

REPORT NUMBER: SINCAP-CAL-21-008

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

**Ford Motor Co.
2021 Ford F-250 Super Duty Crew Cab
Truck**

NHTSA No: M20210214

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



August 18, 2021

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
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Prepared by: Matthew Pronko
Matthew Pronko, Test Engineer

Date: August 18, 2021

Approved by: Vanessa Hansen
Vanessa Hansen, Engineering Manager

Date: August 18, 2021

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 2021 Ford F-250 Super Duty Crew Cab Truck 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 6, 2021. The impact velocity of the Moving Deformable Barrier (MDB) was 61.89 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 197 mm located at level 1. The test vehicle's occupant performance data is as follows: <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th colspan="3">Driver ATD (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>12.369</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>44</td> <td>15.085</td> </tr> <tr> <td>Total Abdominal Force</td> <td>N</td> <td>2500</td> <td>430.101</td> </tr> <tr> <td>Pubic Symphysis Force</td> <td>N</td> <td>6000</td> <td>481.118</td> </tr> </tbody> </table> <table border="1"> <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>52.069</td> </tr> <tr> <td>Lower Spine Resultant Acceleration</td> <td>G</td> <td>82</td> <td>14.317</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td>N</td> <td>5525</td> <td>458.131</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38*</td> <td>1.677</td> </tr> <tr> <td>Maximum Abdominal Rib Deflection</td> <td>mm</td> <td>45*</td> <td>0.482</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	12.369	Maximum Thoracic Rib Deflection	mm	44	15.085	Total Abdominal Force	N	2500	430.101	Pubic Symphysis Force	N	6000	481.118	Measurement Description	Passenger ATD (SID-IIs)			Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	52.069	Lower Spine Resultant Acceleration	G	82	14.317	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	458.131	Maximum Thoracic Rib Deflection	mm	38*	1.677	Maximum Abdominal Rib Deflection	mm	45*	0.482
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SECTION 1

TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test is part of the MY 2021 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 2021 Ford F-250 Super Duty Crew Cab Truck. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated March 2020.

SECTION 2

SUMMARY OF TEST RESULTS

A 2021 Ford F-250 Super Duty Crew Cab Truck 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 61.89 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 6, 2021. 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 March 2020. 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	12.368
Maximum Thorax Rib Deflection	mm	44	15.085
Combined Abdominal Force	N	2500	430.101
Pubic Symphysis Force	N	6000	481.118

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC36)		1000	52.069
Lower Spine (T12) Resultant Acceleration	G	82	14.317
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	458.131
Maximum Thoracic Rib Deflection	mm	38*	1.677
Maximum Abdominal Rib Deflection	mm	45*	0.482

*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	No	N/A		
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	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Other				

GENERAL COMMENTS:

1. P1 serial number – F033
2. P4 serial number – 300

Data Anomalies:

The following channel was questionable for

- Left B-Pillar Middle Y, Exceeded calibration range at 13.5 ms
- Left B-Pillar Lower Y, Exceeded calibration range and saturated at 21.7 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. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2021 Ford F-250 Super Duty Crew Cab Truck
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20210214
Test Date: 5/6/2021

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20210214
Model Year	2021
Make	Ford
Model	F-250 Super Duty
Body Style	Crew Cab Truck
VIN	1FT7W2A68MEC34651
Body Color	White
Odometer Reading (km/mi)	13 mi
Engine Displacement (L)	6.2
Type/No. Cylinders	V8
Engine Placement	Inline
Transmission Type	Automatic
Transmission Speeds	6-Speed
Overdrive	Yes
Final Drive	Rear Wheel Drive
Roof Rack	No
Sunroof/T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes

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

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

No

DATA FROM CERTIFICATION LABEL

Manufactured By	Ford Motor Co.
Date of Manufacture	11/20
Vehicle Type	Truck

GVWR (kg)	4536
GAWR Front (kg)	1792
GAWR Rear (kg)	2876

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	3	3	N/A	6
Capacity Weight (VCW) (kg)				1761
DSC X 68.04 kg				408.24
Cargo Weight (RCLW) (kg)				136

(A)

(B)

(A-B)

VEHICLE SEAT TYPE

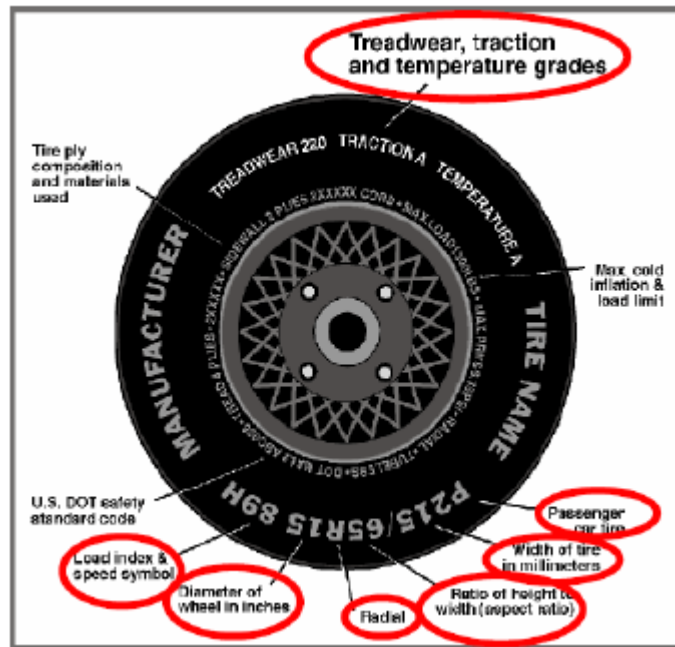
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						W/ Lever	W/ Knob
Front Seat	X					X	
Rear or Second Row Seat		X			X		
Third Row seat							

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

Test Vehicle:	<u>2021 Ford F-250 Super Duty Crew Cab Truck</u>	NHTSA No.:	<u>M20210214</u>
Test Program:	<u>NCAP Side MDB Impact Test</u>	Test Date:	<u>5/6/2021</u>

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)	550	550
Cold Pressure (kPa)	450	550
Recommended Tire Size	LT245/75R17E	LT245/75R17E
Tire Size on Vehicle	LT245/75R17E	LT245/75R17E
Tire Manufacturer	Michelin	Michelin
Tire Model	LTX	LTX
Treadwear	N/A	N/A
Traction	N/A	N/A
Temperature Grade	N/A	N/A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 1 Polyamide, 2 Steel	2 Polyester, 1 Polyamide, 2 Steel
Load Index/Speed Symbol	121/118R	121/118R
Tire Material	Rubber	Rubber
DOT Safety Code Left	M343007X4220	M343007X4120
DOT Safety Code Right	M343007X4220	M343007X4220

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

Test Vehicle:	2021 Ford F-250 Super Duty Crew Cab Truck	NHTSA No.:	M20210214
Test Program:	NCAP Side MDB Impact Test	Test Date:	5/6/2021

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	435	432	525	524
Tire Placard	kPa	450	450	550	550
Owner's Manual	kPa	450	450	550	550
As Tested	kPa	450	450	550	550

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	781	581		810	683		847	687	
Right	kg	760	590		798	676		772	671	
Ratio	%	56.8	43.2		54.2	45.8		54.4	45.6	
Totals	kg	1541	1171	2712	1608	1359	2967	1619	1358	2977

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	2712	(A)
Sum of Actual Weight of 1 ES2re and 1 P572 ATD (SID-IIs)	kg	127	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	136	(C)
Calculated Target Vehicle Test Weight (TVTW)	kg	2975	(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	965	962	Yes
RF	mm	960	952	Yes
RR	mm	1048	1043	Yes
LR	mm	1057	1052	Yes
Vehicle CG (Aft of Front Axle)	mm	1853	1861	
Vehicle CG (Left(+)/Right(-) from Longitudinal Centerline)	mm	26	6	

*** 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:	2021 Ford F-250 Super Duty Crew Cab Truck	NHTSA No.:	M20210214
Test Program:	NCAP Side MDB Impact Test	Test Date:	5/6/2021

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
None	0
Ballast / Equipment Added	77

TEST SURFACE MARKINGS

	Distance from 63° Impact Angle Line (mm)
Fore 25 mm target	965
Aft 25 mm target	967
Pre-Impact Angle Line	236

Parallel Track Target	X Location (mm)	Y Location (mm)
A	0	0
B	2955	1555
C	3855	1555
D	0	3000

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

Test Vehicle:	2021 Ford F-250 Super Duty Crew Cab Truck	NHTSA No.:	M20210214
Test Program:	NCAP Side MDB Impact Test	Test Date:	5/6/2021

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	Not Adjustable		
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 SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid- Fore/Aft	Forward- Most
Driver Seat	Not Adjustable		Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
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:	2021 Ford F-250 Super Duty Crew Cab Truck	NHTSA No.:	M20210214
Test Program:	NCAP Side MDB Impact Test	Test Date:	5/6/2021

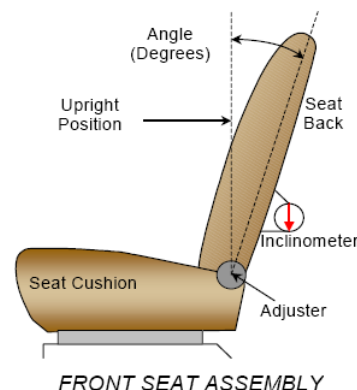
SEAT FORE / AFT POSITION

Seat	Total Fore / Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	254	37 (0-36)	127	19
Front Passenger Seat	254	37 (0-36)	127	19
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat*	Fixed	Fixed	Fixed	Fixed

**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	50.3	30	2.9	9
Front Passenger Seat	50.3	30	3.1	9
Front Center Seat*	Fixed	Fixed	Fixed	Fixed
Struck Side Rear Seat w/ Seated Dummy	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat*	Fixed	Fixed	Fixed	Fixed

**if applicable*

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

Test Vehicle: <u>2021 Ford F-250 Super Duty Crew Cab Truck</u>	NHTSA No.: <u>M20210214</u>
Test Program: <u>NCAP Side MDB Impact Test</u>	Test Date: <u>5/6/2021</u>

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	4 (0-3)	Uppermost
Rear Seat	Fixed	Fixed

HEAD RESTRAINT ADJUSTMENT

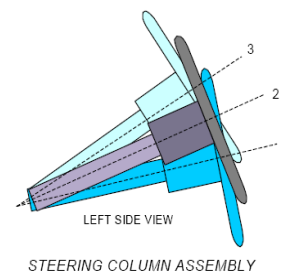
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

	Total # of Positions	Placed in Position #
Driver Seat	2 (0-1)	Uppermost
Rear Seat	1	Lowest

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.

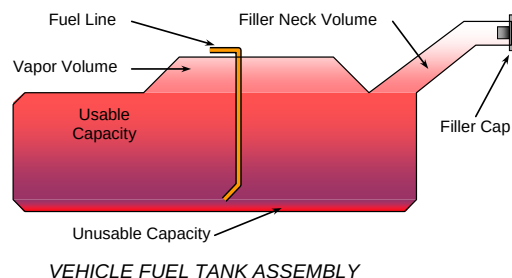
	Degrees	Fore/Aft Position (mm)
Lowermost – Position 1	19.5	
Geometric Center – Position 2	21.4	
Uppermost – Position 3	23.3	
Telescoping Steering Wheel Travel		45
Test Position	21.4	22.5



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>2021 Ford F-250 Super Duty Crew Cab Truck</u>	NHTSA No.:	<u>M20210214</u>
Test Program:	<u>NCAP Side MDB Impact Test</u>	Test Date:	<u>5/6/2021</u>

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	128.7
Usable Capacity of "Optional Tank" (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	128.7
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	119.7
Actual Amount of Solvent Used in Test	119.7
1/3 of Usable Capacity	42.9

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: 2021 Ford F-250 Super Duty Crew Cab Truck

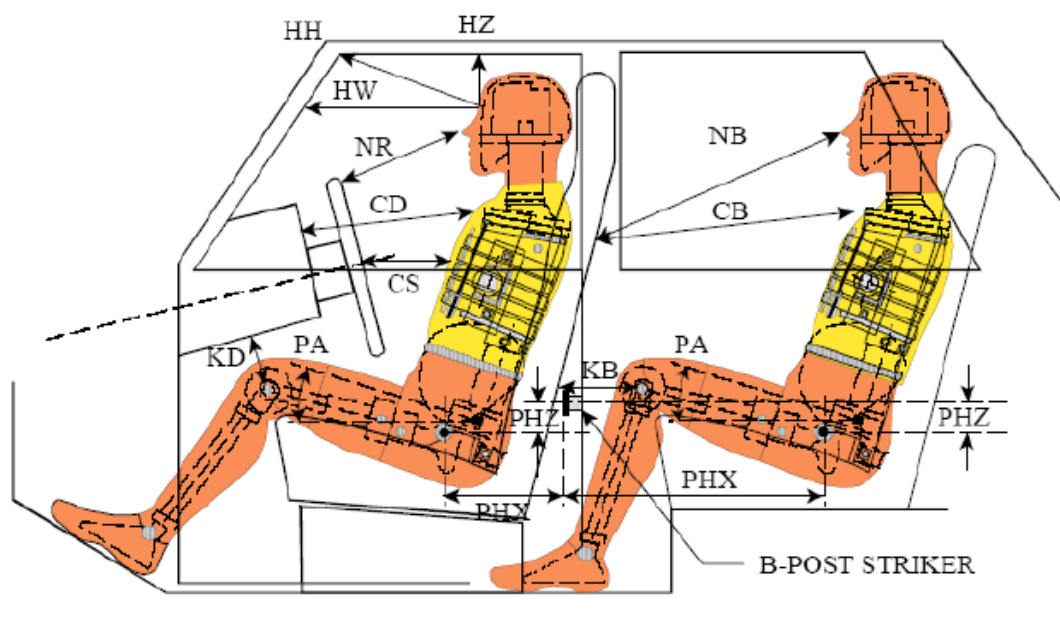
NHTSA No.:

M20210214

Test Program: NCAP Side MDB Impact Test

Test Date:

5/6/2021



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

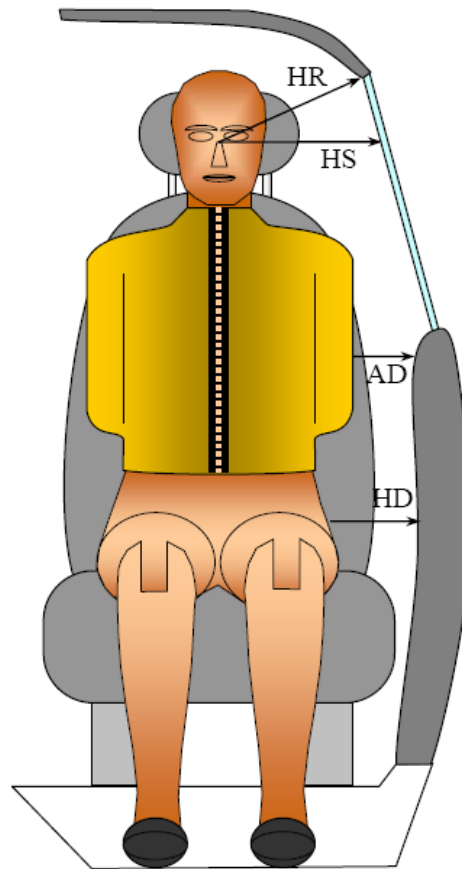
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Description	Driver (Serial No. F033)		Passenger (Serial No.300)	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	530			
HW		Header to Windshield	721			
HZ	HZ	Head to Roof Liner	204		333	
NR	NB	Nose to Rim/Seat Back	476		694	
CD	CB	Chest to Dash/Seat Back	657		715	
CS		Chest to Steering Wheel	415			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	192	30.8	433	13.9
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	170	18.8	428	12.3
PAX°	PAX°	Pelvic Tilt Angle X		21.5		18.8
	PAY°	Pelvic Tilt Angle Y				0.2
PHX	PHX	Hip Point to Striker (X-Axis)	283		205	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	60		38	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2021 Ford F-250 Super Duty Crew Cab Truck
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20210214
 Test Date: 5/6/2021



FRONT VIEW OF DUMMY

DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver (Serial No.F033)	Passenger (Serial No. 300)
HR	Head to Side Header	mm	185	288
HS	Head to Side Window	mm	347	389
AD	Arm to Door	mm	126	178
HD	Hip Point to Door	mm	179	206

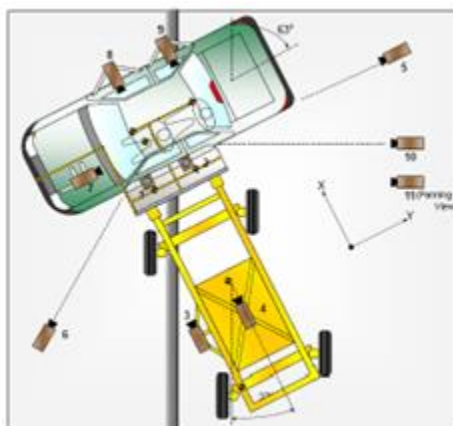
DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2021 Ford F-250 Super Duty Crew Cab Truck

NHTSA No.: M20210214

Test Program: NCAP Side MDB Impact Test

Test Date: 5/6/2021



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	0	0	-8348	12.5	1000
2	Overhead Close-up	0	0	-8348	24	1000
3	Left Impact Point (MDB)	-1470	0	-847	25	1000
4	Side Overall (MDB)	-1140	878	-1587	8	1000
5	Rear	0	9297	-1568	24	1000
6	Left Front	-3985	-5620	-1477	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	1000
11	Real-time In run				Zoom	1000

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

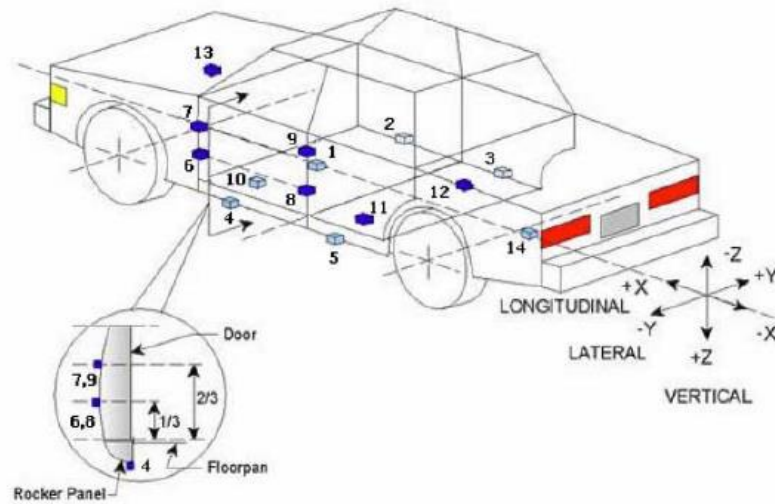
INSTRUMENTATION

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: 2021 Ford F-250 Super Duty Crew Cab Truck
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20210214
Test Date: 5/6/2021



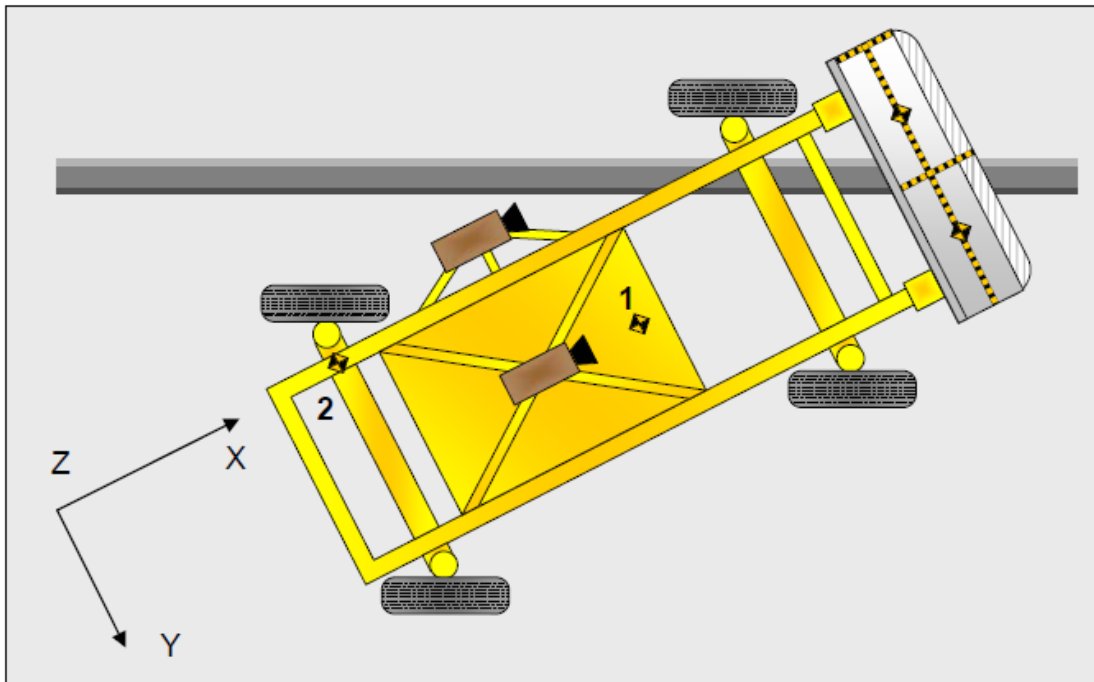
TEST VEHICLE ACCELEROMETER LOCATIONS

No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	4008	10	-300
2	Right Sill at Front Seat	4505	794	-74
3	Right Sill at Rear Seat	2859	785	-111
4	Left Sill at Front Door	4453	-819	-85
5	Left Sill at Rear Door	2865	-794	-118
6	A-Post Lower	4623	-767	-401
7	A-Post Middle	4618	-736	-929
8	B-Post Lower	3486	-761	-460
9	B-Post Middle	3486	-757	-840
10	Front Seat Track	3759	-644	-241
11	Rear Seat Structure	2791	-657	-309
12	Rt. Rear Occ. Compartment	3249	441	-183
13	Engine Block	5300	15	-651
14	Rear Above Axle	1358	-10	-343

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:	<u>2021 Ford F-250 Super Duty Crew Cab Truck</u>	NHTSA No.:	<u>M20210214</u>
Test Program:	<u>NCAP Side MDB Impact Test</u>	Test Date:	<u>5/6/2021</u>



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)

Width between left and right contact switches (mm):

1485

DATA SHEET NO. 8
POST-TEST OBSERVATIONS

Test Vehicle:	2021 Ford F-250 Super Duty Crew Cab Truck	NHTSA No.:	M20210214
Test Program:	NCAP Side MDB Impact Test	Test Date:	5/6/2021

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Front Seat Dummy (ES-2re)	Rear Seat Dummy (SID-IIs)
Face	None	None
Top of Head	Side Headliner	Curtain Airbag
Left Side of Head	Curtain Airbag & Side Headliner	Curtain Airbag
Back of Head	Side Headliner & Headrest	C-Pillar, Seatbelt & Seatback
Left Shoulder	Curtain & Torso/Pelvis Airbag	Curtain Airbag
Upper Torso	Seatback & Torso/Pelvis Airbag	None
Lower Torso	Seatback	None
Left Hip	Seatpan & Torso/Pelvis Airbag	Seatpan
Left Knee	Driver Door	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	Driver window has cracks throughout
Other Notable Effects	None

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

Test Vehicle:	<u>2021 Ford F-250 Super Duty Crew Cab Truck</u>	NHTSA No.:	<u>M20210214</u>
Test Program:	<u>NCAP Side MDB Impact Test</u>	Test Date:	<u>5/6/2021</u>

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	No	N/A		
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	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Other				

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		4062
Vertical Impact Reference Line (Aft of Front Axle - Intended Impact Point)	mm		508
Actual Impact Point (Aft of Frontal Axle)	mm		508
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact Point	0
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact Point	0

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2021 Ford F-250 Super Duty Crew Cab Truck
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20210214
Test Date: 5/6/2021

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	61.89
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	87
B	Top of Bumper	533	700	Right	124
C	Mid-Level	686	800	Right	197
D	Top of Stack	813	800	Right	264

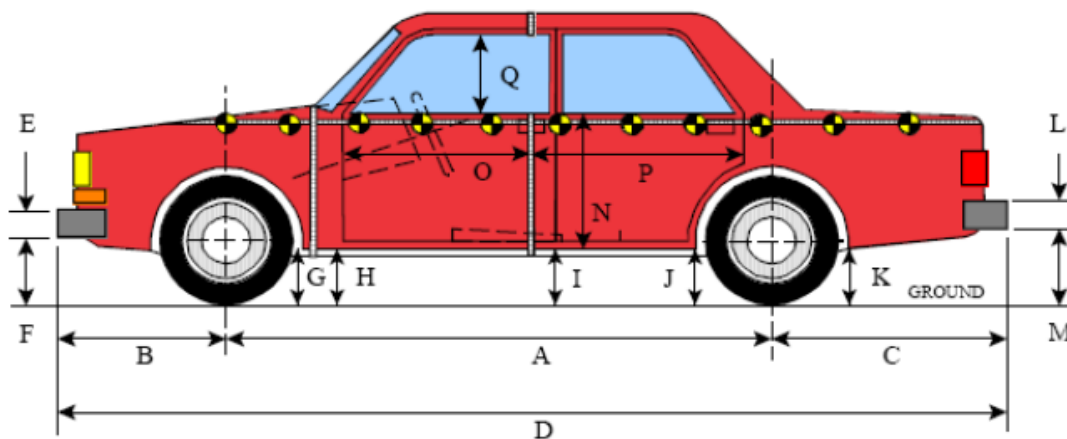
DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2021 Ford F-250 Super Duty Crew Cab Truck

NHTSA No.: M20210214

Test Program: NCAP Side MDB Impact Test

Test Date: 5/6/2021



LEFT SIDE VIEW

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

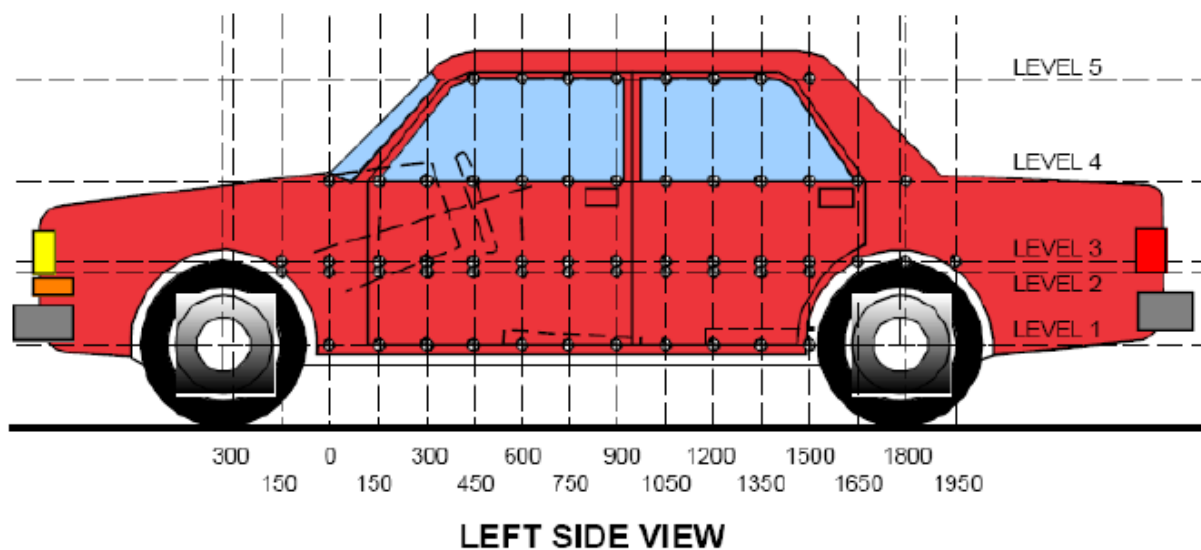
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Wheelbase	4062	4063	1
B	Front Axle to FSOV	973	968	-5
C	Rear Axle to RSOV	1325	1319	-6
D	Total Length at Centerline	6359	6350	-9
E	Front Bumper Thickness	224	224	0
F	Front Bumper Bottom to Ground	375	400	25
G	Sill Height at Front Wheel Well	436	425	-11
H	Sill Height at Front Door Leading Edge	467	464	-3
I	Sill Height at B Pillar	504	490	-14
J1	Sill Height at Rear Wheel Well	499	501	2
J2	Pinch Weld Height at Rear Wheel Well	373	372	-1
K	Sill Height Aft of Rear Wheel Well	518	504	-14
L	Rear Bumper Thickness	221	221	0
M	Rear Bumper Bottom to Ground	523	514	-9
N	Sill Height to Window Bottom of Front Window Sill	873	880	7
O	Front Door Leading Edge to Impact CL	678	674	-4
P	Rear Door Trailing Edge to Impact CL	1550	1515	-35
Q	Front Window Opening	496	474	-22
R	Right Side Length	6293	6288	-5
S	Left Side Length	6296	6296	0
T	Maximum Vehicle Width	2018	1926	-92

DATA SHEET NO. 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2021 Ford F-250 Super Duty Crew Cab Truck
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20210214
 Test Date: 5/6/2021



MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	544	197	1500
2	Driver Hip Point	mm	991	138	1650
3	Mid-Door	mm	905	151	1650
4	Window Sill	mm	1235	59	1500
5	Window Top	mm	1877	4	2400

*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: 2021 Ford F-250 Super Duty Crew Cab Truck
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20210214
 Test Date: 5/6/2021

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

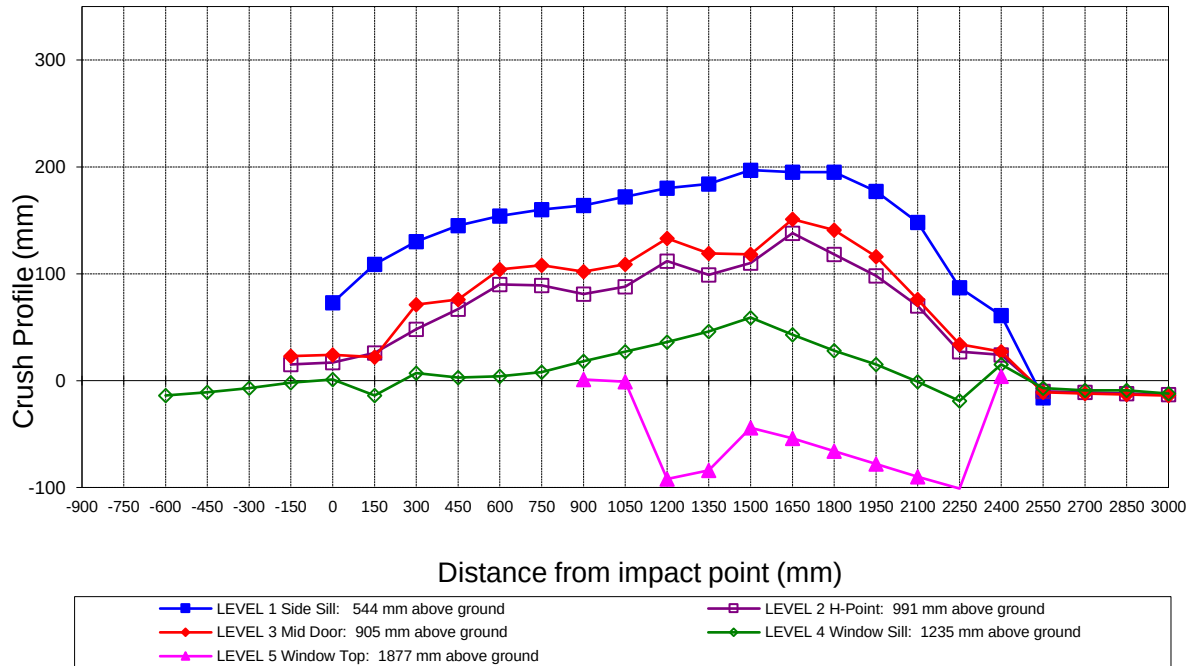
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750															
-600				928					942					-14	
-450				940					951					-11	
-300				949					956					-7	
-150		1003	1010	957			988	987	959			15	23	-2	
0	980	991	991	964		907	974	974	963		73	17	17	1	
150	978	993	995	969		869	967	973	983		109	26	22	-14	
300	974	997	995	973		844	949	924	966		130	48	71	7	
450	977	1000	997	978		832	933	921	975		145	67	76	3	
600	981	1002	999	983		827	912	895	979		154	90	104	4	
750	984	1005	1001	987		824	916	893	979		160	89	108	8	
900	986	1007	1003	991	730	822	926	901	973	729	164	81	102	18	1
1050	988	1008	1004	994	730	816	920	895	967	731	172	88	109	27	-1
1200	988	1009	1006	996	737	808	897	873	960	829	180	112	133	36	-92
1350	988	1010	1007	998	741	804	911	888	952	825	184	99	119	46	-84
1500	986	1008	1003	999	744	789	898	885	940	788	197	110	118	59	-44
1650	985	1008	1003	1000	747	790	870	852	957	801	195	138	151	43	-54
1800	985	1008	1003	1000	749	790	890	862	972	815	195	118	141	28	-66
1950	986	1009	1004	1001	751	809	911	888	986	829	177	98	116	15	-78
2100	984	1009	1004	997	753	836	939	928	998	843	148	70	76	-1	-90
2250	983	1008	1004	998	756	896	981	970	1017	857	87	27	34	-19	-101
2400	984	1007	1004	1001	733	923	983	977	986	729	61	24	27	15	4
2550	976	999	996	994		992	1009	1007	1001		-16	-10	-11	-7	
2700		999	996	996			1010	1008	1005			-11	-12	-9	
2850		1000	997	996			1012	1010	1005			-12	-13	-9	
3000		1005	1011	994			1018	1025	1006			-13	-14	-12	

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: 2021 Ford F-250 Super Duty Crew Cab Truck
 Test Program: NCAP Side MDB Impact Test

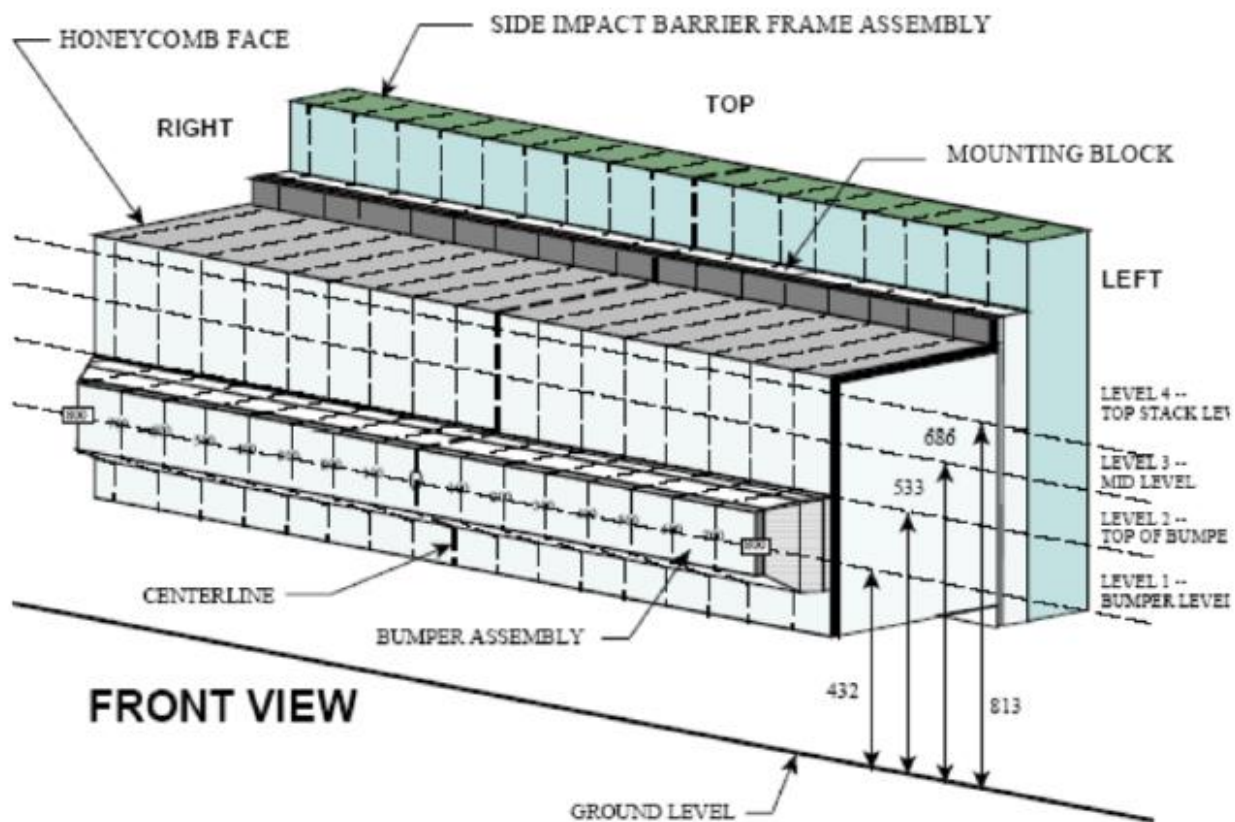
NHTSA No.: M20210214
 Test Date: 5/6/2021



Vehicle Exterior Crush Measurements - Visual Representation

DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle:	2021 Ford F-250 Super Duty Crew Cab Truck	NHTSA No.:	M20210214
Test Program:	NCAP Side MDB Impact Test	Test Date:	5/6/2021



NOTE: Dimensions are shown in millimeters, mm

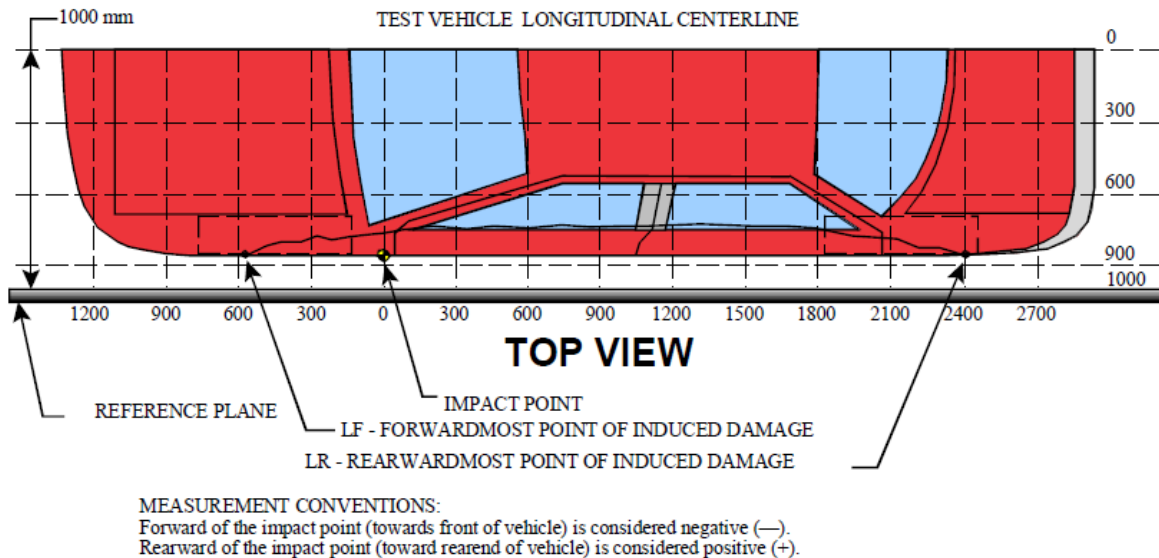
DEFORMABLE BARRIER STATIC CRUSH

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	87	79	75	73	73	74	74	73	72	71	69	67	66	65	65	67	73
2	124	119	119	117	112	109	107	107	109	108	106	102	99	97	98	103	107
3	197	176	162	153	145	163	156	148	142	142	147	149	151	153	158	161	172
4	264	238	219	202	199	197	220	199	206	209	202	191	180	176	182	183	209

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

Test Vehicle:	<u>2021 Ford F-250 Super Duty Crew Cab Truck</u>	NHTSA No.:	<u>M20210214</u>
Test Program:	<u>NCAP Side MDB Impact Test</u>	Test Date:	<u>5/6/2021</u>

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	13	-10	23
2	480	3	84	3	81
3	1110	3	114	-5	119
4	1740	3	142	-3	145
5	2370	3	24	-4	28
6	3000	3	-25	-11	-14

MDB DAMAGE PROFILE DISTANCES

DPD	Distance From Center of MDB	Level	Post-Test (mm)*
1	800 mm left of center	1	73
2	480 mm left of center	1	65
3	160 mm left of center	1	70
4	160 mm right of center	1	74
5	480 mm right of center	1	73
6	800 mm right of center	1	87

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

Test Vehicle:	2021 Ford F-250 Super Duty Crew Cab Truck	NHTSA No.:	M20210214
Test Program:	NCAP Side MDB Impact Test	Test Date:	5/6/2021
Test Time:	10:43 AM	Temperature:	21°C

- | | | |
|---|----------------------|-----|
| 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: | No Spillage Occurred | |

FMVSS NO. 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	67	300	367
90° to 180°	65	300	365
180° to 270°	68	300	368
270° to 360°	66	300	366

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE

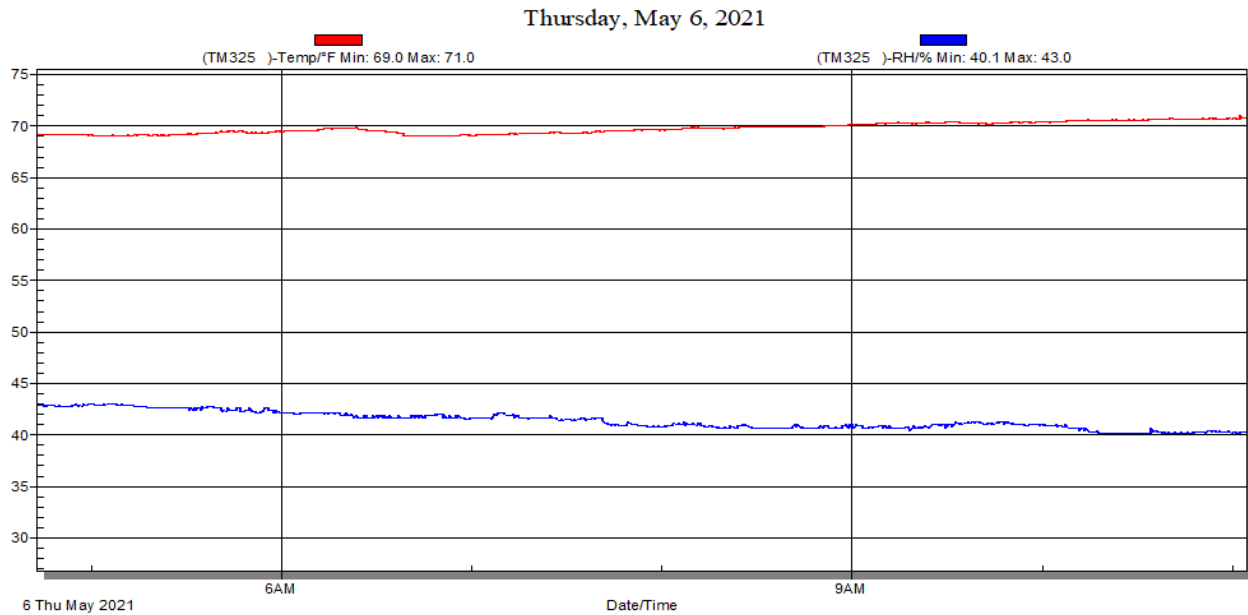
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° to 90°	0	0	0	
90° to 180°	0	0	0	
180° to 270°	0	0	0	
270° to 360°	0	0	0	

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:	<u>2021 Ford F-250 Super Duty Crew Cab Truck</u>	NHTSA No.:	<u>M20210214</u>
Test Program:	<u>NCAP Side MDB Impact Test</u>	Test Date:	<u>5/6/2021</u>



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

APPENDIX A

PHOTOGRAPHS

Note: Photograph placards show “2021 Ford F-250 Super Duty” instead of “2021 Ford F-250 Crew Cab Pickup Truck”.

TABLE OF PHOTOGRAPHS

Fig.	Description	Page
1	As-Delivered Right Front 3/4 View of Test Vehicle	A-5
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3	Pre-Test Frontal View of Test Vehicle	A-6
4	Post-Test Frontal View of Test Vehicle	A-6
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19	Pre-Test Close-Up View of Impact Point Target	A-14
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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 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

