

REPORT NUMBER: SINCAP-CAL-17-004

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

**General Motors LLC
2017 Buick LaCrosse
Four Door Sedan**

NHTSA No: M20170105

**PREPARED BY:
CALSPAN CORPORATION
P.O. BOX 400
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January 6, 2017

FINAL REPORT

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

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Date: January 6, 2017

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Transportation Test Operations

Date: January 6, 2017

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 2017 Buick LaCrosse four door sedan 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 November 23, 2016. The impact velocity of the Moving Deformable Barrier (MDB) was 61.9 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 332mm located at level 2. 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" style="text-align: center;">Measurement Description</th> <th colspan="3" style="text-align: center;">Driver ATD (ES-2re)</th> </tr> <tr> <th style="text-align: center;">Units</th> <th style="text-align: center;">IARV</th> <th style="text-align: center;">Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">1000</td> <td style="text-align: center;">186.575</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td style="text-align: center;">mm</td> <td style="text-align: center;">44</td> <td style="text-align: center;">32.448</td> </tr> <tr> <td>Total Abdominal Force</td> <td style="text-align: center;">N</td> <td style="text-align: center;">2500</td> <td style="text-align: center;">1245.672</td> </tr> <tr> <td>Pubic Symphysis Force</td> <td style="text-align: center;">N</td> <td style="text-align: center;">6000</td> <td style="text-align: center;">-1253.696</td> </tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <thead> <tr> <th rowspan="2" style="text-align: center;">Measurement Description</th> <th colspan="3" style="text-align: center;">Passenger ATD (SID-IIs)</th> </tr> <tr> <th style="text-align: center;">Units</th> <th style="text-align: center;">IARV</th> <th style="text-align: center;">Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">1000</td> <td style="text-align: center;">368.077</td> </tr> <tr> <td>Lower Spine Resultant Acceleration</td> <td style="text-align: center;">G</td> <td style="text-align: center;">82</td> <td style="text-align: center;">66.357</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td style="text-align: center;">N</td> <td style="text-align: center;">5525</td> <td style="text-align: center;">3783.432</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td style="text-align: center;">mm</td> <td style="text-align: center;">38*</td> <td style="text-align: center;">15.712</td> </tr> <tr> <td>Maximum Abdominal Rib Deflection</td> <td style="text-align: center;">mm</td> <td style="text-align: center;">45*</td> <td style="text-align: center;">13.903</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	186.575	Maximum Thoracic Rib Deflection	mm	44	32.448	Total Abdominal Force	N	2500	1245.672	Pubic Symphysis Force	N	6000	-1253.696	Measurement Description	Passenger ATD (SID-IIs)			Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	368.077	Lower Spine Resultant Acceleration	G	82	66.357	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3783.432	Maximum Thoracic Rib Deflection	mm	38*	15.712	Maximum Abdominal Rib Deflection	mm	45*	13.903
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SECTION 1

TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test is part of the MY 2017 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 2017 Buick LaCrosse four door sedan. 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 2017 Buick LaCrosse four door sedan was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.9 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 November 23, 2016. 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	186.575
Maximum Thorax Rib Deflection	mm	44	32.448
Combined Abdominal Force	N	2500	1245.672
Pubic Symphysis Force	N	6000	-1253.696

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC36)		1000	368.077
Lower Spine (T12) Resultant Acceleration	G	82	66.357
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3783.432
Maximum Thoracic Rib Deflection	mm	38*	15.712
Maximum Abdominal Rib Deflection	mm	45*	13.903

*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	No		
Knee Airbag	Yes	No		
Side Airbag 1 - Curtain	Yes	Yes	Yes	Yes
Side Airbag 2 – Torso/Pelvis Airbag	Yes	Yes	No	N/A
Side Airbag 3 – Torso Airbag	No	N/A	Yes	Yes
Seat Belt Pretensioner	Yes	Yes	No	N/A
Seat Belt Load Limiter	Yes	Yes	No	N/A
Other				

GENERAL COMMENTS:

1. P1 serial number – F034
2. P4 serial number – DG8012

Data Anomalies:

The following channel was questionable for

- Rear Passenger Upper Thorax Rib Y Displacement, questionable spikes at 57ms and 67ms
- Left B-Pillar Lower Y Acceleration, questionable spikes from 6ms to 22ms
- Left B-Pillar Middle Y Acceleration, questionable spikes at 12ms and 17ms

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: 2017 Buick LaCrosse four door sedan
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20170105
 Test Date: 11/23/2016

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20170105	Traction Control System (TCS)	Yes
Model Year	2017	Auto-Leveling System	No
Make	Buick	Automatic Door Locks (ADL)	Yes
Model	LaCrosse	Power Window Auto-Reverse	No
Body Style	Four Door Sedan	Other Optional Feature	-
VIN	1G4ZN5SS6HU133012	Driver Front Airbag	Yes
Body Color	Gold	Driver Curtain Airbag	Yes
Odometer Reading (km/mi)	67.6 km / 42 mi	Driver Head/Torso Airbag	No
Engine Displacement (L)	3.6	Driver Torso Airbag	No
Type/No. Cylinders	V6	Driver Torso/Pelvis Airbag	Yes
Engine Placement	Transverse	Driver Pelvis Airbag	No
Transmission Type	Automatic	Driver Knee Airbag	Yes
Transmission Speeds	8-Speed	Rear Pass. Curtain Airbag	Yes
Overdrive	Yes	Rear Pass. Head/Torso Airbag	No
Final Drive	Front Wheel Drive	Rear Pass. Torso Airbag	Yes
Roof Rack	No	Rear Pass. Torso/Pelvis Airbag	No
Sunroof/T-Top	No	Rear Pass. Pelvis Airbag	No
Running Boards	No	Driver Seat Belt Pretensioners	Yes
Tilt Steering Wheel	Yes	Rear Pass. Seat Belt Pretensioners	No
Power Seats	Yes	Driver Load Limiter	Yes
Anti-Lock Brakes (ABS)	Yes	Rear Pass. Load Limiter	No
		Other Safety Restraint	-

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

No

DATA FROM CERTIFICATION LABEL

Manufactured By	General Motors LLC	GVWR (kg)	2057
Date of Manufacture	08/16	GAWR Front (kg)	1067
Vehicle Type	Passenger	GAWR Rear (kg)	990

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3	-	5	
Capacity Weight (VCW) (kg)				385	(A)
DSC X 68.04 kg				340.2	(B)
Cargo Weight (RCLW) (kg)				44.8	(A-B)

VEHICLE SEAT TYPE

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

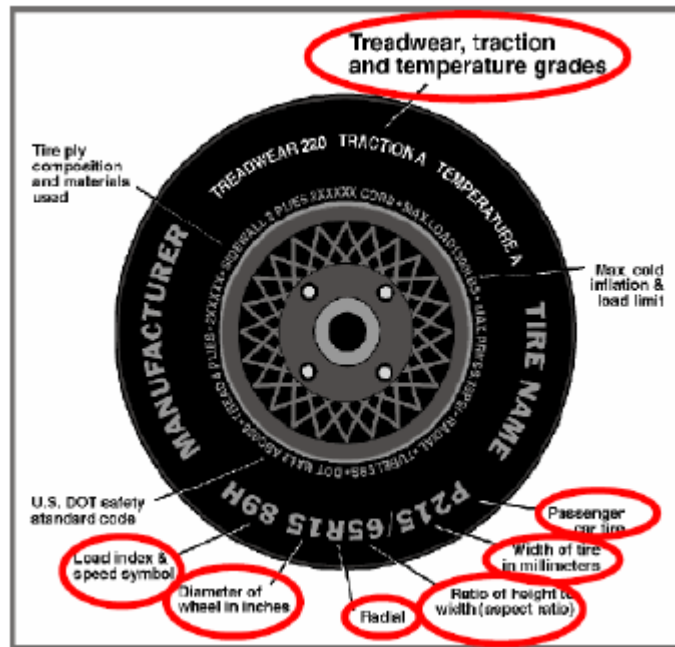
DATA SHEET NO. 1 ... (CONTINUED)
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2017 Buick LaCrosse four door sedan
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20170105
 Test Date: 11/23/2016

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)	220	220
Recommended Tire Size	P235/50R18	P235/50R18
Tire Size on Vehicle	P235/50R18	P235/50R18
Tire Manufacturer	Continental	Continental
Tire Model	ProContact	ProContact
Treadwear	400	400
Traction	A	A
Temperature Grade	A	A
Tire Plies Sidewall	1 Polyester	1 Polyester
Tire Plies Body	1 Polyester, 2 Steel, 1 Polyamide	1 Polyester, 2 Steel, 1 Polyamide
Load Index/Speed Symbol	97V	97V
Tire Material	Rubber	Rubber
DOT Safety Code Left	A31PWBU32516	A31PWBU32516
DOT Safety Code Right	A31PWBU32516	A31PWBU32516

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

Test Vehicle: 2017 Buick LaCrosse four door sedan

NHTSA No.:

M20170105

Test Program: NCAP Side MDB Impact Test

Test Date:

11/23/2016

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	212	210	213	212
Tire Placard	kPa	220	220	220	220
Owner's Manual	kPa	220	220	220	220
As Tested	kPa	220	220	220	220

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	492	336		517	432		526	436	
Right	kg	473	332		479	399		472	406	
Ratio	%	59	41		55	45		54	46	
Totals	kg	965	668	1633	996	831	1827	998	842	1840

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1633	(A)
Sum of Actual Weight of 1 ES2re and 1 P572 ATD (SID-IIs)	kg	127	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	75.8	(C)
Calculated Target Vehicle Test Weight (TVTW)	kg	1835.8	(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	735	735	Yes
RF	mm	743	739	Yes
RR	mm	721	718	Yes
LR	mm	703	703	Yes
Vehicle CG (Aft of Front Axle)	mm	1329	1321	
Vehicle CG (Left(+)/Right(-) from Longitudinal Centerline)	mm	36.5	31.5	

*** 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>2017 Buick LaCrosse four door sedan</u>	NHTSA No.:	<u>M20170105</u>
Test Program:	<u>NCAP Side MDB Impact Test</u>	Test Date:	<u>11/23/2016</u>

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Trunk Carpeting	8
Spare Tire	14
Jack	3
Tail Light	1
Passenger Side Door Internals	16
Ballast / Equipment Added	43

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

Test Vehicle: 2017 Buick LaCrosse four door sedan

NHTSA No.: M20170105

Test Program: NCAP Side MDB Impact Test

Test Date: 11/23/2016

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	8.8	0	4.4
Front Passenger Seat	9.2	0	4.6
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	4.4	10	Max	70	80	90
			Mid	35	45	55
			Min	0	10	20
Front Passenger Seat	4.6	10	Max	70	80	90
			Mid	35	45	55
			Min	0	10	20
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: 2017 Buick LaCrosse four door sedan

NHTSA No.: M20170105

Test Program: NCAP Side MDB Impact Test

Test Date: 11/23/2016

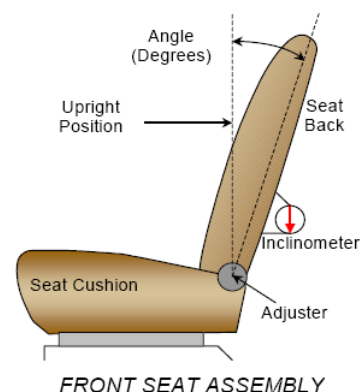
SEAT FORE / AFT POSITION

Seat	Total Fore / Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	260	N/A	130	N/A
Front Passenger Seat	260	N/A	130	N/A
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	-27.5 to 35	N/A	12.8	N/A
Front Passenger Seat	-27.9 to 36.2	N/A	12.8	N/A
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat w/ Seated Dummy	FIXED	FIXED	FIXED	FIXED
Non-Struck Side Rear Seat	FIXED	FIXED	FIXED	FIXED
Rear Center Seat*	FIXED	FIXED	FIXED	FIXED

*if applicable

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

Test Vehicle: 2017 Buick LaCrosse four door sedan
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20170105
 Test Date: 11/23/2016

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 – Uppermost
Rear Seat	FIXED	FIXED

HEAD RESTRAINT ADJUSTMENT

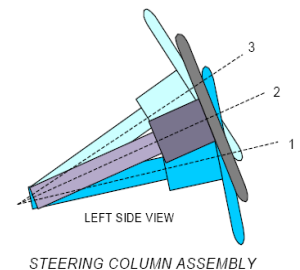
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

	Total # of Positions	Placed in Position #
Driver Seat	8	Uppermost
Rear Seat	2	Lowest

STEERING COLUMN ADJUSTMENT

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

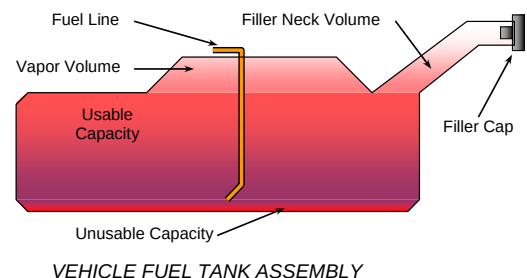
	Degrees	Fore/Aft Position (mm)
Lowermost – Position 1	19.8	
Geometric Center – Position 2	22.2	
Uppermost – Position 3	24.6	
Telescoping Steering Wheel Travel		48
Test Position	22.2	24



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 right side of the vehicle. The pump creates positive pressure in the fuel lines, pushing the gasoline to the engine. See form 1 for more information.



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

Test Vehicle:	<u>2017 Buick LaCrosse four door sedan</u>	NHTSA No.:	<u>M20170105</u>
Test Program:	<u>NCAP Side MDB Impact Test</u>	Test Date:	<u>11/23/2016</u>

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	59.8
Usable Capacity of "Optional Tank" (see Form No. 1)	61.3
Usable Capacity of Standard Tank (see Owner's Manual)	59.8
Usable Capacity of Optional Tank (see Owner's Manual)	61.3
93% of Usable Capacity	55.6
Actual Amount of Solvent Used in Test	55.6
1/3 of Usable Capacity	19.93

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: 2017 Buick LaCrosse four door sedan

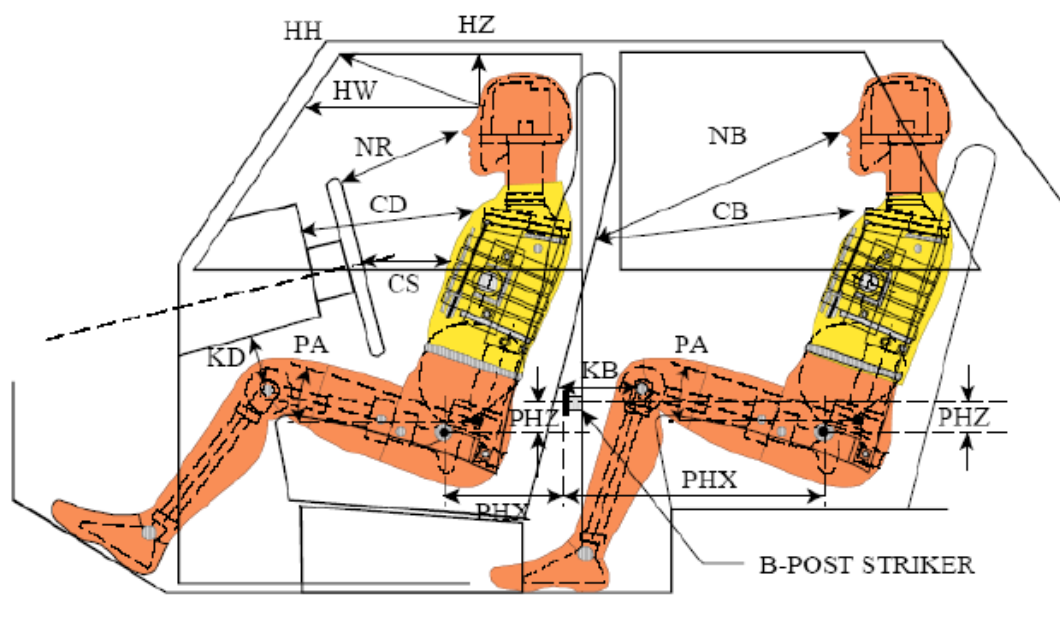
NHTSA No.:

M20170105

Test Program: NCAP Side MDB Impact Test

Test Date:

11/23/2016



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

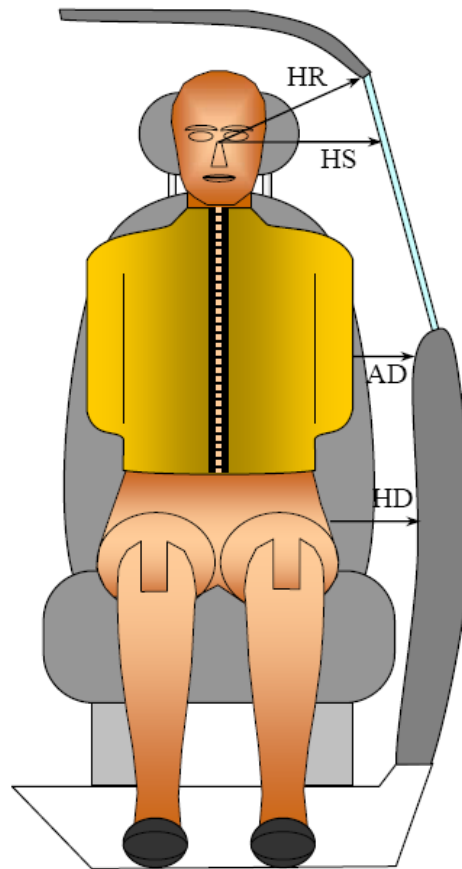
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Description	Driver (Serial No. F034)		Passenger (Serial No.DG8012)	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	434			
HW		Header to Windshield	770			
HZ	HZ	Head to Roof Liner	180		250	
NR	NB	Nose to Rim/Seat Back	505		608	
CD	CB	Chest to Dash/Seat Back	605		568	
CS		Chest to Steering Wheel	405			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	263	30.5	294	11.5
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	259	23.9	288	12.1
PAX°	PAX°	Pelvic Tilt Angle X		-23.1		24.1
	PAY°	Pelvic Tilt Angle Y				0.3
PHX	PHX	Hip Point to Striker (X-Axis)	135		222	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	185		269	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2017 Buick LaCrosse four door sedan
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20170105
 Test Date: 11/23/2016



