

REPORT NUMBER: NCAP-CAL-23-004

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

**Nissan Motor Co., LTD.
2023 Nissan ARIYA
Five Door SUV**

NHTSA No: M20235200

**PREPARED BY:
CALSPAN CORPORATION
P.O. BOX 400
BUFFALO, NEW YORK 104625**



January 24, 2024

FINAL REPORT

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

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

This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof.

If trade or manufacturers' names or products are mentioned it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared by: 
Quinn Porzio, Test Engineer

Date: January 24, 2024

Approved by: 
Vanessa Hansen, Operations Manager

Date: January 24, 2024

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

Date: _____

TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No. NCAP-CAL-23-004		2. Government Accession No.		3. Recipient's Catalog No.																																																					
4. Title and Subtitle Final Report of New Car Assessment Program Frontal Impact Testing of a 2023 Nissan ARIYA SUV NHTSA No.: M20235200				5. Report Date January 24, 2024																																																					
				6. Performing Organization Code CAL																																																					
7. Author(s) Quinn Porzio, Test Engineer Vanessa Hansen, Operations Manager				8. Performing Organization Report No. CAL-DOT-2023-004																																																					
9. Performing Organization Name and Address Calspan Corporation Transportation Test Operations P.O. Box 400 Buffalo, New York 104625				10. Work Unit No.																																																					
				11. Contract or Grant No. 693JJ919D000005																																																					
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards 1200 New Jersey Ave., SE, Washington, D.C. 20590				13. Type of Report and Period Covered: Final Test Report April 18, 2023 - January 24, 2024																																																					
				14. Sponsoring Agency Code NRM-100																																																					
15. Supplementary Notes																																																									
16. Abstract A 56.30 km/h (35 mph), NCAP frontal rigid barrier impact test was conducted on a 2023 Nissan ARIYA 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 April 18, 2023. The impact velocity of the vehicle was 56.33 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 460 mm at vehicle centerline of the front bumper. The test vehicle's occupant performance data is as follows: <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th rowspan="2">Units</th> <th colspan="2">Driver ATD (Serial No. 142)</th> <th colspan="2">Passenger ATD (Serial No. 137)</th> </tr> <tr> <th>Threshold</th> <th>Result</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₁₅)</td> <td></td> <td>700</td> <td>178.837</td> <td>700</td> <td>314.451</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>-25.826</td> <td>52</td> <td>-19.150</td> </tr> <tr> <td>Nij</td> <td></td> <td>1</td> <td>0.453</td> <td>1</td> <td>0.434</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>4,170</td> <td>1719.238</td> <td>2,620</td> <td>1003.104</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>4,000</td> <td>-251.567</td> <td>2,520</td> <td>-151.842</td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>10,008</td> <td>-1211.114</td> <td>6,805</td> <td>-1301.667</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>10,008</td> <td>-1185.578</td> <td>6,805</td> <td>-1284.431</td> </tr> </tbody> </table>						Measurement Description	Units	Driver ATD (Serial No. 142)		Passenger ATD (Serial No. 137)		Threshold	Result	Threshold	Result	Head Injury Criteria (HIC ₁₅)		700	178.837	700	314.451	Maximum Chest Compression	mm	63	-25.826	52	-19.150	Nij		1	0.453	1	0.434	Neck Tension	N	4,170	1719.238	2,620	1003.104	Neck Compression	N	4,000	-251.567	2,520	-151.842	Left Femur Force	N	10,008	-1211.114	6,805	-1301.667	Right Femur Force	N	10,008	-1185.578	6,805	-1284.431
Measurement Description	Units	Driver ATD (Serial No. 142)		Passenger ATD (Serial No. 137)																																																					
		Threshold	Result	Threshold	Result																																																				
Head Injury Criteria (HIC ₁₅)		700	178.837	700	314.451																																																				
Maximum Chest Compression	mm	63	-25.826	52	-19.150																																																				
Nij		1	0.453	1	0.434																																																				
Neck Tension	N	4,170	1719.238	2,620	1003.104																																																				
Neck Compression	N	4,000	-251.567	2,520	-151.842																																																				
Left Femur Force	N	10,008	-1211.114	6,805	-1301.667																																																				
Right Femur Force	N	10,008	-1185.578	6,805	-1284.431																																																				
17. Key Words 56.3 km/h (35 mph) Full Frontal Rigid Barrier Impact Test New Car Assessment Program (NCAP)				18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division 1200 New Jersey Ave, SE Washington, DC 20590																																																					
19. Security Class. (of this report) UNCLASSIFIED		20. Security Class. (of this page) UNCLASSIFIED		21. No. of Pages 194	22. Price																																																				

Form DOT F1700.7 (8-69)

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1 Purpose and Summary of the Test	1-1
2 Occupant and Vehicle Information / Data Sheets	2-1
 <u>Data Sheet</u>	 <u>Page</u>
1 General Test and Vehicle Parameter Data	2-2
2 Seat Adjustment, Fuel System, and Steering Wheel Data	2-6
3 Dummy Longitudinal Clearance Dimensions	2-8
4 Dummy Lateral Clearance Dimensions	2-9
5 Seat Belt Positioning Data	2-10
6 High-Speed Camera Locations and Data	2-11
7 Vehicle Accelerometer Locations	2-13
8 Photographic Reference Target Locations	2-14
9 Load Cell Locations on Fixed Barrier	2-15
10 Test Vehicle Summary of Results	2-16
11 Post-Test Observations	2-17
12 Vehicle Profile Measurements	2-18
13 Accident Investigation Division Data	2-20
14 Vehicle Intrusion Measurements	2-21
15 Summary of Indicant FMVSS No.212 and FMVSS No.219 (Partial) Data	2-23
16 FMVSS 301 Barrier Impact & Static Rollover Results	2-25
17 Dummy/Vehicle Temperature Stabilization Chart	2-26
305-1 General Test and Vehicle Parameter Data for Indicant FMVSS No. 305 Testing	2-27
305-2 Pre-Impact Data for Indicant FMVSS No.305 Testing	2-28
305-3 Pre-Impact Electrical Isolation Measurements and Calculations for Indicant FMVSS No. 305 Testing	2-29
305-4 Post-Impact Data for Indicant FMVSS No. 305 Testing	2-30
305-5 Static Rollover Test Data for Indicant FMVSS No. 305 Testing	2-31
 <u>Appendix</u>	 <u>Page</u>
A Photographs	A-1
B Dummy Response Data Traces	B-1
C Dummy Calibration and Performance Verification Data	C-1
D Test Equipment and Instrumentation Calibration	D-1

SECTION 1

PURPOSE AND SUMMARY OF TEST

PURPOSE

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

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

SUMMARY

A load cell barrier consisting of 128 load cells was impacted by a 2023 Nissan ARIYA SUV at a velocity of 56.33 km/h. The test was performed at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on April 18, 2023. Pre- and post-test photographs of the vehicle and dummies to document the test can be found in Appendix A. One real-time camera and 16 high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in Data Sheet 6 of this report.

One Part 572E, 50th percentile male anthropomorphic test device (ATD), was placed in the driver seating position and one Part 572O 5th percentile female ATD was placed in the right-front passenger seating position according to dummy placement instructions specified in the Laboratory Procedure for NCAP Full Frontal Rigid Barrier Impact Testing. Both ATDs were fully instrumented with head, chest and pelvis tri-axial accelerometers, chest displacement potentiometers, upper neck transducers, femur load cells, and lower leg instrumentation. Seat belt load cells were not installed on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading per Manufacturer request. The driver (position 1) ATD (Serial No. 142) and the right-front passenger (position 2) ATD (Serial No. 137) were qualified prior to this test. Certification details, along with instrumentation calibration data, can be found in Appendix C of this report.

The 486 channels of data were recorded on an on-board data acquisition system. Appendix B contains the vehicle, load cell barrier and dummy response data traces.

There was 87.1 percent windshield retention and no intrusion into the protected zone of the windshield during the event. There was a total of 0.0 grams of stoddard solvent leakage after the event or during any phase of the static rollover. The maximum static crush of the vehicle was 460 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 then the head restraint. The upper torso contacted the frontal airbag. Both knees contacted the knee air bag and knee bolster.

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

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 (50 th)	178.837	0.453	1719.238	-251.567	42.812	-25.826	-1211.114	-1185.578
Passenger (5 th)	314.451	0.434	1003.104	-151.842	34.694	-19.150	-1301.667	-1284.431

GENERAL COMMENTS:

1. P1 (Driver) serial number - 142
2. P2 (Passenger) serial number – 137
3. No Seatbelt load cells were used in this test per Manufacturer request

Data Anomalies:

- Engine Top X Acceleration, Questionable data from 44.2 to 46.4 ms and after 138.2 ms
- Engine Bottom X Acceleration, Questionable data after 46.8 ms

SECTION 2

OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

This section contains information reporting for the following Data Sheets:

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

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

Data Sheet No. 3 – Dummy Longitudinal Clearance Dimensions

Data Sheet No. 4 – Dummy Lateral Clearance Dimensions

Data Sheet No. 5 – Seat Belt Positioning Data

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

Data Sheet No. 7 – Vehicle Accelerometer Locations

Data Sheet No. 8 – Photographic Reference Target Locations

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

Data Sheet No. 10 – Test Vehicle Summary of Results

Data Sheet No. 11 – Post-Test Observations

Data Sheet No. 12 – Vehicle Profile Measurements

Data Sheet No. 13 – Accident Investigation Division Data

Data Sheet No. 14 – Vehicle Intrusion Measurements

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

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

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

Data Sheet No. 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: 2023 Nissan ARIYA SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20235200
Test Date: 04/18/2023

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20235200	Traction Control System (TCS)	Yes
Model Year	2023	Power Steering	Yes
Make	Nissan	Power Window Auto-Reverse	No
Model	ARIYA	Driver Frontal Airbag	Yes
Body Style	SUV	Driver Curtain Airbag	Yes
VIN	JN1BF0AA3PM406035	Driver Head/Torso Airbag	No
Body Color	Black	Driver Torso Airbag	No
Odometer Reading (km /mi)	9 miles	Driver Torso/Pelvis Airbag	Yes
Engine Displacement (L)	N/A	Driver Pelvis Airbag	No
Type / No. Cylinders	Electric Vehicle	Driver Knee Airbag	Yes
Engine Placement	Transverse	Front Pass. Frontal Airbag	Yes
Transmission Type	Automatic	Front Pass. Curtain Airbag	Yes
Transmission Speeds	Direct Drive	Front Pass. Head/Torso Airbag	No
Overdrive	No	Front Pass. Torso Airbag	No
Final Drive	Front Wheel Drive	Front Pass. Torso/Pelvis Airbag	Yes
Roof Rack	No	Front Pass. Pelvis Airbag	No
Sunroof / T-Top	No	Front Pass. Knee Airbag	Yes
Running Boards	No	Driver Pretensioner	Yes
Tilt Steering Wheel	Yes	Driver Load Limiter	Yes
Power Seats	No	Front Pass. Pretensioner	Yes
Anti-Lock Brakes (ABS)	Yes	Front Pass. Load Limiter	Yes
Automatic Door Locks (ADLs)	Yes	Other –	-

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

No

DATA FROM CERTIFICATION LABEL

Manufactured By	Nissan Motor Co. LTD	GVWR (kg)	2560
Date of Manufacture	12-22	GAWR Front (kg)	1255
		GAWR Rear (kg)	1310

VEHICLE SEATING AND WEIGHT CAPACITY DATA

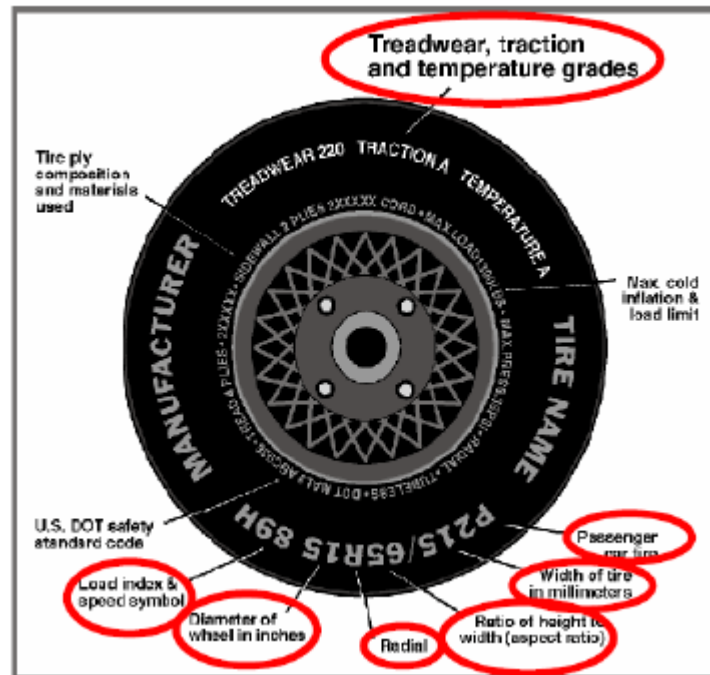
Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench	N/A	
Number of Occupants	2	3	N/A	5
Capacity Wt. (VCW) (kg)				400
Cargo Wt. (RCLW) (kg)				59.8

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

Test Vehicle: 2023 Nissan ARIYA SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20235200
 Test Date: 04/18/2023

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



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	320	320
Recommended Tire Size	235/55R19	235/55R19
Tire Size on Vehicle	235/55R19	235/55R19
Tire Manufacturer	Bridgestone	Bridgestone
Tire Model	Alenza Sport	Alenza Sport
Treadwear	500	500
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	1 Polyester, 2 Steel, 1 Nylon	1 Polyester, 2 Steel, 1 Nylon
Load Index / Speed Symbol	101V	101V
Tire Material	Rubber	Rubber
DOT Safety Code Left	EJFOJMM4222	EJFOJMM2822
DOT Safety Code Right	EJFOJMM4222	EJFOJMM2822

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

Test Vehicle: 2023 Nissan ARIYA SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20235200
 Test Date: 04/18/2023

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	569	468		621	519	
Right	kg	555	486		599	533	
Ratio	%	54	46		53.7	46.3	
Totals	kg	1124	954	2078	1220	1052	2272

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	2078	(A)
Weight of 1 P572E ATD & 1 P572O ATD	kg	142	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	59.8	(C)
Calculated Vehicle Target Weight (TVTW)	kg	2279.8	(A+B+C)

TEST VEHICLE ATTITUDES AND CG

Condition	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	902	904	943	940	1275
As Tested	mm	873	879	925	919	1286
Post-Test	mm	899	894	921	919	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2777
Total Vehicle Length at Left Side	mm	4560
Total Vehicle Length at Centerline	mm	4644
Total Vehicle Length at Right Side	mm	4560
Weight of Ballast in Cargo Area	kg	0
Weight of Vehicle Components Removed	kg	32
Amount of Stoddard Solvent in Fuel Tank	L	Electric Vehicle

LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT:

Trunk Carpeting, charger, rear bumper and beam, rear door panels, headrests, flat repair kit, and tail lights

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

Test Vehicle: 2023 Nissan ARIYA SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20235200
 Test Date: 04/18/2023

TARGET VEHICLE STRUCTURAL MEASUREMENT

No.	Description	Pre-Test
1	Total Length	4644
2	Total Width	1884
3*	Bumper Top Height	524
4*	Bumper Bottom Height	438
5*	Longitudinal Member Top Height	889
6	Distance Between Longitudinal Members	1214
7	Longitudinal Member Width	36
8*	Engine Top Height	929
9*	Engine Bottom Height	213
10	Engine and Gearbox Width	439
11	Front Bumper-Engine Distance	505
12*	Front Shock Absorber Fixing Height	987
13*	Bonnet Leading Edge Height	921
14	Front Shock Absorber Fixing Width	1276
15	Front Bumper – Front Axle Distance	874
16	Front Axle – A Pillar Distance	528
17	A-Pillar – B-Pillar Distance	1099
18	B-Pillar – Rear Axle Distance	1149
19	B-Pillar – C-Pillar Distance	1102
20*	Roof Sill Bottom Height	1508
21*	Roof Sill Top Height	1545
22*	Floor Sill Bottom Height	429
23*	Floor Sill Top Height	460

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

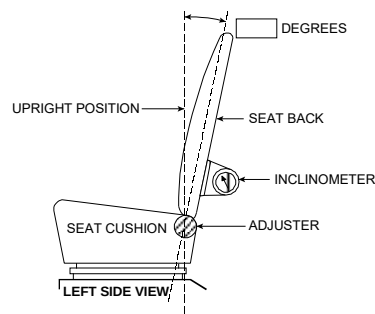
DATA SHEET NO. 2 SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

Test Vehicle: 2023 Nissan ARIYA SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20235200
Test Date: 04/18/2023

NOMINAL DESIGN RIDING POSITION

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



FRONT SEAT ASSEMBLY

SEAT FORE / AFT POSITIONS

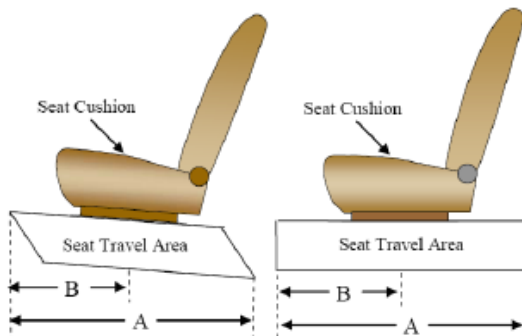
The driver's seat was positioned at the mid-point of fore/aft travel at its lowest position. The passenger's seat was positioned at the most forward position of fore/aft travel. Zero is defined as the forward most position.

Seating Position	Total Fore / Aft Travel	Placed in Position #
Driver Seat	320 (0-26)	10
Passenger Seat	260 (0-26)	1

SEAT BELT UPPER ANCHORAGE

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

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



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

Test Vehicle: 2023 Nissan ARIYA SUV
 Test Program: NCAP Frontal Barrier Impact Test

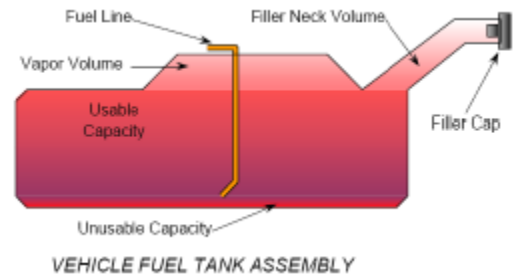
NHTSA No.: M20235200
 Test Date: 04/18/2023

FUEL TANK CAPACITY

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

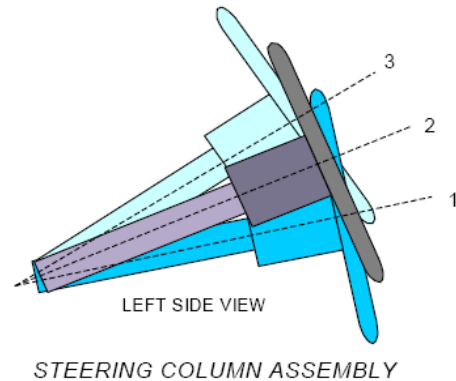
FUEL PUMP

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



STEERING COLUMN ADJUSTMENT

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



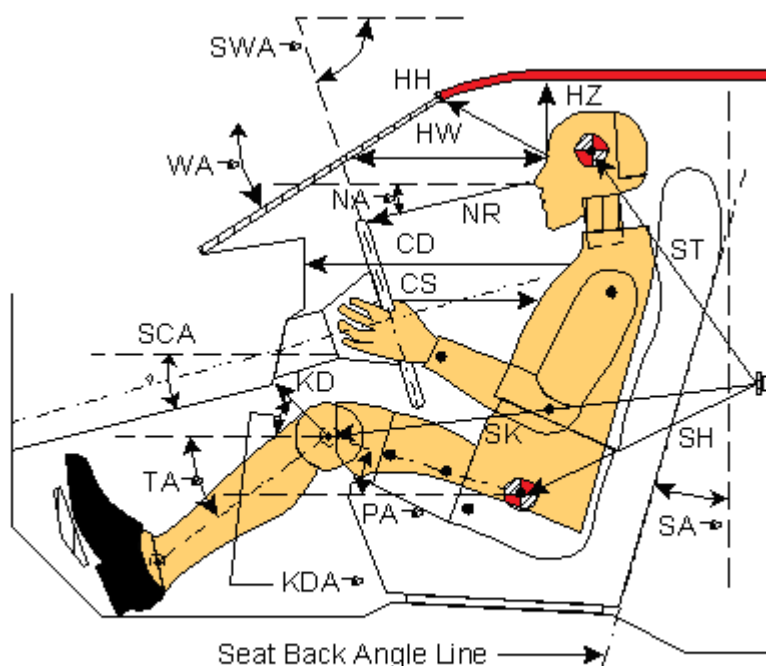
STEERING COLUMN POSITIONS

Description	Degrees	Fore / Aft Position (mm)
Lowermost position No. 1	24.1	
Geometric center position No. 2	26.8	
Uppermost position No. 3	29.4	
Telescoping Steering Wheel Travel		58
Test Position	26.8	29

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2023 Nissan ARIYA SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20235200
 Test Date: 04/18/2023



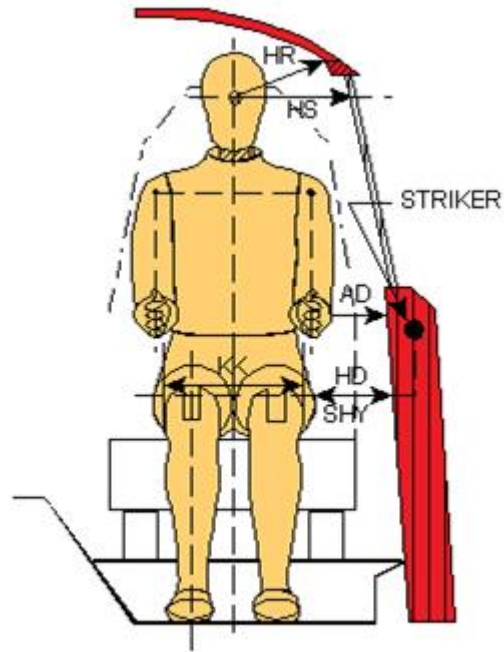
Left Side View

Code	Measurement Description	Driver (SN: 142)		Passenger (SN: 137)	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		25.9		
SWA°	Steering Wheel Angle		27.0		
SCA°	Steering Column Angle		63.0		
SA°	Seat Back Angle (on headrest post)		2.3		0.4
HZ	Head to Roof (Z)	175	90	189	90
HH	Head to Header	349	27.8	272	54.5
HW	Head to Windshield	644	0	578	0
NR	Nose to Rim / Dash	406	9.0	455	30.5
CD	Chest to Dash	600		365	
CS	Chest to Steering Hub	304	1.9		
RA	Rim to Abdomen	195	1.0		
KDL	Left Knee to Dash	145	28.7	78	50.2
KDR	Right Knee to Dash	126	52.1	97	52.8
PA°	Pelvic Angle		24.4		20.0
TA°	Tibia Angle		37.1		43.9
SK	Striker to Knee	615	1.1	742	3.9
ST	Striker to Head	533	76.3	511	60.4
SH	Striker to H-Point	287	22.8	394	17.9

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2023 Nissan ARIYA SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20235200
 Test Date: 04/18/2023



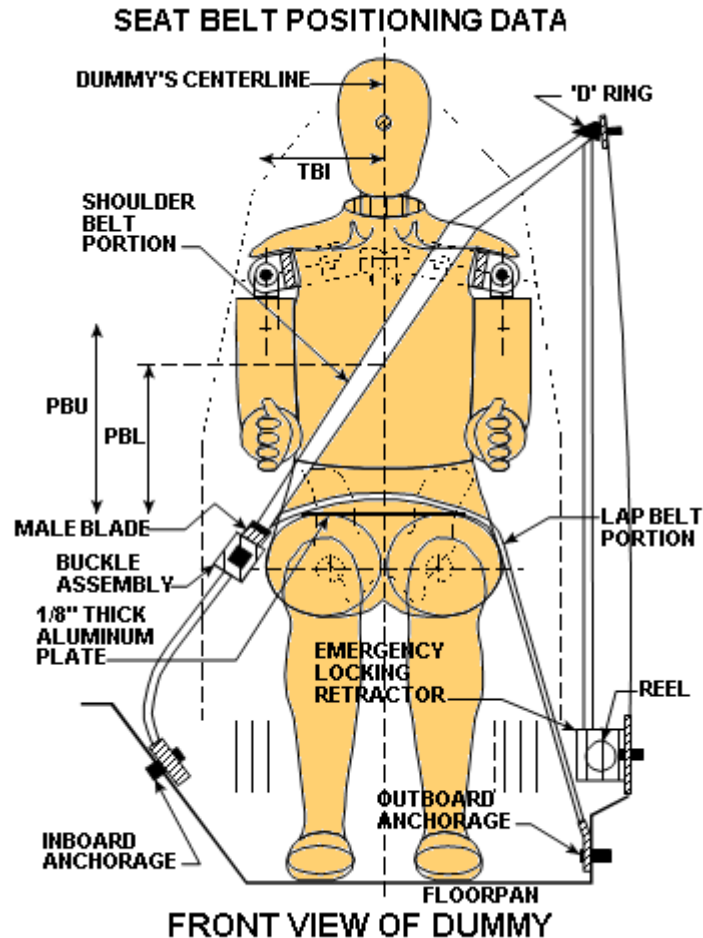
Front View

Code	Description	Driver (mm)	Passenger (mm)
AD	Arm to Door	89	95
HD	H-Point to Door	143	230
HR	Head to Side Header	232	247
HS	Head to Side Window	377	371
KK	Knee to Knee	320	213
SHY	Striker to H-Point (Y Direction)	260	285
AA	Ankle to Ankle	343	168

DATA SHEET NO. 5 SEAT BELT POSITIONING DATA

Test Vehicle: 2023 Nissan ARIYA SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20235200
Test Date: 04/18/2023



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU — Top surface of reference to belt upper edge	mm	335	275
PBL — Top surface of reference to belt lower edge	mm	245	185

BELT LENGTH DATA

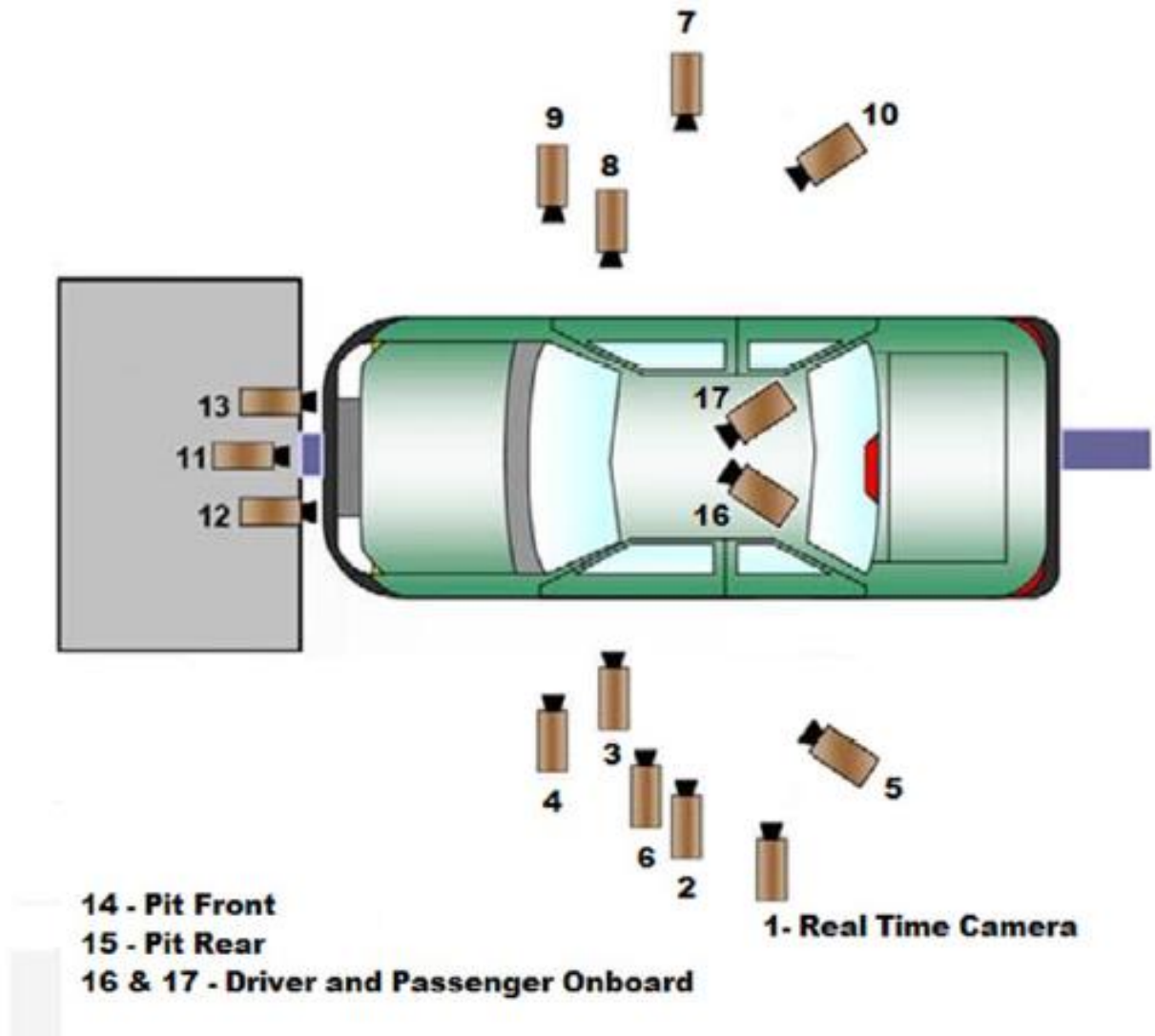
Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	895	980
Lap Belt Length as measured on ATD	mm	445	485
Remainder of belt on reel	mm	1260	1135
Total belt length for continuous webbing systems	mm	2600	2600

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

Test Vehicle: 2023 Nissan ARIYA SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20235200
Test Date: 04/18/2023

CAMERA POSITIONS FOR FRONTAL IMPACTS



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

Test Vehicle: 2023 Nissan ARIYA SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20235200
 Test Date: 04/18/2023

CAMERA LOCATIONS

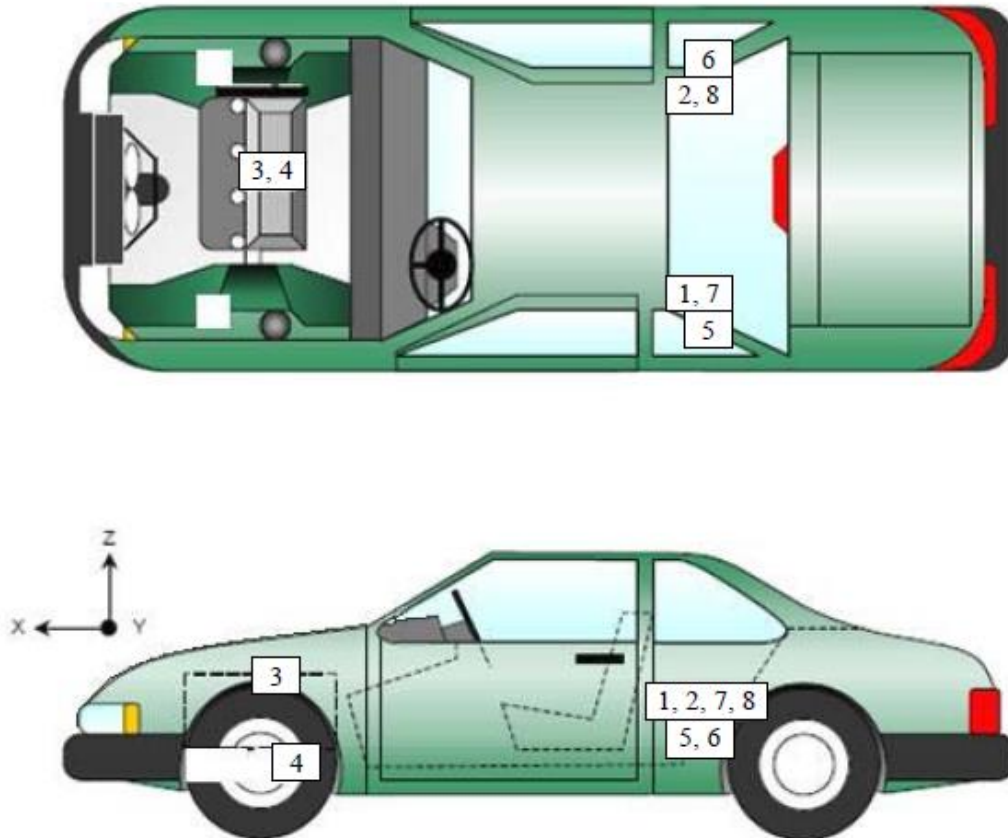
No.	Camera View	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall	-	-	-		30
2	Left Overall	-1990	-7630	-1380	24	1000
3	Driver Close-Up	-1216	-6722	-1552	50	1000
4	Left Front Half	-986	-6226	-1544	28	1000
5	Left Angle	-4323	-5052	-2521	50	1000
6	Steering Column	-1705	-7627	-2265	75	1000
7	Right Overall	-1827	7479	-1346	24	1000
8	Passenger Close-Up	-1469	7050	-1423	50	1000
9	Right Front Half	-1147	6257	-1439	28	1000
10	Right Angle	-4320	4834	-2536	50	1000
11	Windshield	1140	0	-3471	12.5	1000
12	Driver Windshield	1487	-400	-2042	25	1000
13	Passenger Windshield	1487	314	-2042	25	1000
14	Pit Front	-1279	0	2320	12.5	1000
15	Pit Rear	-2586	0	2460	12.5	1000
16	Onboard Driver Airbag (Optional)				8	1000
17	Onboard Passenger Airbag (Optional)				8	1000

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

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

Test Vehicle: 2023 Nissan ARIYA SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20235200
 Test Date: 04/18/2023



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Accelerometer – X Direction	1863	-336	126
2	Right Rear Accelerometer – X Direction	1863	254	117
3	Engine Top X	4004	-106	-324
4	Engine Bottom X	4304	3	400
5	Left Rear Accelerometer – Z Direction	1863	-336	126
6	Right Rear Accelerometer – Z Direction	1863	254	117
7	Left Rear Accelerometer – X Direction Redundant	1863	-350	125
8	Right Rear Accelerometer – X Direction Redundant	1862	266	117

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

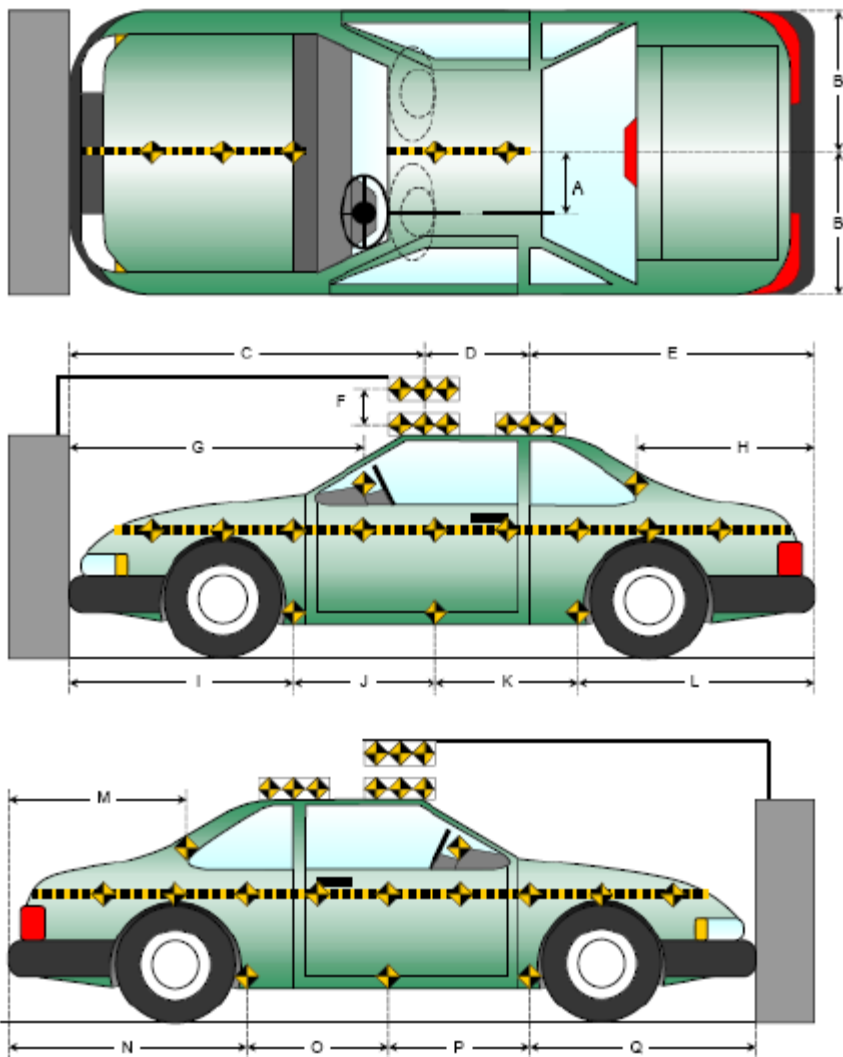
DATA SHEET NO. 8
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2023 Nissan ARIYA SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20235200
 Test Date: 04/18/2023

Item	Value
A	380
B	942
C	2668
D	610
E	1366
F	270
G	1673
H	978
I	1365
J	905
K	898
L	1476
M	976
N	1471
O	905
P	898
Q	1370

All units in millimeters



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

Test Vehicle: 2023 Nissan ARIYA SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20235200
 Test Date: 04/18/2023

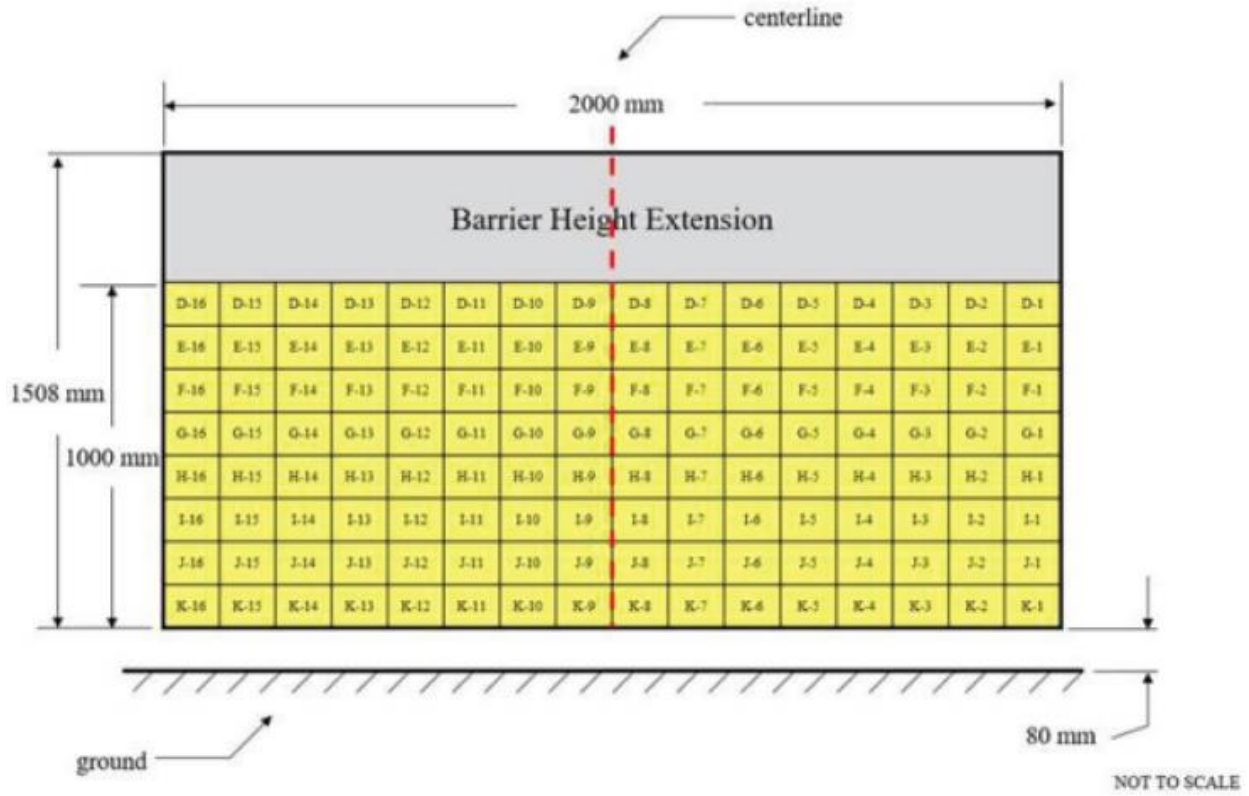


Figure 1 - Load Cell Locations on a 128-Load Cell Barrier with Plywood Height Extension*
 Please note above diagram is not actual representation of load cell barrier used.

DATA SHEET NO. 10
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2023 Nissan ARIYA SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20235200
Test Date: 04/18/2023

INSTRUMENTATION

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

CAMERA COVERAGE

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

DATA SHEET NO. 11
POST-TEST OBSERVATIONS

Test Vehicle: 2023 Nissan ARIYA SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20235200
Test Date: 04/18/2023

TEST DUMMY INFORMATION AND CONTACT LOCATIONS

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

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger	Other
Locked / Unlocked Doors	Locked	Locked	
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	

**NOTE: Indicate "No", "N/A, or "Yes" described

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Windshield Damage	Cracked throughout with some separation on driver side
Window Damage	None
Other	None

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	1653
Center	mm	1647
Right Side	mm	1646
Average	mm	1649

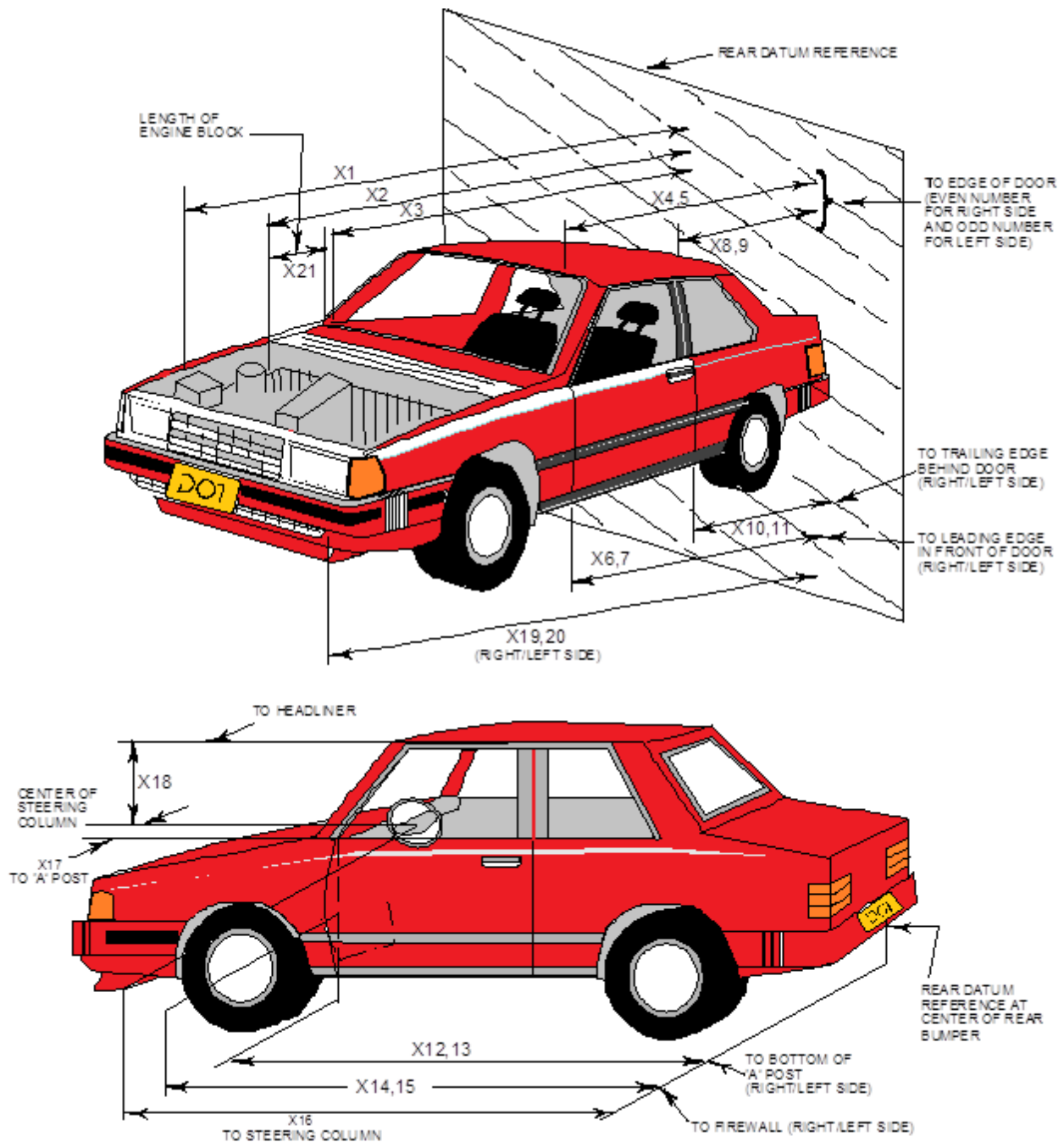
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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	Yes	Yes
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Other				

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

Test Vehicle: 2023 Nissan ARIYA SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20235200
 Test Date: 04/18/2023



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

Test Vehicle: 2023 Nissan ARIYA SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20235200
 Test Date: 04/18/2023

No.	Measurement Description	Pre-Test	Post-Test	Change
1	Total Length of Vehicle at Centerline	4644	4184	-460
2	Rear Surface of Vehicle (RSOV) to Front of Engine	4139	3889	-250
3	RSOV to Firewall	3795	3750	-45
4	RSOV to Upper Leading Edge of Right Door	3241	3239	-2
5	RSOV to Upper Leading Edge of Left Door	3242	3241	-1
6	RSOV to Lower Leading Edge of Right Door	3255	3251	-4
7	RSOV to Lower Leading Edge of Left Door	3255	3252	-3
8	RSOV to Upper Trailing Edge of Right Door	2154	2149	-5
9	RSOV to Upper Trailing Edge of Left Door	2153	2150	-3
10	RSOV to Lower Trailing Edge of Right Door	2230	2225	-5
11	RSOV to Lower Trailing Edge of Left Door	2230	2226	-4
12	RSOV to Bottom of "A" Post of Right Side	3371	3367	-4
13	RSOV to Bottom of "A" Post of Left Side	3357	3354	-3
14	RSOV to Firewall, Right Side	3793	3764	-29
15	RSOV to Firewall, Left Side	3812	3785	-27
16	RSOV to Steering Column	2796	2867	71
17	Center of Steering Column to "A" Post	283	274	-9
18	Center of Steering Column to Headliner	425	426	1
19	RSOV to Right Side of Front Bumper	4580	4181	-399
20	RSOV to Left Side of Front Bumper	4582	4196	-386
21	Length of Engine Block	216	216	0
RD	RSOV to Right Side of Dash Panel	3128	3127	-1
CD	RSOV to Center of Dash Panel	3183	3184	1
LD	RSOV to Left Side of Dash Panel	3134	3138	4

*UR= Unrecoverable data point
 All Dimensions in mm

DATA SHEET NO. 13
ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2023 Nissan ARIYA SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20235200
Test Date: 04/18/2023

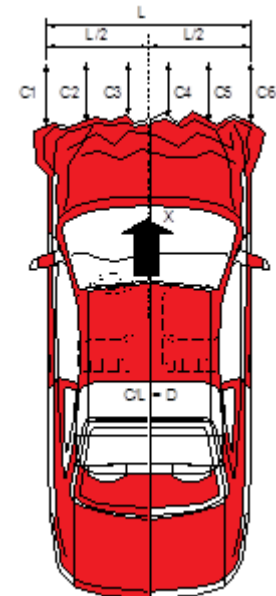
VEHICLE INFORMATION

VIN: JN1BF0AA3PM406035
Vehicle Size Category: Passenger Car

Wheelbase (mm): 2777
Test Weight (kg): 2272

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): 56.33
Velocity Change (km/h): 66.38
Time of Separation (ms): 126



CRUSH PROFILE

Collision Deformation Classification: 12FDEW3
Midpoint of Damage: C3
Damage Region Length (mm): 1550
Impact Mode: Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Crush
C1	Crush Zone 1 at Left Side	mm	4413	4154	259
C2	Crush Zone 2 at Left Side	mm	4577	4180	397
C3	Crush Zone 3 at Left Side	mm	4629	4196	433
C4	Crush Zone 4 at Right Side	mm	4629	4196	433
C5	Crush Zone 5 at Right Side	mm	4577	4177	400
C6	Crush Zone 6 at Right Side	mm	4412	4143	269
L	C1 to C6	mm	1456	1550	-94

DATA SHEET NO. 14
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2023 Nissan ARIYA SUV
Test Program: NCAP Frontal Barrier Impact Test

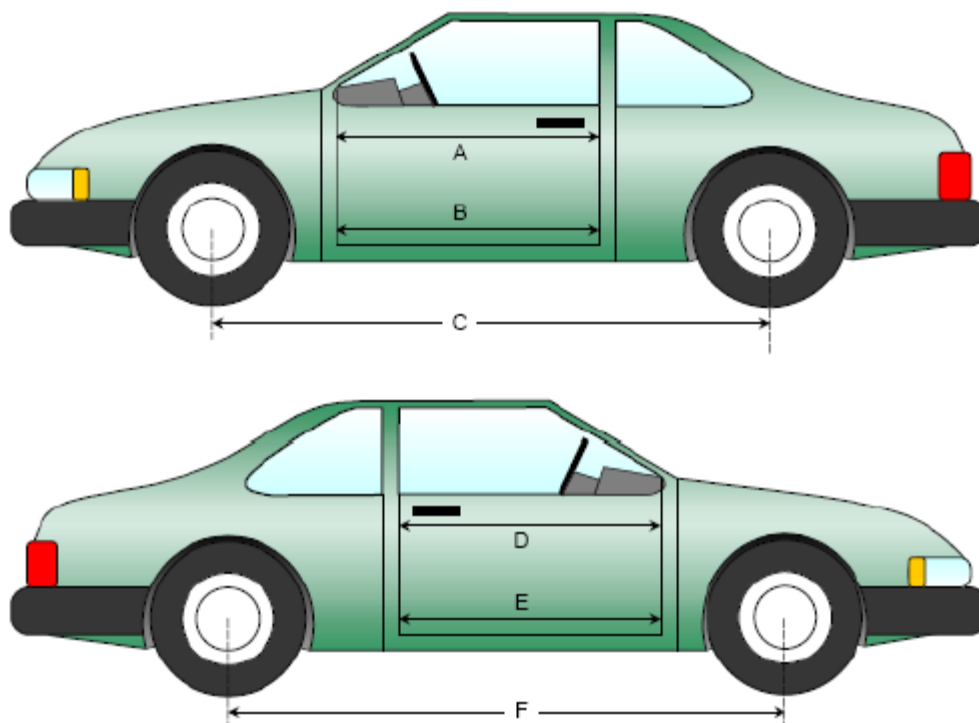
NHTSA No.: M20235200
Test Date: 04/18/2023

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Change
A	Left Side Upper	mm	1001	998	-3
B	Left Side Lower	mm	883	882	-1
D	Right Side Upper	mm	1001	999	-2
E	Right Side Lower	mm	885	884	-1

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Change
C	Left Side Wheelbase	mm	2777	2732	-45
F	Right Side Wheelbase	mm	2777	2712	-65



Left & Right Side Views

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

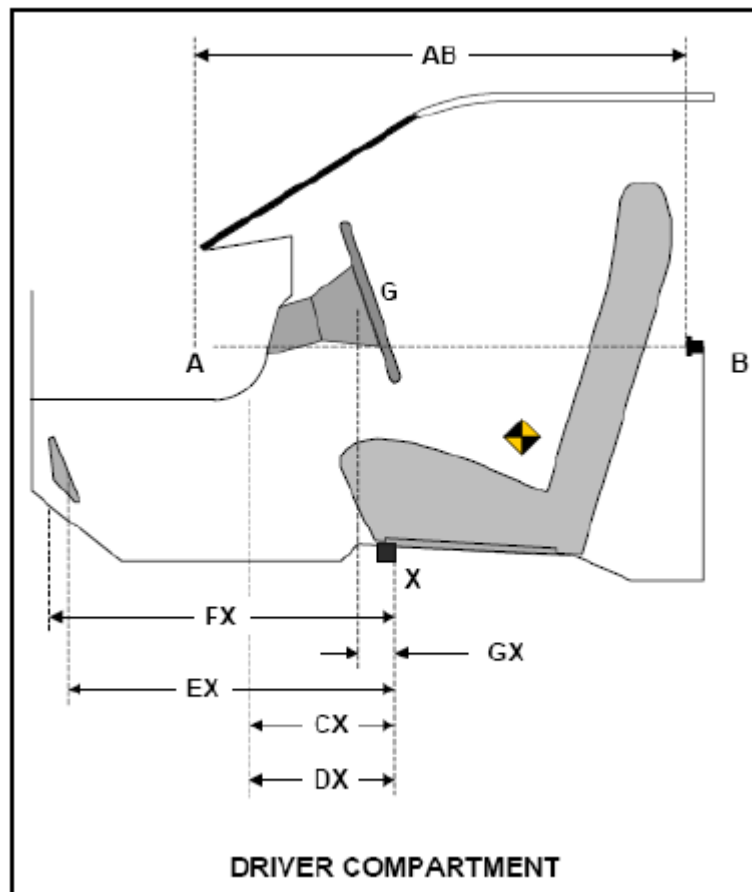
Test Vehicle: 2023 Nissan ARIYA SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20235200
 Test Date: 04/18/2023

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Change
AB	Door Opening (Inside Window Jam)	mm	820	819	-1
CX	Left Knee Bolster to X	mm	314	311	-3
DX	Right Knee Bolster to X	mm	260	238	-22
EX	Brake Pedal to X	mm	559	534	-25
FX	Foot Rest to X	mm	545	537	-8
GX	Center of Steering Column Wheel Hub to X	mm	57	127	70

X = Front of Seat Track (Stationary)



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

Test Vehicle: 2023 Nissan ARIYA SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20235200
 Test Date: 04/18/2023

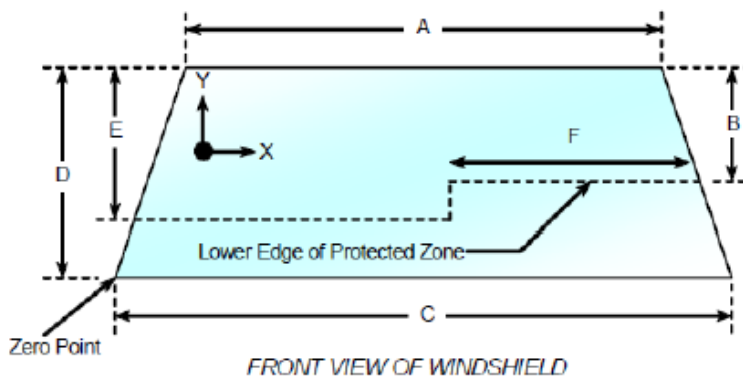
Windshield Mounting Details: A 0.8 mm trim surrounds the top and side of windshield while a plastic shroud is on the bottom.

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

Temperature of windshield molding during test: 21° C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2350	2182	92.9
Right Side	2350	1910	81.3
Total	4700	4092	87.1



Item	Units	Value
A	mm	1270
B	mm	600
C	mm	1670
D	mm	880
E	mm	612
F	mm	546

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: 2023 Nissan ARIYA SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20235200
Test Date: 04/18/2023

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 21 ° C

Test Time: 11:43 AM

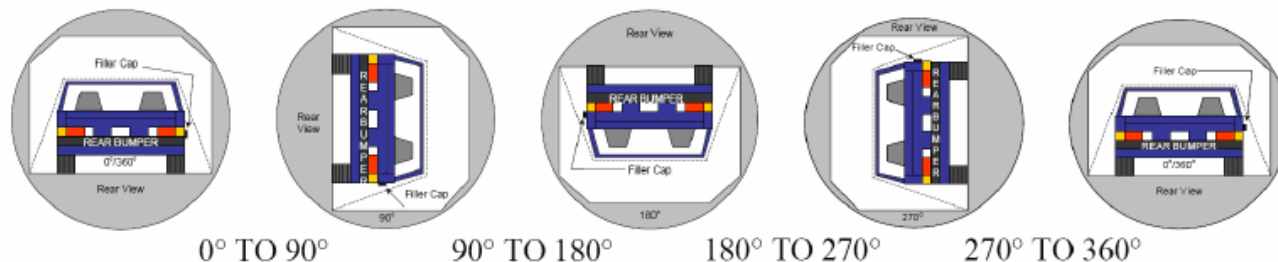
STODDARD SOLVENT SPILLAGE MEASUREMENTS

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

DATA SHEET NO. 16
FMVSS 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2023 Nissan ARIYA SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20235200
 Test Date: 04/18/2023



1. The specified fixture rollover rate for each 90° of rotation is 60 to 180 seconds.
2. The position hold time at each position is 300 seconds (minimum).
3. Details of Stoddard Solvent Spillage: Electric Vehicle

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	72	300	372
90° to 180°	66	300	366
180° to 270°	62	300	362
270° to 360°	70	300	370

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°				

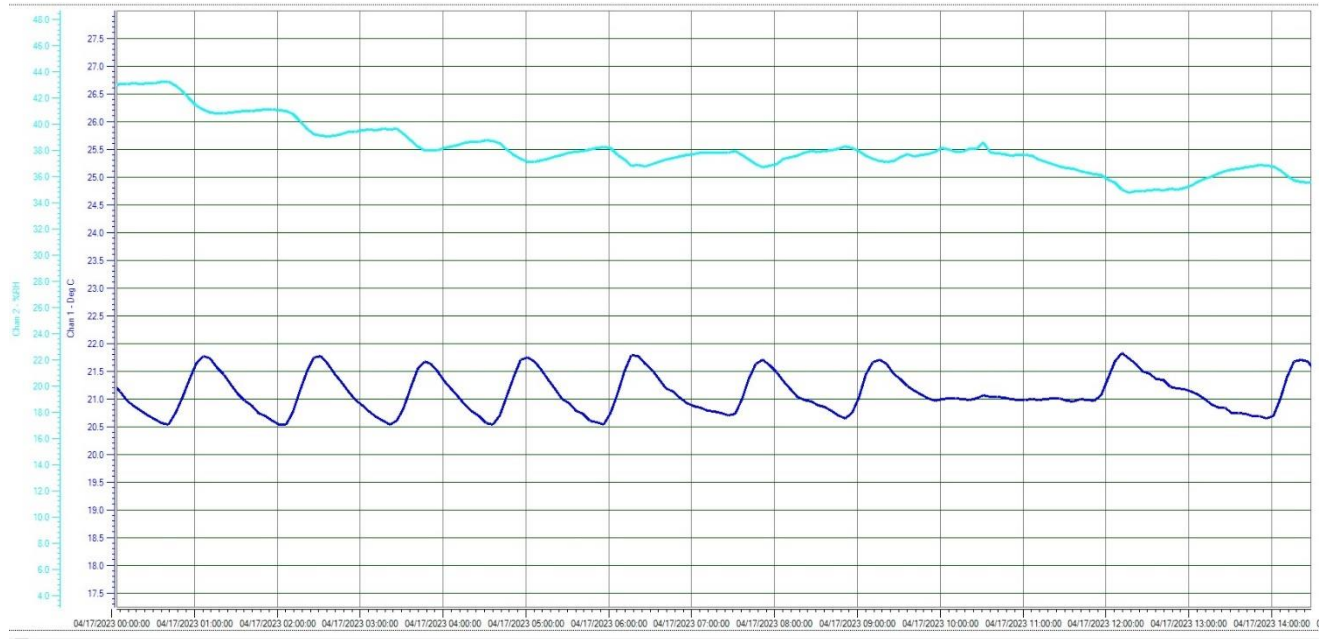
SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 17
DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART

Test Vehicle: 2023 Nissan ARIYA SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20235200
Test Date: 04/18/2023



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: 2023 Nissan ARIYA SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20235200
 Test Date: 04/18/2023

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)	402
Is this Vehicle equipped with an Automatic Propulsion Battery Disconnect?	Yes
Physical Location of Automatic Propulsion Battery Disconnect, if applicable	Under Rear Seat
Auxiliary Battery Type	Lead Acid

PROPULSION BATTERY SYSTEM DATA (COTR SUPPLIED)

Measured Parameter	Value
Electrolyte Fluid Type	Organic Electrolyte
Electrolyte Fluid Specific Gravity	1.2 g/ml
Electrolyte Fluid Kinematic Viscosity (centistokes)	3.7 mPa·s
Electrolyte Fluid Color	Clear
Propulsion Battery Coolant Type, Color and Specific Gravity (if applicable)	Water, Green
Location of Battery Modules (Inside or Outside of Passenger Compartment?)	Outside

PROPULSION BATTERY STATE OF CHARGE

Measured Parameter	Units	Value
<i>For all battery types:</i> Voltage Range corresponding to useable energy of the battery:		
Minimum State of Charge	V	Not Provided
Maximum State of Charge	V	402
95% of Maximum	V	381.9
Test Voltage *	V	397.3
<i>For batteries that are rechargeable ONLY by an energy source on the vehicle:</i> Voltage range corresponding to useable energy of the battery :		
Minimum State of Charge	V	
Maximum State of Charge	V	
95% of Maximum	V	
Test Voltage *	V	

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

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

Test Vehicle: 2023 Nissan ARIYA SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20235200
Test Date: 04/18/2023

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

Measured Parameter	Value
Details of Vehicle Chassis Ground Points & Locations	Connected for unpainted portion of vehicle chassis.
Details of Propulsion Battery Components	Propulsion battery is located underneath in the middle of the vehicle.

