

REPORT NUMBER: SINCAP-CAL-18-004

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

**Nissan Motor Co LTD
2018 Nissan Armada
SUV**

NHTSA No: M20185202

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



March 26, 2018

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
MAIL CODE: NRM-110
1200 NEW JERSEY AVE SE, ROOM W43-410
WASHINGTON, D.C. 20590**

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Date: March 26, 2018

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Transportation Test Operations

Date: March 26, 2018

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

Date: _____

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16. Abstract A 55/28, (61.90kph / 38.5 mph), 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2018 Nissan Armada SUV 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 December 7, 2017. The impact velocity of the Moving Deformable Barrier (MDB) was 62.01 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 190mm located at level 3. The test vehicle's occupant performance data is as follows: <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <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>26.613</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>44</td> <td>25.173</td> </tr> <tr> <td>Total Abdominal Force</td> <td>N</td> <td>2500</td> <td>360.301</td> </tr> <tr> <td>Pubic Symphysis Force</td> <td>N</td> <td>6000</td> <td>640.831</td> </tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <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>31.244</td> </tr> <tr> <td>Lower Spine Resultant Acceleration</td> <td>G</td> <td>82</td> <td>20.628</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td>N</td> <td>5525</td> <td>672.684</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38*</td> <td>1.149</td> </tr> <tr> <td>Maximum Abdominal Rib Deflection</td> <td>mm</td> <td>45*</td> <td>1.447</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	26.613	Maximum Thoracic Rib Deflection	mm	44	25.173	Total Abdominal Force	N	2500	360.301	Pubic Symphysis Force	N	6000	640.831	Measurement Description	Passenger ATD (SID-IIs)			Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	31.244	Lower Spine Resultant Acceleration	G	82	20.628	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	672.684	Maximum Thoracic Rib Deflection	mm	38*	1.149	Maximum Abdominal Rib Deflection	mm	45*	1.447
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17. Key Words New Car Assessment Program (NCAP) Side Impact MDB ES-2re SID-IIs		18. Distribution Statement <u>Copies of this report are available from:</u> National Highway Traffic Safety Administration Technical Information Services Division, NPO-411 1200 New Jersey Ave. SE Washington, D.C. 20590 e-mail: tis@nhtsa.dot.gov FAX: 202-493-2833																																																			
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SECTION 1

TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test is part of the MY 2018 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 2018 Nissan Armada SUV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated October 2015.

SECTION 2

SUMMARY OF TEST RESULTS

A 2018 Nissan Armada SUV 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 62.01 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 December 7, 2017. Pre-test and post-test photographs of the test vehicle, the MDB and the dummies (ES-2re and SID-IIs) are included in this report.

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

The Dummies were instrumented in the following manner:

DRIVER ATD (ES-2re)

Primary and redundant head CG tri-axial accelerometers

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

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

Lower spine (T12) tri-axial accelerometers

Public symphysis y-axis load cell

PASSENGER ATD (SID-IIs)

Primary and redundant head CG tri-axial accelerometers

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

Abdomen upper rib and lower rib y-axis displacement potentiometers

Lower spine (T12) tri-axial accelerometers

Acetabulum and iliac wing y-axis load cells

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

DUMMY INJURY VALUES

Measurement Description	Driver ATD (ES-2re)		
	Units	Threshold	Result
Head Injury Criteria (HIC36)		1000	26.613
Maximum Thorax Rib Deflection	mm	44	25.173
Combined Abdominal Force	N	2500	360.301
Pubic Symphysis Force	N	6000	640.831

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC36)		1000	31.244
Lower Spine (T12) Resultant Acceleration	G	82	20.628
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	672.684
Maximum Thoracic Rib Deflection	mm	38*	1.149
Maximum Abdominal Rib Deflection	mm	45*	1.447

*Proposed IARV

SUPPLEMENTAL RESTRAINT INFORMATION

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

GENERAL COMMENTS:

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

Data Anomalies:

The following channel was questionable for

- Driver Seat Track Y Acceleration, Questionable data after 22.8ms
- Left B-Pillar Lower Y Acceleration, Exceeded calibration range at 15.4ms
- Left B-Pillar Mid Y Acceleration, Exceeded calibration range at 14.1 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: 2018 Nissan Armada SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20185202
 Test Date: 12/7/2017

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20185202	Traction Control System (TCS)	Yes
Model Year	2018	Auto-Leveling System	No
Make	Nissan	Automatic Door Locks (ADL)	Yes
Model	Armada	Power Window Auto-Reverse	No
Body Style	SUV	Other Optional Feature	-
VIN	JN8AY2ND5J9053119	Driver Front Airbag	Yes
Body Color	Silver	Driver Curtain Airbag	Yes
Odometer Reading (km/mi)	7 miles	Driver Head/Torso Airbag	No
Engine Displacement (L)	5.6	Driver Torso Airbag	No
Type/No. Cylinders	V8	Driver Torso/Pelvis Airbag	Yes
Engine Placement	Inline	Driver Pelvis Airbag	No
Transmission Type	Automatic	Driver Knee Airbag	No
Transmission Speeds	7-Speed	Rear Pass. Curtain Airbag	Yes
Overdrive	Yes	Rear Pass. Head/Torso Airbag	No
Final Drive	Rear Wheel Drive	Rear Pass. Torso Airbag	No
Roof Rack	No	Rear Pass. Torso/Pelvis Airbag	No
Sunroof/T-Top	No	Rear Pass. Pelvis Airbag	No
Running Boards	Yes	Driver Seat Belt Pretensioners	Yes
Tilt Steering Wheel	Yes	Rear Pass. Seat Belt Pretensioners	No
Power Seats	Yes	Driver Load Limiter	Yes
Anti-Lock Brakes (ABS)	Yes	Rear Pass. Load Limiter	No
		Other Safety Restraint	-

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

No

DATA FROM CERTIFICATION LABEL

Manufactured By	Nissan Motor Co. LTD	GVWR (kg)	3311
Date of Manufacture	7/17	GAWR Front (kg)	1640
Vehicle Type	MPV	GAWR Rear (kg)	1970

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3	3	8	
Capacity Weight (VCW) (kg)				750	(A)
DSC X 68.04 kg				544.32	(B)
Cargo Weight (RCLW) (kg)				136	(A-B)

VEHICLE SEAT TYPE

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

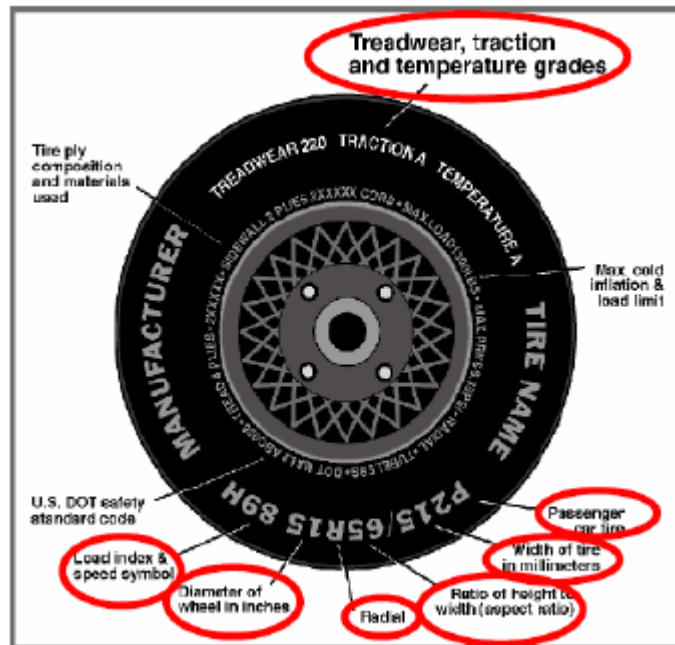
DATA SHEET NO. 1 ... (CONTINUED)
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle:	2018 Nissan Armada SUV
Test Program:	NCAP Side MDB Impact Test

NHTSA No.: M20185202
Test Date: 12/7/2017

VEHICLE TIRE INFORMATION

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



TIRE SIDEWALL INFORMATION

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	240	240
Recommended Tire Size	265/70R18	265/70R18
Tire Size on Vehicle	265/70R18	265/70R18
Tire Manufacturer	Dunlop	Dunlop
Tire Model	Grandtrek	Grandtrek
Treadwear	360	360
Traction	A	A
Temperature Grade	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel, 1 Nylon	2 Polyester, 2 Steel, 1 Nylon
Load Index/Speed Symbol	1116H	1116H
Tire Material	Rubber	Rubber
DOT Safety Code Left	V4D63DDR2717	V4D63DDR2717
DOT Safety Code Right	V4D63DDR2717	V4D63DDR2717

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

Test Vehicle: 2018 Nissan Armada SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20185202
 Test Date: 12/7/2017

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	232	236	236	234
Tire Placard	kPa	240	240	240	240
Owner's Manual	kPa	240	240	240	240
As Tested	kPa	240	240	240	240

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	644	617		684	734		688	725	
Right	kg	630	626		630	723		629	748	
Ratio	%	51	49		47	53		47	53	
Totals	kg	1274	1243	2517	1314	1457	2771	1317	1473	2790

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	2517	(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	2780	(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	910	913	Yes
RF	mm	916	917	Yes
RR	mm	880	888	Yes
LR	mm	870	876	Yes
Vehicle CG (Aft of Front Axle)	mm	1623	1617	
Vehicle CG (Left(+)/Right(-) from Longitudinal Centerline)	mm	11	20	

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

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

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

Test Vehicle:	<u>2018 Nissan Armada SUV</u>	NHTSA No.:	<u>M20185202</u>
Test Program:	<u>NCAP Side MDB Impact Test</u>	Test Date:	<u>12/7/2017</u>

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Trunk Carpeting	9
Jack	6
Tail Light	1
Passenger Side Windows	10
Ballast / Equipment Added	90

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

Test Vehicle: 2018 Nissan Armada SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20185202
 Test Date: 12/7/2017

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	15.7	8.5	12.1
Front Passenger Seat	12.4	9.8	11.1
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	12.1	3	Max	30	30	30
			Mid	15	15	15
			Min	3	3	3
Front Passenger Seat	11.1	16	Max	-	-	-
			Mid	16	16	16
			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: 2018 Nissan Armada SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20185202
 Test Date: 12/7/2017

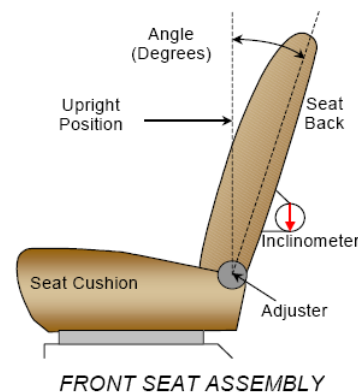
SEAT FORE / AFT POSITION

Seat	Total Fore / Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	240	-	120	-
Front Passenger Seat	240	-	120	-
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	-3.8 to 51.4	-	10.4	-
Front Passenger Seat	-4.4 to 50.7	-	10.4	-
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat w/ Seated Dummy	-1.2 to 18.6	-	-1.2	0
Non-Struck Side Rear Seat	-1.2 to 18.6	-	-1.2	0
Rear Center Seat*	-1.2 to 18.6	-	-1.2	0

**if applicable*

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

Test Vehicle: 2018 Nissan Armada SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20185202
 Test Date: 12/7/2017

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
Rear Seat	4	0

HEAD RESTRAINT ADJUSTMENT

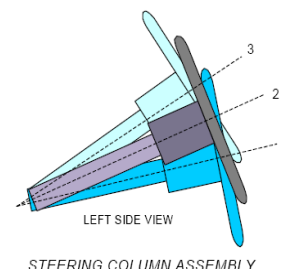
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

	Total # of Positions	Placed in Position #
Driver Seat	6	Highest
Rear Seat	6	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.

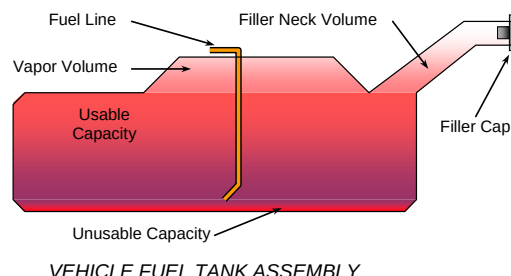
	Degrees	Fore/Aft Position (mm)
Lowermost – Position 1	18.1	
Geometric Center – Position 2	25	
Uppermost – Position 3	32.0	
Telescoping Steering Wheel Travel		30
Test Position	25	15



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.



18.1

DATA SHEET NO. 2 ... (CONTINUED)

SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEM DATA

Test Vehicle: 2018 Nissan Armada SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20185202
 Test Date: 12/7/2017

FUEL TANK CAPACITY

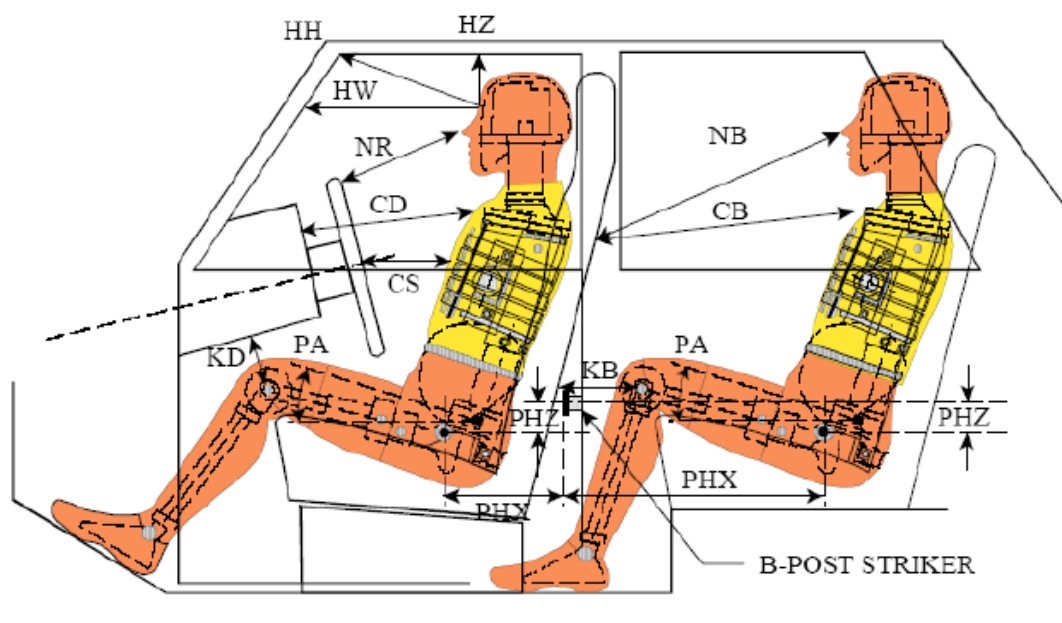
	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	98.4
Usable Capacity of "Optional Tank" (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	98.4
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	91.5
Actual Amount of Solvent Used in Test	91.5
1/3 of Usable Capacity	32.8

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: 2018 Nissan Armada SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20185202
 Test Date: 12/7/2017



LEFT SIDE VIEW

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

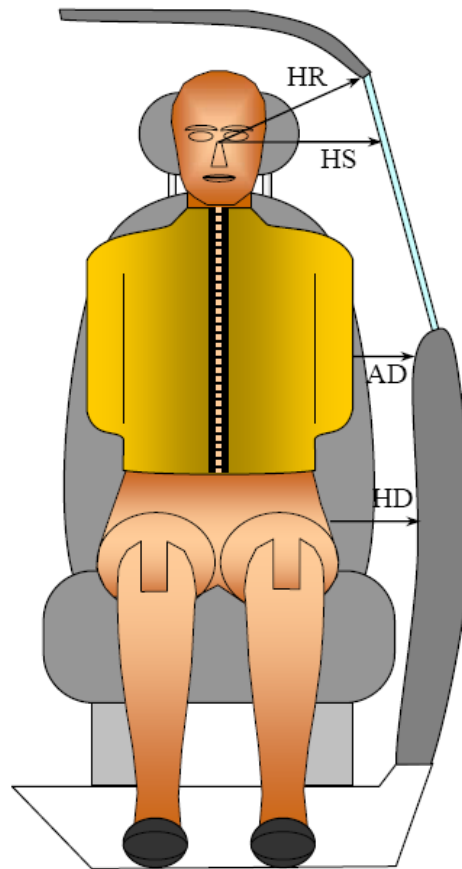
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Description	Driver (Serial No. F034)		Passenger (Serial No.300)	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	440			
HW		Header to Windshield	622			
HZ	HZ	Head to Roof Liner	182		320	
NR	NB	Nose to Rim/Seat Back	440		607	
CD	CB	Chest to Dash/Seat Back	538		614	
CS		Chest to Steering Wheel	324			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	140	29	392	9.8
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	138	26.7	390	7.8
PAX°	PAX°	Pelvic Tilt Angle X		21.4		18.3
	PAY°	Pelvic Tilt Angle Y				0.3
PHX	PHX	Hip Point to Striker (X-Axis)	244		273	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	54		102	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2018 Nissan Armada SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20185202
 Test Date: 12/7/2017



FRONT VIEW OF DUMMY

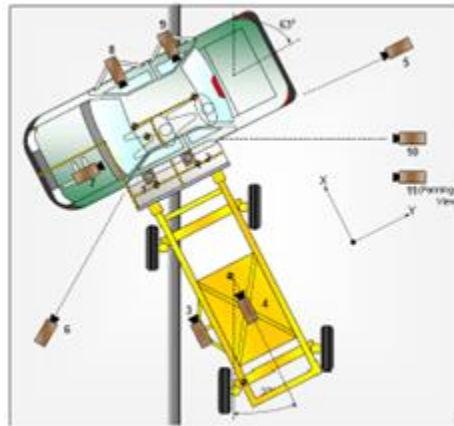
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver (Serial No. F034)	Passenger (Serial No. 300)
HR	Head to Side Header	mm	215	305
HS	Head to Side Window	mm	325	406
AD	Arm to Door	mm	93	173
HD	Hip Point to Door	mm	135	167

DATA SHEET NO. 5 **CAMERA AND INSTRUMENTATION DATA**

Test Vehicle: 2018 Nissan Armada SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20185202
 Test Date: 12/7/2017



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	315	1085	-5305	14	1000
2	Overhead Close-up	0	890	-5305	24	1000
3	Left Impact Point (MDB)	-1410	0	-847	25	1000
4	Side Overall (MDB)	-1140	838	-1587	12.5	1000
5	Rear	0	9616	-1191	24	1000
6	Left Front	-2183	-5493	-1193	20	1000
7	Driver Front (OB)				25	1000
8	Driver Side (OB)				12.5	1000
9	Passenger Side (OB)				12.5	1000
10	Real-time Left Rear				Zoom	60
11	Real-time In run				Zoom	60

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

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

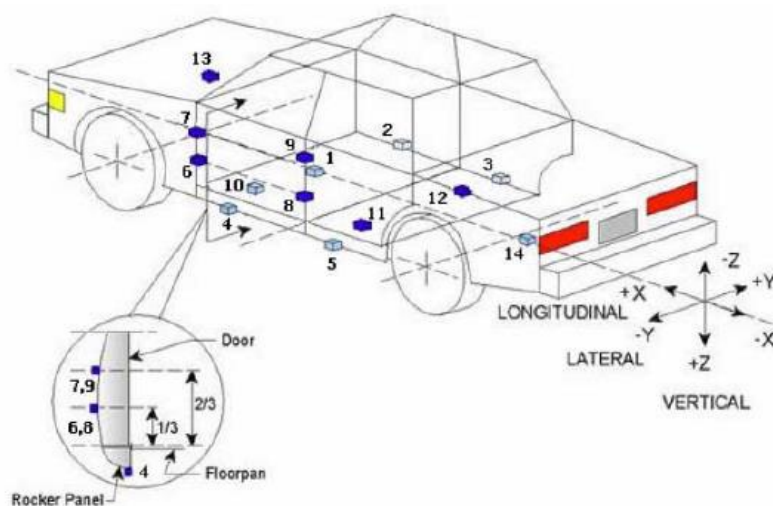
INSTRUMENTATION

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

DATA SHEET NO. 6 TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2018 Nissan Armada SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20185202
Test Date: 12/7/2017



TEST VEHICLE ACCELEROMETER LOCATIONS

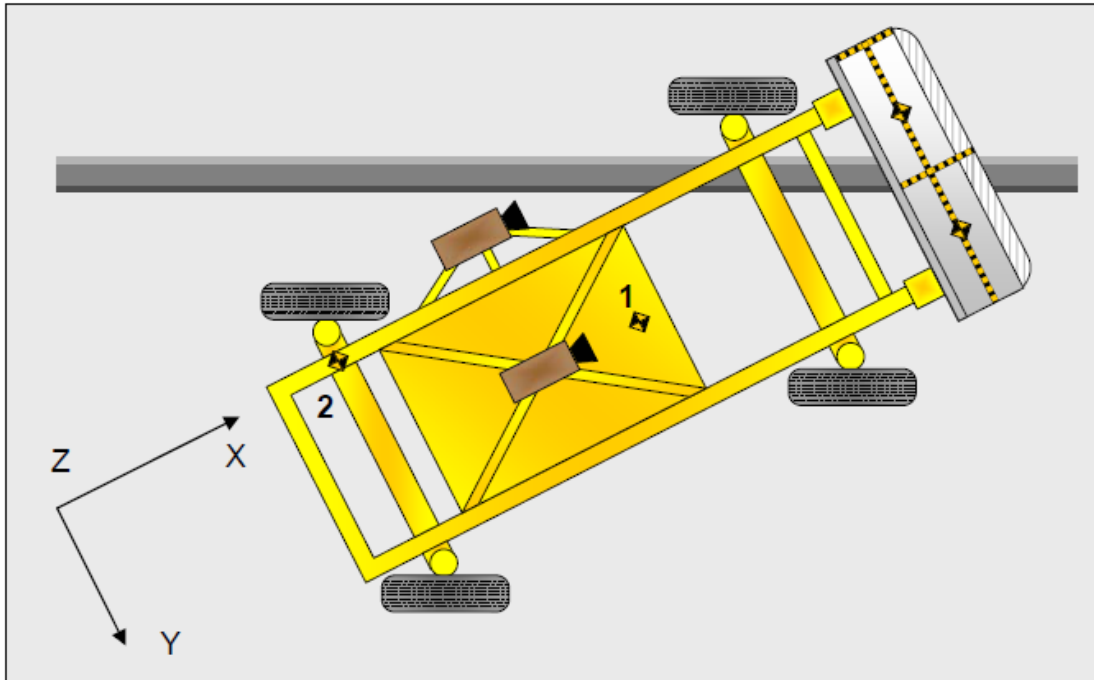
No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	3337	-6	-315
2	Right Sill at Front Seat	3221	725	67
3	Right Sill at Rear Seat	2280	756	69
4	Left Sill at Front Door	3303	-735	67
5	Left Sill at Rear Door	2265	-754	69
6	A-Post Lower	3714	-719	-215
7	A-Post Middle	3629	-734	-756
8	B-Post Lower	2621	-765	-325
9	B-Post Middle	2595	-770	-570
10	Front Seat Track	2889	-656	-41
11	Rear Seat Structure	2251	-477	-50
12	Rt. Rear Occ. Compartment	2477	433	14
13	Engine Block	4337	-12	-548
14	Rear Above Axle	986	94	-207

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: 2018 Nissan Armada SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20185202
 Test Date: 12/7/2017



MDB ACCELEROMETER LOCATIONS

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

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

DATA SHEET NO. 8
POST-TEST OBSERVATIONS

Test Vehicle: 2018 Nissan Armada SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20185202
Test Date: 12/7/2017

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 Header	None
Left Side of Head	Curtain Airbag & Side Header	Curtain Airbag
Back of Head	Headrest	Curtain Airbag & Headrest
Left Shoulder	Curtain Airbag	Passenger Door
Upper Torso	Seatback & Torso/Pelvis Airbag	Passenger Door
Lower Torso	Seatback & Torso/Pelvis Airbag	Passenger Door
Left Hip	Seat pan & Torso/Pelvis Airbag	Seat Pan
Left Knee	None	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	Rear Passenger Window Shattered
Other Notable Effects	None

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

Test Vehicle: 2018 Nissan Armada SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20185202
 Test Date: 12/7/2017

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		3075
Vertical Impact Reference Line (Aft of Front Axle - Intended Impact Point)	mm		508
Actual Impact Point (Aft of Frontal Axle)	mm		510
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact Point	-2
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact Point	-7

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2018 Nissan Armada SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20185202
Test Date: 12/7/2017

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	62.01
Trap No. 2 Velocity (Redundant)	km/h	61.10 to 62.70	61.94
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

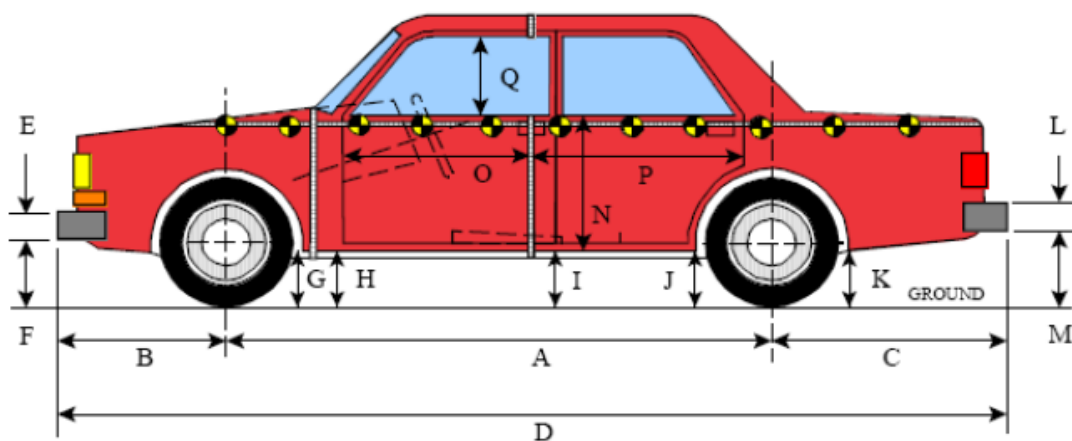
MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush (mm)
Row	Description	Height (mm)	Distance (mm)	Direction	
A	Center of Bumper	432	800	Right	158
B	Top of Bumper	533	800	Right	162
C	Mid-Level	686	800	Right	193
D	Top of Stack	813	800	Right	161

DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2018 Nissan Armada SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20185202
 Test Date: 12/7/2017



LEFT SIDE VIEW

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

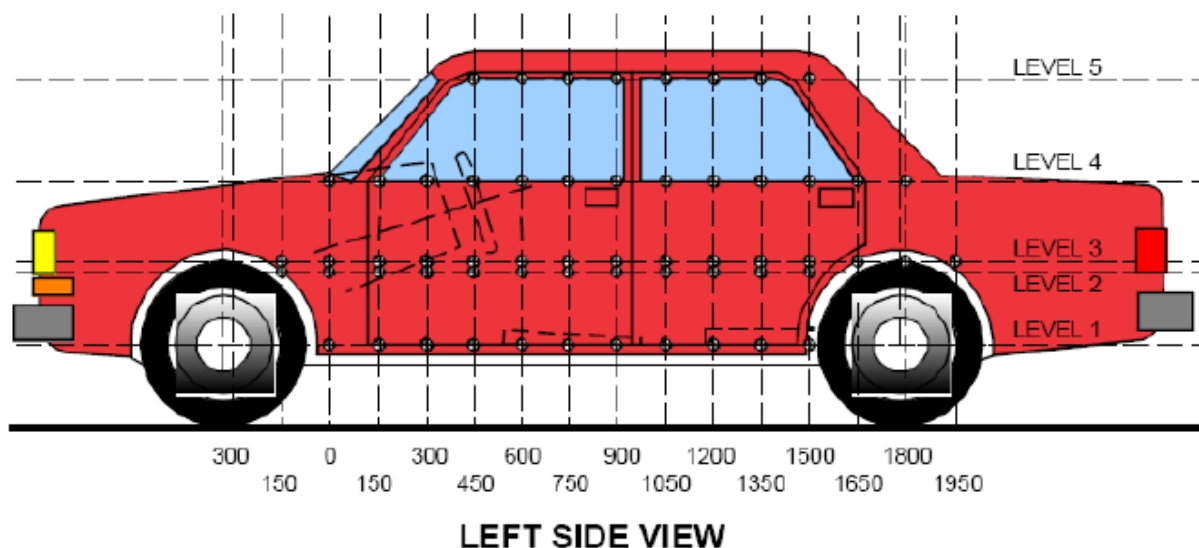
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Wheelbase	3075	3063	-12
B	Front Axle to FSOV	969	979	10
C	Rear Axle to RSOV	1263	1250	-13
D	Total Length at Centerline	5303	5291	-12
E	Front Bumper Thickness	330	330	0
F	Front Bumper Bottom to Ground	426	422	-4
G	Sill Height at Front Wheel Well	330	320	-10
H	Sill Height at Front Door Leading Edge	338	339	1
I	Sill Height at B Pillar	310	286	-24
J1	Sill Height at Rear Wheel Well	263	266	3
J2	Pinch Weld Height at Rear Wheel Well	339	339	0
K	Sill Height Aft of Rear Wheel Well	301	293	-8
L	Rear Bumper Thickness	250	250	0
M	Rear Bumper Bottom to Ground	460	460	0
N	Sill Height to Window Bottom of Front Window Sill	875	892	17
O	Front Door Leading Edge to Impact CL	686	686	0
P	Rear Door Trailing Edge to Impact CL	1455	1430	-25
Q	Front Window Opening	478	470	-8
R	Right Side Length	5233	5229	-4
S	Left Side Length	5233	5216	-17
T	Maximum Vehicle Width	1996	1889	-107

DATA SHEET NO. 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2018 Nissan Armada SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20185202
 Test Date: 12/7/2017



MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	493	189	1650
2	Driver Hip Point	mm	901	180	1650
3	Mid-Door	mm	838	190	1650
4	Window Sill	mm	1250	65	1500
5	Window Top	mm	1797	-5	2700

*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: 2018 Nissan Armada SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20185202
 Test Date: 12/7/2017

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

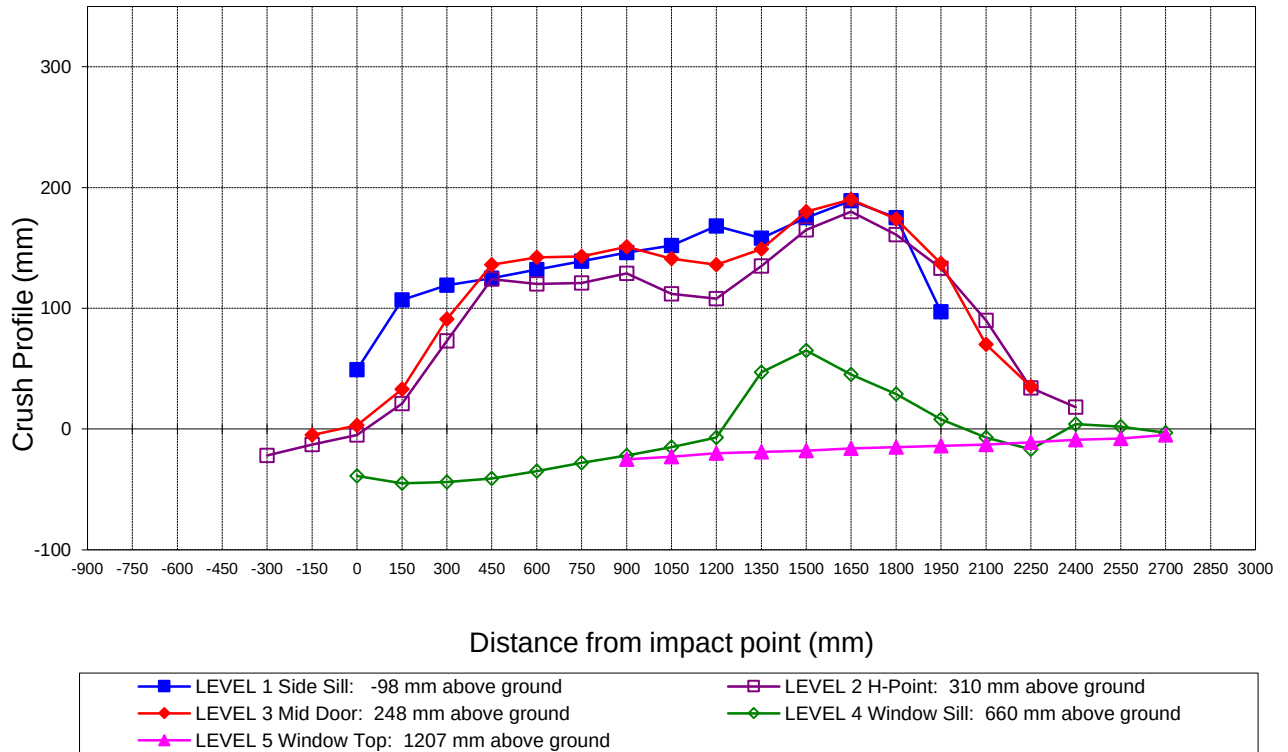
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750															
-600															
-450															
-300		1018					1040					-22			
-150		1002	1016				1015	1021				-13	-5		
0	1004	1000	1000	900		955	1005	998	939		49	-5	2	-39	
150	977	998	998	906		870	977	965	951		107	21	33	-45	
300	971	996	995	913		852	923	904	957		119	73	91	-44	
450	969	996	994	920		844	872	858	961		125	124	136	-41	
600	969	997	995	927		837	877	853	962		132	120	142	-35	
750	970	998	994	933		831	877	851	961		139	121	143	-28	
900	971	998	994	937	724	825	869	843	959	749	146	129	151	-22	-25
1050	971	997	993	939	731	819	885	852	954	754	152	112	141	-15	-23
1200	971	995	991	942	734	803	887	855	949	754	168	108	136	-7	-20
1350	971	994	990	941	735	813	859	841	894	754	158	135	149	47	-19
1500	969	992	988	940	736	794	827	808	875	754	175	165	180	65	-18
1650	968	990	987	939	736	779	810	797	894	752	189	180	190	45	-16
1800	970	991	990	938	734	795	830	816	909	749	175	161	174	29	-15
1950	974	994	995	935	731	877	861	858	927	745	97	133	137	8	-14
2100		997	998	933	727		907	928	940	740		90	70	-7	-13
2250		1001	1013	930	723		967	978	947	734		34	35	-17	-11
2400		1013		926	718		995		922	727		18		4	-9
2550				921	713				919	721				2	-8
2700				917	708				920	713				-3	-5
2850															
3000															

NOTE: Pre-test measurements are taken when the vehicle is in the "As Tested" weight condition.
 Vehicle measurements forward of the vertical impact reference line are negative.
 The crush profile grid is established prior to test based on an estimated impact point.

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

Test Vehicle: 2018 Nissan Armada SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20185202
 Test Date: 12/7/2017

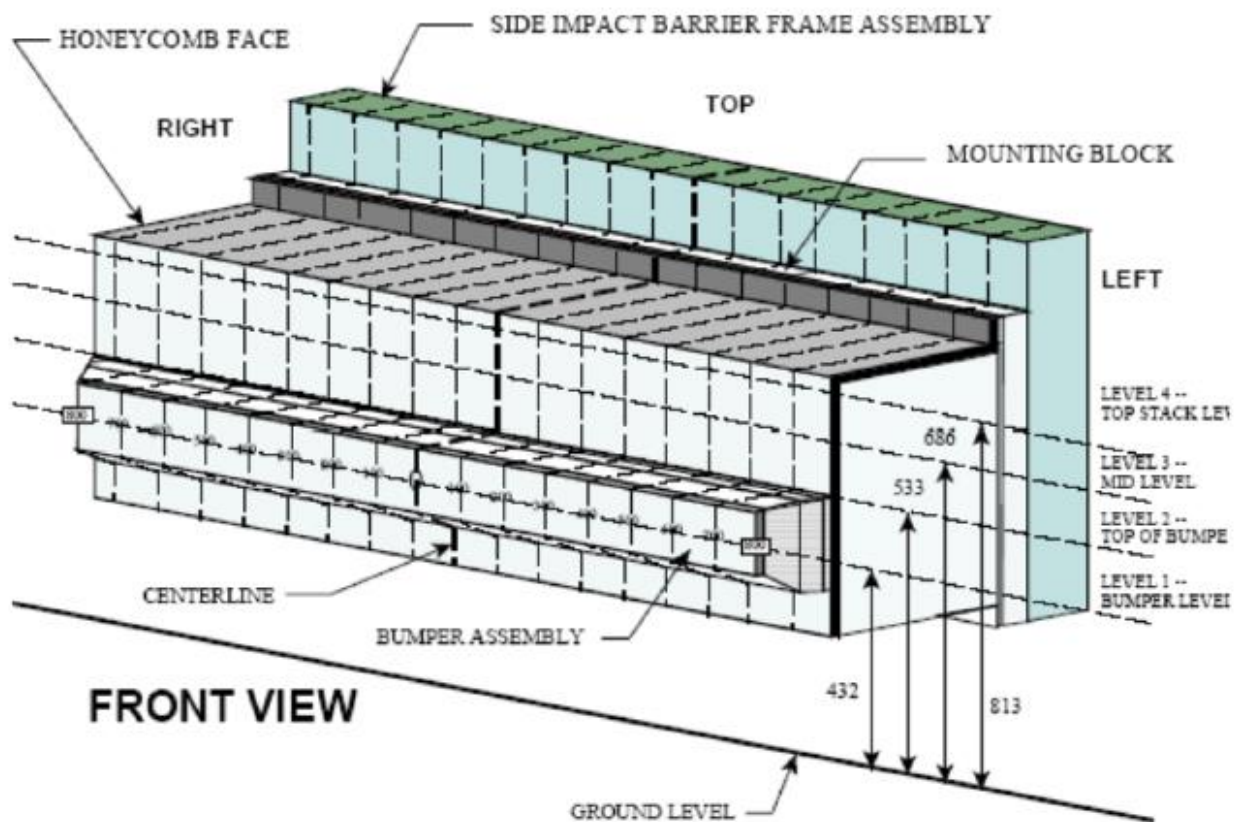


Vehicle Exterior Crush Measurements - Visual Representation

DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2018 Nissan Armada SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20185202
 Test Date: 12/7/2017



NOTE: Dimensions are shown in millimeters, mm

DEFORMABLE BARRIER STATIC CRUSH

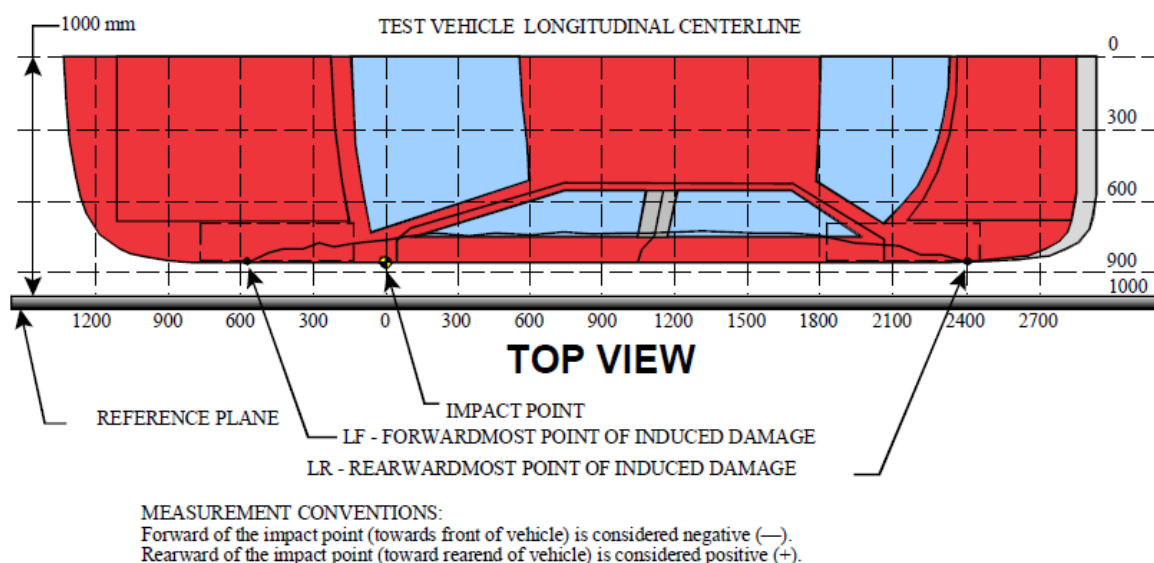
Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
1	158	145	137	135	134	133	131	132	131	129	127	126	126	125	124	123	126
2	162	159	162	160	135	106	95	99	101	103	121	142	151	148	145	143	140
3	193	159	123	99	81	79	91	76	77	68	64	62	65	69	78	89	114
4	161	131	109	105	98	129	137	115	96	76	78	73	78	86	97	117	153

DATA SHEET NO. 13
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2018 Nissan Armada SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20185202
 Test Date: 12/7/2017

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	-21	-16	-5
2	330	3	105	5	100
3	810	3	152	6	146
4	1290	3	153	10	143
5	1770	3	188	11	177
6	2250	3	22	-13	35

MDB DAMAGE PROFILE DISTANCES

DPD	Distance From Center of MDB	Level	Post-Test (mm)*
1	800 mm left of center	1	126
2	480 mm left of center	1	125
3	160 mm left of center	1	128
4	160 mm right of center	1	131
5	480 mm right of center	1	135
6	800 mm right of center	1	158

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

Test Vehicle: <u>2018 Nissan Armada SUV</u>	NHTSA No.: <u>M20185202</u>
Test Program: <u>NCAP Side MDB Impact Test</u>	Test Date: <u>12/7/2017</u>
Test Time: <u>10:40 AM</u>	Temperature: <u>21°C</u>

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

FMVSS NO. 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	69	300	369
90° to 180°	64	300	364
180° to 270°	63	300	363
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	

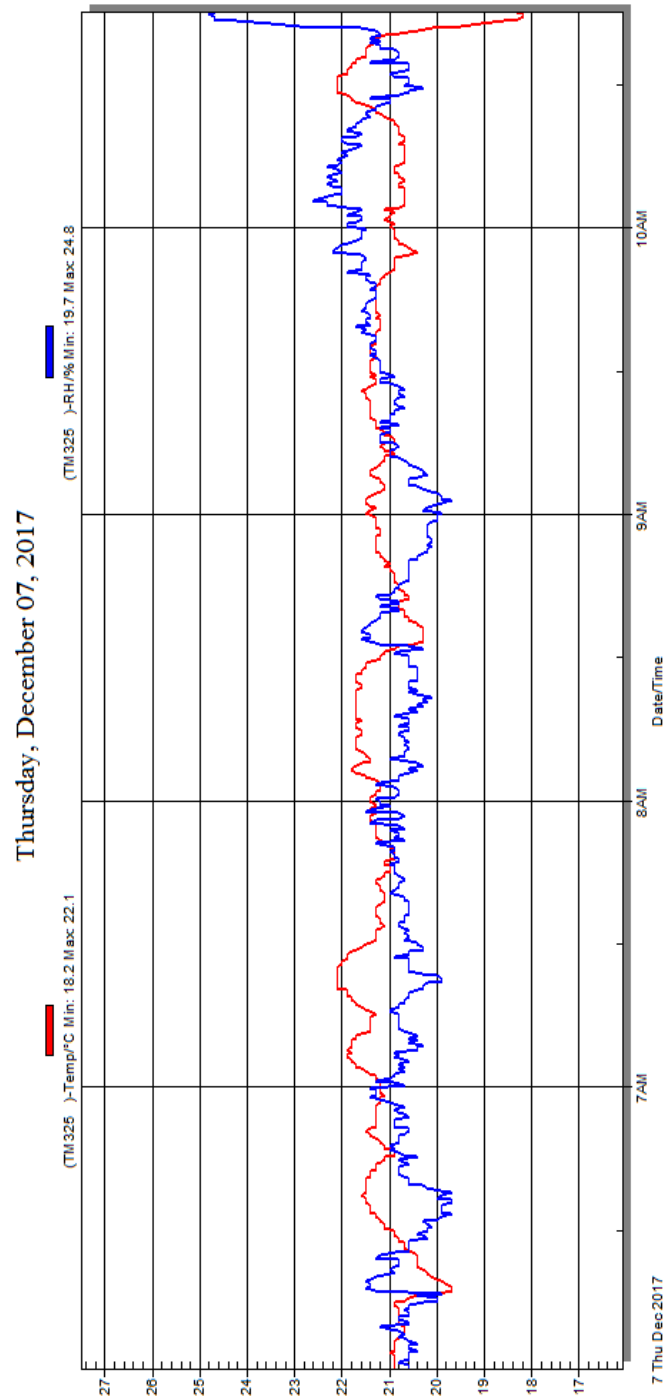
ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

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: 2018 Nissan Armada SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20185202
 Test Date: 12/7/2017



