

REPORT NUMBER: SPNCAP-CAL-22-006

**NEW CAR ASSESSMENT PROGRAM (NCAP)
SIDE IMPACT POLE TEST**

**General Motors LLC
2022 Chevrolet Bolt EV
Five Door Hatchback**

NHTSA No: M20220104

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



September 1, 2023

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
MAIL CODE: NRM-110
1200 NEW JERSEY AVE SE
WASHINGTON, D.C. 20590**

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Date: September 1, 2023

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Date: September 1, 2023

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 32.20 km/h (20 mph), 75° oblique impact Side NCAP Test was conducted on the subject 2022 Chevrolet Bolt EV five door hatchback in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP Pole Laboratory Test Procedure for the generation of consumer information on vehicle side pole crash protection. This test was conducted at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on July 13th, 2022. The impact velocity of the vehicle was 32.20 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle was 21°C. The target vehicle's maximum post-test static crush was 250 mm located at level 3. The test vehicle's occupant performance data is as follows: <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th colspan="3">Driver ATD (SID-IIs) (Serial No. DG8012)</th> </tr> <tr> <th>Units</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td></td> <td>1000</td> <td>186.772</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td>G</td> <td>82</td> <td>35.478</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td>N</td> <td>5525</td> <td>2245.522</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38</td> <td>21.563</td> </tr> <tr> <td>Maximum Abdomen Rib Deflection</td> <td>mm</td> <td>45</td> <td>21.151</td> </tr> </tbody> </table> The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.				Measurement Description	Driver ATD (SID-IIs) (Serial No. DG8012)			Units	Threshold	Result	Head Injury Criteria (HIC ₃₆)		1000	186.772	Resultant Lower Spine Acceleration	G	82	35.478	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2245.522	Maximum Thoracic Rib Deflection	mm	38	21.563	Maximum Abdomen Rib Deflection	mm	45	21.151
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SECTION 1

TEST PURPOSE AND PROCEDURE

This side impact test was conducted as part of the MY 2022 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. 693JJ920D000016. The purpose of this test is to generate comparative side impact performance in a 2022 Chevrolet Bolt EV five door hatchback. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Pole Laboratory Test Procedure, dated March 2020.

SECTION 2

SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2022 Chevrolet Bolt EV. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.20 km/h. The test was conducted by Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on July 13, 2022. Pre-test and post-test photographs of the test vehicle and side impact dummy (SID-IIs) are included in Appendix A of this report.

One Part 572V (SID-IIs) dummy was placed in the driver designated seating position according to instructions specified in the OCWS Side NCAP Pole Laboratory Test Procedure, dated March 2020. The side impact event was documented by 11 cameras. Camera locations and other pertinent camera information are included on page 3-11 in this report.

The Part 572V (SID-IIs) dummy was instrumented accordingly:

Head CG tri-axial accelerometers

Thorax upper, middle, and lower rib displacement potentiometers

Abdomen upper and lower rib displacement potentiometers

Lower spine tri-axial accelerometers

Iliac load cell

Acetabulum load cell

Appendix B contains the dummy response data. Dummy configuration and performance verification data can be found in Appendix C of this report. Appendix D identifies all serial numbers, manufacturers, and calibration dates for test equipment, dummy sensors, potentiometers, and load cells used to collect data during the test.

Injury readings for the SID-IIs dummy were recorded as follows:

INJURY READINGS

Measurement Description	Driver ATD (SID-IIs)		
	Units	IARV	Result
Head Injury Criteria (HIC ₃₆)		1000	186.772
Resultant Lower Spine Acceleration	g	82	35.478
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2245.522
Maximum Thoracic Rib Deflection	mm	38*	21.563
Maximum Abdominal Rib Deflection	mm	45*	21.151

*Proposed IARV

Supplemental restraint information was recorded as follows:

SUPPLEMENTAL RESTRAINT INFORMATION

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	Yes	No		
Side Airbag 1 - Curtain	Yes	Yes	Yes	Yes
Side Airbag 2 – Torso/Pelvis	Yes	Yes	No	N/A
Side Airbag 3 – Torso	No	N/A	Yes	Yes
Seat Belt Pretensioner	Yes	Yes	No	N/A
Seat Belt Load Limiter	Yes	Yes	No	N/A
Other				

GENERAL COMMENTS:

1. P1 serial number – DG8012

Data Anomalies:

- Vehicle CG Z Acceleration, Exceeded calibration range at 23.2 ms
- Left Sill B-Pillar Y Acceleration, Exceeded calibration range at 22.8 ms
- Left Lower B-Pillar Y Acceleration, Exceeded calibration range at 9.1 ms
- Left Middle B-Pillar Y Acceleration, Exceeded calibration range at 13.1 ms
- Load Cell Pole Barrier #1 Fy, Questionable data after 39 ms

SECTION 3

OCCUPANT AND VEHICLE INFORMATION

This section contains information reporting for the following Data Sheets:

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

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

Data Sheet No. 3 – Dummy Longitudinal Clearance Dimensions

Data Sheet No. 4 – Dummy Lateral Clearance Dimensions

Data Sheet No. 5 – Camera and Instrumentation Data

Data Sheet No. 6 – Vehicle Accelerometer Data

Data Sheet No. 7 – Rigid Pole Load Cell Data

Data Sheet No. 8 – Post-Test Observations

Data Sheet No. 9 – Test Vehicle Profile Measurements

Data Sheet No. 10 – Test Vehicle Exterior Crush Measurements

Data Sheet No. 11 – Vehicle Damage Profile Distances

Data Sheet No. 12 – FMVSS No. 301 Static Rollover Results

Data Sheet No. 13 – Dummy / Vehicle Temperature and Humidity Stabilization Data

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

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

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

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

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

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2022 Chevrolet Bolt EV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20220104
Test Date: 07/13/2022

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20220104
Model Year	2022
Make	Chevrolet
Model	Bolt EV
Body Style	Five Door Hatchback
VIN	1G1FW6S03N4123454
Body Color	Blue
Odometer Reading (km/mi)	7 mi
Engine Displacement (L)	N/A
Type / No. Cylinders	EV
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	Direct Drive
Overdrive	Yes
Final Drive	Front Wheel Drive
Roof Rack	No
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes

Traction Control System (TCS)	Yes
Auto-Leveling System	No
Automatic Door Locks (ADL)	Yes
Power Window Auto-Reverse	No
Other Optional Feature	-
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso / Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	Yes
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head / Torso Airbag	No
Rear Pass. Torso Airbag	Yes
Rear Pass. Torso / Pelvis Airbag	No
Rear Pass. Pelvis Airbag	No
Driver Seat Belt Pretensioner	Yes
Rear Pass. Seat Belt Pretensioner	No
Driver Load Limiter	Yes
Rear Pass. Load Limiter	No
Other Safety Restraint	-

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

No

DATA FROM CERTIFICATION LABEL

Manufactured By	General Motors LLC
Date of Manufacture	04/22
Vehicle Type	Passenger Car

GVWR (kg)	2043
GAWR Front (kg)	1027
GAWR Rear (kg)	1016

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	3	-	5
Capacity Weight (VCW) (kg)				396
DSC X 68.04 kg				340.2
Cargo Weight (RCLW) (kg)				55.8

(A)

(B)

(A-B)

VEHICLE SEAT TYPE

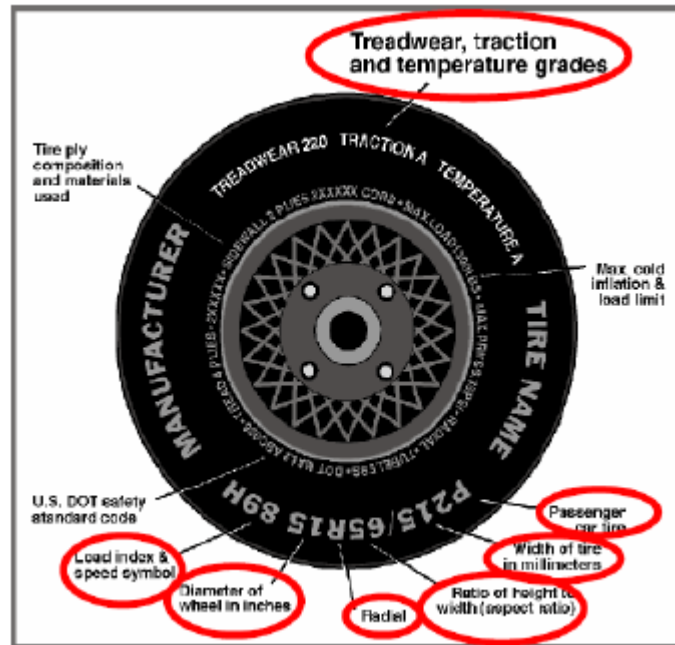
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						W/ Lever	W/ Knob
Front Seat	X	-	-		-	X	-
Rear or Second Row Seat	-	-	X	-	X	-	-
Third Row seat							

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

Test Vehicle: 2022 Chevrolet Bolt EV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20220104
 Test Date: 07/13/2022

Collected for year, make, model, & VIN, all items circled in red, tire manufacturer and tire name.



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	260	260
Recommended Tire Size	215/50R17	215/50R17
Tire Size on Vehicle	215/50R17	215/50R17
Tire Manufacturer	Michelin	Michelin
Tire Model	Energy Saver A/S	Energy Saver A/S
Treadwear	480	480
Traction	A	A
Temperature Grades	B	B
Tire Plies Sidewall	1 Polyester	1 Polyester
Tire Plies Body	1 Polyester, 1 Polyamide, 2 Steel	1 Polyester, 1 Polyamide, 2 Steel
Load Index/Speed Symbol	91H	91H
Tire Material	Rubber	Rubber
DOT Safety Code Left	1B33803RX2821	1B33803RX2821
DOT Safety Code Right	1B33803RX2721	1B33803RX2621

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

Test Vehicle: 2022 Chevrolet Bolt EV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20220104
 Test Date: 07/13/2022

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	249	251	247	253
Tire Placard	kPa	260	260	260	260
Owner's Manual	kPa	260	260	260	260
As Tested	kPa	260	260	260	260

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	462	351.5		476.5	388		469	407.5	
Right	kg	450.5	346		483	363		477	367.5	
Ratio	%	56.7	43.3		56.1	43.9		55	45	
Totals	kg	912.5	697	1609.5	959.5	751	1710.5	946	775	1721

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1609.5	(A)
Actual Weight of 1 P572V (SID-IIs) ATD Used	kg	50	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	55.8	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1715.3	(A+B+C)

Does the measured As Test Vehicle Weight lie within the required weight range
 (i.e. Calculated Test Vehicle Target Weight – 4.5 kg to – 9 kg)? ☒ Yes ☐ No

TEST VEHICLE ATTITUDES AND CG

Measurement Description	Units	As Delivered	As Tested	Fully Loaded	Meets Rqmt***
Driver Door Sill Angle (front-to-rear)*	Deg	-1.2	-1.2	0.10	Yes
Front Passenger Sill Angle (front-to-rear)*	Deg	0.6	0.5	-1.15	Yes
Front Bumper-Line Angle (left-to-right)**	Deg	-0.25	-0.15	-0.15	Yes
Rear Bumper-Line Angle (left-to-right)**	Deg	0.0	0.0	0.0	Yes
Vehicle CG (Aft of Front Axle)	mm	1126	1142	1171	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	8	8	14	

* ND = Nose Down (-), NU = Nose Up (+)

** LD = Left Down (-), LU = Left Up (+)

*** The "As Tested" vehicle attitude measurements must be equal to or between the "As Delivered" and "Fully Loaded" vehicle attitude measurements. Indicate "Yes" or "No" for Meets Requirement

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

Test Vehicle: 2022 Chevrolet Bolt EV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20220104
Test Date: 07/13/2022

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Rear Seat Headrests	3
Trunk Carpeting	11
Passenger rear window	3
Ballast Added	0

Test Height – Adjustable Suspension Setting, if Applicable	N/A
--	-----

Test Surface Markings

	Distance from 75° Impact Location Line (mm)
Fore 25 mm target	886
Aft 25 mm target	884

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

Test Vehicle: 2022 Chevrolet Bolt EV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20220104
 Test Date: 07/13/2022

SEAT POSITIONING

The driver's seat, front center seat (if applicable), and right front passenger's seat should be set to the forward-most, mid-height, mid-angle position. The struck-side rear passenger's seat, rear center seat, and non-struck side rear passenger's seats should be set to the rear-most, lowest, mid-angle position.

SCRL ANGLE RANGE

Seat	SCRL (°)		
	Max	Min	Mid
Driver Seat	15.8	13.6	14.7
Front Passenger Seat	15.8	13.7	14.8
Front Center Seat			
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid-Fore / Aft	Forward-Most
Driver Seat	14.7	32	Max	-	-	-
			Mid	15	23	32
			Min	-	-	-
Front Passenger Seat	14.8	33	Max	-	-	-
			Mid	16	25	33
			Min	-	-	-
Front Center Seat	-	-	Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
Struck Side Rear Seat	Fixed	Fixed	Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
Non-Struck Side Rear Seat	Fixed	Fixed	Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
Rear Center Seat	Fixed	Fixed	Max	-	-	-
			Mid	-	-	-
			Min	-	-	-

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

Test Vehicle: 2022 Chevrolet Bolt EV
 Test Program: NCAP Side Pole Impact Test

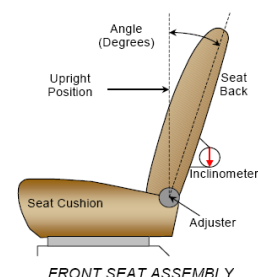
NHTSA No.: M20220104
 Test Date: 07/13/2022

SEAT FORE / AFT POSITION

Seat	Total Fore / Aft Travel		Test Position from Forward most Position	
	mm	Detents*	mm	Detents*
Driver Seat	240	25 (0-24)	0	0
Front Passenger Seat	240	25 (0-24)	0	0
Front Center Seat				
Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed	Fixed

SEAT BACK ANGLE ADJUSTMENT

The driver's seat back is positioned such that the dummy's head is level. The front center and front passenger's seat backs are positioned in a similar manner as the driver's seat back. The struck-side rear passenger seat back is positioned in accordance with the information provided by the manufacturer on Form No. 1 for the 5th percentile female dummy in a Side NCAP MDB test. The rear center and non-struck side rear passenger's seat back are set to match the struck-side rear seat back.



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detents*
Driver Seat w/Seated Dummy	31.9	N/A	28.2	4
Front Passenger Seat	30.9	N/A	27.8	4
Front Center Seat				
Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed	Fixed

SEAT BELT ANCHORAGE ADJUSTMENT

Seat belt anchorages are adjusted in accordance with the information provided by the manufacturer on Form No. 1. Zero is defined as the uppermost detent

Seat	Total # of Positions	Placed in Position #
Driver Seat	Fixed	Fixed

HEAD RESTRAINT ADJUSTMENT

The driver's head restraint is adjusted to the lowest and most full forward in-use position.

Seat	Total # of Positions	Placed in Position #
Driver Seat	7 (0-6)	Lowermost

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

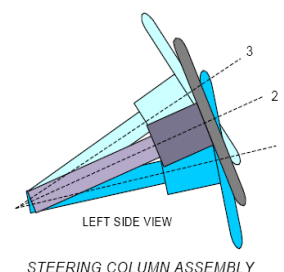
Test Vehicle: 2022 Chevrolet Bolt EV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20220104
 Test Date: 07/13/2022

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the center of its geometric locus it describes when it moves through its full range of motion.

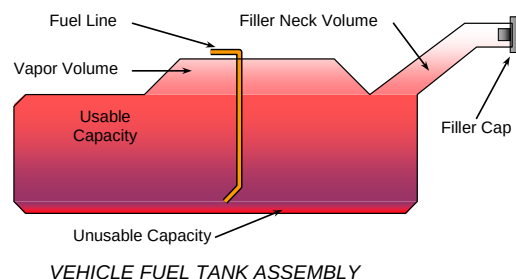
	Degrees	Fore / Aft Position (mm)
Lowermost – Position 1	20.6	
Geometric Center – Position 2	22.7	
Uppermost – Position 3	24.7	
Telescoping Steering Wheel Travel		50
Test Position	22.7	25



FUEL PUMP

Describe the fuel pump type, details about how it operates, and the location of the fuel filler neck.

The vehicle is full electric and has a charging port located in front of the driver door.



FUEL TANK CAPACITY DATA

Description	Liters
Usable Capacity of "Standard Tank" - see Form No. 1	N/A
Usable Capacity of "Optional Tank" - see Form No. 1	N/A
Usable Capacity of "Standard Tank" - see Owner's Manual	N/A
Usable Capacity of "Optional Tank" - see Owner's Manual	N/A
93% of Usable Capacity	N/A
Actual Amount of Solvent Used in Test	Full Electric
1/3 of Usable Capacity	N/A

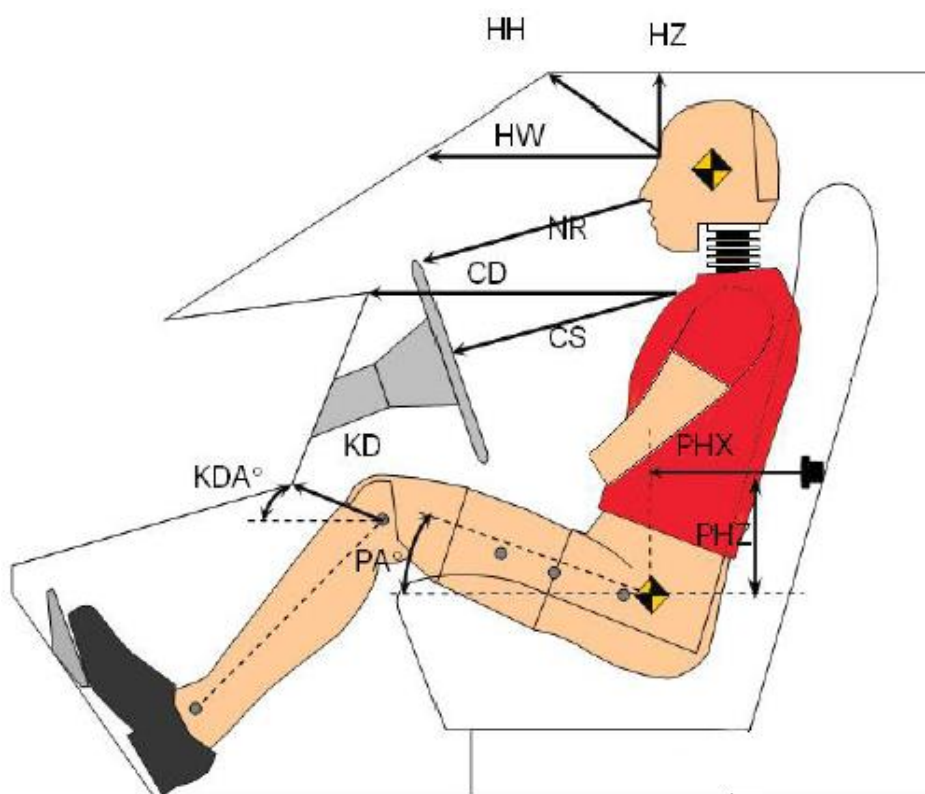
Is the Actual Amount of Solvent Used in the test equal to 93% ±1% of the Usable Capacity stated in Form No. 1?

☒ N/A Yes ☐ No

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2022 Chevrolet Bolt EV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20220104
 Test Date: 07/13/2022



Left Side View

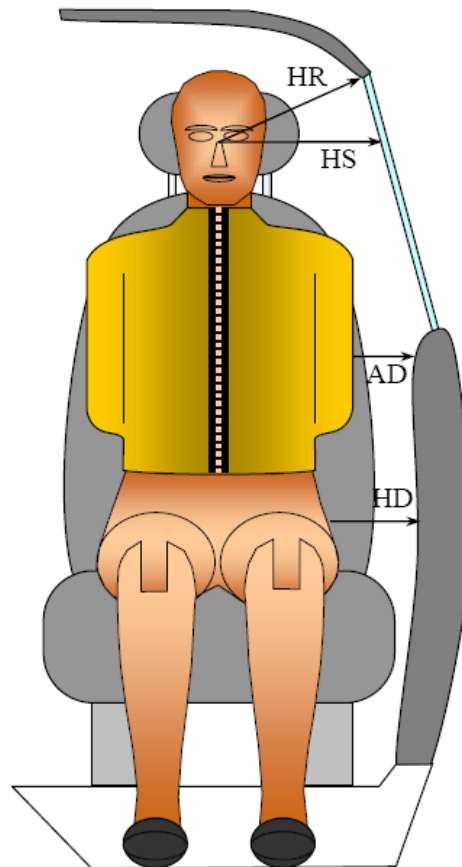
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Description	Driver (Serial No. DG8012)	
		Length (mm)	Angle (°)
HH	Head to Header	317	
HW	Head to Windshield	677	
HZ	Head to Roof Liner	218	
NR	Nose to Rim	231	
CD	Chest to Dash	438	
CS	Chest to Steering Wheel	195	
KD(L) / KDA(L)°	Left Knee to Dash	160	36.2
KD(R) / KDA(R)°	Right Knee to Dash	160	32.1
PAX°	Pelvic Tilt Angle (X-Axis)		20.5
PAY°	Pelvic Tilt Angle (Y-Axis)		0.3
PHX	Hip Point to Striker (X-Axis)	279	
PHZ	Hip Point to Striker (Z-Axis)	48	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2022 Chevrolet Bolt EV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20220104
Test Date: 07/13/2022



FRONT VIEW OF DUMMY

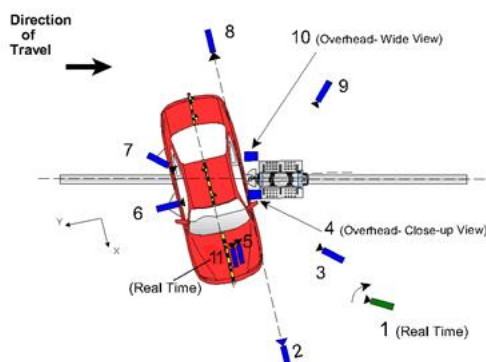
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver - Length (Serial No. DG8012)
HR	Head To Side Header	mm	245
HS	Head to Side Window	mm	364
AD	Arm to Door	mm	165
HD	Hip Point to Door	mm	164

DATA SHEET NO. 5 CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2022 Chevrolet Bolt EV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20220104
Test Date: 07/13/2022



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Real-time (24 - 30 fps) pan view of impact				Zoom	60
2	Front ground level - impact view	7243	0	-1419	28	1000
3	Impact side 45° - forward pole view	5088	-1087	-1324	24	1000
4	Overhead Close-up view of impact	0	0	-9375	28	1000
5	Onboard - dummy front view				25	1000
6	Onboard - dummy side view				12.5	1000
7	Onboard - dummy rear oblique view				12.5	1000
8	Rear ground level - impact view	-7784	0	-1507	28	1000
9	Impact side 45° - rearward pole view	-4005	-4222	-1458	24	1000
10	Overhead wide - view of impact	0	0	-9375	12.5	1000
11	Real-time (24 - 30 fps) - dummy front view				Zoom	60

Notes: Reference - From Point of Impact for X and Y; from Ground for Z
+X = Forward of vehicle, +Y = Right of vehicle, +Z = Down
* All measurements accurate to ± 6 mm. Vehicle is at a 75° angle to the rigid pole.

Comments: All cameras operated as intended.

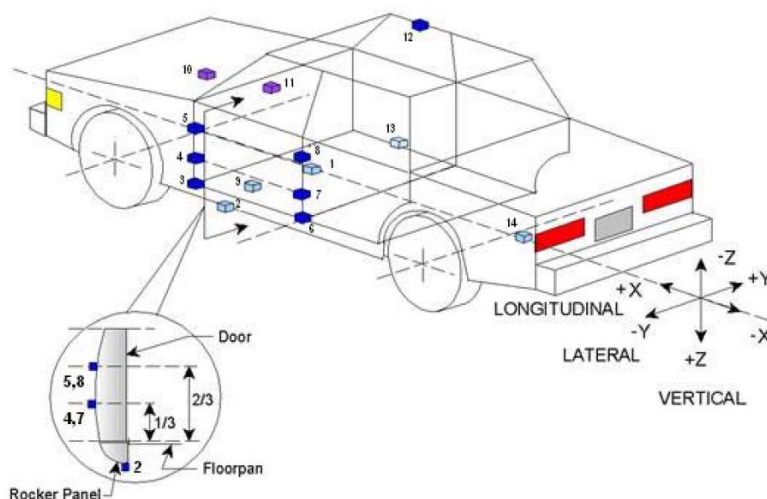
INSTRUMENTATION

Description	Number of Channels
Driver Dummy Channels	22
Vehicle Structure Accelerometers	19
Pole Load Cells	8
Total	49

DATA SHEET NO. 6 **VEHICLE ACCELEROMETER DATA**

Test Vehicle: 2022 Chevrolet Bolt EV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20220104
Test Date: 07/13/2022



TEST VEHICLE ACCELEROMETER LOCATIONS

No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	1603	8	120
2	Left Floor Sill	2533	-645	124
3	A-Pillar Sill	2814	-592	110
4	A-Pillar Low	2961	-568	-174
5	A-Pillar Mid	2700	-664	-553
6	B-Pillar Sill	1767	-636	92
7	B-Pillar Low	1898	-639	56
8	B-Pillar Mid	1828	-644	-545
9	Driver Seat Track	2097	-502	43
10	Engine Top	3535	107	-347
11	Firewall	3158	-98	-290
12	Right Roof	1745	592	-1073
13	Right Floor Sill	2585	644	127
14	Rear Floorpan	896	3	-26

Reference: *X – Rear surface of vehicle (+ forward)*
Y – Vehicle centerline (+ to right)
Z – Ground plane (+ down)

DATA SHEET NO. 7
RIGID POLE LOAD CELL DATA

Test Vehicle: 2022 Chevrolet Bolt EV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20220104
Test Date: 07/13/2022

POLE BARRIER



RIGID POLE LOAD CELL LOCATIONS

ID	Units	Height From Ground
1	mm	200
2	mm	590
3	mm	750
4	mm	1075
5	mm	1260
6	mm	1740
7	mm	1920
8	mm	2300

**DATA SHEET NO. 8
POST-TEST OBSERVATIONS**

Test Vehicle: 2022 Chevrolet Bolt EV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20220104
Test Date: 07/13/2022

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Driver Seat Dummy (SID-IIs)
Face	Curtain Airbag
Top of Head	Curtain Airbag
Left Side of Head	Curtain Airbag
Back of Head	Headrest & Curtain Airbag
Left Shoulder	Torso/Pelvis Airbag
Upper Torso	Seatback
Lower Torso	Seatback
Left Hip	Torso/Pelvis Airbag & Seat Pan
Left Knee	Driver Door

POST-TEST DOOR PERFORMANCE

Description	Struck Side		Non-Struck Side		Rear Hatch/ Other
	Front	Rear	Front	Rear	
Remained Closed and Operational	No	No	Yes	Yes	Yes
Total Separation from Vehicle at Hinges or Latches	No	No	No	No	No
Latch or Hinge Systems Pulled Out of Their Anchorages	No	No	No	No	No
Disengaged from Latched Position	No	No	No	No	No
Latch Separated from Striker	No	No	No	No	No
Jammed Shut	Yes	Yes	No	No	No
If Door Opened at Striker, Width of Opening at Striker (mm)	0	0	0	0	0

POST-TEST SEAT PERFORMANCE

Description	Struck Side		Non-Struck Side	
	Front	Rear	Front	Rear
Seat Movement Along Seat Track	No	No	No	No
Seat Disengagement from Floor Pan	No	No	No	No
Seat Back Movement from Initial Position	No	No	No	No
Seat Back Collapse	No	No	No	No

DATA SHEET NO. 8 ... (CONTINUED)
POST-TEST OBSERVATIONS

Test Vehicle: 2022 Chevrolet Bolt EV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20220104
Test Date: 07/13/2022

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	A & B-Pillar buckled
Sill Separation	None
Windshield Damage	Cracked throughout, originating from upper left corner
Side Window Damage	Driver window shattered
Other Notable Effects	None

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Driver		Struck Side Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	Yes	No		
Side Airbag 1 - Curtain	Yes	Yes	Yes	Yes
Side Airbag 2 – Torso/Pelvis	Yes	Yes	No	N/A
Side Airbag 3 – Torso	No	N/A	Yes	Yes
Seat Belt Pretensioner	Yes	Yes	No	N/A
Seat Belt Load Limiter	Yes	Yes	No	N/A
Other				

VEHICLE SPEED, VEHICLE ANGLE AT IMPACT AND IMPACT POINT LOCATION DATA

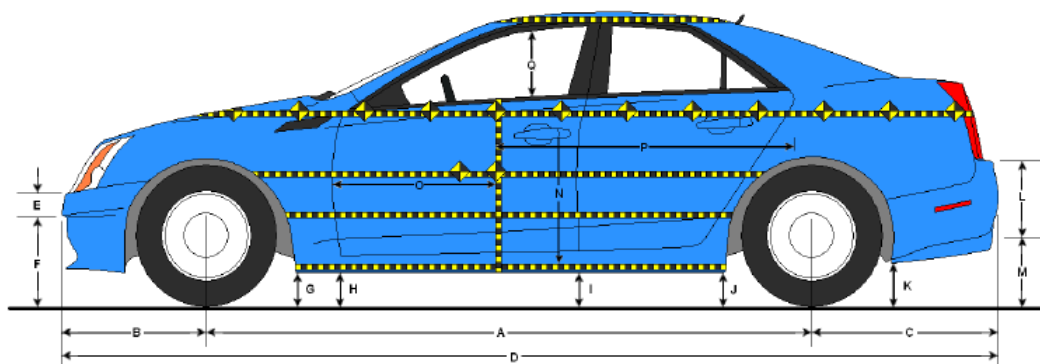
Measured Parameter	Units	Tolerance	Value
Vertical Impact Ref Line - Aft of Front Axle, Intended Impact Pt	mm		1050
Actual Impact Point - Aft of Front Axle	mm		1047
Horizontal Offset (+ forward / - rearward)	mm	+/- 38 *	+3
Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion	deg	75 +/- 3	75
Trap No. 1 Velocity - Primary	kph	31.4 to 33.0	32.20
Trap No. 2 Velocity - Redundant	kph	31.4 to 33.0	32.20

* Of Intended Impact Point

DATA SHEET NO. 9 **TEST VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2022 Chevrolet Bolt EV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20220104
 Test Date: 07/13/2022



LEFT SIDE VIEW

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

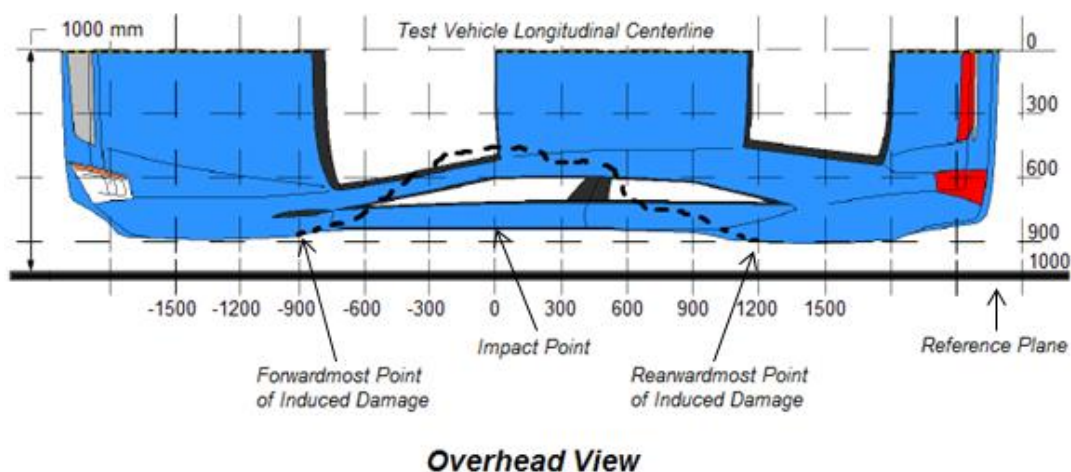
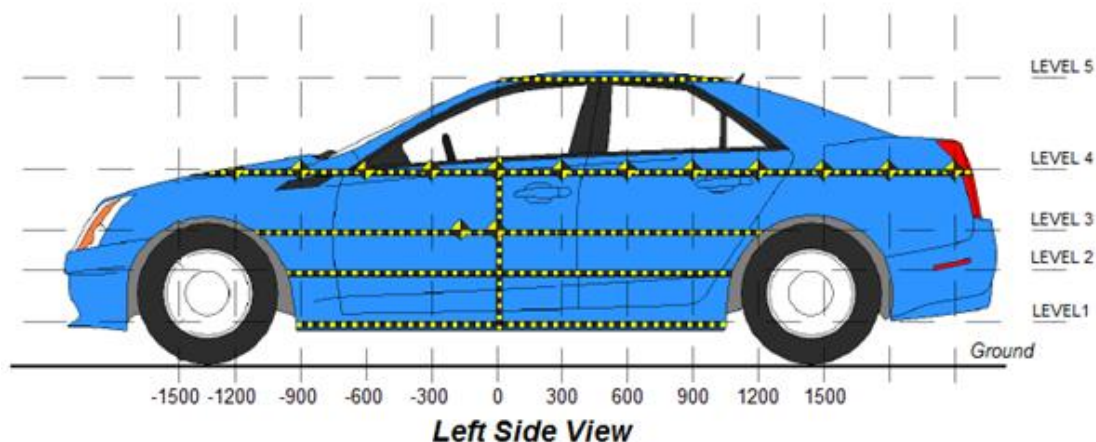
Code	Description	Pre-Test	Post-Test	Difference
A	Vehicle Wheelbase	2601	2599	-2
B	Front Axle to FSOV	822	825	3
C	Rear Axle to RSOV	714	703	-11
D	Total Length at Centerline	4137	4127	-10
E	Front Bumper Thickness	190	190	0
F	Front Bumper Bottom to Ground	419	418	-1
G	Sill Height at Front Wheel Well	163	166	3
H	Sill Height at Front Door Leading Edge	165	172	7
I	Sill Height at B-Pillar	183	154	-29
J1	Sill Height at Rear Wheel Well	184	189	5
J2	Pinch Weld Height at Rear Wheel Well	168	172	4
K	Sill Height Aft of Rear Wheel Well	243	249	6
L	Rear Bumper Thickness	150	150	0
M	Rear Bumper Bottom to Ground	468	465	-3
N	Sill Height to Bottom of Front Window Sill	845	845	0
O	Front Door Leading Edge to Impact CL	621	585	-36
P	Rear Door Trailing Edge to Impact CL	1476	1436	-40
Q	Front Window Opening	439	439	0
R	Right Side Length	3995	3995	0
S	Left Side Length	3994	3982	-12
T	Vehicle Width at B-Pillars	1752	1700	-52
U	Front Wheel Track Width	1465	1509	44
V	Rear Wheel Track Width	1505	1509	4

* All measurements in mm with tolerance of ± 3 mm

DATA SHEET NO. 10 **TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2022 Chevrolet Bolt EV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20220104
 Test Date: 07/13/2022



MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	218	169	0
2	Occupant Hip Point	mm	651	246	0
3	Mid - Door	mm	706	251	0
4	Window Sill	mm	926	215	0
5	Window Top	mm	1504	81	0

NOTE: The above measurements should be taken along the vertical impact reference line. Vehicle measurements forward of the vertical impact reference line are negative.

DATA SHEET NO. 10 ... (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2022 Chevrolet Bolt EV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20220104
 Test Date: 07/13/2022

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

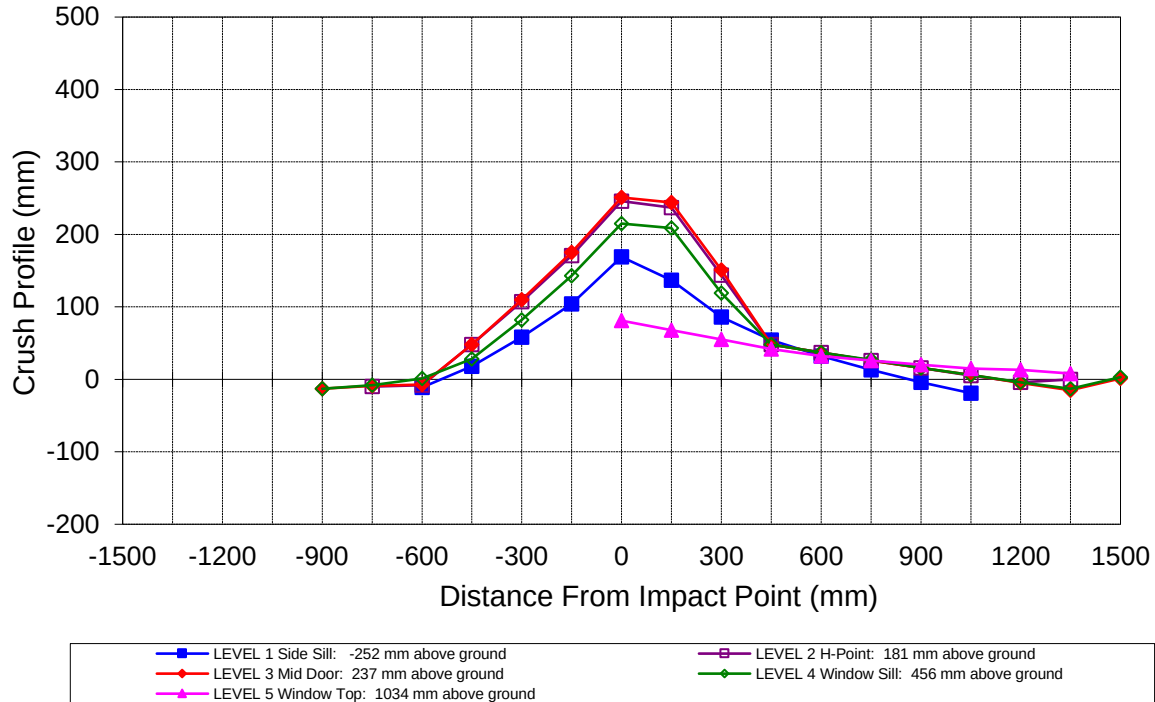
	Pre-Test					Post-Test					Crush				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1500															
-1350															
-1200															
-1050															
-900			863	789				876	802				-13	-13	
-750		866	857	795			876	866	803			-10	-9	-8	
-600	830	855	850	792		841	863	857	791		-11	-8	-7	1	
-450	818	855	854	794		800	807	806	766		18	48	48	28	
-300	811	859	859	801		753	752	749	719		58	107	110	82	
-150	811	863	864	808		707	692	689	665		104	171	175	143	
0	811	867	869	817	585	642	621	618	602	504	169	246	251	215	81
150	810	870	873	828	593	673	633	629	619	525	137	237	244	209	68
300	810	872	875	836	594	724	728	724	717	539	86	144	151	119	55
450	810	872	876	850	594	756	824	828	802	552	54	48	48	48	42
600	810	871	875	852	592	778	834	838	815	560	32	37	37	37	32
750	809	870	873	849	589	796	844	847	822	563	13	26	26	27	26
900	810	869	872	846	584	814	853	856	830	564	-4	16	16	16	20
1050	812	869	871	842	574	831	864	865	836	559	-19	5	6	6	15
1200		872	873	837	562		876	878	841	549		-4	-5	-4	13
1350		871	875	830	535		871	890	843	527		0	-15	-13	8
1500			871	820				870	817				1	3	

NOTE: Pre-test measurements are taken when the vehicle is in the “As Tested” weight condition. Vehicle measurements forward of the vertical impact reference line are negative. The crush profile grid is established prior to the test based on an estimated impact point. The final distance from impact is determined after the final dummy positioning and the pole is aligned with the center of gravity of the dummy’s head.

DATA SHEET NO. 10 ... (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2022 Chevrolet Bolt EV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20220104
 Test Date: 07/13/2022



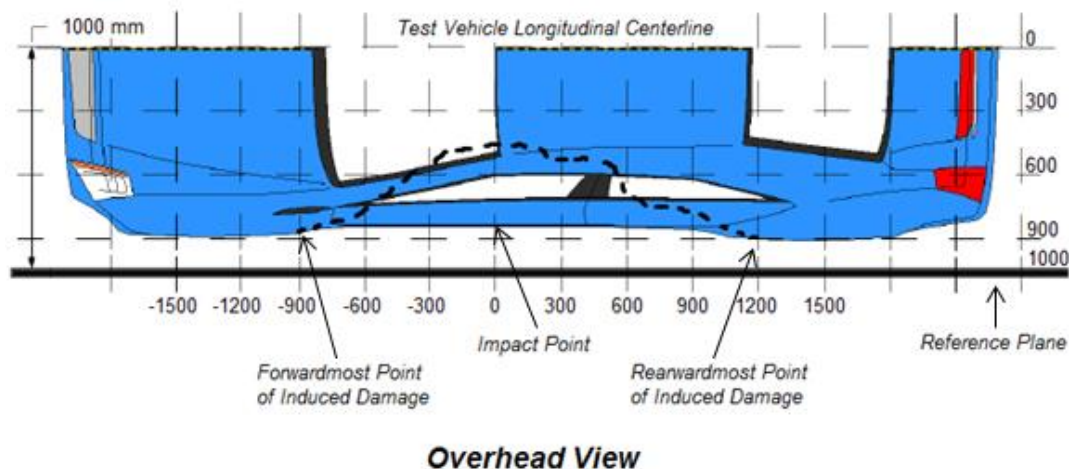
Vehicle Exterior Crush Measurements - Visual Representation

DATA SHEET NO. 11 **VEHICLE DAMAGE PROFILE DISTANCES**

Test Vehicle: 2022 Chevrolet Bolt EV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20220104
 Test Date: 07/13/2022

For guidance regarding damage profile distance measurements, please refer to the latest version of the *NHTSA Test Reference Guide, Volume 1: Vehicle Tests*.



VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	-900	3	124	137	-13
2	-420	3	205	145	60
3	60	3	378	129	249
4	540	3	166	125	41
5	1020	3	137	129	8
6	1500	3	130	129	1

DATA SHEET NO. 12
FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: <u>2022 Chevrolet Bolt EV</u>	NHTSA No.: <u>M20220104</u>
Test Program: <u>NCAP Side MDB Impact Test</u>	Test Date: <u>07/13/2022</u>
Test Time: <u>9:36 AM</u>	Temperature: <u>21° C</u>

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

FMVSS NO. 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	70	300	370
90° to 180°	72	300	372
180° to 270°	61	300	361
270° to 360°	68	300	368

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE

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

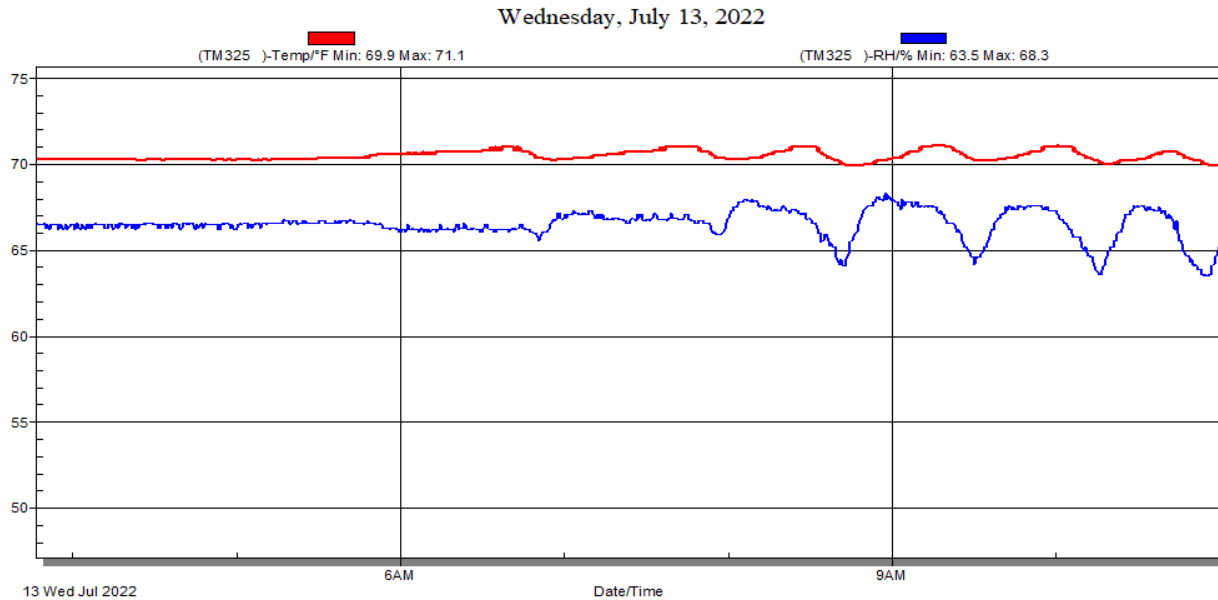
ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 13
DUMMY / VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle: 2022 Chevrolet Bolt EV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20220104
Test Date: 07/13/2022



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

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

Test Vehicle: 2022 Chevrolet Bolt EV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20220104
 Test Date: 07/13/2022

ELECTRIC VEHICLE PROPULSION SYSTEM

Measured Parameter	Value
Type of Electric Vehicle (Electric/Gas-Electric Hybrid/Fuel Cell-Electric Hybrid)	Electric
Propulsion Battery Type	Lithium Ion
Nominal Voltage (Volts)	348
Is this Vehicle equipped with an Automatic Propulsion Battery Disconnect?	Yes
Physical Location of Automatic Propulsion Battery Disconnect, if applicable	Beneath 2 nd Row Passenger Seat
Auxiliary Battery Type	12V AGM

PROPULSION BATTERY SYSTEM DATA (COTR SUPPLIED)

Measured Parameter	Value
Electrolyte Fluid Type	1 molar concentration of lithium salt, LiPF ₆ , EC/EMC (vol3:7)
Electrolyte Fluid Specific Gravity	1.2 g/ml
Electrolyte Fluid Kinematic Viscosity (centistokes)	4.7
Electrolyte Fluid Color	Transparent
Propulsion Battery Coolant Type, Color and Specific Gravity (if applicable)	50/50 Deionized water/ Dexcool mix, Clear, pale orange
Location of Battery Modules (Inside or Outside of Passenger Compartment?)	Outside

PROPULSION BATTERY STATE OF CHARGE

Measured Parameter	Units	Value
<i>For all battery types:</i> Voltage Range corresponding to useable energy of the battery:		
Minimum State of Charge	V	348
Maximum State of Charge	V	400
95% of Maximum	V	380
Test Voltage *	V	397.1
<i>For batteries that are rechargeable ONLY by an energy source on the vehicle:</i> Voltage range corresponding to useable energy of the battery :		
Minimum State of Charge	V	
Maximum State of Charge	V	
95% of Maximum	V	
Test Voltage *	V	

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

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

Test Vehicle: 2022 Chevrolet Bolt EV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20220104
Test Date: 07/13/2022

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

Measured Parameter	Value
Details of Vehicle Chassis Ground Points & Locations	Was located in the trunk of the vehicle connected to vehicle body.
Details of Propulsion Battery Components	Measurements are made at the cabin heater control module connector in the front compartment area. GM has provided an instrumentation wire harness to connect into this cable.

