

REPORT NUMBER: SINCAP-CAL-20-010

**NEW CAR ASSESSMENT PROGRAM (NCAP)
MOVING DEFORMABLE BARRIER SIDE IMPACT TEST**

**FCA US LLC
2020 Chrysler Pacifica Hybrid
Five Door Minivan**

NHTSA No: M20200303

**PREPARED BY:
CALSPAN CORPORATION
P.O. BOX 400
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November 6, 2020

FINAL REPORT

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

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Matthew Pronko, Test Engineer

Date: November 6, 2020

Approved by: Vanessa Hansen
Vanessa Hansen, Operations Manager

Date: November 6, 2020

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

Date: _____

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15. Supplementary Notes																																																							
16. Abstract A 55/28, (61.90kph / 38.5 mph), 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2020 Chrysler Pacifica Hybrid minivan in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for the generation of consumer information on vehicle side crash protection. This test was conducted at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on May 14, 2020. The impact velocity of the Moving Deformable Barrier (MDB) was 61.95 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 21°C. The target vehicle's maximum post-test static crush was 251mm located at level 2. The test vehicle's occupant performance data is as follows: <table border="1" data-bbox="211 1056 1409 1255"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th colspan="3">Driver ATD (ES-2re)</th> </tr> <tr> <th>Units</th> <th>IARV</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td>N/A</td> <td>1000</td> <td>68.273</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>44</td> <td>17.364</td> </tr> <tr> <td>Total Abdominal Force</td> <td>N</td> <td>2500</td> <td>453.462</td> </tr> <tr> <td>Pubic Symphysis Force</td> <td>N</td> <td>6000</td> <td>1361.085</td> </tr> </tbody> </table> <table border="1" data-bbox="211 1289 1409 1524"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th colspan="3">Passenger ATD (SID-IIs)</th> </tr> <tr> <th>Units</th> <th>IARV</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td>N/A</td> <td>1000</td> <td>47.440</td> </tr> <tr> <td>Lower Spine Resultant Acceleration</td> <td>G</td> <td>82</td> <td>61.803</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td>N</td> <td>5525</td> <td>2500.789</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38*</td> <td>3.392</td> </tr> <tr> <td>Maximum Abdominal Rib Deflection</td> <td>mm</td> <td>45*</td> <td>3.211</td> </tr> </tbody> </table> * Proposed IARV 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 (ES-2re)			Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	68.273	Maximum Thoracic Rib Deflection	mm	44	17.364	Total Abdominal Force	N	2500	453.462	Pubic Symphysis Force	N	6000	1361.085	Measurement Description	Passenger ATD (SID-IIs)			Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	47.440	Lower Spine Resultant Acceleration	G	82	61.803	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2500.789	Maximum Thoracic Rib Deflection	mm	38*	3.392	Maximum Abdominal Rib Deflection	mm	45*	3.211
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17. Key Words New Car Assessment Program (NCAP) Side Impact MDB ES-2re SID-IIs			18. Distribution Statement <u>Copies of this report are available from:</u> National Highway Traffic Safety Administration Technical Information Services Division 1200 New Jersey Ave. SE Washington, D.C. 20590																																																				
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SECTION 1

TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test is part of the MY 2020 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract number DTNH22-14-D-00352. The purpose of this test is to generate comparative side impact performance in a 2020 Chrysler Pacifica Hybrid minivan. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated October 2015.

SECTION 2

SUMMARY OF TEST RESULTS

A 2020 Chrysler Pacifica Hybrid minivan was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.95 km/h. The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by the Calspan Corporation's Transportation Test Operations Center in Buffalo, New York on May 14, 2020. Pre-test and post-test photographs of the test vehicle, the MDB and the dummies (ES-2re and SID-IIs) are included in this report.

Dummies were placed in the driver and left rear designated seating positions according to instructions specified in the OCWS Side Impact Laboratory Test Procedure, dated October 2015. The side impact event was documented by 9 high-speed and 2 real-time cameras. Camera locations are included in this report.

The Dummies were instrumented in the following manner:

DRIVER ATD (ES-2re)

Primary and redundant head CG tri-axial accelerometers

Chest upper rib, middle rib, and lower rib y-axis displacement potentiometers

Abdomen forward, middle, and rear y-axis load cells

Lower spine (T12) tri-axial accelerometers

Public symphysis y-axis load cell

PASSENGER ATD (SID-IIs)

Primary and redundant head CG tri-axial accelerometers

Chest upper rib, middle rib, and lower rib y-axis displacement potentiometers

Abdomen upper rib and lower rib y-axis displacement potentiometers

Lower spine (T12) tri-axial accelerometers

Acetabulum and iliac wing y-axis load cells

Appendix B contains the vehicle and dummy response data. Dummy configuration and performance verification data can be found in APPENDIX C of this report. Appendix D of this report contains the test equipment and instrumentation calibration data.

DUMMY INJURY VALUES

Measurement Description	Driver ATD (ES-2re)		
	Units	Threshold	Result
Head Injury Criteria (HIC36)		1000	68.273
Maximum Thorax Rib Deflection	mm	44	17.364
Combined Abdominal Force	N	2500	453.462
Pubic Symphysis Force	N	6000	1361.085

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC36)		1000	47.440
Lower Spine (T12) Resultant Acceleration	G	82	61.803
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2500.789
Maximum Thoracic Rib Deflection	mm	38*	3.392
Maximum Abdominal Rib Deflection	mm	45*	3.211

*Proposed IARV

SUPPLEMENTAL RESTRAINT INFORMATION

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

GENERAL COMMENTS:

1. P1 serial number – F034
2. P4 serial number – 300

Data Anomalies:

- Left B-Pillar Lower Y Acceleration, Exceeded calibration range and saturated at 9.9 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 System 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 – Test Vehicle Accelerometer Locations

Data Sheet No. 7 – MDB Accelerometer Locations

Data Sheet No. 8 – Post-Test Observations

Data Sheet No. 9 – MDB Summary of Results

Data Sheet No. 10 – Test Vehicle Profile Measurements

Data Sheet No. 11 – Test Vehicle Exterior Crush Measurements

Data Sheet No. 12 – MDB Exterior Static Crush Measurements

Data Sheet No. 13 – Vehicle and MDB Damage Profile Distances

Data Sheet No. 14 – FMVSS No. 301 Static Rollover Results

Data Sheet No. 15 – 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: 2020 Chrysler Pacifica Hybrid minivan
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20200303
Test Date: 5/14/2020

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20200303	Traction Control System (TCS)	Yes
Model Year	2020	Auto-Leveling System	No
Make	Chrysler	Automatic Door Locks (ADL)	Yes
Model	Pacifica Hybrid	Power Window Auto-Reverse	No
Body Style	Five Door Minivan	Other Optional Feature	-
VIN	2C4RC1L72LR196272	Driver Front Air bag	Yes
Body Color	Blue	Driver Curtain Air bag	Yes
Odometer Reading (km/mi)	87 Miles	Driver Head/Torso Air bag	No
Engine Displacement (L)	3.6	Driver Torso Air bag	No
Type/No. Cylinders	V6	Driver Torso/Pelvis Air bag	Yes
Engine Placement	Transverse	Driver Pelvis Air bag	No
Transmission Type	Automatic	Driver Knee Air bag	Yes
Transmission Speeds	EVT	Rear Pass. Curtain Air bag	Yes
Overdrive	Yes	Rear Pass. Head/Torso Air bag	No
Final Drive	Front Wheel Drive	Rear Pass. Torso Air bag	No
Roof Rack	No	Rear Pass. Torso/Pelvis Air bag	No
Sunroof/T-Top	No	Rear Pass. Pelvis Air bag	No
Running Boards	No	Driver Seat Belt Pretensioners	Yes
Tilt Steering Wheel	Yes	Rear Pass. Seat Belt Pretensioners	No
Power Seats	Yes	Driver Load Limiter	Yes
Anti-Lock Brakes (ABS)	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	FCA US LLC	GVWR (kg)	2858
Date of Manufacture	3-20	GAWR Front (kg)	1452
Vehicle Type	MPV	GAWR Rear (kg)	1452

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	2	3	7	
Capacity Weight (VCW) (kg)				498	(A)
DSC X 68.04 kg				476.28	(B)
Cargo Weight (RCLW) (kg)				21.72	(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			X		X		

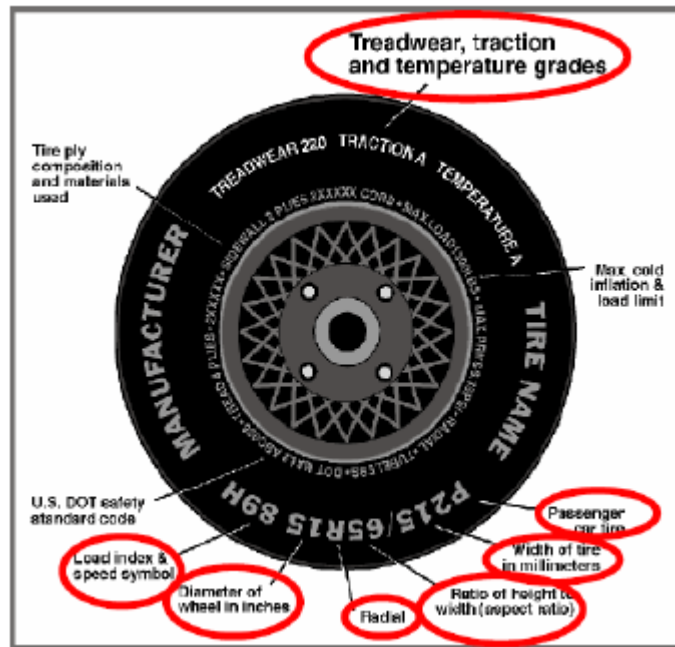
DATA SHEET NO. 1 ... (CONTINUED)
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2020 Chrysler Pacifica Hybrid minivan
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20200303
 Test Date: 5/14/2020

VEHICLE TIRE INFORMATION

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



TIRE SIDEWALL INFORMATION

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	250	250
Recommended Tire Size	235/60R18	235/60R18
Tire Size on Vehicle	235/60R18	235/60R18
Tire Manufacturer	Nexen	Nexen
Tire Model	NPriz RH7a	NPriz RH7a
Treadwear	680	680
Traction	A	A
Temperature Grade	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel, 1 Nylon	2 Polyester, 2 Steel, 1 Nylon
Load Index/Speed Symbol	103H	103H
Tire Material	Rubber	Rubber
DOT Safety Code Left	UAKVEMER2419	UAKVEMER2319
DOT Safety Code Right	UAKVJMAL2319	UAVKEMER2319

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

Test Vehicle: 2020 Chrysler Pacifica Hybrid minivan
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20200303
 Test Date: 5/14/2020

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	300	290	301	300
Tire Placard	kPa	250	250	250	250
Owner's Manual	kPa	250	250	250	250
As Tested	kPa	250	250	250	250

MDB TIRE SPECIFICATIONS

	Units	Requirement	LF	RF	LR	RR
Tire Size		P205/75R15	P205/75R15	P205/75R15	P205/75R15	P205/75R15
Tire Pressure	kPa	200 ± 21	207	207	207	207

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	629	536		636	620		676	599	
Right	kg	636	473		698	462		650	504	
Ratio	%	55.6	44.4		55.2	44.8		54.6	45.4	
Totals	kg	1265	1009	2274	1334	1082	2416	1326	1103	2429

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	2274	(A)
Sum of Actual Weight of 1 ES2re and 1 P572 ATD (SID-IIs)	kg	127	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	21.72	(C)
Calculated Target Vehicle Test Weight (TVTW)	kg	2422.7	(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	Fully Loaded	As Tested	Meets Requirement**
LF	mm	807	803	Yes
RF	mm	810	806	Yes
RR	mm	825	817	Yes
LR	mm	817	808	Yes
Vehicle CG (Aft of Front Axle)	mm	1405	1385	
Vehicle CG (Left(+)/Right(-) from Longitudinal Centerline)	mm	43	34	

*** The "As Tested" vehicle attitude measurements must be equal to or within ± 10mm of the "Fully Loaded" vehicle attitude measurements at each wheel well. Indicate "Yes" or "No" for "Meets Requirements".

Test height adjustable suspension setting, if applicable: N/A

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

Test Vehicle:	<u>2020 Chrysler Pacifica Hybrid minivan</u>	NHTSA No.:	<u>M20200303</u>
Test Program:	<u>NCAP Side MDB Impact Test</u>	Test Date:	<u>5/14/2020</u>

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Trunk Carpeting	9
Rear Passenger Window	6
Third Row Rear Seats	47.5
Ballast / Equipment Added	15

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

Test Vehicle: <u>2020 Chrysler Pacifica Hybrid minivan</u>	NHTSA No.: <u>M20200303</u>	
Test Program: <u>NCAP Side MDB Impact Test</u>	Test Date: <u>5/14/2020</u>	

SEAT POSITIONING

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

SCRL ANGLE RANGE

Seat	SCRL (°)		
	Max	Min	Mid
Driver Seat	20.3	10.7	15.5
Front Passenger Seat	Not Adjustable		
Front Center Seat*			
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat*	Fixed	Fixed	Fixed

**if applicable*

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCRП Height (mm)	SCRП Height Position	SCRП Height (mm)		
				Rearmost	Mid- Fore/Aft	Forward- Most
Driver Seat	15.5	0.5	Max	50	50.5	51
			Mid	25	25.5	26
			Min	0	0.5	1
Front Passenger Seat	Not Adjustable		Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
Front Center Seat*	N/A	N/A	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	-	-	-

**if applicable*

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

Test Vehicle: 2020 Chrysler Pacifica Hybrid minivan
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20200303
 Test Date: 5/14/2020

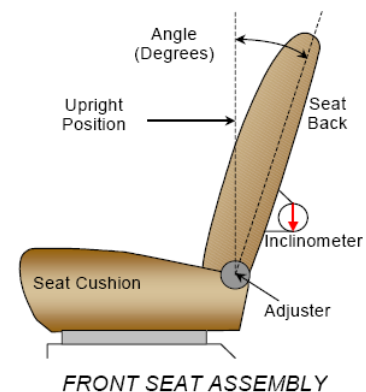
SEAT FORE / AFT POSITION

Seat	Total Fore / Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	220	N/A	110	Power
Front Passenger Seat	220	33 (0-32)	110	16
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	150	0-15	150	15
Non-Struck Side Rear Seat	150	0.-15	150	15
Rear Center Seat*	N/A	N/A	N/A	N/A

**if applicable*

SEAT BACK ANGLE ADJUSTMENT

The driver's seat back is positioned to the manufacturer's designated design angle. 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 seat back is positioned such that the dummy's head is level. The rear center and non-struck side rear outboard seat backs are positioned in a similar manner as 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	63	N/A	0	N/A
Front Passenger Seat	62	N/A	0.2	6
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat w/ Seated Dummy	28	15 (0-14)	6.4	0
Non-Struck Side Rear Seat	28	15 (0-14)	6.4	0
Rear Center Seat*	N/A	N/A	N/A	N/A

**if applicable*

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

Test Vehicle: 2020 Chrysler Pacifica Hybrid minivan
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20200303
 Test Date: 5/14/2020

SEAT BELT ANCHORAGE ADJUSTMENT

Seat belt anchorages are adjusted in accordance with the information provided by the manufacturer on Form No. 1. For this test zero is defined as the uppermost position.

	Total # of Positions	Placed in Position #
Driver Seat	5 (0-4)	0
Rear Seat	5 (0-4)	0

HEAD RESTRAINT ADJUSTMENT

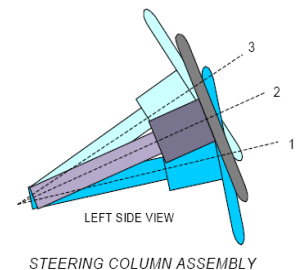
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

	Total # of Positions	Placed in Position #
Driver Seat	5 (0-4)	Uppermost
Rear Seat	5 (0-4)	Lowermost

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.

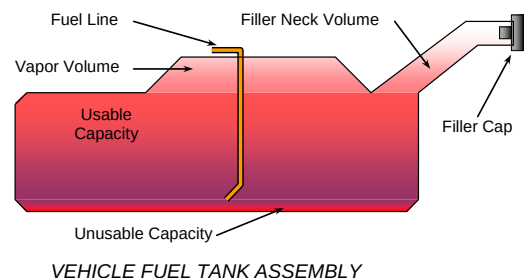
	Degrees	Fore/Aft Position (mm)
Lowermost – Position 1	20.4	
Geometric Center – Position 2	22.8	
Uppermost – Position 3	25.1	
Telescoping Steering Wheel Travel		60
Test Position	22.8	30



FUEL PUMP

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

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



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

Test Vehicle:	<u>2020 Chrysler Pacifica Hybrid minivan</u>	NHTSA No.:	<u>M20200303</u>
Test Program:	<u>NCAP Side MDB Impact Test</u>	Test Date:	<u>5/14/2020</u>

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	62.1
Usable Capacity of "Optional Tank" (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	62
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	57.7
Actual Amount of Solvent Used in Test	57.8
1/3 of Usable Capacity	20.7

Is the Actual Amount of Solvent Used in the test equal to 93% $\pm$ 1% of the Usable Capacity stated in Form No. 1? ☒ **Yes** ☐ **No**

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2020 Chrysler Pacifica Hybrid minivan

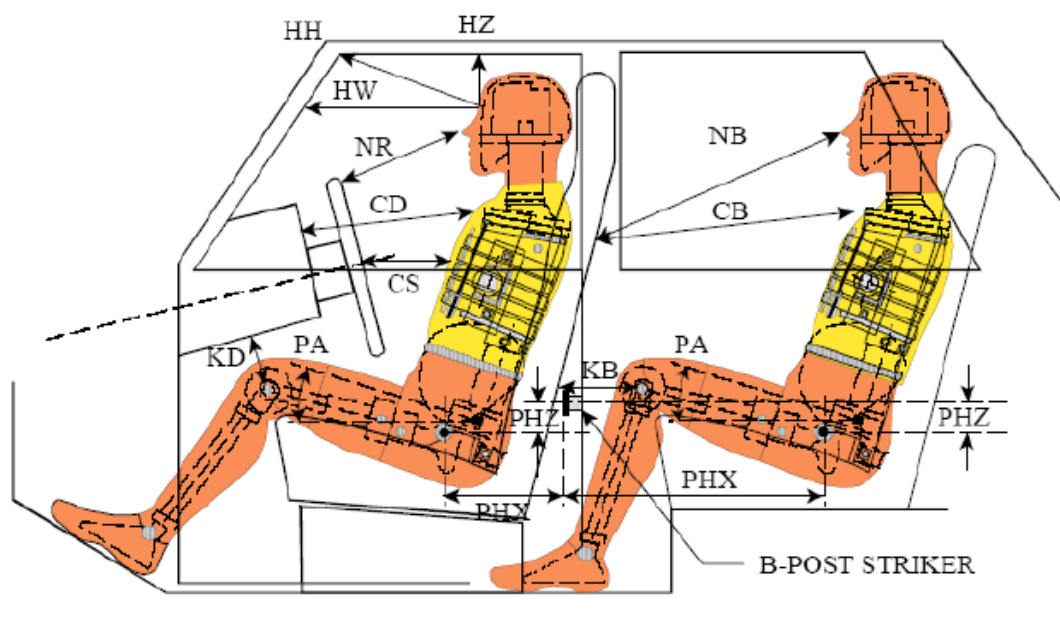
NHTSA No.:

M20200303

Test Program: NCAP Side MDB Impact Test

Test Date:

5/14/2020



LEFT SIDE VIEW

NOTE: 2-DOOR VEHICLE SHOWN.
 REAR DUMMY PHX & PHZ
 MEASUREMENTS FOR A 4-DOOR
 VEHICLE WOULD USE THE C-POST
 STRIKER AS A REFERENCE POINT

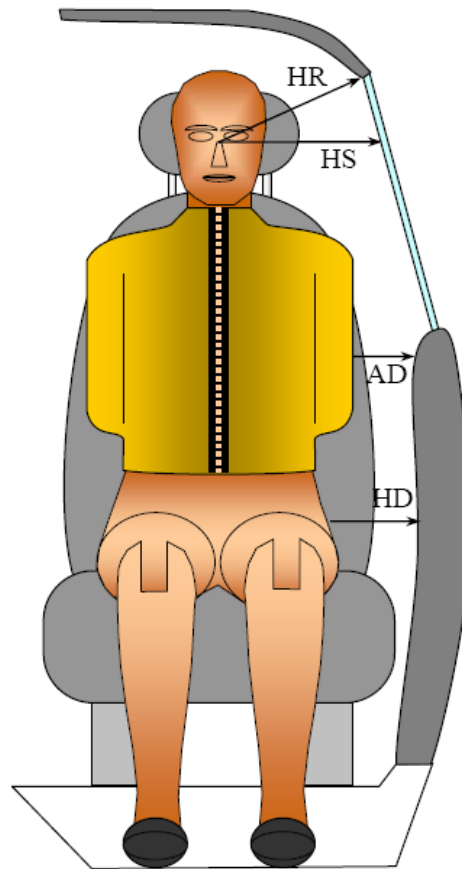
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Description	Driver (Serial No. F034)		Passenger (Serial No.300)	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	355			
HW		Header to Windshield	707			
HZ	HZ	Head to Roof Liner	213		224	
NR	NB	Nose to Rim/Seat Back	404		647	
CD	CB	Chest to Dash/Seat Back	546		652	
CS		Chest to Steering Wheel	322			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	182	38.8	365	0
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	193	33.4	367	0
PAX°	PAX°	Pelvic Tilt Angle X		20.9		23.5
	PAY°	Pelvic Tilt Angle Y				0.2
PHX	PHX	Hip Point to Striker (X-Axis)	210		353	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	111		185	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2020 Chrysler Pacifica Hybrid minivan
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20200303
 Test Date: 5/14/2020



FRONT VIEW OF DUMMY

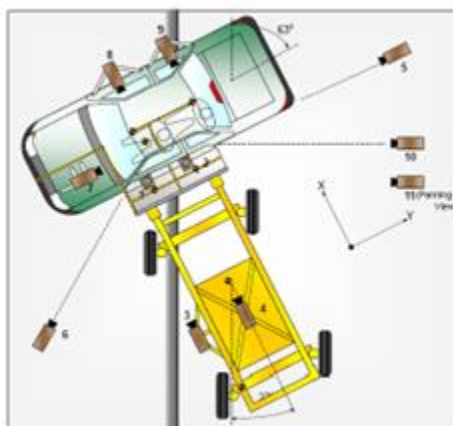
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver (Serial No. F034)	Passenger (Serial No. 300)
HR	Head to Side Header	mm	245	298
HS	Head to Side Window	mm	370	422
AD	Arm to Door	mm	130	182
HD	Hip Point to Door	mm	156	278

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2020 Chrysler Pacifica Hybrid minivan
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20200303
Test Date: 5/14/2020



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	0	0	-8290	12.5	1000
2	Overhead Close-up	0	865	-8290	50	1000
3	Left Impact Point (MDB)	-1470	0	-847	25	1000
4	Side Overall (MDB)	-1140	878	-1587	8	1000
5	Rear	0	10329	-1244	28	1000
6	Left Front	-3241	-6316	-1383	24	1000
7	Driver Front (OB)				25	1000
8	Driver Side (OB)				12.5	1000
9	Passenger Side (OB)				12.5	1000
10	Real-time Left Rear				Zoom	60
11	Real-time In run				Zoom	60

Notes: *Reference: Impact Point projected to Ground*
+X = To Front of MDB, +Y = To Right of MDB, +Z = Down
**All measurements accurate to ± 6 mm.*

If applicable, explain why camera(s) did not operate as intended: All cameras operated normally

INSTRUMENTATION

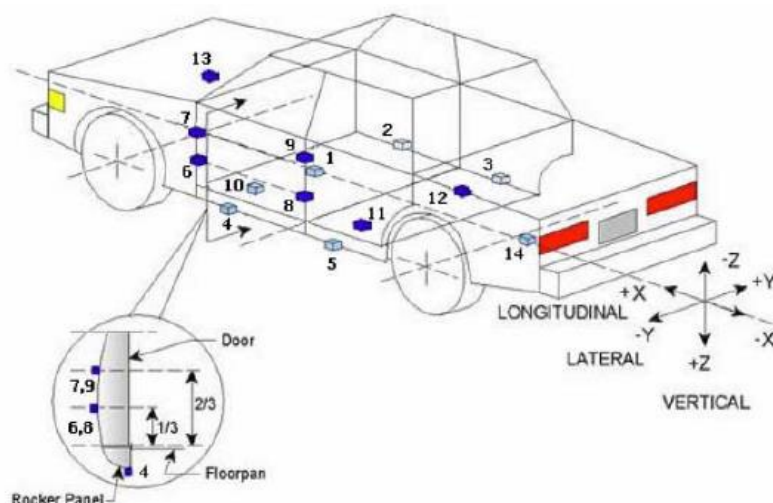
Driver Dummy Channels	16
Passenger Dummy Channels	16
Vehicle Structure Accelerometers	23
MDB Accelerometers	7
Total	62

DATA SHEET NO. 6

TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2020 Chrysler Pacifica Hybrid minivan
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20200303
 Test Date: 5/14/2020



TEST VEHICLE ACCELEROMETER LOCATIONS

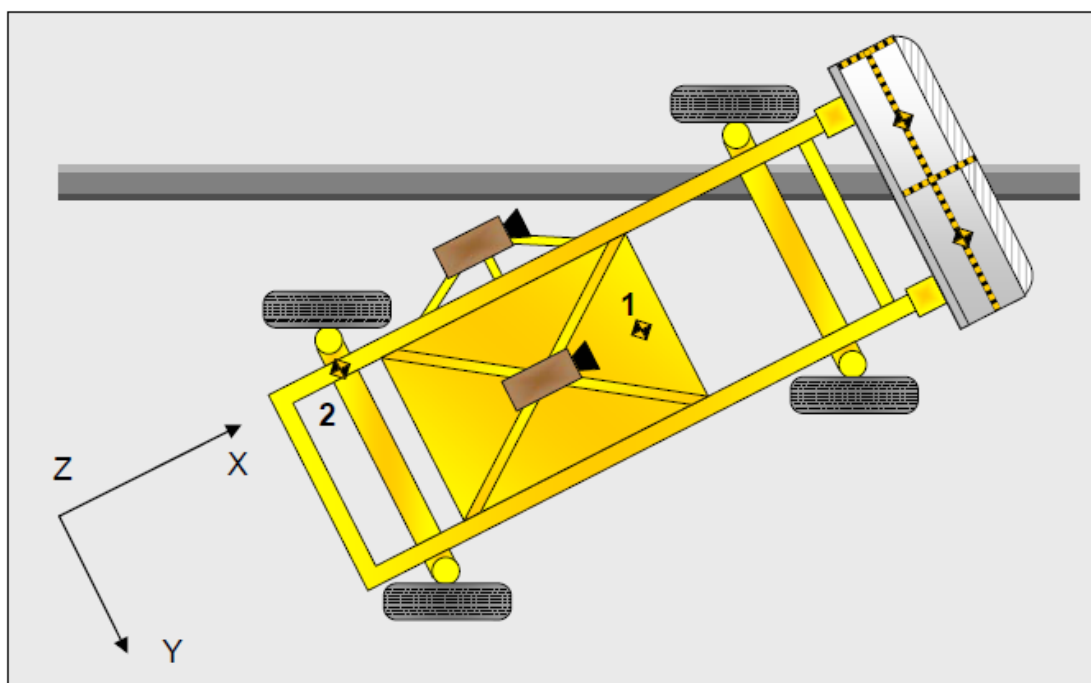
No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2979	1	54
2	Right Sill at Front Seat	3325	735	124
3	Right Sill at Rear Seat	2356	769	60
4	Left Sill at Front Door	3346	-735	127
5	Left Sill at Rear Door	2339	-770	64
6	A-Post Lower	3740	-747	-174
7	A-Post Middle	3738	-747	-628
8	B-Post Lower	2662	-765	-226
9	B-Post Middle	2645	-760	-588
10	Front Seat Track	2825	-601	59
11	Rear Seat Structure	2296	-588	25
12	Rt. Rear Occ. Compartment	2509	409	95
13	Engine Block	4414	237	-356
14	Rear Above Axle	978	-32	7

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

DATA SHEET NO. 7
MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2020 Chrysler Pacifica Hybrid minivan
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20200303
 Test Date: 5/14/2020



MDB ACCELEROMETER LOCATIONS

No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	MDB CG	1859	0	-330
2	MDB Rear	386	-660	-660

Reference: X – Face of MDB (+ forward)
 Y – MDB centerline (+ to right)
 Z – Ground plane (+ down)

DATA SHEET NO. 8
POST-TEST OBSERVATIONS

Test Vehicle: 2020 Chrysler Pacifica Hybrid minivan
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20200303
Test Date: 5/14/2020

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Front Seat Dummy (ES-2re)	Rear Seat Dummy (SID-IIs)
Face	Side Curtain Airbag	None
Top of Head	Side Curtain Airbag, Side Header	Curtain Airbag
Left Side of Head	Side Curtain Airbag	Curtain Airbag
Back of Head	Headrest, Side Header	Headrest & Curtain Airbag
Left Shoulder	Torso/Pelvis Airbag	Passenger Door
Upper Torso	Seatback, Torso/Pelvis Airbag	None
Lower Torso	Seatback, Torso/Pelvis Airbag	None
Left Hip	Driver Door	Seat Pan & Passenger Door
Left Knee	Seat pan, Torso/Pelvis Airbag	Passenger 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

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	B-Pillar Buckled
Sill Separation	None
Windshield Damage	None
Side Window Damage	None
Other Notable Effects	None

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

Test Vehicle: 2020 Chrysler Pacifica Hybrid minivan
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20200303
 Test Date: 5/14/2020

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		3093
Vertical Impact Reference Line (Aft of Front Axle - Intended Impact Point)	mm		508
Actual Impact Point (Aft of Frontal Axle)	mm		506
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact Point	+2
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact Point	+2

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2020 Chrysler Pacifica Hybrid minivan
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20200303
Test Date: 5/14/2020

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1,250
Overall Length Including Honeycomb Frame	4,120
Wheelbase of Framework Carriage	2,600
CG Location of Front Axle	1,120

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	392.5	297.5	690.0
Right	kg	386.0	291.5	677.5
Ratio	%	57.4%	42.6%	100.0%
Totals	kg	778.5	589.0	1367.5

SPEED AND ANGLE AT IMPACT DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.10 to 62.70	61.95
Trap No. 2 Velocity (Redundant)	km/h	61.10 to 62.70	61.87
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90.0
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	63.0
MDB Crabbed angle to MDB Forward Line of Motion	degrees	26.0 to 28.0	27.0

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush (mm)
Row	Description	Height (mm)	Distance (mm)	Direction	
A	Center of Bumper	432	800	Right	267
B	Top of Bumper	533	800	Right	151
C	Mid-Level	686	800	Right	151
D	Top of Stack	813	800	Left	134

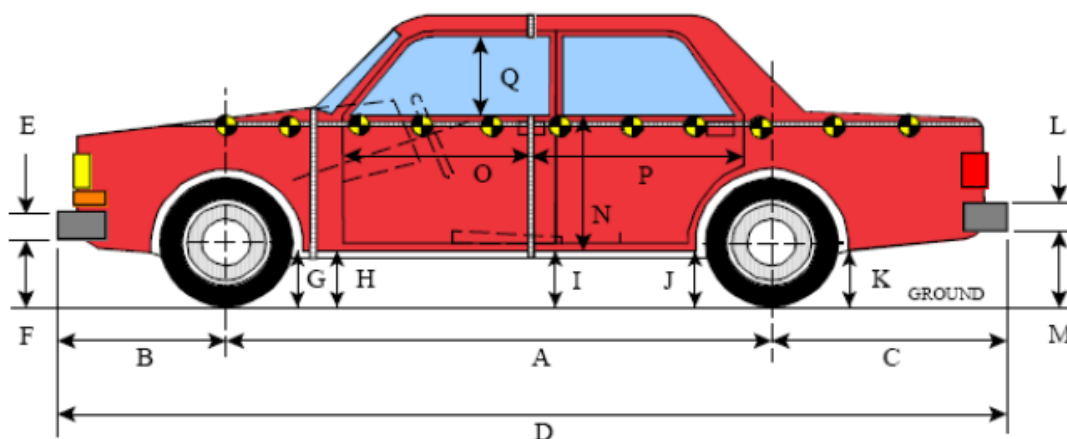
DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2020 Chrysler Pacifica Hybrid minivan

NHTSA No.: M20200303

Test Program: NCAP Side MDB Impact Test

Test Date: 5/14/2020



LEFT SIDE VIEW

All MEASUREMENTS IN (mm) WITH TOLERANCE OF ± 3 mm

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Wheelbase	3093	3090	-3
B	Front Axle to FSOV	958	963	5
C	Rear Axle to RSOV	1121	1120	-1
D	Total Length at Centerline	5173	5173	0
E	Front Bumper Thickness	415	415	0
F	Front Bumper Bottom to Ground	270	276	6
G	Sill Height at Front Wheel Well	165	168	3
H	Sill Height at Front Door Leading Edge	169	172	3
I	Sill Height at B Pillar	190	190	0
J1	Sill Height at Rear Wheel Well	197	197	0
J2	Pinch Weld Height at Rear Wheel Well	194	190	-4
K	Sill Height Aft of Rear Wheel Well	234	239	5
L	Rear Bumper Thickness	100	100	0
M	Rear Bumper Bottom to Ground	435	435	0
N	Sill Height to Window Bottom of Front Window Sill	858	805	-53
O	Front Door Leading Edge to Impact CL	827	817	-10
P	Rear Door Trailing Edge to Impact CL	1386	1356	-30
Q	Front Window Opening	508	501	-7
R	Right Side Length	5087	5091	4
S	Left Side Length	5089	5089	0
T	Maximum Vehicle Width	1994	1864	-130

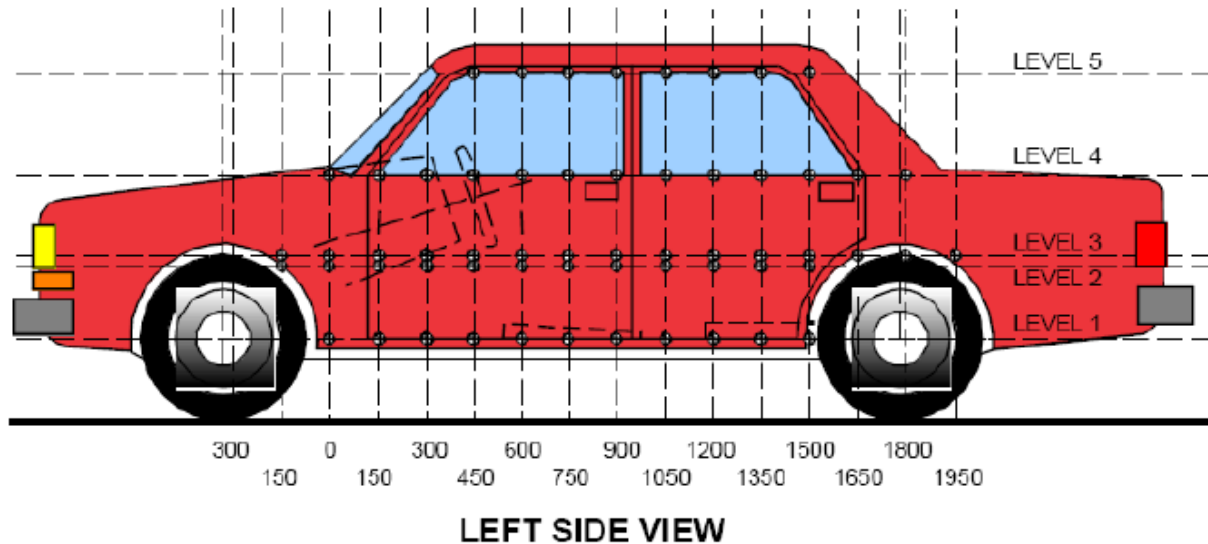
DATA SHEET NO. 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2020 Chrysler Pacifica Hybrid minivan

NHTSA No.: M20200303

Test Program: NCAP Side MDB Impact Test

Test Date: 5/14/2020



MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	281	38	1650
2	Driver Hip Point	mm	712	251	1350
3	Mid-Door	mm	761	249	1350
4	Window Sill	mm	1069	105	1350
5	Window Top	mm	1674	0	1050

*window top level bent outward from original position

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. 11 ... (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2020 Chrysler Pacifica Hybrid minivan
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20200303
 Test Date: 5/14/2020

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

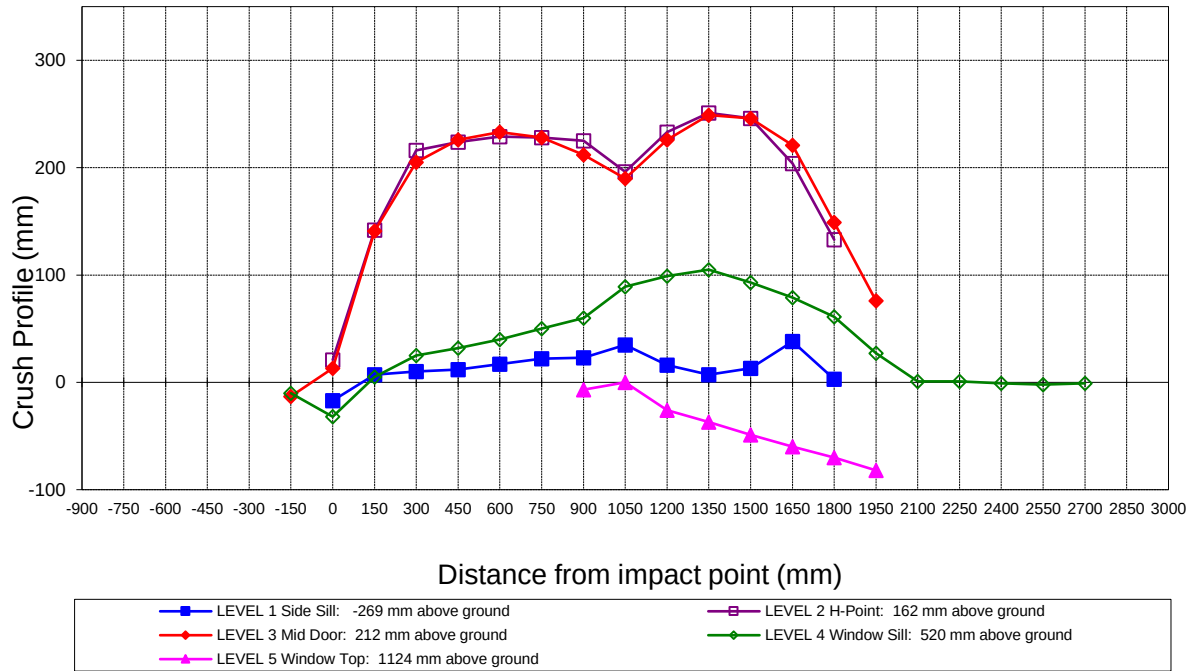
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750															
-600															
-450															
-300															
-150			1004	898				1017	908				-13	-10	
0	963	997	997	906		980	976	982	938		-17	21	15	-32	
150	951	994	993	911		944	852	852	906		7	142	141	5	
300	950	995	995	925		940	779	790	900		10	216	205	25	
450	951	998	999	932		939	774	773	900		12	224	226	32	
600	953	1001	1003	938		936	772	770	898		17	229	233	40	
750	955	1003	1005	944		933	775	777	894		22	228	228	50	
900	953	1004	1007	949	675	930	779	795	889	682	23	225	212	60	-7
1050	953	1005	1008	951	693	918	809	818	862	693	35	196	190	89	0
1200	953	1005	1008	954	699	937	772	782	855	725	16	233	226	99	-26
1350	951	1004	1007	957	702	944	753	758	852	739	7	251	249	105	-37
1500	950	1003	1006	960	704	937	757	760	867	753	13	246	246	93	-49
1650	951	1001	1005	963	706	913	797	784	884	766	38	204	221	79	-60
1800	952	999	1003	966	708	949	866	854	905	778	3	133	149	61	-70
1950			1002	967	708			926	940	790			76	27	-82
2100				968					967					1	
2250				968					967					1	
2400				965					966					-1	
2550				961					963					-2	
2700				956					957					-1	
2850															
3000															

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 test based on an estimated impact point.

DATA SHEET NO. 11 (CONTINUED) **TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2020 Chrysler Pacifica Hybrid minivan
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20200303
 Test Date: 5/14/2020



Vehicle Exterior Crush Measurements - Visual Representation

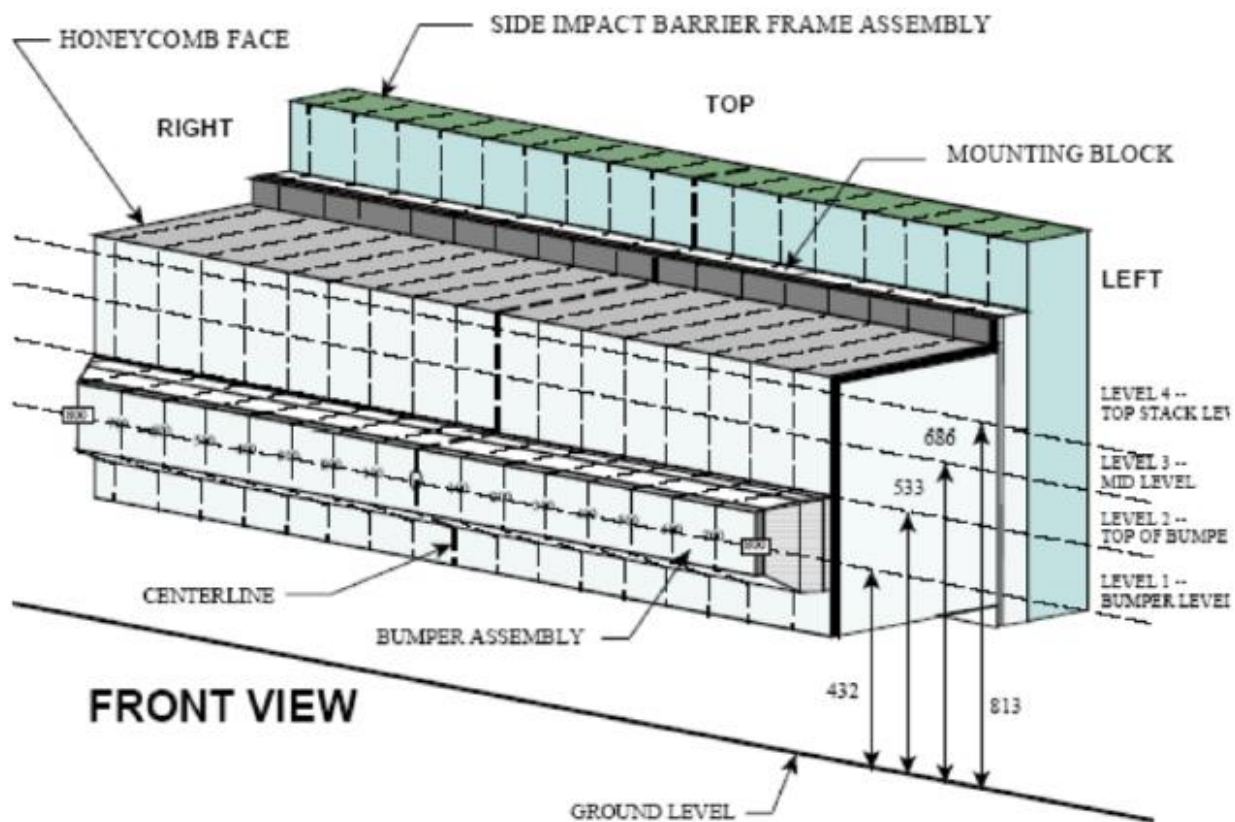
DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2020 Chrysler Pacifica Hybrid minivan

NHTSA No.: M20200303

Test Program: NCAP Side MDB Impact Test

Test Date: 5/14/2020



NOTE: Dimensions are shown in millimeters, mm

DEFORMABLE BARRIER STATIC CRUSH

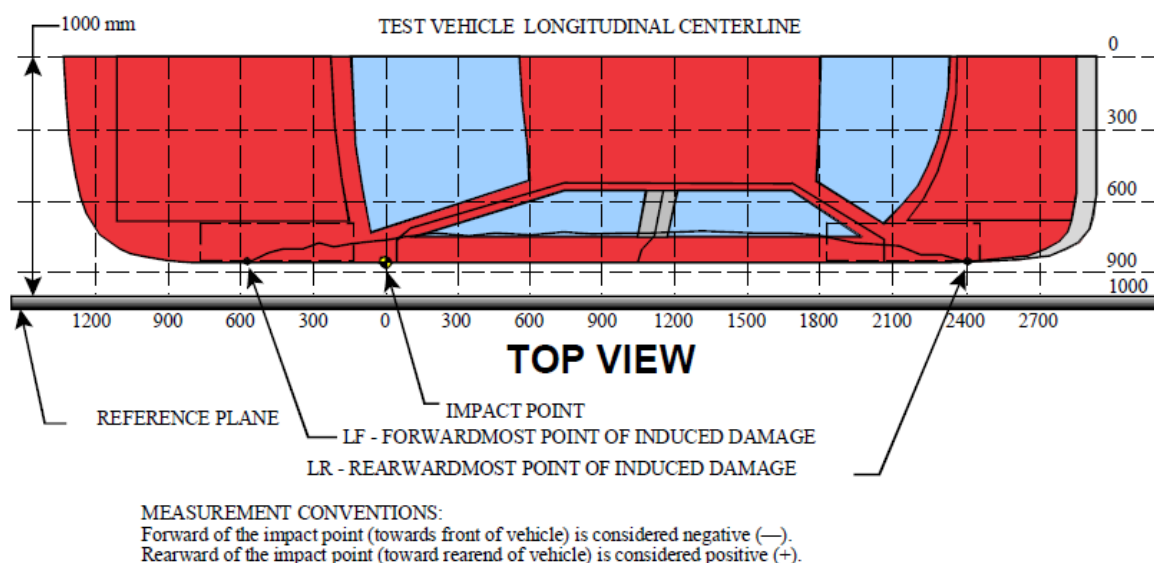
Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
1	267	265	259	256	255	253	250	248	246	242	234	229	226	223	220	218	223
2	151	145	144	141	137	130	124	119	128	123	121	118	115	111	108	106	111
3	151	98	52	44	46	53	75	109	89	62	51	46	45	47	51	63	122
4	130	92	66	56	60	66	99	132	120	86	67	66	70	71	85	99	134

DATA SHEET NO. 13 **VEHICLE AND MDB DAMAGE PROFILE DISTANCES**

Test Vehicle: 2020 Chrysler Pacifica Hybrid minivan
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20200303
 Test Date: 5/14/2020

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	-150	3	-17	-4	-13
2	270	3	198	5	193
3	690	3	226	-4	230
4	1110	3	196	-8	204
5	1530	3	235	-6	241
6	1950	3	74	-2	76

MDB DAMAGE PROFILE DISTANCES

DPD	Distance From Center of MDB	Level	Post-Test (mm)*
1	800 mm left of center	1	223
2	480 mm left of center	1	223
3	160 mm left of center	1	237
4	160 mm right of center	1	249
5	480 mm right of center	1	256
6	800 mm right of center	1	267

DATA SHEET NO. 14
FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: <u>2020 Chrysler Pacifica Hybrid minivan</u>	NHTSA No.: <u>M20200303</u>
Test Program: <u>NCAP Side MDB Impact Test</u>	Test Date: <u>5/14/2020</u>
Test Time: <u>2:30 PM</u>	Temperature: <u>21°C</u>

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

FMVSS NO. 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	67	300	367
90° to 180°	69	300	369
180° to 270°	67	300	367
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	

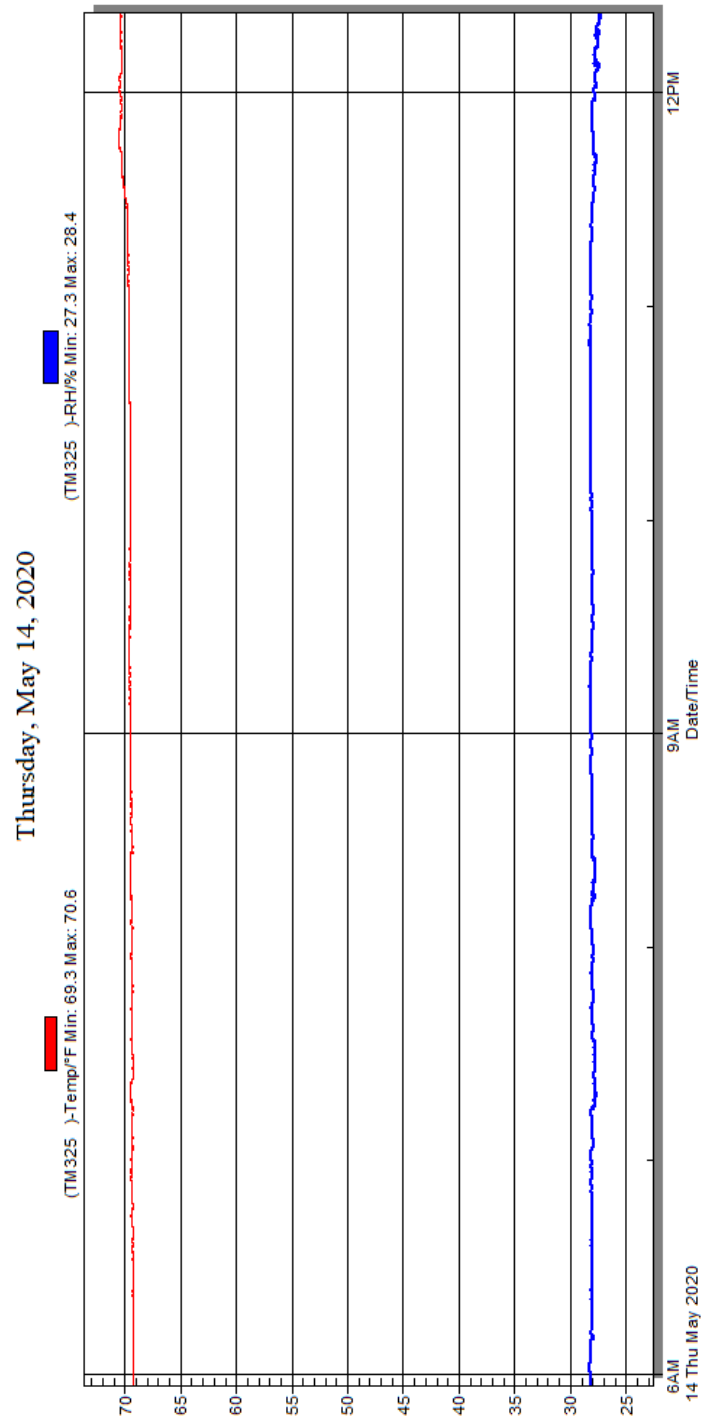
ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 15
DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle: 2020 Chrysler Pacifica Hybrid minivan
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20200303
 Test Date: 5/14/2020



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: <u>2020 Chrysler Pacifica Hybrid minivan</u>	NHTSA No.: <u>M20200303</u>
Test Program: <u>NCAP Side MDB Impact Test</u>	Test Date: <u>5/14/2020</u>

ELECTRIC VEHICLE PROPULSION SYSTEM

Measured Parameter	Value
Type of Electric Vehicle (Electric/Gas-Electric Hybrid/Fuel Cell-Electric Hybrid)	Gas-Electric Hybrid
Propulsion Battery Type	Lithium-Ion
Nominal Voltage (Volts)	360
Is this Vehicle equipped with an Automatic Propulsion Battery Disconnect?	Yes
Physical Location of Automatic Propulsion Battery Disconnect, if applicable	Inside Battery Pack
Auxiliary Battery Type	12V AGM

PROPULSION BATTERY SYSTEM DATA (COTR SUPPLIED)

Measured Parameter	Value
Electrolyte Fluid Type	Gel-type, Organic Carbonate Based
Electrolyte Fluid Specific Gravity	1.3 g/cc
Electrolyte Fluid Kinematic Viscosity (centistokes)	2.2 cP
Electrolyte Fluid Color	Colorless
Propulsion Battery Coolant Type, Color and Specific Gravity (if applicable)	50/50 Glycol/Water
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	0
Maximum State of Charge	V	392
95% of Maximum	V	372.4
Test Voltage *	V	388.6
<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:	<u>2020 Chrysler Pacifica Hybrid minivan</u>	NHTSA No.:	<u>M20200303</u>
Test Program:	<u>NCAP Side MDB Impact Test</u>	Test Date:	<u>5/14/2020</u>

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

Measured Parameter	Value
Details of Vehicle Chassis Ground Points & Locations	Ground wire was attached to the rear quarter panel of the vehicle body
Details of Propulsion Battery Components	All battery components are internal to the battery located on the underside of the vehicle.

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

Test Vehicle: <u>2020 Chrysler Pacifica Hybrid minivan</u>	NHTSA No.: <u>M20200303</u>
Test Program: <u>NCAP Side MDB Impact Test</u>	Test Date: <u>5/14/2020</u>

VOLTMETER INFORMATION

Measured Parameter	Units	Value
Make & Model		Fluke 87
Serial No.		65280327
Internal Impedance Value	MΩ	10
Resolution	V	0.001
Last Calibration Date		7/10/2019

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	392
Propulsion Battery Voltage : (ready to drive position)	V _b	V	388.6
Propulsion Battery to Vehicle Chassis	V ₁	V	349.8
Propulsion Battery to Vehicle Chassis	V ₂	V	354.1
Propulsion Battery to Vehicle Chassis Across Known Resistor	R _o	Ω	203300
Propulsion Battery to Vehicle Chassis with R _o installed	V ₁ '	V	128.7
Propulsion Battery to Vehicle Chassis with R _o installed	V ₂ '	V	12.35
$R_{i1} = R_o * (1 + V_2/V_1) * [(V_1 - V_1')/V_1']$	R _{i1}	Ω	702811
$R_{i2} = R_o * (1 + V_1/V_2) * [(V_2 - V_2')/V_2']$	R _{i2}	Ω	11183146
Lesser value of R _{i1} and R _{i2}	R _i	Ω	702811
Electrical Isolation Value (Minimum E.I. Value is 500 Ω/V)	R _i /V _b	Ω/V	1809

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

NOTES:

- The measurement shall be made with the propulsion battery connected to the vehicle propulsion system, and the vehicle in the "ready-to-drive" (propulsion motor(s) activated) position.
- If the voltage measurement is not at the voltage or within the normal operating voltage range specified by the manufacturer, the battery must be charged.
- The known resistance 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: <u>2020 Chrysler Pacifica Hybrid minivan</u>	NHTSA No.: <u>M20200303</u>
Test Program: <u>NCAP Side MDB Impact Test</u>	Test Date: <u>5/14/2020</u>

VOLTMETER INFORMATION

Measured Parameter	Units	Value
Make & Model		Fluke 87
Serial No.		65280327
Internal Impedance Value	MΩ	10
Nominal Propulsion Battery Voltage (V _b)	V	4.69

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 =	2.73	V	Time:	4	Minutes	22	Seconds
V ₂ =	1.41	V	Time:	4	Minutes	38	Seconds
R ₀ =	203300	Ω	Time:		Minutes		Seconds
V ₁ ' =	0.201	V	Time:	4	Minutes	49	Seconds
V ₂ ' =	0.097	V	Time:	5	Minutes	02	Seconds
R _{i1} =	3879072	Ω	Time:	4	Minutes	55	Seconds
R _{i2} =	8080004	Ω	Time:	5	Minutes	10	Seconds
R _i =	3879072	Ω	Time:	4	Minutes	55	Seconds
R _i /V _b =	827094	Ω/V	Time:	4	Minutes	55	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

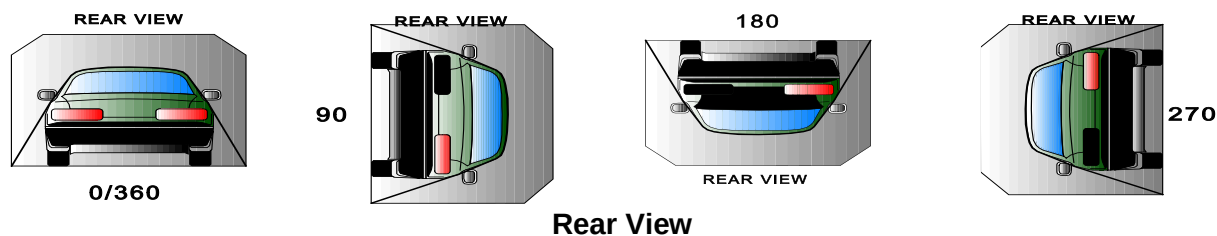
PROPULSION BATTERY SYSTEM COMPONENTS

Measured Parameter	Comments	Passed	Failed
Propulsion Battery Module movement within the passenger compartment	No Movement	X	
Intrusion of an outside Propulsion Battery Component into the passenger compartment	No Intrusion	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: 2020 Chrysler Pacifica Hybrid minivan
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20200303
 Test Date: 5/14/2020



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	7	5	6	7	7
90° to 180°	1	9	5	6	9	7
180° to 270°	1	7	5	6	7	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 87
Serial No.		65280327
Internal Impedance Value	MΩ	10
Nominal Propulsion Battery Voltage (V _b)	V	4.584

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: 2020 Chrysler Pacifica Hybrid minivan

NHTSA No.: M20200303

Test Program: NCAP Side MDB Impact Test

Test Date: 5/14/2020

ELECTRICAL ISOLATION MEASUREMENTS & CALCULATIONS

Parameter	Rollover Stage	Value	Units		Minutes	Seconds
$V_1 =$	90°	1.87	V	Time:	2	26
	180°	0.072	V		8	16
	270°	0.006	V		14	35
	360°	0.02	V		27	32
$V_2 =$	90°	2.01	V	Time:	2	42
	180°	0.062	V		8	30
	270°	0.02	V		14	51
	360°	0.02	V		27	44
$V_1' =$	90°	0.148	V	Time:	2	50
	180°	0.002	V		8	40
	270°	0.001	V		14	59
	360°	0.002	V		27	57
$V_2' =$	90°	0.146	V	Time:	2	58
	180°	0.002	V		8	52
	270°	0.002	V		15	11
	360°	0.003	V		28	11
$R_{i1} =$	90°	4907936	Ω	Time:	2	52
	180°	13242736	Ω		8	45
	270°	4404833	Ω		15	5
	360°	3659400	Ω		28	3
$R_{i2} =$	90°	5010327	Ω	Time:	3	08
	180°	13181710	Ω		9	1
	270°	2378610	Ω		15	21
	360°	2304067	Ω		28	22
$R_i =$	90°	4907936	Ω	Time:	3	15
	180°	13181710	Ω		9	7
	270°	2378610	Ω		15	28
	360°	2304067	Ω		28	27
$R_i/V_b =$	90°	1070667	Ω/V	Time:	3	19
	180°	2875591	Ω/V		9	14
	270°	518894	Ω/V		15	34
	360°	502632	Ω/V		28	32

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

☒ X

Yes

☐

No (Fail)

APPENDIX A
PHOTOGRAPHS

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Figure A-1: As-Delivered Right Front 3/4 View of Test Vehicle