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

Test Vehicle: 2023 Nissan ARIYA SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20235200
 Test Date: 04/18/2023

VOLTMETER INFORMATION

Measured Parameter	Units	Value
Make & Model		Fluke 1587
Serial No.		58100115
Internal Impedance Value	MΩ	10
Resolution	V	0.001
Last Calibration Date		4/28/2022

NOTES:

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

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

Measured Parameter	Symbol	Units	Value
Normal operating voltage range specified by the manufacturer	V_b	V	402
Propulsion Battery Voltage : (ready to drive position)	V_b	V	397.3
Propulsion Battery to Vehicle Chassis	V_1	V	46.7
Propulsion Battery to Vehicle Chassis	V_2	V	374.5
Propulsion Battery to Vehicle Chassis Across Known Resistor	R_o	Ω	199,900
Propulsion Battery to Vehicle Chassis with R_o installed	V_1'	V	5.2
Propulsion Battery to Vehicle Chassis with R_o installed	V_2'	V	40.0
$R_{i1} = R_o * (1 + V_2/V_1) * [(V_1 - V_1')/V_1']$	R_{i1}	Ω	14,388,948
$R_{i2} = R_o * (1 + V_1/V_2) * [(V_2 - V_2')/V_2']$	R_{i2}	Ω	1,880,120
Lesser value of R_{i1} and R_{i2}	R_i	Ω	1,880,120
Electrical Isolation Value (Minimum E.I. Value is 500 Ω/V)	R_i/V_b	Ω/V	4,732

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

NOTES:

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

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

Test Vehicle: 2023 Nissan ARIYA SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20235200
 Test Date: 04/18/2023

VOLTMETER INFORMATION

Measured Parameter	Units	Value
Make & Model		Fluke 1587
Serial No.		58100115
Internal Impedance Value	MΩ	10
Resolution	V	0.001
Last Calibration Date		4/28/2022

NOTES:

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

ELECTRICAL ISOLATION MEASUREMENTS & IMPACT CALCULATIONS

Parameter	Value	Units		Value		Value	
$V_b =$	8.94	V	Time:	2	Minutes	11	Seconds
$V_1 =$	1.000	V	Time:	2	Minutes	19	Seconds
$V_2 =$	0.900	V	Time:	2	Minutes	41	Seconds
$R_o =$	200,000	Ω	Time:		Minutes		Seconds
$V_1' =$	0.000	V	Time:	2	Minutes	50	Seconds
$V_2' =$	0.010	V	Time:	2	Minutes	59	Seconds
$R_{i1} =$	Zero Volts	Ω	Time:	2	Minutes	50	Seconds
$R_{i2} =$	37,577,778	Ω	Time:	2	Minutes	59	Seconds
$R_i =$	37,577,778	Ω	Time:	2	Minutes	59	Seconds
$R_i/V_b =$	4,203,331	Ω/V	Time:	2	Minutes	59	Seconds

Is the Electrical Isolation Value $\geq 500 \Omega/V$ (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

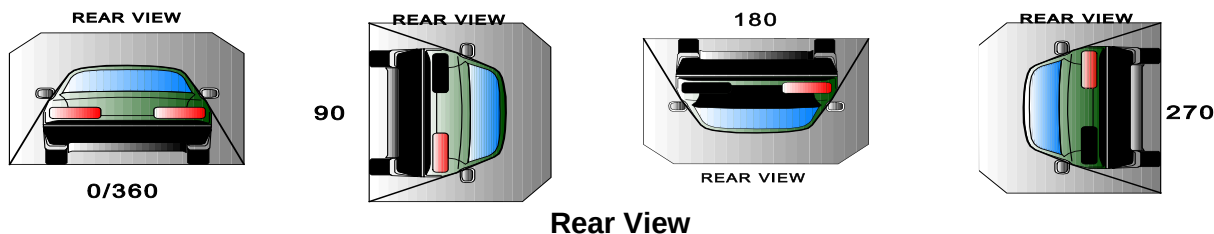
PROPULSION BATTERY SYSTEM COMPONENTS

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: 2023 Nissan ARIYA SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20235200
 Test Date: 04/18/2023



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	Seconds	
0° to 90°	1	12	5	6	12	7
90° to 180°	1	6	5	6	6	7
180° to 270°	1	2	5	6	2	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°	0.0	Liters	None
90° to 180°	0.0	Liters	None
180° to 270°	0.0	Liters	None
270° to 360°	0.0	Liters	None
Total Spillage	0.0	Liters	None

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

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

VOLTMETER INFORMATION

Measured Parameter	Units	Value
Make & Model		Fluke 1587
Serial No.		58100115
Internal Impedance Value	MΩ	10
Last Calibration Date		4/28/2022

NOTES:

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

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

Test Vehicle: 2023 Nissan ARIYA SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20235200
 Test Date: 04/18/2023

ELECTRICAL ISOLATION MEASUREMENTS & CALCULATIONS

Parameter	Rollover Stage	Value	Units	R ₀ =200,000	Minutes	Seconds
V _b =	90°	13.7	V	Time	1	14
	180°	13.7	V		19	45
	270°	13.7	V		28	18
	360°	13.7	V		36	43
V ₁ =	90°	1.30	V	Time:	1	27
	180°	1.24	V		19	58
	270°	0.32	V		28	23
	360°	0.98	V		36	55
V ₂ =	90°	0.34	V	Time:	1	34
	180°	0.34	V		20	4
	270°	0.15	V		28	33
	360°	0.03	V		37	10
V _{1'} =	90°	0.00	V	Time:	1	39
	180°	0.00	V		20	10
	270°	0.00	V		29	8
	360°	0.00	V		37	32
V _{2'} =	90°	0.00	V	Time:	1	45
	180°	0.00	V		20	16
	270°	0.00	V		29	13
	360°	0.00	V		37	35
R _{i1} =	90°	Zero Volts	Ω	Time:	1	39
	180°	Zero Volts	Ω		20	10
	270°	Zero Volts	Ω		29	8
	360°	Zero Volts	Ω		37	32
R _{i2} =	90°	Zero Volts	Ω	Time:	1	45
	180°	Zero Volts	Ω		20	16
	270°	Zero Volts	Ω		29	13
	360°	Zero Volts	Ω		37	35
R _i =	90°	Zero Volts	Ω	Time:	1	45
	180°	Zero Volts	Ω		20	16
	270°	Zero Volts	Ω		29	13
	360°	Zero Volts	Ω		37	35
R _i /V _b =	90°	Zero Volts	Ω/V	Time:	1	45
	180°	Zero Volts	Ω/V		20	16
	270°	Zero Volts	Ω/V		29	13
	360°	Zero Volts	Ω/V		37	35

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

APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

Fig.	Description	Page
1	Load Cell Location	A-6
2	Pre-Test Load Cell Wall	A-6
3	Post-Test Load Cell Wall	A-7
4	Manufacturer's Label	A-7
5	Tire Placard	A-8
6	2023 Nissan ARIYA Frontal As Delivered	A-8
7	Left Rear 3-4 View, as Received	A-9
8	Pre-Test Front View of Test Vehicle	A-9
9	Post-Test Front View of Test Vehicle	A-10
10	Pre-Test Left View of Test Vehicle	A-10
11	Post-Test Left View of Test Vehicle	A-11
12	Pre-Test Right View of Test Vehicle	A-11
13	Post-Test Right View of Test Vehicle	A-12
14	Pre-Test Right Front 3-4 View	A-12
15	Post-Test Right Front 3-4 View	A-13
16	Pre-Test Left Rear 3-4 View	A-13
17	Post-Test Left Rear 3-4 View	A-14
18	Pre-Test Windshield View	A-14
19	Post-Test Windshield View	A-15
20	Pre-Test Engine Compartment View	A-15
21	Post-Test Engine Compartment View	A-16
22	Pre-Test Fuel Filler Cap View	A-16
23	Post-Test Fuel Filler Cap View	A-17
24	Pre-Test Front Underbody View ¹	A-17
25	Post-Test Front Underbody View ¹	A-18
26	Pre-Test Rear Underbody View ¹	A-18
27	Post-Test Rear Underbody View ¹	A-19
28	Pre-Test Dummy Cable Routing	A-19
29	Post-Test Dummy Cable Routing	A-20
30	Pre-Test Driver Dummy Front View	A-20
31	Post-Test Driver Dummy Front View	A-21
32	Pre-Test Driver Dummy Window View	A-21
33	Post-Test Driver Dummy Window View	A-22
34	Pre-Test Driver Dummy and Vehicle Interior View	A-22
35	Post-Test Driver Dummy and Vehicle Interior View	A-23

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

Fig.	Description	Page
72	Post-Test Passenger Dummy Contact With Airbag	A-41
73	Post-Test Passenger Dummy Contact With Headrest	A-42
74	Photograph of Ballast Installed in Vehicle	A-42
75	Post-Test Stoddard Solvent Spillage Location View, if Required	A-43
76	Post-Test Speed Trap Read-Out	A-43
77	Vehicle at 0° on Static Rollover Device	A-44
78	Vehicle at 90° on Static Rollover Device	A-44
79	Vehicle at 180° on Static Rollover Device	A-45
80	Vehicle at 270° on Static Rollover Device	A-45
81	Vehicle at 360° on Static Rollover Device	A-46
82	2023 Nissan ARIYA Frontal Impact Event	A-46
83	Monroney Label Photograph	A-47
305-1	Auxiliary Power Module Warning Label	A-47
305-2	Power Inverter Warning Label	A-48
305-3	First Responder Warning Label	A-48
305-4	First Responder Warning Location	A-49
305-5	Other Vehicle Label(s) Related to Electrical Propulsion System	A-49
305-6	Manual High Voltage Service Disconnect in Place	A-50
305-7	Manual High Voltage Service Disconnect Removed (Plug)	A-50
305-8	Manual High Voltage Service Disconnect Removed Location	A-51
305-9	Pre-Impact View of Propulsion Battery	A-51
305-10	Post-Impact Front View of Propulsion Battery	A-52
305-11	Post-Impact Rear View of Propulsion Battery (if any part of it is visible)	A-52
305-12	Pre-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules	A-53
305-13	Post-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules	A-53
305-14	Pre-Impact View of Propulsion Battery Module(s)	A-54
305-15	Post-Impact View of Propulsion Battery Module(s)	A-54
305-16	Pre-Impact View of Electric Propulsion Drive	A-55
305-17	Post-Impact View of Electric Propulsion Drive	A-55
305-18	Pre-Impact View of High Voltage Interconnects	A-56
305-19	Pre-Impact View of Propulsion Venting System(s)	A-56
305-20	Pre-Impact View of Other Visible Electric Propulsion Components	A-57
305-21	Pre-Impact View of Ground Lead Attached	A-57
305-22	Pre-Impact View of High Voltage Leads Attached	A-58
305-23	Pre-Impact Close-Up View of High Voltage Leads Attached	A-58
305-24	Pre-Impact View of Installed Test Interface Port	A-59
305-25	Post-Impact View of Installed Test Interface Port	A-59
305-26	Pre-Impact View or Other Test Devices	A-60

Fig.	Description	Page
305-27	Post-Impact View or Other Test Devices	A-60
305-28	FMVSS No. 305 Static Rollover 90 Degrees	A-61
305-29	FMVSS No. 305 Static Rollover 180 Degrees	A-61
305-30	FMVSS No. 305 Static Rollover 270 Degrees	A-62
305-31	FMVSS No. 305 Static Rollover 360 Degrees	A-62
305-32	Pre-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery	A-63
305-33	Post-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery	A-63
305-34	Post-Impact Propulsion Battery System Mounting and/or Intrusion Failure(s)	A-64
305-35	Post-Impact View of Battery Component Intrusion	A-64
305-36	Post-Impact View of Battery Module Movement or Retention Loss	A-65
305-37	Post –Impact View of Propulsion Battery Electrolyte Spillage Location (Prior to static roll)	A-65
305-38	Post –Impact View of Propulsion Battery Electrolyte Spillage Location (After to static roll)	A-66