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

Test Vehicle: 2022 Chevrolet Bolt EV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20220104
 Test Date: 07/13/2022

VOLTMETER INFORMATION

Measured Parameter	Units	Value
Make & Model		Fluke 1587
Serial No.		581
Internal Impedance Value	MΩ	10
Resolution	V	0.001
Last Calibration Date		4/28/2022

NOTES:

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

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

Measured Parameter	Symbol	Units	Value
Normal operating voltage range specified by the manufacturer	V_b	V	400
Propulsion Battery Voltage : (ready to drive position)	V_b	V	397.1
Propulsion Battery to Vehicle Chassis	V_1	V	191.0
Propulsion Battery to Vehicle Chassis	V_2	V	203.0
Propulsion Battery to Vehicle Chassis Across Known Resistor	R_o	Ω	206,500
Propulsion Battery to Vehicle Chassis with R_o installed	V_1'	V	38.0
Propulsion Battery to Vehicle Chassis with R_o installed	V_2'	V	40.3
$R_{i1} = R_o * (1 + V_2/V_1) * [(V_1 - V_1')/V_1']$	R_{i1}	Ω	1,715,105
$R_{i2} = R_o * (1 + V_1/V_2) * [(V_2 - V_2')/V_2']$	R_{i2}	Ω	1,618,090
Lesser value of R_{i1} and R_{i2}	R_i	Ω	1,618,090
Electrical Isolation Value (Minimum E.I. Value is 500 Ω/V)	R_i/V_b	Ω/V	4,075

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

NOTES:

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

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

Test Vehicle: 2022 Chevrolet Bolt EV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20220104
 Test Date: 07/13/2022

VOLTMETER INFORMATION

Measured Parameter	Units	Value
Make & Model		Fluke 1587
Serial No.		581
Internal Impedance Value	MΩ	10
Nominal Propulsion Battery Voltage (V _b)	V	4.830

NOTES:

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

ELECTRICAL ISOLATION MEASUREMENTS & IMPACT CALCULATIONS

Parameter	Value	Units		Value		Value	
V ₁ =	2.400	V	Time:	3	Minutes	23	Seconds
V ₂ =	2.500	V	Time:	3	Minutes	27	Seconds
R ₀ =	206,500	Ω	Time:		Minutes		Seconds
V ₁ ' =	0.300	V	Time:	3	Minutes	31	Seconds
V ₂ ' =	0.400	V	Time:	3	Minutes	35	Seconds
R _{i1} =	2,951,229	Ω	Time:	3	Minutes	31	Seconds
R _{i2} =	2,124,885	Ω	Time:	3	Minutes	35	Seconds
R _i =	2,124,885	Ω	Time:	3	Minutes	35	Seconds
R _i /V _b =	439,935	Ω/V	Time:	3	Minutes	35	Seconds

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

NOTES:

- $R_{i1} = R_0 * (1 + V_2/V_1) * [(V_1 - V_1')/V_1]$, $R_{i2} = R_0 * (1 + V_1/V_2) * [(V_2 - V_2')/V_2]$, R_i = Lesser value of R_{i1} and R_{i2}
- If measured voltage is zero and results in a division by zero, record "Zero Volts." This "zero voltage" condition is considered as being compliant
- Minimum Electrical Isolation Value is 500 Ω/V

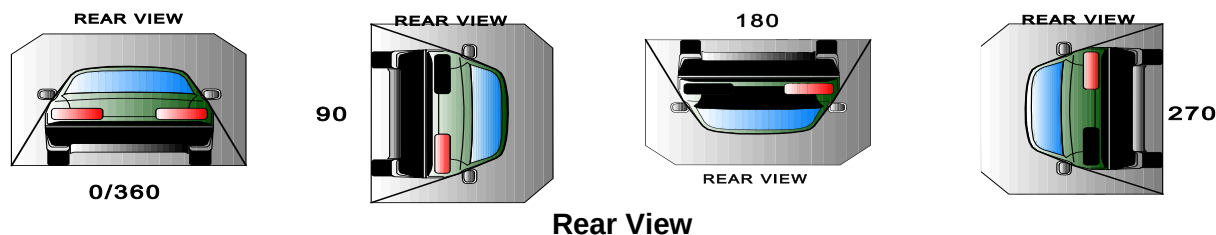
PROPULSION BATTERY SYSTEM COMPONENTS

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

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

Test Vehicle: 2022 Chevrolet Bolt EV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20220104
 Test Date: 07/13/2022



DETERMINATION OF PROPULSION BATTERY ELECTROLYTE COLLECTION TIME PERIOD

Rollover Stage	Rotation Time (spec. 1 -3 min)		FMVSS 301 Hold Time	Total Time		Next Whole Minute Interval
	Minutes	Seconds		Minutes	Seconds	
0° to 90°	1	10	5	6	10	7
90° to 180°	1	12	5	6	12	7
180° to 270°	1	1	5	6	1	7
270° to 360°	1	8	5	6	8	7

ACTUAL TEST VEHICLE PROPULSION BATTERY ELECTROLYTE SPILLAGE

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

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

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

VOLTMETER INFORMATION

Measured Parameter	Units	Value
Make & Model		Fluke 1587
Serial No.		581
Internal Impedance Value	MΩ	10
Nominal Propulsion Battery Voltage (V _b)	V	4.699

NOTES:

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

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

Test Vehicle: 2022 Chevrolet Bolt EV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20220104
 Test Date: 07/13/2022

ELECTRICAL ISOLATION MEASUREMENTS & CALCULATIONS

Parameter	Rollover Stage	Value	Units		Minutes	Seconds
$V_1 =$	90°	0.206	V	Time:	1	16
	180°	0.213	V		9	50
	270°	0.249	V		15	55
	360°	1.311	V		22	26
$V_2 =$	90°	0.472	V	Time:	1	22
	180°	0.262	V		9	56
	270°	0.414	V		15	59
	360°	2.400	V		22	29
$V_1' =$	90°	0.006	V	Time:	1	28
	180°	0.005	V		10	1
	270°	0.414	V		16	6
	360°	0.342	V		22	35
$V_2' =$	90°	0.006	V	Time:	1	33
	180°	0.005	V		10	7
	270°	0.005	V		16	11
	360°	0.355	V		22	41
$R_{i1} =$	90°	22,654,854	Ω	Time:	1	28
	180°	19,156,995	Ω		10	1
	270°	26,832,063	Ω		16	6
	360°	1,656,174	Ω		22	35
$R_{i2} =$	90°	23,037,875	Ω	Time:	1	33
	180°	19,243,120	Ω		10	7
	270°	27,051,201	Ω		16	11
	360°	1,839,351	Ω		22	41
$R_i =$	90°	22,654,854	Ω	Time:	1	28
	180°	19,156,995	Ω		10	1
	270°	26,832,063	Ω		16	6
	360°	1,656,174	Ω		22	35
$R_i/V_b =$	90°	4,821,208	Ω/V	Time:	10	1
	180°	4,082,906	Ω/V		10	7
	270°	5,718,683	Ω/V		16	11
	360°	352,452	Ω/V		1	33

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

☒ Yes

☐ No (Fail)

APPENDIX A
PHOTOGRAPHS

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Figure A-1: As Delivered Right Front $\frac{3}{4}$ View of Test Vehicle



Figure A-2: As Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle



Figure A-3: Pre-Test Frontal View of Test Vehicle

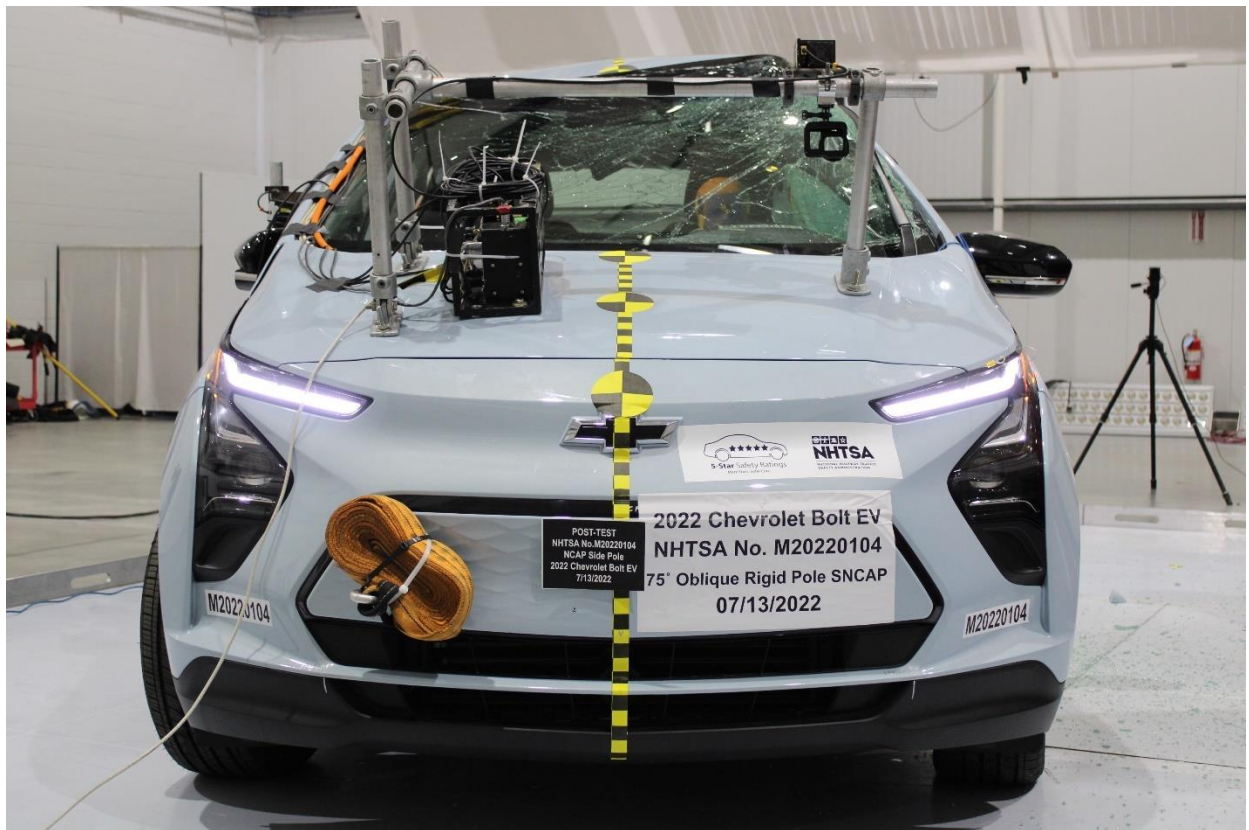


Figure A-4: Post-Test Frontal View of Test Vehicle



Figure A-5: Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle



Figure A-6: Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle

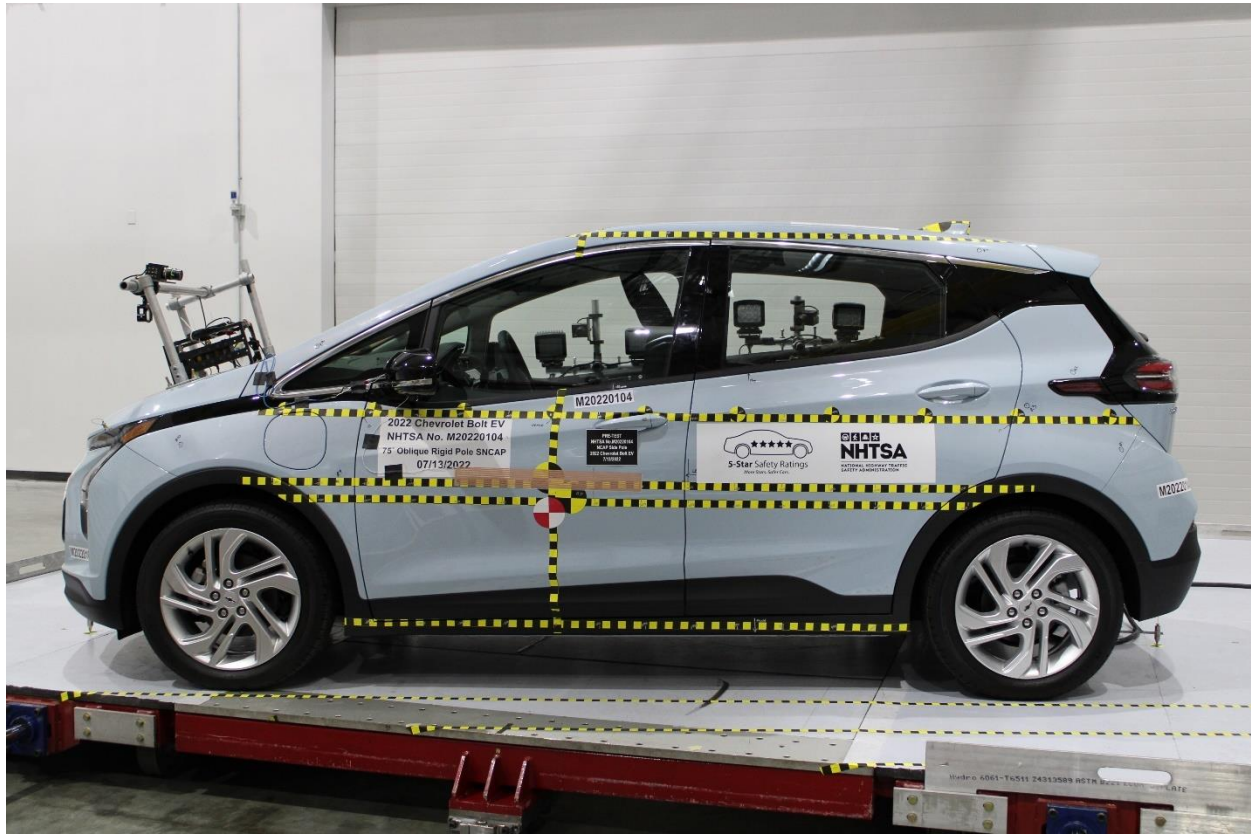


Figure A-7: Pre-Test Left Side View of Test Vehicle



Figure A-8: Post-Test Left Side View of Test Vehicle



Figure A-9: Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



Figure A-10: Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle

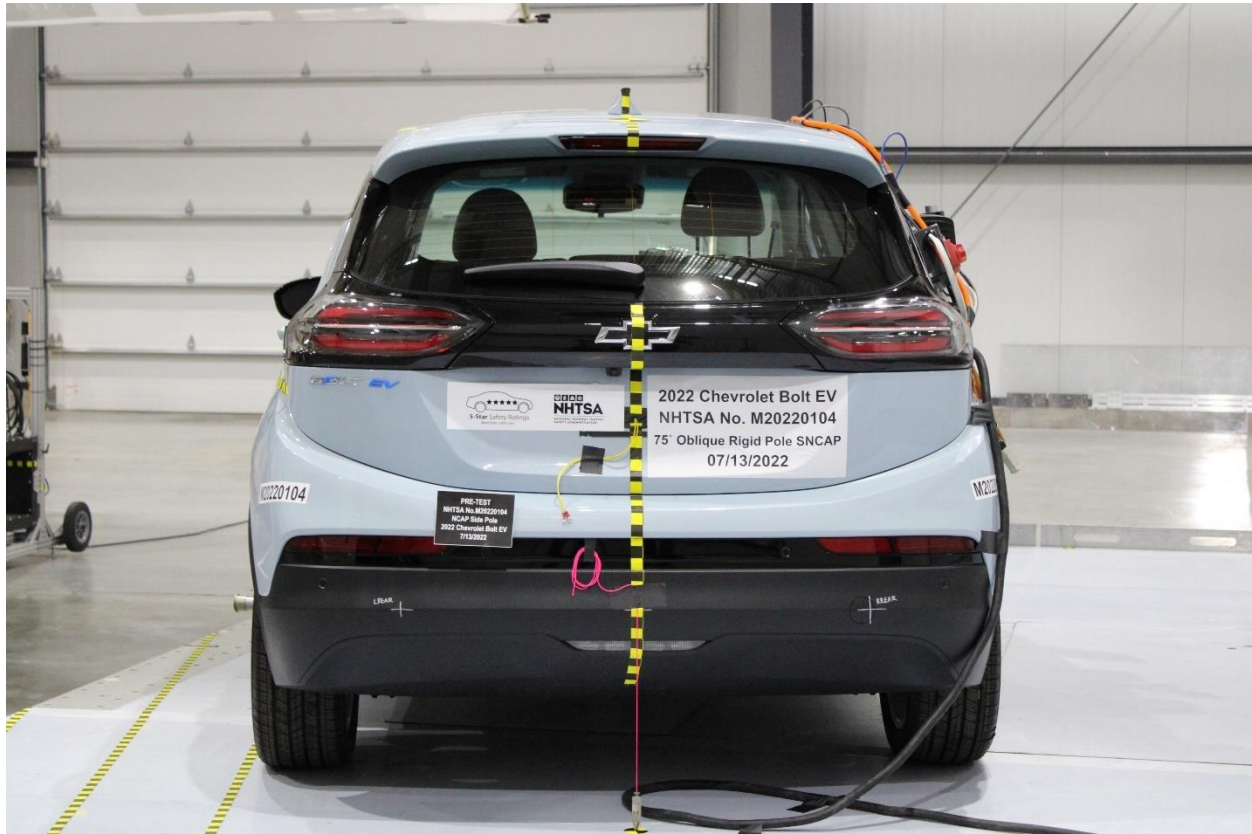


Figure A-11: Pre-Test Rear View of Test Vehicle



Figure A-12: Post-Test Rear View of Test Vehicle



Figure A-13: Pre-Test Right Side View of Test Vehicle



Figure A-14: Post-Test Right Side View of Test Vehicle

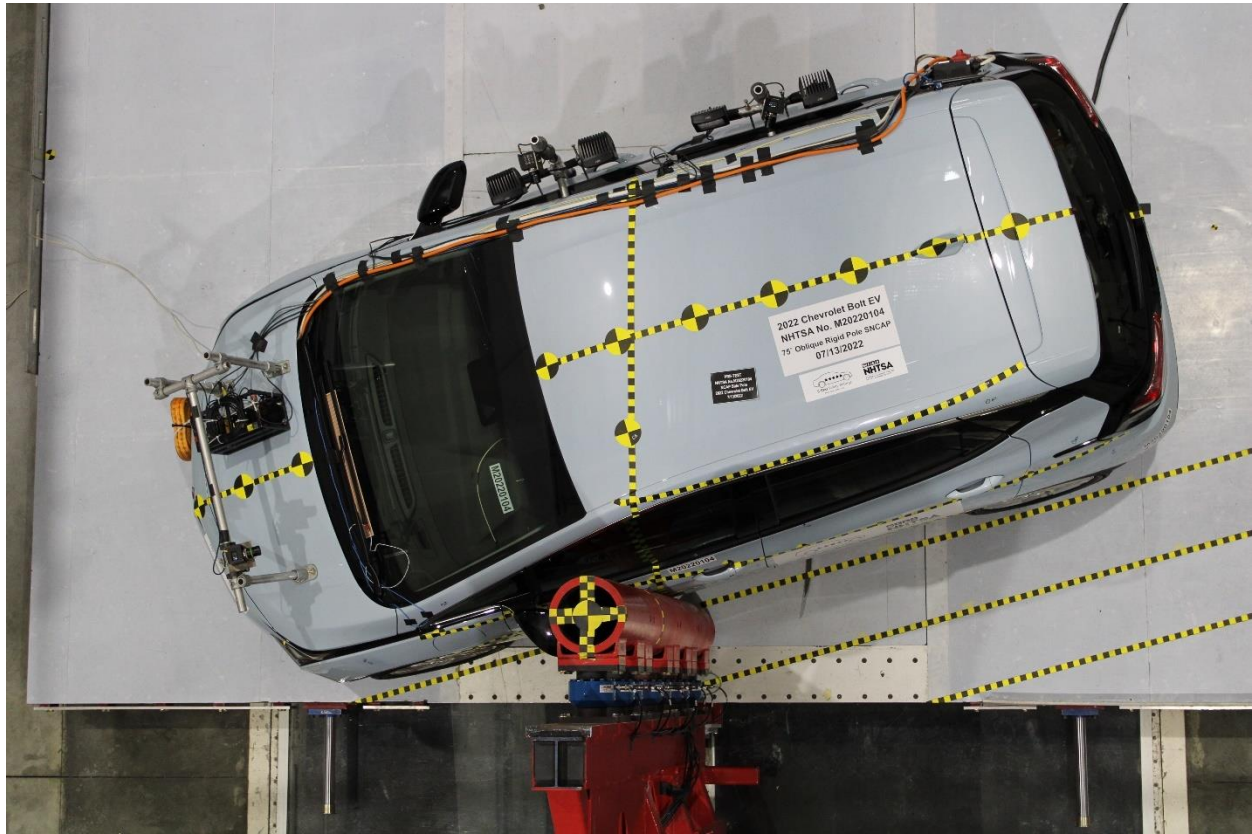


Figure A-15: Pre-Test Overhead View of Test Area

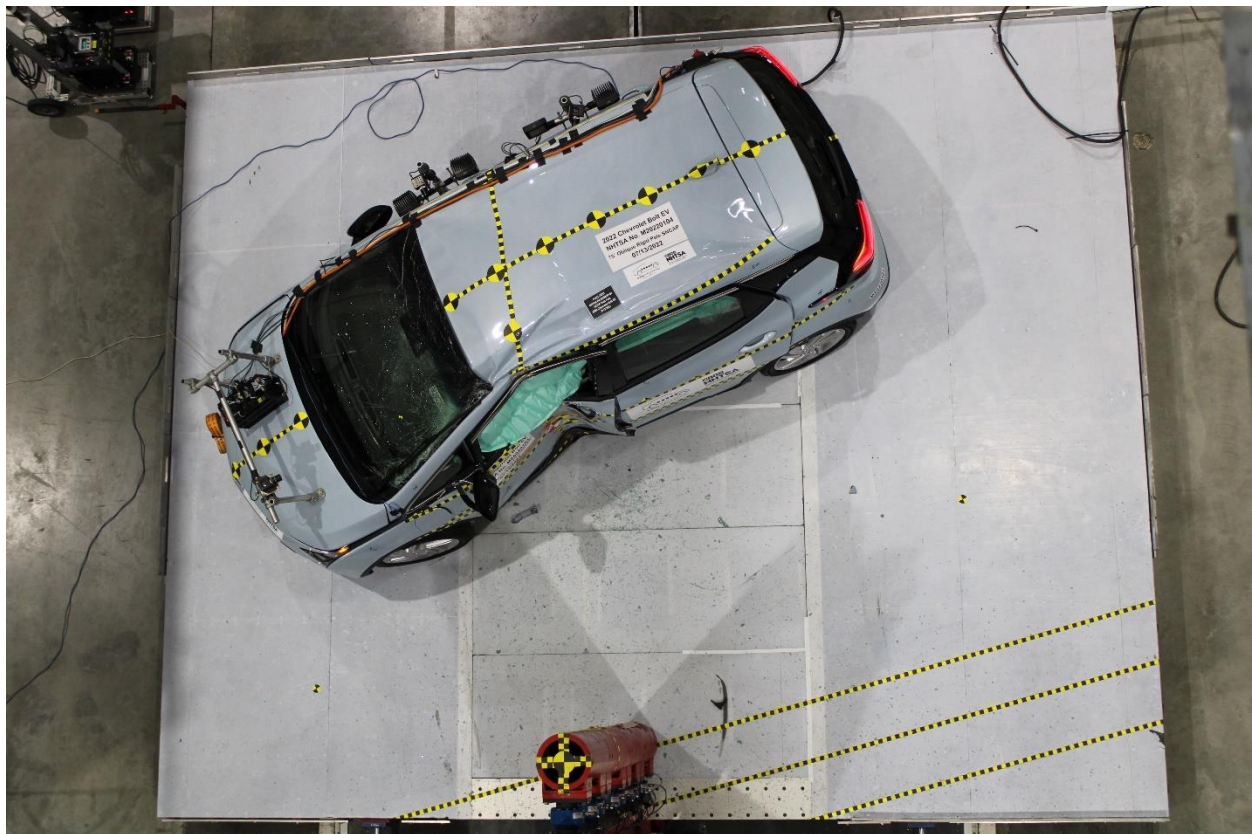


Figure A-16: Post-Test Overhead View of Test Area



Figure A-17: Pre-Test Left Side View of Pole Positioned Against Side of Vehicle



Figure A-18: Pre-Test Right Side View of Pole Positioned Against Side of Vehicle

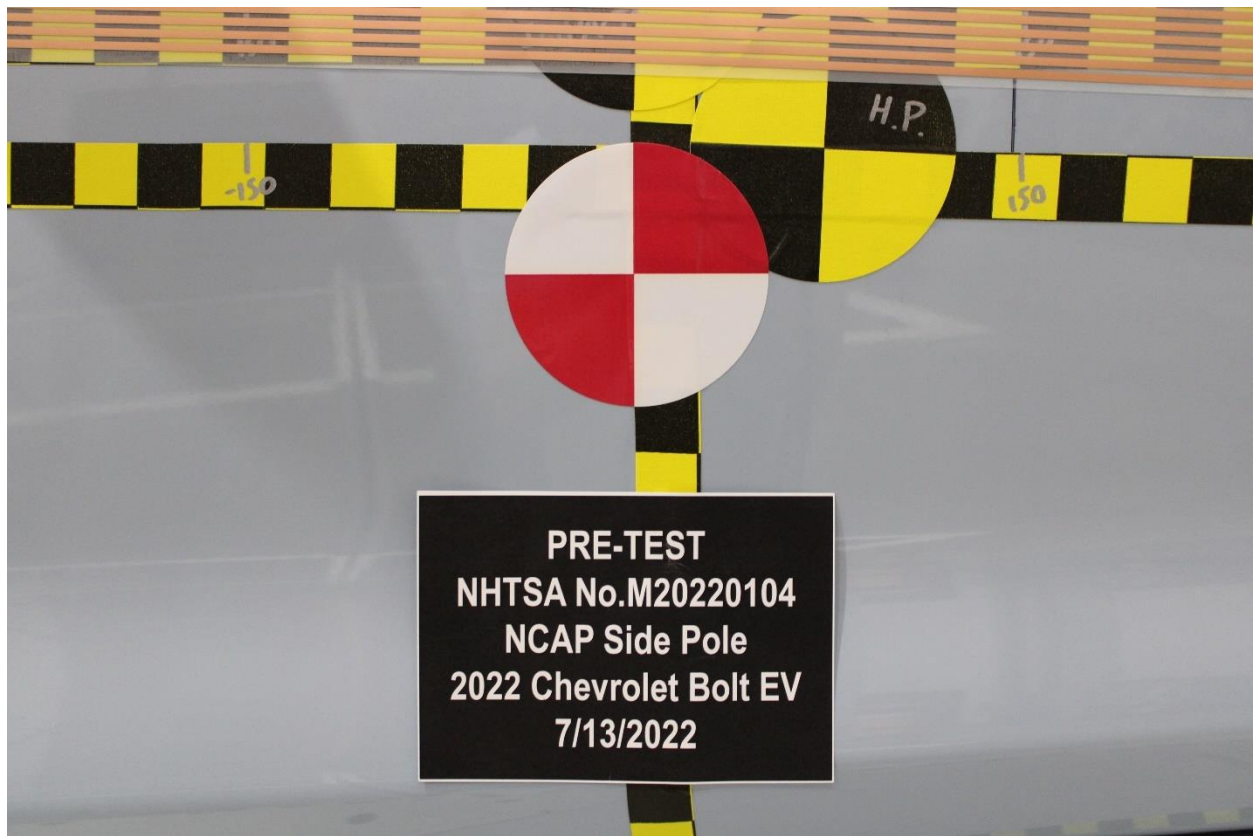


Figure A-19: Pre-Test Close-Up View of Impact Point Target



Figure A-20: Post-Test Close-Up View of Impact Point Target Showing Impact Location



Figure A-21: Pre-Test Front Close-Up View of Dummy Head and Chest



Figure A-22: Post-Test Front Close-Up View of Dummy



Figure A-23: Pre-Test Left Side View of Dummy Showing Belt and Chalking



Figure A-24: Pre-Test Left Side View of Dummy Shoulder and Door Top View



Figure A-25: Post-Test Left Side View of Dummy Shoulder and Door Top View



Figure A-26: Pre-Test Frontal View of Seat Back Prior to Dummy Positioning



Figure A-27: Pre-Test Frontal Close-Up View of Dummy Head / Shoulders in Relation to Head Restraint



Figure A-28: Pre-Test Frontal View of Seat Pan Prior to Dummy Positioning

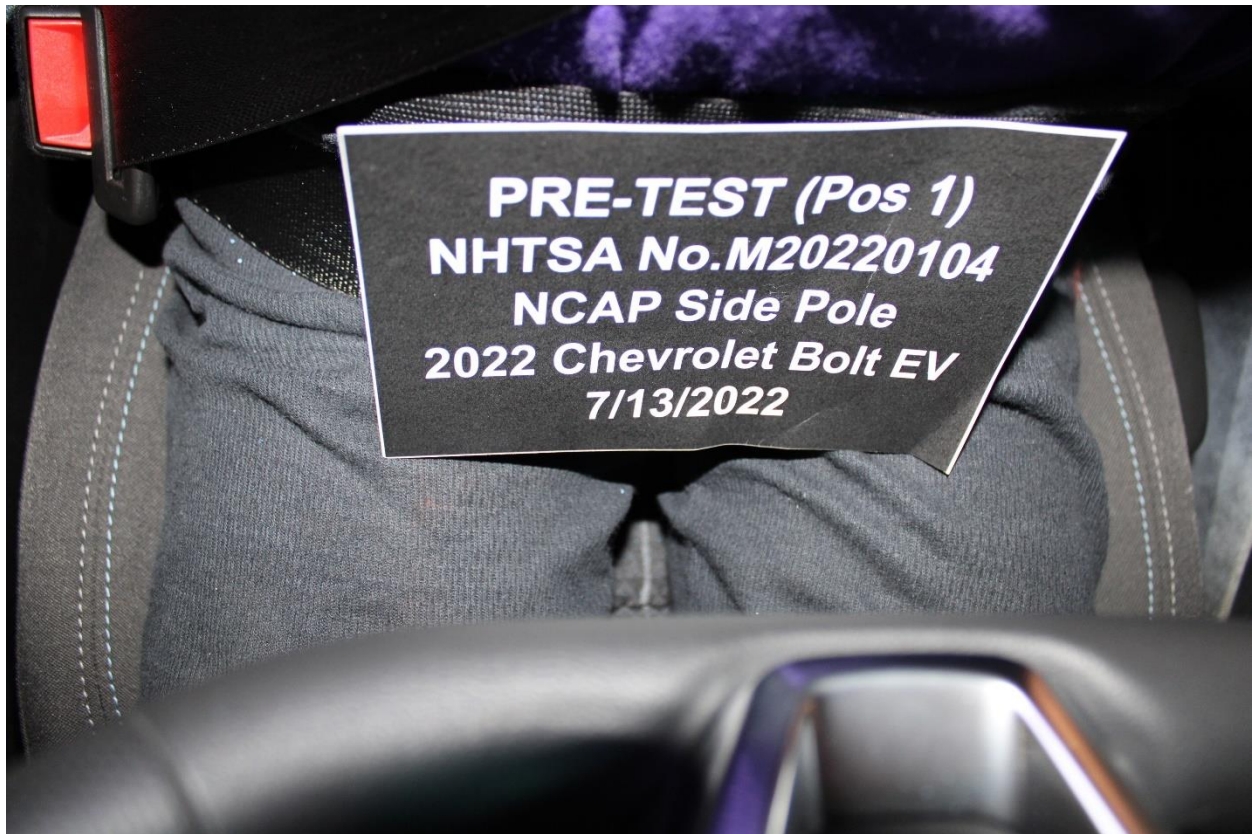


Figure A-29: Pre-Test Overhead View of Dummy Thighs on Seat Pan



Figure A-30: Pre-Test Left Side View of Dummy's Neck Showing Position of Adjustable Neck Bracket



Figure A-31: Pre-Test Left Side View of Dummy's Head Showing Dummy's Head is Level



Figure A-32: Pre-Test Placement of Dummy's Feet



Figure A-33: Pre-Test View of Belt Anchorage for Dummy



Figure A-34: Pre-Test Left Side View of Steering Wheel



Figure A-35: Pre-Test View of Disengaged Parking Brake



Figure A-36: Pre-Test View of Parking Brake

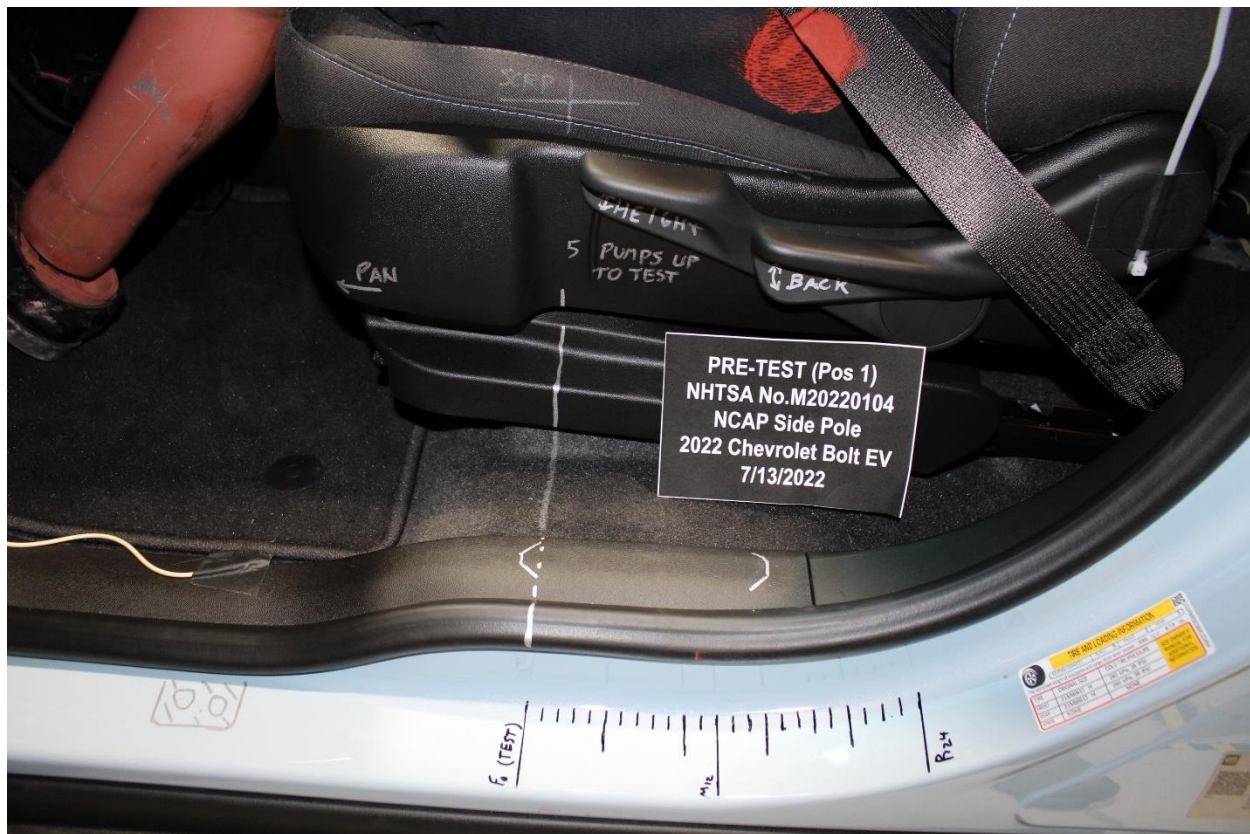


Figure A-37: Pre-Test Close-Up Left Side View of Driver Seat Track

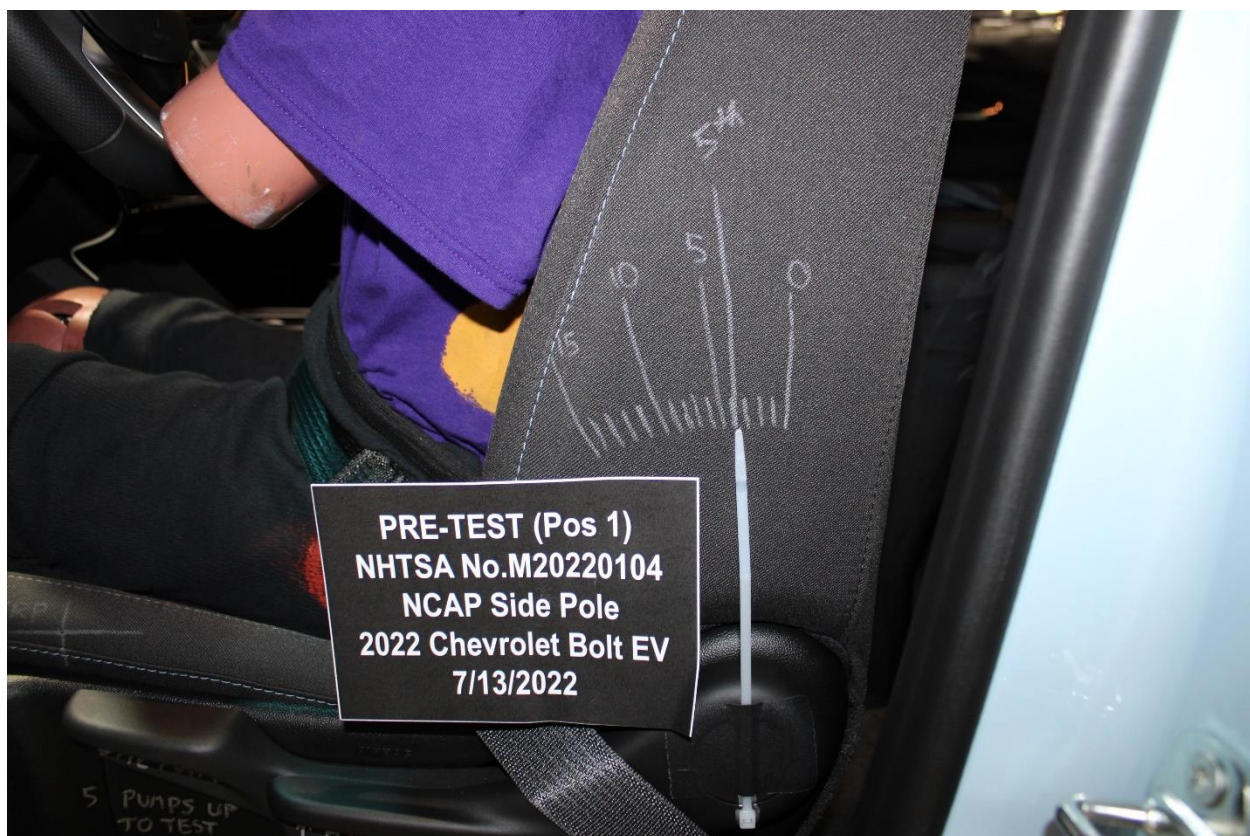


Figure A-38: Pre-Test Close-Up Left Side View of Driver Seat Back

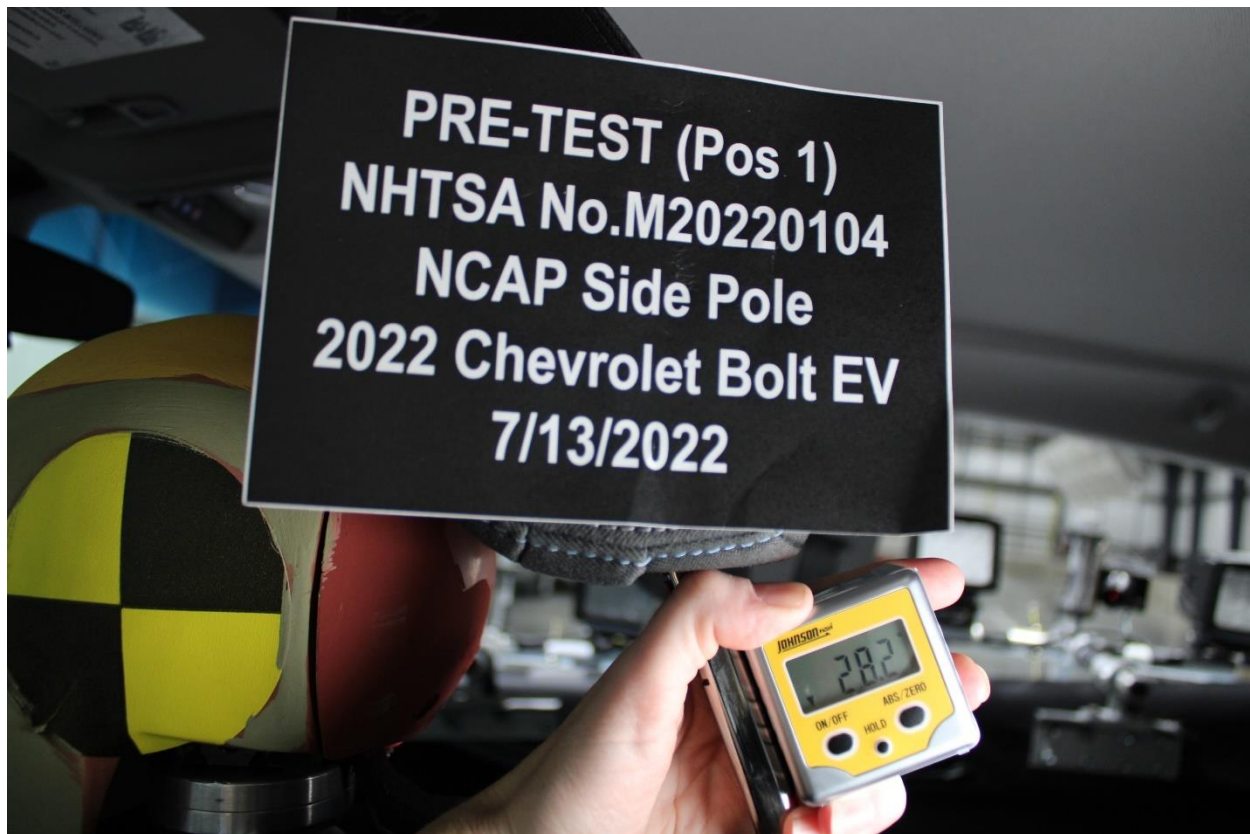


Figure A-39: Pre-Test Close-Up View of Driver Seat Back or Head Restraint



Figure A-40: Pre-Test Dummy and Door Clearance View



Figure A-41: Post-Test Dummy and Door Clearance View

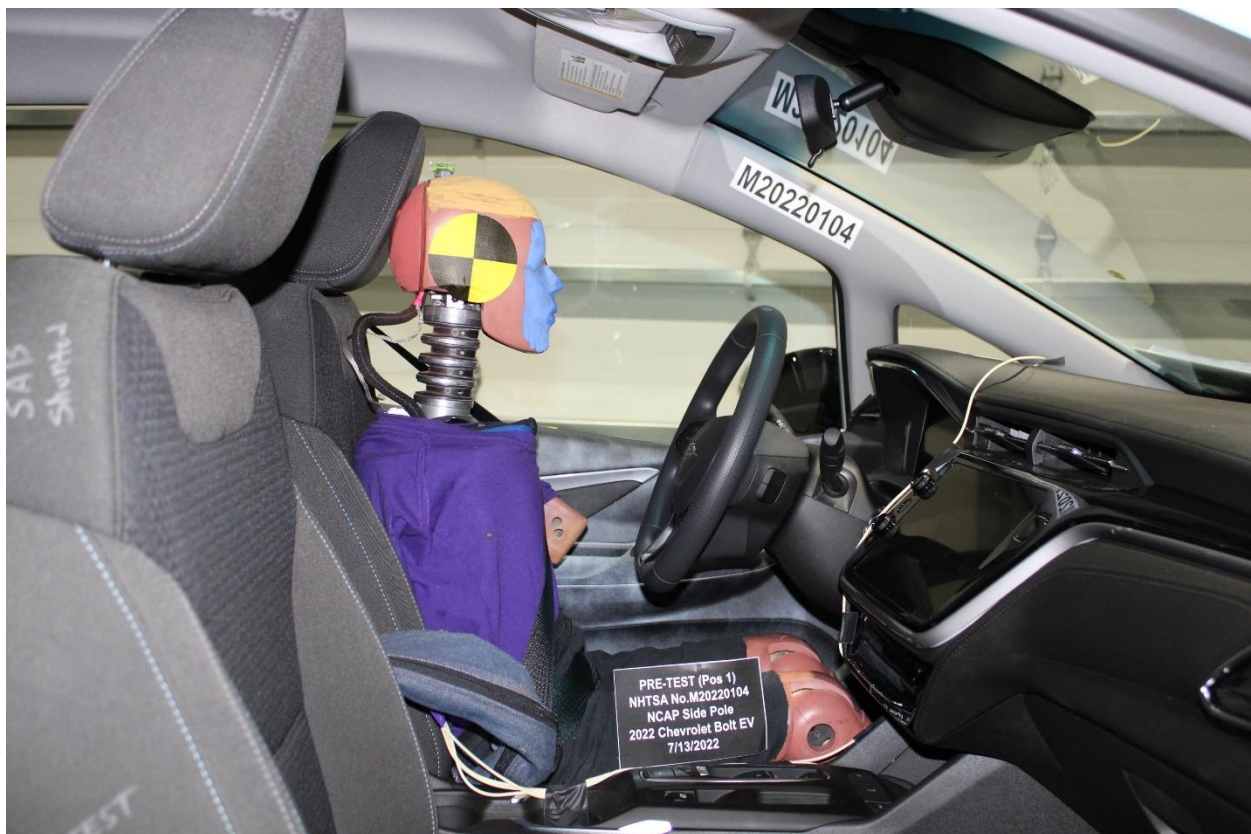


Figure A-42: Pre-Test Right Side View of Dummy and Front Seat of Occupant Compartment



