

REPORT NUMBER: NCAP-MGA-25-031

**NEW CAR ASSESSMENT PROGRAM (NCAP)
Frontal Barrier Impact Test**

**VOLVO CAR CORPORATION
2025 Volvo EX90 Ultra 5-Door SUV
NHTSA No.: O20255900**

**MGA RESEARCH CORPORATION
5000 Warren Road
Burlington, WI 53105**



Test Date: December 10, 2025

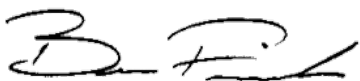
Final Report Date: May 28, 2026

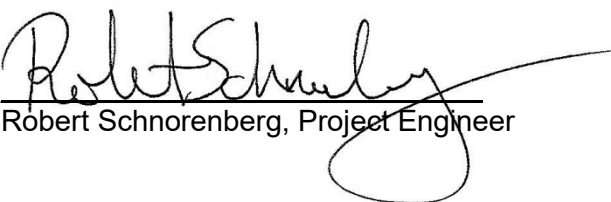
FINAL REPORT

**U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Office of Crashworthiness Standards
Mail Code: NRM-110
1200 New Jersey Ave, SE
Washington, DC 20590**

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Approval Date: May 28, 2026

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

Date: _____

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16. Abstract A 56.3 km/h NCAP Full Frontal Rigid Barrier Impact Test was conducted on a 2025 Volvo EX90 Ultra 5-Door SUV in accordance with the specifications of the Office of Crashworthiness Standards Laboratory Procedure for NCAP Full Frontal Rigid Barrier Impact Testing. The test was conducted at MGA Research Corporation in Burlington, Wisconsin on December 10, 2025. The impact velocity of the vehicle was 56.18 km/h and the ambient temperature at the barrier face at the time of impact was 21.7°C. The target vehicle post-test maximum crush was 483 mm located to the left of the vehicle centerline. The test vehicle's performance was as follows: <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th rowspan="2">Units</th> <th colspan="2">Driver ATD</th> <th colspan="2">Passenger ATD</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>138.995</td> <td>700</td> <td>127.729</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>19.831</td> <td>52</td> <td>17.236</td> </tr> <tr> <td>Nij</td> <td></td> <td>1</td> <td>0.205</td> <td>1</td> <td>0.233</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>4170</td> <td>959.545</td> <td>2620</td> <td>693.517</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>4000</td> <td>495.205</td> <td>2520</td> <td>187.801</td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>10008</td> <td>1653.549</td> <td>6805</td> <td>1558.713</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>10008</td> <td>812.633</td> <td>6805</td> <td>1251.038</td> </tr> </tbody> </table>						Measurement Description	Units	Driver ATD		Passenger ATD		Threshold	Result	Threshold	Result	Head Injury Criteria (HIC ₁₅)		700	138.995	700	127.729	Maximum Chest Compression	mm	63	19.831	52	17.236	Nij		1	0.205	1	0.233	Neck Tension	N	4170	959.545	2620	693.517	Neck Compression	N	4000	495.205	2520	187.801	Left Femur Force	N	10008	1653.549	6805	1558.713	Right Femur Force	N	10008	812.633	6805	1251.038
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TABLE OF CONTENTS

<u>Section</u>		<u>Page No.</u>
1	Purpose and Summary of Test	1
2	Occupant and Vehicle Information / Data Sheets	3
 <u>Data Sheet No.</u>		 <u>Page No.</u>
1	General Test and Vehicle Parameter Data	4
2	Seat Adjustment, Fuel System, and Steering Wheel Data	8
3	Dummy Longitudinal Clearance Dimensions	10
4	Dummy Lateral Clearance Dimensions	11
5	Seat Belt Positioning Data	12
6	High-Speed Camera Locations and Data	13
7	Vehicle Accelerometer Locations	15
8	Photographic Reference Target Locations	16
9	Load Cell Locations on Fixed Barrier	17
10	Test Vehicle Summary of Results	18
11	Post-Test Observations	19
12	Vehicle Profile Measurements	20
13	Accident Investigation Division Data	22
14	Vehicle Intrusion Measurements	23
15	Summary of Indicant FMVSS No. 212 and FMVSS No. 219 (Partial) Data	25
16	FMVSS No. 301 Barrier Impact and Static Rollover Results	26
17	Dummy/Vehicle Temperature Stabilization Data	28
305-1	General Test and Vehicle Parameter Data for Indicant FMVSS No. 305 Testing	29
305-2	Pre-Impact Data for Indicant FMVSS No. 305 Testing	30
305-3	Pre-Impact Electrical Isolation Measurements and Calculations for Indicant FMVSS No. 305 Testing	31
305-4	Post-Impact Data for Indicant FMVSS No. 305 Testing	33
305-5	Static Rollover Test Data for Indicant FMVSS No. 305 Testing	36
 <u>Appendix</u>		
A	Photographs	A
B	Dummy Response Data Traces	B
C	Dummy Qualification and Performance Verification	C
D	Test Equipment and Instrumentation Calibration	D

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 number 693JJ919D000006. 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 was conducted in accordance with the Office of Crashworthiness Standards Laboratory Procedure for NCAP Full Frontal Rigid Barrier Impact Testing, dated May 2018.

SUMMARY

A load cell barrier consisting of 176 load cells was impacted by a 2025 Volvo EX90 Ultra 5-Door SUV at a velocity of 56.18 km/h. The test was performed at MGA Research Corporation on December 10, 2025. Pre-test and post-test photographs of the vehicle and dummies can be found in Appendix A.

Two (2) real-time cameras and sixteen (16) high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in 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 test device (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, right/left femur load cells, and lower leg instrumentation. Seat belt load cells were installed on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading.

The driver (position 1) ATD (Serial No. 064) and the right-front passenger (position 2) ATD (Serial No. 142) were qualified previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C of this report.

The 282 channels of data were recorded on a data acquisition system. Appendix B contains the dummy response data traces.

There was 100 percent windshield retention and no intrusion into the protected zone of the windshield during the event. There was no battery electrolyte leakage and no loss of high-voltage battery isolation after the event or during any phase of the static rollover.

The maximum static crush of the vehicle was 483 mm located to the left of the vehicle centerline and both the 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 airbag. The driver's head also contacted the headrest. The driver's knees contacted the knee airbag.

The passenger's visible contact points were as follows: The passenger's head contacted the airbag. The passenger's head also contacted the headrest. The passenger's knees contacted the knee airbag.

The occupant data is summarized below:

ATD position	HIC₁₅	Nij	Neck Tension (N)	Neck Comp. (N)	3ms Chest Clip (g)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver (50 th)	138.995	0.205	959.545	495.205	32.766	19.831	1653.549	812.633
Passenger (5 th)	127.729	0.233	693.517	187.801	30.199	17.236	1558.713	1251.038

The test data can be found on the NHTSA website at www.nhtsa.gov

TEST NOTES

None.

MGA does not endorse or certify products. The manufacturer's name appears solely for identification purposes.

SECTION 2
OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
 Test Date: 12/10/2025

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	O20255900	Traction Control System (TCS)	Yes
Model Year	2025	Power Steering	Yes
Make	Volvo	Power Window Auto-Reverse	Yes
Model	EX90 Ultra	Driver Frontal Airbag	Yes
Body Style	5-Door SUV	Driver Curtain Airbag	Yes
VIN	7JDEV3VL9SG000950	Driver Head/Torso Airbag	No
Body Color	Vapour Grey	Driver Torso Airbag	No
Odometer (km/mi)	76 km / 47 mi	Driver Torso/Pelvis Airbag	Yes
Engine Displacement (L)		Driver Pelvis Airbag	No
Type/No. Cylinders	Electric	Driver Knee Airbag	Yes
Engine Placement	Lateral	Front Pass. Frontal Airbag	Yes
Transmission Type	Automatic	Front Pass. Curtain Airbag	Yes
Transmission Speeds	1	Front Pass. Head/Torso Airbag	No
Overdrive	No	Front Pass. Torso Airbag	No
Final Drive	AWD	Front Pass. Torso/Pelvis Airbag	Yes
Roof Rack	No	Front Pass. Pelvis Airbag	No
Sunroof/T-Top	Yes	Front Pass. Knee Airbag	Yes
Running Boards	No	Driver Pretensioner	Yes
Tilt Steering Wheel	Yes	Driver Load Limiter	Yes
Power Seats	Yes	Front Pass. Pretensioner	Yes
Anti-Lock Brakes (ABS)	Yes	Front Pass. Load Limiter	Yes
Automatic Door Locks (ADLs)	Yes	Far-Side Seat Airbags	Yes

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

DATA FROM CERTIFICATION LABEL

Manufactured By	VOLVO CAR CORPORATION	GVWR (kg)	3388
Date of Manufacture	06/24	GAWR Front (kg)	1529
		GAWR Rear (kg)	1960

VEHICLE SEATING AND WEIGHT CAPACITY DATA

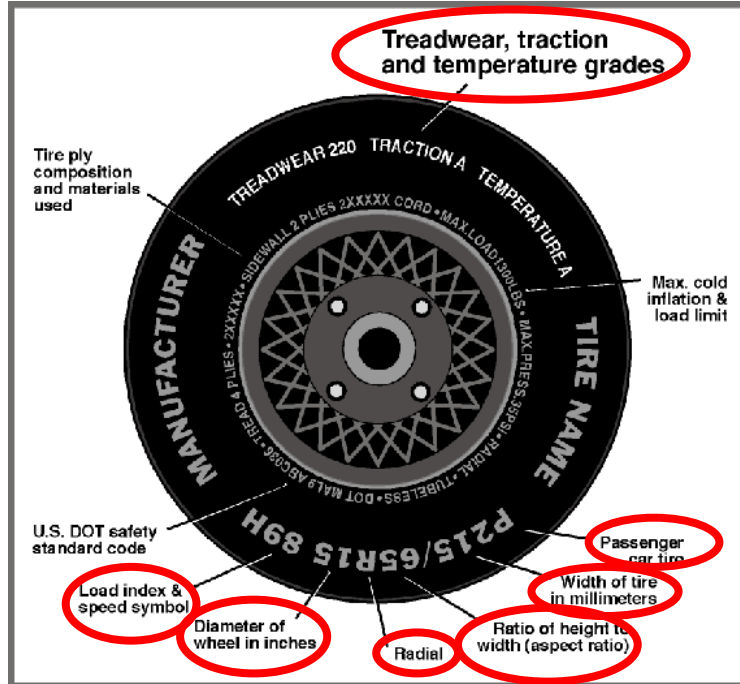
Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Split Bench	Split Bench	
Designated Seating Capacity (DSC)	2	3	2	7
Capacity Weight (VCW) (kg)				558
Cargo Weight (RCLW) (kg)				82

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

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
 Test Date: 12/10/2025

VEHICLE TIRE INFORMATION



Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	340	340
Cold Pressure (kPa)	280	280
Recommended Tire Size	265/45R21	295/40R21
Tire Size on Vehicle	265/45R21	295/40R21
Tire Manufacturer	Michelin	Michelin
Tire Model	Primacy Tour A/S	Primacy Tour A/S
Treadwear	540	540
Traction	B	B
Temperature Grade	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel, 1 Polyamide	2 Polyester, 2 Steel, 1 Polyamide
Load Index/Speed Symbol	108V	111V
Tire Material	Rubber	Rubber
DOT Safety Code Left	03L XL 012X 1824	03L 1R 00LX 1624
DOT Safety Code Right	03L XL 012X 1824	03L 1R 00LX 1624

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

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
 Test Date: 12/10/2025

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	663.0	710.5		700.0	783.0	
Right	kg	650.5	735.5		681.5	810.0	
Ratio	%	47.6%	52.4%		46.4%	53.6%	
Totals	kg	1313.5	1446.0	2759.5	1381.5	1593.0	2974.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	2759.5
Weight of 1 P572E ATD & 1 P572O ATD	kg	141
Rated Cargo/Luggage Weight (RCLW)	kg	82
Calculated Test Vehicle Target Weight (TVTW)	kg	2982.5

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	830	828	839	840	1564
As Tested	mm	803	805	814	819	1599
Post Test	mm	715	763	744	761	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2985
Total Vehicle Length at Left Side	mm	4789
Total Vehicle Length at Centerline	mm	5030
Total Vehicle Length at Right Side	mm	4790
Weight of Ballast in Cargo Area	kg	4
Weight of Vehicle Components Removed	kg	16
Amount of Stoddard Solvent in Fuel Tank	L	

List of components removed to meet test weight: None.

List of components removed for instrumentation, data box, and equipment installation:
Cargo area carpet/trim/dividers, jack and tools.

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

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
 Test Date: 12/10/2025

TARGET VEHICLE STRUCTURAL MEASUREMENT

	Elements	Pre-Test (mm)
1	Total Length	5030
2	Total Width	1957
3	Bumper Top Height	625
4	Bumper Bottom Height	469
5	Longitudinal Member Top Height	708
6	Distance between Longitudinal Members	866
7	Longitudinal Member Width	94
8	Engine Top Height	673
9	Engine Bottom Height	232
10	Engine and Gearbox Width	505
11	Front Bumper-Engine Distance	735
12	Front Shock Absorber Fixing Height	991
13	Bonnet Leading Edge Height	863
14	Front Shock Absorber Fixing Width	963
15	Front Bumper – Front Axle Distance	898
16	Front Axle – A-Pillar Distance	705
17	A-Pillar – B-Pillar Distance	975
18	B-Pillar – Rear Axle Distance	1304
19	B-Pillar – C-Pillar Distance	1213
20	Roof Sill Bottom Height	1508
21	Roof Sill Top Height	1590
22	Floor Sill Bottom Height	241
23	Floor Sill Top Height	432

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

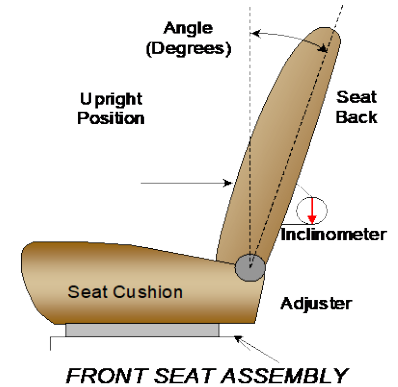
Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
 Test Date: 12/10/2025

NOMINAL DESIGN RIDING POSITION

The driver seat back is positioned as close as possible to the manufacturer's design angle. For the passenger seat back, seat back is adjusted following Appendix F, "Driver & Passenger Dummy Seating & Positioning Procedures" in the NCAP Test Procedure dated May 2018.

	Degrees
Driver Seat Back Angle	22.1° on seat back
Passenger Seat Back Angle	14.1° on seat back



SEAT FORE/AFT POSITIONS

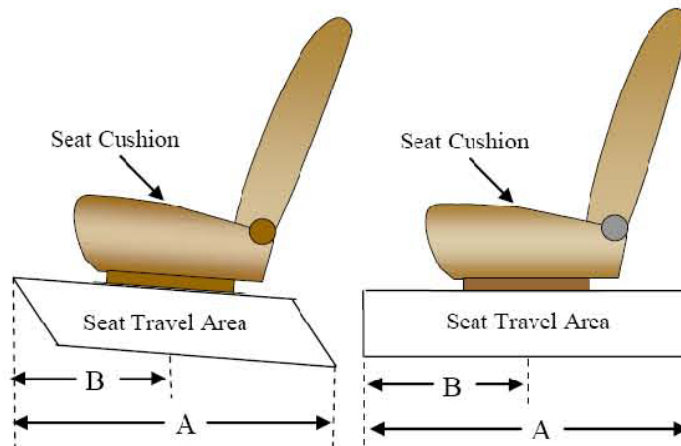
The driver and passenger seat fore/aft positions are adjusted following Appendix F, "Driver & Passenger Dummy Seating & Positioning Procedures" in the NCAP Test Procedure dated May 2018.

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	322 mm	161 mm
Passenger Seat	242 mm	0 mm

SEAT BELT UPPER ANCHORAGES

The seat belt upper anchorages are set following the manufacturer's specified position as listed in Form 1.

	Total # of Positions	Placed in Position #
Driver Seat	4 (1st as 1)	0 (1st as 0)
Passenger Seat	4 (1st as 1)	0 (1st as 0)



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

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

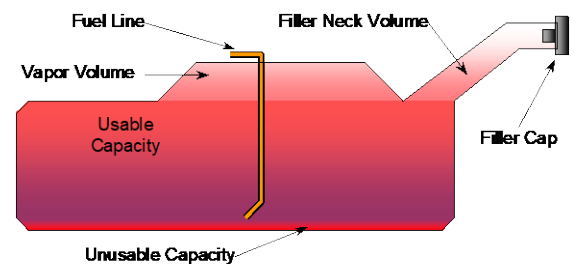
NHTSA No.: O20255900
 Test Date: 12/10/2025

FUEL TANK CAPACITY DATA

	Liters
Usable Capacity of "Standard Tank"	
Usable Capacity of "Optional Tank"	
92-94% of Usable Capacity	
Actual Amount of Solvent used	
1/3 of Usable Capacity	

FUEL PUMP

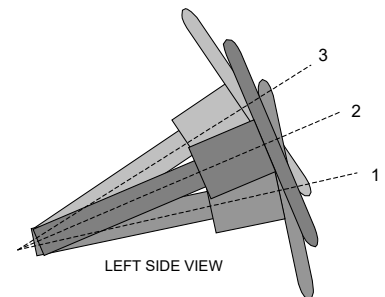
Electric vehicle.



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. An aluminum plate is placed across the rim of the steering wheel, an inclinometer is placed on the plate and the angle is measured.



STEERING COLUMN ASSEMBLY

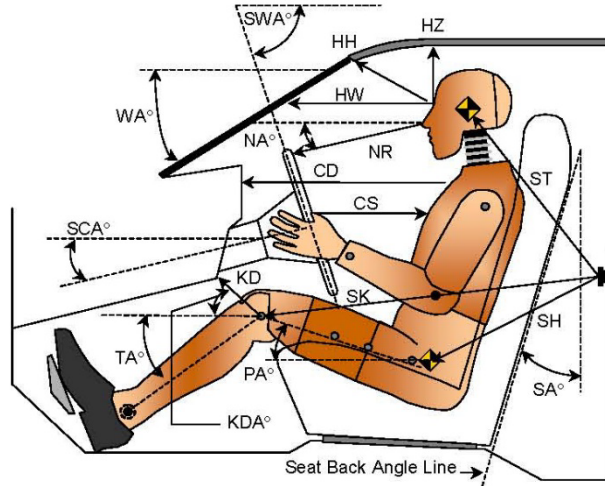
STEERING COLUMN POSITION

	Degrees	Fore/Aft Position (mm)
Lowermost Position 1	68.8	
Geometric Center Position 2	66.5	
Uppermost Position 3	64.1	
Telescoping Steering Wheel Travel		52
Test Position	66.5	26

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
 Test Date: 12/10/2025



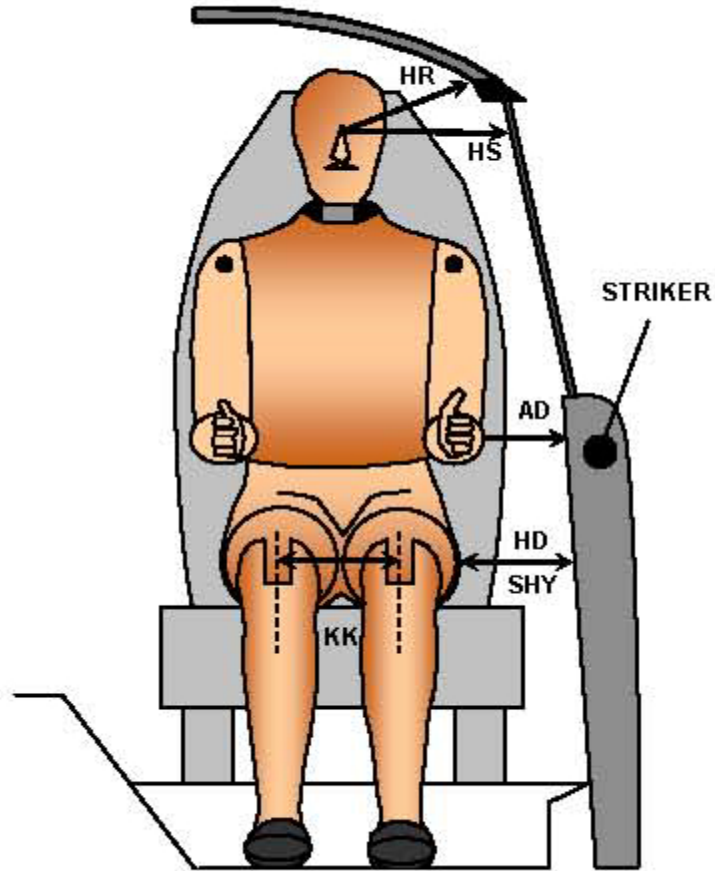
LEFT SIDE VIEW

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		28.9		
SWA°	Steering Wheel Angle		66.5		
SCA°	Steering Column Angle		23.5		
SA°	Seat Back Angle		22.1		14.1
HZ	Head to Roof (Z)	250	90	216	90
HH	Head to Header	438	20.7	315	42.4
HW	Head to Windshield	717	0	639	0
NR	Nose to Rim	445	8.2		
CD	Chest to Dash	673		382	
CS	Chest to Steering Hub	366	1.8		
RA	Rim to Abdomen	234	0		
KDL	Left Knee to Dash	246	35.6	150	47.1
KDR	Right Knee to Dash	236	37.3	158	41.2
PA°	Pelvic Angle		22.9		20.9
TA°	Tibia Angle		38.0		58.2
SK	Striker to Knee	524	97.6	624	95.4
ST	Striker to Head	481	0.1	458	22.3
SH	Striker to H-Point	229	140.9	324	114.8

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
Test Date: 12/10/2025



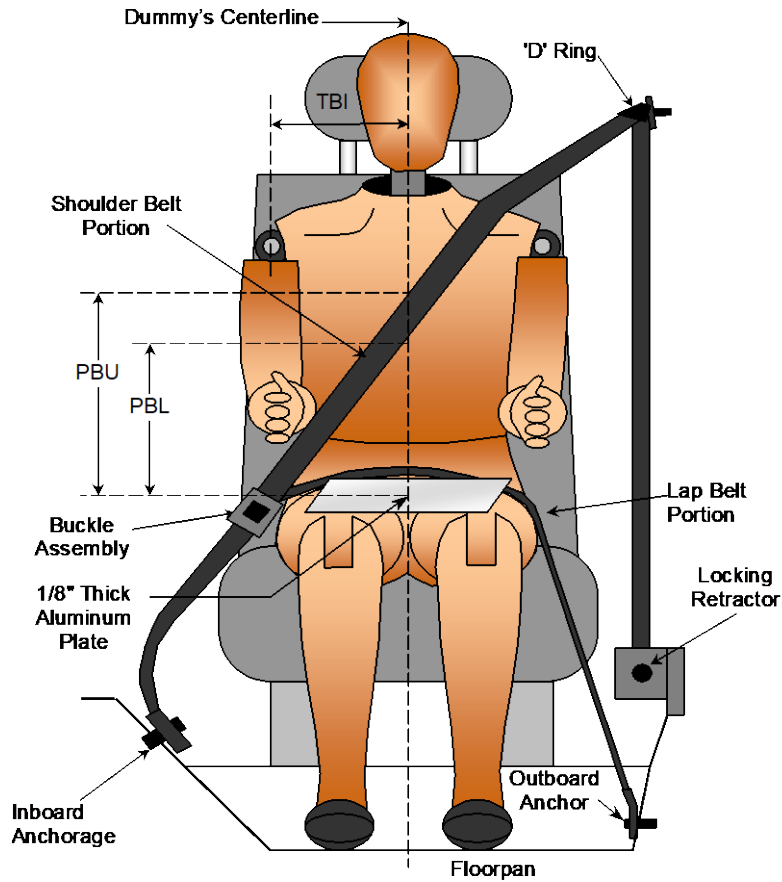
FRONT VIEW OF DUMMY

Code	Measurement Description	Units	Driver	Passenger
AD	Arm to Door	mm	126	87
HD	H-Point to Door	mm	168	217
HR	Head to Side Header	mm	236	252
HS	Head to Side Window	mm	358	368
KK	Knee to Knee	mm	350	229
SHY	Striker to H-Point (Y Direction)	mm	237	276
AA	Ankle to Ankle	mm	331	170

DATA SHEET NO. 5 SEAT BELT POSITIONING DATA

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
Test Date: 12/10/2025



FRONT VIEW OF DUMMY

SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU - Top surface of reference to belt upper edge	mm	365	310
PBL - Top surface of reference to belt lower edge	mm	285	230

BELT LENGTH DATA

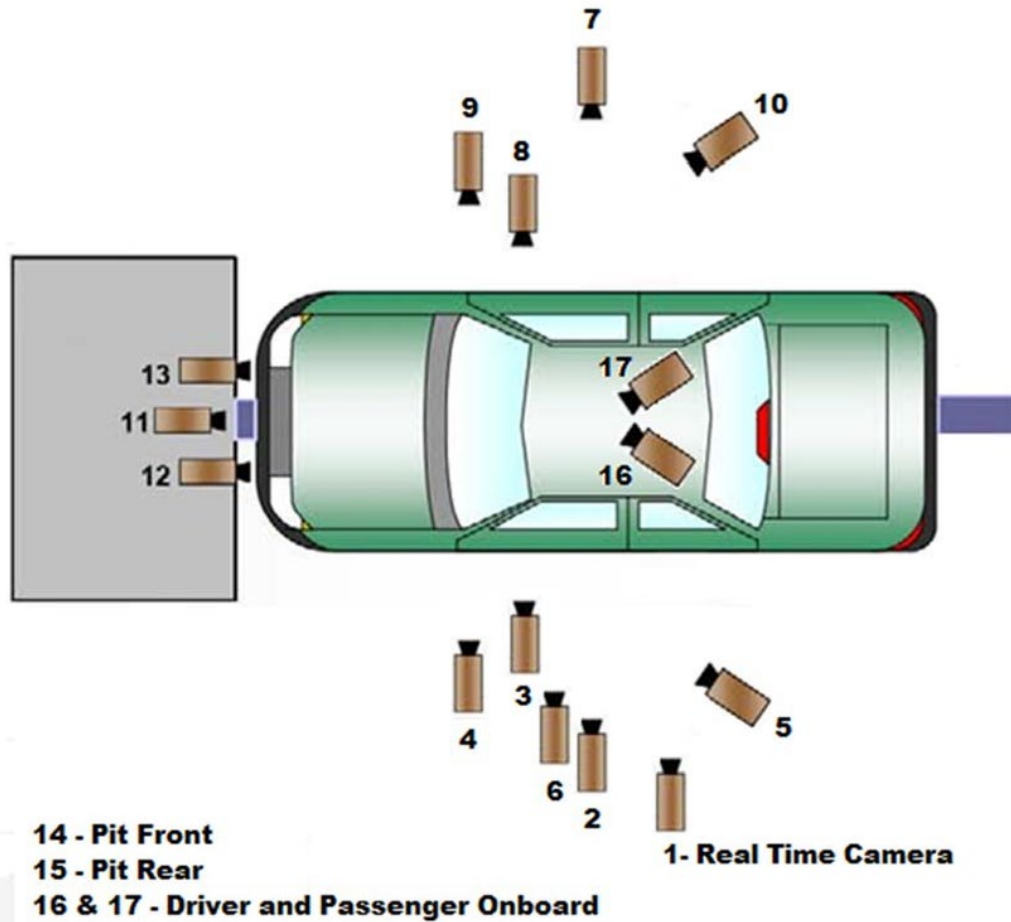
Measurement Description	Units	Driver	Passenger
Shoulder Belt Length as measured on ATD	mm	910	990
Lap Belt Length as measured on ATD	mm	570	510
Remainder of belt on reel	mm	1180	1160
Total Belt Length for Continuous Webbing Systems	mm	3460	3460

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

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
Test Date: 12/10/2025

CAMERA POSITIONS FOR FRONTAL IMPACTS



***Camera locations are approximate and not to scale*

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

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
 Test Date: 12/10/2025

CAMERA LOCATIONS

No.	Camera View	Coordinates* (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall					30
2	Left Overall	-2620	-5940	-1440	12	1000
3	Driver Close-Up	-2180	-6970	-2190	50	1000
4	Left Front Half	-1630	-5600	-1440	24	1000
5	Left Angle	-7290	-5800	-2280	75	1000
6	Steering Column	-1100	-6570	-1260	50	1000
7	Right Overall	-2490	5400	-1560	12	1000
8	Passenger Close-Up	-2090	5800	-2070	50	1000
9	Right Front Half	-1450	5410	-1520	24	1000
10	Right Angle	-7400	5510	-2250	75	1000
11	Windshield	140	0	-2310	12	1000
12	Driver Windshield	180	-370	-2230	25	1000
13	Passenger Windshield	180	370	-2230	25	1000
14	Pit Front	-1060	0	3340	24	1000
15	Pit Rear	-3080	0	3340	24	1000
16	Driver Onboard				12	1000
17	Passenger Onboard				12	1000
18	Real-Time Pan View					30

*COORDINATES:

+X = forward of impact plane

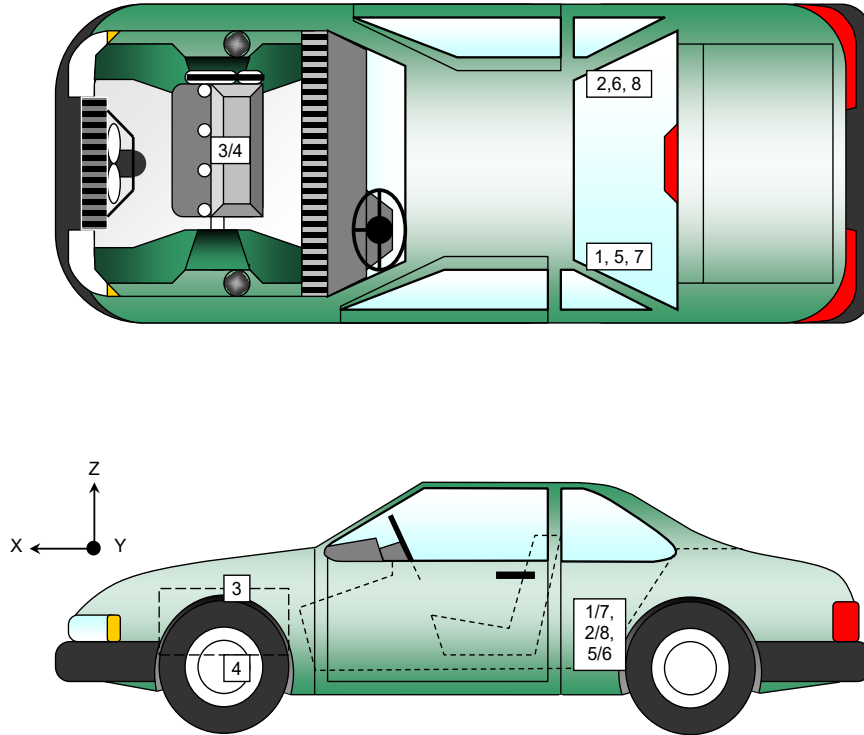
+Y = right of monorail centerline

+Z = below ground level

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

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
Test Date: 12/10/2025



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Crossmember Accelerometer – X Direction	2110	-455	-388
2	Right Rear Crossmember Accelerometer – X Direction	2113	469	-387
3	Engine Top X	4294	52	-619
4	Engine Bottom X	4104	-83	-221
5	Left Rear Crossmember Accelerometer – Z Direction	2110	-455	-388
6	Right Rear Crossmember Accelerometer – Z Direction	2113	469	-387
7	Left Rear Crossmember Accelerometer Redundant – X Direction	2110	-455	-388
8	Right Rear Crossmember Accelerometer Redundant – X Direction	2113	469	-387

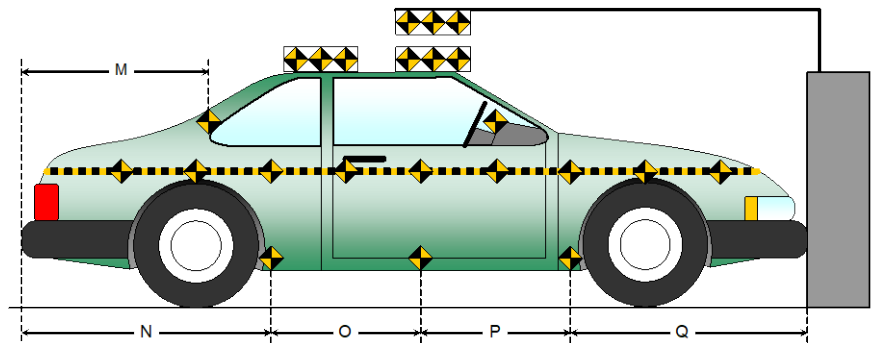
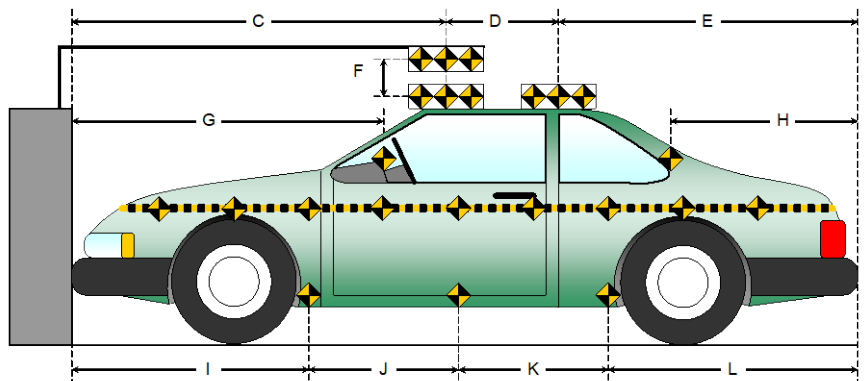
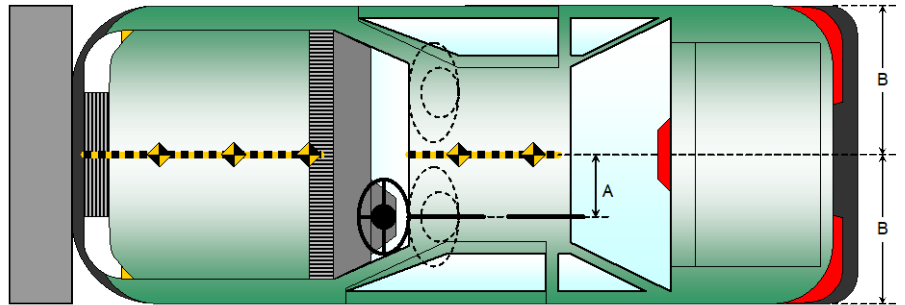
Reference Points: X - Rear Surface of Vehicle (+ forward)
 Y - Vehicle Centerline (+ to right)
 Z - Ground Plane (+ down)

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

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
Test Date: 12/10/2025

Item	Value (mm)
A	395
B	979
C	2538
D	609
E	1883
F	148
G	
H	1261
I	1390
J	1012
K	1019
L	1608
M	1261
N	1610
O	1015
P	1017
Q	1387



DATA SHEET NO. 9
LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
Test Date: 12/10/2025

ADVANCED RESEARCH LOAD CELL BARRIER

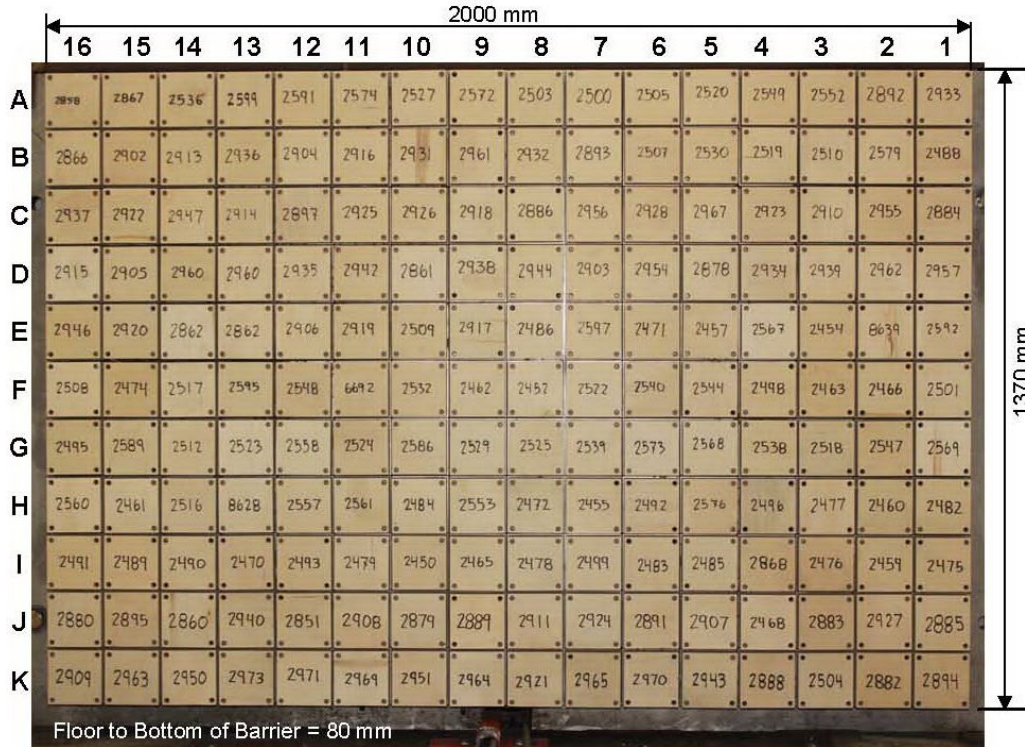


Photo for Reference Only

Centerline

A-16	A-15	A-14	A-13	A-12	A-11	A-10	A-09	A-08	A-07	A-06	A-05	A-04	A-03	A-02	A-01
B-16	B-15	B-14	B-13	B-12	B-11	B-10	B-09	B-08	B-07	B-06	B-05	B-04	B-03	B-02	B-01
C-16	C-15	C-14	C-13	C-12	C-11	C-10	C-09	C-08	C-07	C-06	C-05	C-04	C-03	C-02	C-01
D-16	D-15	D-14	D-13	D-12	D-11	D-10	D-09	D-08	D-07	D-06	D-05	D-04	D-03	D-02	D-01
E-16	E-15	E-14	E-13	E-12	E-11	E-10	E-09	E-08	E-07	E-06	E-05	E-04	E-03	E-02	E-01
F-16	F-15	F-14	F-13	F-12	F-11	F-10	F-09	F-08	F-07	F-06	F-05	F-04	F-03	F-02	F-01
G-16	G-15	G-14	G-13	G-12	G-11	G-10	G-09	G-08	G-07	G-06	G-05	G-04	G-03	G-02	G-01
H-16	H-15	H-14	H-13	H-12	H-11	H-10	H-09	H-08	H-07	H-06	H-05	H-04	H-03	H-02	H-01
I-16	I-15	I-14	I-13	I-12	I-11	I-10	I-09	I-08	I-07	I-06	I-05	I-04	I-03	I-02	I-01
J-16	J-15	J-14	J-13	J-12	J-11	J-10	J-09	J-08	J-07	J-06	J-05	J-04	J-03	J-02	J-01
K-16	K-15	K-14	K-13	K-12	K-11	K-10	K-09	K-08	K-07	K-06	K-05	K-04	K-03	K-02	K-01

Load Cells are 121 mm x 121 mm with a 7 mm gap in between each load cell.

DATA SHEET NO. 10
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
 Test Date: 12/10/2025

INSTRUMENTATION

Instrumentation	Number of Channels Collected
Driver Dummy Data Channels	49
Passenger Dummy Data Channels	49
Vehicle Structure Accelerometers	8
Barrier Channels	176
Total	282

CAMERA COVERAGE

Type of Camera	Number Used in this Test
High-Speed Vehicle Onboard	2
High-Speed Offboard	14
Real-Time	2
Total	18

DATA SHEET NO. 11
POST-TEST OBSERVATIONS

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
Test Date: 12/10/2025

TEST DUMMY INFORMATION AND CONTACT LOCATIONS

Description	Driver	Passenger
Dummy Type / Serial No.	HIII 50% / 064	HIII 5% / 142
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	Knee Airbag
Right Knee Contact	Knee Airbag	Knee Airbag

DOOR OPENING, TRUNK OPENING, AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Locked/Unlocked Doors	Doors were locked pre-test	Doors were locked pre-test
Front Door Opening	Remained closed and locked; opened without tools	Remained closed and locked; opened without tools
Rear Door Opening	Remained closed and locked; opened without tools	Remained closed and locked; opened without tools
Trunk/Hatch/Tailgate Opening	Remained closed; opened without tools	
Seat Track Shift (mm)	0	0
Seat Back Movement	None	None

OTHER VEHICLE POST-TEST OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Windshield Damage	None
Window Damage	None
Other Notable Effects	RF/LF tire deflated

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	1874
Center	mm	1754
Right Side	mm	1853
Average	mm	1827

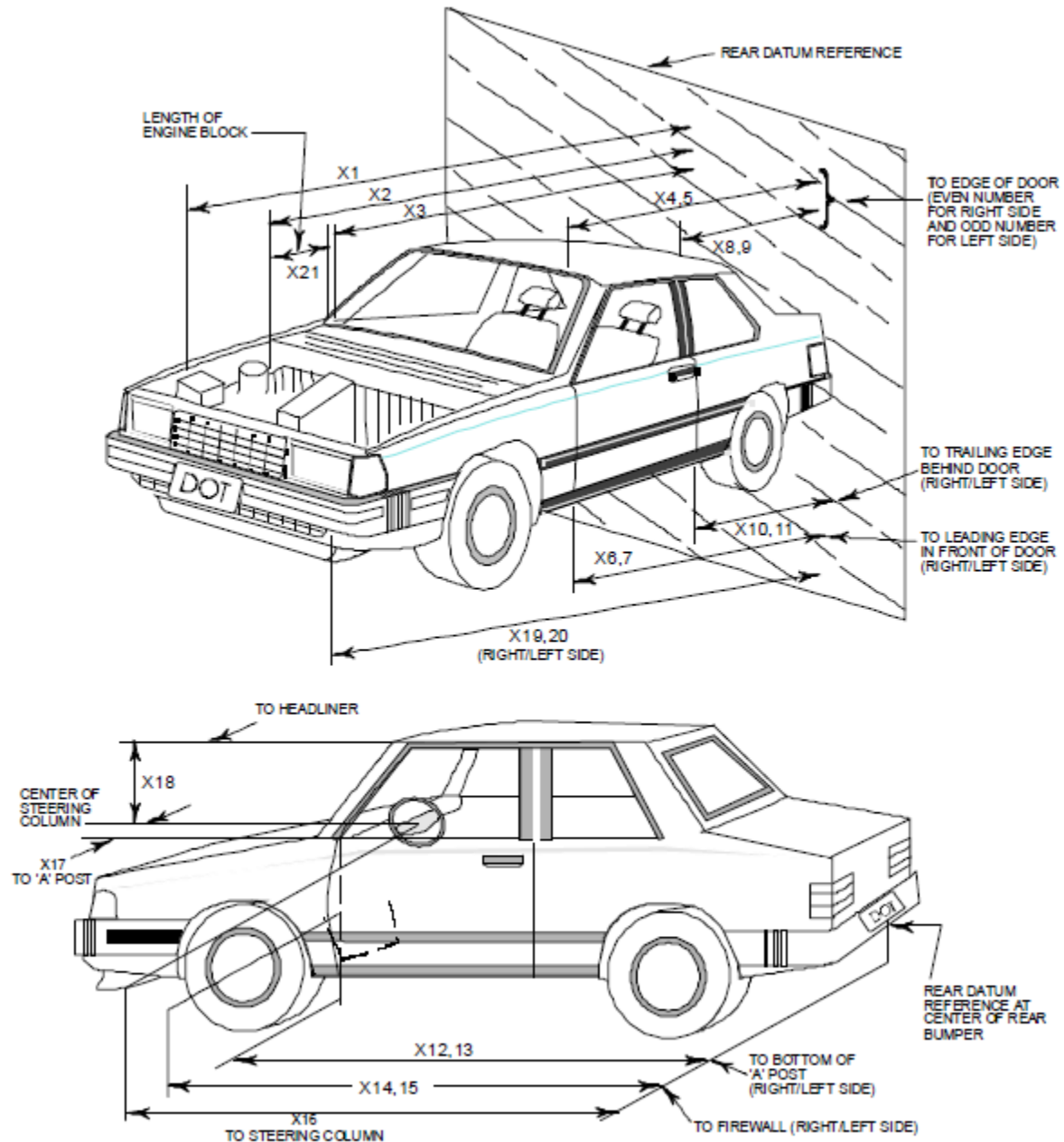
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Driver		Passenger	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	Yes	Yes	Yes
Curtain Side Airbag	Yes	No	Yes	No
Torso/Pelvis Side 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
Far-side Seat Airbag	Yes	No	Yes	No

DATA SHEET NO. 12 VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
Test Date: 12/10/2025



DATA SHEET NO. 12 (CONTINUED)
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
Test Date: 12/10/2025

No.	Measurement Description	Pre-Test	Post-Test	Change
1	Total Length of Vehicle at Centerline	5030	4531	-499
2	RSOV to Front of Engine	4280	N/A	N/A
3	RSOV to Firewall	3998	3966	-32
4	RSOV to Upper Leading Edge of Right Door	3456	3453	-3
5	RSOV to Upper Leading Edge of Left Door	3454	3452	-2
6	RSOV to Lower Leading Edge of Right Door	3508	3508	0
7	RSOV to Lower Leading Edge of Left Door	3507	3506	-1
8	RSOV to Upper Trailing Edge of Right Door	2356	2353	-3
9	RSOV to Upper Trailing Edge of Left Door	2352	2351	-1
10	RSOV to Lower Trailing Edge of Right Door	2430	2428	-2
11	RSOV to Lower Trailing Edge of Left Door	2430	2428	-2
12	RSOV to Bottom of "A" Post of Right Side	3642	3641	-1
13	RSOV to Bottom of "A" Post of Left Side	3640	3638	-2
14	RSOV to Firewall, Right Side	3832	3809	-23
15	RSOV to Firewall, Left Side	3830	3825	-5
16	RSOV to Steering Column	2970	3072	102
17	Center of Steering Column to "A" Post	258	258	0
18	Center of Steering Column to Headliner	433	442	9
19	RSOV to Right Side of Front Bumper	4790	4469	-321
20	RSOV to Left Side of Front Bumper	4789	4452	-337
21	Length of Engine Block	262	262	0
RD	RSOV to Right Side of Dash Panel	3204	3205	1
CD	RSOV to Center of Dash Panel	3215	3216	1
LD	RSOV to Left Side of Dash Panel	3205	3203	-2

All dimensions in mm

DATA SHEET NO. 13
ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
Test Date: 12/10/2025

VEHICLE INFORMATION

VIN: 7JDEV3VL9SG000950
Vehicle Size Category: MPV

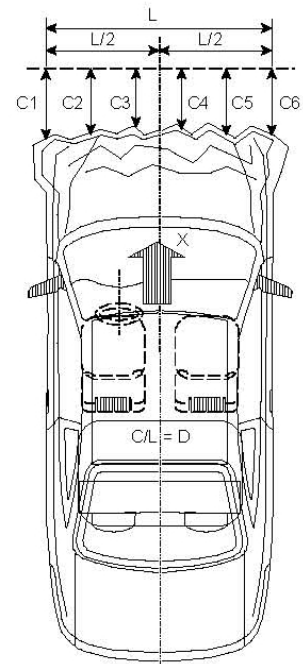
Wheelbase (mm): 2985
Test Weight (kg): 2974.5

ACCELEROMETER DATA

Accelerometer Locations: As per Data Sheet No. 7
Cal. Procedure/Interval: MGA Procedure / 6 month
Integration Algorithm: Trapezoidal
Linearity: > 99%
Impact Velocity (km/h): 56.18
Velocity Change (km/h): 66.4
Time of Separation (msec) 118

CRUSH PROFILE

Collision Deformation Classification: 12FDEW3
Midpoint of Damage: Centerline
Damage Region Length (mm): 1484
Impact Mode: Frontal



No.	Measurement Description	Units	Pre-Test	Post-Test	Exterior Crush
C1	Crush zone 1 at left side	mm	2211	2548	337
C2	Crush zone 2 at left side	mm	2044	2511	467
C3	Crush zone 3 at left side	mm	1998	2481	483
C4	Crush zone 4 at right side	mm	1997	2472	475
C5	Crush zone 5 at right side	mm	2046	2494	448
C6	Crush zone 6 at right side	mm	2210	2531	321
L	C1 TO C6	mm	1484	1598	114

DATA SHEET NO. 14
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

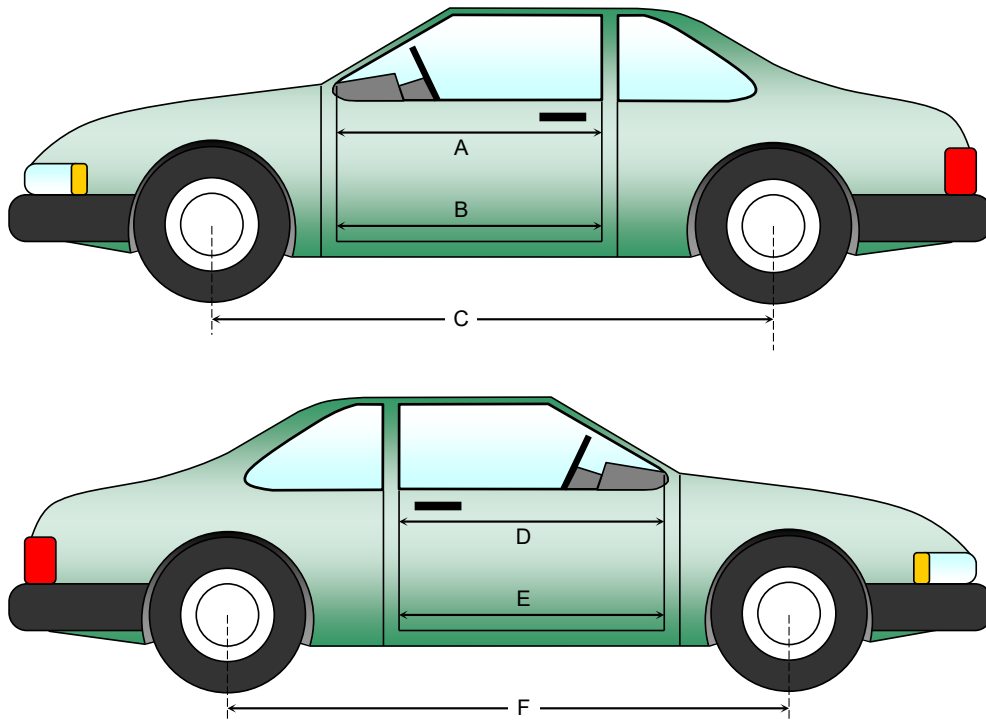
NHTSA No.: O20255900
Test Date: 12/10/2025

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Change
A	Left Side Upper	mm	981	981	0
B	Left Side Lower	mm	885	885	0
D	Right Side Upper	mm	979	979	0
E	Right Side Lower	mm	883	882	-1

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Change
C	Left Side Wheelbase	mm	2985	2879	-106
F	Right Side Wheelbase	mm	2986	2910	-76



DATA SHEET NO. 14 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

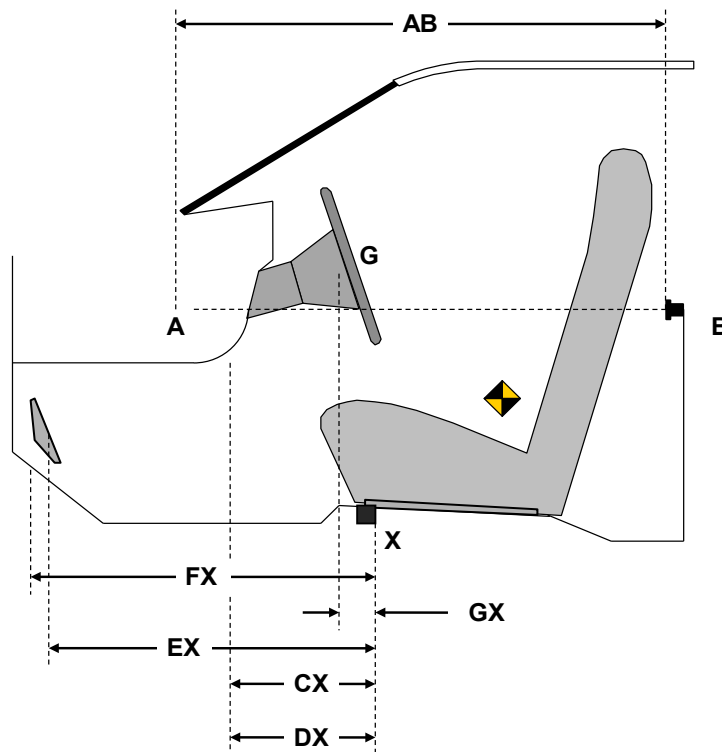
Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
 Test Date: 12/10/2025

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Change
AB	Door Opening (Inside Window Jam)	mm	757	757	0
CX	Left Knee Bolster to X	mm	342	339	-3
DX	Right Knee Bolster to X	mm	348	345	-3
EX	Brake Pedal to X	mm	558	654	96
FX	Foot Rest to X	mm	551	546	-5
GX	Center of Steering Column Wheel Hub to X	mm	64	165	101

X = Front of Seat Track (stationary)



DRIVER COMPARTMENT

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

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
 Test Date: 12/10/2025

WINDSHIELD MOUNTING DETAILS

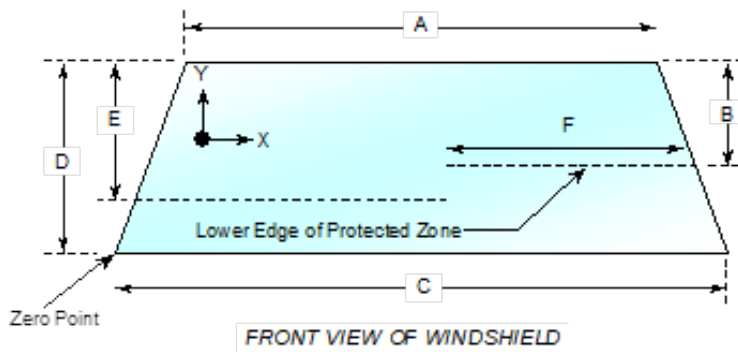
Windshield glass is secured to the vehicle frame with a rubber trim and glue.