Figure A-2: As-Delivered Left Rear 3/4 View of Test Vehicle



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

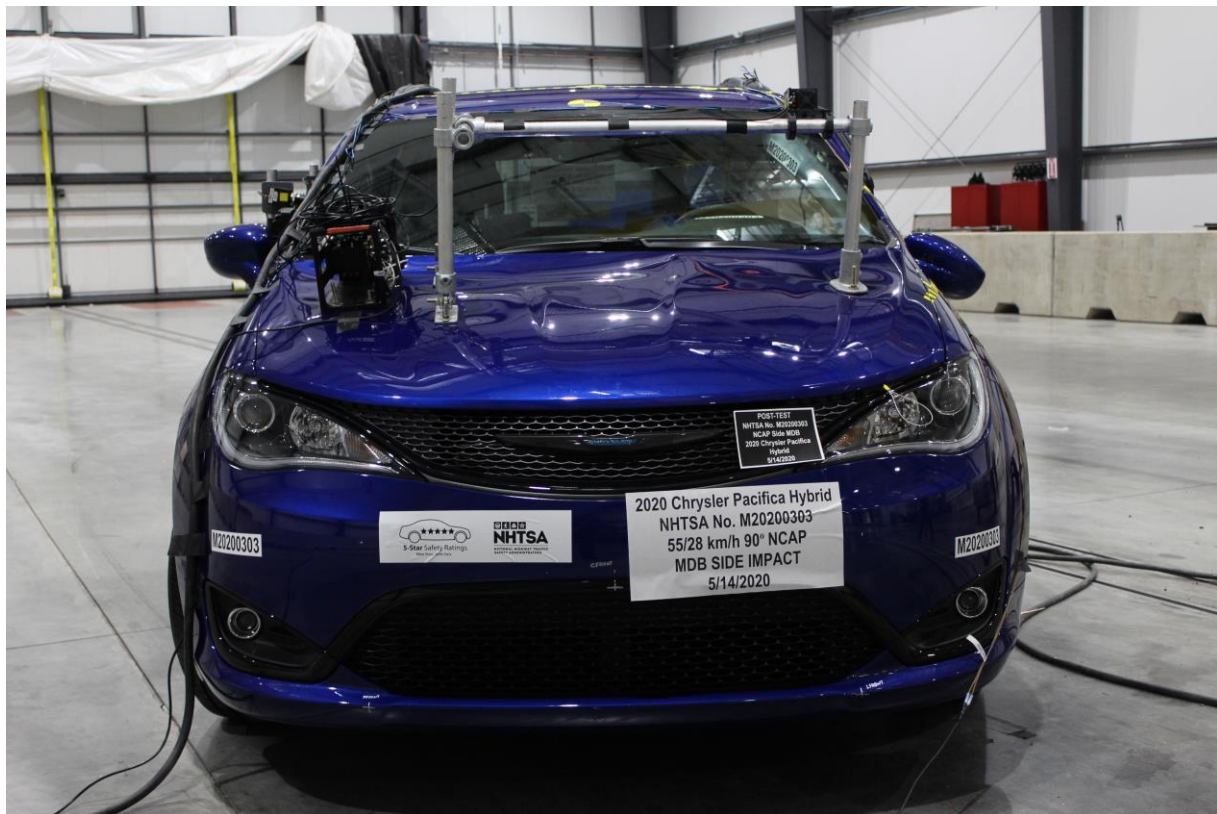


Figure A-4: Post-Test Frontal View of Test Vehicle



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

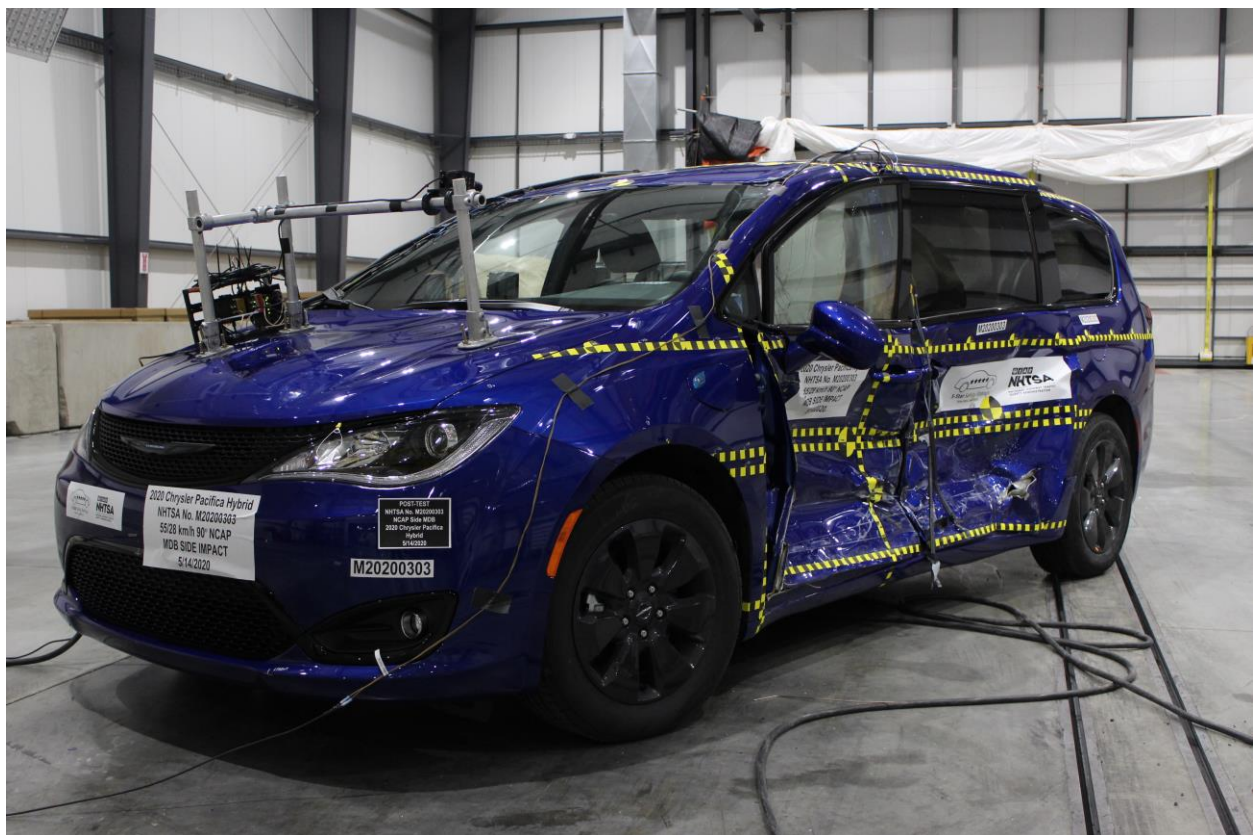


Figure A-6: Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle



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



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

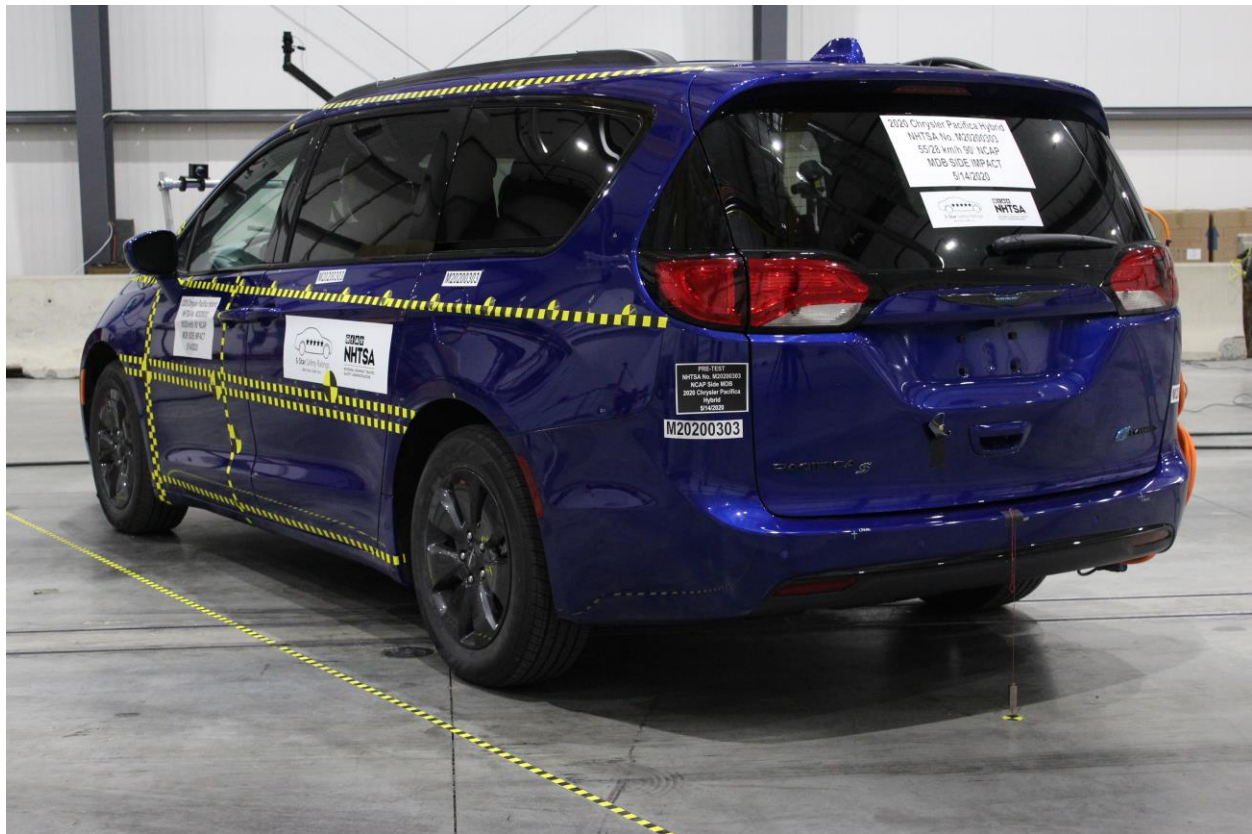


Figure A-9: Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



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

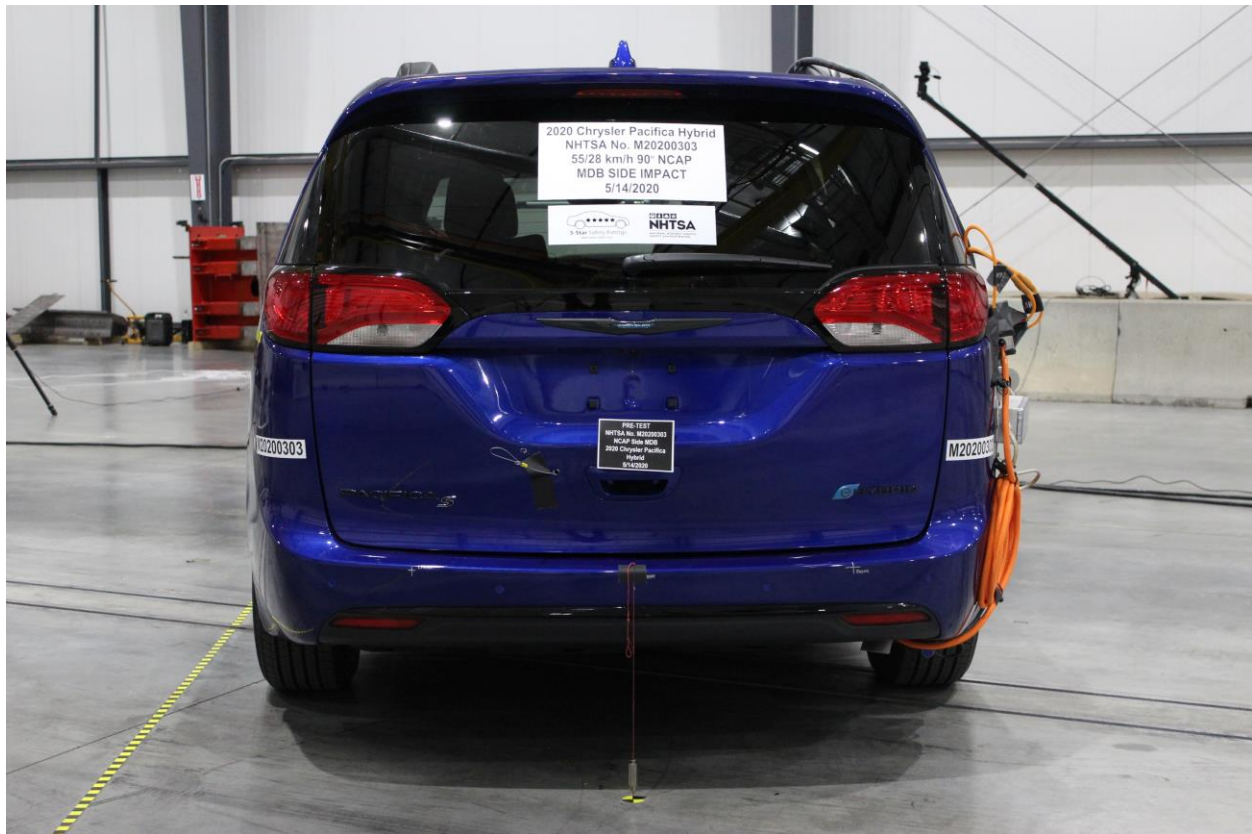


Figure A-11: Pre-Test Rear View of Test Vehicle



Figure A-12: Post-Test Rear Side 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 the Test Area

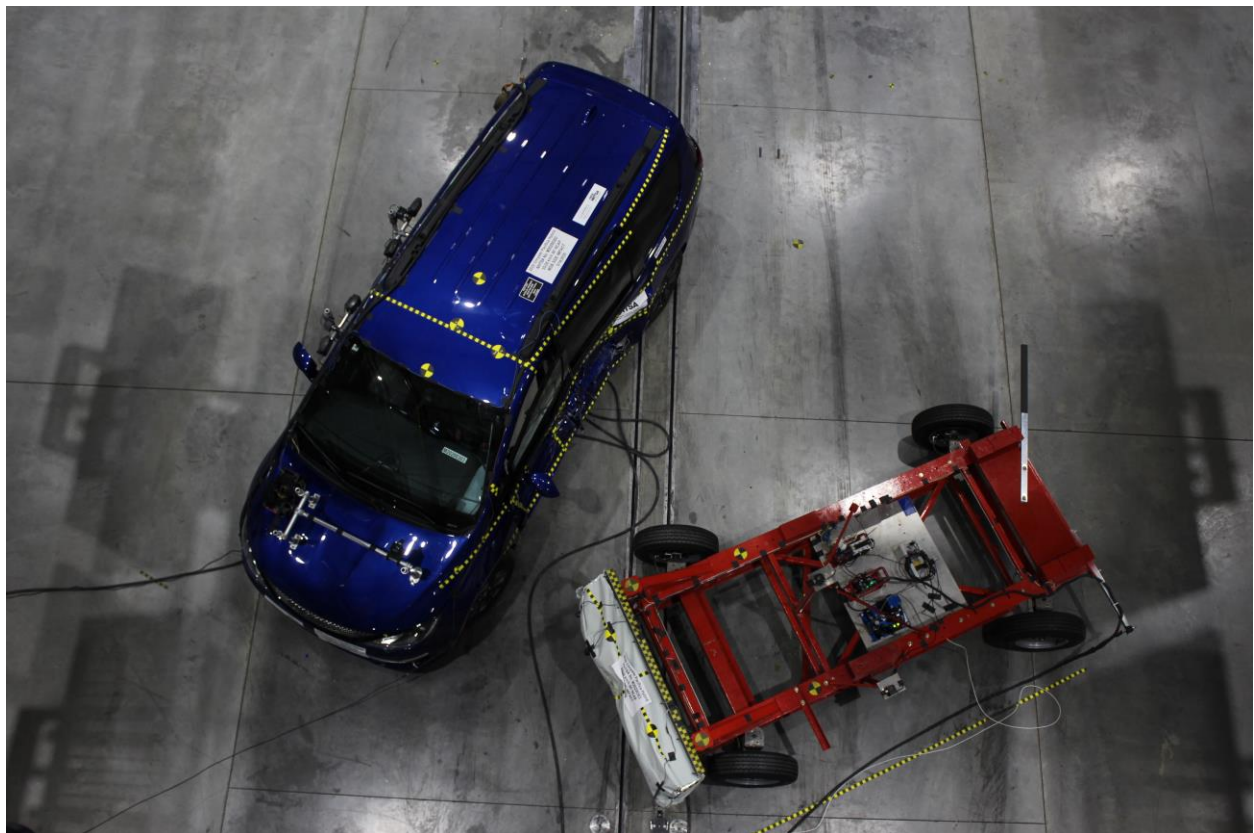


Figure A-16: Post-Test Overhead View of Test Area

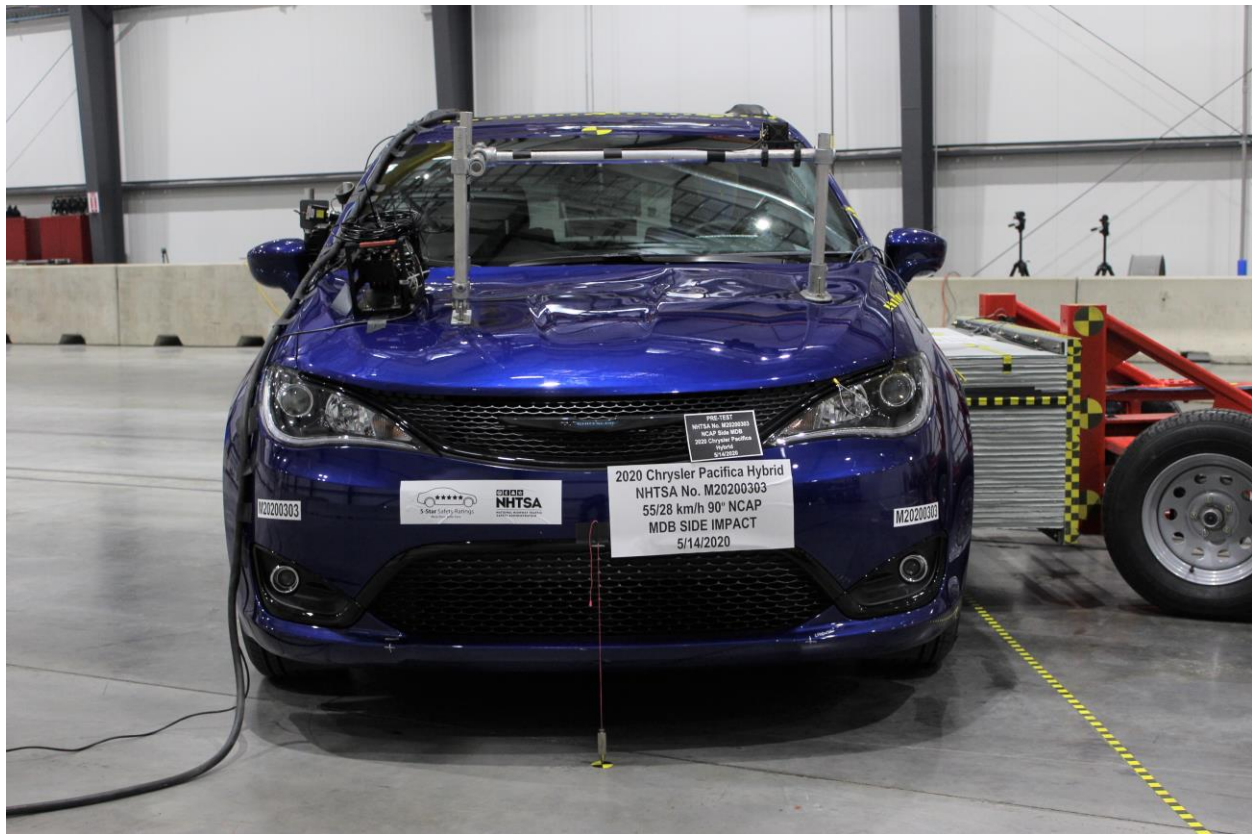


Figure A-17: Pre-Test Left Side View of MDB Positioned Against Side of Test Vehicle

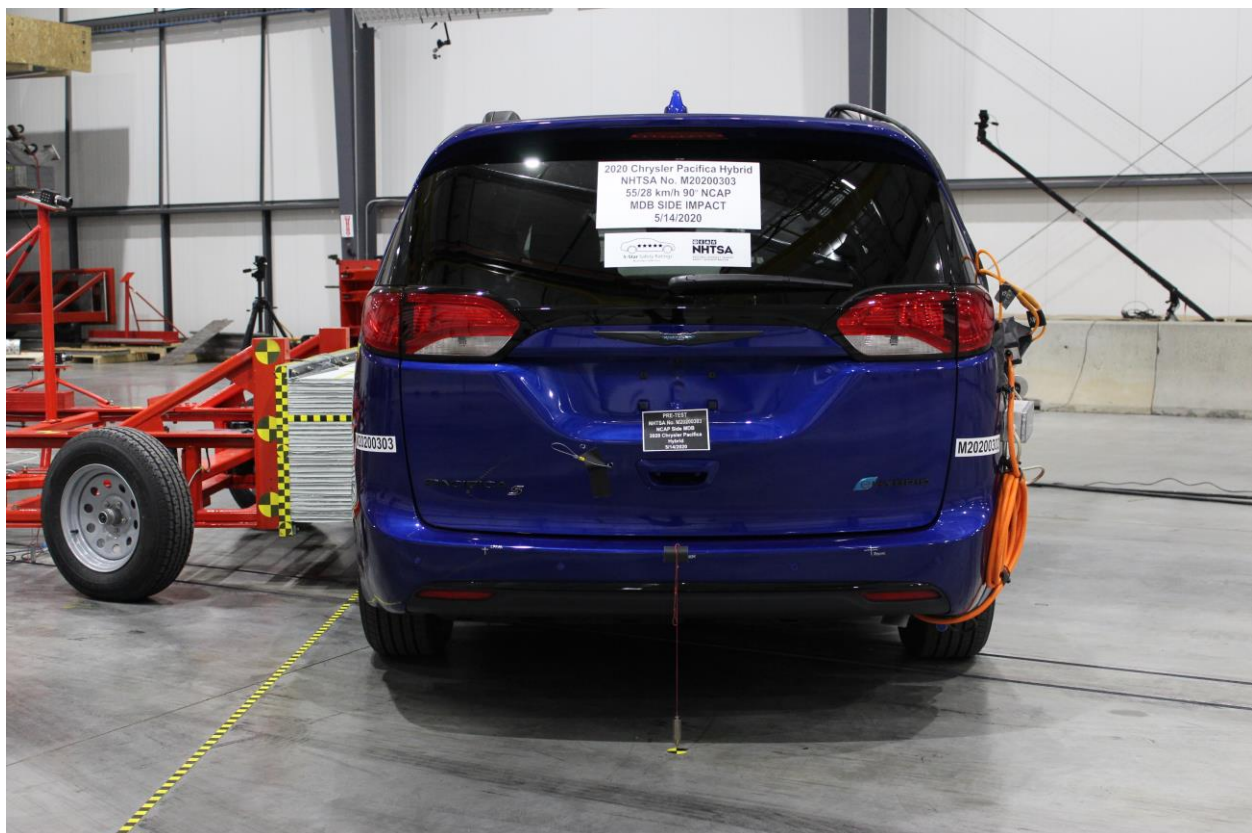


Figure A-18: Pre-Test Right Side View of MDB Positioned Against Side of Test Vehicle

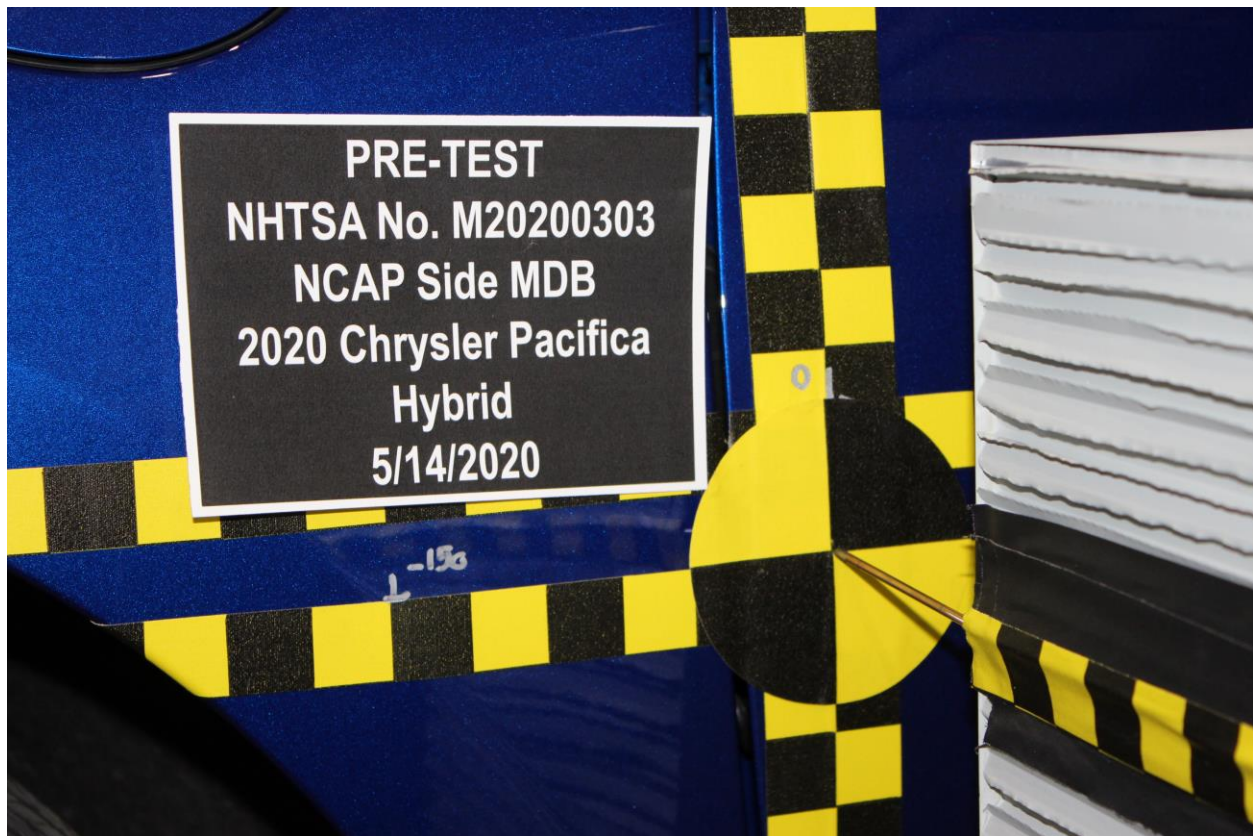


Figure A-19: Pre-Test Close-up View of Impact Point Target



Figure A-20: Post-Test Close-up View of Impact Point Target



Figure A-21: Pre-Test Left Front Door Latch Close-Up



Figure A-22: Post-Test Left Front Door Latch Close-Up



Figure A-23: Pre-Test Left Rear Door Latch Close-Up



Figure A-24: Post-Test Left Rear Door Latch Close-Up



Figure A-25: Pre-Test Front Close-up View of Driver Dummy



Figure A-26: Post-Test Front Close-up View of Driver Dummy



Figure A-27: Pre-Test Left Side View of Driver Dummy Showing Belt and Chalking



Figure A-28: Pre-Test Left Side View of Driver Dummy Shoulder and Door Top View



Figure A-29: Post-Test Left Side View of Driver Dummy Shoulder and Door Top View

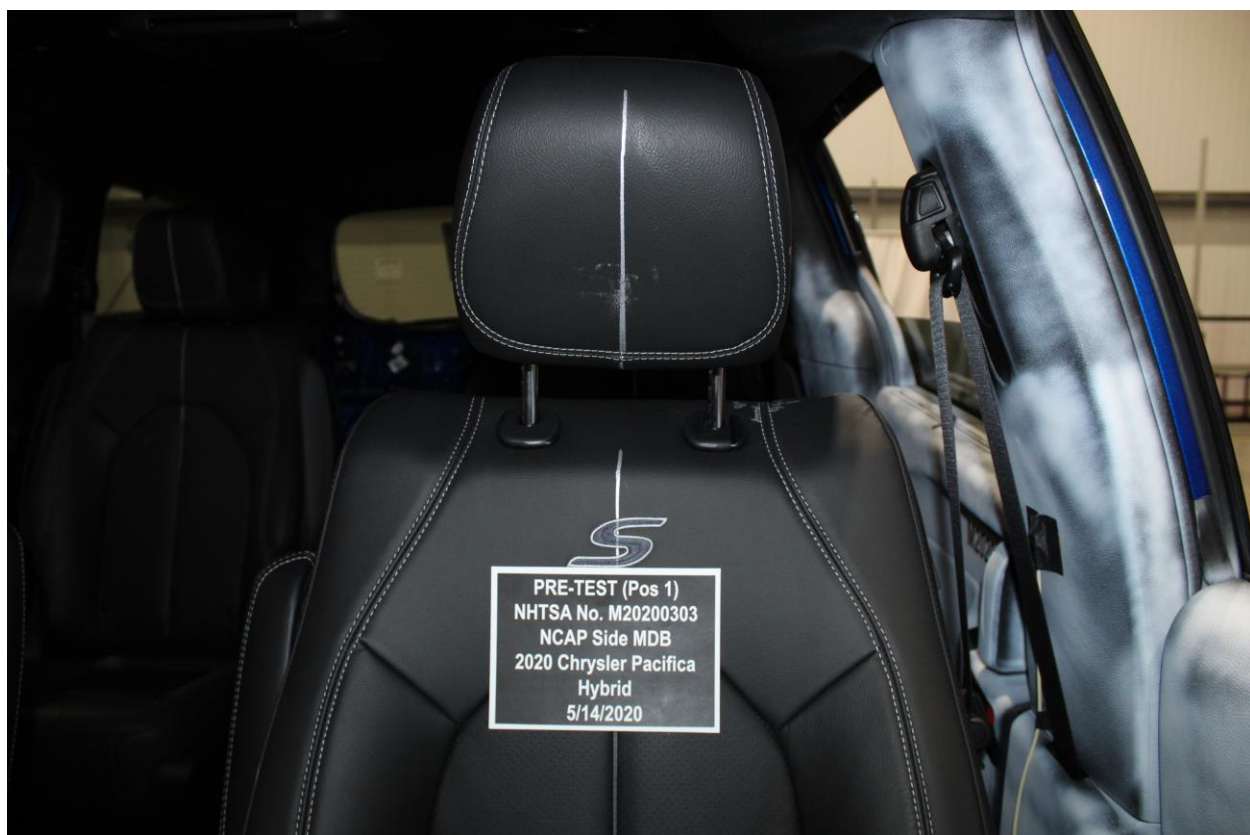


Figure A-30: Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning



Figure A-31: Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint



Figure A-32: Pre-Test Frontal View of Driver Seat Pan Prior to Dummy Positioning

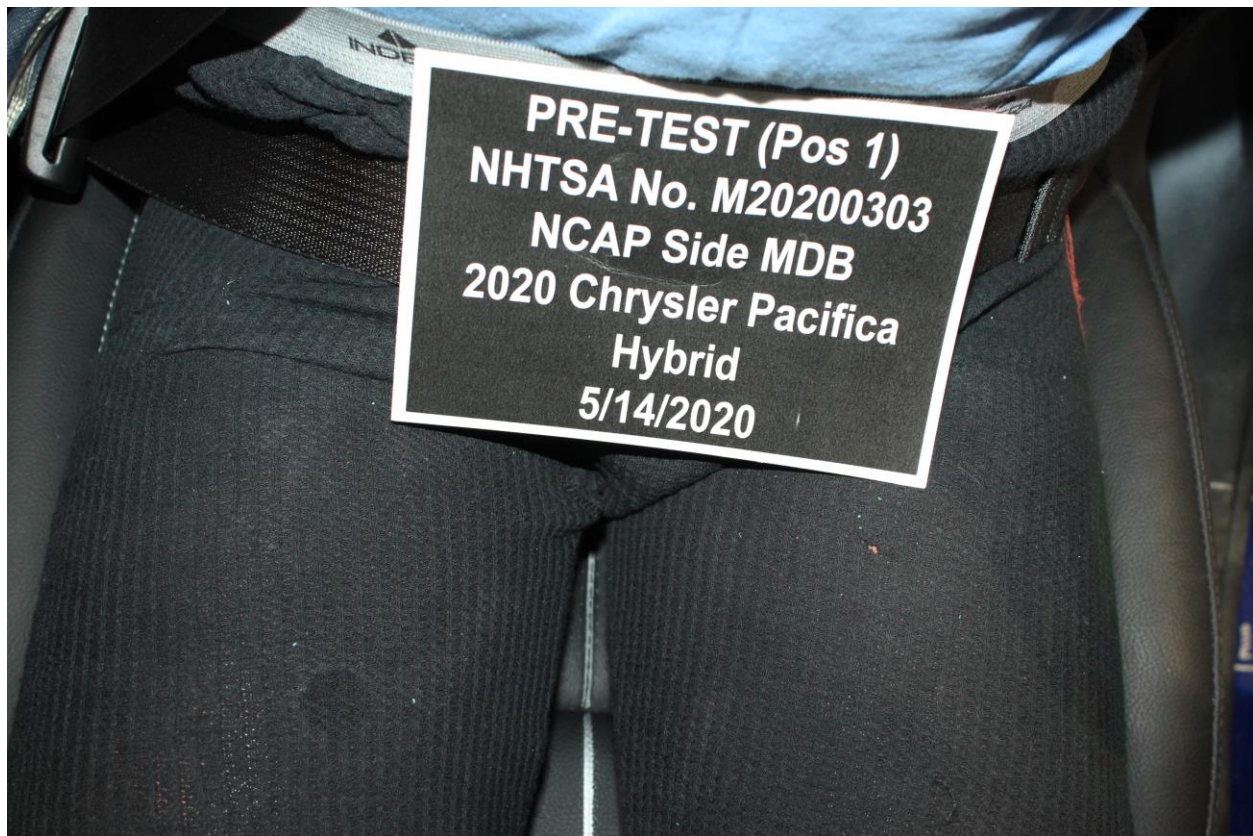


Figure A-33: Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan



Figure A-34: Pre-Test Placement of Driver Dummy's Feet



Figure A-35: Pre-Test View of Belt Anchorage for Driver Dummy



Figure A-36: Pre-Test Left Side View of Steering Wheel



Figure A-37: View of Disengaged Parking Brake

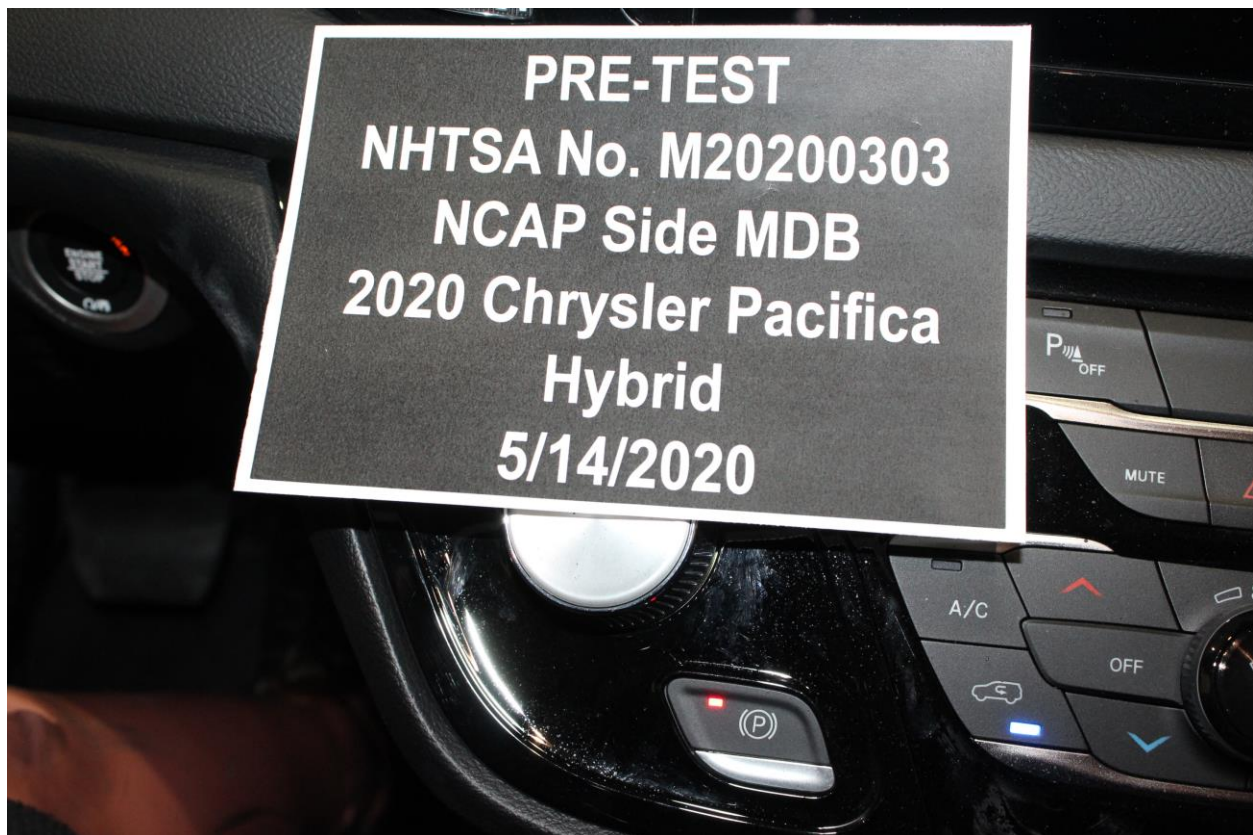


Figure A-38: Pre-Test View of Parking Brake



Figure A-39: Pre-test Close-Up Left Side View of Driver Seat Track



Figure A-40: Pre-Test Close-Up Left Side View of Driver Seat Back



Figure A-41: Pre-Test Close-Up View of Driver Seat Back or Head Restraint



Figure A-42: Pre-Test Driver Dummy and Door Clearance View



Figure A-43: Post-Test Driver Dummy and Door Clearance View



Figure A-44: Pre-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment



Figure A-45: Post-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment



Figure A-46: Pre-Test Driver Inner Door Panel View



Figure A-47: Post-Test Driver Inner Door Panel View Showing Driver Dummy Contact Locations



Figure A-48: Post-Test Driver Dummy Close-Up Head Contact with Vehicle View



Figure A-49: Post-Test Driver Dummy Close-Up Head Contact with Side Air bag View



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

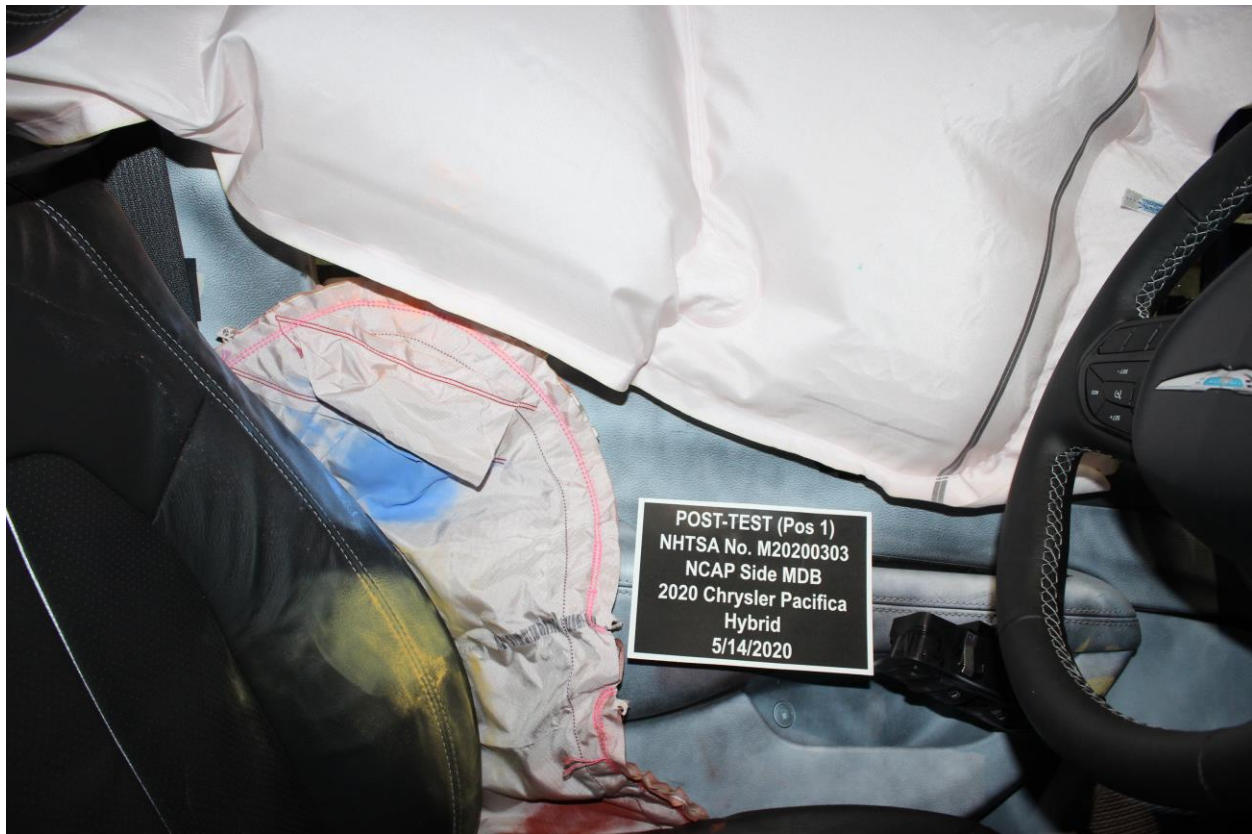


Figure A-51: Post-Test Driver Dummy Close-Up Torso Contact with Side Air bag View

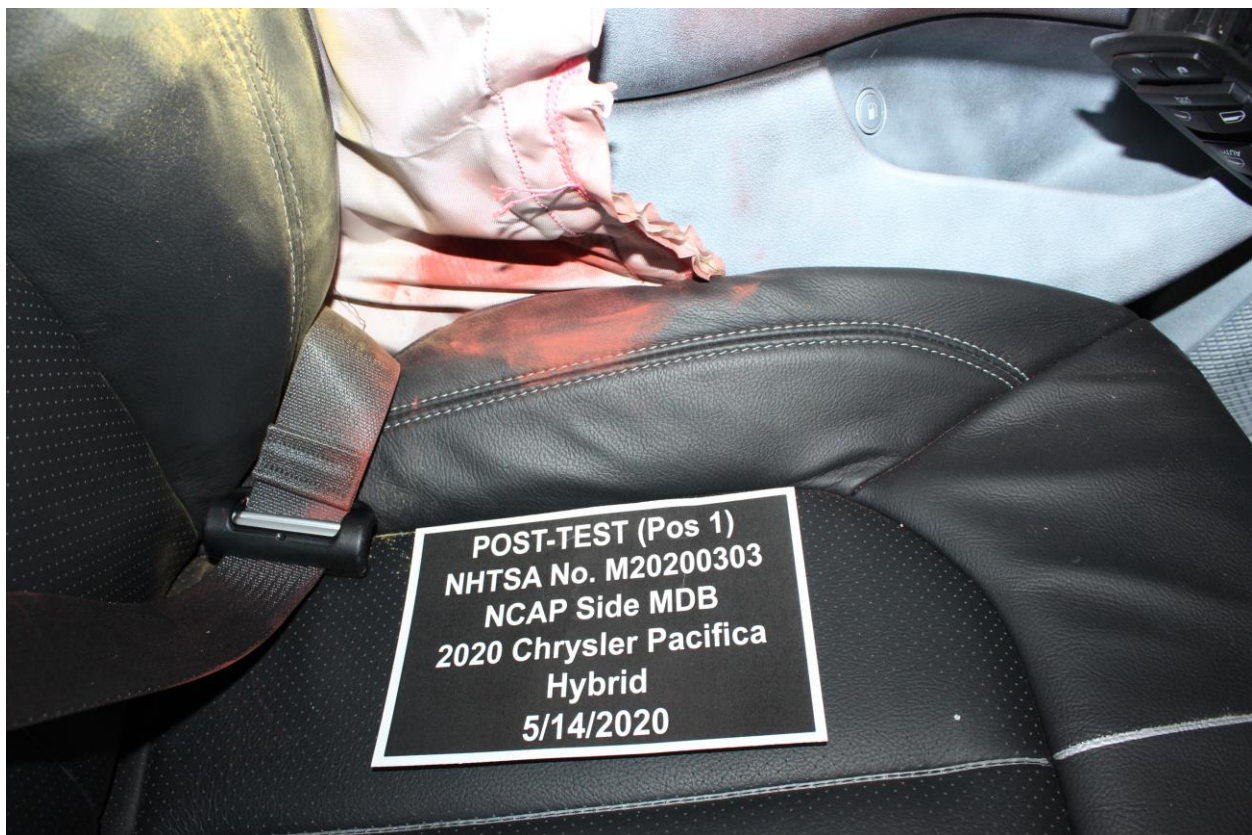


Figure A-52: Post-Test Driver Dummy Close-Up Pelvis Contact View



Figure A-53: Post-Test Driver Dummy Close-Up Pelvis Contact with Side Air bag View



Figure A-54: Post-Test Driver Dummy Close-Up Knee Contact View



Figure A-55: Pre-Test Left Side View of Rear Passenger Dummy Showing Belt and Chalking



Figure A-56: Pre-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View



Figure A-57: Post-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View



Figure A-58: Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning



Figure A-59: Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint

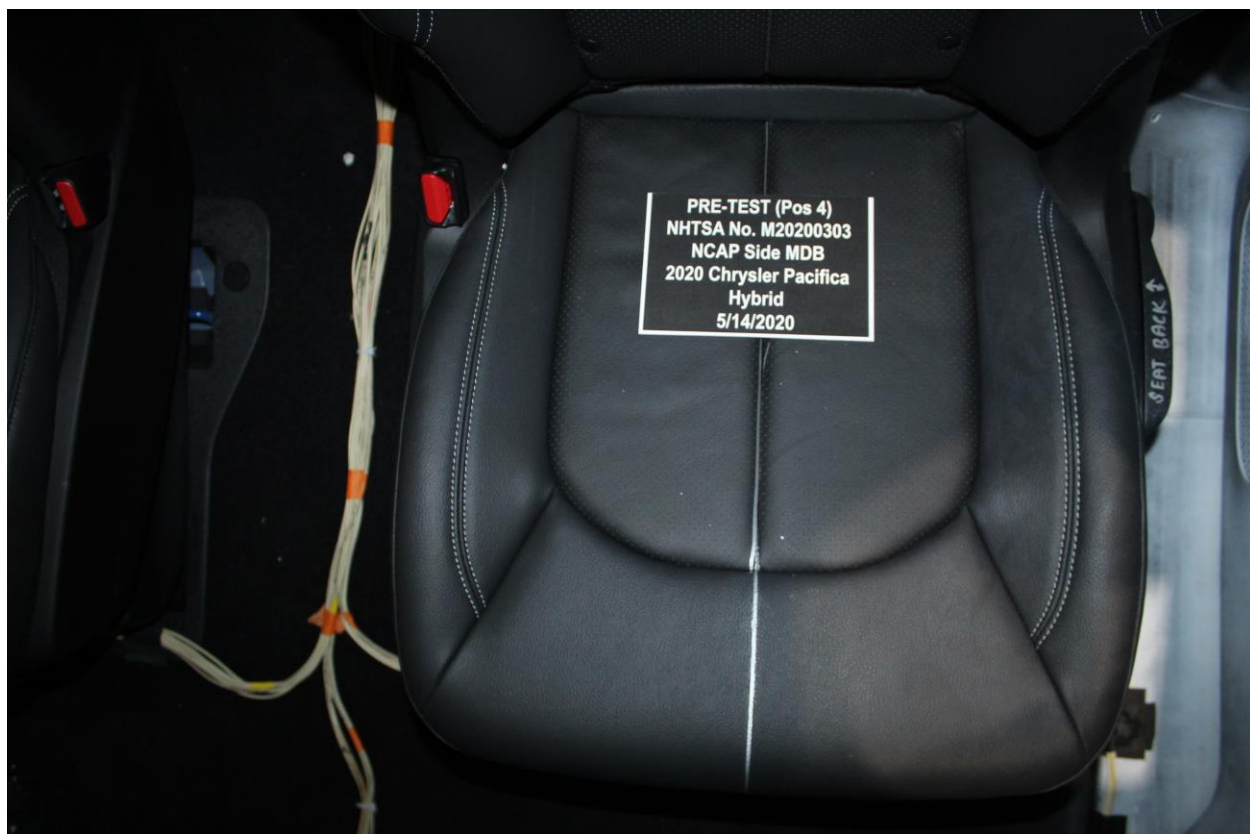


Figure A-60: Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning



Figure A-61: Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan

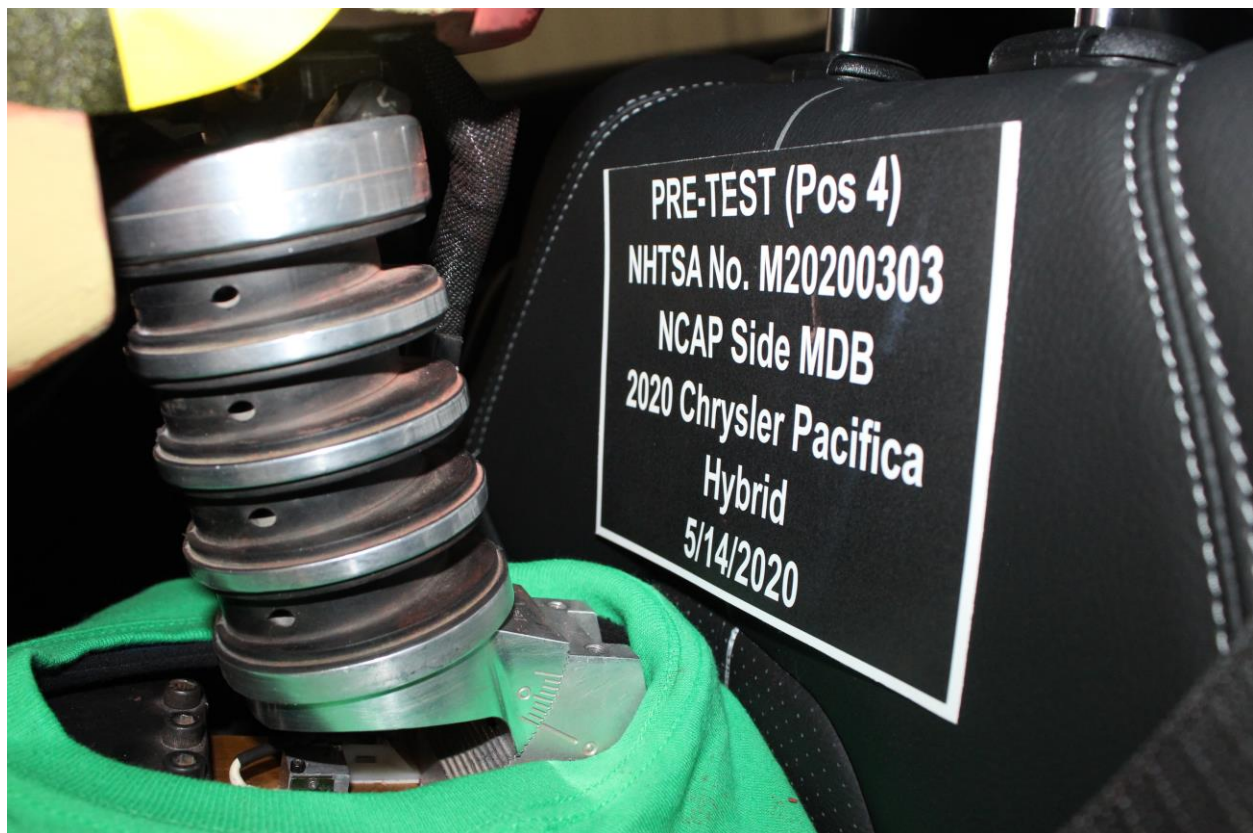


Figure A-62: Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket



Figure A-63: Pre-Test View of Rear Passenger Dummy's Head Showing Dummy's Head is Level



Figure A-64: Pre-Test Placement of Rear Passenger Dummy's Feet



Figure A-65: Pre-Test View of Belt Anchorage for Rear Passenger Dummy

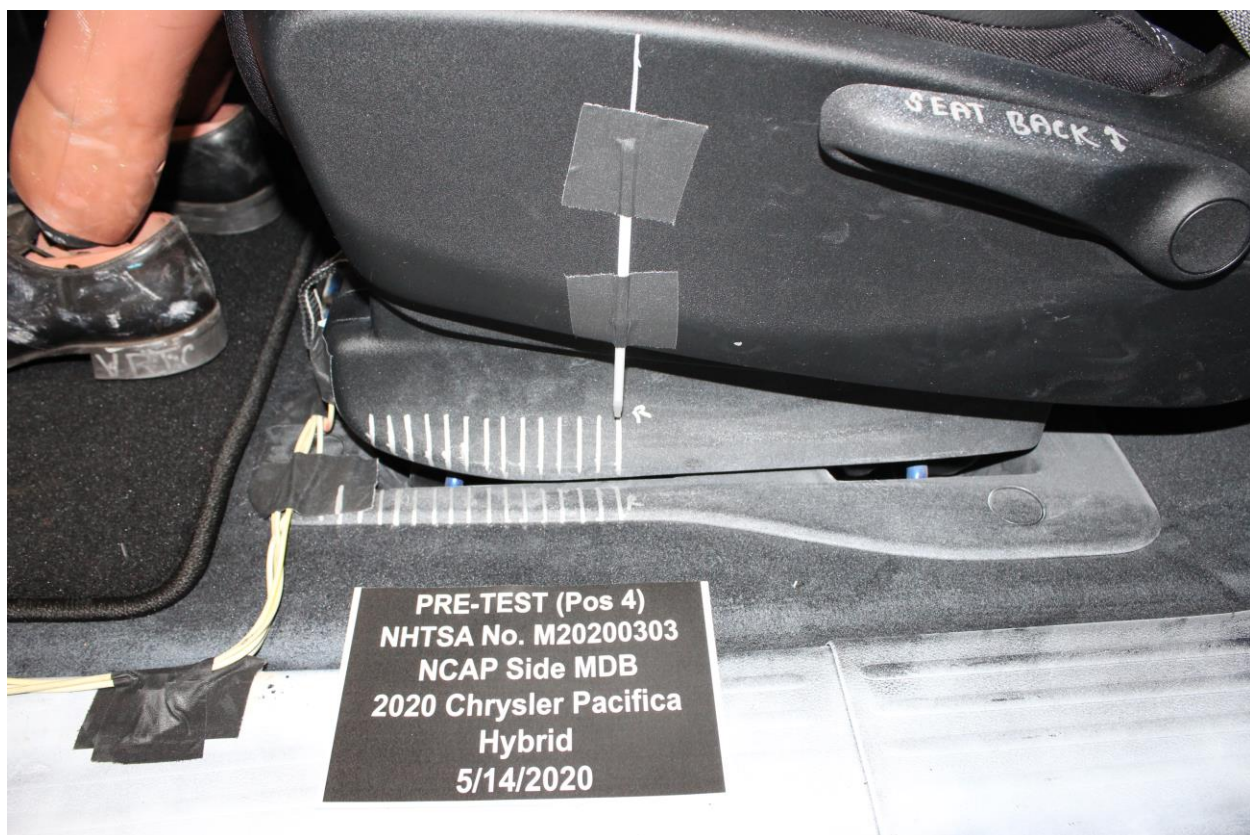


Figure A-66: Pre-Test Close-Up Left Side View of Rear Passenger Seat Track

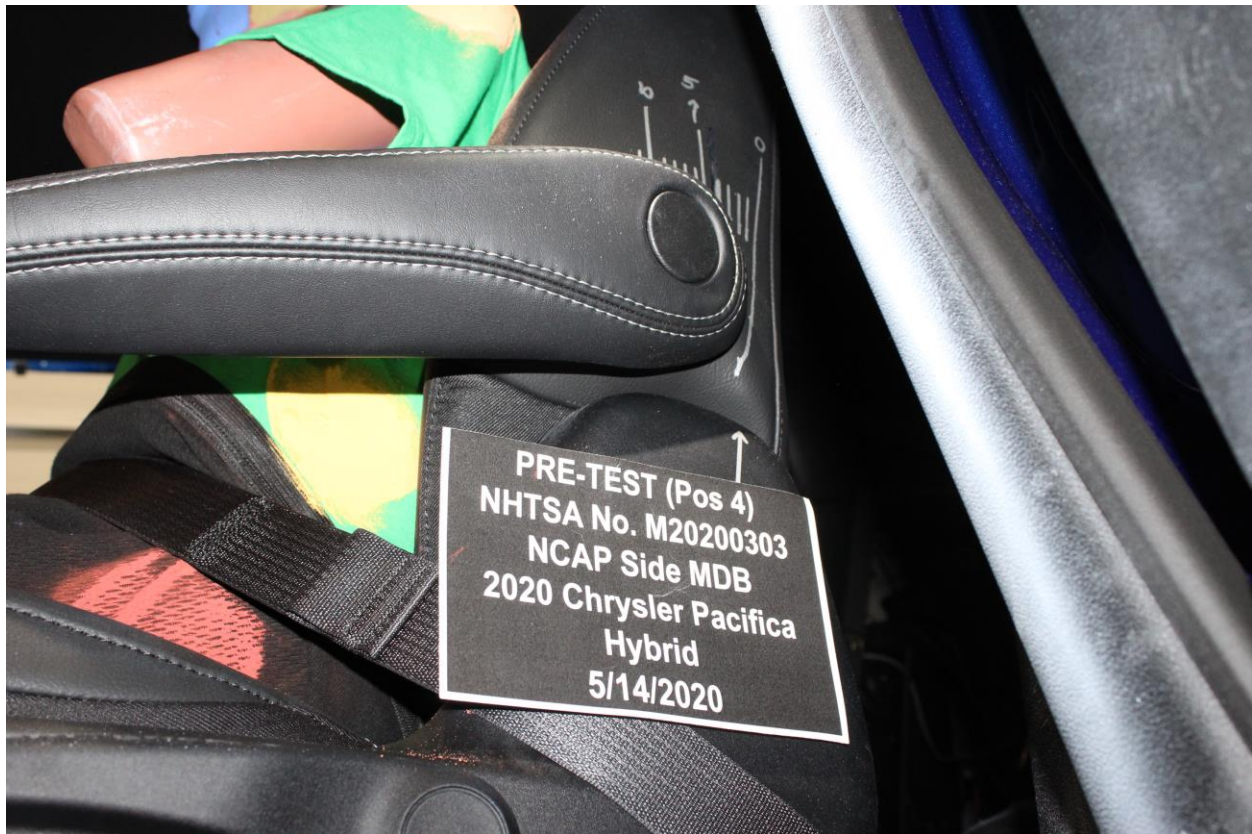


Figure A-67: Pre-Test Close-Up Left Side View of Rear Passenger Seat Back



Figure A-68: Pre-Test Close-Up View of Rear Passenger Seat Back or Head Restraint



Figure A-69: Pre-Test Rear Passenger Dummy and Door Clearance View



Figure A-70: Post-Test Rear Passenger Dummy and Door Clearance View



Figure A-71: Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



Figure A-72: Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



Figure A-73: Pre-Test Rear Passenger Inner Door Panel View



Figure A-74: Post-Test Rear Passenger Inner Door Panel View Showing Rear Passenger Dummy Contact Locations



Figure A-75: Post-Test Rear Passenger Dummy Close-Up Head Contact with Vehicle View



Figure A-76: Post-Test Rear Passenger Dummy Close-Up Head Contact with Side Air bag View



Figure A-77: Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Interior View

Photo Not Applicable

Figure A-78: Post-Test Rear Passenger Dummy Close-Up Torso Contact with Side Air bag View



Figure A-79: Post-Test Rear Passenger Dummy Close-Up Pelvis Contact View

Photo Not Applicable

Figure A-80: Post-Test Rear Passenger Dummy Close-Up Pelvis Contact with Side Air bag View



Figure A-81: Post-Test Rear Passenger Dummy Close-Up Knee Contact View



Figure A-82: Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



Figure A-83: Post-Test View of Fuel Filler Cap or Fuel Filler Neck



Figure A-84: Pre-Test Front View of MDB Impactor Face



Figure A-85: Post-Test Front View of MDB Impactor Face



Figure A-86: Pre-Test Top View of MDB Impactor Face



Figure A-87: Post-Test Top View of MDB Impactor Face



Figure A-88: Pre-Test Left Side View of MDB Impactor Face



Figure A-89: Post-Test Left Side View of MDB Impactor Face



Figure A-90: Pre-Test Right Side View of MDB Impactor Face



Figure A-91: Post-Test Right Side View of MDB Impactor Face

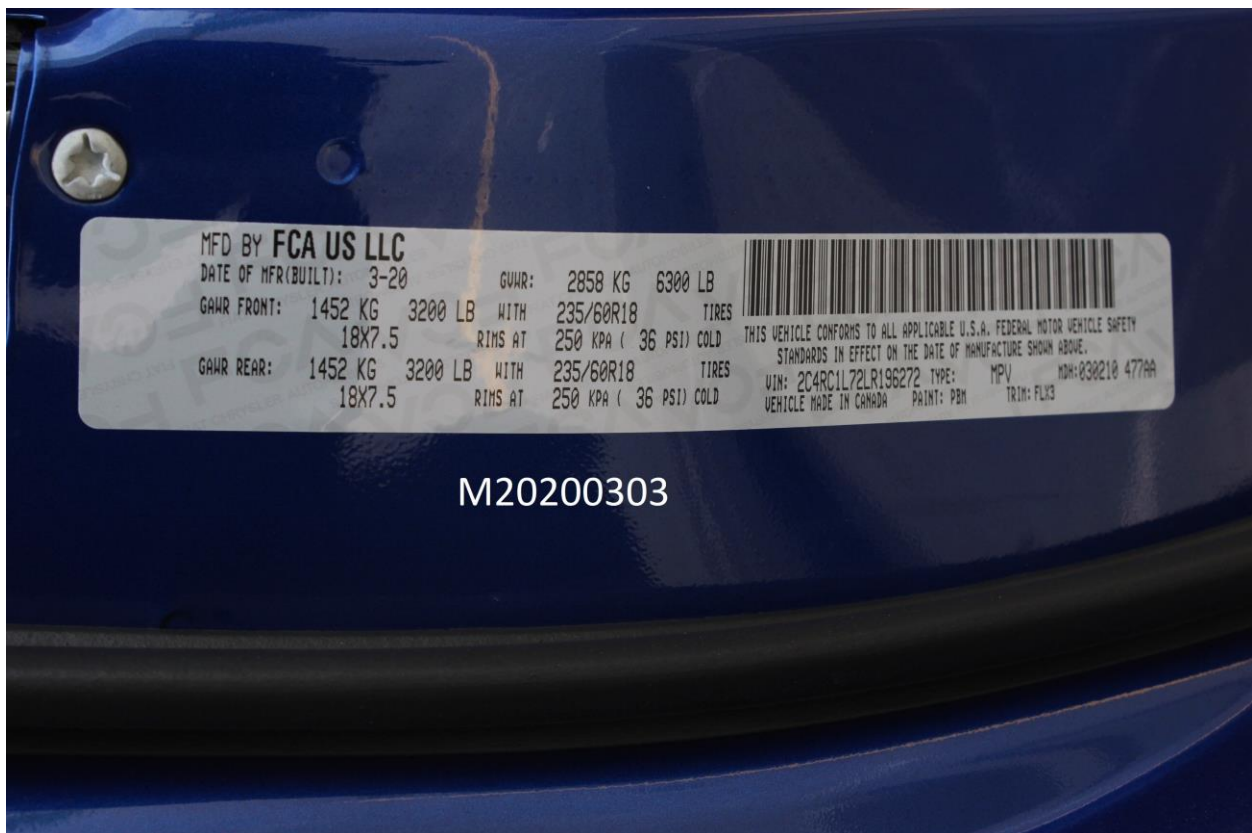


Figure A-92: Close-Up View of Vehicle's Certification Label

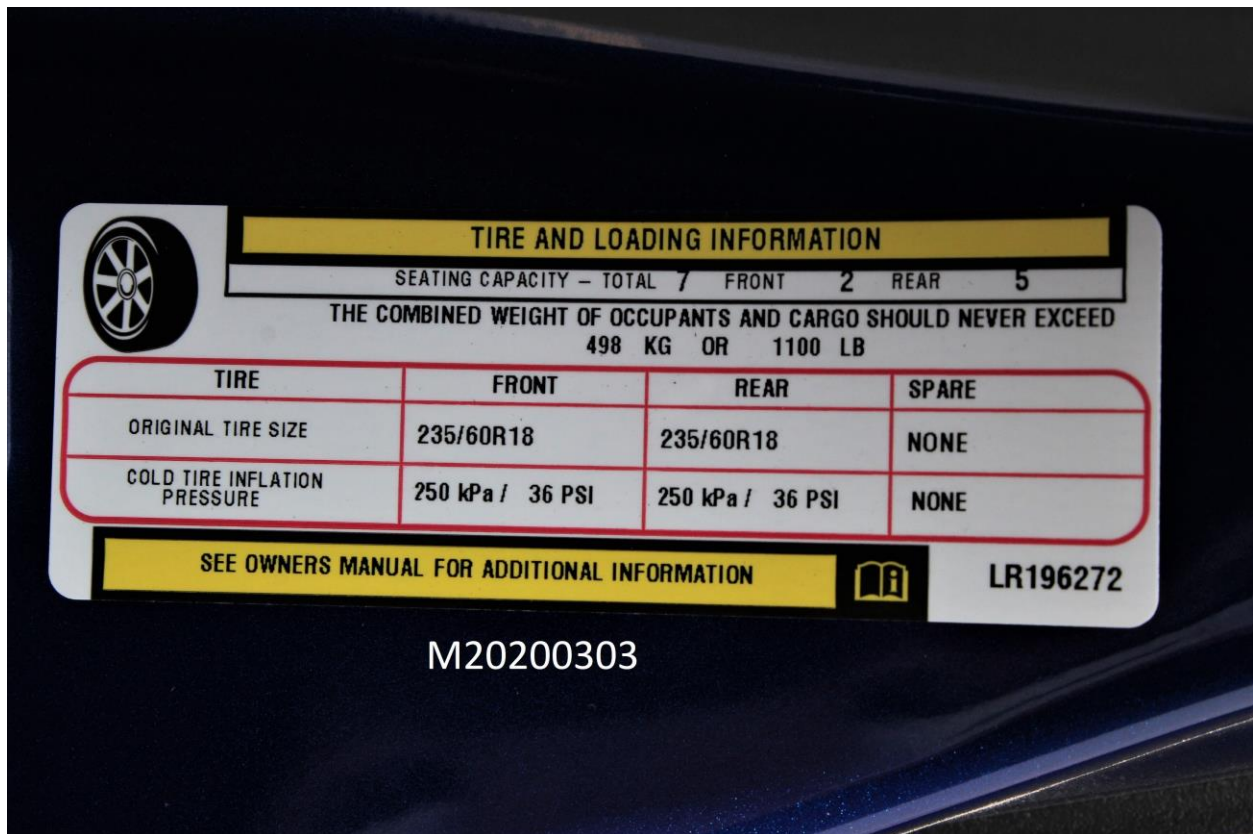


Figure A-93: Close-Up View of Vehicle's Tire Information Placard or Label



Figure A-94: Pre-Test Ballast View



Figure A-95: Post-Test Primary and Redundant Speed Trap Read-Out



Figure A-96: FMVSS No. 301 Static Rollover 0 Degrees

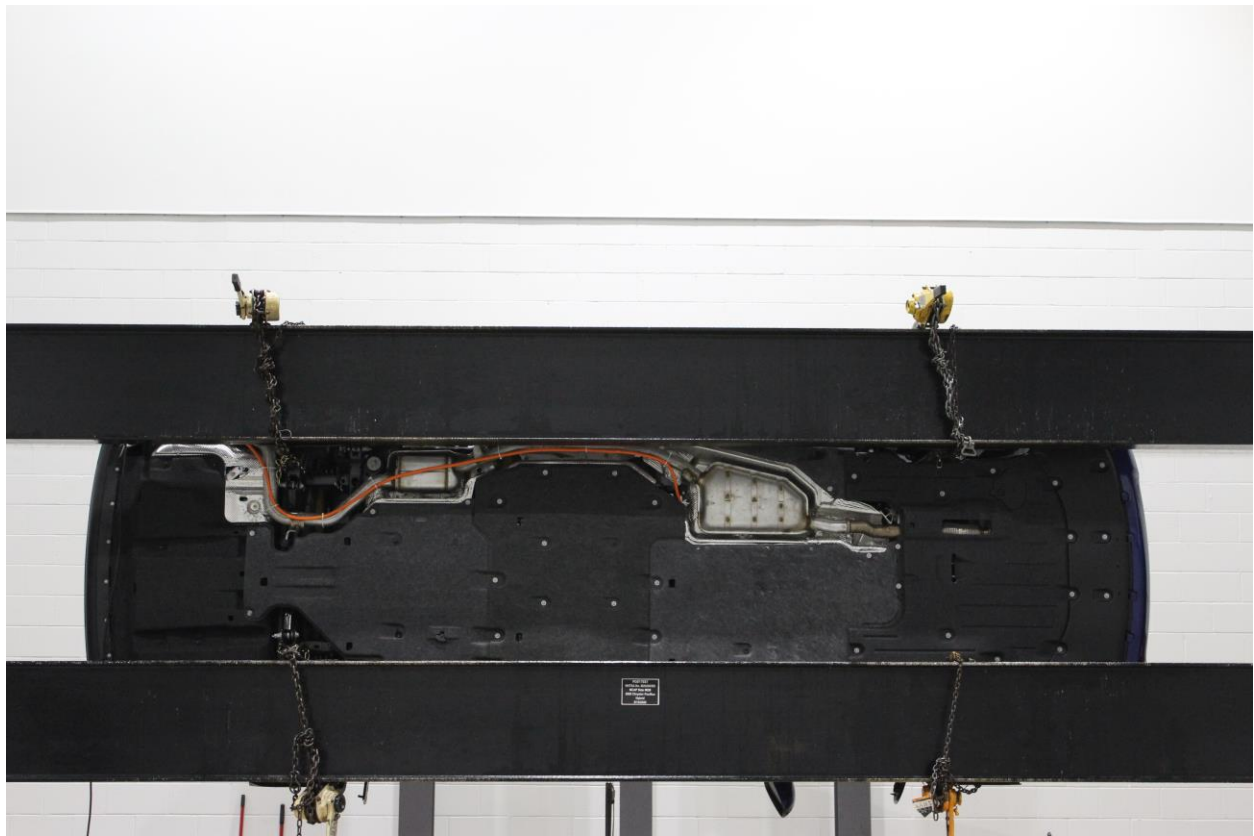


Figure A-97: FMVSS No. 301 Static Rollover 90 Degrees

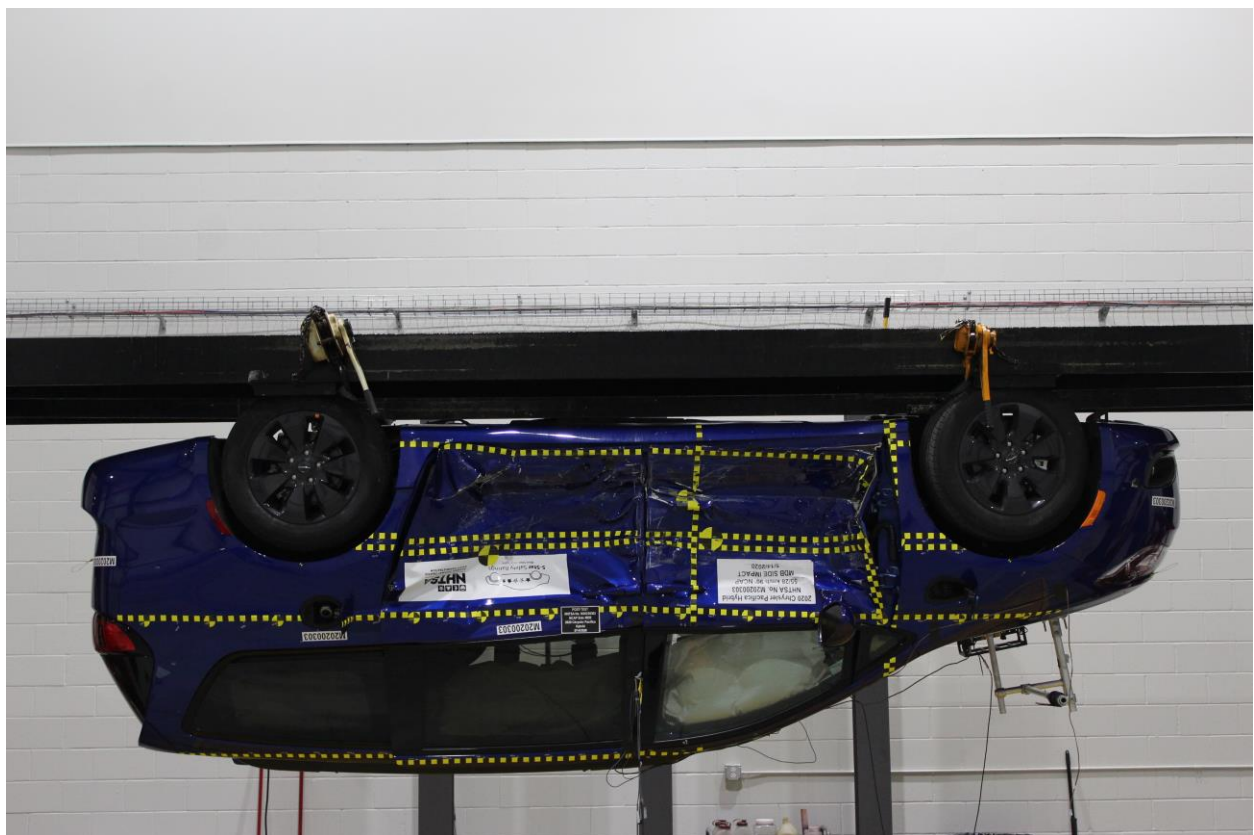


Figure A-98: FMVSS No. 301 Static Rollover 180 Degrees



Figure A-99: FMVSS No. 301 Static Rollover 270 Degrees

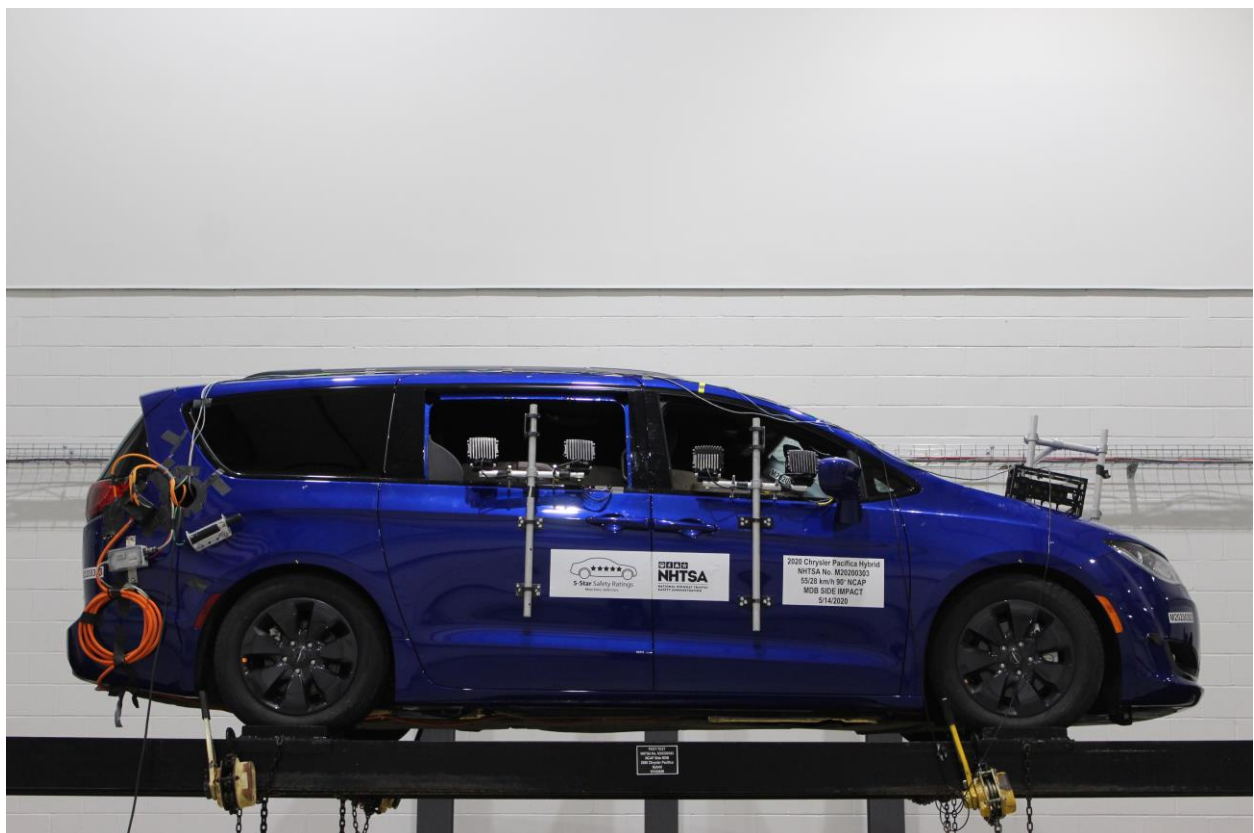


Figure A-100: FMVSS No. 301 Static Rollover 360 Degrees



Figure A-101: Impact Event

CHRYSLER

PACIFICA HYBRID TOURING L

For more information visit: www.chrysler.com
or call 1-800-CHRYSLER

FCA US LLC

THIS VEHICLE IS MANUFACTURED TO MEET SPECIFIC UNITED STATES REQUIREMENTS. THIS VEHICLE IS NOT MANUFACTURED FOR SALE OR REGISTRATION OUTSIDE OF THE UNITED STATES.