FRONT VIEW OF DUMMY

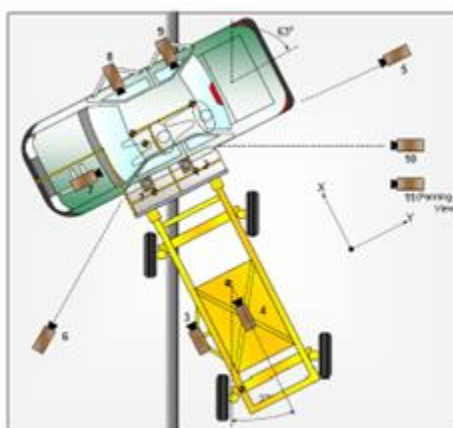
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver (Serial No. F034)	Passenger (Serial No. DG8012)
HR	Head to Side Header	mm	195	242
HS	Head to Side Window	mm	338	376
AD	Arm to Door	mm	123	156
HD	Hip Point to Door	mm	152	172

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

Test Vehicle: 2017 Buick LaCrosse four door sedan
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20170105
 Test Date: 11/23/2016



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)	-1470	0	-847	25	1000
4	Side Overall (MDB)	-1140	838	-1587	12.5	1000
5	Rear	0	9582	-1161	24	1000
6	Left Front	-2669	-4386	-1162	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

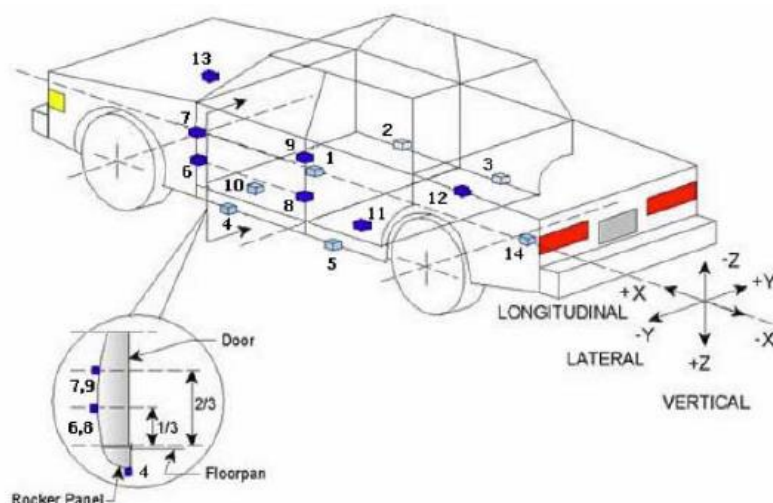
INSTRUMENTATION

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: 2017 Buick LaCrosse four door sedan
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20170105
Test Date: 11/23/2016



TEST VEHICLE ACCELEROMETER LOCATIONS

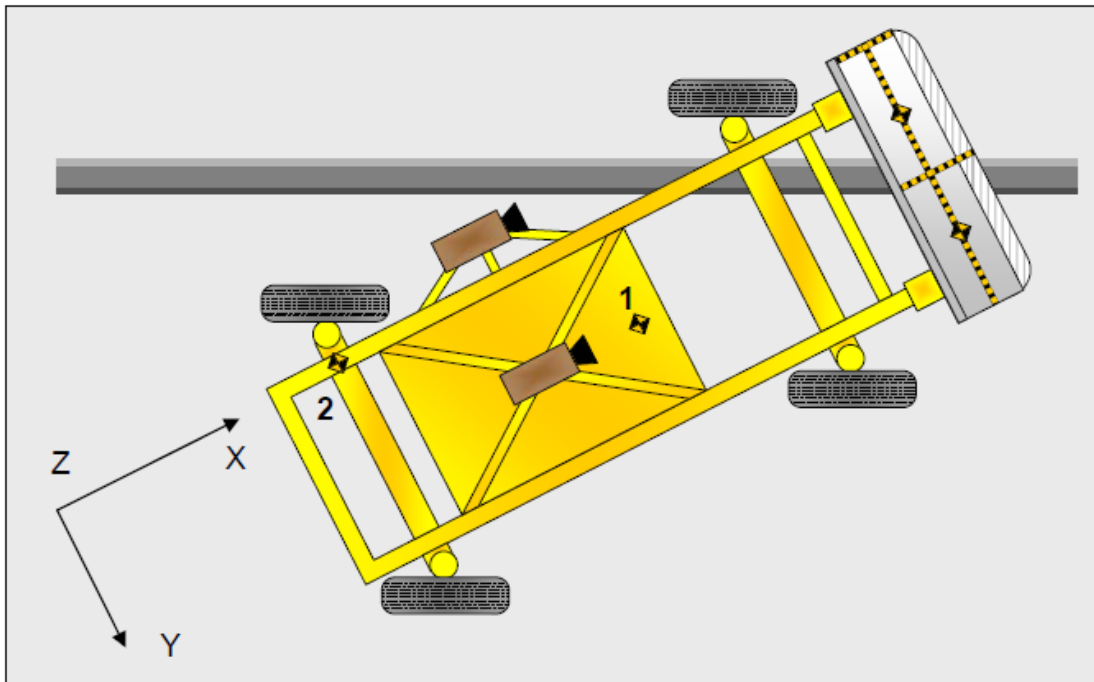
No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2765	-12	205
2	Right Sill at Front Seat	3112	717	-122
3	Right Sill at Rear Seat	2140	713	-111
4	Left Sill at Front Door	3128	-710	-129
5	Left Sill at Rear Door	2160	-709	-137
6	A-Post Lower	3479	-704	126
7	A-Post Middle	3489	-645	565
8	B-Post Lower	2401	-735	131
9	B-Post Middle	2365	-731	355
10	Front Seat Track	2735	-569	-166
11	Rear Seat Structure	2036	-368	-142
12	Rt. Rear Occ. Compartment	2179	449	-214
13	Engine Block	4361	-113	334
14	Rear Above Axle	1033	35	92

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: 2017 Buick LaCrosse four door sedan
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20170105
 Test Date: 11/23/2016



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: 2017 Buick LaCrosse four door sedan
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20170105
Test Date: 11/23/2016

TEST DUMMY INFORMATION AND CONTACT POINTS

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

POST-TEST DOOR PERFORMANCE

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

*Tailgate opened during impact but is still operational.

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	Remained in Good Condition
Sill Separation	None
Windshield Damage	None
Side Window Damage	Driver & Rear Passenger windows shattered
Other Notable Effects	None

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

Test Vehicle: 2017 Buick LaCrosse four door sedan

NHTSA No.: M20170105

Test Program: NCAP Side MDB Impact Test

Test Date: 11/23/2016

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Driver		Struck Side Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	Yes	No		
Side Airbag 1 - Curtain	Yes	Yes	Yes	Yes
Side Airbag 2 - Torso/Pelvis Airbag	Yes	Yes	No	N/A
Side Airbag 3 – Torso Airbag	No	N/A	Yes	Yes
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		2904
Vertical Impact Reference Line (Aft of Front Axle - Intended Impact Point)	mm		508
Actual Impact Point (Aft of Frontal Axle)	mm		508
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact Point	0
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact Point	-3

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2017 Buick LaCrosse four door sedan
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20170105
Test Date: 11/23/2016

MDB SPECIFICATIONS

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

MDB WEIGHTS

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

SPEED AND ANGLE AT IMPACT DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.10 to 62.70	61.9
Trap No. 2 Velocity (Redundant)	km/h	61.10 to 62.70	61.92
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	Left	160
B	Top of Bumper	533	800	Left	74
C	Mid-Level	686	800	Left	96
D	Top of Stack	813	800	Left	146

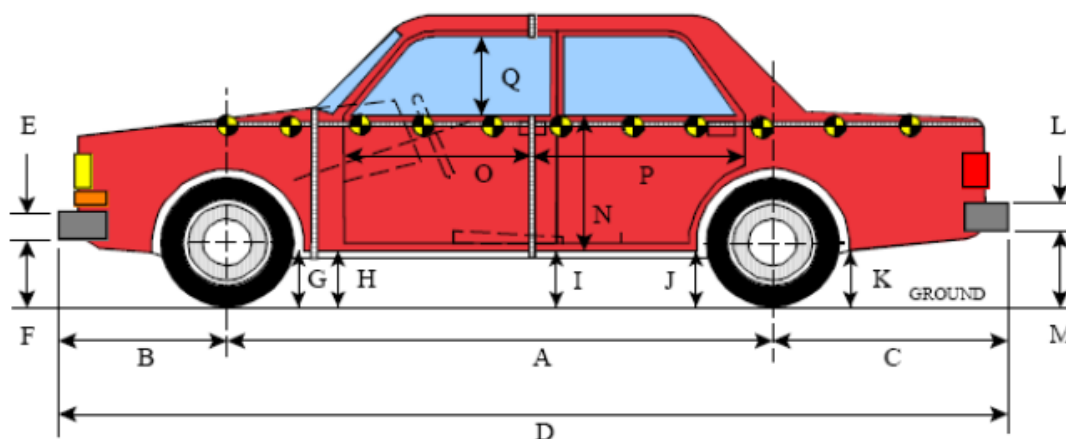
DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2017 Buick LaCrosse four door sedan

NHTSA No.: M20170105

Test Program: NCAP Side MDB Impact Test

Test Date: 11/23/2016



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	2904	2894	-10
B	Front Axle to FSOV	959	967	9
C	Rear Axle to RSOV	1160	1154	-6
D	Total Length at Centerline	5019	5015	-4
E	Front Bumper Thickness	130	130	0
F	Front Bumper Bottom to Ground	344	353	9
G	Sill Height at Front Wheel Well	175	188	13
H	Sill Height at Front Door Leading Edge	183	198	15
I	Sill Height at B Pillar	175	201	26
J1	Sill Height at Rear Wheel Well	176	177	1
J2	Pinch Weld Height at Rear Wheel Well	149	146	-3
K	Sill Height Aft of Rear Wheel Well	205	203	-2
L	Rear Bumper Thickness	240	240	0
M	Rear Bumper Bottom to Ground	395	401	6
N	Sill Height to Window Bottom of Front Window Sill	791	772	-18
O	Front Door Leading Edge to Impact CL	799	776	-22
P	Rear Door Trailing Edge to Impact CL	1400	1286	-115
Q	Front Window Opening	419	411	-8
R	Right Side Length	4895	4894	-1
S	Left Side Length	4892	4883	-9
T	Maximum Vehicle Width	1857	1660	-197

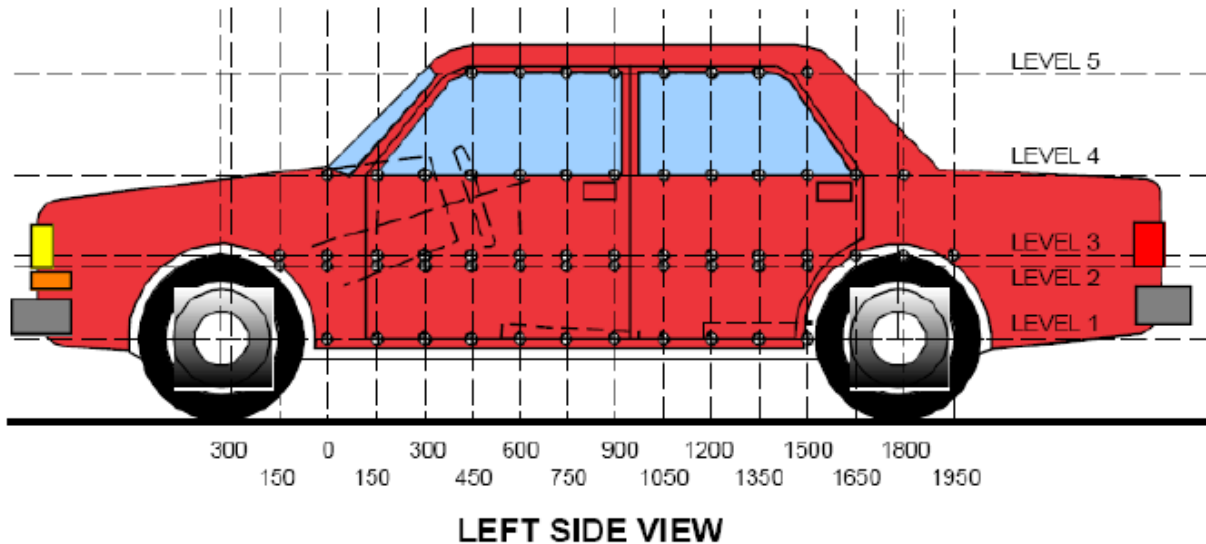
DATA SHEET NO. 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2017 Buick LaCrosse four door sedan

NHTSA No.: M20170105

Test Program: NCAP Side MDB Impact Test

Test Date: 11/23/2016



MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	225	43	900
2	Driver Hip Point	mm	492	332	1650
3	Mid-Door	mm	609	329	1650
4	Window Sill	mm	918	252	1500
5	Window Top	mm	1385	4	1350

*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: 2017 Buick LaCrosse four door sedan

NHTSA No.: M20170105

Test Program: NCAP Side MDB Impact Test

Test Date: 11/23/2016

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

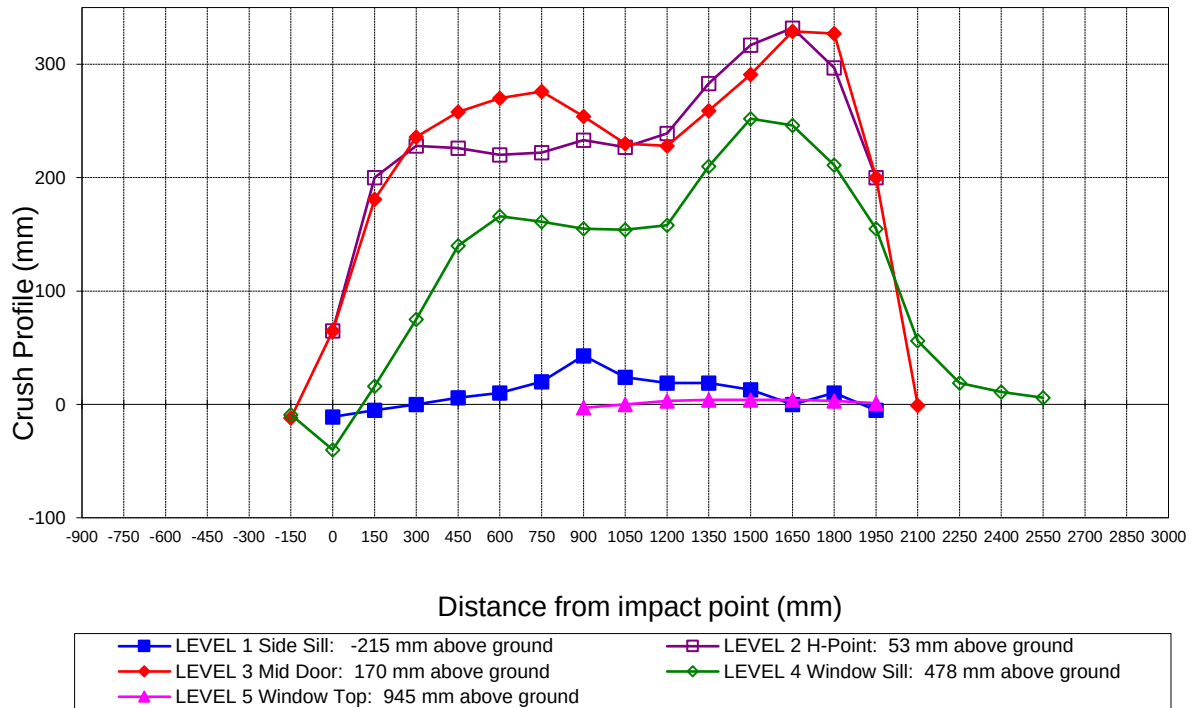
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750															
-600															
-450															
-300															
-150			925	828				937	837				-12	-9	
0	872	915	915	839		883	850	853	879		-11	65	62	-40	
150	867	913	915	824		872	713	734	808		-5	200	181	16	
300	865	912	915	858		865	684	679	783		0	228	236	75	
450	864	912	916	865		858	686	658	725		6	226	258	140	
600	862	912	916	867		852	692	646	701		10	220	270	166	
750	861	912	917	868		841	690	641	707		20	222	276	161	
900	860	912	917	869	616	817	679	663	714	619	43	233	254	155	-3
1050	859	912	917	869	625	835	685	687	715	625	24	227	230	154	0
1200	857	911	916	868	627	838	672	688	710	624	19	239	228	158	3
1350	857	910	914	867	628	838	627	655	657	624	19	283	259	210	4
1500	858	909	913	868	628	845	592	622	616	624	13	317	291	252	4
1650	863	907	911	873	626	863	575	582	627	622	0	332	329	246	4
1800	874	910	913	880	621	864	613	586	669	618	10	297	327	211	3
1950	890	917	920	880	600	895	717	720	725	599	-5	200	200	155	1
2100			928	885				929	829				-1	56	
2250				887					868					19	
2400				887					876					11	
2550				881					875					6	
2700															
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: 2017 Buick LaCrosse four door sedan
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20170105
 Test Date: 11/23/2016