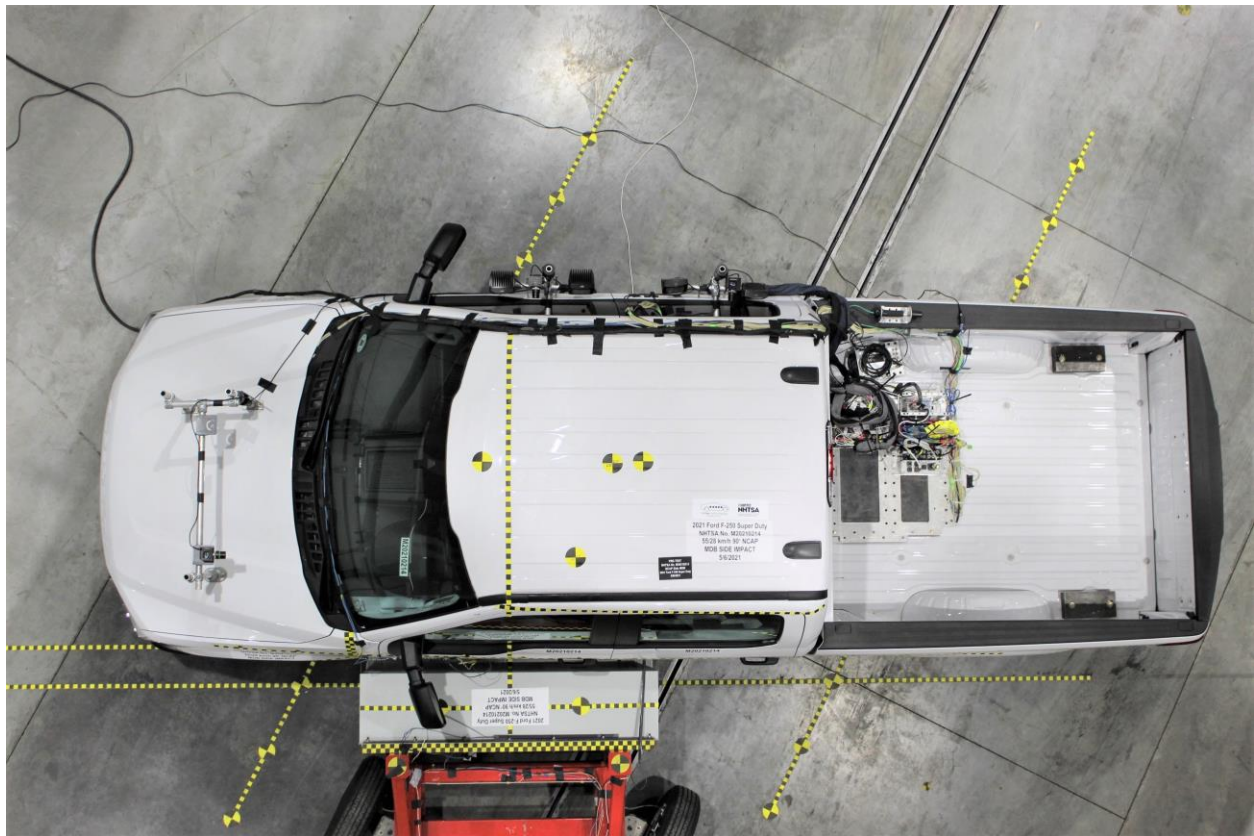


Figure A-15: Pre-Test Overhead View of the Test Area

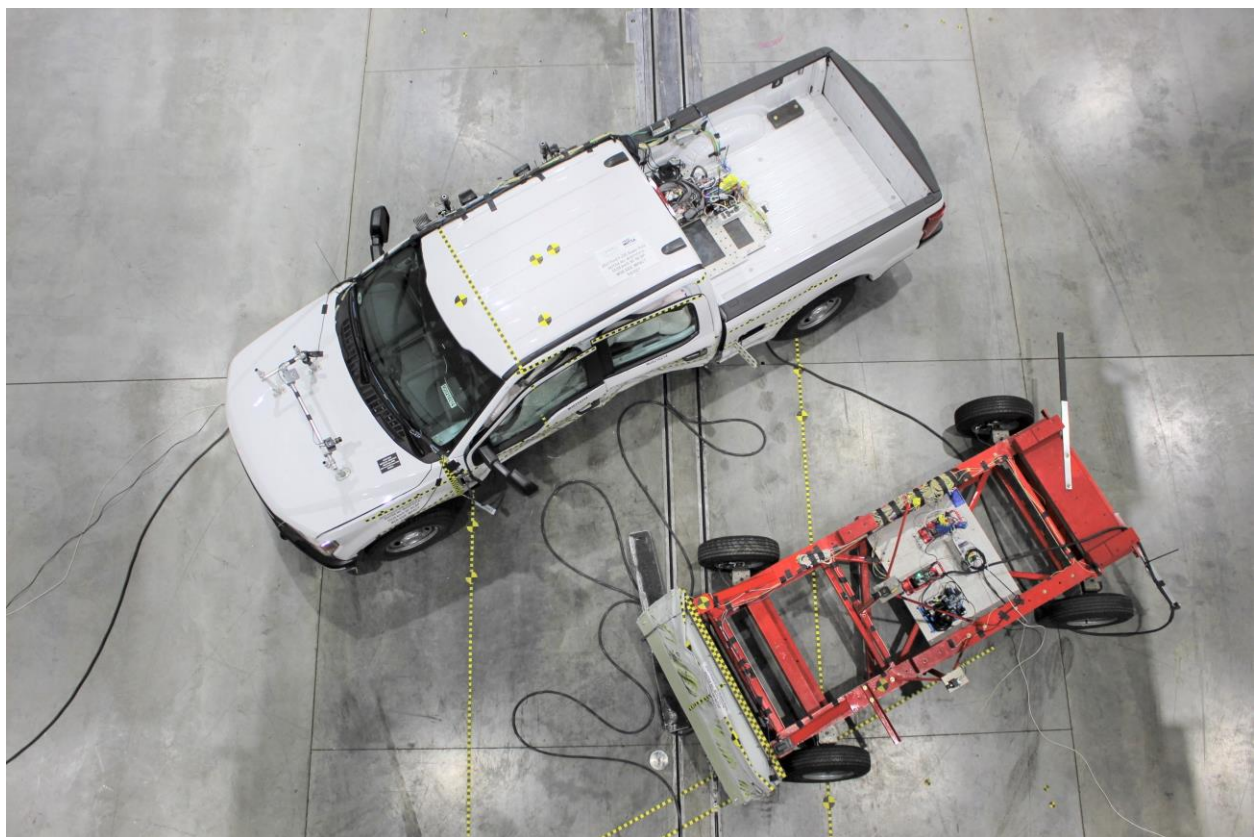


Figure A-16: Post-Test Overhead View of Test Area



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

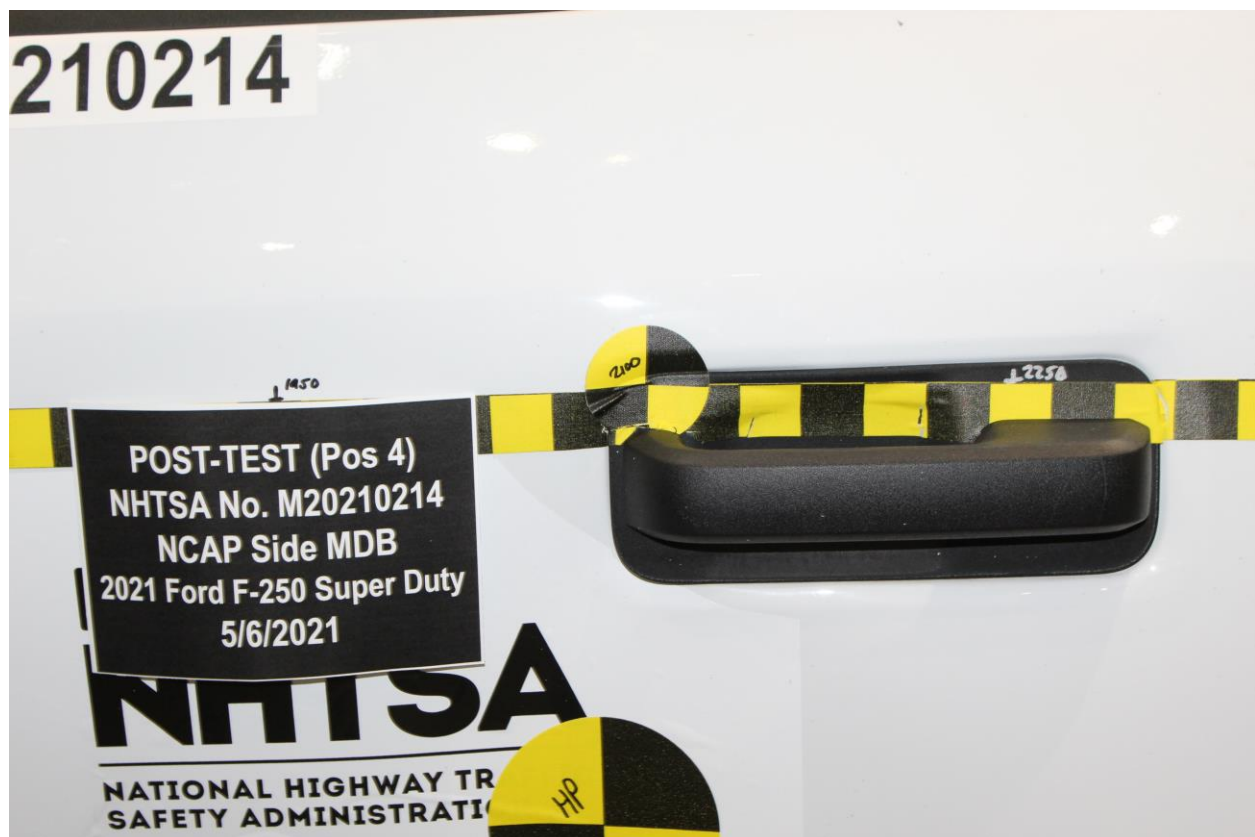


Figure A-24: Post-Test Left Rear Door Latch Close-Up

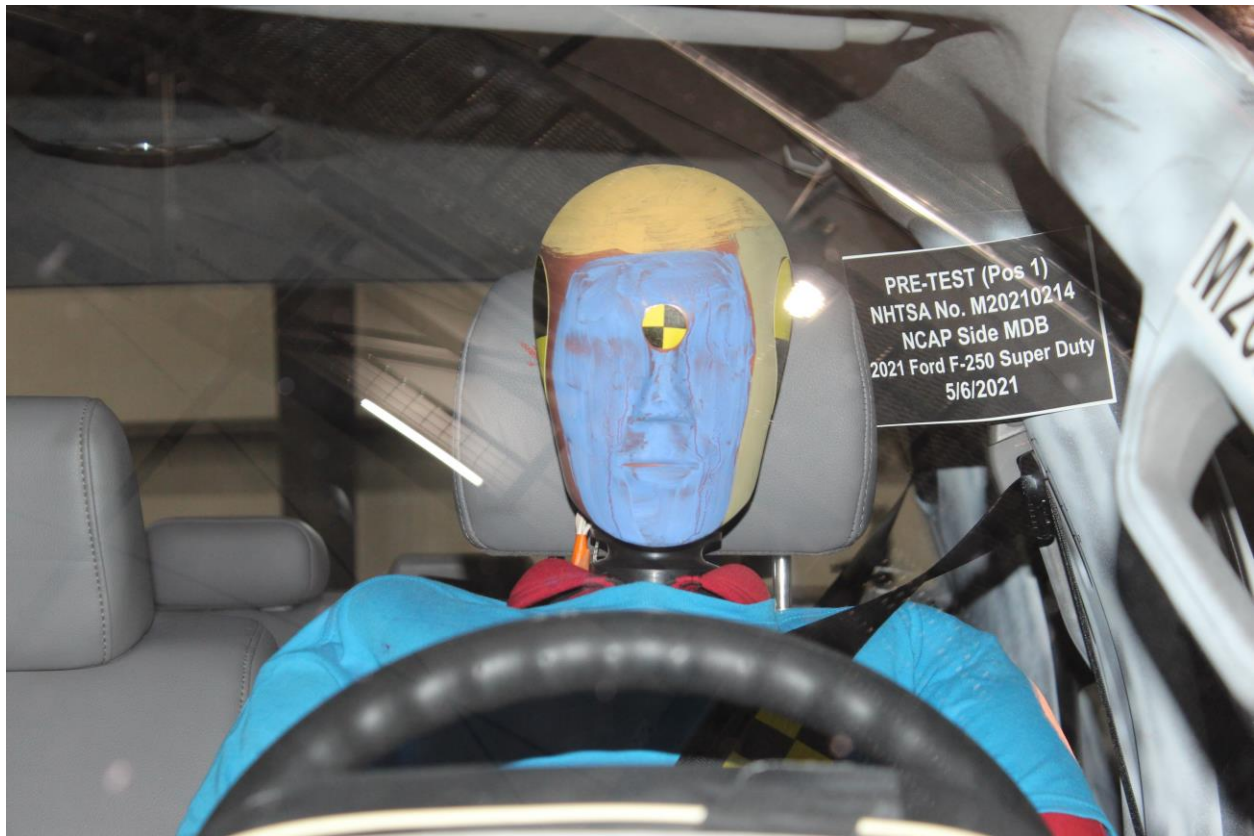


Figure A-25: Pre-Test Front Close-up View of Driver Dummy



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

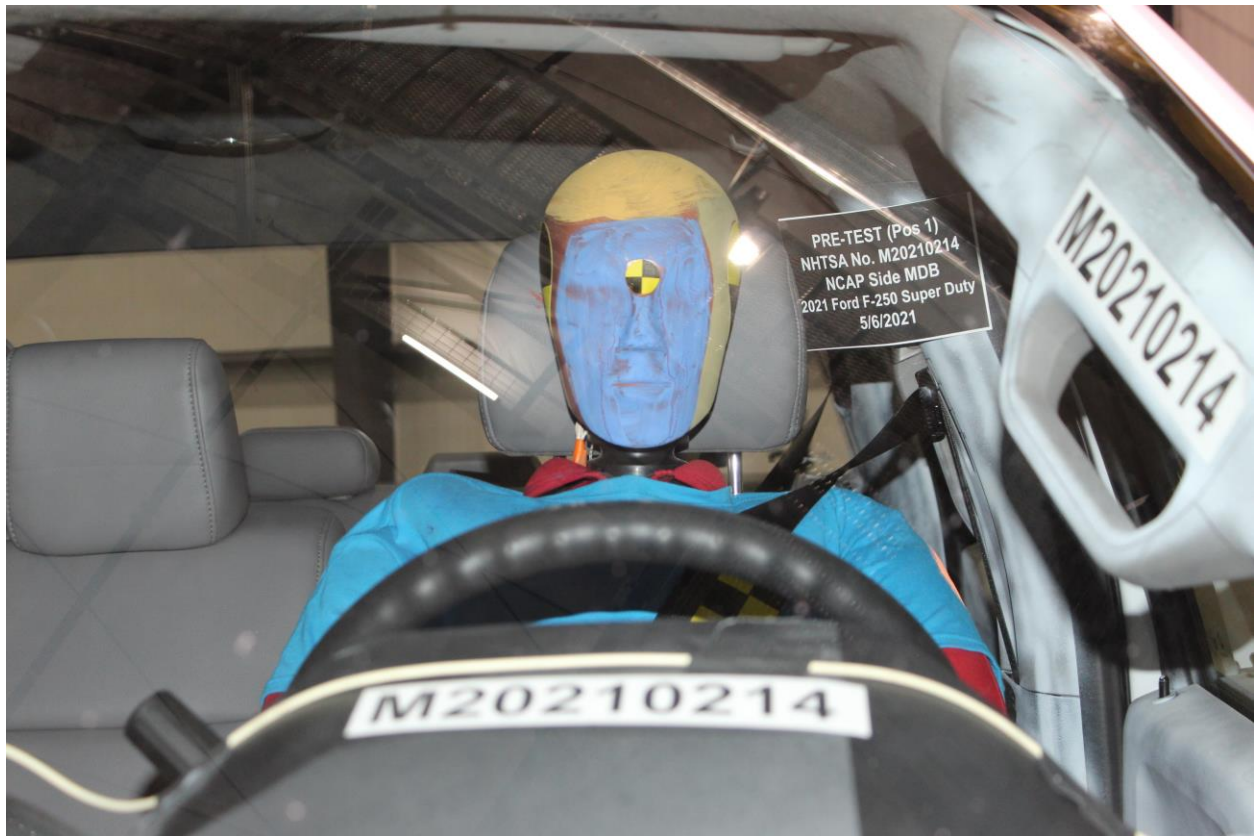


Figure A-31: Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint



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

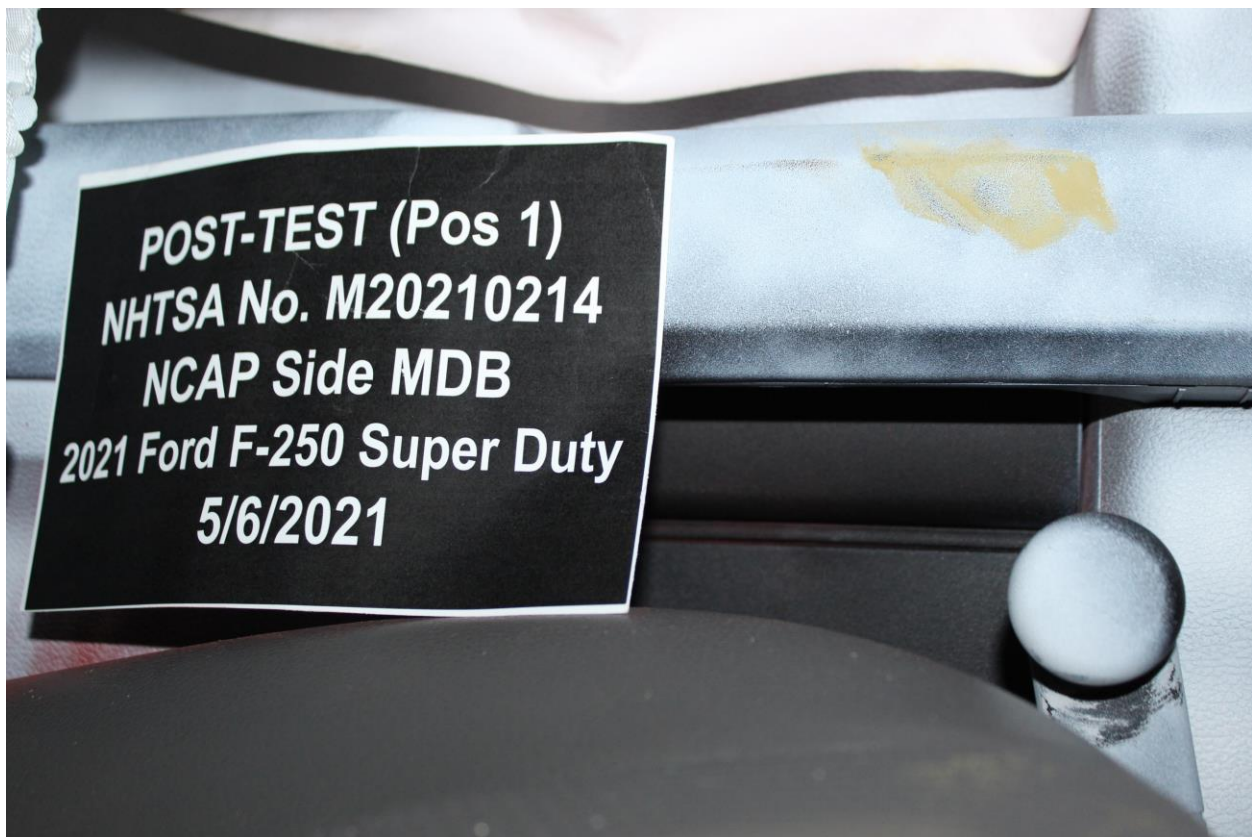


Figure A-54: Post-Test Driver Dummy Close-Up Knee Contact View



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

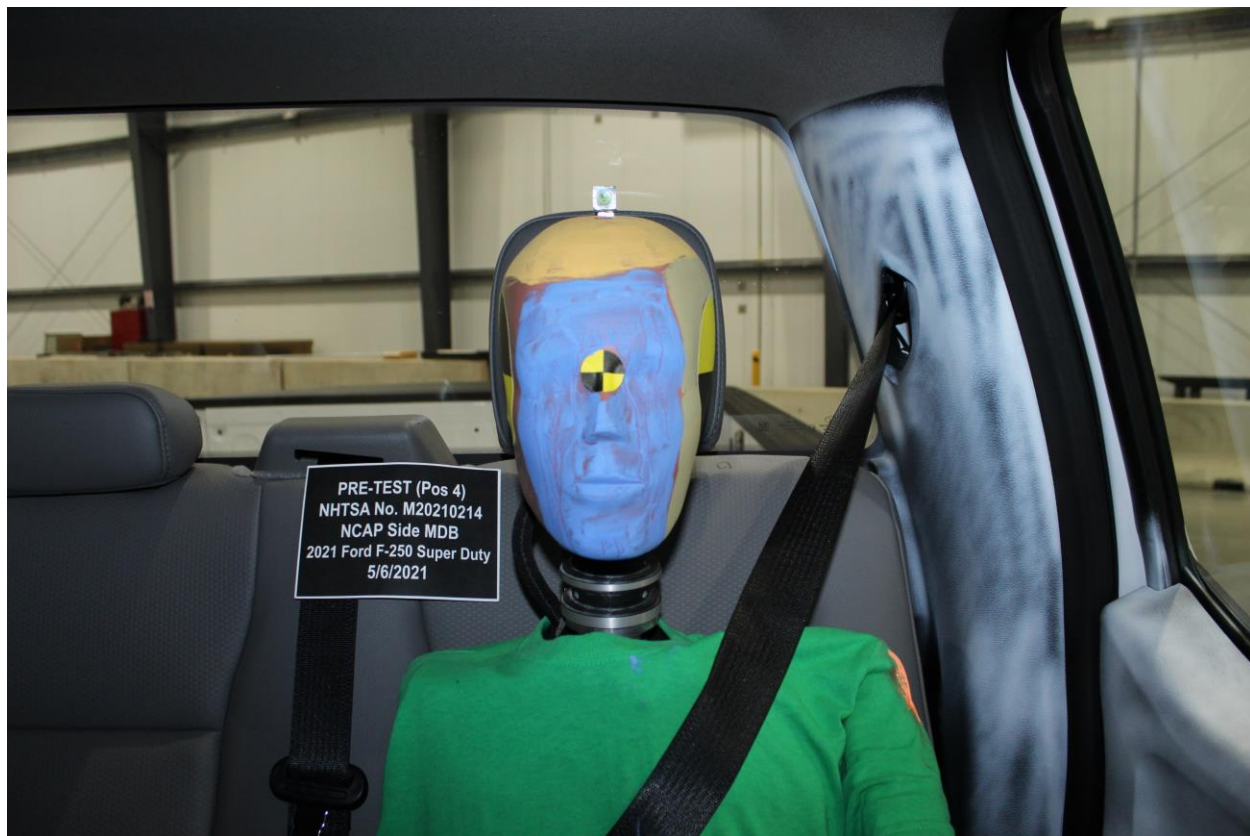


Figure A-59: Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint



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

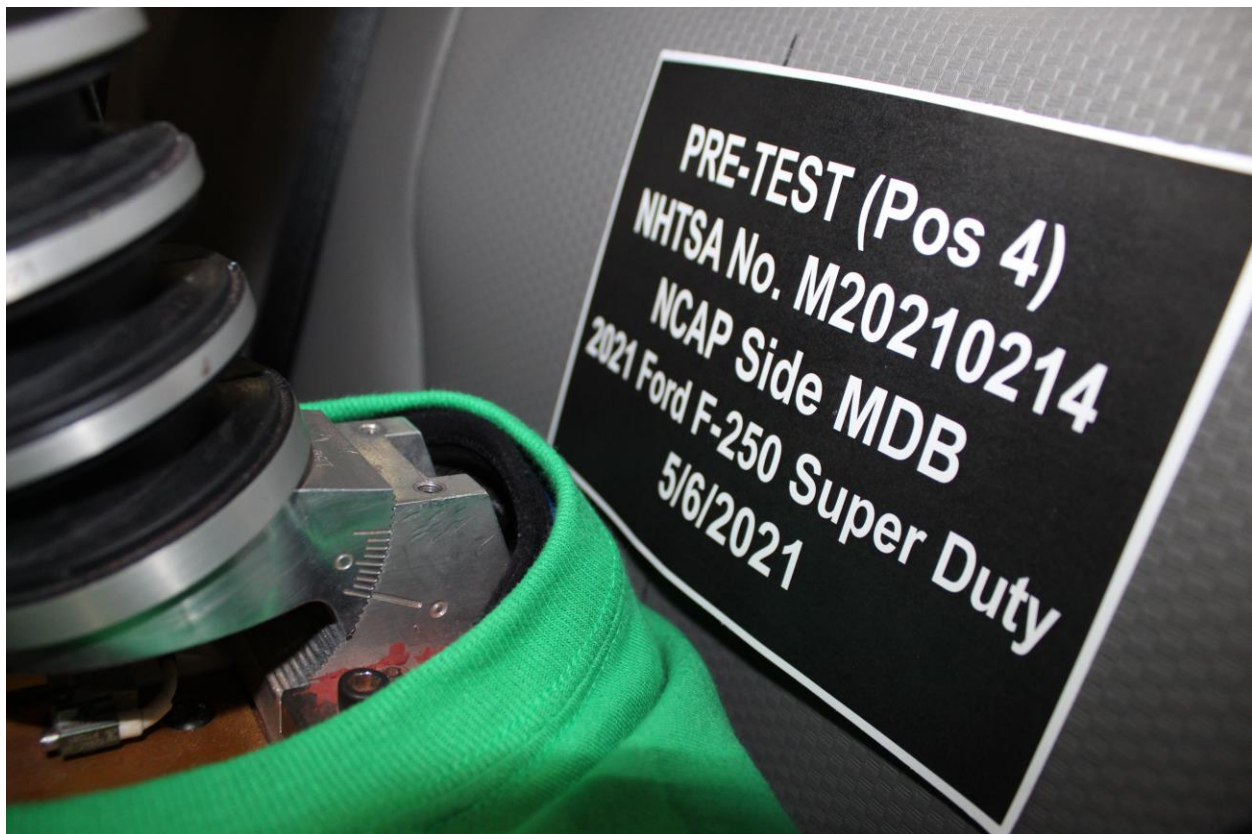


Figure A-62: Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket



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

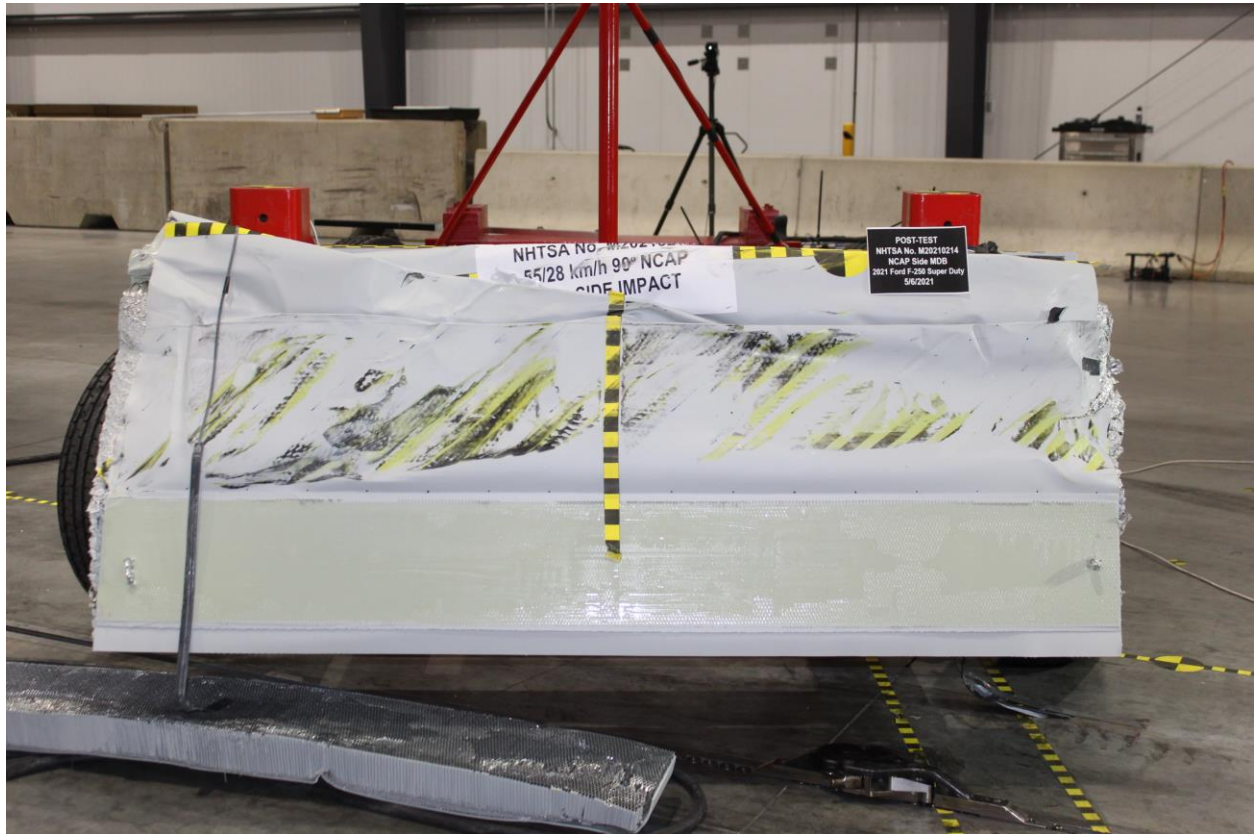


Figure A-85: Post-Test Front View of MDB Impactor Face



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



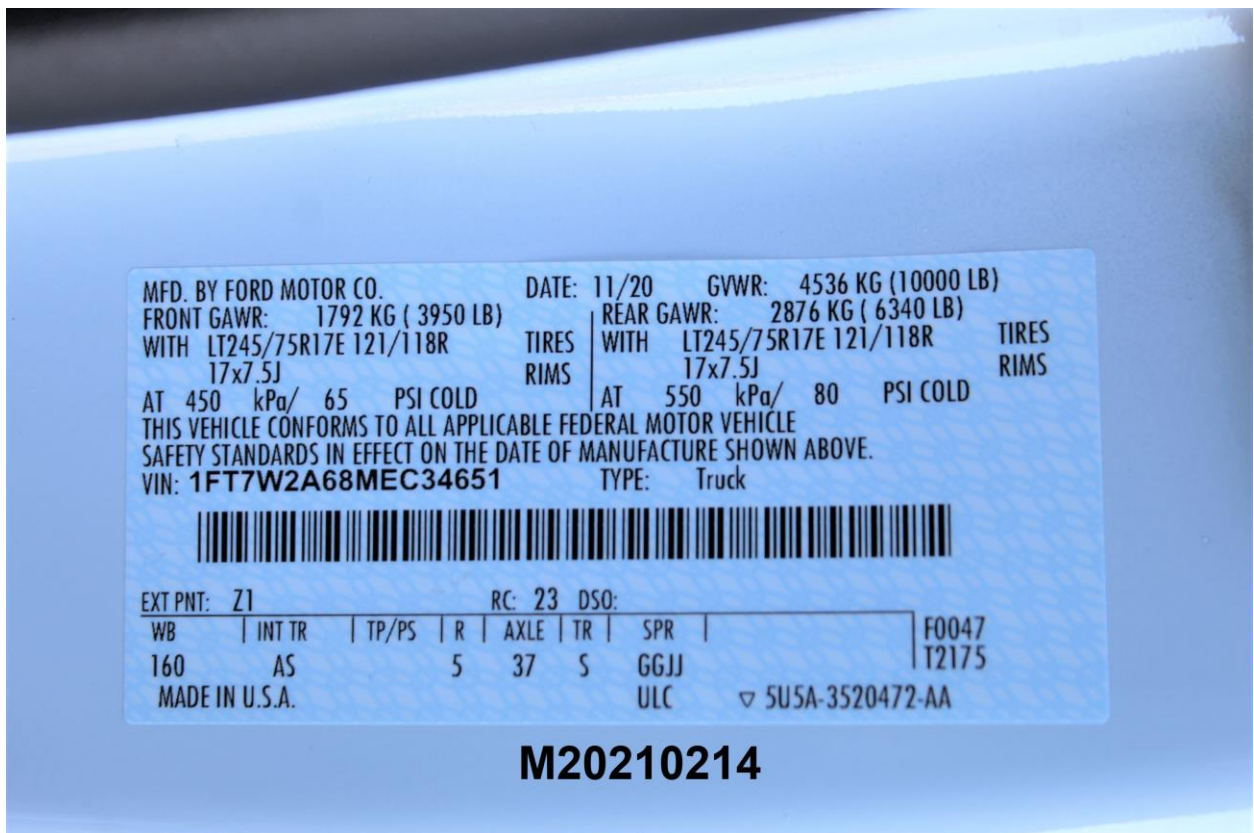
Figure A-89: Post-Test Left Side View of MDB Impactor Face



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



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



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

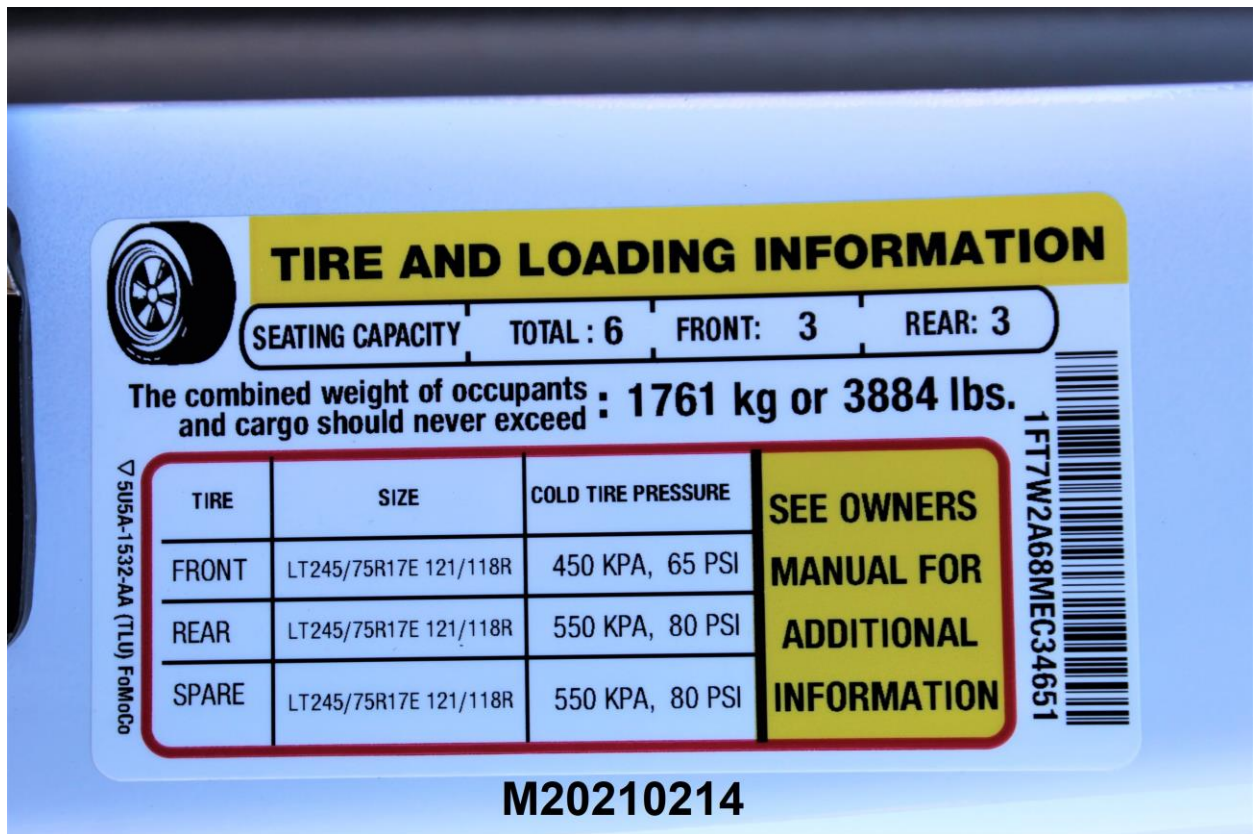


Figure A-93: Close-Up View of Vehicle's Tire Information Placard or Label



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

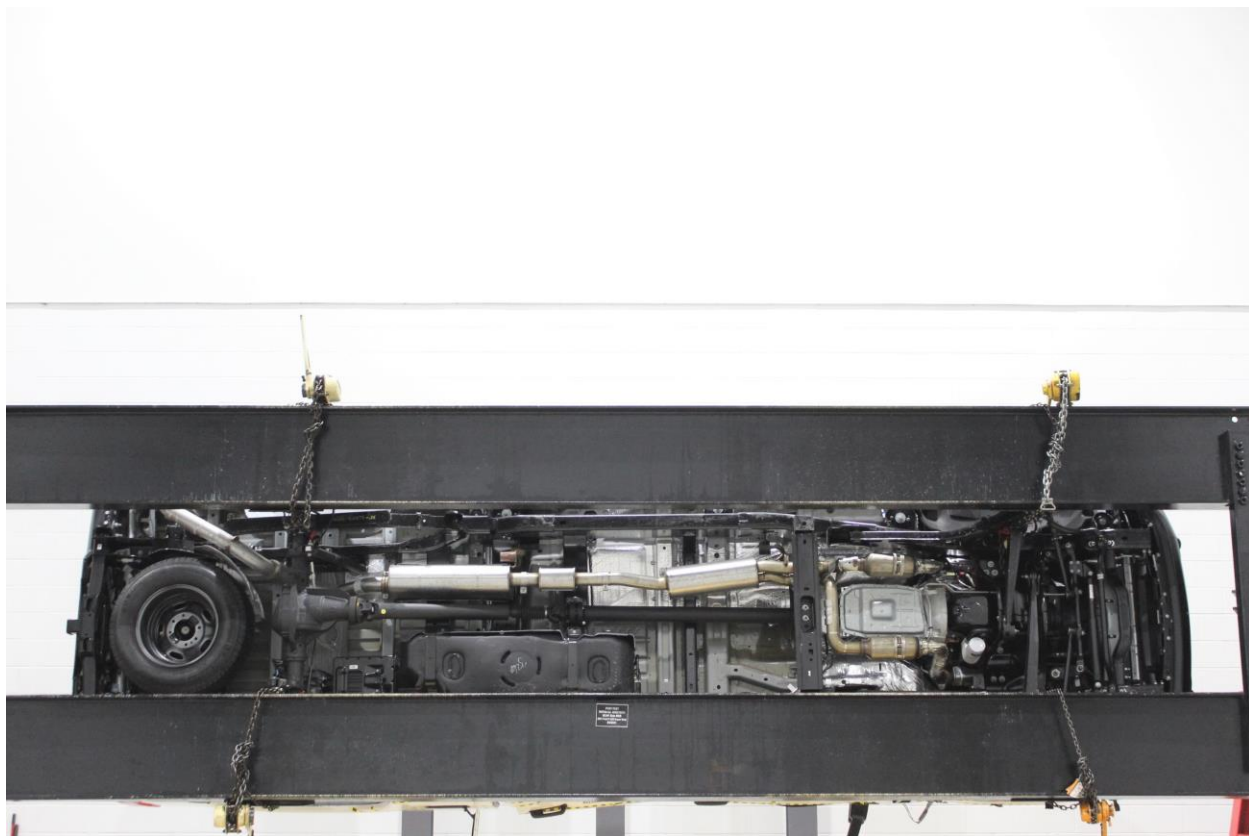


Figure A-97: FMVSS No. 301 Static Rollover 90 Degrees



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

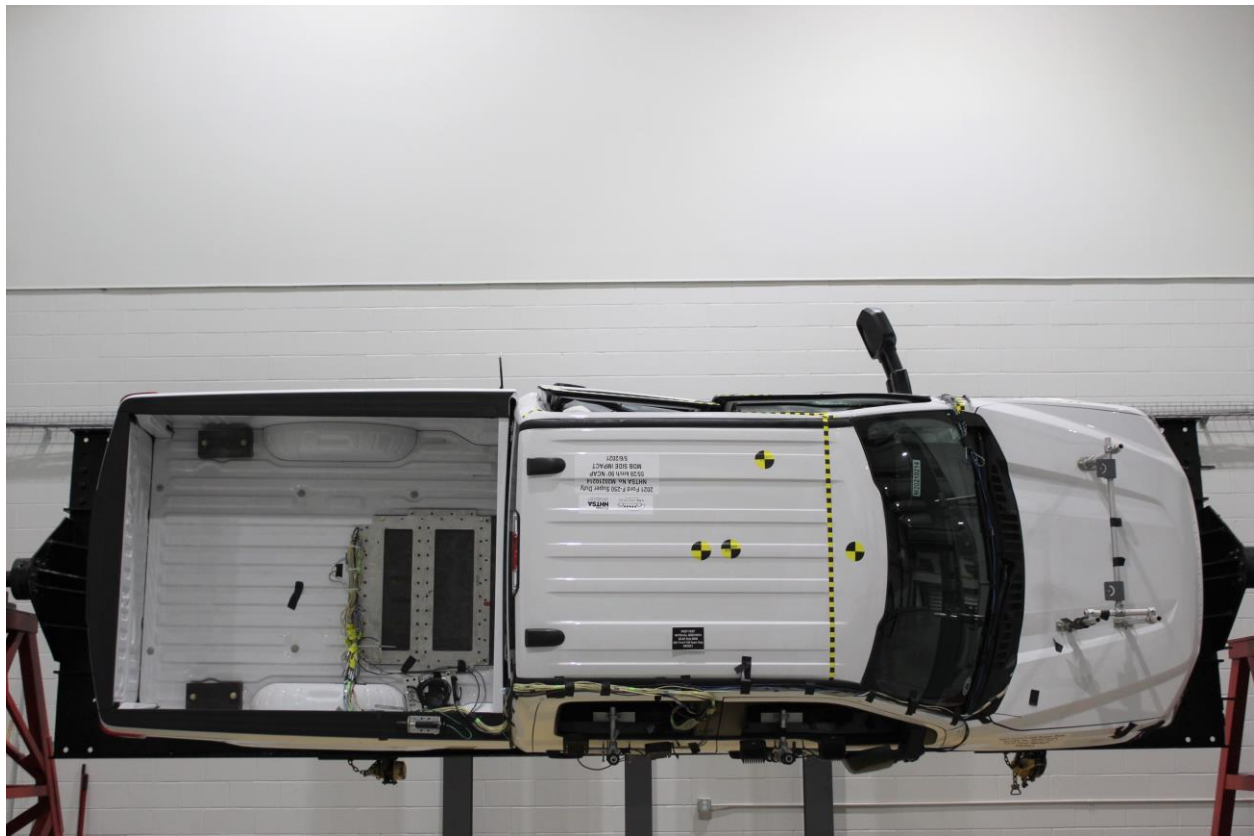


Figure A-99: FMVSS No. 301 Static Rollover 270 Degrees



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



Figure A-101: Impact Event

VEHICLE DESCRIPTION

Go Further

ford.com

SUPER DUTY

2021 F250 SRW 4X2 CREW CAB
XL 160" WB STYLEIDE
6.2L EPI V8 ENGINE
6-SPEED AUTOMATIC TRANS G

EXTERIOR
OXFORD WHITE
INTERIOR
MEDIUM EARTH GRAY VINYL

ME C34651

STANDARD EQUIPMENT INCLUDED AT NO EXTRA CHARGE

EXTERIOR

- BOX RAIL/TAILORED MOLDINGS
- DOOR HANDLES - BLACK
- HEADLAMPS - AUTOLAMP (CNOFF)
- LOCKING REMOVABLE TAILGATE
- PICKUP BOX, TIE DOWN HOOPS
- NA W/BOX DLT
- SPARE TIRE AND WHEEL LOCK
- NA W/BOX DLT
- TOW HOOPS
- TRAILER SWAY CONTROL
- WIPERS - INTERMITTENT

INTERIOR

- 60/40 REAR BENCH W/FLIP-UP/FLIP-DOWN W/ HEAD RESTRAINT
- AIR COND. MANUAL FRONT
- DRIVER SEAT-MANUAL LUMBAR
- OUTSIDE TEMP DISPLAY
- PARTICULATE AIR FILTER
- STEERING - TELESCOPIC
- WHEEL WITH AUDIO
- VINYL SUN VISORS

FUNCTIONAL

- 4-WHEEL ANTILOCK BRAKE SYS
- FORDPASS™ CONNECT 40W-FIT
- HOTSPOT TELMATEMICS MODEM
- HILL START ASSIST
- J-WEEL EFFECT HEADLAMPS
- MYKEY®
- REAR VIEW CAMERA
- NA W/BOX DLT
- TWIN I-BEAM INDEPENDENT
- FIT SUSPENSION W/STAB BAR

SAFETY/SECURITY

- ADVANCE TRACER WITH RSCB
- AIRBAGS - SAFETY CANOPY®
- BELT-MINDER CHIME
- DRIVER/PASSENGER AIR BAGS
- SECURELOCK ANTI-THEFT SYS™
- SOS POST-CRASH ALERT SYS™

WARRANTY

- 3YR/36,000 BUMPER / BUMPER
- 5YR/60,000 POWERTRAIN
- 5YR/60,000 ROADSIDE ASSIST
- 5YR/100,000 DIESEL ENGINE

INCLUDED ON THIS VEHICLE

(MSRP)

OPTIONAL EQUIPMENT/HOTDOG

- PREFERRED EQUIPMENT PKG.60A
- 6-SPEED AUTOMATIC TRANS G
- 3.73 RATIO REGULAR AXLE
- FRONT LICENSE PLATE BRACKET
- 10000H GVWR PACKAGE
- 50 STATE EMISSIONS
- SPARE TIRE AND WHEEL
- JACK
- BOX/LINK LIGHTING

- NO CHARGE
- NO CHARGE
- NO CHARGE
- NO CHARGE
- NO CHARGE
- NO CHARGE
- 75.00
- 69.00

PRICE INFORMATION

BASE PRICE	\$37,820.00
TOTAL OPTIONS/OTHER	138.00
TOTAL VEHICLE & OPTIONS/OTHER	\$7,365.00
DELIVERY	1,695.00

SOLD TO:
Marshall Ford Co., Inc.
14843 Highway 16 West
Philadelphia, MS 39350

23A 430

RAMP ONE

FINAL ASSEMBLY PLANT

KENTUCKY

TOTAL MSRP \$39,650.00

METHOD OF TRANSF.

RAMP TWO

RAIL

ITEM # 23-R00S O/T 1

Whether you decide to lease or finance your vehicle, you'll find the choices that are right for you. See your dealer for details or visit www.ford.com/finance.

SPECIAL ORDER

LL181 N RB 2X 115 001427 11 520

SHIP THROUGH

This label is affixed pursuant to the Federal Automobile Information Disclosure Act. Gasoline, license, and Title Fees, State and Local taxes are not included. Dealer installed options or accessories are not included unless listed above.

California Air Resources Board

Flexible-Fuel Vehicle Gasoline-Ethanol (E85)

Environmental Performance

These ratings are not directly comparable to the U.S. EPA/DOT light-duty vehicle label ratings. For information on how to compare, please see www.arb.ca.gov/ep_label.

Protect the environment. Choose vehicles with higher ratings:

Greenhouse Gas Rating (tailpipe only)

Using alternative fuels may change scores.

Smog Rating (tailpipe only)

Vehicle emissions are a primary contributor to climate change and smog. Ratings are determined by the California Air Resources Board based on this vehicle's measured emissions.

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score Not Rated

Based on the combined ratings of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight.

Frontal Crash	Driver Passenger	★★★★★
---------------	------------------	-------

Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.

Side Crash	Front seat Rear seat	Not Rated Not Rated
------------	----------------------	---------------------

Based on the risk of injury in a side impact.

Rollover	★★★★★
----------	-------

Based on the risk of rollover in a single-vehicle crash.

Star ratings range from 1 to 5 stars (★★★★★), with 5 being the highest. Source: National Highway Traffic Safety Administration (NHTSA). www.safercar.gov or 1-888-327-4256

1FT7W2A6MCEC34651

WARNING: Operating, servicing and maintaining a passenger vehicle, pickup truck, van, or off-road vehicle can expose you to chemicals including engine oil, carbon monoxide, phthalates, and lead, which are known to the State of California to cause cancer and birth defects or other reproductive harm. To minimize exposure, avoid breathing exhaust, do not idle the engine except as necessary, service your vehicle in a well-ventilated area and wear gloves or wash your hands frequently when servicing your vehicle. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov/passenger-vehicle)

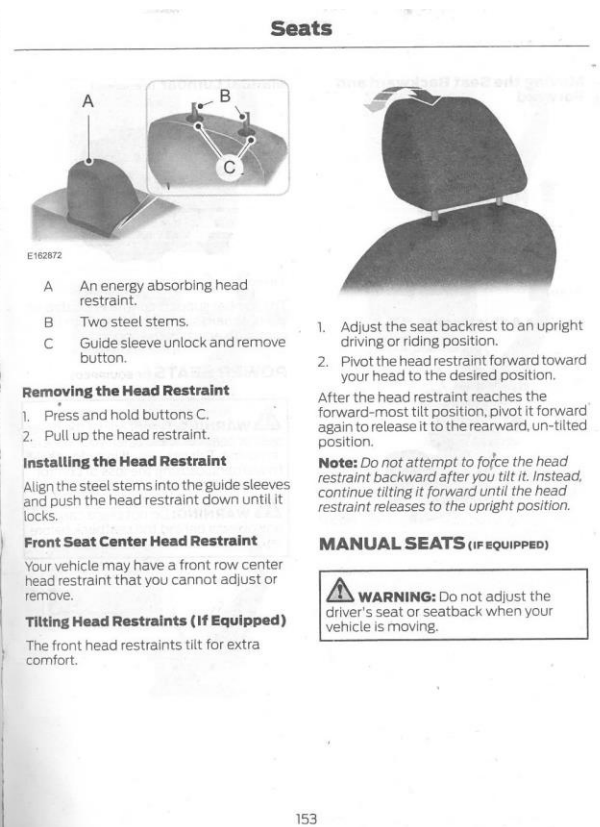
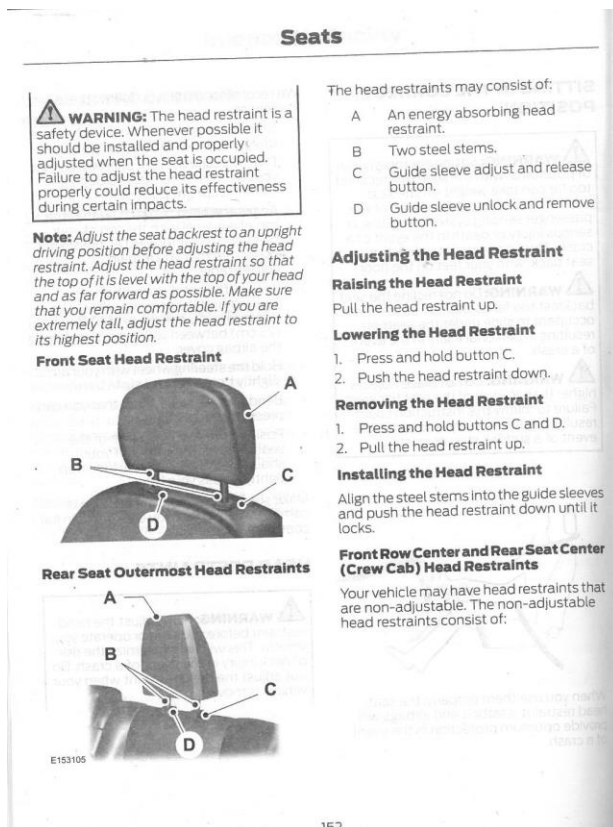


Figure A-103: Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

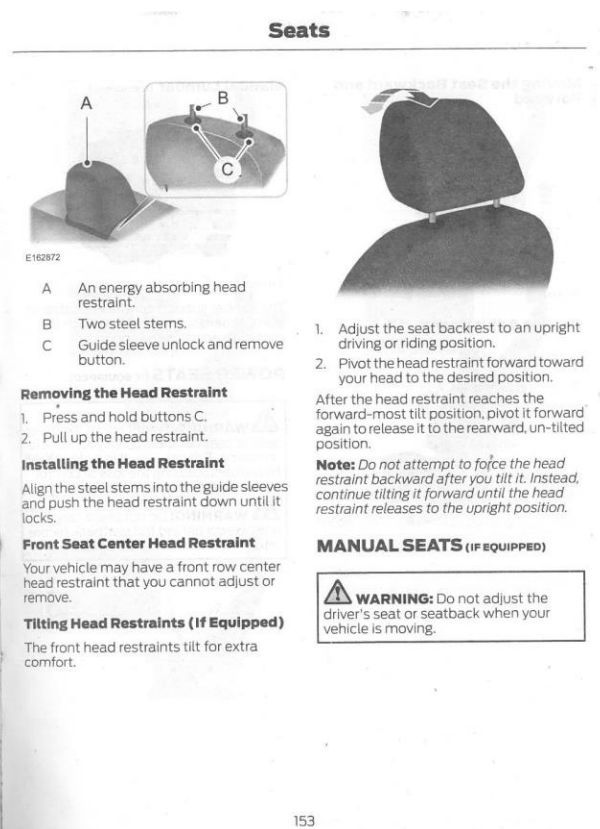
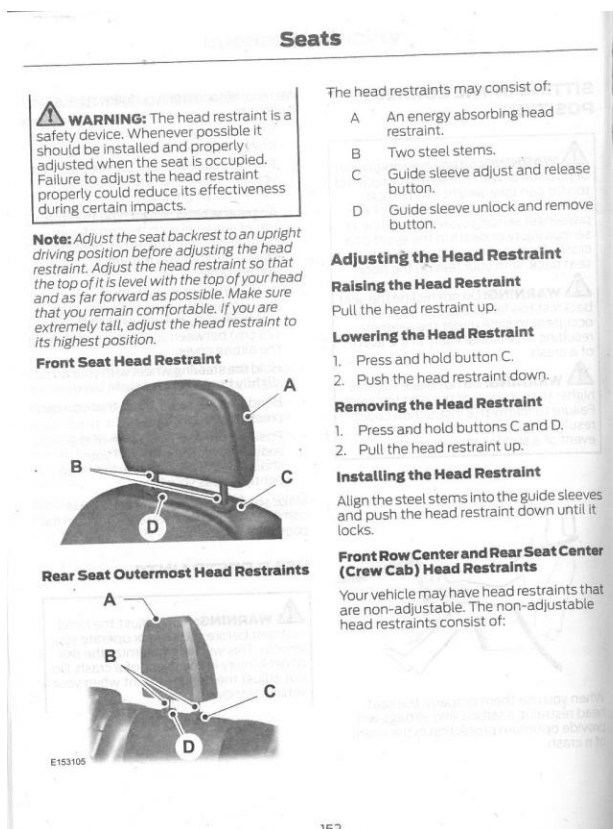


Figure A-104: Left Rear Passenger Head Restraint Use and Adjustment Information from Vehicle Owner's Manual-Rear Restraints Not Adjustable

APPENDIX B

VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

Driver & Passenger Dummy Instrumentation Plots

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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
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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

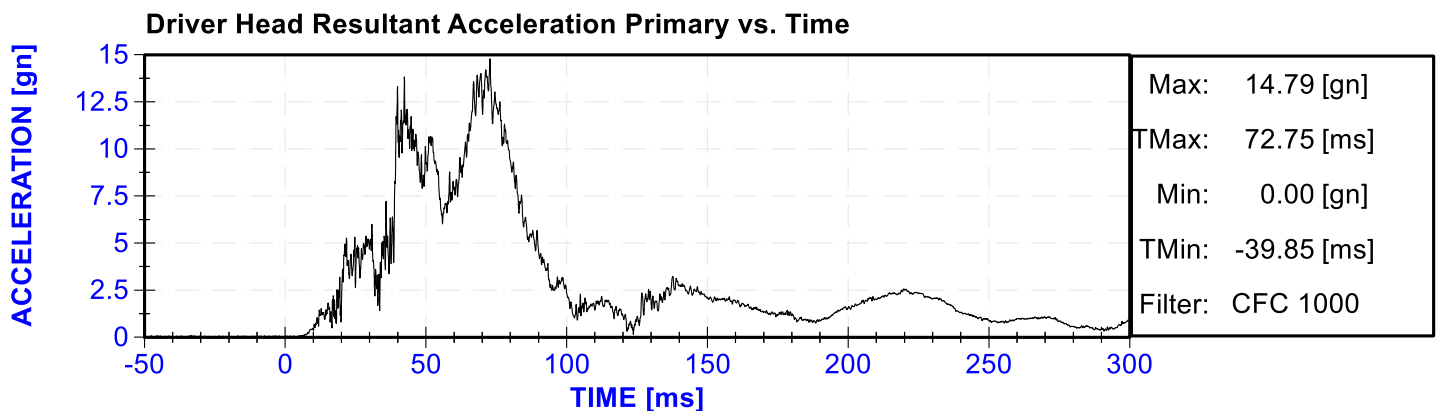
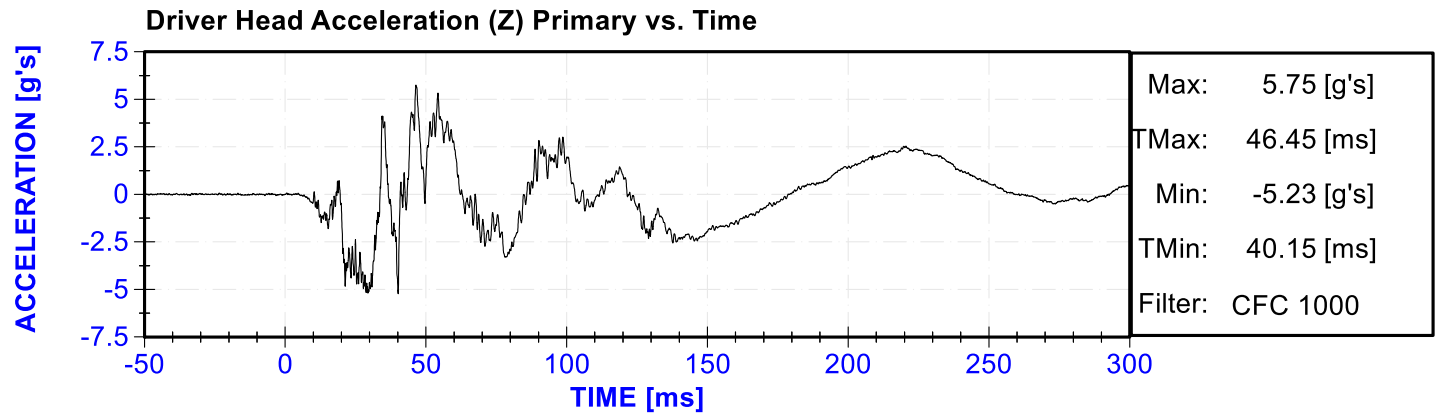
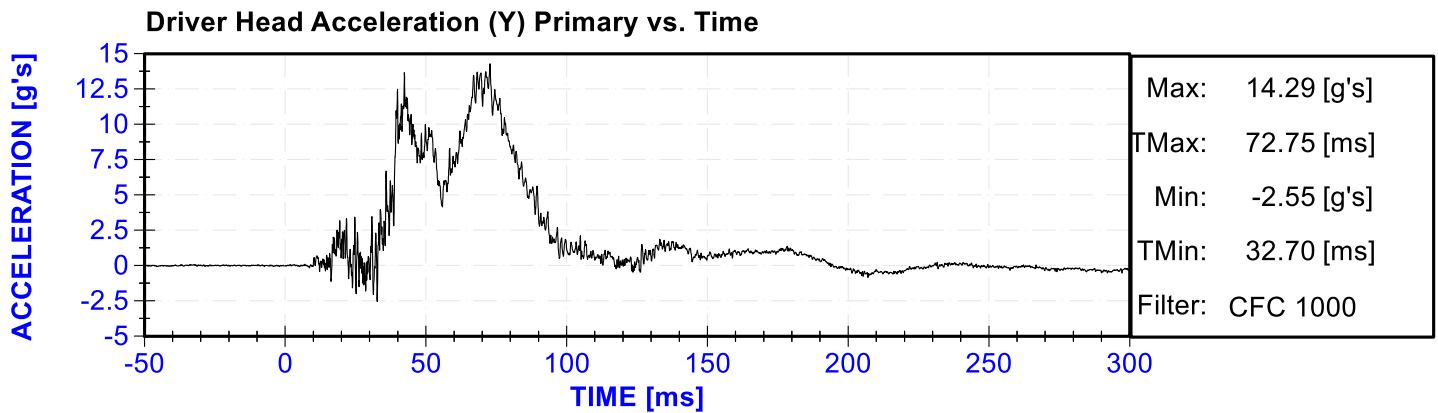
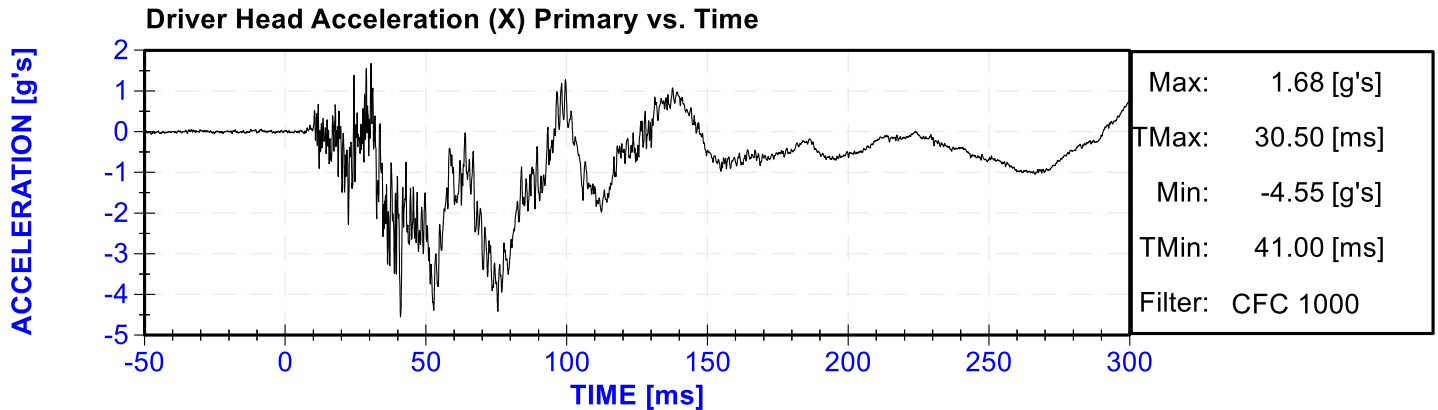
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Driver Lower Spine T12 Acceleration (Y)
Driver Lower Spine T12 Acceleration (Z)
Passenger Upper Thorax Rib Deflection (Y)
Passenger Middle Thorax Rib Deflection (Y)
Passenger Lower Thorax Rib Deflection (Y)
Passenger Upper Abdomen Rib Deflection (Y)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