MANUFACTURER'S SUGGESTED RETAIL PRICE OF THIS MODEL INCLUDING DEALER PREPARATION

Base Price: **\$42,295**

CHRYSLER PACIFICA HYBRID TOURING L
Exterior Color: Ocean Blue Metallic Exterior Paint
Interior Color: Black / Black / Black Interior Colors
Interior: Perforated Leather Buckets Seats with S Logo
Engine: 3.6L V6 Hybrid Engine
Transmission: 8-Speed Shiftronic Transmission

STANDARD EQUIPMENT (UNLESS REPLACED BY OPTIONAL EQUIPMENT)
FUNCTIONAL/SAFETY FEATURES
6.6kW Battery Charger with Cord
ABS 4-Wheel Disc Regen Brakes
16.5-Gallon Fuel Tank
Advanced Multistage Front Air Bags
Driver Inflatable Knee-Bolster Air Bag
Passenger Inflatable Knee-Bolster Air Bag
Supplemental Side-Curtain Air-Rows Air Bags
Supplemental Front-Side Air Bags
LATCH Ready Child Seat Anchor System
ParkView® Rear Back-Up Camera
Blind Spot & RR Cross Path Detection
ParkSense® Rear Park Assist with Stop
Electronic Stability Control
Sentry Key® Theft Deterrent System
Remote Proximity for All Doors
Push-Button Start
Remote-Start System
Ready-Alert Braking
Tire Service Kit

INTERIOR FEATURES
Uconnect® 4 with 8.4-Inch Display
SiriusXM® with 1-Year Radio Sub Call 800-643-2112
Google Android Auto®
Apple CarPlay®
HD™ Radio
7-Inch Full Color TFT Display
Active Noise Cancellation
8-Way Power Driver Seat
4-Way Power Lumbar Adjustable Driver Seat
Heated Front Seats
Easy Slide 2nd-Row Bucket Seats
3rd-Row Stow 'n Go® 60/40 Bench
Integrated Voice Command with Bluetooth®
Media Hub (USB, Aux)
Heated Steering Wheel
Rear View Automatic Dimming Mirror
Air Conditioning with 3-Zone Auto Temp Control

OPTIONAL EQUIPMENT (May Replace Standard Equipment)
Customer Preferred Package ZEN
5 Appearance Package \$795
5 Badges
Perforated Leather Buckets Seats with S Logo
Gloss Black Upper/Lower Grille Surround
18-Inch x 7.5-Inch Black Noise Painted Wheels
235/60R18 BSW All-Season Tires
Black Noise Badging
Black Stow 'n Place® Roof Rack
KeySense™
Uconnect® 4 NAV with 8.4-Inch Display
4G LTE Wi-Fi Hot Spot
5-Year SiriusXM® Travel Link Service
5-Year SiriusXM® Traffic™ Service
SiriusXM® Guardian™ Connected Services w/1-Yr Trial
Single Overhead DVD System \$895

DESTINATION CHARGE \$1,495

TOTAL PRICE: *\$46,670

WARRANTY COVERAGE
5-year or 60,000-mile Powertrain Limited Warranty.
3-year or 36,000-mile Basic Limited Warranty.
Ask Dealer for a copy of the limited warranties or see your owner's manual for details.

5 YEAR / 60,000 MILE POWERTRAIN WARRANTY

Fuel Economy and Environment

Fuel Economy Midsize range from 20 to 48 MPGe. The best vehicle rates 136 MPGe.

Electricity + Gasoline (EPA)
82 MPGe 0.0 41
combined city/highway

Gasoline Only
30 MPG 3.3
combined city/highway

Driving Range
Electricity + Gasoline 32 miles
All electric range = 0-32 miles

Annual fuel cost \$1,050

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

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 22 MPG and cost \$9,500 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$2.70 per gallon and \$0.13 per kW-hr. This is a dual fueled automobile. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fuel economy.gov
Calculate personalized estimates and compare vehicles

GOVERNMENT 5-STAR SAFETY RATINGS
This vehicle has not been rated by the government for overall vehicle score, frontal crash, side crash or rollover risk.

Source: National Highway Traffic Safety Administration (NHTSA)
www.safercar.gov or 1-888-327-4236

PARTS CONTENT INFORMATION FOR VEHICLES IN THIS CARLINE:
U.S. CANADIAN PARTS CONTENT: 54%
MAJOR SOURCES OF FOREIGN PARTS CONTENT:
MEXICO: 22%
NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.

FOR THIS VEHICLE:
FINAL ASSEMBLY POINT: WINDSOR, ONTARIO, CANADA
COUNTRY OF ORIGIN: ENGINE: MEXICO
TRANSMISSION: UNITED STATES

VEHICLE PROTECTION
A PRODUCT OF FCA US LLC
Ask for Mopar Vehicle Protection for your vehicle. We Built It. We Back It.

Figure A-102: Monroney Label

Head Restraints — Front Seats

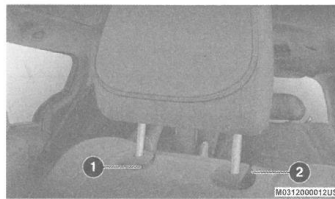
The front driver and passenger seats are equipped with four-way head restraints.

To raise the head restraint, pull upward on the head restraint. To lower the head restraint, push the adjustment button, located at the base of the head restraint, and push downward. The front head restraints are also adjustable forward and rearward. To tilt forward, pull the top of the head restraint toward the front of the vehicle to the desired position. To adjust the head restraint rearward, continue pulling forward on the top of the head restraint to the furthest forward position and the head restraint will return to the upright position.

NOTE:

To remove the head restraint, raise it as far as it can go. Then, push the release button and the adjustment button at the base of each post while pulling the head restraint up. Seatback angle may need to be adjusted to fully remove the head restraint. To reinstall the head

restraint, put the head restraint posts into the holes and push downward. Then, adjust the head restraint to the appropriate height.



Front Head Restraint

- 1 — Release Button
2 — Adjustment Button



Normal Position



Forward Adjustment

WARNING!

- A loose head restraint thrown forward in a collision or hard stop could cause serious injury or death to occupants of the vehicle. Always securely stow removed head restraints in a location outside the occupant compartment.
- ALL the head restraints MUST be reinstalled in the vehicle to properly protect the occupants. Follow the re-installation instructions above prior to operating the vehicle or occupying a seat.

2

Figure A-103: Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

Head Restraints — Second Row Quad Seats

The second row outboard head restraints, as well as the removable 8th passenger seat (if equipped) have adjustable head restraints.

To raise the head restraint, pull upward on the head restraint. To lower the head restraint, push the adjustment button, located at the base of the head restraint, and push downward.

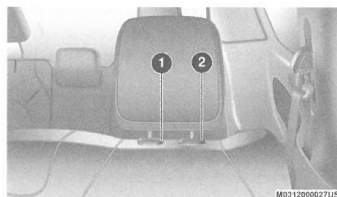
NOTE:

If equipped with Stow 'n Go seating, the head restraints are non-adjustable. Do not pull on non-adjustable head restraints when folding.

Head Restraints — Second Row Bench

The second row bench seat is equipped with adjustable head restraints.

To raise the head restraint, pull upward on the head restraint. To lower the head restraint, push the adjustment button, located at the base of the head restraint, and push downward.



Bench Seat Head Restraint

- 1 — Release Button
2 — Adjustment Button

To remove the head restraint, raise it as far as it can go. Then, push the release button and the adjustment button at the base of each post while pulling the head restraint up. Seatback angle may need to be adjusted to fully remove the head restraint. To reinstall the head restraint, put the head restraint posts into the holes and push downward. Then, adjust the head restraint to the appropriate height.

WARNING!

- A loose head restraint thrown forward in a collision or hard stop could cause serious injury or death to occupants of the vehicle. Always securely stow removed head restraints in a location outside the occupant compartment.
- ALL the head restraints MUST be reinstalled in the vehicle to properly protect the occupants. Follow the re-installation instructions above prior to operating the vehicle or occupying a seat.

NOTE:

For child restraint tethering, refer to "Occupant Restraint Systems" in "Safety" for further information.

Figure A-104: Left Rear Passenger Head Restraint Use and Adjustment Information from Vehicle Owner's Manual-Rear Restraints Not Adjustable

Photo Not Applicable

Figure 305-1: Auxiliary Power Module Warning Label

Photo Not Applicable

Figure 305-2: Power Inverter Warning Label



Figure 305-3 First Responder Warning Label

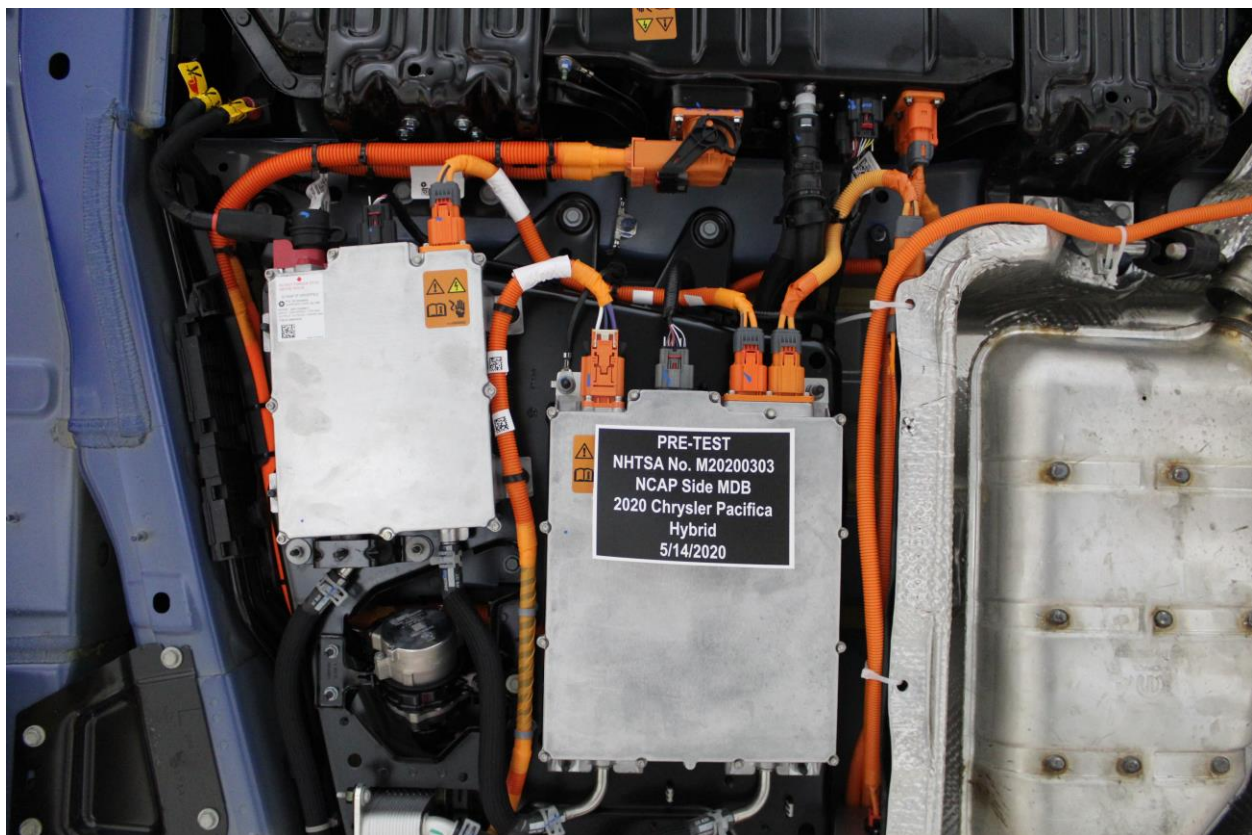


Figure 305-4: First Responder Warning Label Location



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

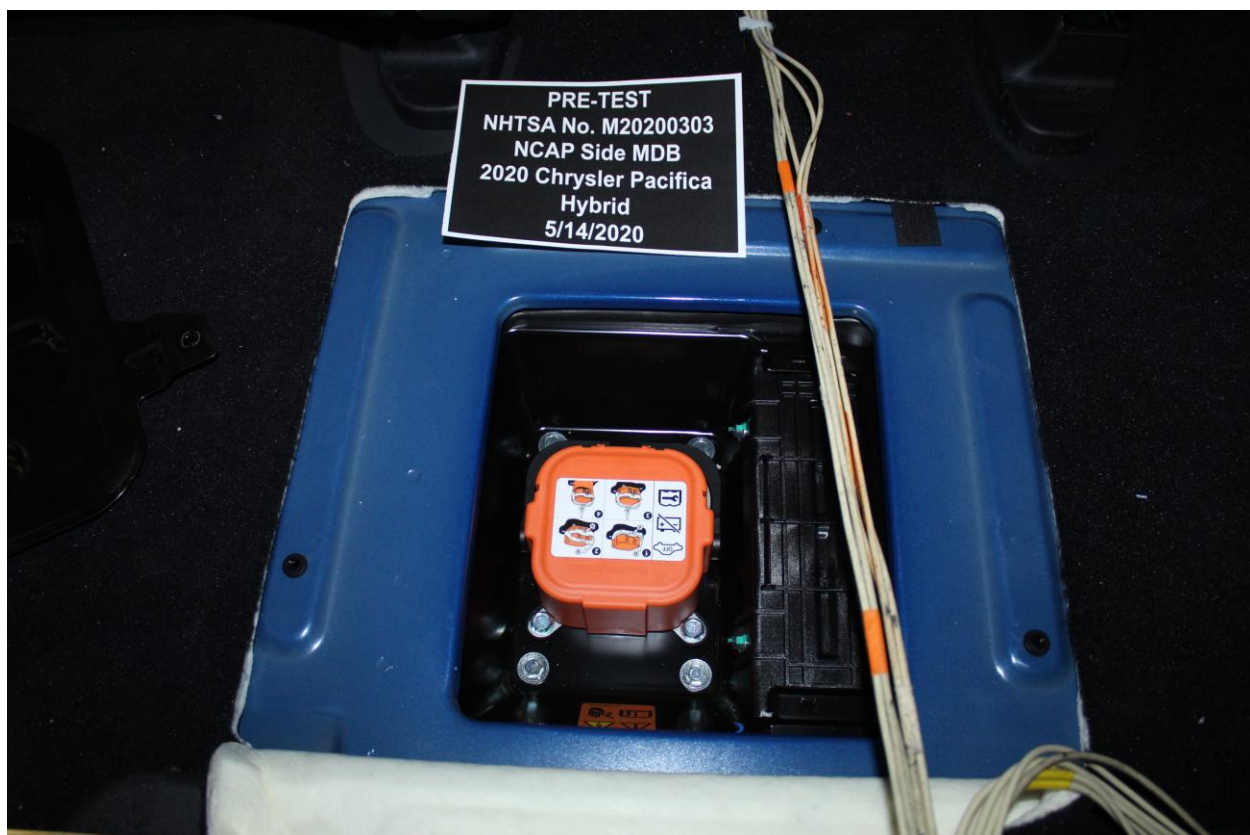


Figure 305-6: Manual High Voltage Service Disconnect in Place



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

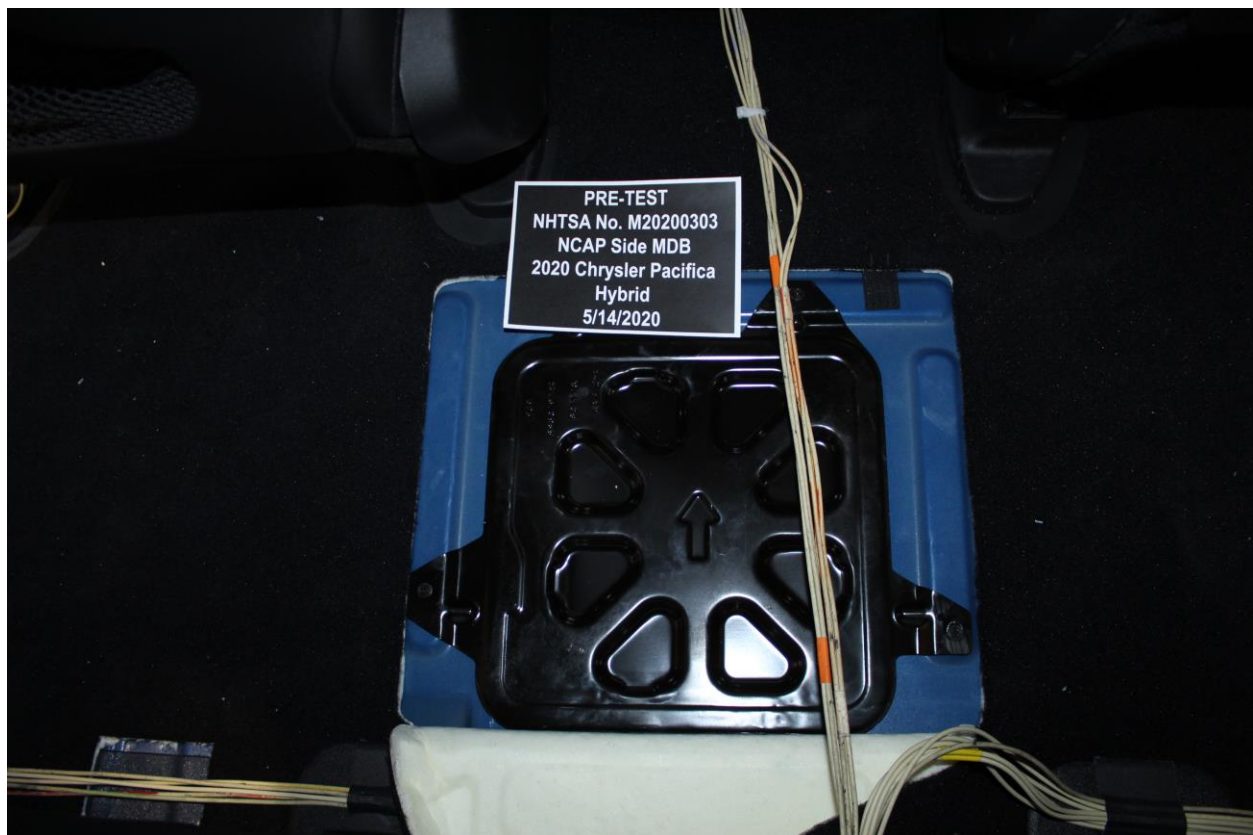


Figure 305-8: Manual High Voltage Service Disconnect Removed Location

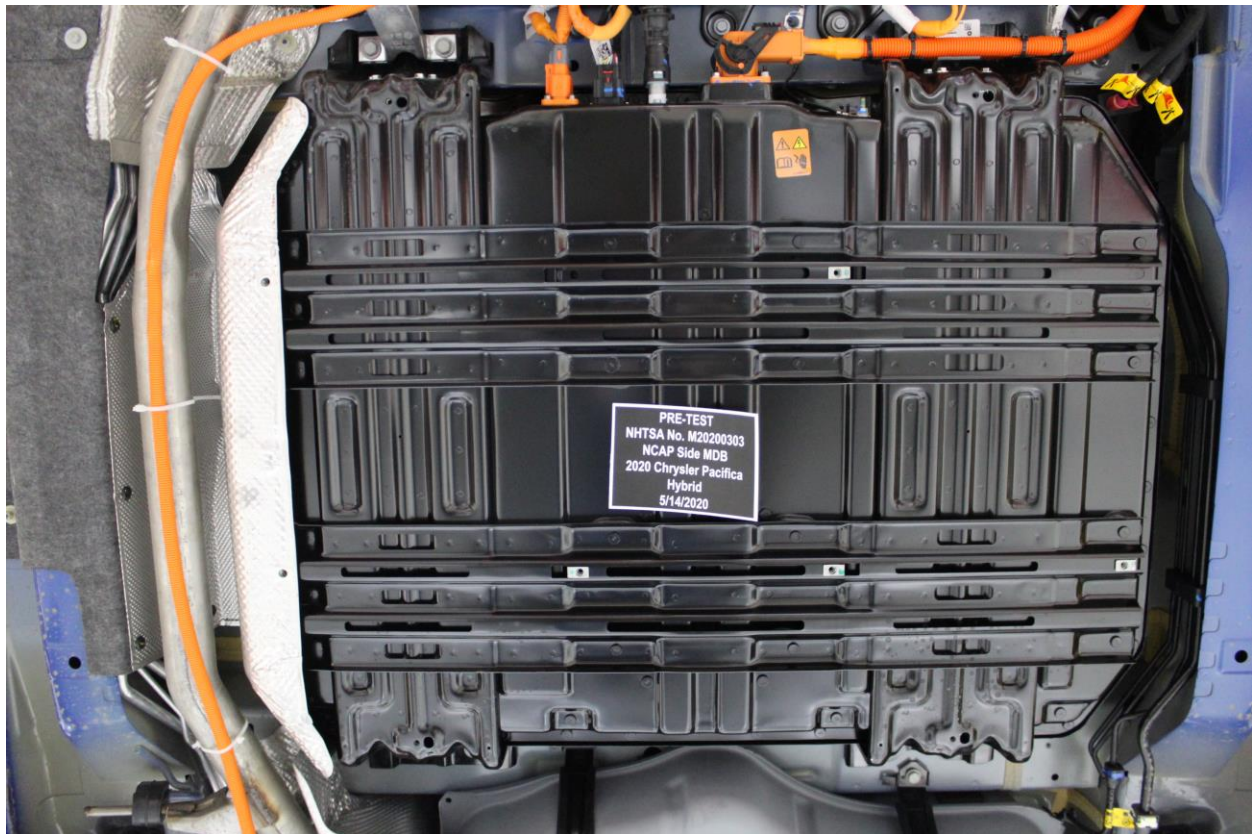


Figure 305-9: Pre-Impact View of Propulsion Battery

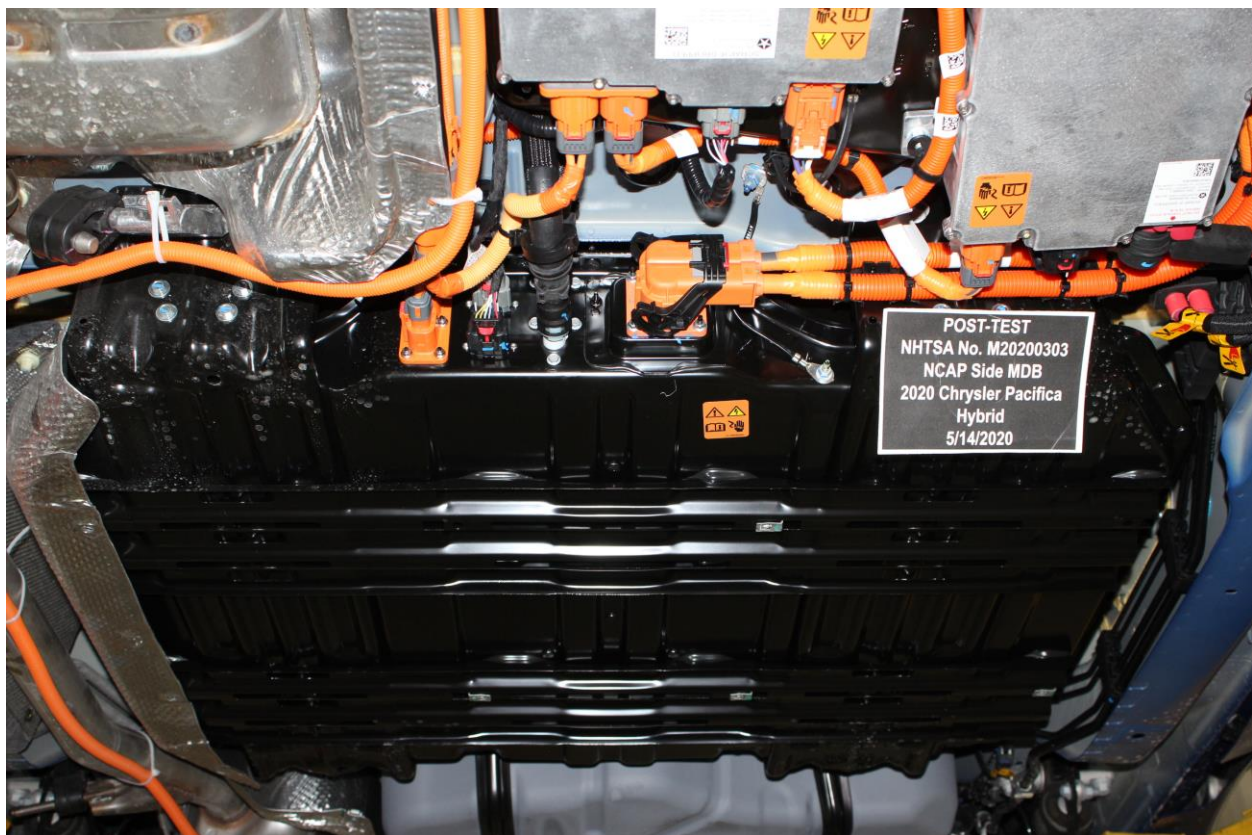


Figure 305-10: Post-Impact Front View of Propulsion Battery



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

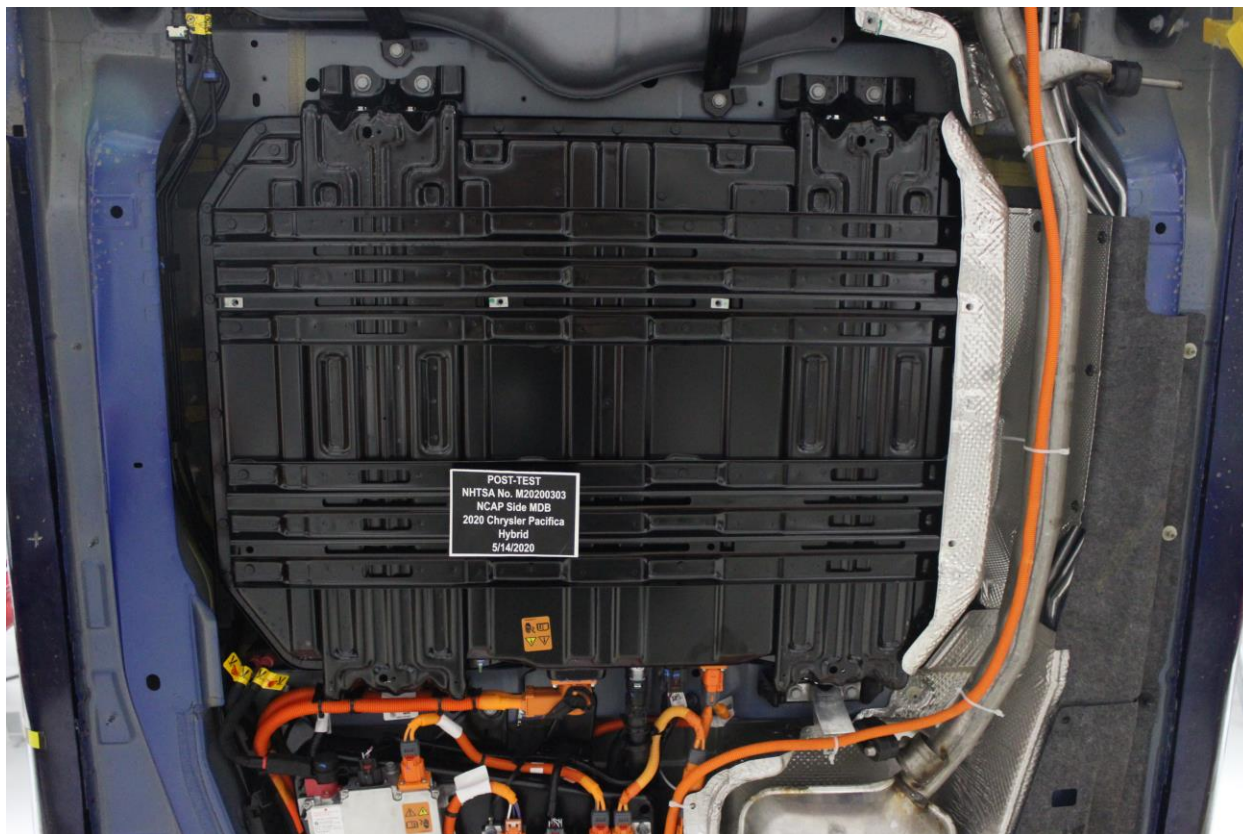


Figure 305-13: Post-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules

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



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



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



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



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



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



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



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



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



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

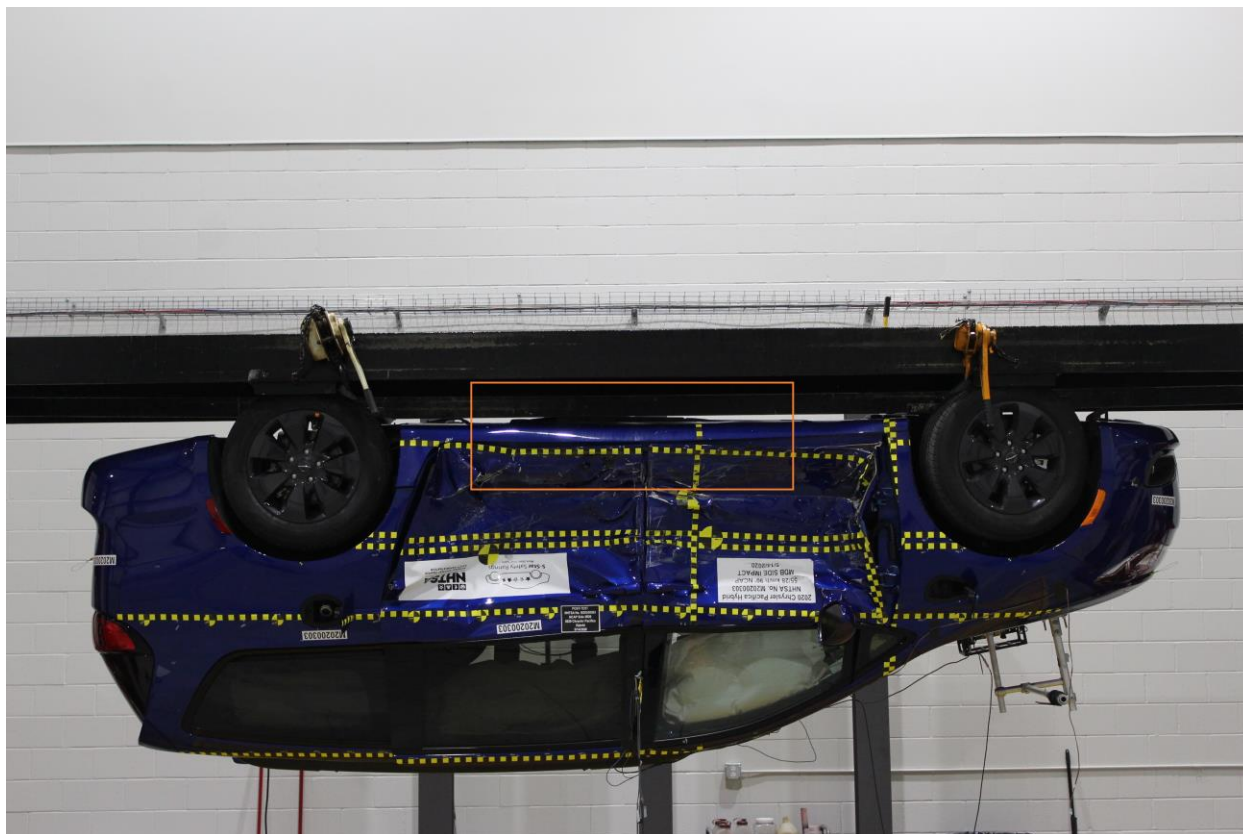


Figure 305-29: FMVSS No. 305 Static Rollover 180 Degrees



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



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



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



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

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 & Passenger Dummy Instrumentation Plots

Fig.	Description	Page
1	Driver Head Acceleration (X) Primary vs. Time	B-5
2	Driver Head Acceleration (Y) Primary vs. Time	B-5
3	Driver Head Acceleration (Z) Primary vs. Time	B-5
4	Driver Head Resultant Acceleration Primary vs. Time	B-5
5	Driver Upper Thorax Rib Deflection (Y) vs. Time	B-6
6	Driver Middle Thorax Rib Deflection (Y) vs. Time	B-6
7	Driver Lower Thorax Rib Deflection (Y) vs. Time	B-6
8	Driver Thorax Rib Deflection Maximum vs. Time	B-6
9	Driver Anterior Abdominal Force (Y) vs. Time	B-7
10	Driver Middle Abdominal Force (Y) vs. Time	B-7
11	Driver Posterior Abdominal Force (Y) vs. Time	B-7
12	Driver Total Abdominal Force (Y) vs. Time	B-7
13	Driver Pubic Symphysis Force (Y) vs. Time	B-8
14	Passenger Head Acceleration (X) vs. Time Primary	B-8
15	Passenger Head Acceleration (Y) vs. Time Primary	B-8
16	Passenger Head Acceleration (Z) vs. Time Primary	B-8
17	Passenger Head Resultant Acceleration Primary vs. Time	B-9
18	Passenger Lower Spine T12 Acceleration (X) vs. Time	B-9
19	Passenger Lower Spine T12 Acceleration (Y) vs. Time	B-9
20	Passenger Lower Spine T12 Acceleration (Z) vs. Time	B-9
21	Passenger Lower Spine T12 Resultant Acceleration vs. Time	B-10
22	Passenger Iliac Force on Impact Side (Y) vs. Time	B-10
23	Passenger Acetabulum Force on Impact Side (Y) vs. Time	B-10
24	Passenger Total Pelvic Force on Impact Side (Y) vs. Time	B-10

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 & Passenger Dummy Instrumentation Data

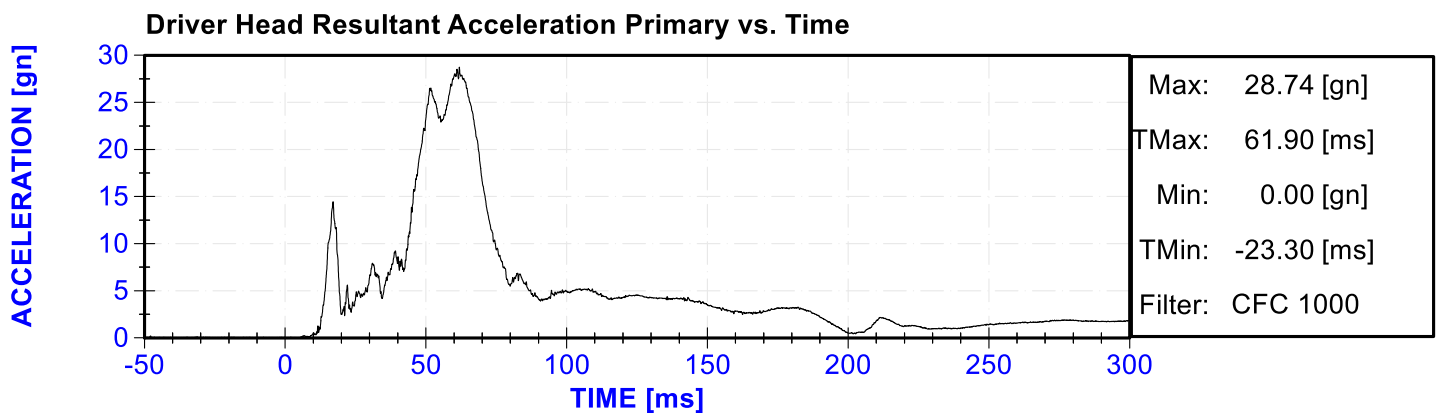
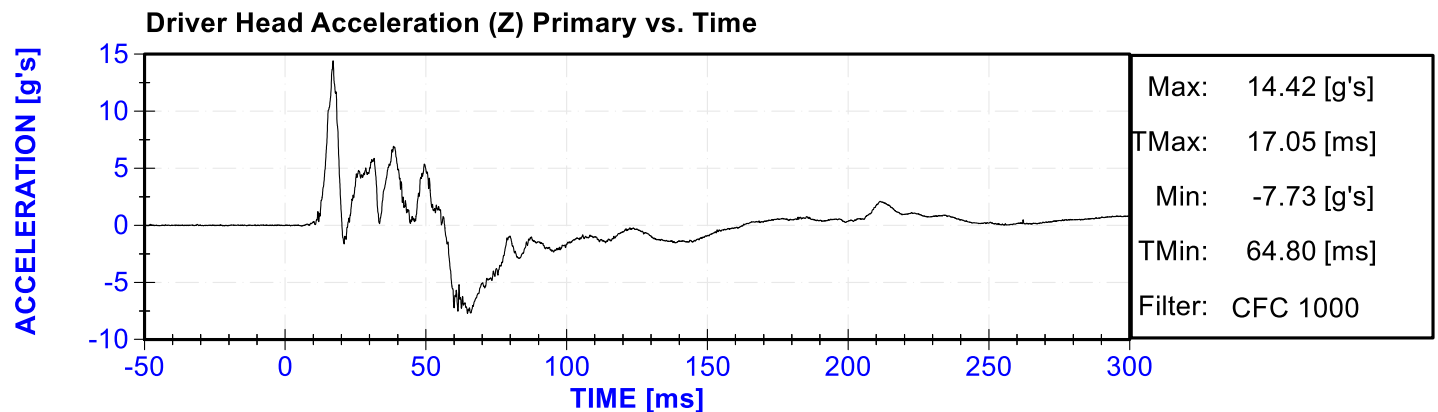
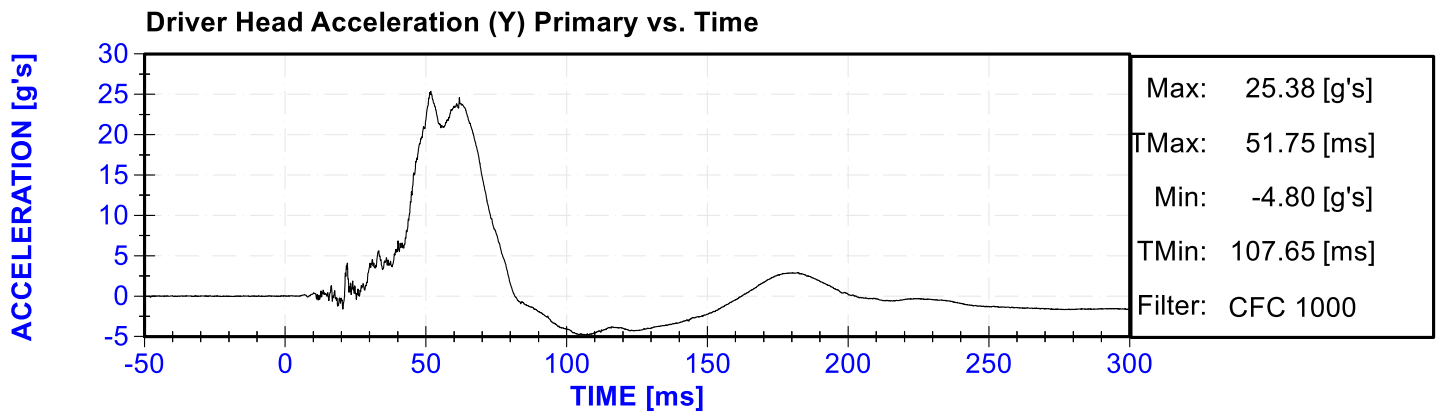
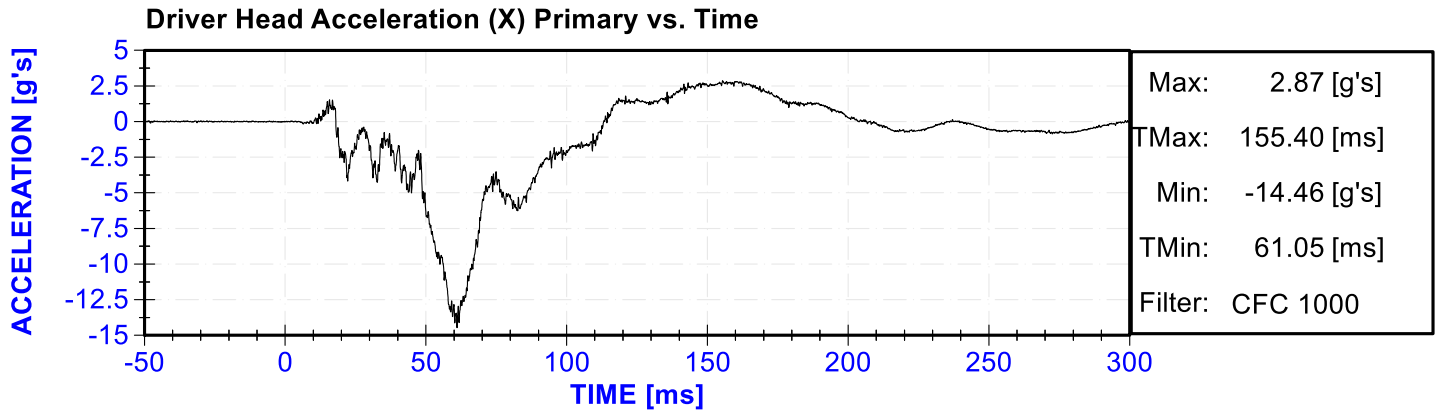
Driver Lower Spine T12 Acceleration (X)
Driver Lower Spine T12 Acceleration (Y)
Driver Lower Spine T12 Acceleration (Z)
Passenger Upper Thorax Rib Deflection (Y)
Passenger Middle Thorax Rib Deflection (Y)
Passenger Lower Thorax Rib Deflection (Y)
Passenger Upper Abdomen Rib Deflection (Y)
Passenger Lower Abdomen Rib Deflection (Y)
Driver Head Acceleration Redundant (X)
Driver Head Acceleration Redundant (Y)
Driver Head Acceleration Redundant (Z)
Passenger Head Acceleration Redundant (X)
Passenger Head Acceleration Redundant (Y)
Passenger Head Acceleration Redundant (Z)

Vehicle Instrumentation Data

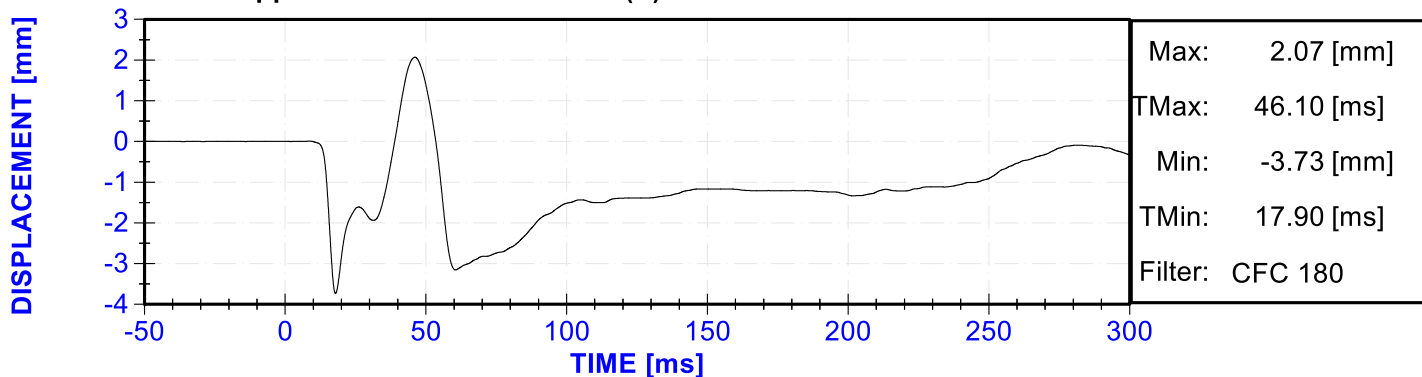
Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Right Side Sill at Front Seat Acceleration (X)
Right Side Sill at Front Seat Acceleration (Y)
Right Side Sill at Front Seat Acceleration (Z)
Right Side Sill at Rear Seat Acceleration (X)
Right Side Sill at Rear Seat Acceleration (Y)
Right Side Sill at Rear Seat Acceleration (Z)
Left Side Sill at Front Seat Acceleration (Y)
Left Side Sill at Rear Seat Acceleration (Y)
Lower A-Post Acceleration (Y)
Middle A-Post Acceleration (Y)
Lower B-Post Acceleration (Y)
Middle B-Post Acceleration (Y)
Front Seat Track Acceleration (Y)
Rear Seat Structure Acceleration (Y)
Right Rear Occupant Compartment Acceleration (Y)
Engine Block (X)
Engine Block (Y)
Rear Floorpan Above Axle Acceleration (X)
Rear Floorpan Above Axle Acceleration (Y)
Rear Floorpan Above Axle Acceleration (Z)

MDB Instrumentation Data

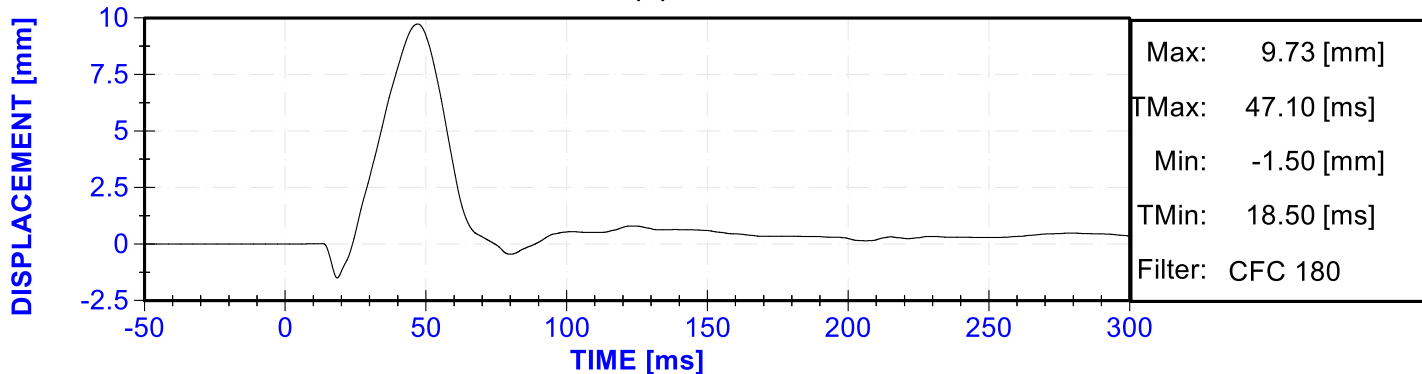
MDB Center of Gravity Acceleration (X)
MDB Center of Gravity Acceleration (Y)
MDB Center of Gravity Acceleration (Z)
MDB Rear Acceleration (X)
MDB Rear Acceleration (Y)
Left MDB Contact Switch
Right MDB Contact Switch



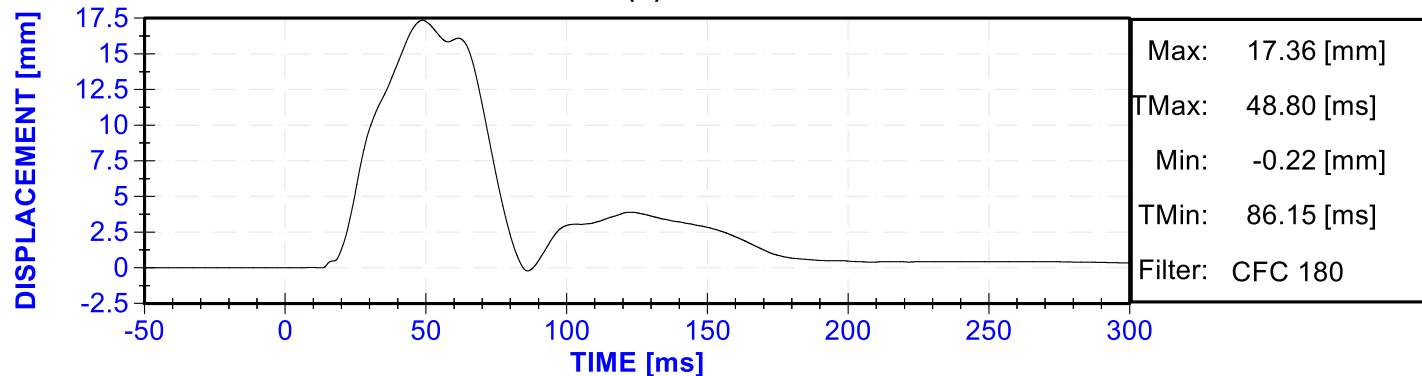
Driver Upper Thorax Rib Deflection (Y) vs. Time



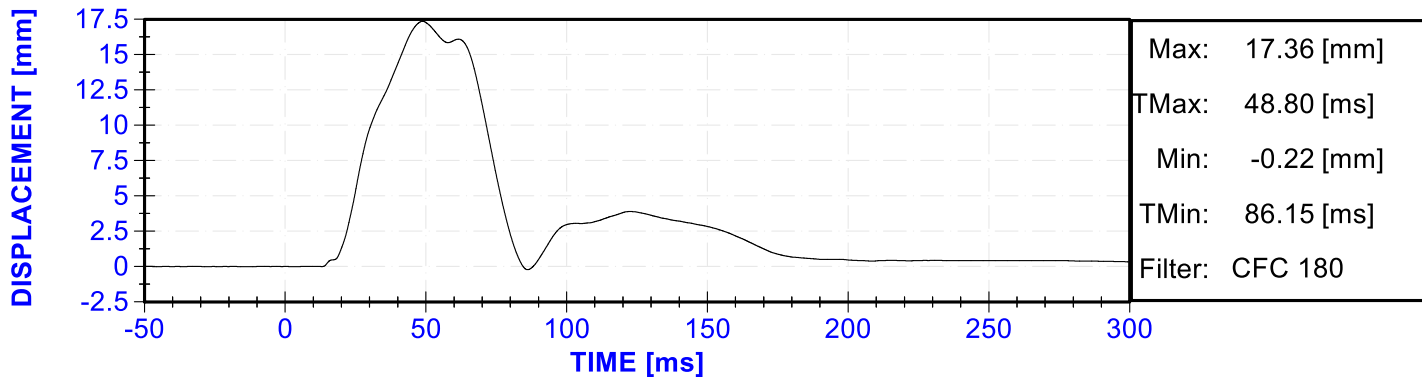
Driver Middle Thorax Rib Deflection (Y) vs. Time

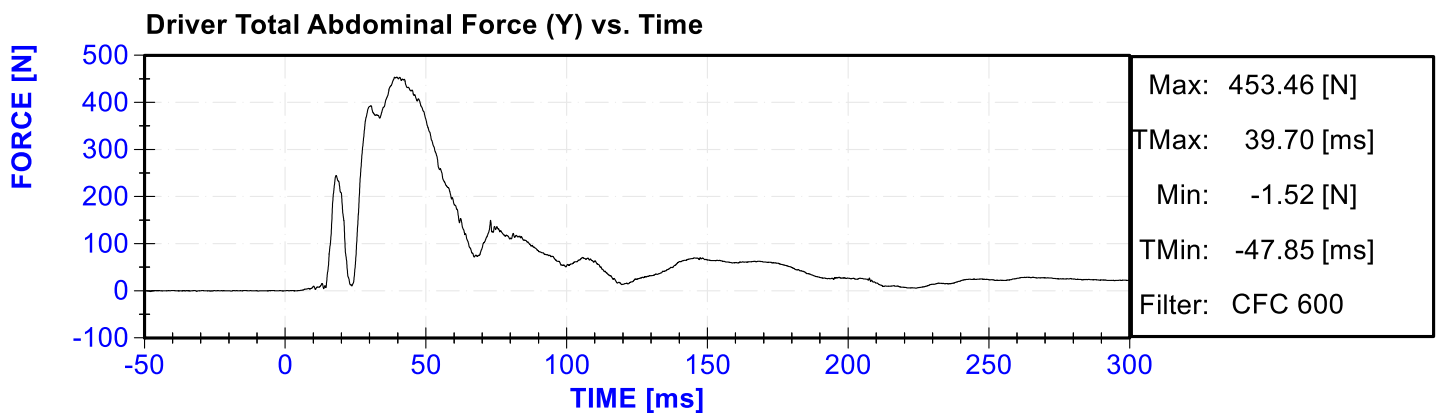
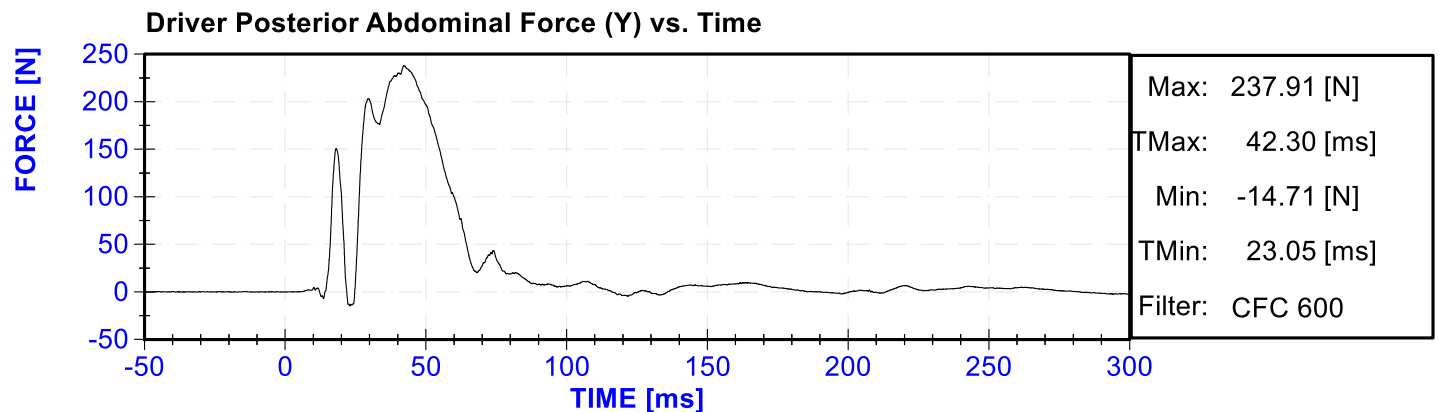
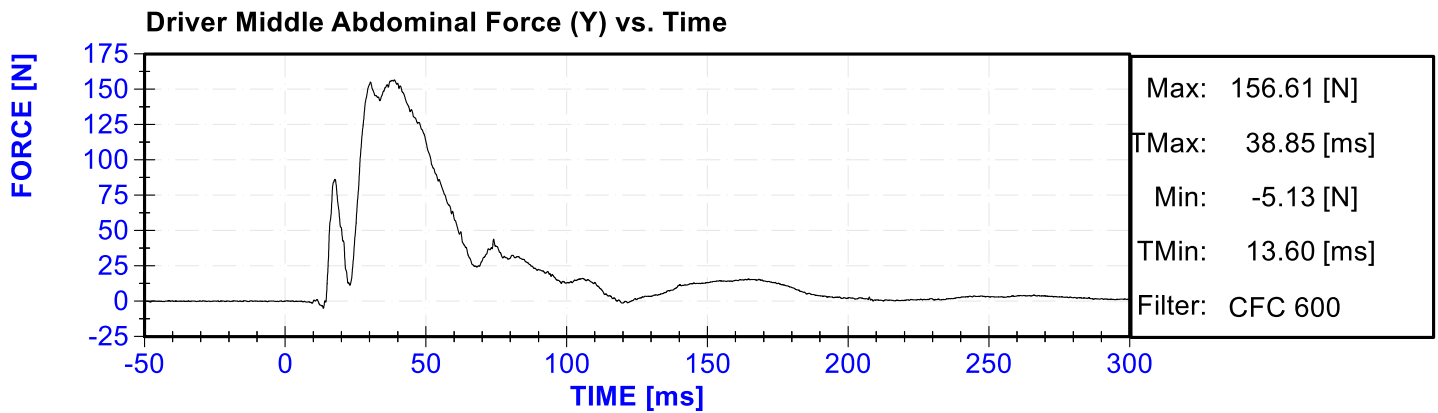
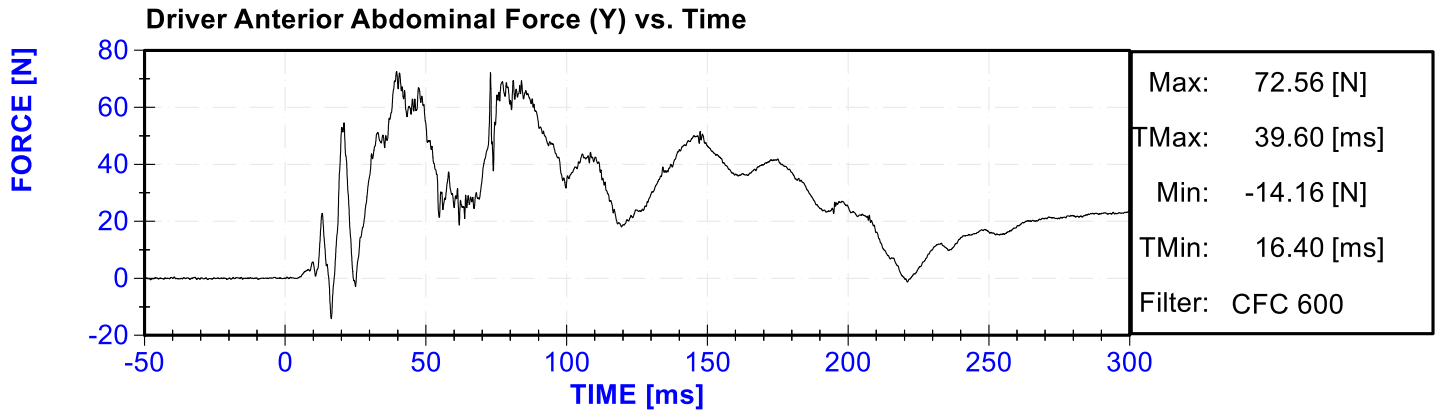