Vehicle Exterior Crush Measurements - Visual Representation

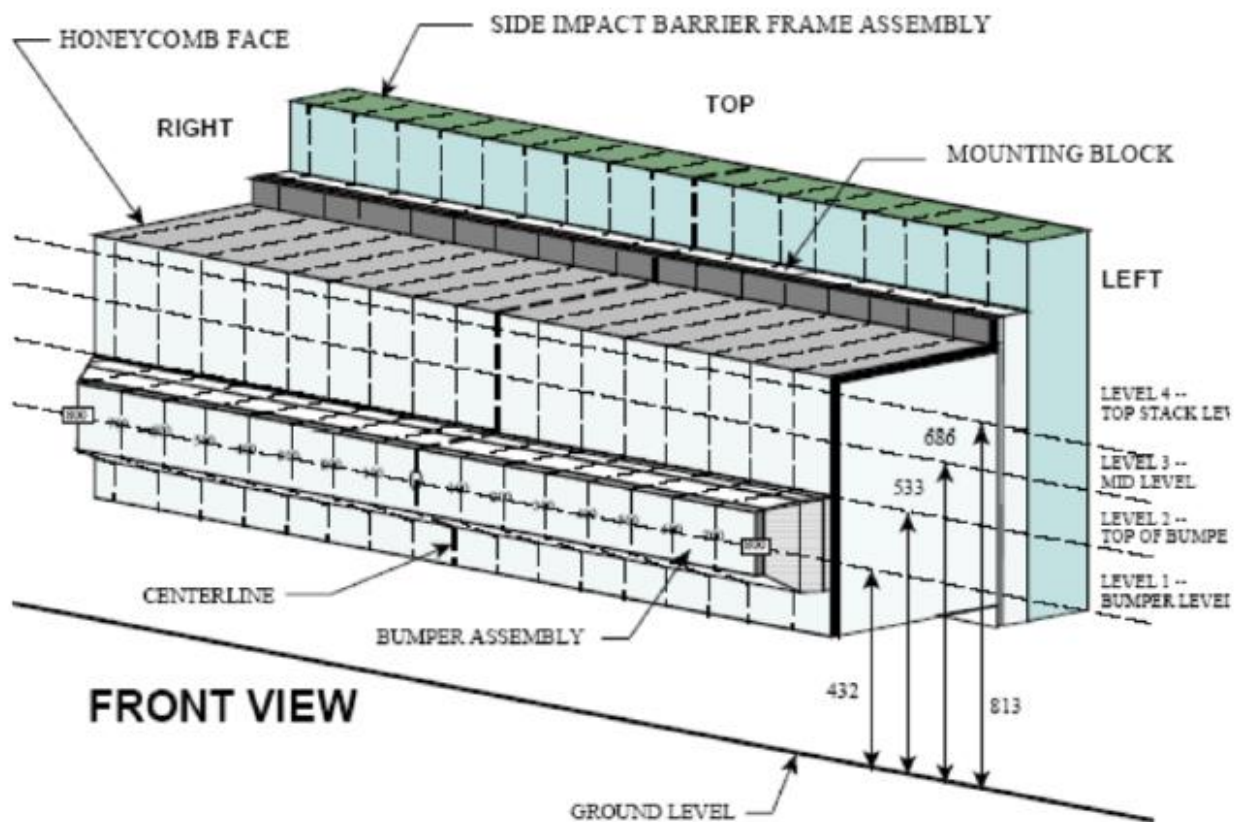
DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2017 Buick LaCrosse four door sedan

NHTSA No.: M20170105

Test Program: NCAP Side MDB Impact Test

Test Date: 11/23/2016



NOTE: Dimensions are shown in millimeters, mm

DEFORMABLE BARRIER STATIC CRUSH

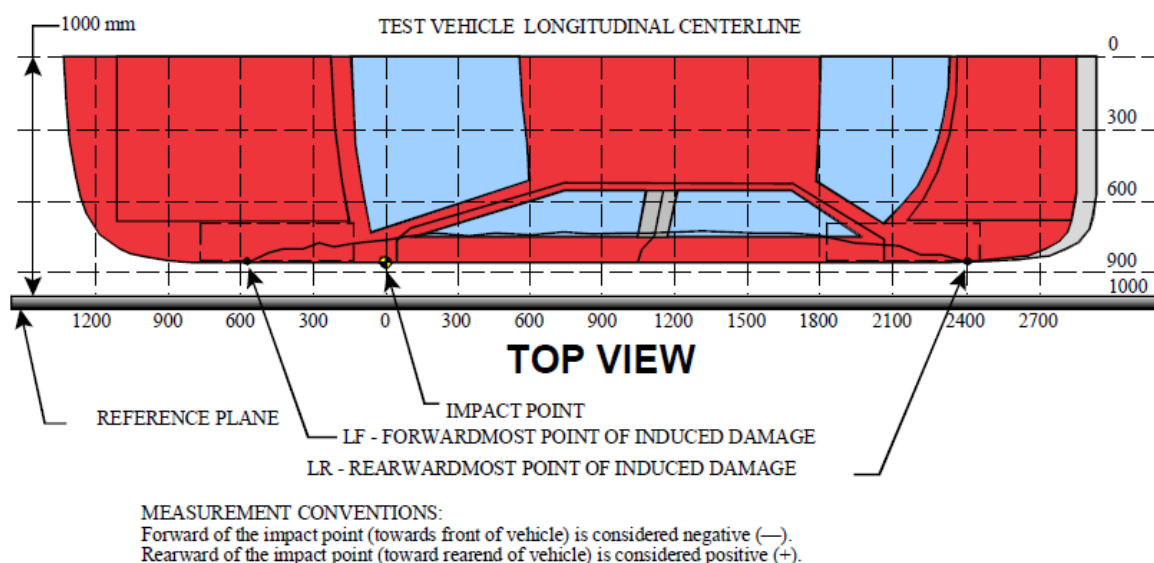
Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100		0	100	200	300	400	500	600	700
1	80	92	101	110	118	143	145	147	147	149	147	148	150	152	154	157	160
2	20	26	33	40	44	57	74	69	61	54	60	61	62	63	64	66	73
3	-1	-13	-3	6	15	39	71	70	48	25	17	15	17	22	30	51	96
4	26	-3	-8	2	22	57	95	87	62	40	24	23	25	29	58	100	146

DATA SHEET NO. 13
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2017 Buick LaCrosse four door sedan
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20170105
 Test Date: 11/23/2016

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	63	75	-12
2	300	3	321	85	236
3	750	3	359	83	276
4	1200	3	312	84	228
5	1650	3	418	89	329
6	2100	3	71	72	-1

MDB DAMAGE PROFILE DISTANCES

DPD	Distance From Center of MDB	Level	Post-Test (mm)*
1	800 mm left of center	1	160
2	480 mm left of center	1	151
3	160 mm left of center	1	148
4	160 mm right of center	1	146
5	480 mm right of center	1	112
6	800 mm right of center	1	80

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

Test Vehicle: <u>2017 Buick LaCrosse four door sedan</u>	NHTSA No.: <u>M20170105</u>
Test Program: <u>NCAP Side MDB Impact Test</u>	Test Date: <u>11/23/2016</u>

Test Time: <u>11:20 AM</u>	Temperature: <u>21°C</u>
----------------------------	--------------------------

- | | | |
|---|-----------------------------|-----|
| A. From impact until vehicle motion ceases:
(Maximum allowable is 1 oz.) | <u>0</u> | oz. |
| B. For the 5-minute period after motion ceases:
(Maximum allowable is 5 oz.) | <u>0</u> | oz. |
| C. For the following 25 minutes:
(Maximum allowable is 1 oz./minute) | <u>0</u> | 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°	71	300	371
90° to 180°	64	300	364
180° to 270°	62	300	362
270° to 360°	70	300	370

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	

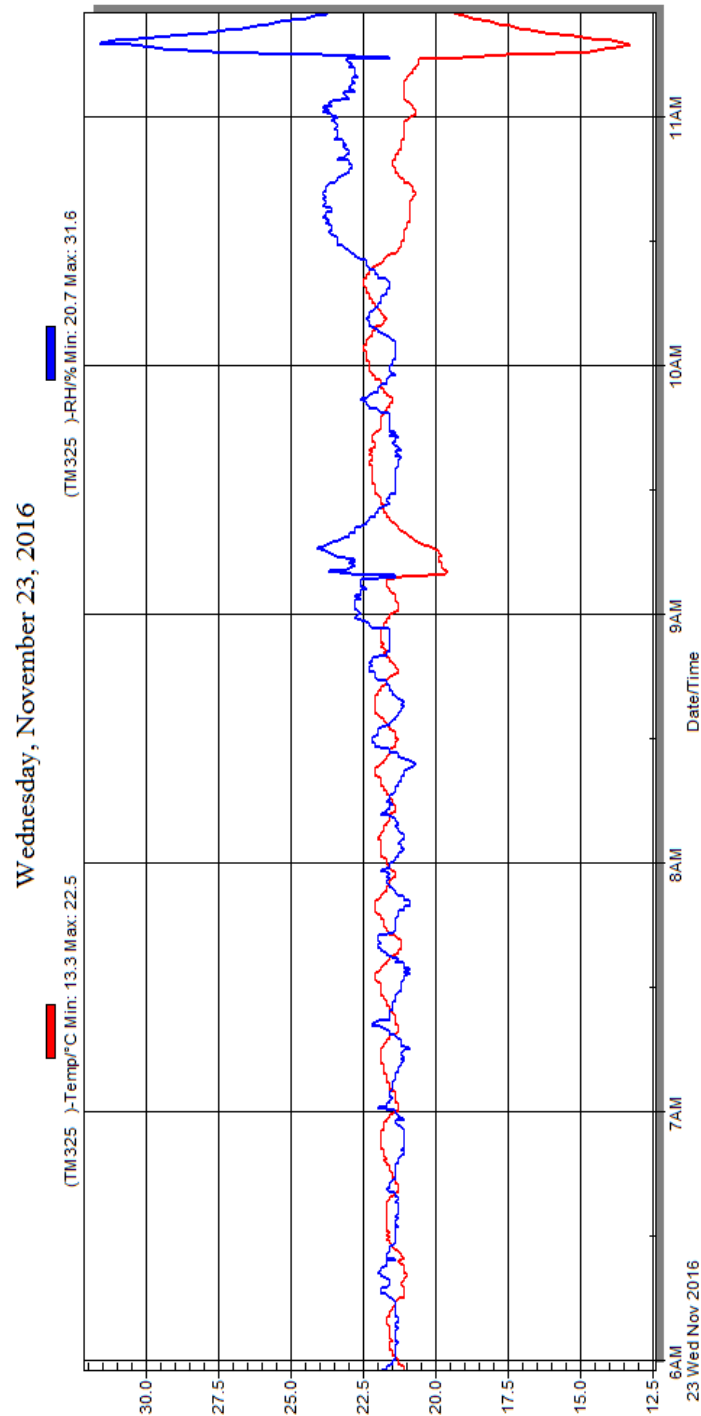
ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

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: 2017 Buick LaCrosse four door sedan
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20170105
 Test Date: 11/23/2016



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

APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

Fig.	Description	Page
1	As-Delivered Right Front 3/4 View of Test Vehicle	A-5
2	As-Delivered Left Rear 3/4 View of Test Vehicle	A-5
3	Pre-Test Frontal View of Test Vehicle	A-6
4	Post-Test Frontal View of Test Vehicle	A-6
5	Pre-Test Left Front 3/4 View of Test Vehicle	A-7
6	Post-Test Left Front 3/4 View of Test Vehicle	A-7
7	Pre-Test Left Side View of Test Vehicle	A-8
8	Post-Test Left Side View of Test Vehicle	A-8
9	Pre-Test Left Rear 3/4 View of Test Vehicle	A-9
10	Post-Test Left Rear 3/4 View of Test Vehicle	A-9
11	Pre-Test Rear View of Test Vehicle	A-10
12	Post-Test Rear Side View of Test Vehicle	A-10
13	Pre-Test Right Side View of Test Vehicle	A-11
14	Post-Test Right Side View of Test Vehicle	A-11
15	Pre-Test Overhead View of Test Area	A-12
16	Post-Test Overhead View of Test Area	A-12
17	Pre-Test Left Side View of MDB Positioned Against Side of Test Vehicle	A-13
18	Pre-Test Right Side View of MDB Positioned Against Side of Test Vehicle	A-13
19	Pre-Test Close-Up View of Impact Point Target	A-14
20	Post-Test Close-up View of Impact Point Target	A-14
21	Pre-Test Left Front Door Latch Close-Up	A-15
22	Post-Test Left Front Door Latch Close-Up	A-15
23	Pre-Test Left Rear Door Latch Close-Up	A-16
24	Post-Test Left Rear Door Latch Close-Up	A-16
25	Pre-Test Front Close-up View of Driver Dummy	A-17
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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