Figure A-43: Post-Test Right Side View of Dummy and Front Seat of Occupant Compartment



Figure A-44: Pre-Test Inner Door Panel View



Figure A-45: Post-Test Inner Door Panel View Showing Dummy Contact Location



Figure A-46: Post-Test Dummy Close-Up Head Contact with Vehicle Interior View



Figure A-47: Post-Test Dummy Close-Up Head Contact with Side Airbag View



Figure A-48: Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View

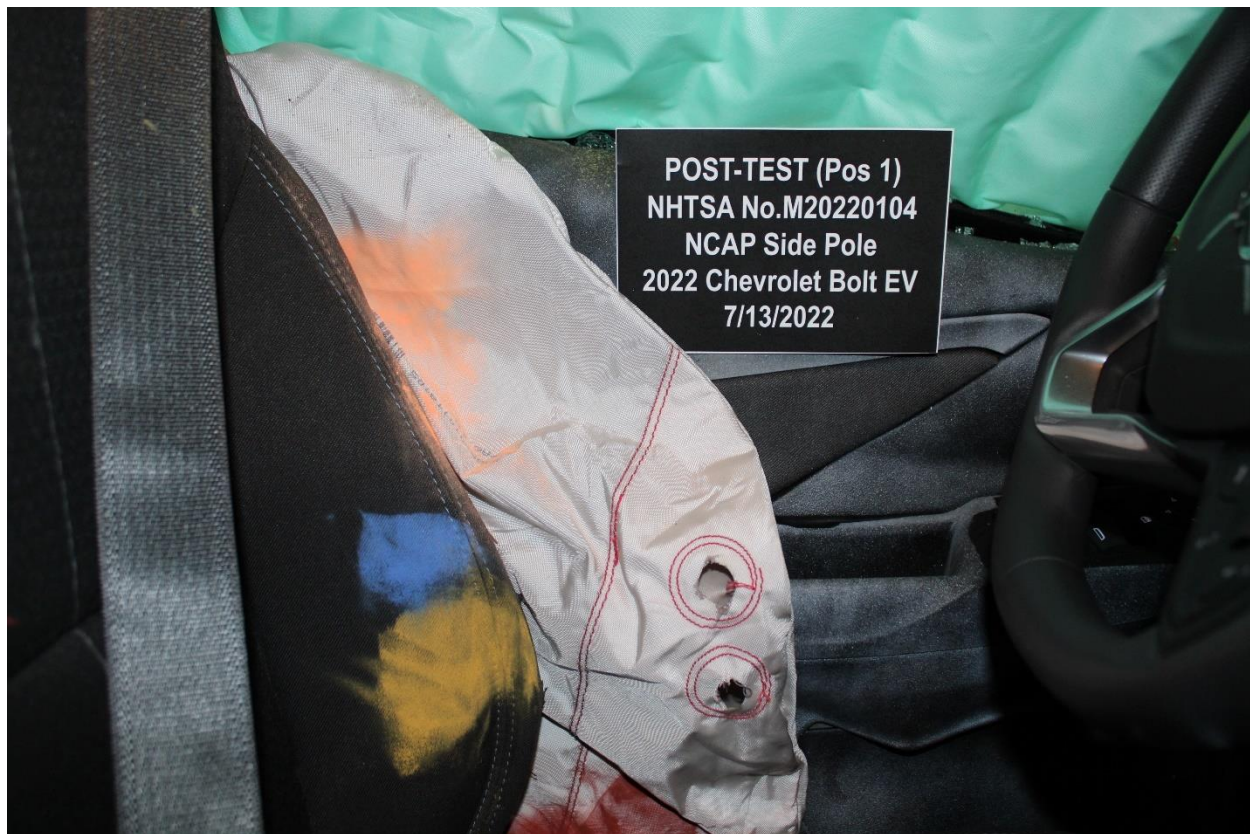


Figure A-49: Post-Test Dummy Close-Up Torso Contact with Side Airbag View

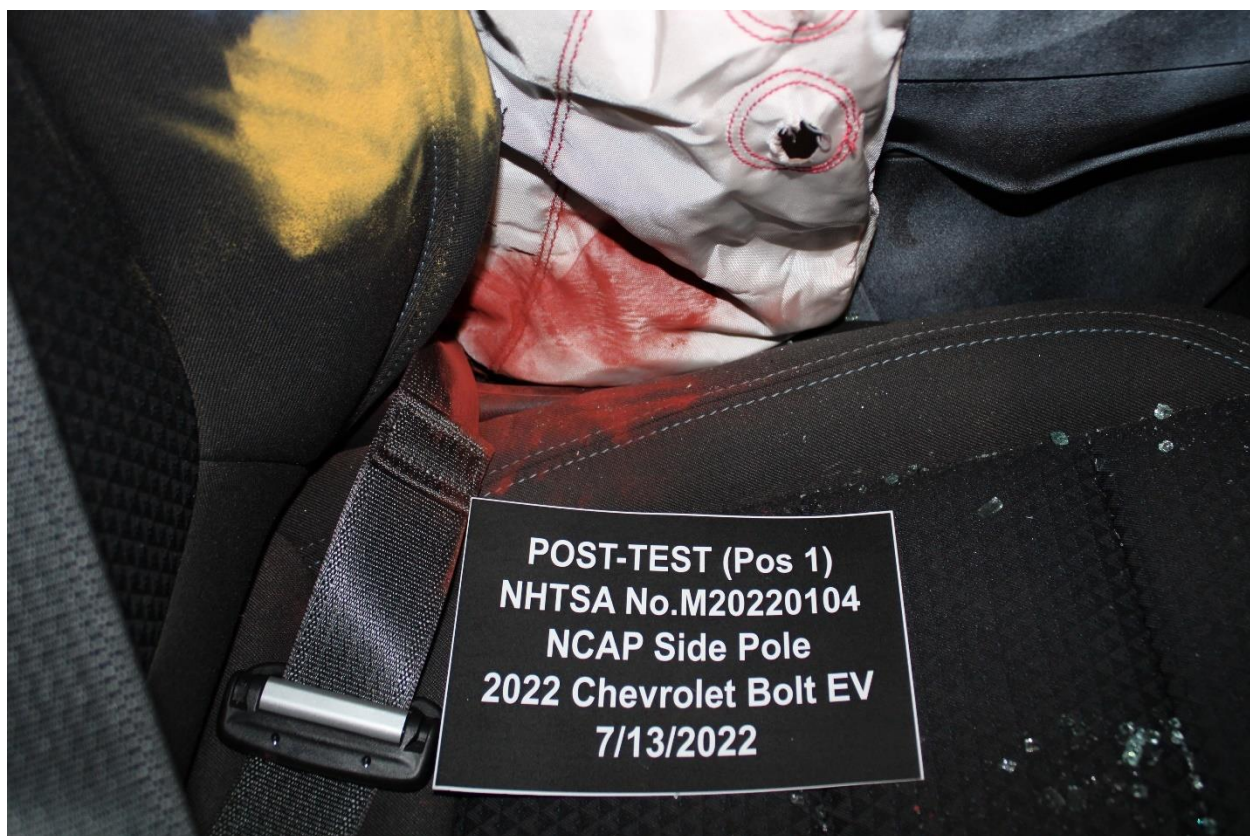


Figure A-50: Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View



Figure A-51: Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View



Figure A-52: Post-Test Dummy Close-Up Knee Contact with Vehicle Interior View



Figure A-53: Pre-Test Right Side View of Dummy and Rear Seat of Occupant Compartment



Figure A-54: Post-Test Inner Rear Passenger Torso Air Bag Deployment View



Figure A-55: Pre-Test View of Charging Port



Figure A-56: Post-Test View of Charging Port



Figure A-57: Close-Up View of Vehicle's Certification Label

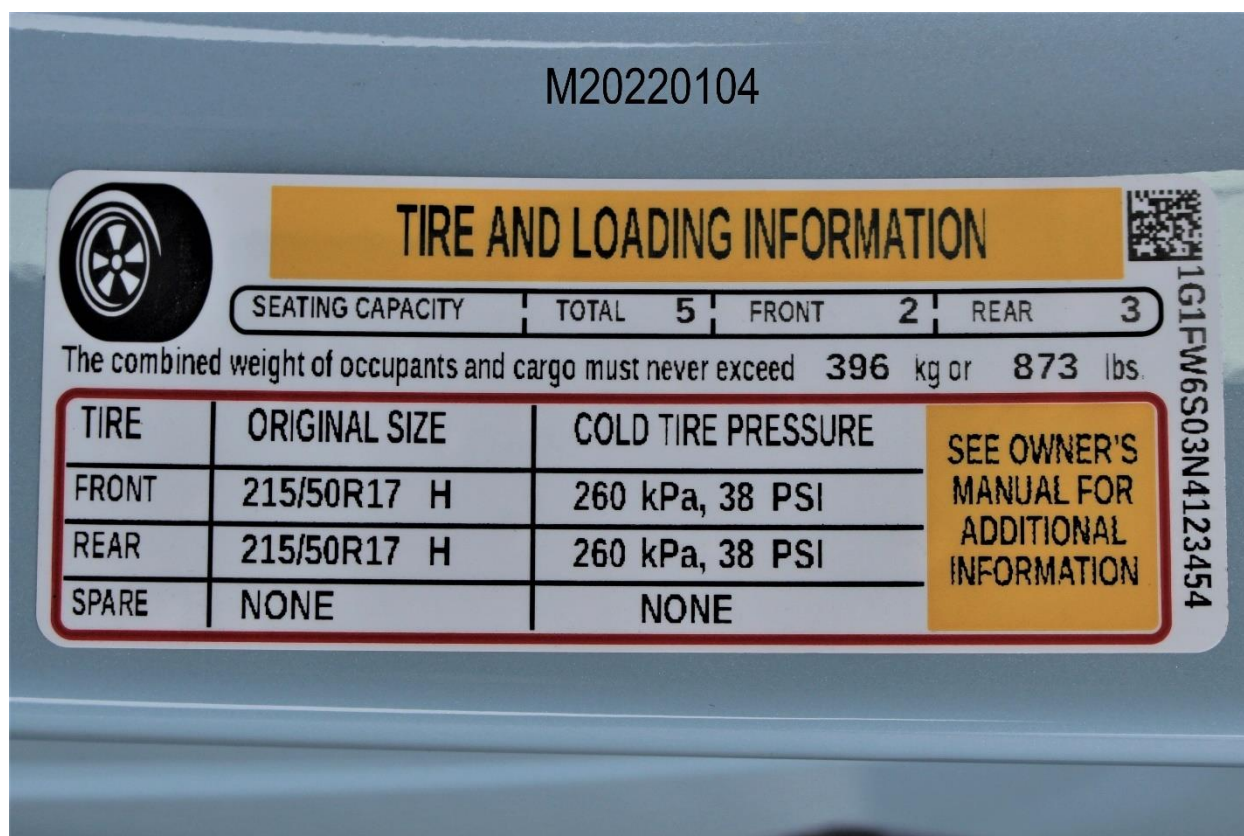


Figure A-58: Close-Up View of Vehicle's Tire Information Placard or Label

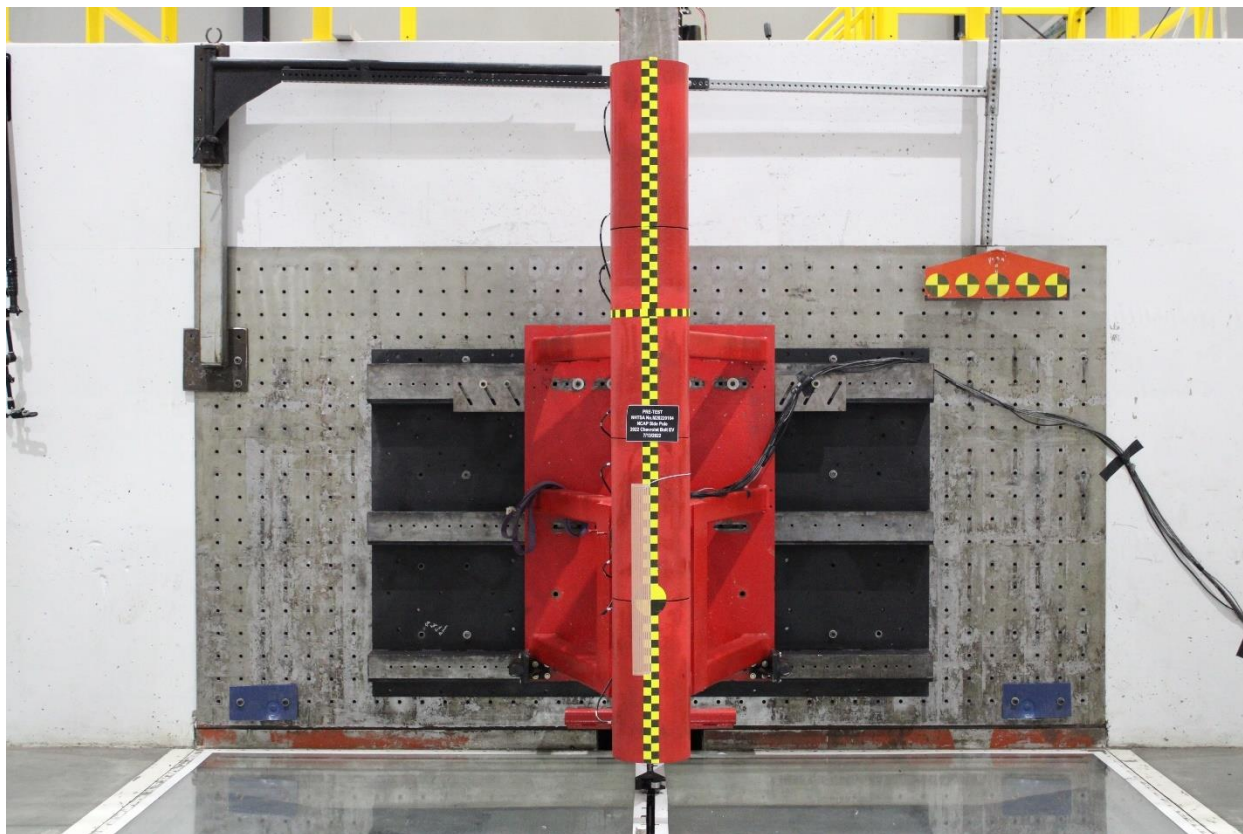


Figure A-59: Pre-Test Pole Barrier Front View

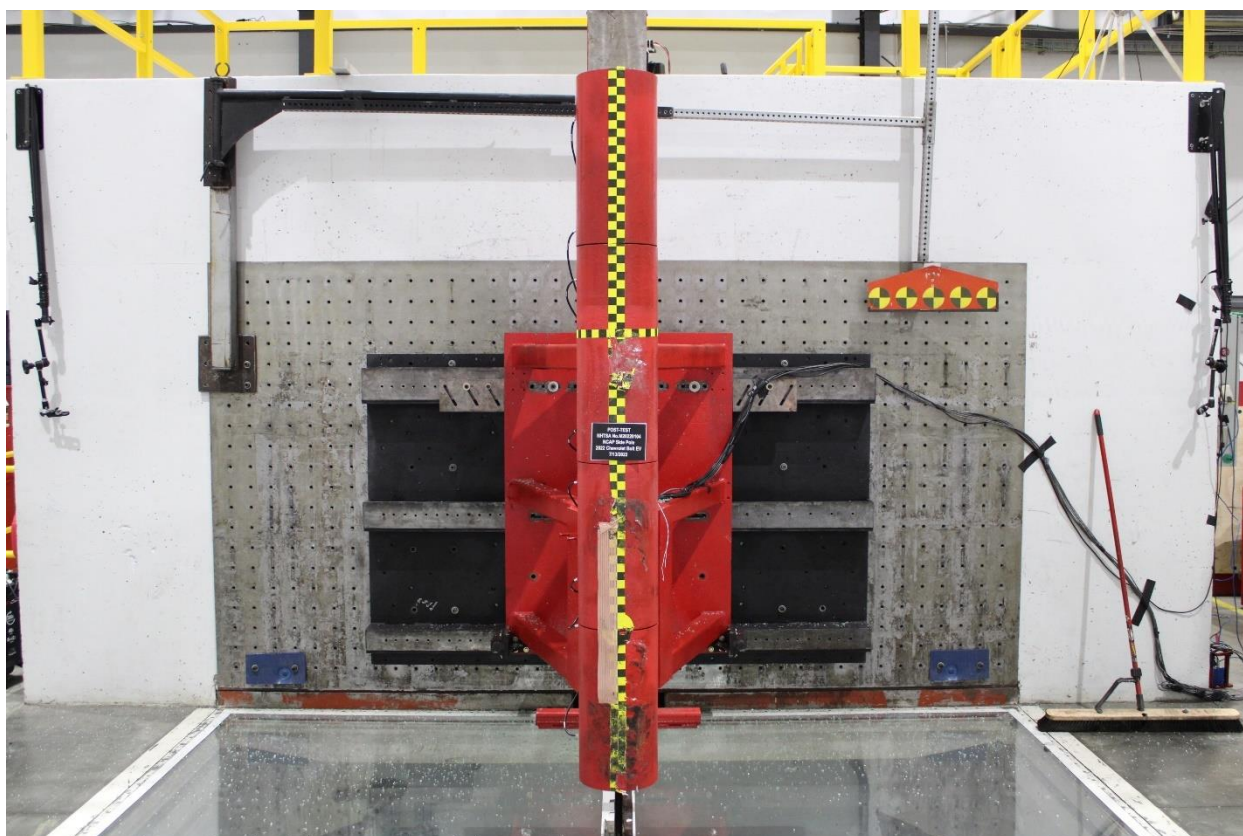


Figure A-60: Post-Test Pole Barrier Front View

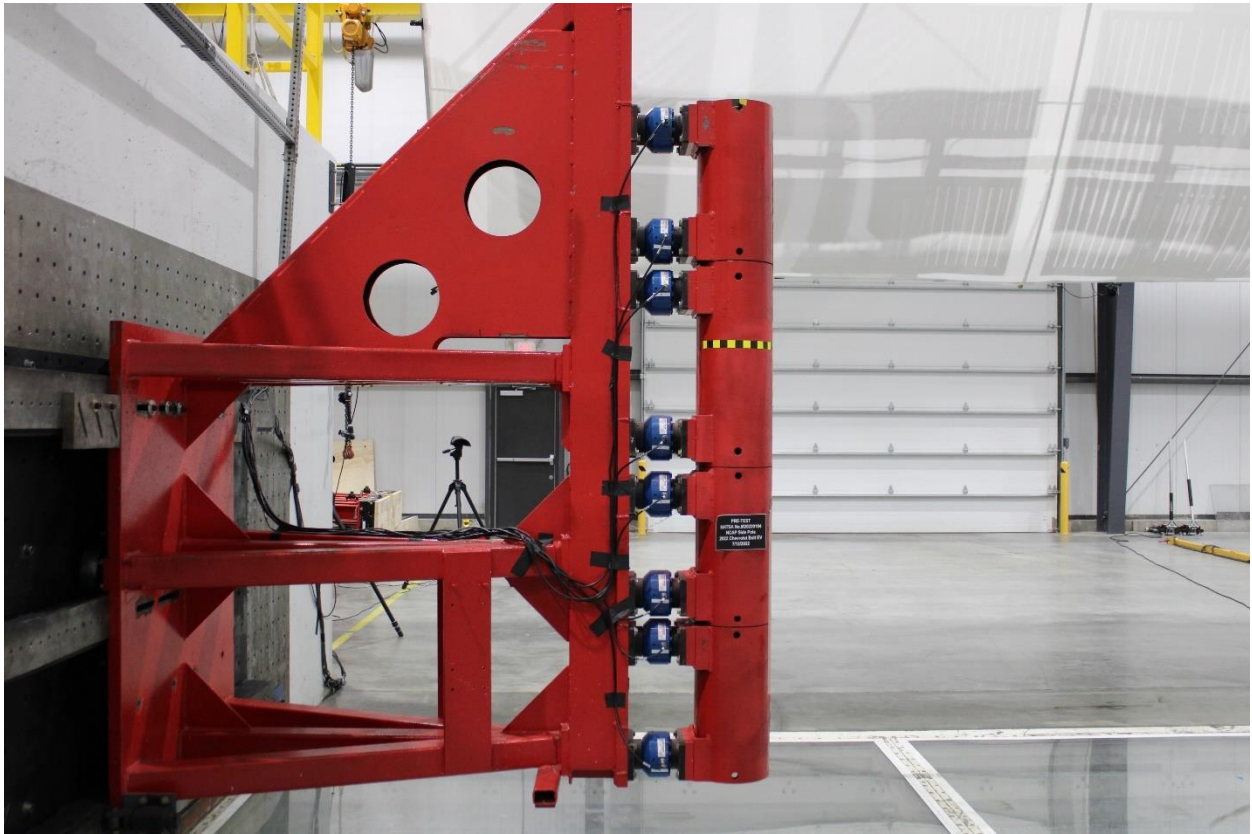


Figure A-61: Pre-Test Pole Barrier Side View

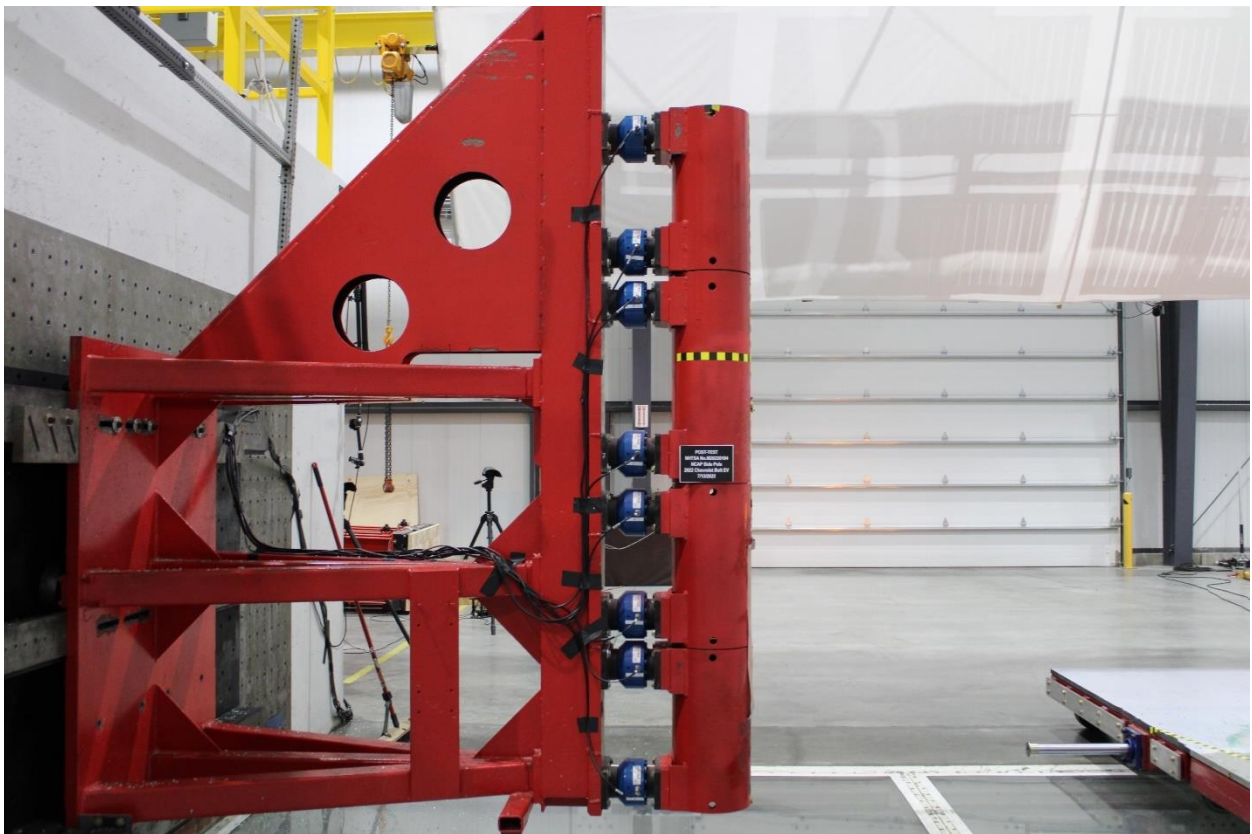


Figure A-62: Post-Test Pole Barrier Side View

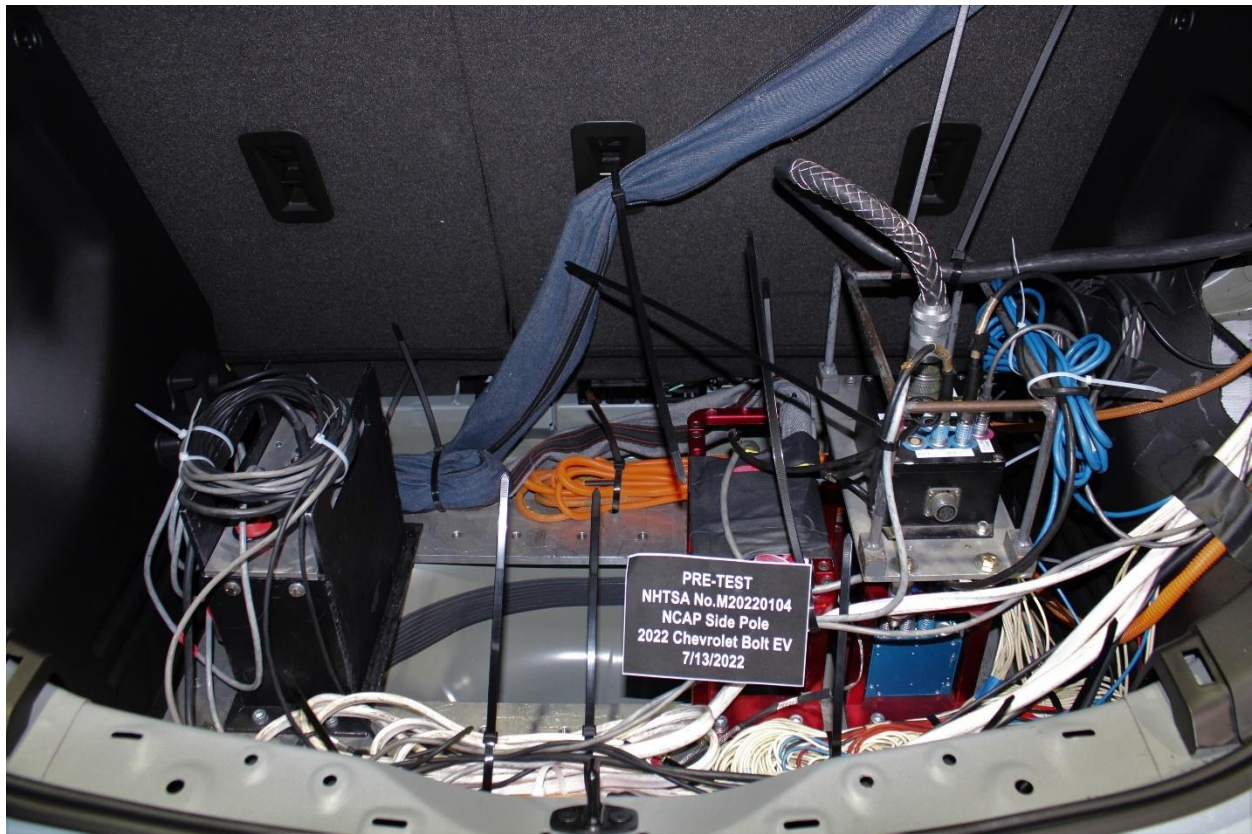


Figure A-63: Pre-Test Ballast View



Figure A-64: Post-Test Primary and Redundant Speed Trap Read-Out



Figure A-65: FMVSS No. 301 Static Rollover 0 Degrees

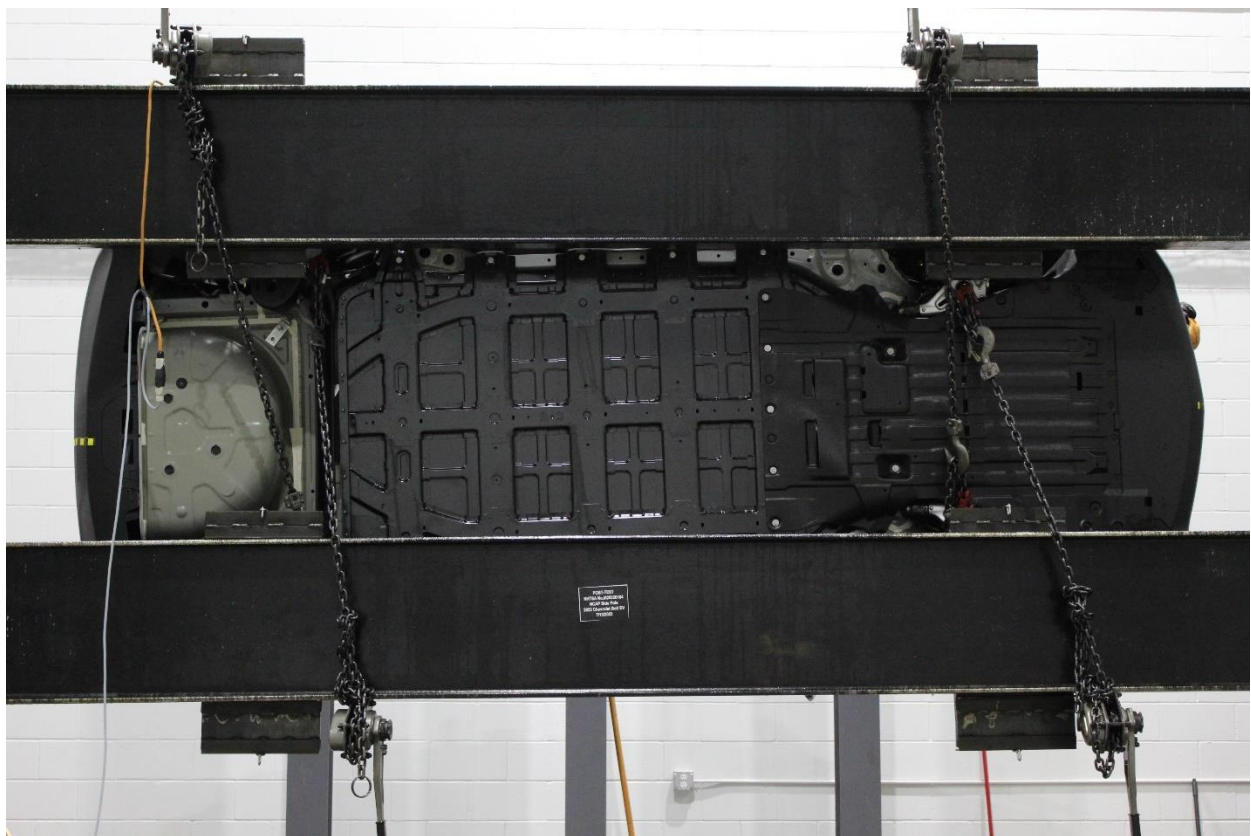


Figure A-66: FMVSS No. 301 Static Rollover 90 Degrees

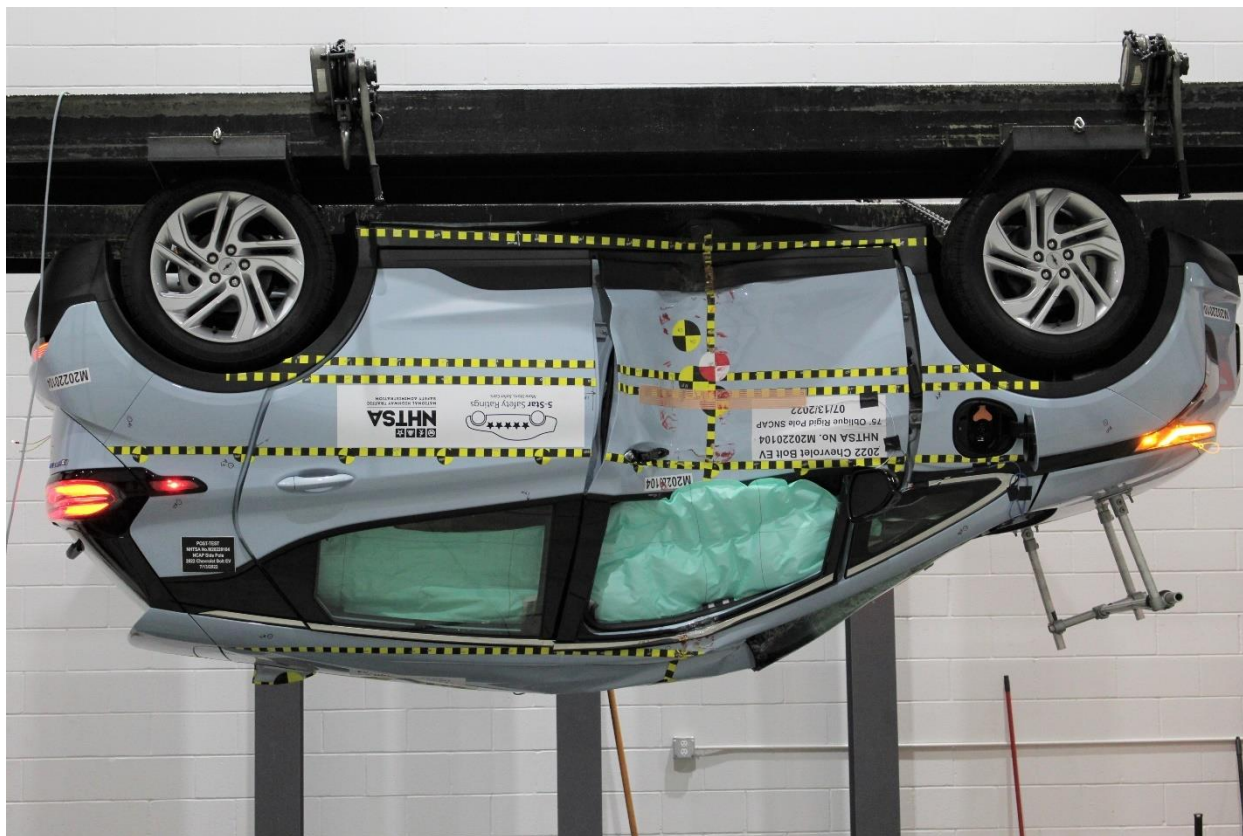


Figure A-67: FMVSS No. 301 Static Rollover 180 Degrees

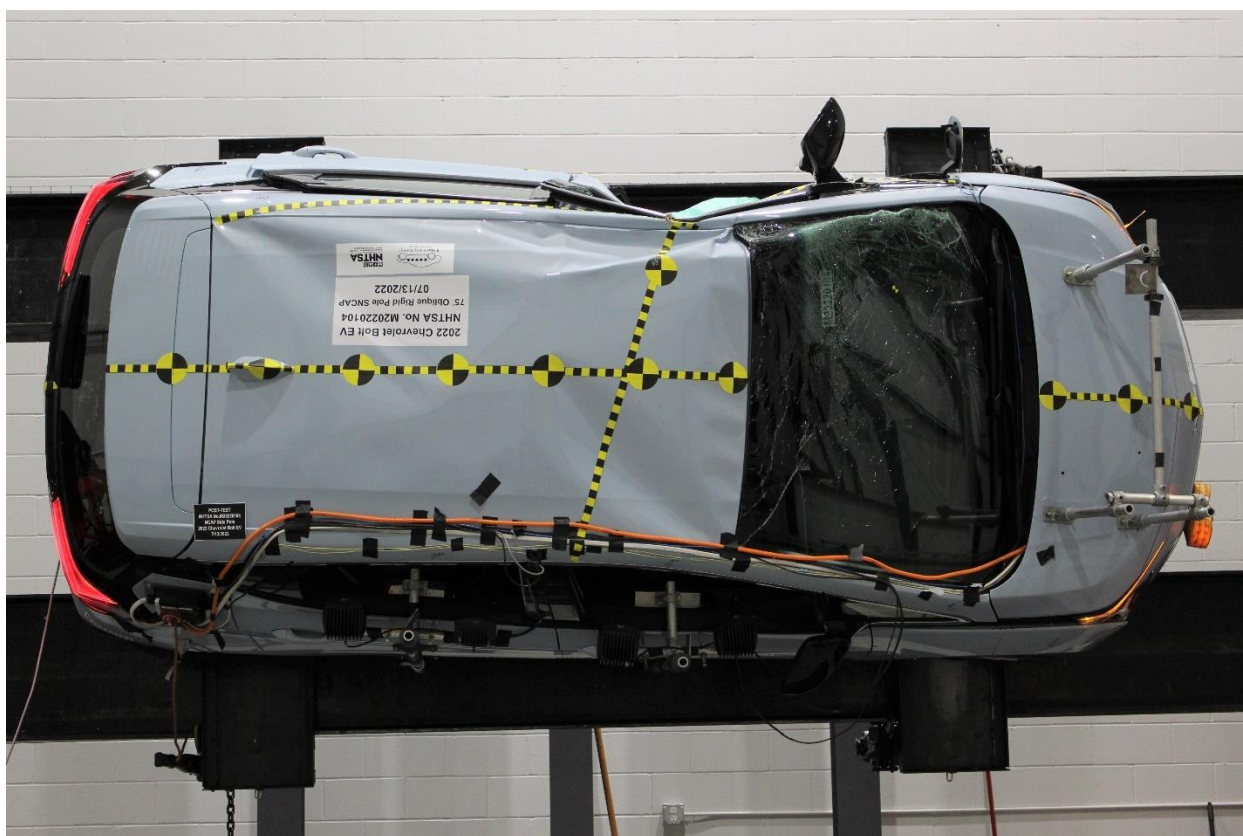


Figure A-68: FMVSS No. 301 Static Rollover 270 Degrees

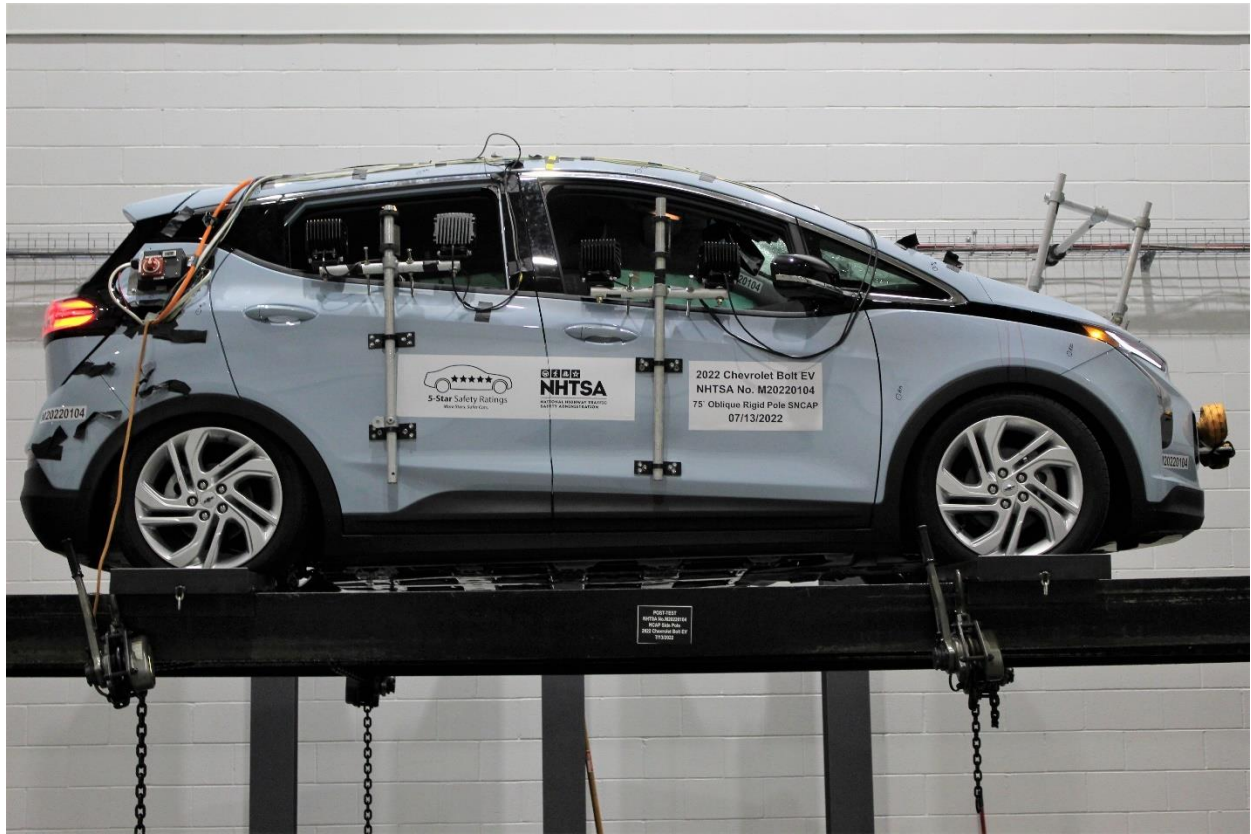


Figure A-69: FMVSS No. 301 Static Rollover 360 Degrees



Figure A-70: Impact Event

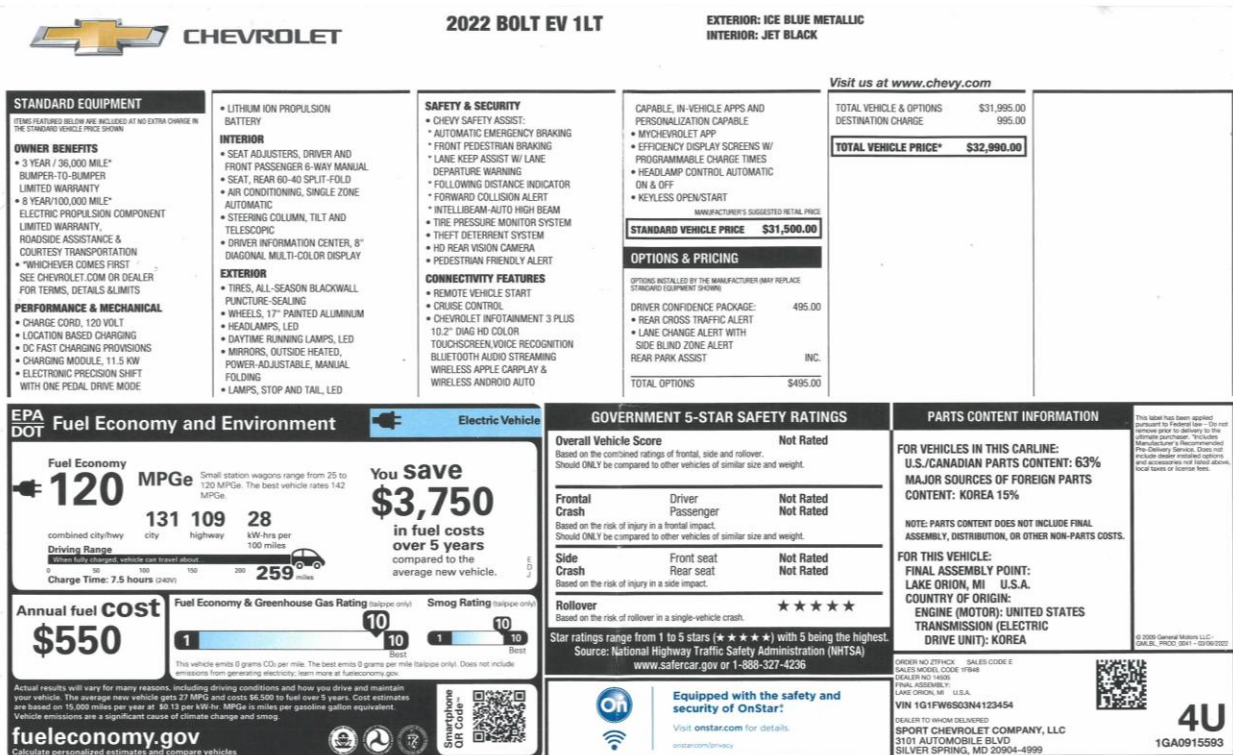


Figure A-71: Monroney Label

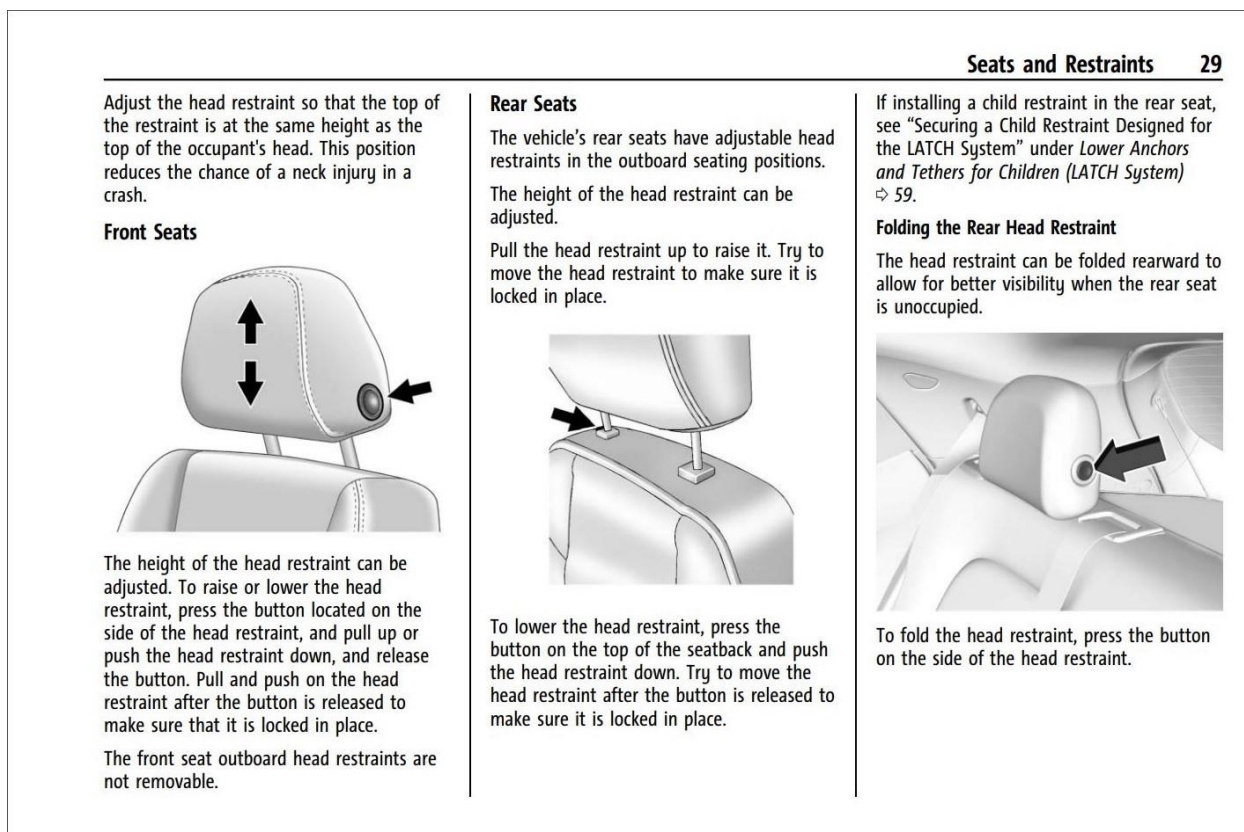


Figure A-72: Head Restraint Use and Adjustment Information from Vehicle Owner's Manual