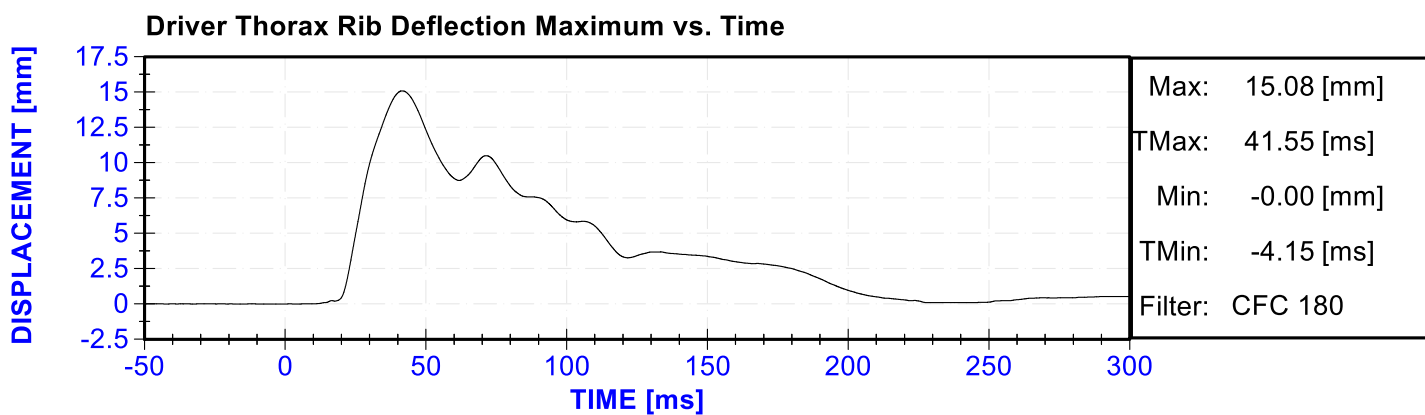
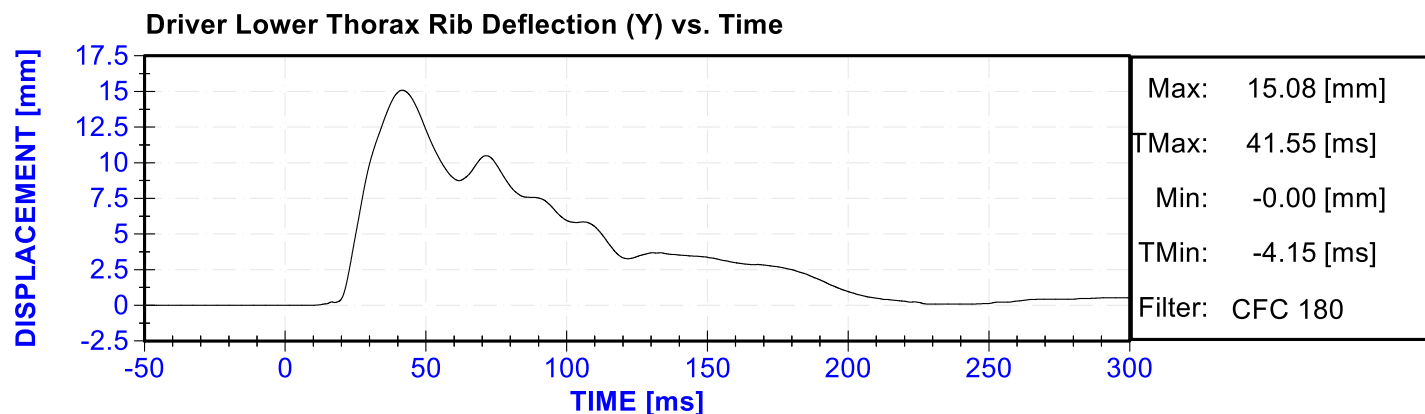
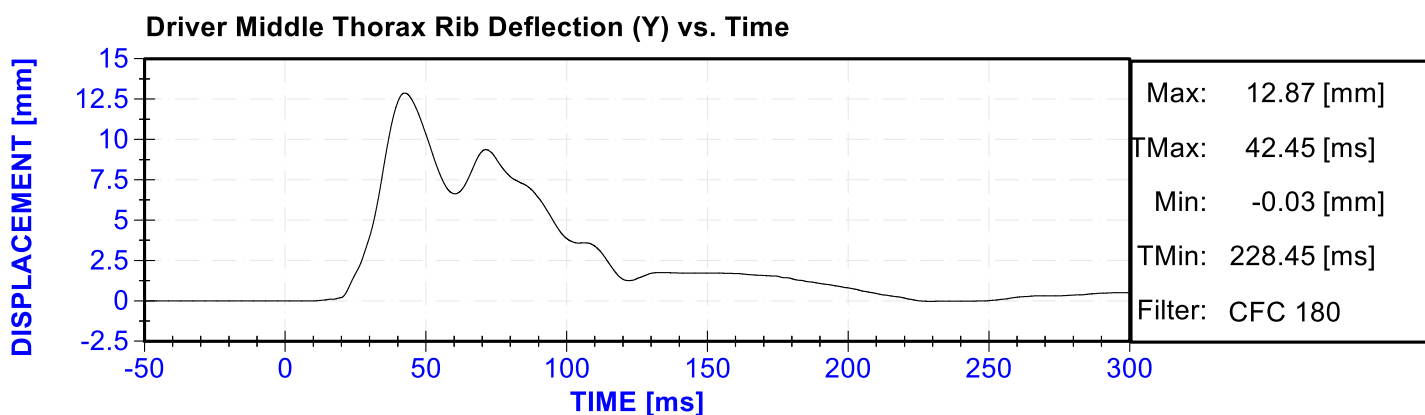
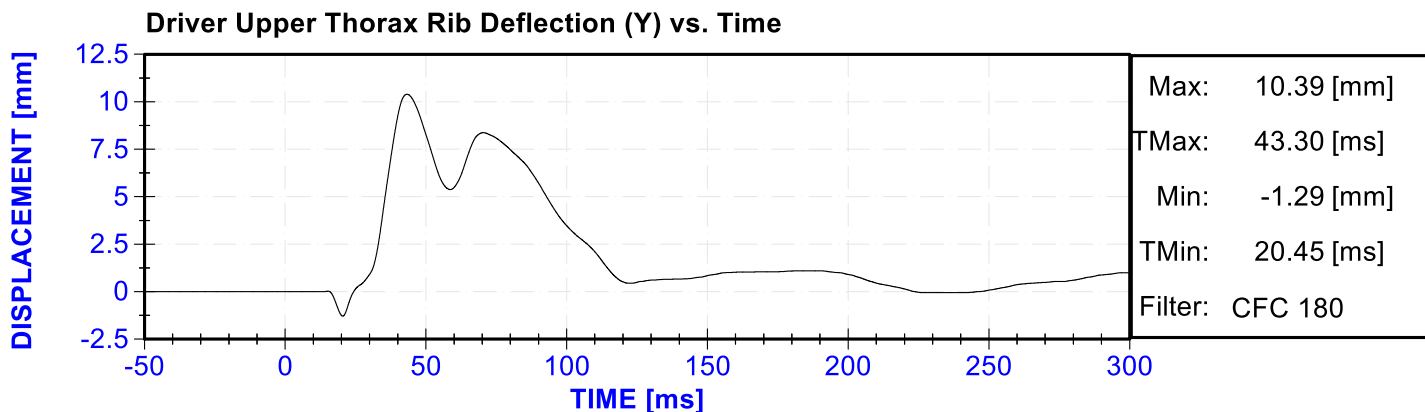
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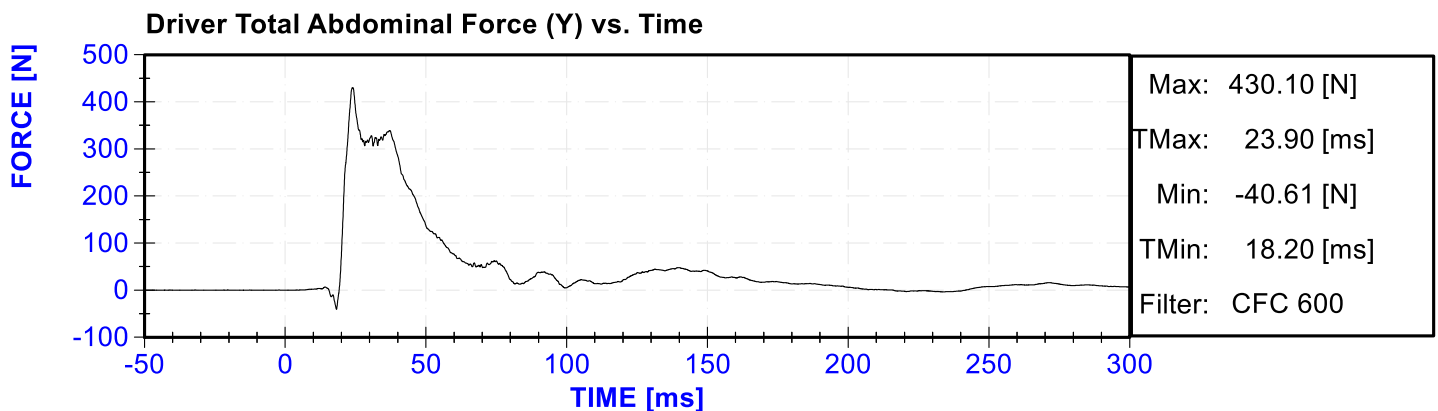
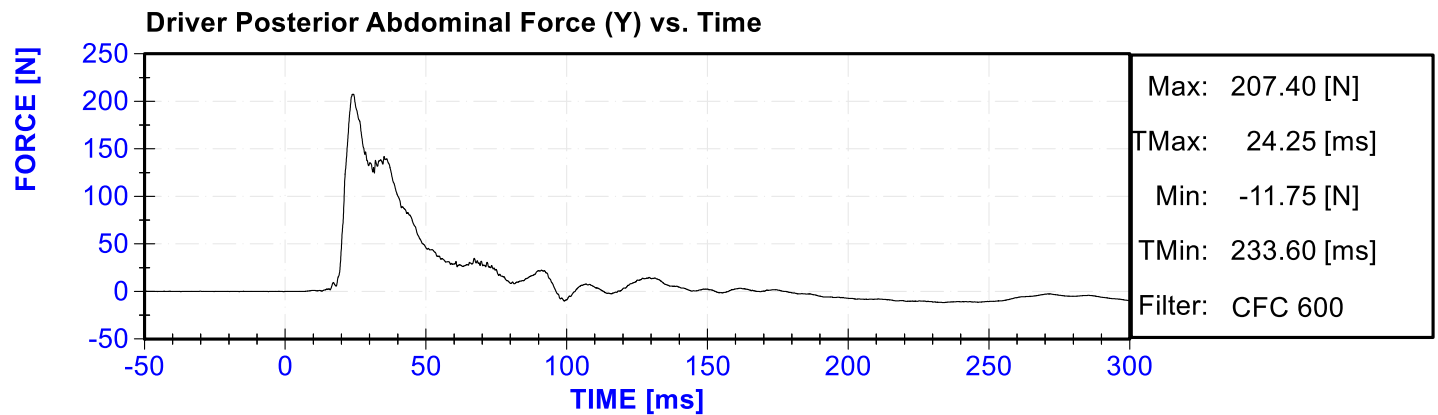
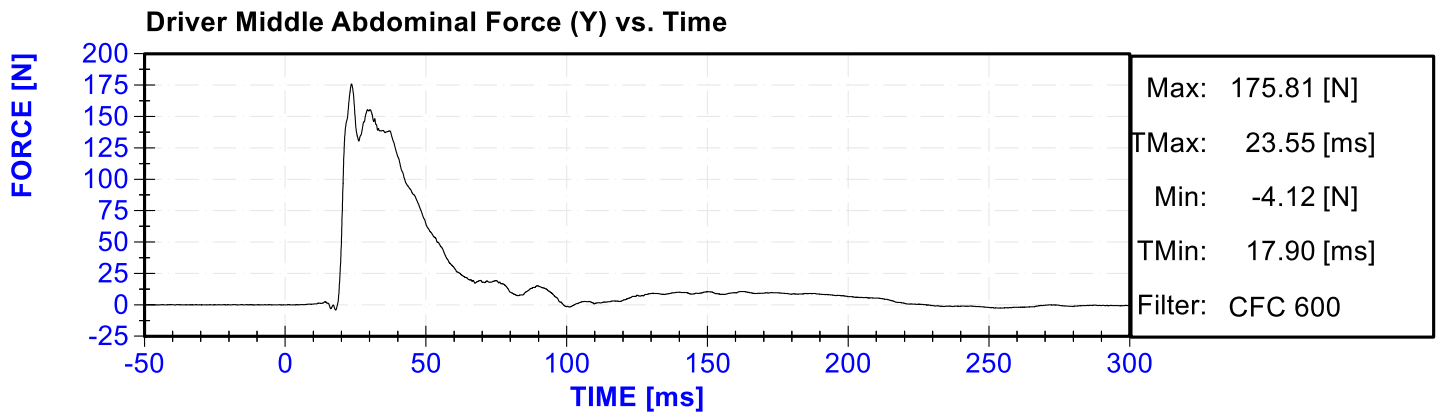
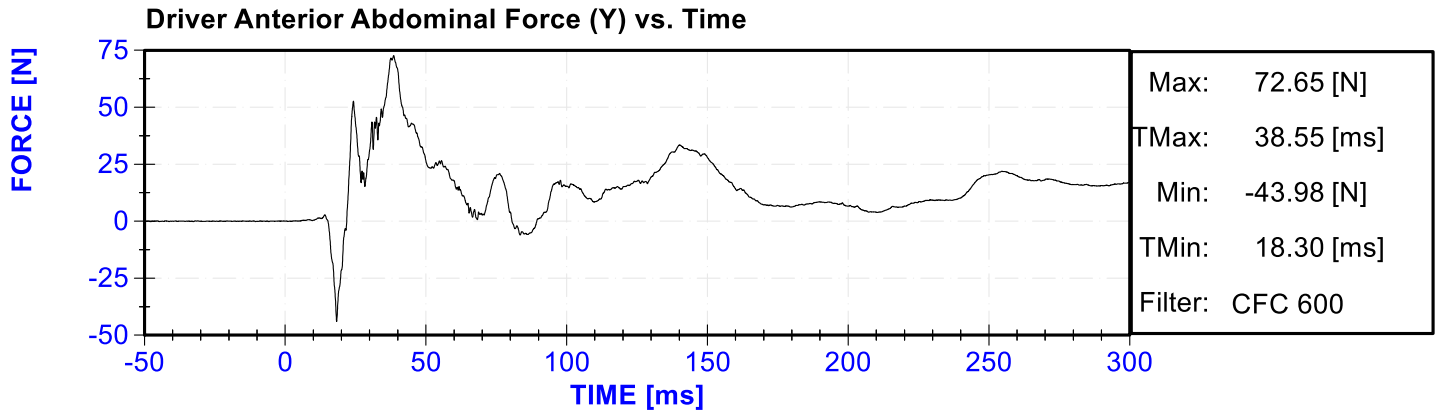
Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Right Side Sill at Front Seat Acceleration (X)
Right Side Sill at Front Seat Acceleration (Y)
Right Side Sill at Front Seat Acceleration (Z)
Right Side Sill at Rear Seat Acceleration (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)

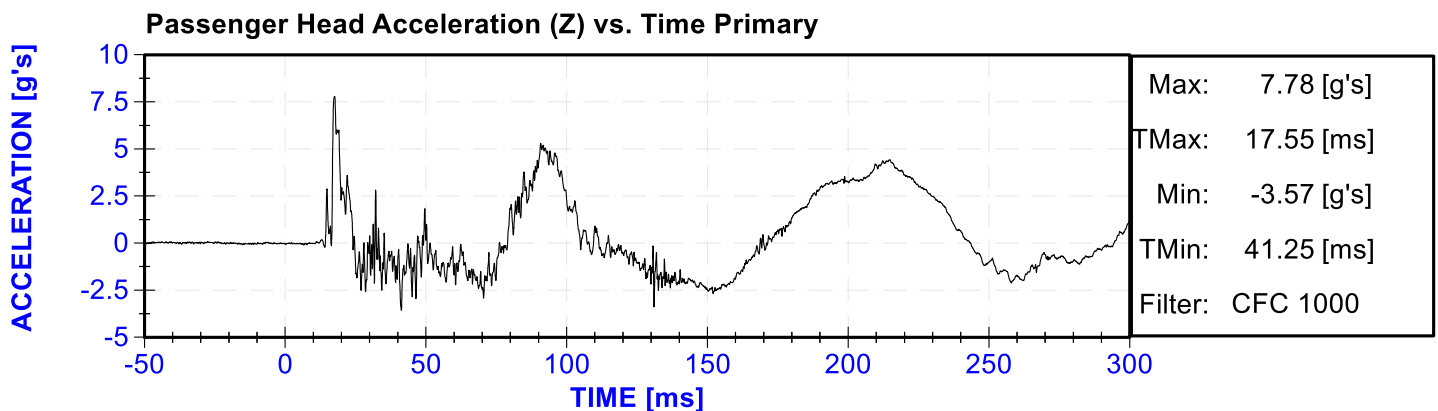
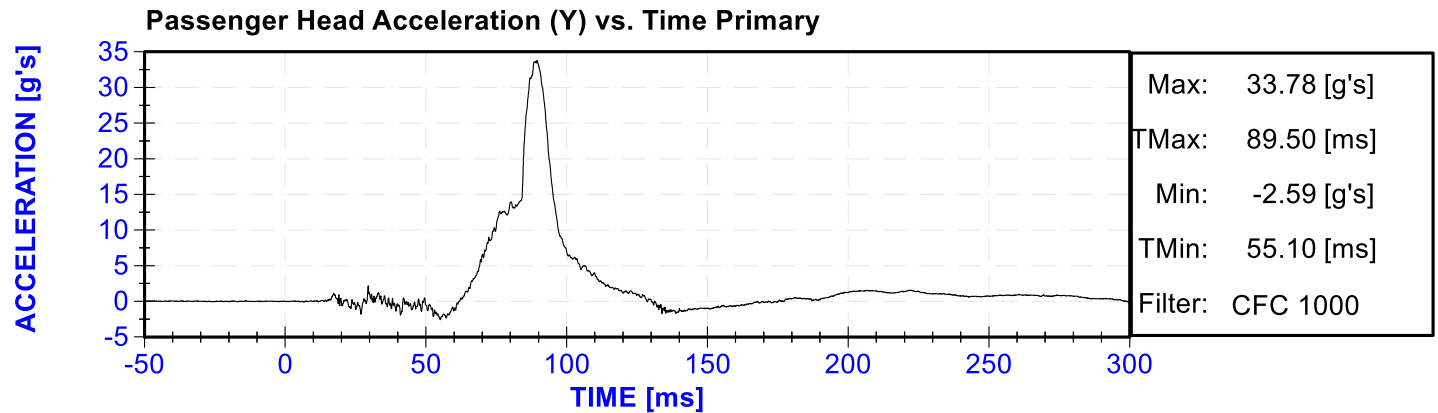
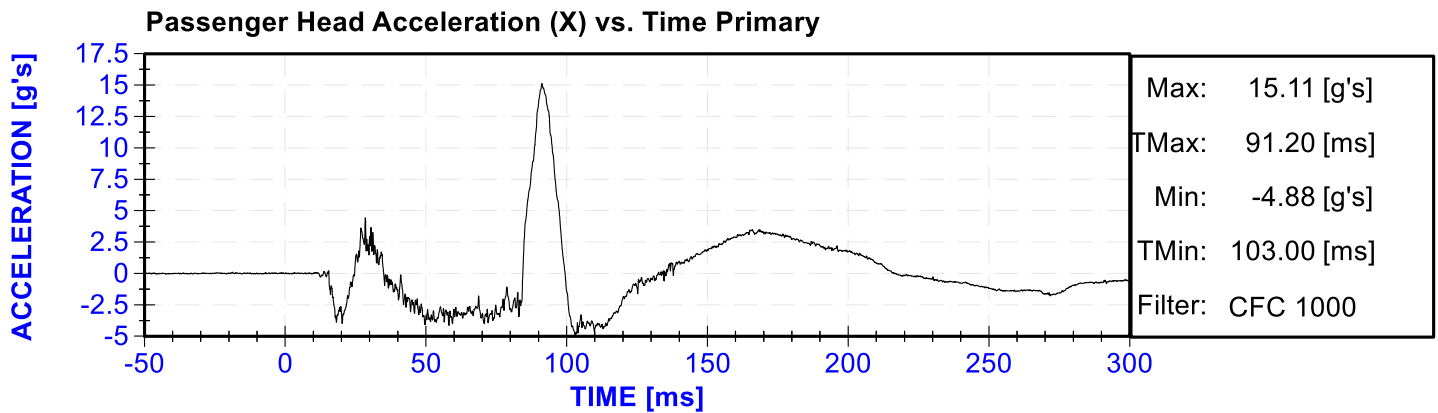
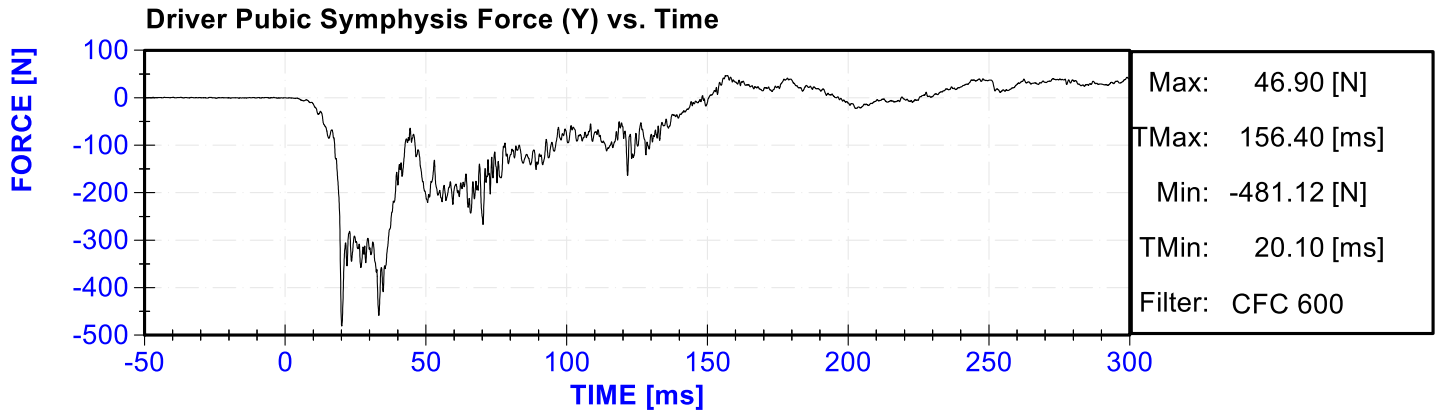
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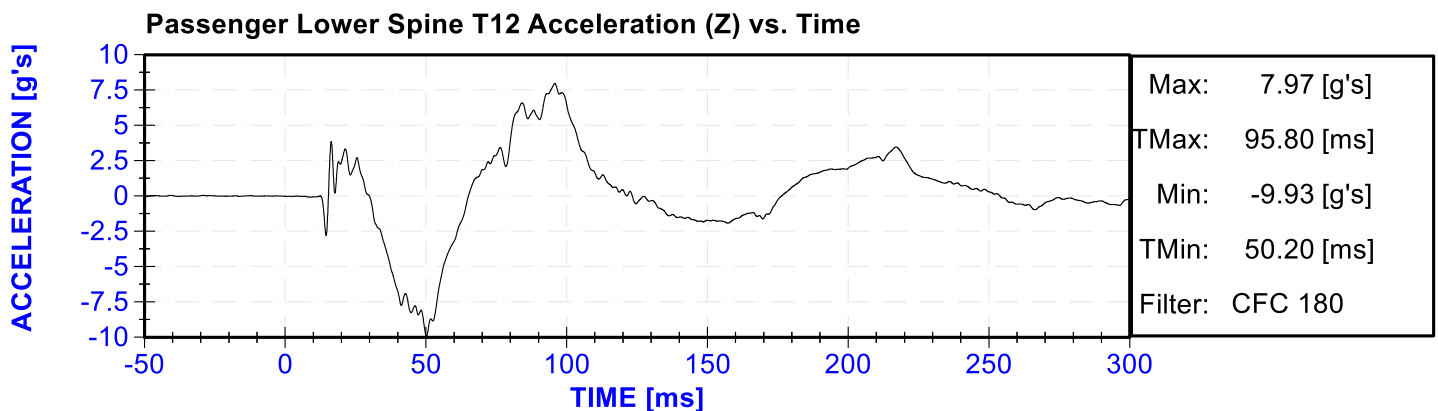
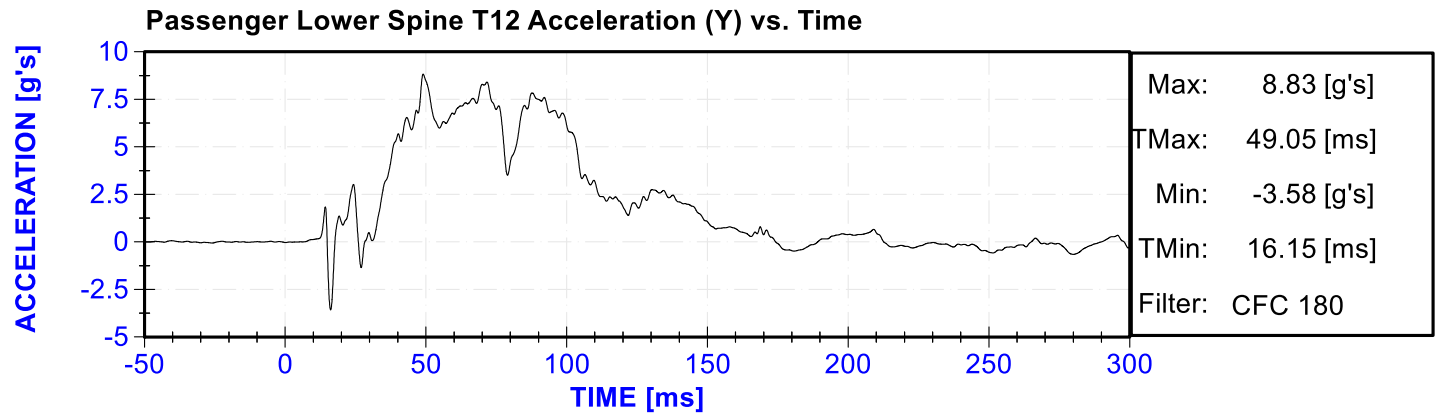
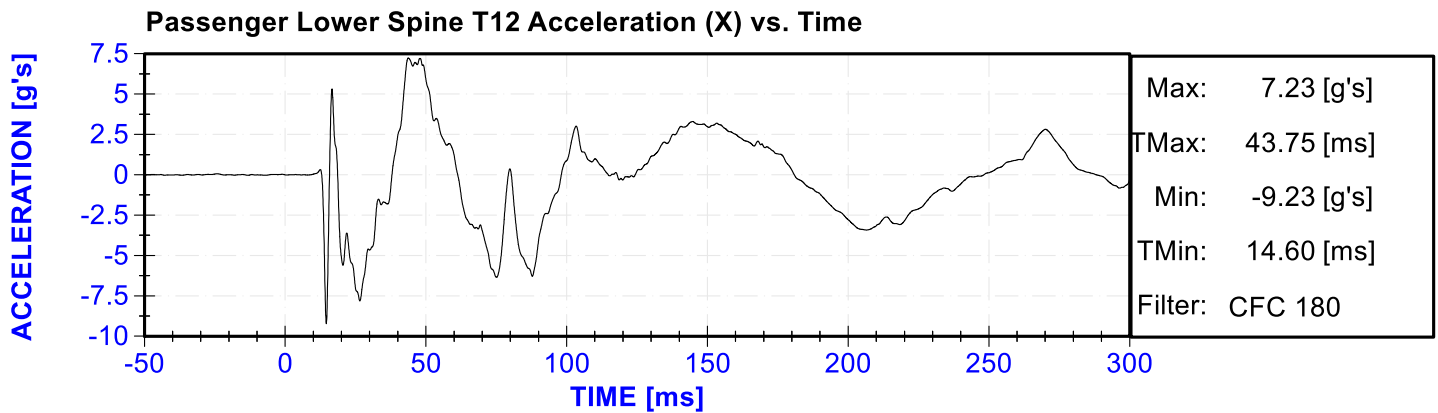
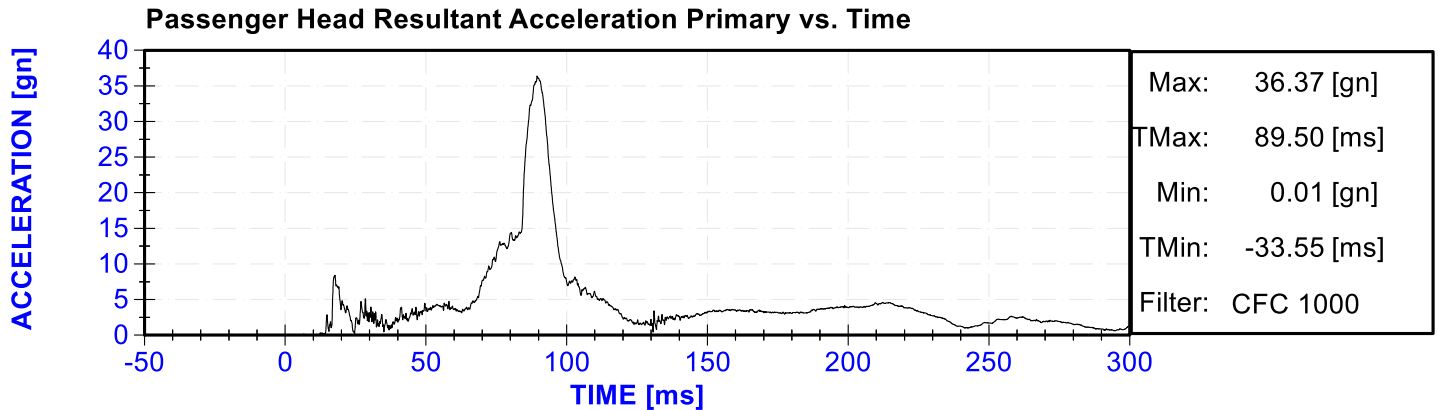
MDB Center of Gravity Acceleration (X)
MDB Center of Gravity Acceleration (Y)
MDB Center of Gravity Acceleration (Z)
MDB Rear Acceleration (X)
MDB Rear Acceleration (Y)
Left MDB Contact Switch
Right MDB Contact Switch

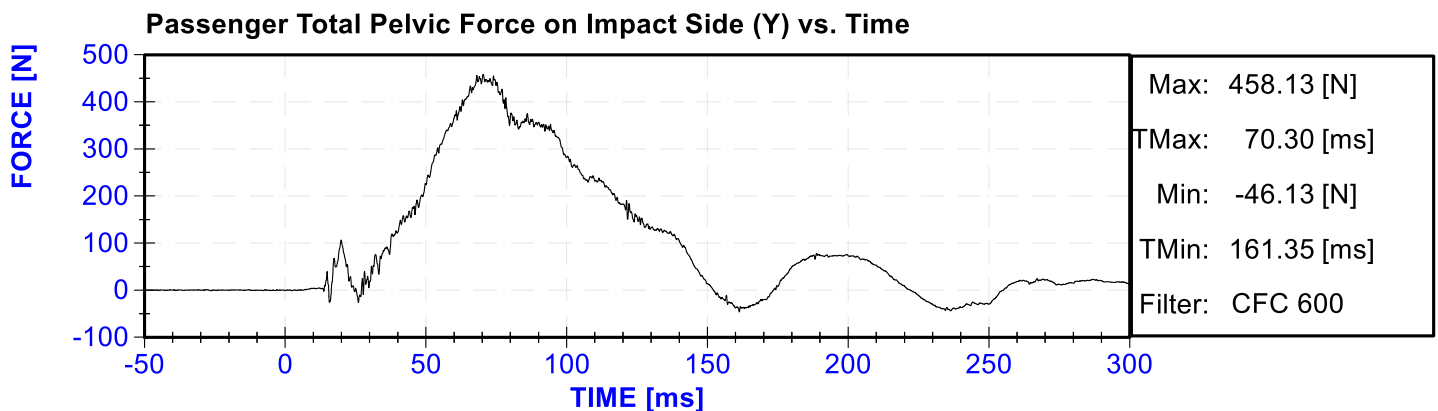
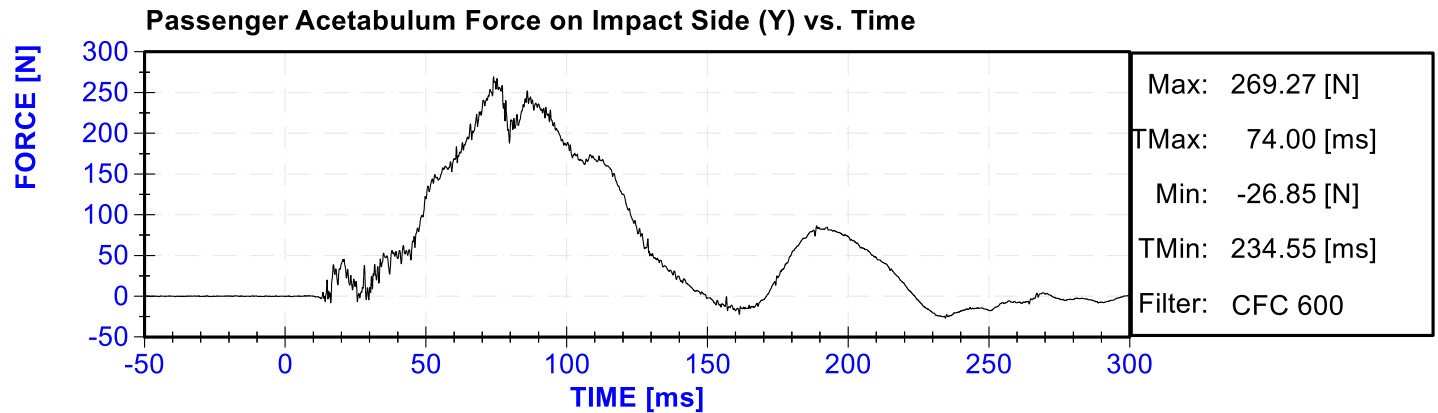
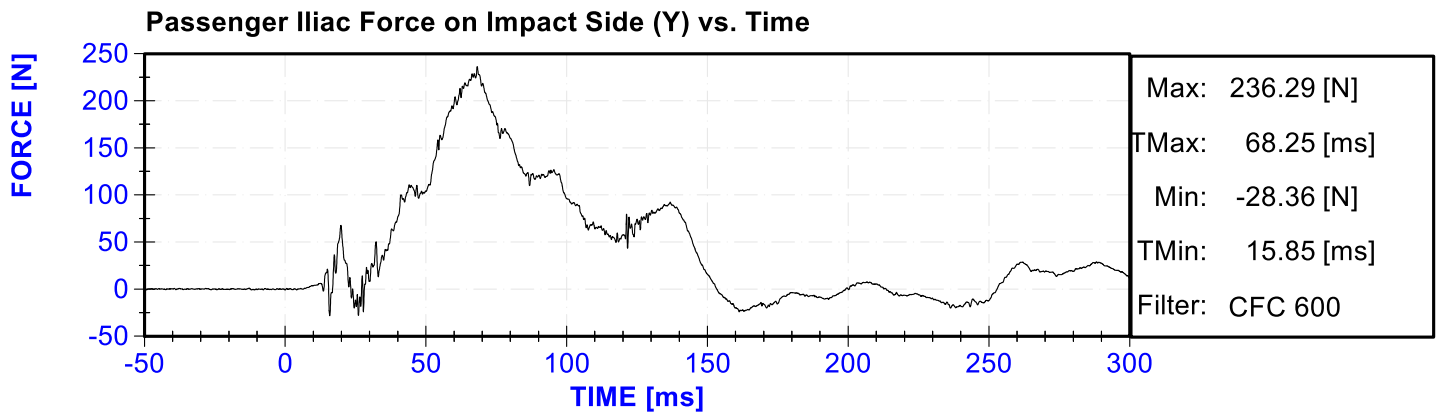
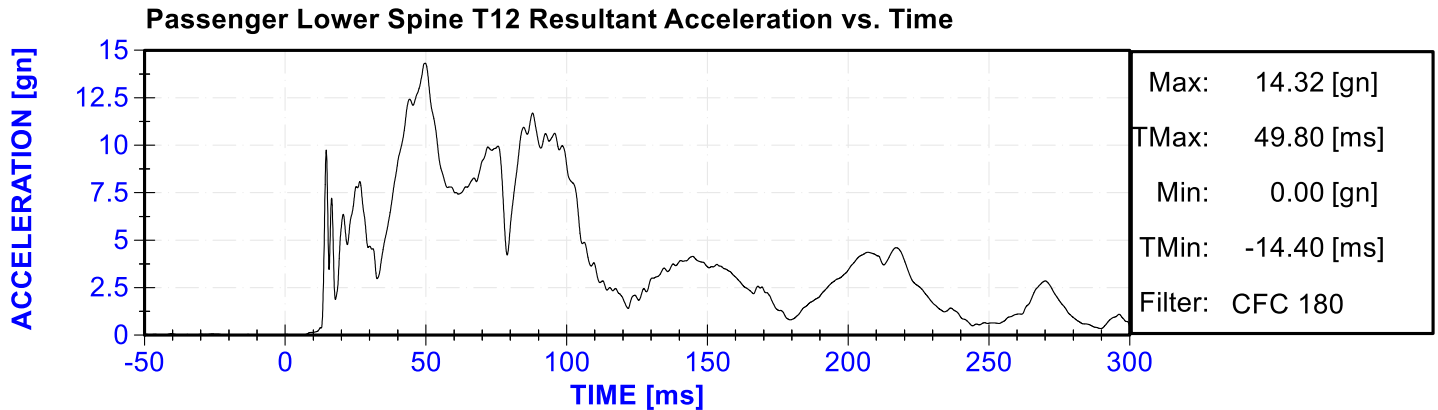












APPENDIX C

DUMMY PERFORMANCE CALIBRATION TEST DATA

CALIBRATION TEST RESULTS

PRE-TEST

EUROSID 2 (ES-2RE) MALE – DRIVER ATD

SERIAL NO: F033

(CONFIGURED FOR LEFT SIDE IMPACT)

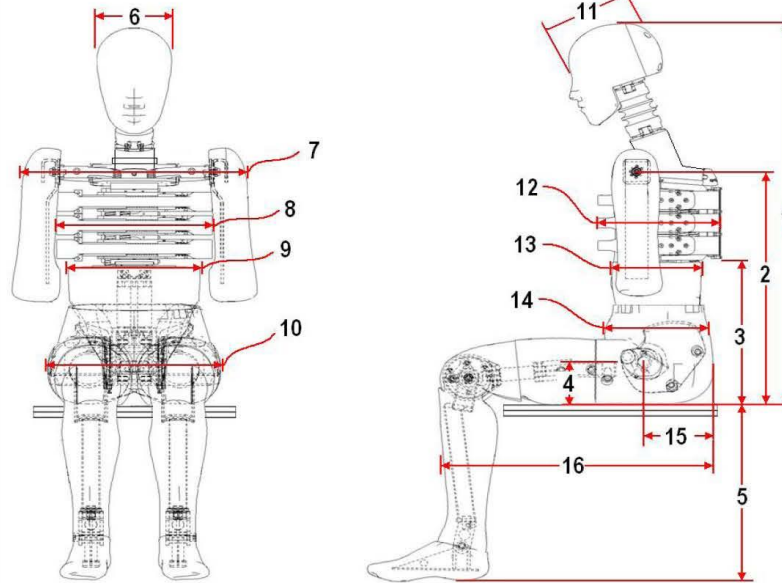


External Measurements - EuroSID-2re

Technician: K. Brogan

Date: 3/16/2021

Dummy Serial Number: F033



FRONT VIEW

SIDE VIEW

Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	912	Pass
2	Seat to Shoulder Joint	558	572	569	Pass
3	Seat to Lower Face of Thoracic Spine Box	346	356	353	Pass
4	Seat to Hip Joint (center of bolt)	97	103	98	Pass
5	Sole to Seat, Sitting	333	451	426	Pass
6	Head Width	152	158	154	Pass
7	Shoulder/Arm Width	461	479	472	Pass
8	Thorax Width	322	332	329	Pass
9	Abdomen Width	273	287	285	Pass
10	Pelvis Lap Width	359	373	367	Pass
11	Head Depth	196	206	201	Pass
12	Thorax Depth	262	272	269	Pass
13	Abdomen Depth	194	204	201	Pass
14	Pelvis Depth	235	245	239	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

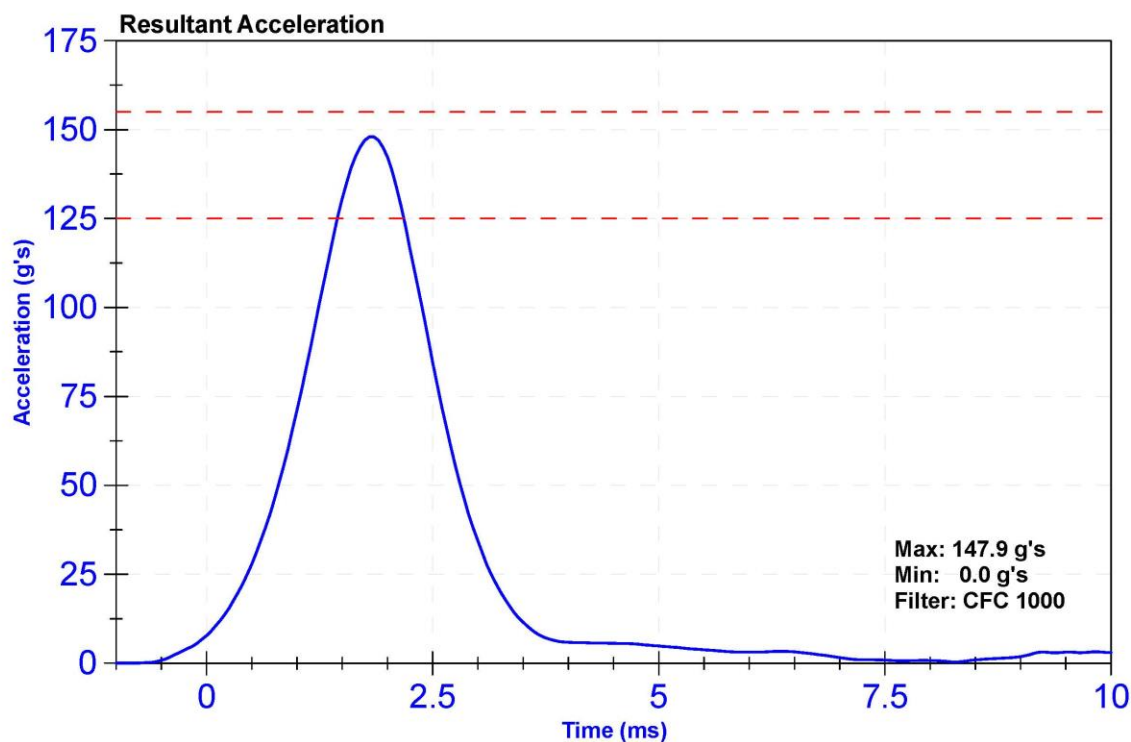
ATD Manufacturer	FTSS	Test Technician	E. Helenbrook
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

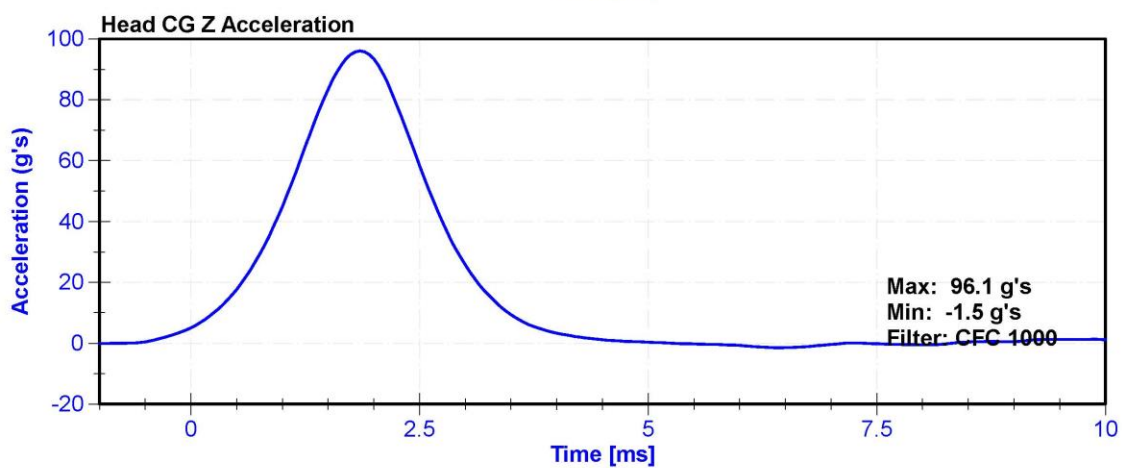
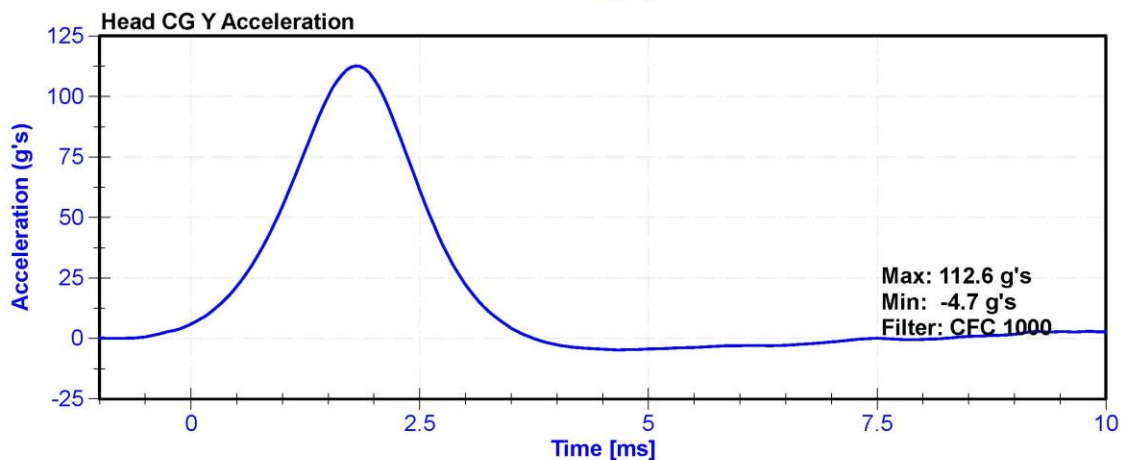
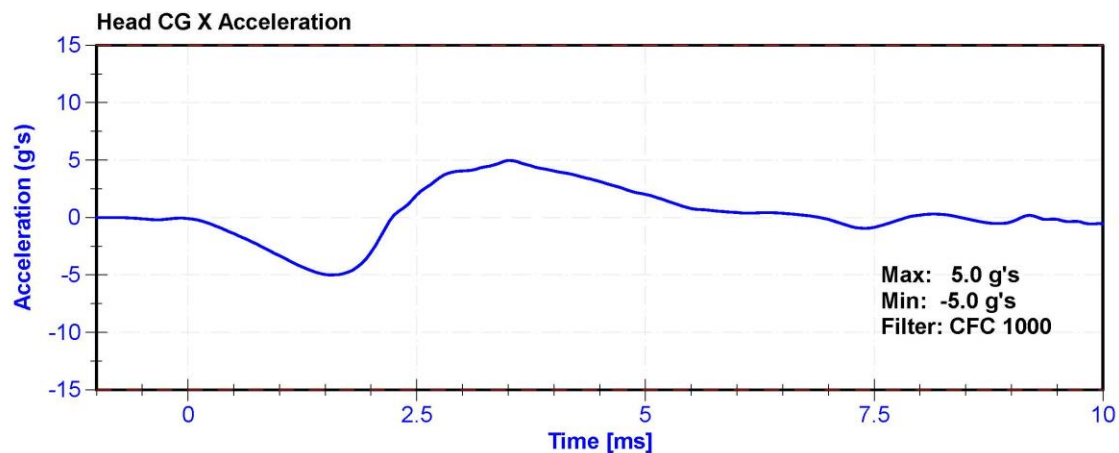
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	28.0	Pass
Resultant Acceleration	125	155	g's	147.9	Pass
Oscillation	0	15	%	2.27	Pass
Fore-Aft Acceleration	-15	15	g's	-5.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P63861	11/24/2020	5/25/2021
Y Accelerometer	ENDEVCO 7264CT	AC-P49216	11/24/2020	5/25/2021
Z Accelerometer	ENDEVCO 7264	AC-P51303	11/24/2020	5/25/2021





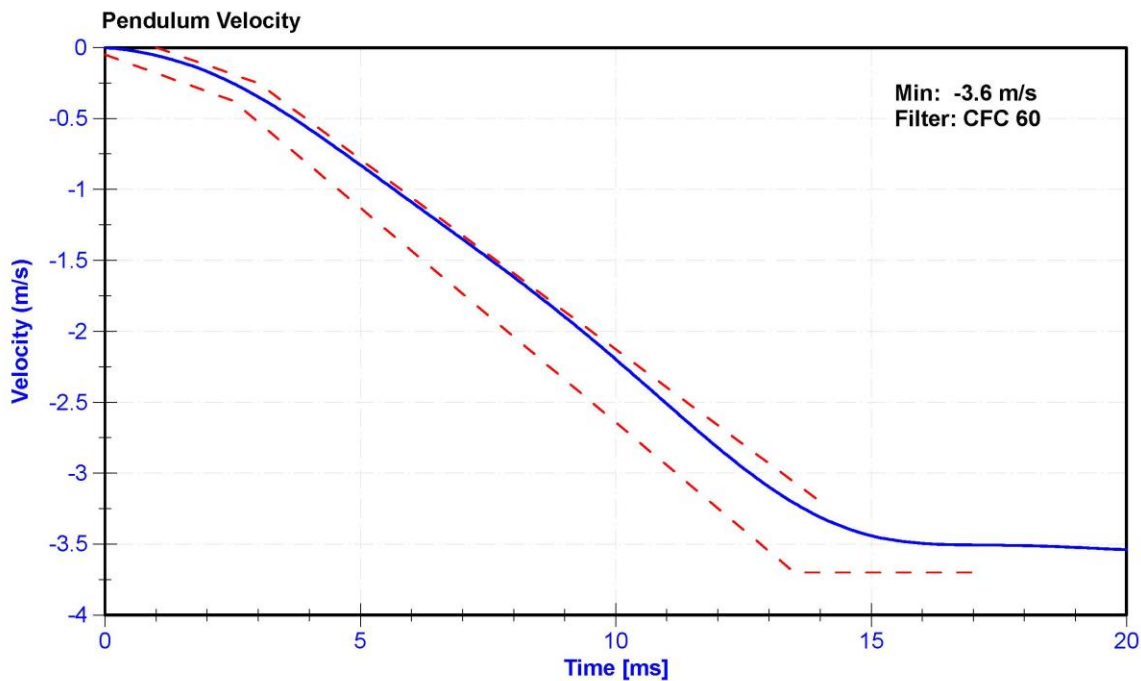
ATD Manufacturer	FTSS	Test Technician	E. Helenbrook
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

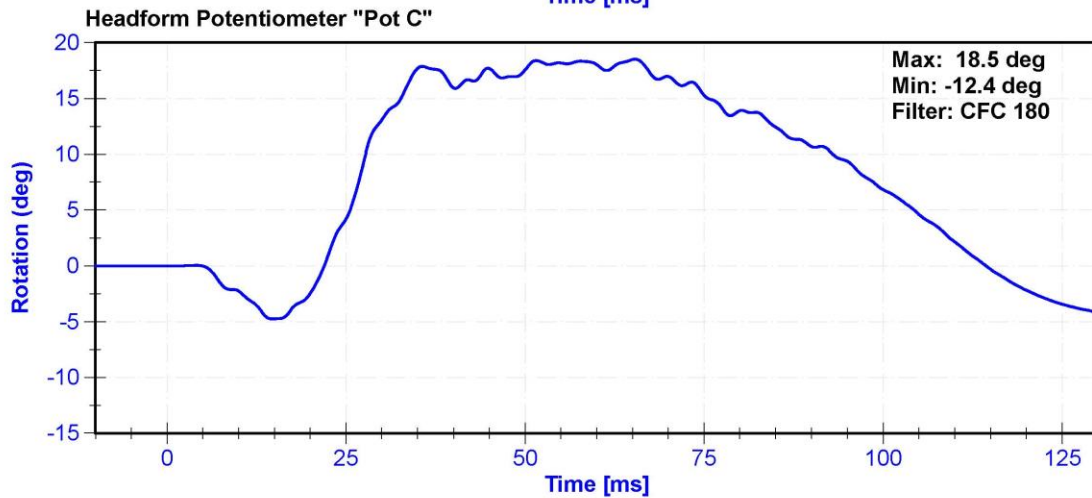
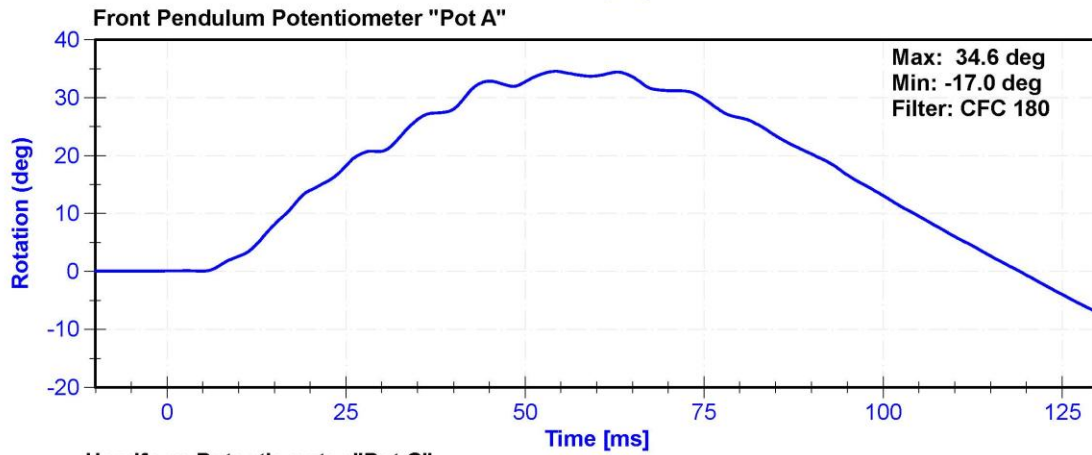
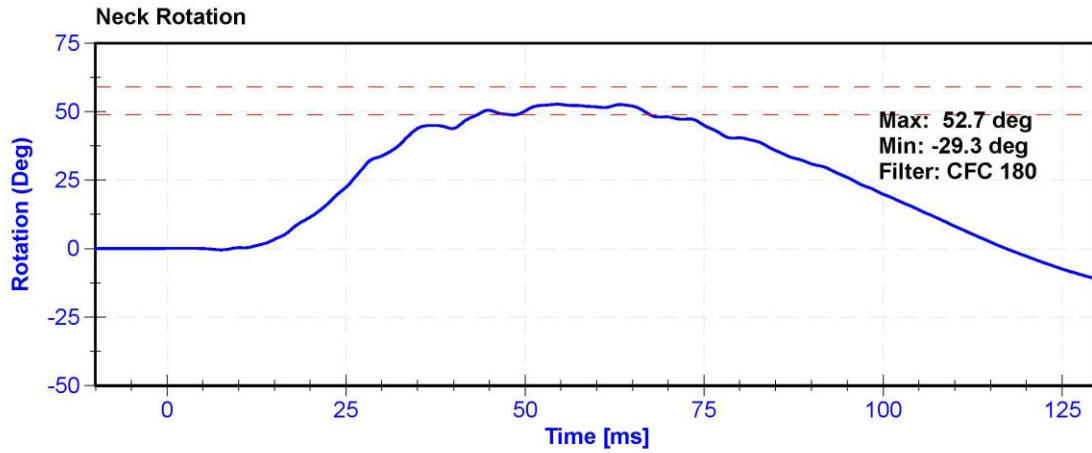
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	28	Pass
Velocity	3.3	3.5	m/s	3.38	Pass
Lateral Neck Rotation	49	59	deg	52.7	Pass
Time at Maximum Rotation	54	66	ms	54.5	Pass
Time of Rotation Decay from Maximum	53	88	ms	62.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231C	AC-C16503	2/5/2021	2/5/2022
Front Pendulum Potentiometer	SP22G	DS-094	8/18/2020	8/18/2021
Headform Potentiometer	SP22G	DS-095	8/18/2020	8/18/2021





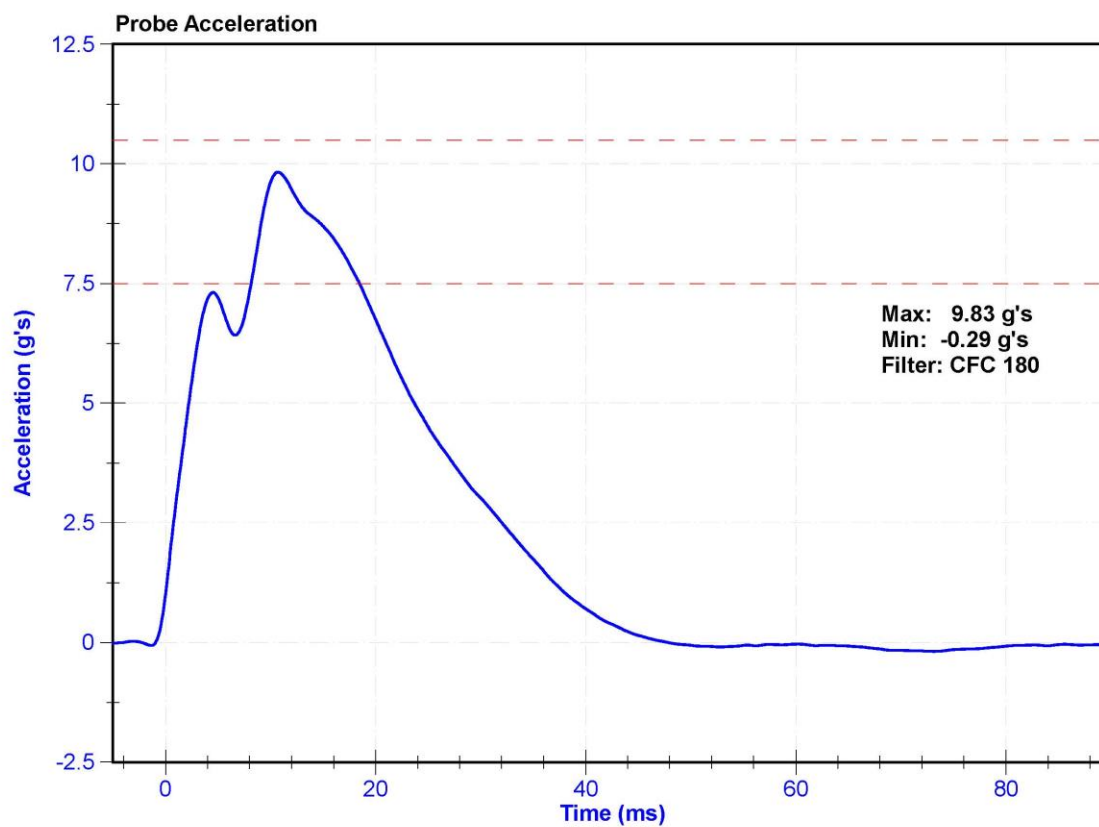
ATD Manufacturer	FTSS	Test Technician	S. Vacanti
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	28.0	Pass
Velocity	4.2	4.4	m/s	4.34	Pass
Probe Acceleration	7.5	10.5	g's	9.83	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7264C	T25885	2/2/2021	2/2/2022



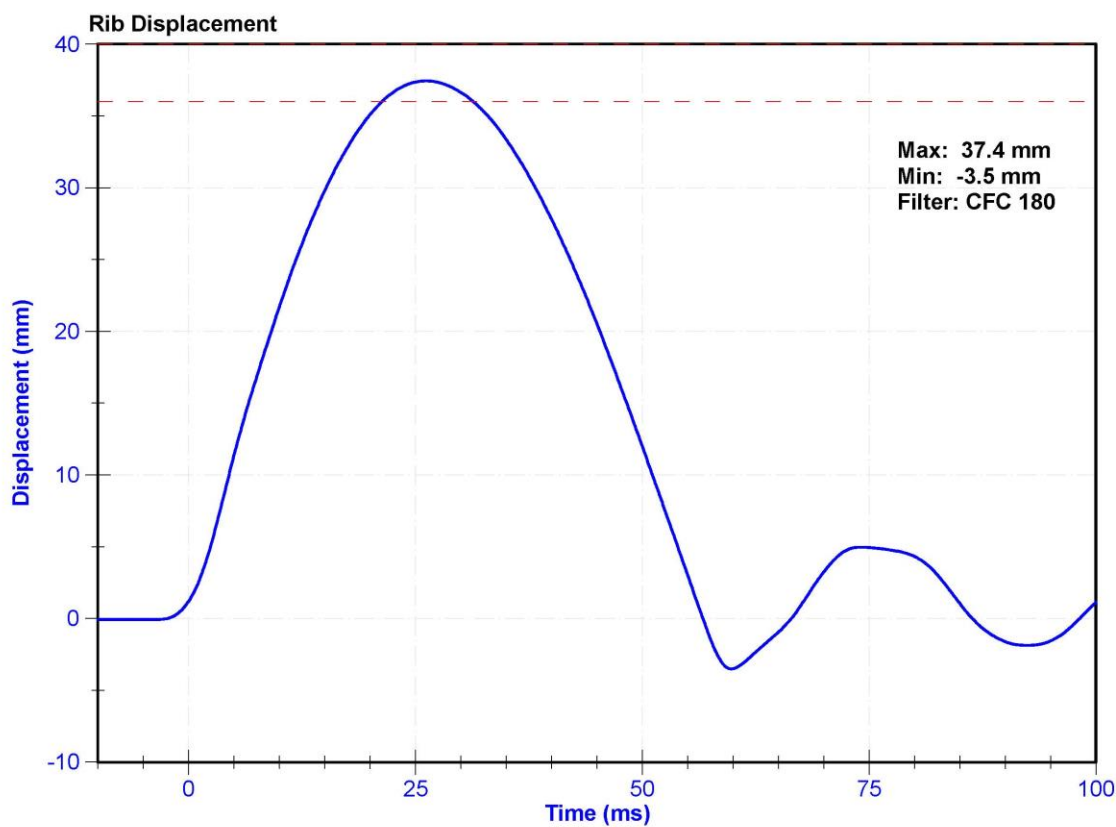
ATD Manufacturer	FTSS	Test Technician	S. Vacanti
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	28.0	Pass
Rib Displacement	36	40	mm	37.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-179GFE	11/25/2020	5/26/2021