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

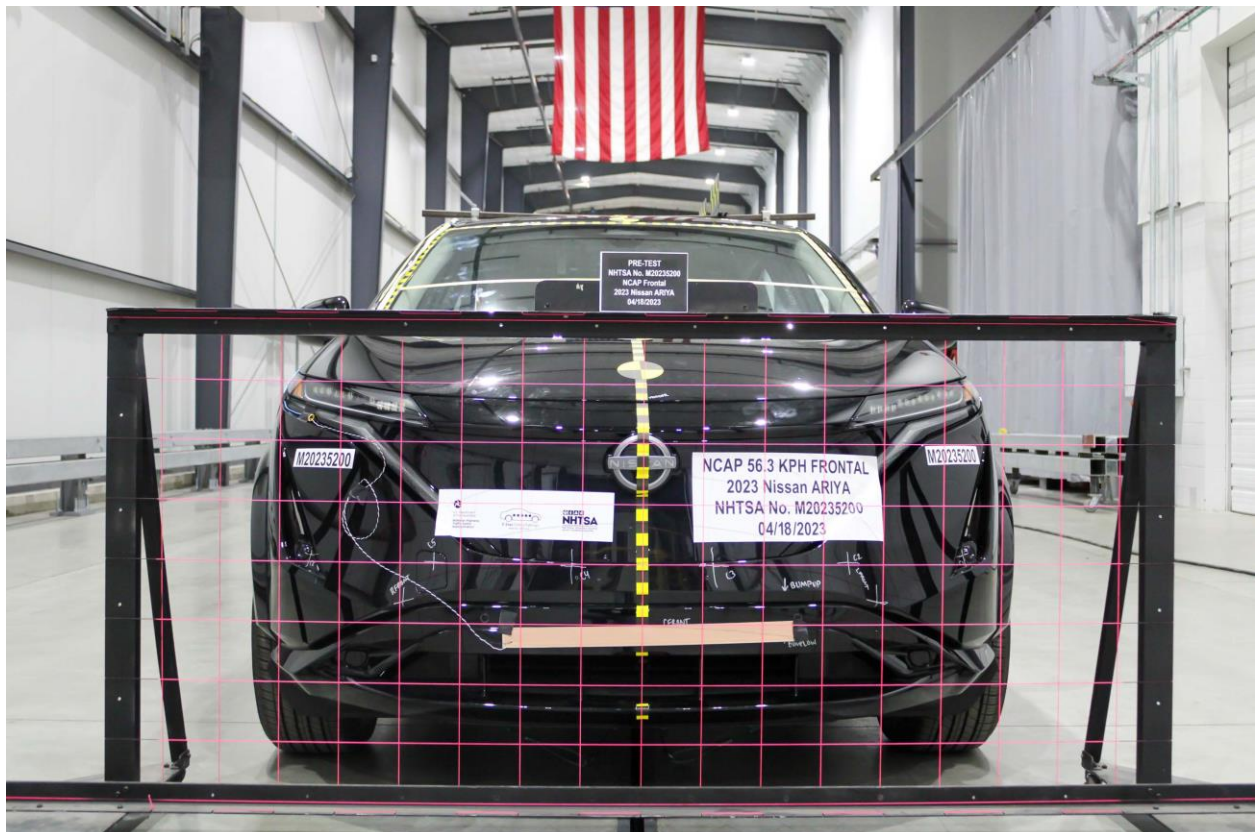


Figure A-1: Load Cell Location



Figure A-2: Pre-Test Load Cell Wall

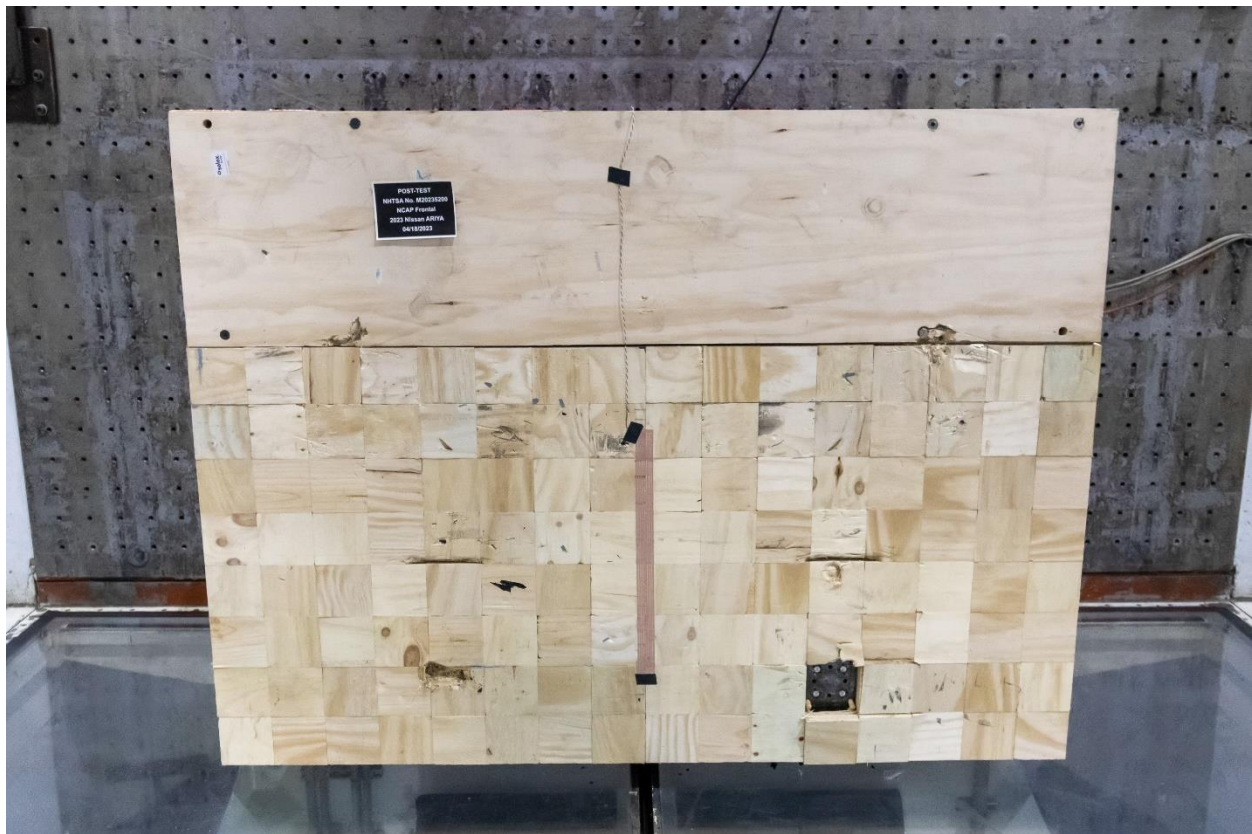


Figure A-3: Post-Test Load Cell Wall

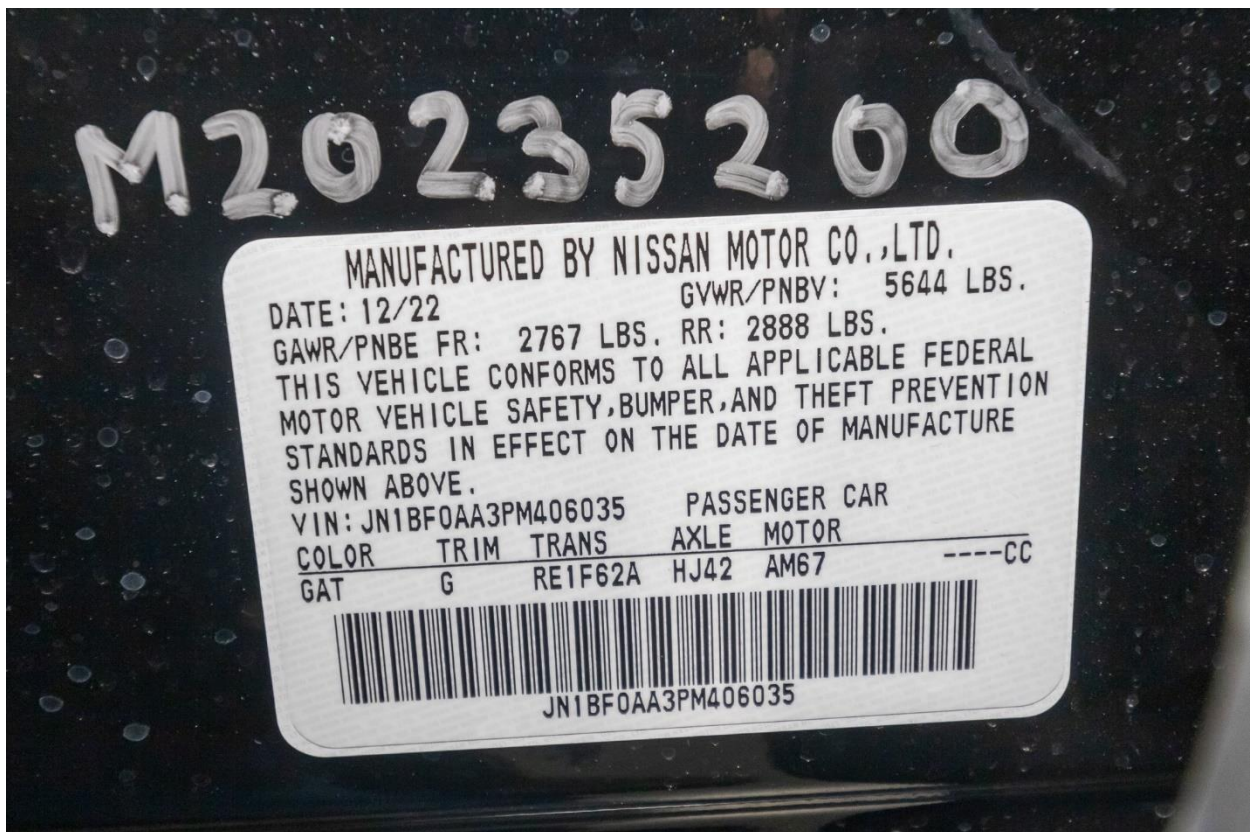


Figure A-4: Manufacturer's Label

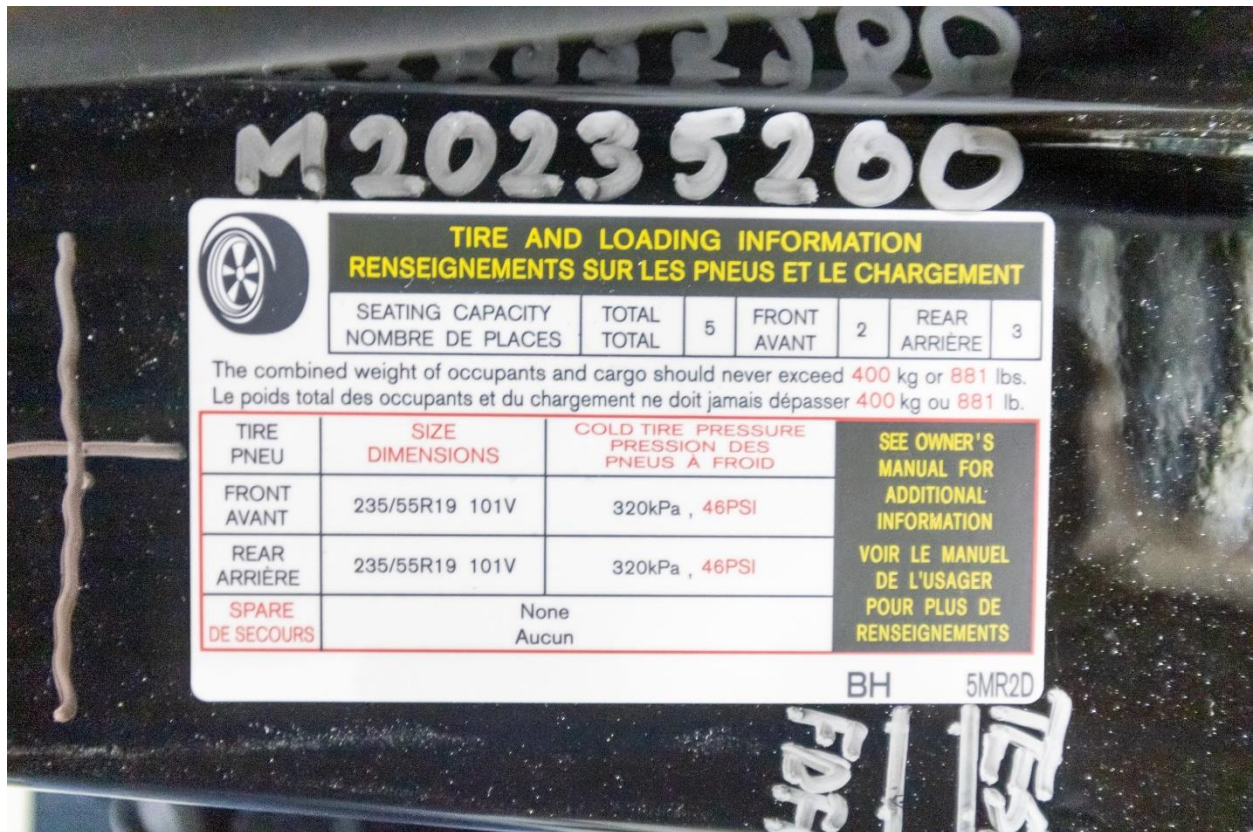


Figure A-5: Tire Placard



Figure A-6: 2023 Nissan ARIYA Frontal As Delivered



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



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

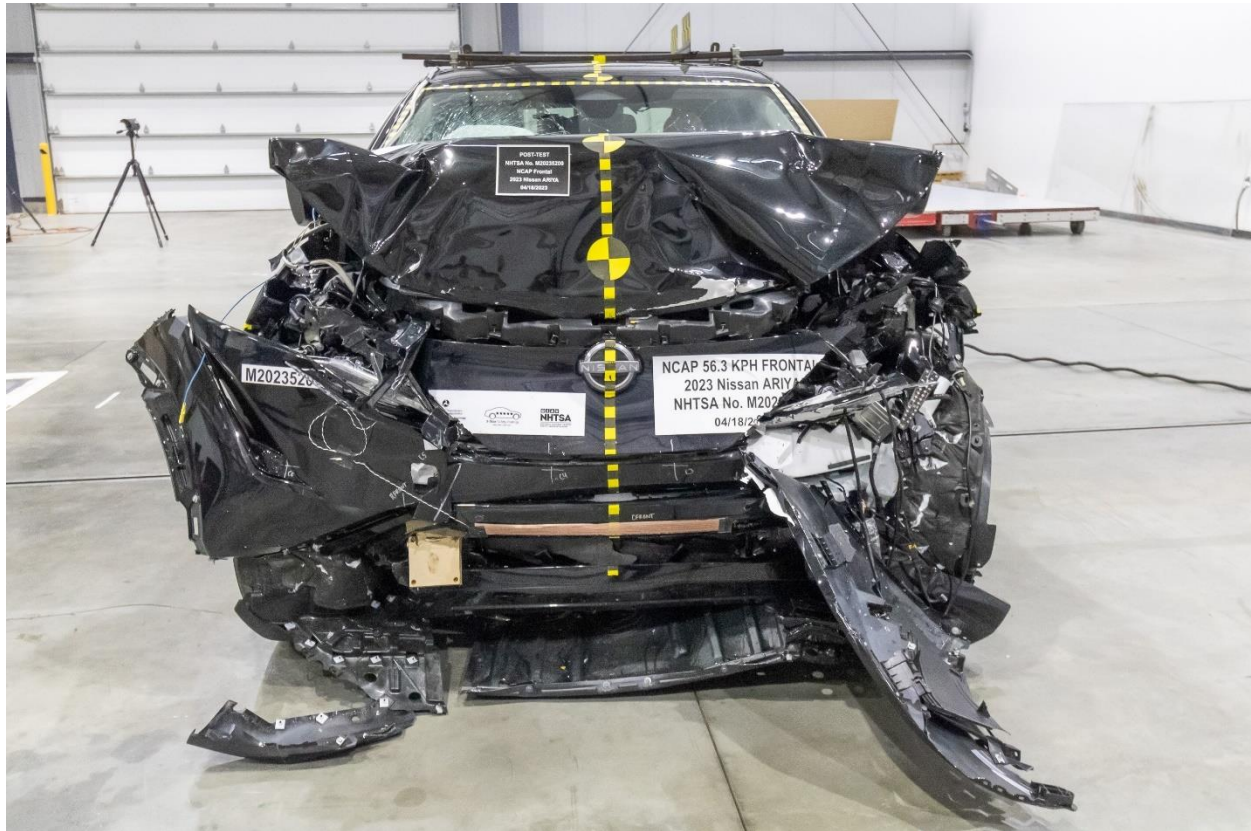


Figure A-9: Post-Test Front View of Test Vehicle



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

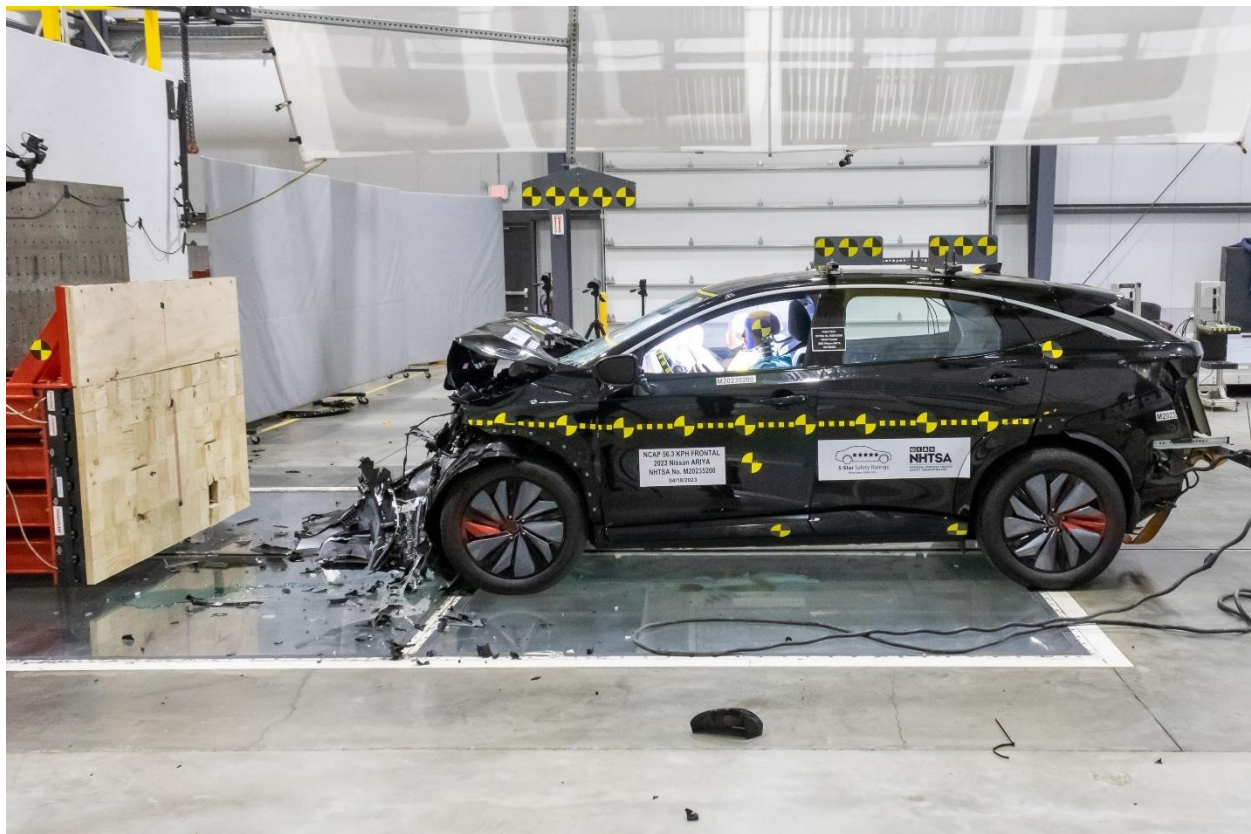


Figure A-11: Post-Test Left View of Test Vehicle



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

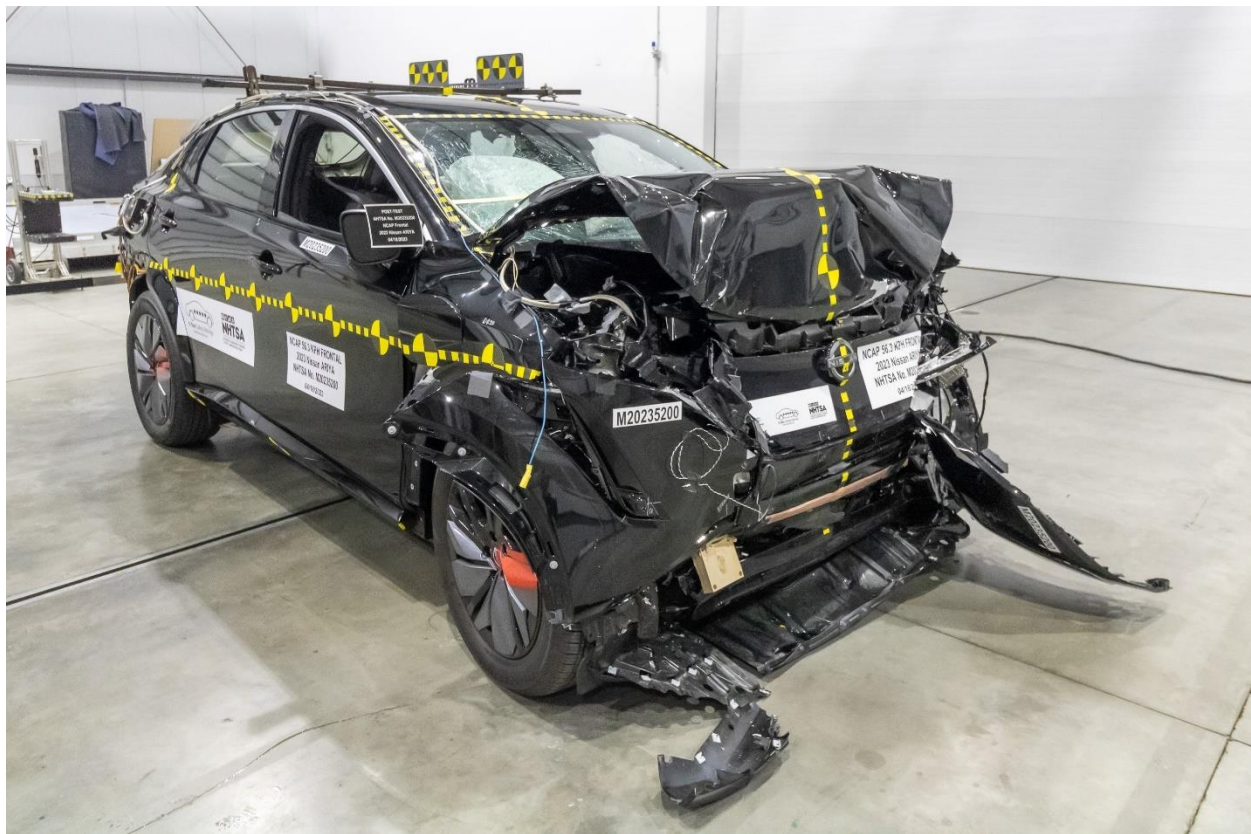


Figure A-15: Post-Test Right Front 3-4 View



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

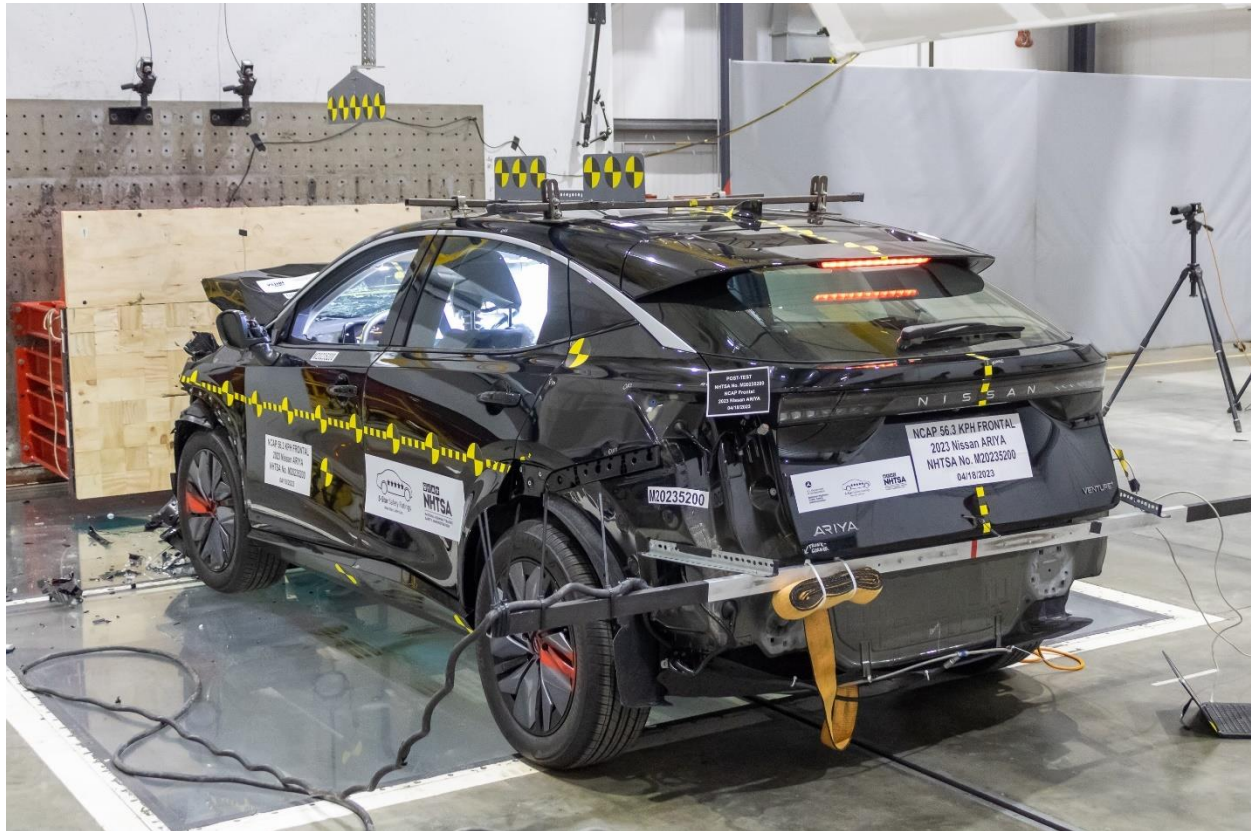


Figure A-17: Post-Test Left Rear 3-4 View



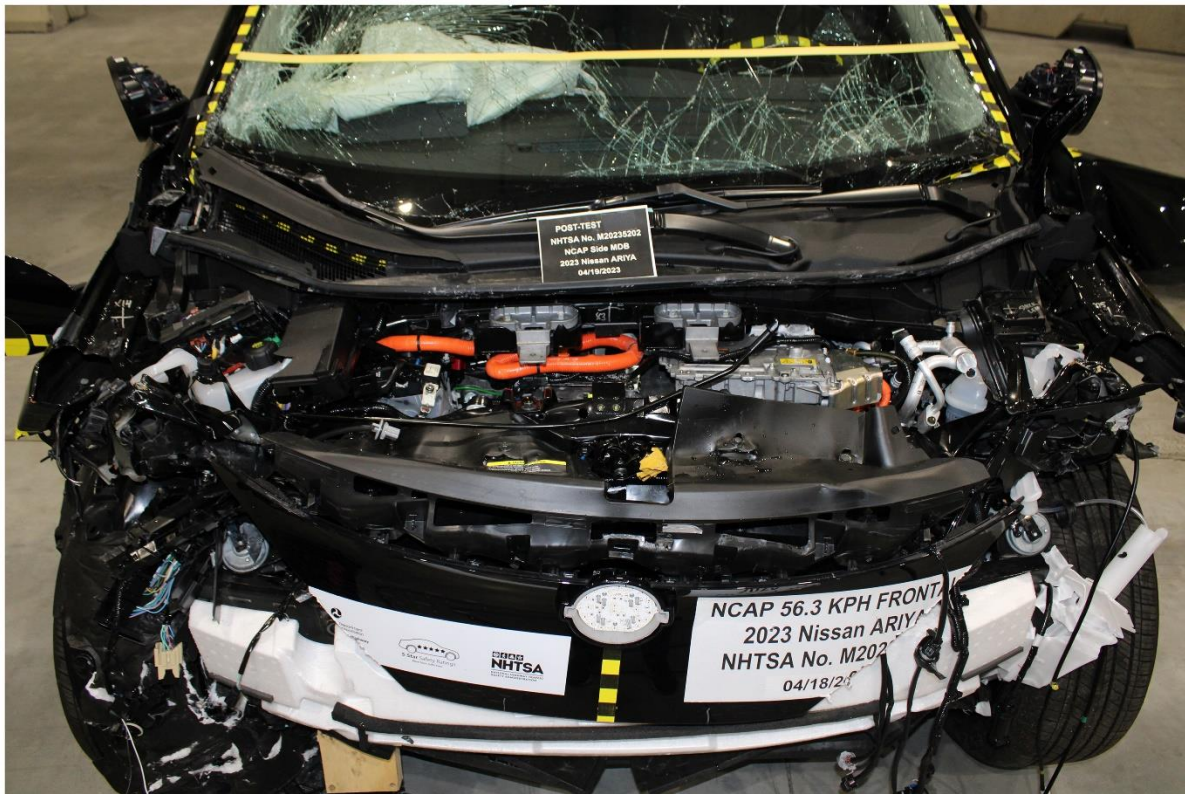
Figure A-18: Pre-Test Windshield View



Figure A-19: Post-Test Windshield View



Figure A-20: Pre-Test Engine Compartment View



POST-TEST NHSTA No.M20235200 NCAP FRONTAL 2023 NISSAN ARIYA 04/18/2023

Figure A-21: Post-Test Engine Compartment View



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



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

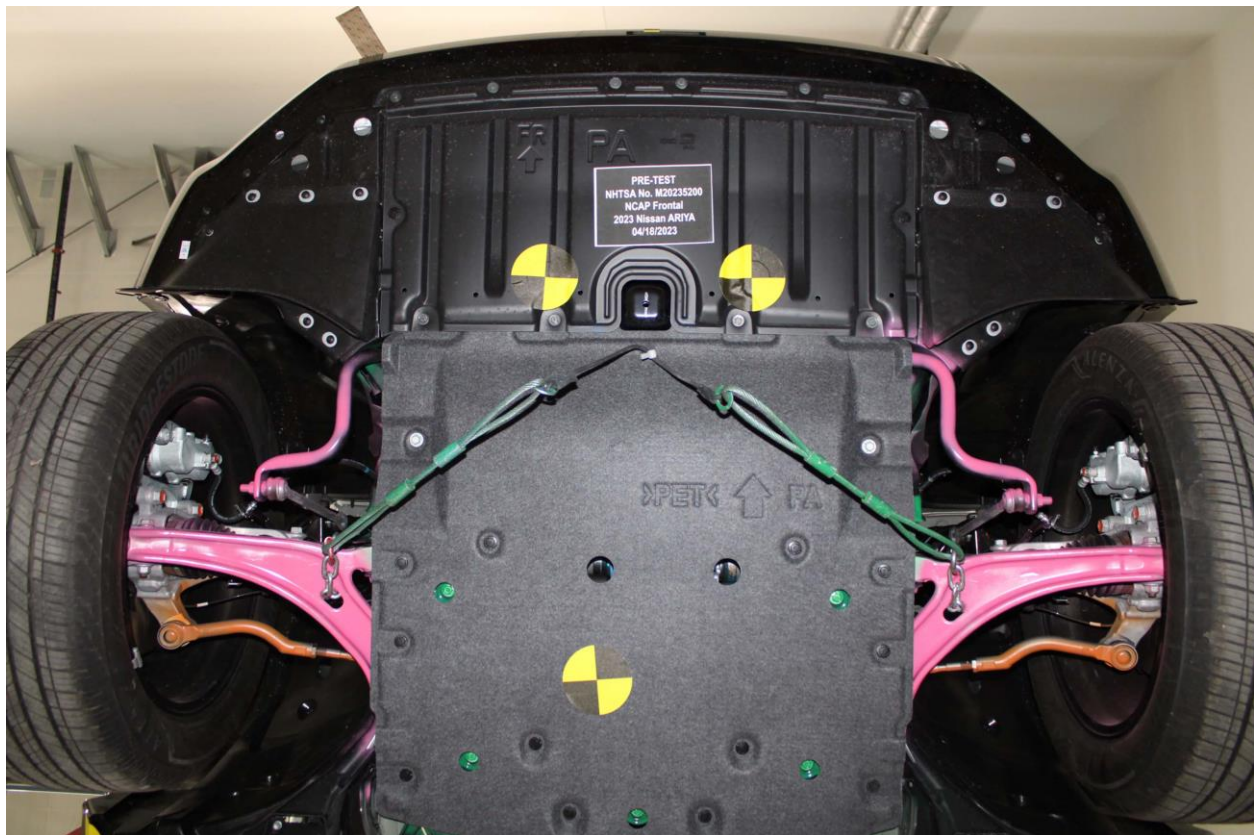


Figure A-24: Pre-Test Front Underbody View

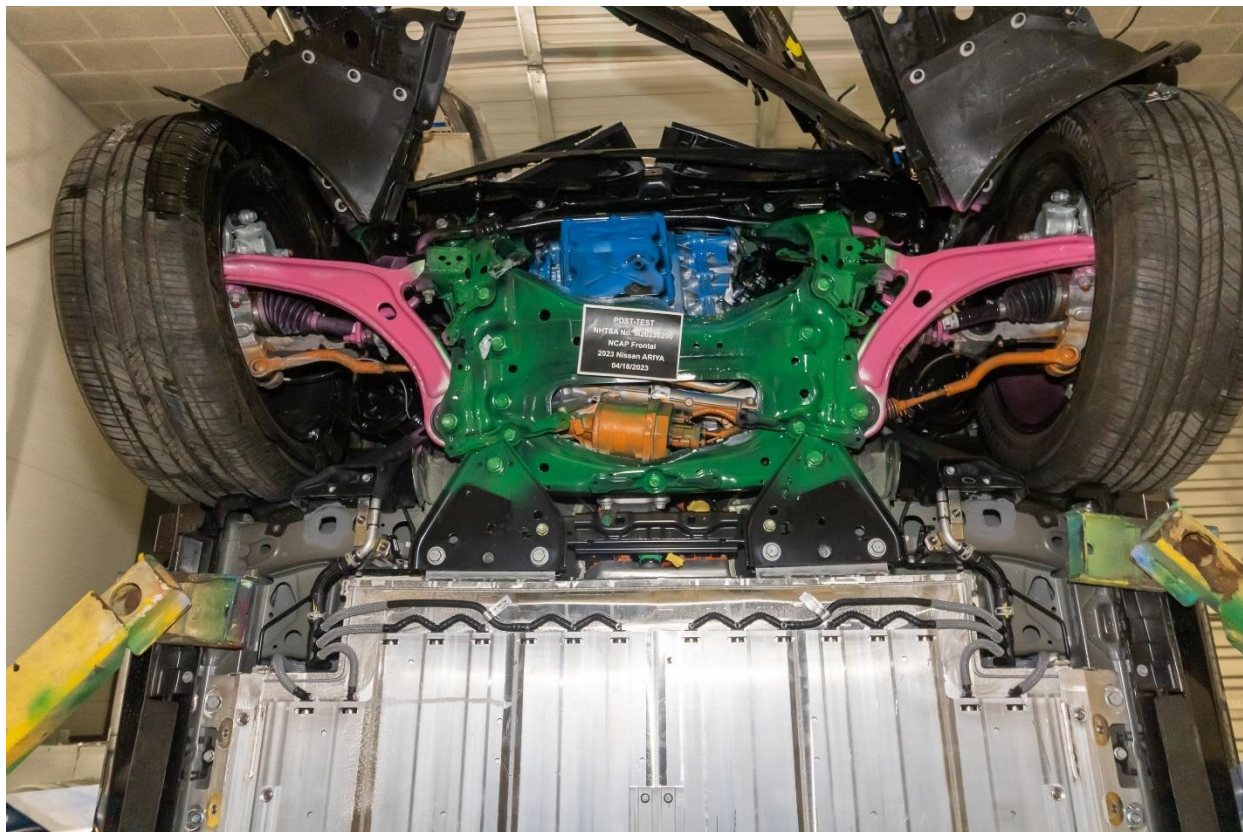


Figure A-25: Post-Test Front Underbody View



Figure A-26: Pre-Test Rear Underbody View

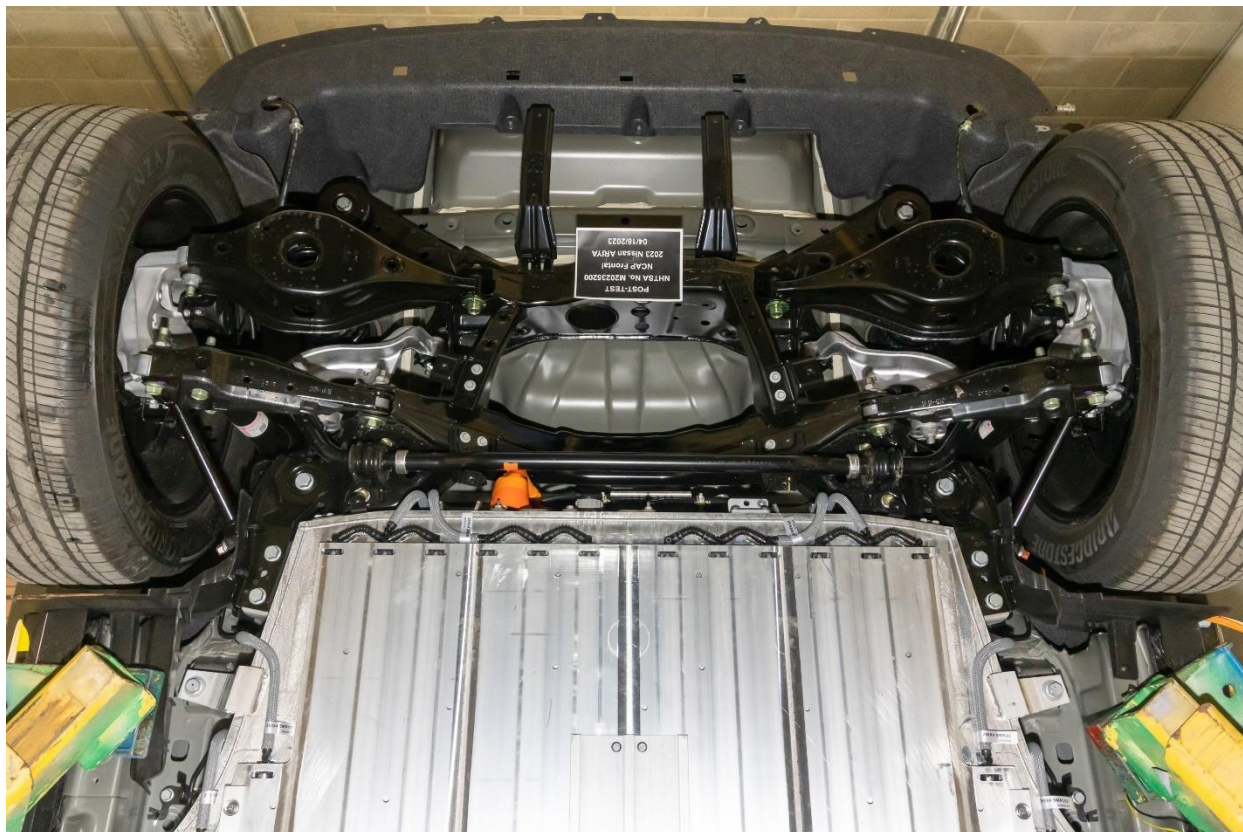


Figure A-27: Post-Test Rear Underbody View



Figure A-28: Pre-Test Dummy Cable Routing



Figure A-29: Post-Test Dummy Cable Routing

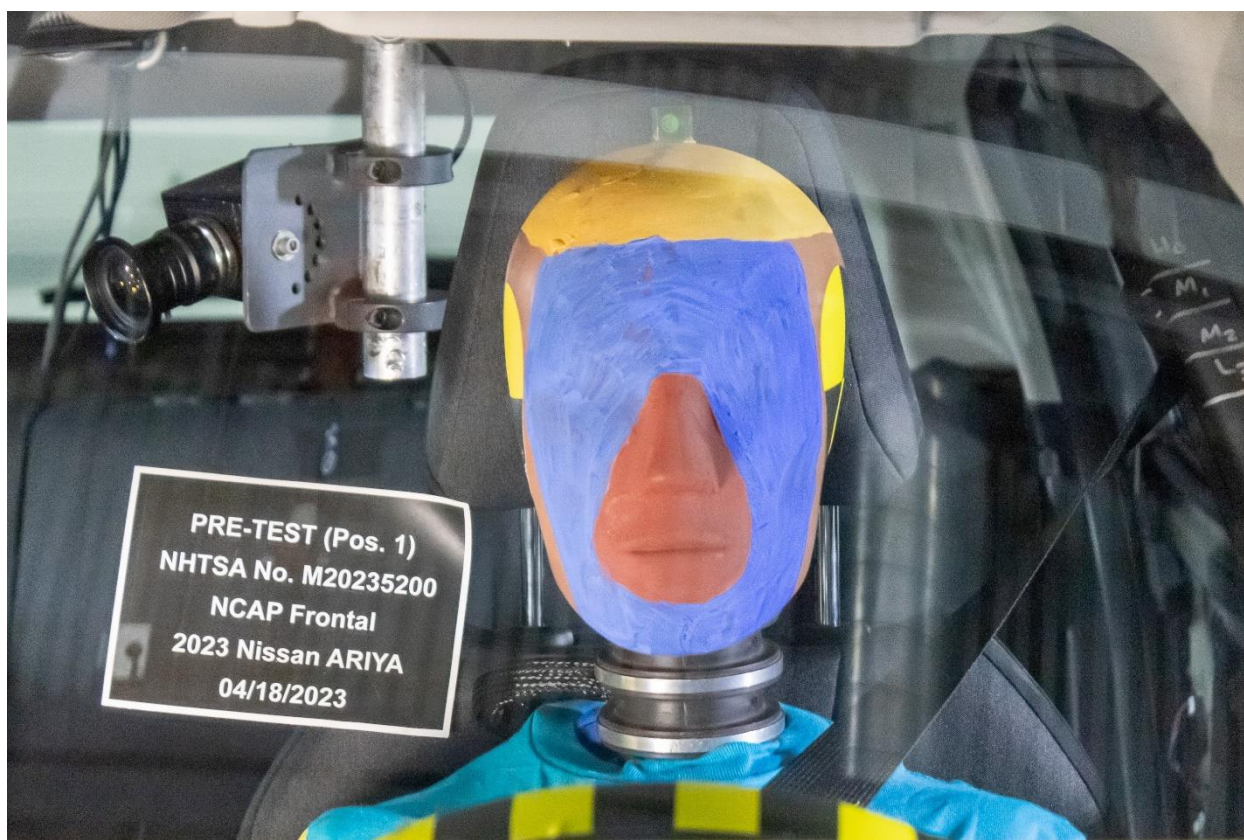


Figure A-30: Pre-Test Driver Dummy Front View

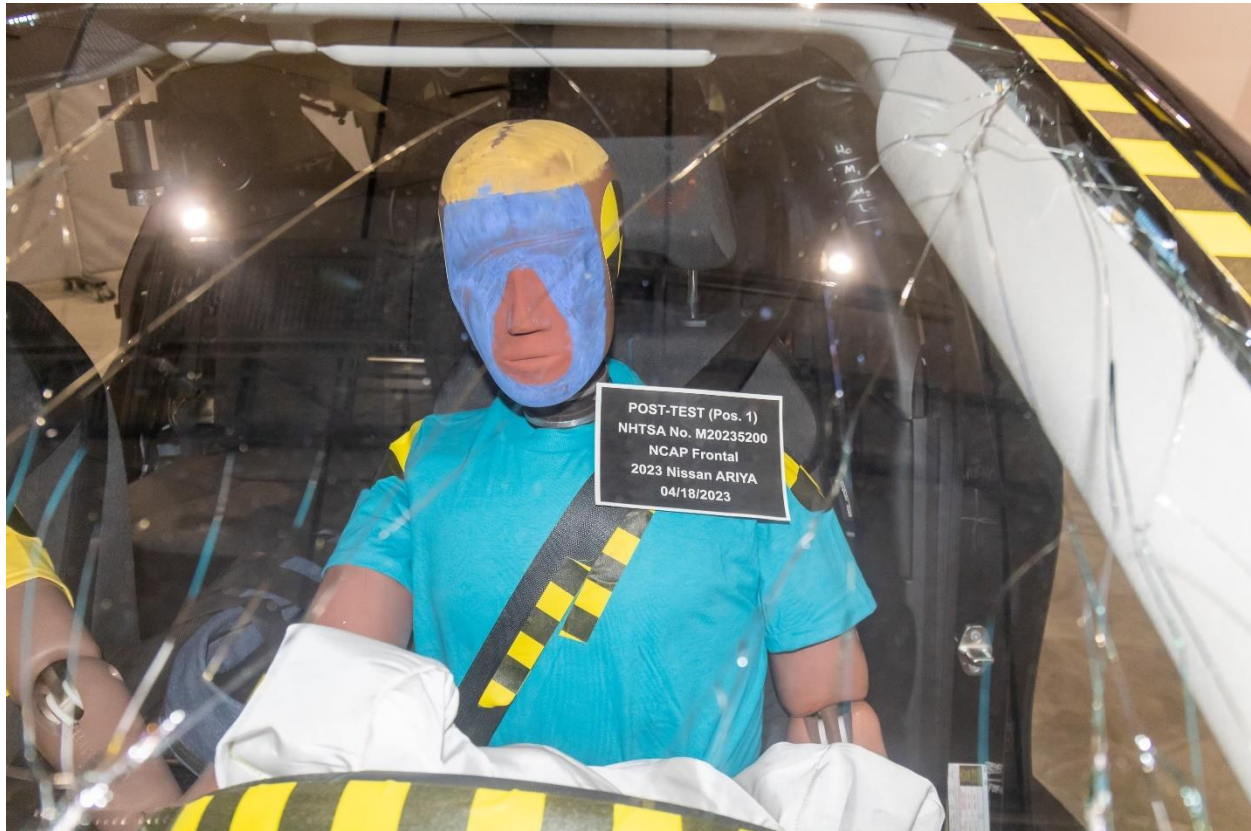


Figure A-31: Post-Test Driver Dummy Front View



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



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



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



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



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



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

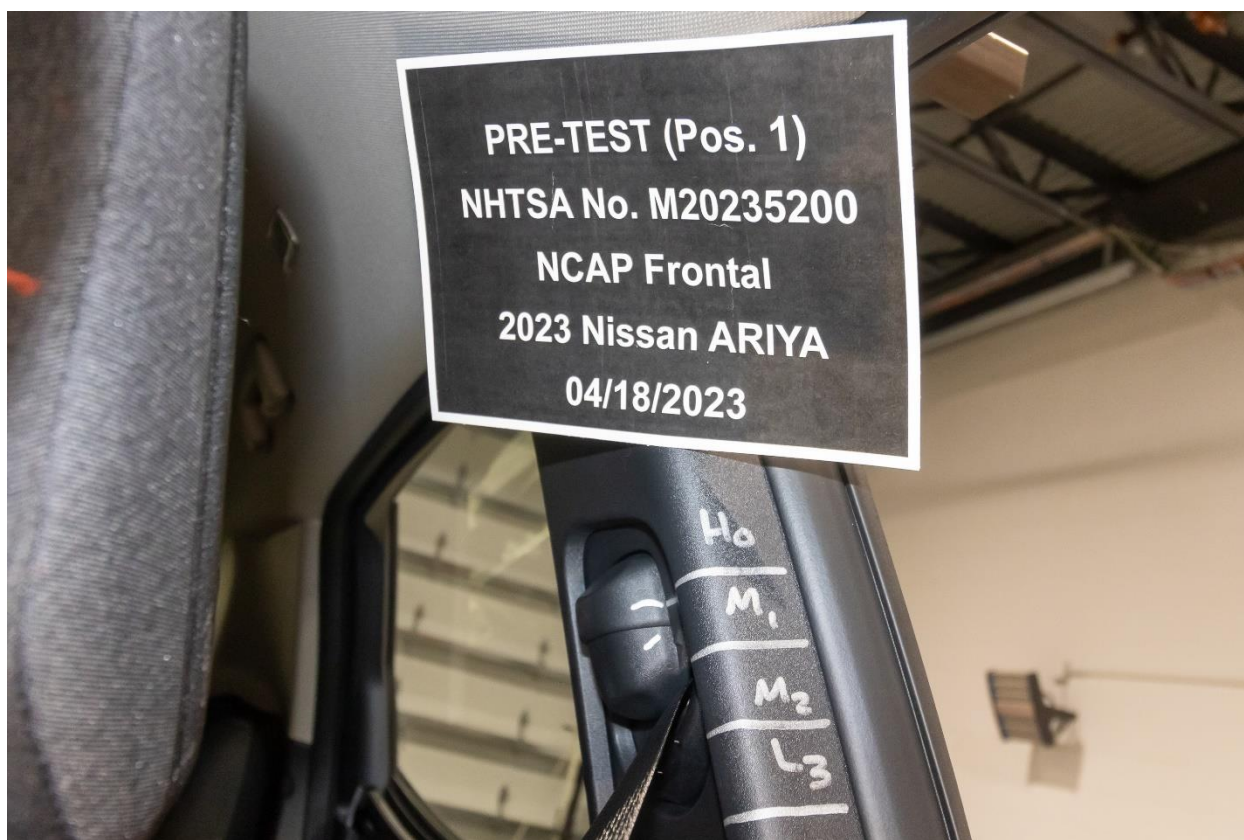


Figure A-38: Pre-Test View of Belt Anchorage for Driver Dummy



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



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



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



Figure A-42: Pre-Test Driver Dummy Feet



Figure A-43: Post-Test Driver Dummy Feet



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



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



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



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

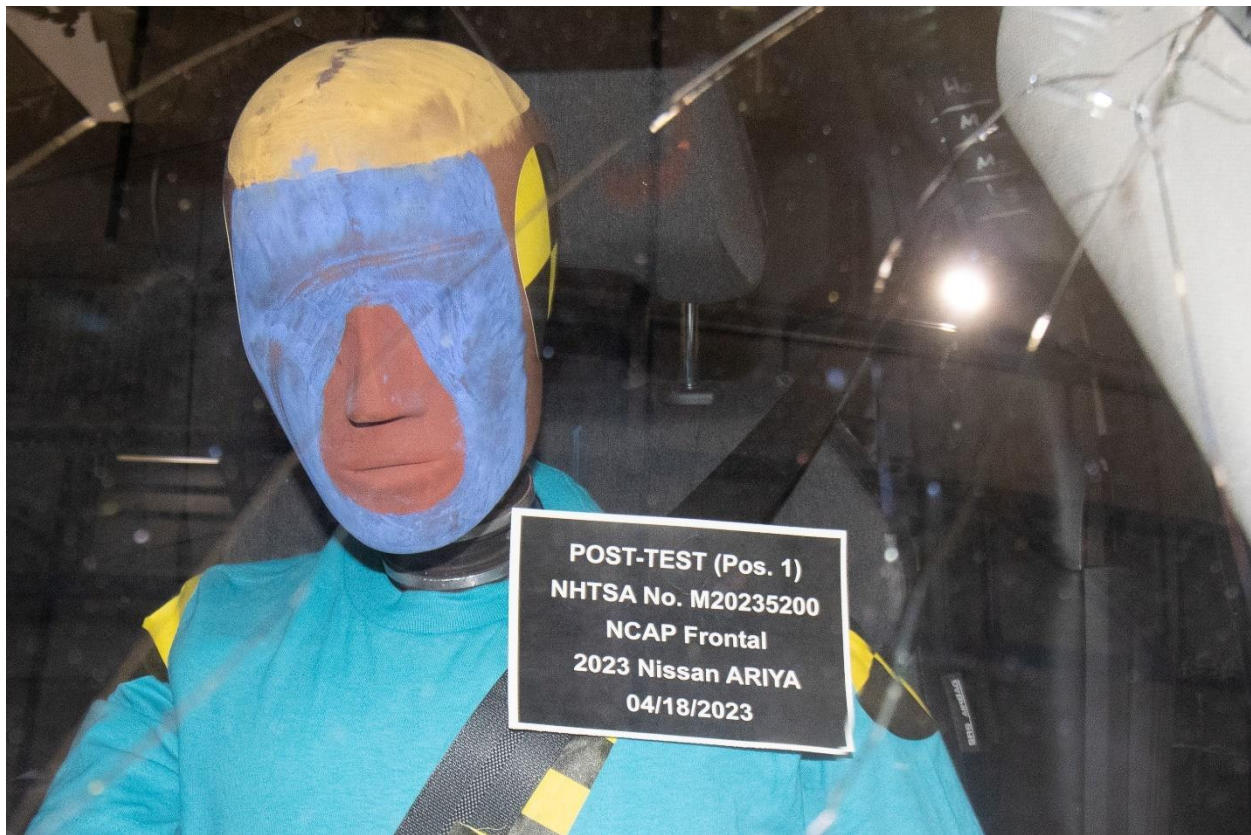


Figure A-48: Post-Test Driver Dummy Face



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



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



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



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

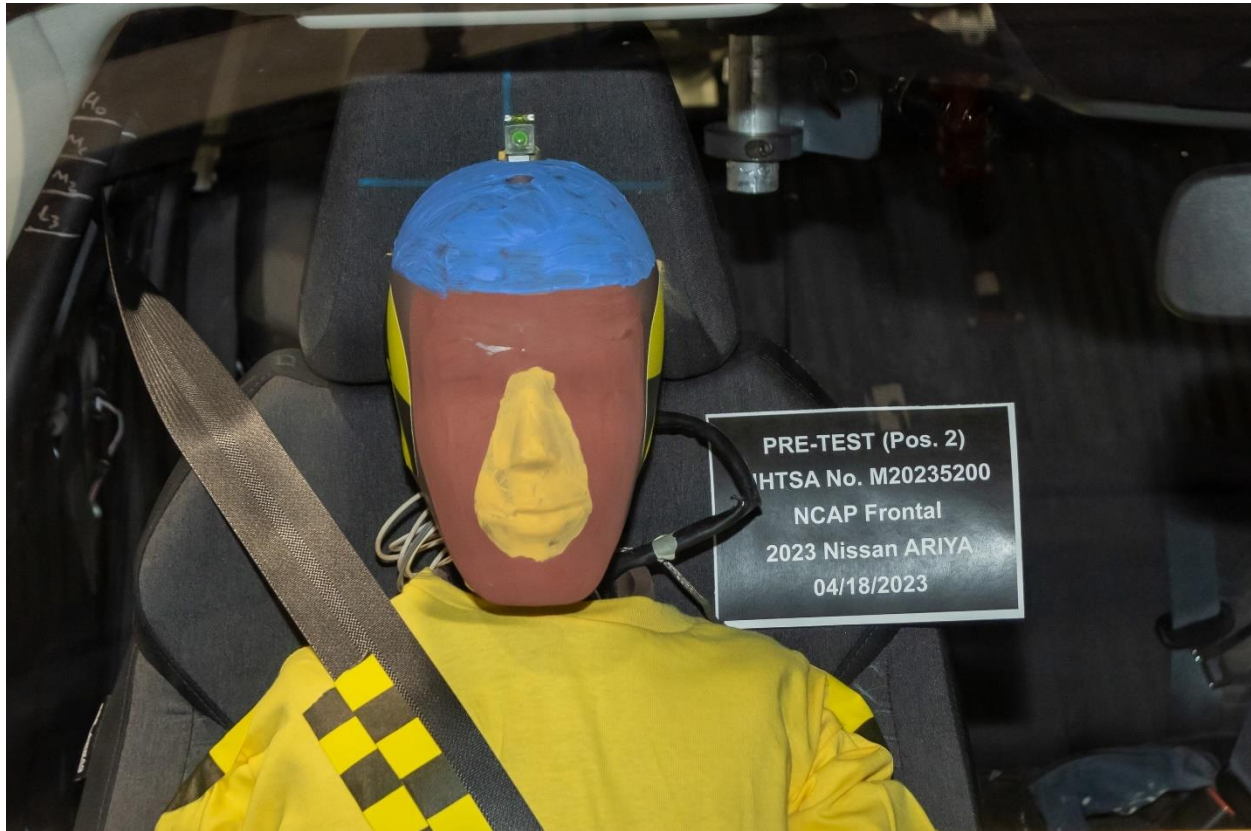


Figure A-53: Pre-Test Passenger Dummy Front View

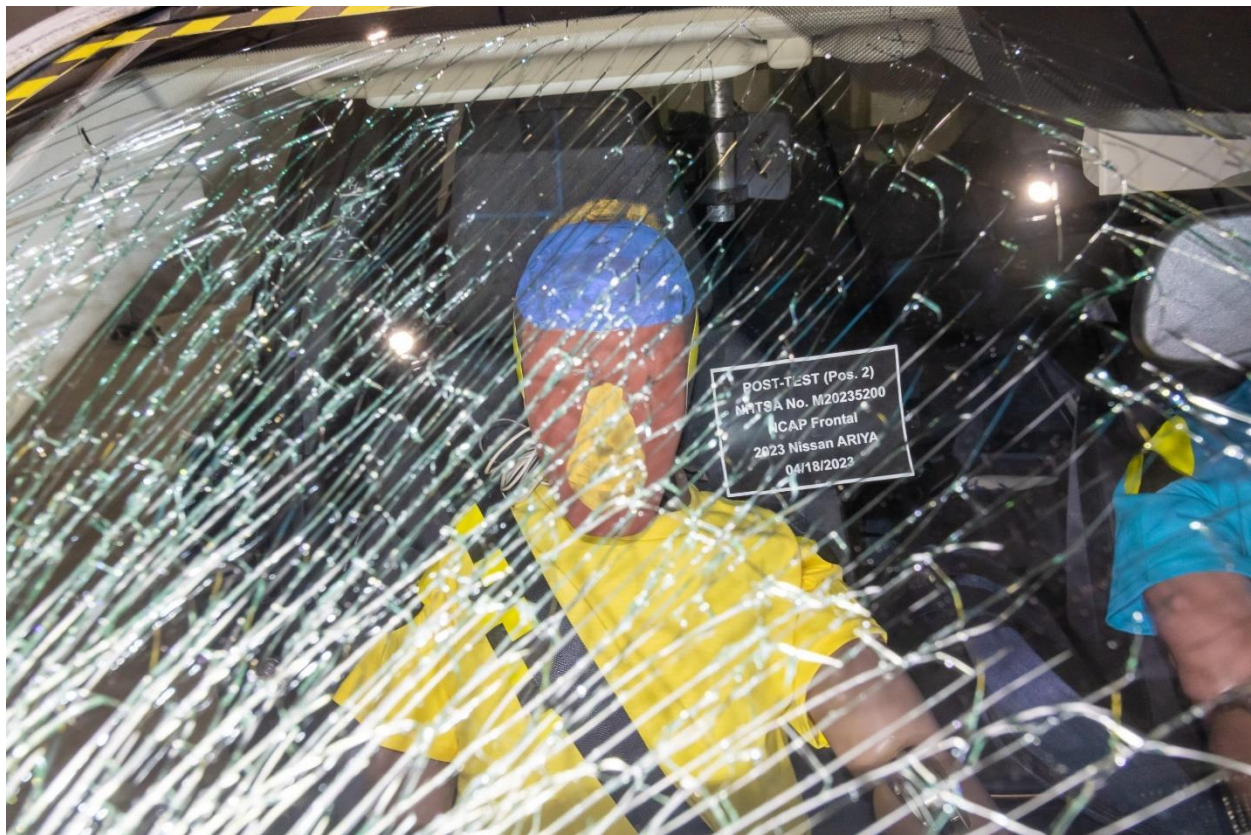


Figure A-54: Post-Test Passenger Dummy Front View



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



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



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



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

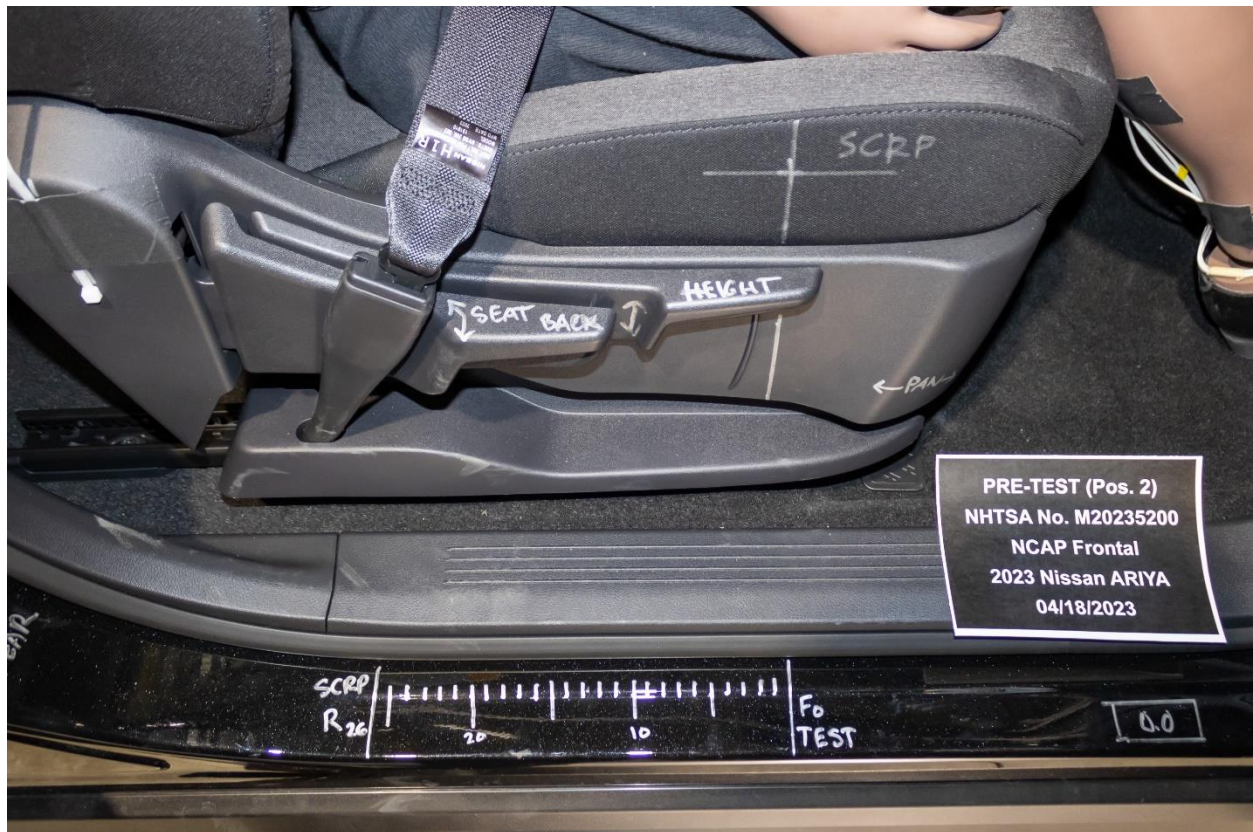


Figure A-59: Pre-Test Passenger's Seat Fore-Aft Markings



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

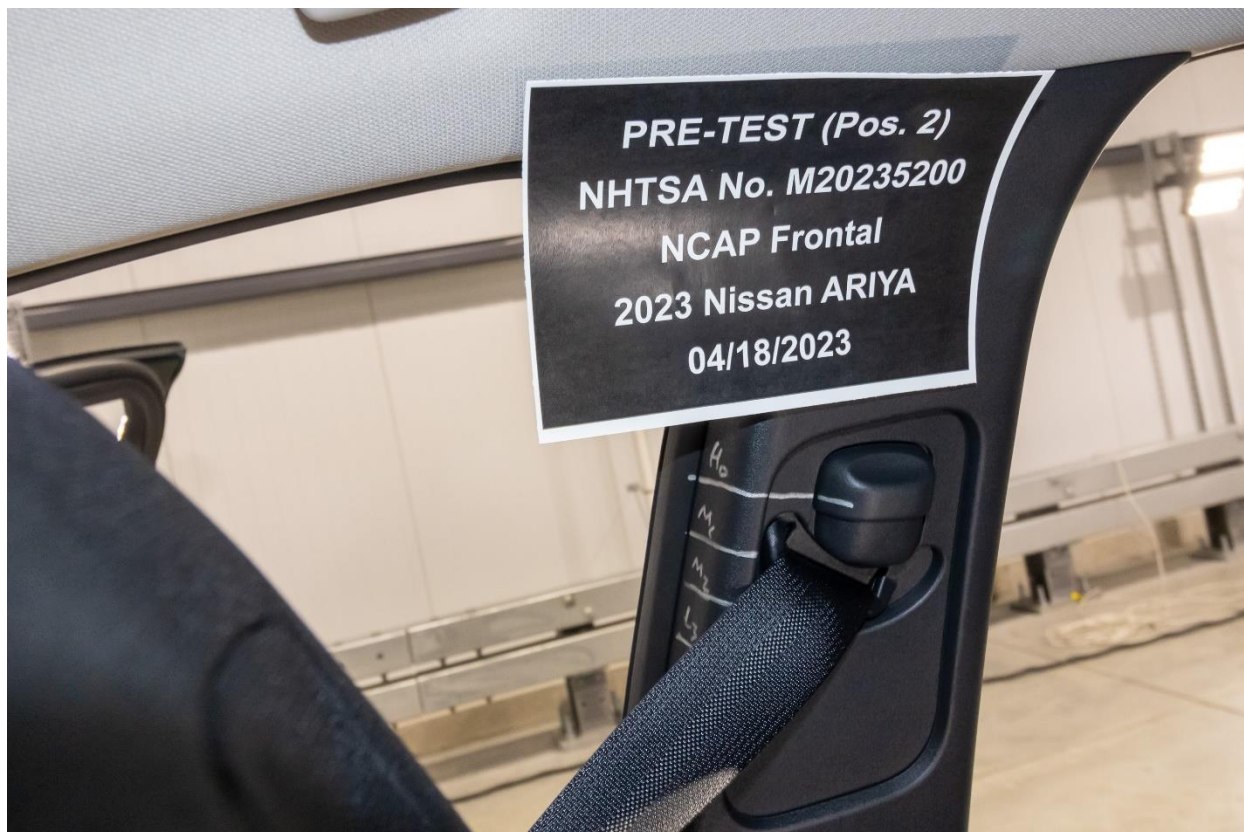


Figure A-61: Pre-Test View of Belt Anchorage for Passenger Dummy



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



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



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



Figure A-65: Pre-Test Passenger Dummy Feet



Figure A-66: Post-Test Passenger Dummy Feet



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



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



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



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



Figure A-71: Post-Test Passenger Dummy Face

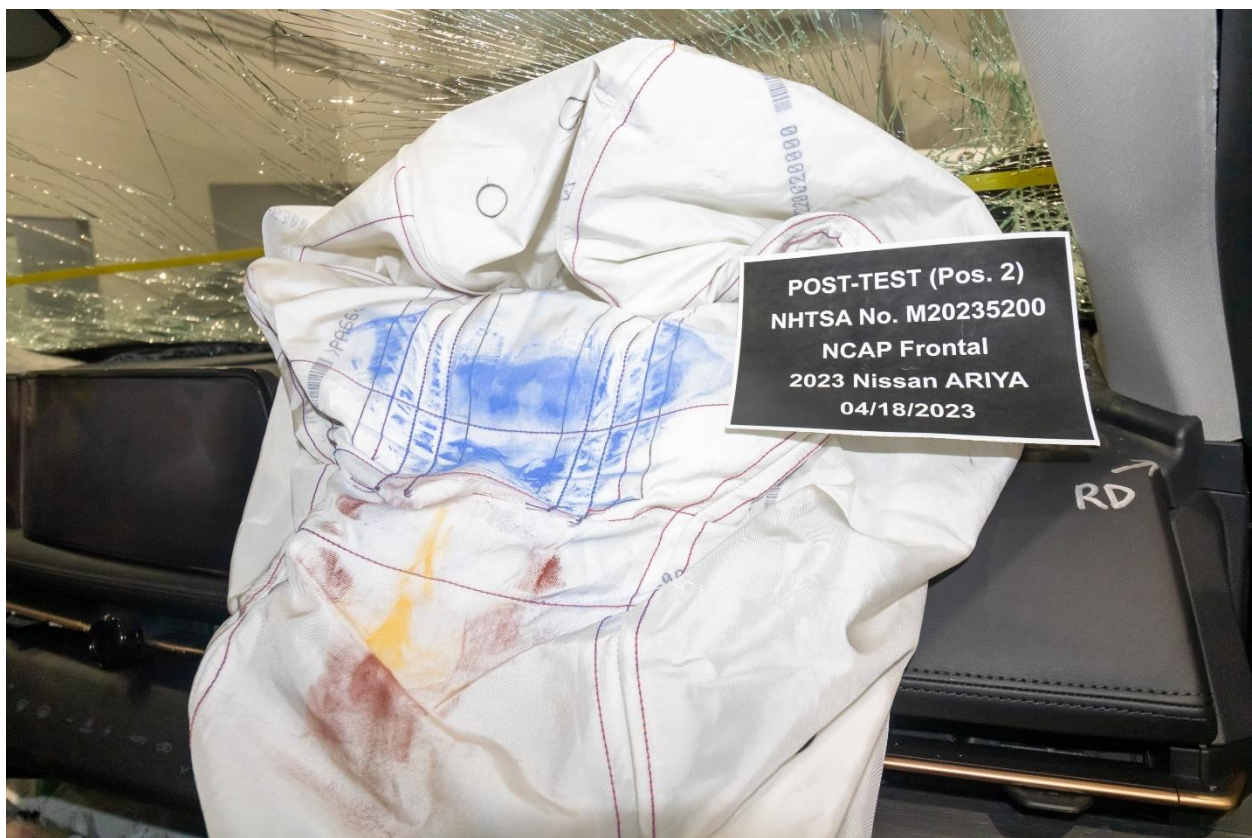


Figure A-72: Post-Test Passenger Dummy Contact With Airbag



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

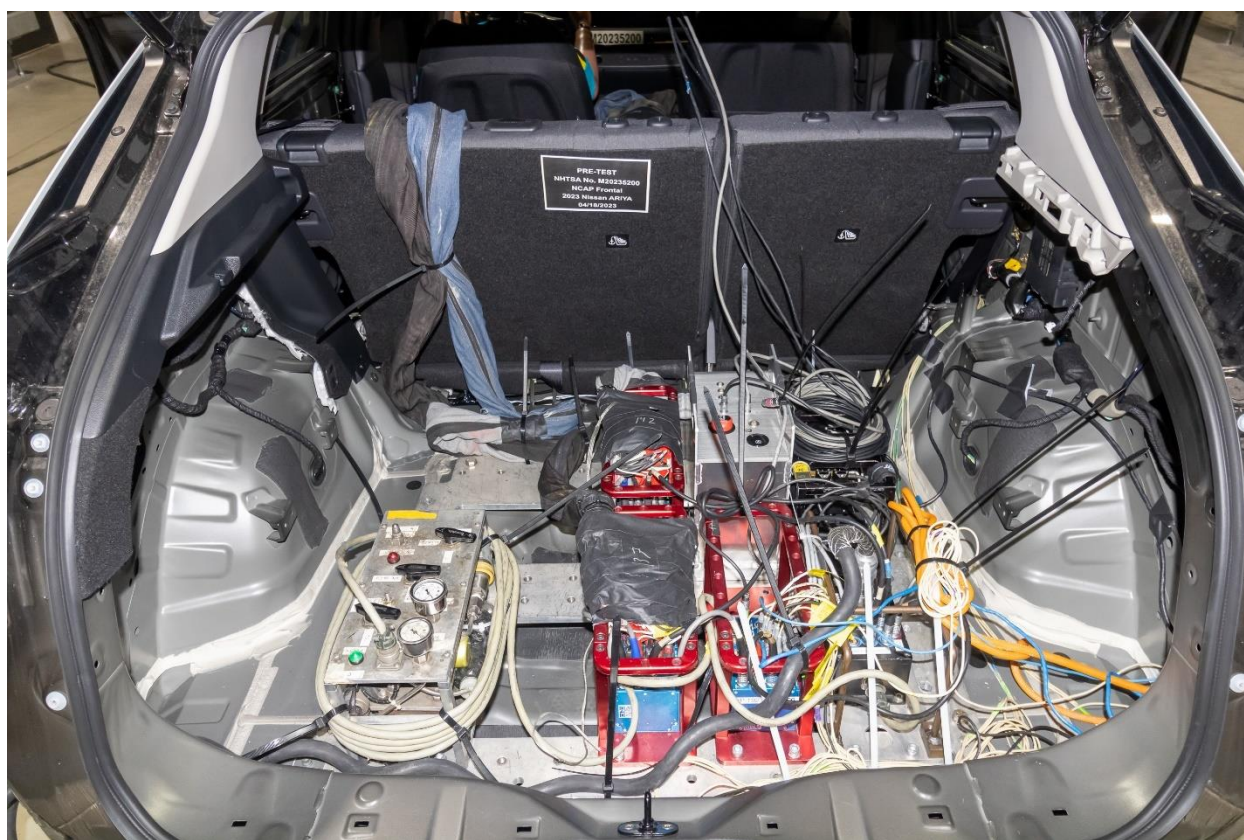


Figure A-74: Photograph of Ballast Installed in Vehicle

Photo Not Applicable

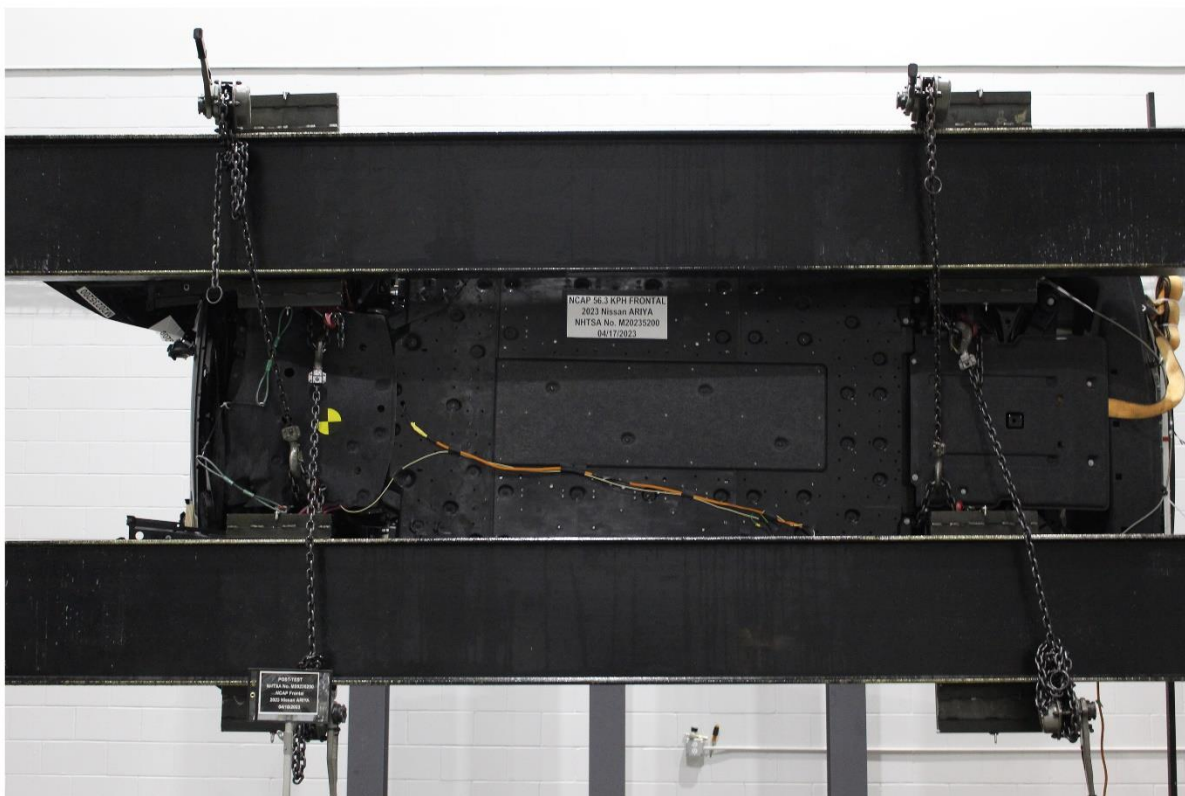
Figure A-75: Post-Test Stoddard Solvent Spillage Location View, If Required



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



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



POST-TEST NHSTA No.M20235200 NCAP FRONTAL 2023 NISSAN ARIYA 04/18/2023

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



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

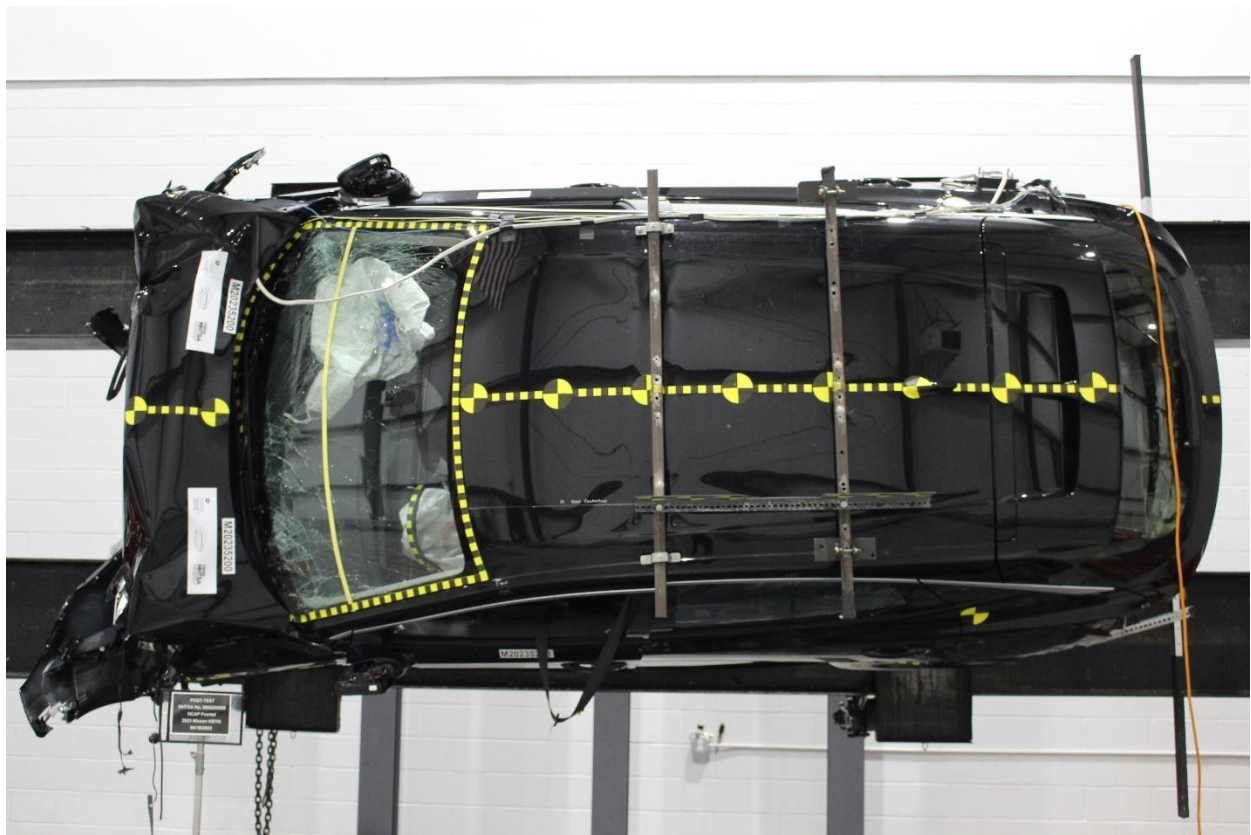


Figure A-80: Vehicle at 270° on Static Rollover Device



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



Figure A-82: 2023 Nissan ARIYA Frontal Impact Event

2023 NISSAN ARIYA

VENTURE+ FWD

UP TO 304 MILES+++

Scan QR code for general model information and options

100% ELECTRIC

Standard Equipment Included at No Extra Charge

MECHANICAL & PERFORMANCE:
 238 hp (178kW) AC Synchronous Motor
 87 kWh useable Lithium-Ion Battery
 with Liquid Cooling
 Battery Heater
 7.2kW Onboard Charger
 Quick Charge Port
 Power Assisted Vented Front & Rear Braking System
 Regenerative Braking System with e-Step Mode
 Portable Charge Cable (120V EVSE)

SAFETY & SECURITY:
 Nissan Safety Shield 360
 Automatic Emergency Braking with Pedestrian Detection
 Blind Spot Warning
 Lane Departure Warning
 Rear Automatic Braking
 Rear Cross Traffic Alert
 High Beam Assist
 Intelligent Blind Spot Intervention

COMFORT & CONVENIENCE:
 ProPILOT Assist with Nav-Link
 Intelligent Cruise Control
 12.3" Advanced Drive-Assist™ Display
 Front & Rear Capacitive Door Handle with Approach Unlock & Walk Away Lock
 Rear Door Alert
 Rear View Monitor
 Intelligent Auto Headlights
 Intelligent Driver Awareness
 Traffic Sign Recognition
 Nissan Intelligent Key® with Push Button Ignition+
 Hybrid Heater

AUDIO & INFOTAINMENT:
 NissanConnect®
 Wireless Apple CarPlay®++
 Android Auto™+++
 Nissan Door to Door Connected Navigation
 SiriusXM® with 360L
 Advanced Audio Features
 SiriusXM® Satellite Traffic
 SiriusXM® Satellite Travel Link
 Bluetooth® Hands-Free Phone System
 NissanConnect® Services with Trial Access Included++

EXTERIOR:
 19" Alloy Wheels with Aero Wheel Covers
 Full LED Headlights (Low/High Beam) with LED Signature DRL
 Dual Power Folding & Heated Outside Mirrors
 LED Tail Lights
 with Full-width Illumination

+++Federal/State/Local Laws may apply. Review before using.
 ++For More Information See Dealer Owner's Manual or www.NissanUSA.com/connect/regal
 +++Actual Range Will Vary With Trim Levels, Options, & Driving Conditions See Customer Disclosure For Details
 ++++Optional Equipment Replaces Standard Where Applicable

Manufacturer's Suggested Retail Base Price: \$47,190.00

Options Included by Manufacturer

DESTINATION CHARGES 1,295.00

Total* \$48,485.00

EPA Fuel Economy and Environment

Fuel Economy

103 MPGe

combined city/hwy 111 95 33
 city highway 100 miles
 When fully charged, vehicle can travel about 275 275 275 miles
 Charge Time: 14 hours(40V)

304 miles

You save \$4,500
 in fuel costs over 5 years compared to the average new vehicle.

Annual fuel Cost \$700

Fuel Economy & Greenhouse Gas Rating (tailpipe only) Smog Rating (tailpipe only)

10 **10** **10**

This vehicle emits 0 grams CO₂ per mile. The best em to 0 grams per mile (tailpipe only). Does not include emissions from generating electricity; learn more at fueleconomy.gov.

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 24 MPG and costs \$8,500 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$0.14 per kWh. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fueleconomy.gov
 Calculate personalized estimates and compare vehicles

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score Not Rated
 Based on the combined ratings of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight.

Frontal Crash Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.	Driver Passenger Not Rated	Not Rated Not Rated
Side Crash Based on the risk of injury in a side impact.	Front seat Not Rated	Rear seat Not Rated
Rollover Based on the risk of rollover in a single-vehicle crash.	Not Rated	

Star ratings range from 1 to 5 stars (*****) with 5 being the highest.
 Source: National Highway Traffic Safety Administration (NHTSA)
 www.safercar.gov or 1-888-327-4236

DELIVERY

VEHICLE COLORS:
 EXT:BLACK DIAMOND P
 INT: CHARCOAL

FINAL ASSEMBLY POINT:
 ELIZABETH

TRANSPORT METHOD:
 TRUCK

DEALER:
 MAGUIRE NISSAN, INC.
 17 UPTOWN ROAD
 ITHACA NY
 14850

Security+Plus Extended Protection Plan

The only service agreement backed by Nissan Extended Services North America
 Ask your dealer for details, or call 1-800-NISSAN-1 for more information

VIN: JN1BF0AA3PM406035
EMS: 50 STATE EMISSIONS
MDL: 24113-406035 GAT-G
OPT: E-C03

20230202230416AS3719

Figure A-83: Monroney Label Photograph



PRE-TEST NHSTA No.M20235200 NCAP FRONTAL 2023 NISSAN ARIYA 04/18/2023

Figure 305-1: Auxiliary Power Module Warning Label



Figure 305-2: Power Inverter Warning Label

Photo Not Applicable

Figure 305-3 First Responder Warning Label

Photo Not Applicable

Figure 305-4: First Responder Warning Label Location

Photo Not Applicable

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



PRE-TEST NHSTA No.M20235200 NCAP FRONTAL 2023 NISSAN ARIYA 04/18/2023

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



PRE -TEST NHSTA No.M20235200 NCAP FRONTAL 2023 NISSAN ARIYA 04/18/2023

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



PRE-TEST NHSTA No.M20235200 NCAP FRONTAL 2023 NISSAN ARIYA 04/18/2023

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

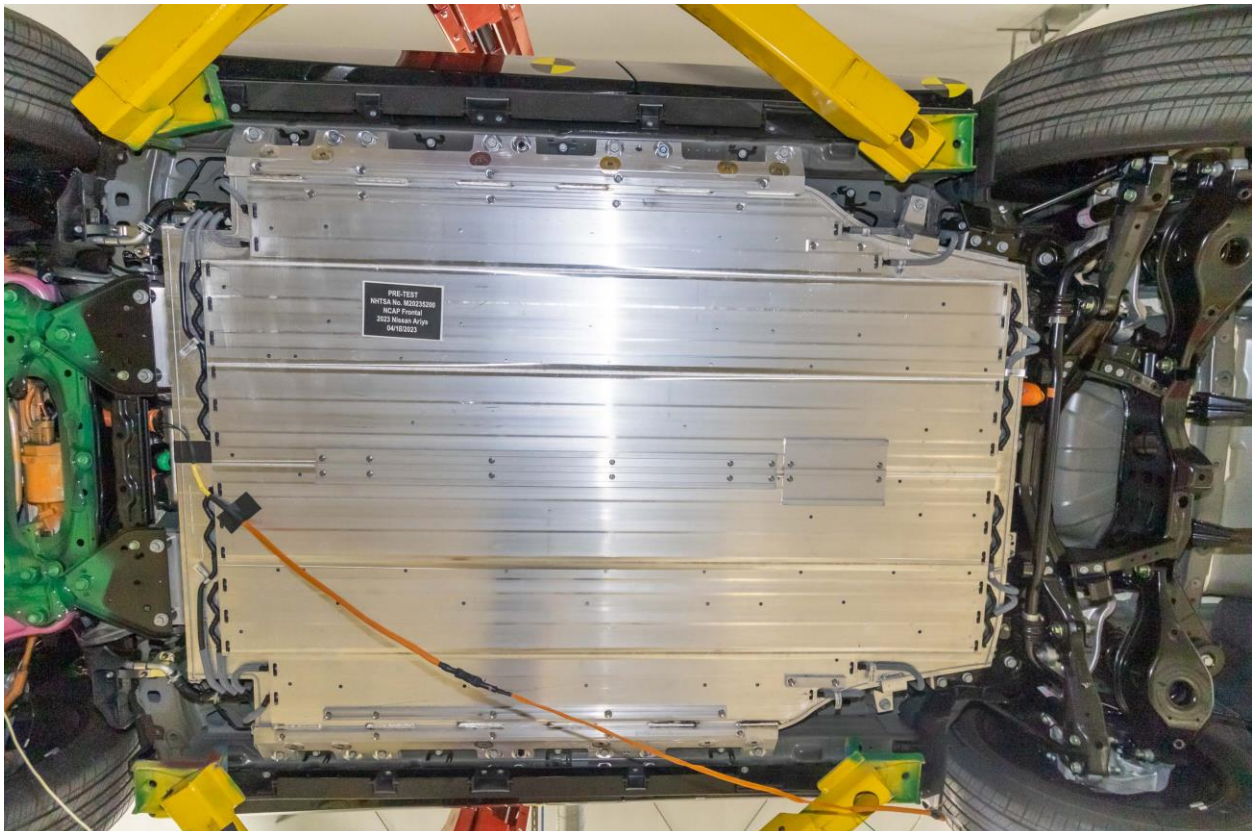


Figure 305-9: Pre-Impact View of Propulsion Battery

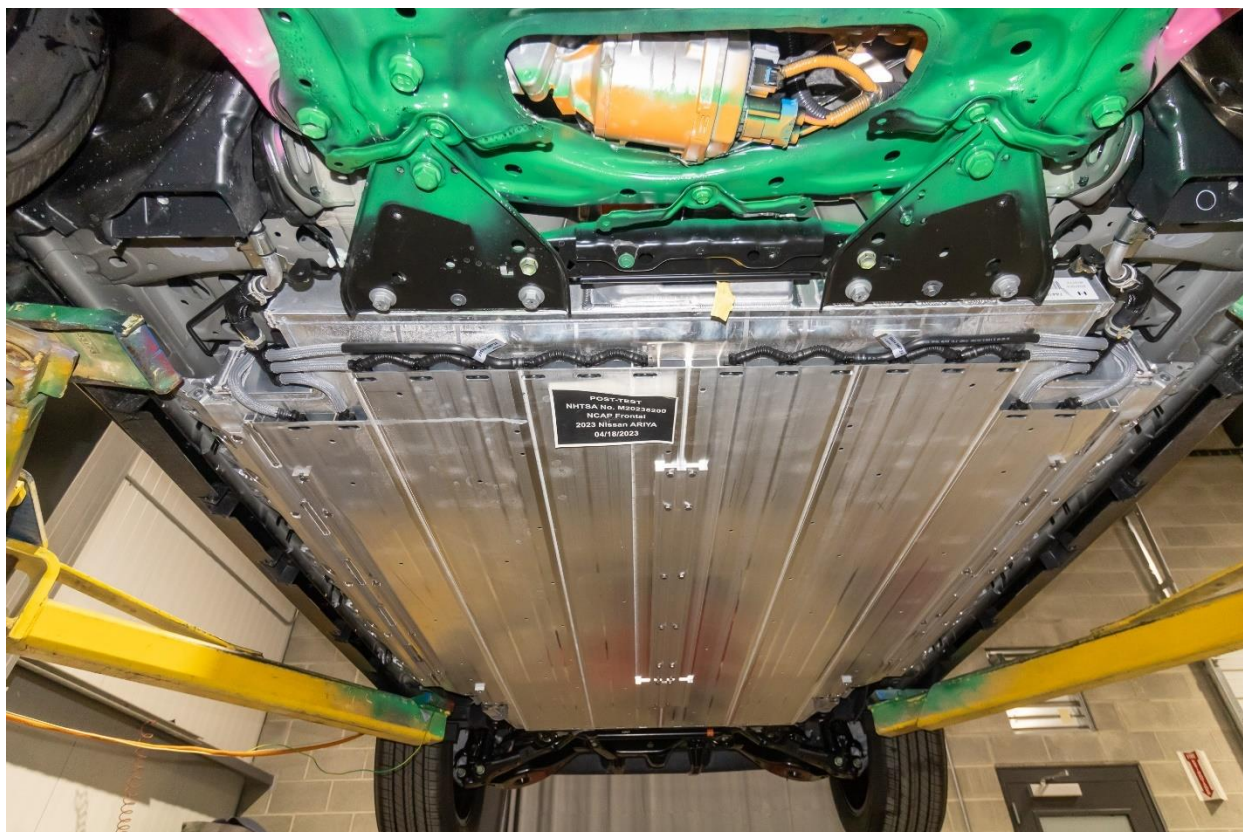


Figure 305-10: Post-Impact Front View of Propulsion Battery



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

Photo Not Applicable

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

Photo Not Applicable

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

Photo Not Applicable

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

Photo Not Applicable

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



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



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

Photo Not Applicable

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

Photo Not Available

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

Photo Not Available

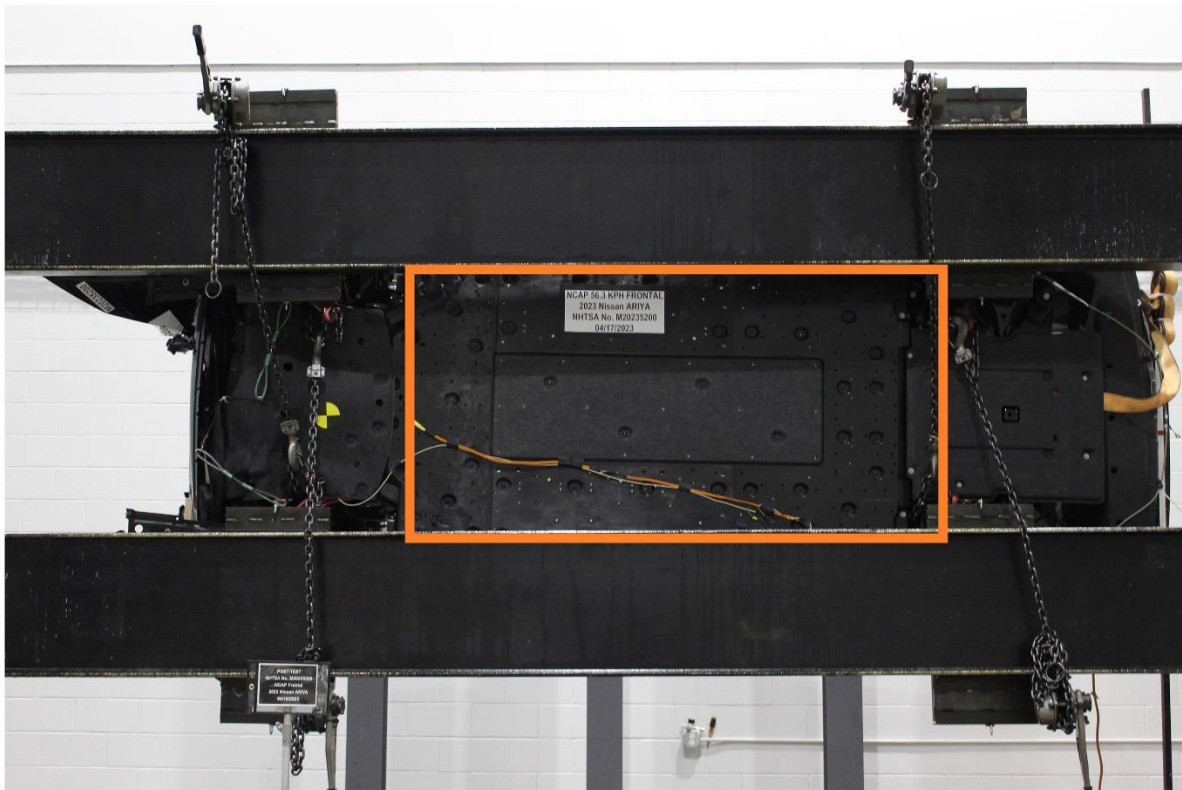
Figure 305-25: Post-Impact View of Installed Test Interface Port

Photo Not Applicable

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

Photo Not Applicable

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



POST-TEST NHSTA No.M20235200 NCAP FRONTAL 2023 NISSAN ARIYA 04/18/2023

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

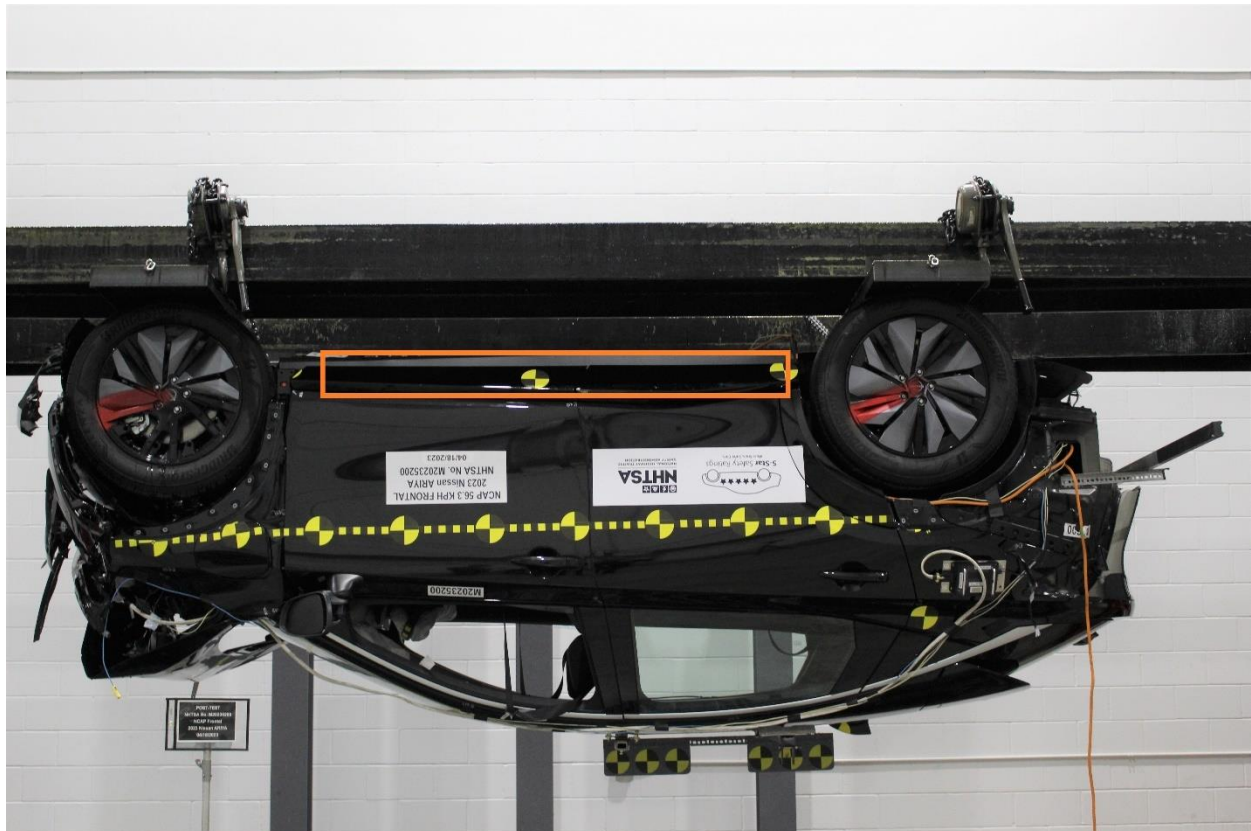


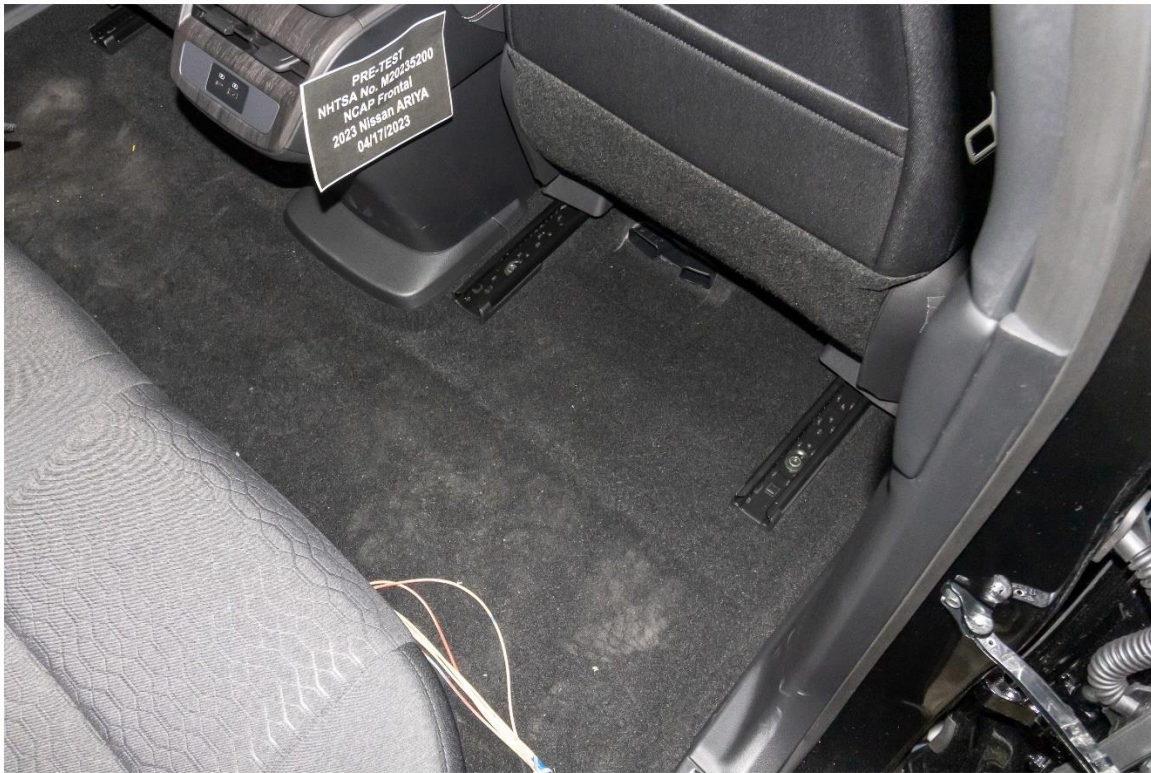
Figure 305-29: FMVSS No. 305 Static Rollover 180 Degrees



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



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



PRE-TEST NHSTA No.M20235200 NCAP FRONTAL 2023 NISSAN ARIYA 04/18/2023

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



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

Photo Not Applicable

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

Photo Not Applicable

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

Photo Not Applicable

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

Photo Not Applicable

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

Photo Not Applicable

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

APPENDIX B

VEHICLE AND DUMMY RESPONSE DATA TRACES

Table of Data Plots

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

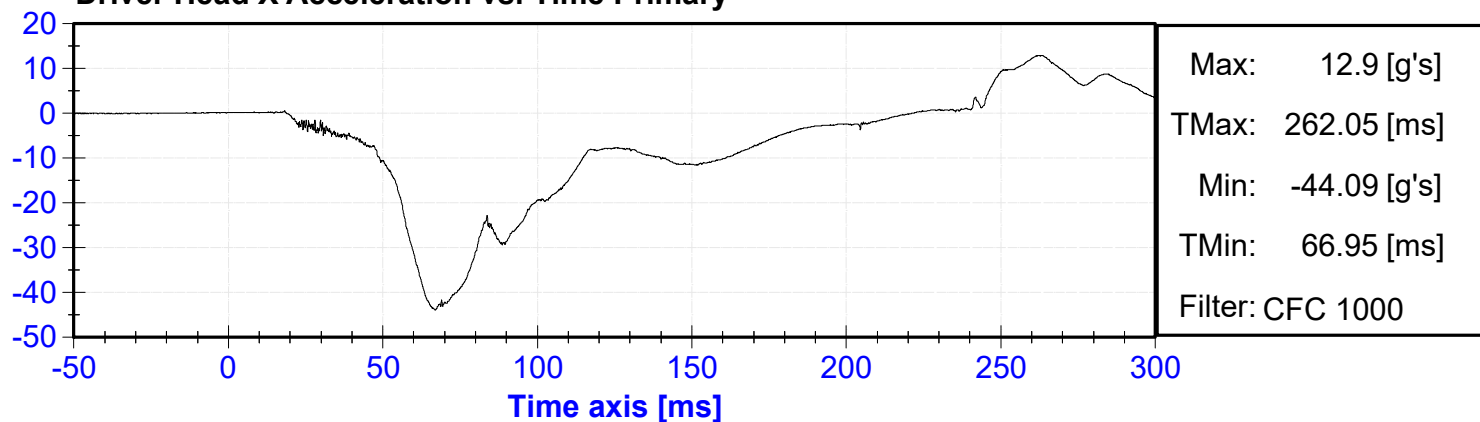
The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at www.NHTSA.gov

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

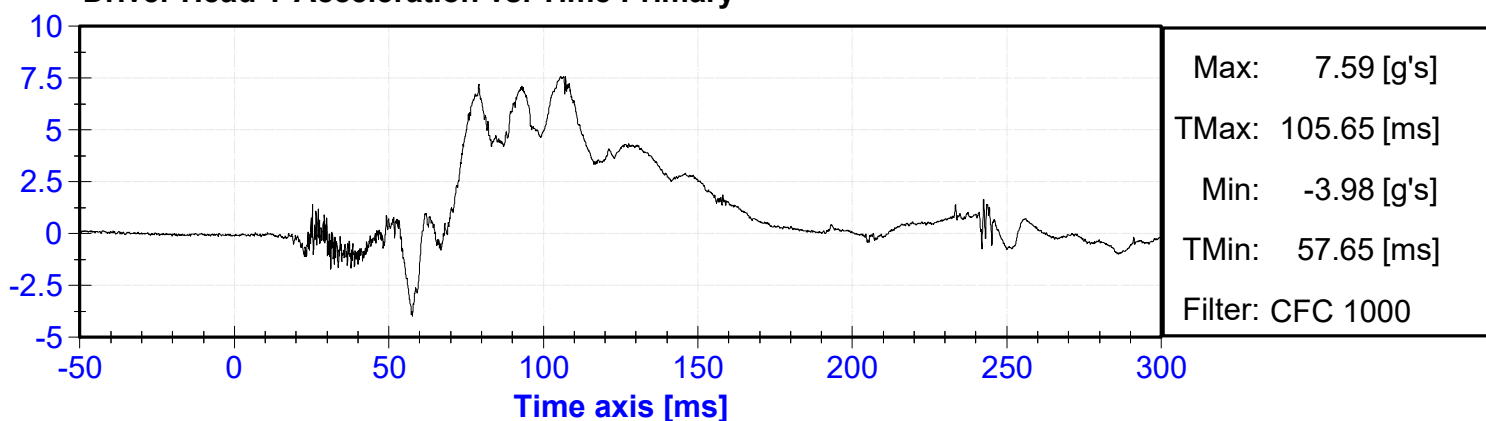
Driver Left Upper Tibia Force Z
Driver Left Lower Tibia Moment X
Driver Left Lower Tibia Moment Y
Driver Left Lower Tibia Force Z
Driver Right Upper Tibia Moment X
Driver Right Upper Tibia Moment Y
Driver Right Upper Tibia Force Z
Driver Right Lower Tibia Moment X
Driver Right Lower Tibia Moment Y
Driver 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

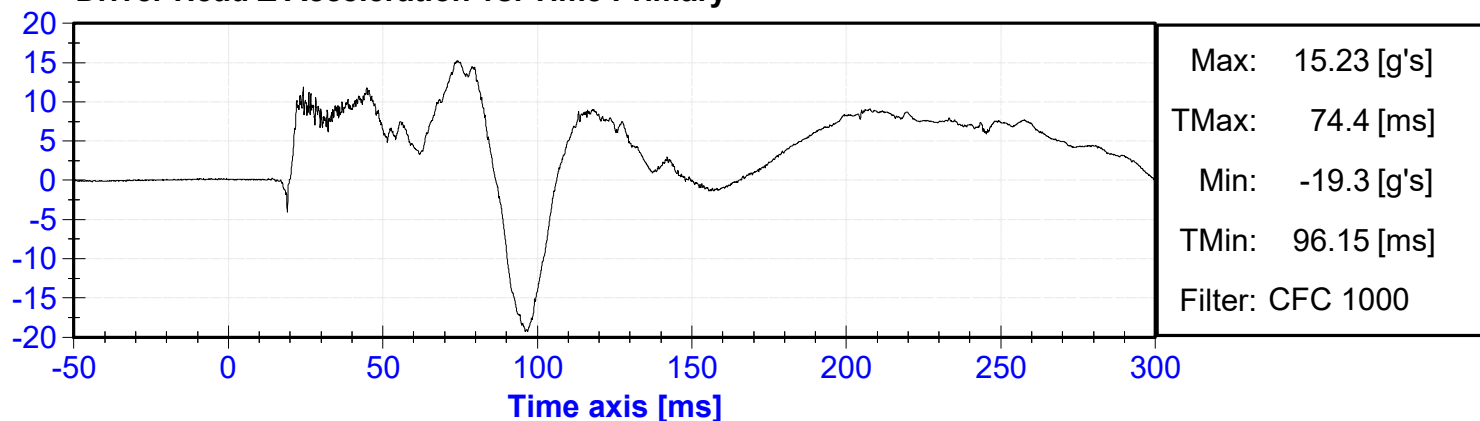
Driver Head X Acceleration vs. Time Primary



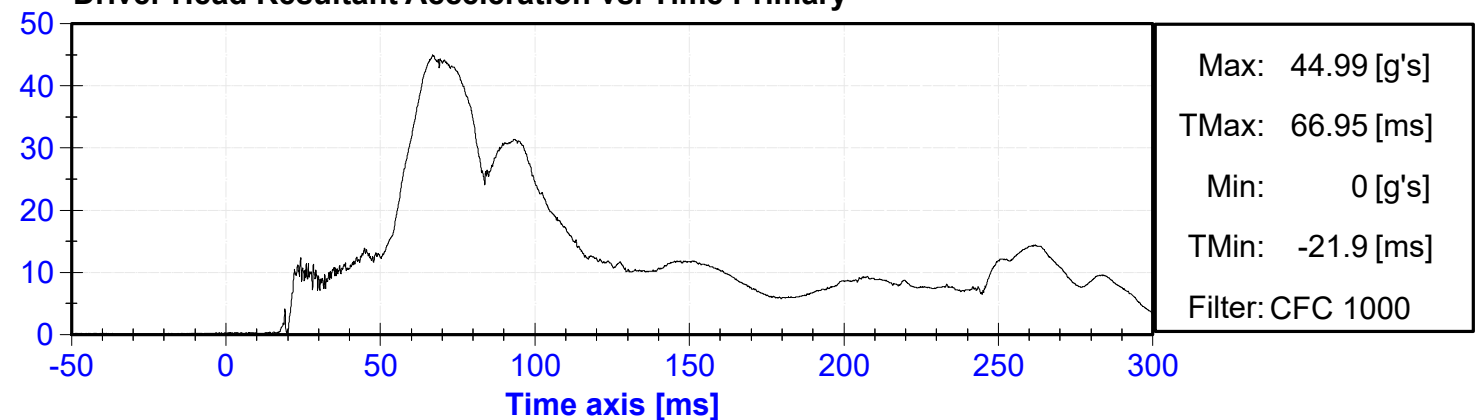
Driver Head Y Acceleration vs. Time Primary



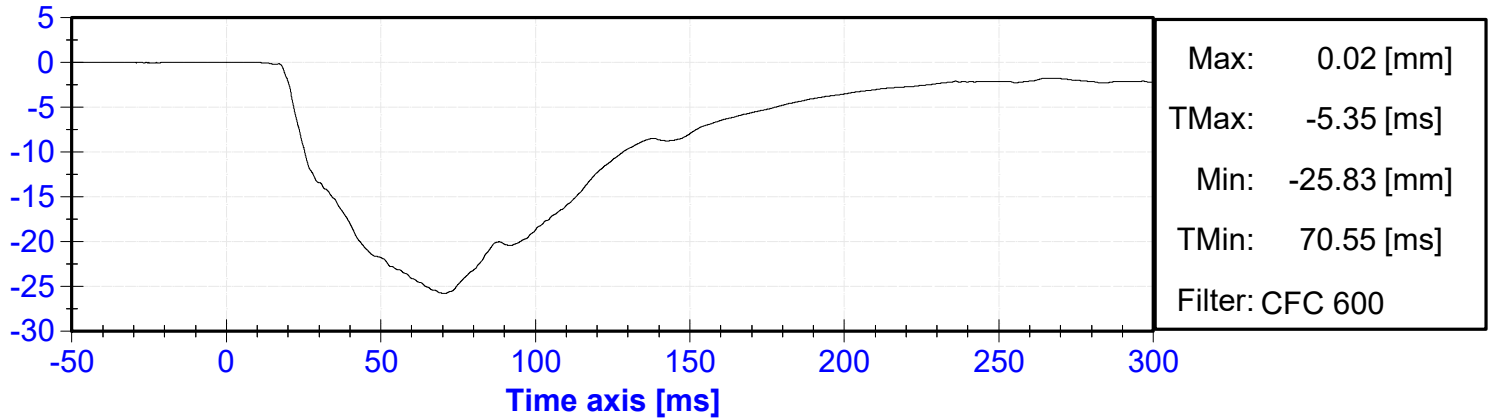
Driver Head Z Acceleration vs. Time Primary



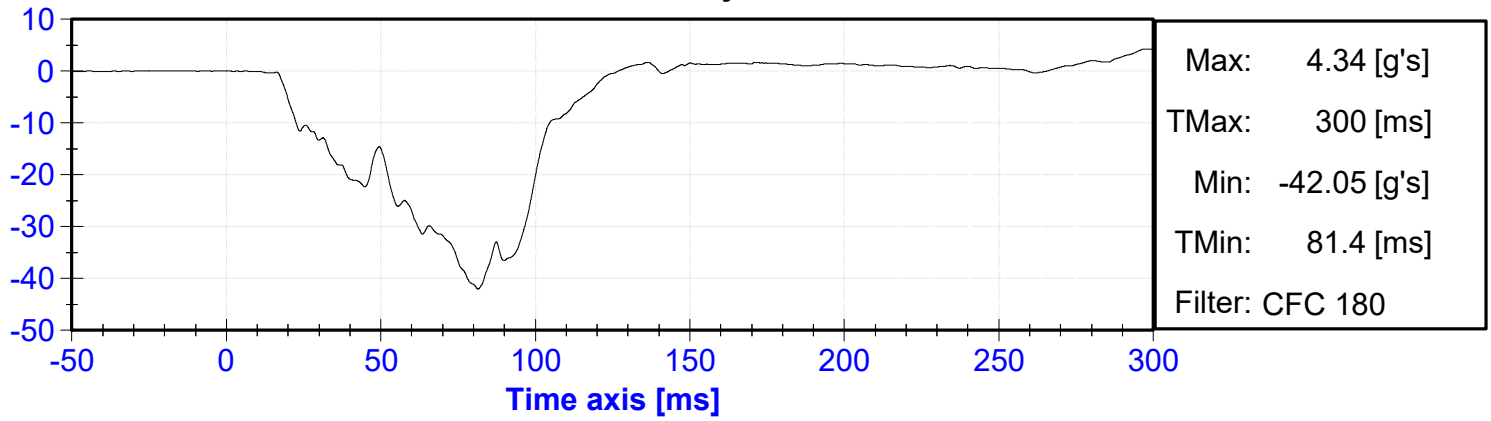
Driver Head Resultant Acceleration vs. Time Primary



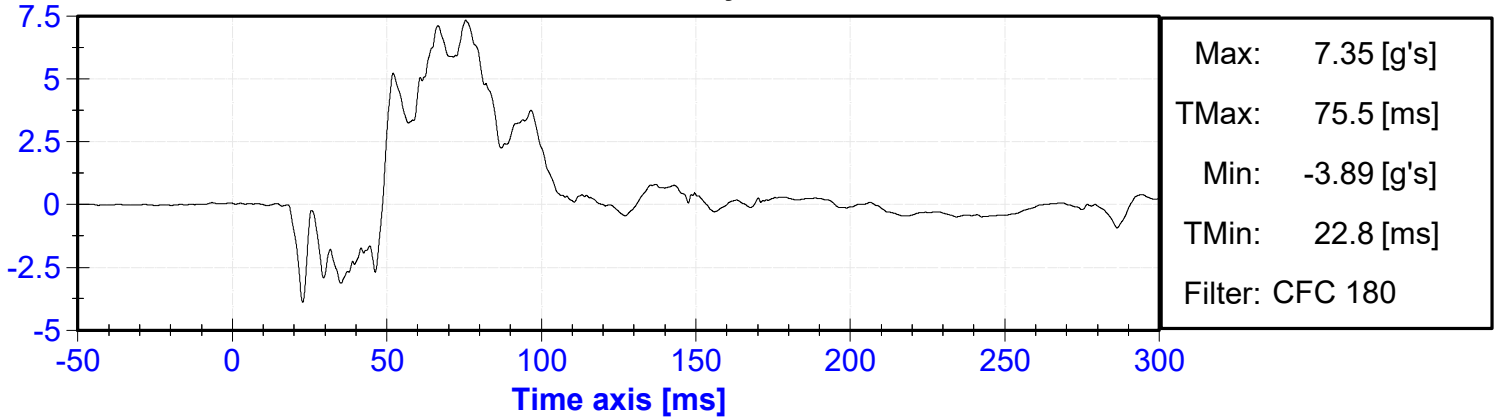
Driver Chest X Deflection vs. Time



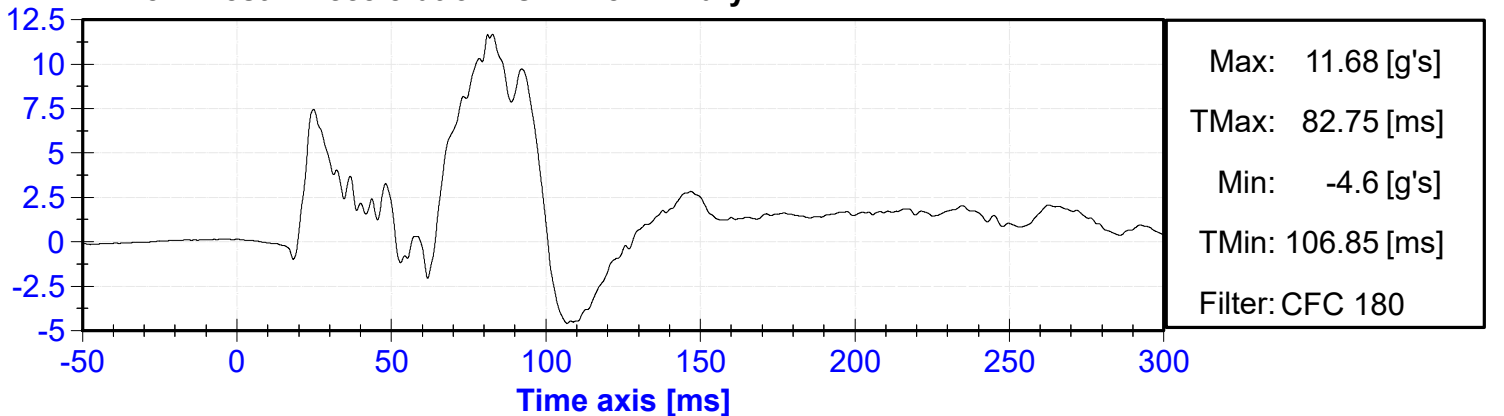
Driver Chest X Acceleration vs. Time Primary



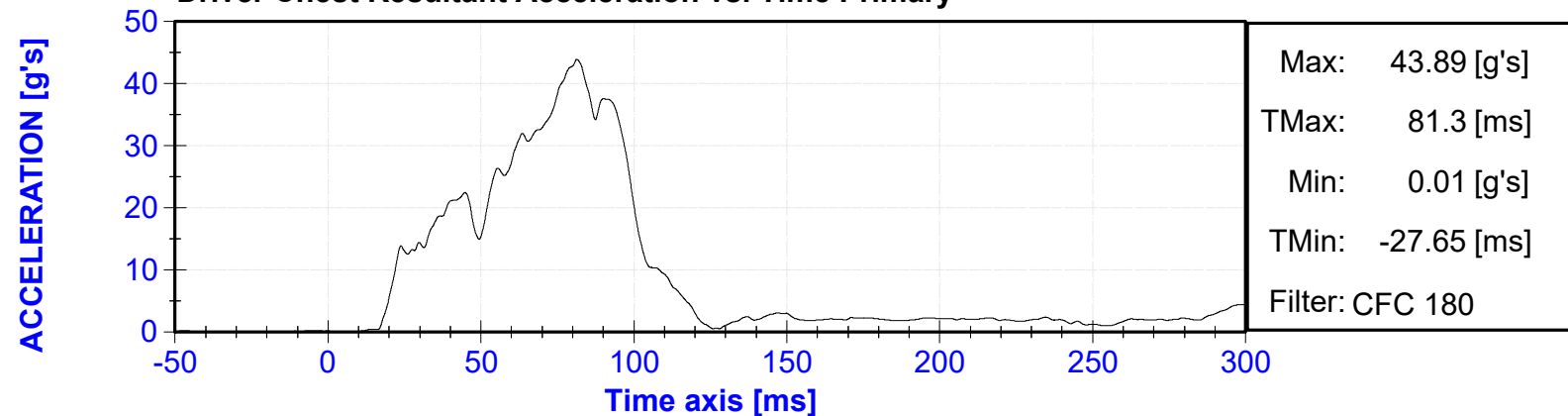
Driver Chest Y Acceleration vs. Time Primary