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

Temperature of windshield molding during test: 21.7°C.

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% of Retention
Left Side	2277	2277	100
Right Side	2277	2277	100
Total	4554	4554	100



Item	Units	Value
A	mm	1284
B	mm	493
C	mm	1562
D	mm	854
E	mm	489
F	mm	601

AREA OF PROTECTED ZONE FAILURES

A. Provide coordinates of the area that the protected zone was penetrated more than 0.25 inches by a vehicle component other than one that is normally in contact with the windshield. **None**

X	Y

B. Provide coordinates of the area beneath the protected zone that the inner surface of the windshield was penetrated by a vehicle component. **None**

X	Y

DATA SHEET NO. 16
FMVSS NO. 301 BARRIER IMPACT AND STATIC ROLLOVER RESULTS

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
 Test Date: 12/10/2025

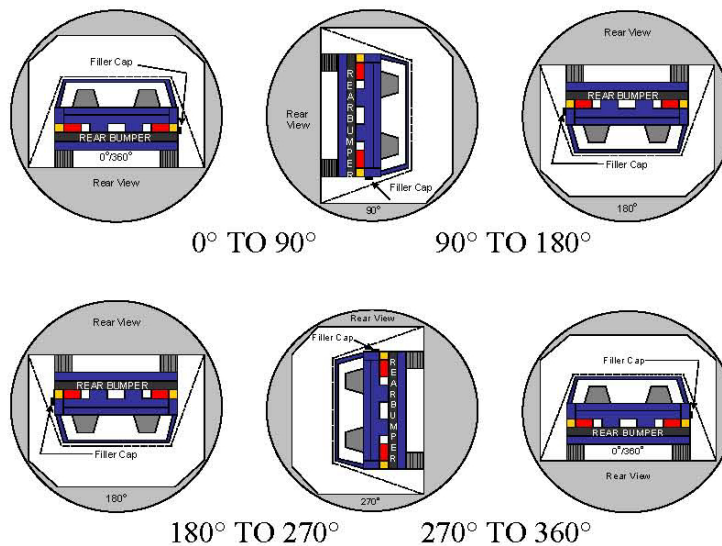
FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: N/A

Test Time: N/A

- A. From impact until vehicle motion ceases: (Maximum Allowable = 1 ounce) N/A oz.
 B. For the 5 minute period after motion ceases: (Maximum Allowable = 5 ounces) N/A oz.
 C. For the following 25 minutes: (Maximum Allowable = 1 ounce / minute) N/A
 D. Spillage Details: N/A

FMVSS 301 STATIC ROLLOVER RESULTS



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: **None**

SOLVENT COLLECTION TIME TABLE IN SECONDS

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

DATA SHEET NO. 16 (CONTINUED)
FMVSS 301 BARRIER IMPACT AND STATIC ROLLOVER

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
 Test Date: 12/10/2025

FMVSS 301 SPILLAGE TABLE (UNITS IN OUNCES)

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

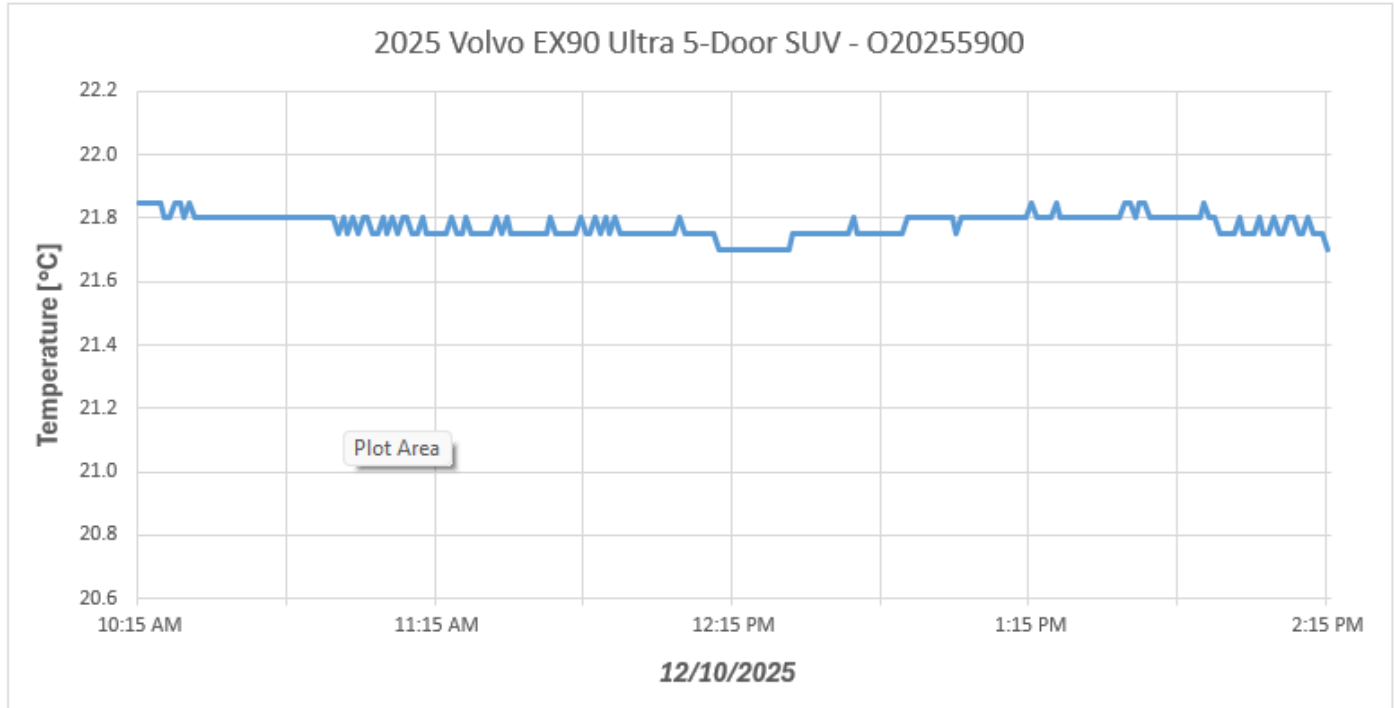
SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 17
DUMMY/VEHICLE TEMPERATURE STABILIZATION DATA

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
 Test Date: 12/10/2025



Serial #	Description	Maximum	Average	Minimum	Units
X1549602	VSC Start Room A - Temp (1038)	21.85	21.78	21.70	°C

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

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
 Test Date: 12/10/2025

ELECTRIC VEHICLE PROPULSION SYSTEM

	Units	Observations and Conclusions
Type of Electric Vehicle		Electric
Propulsion Battery Type		Lithium Ion Cells
Nominal Voltage	V	400
Physical Location of Automatic Propulsion Battery Disconnect		Inside the Battery Distribution Unit (BDU)
Auxiliary Battery Type		12V Lead

PROPULSION BATTERY SYSTEM DATA

	Units	Observations and Conclusions
Electrolyte Fluid Type		Dry Cells
Electrolyte Fluid Specific Gravity	g/L	N/A
Electrolyte Fluid Kinematic Viscosity	cSt	N/A
Electrolyte Fluid Color		Neutral
Propulsion Battery Coolant Type, Color, Specific Gravity (if applicable)		Glycol, Green
Location of Battery Modules		Inside Passenger Compartment
	X	Outside Passenger Compartment
		The high-voltage battery is located below the occupant compartment.

PROPULSION BATTERY STATE OF CHARGE

<i>For all battery types:</i>	
Voltage range corresponding to useable energy of the battery:	
Minimum State of Charge	286 V
Maximum State of Charge	434 V
95% of Maximum State of Charge	412.3 V
Test Voltage - No less than 95% of maximum State of Charge	420.7 V
<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	
Maximum State of Charge	
Test Voltage – 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: 2025 Volvo EX90 Ultra 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
Test Date: 12/10/2025

VEHICLE CHASSIS GROUND POINT(S) LOCATION(S)

Details of Vehicle Chassis Ground Point(s) & Location(s)	Rear crossmember vehicle ground
---	---------------------------------

PROPULSION BATTERY SYSTEM

Details of Electric Energy Storage/Conversion System Test Points	Connected at + and – terminal ends of propulsion system
Additional Comments	Connected via OEM supplied breakout harness

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

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
 Test Date: 12/10/2025

VOLTMETER INFORMATION

	Units	Observations and Conclusions
Make		Fluke
Model		177
Serial Number		58990422
Internal Impedance Value	MΩ	> 10 MΩ < 100 pF
Resolution	V	0.001
Last Calibration Date		8/21/2025

PROPULSION BATTERY VOLTAGE

Measurement shall be made with Energy Storage/Conversion System connected to the vehicle propulsion system, and the vehicle in the “ready-to-drive” (propulsion system energized) position.
NOTE: If voltage measurement is not at the voltage or within the normal operating voltage range specified by the manufacturer, the battery must be charged.

Vb	V	420.7
----	---	-------

ELECTRIC ISOLATION MEASUREMENTS
PROPULSION BATTERY TO VEHICLE CHASSIS

Vehicle chassis point(s) determined and supplied to contractor by COTR.

V1	V	397.6
V2	V	20.3

PROPULSION BATTERY TO VEHICLE CHASSIS ACROSS RESISTOR

The known resistance Ro (in ohms) should be approximately 500 times the normal operating voltage of the vehicle (in volts) per SAE J1766.

Ro	Ω	226,100
----	---	---------

V1' Pre-Impact	V	165.4
V2' Pre-Impact	V	0.2

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

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
 Test Date: 12/10/2025

ELECTRICAL ISOLATION CALCULATIONS

NOTE: If measured voltage is zero and results in a division by zero, record "Zero Volts".
 This "zero voltage" condition is considered as being compliant.

$R_{i1} = R_o (1 + V_2/V_1) [(V_1 - V_1')/V_1']$		
Ri1 Pre-Impact	Ω	333,621
$R_{i2} = R_o (1 + V_1/V_2) [(V_2 - V_2')/V_2']$		
Ri2 Pre-Impact	Ω	467,781,409
$R_i = \text{The lesser of } R_{i1} \text{ and } R_{i2}$		
Ri Pre-Impact	Ω	333,621
$R_i / V_b = \text{Electrical Isolation Value} / \text{Nominal Battery Voltage}$		
Ri / Vb Pre-Impact	Ω/V	793

NOTE: The minimum Electrical Isolation Value is 500 Ω/V .

	Yes	No (Fail)
Is the measured Electrical Isolation Value $\geq 500 \Omega/V$?	X	
Additional Comments	None	

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

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
 Test Date: 12/10/2025

VOLTMETER INFORMATION

	Units	Observations and Conclusions
Make		Fluke
Model		177
Serial Number		58990422
Internal Impedance Value	MΩ	> 10 MΩ < 100 pF
Resolution	V	0.001
Last Calibration Date		8/21/2025

ELECTRICAL ISOLATION MEASUREMENTS

Vb Post-Impact	V	6.6
----------------	---	-----

V1 Post-Impact	V	1.8	Impact Time	2	Minutes	14	Seconds
V2 Post-Impact	V	7.3		2	Minutes	19	Seconds
V1' Post-Impact	V	0.0		2	Minutes	35	Seconds
V2' Post-Impact	V	0.1		2	Minutes	27	Seconds

Ro	Ω	226,100
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DATA SHEET NO. 305-4 (CONTINUED)
POST-IMPACT DATA
FOR INDICANT FMVSS NO. 305 TESTING

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
 Test Date: 12/10/2025

ELECTRICAL ISOLATION CALCULATIONS

NOTE: If measured voltage is zero and results in a division by zero, record "Zero Volts".
 This "zero voltage" condition is considered as being compliant.

$R_{i1} = R_o (1 + V_2/V_1) [(V_1 - V_1')/V_1']$							
Ri1 Post-Impact	Ω	Zero Volts	Impact Time	2	Minutes	35	Seconds
$R_{i2} = R_o (1 + V_1/V_2) [(V_2 - V_2')/V_2']$							
Ri2 Post-Impact	Ω	20,293,249	Impact Time	2	Minutes	27	Seconds
Ri = The lesser of Ri1 and Ri2							
Ri Post-Impact	Ω	20,293,249	Impact Time	2	Minutes	27	Seconds
Ri / Vb = Electrical Isolation Value / Nominal Battery Voltage							
Ri / Vb Post-Impact	Ω/V	3,074,735	Impact Time	2	Minutes	27	Seconds

NOTE: The minimum Electrical Isolation Value is 500 Ω/V.

	Yes	No (Fail)
Is the measured Electrical Isolation Value ≥ 500 Ω/V?	X	
Additional Comments	None	

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

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
 Test Date: 12/10/2025

PROPULSION BATTERY SYSTEM COMPONENTS

Describe any Propulsion Battery Module movement within the passenger compartment [Supply photographs as appropriate]:
Not Applicable

	Yes (Fail)	No
Has the Propulsion Battery Module moved within the passenger compartment?		X

Describe intrusion of an outside Propulsion Battery Component into the passenger compartment [Supply photographs as appropriate]:
No Intrusion

	Yes (Fail)	No
Has an outside Propulsion Battery Component intruded into the passenger compartment?		X

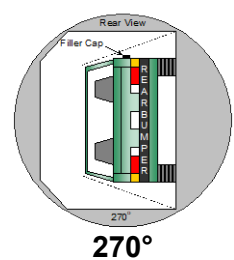
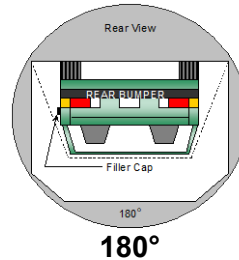
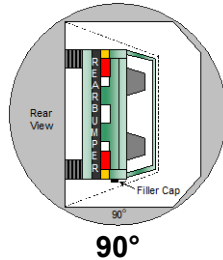
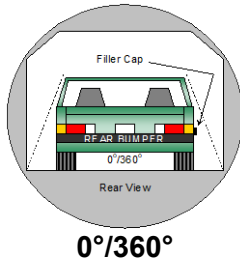
	Yes (Fail)	No
Is the Propulsion Battery Electrolyte Spillage visible in the passenger compartment?		X

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

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
 Test Date: 12/10/2025

PROPULSION BATTERY SYSTEM COMPONENTS



PROPULSION BATTERY ELECTROLYTE COLLECTION TIME PERIOD

Test Phase	Rotation Time (spec. 1-3 min)				FMVSS 301 Hold Time		Total Time				Next Whole Minute Interval	
0° - 90°	1	min	48	sec	5	min	6	min	48	sec	7	min
90° - 180°	1	min	50	sec	5	min	6	min	50	sec	7	min
180° - 270°	1	min	46	sec	5	min	6	min	46	sec	7	min
270° - 360°	1	min	49	sec	5	min	6	min	49	sec	7	min

TEST VEHICLE PROPULSION BATTERY ELECTROLYTE SPILLAGE

NOTE: The maximum allowable Propulsion Battery Electrolyte Spillage is 5.0 Liters.

Test Phase	Propulsion Battery Electrolyte Spillage (L)	Spillage Location
0° to 90°	0	Not Applicable
90° to 180°	0	Not Applicable
180° to 270°	0	Not Applicable
270° to 360°	0	Not Applicable
Total Spillage	0	

	Yes (Fail)	No
Is the total Propulsion Battery Electrolyte Spillage greater than 5.0 Liters?		X
Is the Propulsion Battery Electrolyte Spillage visible in the passenger compartment?		X

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

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
Test Date: 12/10/2025

VOLTMETER INFORMATION

	Units	Observations and Conclusions
Make		Fluke
Model		177
Serial Number		58990422
Internal Impedance Value	MΩ	> 10 MΩ < 100 pF
Resolution	V	0.001
Last Calibration Date		8/21/2025

ELECTRICAL ISOLATION MEASUREMENTS

Vb Post-Impact	V	6.64
Ro	Ω	226,100

Record V1, V2, V1', V2' voltage measurements at the start of each successive increment of 90°, 180°, 270°, and 360° of the static rollover test.

	Voltage	Units	Test Phase	Time			
V1	2.22	V	0°		min		sec
	0.24		90°	2		22	
	0.54		180°	2		27	
	0.38		270°	2		45	
	0.42		360°	2		23	
V2	4.12	V	0°		min		sec
	5.93		90°	2		27	
	5.53		180°	2		31	
	5.56		270°	2		51	
	5.47		360°	2		29	
V1'	0.03	V	0°		min		sec
	0.03		90°	2		41	
	0.02		180°	2		47	
	0.03		270°	3		6	
	0.02		360°	2		43	
V2'	0.06	V	0°		min		sec
	0.06		90°	2		33	
	0.04		180°	2		39	
	0.05		270°	2		56	
	0.04		360°	2		36	

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

Test Vehicle: 2025 Volvo EX90 Ultra 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20255900
 Test Date: 12/10/2025

ELECTRICAL ISOLATION CALCULATIONS

NOTE: If measured voltage is zero and results in a division by zero, record "Zero Volts".
 This "zero voltage" condition is considered as being compliant.

	Voltage	Units	Test Phase	Time			
Ri1 = Ro (1 + V2/V1) [(V1-V1')/V1']							
Ri1	47,136,758	Ω	0°		min		sec
	40,688,579		90°	2		41	
	66,079,819		180°	2		47	
	41,233,500		270°	3		6	
	63,415,667		360°	2		43	
Ri2 = Ro (1 + V1/V2) [(V2-V2')/V2']							
Ri2	23,543,303	Ω	0°		min		sec
	23,015,366		90°	2		33	
	34,062,497		180°	2		39	
	26,619,127		270°	2		56	
	33,049,764		360°	2		36	
Ri = The lesser of Ri1 and Ri2							
Ri	23,543,303	Ω	0°		min		sec
	23,015,366		90°	2		33	
	34,062,497		180°	2		39	
	26,619,127		270°	2		56	
	33,049,764		360°	2		36	
Ri / Vb = Electrical Isolation Value / Nominal Battery Voltage							
Ri / Vb	3,545,678	Ω/V	0°		min		sec
	3,466,170		90°	2		33	
	5,129,894		180°	2		39	
	4,008,905		270°	2		56	
	Zero Volts		360°	2		36	

NOTE: The minimum Electrical Isolation Value is 500 Ω/V .

	Yes	No (Fail)
Is the measured Electrical Isolation Value $\geq 500 \Omega/V$?	X	
Additional Comments	None	

**APPENDIX A
PHOTOGRAPHS**

TABLE OF PHOTOGRAPHS

		<u>Page No.</u>
Photo No. 001	Load Cell Location	A-1
Photo No. 002	Pre-Test Load Cell Wall	A-1
Photo No. 003	Post-Test Load Cell Wall	A-2
Photo No. 004	Manufacturer's Label	A-2
Photo No. 005	Tire Placard	A-3
Photo No. 006	2025 Volvo EX90 Ultra 5-Door SUV Frontal As Delivered	A-3
Photo No. 007	Left Rear 3-4 View, As Received	A-4
Photo No. 008	Pre-Test Front View of Test Vehicle	A-4
Photo No. 009	Post-Test Front View of Test Vehicle	A-5
Photo No. 010	Pre-Test Left View of Test Vehicle	A-5
Photo No. 011	Post-Test Left View of Test Vehicle	A-6
Photo No. 012	Pre-Test Right View of Test Vehicle	A-6
Photo No. 013	Post-Test Right View of Test Vehicle	A-7
Photo No. 014	Pre-Test Right Front 3-4 View	A-7
Photo No. 015	Post-Test Right Front 3-4 View	A-8
Photo No. 016	Pre-Test Left Rear 3-4 View	A-8
Photo No. 017	Post-Test Left Rear 3-4 View	A-9
Photo No. 018	Pre-Test Windshield View	A-9
Photo No. 019	Post-Test Windshield View	A-10
Photo No. 020	Pre-Test Engine Compartment View	A-10
Photo No. 021	Post-Test Engine Compartment View	A-11
Photo No. 022	Pre-Test Fuel Filler Cap View	A-11
Photo No. 023	Post-Test Fuel Filler Cap View	A-12
Photo No. 024	Pre-Test Front Underbody View	A-12
Photo No. 025	Post-Test Front Underbody View	A-13
Photo No. 026	Pre-Test Rear Underbody View	A-13
Photo No. 027	Post-Test Rear Underbody View	A-14
Photo No. 028	Pre-Test Dummy Cable Routing	A-14
Photo No. 029	Post-Test Dummy Cable Routing	A-15

		<u>Page No.</u>
Photo No. 030	Pre-Test Driver Dummy Front View	A-15
Photo No. 031	Post-Test Driver Dummy Front View	A-16
Photo No. 032	Pre-Test Driver Dummy Window View	A-16
Photo No. 033	Post-Test Driver Dummy Window View	A-17
Photo No. 034	Pre-Test Driver Dummy and Vehicle Interior View	A-17
Photo No. 035	Post-Test Driver Dummy and Vehicle Interior View	A-18
Photo No. 036	Pre-Test Driver's Seat Fore-Aft Markings	A-18
Photo No. 037	Post-Test Driver's Seat Fore-Aft Markings	A-19
Photo No. 038	Pre-Test View of Belt Anchorage for Driver Dummy	A-19
Photo No. 039	Post-Test View of Belt Anchorage for Driver Dummy	A-20
Photo No. 040	Pre-Test View of Belt Buckle and Latch Plate for Driver Dummy	A-20
Photo No. 041	Post-Test View of Belt Buckle and Latch Plate for Driver Dummy	A-21
Photo No. 042	Pre-Test Driver Dummy Feet	A-21
Photo No. 043	Post-Test Driver Dummy Feet	A-22
Photo No. 044	Pre-Test Driver's Side Knee Bolster	A-22
Photo No. 045	Post-Test Driver's Side Knee Bolster	A-23
Photo No. 046	Pre-Test Driver's Side Floorpan	A-23
Photo No. 047	Post-Test Driver's Side Floorpan	A-24
Photo No. 048	Post-Test Driver Dummy Face	A-24
Photo No. 049	Post-Test Driver Dummy Contact with Airbag	A-25
Photo No. 050	Post-Test Driver Dummy Contact with Headrest	A-25
Photo No. 051	Pre-Test View of the Steering Wheel	A-26
Photo No. 052	Post-Test View of the Steering Wheel	A-26
Photo No. 053	Pre-Test Passenger Dummy Front View	A-27
Photo No. 054	Post-Test Passenger Dummy Front View	A-27
Photo No. 055	Pre-Test Passenger Dummy Window View	A-28
Photo No. 056	Post-Test Passenger Dummy Window View	A-28
Photo No. 057	Pre-Test Passenger Dummy and Vehicle Interior	A-29
Photo No. 058	Post-Test Passenger Dummy and Vehicle Interior	A-29
Photo No. 059	Pre-Test Passenger's Seat Fore-Aft Markings	A-30

		<u>Page No.</u>
Photo No. 060	Post-Test Passenger's Seat Fore-Aft Markings	A-30
Photo No. 061	Pre-Test View of Belt Anchorage for Passenger Dummy	A-31
Photo No. 062	Post-Test View of Belt Anchorage for Passenger Dummy	A-31
Photo No. 063	Pre-Test View of Belt Buckle and Latch Plate for Passenger Dummy	A-32
Photo No. 064	Post-Test View of Belt Buckle and Latch Plate for Passenger Dummy	A-32
Photo No. 065	Pre-Test Passenger Dummy Feet	A-33
Photo No. 066	Post-Test Passenger Dummy Feet	A-33
Photo No. 067	Pre-Test Passenger's Side Knee Bolster	A-34
Photo No. 068	Post-Test Passenger's Side Knee Bolster	A-34
Photo No. 069	Pre-Test Passenger's Side Floorpan	A-35
Photo No. 070	Post-Test Passenger's Side Floorpan	A-35
Photo No. 071	Post-Test Passenger Dummy Face	A-36
Photo No. 072	Post-Test Passenger Dummy Contact with Airbag	A-36
Photo No. 073	Post-Test Passenger Dummy Contact with Headrest	A-37
Photo No. 074	Photograph of Ballast Installed in Vehicle	A-37
Photo No. 075	Post-Test Stoddard Solvent Spillage Location View	A-38
Photo No. 076	Post-Test Speed Trap Read-Out	A-38
Photo No. 077	Vehicle at 0 Degree on Static Rollover Device	A-39
Photo No. 078	Vehicle at 90 Degrees on Static Rollover Device	A-39
Photo No. 079	Vehicle at 180 Degrees on Static Rollover Device	A-40
Photo No. 080	Vehicle at 270 Degrees on Static Rollover Device	A-40
Photo No. 081	Vehicle at 360 Degrees on Static Rollover Device	A-41
Photo No. 082	2025 Volvo EX90 Ultra 5-Door SUV Frontal Impact Event	A-41
Photo No. 083	Monroney Label Photograph	A-42
Photo No. 305-01	Auxiliary Power Module Warning Label	A-42
Photo No. 305-02	Power Inverter Warning Label	A-43
Photo No. 305-03	First Responder Warning Label	A-43
Photo No. 305-04	First Responder Warning Location	A-44
Photo No. 305-05	Other Vehicle Label(s) Related to Electrical Propulsion System	A-44
Photo No. 305-06	Manual High Voltage Service Disconnect in Place	A-45

		<u>Page No.</u>
Photo No. 305-07	Manual High Voltage Service Disconnect Removed	A-45
Photo No. 305-08	Manual High Voltage Service Disconnect Removed	A-46
Photo No. 305-09	Pre-Impact View of Propulsion Battery	A-46
Photo No. 305-10	Post-Impact Front View of Propulsion Battery	A-47
Photo No. 305-11	Post-Impact Rear View of Propulsion Battery	A-47
Photo No. 305-12	Pre-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules	A-48
Photo No. 305-13	Post-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules	A-48
Photo No. 305-14	Pre-Impact View of Propulsion Battery Module(s)	A-49
Photo No. 305-15	Post-Impact View of Propulsion Battery Module(s)	A-49
Photo No. 305-16	Pre-Impact View of Electric Propulsion Drive	A-50
Photo No. 305-17	Post-Impact View of Electric Propulsion Drive	A-50
Photo No. 305-18	Pre-Impact View of High Voltage Interconnect(s)	A-51
Photo No. 305-19	Pre-Impact View Propulsion Battery Venting System(s)	A-51
Photo No. 305-20	Pre-Impact View of Other Visible Electric Propulsion Components	A-52
Photo No. 305-21	Pre-Impact View of Ground Lead Attached	A-52
Photo No. 305-22	Pre-Impact View of High Voltage Leads Attached	A-53
Photo No. 305-23	Pre-Impact Close-Up View of High Voltage Leads Attached	A-53
Photo No. 305-24	Pre-Impact View of Installed Test Interface Port	A-54
Photo No. 305-25	Post-Impact View of Installed Test Interface Port	A-54
Photo No. 305-26	Pre-Impact View of Other Test Devices	A-55
Photo No. 305-27	Post-Impact View of Other Test Devices	A-55
Photo No. 305-28	FMVSS No. 305 Static Rollover at 90 Degrees	A-56
Photo No. 305-29	FMVSS No. 305 Static Rollover at 180 Degrees	A-56
Photo No. 305-30	FMVSS No. 305 Static Rollover at 270 Degrees	A-57
Photo No. 305-31	FMVSS No. 305 Static Rollover at 360 Degrees	A-57
Photo No. 305-32	Pre-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery	A-58
Photo No. 305-33	Post-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery	A-58
Photo No. 305-34	Post-Impact Propulsion Battery System Mounting and/or Intrusion Failure(s)	A-59

Page No.

Photo No. 305-35	Post-Impact View of Battery Component Intrusion	A-59
Photo No. 305-36	Post-Impact View of Battery Module Movement or Retention Loss	A-60
Photo No. 305-37	Post-Impact View of Propulsion Battery Electrolyte Spillage Location	A-60
Photo No. 305-38	Post-Test View of Propulsion Battery Electrolyte Spillage Location	A-61