Driver Lower Thorax Rib Deflection (Y) vs. Time

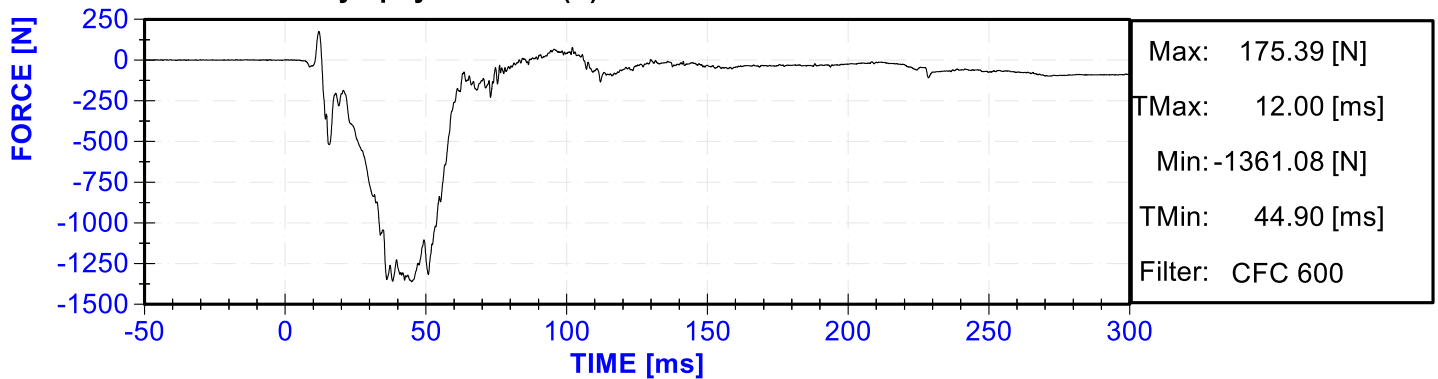


Driver Thorax Rib Deflection Maximum vs. Time

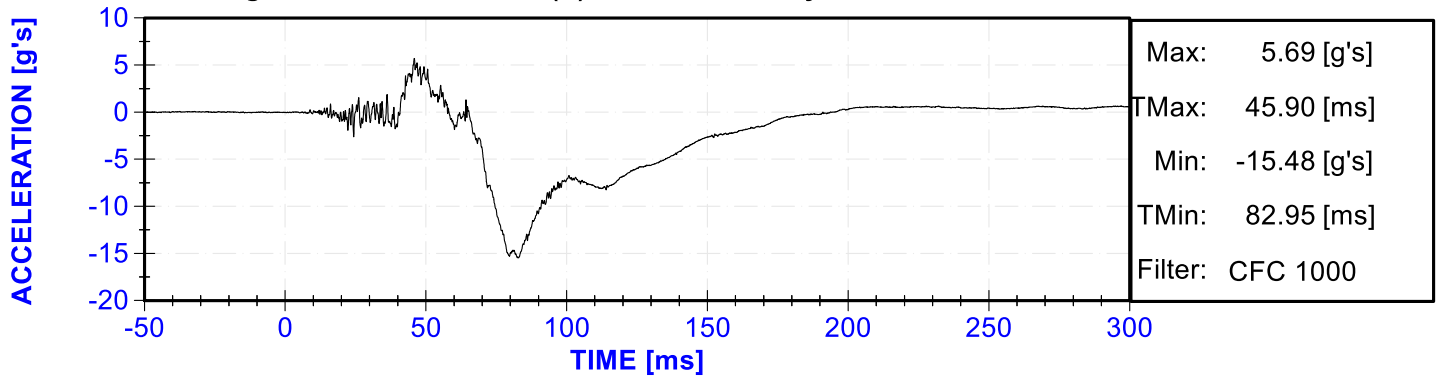




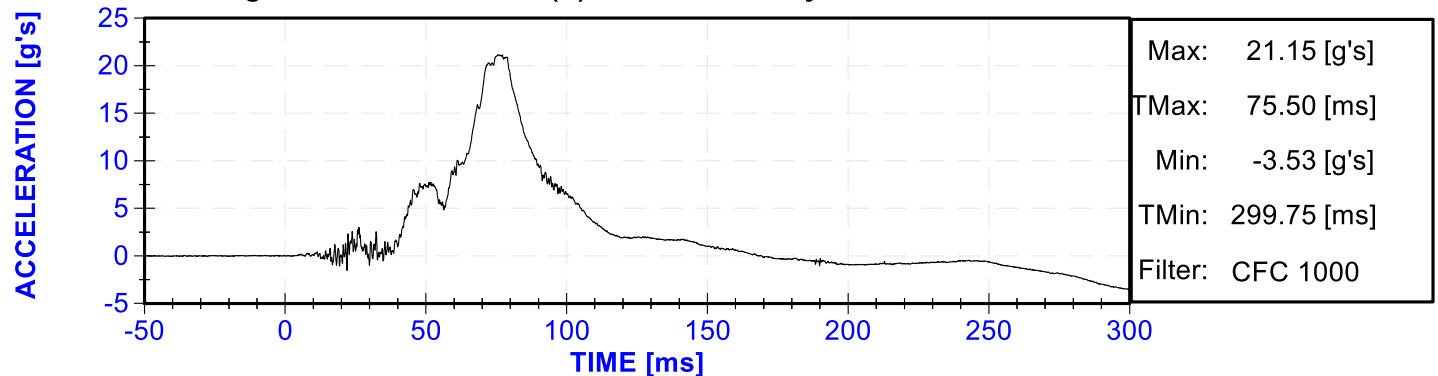
Driver Pubic Symphysis Force (Y) vs. Time



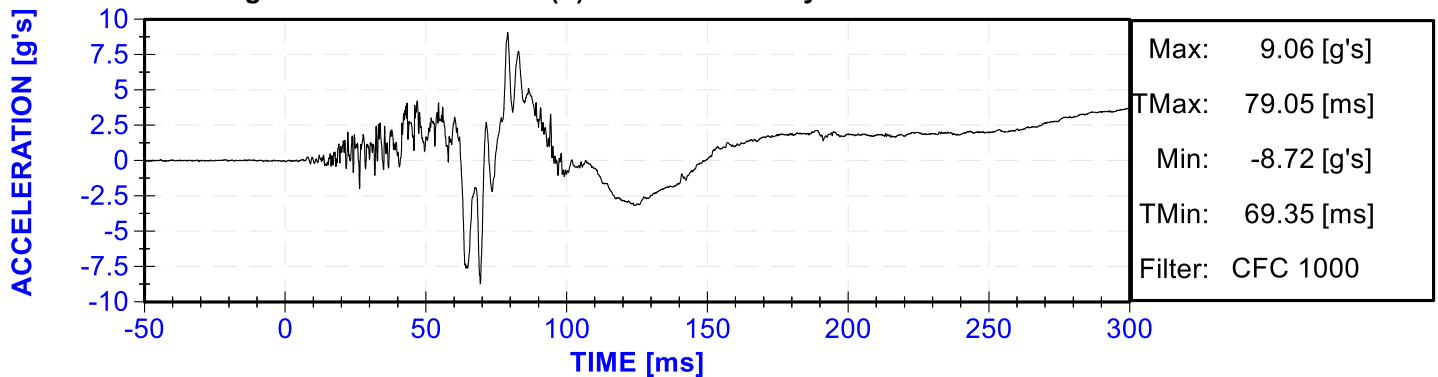
Passenger Head Acceleration (X) vs. Time Primary



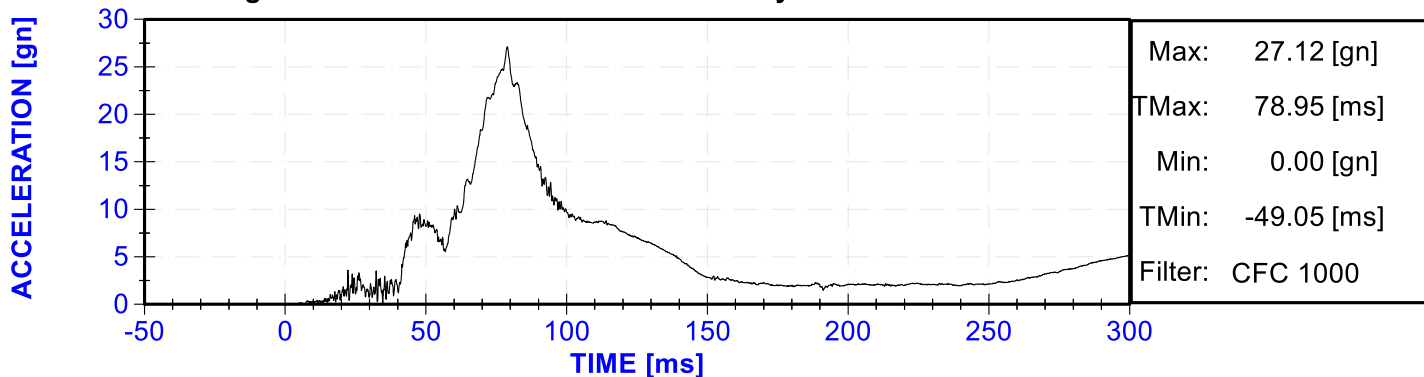
Passenger Head Acceleration (Y) vs. Time Primary



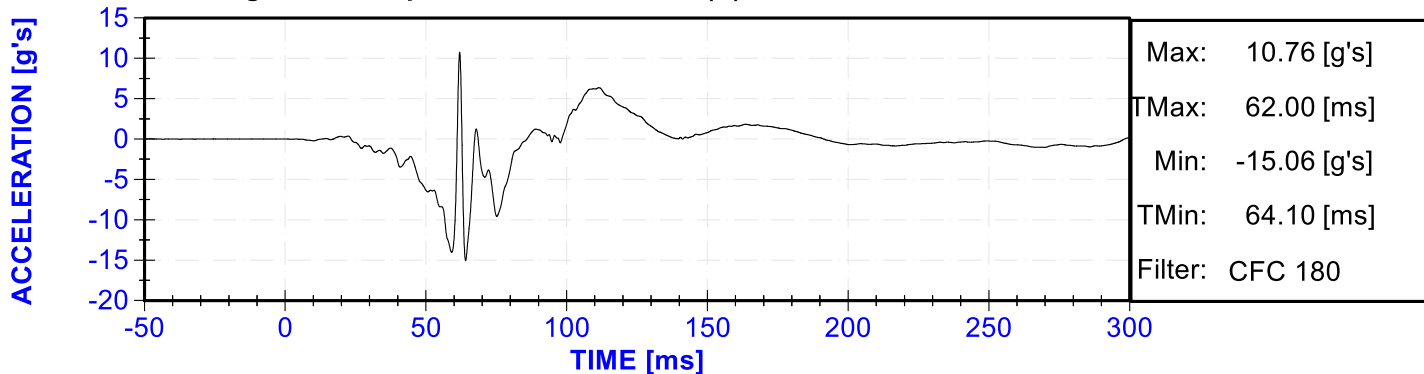
Passenger Head Acceleration (Z) vs. Time Primary



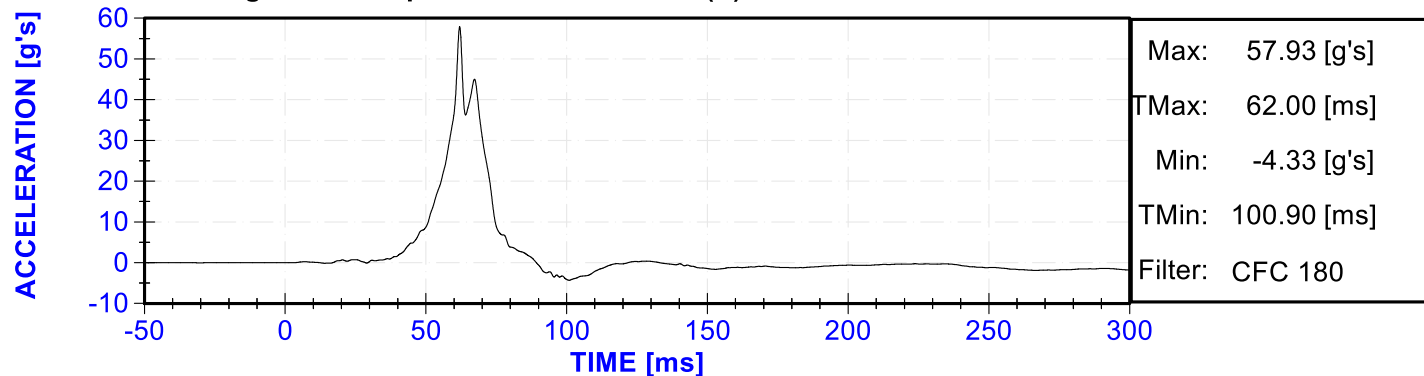
Passenger Head Resultant Acceleration Primary vs. Time



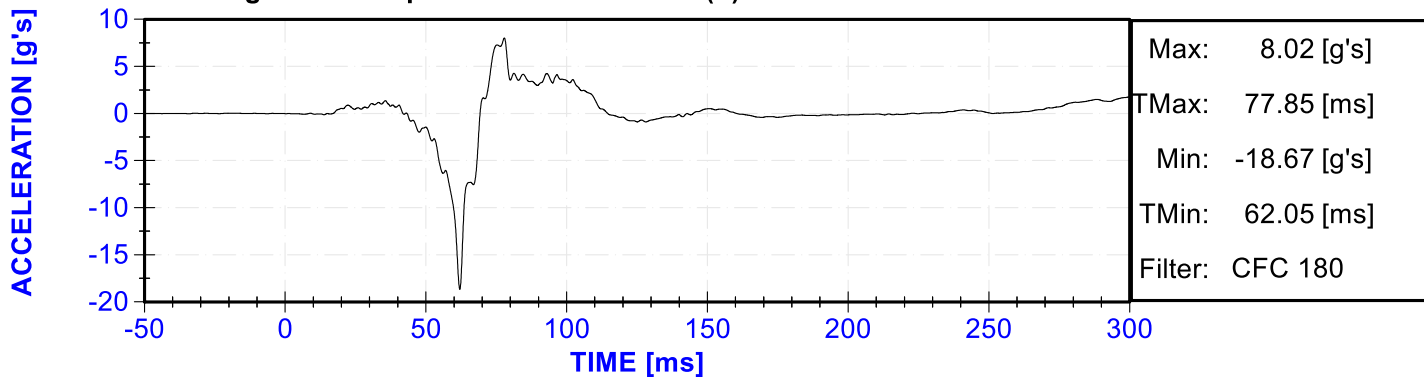
Passenger Lower Spine T12 Acceleration (X) vs. Time



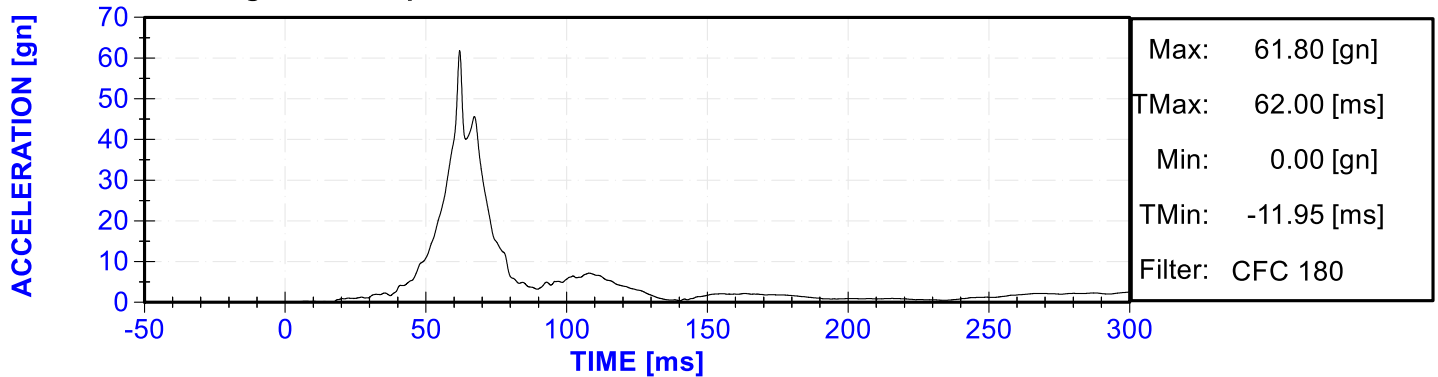
Passenger Lower Spine T12 Acceleration (Y) vs. Time



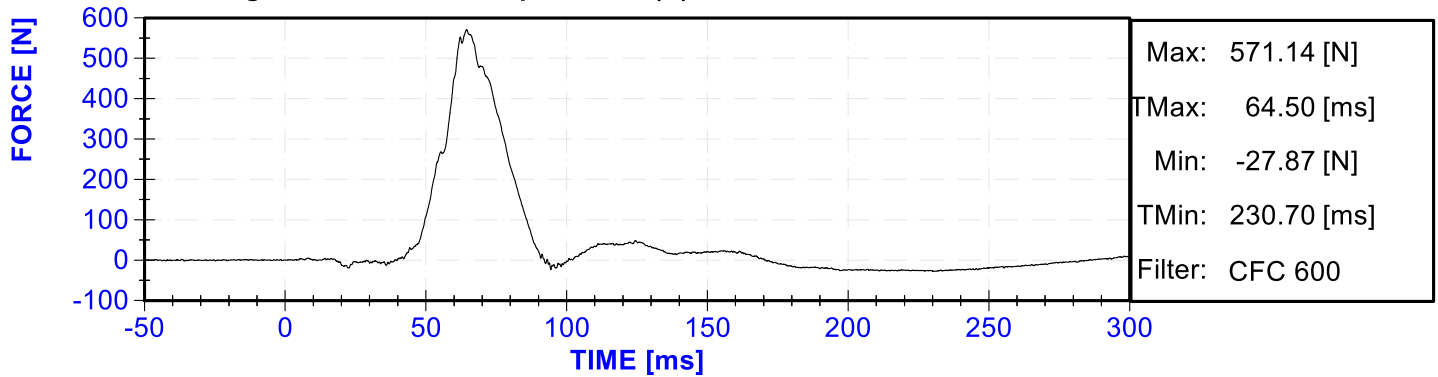
Passenger Lower Spine T12 Acceleration (Z) vs. Time



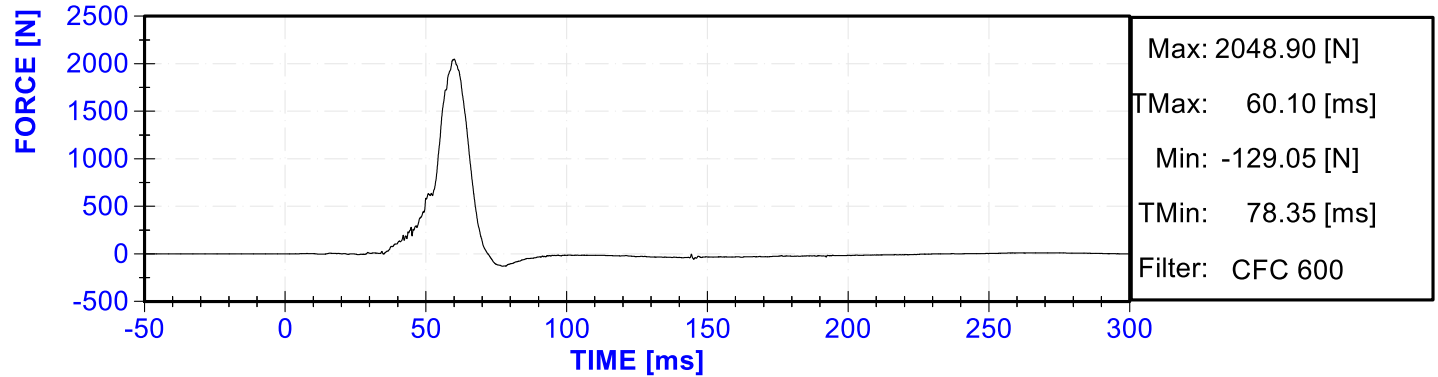
Passenger Lower Spine T12 Resultant Acceleration vs. Time



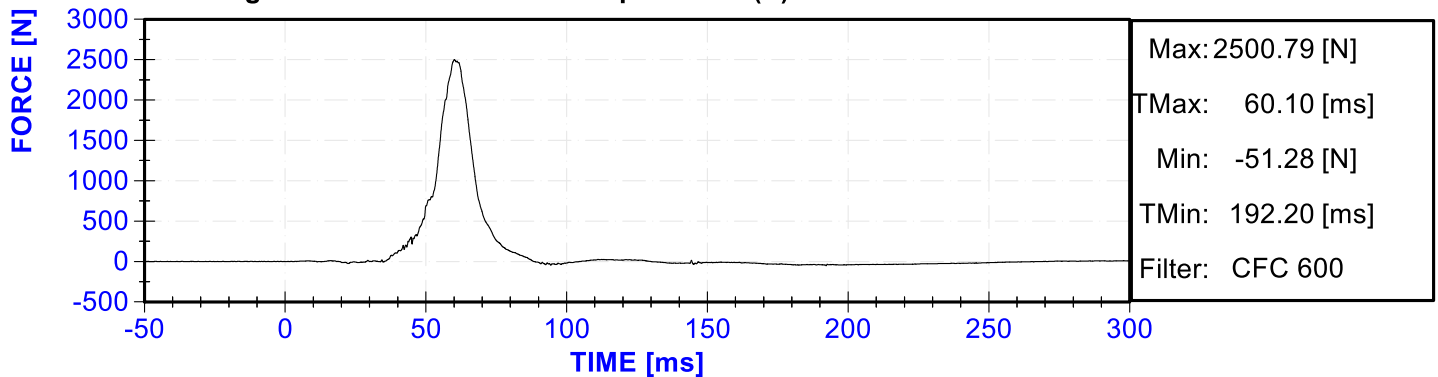
Passenger Iliac Force on Impact Side (Y) vs. Time



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



Passenger Total Pelvic Force on Impact Side (Y) vs. Time



APPENDIX C

DUMMY PERFORMANCE CALIBRATION TEST DATA

CALIBRATION TEST RESULTS

PRE-TEST

EUROSID 2 (ES-2RE) MALE – DRIVER ATD

SERIAL NO: F034

(CONFIGURED FOR LEFT SIDE IMPACT)

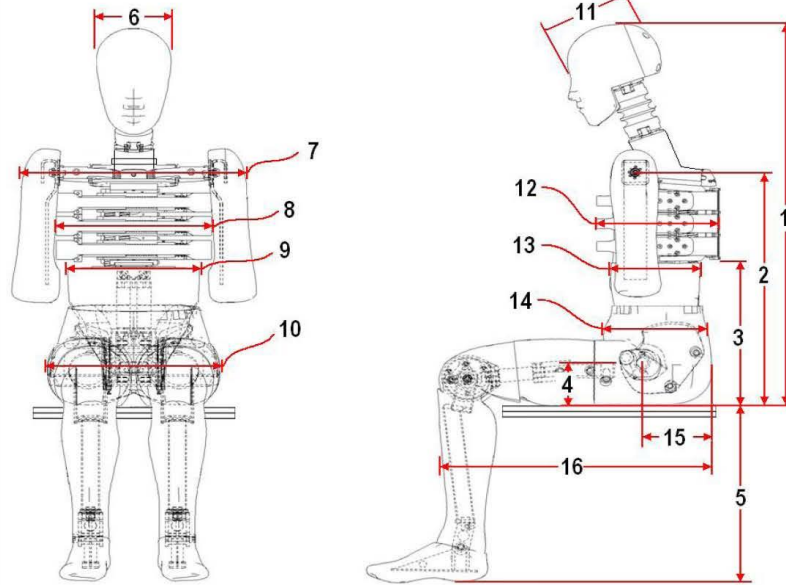


External Measurements - EuroSID-2re

Technician: K. Dutton

Date: 04/27/2020

Dummy Serial Number: F034



FRONT VIEW

SIDE VIEW

Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	910	Pass
2	Seat to Shoulder Joint	558	572	569	Pass
3	Seat to Lower Face of Thoracic Spine Box	346	356	352	Pass
4	Seat to Hip Joint (center of bolt)	97	103	101	Pass
5	Sole to Seat, Sitting	333	451	421	Pass
6	Head Width	152	158	154	Pass
7	Shoulder/Arm Width	461	479	470	Pass
8	Thorax Width	322	332	330	Pass
9	Abdomen Width	273	287	285	Pass
10	Pelvis Lap Width	359	373	365	Pass
11	Head Depth	196	206	203	Pass
12	Thorax Depth	262	272	269	Pass
13	Abdomen Depth	194	204	202	Pass
14	Pelvis Depth	235	245	242	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150	160	155	Pass
16	Back of Buttocks to Front Knee	597	615	609	Pass

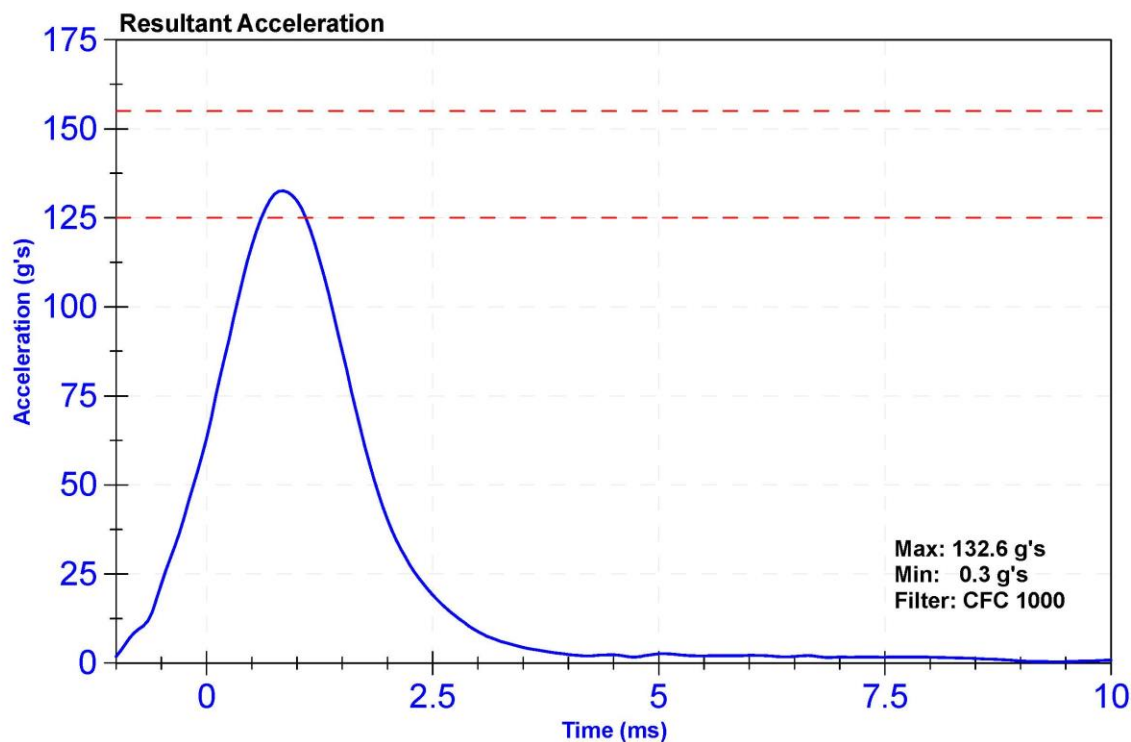
ATD Manufacturer	FTSS	Test Technician	M. Ashford
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

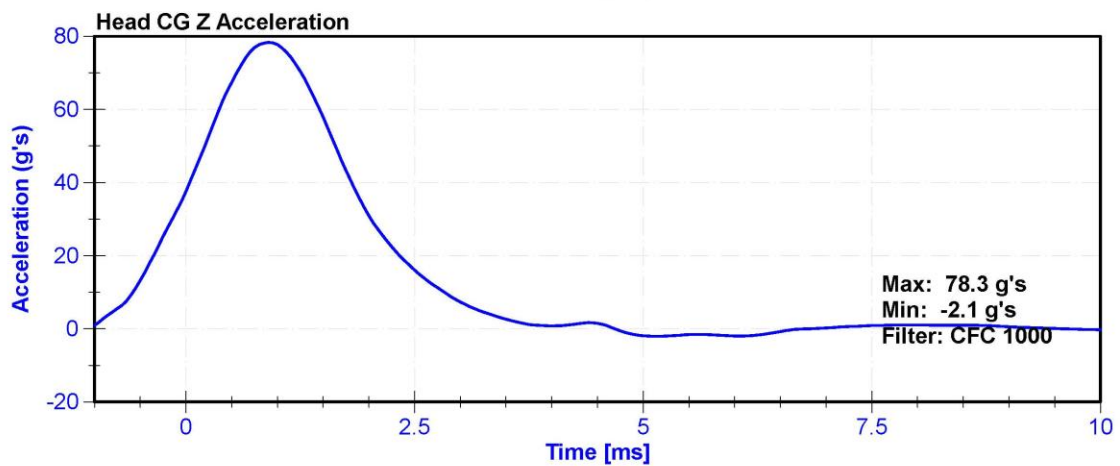
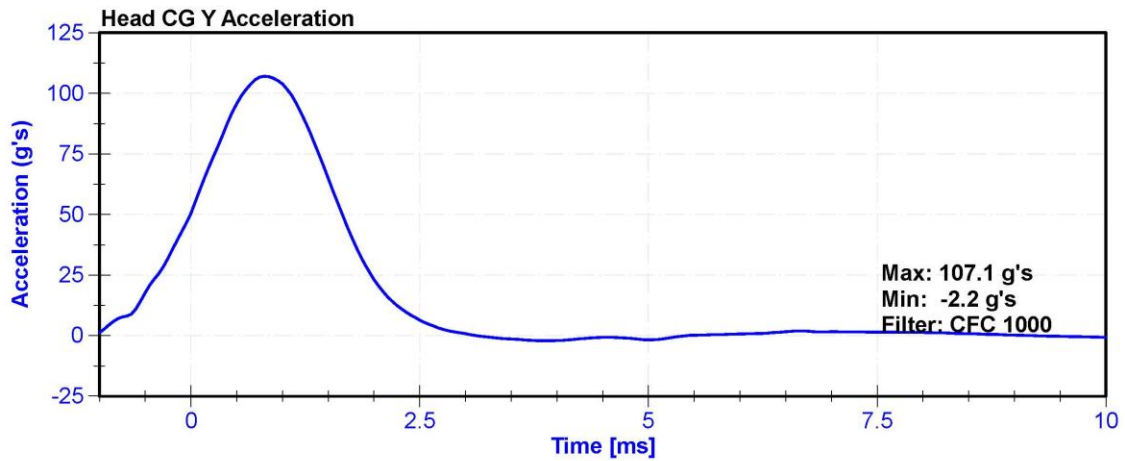
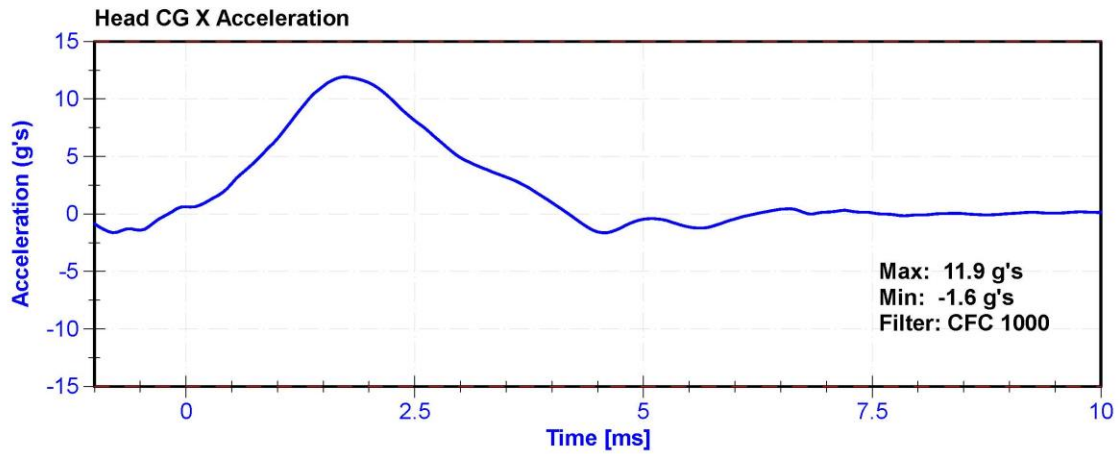
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	37.2	Pass
Resultant Acceleration	125	155	g's	132.6	Pass
Oscillation	0	15	%	2.01	Pass
Fore-Aft Acceleration	-15	15	g's	11.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco 7264	P49204	4/15/2020	10/14/2020
Y Accelerometer	Endevco 7264	P63981	4/15/2020	10/14/2020
Z Accelerometer	Endevco 7264	P64007	4/15/2020	10/14/2020





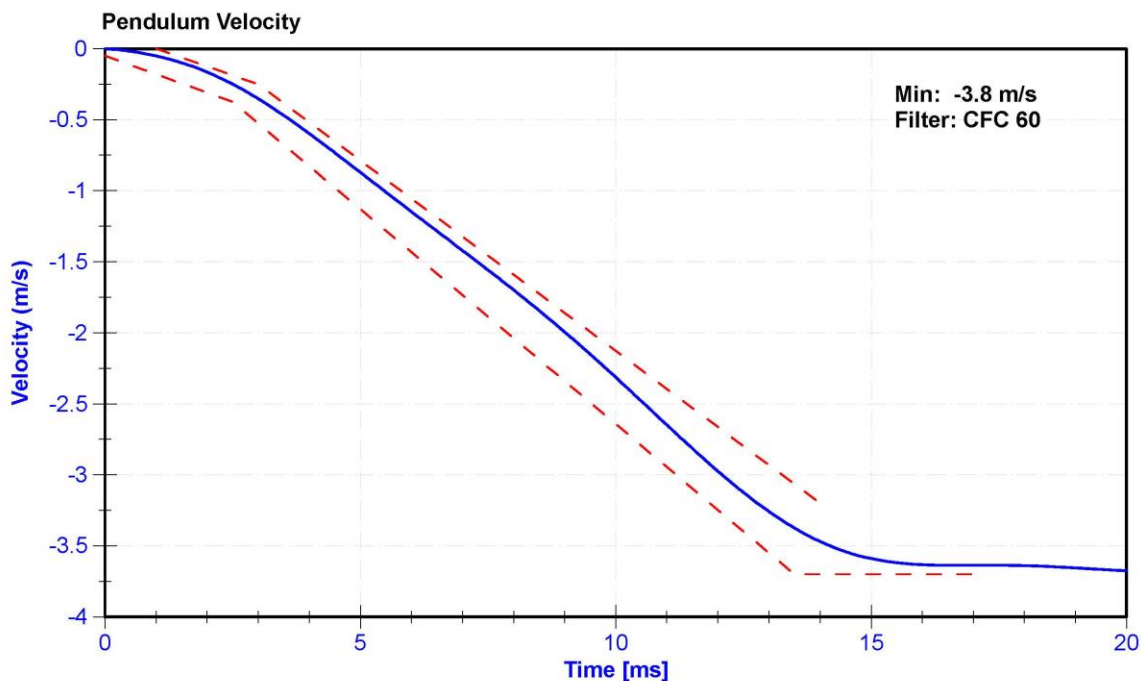
ATD Manufacturer	FTSS	Test Technician	M. Dudek
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

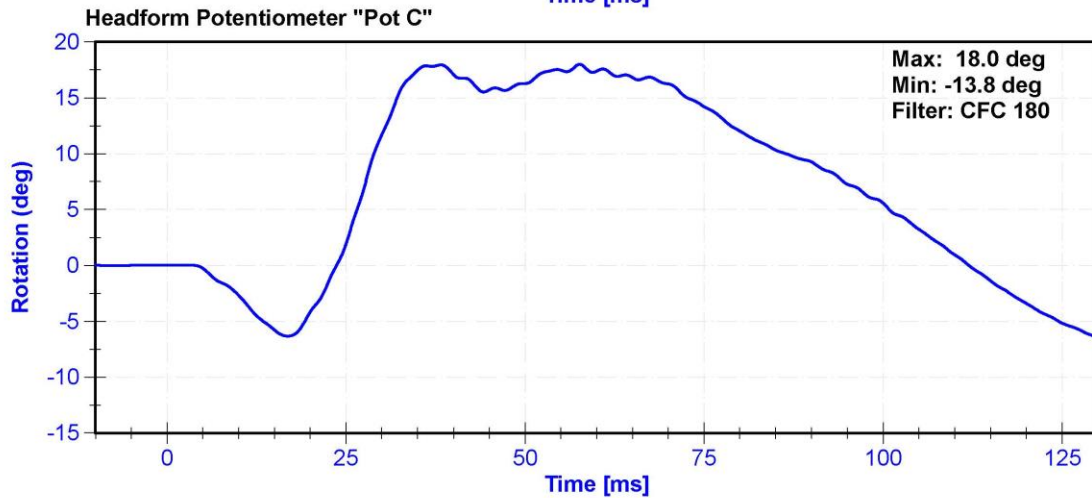
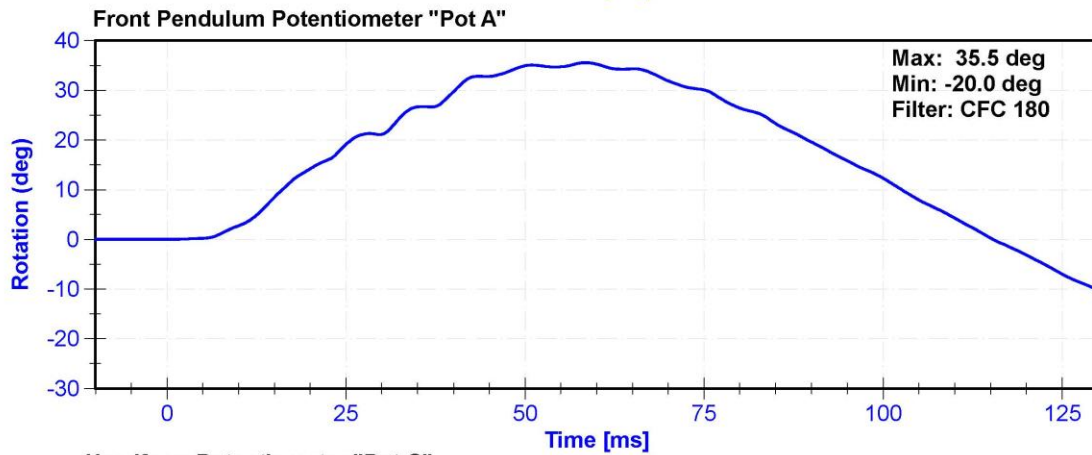
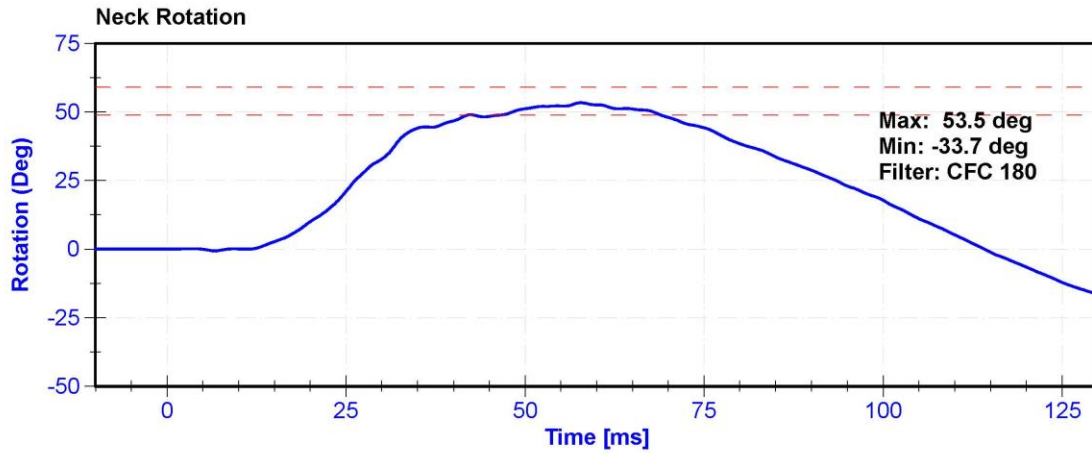
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	33.5	Pass
Velocity	3.3	3.5	m/s	3.38	Pass
Lateral Neck Rotation	49	59	deg	53.5	Pass
Time at Maximum Rotation	54	66	ms	57.8	Pass
Time of Rotation Decay from Maximum	53	88	ms	56.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5M9	1/30/2020	1/29/2021
Front Pendulum Potentiometer	SP22G	DS-094	10/31/2019	10/30/2020
Headform Potentiometer	SP22G	DS-095	10/31/2019	10/30/2020





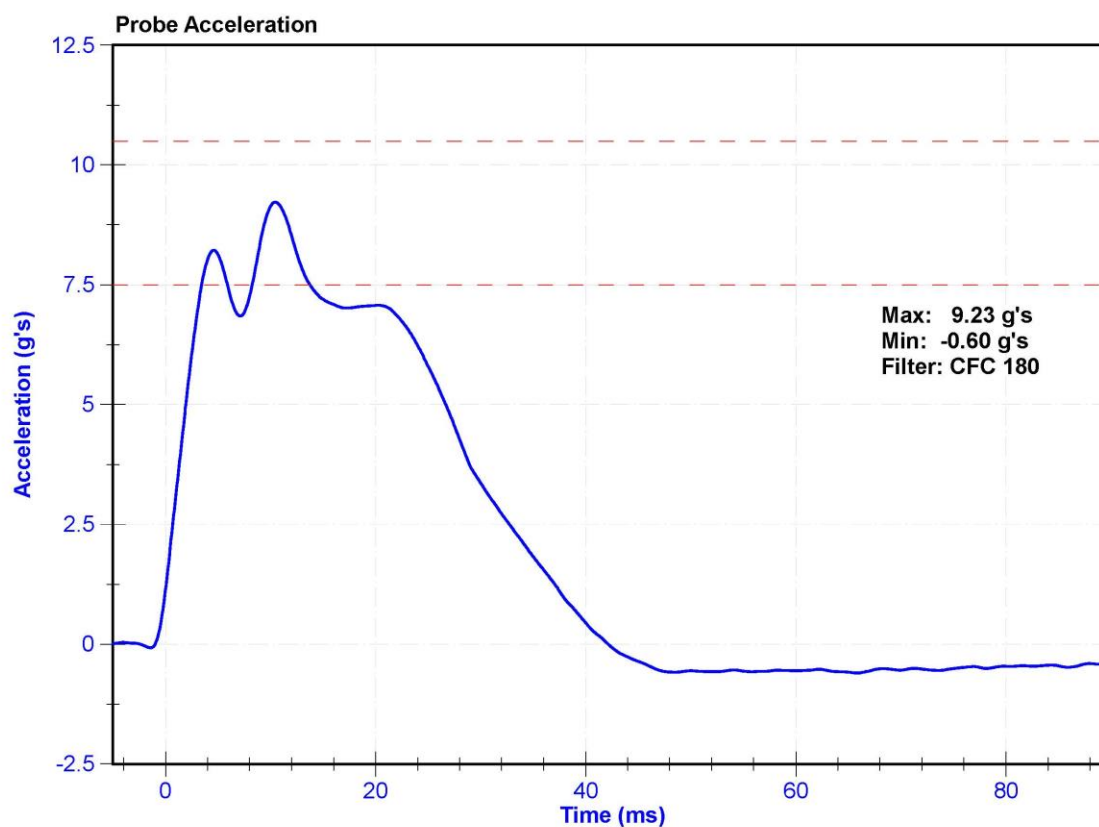
ATD Manufacturer	FTSS	Test Technician	C. Mantell
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	34.6	Pass
Velocity	4.2	4.4	m/s	4.40	Pass
Probe Acceleration	7.5	10.5	g's	9.23	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	MSI 64C-2000	A260568	1/29/2020	7/29/2020



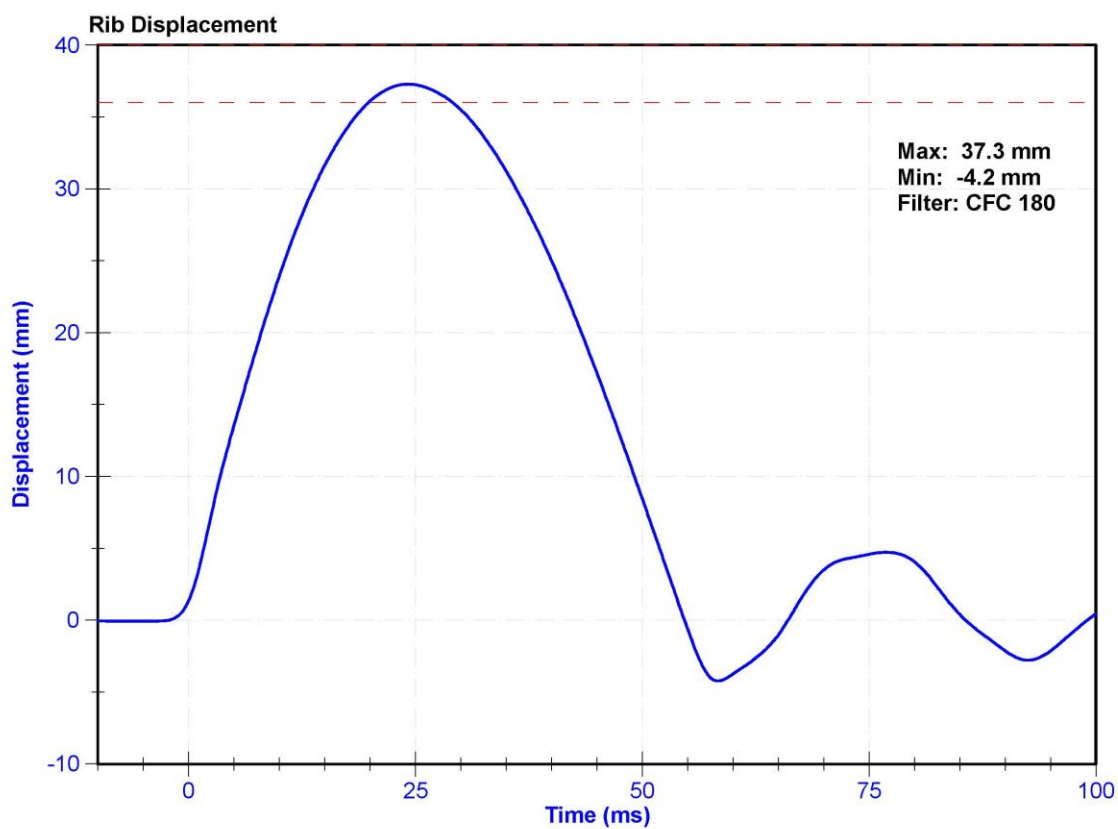
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	30.5	Pass
Rib Displacement	36	40	mm	37.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	4/14/2020	10/13/2020



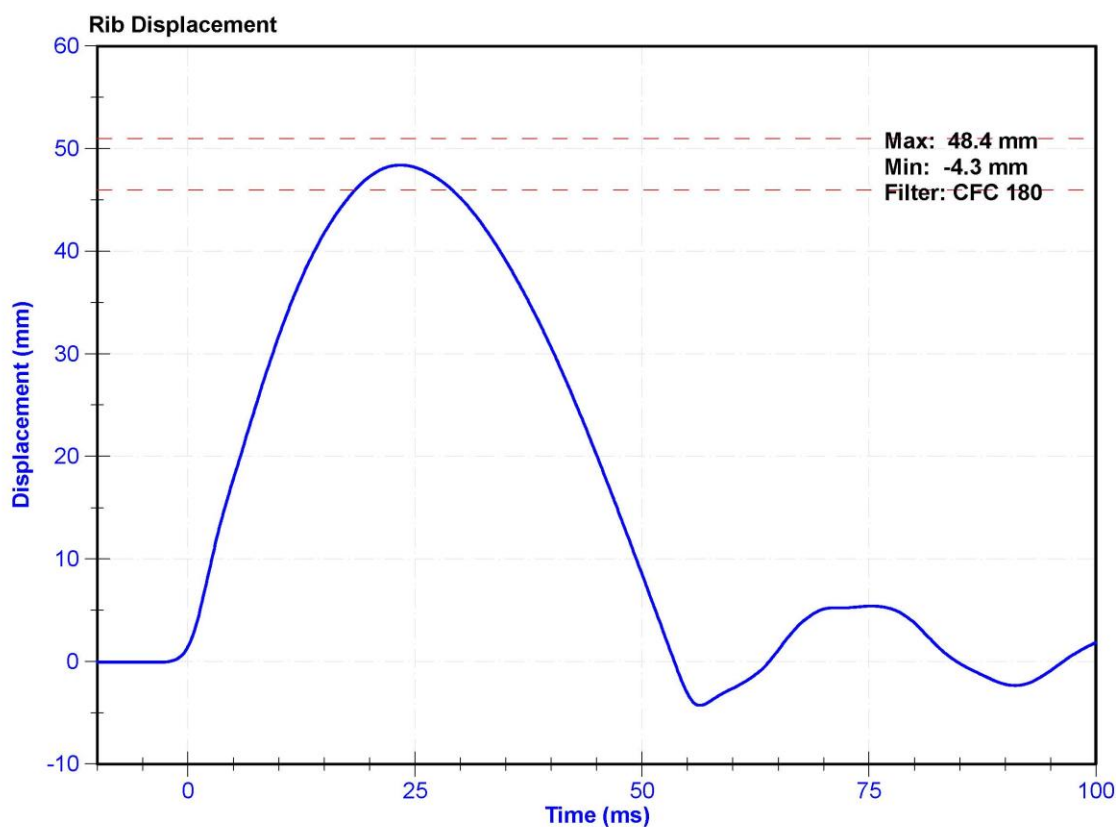
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	32.4	Pass
Rib Displacement	46	51	mm	48.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	4/14/2020	10/13/2020



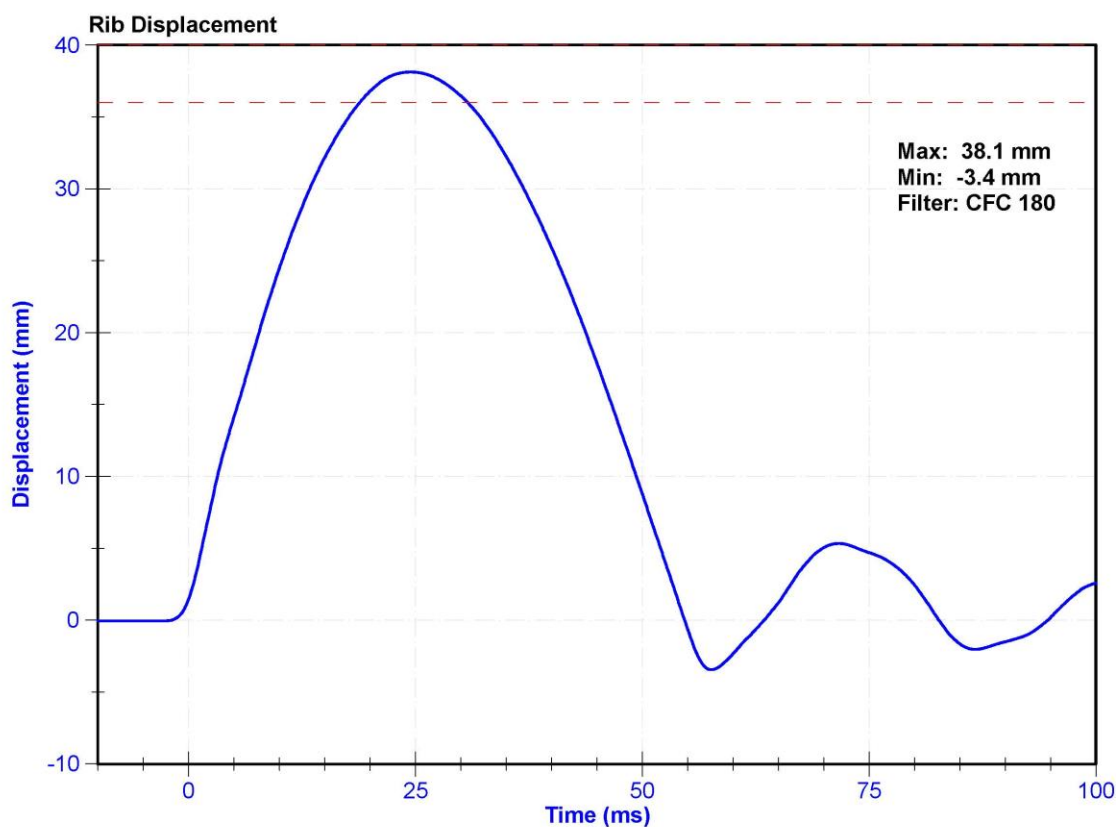
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.2	Pass
Humidity	10	70	%	33.3	Pass
Rib Displacement	36	40	mm	38.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	4/14/2020	10/13/2020



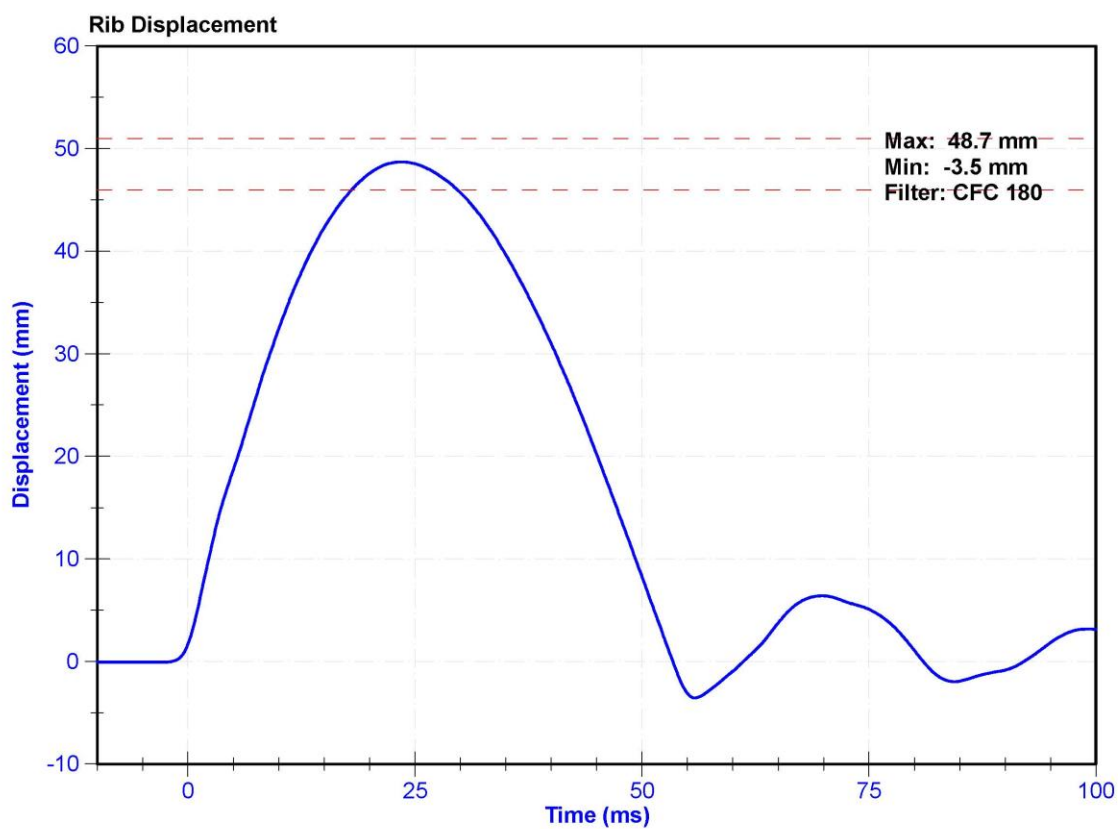
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.2	Pass
Humidity	10	70	%	33.3	Pass
Rib Displacement	46	51	mm	48.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	4/14/2020	10/13/2020



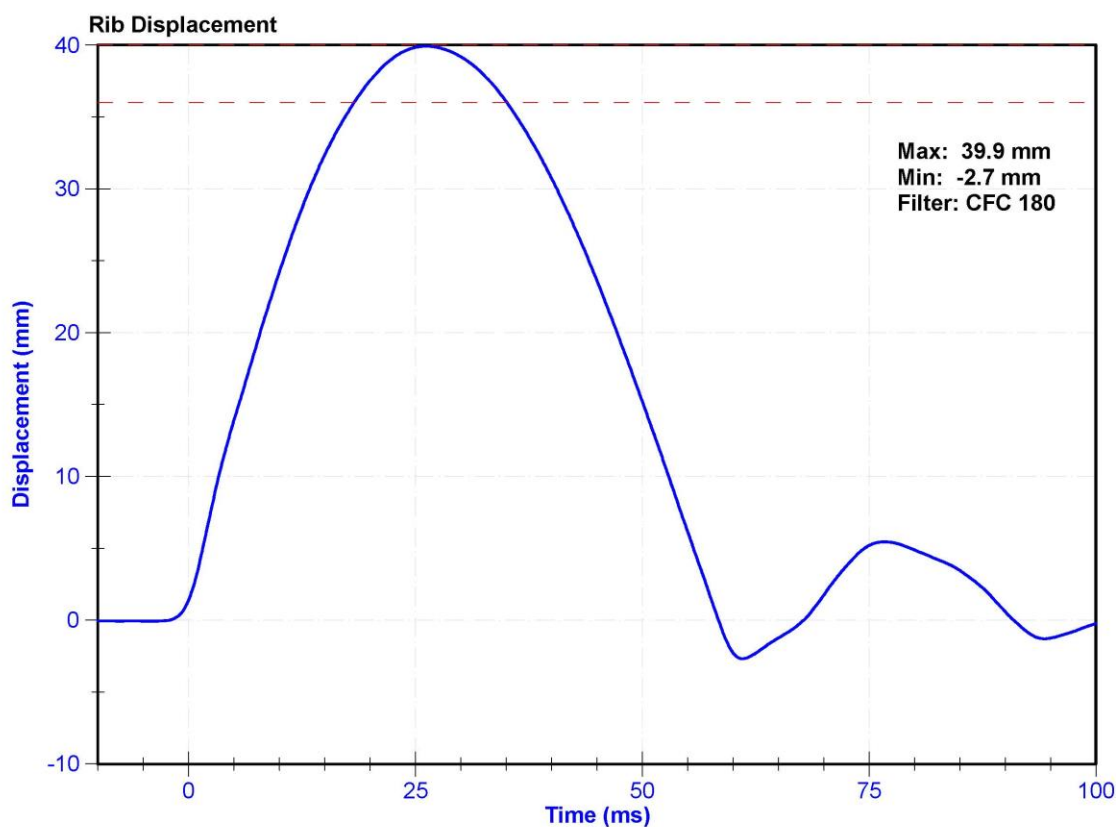
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.2	Pass
Humidity	10	70	%	33.9	Pass
Rib Displacement	36	40	mm	39.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	4/14/2020	10/13/2020



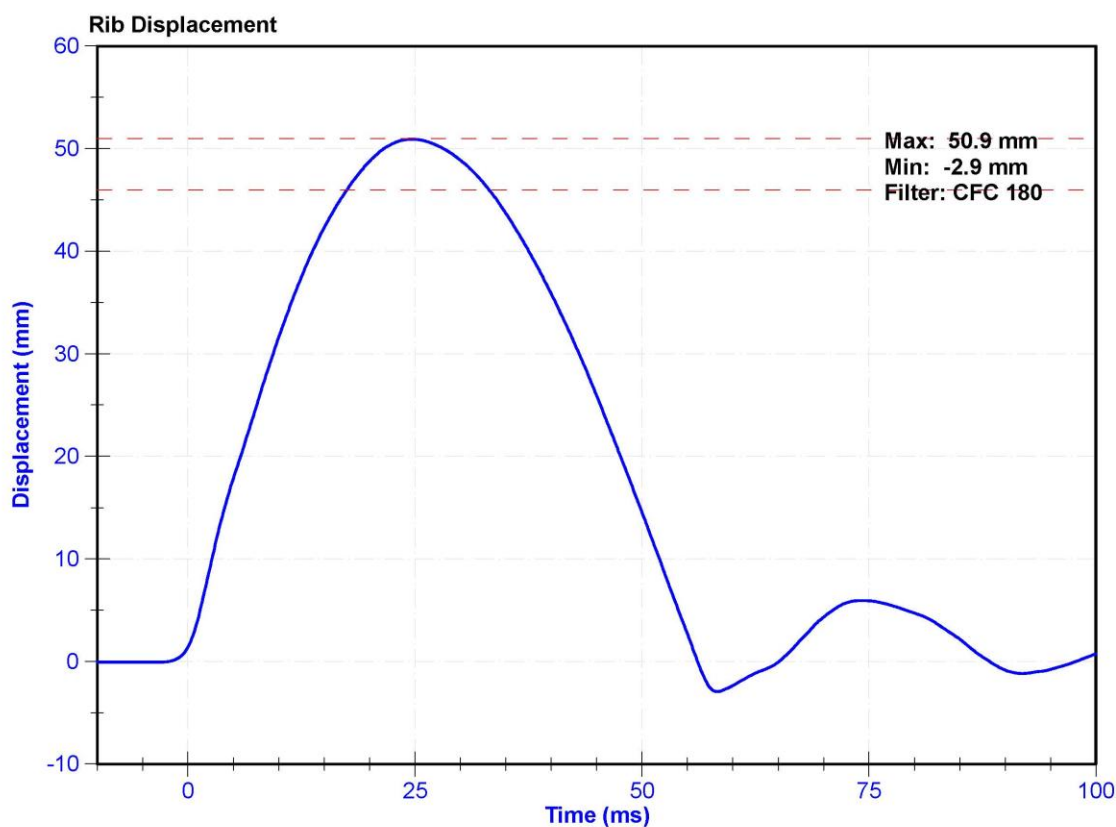
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.2	Pass
Humidity	10	70	%	33.9	Pass
Rib Displacement	46	51	mm	50.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	4/14/2020	10/13/2020



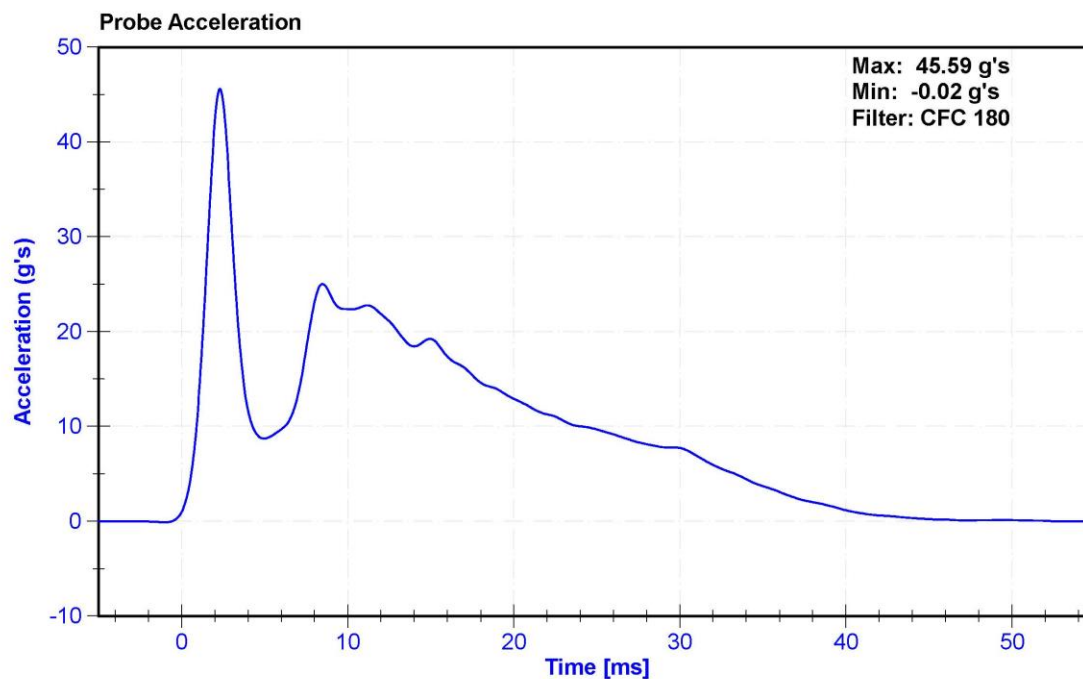
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

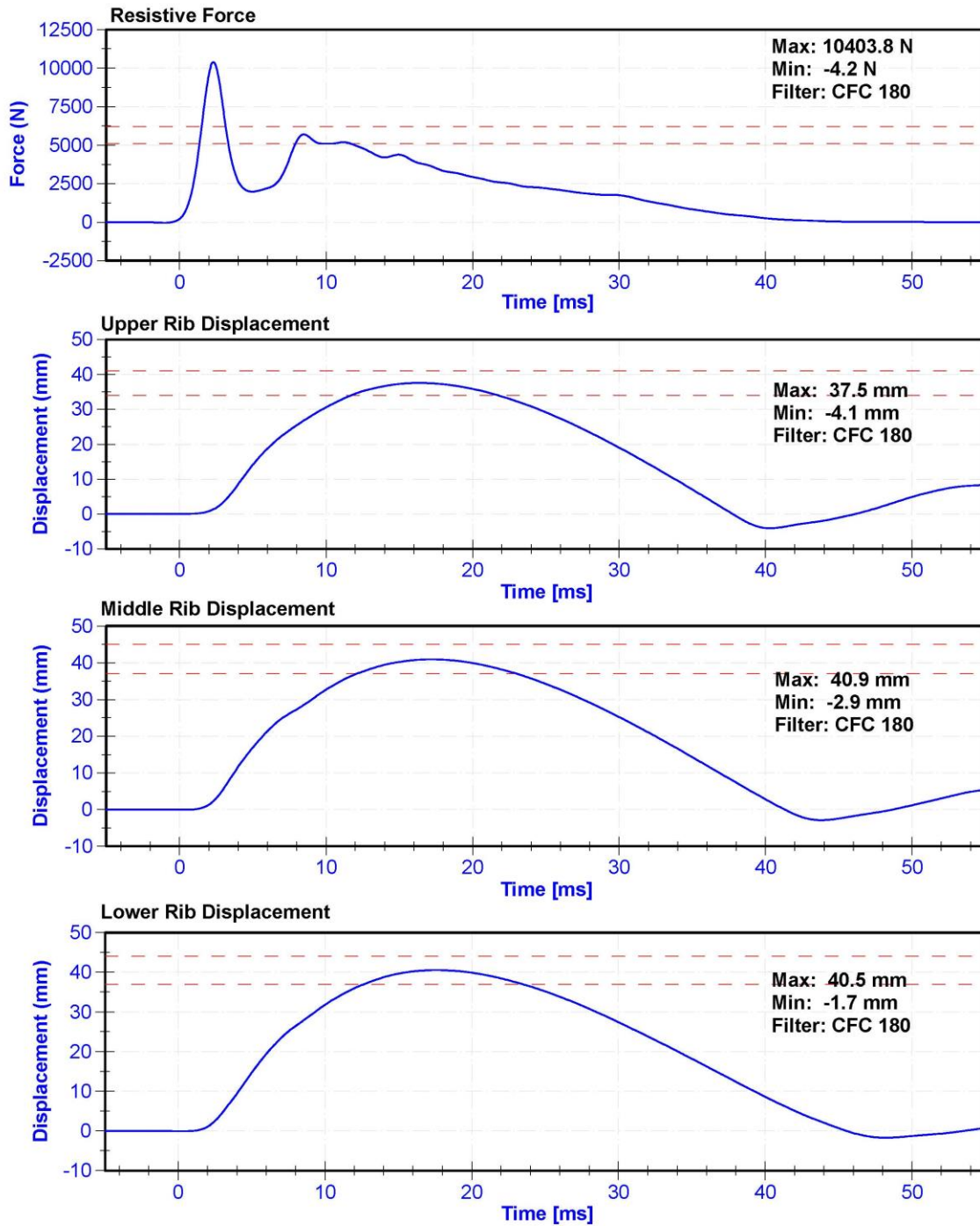
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	29.0	Pass
Velocity	5.4	5.6	m/s	5.43	Pass
Resistive Force after 6ms	5100	6200	N	5707.9	Pass
Upper Thorax Rib Deflection	34	41	mm	37.5	Pass
Mid Thorax Rib Deflection	37	45	mm	40.9	Pass
Lower Thorax Rib Deflection	37	44	mm	40.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	MSI 64C-2000	A260568	1/29/2020	7/29/2020
Upper Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	4/14/2020	10/13/2020
Middle Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	4/14/2020	10/13/2020
Lower Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	4/14/2020	10/13/2020