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

APPENDIX A
PHOTOGRAPHS

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



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



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



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



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



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

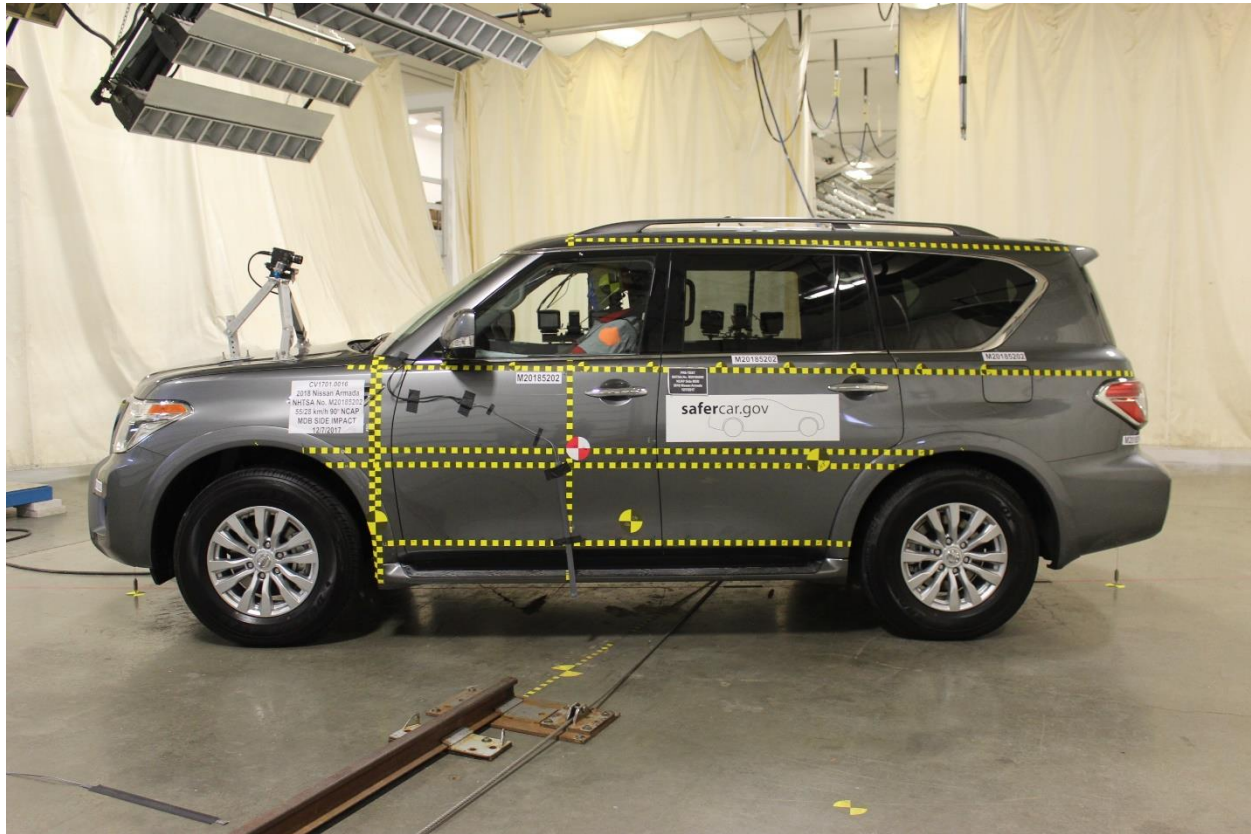


Figure A-7: Pre-Test Left Side View of Test Vehicle



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



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



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



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



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



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



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

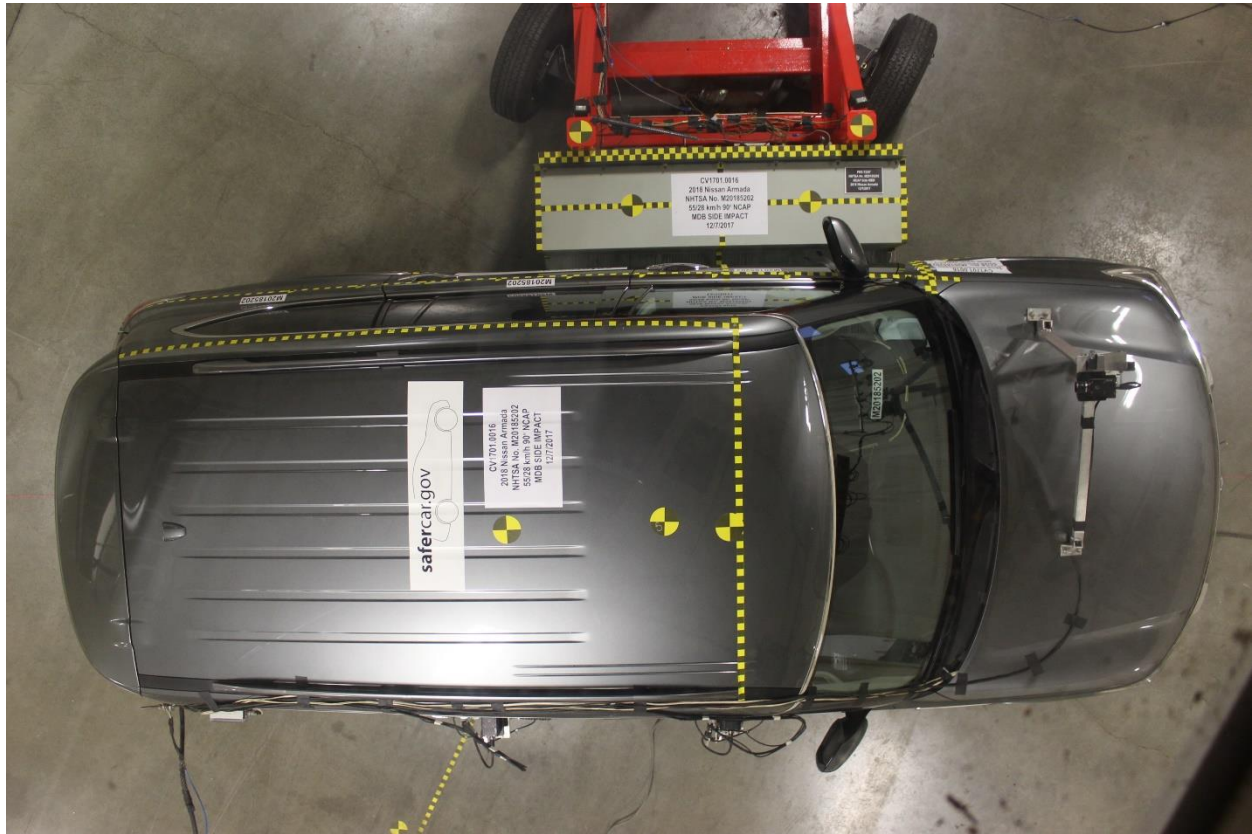


Figure A-15: Pre-Test Overhead View of the Test Area



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



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



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



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



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

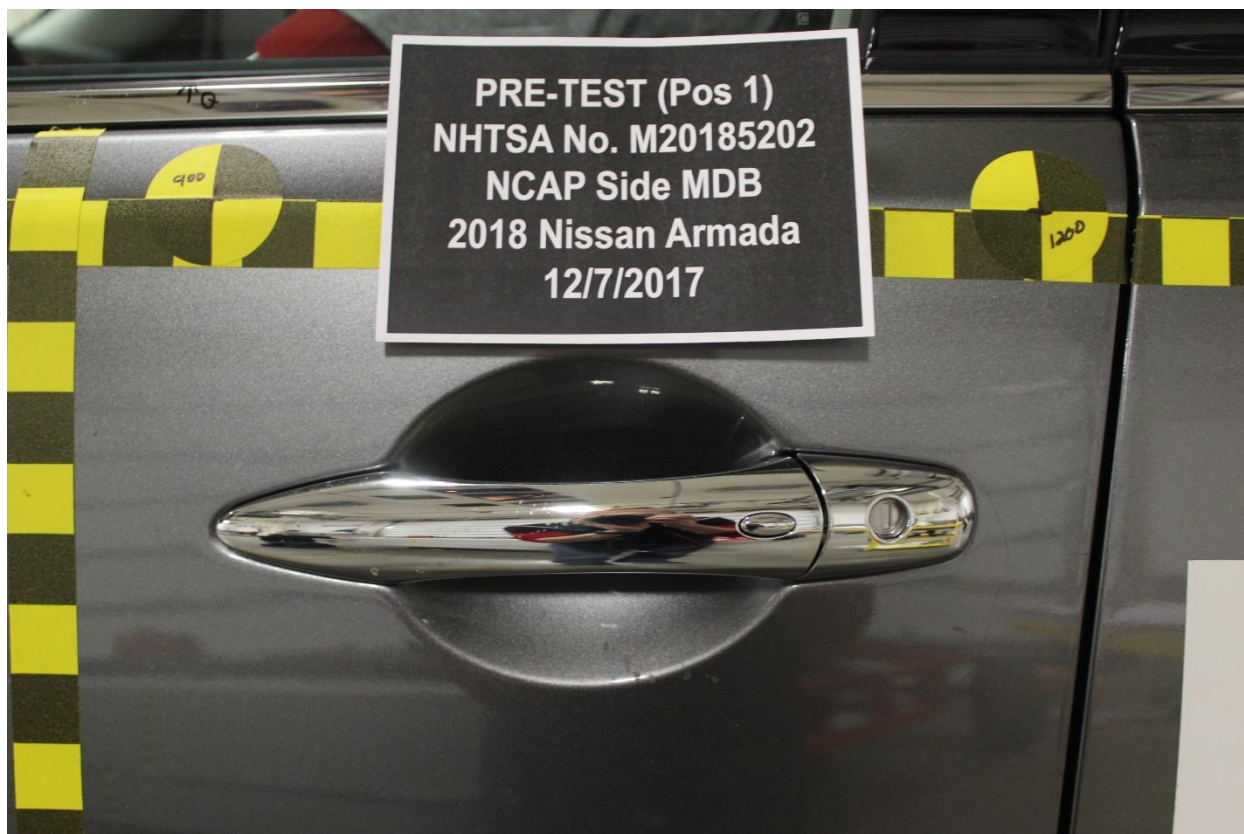


Figure A-21: Pre-Test Left Front Door Latch Close-Up



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



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

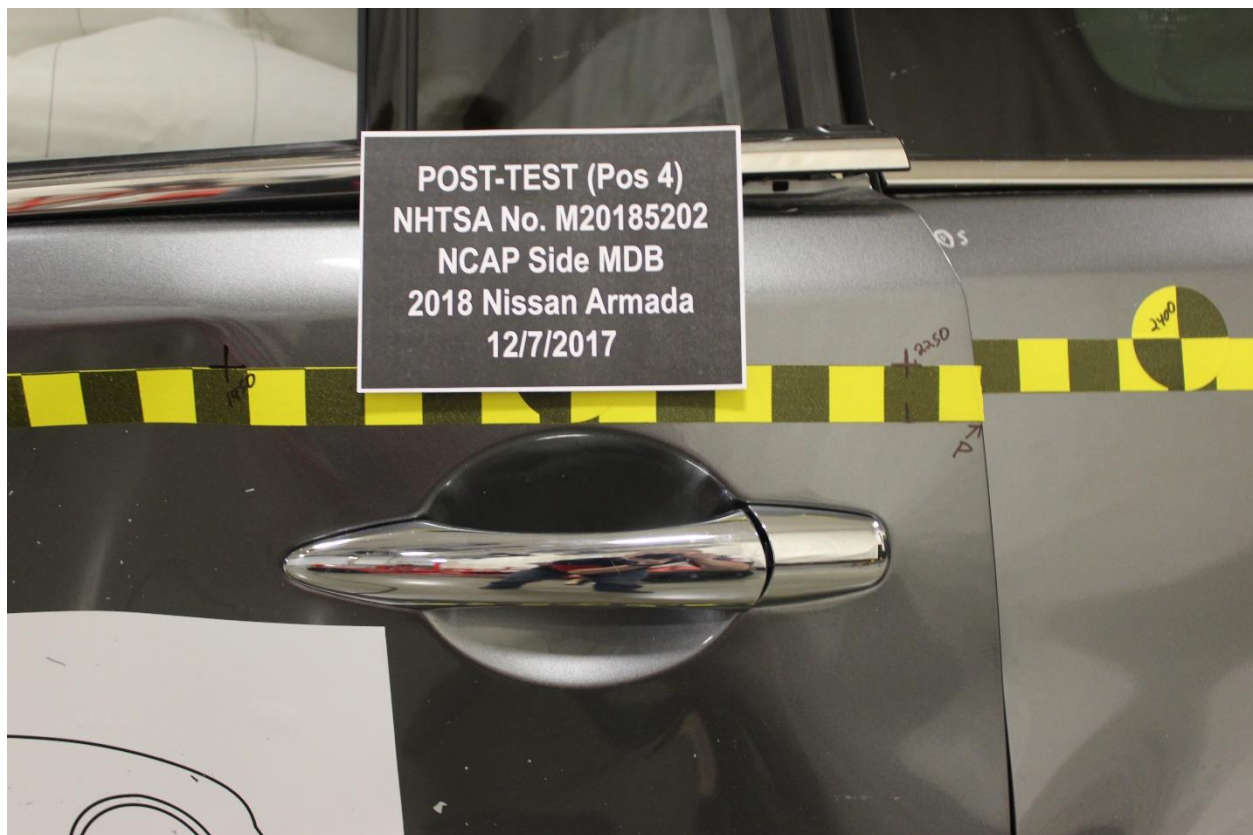


Figure A-24: Post-Test Left Rear Door Latch Close-Up



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



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



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



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



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



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

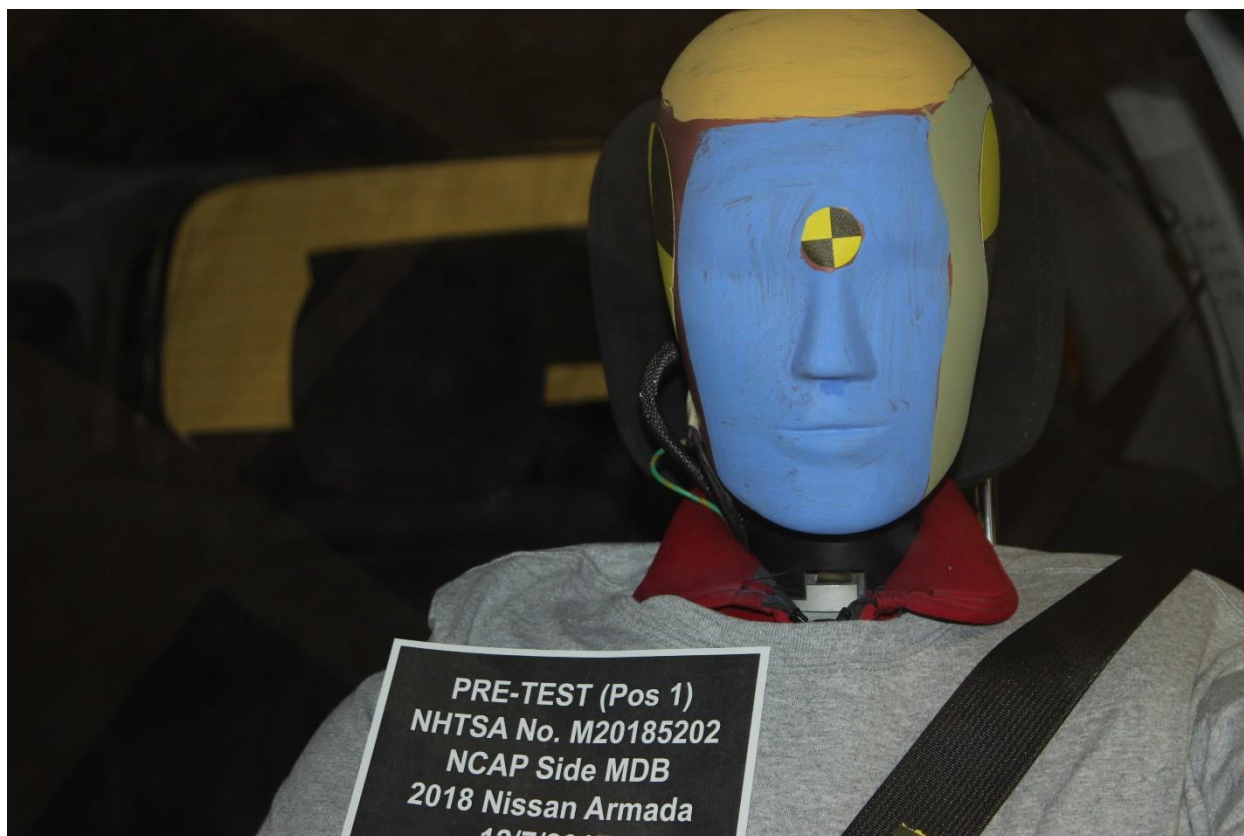


Figure A-31: Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint



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



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



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



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



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



Figure A-37: View of Disengaged Parking Brake



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



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

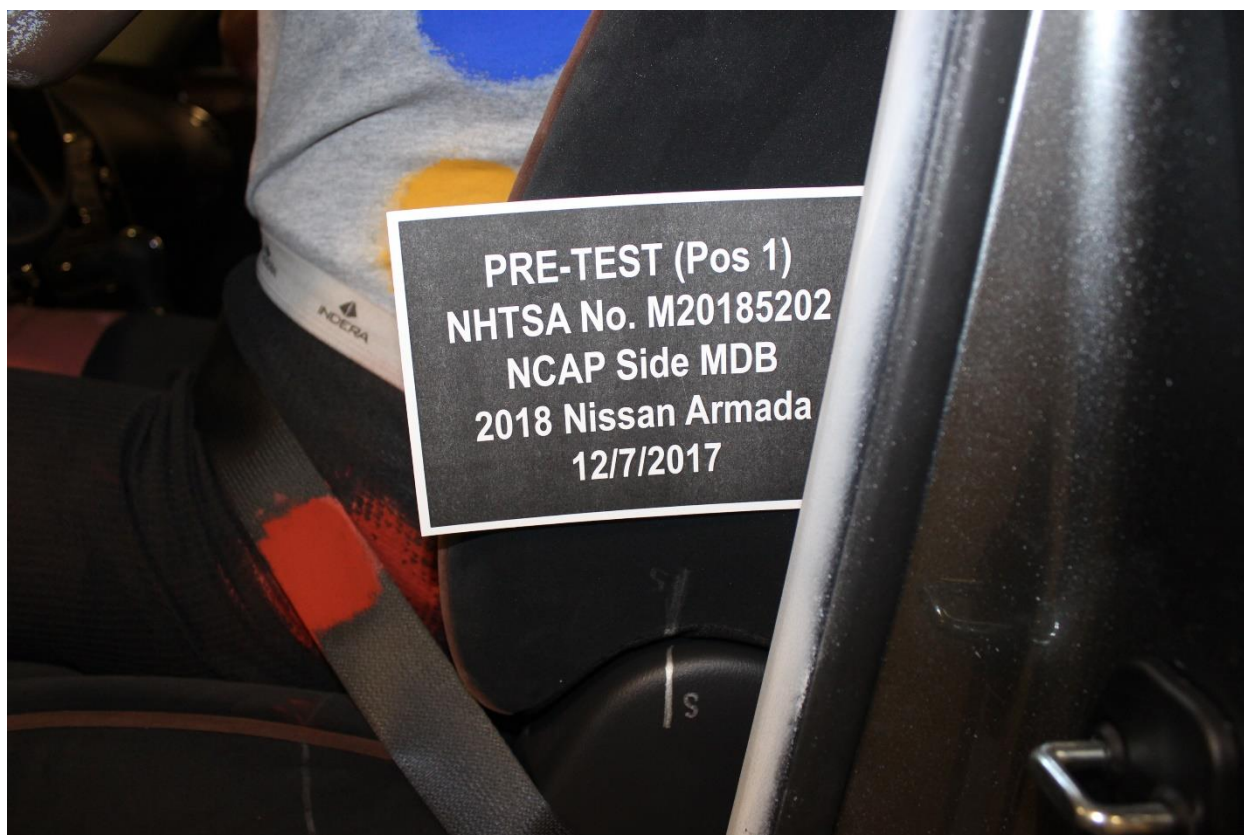


Figure A-40: Pre-Test Close-Up Left Side View of Driver Seat Back



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



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



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



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



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



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



Figure A-47: Post-Test Driver Inner Door Panel View



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 Airbag View



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

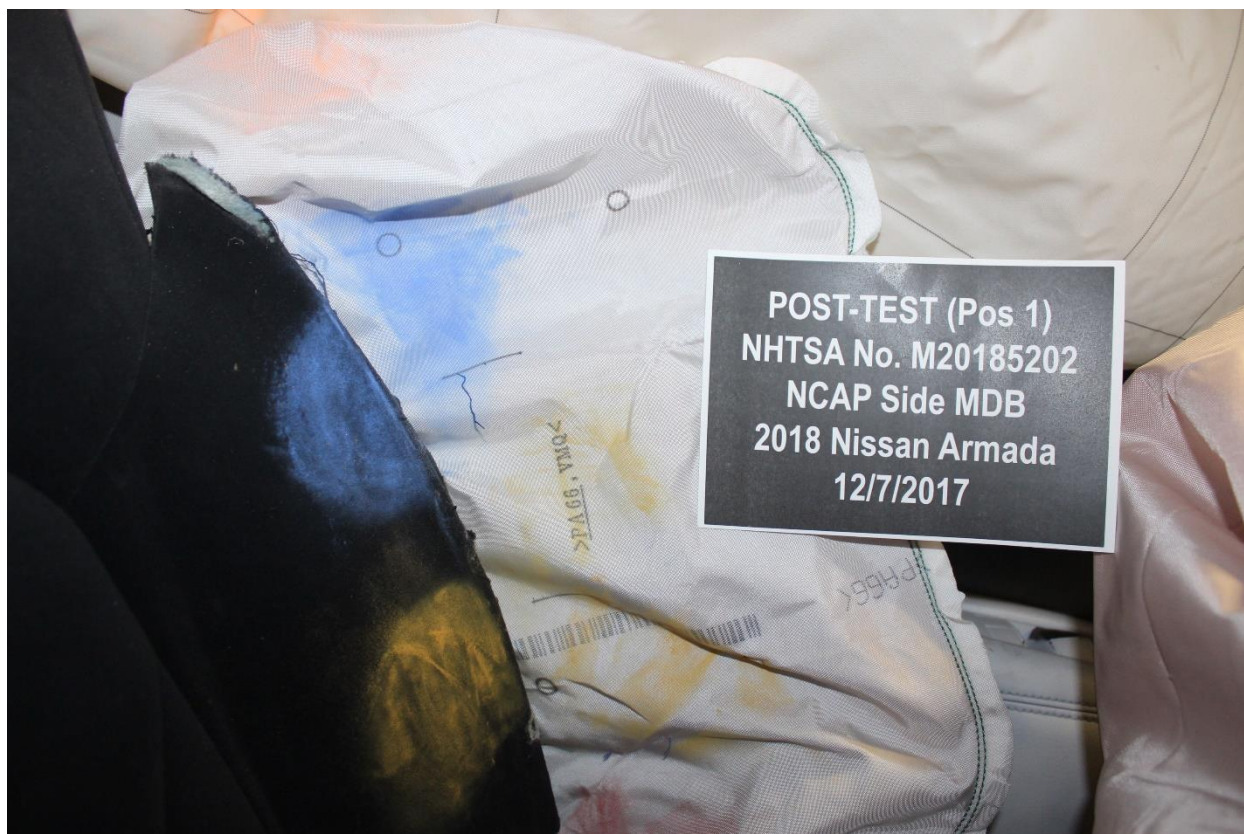


Figure A-51: Post-Test Driver Dummy Close-Up Torso Contact with Side Airbag View

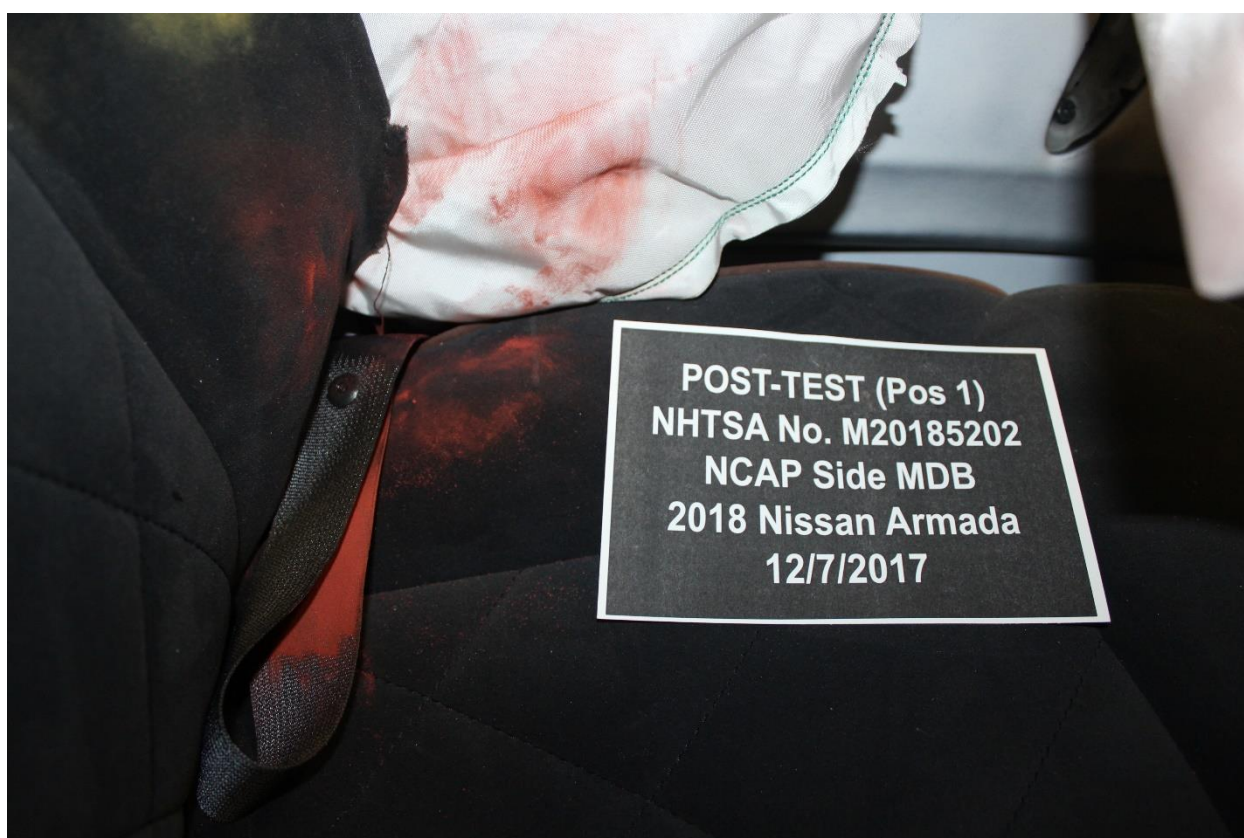


Figure A-52: Post-Test Driver Dummy Close-Up Pelvis Contact View

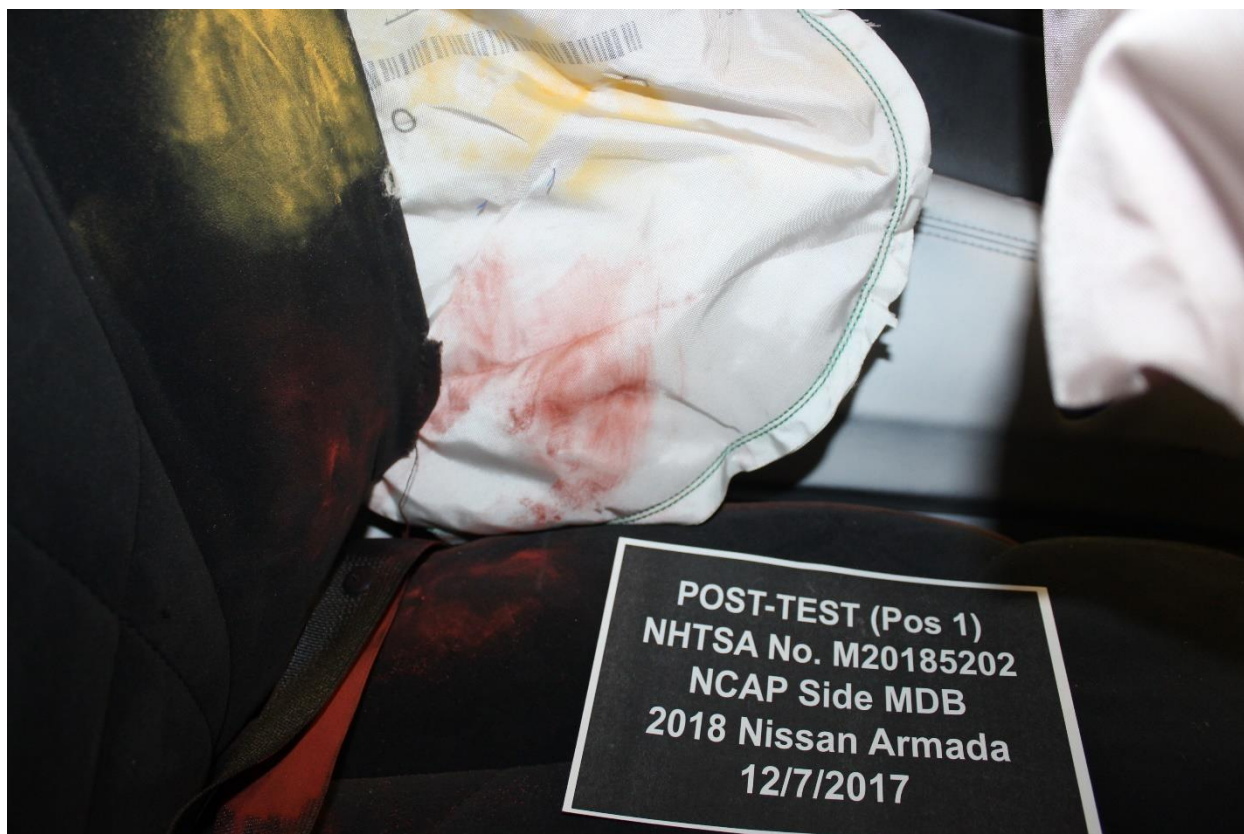


Figure A-53: Post-Test Driver Dummy Close-Up Pelvis Contact with Side Airbag View

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



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



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



Figure A-57: Post-Test Left Side View of 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

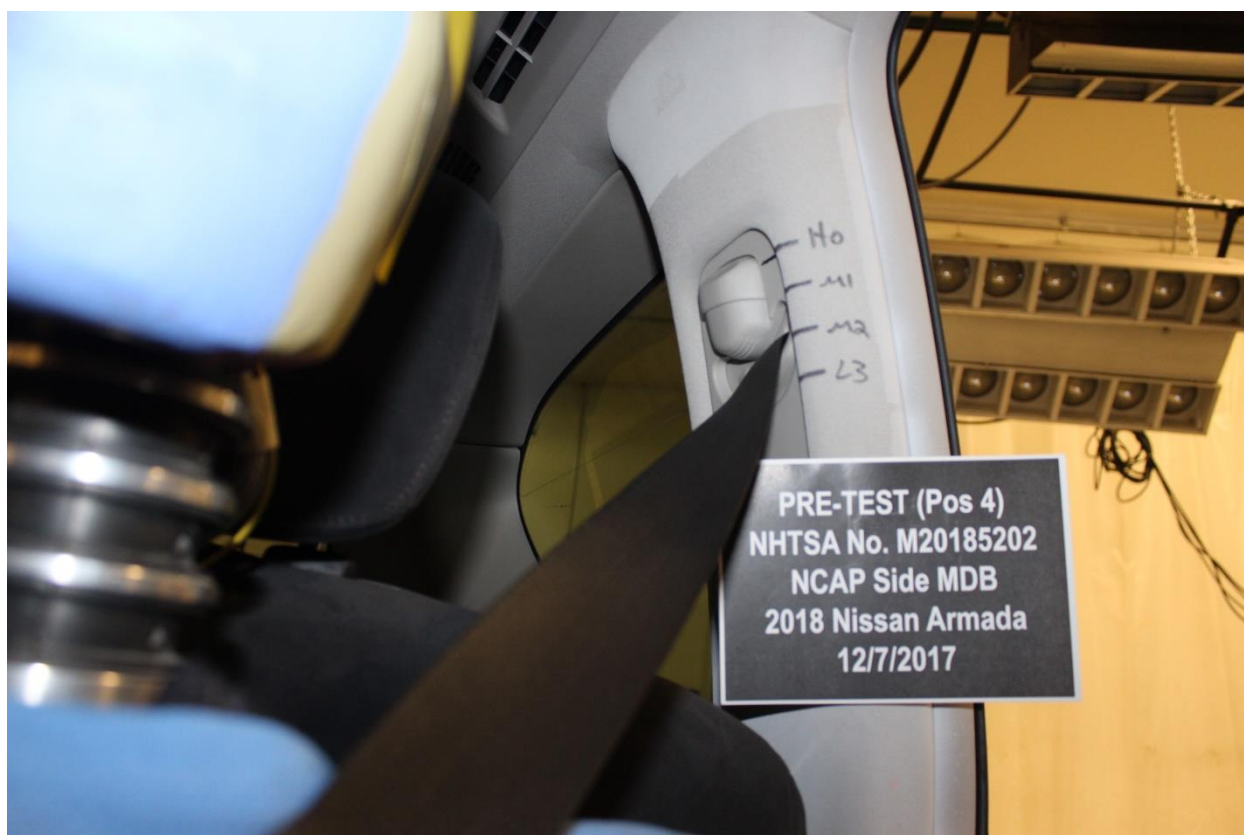


Figure A-65: Pre-Test View of Belt Anchorage for Rear Passenger Dummy



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 Passenger Dummy and Door Clearance View



Figure A-70: Post-Test 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 Passenger Inner Door Panel View



Figure A-74: Post-Test Passenger Inner Door Panel View



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 Airbag 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 Airbag 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 Airbag View



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



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



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



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



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



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



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



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

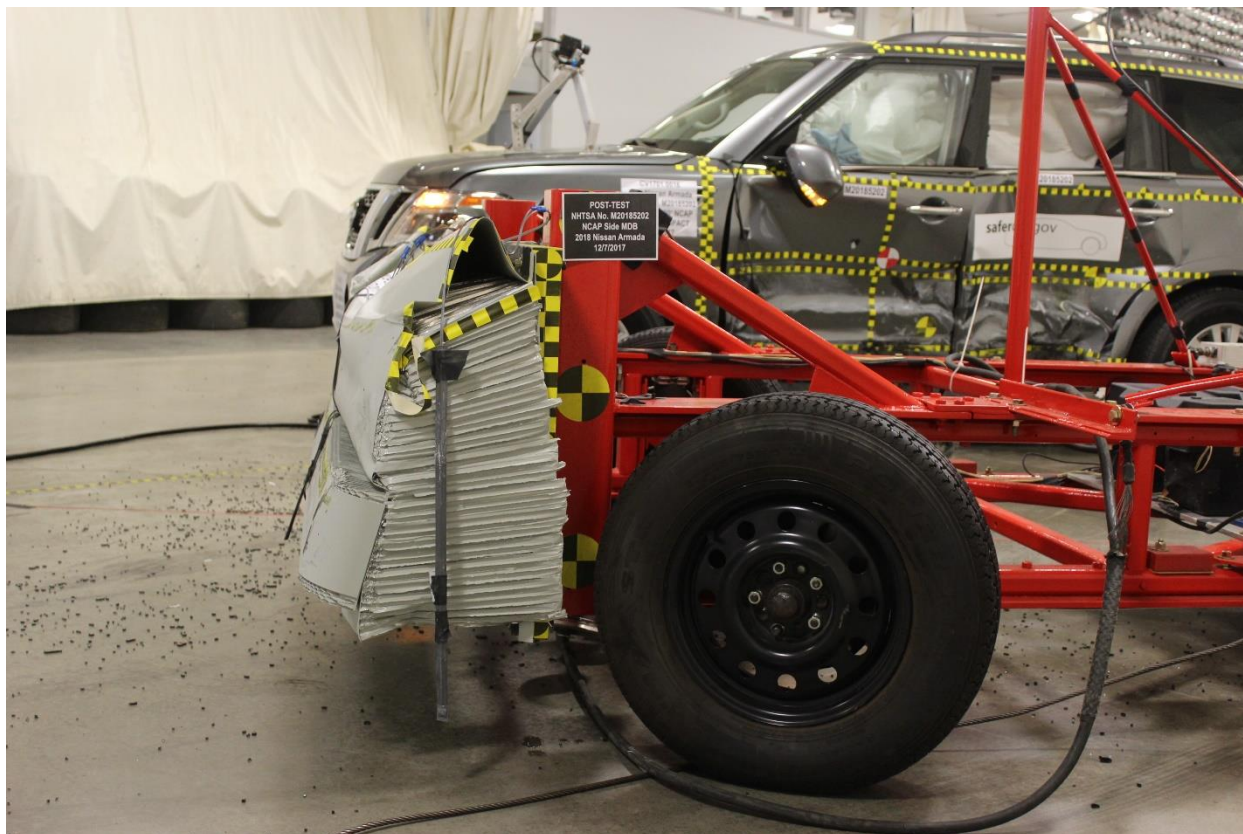


Figure A-89: Post-Test Left Side View of MDB Impactor Face



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



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



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



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

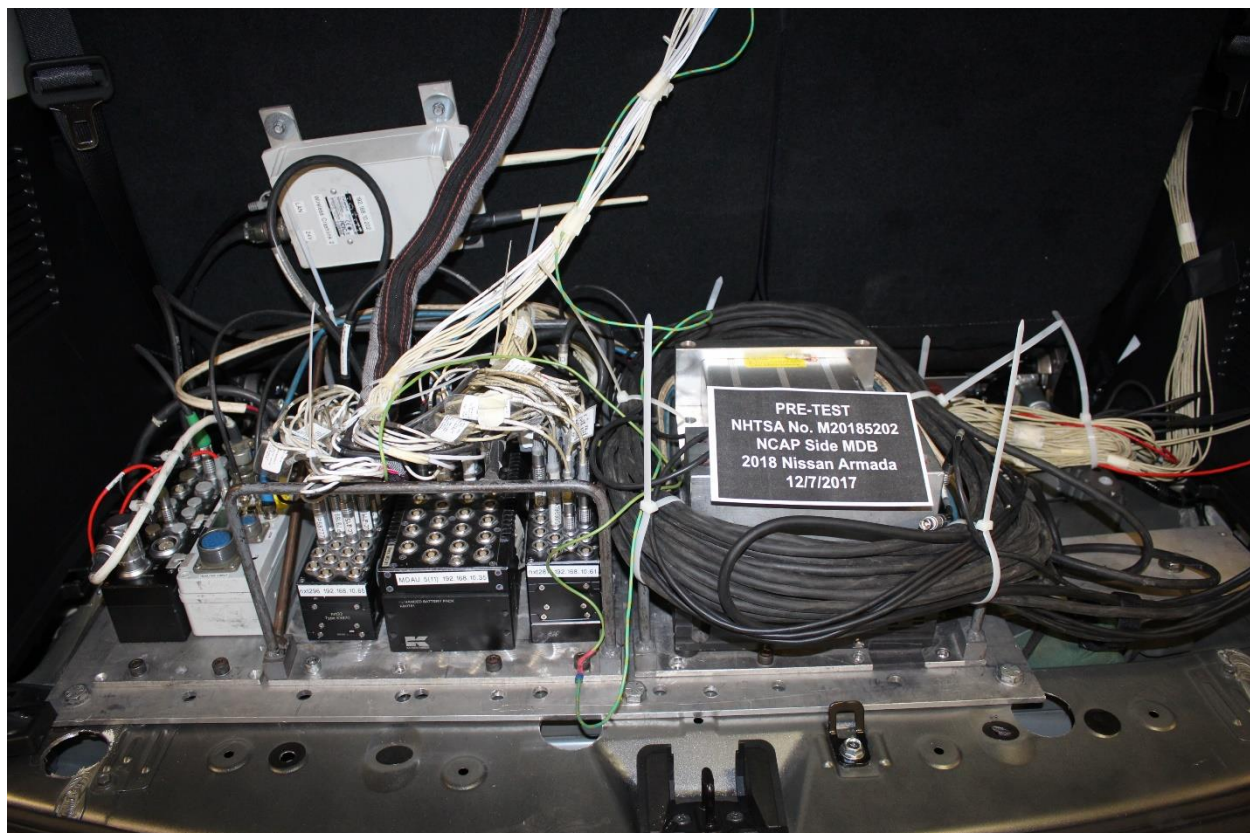


Figure A-94: Pre-Test Ballast View



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



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



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



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



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



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



Figure A-101: Impact Event

2018 NISSAN ARMADA

SV 2WD

Scan QR code for general model information & options

Standard Equipment Included at No Extra Charge

MECHANICAL & PERFORMANCE

- 5.6-Liter Endurance® V8 Engine
- 100-hp Torque-on-Demand 4x4
- 7-speed Automatic Transmission
- Independent Double-Wishbone Suspension
- Front and Rear Ventilated Disk Brakes
- Hi Start Assist
- 18" Alloy Wheels

SAFETY & SECURITY

- Driver & Front Passenger, Side-impact & Curtain Airbags
- Lower Anchors & Tethers for Children (LATCH)
- Vehicle Dynamic Control (VDC)
- With Traction Control System (TCS)
- 4-Wheel Anti-Lock Braking System (ABS)
- Electronic Brake Force Distribution (EBD)
- Tire Pressure Monitoring System (TPMS)
- Vehicle Security System (VSS)
- Nissan Anti-Theft System (NATS)

COMFORT & CONVENIENCE

- 10-Way Power Driver Seat
- including 2-Way Power Lumbar Support
- 6-Way Power Front Passenger Seat
- including 2-Way Power Lumbar Support
- Heated Driver and Front Passenger Seats
- 60/40 Split Fold-Down Rear Seats
- Intelligent Key with Push Button Start
- Leather-Wrapped Steering Wheel
- Leather-Wrapped Shift Knob
- Cruise Control
- 13 Speaker Bose® Premium Audio System
- with AM/FM/SXM/CD/MP3 Aux
- 4 USB Ports
- 2 Charge Only
- 2 Charge with iPod/Connectivity

COMFORT & CONVENIENCE CONT.

- Nissan Navigation System*
- 8" Color Display with Multi-Touch Control
- Bluetooth® Hands-free Phone System
- Hands-free Text Messaging Assistant**
- HD Radio** Technology
- SiriusXM® Satellite Radio*
- SiriusXM Traffic and Travel Link-
- Navigation® Services
- Powered by SiriusXM®
- Dual Zone Automatic A/C with Microfilter
- Rear A/C with Rear Controls
- (2) 12-Volt Power Outlets
- Power Windows w/ One Touch Up/Down
- Front and Rear Sunroof System
- RearView Monitor
- Rear Defroster and Rear Intermittent Wipers

EXTERIOR

- Automatic On/Off Headlights
- Side, Back and Rear Window Privacy Glass
- Electric Folding and Heated Outside Mirror
- with Turn Signal Indicator
- Dark Painted Roof Rails, Side Step Rails, and Overlanders

Manufacturer's Suggested Retail Base Price: \$45,600.00

Options Included by Manufacturer

- CARPETED FLOOR MATS**
Carpeted Floor Mats (3-row) 310.00
- CARGO PACKAGE**
Cargo Area Protector
Cargo Net
First Aid Kit
DRIVER PACKAGE
Front Fog Lights
Auto-Dimming Interior Rear View Mirror
w/ Homelink® Universal Transceiver
Power Folding 60/40 3rd Row Seat
Power Liftgate 600.00
- DESTINATION CHARGES** 1,295.00

Total* \$48,030.00

*For more information, see dealer, owner's manual, or www.NissanUSA.com connect/important-information.

EPA DOT Fuel Economy and Emissions

16 MPG
combined city/hwy
6.2 gallons per 100 miles

14 city
19 highway

Annual fuel Cost \$2,250

Price estimate assumes 14.9¢/gal. CO₂ per mile. The best estimate is 2.0 gallons per mile. Producing and distributing fuel also create emissions. Learn more at www.fueleconomy.gov.

Fuel Economy & Greenhouse Gas Rating

1 2 3 4 5

10 Best

Produce greenhouse gas emissions. Learn more at www.fueleconomy.gov.

fuel economy.gov

Calculate personalized estimates and compare vehicles

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score Not Rated

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

Frontal	Driver Passenger	Not Rated
Crash	Crash	Not Rated
Based on the risk of injury in a frontal impact.	Based on the risk of injury in a side impact.	

Side	Front seat	Not Rated
Crash	Crash	Not Rated
Based on the risk of injury in a side impact.		

Rollover	Not Rated
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 1-888-327-4236

DELIVERY

VEHICLE COLORS:
EXT: GUN METALLIC
INT: CHARCOAL

FINAL ASSEMBLY POINT:
LOS ANGELES

TRANSPORT METHOD:
TRUCK

DEALER:
EMPIRE: NISSAN INC.
1377 KETTERING LOOP
OAKTOWN CA
91761

Security+Plus Extended Protection Plan

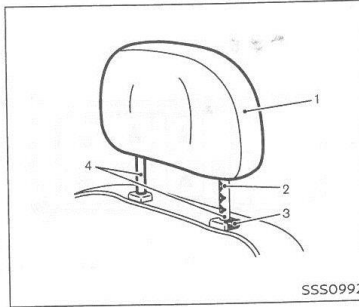
The only service agreement backed by Nissan Extended Services North America!

Ask your dealer for details, or call 1-800-NISSAN-1 for more information

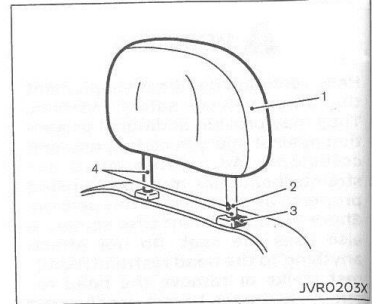
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EMS: 50 STATE EMISSIONS
MDL: 26116-053119 KAO-G
OPT: 9 (S2929021295603)

*Does not include dealer installed options and accessories, local taxes or license fees. This label has been placed on the vehicle for informational purposes only. It is not intended to be used for financing or insurance purposes.

riding in that designated seating position.



- ADJUSTABLE HEAD RESTRAINT/HEADREST COMPONENTS**
1. Removable head restraint/headrest
 2. Multiple notches
 3. Lock knob
 4. Stalks

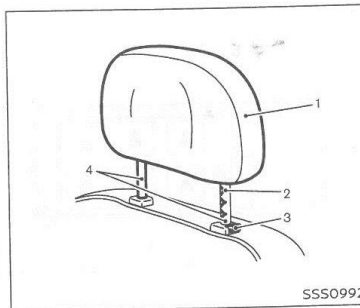


- NON-ADJUSTABLE HEAD RESTRAINT/HEADREST COMPONENTS**
1. Removable head restraint/headrest
 2. Single notch
 3. Lock knob
 4. Stalks

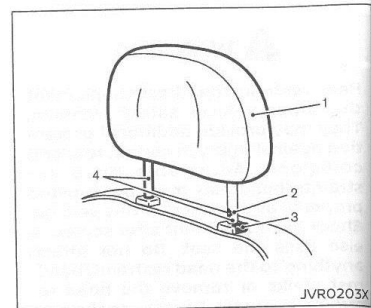
1-16 Safety — seats, seat belts and supplemental restraint system

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

riding in that designated seating position.



- ADJUSTABLE HEAD RESTRAINT/HEADREST COMPONENTS**
1. Removable head restraint/headrest
 2. Multiple notches
 3. Lock knob
 4. Stalks



- NON-ADJUSTABLE HEAD RESTRAINT/HEADREST COMPONENTS**
1. Removable head restraint/headrest
 2. Single notch
 3. Lock knob
 4. Stalks

1-16 Safety — seats, seat belts and supplemental restraint system

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

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Driver & Passenger Dummy Instrumentation Plots

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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.dot.gov.

Additional Driver & Passenger Dummy Instrumentation Data

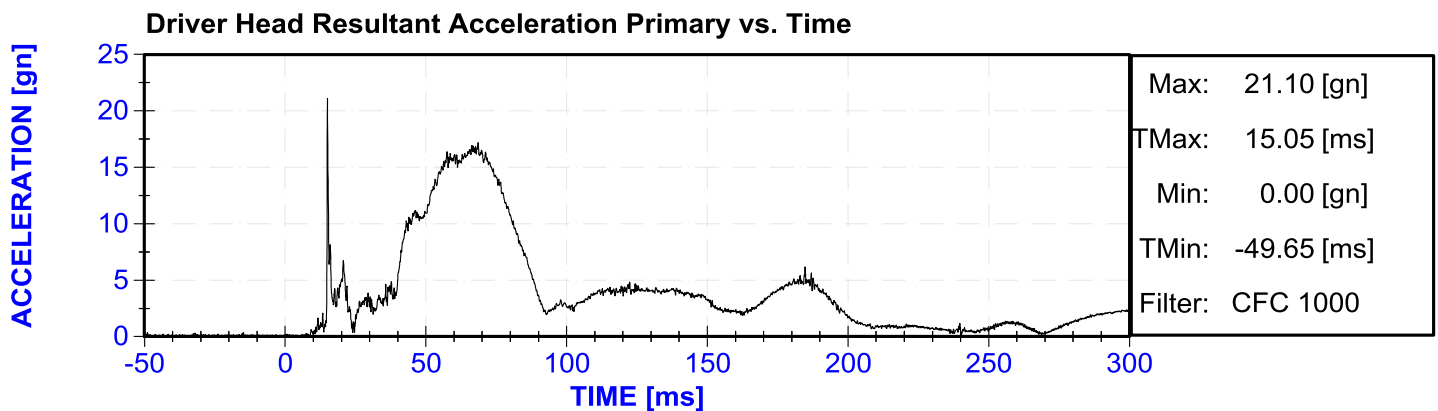
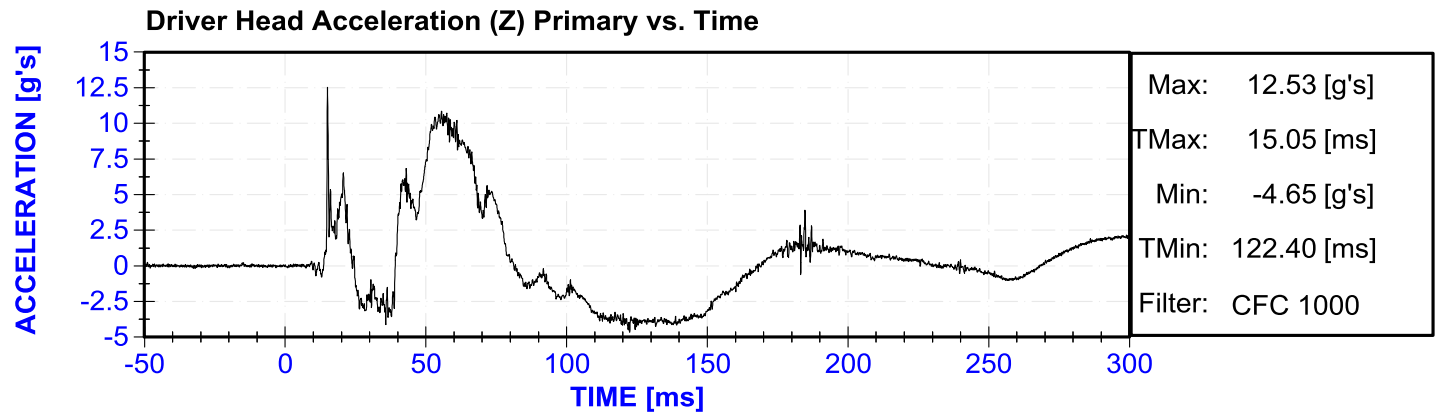
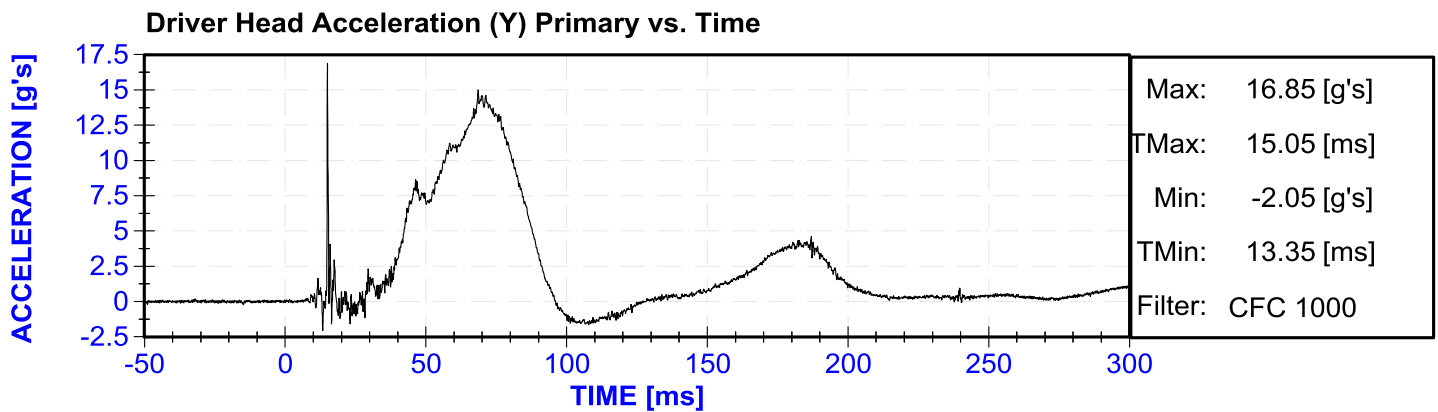
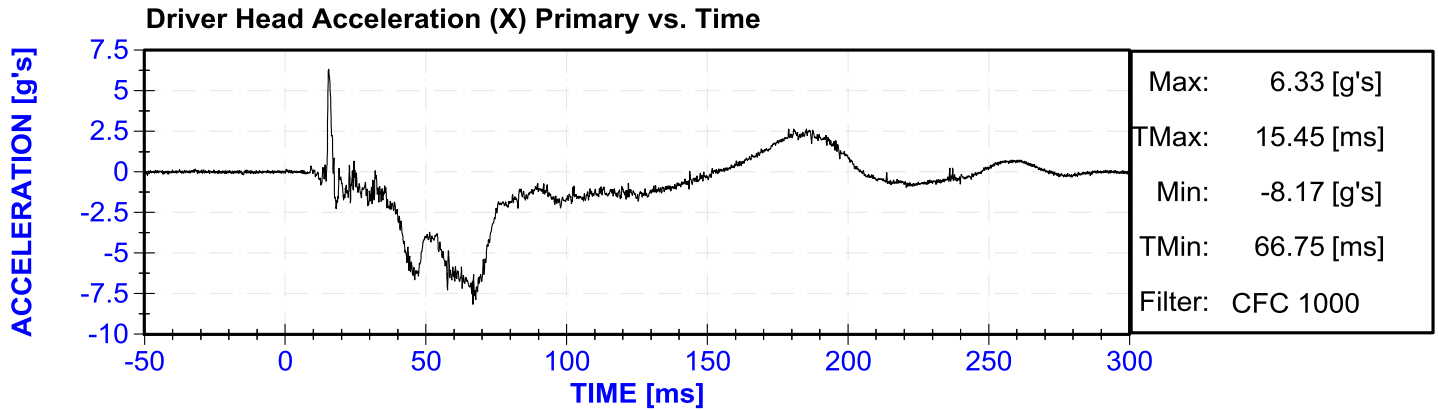
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Driver Lower Spine T12 Acceleration (Y)
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Passenger Lower Thorax Rib Deflection (Y)
Passenger Upper Abdomen Rib Deflection (Y)
Passenger Lower Abdomen Rib Deflection (Y)
Driver Head Acceleration Redundant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

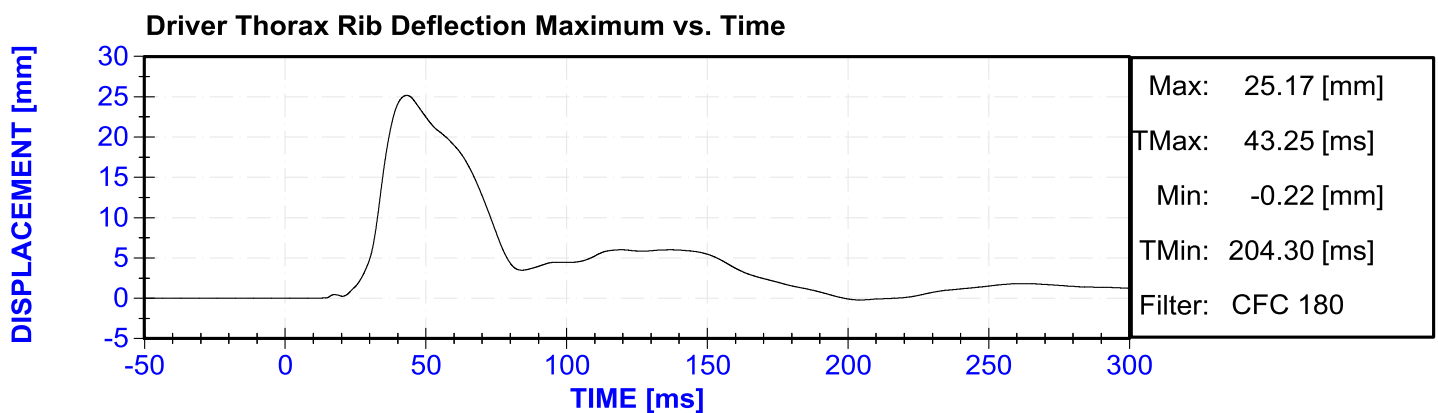
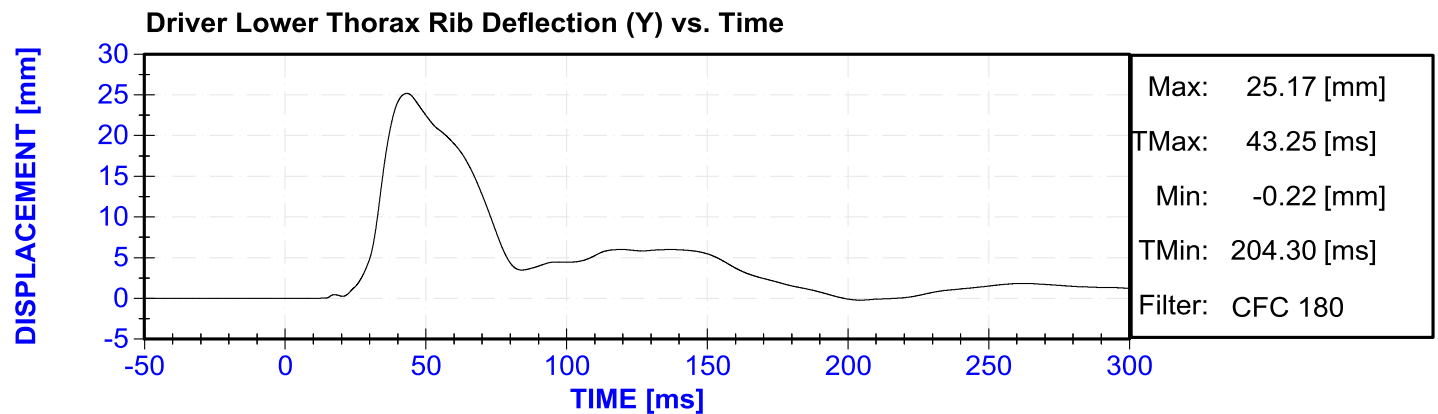
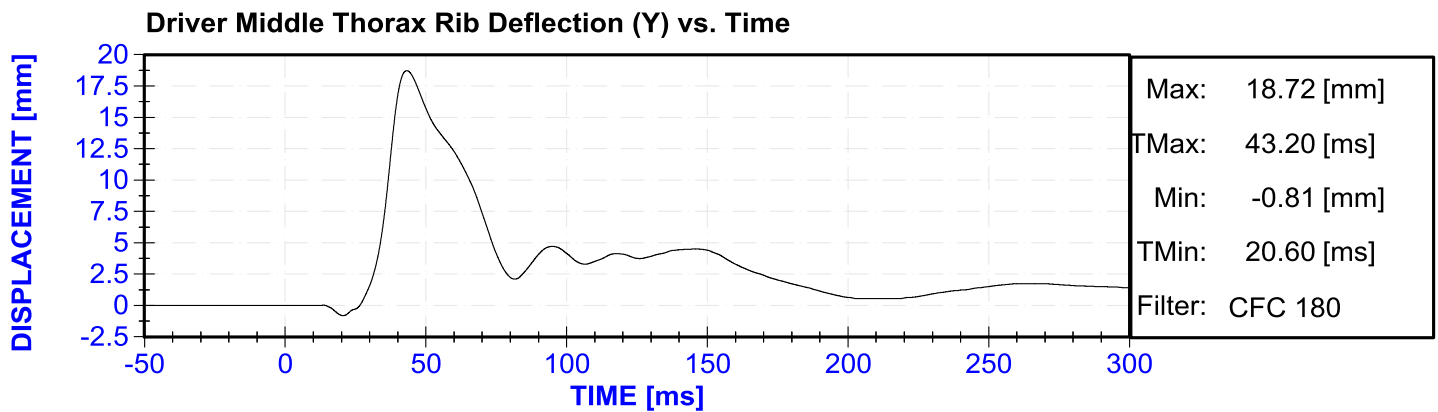
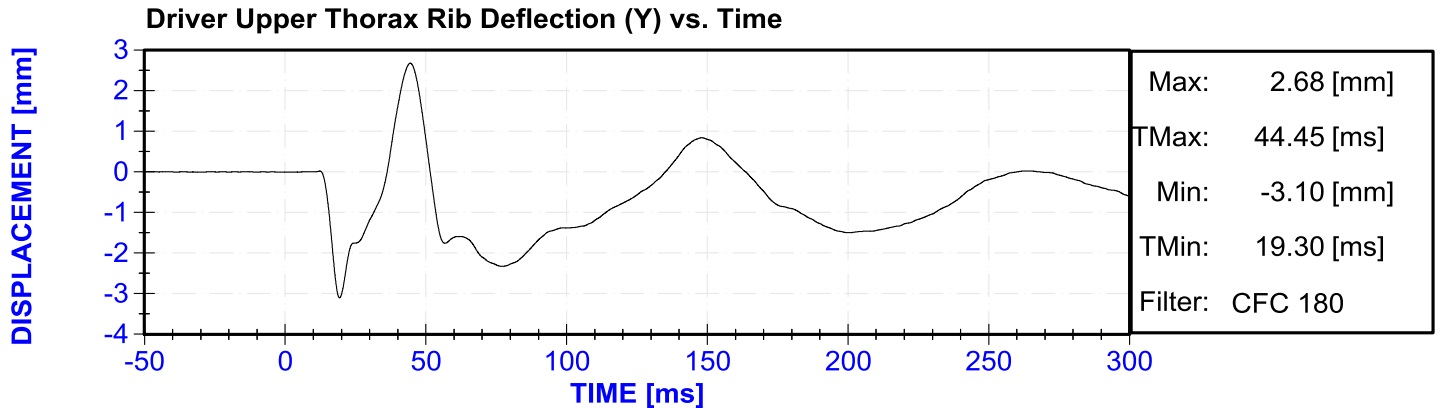
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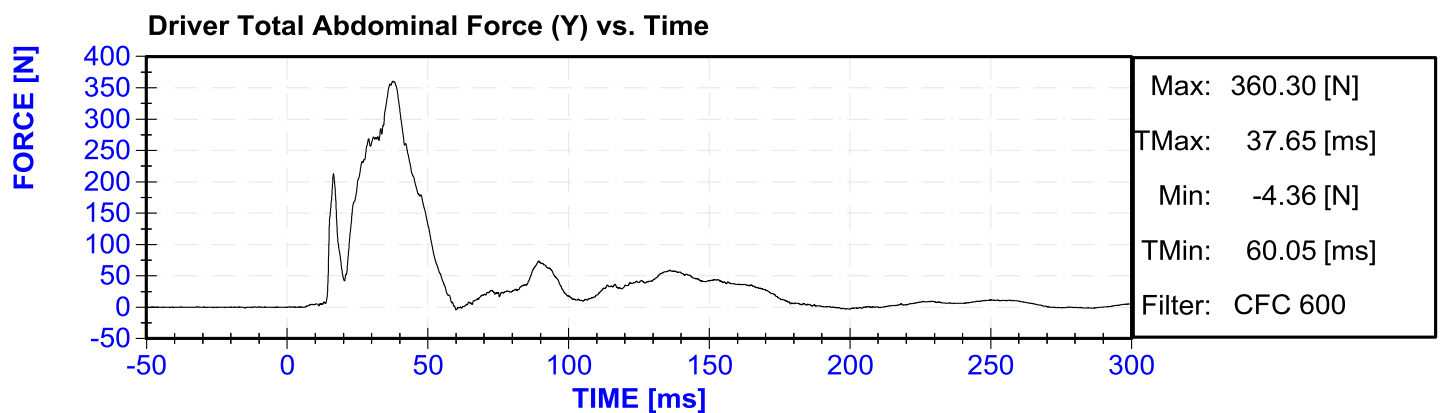
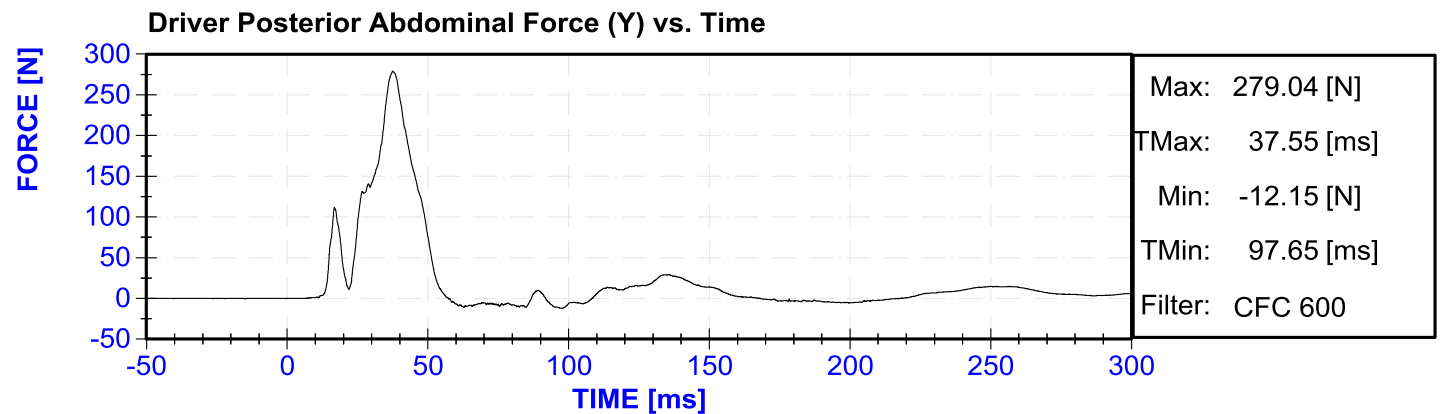
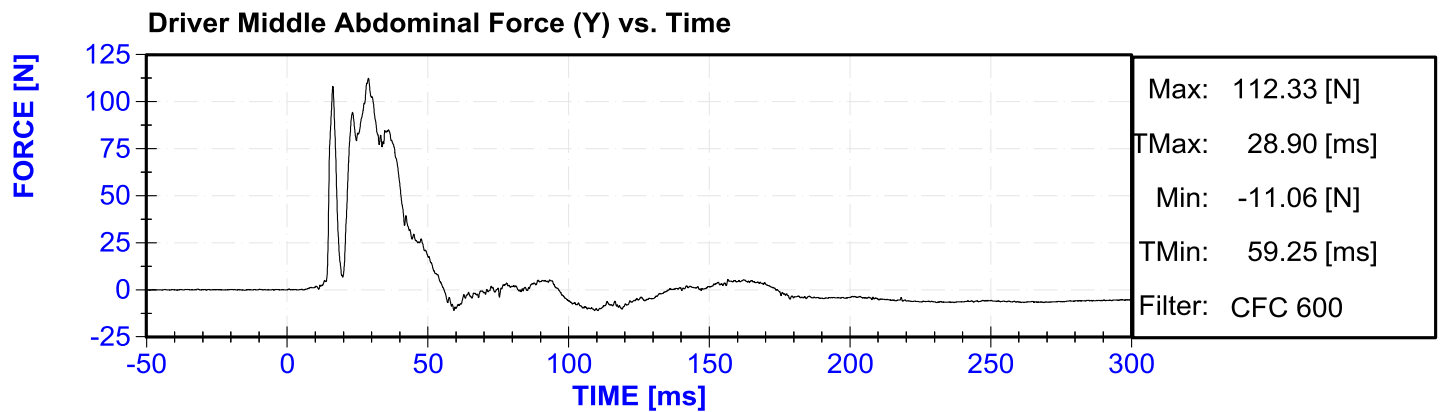
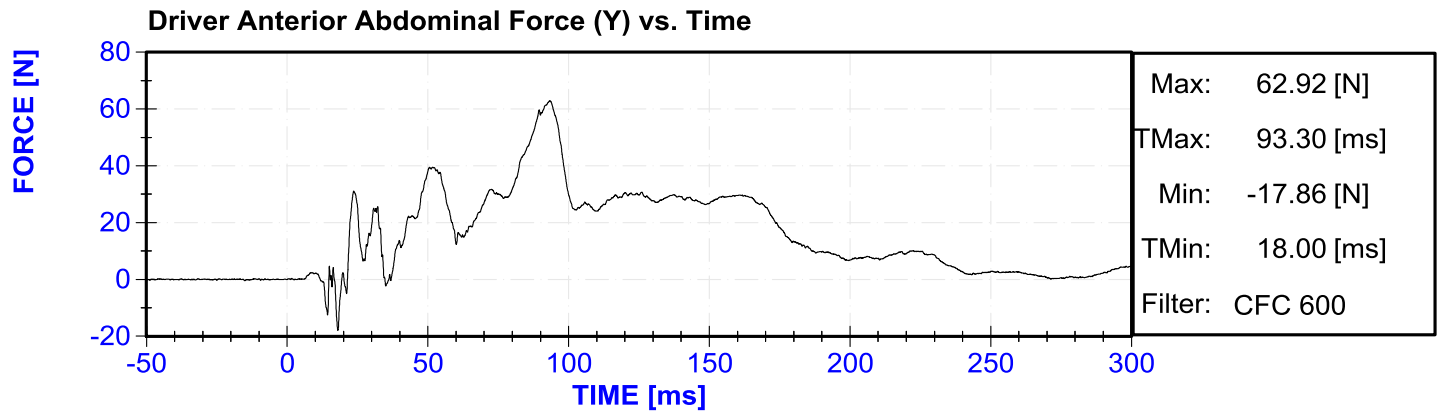
Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Right Side Sill at Front Seat Acceleration (X)
Right Side Sill at Front Seat Acceleration (Y)
Right Side Sill at Front Seat Acceleration (Z)
Right Side Sill at Rear Seat Acceleration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