Photo No. 001 - Load Cell Location



Photo No. 002 - Pre-Test Load Cell Wall



Photo No. 003 - Post-Test Load Cell Wall

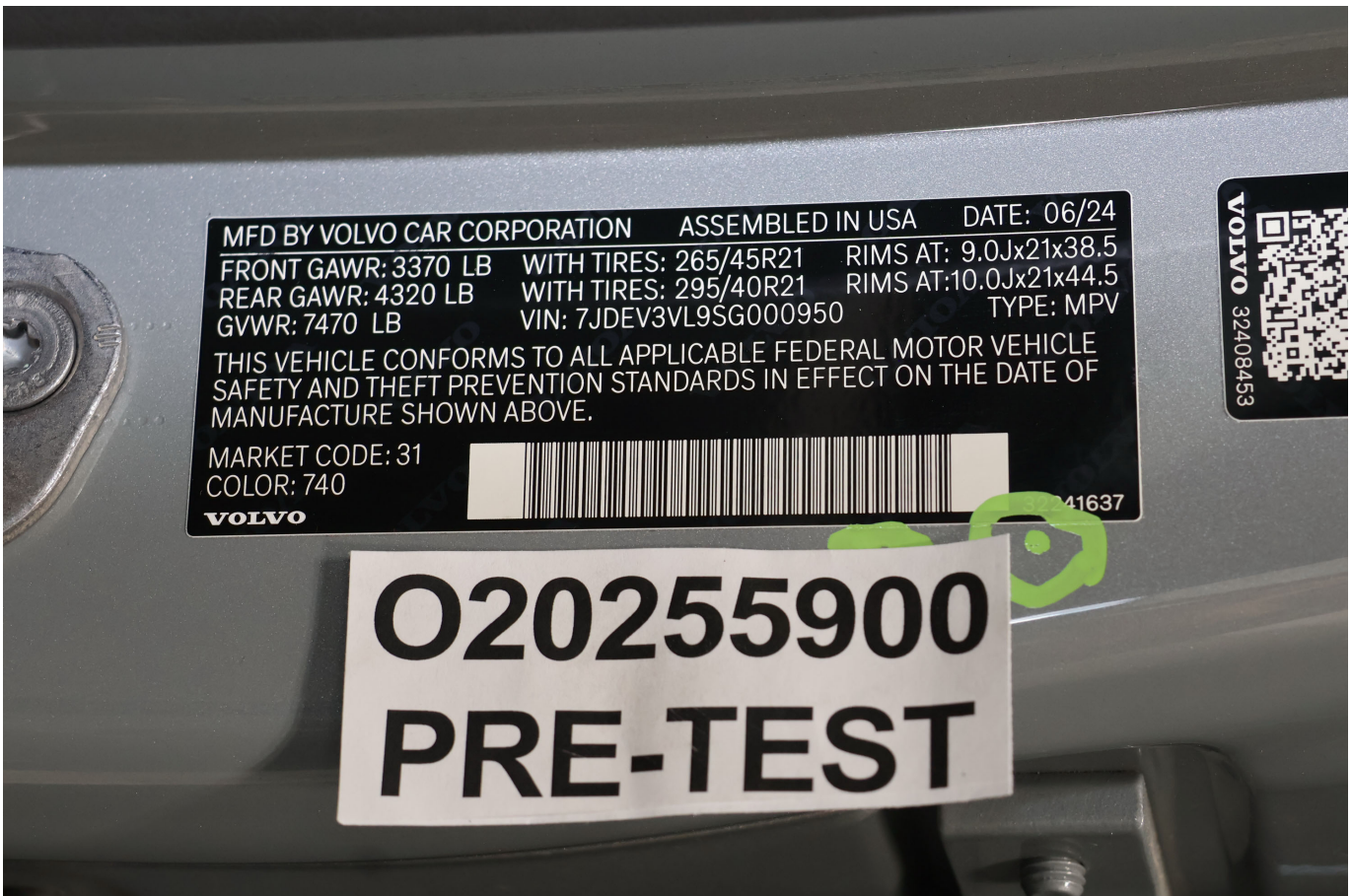


Photo No. 004 - Manufacturer's Label

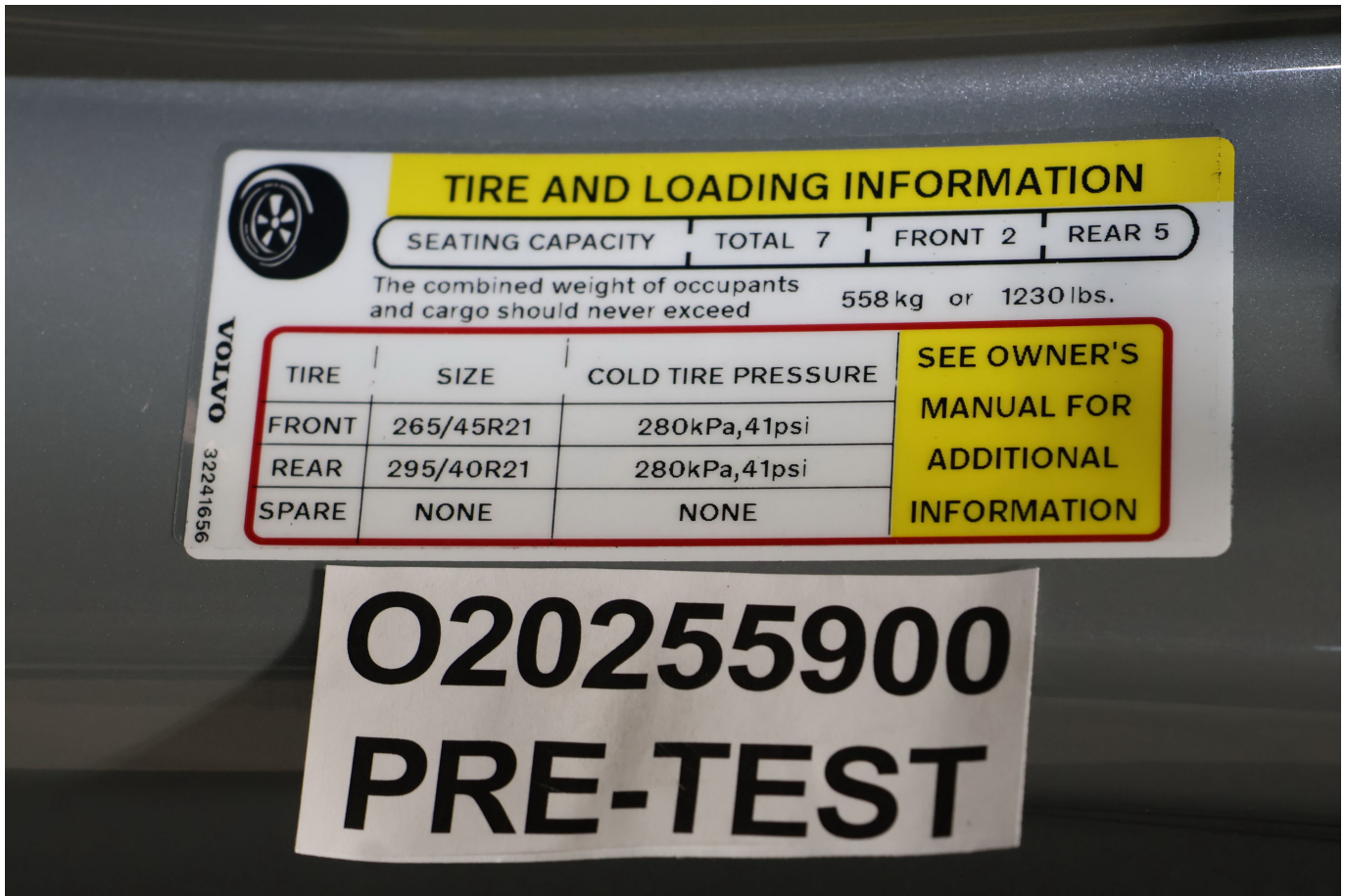


Photo No. 005 - Tire Placard



Photo No. 006 - 2025 Volvo EX90 Ultra 5-Door SUV Frontal As Delivered



Photo No. 007 - Left Rear 3-4 View, As Received

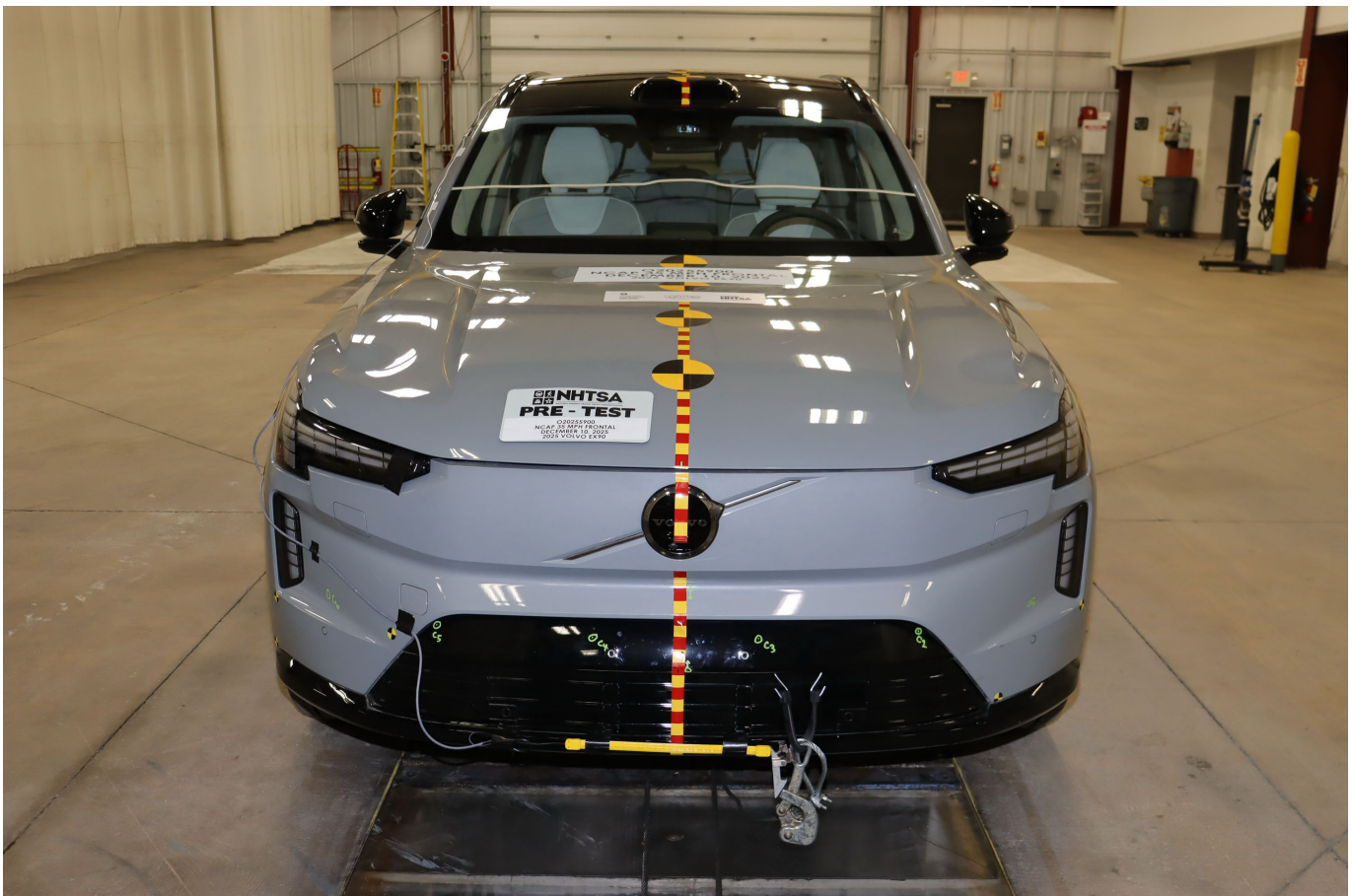


Photo No. 008 - Pre-Test Front View of Test Vehicle



Photo No. 009 - Post-Test Front View of Test Vehicle



Photo No. 010 - Pre-Test Left View of Test Vehicle



Photo No. 011 - Post-Test Left View of Test Vehicle



Photo No. 012 - Pre-Test Right View of Test Vehicle



Photo No. 013 - Post-Test Right View of Test Vehicle



Photo No. 014 - Pre-Test Right Front 3-4 View



Photo No. 015 - Post-Test Right Front 3-4 View



Photo No. 016 - Pre-Test Left Rear 3-4 View



Photo No. 017 - Post-Test Left Rear 3-4 View



Photo No. 018 - Pre-Test Windshield View



Photo No. 019 - Post-Test Windshield View



Photo No. 020 - Pre-Test Engine Compartment View

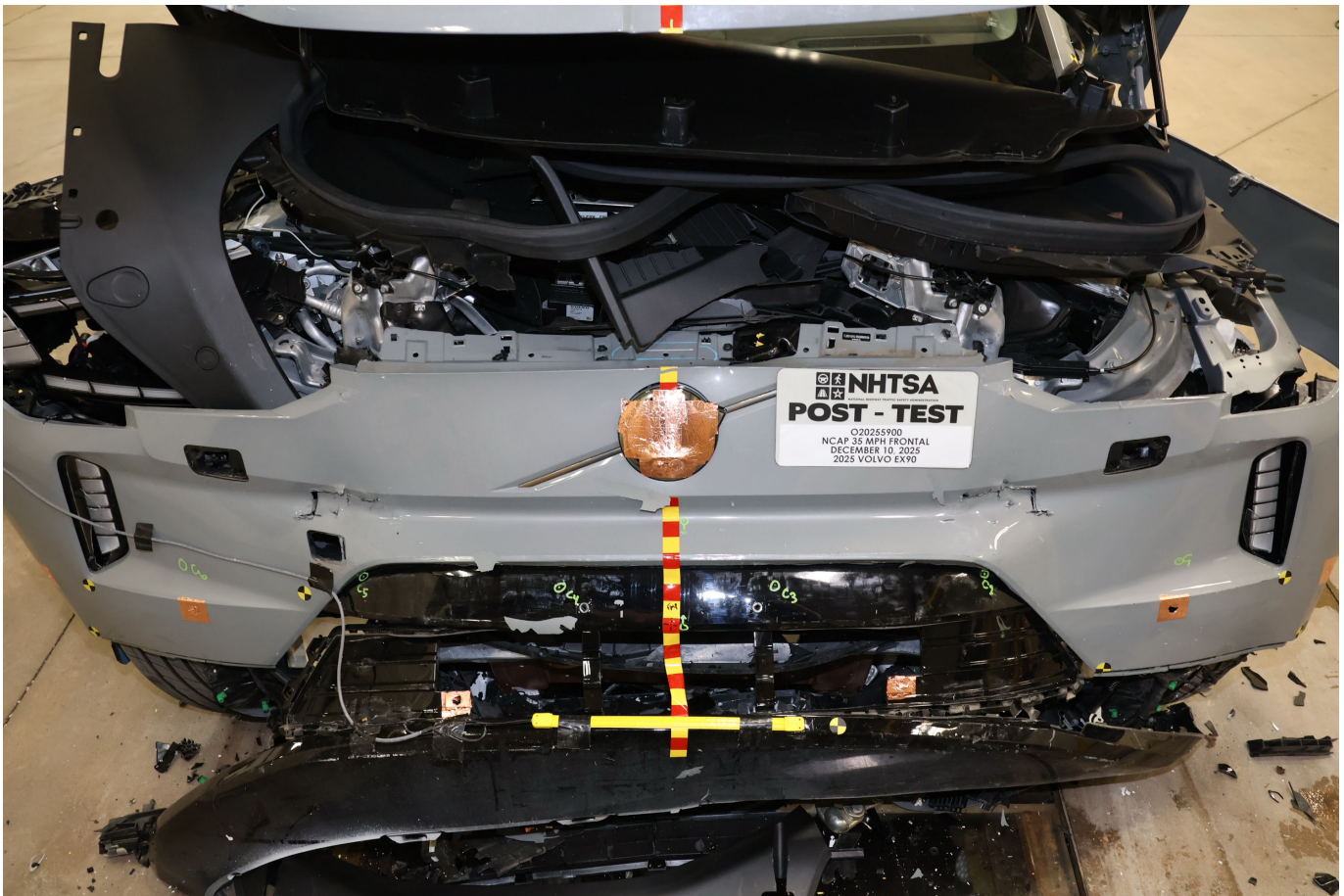


Photo No. 021 - Post-Test Engine Compartment View

PHOTOGRAPH NOT APPLICABLE

Photo No. 022 - Pre-Test Fuel Filler Cap View

PHOTOGRAPH NOT APPLICABLE

Photo No. 023 - Post-Test Fuel Filler Cap View



Photo No. 024 - Pre-Test Front Underbody View



Photo No. 025 - Post-Test Front Underbody View

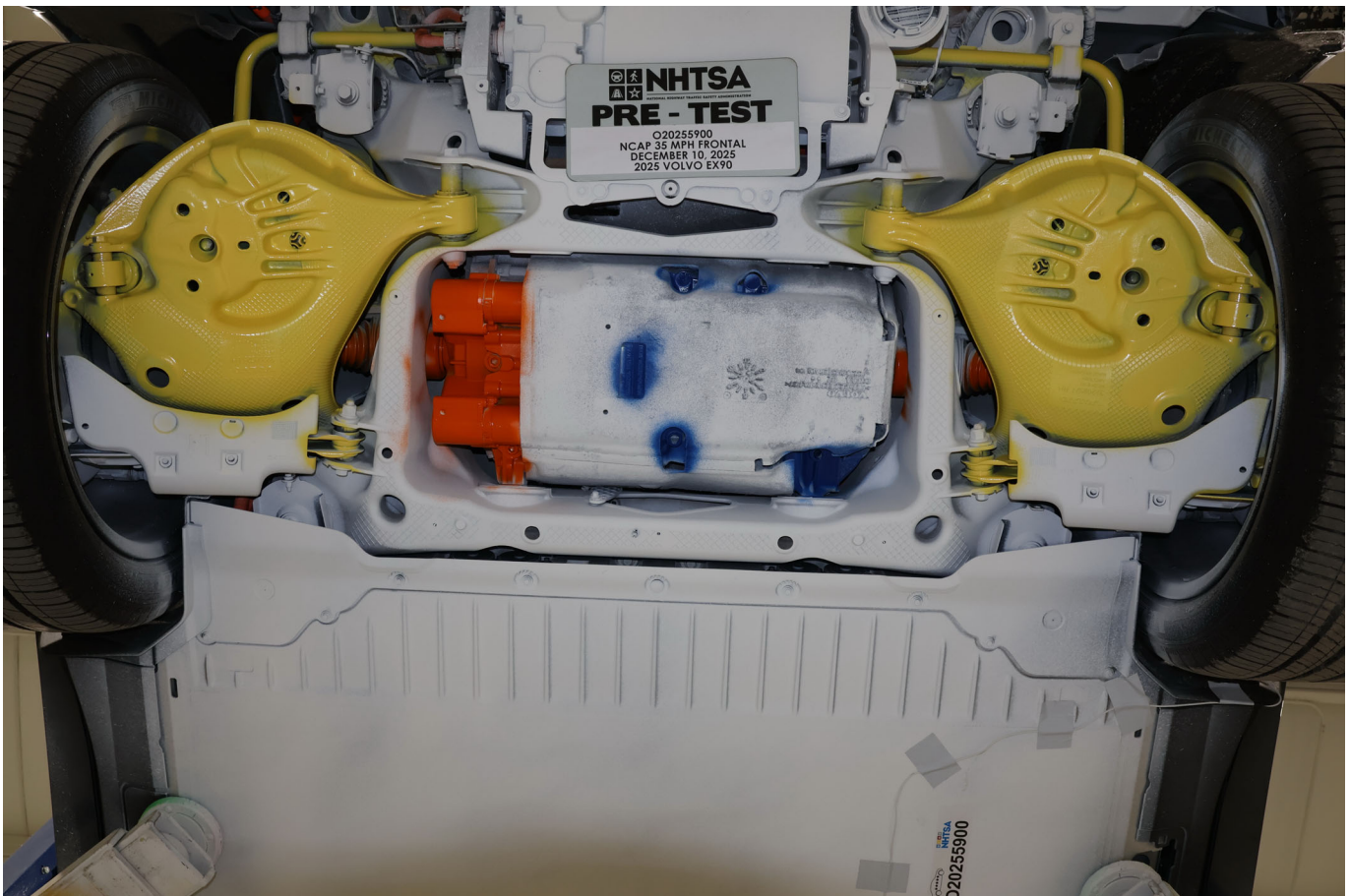


Photo No. 026 - Pre-Test Rear Underbody View

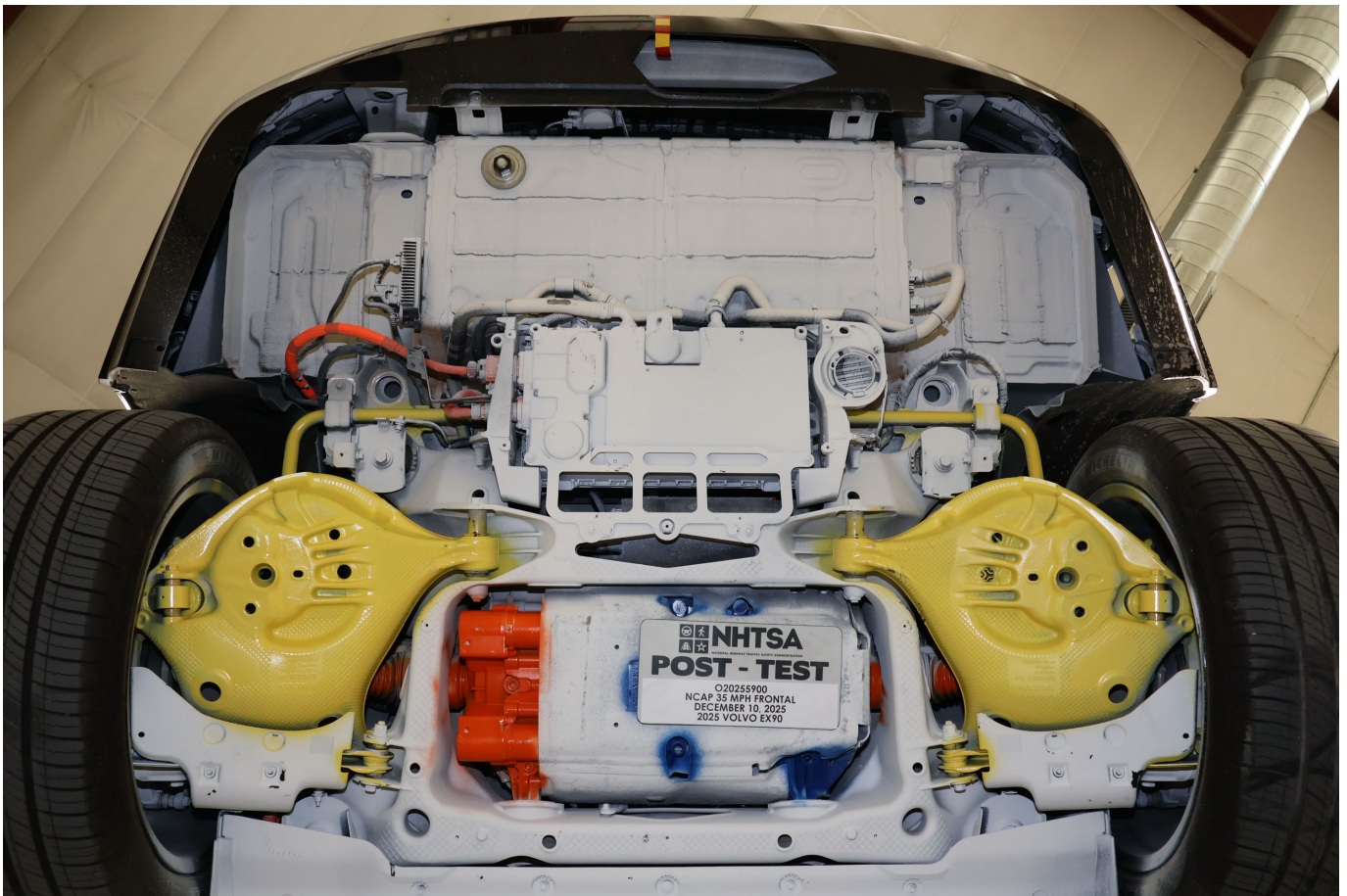


Photo No. 027 - Post-Test Rear Underbody View



Photo No. 028 - Pre-Test Dummy Cable Routing



Photo No. 029 - Post-Test Dummy Cable Routing



Photo No. 030 - Pre-Test Driver Dummy Front View



Photo No. 031 - Post-Test Driver Dummy Front View



Photo No. 032 - Pre-Test Driver Dummy Window View



Photo No. 033 - Post-Test Driver Dummy Window View



Photo No. 034 - Pre-Test Driver Dummy and Vehicle Interior View



Photo No. 035 - Post-Test Driver Dummy and Vehicle Interior View



Photo No. 036 - Pre-Test Driver's Seat Fore-Aft Markings



Photo No. 037 - Post-Test Driver's Seat Fore-Aft Markings



Photo No. 038 - Pre-Test View of Belt Anchorage for Driver Dummy



Photo No. 039 - Post-Test View of Belt Anchorage for Driver Dummy



Photo No. 040 - Pre-Test View of Belt Buckle and Latch Plate for Driver Dummy

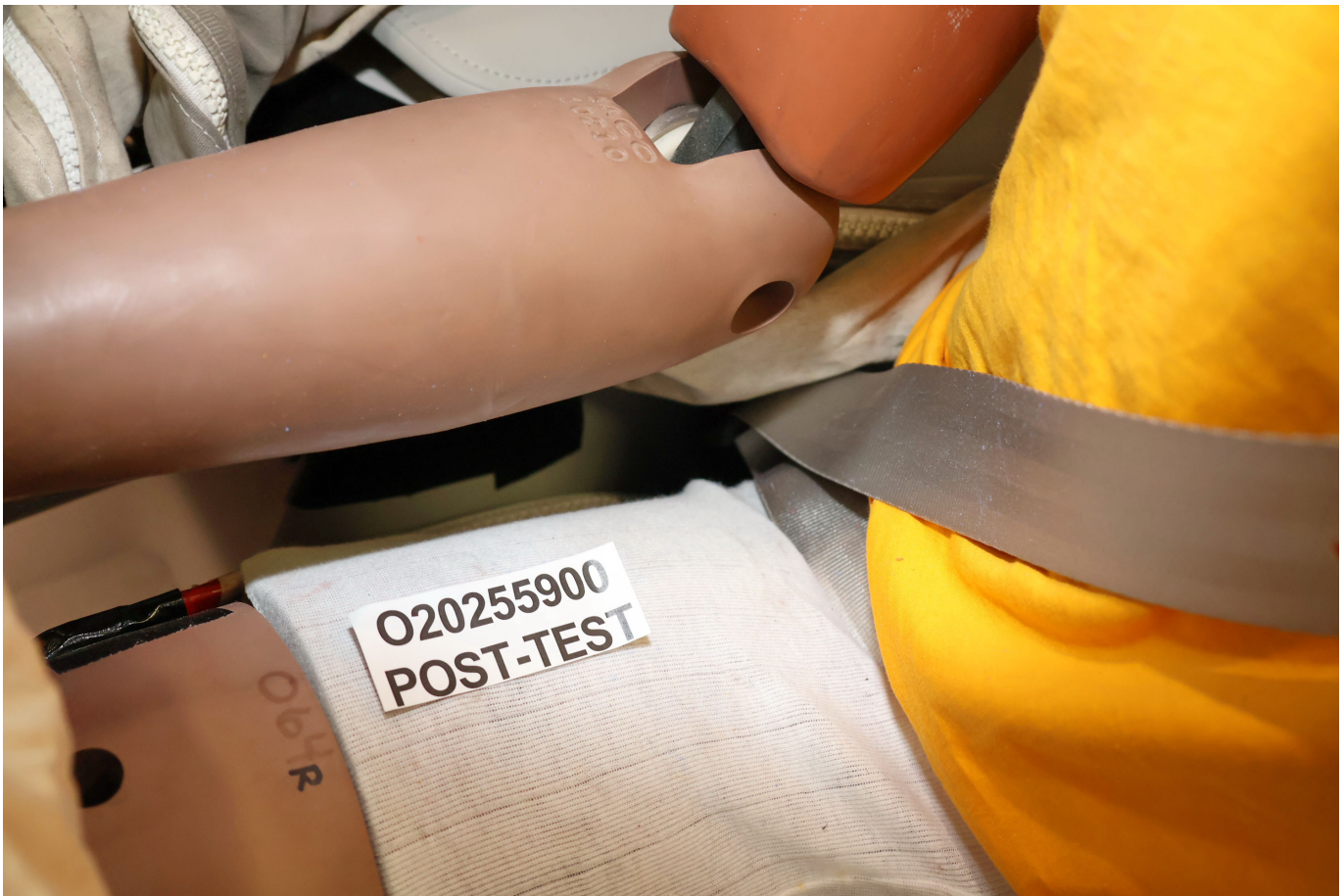


Photo No. 041 - Post-Test View of Belt Buckle and Latch Plate for Driver Dummy



Photo No. 042 - Pre-Test Driver Dummy Feet



Photo No. 043 - Post-Test Driver Dummy Feet



Photo No. 044 - Pre-Test Driver's Side Knee Bolster



Photo No. 045 - Post-Test Driver's Side Knee Bolster



Photo No. 046 - Pre-Test Driver's Side Floorpan



Photo No. 047 - Post-Test Driver's Side Floorpan



Photo No. 048 - Post-Test Driver Dummy Face



Photo No. 049 - Post-Test Driver Dummy Contact with Airbag



Photo No. 050 - Post-Test Driver Dummy Contact with Headrest



Photo No. 051 - Pre-Test View of the Steering Wheel



Photo No. 052 - Post-Test View of the Steering Wheel



Photo No. 053 - Pre-Test Passenger Dummy Front View



Photo No. 054 - Post-Test Passenger Dummy Front View



Photo No. 055 - Pre-Test Passenger Dummy Window View



Photo No. 056 - Post-Test Passenger Dummy Window View



Photo No. 057 - Pre-Test Passenger Dummy and Vehicle Interior View



Photo No. 058 - Post-Test Passenger Dummy and Vehicle Interior View



Photo No. 059 - Pre-Test Passenger's Seat Fore-Aft Markings



Photo No. 060 - Post-Test Passenger's Seat Fore-Aft Markings



Photo No. 061 - Pre-Test View of Belt Anchorage for Passenger Dummy



Photo No. 062 - Post-Test View of Belt Anchorage for Passenger Dummy



Photo No. 063 - Pre-Test View of Belt Buckle and Latch Plate for Passenger Dummy



Photo No. 064 - Post-Test View of Belt Buckle and Latch Plate for Passenger Dummy



Photo No. 065 - Pre-Test Passenger Dummy Feet



Photo No. 066 - Post-Test Passenger Dummy Feet



Photo No. 067 - Pre-Test Passenger's Side Knee Bolster



Photo No. 068 - Post-Test Passenger's Side Knee Bolster



Photo No. 069 - Pre-Test Passenger's Side Floorpan



Photo No. 070 - Post-Test Passenger's Side Floorpan



Photo No. 071 - Post-Test Passenger Dummy Face



Photo No. 072 - Post-Test Passenger Dummy Contact with Airbag



Photo No. 073 - Post-Test Passenger Dummy Contact with Headrest



Photo No. 074 - Photograph of Ballast Installed in Vehicle

PHOTOGRAPH NOT APPLICABLE

Photo No. 075 - Post-Test Stoddard Solvent Spillage Location View



Photo No. 076 - Post-Test Speed Trap Read-Out

PHOTOGRAPH NOT APPLICABLE

Photo No. 077 - Vehicle at 0 Degrees on Static Rollover Device

PHOTOGRAPH NOT APPLICABLE

Photo No. 078 - Vehicle at 90 Degrees on Static Rollover Device

PHOTOGRAPH NOT APPLICABLE

Photo No. 079 - Vehicle at 180 Degrees on Static Rollover Device

PHOTOGRAPH NOT APPLICABLE

Photo No. 080 - Vehicle at 270 Degrees on Static Rollover Device

PHOTOGRAPH NOT APPLICABLE

Photo No. 081 - Vehicle at 360 Degrees on Static Rollover Device



Photo No. 082 - 2025 Volvo EX90 Ultra 5-Door SUV Frontal Impact Event



Photo No. 305-02 - Power Inverter Warning Label



Photo No. 305-03 - First Responder Warning Label

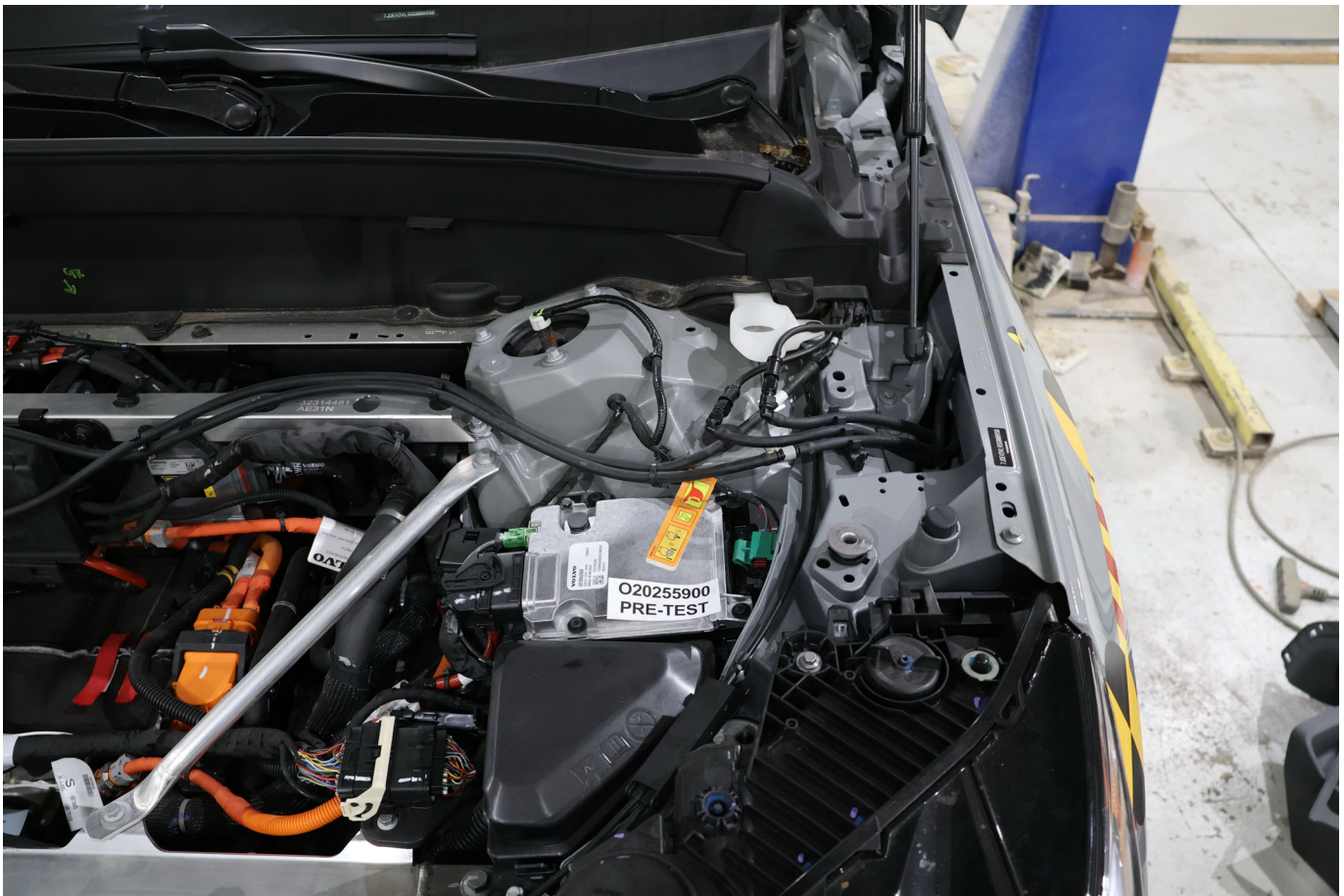


Photo No. 305-04 - First Responder Warning Location



Photo No. 305-05 - Other Vehicle Label(s) Related to Electrical Propulsion System

PHOTOGRAPH NOT APPLICABLE

Photo No. 305-06 - Manual High Voltage Service Disconnect in Place

PHOTOGRAPH NOT APPLICABLE

Photo No. 305-07 - Manual High Voltage Service Disconnect Removed

PHOTOGRAPH NOT APPLICABLE

Photo No. 305-08 - Manual High Voltage Service Disconnect Removed



Photo No. 305-09 - Pre-Impact View of Propulsion Battery



Photo No. 305-10 - Post-Impact Front View of Propulsion Battery



Photo No. 305-11 - Post-Impact Rear View of Propulsion Battery

PHOTOGRAPH NOT AVAILABLE

Photo No. 305-12 - Pre-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules

PHOTOGRAPH NOT AVAILABLE

Photo No. 305-13 - Post-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules

PHOTOGRAPH NOT AVAILABLE

Photo No. 305-14 - Pre-Impact View of Propulsion Battery Module(s)

PHOTOGRAPH NOT AVAILABLE

Photo No. 305-15 - Post-Impact View of Propulsion Battery Module(s)

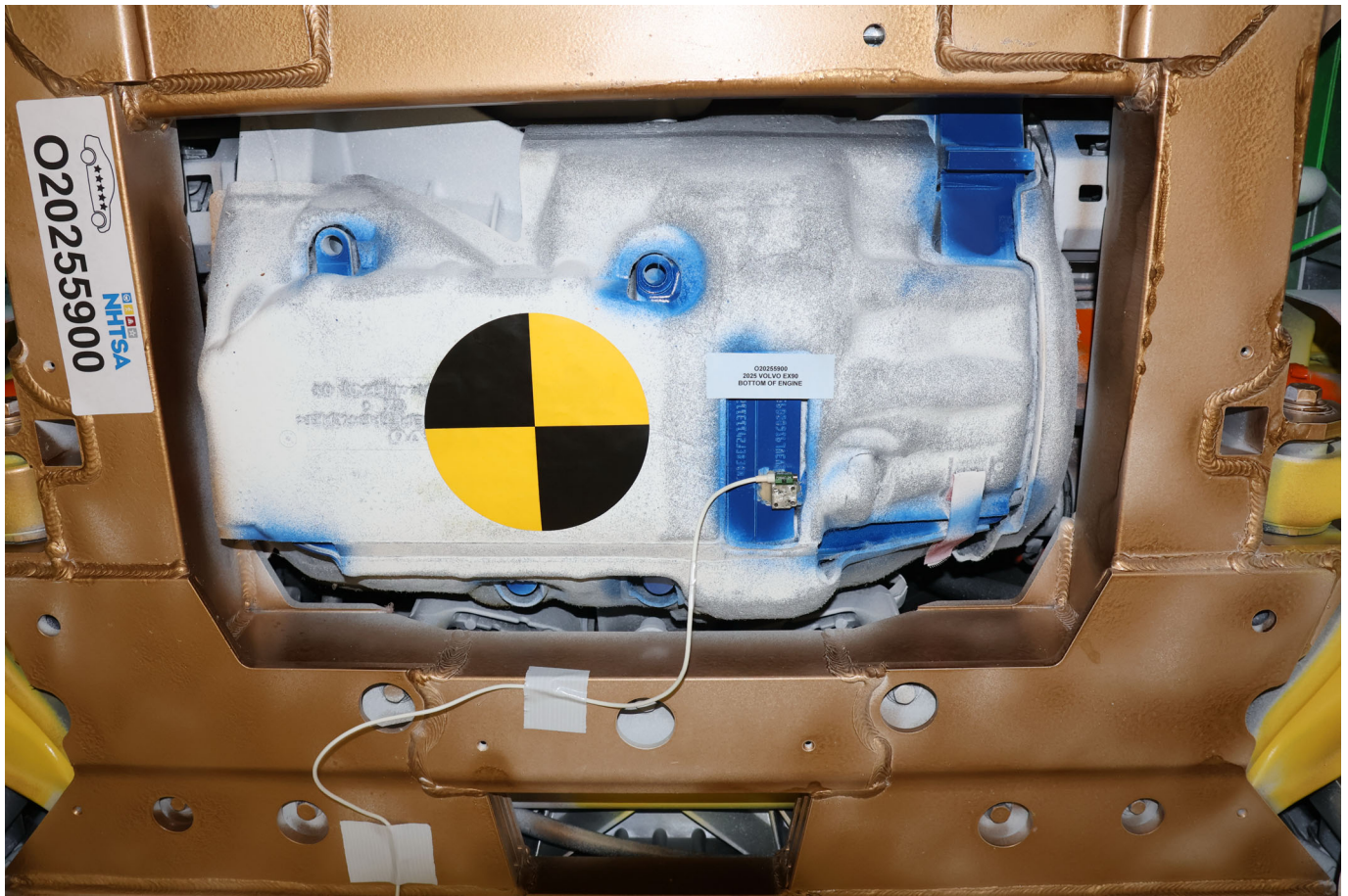


Photo No. 305-16 - Pre-Impact View of Electric Propulsion Drive

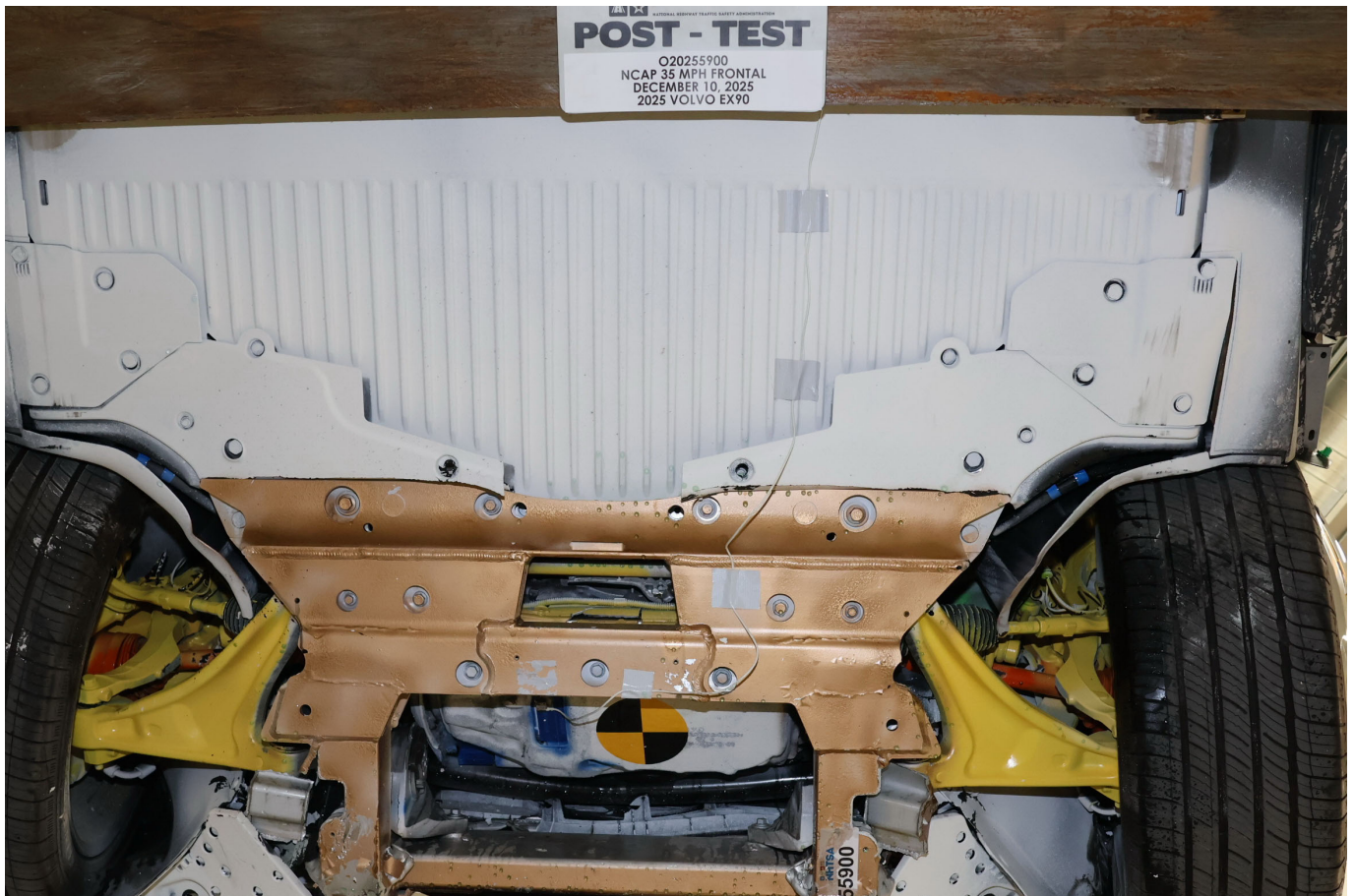


Photo No. 305-17 - Post-Impact View of Electric Propulsion Drive

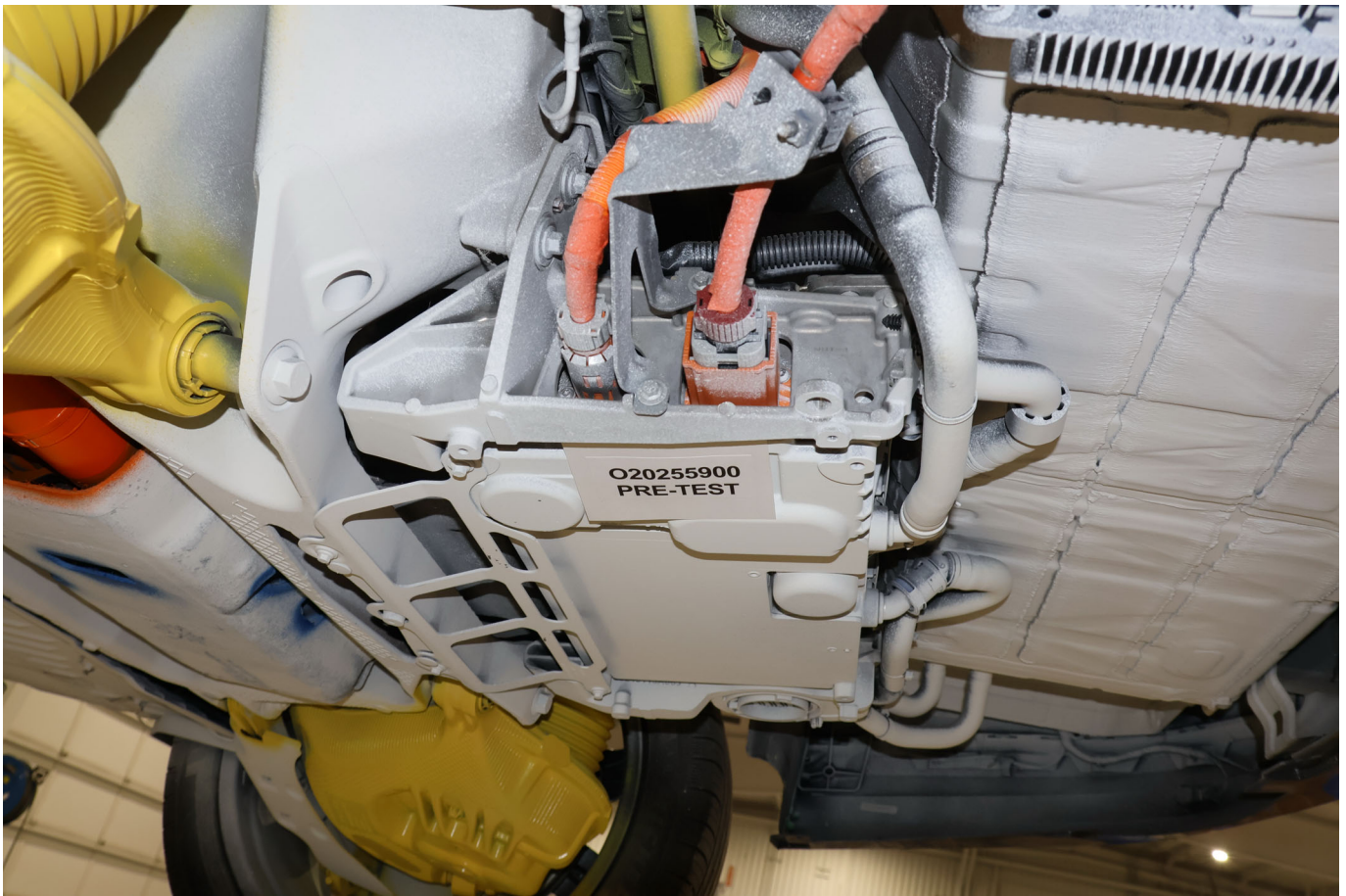


Photo No. 305-18 - Pre-Impact View of High Voltage Interconnect(s)

PHOTOGRAPH NOT APPLICABLE

Photo No. 305-19 - Pre-Impact View Propulsion Battery Venting System(s)

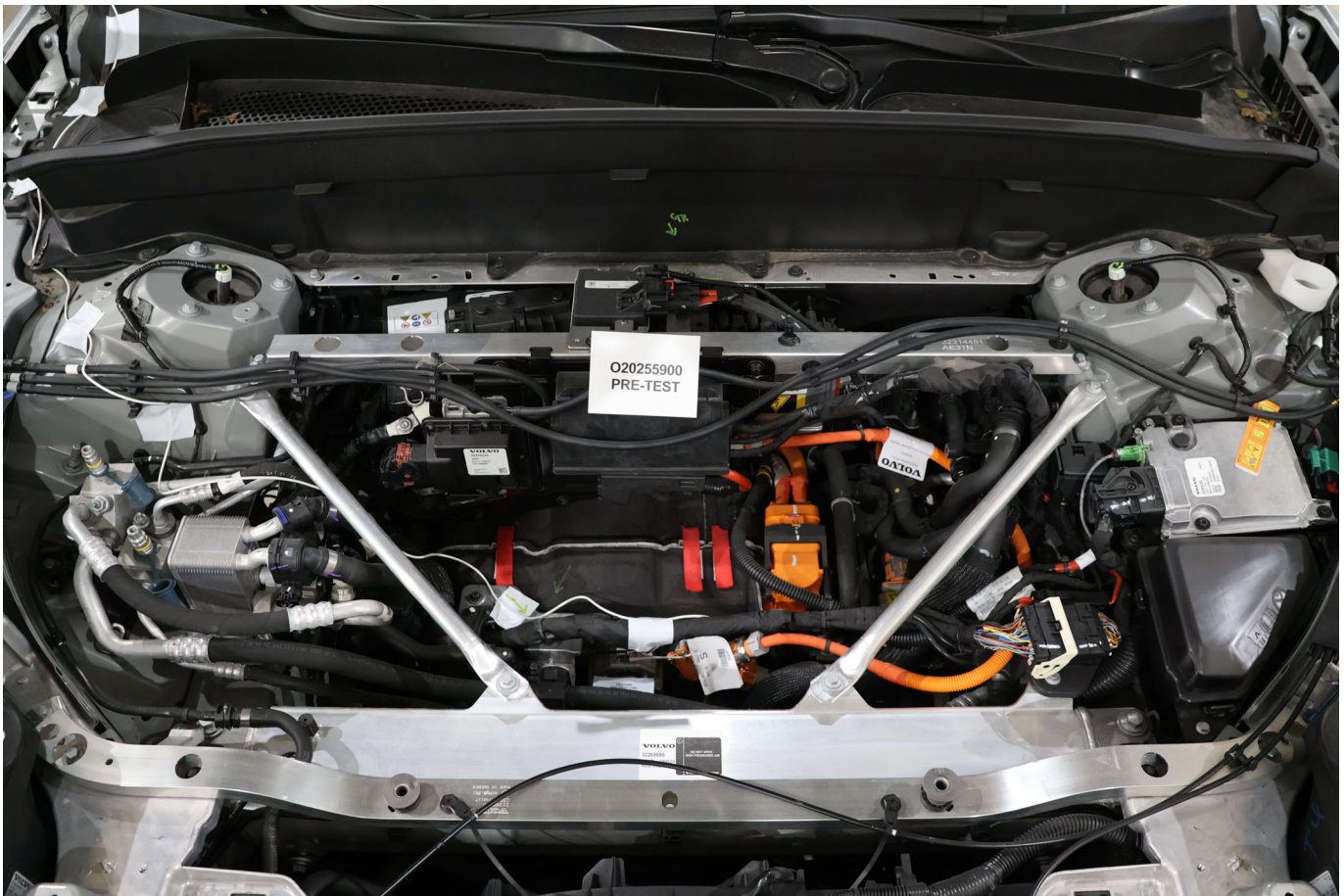


Photo No. 305-20 - Pre-Impact View of Other Visible Electric Propulsion Components



Photo No. 305-21 - Pre-Impact View of Ground Lead Attached



Photo No. 305-22 - Pre-Impact View of High Voltage Leads Attached

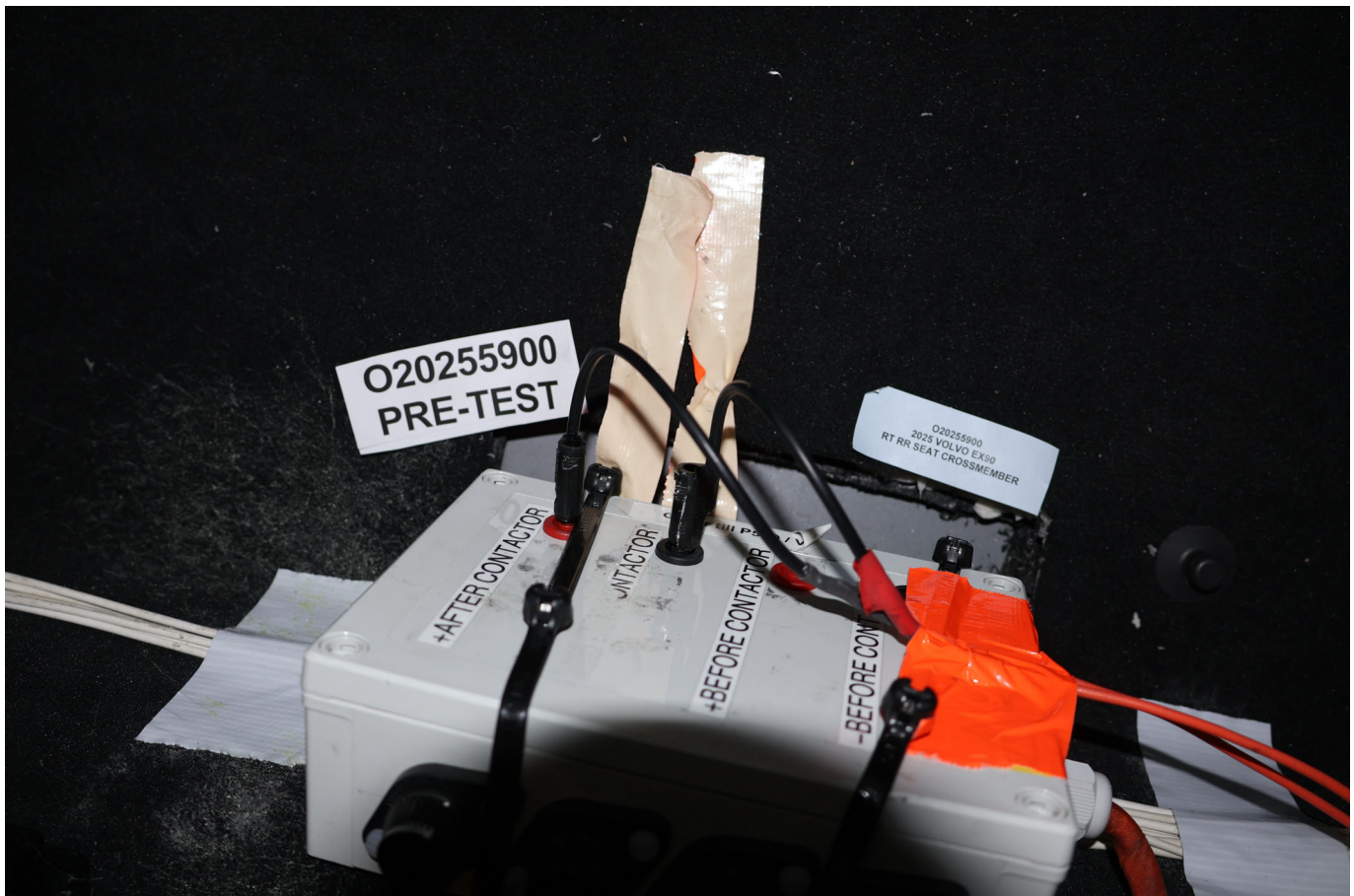


Photo No. 305-23 - Pre-Impact Close-Up View of High Voltage Leads Attached



Photo No. 305-24 - Pre-Impact View of Installed Test Interface Port



Photo No. 305-25 - Post-Impact View of Installed Test Interface Port



Photo No. 305-26 - Pre-Impact View of Other Test Devices

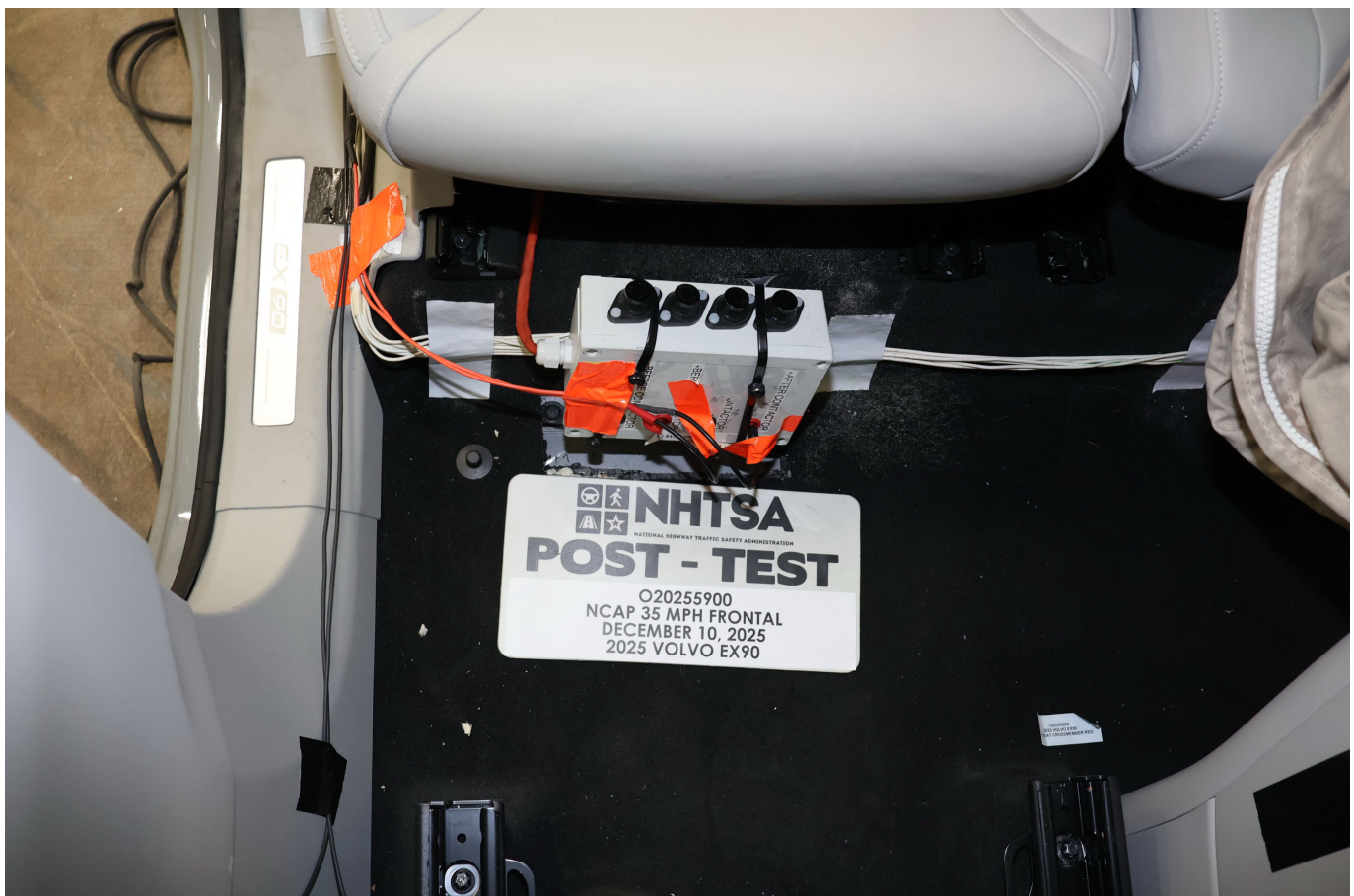


Photo No. 305-27 - Post-Impact View of Other Test Devices

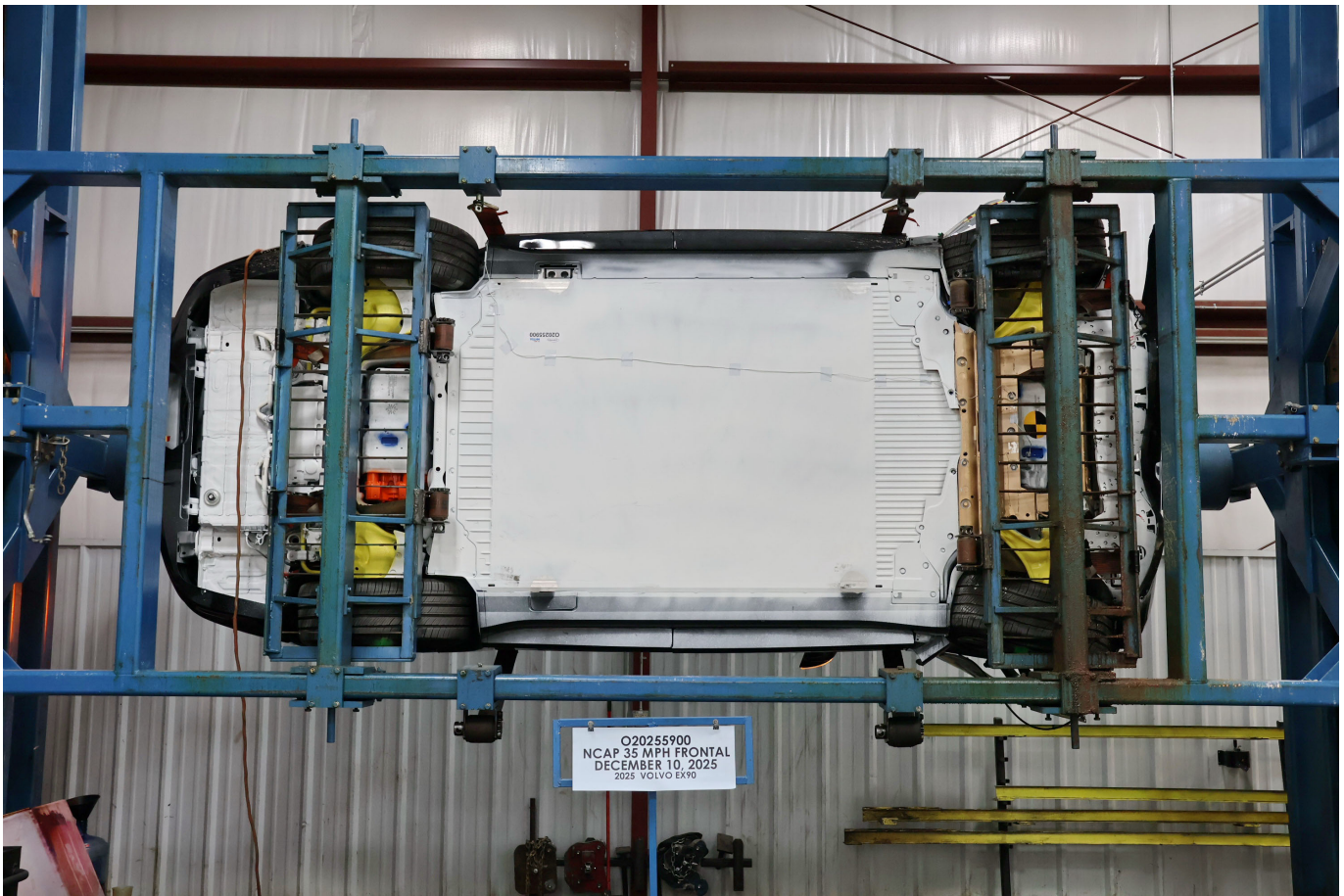


Photo No. 305-28 - FMVSS No. 305 Static Rollover at 90 Degrees



Photo No. 305-29 - FMVSS No. 305 Static Rollover at 180 Degrees



Photo No. 305-30 - FMVSS No. 305 Static Rollover at 270 Degrees



Photo No. 305-31 - FMVSS No. 305 Static Rollover at 360 Degrees



Photo No. 305-32 - Pre-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery



Photo No. 305-33 - Post-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery

PHOTOGRAPH NOT APPLICABLE

Photo No. 305-34 - Post-Impact Propulsion Battery System Mounting and-or Intrusion Failure(s)

PHOTOGRAPH NOT APPLICABLE

Photo No. 305-35 - Post-Impact View of Battery Component Intrusion

PHOTOGRAPH NOT APPLICABLE

Photo No. 305-36 - Post-Impact View of Battery Module Movement or Retention Loss

PHOTOGRAPH NOT APPLICABLE

Photo No. 305-37 - Post-Impact View of Propulsion Battery Electrolyte Spillage Location

PHOTOGRAPH NOT APPLICABLE

Photo No. 305-38 - Post-Test View of Propulsion Battery Electrolyte Spillage Location

APPENDIX B
DUMMY RESPONSE DATA TRACES

TABLE OF DATA PLOTS

Page No.

