/7/2025	11/3/2025




Pendulum Acceleration
Max: 119.0 g's
Min: -1.1 g's
Filter: CFC 600
Acceleration (g's)
125
100
75
50
25
0
-25
0
2
4
6
8
Time [ms]


Change in Pendulum Velocity (Integrated Acceleration)
Velocity (m/s)
3
2.5
2
1.5
1
0.5
0
0
2
4
6
8
Time [ms]
Max: 2.7 m/s
Filter: CFC 180

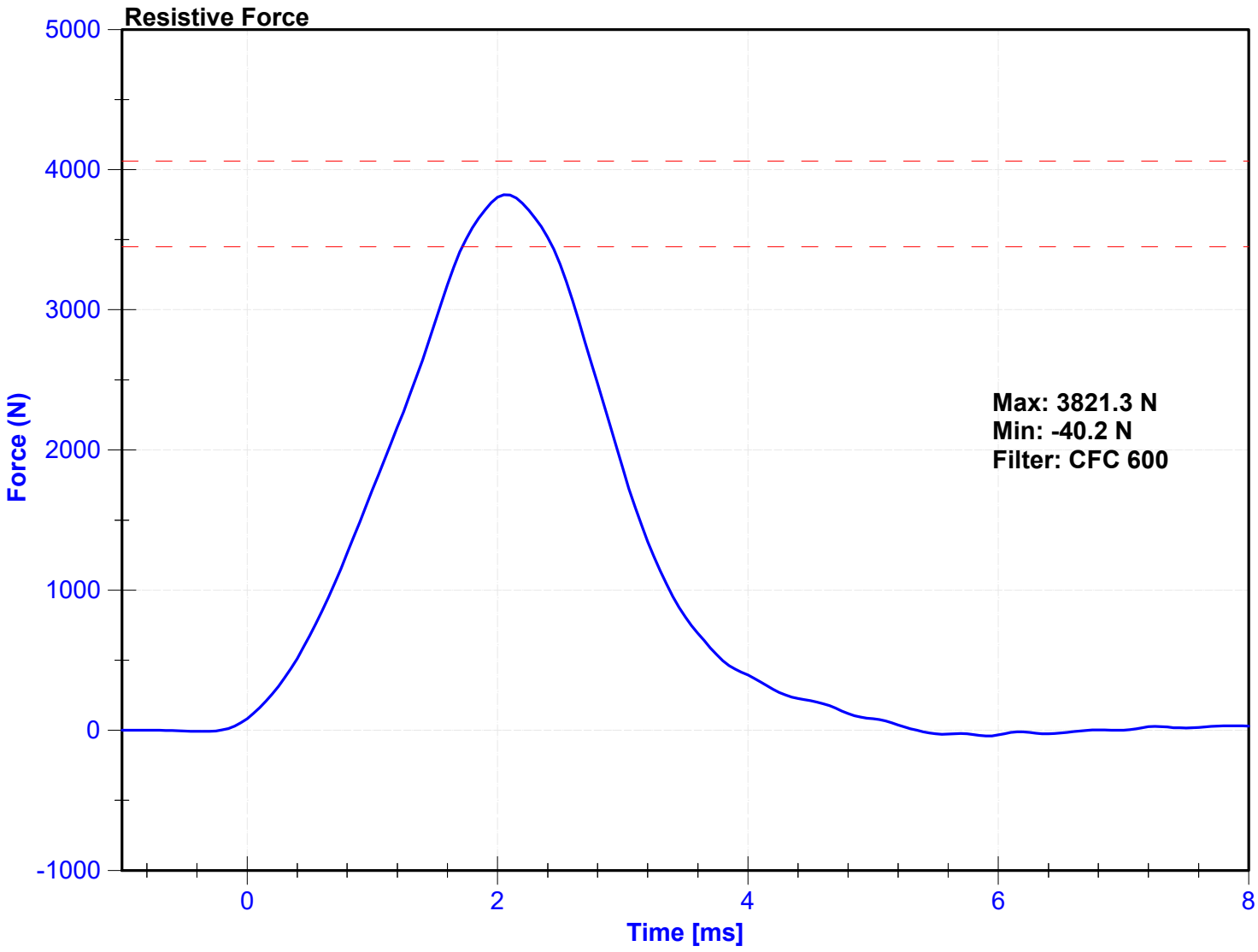
ATD Manufacturer	Humanetics	Test Technician	W. Brokx
ATD Serial Number	137	Laboratory Supervisor	J. Kinderman

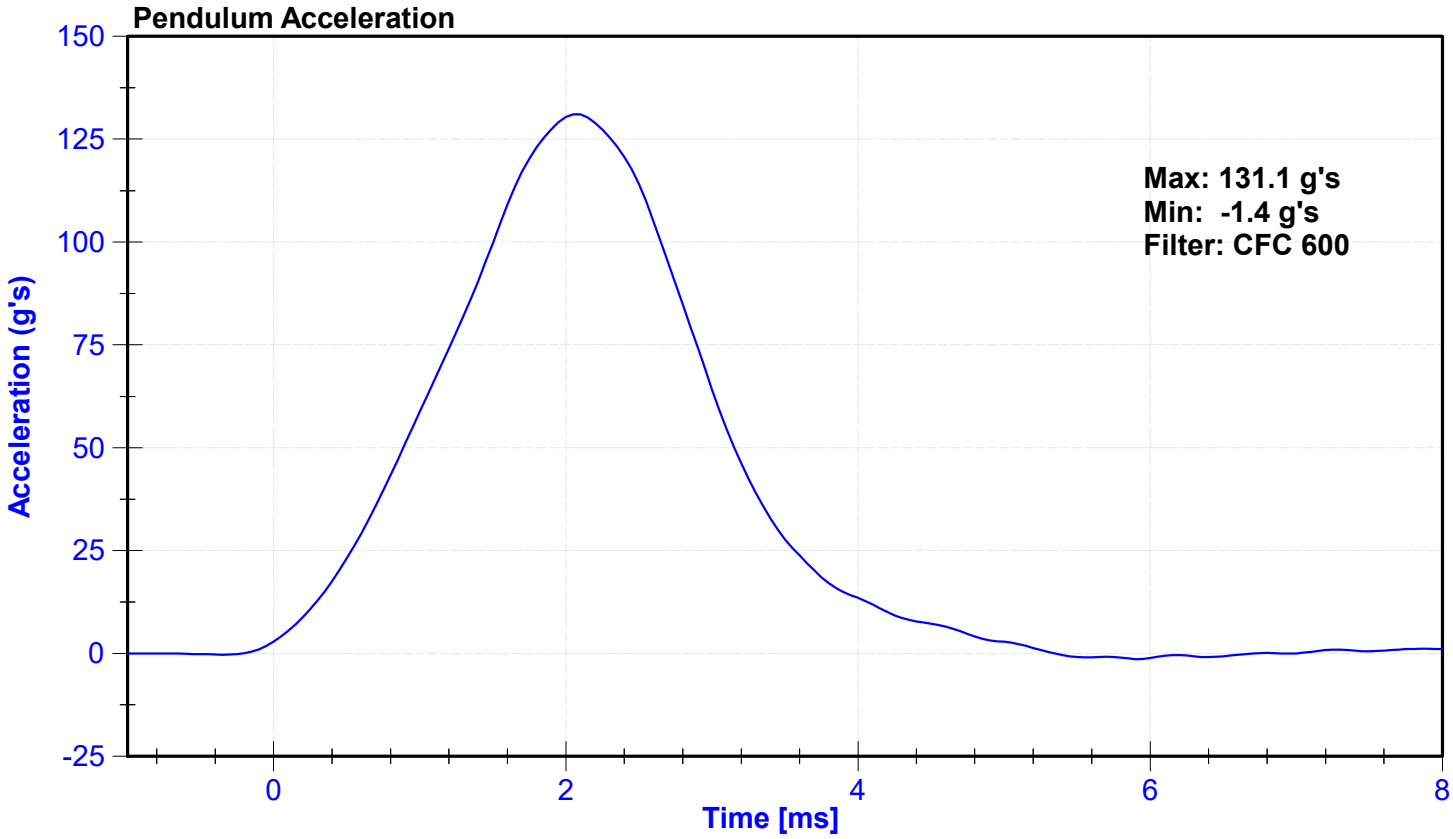
Results

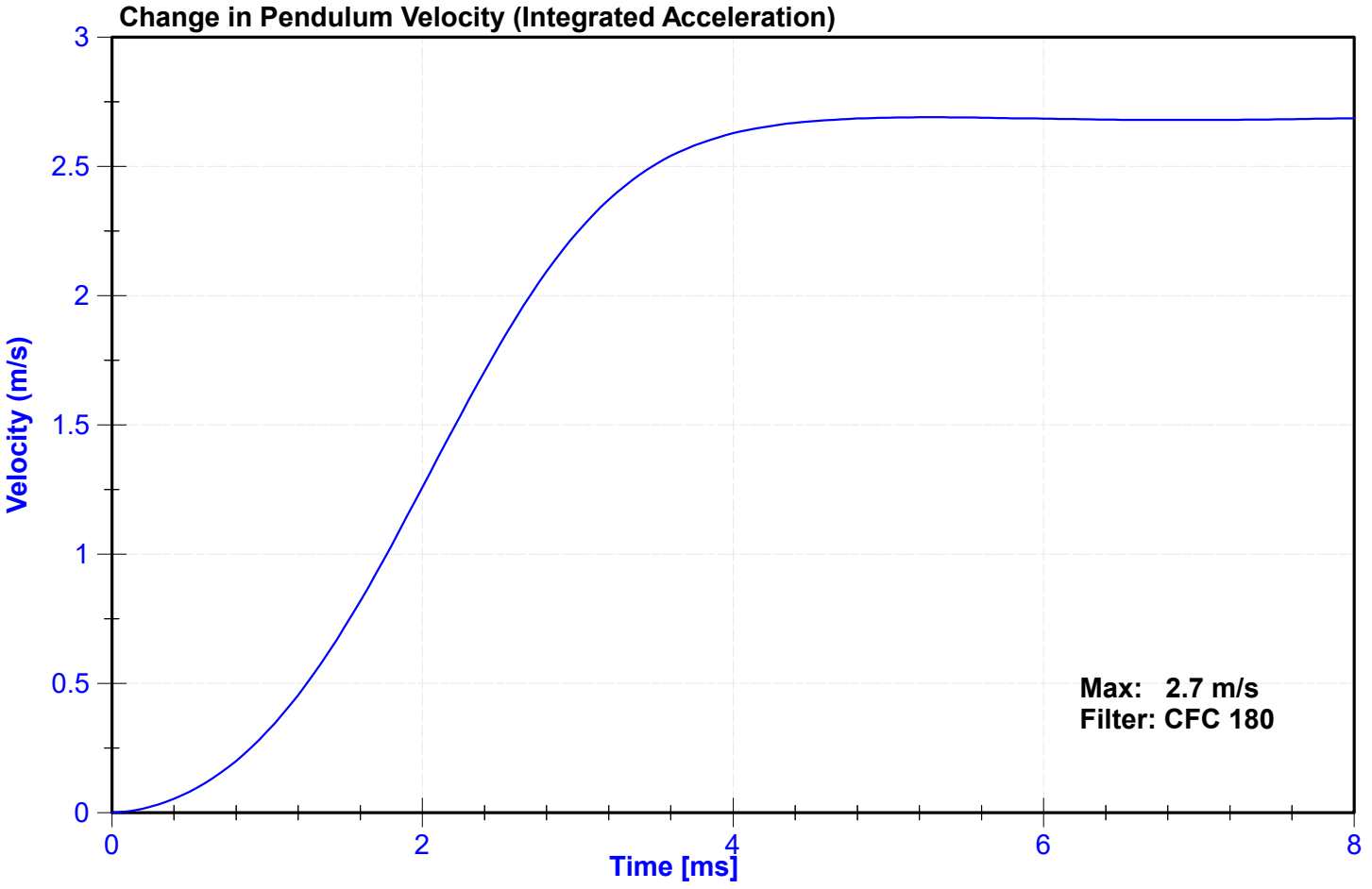
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	ºC	21.5	Pass
Humidity	10	70	%	52	Pass
Velocity	2.07	2.13	m/s	2.084	Pass
Resistive Force	3450	4060	N	3821.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18566	5/7/2025	11/3/2025




Pendulum Acceleration
Max: 131.1 g's
Min: -1.4 g's
Filter: CFC 600
Acceleration (g's)
Time [ms]
150
125
100
75
50
25
0
-25
0
2
4
6
8


Change in Pendulum Velocity (Integrated Acceleration)
Max: 2.7 m/s
Filter: CFC 180
Velocity (m/s)
Time [ms]
3
2.5
2
1.5
1
0.5
0
0
2
4
6
8

CALIBRATION TEST RESULTS

POST-TEST

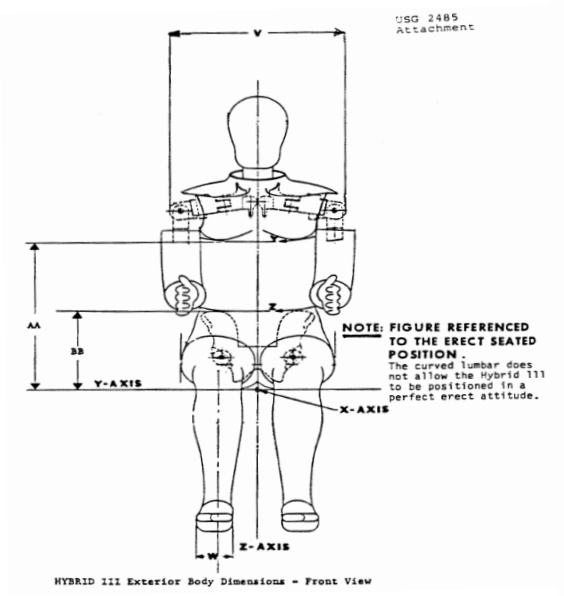
HYBRID III 50TH PERCENTILE MALE - DRIVER ATD

SERIAL NO: 065

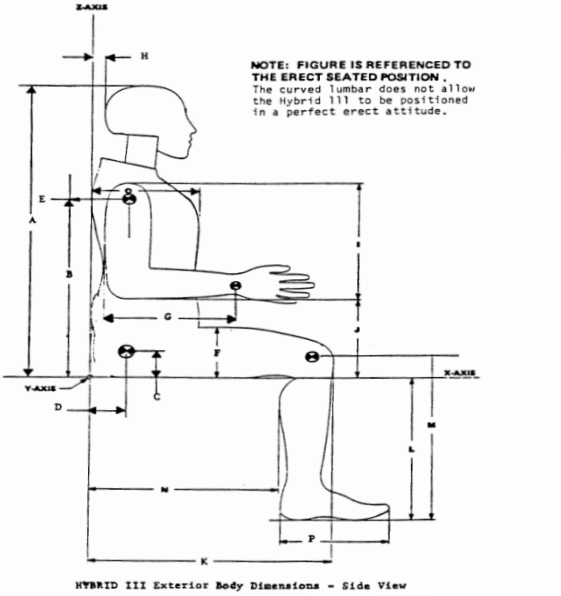
External Measurements - Hybrid 3 - 50th Male

Technician: J. Rios Date: 10/07/2025

Dummy Serial Number: 065



HYBRID III Exterior Body Dimensions - Front View



HYBRID III Exterior Body Dimensions - Side View

Symbol	Description	Specification (in)		Result (in)	Pass/Fail
A	Sitting Height	34.6	35.0	34.9	Pass
B	Shoulder Pivot Height	19.9	20.5	20.1	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	6.0	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	13.2	Pass
J	Elbow Rest Height	7.5	8.3	8.0	Pass
K	Buttock to Knee Length	22.8	23.8	23.2	Pass
L	Popliteal Height	16.9	17.9	17.6	Pass
M	Knee Pivot Height	19.1	19.7	19.5	Pass
N	Buttock Popliteal Length	17.8	18.8	18.1	Pass
O	Chest Depth without Jacket	8.4	9.0	8.8	Pass
P	Foot Length (right)	9.9	10.5	10.3	Pass
V	Shoulder Breadth	16.3	17.2	16.4	Pass
W	Foot Breadth	3.6	4.2	4.0	Pass
Y	Chest Circumference with Jacket	38.2	39.4	38.7	Pass
Z	Waist Circumference	32.9	34.1	33.6	Pass
AA	Reference Location (Chest Circumference)	16.9	17.1	17.0	Pass
BB	Reference Location (Waist Circumference)	8.9	9.1	9.0	Pass

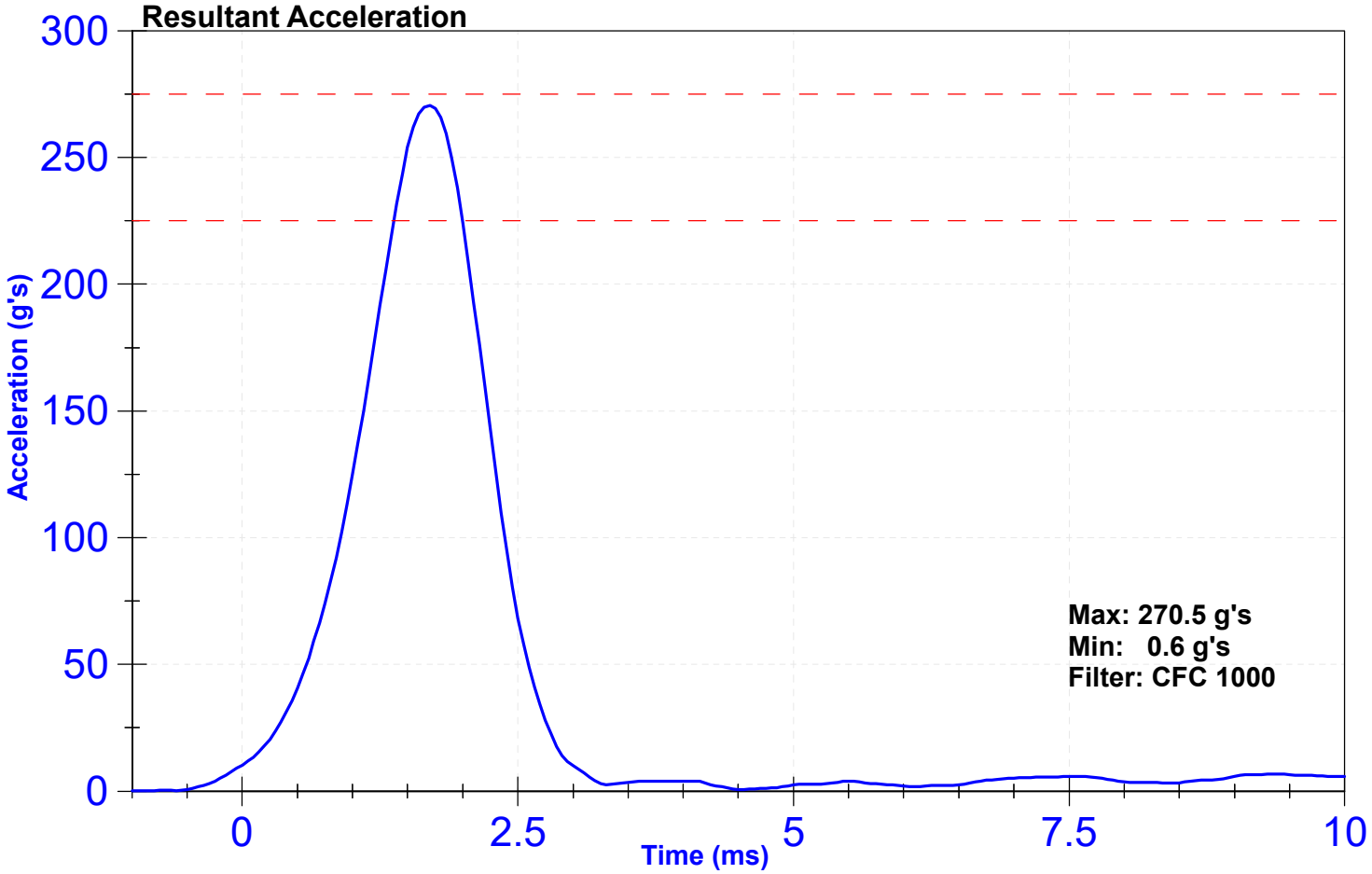
ATD Manufacturer	Humanetics	Test Technician	J. Rios
ATD Serial Number	065	Laboratory Supervisor	J. Kinderman

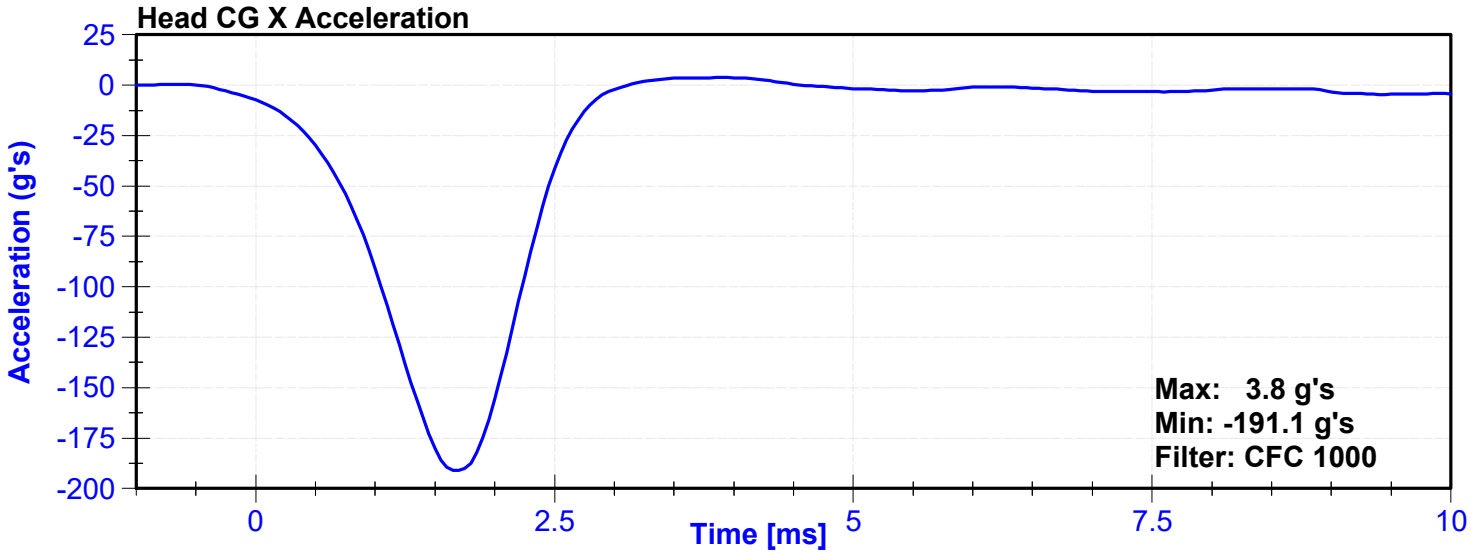
Results

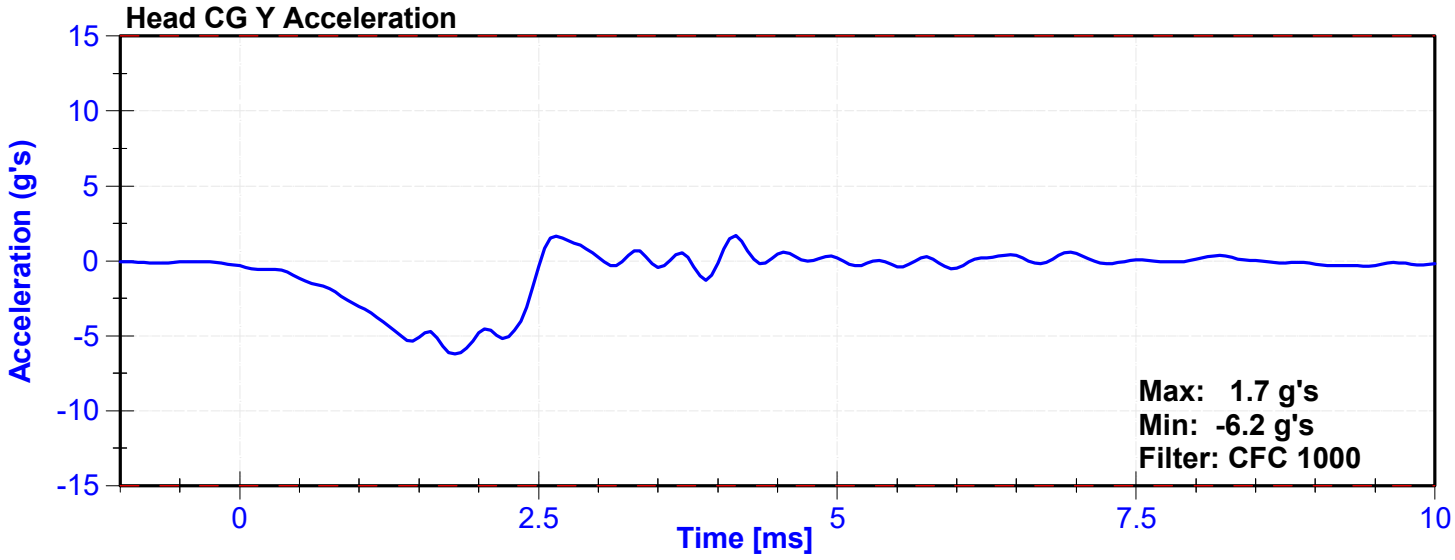
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	ºC	21.7	Pass
Humidity	10	70	%	47	Pass
Resultant Acceleration	225	275	g's	270.5	Pass
Oscillation	0	10	%	2.5	Pass
Lateral Acceleration	-15	15	g's	-6.2	Pass

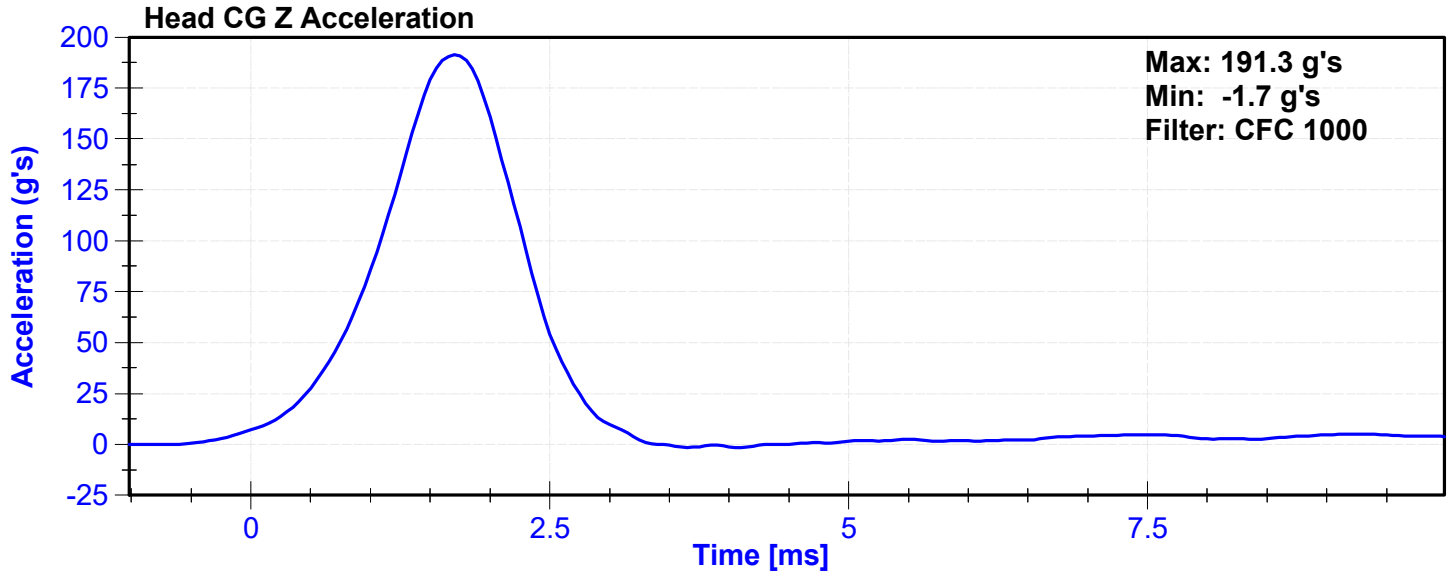
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	P52152	6/10/2025	12/7/2025
Y Accelerometer	Endevco	P58888	6/10/2025	12/7/2025
Z Accelerometer	Endevco	P58911	6/10/2025	12/7/2025




Head CG X Acceleration
Acceleration (g's)
25
0
-25
-50
-75
-100
-125
-150
-175
-200
0
2.5
5
7.5
10
Time [ms]
Max: 3.8 g's
Min: -191.1 g's
Filter: CFC 1000


Head CG Y Acceleration
Acceleration (g's)
15
10
5
0
-5
-10
-15
0
2.5
5
7.5
10
Time [ms]
Max: 1.7 g's
Min: -6.2 g's
Filter: CFC 1000


Head CG Z Acceleration
Acceleration (g's)
200
175
150
125
100
75
50
25
0
-25
0
2.5
5
7.5
Time [ms]
Max: 191.3 g's
Min: -1.7 g's
Filter: CFC 1000