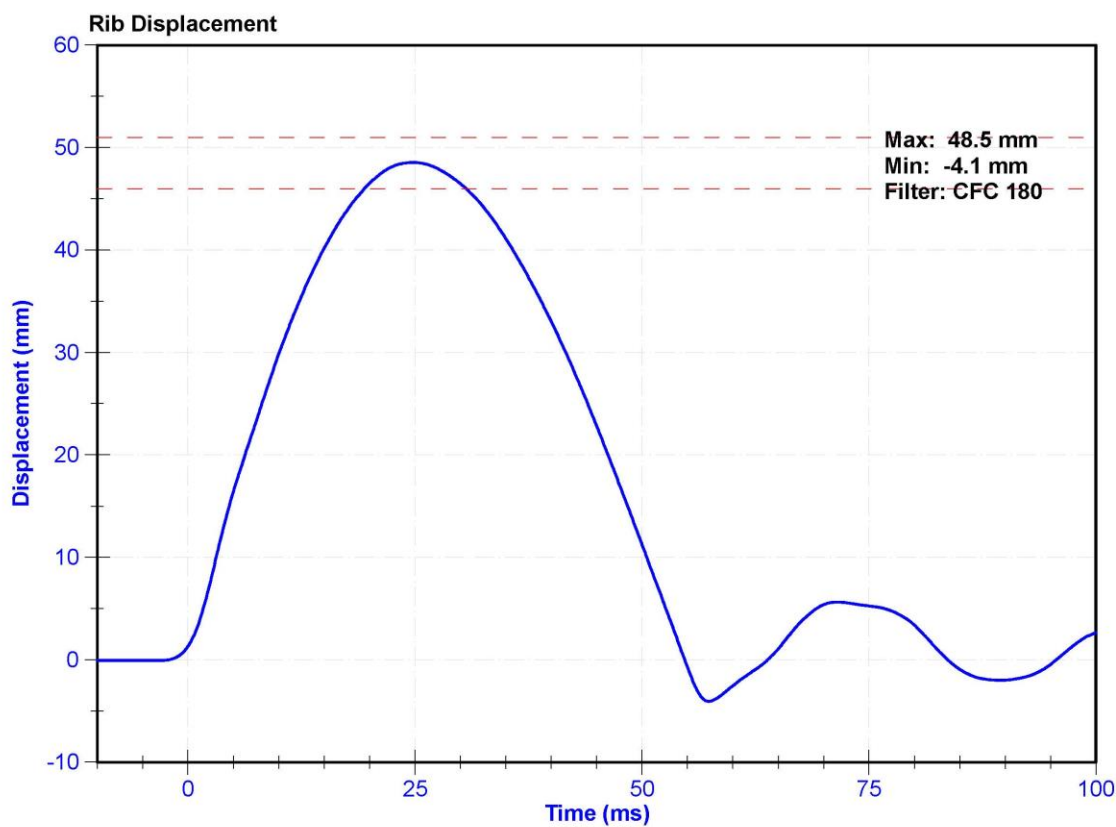
ATD Manufacturer	FTSS	Test Technician	S. Vacanti
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	29.0	Pass
Rib Displacement	46	51	mm	48.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-179GFE	11/25/2020	5/26/2021



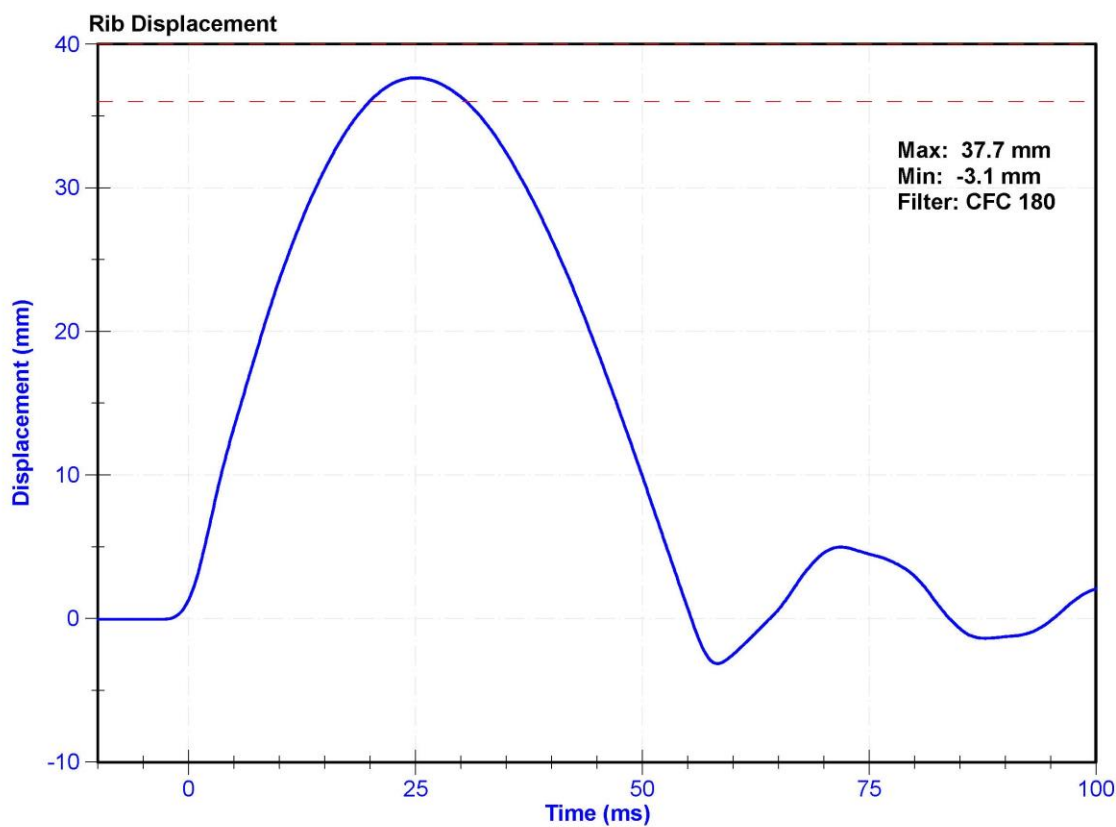
ATD Manufacturer	FTSS	Test Technician	S. Vacanti
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	28.0	Pass
Rib Displacement	36	40	mm	37.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-185GFE	11/25/2020	5/26/2021



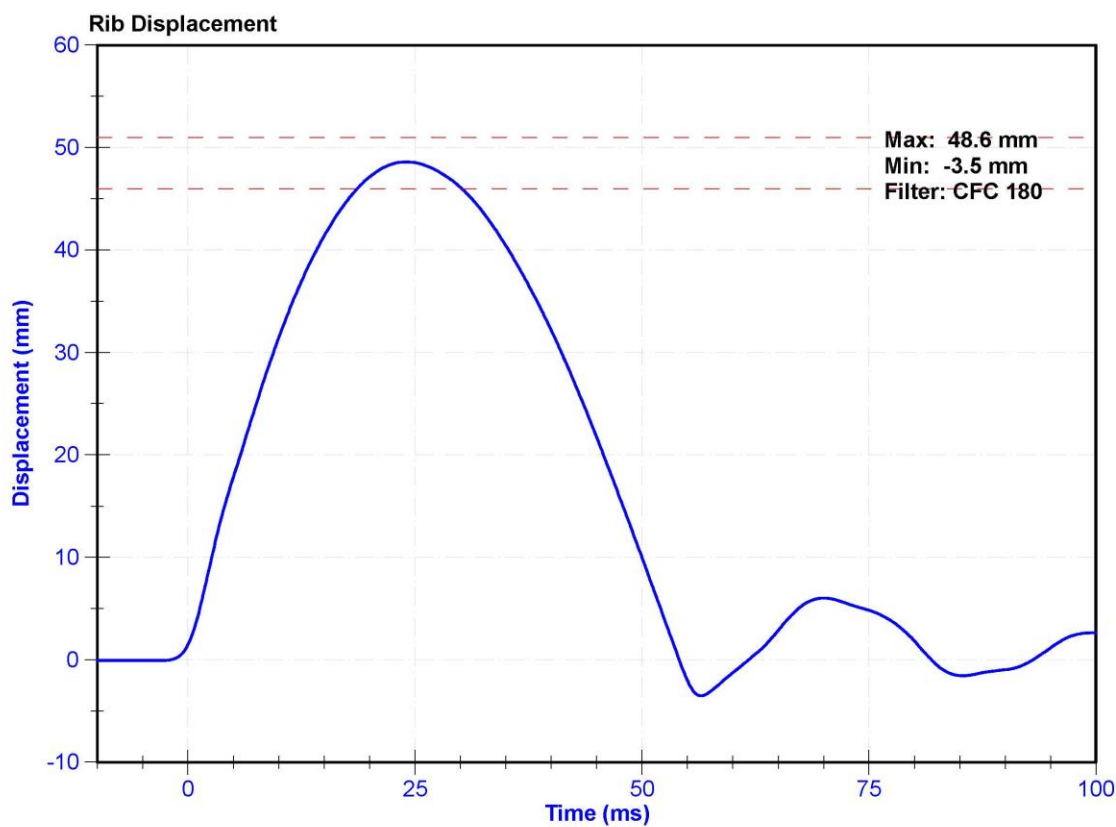
ATD Manufacturer	FTSS	Test Technician	S. Vacanti
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	28.0	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-185GFE	11/25/2020	5/26/2021



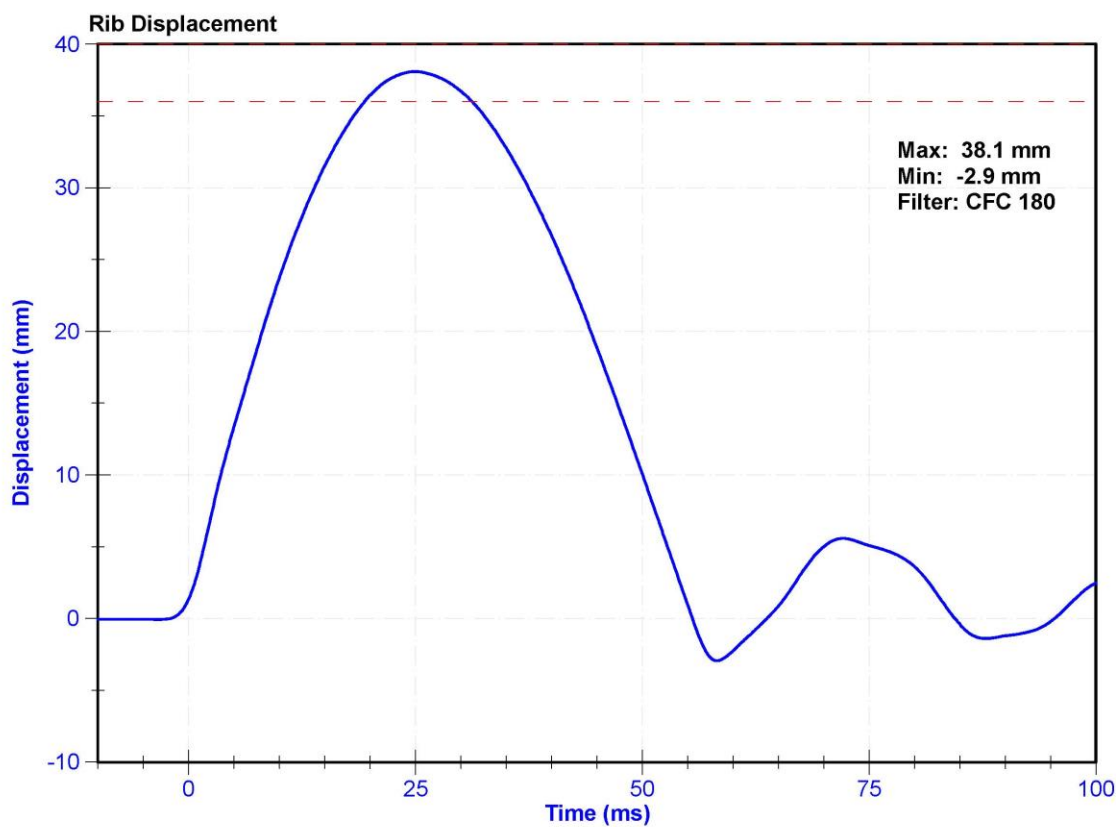
ATD Manufacturer	FTSS	Test Technician	S. Vacanti
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	28.0	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-178GFE	11/25/2020	5/26/2021



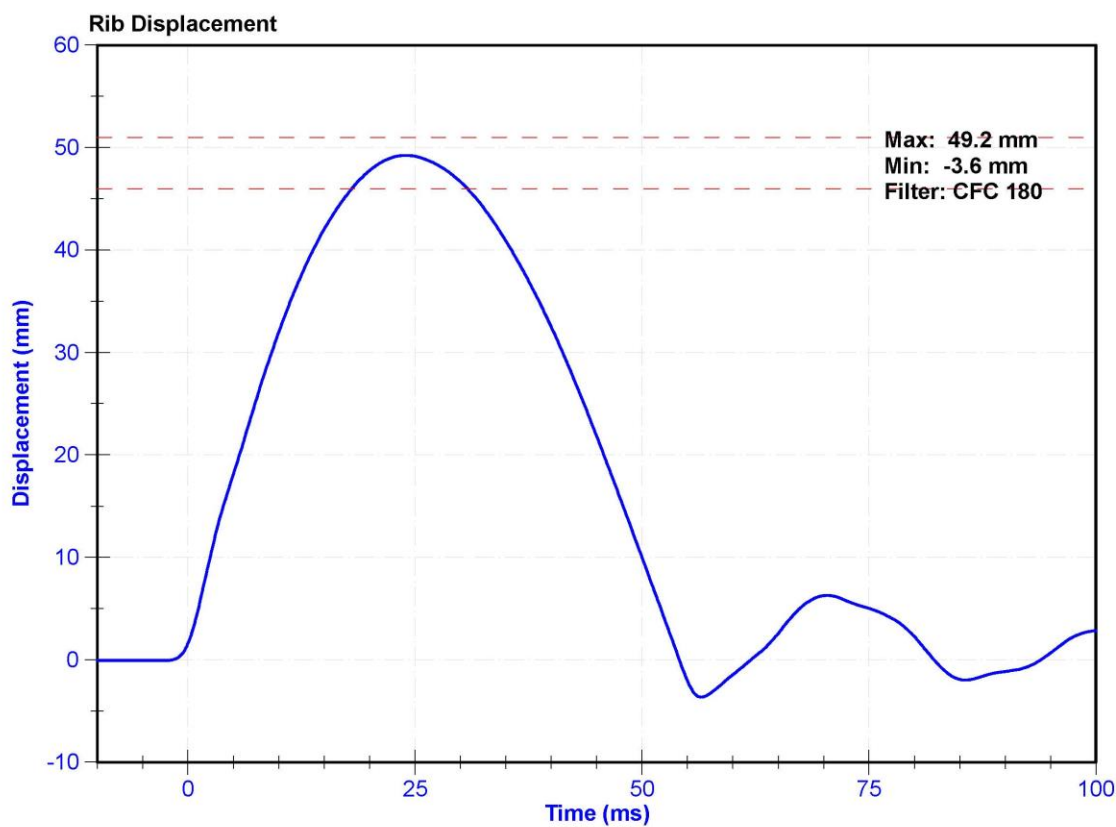
ATD Manufacturer	FTSS	Test Technician	S. Vacanti
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	28.0	Pass
Rib Displacement	46	51	mm	49.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-178GFE	11/25/2020	5/26/2021



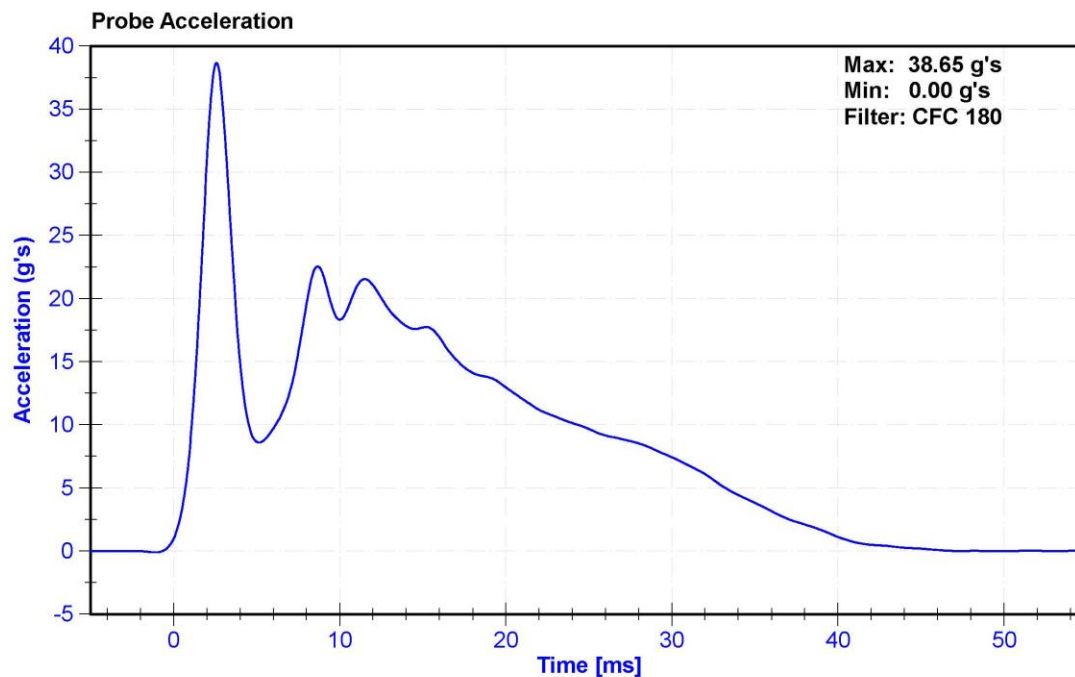
ATD Manufacturer	FTSS	Test Technician	S. Vacanti
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

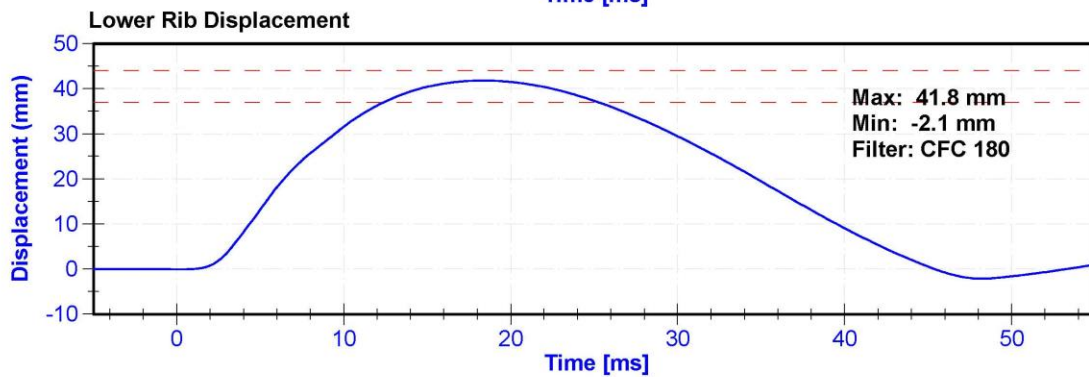
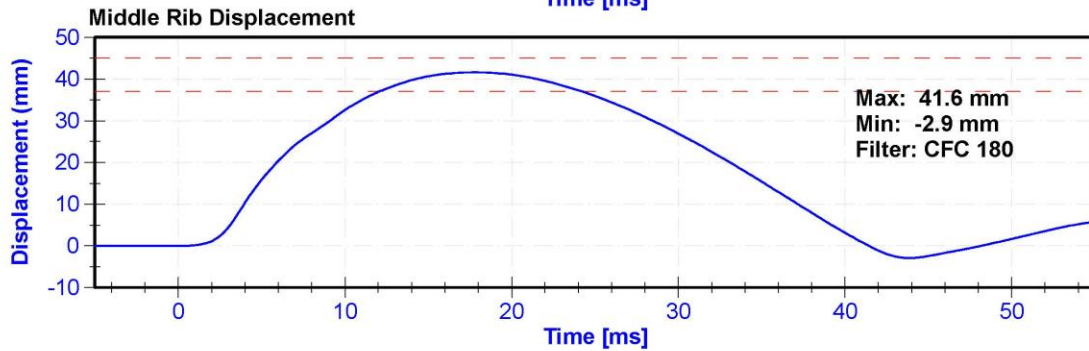
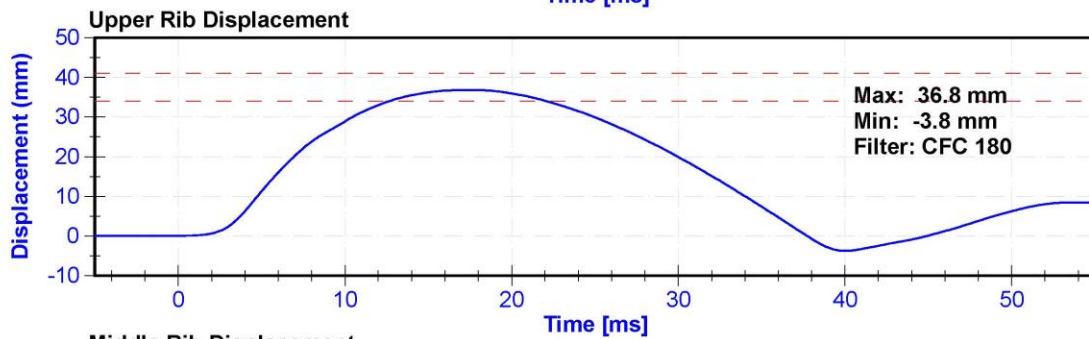
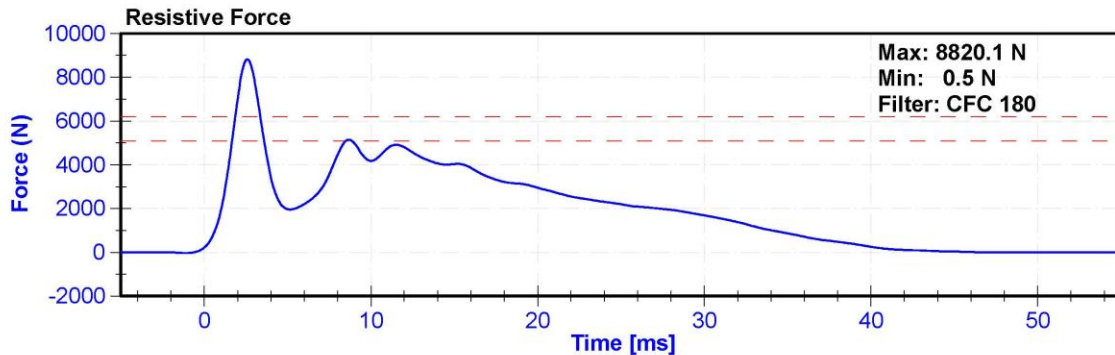
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	28.0	Pass
Velocity	5.4	5.6	m/s	5.48	Pass
Resistive Force after 6ms	5100	6200	N	5144.0	Pass
Upper Thorax Rib Deflection	34	41	mm	36.8	Pass
Mid Thorax Rib Deflection	37	45	mm	41.6	Pass
Lower Thorax Rib Deflection	37	44	mm	41.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7264C-2K-TZ2	T25885	2/2/2021	2/2/2022
Upper Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-179GFE	11/25/2020	5/26/2021
Middle Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-185GFE	11/25/2020	5/26/2021
Lower Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-178GFE	11/25/2020	5/26/2021





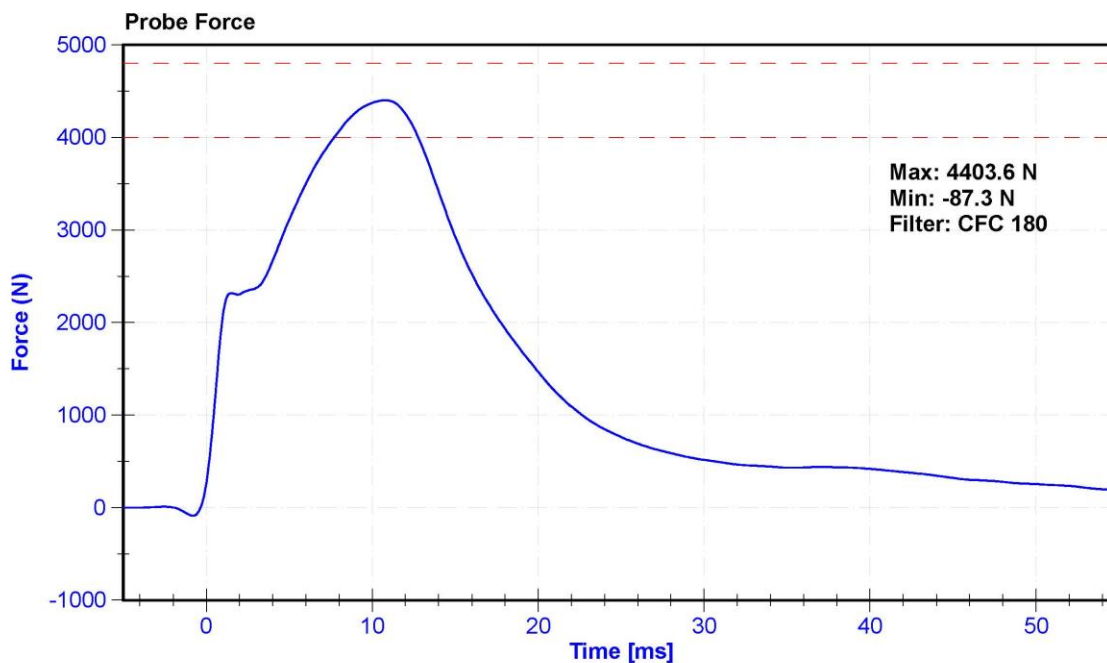
ATD Manufacturer	FTSS	Test Technician	S. Vacanti
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

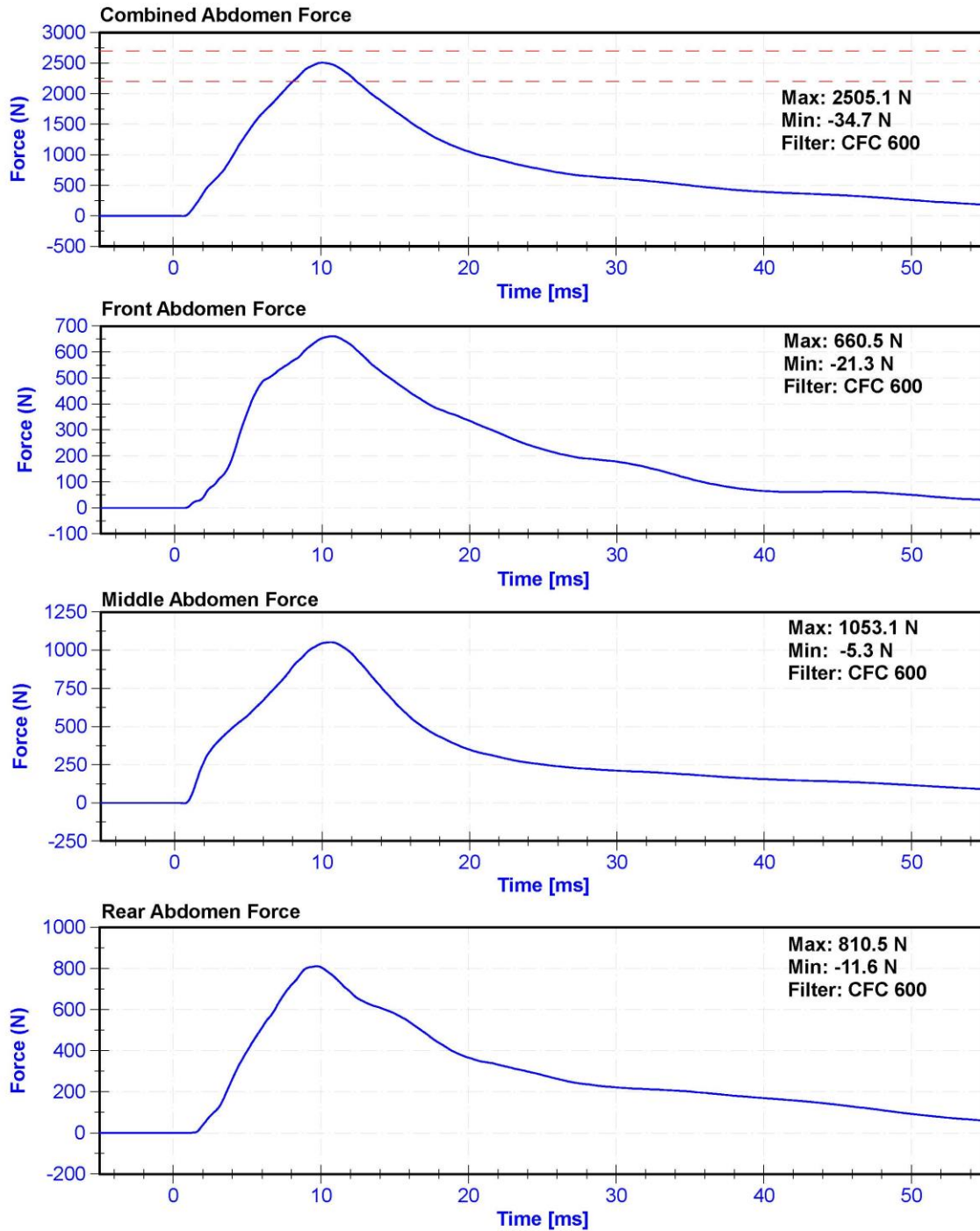
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	28	Pass
Velocity	3.9	4.1	m/s	4.06	Pass
Combined Abdomen Force	2200	2700	N	2505.1	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	10.05	Pass
Resistive Probe Force	4000	4800	N	4403.6	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	ENDEVCO 7264C	T25885	2/2/2021	2/2/2022
Front Abdomen Load Cell	FTSS 2631	LC-1509	11/10/2020	11/10/2021
Middle Abdomen Load Cell	DENTON 2631	LC-1508	11/10/2020	11/10/2021
Rear Abdomen Load Cell	FTSS 2631	LC-1507	11/10/2020	11/10/2021





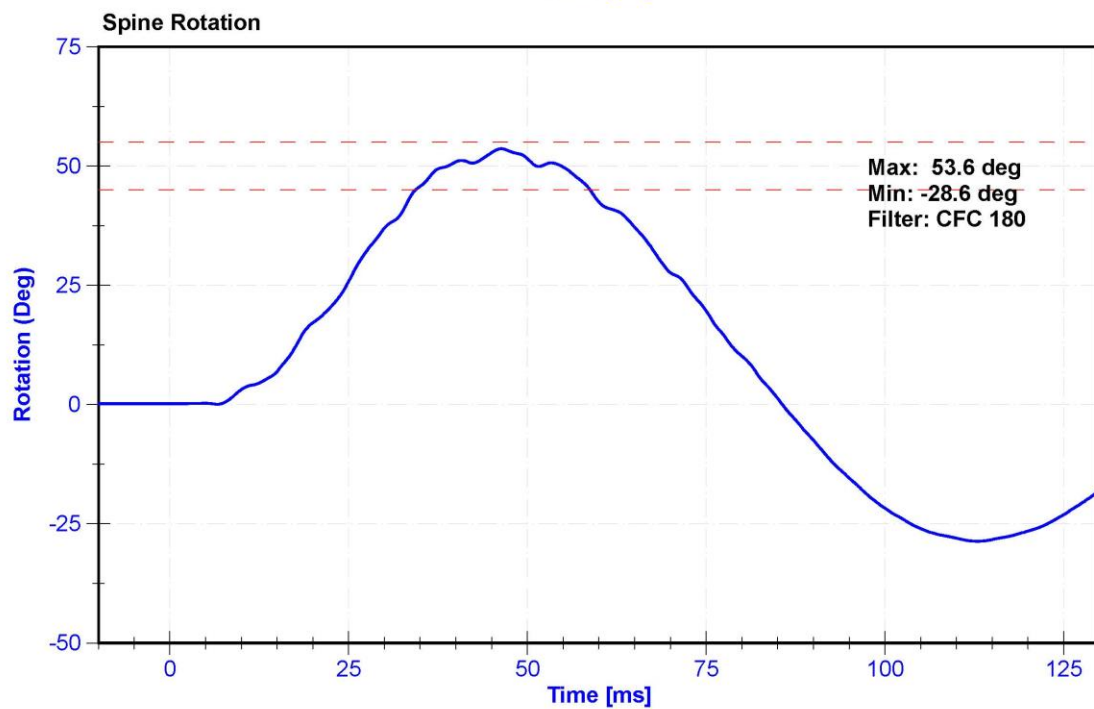
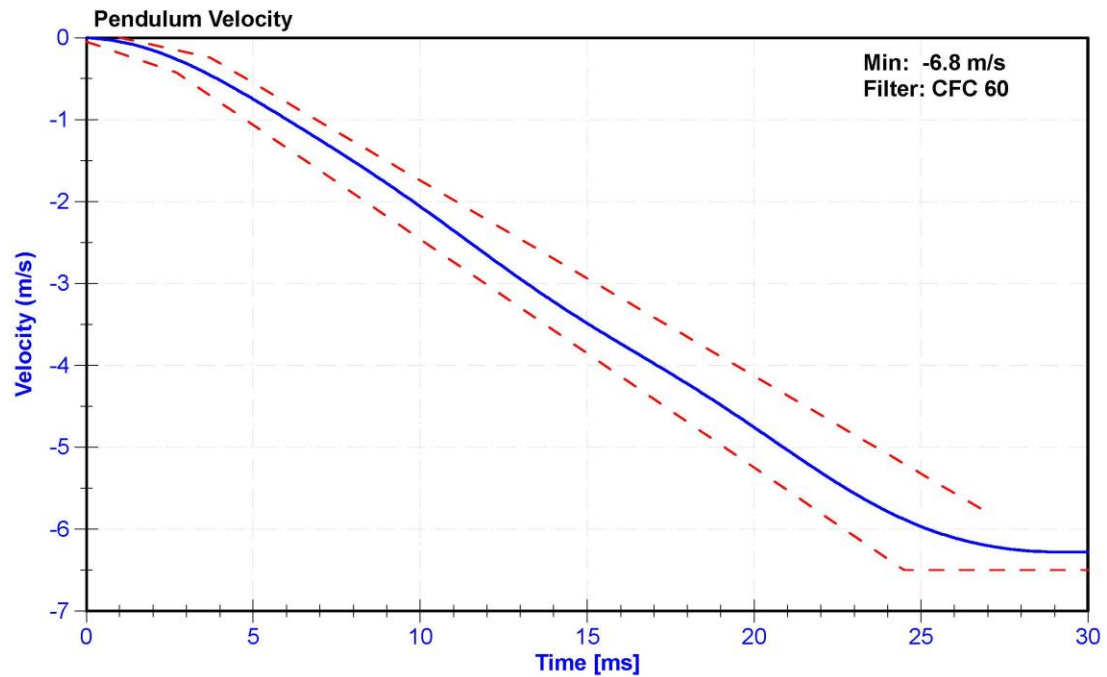
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

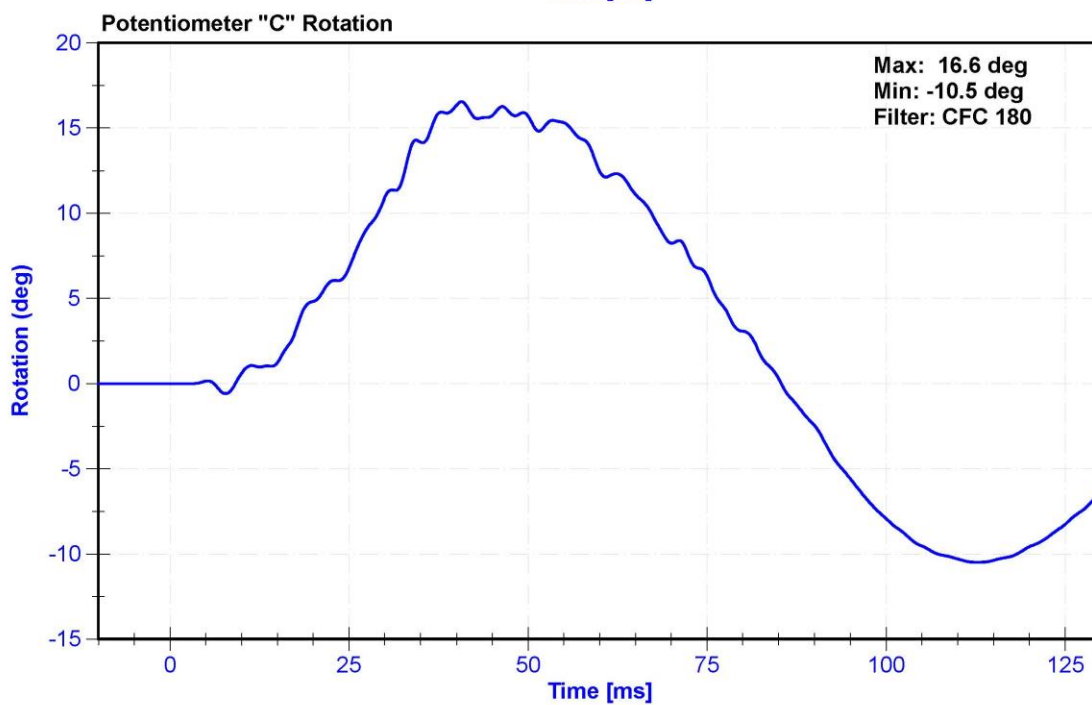
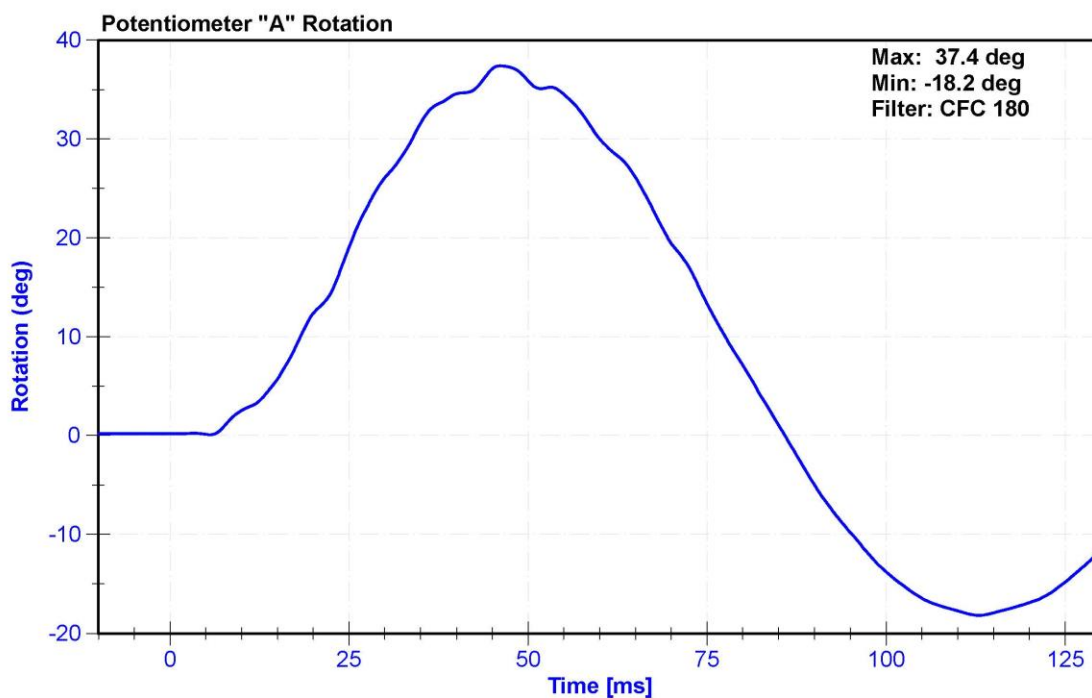
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	26.0	Pass
Velocity	5.95	6.15	m/s	6.005	Pass
Lateral Spine Rotation	45	55	deg	53.6	Pass
Time at Maximum Rotation	39	53	ms	46.3	Pass
Time of Decay to Zero Degrees	37	57	ms	39.4	Pass
Pulse within Corridor?	-	-	-		

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C16503 Striker	2/5/2021	2/5/2022
Pendulum "A" Potentiometer	SP22G	DS-094	8/18/2020	8/18/2021
Condyle "B" Potentiometer	SP22G	DS-095	8/18/2020	8/18/2021





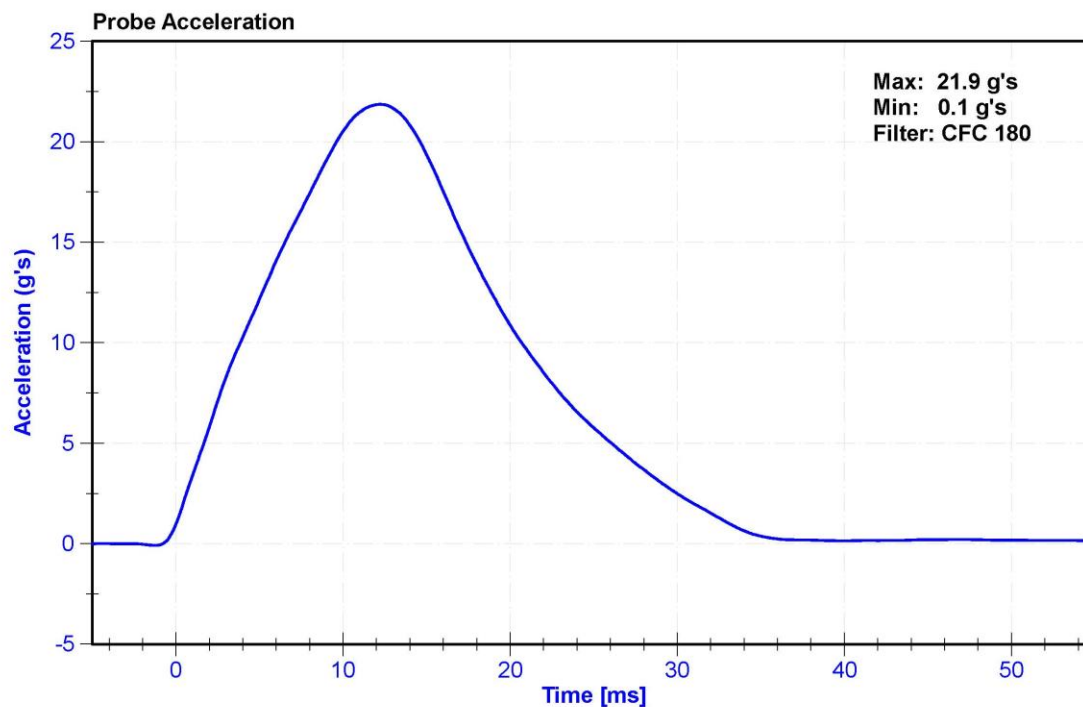
ATD Manufacturer	FTSS	Test Technician	S. Vacanti
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

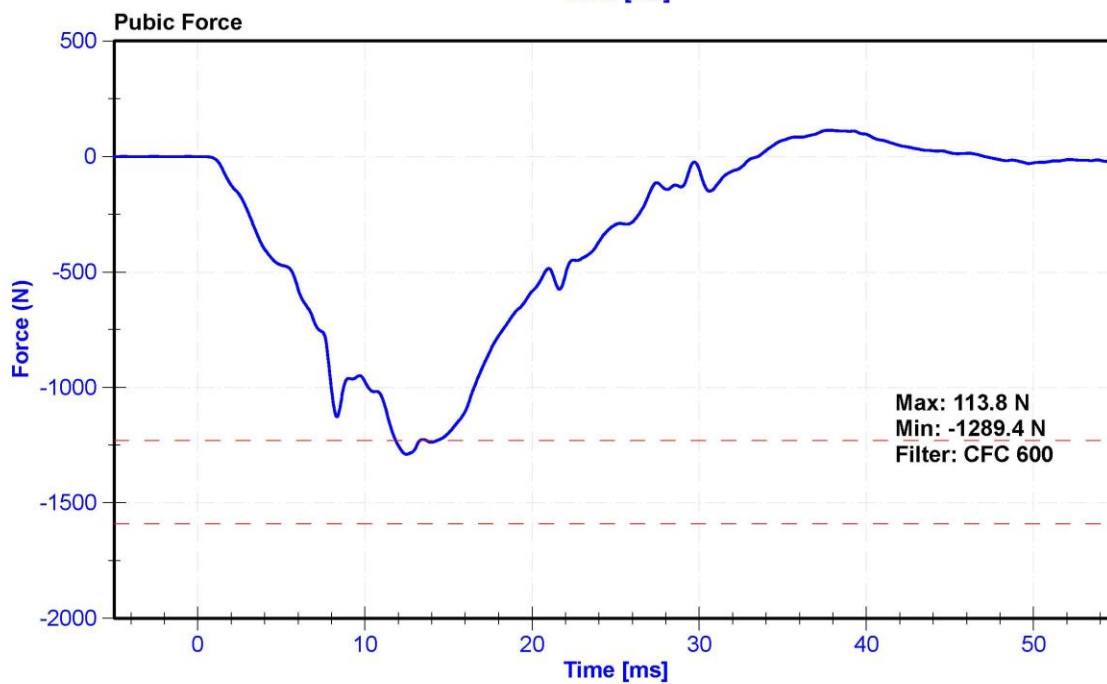
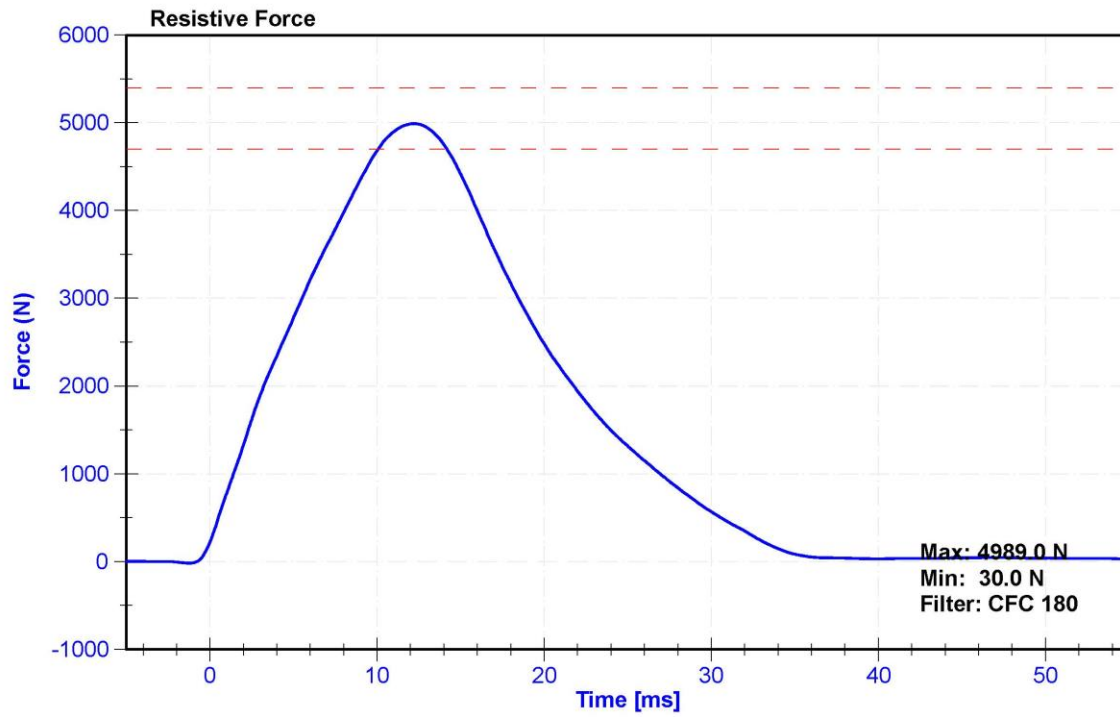
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	28.0	Pass
Velocity	4.2	4.4	m/s	4.39	Pass
Resistive Force	4700	5400	N	4989.0	Pass
Time at Peak Resistive Force	11.8	16.1	ms	12.20	Pass
Pubic Force	-1590	-1230	N	-1289.4	Pass
Time at Peak Pubic Force	12.2	17.0	ms	12.50	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264C	T25885	2/2/2021	2/2/2022
Pubic Load Cell	Denton 3096JFL	LC-464fy	7/23/2020	7/23/2021





CALIBRATION TEST RESULTS

PRE-TEST

SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD

SERIAL No: 300

(CONFIGURED FOR LEFT SIDE IMPACT)

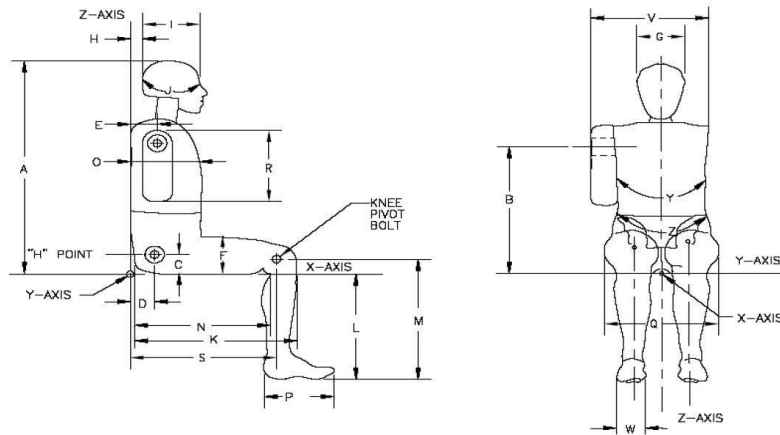


External Measurements - SID-IIs

Technician: **K. Brogan**

Date: **03/16/2021**

Dummy Serial Number: **300**



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	782	Pass
B	Shoulder Pivot Height	437	453	446	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	126	Pass
G	Head Breadth	140	148	144	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	186	Pass
J	Head Circumference	541	551	546	Pass
K	Buttock to Knee Length	514	540	532	Pass
L	Popliteal Height	343	369	361	Pass
M	Knee Pivot to floor height	392	409	398	Pass
N	Buttock Popliteal Length	416	442	430	Pass
O	Chest Depth w/o jacket	195	211	208	Pass
P	Foot Length	216	232	220	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	318	Pass
R	Arm Length	249	259	254	Pass
S	Knee Joint to seatback	477	493	484	Pass
V	Shoulder Width	341	357	352	Pass
W	Foot Width	78	94	83	Pass
Y	Chest Circumference w/jacket	851	881	875	Pass
Z	Waist Circumference	761	791	773	Pass

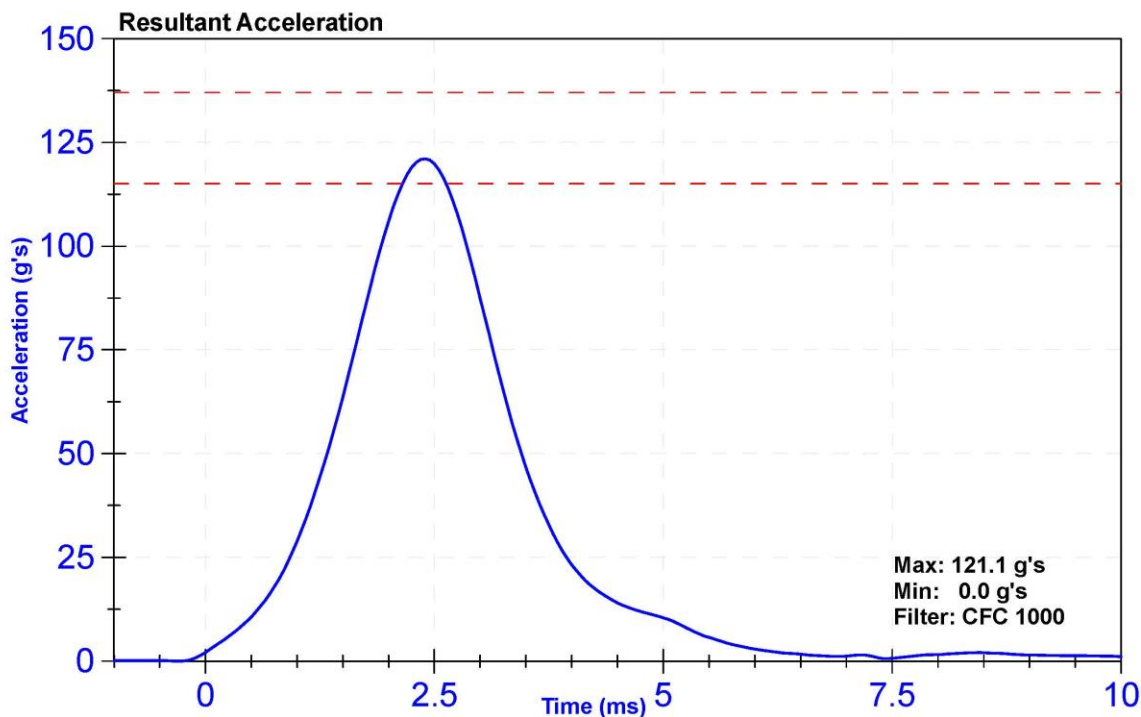
ATD Manufacturer	FTSS	Test Technician	S. Vacanti
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

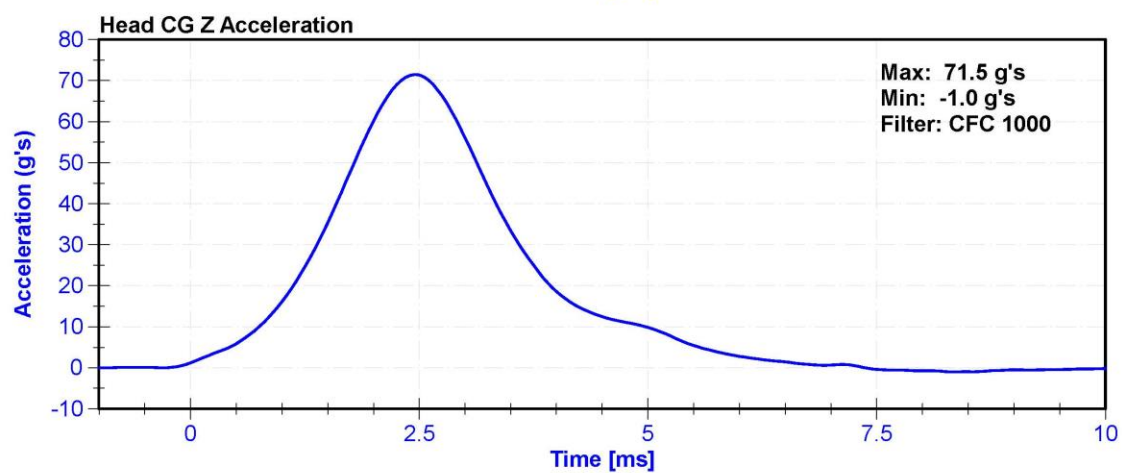
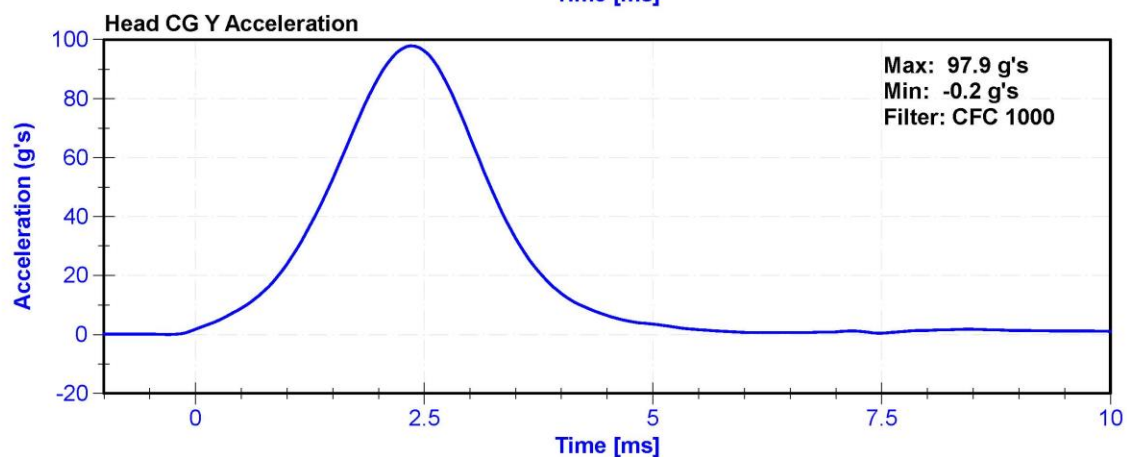
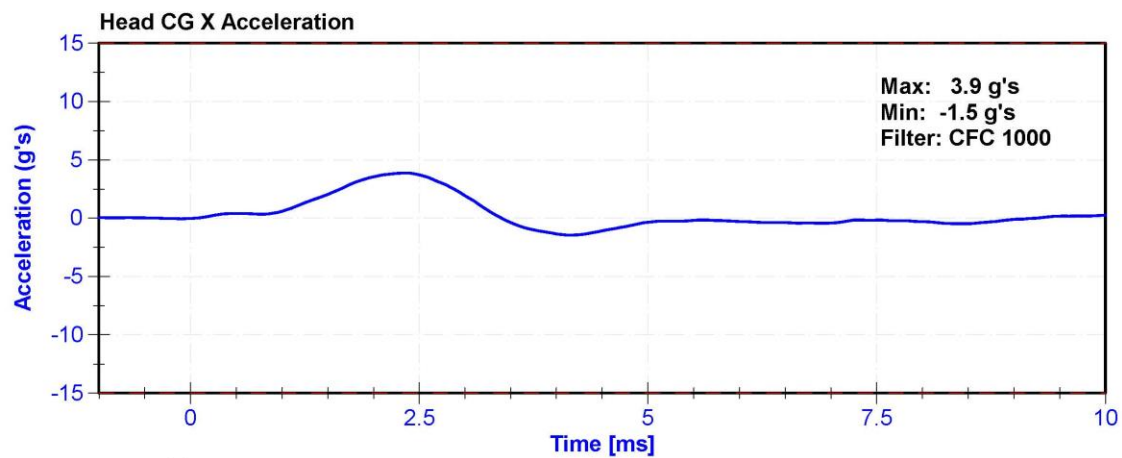
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	24	Pass
Resultant Acceleration	115	137	g's	121.1	Pass
Oscillation	0	15	%	1.7	Pass
Fore-Aft Acceleration	-15	15	g's	3.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P59018	11/10/2020	5/11/2021
Y Accelerometer	ENDEVCO 7264	AC-P79189	11/10/2020	5/11/2021
Z Accelerometer	ENDEVCO 7264CT	AC-P58777	11/10/2020	5/11/2021