List of Data Plots Provided in the Test Report

Figure No. 1.	Driver Head X Acceleration vs. Time	B-1
Figure No. 2.	Driver Head Y Acceleration vs. Time	B-1
Figure No. 3.	Driver Head Z Acceleration vs. Time	B-1
Figure No. 4.	Driver Head Resultant Acceleration vs. Time	B-1
Figure No. 5.	Driver Chest Displacement vs. Time	B-2
Figure No. 6.	Driver Chest X Acceleration vs. Time	B-3
Figure No. 7.	Driver Chest Y Acceleration vs. Time	B-3
Figure No. 8.	Driver Chest Z Acceleration vs. Time	B-3
Figure No. 9.	Driver Chest Resultant Acceleration vs. Time	B-3
Figure No. 10.	Driver Neck Force X vs. Time	B-4
Figure No. 11.	Driver Neck Force Z vs. Time	B-4
Figure No. 12.	Driver Neck Moment Y vs. Time	B-4
Figure No. 13.	Driver Nij (NTF) vs. Time	B-5
Figure No. 14.	Driver Nij (NTE) vs. Time	B-5
Figure No. 15.	Driver Nij (NCF) vs. Time	B-5
Figure No. 16.	Driver Nij (NCE) vs. Time	B-5
Figure No. 17.	Driver Left Femur Force vs. Time	B-6
Figure No. 18.	Driver Right Femur Force vs. Time	B-6
Figure No. 19.	Passenger Head X Acceleration vs. Time	B-7
Figure No. 20.	Passenger Head Y Acceleration vs. Time	B-7
Figure No. 21.	Passenger Head Z Acceleration vs. Time	B-7
Figure No. 22.	Passenger Head Resultant Acceleration vs. Time	B-7
Figure No. 23.	Passenger Chest Displacement vs. Time	B-8
Figure No. 24.	Passenger Chest X Acceleration vs. Time	B-9
Figure No. 25.	Passenger Chest Y Acceleration vs. Time	B-9
Figure No. 26.	Passenger Chest Z Acceleration vs. Time	B-9
Figure No. 27.	Passenger Chest Resultant Z Acceleration vs. Time	B-9

	<u>Page No.</u>
Figure No. 28. Passenger Neck Force X vs. Time	B-10
Figure No. 29. Passenger Neck Force Z vs. Time	B-10
Figure No. 30. Passenger Neck Moment Y vs. Time	B-10
Figure No. 31. Passenger Nij (NTF) vs. Time	B-11
Figure No. 32. Passenger Nij (NTE) vs. Time	B-11
Figure No. 33. Passenger Nij (NCF) vs. Time	B-11
Figure No. 34. Passenger Nij (NCE) vs. Time	B-11
Figure No. 35. Passenger Left Femur Force vs. Time	B-12
Figure No. 36. Passenger Right Femur Force vs. Time	B-12

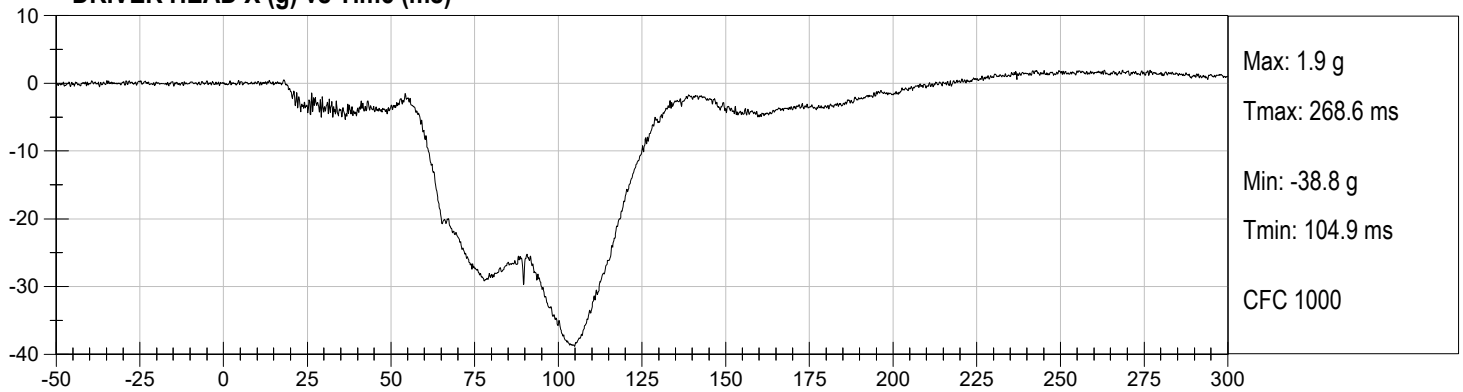
The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at www.nhtsa.gov

Driver Head X Redundant
 Driver Head Y Redundant
 Driver Head Z Redundant
 Driver Head Angular Velocity X
 Driver Head Angular Velocity Y
 Driver Head Angular Velocity Z
 Driver Upper Neck Force Y
 Driver Upper Neck Moment X
 Driver Upper Neck Moment Z
 Driver Chest X Redundant
 Driver Chest Y Redundant
 Driver Chest Z 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

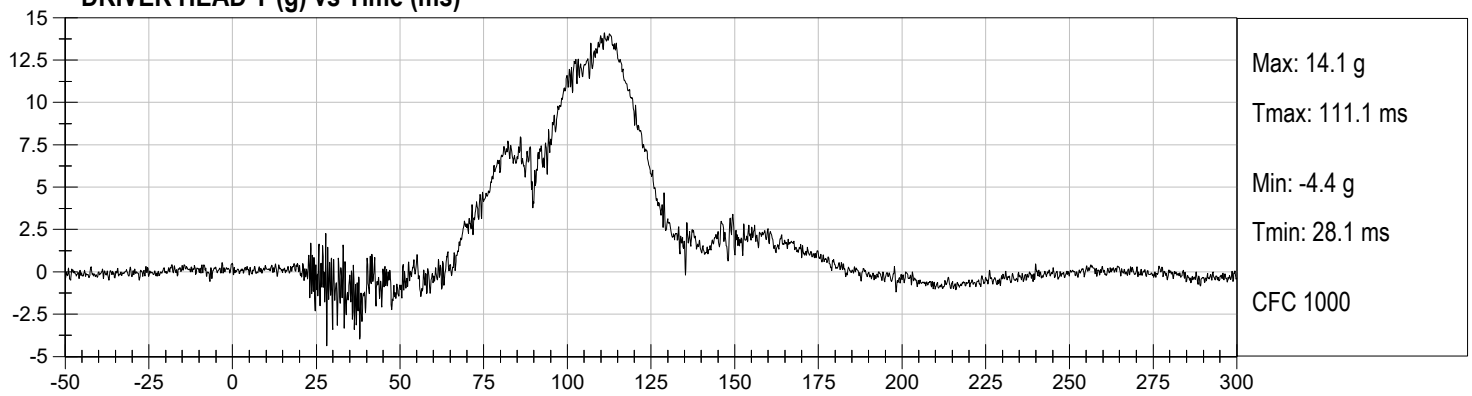
Driver Left Upper Tibia Force Z
Driver Left Lower Tibia Moment X
Driver Left Lower Tibia Moment Y
Driver Left Lower Tibia Force Z
Driver Right Upper Tibia Moment X
Driver Right Upper Tibia Moment Y
Driver Right Upper Tibia Force Z
Driver Right Lower Tibia Moment X
Driver Right Lower Tibia Moment Y
Driver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

Passenger Pelvis Z
Passenger Left Femur Redundant
Passenger Right Femur Redundant
Passenger Left Upper Tibia Moment X
Passenger Left Upper Tibia Moment Y
Passenger Left Upper Tibia Force Z
Passenger Left Lower Tibia Moment X
Passenger Left Lower Tibia Moment Y
Passenger Left Lower Tibia Force Z
Passenger Right Upper Tibia Moment X
Passenger Right Upper Tibia Moment Y
Passenger Right Upper Tibia Force Z
Passenger Right Lower Tibia Moment X
Passenger Right Lower Tibia Moment Y
Passenger Right Lower Tibia Force Z
Passenger Left Foot Fore Z
Passenger Left Foot Aft X
Passenger Left Foot Aft Z
Passenger Right Foot Fore Z
Passenger Right Foot Aft X
Passenger Right Foot Aft Z
Passenger Lap Belt Force
Passenger Shoulder Belt Force
Left Rear Seat Crossmember X
Right Rear Seat Crossmember X
Vehicle Engine Top X
Vehicle Engine Bottom X
Left Rear Seat Crossmember Z
Right Rear Seat Crossmember Z
Left Rear Seat Crossmember Xr
Right Rear Seat Crossmember Xr
Advanced Research Load Cell Barrier – 528 channels

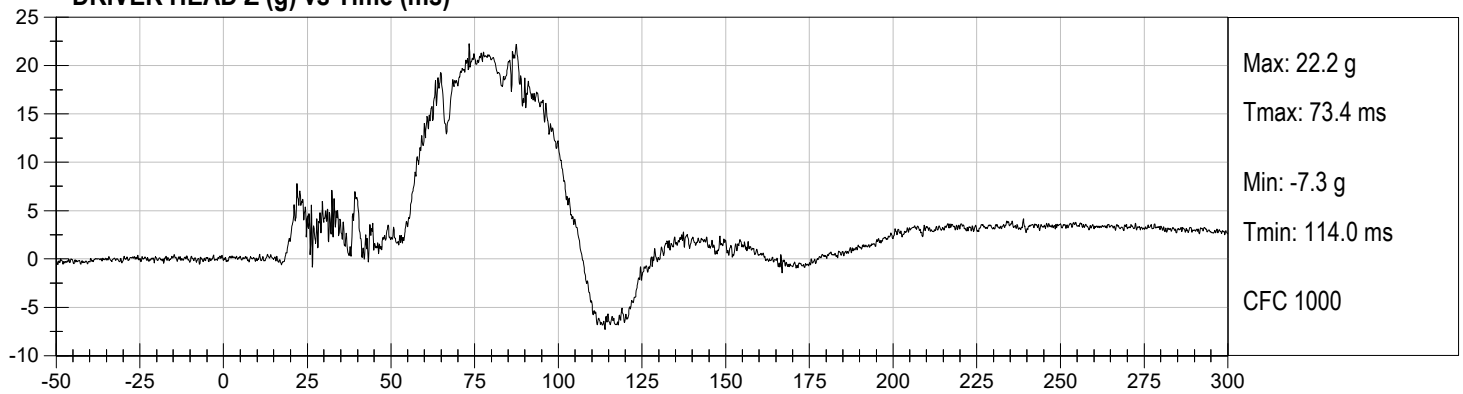
DRIVER HEAD X (g) vs Time (ms)



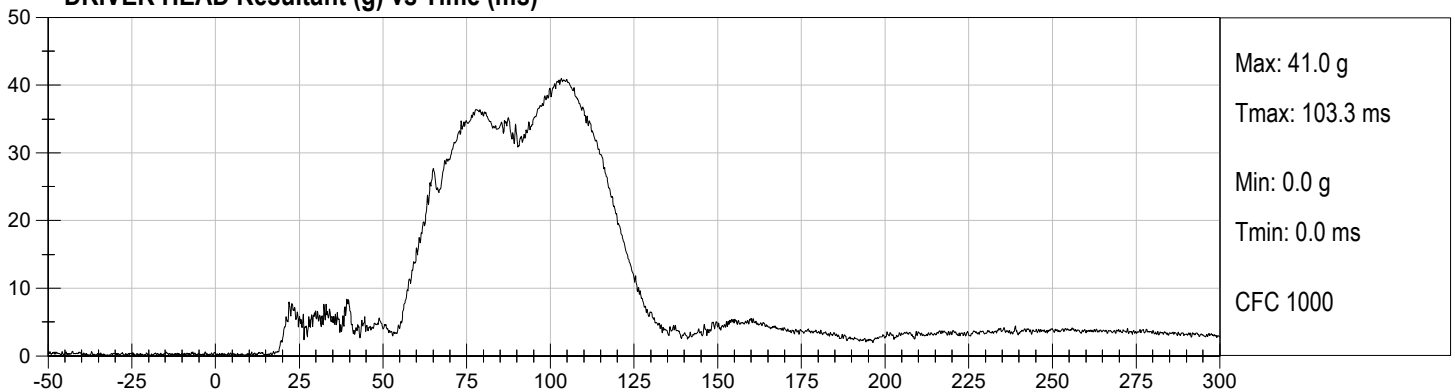
DRIVER HEAD Y (g) vs Time (ms)

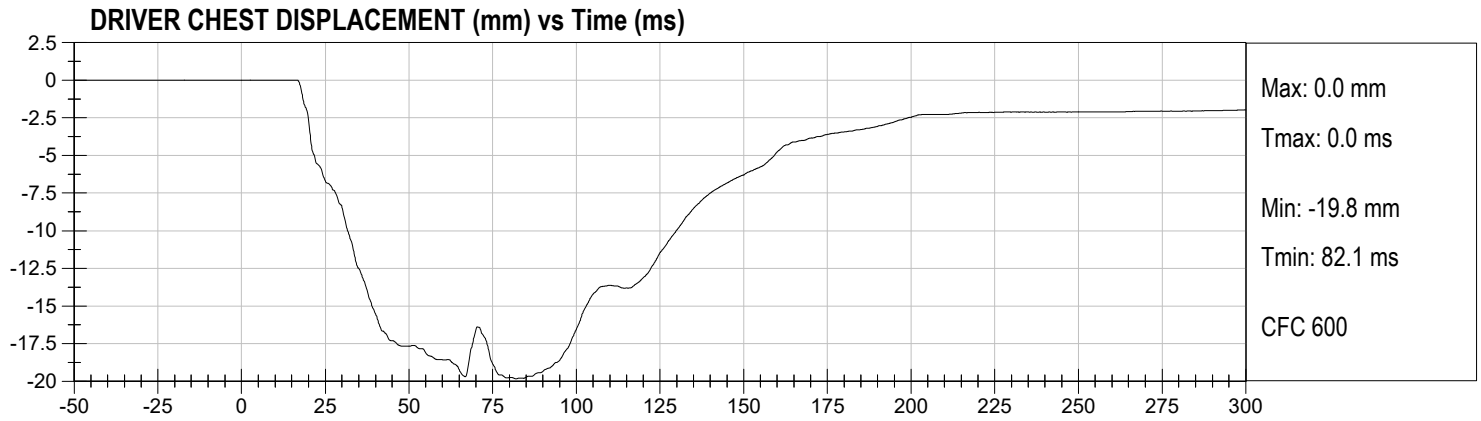


DRIVER HEAD Z (g) vs Time (ms)

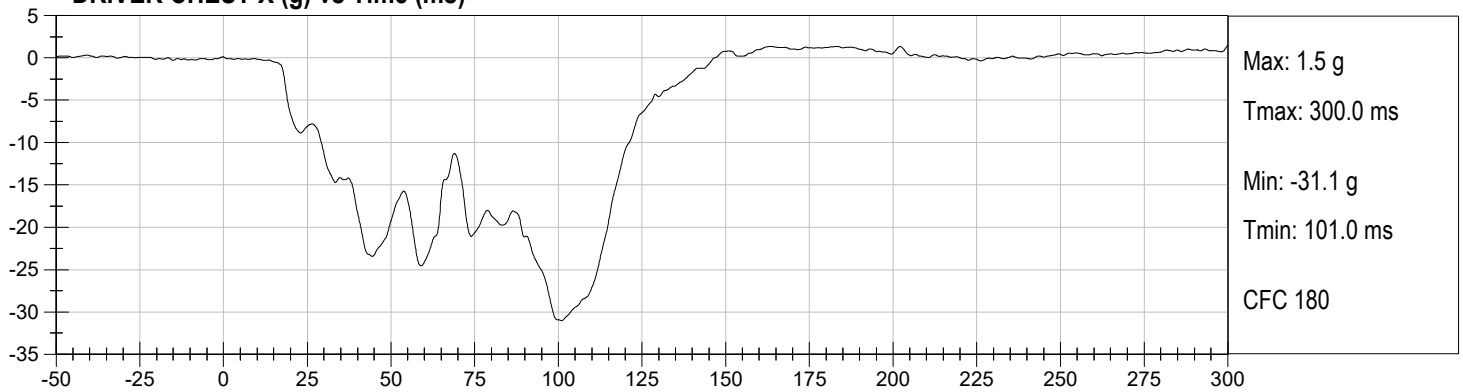


DRIVER HEAD Resultant (g) vs Time (ms)

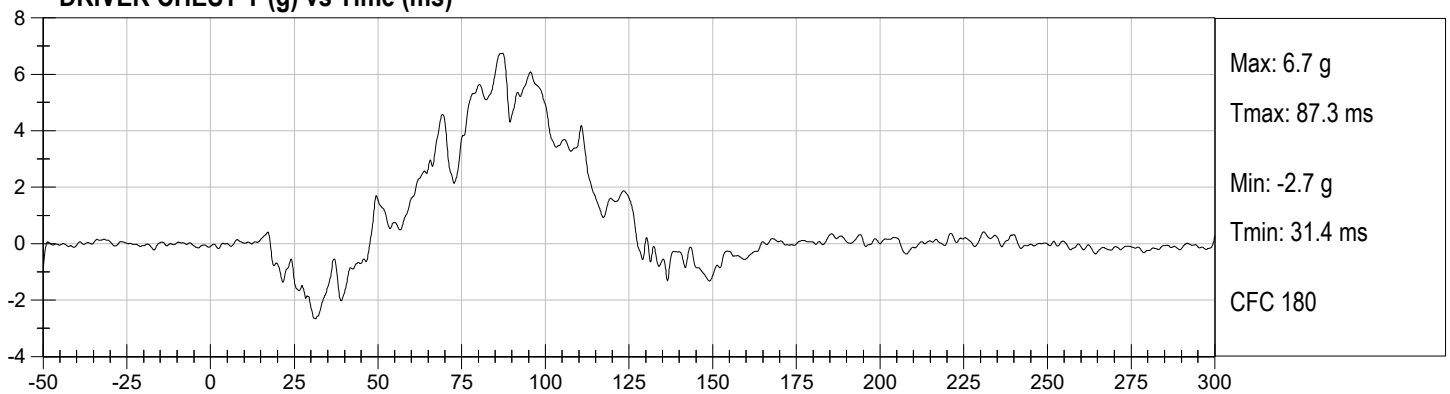




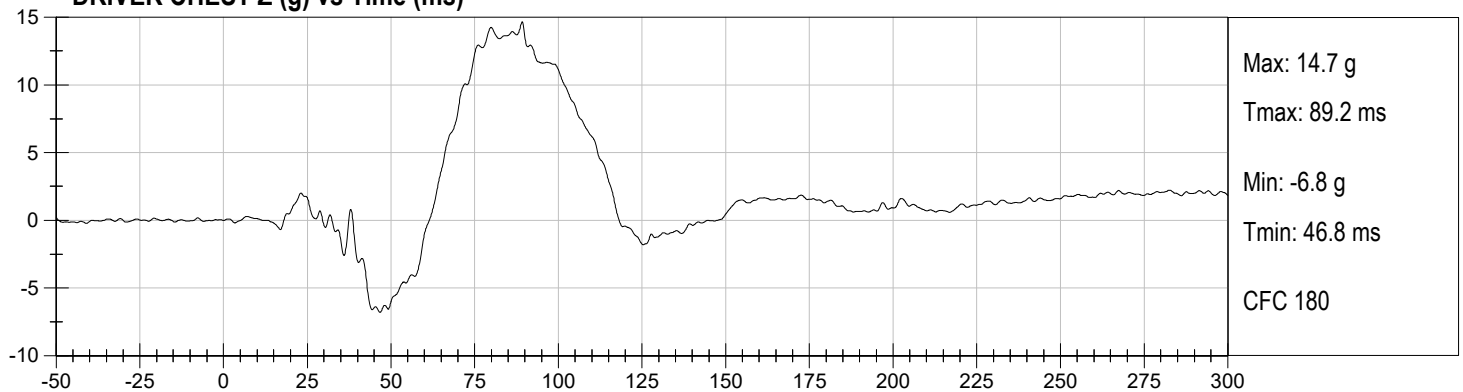
DRIVER CHEST X (g) vs Time (ms)



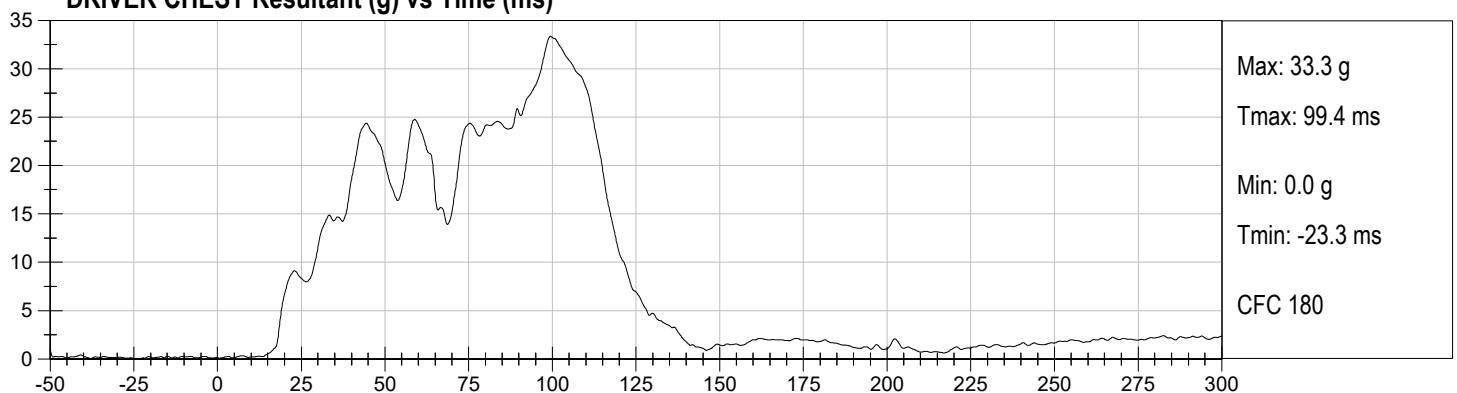
DRIVER CHEST Y (g) vs Time (ms)



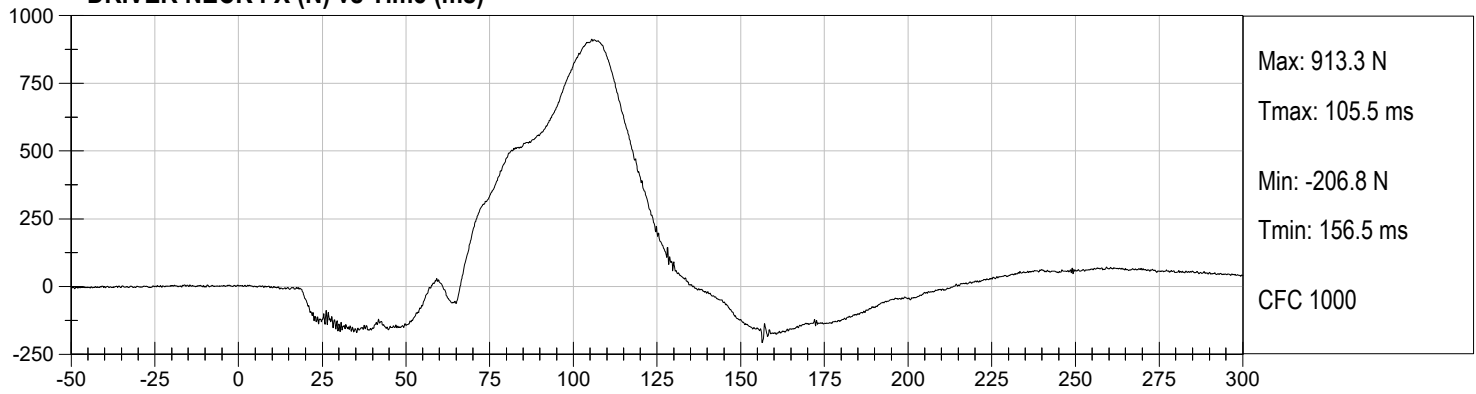
DRIVER CHEST Z (g) vs Time (ms)



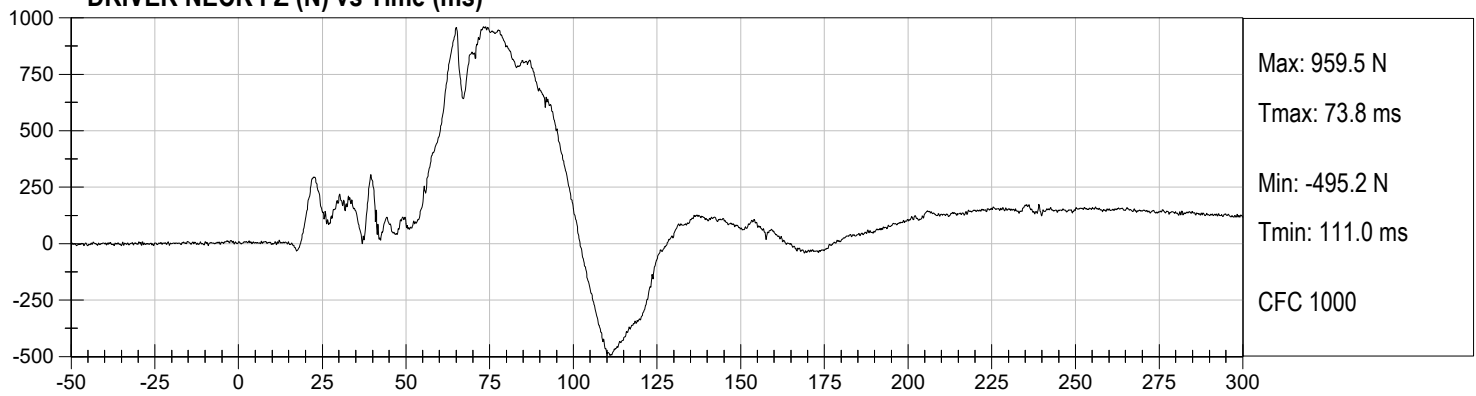
DRIVER CHEST Resultant (g) vs Time (ms)



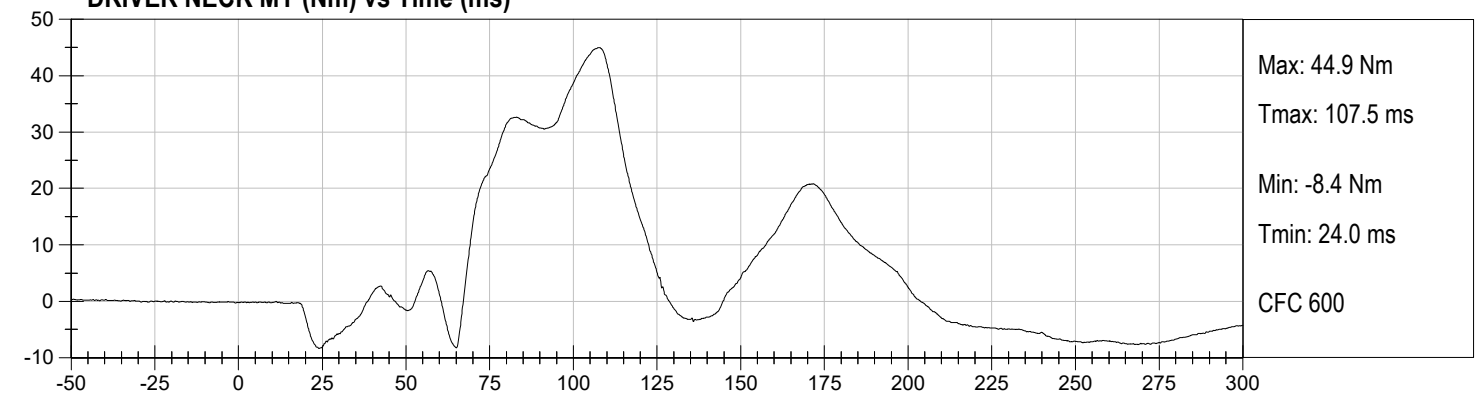
DRIVER NECK FX (N) vs Time (ms)



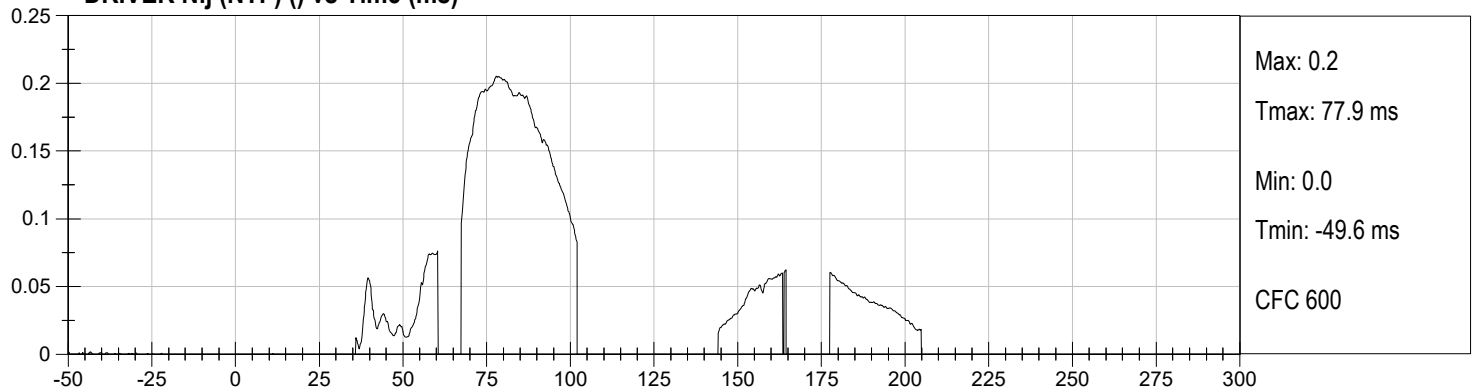
DRIVER NECK FZ (N) vs Time (ms)



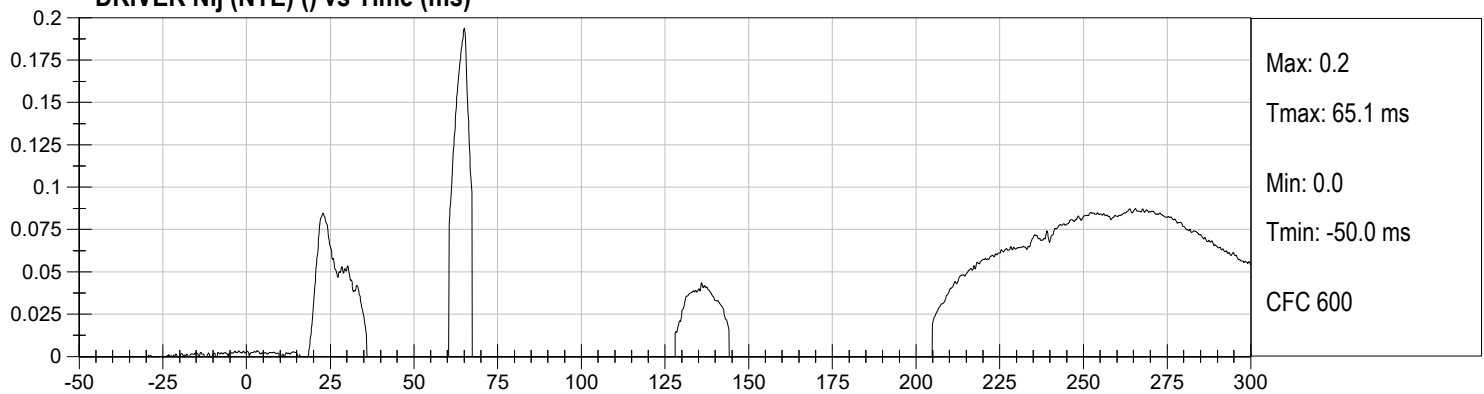
DRIVER NECK MY (Nm) vs Time (ms)



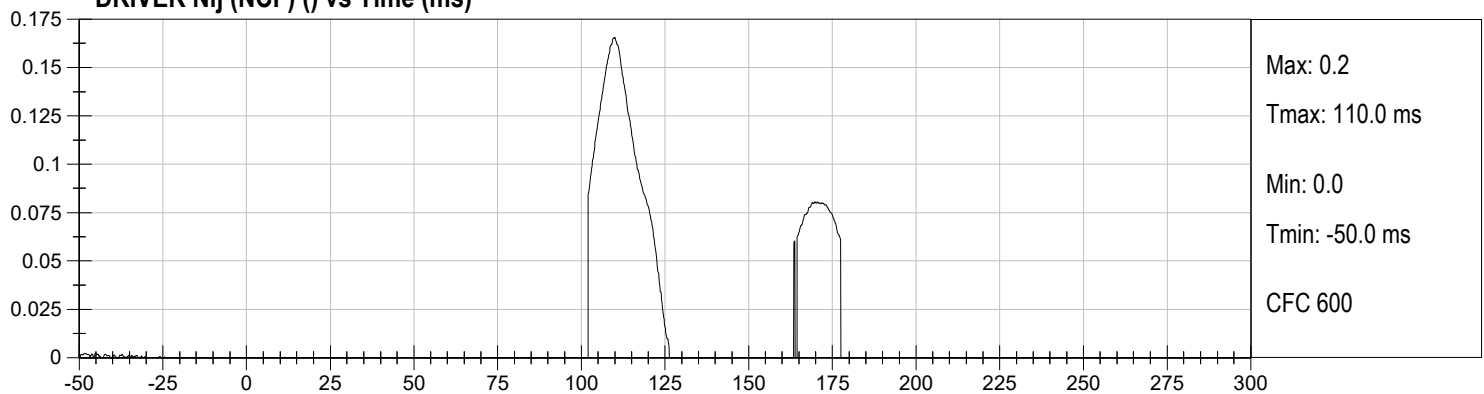
DRIVER Nij (NTF) () vs Time (ms)



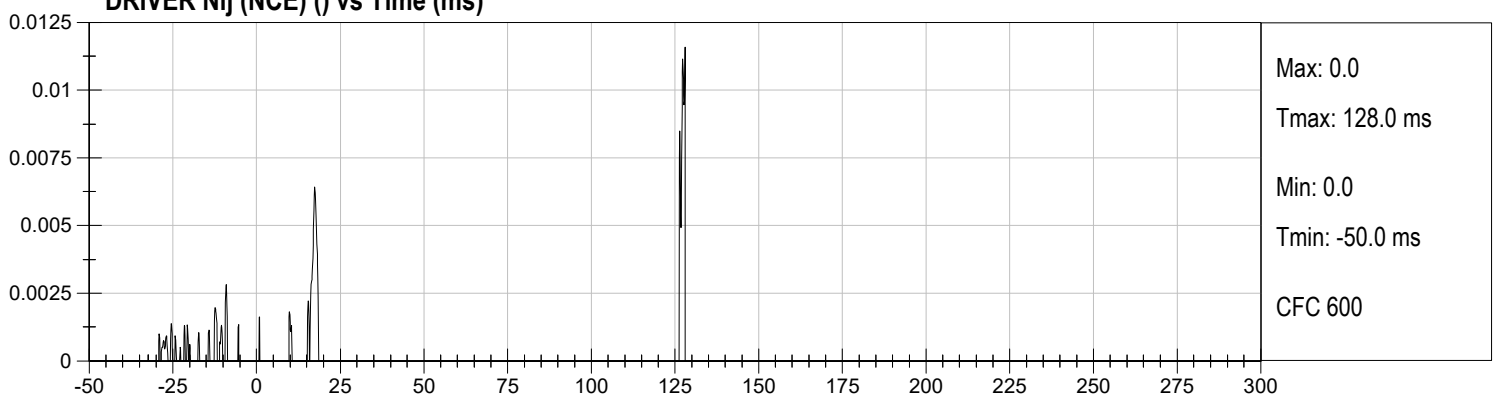
DRIVER Nij (NTE) () vs Time (ms)



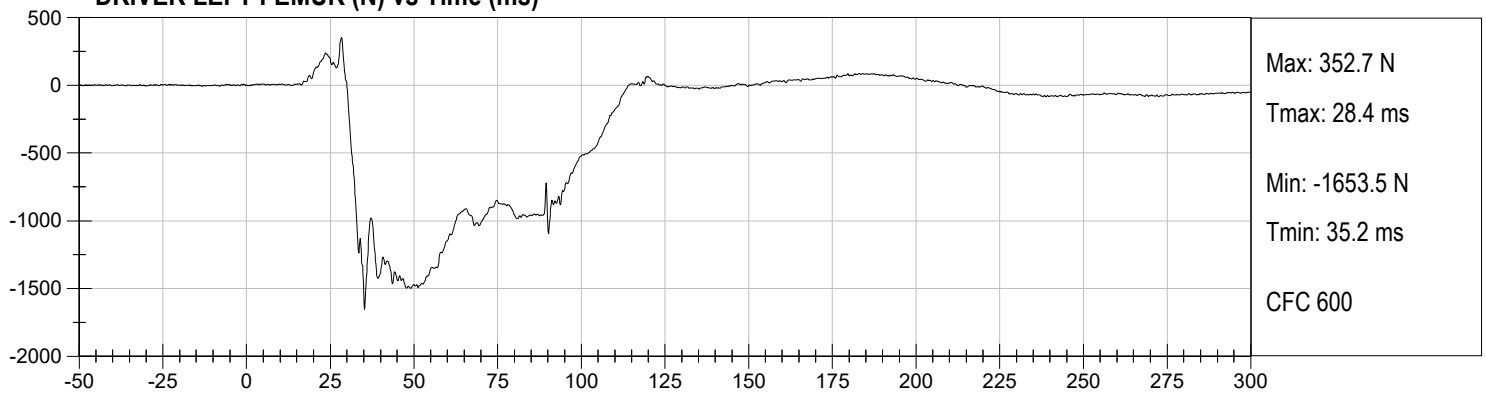
DRIVER Nij (NCF) () vs Time (ms)



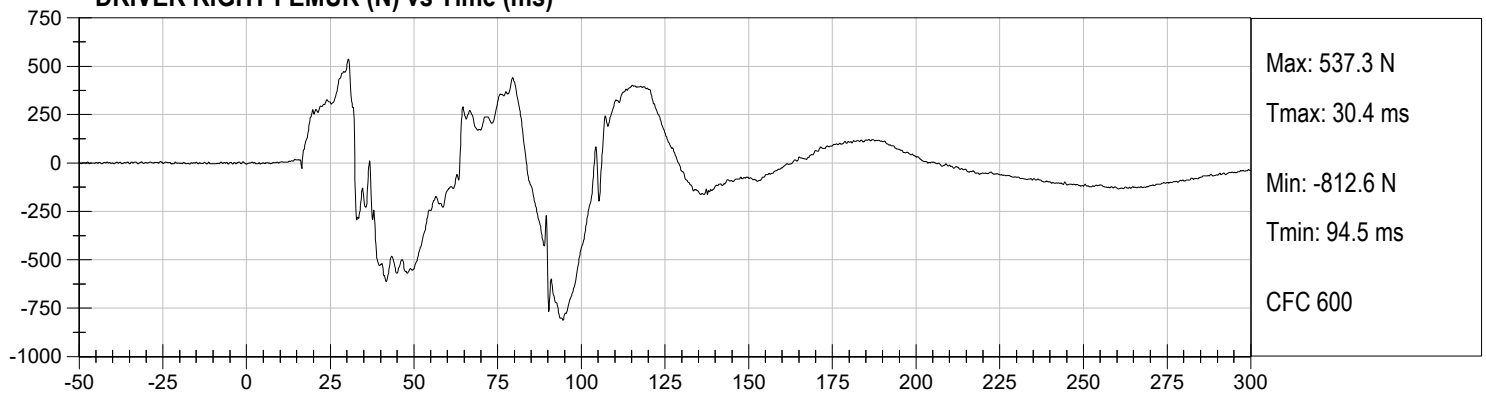
DRIVER Nij (NCE) () vs Time (ms)



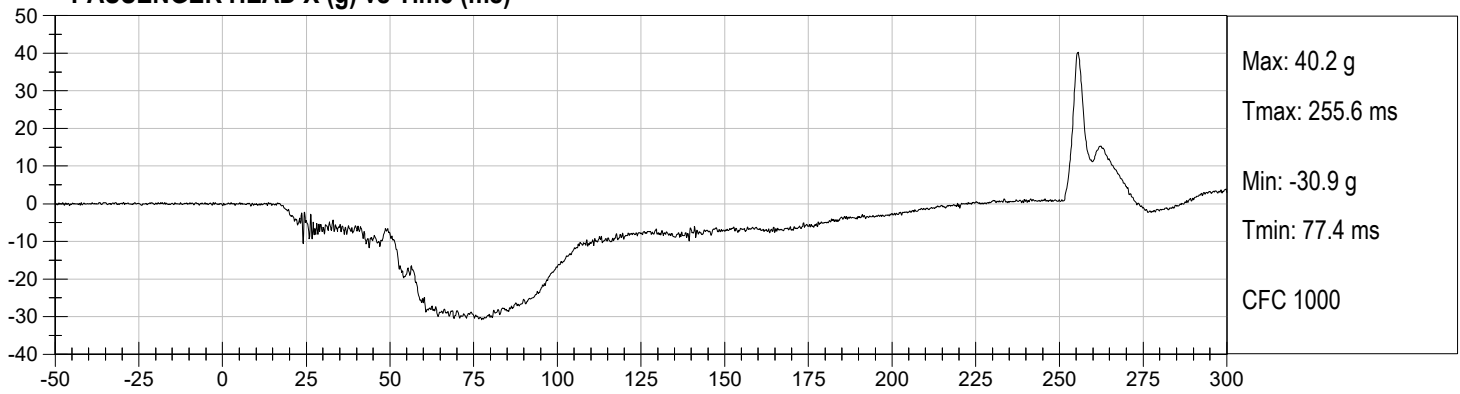
DRIVER LEFT FEMUR (N) vs Time (ms)



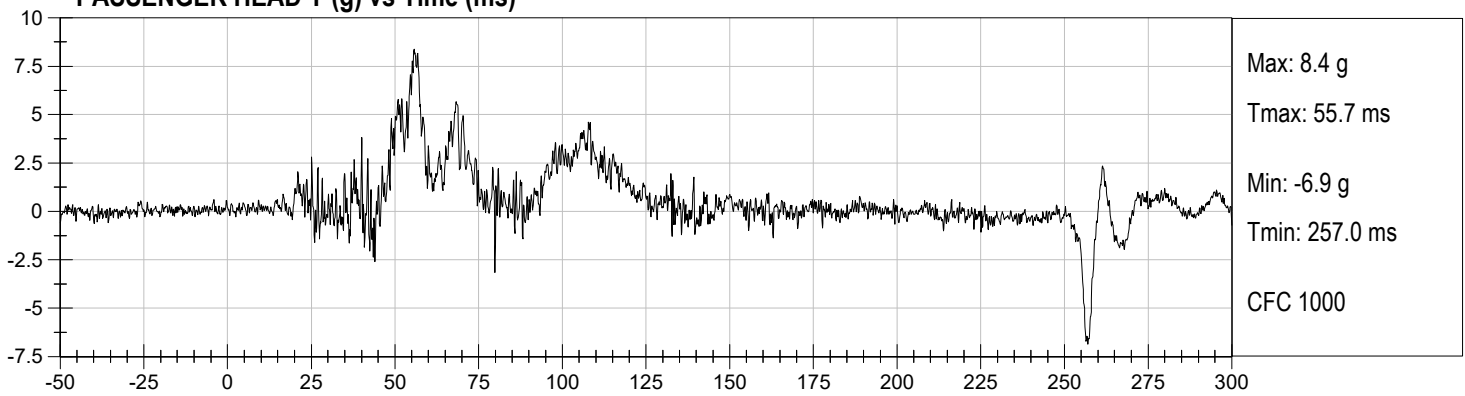
DRIVER RIGHT FEMUR (N) vs Time (ms)



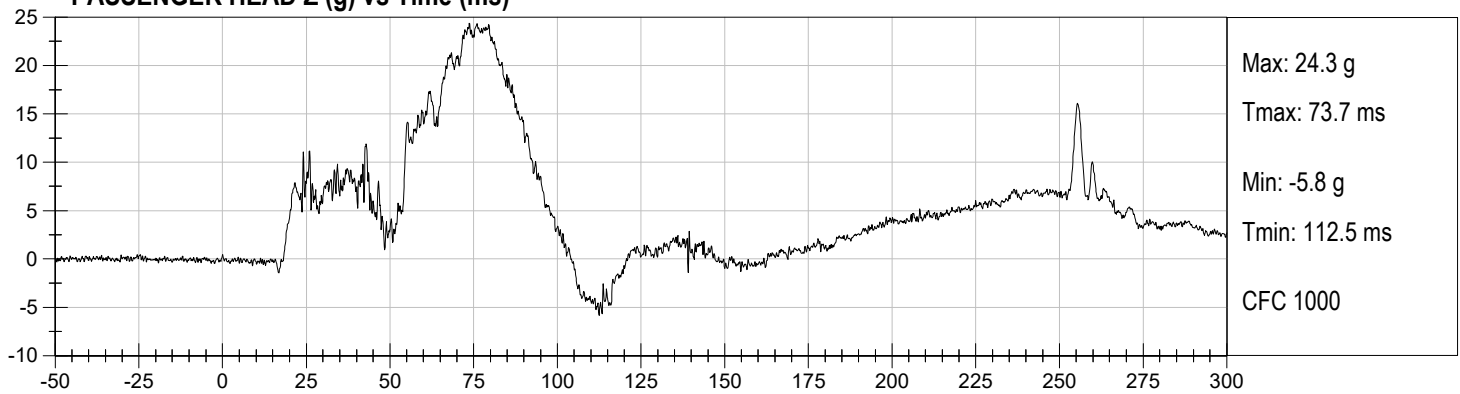
PASSENGER HEAD X (g) vs Time (ms)



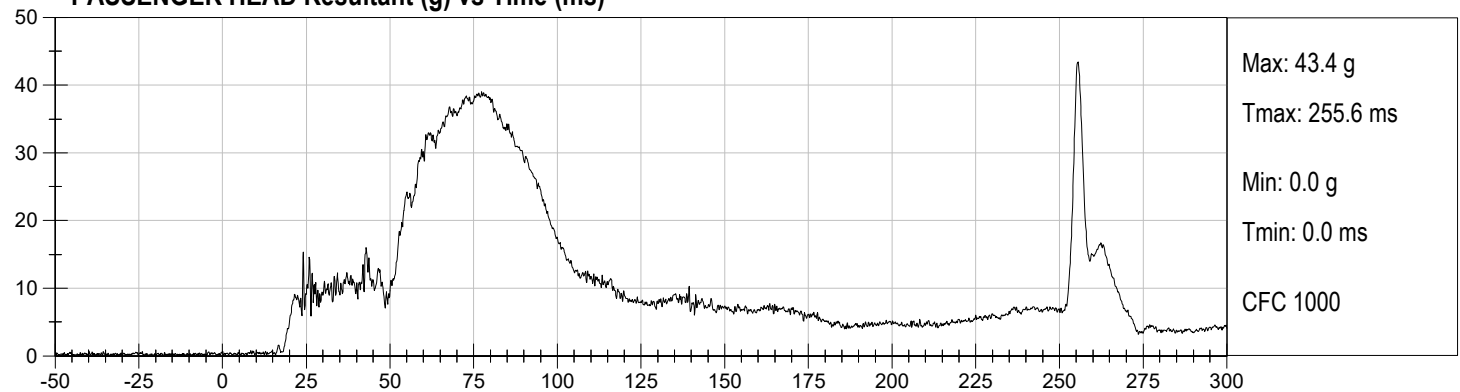
PASSENGER HEAD Y (g) vs Time (ms)

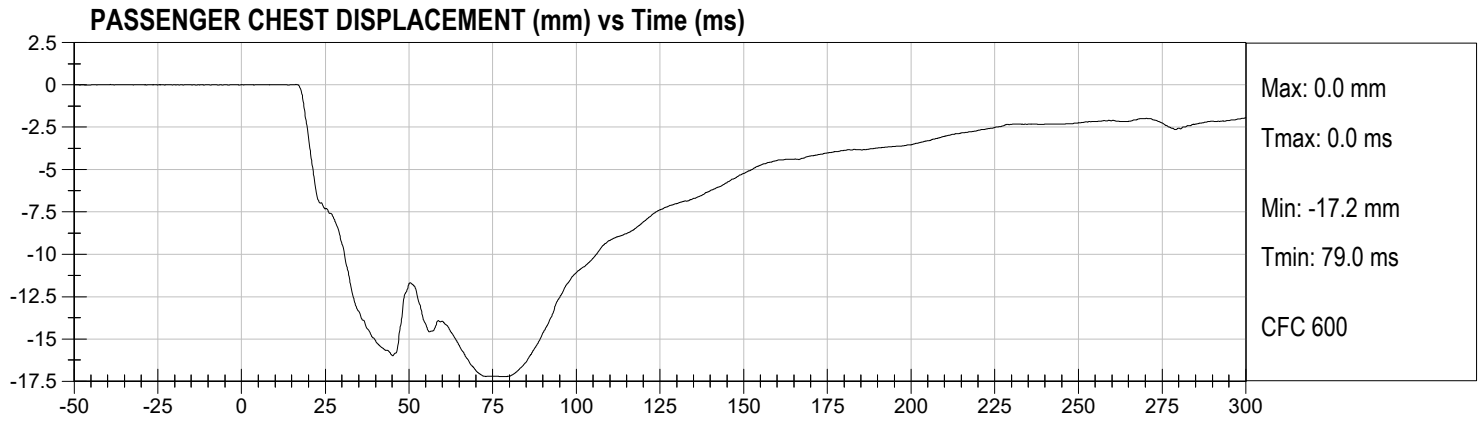


PASSENGER HEAD Z (g) vs Time (ms)

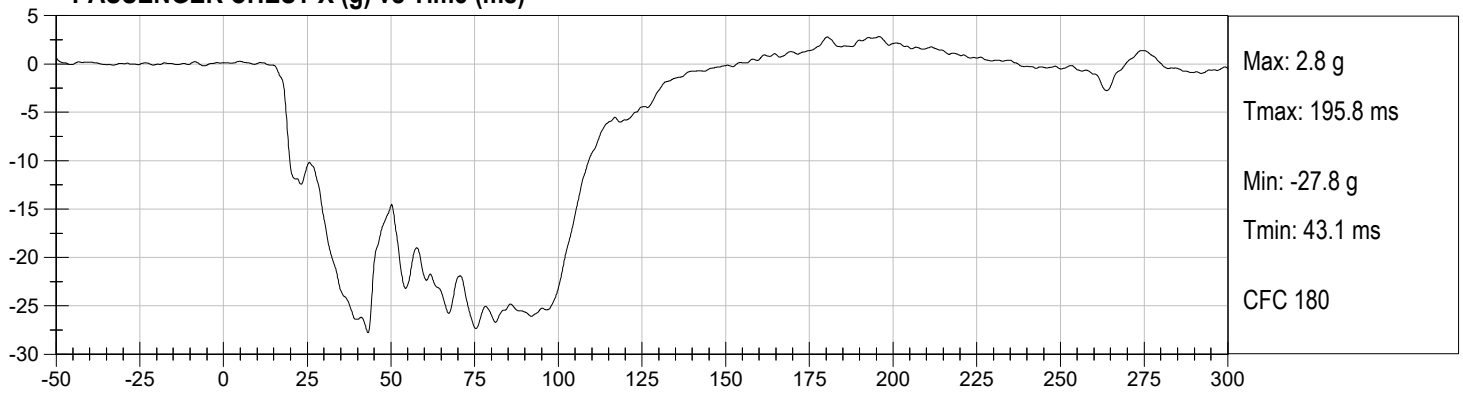


PASSENGER HEAD Resultant (g) vs Time (ms)