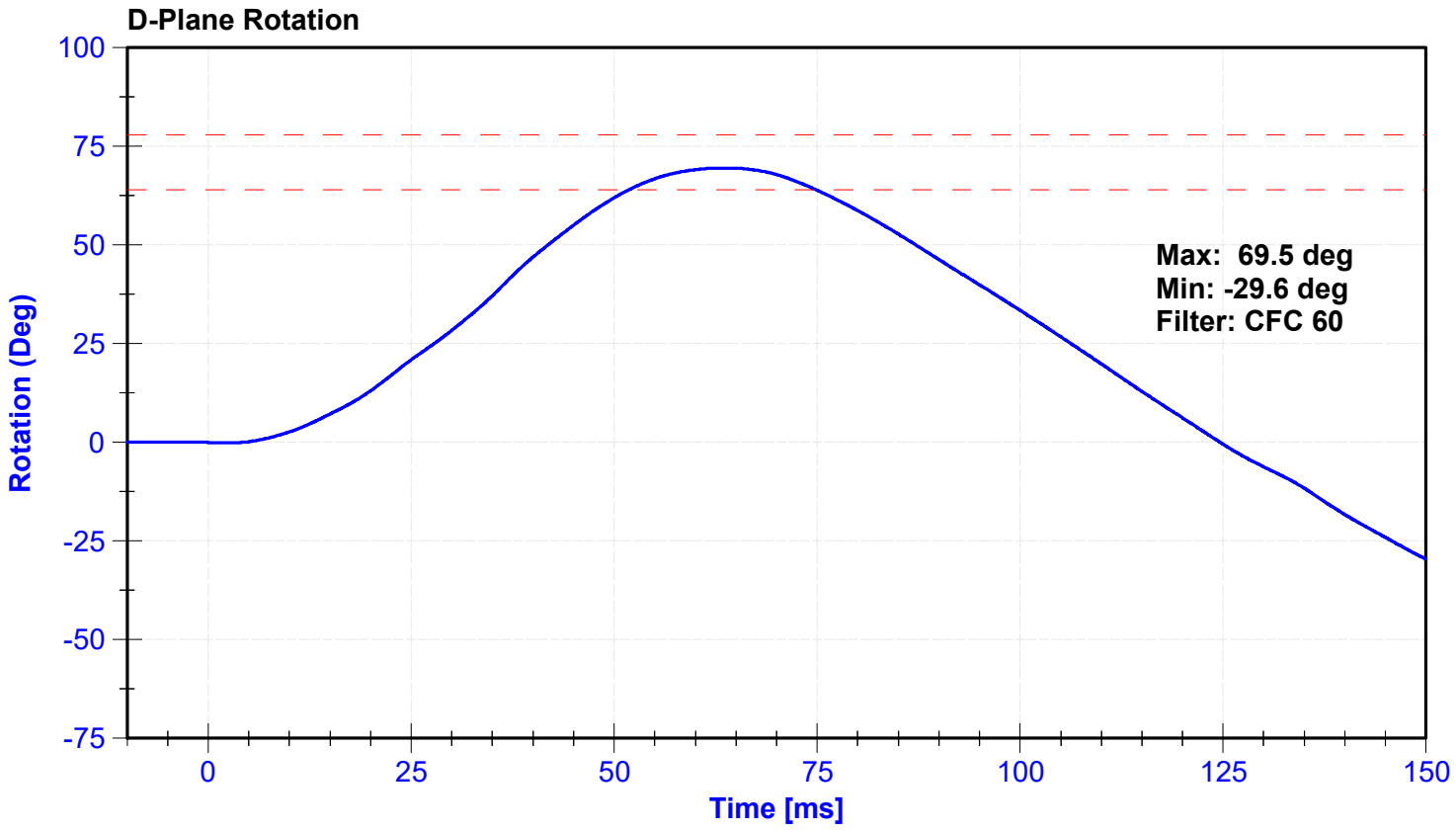
ATD Manufacturer	Humanetics	Test Technician	J. Rios
ATD Serial Number	065	Laboratory Supervisor	J. Kinderman

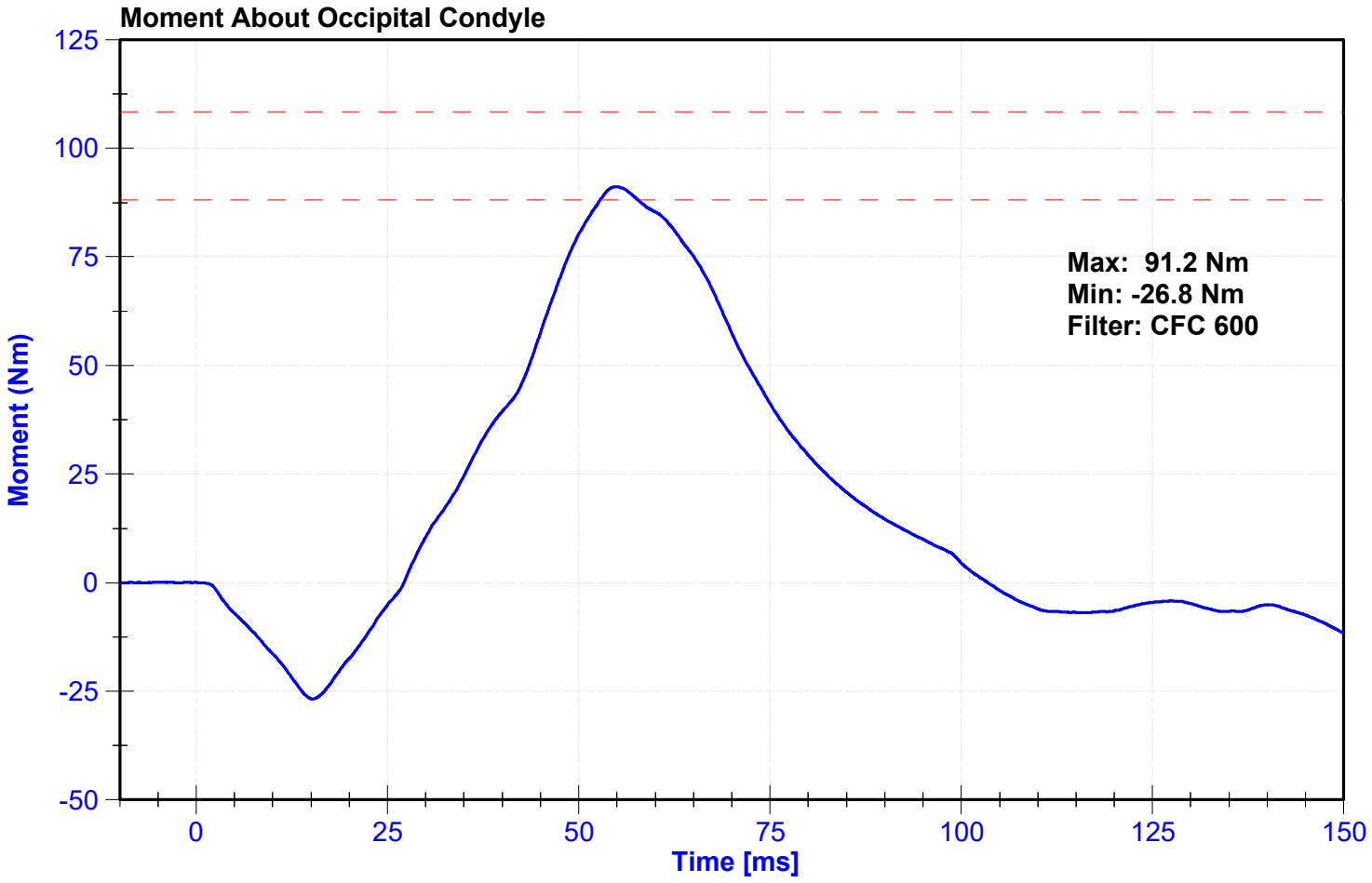
Results

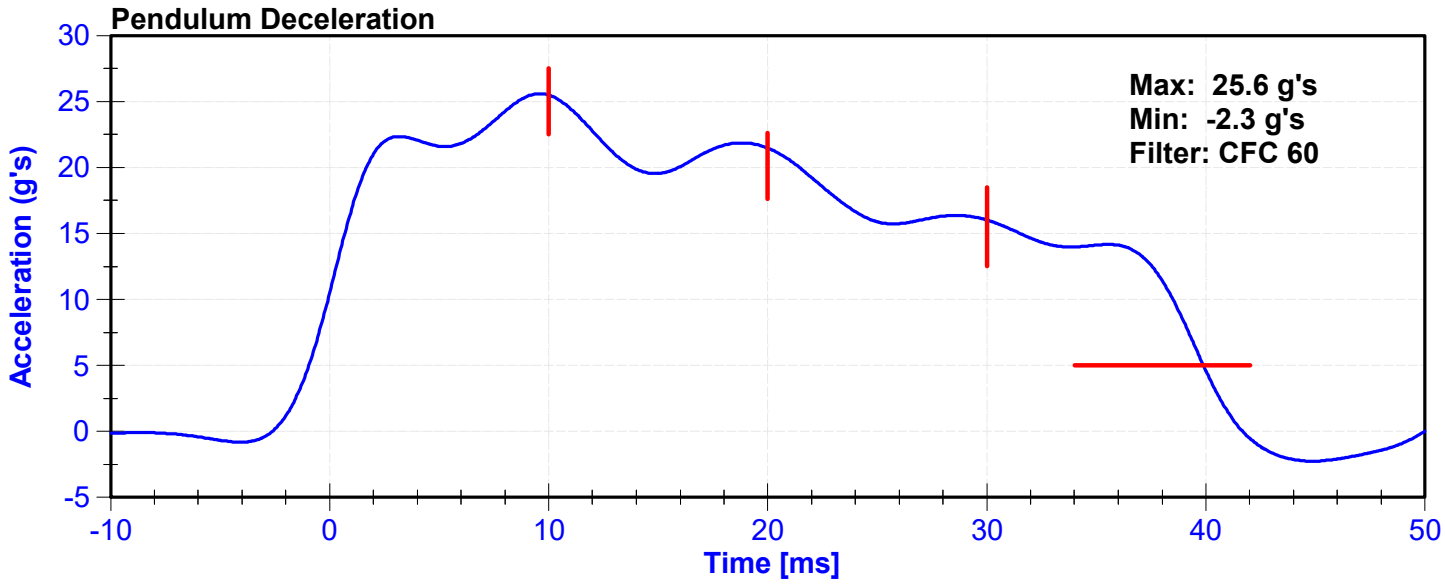
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.4	Pass
Humidity	10	70	%	41	Pass
Velocity	6.89	7.13	m/s	6.944	Pass
Pendulum Deceleration at 10ms	22.5	27.5	g's	25.48	Pass
Pendulum Deceleration at 20ms	17.6	22.6	g's	21.46	Pass
Pendulum Deceleration at 30ms	12.5	18.5	g's	16.01	Pass
Max. Pendulum Deceleration After 30ms	0	29	g's	25.6	Pass
Pendulum Deceleration Time to 5 g's	34	42	ms	39.9	Pass
Maximum D Plane Rotation	64	78	deg	69.5	Pass
Time to Maximum Rotation	57	64	ms	63.6	Pass
Rotation Decay to Zero	113	127	ms	124.7	Pass
Moment About Occipital Condyle	88.1	108.4	Nm	91.19	Pass
Time to Maximum Moment	47	58	ms	54.8	Pass
Moment Decay to Zero	97	107	ms	103.5	Pass

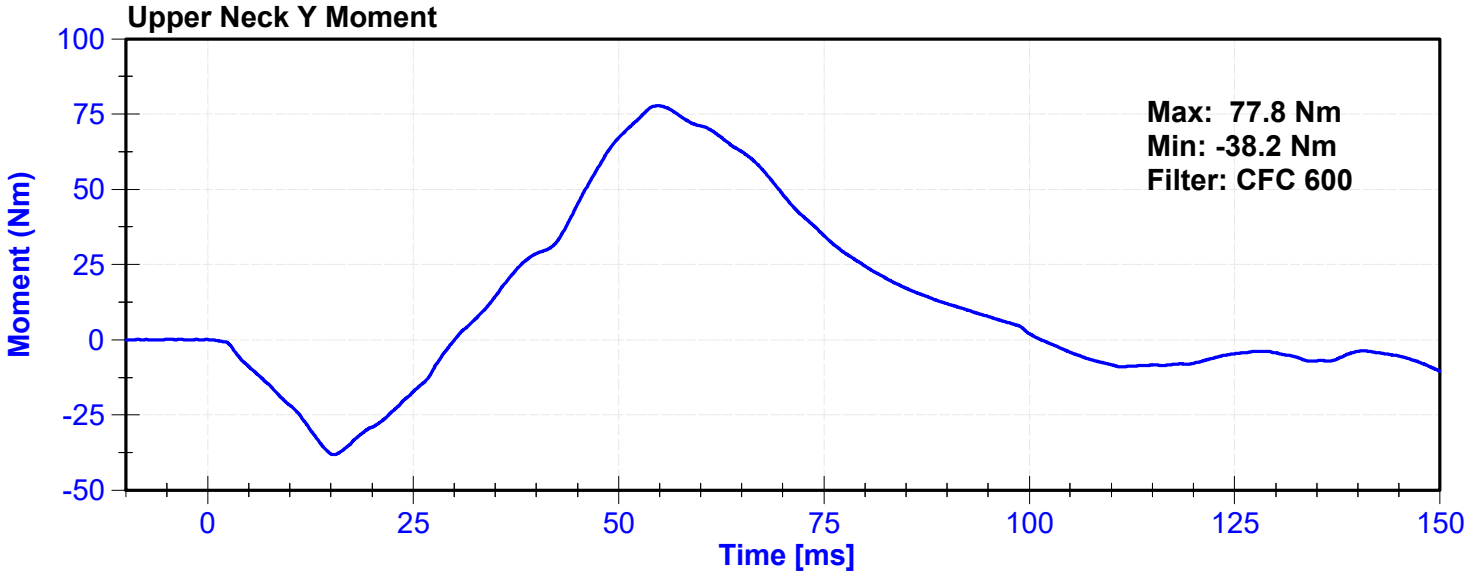
Transducer Calibrations

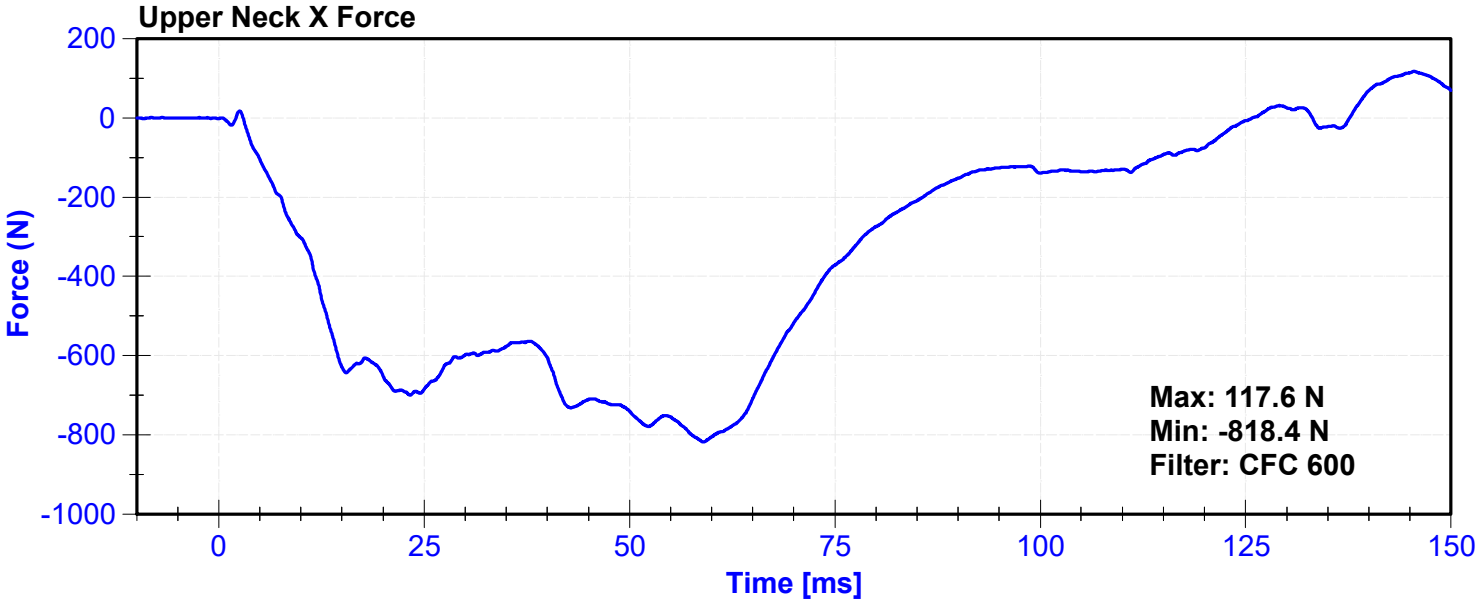
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16646	10/17/2024	10/17/2025
Pendulum Potentiometer	ETI	LABPOT1	5/14/2025	5/14/2026
Condyle Potentiometer	ETI	LABPOT2	5/14/2025	5/14/2026
Upper Neck Load Cell	Denton	2207-FX	7/7/2025	7/7/2026


D-Plane Rotation
Rotation (Deg)
100
75
50
25
0
-25
-50
-75
0
25
50
75
100
125
150
Time [ms]
Max: 69.5 deg
Min: -29.6 deg
Filter: CFC 60


Moment About Occipital Condyle
Moment (Nm)
125
100
75
50
25
0
-25
-50
0
25
50
75
100
125
150
Time [ms]
Max: 91.2 Nm
Min: -26.8 Nm
Filter: CFC 600


Pendulum Deceleration
Acceleration (g's)
Time [ms]
Max: 25.6 g's
Min: -2.3 g's
Filter: CFC 60


Upper Neck Y Moment
Moment (Nm)
Time [ms]
Max: 77.8 Nm
Min: -38.2 Nm
Filter: CFC 600


Upper Neck X Force
Force (N)
Time [ms]
Max: 117.6 N
Min: -818.4 N
Filter: CFC 600

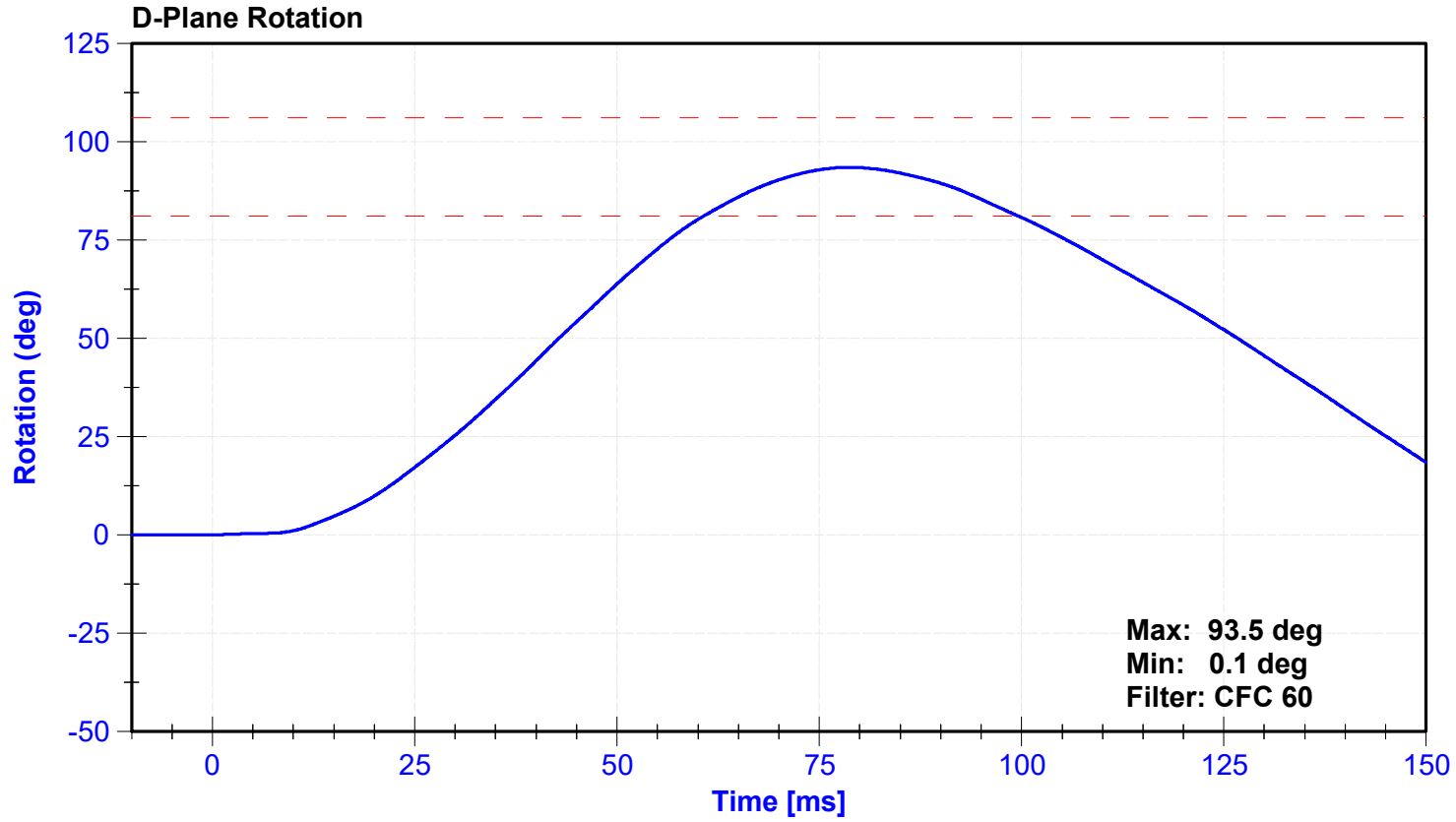
ATD Manufacturer	Humanetics	Test Technician	J. Rios
ATD Serial Number	065	Laboratory Supervisor	J. Kinderman

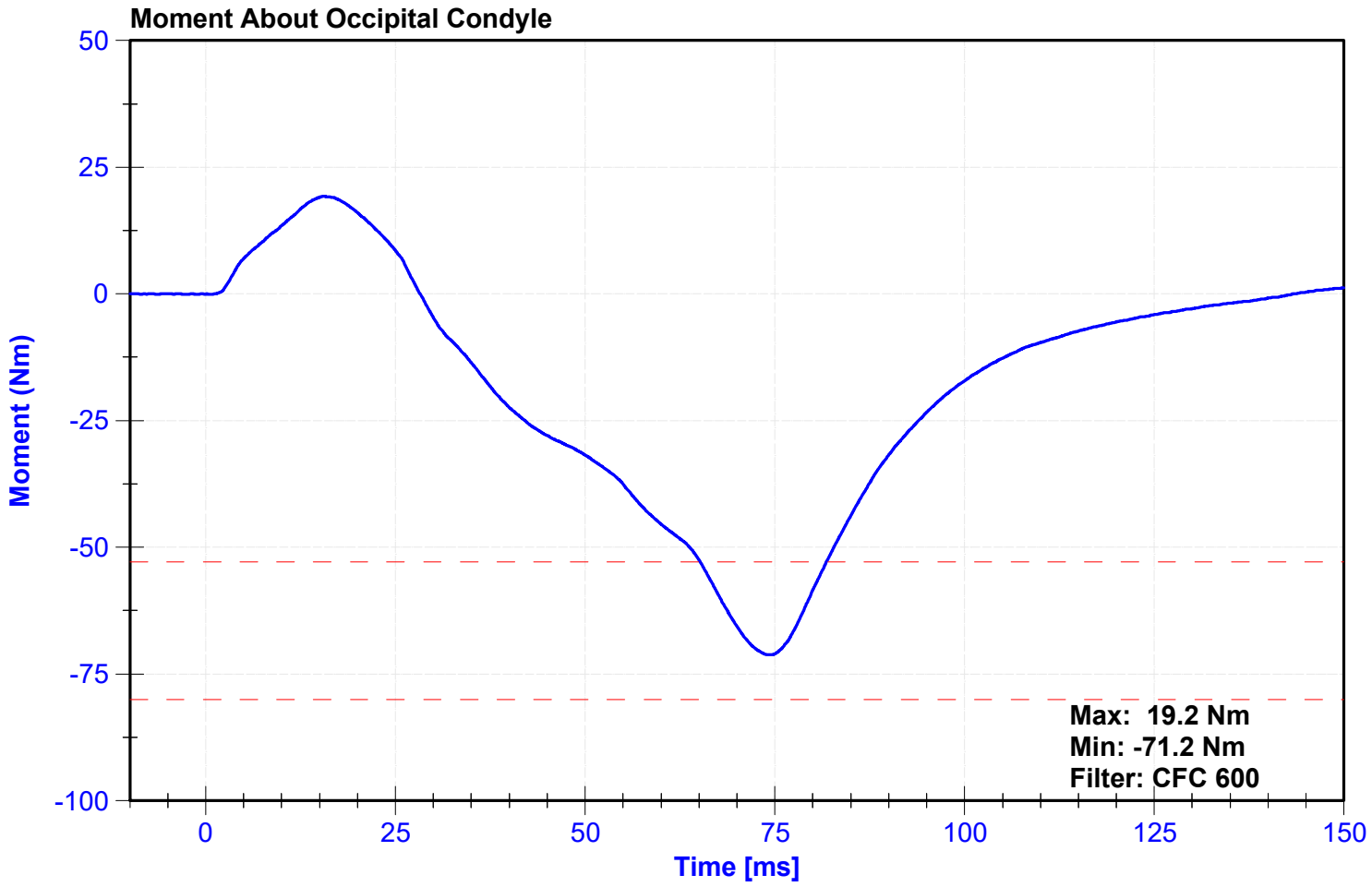
Results

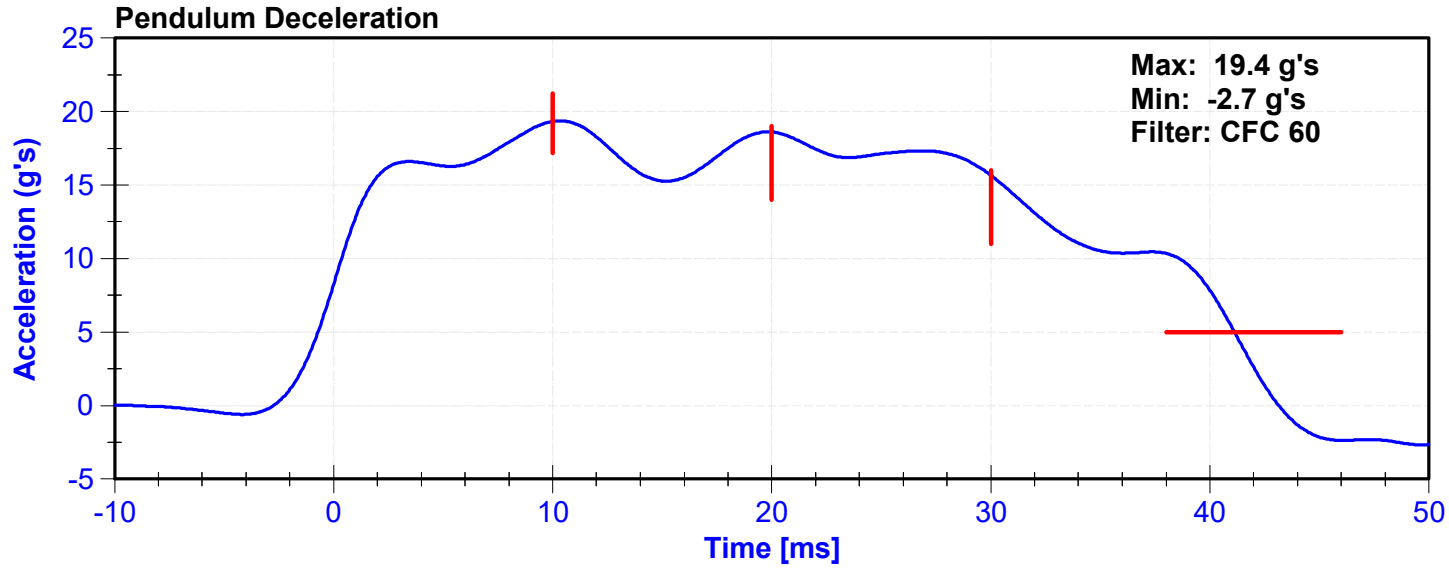
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.4	Pass
Humidity	10	70	%	41	Pass
Velocity	5.94	6.19	m/s	6.007	Pass
Pendulum Deceleration at 10ms	17.2	21.2	g's	19.33	Pass
Pendulum Deceleration at 20ms	14	19	g's	18.6	Pass
Pendulum Deceleration at 30ms	11	16	g's	15.7	Pass
Max. Pendulum Deceleration After 30ms	0	22	g's	19.4	Pass
Pendulum Deceleration Time to 5 g's	38	46	ms	41.2	Pass
Maximum D Plane Rotation	81	106	deg	93.5	Pass
Time to Maximum Rotation	72	82	ms	78.7	Pass
Rotation Decay to Zero	147	174	ms	164.0	Pass
Minimum Moment About OC	-80	-52.9	Nm	-71.20	Pass
Time to Minimum Moment	65	79	ms	74.2	Pass
Moment Decay to Zero	120	148	ms	143.4	Pass