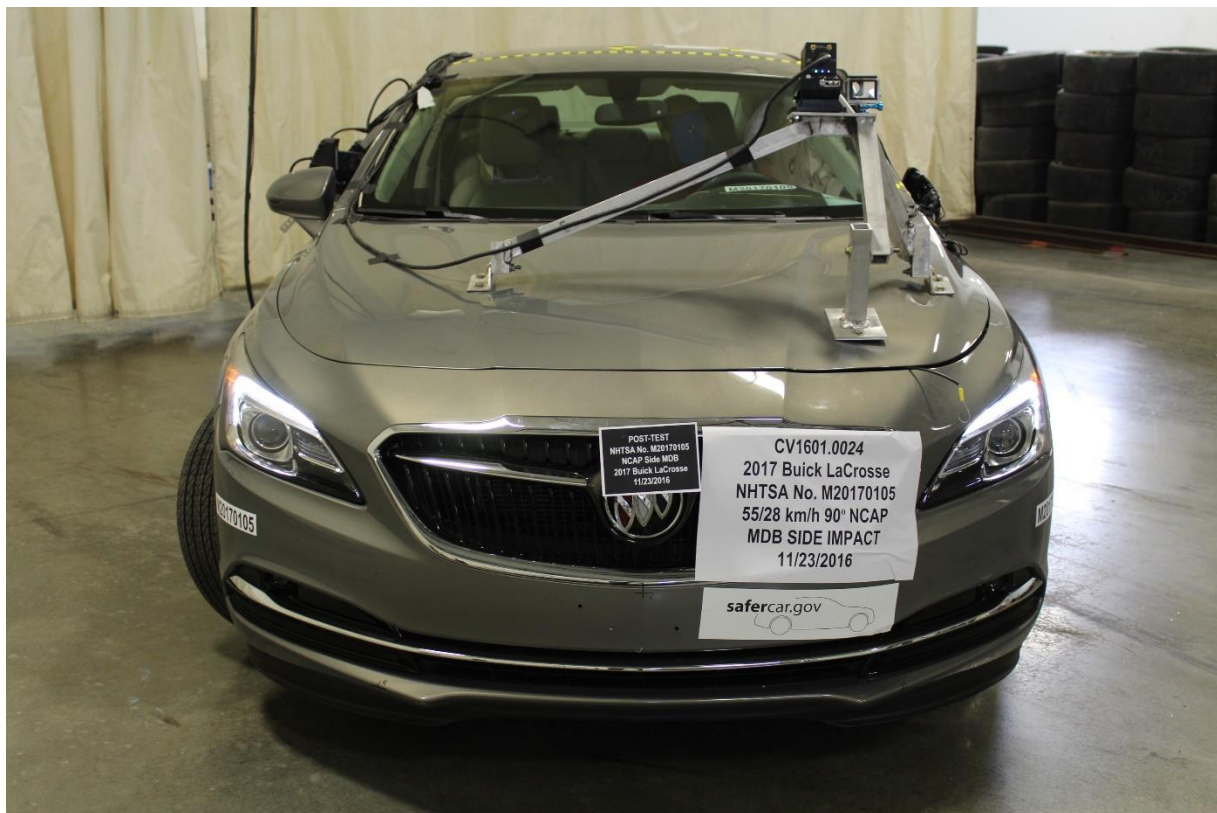


Figure A-4: Post-Test Frontal View of Test Vehicle



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

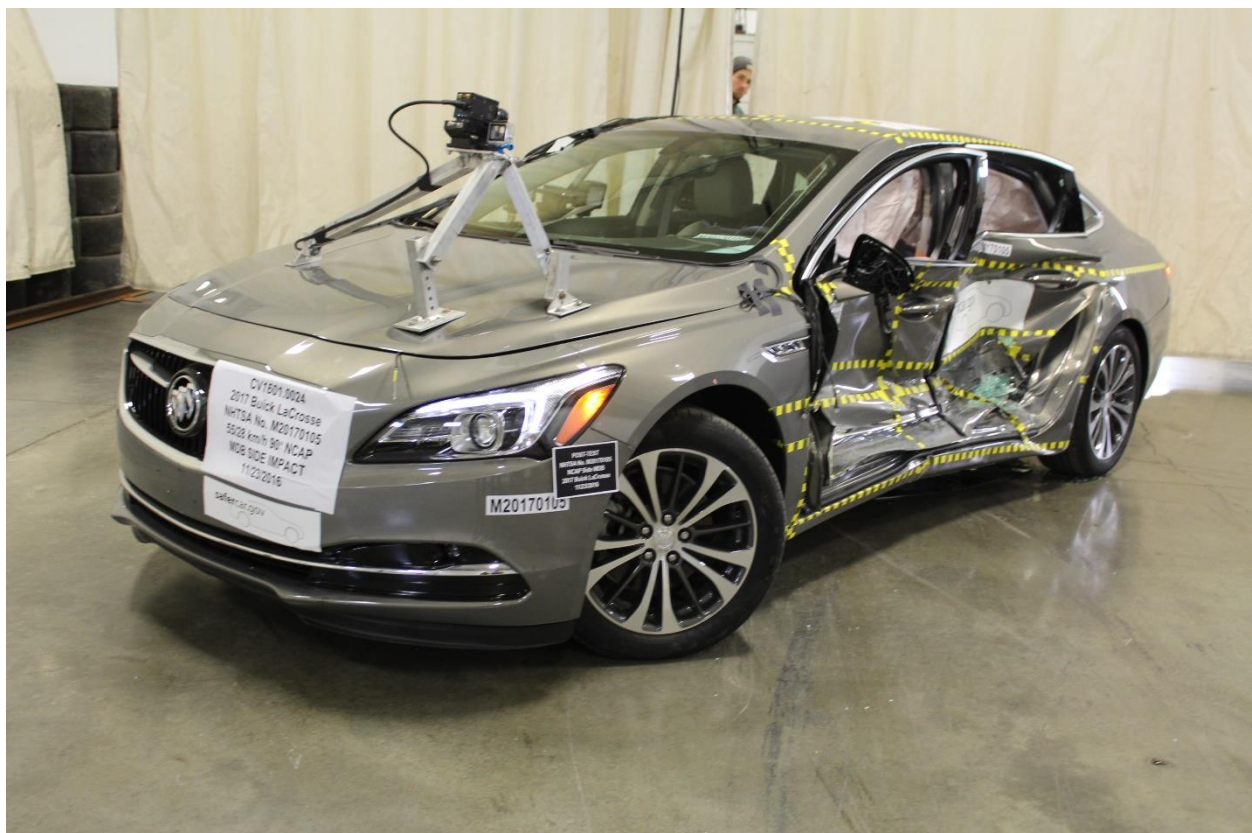


Figure A-6: Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle

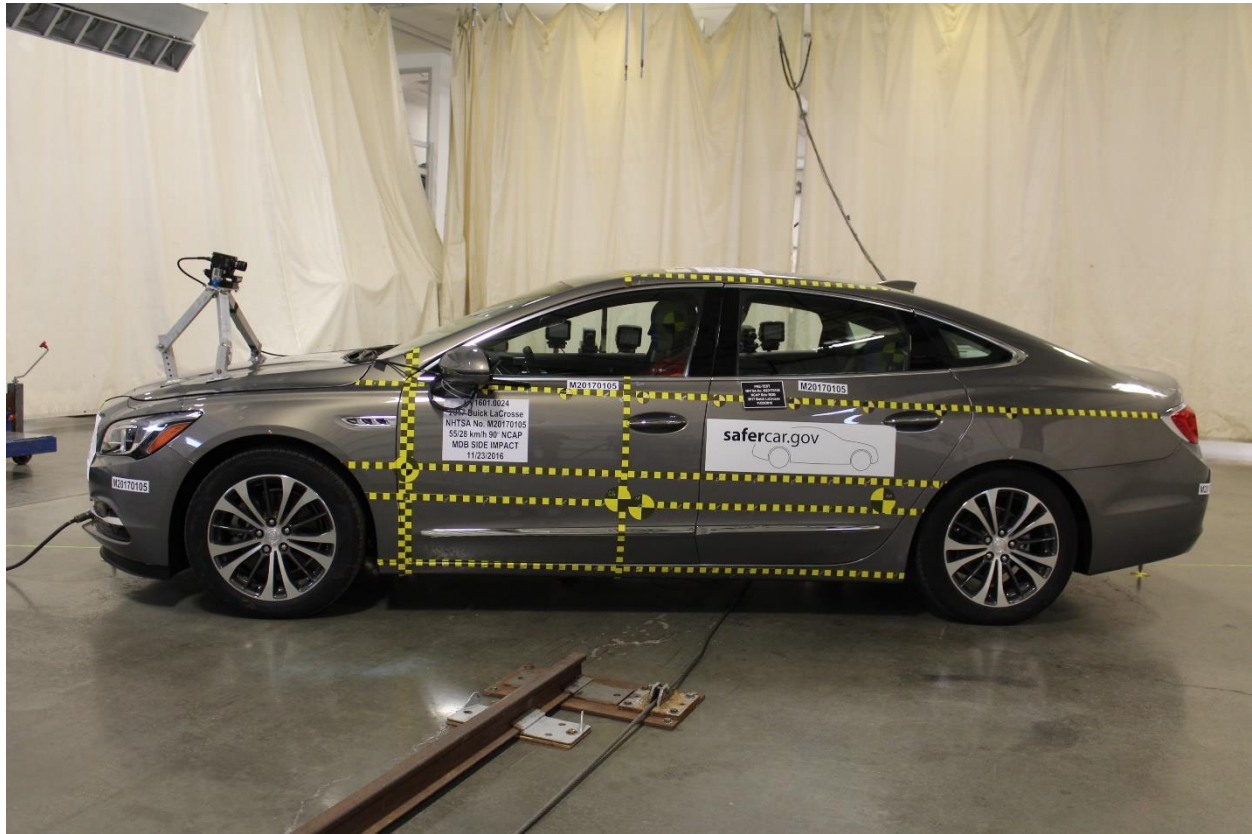


Figure A-7: Pre-Test Left Side View of Test Vehicle

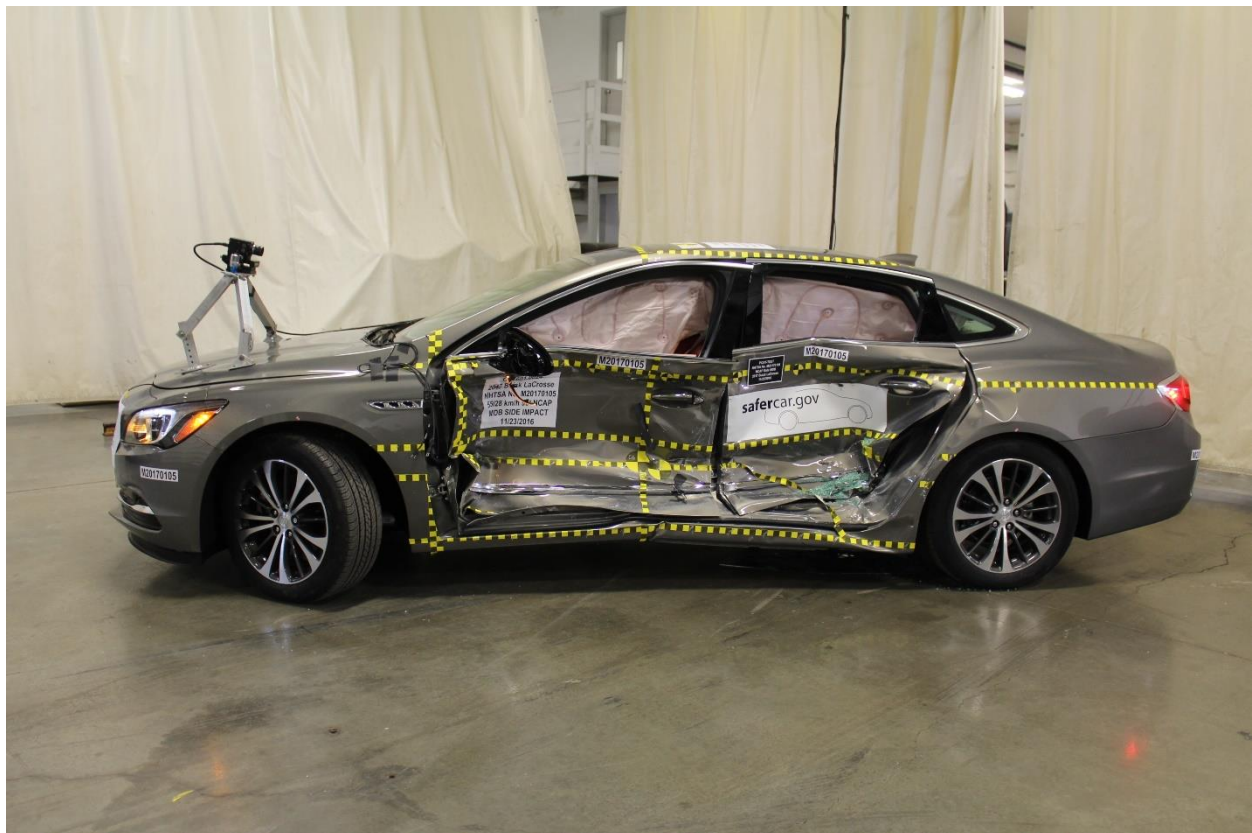


Figure A-8: Post-Test Left Side View of Test Vehicle



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

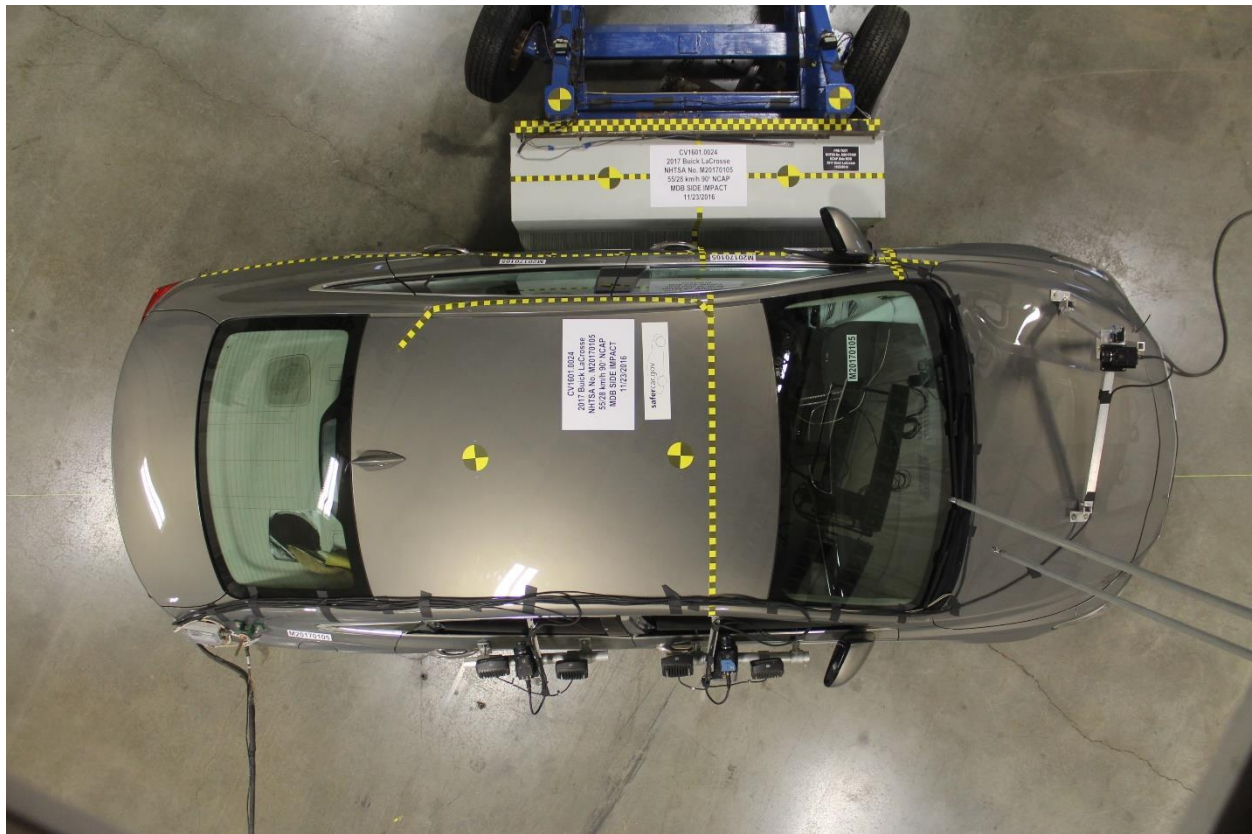


Figure A-15: Pre-Test Overhead View of the Test Area



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

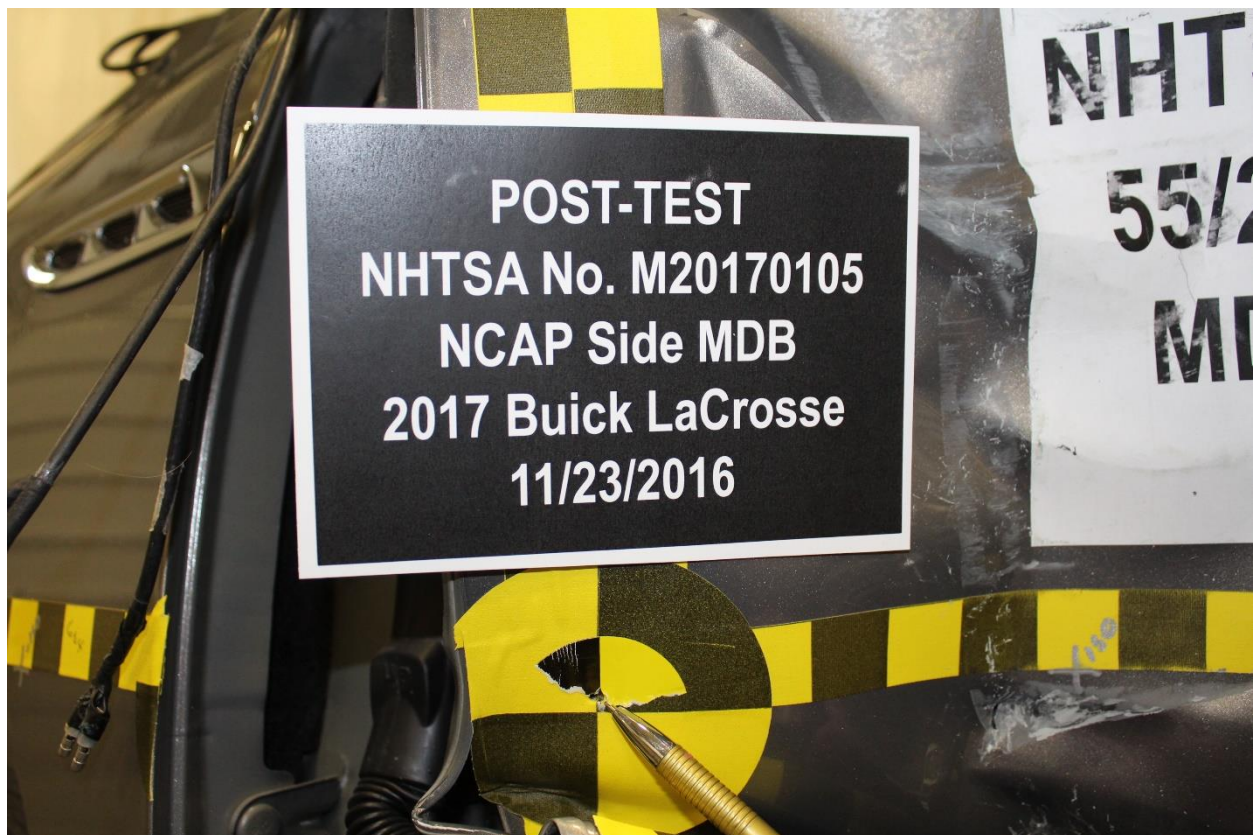


Figure A-20: Post-Test Close-up View of Impact Point Target

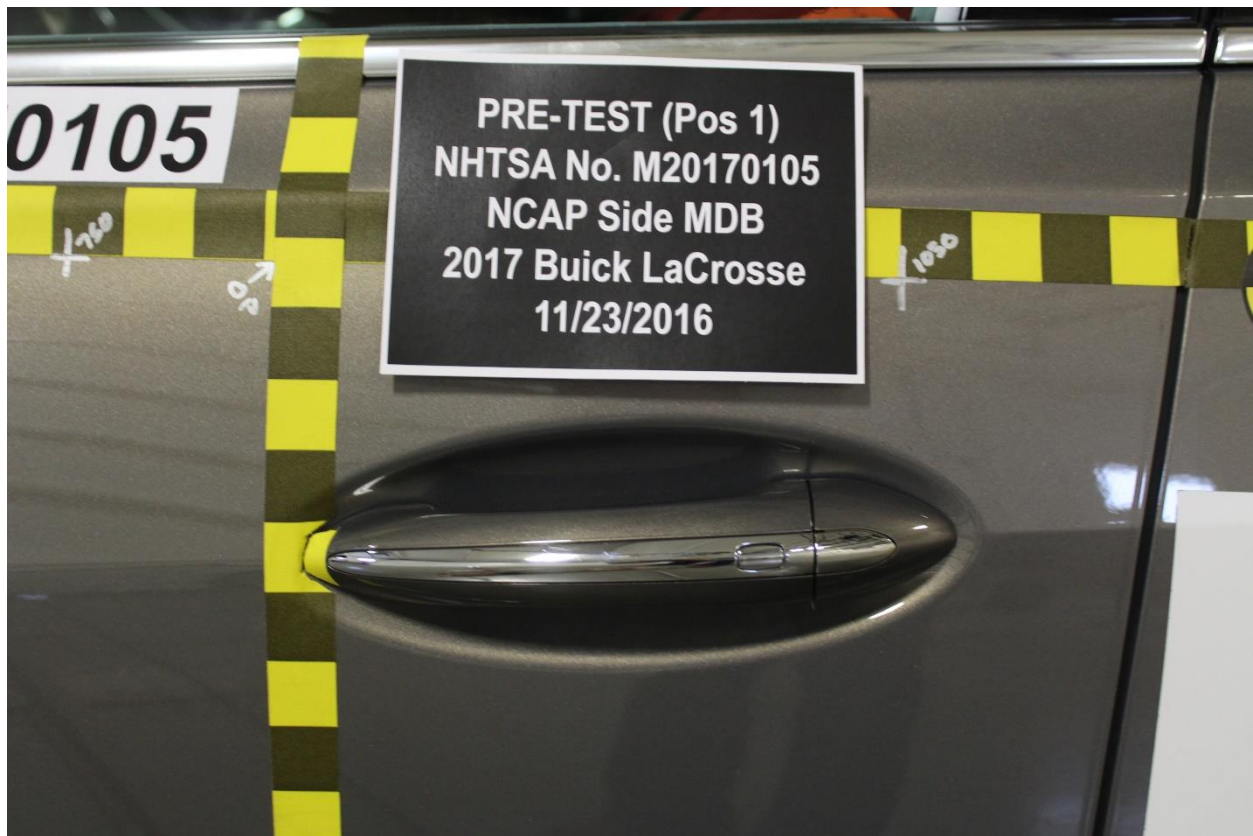


Figure A-21: Pre-Test Left Front Door Latch Close-Up



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

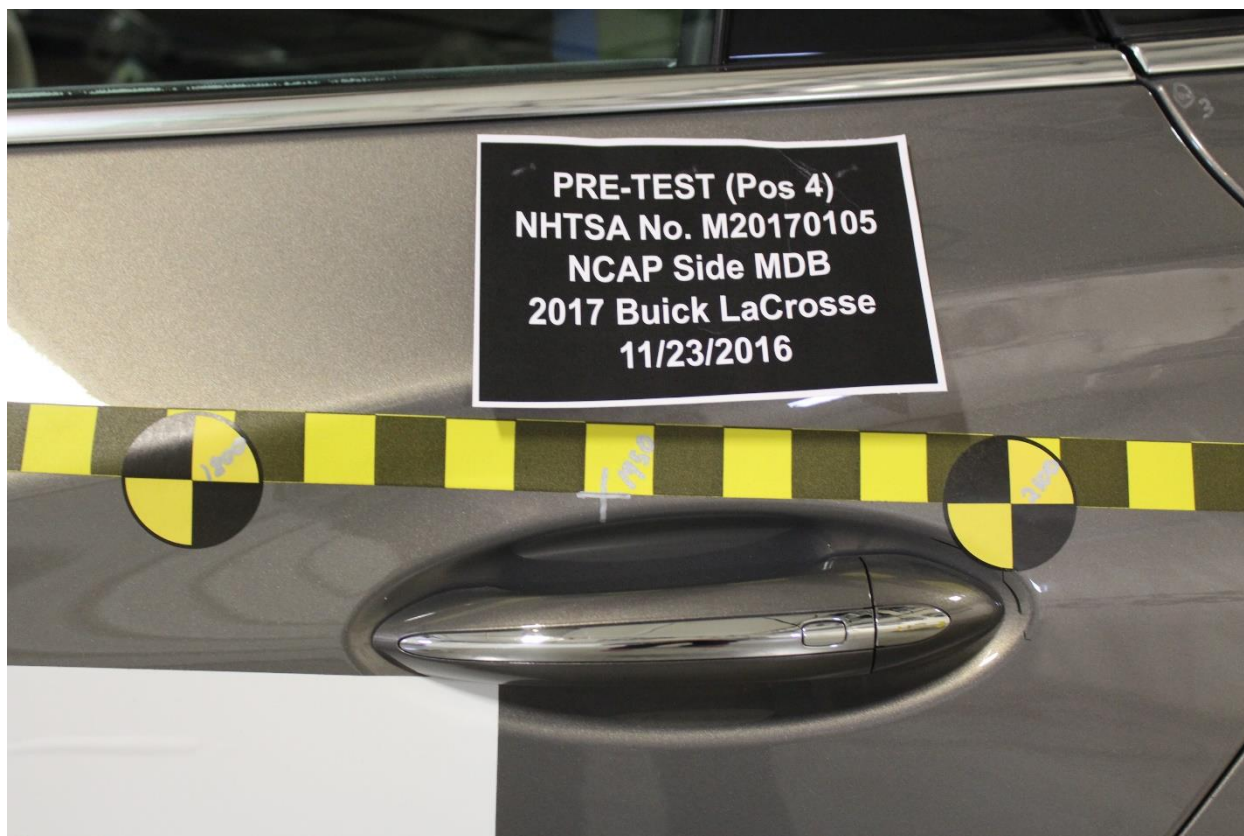


Figure A-23: Pre-Test Left Rear Door Latch Close-Up



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