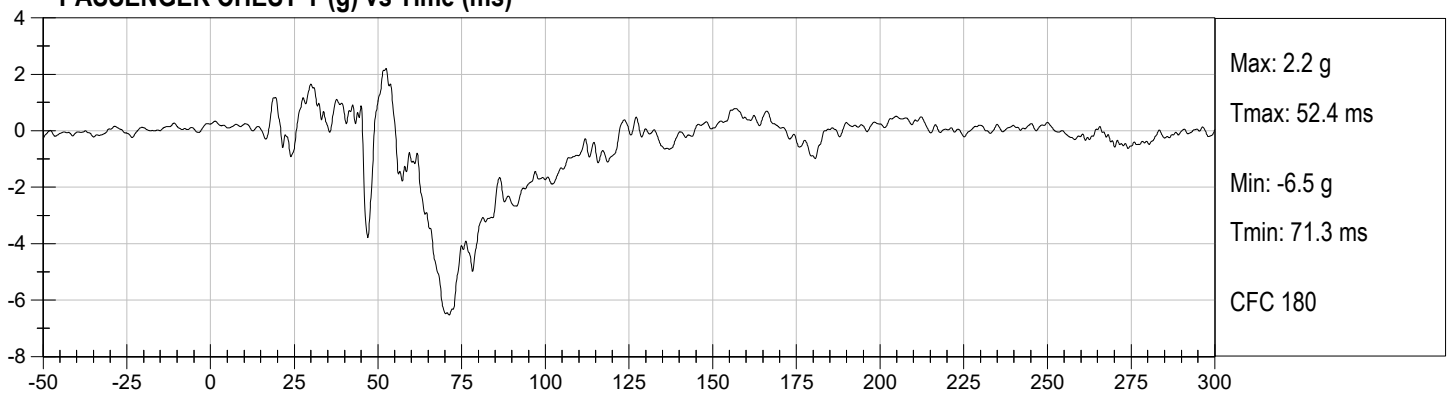




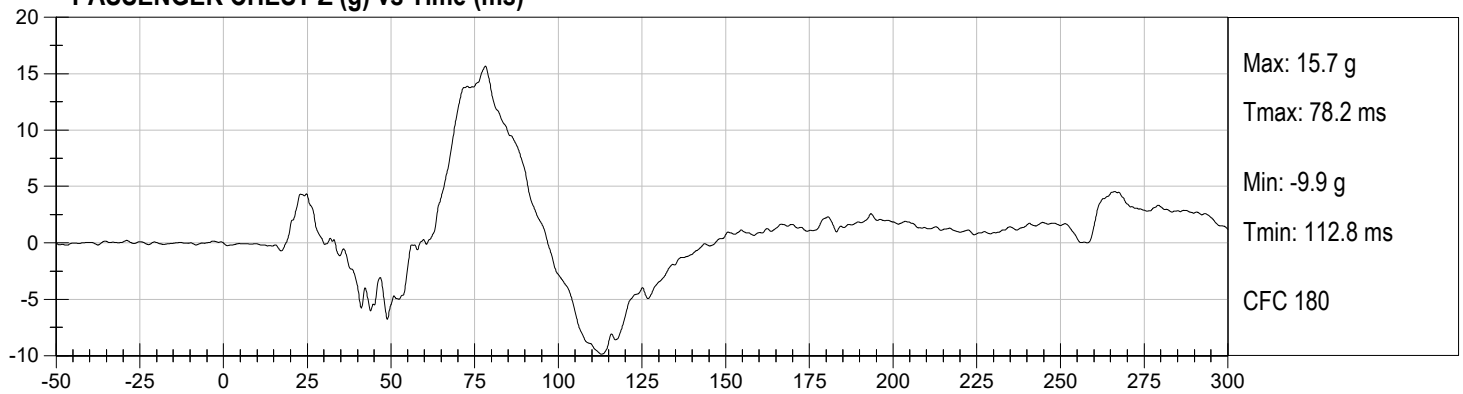
PASSENGER CHEST X (g) vs Time (ms)



PASSENGER CHEST Y (g) vs Time (ms)



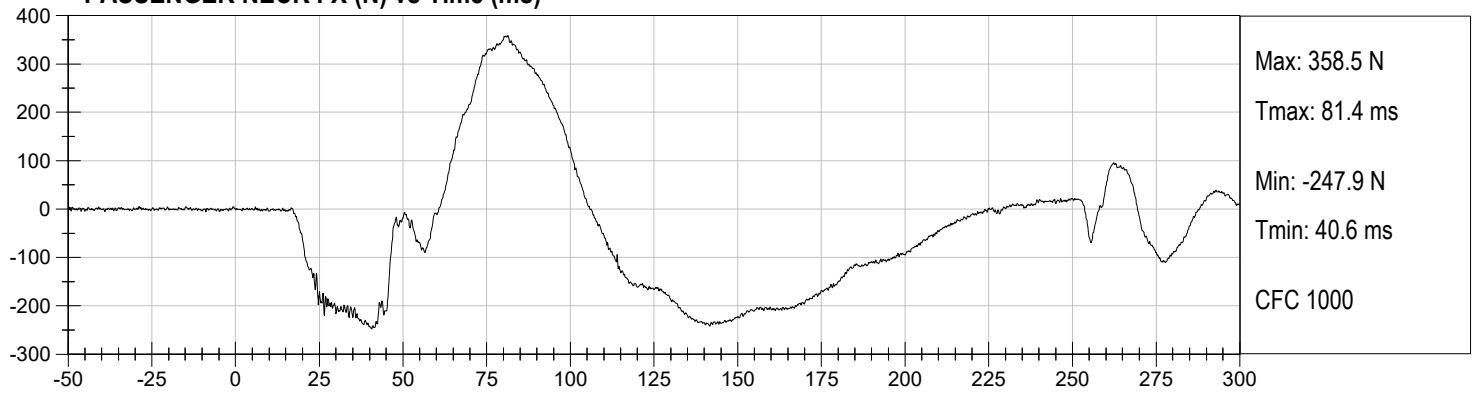
PASSENGER CHEST Z (g) vs Time (ms)



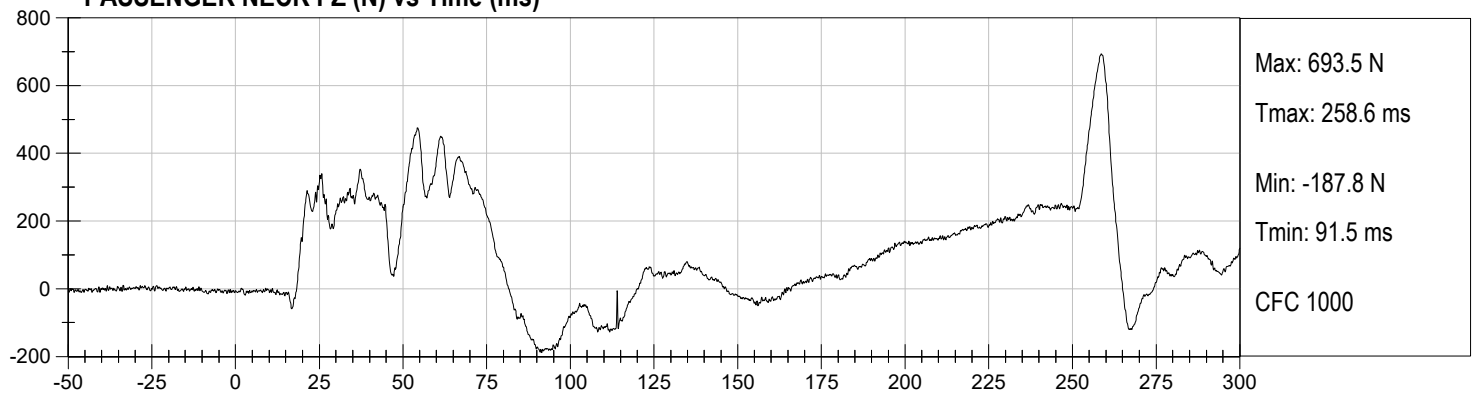
PASSENGER CHEST Resultant (g) vs Time (ms)



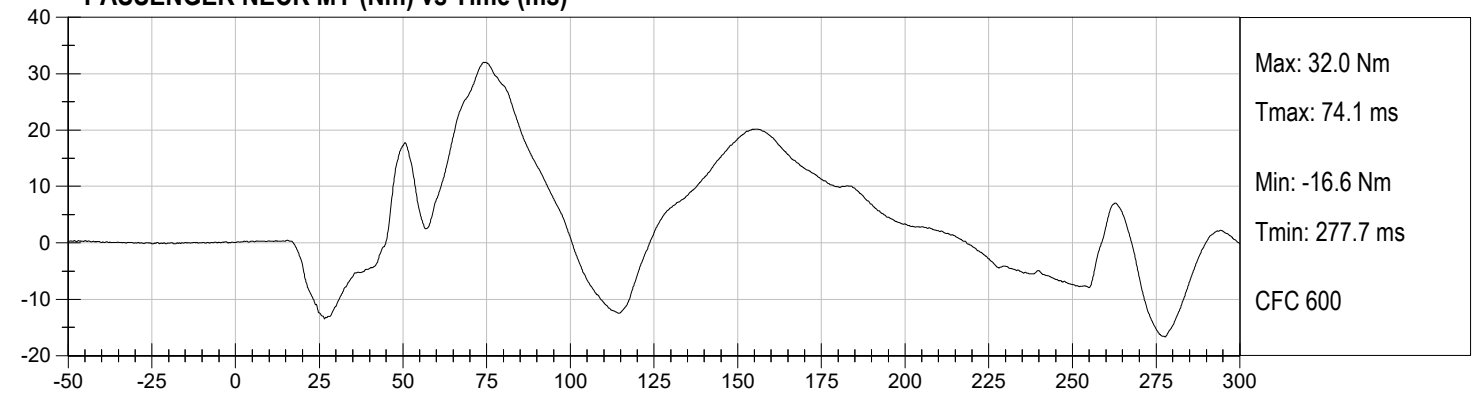
PASSENGER NECK FX (N) vs Time (ms)



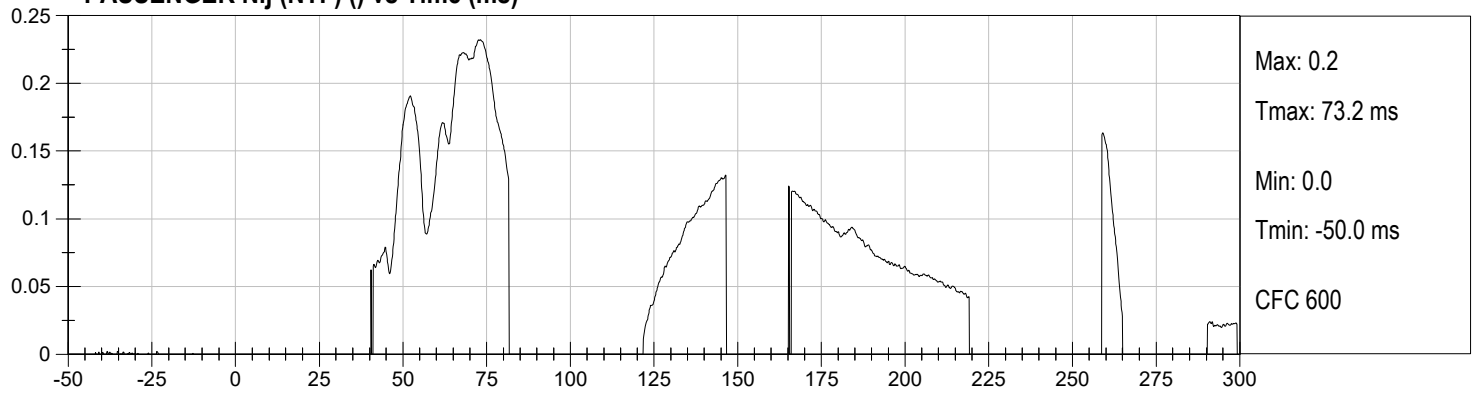
PASSENGER NECK FZ (N) vs Time (ms)



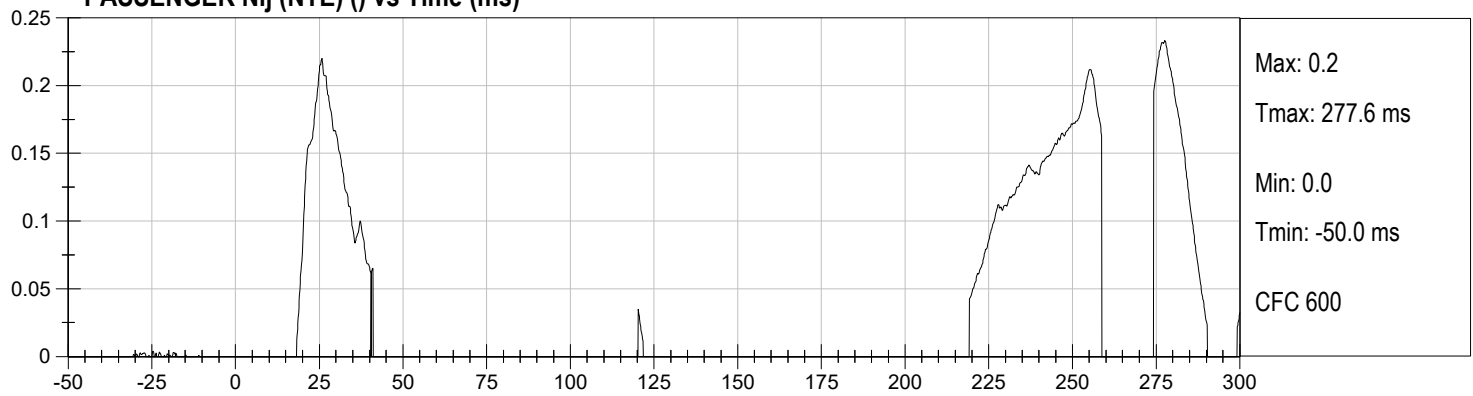
PASSENGER NECK MY (Nm) vs Time (ms)



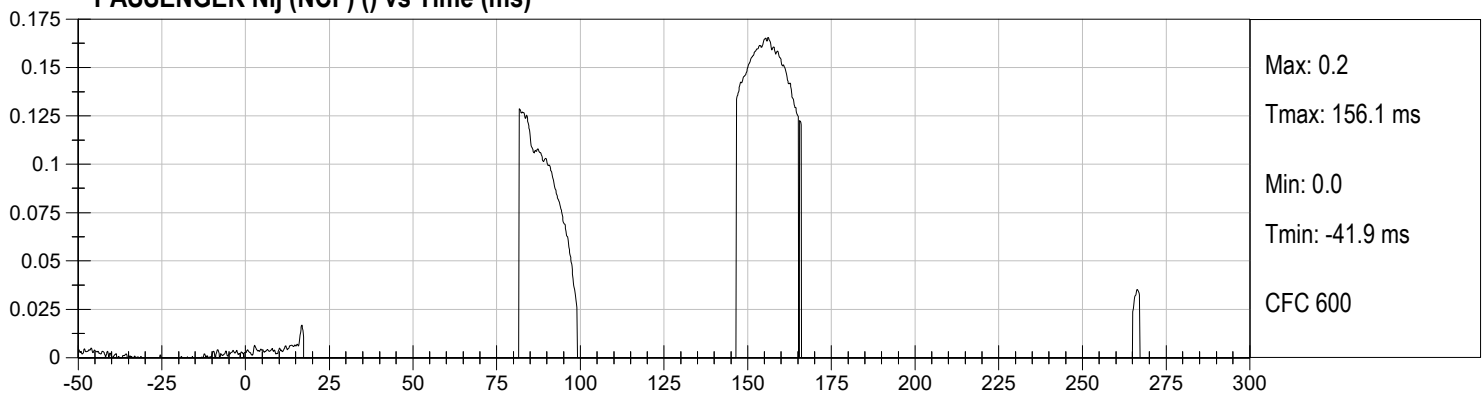
PASSENGER Nij (NTF) () vs Time (ms)



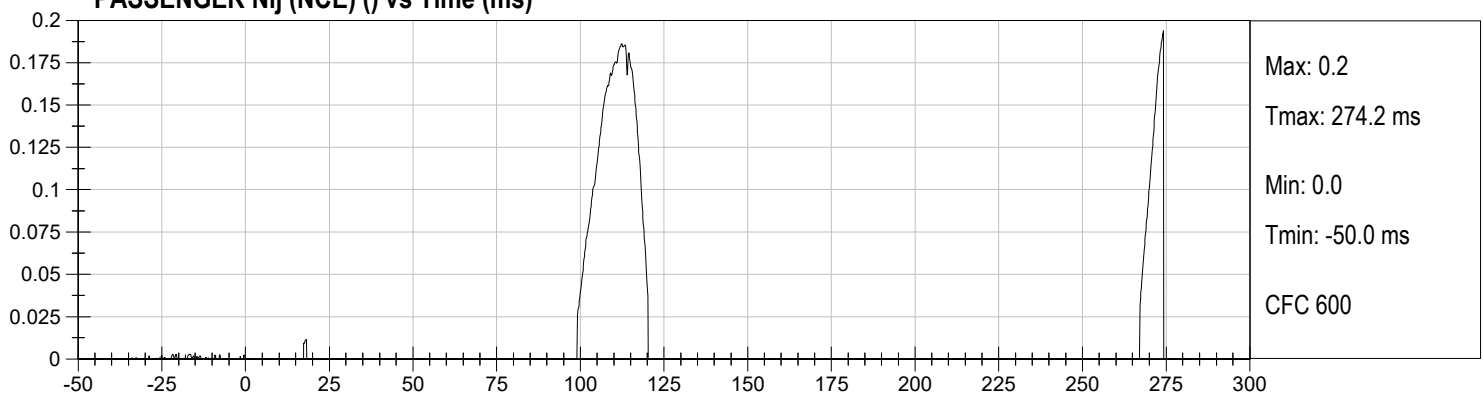
PASSENGER Nij (NTE) () vs Time (ms)



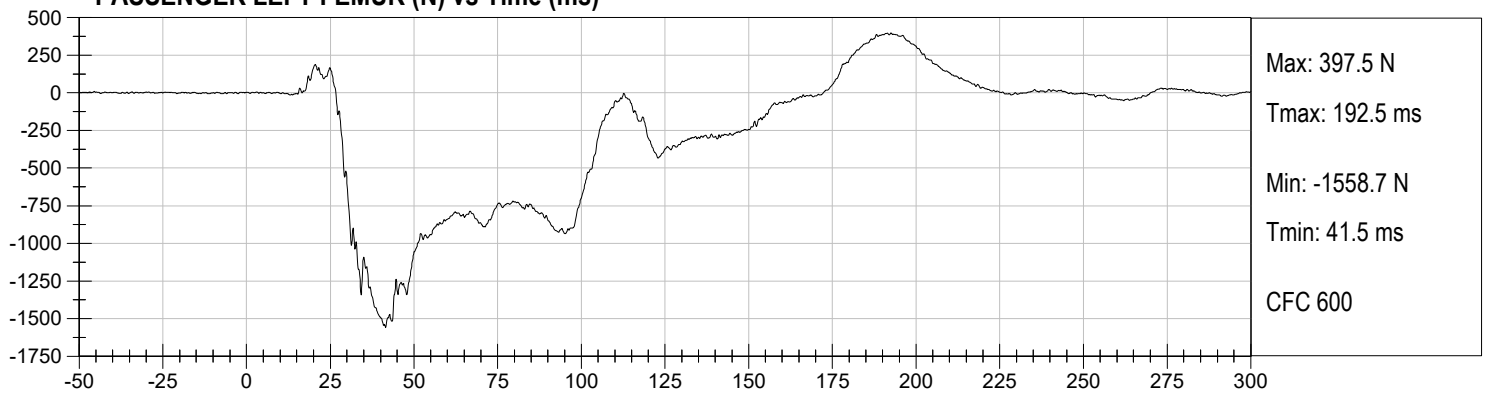
PASSENGER Nij (NCF) () vs Time (ms)



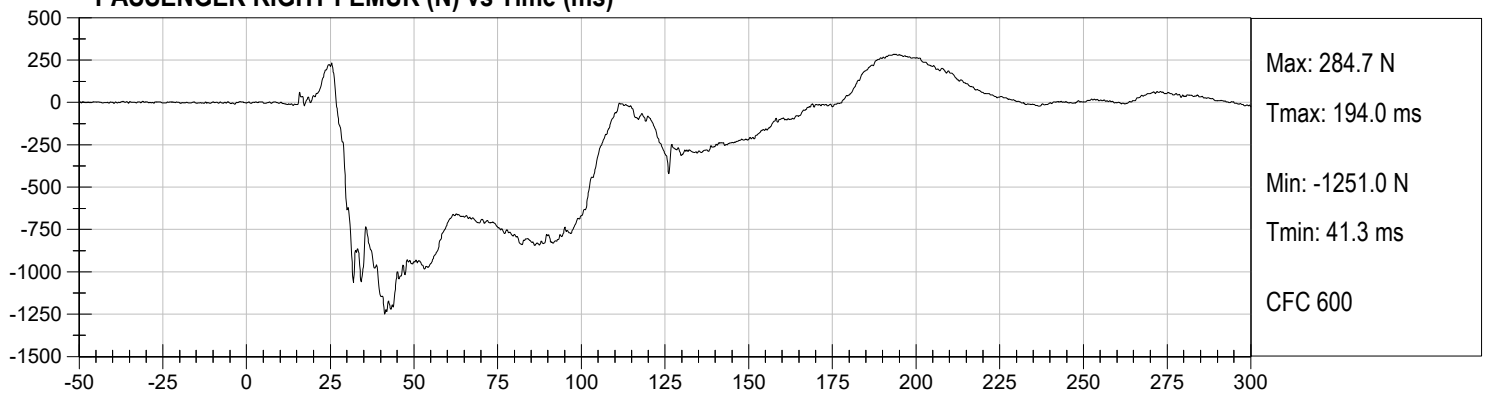
PASSENGER Nij (NCE) () vs Time (ms)



PASSENGER LEFT FEMUR (N) vs Time (ms)



PASSENGER RIGHT FEMUR (N) vs Time (ms)



APPENDIX C
DUMMY QUALIFICATION AND PERFORMANCE VERIFICATION

QUALIFICATION TEST RESULTS

PRE-TEST

HYBRID III 50TH PERCENTILE MALE - DRIVER ATD

**Hybrid III 50th, External Measurements
SN: 064**

HYBRID III, PART 572, SUBPART E EXTERNAL DIMENSIONS				
DIMENSION	DESCRIPTION	DETAILS	ASSEMBLY DIMENSION (inches)	ACTUAL MEASUREMENT
A	TOTAL SITTING HEIGHT	Seat surface to highest point on top of the head.	34.6–35.0	34.71
B	SHOULDER PIVOT HEIGHT	Centerline of shoulder pivot bolt to the seat surface.	19.9-20.5	20.31
C	H-POINT HEIGHT	Reference	3.3-3.5	3.38
D	H-POINT LOCATION FROM BACKLINE	Reference	5.3-5.5	5.40
E	SHOULDER PIVOT FROM BACKLINE	Center of the shoulder clevis to the rear vertical surface of the fixture.	3.3-3.7	3.46
F	THIGH CLEARANCE	Measured at the highest point on the upper femur segment.	5.5-6.1	6.09
G	BACK OF ELBOW TO WRIST PIVOT	back of the elbow flesh to the wrist pivot in line with the elbow and wrist pivots	11.4-12.0	11.48
H	HEAD BACK TO BACKLINE	Back of Skull cap skin to seat rear vertical surface (Reference)	1.6-1.8	1.75
I	SHOULDER TO- ELBOW LENGTH	Measure from the highest point on top of the shoulder clevis to the lowest part of the flesh on the elbow in line with the elbow pivot bolt.	13.0-13.6	13.08
J	ELBOW REST HEIGHT	Measure from the flesh below the elbow pivot bolt to the seat surface.	7.5-8.3	8.13
K	BUTTOCK TO KNEE LENGTH	The forward most part of the knee flesh to the rear vertical surface of the fixture.	22.8-23.8	23.49
L	POPLITEAL HEIGHT	Seat surface to the plane of the horizontal plane of the bottom of the feet.	16.9-17.9	17.01
M	KNEE PIVOT HEIGHT	Centerline of knee pivot bolt to the horizontal plane of the bottom of the feet.	19.1-19.7	19.22
N	BUTTOCK POPLITEAL LENGTH	The rearmost surface of the lower leg to the same point on the rear surface of the buttocks used for dim. "K".	17.8-18.8	18.20

HYBRID III, SUBPART E EXTERIOR DIMENSIONS, continued				
DIMENSION	DESCRIPTION	DETAILS		ACTUAL MEASUREMENT
O	CHEST DEPTH WITHOUT JACKET	Measured 16.9-17.1 in. above seat surface	8.4-9.0	8.43
P	FOOT LENGTH	Tip of toe to rear of heel	9.9-10.5	10.33
V	SHOULDER BREADTH	Outside edges of right and left shoulder clevises	16.3-17.2	16.65
W	FOOT BREADTH	The widest part of the foot	3.6-4.2	3.94
Y	CHEST CIRCUMFERENCE (WITH CHEST JACKET)	Measured 16.9-17.1 in. above seat surface	38.2-39.4	39.25
Z	WAIST CIRCUMFERENCE	Measured 8.9-9.1 in. above seat surface	32.9-34.1	33.89
AA	REFERENCE LOCATION FOR MEASUREMENT OF CHEST CIRCUMFERENCE	Reference	16.9-17.1	17.00
BB	REFERENCE LOCATION FOR MEASUREMENT OF WAIST CIRCUMFERENCE	Reference	8.9-9.1	9.00

NOTE: THE H-POINT IS LOCATED 1.83 INCHES FORWARD AND 2.57 INCHES DOWN FROM THE CENTER OF THE PELVIS ANGLE REFERENCE HOLE.

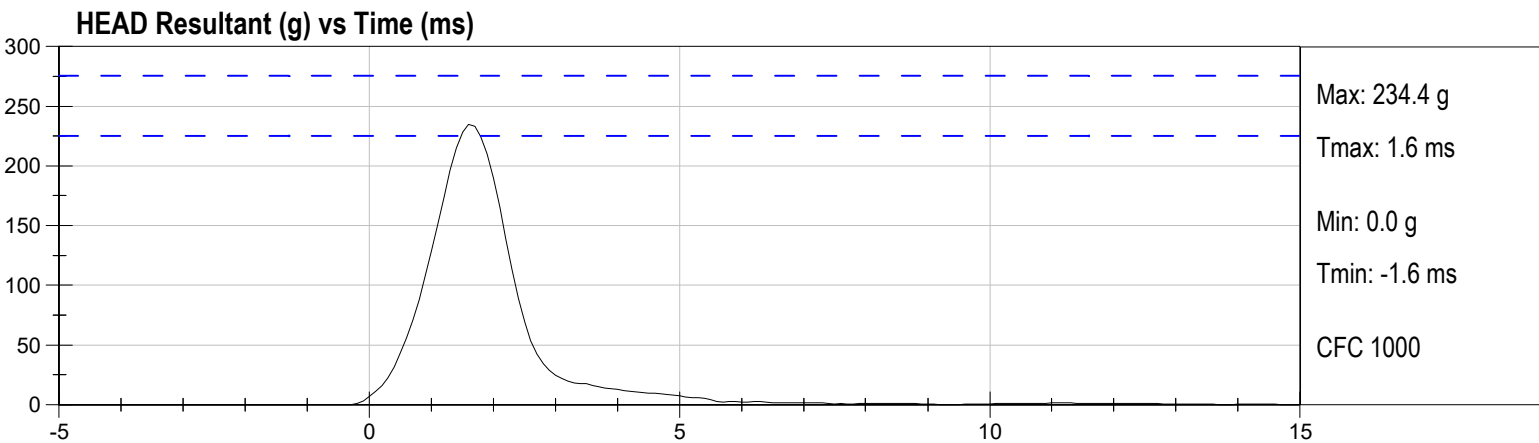
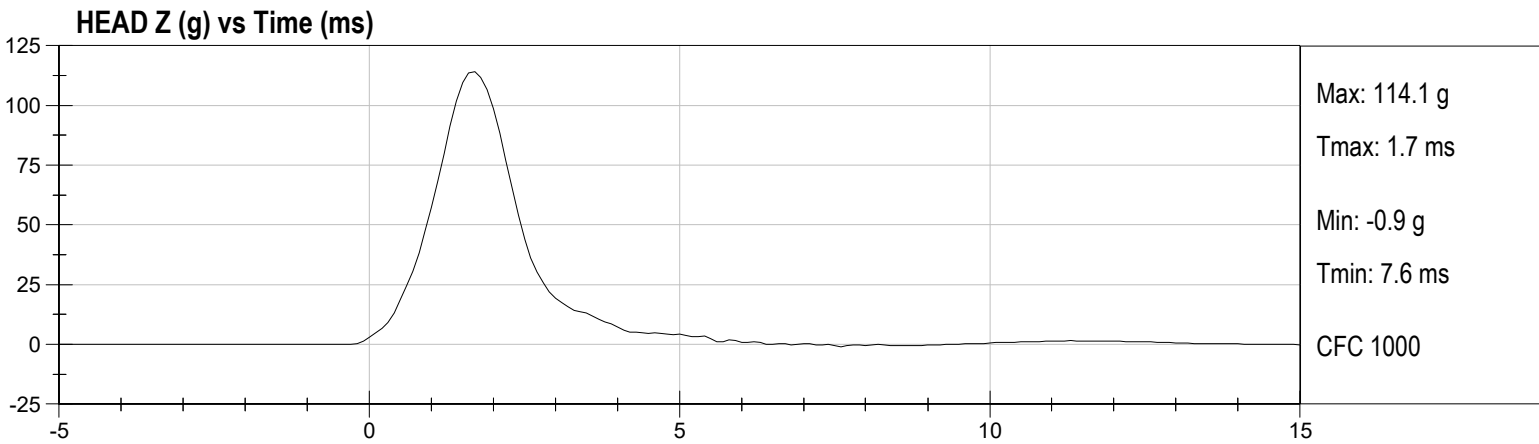
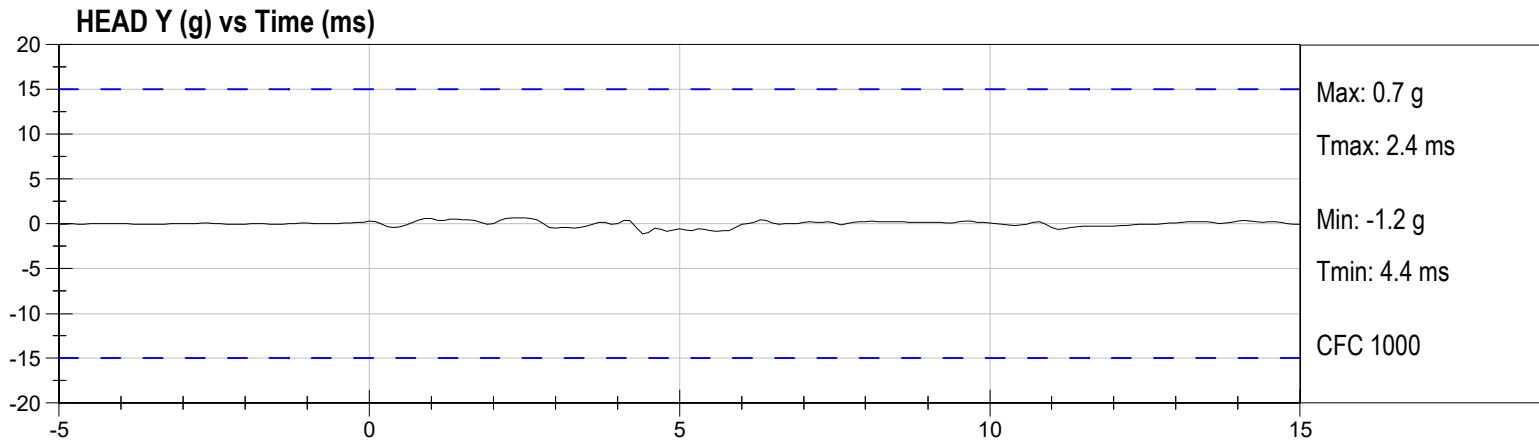
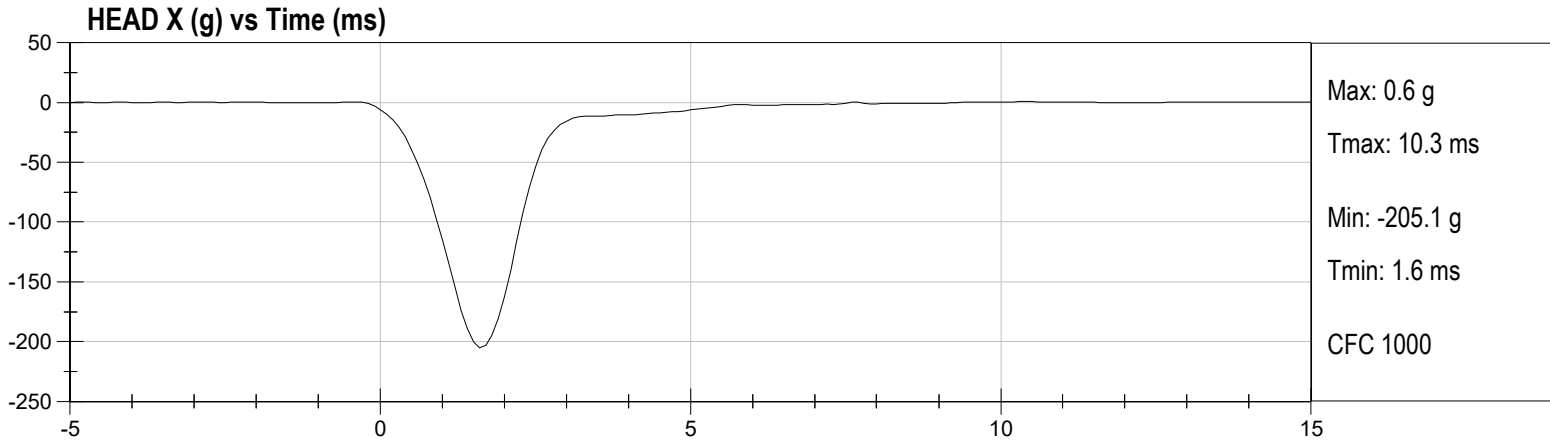


Head Drop Test
Hybrid III 50th Percentile Male
ATD Serial No: 064

Test Date: 10/15/2025
Test ID: D252991
Test Technician: Brian Lucas

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	39	Pass
Peak Resultant Acceleration	g	225 to 275	234	Pass
Peak Lateral Acceleration	g	-15.0 to 15.0	-1.2	Pass
Unimodal	%	within 10% of peak	1	Pass

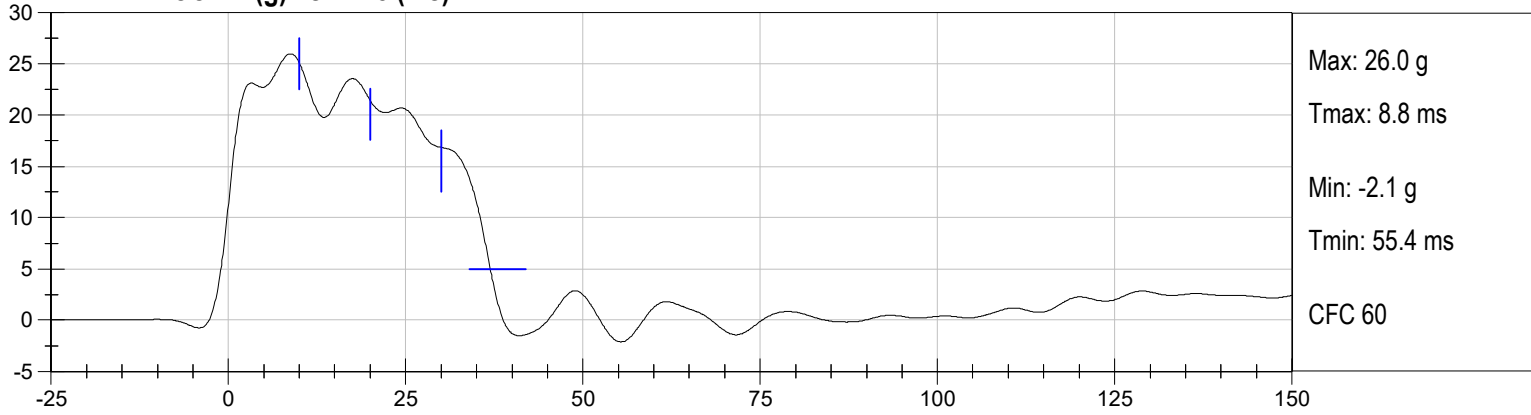
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
HEAD X	Endevco	T30974	05/27/2025	11/26/2025
HEAD Y	Endevco	T30975	05/27/2025	11/26/2025
HEAD Z	Endevco	T30976	05/27/2025	11/26/2025



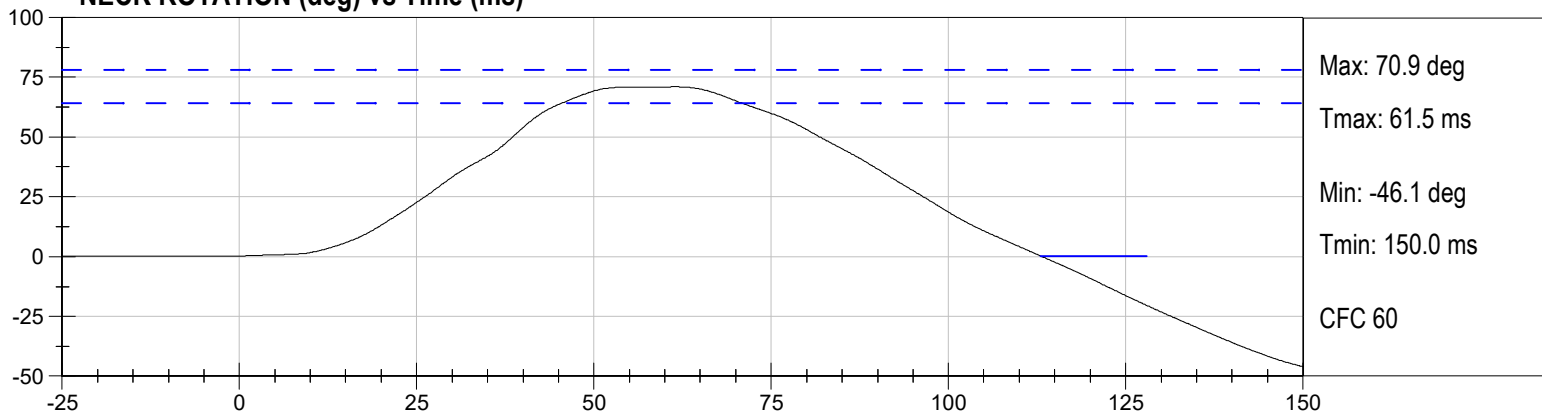
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	41	Pass
Pendulum Velocity	m/s	6.89 to 7.13	6.96	Pass
Pendulum Deceleration At 10 ms After T0	g	22.50 to 27.50	25.23	Pass
Pendulum Deceleration At 20 ms After T0	g	17.60 to 22.60	21.53	Pass
Pendulum Deceleration At 30 ms After T0	g	12.50 to 18.50	16.85	Pass
Peak Pendulum Deceleration After 30 ms	g	<= 29.0	16.8	Pass
Deceleration Decay Time to Cross 5 g	ms	34.0 to 42.0	37.1	Pass
Maximum "D" Plane Rotation	deg	64.0 to 78.0	70.9	Pass
Time of Maximum "D" Plane Rotation	ms	57.0 to 64.0	61.5	Pass
"D" Plane Rotation Decay Time To Zero Crossing	ms	113.0 to 128.0	113.3	Pass
Maximum Moment About Occipital Condyle	Nm	88.1 to 108.5	105.3	Pass
Time of Maximum Moment About Occipital Condyle	ms	47.0 to 58.0	49.7	Pass
Positive Moment Decay Time To Zero Crossing	ms	97.0 to 107.0	97.3	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
PEND. ACCEL.	Endevco	AH5P1	07/09/2025	1/8/2026
NECK FORCE X	Denton	NG2202FX	05/07/2025	5/7/2026
NECK MOMENT Y	Denton	NG2202MY	05/07/2025	5/7/2026
PEND. POT	Servo	4707	08/13/2025	2/12/2026
HEAD POT	Servo	7297	08/13/2025	2/12/2026

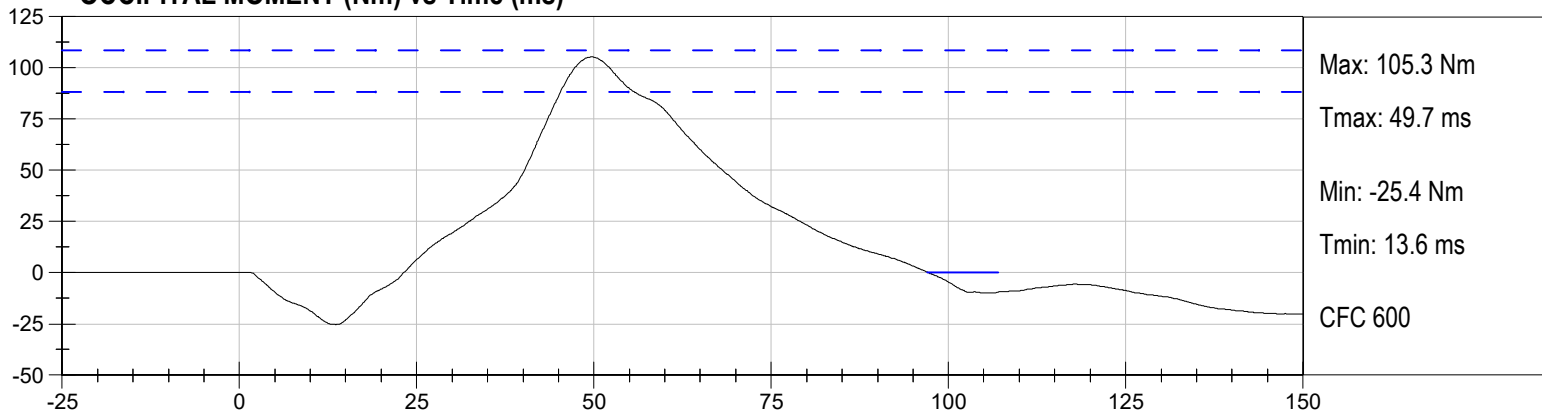
PEND. ACCEL. (g) vs Time (ms)



NECK ROTATION (deg) vs Time (ms)



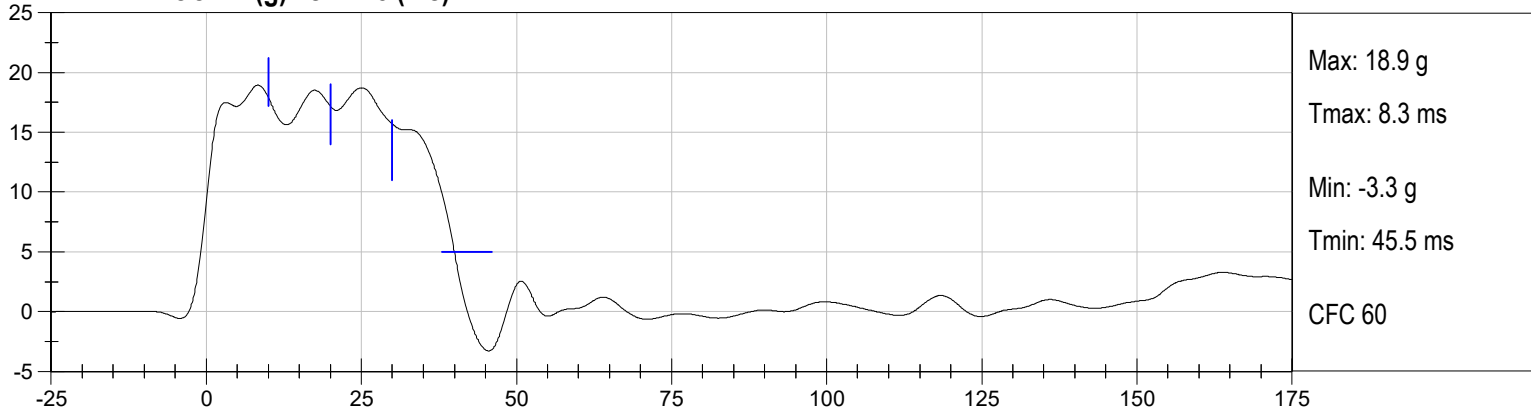
OCCIPITAL MOMENT (Nm) vs Time (ms)



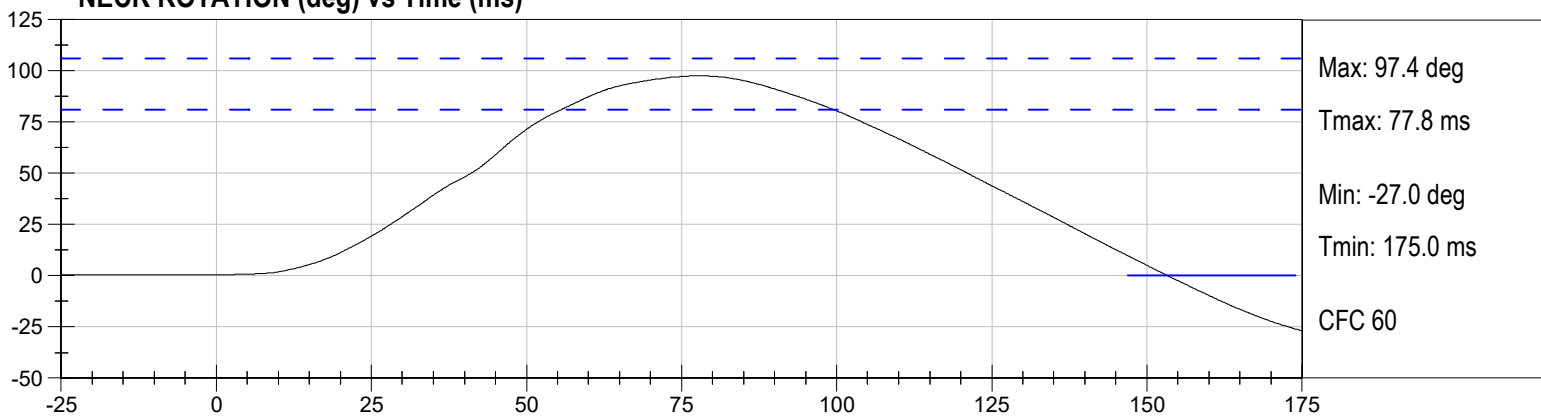
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	40	Pass
Pendulum Velocity	m/s	5.95 to 6.19	6.05	Pass
Pendulum Deceleration At 10 ms After T0	g	17.20 to 21.20	18.00	Pass
Pendulum Deceleration At 20 ms After T0	g	14.00 to 19.00	17.23	Pass
Pendulum Deceleration At 30 ms After T0	g	11.00 to 16.00	15.71	Pass
Peak Pendulum Deceleration After 30 ms	g	<= 22.0	15.7	Pass
Deceleration Decay Time to Cross 5 G's	ms	38.0 to 46.0	40.1	Pass
Maximum "D" Plane Rotation	deg	81.0 to 106.0	97.4	Pass
Time of Maximum "D" Plane Rotation	ms	72.0 to 82.0	77.8	Pass
"D" Plane Rotation Decay Time To Zero Crossing	ms	147.0 to 174.0	153.4	Pass
Minimum Moment About Occipital Condyle	Nm	-79.9 to -52.9	-64.2	Pass
Time of Minimum Moment About Occipital Condyle	ms	65.0 to 79.0	71.1	Pass
Negative Moment Decay Time To Zero Crossing	ms	120.0 to 148.0	138.3	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
PEND. ACCEL.	Endevco	AH5P1	07/09/2025	1/8/2026
NECK FORCE X	Denton	NG2202FX	05/07/2025	5/7/2026
NECK MOMENT Y	Denton	NG2202MY	05/07/2025	5/7/2026
PEND. POT	Servo	4707	08/13/2025	2/12/2026
HEAD POT	Servo	7297	08/13/2025	2/12/2026

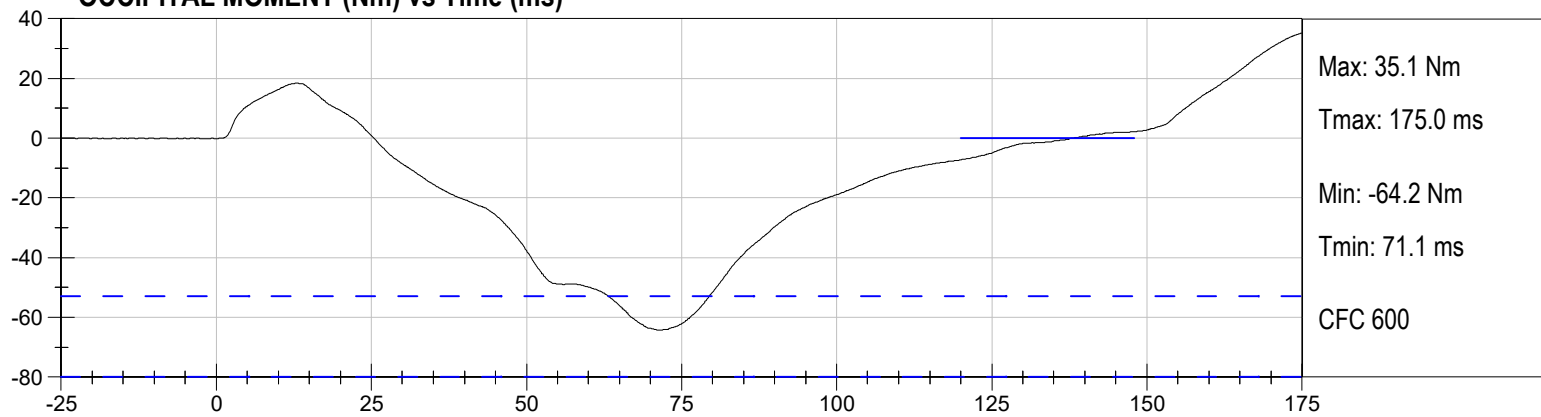
PEND. ACCEL. (g) vs Time (ms)



NECK ROTATION (deg) vs Time (ms)



OCCIPITAL MOMENT (Nm) vs Time (ms)