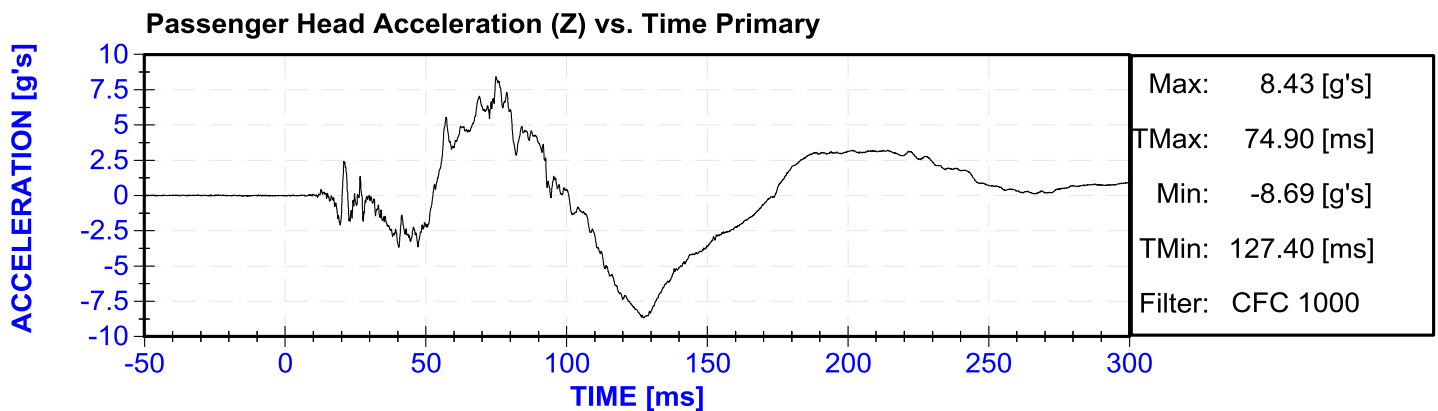
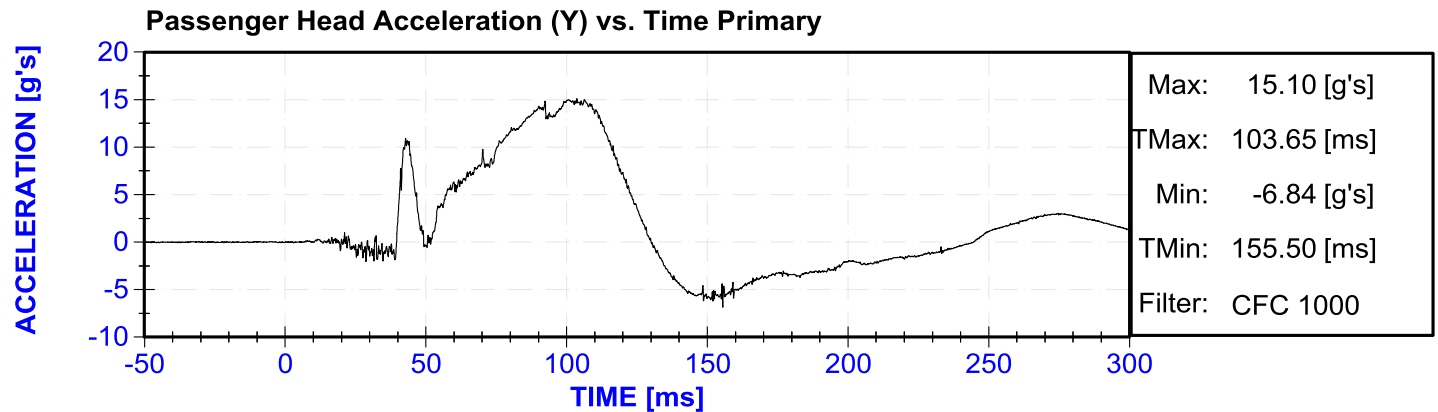
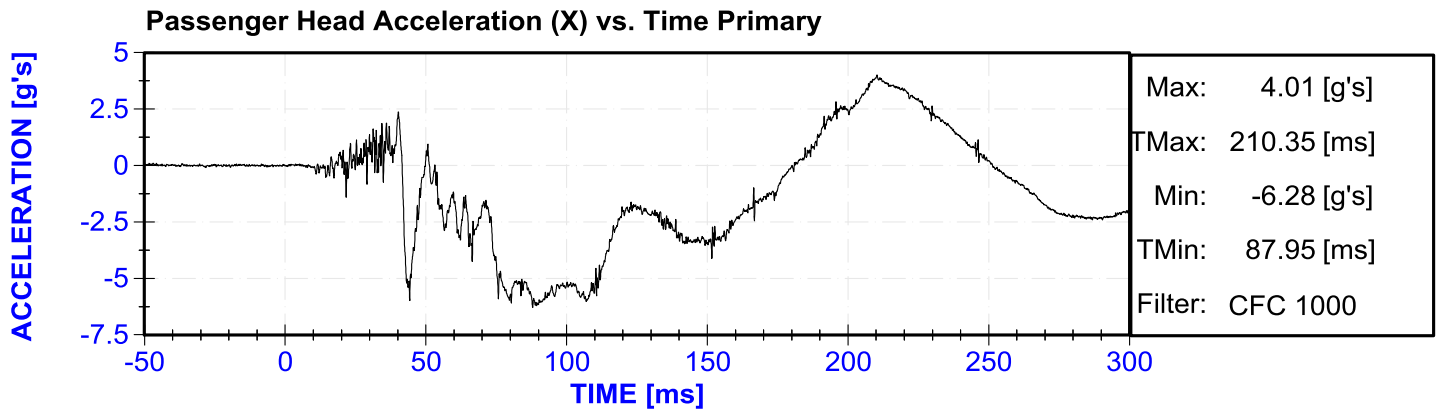
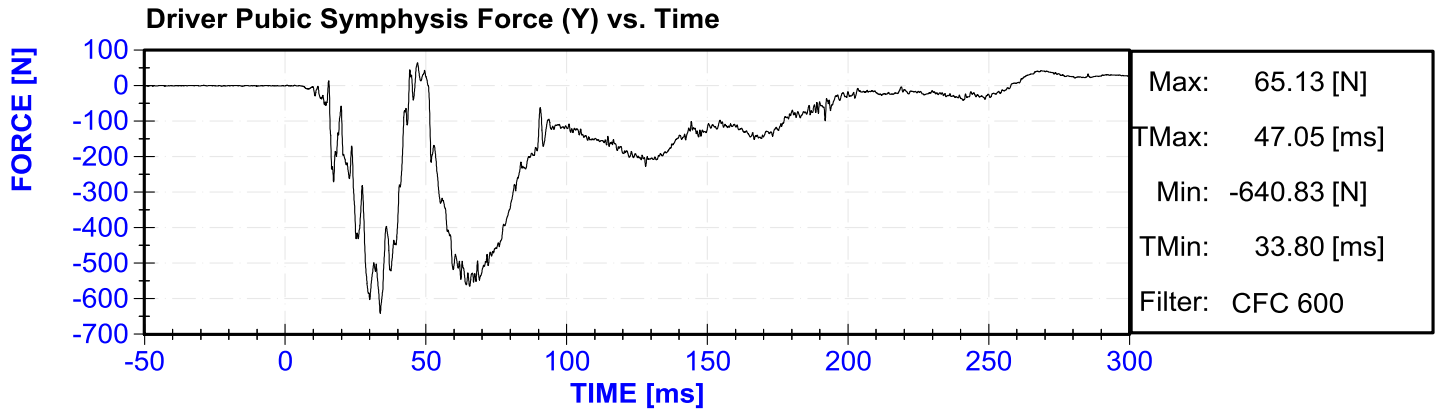
MDB Instrumentation Data

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

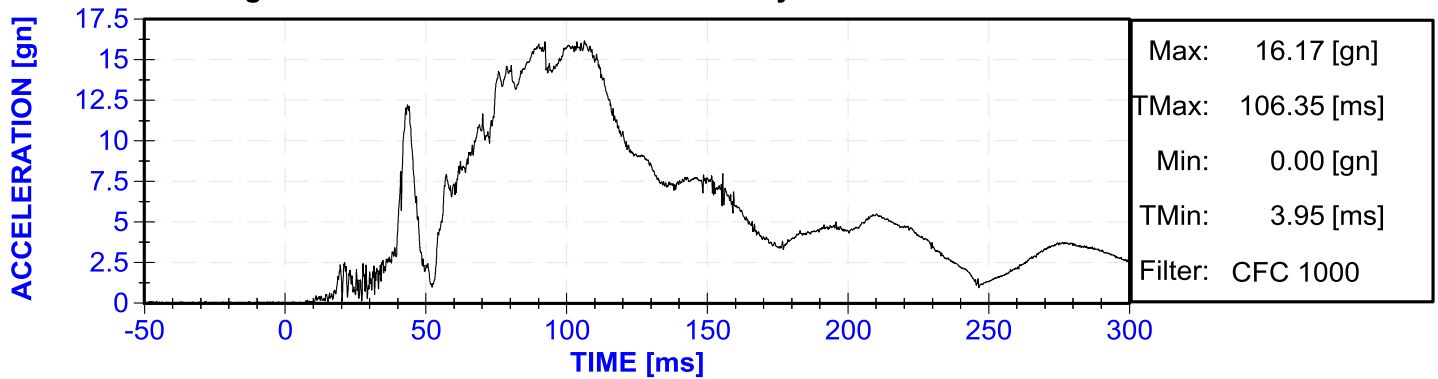




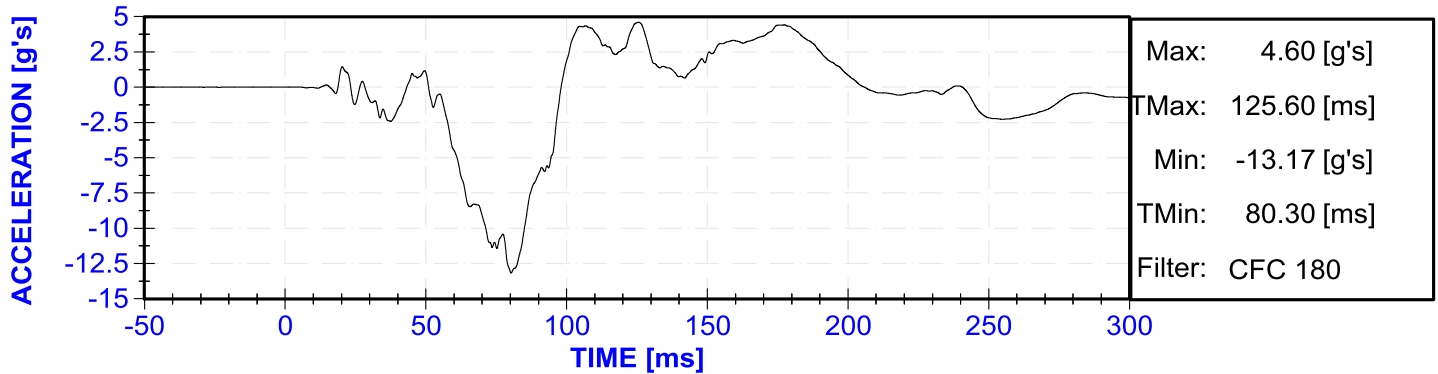




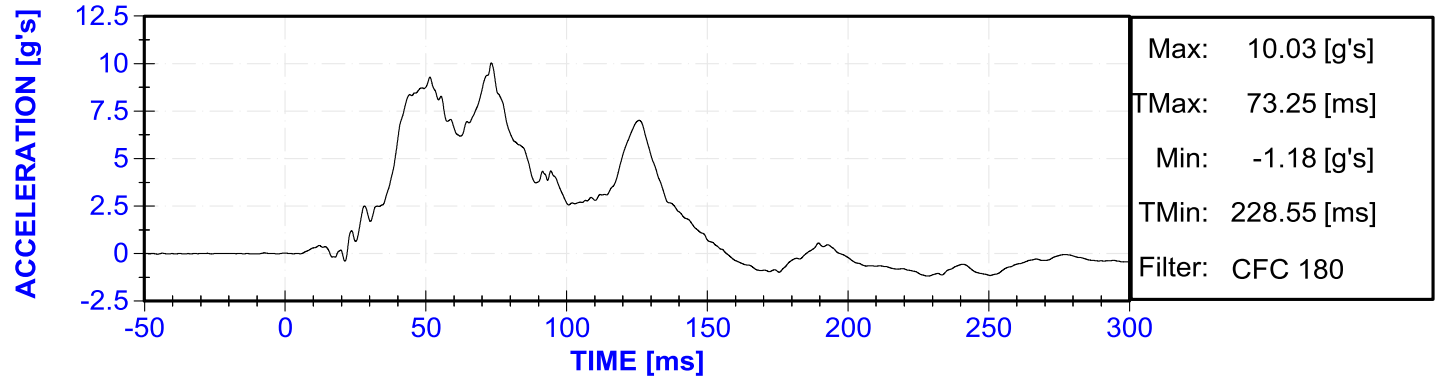
Passenger Head Resultant Acceleration Primary vs. Time



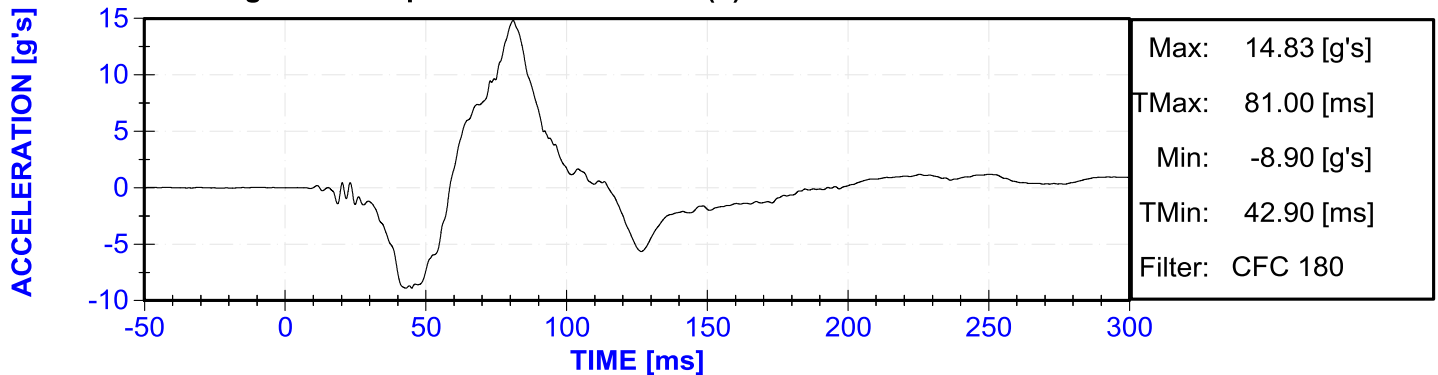
Passenger Lower Spine T12 Acceleration (X) vs. Time

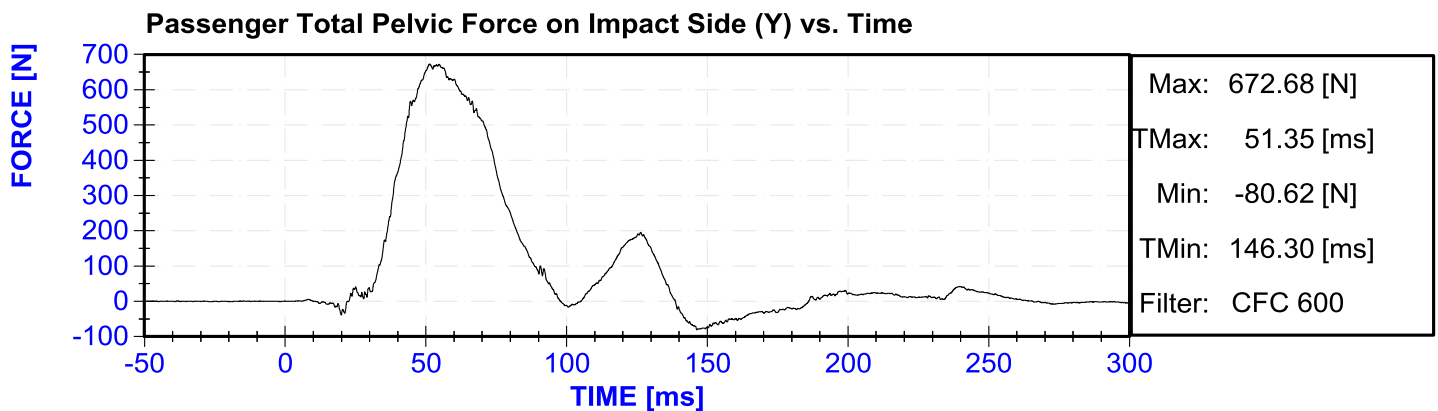
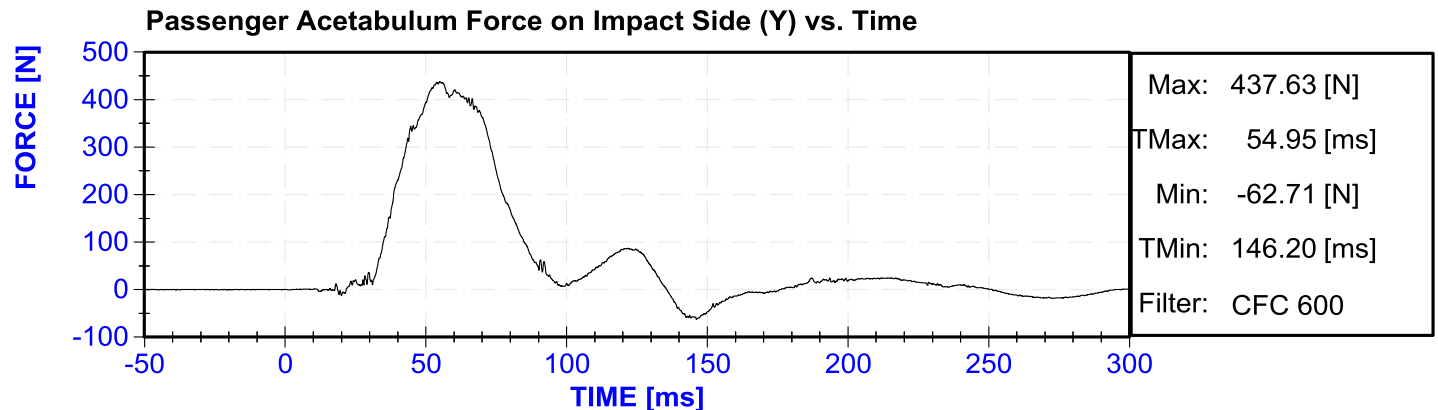
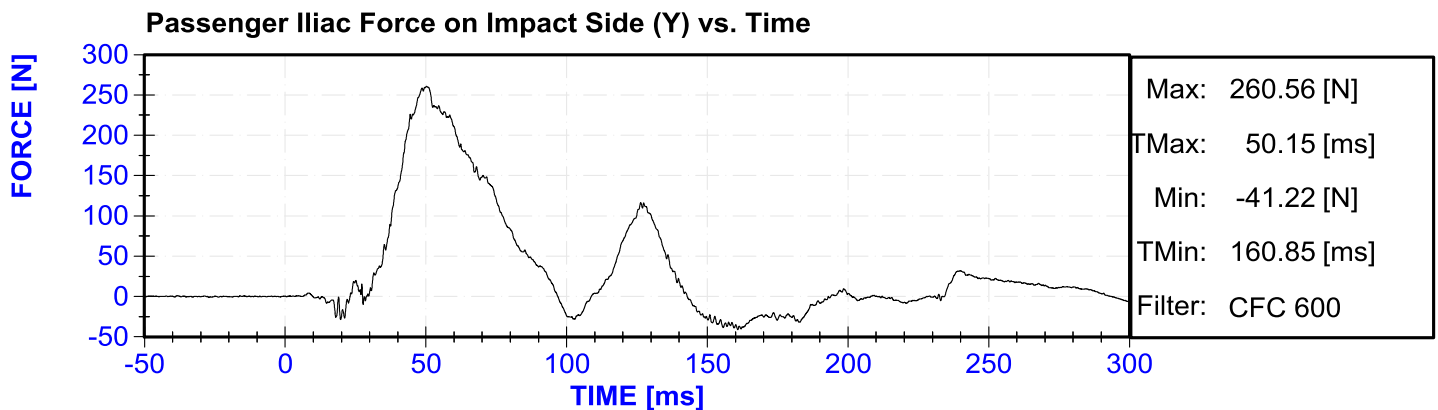
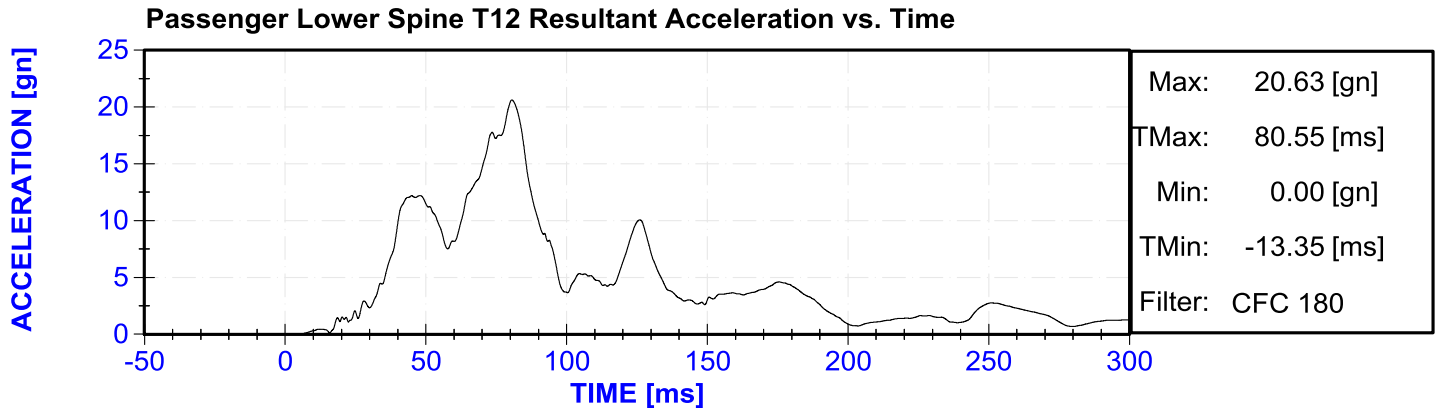


Passenger Lower Spine T12 Acceleration (Y) vs. Time



Passenger Lower Spine T12 Acceleration (Z) vs. Time





APPENDIX C

DUMMY PERFORMANCE CALIBRATION TEST DATA

CALIBRATION TEST RESULTS

PRE-TEST

EUROSID 2 (ES-2RE) MALE – DRIVER ATD

SERIAL NO: F034

(CONFIGURED FOR LEFT SIDE IMPACT)

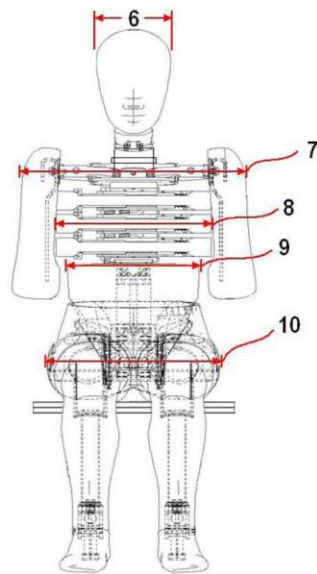


External Measurements - EuroSID-2re

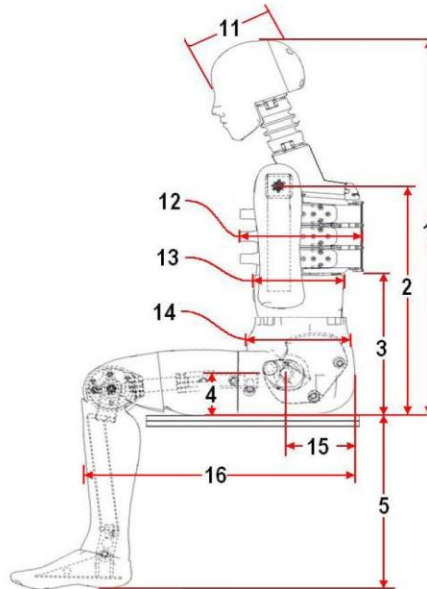
Technician: K. Brogan

Date: 11/15/2017

Dummy Serial Number: F034



FRONT VIEW



SIDE VIEW

Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	913	Pass
2	Seat to Shoulder Joint	558	572	565	Pass
3	Seat to Lower Face of Thoracic Spine Box	346	356	350	Pass
4	Seat to Hip Joint (center of bolt)	97	103	100	Pass
5	Sole to Seat, Sitting	333	451	420	Pass
6	Head Width	152	158	154	Pass
7	Shoulder/Arm Width	461	479	469	Pass
8	Thorax Width	322	332	326	Pass
9	Abdomen Width	273	287	282	Pass
10	Pelvis Lap Width	359	373	367	Pass
11	Head Depth	196	206	202	Pass
12	Thorax Depth	262	272	268	Pass
13	Abdomen Depth	194	204	199	Pass
14	Pelvis Depth	235	245	241	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150	160	154	Pass
16	Back of Buttocks to Front Knee	597	615	600	Pass

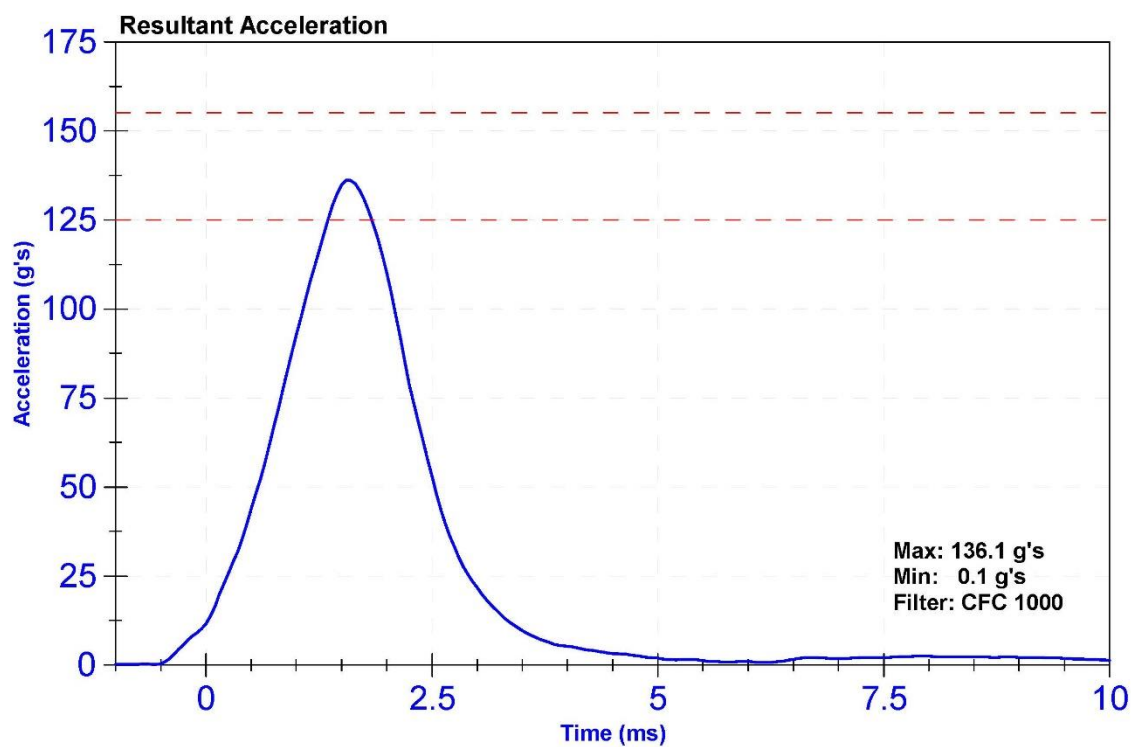
ATD Manufacturer	DP6741	Test Technician	S .Keller
ATD Serial Number	F034	Laboratory Supervisor	M. Goehle

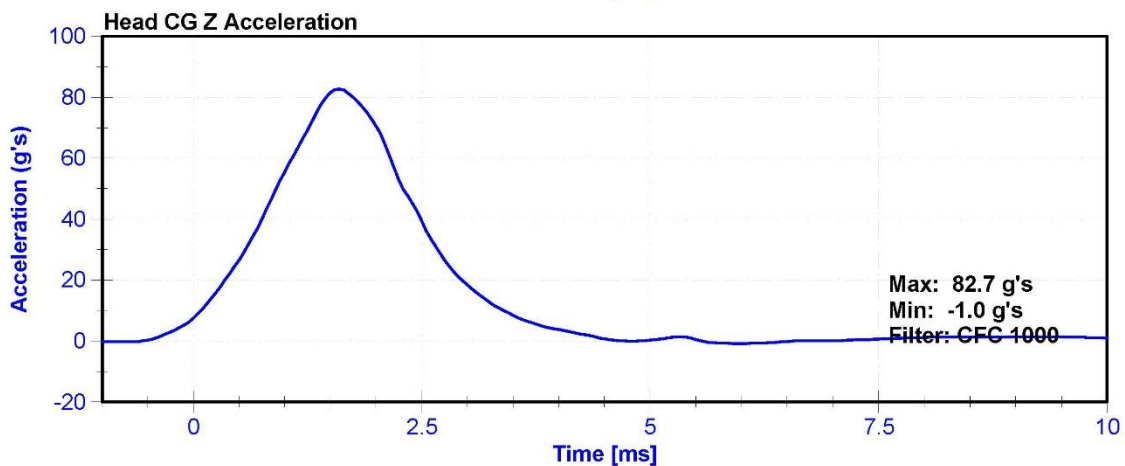
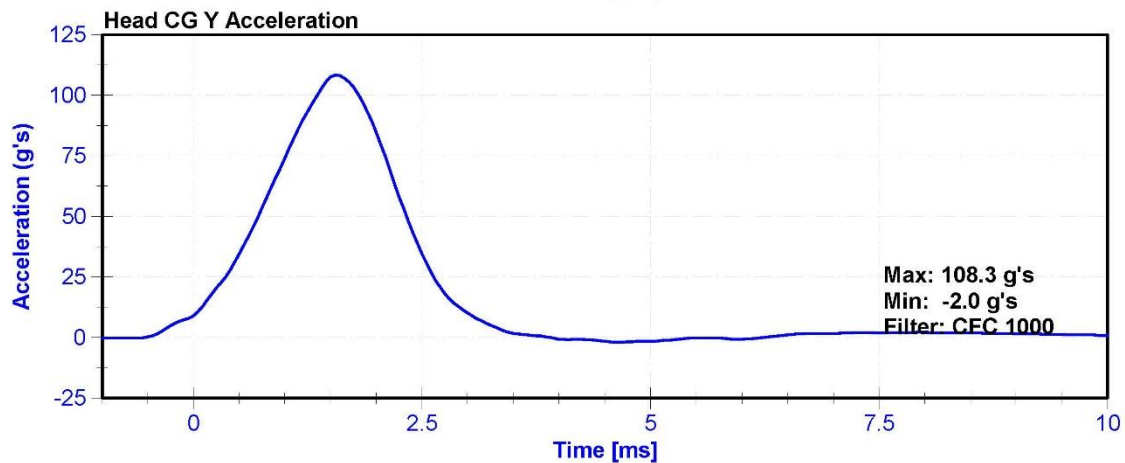
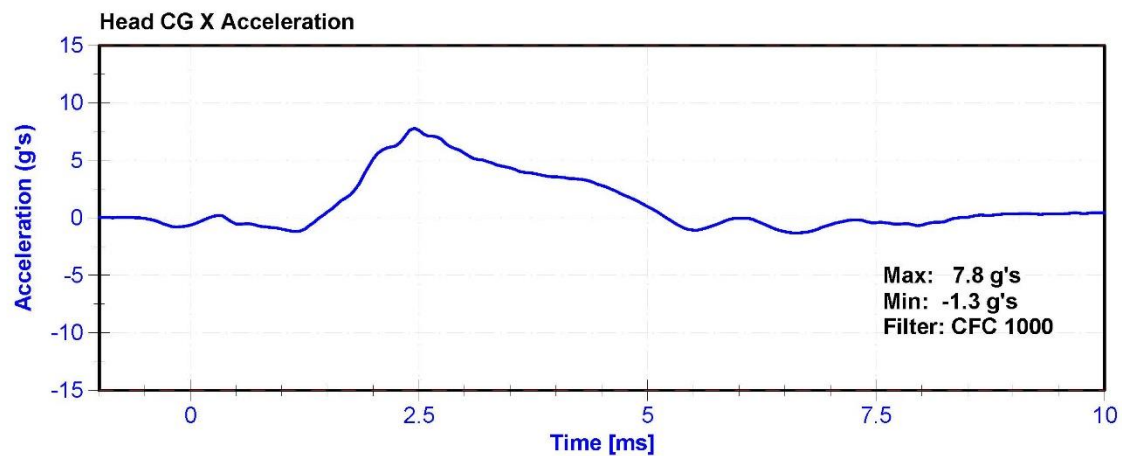
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	34.6	Pass
Resultant Acceleration	125	155	g's	136.1	Pass
Oscillation	0	15	%	1.87	Pass
Fore-Aft Acceleration	-15	15	g's	7.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P58904	10/24/2017	4/24/2018
Y Accelerometer	ENDEVCO 7264CT	AC-P58911	10/24/2017	4/24/2018
Z Accelerometer	ENDEVCO 7264CT	AC-P58776	10/24/2017	4/24/2018





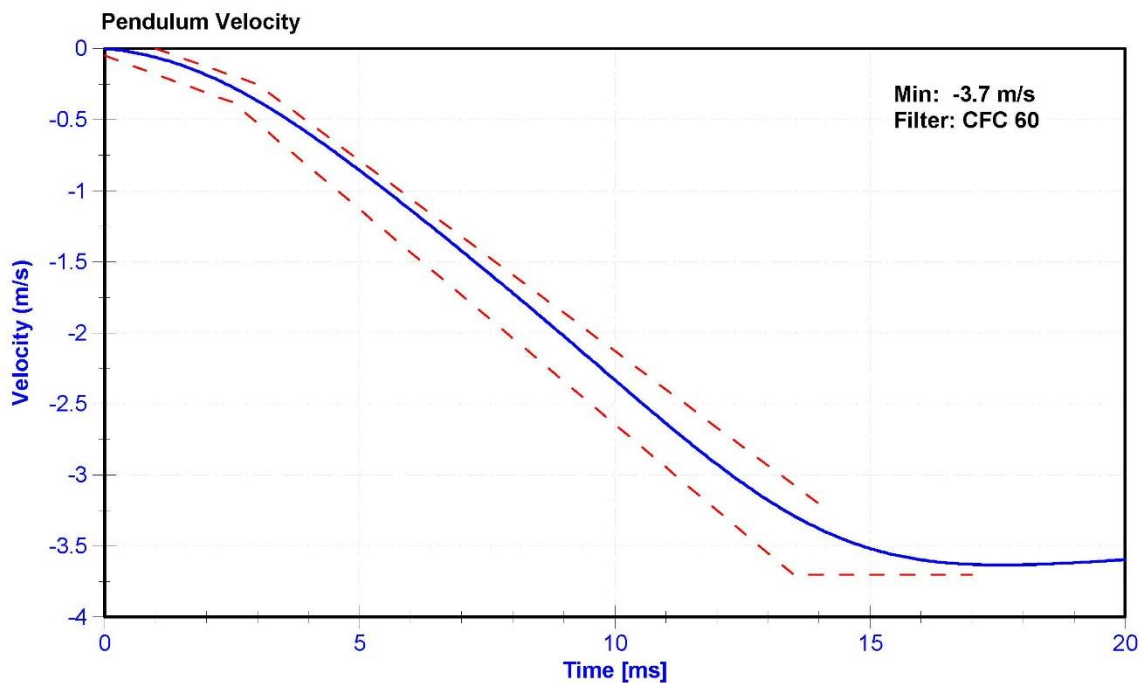
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	F034	Laboratory Supervisor	M. Goehle

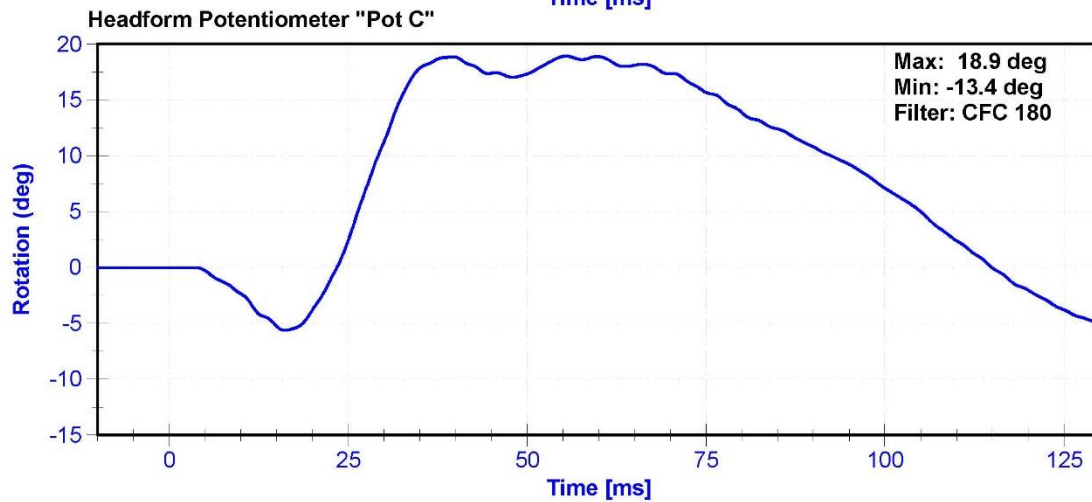
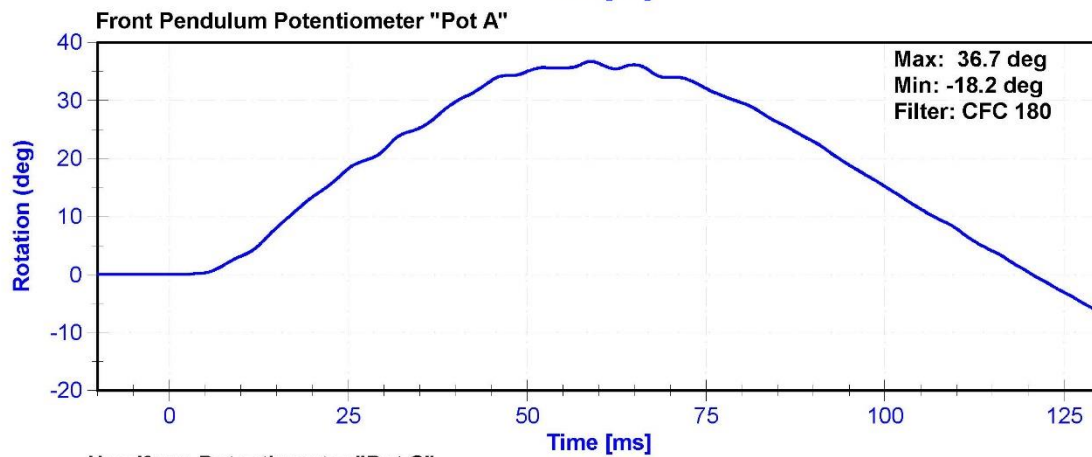
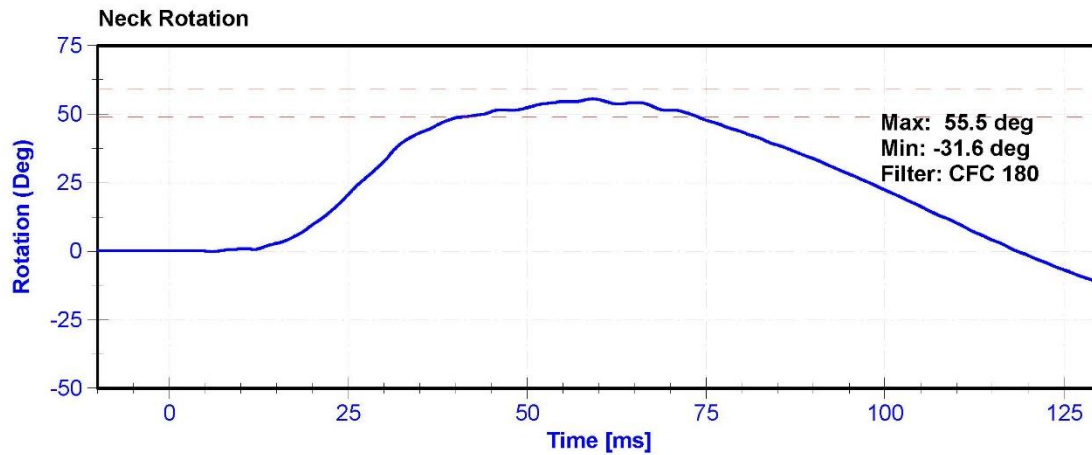
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.1	Pass
Humidity	10	70	%	37.4	Pass
Velocity	3.3	3.5	m/s	3.42	Pass
Lateral Neck Rotation	49	59	deg	55.5	Pass
Time at Maximum Rotation	54	66	ms	59.2	Pass
Time of Rotation Decay from Maximum	53	88	ms	59.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/11/2017	5/11/2018
Front Pendulum Potentiometer	SP22G	DS-094	10/30/2017	10/30/2018
Headform Potentiometer	SP22G	DS-095	10/30/2017	10/30/2018





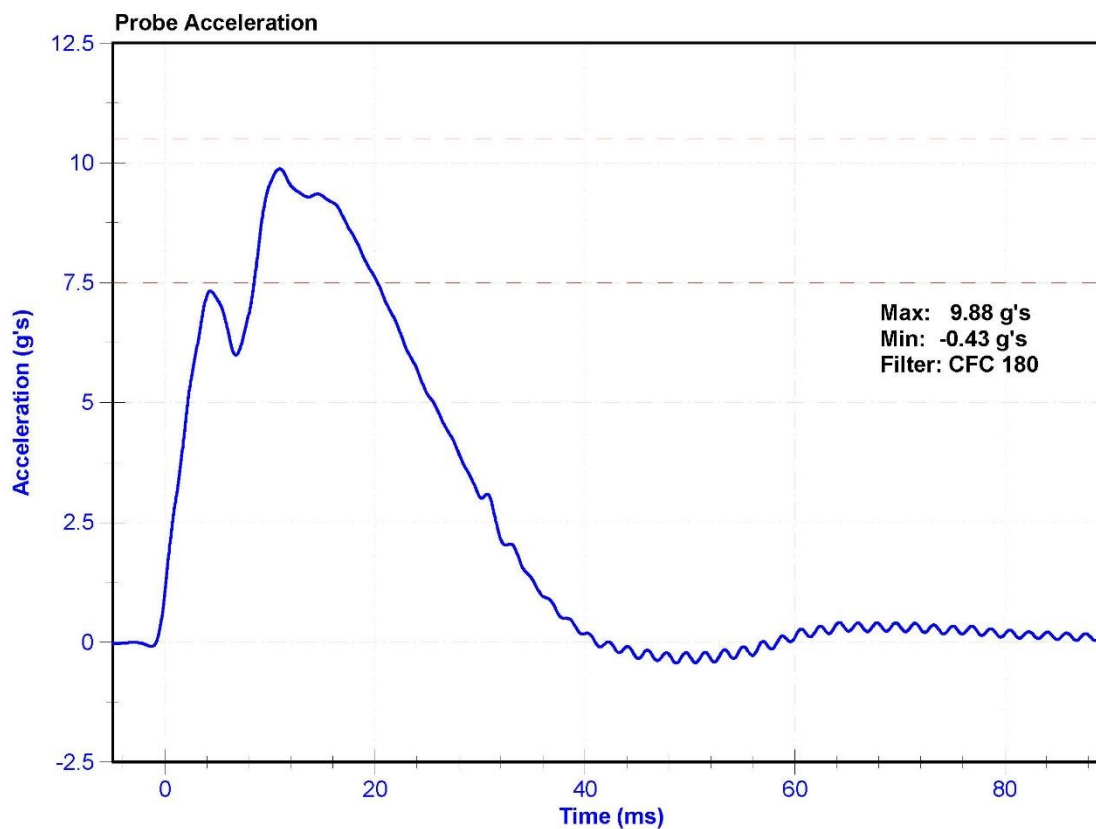
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	F034	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	41.1	Pass
Velocity	4.2	4.4	m/s	4.22	Pass
Probe Acceleration	7.5	10.5	g's	9.88	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	4/17/2018



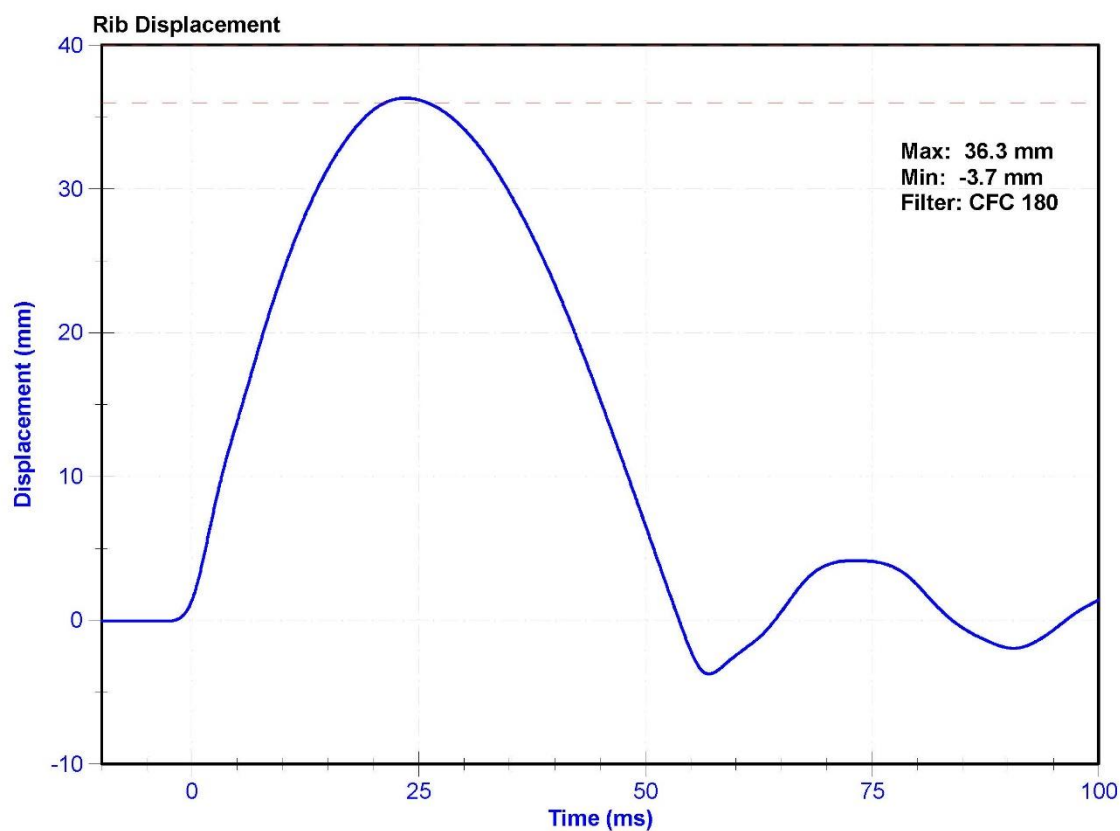
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	F034	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	38.3	Pass
Rib Displacement	36	40	mm	36.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	9/27/2017	9/27/2018



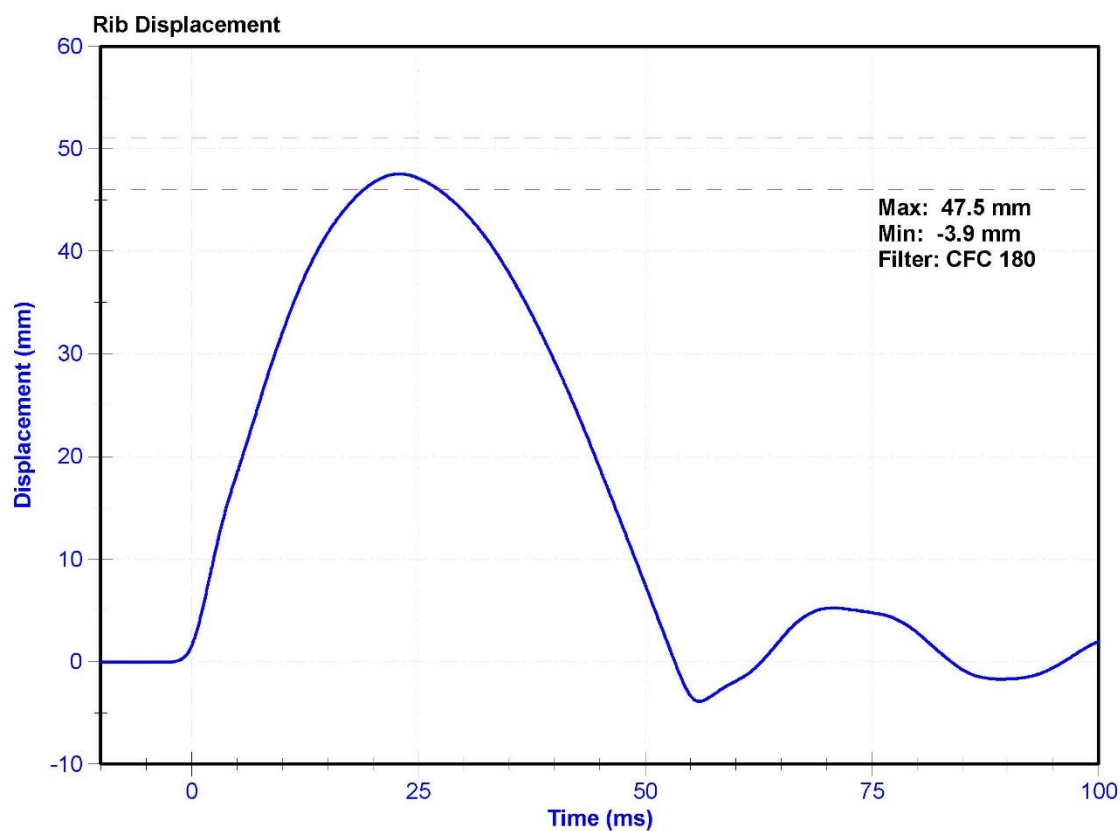
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	F034	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	38.3	Pass
Rib Displacement	46	51	mm	47.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	9/27/2017	9/27/2018



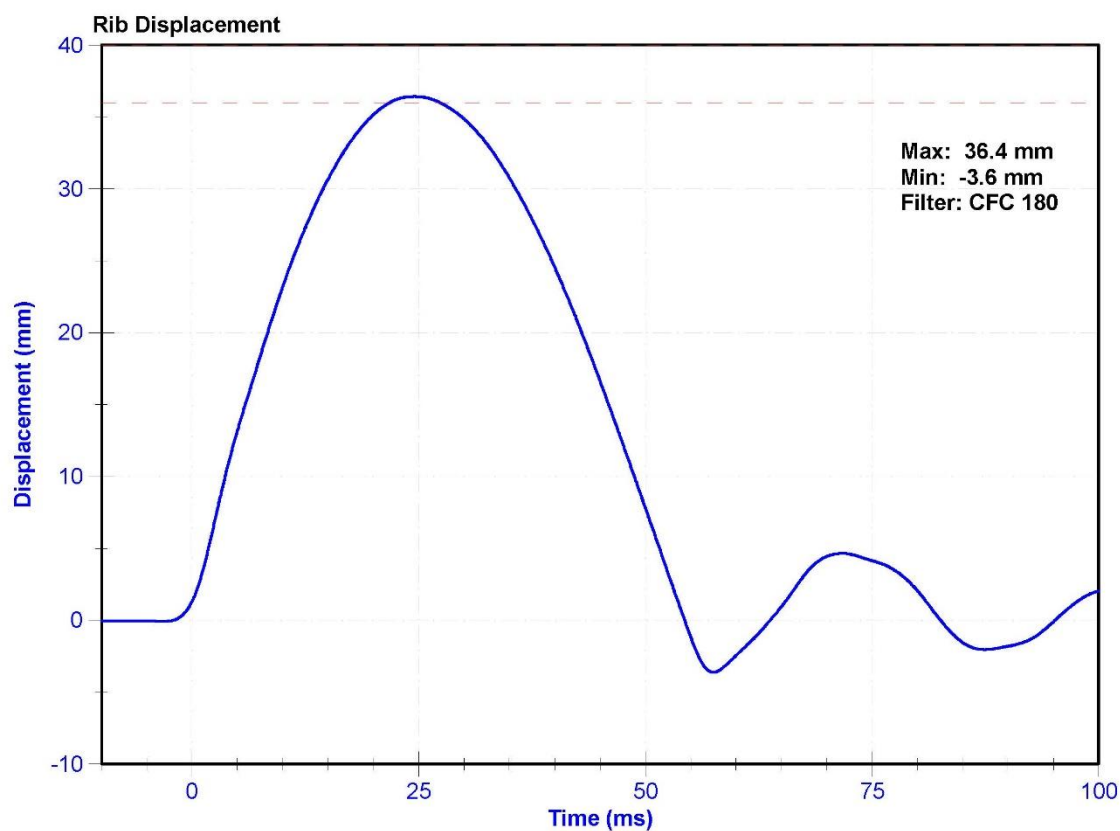
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	F034	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	37.7	Pass
Rib Displacement	36	40	mm	36.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	9/27/2017	9/27/2018