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

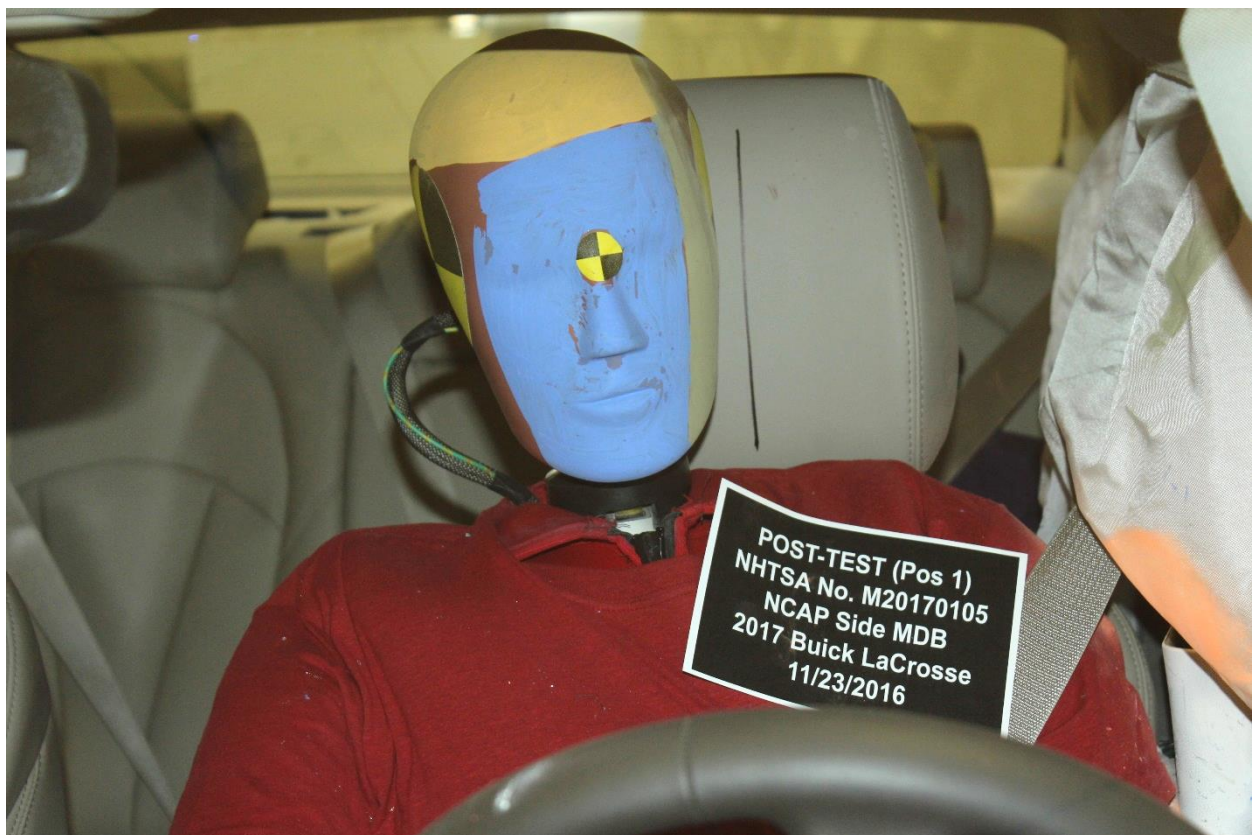


Figure A-26: Post-Test Front Close-up View of Driver Dummy



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

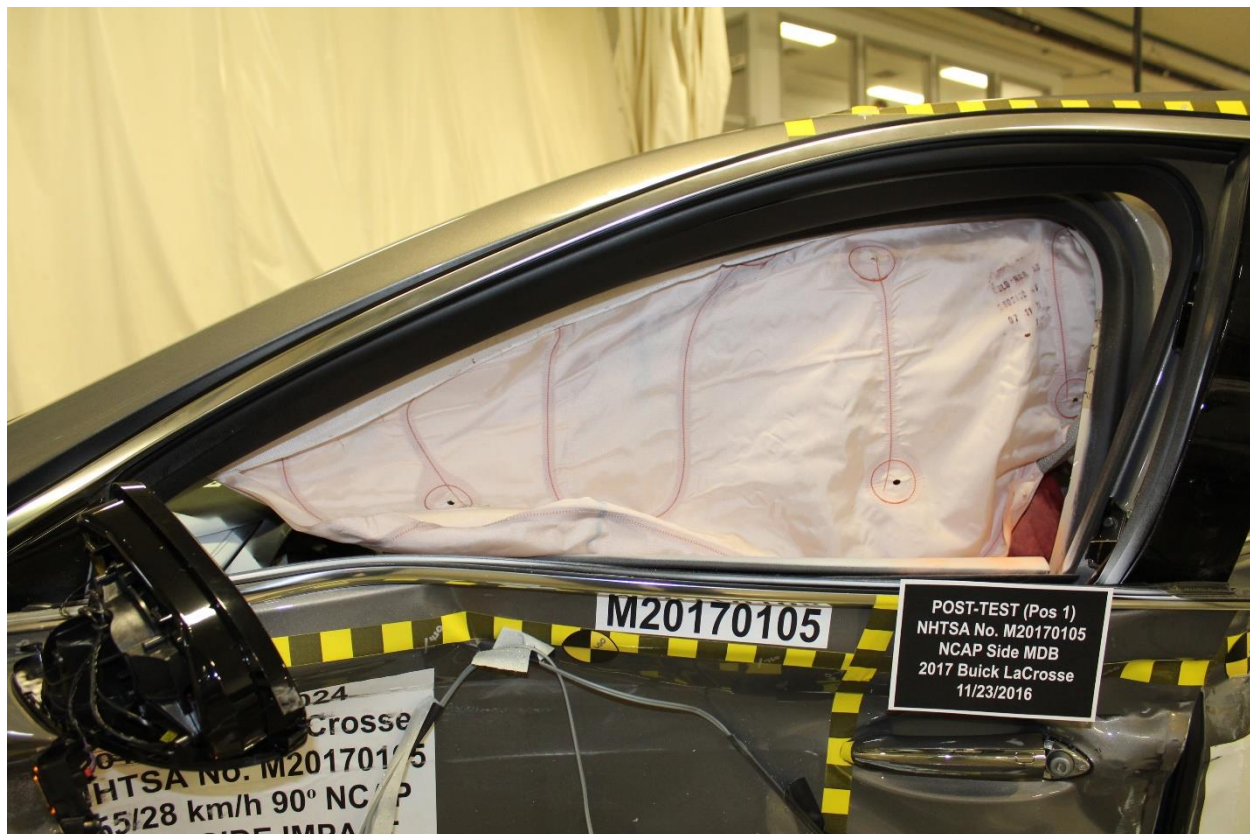


Figure A-29: Post-Test Left Side View of Driver Dummy Shoulder and Door Top View



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

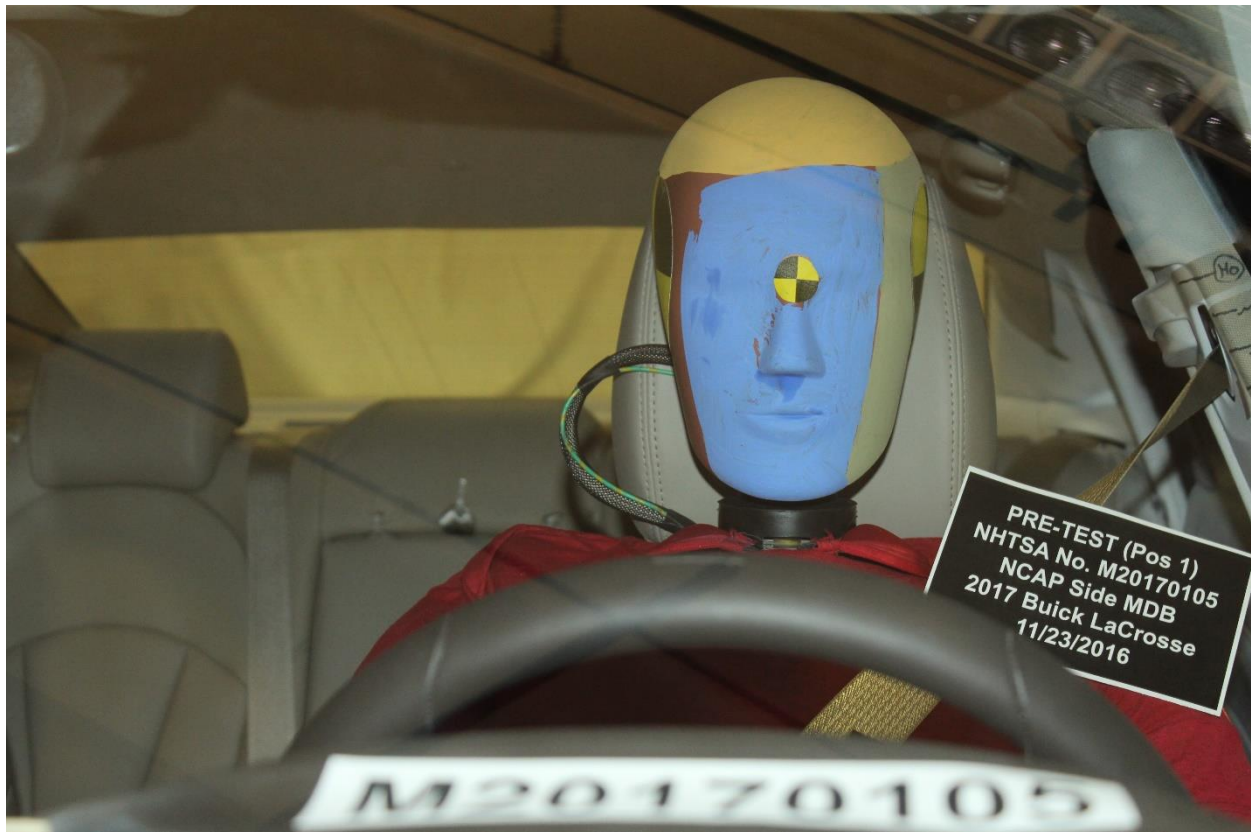


Figure A-31: Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint



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

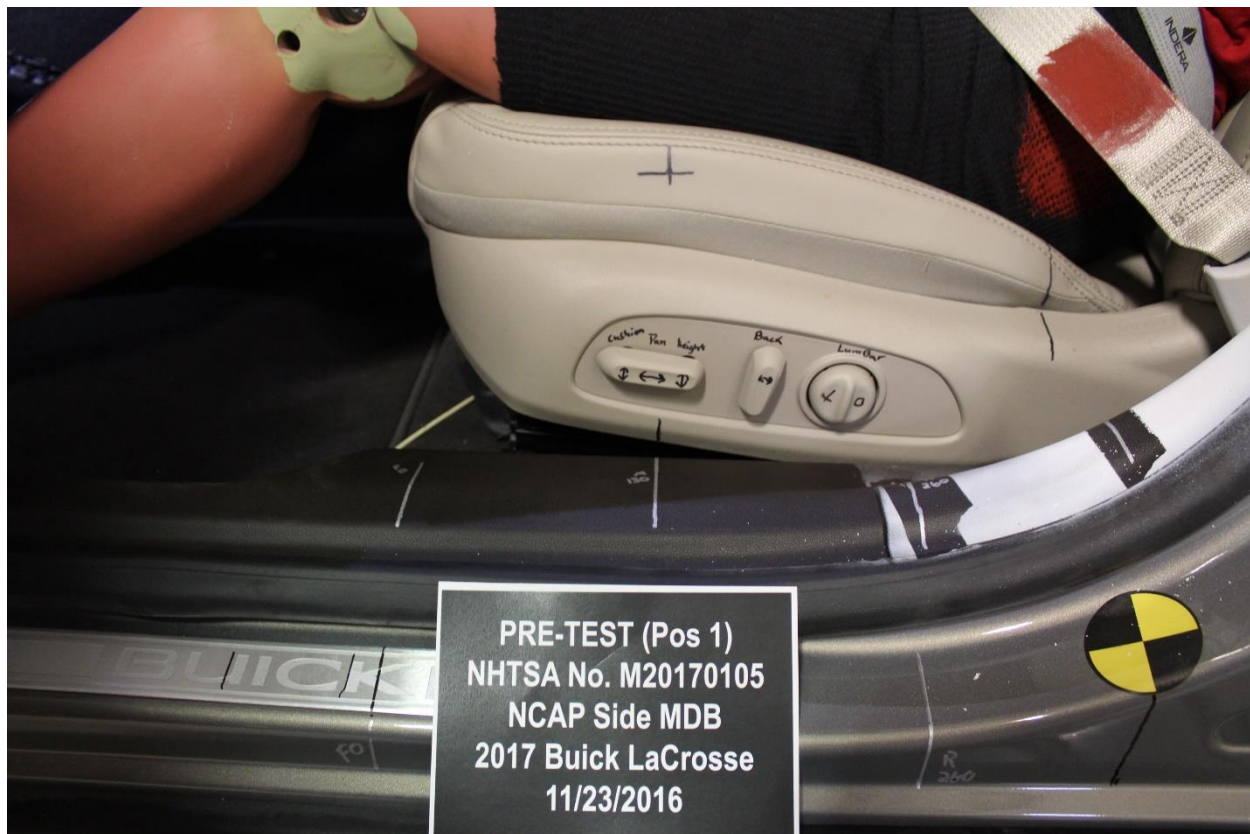


Figure A-39: Pre-test Close-Up Left Side View of Driver Seat Track



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

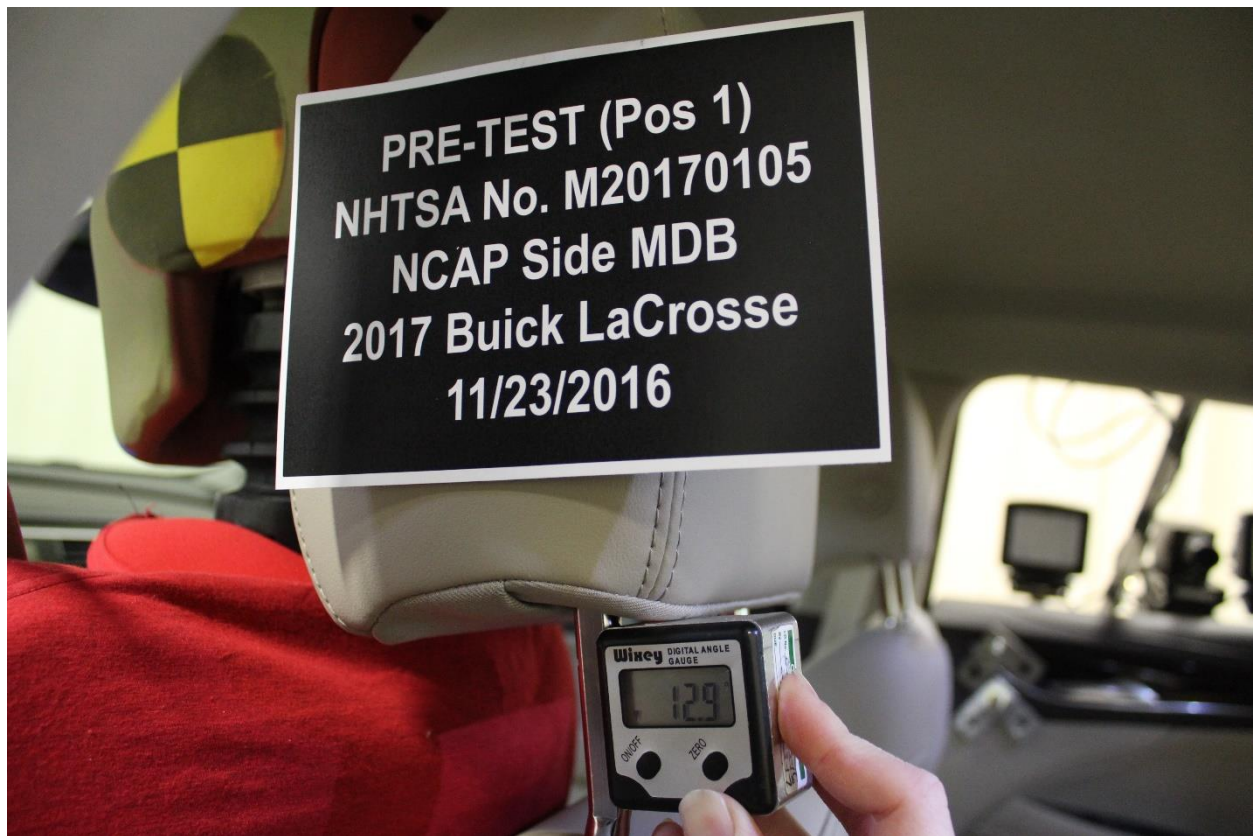


Figure A-41: Pre-Test Close-Up View of Driver Seat Back or Head Restraint



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

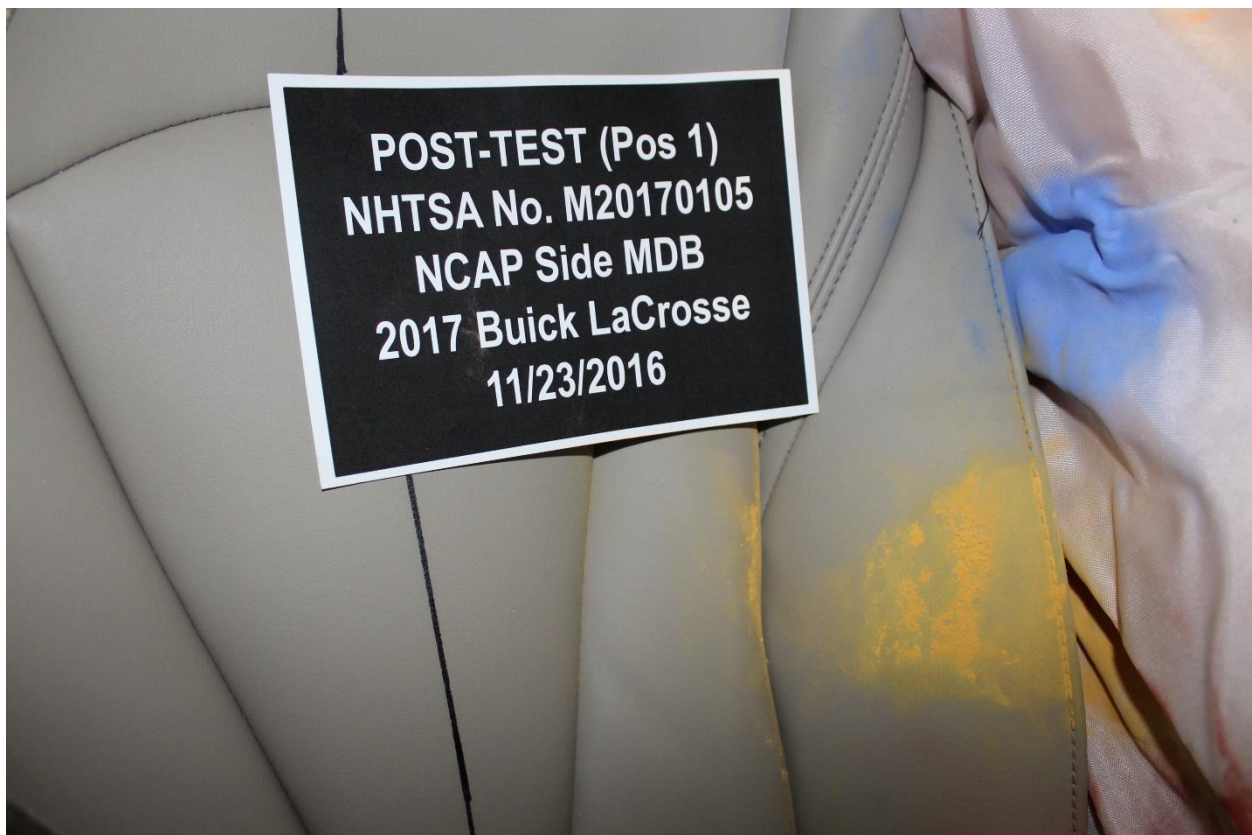


Figure A-50: Post-Test Driver Dummy Close-Up Torso Contact with Vehicle Interior View