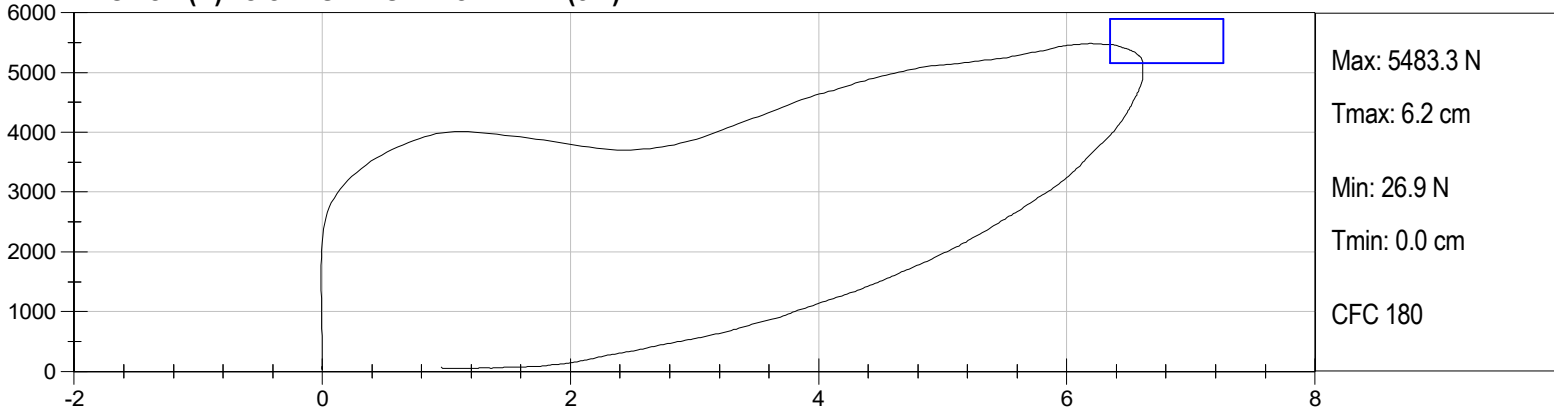
Thorax Impact Test
Hybrid III 50th Percentile Male
ATD Serial No: 064

Test Date: 10/16/2025
Test ID: D252994
Test Technician: Brian Lucas

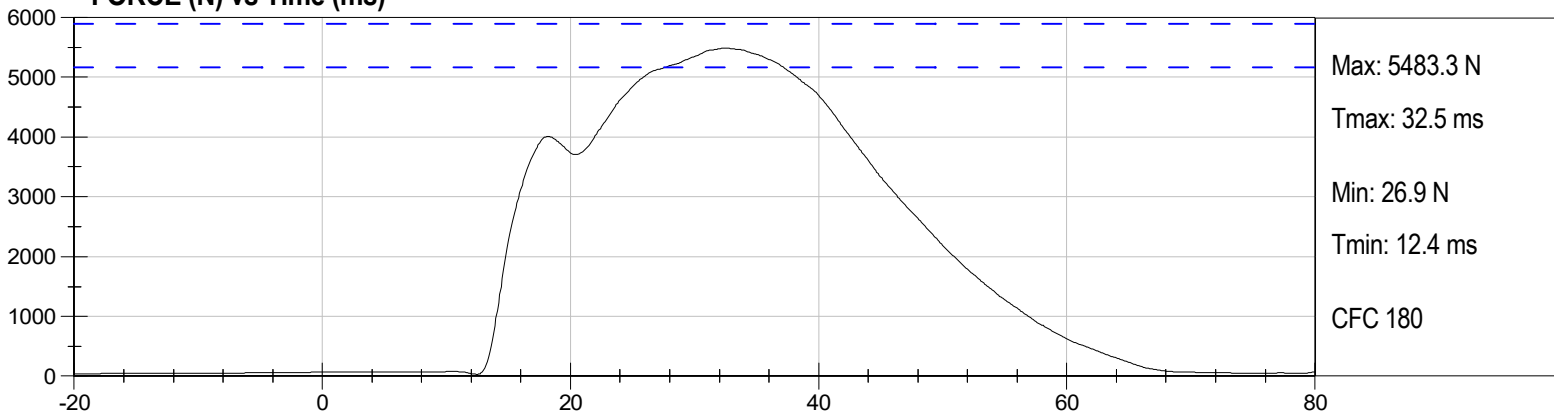
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	39	Pass
Probe Velocity	m/s	6.58 to 6.82	6.68	Pass
Peak Probe Force	N	5159 to 5893	5483	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.62	Pass
Internal Hysteresis	%	69 to 85	73	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
PROBE	Endevco	P79577	09/23/2025	3/25/2026
CHEST DISPLACEMENT	Humanetics	064	05/21/2025	11/20/2025

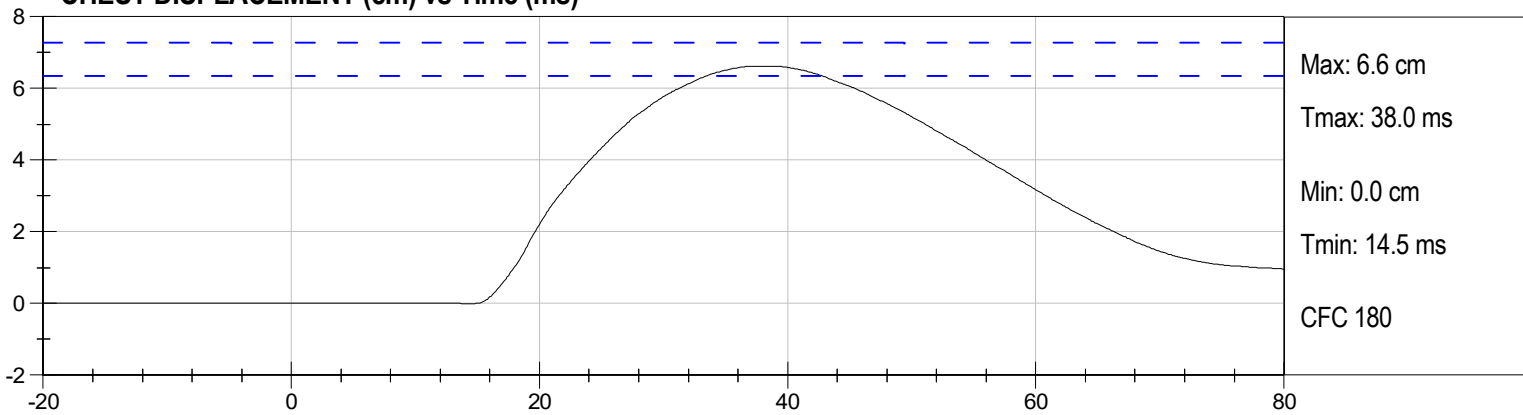
FORCE (N) vs CHEST DISPLACEMENT (cm)



FORCE (N) vs Time (ms)



CHEST DISPLACEMENT (cm) vs Time (ms)



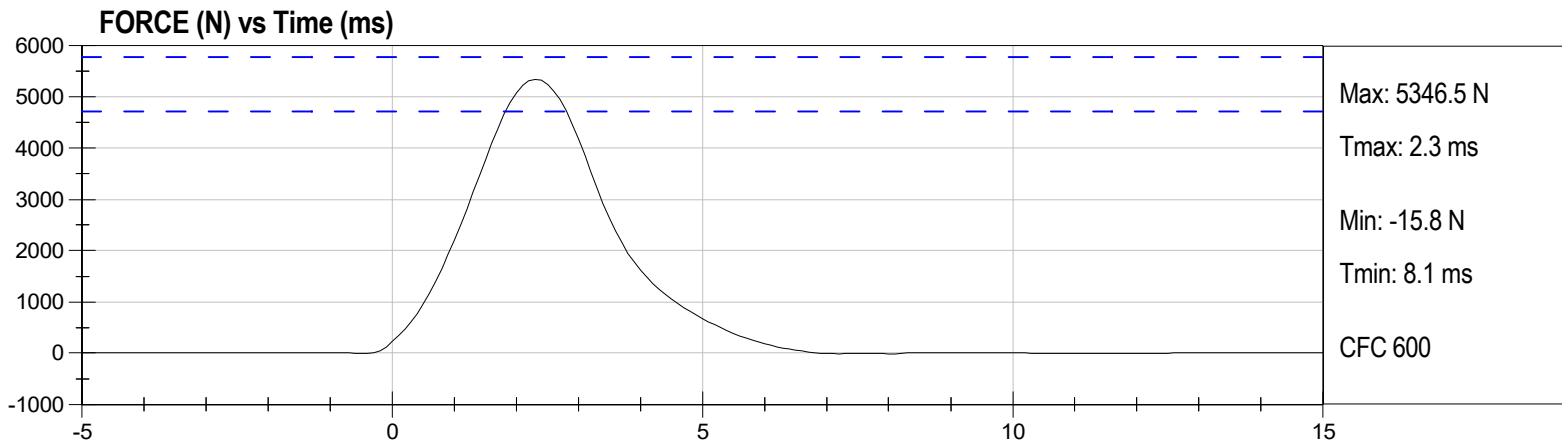


Right Knee Impact Test
Hybrid III 50th Percentile Male
ATD Serial No: 064

Test Date: 10/15/2025
Test ID: D252995
Test Technician: Brian Lucas

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	41	Pass
Probe Velocity	m/s	2.07 to 2.13	2.12	Pass
Peak Probe Force	N	4715 to 5782	5346	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
KNEE PROBE	Endevco	P82128	05/30/2025	11/29/2025



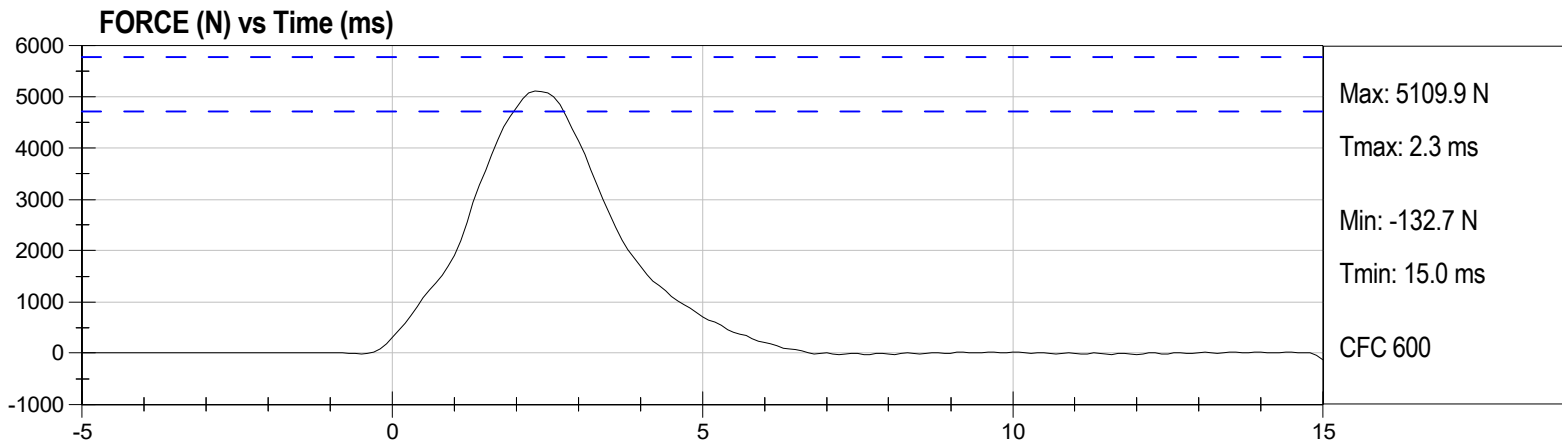


Left Knee Impact Test
Hybrid III 50th Percentile Male
ATD Serial No: 064

Test Date: 10/15/2025
Test ID: D252996
Test Technician: Brian Lucas

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	41	Pass
Probe Velocity	m/s	2.07 to 2.13	2.12	Pass
Peak Probe Force	N	4715 to 5782	5110	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
KNEE PROBE	Endevco	P82128	05/30/2025	11/29/2025



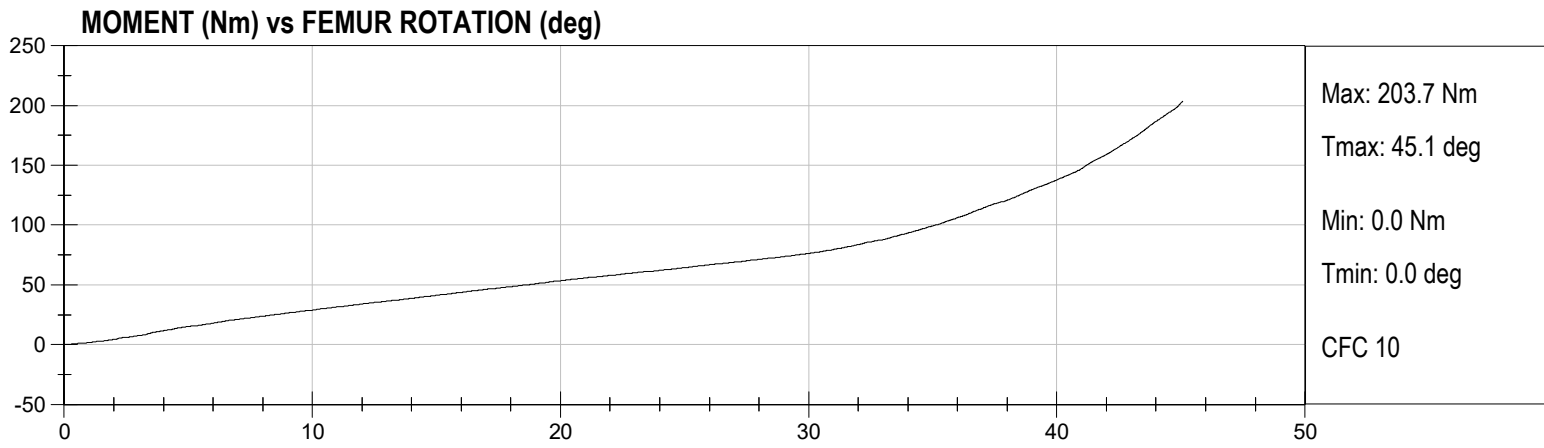


Right Hip-Femur Flexion Test
Hybrid III 50th Percentile Male
ATD Serial No: 064

Test Date: 10/15/2025
Test ID: D252999
Test Technician: Brian Lucas

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	40	Pass
Rotation Rate	deg/s	5.0 to 10.0	6.4	Pass
Moment at 30 Degrees	Nm	<= 94.9	76.3	Pass
Rotation Angle at 203.4 Nm	deg	40.0 to 50.0	45.1	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
LOAD CELL	FTSS	DS8350MY	03/11/2025	3/11/2026
FRAME ANGLE	Servo	3966	10/03/2025	4/4/2026
FEMUR ANGLE	Servo	4714	10/03/2025	4/4/2026



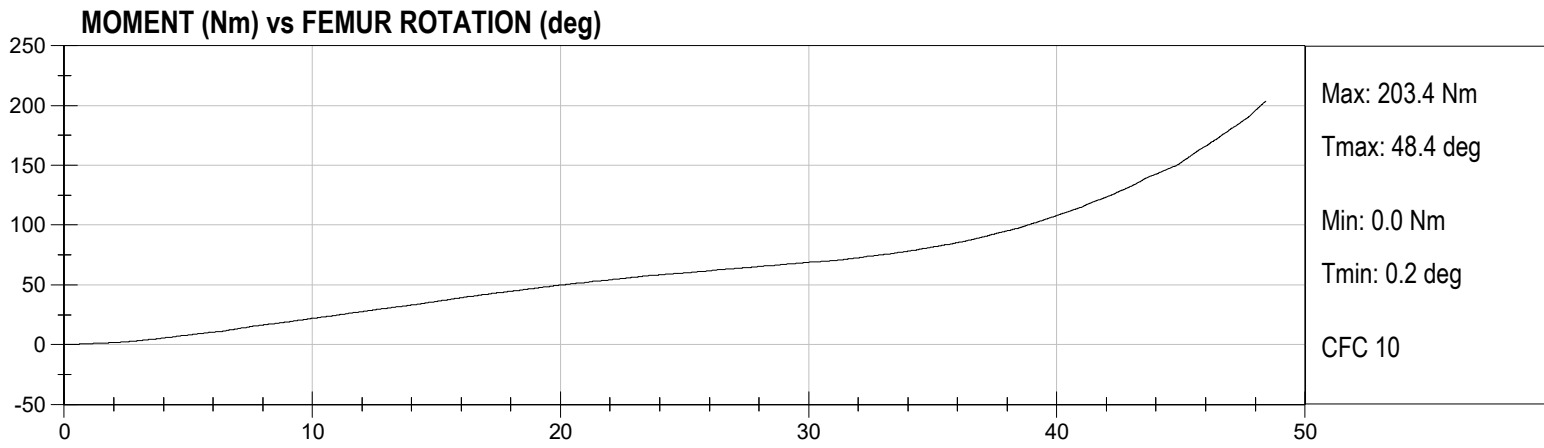


Left Hip-Femur Flexion Test
Hybrid III 50th Percentile Male
ATD Serial No: 064

Test Date: 10/15/2025
Test ID: D252990
Test Technician: Brian Lucas

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	40	Pass
Rotation Rate	deg/s	5.0 to 10.0	6.5	Pass
Moment at 30 Degrees	Nm	<= 94.9	68.8	Pass
Rotation Angle at 203.4 Nm	deg	40.0 to 50.0	48.4	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
LOAD CELL	FTSS	DS8350MY	03/11/2025	3/11/2026
FRAME ANGLE	Servo	3966	10/03/2025	4/4/2026
FEMUR ANGLE	Servo	4714	10/03/2025	4/4/2026



QUALIFICATION TEST RESULTS

POST-TEST

HYBRID III 50TH PERCENTILE MALE - DRIVER ATD

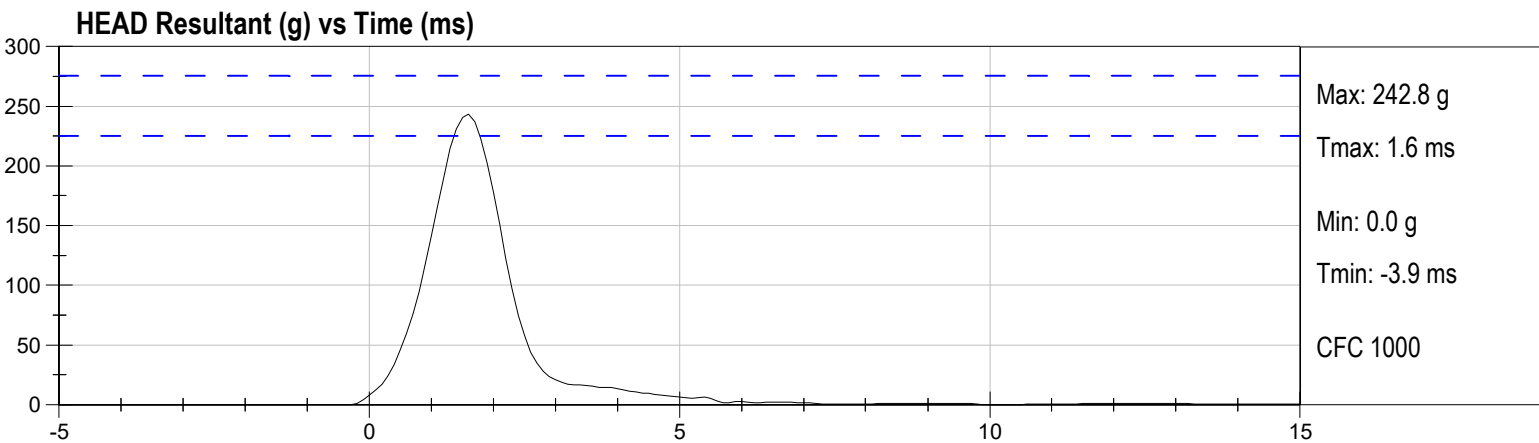
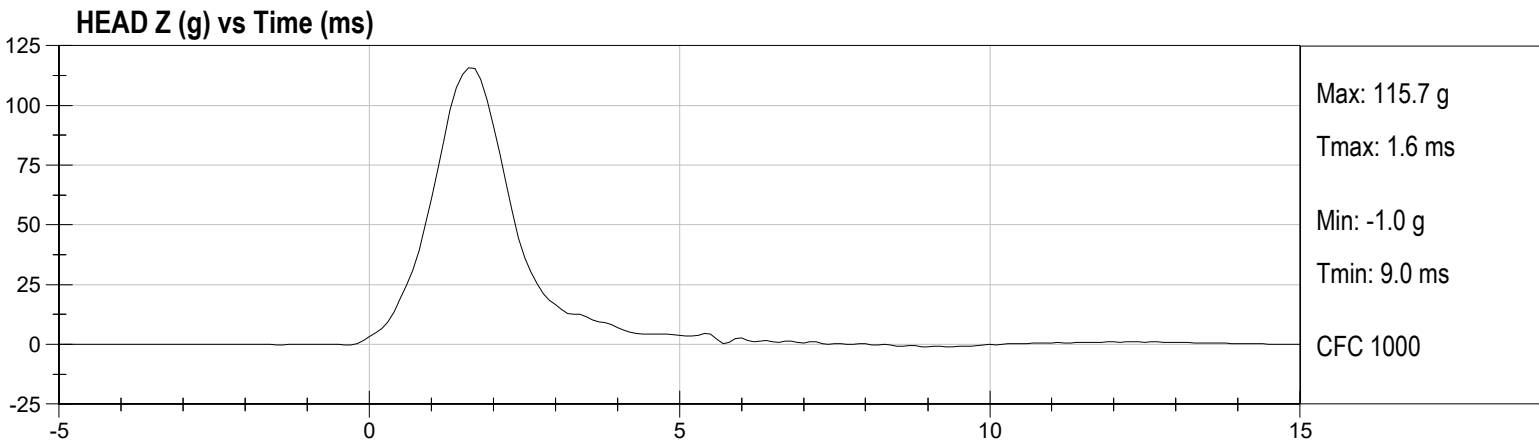
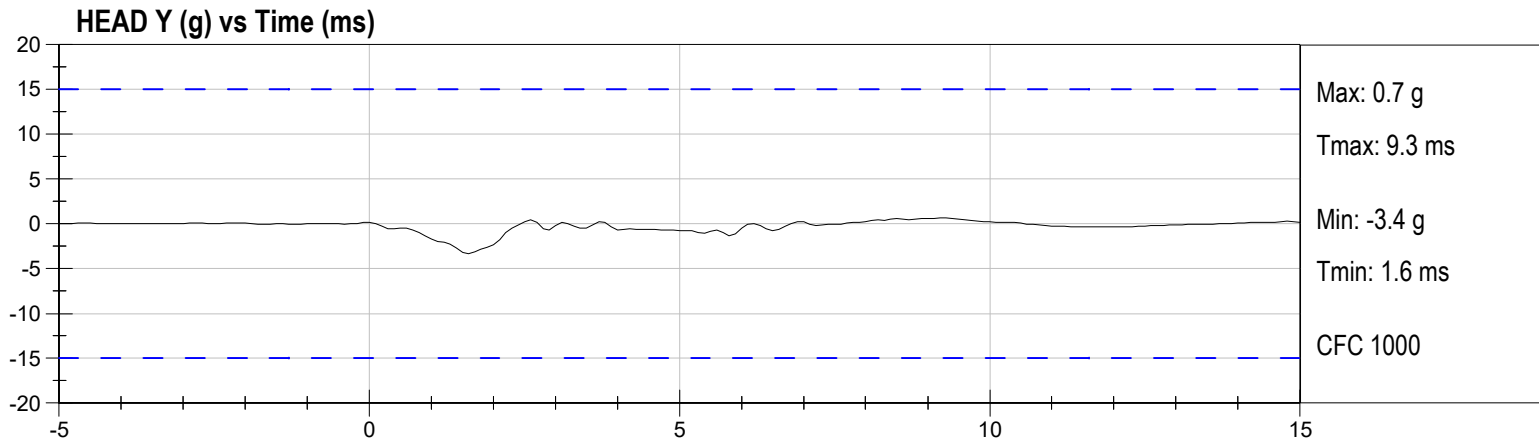
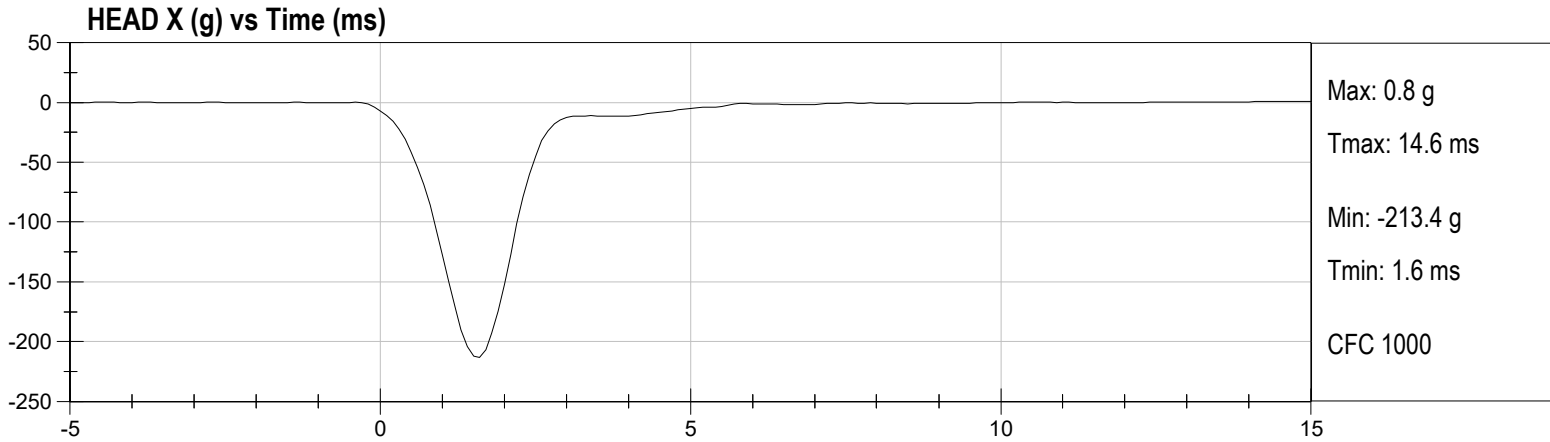


Head Drop Test
Hybrid III 50th Percentile Male
ATD Serial No: 064

Test Date: 12/11/2025
Test ID: D253571
Test Technician: Brian Lucas

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	34	Pass
Peak Resultant Acceleration	g	225 to 275	243	Pass
Peak Lateral Acceleration	g	-15.0 to 15.0	-3.4	Pass
Unimodal	%	within 10% of peak	3	Pass

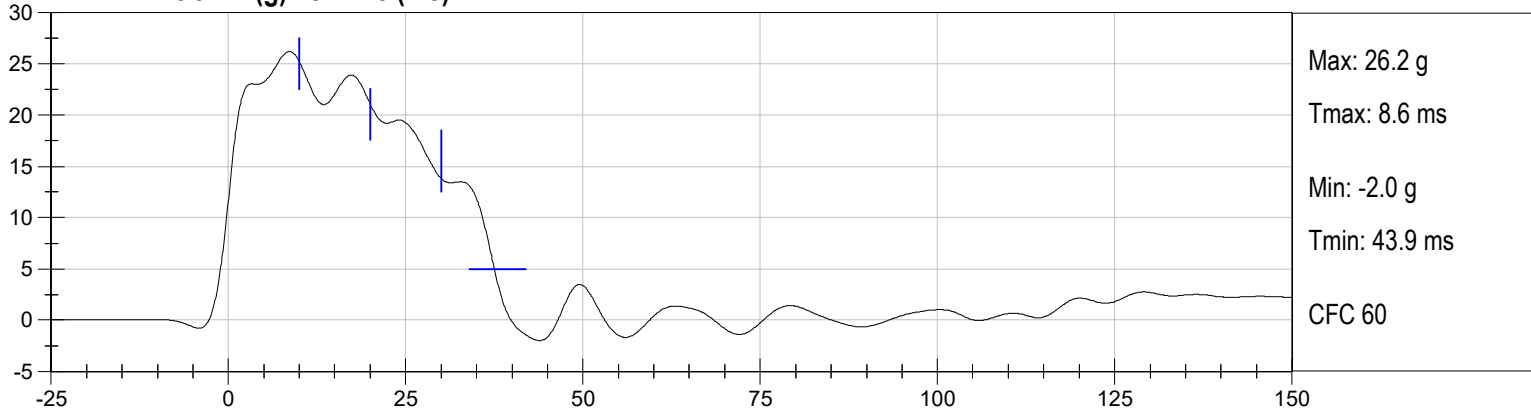
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
HEAD X	Endevco	T30974	12/03/2025	6/4/2026
HEAD Y	Endevco	T30975	12/03/2025	6/4/2026
HEAD Z	Endevco	T30976	12/03/2025	6/4/2026



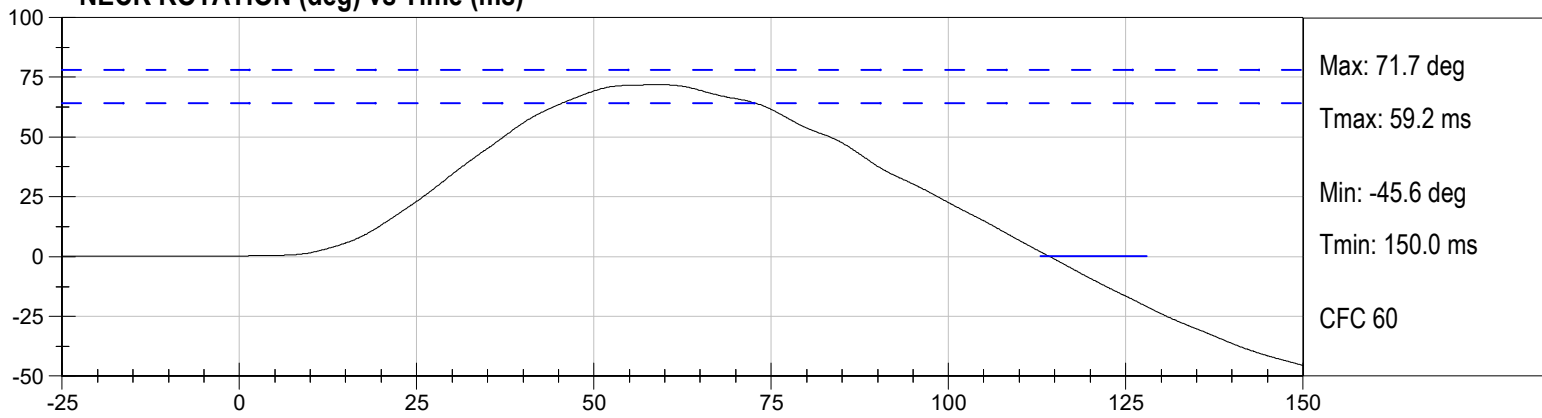
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	37	Pass
Pendulum Velocity	m/s	6.89 to 7.13	6.96	Pass
Pendulum Deceleration At 10 ms After T0	g	22.50 to 27.50	25.34	Pass
Pendulum Deceleration At 20 ms After T0	g	17.60 to 22.60	21.21	Pass
Pendulum Deceleration At 30 ms After T0	g	12.50 to 18.50	13.89	Pass
Peak Pendulum Deceleration After 30 ms	g	<= 29.0	13.8	Pass
Deceleration Decay Time to Cross 5 g	ms	34.0 to 42.0	37.6	Pass
Maximum "D" Plane Rotation	deg	64.0 to 78.0	71.7	Pass
Time of Maximum "D" Plane Rotation	ms	57.0 to 64.0	59.2	Pass
"D" Plane Rotation Decay Time To Zero Crossing	ms	113.0 to 128.0	114.4	Pass
Maximum Moment About Occipital Condyle	Nm	88.1 to 108.5	94.5	Pass
Time of Maximum Moment About Occipital Condyle	ms	47.0 to 58.0	50.2	Pass
Positive Moment Decay Time To Zero Crossing	ms	97.0 to 107.0	97.1	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
PEND. ACCEL.	Endevco	AH5P1	07/09/2025	1/8/2026
NECK FORCE X	Denton	NG2202FX	05/07/2025	5/7/2026
NECK MOMENT Y	Denton	NG2202MY	05/07/2025	5/7/2026
PEND. POT	Servo	4707	08/13/2025	2/12/2026
HEAD POT	Servo	7297	08/13/2025	2/12/2026

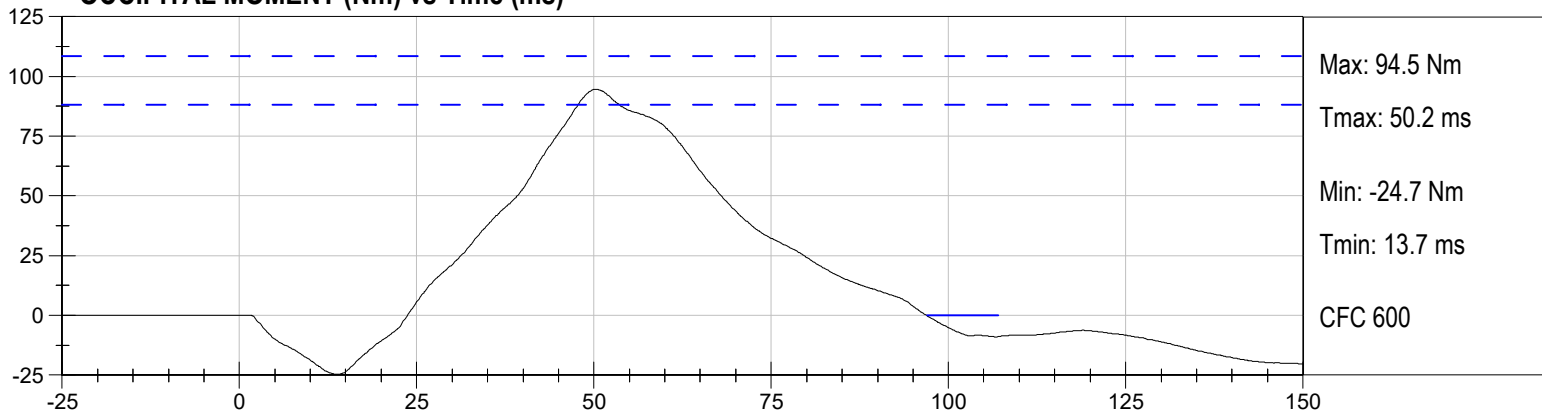
PEND. ACCEL. (g) vs Time (ms)



NECK ROTATION (deg) vs Time (ms)



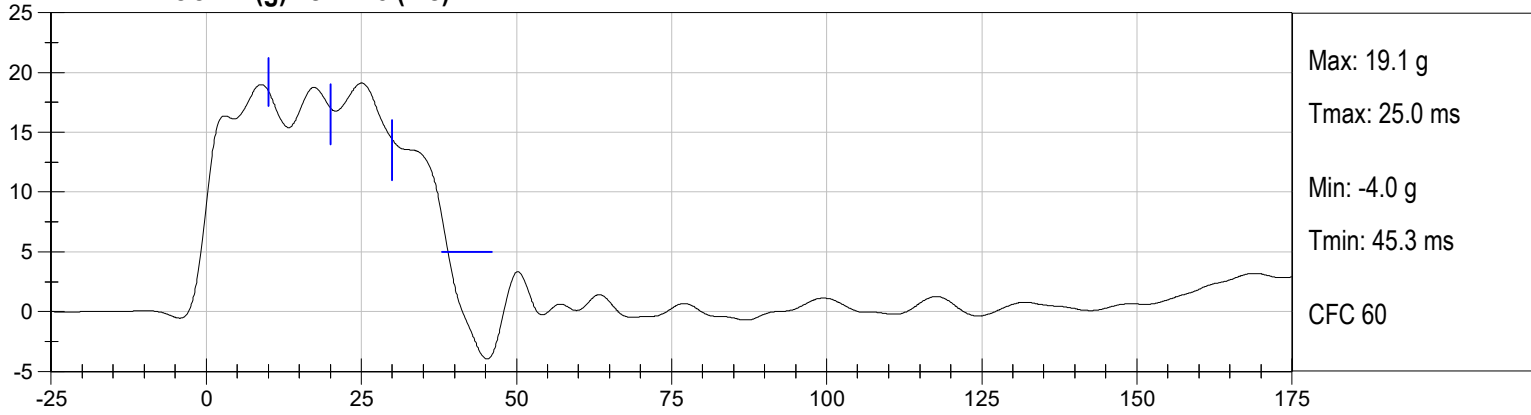
OCCIPITAL MOMENT (Nm) vs Time (ms)



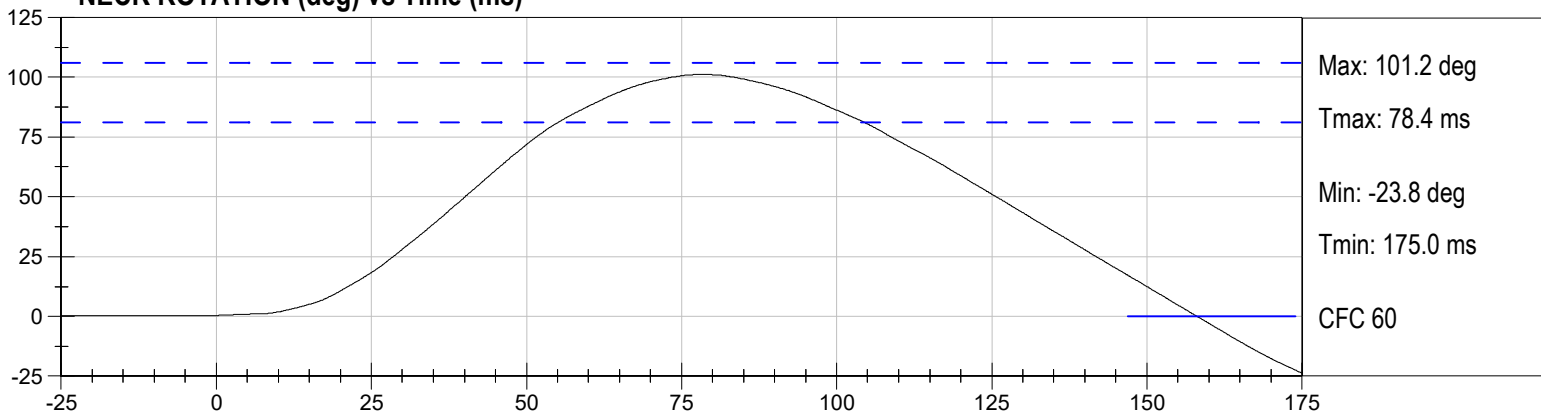
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	36	Pass
Pendulum Velocity	m/s	5.95 to 6.19	5.98	Pass
Pendulum Deceleration At 10 ms After T0	g	17.20 to 21.20	18.53	Pass
Pendulum Deceleration At 20 ms After T0	g	14.00 to 19.00	17.10	Pass
Pendulum Deceleration At 30 ms After T0	g	11.00 to 16.00	14.43	Pass
Peak Pendulum Deceleration After 30 ms	g	<= 22.0	14.4	Pass
Deceleration Decay Time to Cross 5 G's	ms	38.0 to 46.0	39.1	Pass
Maximum "D" Plane Rotation	deg	81.0 to 106.0	101.2	Pass
Time of Maximum "D" Plane Rotation	ms	72.0 to 82.0	78.4	Pass
"D" Plane Rotation Decay Time To Zero Crossing	ms	147.0 to 174.0	158.2	Pass
Minimum Moment About Occipital Condyle	Nm	-79.9 to -52.9	-62.7	Pass
Time of Minimum Moment About Occipital Condyle	ms	65.0 to 79.0	74.0	Pass
Negative Moment Decay Time To Zero Crossing	ms	120.0 to 148.0	143.1	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
PEND. ACCEL.	Endevco	AH5P1	07/09/2025	1/8/2026
NECK FORCE X	Denton	NG2202FX	05/07/2025	5/7/2026
NECK MOMENT Y	Denton	NG2202MY	05/07/2025	5/7/2026
PEND. POT	Servo	4707	08/13/2025	2/12/2026
HEAD POT	Servo	7297	08/13/2025	2/12/2026

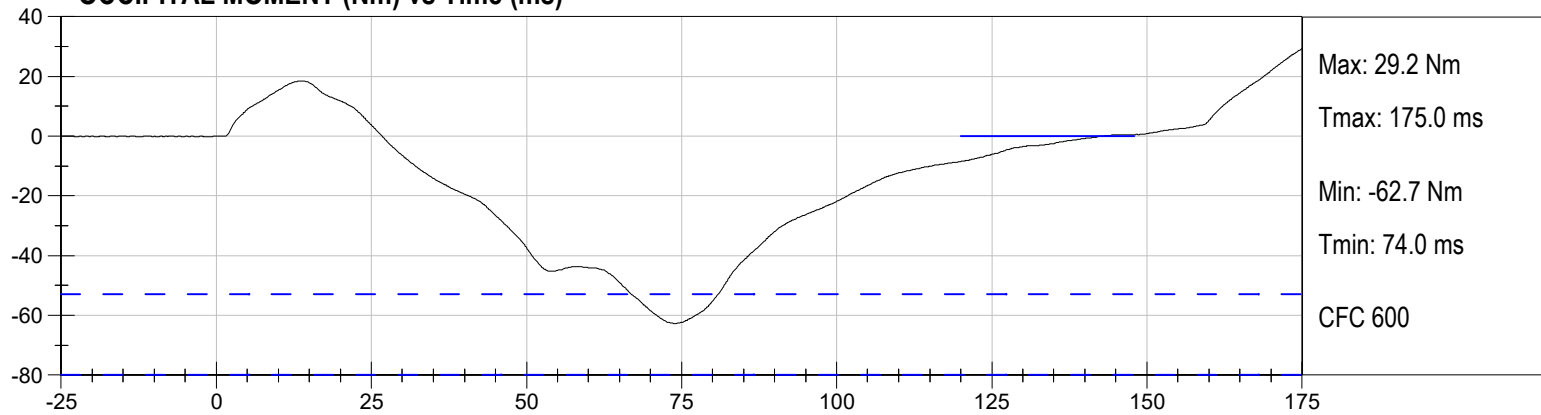
PEND. ACCEL. (g) vs Time (ms)



NECK ROTATION (deg) vs Time (ms)



OCCIPITAL MOMENT (Nm) vs Time (ms)





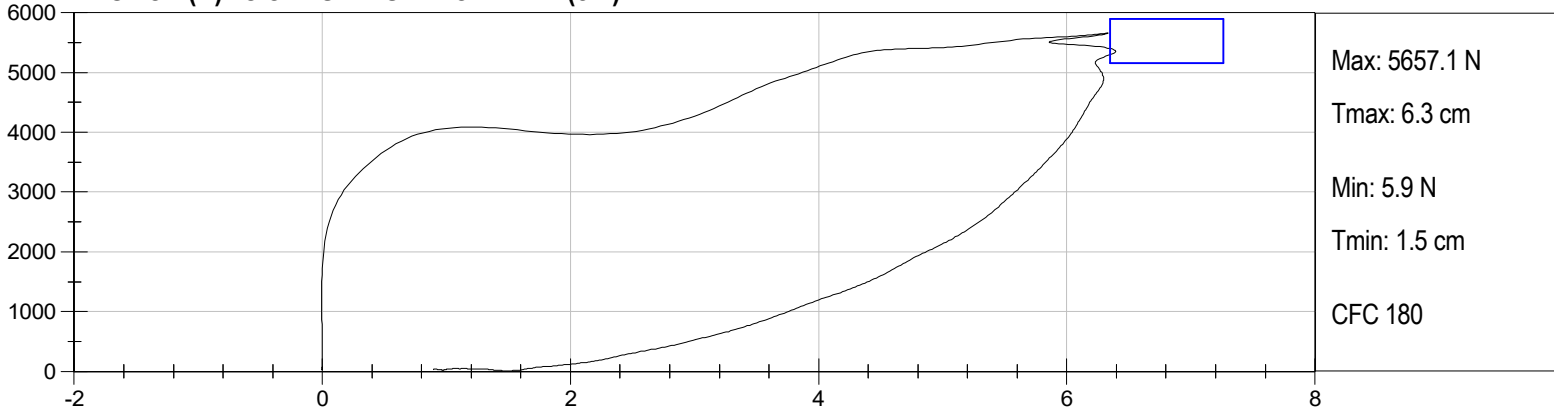
Thorax Impact Test
Hybrid III 50th Percentile Male
ATD Serial No: 064

Test Date: 12/11/2025
Test ID: D253574
Test Technician: Brian Lucas

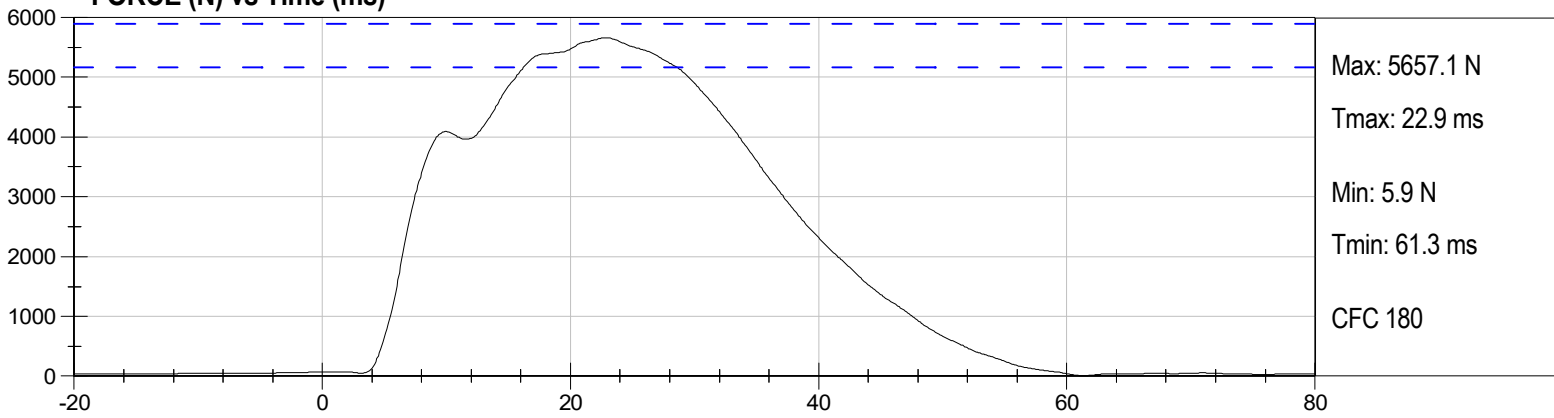
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	32	Pass
Probe Velocity	m/s	6.58 to 6.82	6.77	Pass
Peak Probe Force	N	5159 to 5893	5657	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.39	Pass
Internal Hysteresis	%	69 to 85	74	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
PROBE	Endevco	P79577	09/23/2025	3/25/2026
CHEST DISPLACEMENT	Humanetics	064	10/24/2025	4/25/2026

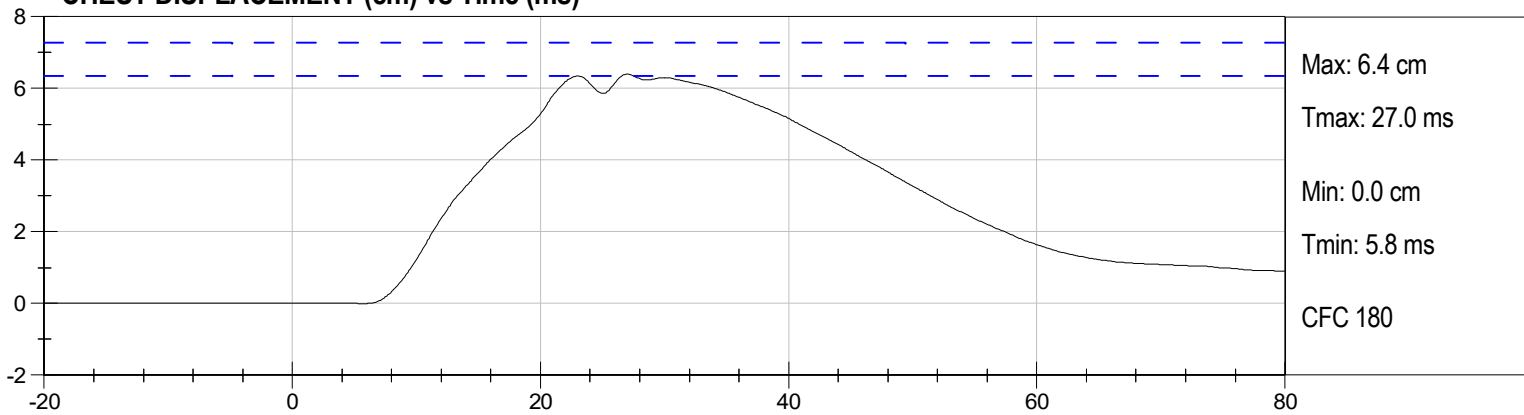
FORCE (N) vs CHEST DISPLACEMENT (cm)



FORCE (N) vs Time (ms)



CHEST DISPLACEMENT (cm) vs Time (ms)



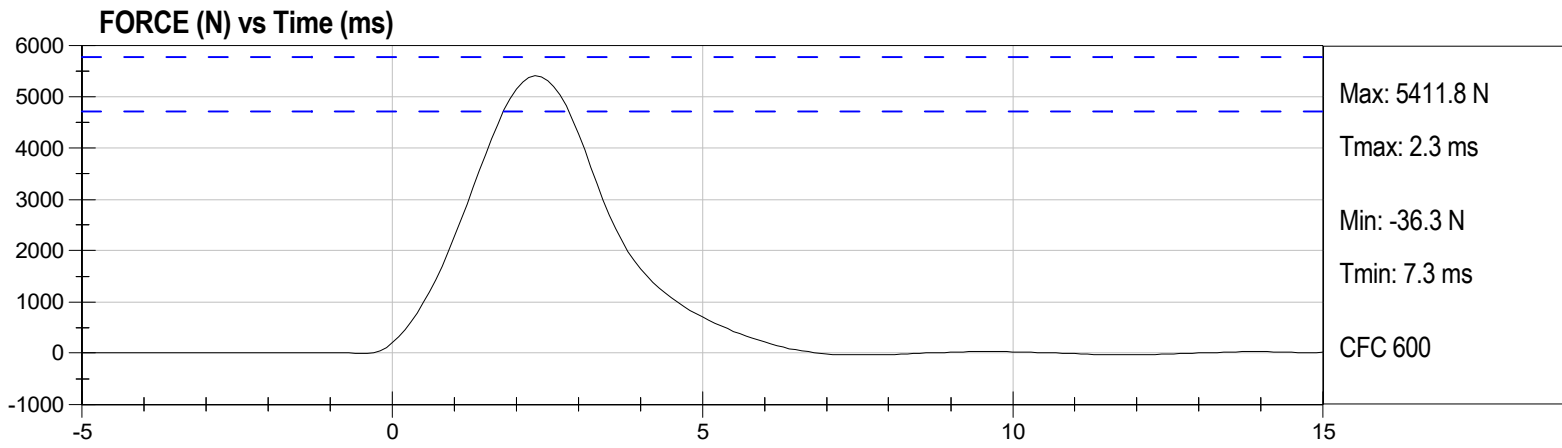


Right Knee Impact Test
Hybrid III 50th Percentile Male
ATD Serial No: 064

Test Date: 12/11/2025
Test ID: D253575
Test Technician: Brian Lucas

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	36	Pass
Probe Velocity	m/s	2.07 to 2.13	2.11	Pass
Peak Probe Force	N	4715 to 5782	5412	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
KNEE PROBE	Endevco	P82128	12/03/2025	6/4/2026