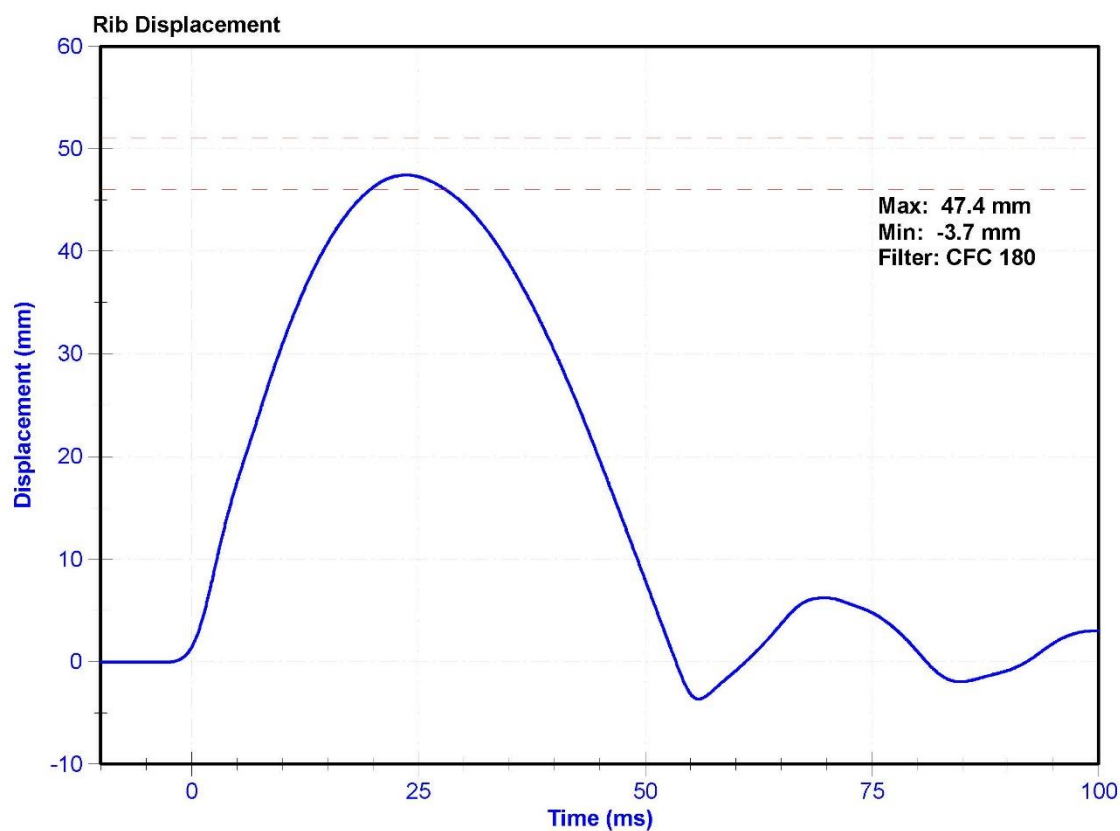
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	F034	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.8	Pass
Humidity	10	70	%	38.1	Pass
Rib Displacement	46	51	mm	47.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	9/27/2017	9/27/2018



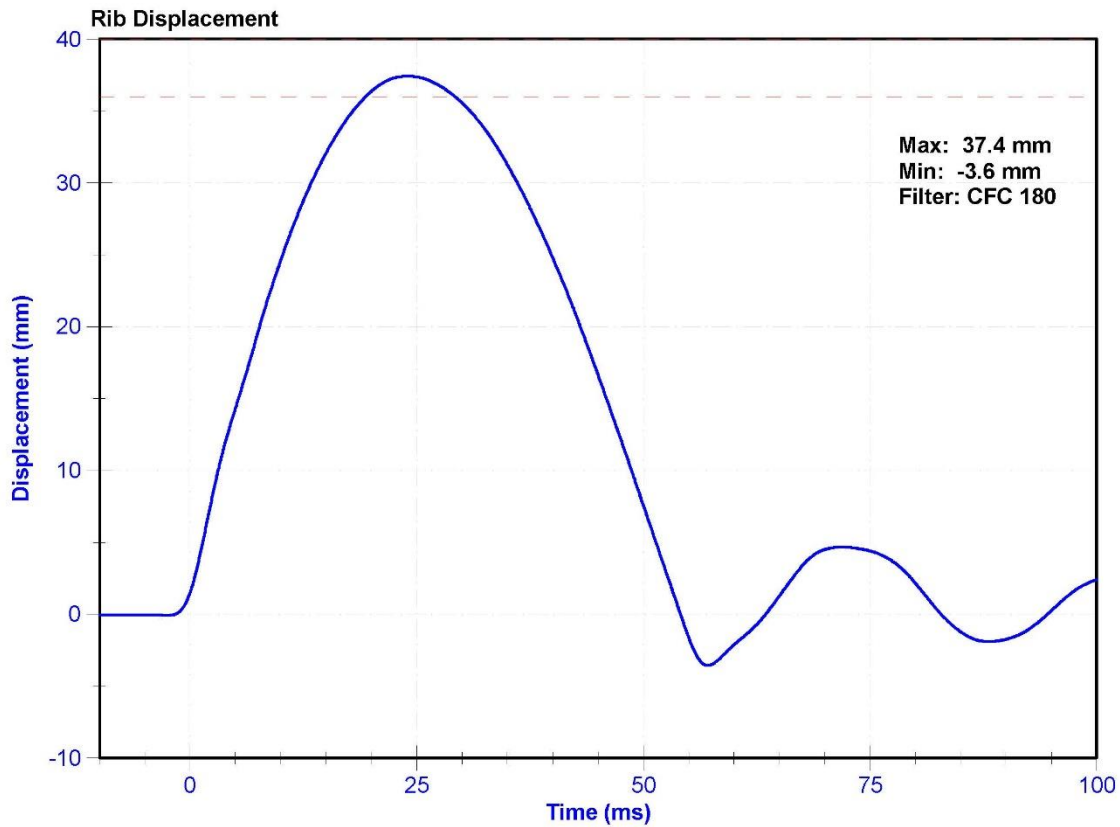
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	F034	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.8	Pass
Humidity	10	70	%	37.8	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-182GFE	9/27/2017	9/27/2018



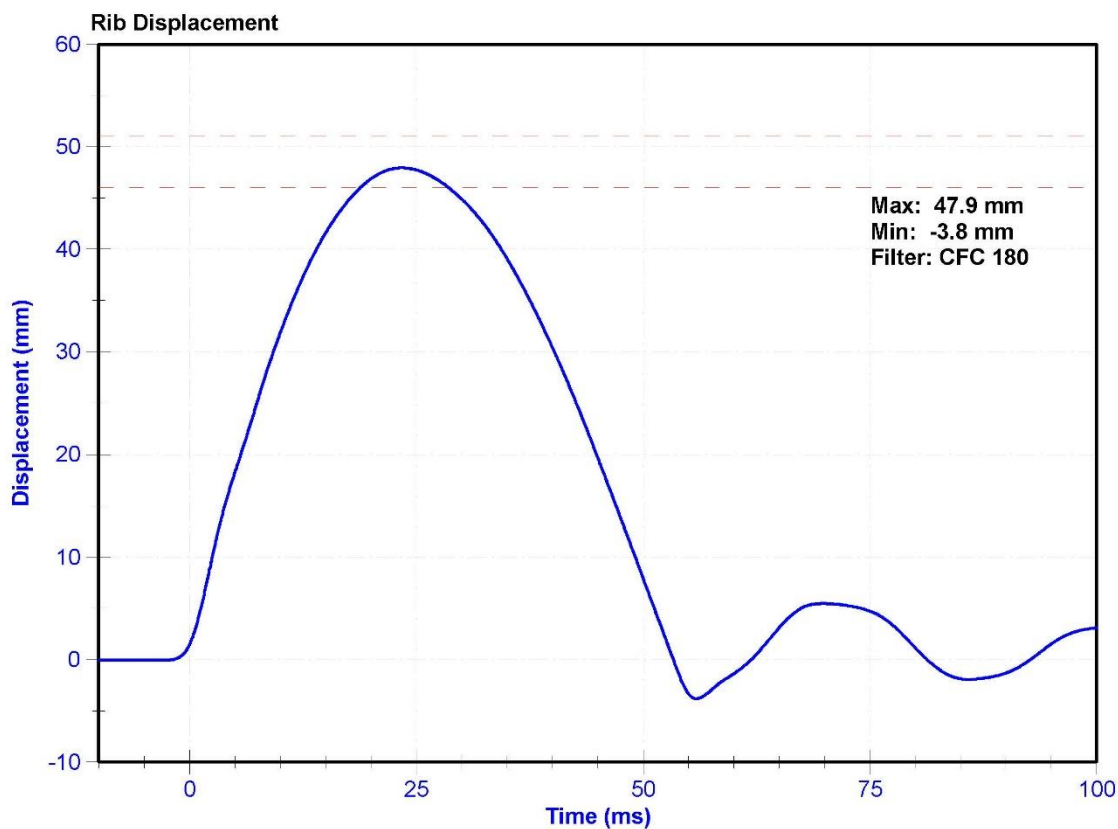
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	F034	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.8	Pass
Humidity	10	70	%	37.8	Pass
Rib Displacement	46	51	mm	47.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	9/27/2017	9/27/2018



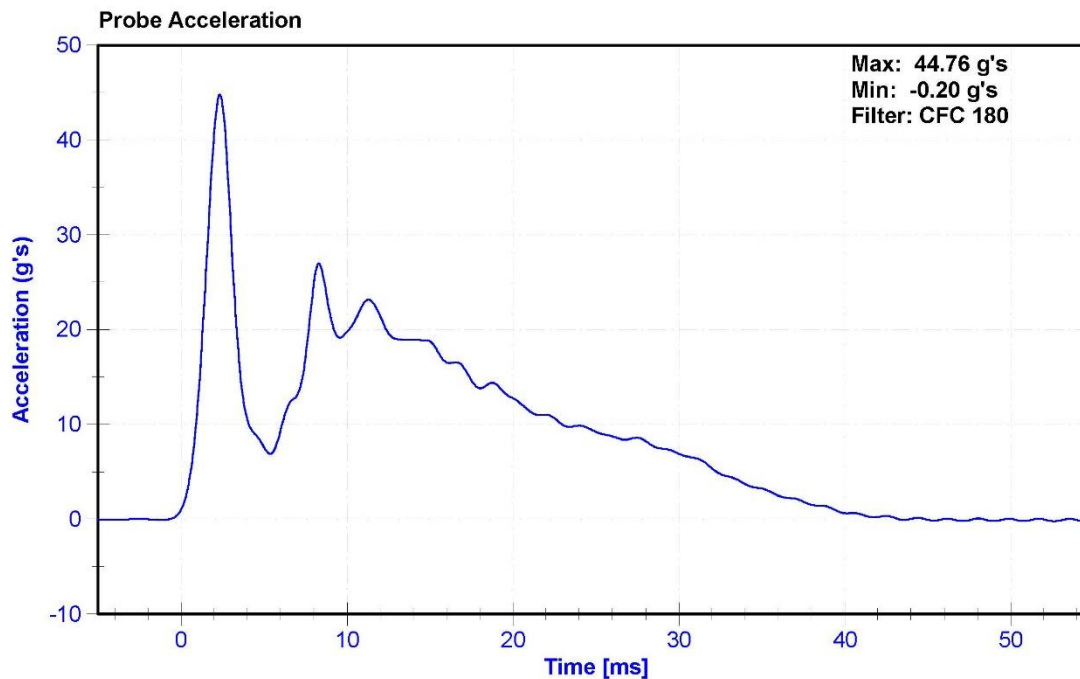
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	F034	Laboratory Supervisor	M. Goehle

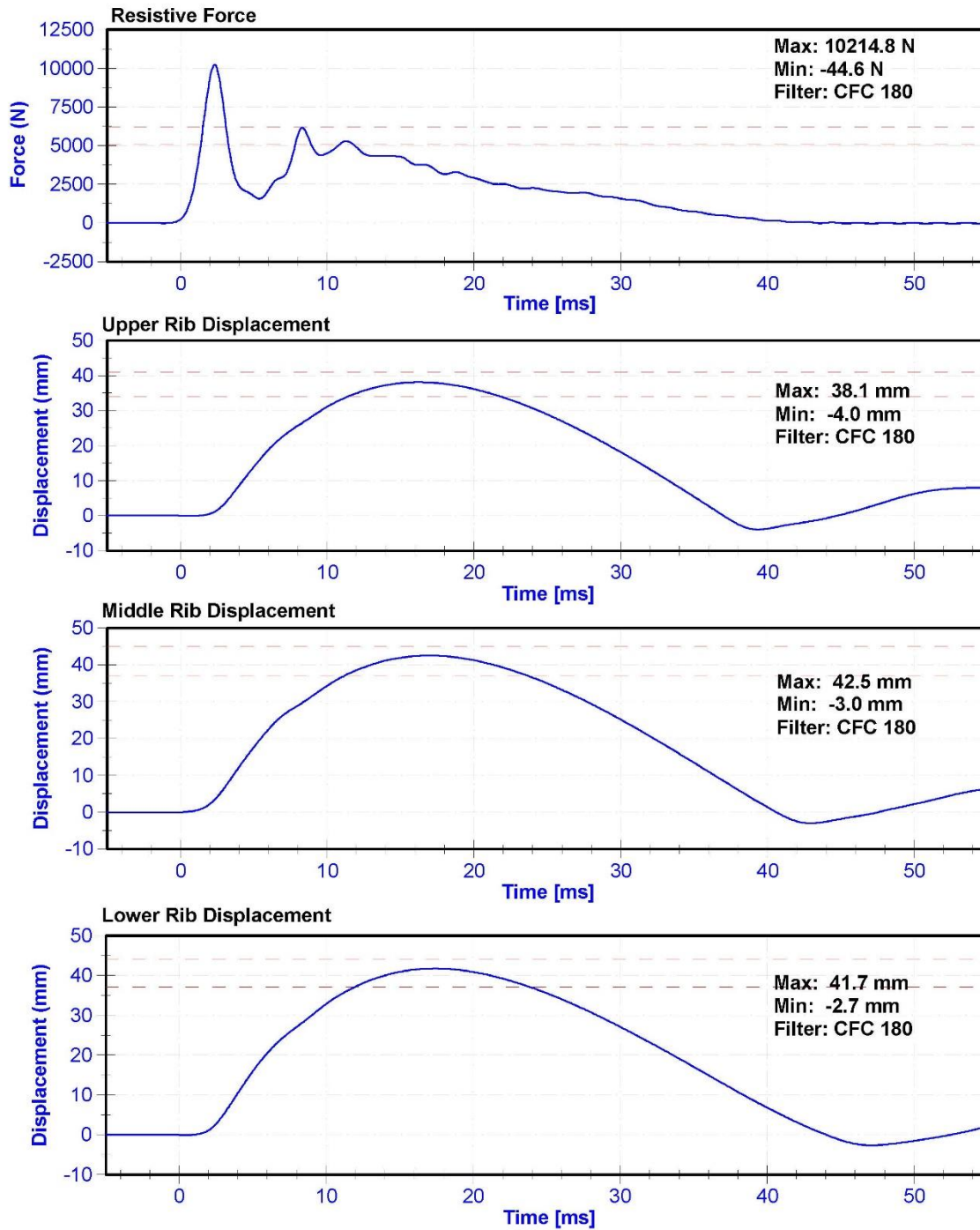
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	40.2	Pass
Velocity	5.4	5.6	m/s	5.56	Pass
Resistive Force after 6ms	5100	6200	N	6155.5	Pass
Upper Thorax Rib Deflection	34	41	mm	38.1	Pass
Mid Thorax Rib Deflection	37	45	mm	42.5	Pass
Lower Thorax Rib Deflection	37	44	mm	41.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	4/17/2018
Upper Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	9/27/2017	9/27/2018
Middle Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	9/27/2017	9/27/2018
Lower Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	9/27/2017	9/27/2018





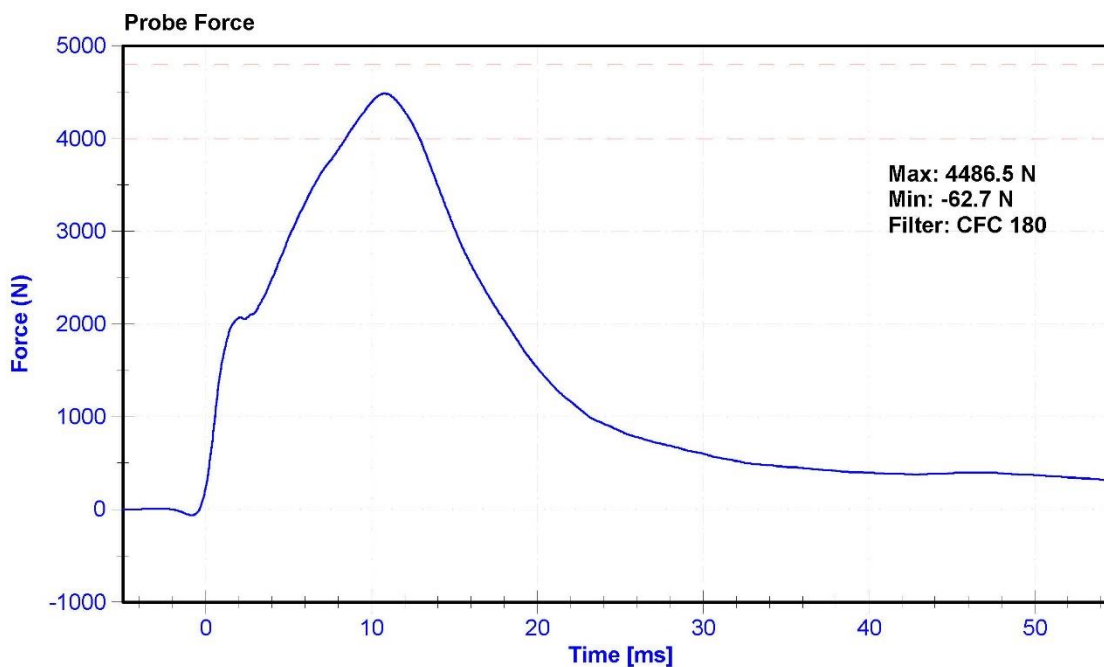
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	F034	Laboratory Supervisor	M. Goehle

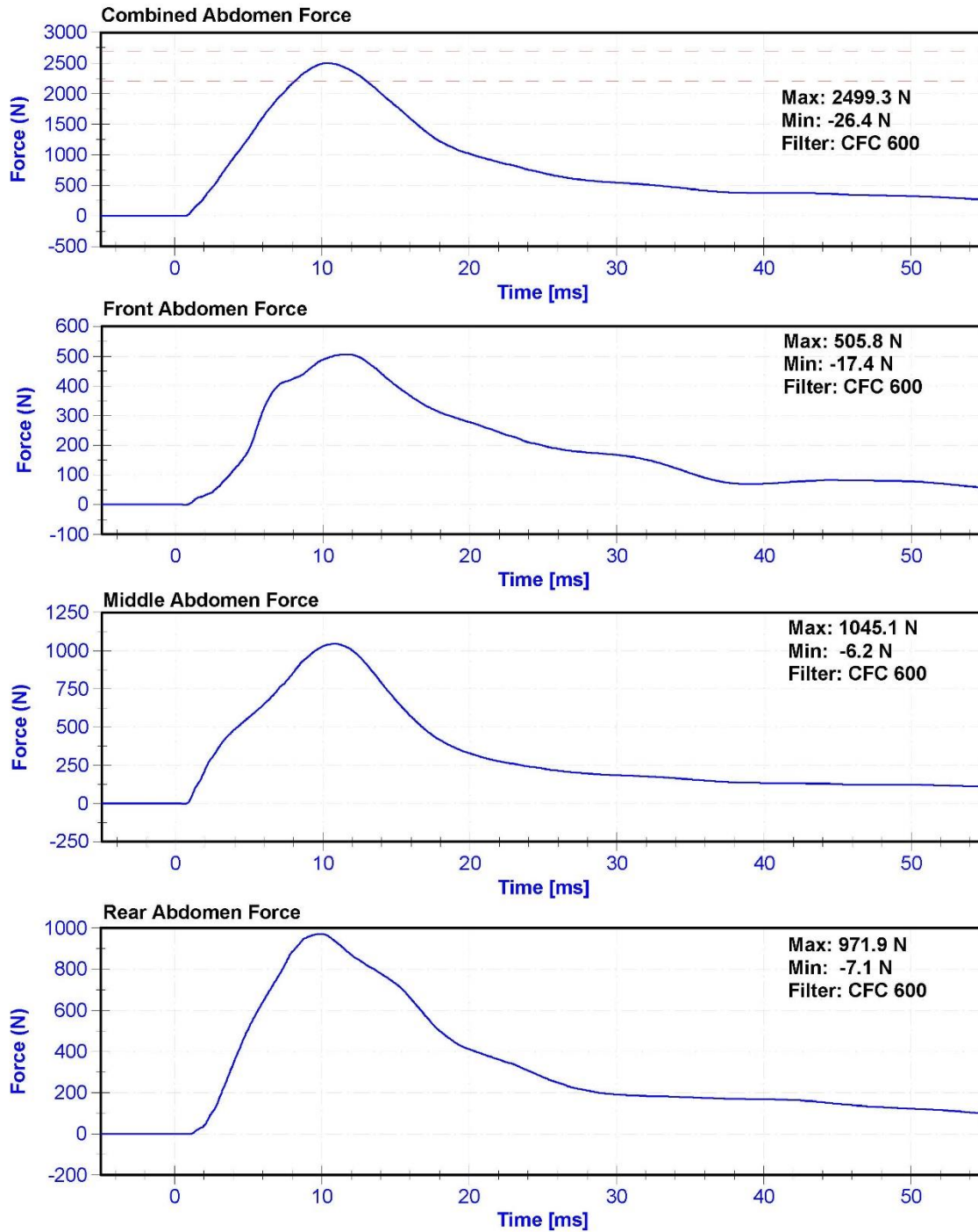
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.8	Pass
Humidity	10	70	%	31.4	Pass
Velocity	3.9	4.1	m/s	4.07	Pass
Combined Abdomen Force	2200	2700	N	2499.3	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	10.35	Pass
Resistive Probe Force	4000	4800	N	4486.5	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 7264CT	AC-P32453	10/17/2017	4/17/2018
Front Abdomen Load Cell	DENTON 2631	LC-1512	6/5/2017	6/5/2018
Middle Abdomen Load Cell	DENTON 2631	LC-1526	6/5/2017	6/5/2018
Rear Abdomen Load Cell	DENTON 2631	LC-1516	6/5/2017	6/5/2018





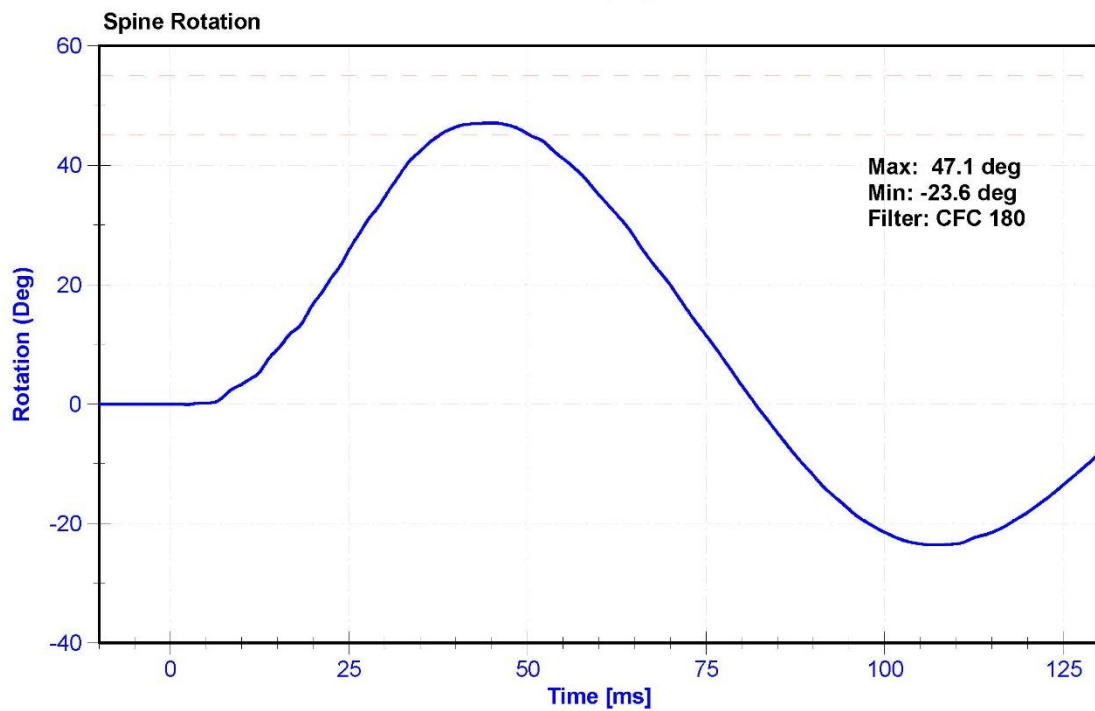
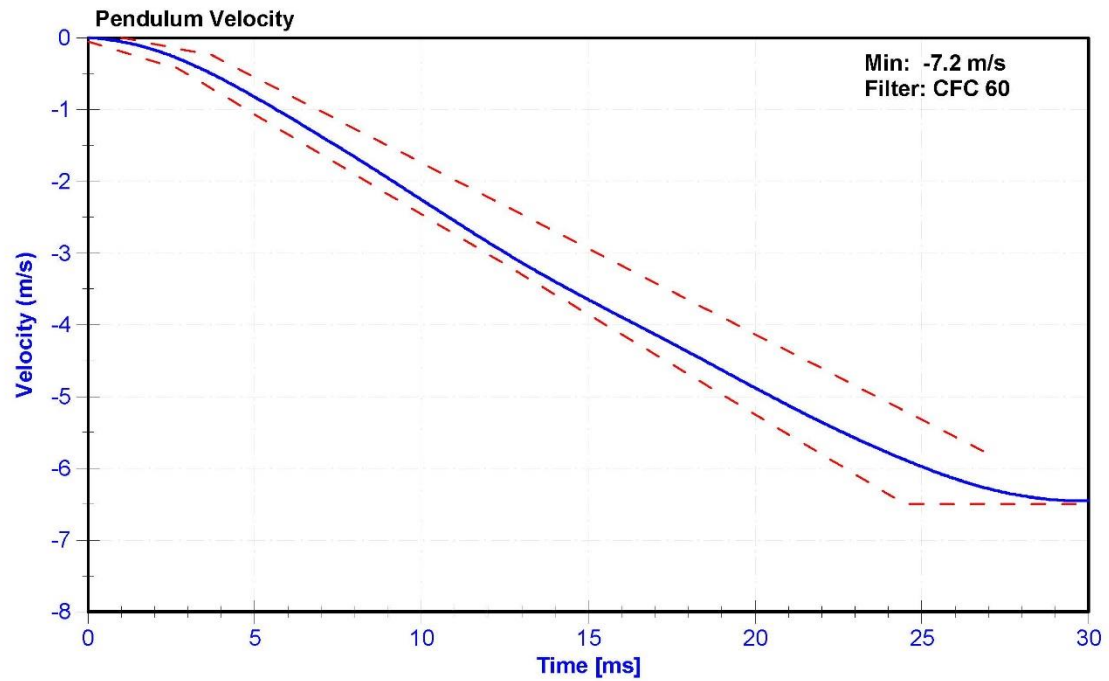
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	F034	Laboratory Supervisor	M. Goehle

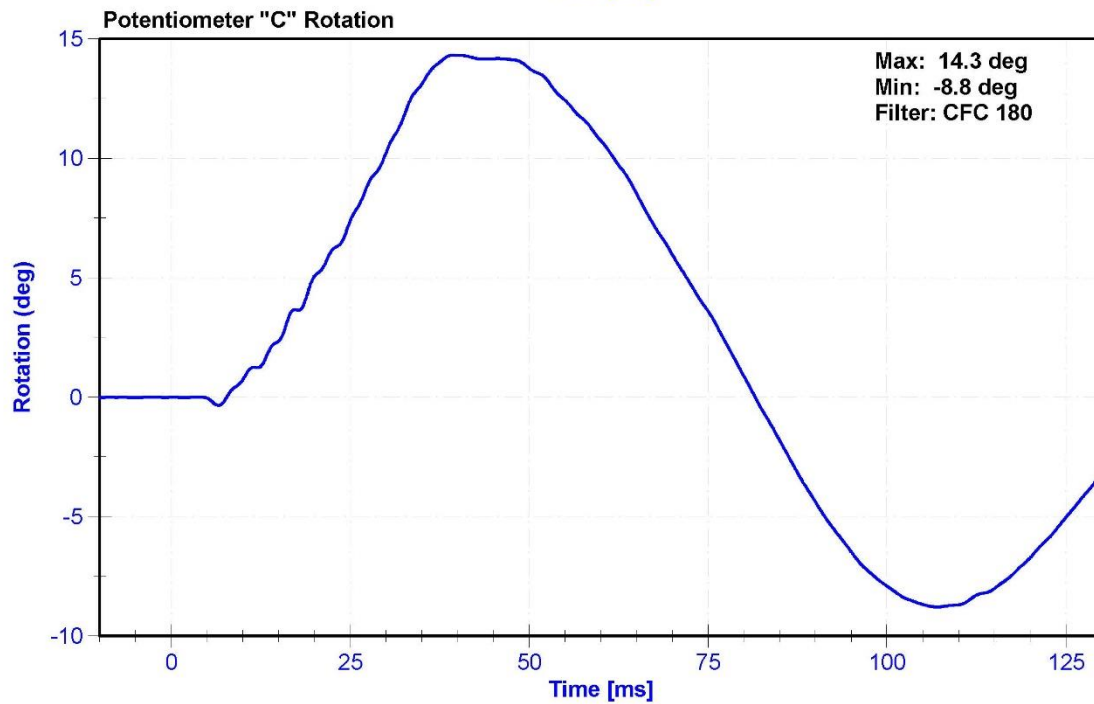
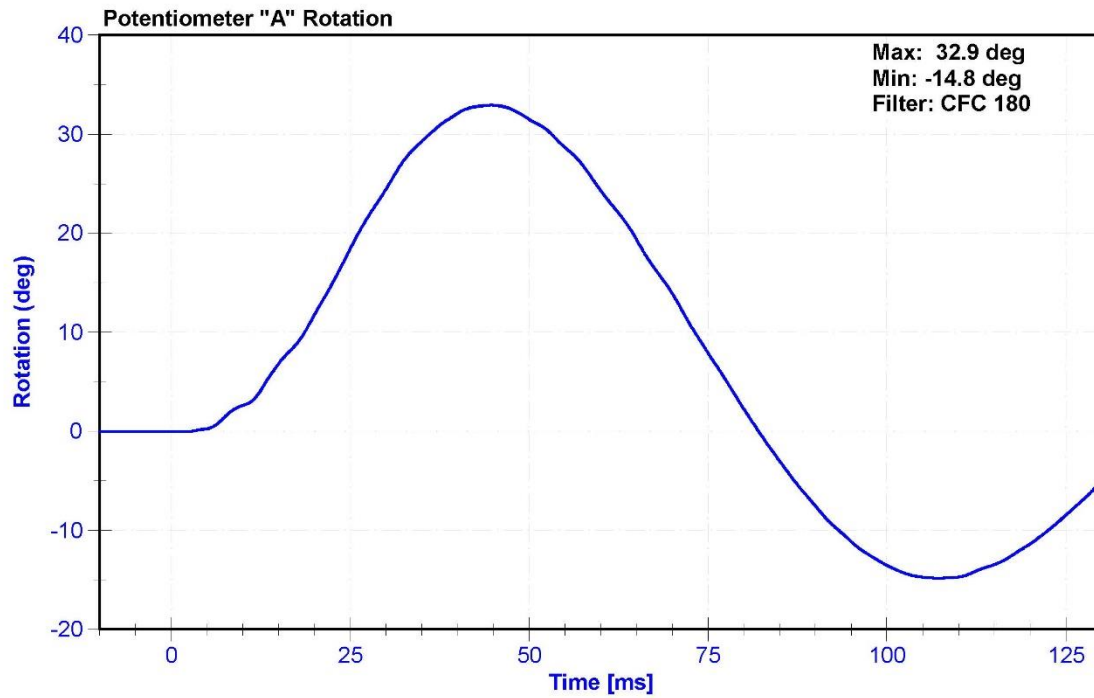
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.0	Pass
Humidity	10	70	%	36.2	Pass
Velocity	5.95	6.15	m/s	6.113	Pass
Lateral Spine Rotation	45	55	deg	47.1	Pass
Time at Maximum Rotation	39	53	ms	44.9	Pass
Time of Decay to Zero Degrees	37	57	ms	37.1	Pass
Pulse within Corridor?	-	-	-		

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/11/2017	5/11/2018
Pendulum "A" Potentiometer	SP22G	DS-094	10/30/2017	10/30/2018
Condyle "B" Potentiometer	SP22G	DS-095	10/30/2017	10/30/2018





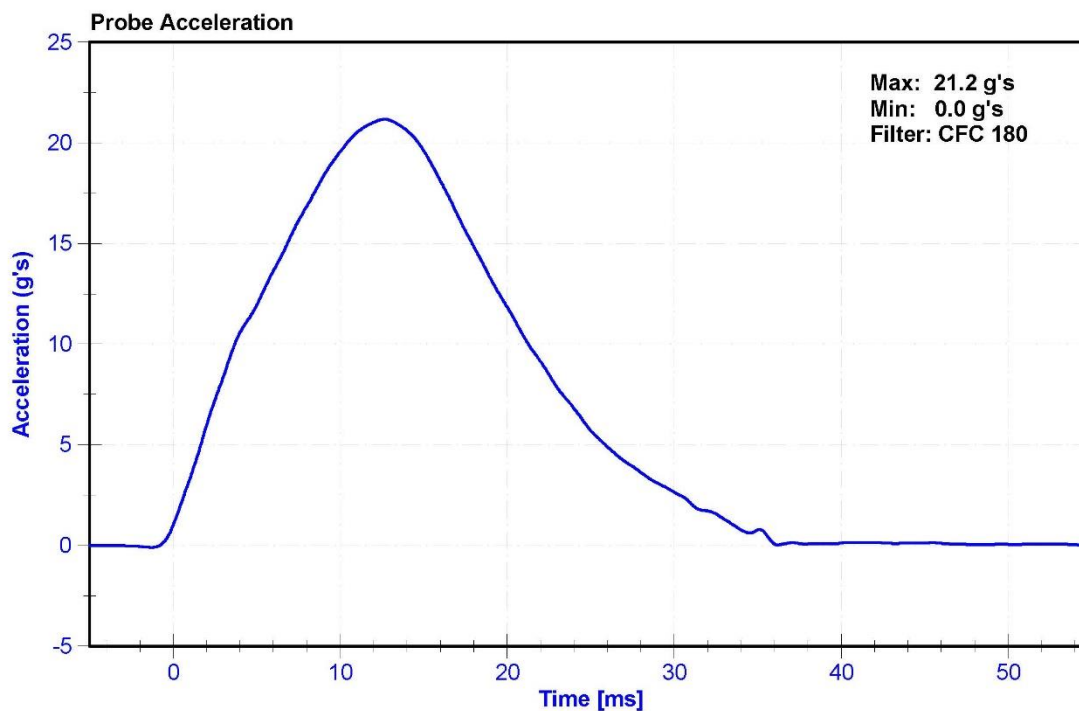
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	F034	Laboratory Supervisor	M. Goehle

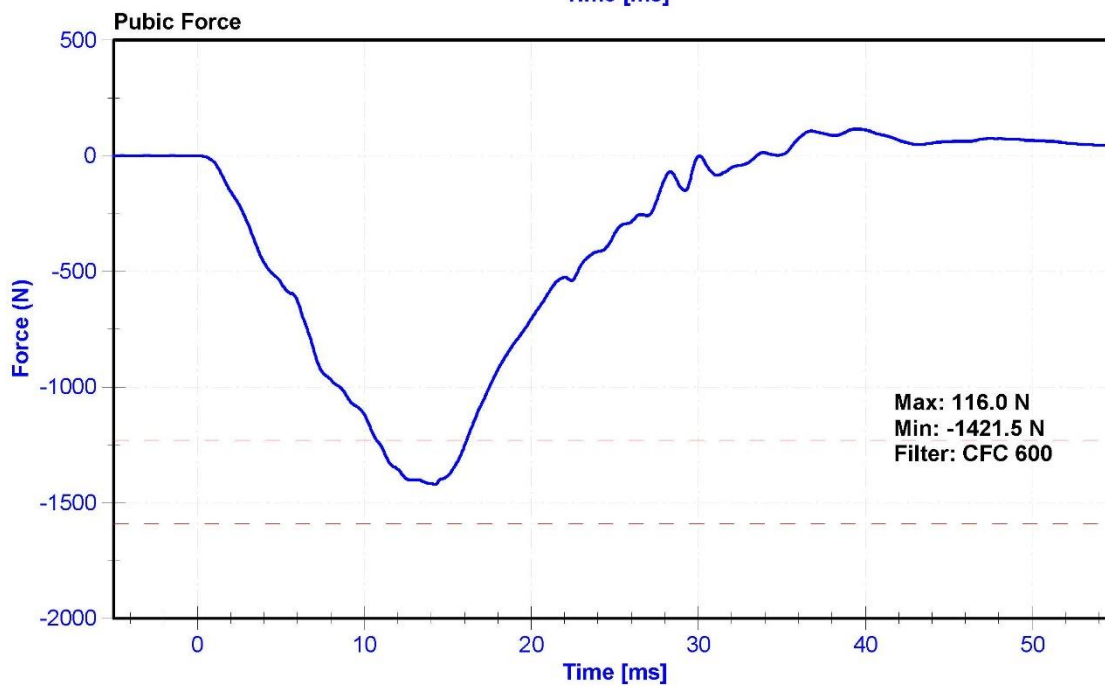
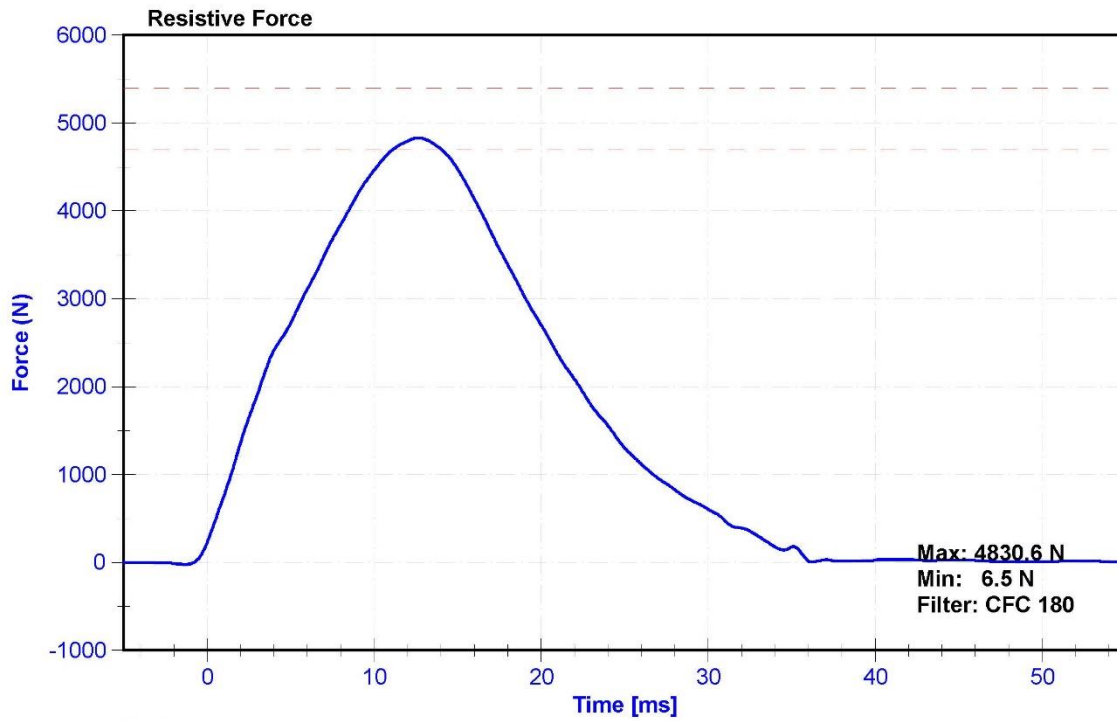
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.1	Pass
Humidity	10	70	%	38.0	Pass
Velocity	4.2	4.4	m/s	4.37	Pass
Resistive Force	4700	5400	N	4830.6	Pass
Time at Peak Resistive Force	11.8	16.1	ms	12.65	Pass
Pubic Force	-1590	-1230	N	-1421.5	Pass
Time at Peak Pubic Force	12.2	17.0	ms	14.25	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	4/17/2018
Pubic Load Cell	Denton 3096JFL	LC-465Fy	6/6/2017	6/6/2018





CALIBRATION TEST RESULTS

PRE-TEST

SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD

SERIAL No: 300

(CONFIGURED FOR LEFT SIDE IMPACT)

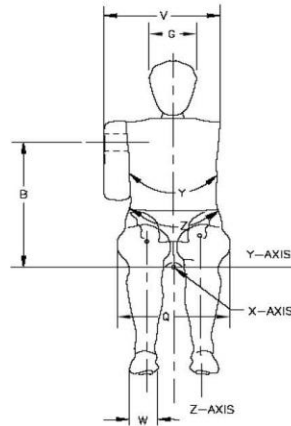
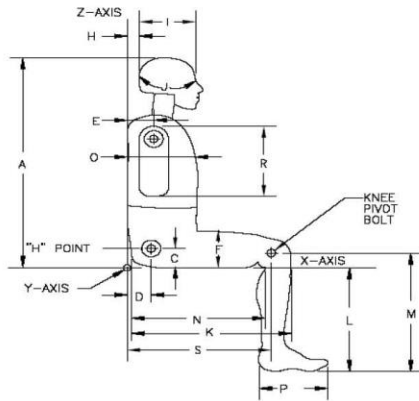


External Measurements - SID-IIs

Technician: K. Brogan

Date: 11/15/2017

Dummy Serial Number: 300



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	781	Pass
B	Shoulder Pivot Height	437	453	446	Pass
C	H-point Height	79	89	86	Pass
D	H-point from seatback	141	151	146	Pass
E	Shoulder Pivot from Backline	97	107	103	Pass
F	Thigh Clearance	119	135	122	Pass
G	Head Breadth	140	148	145	Pass
H	Head Back from Backline	40	46	45	Pass
I	Head Depth	178	188	182	Pass
J	Head Circumference	541	551	547	Pass
K	Buttock to Knee Length	514	540	536	Pass
L	Popliteal Height	343	369	356	Pass
M	Knee Pivot to floor height	392	409	402	Pass
N	Buttock Popliteal Length	416	442	435	Pass
O	Chest Depth w/o jacket	195	211	205	Pass
P	Foot Length	216	232	221	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	319	Pass
R	Arm Length	249	259	251	Pass
S	Knee Joint to seatback	477	493	485	Pass
V	Shoulder Width	341	357	351	Pass
W	Foot Width	78	94	85	Pass
Y	Chest Circumference w/jacket	851	881	870	Pass
Z	Waist Circumference	761	791	770	Pass

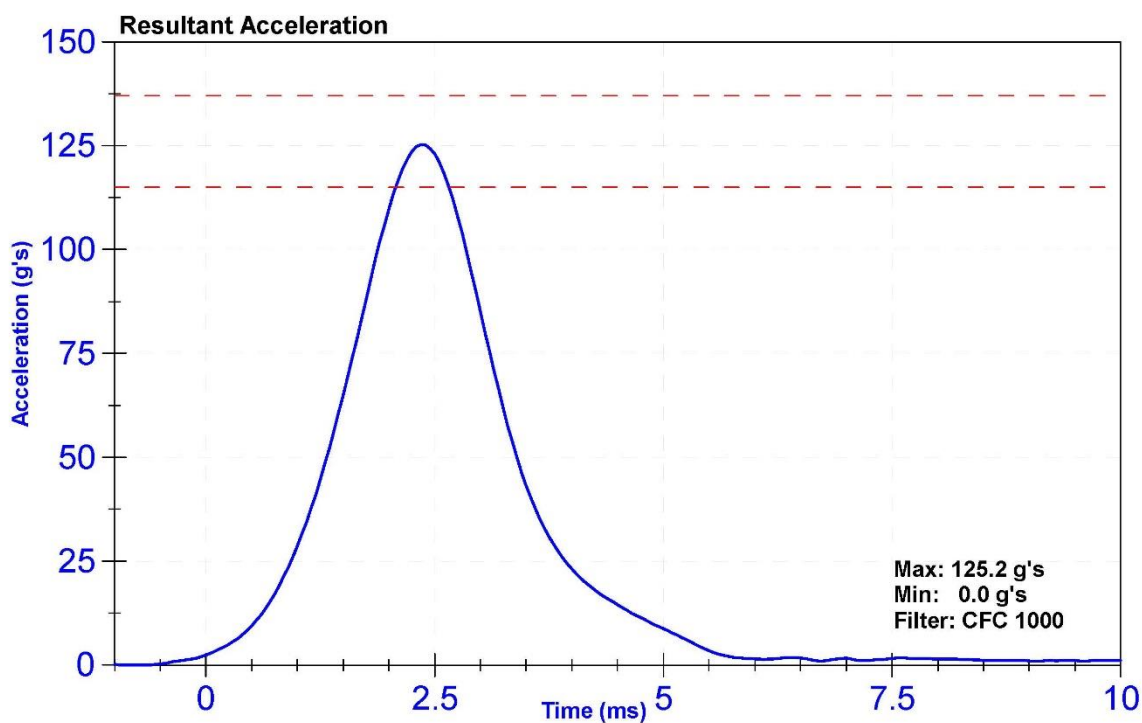
ATD Manufacturer	FTSS	Test Technician	S. Keller
ATD Serial Number	300	Laboratory Supervisor	M. Goehle

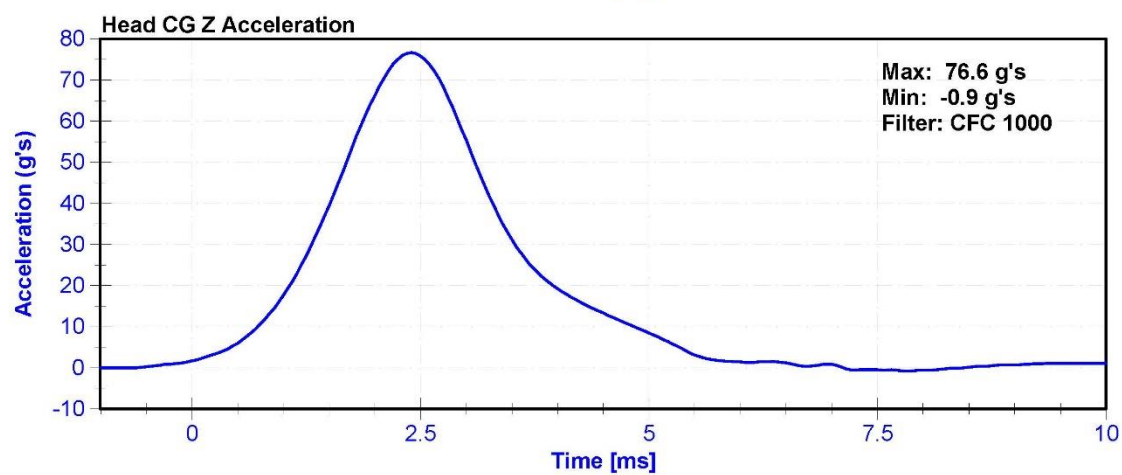
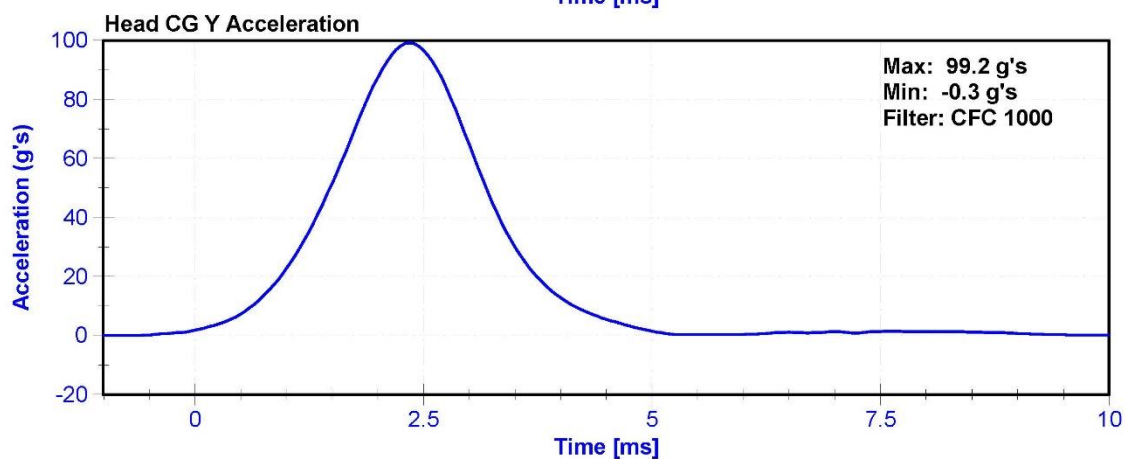
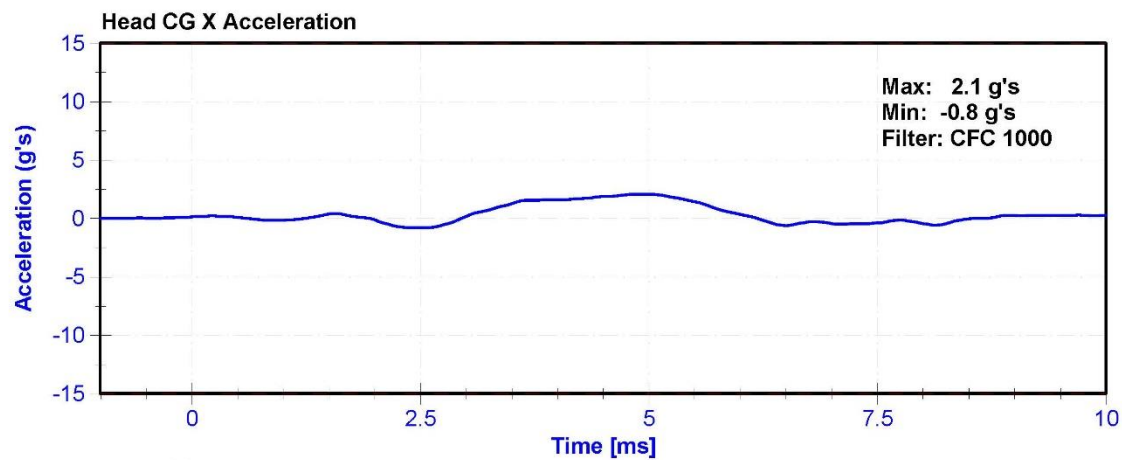
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	31.4	Pass
Resultant Acceleration	115	137	g's	125.2	Pass
Oscillation	0	15	%	1.4	Pass
Fore-Aft Acceleration	-15	15	g's	2.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P58777	9/28/2017	3/29/2018
Y Accelerometer	ENDEVCO 7264CT	AC-P59018	9/28/2017	3/29/2018
Z Accelerometer	ENDEVCO 7264	AC-P79189	9/28/2017	3/29/2018





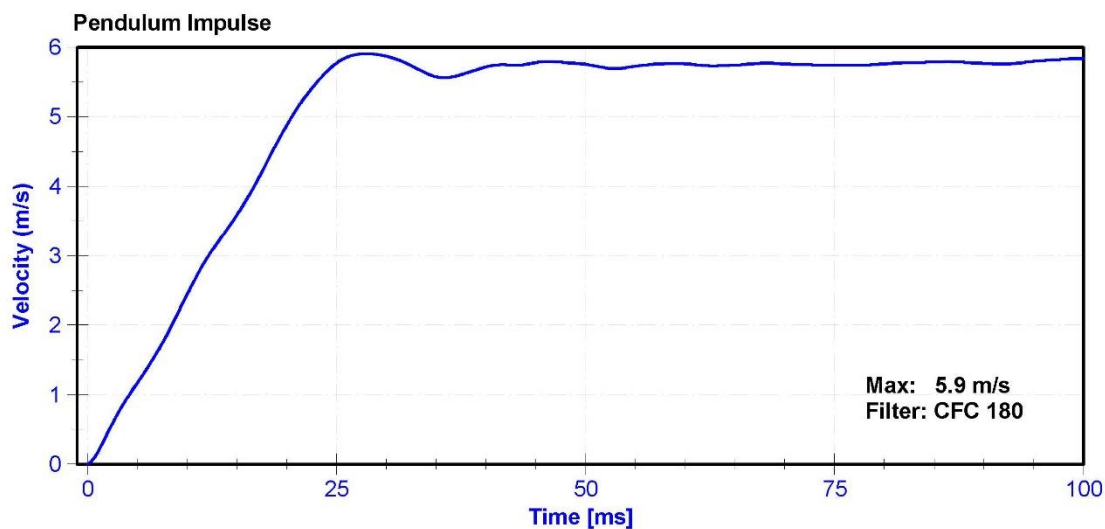
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	300	Laboratory Supervisor	M. Goehle