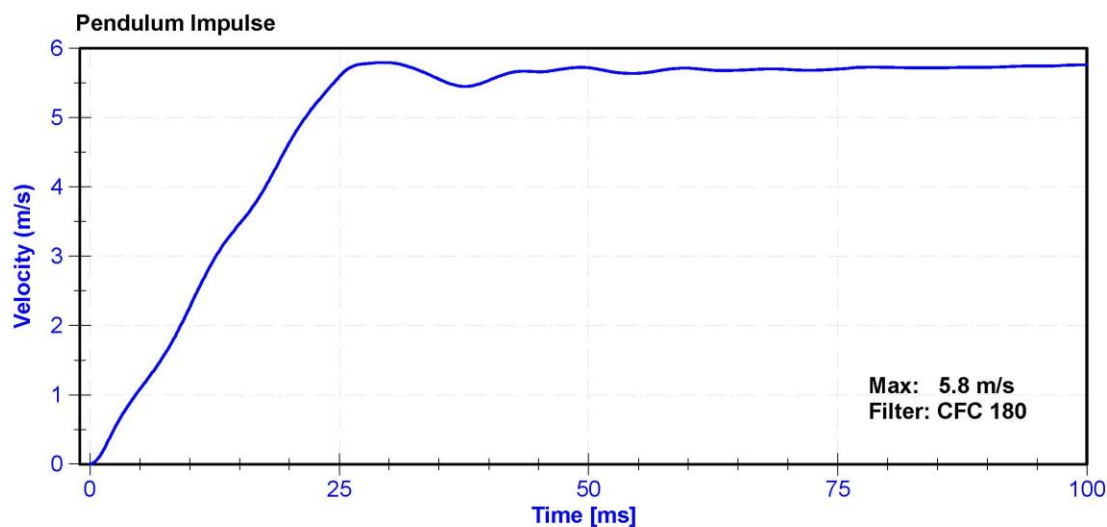
ATD Manufacturer	FTSS	Test Technician	S. Vacanti
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

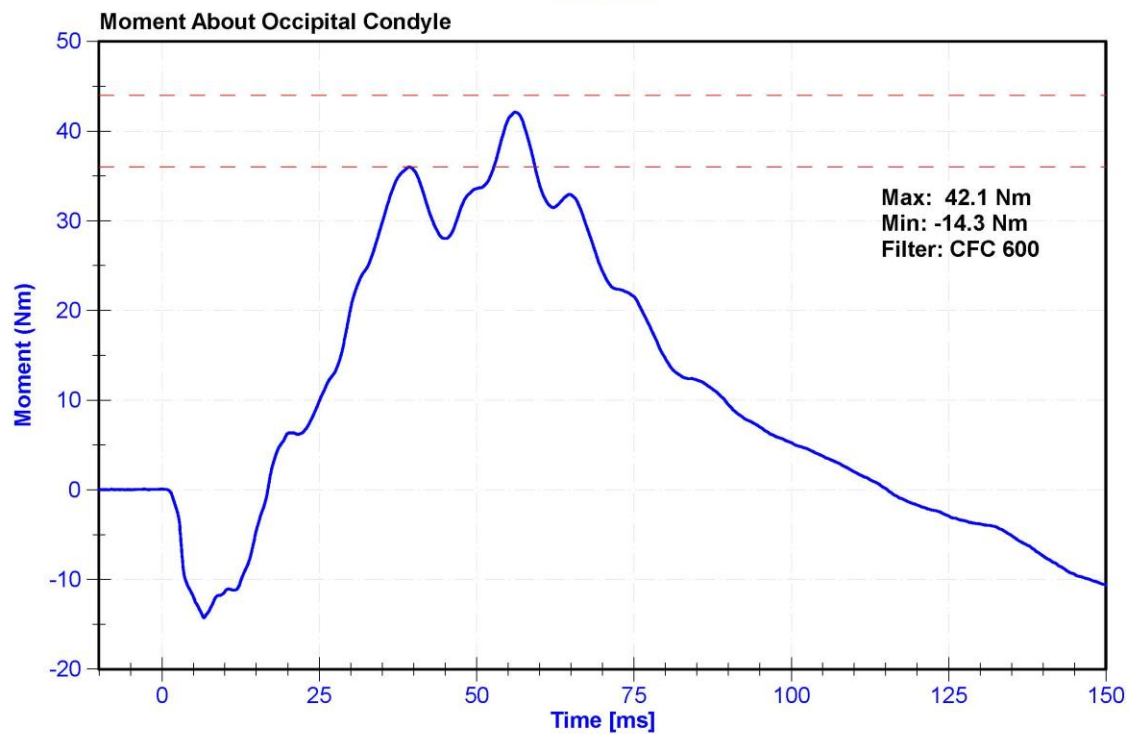
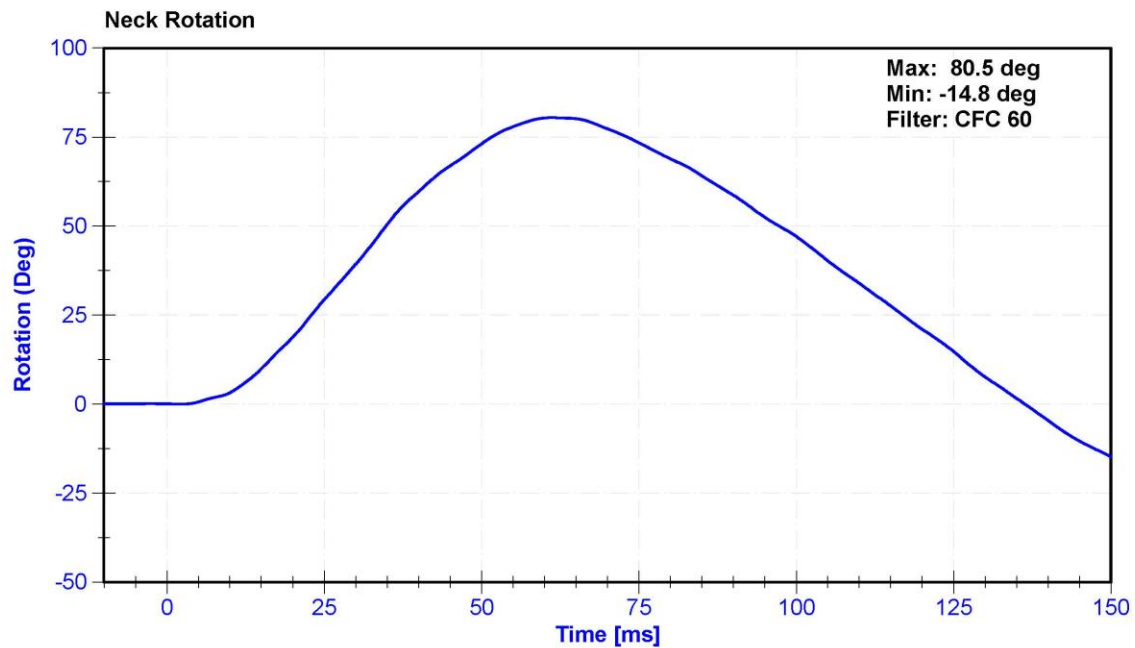
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	24	Pass
Velocity	5.51	5.63	m/s	5.549	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.26	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.47	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.64	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.59	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.79	Pass
Neck Rotation	71	81	deg	80.5	Pass
Time at Maximum Rotation	50	70	ms	61.1	Pass
Moment about the OC	36	44	Nm	42.1	Pass
Moment Decay to 0 Nm	102	126	ms	115.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C16503 Striker	2/5/2021	2/5/2022
Pendulum Potentiometer	Denton 78051-342	DS-184Pend	11/6/2020	11/6/2021
Condyle Potentiometer	Denton 78051-342	DS-185Pend	11/6/2020	11/6/2021
Upper Neck Load Cell	Denton 1716	17162019 FY	3/18/2020	3/18/2021





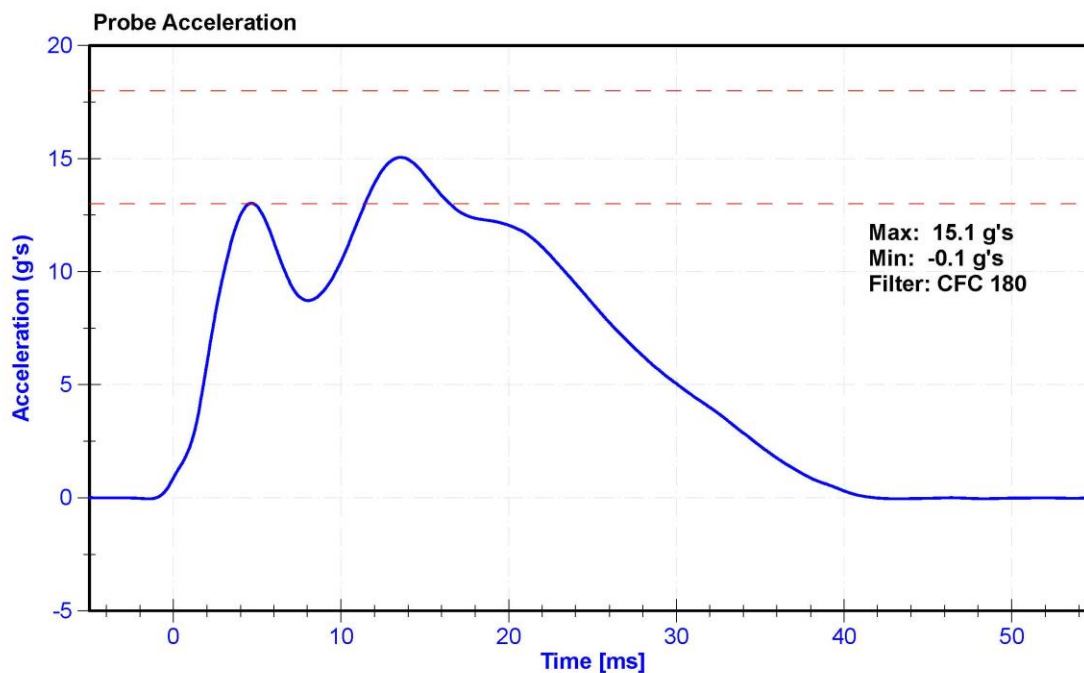
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

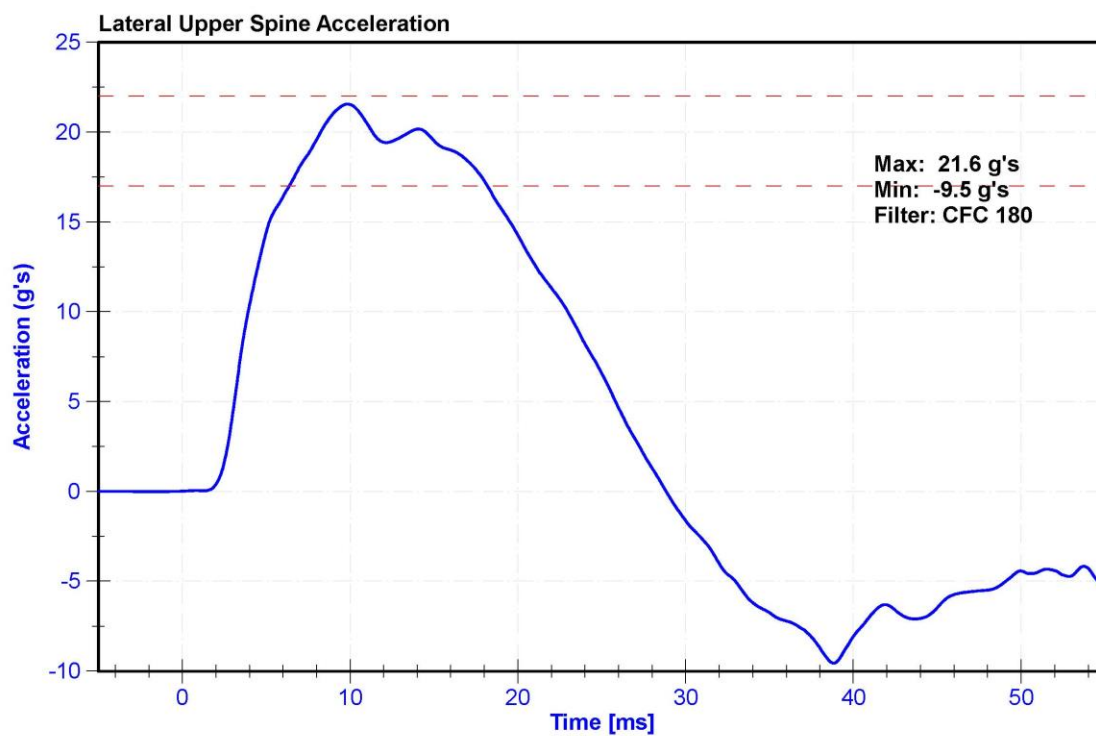
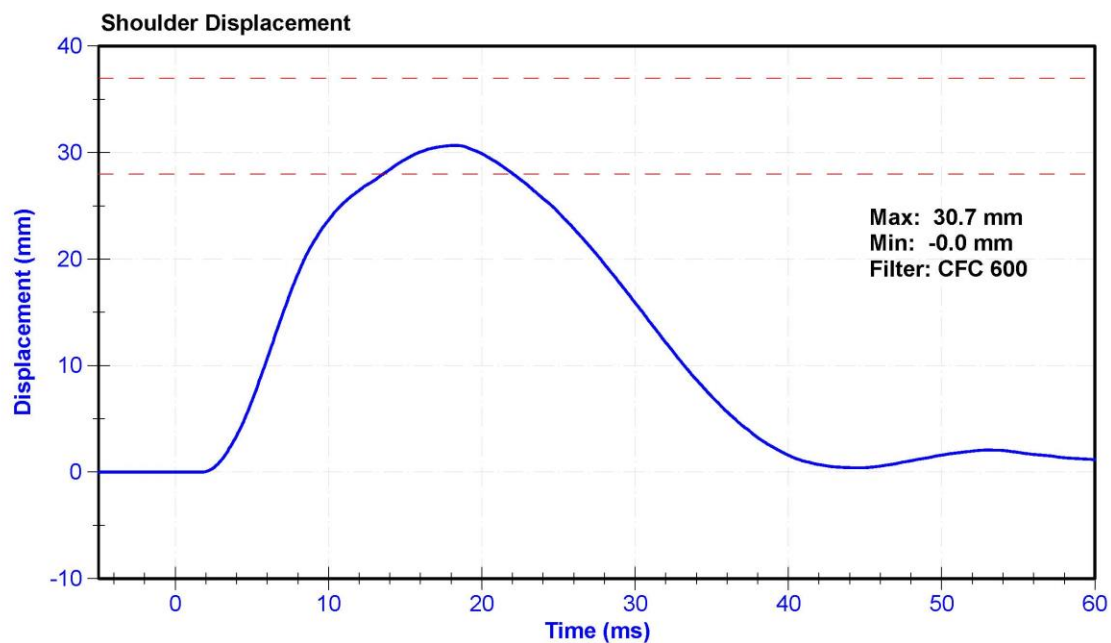
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	22	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Probe Acceleration	13	18	g's	15.1	Pass
Shoulder Deflection	28	37	mm	30.7	Pass
Lateral Upper Spine Acceleration	17	22	g's	21.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264C	T25885	2/2/2021	2/2/2022
Shoulder Potentiometer	Servo 08CT1-3725	DS-053 GFE	11/10/2020	5/11/2021
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P71281	11/9/2020	5/10/2021





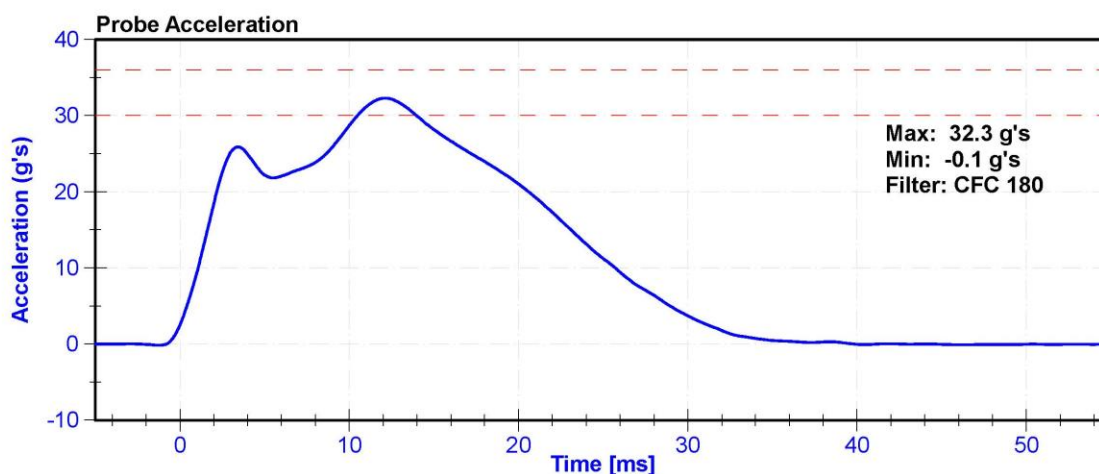
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

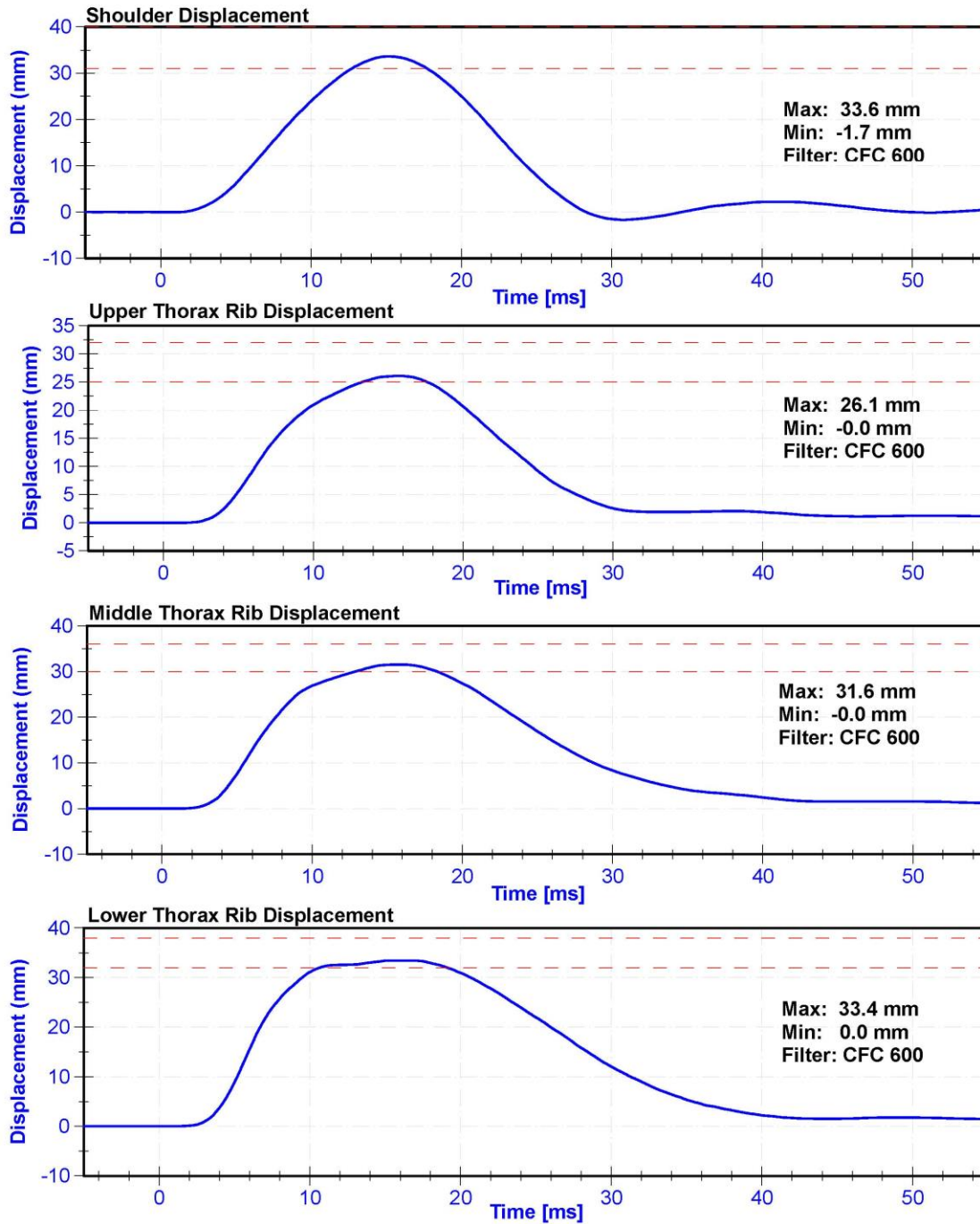
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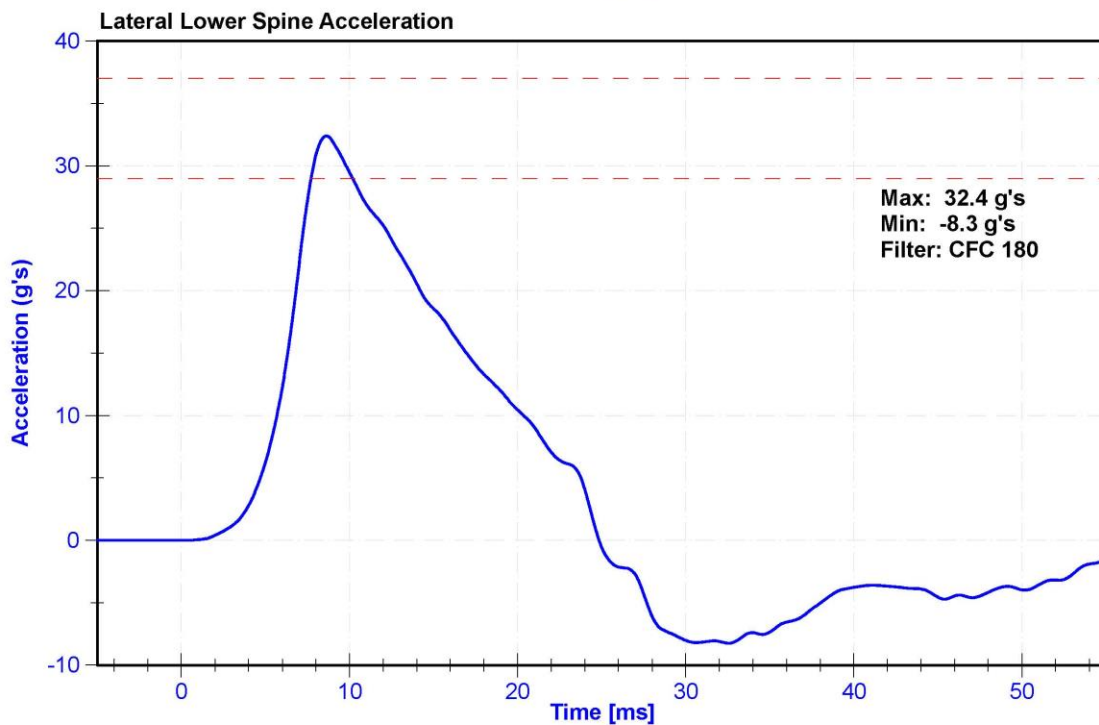
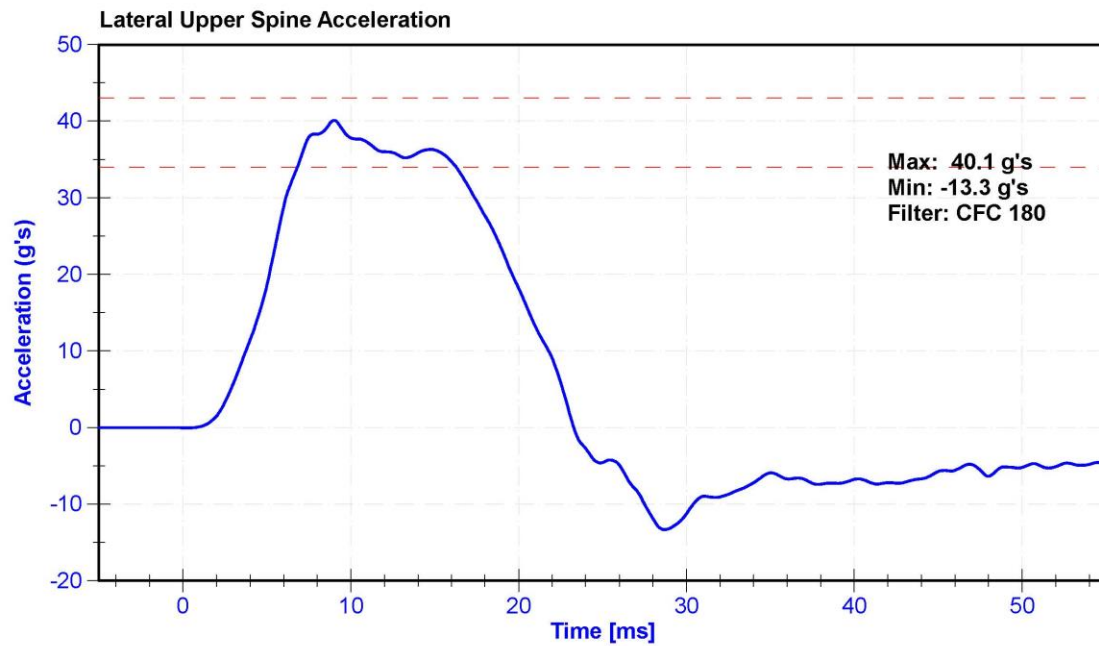
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	31.0	Pass
Velocity	6.6	6.8	m/s	6.74	Pass
Probe Acceleration after 5 ms	30	36	g's	32.3	Pass
Lateral Upper Spine Acceleration	34	43	g's	40.1	Pass
Lateral Lower Spine Acceleration	29	37	g's	32.4	Pass
Shoulder Deflection	31	40	mm	33.6	Pass
Upper Thorax Rib Deflection	25	32	mm	26.1	Pass
Mid Thorax Rib Deflection	30	36	mm	31.6	Pass
Lower Thorax Rib Deflection	32	38	mm	33.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264C	T25885	2/2/2021	2/2/2022
Upper Spine T1 Y Accelerometer	ENDEVCO 7264CT	AC-P71281	11/9/2020	5/10/2021
Upper Spine T12 Y Accelerometer	ENDEVCO 7264	AC-P64147	11/9/2020	5/10/2021
Shoulder Potentiometer	Servo 08CT1-3725	DS-053 GFE	11/10/2020	5/11/2021
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	11/10/2020	5/11/2021
Middle Thorax Rib Potentiometer	Servo 08TC1-3745	DS-040GFE	11/10/2020	5/11/2021
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	11/9/2020	5/10/2021







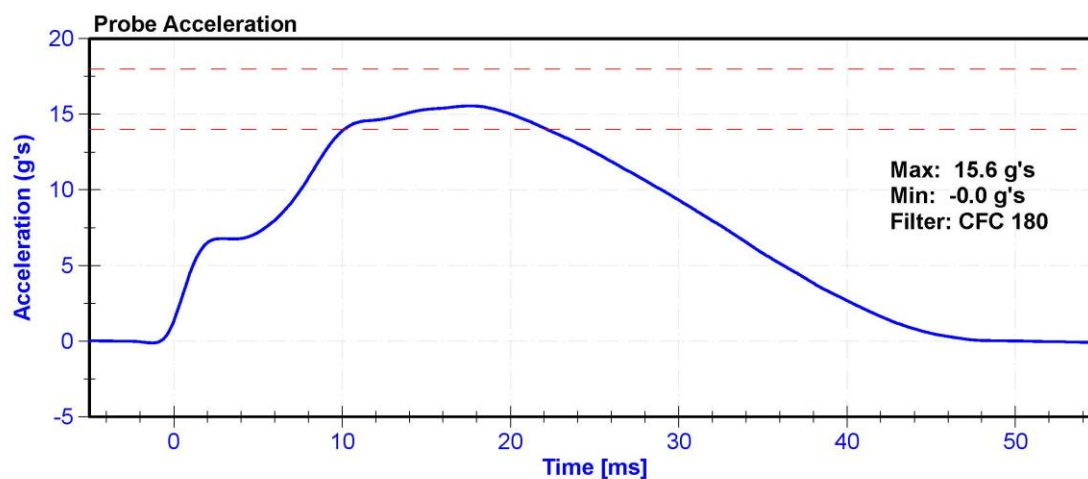
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

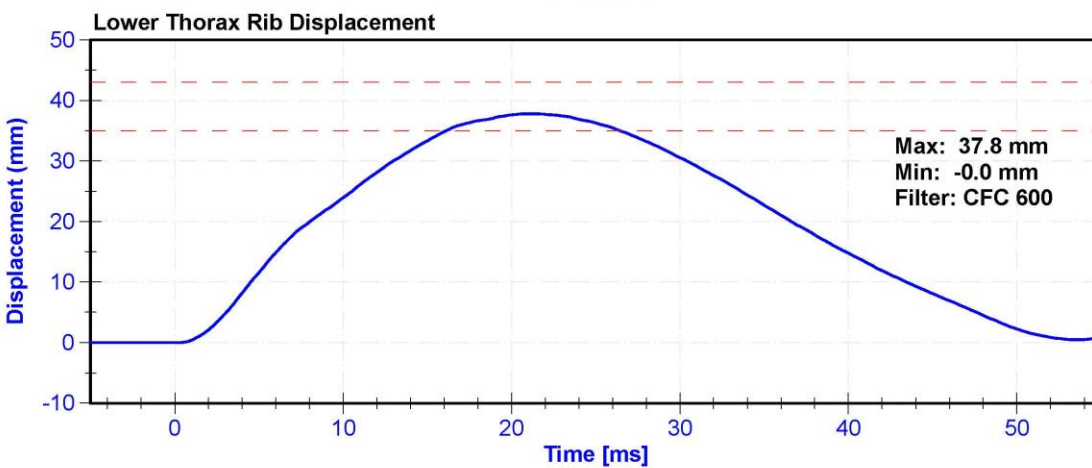
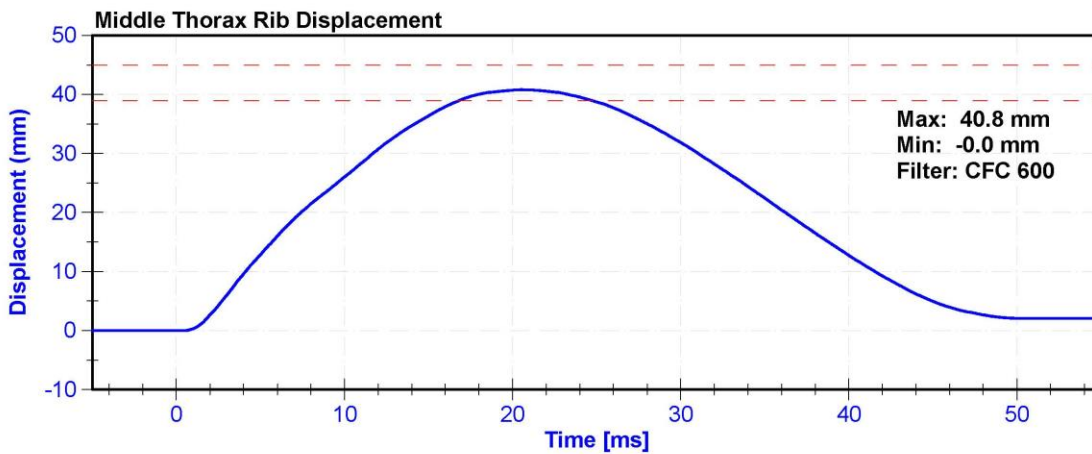
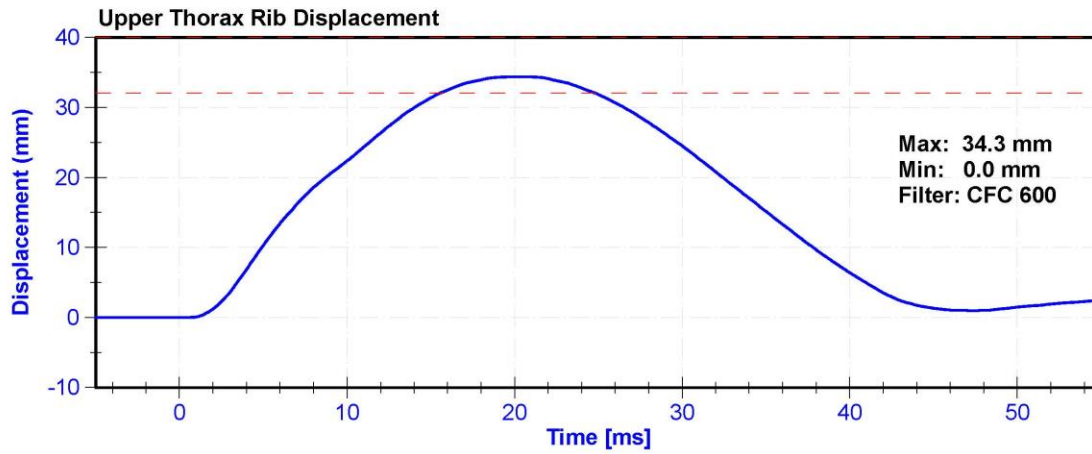
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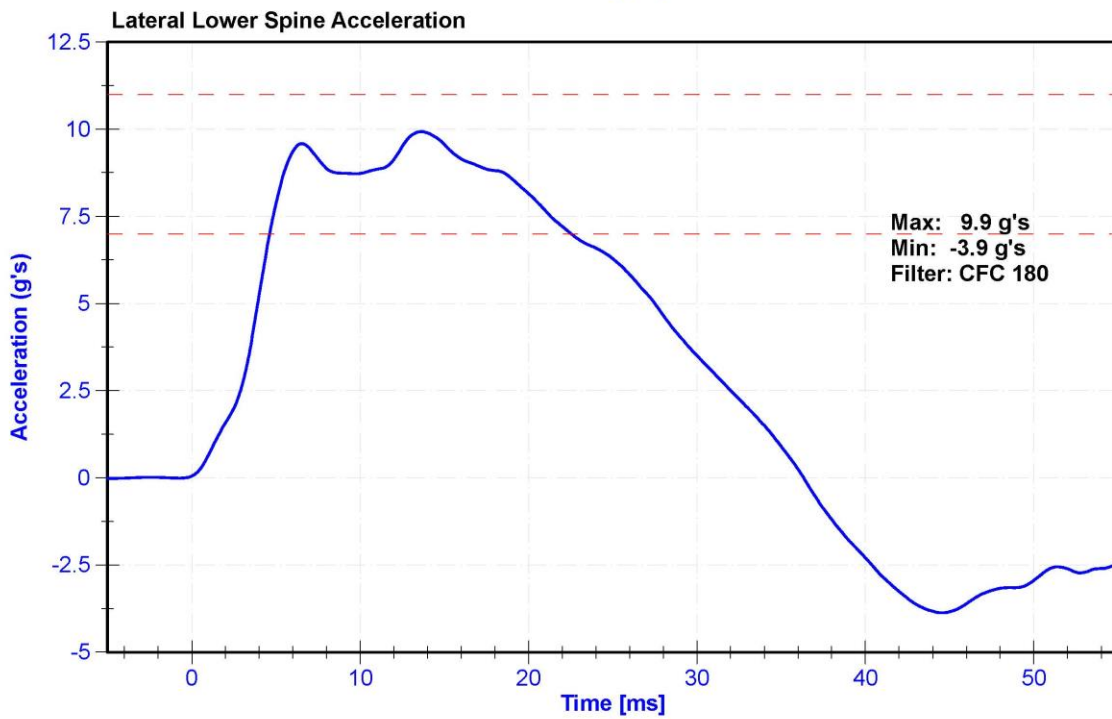
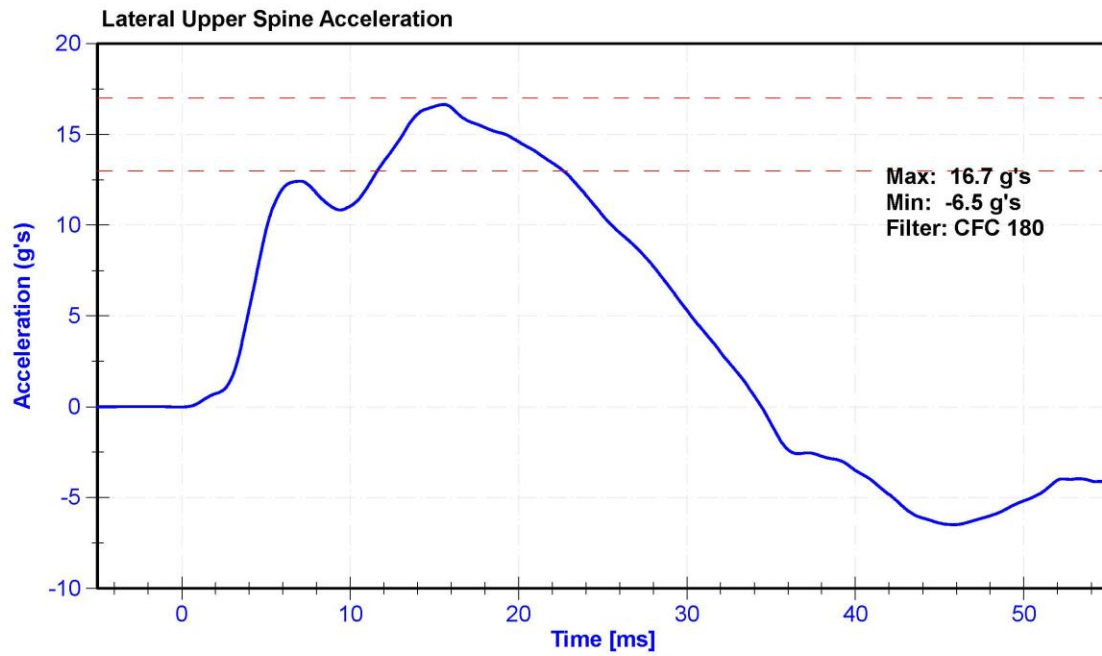
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	29	Pass
Velocity	4.2	4.4	m/s	4.37	Pass
Probe Acceleration	14	18	g's	15.6	Pass
Lateral Upper Spine Acceleration	13	17	g's	16.7	Pass
Lateral Lower Spine Acceleration	7	11	g's	9.9	Pass
Upper Thorax Rib Deflection	32	40	mm	34.3	Pass
Middle Thorax Rib Deflection	39	45	mm	40.8	Pass
Lower Thorax Rib Deflection	35	43	mm	37.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264C	T25885	2/2/2021	2/2/2022
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P71281	11/9/2020	5/10/2021
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	11/9/2020	5/10/2021
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	11/10/2020	5/11/2021
Middle Thorax Rib Potentiometer	Servo 08TC1-3745	DS-040GFE	11/10/2020	5/11/2021
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	11/9/2020	5/10/2021







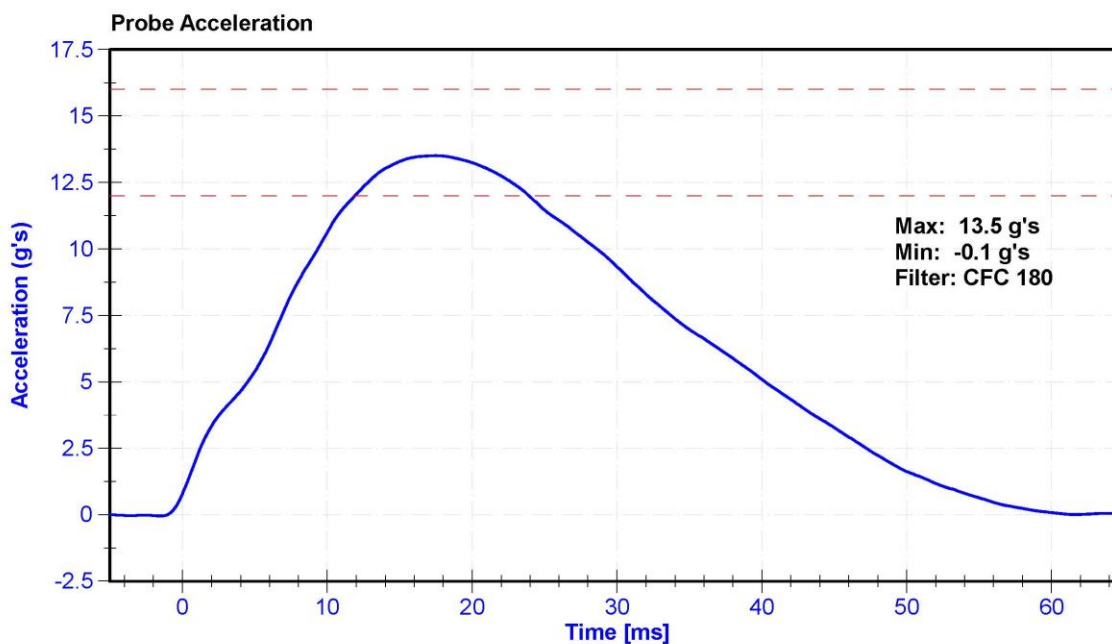
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

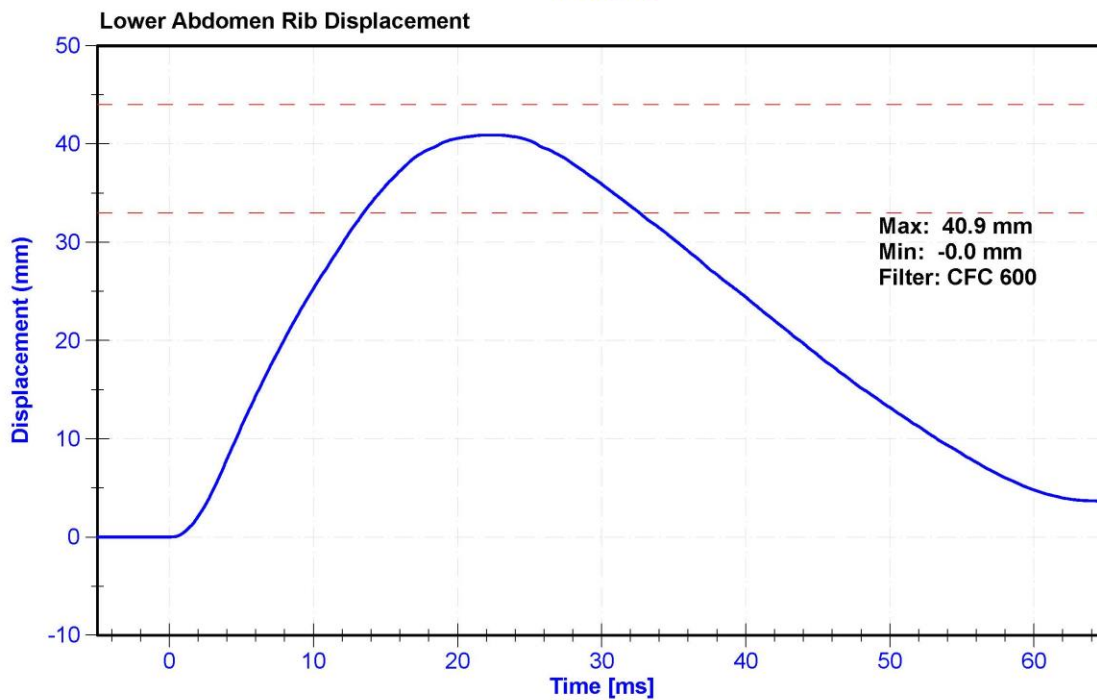
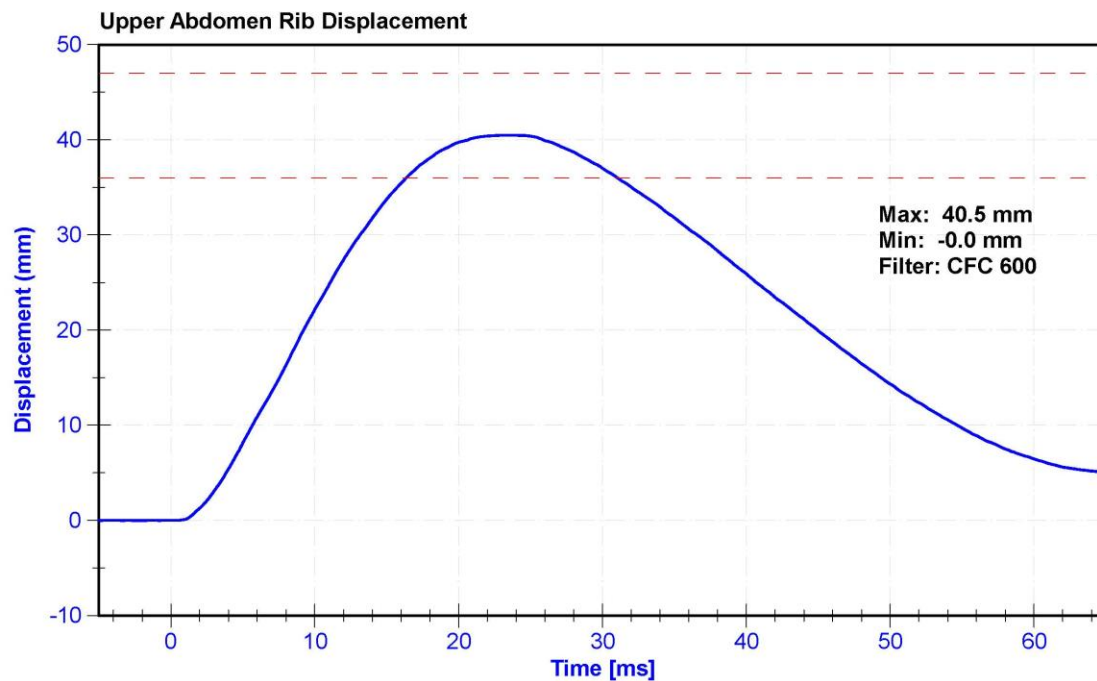
Results

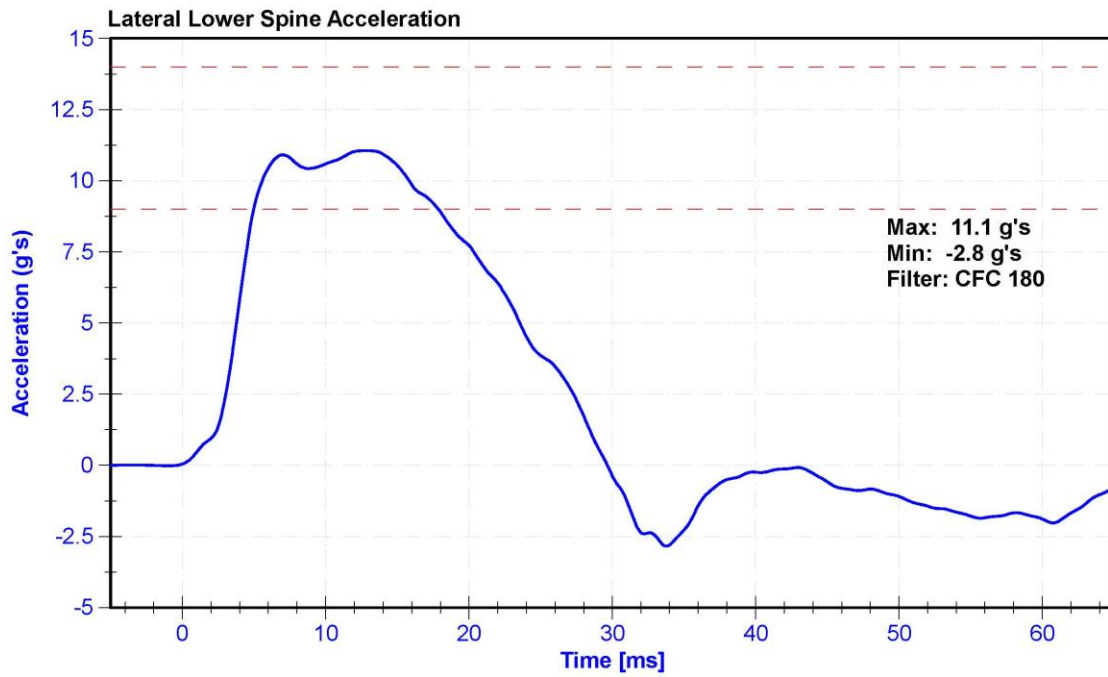
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	29.0	Pass
Velocity	4.2	4.4	m/s	4.33	Pass
Probe Acceleration	12	16	g's	13.5	Pass
Lateral Lower Spine Acceleration	9	14	g's	11.1	Pass
Upper Abdomen Rib Deflection	36	47	mm	40.5	Pass
Lower Abdomen Rib Deflection	33	44	mm	40.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7264C	T25885	2/2/2021	2/2/2022
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	11/9/2020	5/10/2021
Upper Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-308GFE	11/10/2020	5/11/2021
Lower Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-307GFE	11/10/2020	5/11/2021







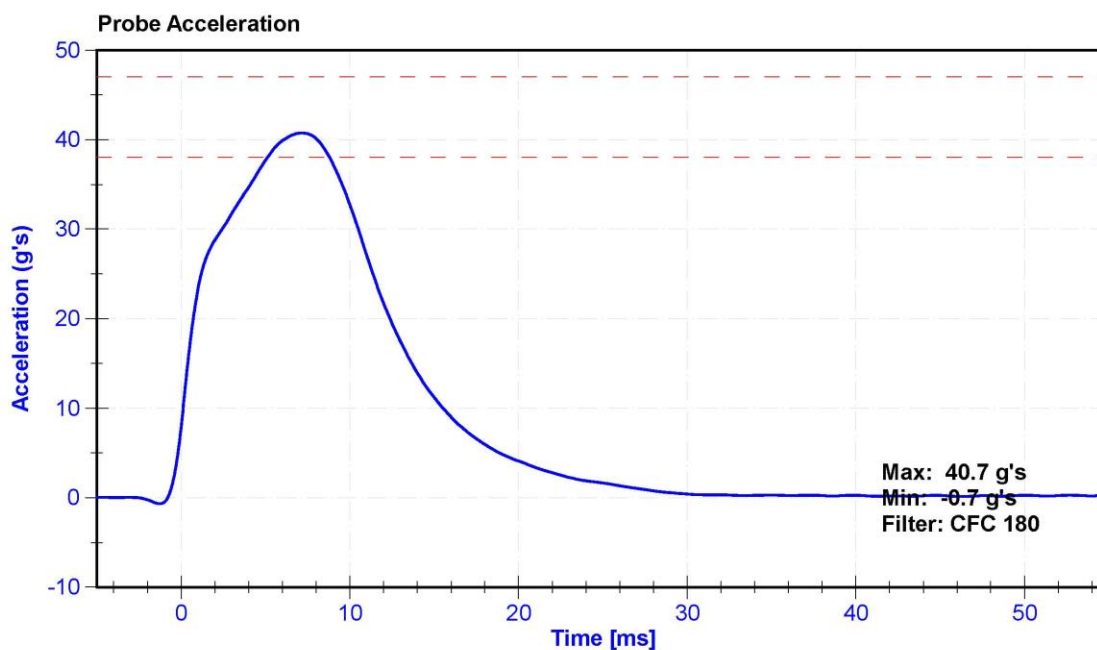
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

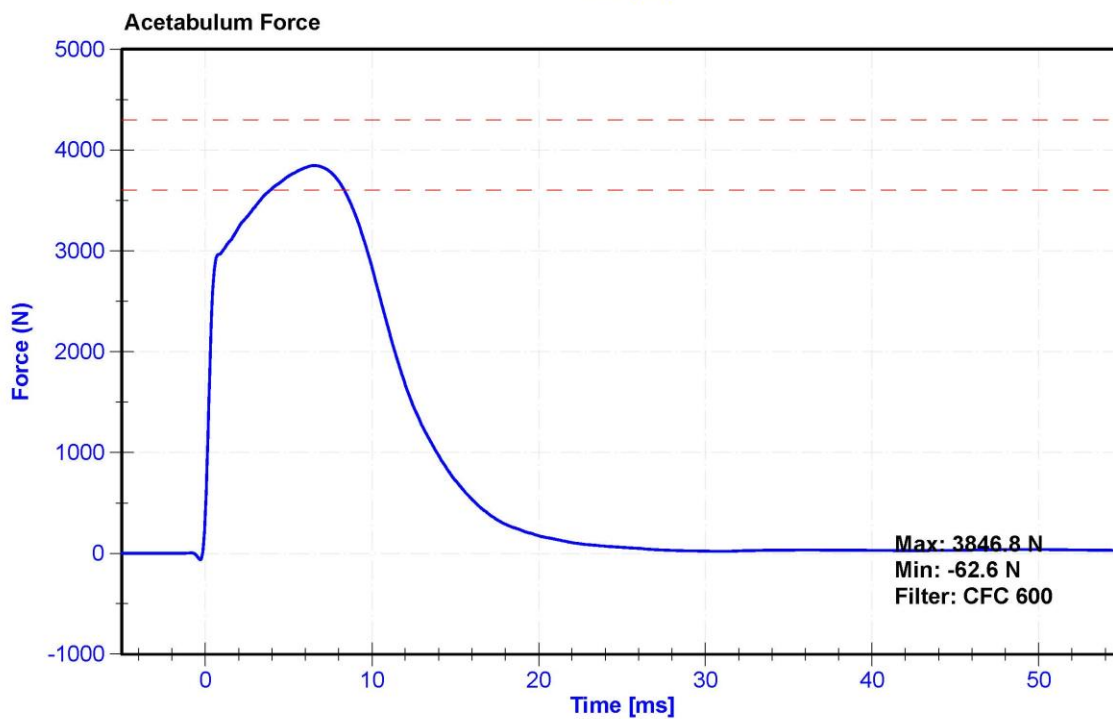
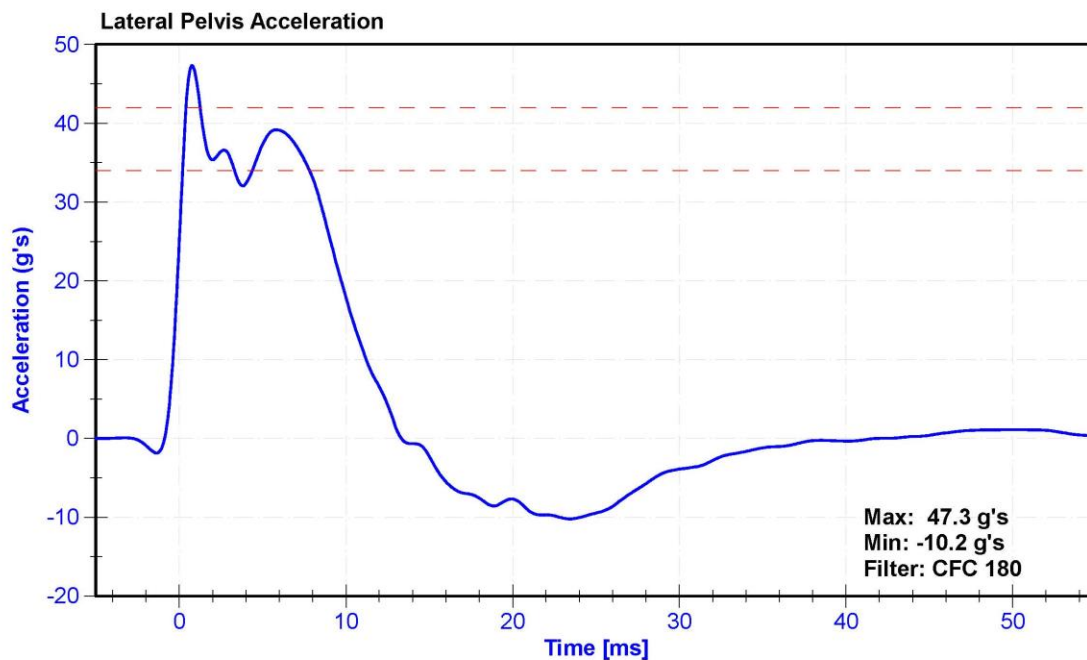
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	29	Pass
Velocity	6.6	6.8	m/s	6.66	Pass
Probe Acceleration	38	47	g's	40.7	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	39.1	Pass
Acetabulum Force	3600	4300	N	3846.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264C	T25885	2/2/2021	2/2/2022
Pelvis Y Accelerometer	ENDEVCO 7264C	AC-P51731	11/9/2020	5/10/2021
Acetabulum Load Cell	Denton IF-520	LC-236Fy	3/18/2020	3/18/2021
Certification Plug	SACO	13114	8-5-2021	N/A
Crash Test Plug	SACO	13121	8-5-2019	N/A