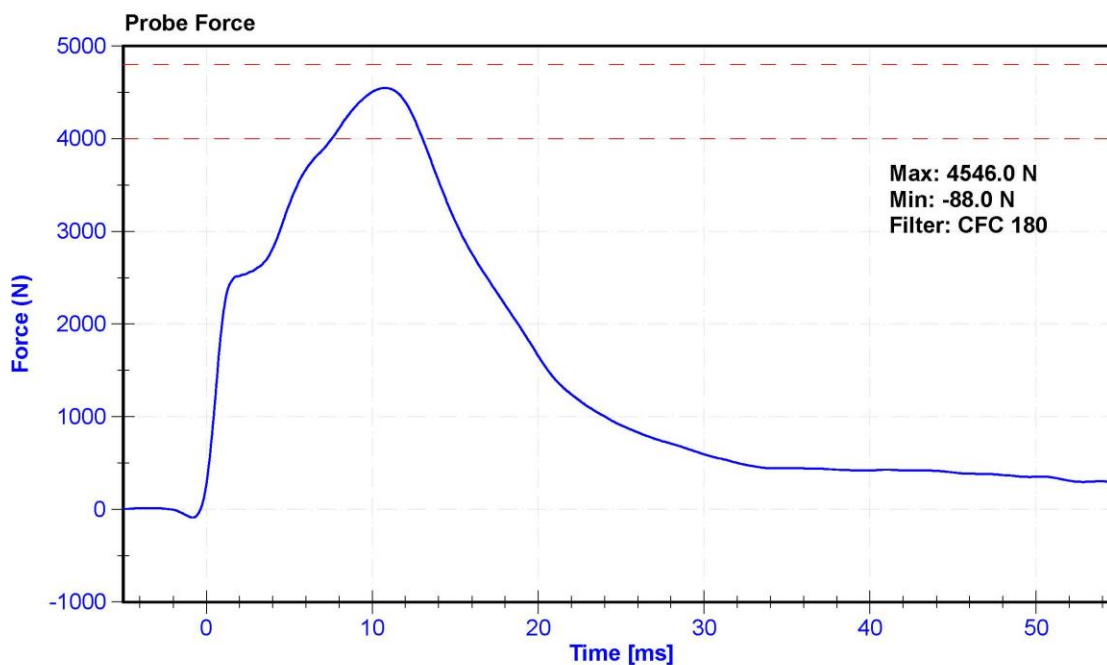
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	FO34	Laboratory Supervisor	K.Brogan

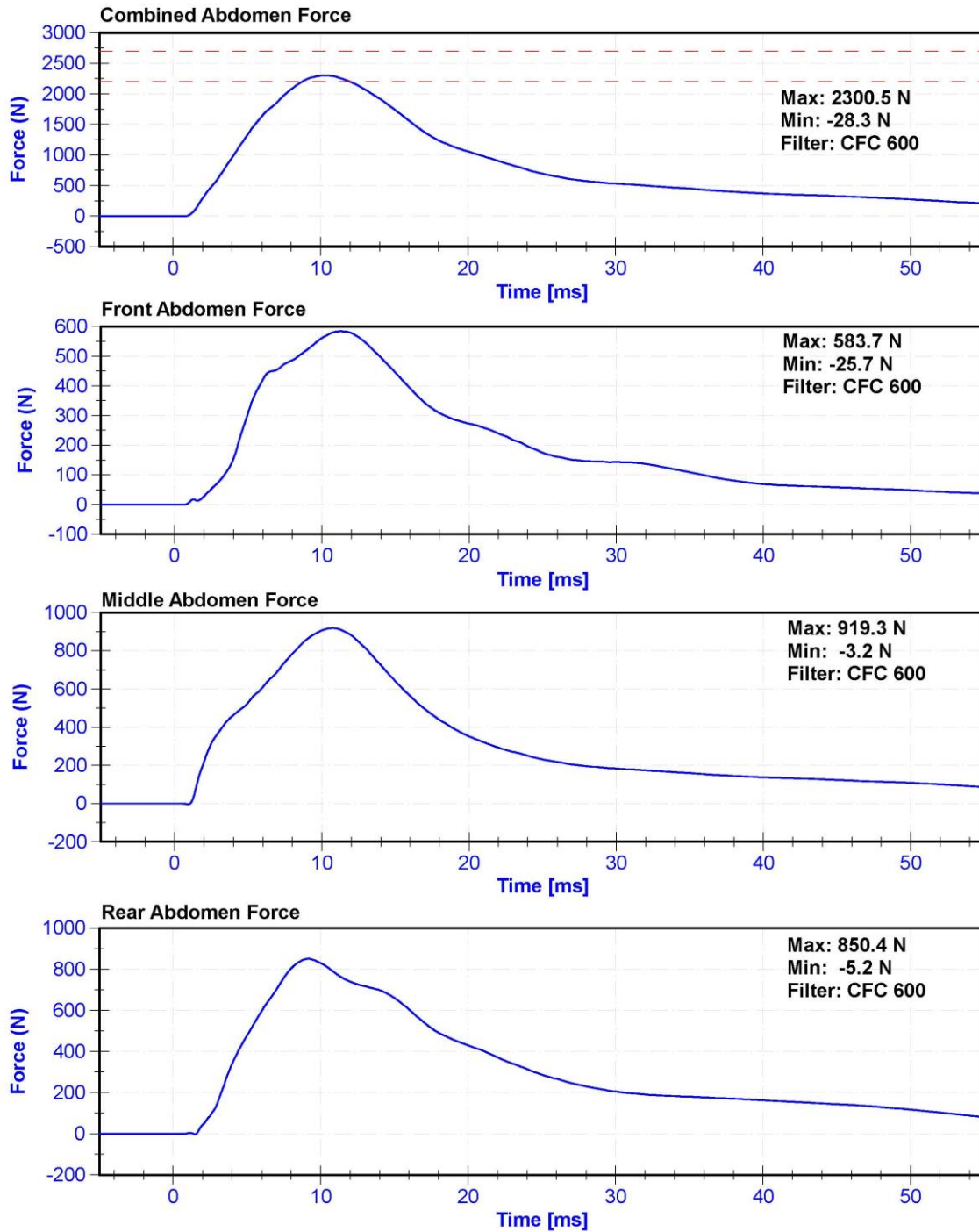
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	29	Pass
Velocity	3.9	4.1	m/s	4.09	Pass
Combined Abdomen Force	2200	2700	N	2300.5	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	10.35	Pass
Resistive Probe Force	4000	4800	N	4546.0	Pass
Time at Peak Resistive Force	10.6	13.0	ms	10.80	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A260568	1/29/2020	7/29/2020
Front Abdomen Load Cell	DENTON 2631	LC-1440	6/14/2019	6/13/2020
Middle Abdomen Load Cell	DENTON 2631	LC-1525	6/5/2019	6/4/2020
Rear Abdomen Load Cell	DENTON 2631	LC-1528	6/14/2019	6/13/2020







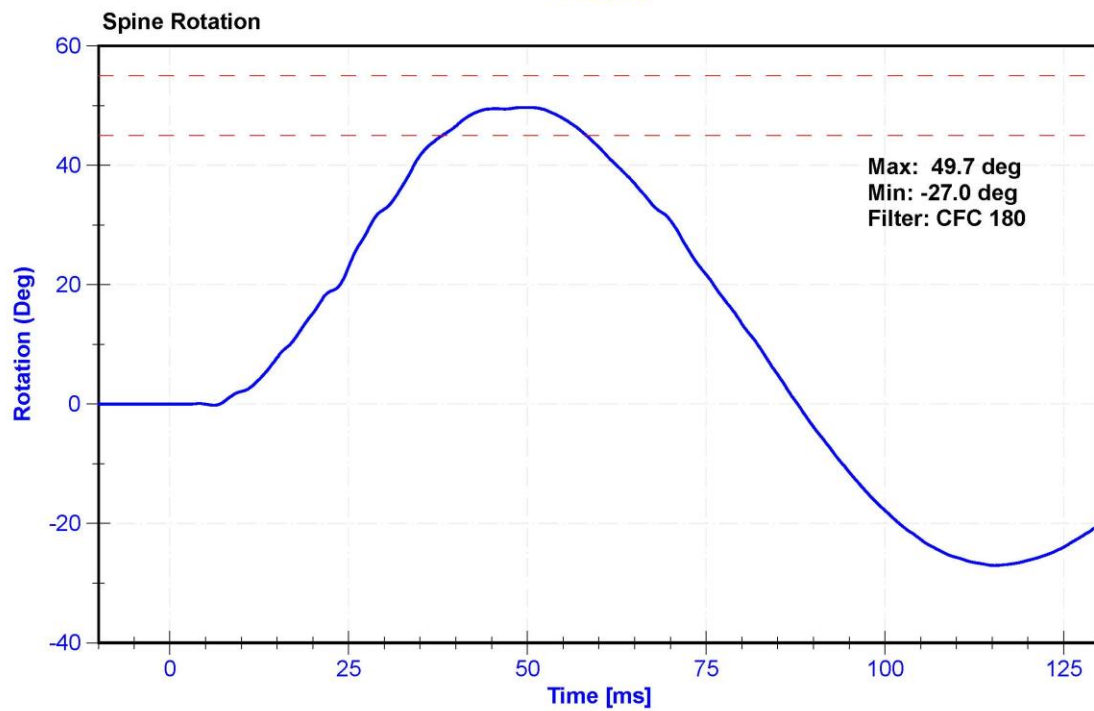
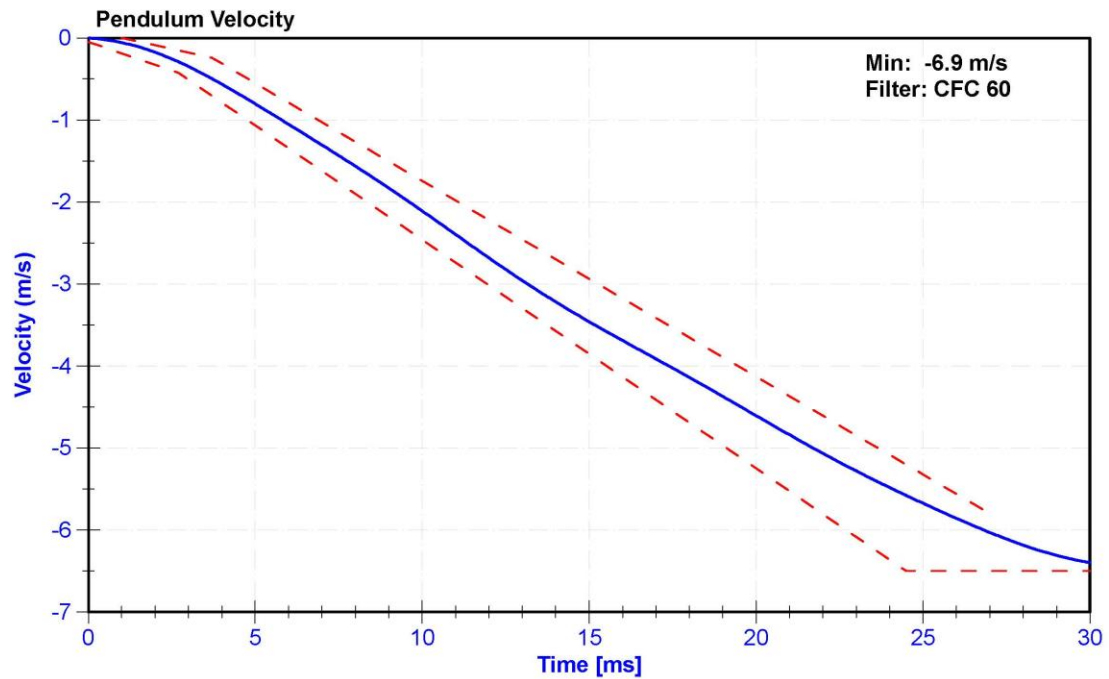
ATD Manufacturer	FTSS	Test Technician	M. Dudek
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

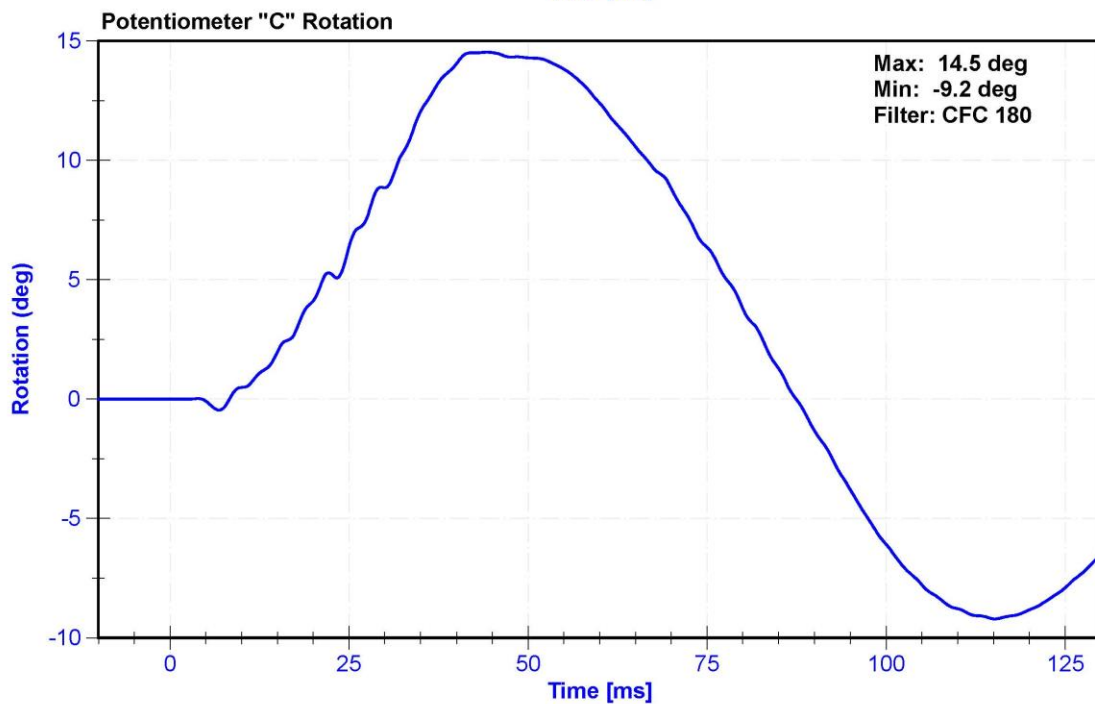
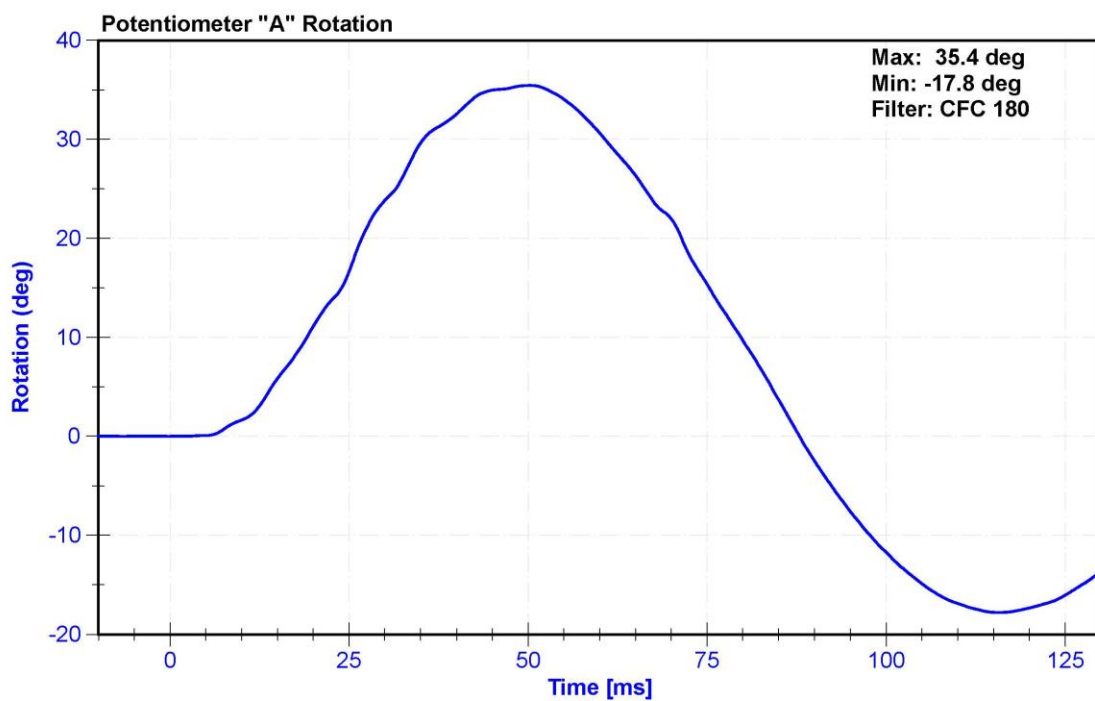
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.0	Pass
Humidity	10	70	%	30.5	Pass
Velocity	5.95	6.15	m/s	6.046	Pass
Lateral Spine Rotation	45	55	deg	49.7	Pass
Time at Maximum Rotation	39	53	ms	49.8	Pass
Time of Decay to Zero Degrees	37	57	ms	38.0	Pass
Pulse within Corridor?	-	-	-		

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5M9 Pend	1/30/2020	1/29/2021
Pendulum "A" Potentiometer	SP22G	DS-094	10/31/2019	10/30/2020
Condyle "B" Potentiometer	SP22G	DS-095	10/31/2019	10/30/2020





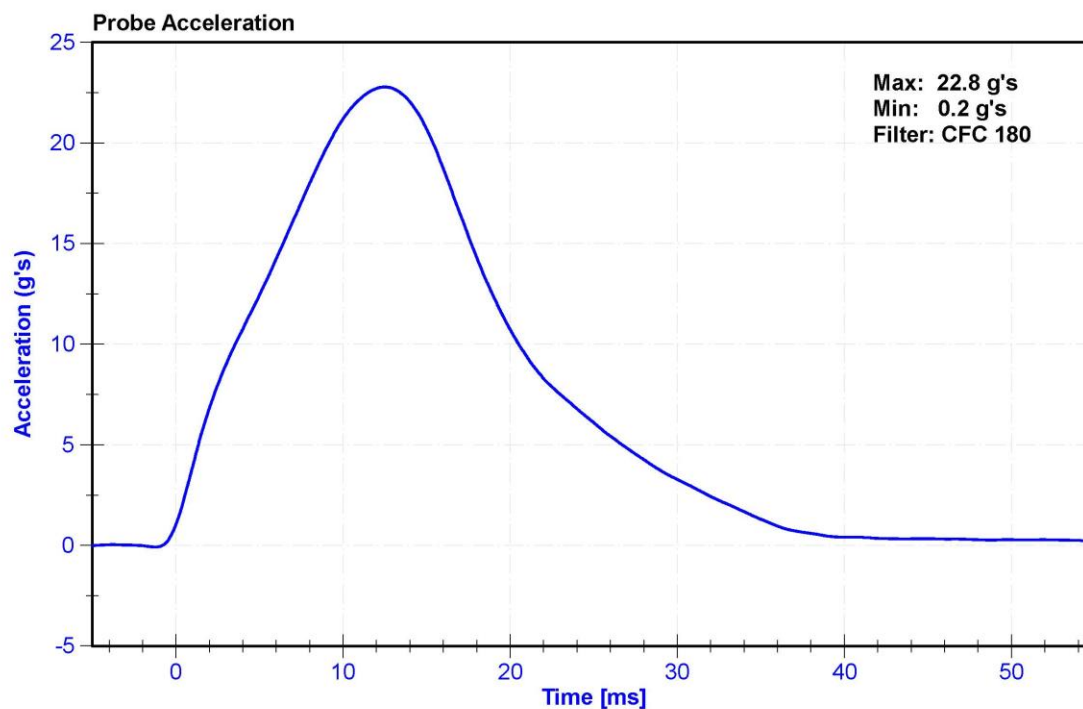
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

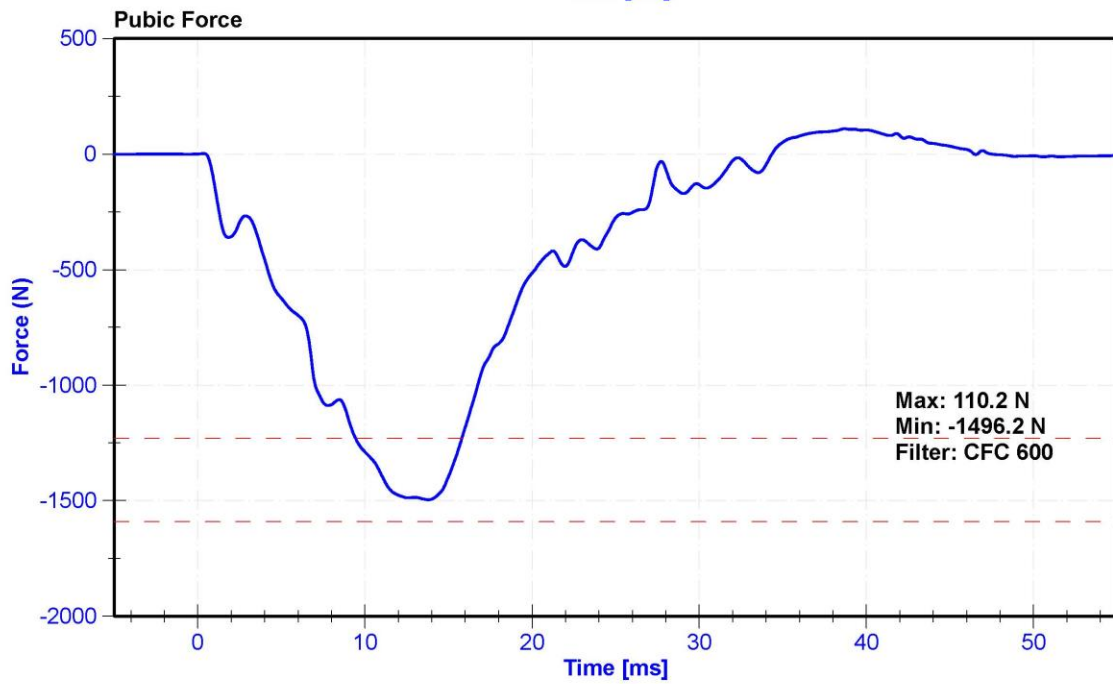
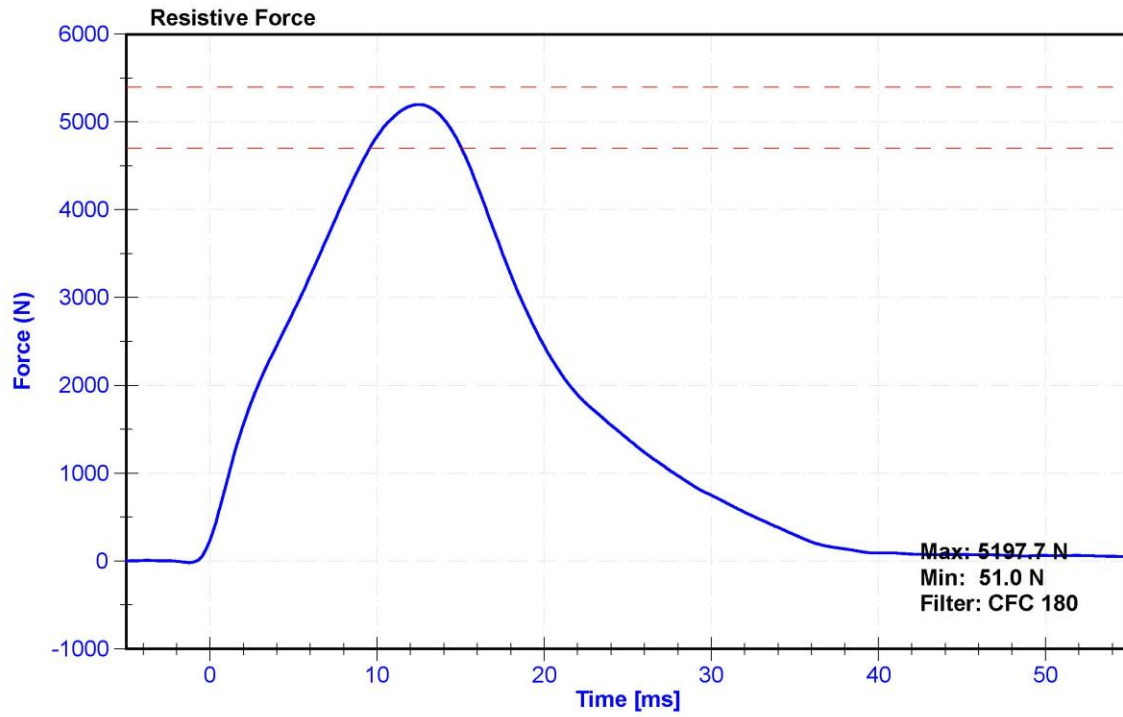
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	27.0	Pass
Velocity	4.2	4.4	m/s	4.39	Pass
Resistive Force	4700	5400	N	5197.7	Pass
Time at Peak Resistive Force	11.8	16.1	ms	12.50	Pass
Pubic Force	-1590	-1230	N	-1496.2	Pass
Time at Peak Pubic Force	12.2	17.0	ms	13.80	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A260568	1/29/2020	7/29/2020
Pubic Load Cell	Denton 3096JFL	LC-464fy	6/14/2019	6/13/2020





CALIBRATION TEST RESULTS

PRE-TEST

SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD

SERIAL No: 300

(CONFIGURED FOR LEFT SIDE IMPACT)

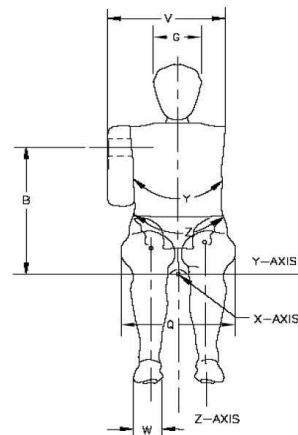
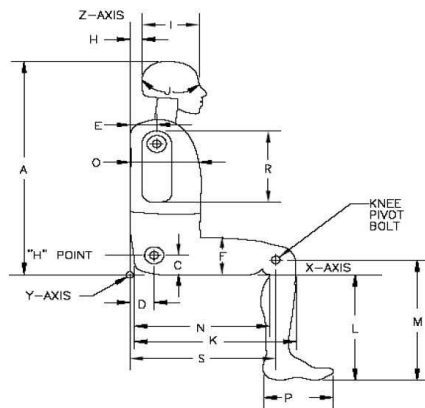


External Measurements - SID-IIs

Technician: K. Dutton

Date: 04/27/2020

Dummy Serial Number: 300



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	780	Pass
B	Shoulder Pivot Height	437	453	450	Pass
C	H-point Height	79	89	86	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	145	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	186	Pass
J	Head Circumference	541	551	545	Pass
K	Buttock to Knee Length	514	540	532	Pass
L	Popliteal Height	343	369	359	Pass
M	Knee Pivot to floor height	392	409	402	Pass
N	Buttock Popliteal Length	416	442	432	Pass
O	Chest Depth w/o jacket	195	211	206	Pass
P	Foot Length	216	232	221	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	319	Pass
R	Arm Length	249	259	253	Pass
S	Knee Joint to seatback	477	493	485	Pass
V	Shoulder Width	341	357	352	Pass
W	Foot Width	78	94	84	Pass
Y	Chest Circumference w/jacket	851	881	870	Pass
Z	Waist Circumference	761	791	772	Pass

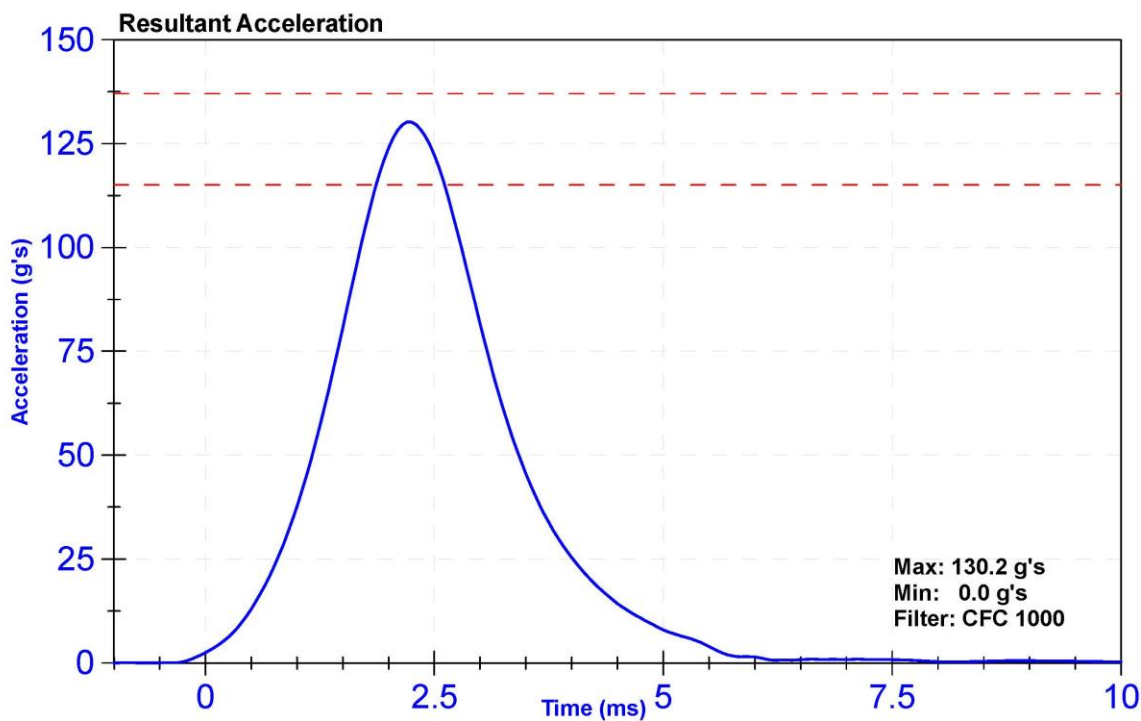
ATD Manufacturer	FTSS	Test Technician	E. Helenbrook
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

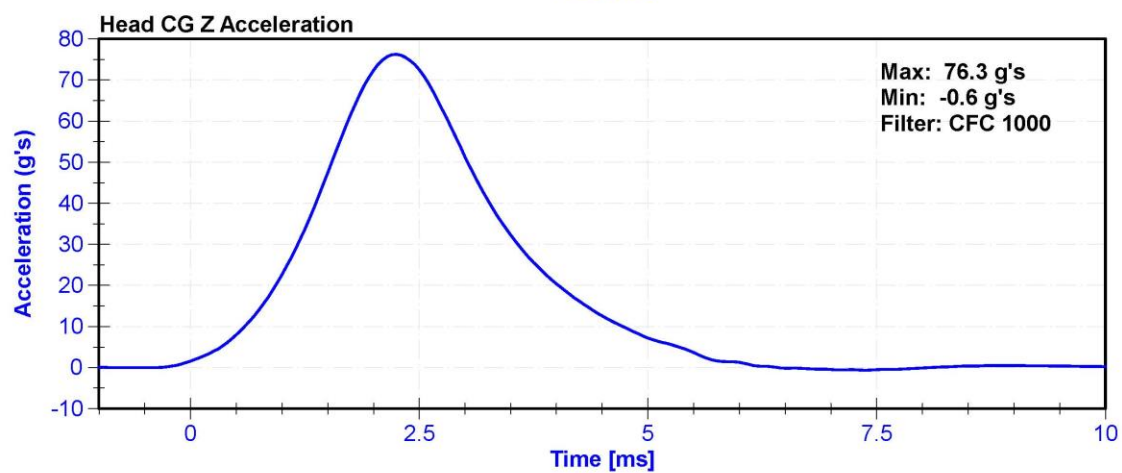
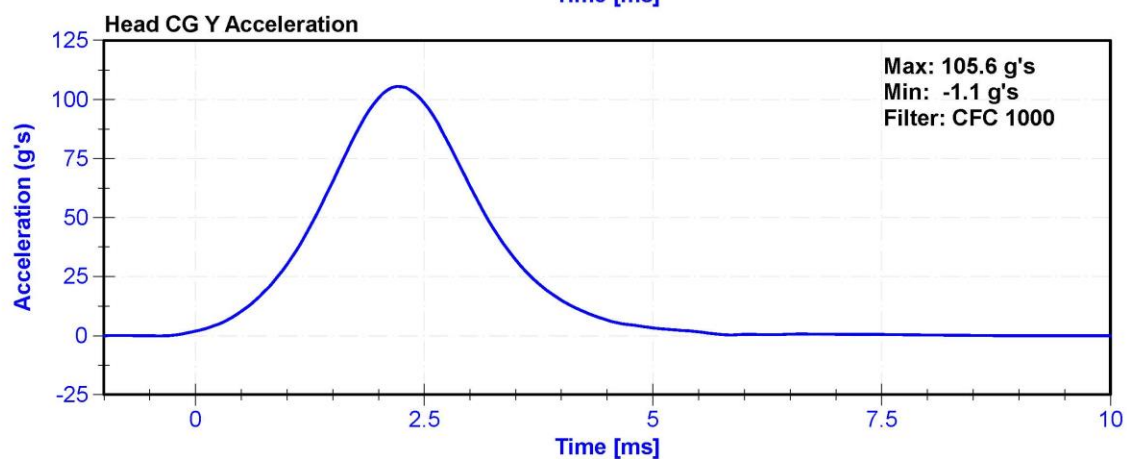
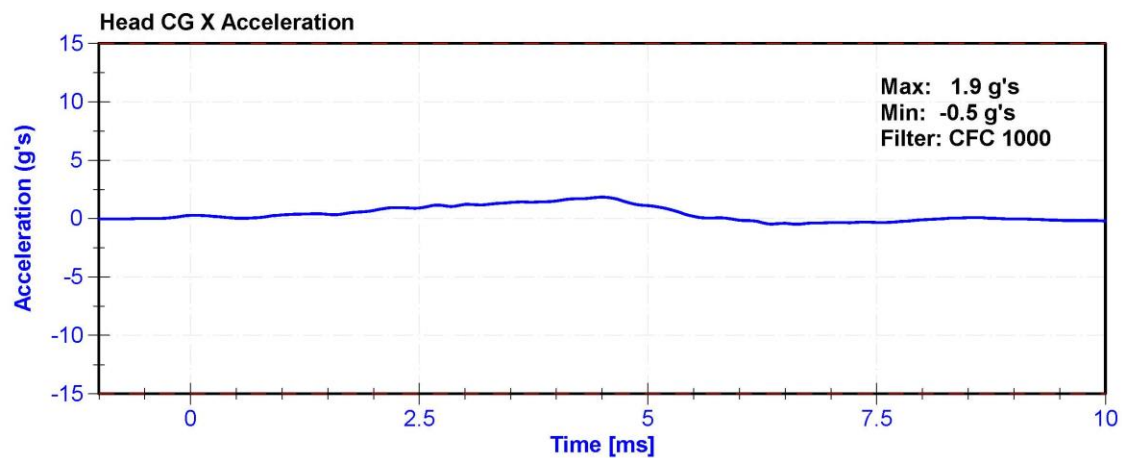
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	37.3	Pass
Resultant Acceleration	115	137	g's	130.2	Pass
Oscillation	0	15	%	1.1	Pass
Fore-Aft Acceleration	-15	15	g's	1.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264	AC-P68057	4/20/2020	10/19/2020
Y Accelerometer	ENDEVCO 7264	AC-P79189	4/20/2020	10/19/2020
Z Accelerometer	ENDEVCO 7264CT	AC-P52095	4/20/2020	10/19/2020





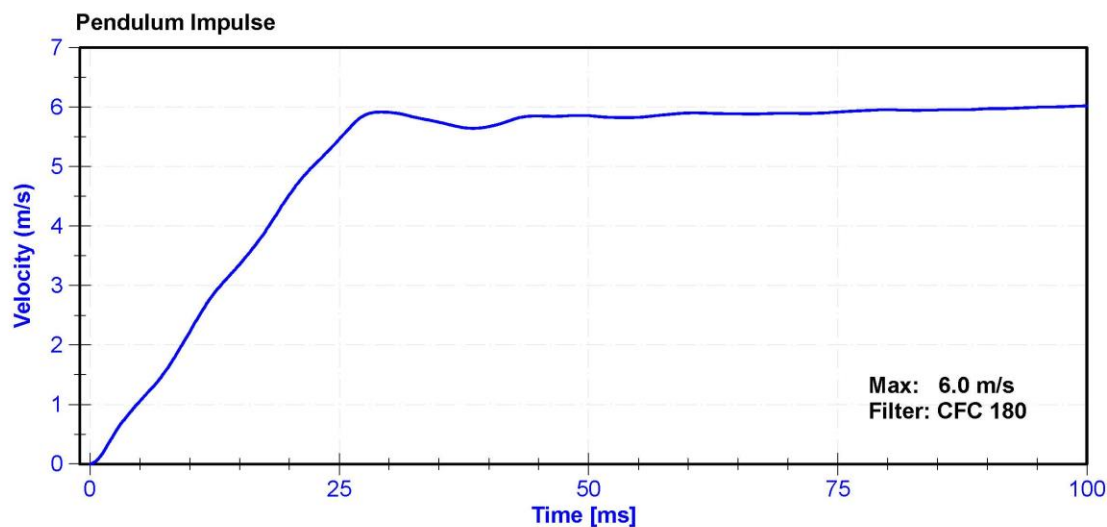
ATD Manufacturer	FTSS	Test Technician	E. Helenbrook
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

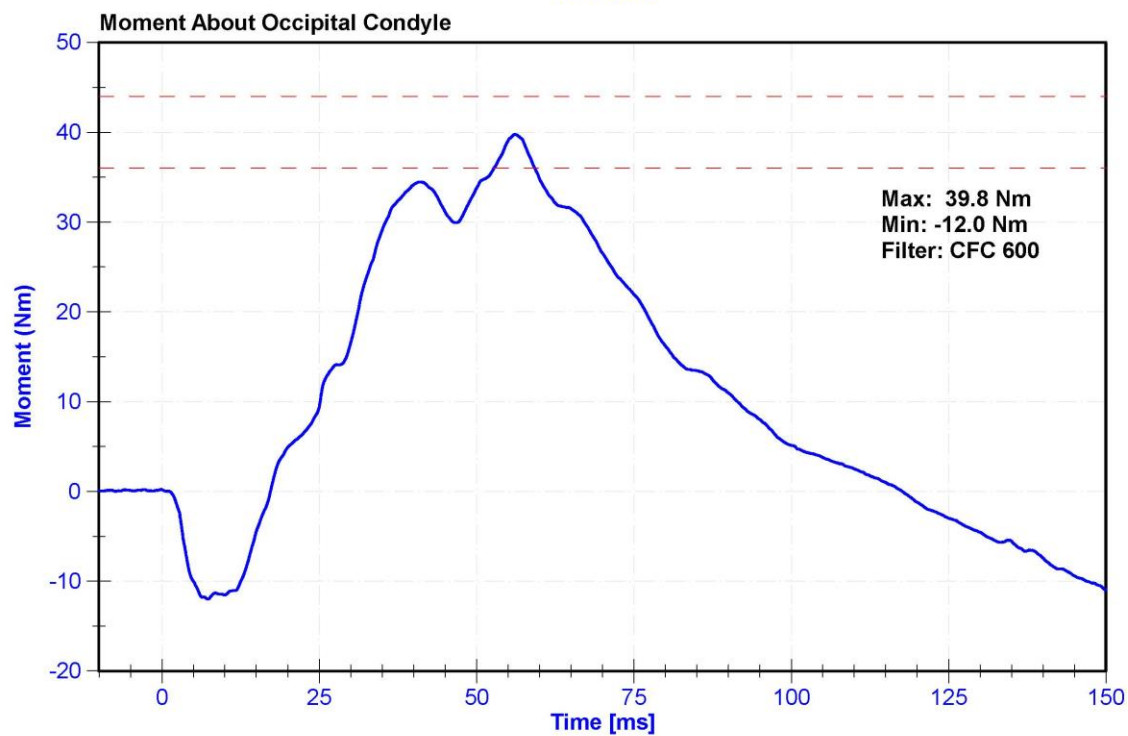
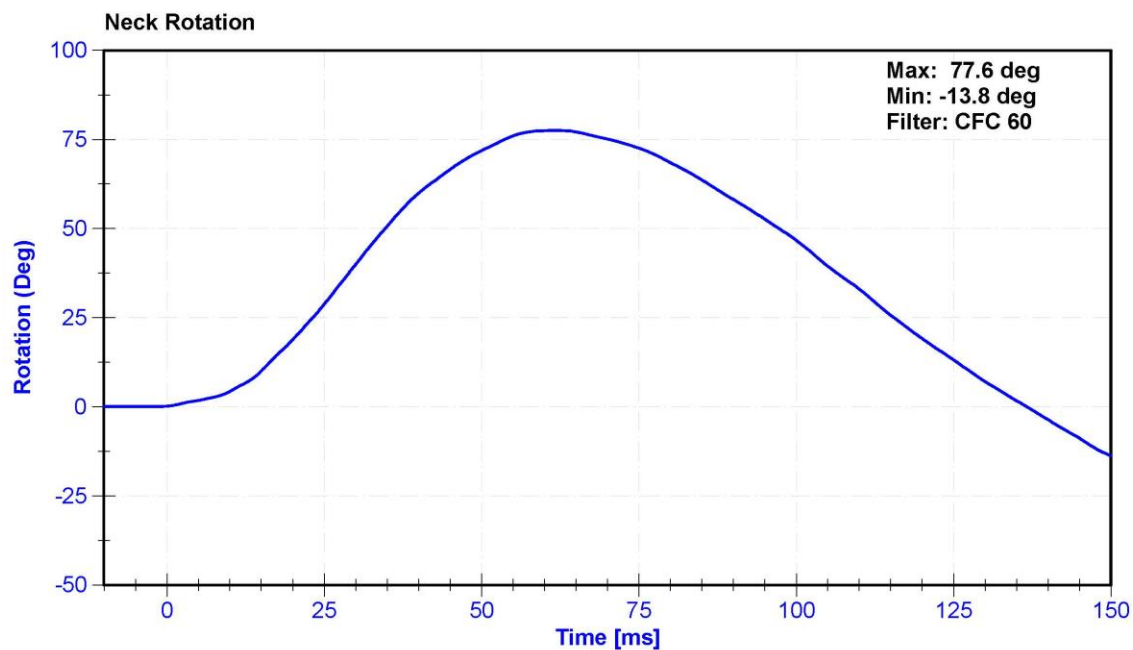
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.2	Pass
Humidity	10	70	%	35.5	Pass
Velocity	5.51	5.63	m/s	5.514	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.22	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.35	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.52	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.46	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	6.02	Pass
Neck Rotation	71	81	deg	77.6	Pass
Time at Maximum Rotation	50	70	ms	61.7	Pass
Moment about the OC	36	44	Nm	39.8	Pass
Moment Decay to 0 Nm	102	126	ms	117.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AH5M9	1/30/2020	1/29/2021
Pendulum Potentiometer	Servo 14CBI-3615	DS-184	11/4/2019	11/3/2020
Condyle Potentiometer	Servo 14CBI-3615	DS-185	11/4/2019	11/3/2020
Upper Neck Load Cell	Denton 1716A	1716-2192-Fy	6/20/2019	6/19/2020





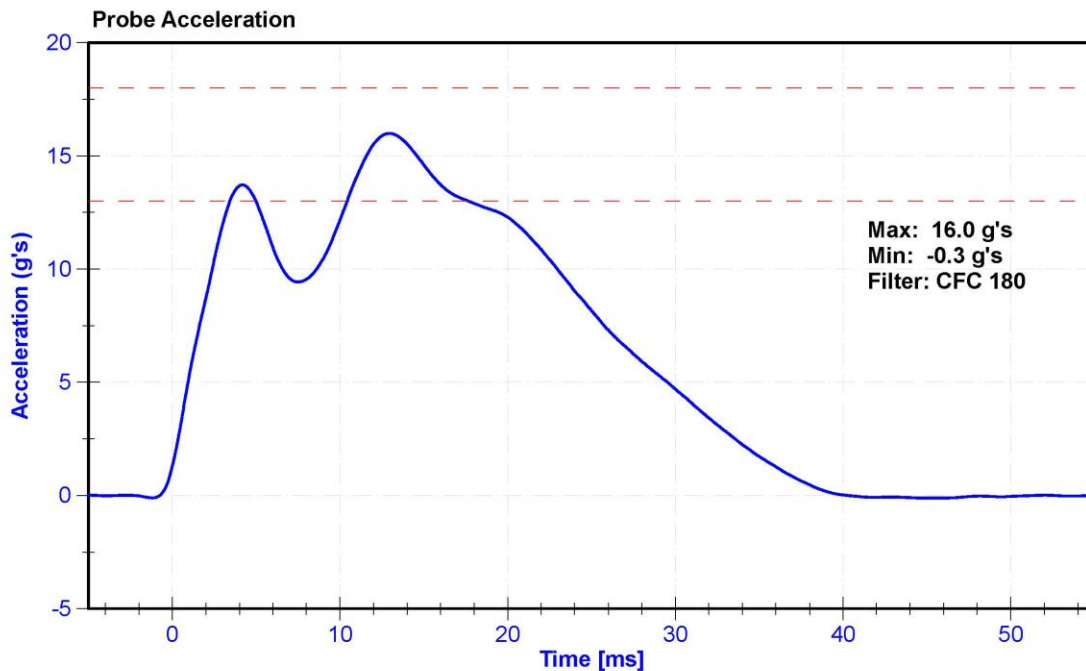
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

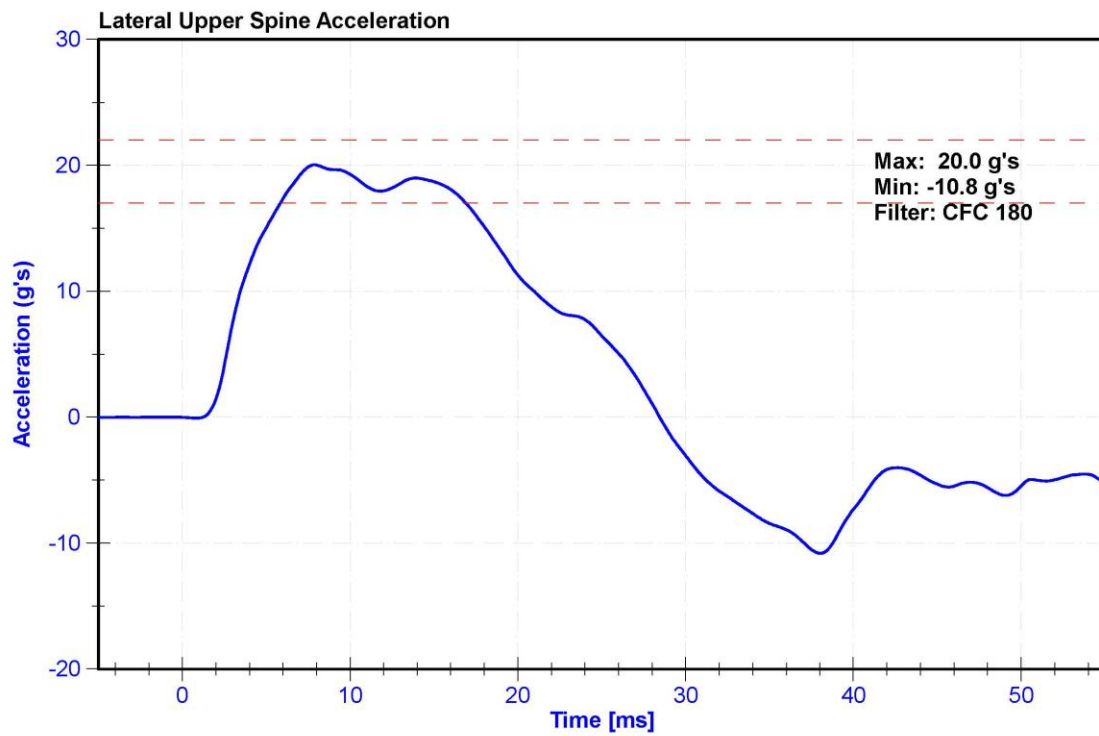
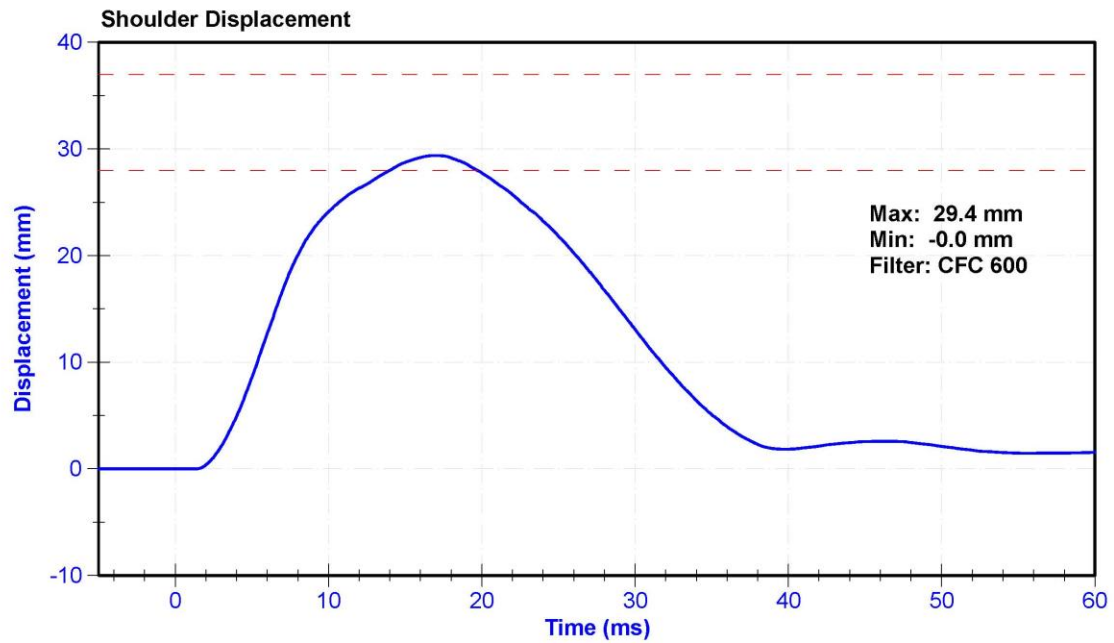
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	29	Pass
Velocity	4.2	4.4	m/s	4.29	Pass
Probe Acceleration	13	18	g's	16.0	Pass
Shoulder Deflection	28	37	mm	29.4	Pass
Lateral Upper Spine Acceleration	17	22	g's	20.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A286228	1/29/2020	7/29/2020
Shoulder Potentiometer	Servo 08CT1-3725	DS-053 GFE	10/29/2019	4/28/2020
Upper Spine Y Accelerometer	ENDEVCO 7264CT	P17283	4/21/2020	10/20/2020





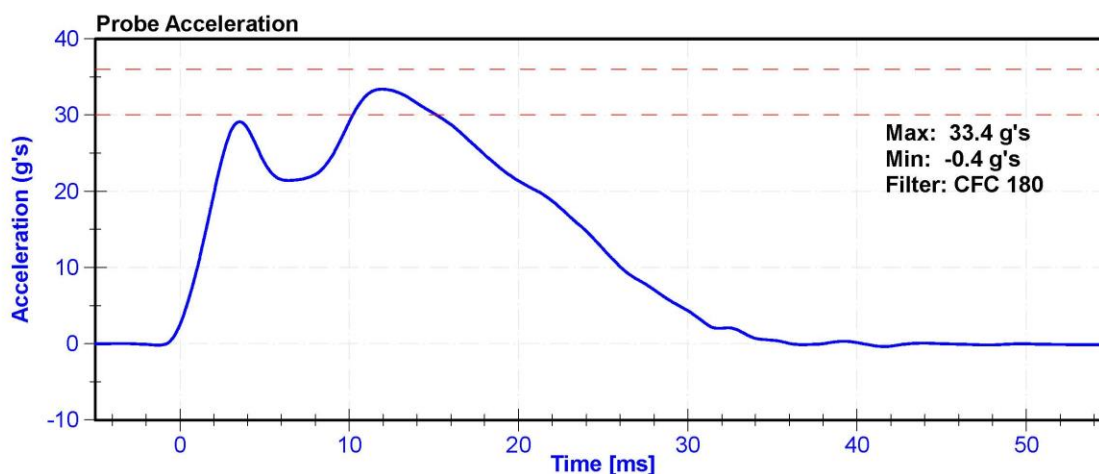
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

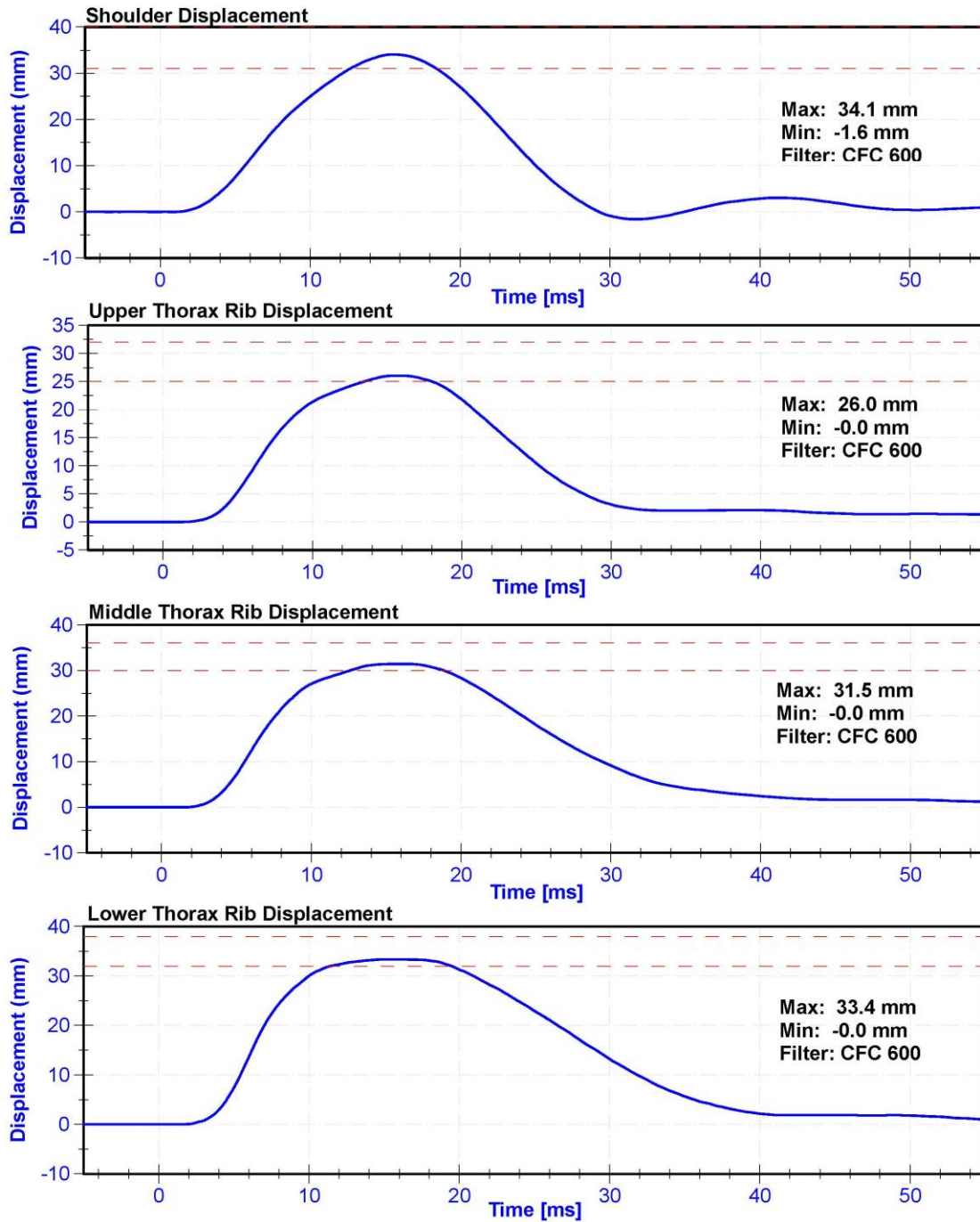
Results

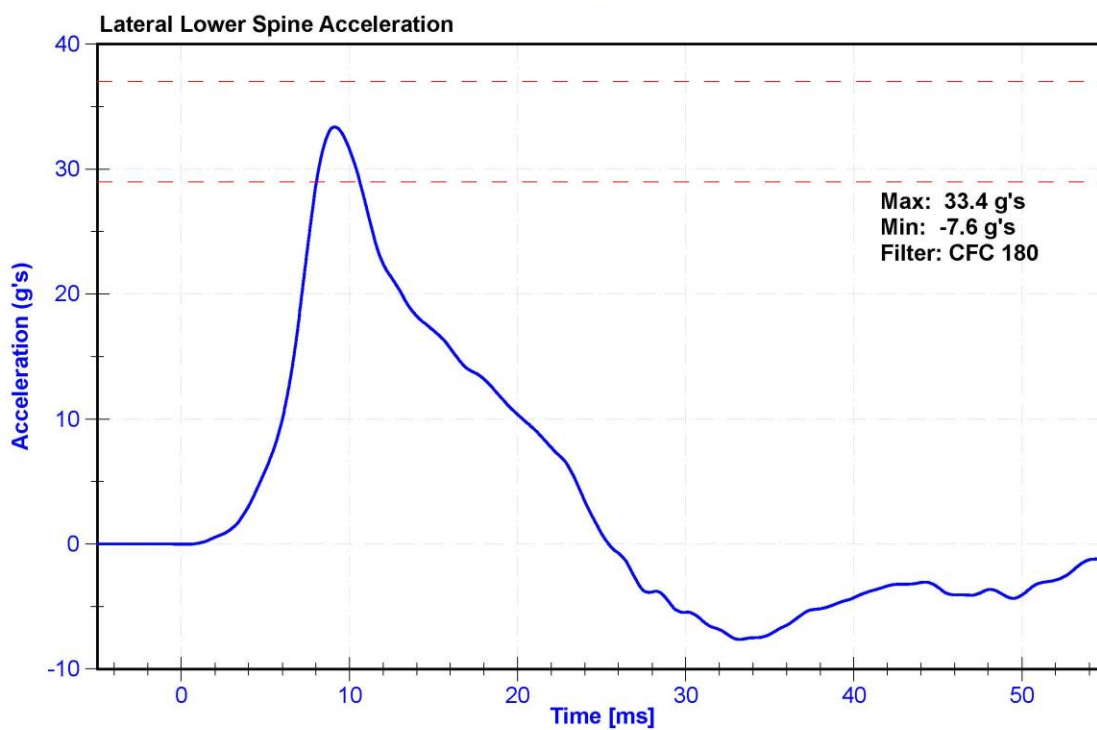
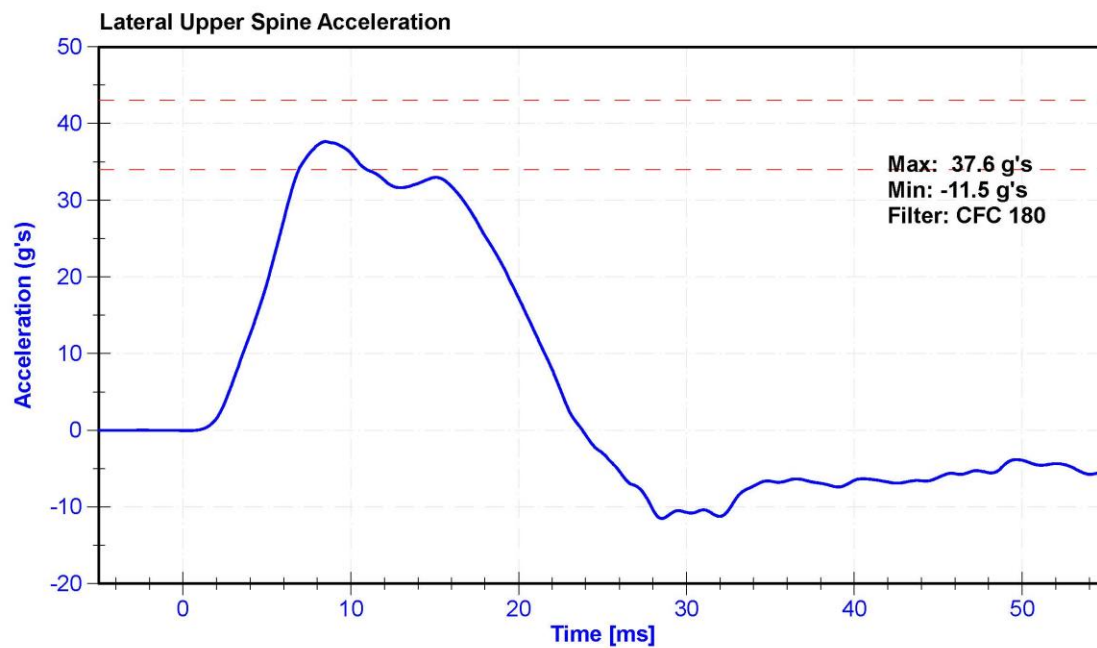
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	29.2	Pass
Velocity	6.6	6.8	m/s	6.68	Pass
Probe Acceleration after 5 ms	30	36	g's	33.4	Pass
Lateral Upper Spine Acceleration	34	43	g's	37.6	Pass
Lateral Lower Spine Acceleration	29	37	g's	33.4	Pass
Shoulder Deflection	31	40	mm	34.1	Pass
Upper Thorax Rib Deflection	25	32	mm	26.0	Pass
Mid Thorax Rib Deflection	30	36	mm	31.5	Pass
Lower Thorax Rib Deflection	32	38	mm	33.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A286228	1/29/2020	7/29/2020
Upper Spine T1 Y Accelerometer	ENDEVCO 7264CT	P17283	4/21/2020	10/20/2020
Upper Spine T12 Y Accelerometer	ENDEVCO 7264	AC-P64147	4/20/2020	10/19/2020
Shoulder Potentiometer	Servo 08CT1-3725	DS-053 GFE	10/29/2019	4/28/2020
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	10/29/2019	4/28/2020
Middle Thorax Rib Potentiometer	Servo 08TC1-3745	DS-040GFE	10/29/2019	4/28/2020
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	10/29/2019	4/28/2020







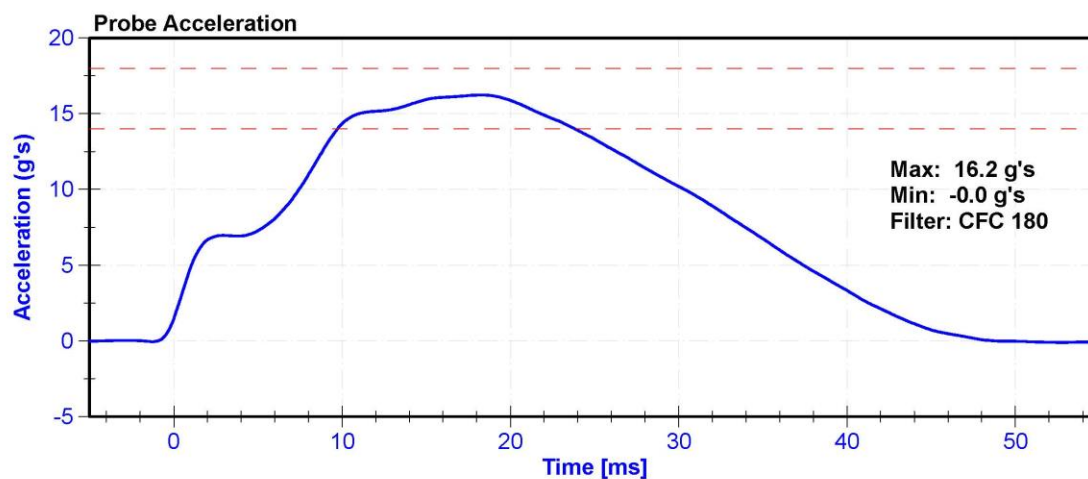
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