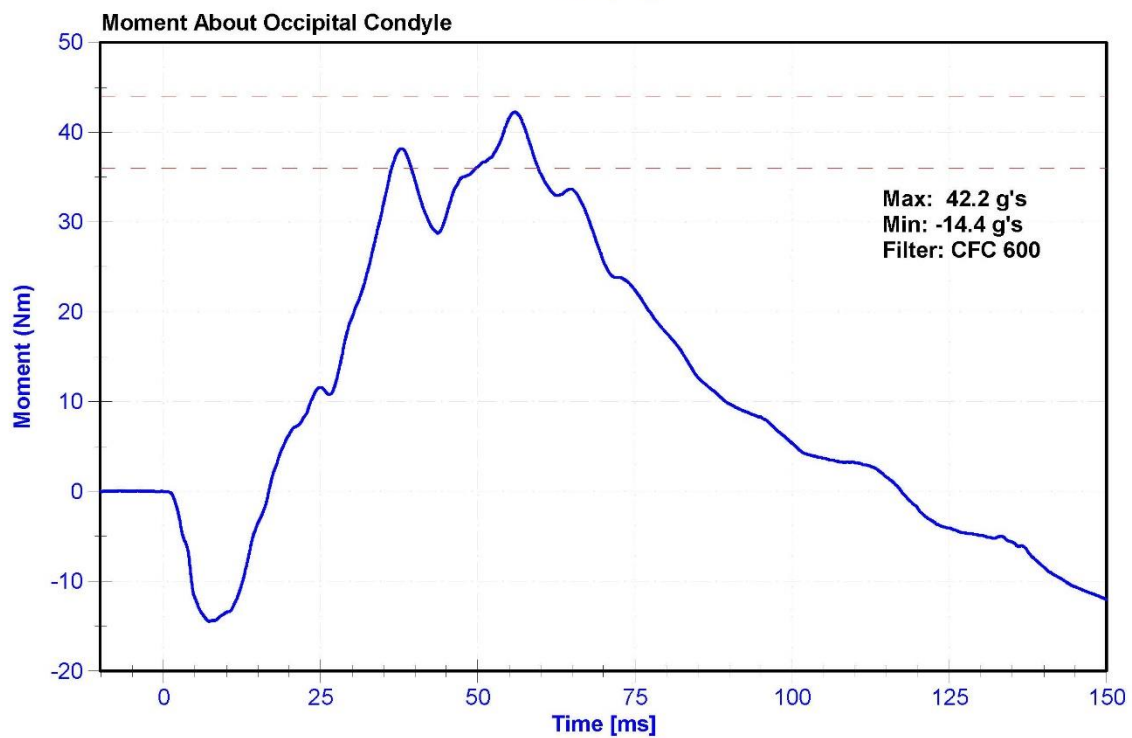
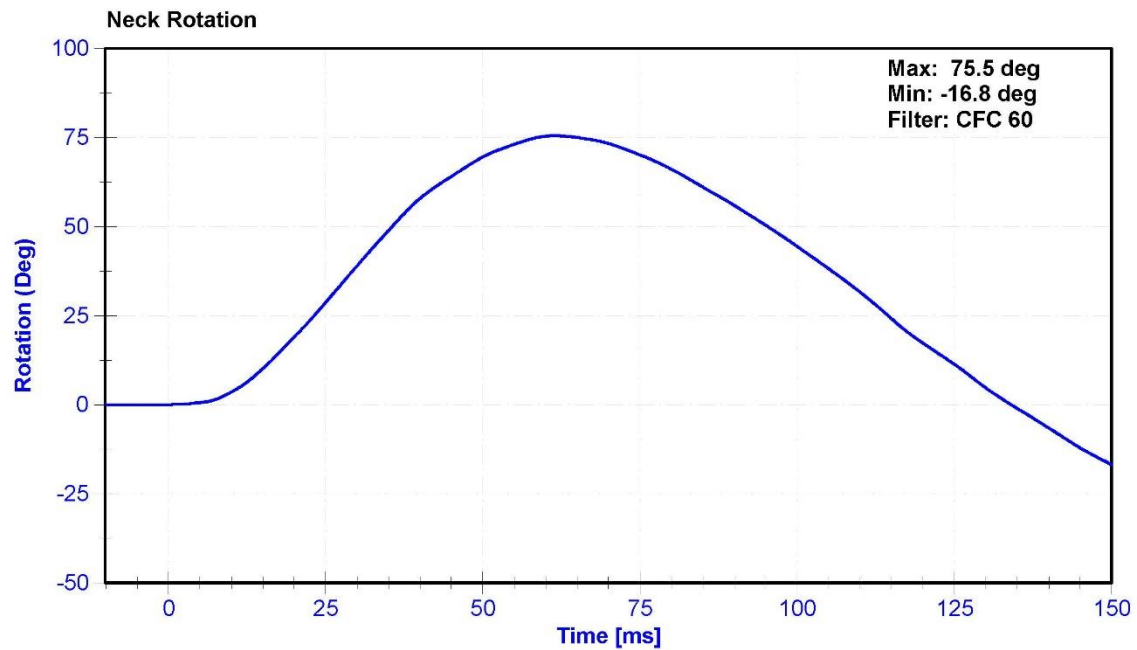
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	34.6	Pass
Velocity	5.51	5.63	m/s	5.620	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.44	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.59	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.88	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.77	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.91	Pass
Neck Rotation	71	81	deg	75.5	Pass
Time at Maximum Rotation	50	70	ms	61.4	Pass
Moment about the OC	36	44	Nm	42.2	Pass
Moment Decay to 0 Nm	102	126	ms	117.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/11/2017	5/11/2018
Pendulum Potentiometer	Denton 78051-342	DS-184Pend	10/27/2017	10/27/2018
Condyle Potentiometer	Denton 78051-342	DS-185Pend	10/27/2017	10/27/2018
Upper Neck Load Cell	Denton 1716	LC-1872 FY	7/26/2017	7/26/2018





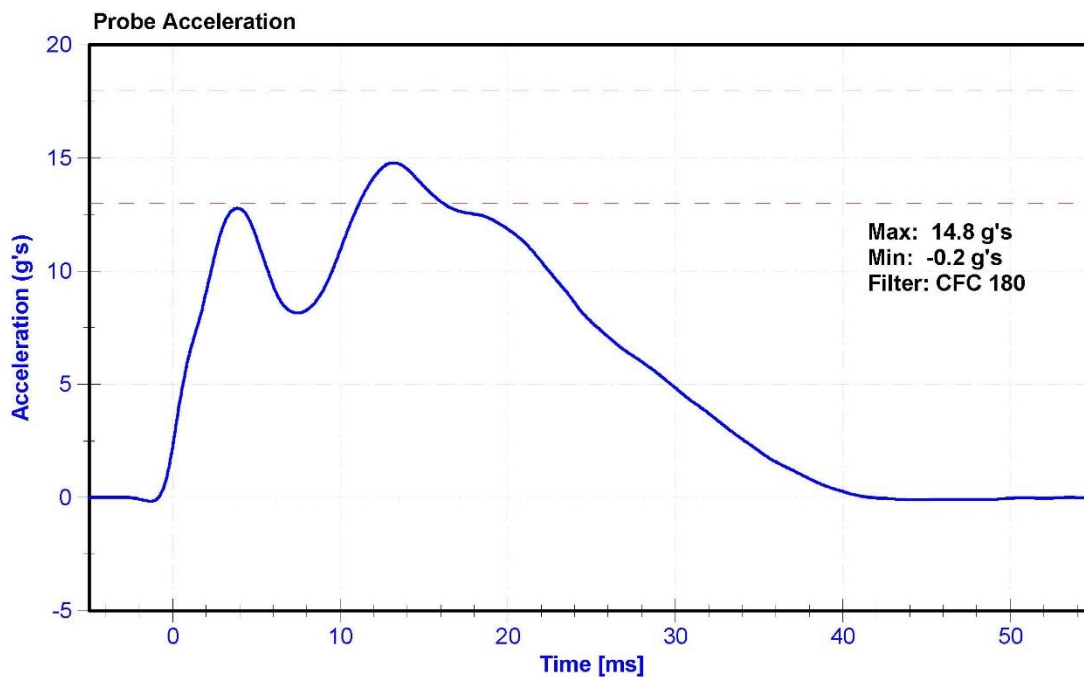
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	300	Laboratory Supervisor	M. Goehle

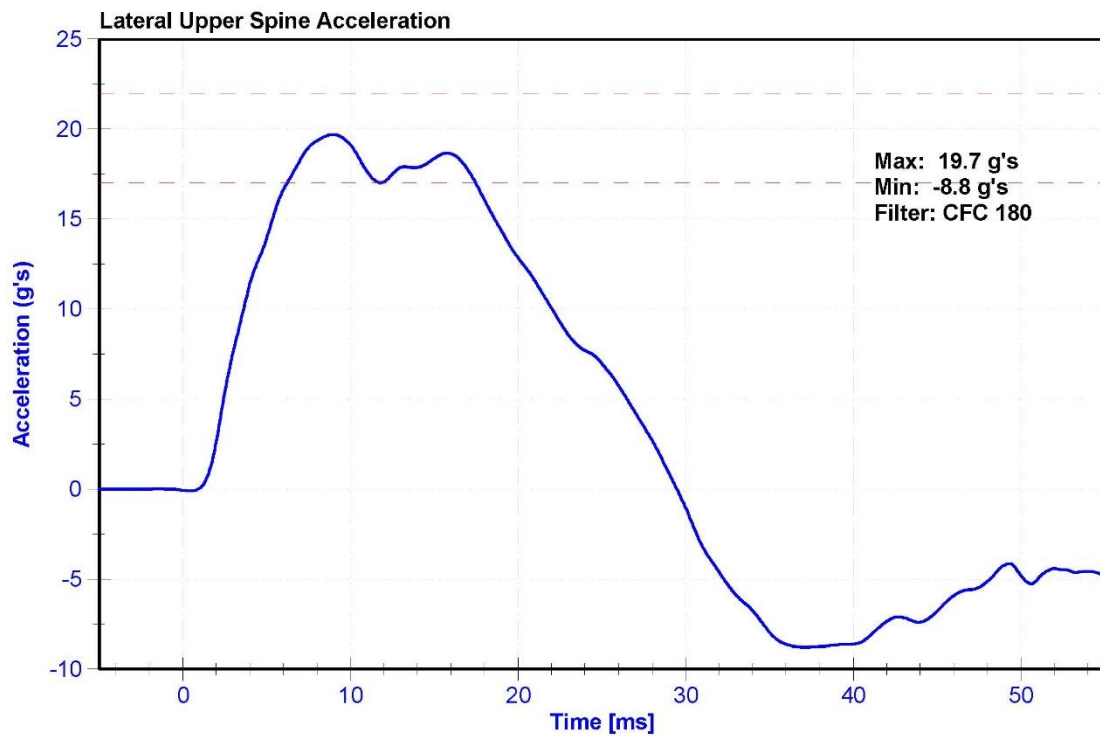
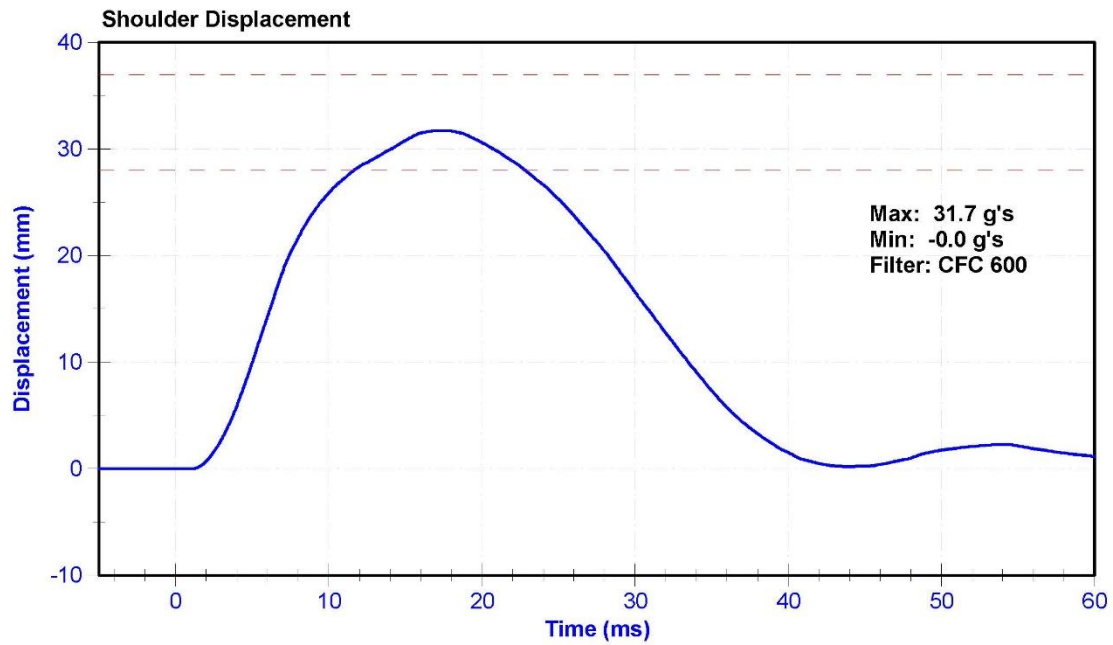
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	35.2	Pass
Velocity	4.2	4.4	m/s	4.37	Pass
Probe Acceleration	13	18	g's	14.8	Pass
Shoulder Deflection	28	37	mm	31.7	Pass
Lateral Upper Spine Acceleration	17	22	g's	19.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	4/17/2018
Shoulder Potentiometer	Servo 08TC1-3725	DS-1063GFE	9/27/2017	9/27/2018
Upper Spine Y Accelerometer	ENDEVCO 7264	AC-P83320	9/27/2017	3/28/2018





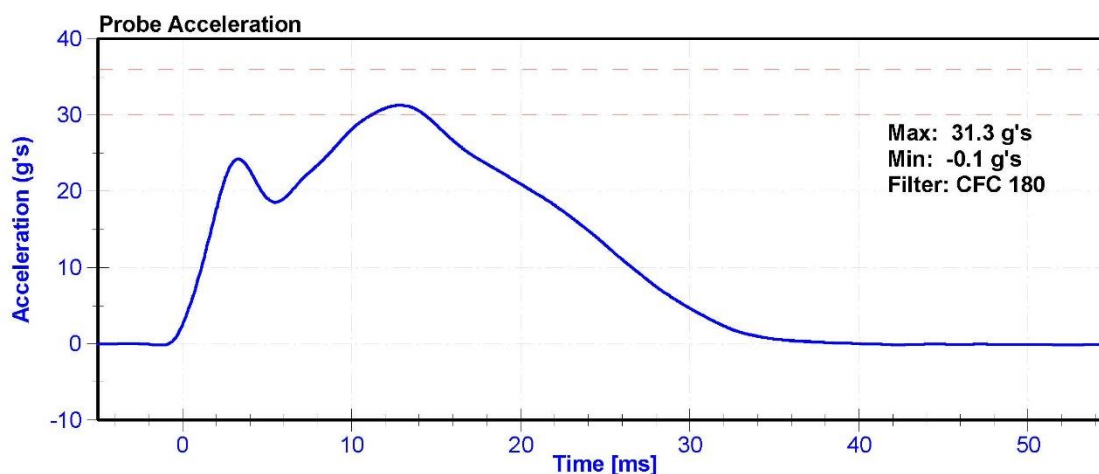
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	300	Laboratory Supervisor	M. Goehle

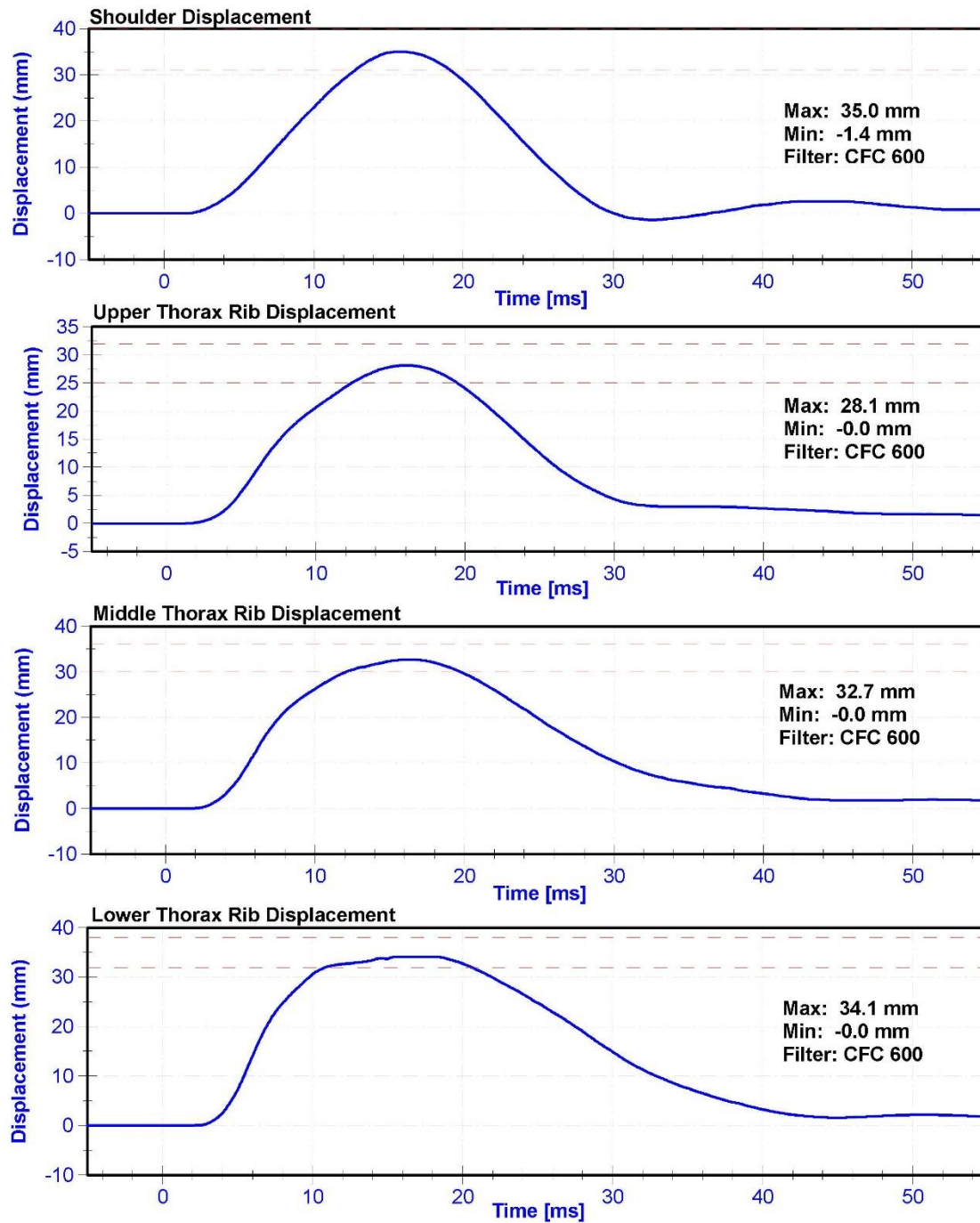
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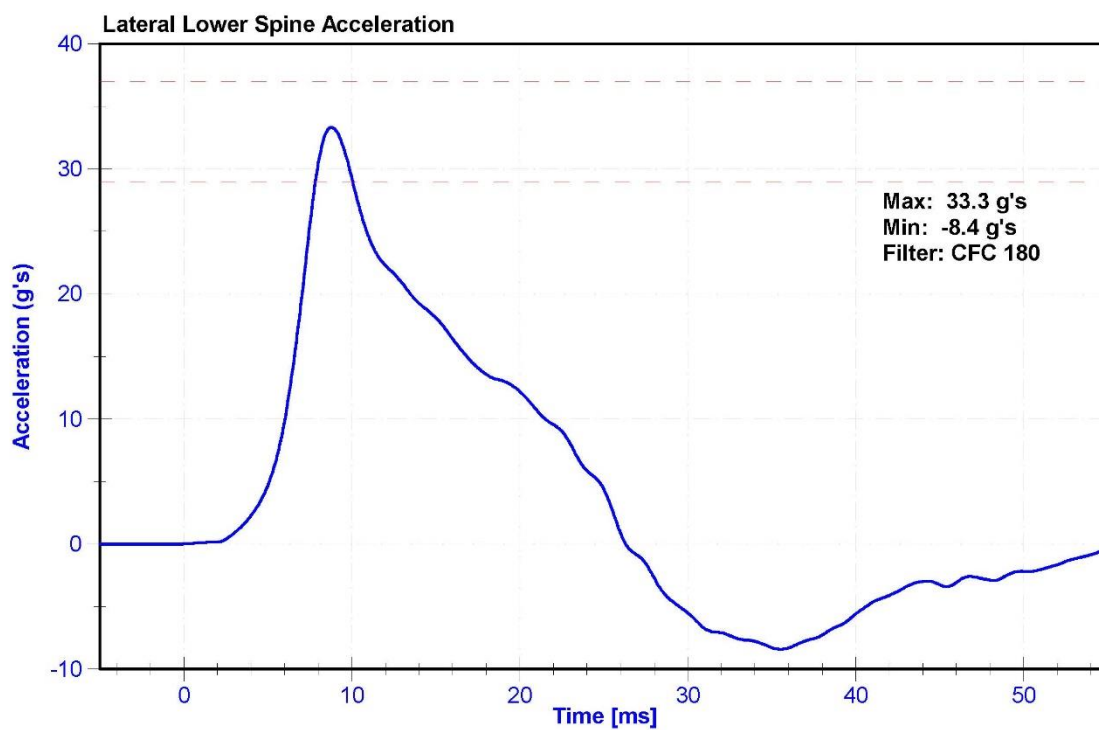
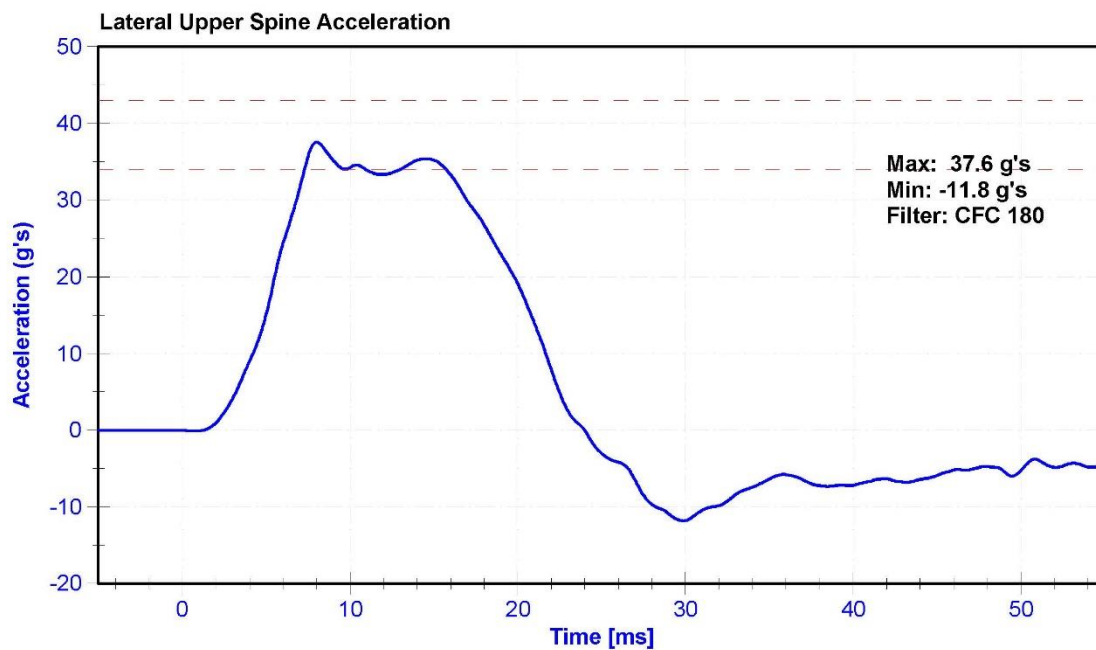
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.0	Pass
Humidity	10	70	%	35.2	Pass
Velocity	6.6	6.8	m/s	6.70	Pass
Probe Acceleration after 5 ms	30	36	g's	31.3	Pass
Lateral Upper Spine Acceleration	34	43	g's	37.6	Pass
Lateral Lower Spine Acceleration	29	37	g's	33.3	Pass
Shoulder Deflection	31	40	mm	35.0	Pass
Upper Thorax Rib Deflection	25	32	mm	28.1	Pass
Mid Thorax Rib Deflection	30	36	mm	32.7	Pass
Lower Thorax Rib Deflection	32	38	mm	34.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	4/17/2018
Upper Spine T1 Y Accelerometer	ENDEVCO 7264	AC-P83320	9/27/2017	3/28/2018
Upper Spine T12 Y Accelerometer	ENDEVCO 7264	AC-P64147	9/27/2017	3/28/2018
Shoulder Potentiometer	Servo 08TC1-3725	DS-1063GFE	9/27/2017	9/27/2018
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	9/27/2017	9/27/2018
Middle Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1151GFE	9/27/2017	9/27/2018
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	9/27/2017	9/27/2018







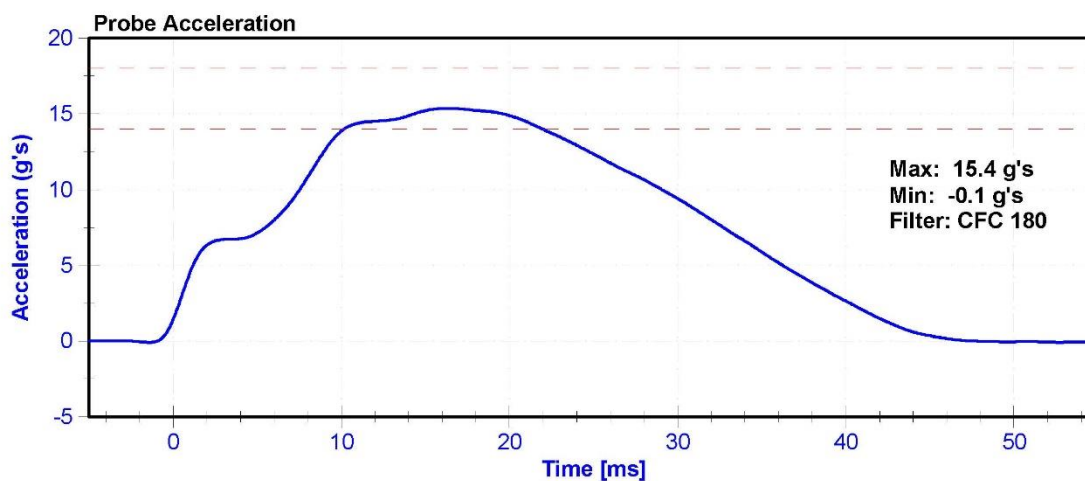
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	300	Laboratory Supervisor	M. Goehle

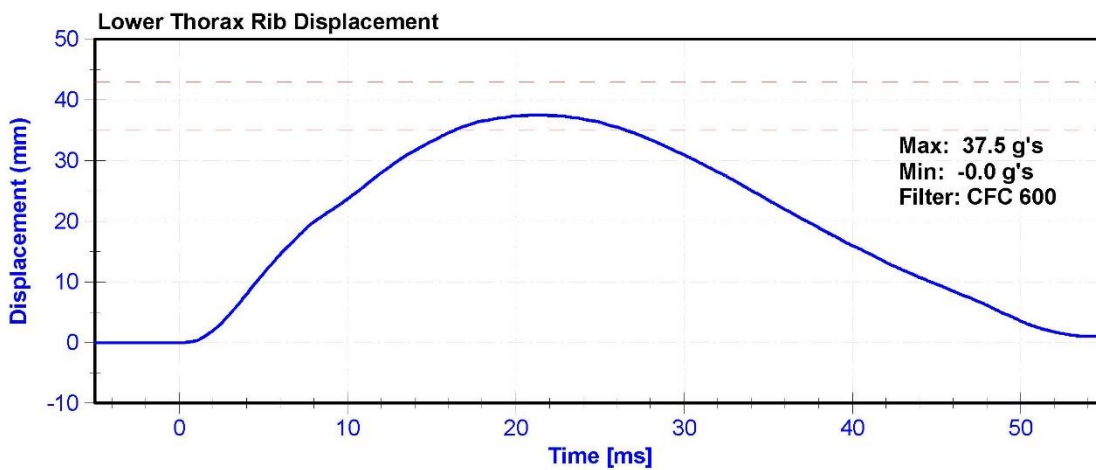
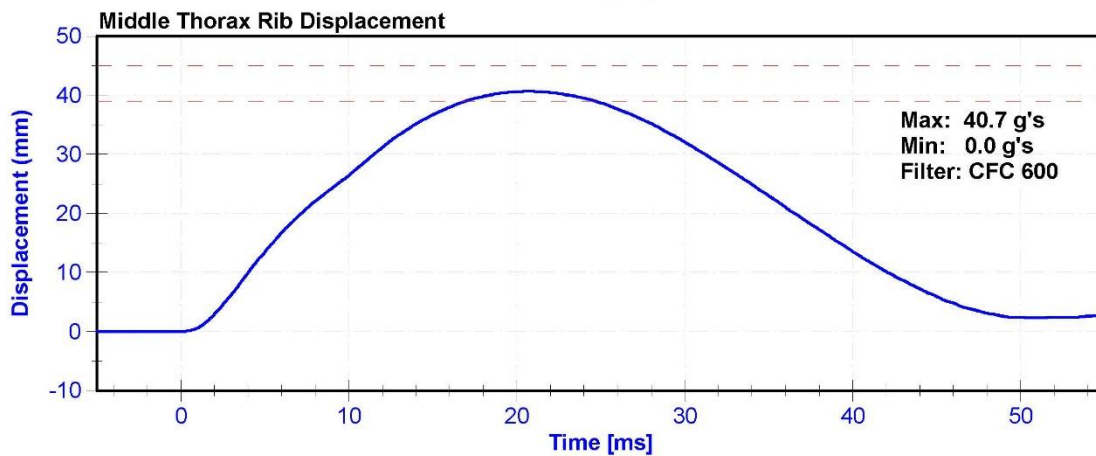
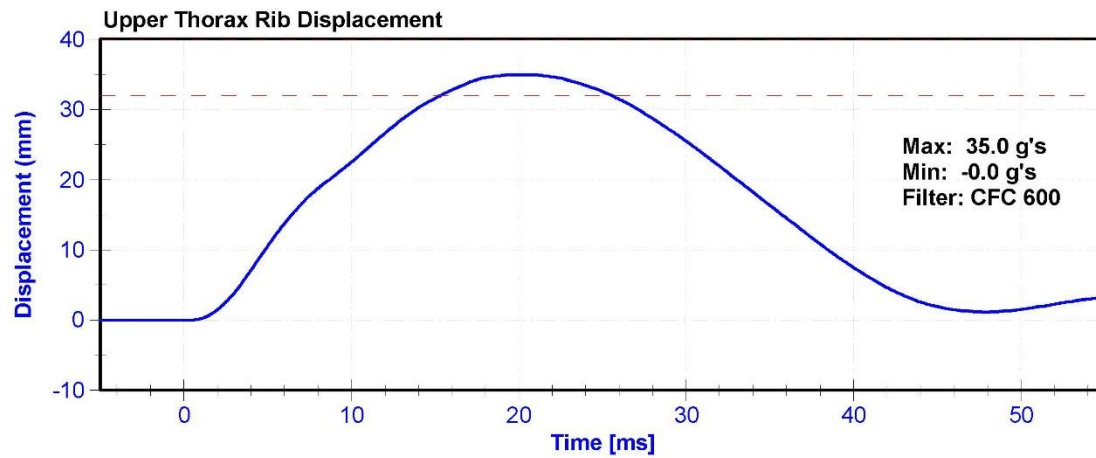
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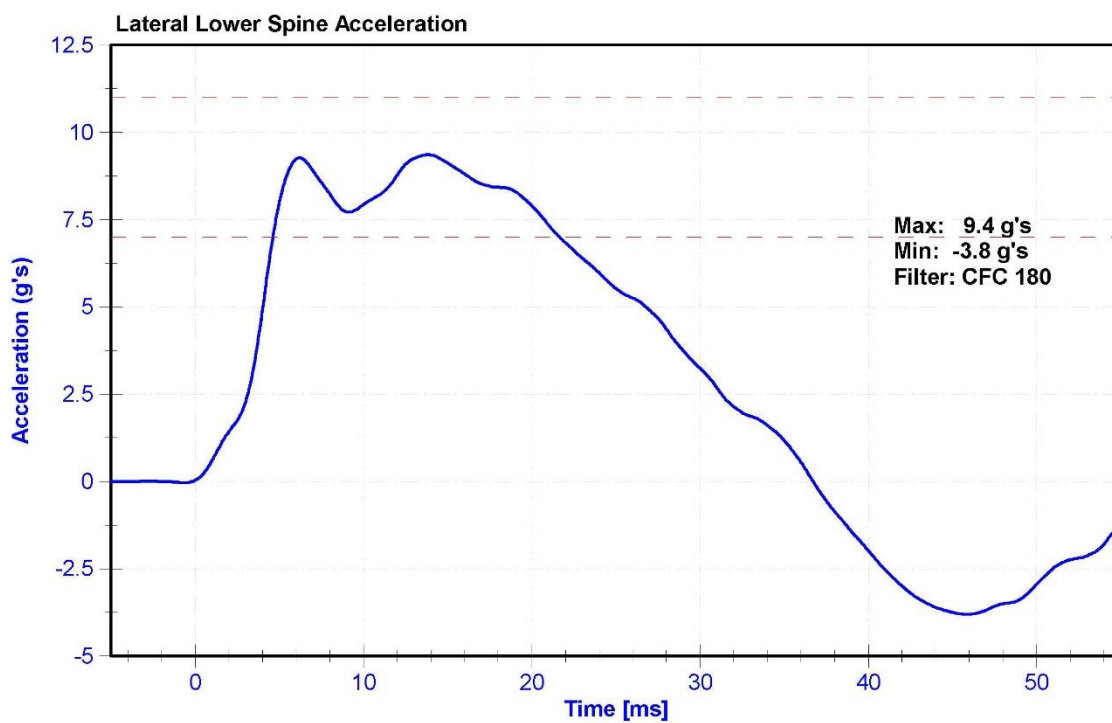
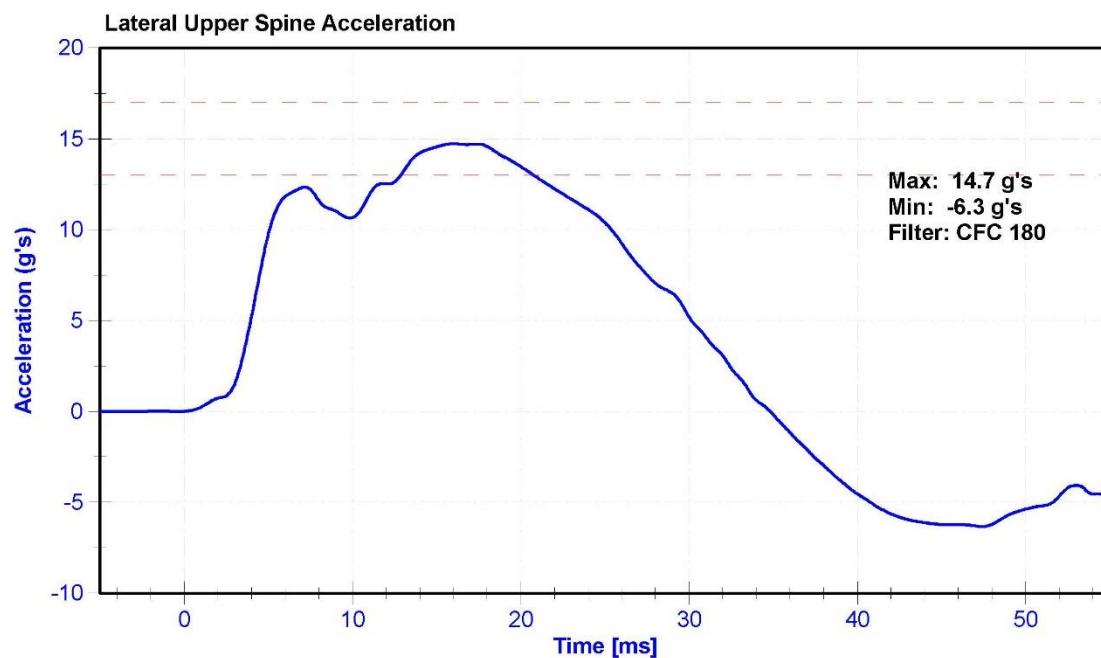
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	35.9	Pass
Velocity	4.2	4.4	m/s	4.37	Pass
Probe Acceleration	14	18	g's	15.4	Pass
Lateral Upper Spine Acceleration	13	17	g's	14.7	Pass
Lateral Lower Spine Acceleration	7	11	g's	9.4	Pass
Upper Thorax Rib Deflection	32	40	mm	35.0	Pass
Middle Thorax Rib Deflection	39	45	mm	40.7	Pass
Lower Thorax Rib Deflection	35	43	mm	37.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	4/17/2018
Upper Spine Y Accelerometer	ENDEVCO 7264	AC-P83320	9/27/2017	3/28/2018
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	9/27/2017	3/28/2018
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	9/27/2017	9/27/2018
Middle Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1151GFE	9/27/2017	9/27/2018
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	9/27/2017	9/27/2018







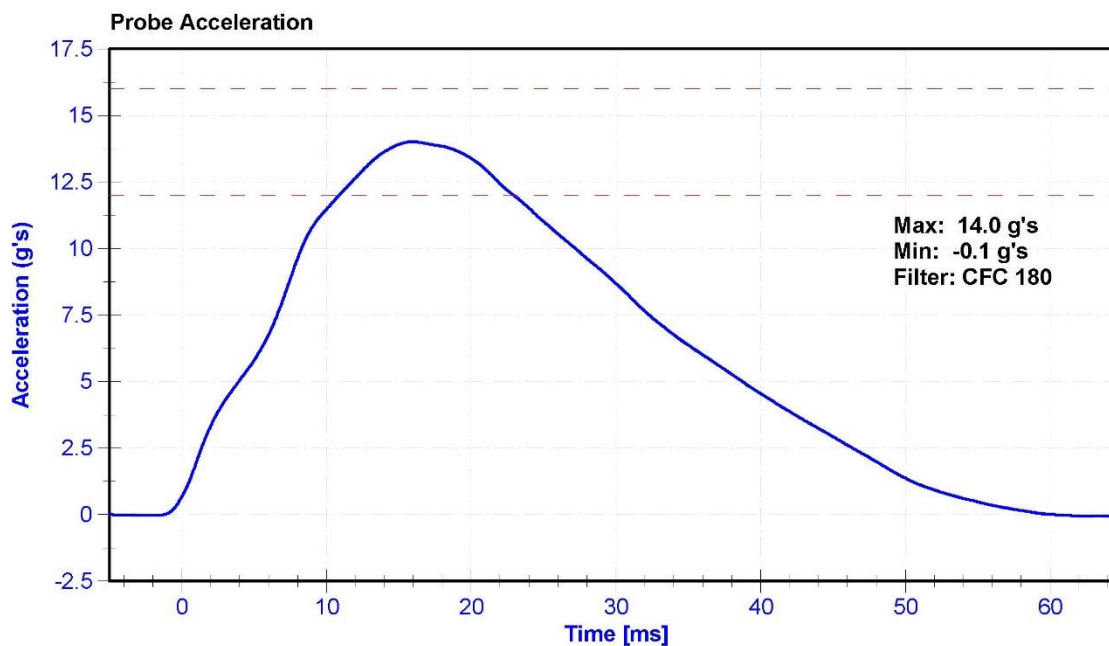
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	300	Laboratory Supervisor	M. Goehle

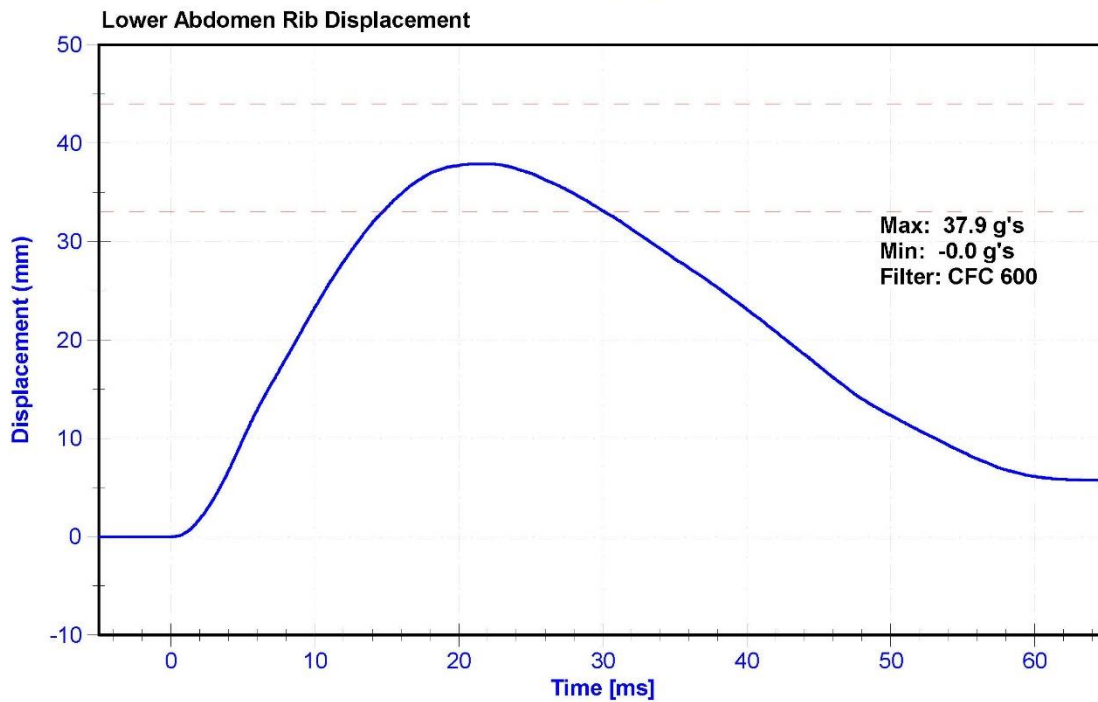
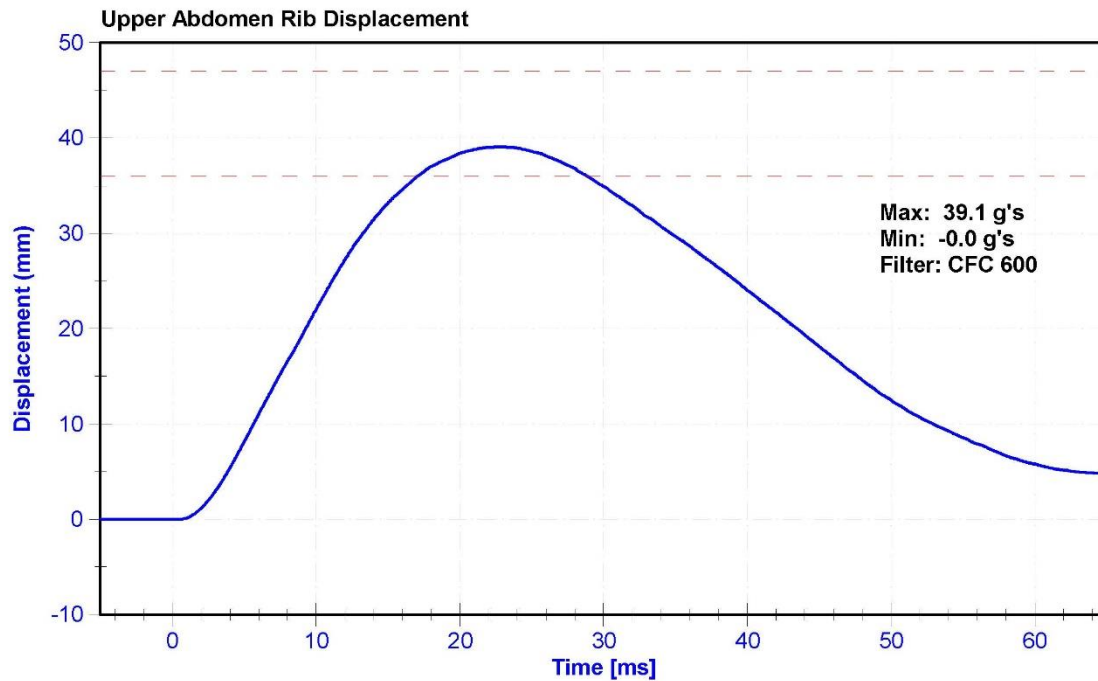
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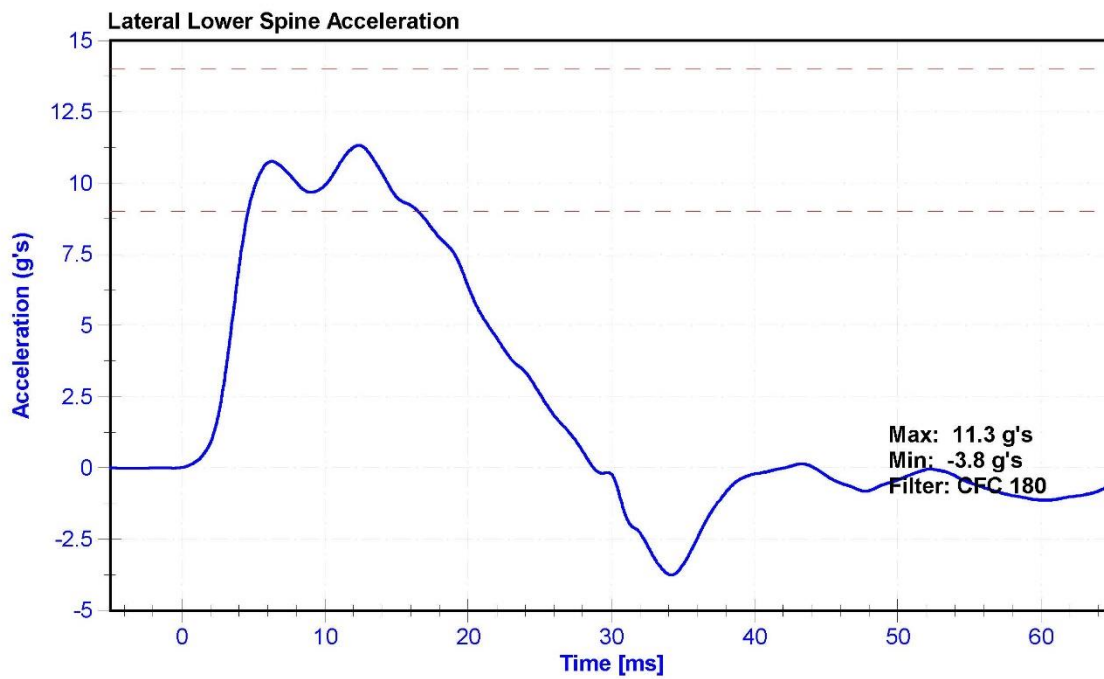
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	39.6	Pass
Velocity	4.2	4.4	m/s	4.36	Pass
Probe Acceleration	12	16	g's	14.0	Pass
Lateral Lower Spine Acceleration	9	14	g's	11.3	Pass
Upper Abdomen Rib Deflection	36	47	mm	39.1	Pass
Lower Abdomen Rib Deflection	33	44	mm	37.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	4/17/2018
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	9/27/2017	3/28/2018
Upper Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-308GFE	9/27/2017	9/27/2018
Lower Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-307GFE	9/27/2017	9/27/2018







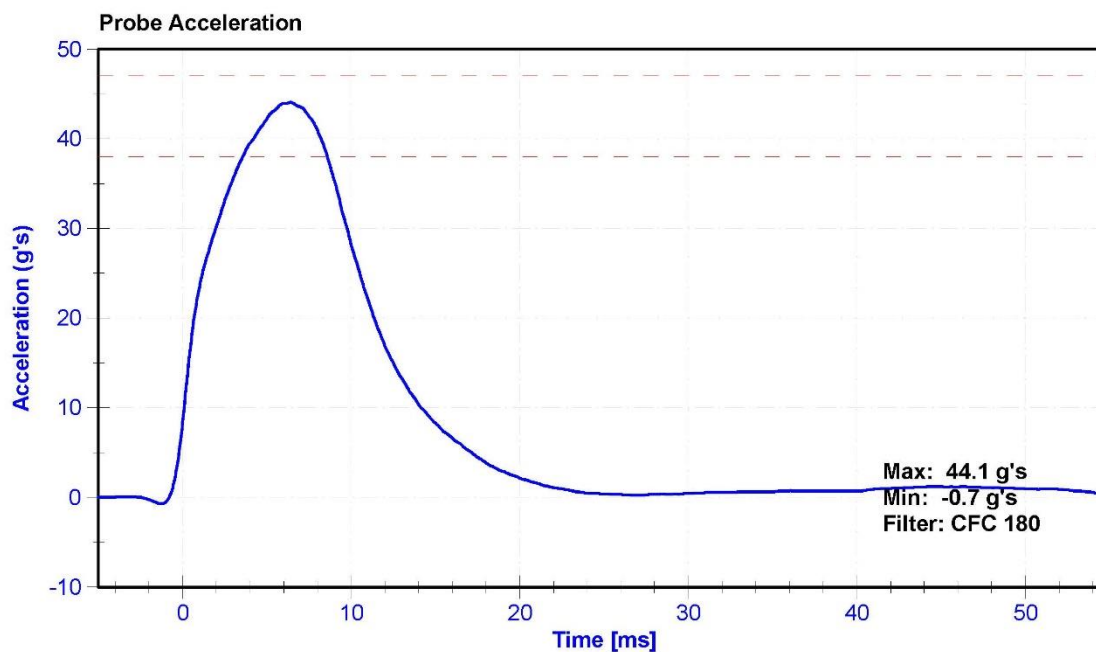
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	300	Laboratory Supervisor	M. Goehle

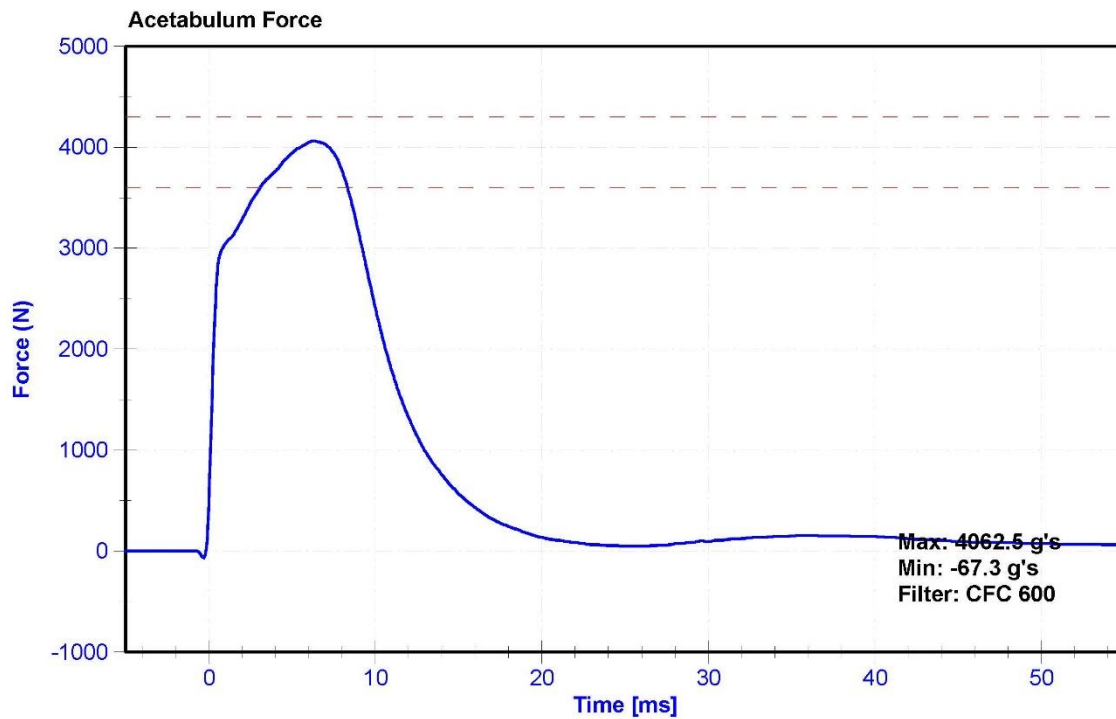
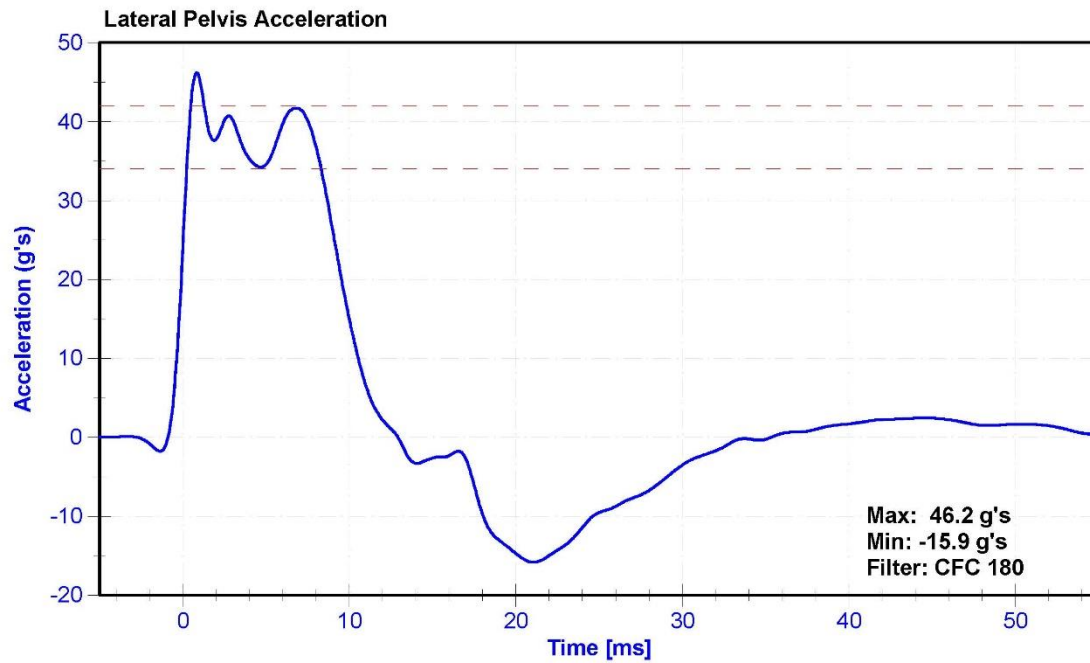
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	36.6	Pass
Velocity	6.6	6.8	m/s	6.63	Pass
Probe Acceleration	38	47	g's	44.1	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	41.7	Pass
Acetabulum Force	3600	4300	N	4062.5	Pass

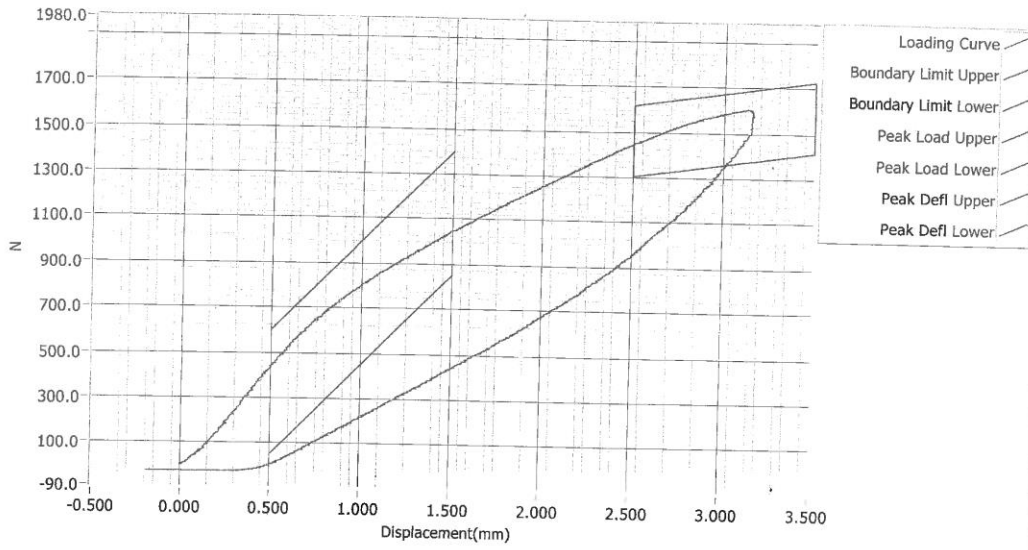
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	4/17/2018
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P79602	9/27/2017	3/28/2018
Acetabulum Load Cell	DENTON 3249J	LC-275Fy	6/20/2017	6/20/2018
Certification Plug	Humanetics	80930	11/25/2014	N/A
Crash Test Plug	Humanetics	80898	11/25/2014	N/A





Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

Test ID

Part Serial Number

Test Date

Test Time

1585 N

80930

11/25/2014

7:59 AM

Cert ID

ATD Serial Number

ATD Type

N/A

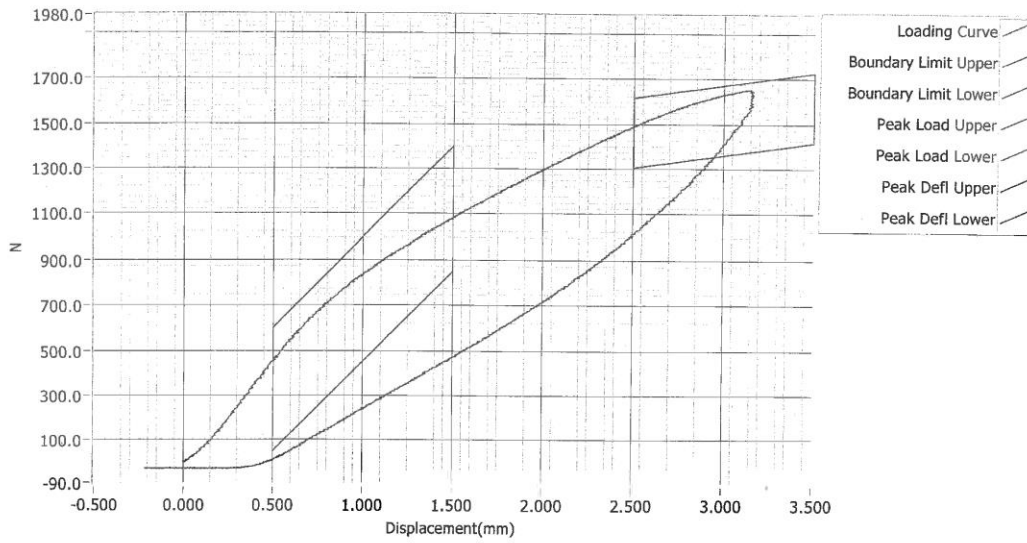
SIDIIs

Current Date : 11/25/2014

Current Time : 07:59:46

Cert. -2

Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
	80898	11/25/2014	6:45 AM
Cert ID	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

Current Date : 11/25/2014

Current Time : 06:46:37

Crash @ 1630N

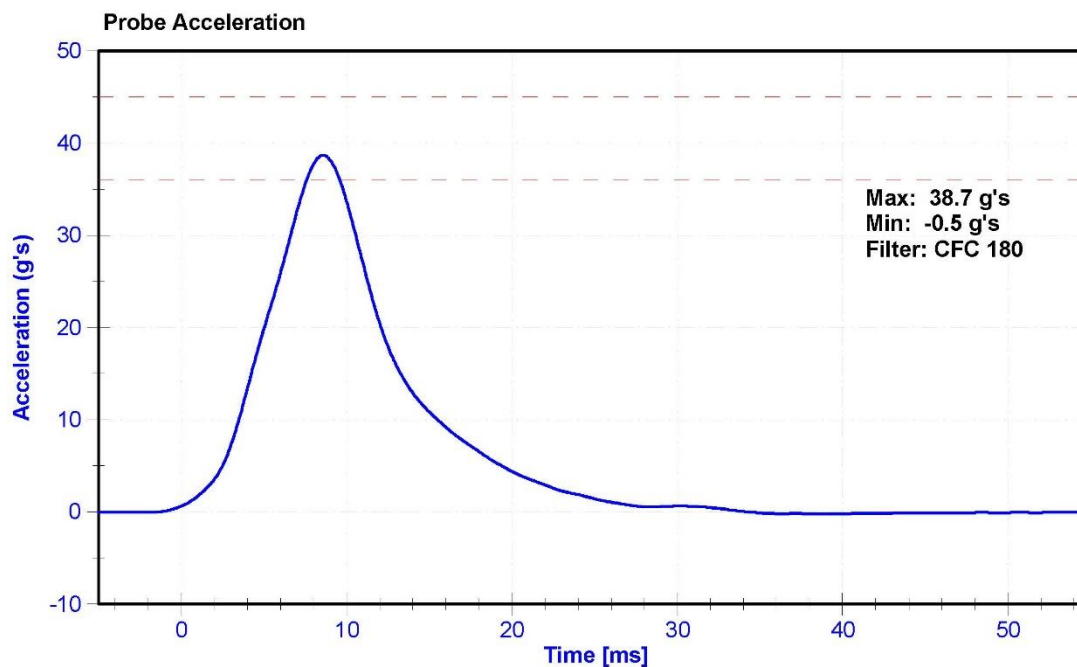
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	300	Laboratory Supervisor	M. Goehle

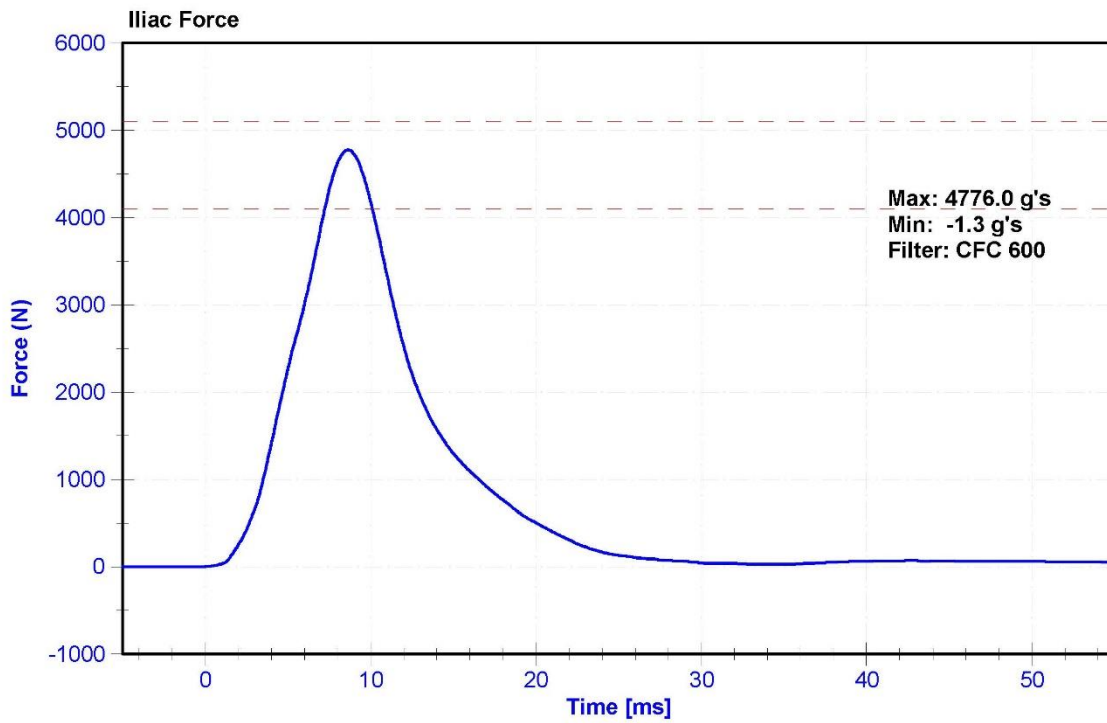
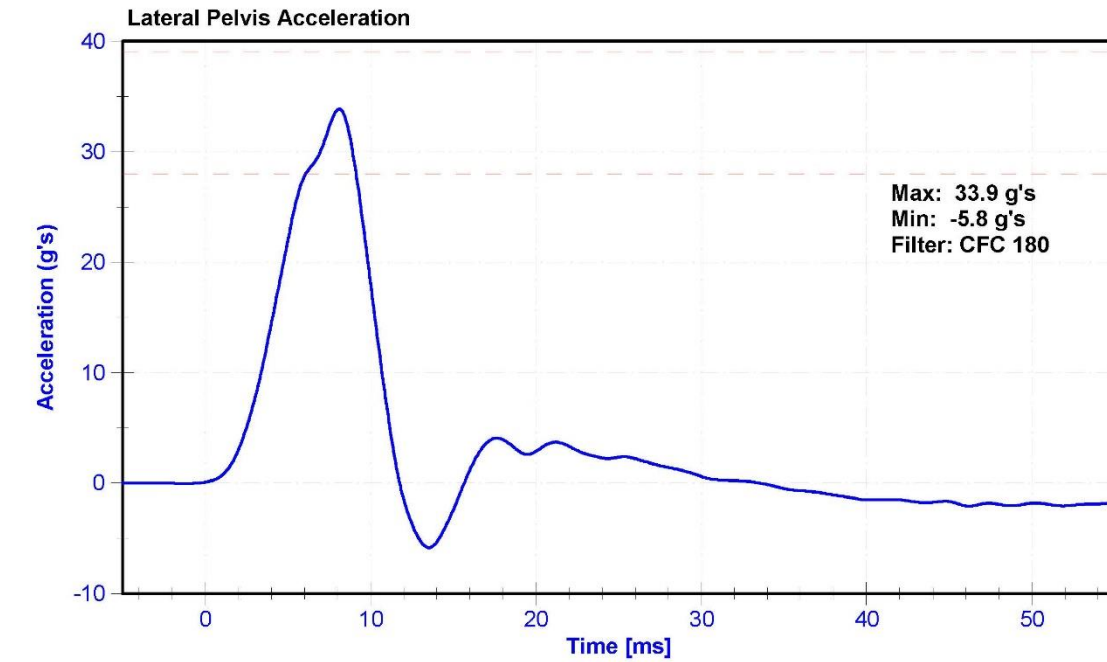
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	38.5	Pass
Velocity	4.2	4.4	m/s	4.36	Pass
Probe Acceleration	36	45	g's	38.7	Pass
Lateral Pelvis Acceleration	28	39	g's	33.9	Pass
Iliac Force	4100	5100	N	4776.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	4/17/2018
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P79602	9/27/2017	3/28/2018
Iliac Load Cell	DENTON 3228J	LC-279Fy	6/21/2017	6/21/2018





CALIBRATION TEST RESULTS

POST-TEST

EUROSID 2 (ES-2RE) MALE – DRIVER ATD

SERIAL NO: F034

(CONFIGURED FOR LEFT SIDE IMPACT)

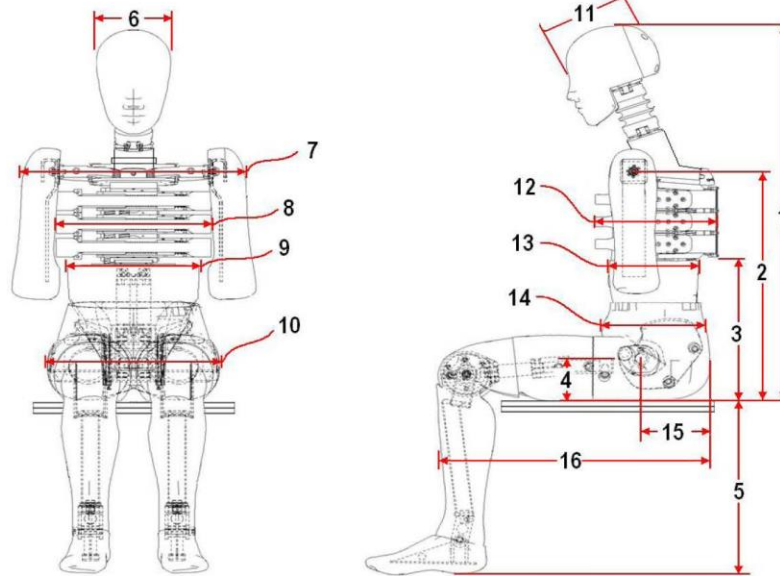


External Measurements - EuroSID-2re

Technician: K. Brogan

Date: 12/8/2017

Dummy Serial Number: F034



FRONT VIEW

SIDE VIEW

Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	913	Pass
2	Seat to Shoulder Joint	558	572	565	Pass
3	Seat to Lower Face of Thoracic Spine Box	346	356	350	Pass
4	Seat to Hip Joint (center of bolt)	97	103	100	Pass
5	Sole to Seat, Sitting	333	451	420	Pass
6	Head Width	152	158	154	Pass
7	Shoulder/Arm Width	461	479	469	Pass
8	Thorax Width	322	332	326	Pass
9	Abdomen Width	273	287	282	Pass
10	Pelvis Lap Width	359	373	367	Pass
11	Head Depth	196	206	202	Pass
12	Thorax Depth	262	272	268	Pass
13	Abdomen Depth	194	204	199	Pass
14	Pelvis Depth	235	245	241	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150	160	154	Pass
16	Back of Buttocks to Front Knee	597	615	600	Pass

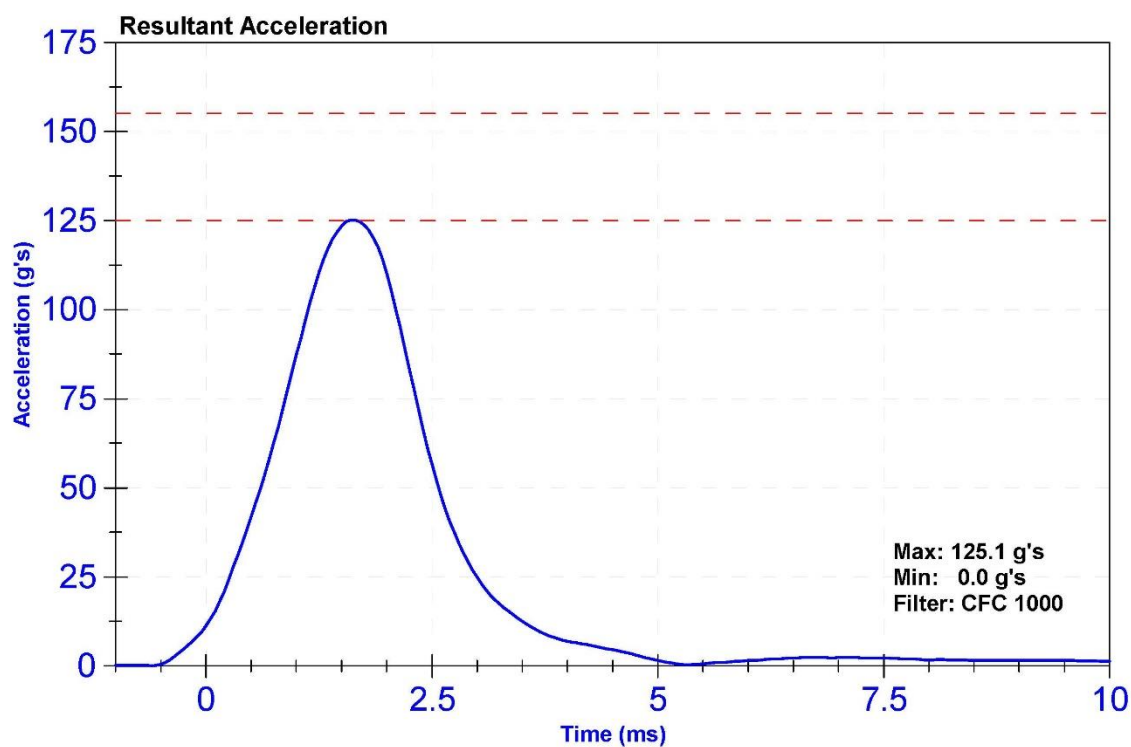
ATD Manufacturer	DP6741	Test Technician	S. McCloskey
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

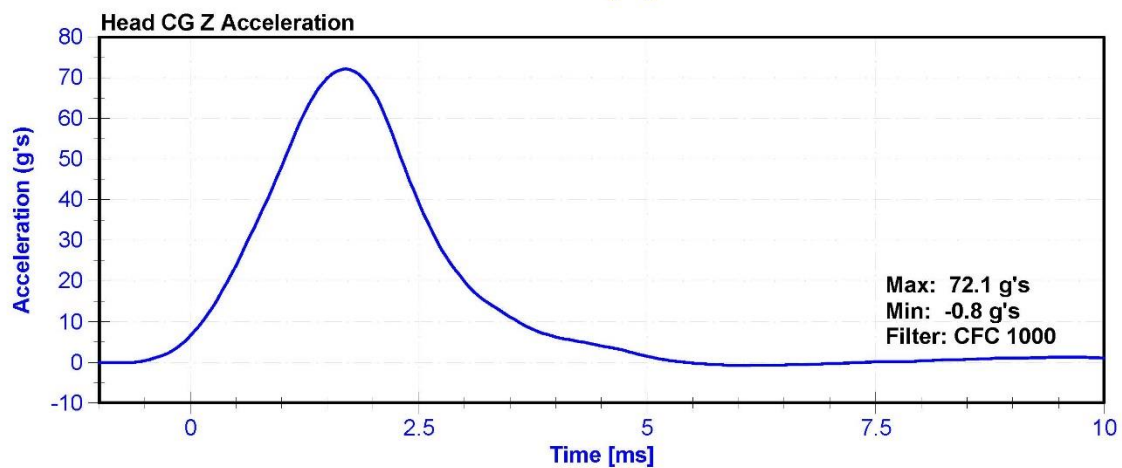
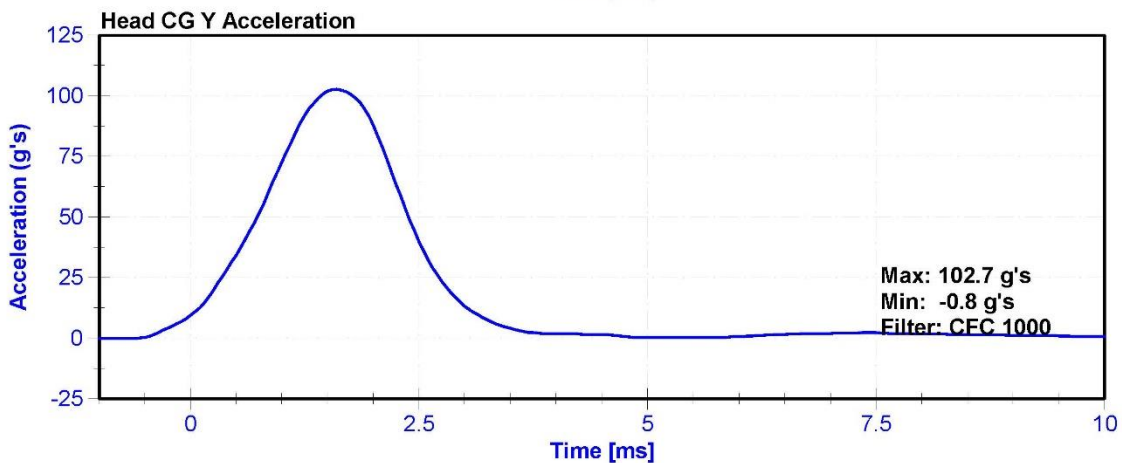
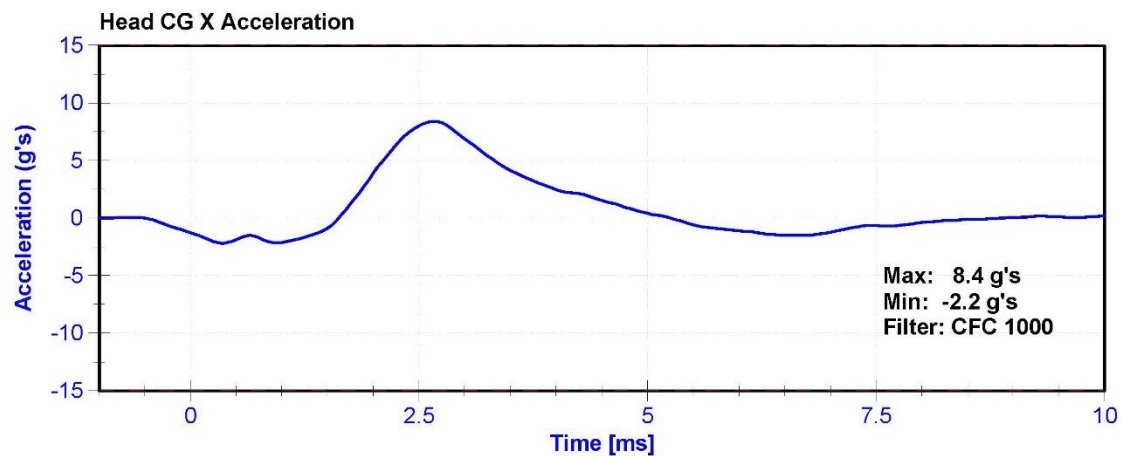
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	31.4	Pass
Resultant Acceleration	125	155	g's	125.1	Pass
Oscillation	0	15	%	1.91	Pass
Fore-Aft Acceleration	-15	15	g's	8.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P58904	10/24/2017	4/24/2018
Y Accelerometer	ENDEVCO 7264CT	AC-P58911	10/24/2017	4/24/2018
Z Accelerometer	ENDEVCO 7264CT	AC-P58776	10/24/2017	4/24/2018





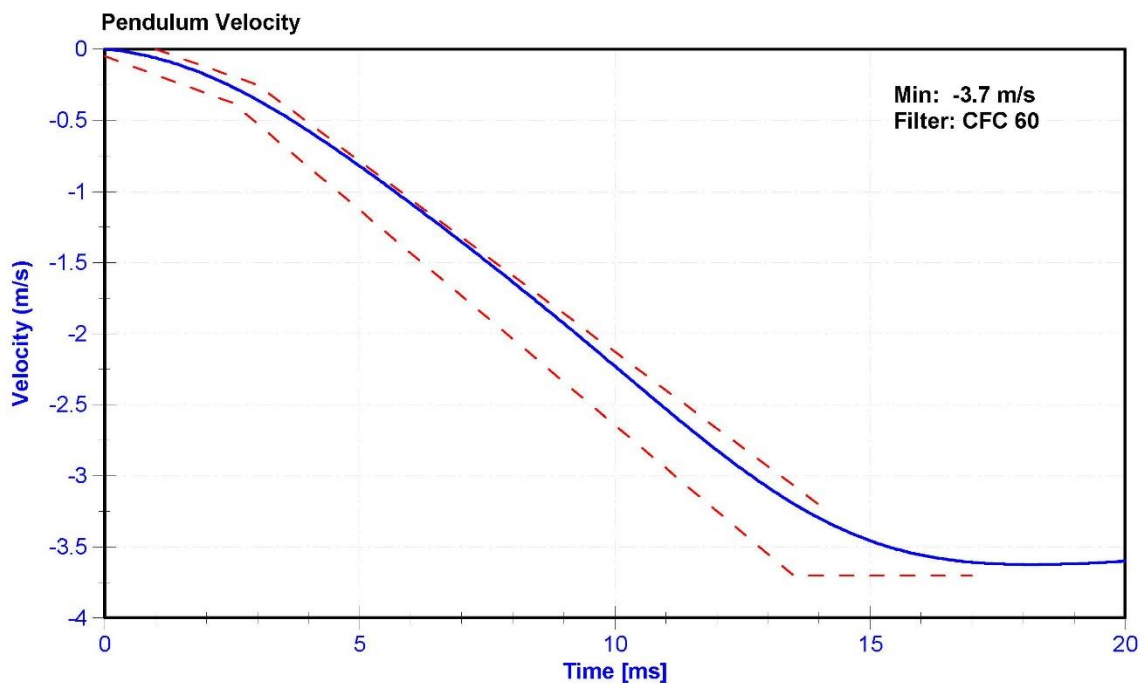
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M. Goehle

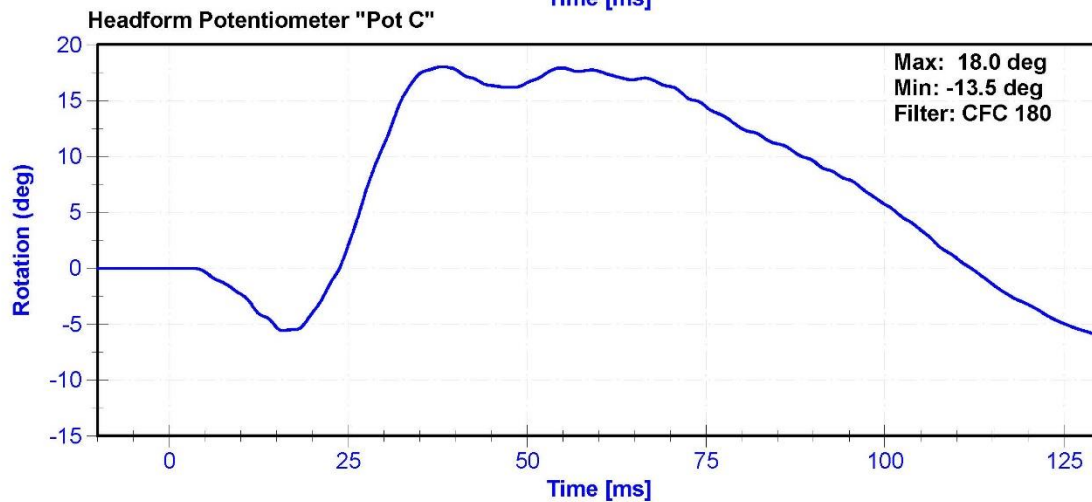
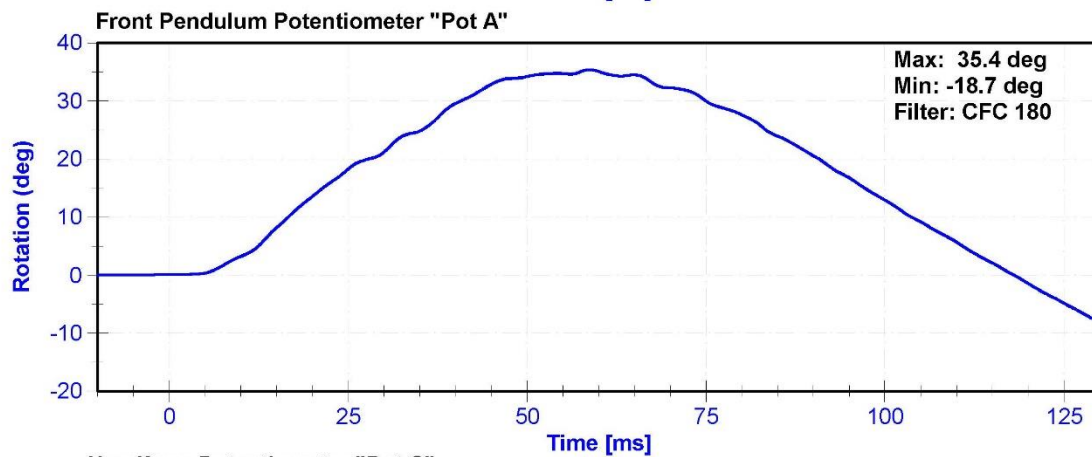
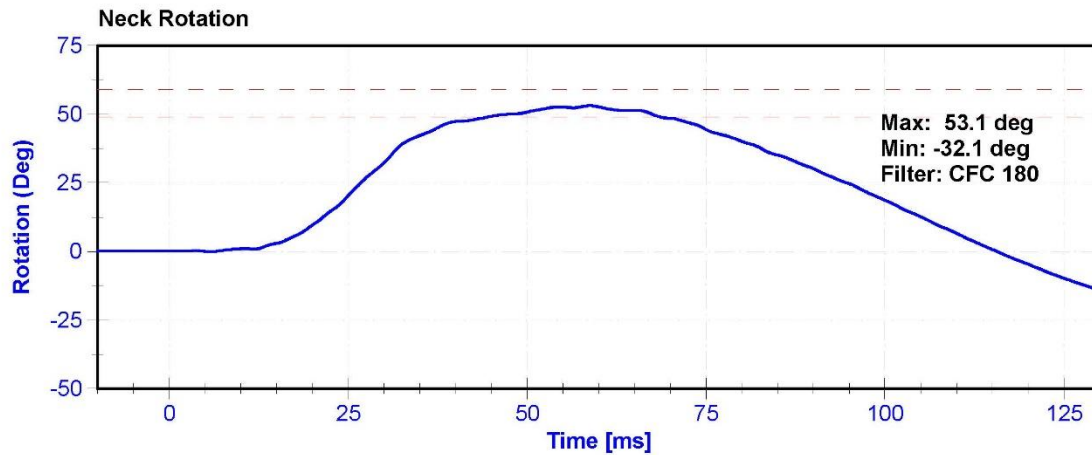
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22	Pass
Humidity	10	70	%	27.2	Pass
Velocity	3.3	3.5	m/s	3.40	Pass
Lateral Neck Rotation	49	59	deg	53.1	Pass
Time at Maximum Rotation	54	66	ms	58.8	Pass
Time of Rotation Decay from Maximum	53	88	ms	56.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/11/2017	5/11/2018
Front Pendulum Potentiometer	SP22G	DS-094	10/30/2017	10/30/2018
Headform Potentiometer	SP22G	DS-095	10/30/2017	10/30/2018





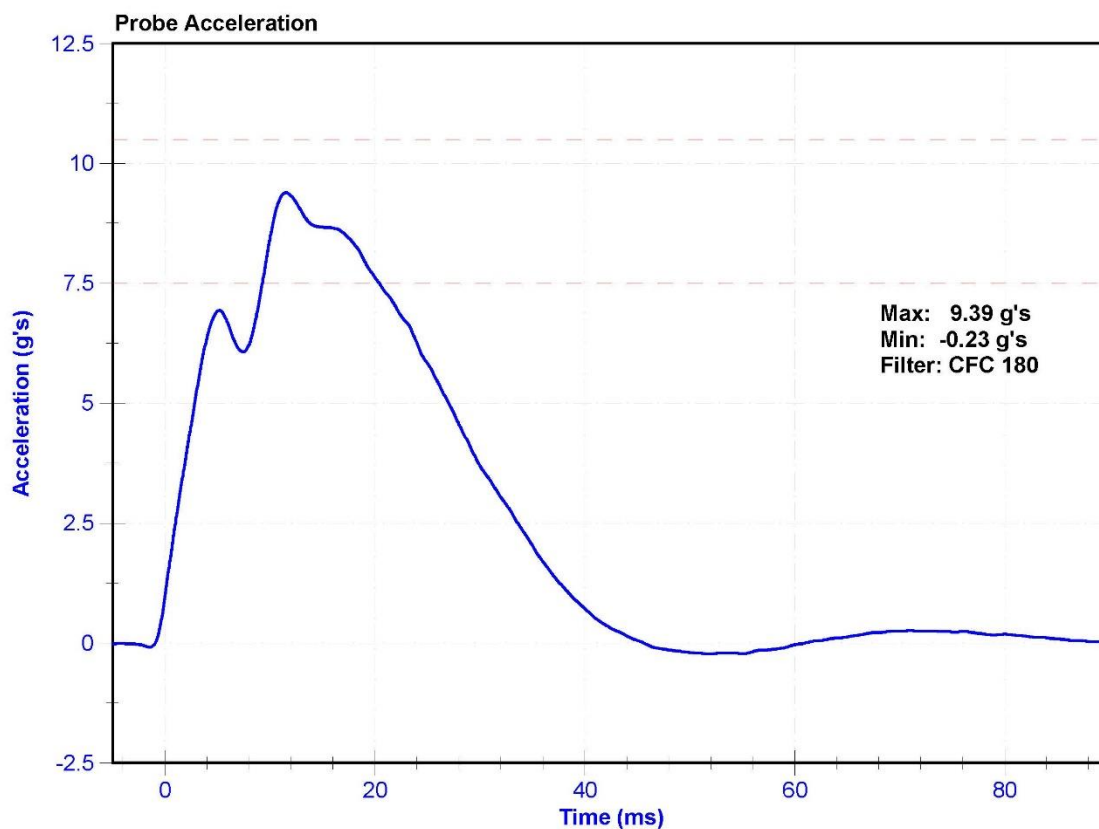
ATD Manufacturer	FTSS	Test Technician	S. McCloskey
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	30.7	Pass
Velocity	4.2	4.4	m/s	4.23	Pass
Probe Acceleration	7.5	10.5	g's	9.39	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	4/17/2018



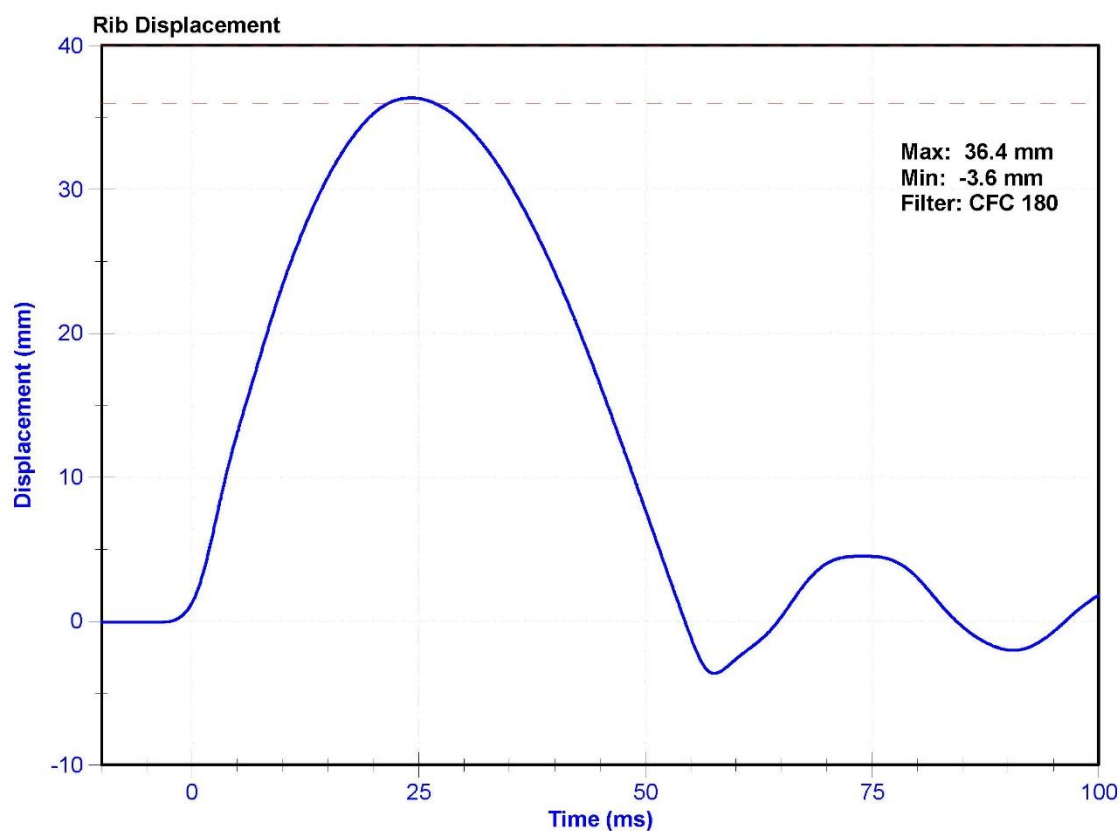
ATD Manufacturer	FTSS	Test Technician	S. McCloskey
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.0	Pass
Humidity	10	70	%	30.0	Pass
Rib Displacement	36	40	mm	36.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	9/27/2017	9/27/2018



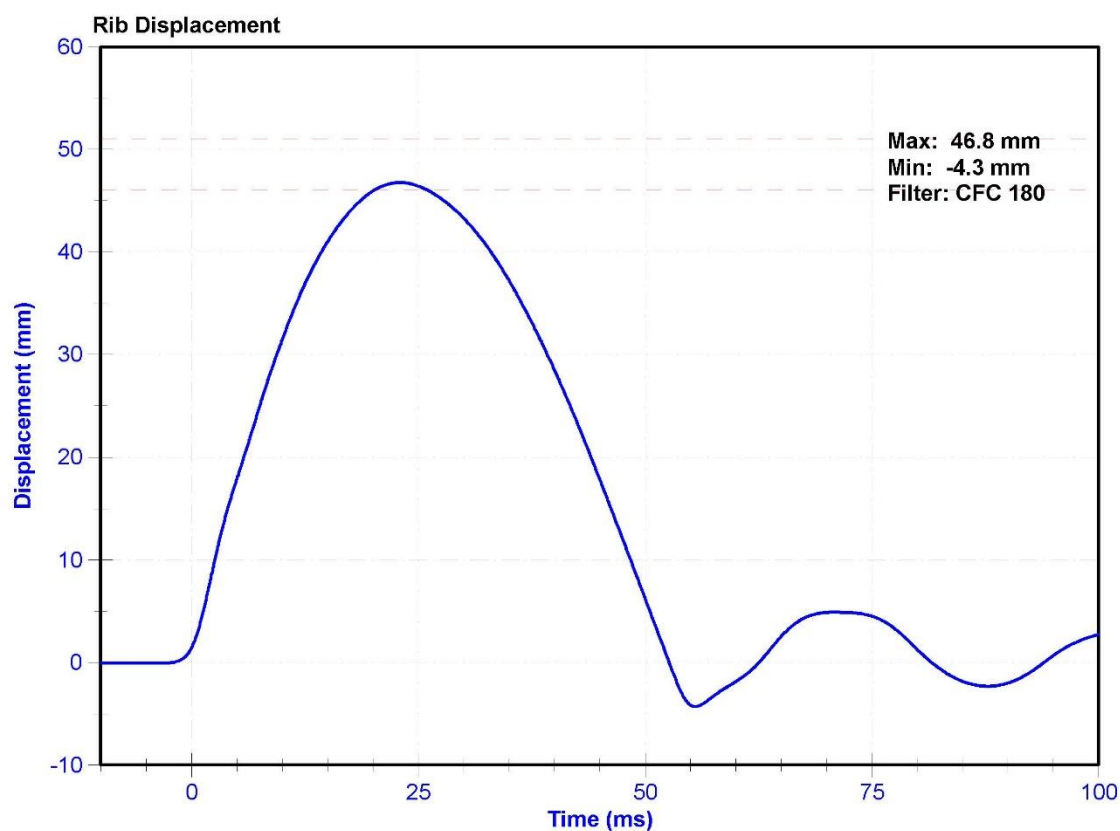
ATD Manufacturer	FTSS	Test Technician	S. McCloskey
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.0	Pass
Humidity	10	70	%	30.2	Pass
Rib Displacement	46	51	mm	46.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	9/27/2017	9/27/2018



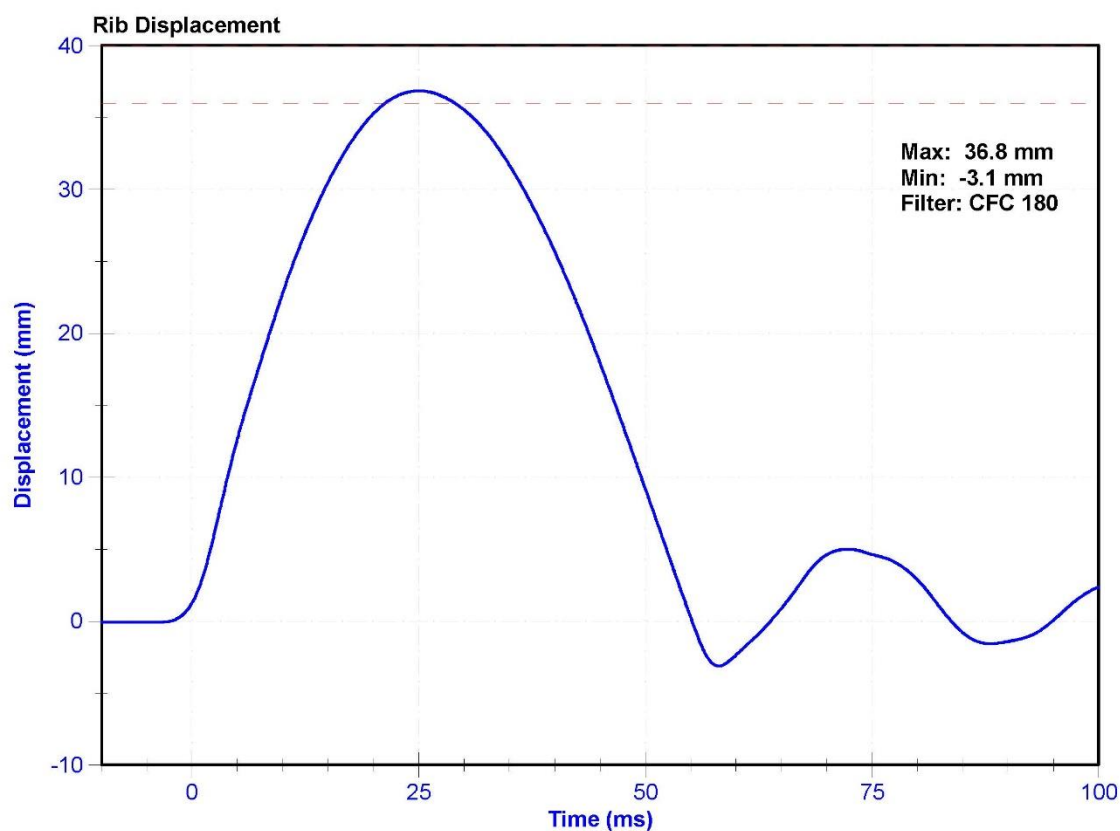
ATD Manufacturer	FTSS	Test Technician	S. McCloskey
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	30.0	Pass
Rib Displacement	36	40	mm	36.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	9/27/2017	9/27/2018



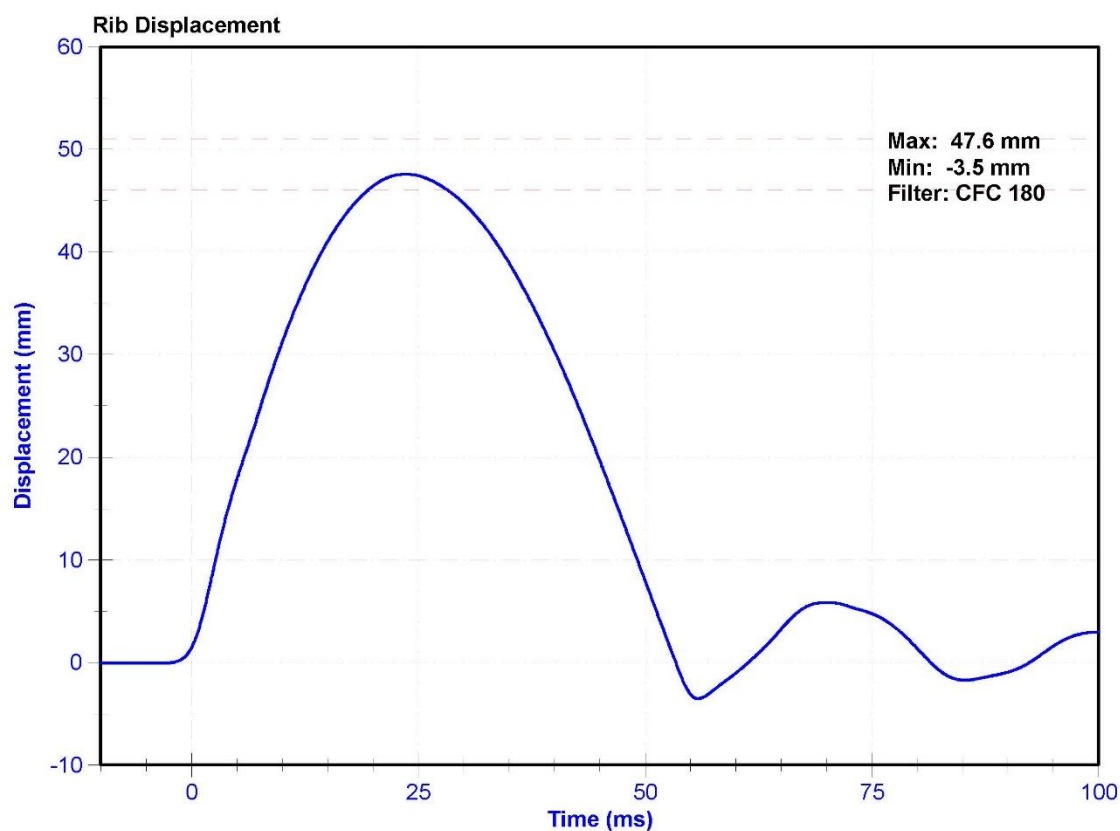
ATD Manufacturer	FTSS	Test Technician	S. McCloskey
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	30.0	Pass
Rib Displacement	46	51	mm	47.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	9/27/2017	9/27/2018



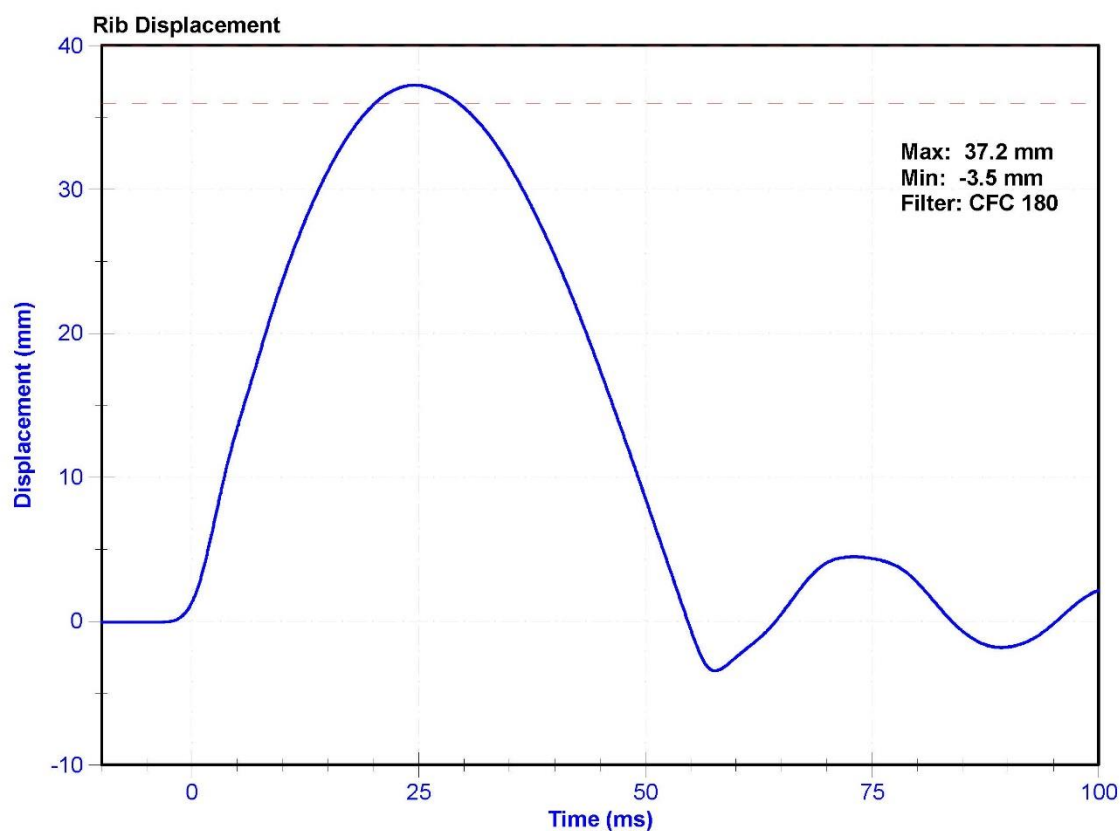
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	F034	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.8	Pass
Humidity	10	70	%	37.8	Pass
Rib Displacement	36	40	mm	37.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	9/27/2017	9/27/2018



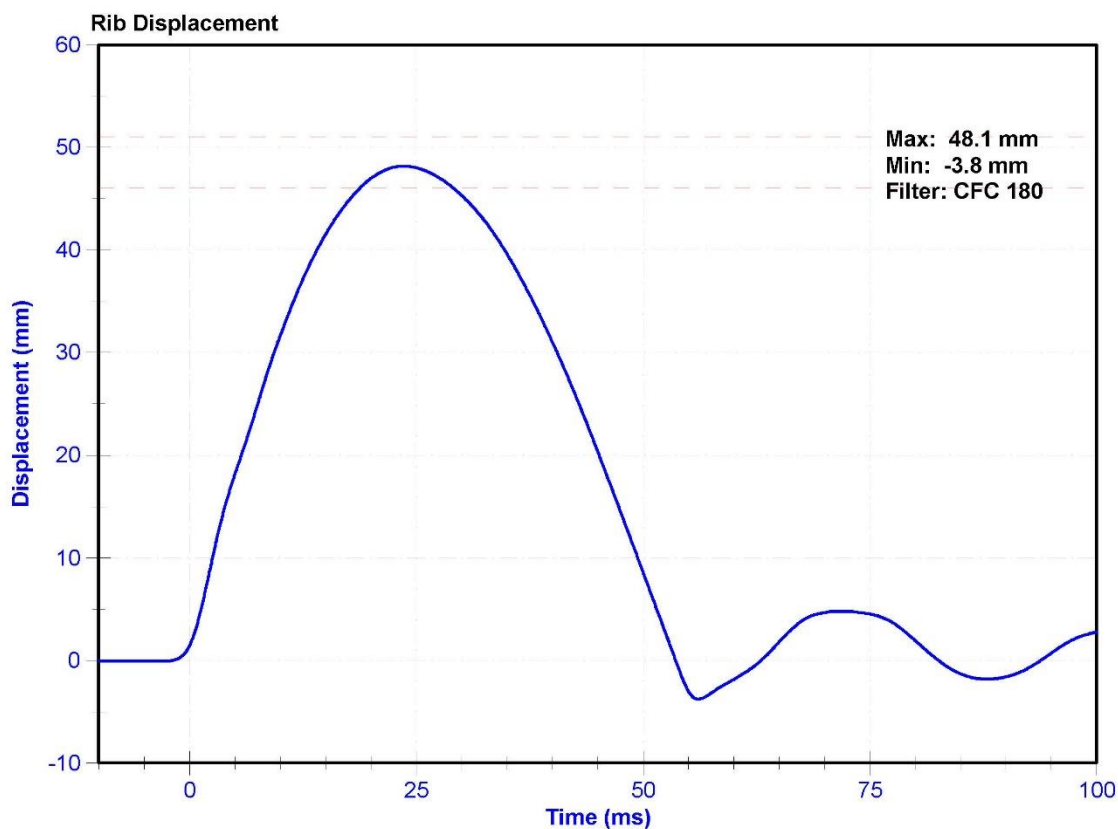
ATD Manufacturer	FTSS	Test Technician	S. McCloskey
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.8	Pass
Humidity	10	70	%	30.0	Pass
Rib Displacement	46	51	mm	48.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	9/27/2017	9/27/2018



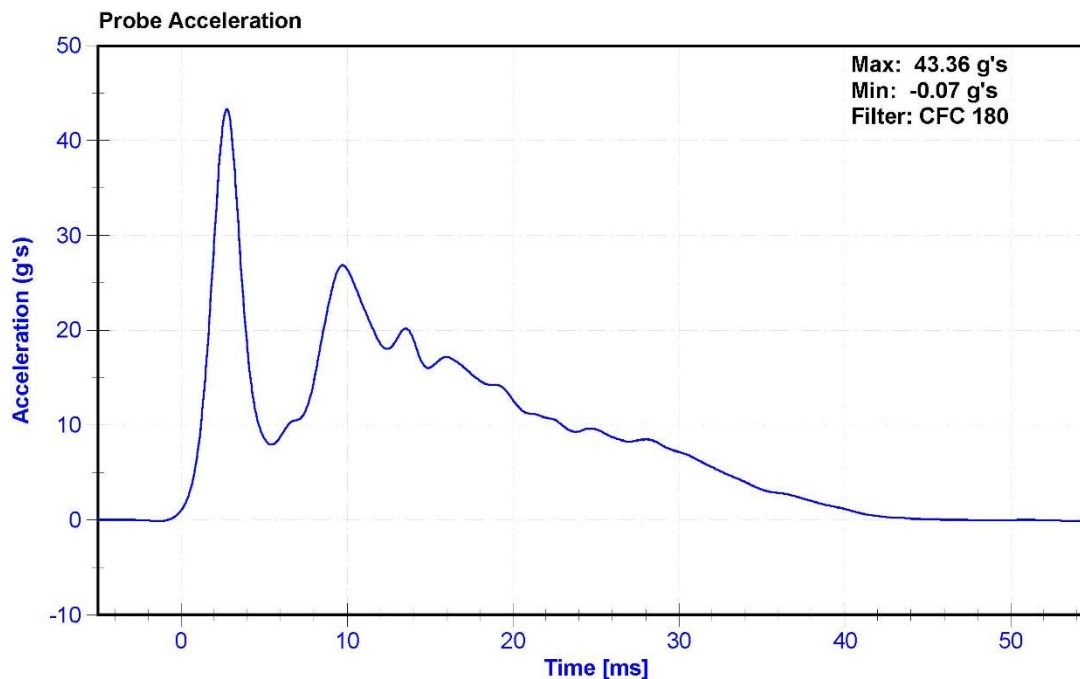
ATD Manufacturer	FTSS	Test Technician	S. McCloskey
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

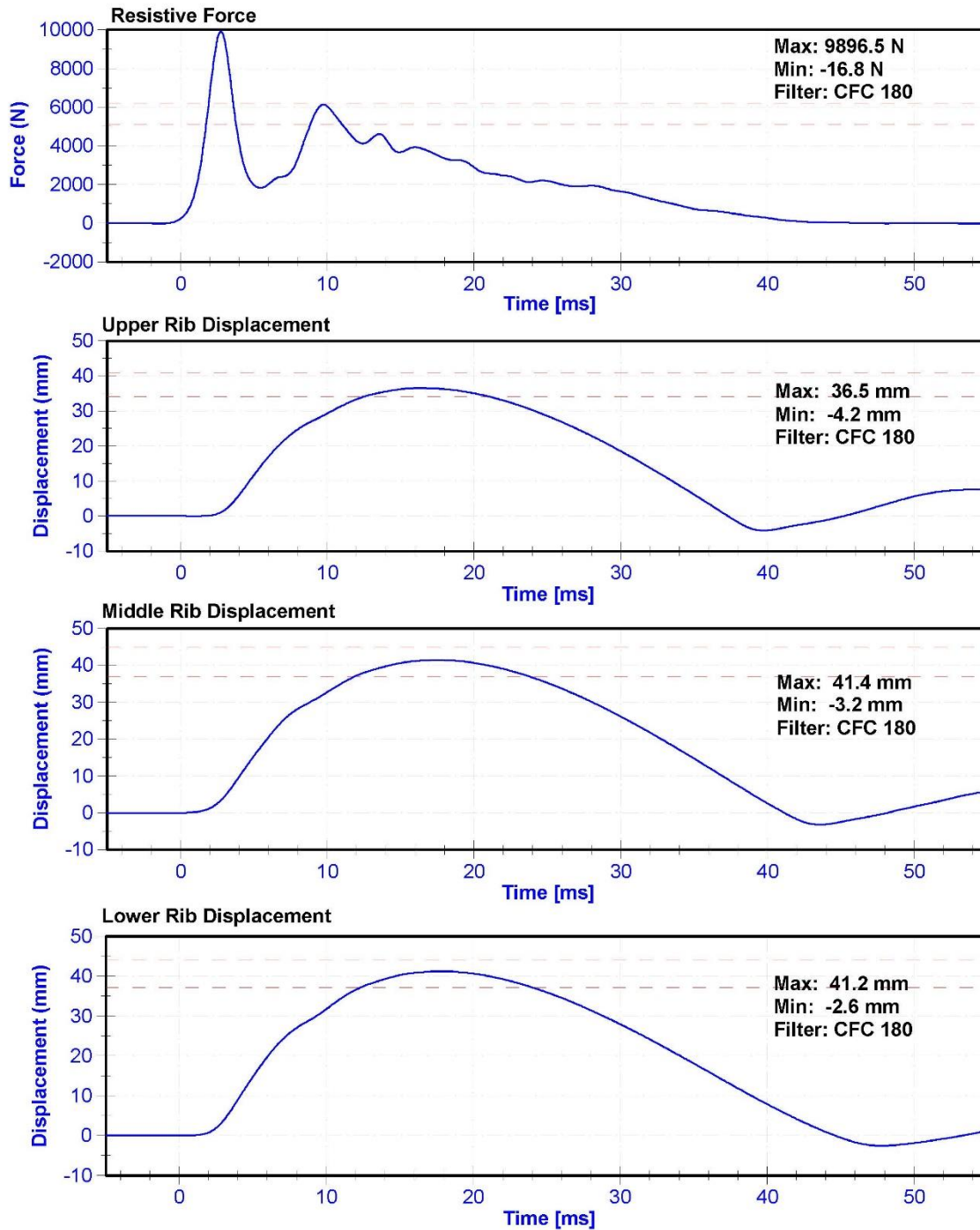
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.8	Pass
Humidity	10	70	%	30.5	Pass
Velocity	5.4	5.6	m/s	5.58	Pass
Resistive Force after 6ms	5100	6200	N	6127.9	Pass
Upper Thorax Rib Deflection	34	41	mm	36.5	Pass
Mid Thorax Rib Deflection	37	45	mm	41.4	Pass
Lower Thorax Rib Deflection	37	44	mm	41.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	4/17/2018
Upper Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	9/27/2017	9/27/2018
Middle Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	9/27/2017	9/27/2018
Lower Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	9/27/2017	9/27/2018