SID-11s Pelvis Plug Certification Test

Plug S/N 13956

Test Number 13430

Report Number 13475

Test Date 5/22/2020 8:42:47 AM

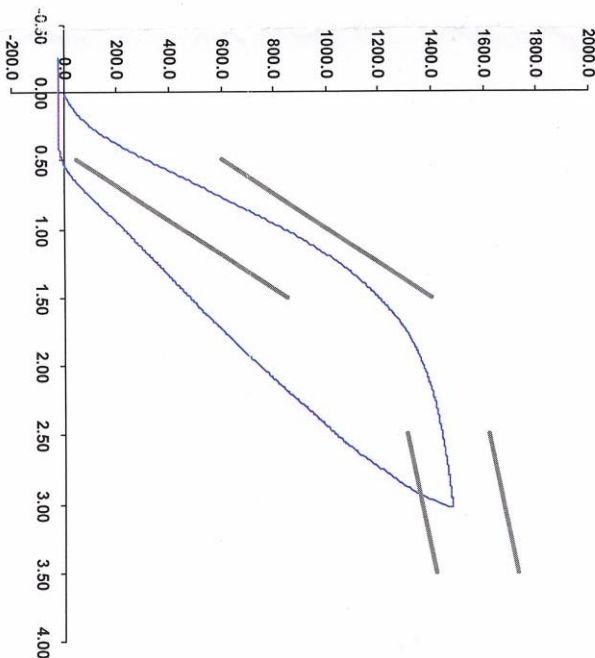
300
3/17/21
Non impact +

Force (-N) vs Extension (-mm)

Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	320.48	50.00
Force @ 1.5 mm (N)	1,204.12	850.00
Force @ 2.5 mm (N)	1,440.70	1,306.00
Force @ 3.0 mm (N)	1,481.25	1,361.00

Testing Machine STM-20 5965542
Load Cell S/N (FI360947), Units (LBS) 1000
Crosshead Speed (mm / min) or Rate 12.7
Extension or Position Measured by XHD_100 (XHD100)

Notes:



Operator

Part Number 180-4450

Template No 107
SACO Research

22-May-20

By: DC

Date: 5-22-2020

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



SID-11s Pelvis Plug Certification Test

Plug S/N 13121
Test Number 10482
Report Number 10518
Test Date 8/5/2019 10:36:01 AM

Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	282.31	50.00
Force @ 1.5 mm (N)	1,266.77	850.00
Force @ 2.5 mm (N)	1,569.82	1,306.00
Force @ 3.0 mm (N)	1,611.09	1,361.00

Testing Machine STM-20 5965542
Load Cell S/N (F1350947), Units (LBS) 1000
Crosshead Speed (mm/min) or Rate 12.7
Extension or Position Measured by XHD_100 (XHD100)

Notes:

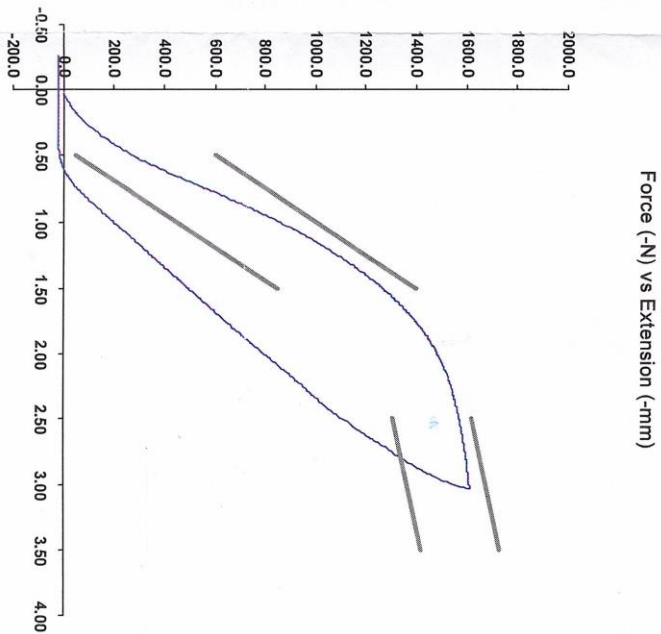
Operator

Part Number 180-4450

Template No 107 05-Aug-19
SACO Research

By: DC Date: 8/5/2019

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





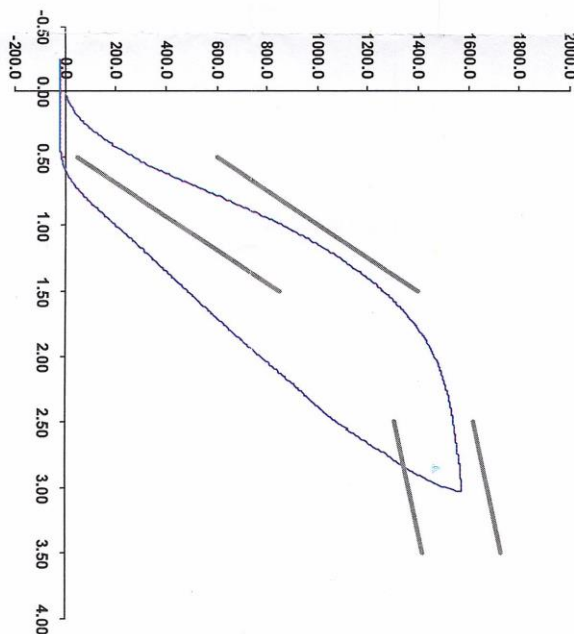
300 Cert
3/17/21

SID-11s Pelvis Plug Certification Test

Plug S/N 13114
Test Number 10475
Report Number 10511
Test Date 8/5/2019 10:22:58 AM

Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	283.46	50.00
Force @ 1.5 mm (N)	1,262.79	850.00
Force @ 2.5 mm (N)	1,539.62	1,306.00
Force @ 3.0 mm (N)	1,573.12	1,361.00

Testing Machine STM-20 5965542	Load Cell S/N (F1350947), Units (LBS)	1000
Crosshead Speed (mm/min) or Rate	12.7	
Extension or Position Measured by	XHD_100 (XHD100)	
Notes:		



Operator
Part Number 180-4450

Template No 107 05-Aug-19
SACO Research
By: DC Date: 8/5/2019
SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 FAX

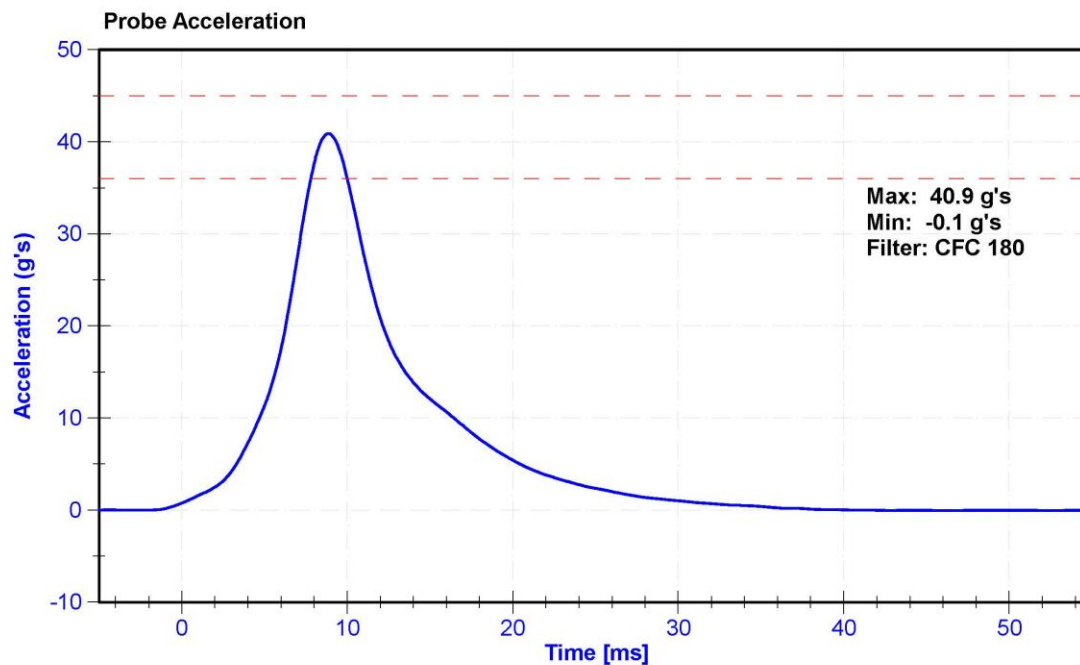
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	300	Laboratory Supervisor	D.Reinhard

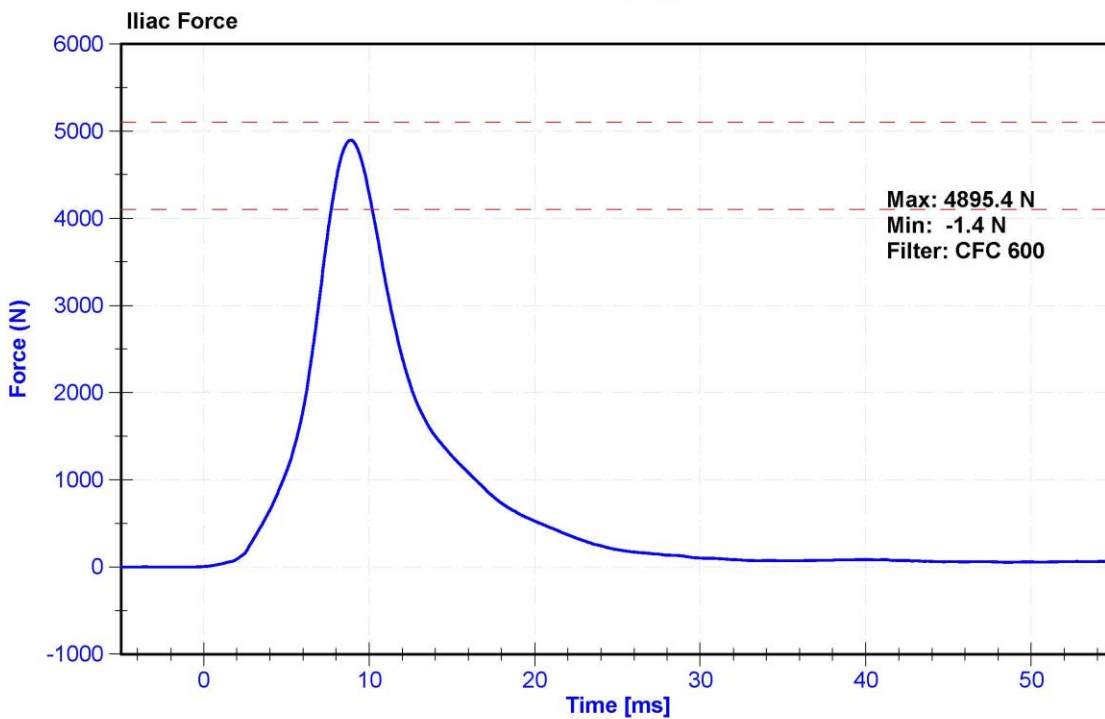
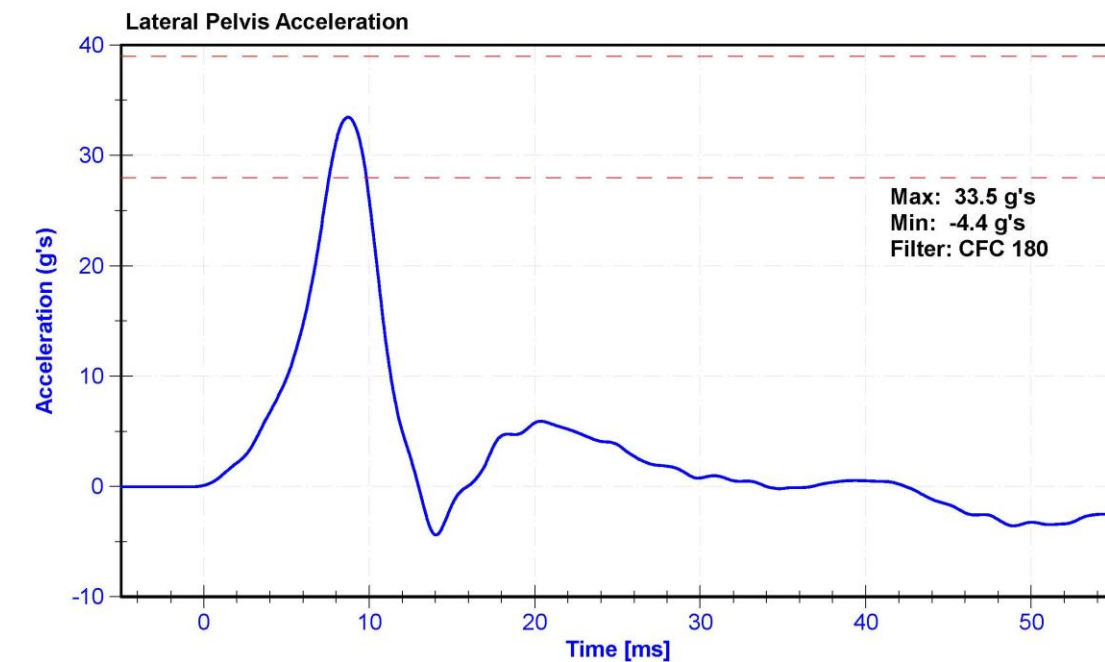
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	29.0	Pass
Velocity	4.2	4.4	m/s	4.27	Pass
Probe Acceleration	36	45	g's	40.9	Pass
Lateral Pelvis Acceleration	28	39	g's	33.5	Pass
Iliac Force	4100	5100	N	4895.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264C	T25885	2/2/2021	2/2/2022
Pelvis Y Accelerometer	ENDEVCO 7264C	AC-P51731	11/9/2020	5/10/2021
Iliac Load Cell	DENTON 3228J	LC-279Fy	11/23/2020	11/23/2021





CALIBRATION TEST RESULTS

POST-TEST

EUROSID 2 (ES-2RE) MALE – DRIVER ATD

SERIAL NO: F033

(CONFIGURED FOR LEFT SIDE IMPACT)

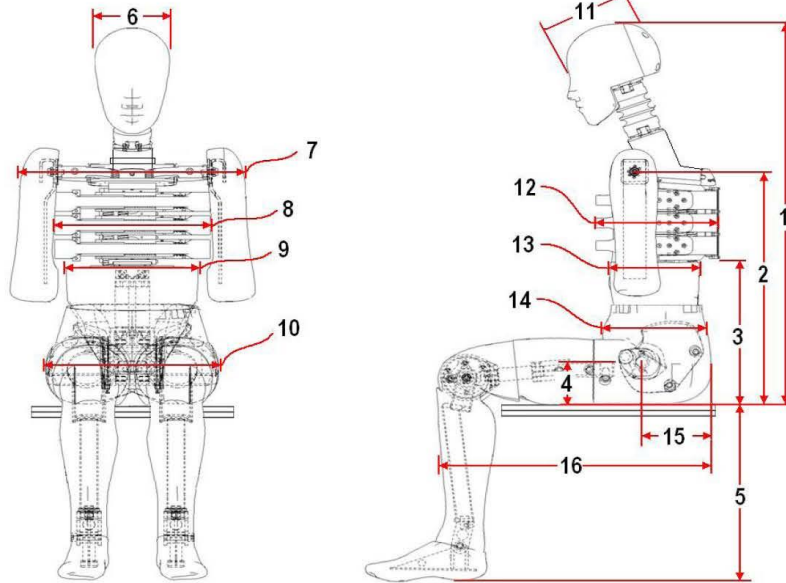


External Measurements - EuroSID-2re

Technician: K. Brogan

Date: 5/13/2021

Dummy Serial Number: F033



FRONT VIEW

SIDE VIEW

Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	912	Pass
2	Seat to Shoulder Joint	558	572	569	Pass
3	Seat to Lower Face of Thoracic Spine Box	346	356	353	Pass
4	Seat to Hip Joint (center of bolt)	97	103	98	Pass
5	Sole to Seat, Sitting	333	451	426	Pass
6	Head Width	152	158	155	Pass
7	Shoulder/Arm Width	461	479	472	Pass
8	Thorax Width	322	332	329	Pass
9	Abdomen Width	273	287	285	Pass
10	Pelvis Lap Width	359	373	368	Pass
11	Head Depth	196	206	201	Pass
12	Thorax Depth	262	272	269	Pass
13	Abdomen Depth	194	204	201	Pass
14	Pelvis Depth	235	245	239	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

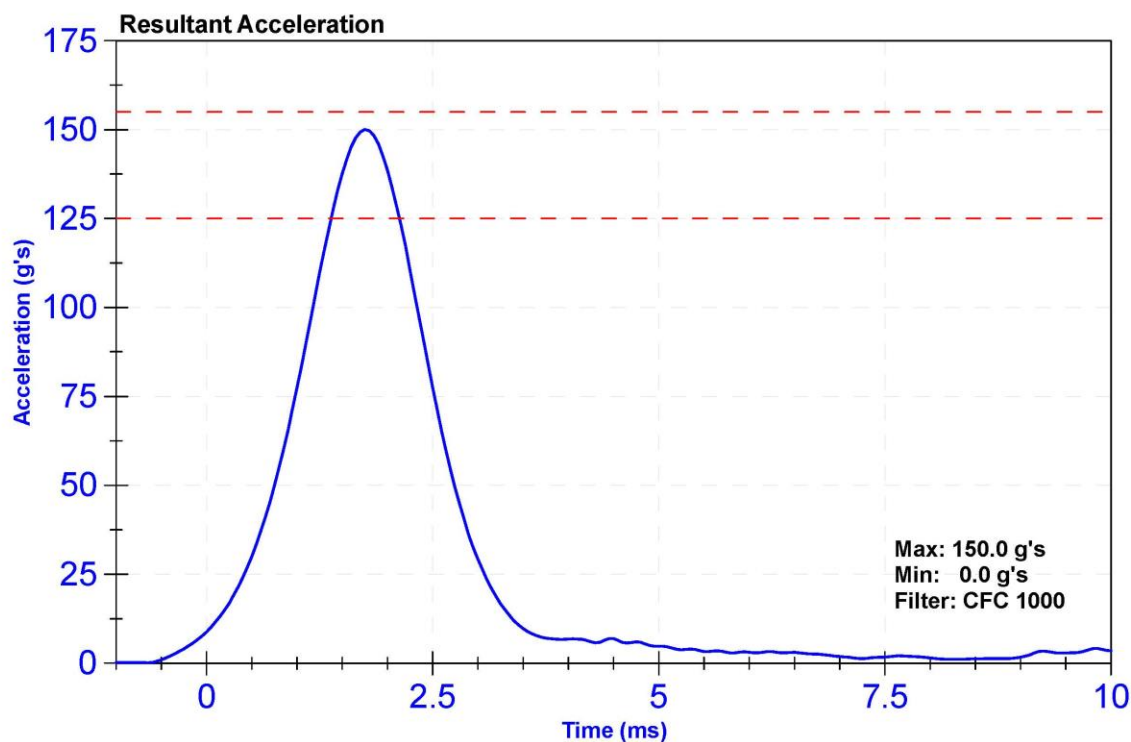
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

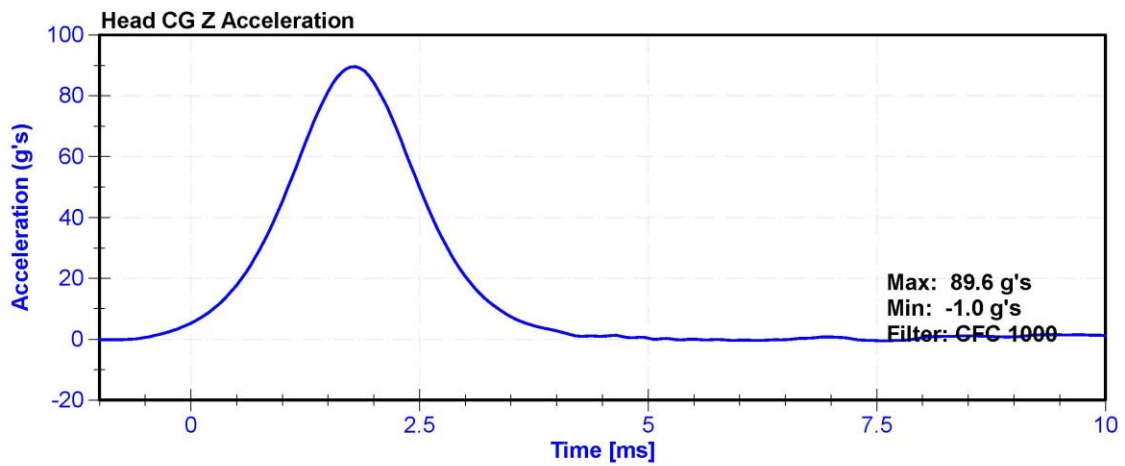
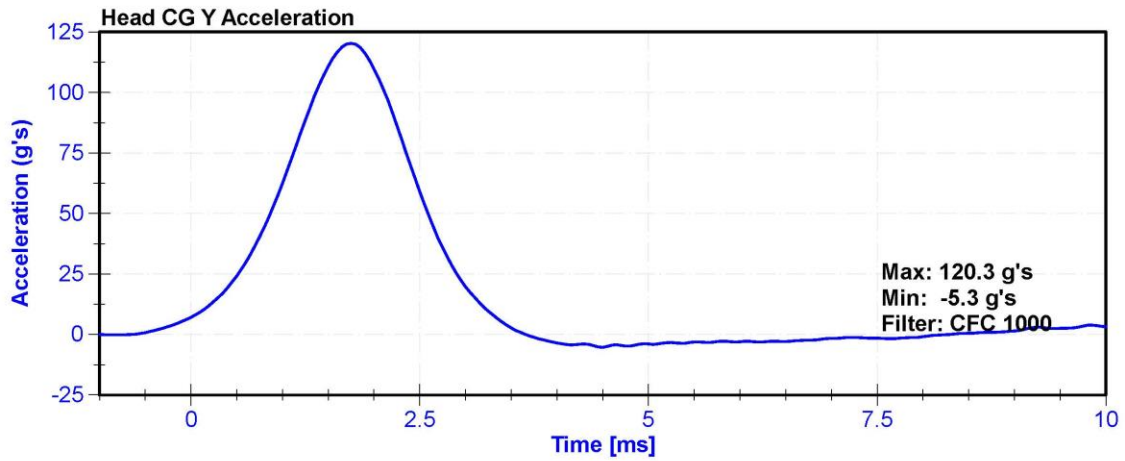
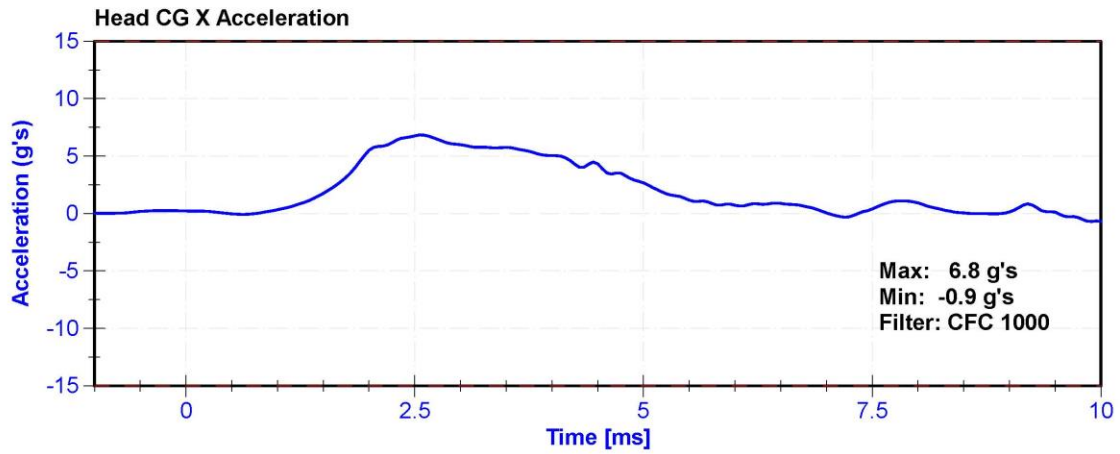
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	34.0	Pass
Resultant Acceleration	125	155	g's	150.0	Pass
Oscillation	0	15	%	4.60	Pass
Fore-Aft Acceleration	-15	15	g's	6.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P63861	11/24/2020	5/25/2021
Y Accelerometer	ENDEVCO 7264CT	AC-P49216	11/24/2020	5/25/2021
Z Accelerometer	ENDEVCO 7264	AC-P51303	11/24/2020	5/25/2021





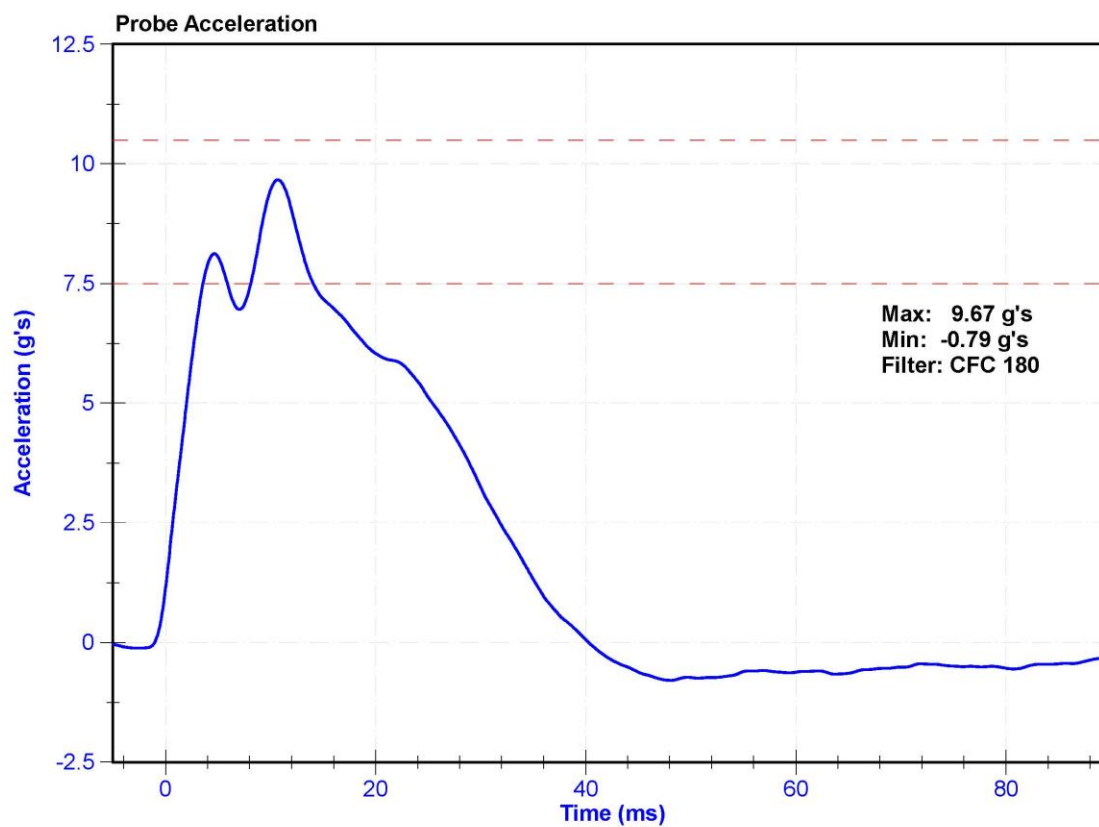
ATD Manufacturer	FTSS	Test Technician	D. Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	35.0	Pass
Velocity	4.2	4.4	m/s	4.34	Pass
Probe Acceleration	7.5	10.5	g's	9.67	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	MSI 64C-2000	A278994	12/3/2020	12/3/2021



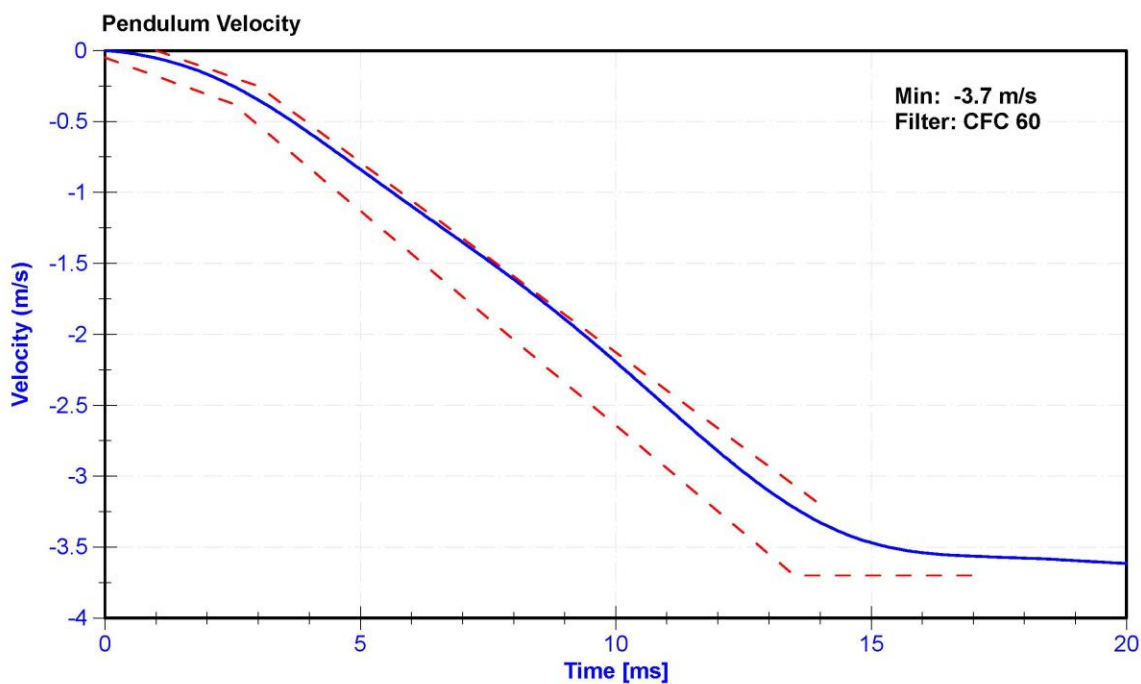
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

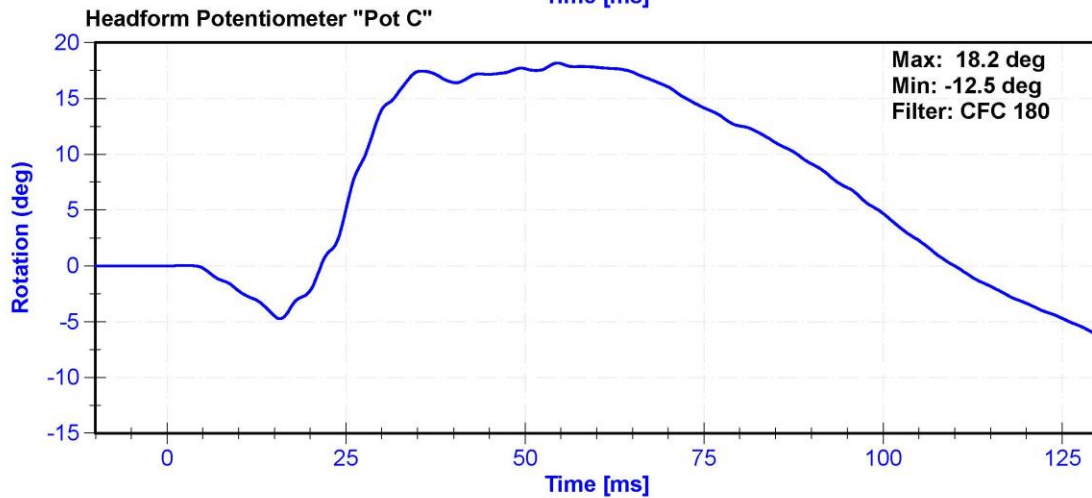
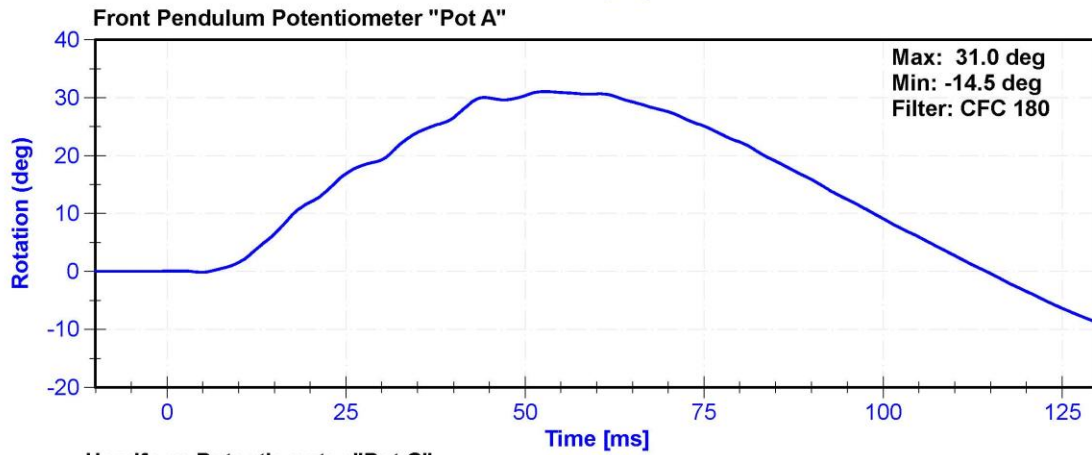
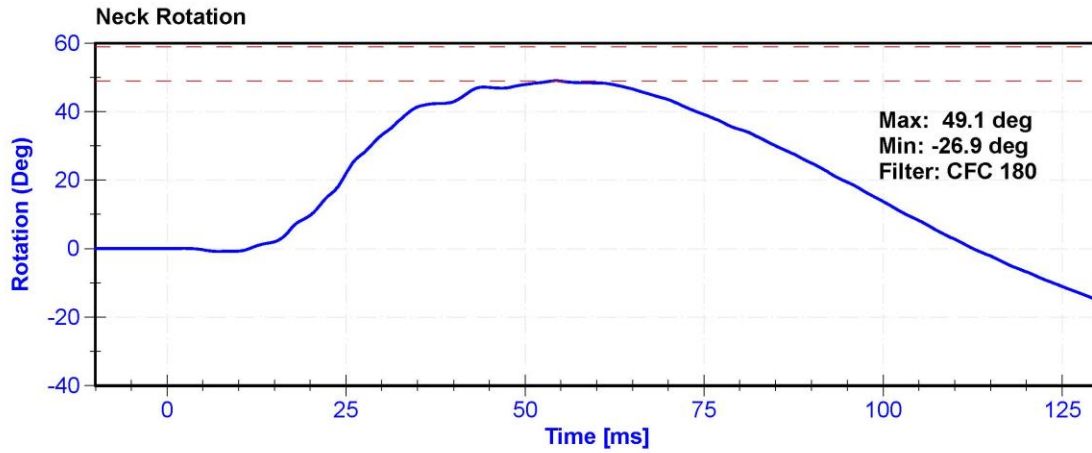
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	34	Pass
Velocity	3.3	3.5	m/s	3.38	Pass
Lateral Neck Rotation	49	59	deg	49.1	Pass
Time at Maximum Rotation	54	66	ms	54.3	Pass
Time of Rotation Decay from Maximum	53	88	ms	58.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C16503	2/5/2021	2/5/2022
Front Pendulum Potentiometer	SP22G	DS-094	8/18/2020	8/18/2021
Headform Potentiometer	SP22G	DS-095	8/18/2020	8/18/2021





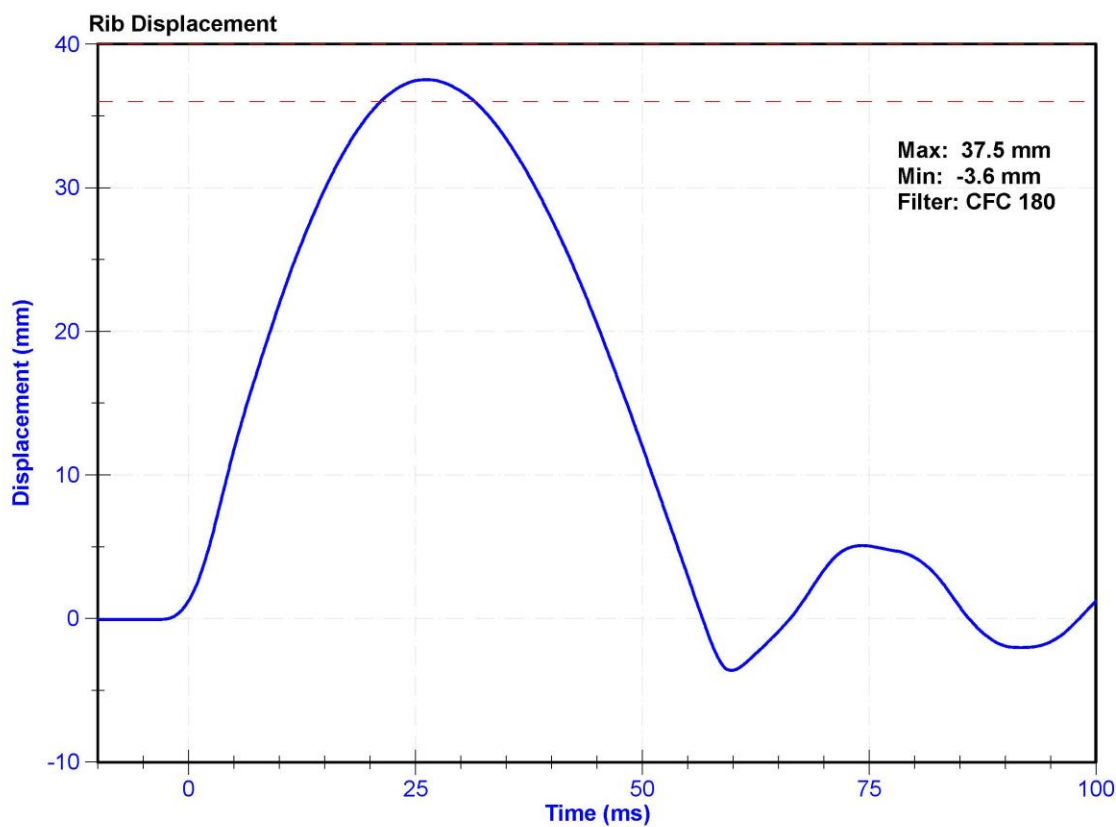
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	34.0	Pass
Rib Displacement	36	40	mm	37.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-179GFE	11/25/2020	5/26/2021



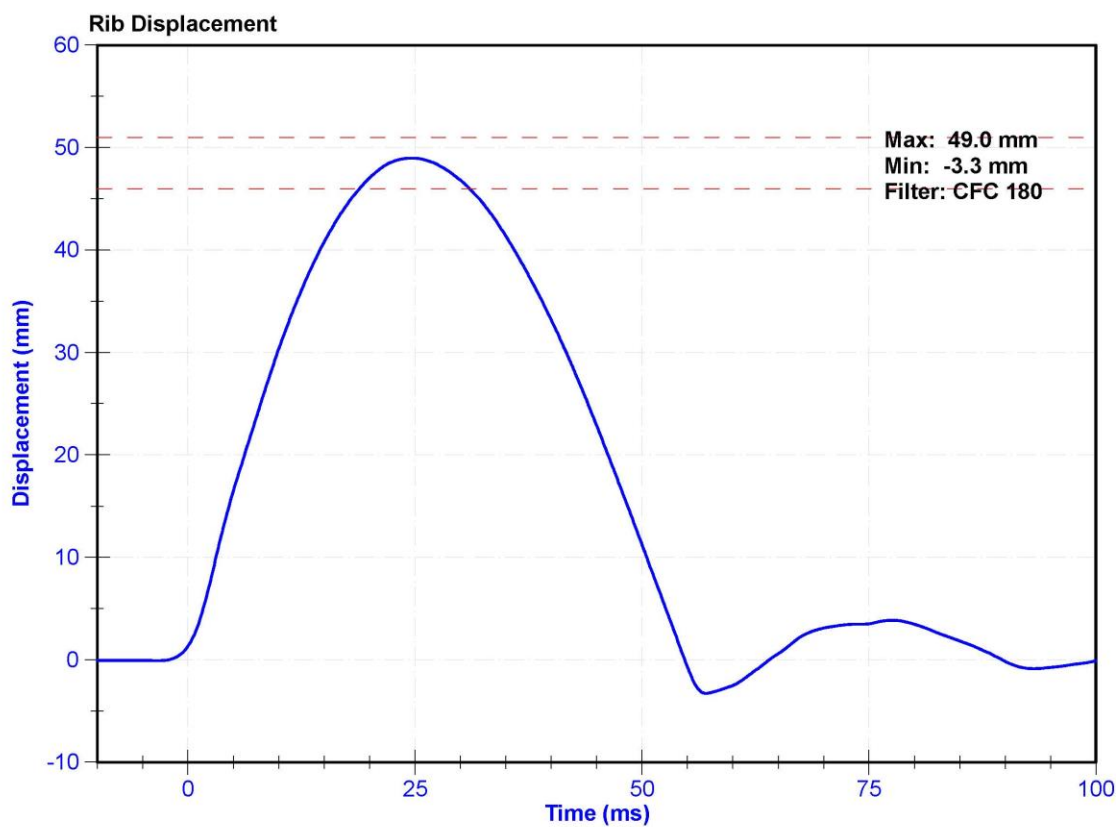
ATD Manufacturer	FTSS	Test Technician	D. Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	34.0	Pass
Rib Displacement	46	51	mm	49.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-179GFE	11/25/2020	5/26/2021



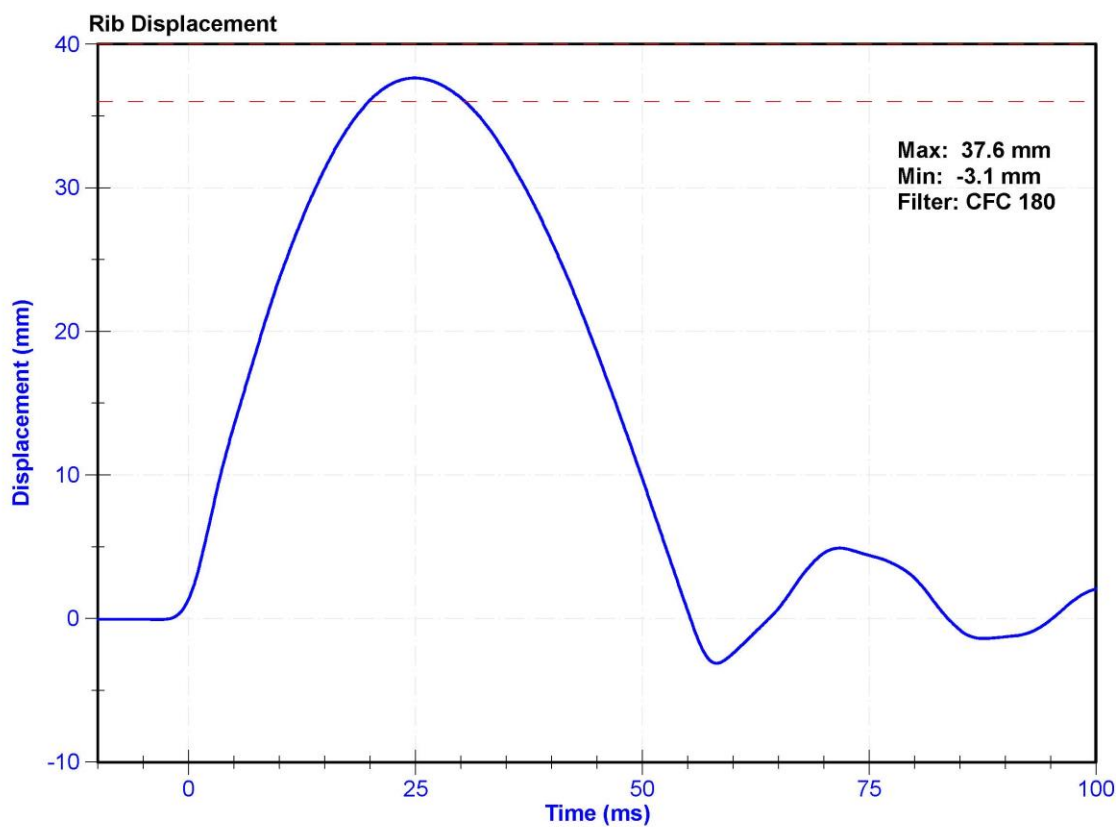
ATD Manufacturer	FTSS	Test Technician	D. Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	34.0	Pass
Rib Displacement	36	40	mm	37.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-185GFE	11/25/2020	5/26/2021



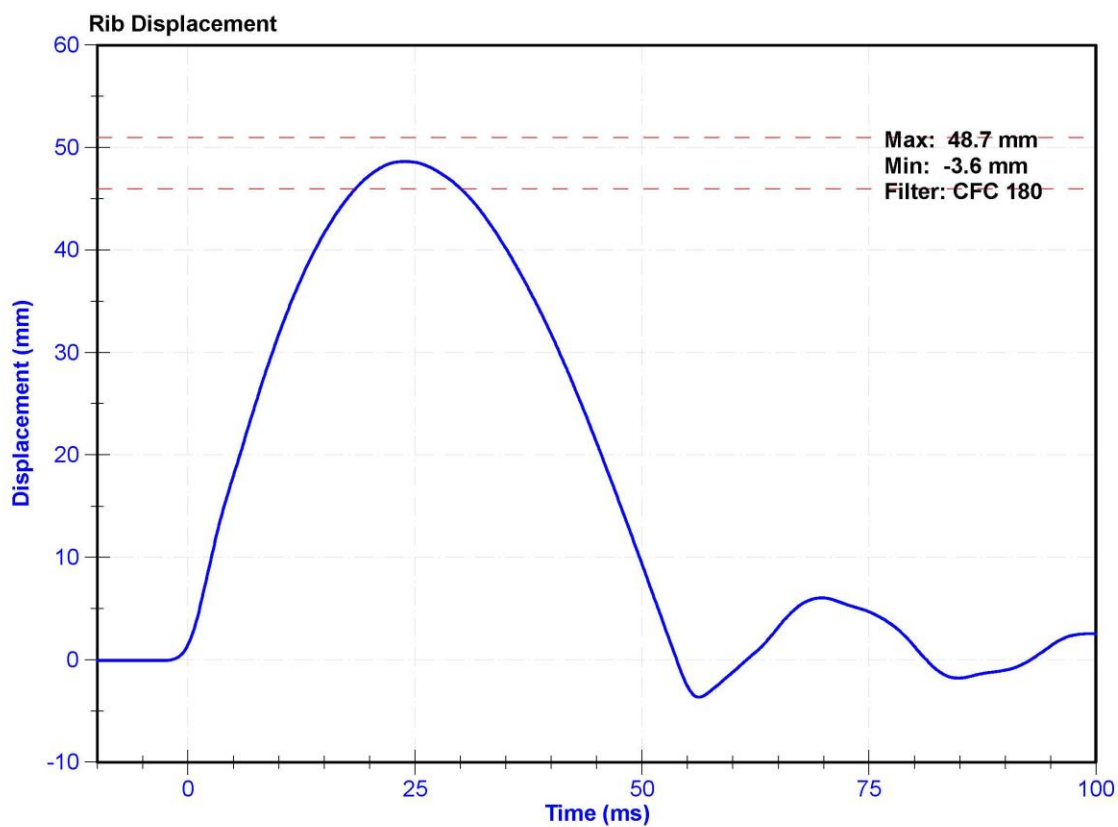
ATD Manufacturer	FTSS	Test Technician	D. Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	34.0	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-185GFE	11/25/2020	5/26/2021



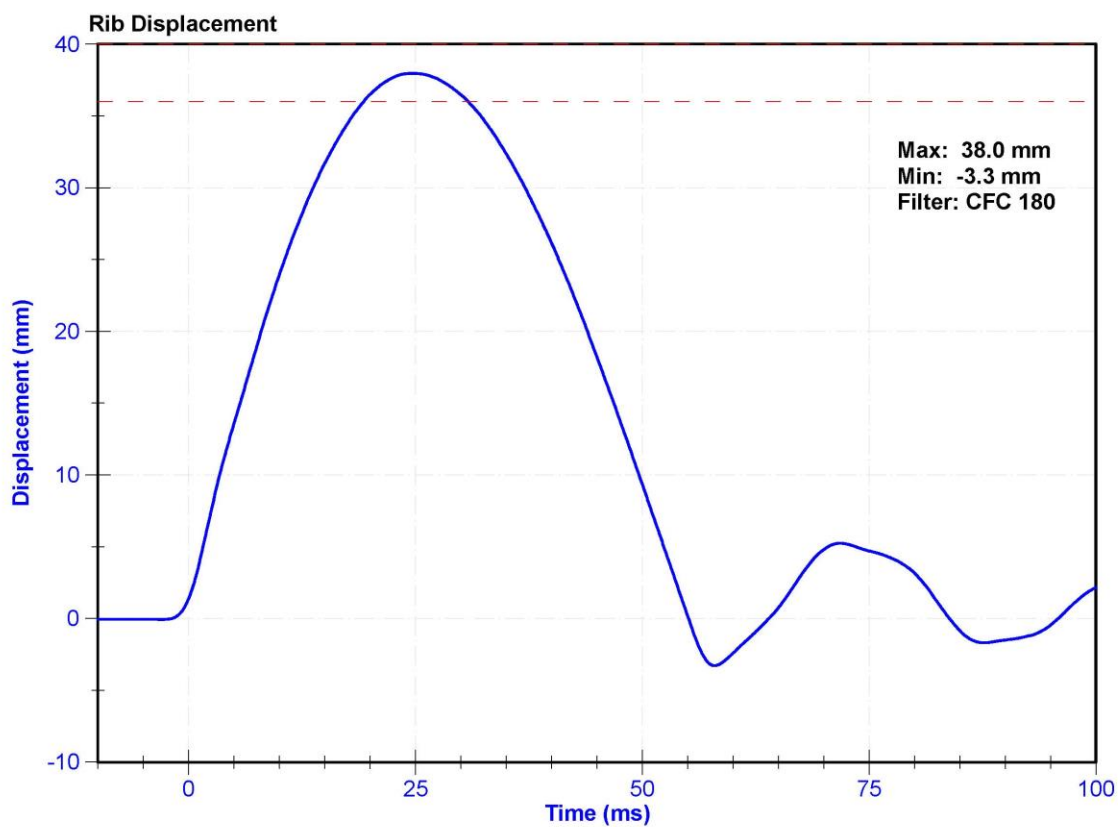
ATD Manufacturer	FTSS	Test Technician	D. Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	34.0	Pass
Rib Displacement	36	40	mm	38.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-178GFE	11/25/2020	5/26/2021



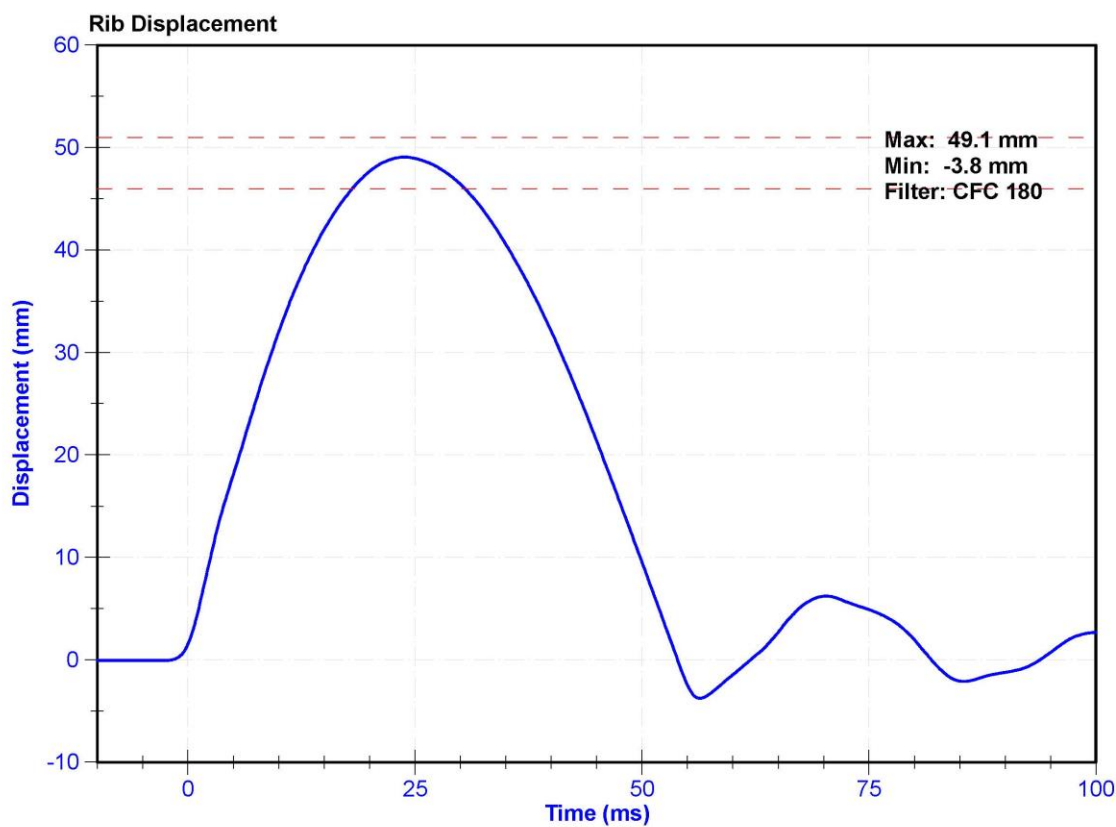
ATD Manufacturer	FTSS	Test Technician	D. Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	34.0	Pass
Rib Displacement	46	51	mm	49.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-178GFE	11/25/2020	5/26/2021



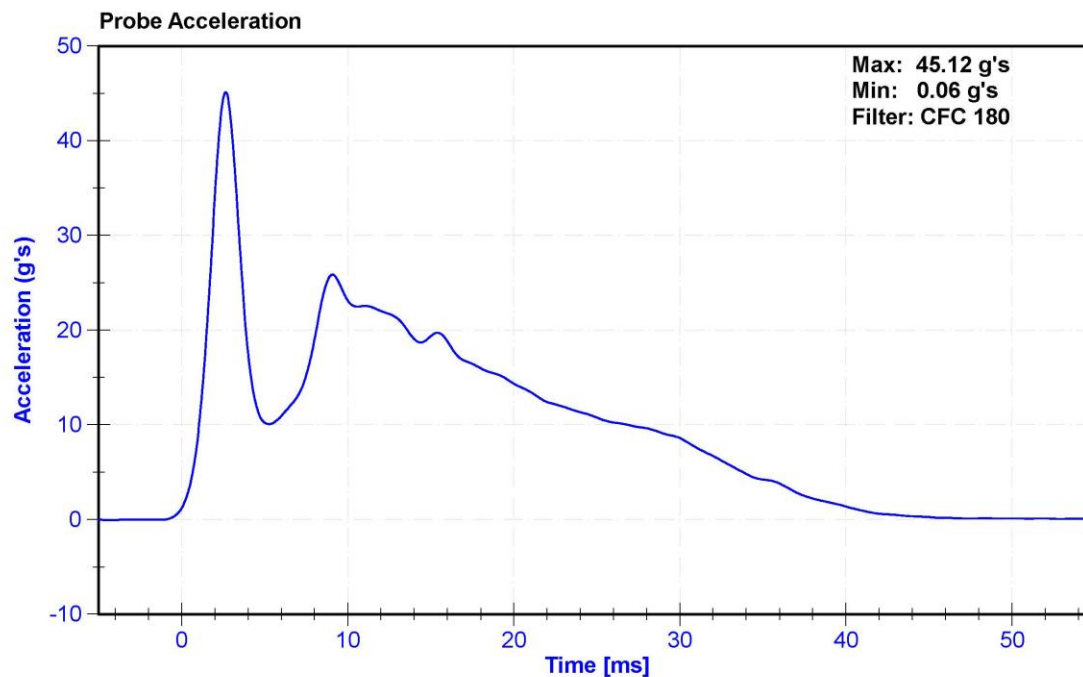
ATD Manufacturer	FTSS	Test Technician	D. Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