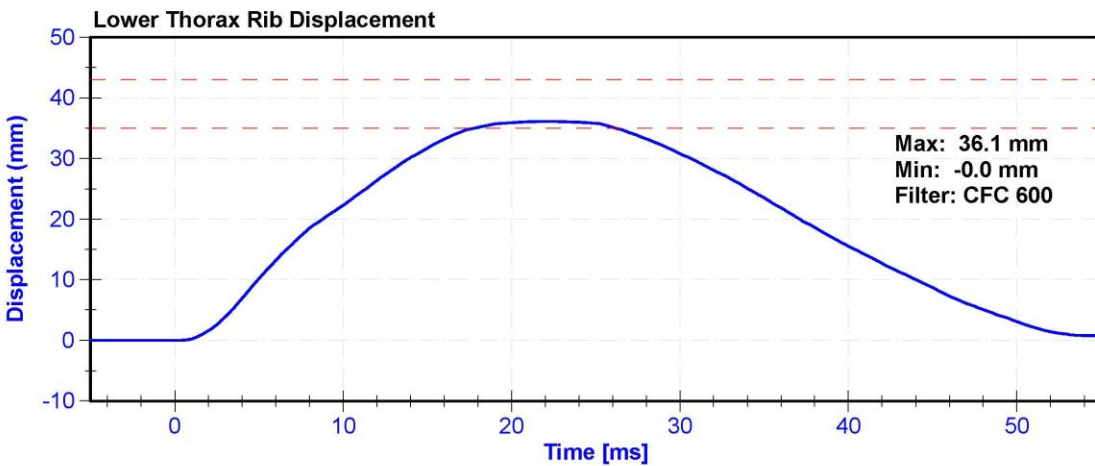
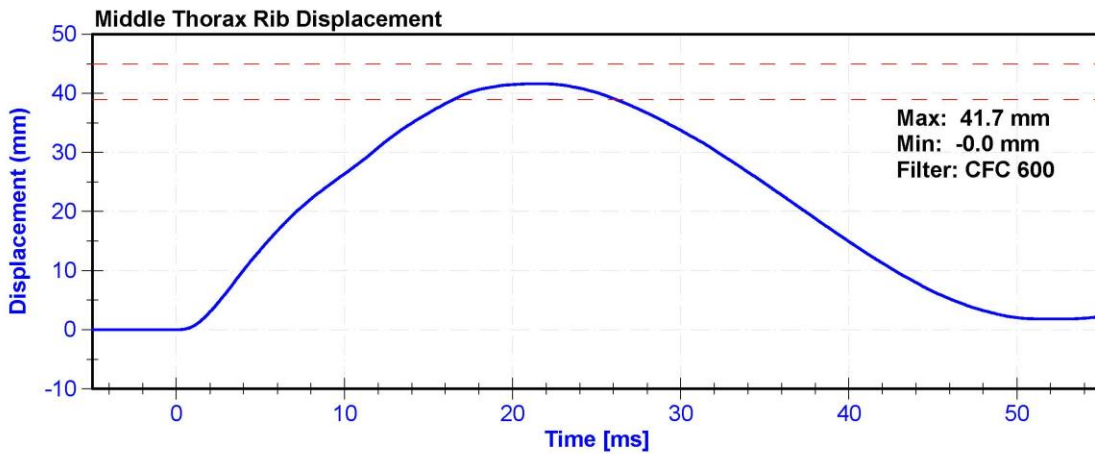
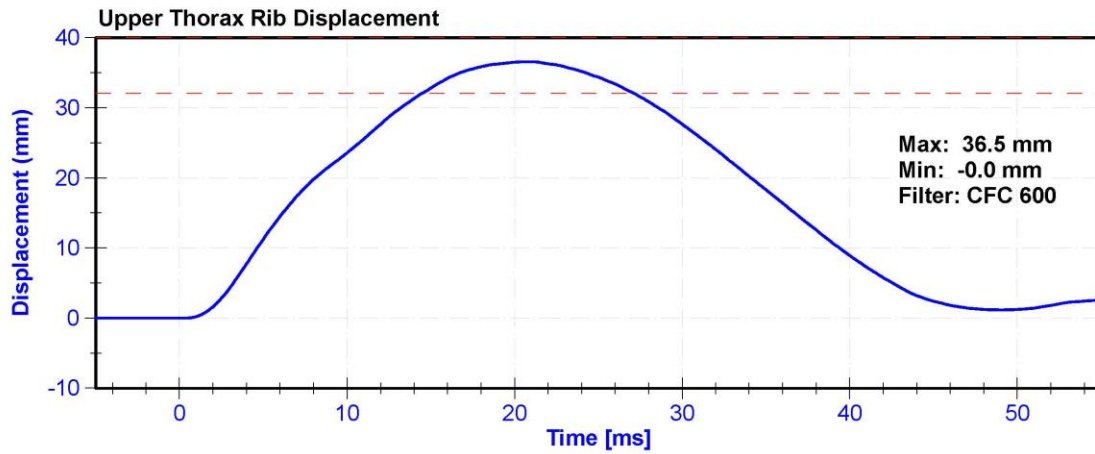
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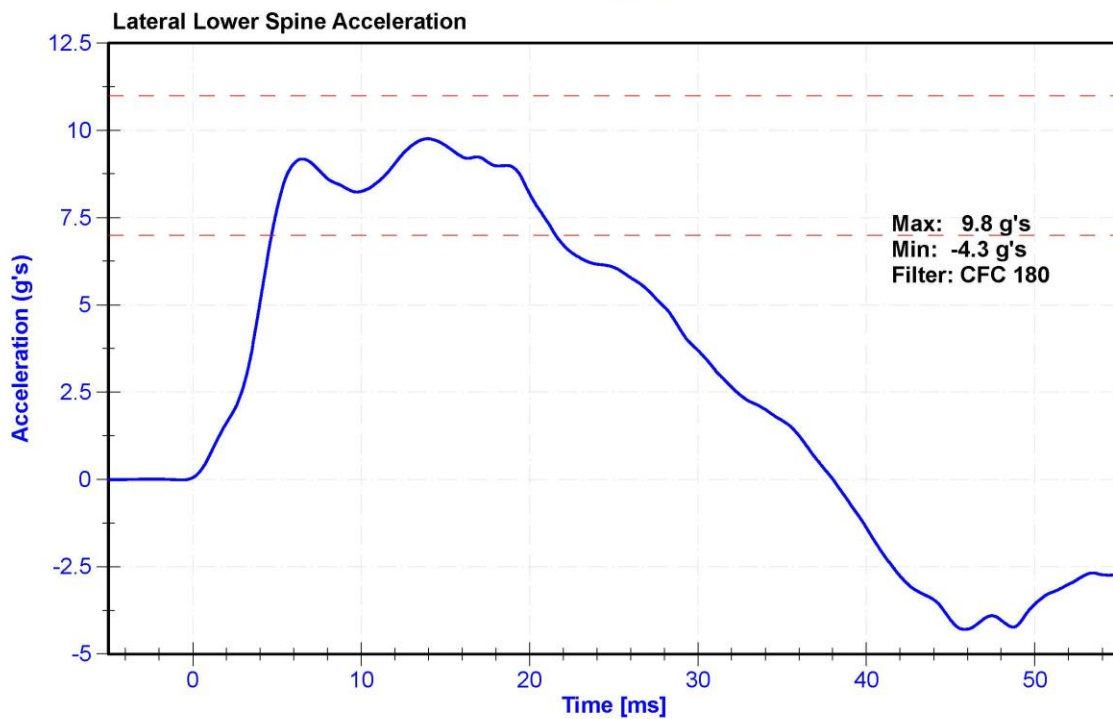
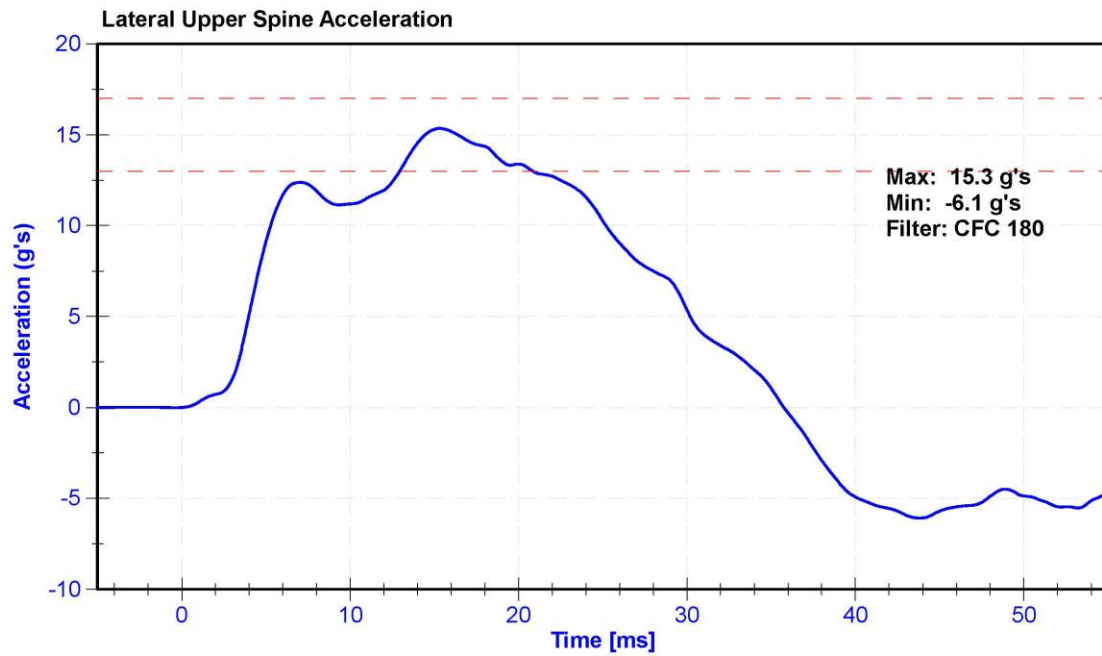
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22	Pass
Humidity	10	70	%	35.7	Pass
Velocity	4.2	4.4	m/s	4.39	Pass
Probe Acceleration	14	18	g's	16.2	Pass
Lateral Upper Spine Acceleration	13	17	g's	15.3	Pass
Lateral Lower Spine Acceleration	7	11	g's	9.8	Pass
Upper Thorax Rib Deflection	32	40	mm	36.5	Pass
Middle Thorax Rib Deflection	39	45	mm	41.7	Pass
Lower Thorax Rib Deflection	35	43	mm	36.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A286228	1/29/2020	7/29/2020
Upper Spine Y Accelerometer	ENDEVCO 7264CT	P17283	4/21/2020	10/20/2020
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	4/20/2020	10/19/2020
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	10/29/2019	4/28/2020
Middle Thorax Rib Potentiometer	Servo 08TC1-3745	DS-040GFE	10/29/2019	4/28/2020
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	10/29/2019	4/28/2020







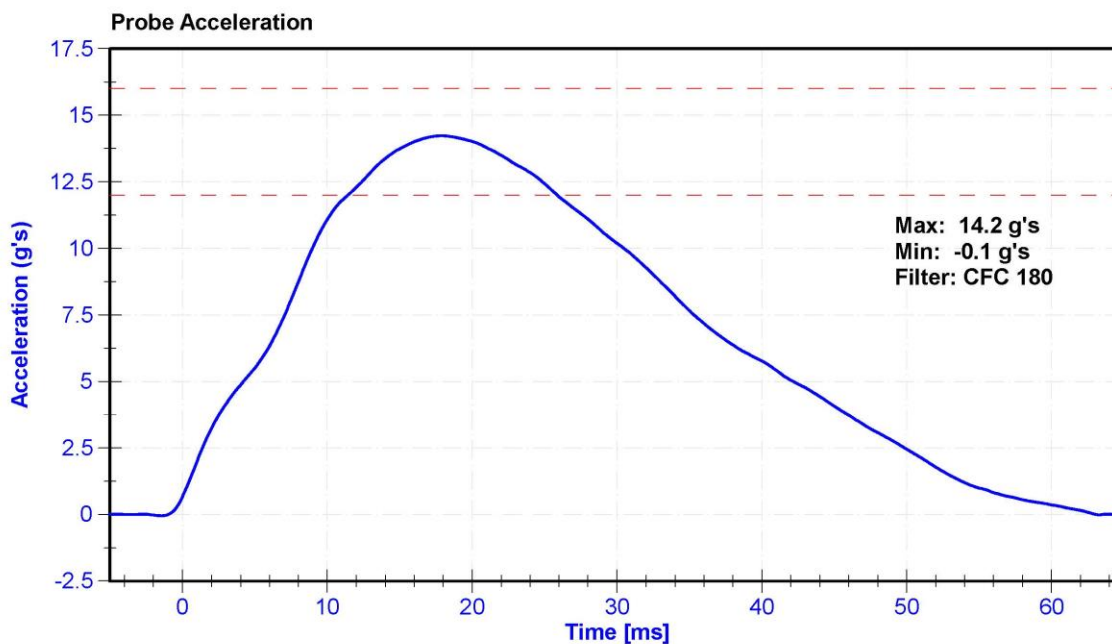
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

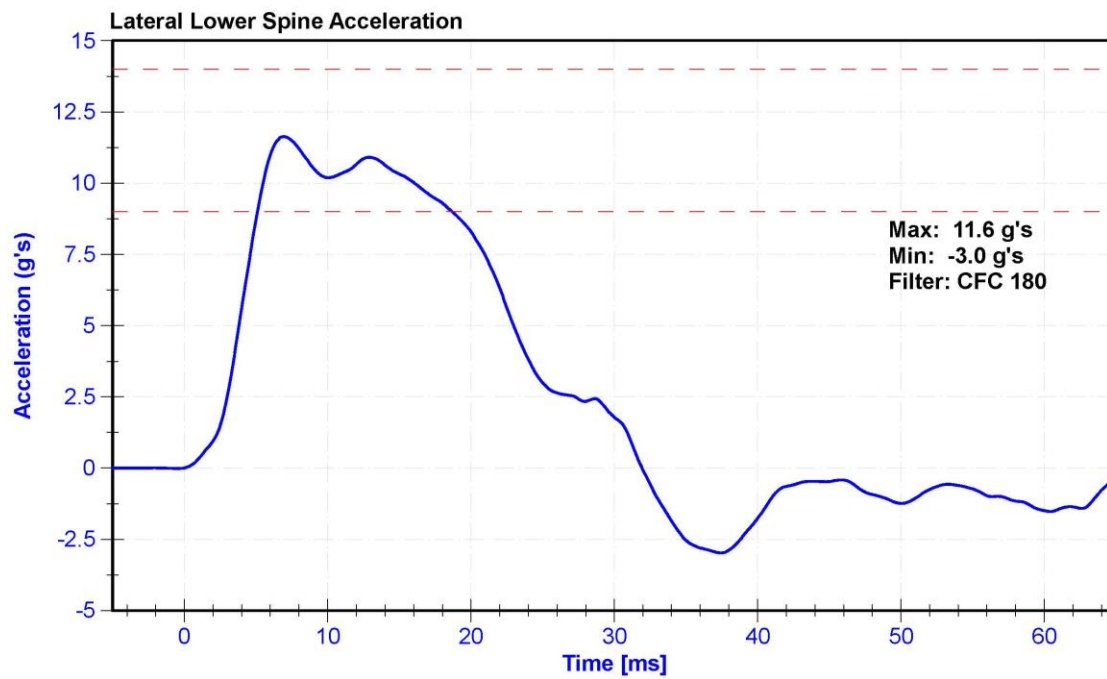
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.0	Pass
Humidity	10	70	%	36.3	Pass
Velocity	4.2	4.4	m/s	4.36	Pass
Probe Acceleration	12	16	g's	14.2	Pass
Lateral Lower Spine Acceleration	9	14	g's	11.6	Pass
Upper Abdomen Rib Deflection	36	47	mm	43.2	Pass
Lower Abdomen Rib Deflection	33	44	mm	40.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	MSI 64C-2000	A286228	1/29/2020	7/29/2020
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	4/20/2020	10/19/2020
Upper Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-308GFE	10/29/2019	4/28/2020
Lower Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-307GFE	10/29/2019	4/28/2020





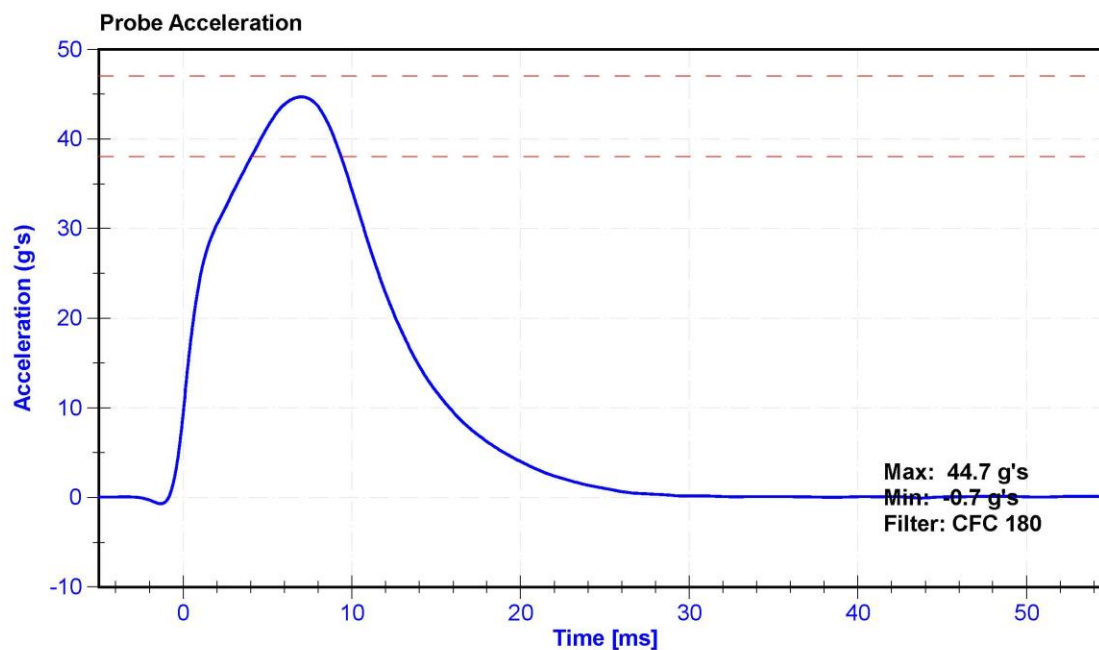
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

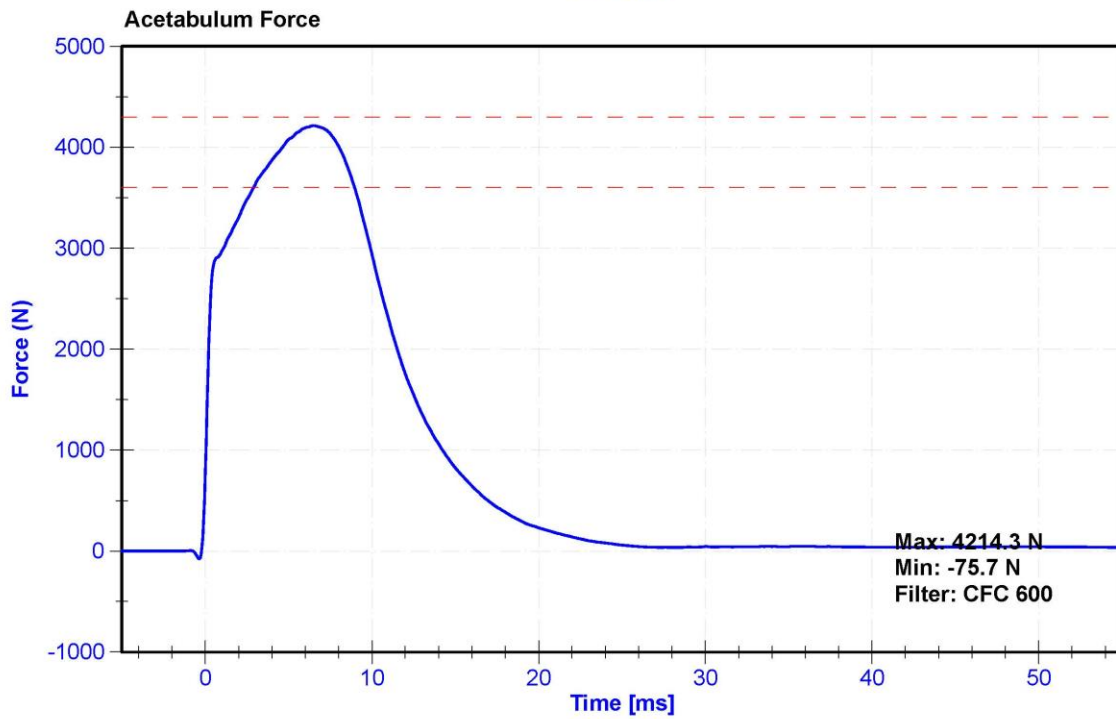
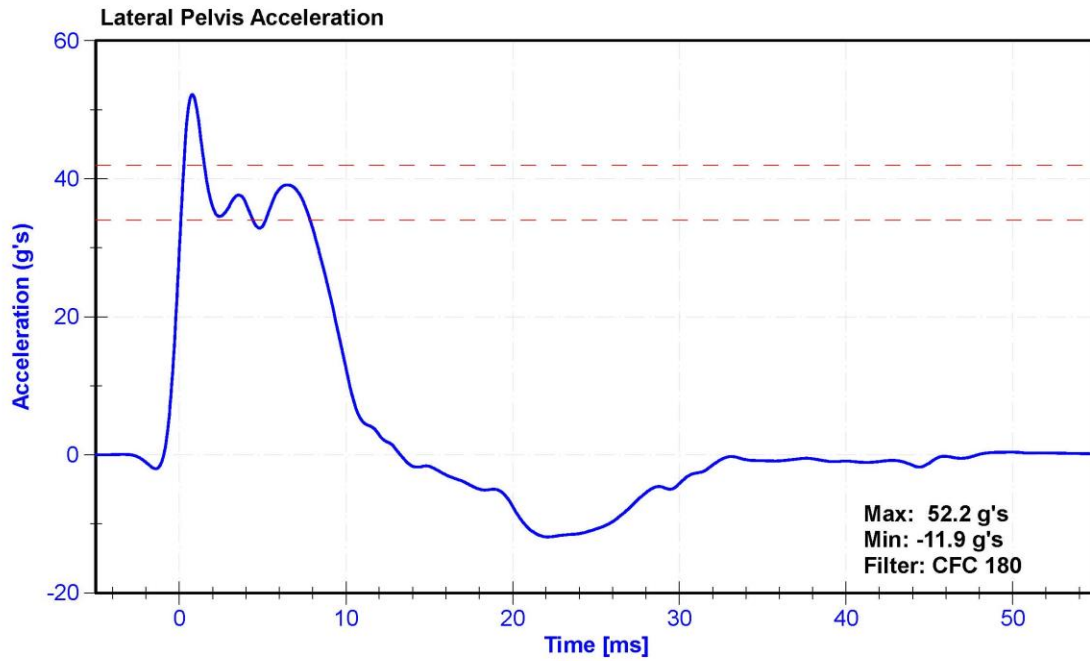
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.2	Pass
Humidity	10	70	%	29	Pass
Velocity	6.6	6.8	m/s	6.61	Pass
Probe Acceleration	38	47	g's	44.7	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	39.1	Pass
Acetabulum Force	3600	4300	N	4214.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A286228	1/29/2020	7/29/2020
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P51731	4/20/2020	10/19/2020
Acetabulum Load Cell	Denton 3249J	LC-276Fy	9/24/2019	9/23/2020
Certification Plug	SACO	11868	1/31/2018	N/A
Crash Test Plug	SACO	13444	9/20/2019	N/A







300
ceft
4/28/20

SID-IIs Pelvis Plug Certification Test

Plug S/N 11868

Test Number 6029

Report Number 6045

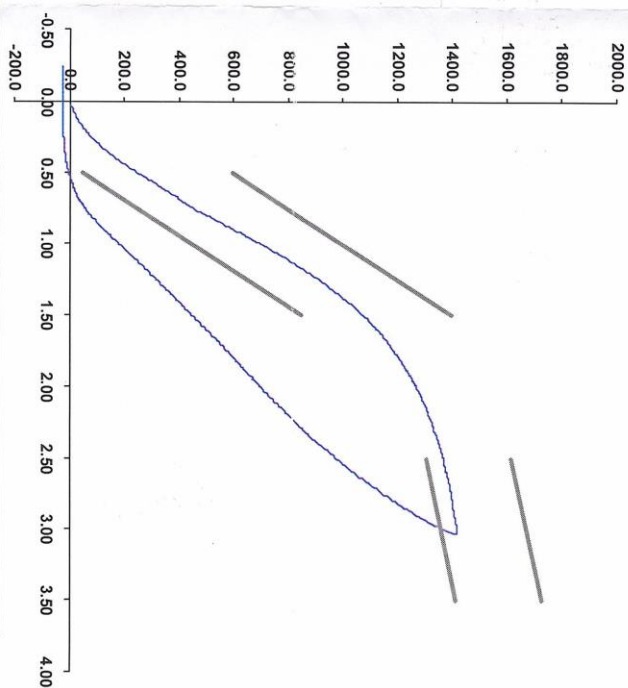
Test Date 1/31/2018 9:25:32 AM

Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	249.77	50.00
Force @ 1.5 mm (N)	1,073.39	850.00
Force @ 2.5 mm (N)	1,370.01	1,306.00
Force @ 3.0 mm (N)	1,420.65	1,361.00

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 DC

Part Number 180-4450

Template No 107 31-Jan-18
SACO Research

By: DC Date: 1/31/18

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



SID-11s Pelvis Plug Certification Test

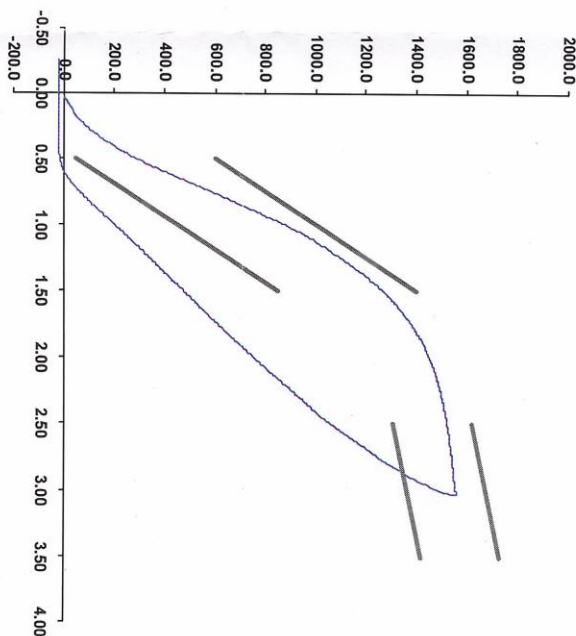
Plug S/N 13444
Test Number 11088
Report Number 11126
Test Date 9/20/2019 8:43:38 AM

Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	293.91	50.00
Force @ 1.5 mm (N)	1,273.98	850.00
Force @ 2.5 mm (N)	1,522.14	1,306.00
Force @ 3.0 mm (N)	1,558.54	1,361.00

Testing Machine STM-20 596542
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)

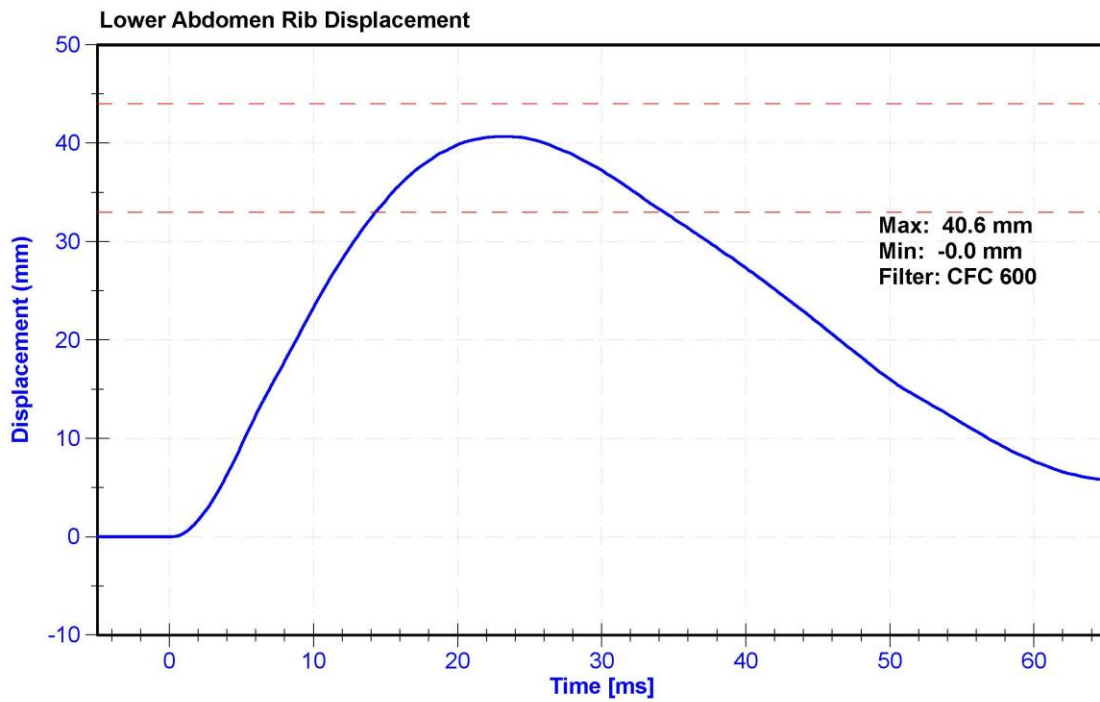
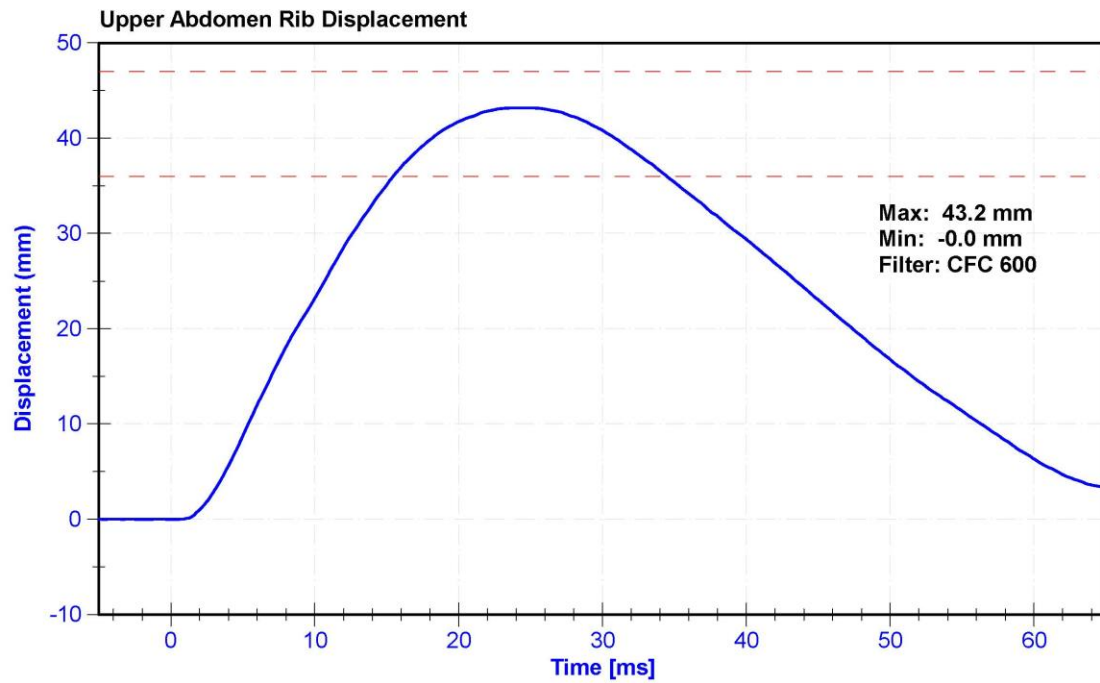


Operator

Part Number 180-4450

Template No 107 20-Sep-19
SACO Research

By: DA Date: 9/20/2019
SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 FAX



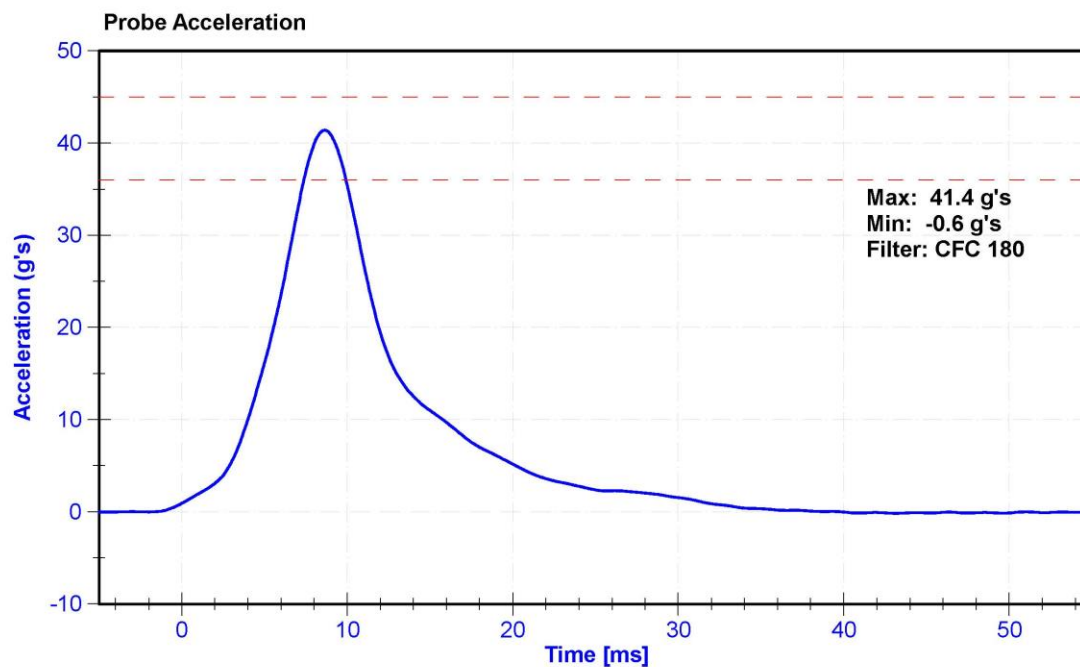
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	300	Laboratory Supervisor	D.Reinhard

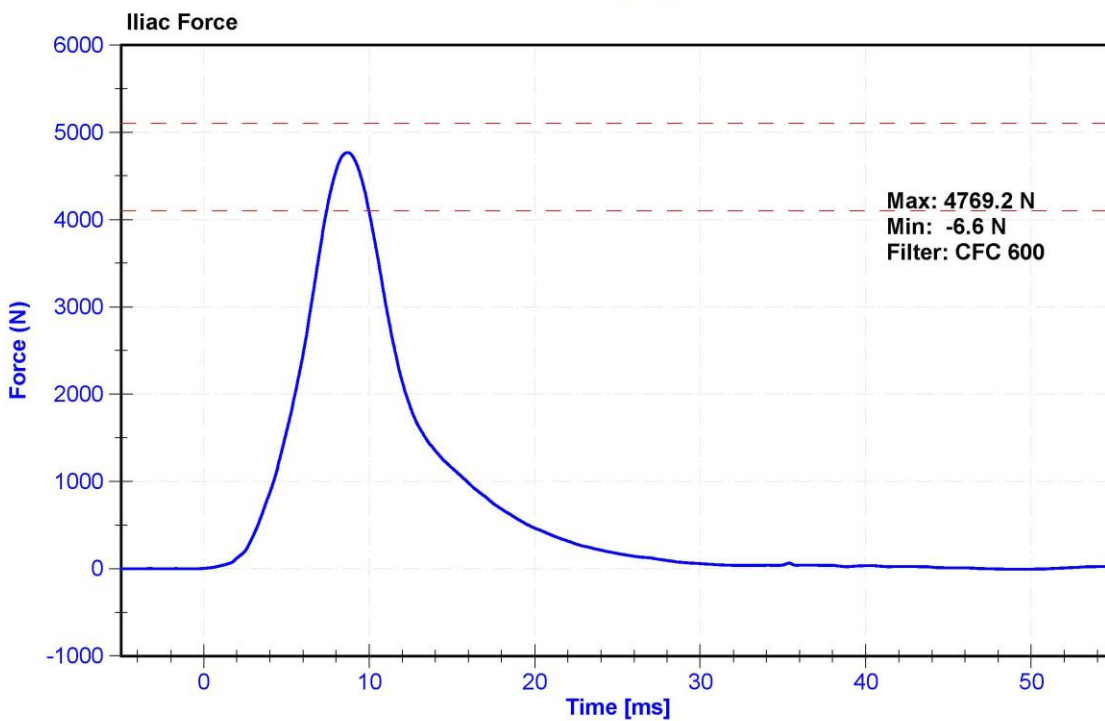
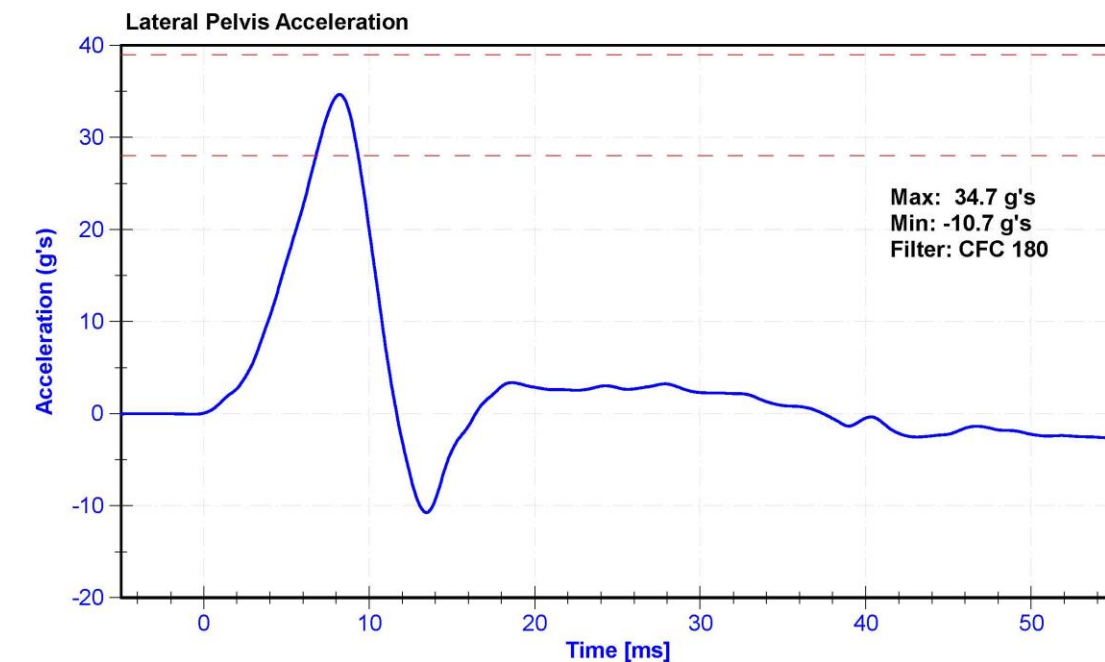
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.2	Pass
Humidity	10	70	%	29.0	Pass
Velocity	4.2	4.4	m/s	4.20	Pass
Probe Acceleration	36	45	g's	41.4	Pass
Lateral Pelvis Acceleration	28	39	g's	34.7	Pass
Iliac Force	4100	5100	N	4769.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A286228	1/29/2020	7/29/2020
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P51731	4/20/2020	10/19/2020
Iliac Load Cell	DENTON 3228J	LC-280Fy	6/20/2019	6/19/2020





CALIBRATION TEST RESULTS

POST-TEST

EUROSID 2 (ES-2RE) MALE – DRIVER ATD

SERIAL NO: F034

(CONFIGURED FOR LEFT SIDE IMPACT)

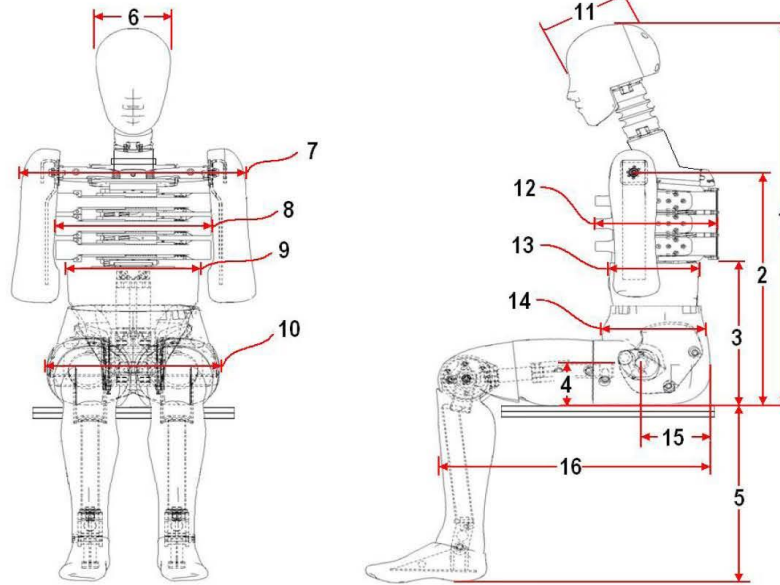


External Measurements - EuroSID-2re

Technician: K. Dutton

Date: 05/15/2020

Dummy Serial Number: F034



FRONT VIEW

SIDE VIEW

Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	910	Pass
2	Seat to Shoulder Joint	558	572	569	Pass
3	Seat to Lower Face of Thoracic Spine Box	346	356	352	Pass
4	Seat to Hip Joint (center of bolt)	97	103	101	Pass
5	Sole to Seat, Sitting	333	451	421	Pass
6	Head Width	152	158	154	Pass
7	Shoulder/Arm Width	461	479	470	Pass
8	Thorax Width	322	332	330	Pass
9	Abdomen Width	273	287	285	Pass
10	Pelvis Lap Width	359	373	365	Pass
11	Head Depth	196	206	204	Pass
12	Thorax Depth	262	272	269	Pass
13	Abdomen Depth	194	204	202	Pass
14	Pelvis Depth	235	245	241	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150	160	155	Pass
16	Back of Buttocks to Front Knee	597	615	609	Pass

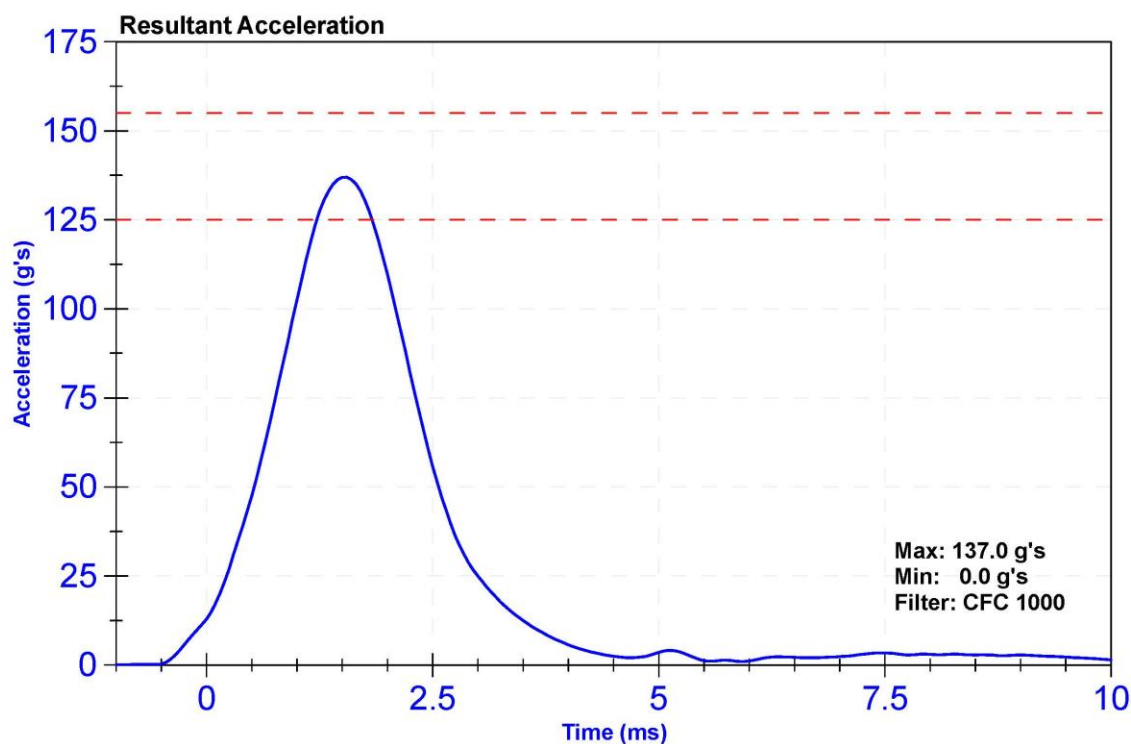
ATD Manufacturer	FTSS	Test Technician	C. Mantell
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

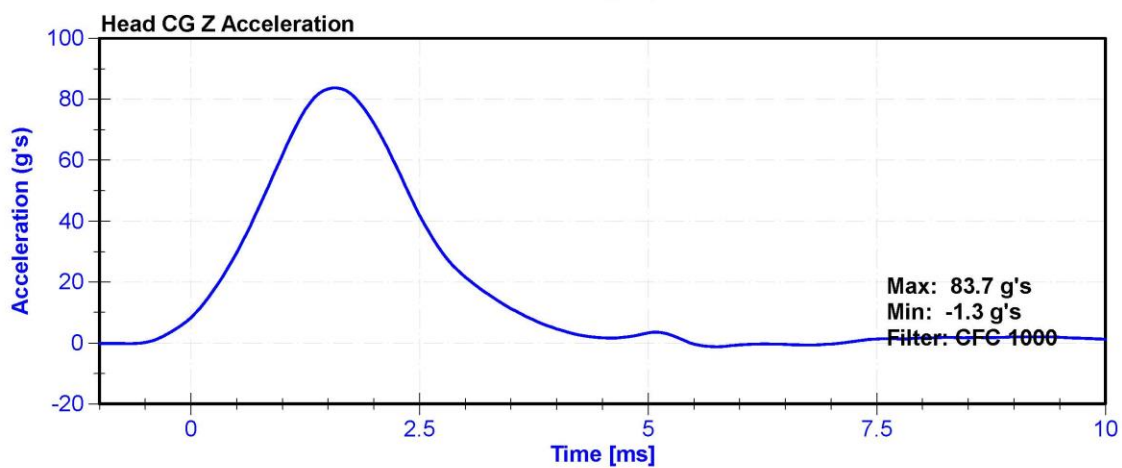
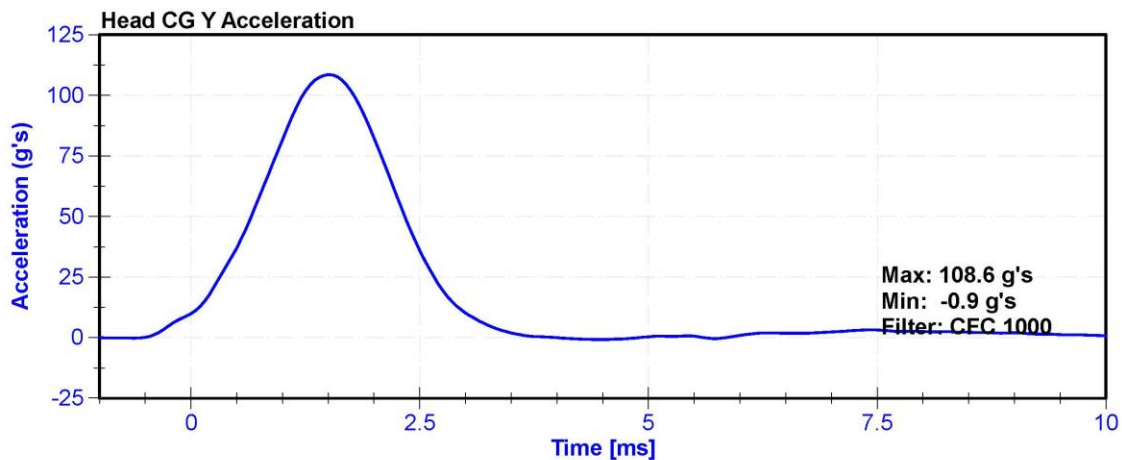
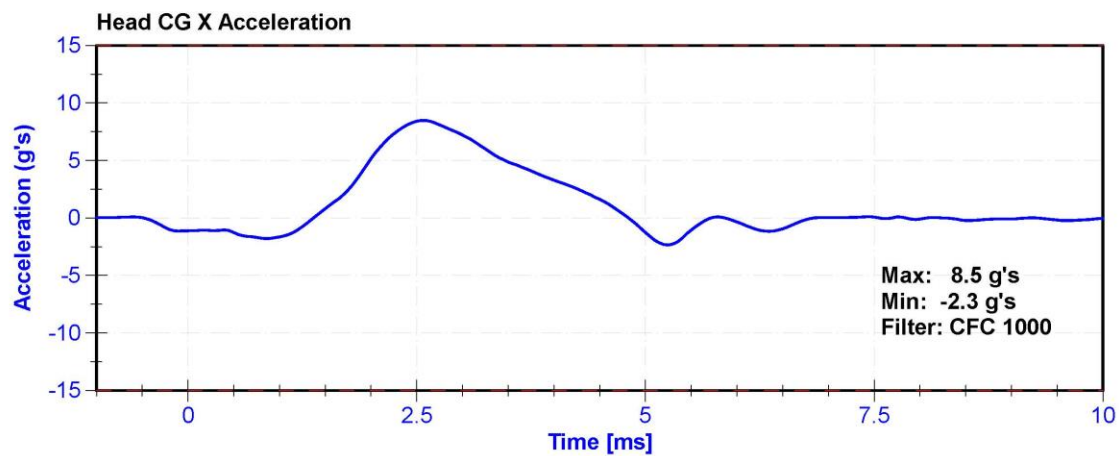
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	42.0	Pass
Resultant Acceleration	125	155	g's	137.0	Pass
Oscillation	0	15	%	2.99	Pass
Fore-Aft Acceleration	-15	15	g's	8.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264	AC-P49204	4/15/2020	10/14/2020
Y Accelerometer	ENDEVCO 7264	AC-P83437	4/15/2020	10/14/2020
Z Accelerometer	ENDEVCO 7264	AC-P64007	4/15/2020	10/14/2020





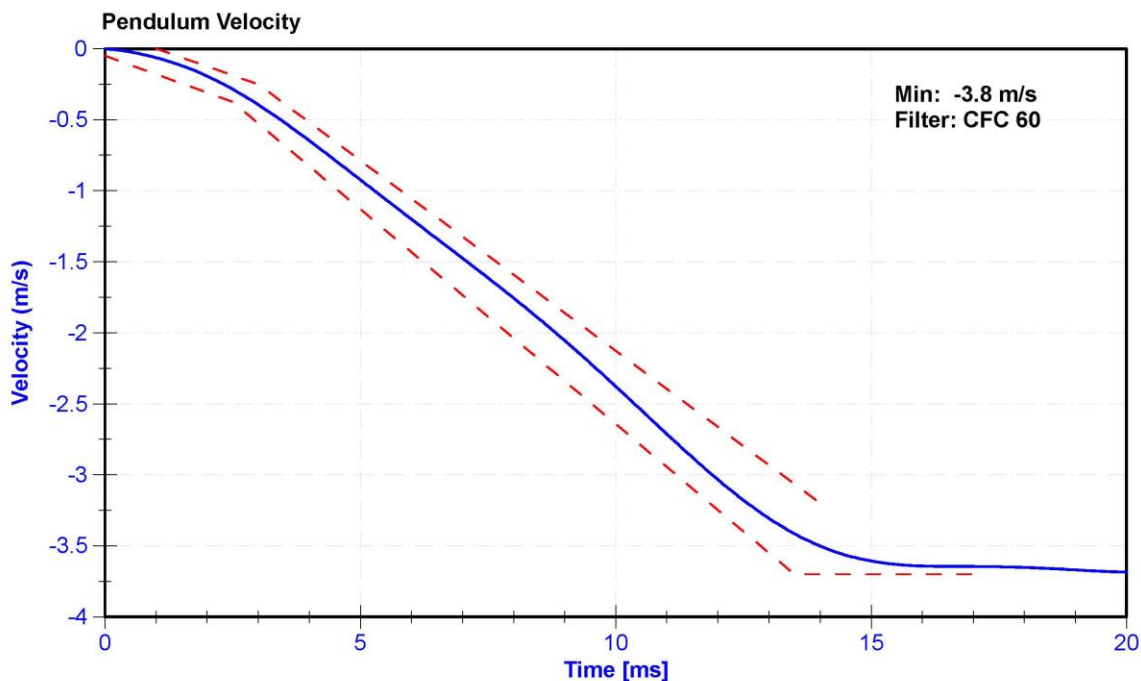
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

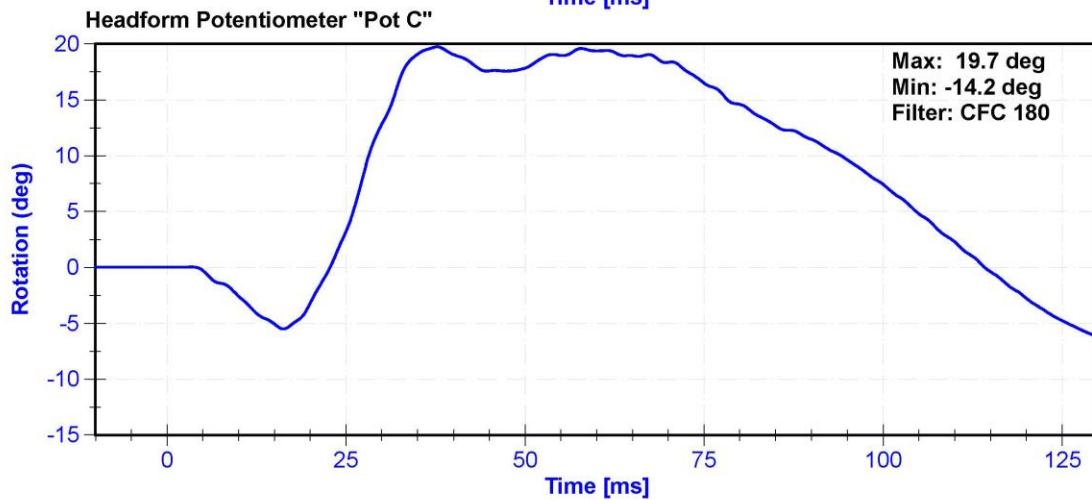
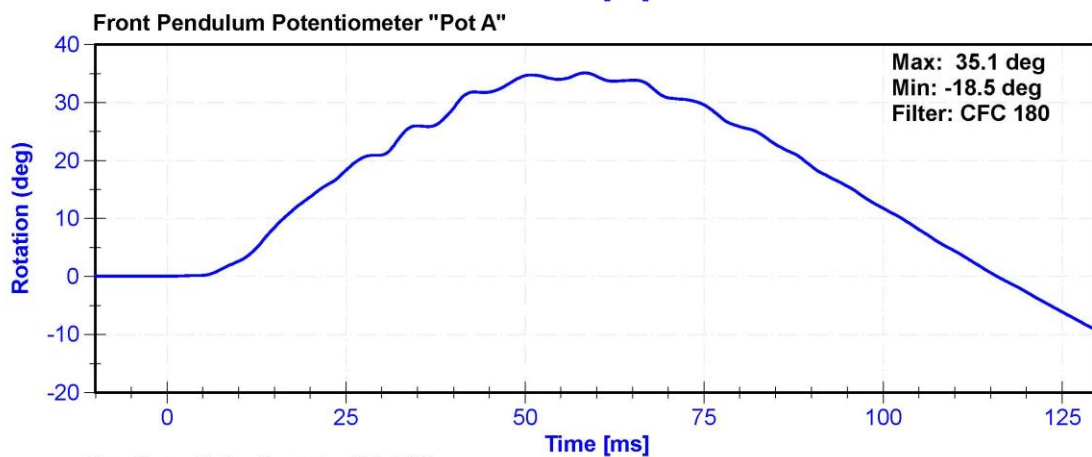
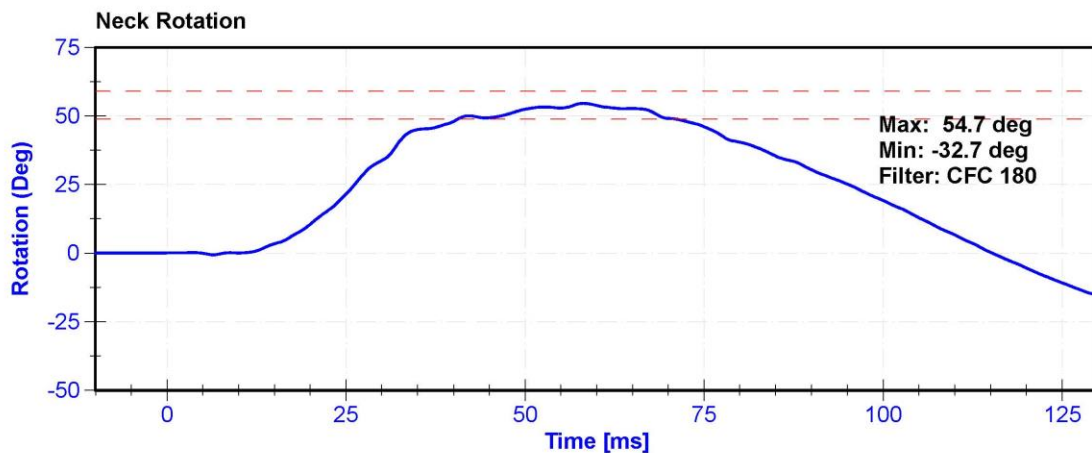
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	53.1	Pass
Velocity	3.3	3.5	m/s	3.40	Pass
Lateral Neck Rotation	49	59	deg	54.7	Pass
Time at Maximum Rotation	54	66	ms	58.1	Pass
Time of Rotation Decay from Maximum	53	88	ms	57.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5M9	1/30/2020	1/29/2021
Front Pendulum Potentiometer	SP22G	DS-094	10/31/2019	10/30/2020
Headform Potentiometer	SP22G	DS-095	10/31/2019	10/30/2020





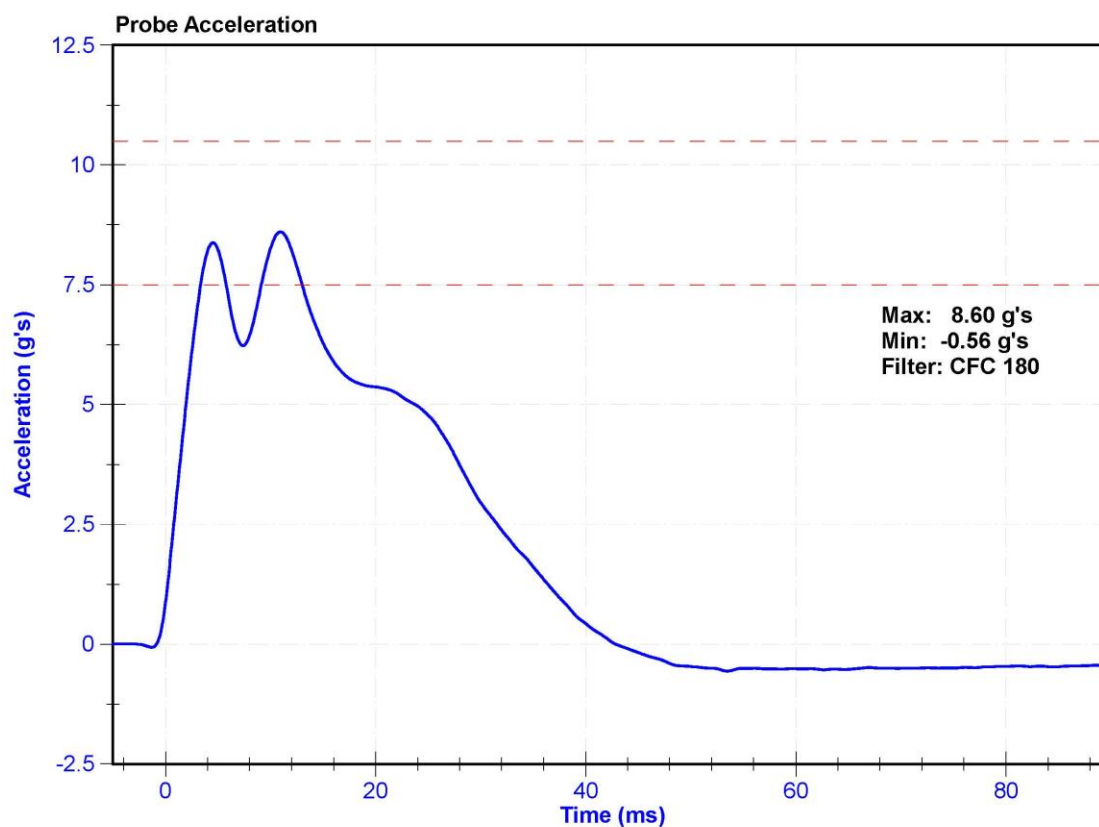
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.2	Pass
Humidity	10	70	%	51.0	Pass
Velocity	4.2	4.4	m/s	4.40	Pass
Probe Acceleration	7.5	10.5	g's	8.60	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	MSI 64C-2000	A279031	5/8/2020	5/8/2021



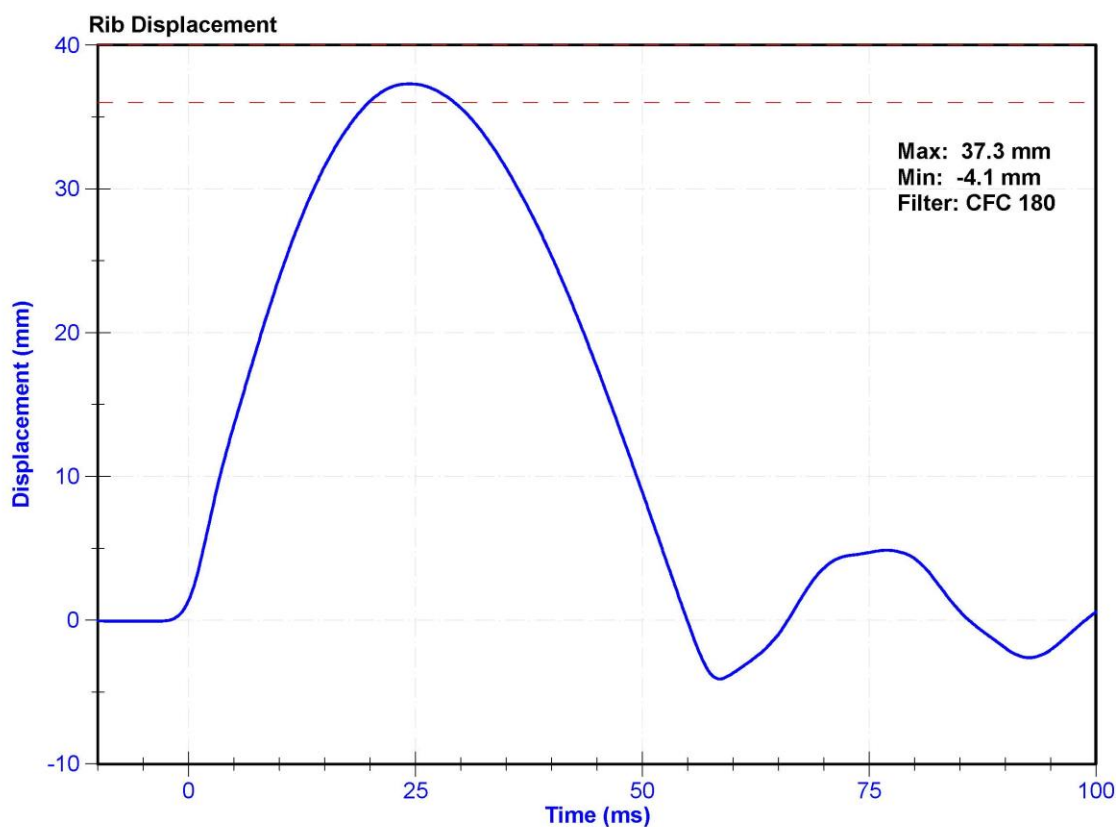
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.2	Pass
Humidity	10	70	%	52.1	Pass
Rib Displacement	36	40	mm	37.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	4/14/2020	10/13/2020