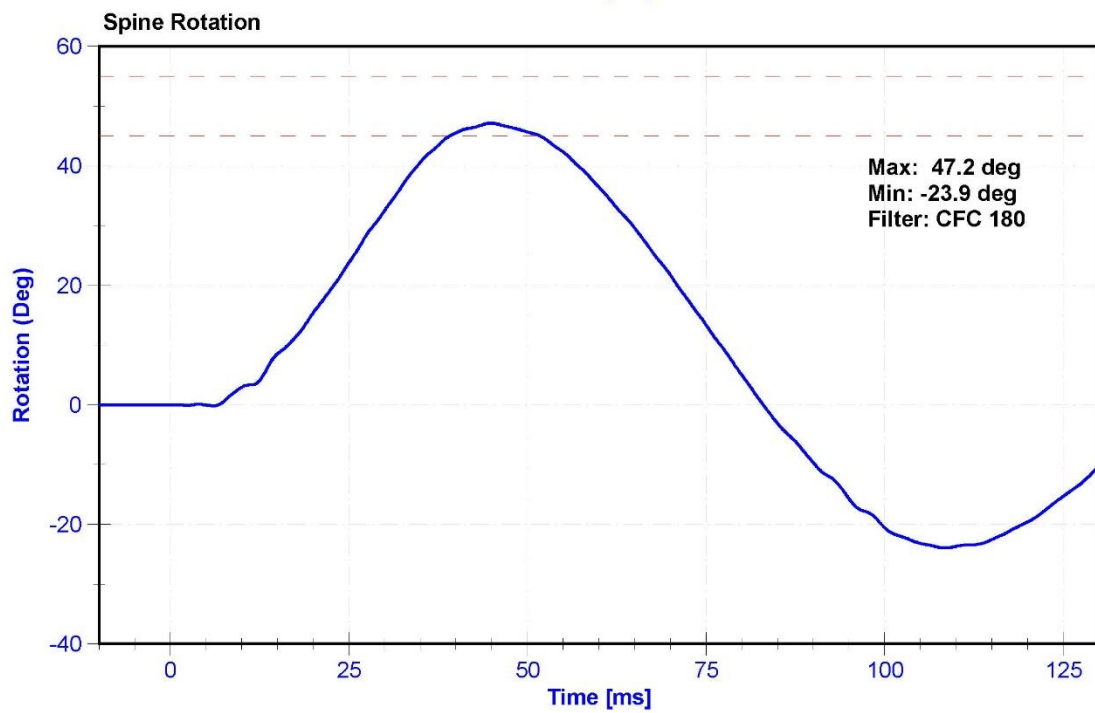
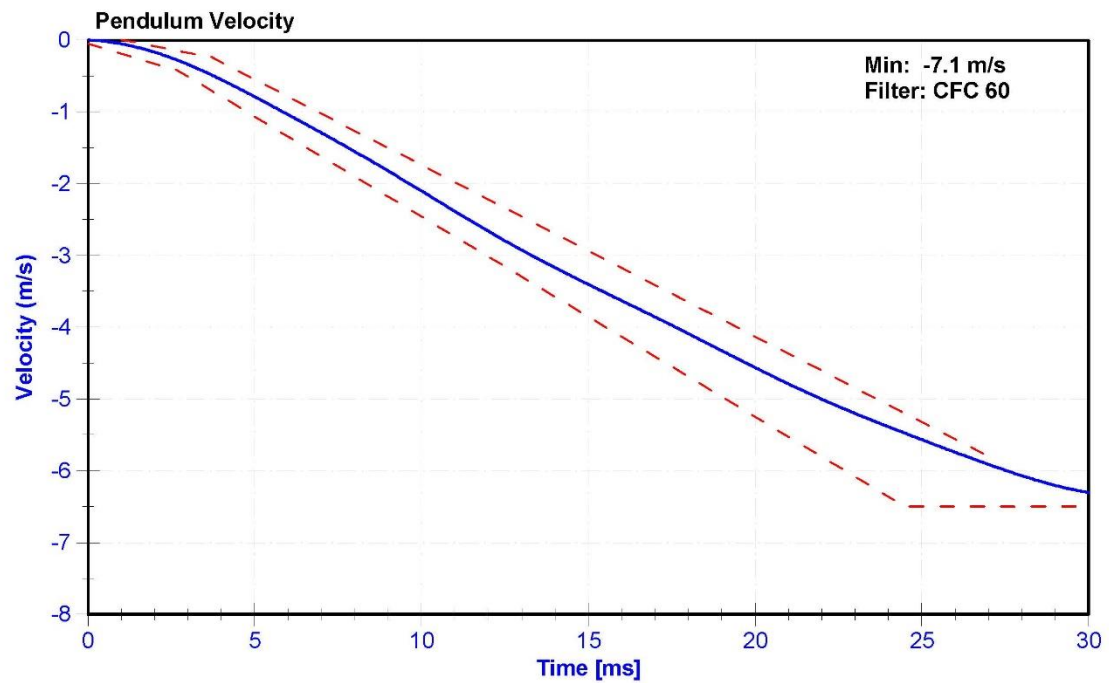
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

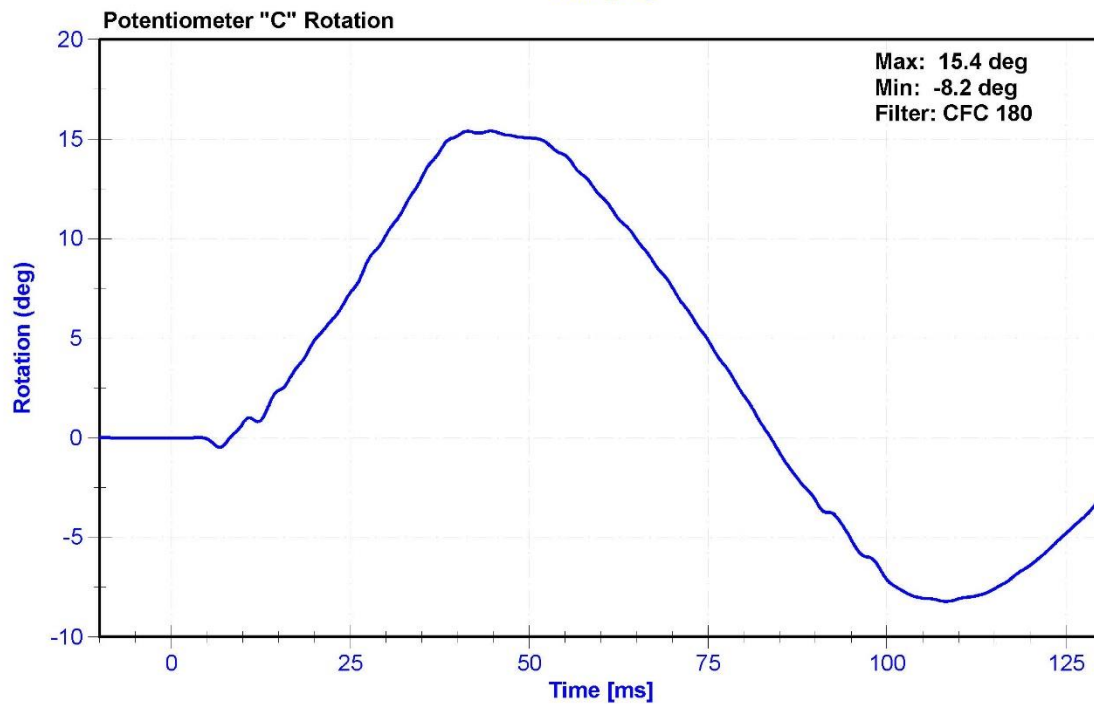
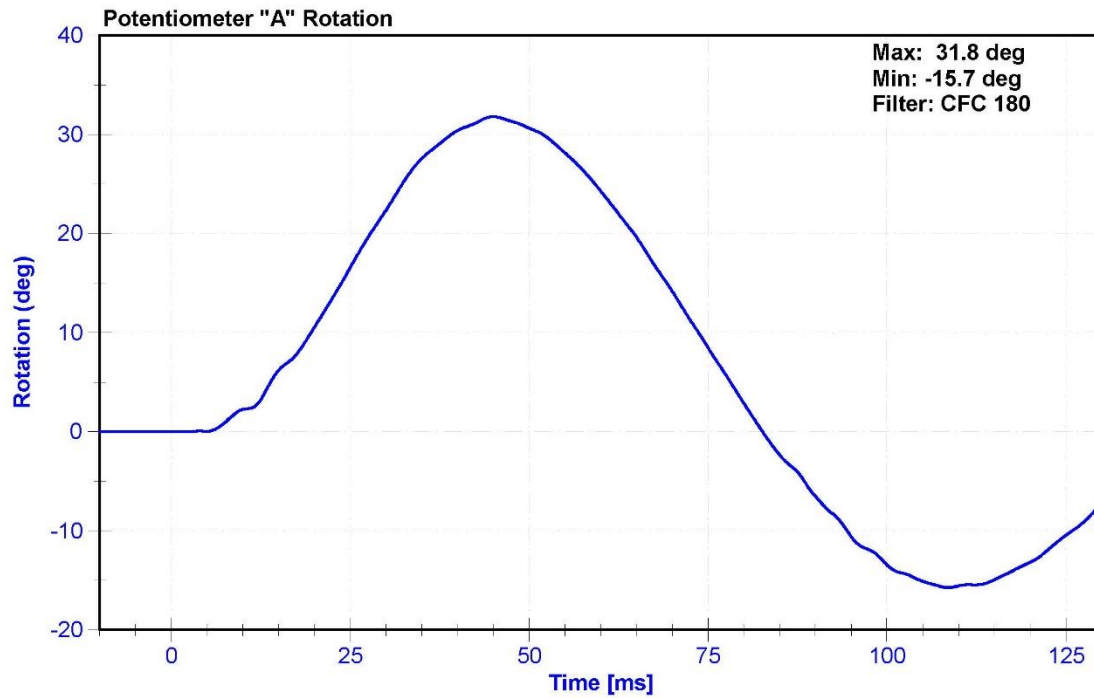
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	30.3	Pass
Velocity	5.95	6.15	m/s	6.113	Pass
Lateral Spine Rotation	45	55	deg	47.2	Pass
Time at Maximum Rotation	39	53	ms	44.8	Pass
Time of Decay to Zero Degrees	37	57	ms	38.2	Pass
Pulse within Corridor?	-	-	-		

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/11/2017	5/11/2018
Pendulum "A" Potentiometer	SP22G	DS-094	10/30/2017	10/30/2018
Condyle "B" Potentiometer	SP22G	DS-095	10/30/2017	10/30/2018





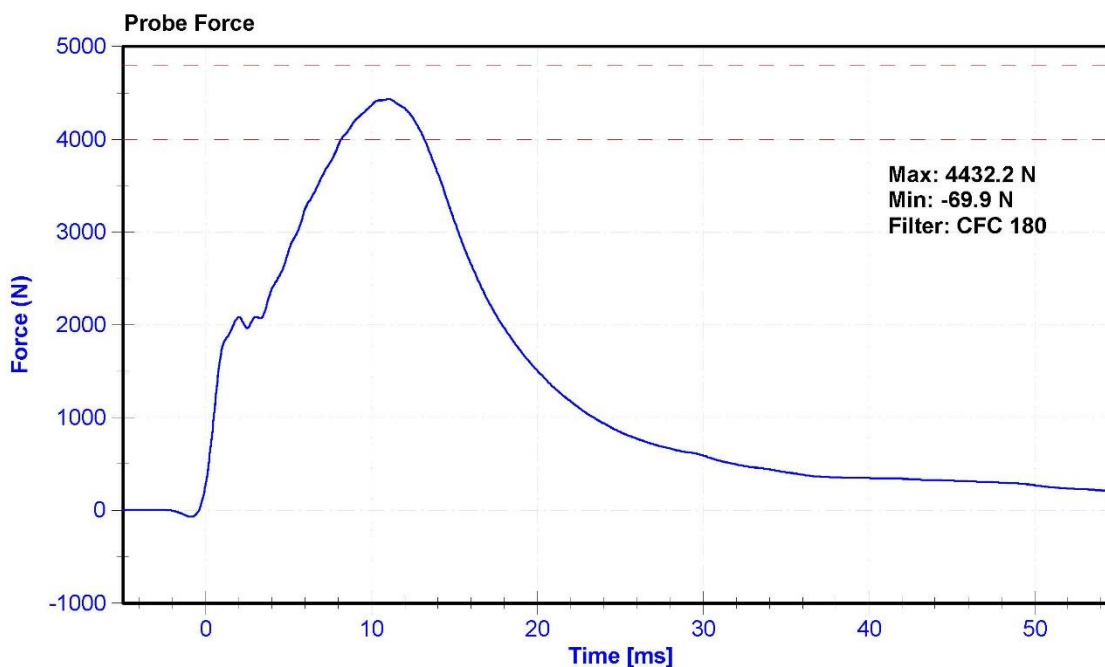
ATD Manufacturer	FTSS	Test Technician	S. McCloskey
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

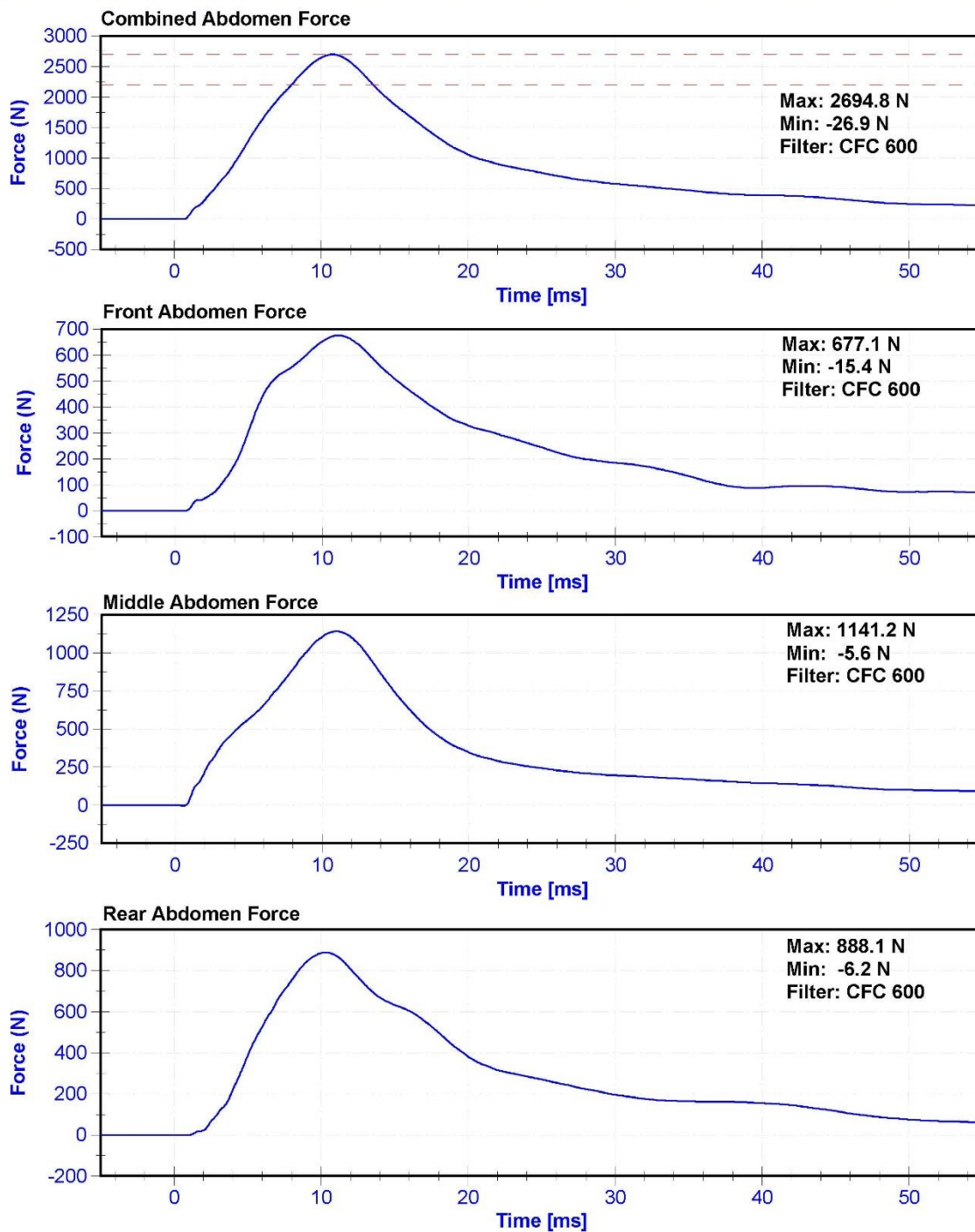
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.2	Pass
Humidity	10	70	%	29.6	Pass
Velocity	3.9	4.1	m/s	4.07	Pass
Combined Abdomen Force	2200	2700	N	2694.8	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	10.75	Pass
Resistive Probe Force	4000	4800	N	4432.2	Pass
Time at Peak Resistive Force	10.6	13.0	ms	11.05	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	4/17/2018
Front Abdomen Load Cell	DENTON 2631	LC-1512	6/5/2017	6/5/2018
Middle Abdomen Load Cell	DENTON 2631	LC-1526	6/5/2017	6/5/2018
Rear Abdomen Load Cell	DENTON 2631	LC-1516	6/5/2017	6/5/2018





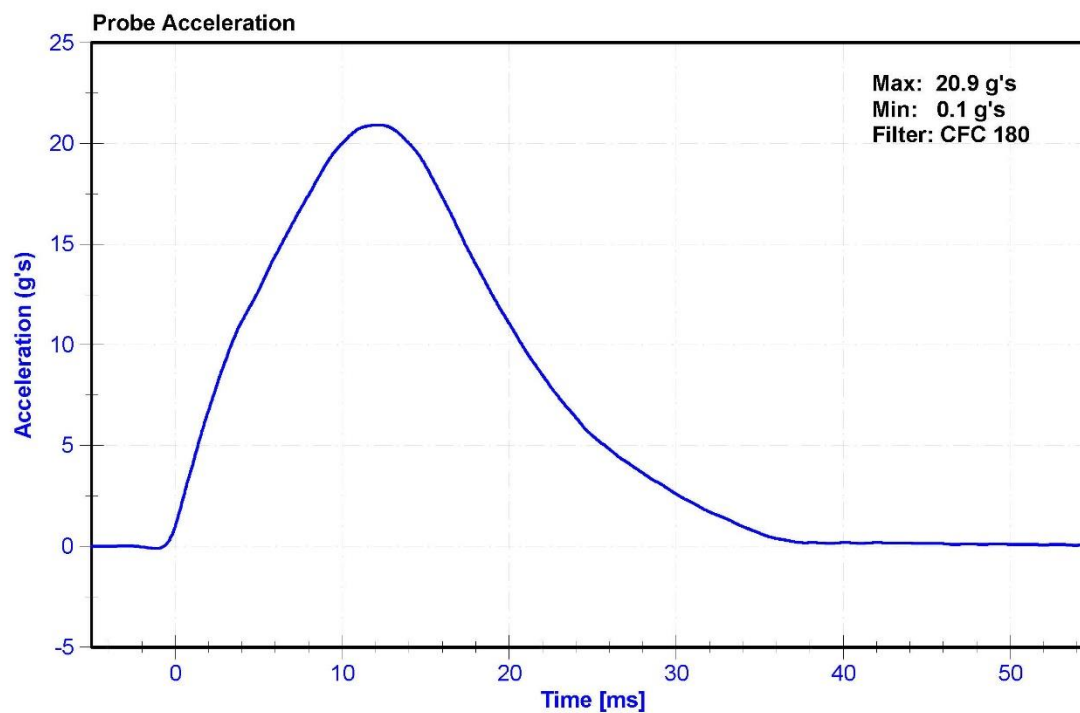
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	F034	Laboratory Supervisor	M. Goehle

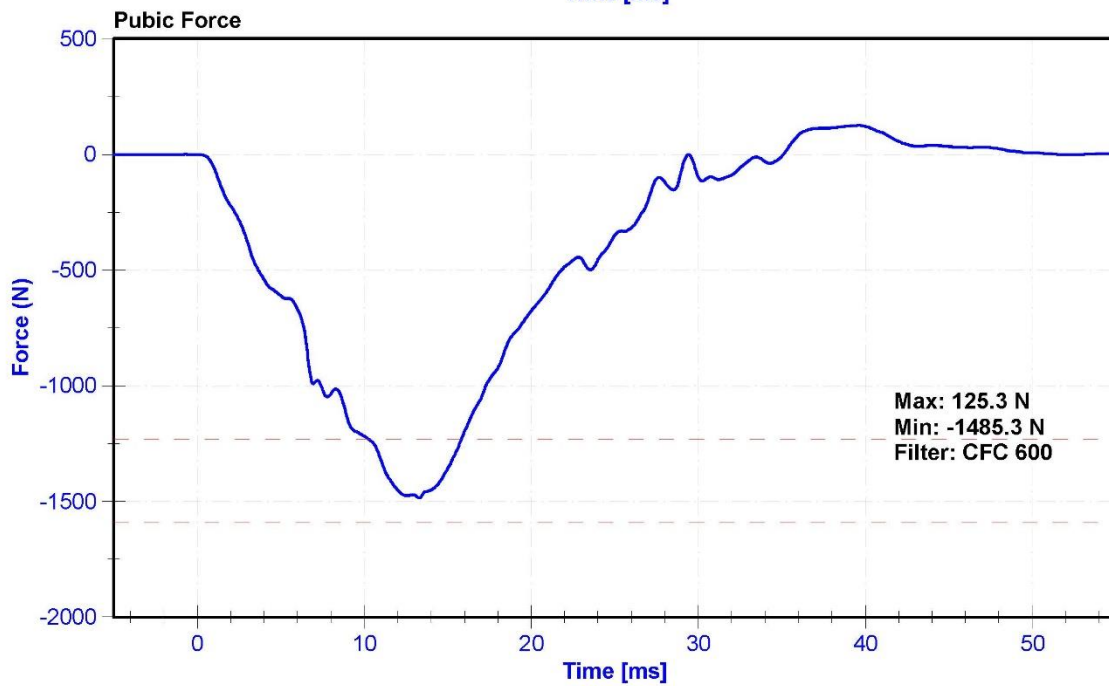
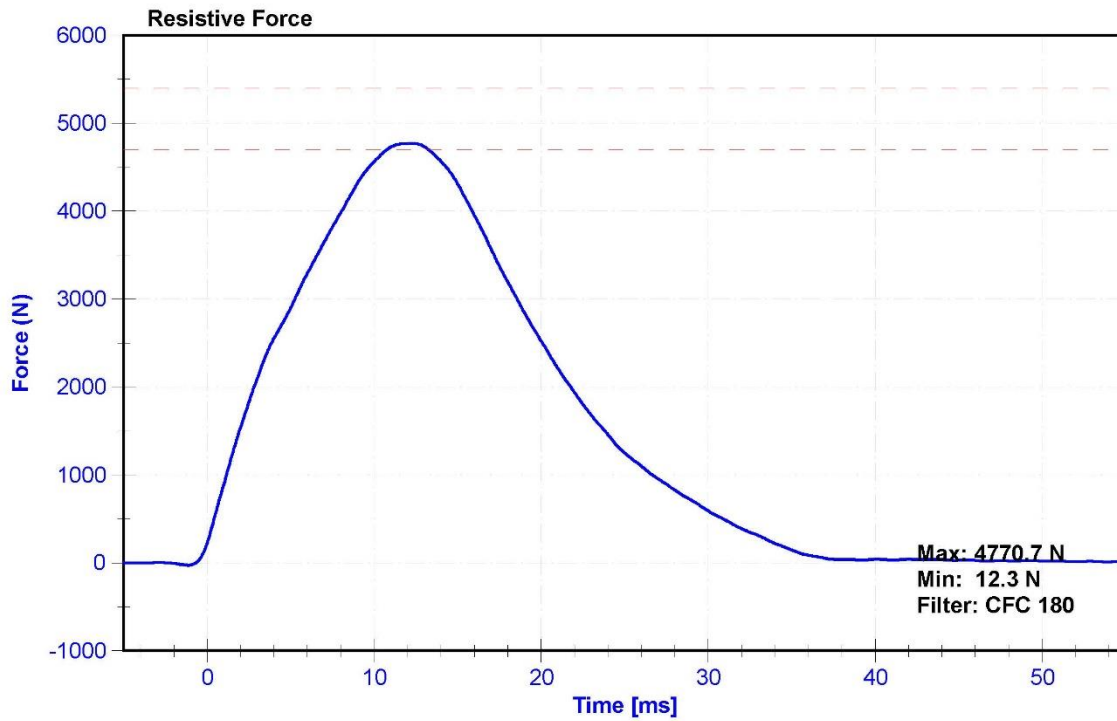
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.1	Pass
Humidity	10	70	%	29.8	Pass
Velocity	4.2	4.4	m/s	4.38	Pass
Resistive Force	4700	5400	N	4770.7	Pass
Time at Peak Resistive Force	11.8	16.1	ms	12.30	Pass
Pubic Force	-1590	-1230	N	-1485.3	Pass
Time at Peak Pubic Force	12.2	17.0	ms	13.30	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	4/17/2018
Pubic Load Cell	Denton 3096JFL	LC-465Fy	6/6/2017	6/6/2018





CALIBRATION TEST RESULTS

POST-TEST

SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD

SERIAL No: 300

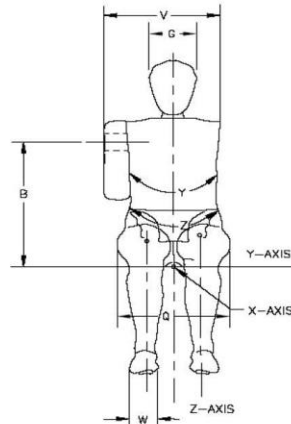
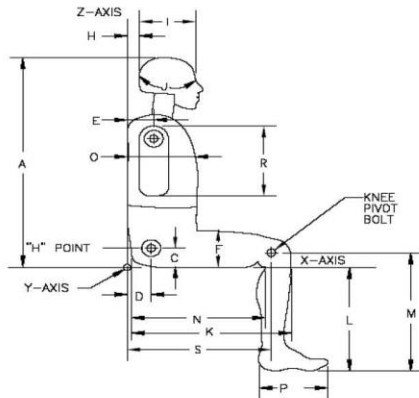


External Measurements - SID-IIs

Technician: K. Brogan

Date: 12/8/2017

Dummy Serial Number: 300



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	781	Pass
B	Shoulder Pivot Height	437	453	446	Pass
C	H-point Height	79	89	86	Pass
D	H-point from seatback	141	151	146	Pass
E	Shoulder Pivot from Backline	97	107	103	Pass
F	Thigh Clearance	119	135	122	Pass
G	Head Breadth	140	148	145	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	182	Pass
J	Head Circumference	541	551	547	Pass
K	Buttock to Knee Length	514	540	536	Pass
L	Popliteal Height	343	369	356	Pass
M	Knee Pivot to floor height	392	409	402	Pass
N	Buttock Popliteal Length	416	442	435	Pass
O	Chest Depth w/o jacket	195	211	205	Pass
P	Foot Length	216	232	221	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	319	Pass
R	Arm Length	249	259	251	Pass
S	Knee Joint to seatback	477	493	485	Pass
V	Shoulder Width	341	357	351	Pass
W	Foot Width	78	94	85	Pass
Y	Chest Circumference w/jacket	851	881	870	Pass
Z	Waist Circumference	761	791	772	Pass

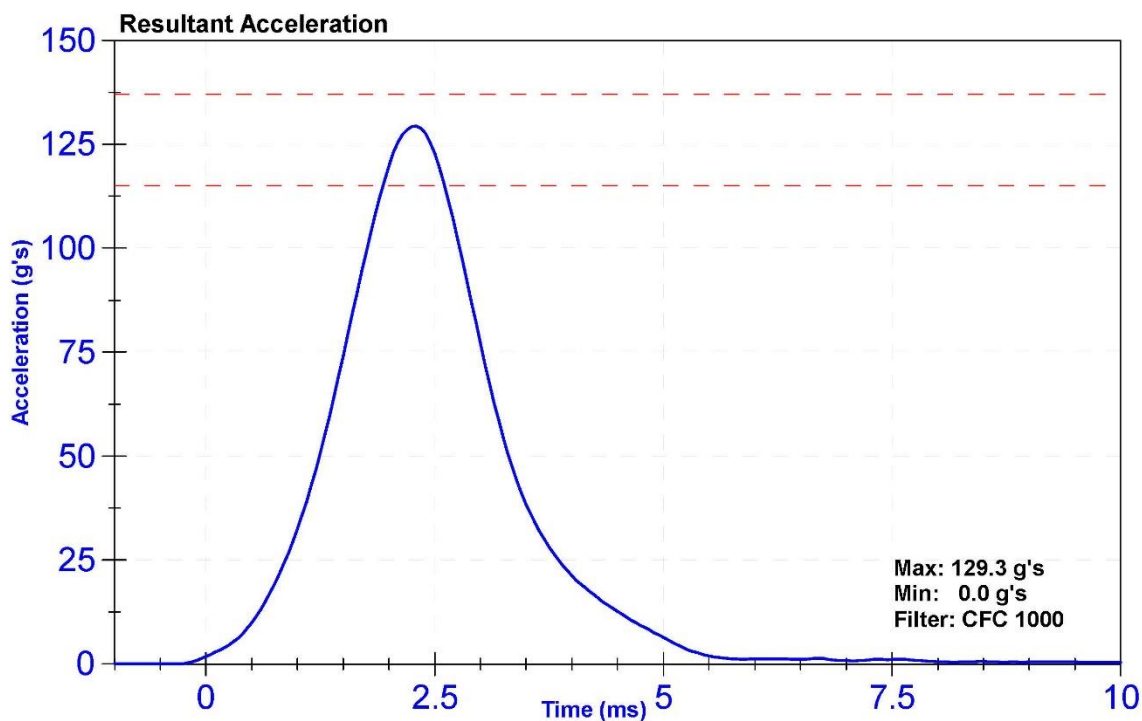
ATD Manufacturer	FTSS	Test Technician	S. Keller
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

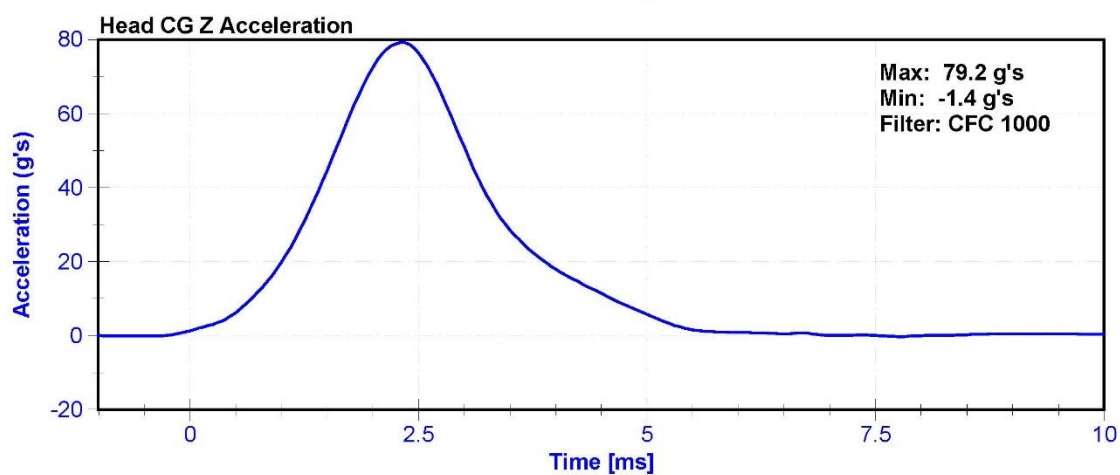
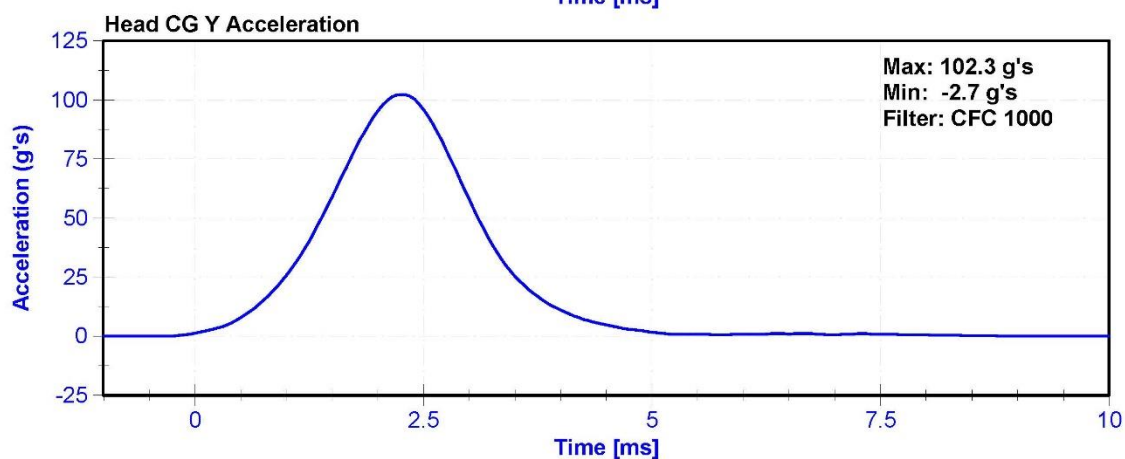
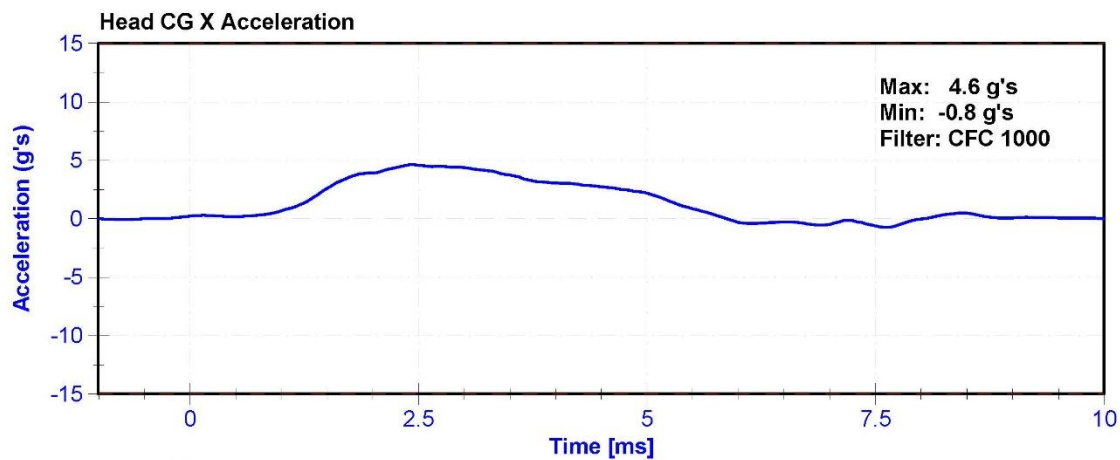
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	32.5	Pass
Resultant Acceleration	115	137	g's	129.3	Pass
Oscillation	0	15	%	2.2	Pass
Fore-Aft Acceleration	-15	15	g's	4.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P58777	9/28/2017	3/29/2018
Y Accelerometer	ENDEVCO 7264CT	AC-P59018	9/28/2017	3/29/2018
Z Accelerometer	ENDEVCO 7264	AC-P79189	9/28/2017	3/29/2018





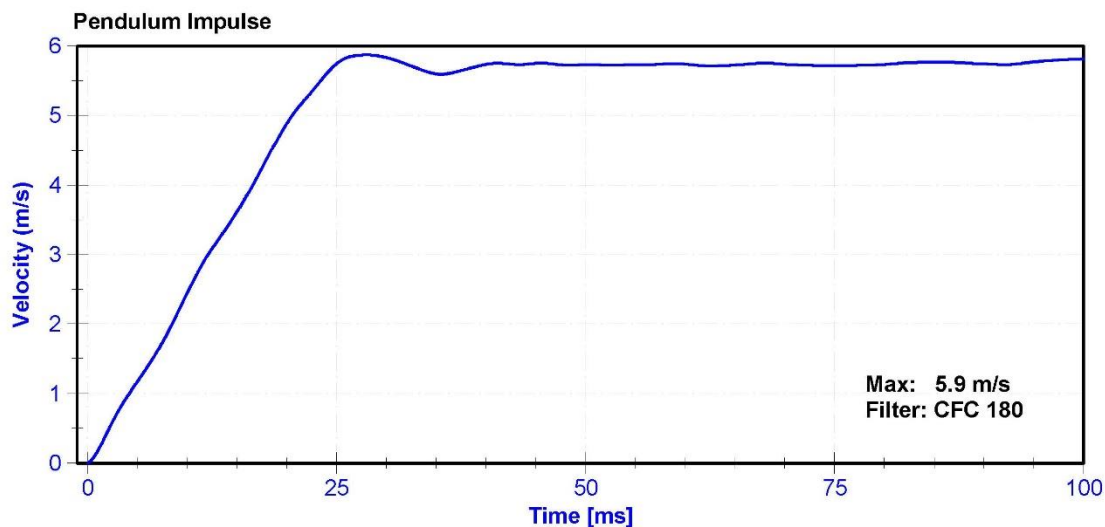
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

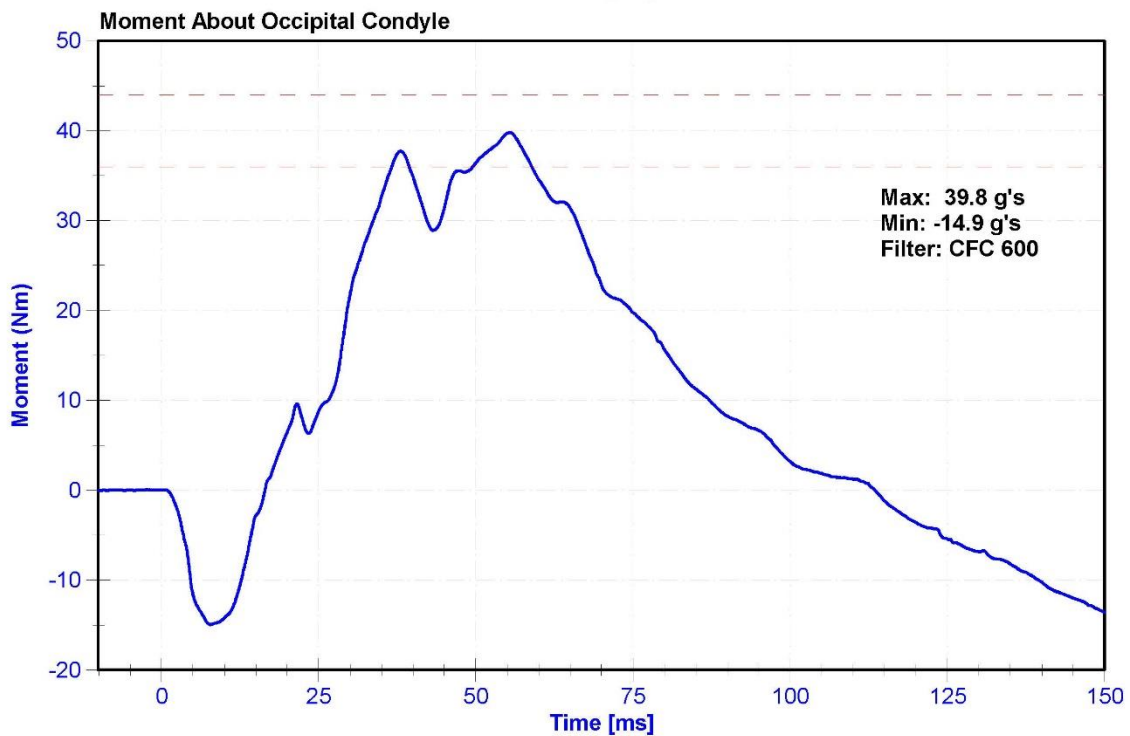
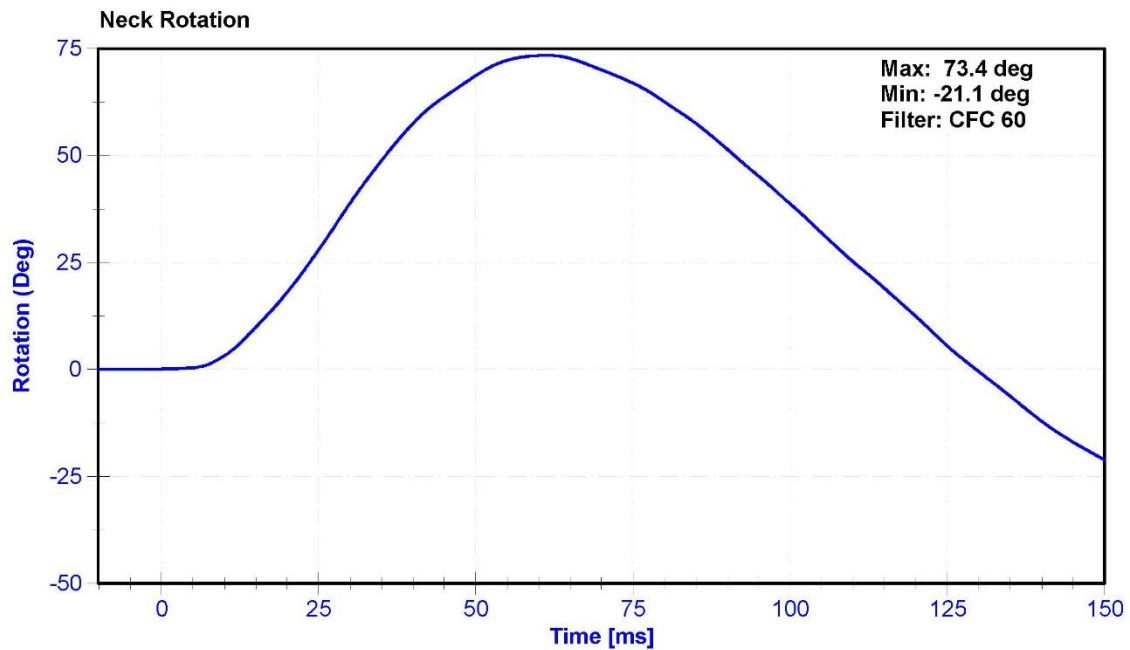
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	30.9	Pass
Velocity	5.51	5.63	m/s	5.620	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.44	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.62	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.88	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.75	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.87	Pass
Neck Rotation	71	81	deg	73.4	Pass
Time at Maximum Rotation	50	70	ms	61.3	Pass
Moment about the OC	36	44	Nm	39.8	Pass
Moment Decay to 0 Nm	102	126	ms	113.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/11/2017	5/11/2018
Pendulum Potentiometer	Denton 78051-342	DS-184Pend	10/27/2017	10/27/2018
Condyle Potentiometer	Denton 78051-342	DS-185Pend	10/27/2017	10/27/2018
Upper Neck Load Cell	Denton 1716	LC-1872 FY	7/26/2017	7/26/2018





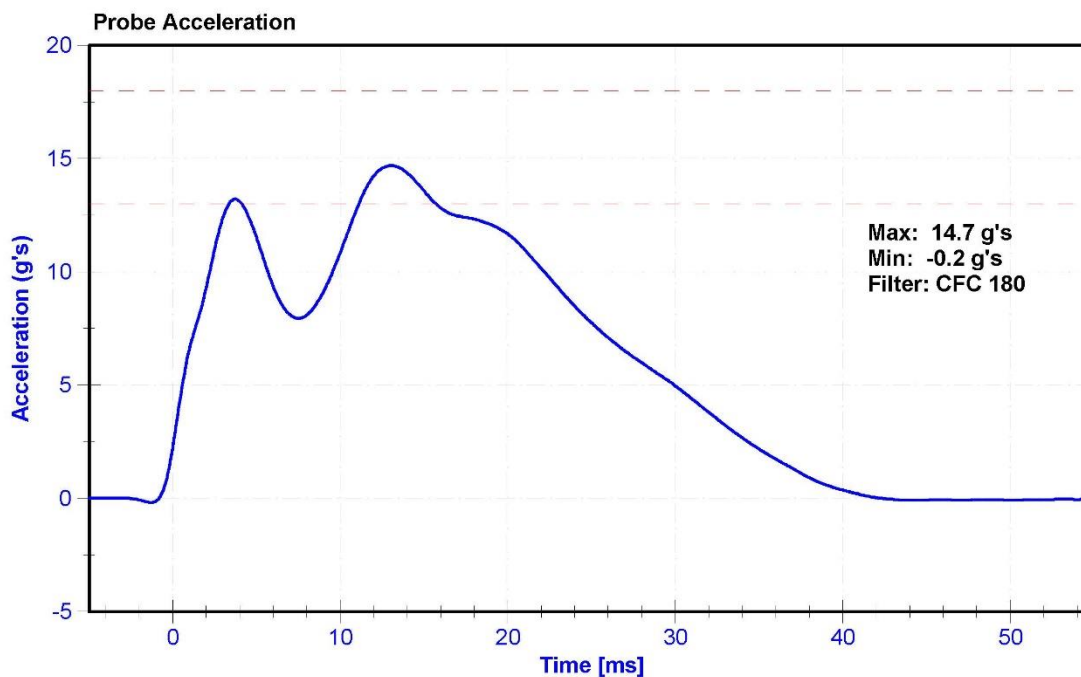
ATD Manufacturer	FTSS	Test Technician	S. McCloskey
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

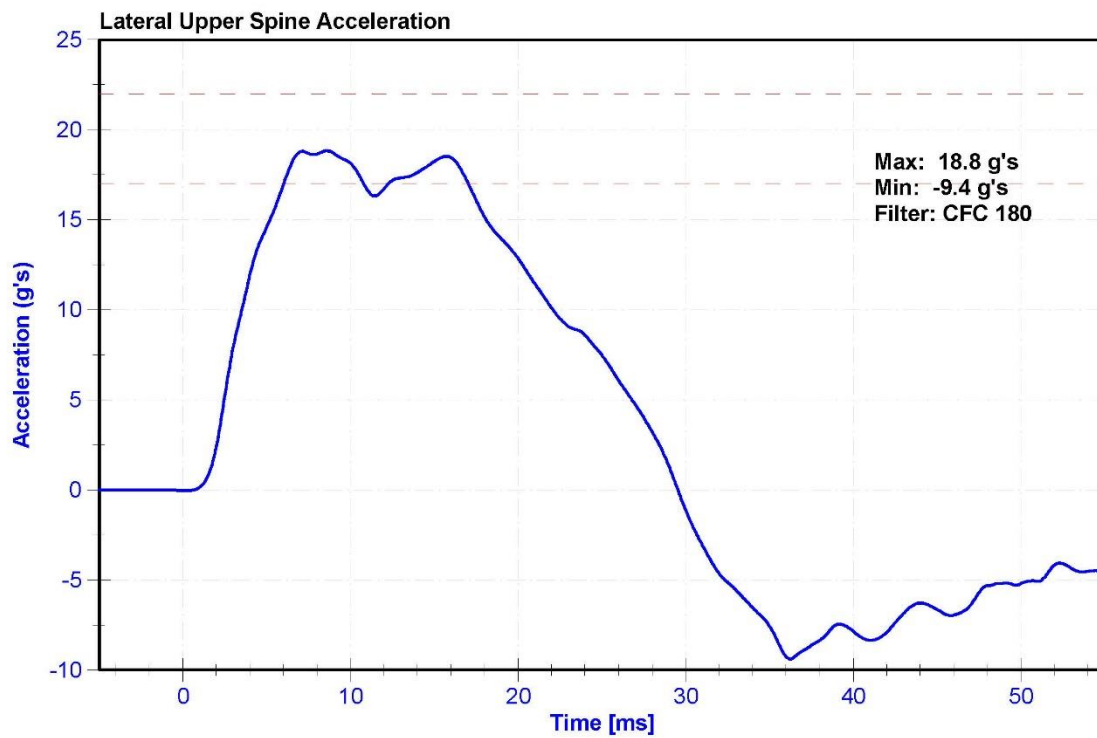
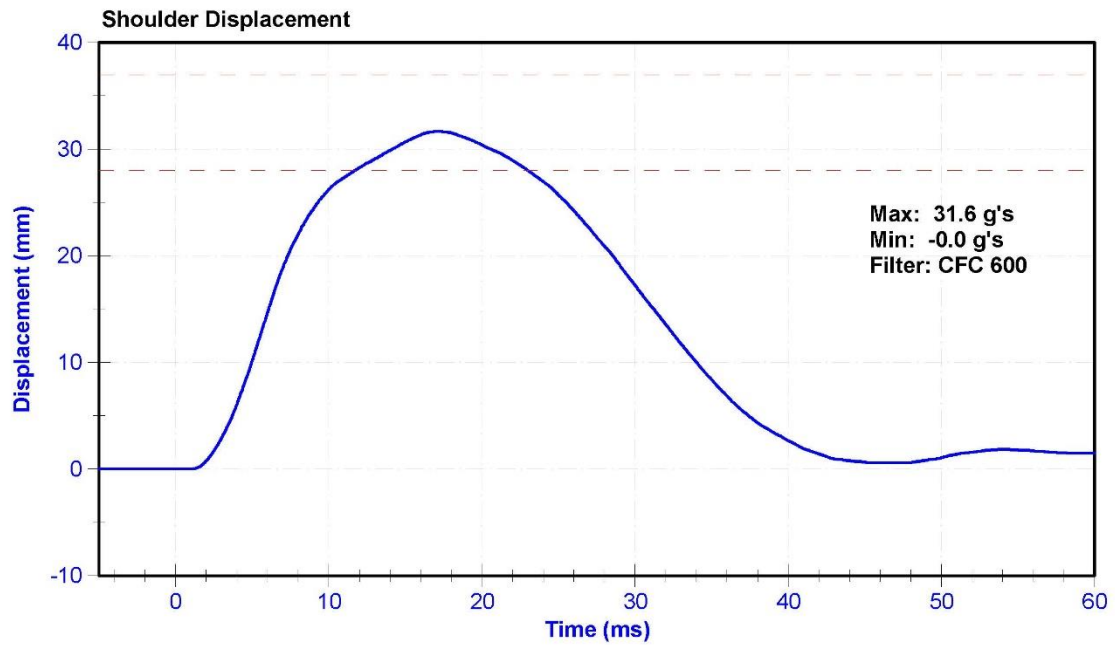
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.2	Pass
Humidity	10	70	%	32.5	Pass
Velocity	4.2	4.4	m/s	4.36	Pass
Probe Acceleration	13	18	g's	14.7	Pass
Shoulder Deflection	28	37	mm	31.6	Pass
Lateral Upper Spine Acceleration	17	22	g's	18.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	4/17/2018
Shoulder Potentiometer	Servo 08TC1-3725	DS-1063GFE	9/27/2017	9/27/2018
Upper Spine Y Accelerometer	ENDEVCO 7264	AC-P83320	9/27/2017	3/28/2018





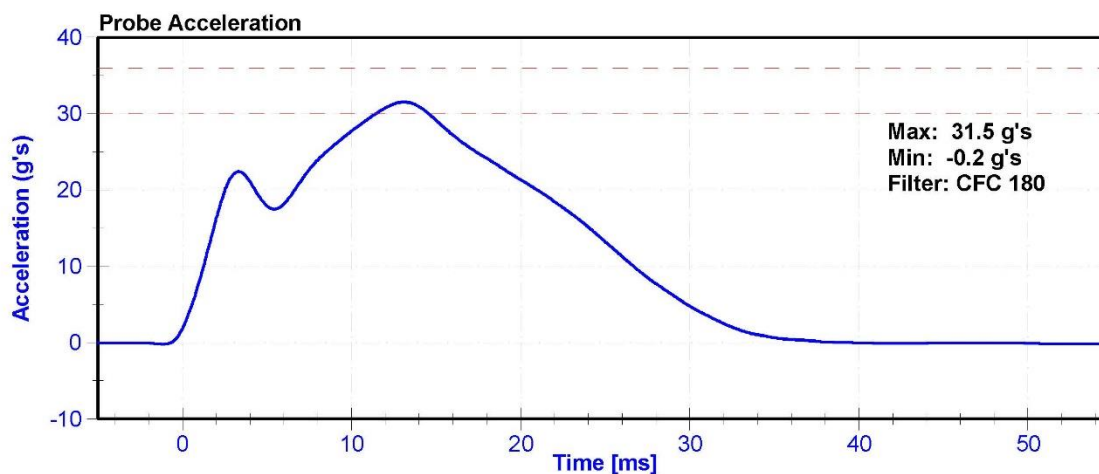
ATD Manufacturer	FTSS	Test Technician	S. McCloskey
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