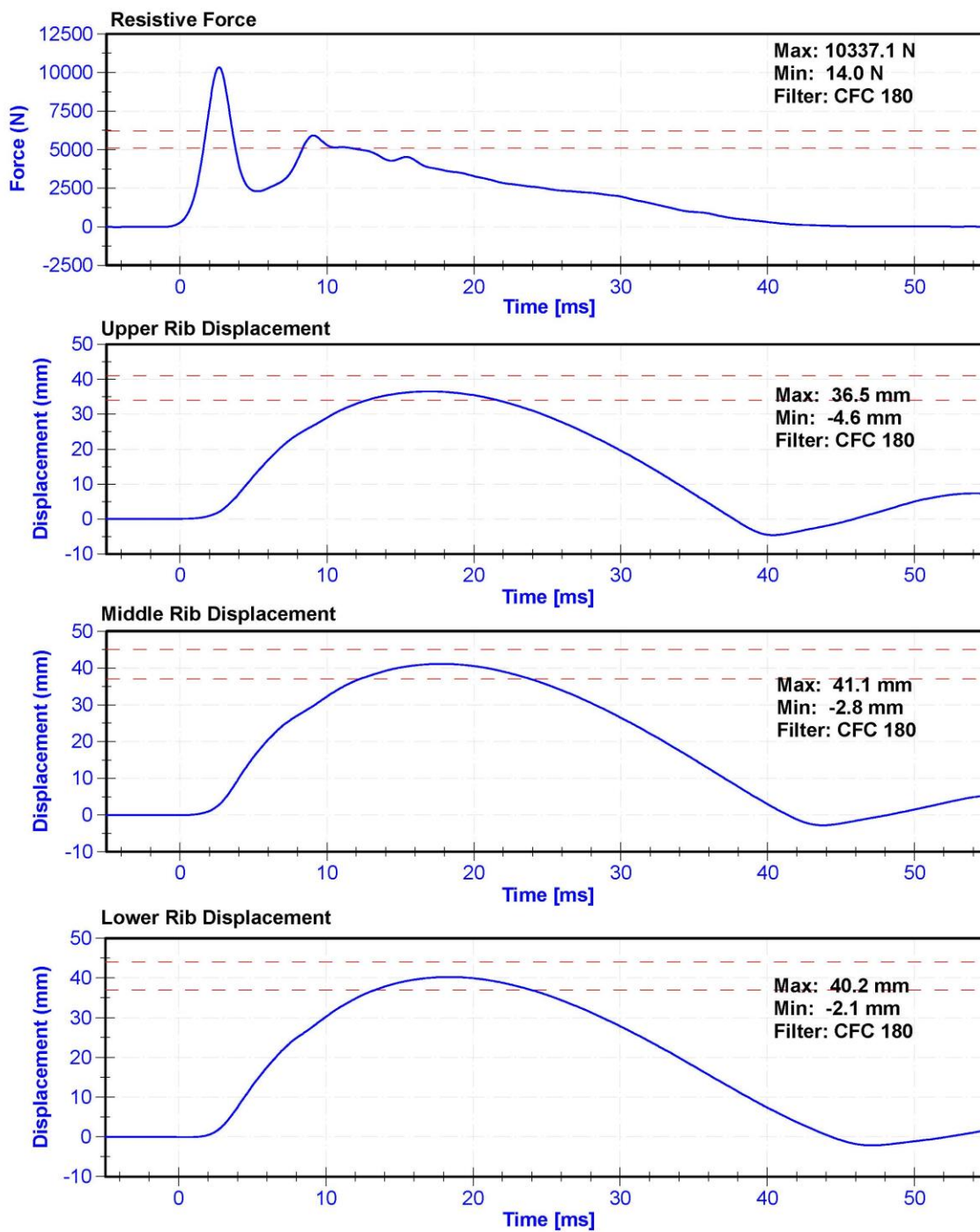
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	34.0	Pass
Velocity	5.4	5.6	m/s	5.47	Pass
Resistive Force after 6ms	5100	6200	N	5921.9	Pass
Upper Thorax Rib Deflection	34	41	mm	36.5	Pass
Mid Thorax Rib Deflection	37	45	mm	41.1	Pass
Lower Thorax Rib Deflection	37	44	mm	40.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	MSI 64C-2000	A278994	12/3/2020	12/3/2021
Upper Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-179GFE	11/25/2020	5/26/2021
Middle Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-185GFE	11/25/2020	5/26/2021
Lower Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-178GFE	11/25/2020	5/26/2021





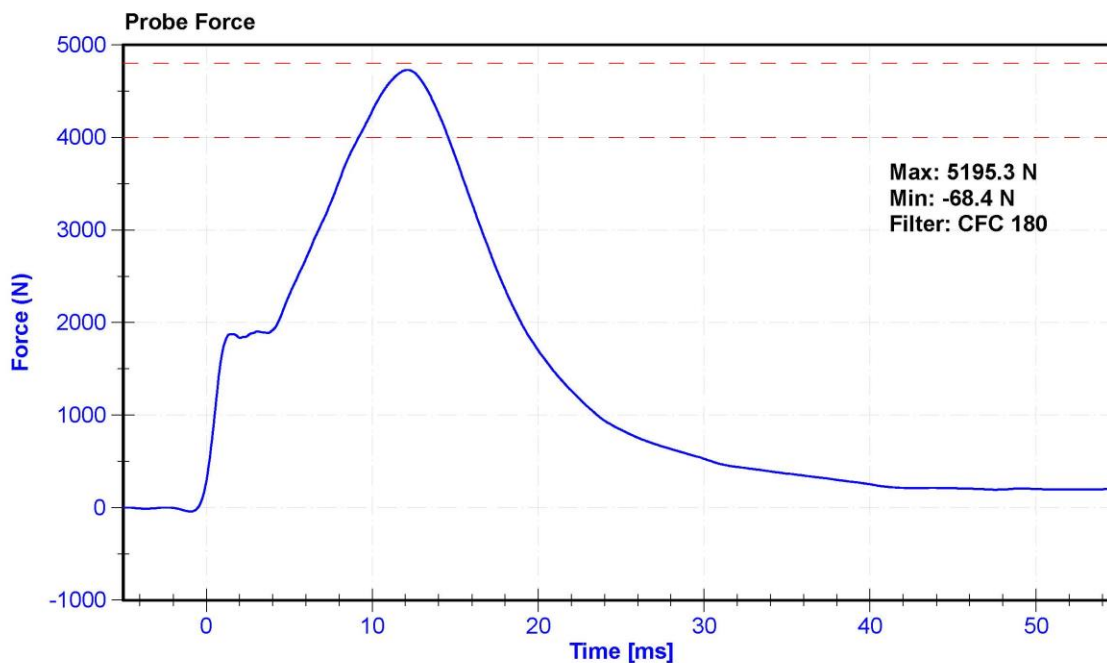
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K.Brogan

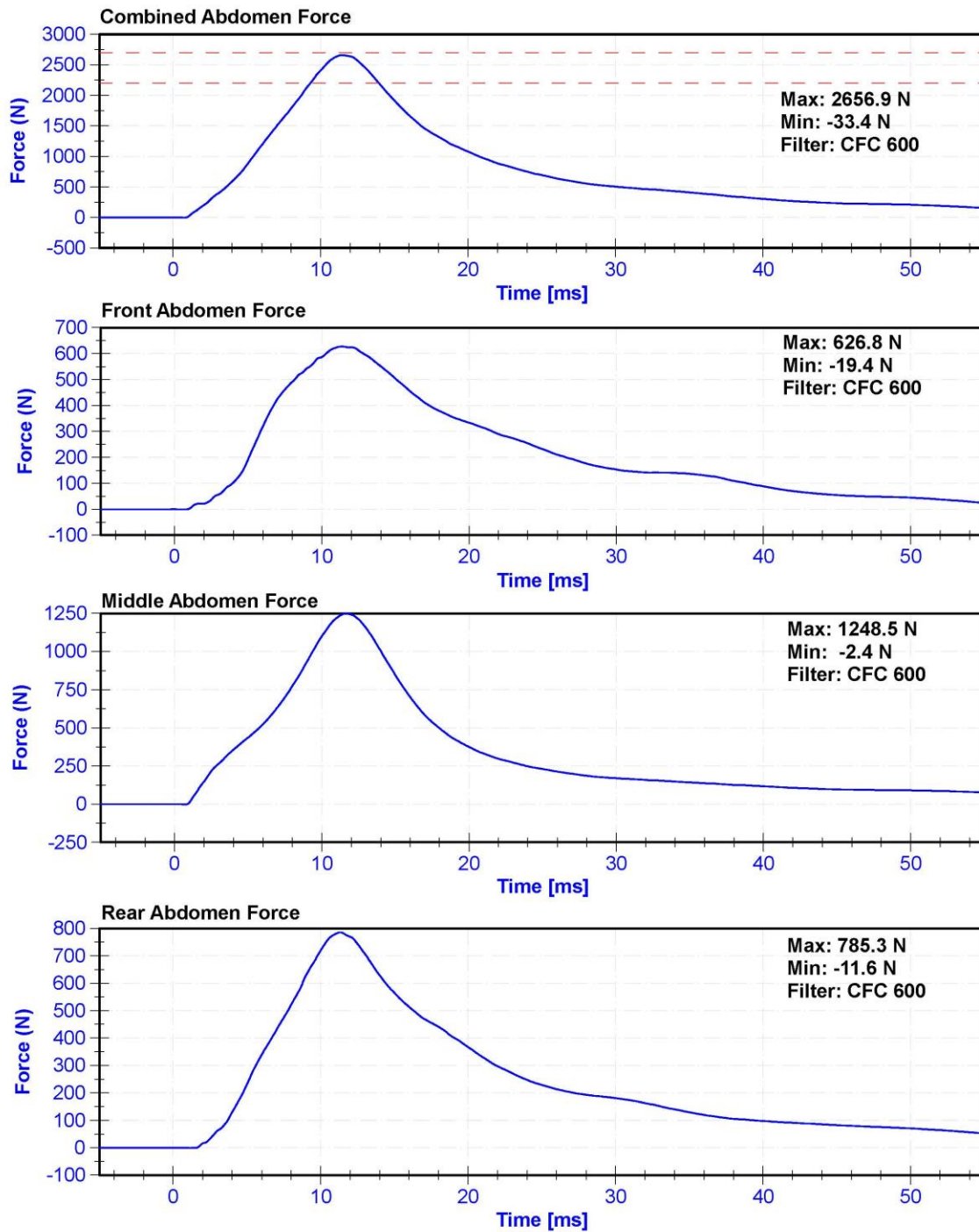
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	35	Pass
Velocity	3.9	4.1	m/s	4.08	Pass
Combined Abdomen Force	2200	2700	N	2656.9	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	11.50	Pass
Resistive Probe Force	4000	4800	N	4727.7	Pass
Time at Peak Resistive Force	10.6	13.0	ms	12.15	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A278994	12/3/2020	12/3/2021
Front Abdomen Load Cell	FTSS 2631	LC-1509	11/10/2020	11/10/2021
Middle Abdomen Load Cell	DENTON 2631	LC-1508	11/10/2020	11/10/2021
Rear Abdomen Load Cell	FTSS 2631	LC-1507	11/10/2020	11/10/2021







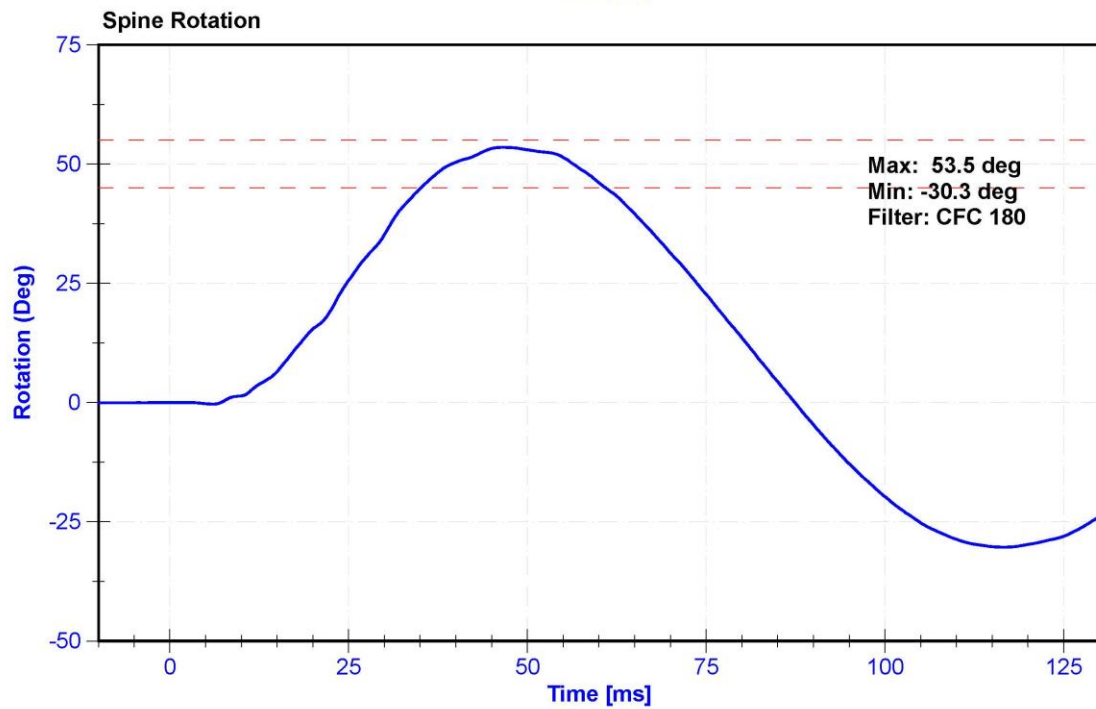
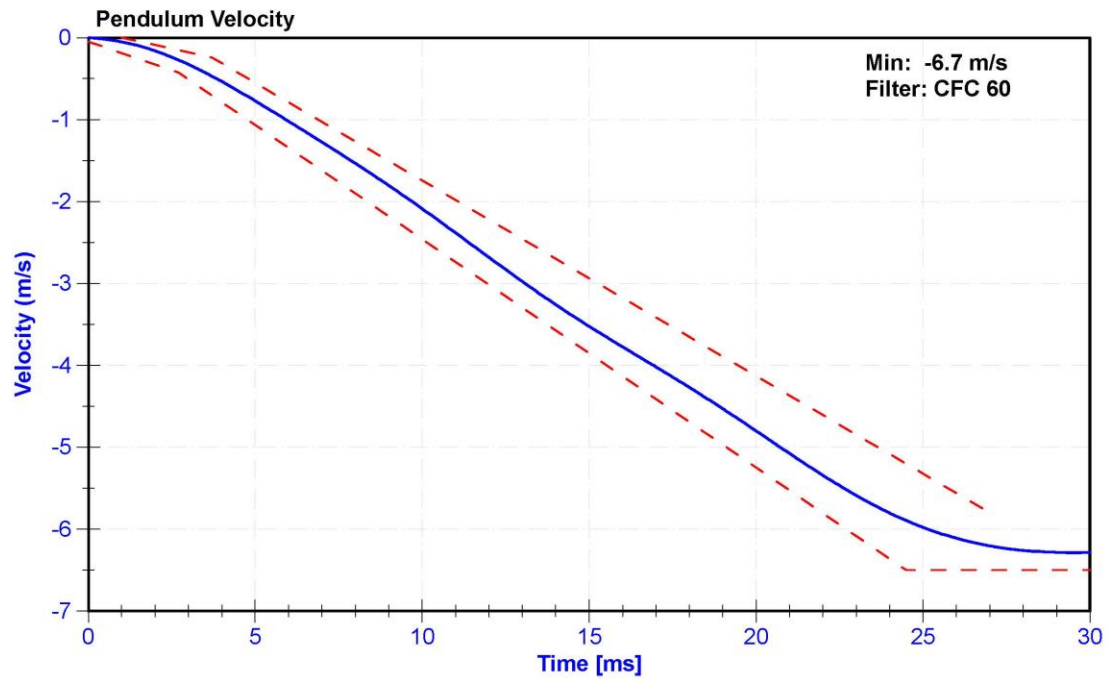
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

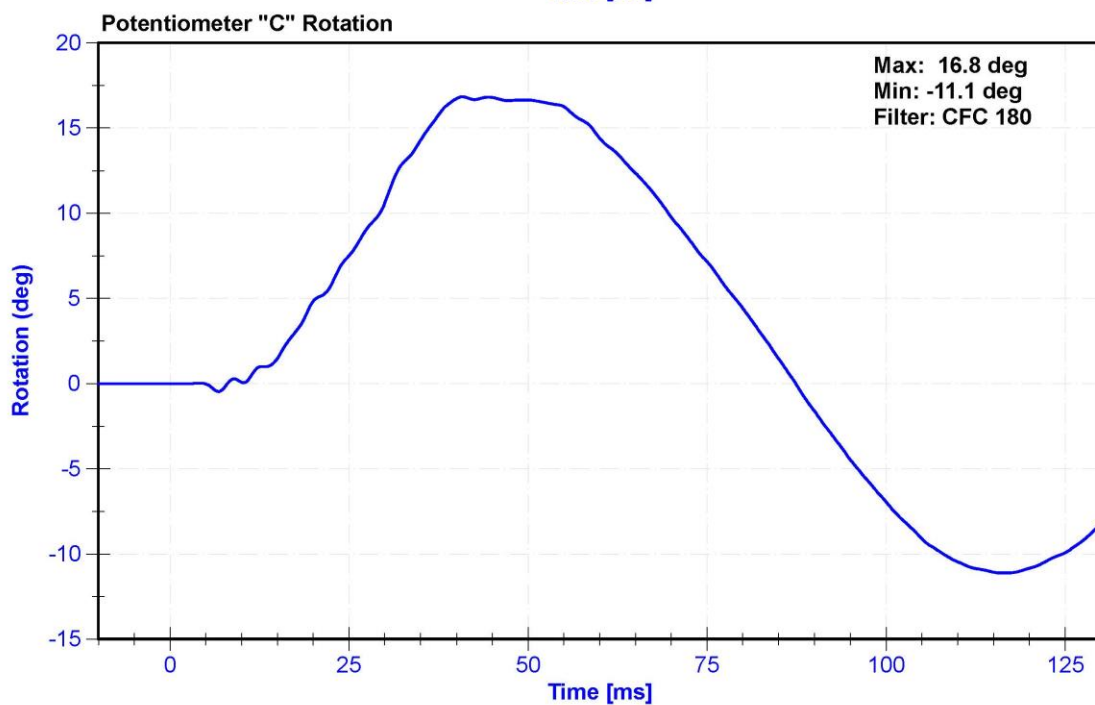
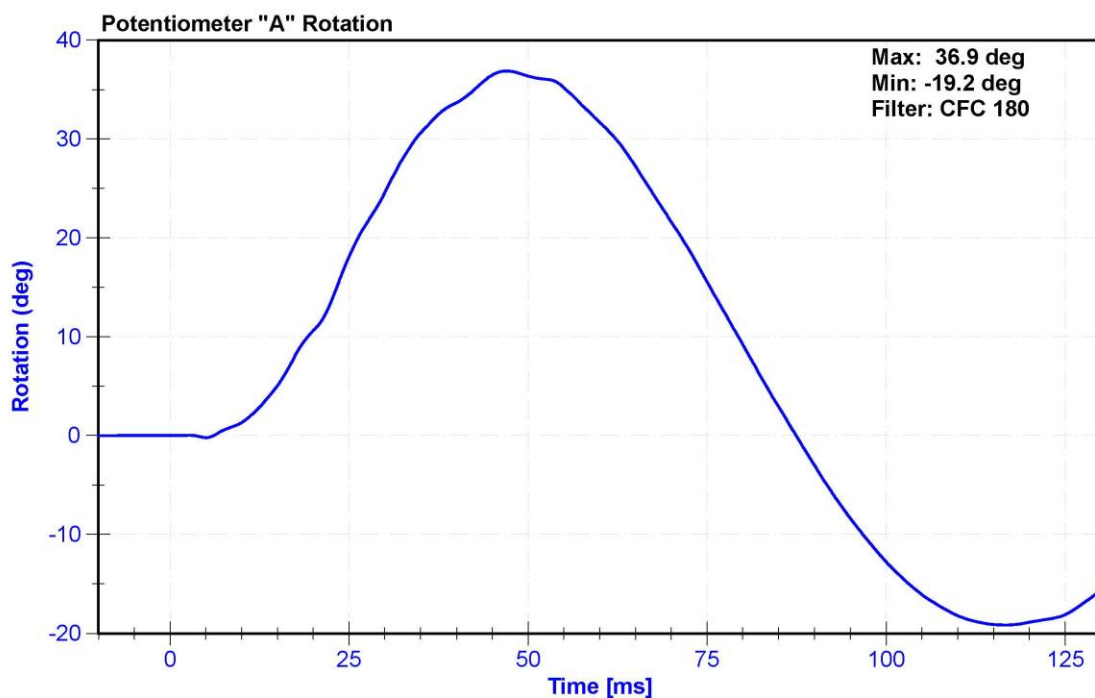
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	38.0	Pass
Velocity	5.95	6.15	m/s	5.976	Pass
Lateral Spine Rotation	45	55	deg	53.5	Pass
Time at Maximum Rotation	39	53	ms	46.5	Pass
Time of Decay to Zero Degrees	37	57	ms	40.9	Pass
Pulse within Corridor?	-	-	-		

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C16503 Striker	2/5/2021	2/5/2022
Pendulum "A" Potentiometer	SP22G	DS-094	8/18/2020	8/18/2021
Condyle "B" Potentiometer	SP22G	DS-095	8/18/2020	8/18/2021





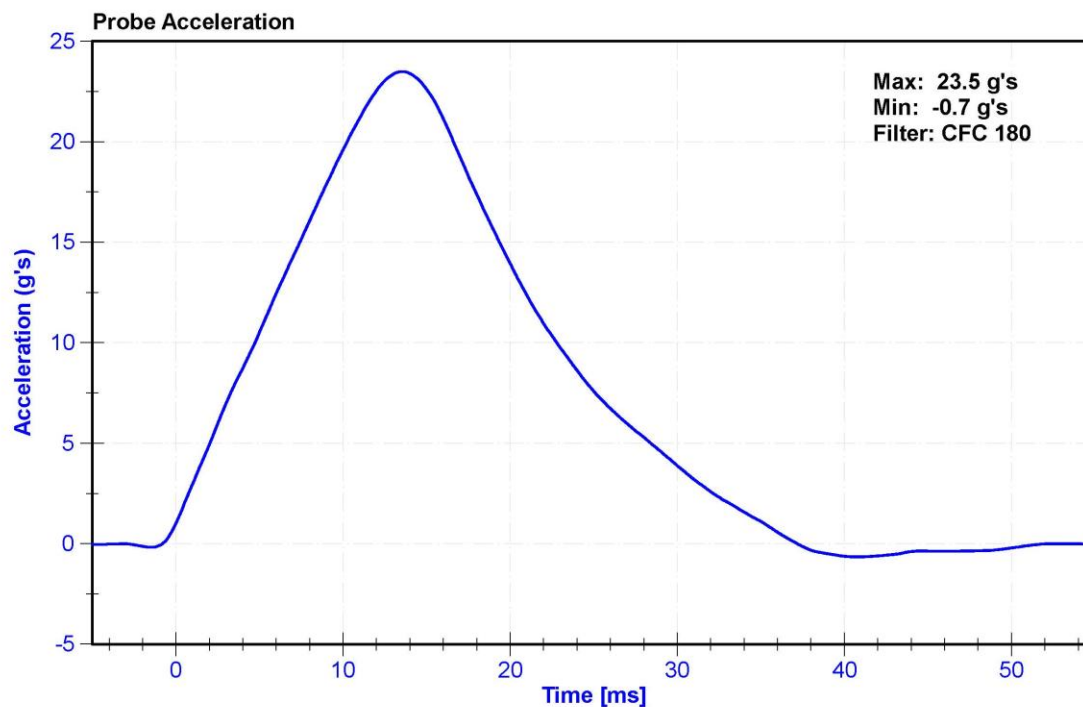
ATD Manufacturer	FTSS	Test Technician	D. Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

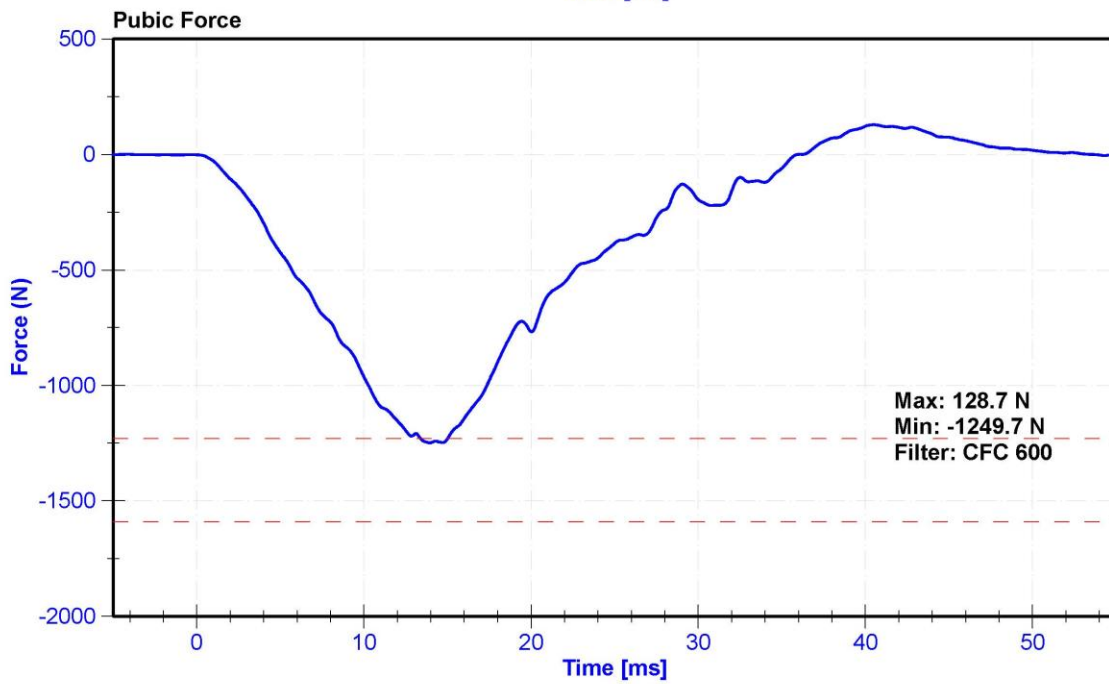
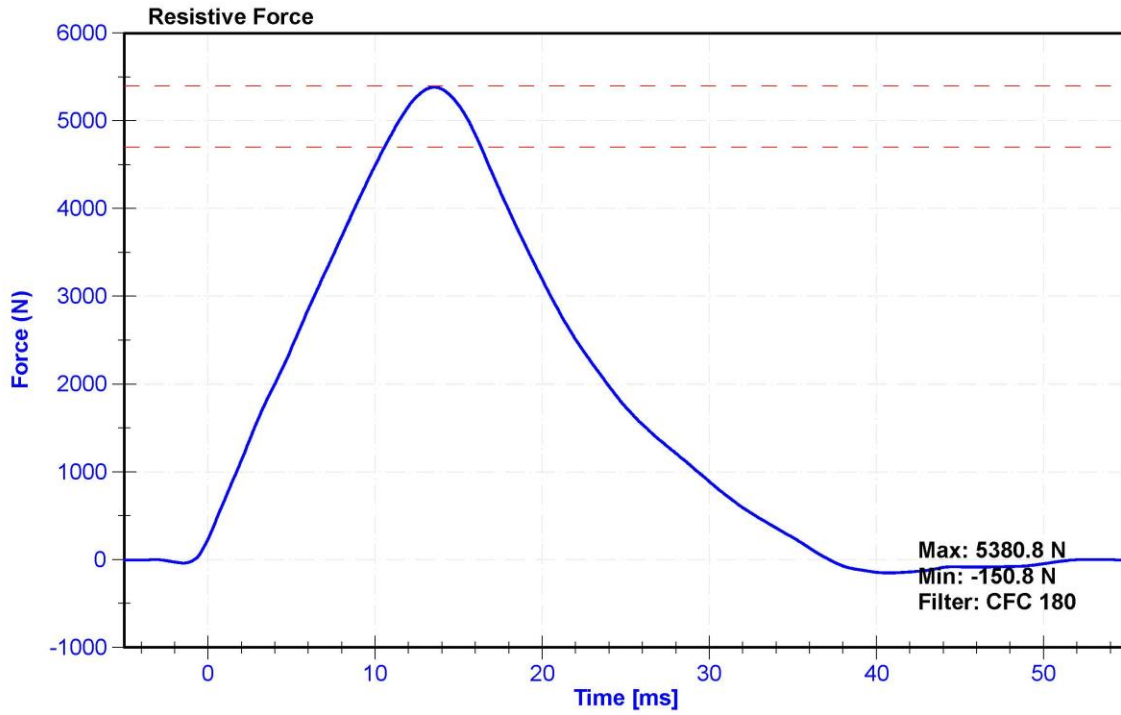
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	34.0	Pass
Velocity	4.2	4.4	m/s	4.29	Pass
Resistive Force	4700	5400	N	5380.8	Pass
Time at Peak Resistive Force	11.8	16.1	ms	13.55	Pass
Pubic Force	-1590	-1230	N	-1249.7	Pass
Time at Peak Pubic Force	12.2	17.0	ms	13.95	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A278994	12/3/2020	12/3/2021
Pubic Load Cell	Denton 3096JFL	LC-464fy	7/23/2020	7/23/2021





CALIBRATION TEST RESULTS

POST-TEST

SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD

SERIAL No: 300

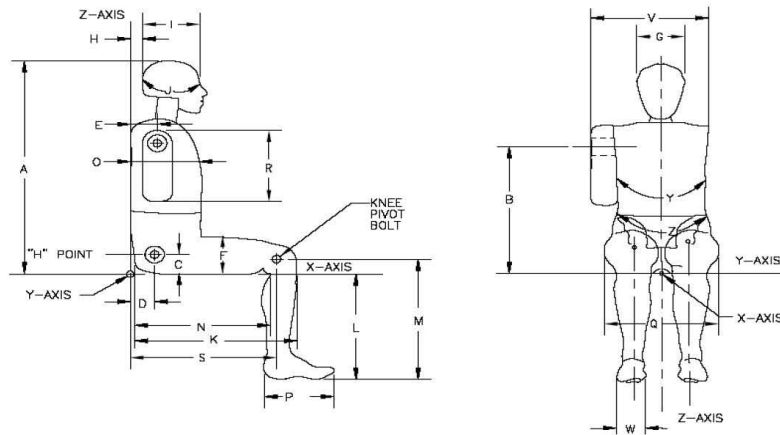


External Measurements - SID-IIs

Technician: **K. Brogan**

Date: **05/07/2021**

Dummy Serial Number: **300**



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	782	Pass
B	Shoulder Pivot Height	437	453	446	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	105	Pass
F	Thigh Clearance	119	135	126	Pass
G	Head Breadth	140	148	144	Pass
H	Head Back from Backline	40	46	42	Pass
I	Head Depth	178	188	186	Pass
J	Head Circumference	541	551	546	Pass
K	Buttock to Knee Length	514	540	532	Pass
L	Popliteal Height	343	369	361	Pass
M	Knee Pivot to floor height	392	409	398	Pass
N	Buttock Popliteal Length	416	442	431	Pass
O	Chest Depth w/o jacket	195	211	208	Pass
P	Foot Length	216	232	220	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	318	Pass
R	Arm Length	249	259	254	Pass
S	Knee Joint to seatback	477	493	484	Pass
V	Shoulder Width	341	357	352	Pass
W	Foot Width	78	94	83	Pass
Y	Chest Circumference w/jacket	851	881	875	Pass
Z	Waist Circumference	761	791	773	Pass

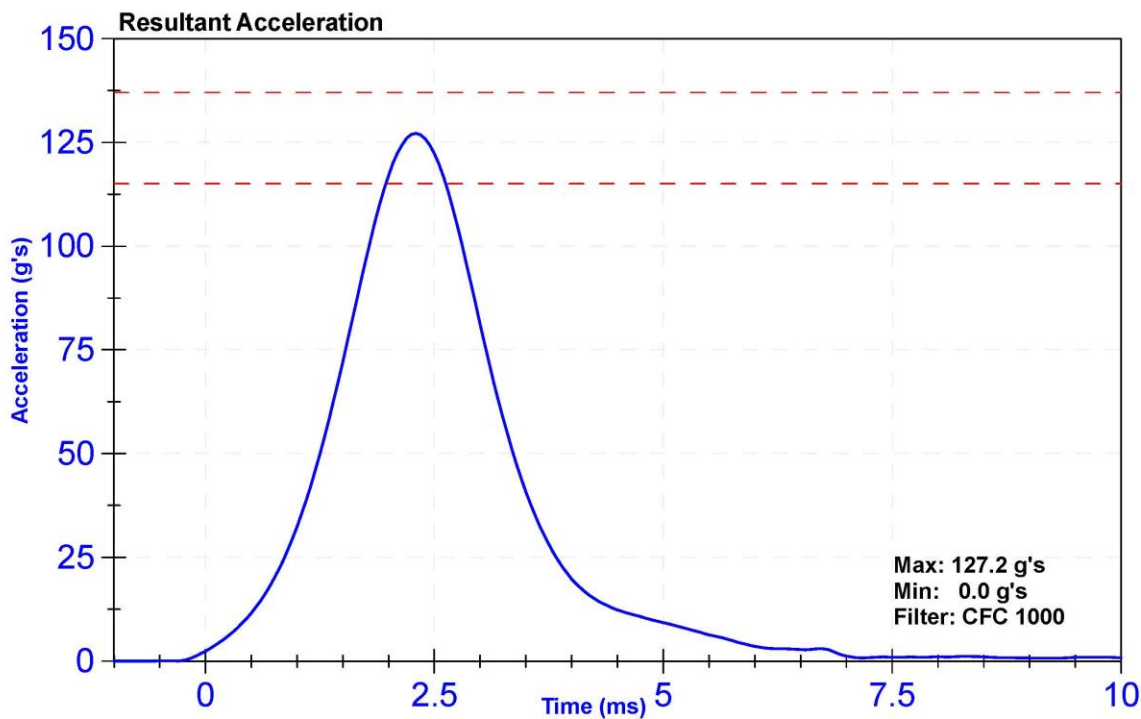
ATD Manufacturer	FTSS	Test Technician	S. Vacanti
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

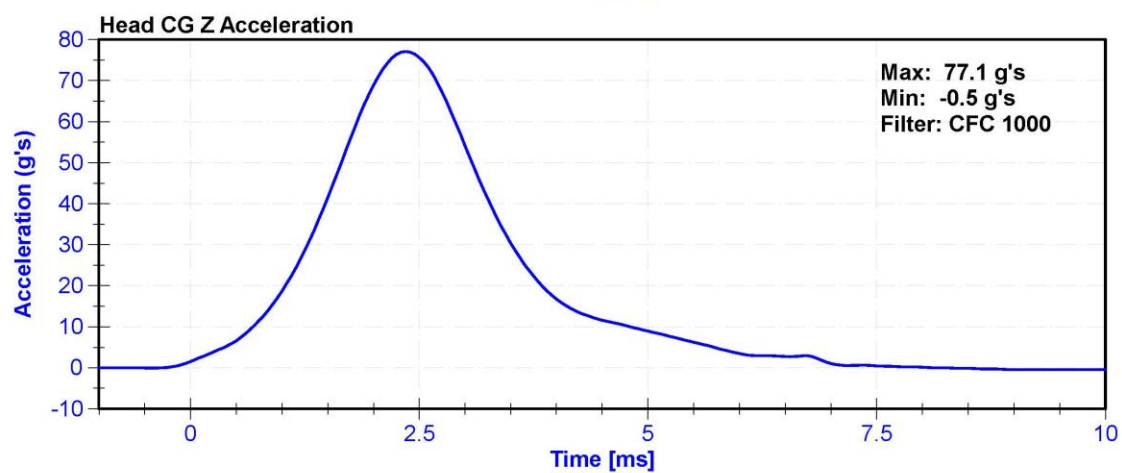
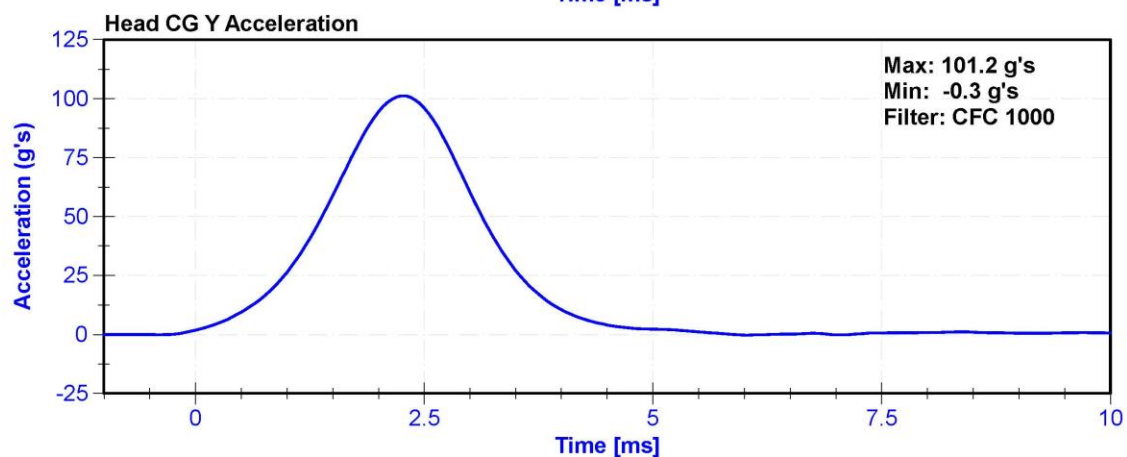
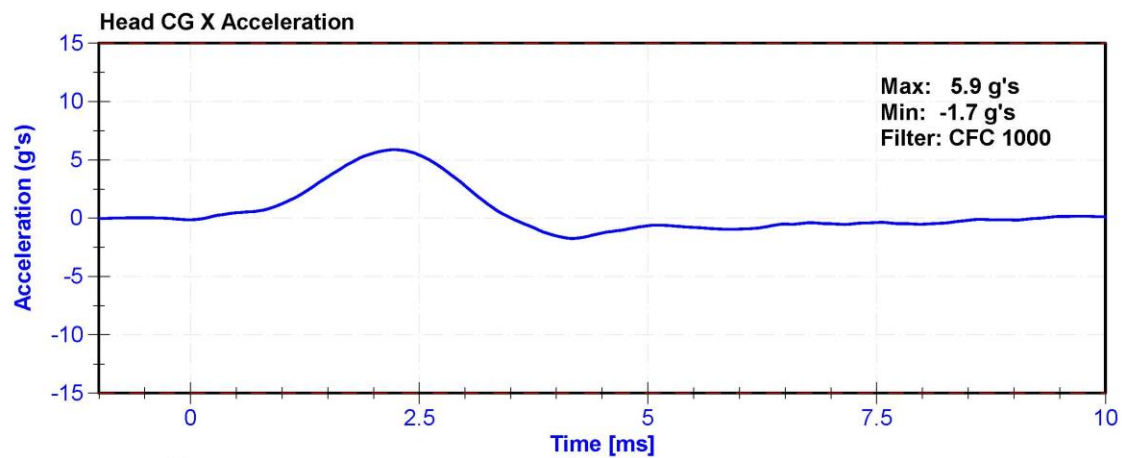
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	32	Pass
Resultant Acceleration	115	137	g's	127.2	Pass
Oscillation	0	15	%	2.3	Pass
Fore-Aft Acceleration	-15	15	g's	5.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P59018	11/10/2020	5/11/2021
Y Accelerometer	ENDEVCO 7264	AC-P79189	11/10/2020	5/11/2021
Z Accelerometer	ENDEVCO 7264CT	AC-P58777	11/10/2020	5/11/2021





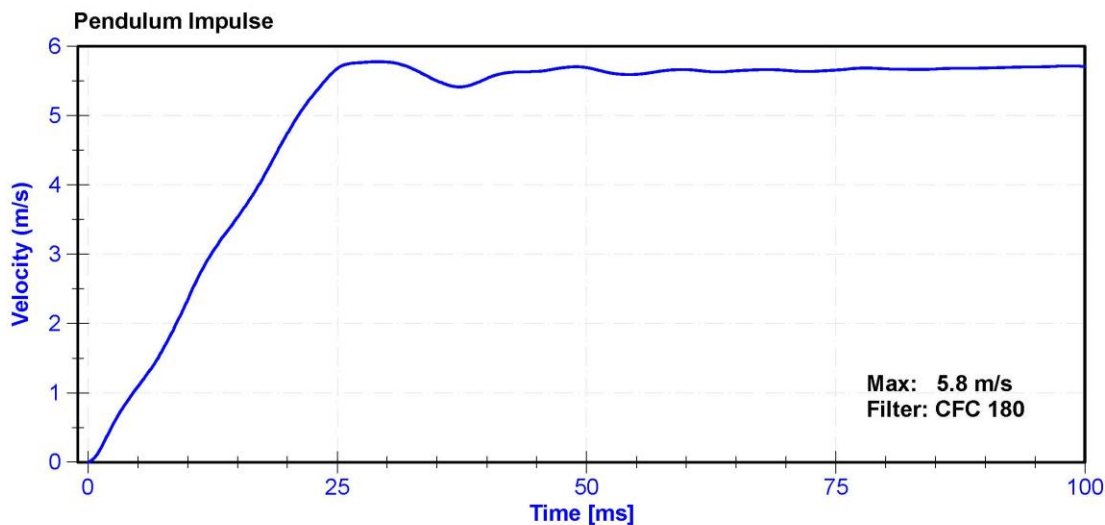
ATD Manufacturer	FTSS	Test Technician	S. Vacanti
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

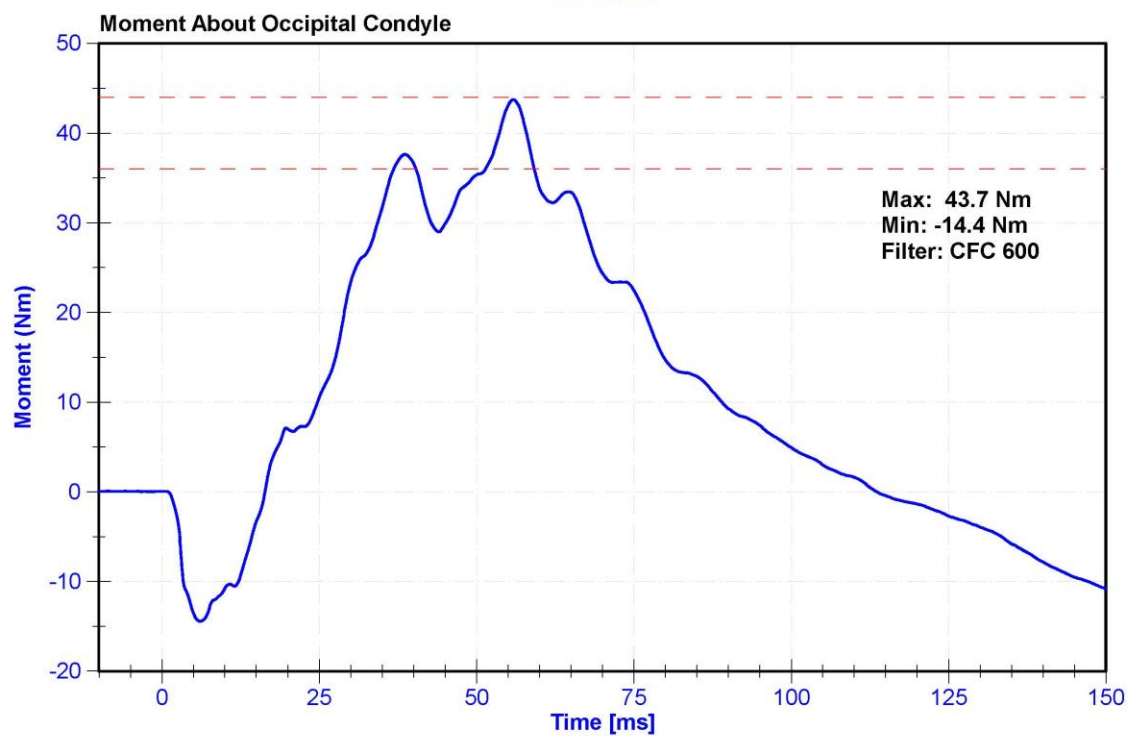
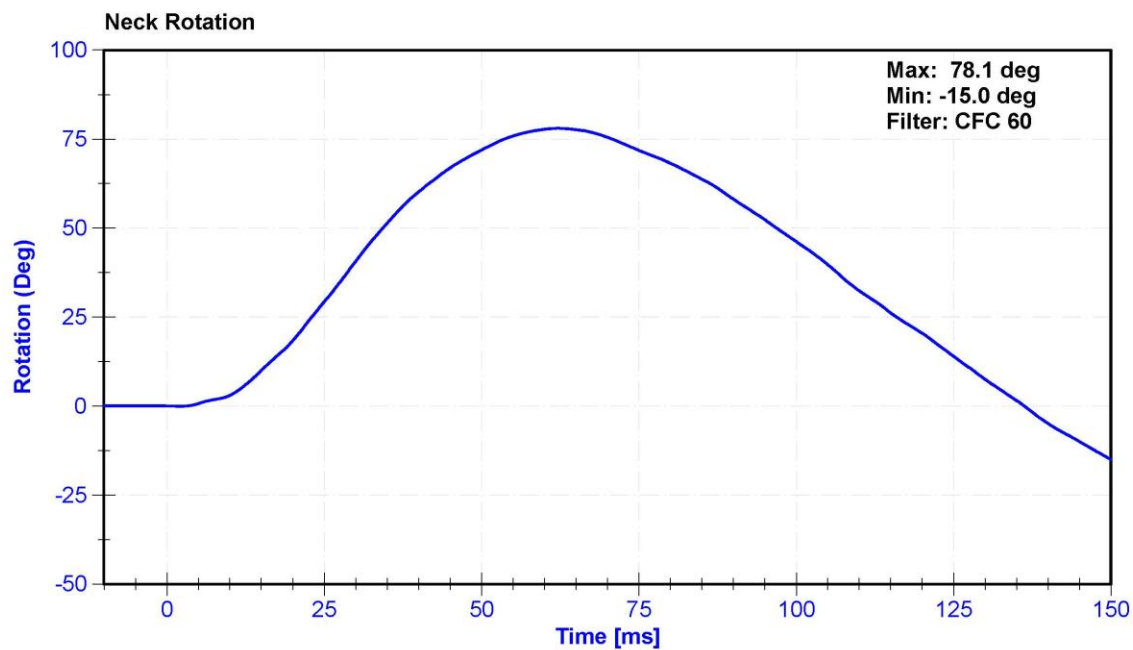
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	32	Pass
Velocity	5.51	5.63	m/s	5.541	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.34	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.53	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.74	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.68	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.78	Pass
Neck Rotation	71	81	deg	78.1	Pass
Time at Maximum Rotation	50	70	ms	62.1	Pass
Moment about the OC	36	44	Nm	43.7	Pass
Moment Decay to 0 Nm	102	126	ms	113.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C16503 Striker	2/5/2021	2/5/2022
Pendulum Potentiometer	Denton 78051-342	DS-184Pend	11/6/2020	11/6/2021
Condyle Potentiometer	Denton 78051-342	DS-185Pend	11/6/2020	11/6/2021
Upper Neck Load Cell	Denton 1716AJ	17162187-FY	8/12/2020	8/12/2021





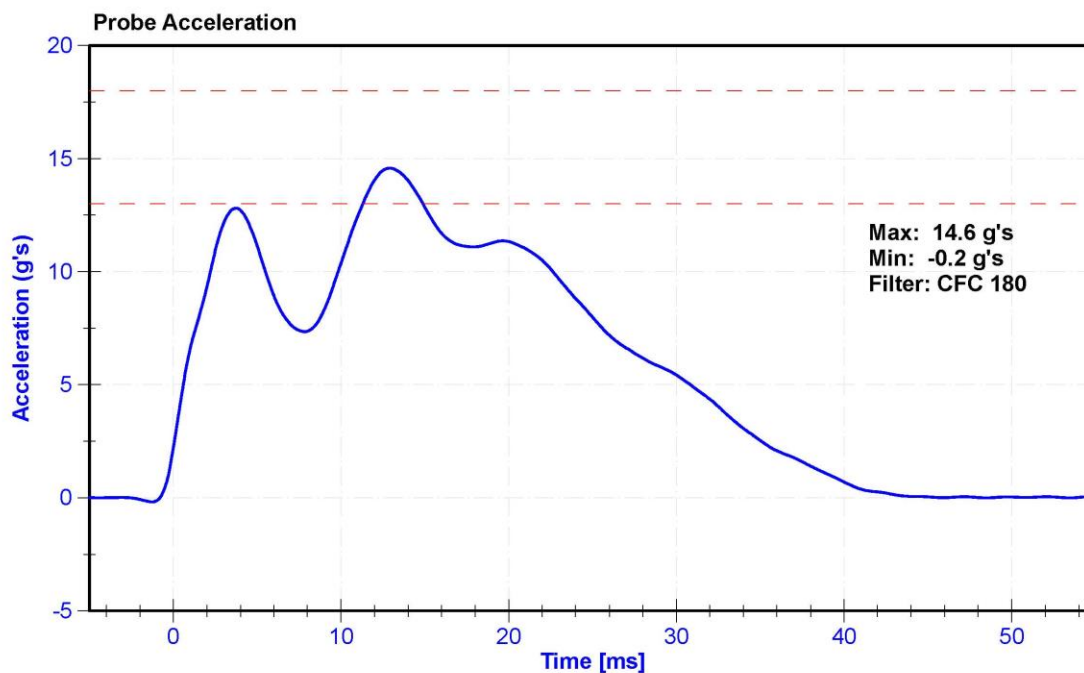
ATD Manufacturer	FTSS	Test Technician	S. Vacanti
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

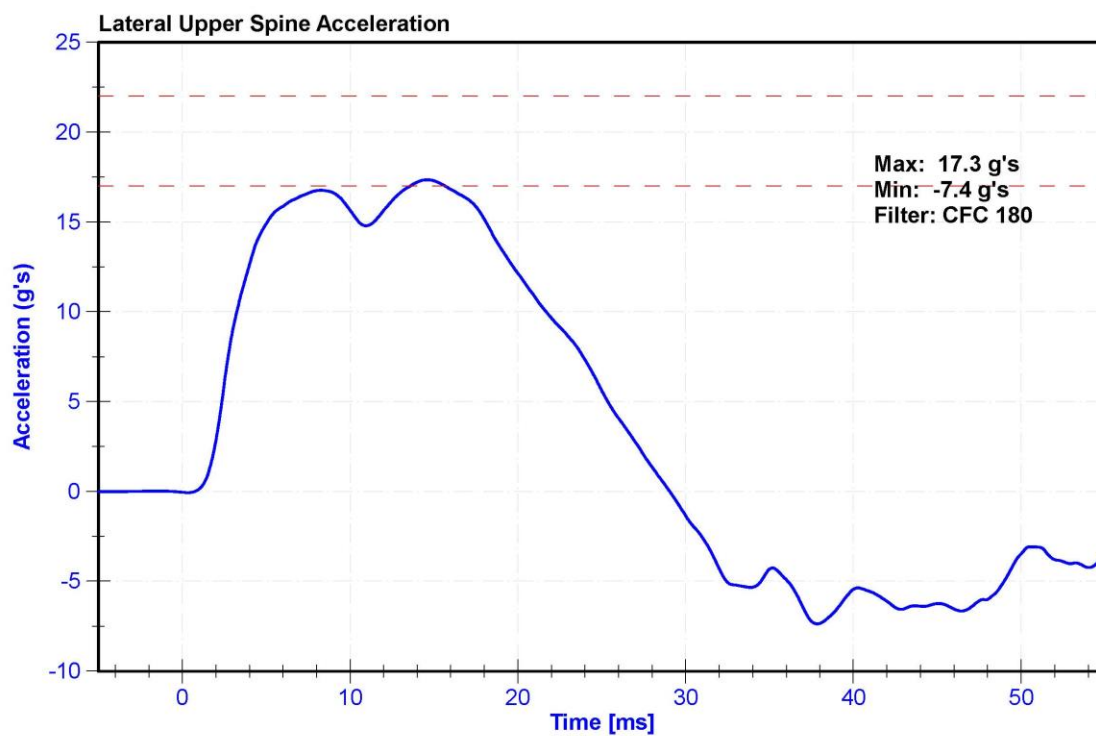
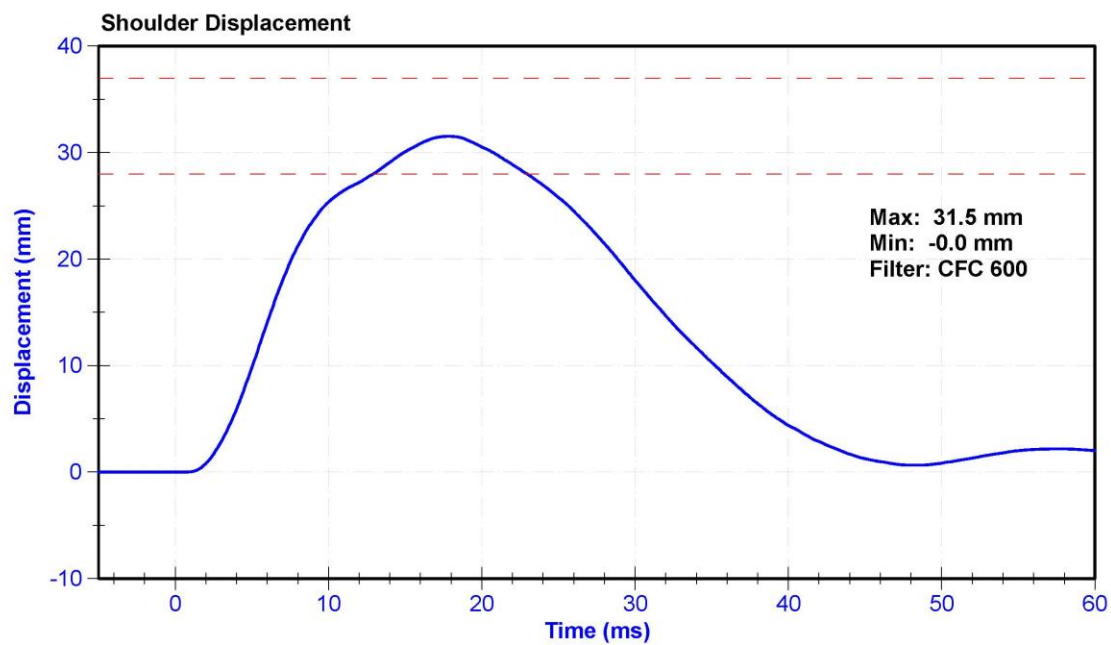
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	32	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Probe Acceleration	13	18	g's	14.6	Pass
Shoulder Deflection	28	37	mm	31.5	Pass
Lateral Upper Spine Acceleration	17	22	g's	17.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264C	T25885	2/2/2021	2/2/2022
Shoulder Potentiometer	Servo 08CT1-3725	DS-053 GFE	5/12/2021	11/10/2021
Upper Spine Y Accelerometer	Endevco 7264C	T20880	5/13/2021	11/11/2021





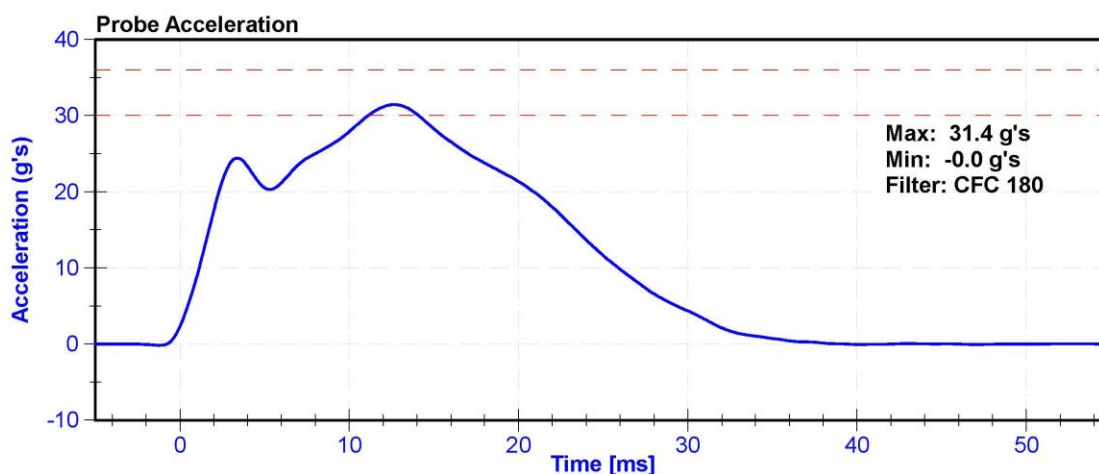
ATD Manufacturer	FTSS	Test Technician	S. Vacanti
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