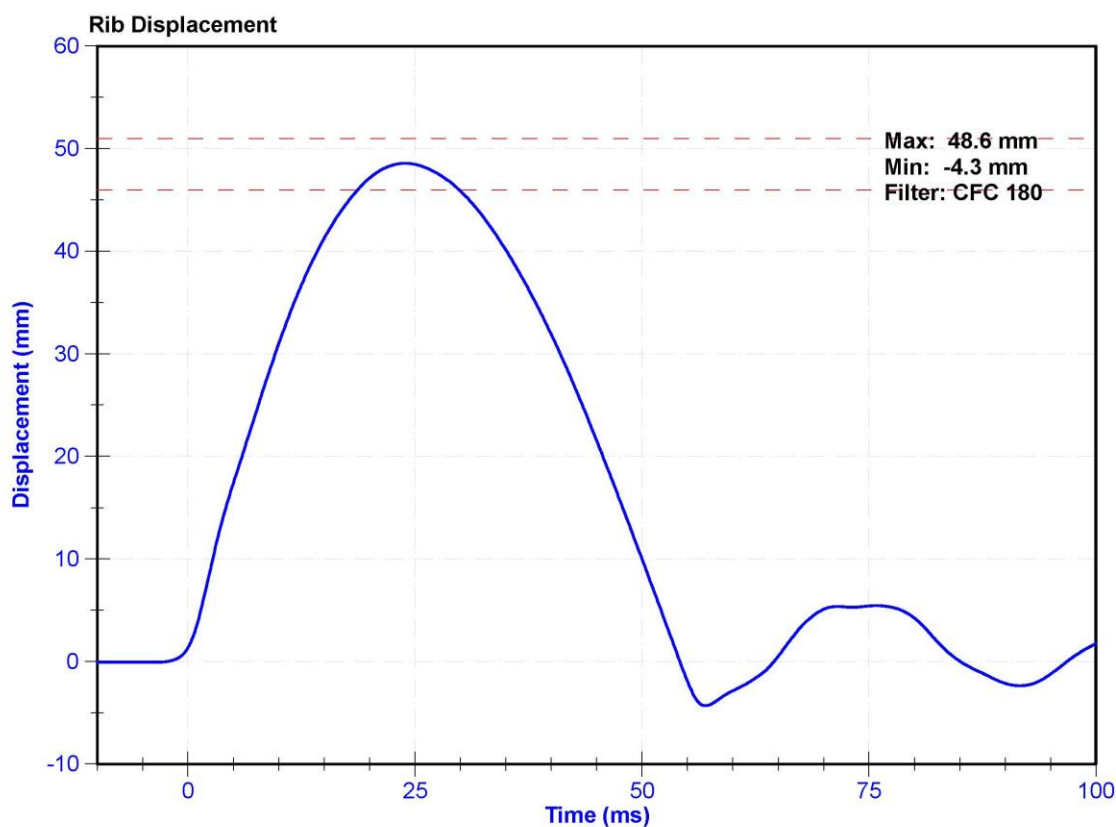
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.2	Pass
Humidity	10	70	%	52.1	Pass
Rib Displacement	46	51	mm	48.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	4/14/2020	10/13/2020



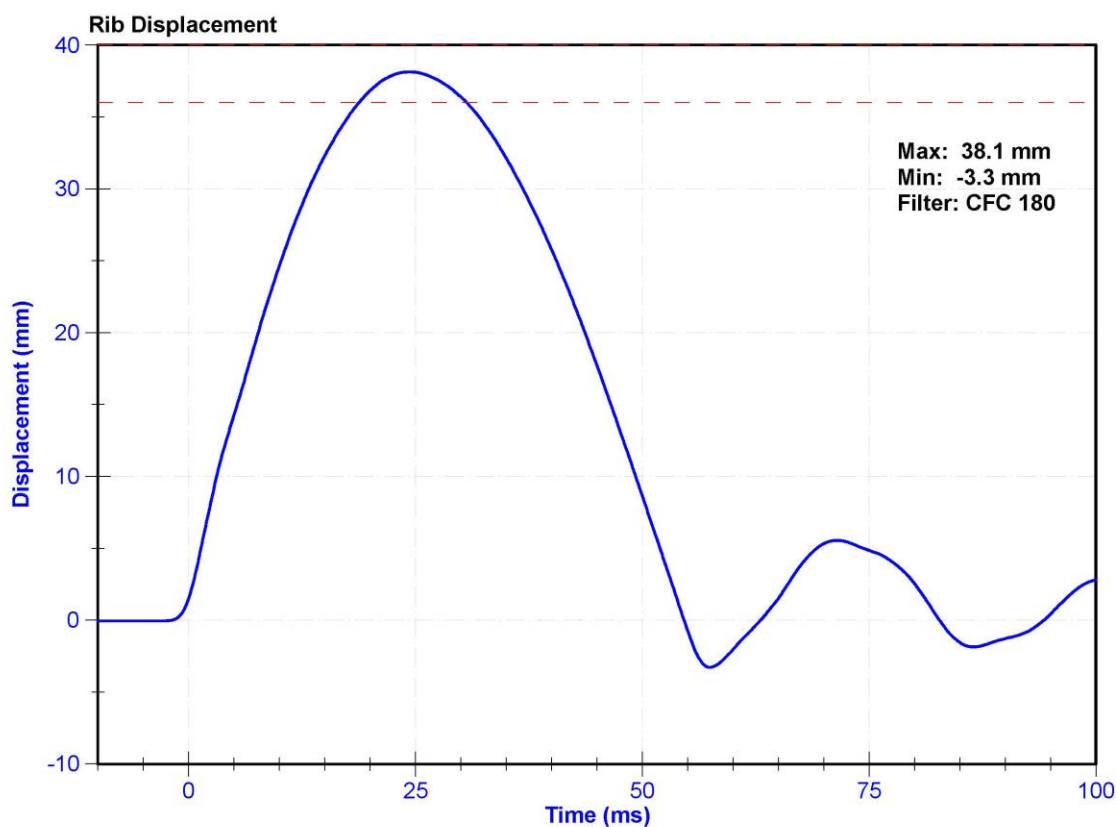
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	51.3	Pass
Rib Displacement	36	40	mm	38.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	4/14/2020	10/13/2020



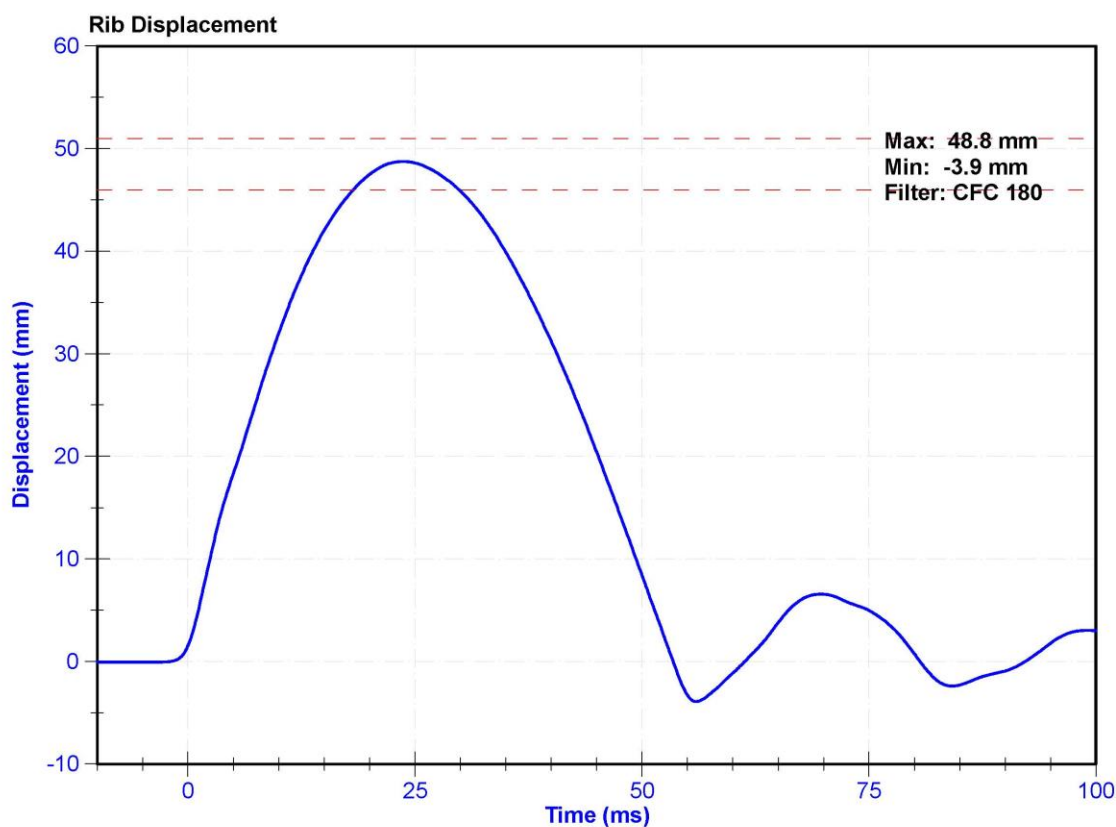
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	51.3	Pass
Rib Displacement	46	51	mm	48.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	4/14/2020	10/13/2020





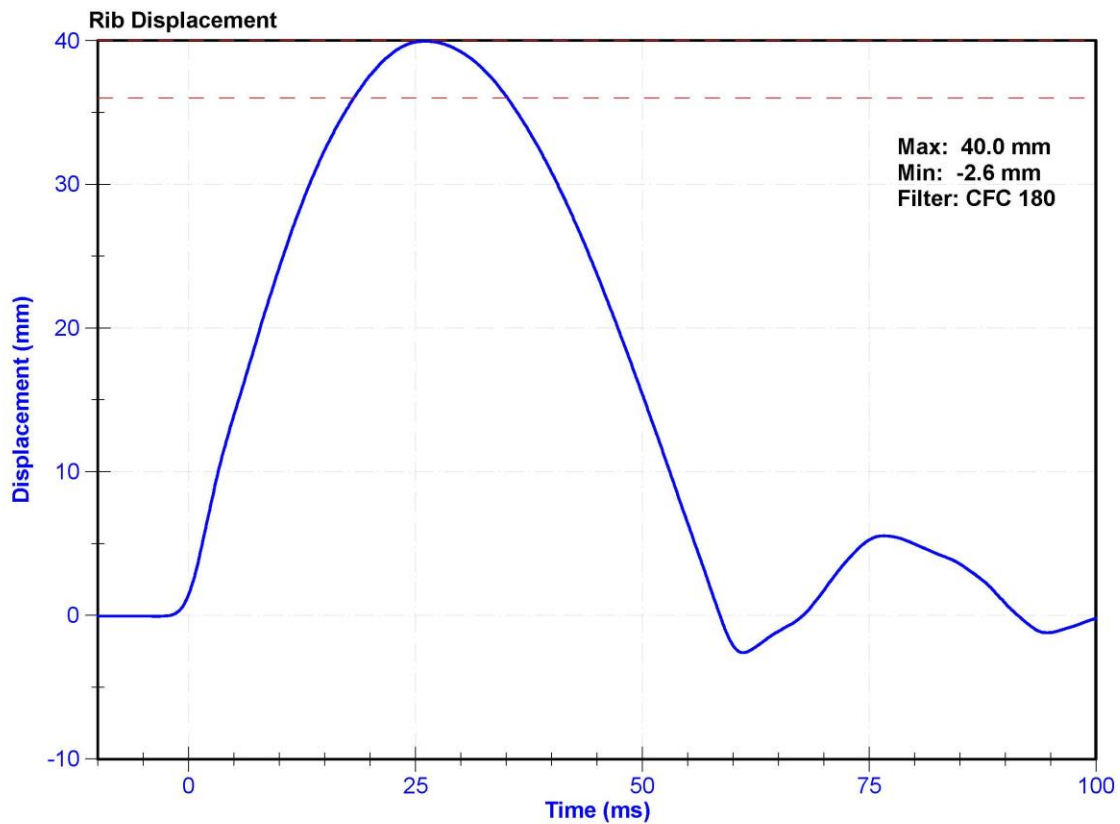
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	51.1	Pass
Rib Displacement	36	40	mm	40.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	4/14/2020	10/13/2020



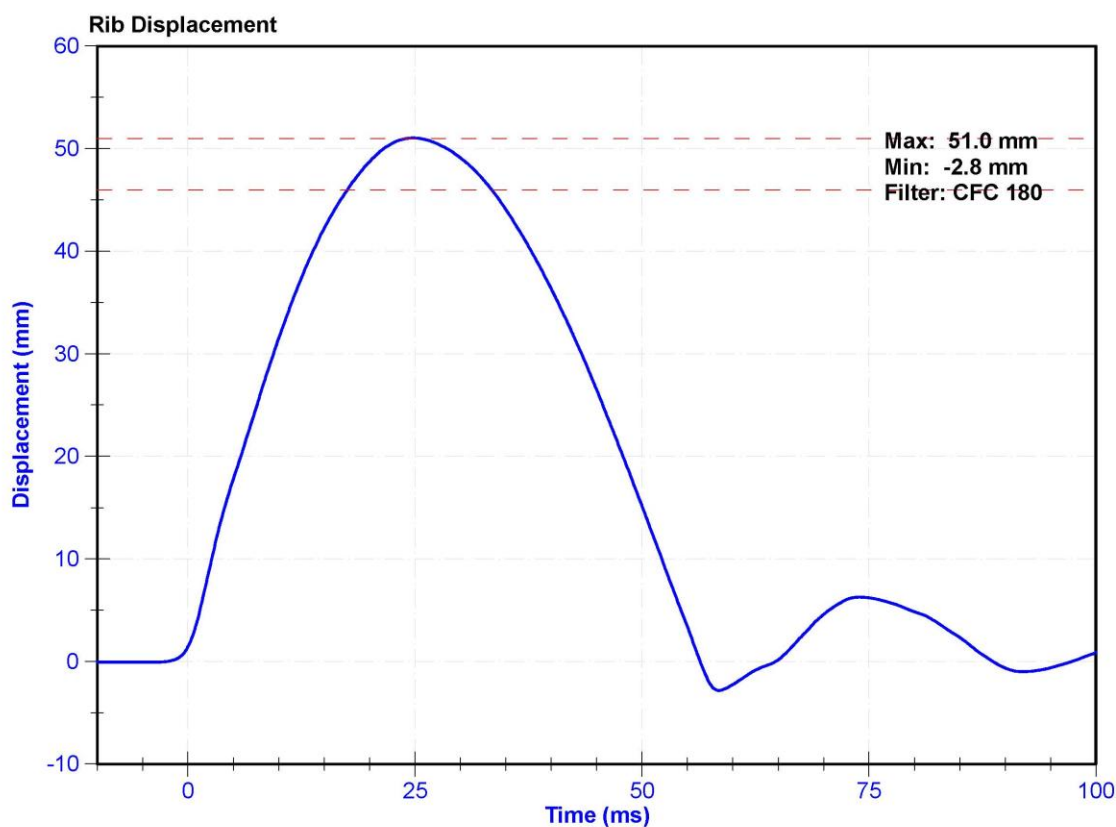
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	51.1	Pass
Rib Displacement	46	51	mm	51.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	4/14/2020	10/13/2020



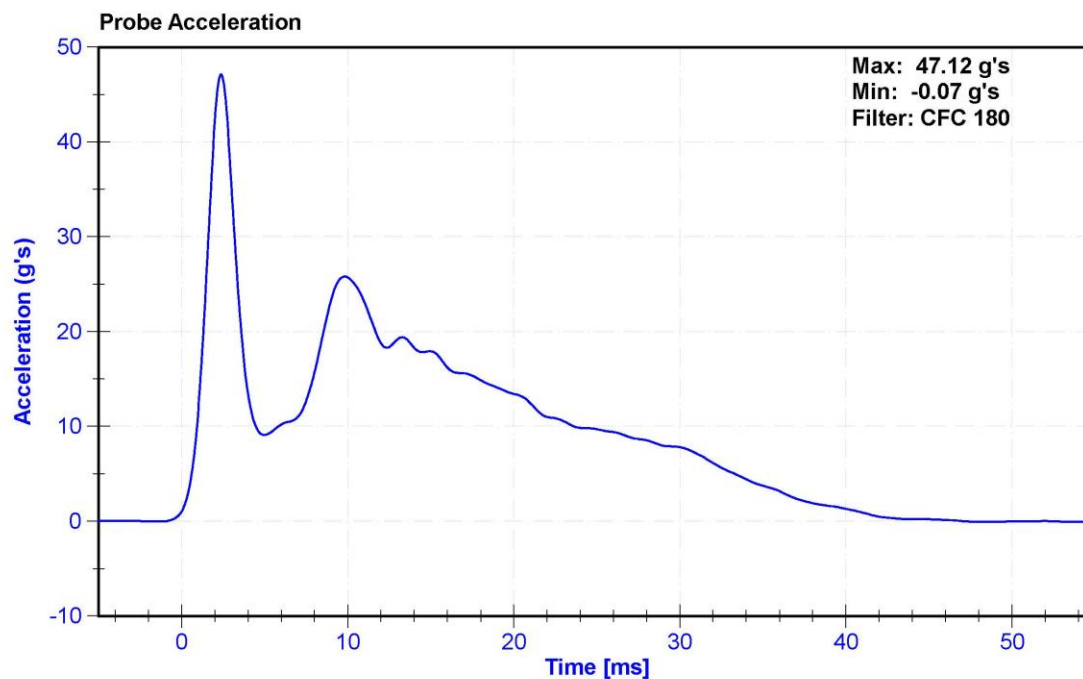
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

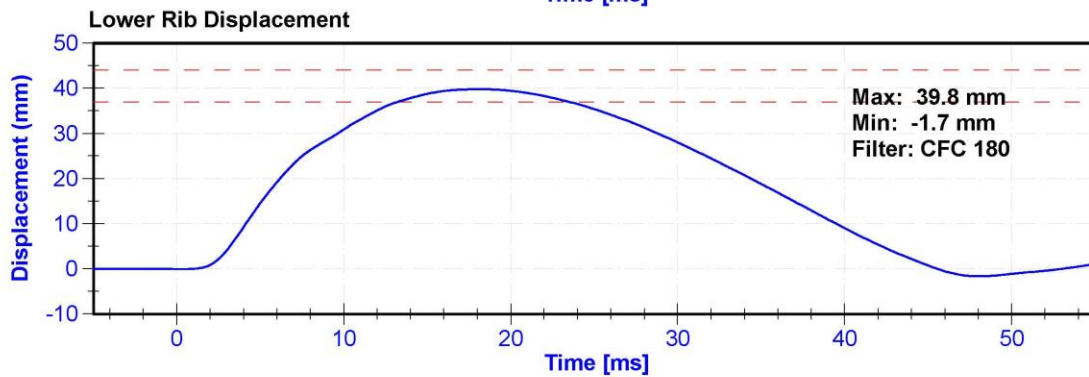
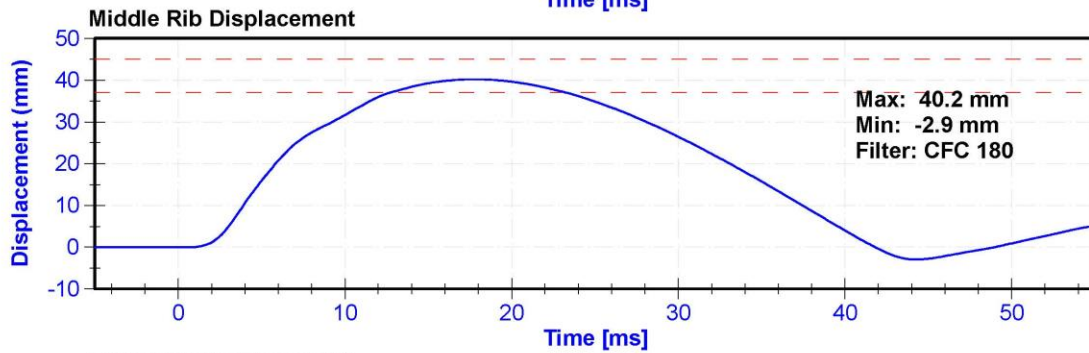
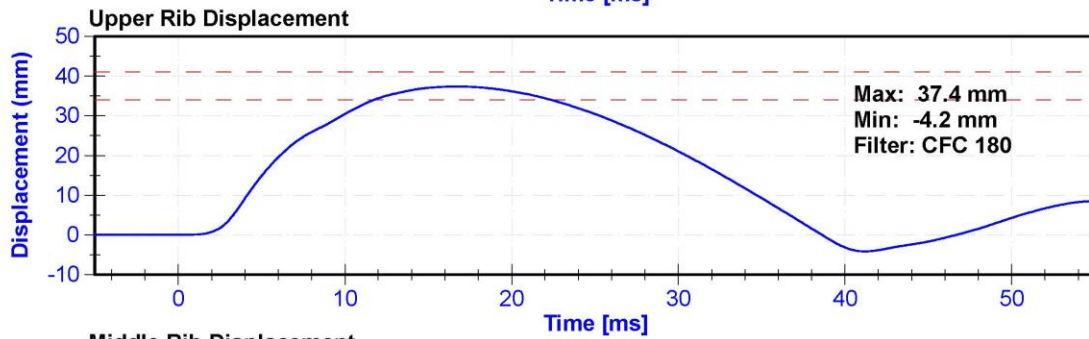
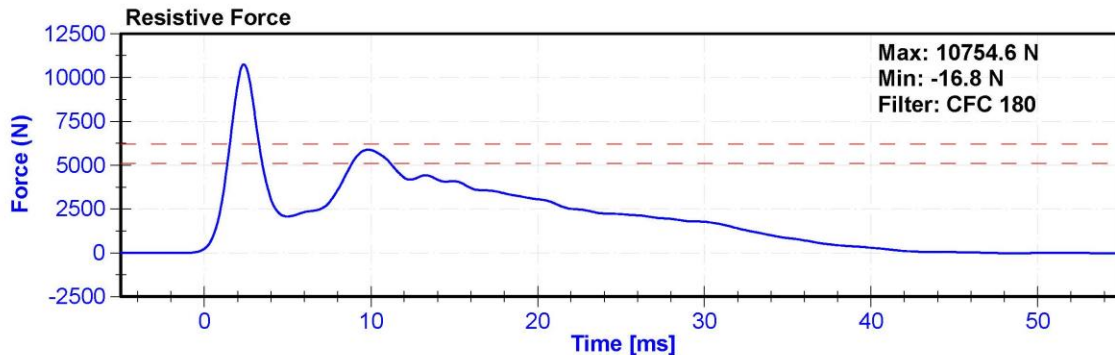
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	51.0	Pass
Velocity	5.4	5.6	m/s	5.42	Pass
Resistive Force after 6ms	5100	6200	N	5887.7	Pass
Upper Thorax Rib Deflection	34	41	mm	37.4	Pass
Mid Thorax Rib Deflection	37	45	mm	40.2	Pass
Lower Thorax Rib Deflection	37	44	mm	39.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	MSI 64C-2000	A279031	5/8/2020	5/8/2021
Upper Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	4/14/2020	10/13/2020
Middle Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	4/14/2020	10/13/2020
Lower Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	4/14/2020	10/13/2020





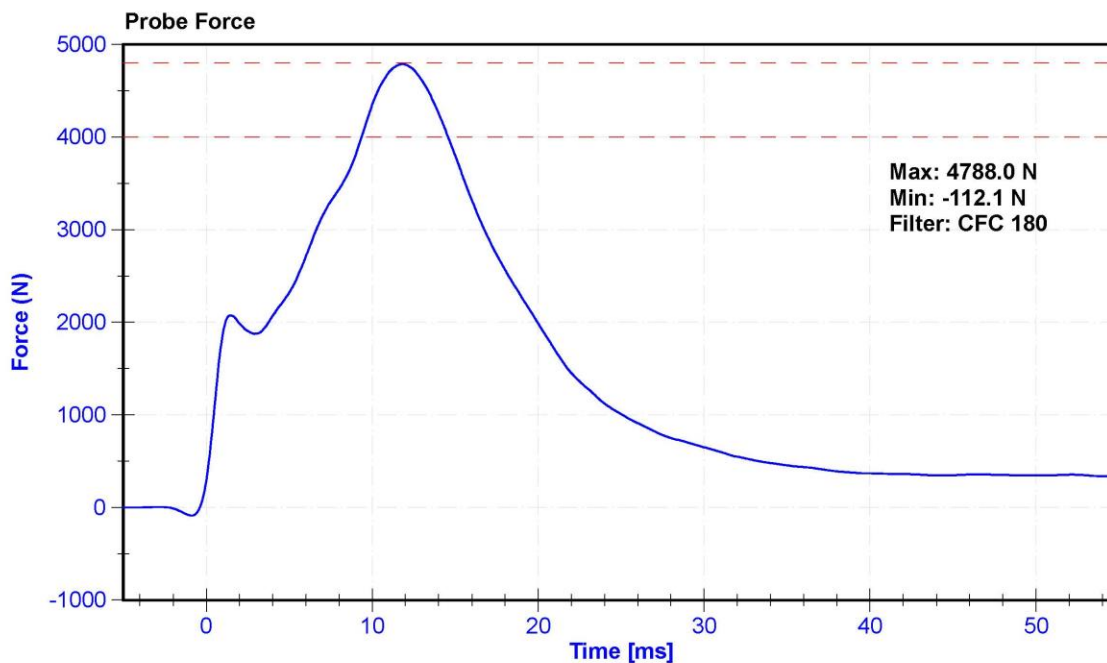
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

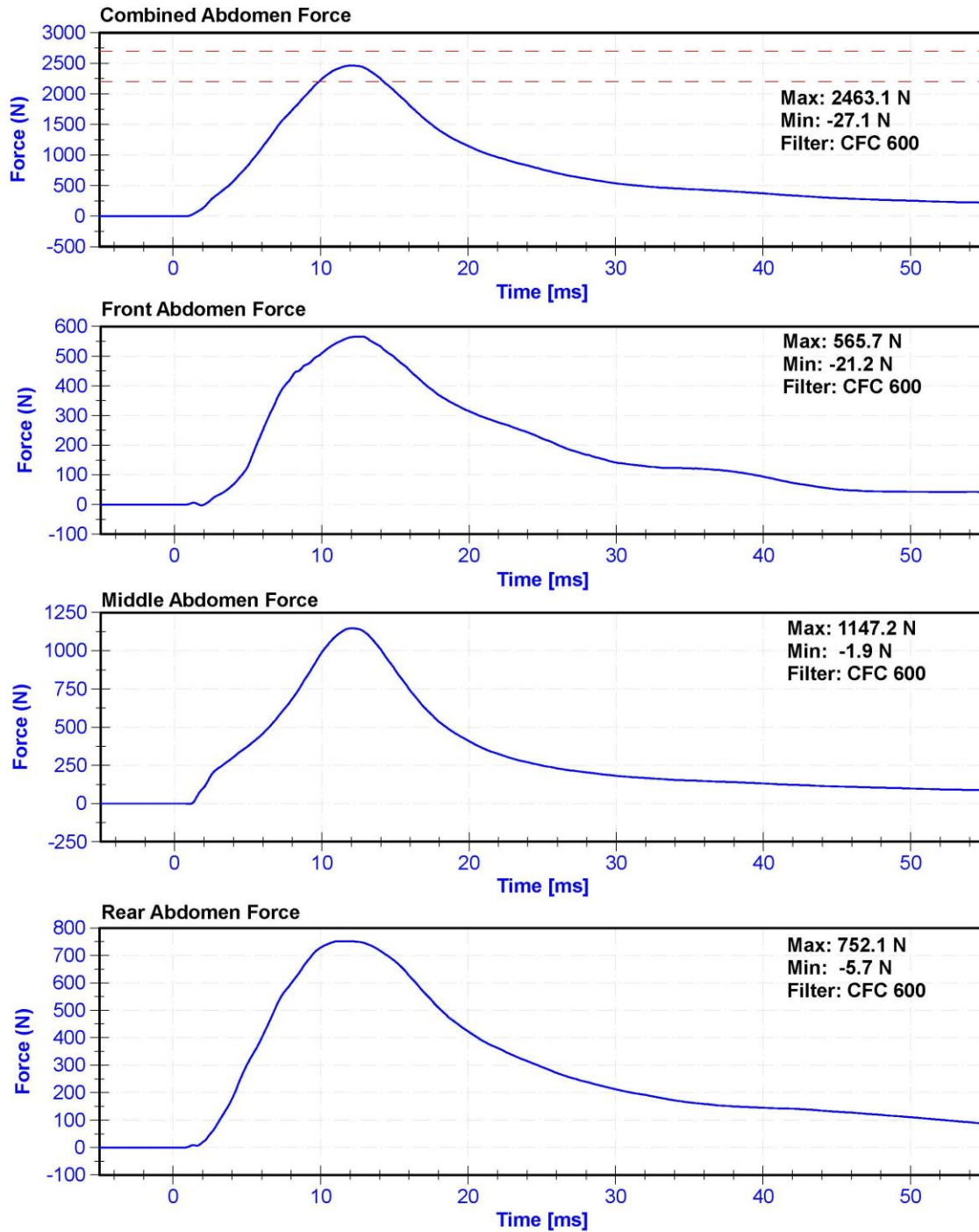
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	29	Pass
Velocity	3.9	4.1	m/s	4.07	Pass
Combined Abdomen Force	2200	2700	N	2463.1	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	12.10	Pass
Resistive Probe Force	4000	4800	N	4788.0	Pass
Time at Peak Resistive Force	10.6	13.0	ms	11.80	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A279031	5/8/2020	5/8/2021
Front Abdomen Load Cell	DENTON 2631	LC-1440	6/14/2019	6/13/2020
Middle Abdomen Load Cell	DENTON 2631	LC-1525	6/5/2019	6/4/2020
Rear Abdomen Load Cell	DENTON 2631	LC-1528	6/14/2019	6/13/2020







ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

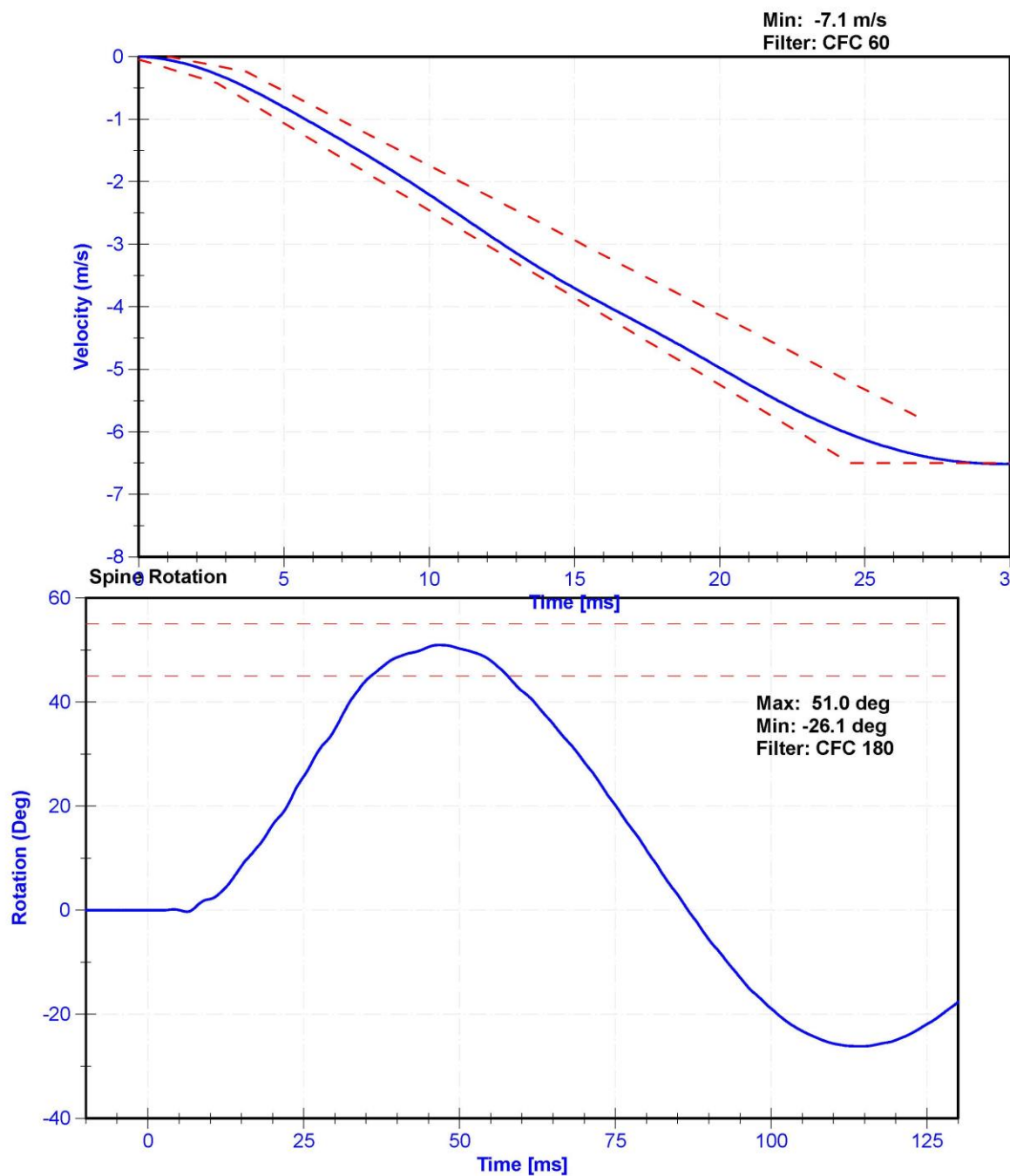
Results

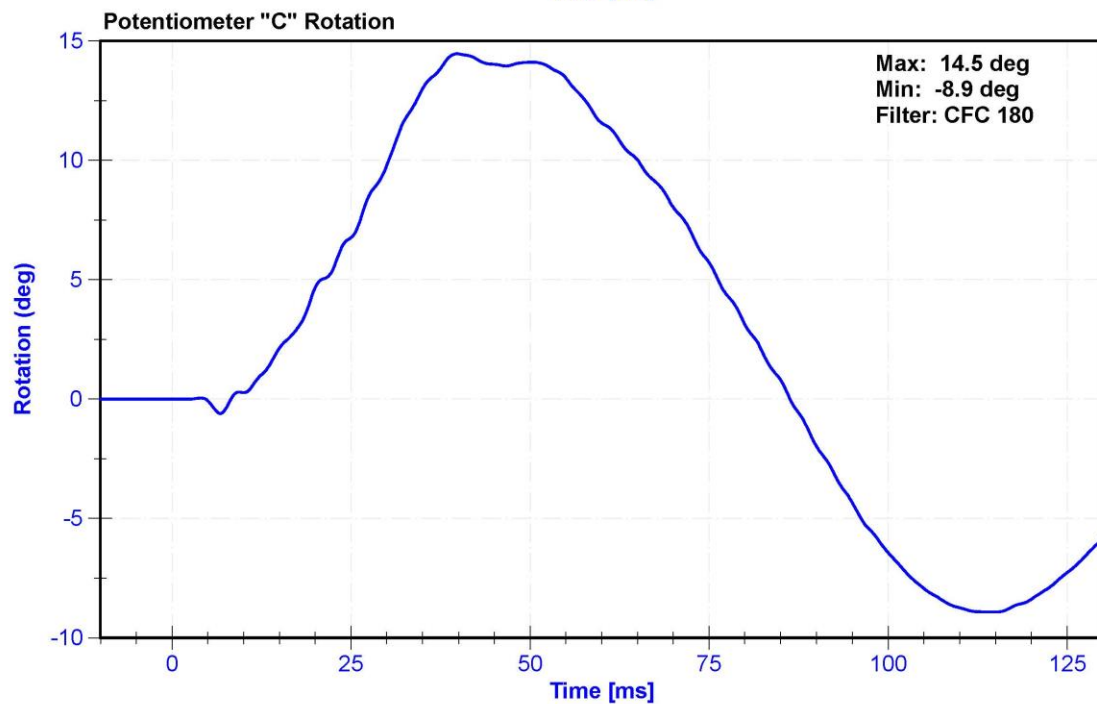
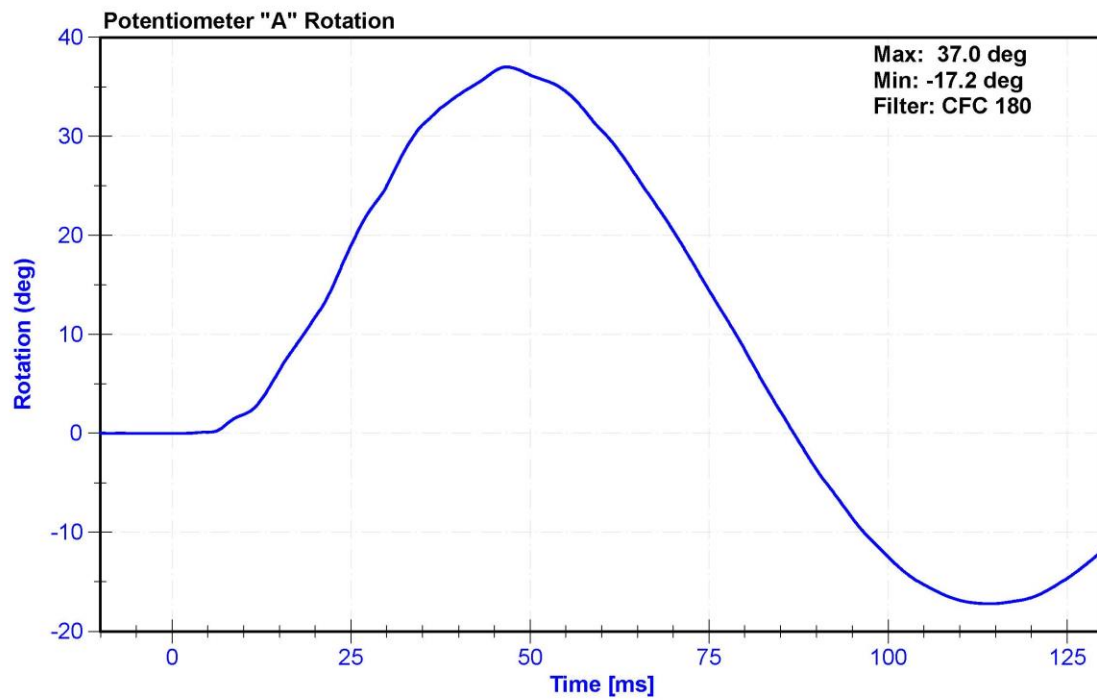
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	52.3	Pass
Velocity	5.95	6.15	m/s	6.005	Pass
Lateral Spine Rotation	45	55	deg	51.0	Pass
Time at Maximum Rotation	39	53	ms	46.7	Pass
Time of Decay to Zero Degrees	37	57	ms	40.0	Pass
Pulse within Corridor?	-	-	-		

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5M9 Pend	1/30/2020	1/29/2021
Pendulum "A" Potentiometer	SP22G	DS-094	10/31/2019	10/30/2020
Condyle "B" Potentiometer	SP22G	DS-095	10/31/2019	10/30/2020

Pendulum Velocity





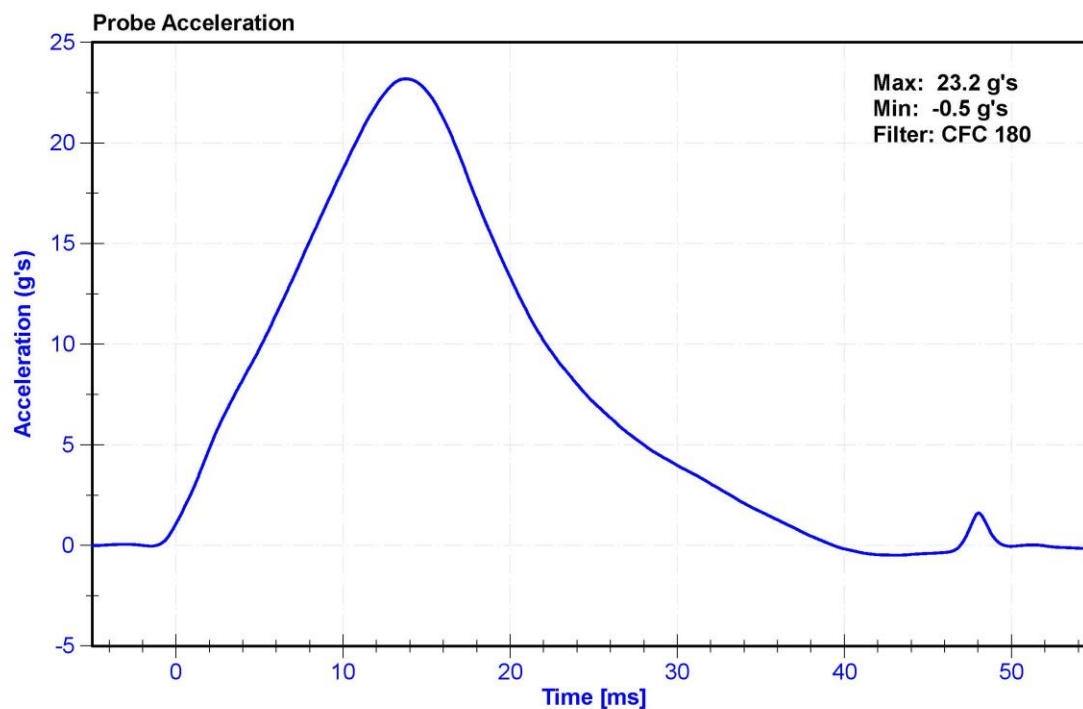
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

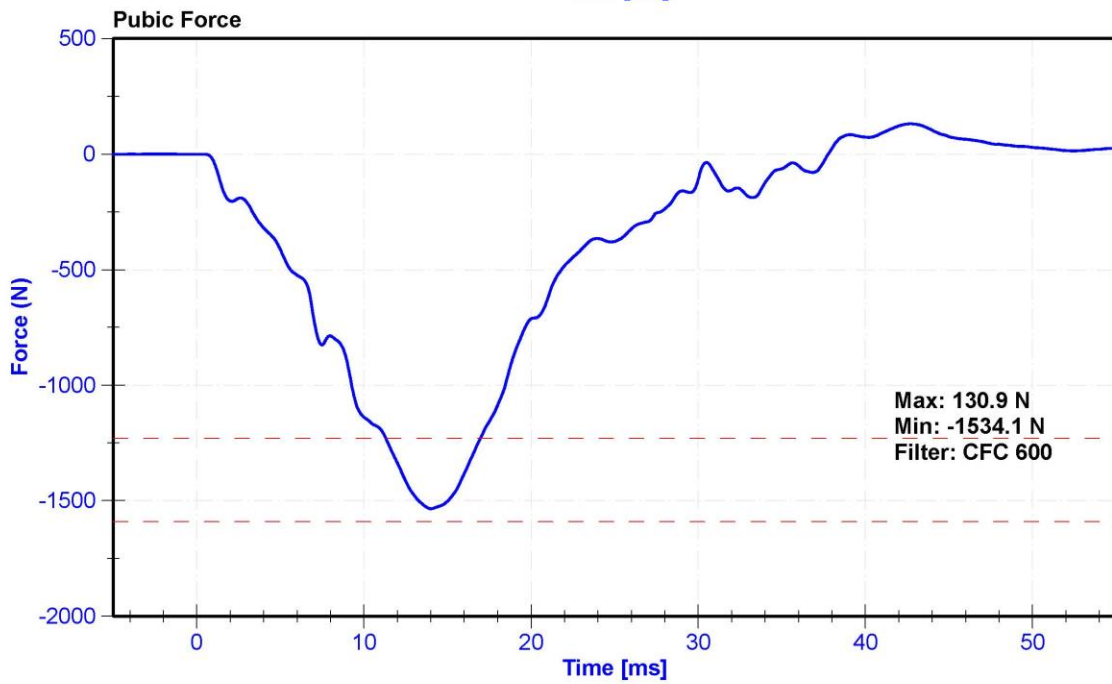
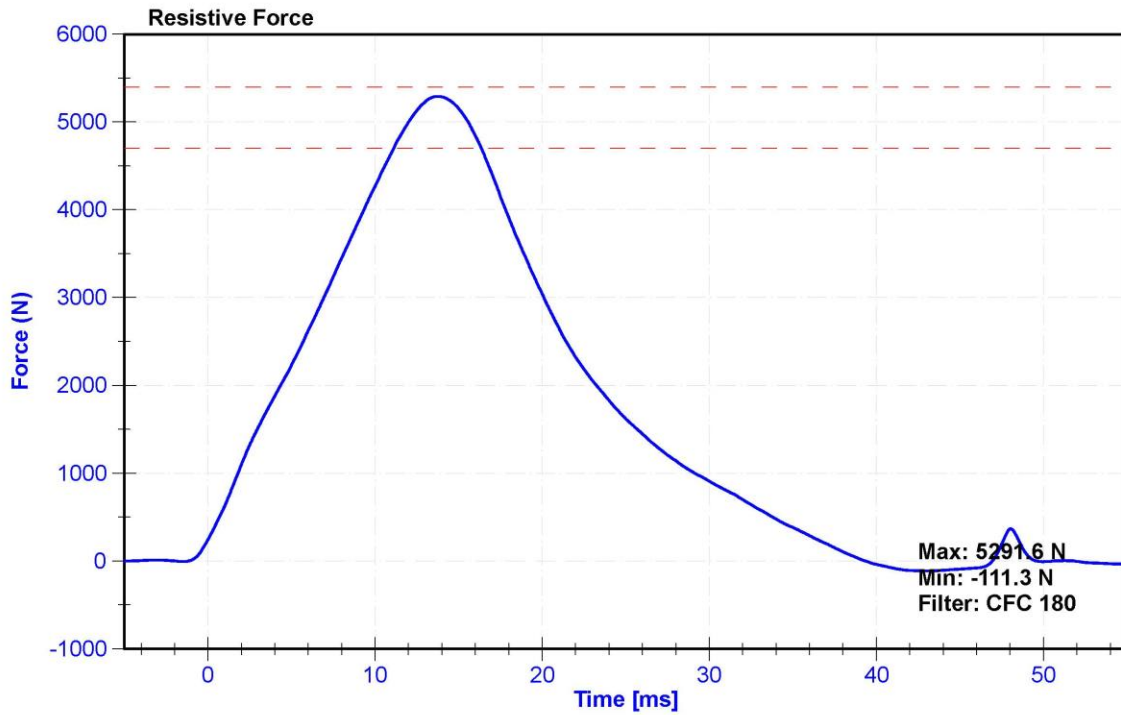
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	51.3	Pass
Velocity	4.2	4.4	m/s	4.39	Pass
Resistive Force	4700	5400	N	5291.6	Pass
Time at Peak Resistive Force	11.8	16.1	ms	13.75	Pass
Pubic Force	-1590	-1230	N	-1534.1	Pass
Time at Peak Pubic Force	12.2	17.0	ms	14.00	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A279031	5/8/2020	5/8/2021
Pubic Load Cell	Denton 3096JFL	LC-464fy	6/14/2019	6/13/2020





CALIBRATION TEST RESULTS

POST-TEST

SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD

SERIAL No: 300

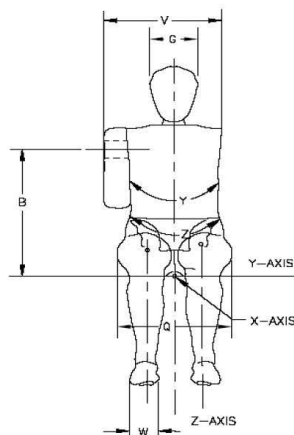
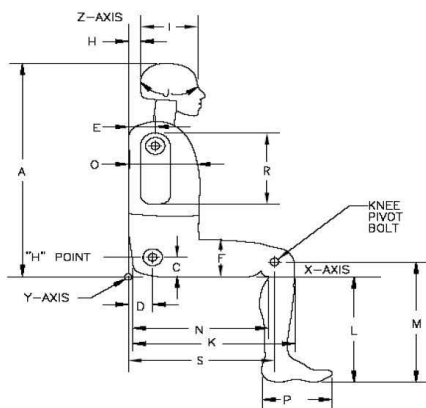


External Measurements - SID-IIs

Technician: **K. Dutton**

Date: **05/15/2020**

Dummy Serial Number: **300**



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	780	Pass
B	Shoulder Pivot Height	437	453	450	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	104	Pass
F	Thigh Clearance	119	135	125	Pass
G	Head Breadth	140	148	145	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	186	Pass
J	Head Circumference	541	551	545	Pass
K	Buttock to Knee Length	514	540	532	Pass
L	Popliteal Height	343	369	359	Pass
M	Knee Pivot to floor height	392	409	402	Pass
N	Buttock Popliteal Length	416	442	432	Pass
O	Chest Depth w/o jacket	195	211	206	Pass
P	Foot Length	216	232	221	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	319	Pass
R	Arm Length	249	259	253	Pass
S	Knee Joint to seatback	477	493	485	Pass
V	Shoulder Width	341	357	352	Pass
W	Foot Width	78	94	84	Pass
Y	Chest Circumference w/jacket	851	881	870	Pass
Z	Waist Circumference	761	791	772	Pass

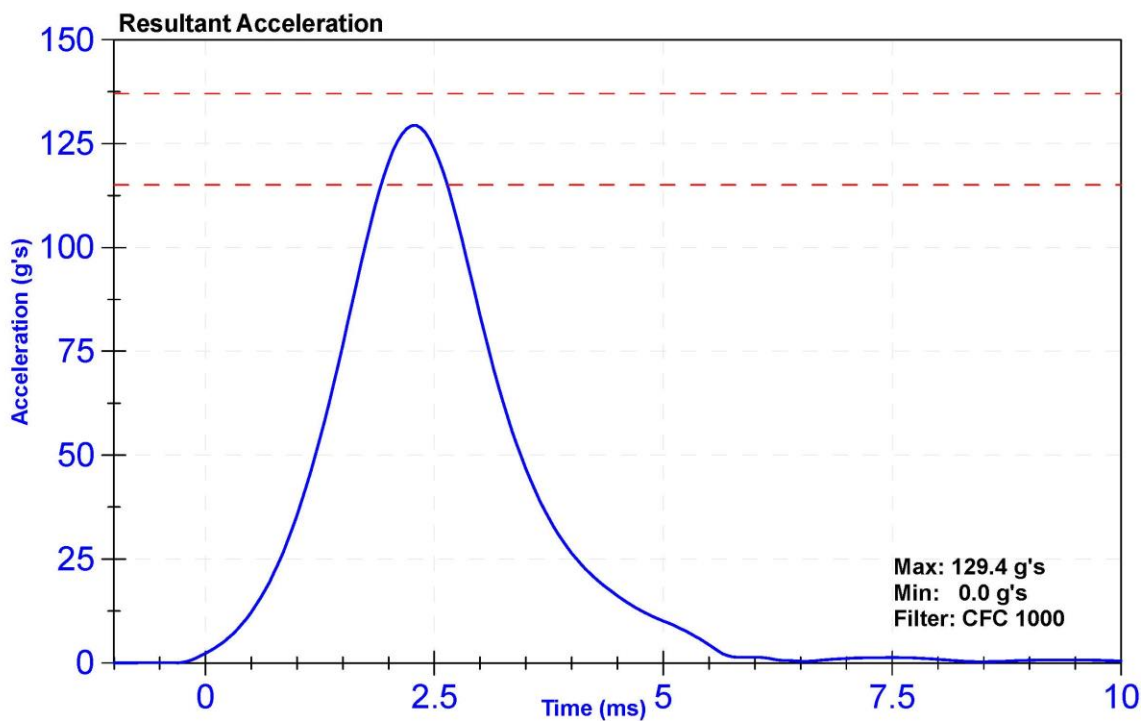
ATD Manufacturer	FTSS	Test Technician	E. Helenbrook
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

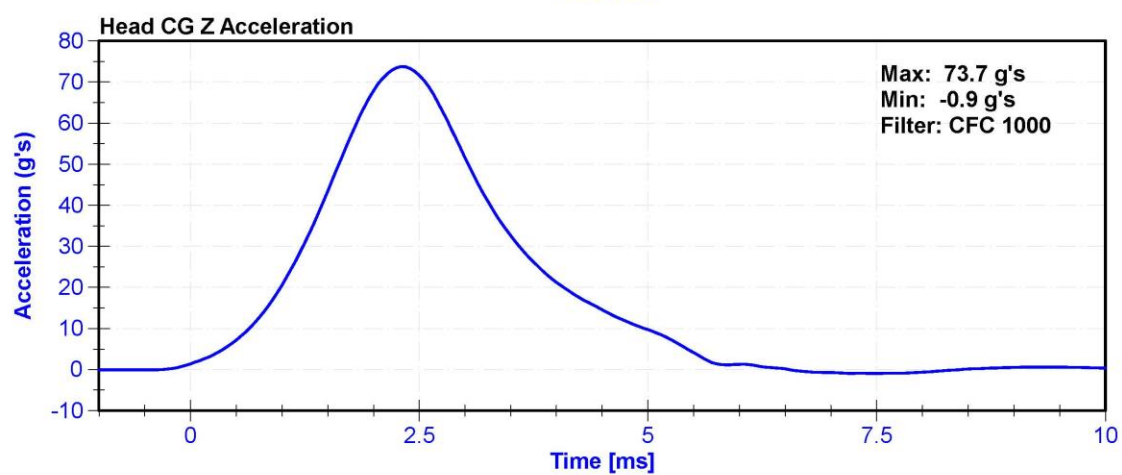
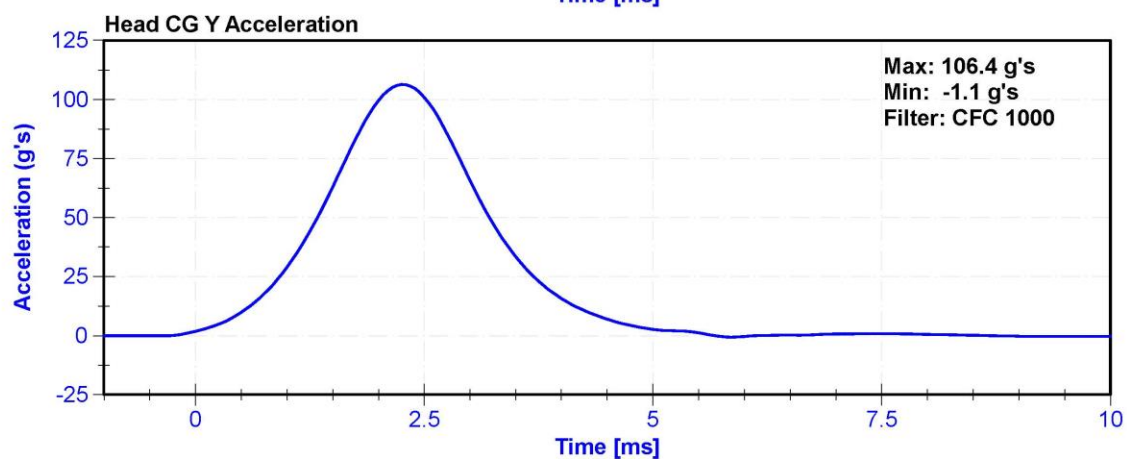
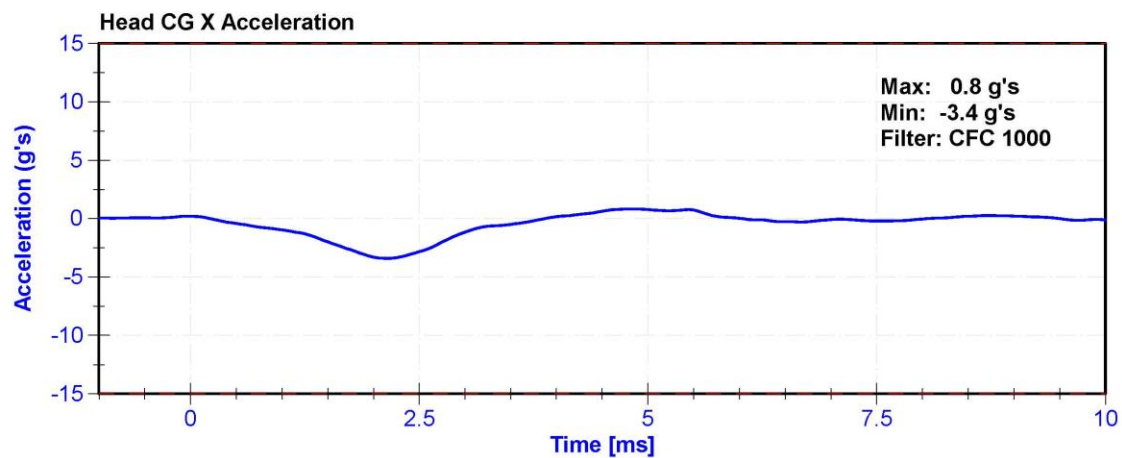
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	35.6	Pass
Resultant Acceleration	115	137	g's	129.4	Pass
Oscillation	0	15	%	1.0	Pass
Fore-Aft Acceleration	-15	15	g's	-3.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264	AC-P68057	4/20/2020	10/19/2020
Y Accelerometer	ENDEVCO 7264	AC-P79189	4/20/2020	10/19/2020
Z Accelerometer	ENDEVCO 7264CT	AC-P52095	4/20/2020	10/19/2020





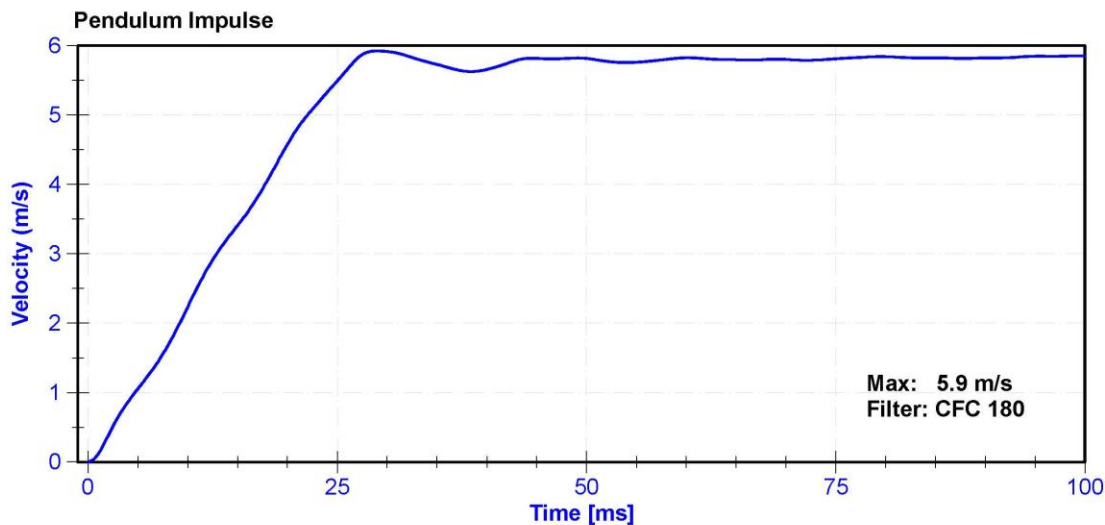
ATD Manufacturer	FTSS	Test Technician	E. Helenbrook
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

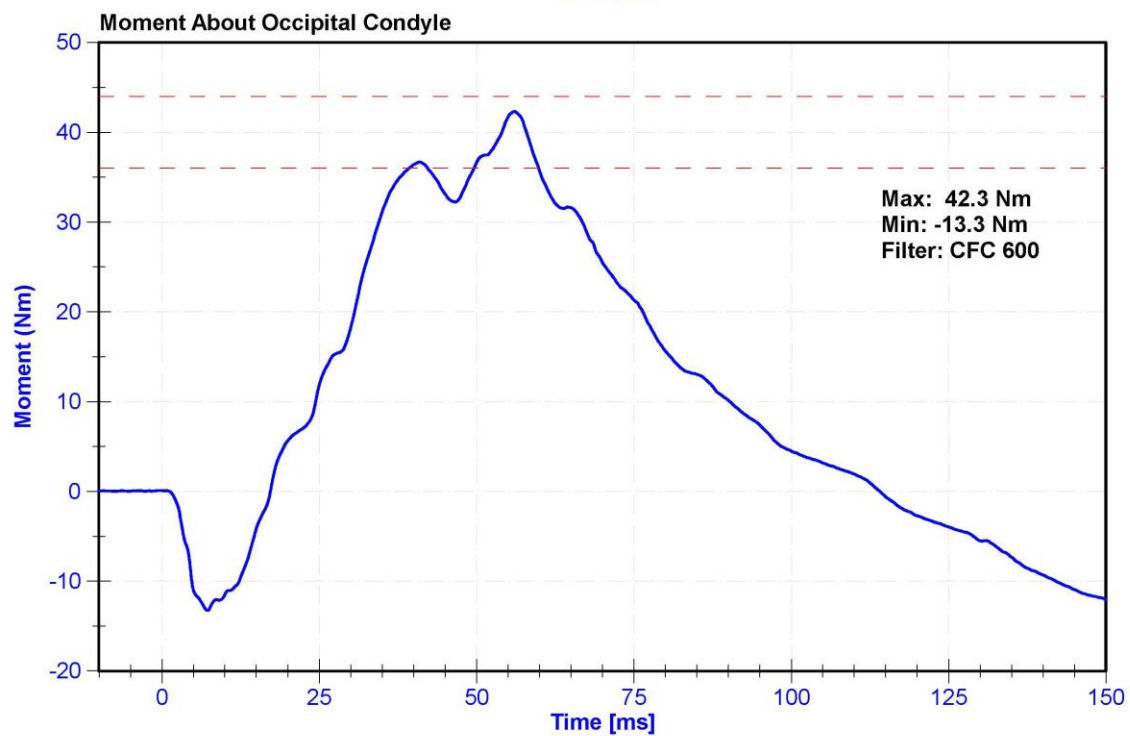
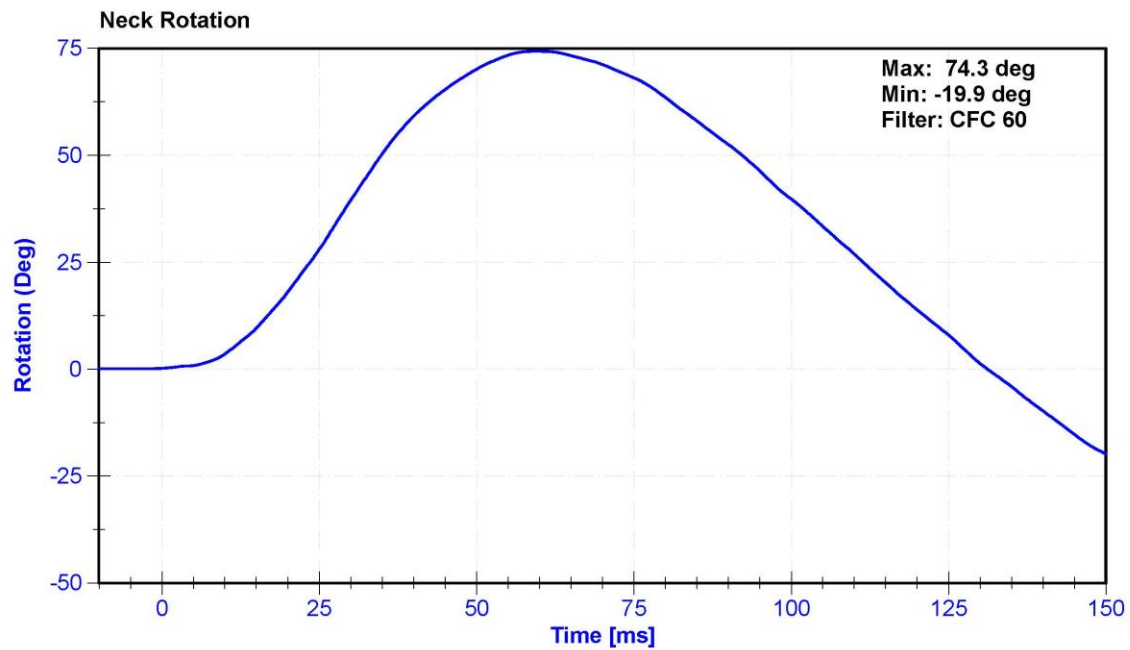
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	32.4	Pass
Velocity	5.51	5.63	m/s	5.549	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.23	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.41	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.57	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.49	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.92	Pass
Neck Rotation	71	81	deg	74.3	Pass
Time at Maximum Rotation	50	70	ms	59.3	Pass
Moment about the OC	36	44	Nm	42.3	Pass
Moment Decay to 0 Nm	102	126	ms	114.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5M9 Pend	1/30/2020	1/29/2021
Pendulum Potentiometer	Denton 78051-342	DS-184Pend	11/4/2019	11/3/2020
Condyle Potentiometer	Denton 78051-342	DS-185Pend	11/4/2019	11/3/2020
Upper Neck Load Cell	Denton 1716A	LC-2192Fy	6/20/2019	6/19/2020