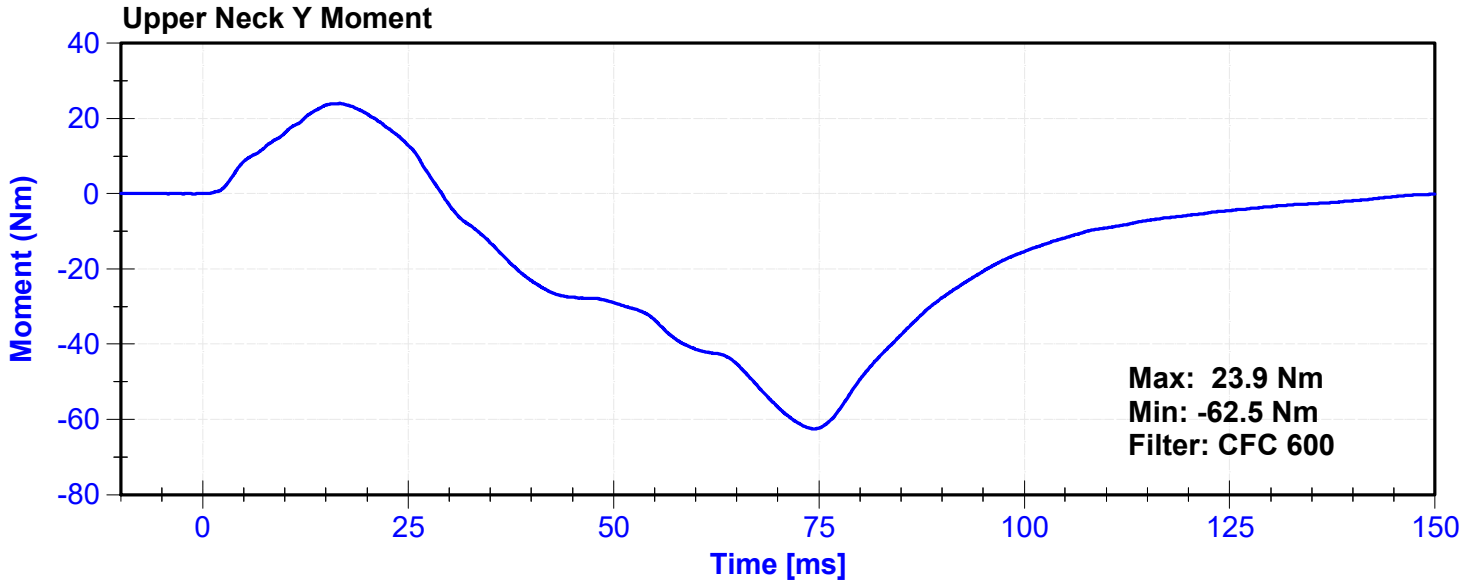
Transducer Calibrations

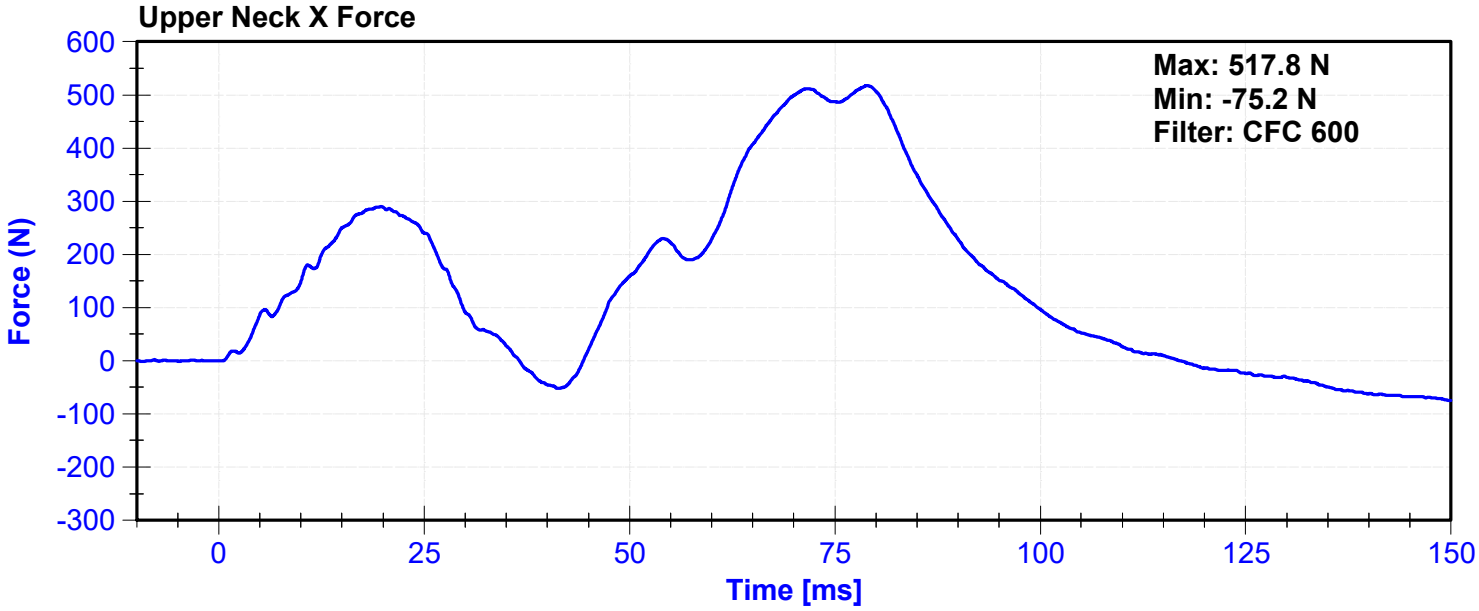
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16646	10/17/2024	10/17/2025
Pendulum Potentiometer	ETI	SP22G_LABPOT1	5/14/2025	5/14/2026
Condyle Potentiometer	ETI	SP22G_LABPOT2	5/14/2025	5/14/2026
Upper Neck Load Cell	Denton	2207-FX	7/7/2025	7/7/2026


D-Plane Rotation
Rotation (deg)
125
100
75
50
25
0
-25
-50
0
25
50
75
100
125
150
Time [ms]
Max: 93.5 deg
Min: 0.1 deg
Filter: CFC 60


Moment About Occipital Condyle
Moment (Nm)
50
25
0
-25
-50
-75
-100
0
25
50
75
100
125
150
Time [ms]
Max: 19.2 Nm
Min: -71.2 Nm
Filter: CFC 600


Pendulum Deceleration
Max: 19.4 g's
Min: -2.7 g's
Filter: CFC 60
Acceleration (g's)
Time [ms]


Upper Neck Y Moment
Max: 23.9 Nm
Min: -62.5 Nm
Filter: CFC 600
Moment (Nm)
Time [ms]


Upper Neck X Force
Max: 517.8 N
Min: -75.2 N
Filter: CFC 600
Force (N)
Time [ms]

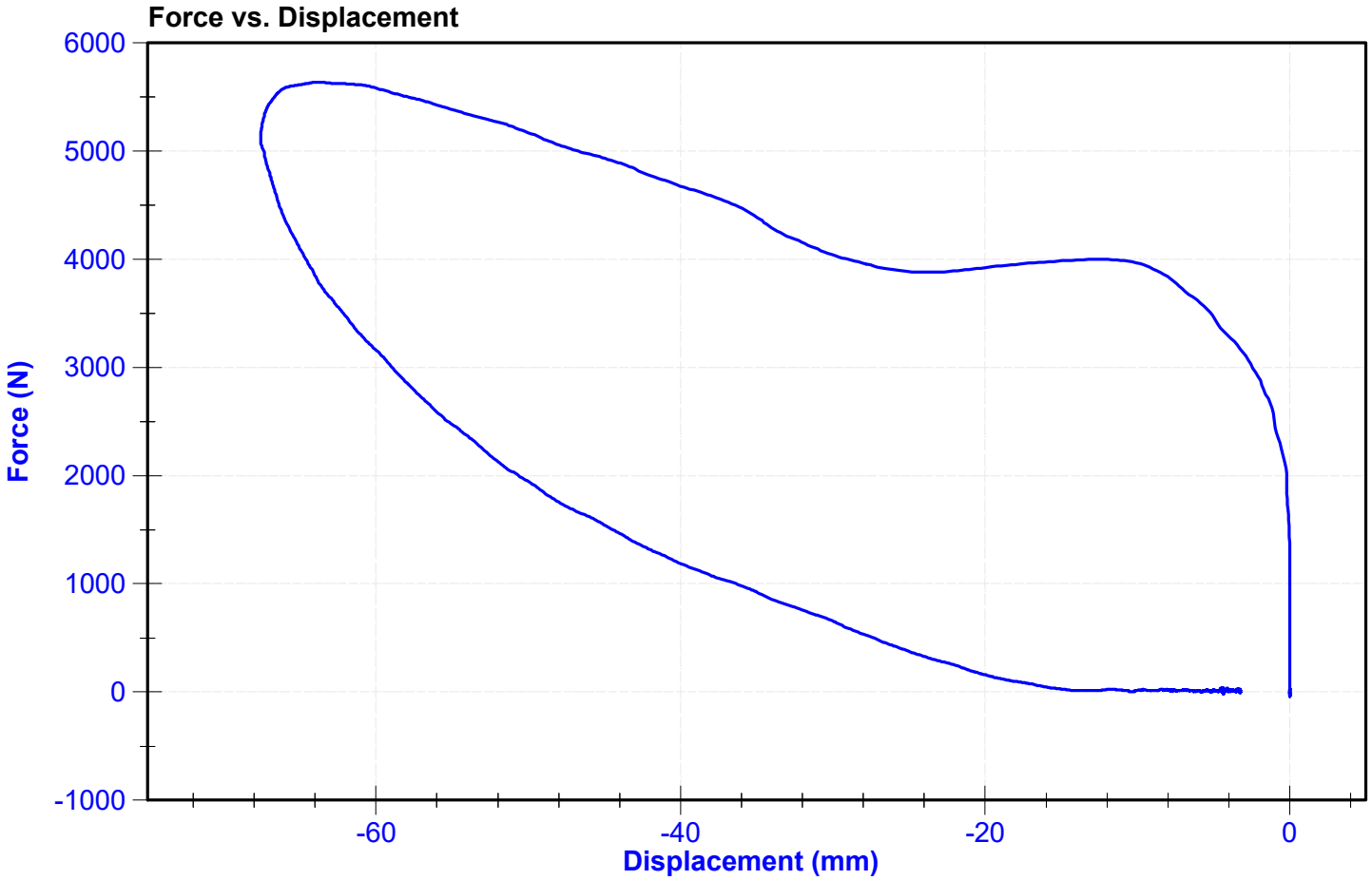
ATD Manufacturer	Humanetics	Test Technician	J. Rios
ATD Serial Number	065	Laboratory Supervisor	J. Kinderman

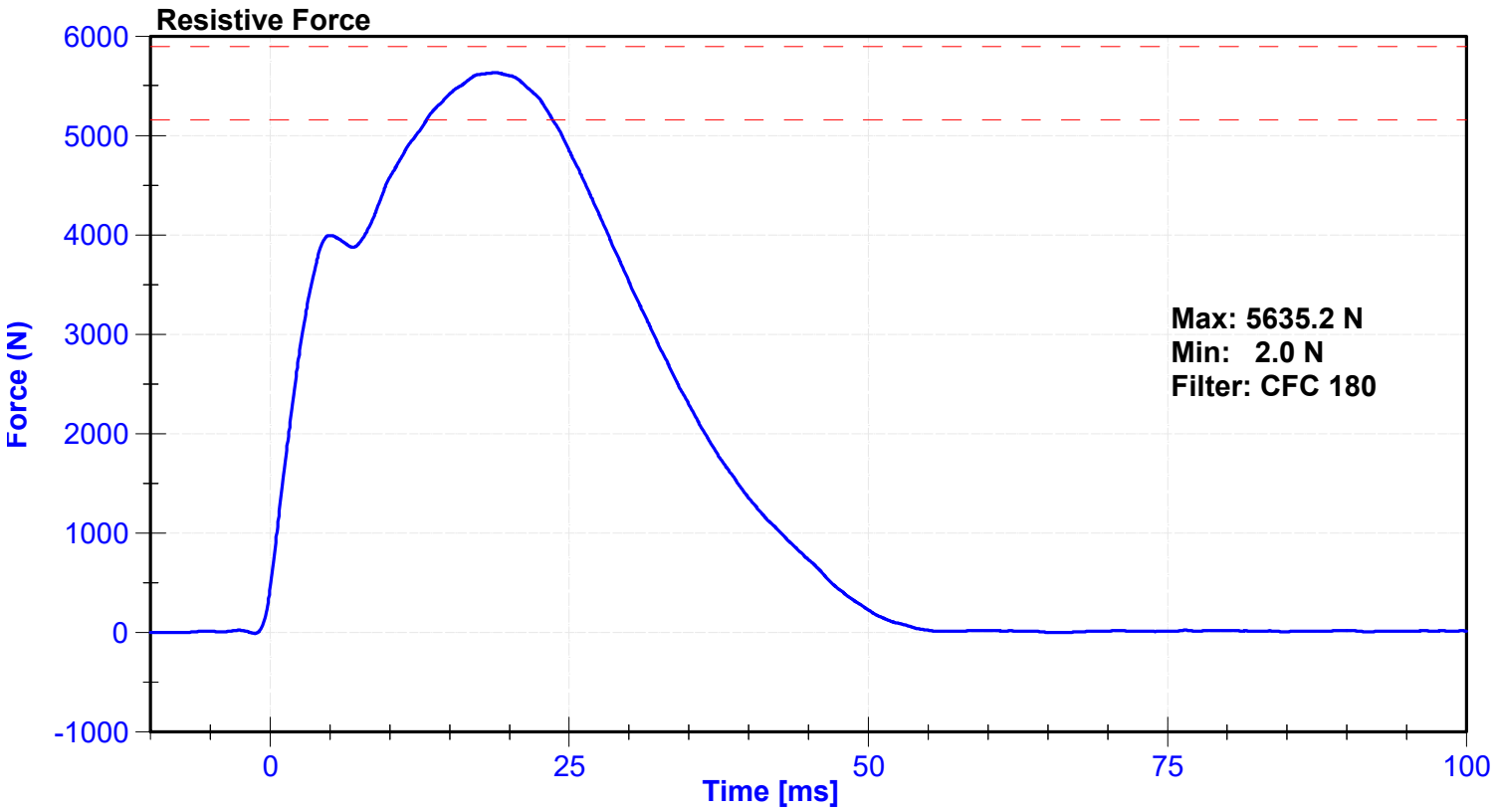
Results

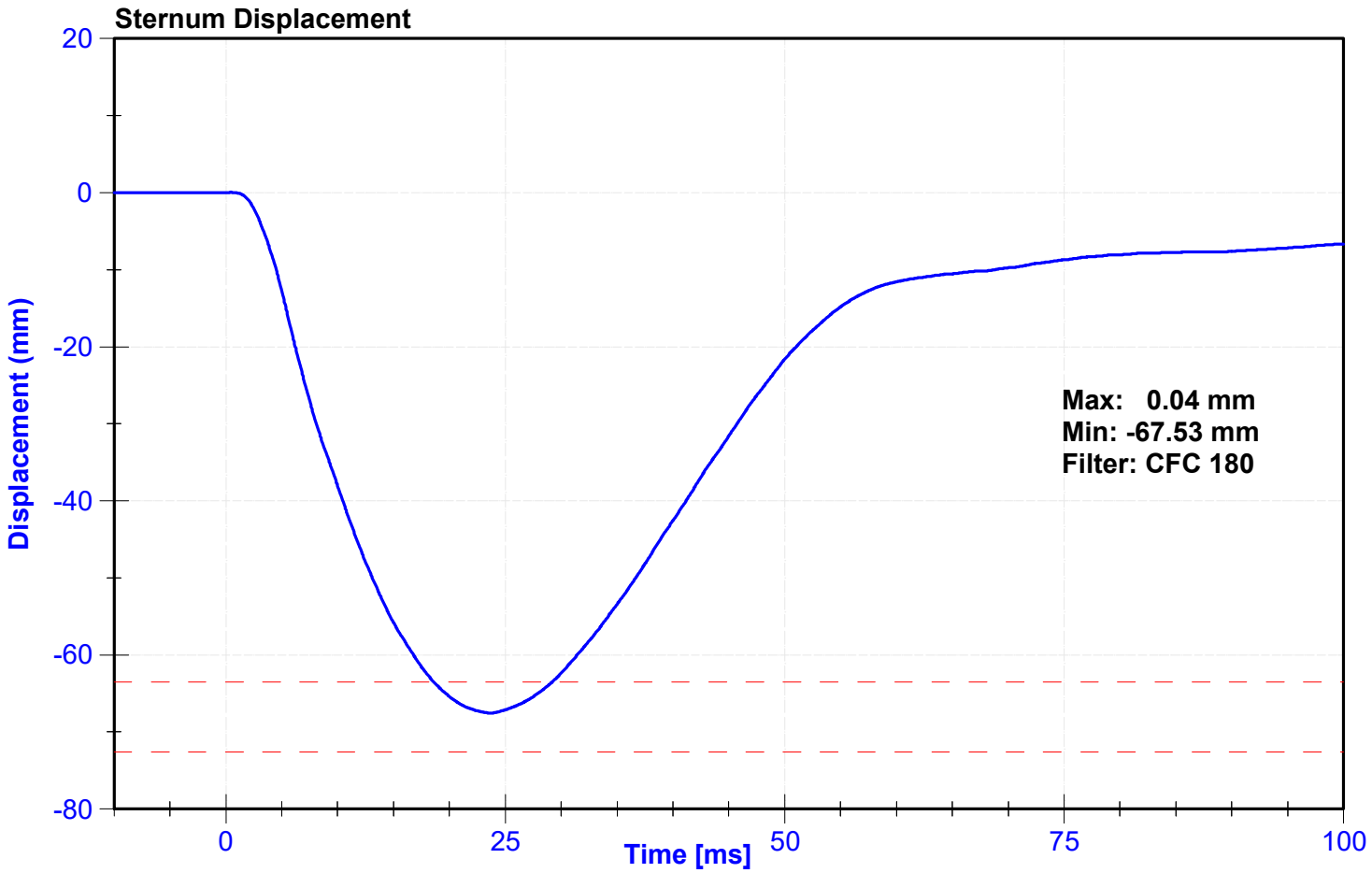
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.4	Pass
Humidity	10	70	%	39	Pass
Velocity	6.59	6.83	m/s	6.669	Pass
Chest Displacement	-72.6	-63.5	mm	-67.53	Pass
Resistive Force	5160	5894	N	5635.2	Pass
Hysteresis	69	85	%	72.3	Pass

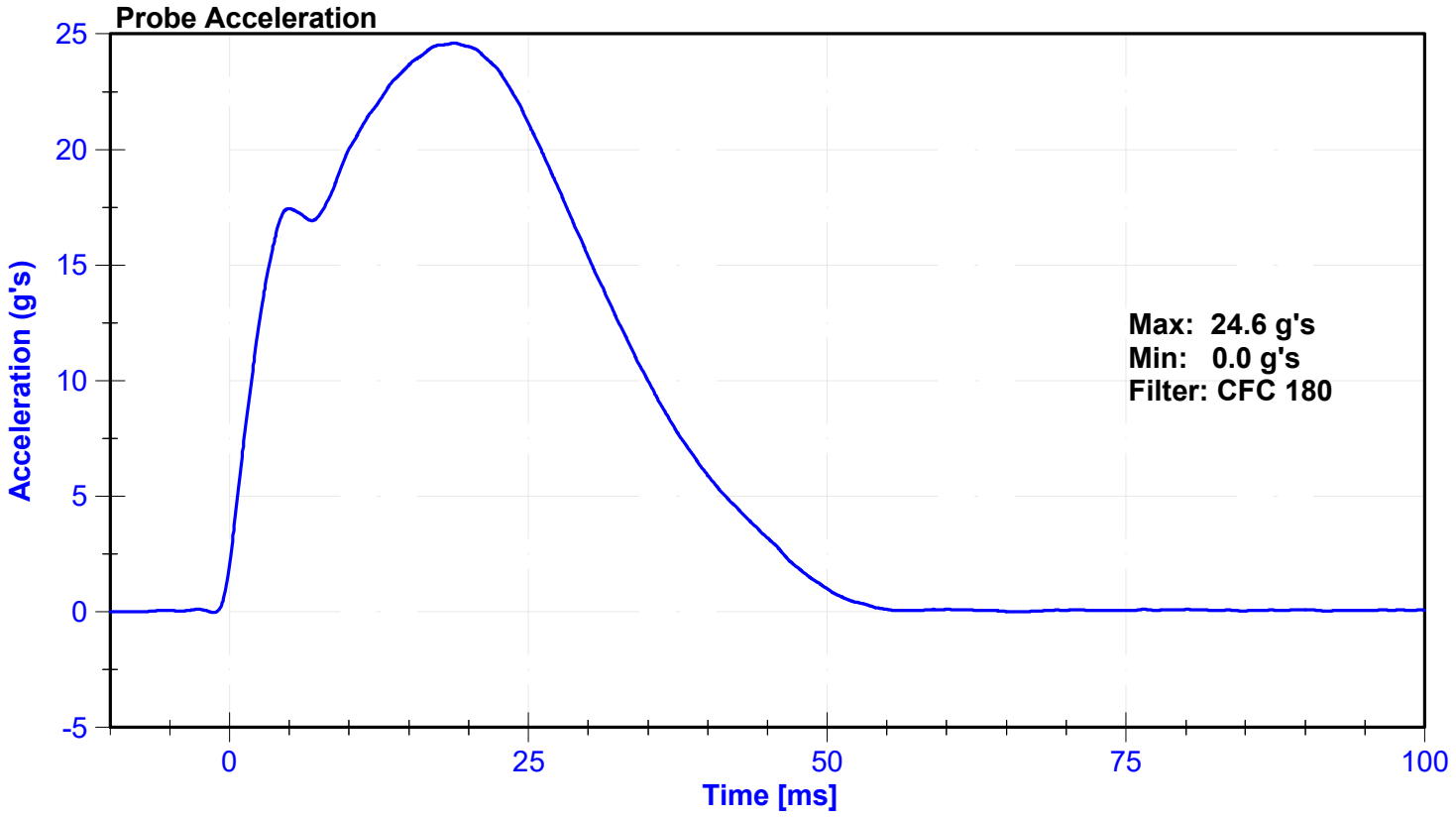
Transducer Calibrations

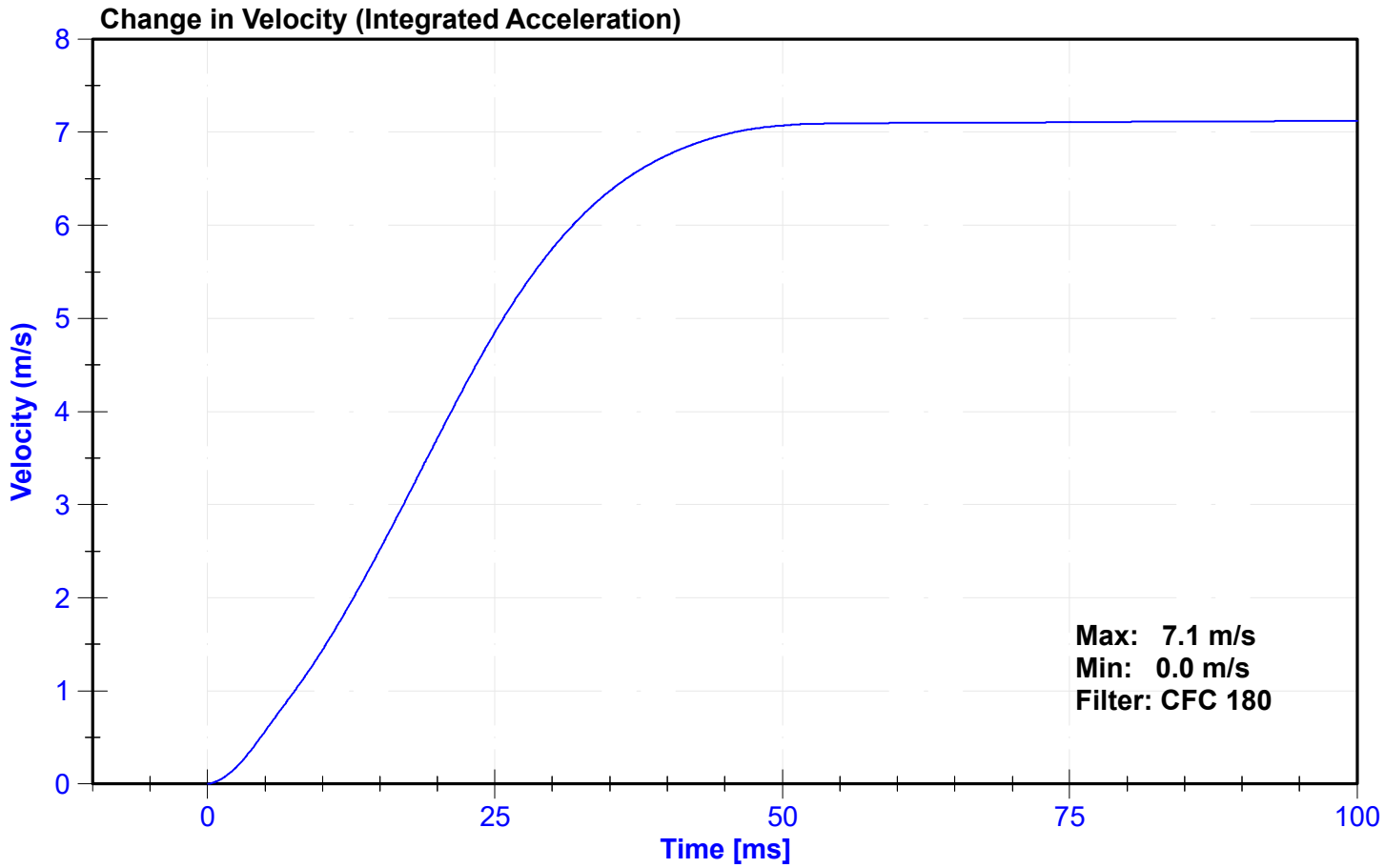
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25863	1/17/2025	1/17/2026
Chest Potentiometer	Servo	1046	6/10/2025	12/9/2025




Resistive Force
Force (N)
6000
5000
4000
3000
2000
1000
0
-1000
0
25
50
75
100
Time [ms]
Max: 5635.2 N
Min: 2.0 N
Filter: CFC 180


Sternum Displacement
Displacement (mm)
20
0
-20
-40
-60
-80
0
25
50
75
100
Time [ms]
Max: 0.04 mm
Min: -67.53 mm
Filter: CFC 180


Probe Acceleration
Acceleration (g's)
25
20
15
10
5
0
-5
0
25
50
75
100
Time [ms]
Max: 24.6 g's
Min: 0.0 g's
Filter: CFC 180


Change in Velocity (Integrated Acceleration)
Velocity (m/s)
8
7
6
5
4
3
2
1
0
0
25
50
75
100
Time [ms]
Max: 7.1 m/s
Min: 0.0 m/s
Filter: CFC 180

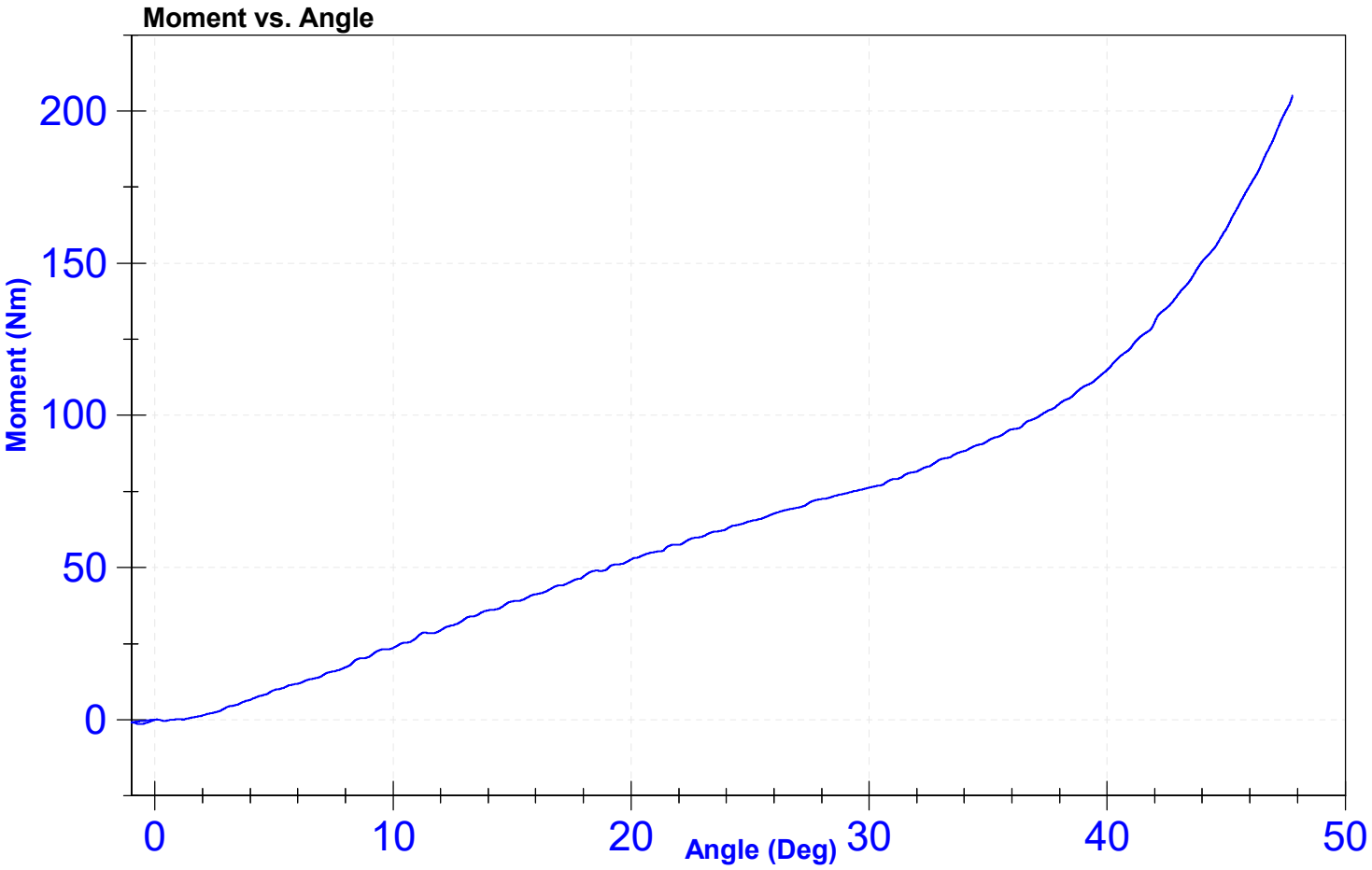
ATD Manufacturer	Humanetics	Test Technician	J. Rios
ATD Serial Number	065	Laboratory Supervisor	J. Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	ºC	21.5	Pass
Humidity	10	70	%	40	Pass
Average Velocity	5	10	deg/s	7.8	Pass
Angle at 203Nm	40	50	deg	47.7	Pass
Moment at 30 degrees	0	94.9	Nm	76.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	ETI SP22	DS0008	9/29/2025	9/29/2026
Load Cell	PCB 2301-02	115	2024-11-11	2025-11-11