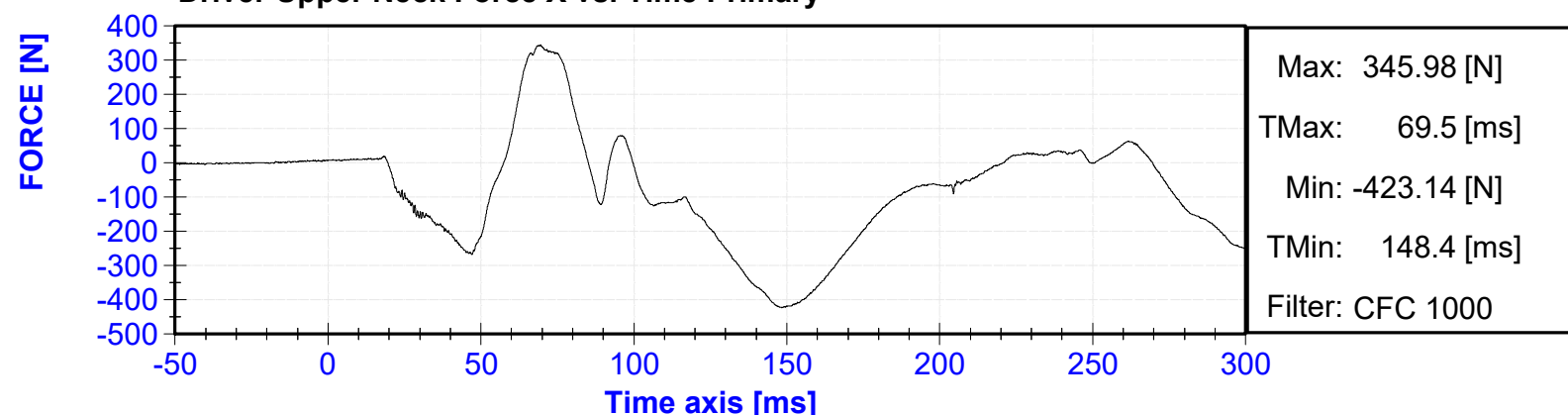
Driver Chest Z Acceleration vs. Time Primary



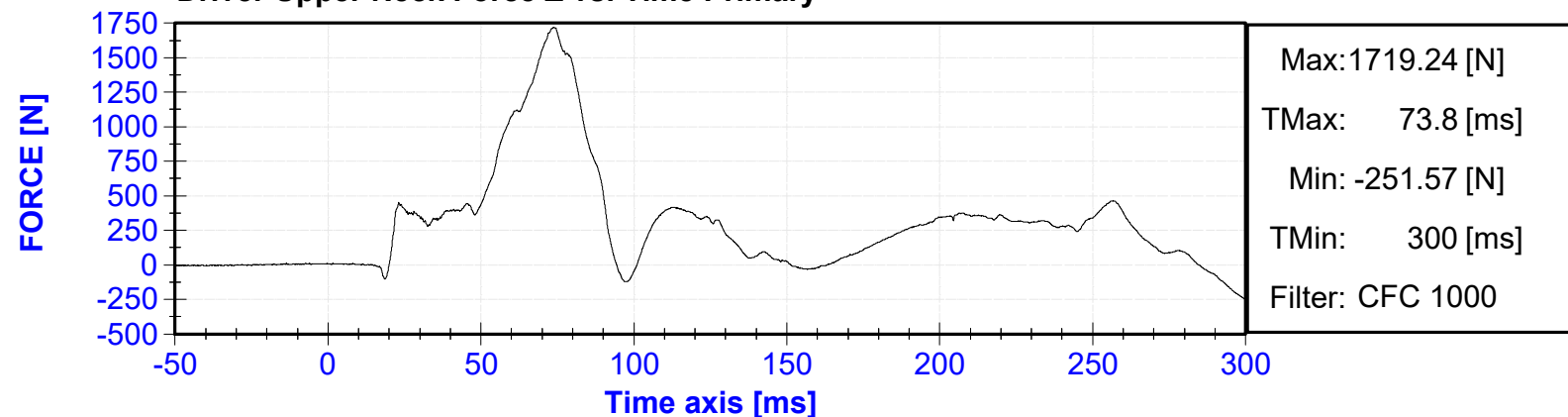
Driver Chest Resultant Acceleration vs. Time Primary



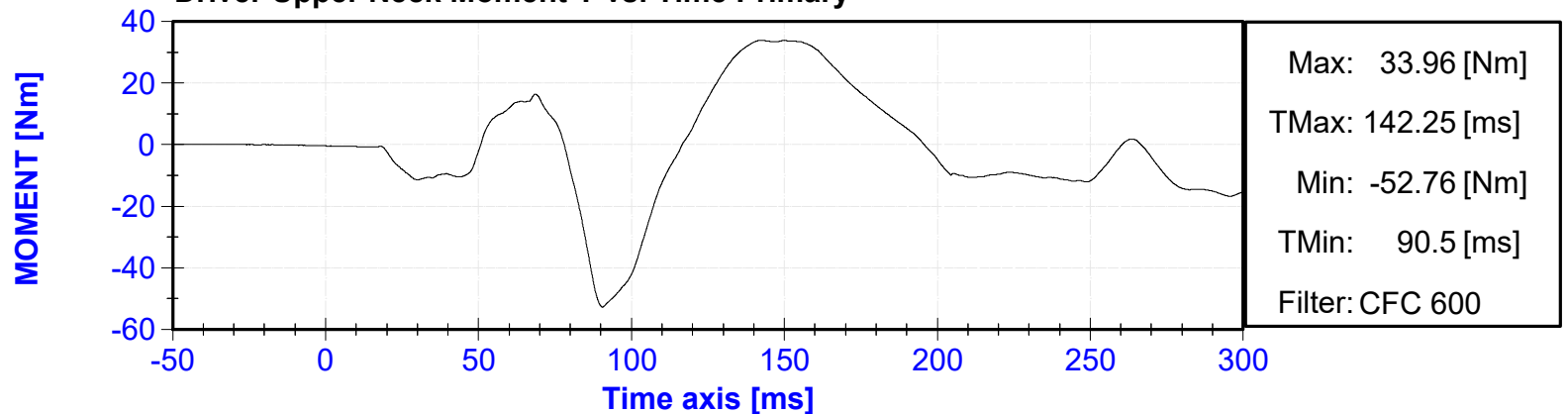
Driver Upper Neck Force X vs. Time Primary



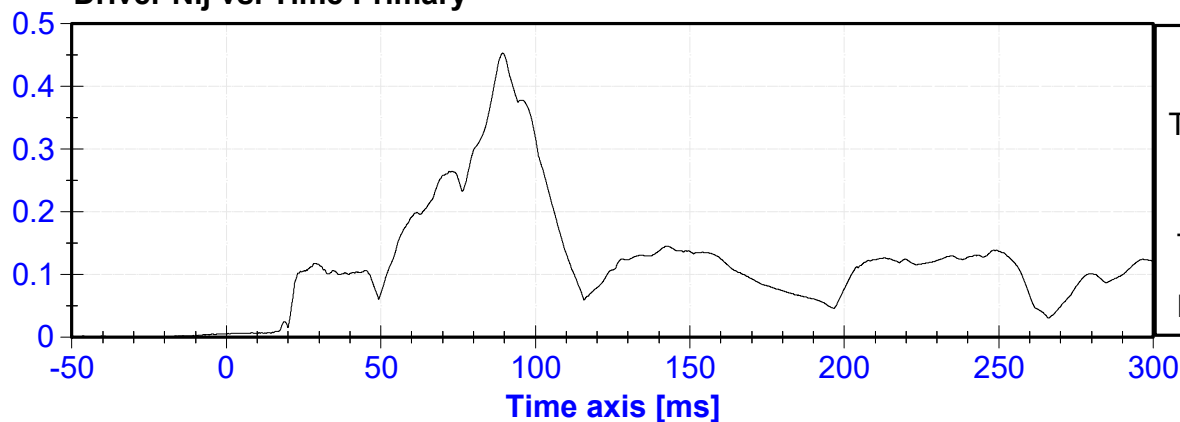
Driver Upper Neck Force Z vs. Time Primary



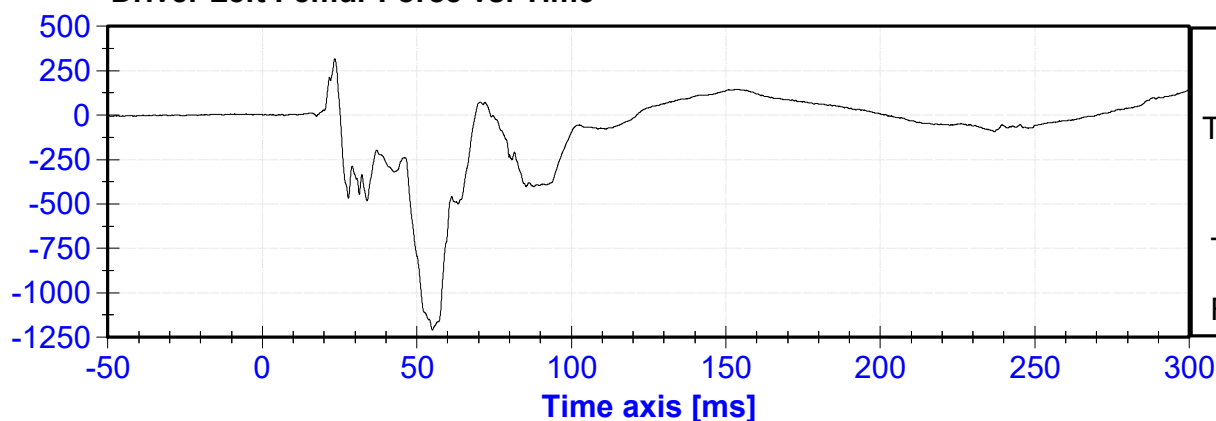
Driver Upper Neck Moment Y vs. Time Primary



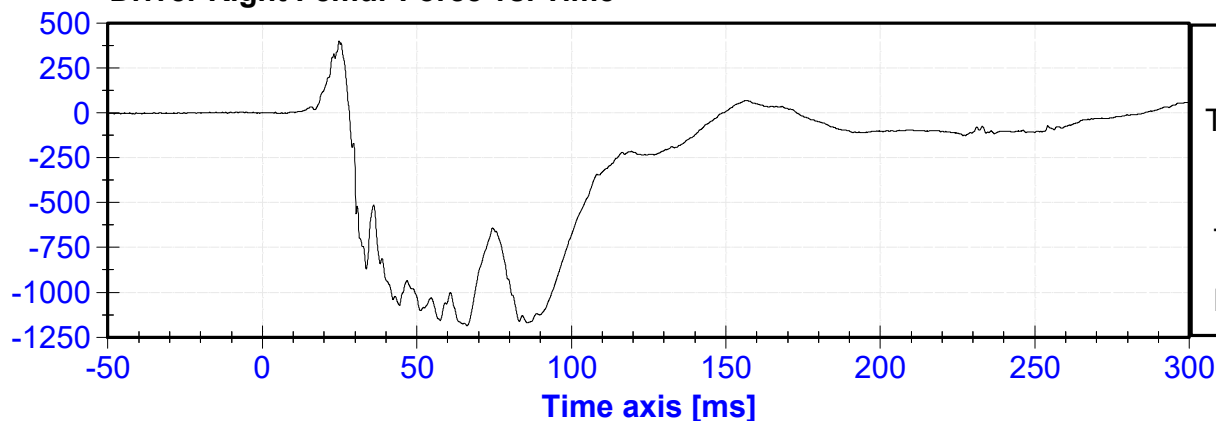
Driver Nij vs. Time Primary



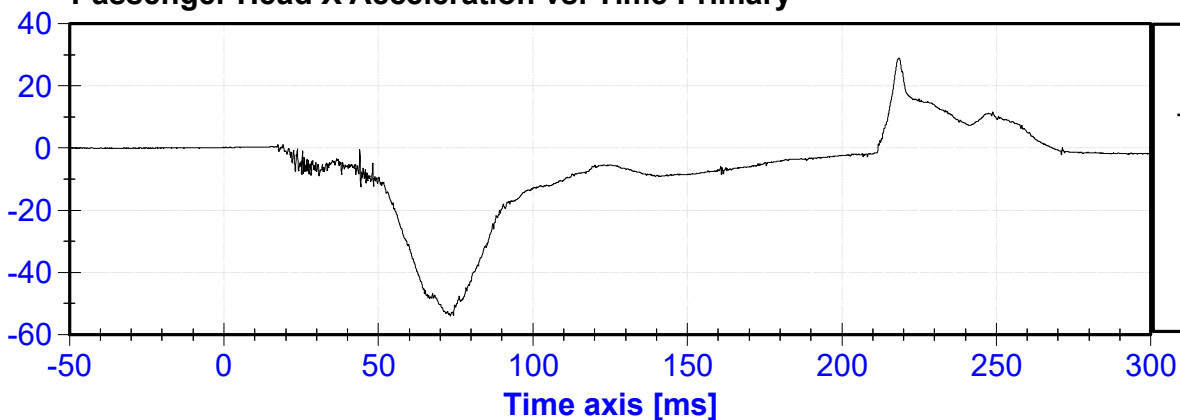
Driver Left Femur Force vs. Time



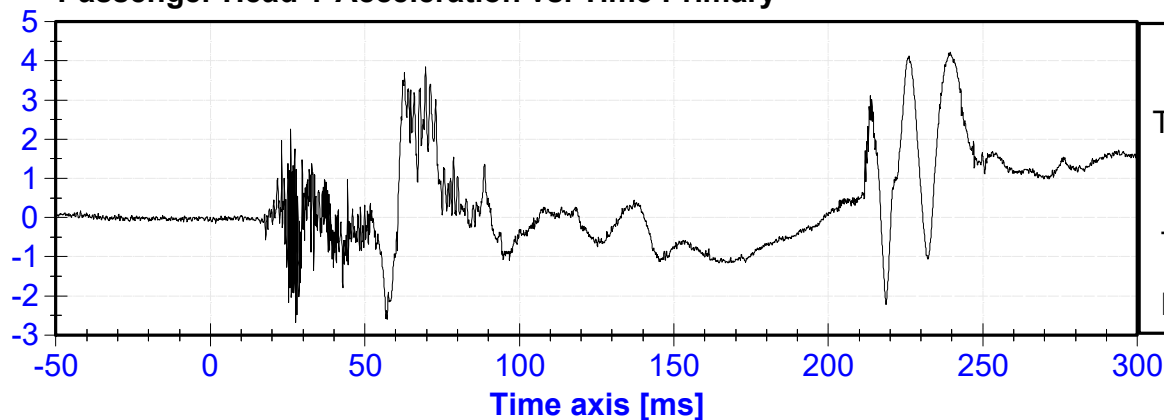
Driver Right Femur Force vs. Time



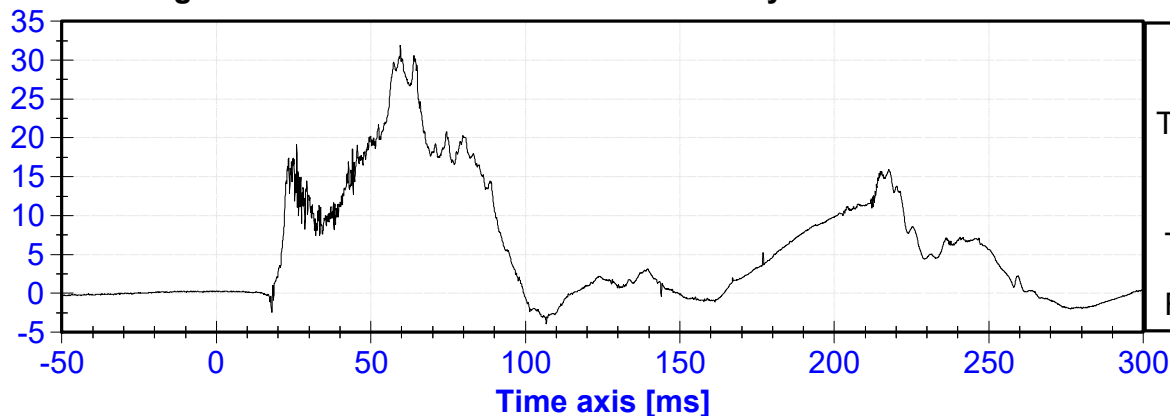
Passenger Head X Acceleration vs. Time Primary



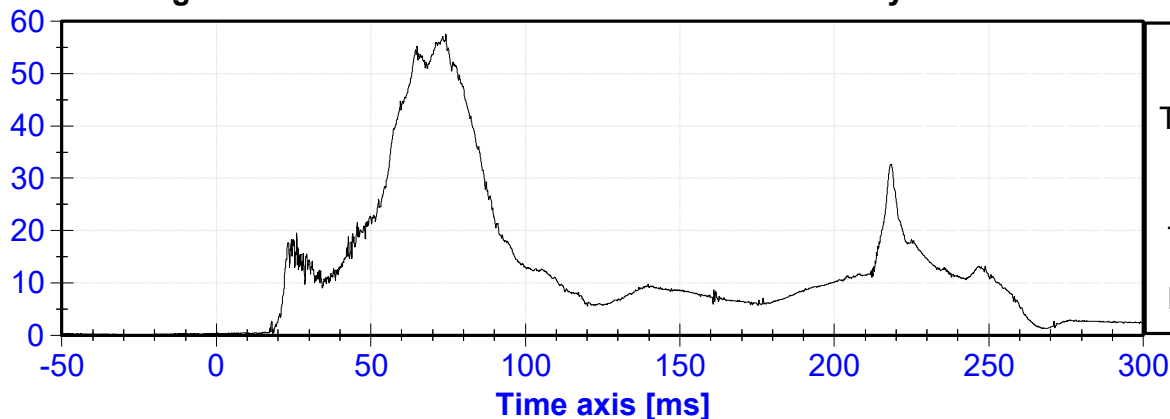
Passenger Head Y Acceleration vs. Time Primary



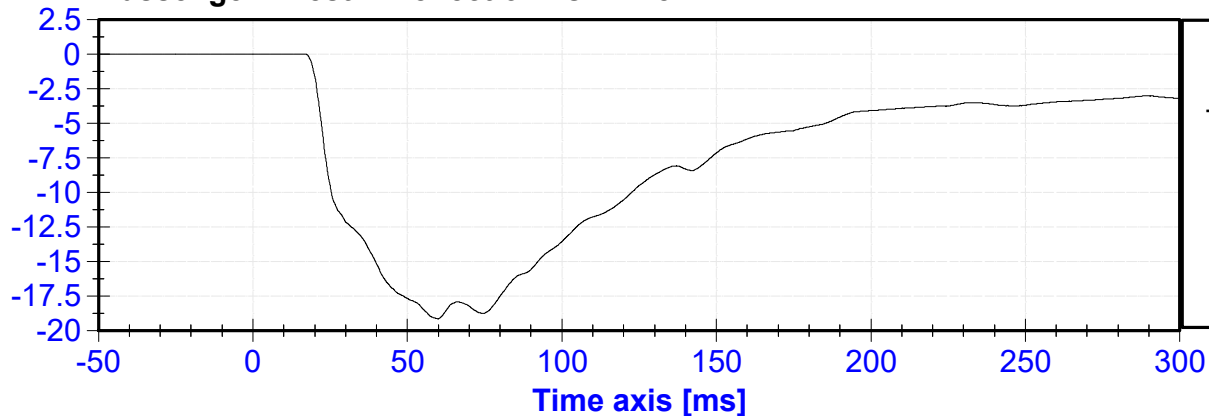
Passenger Head Z Acceleration vs. Time Primary



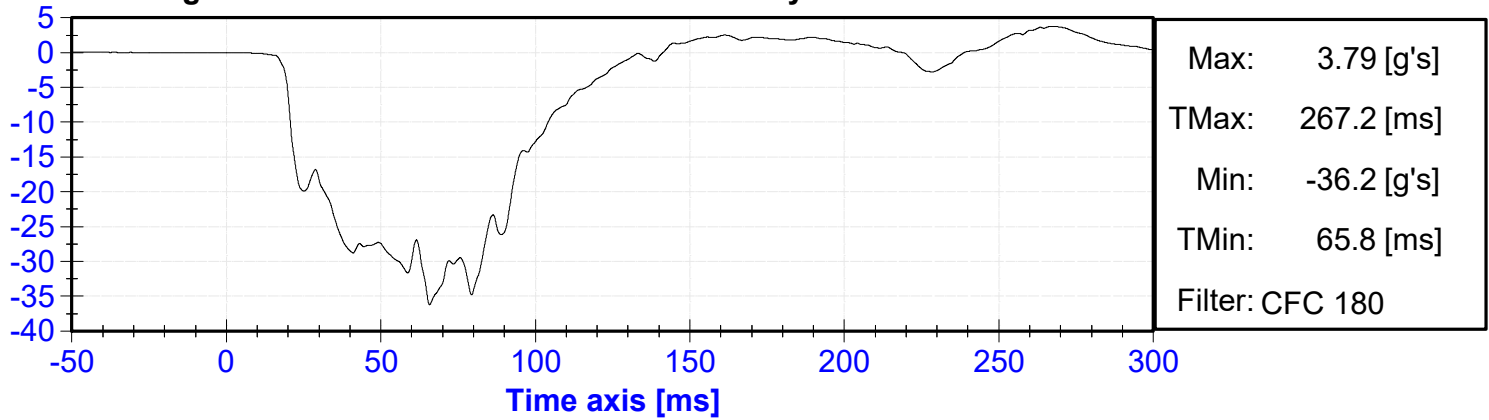
Passenger Head Resultant Acceleration vs. Time Primary



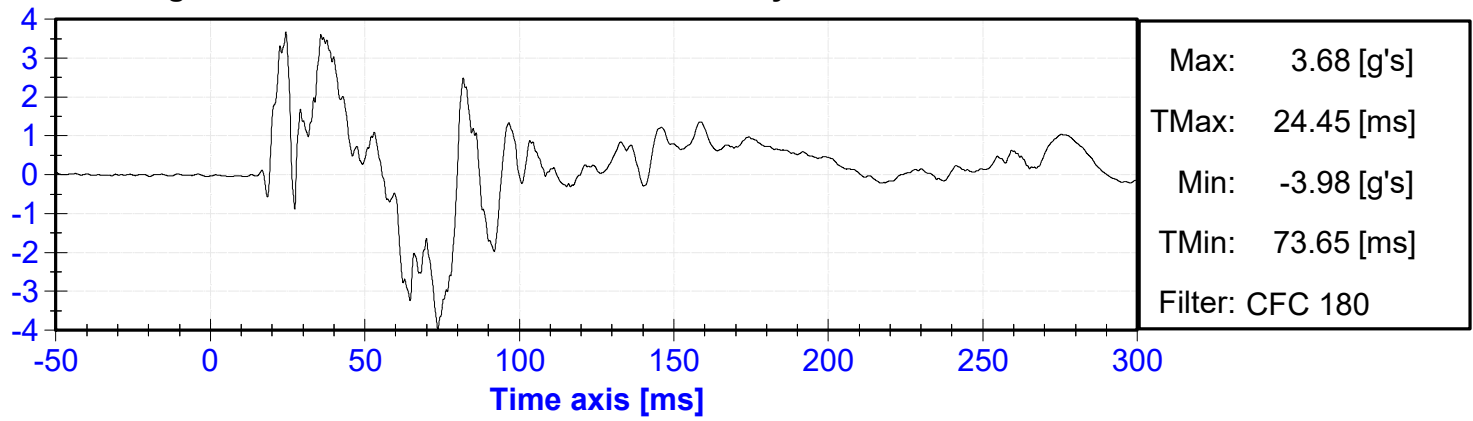
Passenger Chest X Deflection vs. Time



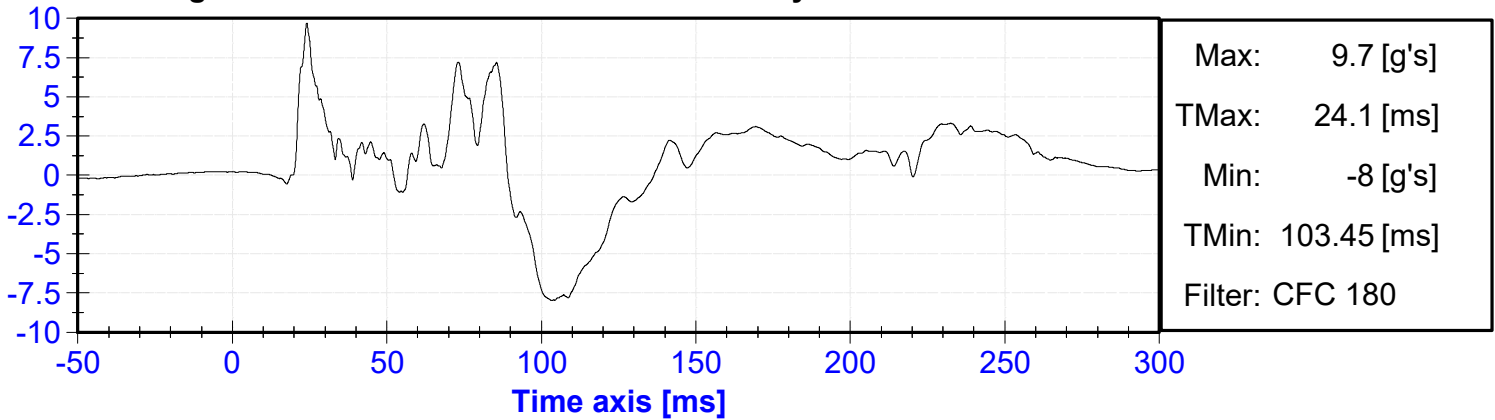
Passenger Chest X Acceleration vs. Time Primary



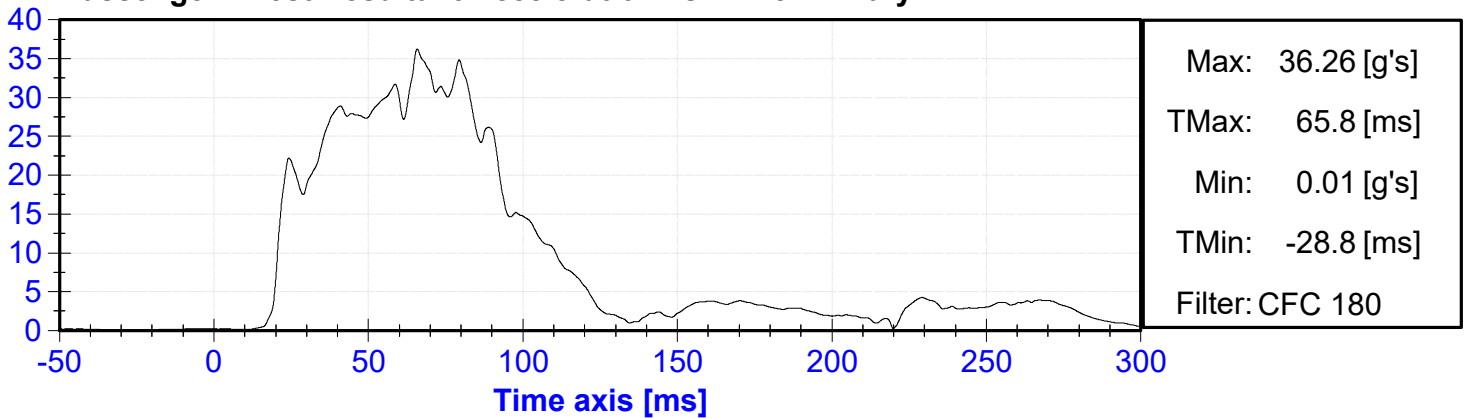
Passenger Chest Y Acceleration vs. Time Primary



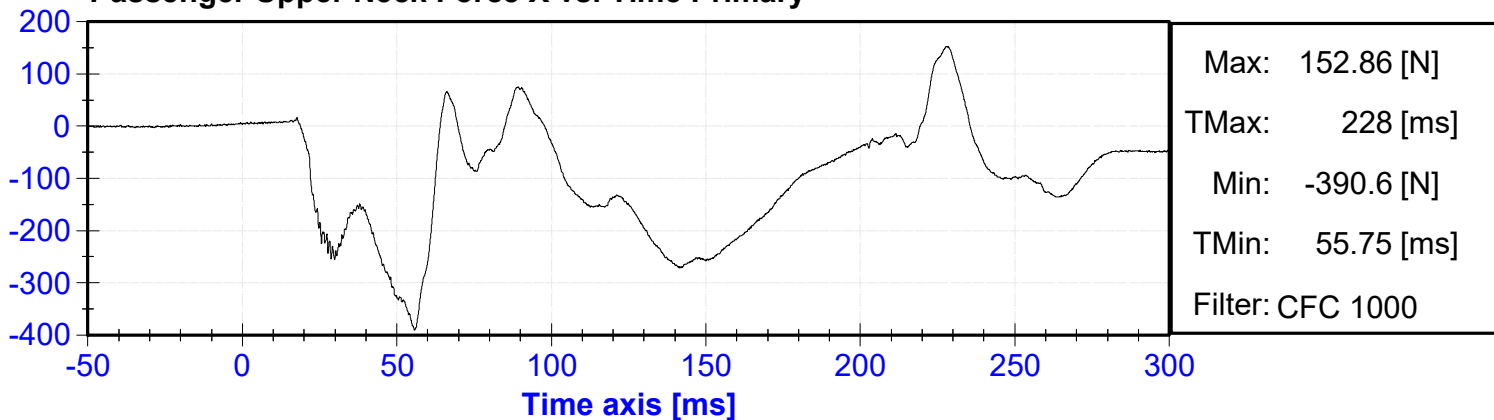
Passenger Chest Z Acceleration vs. Time Primary



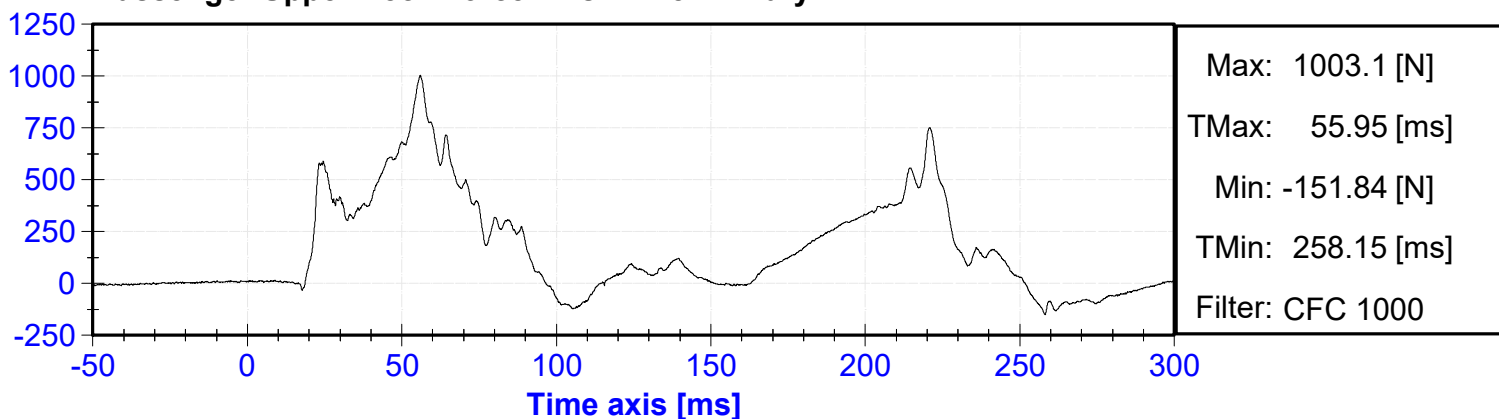
Passenger Chest Resultant Acceleration vs. Time Primary



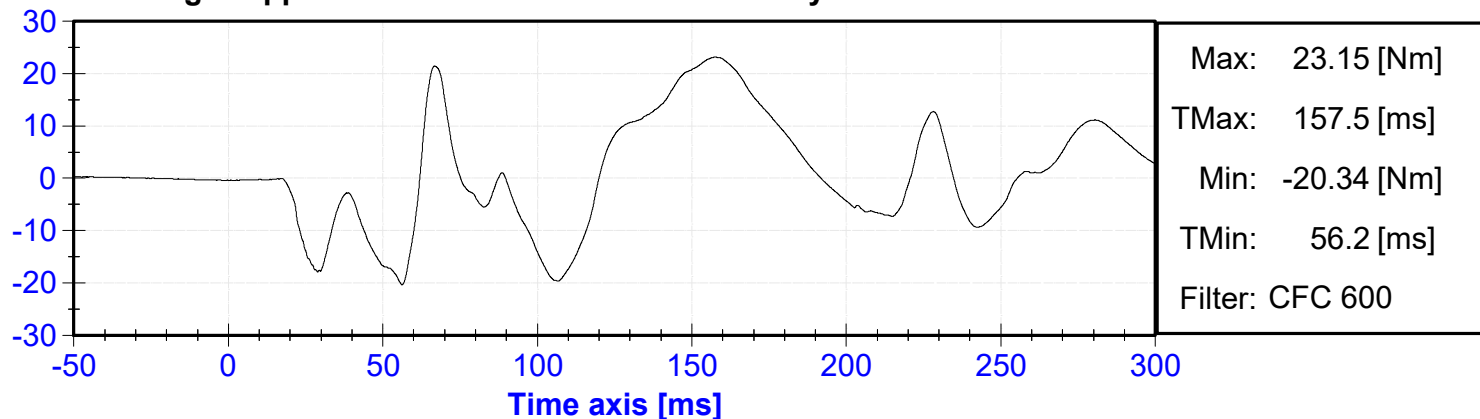
Passenger Upper Neck Force X vs. Time Primary



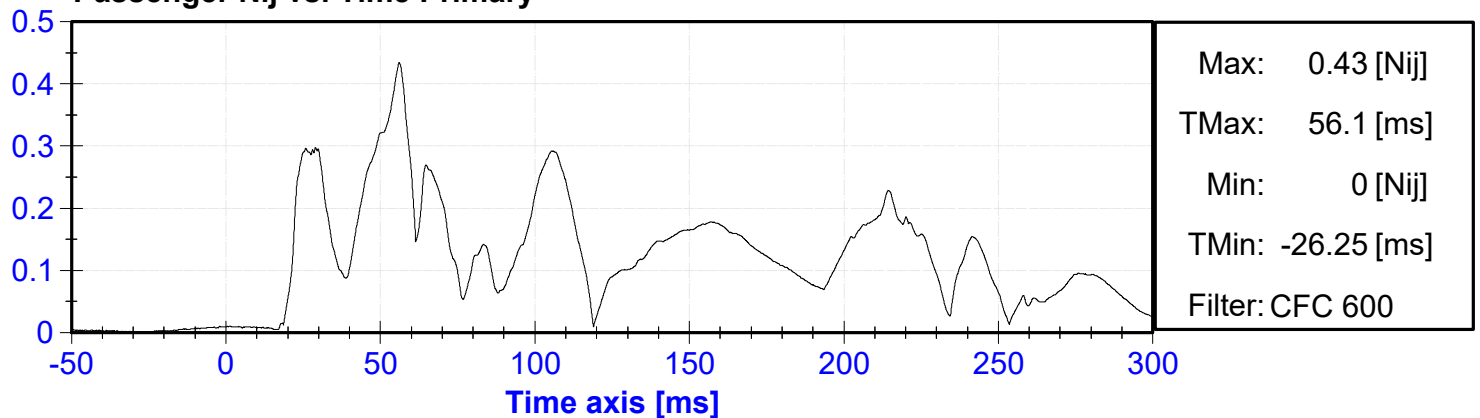
Passenger Upper Neck Force Z vs. Time Primary



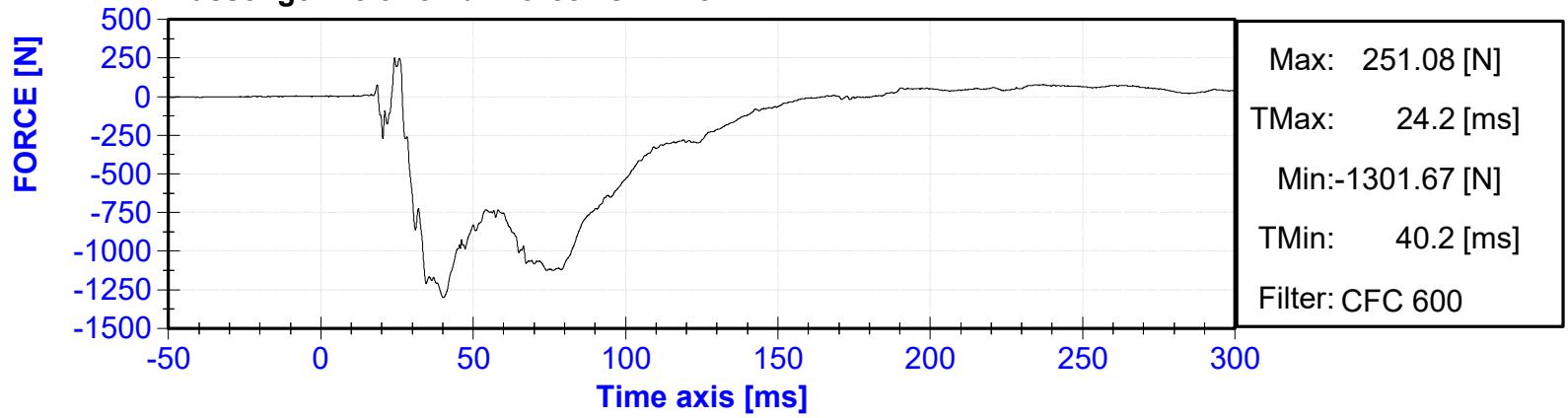
Passenger Upper Neck Moment Y vs. Time Primary



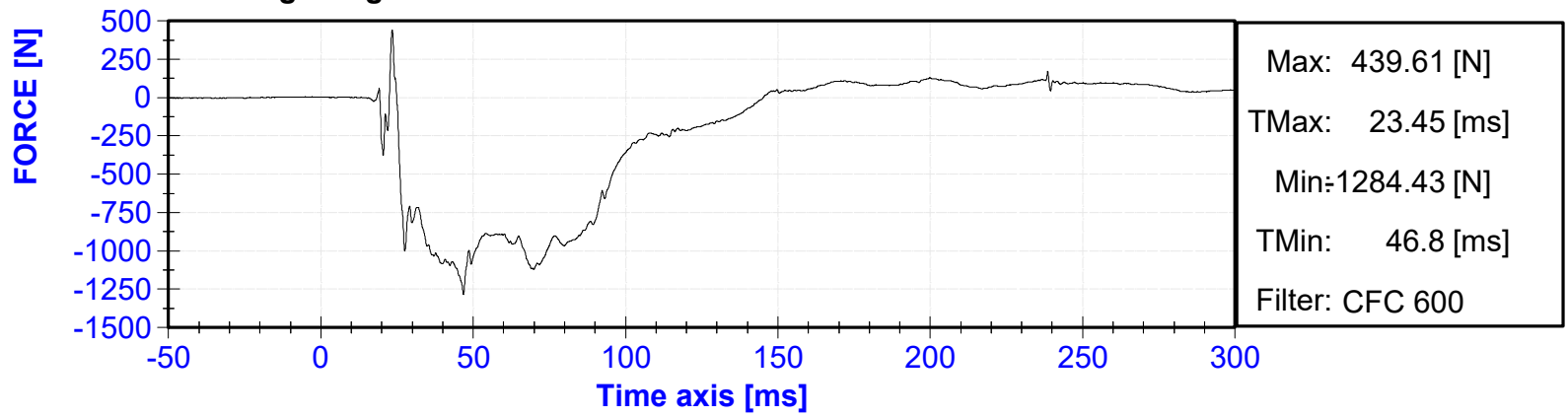
Passenger Nij vs. Time Primary



Passenger Left Femur Force vs. Time



Passenger Right Femur Force vs. Time



APPENDIX C

DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

HYBRID III 50TH PERCENTILE MALE - DRIVER ATD

SERIAL NO: 142

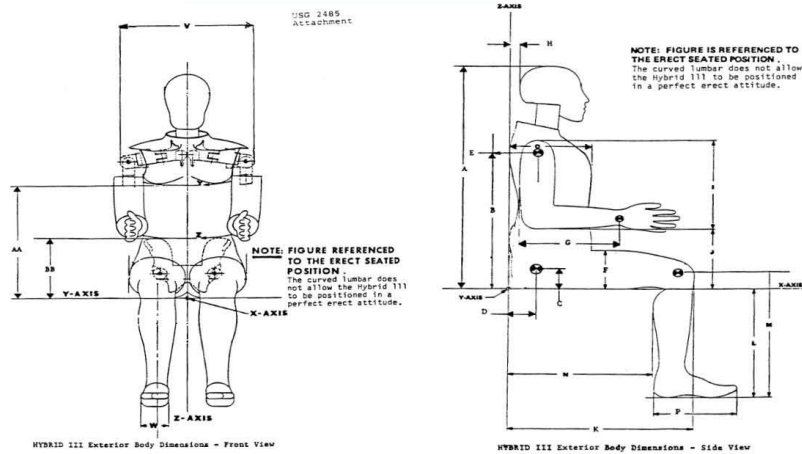


External Measurements - Hybrid 3 - 50th Male

Technician: K. Brogan

Date: 02/22/2023

Dummy Serial Number: 142



Symbol	Description	Specification (in)		Result (in)	Pass/Fail
A	Sitting Height	34.6	35.0	34.8	Pass
B	Shoulder Pivot Height	19.9	20.5	20.2	Pass
C	H-Point Height	3.3	3.5	3.3	Pass
D	H-Point from Backline	5.3	5.5	5.3	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	11.6	Pass
H	Head Back to Backline	1.6	1.8	1.7	Pass
I	Shoulder to Elbow Length	13.0	13.6	13.2	Pass
J	Elbow Rest Height	7.5	8.3	7.9	Pass
K	Buttock to Knee Length	22.8	23.8	23.5	Pass
L	Popliteal Height	16.9	17.9	17.1	Pass
M	Knee Pivot Height	19.1	19.7	19.4	Pass
N	Buttock Popliteal Length	17.8	18.8	18.3	Pass
O	Chest Depth without Jacket	8.4	9.0	8.6	Pass
P	Foot Length (right)	9.9	10.5	10.2	Pass
V	Shoulder Breadth	16.3	17.2	16.8	Pass
W	Foot Breadth	3.6	4.2	3.9	Pass
Y	Chest Circumference with Jacket	38.2	39.4	39.0	Pass
Z	Waist Circumference	32.9	34.1	33.3	Pass
AA	Reference Location (Chest Circumference)	16.9	17.1	17.0	Pass
BB	Reference Location (Waist Circumference)	8.9	9.1	9.0	Pass

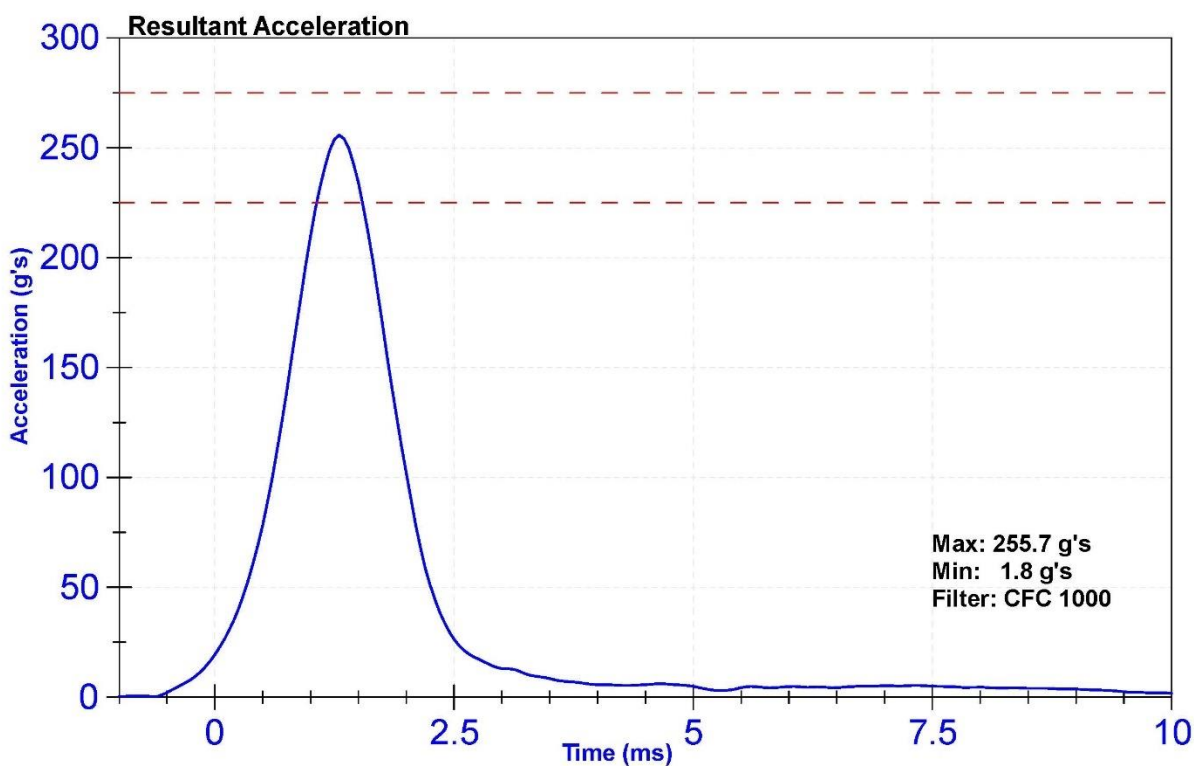
ATD Manufacturer	Humanetics	Test Technician	T. Roseman
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

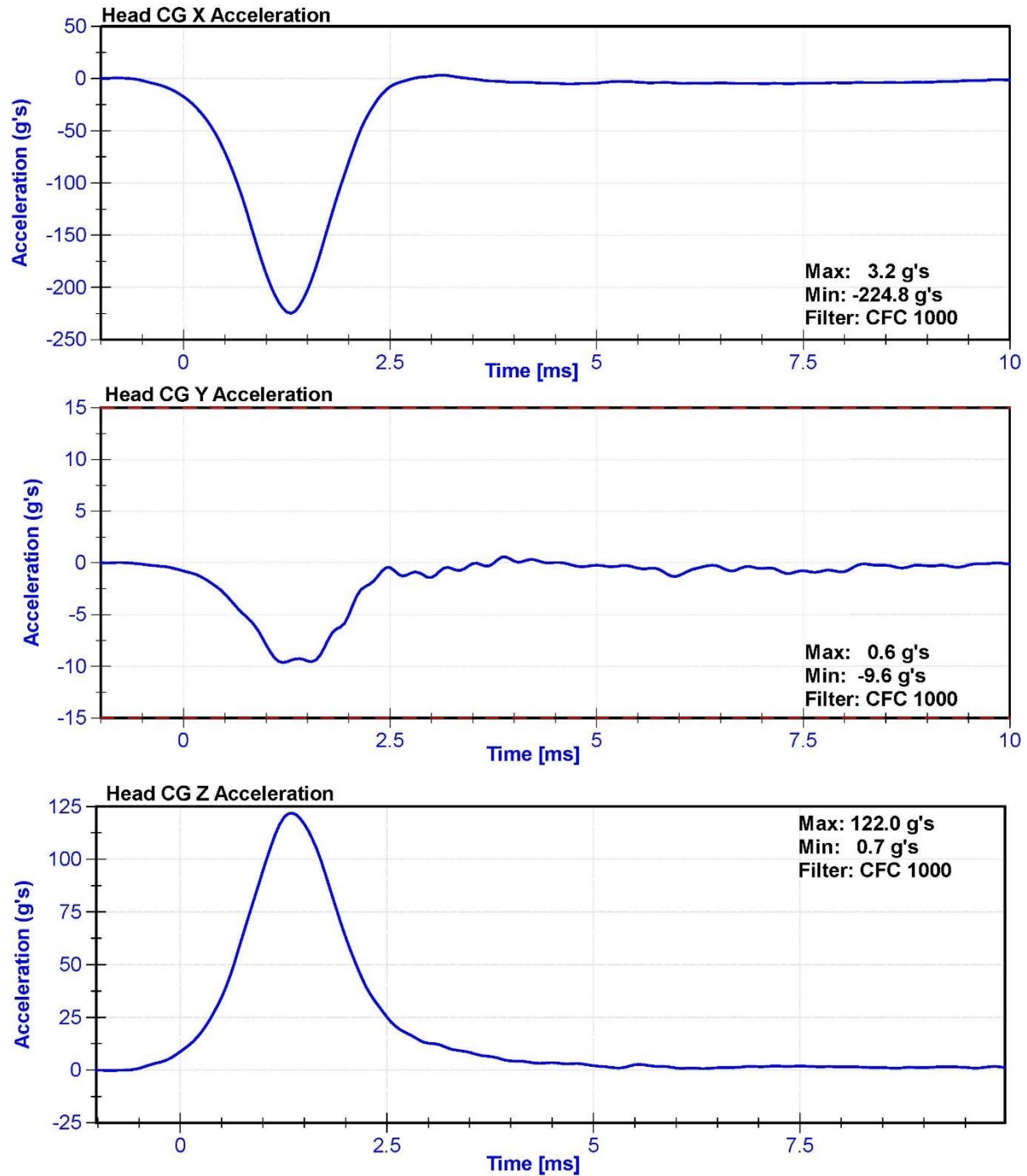
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.0	Pass
Humidity	10	70	%	24.2	Pass
Resultant Acceleration	225	275	g's	255.7	Pass
Oscillation	0	10	%	2.3	Pass
Lateral Acceleration	-15	15	g's	-9.6	Pass

Transducer Calibrations

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





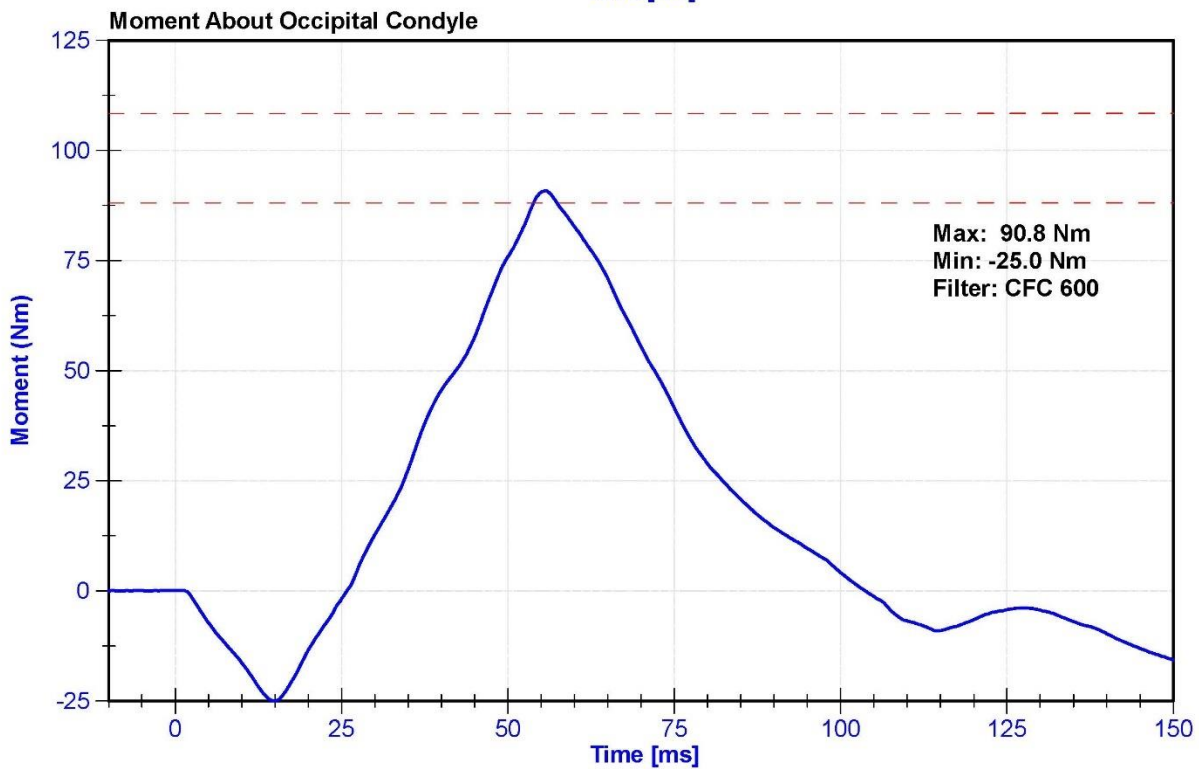
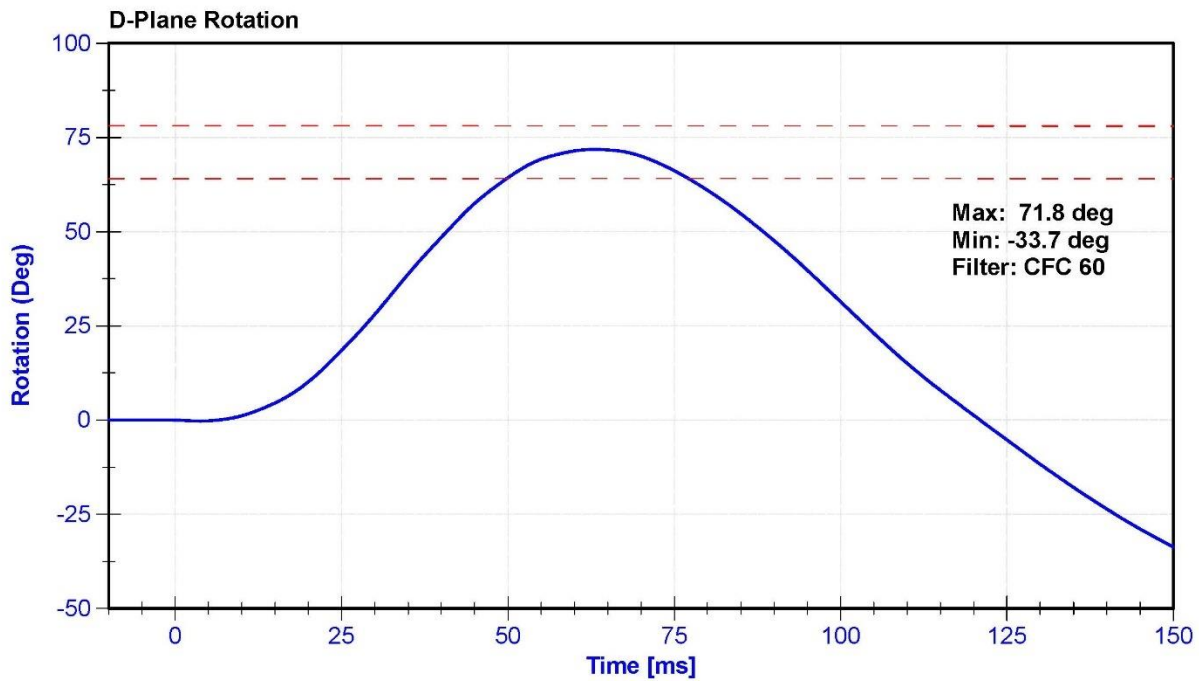
ATD Manufacturer	Humanetics	Test Technician	T. Roseman
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

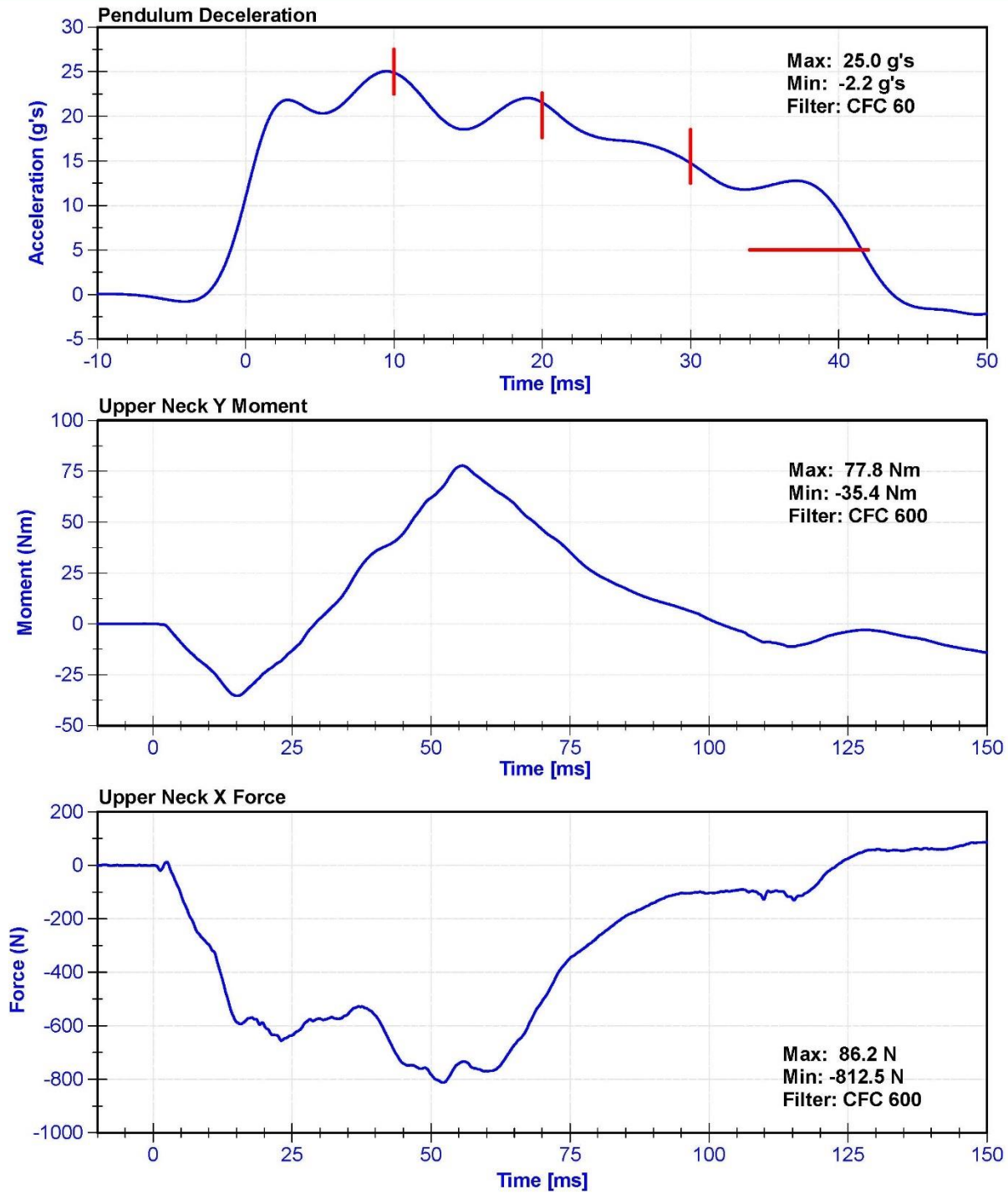
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	23.5	Pass
Velocity	6.89	7.13	m/s	6.999	Pass
Pendulum Deceleration at 10ms	22.5	27.5	g's	24.89	Pass
Pendulum Deceleration at 20ms	17.6	22.6	g's	21.54	Pass
Pendulum Deceleration at 30ms	12.5	18.5	g's	14.74	Pass
Max. Pendulum Deceleration After 30ms	0	29	g's	25.0	Pass
Pendulum Deceleration Time to 5 g's	34	42	ms	41.6	Pass
Maximum D Plane Rotation	64	78	deg	71.8	Pass
Time to Maximum Rotation	57	64	ms	63.0	Pass
Rotation Decay to Zero	113	127	ms	121.0	Pass
Moment About Occipital Condyle	88.1	108.4	Nm	90.85	Pass
Time to Maximum Moment	47	58	ms	55.6	Pass
Moment Decay to Zero	97	107	ms	103.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	7231C-750	10/26/2022	10/26/2023
Pendulum Potentiometer	ETI	LABPOT1	5/9/2022	5/9/2023
Condyle Potentiometer	ETI	LABPOT2	5/9/2022	5/9/2023
Upper Neck Load Cell	Denton	2187-FX	6/13/2022	6/13/2023





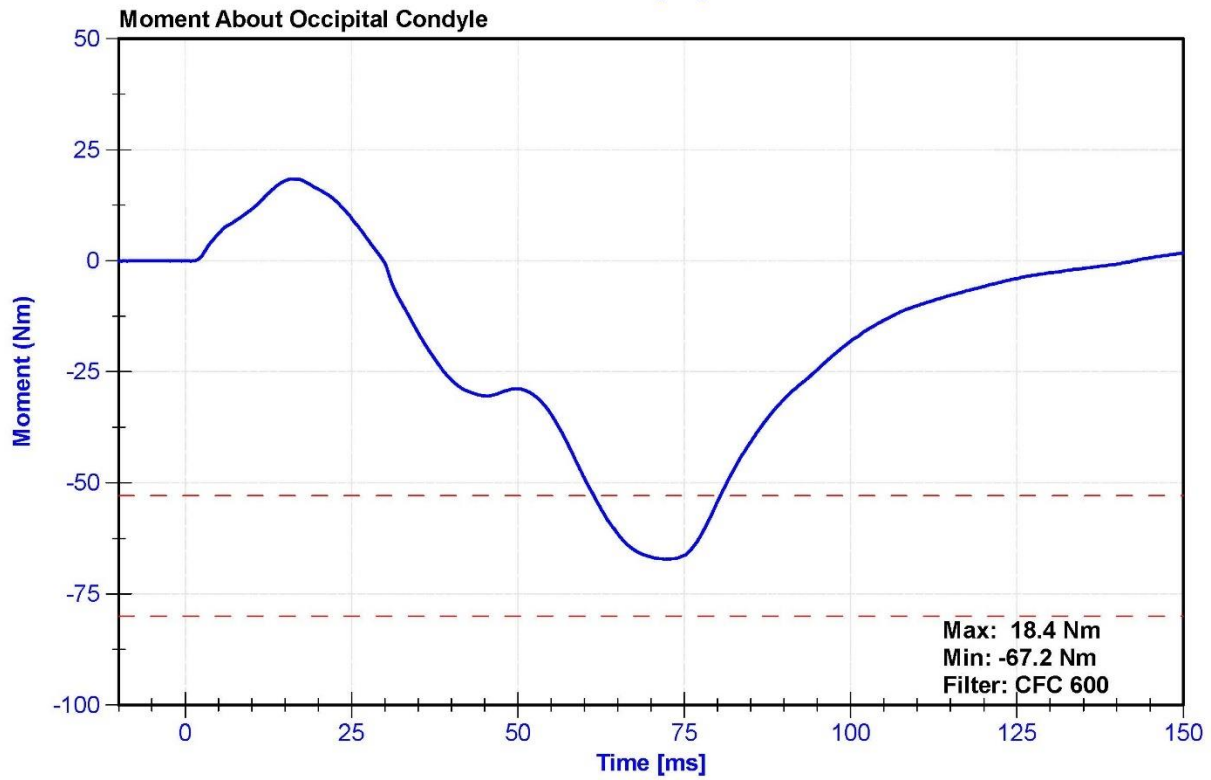
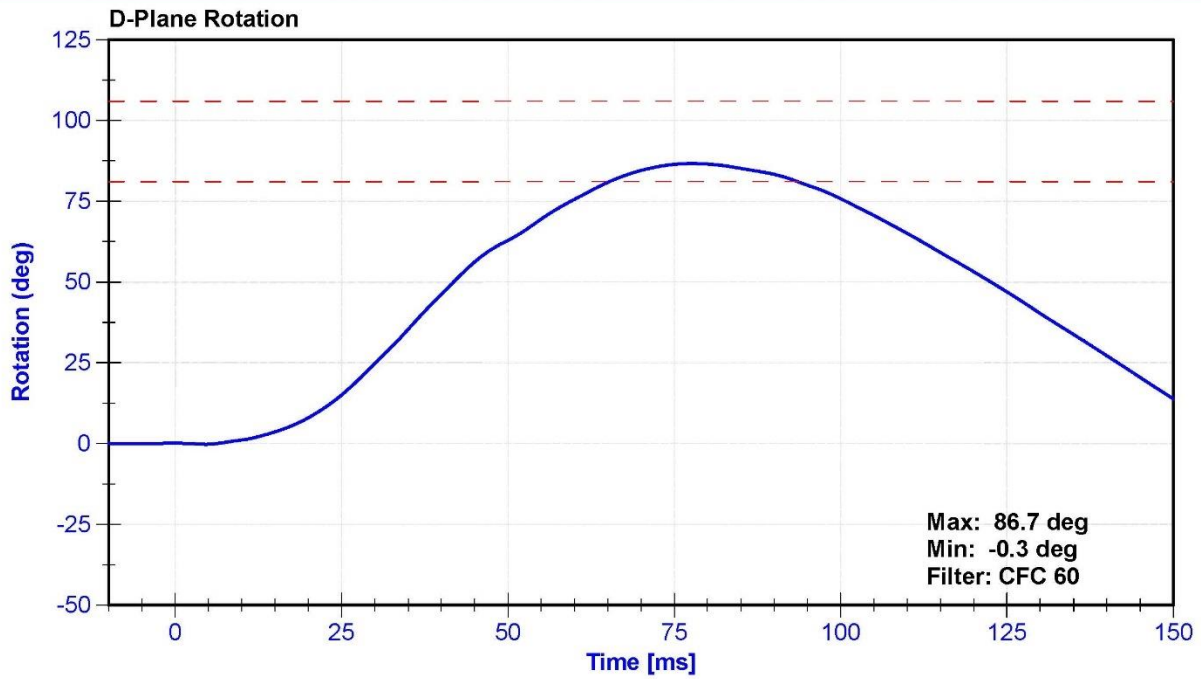
ATD Manufacturer	Humanetics	Test Technician	T. Roseman
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