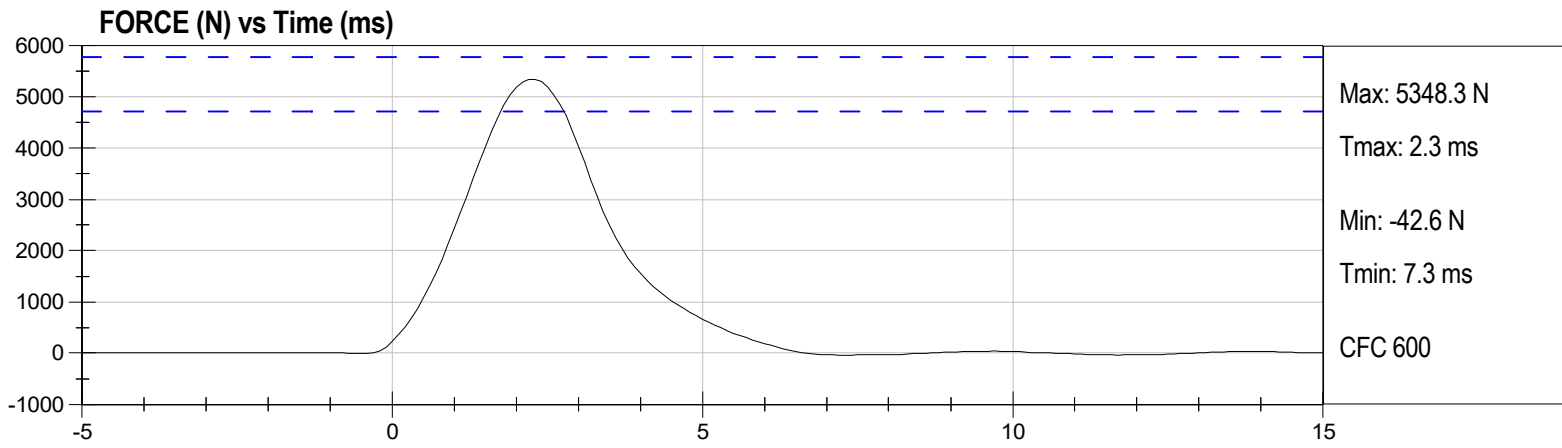


Left Knee Impact Test
Hybrid III 50th Percentile Male
ATD Serial No: 064

Test Date: 12/11/2025
Test ID: D253576
Test Technician: Brian Lucas

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	36	Pass
Probe Velocity	m/s	2.07 to 2.13	2.12	Pass
Peak Probe Force	N	4715 to 5782	5348	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
KNEE PROBE	Endevco	P82128	12/03/2025	6/4/2026



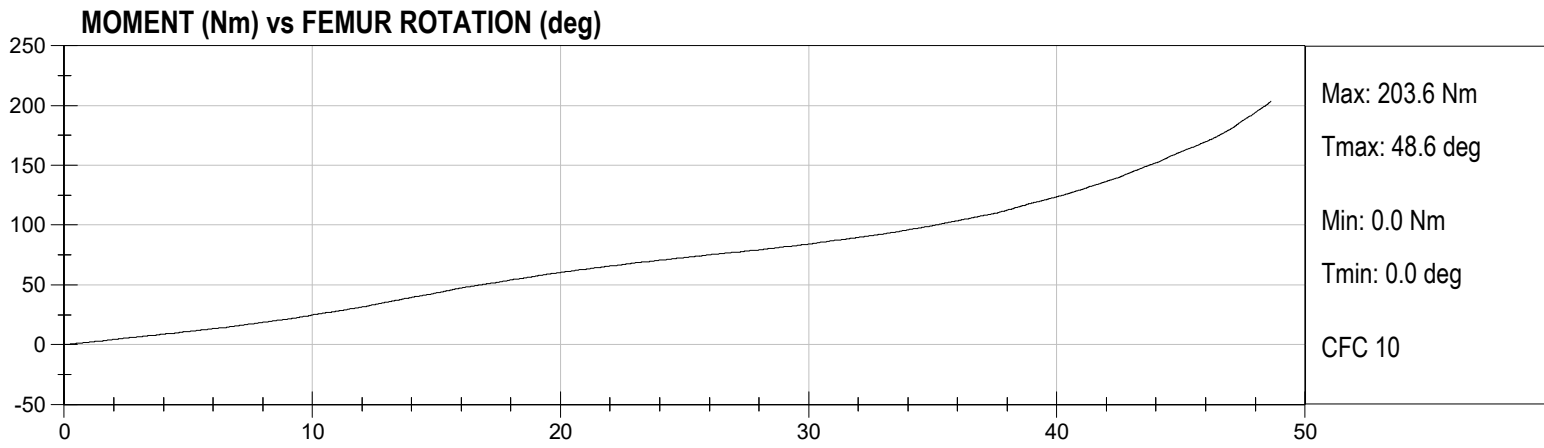


Right Hip-Femur Flexion Test
Hybrid III 50th Percentile Male
ATD Serial No: 064

Test Date: 12/11/2025
Test ID: D253579
Test Technician: Jonah Pulokas

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	38	Pass
Rotation Rate	deg/s	5.0 to 10.0	6.7	Pass
Moment at 30 Degrees	Nm	<= 94.9	84.1	Pass
Rotation Angle at 203.4 Nm	deg	40.0 to 50.0	48.6	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
LOAD CELL	FTSS	DS8350MY	03/11/2025	3/11/2026
FRAME ANGLE	Servo	3966	10/03/2025	4/4/2026
FEMUR ANGLE	Servo	4714	10/03/2025	4/4/2026



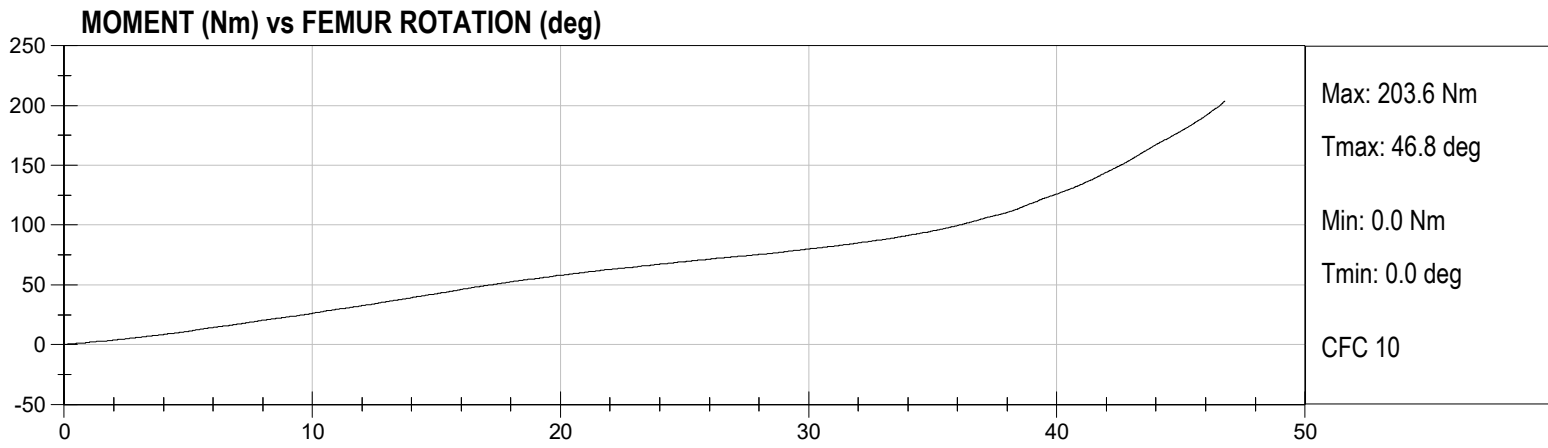


Left Hip-Femur Flexion Test
Hybrid III 50th Percentile Male
ATD Serial No: 064

Test Date: 12/11/2025
Test ID: D253570
Test Technician: Jonah Pulokas

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	38	Pass
Rotation Rate	deg/s	5.0 to 10.0	6.5	Pass
Moment at 30 Degrees	Nm	<= 94.9	80.0	Pass
Rotation Angle at 203.4 Nm	deg	40.0 to 50.0	46.8	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
LOAD CELL	FTSS	DS8350MY	03/11/2025	3/11/2026
FRAME ANGLE	Servo	3966	10/03/2025	4/4/2026
FEMUR ANGLE	Servo	4714	10/03/2025	4/4/2026



QUALIFICATION TEST RESULTS

PRE-TEST

HYBRID III 5TH PERCENTILE FEMALE - PASSENGER ATD

Hybrid III, 5th External Measurements
SN: 142

HYBRID III, PART 572, SUBPART O EXTERNAL DIMENSIONS				
DIMENSION	DESCRIPTION	DETAILS	ASSEMBLY DIMENSION (mm)	ACTUAL MEASUREMENT
A	TOTAL SITTING HEIGHT	Seat surface to highest point on top of the head.	774.7-800.1	775.0
B	SHOULDER PIVOT HEIGHT	Centerline of shoulder pivot bolt to the seat surface.	431.8-457.2	438.2
C	H-POINT HEIGHT	Reference	81.3-86.3	81.8
D	H-POINT LOCATION FROM BACKLINE	Reference	144.8-149.8	148.3
E	SHOULDER PIVOT FROM BACKLINE	Center of the shoulder clevis to the rear vertical surface of the fixture.	68.6-83.8	83.0
F	THIGH CLEARANCE	Measured at the highest point on the upper femur segment.	119.4-134.6	124.4
G	BACK OF ELBOW TO WRIST PIVOT	back of the elbow flesh to the wrist pivot in line with the elbow and wrist pivots	243.9-259.1	245.2
H	HEAD BACK TO BACKLINE	Back of Skull cap skin to seat rear vertical surface (Reference)	43.2-48.2	43.4
I	SHOULDER TO- ELBOW LENGTH	Measure from the highest point on top of the shoulder clevis to the lowest part of the flesh on the elbow in line with the elbow pivot bolt.	276.8-297.2	281.1
J	ELBOW REST HEIGHT	Measure from the flesh below the elbow pivot bolt to the seat surface.	182.8-203.2	197.2
K	BUTTOCK TO KNEE LENGTH	The forward most part of the knee flesh to the rear vertical surface of the fixture.	520.7-546.1	537.2
L	POPLITEAL HEIGHT	Seat surface to the plane of the horizontal plane of the bottom of the feet.	355.6-376	358.8
M	KNEE PIVOT HEIGHT	Centerline of knee pivot bolt to the horizontal plane of the bottom of the feet.	393.7-419.1	403.1
N	BUTTOCK POPLITEAL LENGTH	The rearmost surface of the lower leg to the same point on the rear surface of the buttocks used for dim. "K".	414-439.4	435.2

HYBRID III, SUBPART O EXTERNAL DIMENSIONS, continued				
DIMENSION	DESCRIPTION	DETAILS	ASSEMBLY DIMENSION (mm)	ACTUAL MEASUREMENT
O	CHEST DEPTH WITHOUT JACKET	Measured 304.8 ± 5.1 mm above seat surface	175.3-190.5	181.2
P	FOOT LENGTH	Tip of toe to rear of heel	218.5-233.7	227.3
Q	STANDING HEIGHT	(THEORETICAL)	1501.1	N/A
R	BUTTOCK TO KNEE PIVOT LENGTH	The rear surface of the buttocks to the knee pivot bolt	457.2-482.6	475.0
S	HEAD BREADTH	The widest part of the head	137.1-147.3	138.6
T	HEAD DEPTH	Back of the head to the forehead	177.8-188	181.0
U	HIP BREADTH	The widest part of the hip	299.7-314.9	308.4
V	SHOULDER BREADTH	Outside edges of right and left shoulder clevises	350.5-365.7	362.1
W	FOOT BREADTH	The widest part of the foot	78.8-94	82.8
X	HEAD CIRCUMFERENCE	Measured at the point as in dim. "T"	528.3-548.7	545.2
Y	CHEST CIRCUMFERENCE (WITH CHEST JACKET)	Measured 345.4 ± 12.7 mm above seat surface	850.9-881.3	870.7
Z	WAIST CIRCUMFERENCE	Measured 165.1 ± 5.1 mm above seat surface	759.5-789.9	779.9
AA	REFERENCE LOCATION FOR MEASUREMENT OF CHEST CIRCUMFERENCE	Reference	332.7-358.1	350.1
BB	REFERENCE LOCATION FOR MEASUREMENT OF WAIST CIRCUMFERENCE	Reference	160.1-170.2	170.0

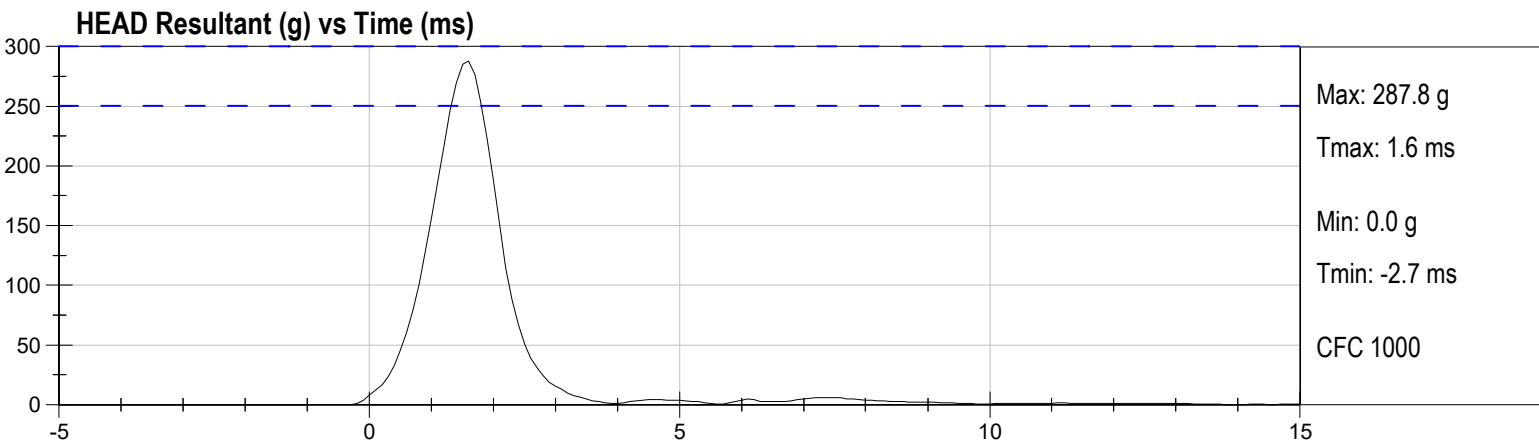
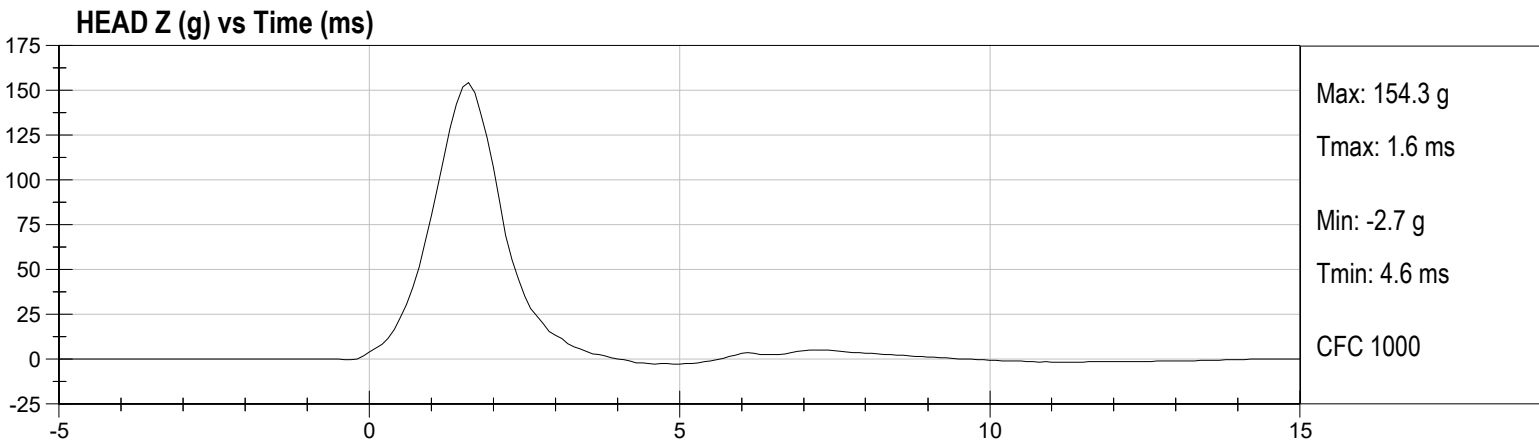
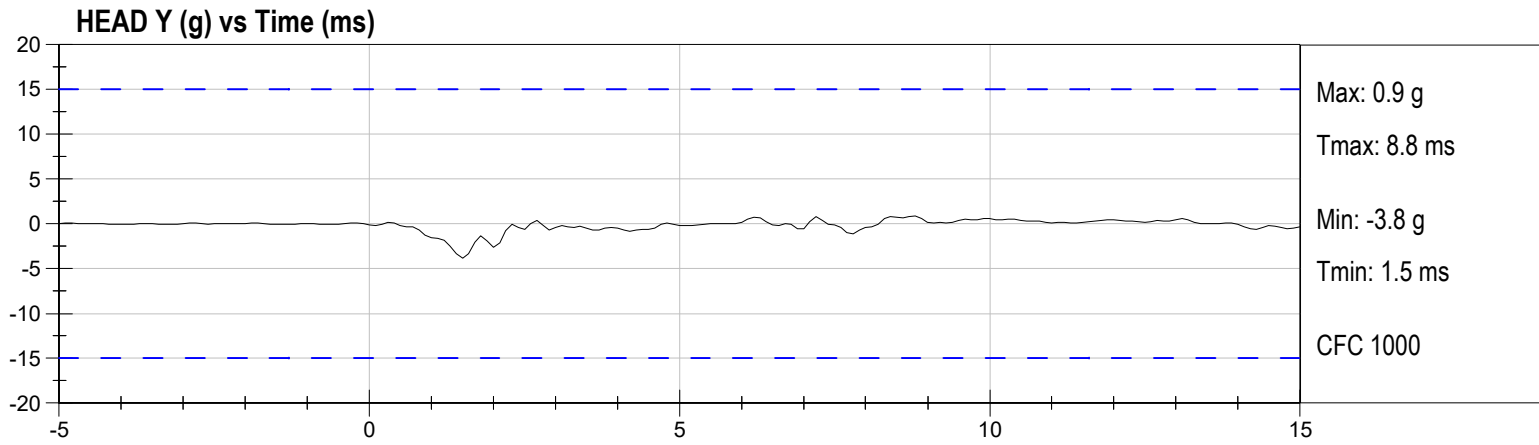
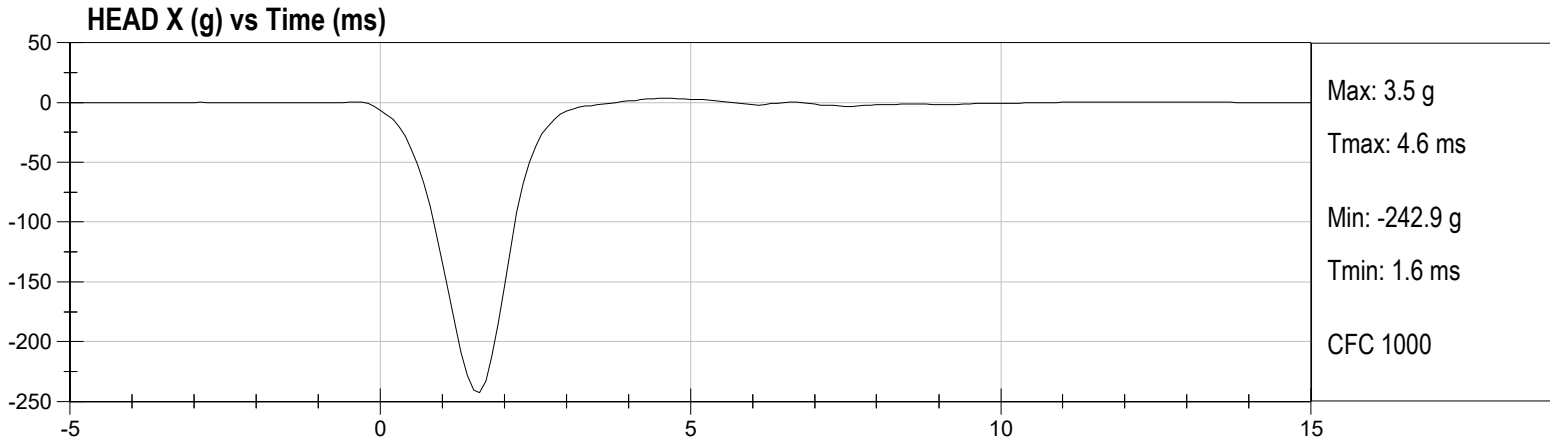


Head Drop Test
Hybrid III 5th Percentile Female
ATD Serial No: 142

Test Date: 10/15/2025
Test ID: D253001
Test Technician: Jonah Pulokas

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	40	Pass
Peak Resultant Acceleration	g	250 to 300	288	Pass
Peak Lateral Acceleration	g	-15.0 to 15.0	-3.8	Pass
Unimodal	%	within 10% of peak	2	Pass

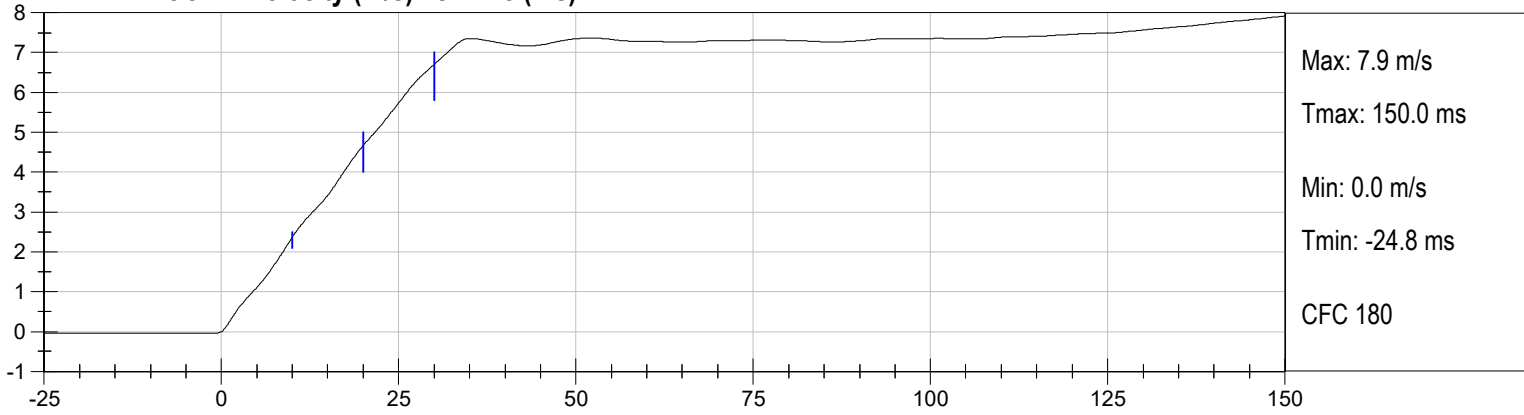
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
HEAD X	Endevco	T30974	05/27/2025	11/26/2025
HEAD Y	Endevco	T30975	05/27/2025	11/26/2025
HEAD Z	Endevco	T30976	05/27/2025	11/26/2025



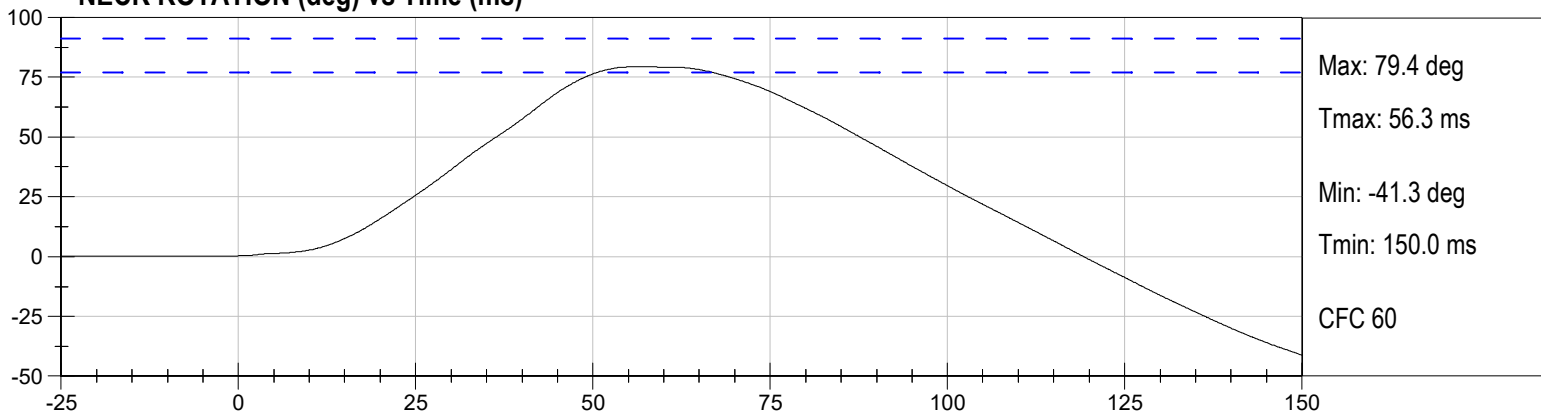
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	41	Pass
Pendulum Velocity	m/s	6.89 to 7.13	6.96	Pass
Pendulum Velocity At 10 ms After T0	m/s	2.1 to 2.5	2.34	Pass
Pendulum Velocity At 20 ms After T0	m/s	4.0 to 5.0	4.65	Pass
Pendulum Velocity At 30 ms After T0	m/s	5.8 to 7.0	6.68	Pass
Maximum "D" Plane Rotation	Deg	77 to 91	79	Pass
Occipital Condyle Moment within Rotation Corridor	Nm	69 to 83	73	Pass
Positive Moment Time Curve Decay to 10 Nm	ms	80 to 100	85	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
PEND. ACCEL.	Endevco	AH5P1	07/09/2025	1/8/2026
NECK FORCE X	Denton	NG2256FX	07/14/2025	7/14/2026
NECK MOMENT Y	Denton	NG2256MY	07/14/2025	7/14/2026
PEND. POT	Servo	4707	08/13/2025	2/12/2026
HEAD POT	Servo	7297	08/13/2025	2/12/2026

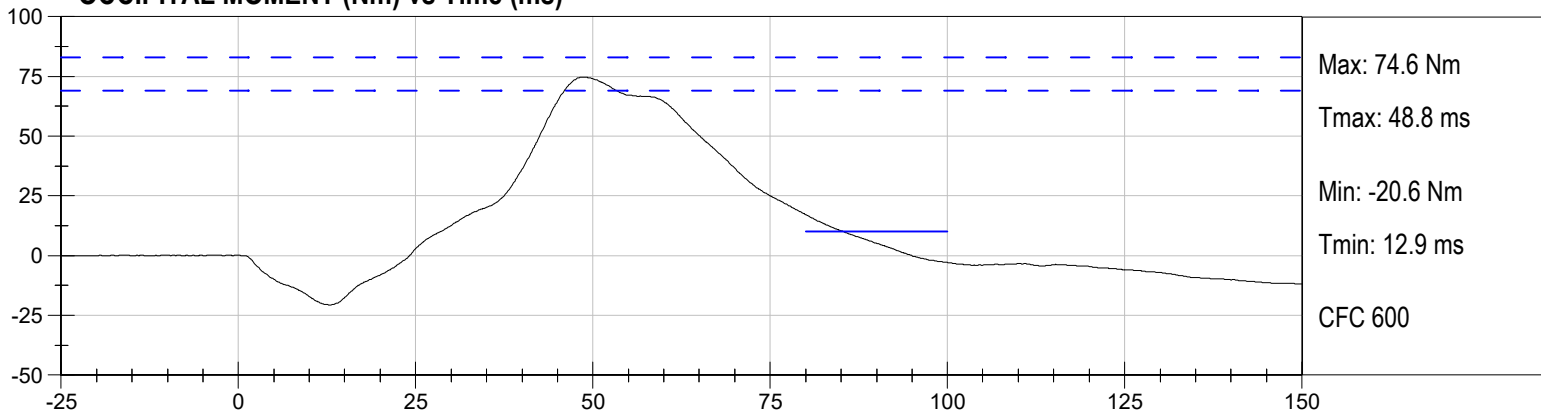
PEND. ACCEL. Velocity (m/s) vs Time (ms)



NECK ROTATION (deg) vs Time (ms)



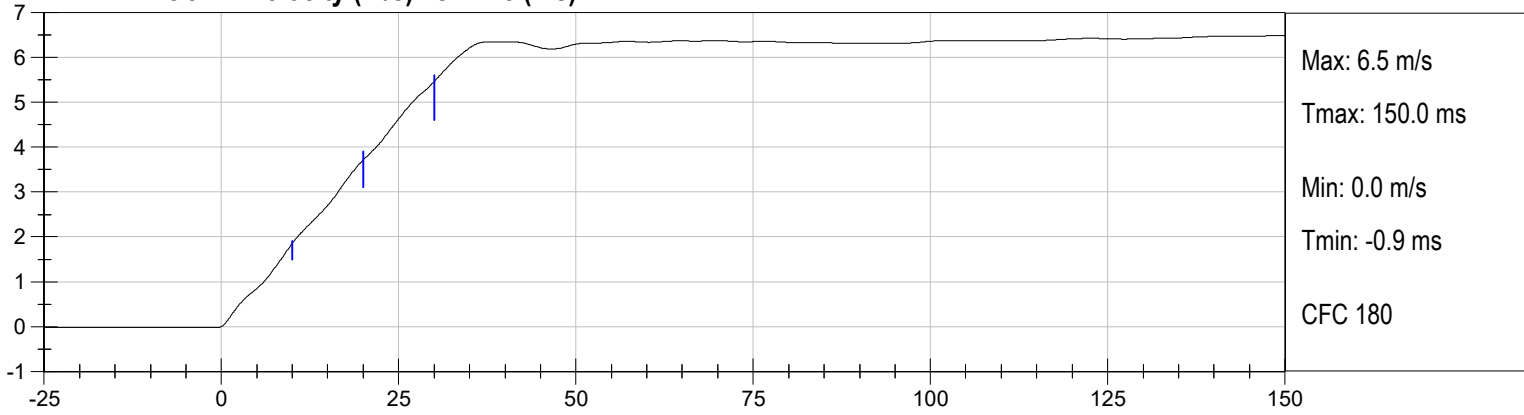
OCCIPITAL MOMENT (Nm) vs Time (ms)



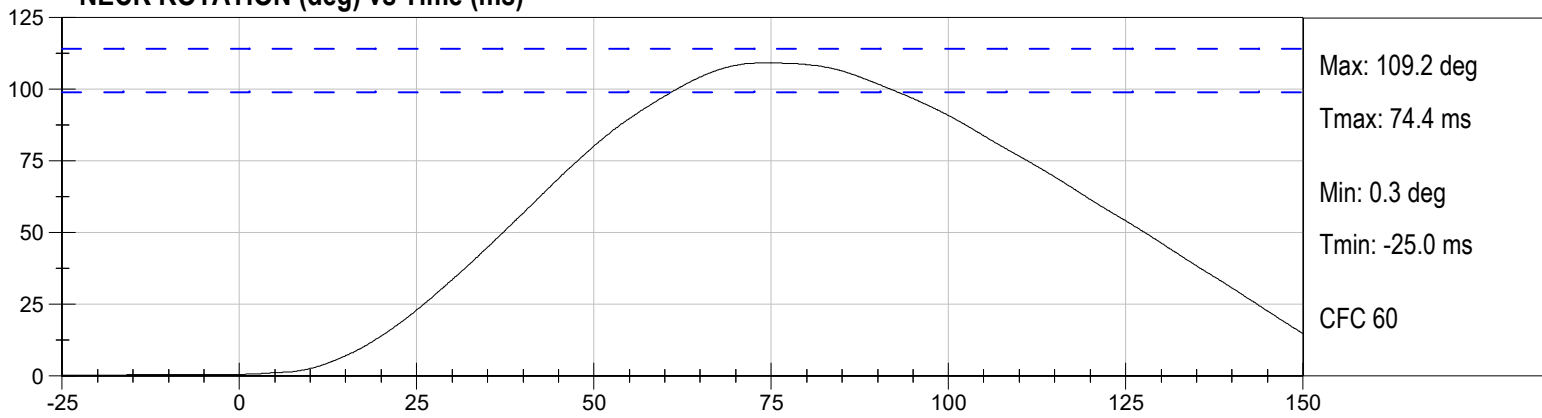
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	43	Pass
Pendulum Velocity	m/s	5.95 to 6.19	5.98	Pass
Pendulum Velocity At 10 ms After T0	m/s	1.5 to 1.9	1.83	Pass
Pendulum Velocity At 20 ms After T0	m/s	3.1 to 3.9	3.70	Pass
Pendulum Velocity At 30 ms After T0	m/s	4.6 to 5.6	5.45	Pass
Maximum "D" Plane Rotation	Deg	99 to 114	109.2	Pass
Occipital Condyle Moment within Rotation Corridor	Nm	-53 to -65	-54	Pass
Negative Moment Time Curve Decay to -10 Nm	ms	94 to 114	104	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
PEND. ACCEL.	Endevco	AH5P1	07/09/2025	1/8/2026
NECK FORCE X	Denton	NG2256FX	07/14/2025	7/14/2026
NECK MOMENT Y	Denton	NG2256MY	07/14/2025	7/14/2026
PEND. POT	Servo	4707	08/13/2025	2/12/2026
HEAD POT	Servo	7297	08/13/2025	2/12/2026

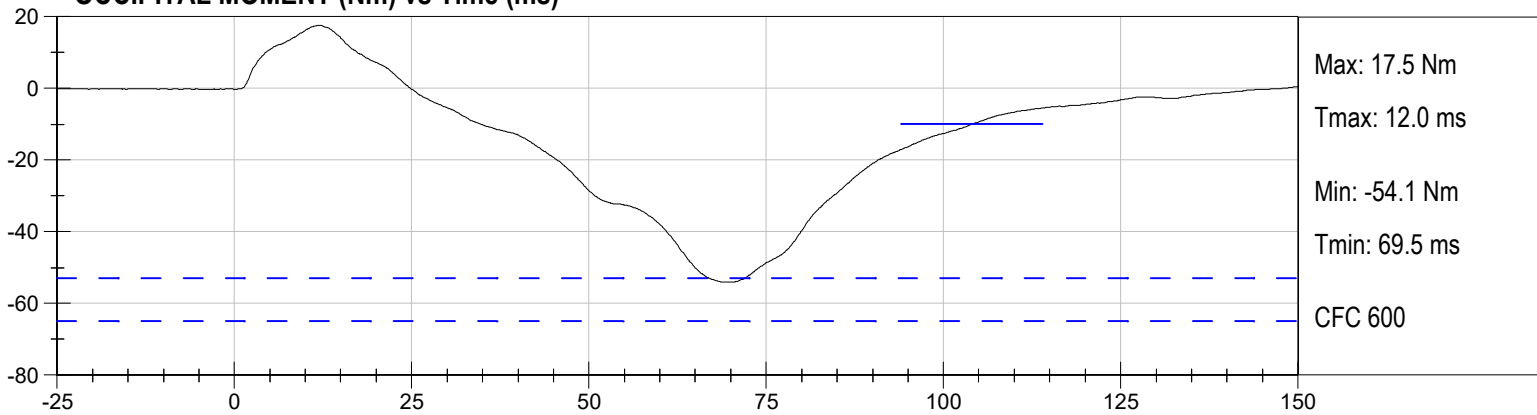
PEND. ACCEL. Velocity (m/s) vs Time (ms)



NECK ROTATION (deg) vs Time (ms)



OCCIPITAL MOMENT (Nm) vs Time (ms)





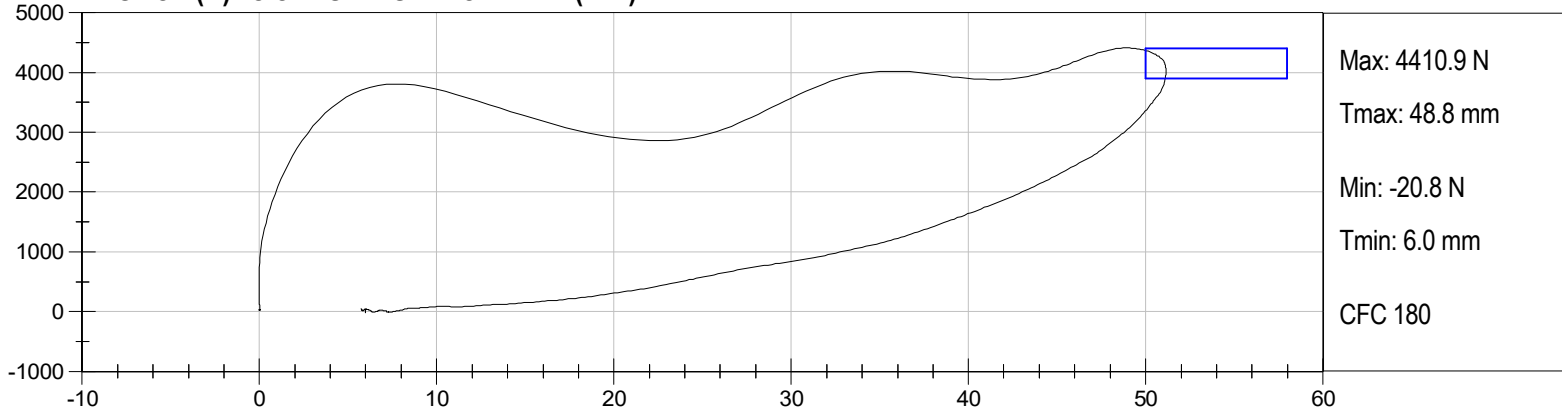
Thorax Impact Test
Hybrid III 5th Percentile Female
ATD Serial No: 142

Test Date: 10/15/2025
Test ID: D253004
Test Technician: Brian Lucas

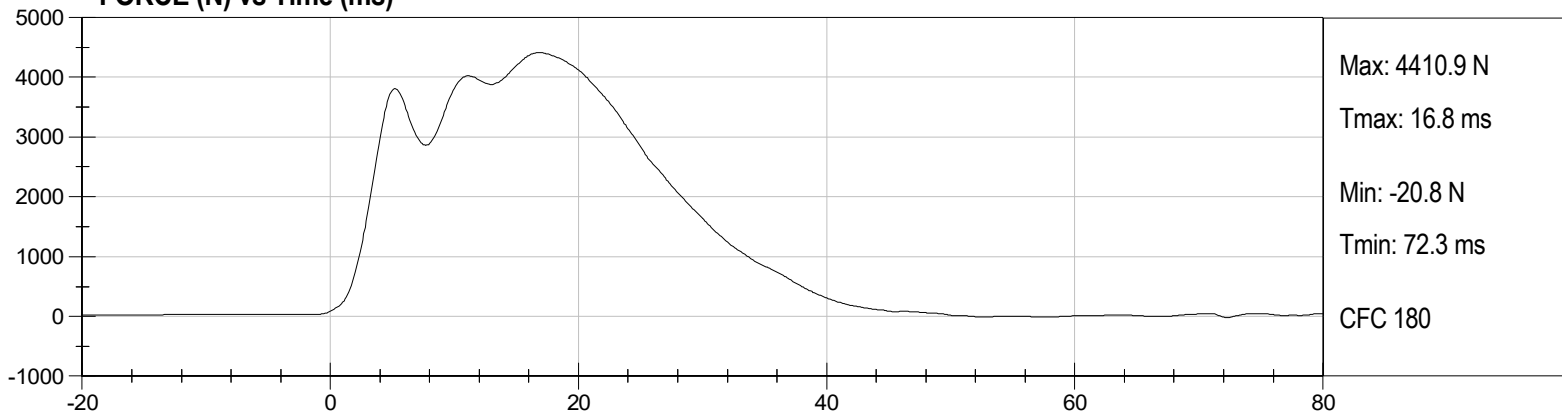
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	43	Pass
Probe Velocity	m/s	6.59 to 6.83	6.68	Pass
Peak Deflection	mm	50 to 58	51	Pass
Peak Resistive Force w/in Corridor	N	3900 to 4400	4371	Pass
Internal Hysteresis	%	69 to 85	74	Pass
Peak Force 18 mm - 50 mm	N	0 to 4600	4411	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
PROBE	Endevco	P79577	09/23/2025	3/25/2026
CHEST DISPLACEMENT	Humanetics	142	04/29/2025	10/29/2025

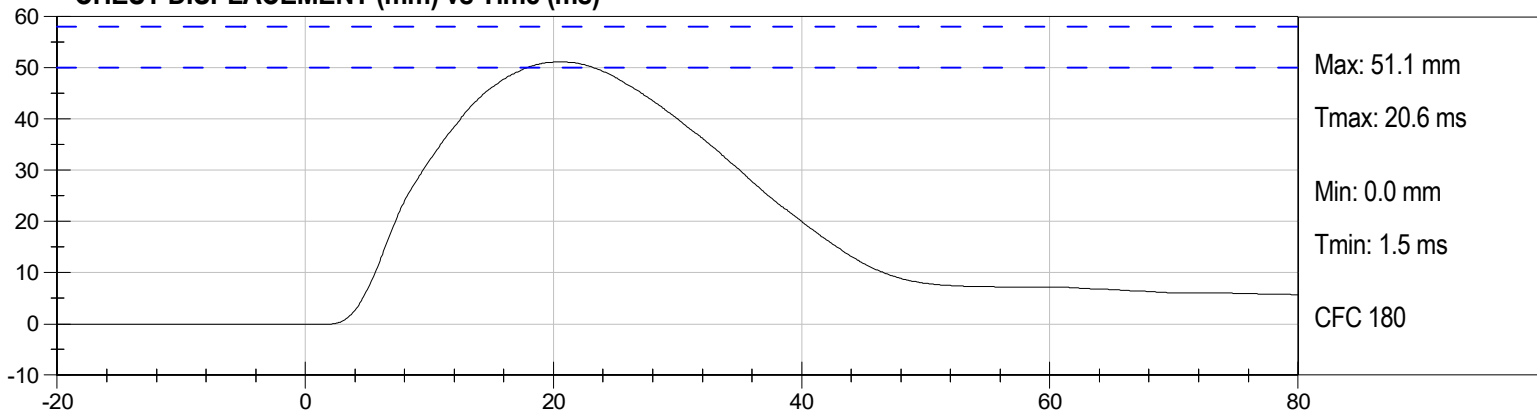
FORCE (N) vs CHEST DISPLACEMENT (mm)



FORCE (N) vs Time (ms)



CHEST DISPLACEMENT (mm) vs Time (ms)



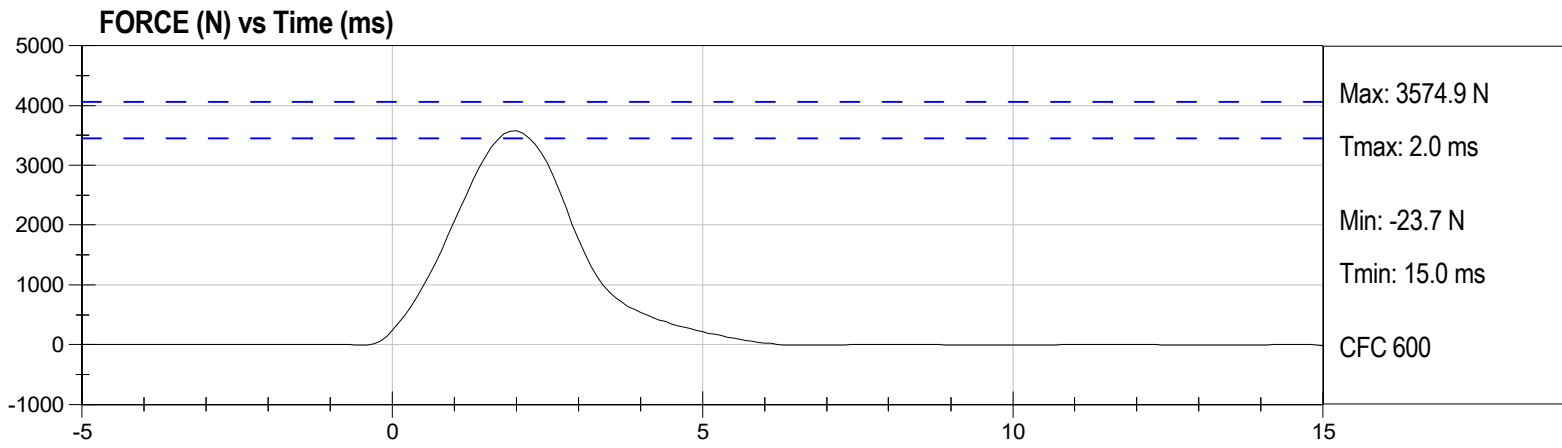


Right Knee Impact Test
Hybrid III 5th Percentile Female
ATD Serial No: 142

Test Date: 10/15/2025
Test ID: D253005
Test Technician: Jonah Pulokas

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	43	Pass
Probe Velocity	m/s	2.07 to 2.13	2.13	Pass
Peak Probe Force	N	3450 to 4060	3575	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
KNEE PROBE	Endevco	P82128	05/30/2025	11/29/2025



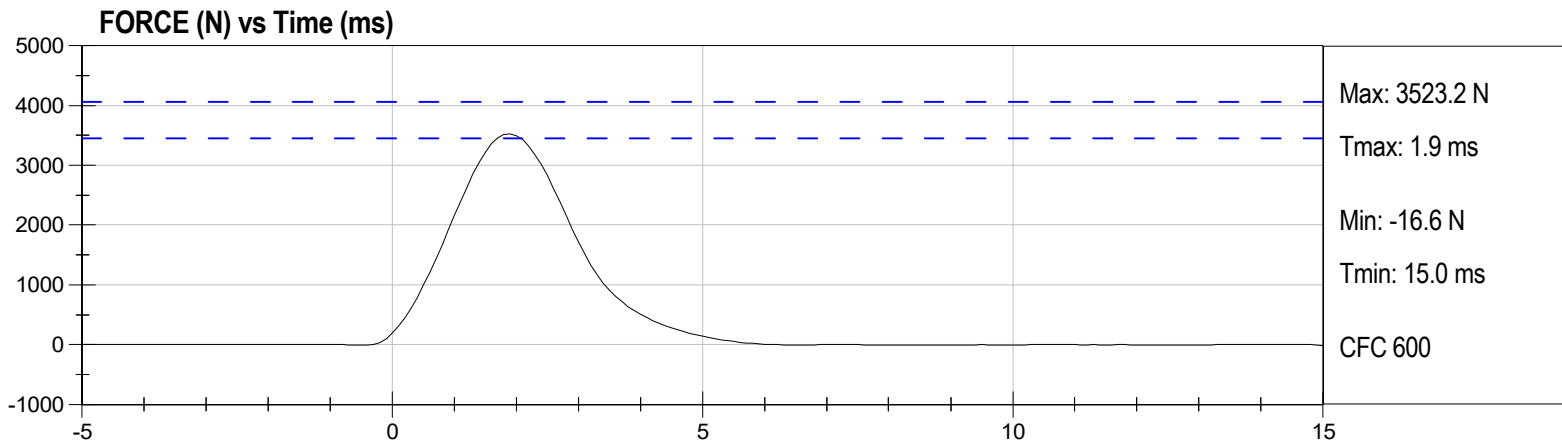


Left Knee Impact Test
Hybrid III 5th Percentile Female
ATD Serial No: 142

Test Date: 10/15/2025
Test ID: D253006
Test Technician: Jonah Pulokas

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	42	Pass
Probe Velocity	m/s	2.07 to 2.13	2.10	Pass
Peak Probe Force	N	3450 to 4060	3523	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
KNEE PROBE	Endevco	P82128	05/30/2025	11/29/2025