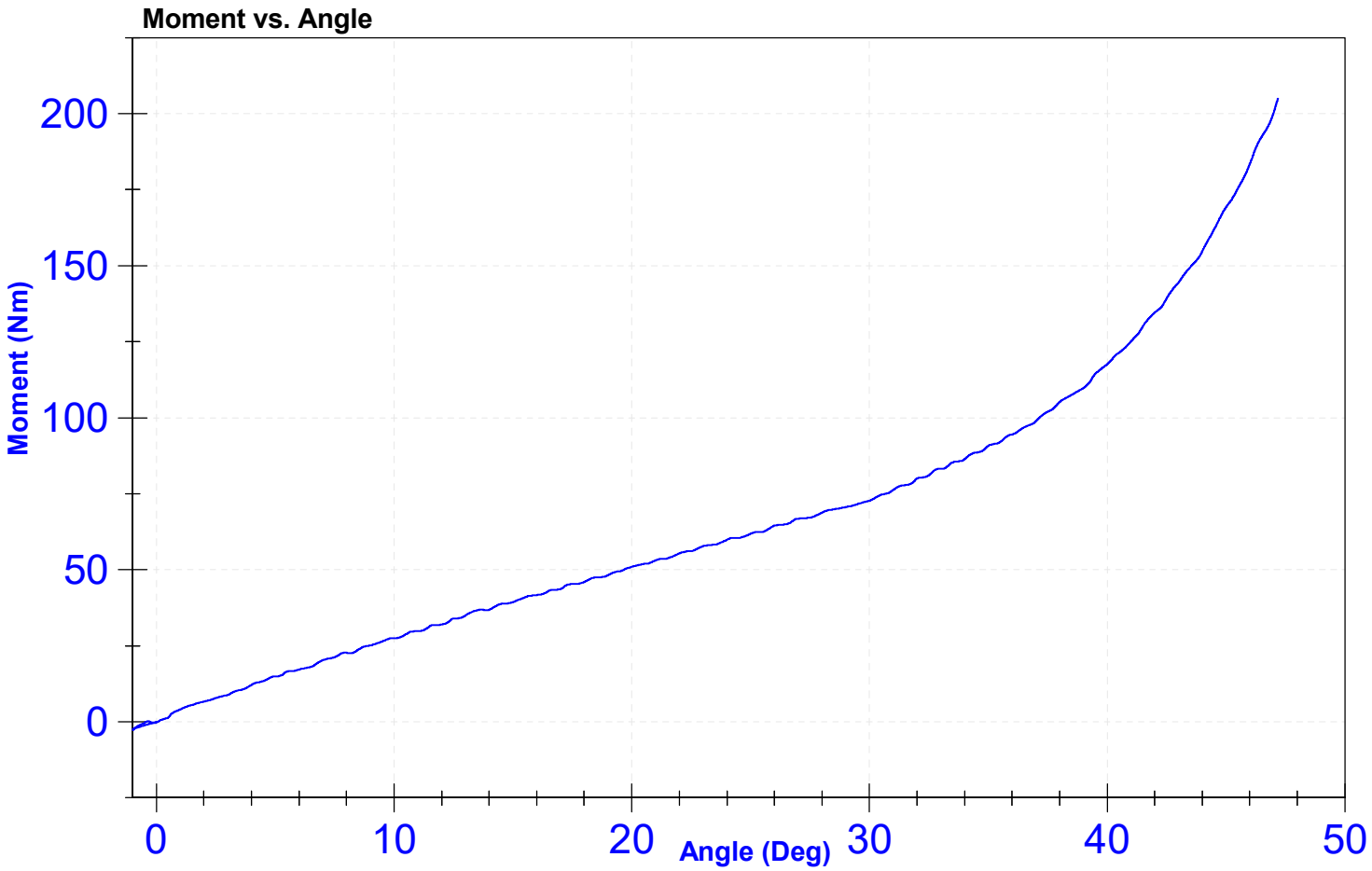
ATD Manufacturer	Humanetics	Test Technician	J. Rios
ATD Serial Number	065	Laboratory Supervisor	J. Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	ºC	21.5	Pass
Humidity	10	70	%	40	Pass
Average Velocity	5	10	deg/s	7.8	Pass
Angle at 203Nm	40	50	deg	47.1	Pass
Moment at 30 degrees	0	94.9	Nm	72.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	ETI SP22	DS0008	9/29/2025	9/29/2026
Load Cell	PCB 2301-02	115	2024-11-11	2025-11-11



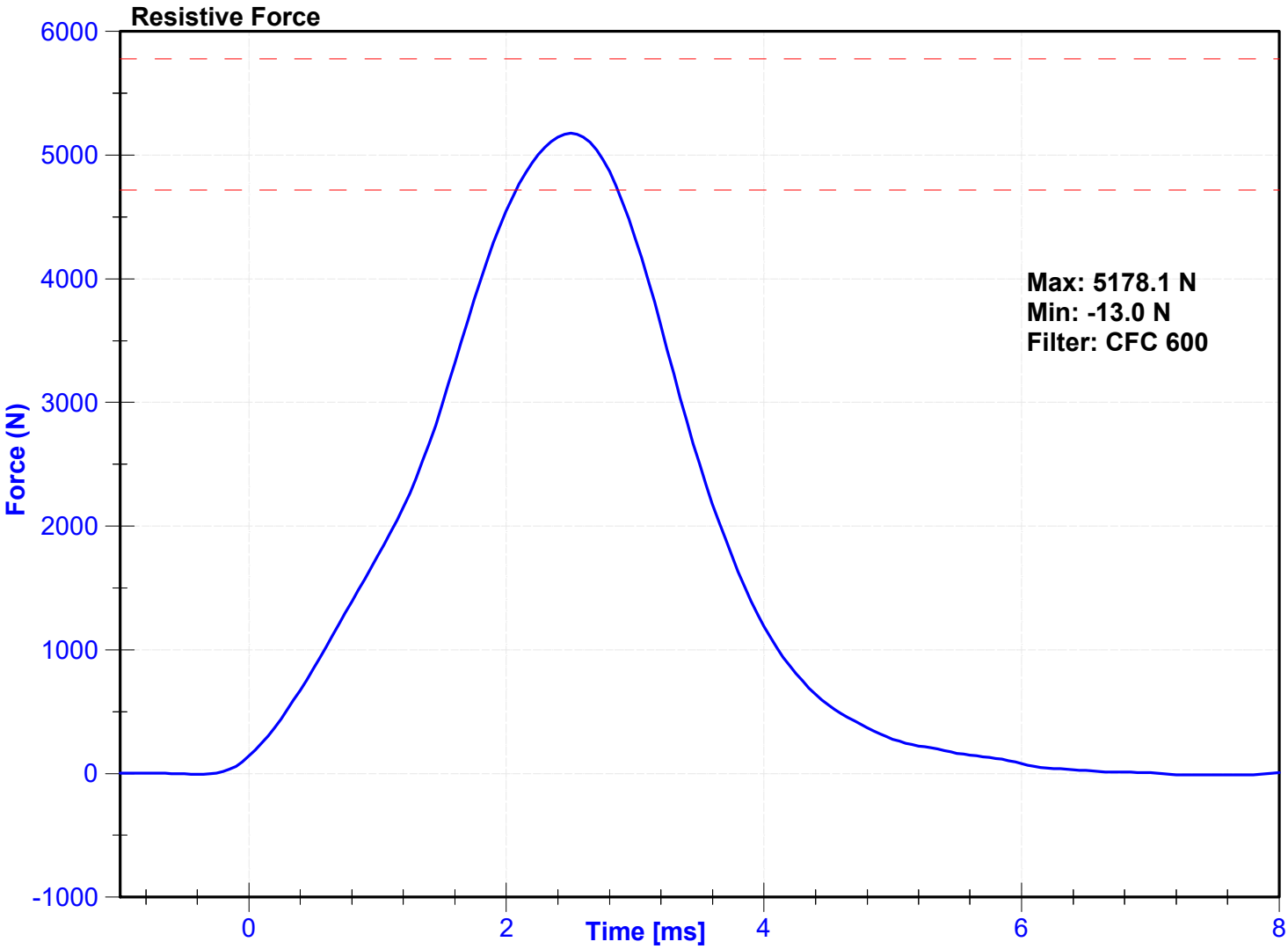
ATD Manufacturer	Humanetics	Test Technician	J. Rios
ATD Serial Number	065	Laboratory Supervisor	J. Kinderman

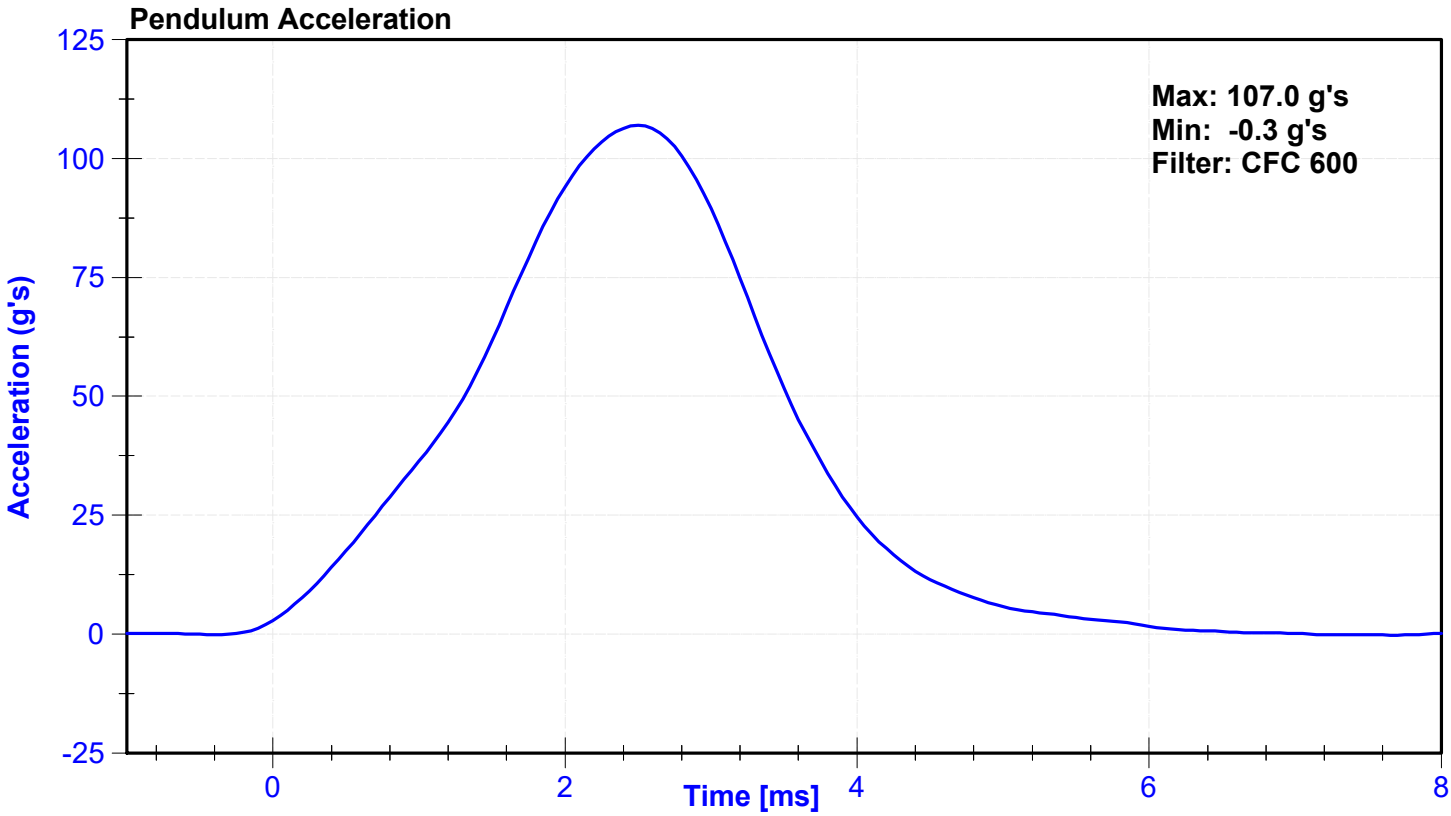
Results

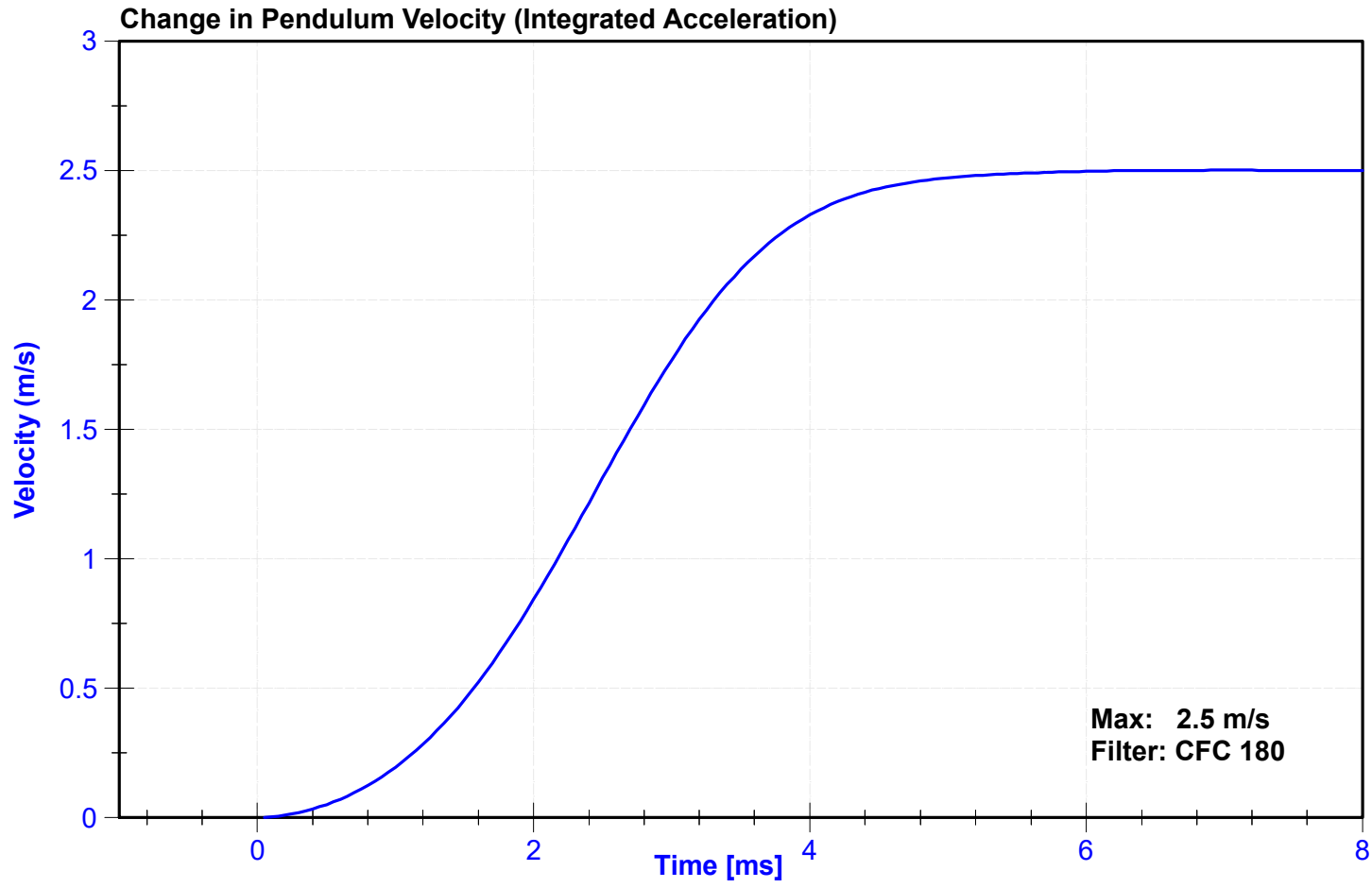
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	ºC	21.4	Pass
Humidity	10	70	%	44	Pass
Velocity	2.07	2.13	m/s	2.087	Pass
Maximum Resistive Force	4720	5780	N	5178.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18566	5/7/2025	11/3/2025




Pendulum Acceleration
Max: 107.0 g's
Min: -0.3 g's
Filter: CFC 600
Acceleration (g's)
125
100
75
50
25
0
-25
0
2
4
6
8
Time [ms]


Change in Pendulum Velocity (Integrated Acceleration)
Max: 2.5 m/s
Filter: CFC 180
Velocity (m/s)
3
2.5
2
1.5
1
0.5
0
0
2
4
6
8
Time [ms]

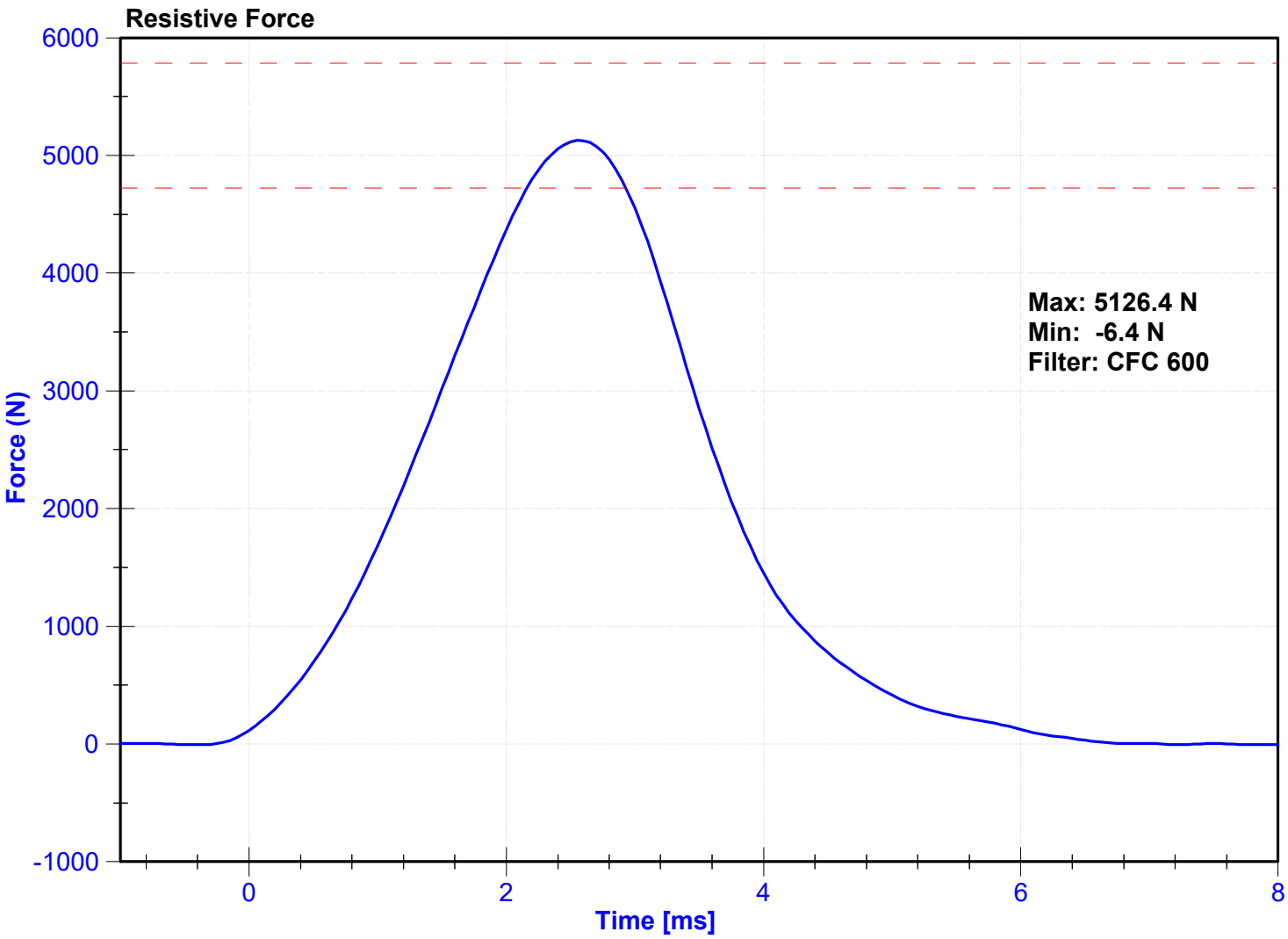
ATD Manufacturer	Humanetics	Test Technician	J. Rios
ATD Serial Number	065	Laboratory Supervisor	J. Kinderman

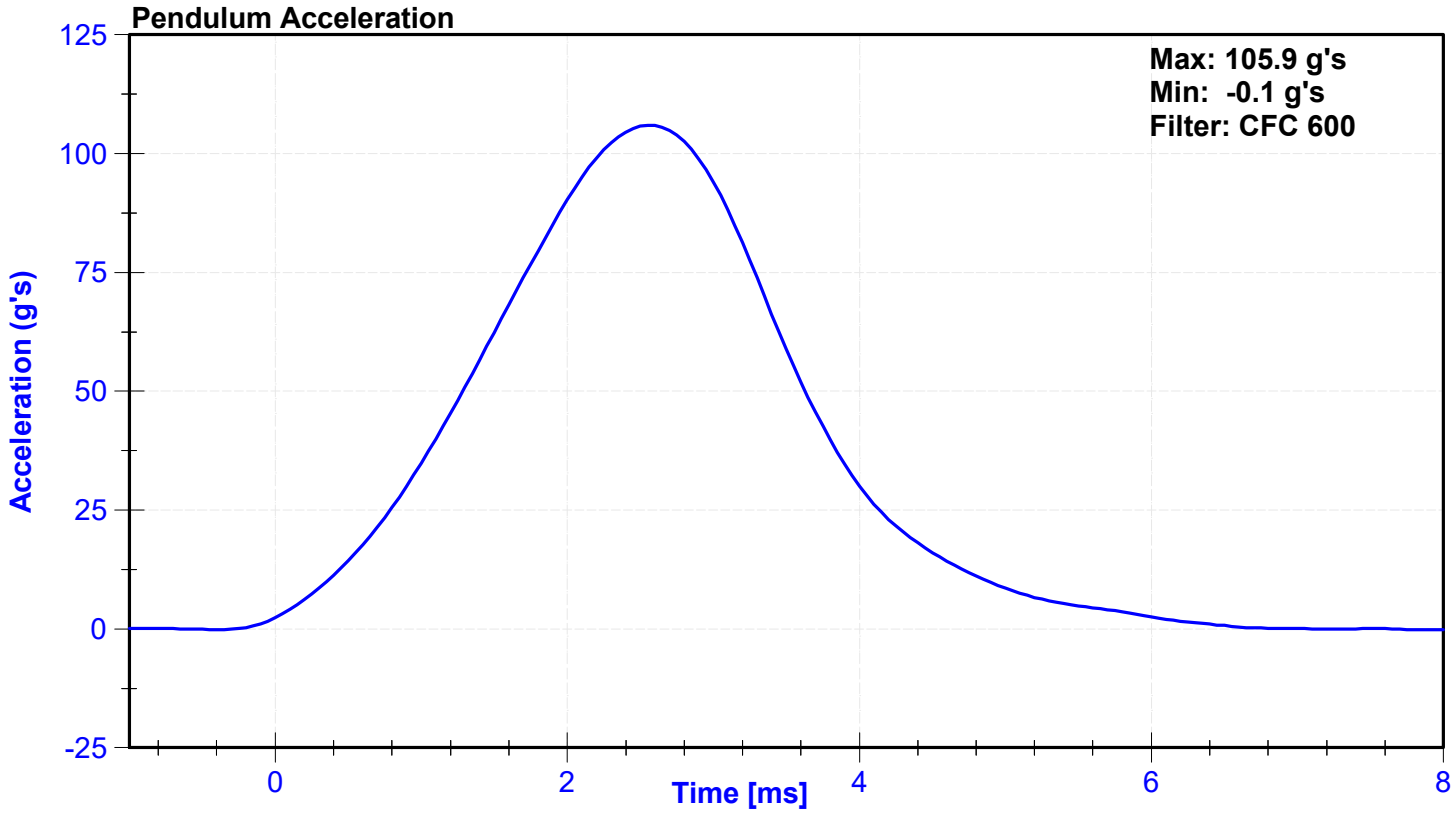
Results

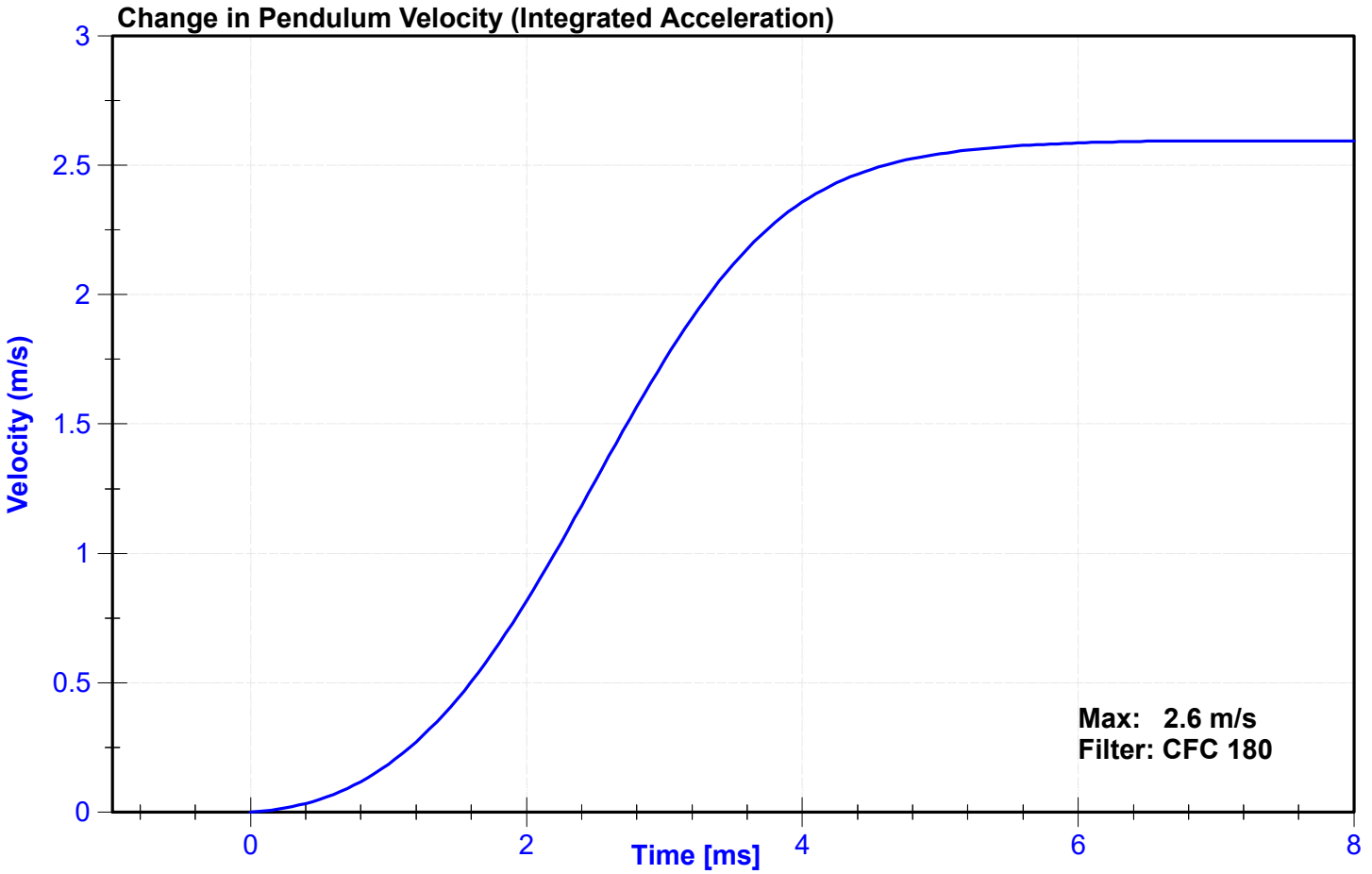
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	ºC	21.4	Pass
Humidity	10	70	%	44	Pass
Velocity	2.07	2.13	m/s	2.086	Pass
Maximum Resistive Force	4720	5780	N	5126.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18566	5/7/2025	11/3/2025