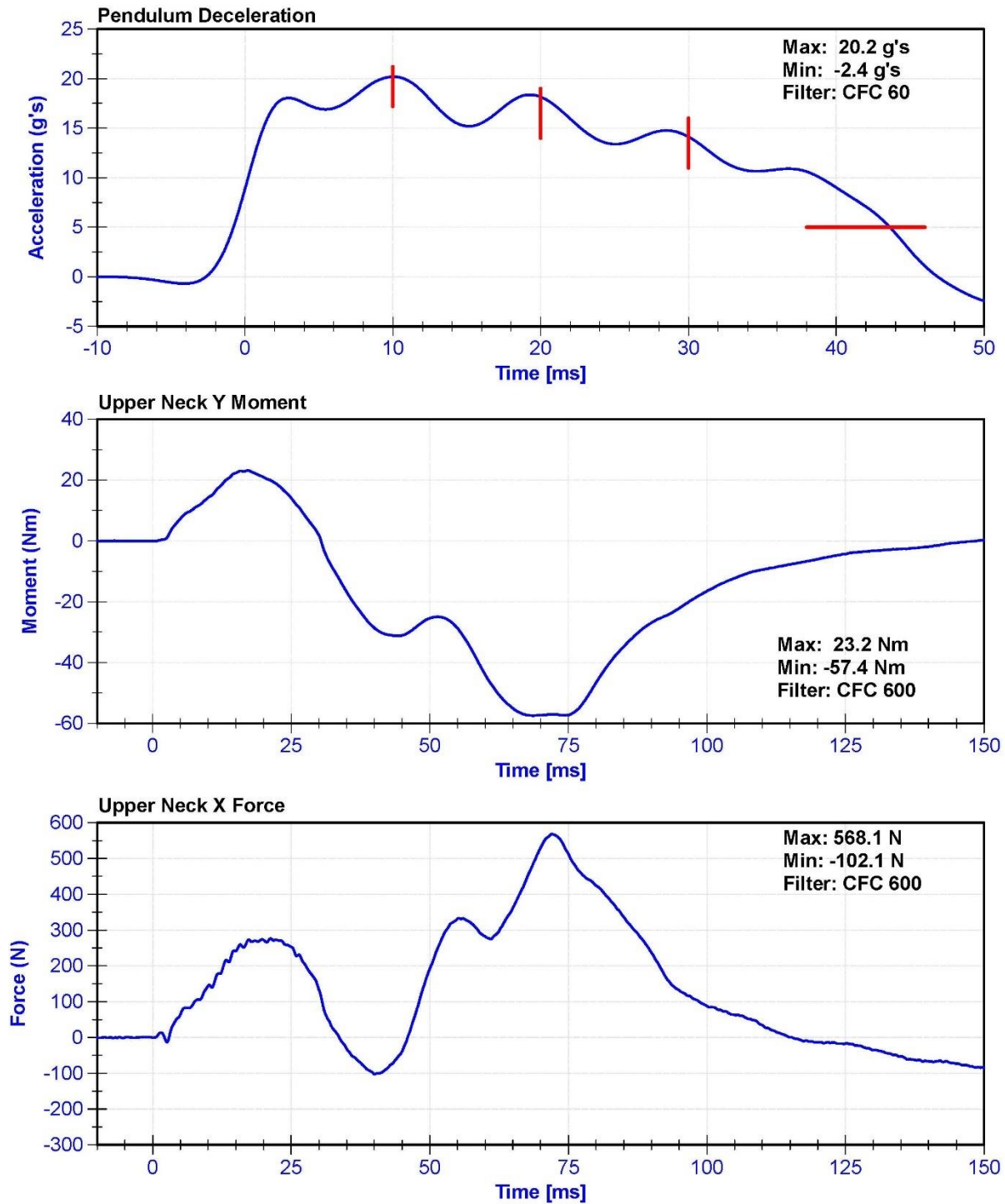
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	23.5	Pass
Velocity	5.94	6.19	m/s	6.062	Pass
Pendulum Deceleration at 10ms	17.2	21.2	g's	20.19	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	20.2	Pass
Pendulum Deceleration Time to 5 g's	38	46	ms	43.7	Pass
Maximum D Plane Rotation	81	106	deg	86.7	Pass
Time to Maximum Rotation	72	82	ms	77.7	Pass
Rotation Decay to Zero	147	174	ms	160.6	Pass
Minimum Moment About OC	-80	-52.9	Nm	-67.19	Pass
Time to Minimum Moment	65	79	ms	72.1	Pass
Moment Decay to Zero	120	148	ms	142.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16503	10/26/2022	10/26/2023
Pendulum Potentiometer	ETI	LABPOT1	5/9/2022	5/9/2023
Condyle Potentiometer	ETI	LABPOT2	5/9/2022	5/9/2023
Upper Neck Load Cell	Denton	2187-FX	6/13/2022	6/13/2023





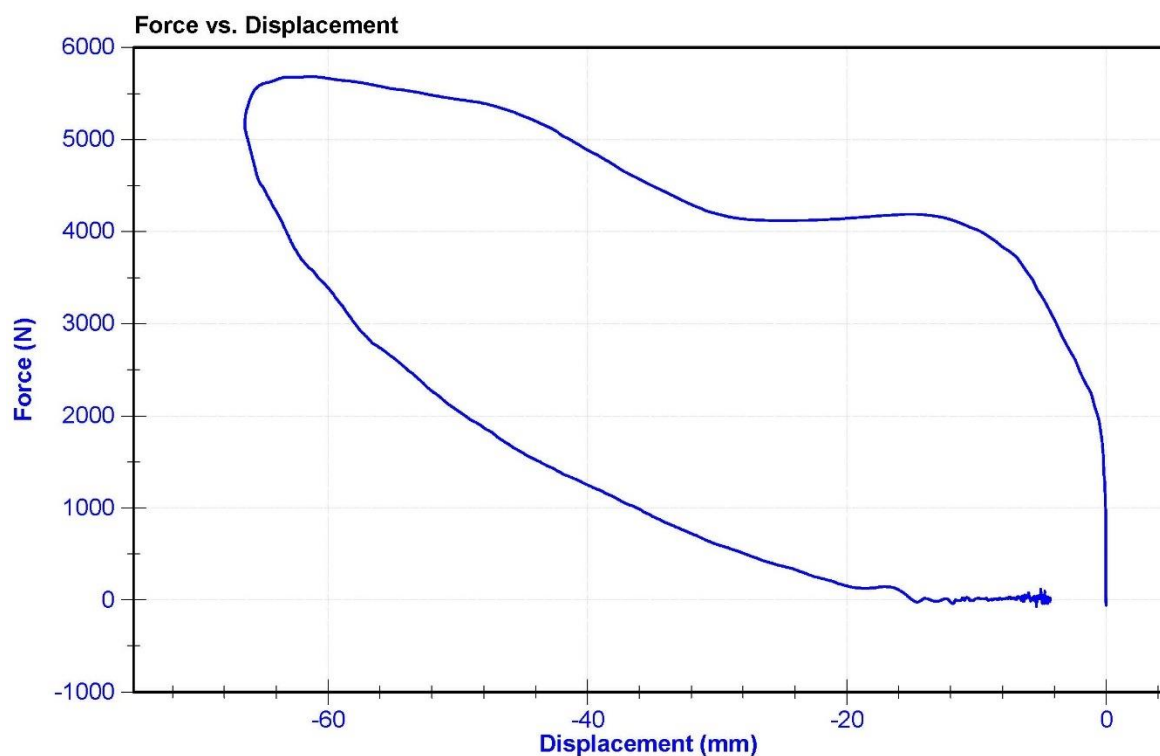
ATD Manufacturer	Humanetics	Test Technician	C. Mantell
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

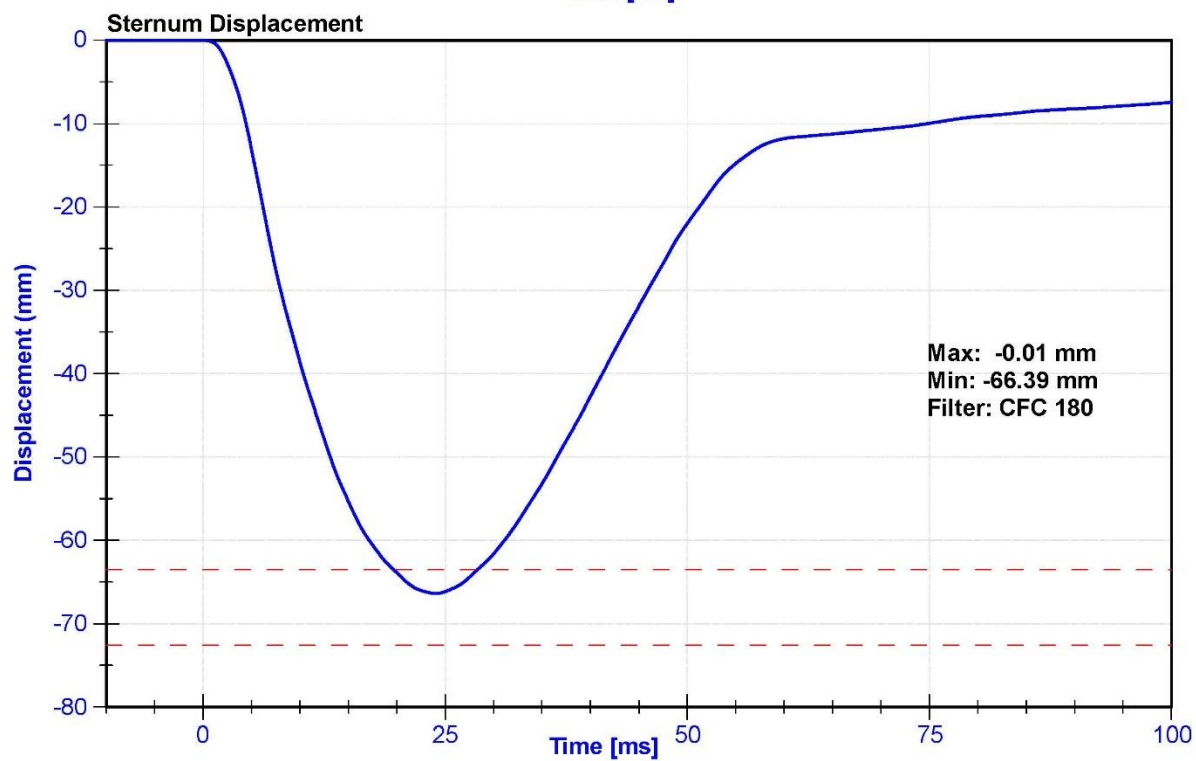
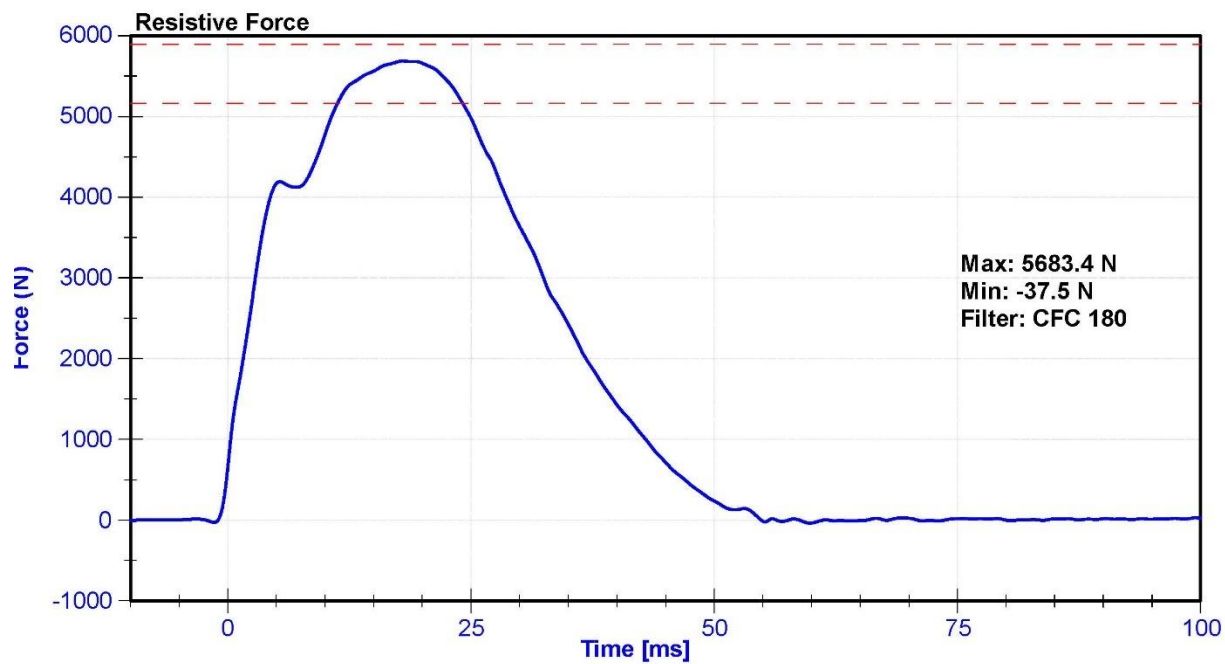
Results

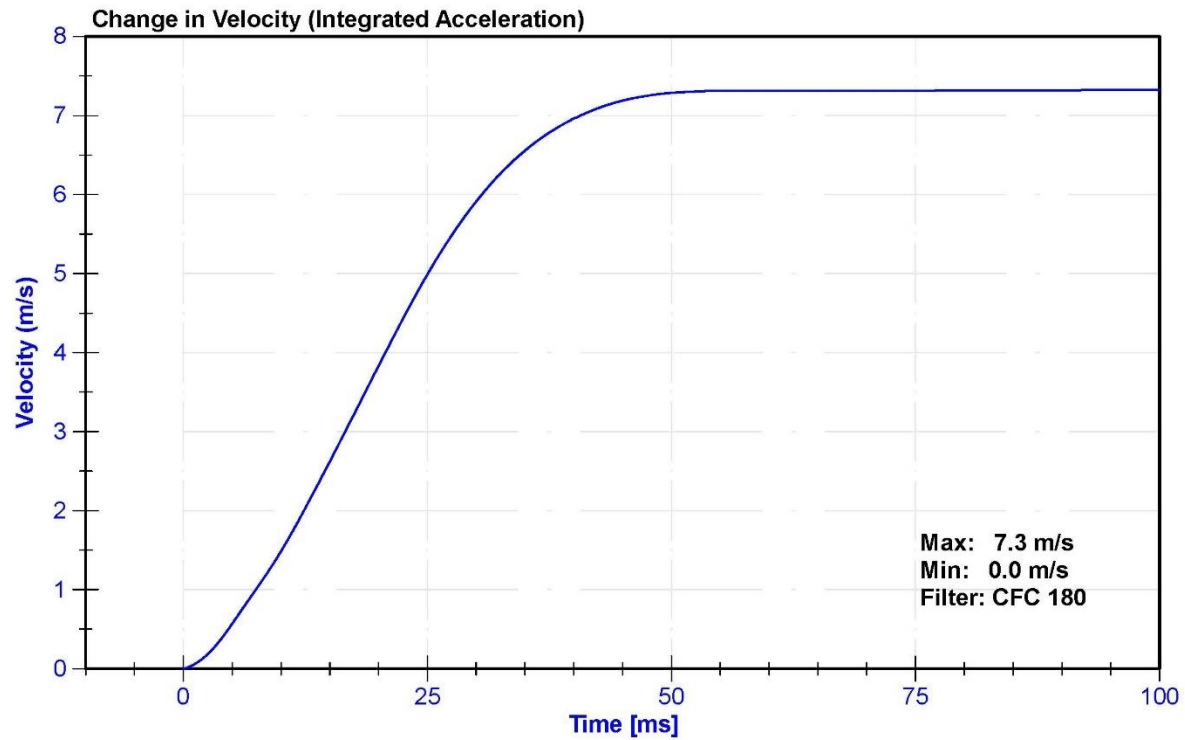
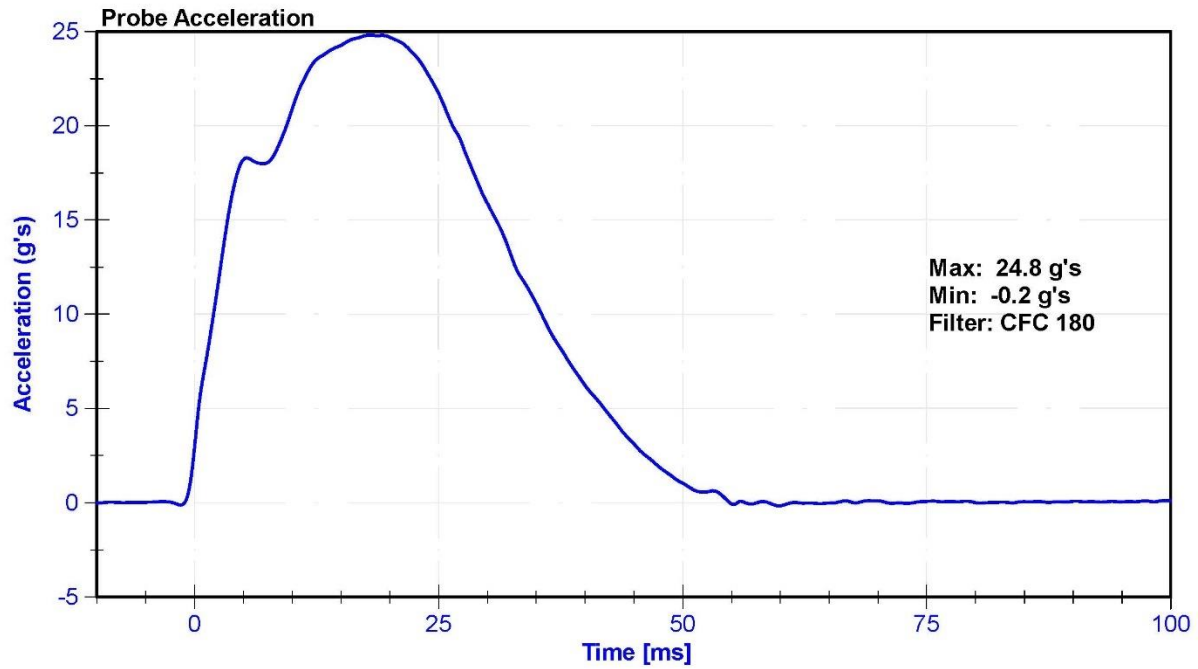
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	19	Pass
Velocity	6.59	6.83	m/s	6.727	Pass
Chest Displacement	-72.6	-63.5	mm	-66.39	Pass
Resistive Force	5160	5894	N	5683.4	Pass
Hysteresis	69	85	%	72.9	Pass

Transducer Calibrations

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



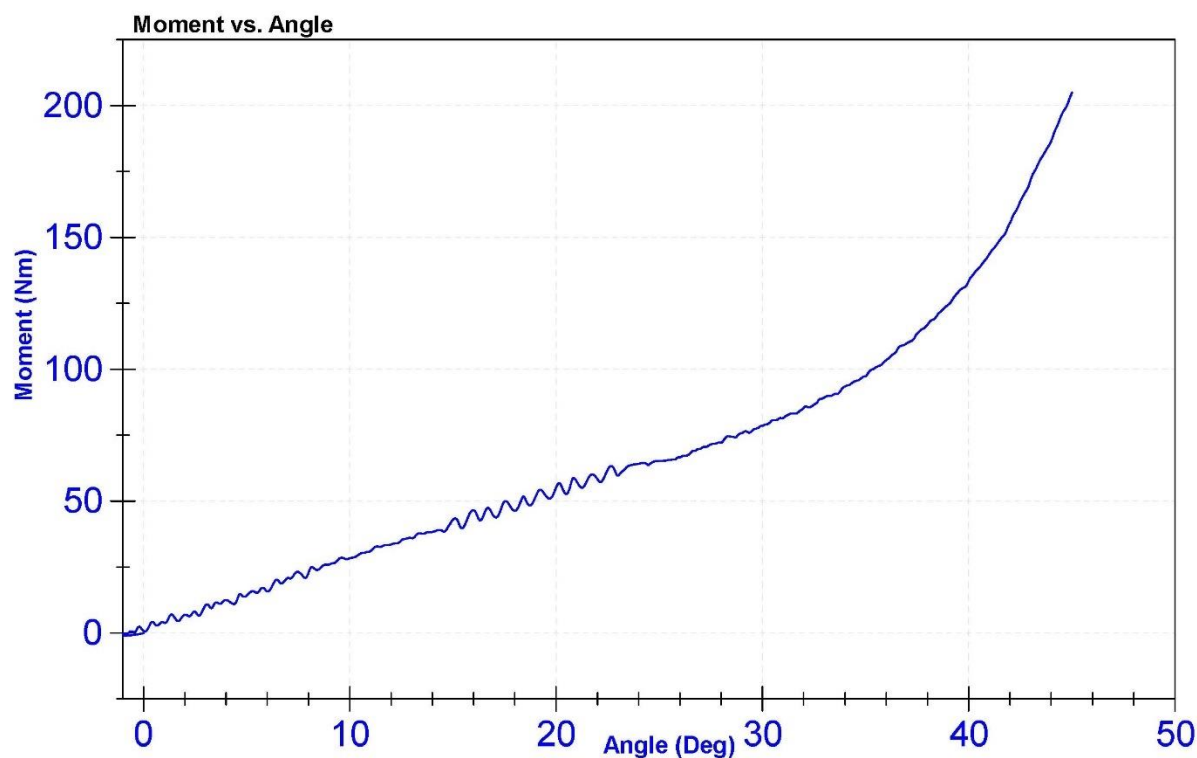




ATD Manufacturer	Humanetics	Test Technician	T. Roseman
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

Results					
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.0	Pass
Humidity	10	70	%	24.2	Pass
Average Velocity	5	10	deg/s	7.7	Pass
Angle at 203Nm	40	50	deg	44.9	Pass
Moment at 30 degrees	0	94.9	Nm	78.6	Pass

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



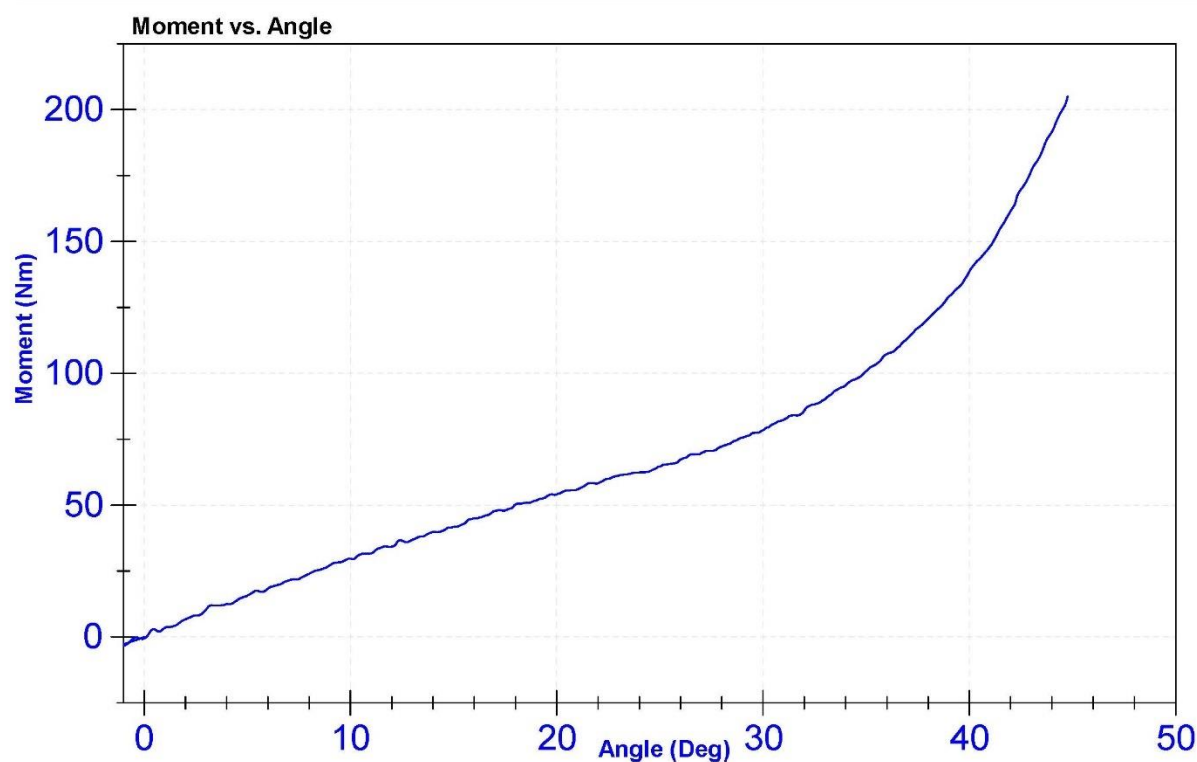
ATD Manufacturer	Humanetics	Test Technician	T. Roseman
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.0	Pass
Humidity	10	70	%	24.2	Pass
Average Velocity	5	10	deg/s	7.7	Pass
Angle at 203Nm	40	50	deg	44.7	Pass
Moment at 30 degrees	0	94.9	Nm	78.4	Pass

Transducer Calibrations

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



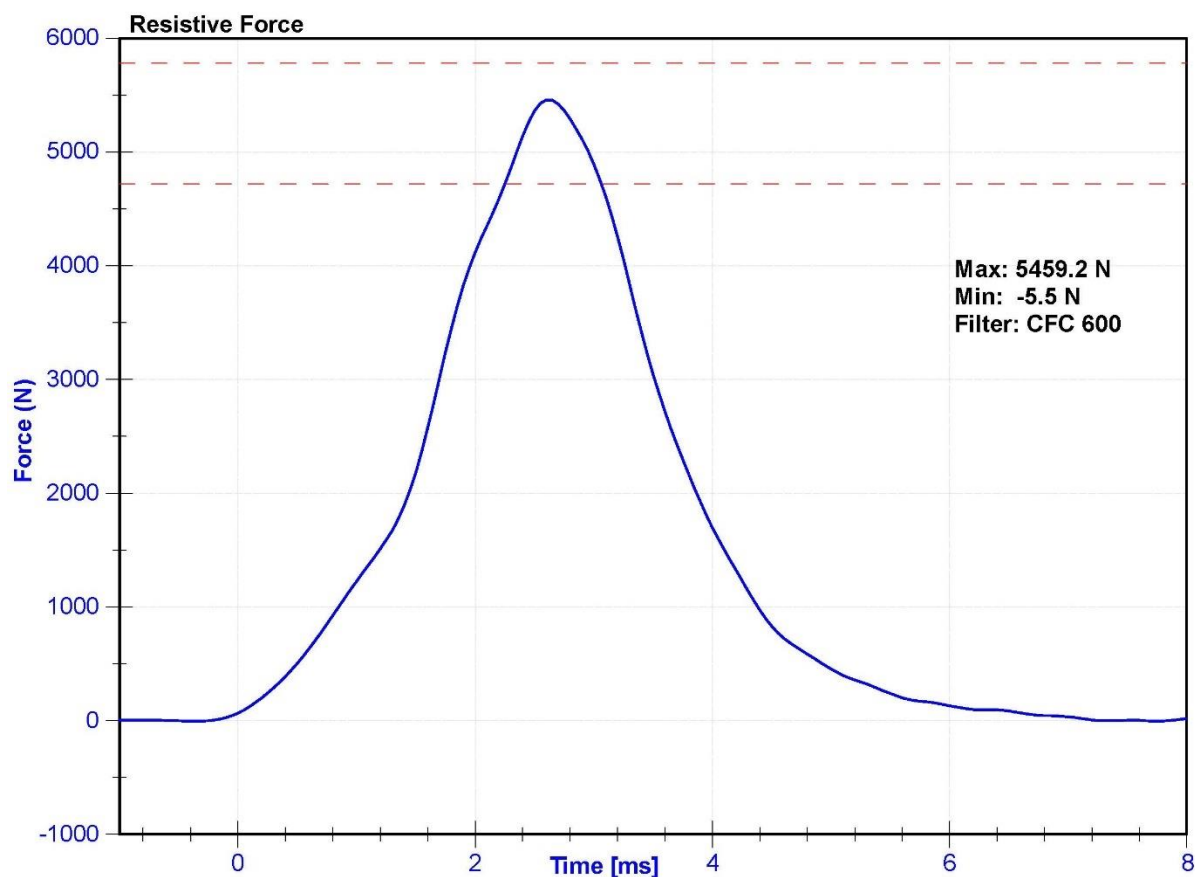
ATD Manufacturer	Humanetics	Test Technician	T. Roseman
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

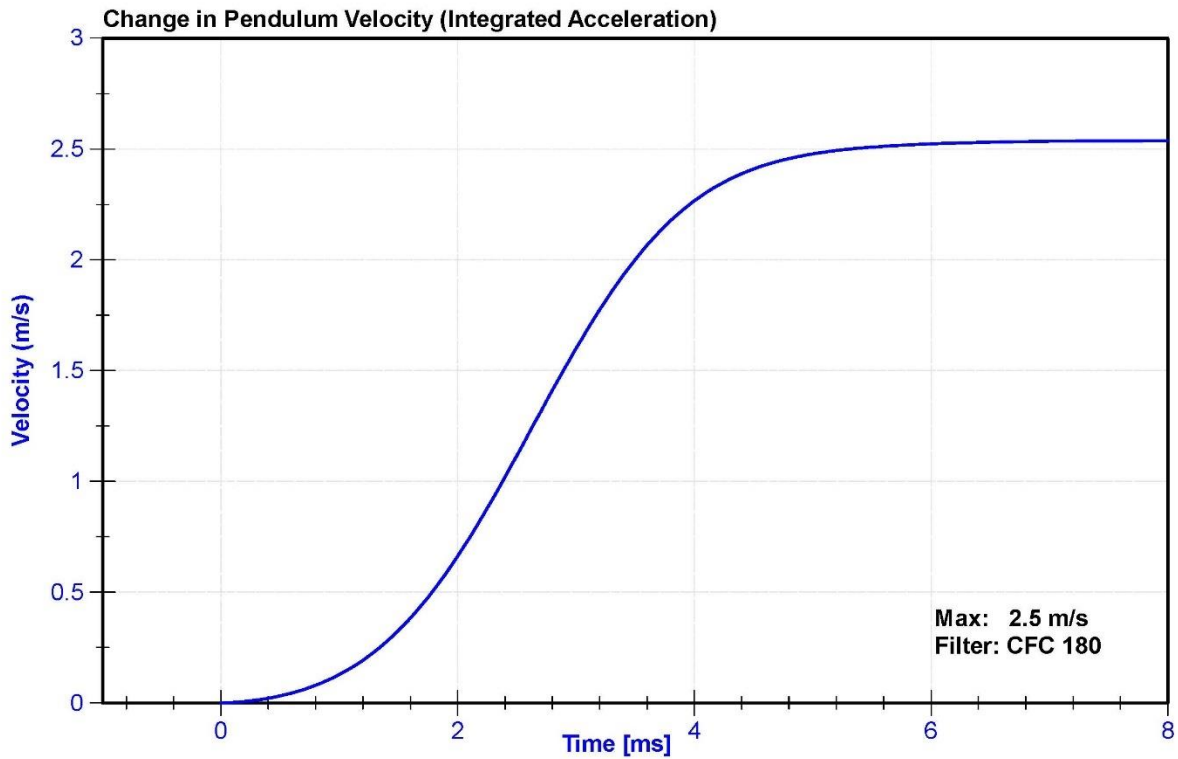
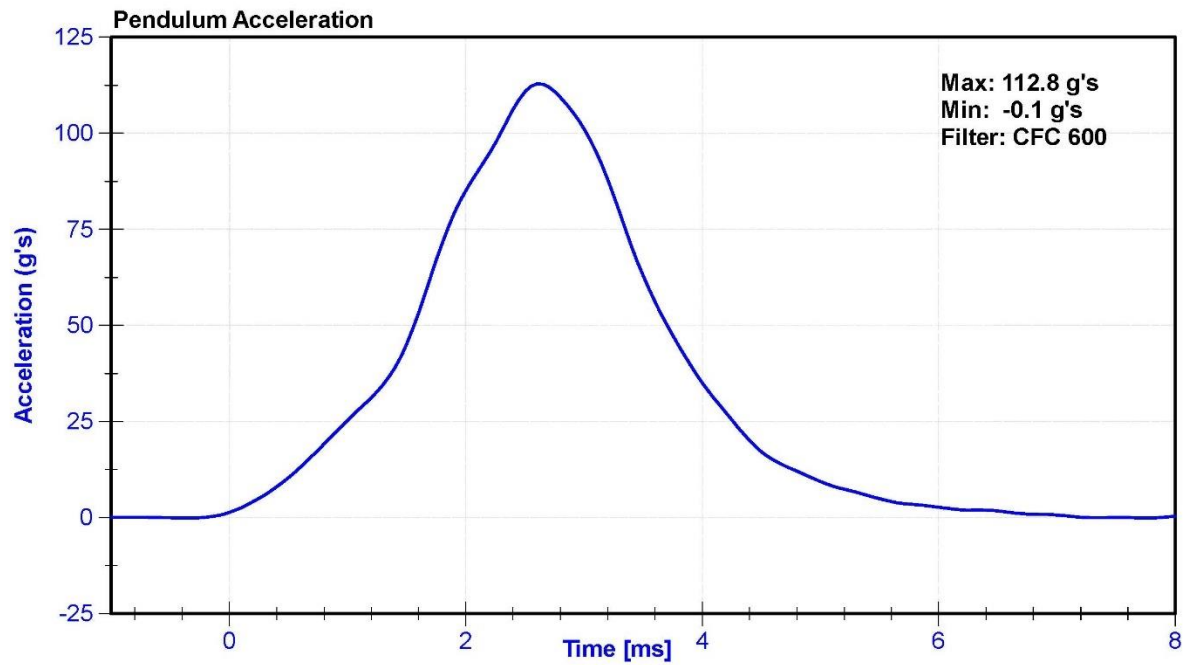
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.9	Pass
Humidity	10	70	%	24.3	Pass
Velocity	2.07	2.13	m/s	2.086	Pass
Maximum Resistive Force	4720	5780	N	5459.2	Pass

Transducer Calibrations

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





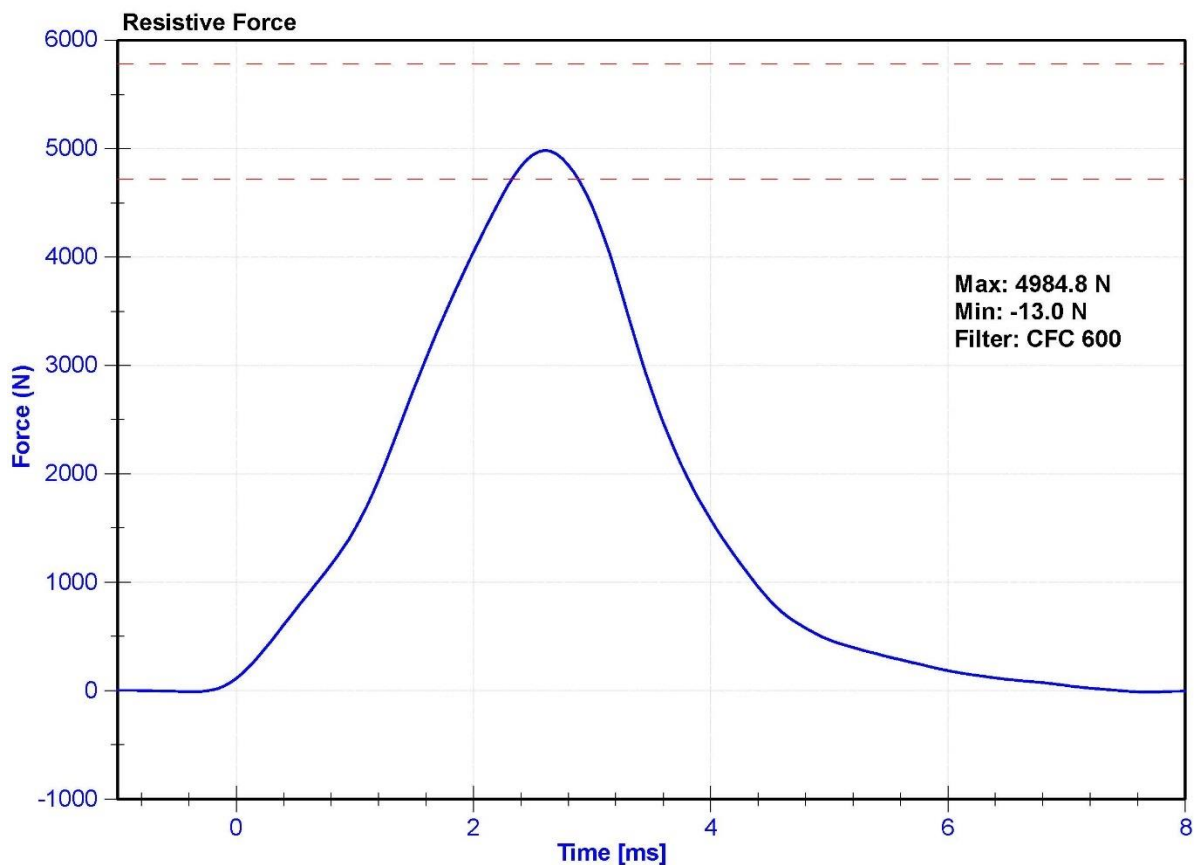
ATD Manufacturer	Humanetics	Test Technician	T. Roseman
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

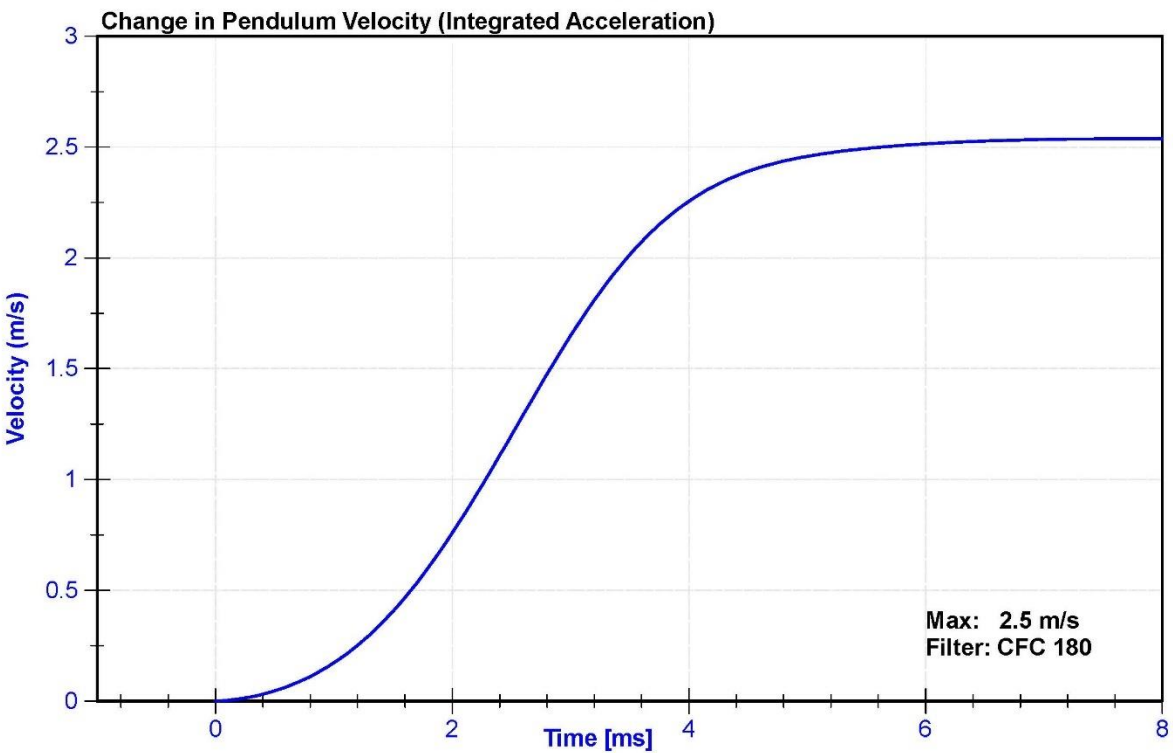
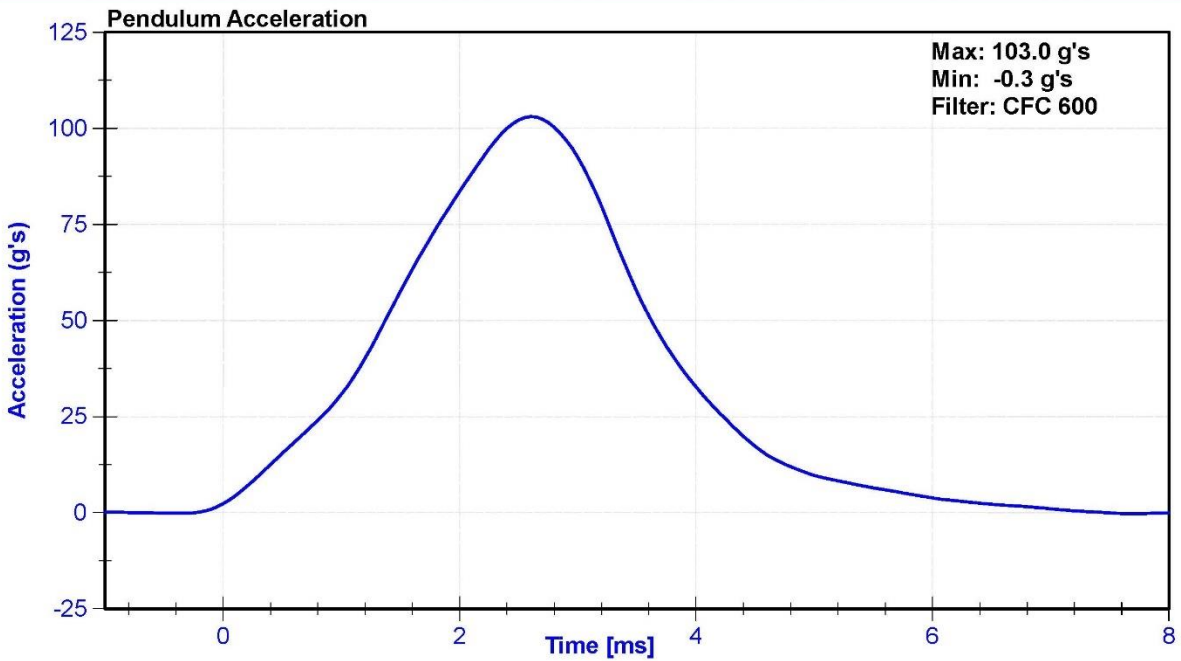
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.9	Pass
Humidity	10	70	%	24.3	Pass
Velocity	2.07	2.13	m/s	2.108	Pass
Maximum Resistive Force	4720	5780	N	4984.8	Pass

Transducer Calibrations

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





CALIBRATION TEST RESULTS

PRE-TEST

HYBRID III 5TH PERCENTILE - PASSENGER ATD

SERIAL NO: 137

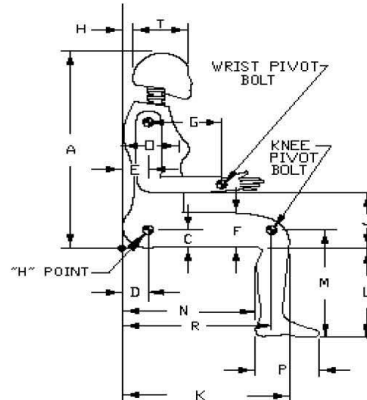
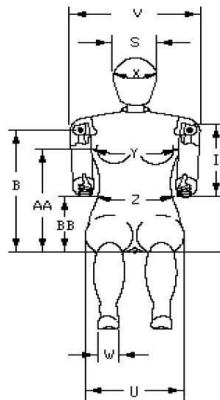


External Measurements - Hybrid 3 - 5th Female

Technician: K. Brogan

Date: 02/23/2023

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	146	Pass
E	Shoulder Pivot from Backline	69	84	75	Pass
F	Thigh Clearance	119	135	130	Pass
G	Back of Elbow to Wrist Pivot	244	259	251	Pass
H	Head Back to Backline	43	48	45	Pass
I	Shoulder to Elbow Length	277	297	287	Pass
J	Elbow Rest Height	183	203	195	Pass
K	Buttock to Knee Length	521	546	535	Pass
L	Popliteal Height	356	376	368	Pass
M	Knee Pivot Height	394	419	407	Pass
N	Buttock Popliteal Length	414	439	427	Pass
O	Chest Depth without Jacket	175	191	182	Pass
P	Foot Length (right)	219	234	231	Pass
R	Buttock To Knee Pivot Length	457	483	465	Pass
S	Head Breadth	137	147	143	Pass
T	Head Depth	178	188	180	Pass
U	Hip Breadth	300	315	311	Pass
V	Shoulder Breadth	351	366	360	Pass
W	Foot Breadth	79	94	85	Pass
X	Head Circumference	528	549	544	Pass
Y	Chest Circumference with Jacket	851	881	872	Pass
Z	Waist Circumference	460	790	655	Pass
AA	Reference Location (Chest Circumference)	333	358	345	Pass
BB	Reference Location (Waist Circumference)	160	170	166	Pass

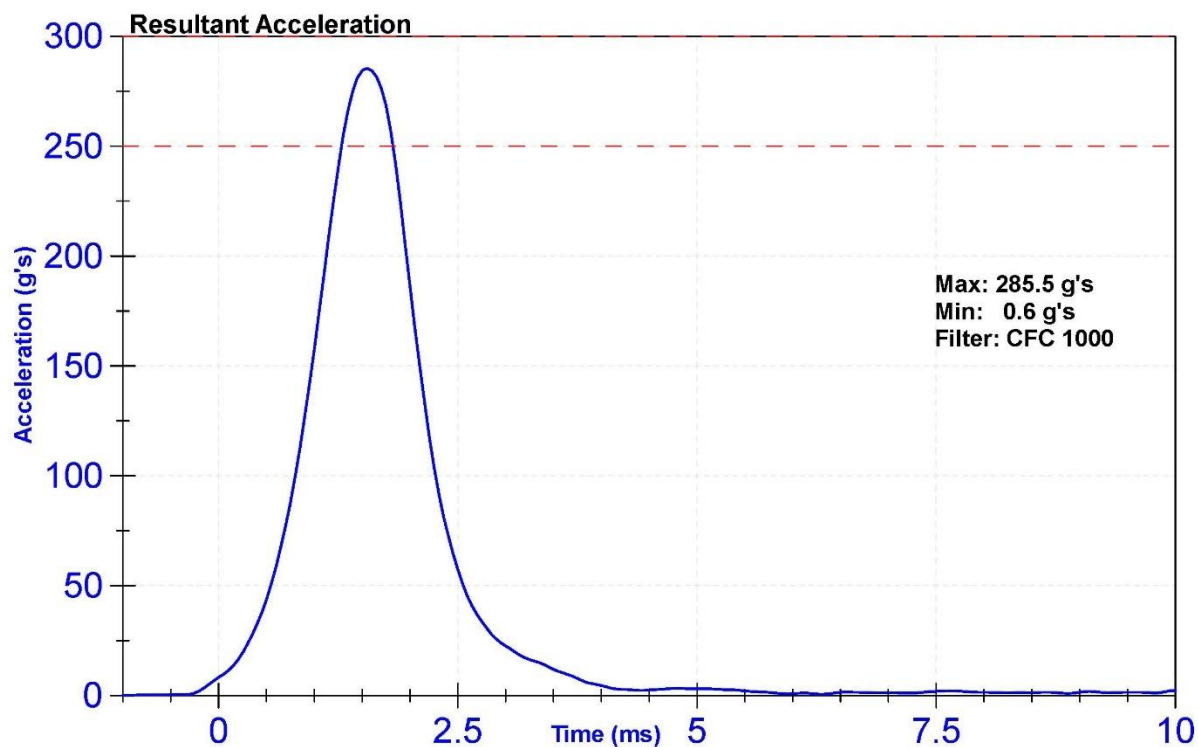
ATD Manufacturer	Humanetics	Test Technician	C. Mantell
ATD Serial Number	137	Laboratory Supervisor	K. Brogan

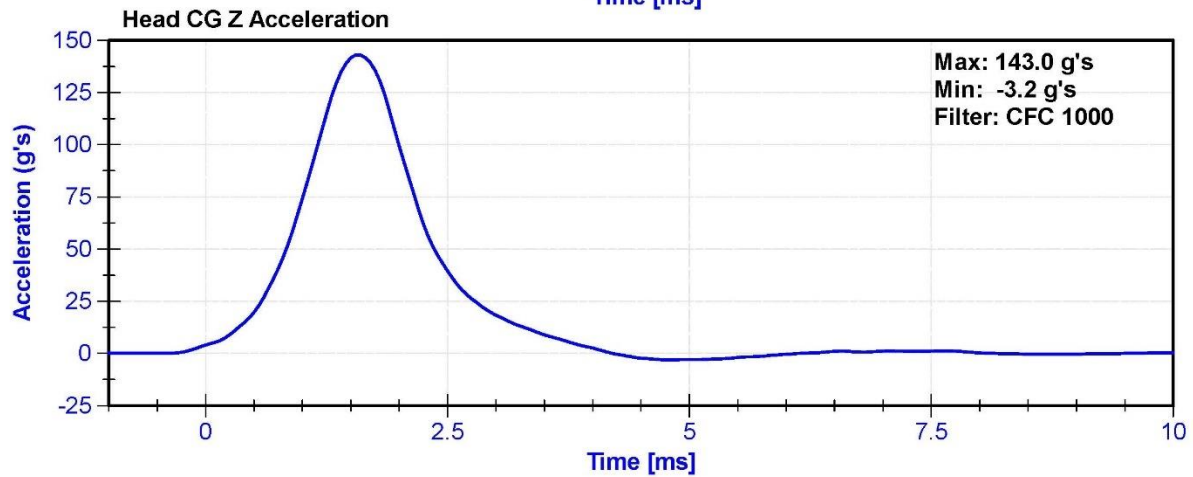
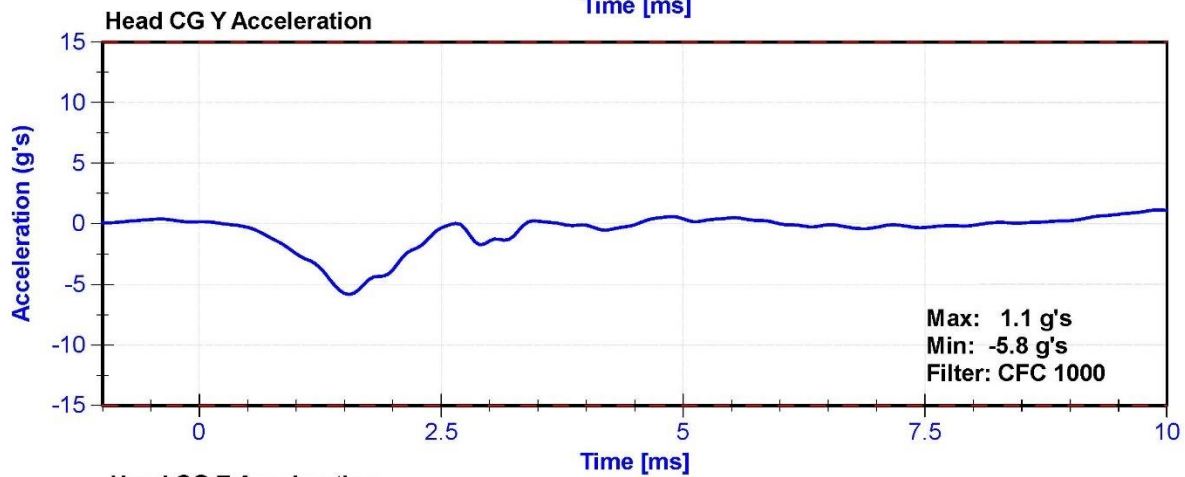
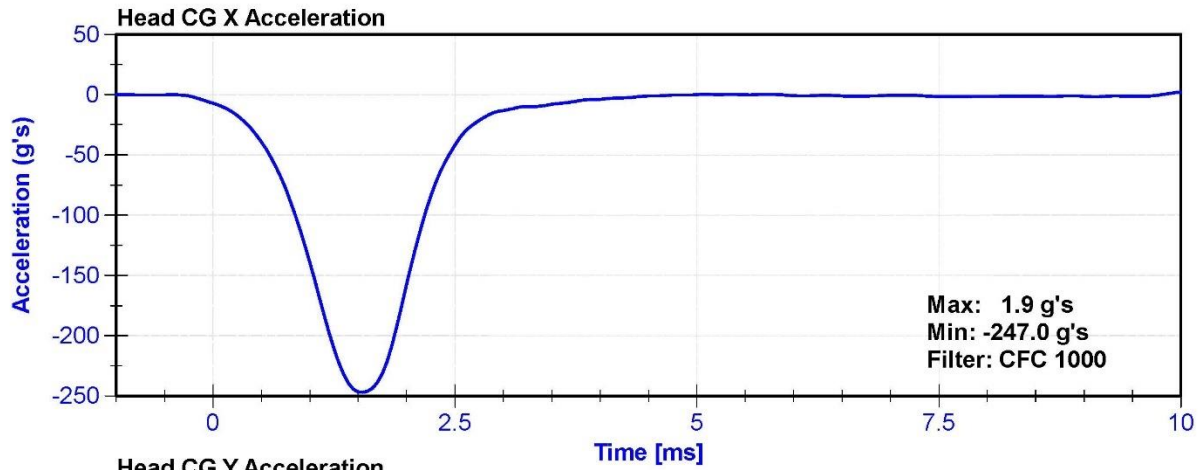
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.0	Pass
Humidity	10	70	%	19.0	Pass
Resultant Acceleration	250	300	g's	285.5	Pass
Oscillation	0	10	%	1.3	Pass
Lateral Acceleration	-15	15	g's	-5.8	Pass

Transducer Calibrations

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





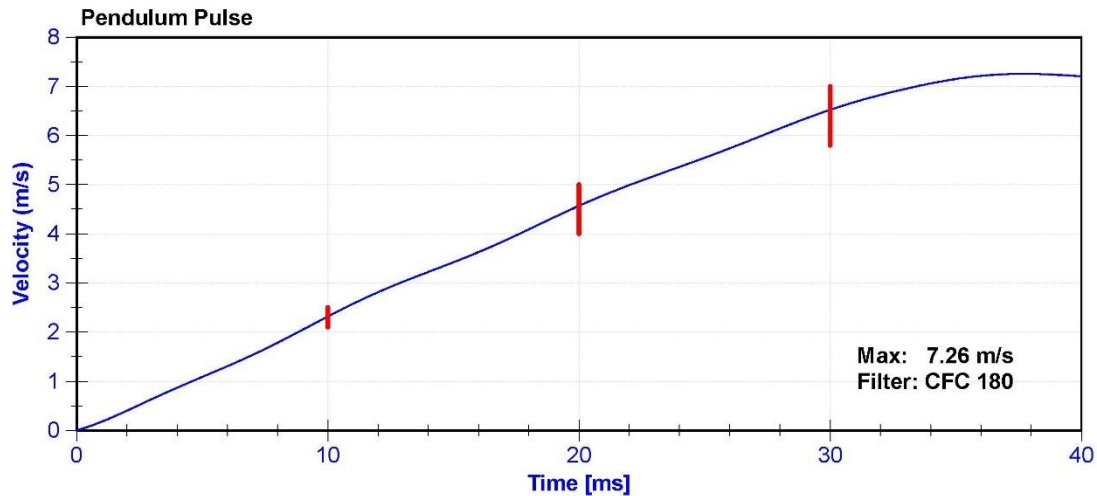
ATD Manufacturer	Humanetics	Test Technician	J. Miller
ATD Serial Number	137	Laboratory Supervisor	K. Brogan

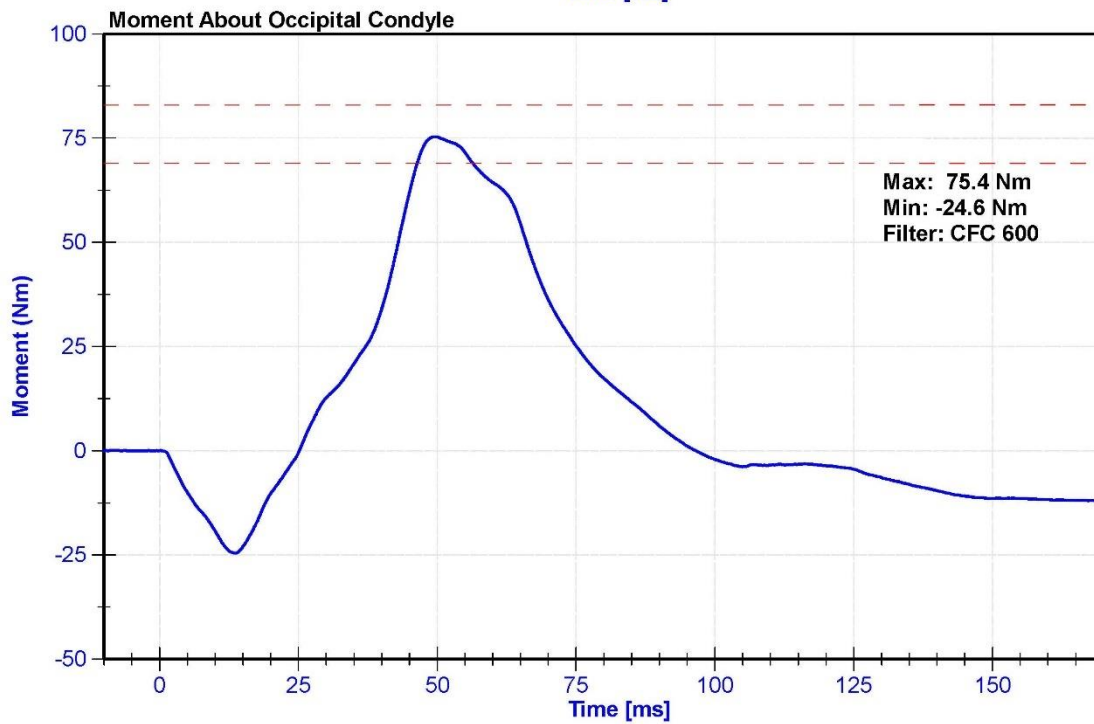
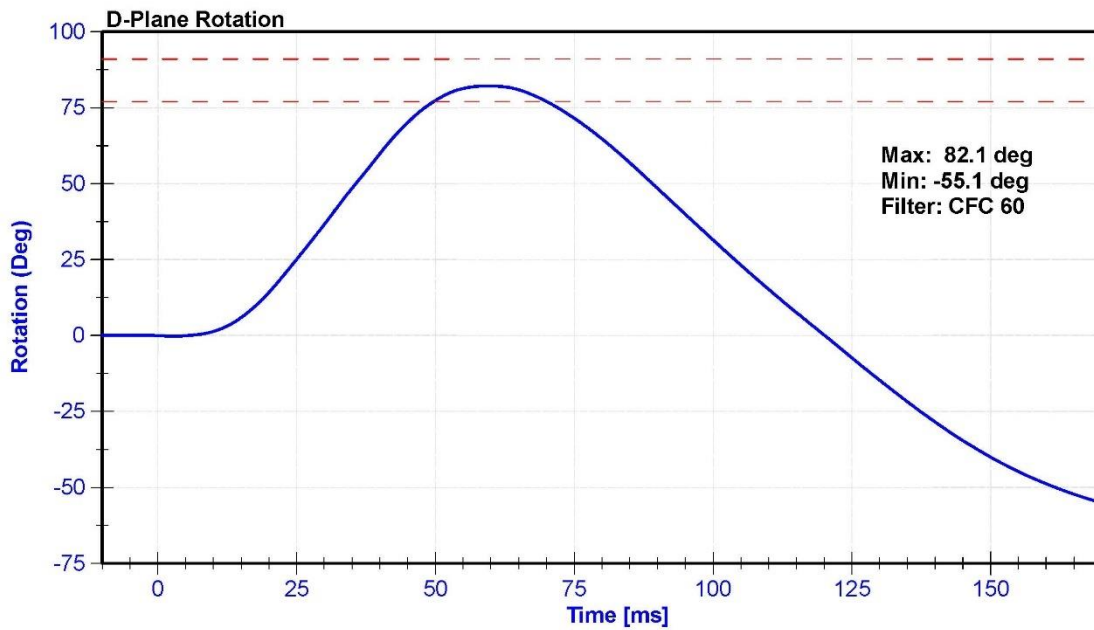
Results

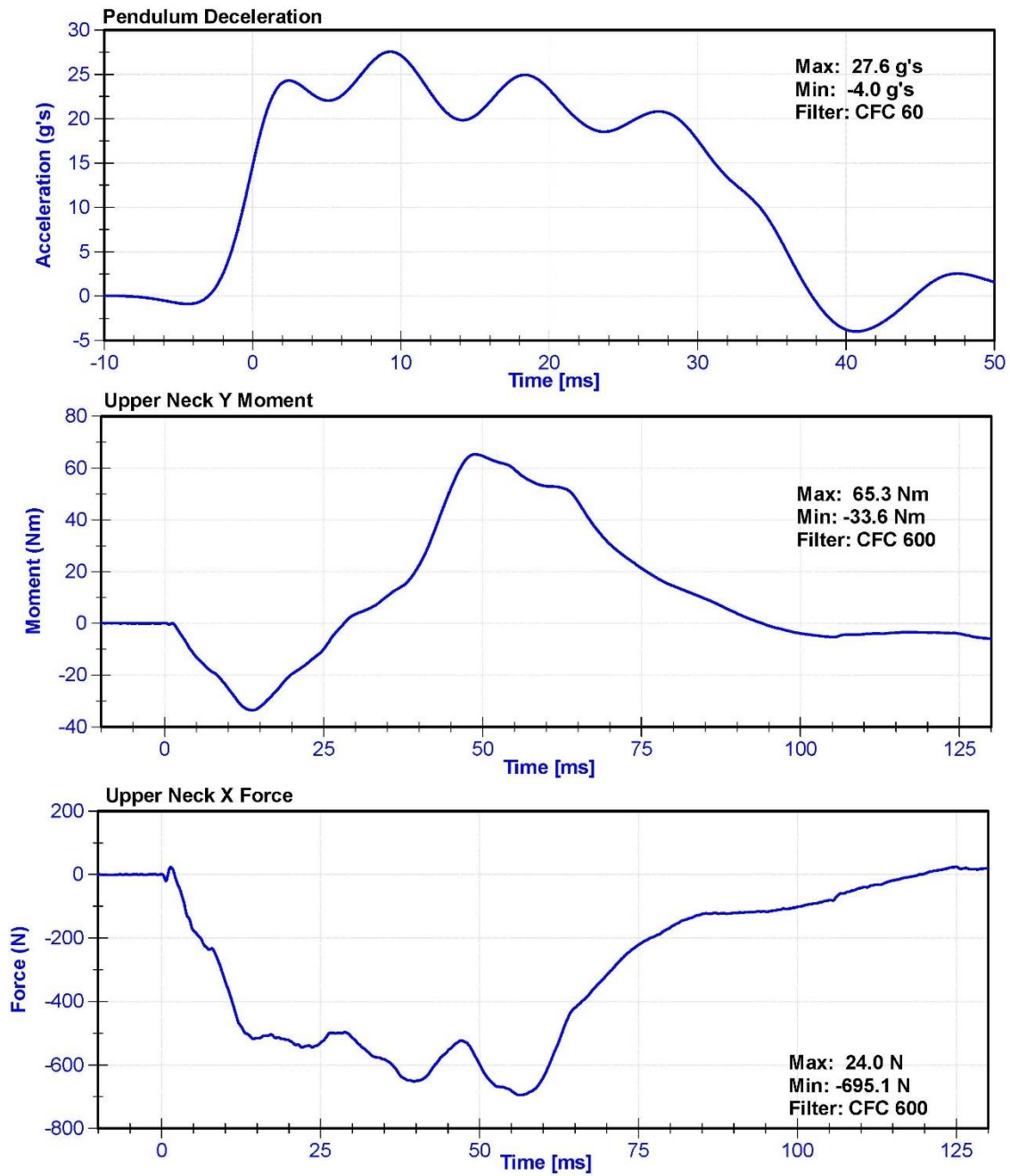
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.2	Pass
Humidity	10	70	%	19	Pass
Velocity	6.89	7.13	m/s	7.029	Pass
Pendulum Impulse at 10ms	2.1	2.5	m/s	2.32	Pass
Pendulum Impulse at 20ms	4.0	5.0	m/s	4.57	Pass
Pendulum Impulse at 30ms	5.8	7.0	m/s	6.52	Pass
Max D Plane Rotation	77	91	deg	82.1	Pass
Max Moment During Rotation Interval	69	83	Nm	75.4	Pass
Moment Decay to 10.0 Nm	80	100	ms	86.6	Pass