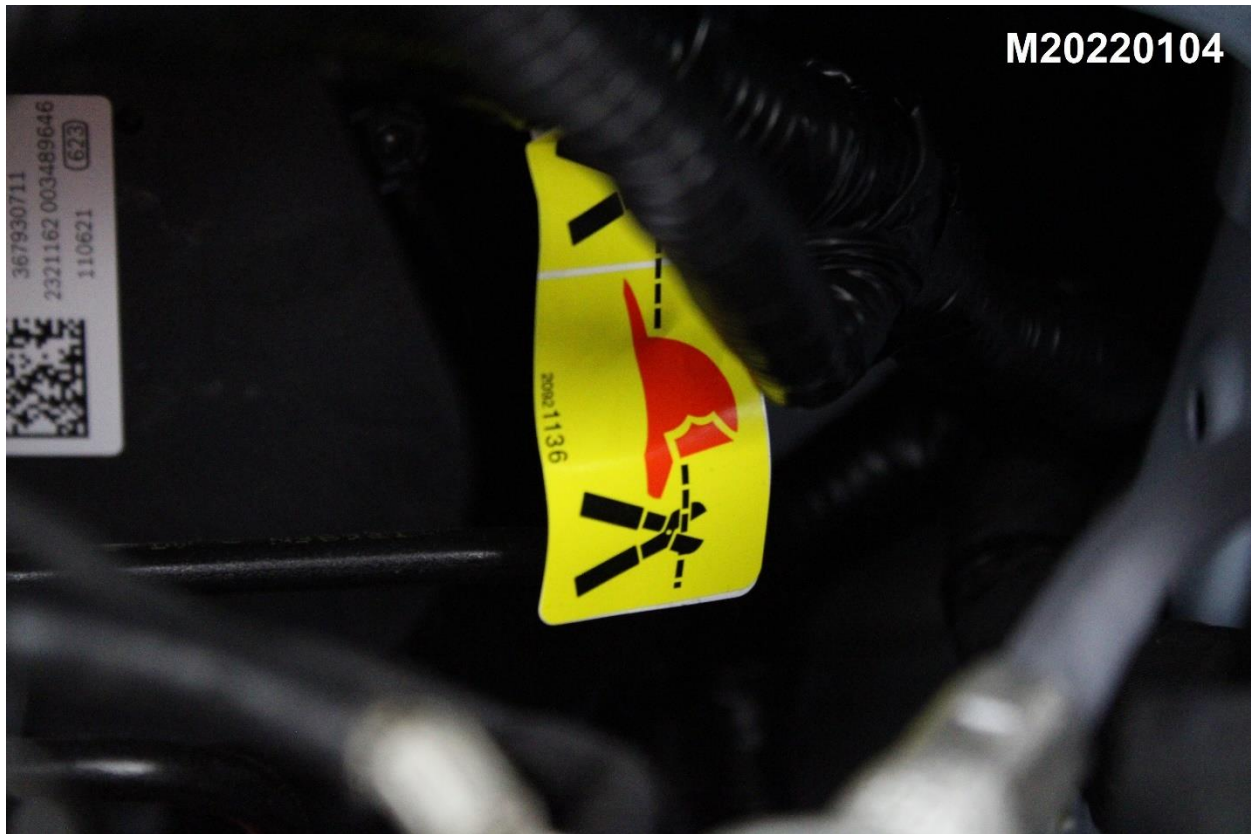
Figure A-73: Post-Test View of Shattered Vehicle Inner Door Panel

Photo Not Applicable

Figure 305-1: Auxiliary Power Module Warning Label



Figure 305-2: Power Inverter Warning Label



M20220104

Figure 305-3 First Responder Warning Label



Figure 305-4: First Responder Warning Label Location



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



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



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



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

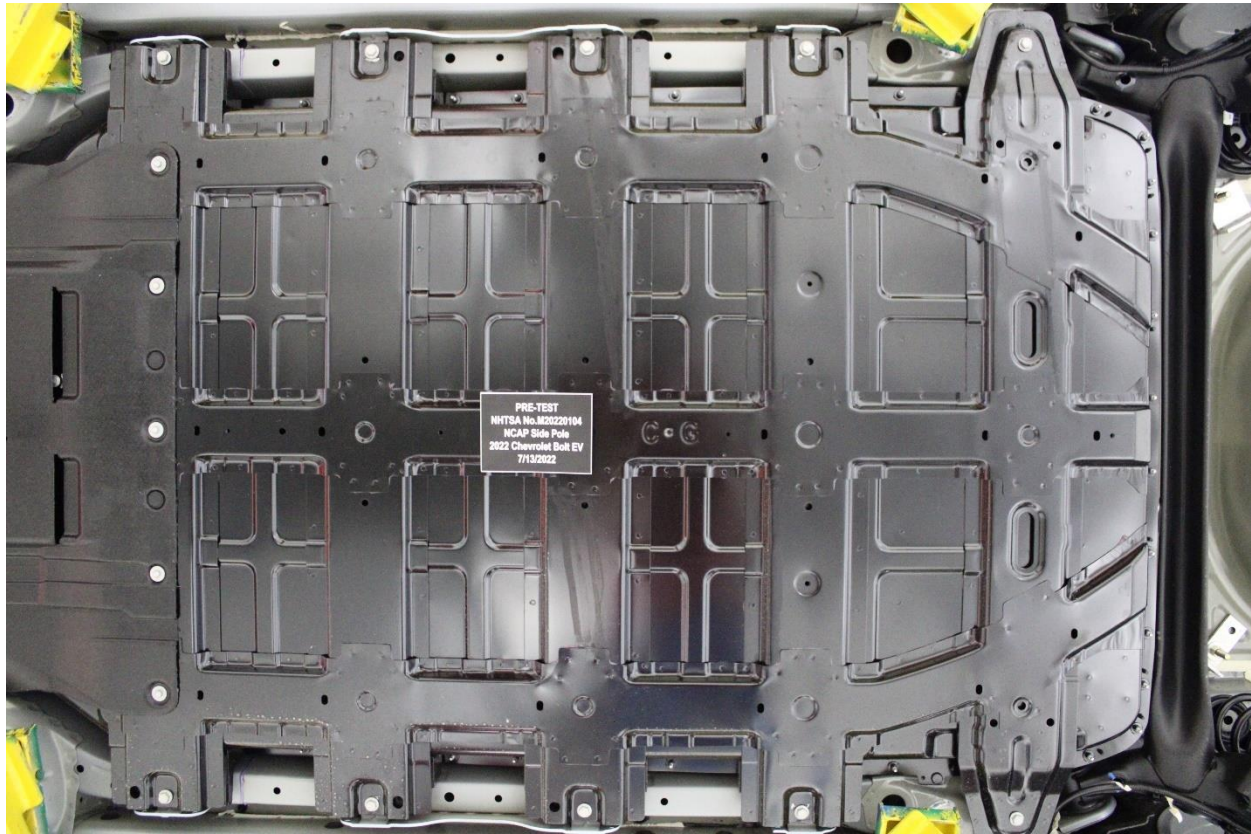


Figure 305-9: Pre-Impact View of Propulsion Battery



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



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



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



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

Photo Not Applicable

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

Photo Not Applicable

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

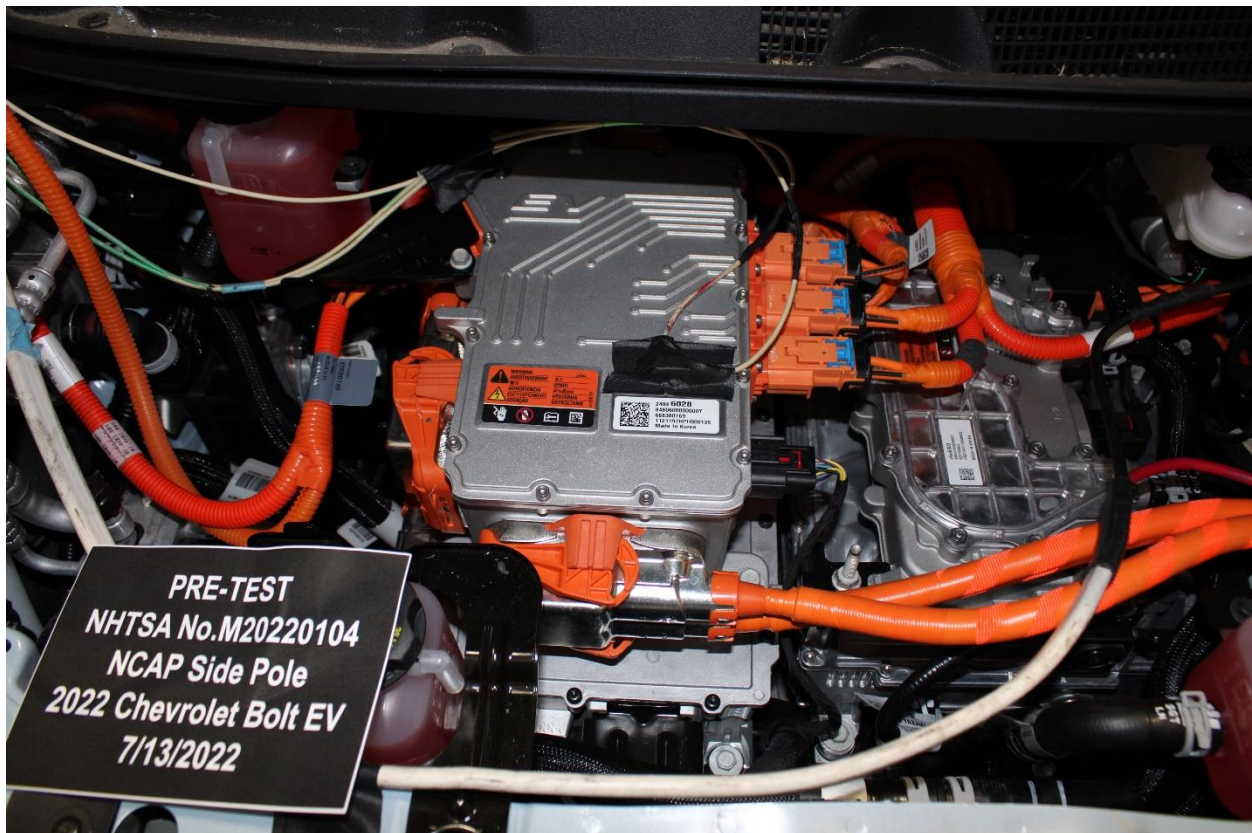


Figure 305-16: Pre-Impact View of Electric Propulsion Drive



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

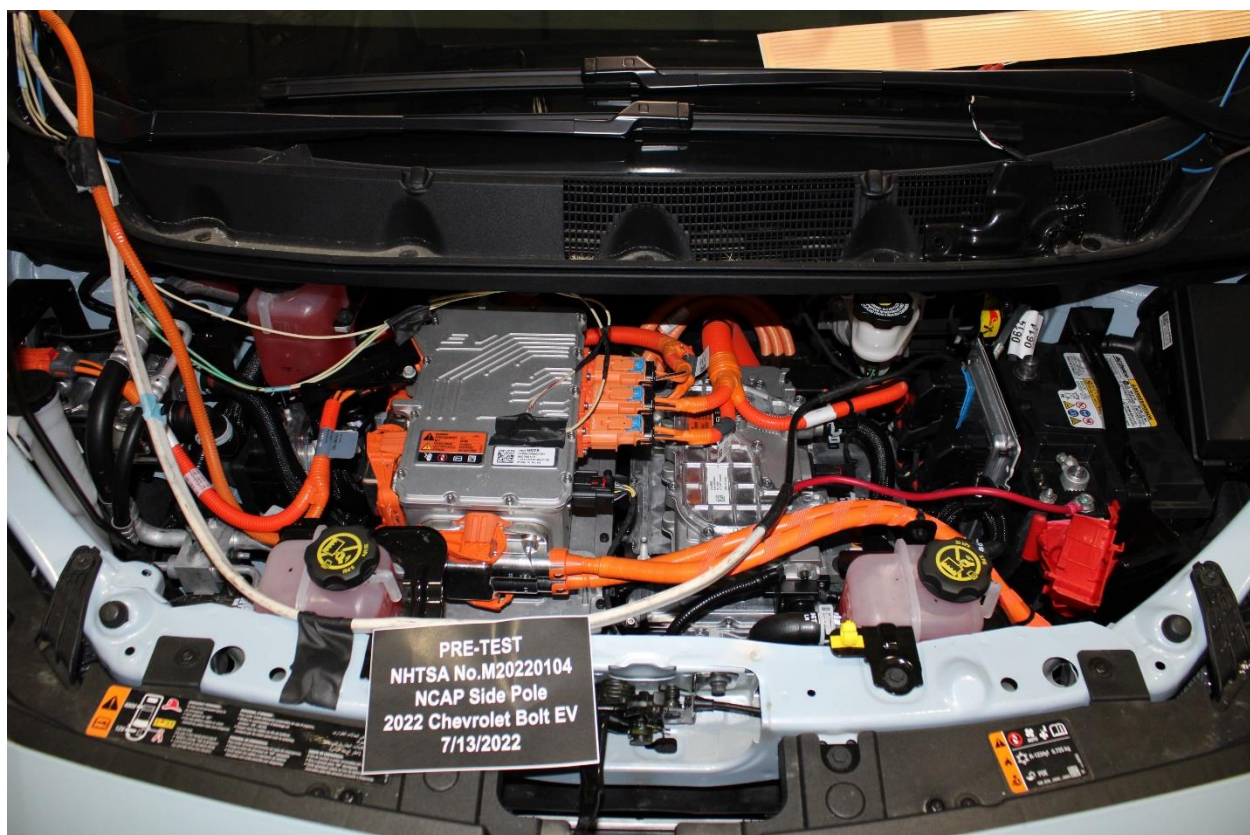


Figure 305-18: Pre-Impact View of High Voltage Interconnects

Photo Not Applicable

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

Photo Not Applicable

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



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



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

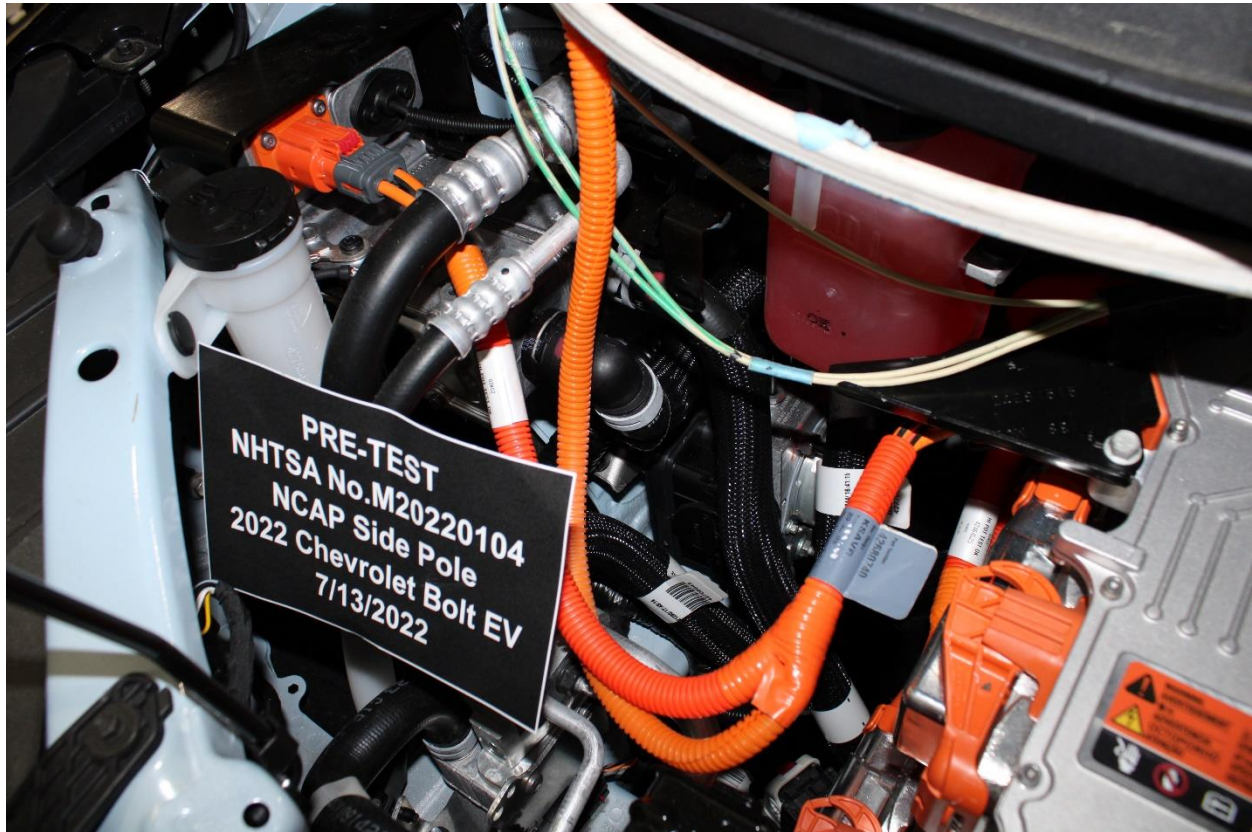


Figure 305-23: Pre-Impact Close Up View of High Voltage Leads Attached

Photo Not Applicable

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

Photo Not Applicable

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

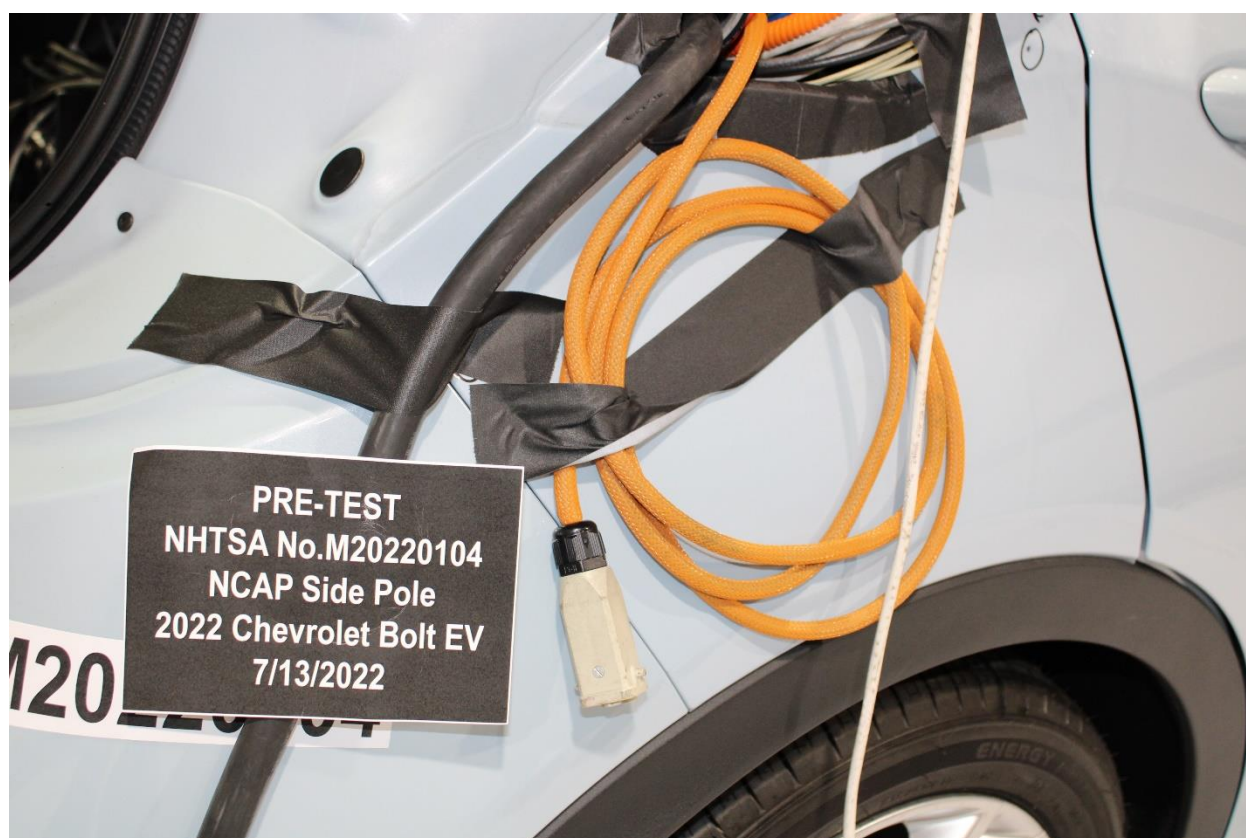


Figure 305-26: Pre-Impact View of Other Test Devices

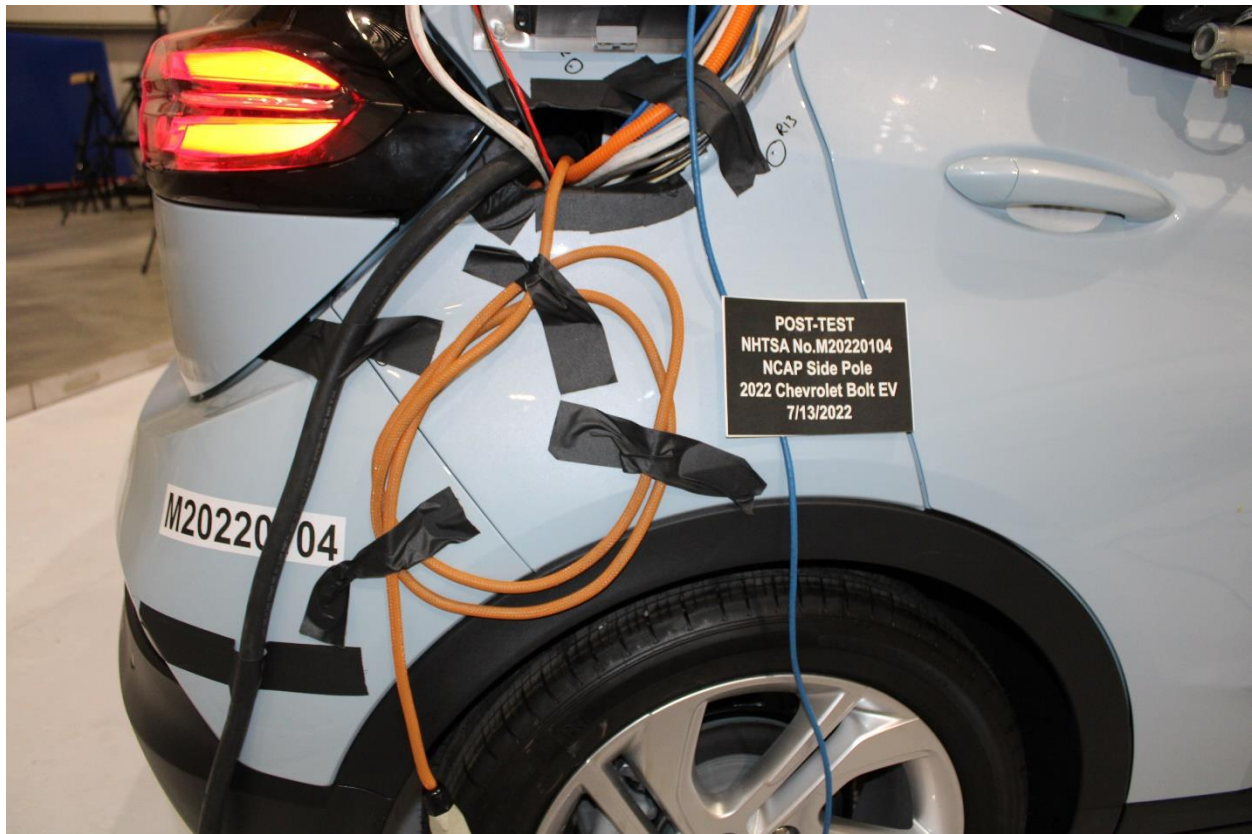


Figure 305-27: Post-Impact View of Other Test Devices

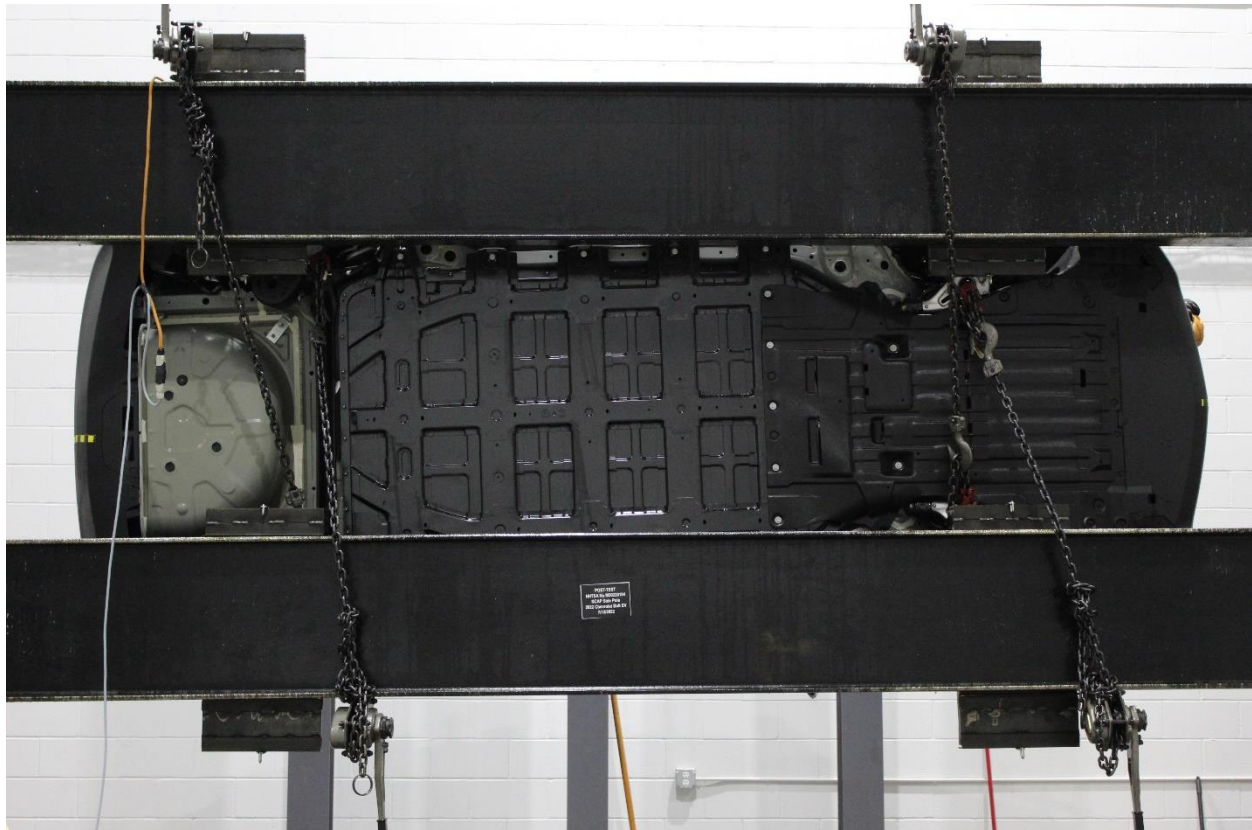


Figure 305-28: FMVSS No. 305 Static Rollover 90 Degrees

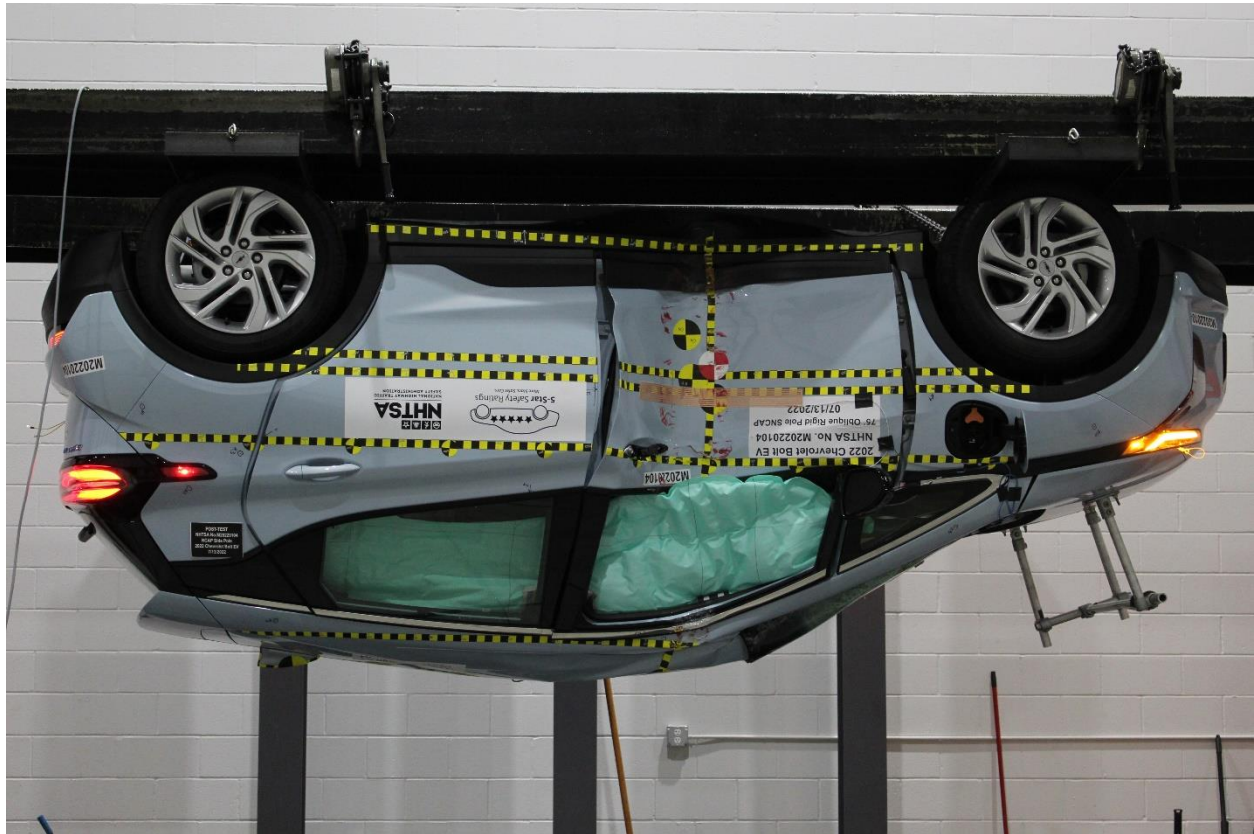


Figure 305-29: FMVSS No. 305 Static Rollover 180 Degrees

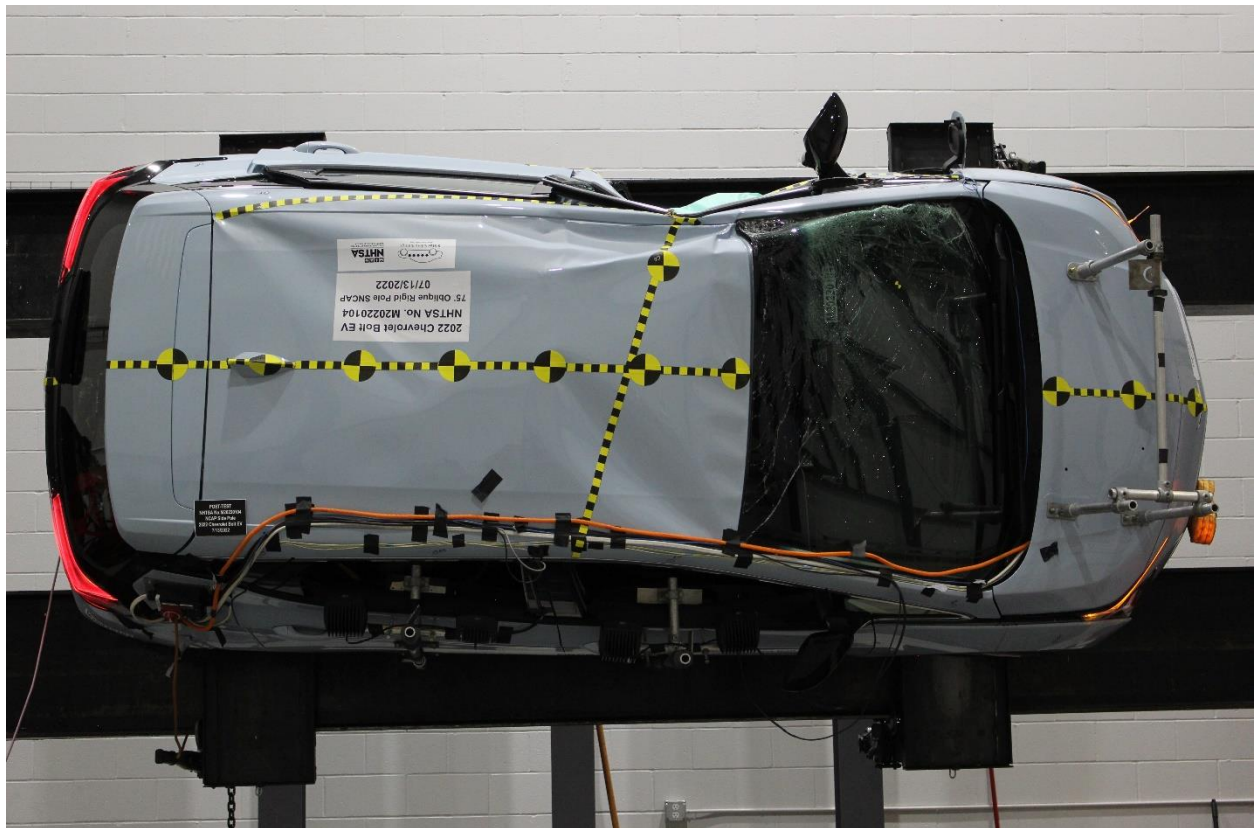


Figure 305-30: FMVSS No. 305 Static Rollover 270 Degrees



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



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

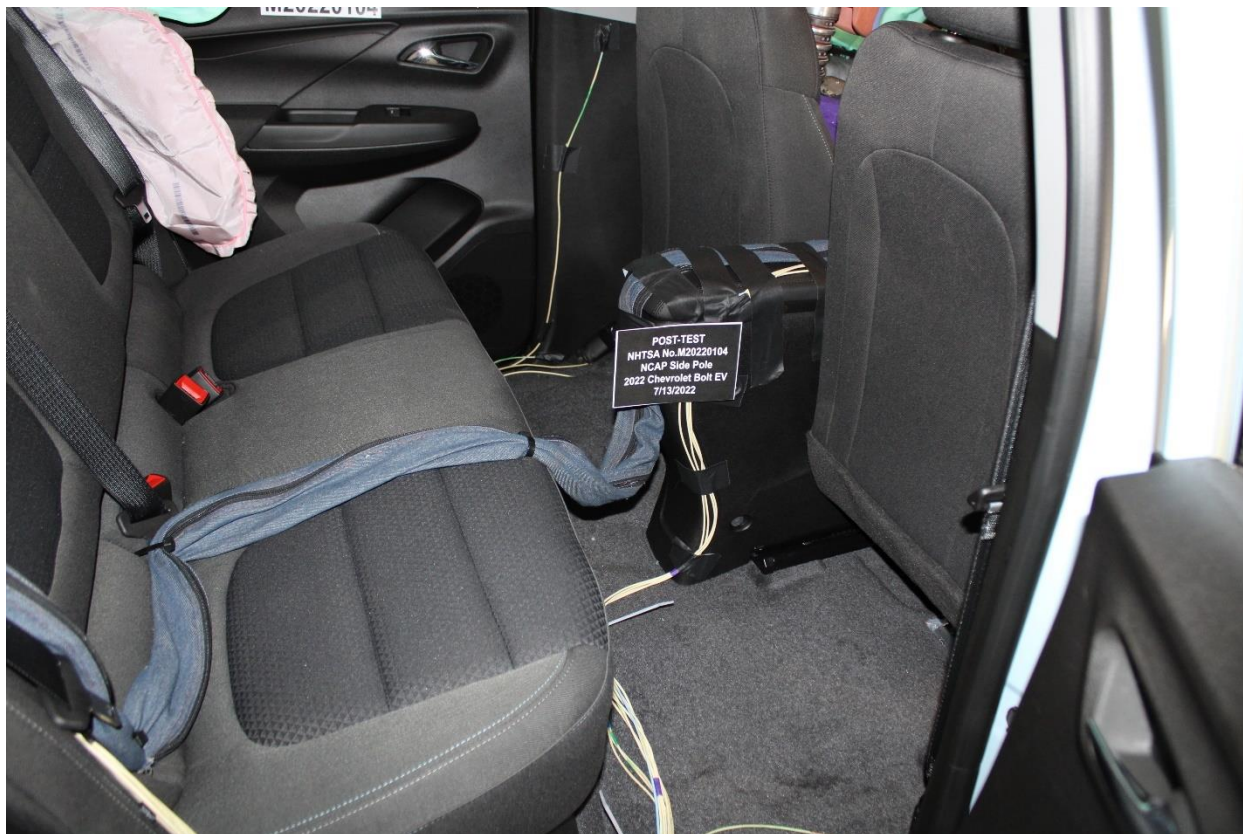


Figure 305-33: Post-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery

Photo Not Applicable

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

Photo Not Applicable

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

Photo Not Applicable

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

Photo Not Applicable

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

Photo Not Applicable

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

APPENDIX B

VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

Driver Dummy Instrumentation Plots

Fig.	Description	Page
1	Driver Head Acceleration (X) Primary vs. Time	B-4
2	Driver Head Acceleration (Y) Primary vs. Time	B-4
3	Driver Head Acceleration (Z) Primary vs. Time	B-4
4	Driver Head Resultant Acceleration Primary vs. Time	B-4
5	Driver Lower Spine T12 Acceleration (X) vs. Time	B-5
6	Driver Lower Spine T12 Acceleration (Y) vs. Time	B-5
7	Driver Lower Spine T12 Acceleration (Z) vs. Time	B-5
8	Driver Lower Spine T12 Resultant Acceleration vs. Time	B-5
9	Driver Iliac Wing Force on Impact Side (Y) vs. Time	B-6
10	Driver Acetabulum Force on Impact Side (Y) vs. Time	B-6
11	Driver Total Pelvis Force on Impact Side (Y) vs. Time	B-6

The following additional data for this test can be obtained from the Research and Development section of the NHTSA website. The website can be found at www.NHTSA.gov.

Additional Driver Dummy Instrumentation Data

Driver Head Acceleration Redundant (X)
Driver Head Acceleration Redundant (Y)
Driver Head Acceleration Redundant (Z)
Driver Upper Thorax Rib Deflection (Y)
Driver Middle Thorax Rib Deflection (Y)
Driver Lower Thorax Rib Deflection (Y)
Driver Upper Abdomen Rib Deflection (Y)
Driver Lower Abdomen Rib Deflection (Y)

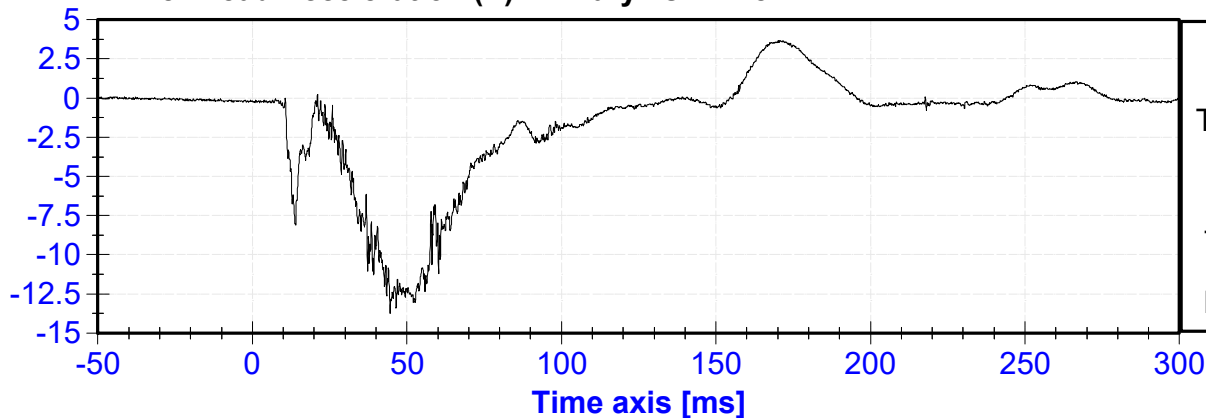
Vehicle Instrumentation Data

Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Left Floor Sill Acceleration (Y)
Left A-Pillar Sill Acceleration (Y)
Left Lower A-Pillar Acceleration (Y)
Left Mid A-Pillar Acceleration (Y)
Left B-Pillar Sill Acceleration (Y)
Left Lower B-Pillar Acceleration (Y)
Left Mid B-Pillar Acceleration (Y)
Driver Seat Track at Dummy Hip Point Acceleration (Y)
Engine Top Acceleration (X)
Engine Top Acceleration (Y)
Firewall Center Acceleration (Y)
Right Roof at Vertical Impact Reference Line Acceleration (Y)
Right Sill at Vertical Impact Reference Line Acceleration (Y)
Rear Floorpan Behind Rear Axle at Centerline Acceleration (X)
Rear Floorpan Behind Rear Axle at Centerline Acceleration (Y)

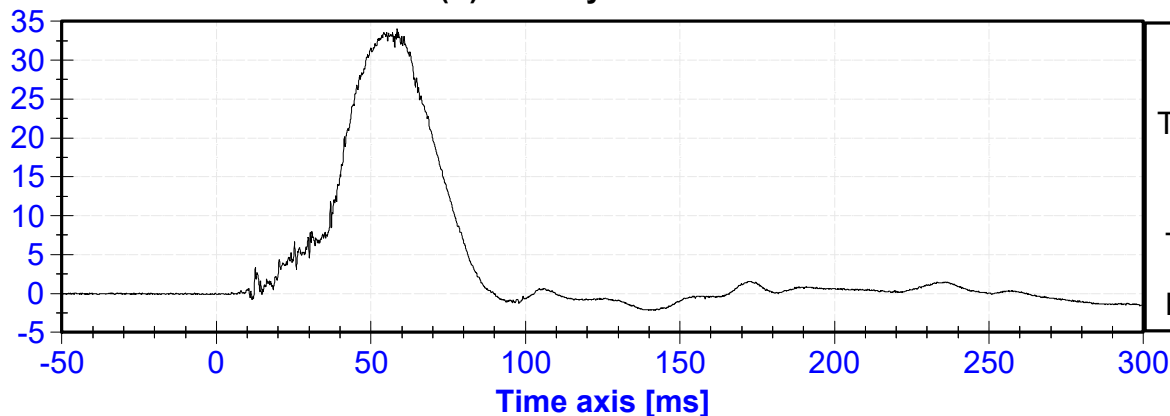
Pole Instrumentation Data

Load Cell Pole Barrier #1 Force (Y)
Load Cell Pole Barrier #2 Force (Y)
Load Cell Pole Barrier #3 Force (Y)
Load Cell Pole Barrier #4 Force (Y)
Load Cell Pole Barrier #5 Force (Y)
Load Cell Pole Barrier #6 Force (Y)
Load Cell Pole Barrier #7 Force (Y)
Load Cell Pole Barrier #8 Force (Y)

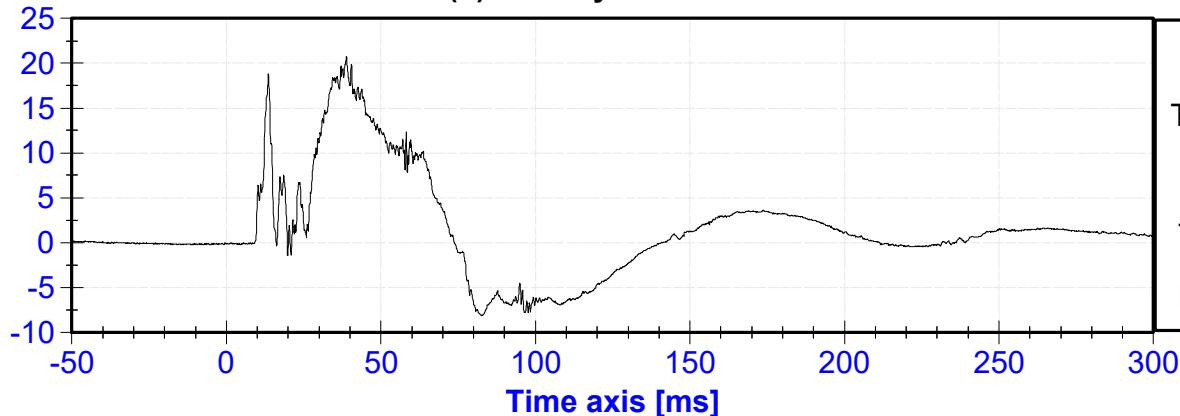
Driver Head Acceleration (X) Primary vs. Time



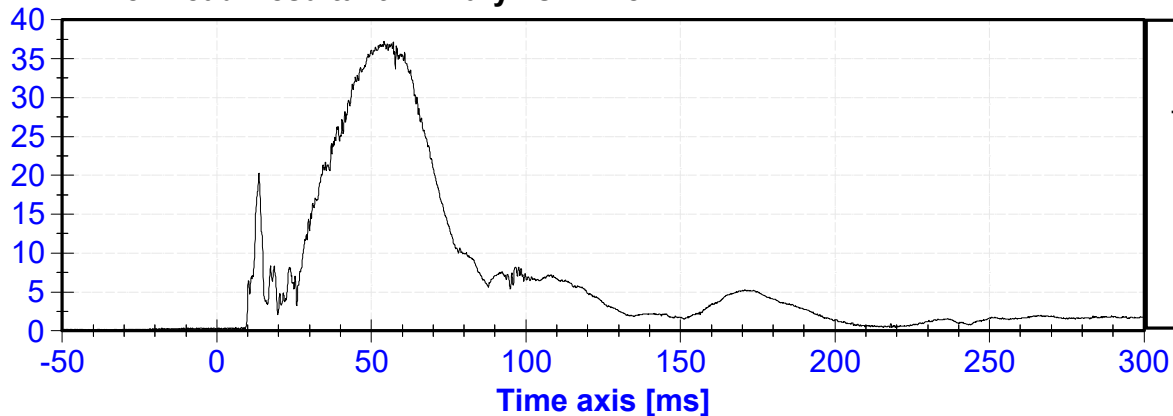
Driver Head Acceleration (Y) Primary vs. Time