Pendulum Acceleration
Max: 105.9 g's
Min: -0.1 g's
Filter: CFC 600
Acceleration (g's)
125
100
75
50
25
0
-25
0
2
4
6
8
Time [ms]


Change in Pendulum Velocity (Integrated Acceleration)
Max: 2.6 m/s
Filter: CFC 180
Velocity (m/s)
3
2.5
2
1.5
1
0.5
0
0
2
4
6
8
Time [ms]

CALIBRATION TEST RESULTS

POST-TEST

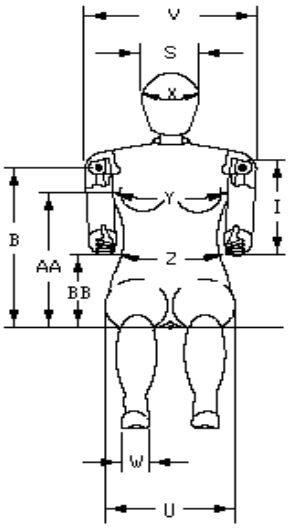
HYBRID III 5TH PERCENTILE FEMALE - PASSENGER ATD

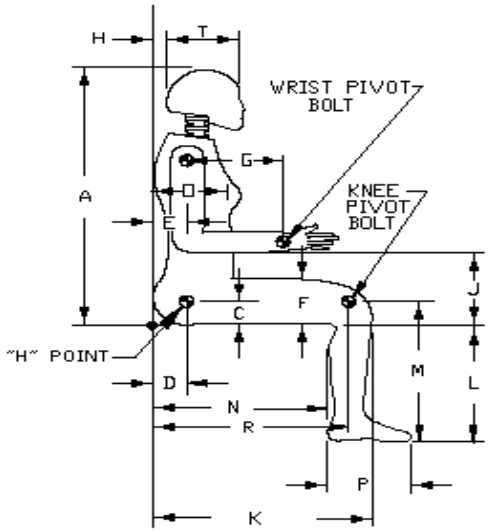
SERIAL NO: 137

External Measurements - Hybrid 3 - 5th Female

Technician: J. Rios Date: 10/06/2025

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	446	Pass
C	H-Point Height	81	86	86	Pass
D	H-Point from Backline	145	150	148	Pass
E	Shoulder Pivot from Backline	69	84	81	Pass
F	Thigh Clearance	119	135	129	Pass
G	Back of Elbow to Wrist Pivot	244	259	255	Pass
H	Head Back to Backline	43	48	46	Pass
I	Shoulder to Elbow Length	277	297	282	Pass
J	Elbow Rest Height	183	203	198	Pass
K	Buttock to Knee Length	521	546	540	Pass
L	Popliteal Height	356	376	364	Pass
M	Knee Pivot Height	394	419	413	Pass
N	Buttock Popliteal Length	414	439	428	Pass
O	Chest Depth without Jacket	175	191	182	Pass
P	Foot Length (right)	219	234	227	Pass
R	Buttock To Knee Pivot Length	457	483	470	Pass
S	Head Breadth	137	147	141	Pass
T	Head Depth	178	188	184	Pass
U	Hip Breadth	300	315	307	Pass
V	Shoulder Breadth	351	366	359	Pass
W	Foot Breadth	79	94	88	Pass
X	Head Circumference	528	549	540	Pass
Y	Chest Circumference with Jacket	851	881	864	Pass
Z	Waist Circumference	460	790	632	Pass
AA	Reference Location (Chest Circumference)	333	358	343	Pass
BB	Reference Location (Waist Circumference)	160	170	164	Pass

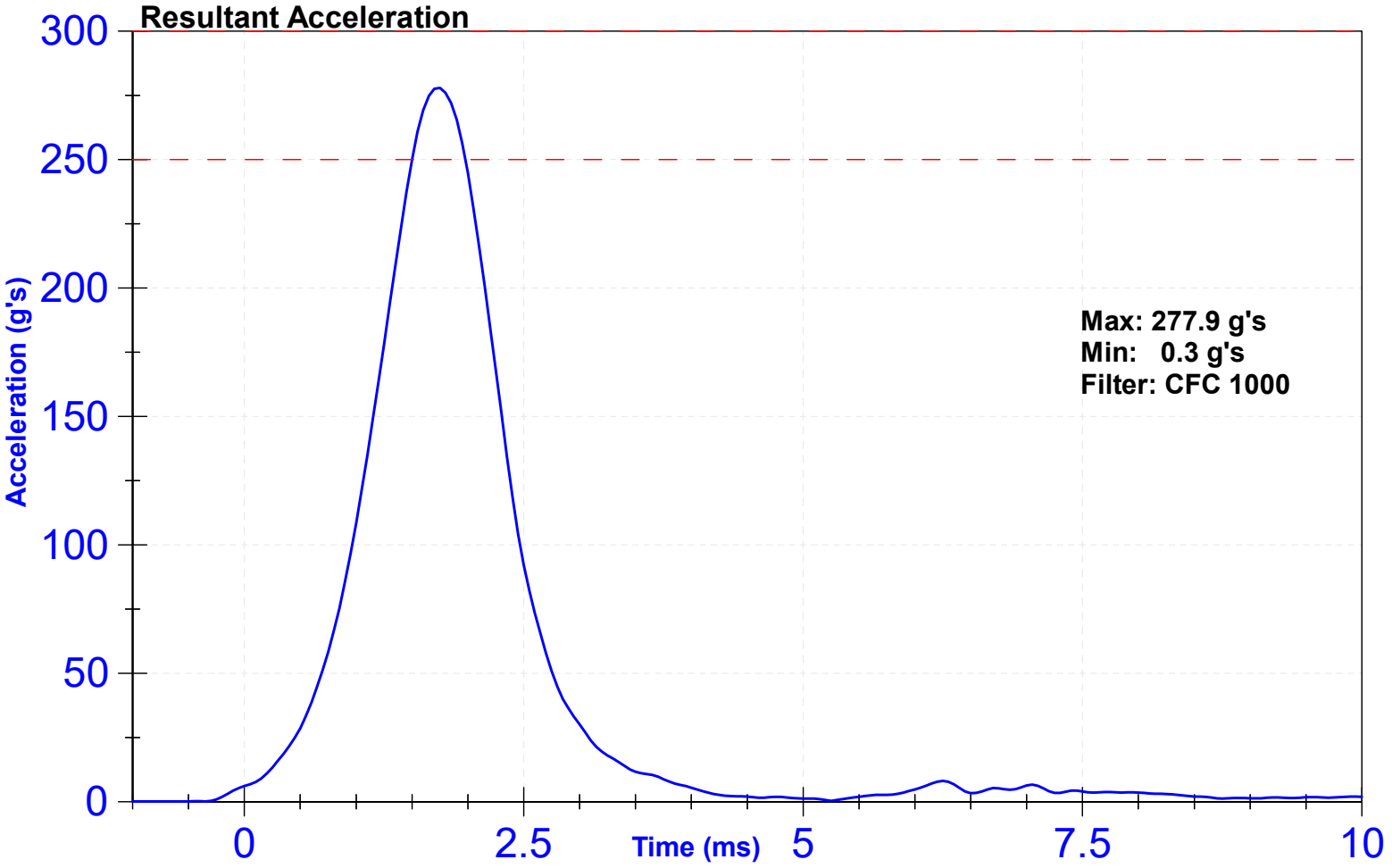
ATD Manufacturer	Humanetics	Test Technician	Z. Nyhart
ATD Serial Number	137	Laboratory Supervisor	J. Kinderman

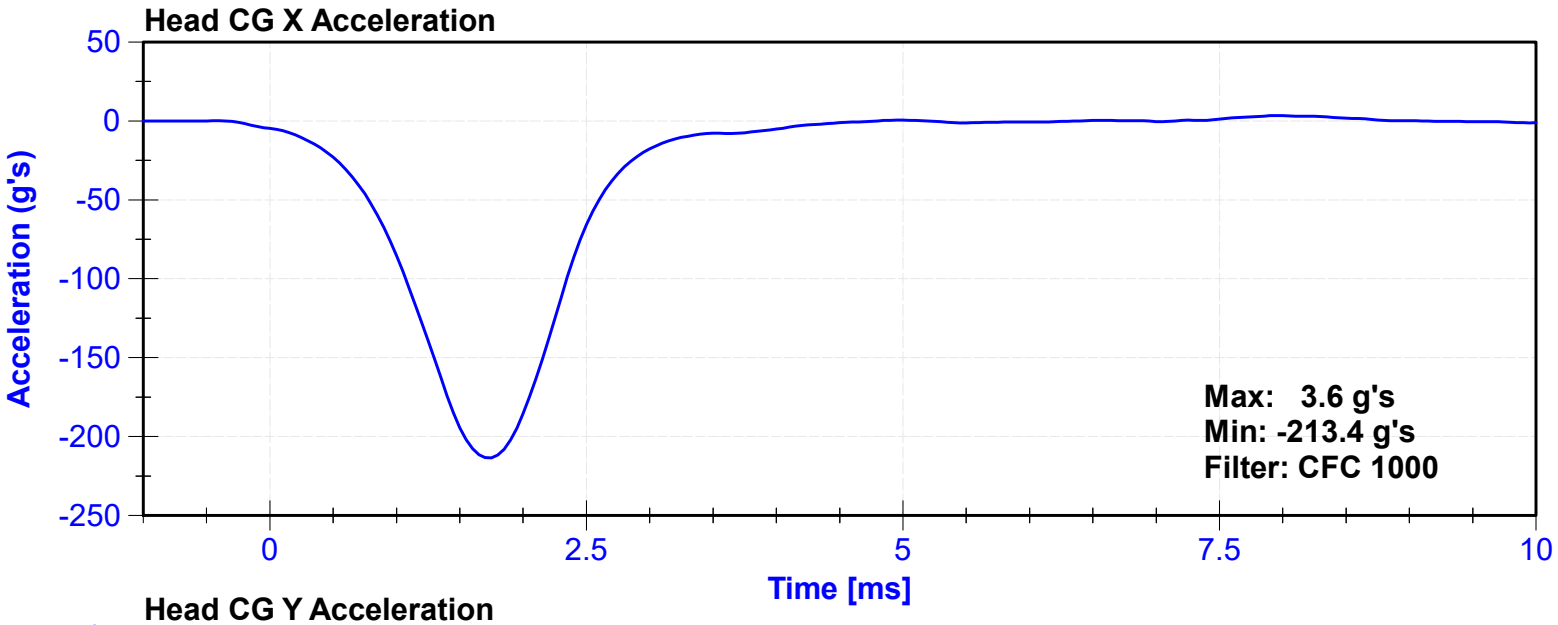
Results

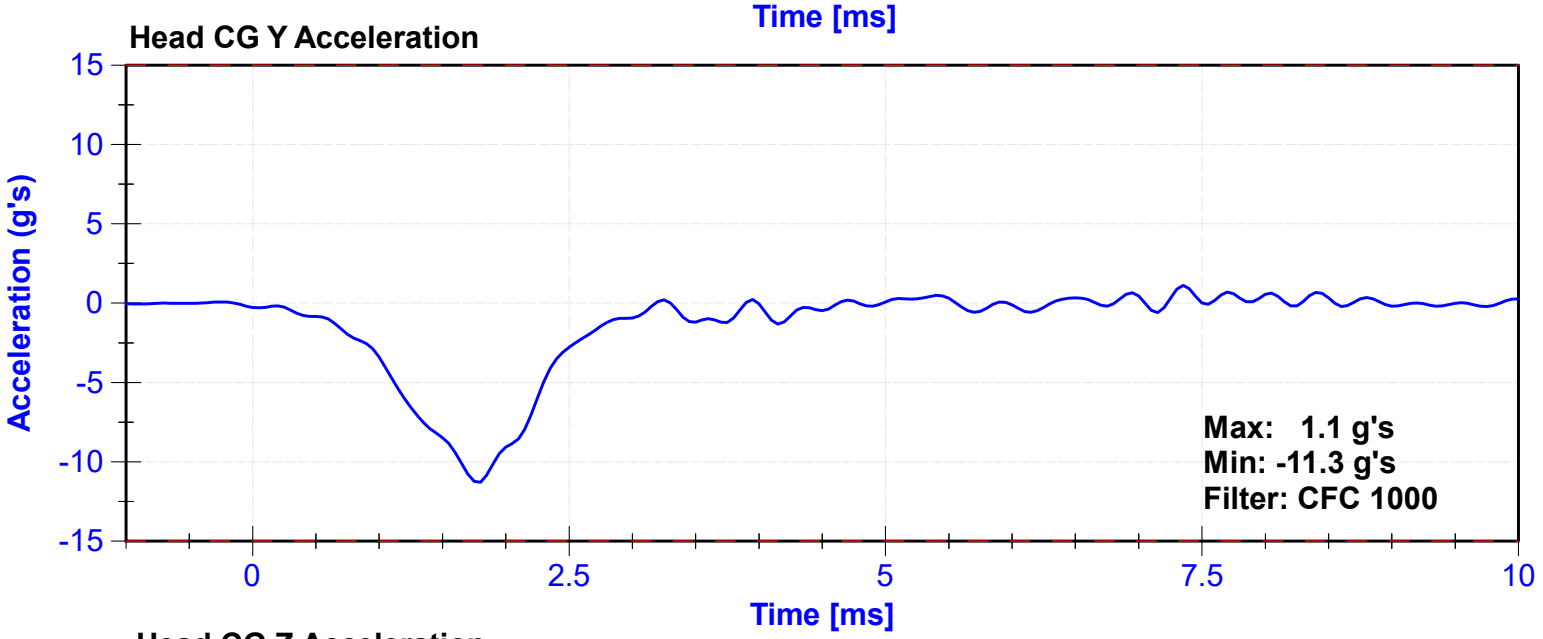
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	ºC	21.4	Pass
Humidity	10	70	%	44	Pass
Resultant Acceleration	250	300	g's	277.9	Pass
Oscillation	0	10	%	2.9	Pass
Lateral Acceleration	-15	15	g's	-11.3	Pass

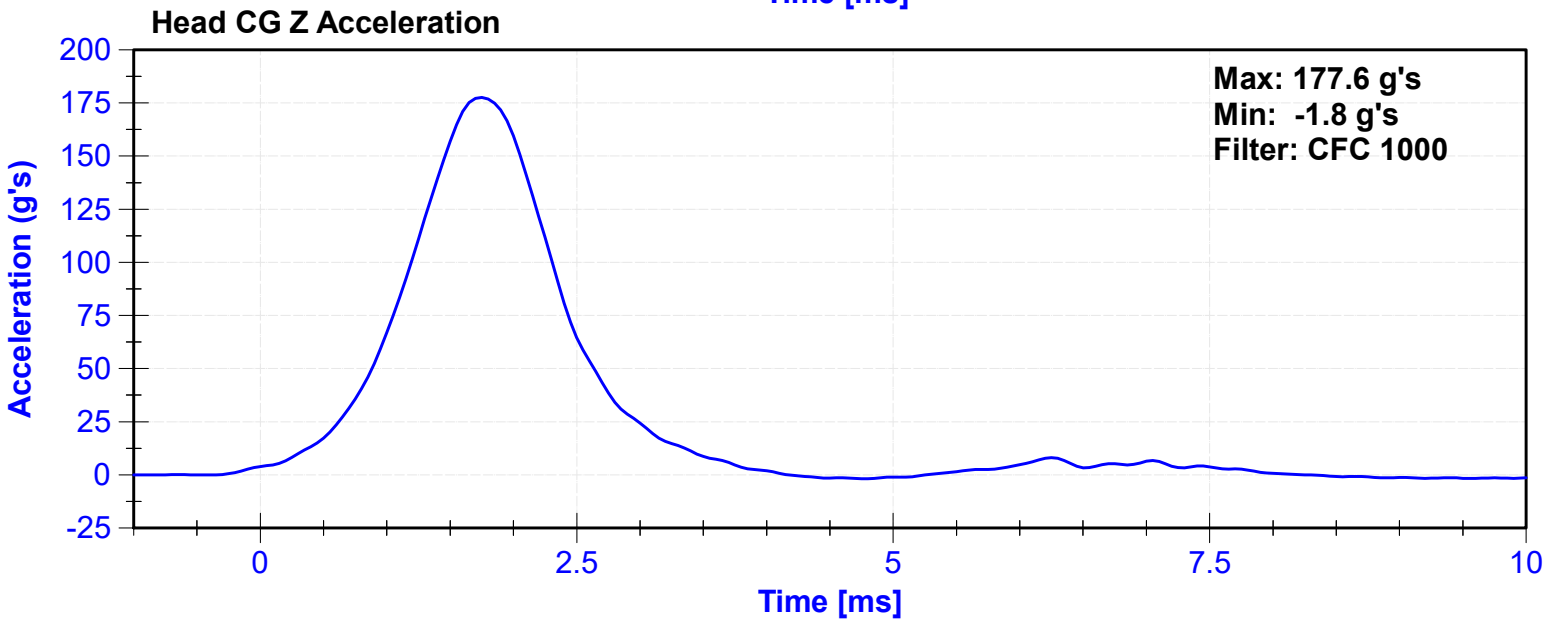
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	P79417	6/11/2025	12/8/2025
Y Accelerometer	Endevco	P83335	6/11/2025	12/8/2025
Z Accelerometer	Endevco	P64149	6/11/2025	12/8/2025




Head CG X Acceleration
Acceleration (g's)
50
0
-50
-100
-150
-200
-250
0
2.5
5
7.5
10
Time [ms]
Max: 3.6 g's
Min: -213.4 g's
Filter: CFC 1000


Head CG Y Acceleration
Acceleration (g's)
15
10
5
0
-5
-10
-15
0
2.5
5
7.5
10
Time [ms]
Max: 1.1 g's
Min: -11.3 g's
Filter: CFC 1000


Head CG Z Acceleration
Acceleration (g's)
200
175
150
125
100
75
50
25
0
-25
0
2.5
5
7.5
10
Time [ms]
Max: 177.6 g's
Min: -1.8 g's
Filter: CFC 1000

ATD Manufacturer	Humanetics	Test Technician	Z. Nyhart
ATD Serial Number	137	Laboratory Supervisor	J. Kinderman

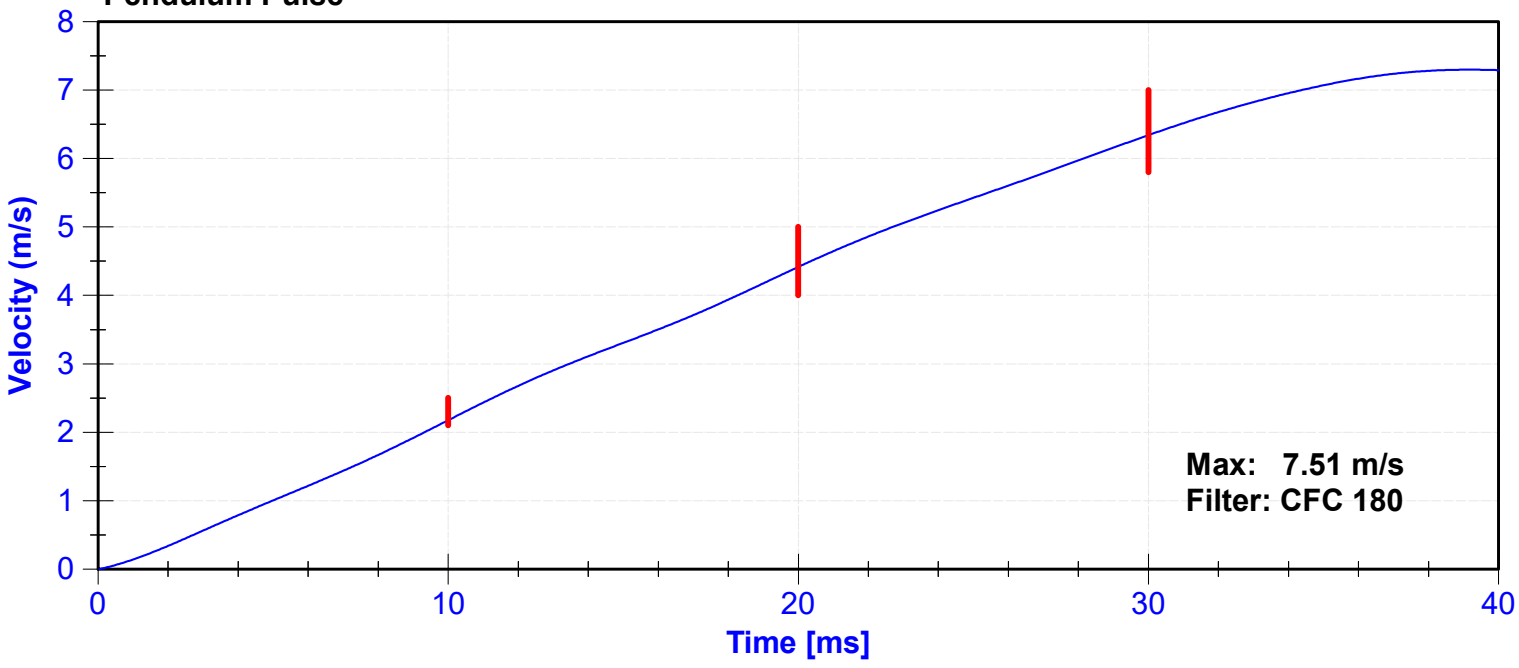
Results

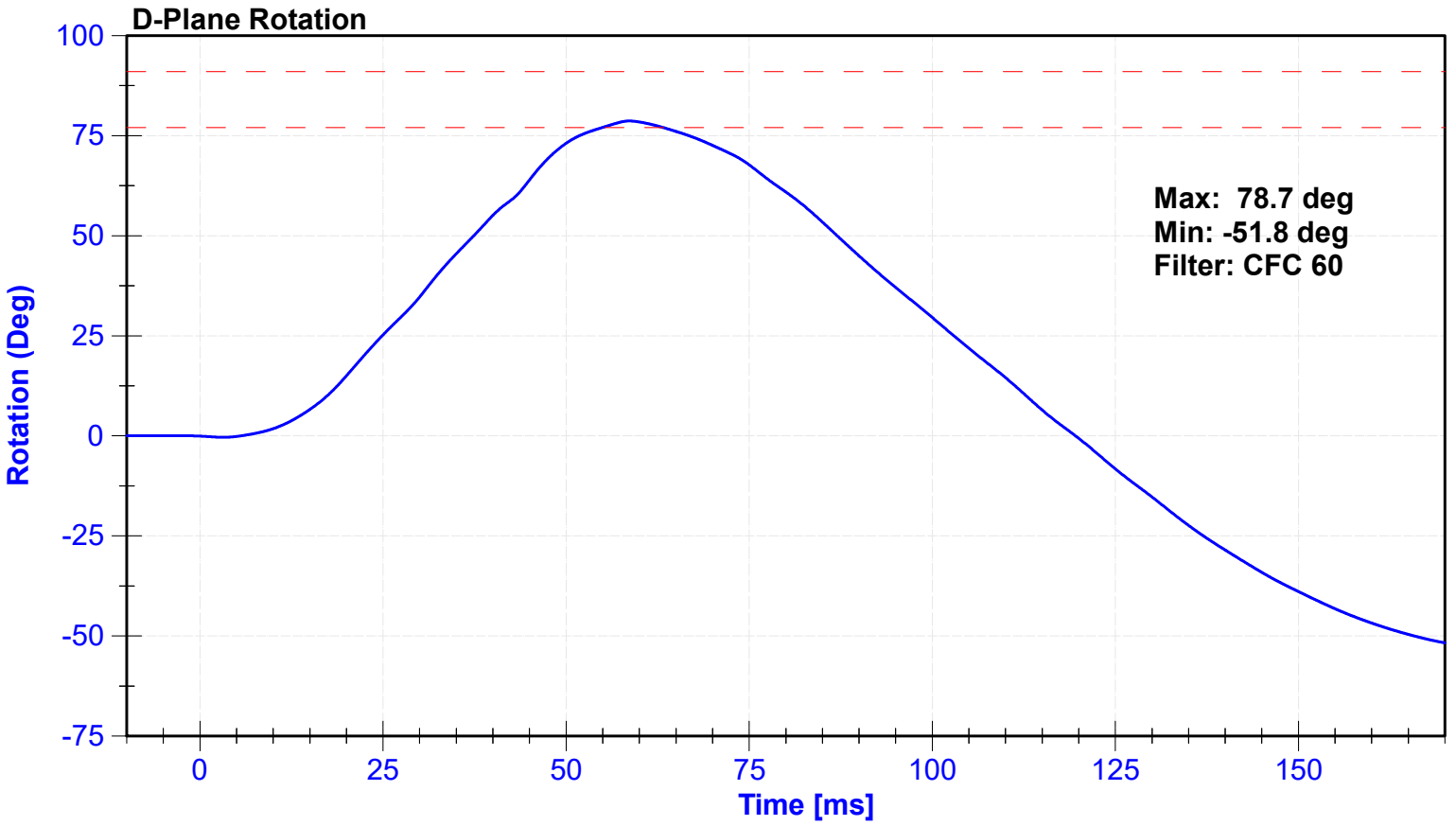
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.4	Pass
Humidity	10	70	%	43	Pass
Velocity	6.89	7.13	m/s	6.979	Pass
Pendulum Impulse at 10ms	2.1	2.5	m/s	2.17	Pass
Pendulum Impulse at 20ms	4.0	5.0	m/s	4.41	Pass
Pendulum Impulse at 30ms	5.8	7.0	m/s	6.34	Pass
Max D Plane Rotation	77	91	deg	78.7	Pass
Max Moment During Rotation Interval	69	83	Nm	82.2	Pass
Moment Decay to 10.0 Nm	80	100	ms	87.0	Pass