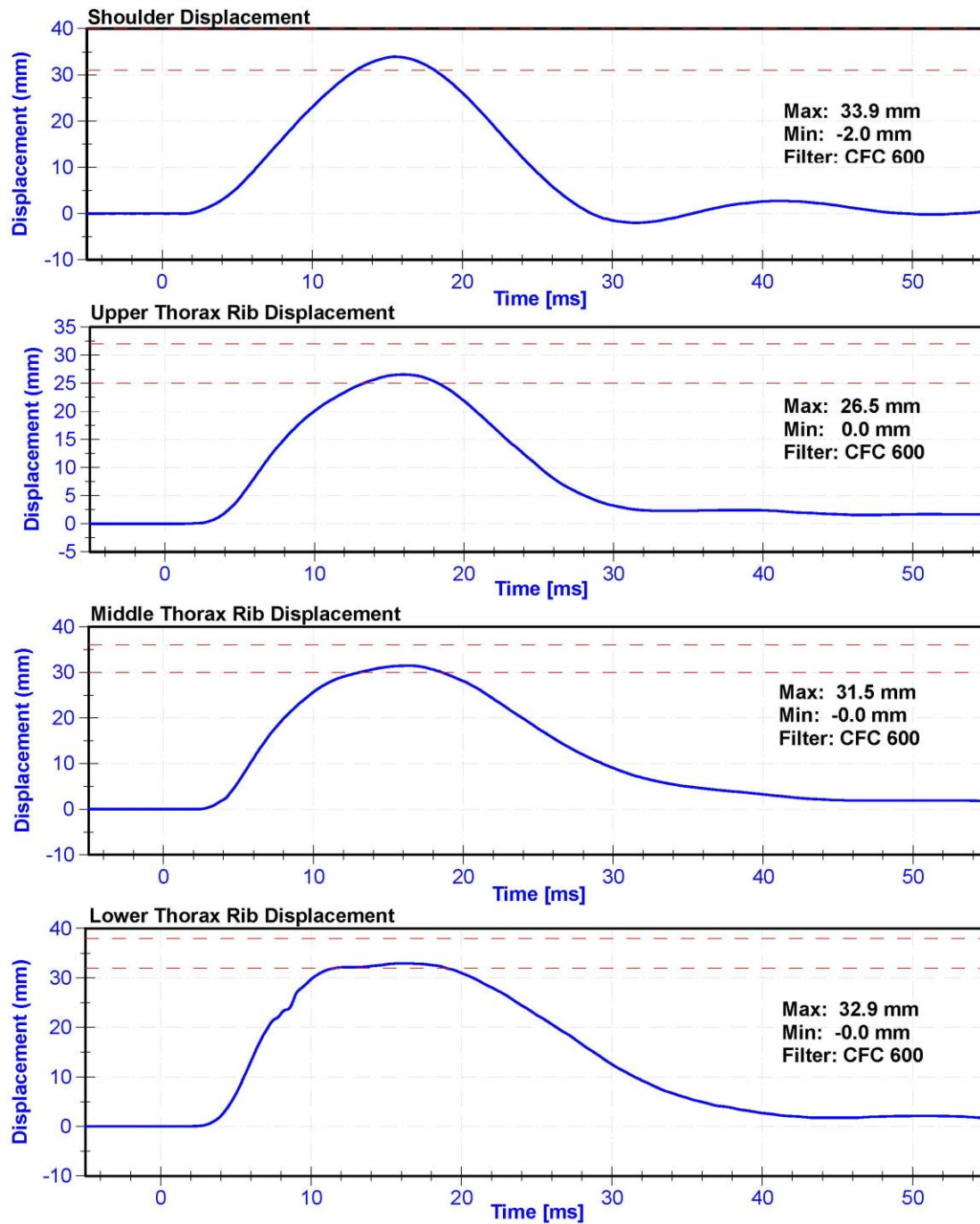
Results

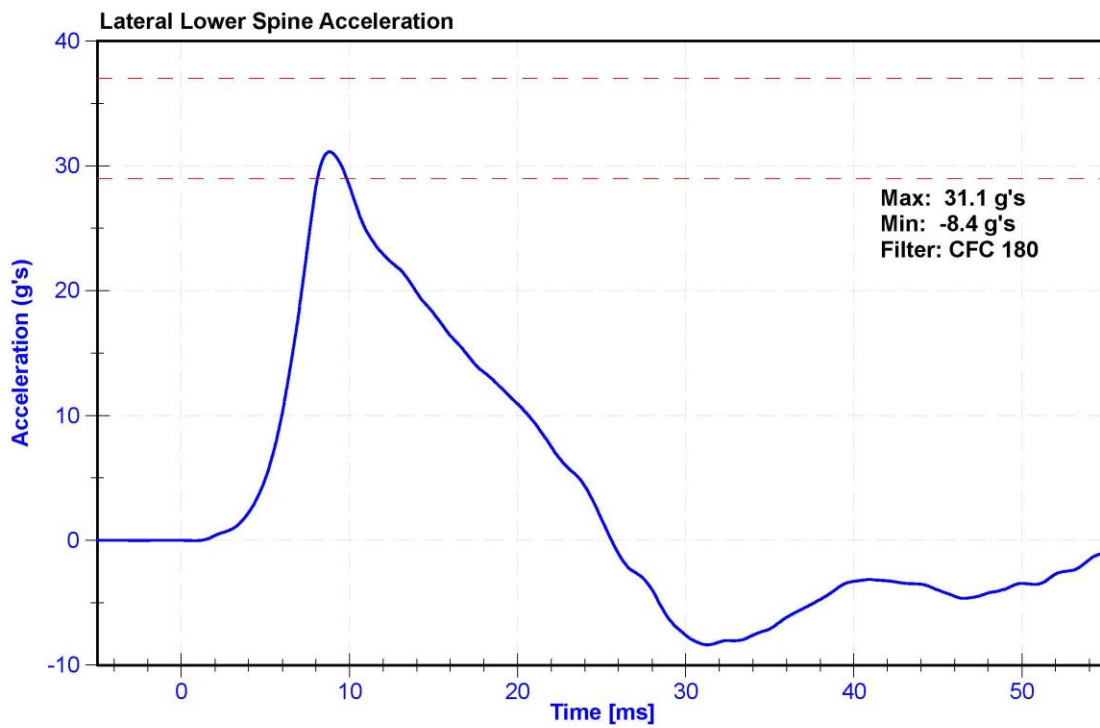
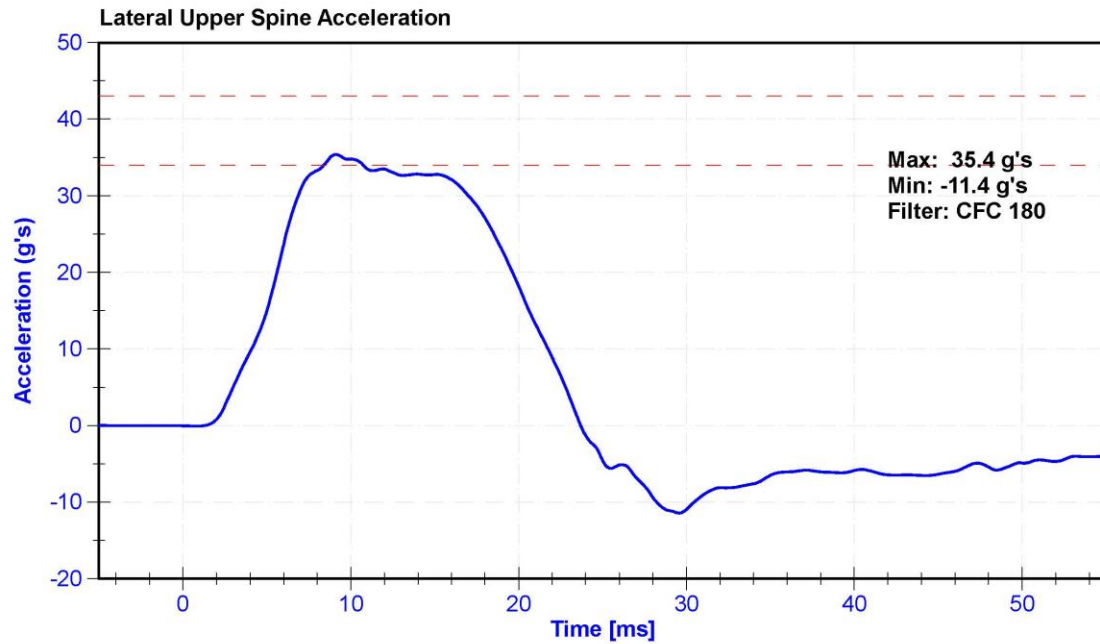
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	32.0	Pass
Velocity	6.6	6.8	m/s	6.74	Pass
Probe Acceleration after 5 ms	30	36	g's	31.4	Pass
Lateral Upper Spine Acceleration	34	43	g's	35.4	Pass
Lateral Lower Spine Acceleration	29	37	g's	31.1	Pass
Shoulder Deflection	31	40	mm	33.9	Pass
Upper Thorax Rib Deflection	25	32	mm	26.5	Pass
Mid Thorax Rib Deflection	30	36	mm	31.5	Pass
Lower Thorax Rib Deflection	32	38	mm	32.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264C	T25885	2/2/2021	2/2/2022
Upper Spine T1 Y Accelerometer	Endevco 7264C	T20880	5/13/2021	11/11/2021
Upper Spine T12 Y Accelerometer	ENDEVCO 7264	AC-P64147	5/13/2021	11/11/2021
Shoulder Potentiometer	Servo 08CT1-3725	DS-053 GFE	5/12/2021	11/10/2021
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	5/12/2021	11/10/2021
Middle Thorax Rib Potentiometer	Servo 08TC1-3745	DS-040GFE	5/12/2021	11/10/2021
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	5/12/2021	11/10/2021







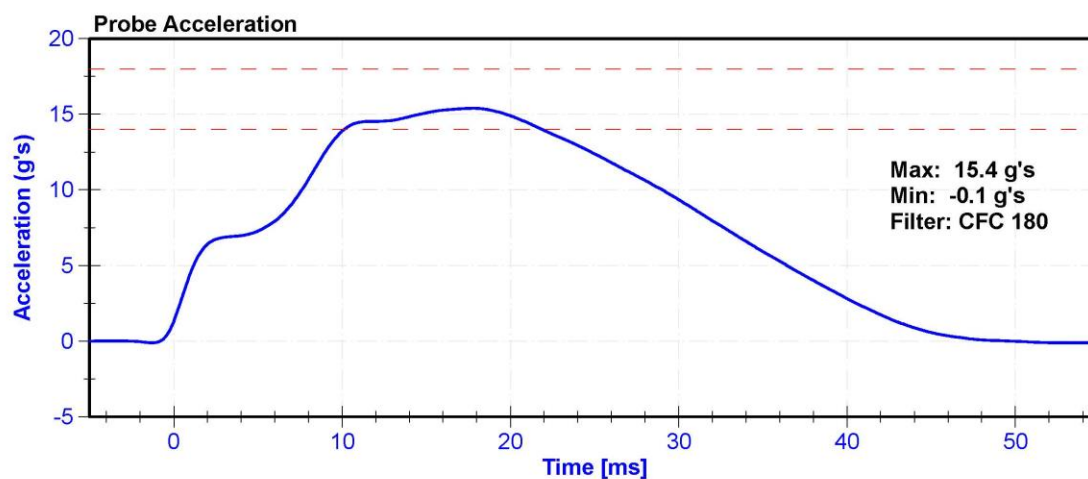
ATD Manufacturer	FTSS	Test Technician	S. Vacanti
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

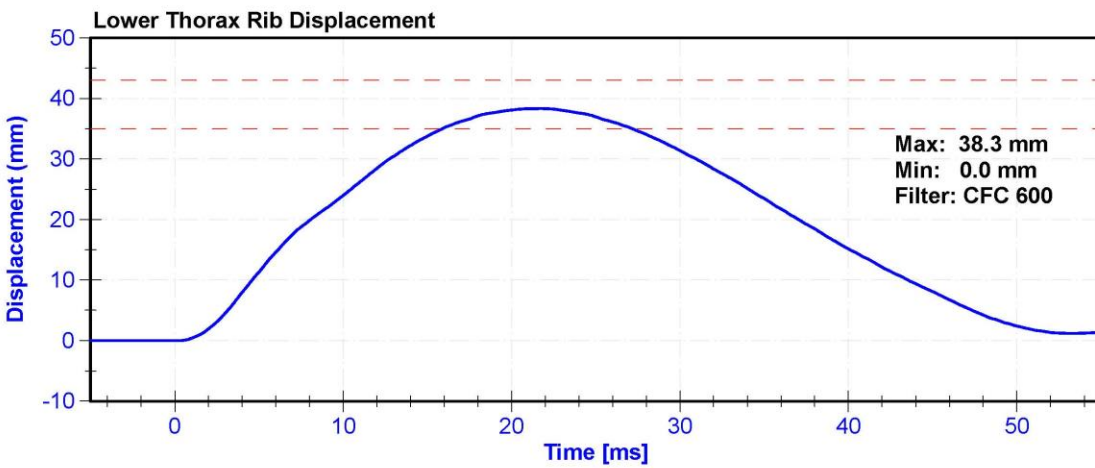
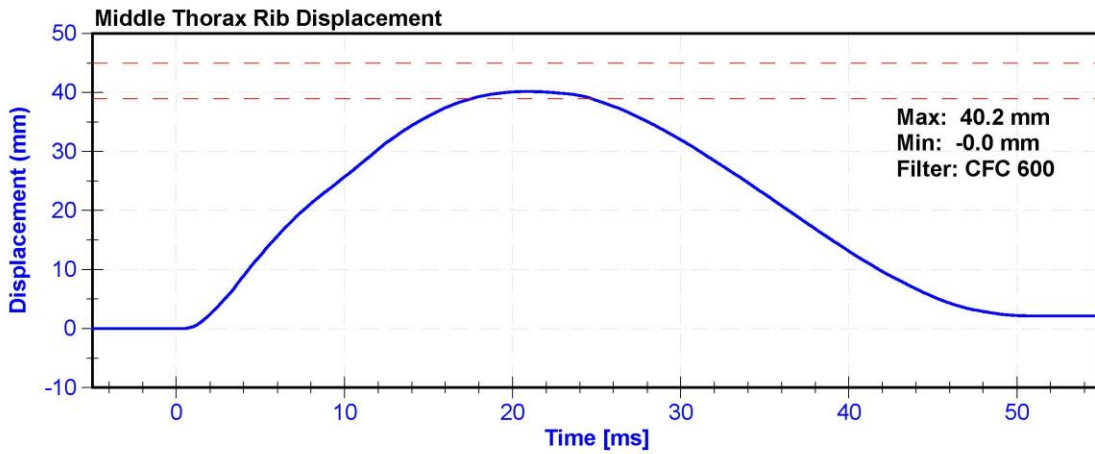
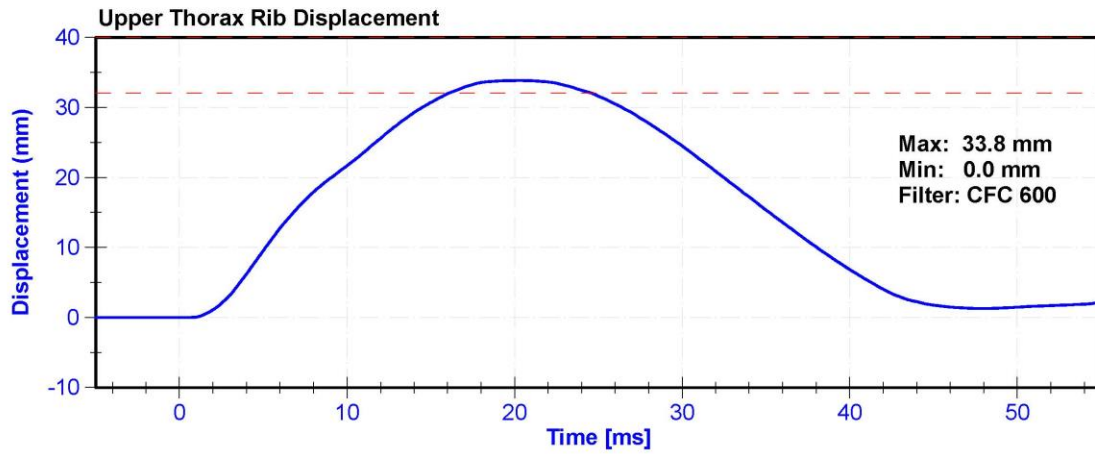
Results

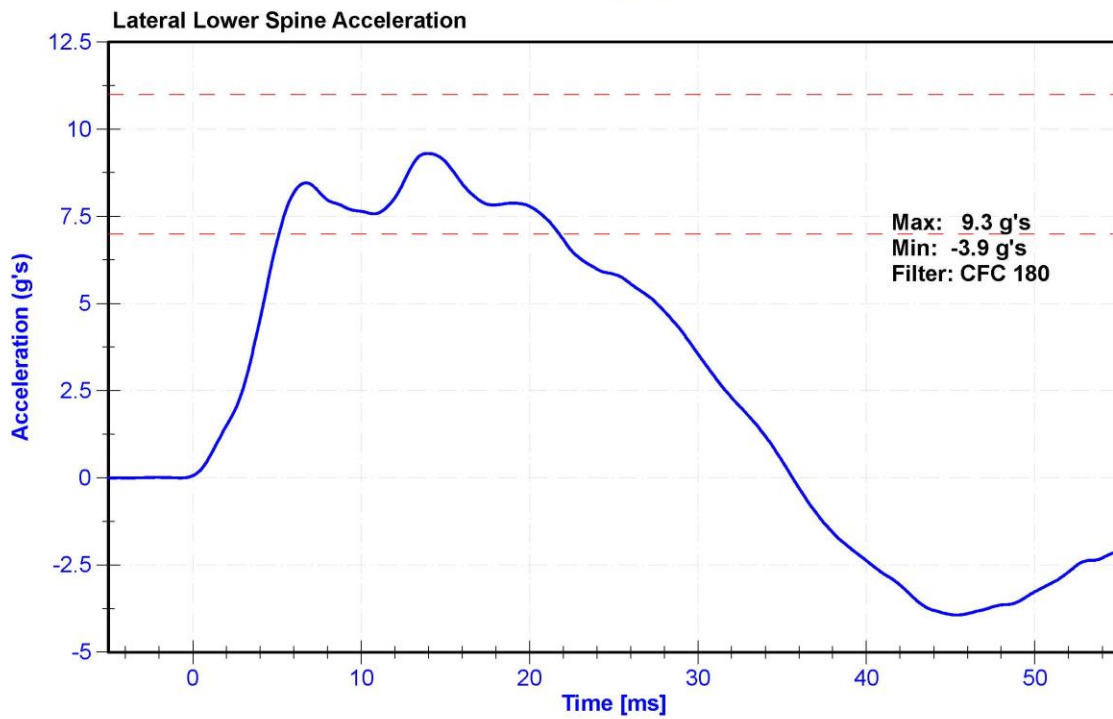
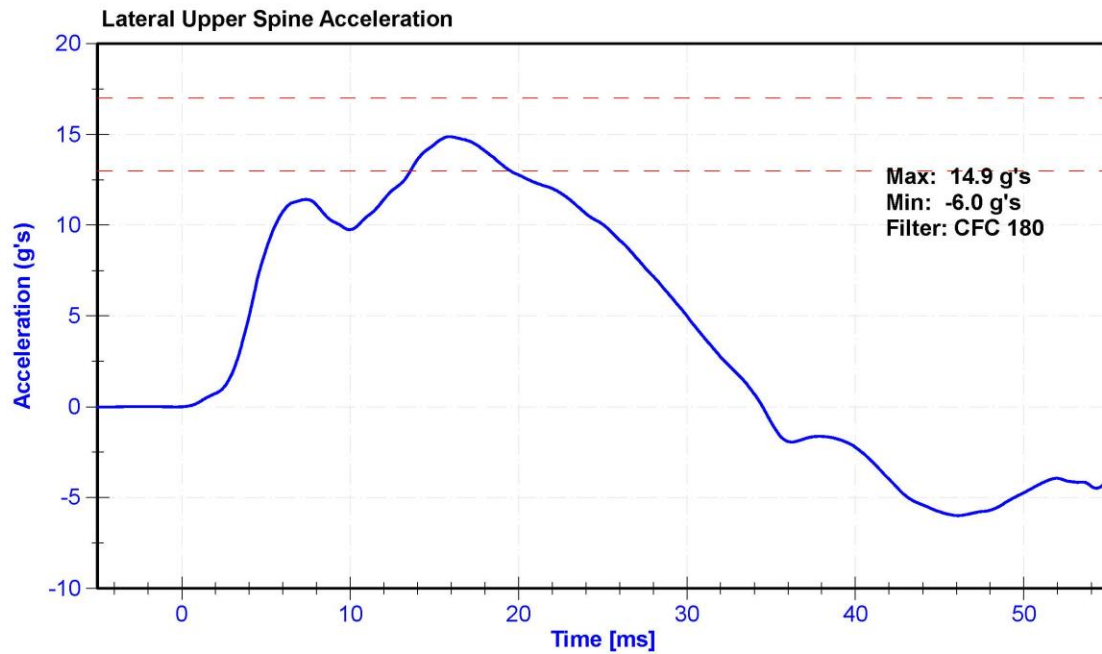
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	32	Pass
Velocity	4.2	4.4	m/s	4.37	Pass
Probe Acceleration	14	18	g's	15.4	Pass
Lateral Upper Spine Acceleration	13	17	g's	14.9	Pass
Lateral Lower Spine Acceleration	7	11	g's	9.3	Pass
Upper Thorax Rib Deflection	32	40	mm	33.8	Pass
Middle Thorax Rib Deflection	39	45	mm	40.2	Pass
Lower Thorax Rib Deflection	35	43	mm	38.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264C	T25885	2/2/2021	2/2/2022
Upper Spine Y Accelerometer	Endevco 7264C	T20880	5/13/2021	11/11/2021
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	5/13/2021	11/11/2021
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	5/12/2021	11/10/2021
Middle Thorax Rib Potentiometer	Servo 08TC1-3745	DS-040GFE	5/12/2021	11/10/2021
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	5/12/2021	11/10/2021







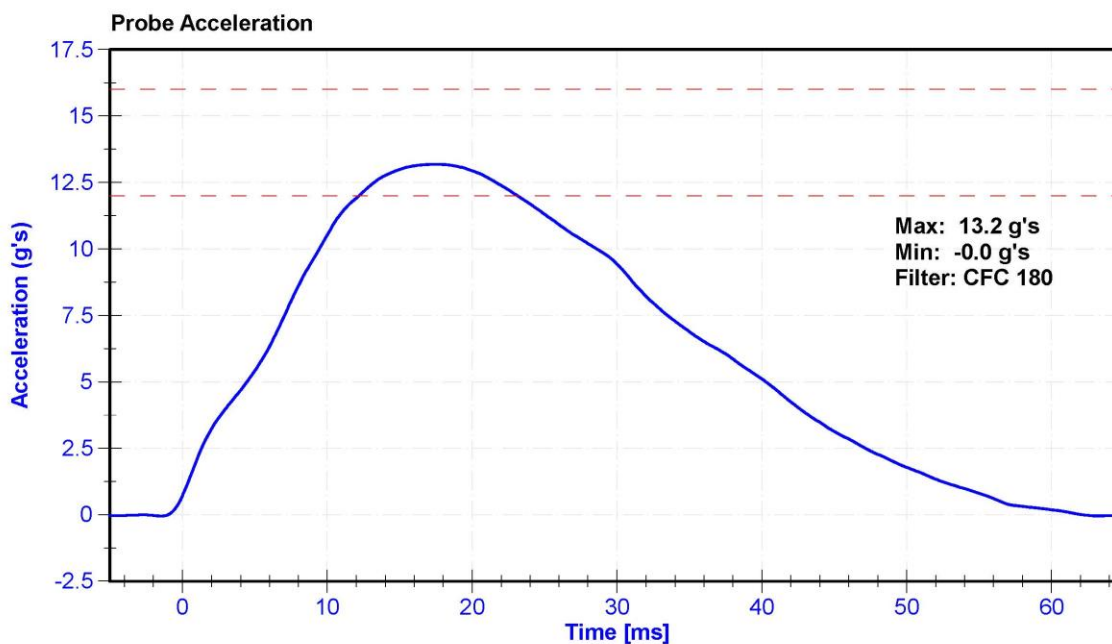
ATD Manufacturer	FTSS	Test Technician	S. Vacanti
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

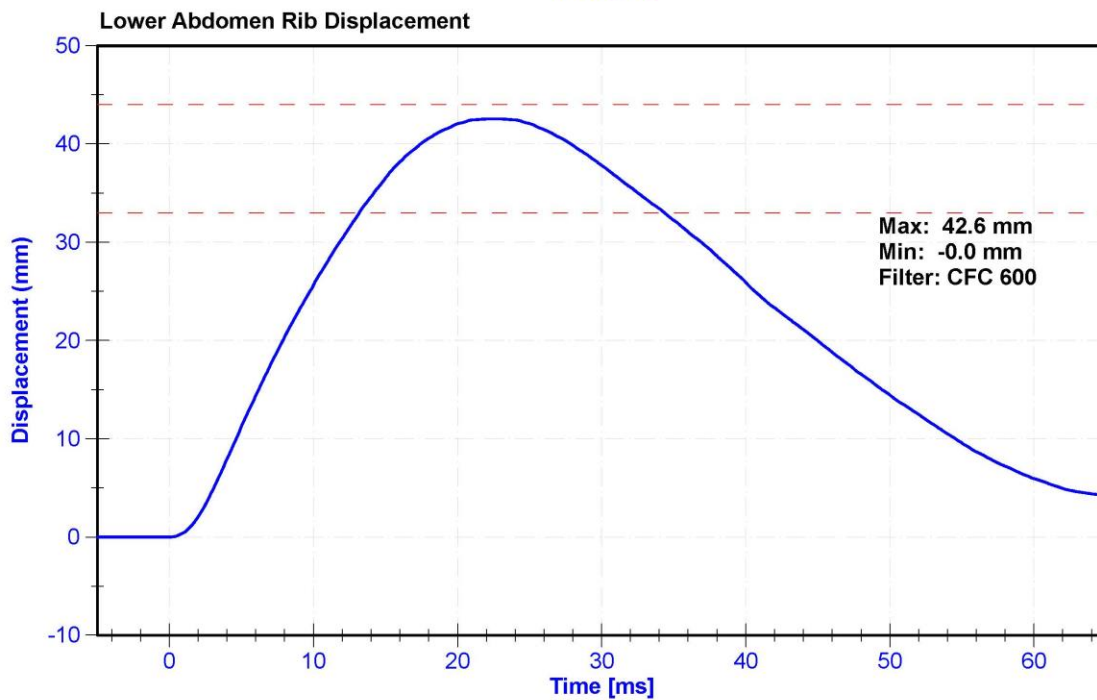
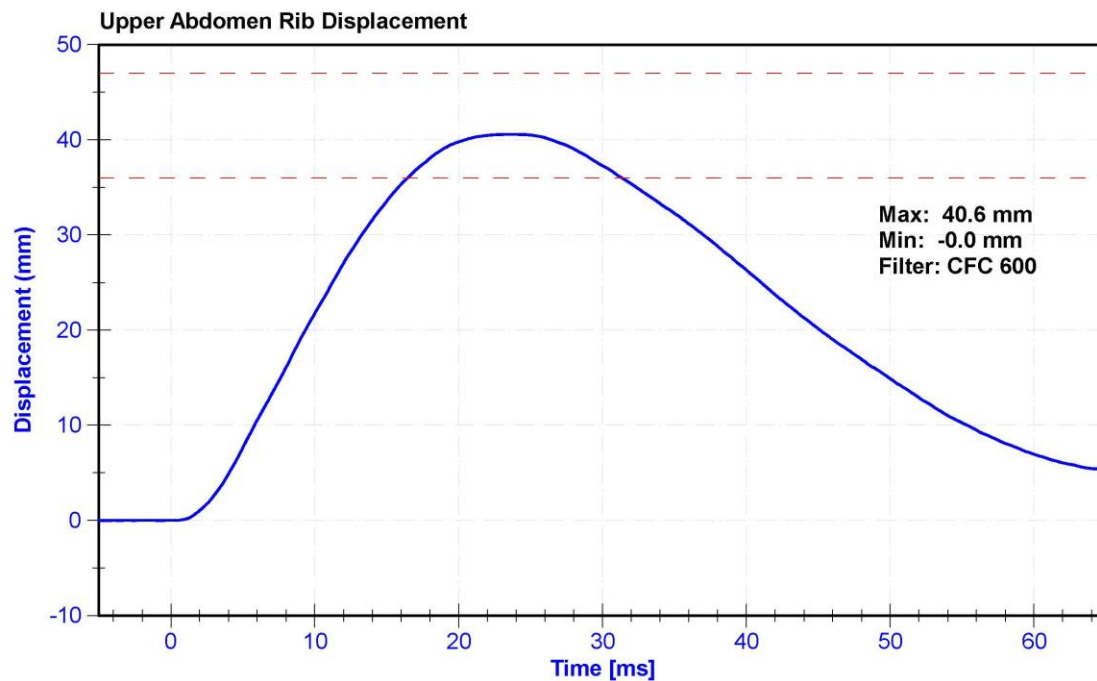
Results

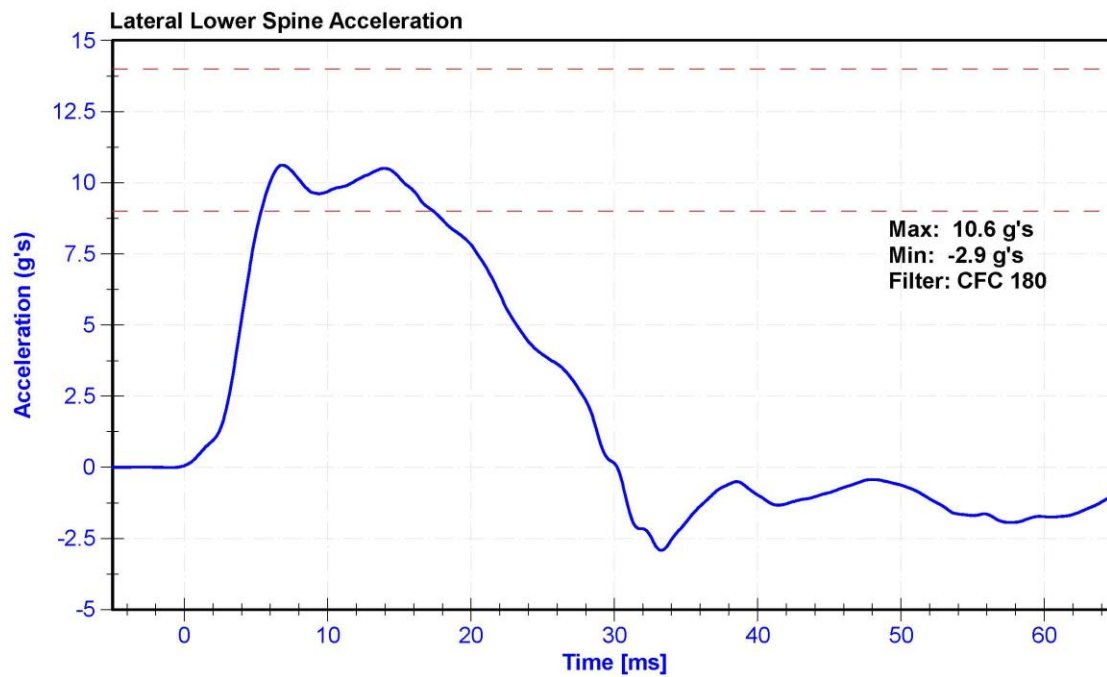
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	32.0	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Probe Acceleration	12	16	g's	13.2	Pass
Lateral Lower Spine Acceleration	9	14	g's	10.6	Pass
Upper Abdomen Rib Deflection	36	47	mm	40.6	Pass
Lower Abdomen Rib Deflection	33	44	mm	42.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7264C	T25885	2/2/2021	2/2/2022
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	5/13/2021	11/11/2021
Upper Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-307GFE	5/12/2021	11/10/2021
Lower Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-308GFE	5/12/2021	11/10/2021







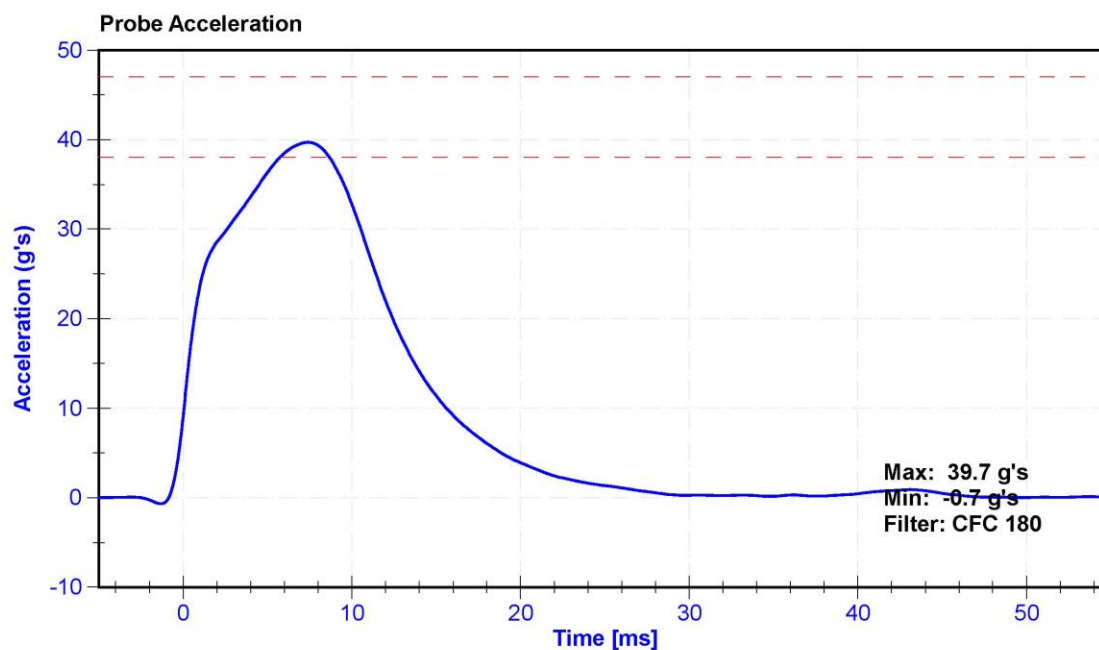
ATD Manufacturer	FTSS	Test Technician	D. Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

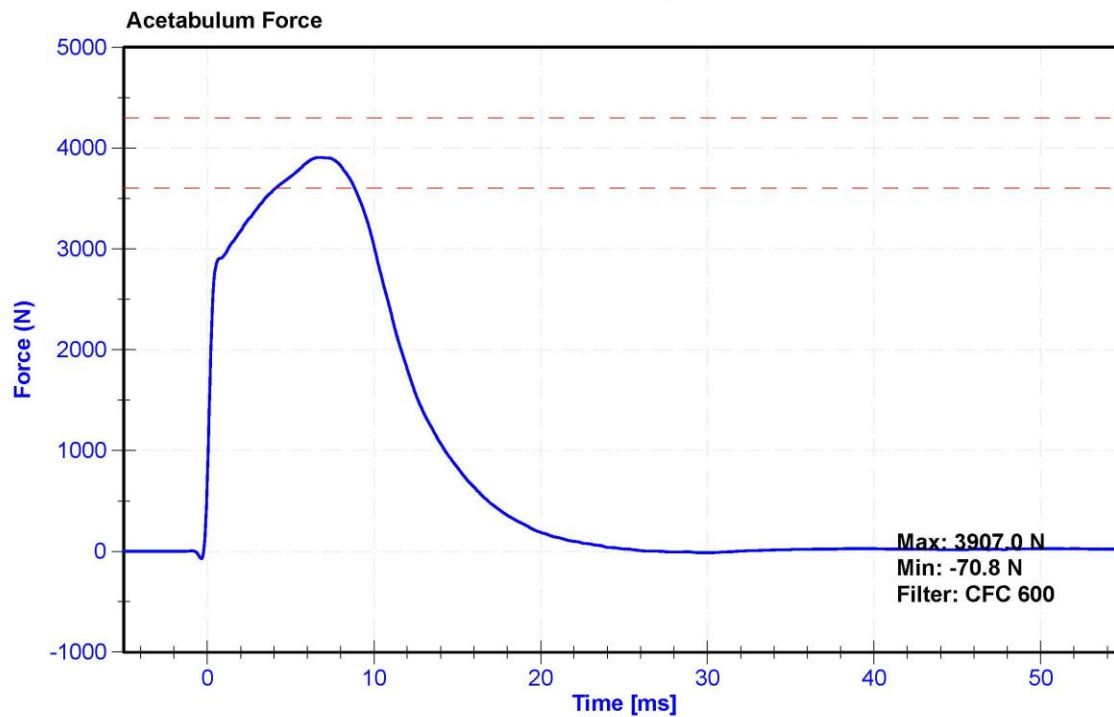
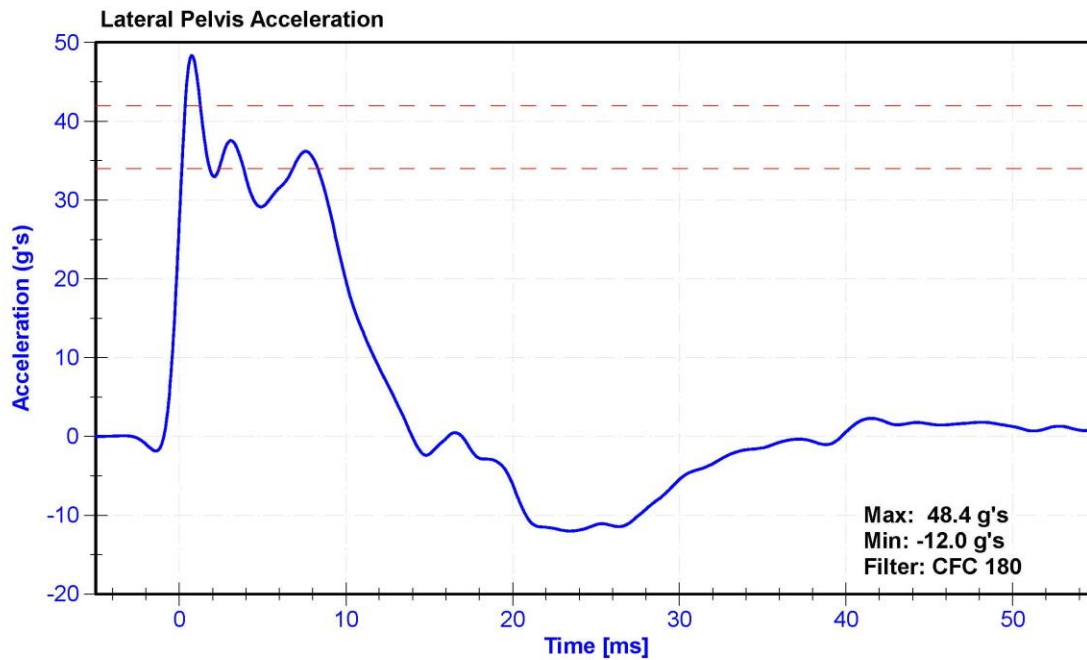
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	39.1	Pass
Velocity	6.6	6.8	m/s	6.68	Pass
Probe Acceleration	38	47	g's	39.7	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	36.2	Pass
Acetabulum Force	3600	4300	N	3907.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264C-2K-TZ2	T25885	2/2/2021	2/2/2022
Pelvis Y Accelerometer	ENDEVCO 7264C-2K-TZ2	AC-P51731	5/13/2021	11/11/2021
Acetabulum Load Cell	DENTON 3249J	LC-275Fy	11/23/2020	11/23/2021
Certification Plug	SACO	14038	5-22-2020	N/A
Crash Test Plug	SACO	13878	5-20-2020	N/A







5/13/21
300
CRASH

SID-IIS Pelvis Plug Certification Test

Plug S/N 13878

Test Number 13352

Report Number 13397

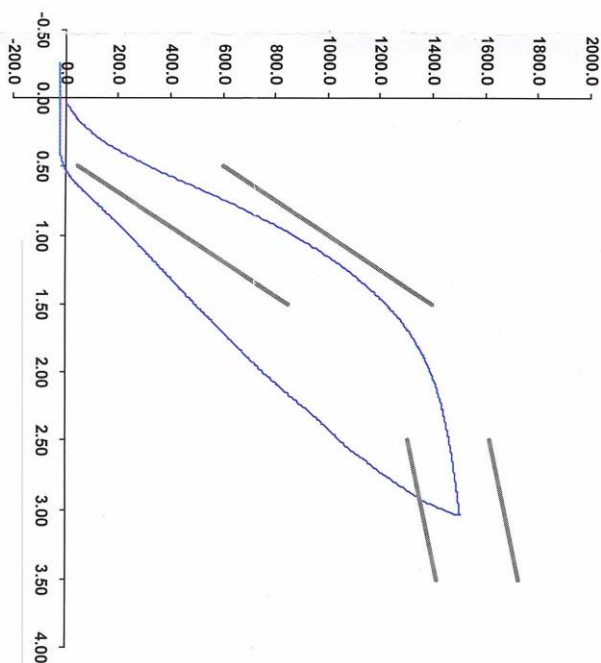
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Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	323.23	50.00
Force @ 1.5 mm (N)	1,225.48	850.00
Force @ 2.5 mm (N)	1,463.75	1,306.00
Force @ 3.0 mm (N)	1,505.80	1,361.00

Testing Machine STM-20 5965542
Load Cell S/N (FI360947), Units (LBS) 1000
Preload Value (-N) 22.24
Crosshead Speed (mm / min) or Rate 12.7
Extension or Position Measured by XHD_100 (XHD100)

Notes:

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107 20-May-20
SACO Research

By: DC Date: 5/20/2020

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



5/13/21
300
CBRT

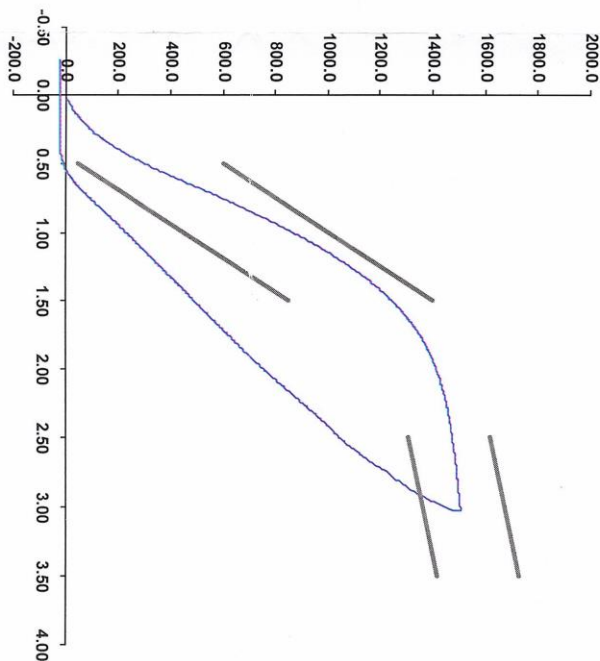
SID-11s Pelvis Plug Certification Test

Plug S/N 14038
Test Number 13512
Report Number 13557
Test Date 5/22/2020 1:06:52 PM

Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	50.00	600.00
Force @ 1.5 mm (N)	850.00	1,400.00
Force @ 2.5 mm (N)	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,361.00	1,673.00

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:



Operator

Part Number 180-4450

Template No 107 22-May-20
SACO Research

By: PC Date: 5-22-2020
SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 FAX



5/13/21
300

SID-Ils Pelvis Plug Certification Test

Non-Impact Force (-N) vs Extension (-mm)

Plug S/N 13957

Test Number 13431

Report Number 13476

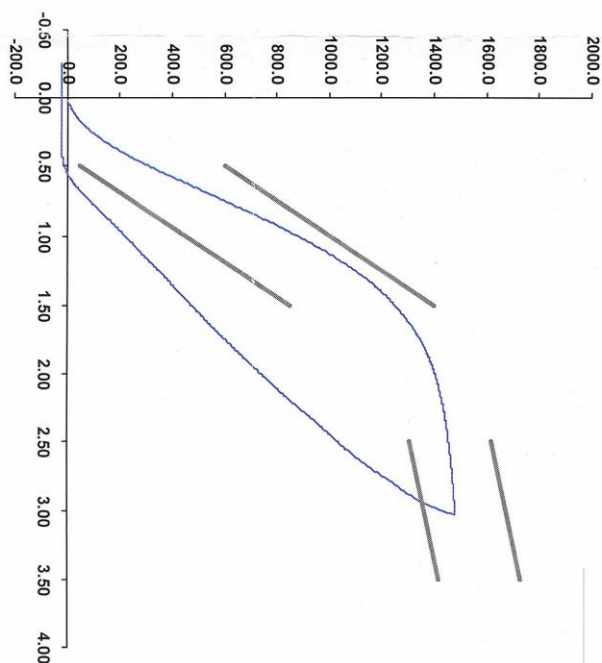
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Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	321.78	50.00
Force @ 1.5 mm (N)	1,254.14	850.00
Force @ 2.5 mm (N)	1,454.80	1,306.00
Force @ 3.0 mm (N)	1,481.59	1,361.00

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:



Operator

Part Number 180-4450

Template No 107 22-May-20
SACO Research

By: DC

Date: 5-22-2020

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

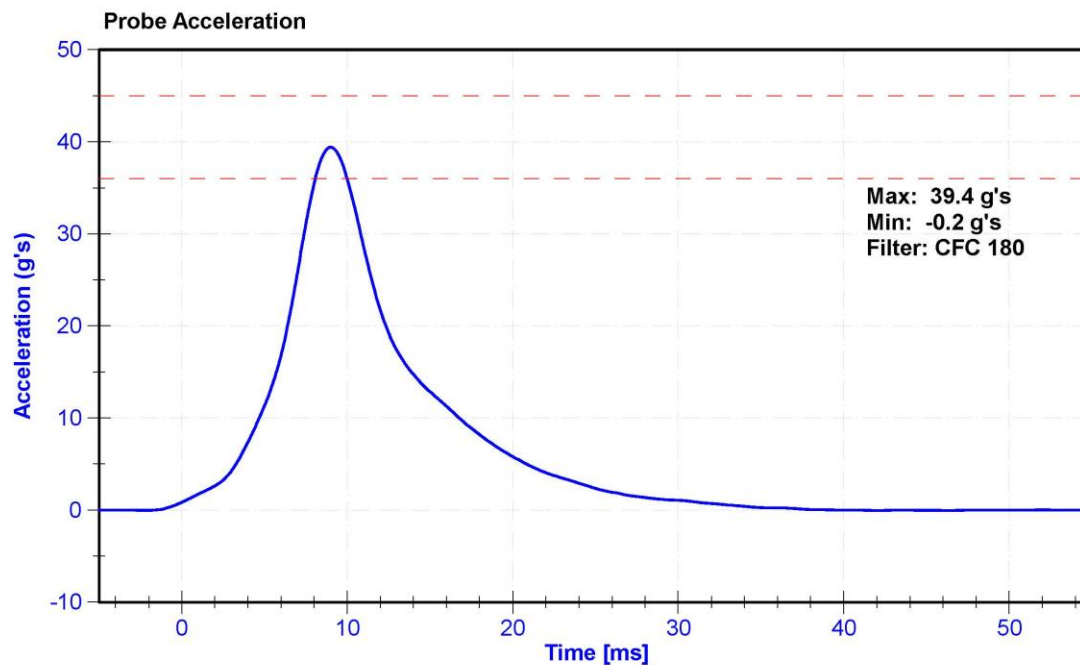
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	300	Laboratory Supervisor	D.Reinhard

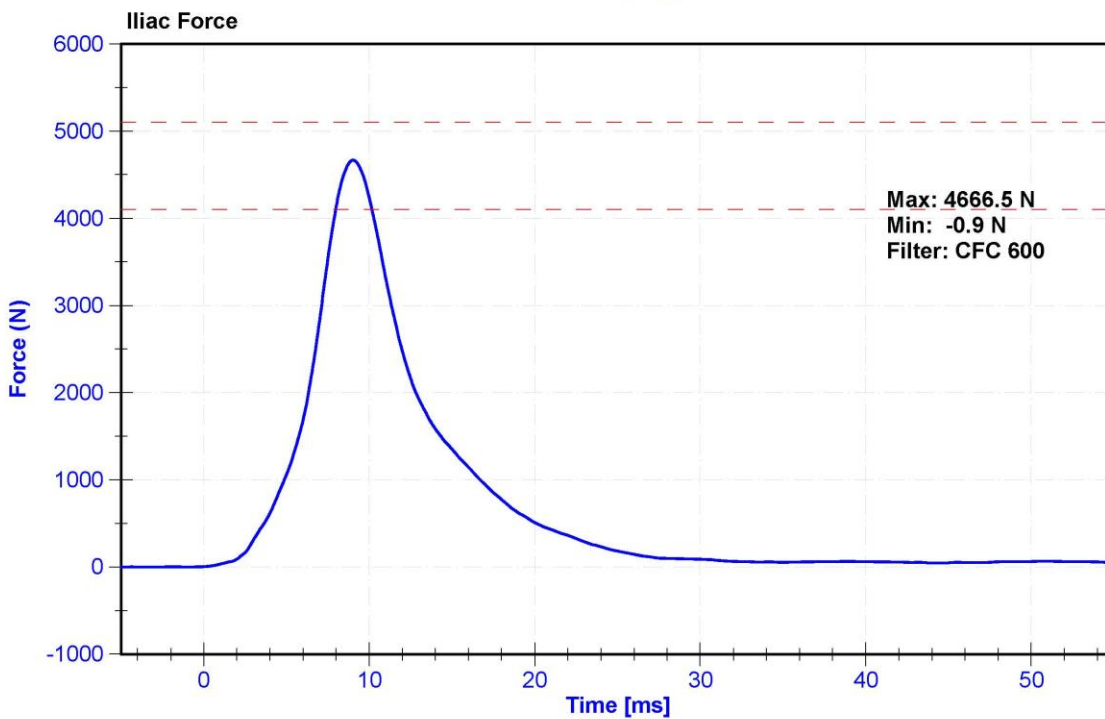
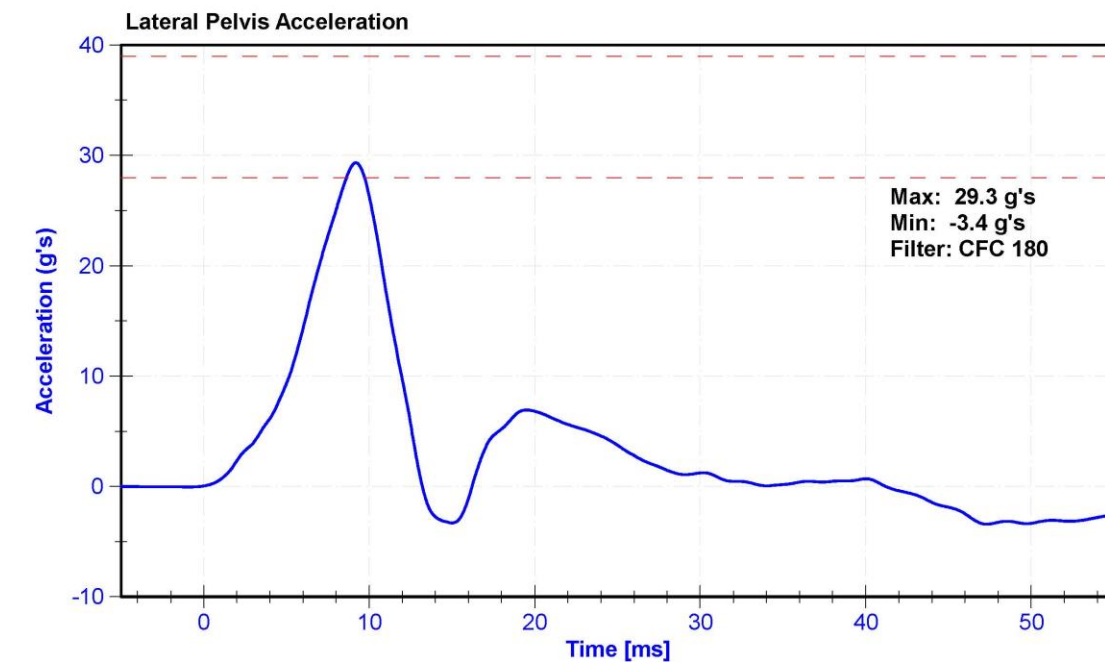
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	40.1	Pass
Velocity	4.2	4.4	m/s	4.27	Pass
Probe Acceleration	36	45	g's	39.4	Pass
Lateral Pelvis Acceleration	28	39	g's	29.3	Pass
Iliac Force	4100	5100	N	4666.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264C	T25885	2/2/2021	2/2/2022
Pelvis Y Accelerometer	ENDEVCO 7264C	AC-P51731	5/13/2021	11/11/2021
Iliac Load Cell	DENTON 3228J	LC-279Fy	11/23/2020	11/23/2021





APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation (ES-2re)

			ES-2re S/N: F033		
			Serial Number	Manufacturer	Calibration Date
Head Accelerometers	Primary	X	AC-P63861	ENDEVCO	11/24/2020
		Y	AC-P49216	ENDEVCO	11/24/2020
		Z	AC-P51303	ENDEVCO	11/24/2020
	Redundant	X	AC-P58868	ENDEVCO	11/24/2020
		Y	AC-P16755	ENDEVCO	11/24/2020
		Z	AC-P52132	ENDEVCO	11/24/2020
Thorax Rib Displacement Potentiometers	Upper	Y	DS-179GFE	Honeywell	11/25/2020
	Middle	Y	DS-185GFE	Honeywell	11/25/2020
	Lower	Y	DS-178GFE	Honeywell	11/25/2020
Abdomen Load Cells	Forward	Y	LC-1509	FTSS 2631	11/10/2020
	Middle	Y	LC-1508	DENTON	11/10/2020
	Rear	Y	LC-1507	DENTON	11/10/2020
Lower Spine Accelerometers (T12)		X	AC-P52009	ENDEVCO	11/24/2020
		Y	AC-P49163	ENDEVCO	11/24/2020
		Z	AC-P52033	ENDEVCO	11/24/2020
Pubic Symphysis Load Cell		Y	LC-464fy	DENTON	7/23/2020

Table 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N: 300		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers		Primary	X	AC-P59018	ENDEVCO	11/10/2020
			Y	AC-P79189	ENDEVCO	11/10/2020
			Z	AC-P58777	ENDEVCO	11/10/2020
		Redundant	X	AC-P68057	ENDEVCO	11/10/2020
			Y	AC-P58986	ENDEVCO	11/10/2020
			Z	AC-P52025	ENDEVCO	11/10/2020
Displacement Potentiometers	Thoracic Rib	Upper	Y	DS-451GFE	Servo	11/10/2020
		Middle	Y	DS-040GFE	Servo	11/10/2020
		Lower	Y	DS-1156GFE	Servo	11/9/2020
	Abdominal Rib	Upper	Y	DS-308GFE	Servo	11/10/2020
		Lower	Y	DS-307GFE	Servo	11/10/2020
Lower Spine Accelerometers (T12)			X	AC-P64003	ENDEVCO	11/9/2020
			Y	AC-P64147	ENDEVCO	11/9/2020
			Z	AC-P58786	ENDEVCO	11/9/2020
Acetabulum Load Cell			Y	LC-275Fy	DENTON	11/23/2020
Iliac Wing Load Cell			Y	LC-279Fy	DENTON	11/23/2020
Pelvis Plug (struck side)				13121	SACO	8/5/2019
Pelvis Plug (non-struck side)				13956	SACO	5/22/2020

Table 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	1201-1000_A315118	Measurement Specialties	4/23/2021
	Vehicle Center of Gravity	Y	1201-1000_A315746	Measurement Specialties	4/23/2021
	Vehicle Center of Gravity	Z	1201-1000_A315839	Measurement Specialties	4/23/2021
2	Right Sill at Front Seat	X	1201-1000_A282707	Measurement Specialties	1/27/2021
	Right Sill at Front Seat	Y	1201-1000_A315940	Measurement Specialties	1/27/2021
	Right Sill at Front Seat	Z	1201-1000_A315104	Measurement Specialties	1/27/2021
3	Right Sill at Rear Seat	X	1201-1000_A280925	Measurement Specialties	4/23/2021
	Right Sill at Rear Seat	Y	1201-1000_A315764	Measurement Specialties	4/23/2021
	Right Sill at Rear Seat	Z	1201-1000_A315825	Measurement Specialties	4/23/2021
4	Left Sill at Front Door	Y	1201-1000_A370910	Measurement Specialties	11/18/2020
5	Left Sill at Rear Door	Y	1201-1000_A274237	Measurement Specialties	2/19/2021
6	Left A-Post Lower	Y	1201-1000_A370920	Measurement Specialties	11/18/2020
7	Left A-Post Middle	Y	1201-1000_A274257	Measurement Specialties	3/24/2021
8	Left B-Post Lower	Y	1201-1000_A372832	Measurement Specialties	3/25/2021
9	Left B-Post Middle	Y	1201-1000_A370906	Measurement Specialties	3/30/2021
10	Front Seat Track	Y	1201-1000_A290910	Measurement Specialties	4/16/2021
11	Rear Seat Track or Structure	Y	1201-1000_A290940	Measurement Specialties	4/14/2021
12	Right Rear Occ. Compartment	Y	1201-1000_A374353	Measurement Specialties	11/28/2020
13	Engine Block	X	1201-1000_A374366	Measurement Specialties	3/25/2021
	Engine Block	Y	1201-1000_A370919	Measurement Specialties	3/30/2021
14	Rear Floorpan Above Axle	X	1201-1000_A284226	Measurement Specialties	4/26/2021
	Rear Floorpan Above Axle	Y	1201-1000_A284286	Measurement Specialties	4/26/2021
	Rear Floorpan Above Axle	Z	1201-1000_A284325	Measurement Specialties	4/26/2021

TABLE 4 – MDB Instrumentation

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	1201-1000_A373209	Measurement Specialties	3/12/2021
MDB Center of Gravity	Y	1201-1000_A374324	Measurement Specialties	3/12/2021
MDB Center of Gravity	Z	1201-1000_A374325	Measurement Specialties	3/12/2021
Left Frame at Rear Axle Centerline	X	1201-1000_A315965	Measurement Specialties	5/4/2021
Left Frame at Rear Axle Centerline	Y	1201-1000_A350918	Measurement Specialties	4/16/2021