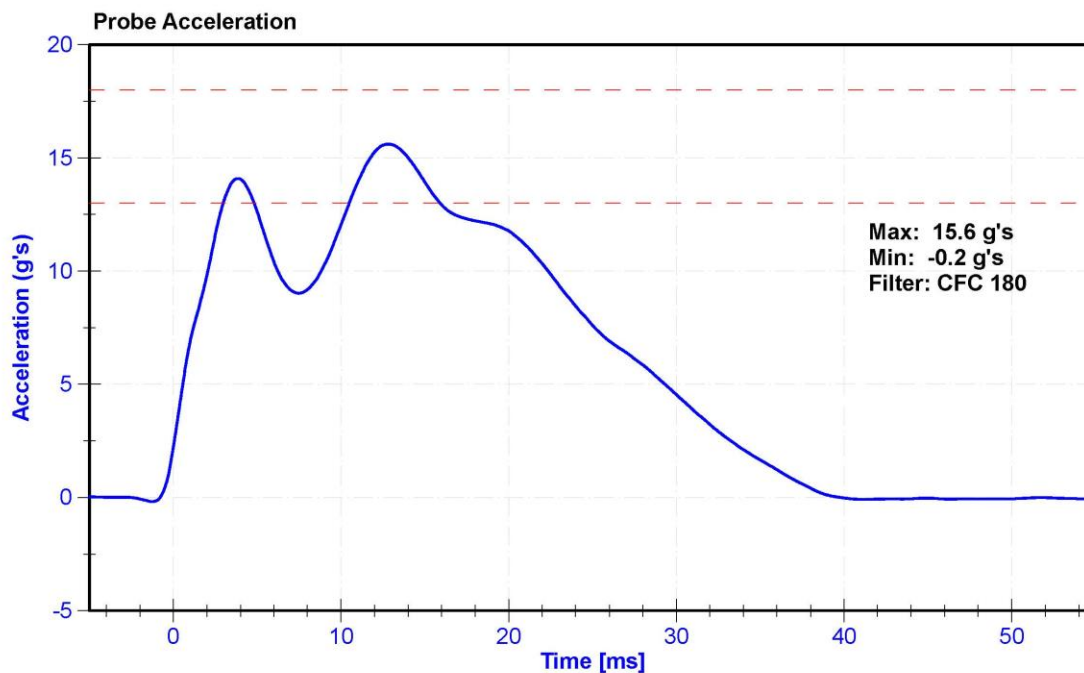
ATD Manufacturer	FTSS	Test Technician	E. Helenbrook
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

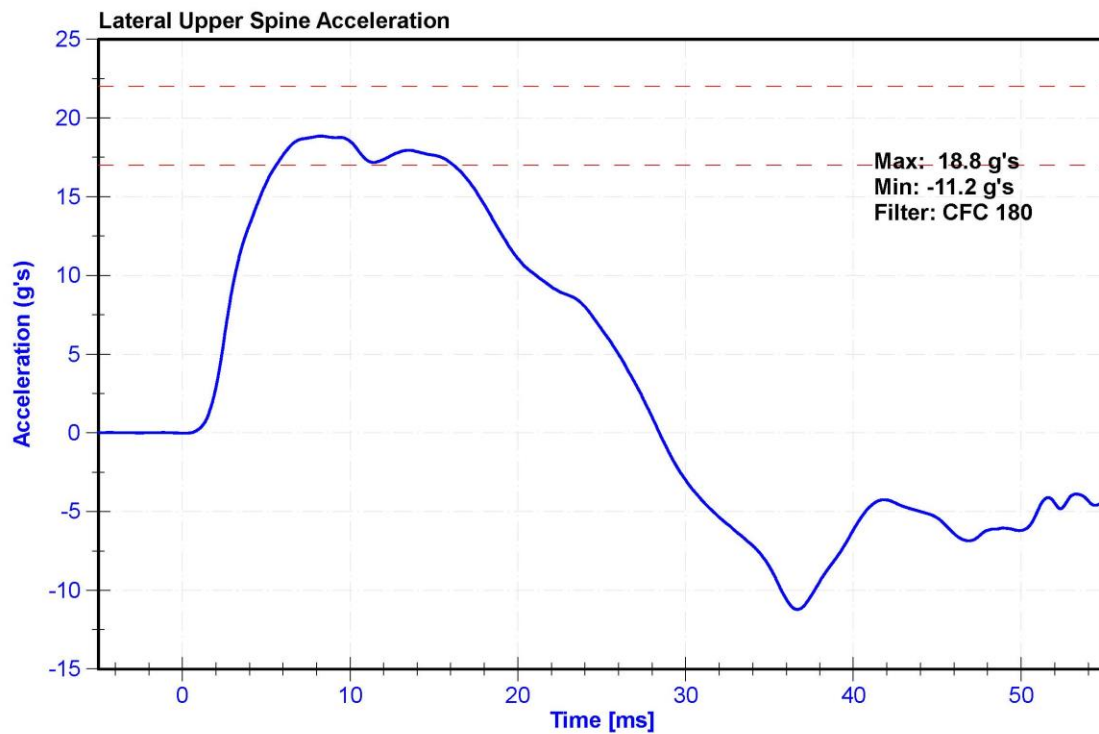
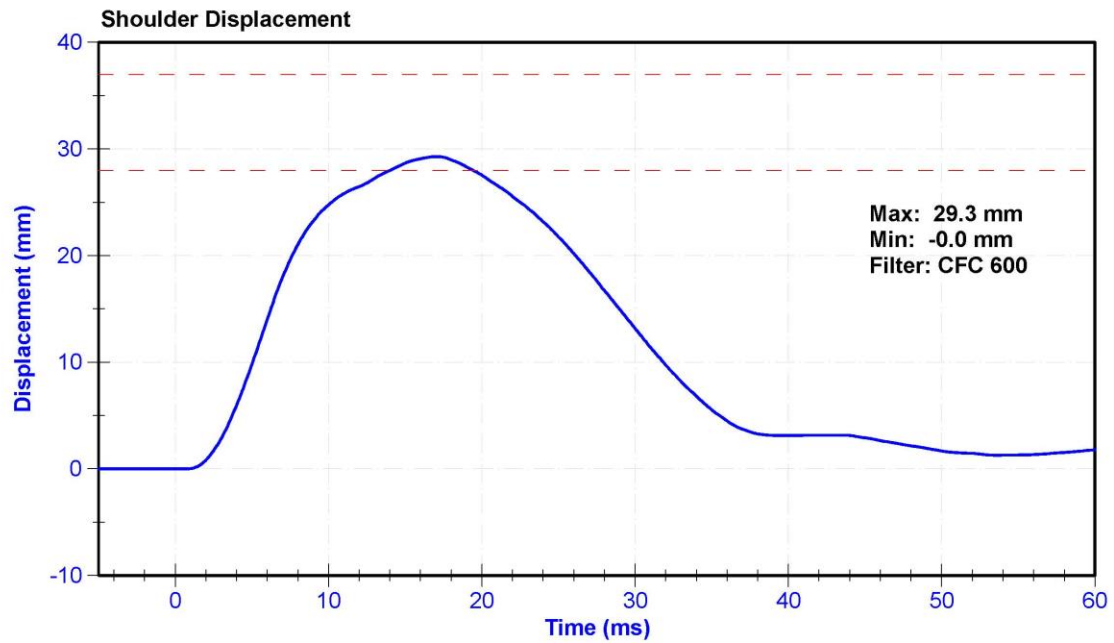
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	34.5	Pass
Velocity	4.2	4.4	m/s	4.29	Pass
Probe Acceleration	13	18	g's	15.6	Pass
Shoulder Deflection	28	37	mm	29.3	Pass
Lateral Upper Spine Acceleration	17	22	g's	18.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A286228	1/29/2020	7/29/2020
Shoulder Potentiometer	Servo 08CT1-3725	DS-053 GFE	4/30/2020	10/29/2020
Upper Spine Y Accelerometer	ENDEVCO 7264CT	P17283	4/21/2020	10/20/2020





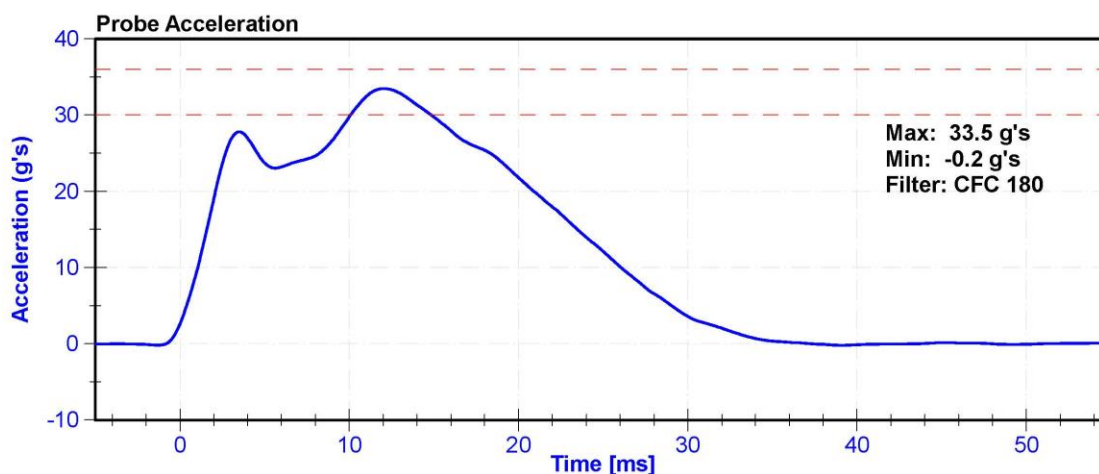
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

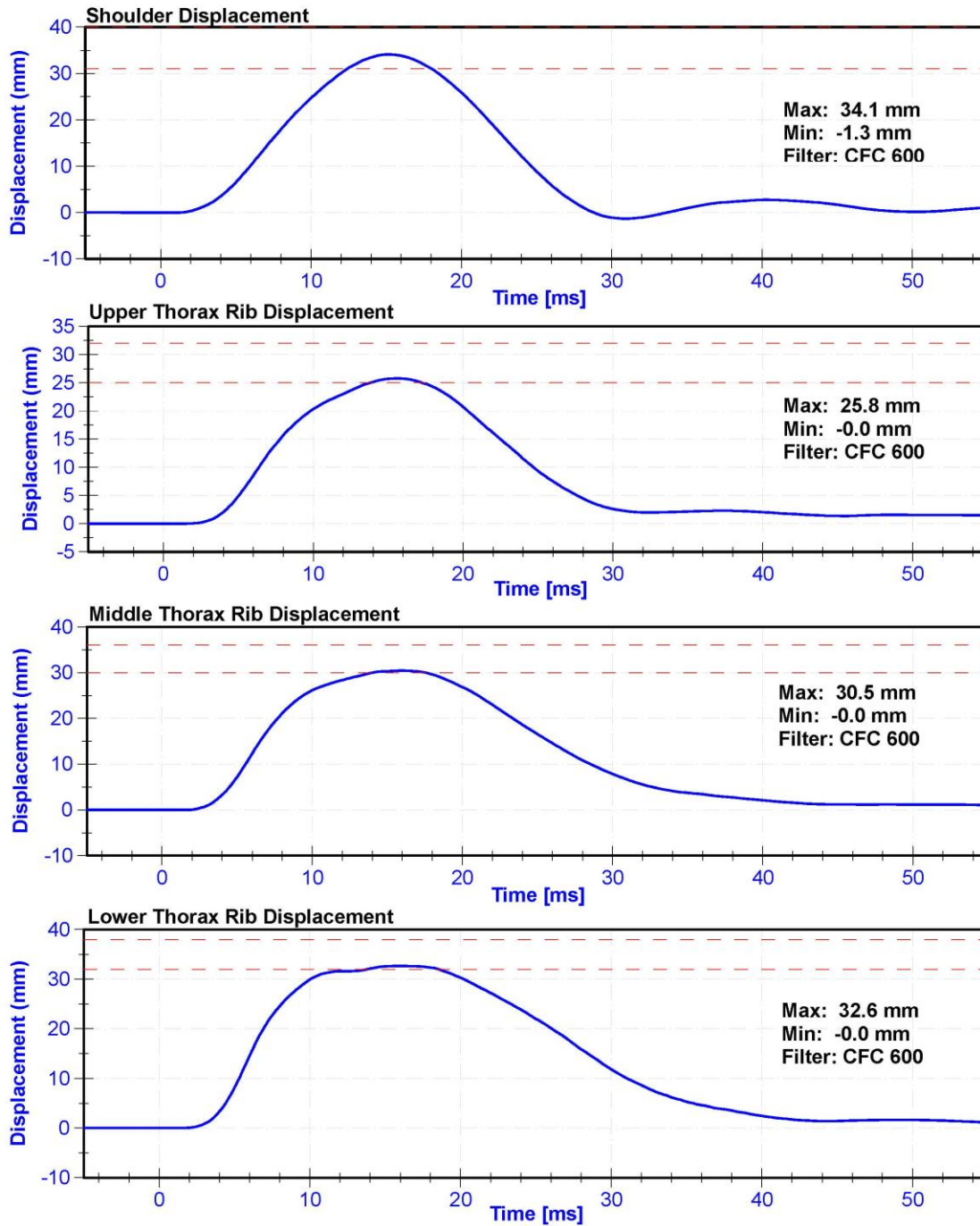
Results

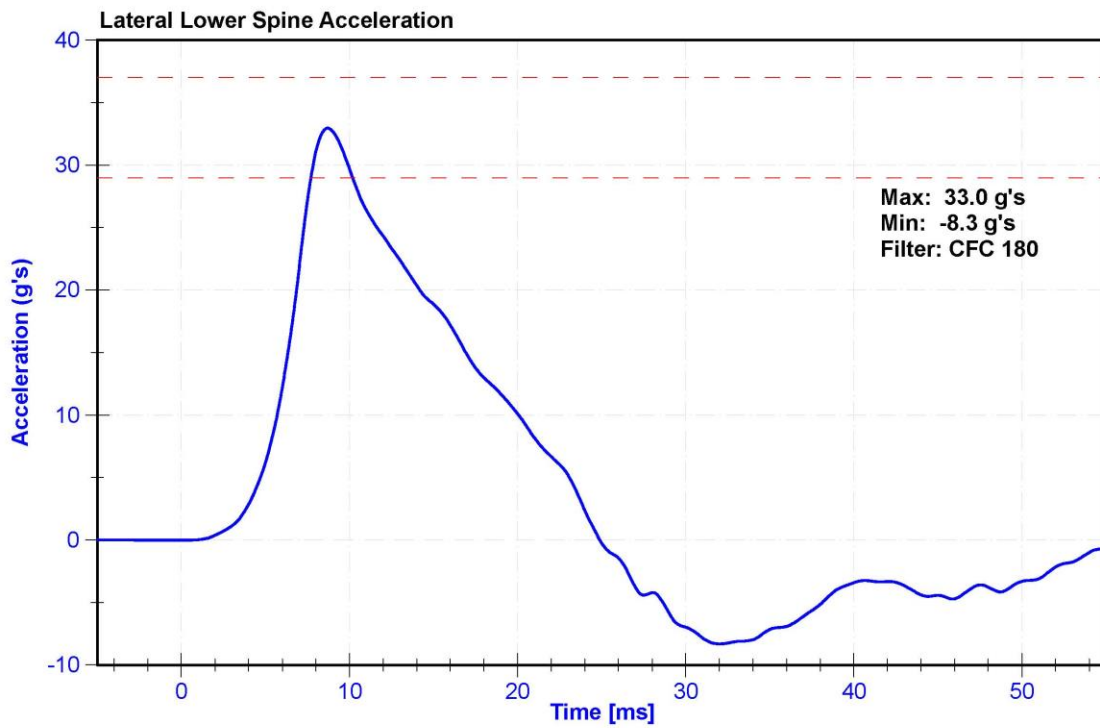
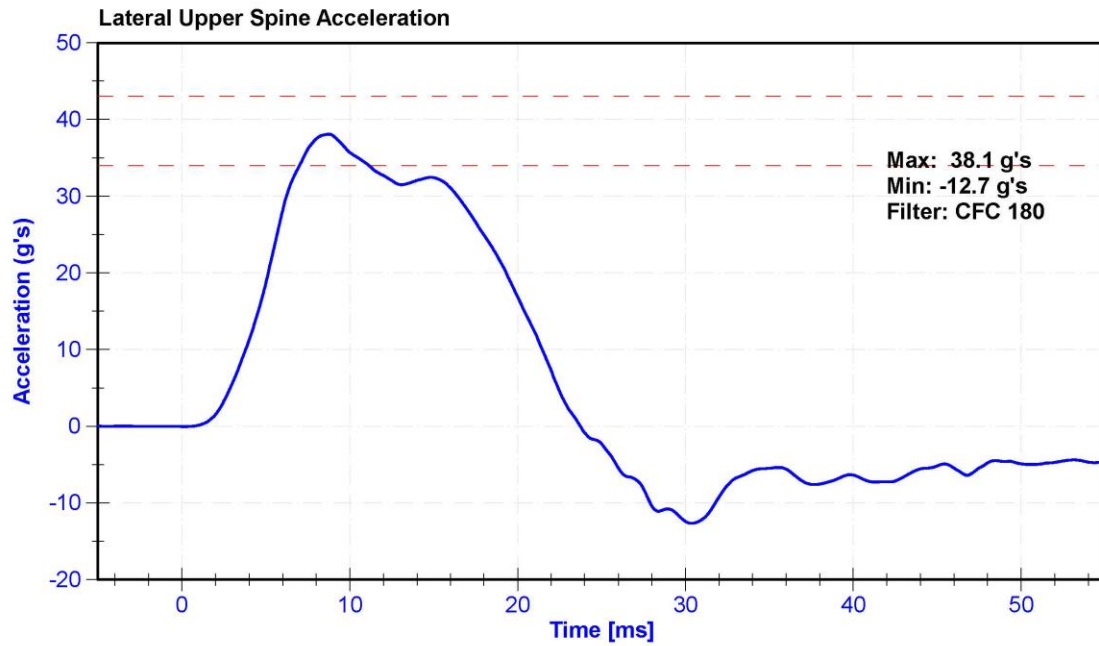
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	29.0	Pass
Velocity	6.6	6.8	m/s	6.71	Pass
Probe Acceleration after 5 ms	30	36	g's	33.5	Pass
Lateral Upper Spine Acceleration	34	43	g's	38.1	Pass
Lateral Lower Spine Acceleration	29	37	g's	33.0	Pass
Shoulder Deflection	31	40	mm	34.1	Pass
Upper Thorax Rib Deflection	25	32	mm	25.8	Pass
Mid Thorax Rib Deflection	30	36	mm	30.5	Pass
Lower Thorax Rib Deflection	32	38	mm	32.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A286228	1/29/2020	7/29/2020
Upper Spine T1 Y Accelerometer	ENDEVCO 7264CT	P17283	4/21/2020	10/20/2020
Upper Spine T12 Y Accelerometer	ENDEVCO 7264	AC-P64147	4/20/2020	10/19/2020
Shoulder Potentiometer	Servo 08CT1-3725	DS-053 GFE	4/30/2020	10/29/2020
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	4/30/2020	10/29/2020
Middle Thorax Rib Potentiometer	Servo 08TC1-3745	DS-040GFE	4/30/2020	10/29/2020
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	4/30/2020	10/29/2020







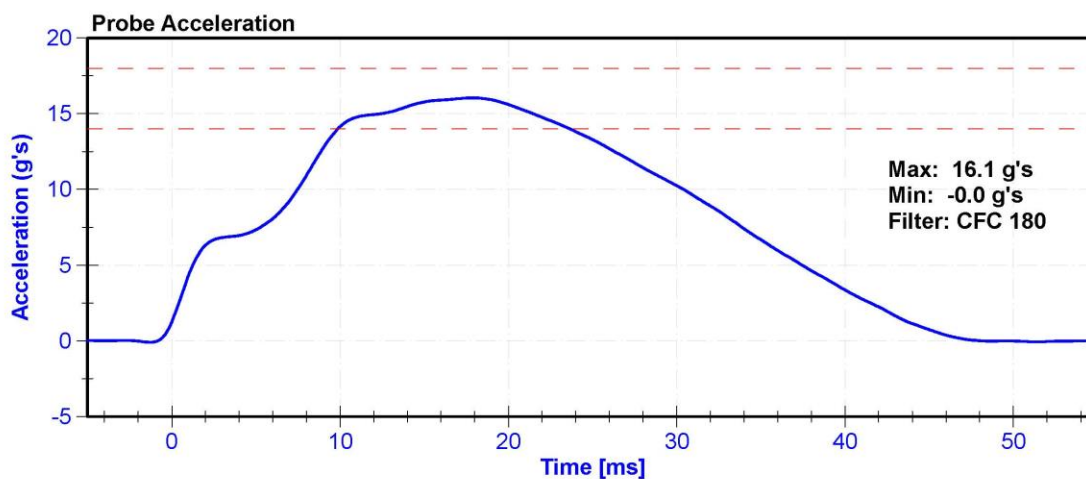
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

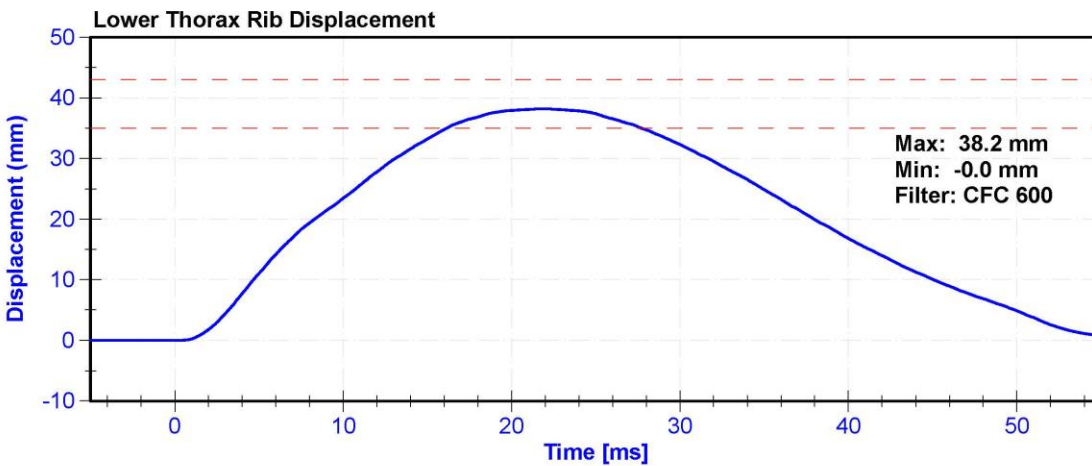
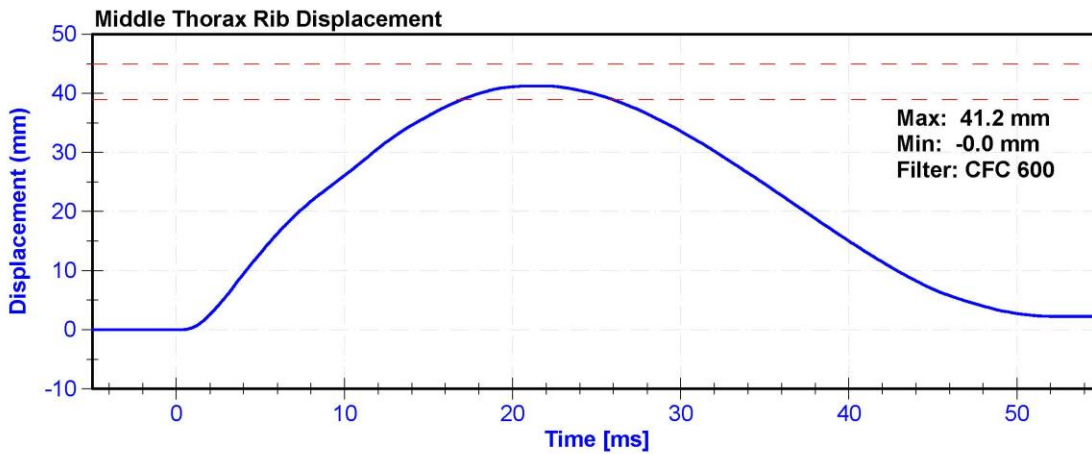
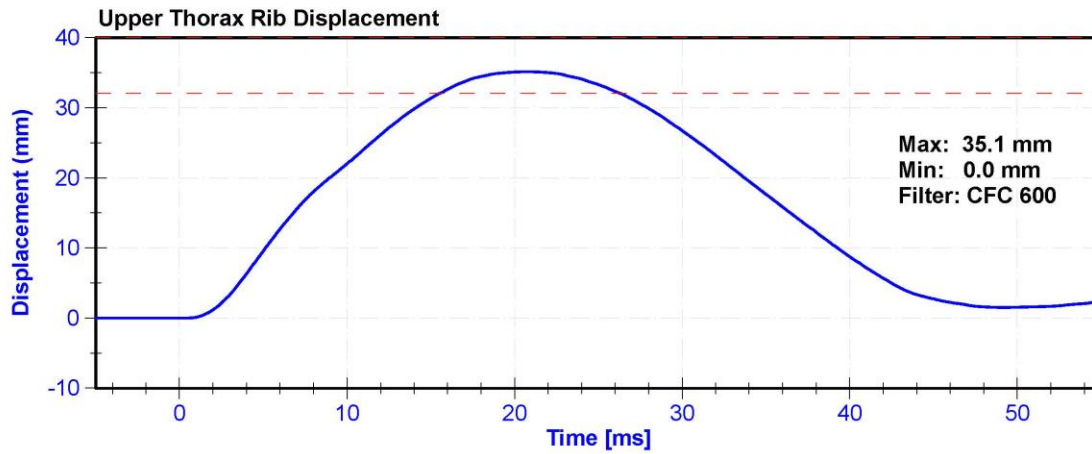
Results

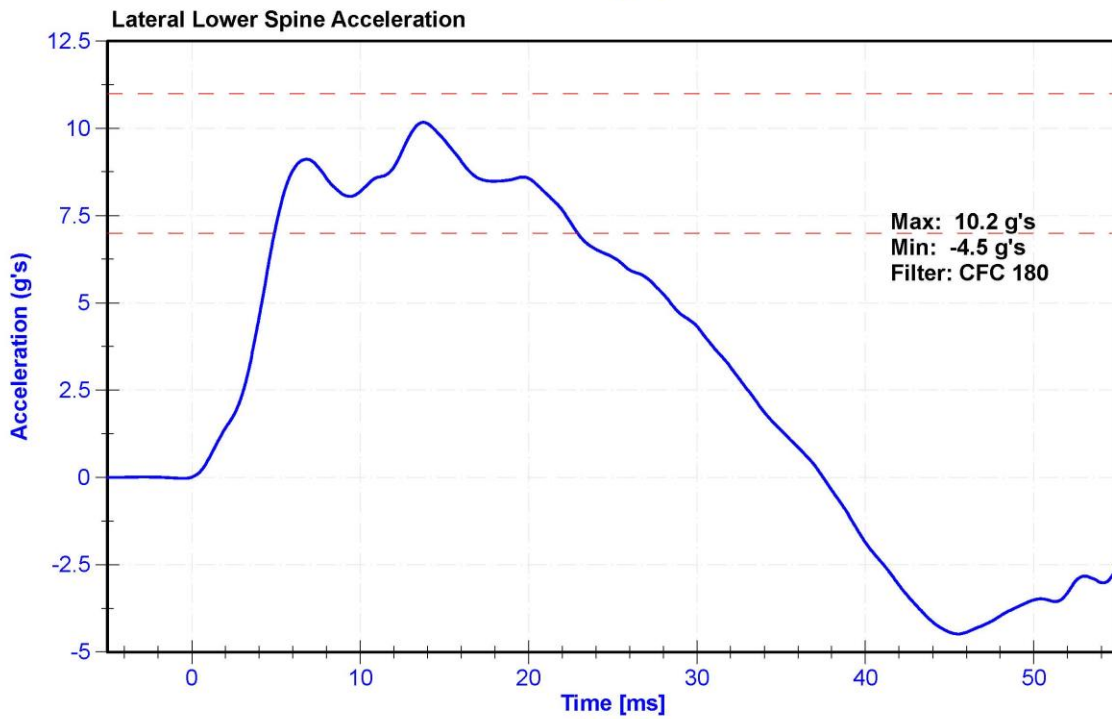
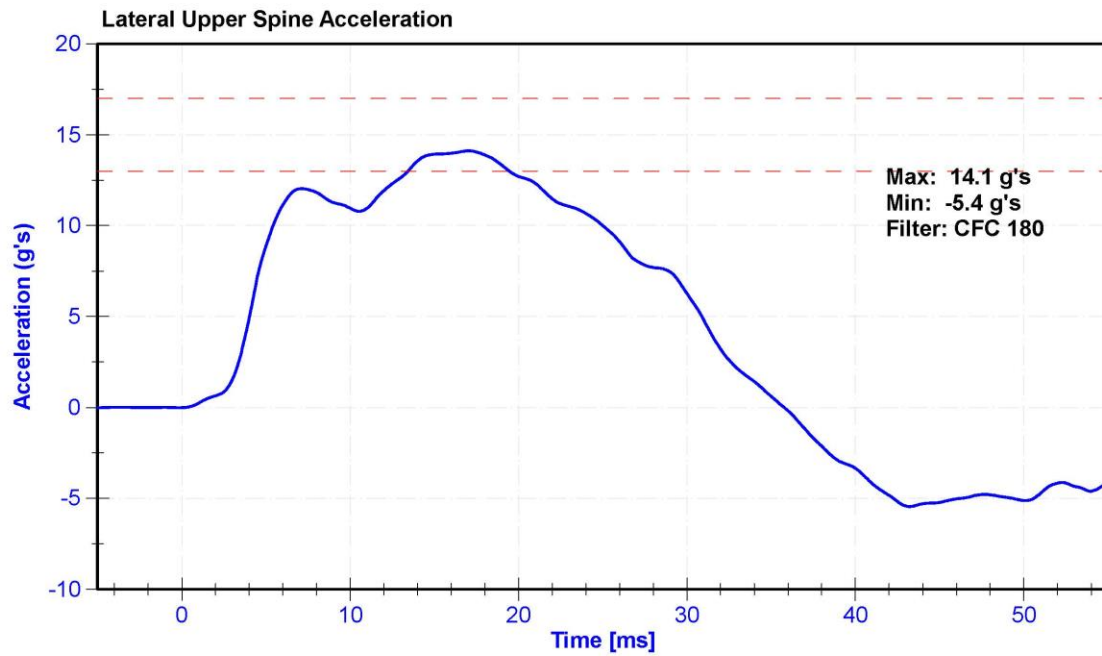
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	29	Pass
Velocity	4.2	4.4	m/s	4.39	Pass
Probe Acceleration	14	18	g's	16.1	Pass
Lateral Upper Spine Acceleration	13	17	g's	14.1	Pass
Lateral Lower Spine Acceleration	7	11	g's	10.2	Pass
Upper Thorax Rib Deflection	32	40	mm	35.1	Pass
Middle Thorax Rib Deflection	39	45	mm	41.2	Pass
Lower Thorax Rib Deflection	35	43	mm	38.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A286228	1/29/2020	7/29/2020
Upper Spine Y Accelerometer	ENDEVCO 7264CT	P17283	4/21/2020	10/20/2020
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	4/20/2020	10/19/2020
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	4/30/2020	10/29/2020
Middle Thorax Rib Potentiometer	Servo 08TC1-3745	DS-040GFE	4/30/2020	10/29/2020
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	4/30/2020	10/29/2020







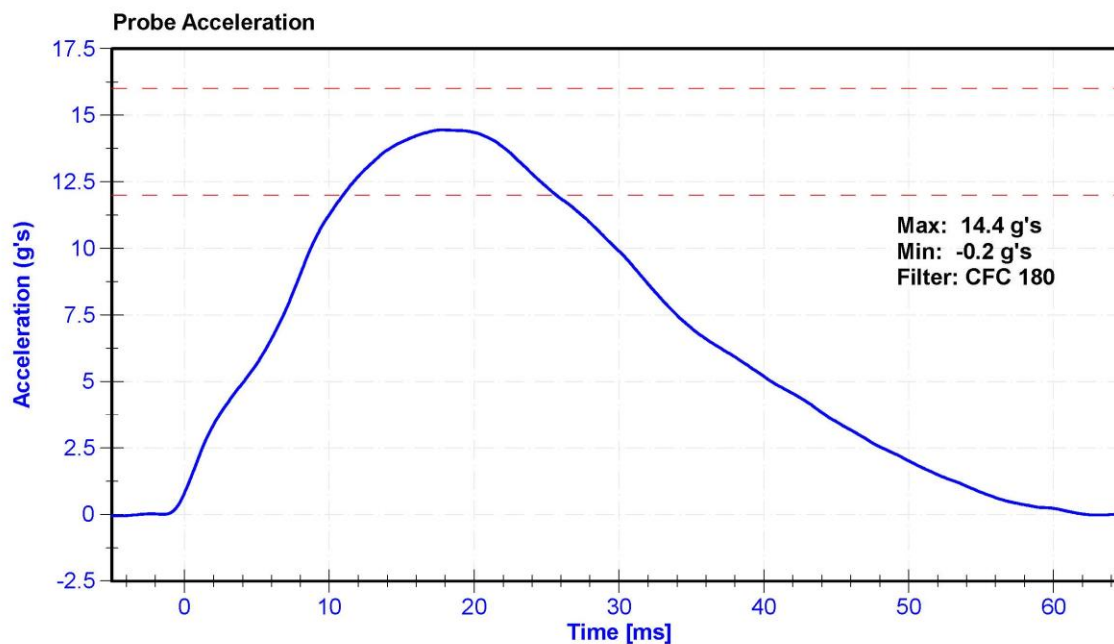
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

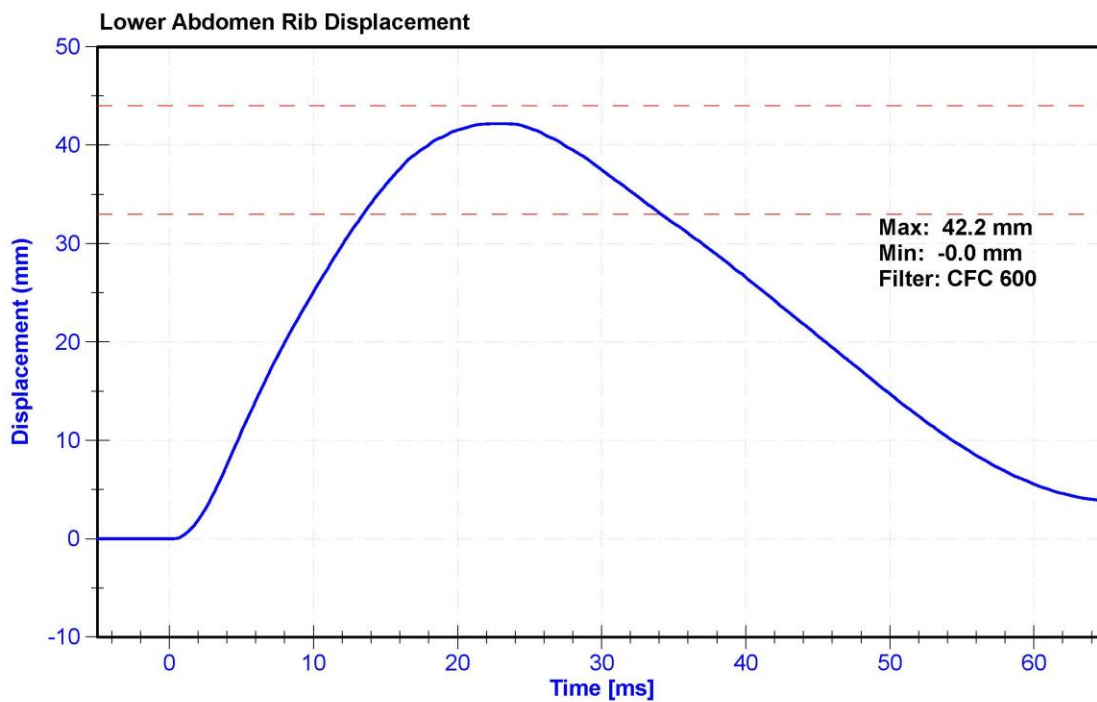
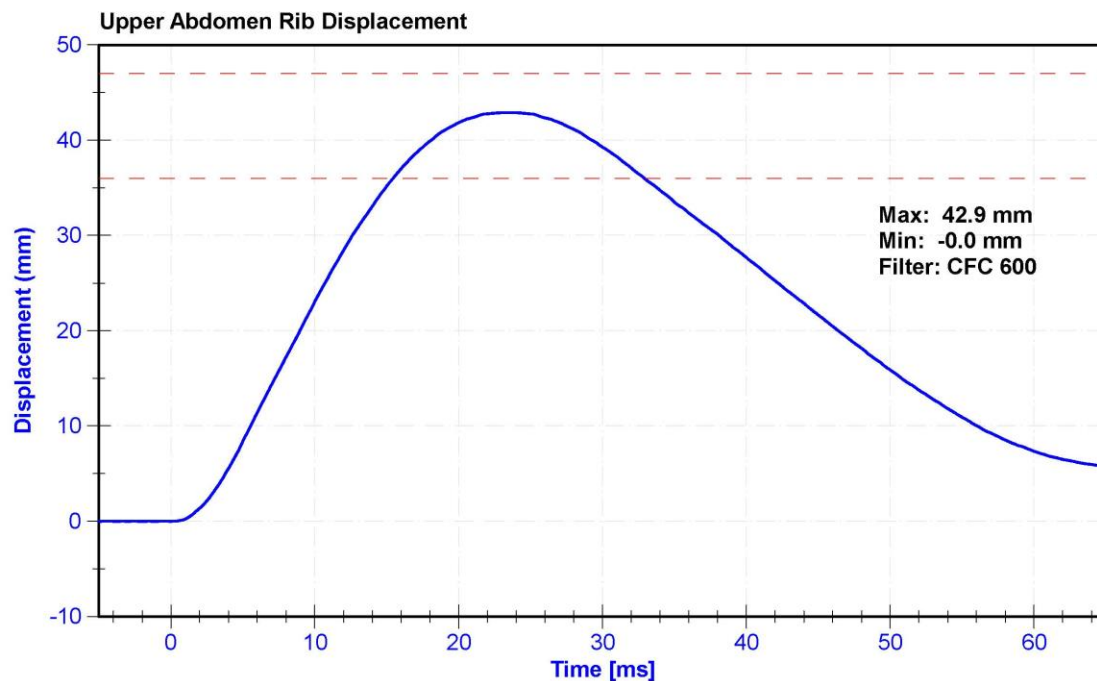
Results

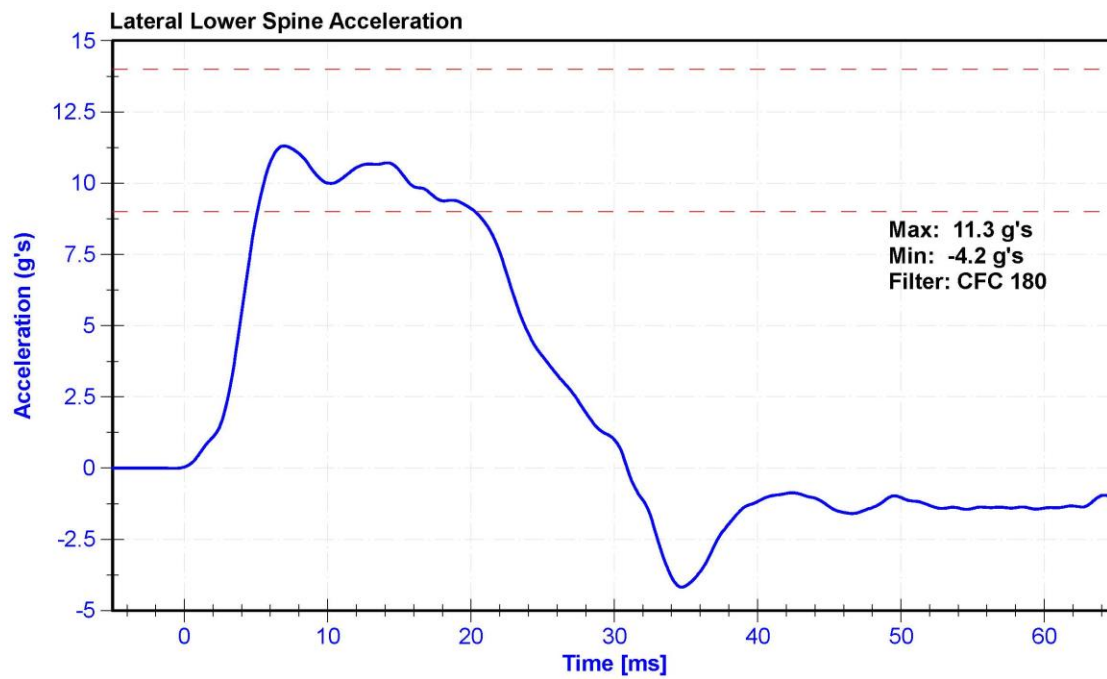
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	30.0	Pass
Velocity	4.2	4.4	m/s	4.36	Pass
Probe Acceleration	12	16	g's	14.4	Pass
Lateral Lower Spine Acceleration	9	14	g's	11.3	Pass
Upper Abdomen Rib Deflection	36	47	mm	42.9	Pass
Lower Abdomen Rib Deflection	33	44	mm	42.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	MSI 64C-2000	A286228	1/29/2020	7/29/2020
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	4/20/2020	10/19/2020
Upper Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-308GFE	4/30/2020	10/29/2020
Lower Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-307GFE	4/30/2020	10/29/2020







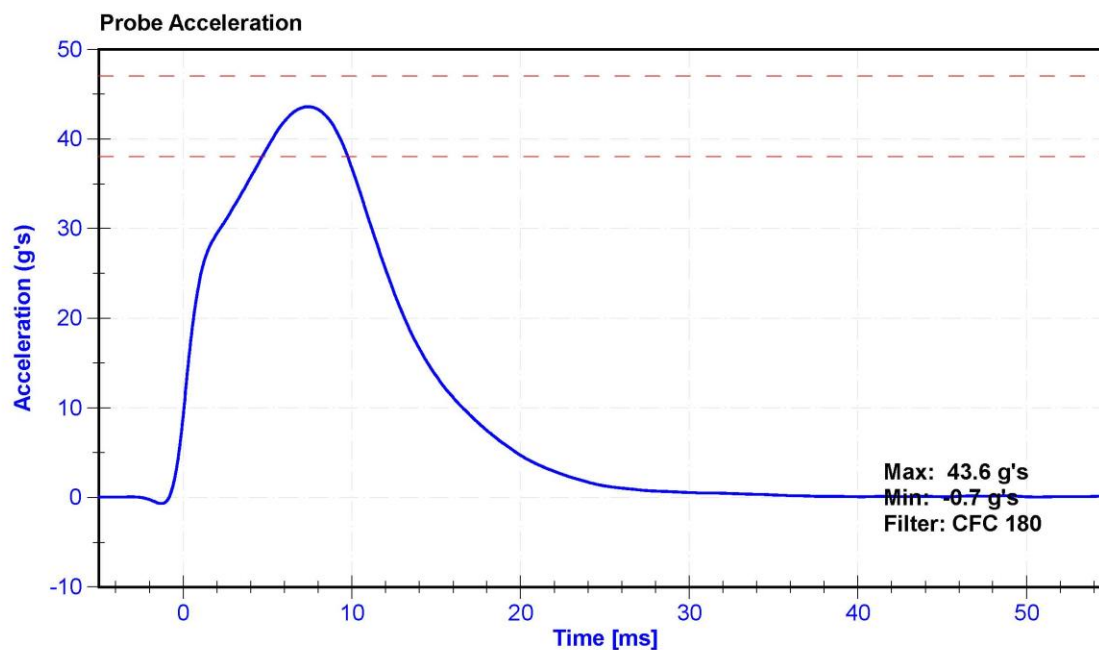
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

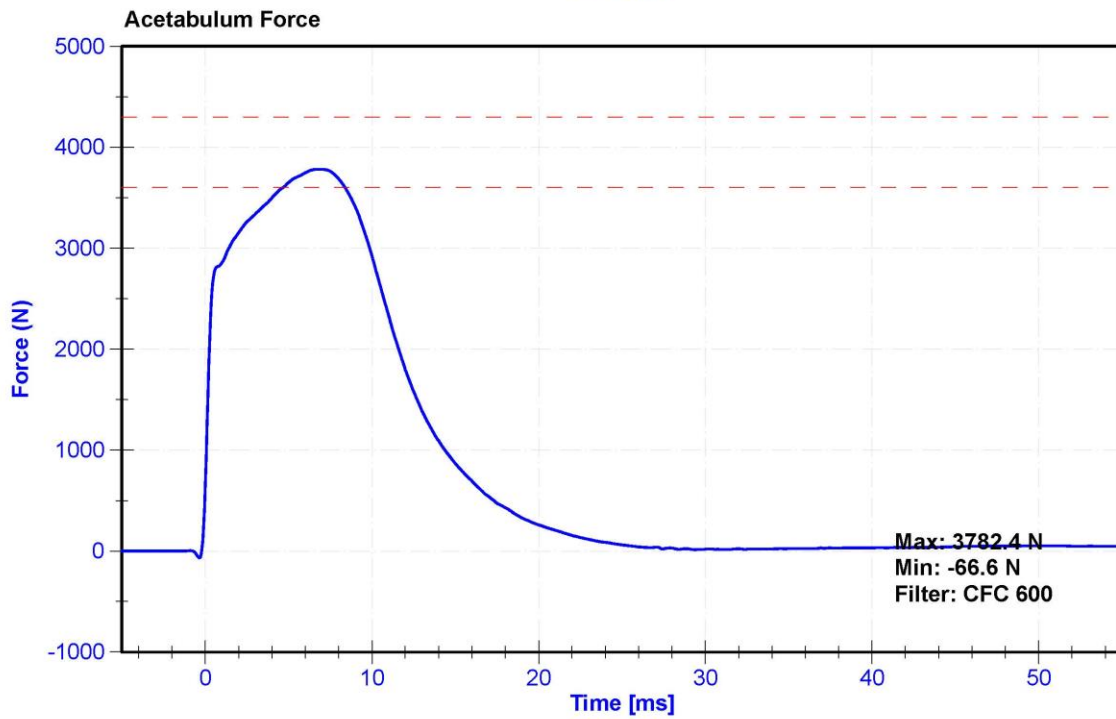
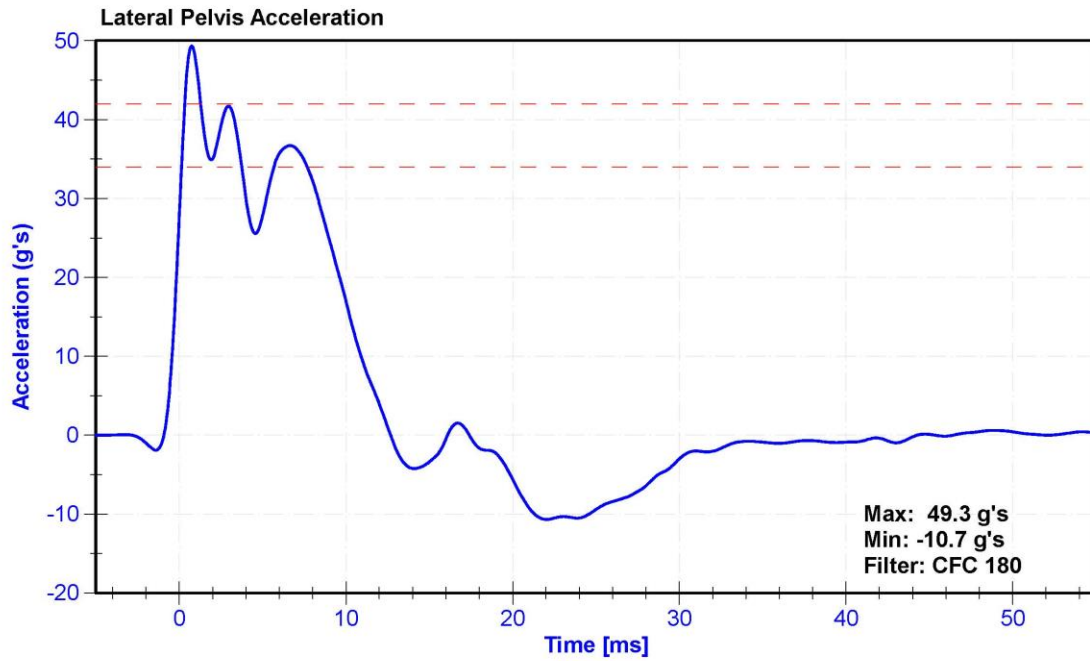
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	29	Pass
Velocity	6.6	6.8	m/s	6.63	Pass
Probe Acceleration	38	47	g's	43.6	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	36.7	Pass
Acetabulum Force	3600	4300	N	3782.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A286228	1/29/2020	7/29/2020
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P51731	4/20/2020	10/19/2020
Acetabulum Load Cell	Denton 3249J	LC-276Fy	9/24/2019	9/23/2020
Certification Plug	SACO	13602	9/25/2019	N/A
Crash Test Plug	SACO	13594	9/25/2019	N/A







300 DB Cert
Crash
5-18-2020

SID-IIS Pelvis Plug Certification Test

Plug S/N 13602

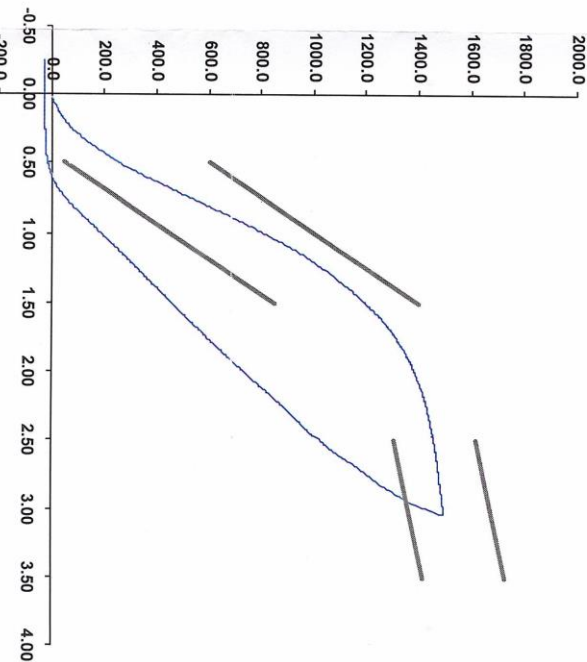
Test Number 11246

Report Number 11284

Test Date 9/25/2019 12:58:43 PM

Force (-N) vs Extension (-mm)

Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	267.22	50.00
Force @ 1.5 mm (N)	1,199.91	850.00
Force @ 2.5 mm (N)	1,459.89	1,306.00
Force @ 3.0 mm (N)	1,497.08	1,361.00



Notes:

Testing Machine STM-20 596564;
Load Cell S/N (F1360947), Units (LBS) 1000
Crosshead Speed (mm/min) or Rate 12.7
Extension or Position Measured by XHD_100 (XHD100)

Operator

Part Number 180-4450

Template No 107 25-Sep-19
SACO Research

By: DC

Date: 9/25/2019

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



300
Crush
5/15/20

SID-11s Pelvis Plug Certification Test

Plug S/N 13594

Test Number 11238

Report Number 11276

Test Date 9/25/2019 12:47:15 PM

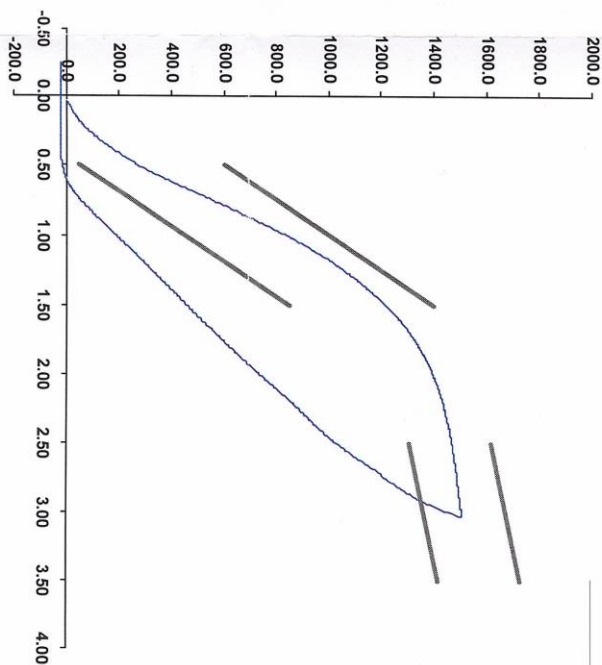
Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	283.57	50.00
Force @ 1.5 mm (N)	1,221.04	850.00
Force @ 2.5 mm (N)	1,471.82	1,306.00
Force @ 3.0 mm (N)	1,508.04	1,361.00

Testing Machine STM-20 596554;
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 25-Sep-19
SACO Research

By: SC Date: 9/25/2019

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

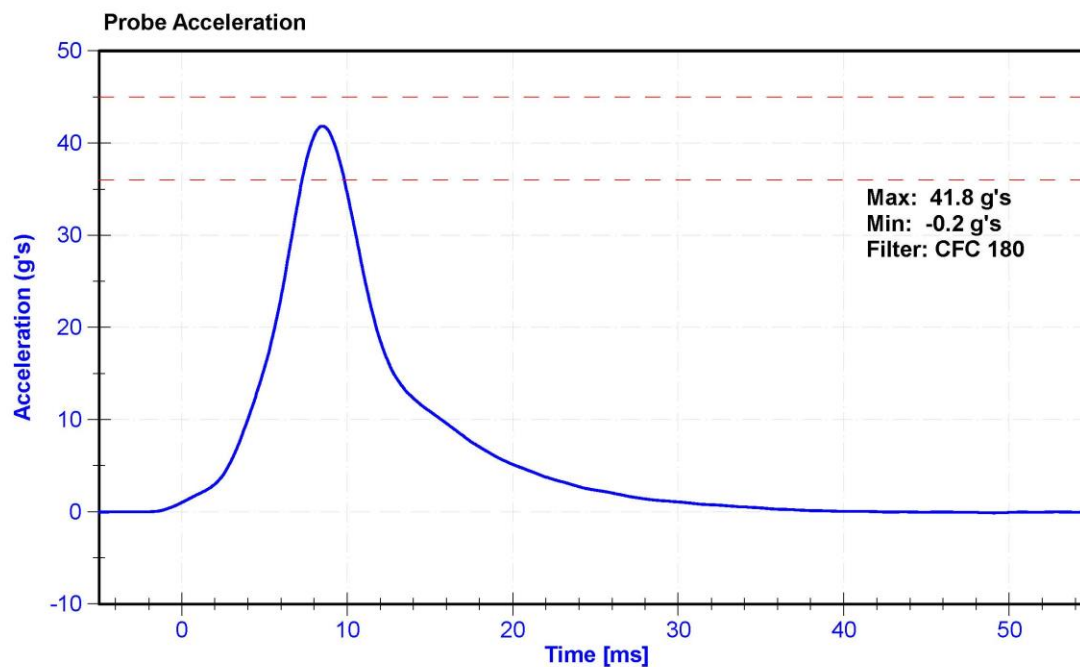
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	300	Laboratory Supervisor	D.Reinhard

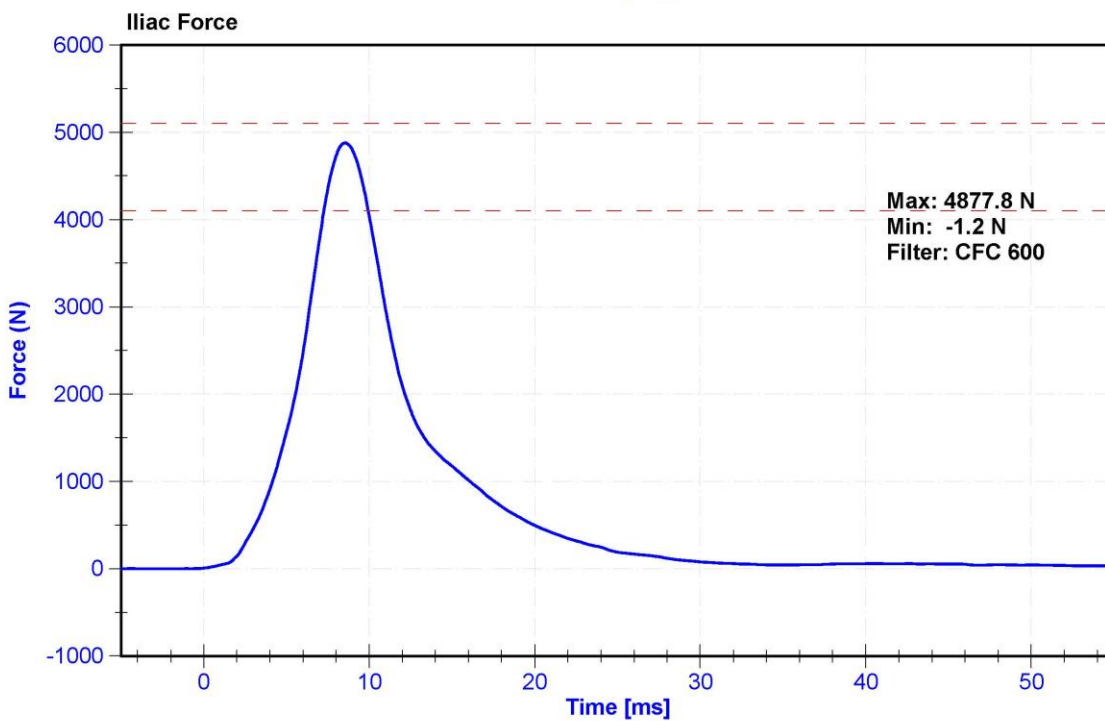
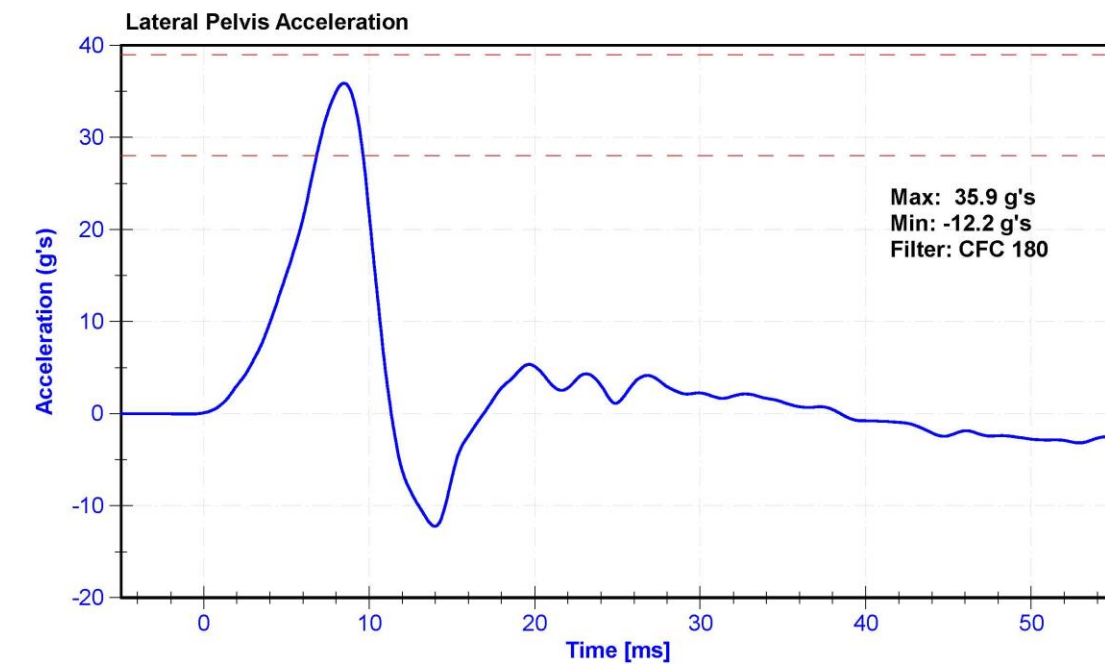
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.2	Pass
Humidity	10	70	%	29.0	Pass
Velocity	4.2	4.4	m/s	4.20	Pass
Probe Acceleration	36	45	g's	41.8	Pass
Lateral Pelvis Acceleration	28	39	g's	35.9	Pass
Iliac Force	4100	5100	N	4877.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A286228	1/29/2020	7/29/2020
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P51731	4/20/2020	10/19/2020
Iliac Load Cell	DENTON 3228J	LC-280Fy	6/20/2019	6/19/2020





APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation (ES-2re)

			ES-2re S/N: F034		
			Serial Number	Manufacturer	Calibration Date
Head Accelerometers	Primary	X	AC-P49204	ENDEVCO	4/15/2020
		Y	AC-P83437	ENDEVCO	4/15/2020
		Z	AC-P64007	ENDEVCO	4/15/2020
	Redundant	X	AC-P52003	ENDEVCO	4/15/2020
		Y	AC-P63981	ENDEVCO	4/15/2020
		Z	AC-P51962	ENDEVCO	4/15/2020
Thorax Rib Displacement Potentiometers	Upper	Y	DS-183GFE	Honeywell	4/14/2020
	Middle	Y	DS-184GFE	Honeywell	4/14/2020
	Lower	Y	DS-182GFE	Honeywell	4/14/2020
Abdomen Load Cells	Forward	Y	LC-1440	DENTON	6/14/2019
	Middle	Y	LC-1525	DENTON	6/5/2019
	Rear	Y	LC-1528	DENTON	6/14/2019
Lower Spine Accelerometers (T12)		X	AC-P17299	ENDEVCO	4/15/2020
		Y	AC-P39731	ENDEVCO	4/15/2020
		Z	AC-P22639	ENDEVCO	4/15/2020
Pubic Symphysis Load Cell		Y	LC-464fy	DENTON	6/14/2019

Table 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N: 300		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers		Primary	X	AC-P59018	ENDEVCO	4/20/2020
			Y	AC-P79189	ENDEVCO	4/20/2020
			Z	AC-P58777	ENDEVCO	4/20/2020
		Redundant	X	AC-P68057	ENDEVCO	4/20/2020
			Y	AC-P58986	ENDEVCO	4/20/2020
			Z	AC-P52095	ENDEVCO	4/20/2020
Displacement Potentiometers	Thoracic Rib	Upper	Y	DS-451GFE	Servo	4/30/2020
		Middle	Y	DS-040GFE	Servo	4/30/2020
		Lower	Y	DS-1156GFE	Servo	4/30/2020
	Abdominal Rib	Upper	Y	DS-308GFE	Servo	4/30/2020
		Lower	Y	DS-307GFE	Servo	4/30/2020
Lower Spine Accelerometers (T12)			X	AC-P64003	ENDEVCO	4/20/2020
			Y	AC-P64147	ENDEVCO	4/20/2020
			Z	AC-P58786	ENDEVCO	4/20/2020
Acetabulum Load Cell			Y	LC-276Fy	DENTON	9/24/2019
Iliac Wing Load Cell			Y	LC-280Fy	DENTON	6/20/2019
Pelvis Plug (struck side)				13444	SACO	9/20/2019
Pelvis Plug (non-struck side)				-	-	-

Table 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	AC-A280958	MSI 1201-1000	3/14/2020
	Vehicle Center of Gravity	Y	AC-A280998	MSI 1201-1000	3/16/2020
	Vehicle Center of Gravity	Z	AC-A280999	MSI 1201-1000	3/16/2020
2	Right Sill at Front Seat	X	A315089	MSI 1201-1000	3/16/2020
	Right Sill at Front Seat	Y	A315729	MSI 1201-1000	3/16/2020
	Right Sill at Front Seat	Z	A315827	MSI 1201-1000	3/16/2020
3	Right Sill at Rear Seat	X	A315079	MSI 1201-1000	3/16/2020
	Right Sill at Rear Seat	Y	A315102	MSI 1201-1000	3/16/2020
	Right Sill at Rear Seat	Z	A315201	MSI 1201-1000	3/16/2020
4	Left Sill at Front Door	Y	A284318	MSI 1201-1000	5/6/2020
5	Left Sill at Rear Door	Y	AC-A280364	MSI 1201-1000	5/1/2020
6	Left A-Post Lower	Y	AC-A280952	MSI 1201-1000	8/21/2020
7	Left A-Post Middle	Y	A282646	MSI 1201-1000	3/14/2020
8	Left B-Post Lower	Y	AC-A255972	MSI 1201-1000	5/1/2020
9	Left B-Post Middle	Y	A315957	MSI 1201-1000	3/18/2020
10	Front Seat Track	Y	A315759	MSI 1201-1000	3/6/2020
11	Rear Seat Track or Structure	Y	AC-A280026	MSI 1201-1000	5/1/2020
12	Right Rear Occ. Compartment	Y	AC-A250368	MSI 1201-1000	1/27/2020
13	Engine Block	X	A315006	MSI 1201-1000	3/6/2020
	Engine Block	Y	A315924	MSI 1201-1000	3/6/2020
14	Rear Floorpan Above Axle	X	A315790	MSI 1201-1000	1/28/2020
	Rear Floorpan Above Axle	Y	A315840	MSI 1201-1000	2/4/2020
	Rear Floorpan Above Axle	Z	A315843	MSI 1201-1000	2/5/2020

TABLE 4 – MDB Instrumentation

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	A315087	MSI 1201-1000	3/16/2020
MDB Center of Gravity	Y	A315096	MSI 1201-1000	3/17/2020
MDB Center of Gravity	Z	A315733	MSI 1201-1000	3/17/2020
Left Frame at Rear Axle Centerline	X	A315182	MSI 1201-1000	3/30/2020
Left Frame at Rear Axle Centerline	Y	A315715	MSI 1201-1000	3/30/2020