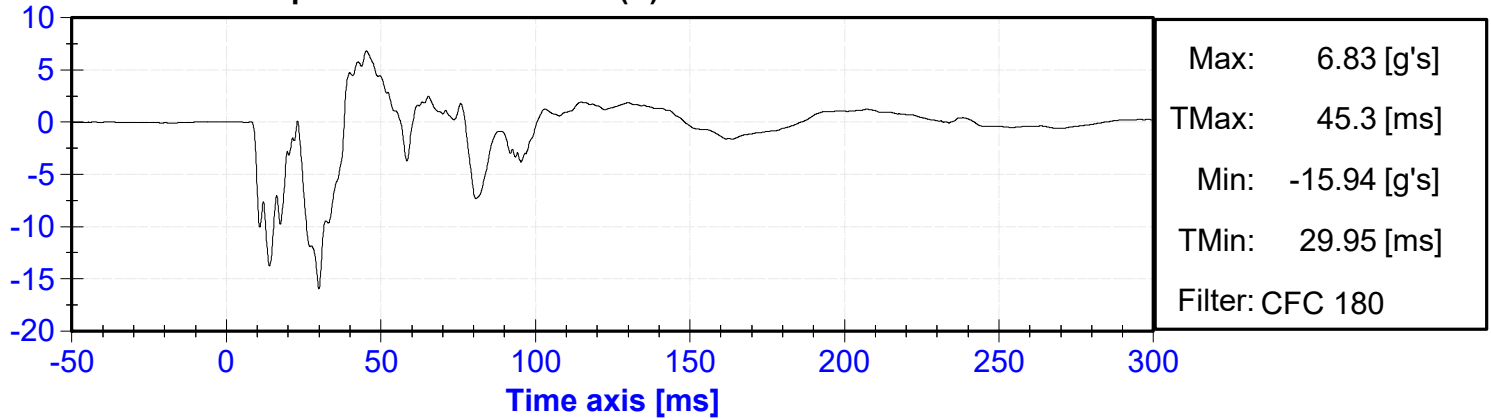
Driver Head Acceleration (Z) Primary vs. Time



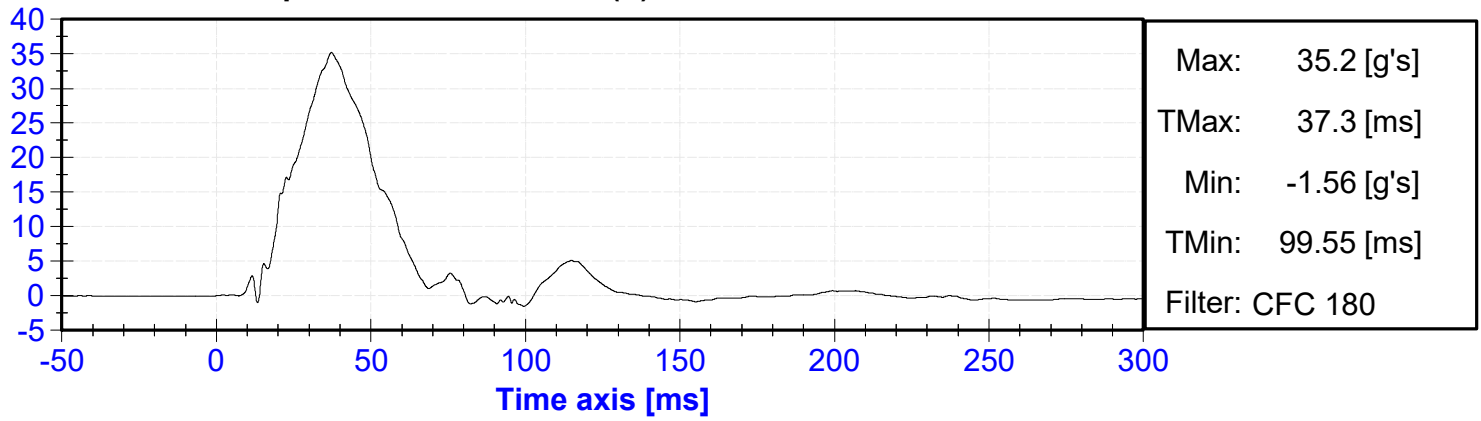
Driver Head Resultant Primary vs. Time



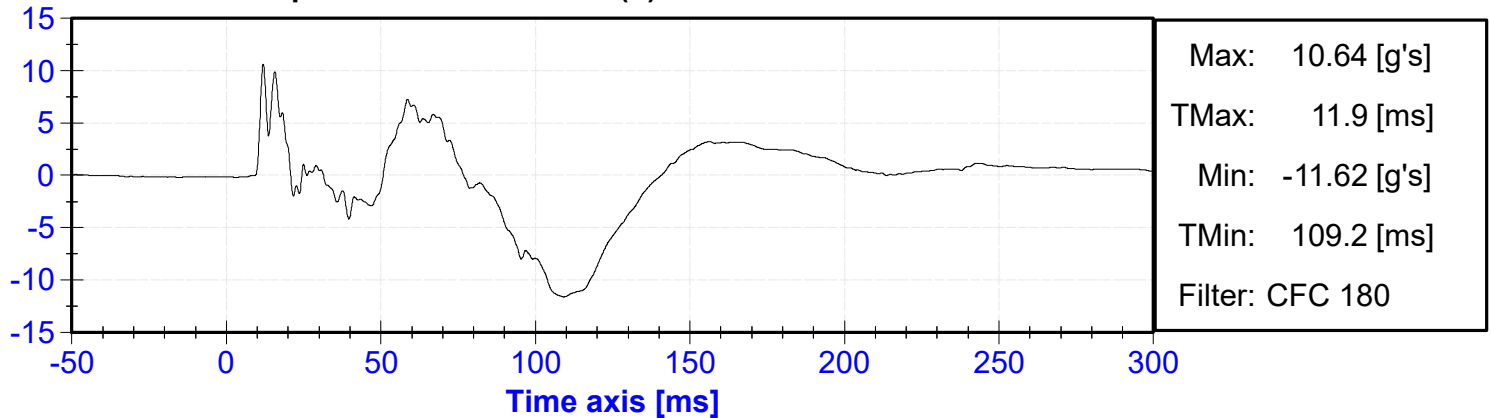
Driver Lower Spine T12 Acceleration (X) vs. Time



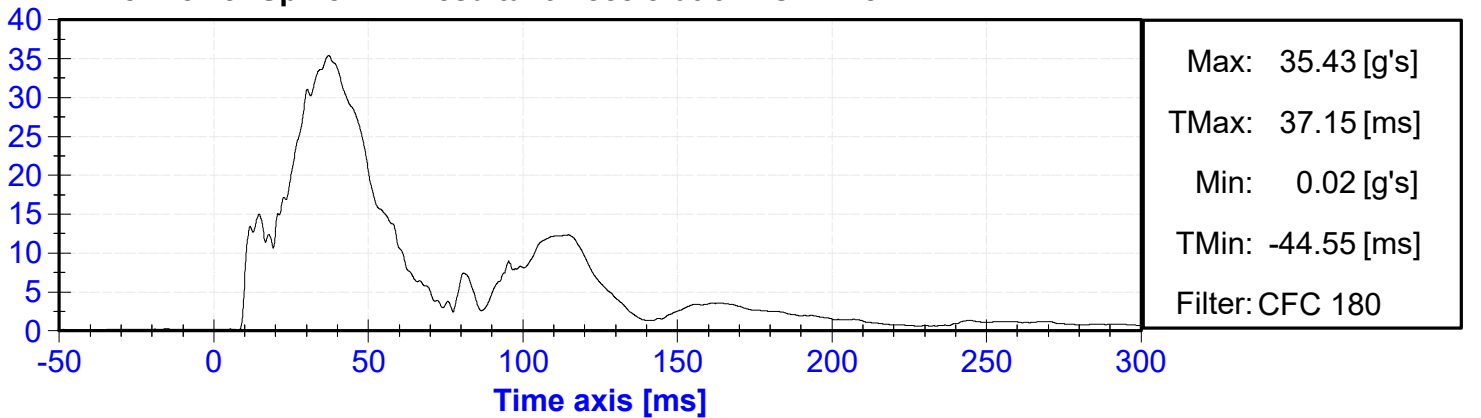
Driver Lower Spine T12 Acceleration (Y) vs. Time



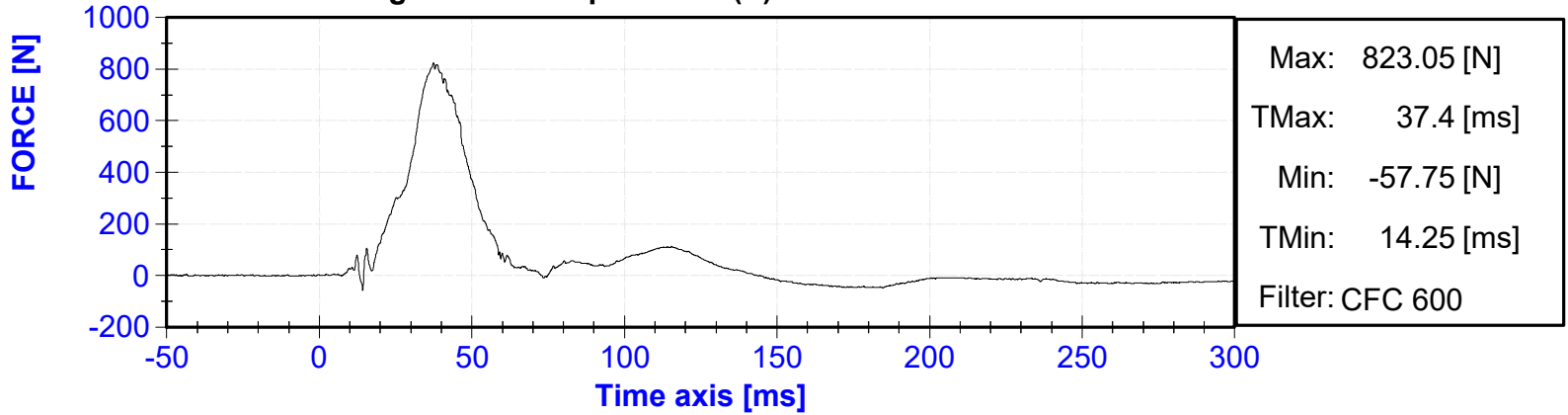
Driver Lower Spine T12 Acceleration (Z) vs. Time



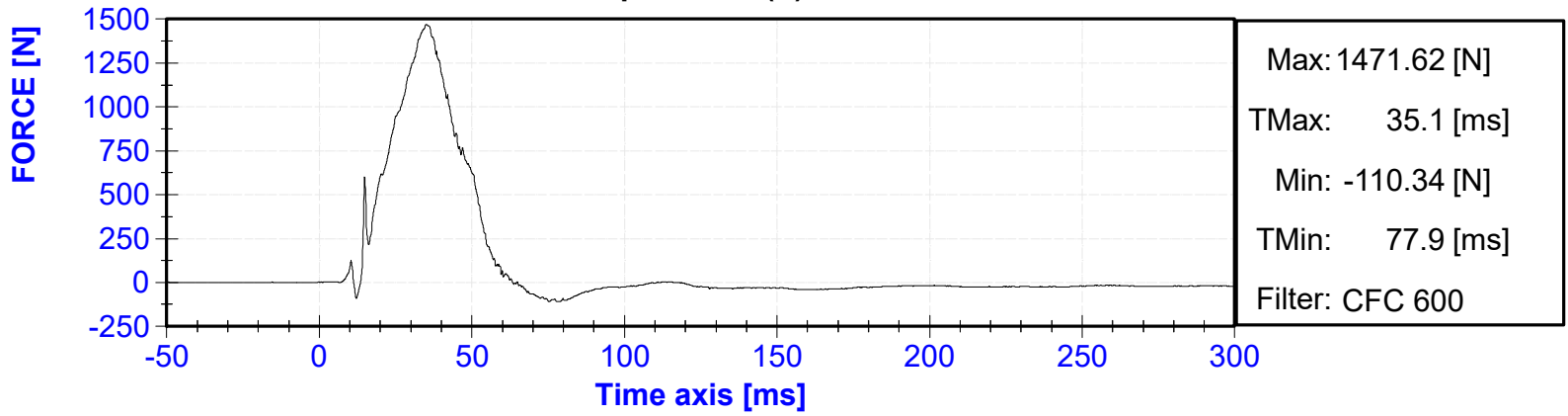
Driver Lower Spine T12 Resultant Acceleration vs. Time



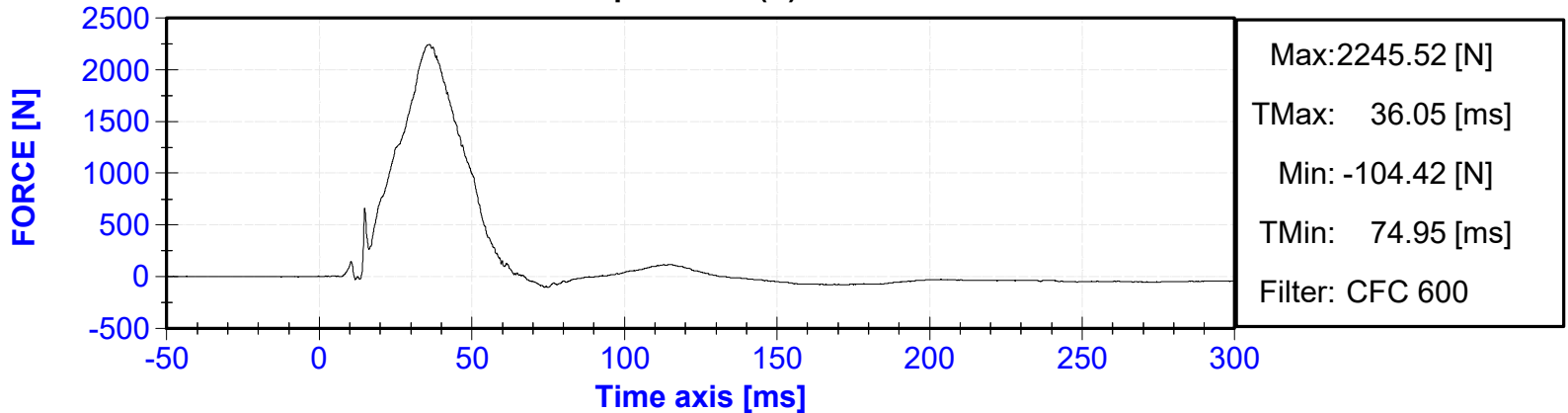
Driver Iliac Wing Force on Impact Side (Y) vs. Time



Driver Acetabulum Force on Impact Side (Y) vs. Time



Driver Total Pelvis Force on Impact Side (Y) vs. Time



APPENDIX C

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

SID-IIS 5TH PERCENTILE FEMALE - DRIVER ATD

SERIAL NO: DG8012

(CONFIGURED FOR LEFT SIDE IMPACT)

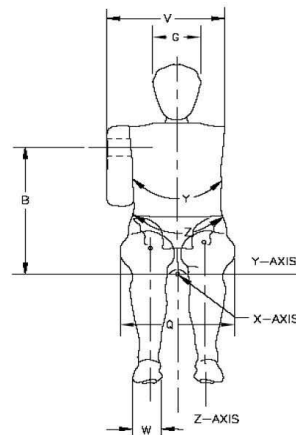
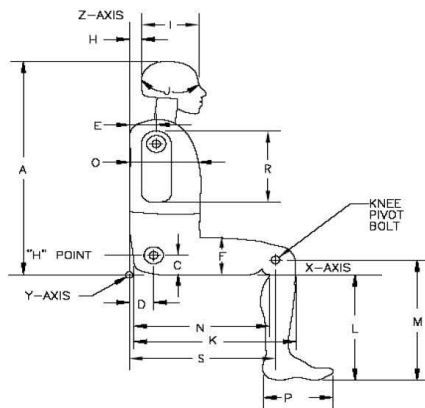


External Measurements - SID-IIs

Technician: K. Brogan

Date: 06/30/2022

Dummy Serial Number: DG8012



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	780	Pass
B	Shoulder Pivot Height	437	453	445	Pass
C	H-point Height	79	89	84	Pass
D	H-point from seatback	141	151	145	Pass
E	Shoulder Pivot from Backline	97	107	102	Pass
F	Thigh Clearance	119	135	125	Pass
G	Head Breadth	140	148	144	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	185	Pass
J	Head Circumference	541	551	547	Pass
K	Buttock to Knee Length	514	540	530	Pass
L	Popliteal Height	343	369	356	Pass
M	Knee Pivot to floor height	392	409	400	Pass
N	Buttock Popliteal Length	416	442	432	Pass
O	Chest Depth w/o jacket	195	211	205	Pass
P	Foot Length	216	232	225	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	320	Pass
R	Arm Length	249	259	250	Pass
S	Knee Joint to seatback	477	493	485	Pass
V	Shoulder Width	341	357	348	Pass
W	Foot Width	78	94	85	Pass
Y	Chest Circumference w/jacket	851	881	868	Pass
Z	Waist Circumference	761	791	775	Pass



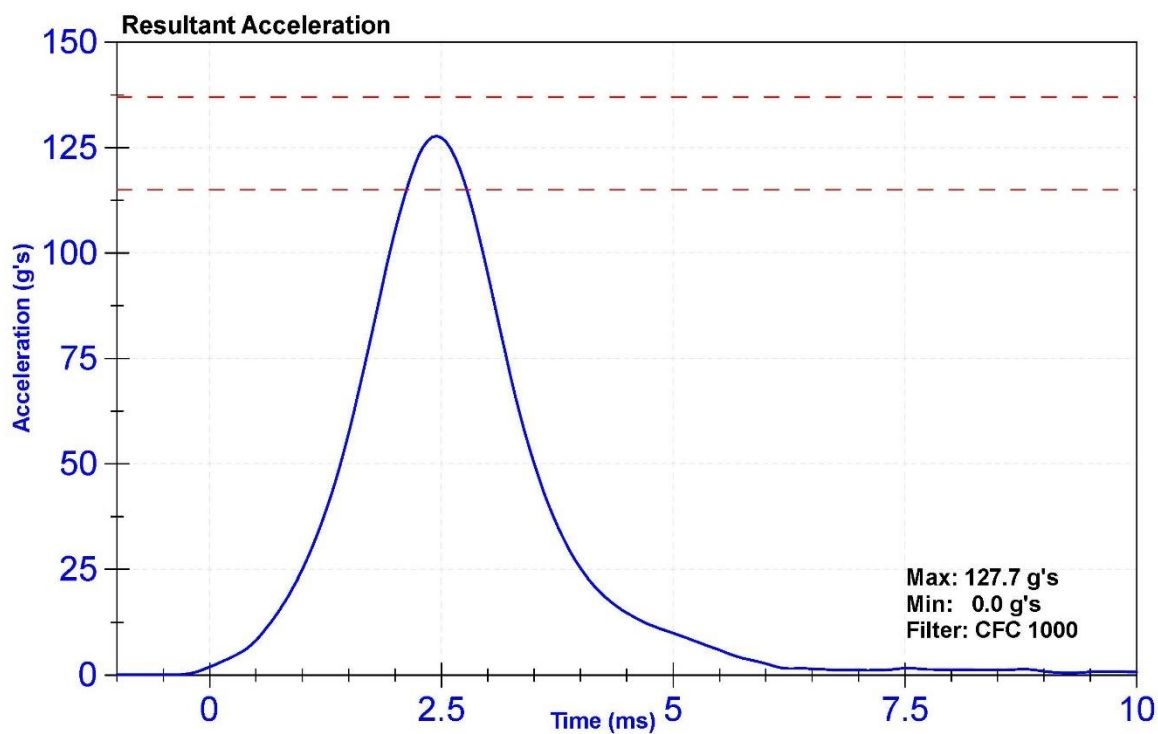
ATD Manufacturer	FTSS	Test Technician	T. Roseman
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

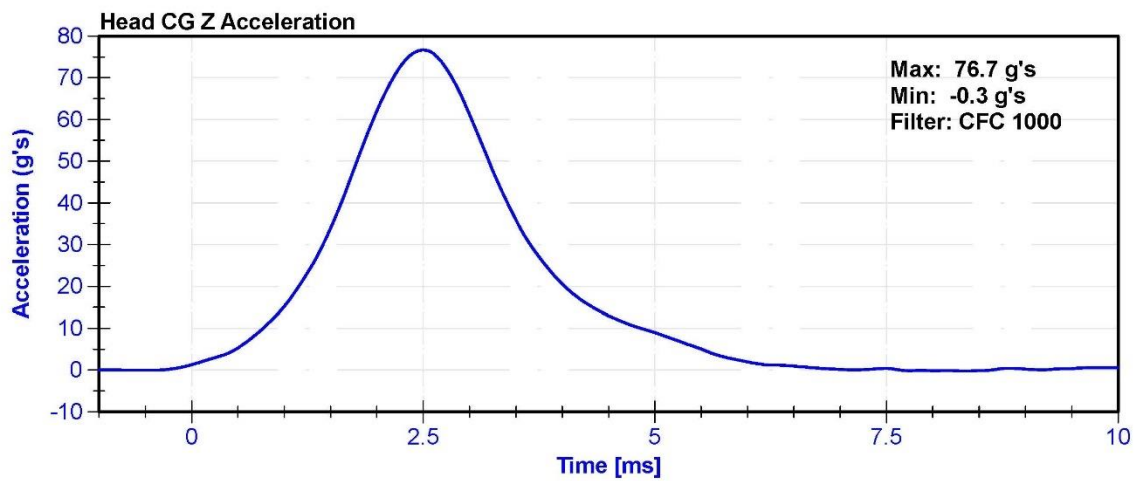
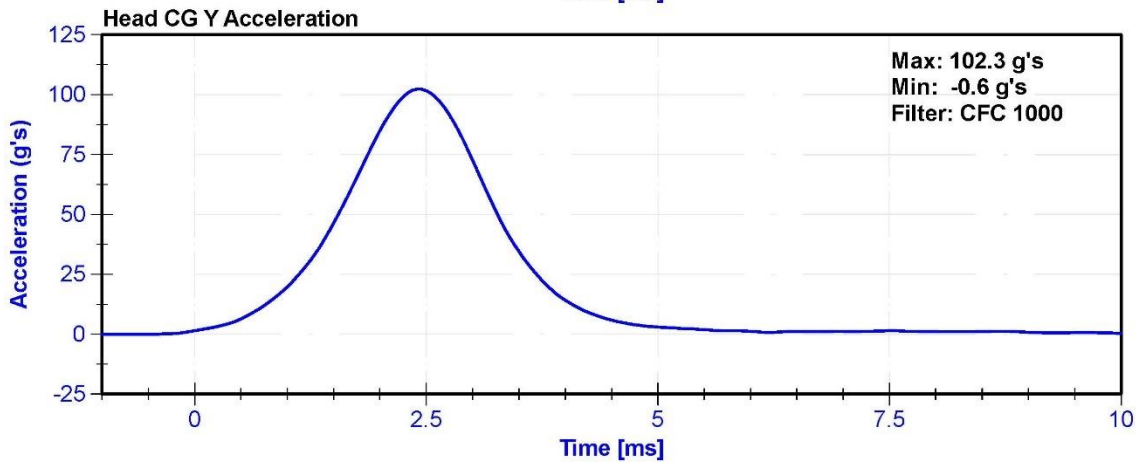
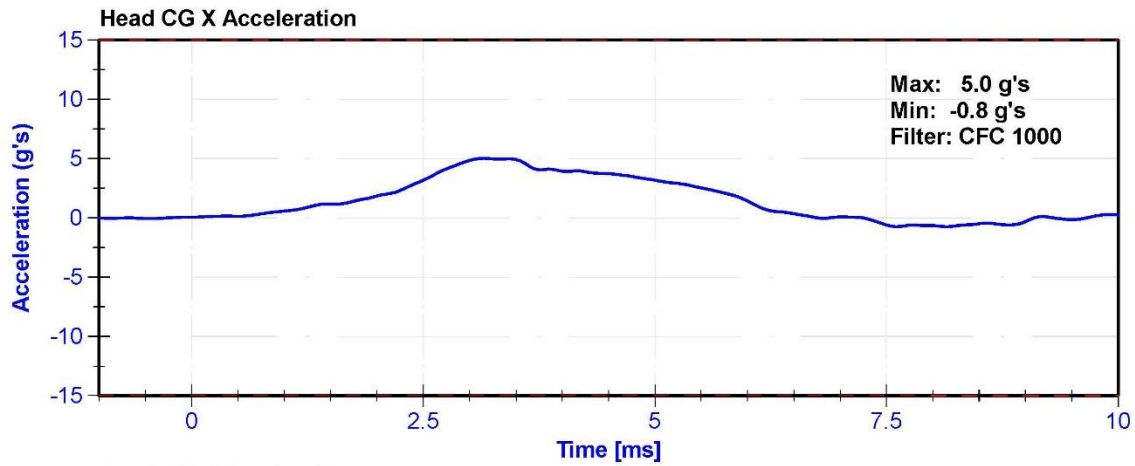
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	48.9	Pass
Resultant Acceleration	115	137	g's	127.7	Pass
Oscillation	0	15	%	1.2	Pass
Fore-Aft Acceleration	-15	15	g's	5.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	P74788	6/17/2022	12/14/2022
Y Accelerometer	Endevco	P83432	6/17/2022	12/14/2022
Z Accelerometer	Endevco	P83319	6/17/2022	12/14/2022





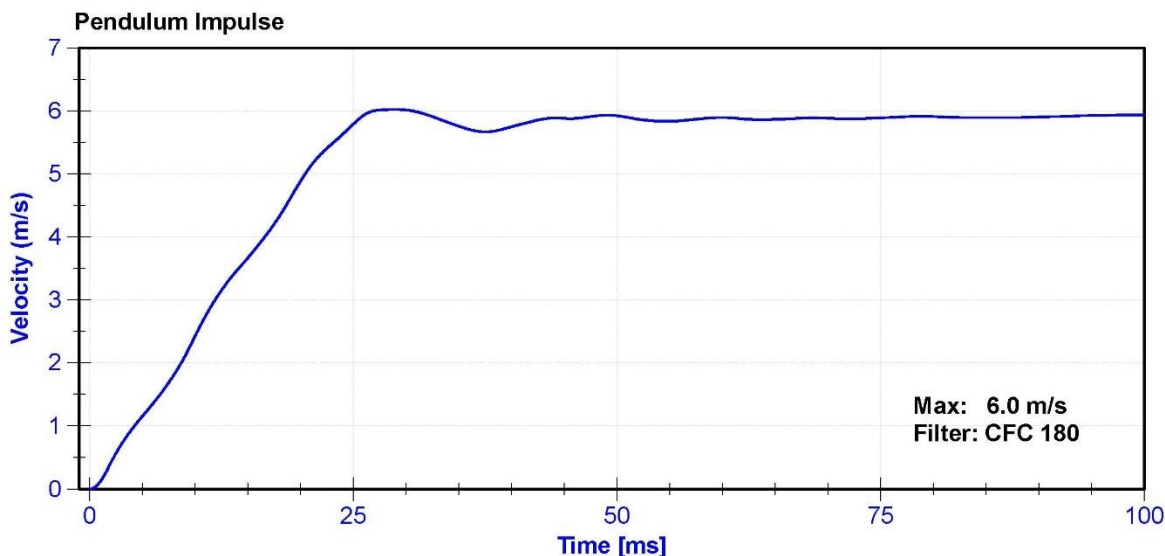
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ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

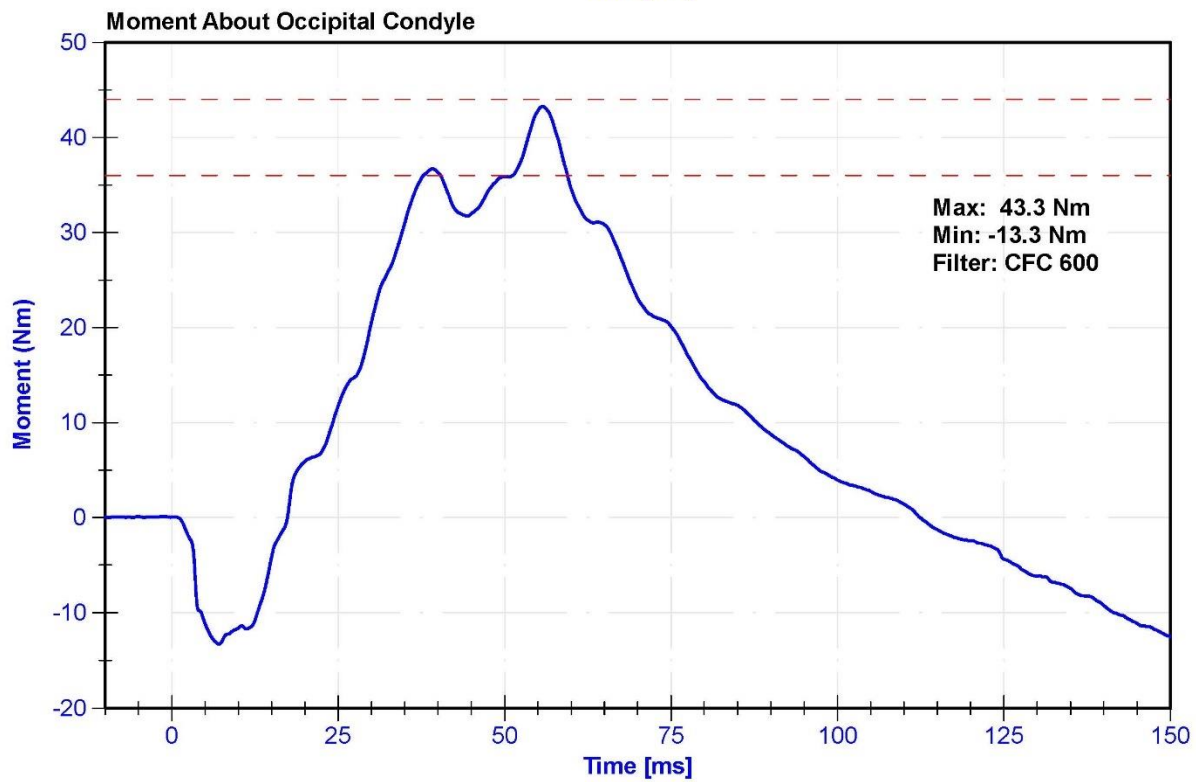
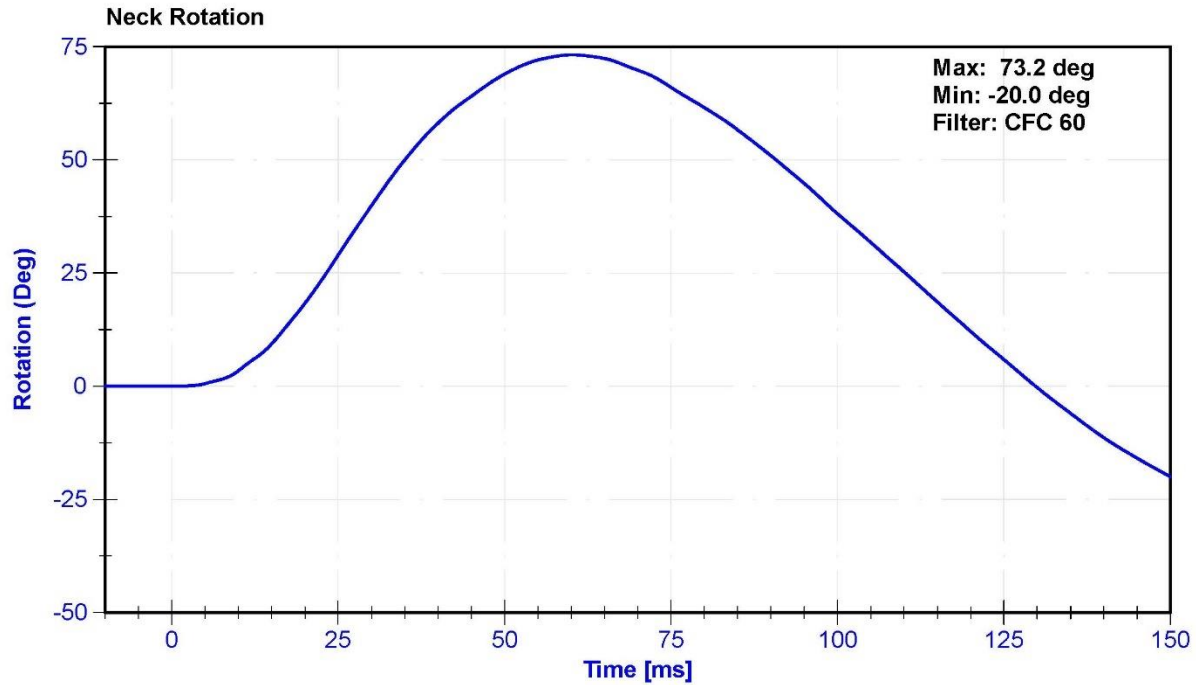
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	45	Pass
Velocity	5.51	5.63	m/s	5.593	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.43	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.67	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.89	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.79	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	6.02	Pass
Neck Rotation	71	81	deg	73.2	Pass
Time at Maximum Rotation	50	70	ms	60.1	Pass
Moment about the OC	36	44	Nm	43.3	Pass
Moment Decay to 0 Nm	102	126	ms	112.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	7231CT	10/28/2021	10/28/2022
Pendulum Potentiometer	Servo	4961	2/23/2022	2/23/2023
Condyle Potentiometer	Servo	DS185	11/12/2021	11/12/2022
Upper Neck Load Cell	Humanetics	1716A_1872-FY	6/13/2022	6/13/2023





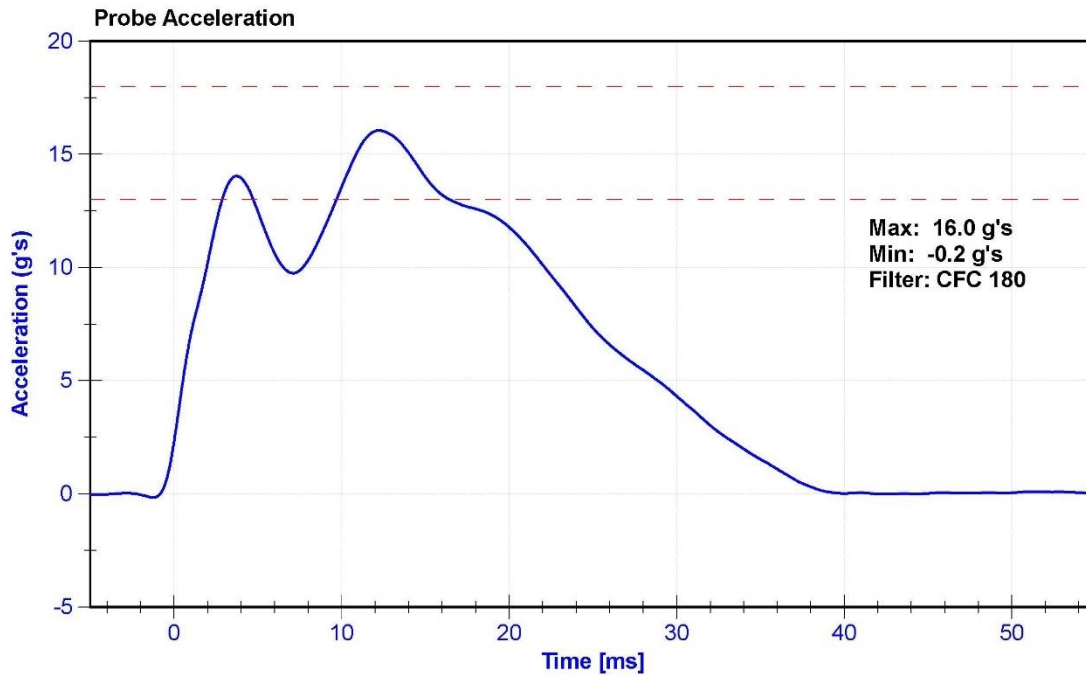
ATD Manufacturer	FTSS	Test Technician	D. Sakona, T. Roseman
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

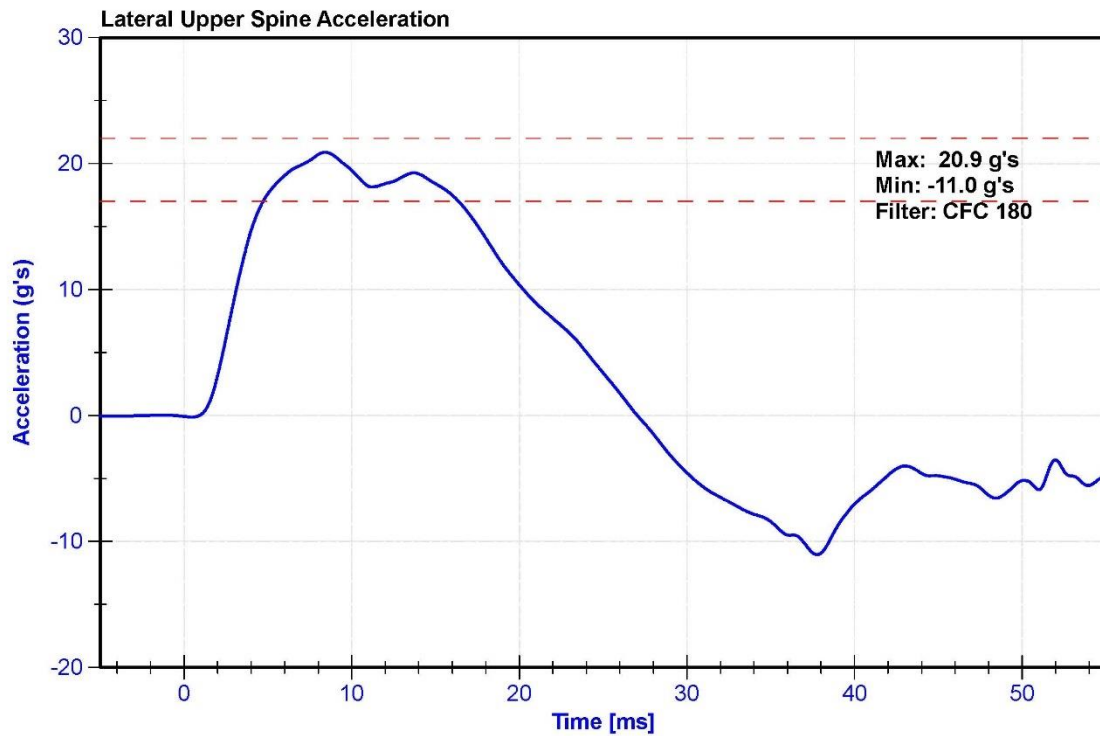
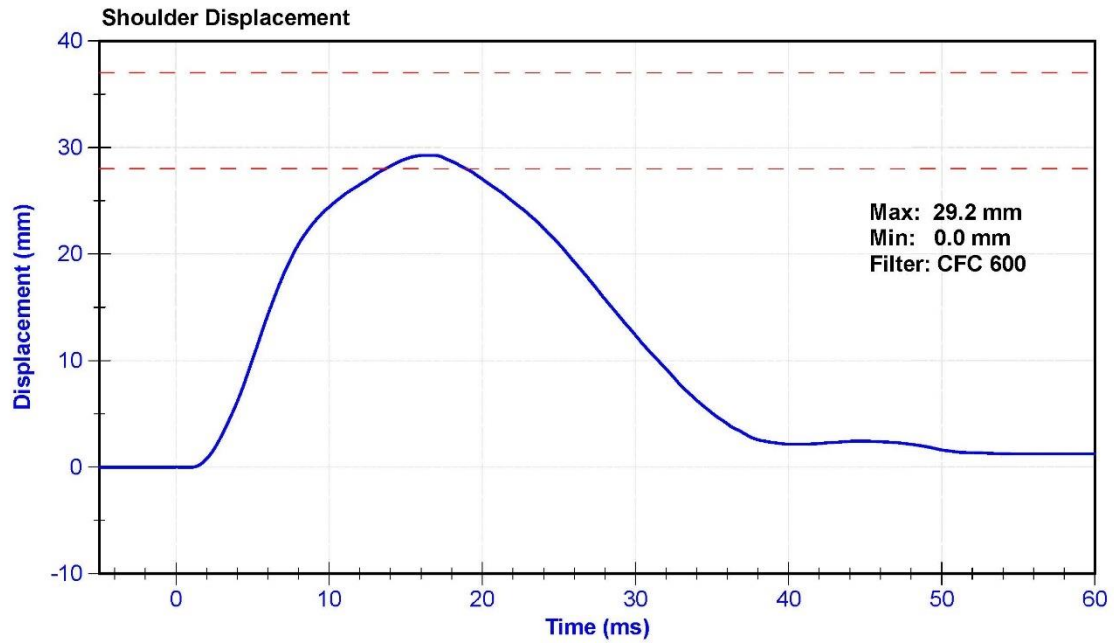
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	42.5	Pass
Velocity	4.2	4.4	m/s	4.34	Pass
Probe Acceleration	13	18	g's	16.0	Pass
Shoulder Deflection	28	37	mm	29.2	Pass
Lateral Upper Spine Acceleration	17	22	g's	20.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25885	10/25/2021	10/25/2022
Shoulder Potentiometer	Servo	1274GFE	6/20/2022	12/19/2022
Upper Spine Y Accelerometer	Endevco	P64148	6/17/2022	12/14/2022





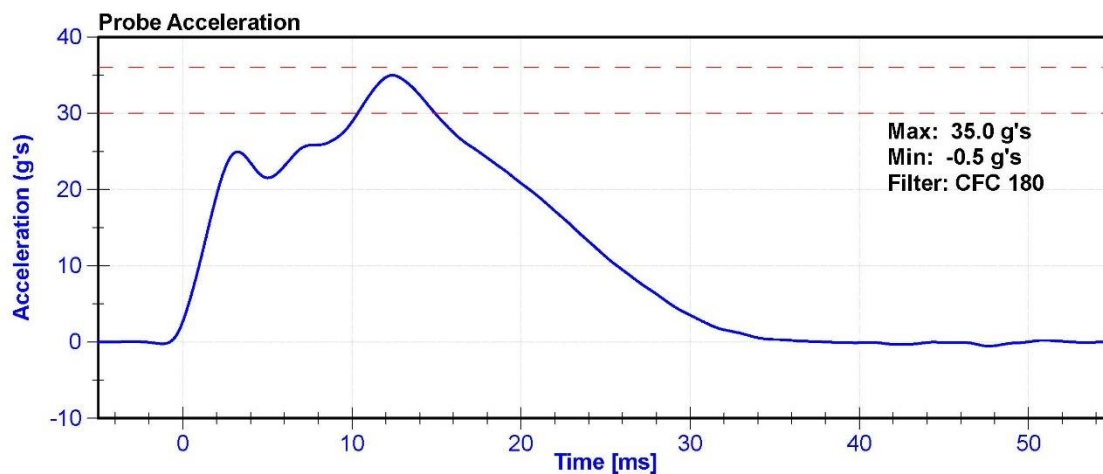
ATD Manufacturer	FTSS	Test Technician	D. Sakona, T. Roseman
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