Transducer Calibrations

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







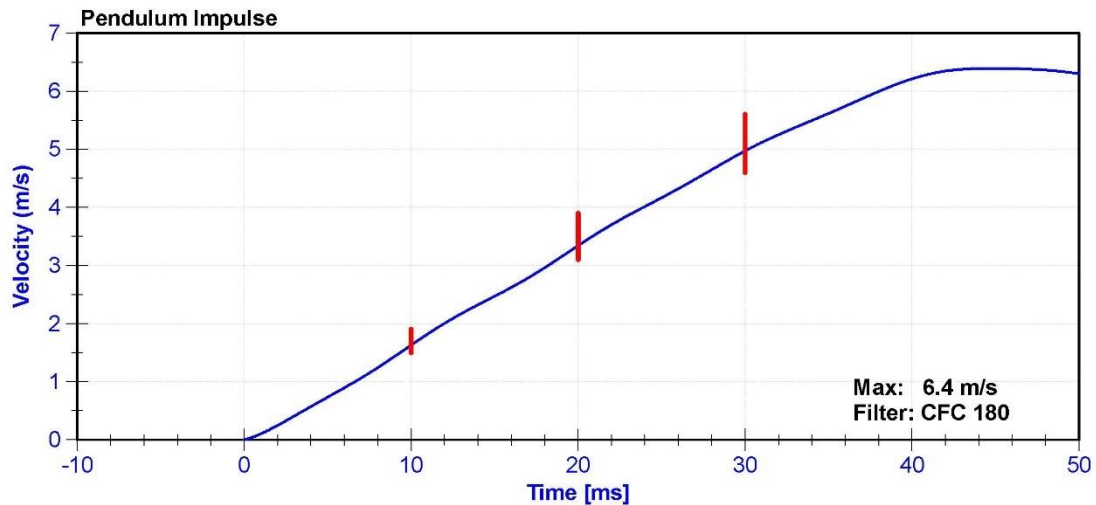
ATD Manufacturer	Humanetics	Test Technician	J. Miller
ATD Serial Number	137	Laboratory Supervisor	K. Brogan

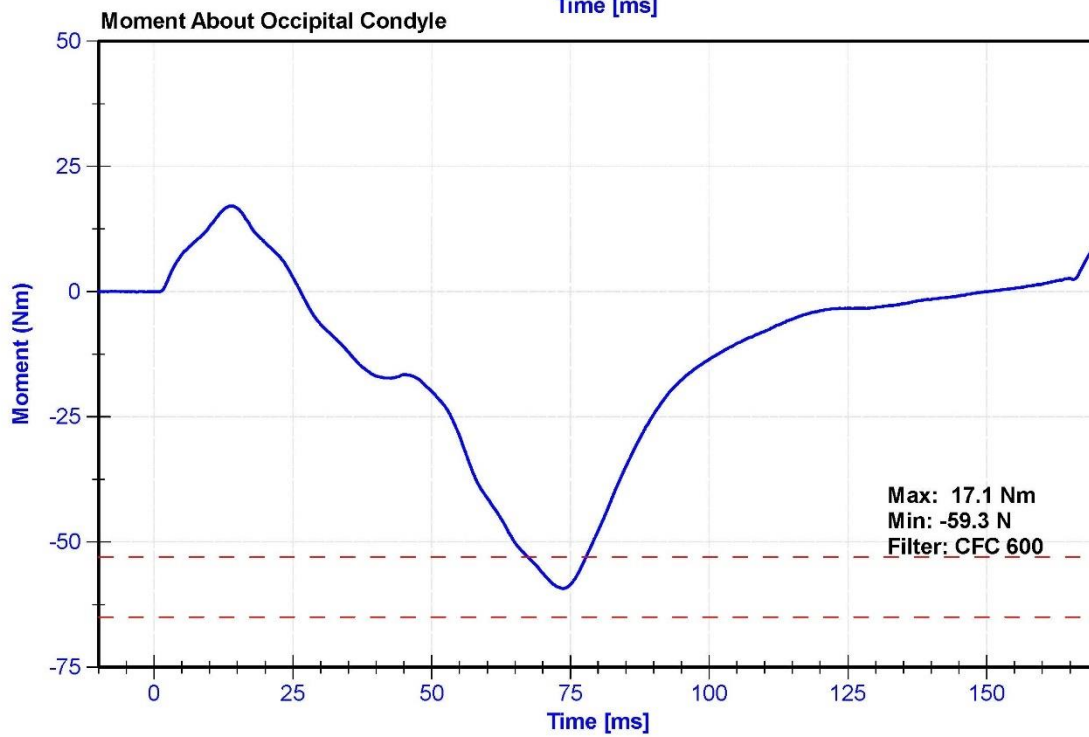
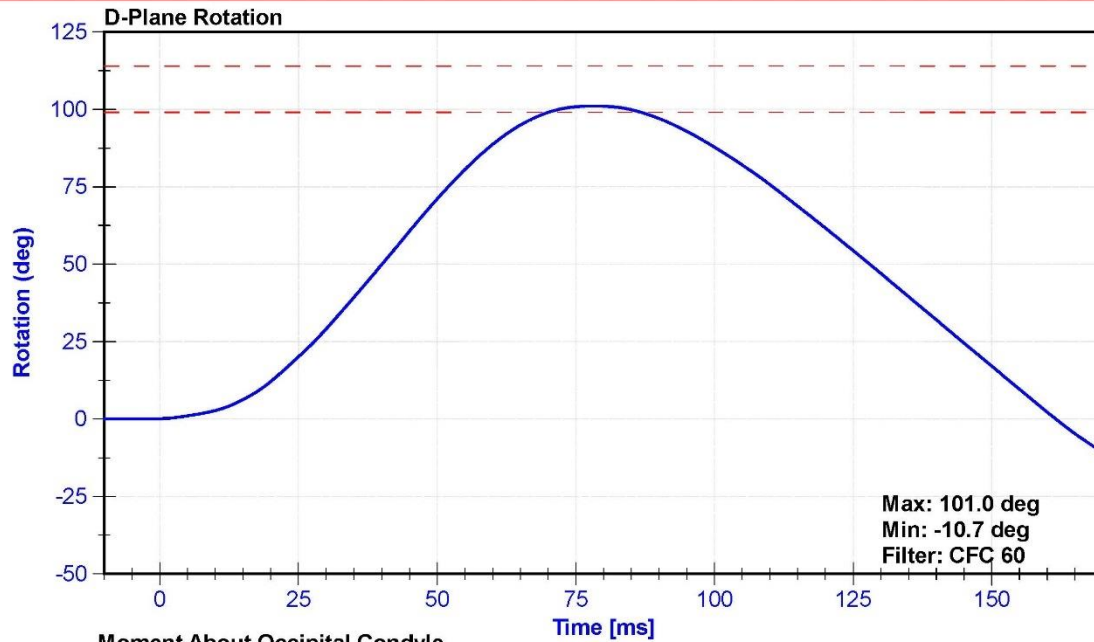
Results

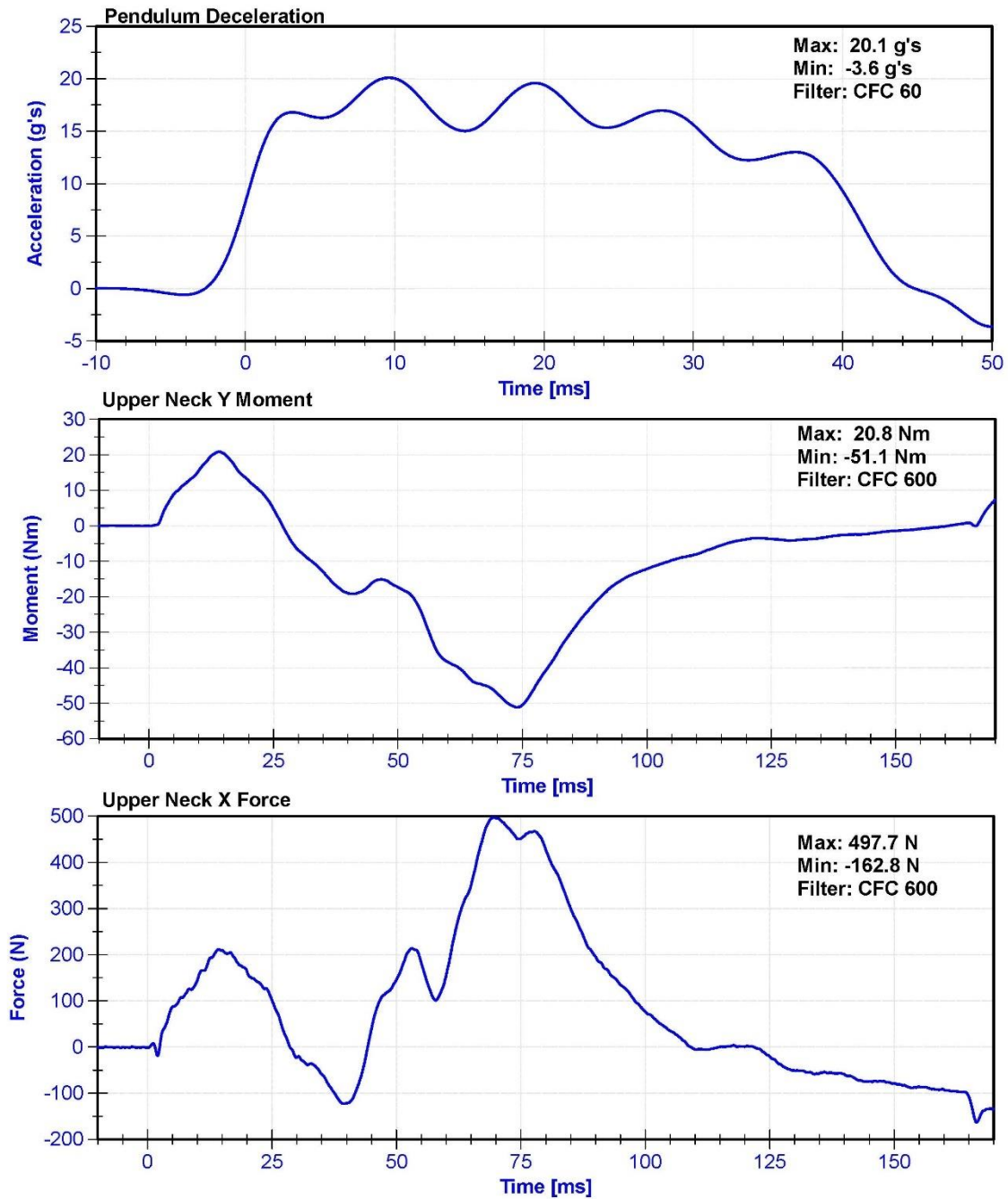
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	20	Pass
Velocity	5.95	6.19	m/s	6.115	Pass
Pendulum Impulse at 10ms	1.5	1.9	m/s	1.63	Pass
Pendulum Impulse at 20ms	3.1	3.9	m/s	3.34	Pass
Pendulum Impulse at 30ms	4.6	5.6	m/s	4.97	Pass
D Plane Rotation	99	114	deg	101.0	Pass
Moment During Rotation Interval	-65	-53	Nm	-59.3	Pass
Moment Decay to -10Nm	94	114	ms	105.8	Pass

Transducer Calibrations

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







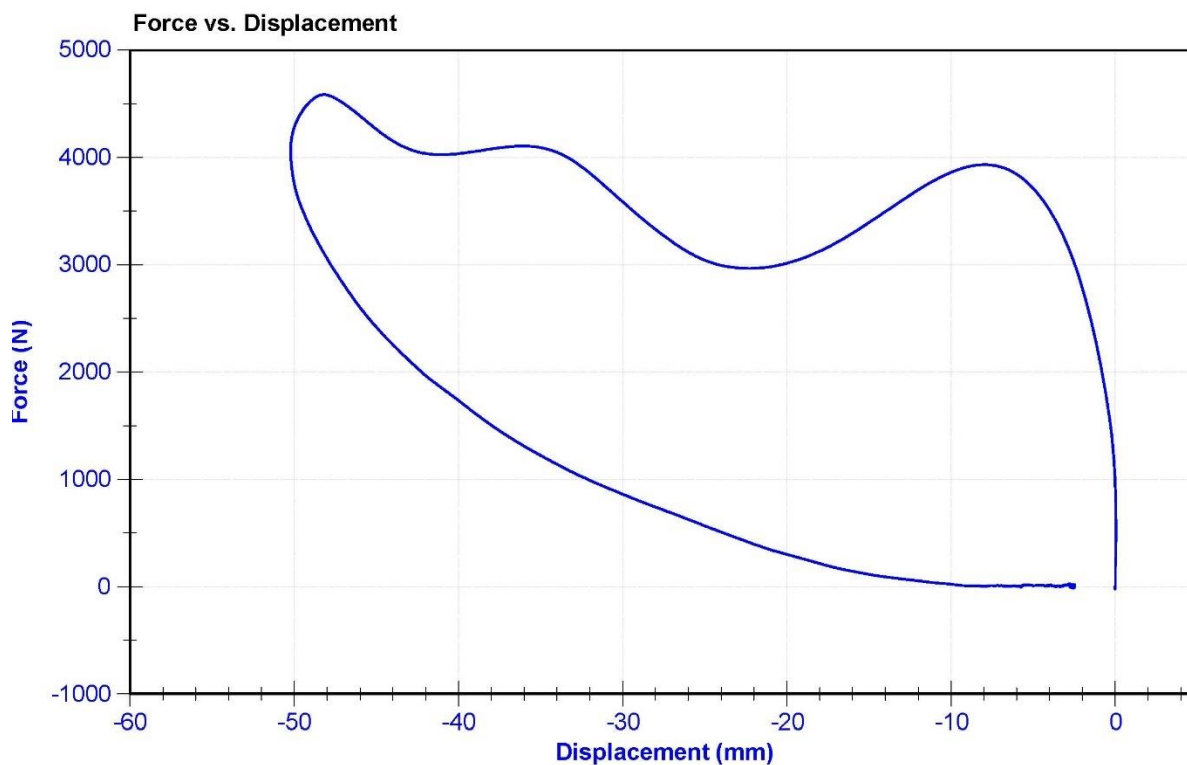
ATD Manufacturer	Humanetics	Test Technician	C. Mantell
ATD Serial Number	137	Laboratory Supervisor	K. Brogan

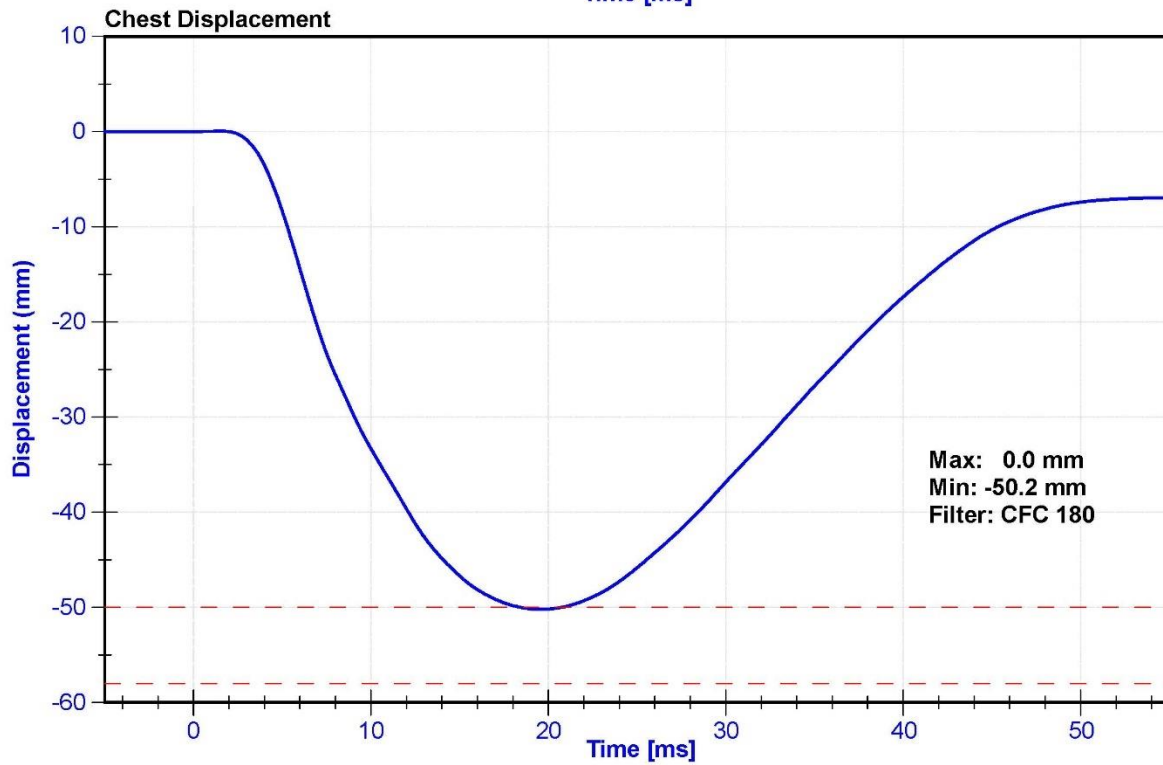
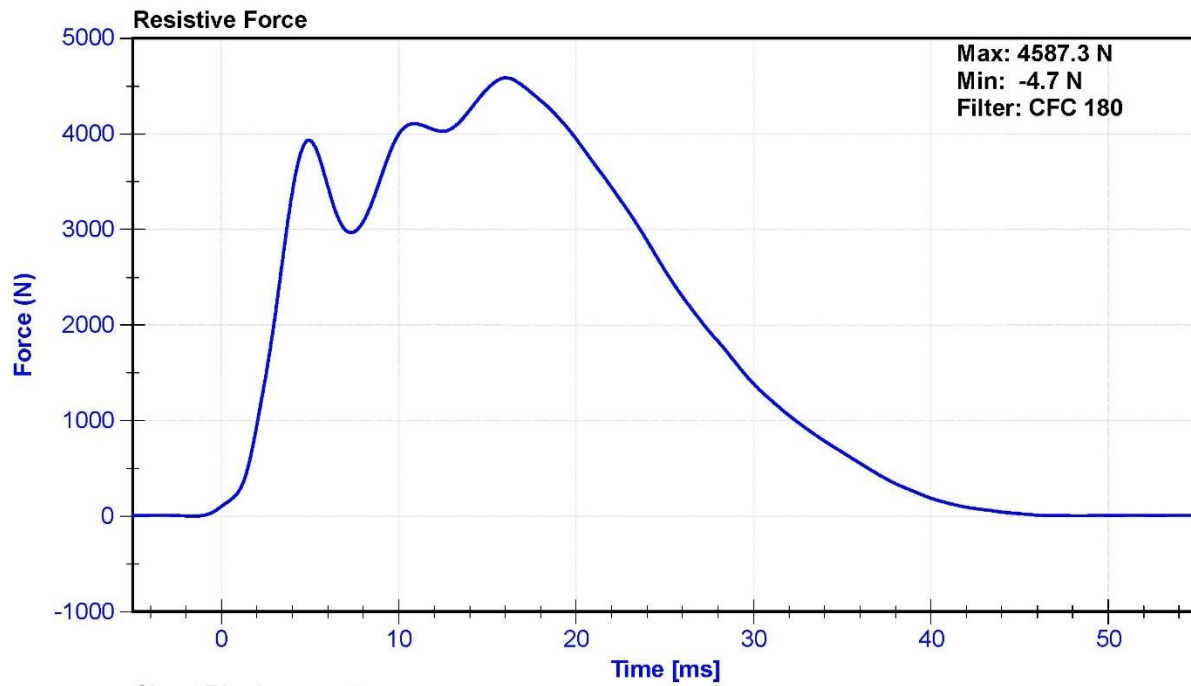
Results

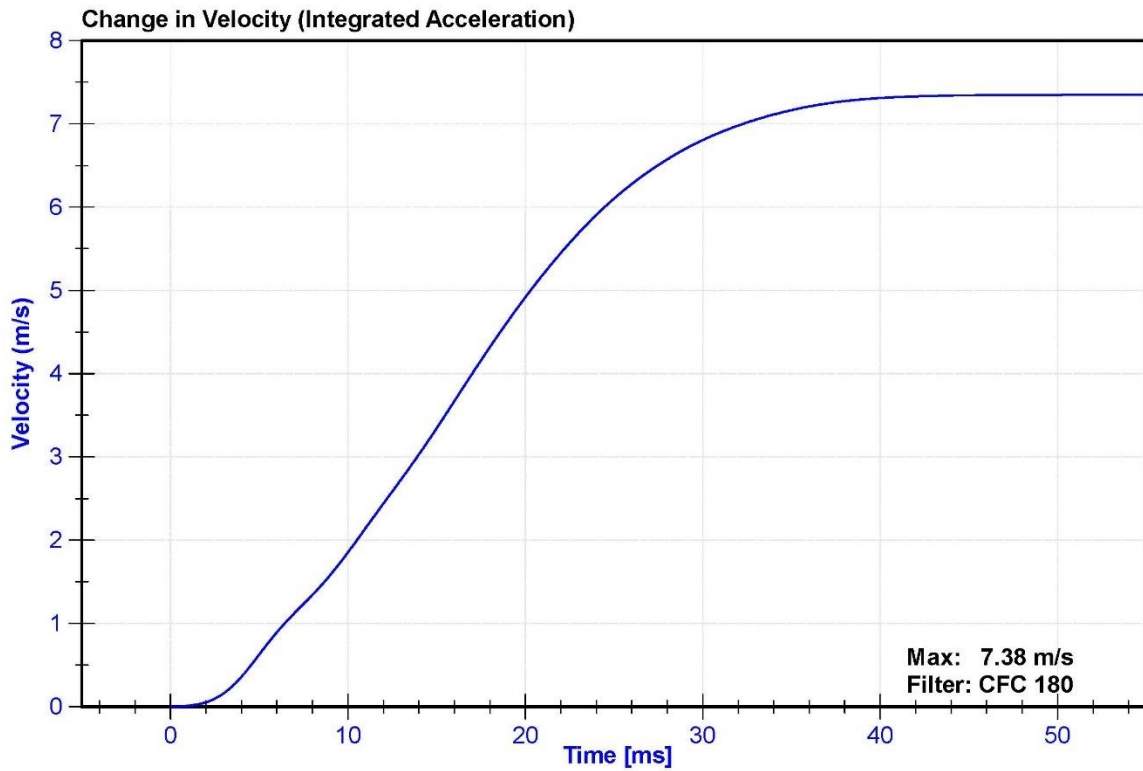
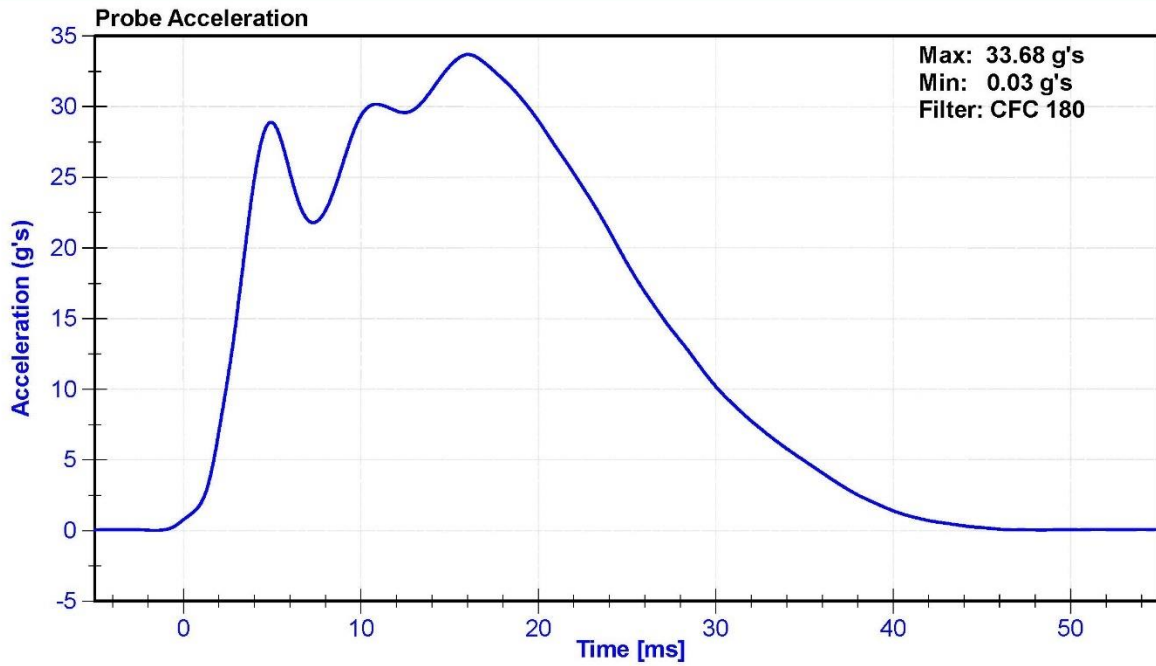
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	22	Pass
Velocity	6.59	6.83	m/s	6.719	Pass
Chest Deflection	-58	-50	mm	-50.2	Pass
Maximum Resistive Force (50 to 58mm)	3900	4400	N	4285.3	Pass
Maximum Resistive Force (18 to 50mm)	0	4600	N	4587.3	Pass
Hysteresis	69	85	%	75.1	Pass

Transducer Calibrations

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







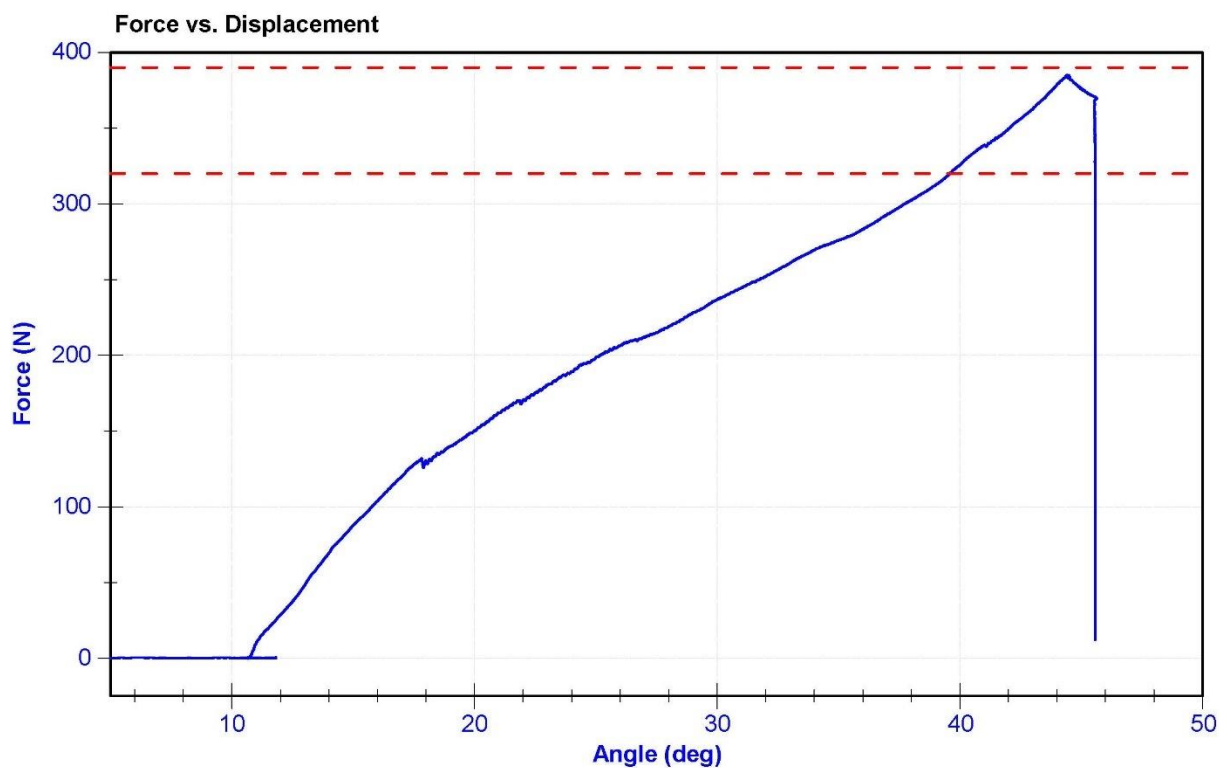
ATD Manufacturer	Humanetics	Test Technician	C. Mantell
ATD Serial Number	137	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.6	25.6	°C	21.1	Pass
Humidity	10	70	%	19.3	Pass
Initial Angle	0	20	deg	10.7	Pass
Force at 45 Degrees	320	390	N	385.1	Pass
Return Angle Relative to Initial	0	8	deg	4.7	Pass

Transducer Calibrations

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



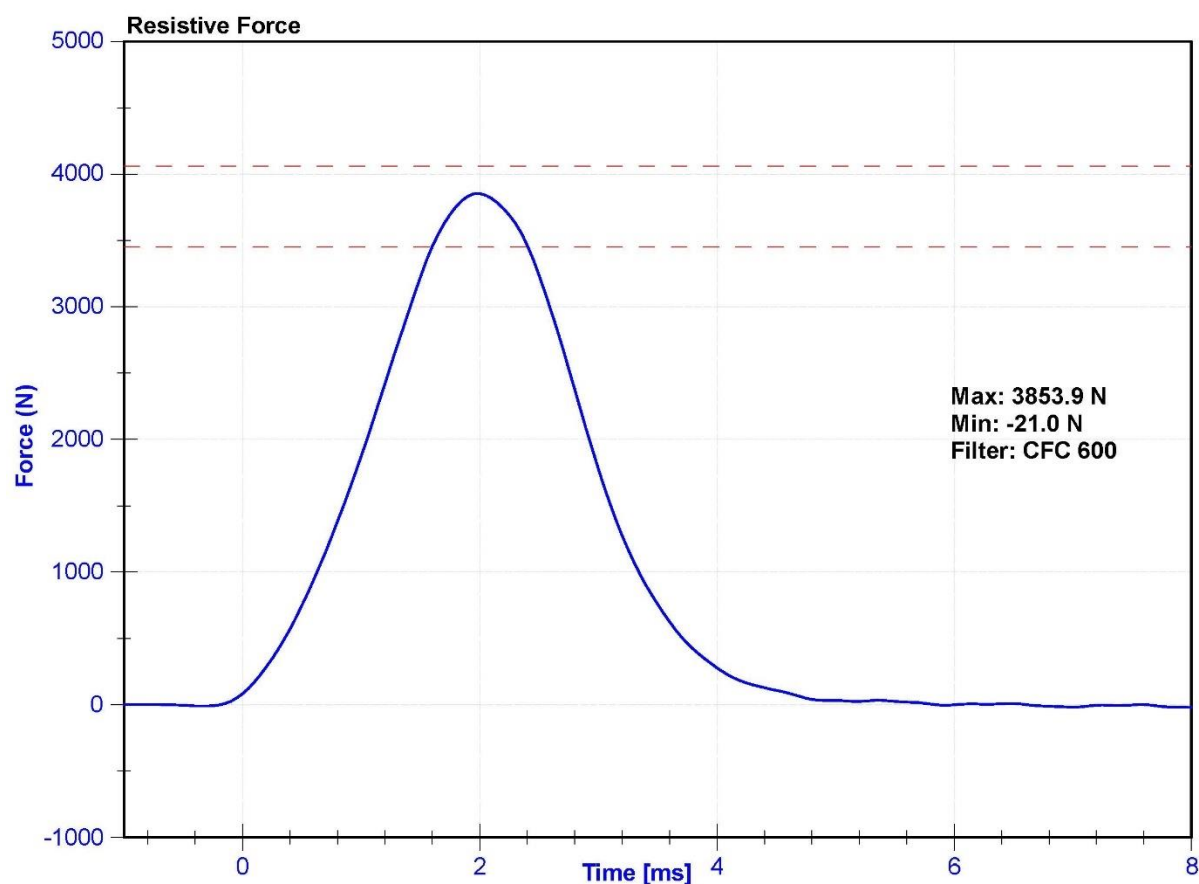
ATD Manufacturer	Humanetics	Test Technician	T. Roseman
ATD Serial Number	137	Laboratory Supervisor	K. Brogan

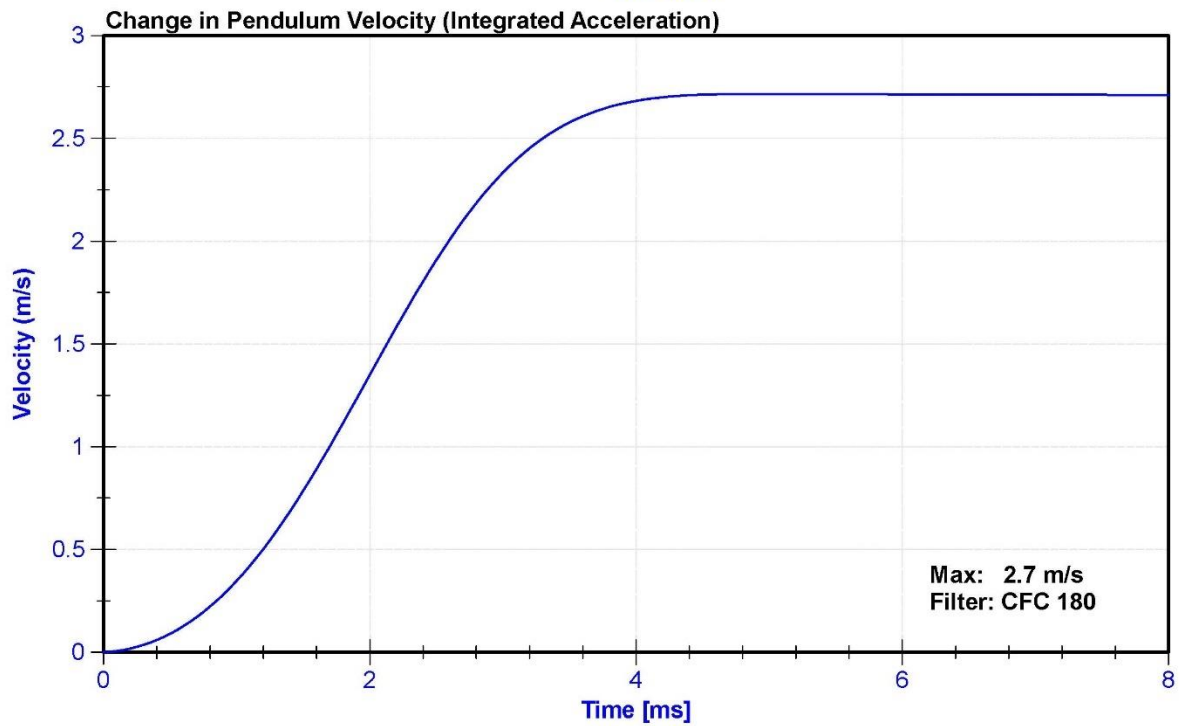
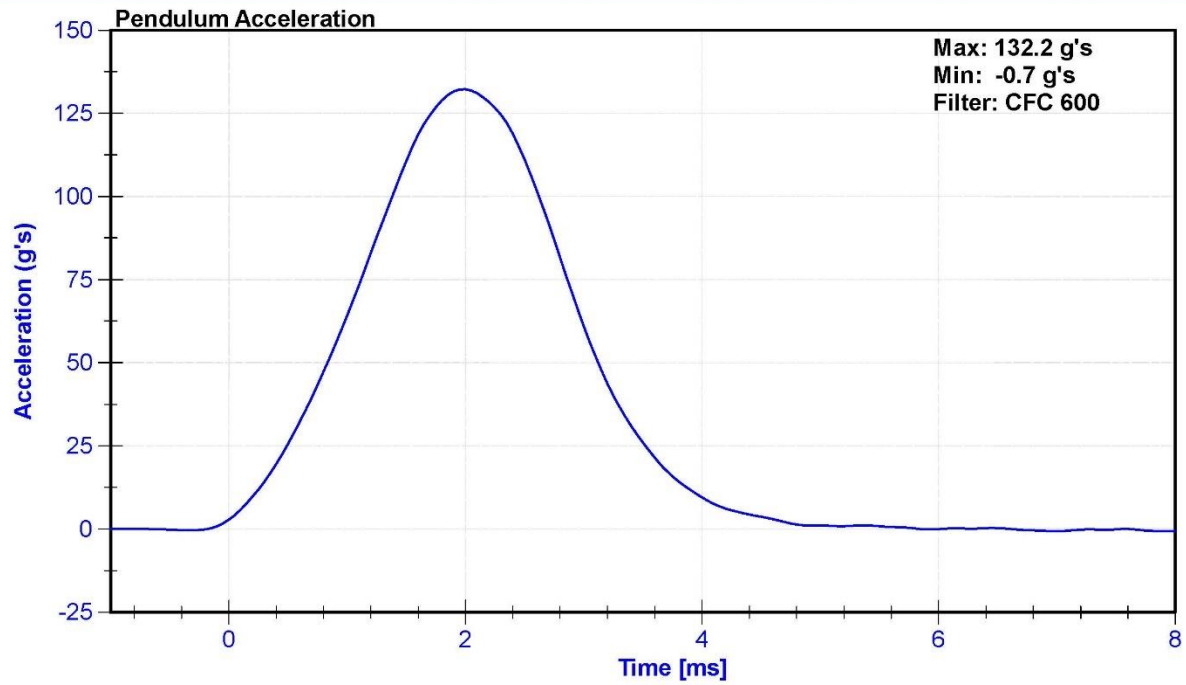
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.9	Pass
Humidity	10	70	%	24.3	Pass
Velocity	2.07	2.13	m/s	2.124	Pass
Resistive Force	3450	4060	N	3853.9	Pass

Transducer Calibrations

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





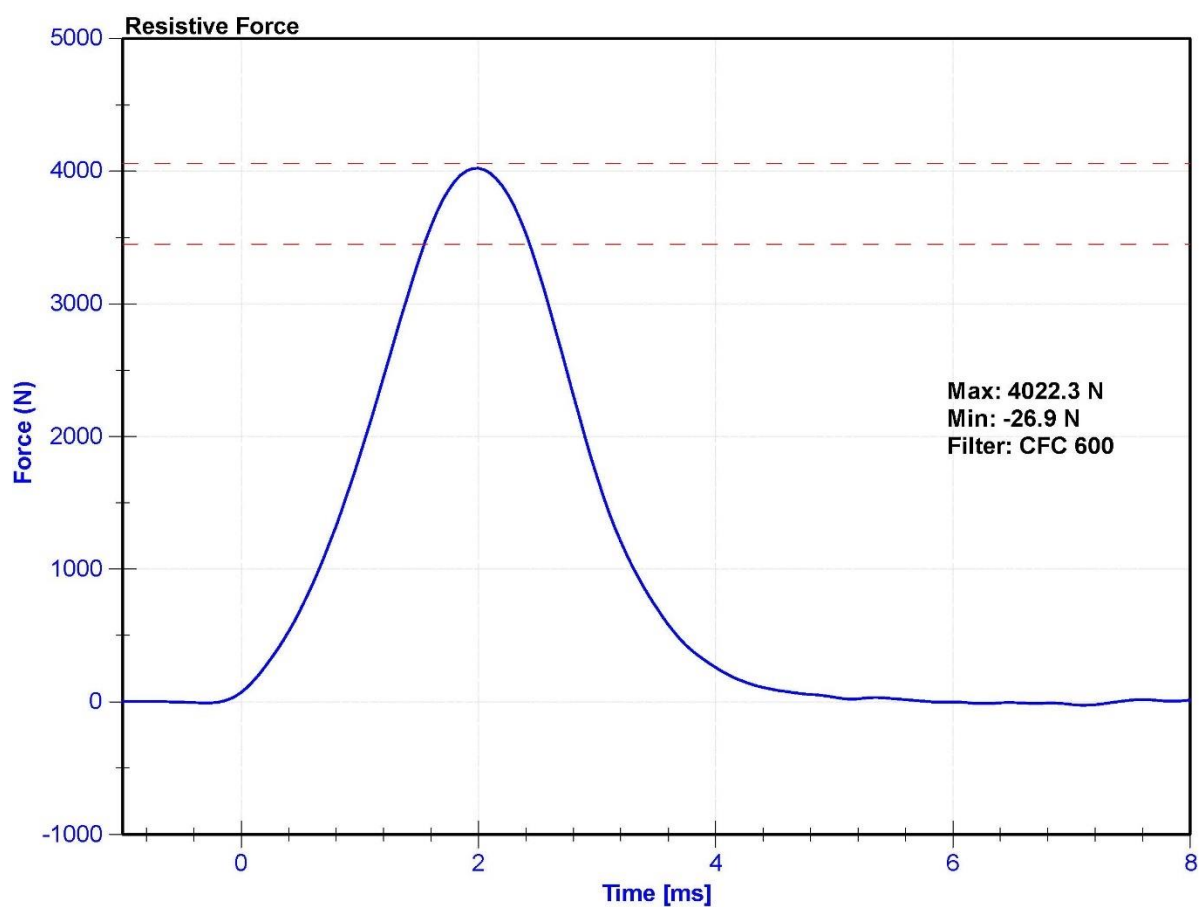
ATD Manufacturer	Humanetics	Test Technician	T. Roseman
ATD Serial Number	137	Laboratory Supervisor	K. Brogan

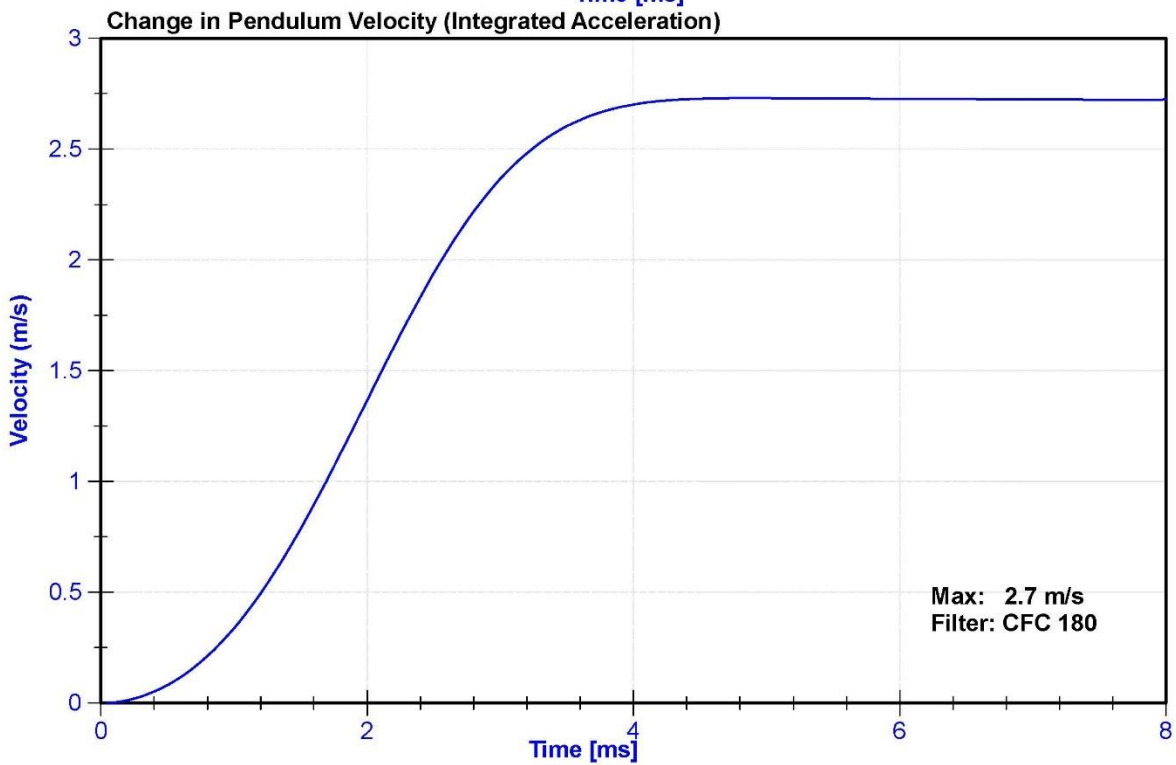
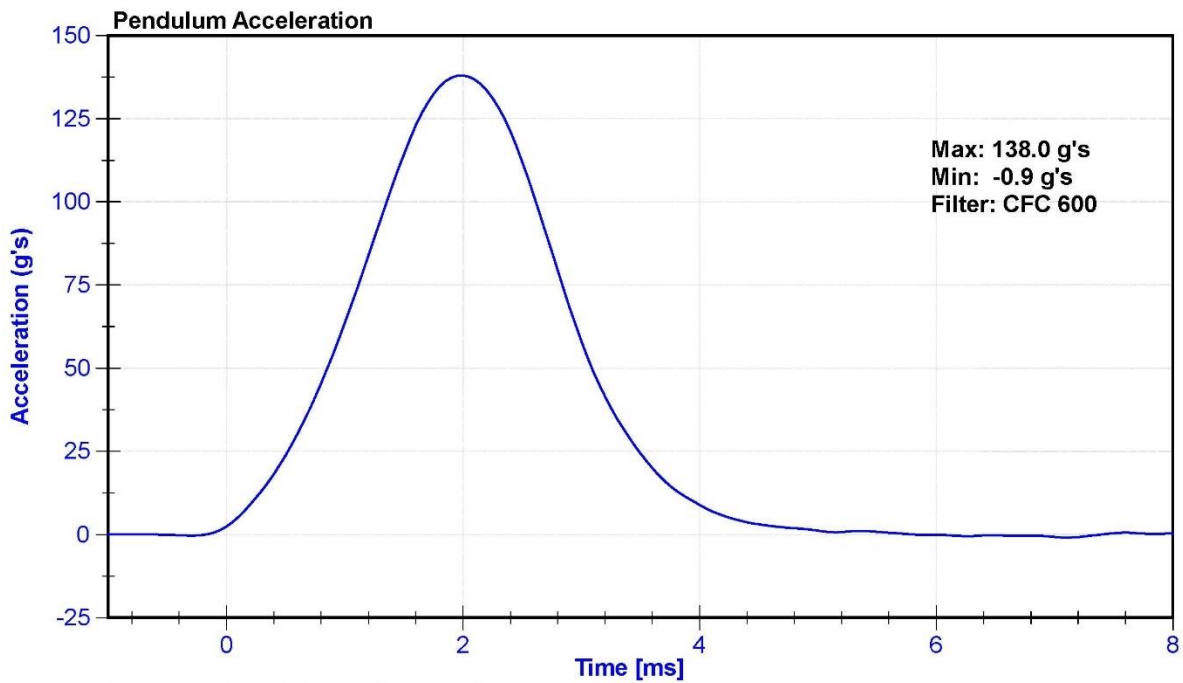
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.9	Pass
Humidity	10	70	%	24.3	Pass
Velocity	2.07	2.13	m/s	2.130	Pass
Resistive Force	3450	4060	N	4022.3	Pass

Transducer Calibrations

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





CALIBRATION TEST RESULTS

POST-TEST

HYBRID III 50TH PERCENTILE MALE - DRIVER ATD

SERIAL NO: 142

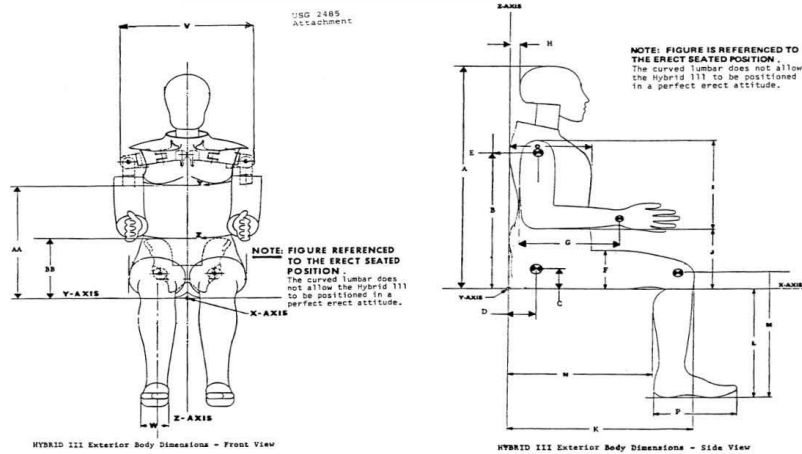


External Measurements - Hybrid 3 - 50th Male

Technician: K. Brogan

Date: 04/19/2023

Dummy Serial Number: 142



Symbol	Description	Specification (in)		Result (in)	Pass/Fail
A	Sitting Height	34.6	35.0	34.8	Pass
B	Shoulder Pivot Height	19.9	20.5	20.2	Pass
C	H-Point Height	3.3	3.5	3.3	Pass
D	H-Point from Backline	5.3	5.5	5.4	Pass
E	Shoulder Pivot from Backline	3.3	3.7	3.5	Pass
F	Thigh Clearance	5.5	6.1	5.9	Pass
G	Back of Elbow to Wrist Pivot	11.4	12.0	11.6	Pass
H	Head Back to Backline	1.6	1.8	1.7	Pass
I	Shoulder to Elbow Length	13.0	13.6	13.2	Pass
J	Elbow Rest Height	7.5	8.3	7.9	Pass
K	Buttock to Knee Length	22.8	23.8	23.5	Pass
L	Popliteal Height	16.9	17.9	17.3	Pass
M	Knee Pivot Height	19.1	19.7	19.5	Pass
N	Buttock Popliteal Length	17.8	18.8	18.2	Pass
O	Chest Depth without Jacket	8.4	9.0	8.8	Pass
P	Foot Length (right)	9.9	10.5	10.2	Pass
V	Shoulder Breadth	16.3	17.2	16.9	Pass
W	Foot Breadth	3.6	4.2	3.9	Pass
Y	Chest Circumference with Jacket	38.2	39.4	39.0	Pass
Z	Waist Circumference	32.9	34.1	33.4	Pass
AA	Reference Location (Chest Circumference)	16.9	17.1	17.0	Pass
BB	Reference Location (Waist Circumference)	8.9	9.1	9.0	Pass

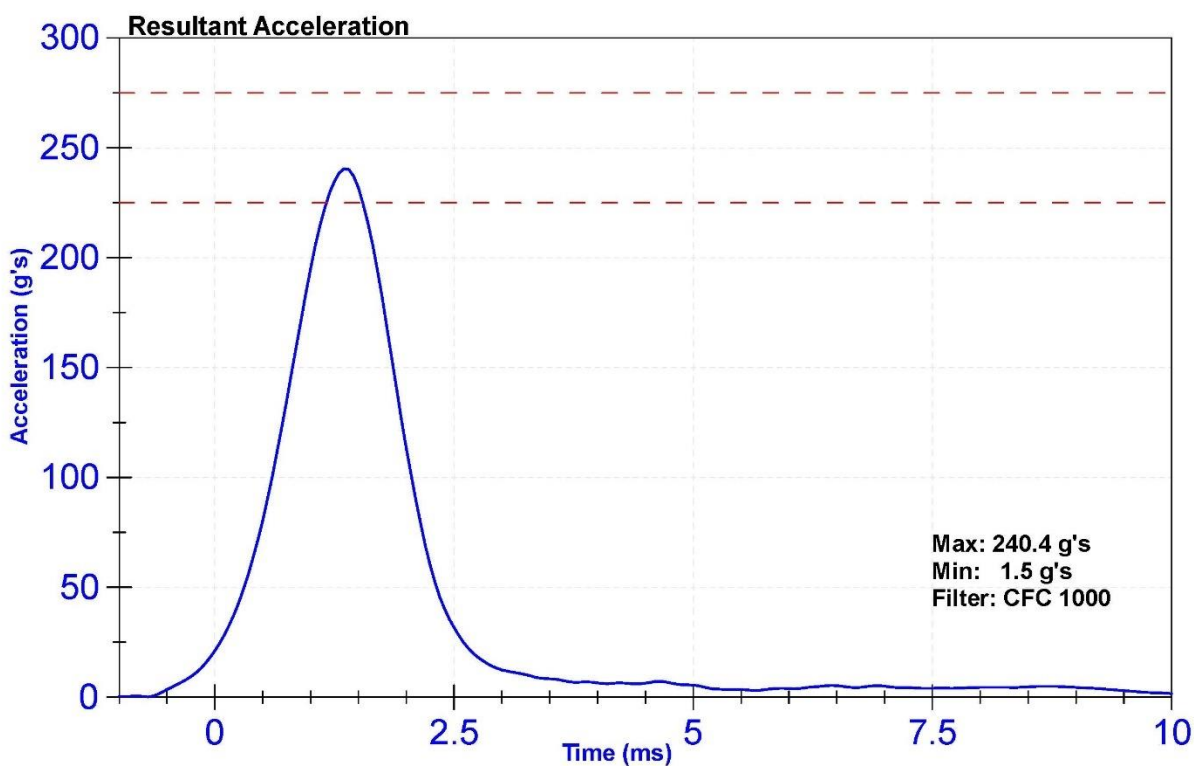
ATD Manufacturer	Humanetics	Test Technician	Z. Schneider
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

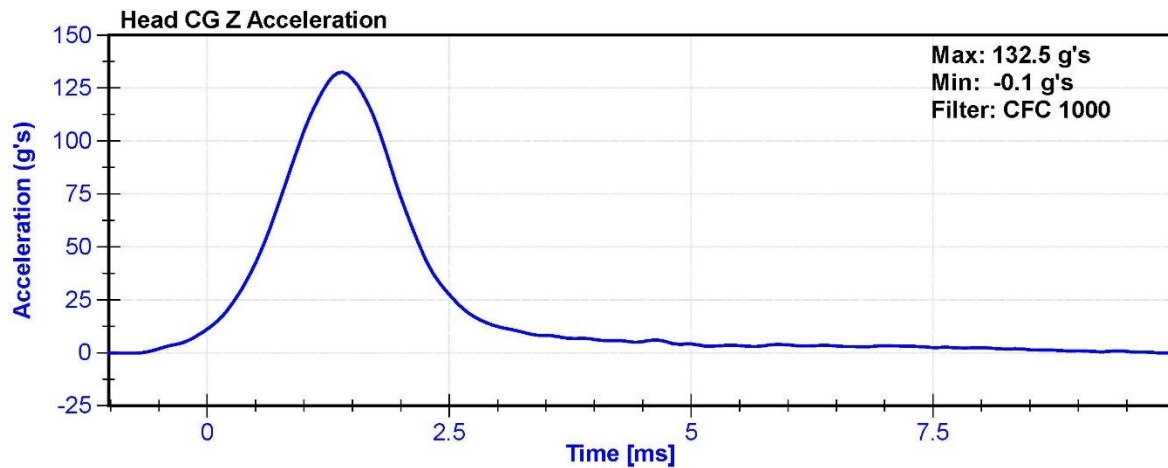
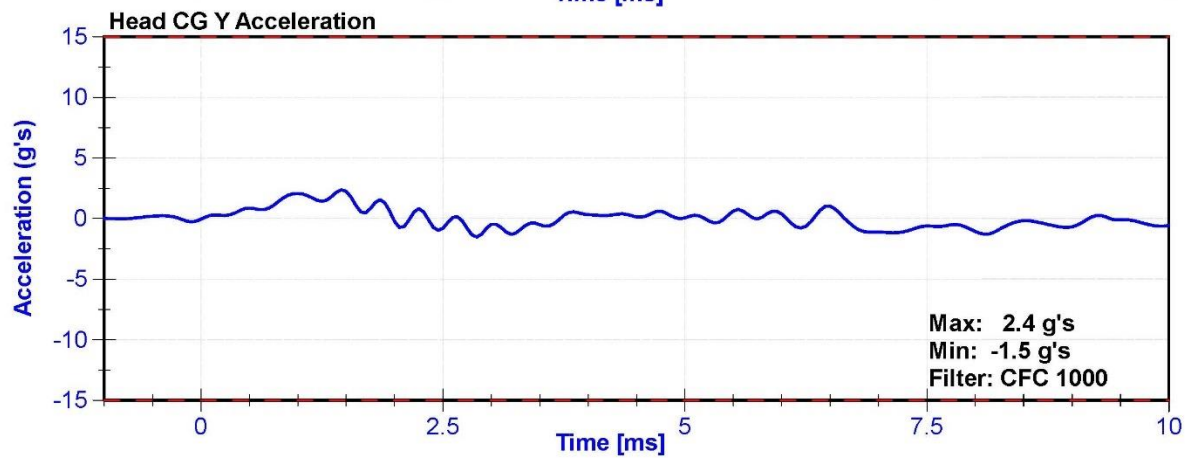
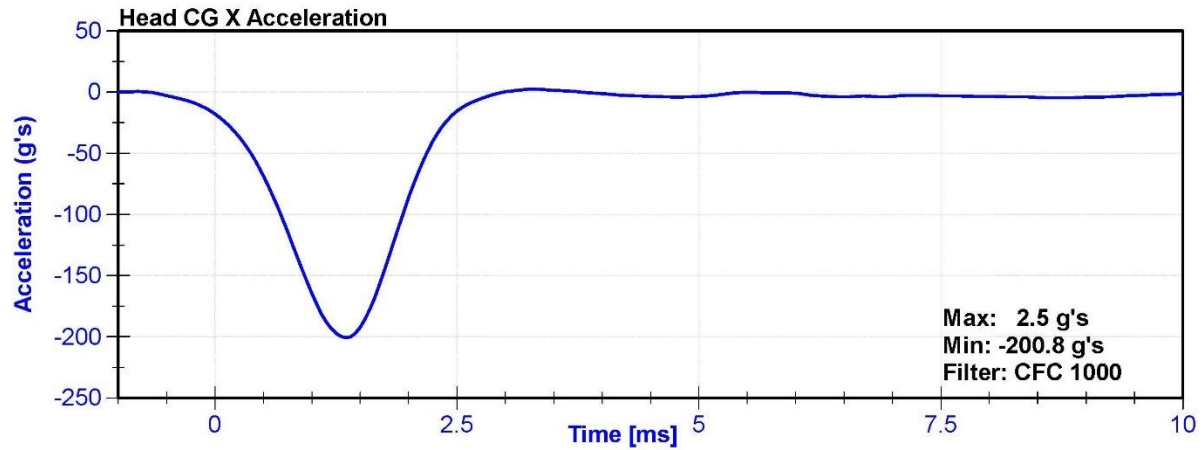
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	22	Pass
Humidity	10	70	%	25	Pass
Resultant Acceleration	225	275	g's	240.4	Pass
Oscillation	0	10	%	2.9	Pass
Lateral Acceleration	-15	15	g's	2.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	P51681	4/6/2023	10/3/2023
Y Accelerometer	Endevco	P64151	4/6/2023	10/3/2023
Z Accelerometer	Endevco	P52114	4/6/2023	10/3/2023





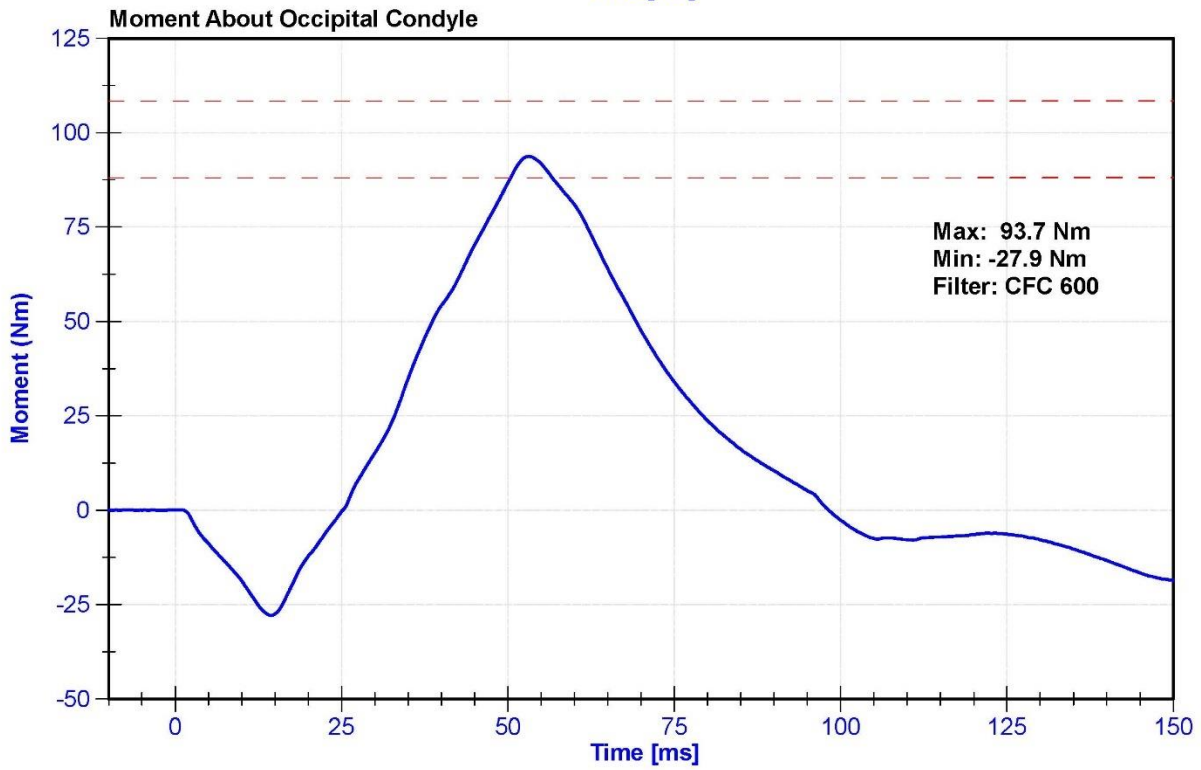
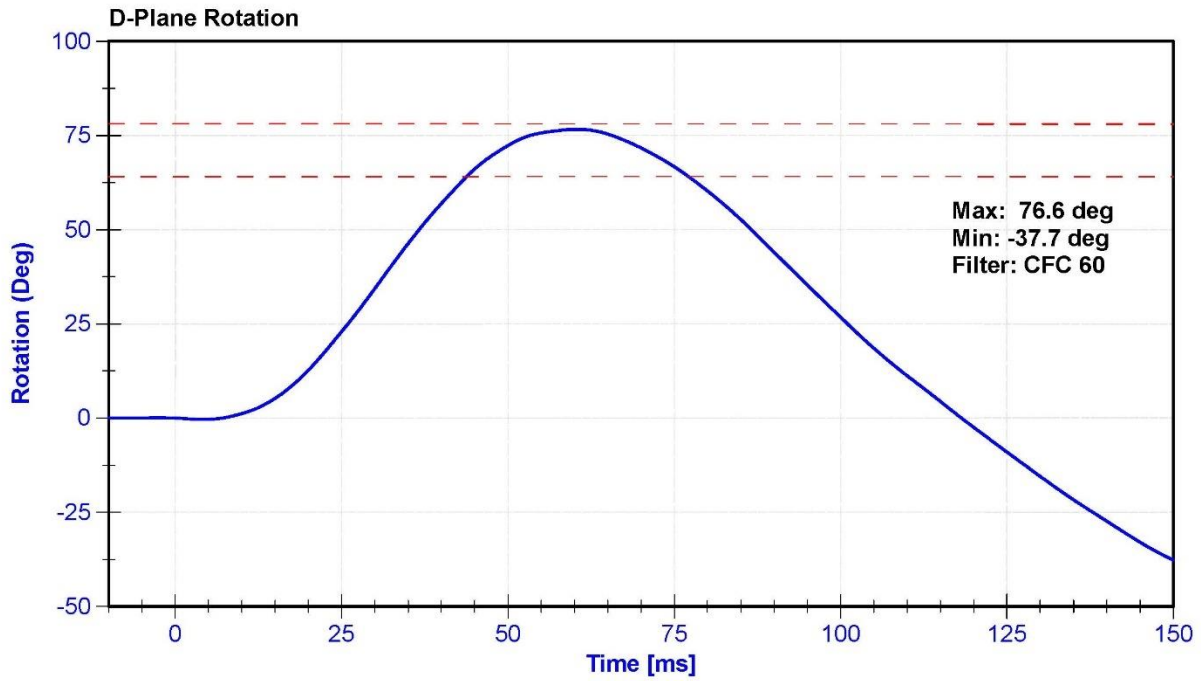
ATD Manufacturer	Humanetics	Test Technician	Z. Schneider
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