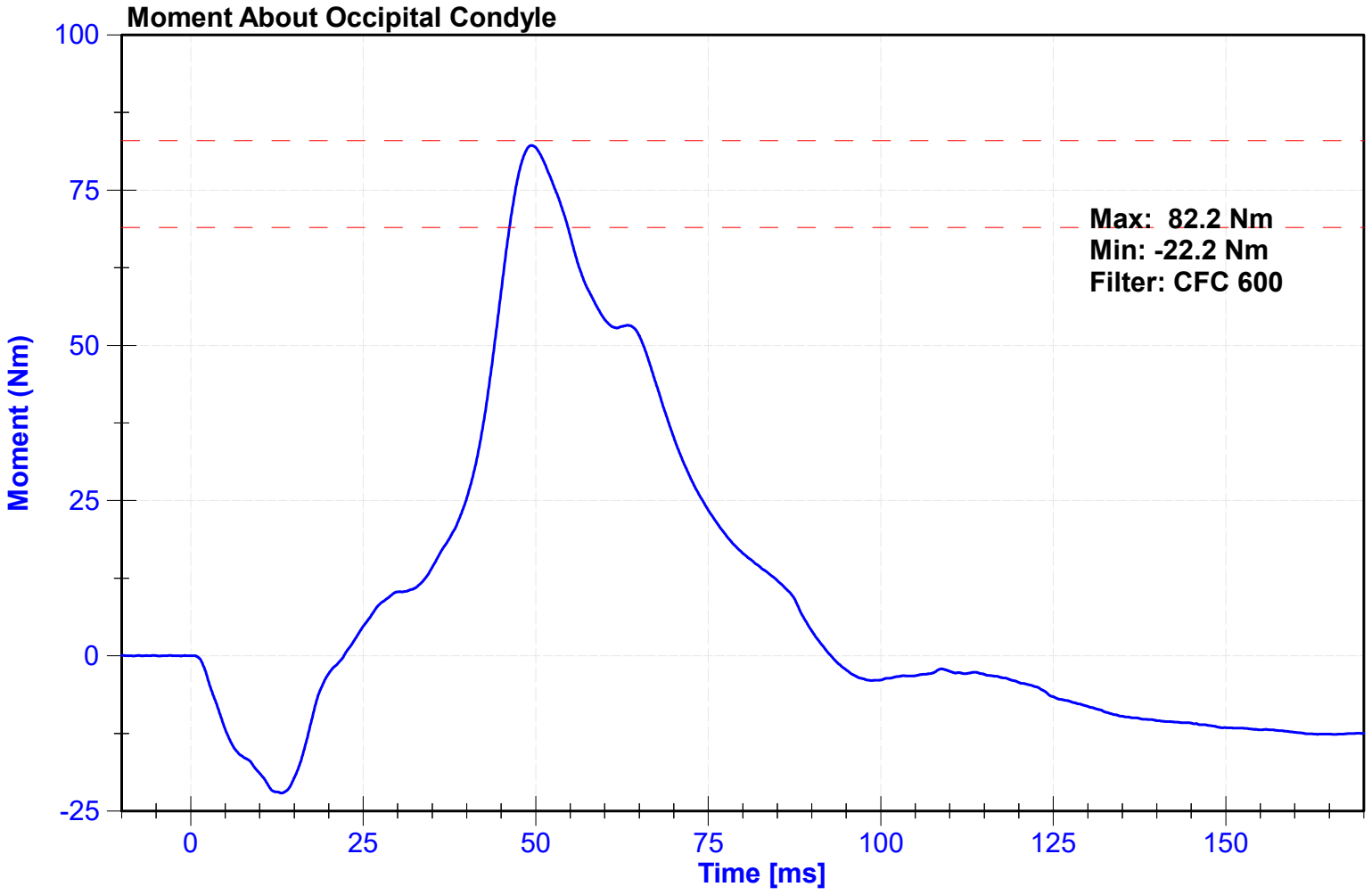
Transducer Calibrations

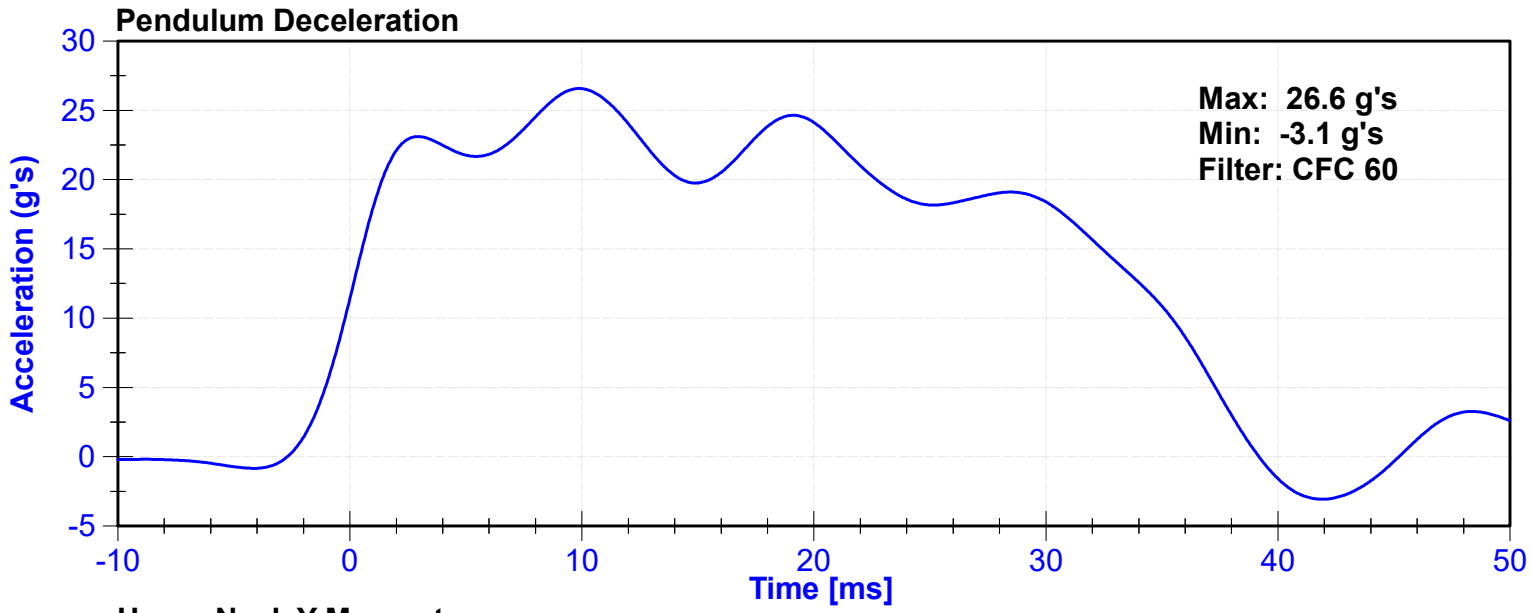
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16646	10/17/2024	10/17/2025
Pendulum Potentiometer	ETI	SP22G_LABPOT1	5/14/2025	5/14/2026
Condyle Potentiometer	ETI	SP22G_LABPOT2	5/14/2025	5/14/2026
Upper Neck Load Cell	Humanetics	1872-FX	7/7/2025	7/7/2026

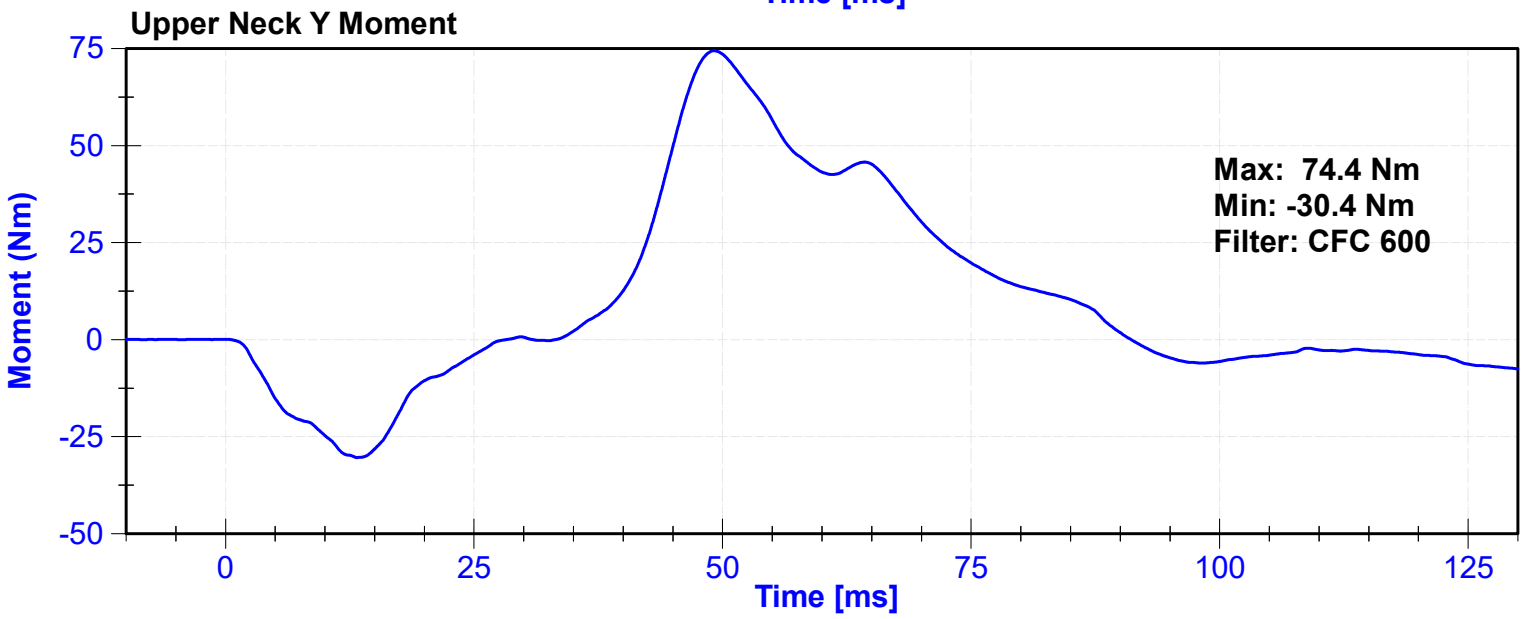
Pendulum Pulse

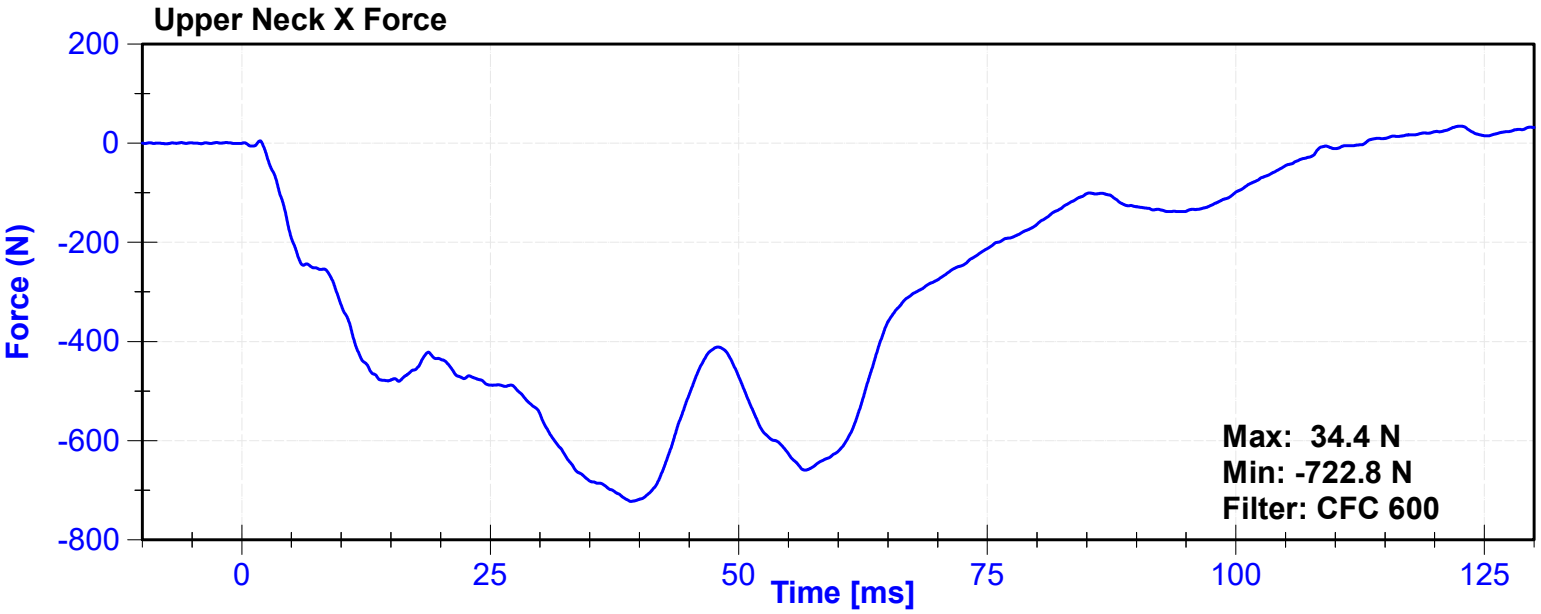



D-Plane Rotation
Max: 78.7 deg
Min: -51.8 deg
Filter: CFC 60
Rotation (Deg)
100
75
50
25
0
-25
-50
-75
0
25
50
75
100
125
150
Time [ms]


Moment About Occipital Condyle
Max: 82.2 Nm
Min: -22.2 Nm
Filter: CFC 600
Moment (Nm)
100
75
50
25
0
-25
0
25
50
75
100
125
150
Time [ms]


Pendulum Deceleration
Acceleration (g's)
Time [ms]
Max: 26.6 g's
Min: -3.1 g's
Filter: CFC 60


Upper Neck Y Moment
Moment (Nm)
Time [ms]
Max: 74.4 Nm
Min: -30.4 Nm
Filter: CFC 600


Upper Neck X Force
Force (N)
Time [ms]
Max: 34.4 N
Min: -722.8 N
Filter: CFC 600

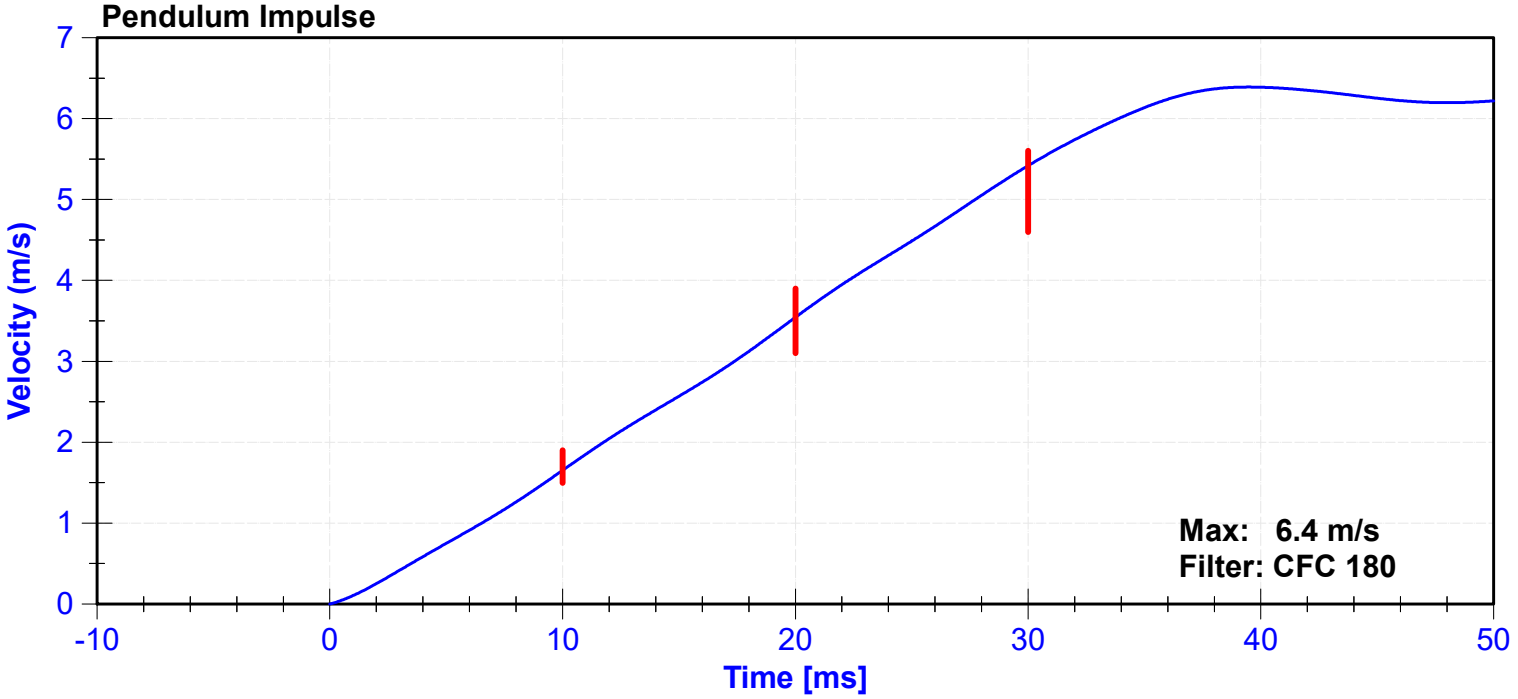
ATD Manufacturer	Humanetics	Test Technician	Z. Nyhart
ATD Serial Number	137	Laboratory Supervisor	J. Kinderman

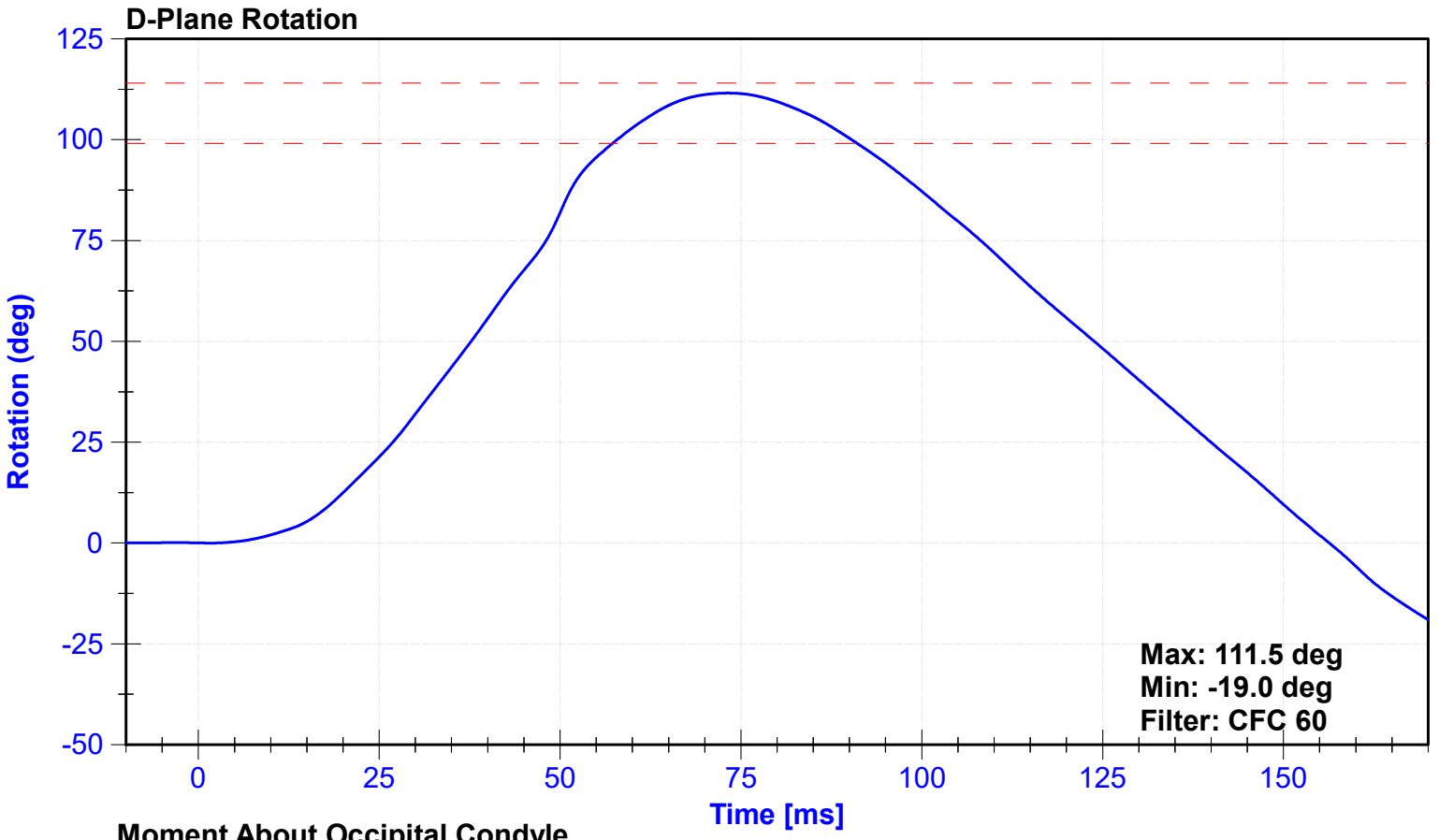
Results

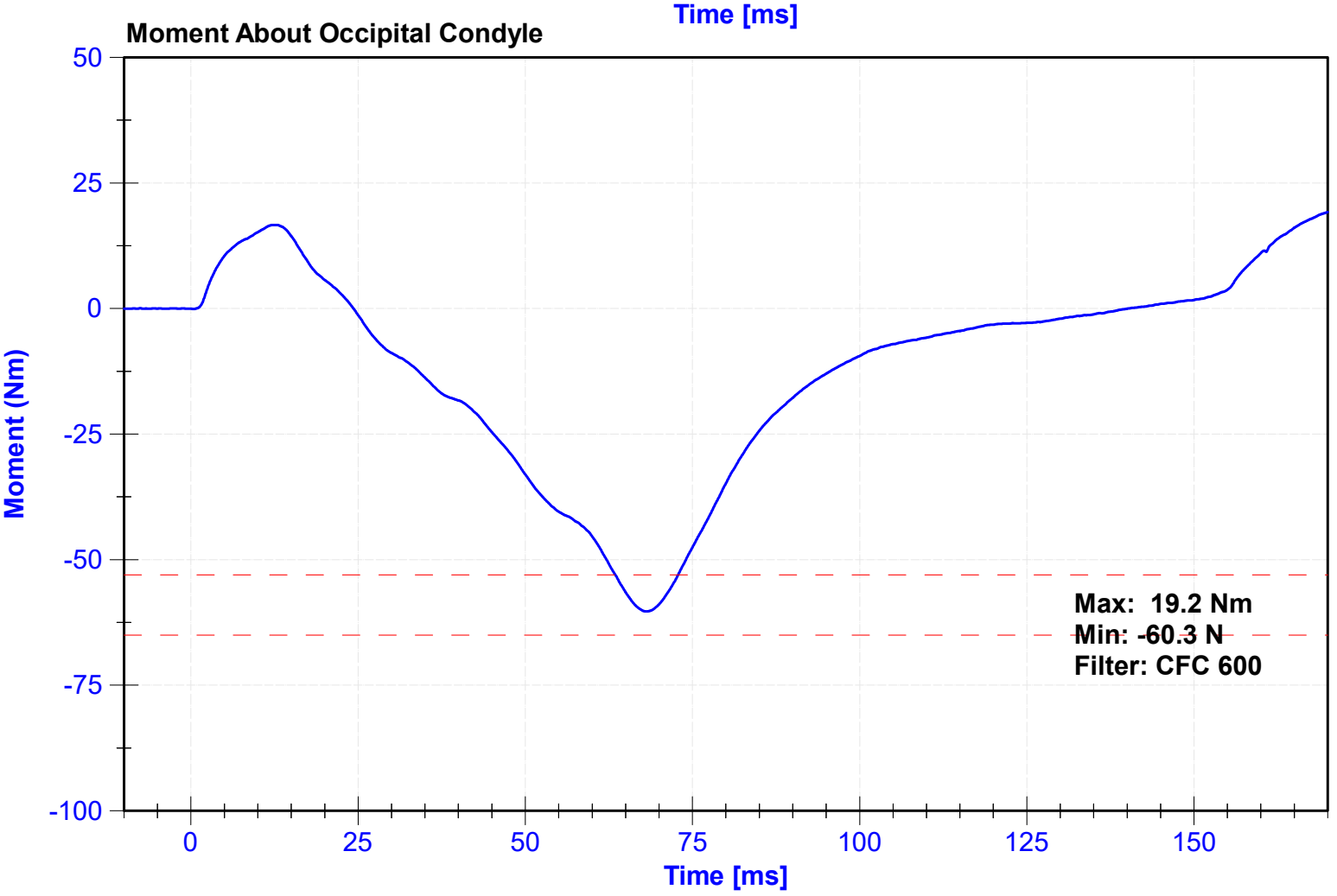
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.4	Pass
Humidity	10	70	%	44	Pass
Velocity	5.95	6.19	m/s	6.013	Pass
Pendulum Impulse at 10ms	1.5	1.9	m/s	1.65	Pass
Pendulum Impulse at 20ms	3.1	3.9	m/s	3.54	Pass
Pendulum Impulse at 30ms	4.6	5.6	m/s	5.42	Pass
D Plane Rotation	99	114	deg	111.5	Pass
Moment During Rotation Interval	-65	-53	Nm	-60.3	Pass
Moment Decay to -10Nm	94	114	ms	99.1	Pass

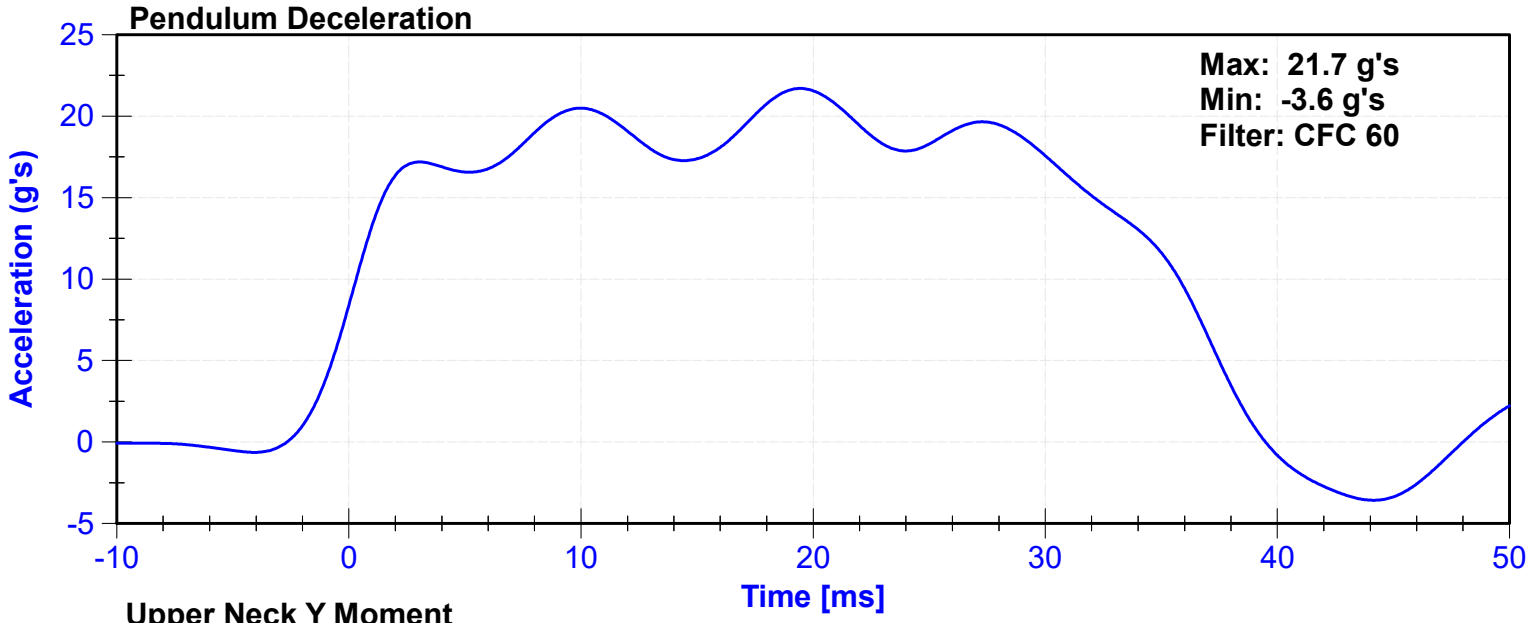
Transducer Calibrations

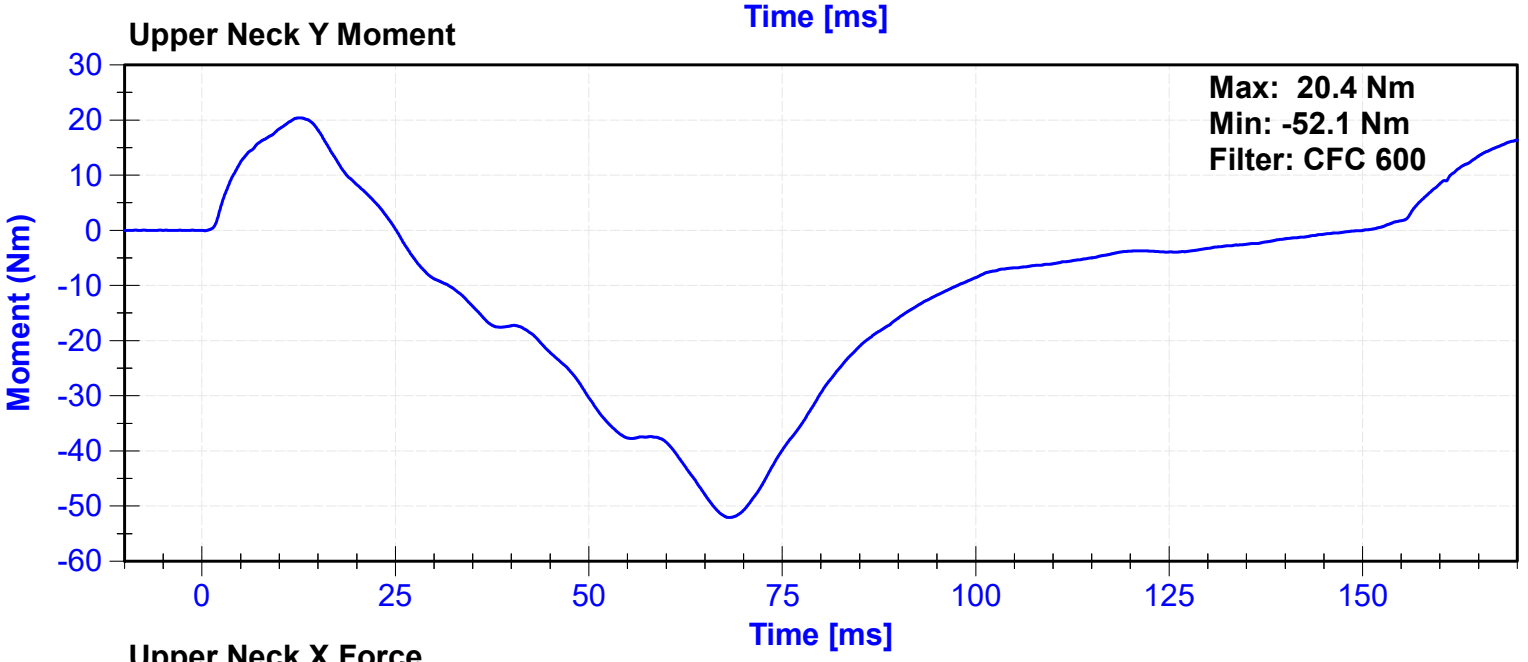
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16646	10/17/2024	10/17/2025
Pendulum Potentiometer	ETI	SP22G_LABPOT1	5/14/2025	5/14/2026
Condyle Potentiometer	ETI	SP22G_LABPOT2	5/14/2025	5/14/2026
Upper Neck Load Cell	Humanetics	1716A	7/7/2025	7/7/2026