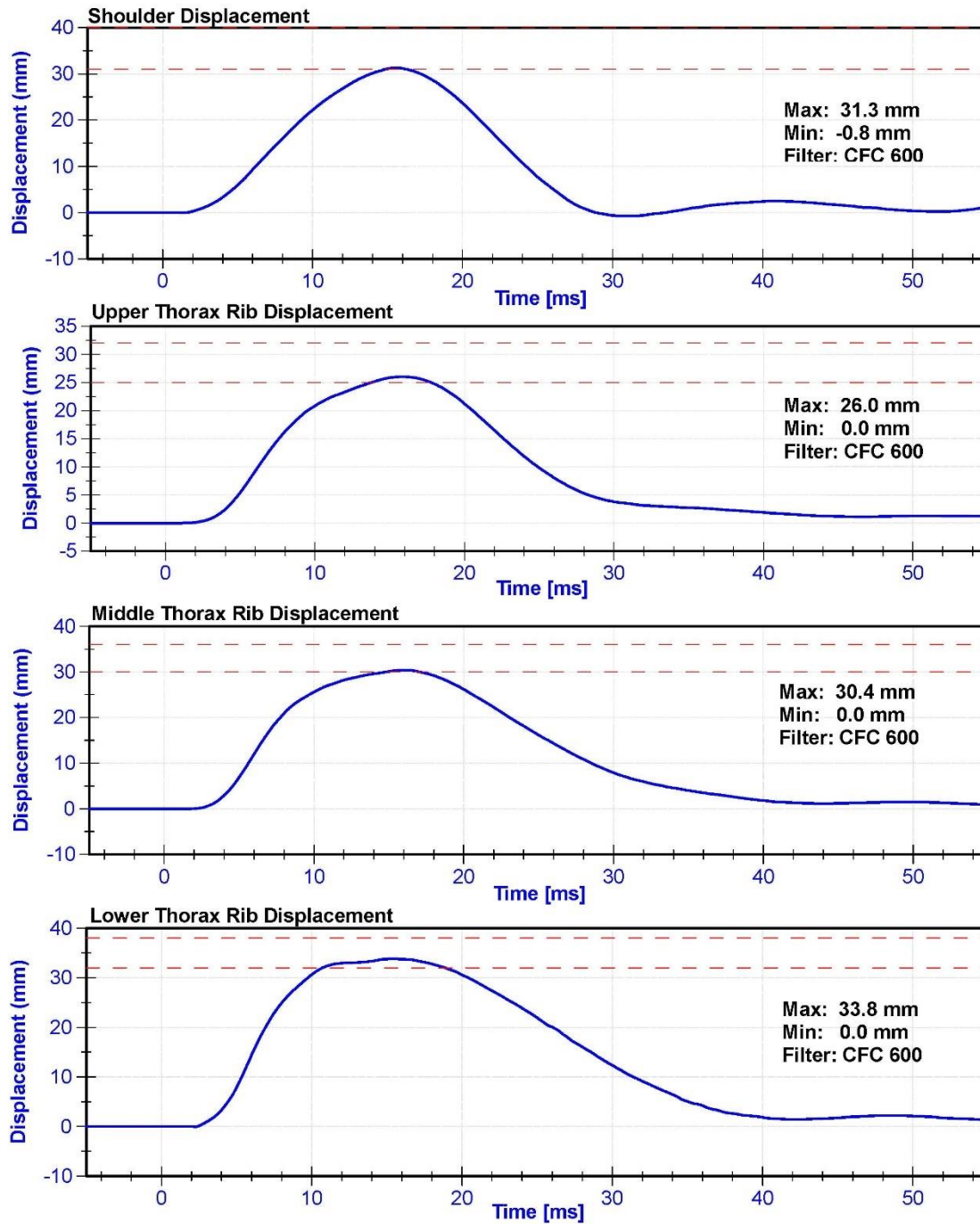
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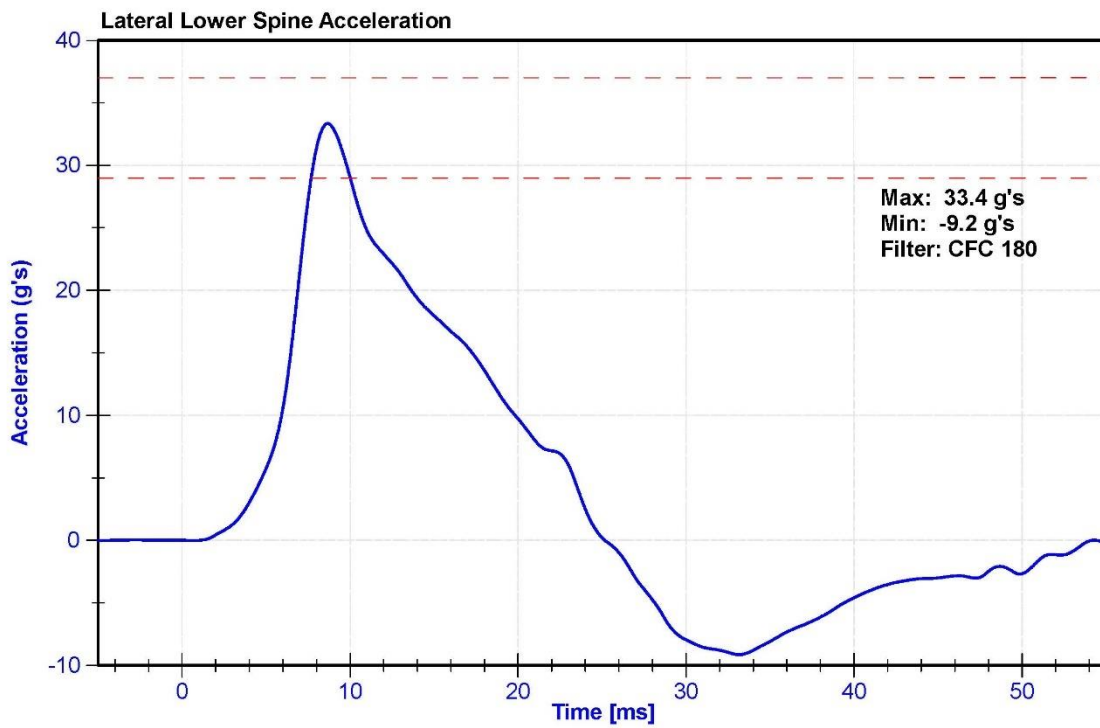
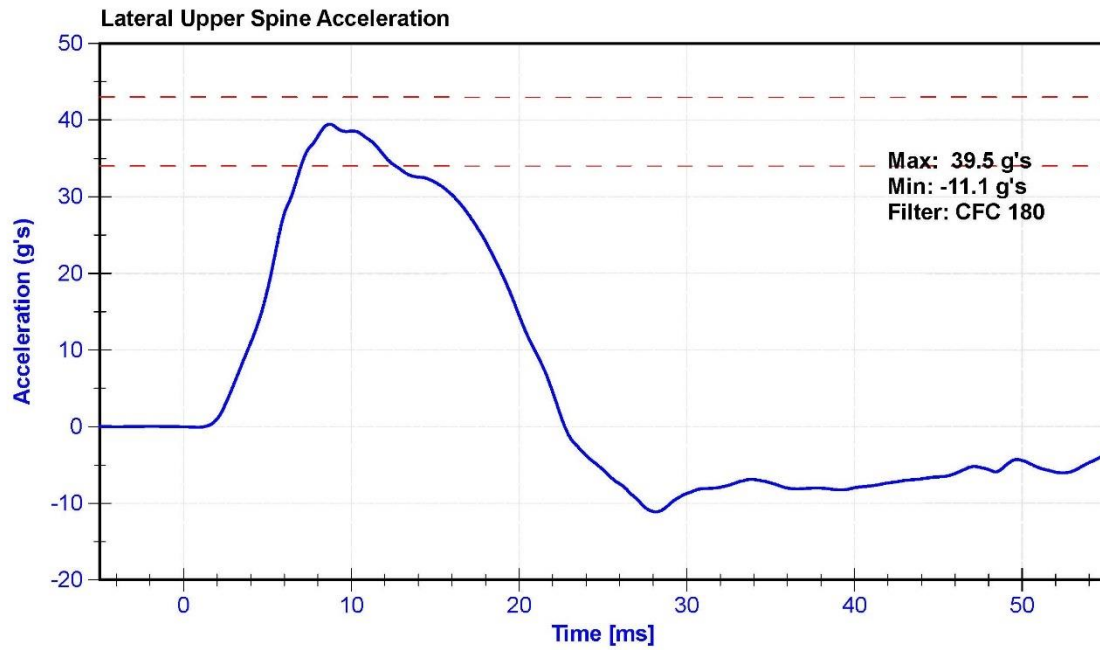
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	42.5	Pass
Velocity	6.6	6.8	m/s	6.62	Pass
Probe Acceleration after 5 ms	30	36	g's	35.0	Pass
Lateral Upper Spine Acceleration	34	43	g's	39.5	Pass
Lateral Lower Spine Acceleration	29	37	g's	33.4	Pass
Shoulder Deflection	31	40	mm	31.3	Pass
Upper Thorax Rib Deflection	25	32	mm	26.0	Pass
Mid Thorax Rib Deflection	30	36	mm	30.4	Pass
Lower Thorax Rib Deflection	32	38	mm	33.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25885	10/25/2021	10/25/2022
Upper Spine T1 Y Accelerometer	Endevco	P64148	6/17/2022	12/14/2022
Upper Spine T12 Y Accelerometer	Endevco	P51327	6/17/2022	12/14/2022
Shoulder Potentiometer	Servo	1274GFE	6/20/2022	12/19/2022
Upper Thorax Rib Potentiometer	Servo	1199GFE	6/17/2022	12/16/2022
Middle Thorax Rib Potentiometer	Servo	1246GFE	6/17/2022	12/16/2022
Lower Thorax Rib Potentiometer	Servo	011GFE	6/17/2022	12/16/2022







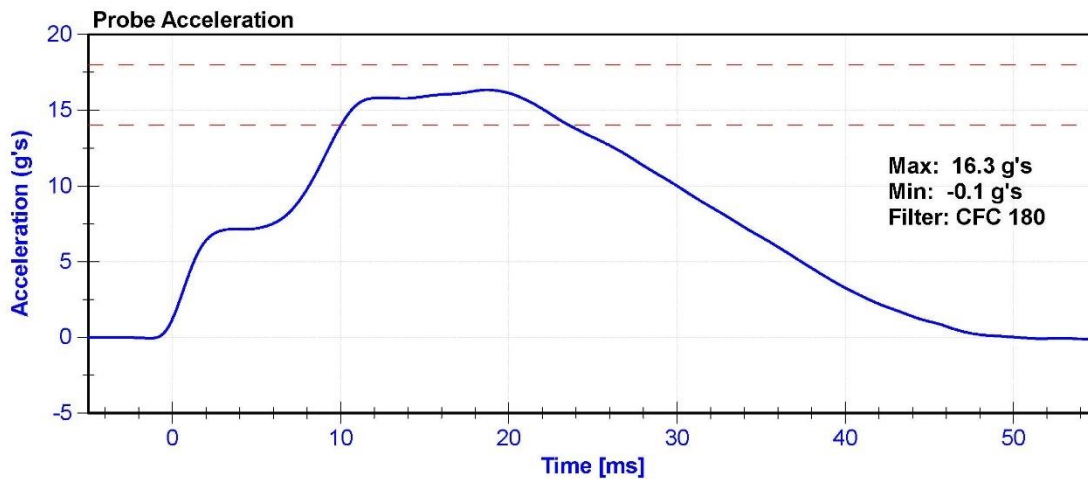
ATD Manufacturer	FTSS	Test Technician	D. Sakona, T. Roseman
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

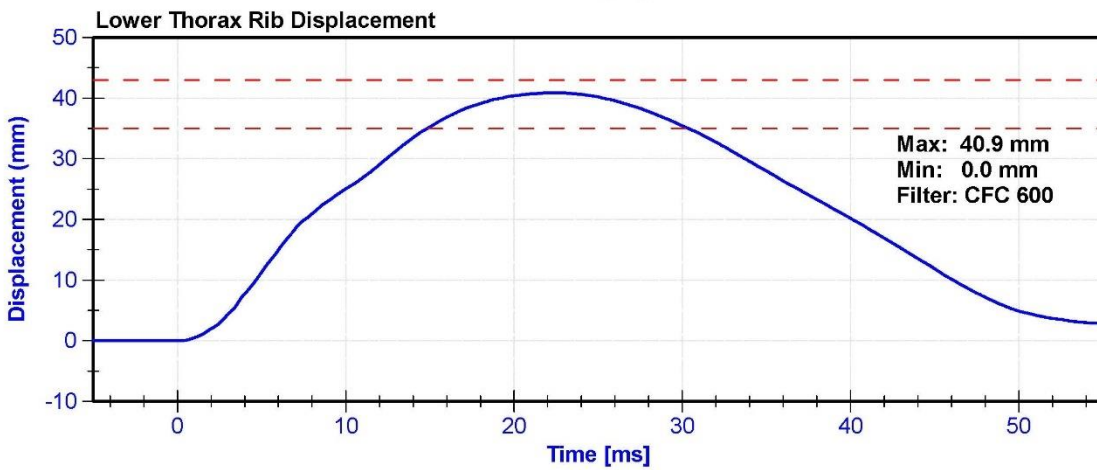
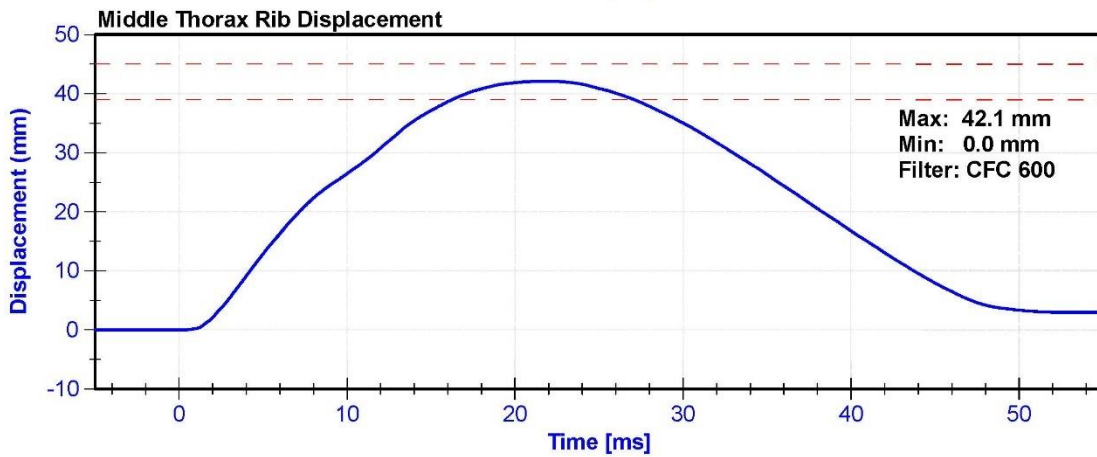
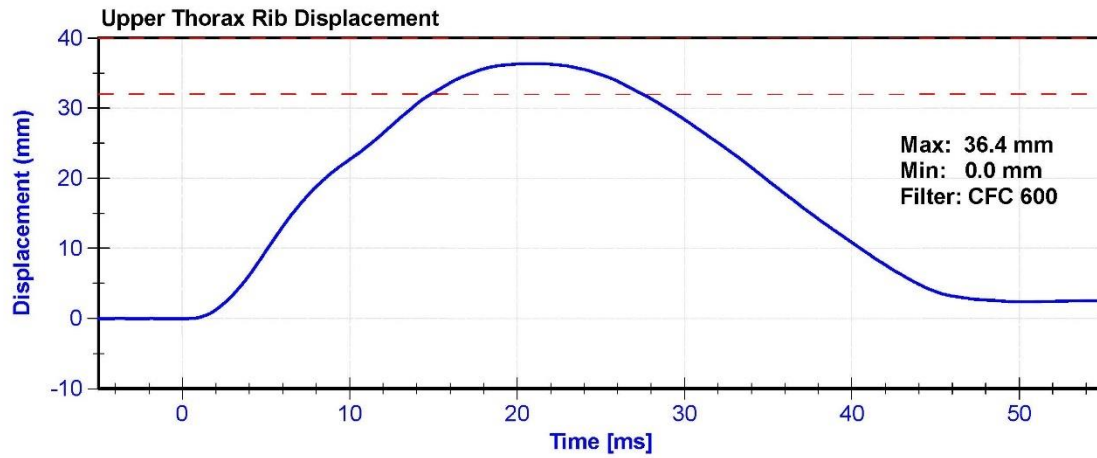
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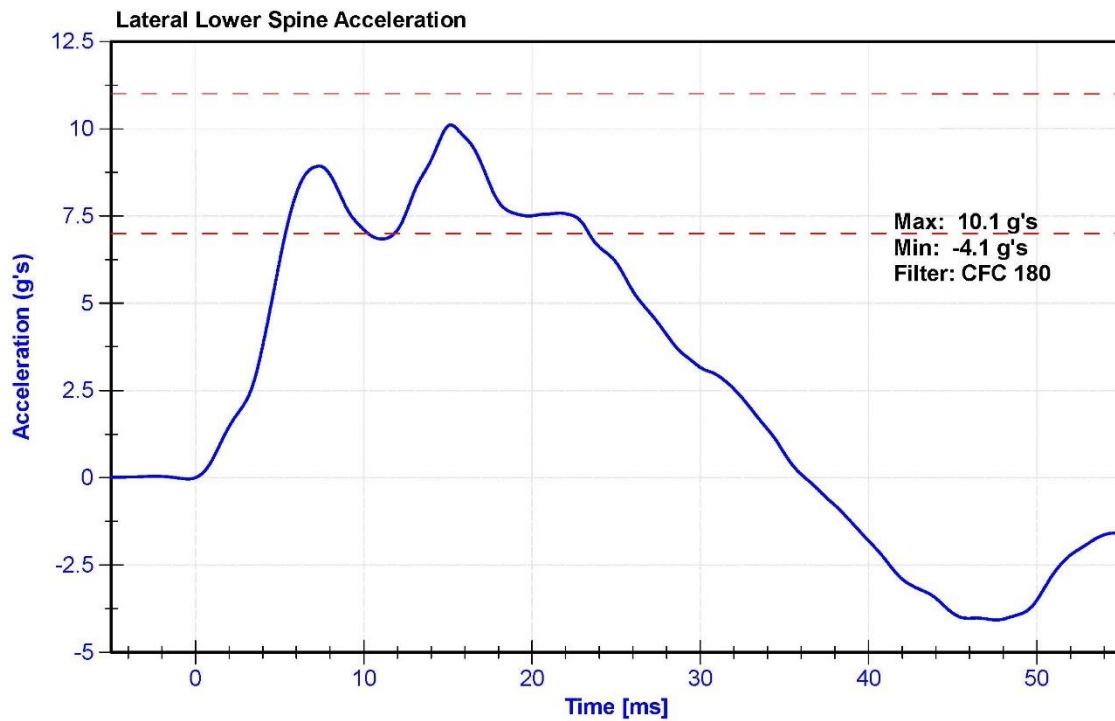
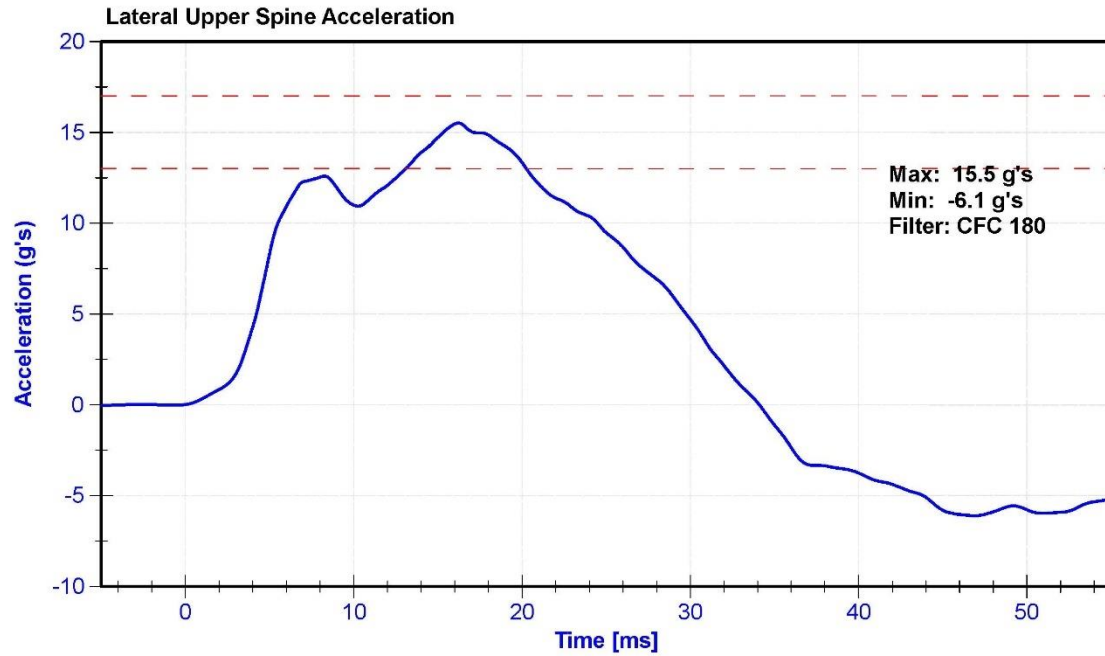
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	42.5	Pass
Velocity	4.2	4.4	m/s	4.34	Pass
Probe Acceleration	14	18	g's	16.3	Pass
Lateral Upper Spine Acceleration	13	17	g's	15.5	Pass
Lateral Lower Spine Acceleration	7	11	g's	10.1	Pass
Upper Thorax Rib Deflection	32	40	mm	36.4	Pass
Middle Thorax Rib Deflection	39	45	mm	42.1	Pass
Lower Thorax Rib Deflection	35	43	mm	40.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25885	10/25/2021	10/25/2022
Upper Spine Y Accelerometer	Endevco	P64148	6/17/2022	12/14/2022
Lower Spine Y Accelerometer	Endevco	P51327	6/17/2022	12/14/2022
Upper Thorax Rib Potentiometer	Servo	1199GFE	6/17/2022	12/16/2022
Middle Thorax Rib Potentiometer	Servo	1246GFE	6/17/2022	12/16/2022
Lower Thorax Rib Potentiometer	Servo	011GFE	6/17/2022	12/16/2022







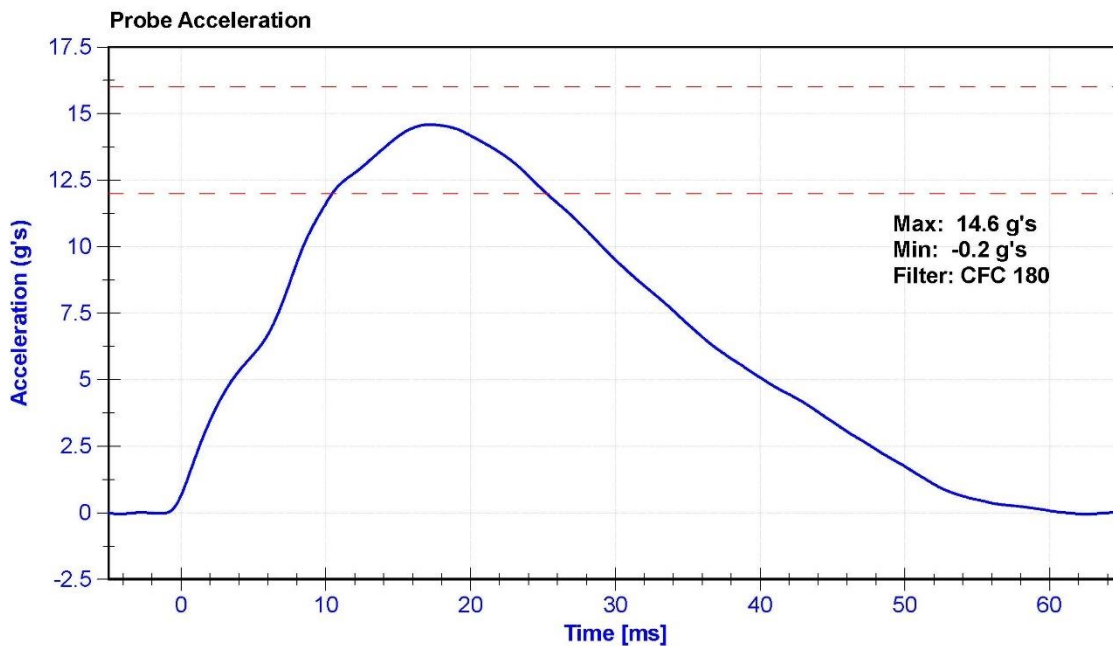
ATD Manufacturer	FTSS	Test Technician	D. Sakona, T. Roseman
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

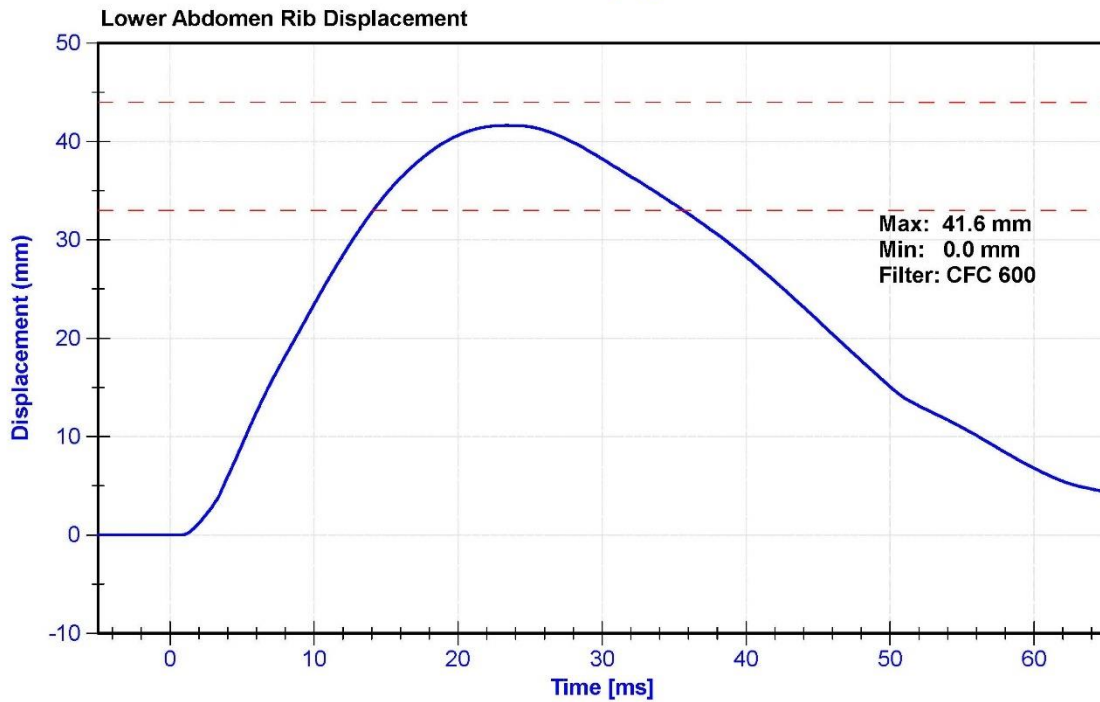
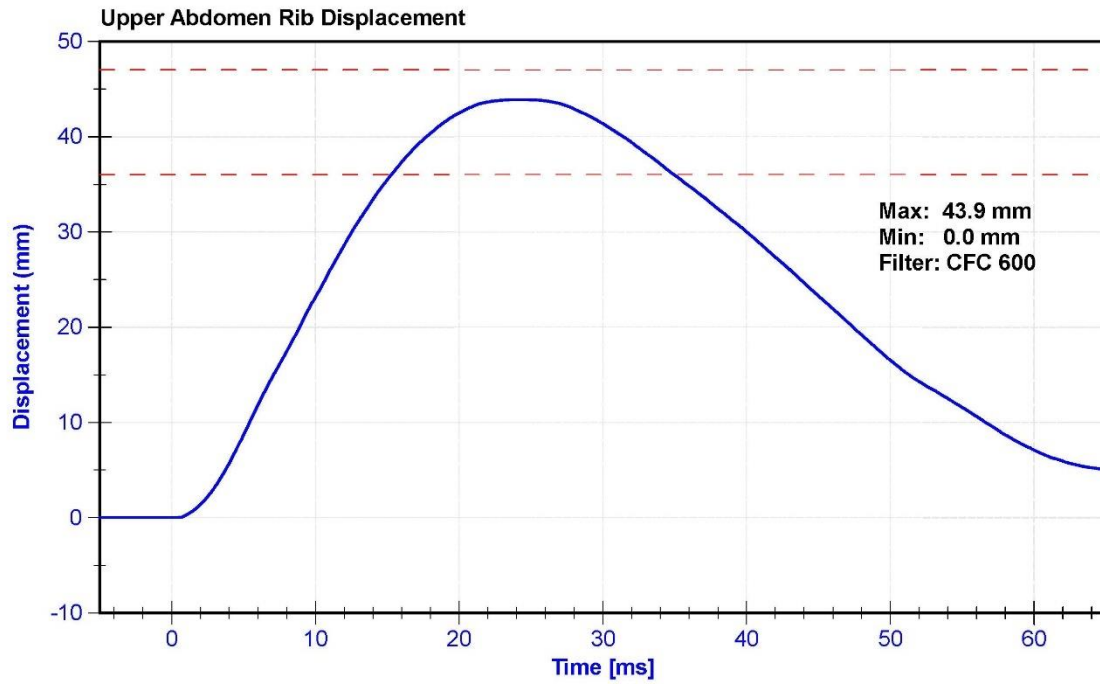
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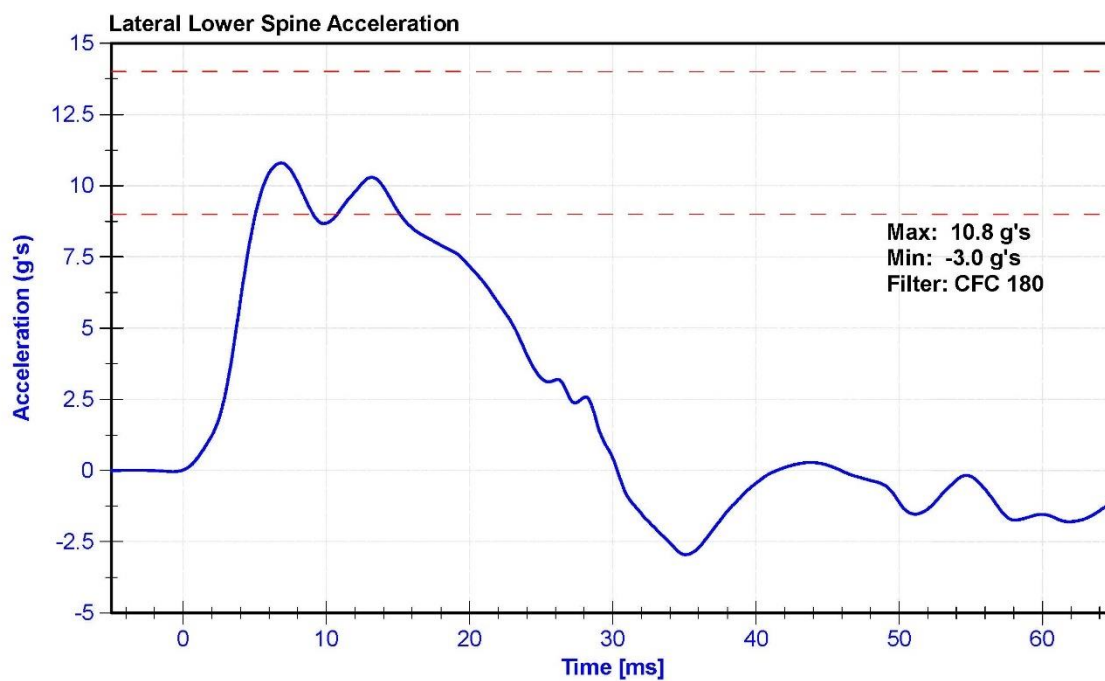
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	42.5	Pass
Velocity	4.2	4.4	m/s	4.34	Pass
Probe Acceleration	12	16	g's	14.6	Pass
Lateral Lower Spine Acceleration	9	14	g's	10.8	Pass
Upper Abdomen Rib Deflection	36	47	mm	43.9	Pass
Lower Abdomen Rib Deflection	33	44	mm	41.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	T25885	10/25/2021	10/25/2022
Lower Spine Y Accelerometer	Endevco	P51327	6/17/2022	12/14/2022
Upper Abdomen Rib Potentiometer	Servo	008GFE	6/17/2022	12/16/2022
Lower Abdomen Rib Potentiometer	Servo	041 GFE	6/17/2022	12/16/2022







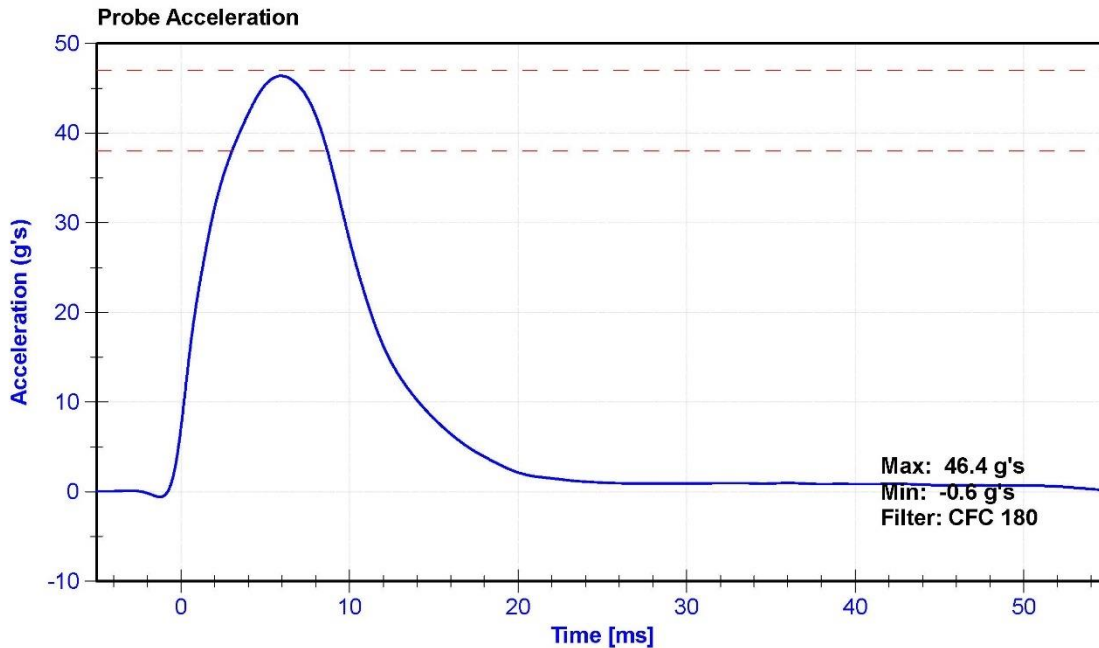
ATD Manufacturer	FTSS	Test Technician	D. Sakona, T. Roseman
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

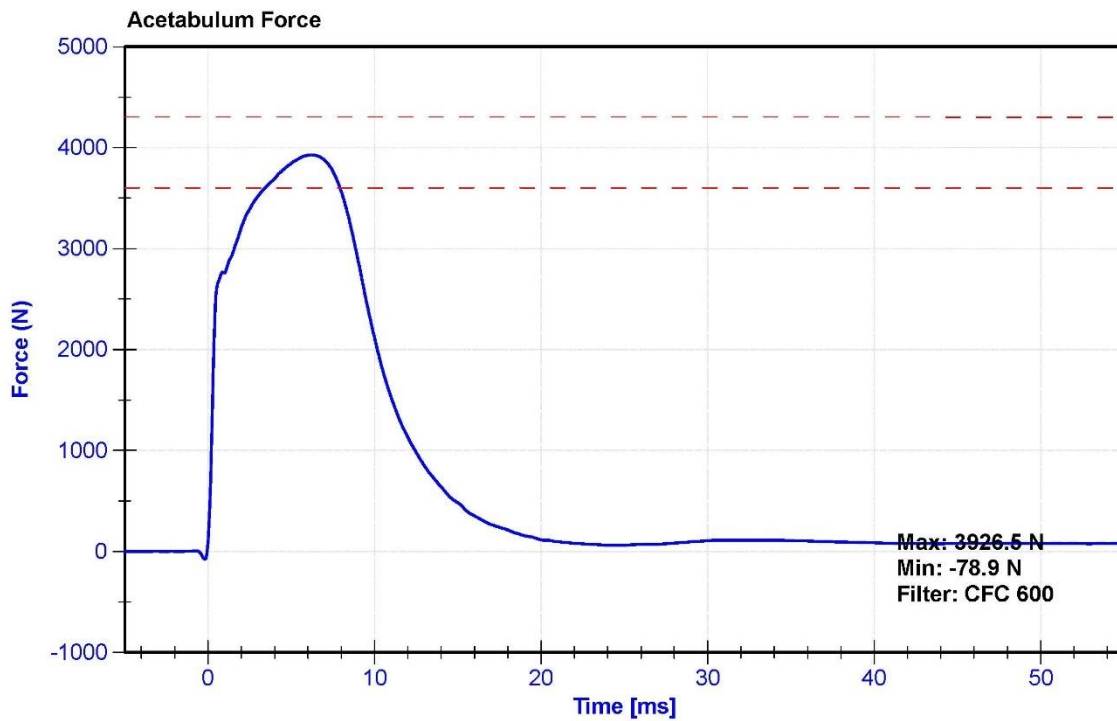
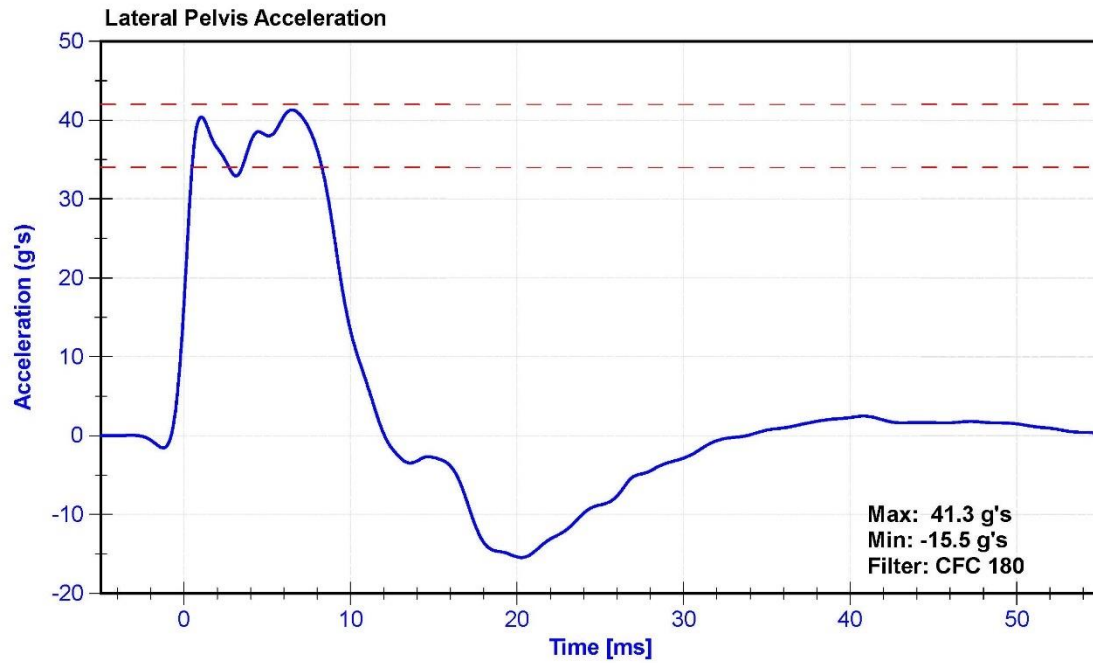
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	42.5	Pass
Velocity	6.6	6.8	m/s	6.61	Pass
Probe Acceleration	38	47	g's	46.4	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	41.3	Pass
Acetabulum Force	3600	4300	N	3926.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25885	10/25/2021	10/25/2022
Pelvis Y Accelerometer	Endevco	P51875	6/17/2022	12/14/2022
Acetabulum Load Cell	Denton	276-FY	9/14/2021	9/14/2022
Certification Plug	SACO			N/A
Crash Test Plug	SACO			N/A







PG 8012 CERT
6/30/2022

SID-Its Pelvis Plug Certification Test

Plug S/N 15200

Test Number 17916

Report Number 17965

Test Date 3/8/2021 1:27:19 PM

Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	334	600
Force @ 1.5 mm (N)	1,156	1,400
Force @ 2.5 mm (N)	1,397	1,618
Force @ 3.0 mm (N)	1,449	1,673

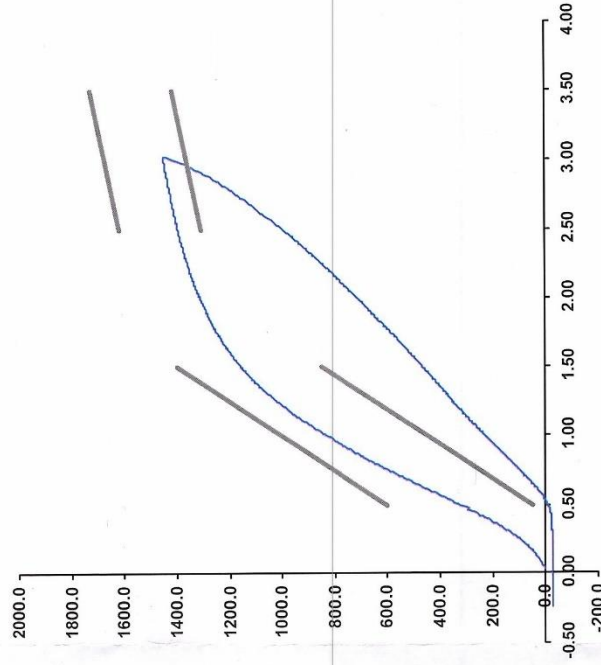
Testing Machine STM-20 5965542

Load Cell S/N (F1360947), Units (LBS) 1000

Crosshead Speed (mm / min) or Rate 12.7
Extension or Position Measured by XHD_100 (XHD100)

Notes:

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107 08-Mar-21

SACO Research

By : De Date : 3/8/2021

SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 910-694-2082 FAX



DG8012 CRASH
6/30/2022

SID-IIs Pelvis Plug Certification Test

Plug S/N 15130

Test Number 17842

Report Number 17891

Test Date 3/5/2021 10:11:56 AM

Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	296	600
Force @ 1.5 mm (N)	1,144	1,400
Force @ 2.5 mm (N)	1,401	1,618
Force @ 3.0 mm (N)	1,455	1,673

Testing Machine STM-20 5965542

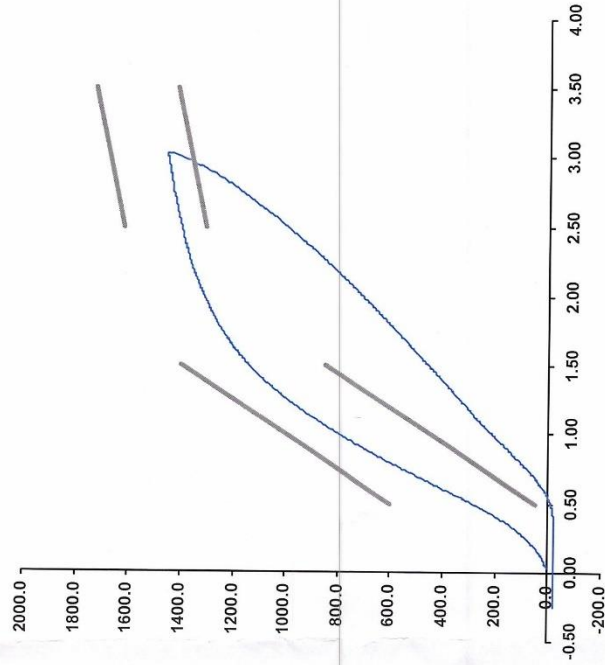
Load Cell S/N (F1360947), Units (LBS) 1000

Crosshead Speed (mm / min) or Rate 12.7

Extension or Position Measured by XHD_100 (XHD100)

Notes:

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107 05-Mar-21

SACO Research

By: DC Date: 3/5/2021

SACO Research 41735 Elm St #401 Murrieta, CA 92562 Tel 310-694-2082 FAX



D68812 NON IMPACT
6/30/2021

SID-11s Pelvis Plug Certification Test

Plug S/N 15225

Test Number 17976

Report Number 18025

Test Date 3/10/2021 12:41:19 PM

Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	310	600
Force @ 1.5 mm (N)	1,145	1,400
Force @ 2.5 mm (N)	1,409	1,618
Force @ 3.0 mm (N)	1,482	1,673

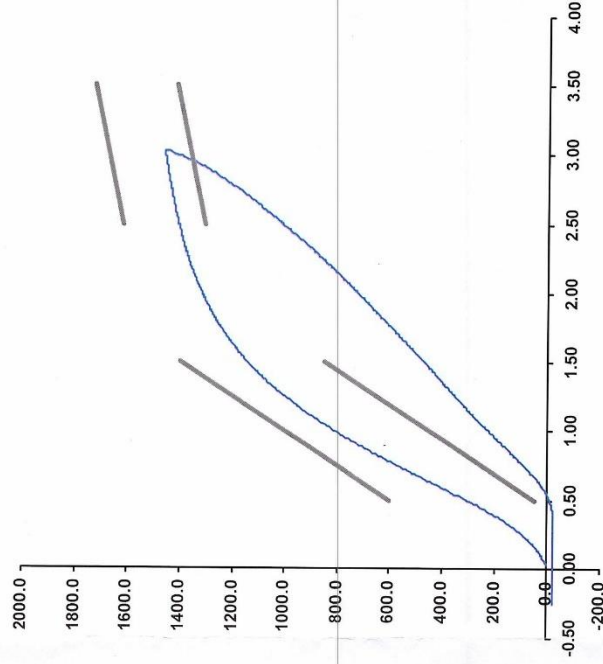
Testing Machine STM-20 5965542

Load Cell S/N (F1360947), Units (LBS) 1000

Crosshead Speed (mm / min) or Rate 12.7
Extension or Position Measured by XHD_100 (XHD100)

Notes:

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107
10-Mar-21

SACO Research

By: DC Date: 3/10/2021

SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 FAX

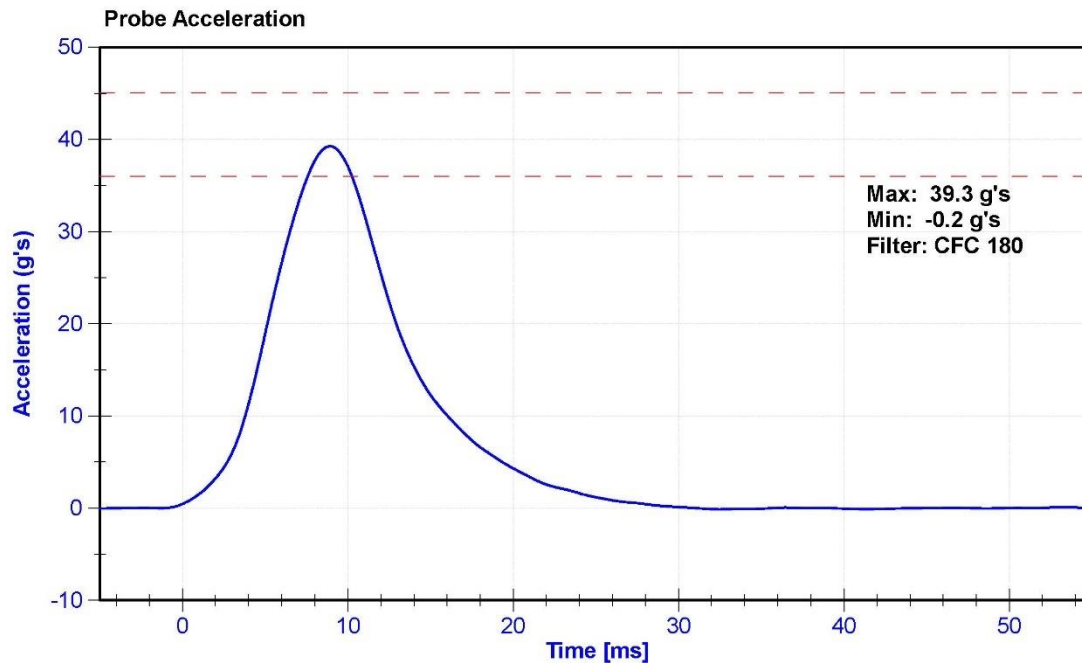
ATD Manufacturer	FTSS	Test Technician	D. Sakona, T. Roseman
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