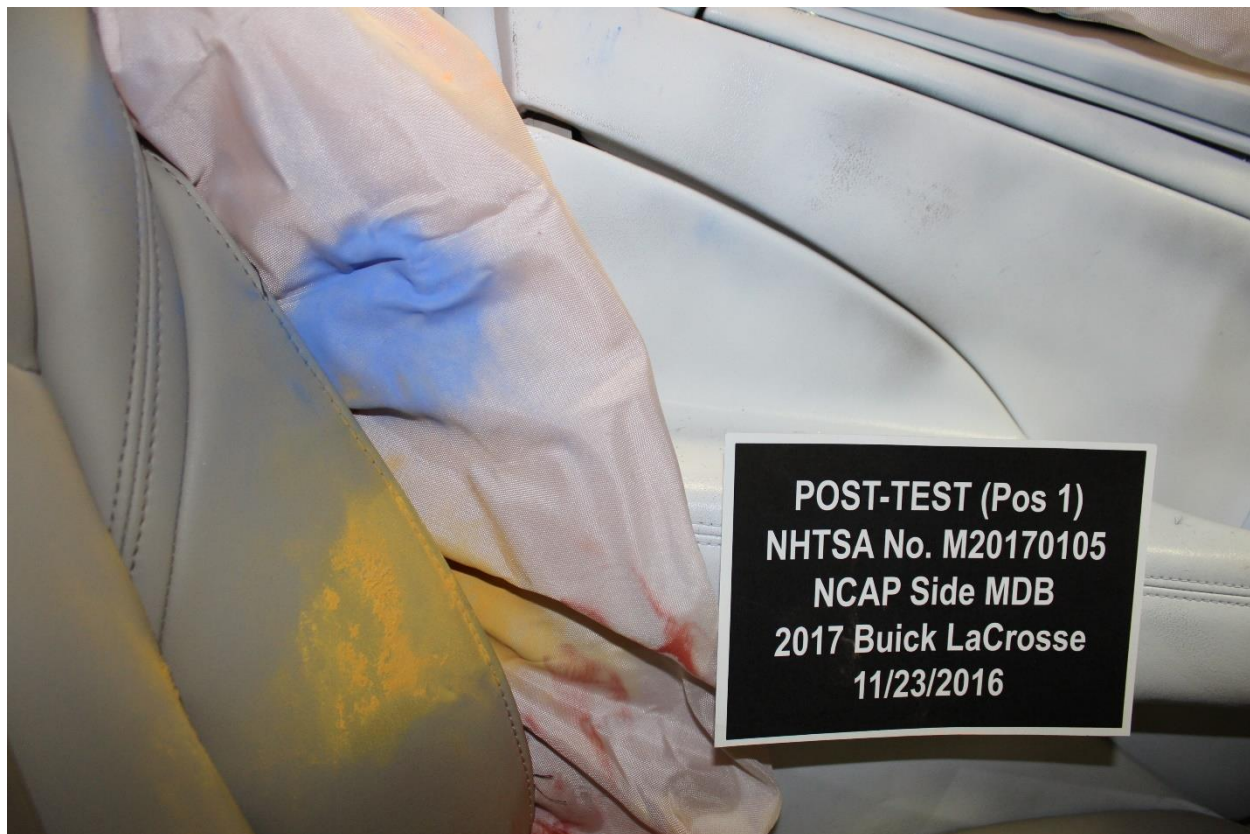


Figure A-51: Post-Test Driver Dummy Close-Up Torso Contact with Side Airbag View

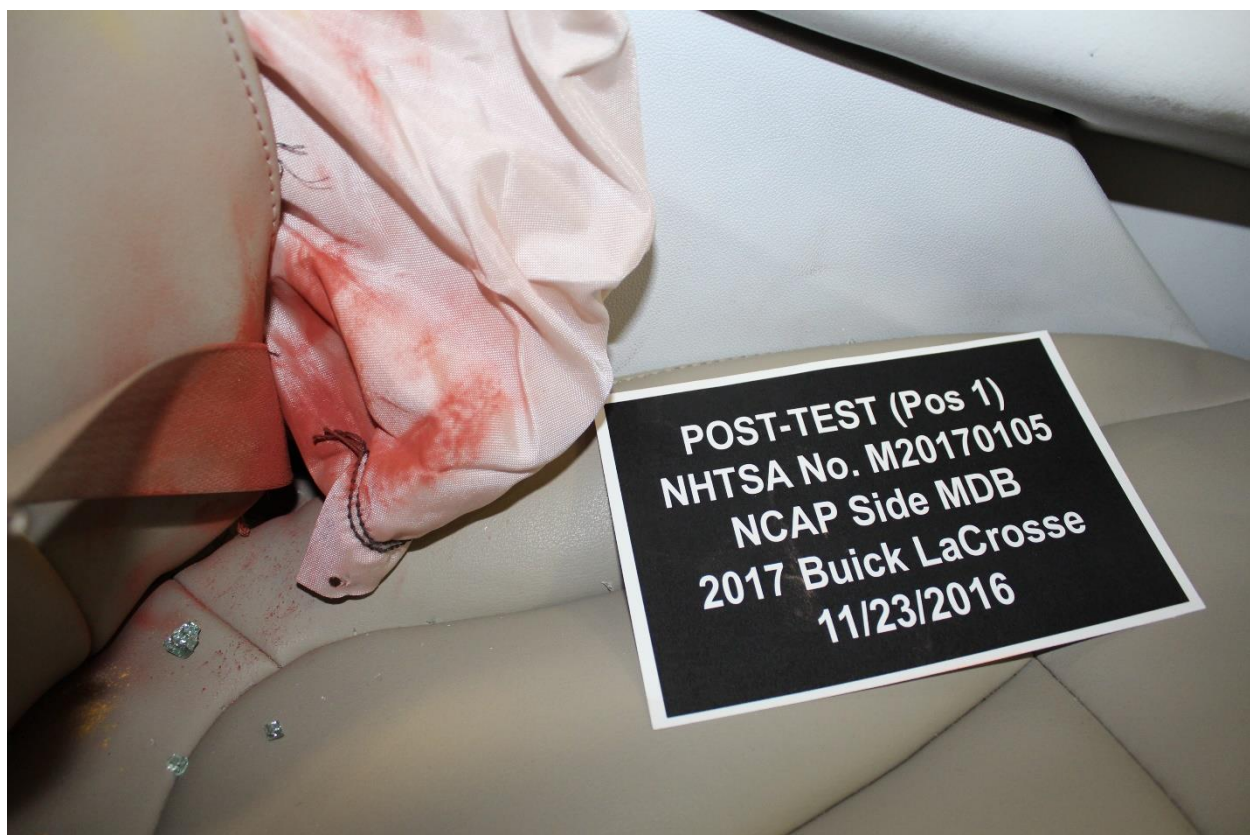


Figure A-52: Post-Test Driver Dummy Close-Up Pelvis Contact View



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



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

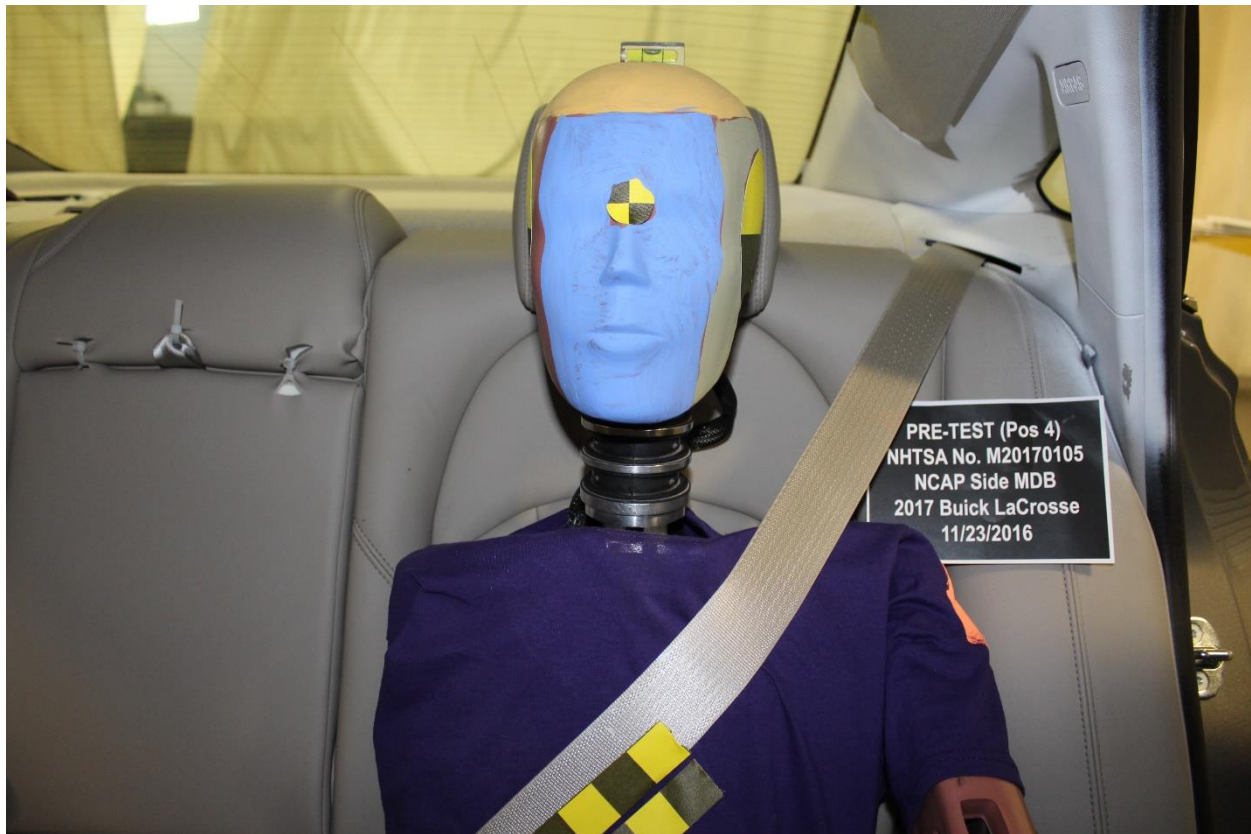


Figure A-59: Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint



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

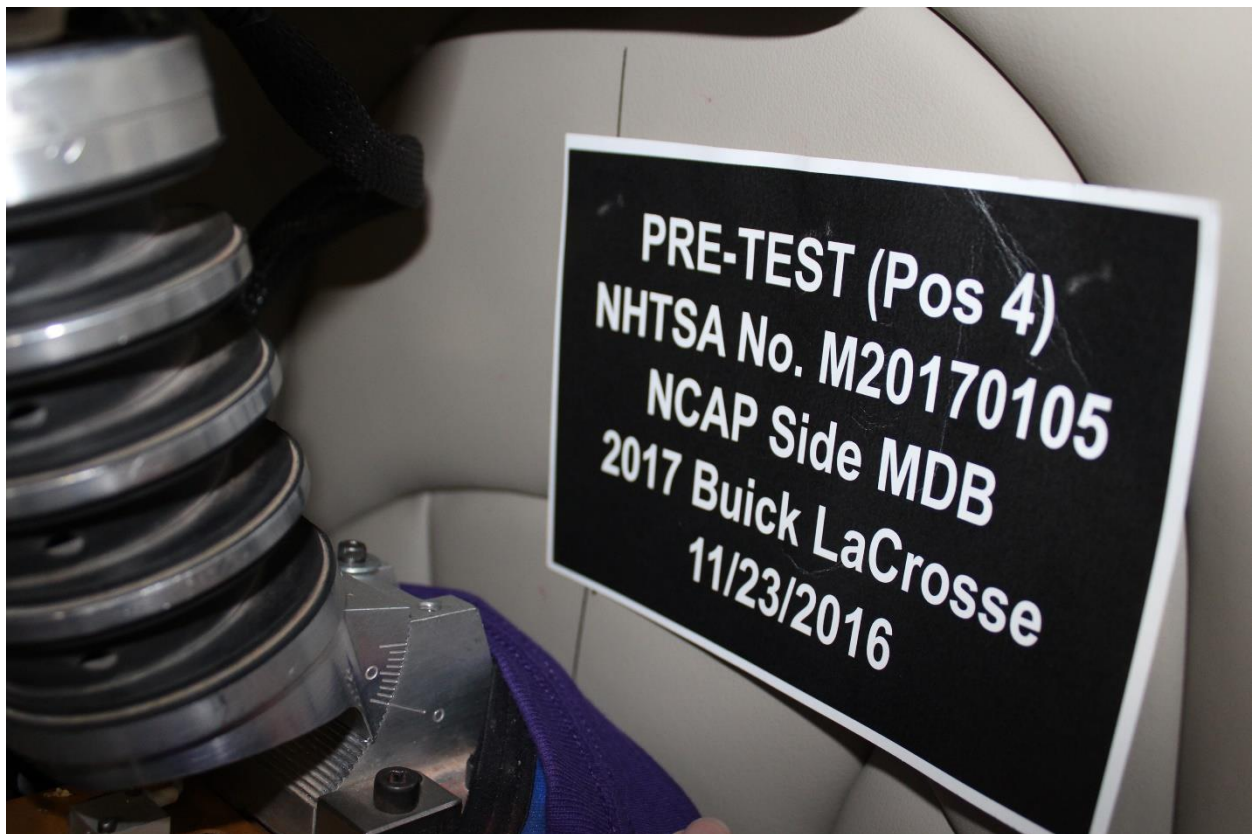


Figure A-62: Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket



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

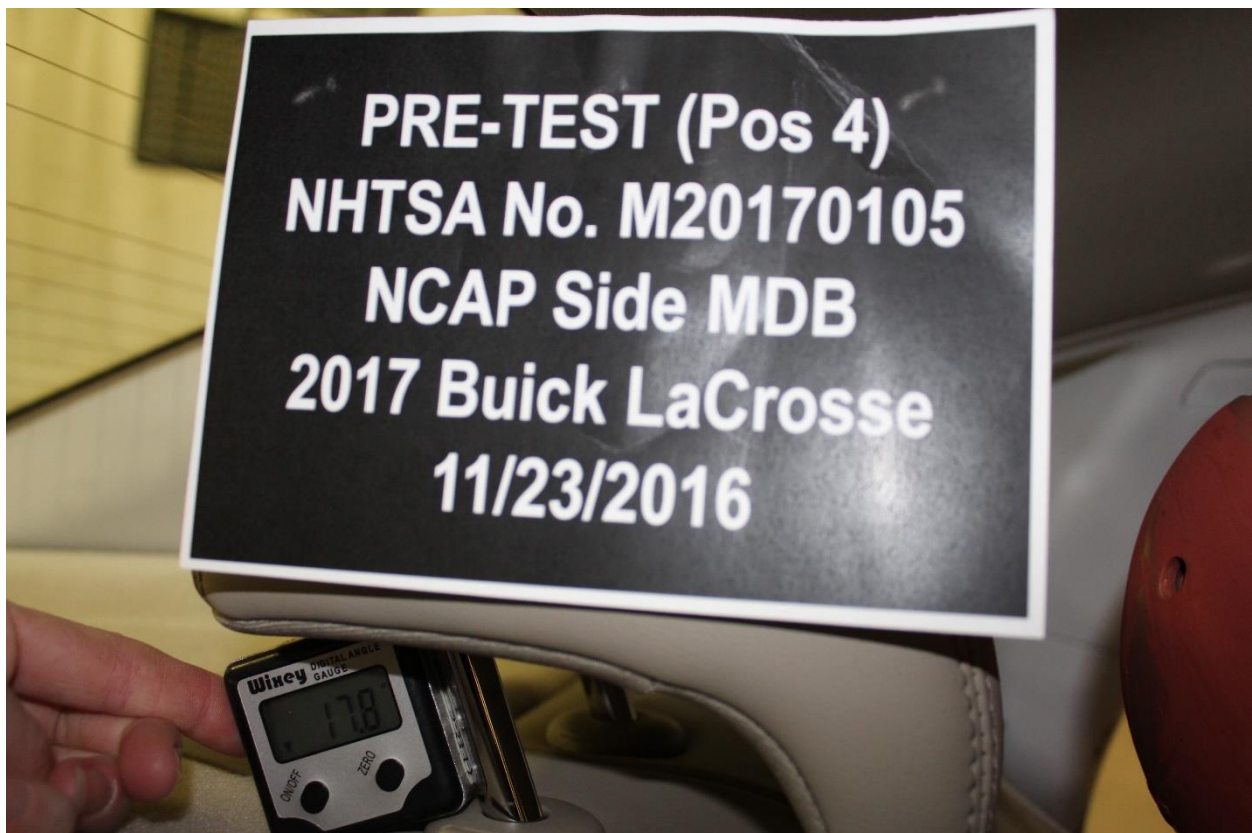


Figure A-68: Pre-Test Close-Up View of Rear Passenger Seat Back or Head Restraint



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

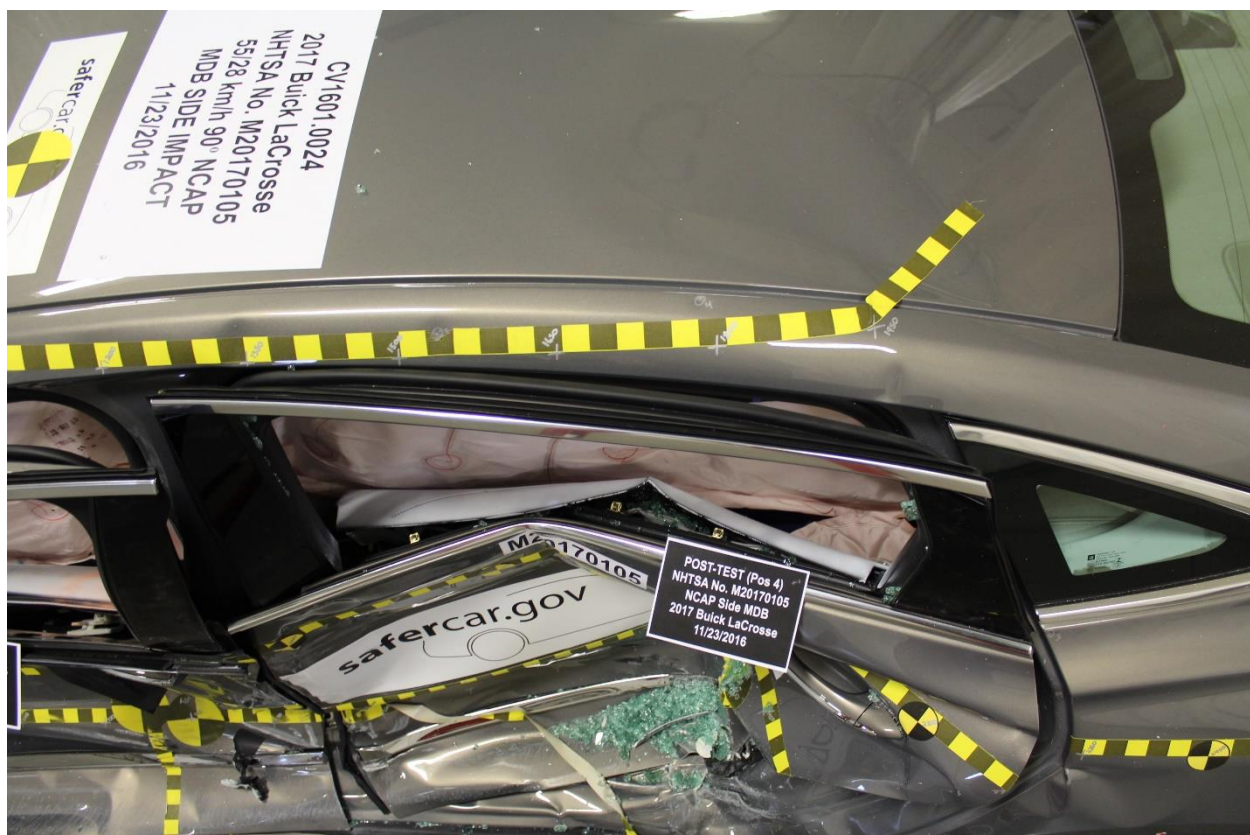


Figure A-70: Post-Test Passenger Dummy and Door Clearance View



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



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

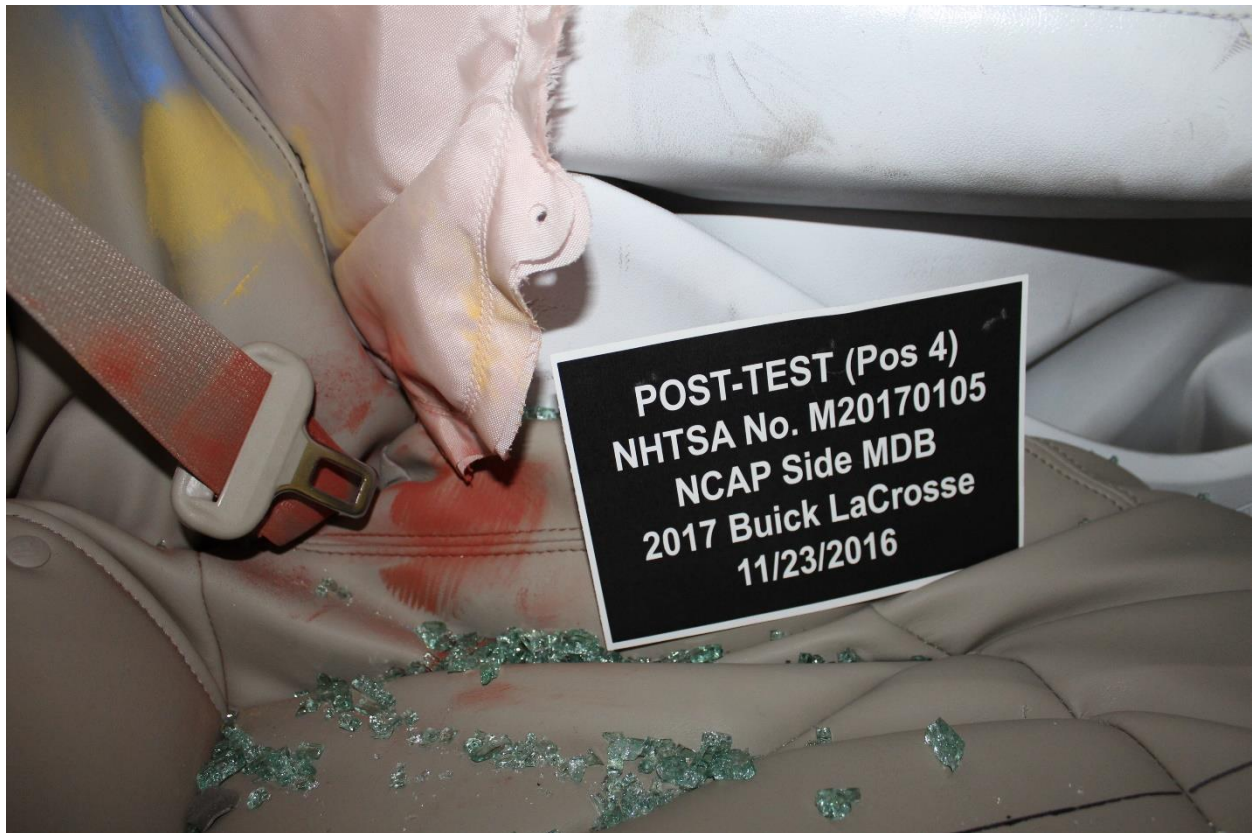