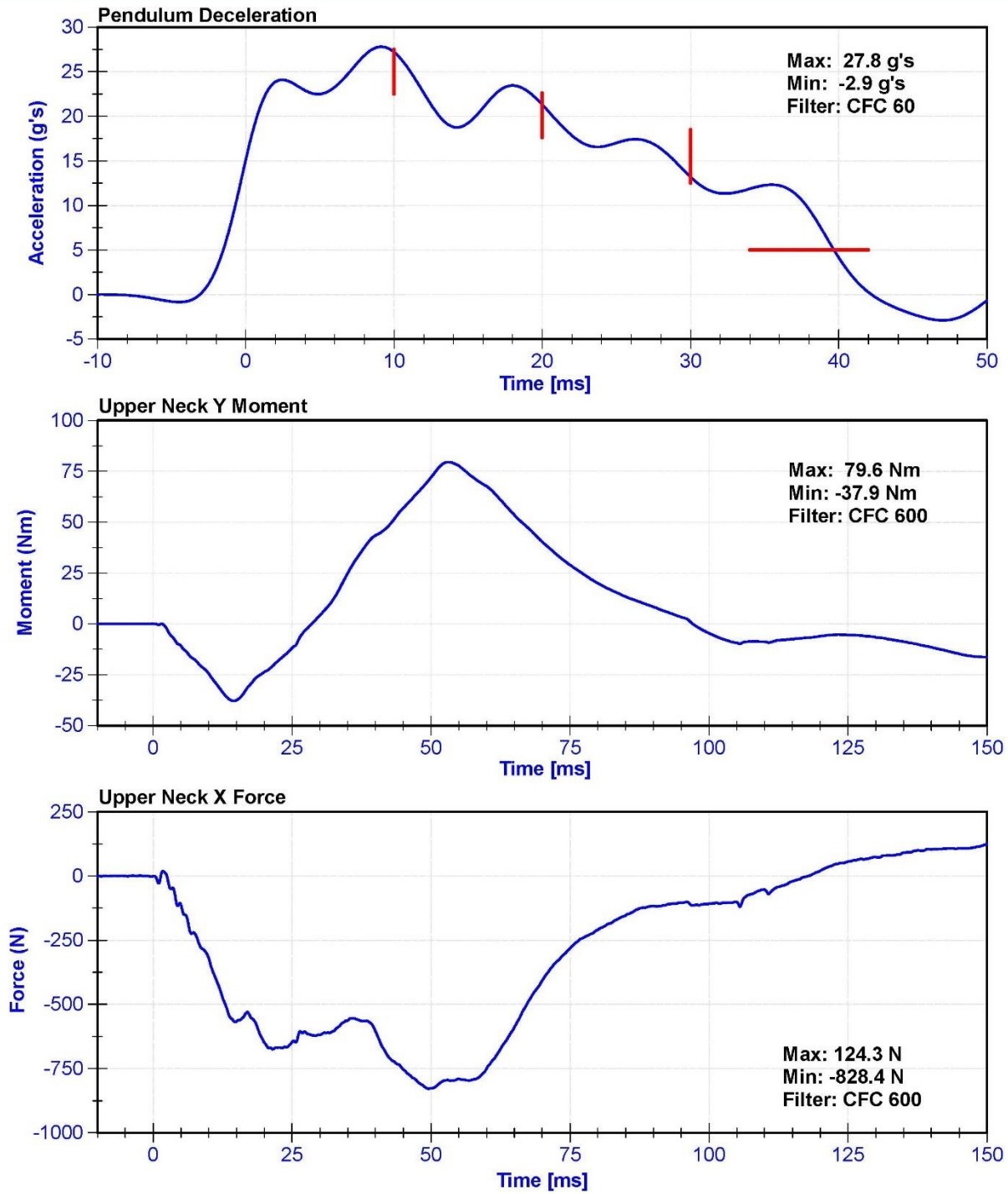
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	27	Pass
Velocity	6.89	7.13	m/s	6.952	Pass
Pendulum Deceleration at 10ms	22.5	27.5	g's	27.20	Pass
Pendulum Deceleration at 20ms	17.6	22.6	g's	21.30	Pass
Pendulum Deceleration at 30ms	12.5	18.5	g's	13.19	Pass
Max. Pendulum Deceleration After 30ms	0	29	g's	27.8	Pass
Pendulum Deceleration Time to 5 g's	34	42	ms	39.7	Pass
Maximum D Plane Rotation	64	78	deg	76.6	Pass
Time to Maximum Rotation	57	64	ms	60.4	Pass
Rotation Decay to Zero	113	127	ms	118.2	Pass
Moment About Occipital Condyle	88.1	108.4	Nm	93.69	Pass
Time to Maximum Moment	47	58	ms	53.1	Pass
Moment Decay to Zero	97	107	ms	98.3	Pass

Transducer Calibrations

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





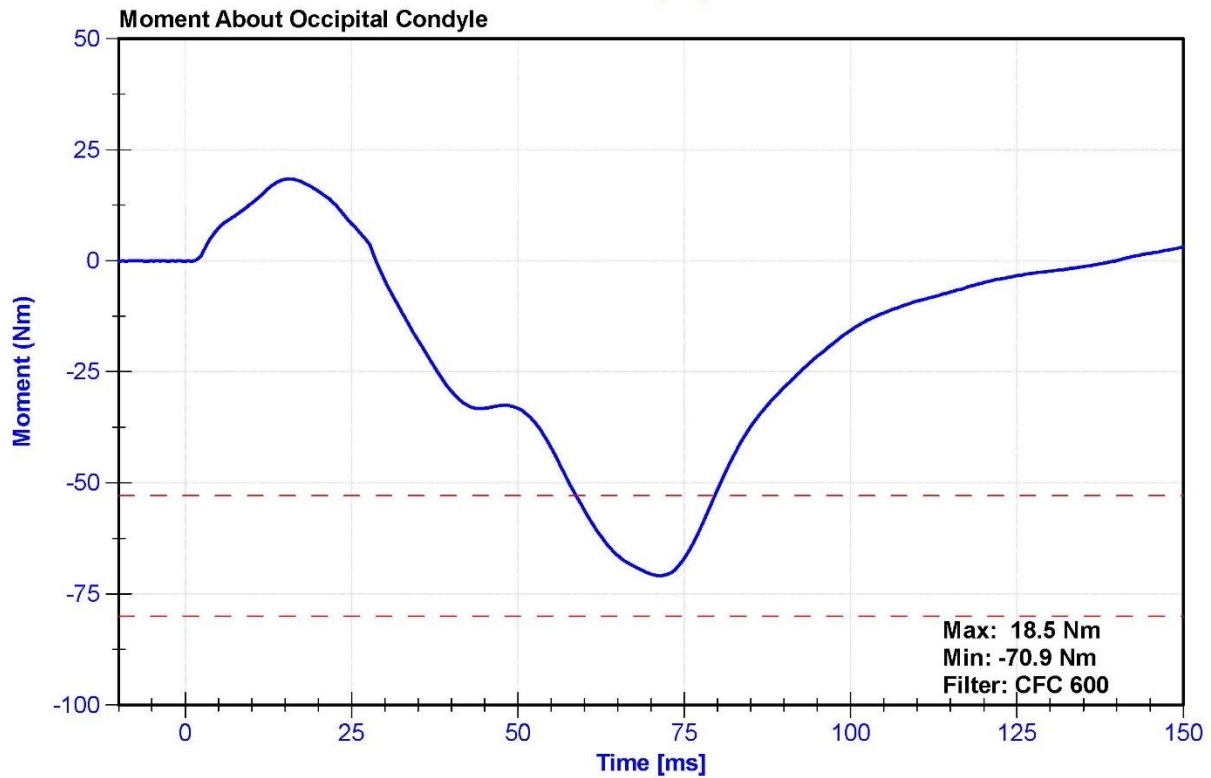
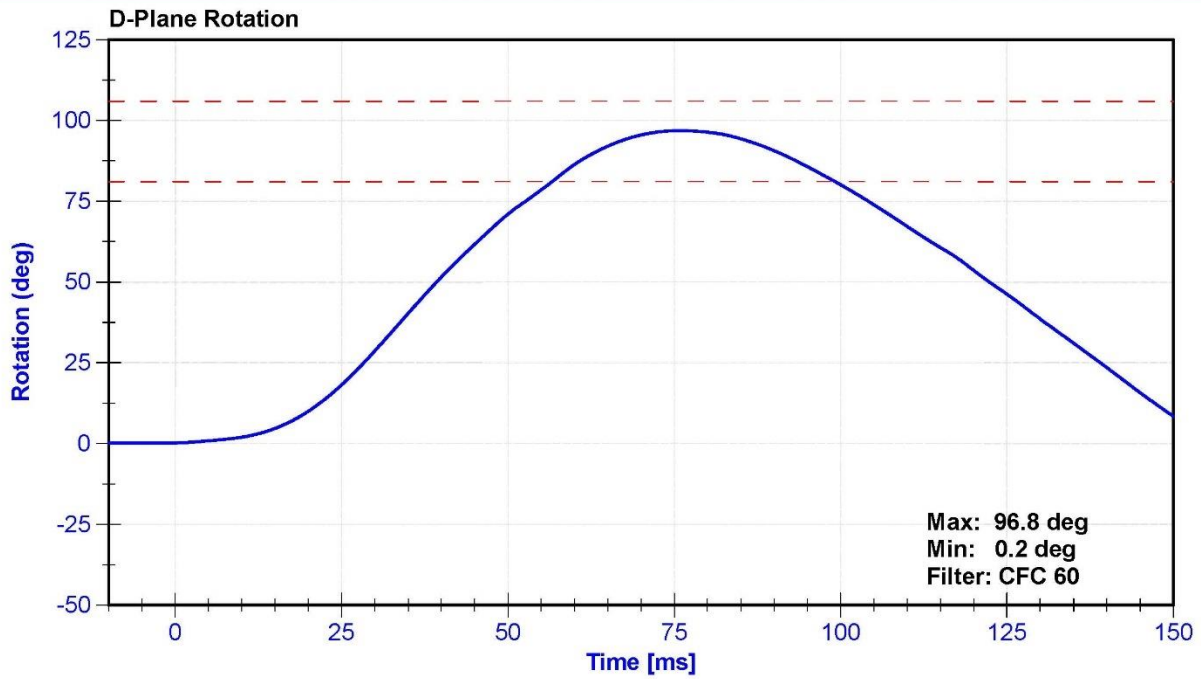
ATD Manufacturer	Humanetics	Test Technician	Z. Schneider
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

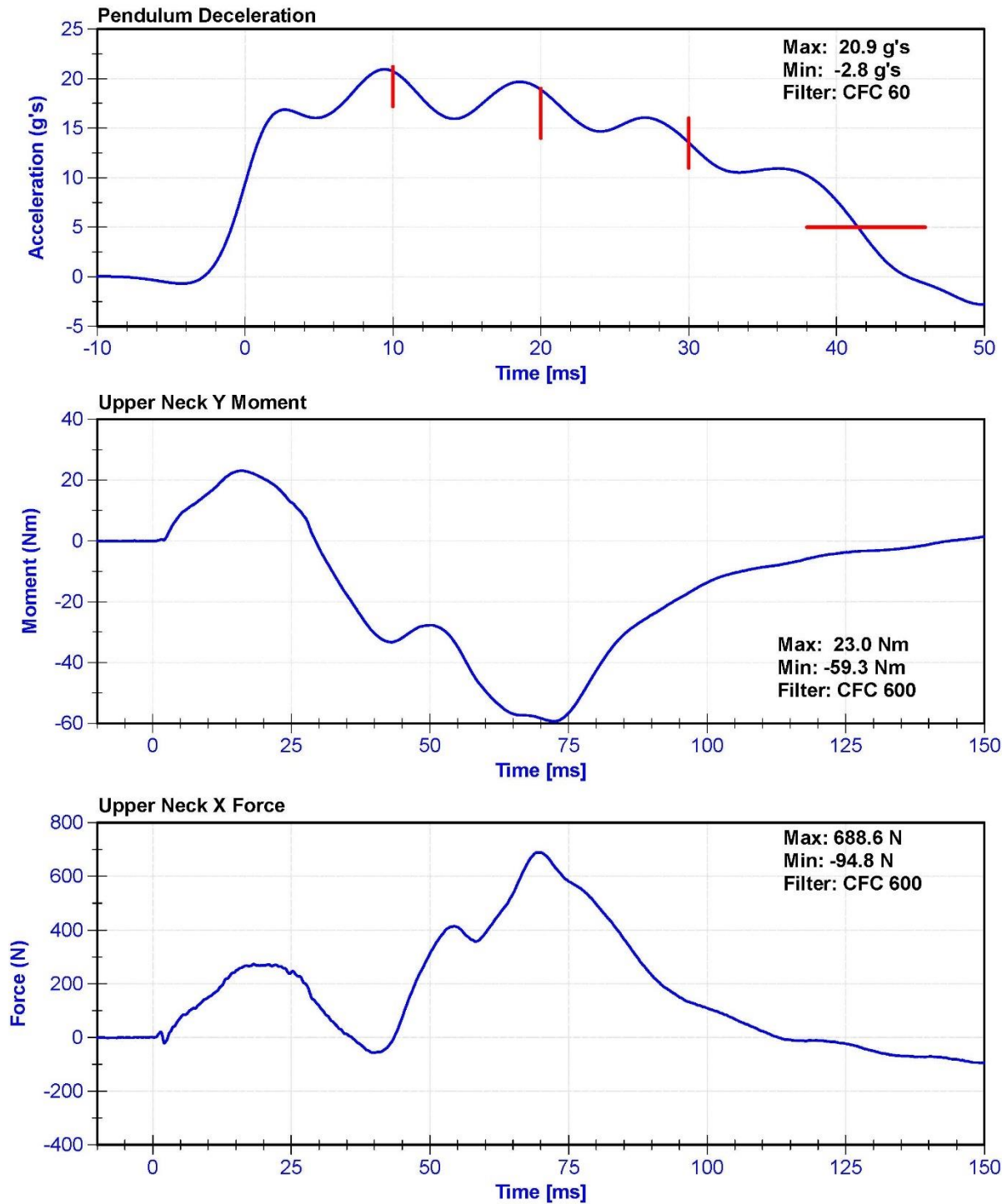
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	27	Pass
Velocity	5.94	6.19	m/s	6.066	Pass
Pendulum Deceleration at 10ms	17.2	21.2	g's	20.73	Pass
Pendulum Deceleration at 20ms	14	19	g's	18.9	Pass
Pendulum Deceleration at 30ms	11	16	g's	13.5	Pass
Max. Pendulum Deceleration After 30ms	0	22	g's	20.9	Pass
Pendulum Deceleration Time to 5 g's	38	46	ms	41.5	Pass
Maximum D Plane Rotation	81	106	deg	96.8	Pass
Time to Maximum Rotation	72	82	ms	75.8	Pass
Rotation Decay to Zero	147	174	ms	155.7	Pass
Minimum Moment About OC	-80	-52.9	Nm	-70.92	Pass
Time to Minimum Moment	65	79	ms	71.3	Pass
Moment Decay to Zero	120	148	ms	139.9	Pass

Transducer Calibrations

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





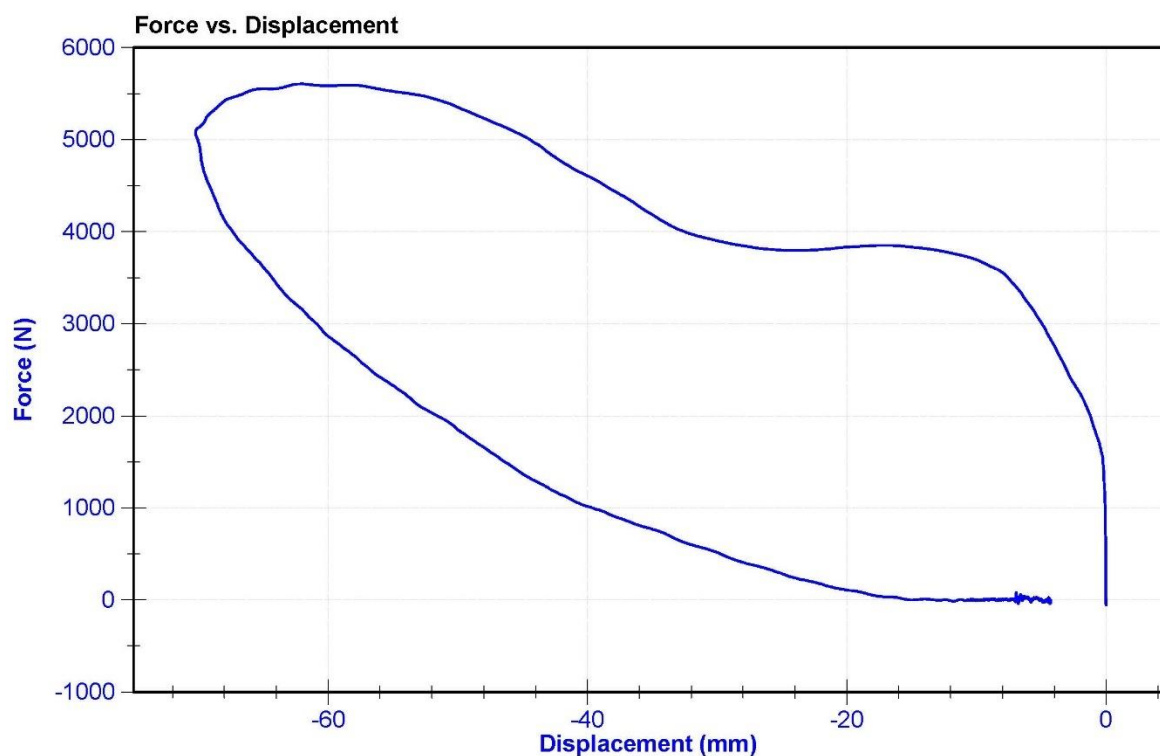
ATD Manufacturer	Humanetics	Test Technician	Z.Schneider
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

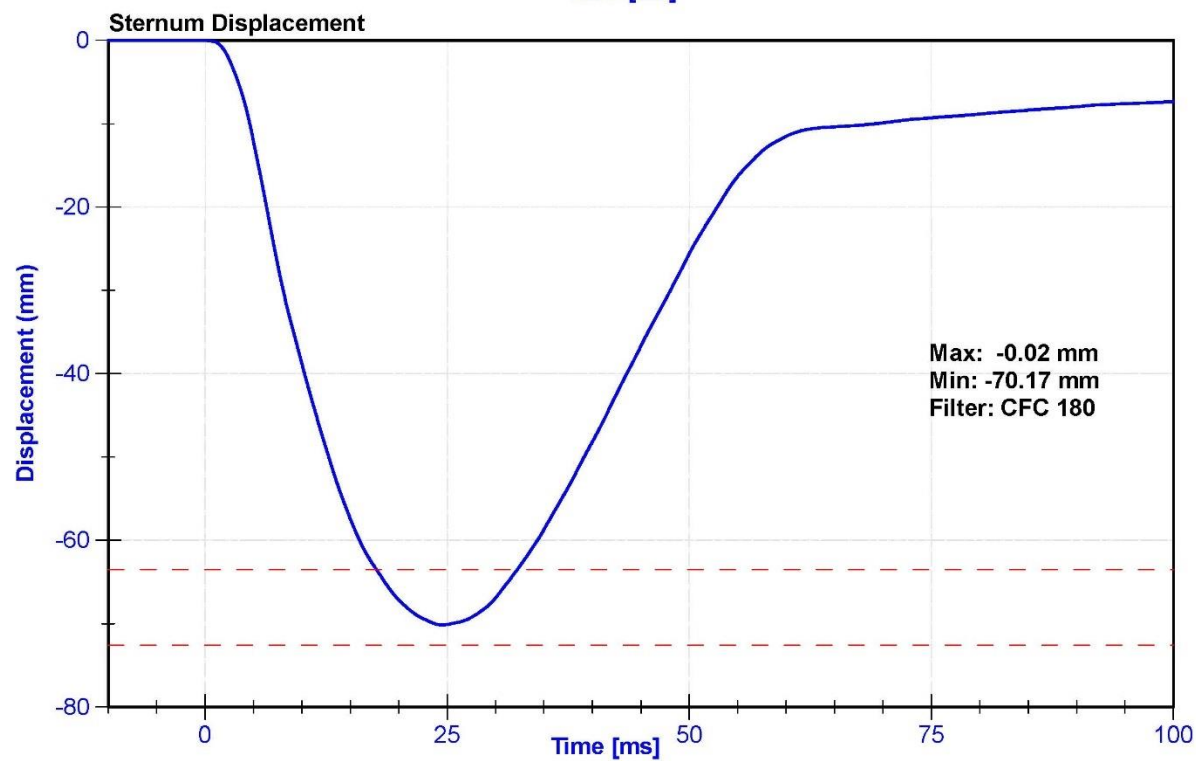
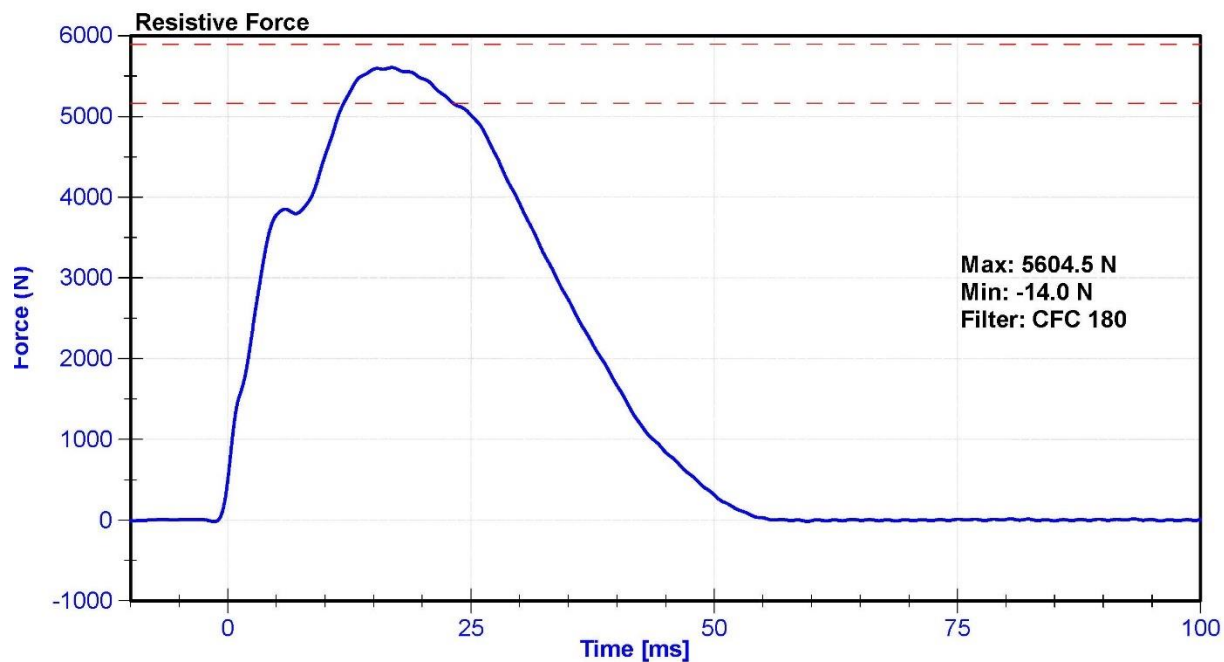
Results

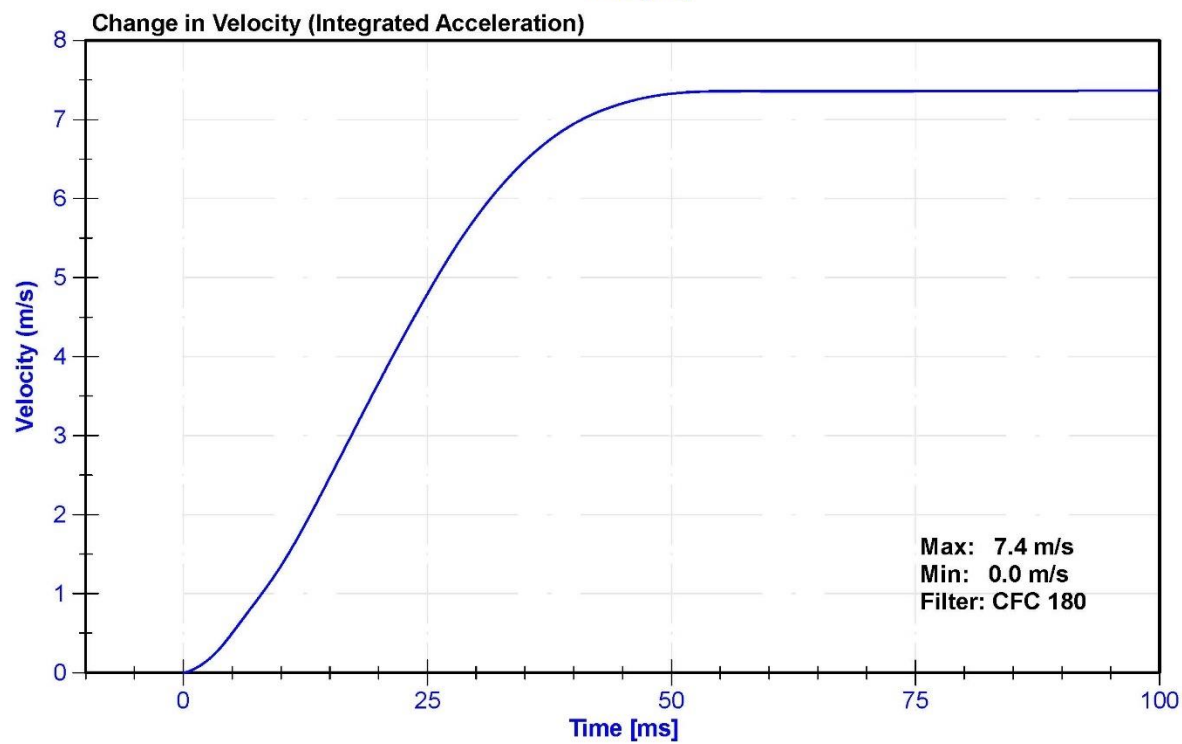
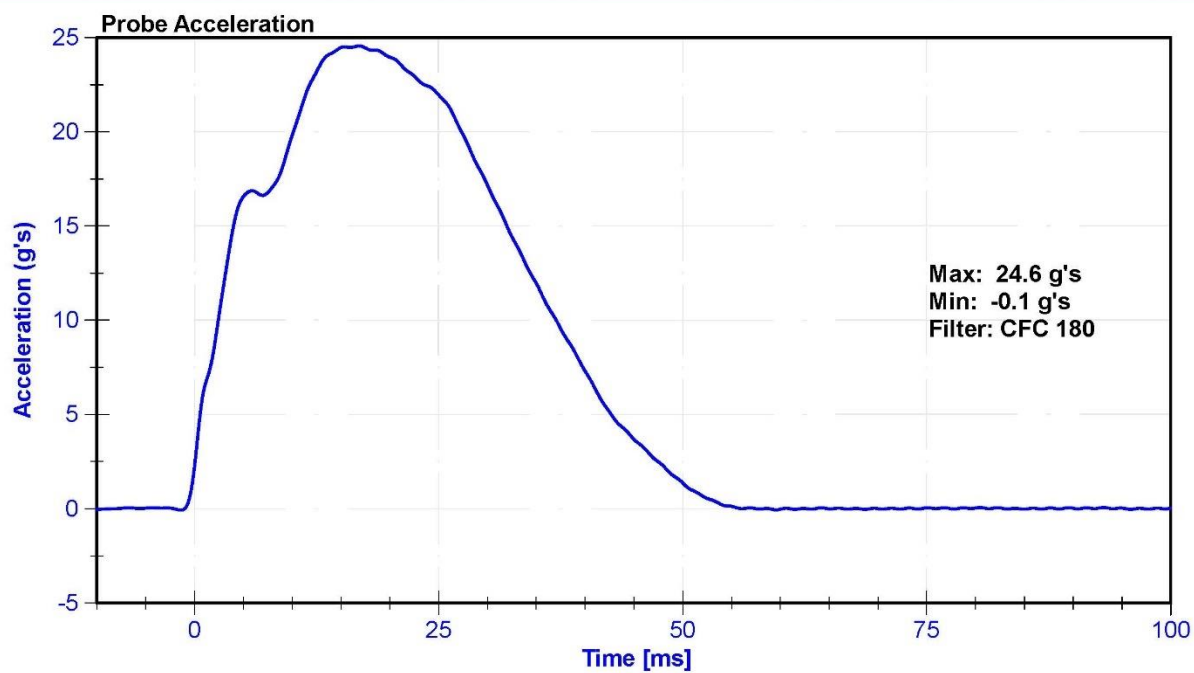
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.1	Pass
Humidity	10	70	%	36.5	Pass
Velocity	6.59	6.83	m/s	6.761	Pass
Chest Displacement	-72.6	-63.5	mm	-70.17	Pass
Resistive Force	5160	5894	N	5604.5	Pass
Hysteresis	69	85	%	72.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18546	11/19/2022	5/18/2023
Chest Potentiometer	JDK	0075	4/10/2023	10/9/2023







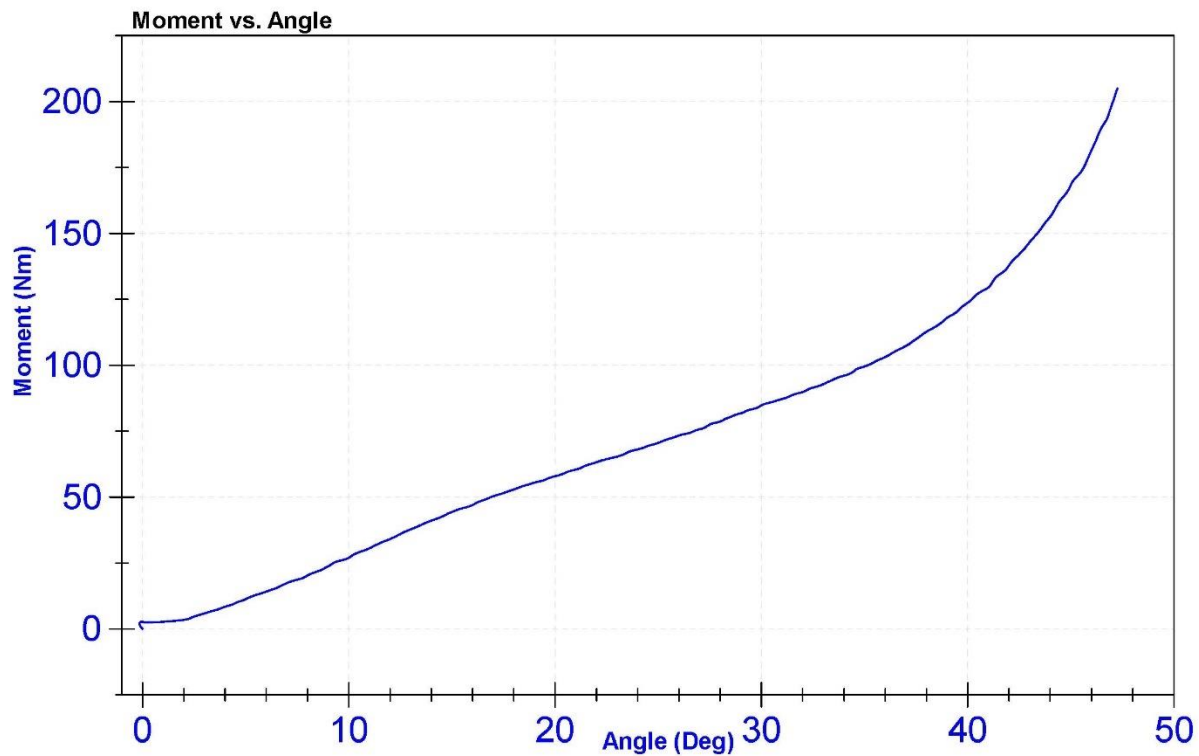
ATD Manufacturer	Humanetics	Test Technician	Z. Schneider
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	22	Pass
Humidity	10	70	%	25	Pass
Average Velocity	5	10	deg/s	7.4	Pass
Angle at 203Nm	40	50	deg	47.2	Pass
Moment at 30 degrees	0	94.9	Nm	84.8	Pass

Transducer Calibrations

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



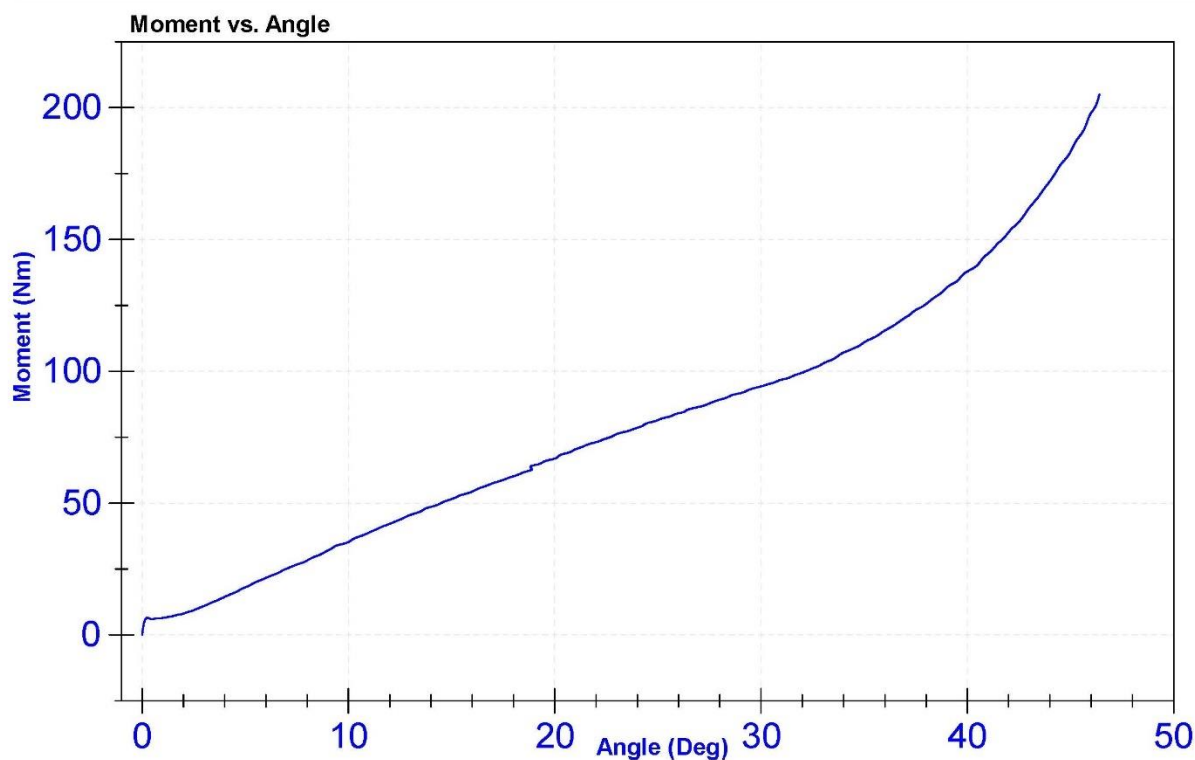
ATD Manufacturer	Humanetics	Test Technician	Z. Schneider
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	22	Pass
Humidity	10	70	%	25	Pass
Average Velocity	5	10	deg/s	7.2	Pass
Angle at 203Nm	40	50	deg	46.3	Pass
Moment at 30 degrees	0	94.9	Nm	94.2	Pass

Transducer Calibrations

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



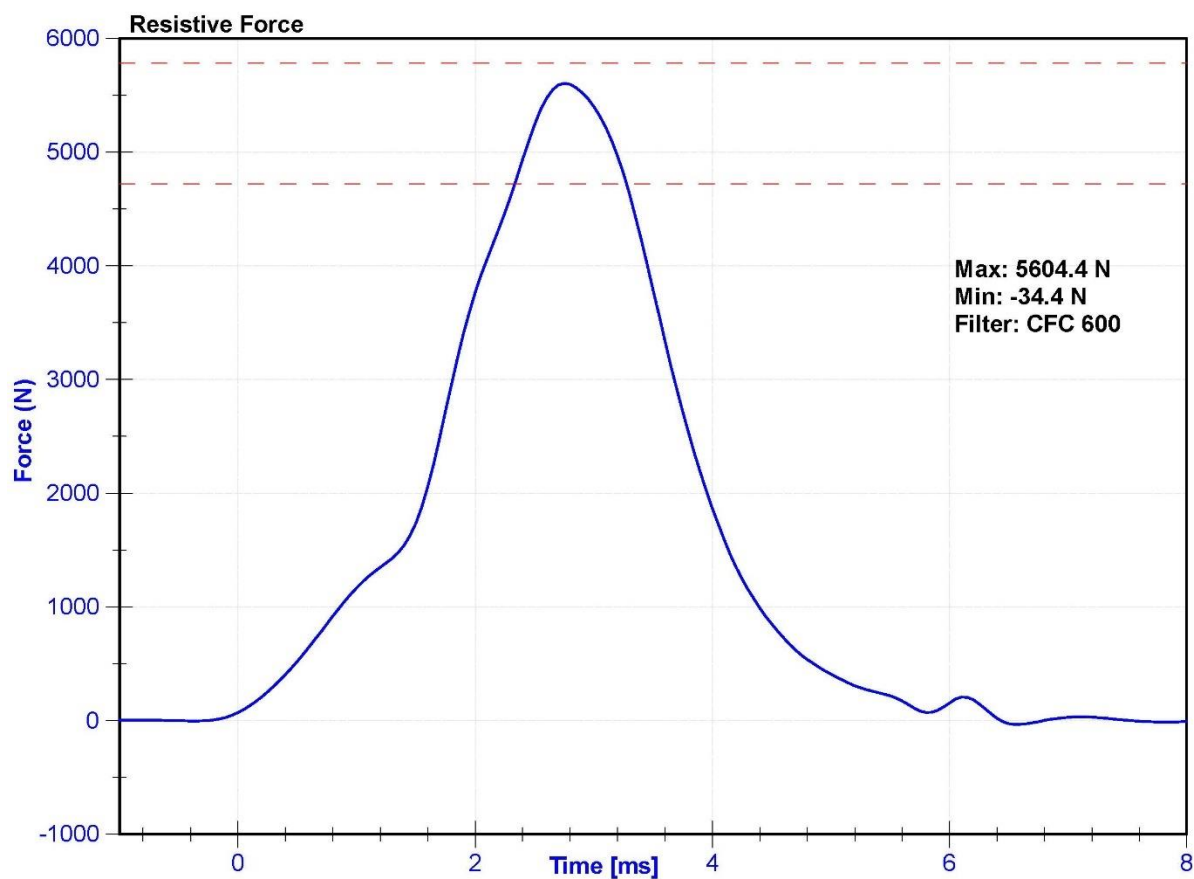
ATD Manufacturer	Humanetics	Test Technician	Z. Schneider
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

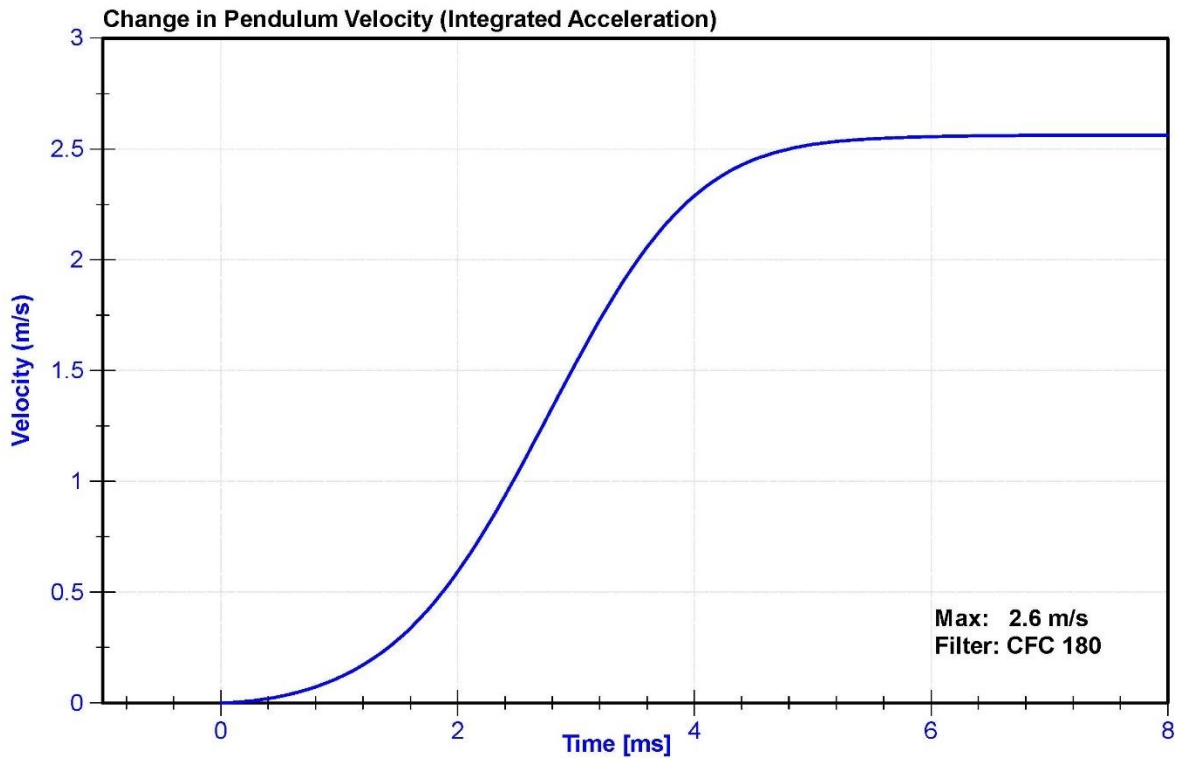
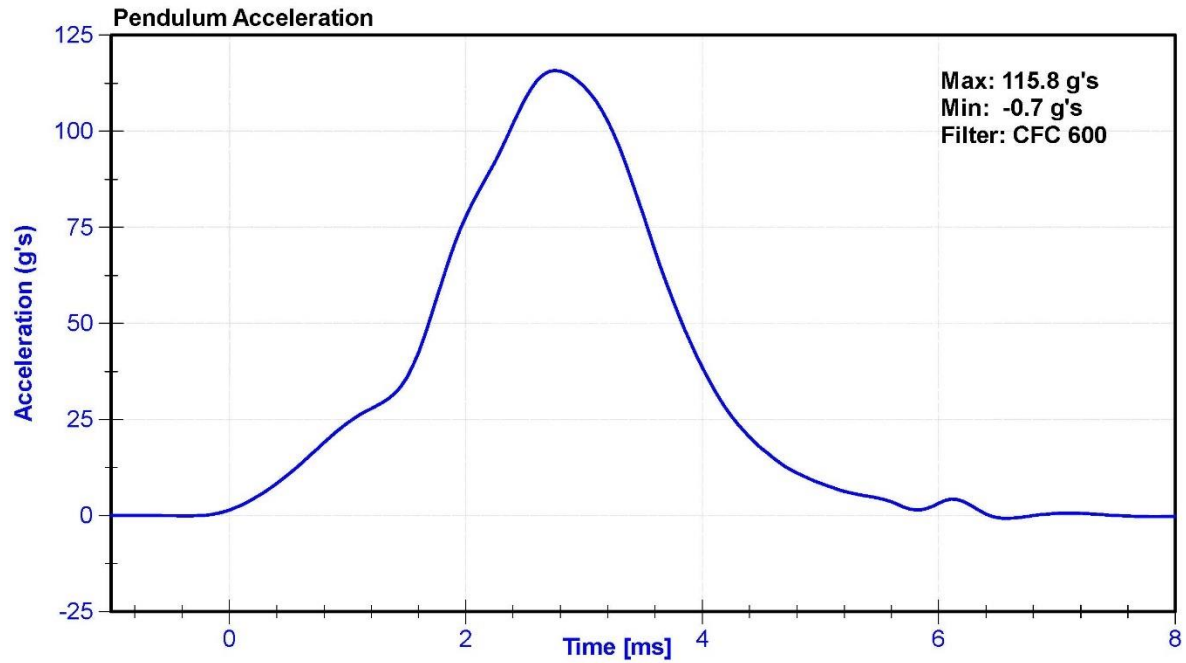
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21	Pass
Humidity	10	70	%	27.2	Pass
Velocity	2.07	2.13	m/s	2.073	Pass
Maximum Resistive Force	4720	5780	N	5604.4	Pass

Transducer Calibrations

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





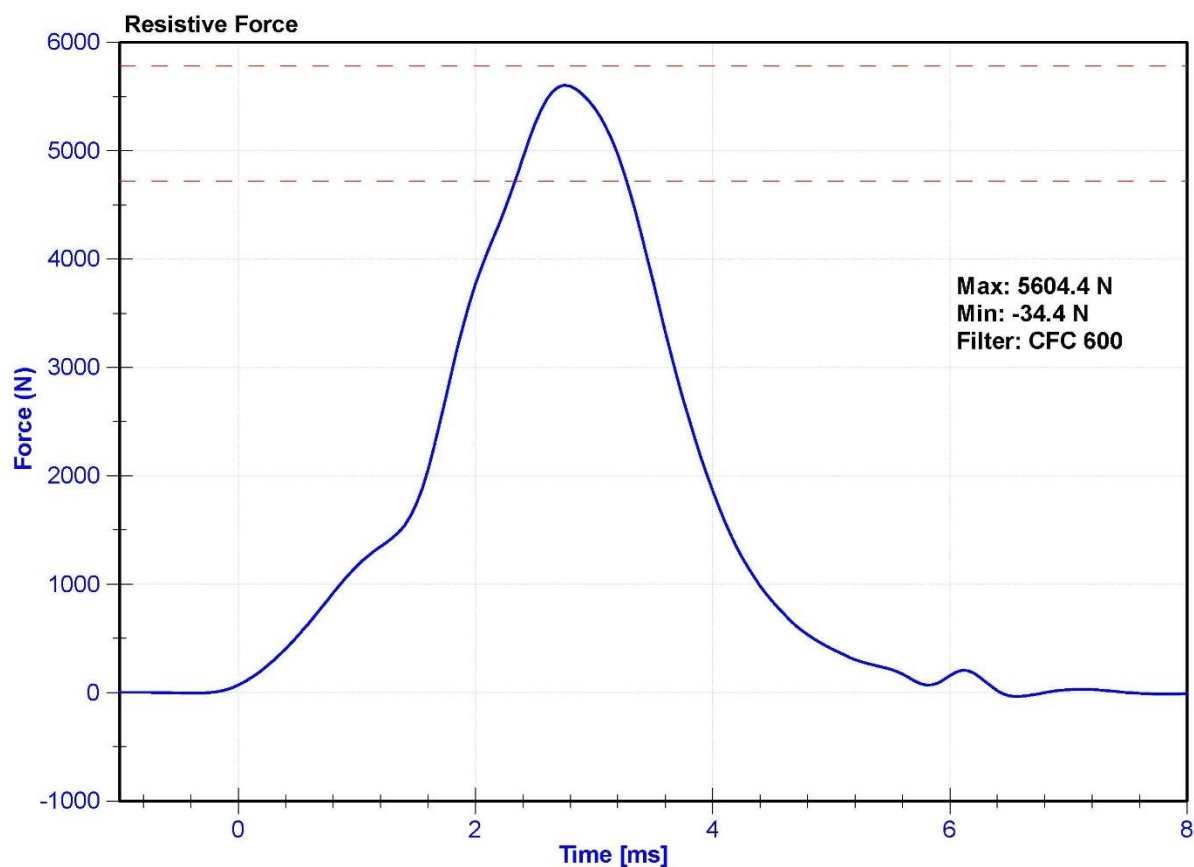
ATD Manufacturer	Humanetics	Test Technician	Z. Schneider
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

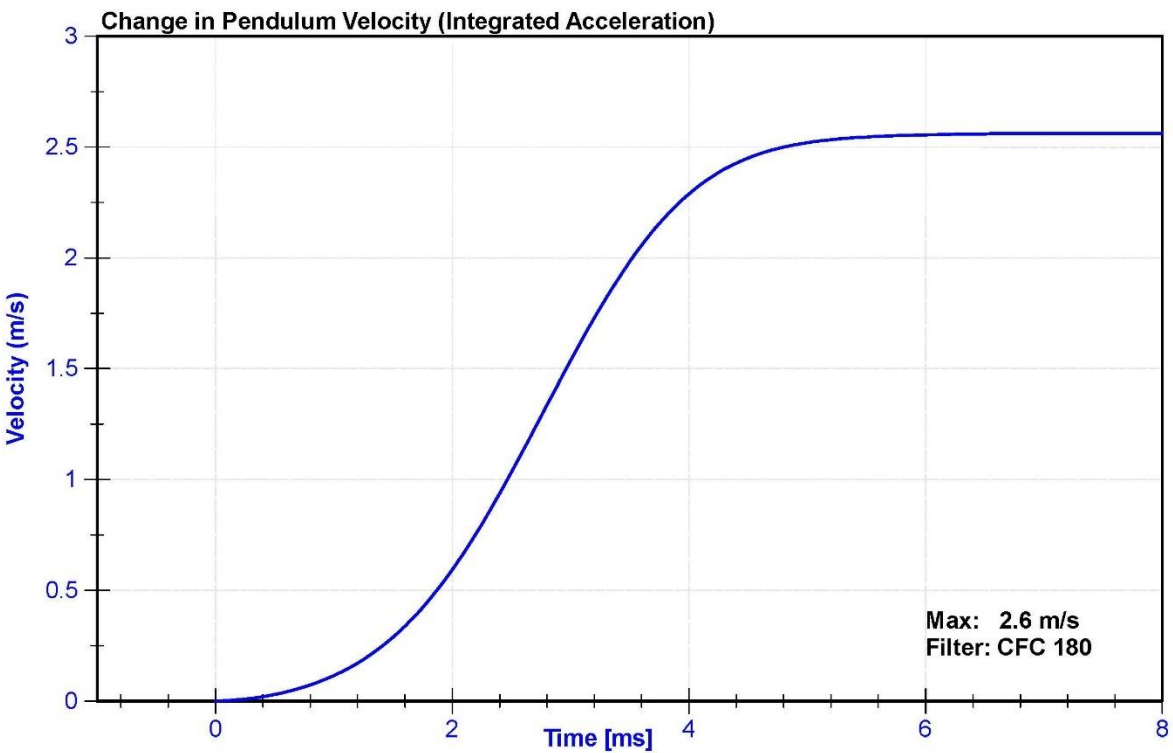
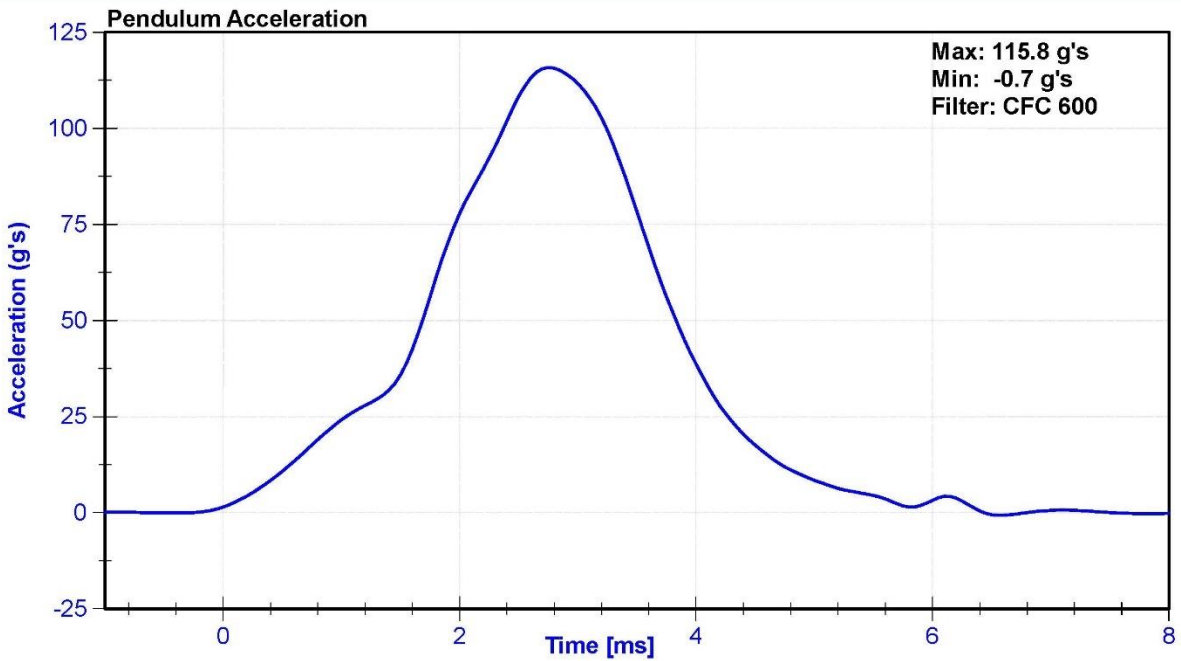
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.2	Pass
Humidity	10	70	%	27.5	Pass
Velocity	2.07	2.13	m/s	2.073	Pass
Maximum Resistive Force	4720	5780	N	5604.4	Pass

Transducer Calibrations

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





CALIBRATION TEST RESULTS

POST-TEST

HYBRID III 5TH PERCENTILE FEMALE - PASSENGER ATD

SERIAL NO: 137

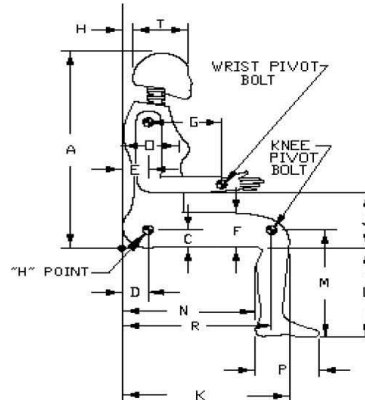
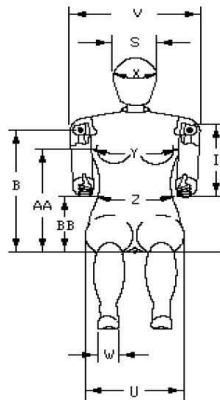


External Measurements - Hybrid 3 - 5th Female

Technician: K. Brogan

Date: 04/20/2023

Dummy Serial Number: 137



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	775	800	786	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	75	Pass
F	Thigh Clearance	119	135	130	Pass
G	Back of Elbow to Wrist Pivot	244	259	251	Pass
H	Head Back to Backline	43	48	45	Pass
I	Shoulder to Elbow Length	277	297	287	Pass
J	Elbow Rest Height	183	203	196	Pass
K	Buttock to Knee Length	521	546	535	Pass
L	Popliteal Height	356	376	368	Pass
M	Knee Pivot Height	394	419	407	Pass
N	Buttock Popliteal Length	414	439	427	Pass
O	Chest Depth without Jacket	175	191	182	Pass
P	Foot Length (right)	219	234	230	Pass
R	Buttock To Knee Pivot Length	457	483	465	Pass
S	Head Breadth	137	147	143	Pass
T	Head Depth	178	188	180	Pass
U	Hip Breadth	300	315	311	Pass
V	Shoulder Breadth	351	366	359	Pass
W	Foot Breadth	79	94	85	Pass
X	Head Circumference	528	549	544	Pass
Y	Chest Circumference with Jacket	851	881	872	Pass
Z	Waist Circumference	460	790	655	Pass
AA	Reference Location (Chest Circumference)	333	358	346	Pass
BB	Reference Location (Waist Circumference)	160	170	166	Pass

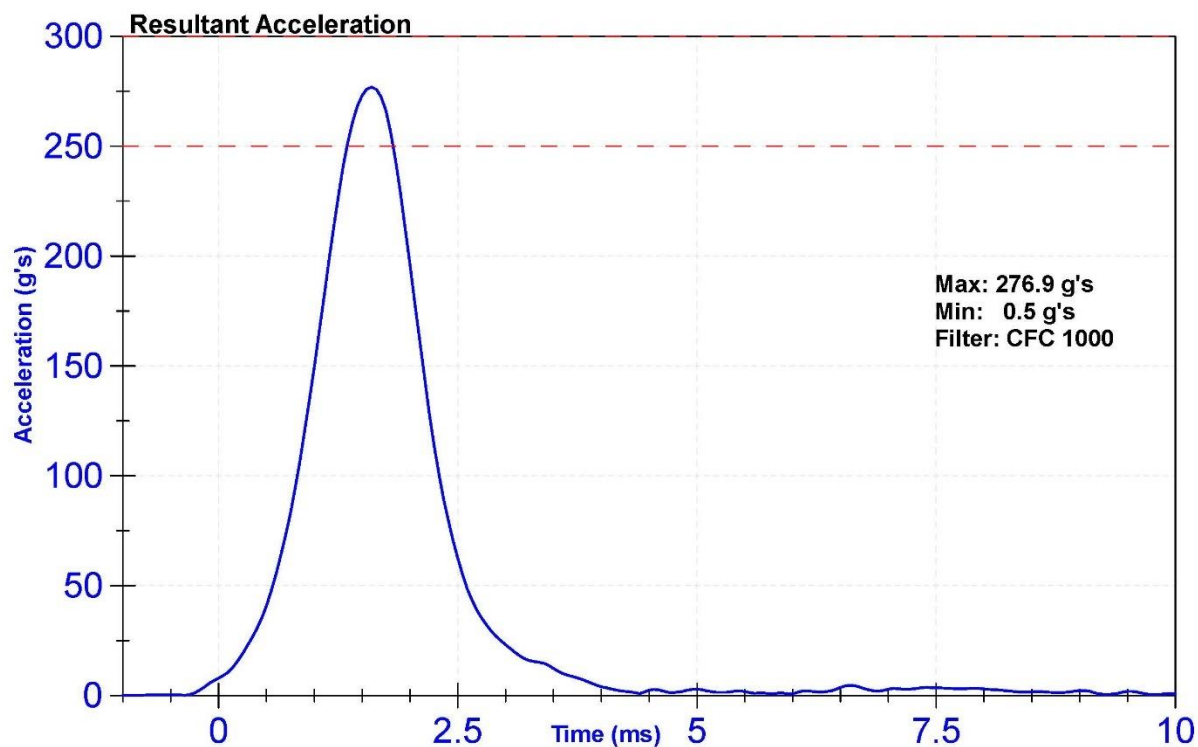
ATD Manufacturer	Humanetics	Test Technician	Z. Schneider
ATD Serial Number	137	Laboratory Supervisor	K. Brogan

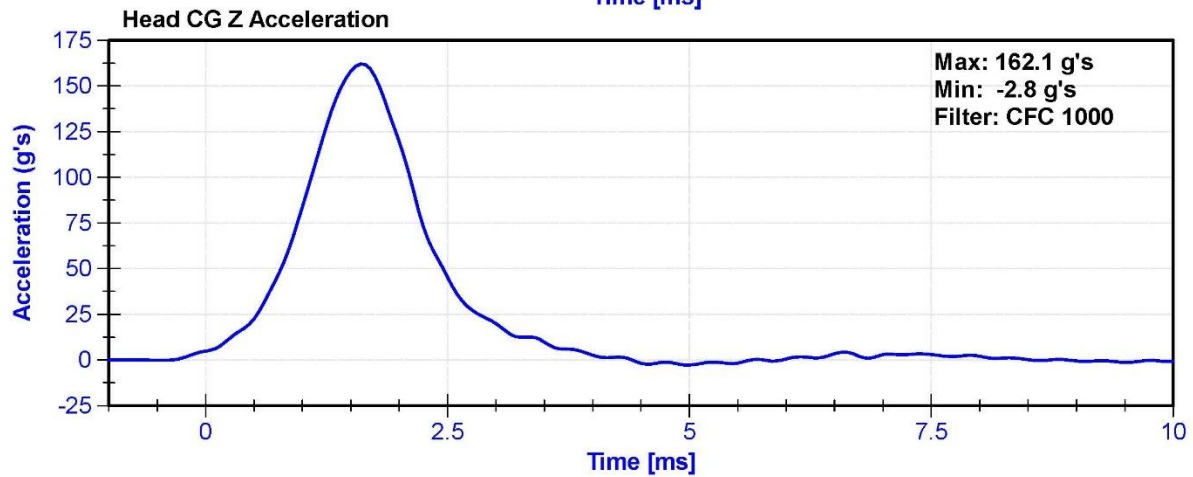
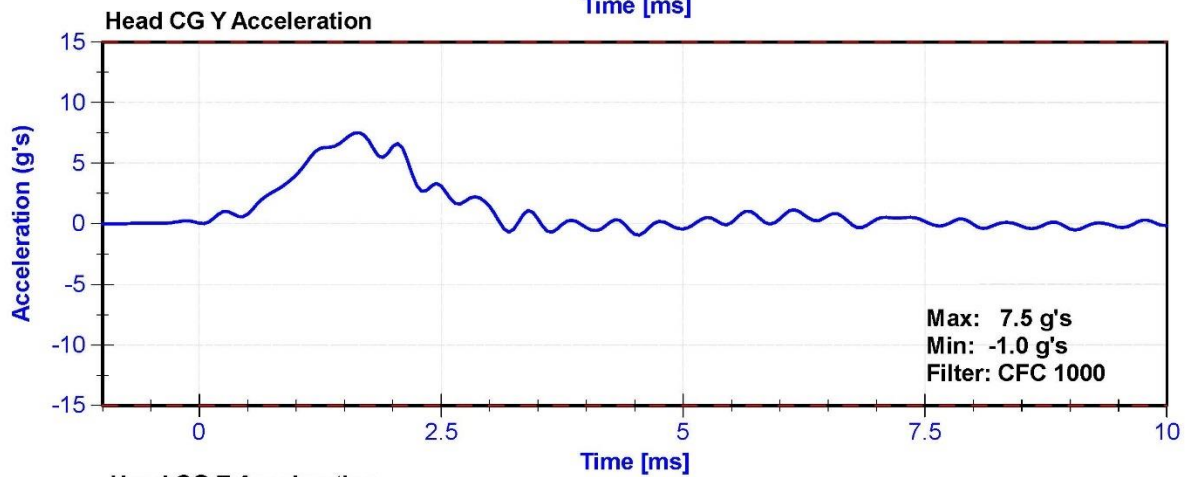
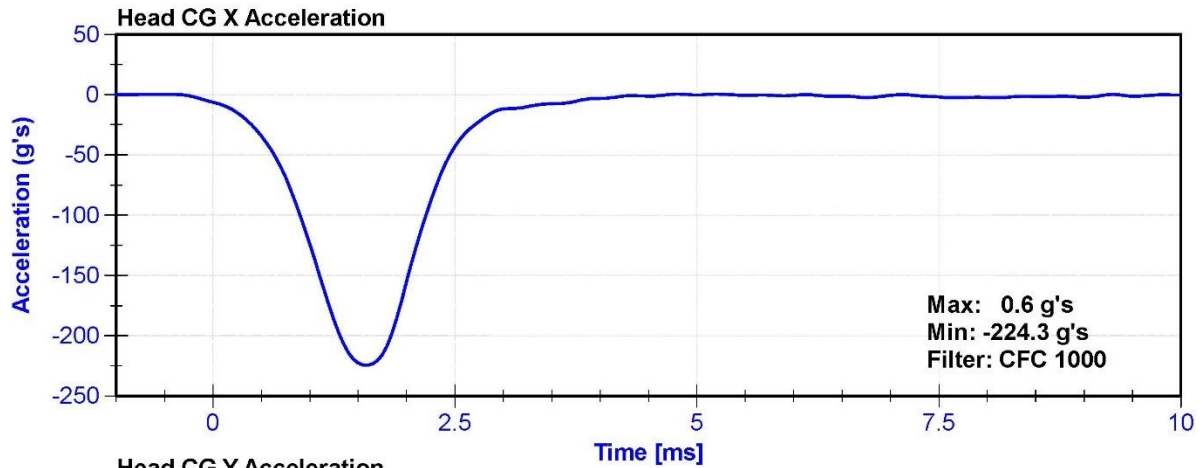
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.0	Pass
Humidity	10	70	%	25	Pass
Resultant Acceleration	250	300	g's	276.9	Pass
Oscillation	0	10	%	1.6	Pass
Lateral Acceleration	-15	15	g's	7.5	Pass