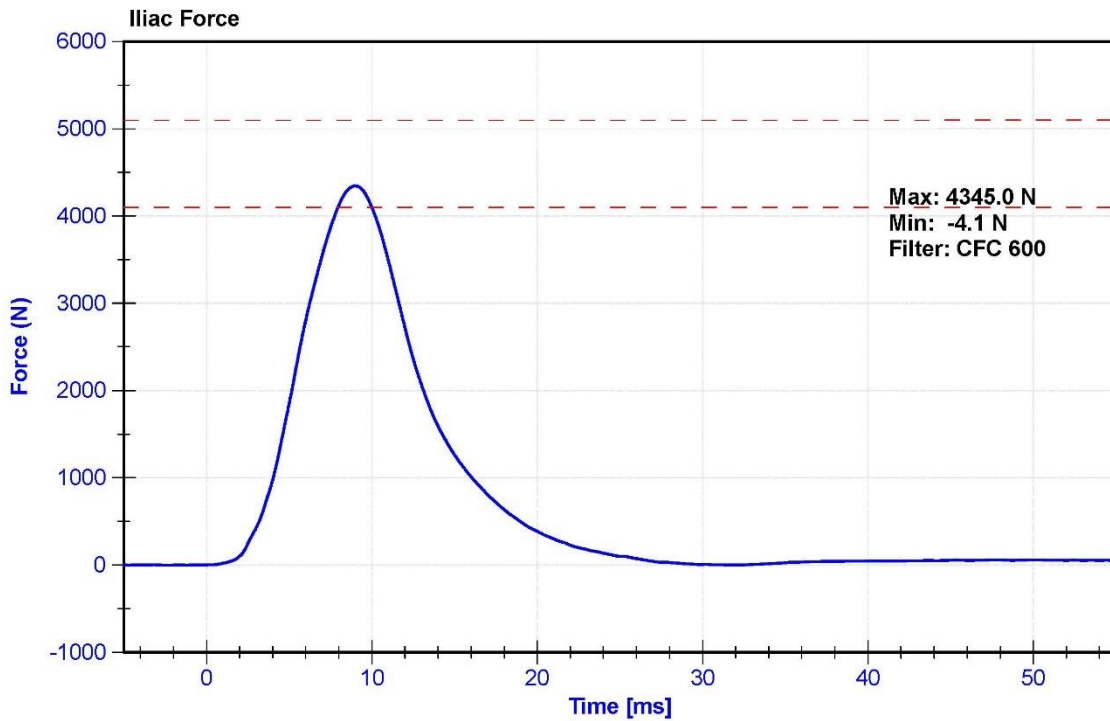
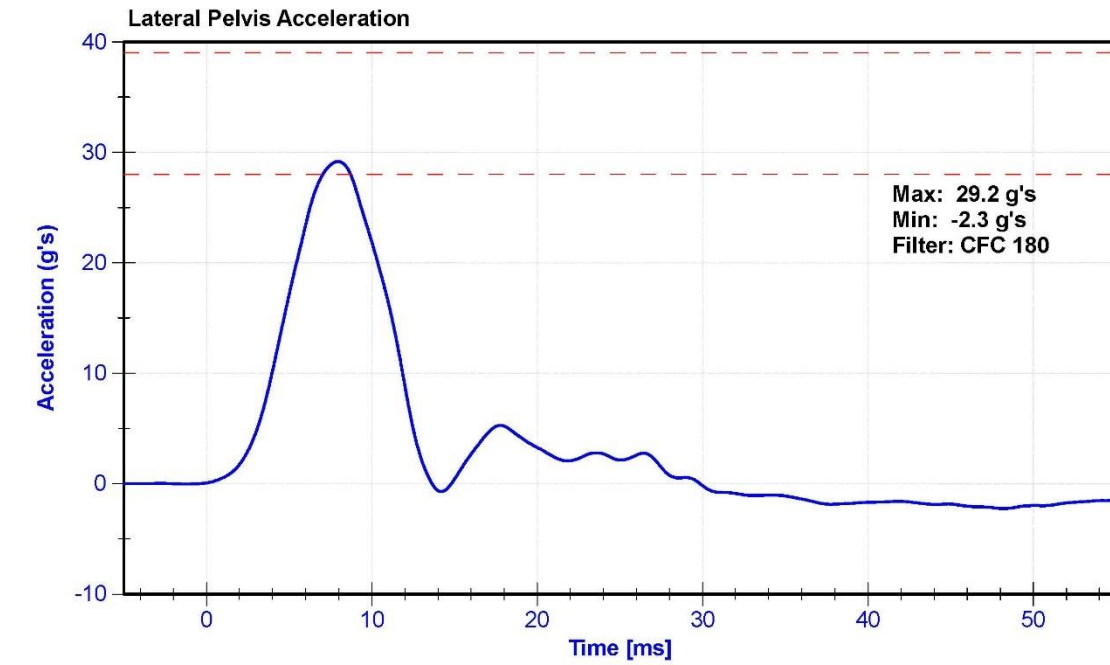
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	42.5	Pass
Velocity	4.2	4.4	m/s	4.37	Pass
Probe Acceleration	36	45	g's	39.3	Pass
Lateral Pelvis Acceleration	28	39	g's	29.2	Pass
Iliac Force	4100	5100	N	4345.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25885	10/25/2021	10/25/2022
Pelvis Y Accelerometer	Endevco	P51875	6/17/2022	12/14/2022
Iliac Load Cell	Denton	290-FY	9/14/2021	9/14/2022





CALIBRATION TEST RESULTS

POST-TEST

SID-IIS 5TH PERCENTILE FEMALE - DRIVER ATD

SERIAL NO: DG8012

(CONFIGURED FOR LEFT SIDE IMPACT)

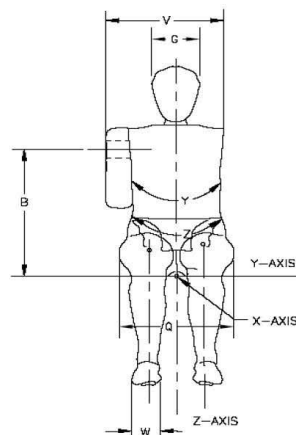
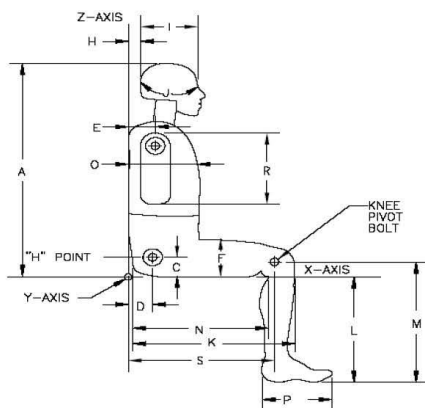


External Measurements - SID-IIs

Technician: **K. Brogan**

Date: **07/15/2022**

Dummy Serial Number: **DG8012**



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	781	Pass
B	Shoulder Pivot Height	437	453	445	Pass
C	H-point Height	79	89	84	Pass
D	H-point from seatback	141	151	145	Pass
E	Shoulder Pivot from Backline	97	107	103	Pass
F	Thigh Clearance	119	135	125	Pass
G	Head Breadth	140	148	145	Pass
H	Head Back from Backline	40	46	45	Pass
I	Head Depth	178	188	184	Pass
J	Head Circumference	541	551	545	Pass
K	Buttock to Knee Length	514	540	536	Pass
L	Popliteal Height	343	369	358	Pass
M	Knee Pivot to floor height	392	409	400	Pass
N	Buttock Popliteal Length	416	442	432	Pass
O	Chest Depth w/o jacket	195	211	205	Pass
P	Foot Length	216	232	225	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	320	Pass
R	Arm Length	249	259	250	Pass
S	Knee Joint to seatback	477	493	485	Pass
V	Shoulder Width	341	357	348	Pass
W	Foot Width	78	94	85	Pass
Y	Chest Circumference w/jacket	851	881	870	Pass
Z	Waist Circumference	761	791	780	Pass

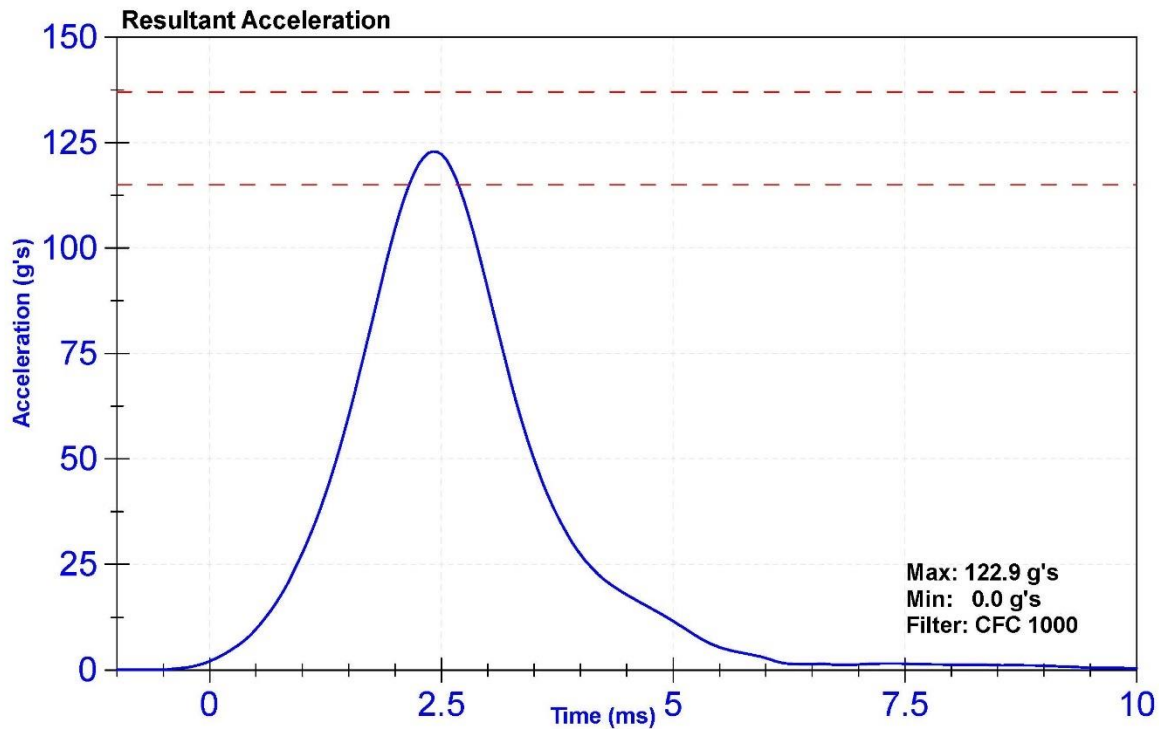
ATD Manufacturer	FTSS	Test Technician	T. Roseman
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

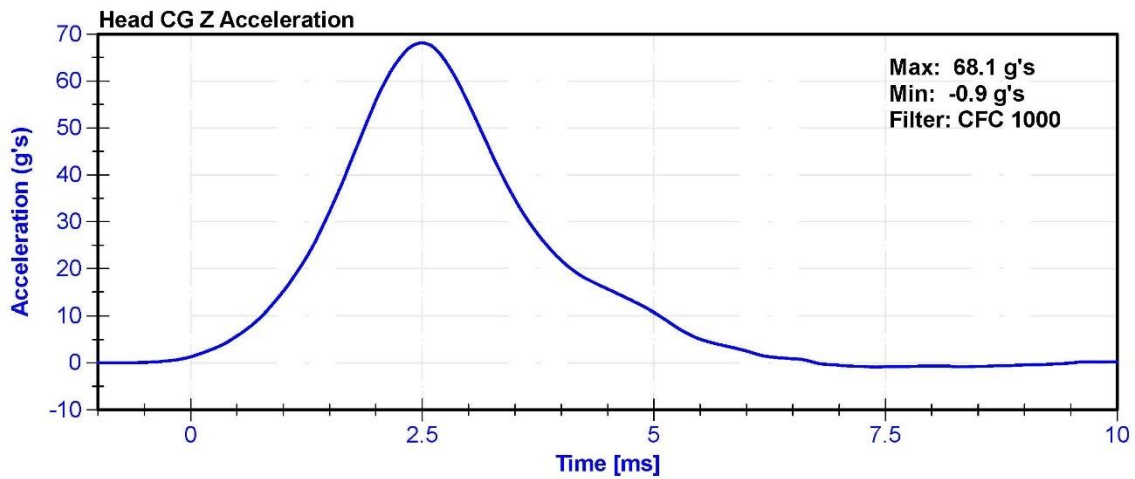
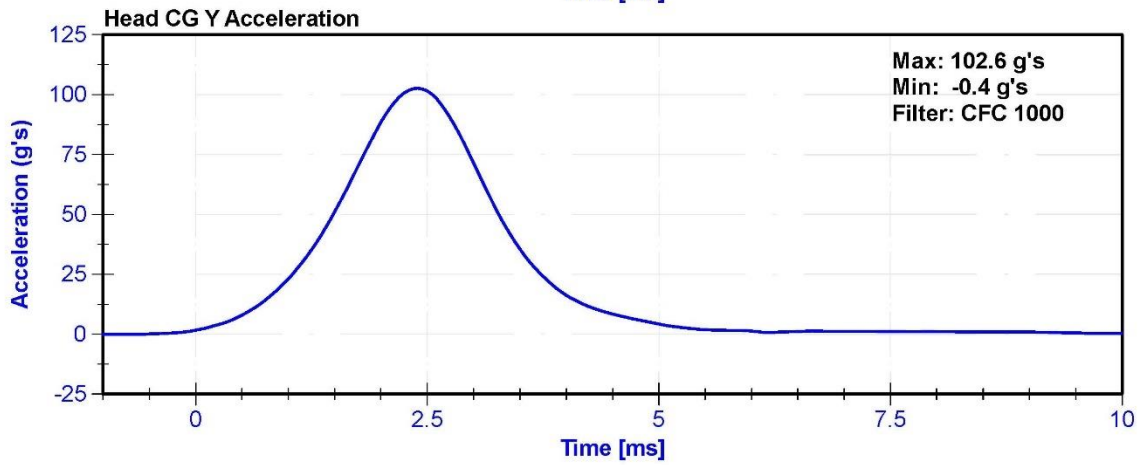
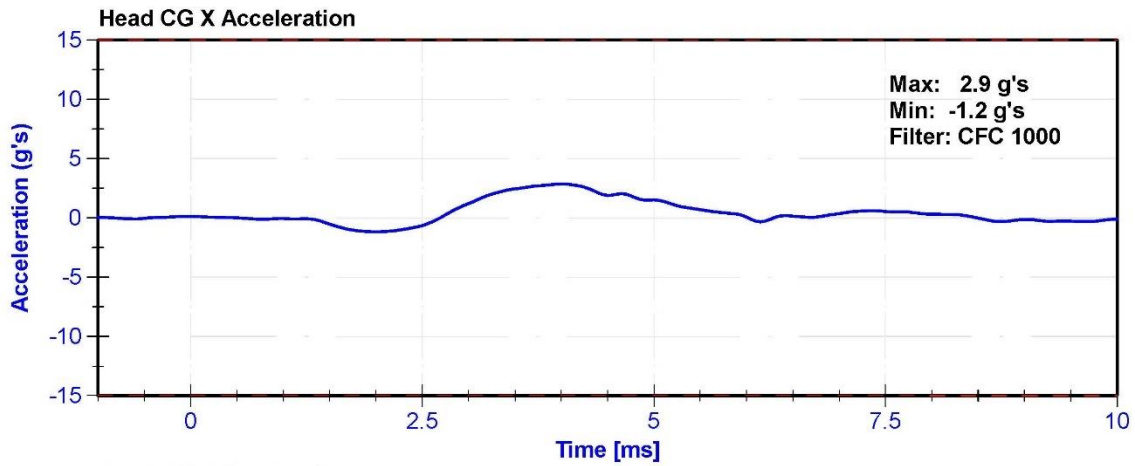
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	52.6	Pass
Resultant Acceleration	115	137	g's	122.9	Pass
Oscillation	0	15	%	1.2	Pass
Fore-Aft Acceleration	-15	15	g's	2.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	P74788	6/17/2022	12/14/2022
Y Accelerometer	Endevco	P83432	6/17/2022	12/14/2022
Z Accelerometer	Endevco	P83319	6/17/2022	12/14/2022





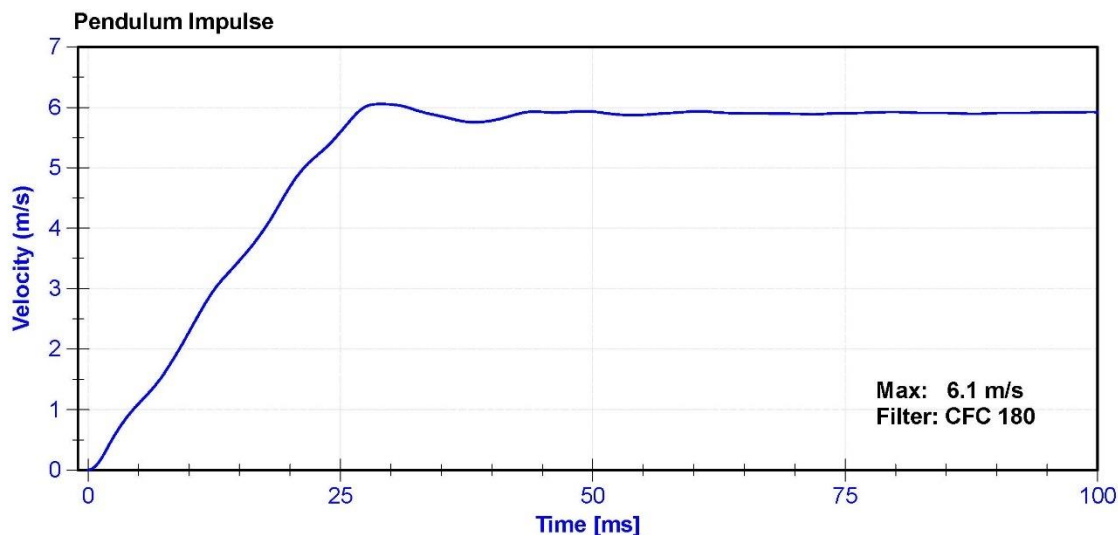
ATD Manufacturer	FTSS	Test Technician	T. Roseman
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

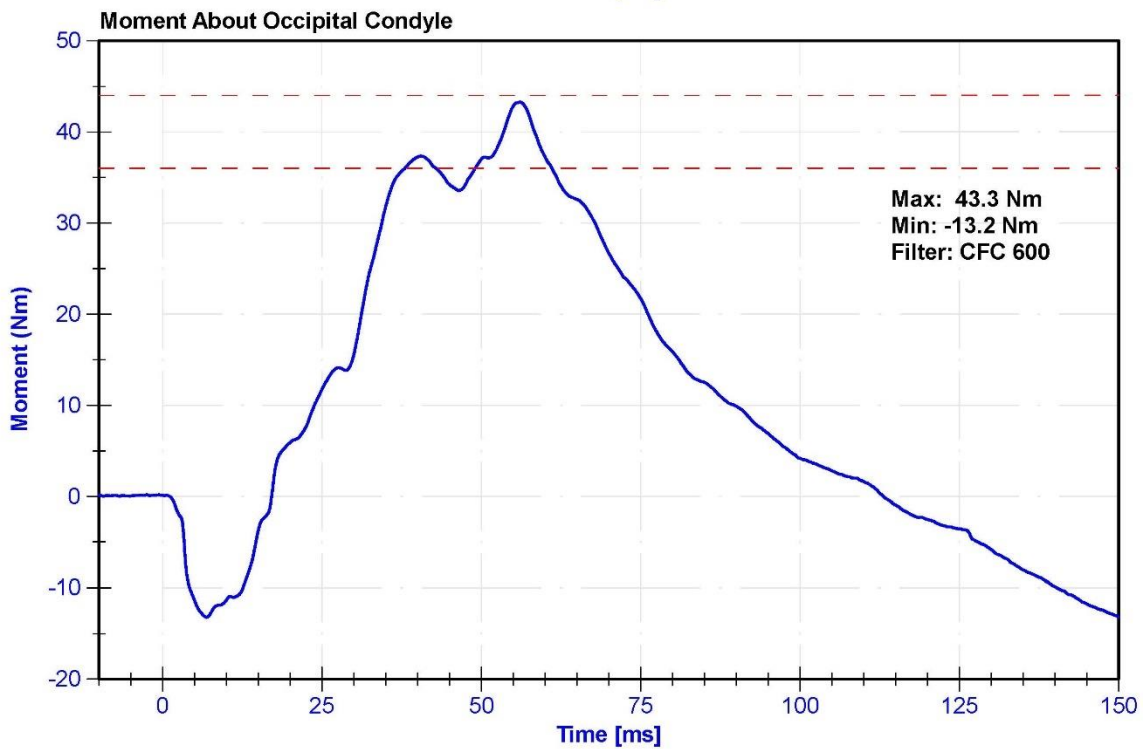
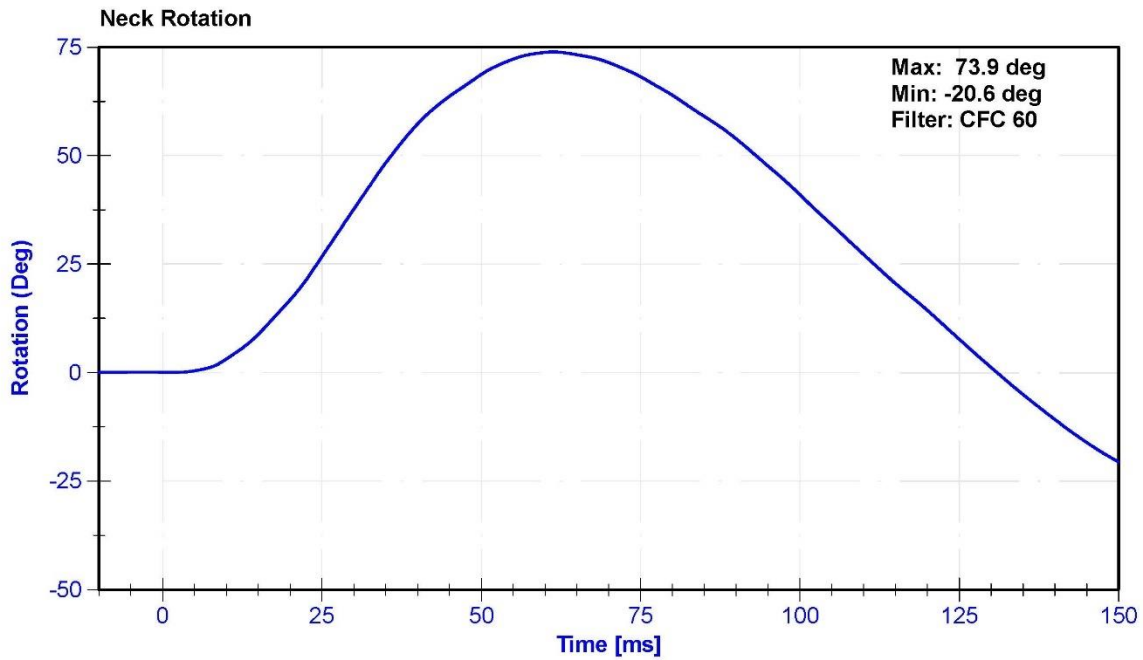
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	59.5	Pass
Velocity	5.51	5.63	m/s	5.604	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.28	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.47	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.69	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.59	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	6.06	Pass
Neck Rotation	71	81	deg	73.9	Pass
Time at Maximum Rotation	50	70	ms	61.3	Pass
Moment about the OC	36	44	Nm	43.3	Pass
Moment Decay to 0 Nm	102	126	ms	113.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	7231CT	10/28/2021	10/28/2022
Pendulum Potentiometer	Servo	4961	2/23/2022	2/23/2023
Condyle Potentiometer	Servo	DS185	11/12/2021	11/12/2022
Upper Neck Load Cell	Humanetics	1716A_1872-FY	6/13/2022	6/13/2023





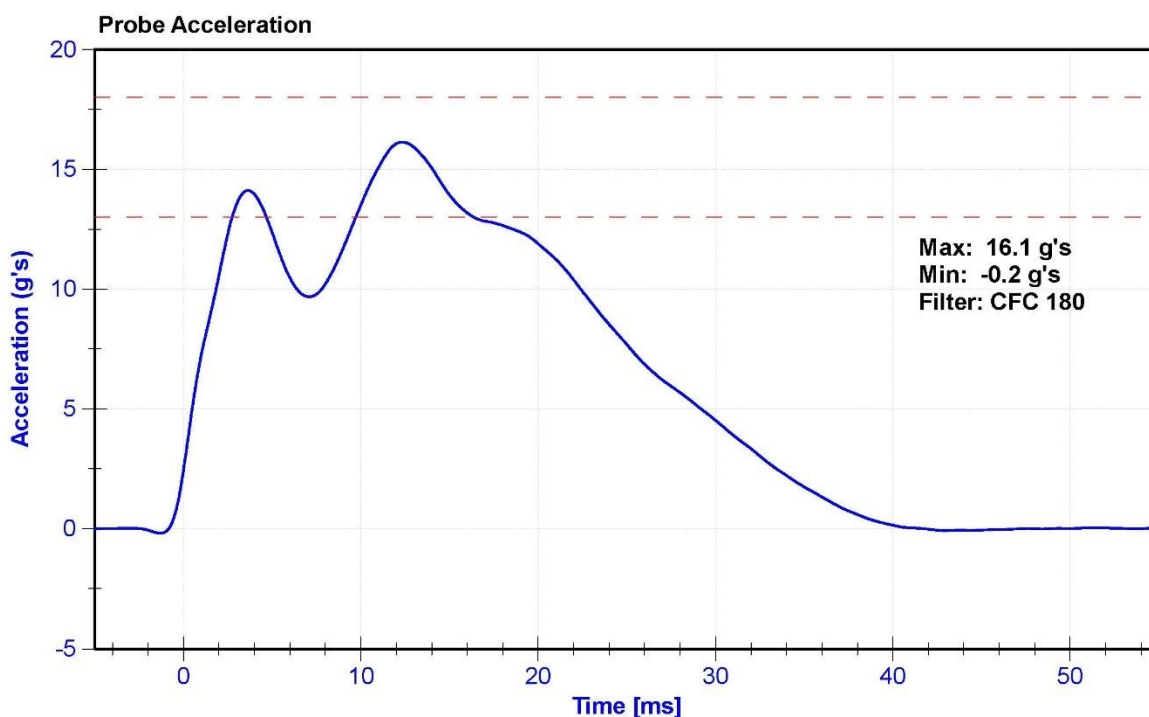
ATD Manufacturer	FTSS	Test Technician	T. Roseman
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

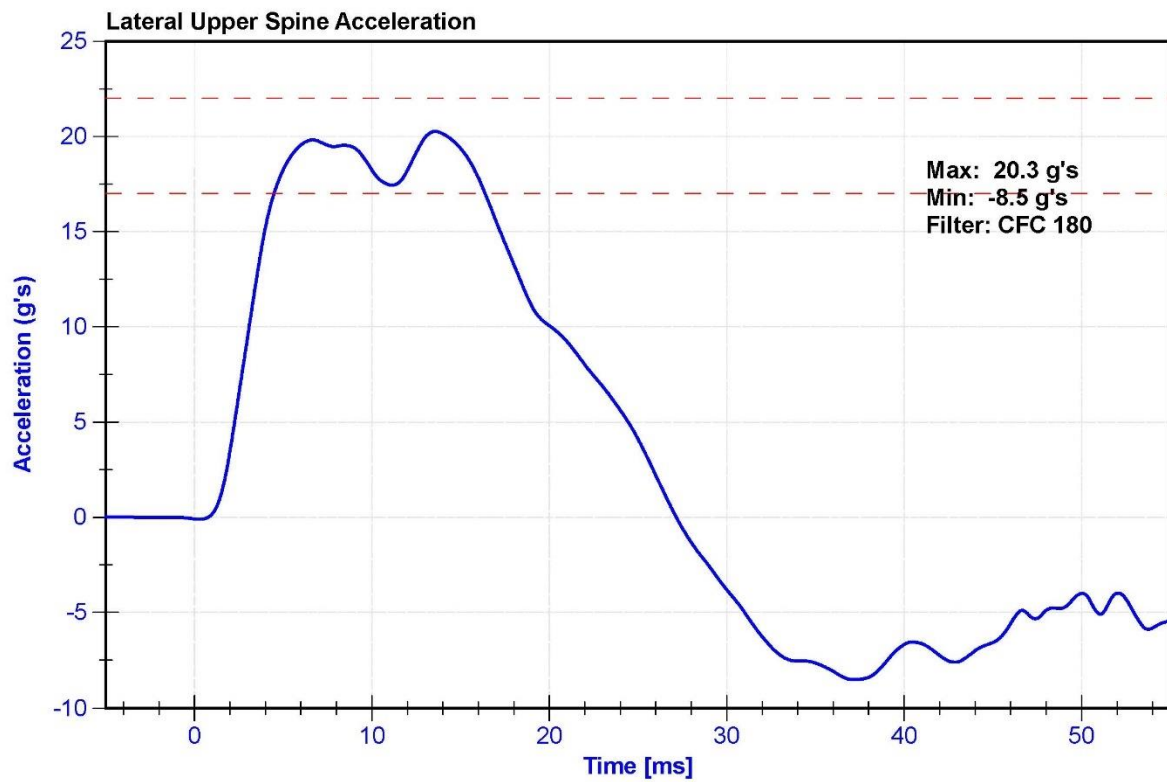
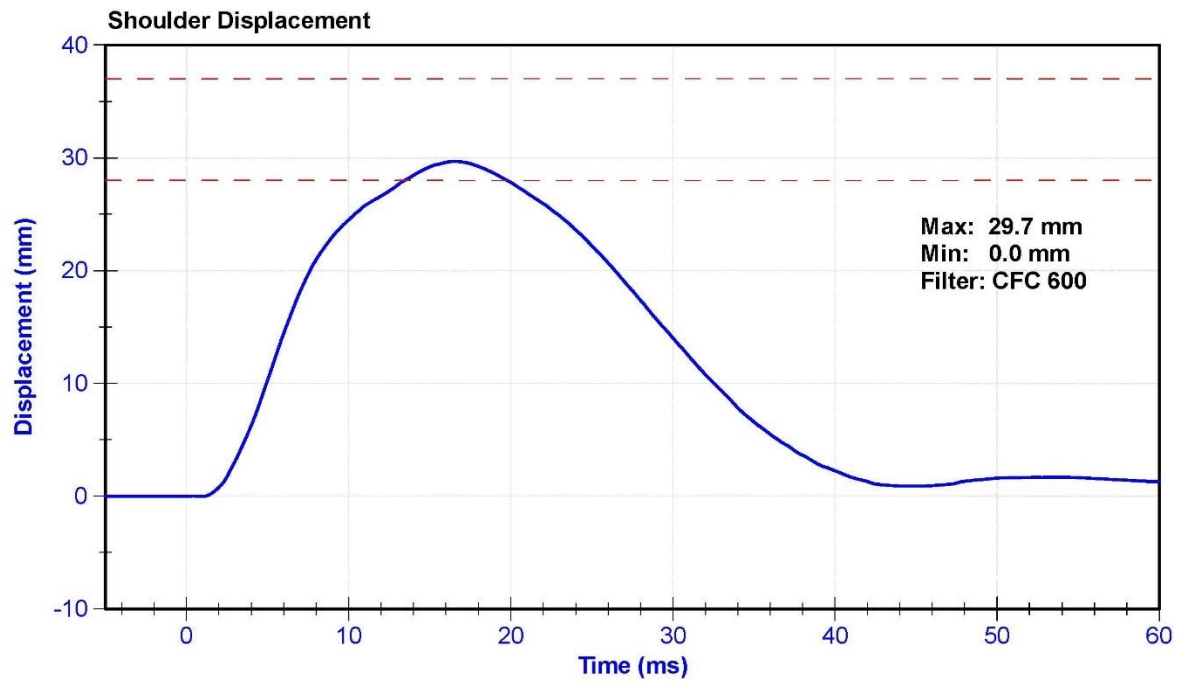
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	53.3	Pass
Velocity	4.2	4.4	m/s	4.35	Pass
Probe Acceleration	13	18	g's	16.1	Pass
Shoulder Deflection	28	37	mm	29.7	Pass
Lateral Upper Spine Acceleration	17	22	g's	20.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25885	10/25/2021	10/25/2022
Shoulder Potentiometer	Servo	1274GFE	6/20/2022	12/19/2022
Upper Spine Y Accelerometer	Endevco	P64148	6/17/2022	12/14/2022





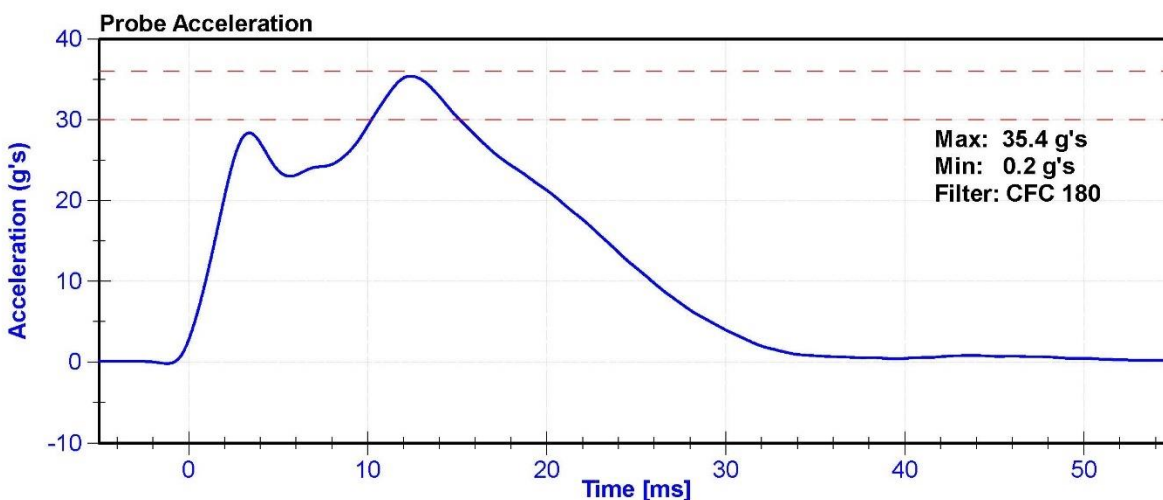
ATD Manufacturer	FTSS	Test Technician	T. Roseman
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

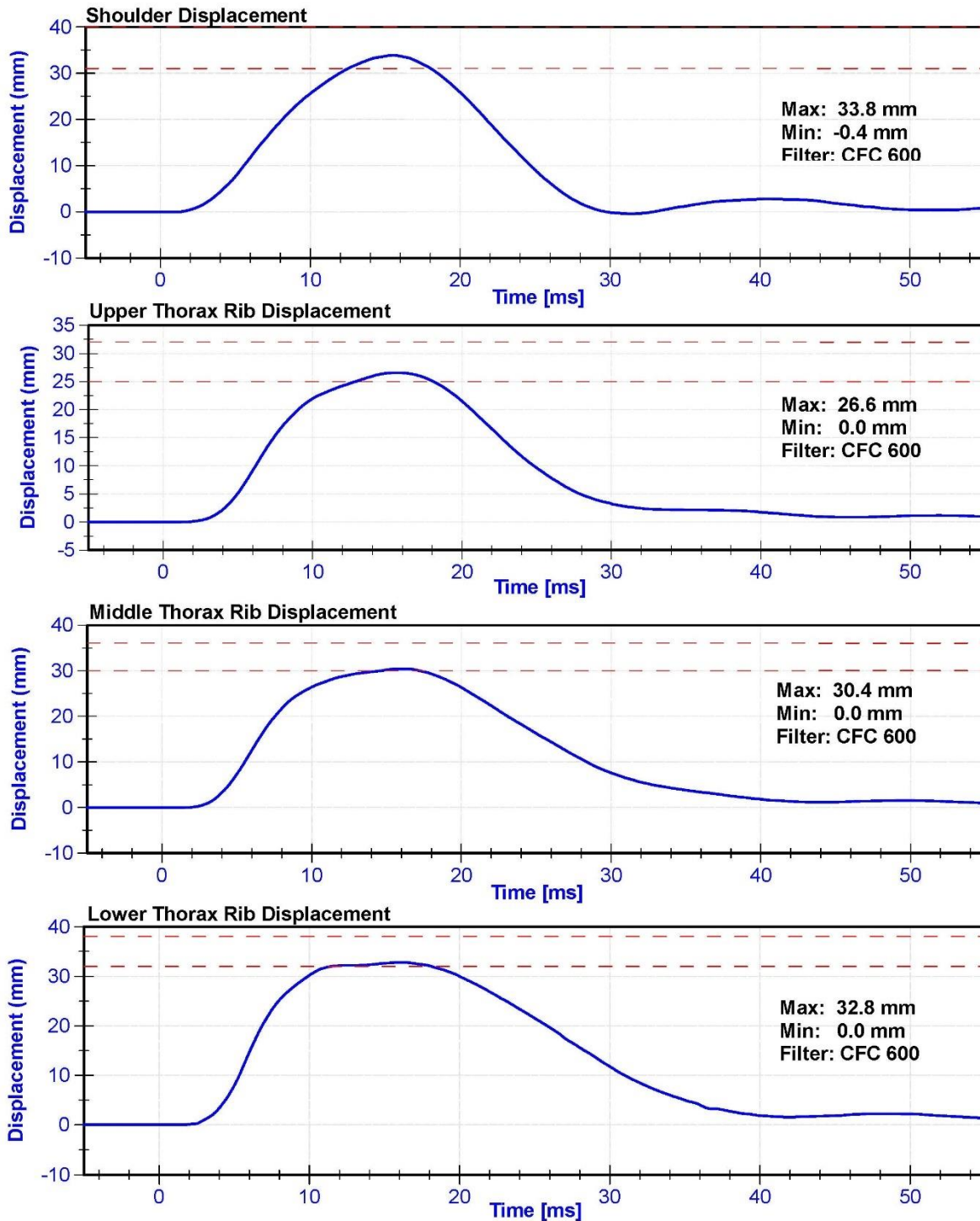
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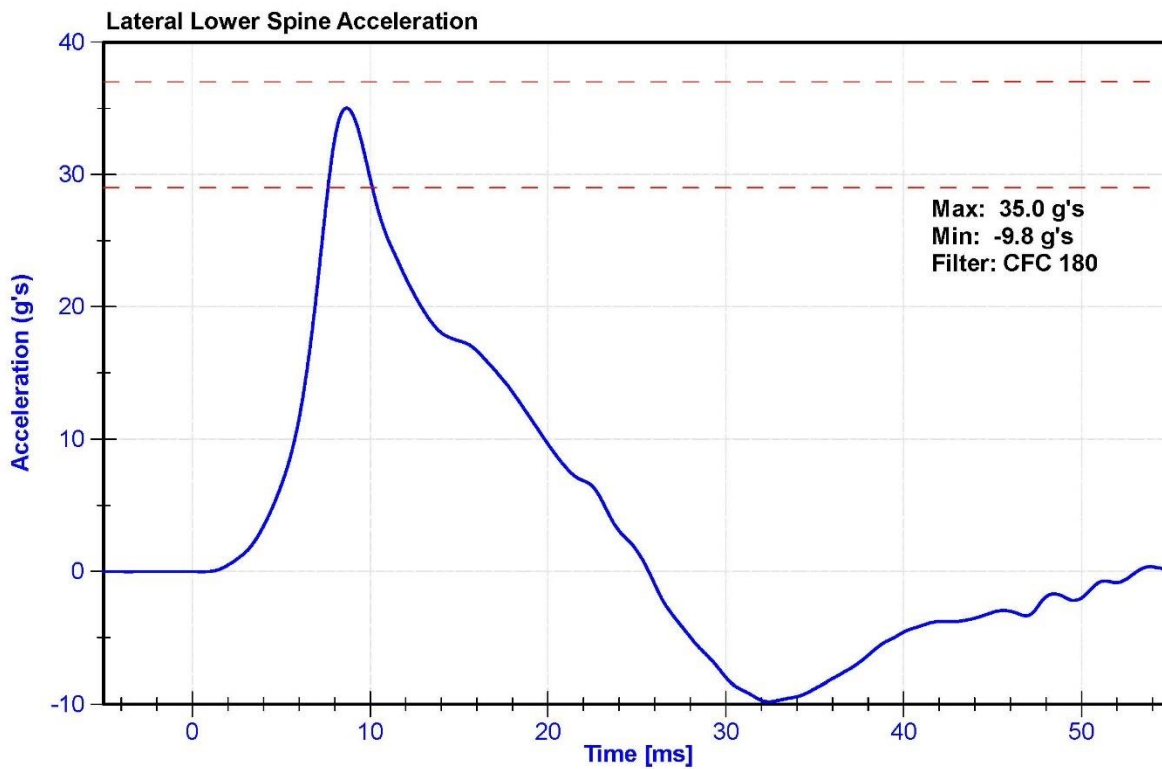
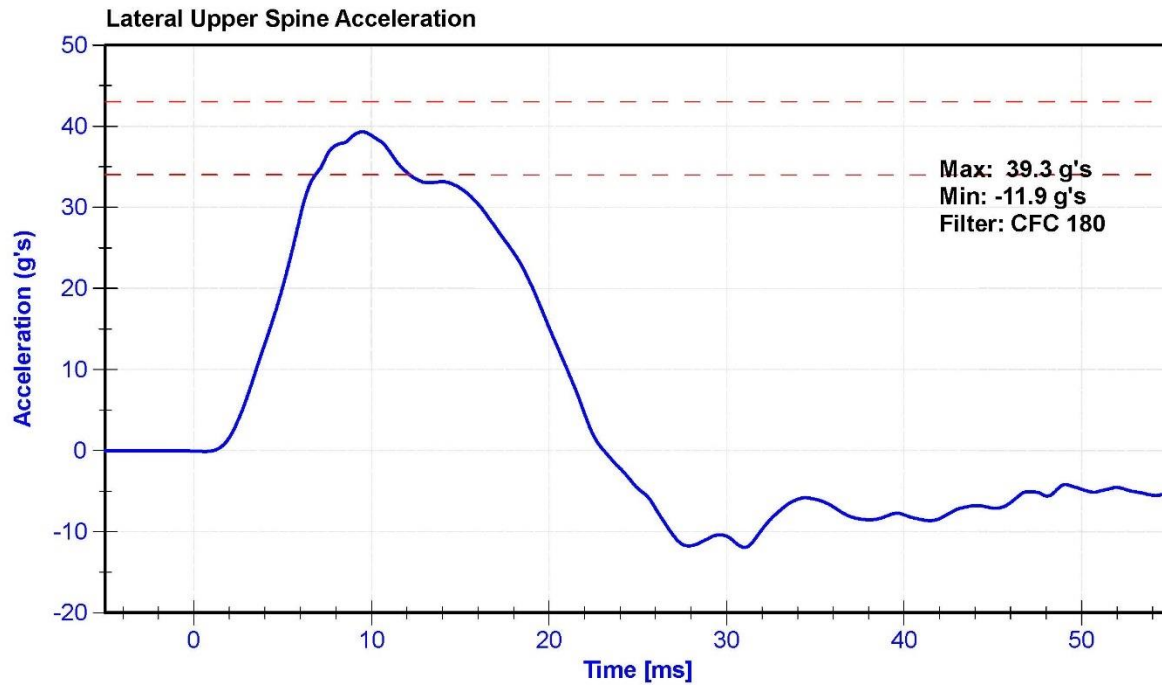
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	53.3	Pass
Velocity	6.6	6.8	m/s	6.68	Pass
Probe Acceleration after 5 ms	30	36	g's	35.4	Pass
Lateral Upper Spine Acceleration	34	43	g's	39.3	Pass
Lateral Lower Spine Acceleration	29	37	g's	35.0	Pass
Shoulder Deflection	31	40	mm	33.8	Pass
Upper Thorax Rib Deflection	25	32	mm	26.6	Pass
Mid Thorax Rib Deflection	30	36	mm	30.4	Pass
Lower Thorax Rib Deflection	32	38	mm	32.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25885	10/25/2021	10/25/2022
Upper Spine T1 Y Accelerometer	Endevco	P64148	6/17/2022	12/14/2022
Upper Spine T12 Y Accelerometer	Endevco	P51327	6/17/2022	12/14/2022
Shoulder Potentiometer	Servo	1274GFE	6/20/2022	12/19/2022
Upper Thorax Rib Potentiometer	Servo	1199GFE	6/17/2022	12/16/2022
Middle Thorax Rib Potentiometer	Servo	1246GFE	6/17/2022	12/16/2022
Lower Thorax Rib Potentiometer	Servo	011GFE	6/17/2022	12/16/2022







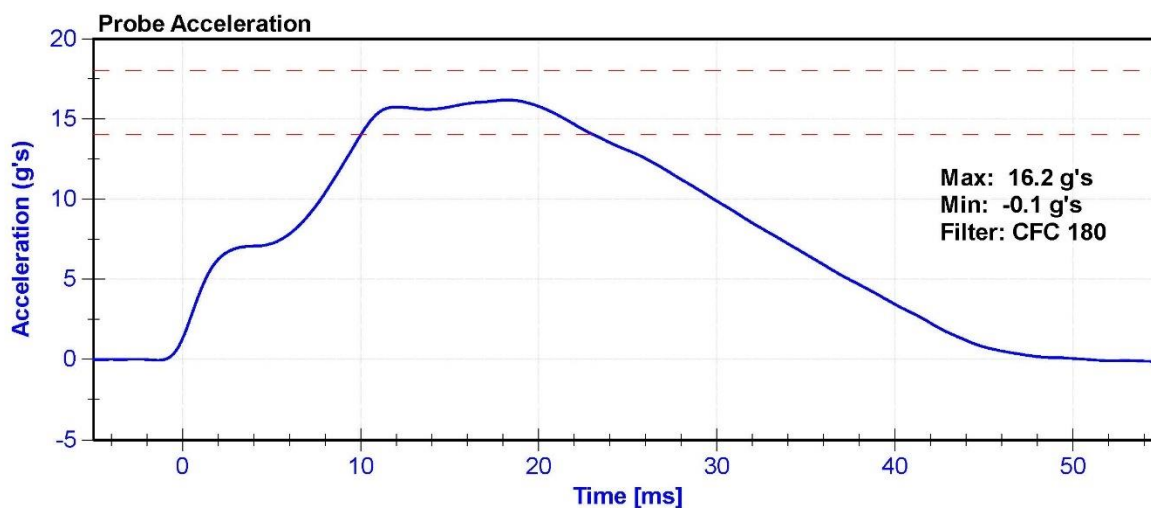
ATD Manufacturer	FTSS	Test Technician	T. Roseman
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