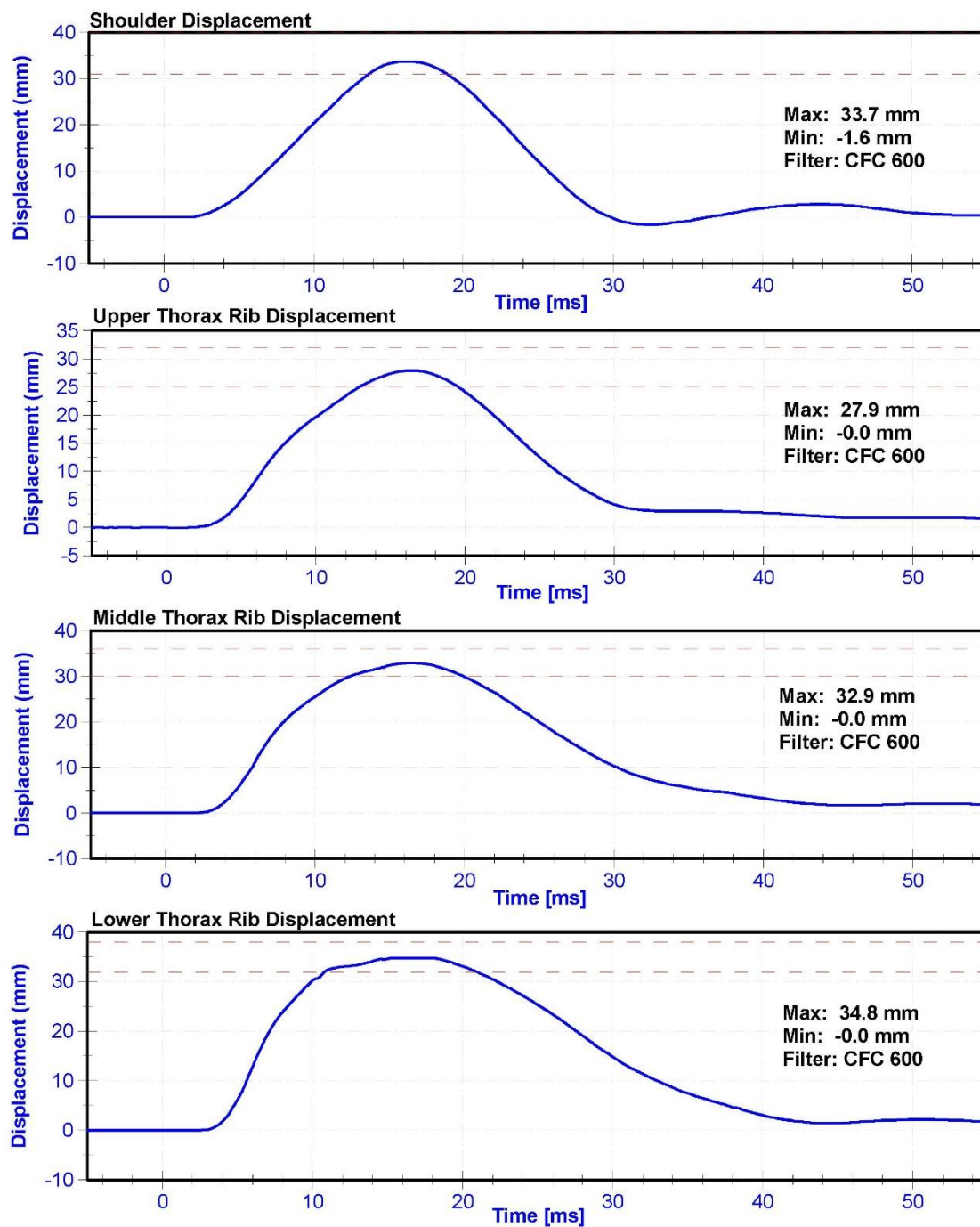
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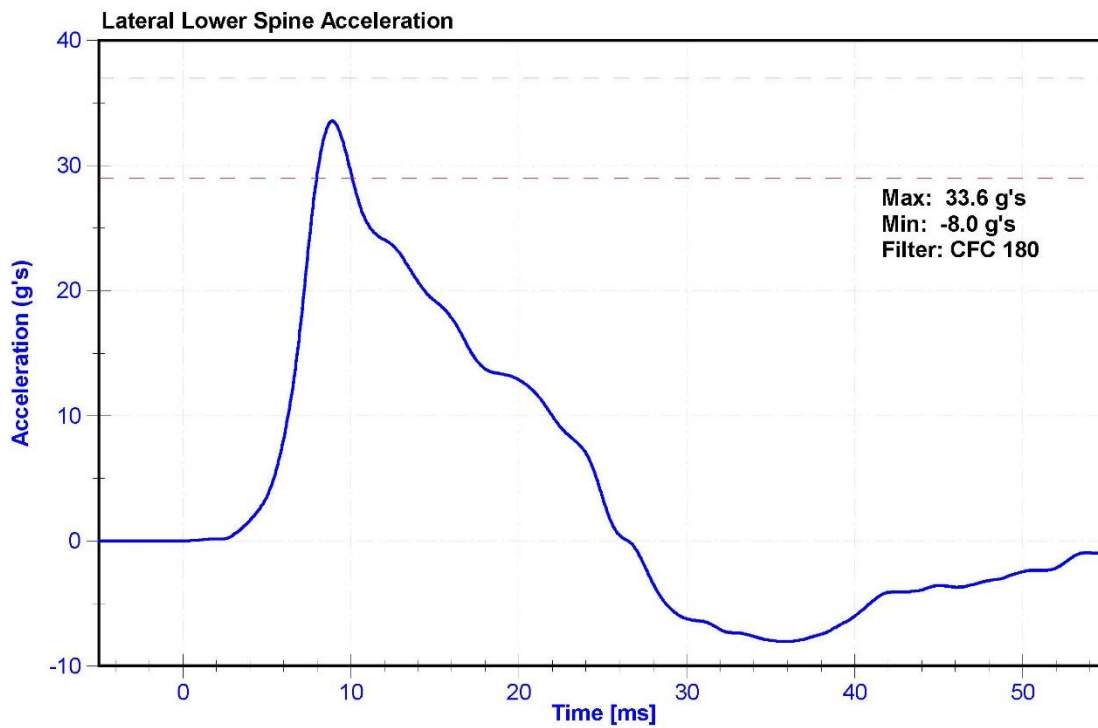
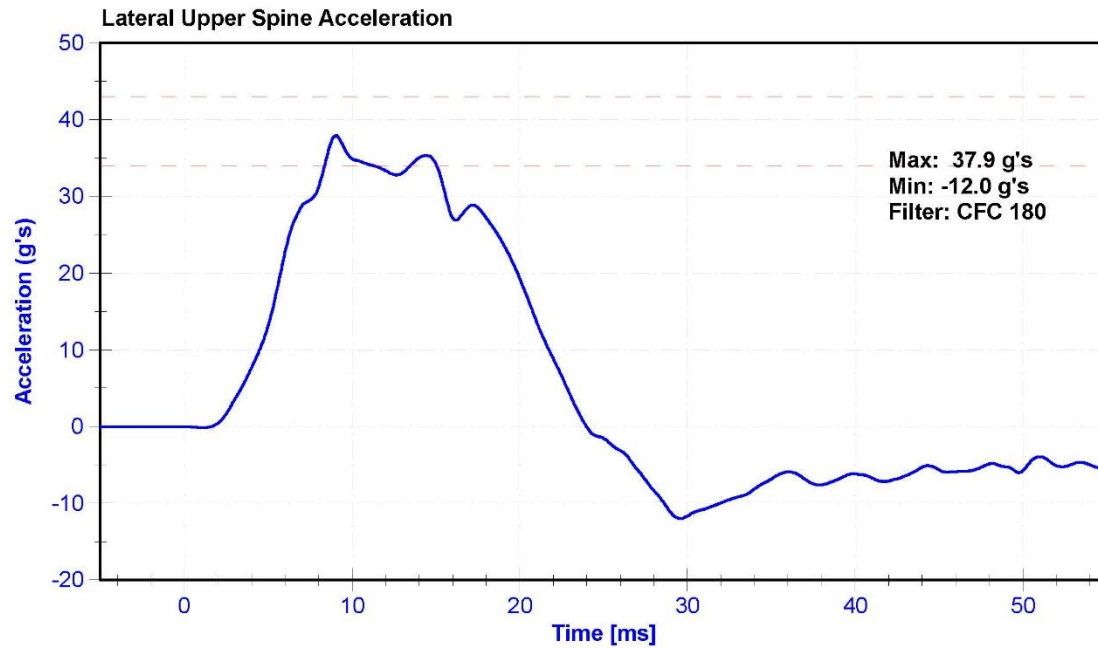
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.8	Pass
Humidity	10	70	%	32.2	Pass
Velocity	6.6	6.8	m/s	6.71	Pass
Probe Acceleration after 5 ms	30	36	g's	31.5	Pass
Lateral Upper Spine Acceleration	34	43	g's	37.9	Pass
Lateral Lower Spine Acceleration	29	37	g's	33.6	Pass
Shoulder Deflection	31	40	mm	33.7	Pass
Upper Thorax Rib Deflection	25	32	mm	27.9	Pass
Mid Thorax Rib Deflection	30	36	mm	32.9	Pass
Lower Thorax Rib Deflection	32	38	mm	34.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	4/17/2018
Upper Spine T1 Y Accelerometer	ENDEVCO 7264	AC-P83320	9/27/2017	3/28/2018
Upper Spine T12 Y Accelerometer	ENDEVCO 7264	AC-P64147	9/27/2017	3/28/2018
Shoulder Potentiometer	Servo 08TC1-3725	DS-1063GFE	9/27/2017	9/27/2018
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	9/27/2017	9/27/2018
Middle Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1151GFE	9/27/2017	9/27/2018
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	9/27/2017	9/27/2018







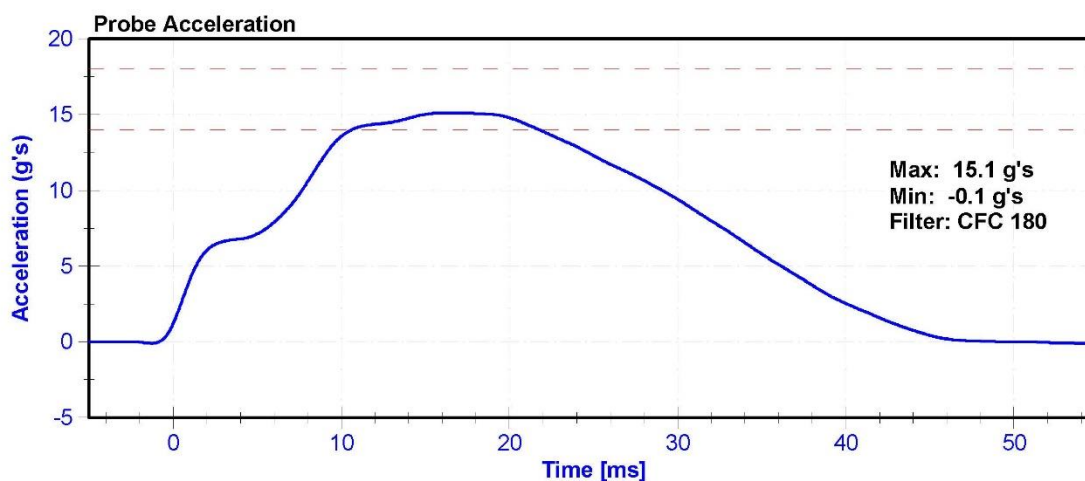
ATD Manufacturer	FTSS	Test Technician	S. McCloskey
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

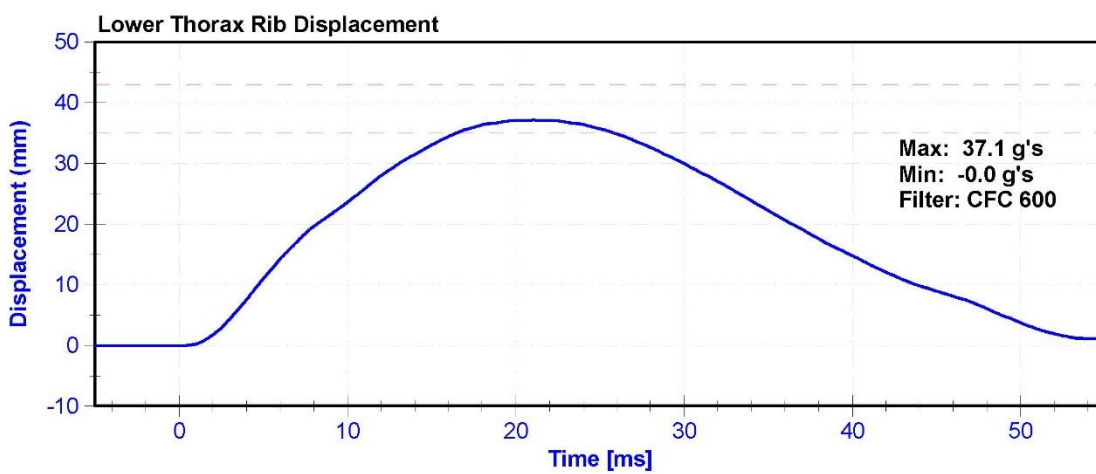
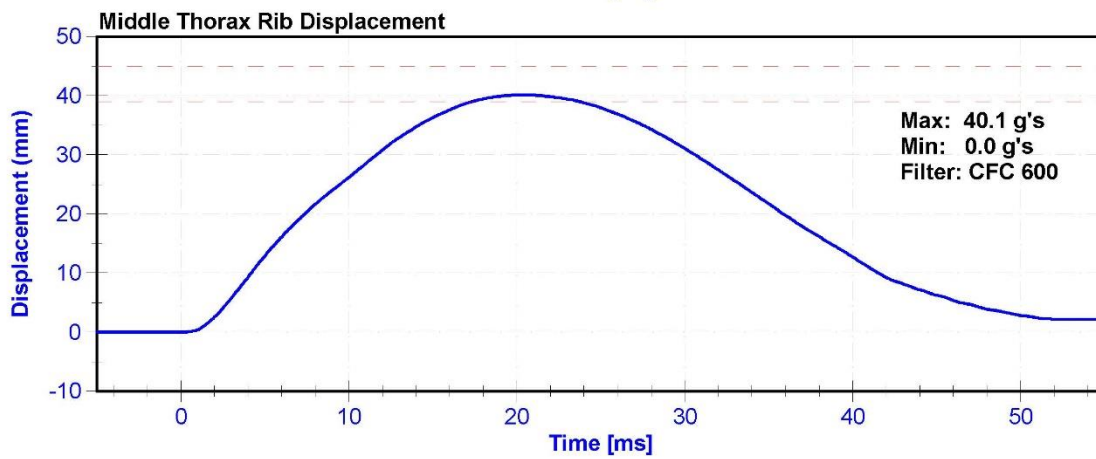
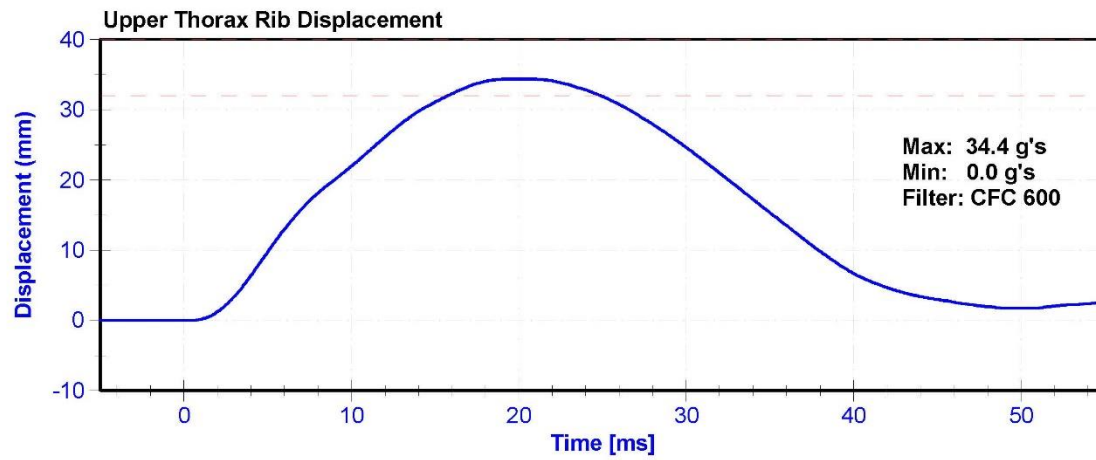
Results

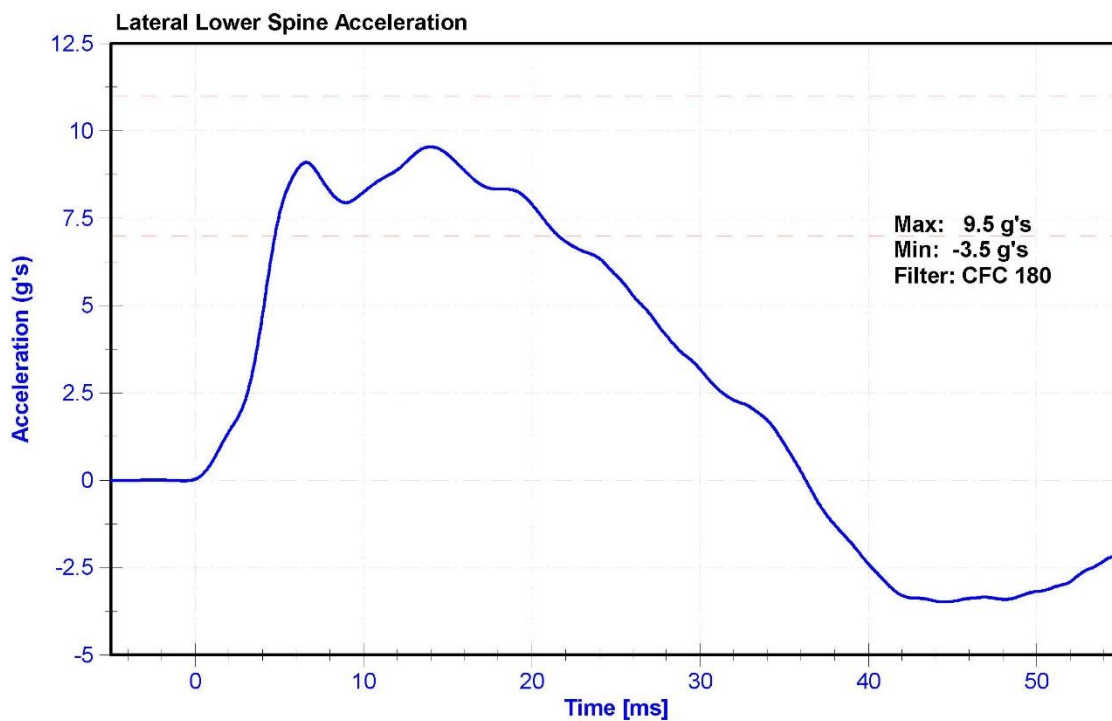
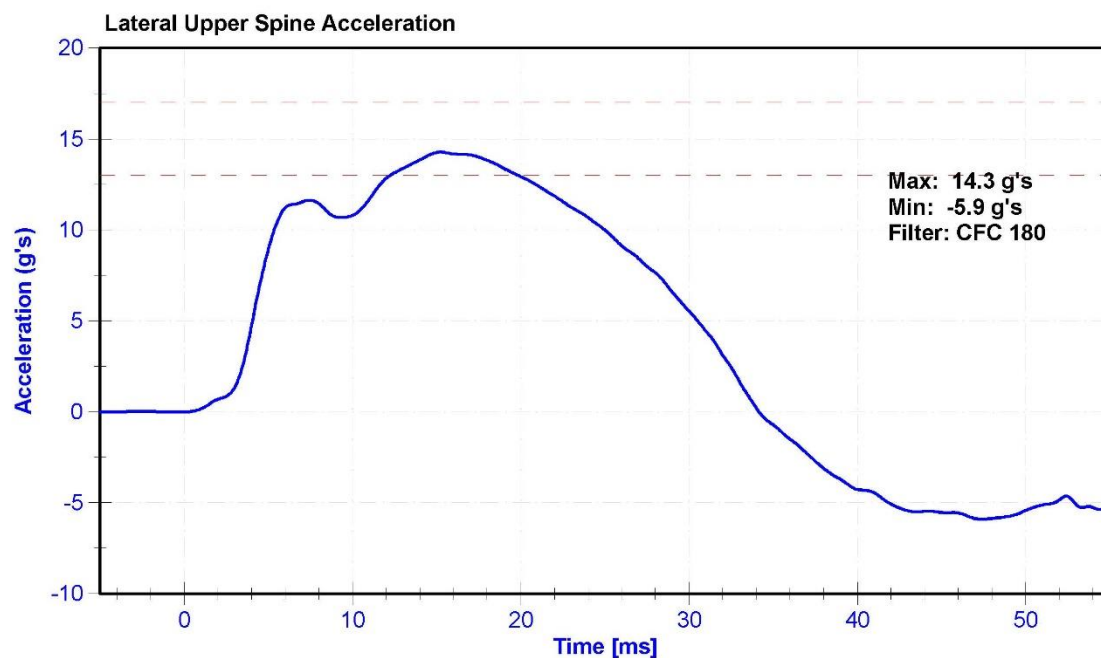
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.8	Pass
Humidity	10	70	%	33.4	Pass
Velocity	4.2	4.4	m/s	4.34	Pass
Probe Acceleration	14	18	g's	15.1	Pass
Lateral Upper Spine Acceleration	13	17	g's	14.3	Pass
Lateral Lower Spine Acceleration	7	11	g's	9.5	Pass
Upper Thorax Rib Deflection	32	40	mm	34.4	Pass
Middle Thorax Rib Deflection	39	45	mm	40.1	Pass
Lower Thorax Rib Deflection	35	43	mm	37.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	4/17/2018
Upper Spine Y Accelerometer	ENDEVCO 7264	AC-P83320	9/27/2017	3/28/2018
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	9/27/2017	3/28/2018
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	9/27/2017	9/27/2018
Middle Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1151GFE	9/27/2017	9/27/2018
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	9/27/2017	9/27/2018







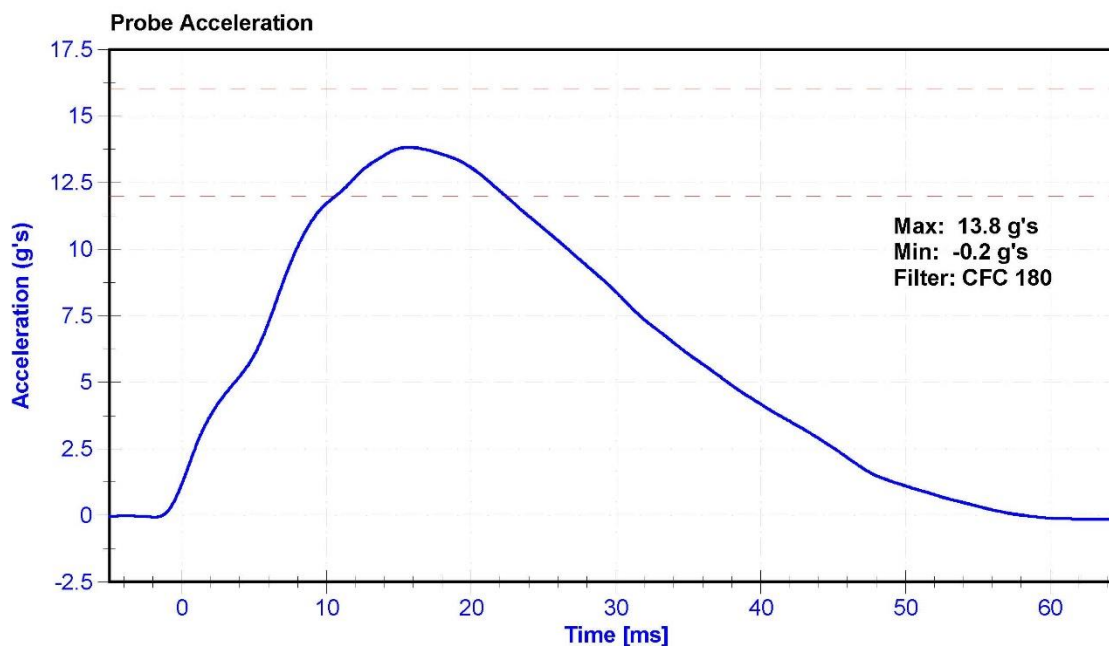
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

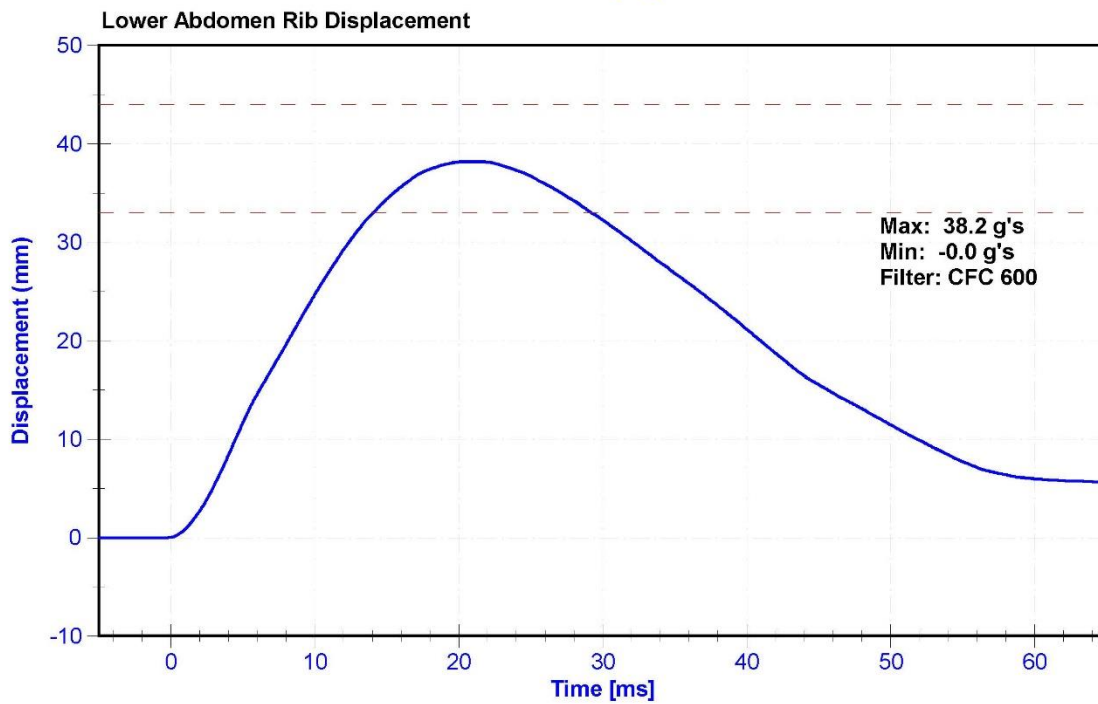
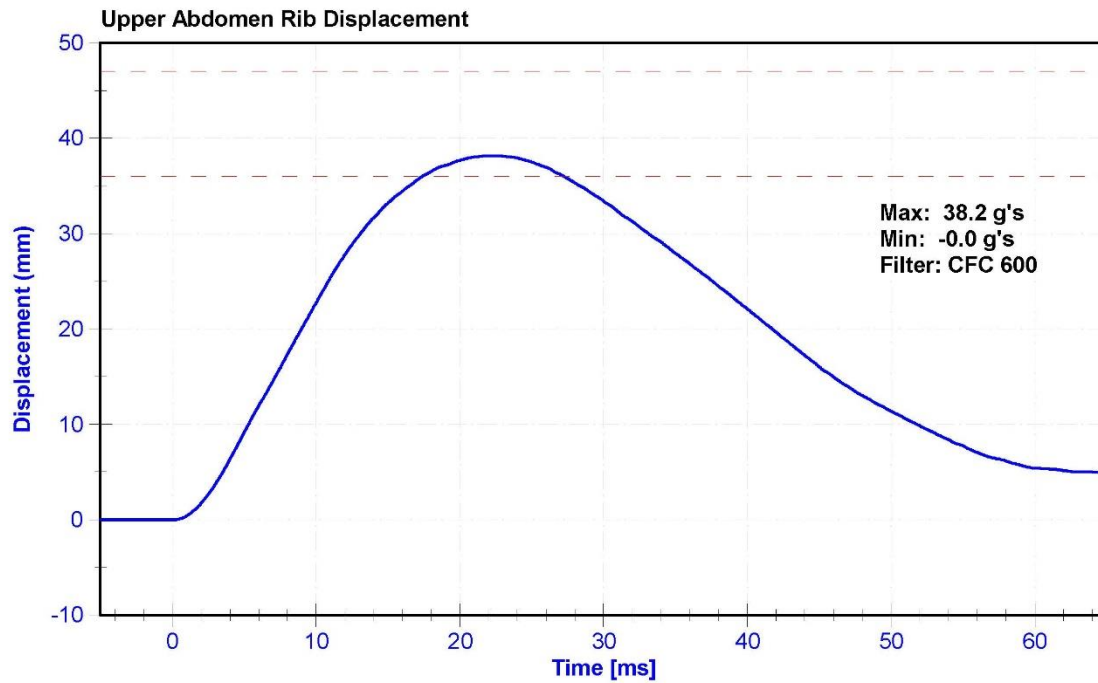
Results

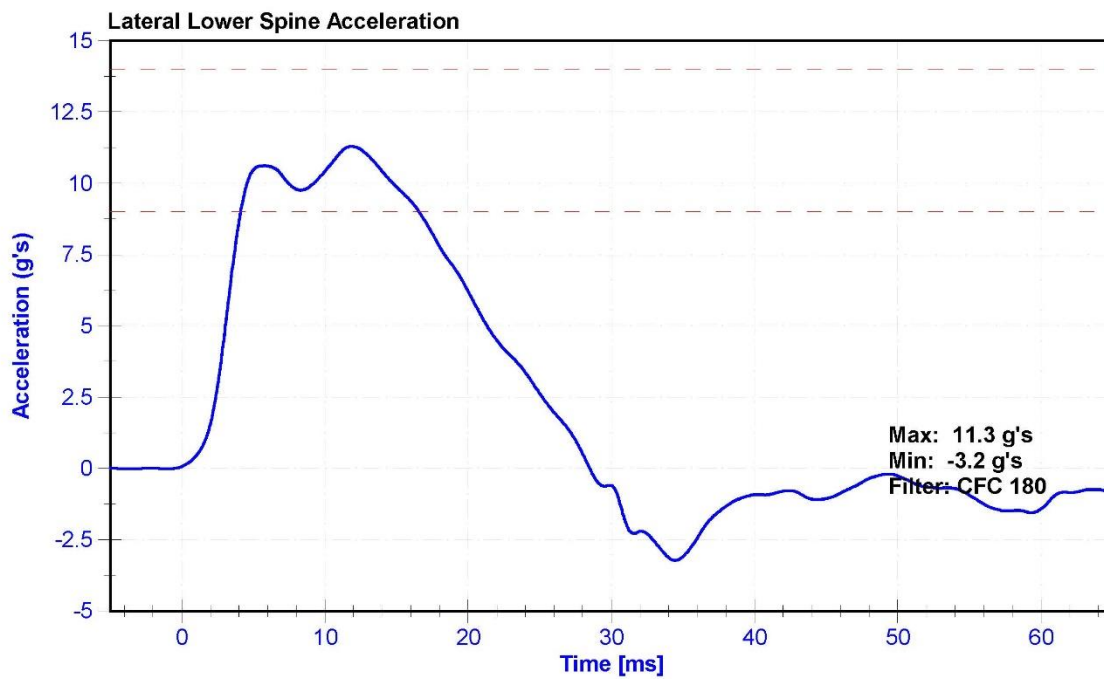
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.1	Pass
Humidity	10	70	%	32.6	Pass
Velocity	4.2	4.4	m/s	4.36	Pass
Probe Acceleration	12	16	g's	13.8	Pass
Lateral Lower Spine Acceleration	9	14	g's	11.3	Pass
Upper Abdomen Rib Deflection	36	47	mm	38.2	Pass
Lower Abdomen Rib Deflection	33	44	mm	38.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	4/17/2018
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	9/27/2017	3/28/2018
Upper Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-308GFE	9/27/2017	9/27/2018
Lower Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-307GFE	9/27/2017	9/27/2018







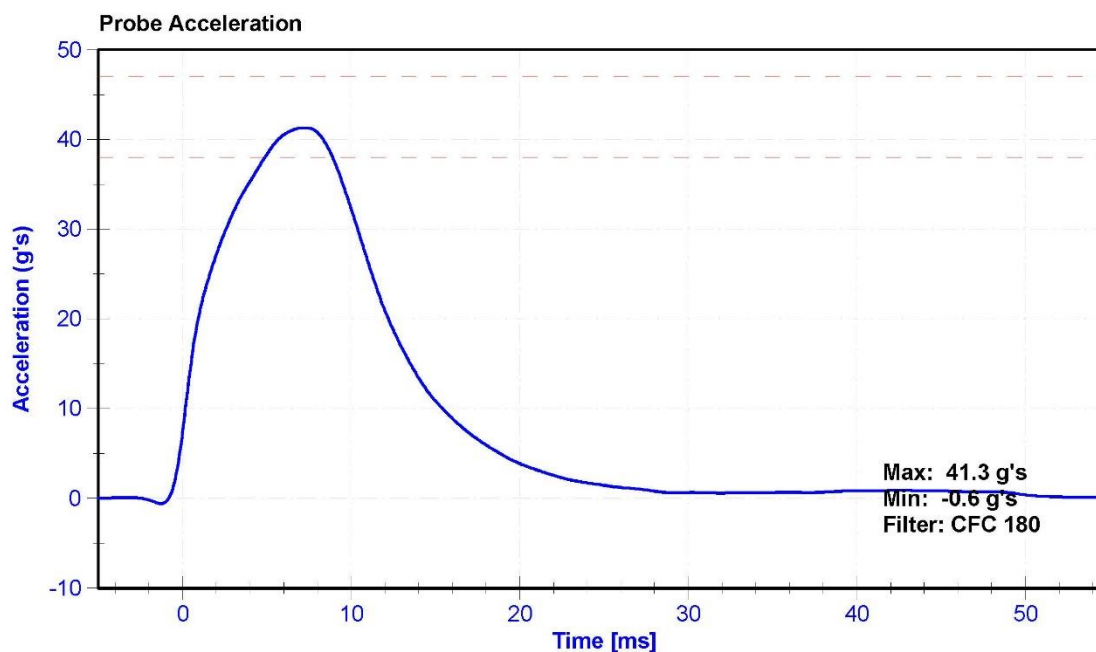
ATD Manufacturer	FTSS	Test Technician	S. McCloskey
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

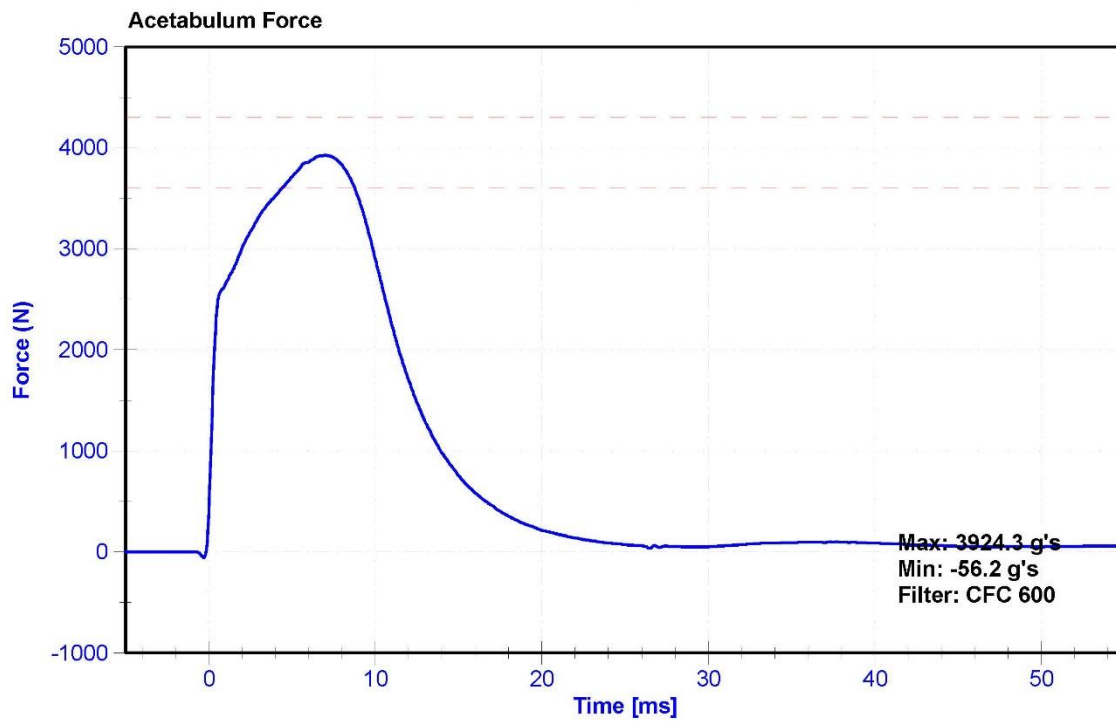
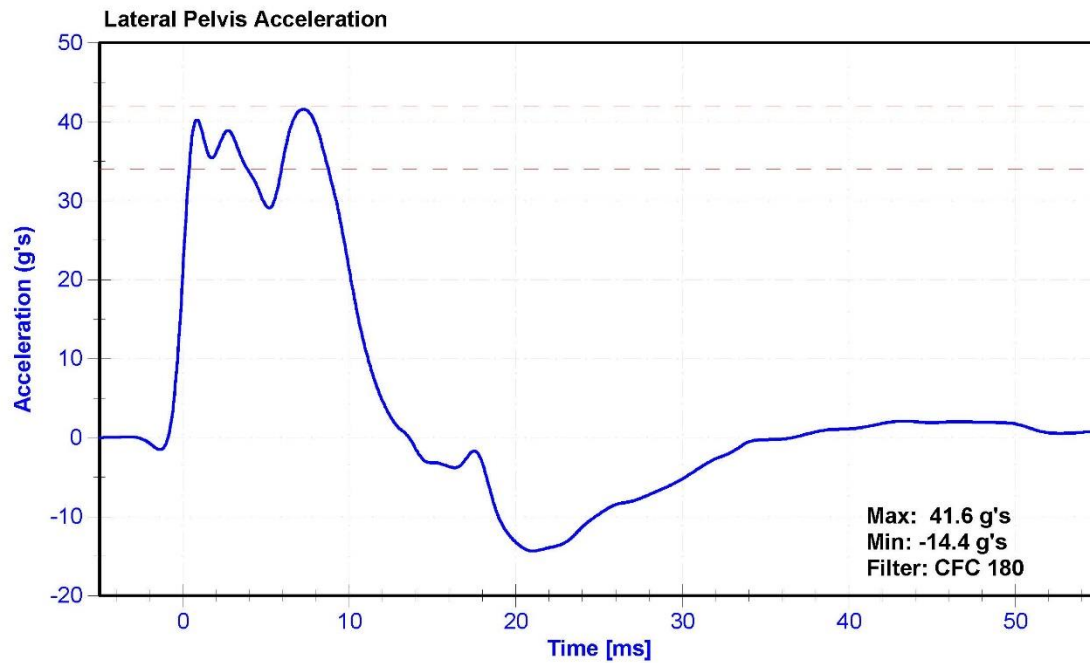
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.2	Pass
Humidity	10	70	%	31.5	Pass
Velocity	6.6	6.8	m/s	6.63	Pass
Probe Acceleration	38	47	g's	41.3	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	41.6	Pass
Acetabulum Force	3600	4300	N	3924.3	Pass

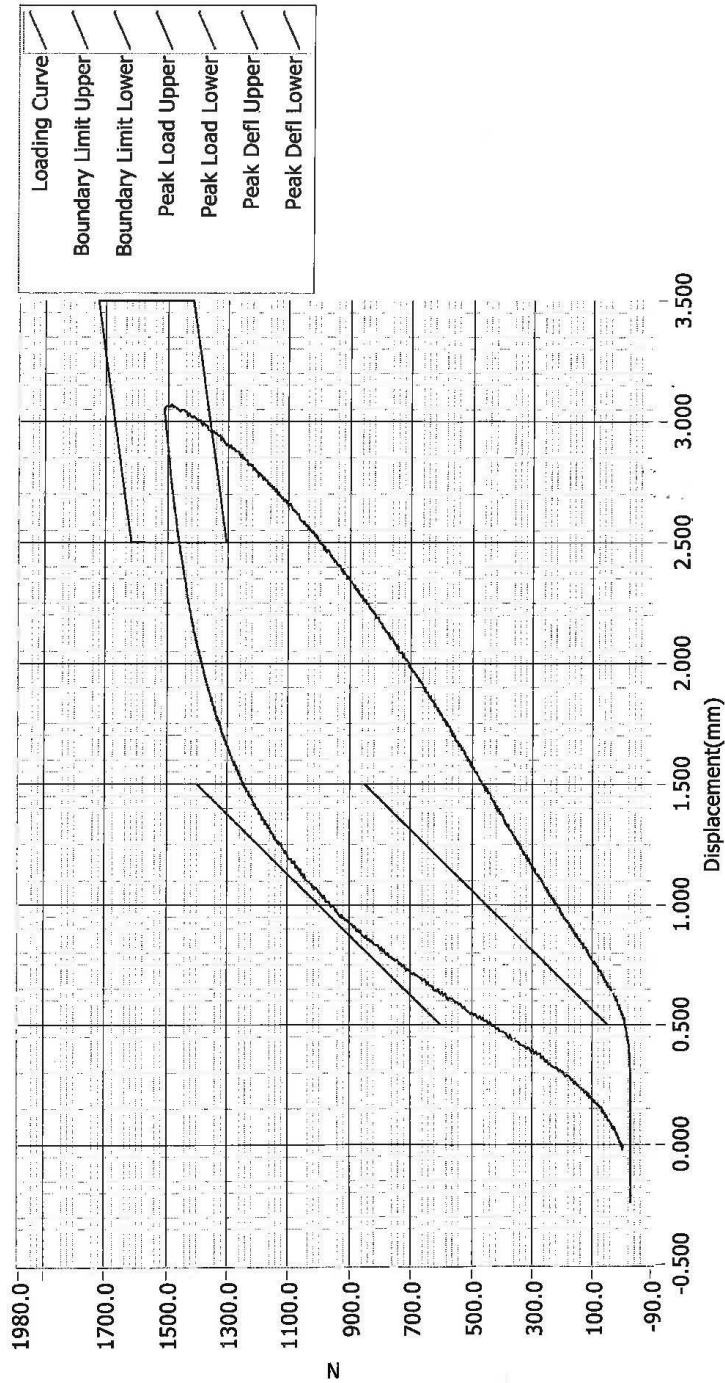
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	4/17/2018
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P79602	9/27/2017	3/28/2018
Acetabulum Load Cell	DENTON 3249J	LC-275Fy	6/20/2017	6/20/2018
Certification Plug	Humanetics	65068	4/5/2013	N/A
Crash Test Plug	Humanetics	65070	4/5/2013	N/A





Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

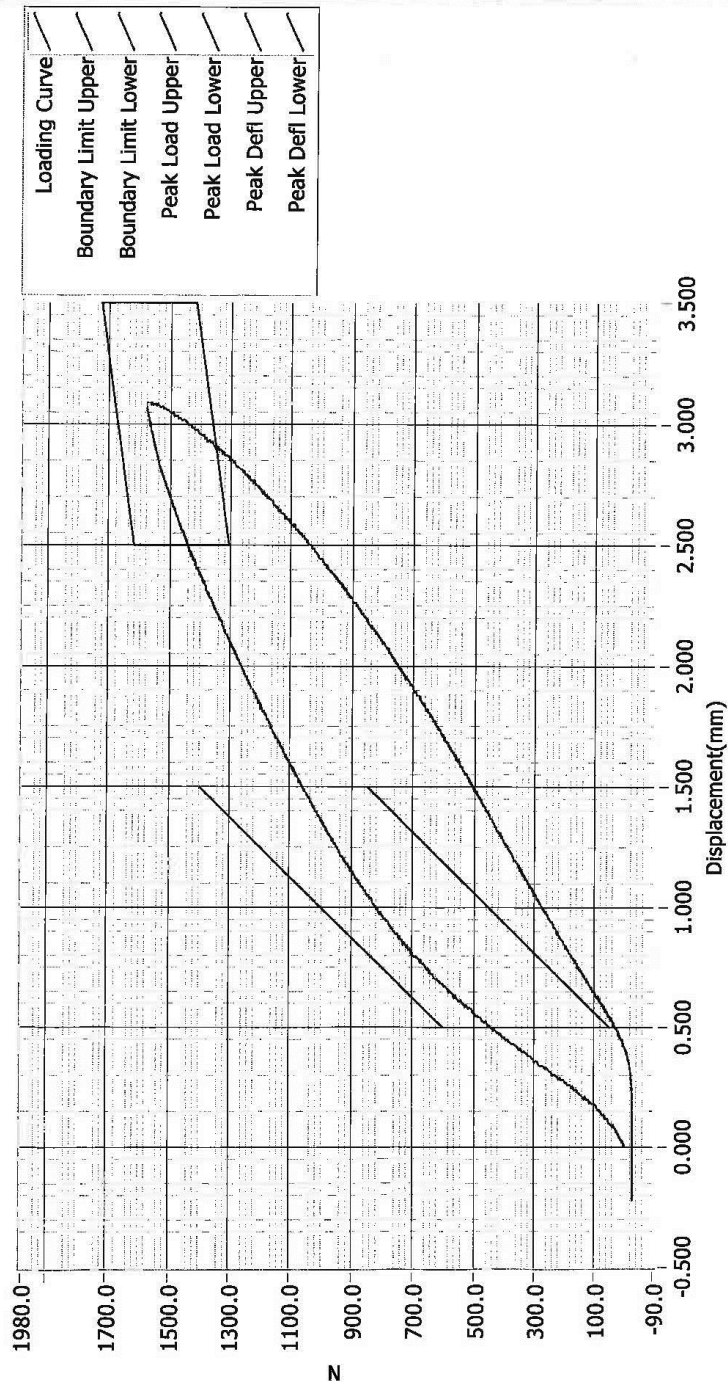
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<u>Cert ID</u>	<u>ATD Serial Number</u>	<u>ATD Type</u>	
	N/A	SIDIIs	

Cert 12/7/17

Current Date : 4/5/2013 Current Time : 20:59:22

CRASH 12/11/17

Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
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Cert ID	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

Current Date : 4/5/2013 Current Time : 21:01:28

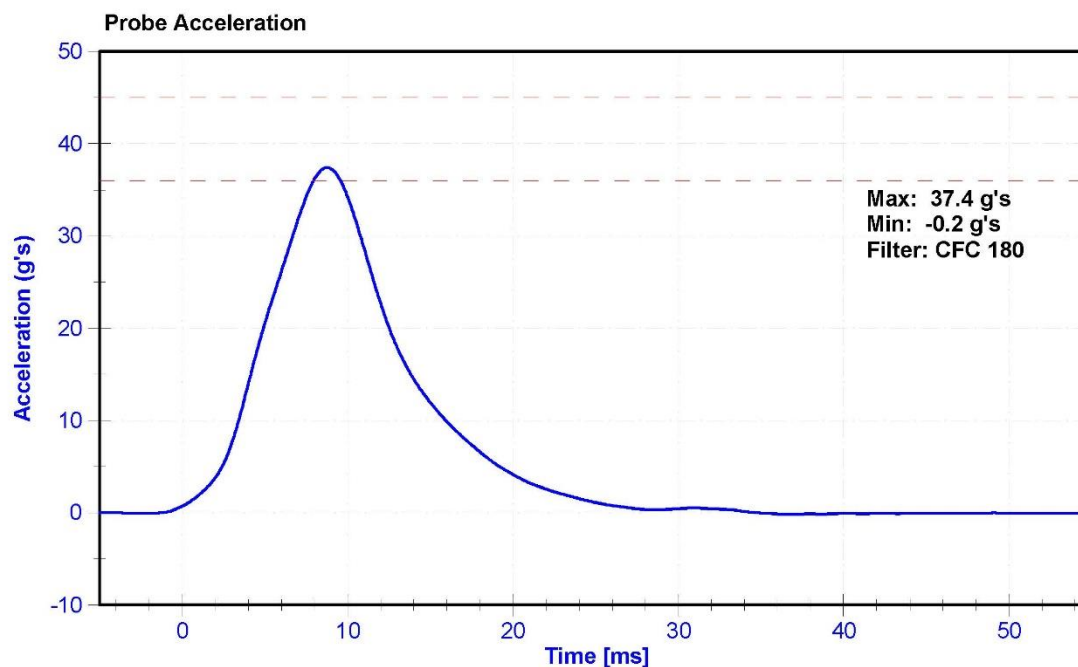
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

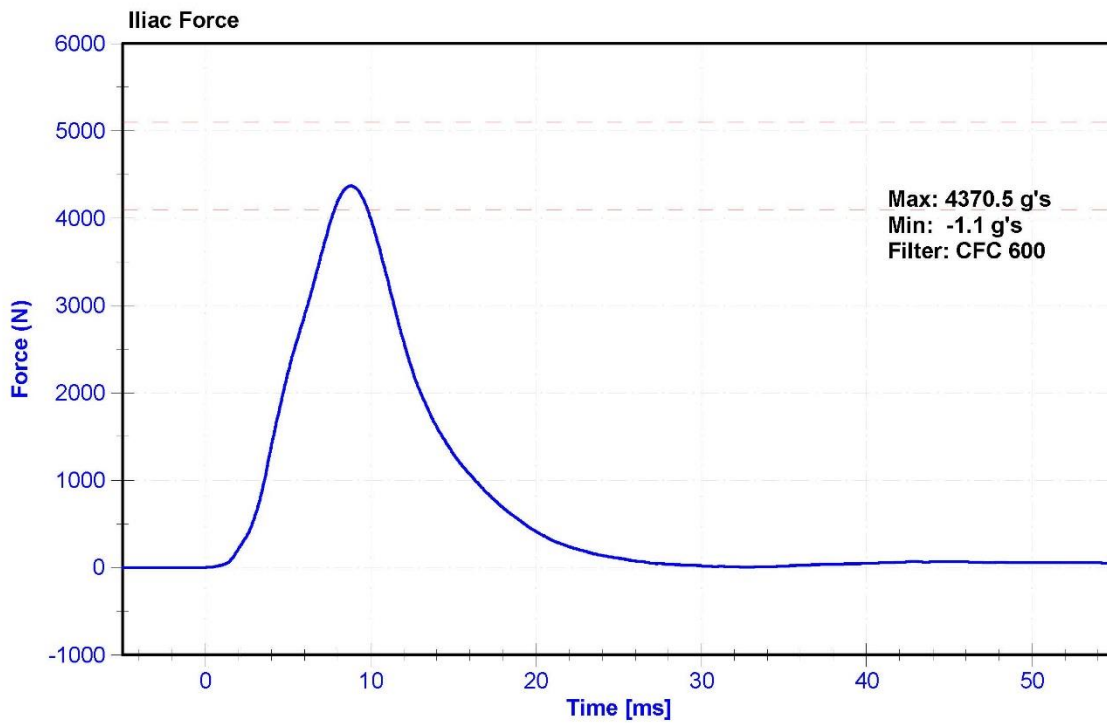
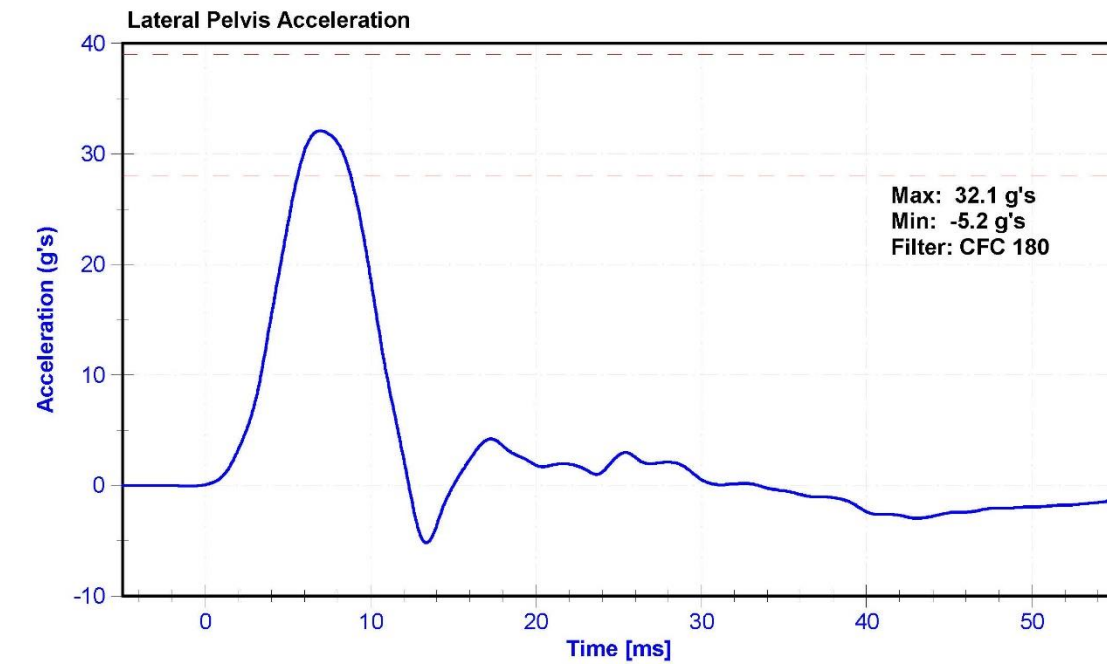
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	33.5	Pass
Velocity	4.2	4.4	m/s	4.38	Pass
Probe Acceleration	36	45	g's	37.4	Pass
Lateral Pelvis Acceleration	28	39	g's	32.1	Pass
Iliac Force	4100	5100	N	4370.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	4/17/2018
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P79602	9/27/2017	3/28/2018
Iliac Load Cell	DENTON 3228J	LC-279Fy	6/21/2017	6/21/2018





APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation (ES-2re)

			ES-2re S/N: F034		
			Serial Number	Manufacturer	Calibration Date
Head Accelerometers	Primary	X	AC-P58904	ENDEVCO	10/24/2017
		Y	AC-P58911	ENDEVCO	10/24/2017
		Z	AC-P58776	ENDEVCO	10/24/2017
	Redundant	X	AC-P58887	ENDEVCO	10/24/2017
		Y	AC-P58888	ENDEVCO	10/24/2017
		Z	AC-P51734	ENDEVCO	10/24/2017
Thorax Rib Displacement Potentiometers	Upper	Y	DS-183GFE	Honeywell	9/27/2017
	Middle	Y	DS-184GFE	Honeywell	9/27/2017
	Lower	Y	DS-182GFE	Honeywell	9/27/2017
Abdomen Load Cells	Forward	Y	LC-1512	DENTON	6/5/2017
	Middle	Y	LC-1526	DENTON	6/5/2017
	Rear	Y	LC-1516	DENTON	6/5/2017
Lower Spine Accelerometers (T12)		X	AC-P52079	ENDEVCO	10/24/2017
		Y	AC-P51948	ENDEVCO	10/24/2017
		Z	AC-P51269	ENDEVCO	10/24/2017
Pubic Symphysis Load Cell		Y	LC-465Fy	DENTON	6/6/2017

Table 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N: 300		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers		Primary	X	AC-P58777	ENDEVCO	9/28/2017
			Y	AC-P59018	ENDEVCO	9/28/2017
			Z	AC-P79189	ENDEVCO	9/28/2017
		Redundant	X	AC-P52095	ENDEVCO	9/28/2017
			Y	AC-P58986	ENDEVCO	9/28/2017
			Z	AC-P68057	ENDEVCO	9/28/2017
Displacement Potentiometers	Thoracic Rib	Upper	Y	DS-451GFE	SERVO	9/27/2017
		Middle	Y	DS-1151GFE	SERVO	9/27/2017
		Lower	Y	DS-1156GFE	SERVO	9/27/2017
	Abdominal Rib	Upper	Y	DS-308GFE	SERVO	9/27/2017
		Lower	Y	DS-307GFE	SERVO	9/27/2017
Lower Spine Accelerometers (T12)			X	AC-P58883	ENDEVCO	9/27/2017
			Y	AC-P64147	ENDEVCO	9/27/2017
			Z	AC-P58786	ENDEVCO	9/27/2017
Acetabulum Load Cell			Y	LC-275Fy	DENTON	6/20/2017
Iliac Wing Load Cell			Y	LC-279Fy	DENTON	6/21/2017
Pelvis Plug (struck side)				80898	Humanetics	11/25/2014
Pelvis Plug (non-struck side)				-	-	-

Table 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	AC-A192205	Measurement Specialties	10/12/2017
	Vehicle Center of Gravity	Y	AC-A222638	MSI 1201-1000	8/24/2017
	Vehicle Center of Gravity	Z	AC-A229245	MSI 1201-1000	10/12/2017
2	Right Sill at Front Seat	X	AC-A196603	MSI 1201-1000	9/26/2017
	Right Sill at Front Seat	Y	AC-A217572	MSI 1201-1000	9/26/2017
	Right Sill at Front Seat	Z	AC-A217573	MSI 1201-1000	9/26/2017
3	Right Sill at Rear Seat	X	AC-A196610	MSI 1201-1000	9/27/2017
	Right Sill at Rear Seat	Y	AC-A217542	MSI 1201-1000	9/27/2017
	Right Sill at Rear Seat	Z	AC-A222648	MSI 1201-1000	9/27/2017
4	Left Sill at Front Door	Y	AC-A229242	MSI 1201-1000	10/17/2017
5	Left Sill at Rear Door	Y	AC-A217569	MSI 1201-1000	10/17/2017
6	Left A-Post Lower	Y	AC-A229239	MSI 1201-1000	10/17/2017
7	Left A-Post Middle	Y	AC-A197044	MSI 1201-1000	10/17/2017
8	Left B-Post Lower	Y	AC-A197025	MSI 1201-1000	10/17/2017
9	Left B-Post Middle	Y	AC-A217565	MSI 1201-1000	10/17/2017
10	Front Seat Track	Y	AC-A192216	Measurement Specialties	12/5/2017
11	Rear Seat Track or Structure	Y	AC-A207248	MSI 1201-1000	12/5/2017
12	Right Rear Occ. Compartment	Y	AC-A207259	MSI 1201-1000	12/5/2017
13	Engine Block	X	AC-A196609	MSI 1201-1000	12/5/2017
	Engine Block	Y	AC-A217582	MSI 1201-1000	12/5/2017
14	Rear Floorpan Above Axle	X	AC-A196995	MSI 1201-1000	9/26/2017
	Rear Floorpan Above Axle	Y	AC-A222642	MSI 1201-1000	8/24/2017
	Rear Floorpan Above Axle	Z	AC-A222645	MSI 1201-1000	8/24/2017

TABLE 4 – MDB Instrumentation

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	AC-A197006	MSI 1201-1000	10/17/2017
MDB Center of Gravity	Y	AC-A197023	MSI 1201-1000	10/17/2017
MDB Center of Gravity	Z	AC-A197032	MSI 1201-1000	10/17/2017
Left Frame at Rear Axle Centerline	X	AC-A217559	MSI 1201-1000	10/17/2017
Left Frame at Rear Axle Centerline	Y	AC-A222646	MSI 1201-1000	10/17/2017