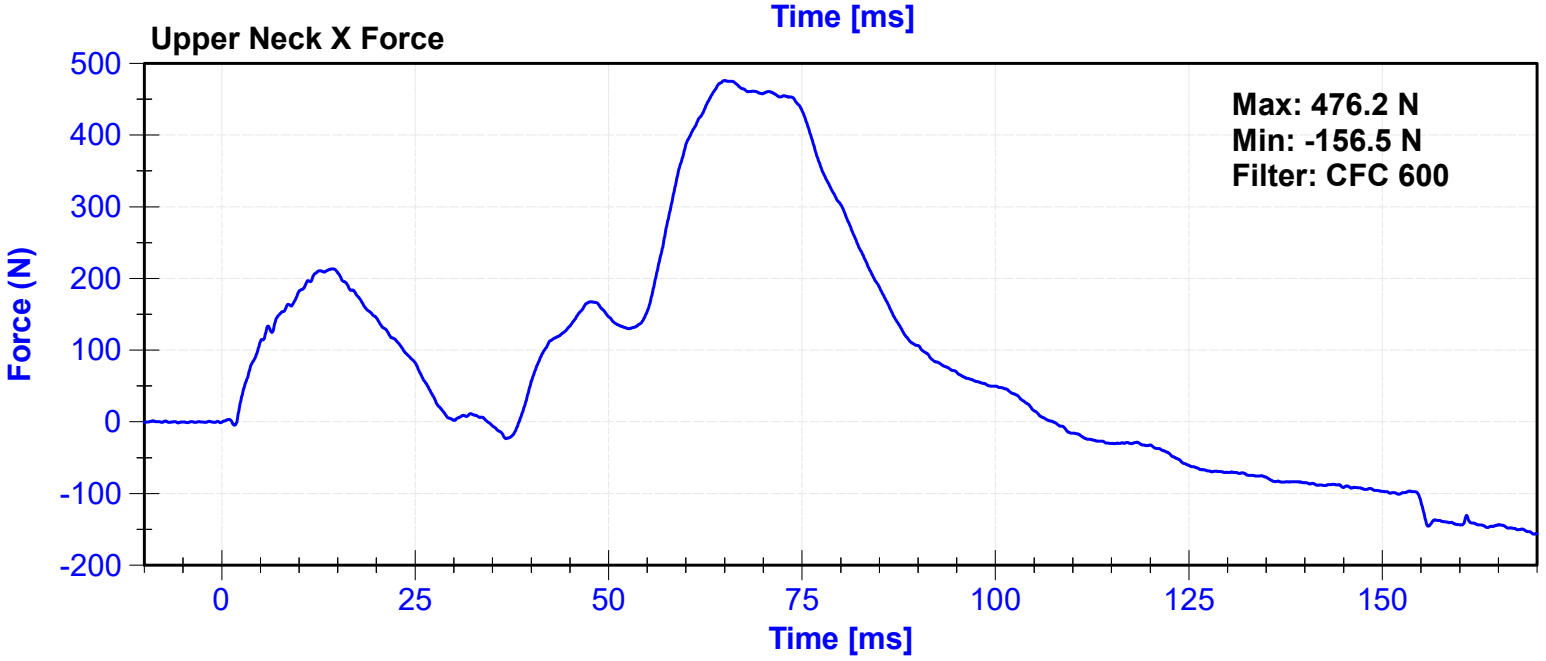



D-Plane Rotation
Rotation (deg)
125
100
75
50
25
0
-25
-50
0
25
50
75
100
125
150
Time [ms]
Max: 111.5 deg
Min: -19.0 deg
Filter: CFC 60


Moment About Occipital Condyle
Moment (Nm)
50
25
0
-25
-50
-75
-100
0
25
50
75
100
125
150
Time [ms]
Max: 19.2 Nm
Min: -60.3 N
Filter: CFC 600


Pendulum Deceleration
Max: 21.7 g's
Min: -3.6 g's
Filter: CFC 60
Acceleration (g's)
25
20
15
10
5
0
-5
-10
0
10
20
30
40
50
Time [ms]


Upper Neck Y Moment
Max: 20.4 Nm
Min: -52.1 Nm
Filter: CFC 600
Moment (Nm)
30
20
10
0
-10
-20
-30
-40
-50
-60
0
25
50
75
100
125
150
Time [ms]


Upper Neck X Force
Max: 476.2 N
Min: -156.5 N
Filter: CFC 600
Force (N)
500
400
300
200
100
0
-100
-200
0
25
50
75
100
125
150
Time [ms]

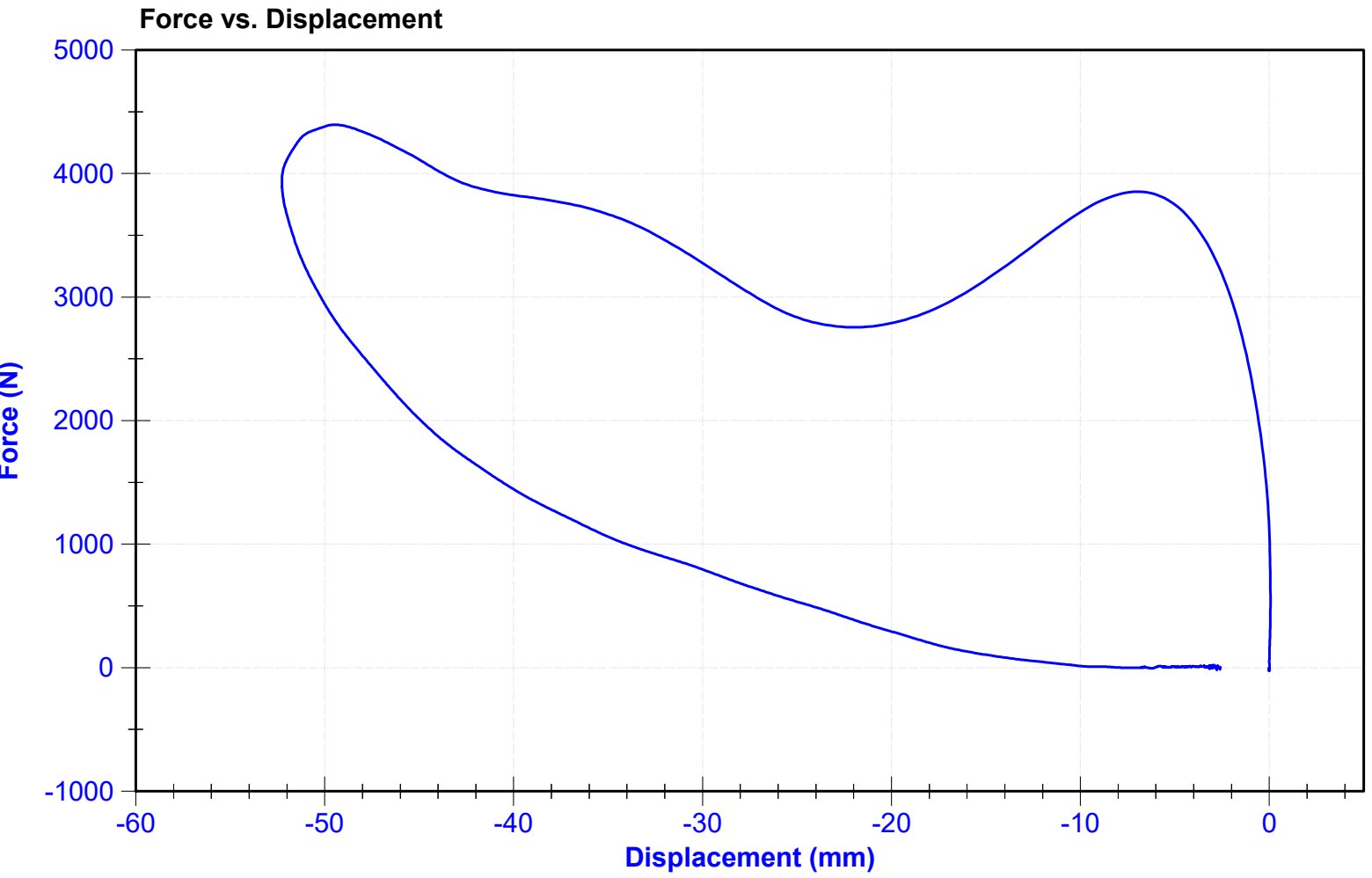
ATD Manufacturer	Humanetics	Test Technician	Z. Nyhart
ATD Serial Number	137	Laboratory Supervisor	J. Kinderman

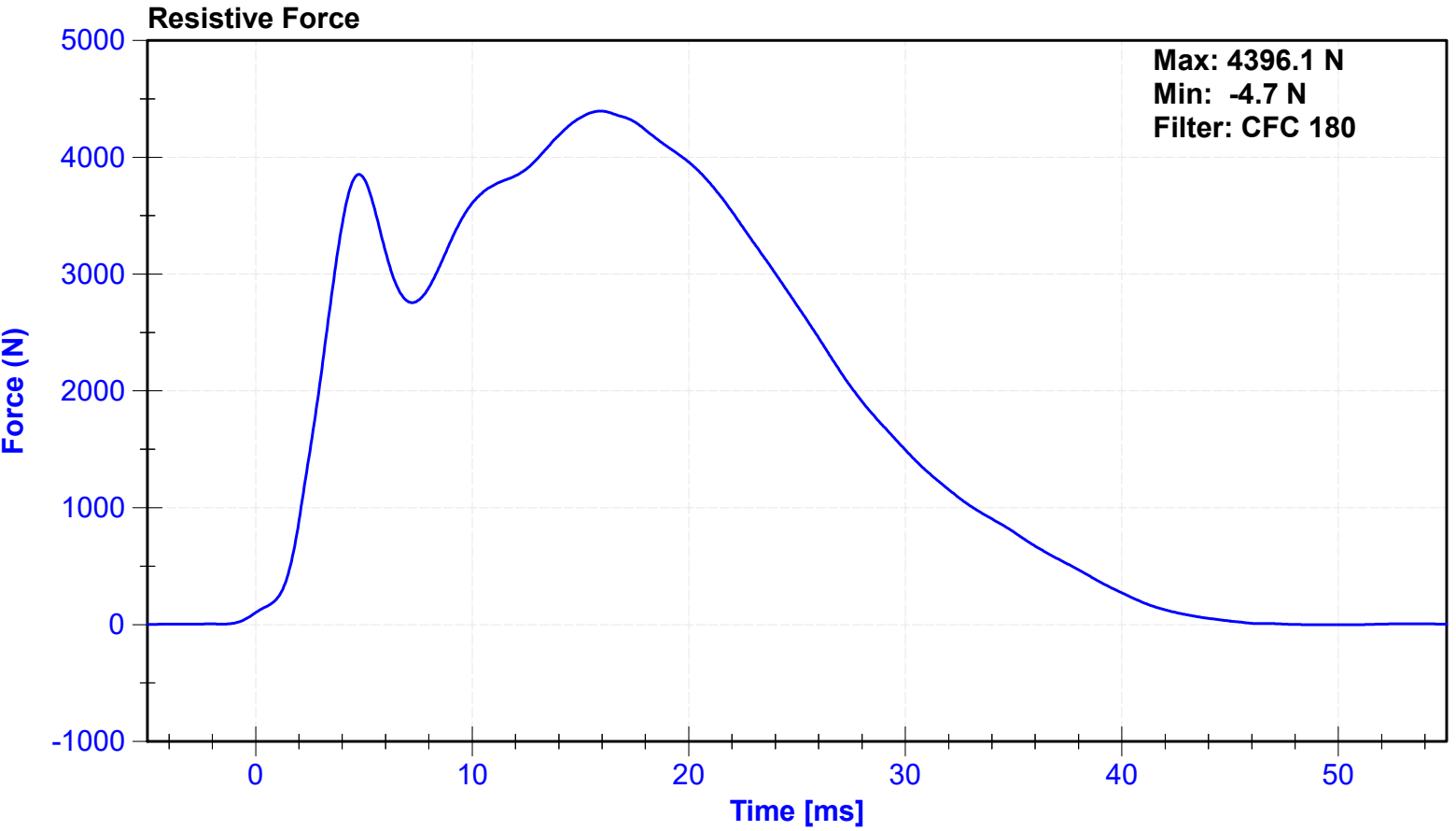
Results

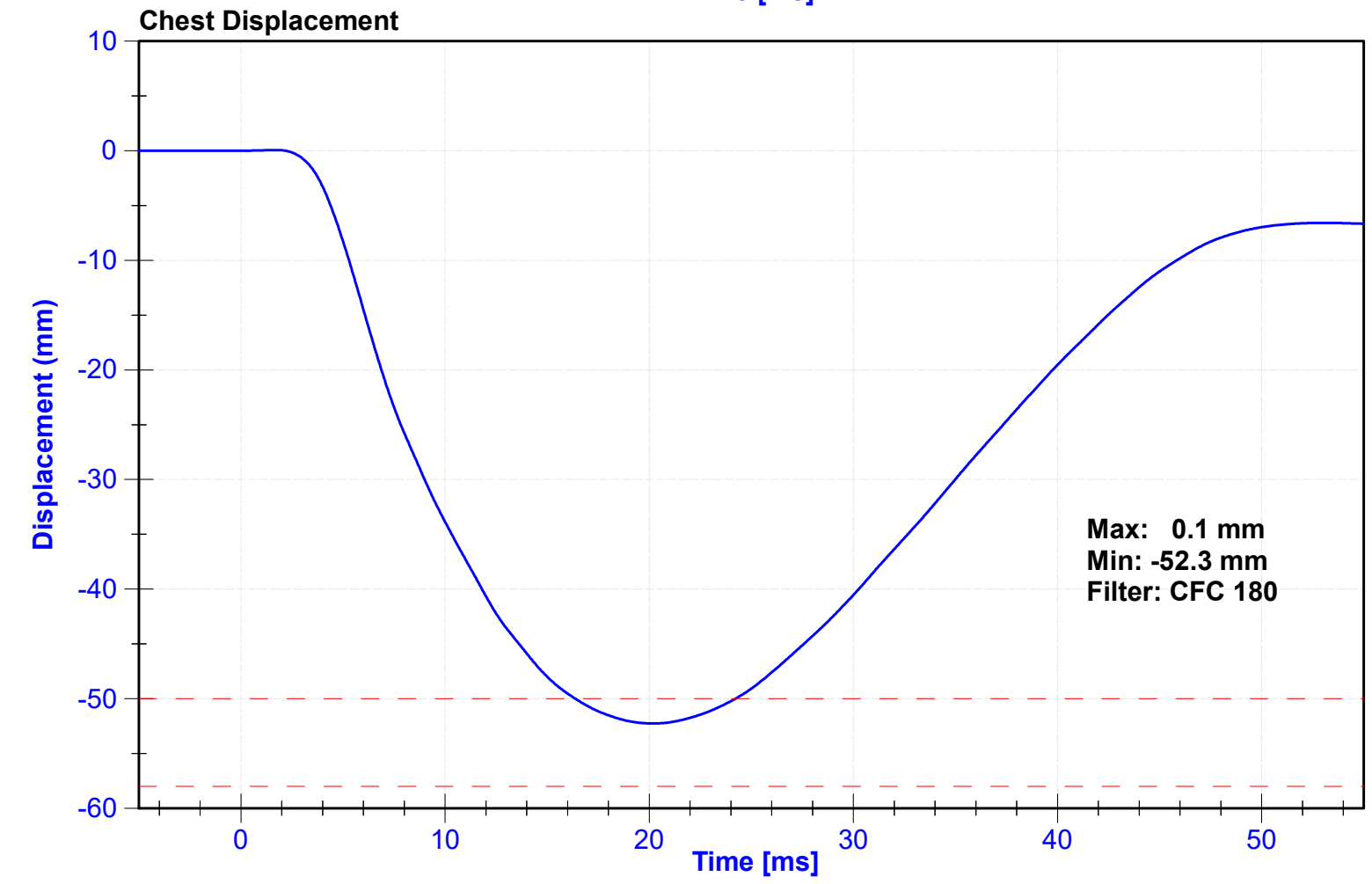
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.2	Pass
Humidity	10	70	%	47	Pass
Velocity	6.59	6.83	m/s	6.631	Pass
Chest Deflection	-58	-50	mm	-52.3	Pass
Maximum Resistive Force (50 to 58mm)	3900	4400	N	4382.7	Pass
Maximum Resistive Force (18 to 50mm)	0	4600	N	4396.1	Pass
Hysteresis	69	85	%	74.8	Pass

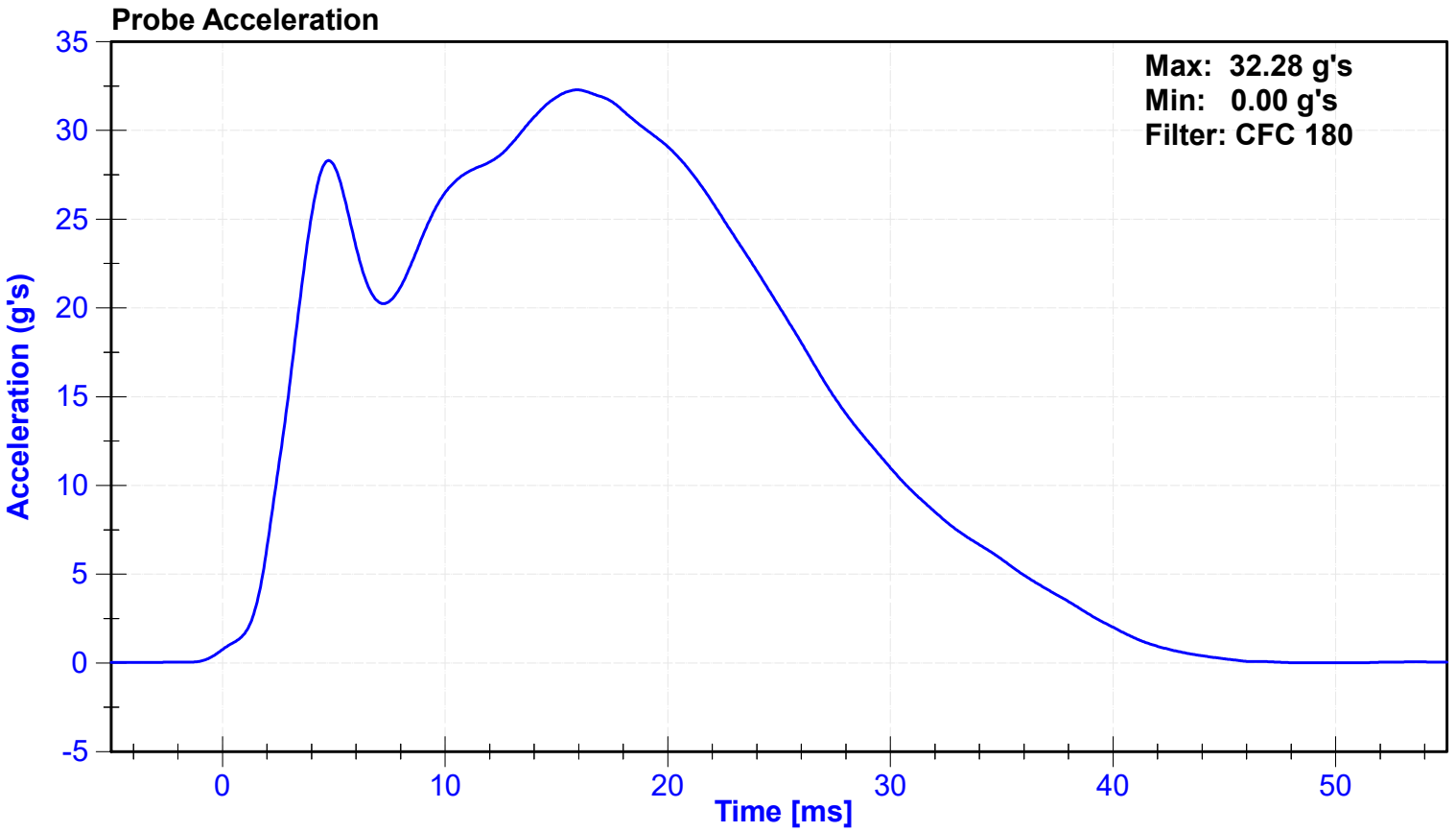
Transducer Calibrations

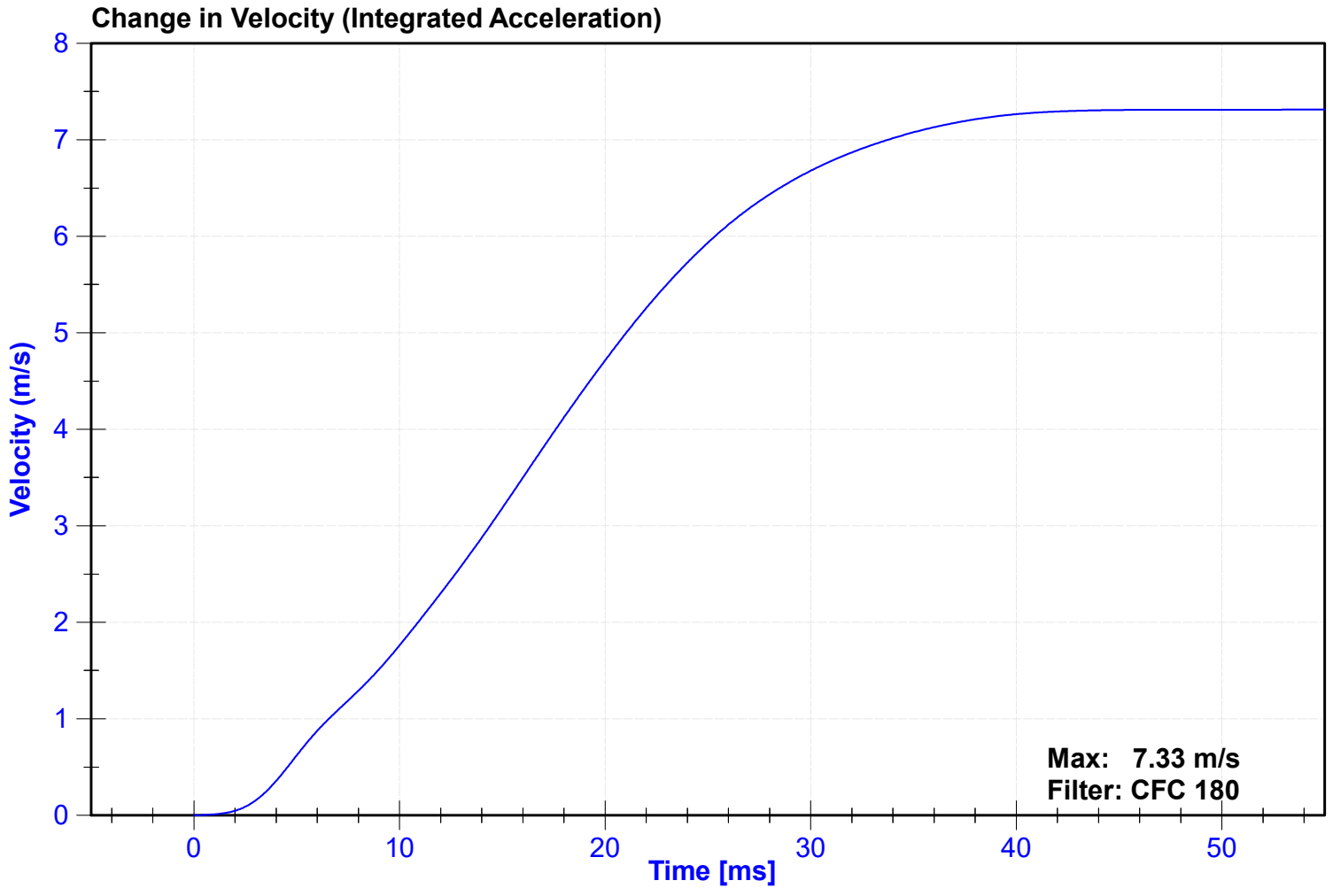
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25863	1/17/2025	1/17/2026
Chest Potentiometer	Servo	0720	6/17/2025	12/16/2025




Resistive Force
Max: 4396.1 N
Min: -4.7 N
Filter: CFC 180
Force (N)
5000
4000
3000
2000
1000
0
-1000
0
10
20
30
40
50
Time [ms]


Chest Displacement
Max: 0.1 mm
Min: -52.3 mm
Filter: CFC 180
Displacement (mm)
10
0
-10
-20
-30
-40
-50
-60
0
10
20
30
40
50
Time [ms]


Probe Acceleration
Max: 32.28 g's
Min: 0.00 g's
Filter: CFC 180
Acceleration (g's)
35
30
25
20
15
10
5
0
-5
0
10
20
30
40
50
Time [ms]


Change in Velocity (Integrated Acceleration)
Max: 7.33 m/s
Filter: CFC 180
Velocity (m/s)
8
7
6
5
4
3
2
1
0
0
10
20
30
40
50
Time [ms]

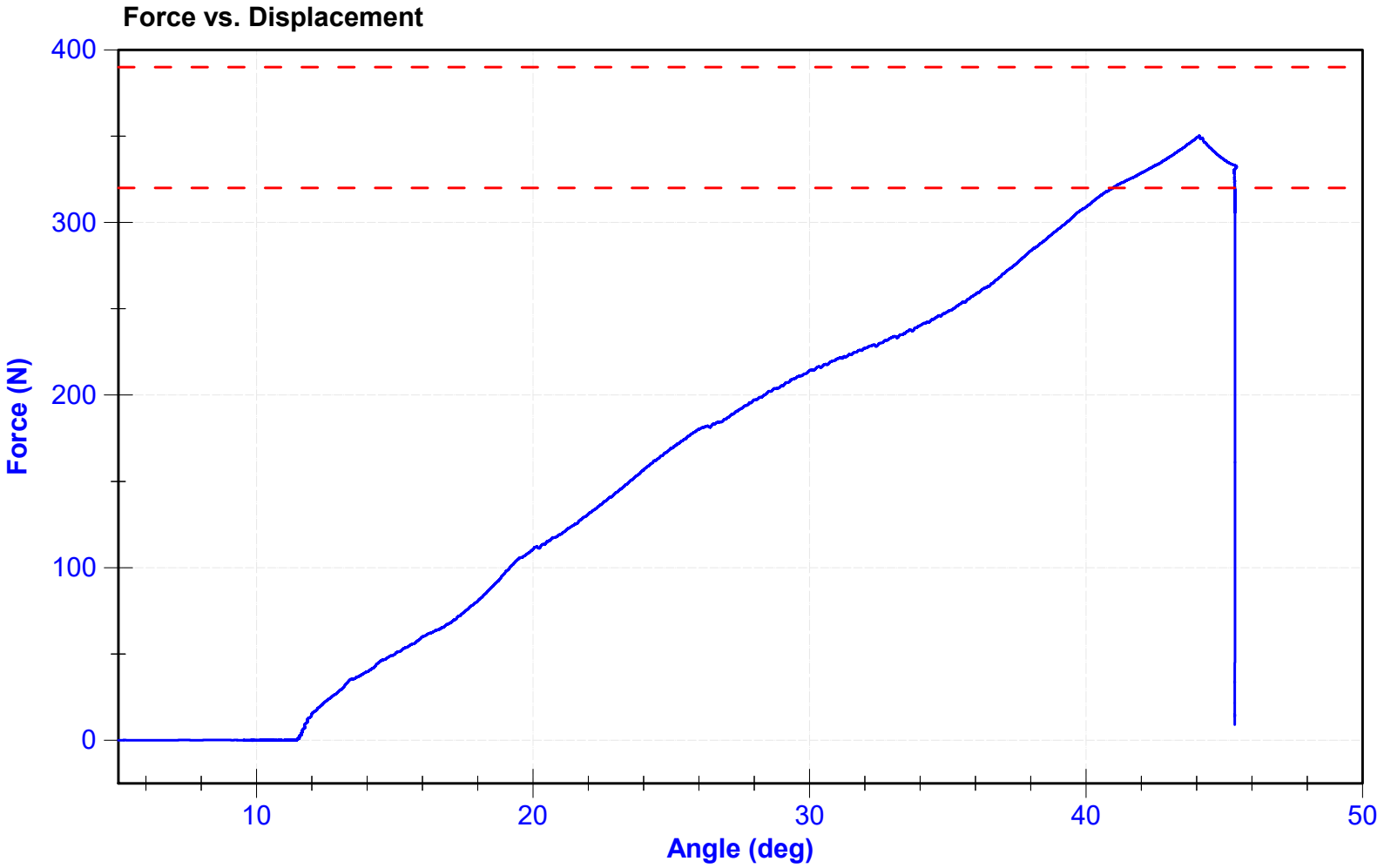
ATD Manufacturer	Humanetics	Test Technician	Z. Nyhart
ATD Serial Number	137	Laboratory Supervisor	J. Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.6	25.6	ºC	21.4	Pass
Humidity	10	70	%	46	Pass
Initial Angle	0	20	deg	10.4	Pass
Force at 45 Degrees	320	390	N	350.2	Pass
Return Angle Relative to Initial	0	8	deg	3.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	Rieker	DS-1905226	2025-08-08	2026-08-08
Load Cell	Interface	1134516	2025-02-26	2026-02-26