Transducer Calibrations

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





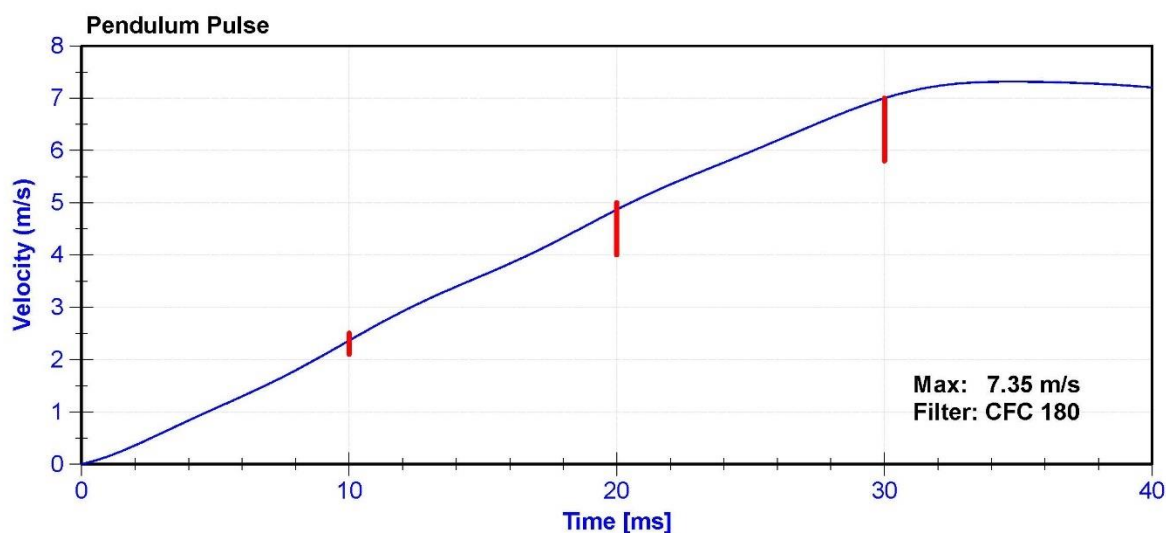
ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	137	Laboratory Supervisor	K. Brogan

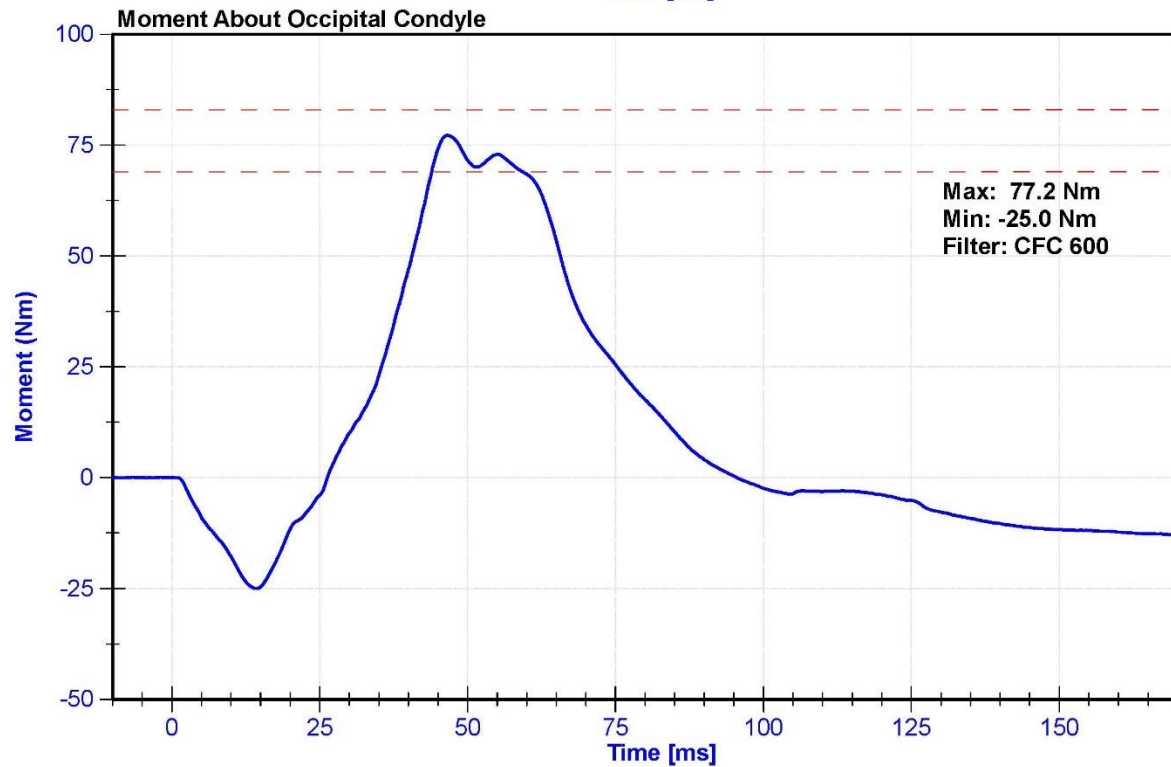
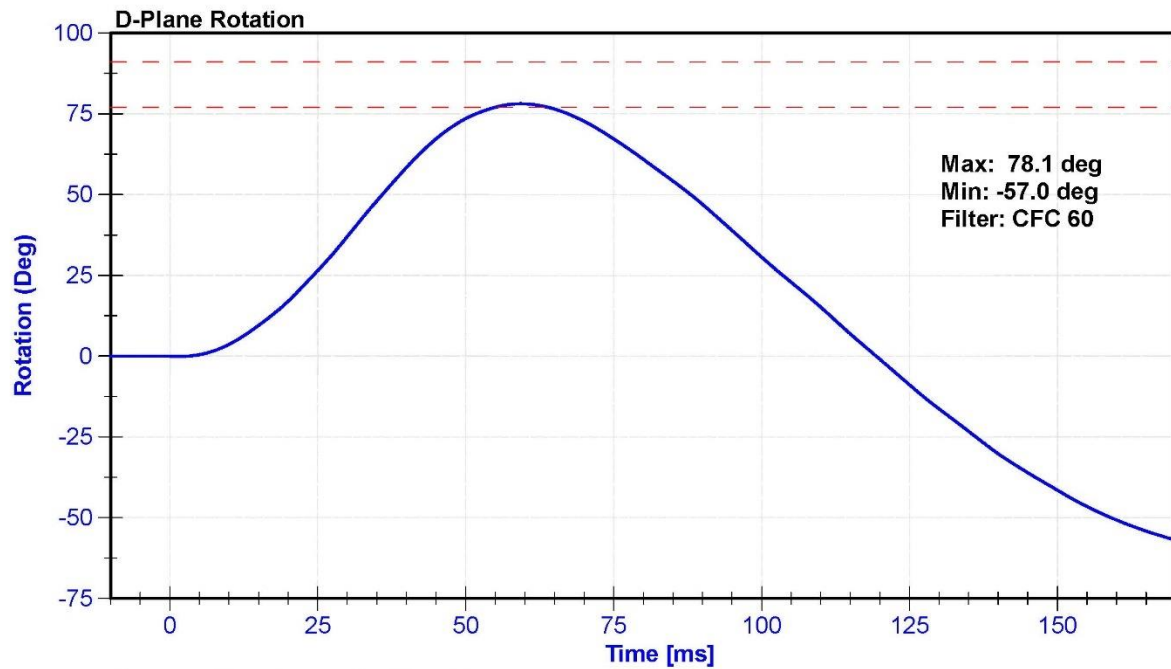
Results

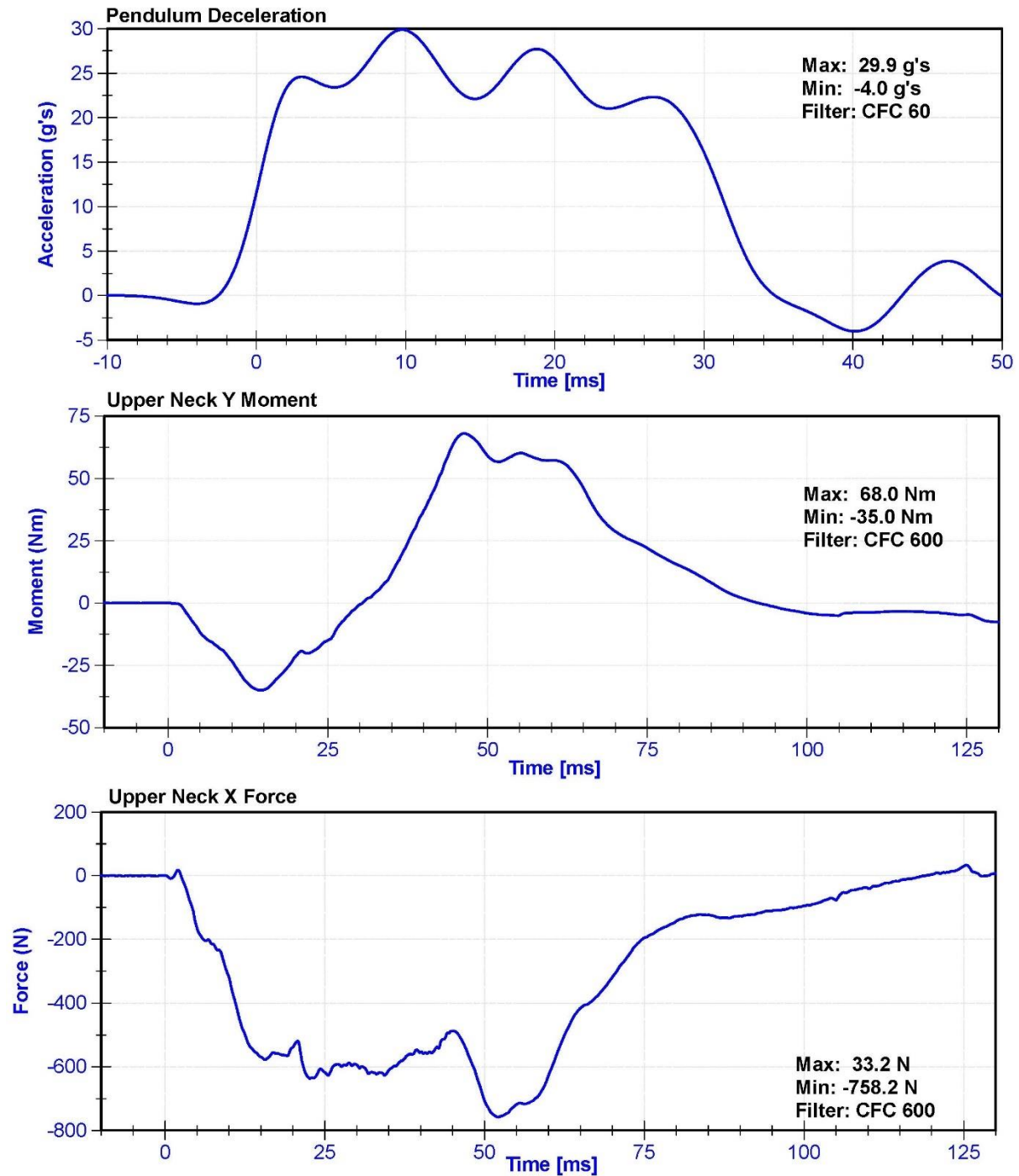
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	26.5	Pass
Velocity	6.89	7.13	m/s	7.029	Pass
Pendulum Impulse at 10ms	2.1	2.5	m/s	2.36	Pass
Pendulum Impulse at 20ms	4.0	5.0	m/s	4.87	Pass
Pendulum Impulse at 30ms	5.8	7.0	m/s	7.00	Pass
Max D Plane Rotation	77	91	deg	78.1	Pass
Max Moment During Rotation Interval	69	83	Nm	77.2	Pass
Moment Decay to 10.0 Nm	80	100	ms	85.3	Pass

Transducer Calibrations

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







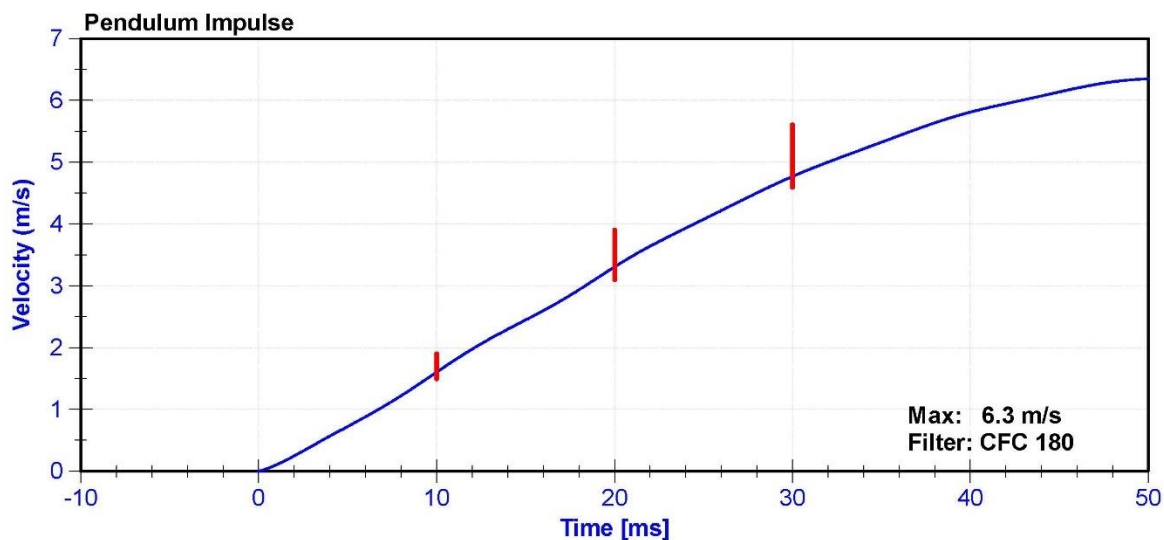
ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	137	Laboratory Supervisor	K. Brogan

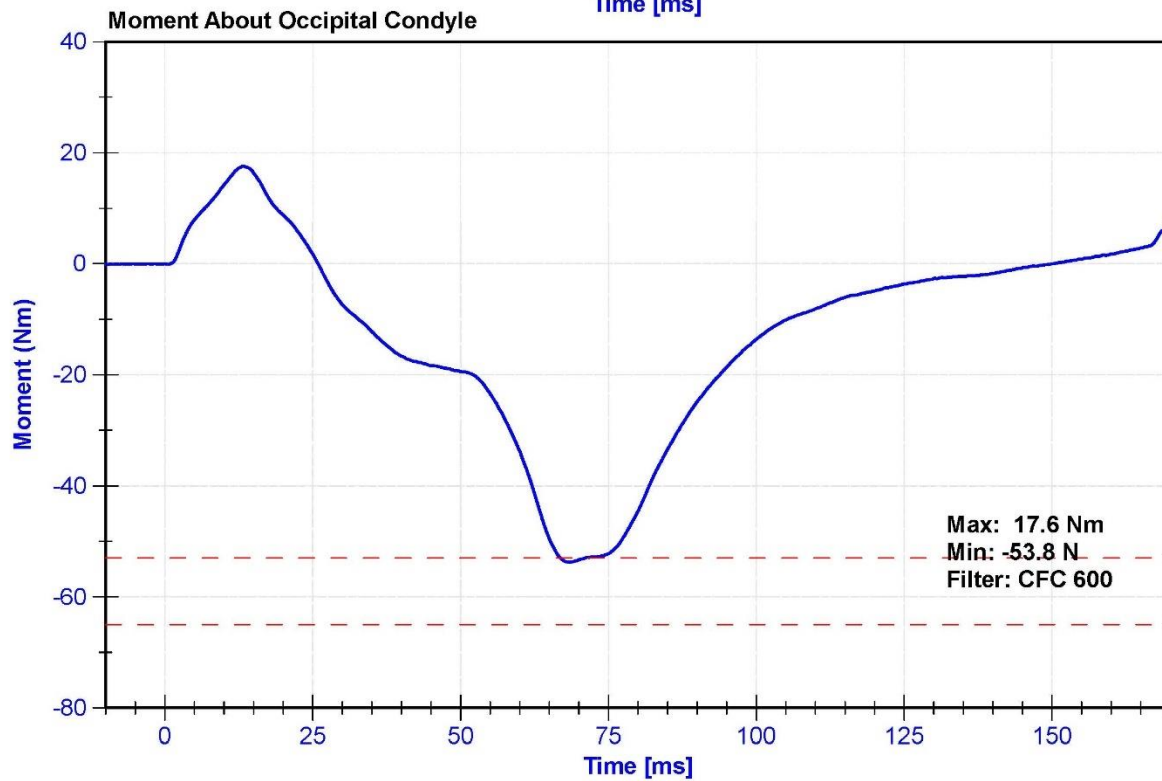
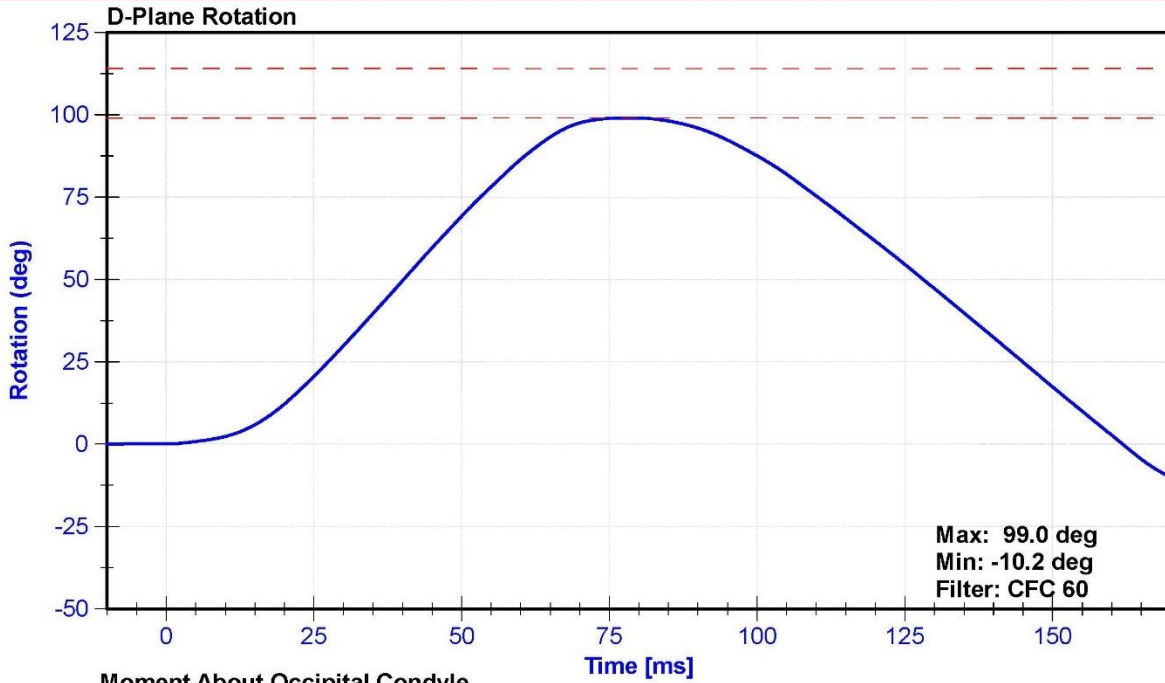
Results

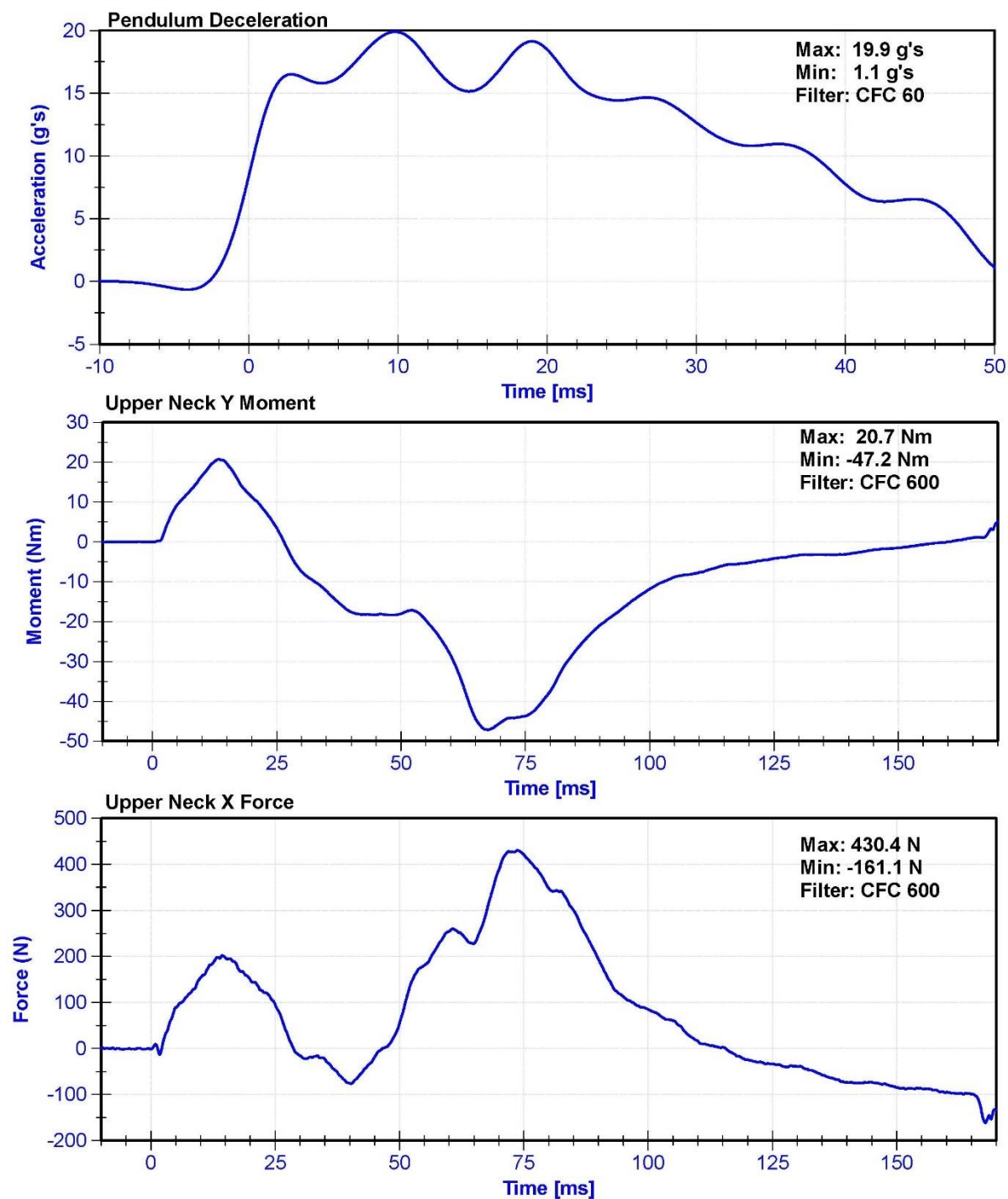
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	26.5	Pass
Velocity	5.95	6.19	m/s	6.062	Pass
Pendulum Impulse at 10ms	1.5	1.9	m/s	1.60	Pass
Pendulum Impulse at 20ms	3.1	3.9	m/s	3.31	Pass
Pendulum Impulse at 30ms	4.6	5.6	m/s	4.77	Pass
D Plane Rotation	99	114	deg	99.0	Pass
Moment During Rotation Interval	-65	-53	Nm	-53.8	Pass
Moment Decay to -10Nm	94	114	ms	105.3	Pass

Transducer Calibrations

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







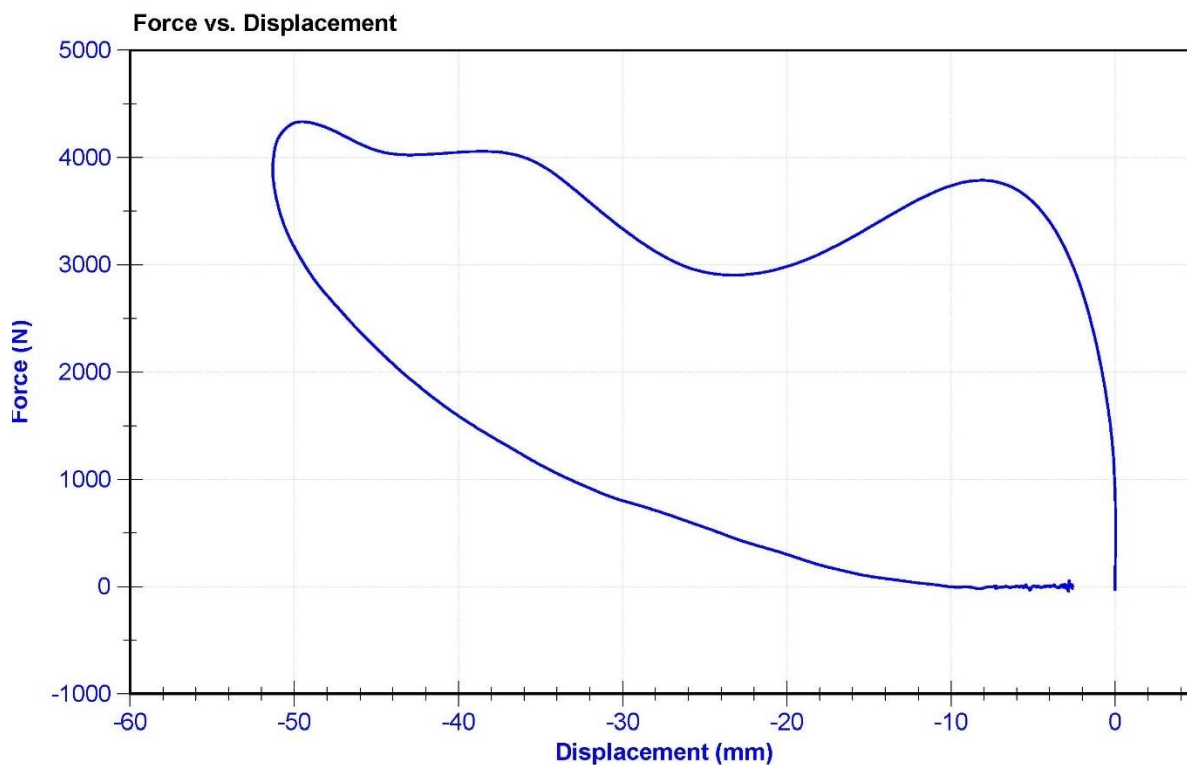
ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	137	Laboratory Supervisor	K. Brogan

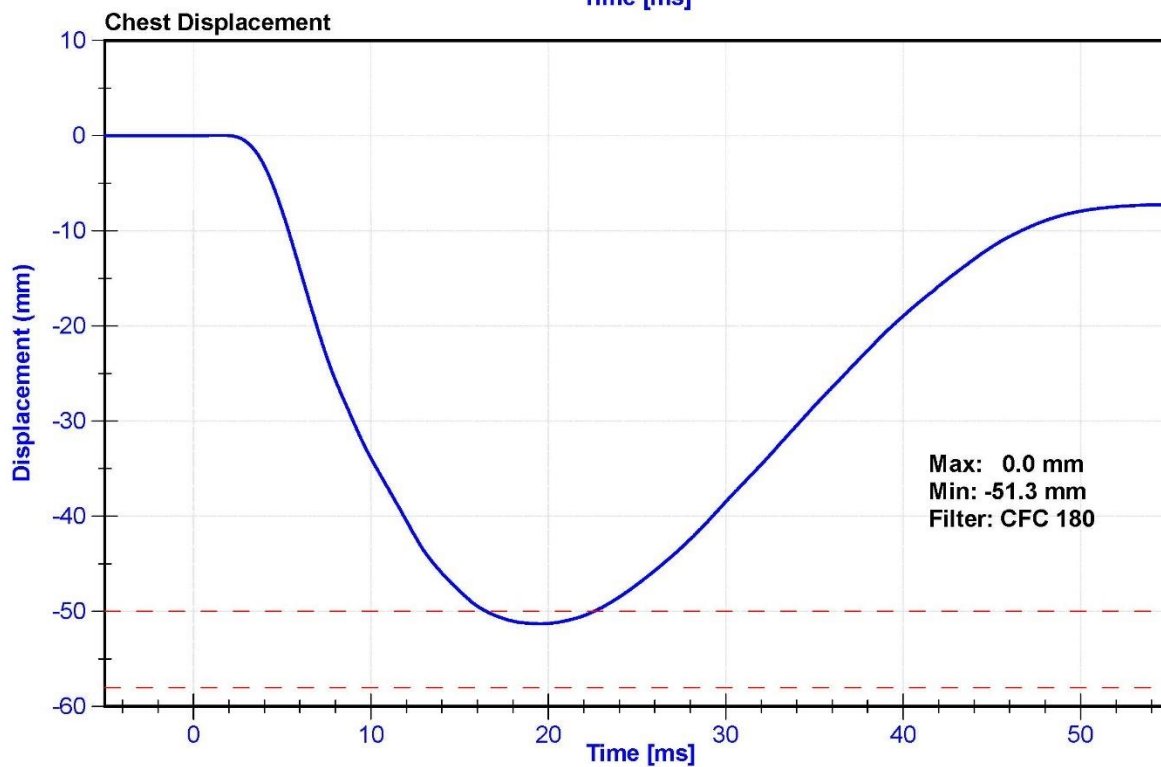
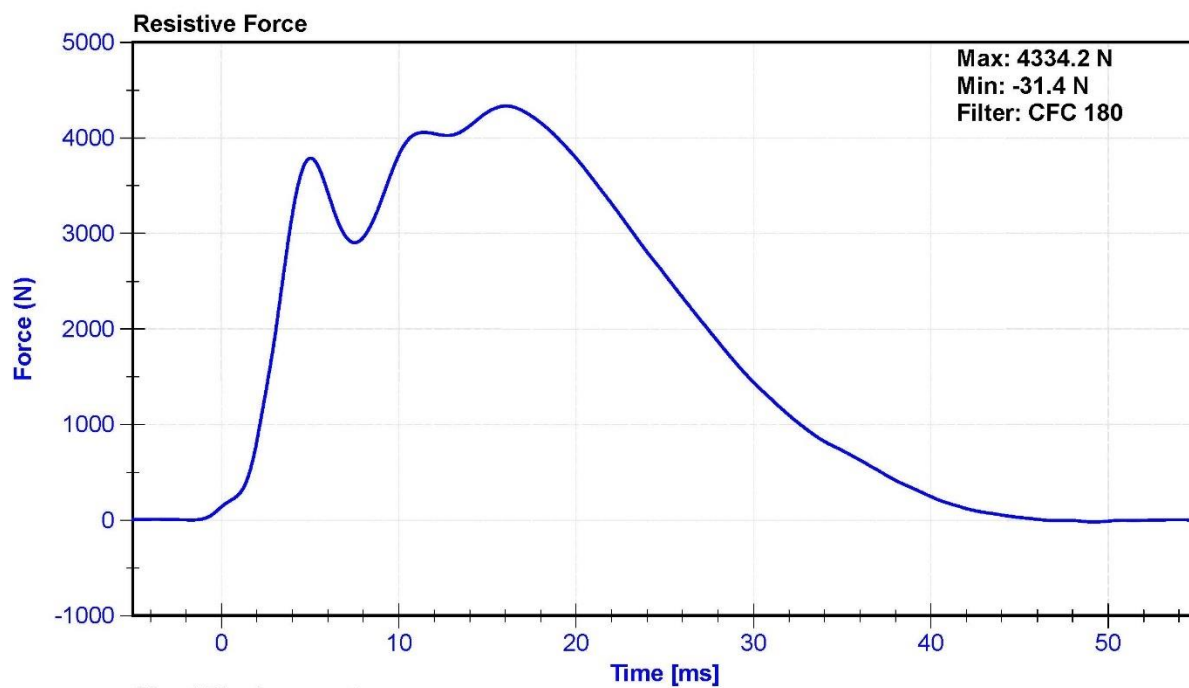
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.2	Pass
Humidity	10	70	%	29.5	Pass
Velocity	6.59	6.83	m/s	6.691	Pass
Chest Deflection	-58	-50	mm	-51.3	Pass
Maximum Resistive Force (50 to 58mm)	3900	4400	N	4334.2	Pass
Maximum Resistive Force (18 to 50mm)	0	4600	N	3788.2	Pass
Hysteresis	69	85	%	75.0	Pass

Transducer Calibrations

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





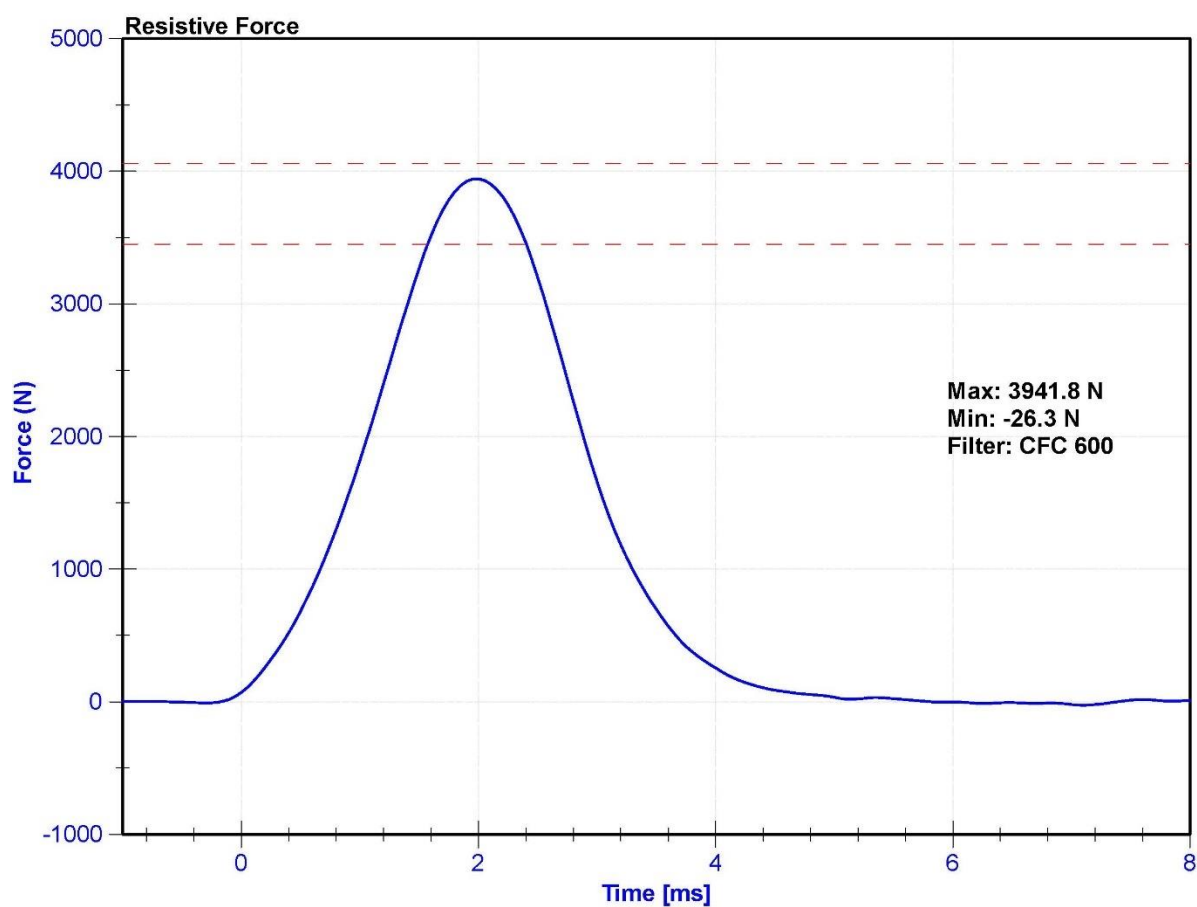
ATD Manufacturer	Humanetics	Test Technician	T. Roseman
ATD Serial Number	137	Laboratory Supervisor	K. Brogan

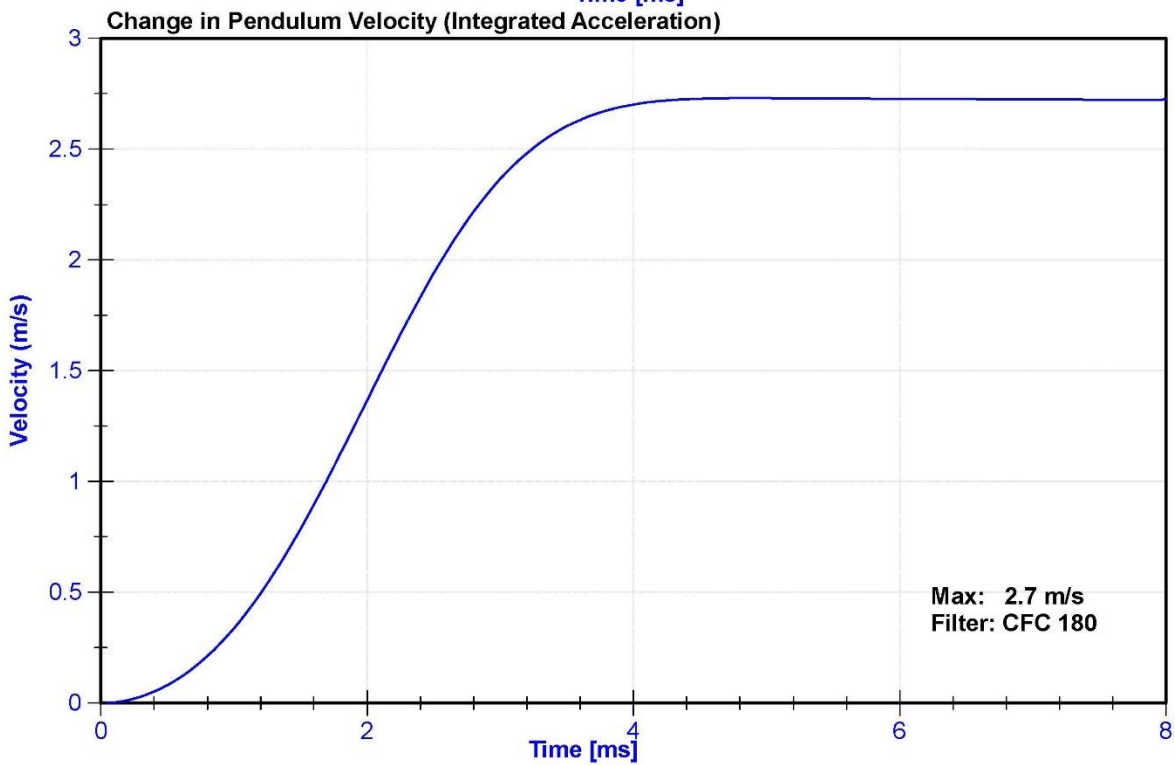
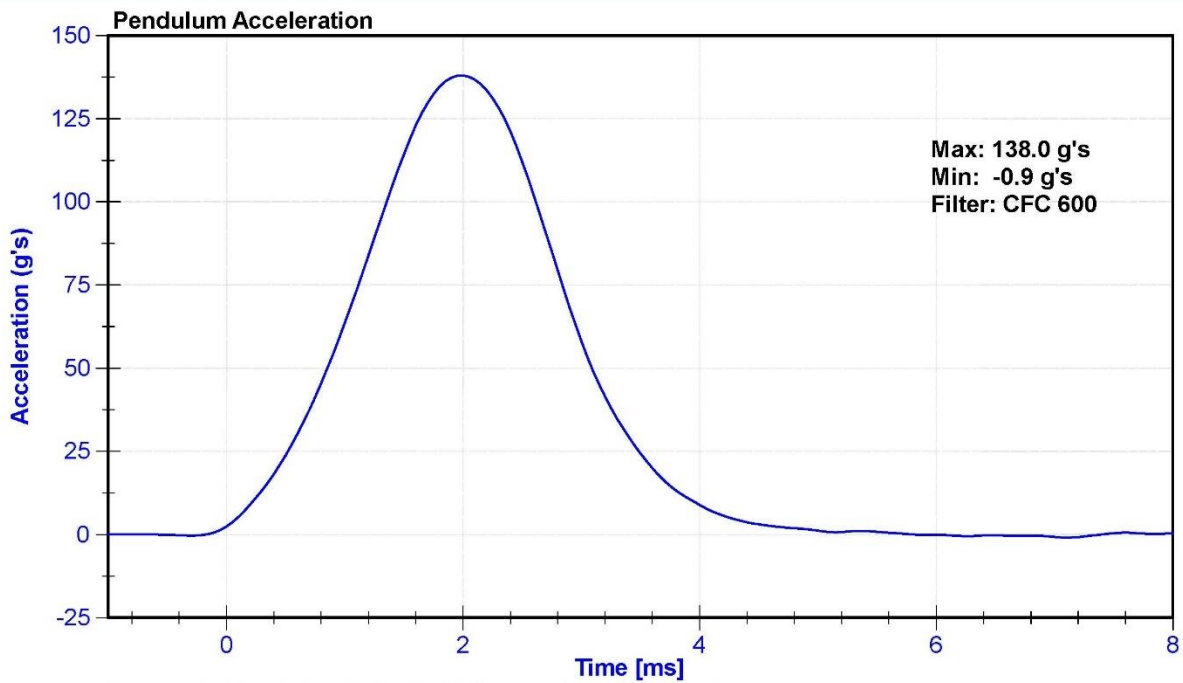
Results

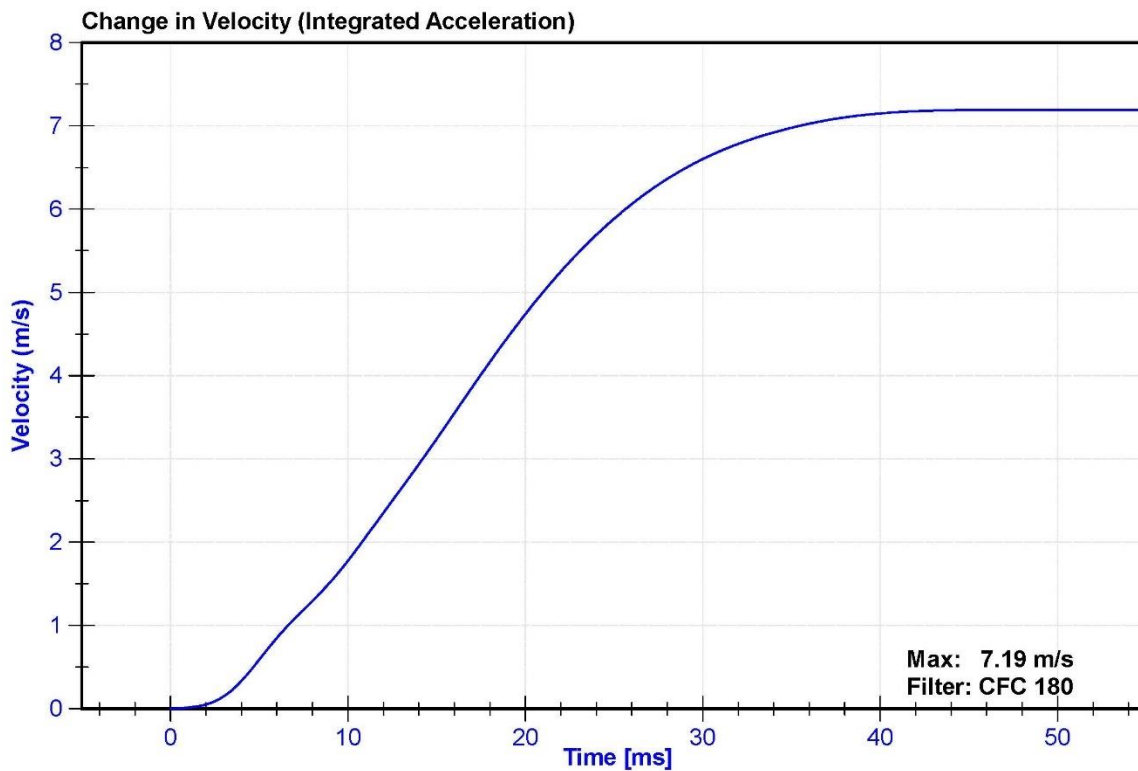
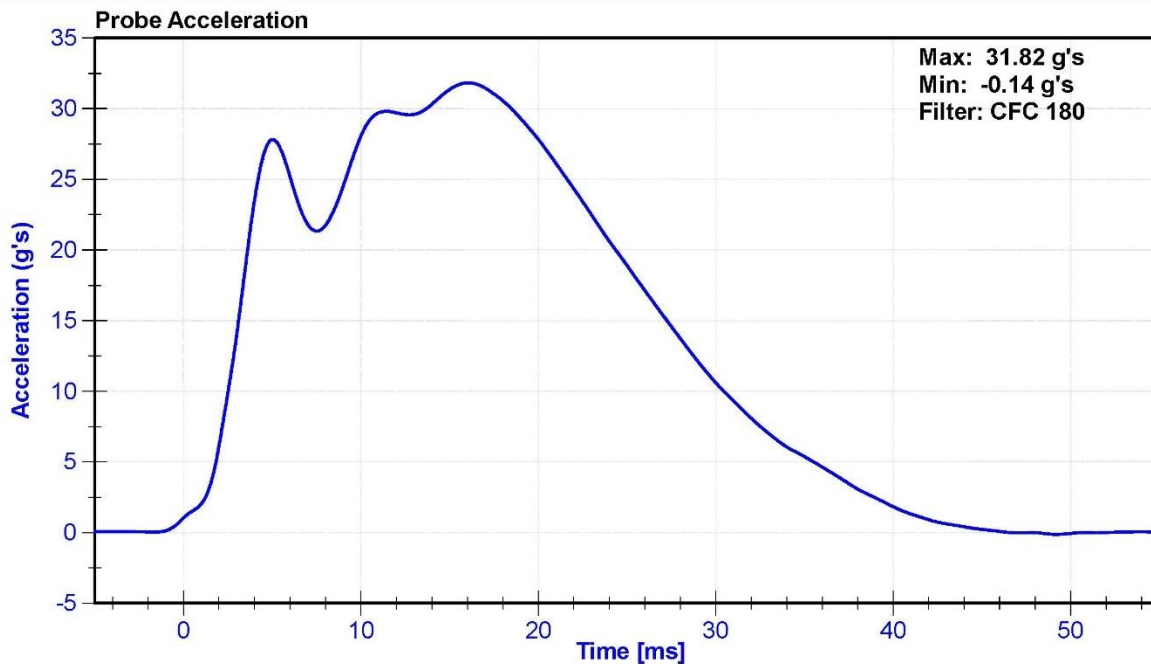
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.9	Pass
Humidity	10	70	%	24.3	Pass
Velocity	2.07	2.13	m/s	2.130	Pass
Resistive Force	3450	4060	N	3941.8	Pass

Transducer Calibrations

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







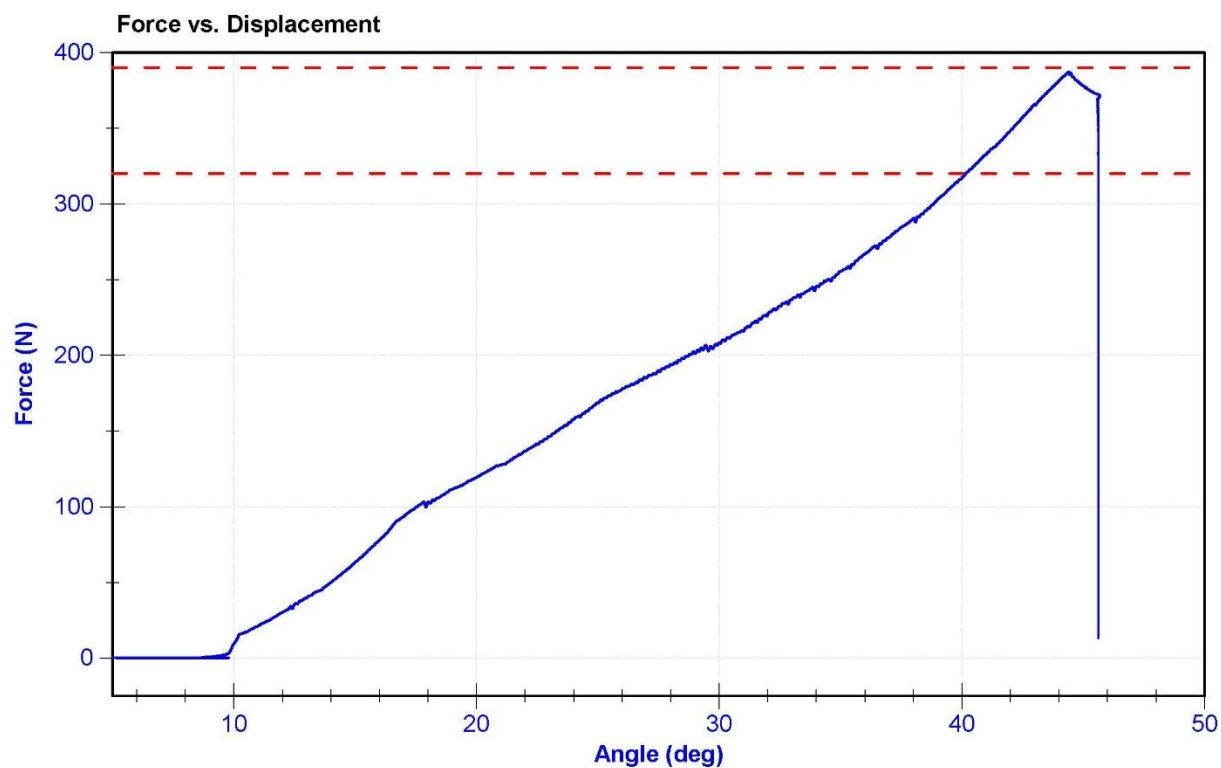
ATD Manufacturer	Humanetics	Test Technician	D. Sakona
ATD Serial Number	137	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.6	25.6	°C	21.2	Pass
Humidity	10	70	%	29.5	Pass
Initial Angle	0	20	deg	9.2	Pass
Force at 45 Degrees	320	390	N	387.2	Pass
Return Angle Relative to Initial	0	8	deg	7.0	Pass

Transducer Calibrations

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



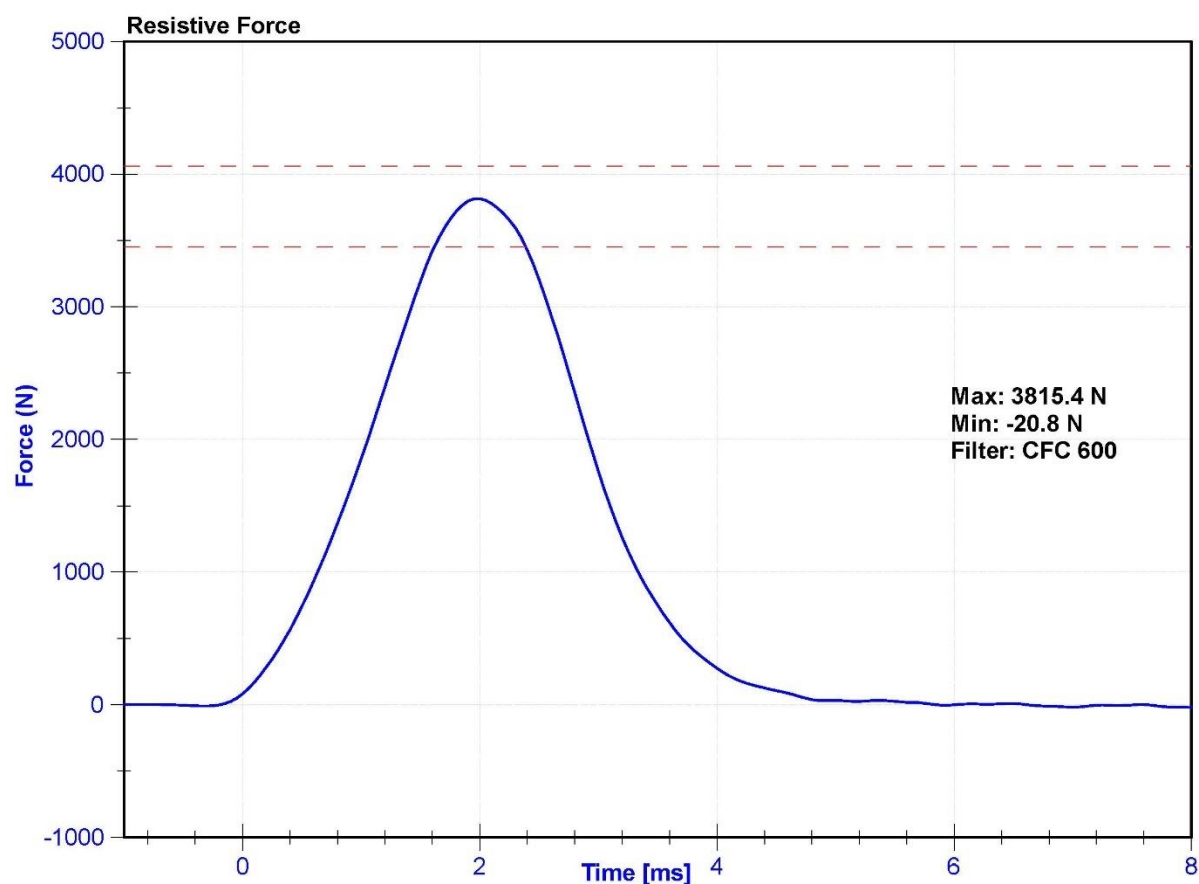
ATD Manufacturer	Humanetics	Test Technician	T. Roseman
ATD Serial Number	137	Laboratory Supervisor	K. Brogan

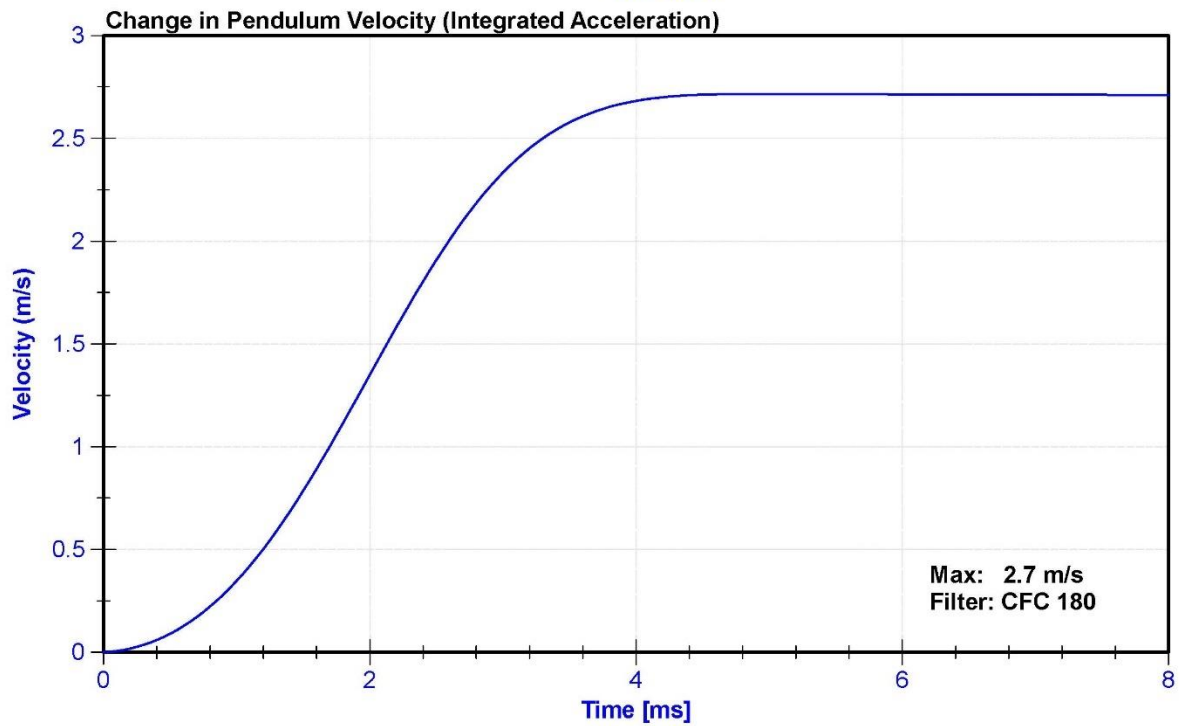
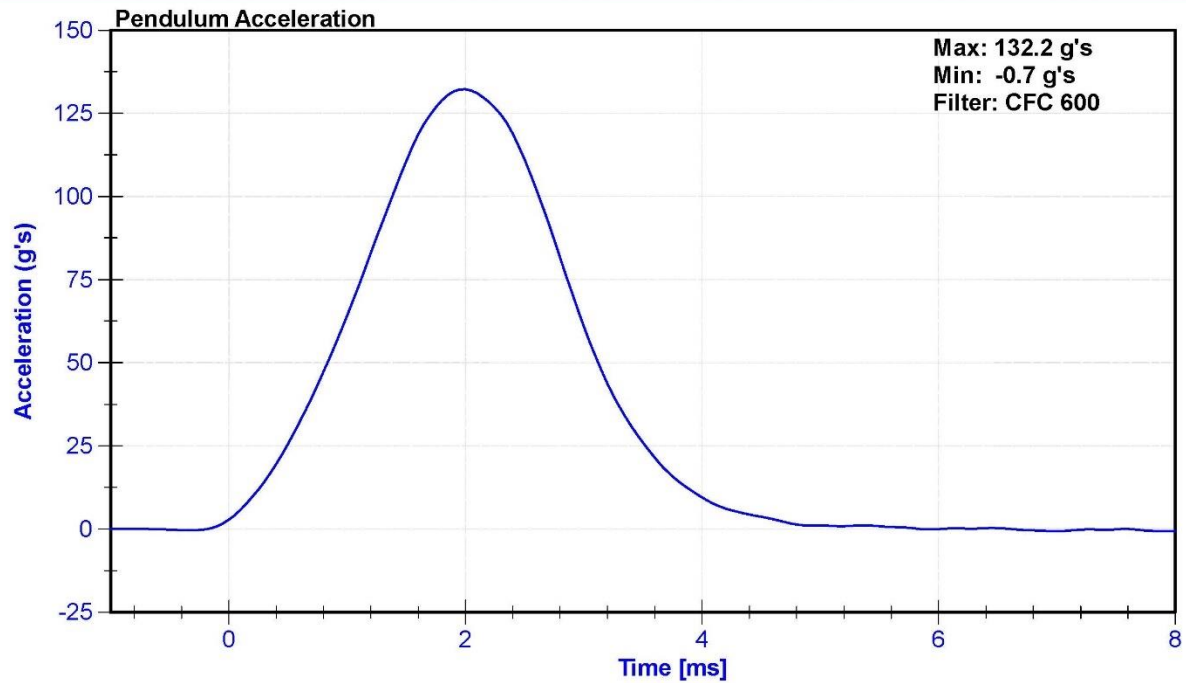
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.9	Pass
Humidity	10	70	%	24.3	Pass
Velocity	2.07	2.13	m/s	2.124	Pass
Resistive Force	3450	4060	N	3815.4	Pass

Transducer Calibrations

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





APPENDIX D

DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA

Table 1 – Driver Dummy Instrumentation

Instrumentation		Axis/Location	Hybrid III 50 th S/N: 142		
			Serial Number	Manufacturer	Calibration Date
Head Accelerometers	Primary	X	P51681	Endevco	4/6/2023
		Y	P64151	Endevco	4/6/2023
		Z	P52114	Endevco	4/6/2023
	Redundant	X	P52079	Endevco	4/6/2023
		Y	P58905	Endevco	4/6/2023
		Z	P63996	Endevco	4/6/2023
Head Angular Rate Sensors		X	7603	DTS ARS	9/6/2022
		Y	15692	DTS ARS	9/6/2022
		Z	15695	DTS ARS	9/6/2022
Upper Neck Load Cell		FX, Fy, Fz MX,MY, MZ	2187-FX	Denton	6/13/2022
Chest Accelerometers	Primary	X	P51991	Endevco	4/6/2023
		Y	P51269	Endevco	4/6/2023
		Z	P49185	Endevco	4/6/2023
	Redundant	X	P68059	Endevco	4/6/2023
		Y	P51713	Endevco	4/6/2023
		Z	P78824	Endevco	4/6/2023
Chest Potentiometer		X	0075	JDK	4/10/2023
Pelvis Accelerometer		X	P58800	Endevco	4/6/2023
		Y	P52157	Endevco	4/6/2023
		Z	P83317	Endevco	4/6/2023
Femur Load Cells - Left	Primary	Z	DI4211-FZ1	Denton	6/14/2022
	Redundant	Z	DI4211-FZ2	Denton	6/14/2022
Femur Load Cells - Right	Primary	Z	115-FZ1	Denton	6/14/2022
	Redundant	Z	115-FZ2	Denton	6/14/2022
Tibia Load Cells - Left	Upper	MX, MY, FZ	407-FZ	Denton	6/10/2022
	Lower	MX, MY, FZ	396-FZ	Denton	6/9/2022
Tibia Load Cells – Right	Upper	MX, MY, FZ	362-FZ	Denton	6/9/2022
	Lower	MX, MY, FZ	364-FZ	Denton	6/9/2022
Foot Accelerometers - Left	Rear	X	P82756	Endevco	4/6/2023
	Front	Z	P51872	Endevco	4/6/2023
Foot Accelerometers - Right	Rear	X	P66942	Endevco	4/6/2023
	Front	Z	P58779	Endevco	4/6/2023

Table 2 – Front Passenger Dummy Instrumentation

Instrumentation		Axis/Location	Hybrid III 5 th S/N: 137		
			Serial Number	Manufacturer	Calibration Date
Head Accelerometers	Primary	X	P79417	Endevco	12/13/2022
		Y	P83335	Endevco	12/13/2022
		Z	P64149	Endevco	12/12/2022
	Redundant	X	P52008	Endevco	12/13/2022
		Y	P52045	Endevco	12/13/2022
		Z	P74774	Endevco	12/12/2022
Head Angular Rate Sensors		X	15212	DTS ARS	9/6/2022
		Y	6731	DTS ARS	9/6/2022
		Z	7521	DTS ARS	9/6/2022
Upper Neck Load Cell		FX, Fy, Fz MX,MY, MZ	1916-FX	Humanetics	6/10/2022
Chest Accelerometers	Primary	X	T21142	Endevco	12/12/2022
		Y	P83346	Endevco	12/12/2022
		Z	P49190	Endevco	12/12/2022
	Redundant	X	P58794	Endevco	12/12/2022
		Y	P69791	Endevco	12/12/2022
		Z	T11253	Endevco	12/12/2022
Chest Potentiometer		X	0720	Servo	12/12/2022
Pelvis Accelerometer		X	P58735	Endevco	12/12/2022
		Y	P77587	Endevco	12/12/2022
		Z	P51285	Endevco	12/12/2022
Femur Load Cells - Left	Primary	Z	135-FZ1	Denton	6/14/2022
	Redundant	Z	135-FZ2	Denton	6/14/2022
Femur Load Cells - Right	Primary	Z	136-FZ1	Denton	6/14/2022
	Redundant	Z	136-FZ2	Denton	6/14/2022
Tibia Load Cells - Left	Upper	MX, MY, FZ	364-FZ	Denton	6/10/2022
	Lower	MX, MY, FZ	398-FZ	Denton	6/8/2022
Tibia Load Cells – Right	Upper	MX, MY, FZ	368-FZ	Denton	6/10/2022
	Lower	MX, MY, FZ	490-FZ	Denton	6/8/2022
Foot Accelerometers - Left	Rear	X	P78959	Endevco	12/12/2022
	Front	Z	P83418	Endevco	12/12/2022
Foot Accelerometers - Right	Rear	X	P83428	Endevco	12/12/2022
	Front	Z	P80265	Endevco	12/12/2022

Table 3 – Vehicle Instrumentation

Instrumentation			Axis	Serial Number	Manufacturer	Calibration Date
Crossmember/Rear Seat Accelerometers	Left	Primary	X	A315832	Measurement Specialties	4/8/2023
			Z	A315871	Measurement Specialties	4/8/2023
		Redundant	X	A315935	Measurement Specialties	4/8/2023
	Right	Primary	X	A315879	Measurement Specialties	4/8/2023
			Z	A352392	Measurement Specialties	4/8/2023
		Redundant	X	A352406	Measurement Specialties	4/8/2023
Engine Accelerometers	Top		X	G22446	Endevco	3/18/2023
	Bottom		X	A372832	Measurement Specialties	1/20/2023