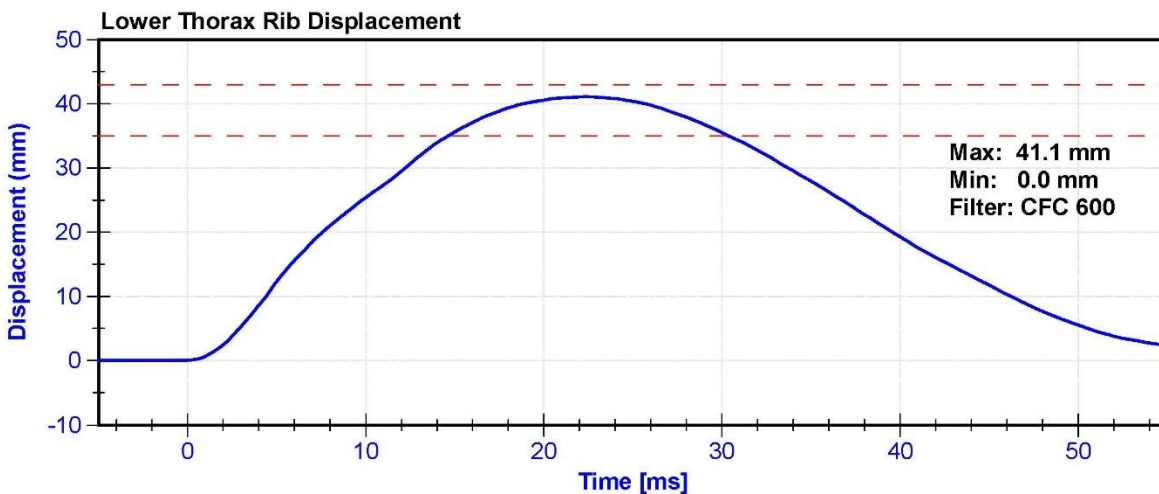
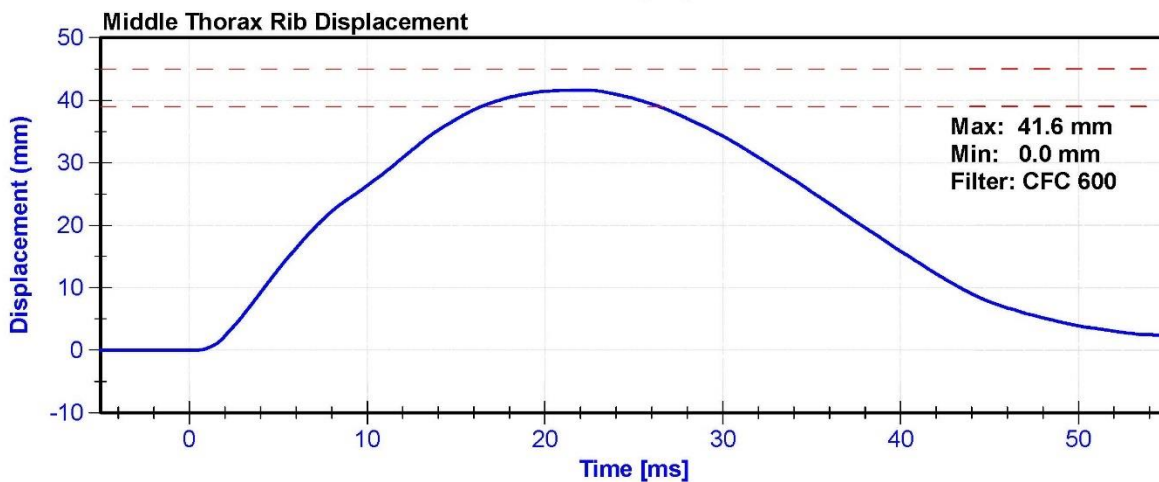
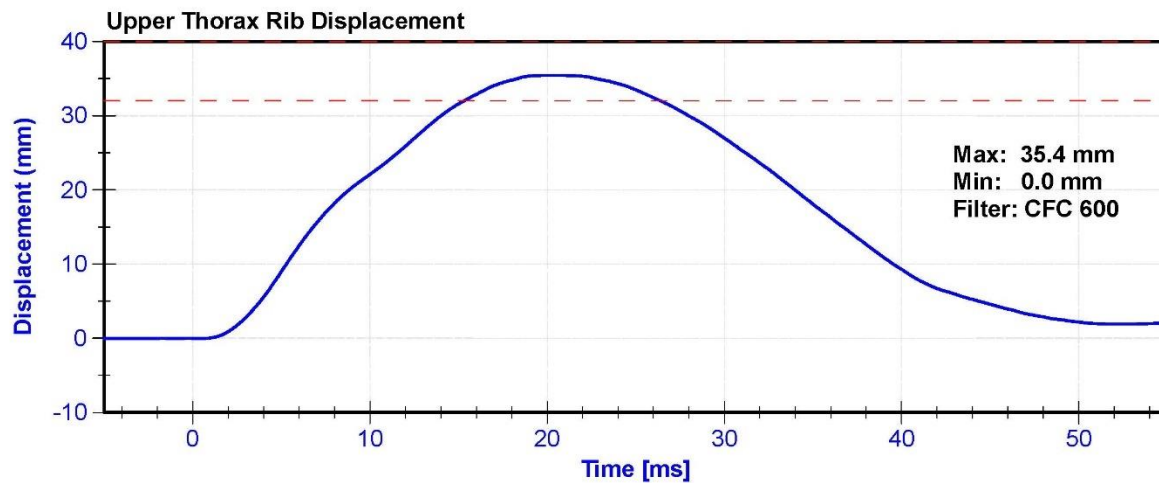
Results

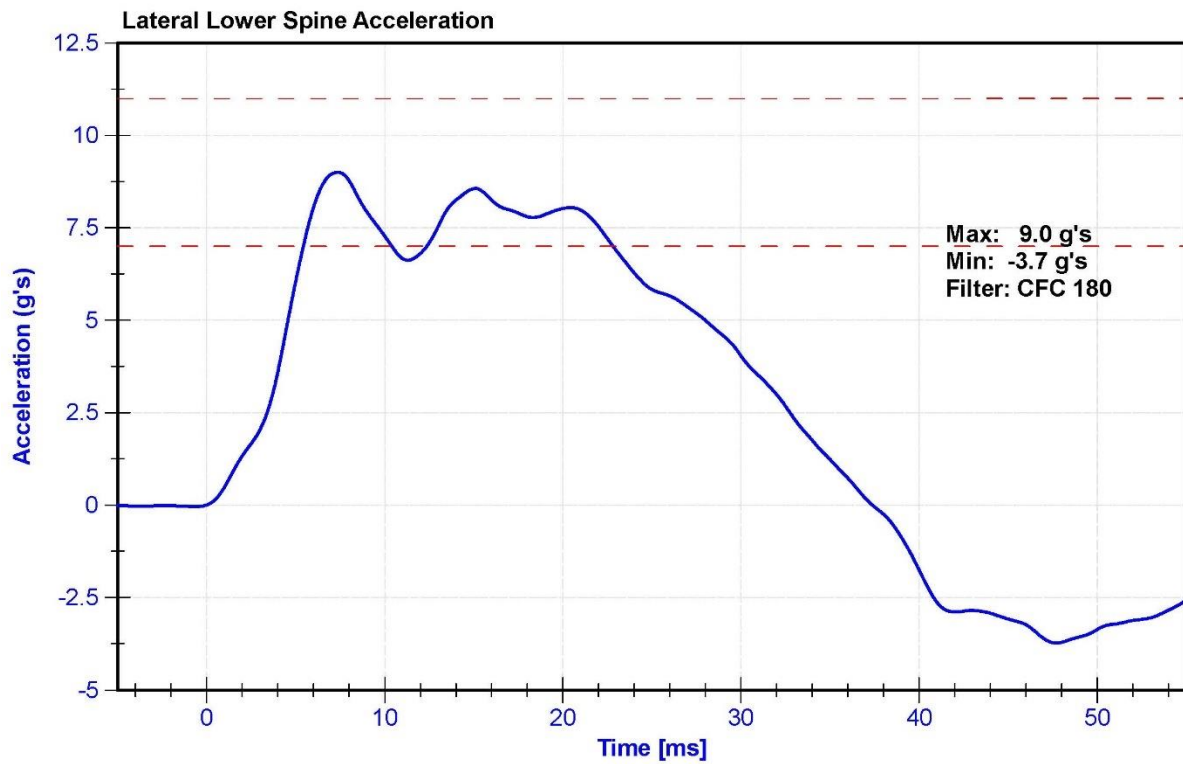
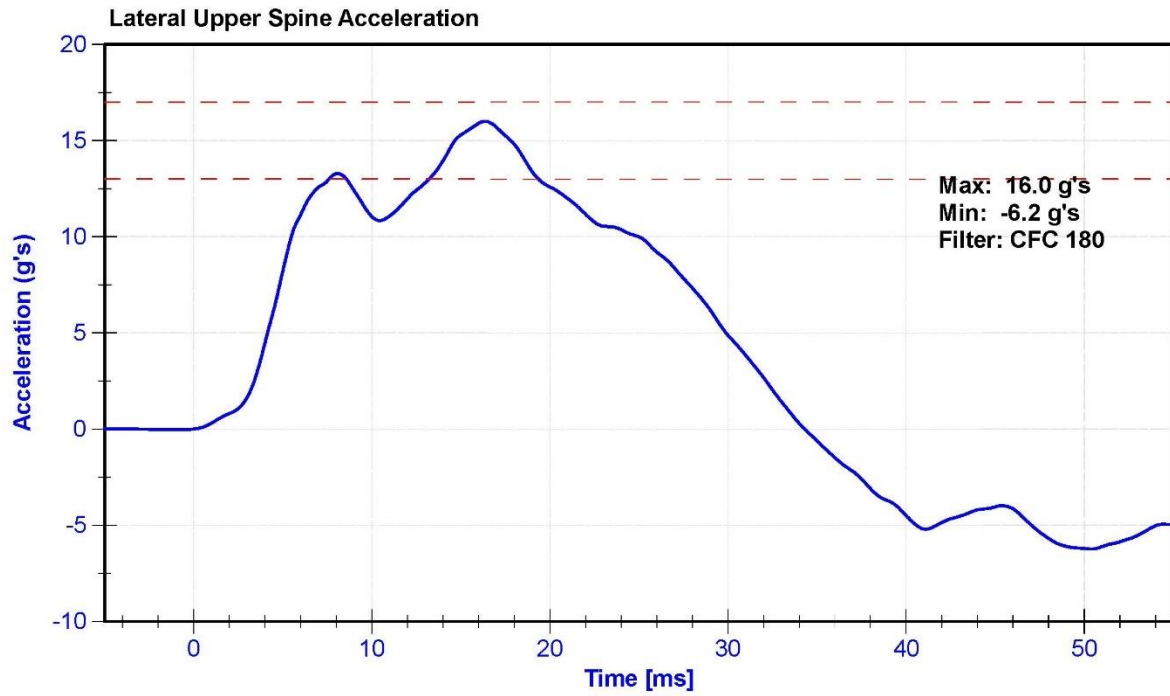
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	53.3	Pass
Velocity	4.2	4.4	m/s	4.35	Pass
Probe Acceleration	14	18	g's	16.2	Pass
Lateral Upper Spine Acceleration	13	17	g's	16.0	Pass
Lateral Lower Spine Acceleration	7	11	g's	9.0	Pass
Upper Thorax Rib Deflection	32	40	mm	35.4	Pass
Middle Thorax Rib Deflection	39	45	mm	41.6	Pass
Lower Thorax Rib Deflection	35	43	mm	41.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25885	10/25/2021	10/25/2022
Upper Spine Y Accelerometer	Endevco	P64148	6/17/2022	12/14/2022
Lower Spine Y Accelerometer	Endevco	P51327	6/17/2022	12/14/2022
Upper Thorax Rib Potentiometer	Servo	1199GFE	6/17/2022	12/16/2022
Middle Thorax Rib Potentiometer	Servo	1246GFE	6/17/2022	12/16/2022
Lower Thorax Rib Potentiometer	Servo	011GFE	6/17/2022	12/16/2022







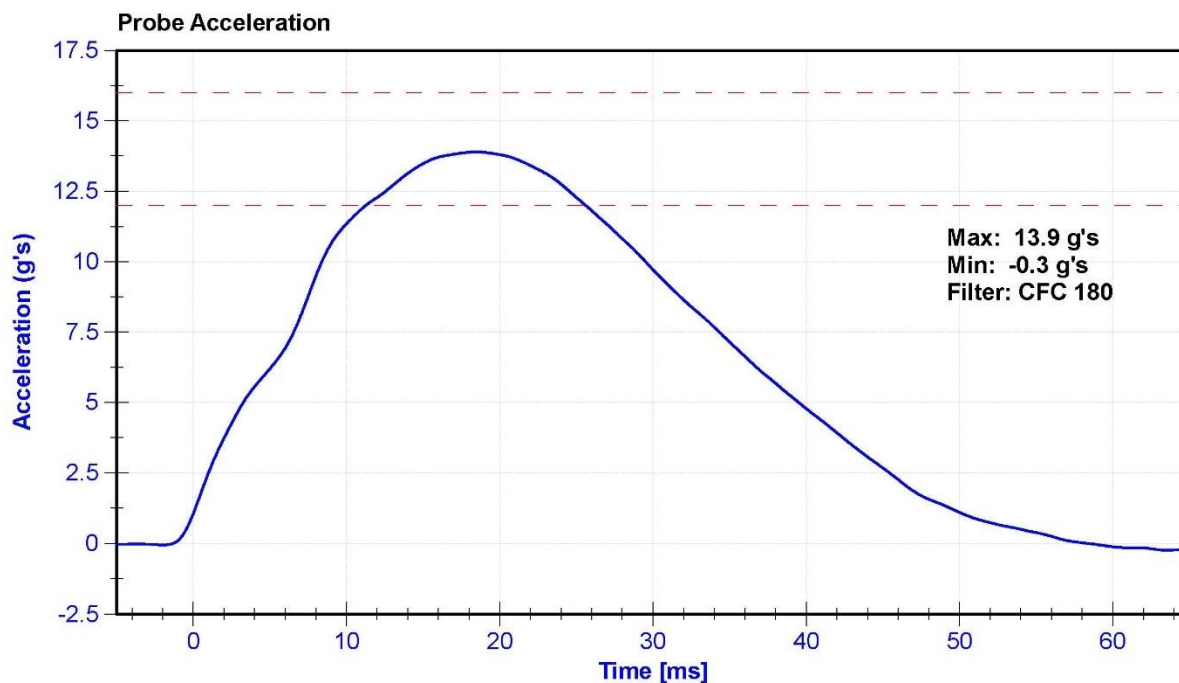
ATD Manufacturer	FTSS	Test Technician	T. Roseman
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

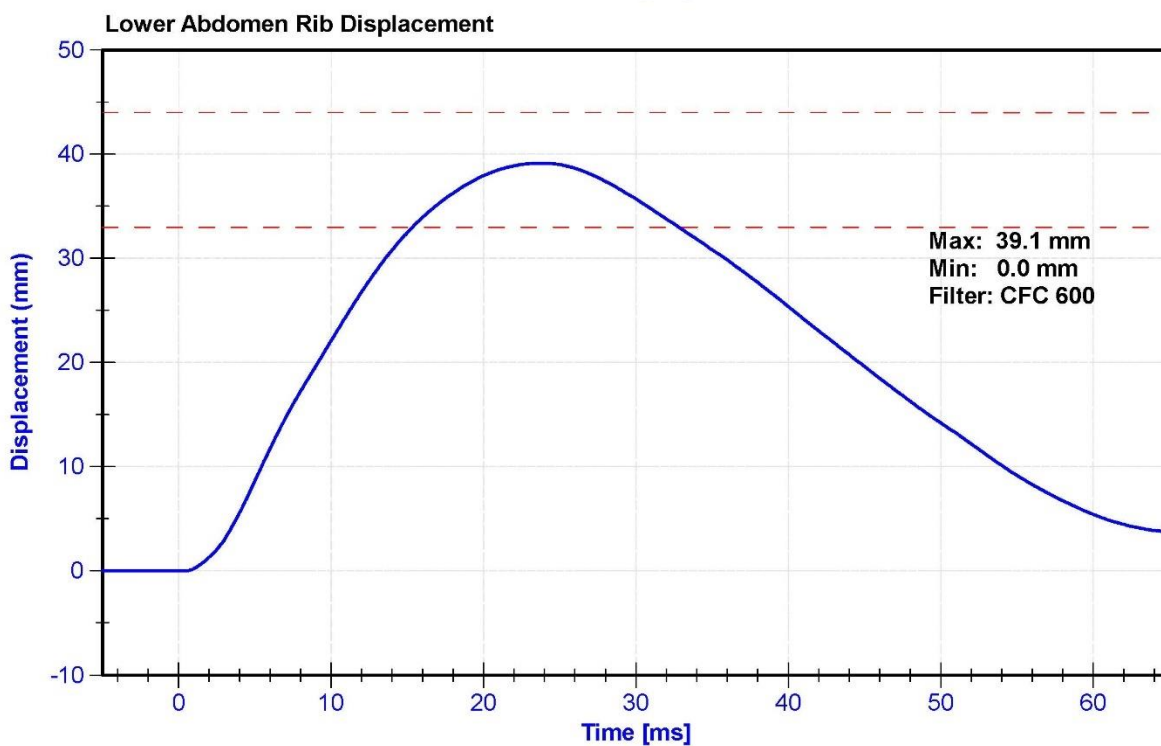
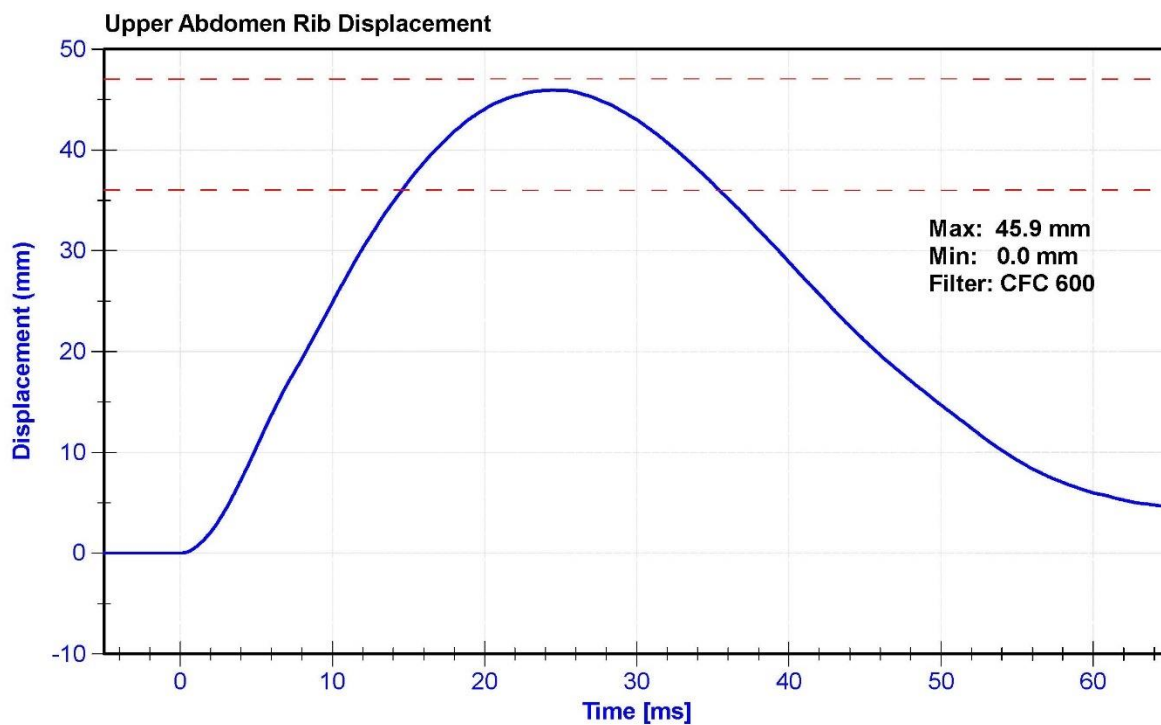
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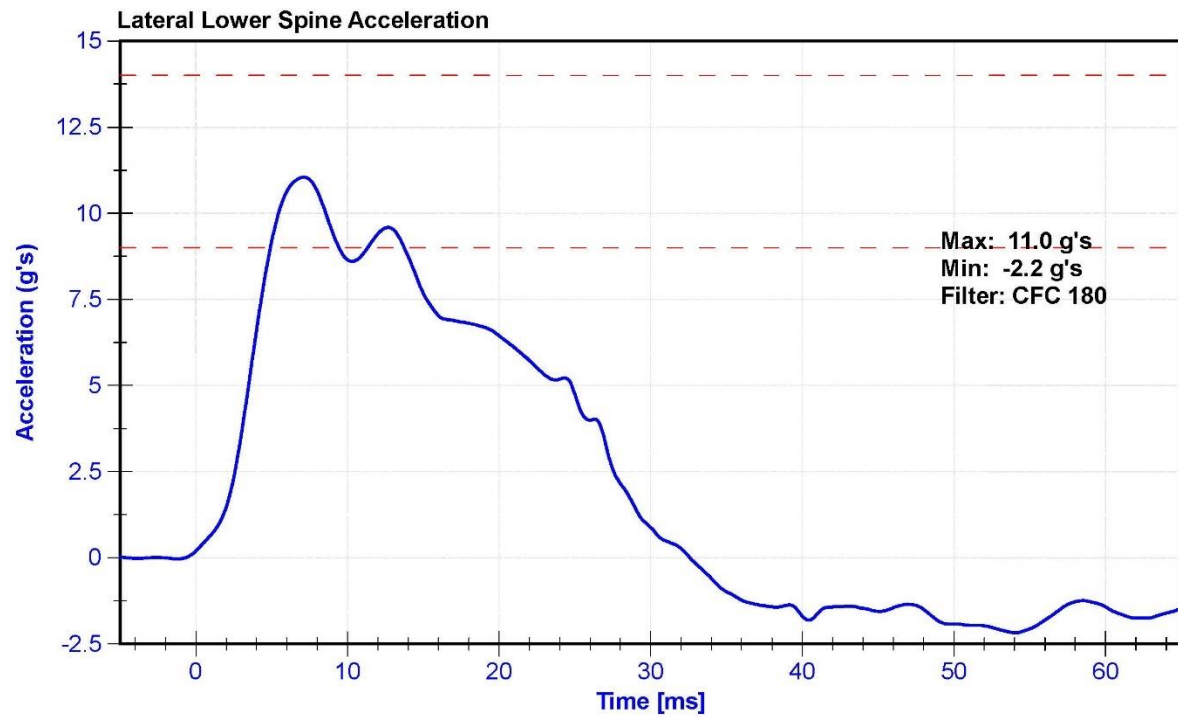
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	53.3	Pass
Velocity	4.2	4.4	m/s	4.33	Pass
Probe Acceleration	12	16	g's	13.9	Pass
Lateral Lower Spine Acceleration	9	14	g's	11.0	Pass
Upper Abdomen Rib Deflection	36	47	mm	45.9	Pass
Lower Abdomen Rib Deflection	33	44	mm	39.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	T25885	10/25/2021	10/25/2022
Lower Spine Y Accelerometer	Endevco	P51327	6/17/2022	12/14/2022
Upper Abdomen Rib Potentiometer	Servo	008GFE	6/17/2022	12/16/2022
Lower Abdomen Rib Potentiometer	Servo	041 GFE	6/17/2022	12/16/2022







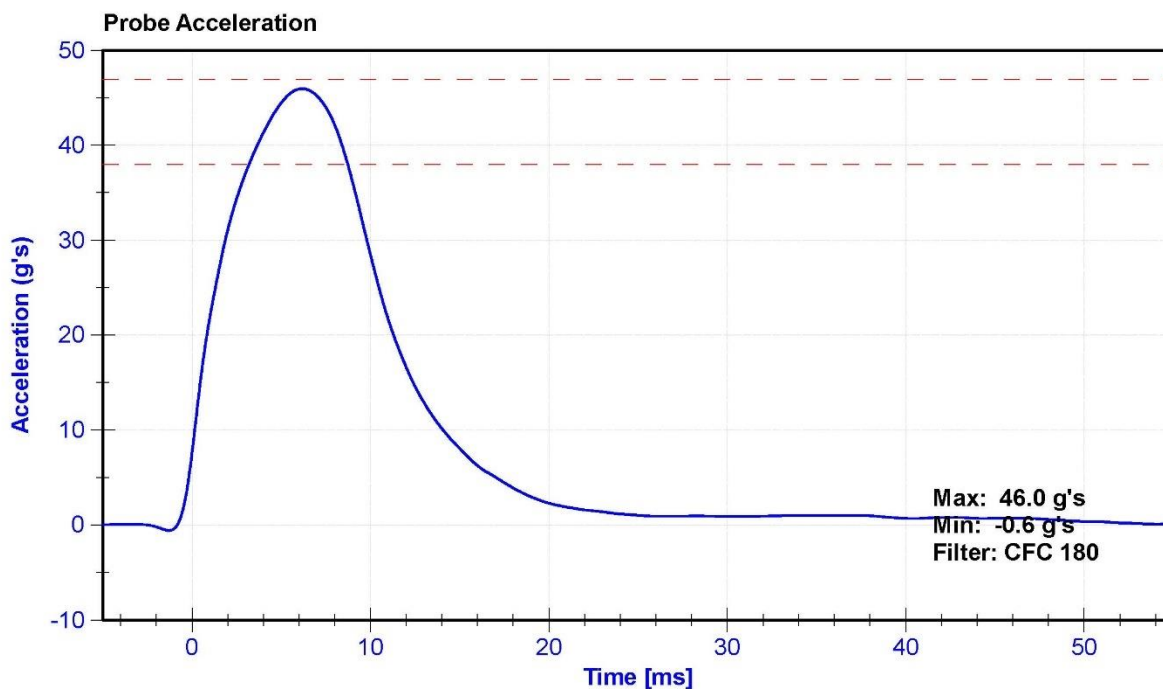
ATD Manufacturer	FTSS	Test Technician	T. Roseman
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

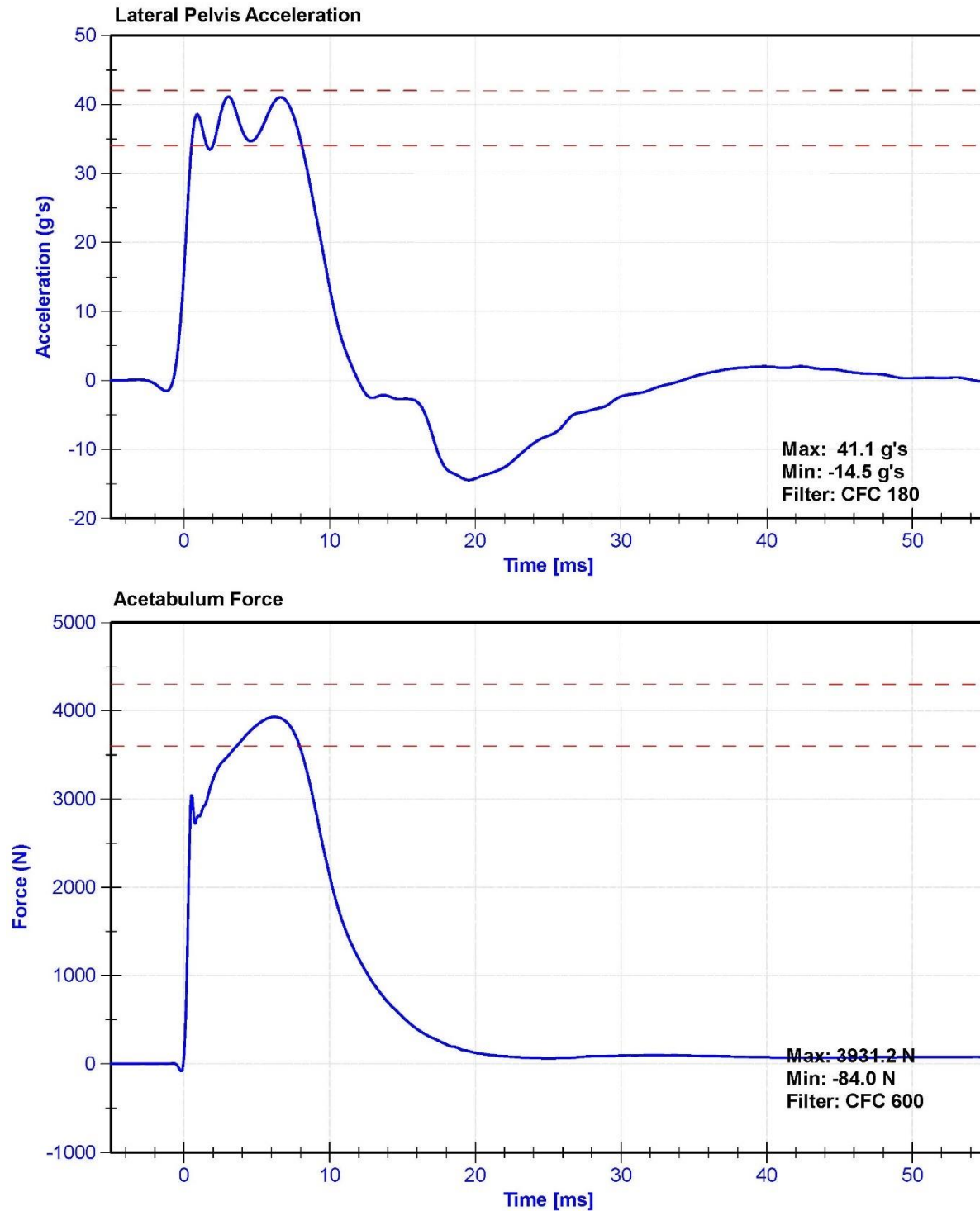
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	53.3	Pass
Velocity	6.6	6.8	m/s	6.63	Pass
Probe Acceleration	38	47	g's	46.0	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	41.0	Pass
Acetabulum Force	3600	4300	N	3931.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25885	10/25/2021	10/25/2022
Pelvis Y Accelerometer	Endevco	P51875	6/17/2022	12/14/2022
Acetabulum Load Cell	Denton	276-FY	9/14/2021	9/14/2022
Certification Plug	SACO			N/A
Crash Test Plug	SACO			N/A







SID-IIs Pelvis Plug Certification Test

DG8012
CLEAR 7/15/2021

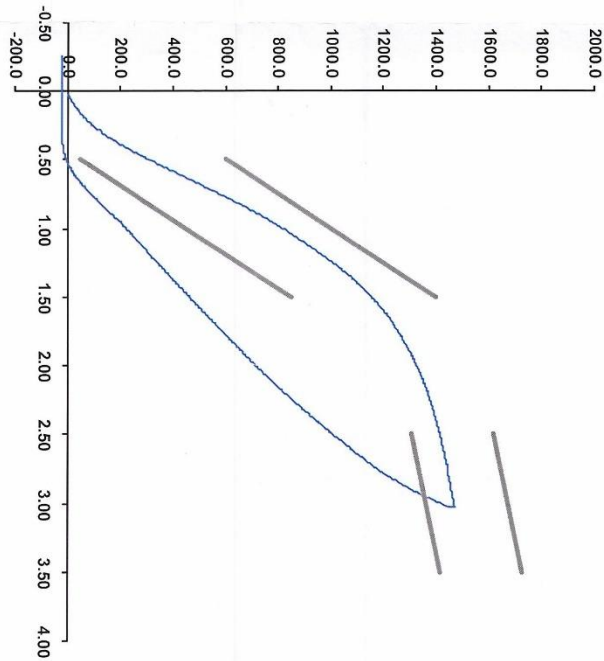
Force (N) vs Extension (mm)

Plug S/N 15136
Test Number 17848
Report Number 17897
Test Date 3/5/2021 10:24:25 AM

Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	50	600
Force @ 1.5 mm (N)	850	1,400
Force @ 2.5 mm (N)	1,306	1,618
Force @ 3.0 mm (N)	1,361	1,673

Testing Machine STM-20 5965542
Load Cell S/N (F1360947), Units (LBS) 1000
Crosshead Speed (mm / min) or Rate 12.7
Extension or Position Measured by XHD_100 (XHD100)

Notes:



Operator

Part Number 180-4450

Template No 107
SACO Research

05-Mar-21

By: ✓

Date: 3/5/2021

SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 FAX



D68012
Crash 7/15/2022

SID-IIs Pelvis Plug Certification Test

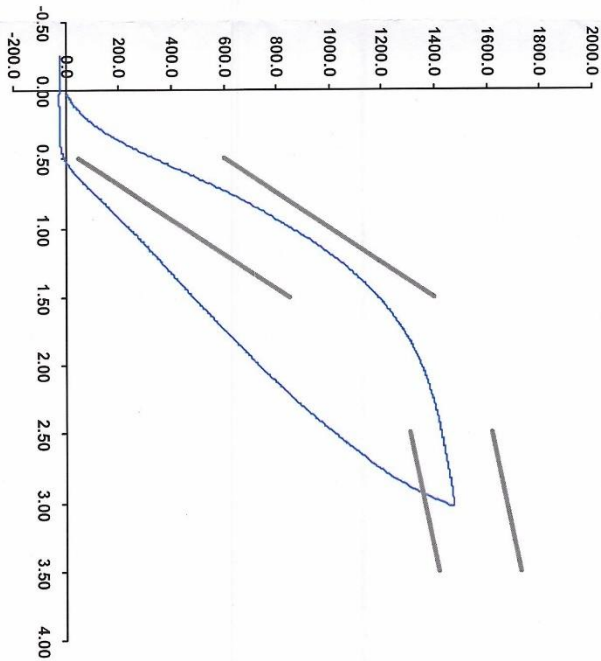
Plug S/N 15246
Test Number 17997
Report Number 18046
Test Date 3/10/2021 1:26:46 PM

Force (-N) vs Extension (-mm)

Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	50	600
Force @ 1.5 mm (N)	850	1,400
Force @ 2.5 mm (N)	1,306	1,618
Force @ 3.0 mm (N)	1,361	1,673

Testing Machine STM-20 5965542
Load Cell S/N (F1360947), Units (LBS) 1000
Crosshead Speed (mm / min) or Rate 12.7
Extension or Position Measured by XHD_100 (XHD100)

Notes:



Operator

Part Number 180-4450

Template No 107 10-Mar-21
SACO Research

By: SC Date: 3/10/2021
SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 FAX



DG8012
Non-Impact
7/15/2022

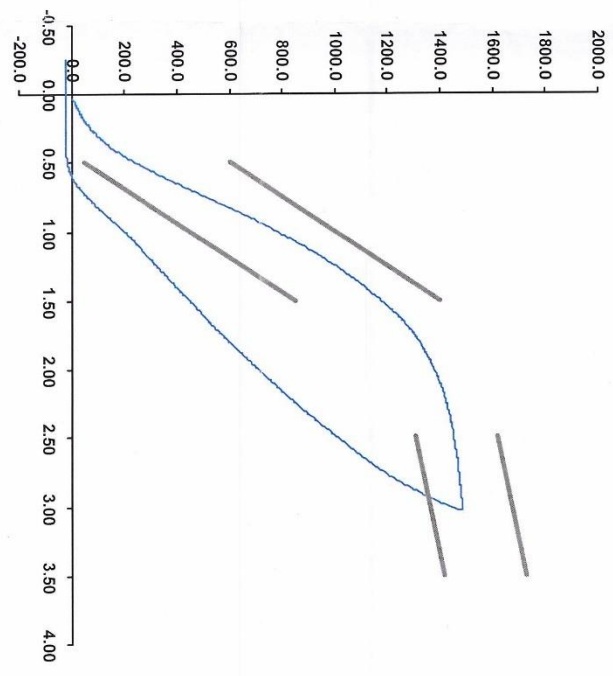
SID-IIs Pelvis Plug Certification Test

Plug S/N 15432
Test Number 20093
Report Number 20147
Test Date 9/9/2021 10:10:27 AM

Force (-N) vs Extension (-mm)

Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	50	600
Force @ 1.5 mm (N)	850	1,400
Force @ 2.5 mm (N)	1,306	1,618
Force @ 3.0 mm (N)	1,361	1,673

Testing Machine STM-20 5965542
Load Cell S/N (F1360947), Units (LBS) 1000
Preload Value (-N) 22.24
Crosshead Speed (mm / min) or Rate 12.7
Extension or Position Measured by XHD_100 (XHD100)



Notes:

Template No 107 09-Sep-21
SACO Research

By: DC Date: 9/9/2021
SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 FAX

Operator
Part Number 180-4450

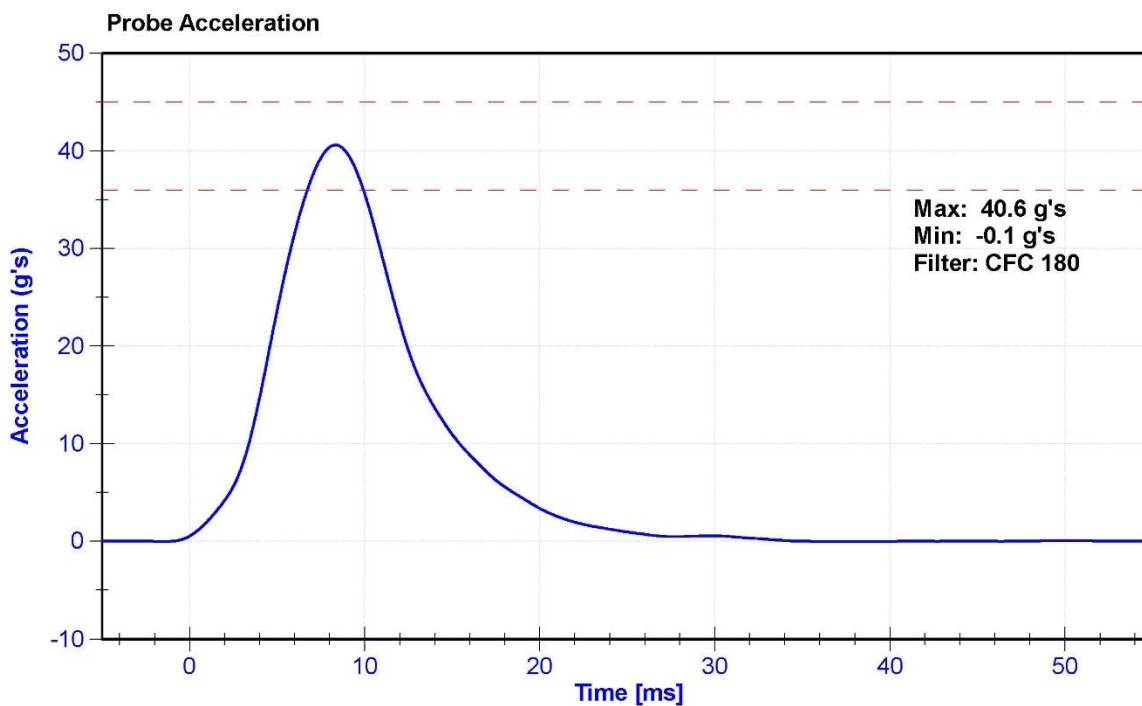
ATD Manufacturer	FTSS	Test Technician	T. Roseman
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

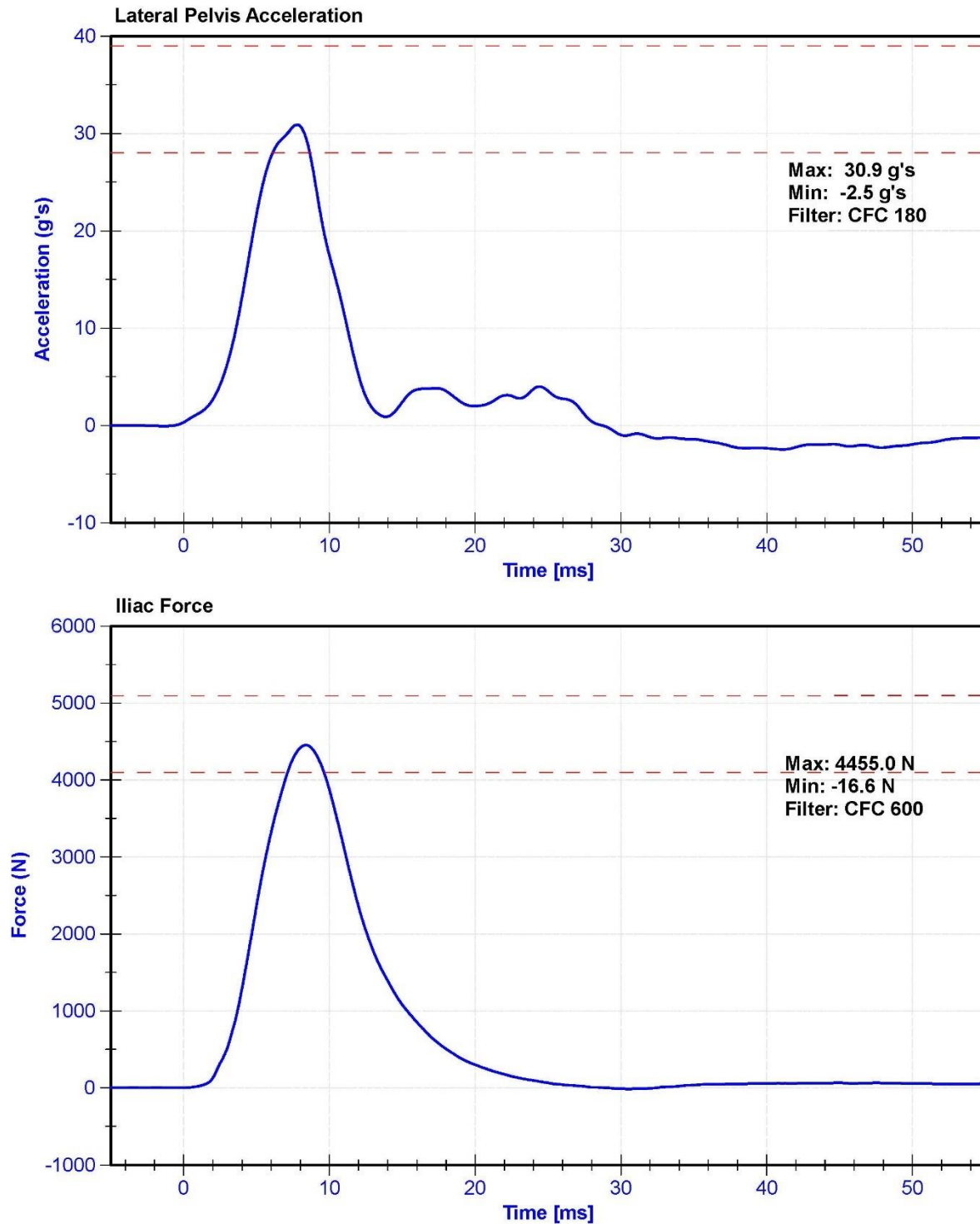
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	53.3	Pass
Velocity	4.2	4.4	m/s	4.38	Pass
Probe Acceleration	36	45	g's	40.6	Pass
Lateral Pelvis Acceleration	28	39	g's	30.9	Pass
Iliac Force	4100	5100	N	4455.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25885	10/25/2021	10/25/2022
Pelvis Y Accelerometer	Endevco	P51875	6/17/2022	12/14/2022
Iliac Load Cell	Denton	290-FY	9/14/2021	9/14/2022





APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N: DG8012		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers			X	P74788	Endevco	6/17/2022
			Y	P83432	Endevco	6/17/2022
			Z	P83319	Endevco	6/17/2022
Head Accelerometers - Redundant			X	P80334	Endevco	6/17/2022
			Y	P52155	Endevco	6/17/2022
			Z	P83322	Endevco	6/17/2022
Displacement Potentiometer	Shoulder		Y			
	Thoracic Rib	Upper	Y	1199GFE	Servo	6/17/2022
		Middle	Y	1246GFE	Servo	6/17/2022
		Lower	Y	011GFE	Servo	6/17/2022
	Abdominal Rib	Upper	Y	008GFE	Servo	6/17/2022
		Lower	Y	041 GFE	Servo	6/17/2022
Lower Spine Accelerometers (T12)			X	P71272	Endevco	P71272
			Y	P51327	Endevco	P51327
			Z	P52067	Endevco	P52067
Acetabulum Load Cell			Y	276-FY	Denton	276-FY
Lilac Wing Load Cell			Y	290-FY	Denton	290-FY
Pelvis Plug (Struck Side)				15130	SACO	3/5/2021
Pelvis Plug (Non-Struck Side)				15225	SACO	3/10/2021

Table 2 – Vehicle Instrumentation

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	A370891	Measurement Specialties	5/12/2022
Vehicle Center of Gravity	Y	A370892	Measurement Specialties	5/12/2022
Vehicle Center of Gravity	Z	A370896	Measurement Specialties	5/12/2022
Left Floor Sill	Y	A431385	Measurement Specialties	3/22/2022
A-Pillar Sill	Y	A431381	Measurement Specialties	3/22/2022
A-Pillar Low	Y	A431372	Measurement Specialties	3/22/2022
A-Pillar Mid	Y	A431347	Measurement Specialties	3/22/2022
B-Pillar Sill	Y	A374235	Measurement Specialties	3/22/2022
B-Pillar Low	Y	A290945	Measurement Specialties	2/25/2022
B-Pillar Mid	Y	A405556	Measurement Specialties	3/29/2022
Driver Seat	Y	A431235	Measurement Specialties	3/21/2022
Engine Top	X	A315745	Measurement Specialties	5/12/2022
Engine Top	Y	A374224	Measurement Specialties	5/12/2022
Firewall	Y	A431228	Measurement Specialties	3/21/2022
Right Roof	Y	A431238	Measurement Specialties	3/21/2022
Right Floor Sill	Y	A352322	Measurement Specialties	4/14/2022
Rear Floorpan	X	A315012	Measurement Specialties	5/12/2022
Rear Floorpan	Y	A372838	Measurement Specialties	5/12/2022

Table 3 – Pole Instrumentation

Pole Instrumentation	Serial Number	Manufacturer	Calibration Date
Load Cell 1	1220AF-1057559-F0	Interface	8/2/2021
Load Cell 2	1220AF-1117006-F0	Interface	8/5/2021
Load Cell 3	1220AF-1117025-F0	Interface	7/28/2021
Load Cell 4	1220AF-1117019-F0	Interface	8/2/2021
Load Cell 5	1220AF-1117011-F0	Interface	8/2/2021
Load Cell 6	1220AF-1117017-F0	Interface	8/2/2021
Load Cell 7	1220AF-1117035-F0	Interface	8/2/2021
Load Cell 8	1220AF-1130989-F0	Interface	8/2/2021