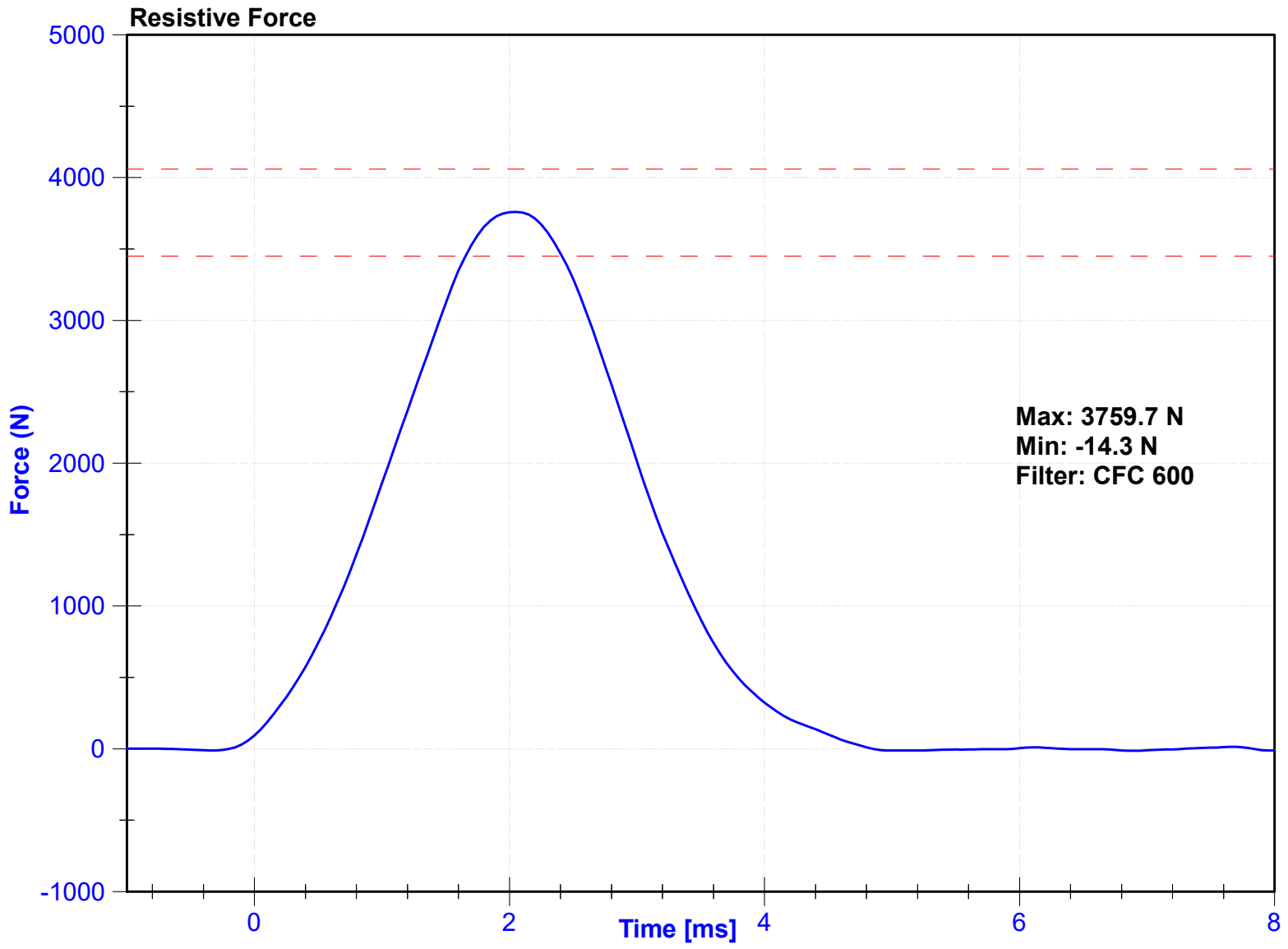
ATD Manufacturer	Humanetics	Test Technician	Z. Nyhart
ATD Serial Number	143	Laboratory Supervisor	J. Kinderman

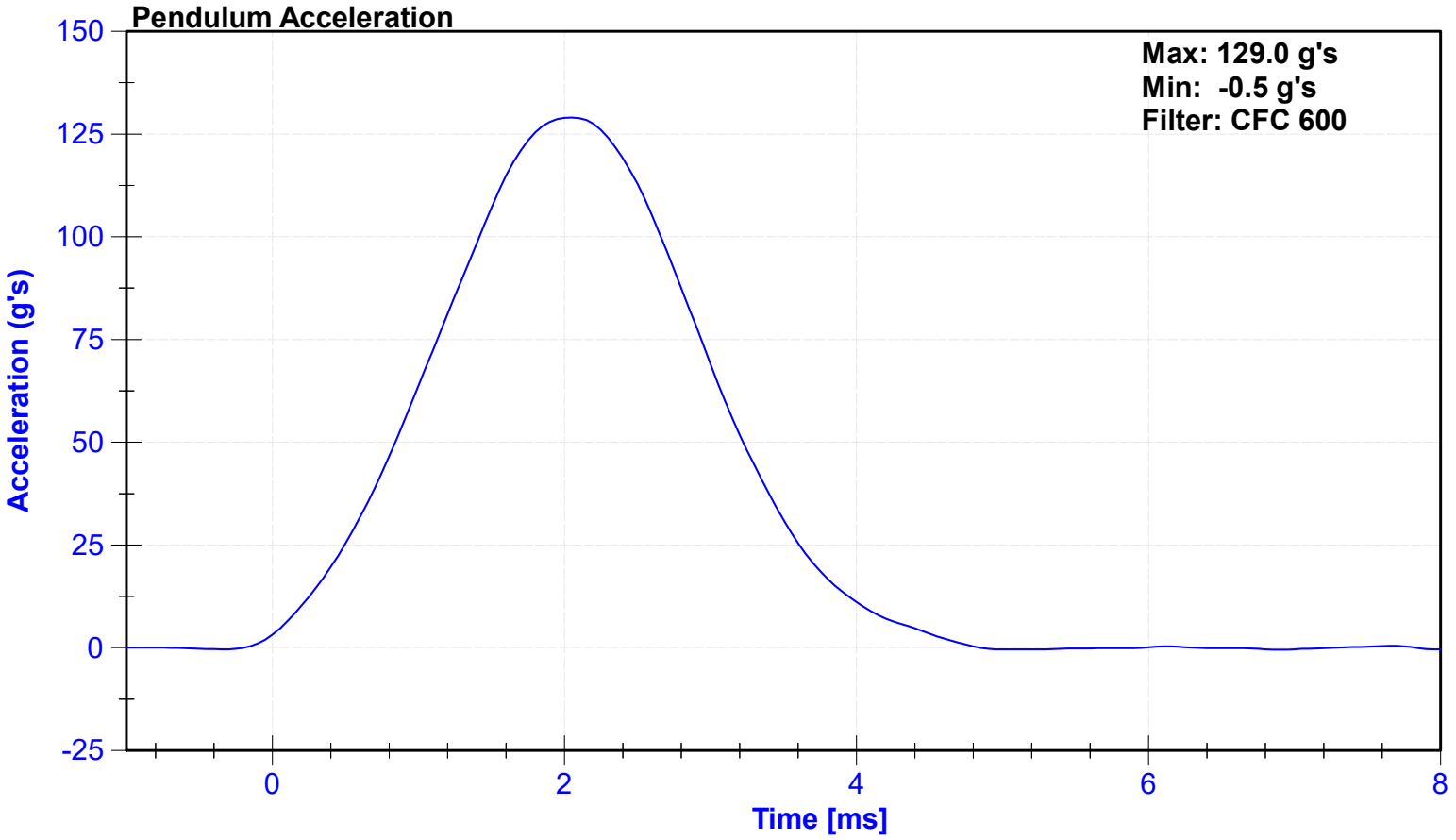
Results

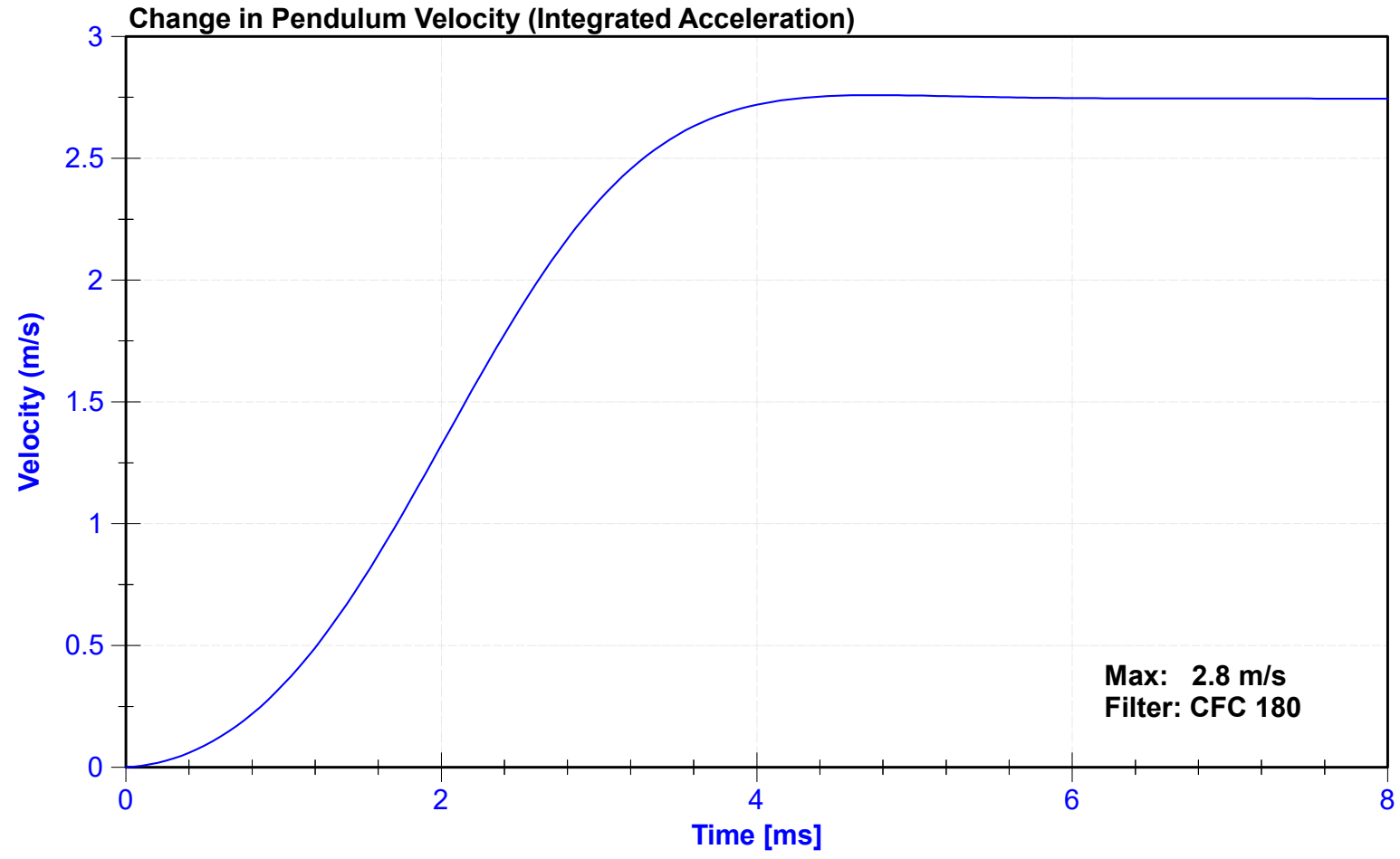
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	ºC	21.4	Pass
Humidity	10	70	%	44	Pass
Velocity	2.07	2.13	m/s	2.105	Pass
Resistive Force	3450	4060	N	3759.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18566	5/7/2025	11/3/2025




Pendulum Acceleration
Max: 129.0 g's
Min: -0.5 g's
Filter: CFC 600
Acceleration (g's)
150
125
100
75
50
25
0
-25
0
2
4
6
8
Time [ms]


Change in Pendulum Velocity (Integrated Acceleration)
Velocity (m/s)
3
2.5
2
1.5
1
0.5
0
0
2
4
6
8
Time [ms]
Max: 2.8 m/s
Filter: CFC 180

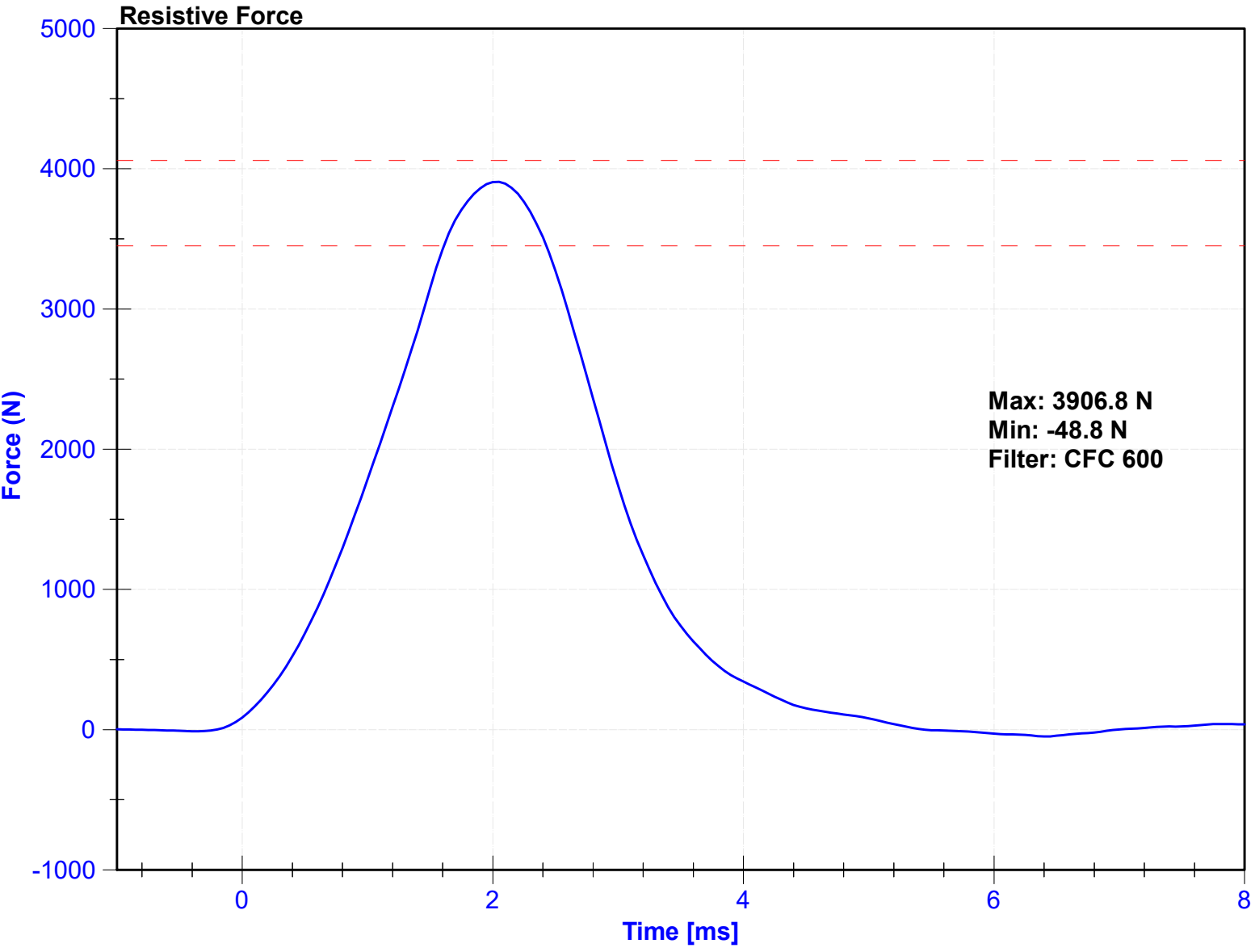
ATD Manufacturer	Humanetics	Test Technician	Z. Nyhart
ATD Serial Number	143	Laboratory Supervisor	J. Kinderman

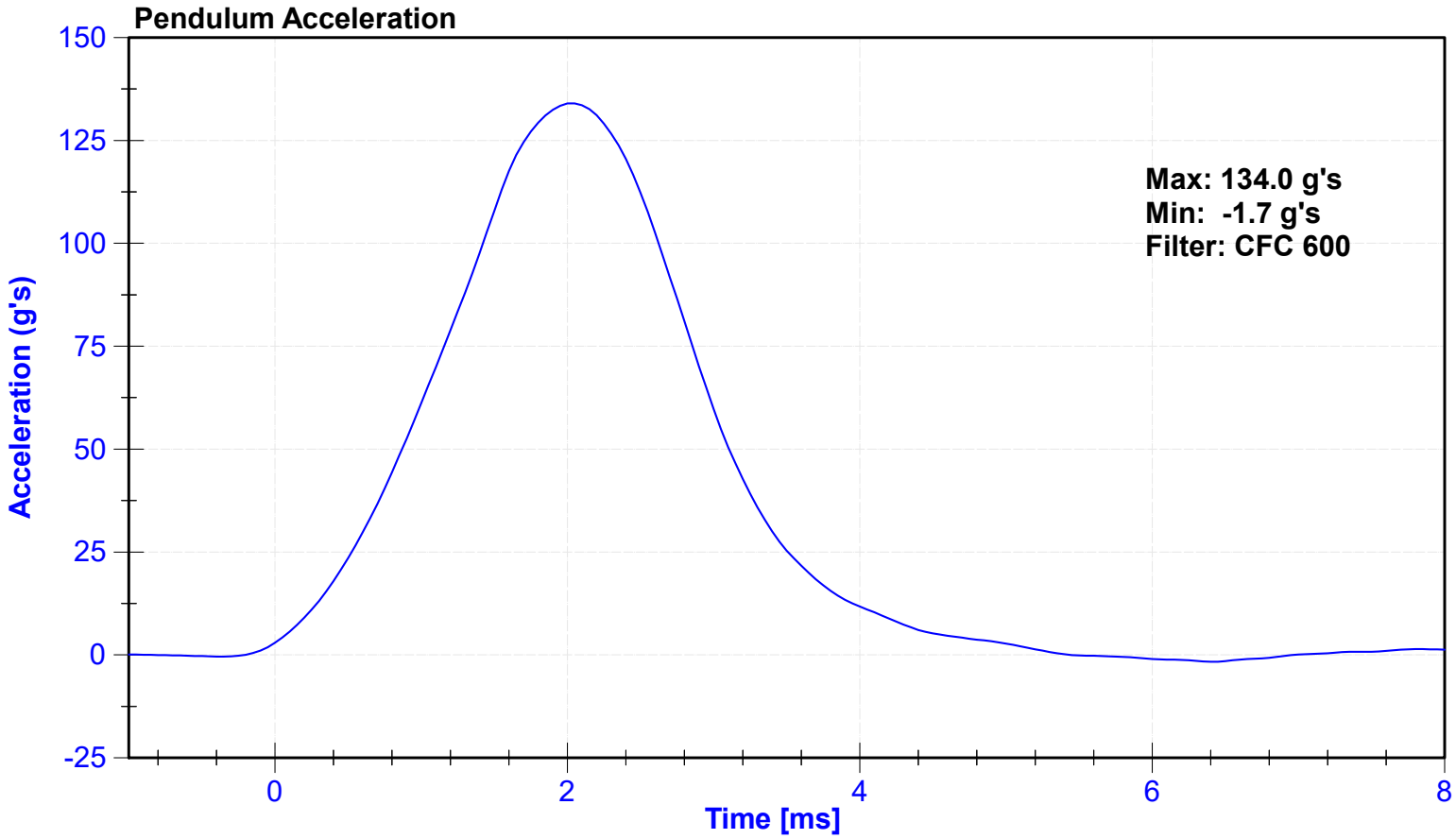
Results

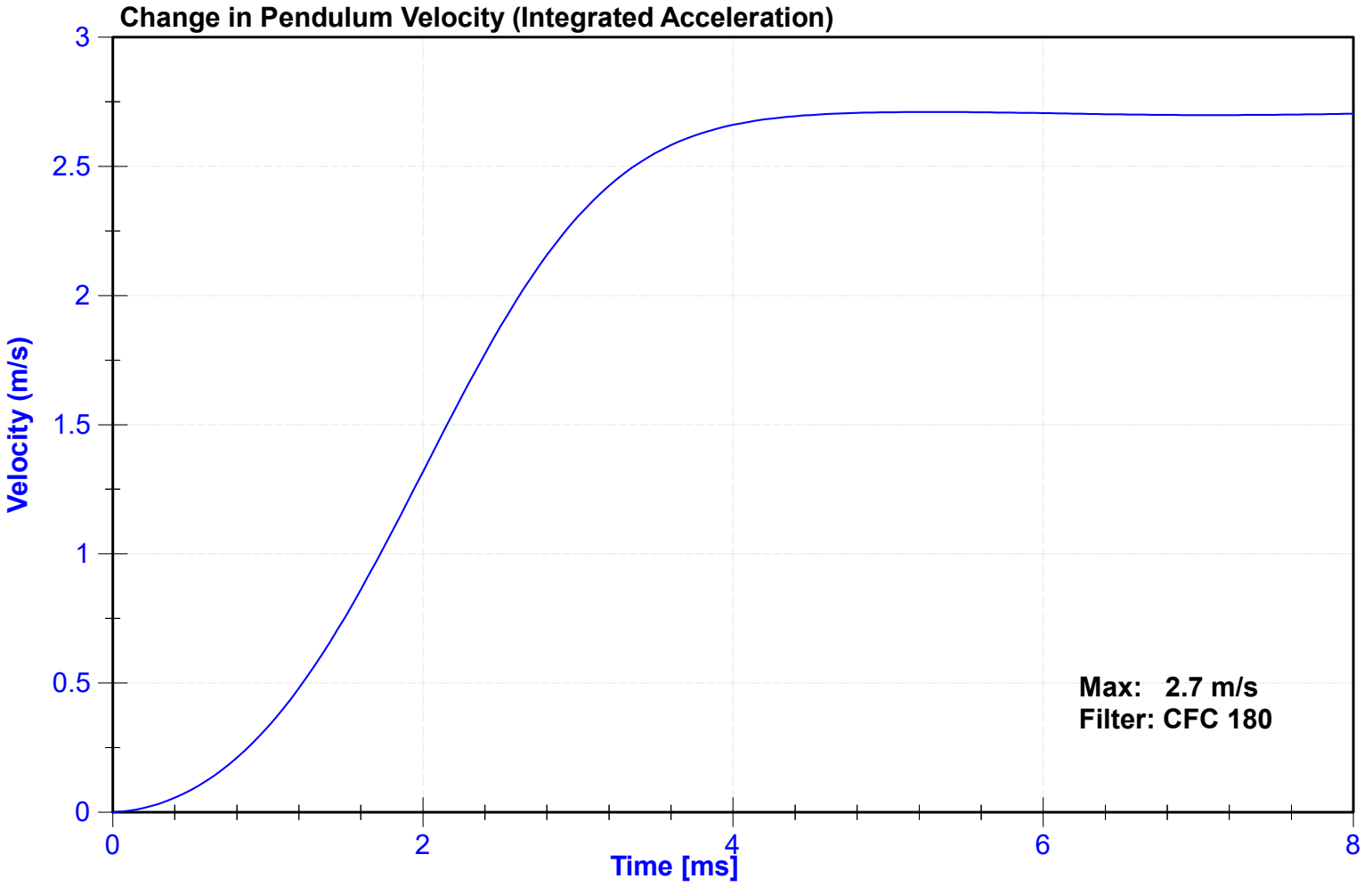
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	ºC	21.4	Pass
Humidity	10	70	%	44	Pass
Velocity	2.07	2.13	m/s	2.083	Pass
Resistive Force	3450	4060	N	3906.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18566	5/7/2025	11/3/2025




Pendulum Acceleration
Max: 134.0 g's
Min: -1.7 g's
Filter: CFC 600
Acceleration (g's)
Time [ms]
150
125
100
75
50
25
0
-25
0
2
4
6
8


Change in Pendulum Velocity (Integrated Acceleration)
Max: 2.7 m/s
Filter: CFC 180
Velocity (m/s)
Time [ms]
3
2.5
2
1.5
1
0.5
0
0
2
4
6
8

APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION

Table 1 – Driver Dummy Instrumentation

Instrumentation		Axis/Location	Hybrid III 50th S/N: 065		
			Serial Number	Manufacturer	Calibration Date
Head Accelerometers	Primary	X	P52152	Endevco	06/10/2025
		Y	P58888	Endevco	06/10/2025
		Z	P58911	Endevco	06/10/2025
	Redundant	X	P52012	Endevco	06/10/2025
		Y	P51979	Endevco	06/10/2025
		Z	P49204	Endevco	06/10/2025
Head Angular Rate Sensors		X	7603	DTS ARS	03/03/2025
		Y	15692	DTS ARS	03/03/2025
		Z	7589	DTS ARS	03/03/2025
Upper Neck Load Cell		FX, Fy, Fz MX,MY, MZ	2207-FX	Denton	07/07/2025
Chest Accelerometers	Primary	X	P58887	Endevco	06/09/2025
		Y	P66917	Endevco	06/09/2025
		Z	P49197	Endevco	06/09/2025
	Redundant	X	P49213	Endevco	06/09/2025
		Y	P63840	Endevco	06/09/2025
		Z	P83313	Endevco	06/09/2025
Chest Potentiometer		X	1046	Servo	06/10/2025
Pelvis Accelerometer		X	P51699	Endevco	06/09/2025
		Y	P94090	Endevco	06/09/2025
		Z	P83437	Endevco	06/09/2025
Femur Load Cells - Left	Primary	Z	108-FZ1	Denton	07/10/2025
	Redundant	Z	108-FZ2	Denton	07/10/2025
Femur Load Cells - Right	Primary	Z	119-FZ1	Denton	07/10/2025
	Redundant	Z	119-FZ2	Denton	07/10/2025
Tibia Load Cells - Left	Upper	MX, MY, FZ	404-FZ	Denton	07/09/2025
	Lower	MX, MY, FZ	371-FZ	Denton	07/08/2025
Tibia Load Cells – Right	Upper	MX, MY, FZ	406-FZ	Denton	07/09/2025
	Lower	MX, MY, FZ	674-FZ	Denton	07/08/2025
Foot Accelerometers - Left	Rear	X	P69807	Endevco	06/09/2025
	Front	Z	P51729	Endevco	06/09/2025
Foot Accelerometers - Right	Rear	X	P52255	Endevco	06/09/2025
	Front	Z	P51685	Endevco	06/09/2025
Seat belt Load Cells	Lap		295	GFE	02/11/2025
	Shoulder		292	GFE	02/11/2025

Table 2 – Front Passenger Dummy Instrumentation

Instrumentation		Axis/Location	Hybrid III 5th S/N: 137		
			Serial Number	Manufacturer	Calibration Date
Head Accelerometers	Primary	X	P79417	Endevco	06/11/2025
		Y	P83335	Endevco	06/11/2025
		Z	P64149	Endevco	06/11/2025
	Redundant	X	P52008	Endevco	06/11/2025
		Y	P52045	Endevco	06/11/2025
		Z	P74774	Endevco	06/11/2025
Head Angular Rate Sensors		X	15212	DTS ARS	03/03/2025
		Y	14921	DTS ARS	03/03/2025
		Z	7370	DTS ARS	03/03/2025
Upper Neck Load Cell		FX, Fy, Fz MX,MY, MZ	1872-FX	Humanetics	07/07/2025
Chest Accelerometers	Primary	X	P58780	Endevco	06/11/2025
		Y	P83346	Endevco	06/11/2025
		Z	P49190	Endevco	06/11/2025
	Redundant	X	P58794	Endevco	06/11/2025
		Y	P69791	Endevco	06/11/2025
		Z	T11253	Endevco	06/11/2025
Chest Potentiometer		X	0720	Servo	06/17/2025
Pelvis Accelerometer		X	P58735	Endevco	06/11/2025
		Y	P59019	Endevco	09/25/2025
		Z	P51285	Endevco	06/11/2025
Femur Load Cells - Left	Primary	Z	118-FZ1	Denton	07/10/2025
	Redundant	Z	118-FZ2	Denton	07/10/2025
Femur Load Cells - Right	Primary	Z	124-FZ1	Denton	07/10/2025
	Redundant	Z	124-FZ2	Denton	07/10/2025
Tibia Load Cells - Left	Upper	MX, MY, FZ	651-FZ	Denton	07/09/2025
	Lower	MX, MY, FZ	359-FZ	Denton	07/08/2025
Tibia Load Cells – Right	Upper	MX, MY, FZ	371-FZ	Denton	07/09/2025
	Lower	MX, MY, FZ	362-FZ	Denton	07/08/2025
Foot Accelerometers - Left	Rear	X	P78959	Endevco	06/11/2025
	Front	Z	T29381	Endevco	07/11/2025
Foot Accelerometers - Right	Rear	X	P63998	Endevco	06/11/2025
	Front	Z	P80265	Endevco	06/11/2025
Seat belt Load Cells	Lap		DK1753	GFE	02/11/2025
	Shoulder		174	GFE	02/11/2025

Table 3 – Vehicle Instrumentation

Instrumentation			Axis	Serial Number	Manufacturer	Calibration Date
Crossmember/Rear Seat Accelerometers	Left	Primary	X	A372843	Measurement Specialties	06/20/2025
			Z	A374309	Measurement Specialties	02/18/2025
		Redundant	X	A372845	Measurement Specialties	06/20/2025
	Right	Primary	X	G27006	Endevco	06/17/2025
			Z	G27016	Endevco	06/17/2025
		Redundant	X	G27008	Endevco	06/16/2025
Engine Accelerometers	Top		X	A431361	Measurement Specialties	02/20/2025
	Bottom		X	G25848	Endevco	06/24/2025