Figure A-79: Post-Test Rear Passenger Dummy Close-Up Pelvis Contact View



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

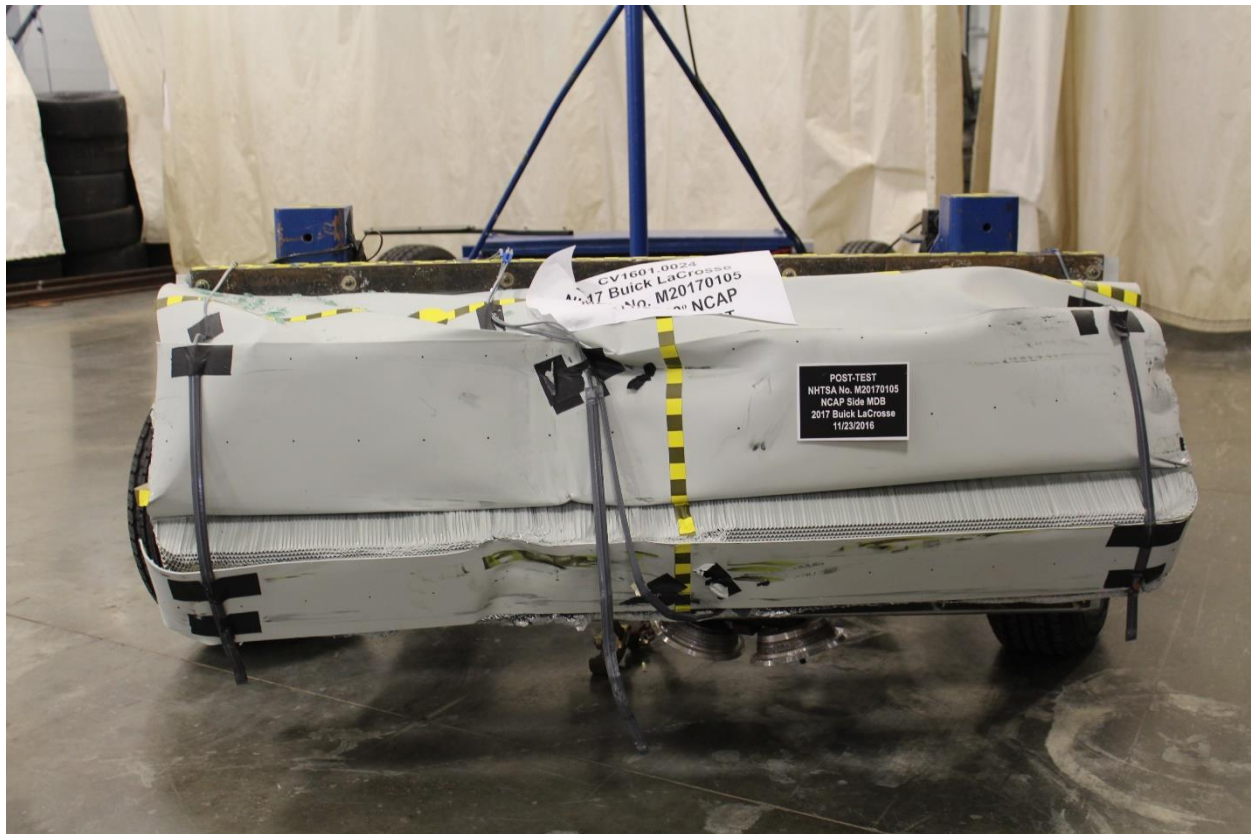


Figure A-85: Post-Test Front View of MDB Impactor Face



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



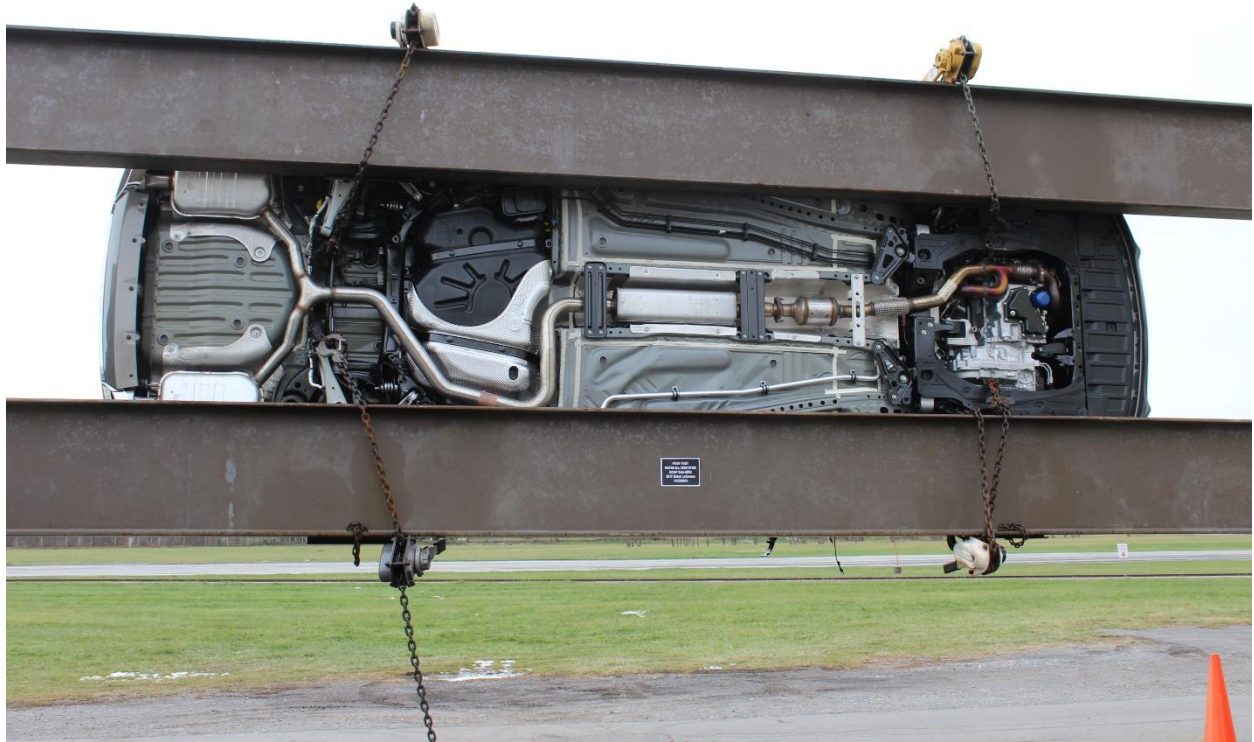


Figure A-99: FMVSS No. 301 Static Rollover 270 Degrees



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



Figure A-101: Impact Event

BUICK

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EXTERIOR: PEPPERDUST METALLIC
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ACCENTS

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STANDARD VEHICLE PRICE	\$36,065.00													
OPTIONAL EQUIPMENT INSTALLED BY THE MANUFACTURER MAY REPLACE STANDARD EQUIPMENT LISTED														
PEPPERDUST METALLIC	335.00													
TOTAL OPTIONS	\$335.00													
TOTAL VEHICLE & OPTIONS	\$36,400.00													
DESTINATION CHARGE	925.00													

EPA DOT Fuel Economy and Environment

These estimates reflect new EPA methods beginning with 2017 models.