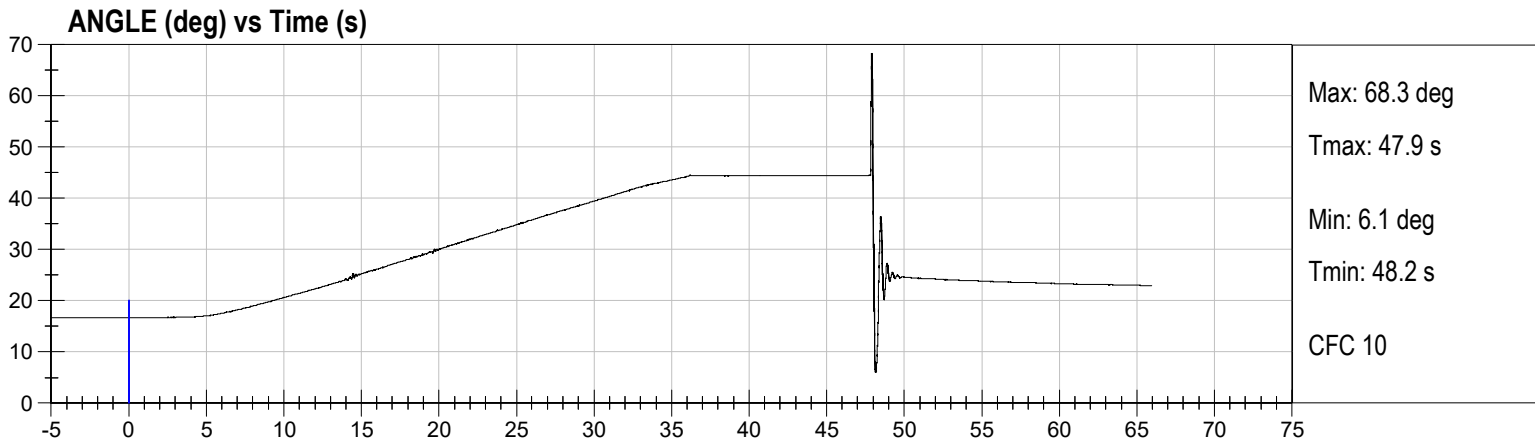
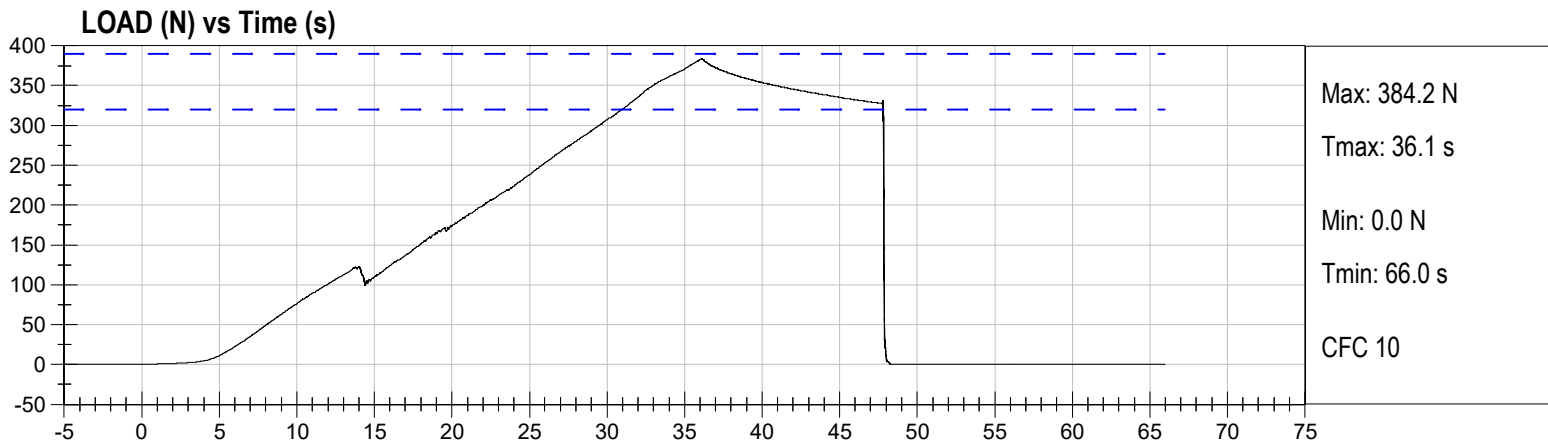


Torso Flexion Test
Hybrid III 5th Percentile Female
ATD Serial No: 142

Test Date: 10/15/2025
Test ID: D253007
Test Technician: Jonah Pulokas

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	41	Pass
Initial Angle	deg	0 to 20	17	Pass
Return Angle Relative to Initial	deg	-8 to 8	5	Pass
Force at 45 deg	N	320 to 390	384	Pass
Upper Torso Deflection Rate	deg/s	0.5 to 1.5	0.9	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
LOAD	Interface	479661	08/04/2025	2/3/2026
ANGLE	Seika	494819	06/20/2025	6/20/2026



QUALIFICATION TEST RESULTS

POST-TEST

HYBRID III 5TH PERCENTILE FEMALE - PASSENGER ATD

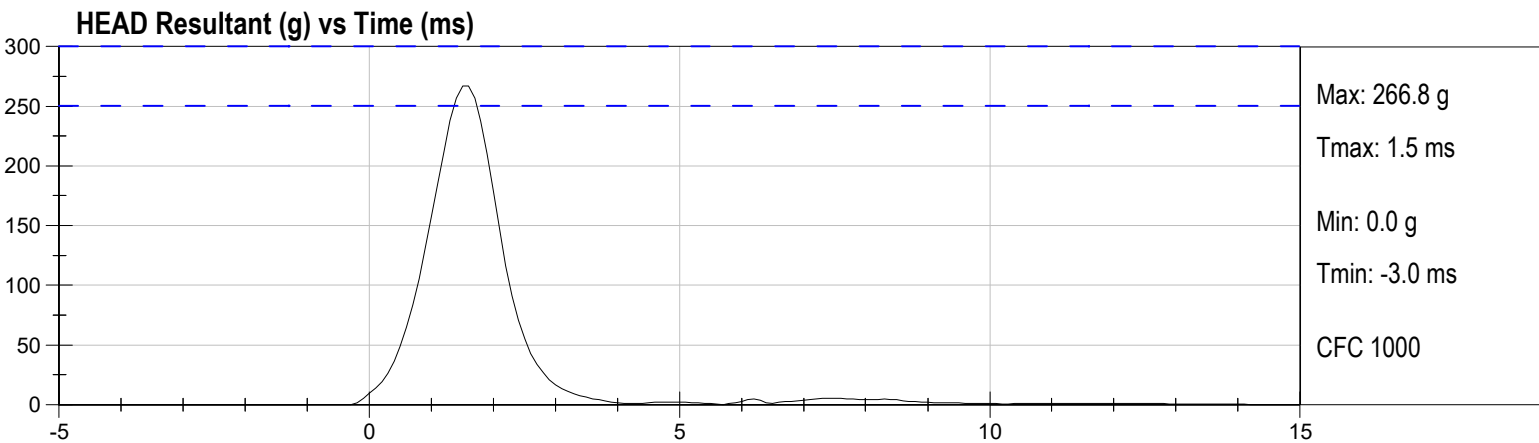
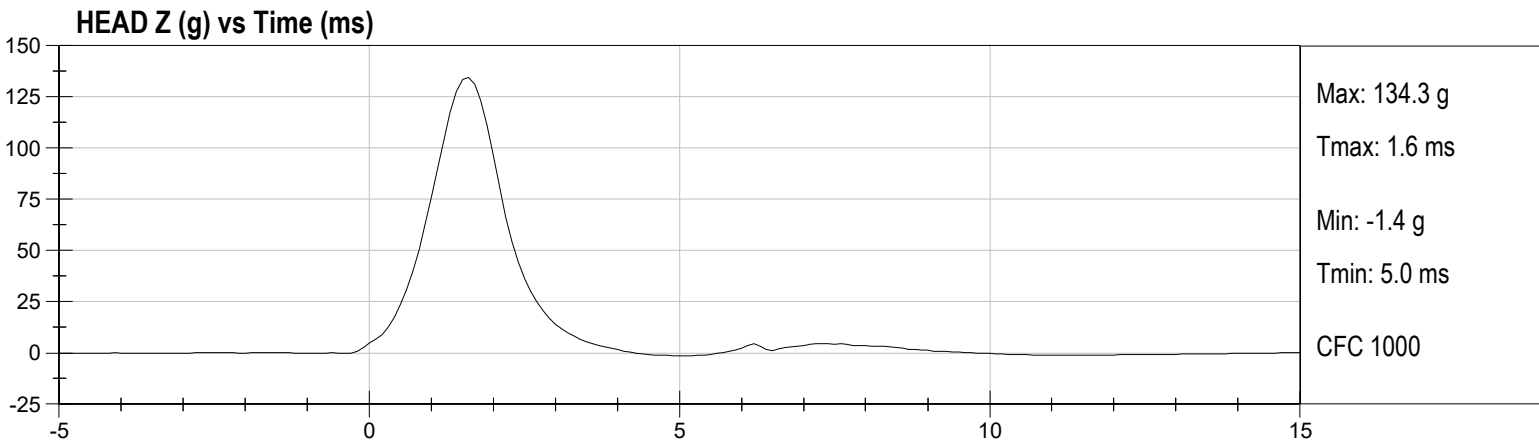
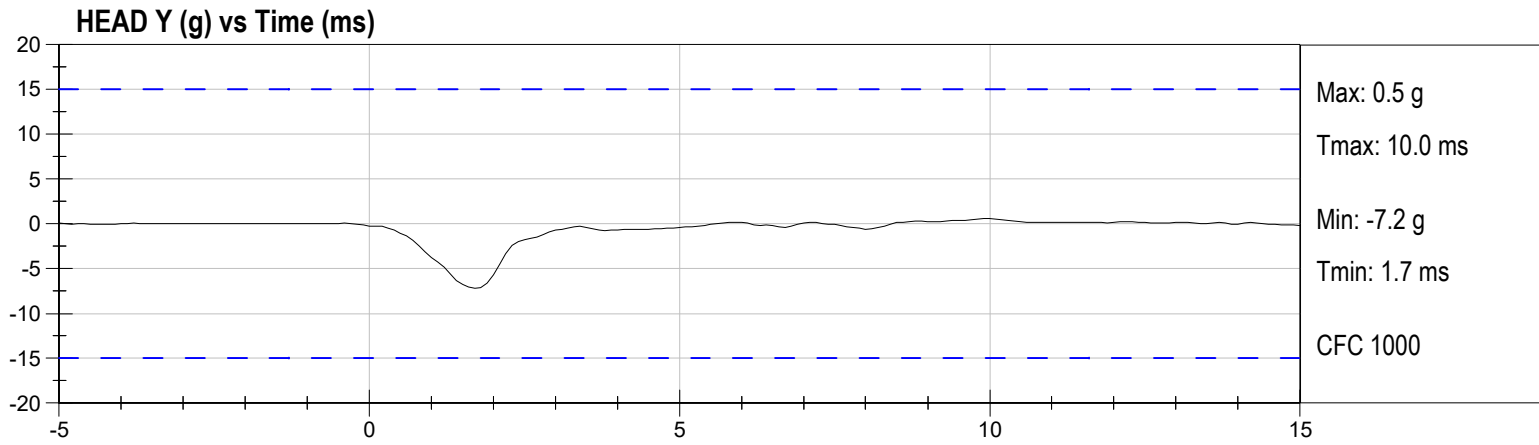
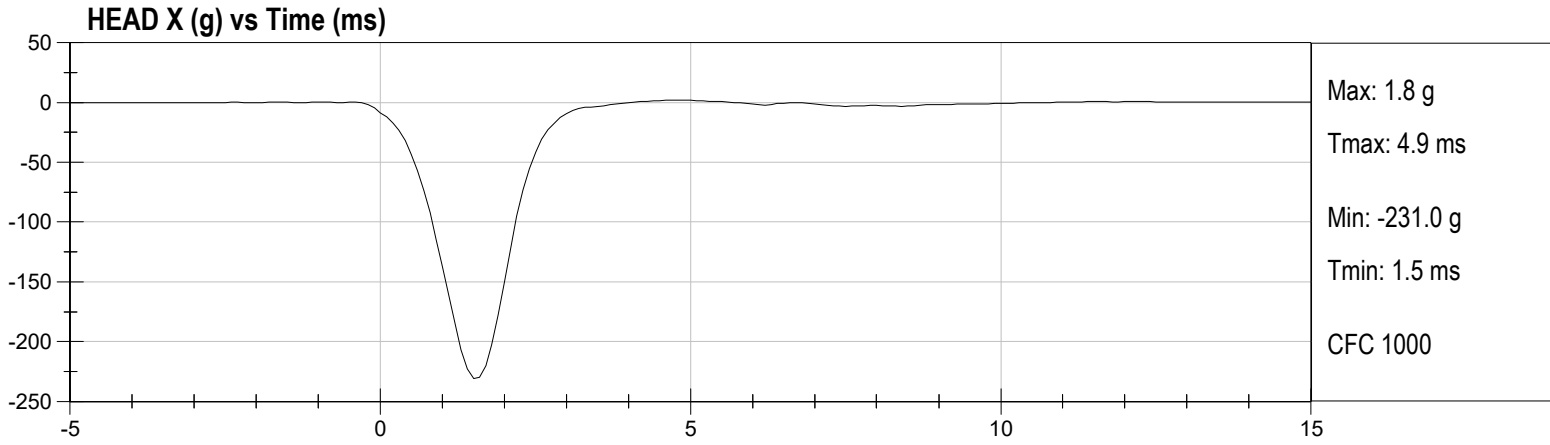


Head Drop Test
Hybrid III 5th Percentile Female
ATD Serial No: 142

Test Date: 12/11/2025
Test ID: D253581
Test Technician: Maggie LaRose

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	35	Pass
Peak Resultant Acceleration	g	250 to 300	267	Pass
Peak Lateral Acceleration	g	-15.0 to 15.0	-7.2	Pass
Unimodal	%	within 10% of peak	2	Pass

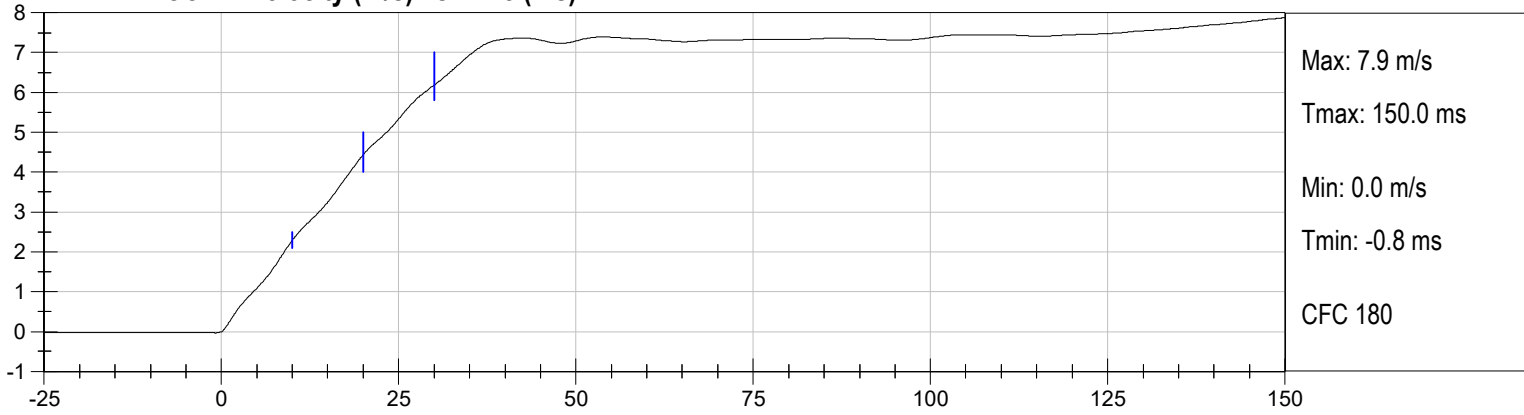
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
HEAD X	Endevco	T30974	12/03/2025	6/4/2026
HEAD Y	Endevco	T30975	12/03/2025	6/4/2026
HEAD Z	Endevco	T30976	12/03/2025	6/4/2026



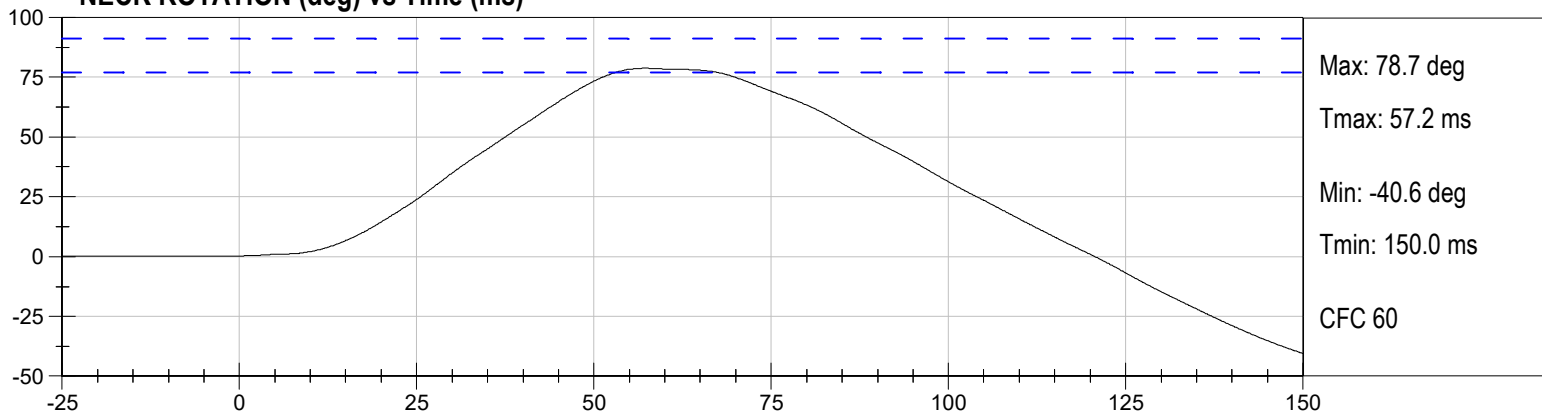
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	39	Pass
Pendulum Velocity	m/s	6.89 to 7.13	6.96	Pass
Pendulum Velocity At 10 ms After T0	m/s	2.1 to 2.5	2.26	Pass
Pendulum Velocity At 20 ms After T0	m/s	4.0 to 5.0	4.42	Pass
Pendulum Velocity At 30 ms After T0	m/s	5.8 to 7.0	6.17	Pass
Maximum "D" Plane Rotation	Deg	77 to 91	79	Pass
Occipital Condyle Moment within Rotation Corridor	Nm	69 to 83	76	Pass
Positive Moment Time Curve Decay to 10 Nm	ms	80 to 100	87	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
PEND. ACCEL.	Endevco	AH5P1	07/09/2025	1/8/2026
NECK FORCE X	Denton	NG2256FX	07/14/2025	7/14/2026
NECK MOMENT Y	Denton	NG2256MY	07/14/2025	7/14/2026
PEND. POT	Servo	4707	08/13/2025	2/12/2026
HEAD POT	Servo	7297	08/13/2025	2/12/2026

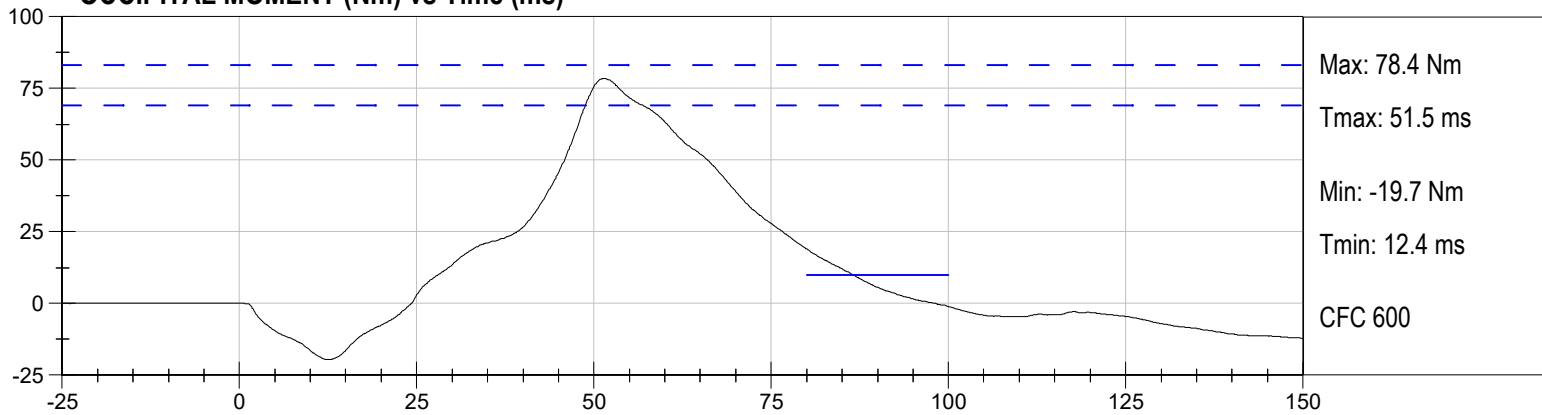
PEND. ACCEL. Velocity (m/s) vs Time (ms)



NECK ROTATION (deg) vs Time (ms)



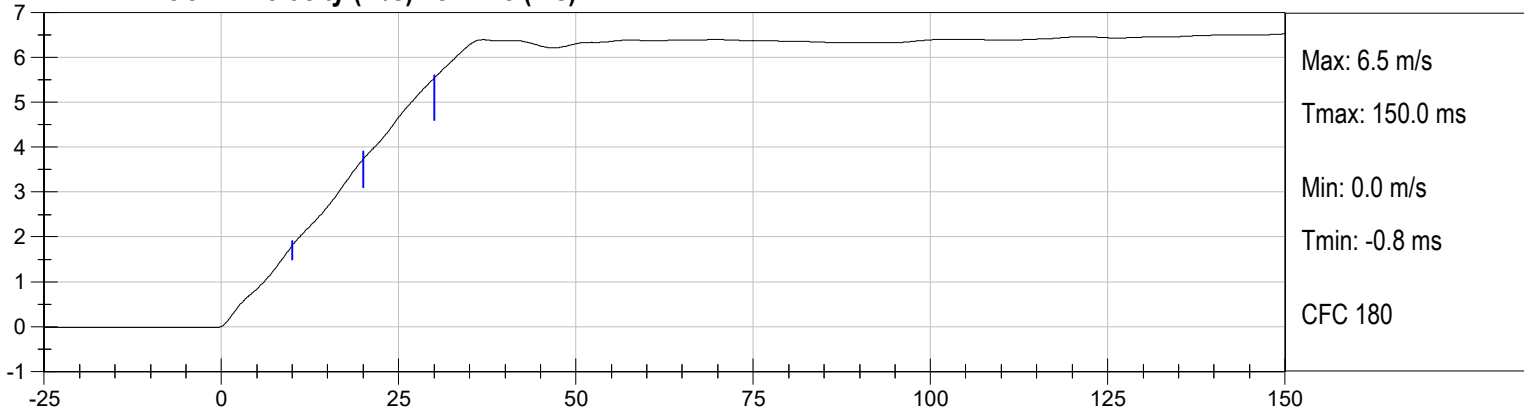
OCCIPITAL MOMENT (Nm) vs Time (ms)



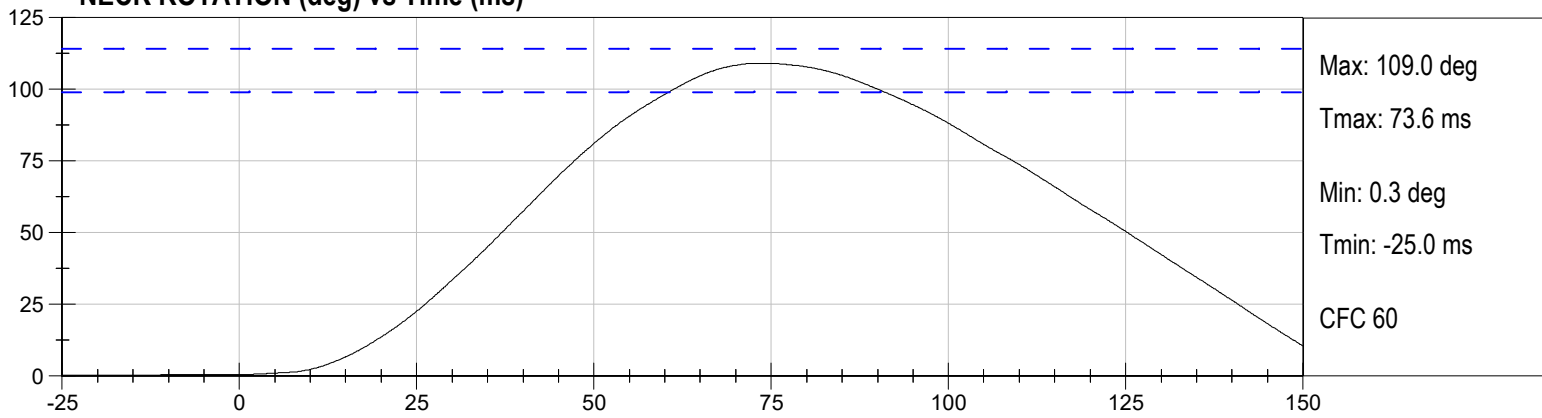
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	38	Pass
Pendulum Velocity	m/s	5.95 to 6.19	6.05	Pass
Pendulum Velocity At 10 ms After T0	m/s	1.5 to 1.9	1.79	Pass
Pendulum Velocity At 20 ms After T0	m/s	3.1 to 3.9	3.72	Pass
Pendulum Velocity At 30 ms After T0	m/s	4.6 to 5.6	5.52	Pass
Maximum "D" Plane Rotation	Deg	99 to 114	109.0	Pass
Occipital Condyle Moment within Rotation Corridor	Nm	-53 to -65	-59	Pass
Negative Moment Time Curve Decay to -10 Nm	ms	94 to 114	103	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
PEND. ACCEL.	Endevco	AH5P1	07/09/2025	1/8/2026
NECK FORCE X	Denton	NG2256FX	07/14/2025	7/14/2026
NECK MOMENT Y	Denton	NG2256MY	07/14/2025	7/14/2026
PEND. POT	Servo	4707	08/13/2025	2/12/2026
HEAD POT	Servo	7297	08/13/2025	2/12/2026

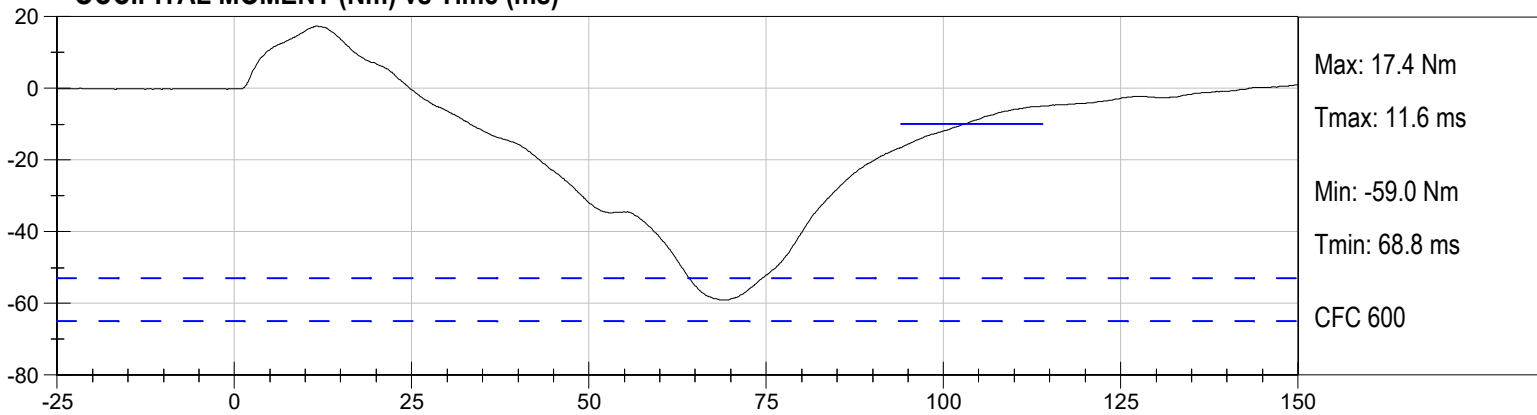
PEND. ACCEL. Velocity (m/s) vs Time (ms)



NECK ROTATION (deg) vs Time (ms)



OCCIPITAL MOMENT (Nm) vs Time (ms)





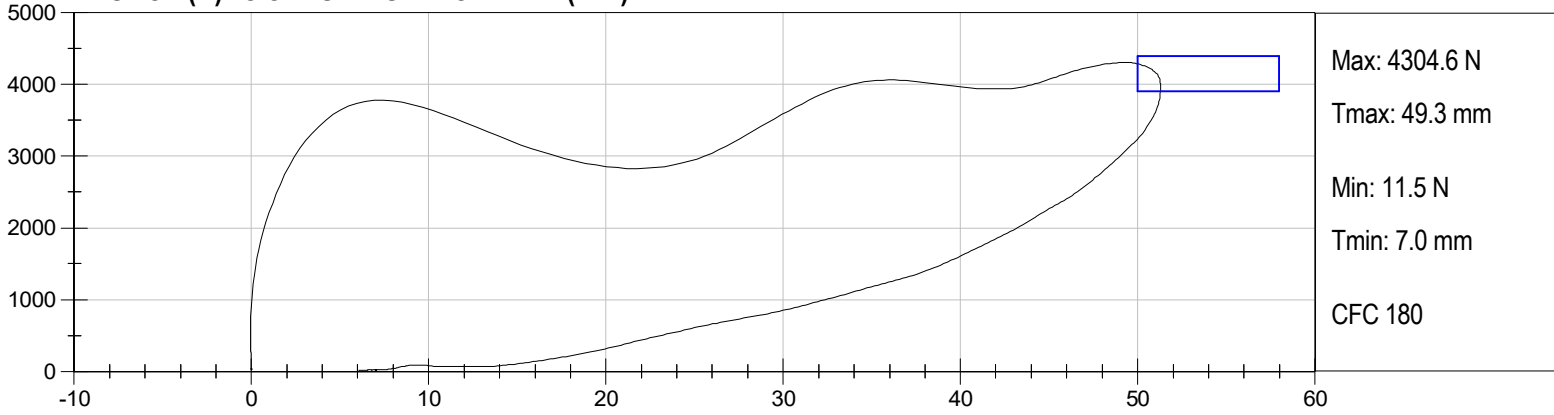
Thorax Impact Test
Hybrid III 5th Percentile Female
ATD Serial No: 142

Test Date: 12/11/2025
Test ID: D253584
Test Technician: Maggie LaRose

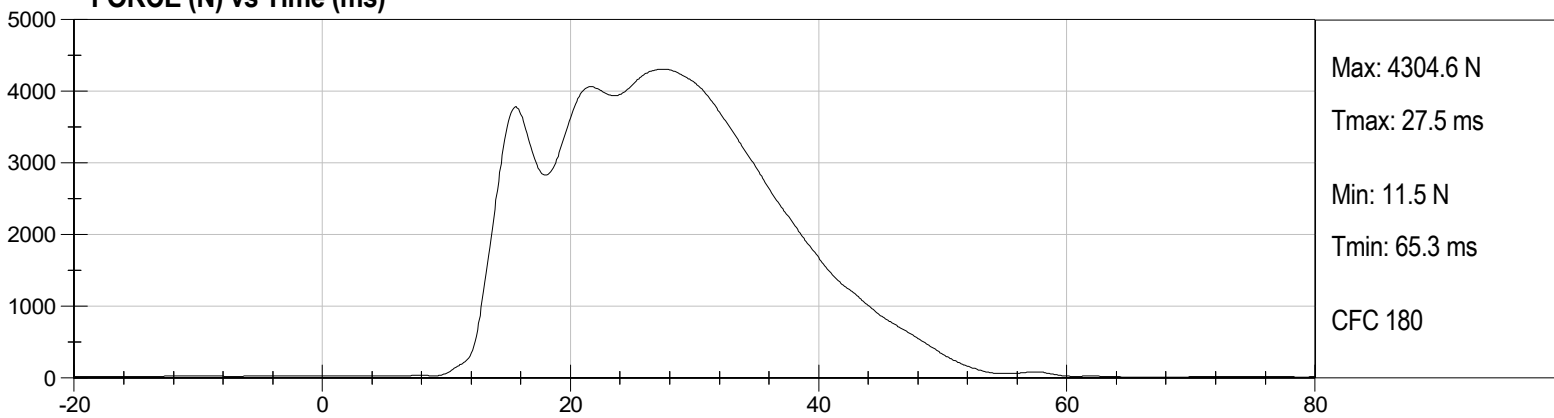
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	32	Pass
Probe Velocity	m/s	6.59 to 6.83	6.77	Pass
Peak Deflection	mm	50 to 58	51	Pass
Peak Resistive Force w/in Corridor	N	3900 to 4400	4285	Pass
Internal Hysteresis	%	69 to 85	74	Pass
Peak Force 18 mm - 50 mm	N	0 to 4600	4305	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
PROBE	Endevco	P79577	09/23/2025	3/25/2026
CHEST DISPLACEMENT	Humanetics	142	10/17/2025	4/18/2026

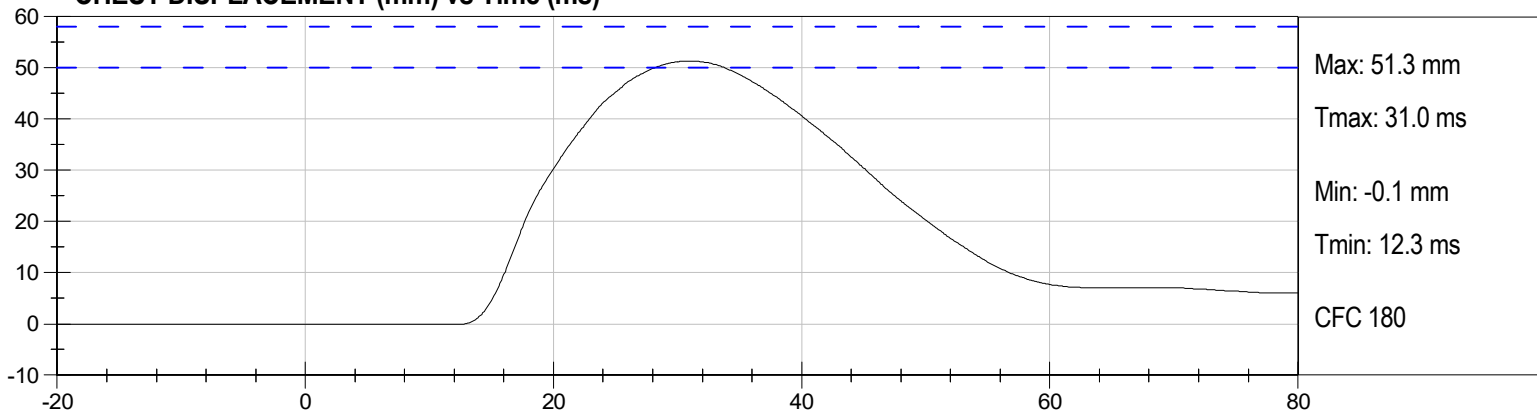
FORCE (N) vs CHEST DISPLACEMENT (mm)



FORCE (N) vs Time (ms)



CHEST DISPLACEMENT (mm) vs Time (ms)



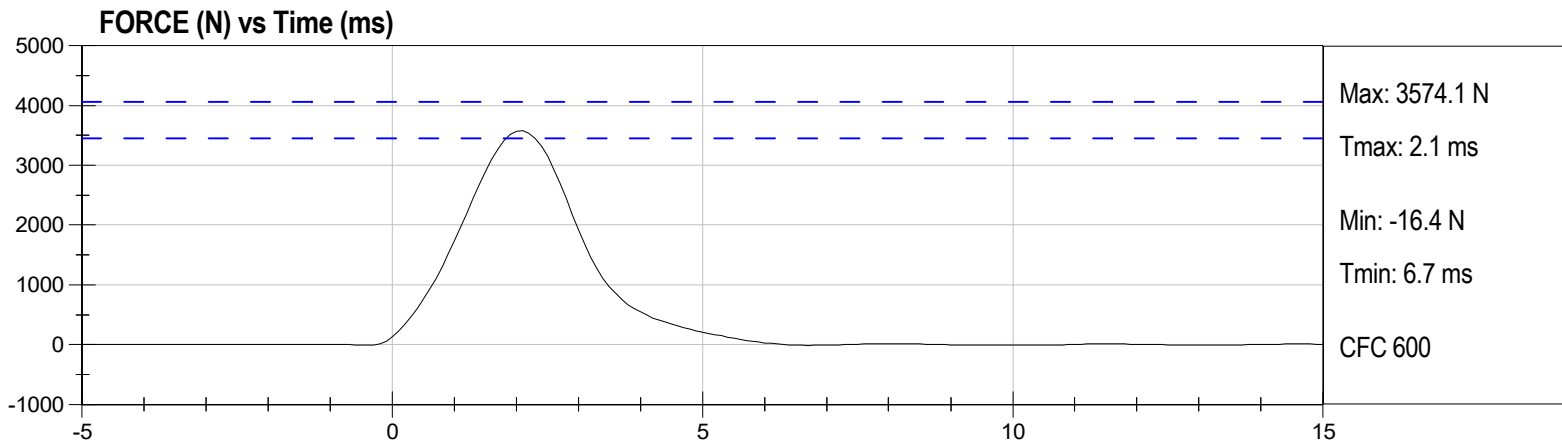


Right Knee Impact Test
Hybrid III 5th Percentile Female
ATD Serial No: 142

Test Date: 12/11/2025
Test ID: D253585
Test Technician: Maggie LaRose

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	38	Pass
Probe Velocity	m/s	2.07 to 2.13	2.09	Pass
Peak Probe Force	N	3450 to 4060	3574	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
KNEE PROBE	Endevco	P82128	12/03/2025	6/4/2026



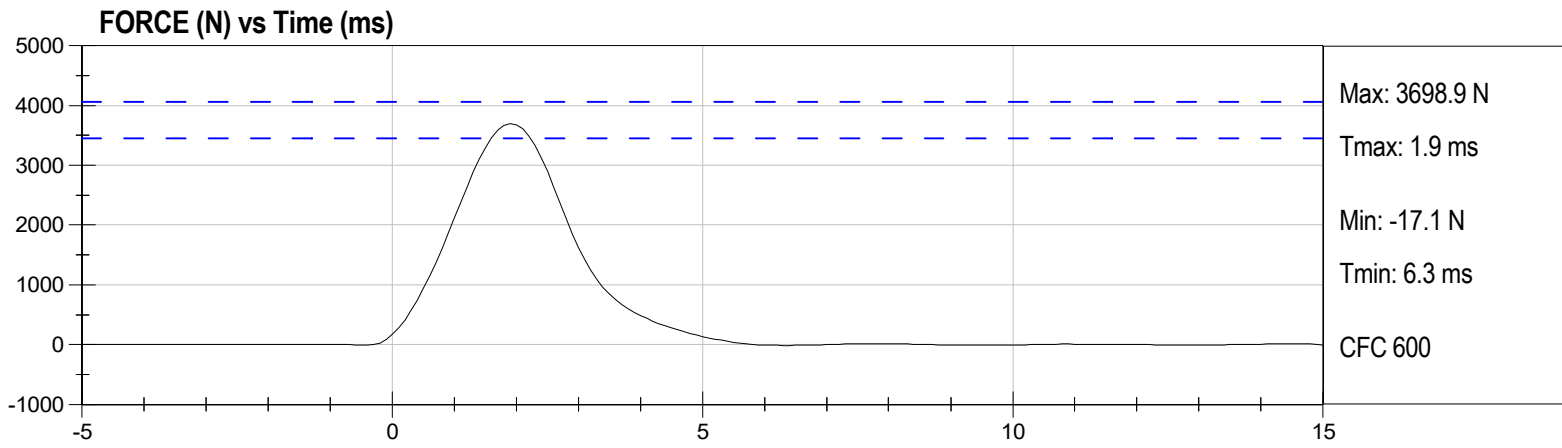


Left Knee Impact Test
Hybrid III 5th Percentile Female
ATD Serial No: 142

Test Date: 12/11/2025
Test ID: D253586
Test Technician: Maggie LaRose

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	38	Pass
Probe Velocity	m/s	2.07 to 2.13	2.08	Pass
Peak Probe Force	N	3450 to 4060	3699	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
KNEE PROBE	Endevco	P82128	12/03/2025	6/4/2026



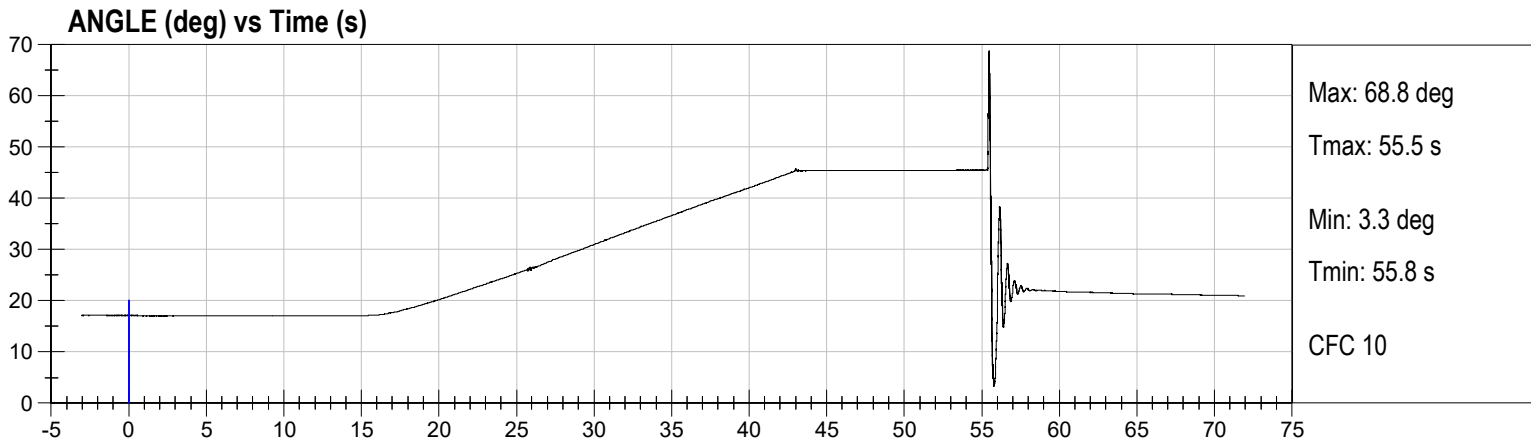
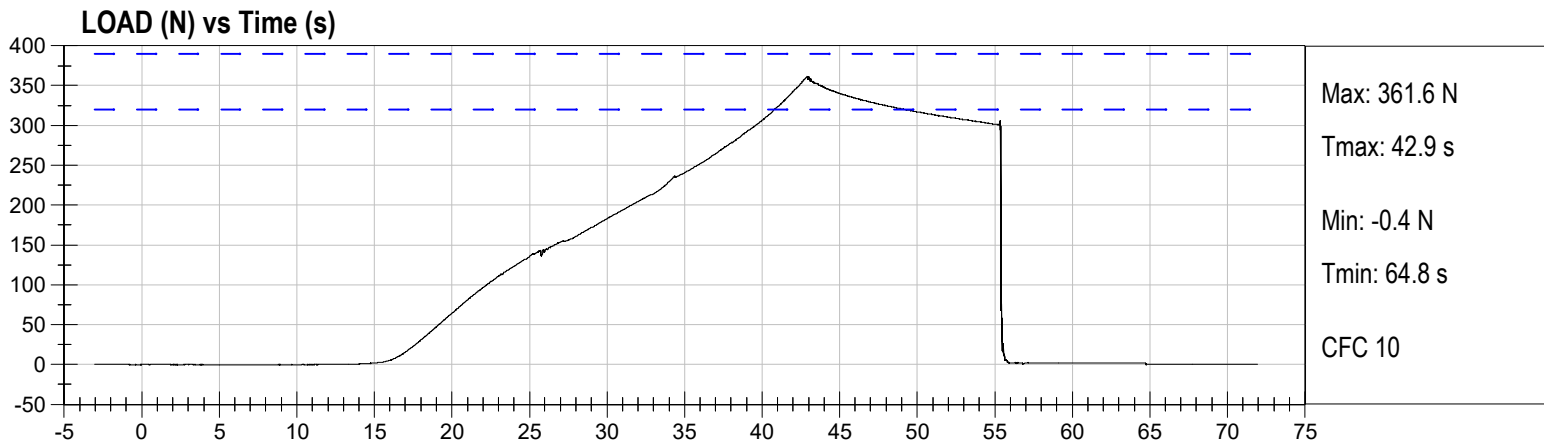


Torso Flexion Test
Hybrid III 5th Percentile Female
ATD Serial No: 142

Test Date: 12/11/2025
Test ID: D253587
Test Technician: Maggie LaRose

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	34	Pass
Initial Angle	deg	0 to 20	17	Pass
Return Angle Relative to Initial	deg	-8 to 8	3	Pass
Force at 45 deg	N	320 to 390	362	Pass
Upper Torso Deflection Rate	deg/s	0.5 to 1.5	1.1	Pass

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
LOAD	Interface	479661	08/04/2025	2/3/2026
ANGLE	Seika	494819	06/20/2025	6/20/2026



APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION

TABLE 1 – DRIVER DUMMY INSTRUMENTATION

Instrument Location			Axis	Hybrid III 50 th S/N 064		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers	Primary		X	T30960	Endevco	10/24/2025
			Y	P79743	Endevco	10/24/2025
			Z	P79741	Endevco	10/24/2025
	Redundant		X	P79744	Endevco	10/24/2025
			Y	P94834	Endevco	10/24/2025
			Z	P94856	Endevco	10/24/2025
Head Angular Rate Sensors			X	ARS7325	DTS	07/15/2025
			Y	ARS7340	DTS	07/15/2025
			Z	ARS7354	DTS	07/15/2025
Upper Neck Load Cell		Fx, Fy, Fz Mx, My, Mz	NG2202	Denton	05/07/2025	
Chest Accelerometers	Primary		X	P86793	Endevco	10/23/2025
			Y	P88348	Endevco	10/23/2025
			Z	P86792	Endevco	10/23/2025
	Redundant		X	P88667	Endevco	10/23/2025
			Y	P94109	Endevco	10/23/2025
			Z	P88666	Endevco	10/23/2025
Chest Potentiometer		X	064	Humanetics	10/24/2025	
Pelvis Accelerometers			X	P97742	Endevco	10/24/2025
			Y	P96038	Endevco	10/24/2025
			Z	P95526	Endevco	10/24/2025
Femur Load Cells	Right	Primary	Z	FG121P	Denton	10/24/2025
		Redundant	Z	FG121R	Denton	10/24/2025
	Left	Primary	Z	FG122P	Denton	10/24/2025
		Redundant	Z	FG122R	Denton	10/24/2025
Tibia Load Cells	Right	Upper	Mx, My, Fz	T589	Denton	11/26/2025
		Lower	Mx, My, Fz	A610	Denton	11/26/2025
	Left	Upper	Mx, My, Fz	T591	Denton	11/26/2025
		Lower	Mx, My, Fz	A611	Denton	11/26/2025
Foot Accelerometers	Right	Rear	X	T22486	Endevco	10/23/2025
			Z	P97382	Endevco	10/23/2025
		Front	Z	P82120	Endevco	10/23/2025
	Left	Rear	X	T16468	Endevco	10/23/2025
			Z	T32154	Endevco	10/23/2025
		Front	Z	T32190	Endevco	10/23/2025
Seat Belt Load Cells		Lap		SBG161	FTSS	10/21/2024
		Shoulder		SBG157	FTSS	10/21/2024

TABLE 2 – FRONT PASSENGER DUMMY INSTRUMENTATION

Instrument Location			Axis	Hybrid III 5 th S/N 142		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers	Primary		X	P94799	Endevco	10/17/2025
			Y	P94800	Endevco	10/17/2025
			Z	P94801	Endevco	10/17/2025
	Redundant		X	P94802	Endevco	10/17/2025
			Y	P94803	Endevco	10/17/2025
			Z	P97377	Endevco	10/17/2025
Head Angular Rate Sensors			X	ARS7357	DTS	07/15/2025
			Y	ARS7366	DTS	07/15/2025
			Z	ARS7371	DTS	07/15/2025
Upper Neck Load Cell			Fx, Fy, Fz Mx, My, Mz	NG2256	Denton	07/14/2025
Chest Accelerometers	Primary		X	P88719	Endevco	10/17/2025
			Y	P94785	Endevco	10/17/2025
			Z	P94793	Endevco	10/17/2025
	Redundant		X	P95322	Endevco	10/17/2025
			Y	P95370	Endevco	10/17/2025
			Z	T30901	Endevco	10/17/2025
Chest Potentiometer			X	142	Humanetics	10/17/2025
Pelvis Accelerometers			X	P94798	Endevco	10/17/2025
			Y	P82646	Endevco	10/17/2025
			Z	P97705	Endevco	10/17/2025
Femur Load Cells	Right	Primary	Z	FG126P	Denton	10/17/2025
		Redundant	Z	FG126R	Denton	10/17/2025
	Left	Primary	Z	FG127P	Denton	10/17/2025
		Redundant	Z	FG127R	Denton	10/17/2025
Tibia Load Cells	Right	Upper	Mx, My, Fz	TG408	Denton	01/17/2025
		Lower	Mx, My, Fz	A609	Denton	10/02/2025
	Left	Upper	Mx, My, Fz	TG480	Denton	01/17/2025
		Lower	Mx, My, Fz	AG502	Denton	01/17/2025
Foot Accelerometers	Right	Rear	X	P79770	Endevco	10/17/2025
			Z	P79414	Endevco	10/17/2025
		Front	Z	P79611	Endevco	10/17/2025
	Left	Rear	X	P83167	Endevco	10/17/2025
			Z	P83168	Endevco	10/17/2025
		Front	Z	P83169	Endevco	10/17/2025
Seat Belt Load Cells		Lap		SBG273	FTSS	10/21/2024
		Shoulder		SBG272	FTSS	10/21/2024

TABLE 3 – VEHICLE INSTRUMENTATION

Instrument Location			Axis	Serial Number	Manufacturer	Calibration Date
Crossmember / Rear Seat Accelerometers	Left	Primary	X	A620562	MSI	09/17/2025
			Z	T42818	Endevco	09/17/2025
		Redundant	X	A618974	MSI	09/17/2025
	Right	Primary	X	T41507	Endevco	10/13/2025
			Z	T33412	Endevco	10/14/2025
		Redundant	X	T42813	Endevco	10/14/2025
Engine Accelerometers		Top	X	T47292	Endevco	11/13/2025
		Bottom	X	T47053	Endevco	11/13/2025