Fuel Economy

25 MPG
combined city/highway

21 city 31 highway

4.0 gallons per 100 miles

You spend \$250 more in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost \$1,450

Fuel Economy & Greenhouse Gas Rating (10 to 100 scale)

5

Smog Rating (1 to 10 scale)

6

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 26 MPG and costs \$9,200 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$2.40 per gallon. MPG is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

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GOVERNMENT 5-STAR SAFETY RATINGS

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

Equipped with the safety and connectivity of OnStar.

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PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS CARLINE:
U.S./CANADIAN PARTS CONTENT: 55%
MAJOR SOURCES OF FOREIGN PARTS CONTENT: MEXICO 22%

NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.

FOR THIS VEHICLE:
FINAL ASSEMBLY POINT:
DETROIT, MI U.S.A.
COUNTRY OF ORIGIN:
ENGINE: UNITED STATES
TRANSMISSION: JAPAN

CHASSIS NO. 14258586HU133012
VIN 1G4ZNS8586HU133012
DETROIT, MI 48266
CAPITOL BUICK GMC
6500 CAPITOL DR
GREENBELT, MD 20770-3205

NZ
1001294055

Figure A-102: Monroney Label

Head Restraints

Warning

With head restraints that are not installed and adjusted properly, there is a greater chance that occupants will suffer a neck/spinal injury in a crash. Do not drive until the head restraints for all occupants are installed and adjusted properly.

If your vehicle has rear head restraints that fold down, always return them to the full upright position whenever an occupant is seated in the seat.

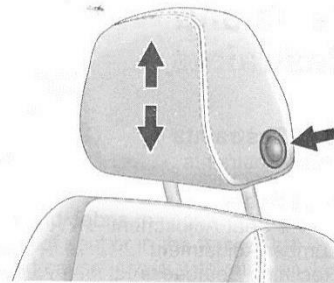


Adjust the head restraint so that the top of the restraint is at the same height as the top of the occupant's head. This position reduces the chance of a neck injury in a crash.

Front Seats

The vehicle's front seats have adjustable head restraints in the outboard seating positions.

The height of the head restraint can be adjusted.



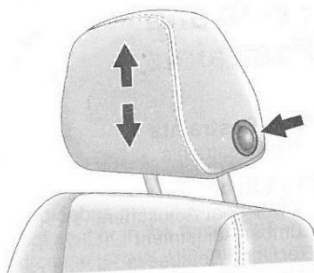
To raise or lower the head restraint, press the button located on the side of the head restraint, and pull up or push the head restraint down and release the button. Pull and push on the head restraint after the button is released to make sure that it is locked in place.

The front seat outboard head restraints are not removable.

Rear Seats

The vehicle's rear seats have adjustable head restraints in the outboard seating positions.

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



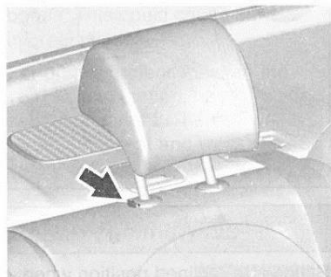
To raise or lower the head restraint, press the button located on the side of the head restraint, and pull up or push the head restraint down and release the button. Pull and push on the head restraint after the button is released to make sure that it is locked in place.

The front seat outboard head restraints are not removable.

Rear Seats

The vehicle's rear seats have adjustable head restraints in the outboard seating positions.

The height of the head restraint can be adjusted. Pull the head restraint up to raise it. Try to move the head restraint to make sure that it is locked in place.



To lower the head restraint, press the button, located on the top of the seatback, and push the head restraint down. Try to move the head restraint after the button is released to make sure that it is locked in place.

Always adjust the head restraint so that the top of the restraint is at the same height as the top of the occupant's head.

If you are installing a child restraint in the rear seat, see "Securing a Child Restraint Designed for the LATCH System" under *Lower Anchors and Tethers for Children (LATCH System)* ⇨ 84.

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

APPENDIX B

VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

Driver & Passenger Dummy Instrumentation Plots

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4	Driver Head Resultant Acceleration Primary vs. Time	B-5
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7	Driver Lower Thorax Rib Deflection (Y) vs. Time	B-6
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9	Driver Anterior Abdominal Force (Y) vs. Time	B-7
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12	Driver Total Abdominal Force (Y) vs. Time	B-7
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14	Passenger Head Acceleration (X) vs. Time Primary	B-8
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16	Passenger Head Acceleration (Z) vs. Time Primary	B-8
17	Passenger Head Resultant Acceleration Primary vs. Time	B-9
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20	Passenger Lower Spine T12 Acceleration (Z) vs. Time	B-9
21	Passenger Lower Spine T12 Resultant Acceleration vs. Time	B-10
22	Passenger Iliac Force on Impact Side (Y) vs. Time	B-10
23	Passenger Acetabulum Force on Impact Side (Y) vs. Time	B-10
24	Passenger Total Pelvic Force on Impact Side (Y) vs. Time	B-10

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

Additional Driver & Passenger Dummy Instrumentation Data

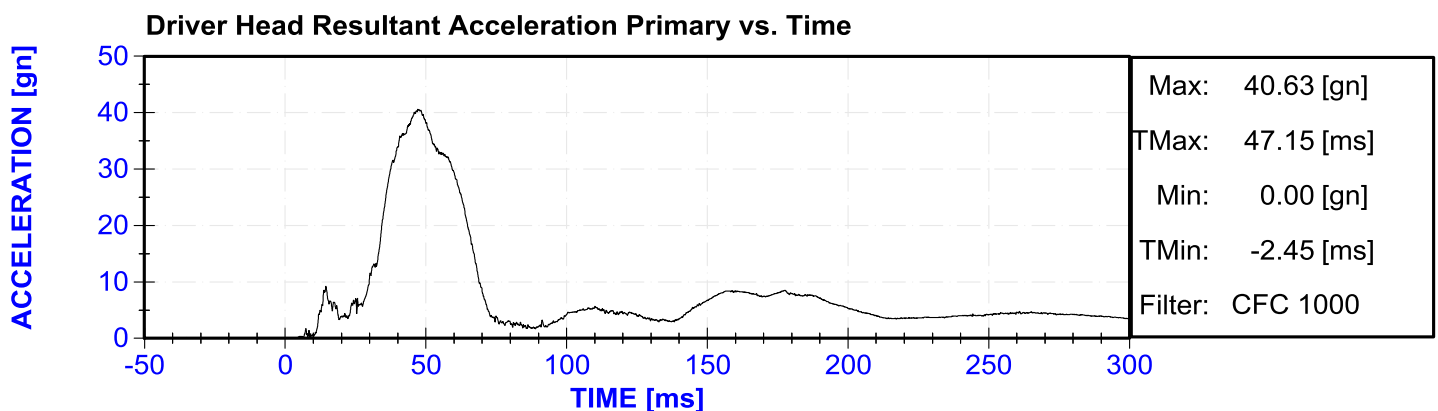
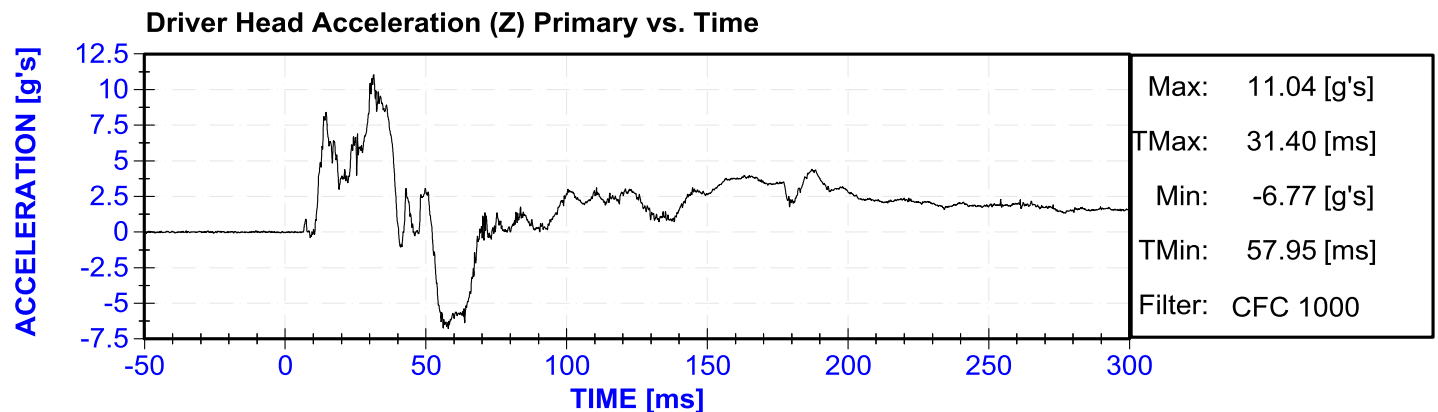
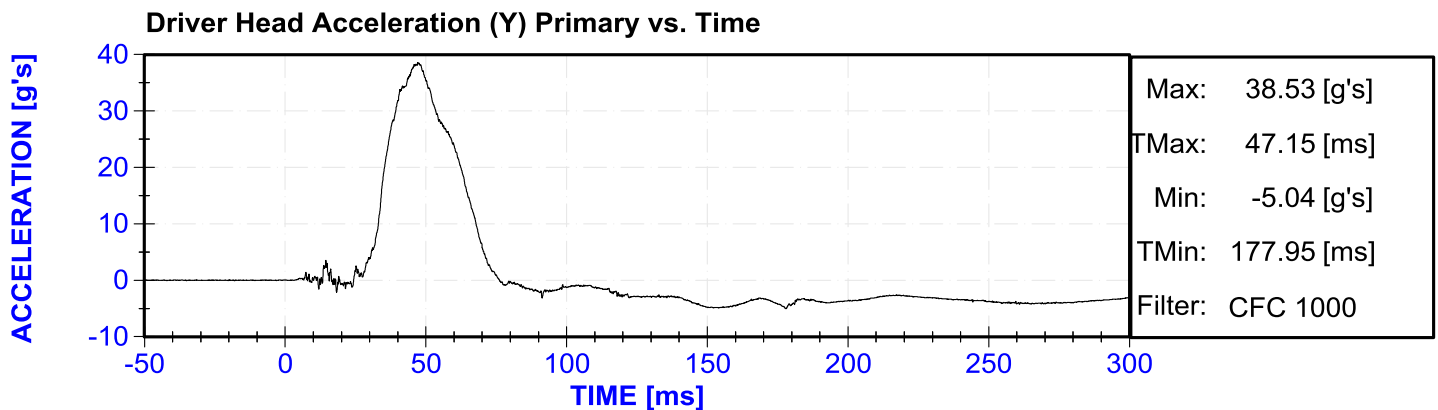
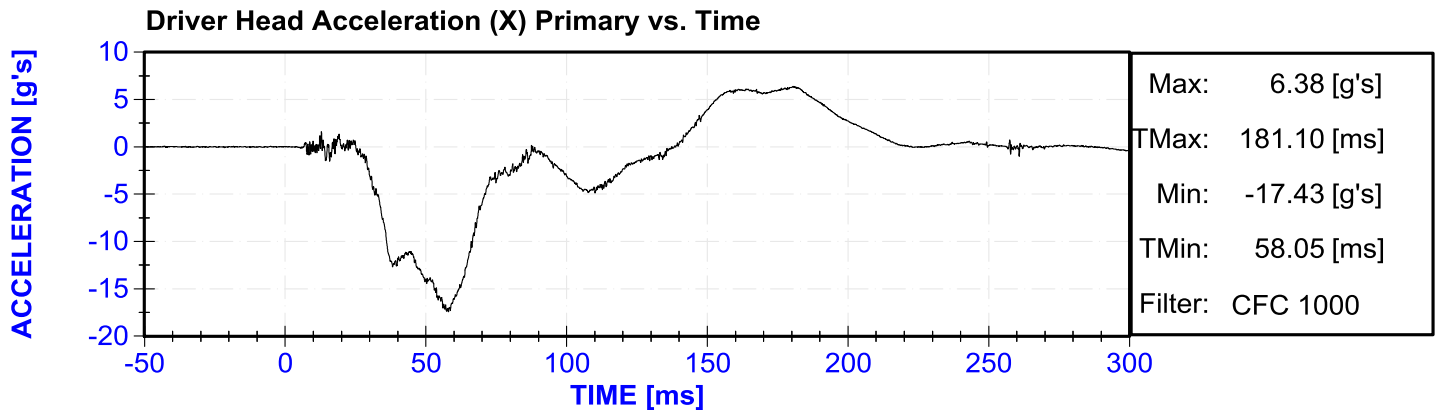
Driver Lower Spine T12 Acceleration (X)
Driver Lower Spine T12 Acceleration (Y)
Driver Lower Spine T12 Acceleration (Z)
Passenger Upper Thorax Rib Deflection (Y)
Passenger Middle Thorax Rib Deflection (Y)
Passenger Lower Thorax Rib Deflection (Y)
Passenger Upper Abdomen Rib Deflection (Y)
Passenger Lower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

Vehicle Instrumentation Data

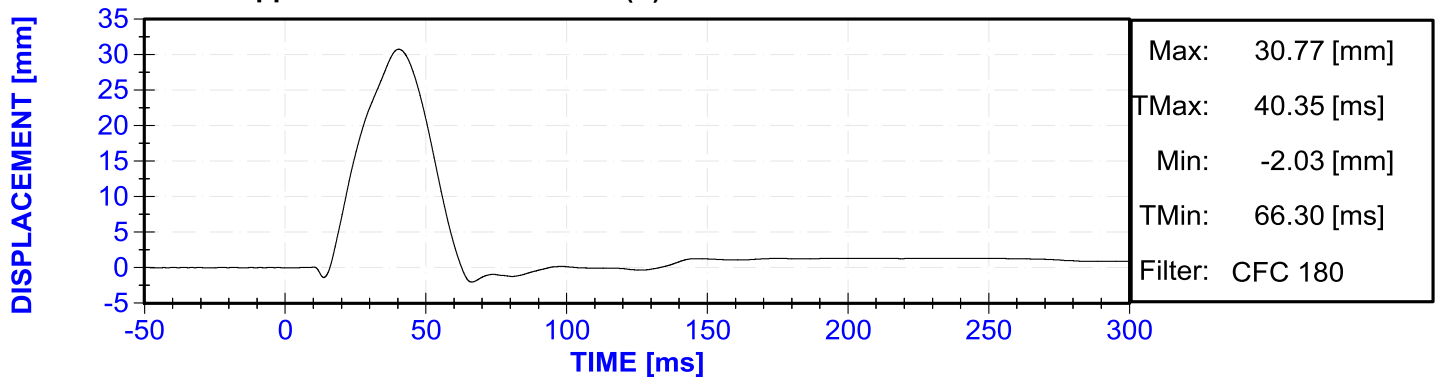
Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Right Side Sill at Front Seat Acceleration (X)
Right Side Sill at Front Seat Acceleration (Y)
Right Side Sill at Front Seat Acceleration (Z)
Right Side Sill at Rear Seat Acceleration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

MDB Instrumentation Data

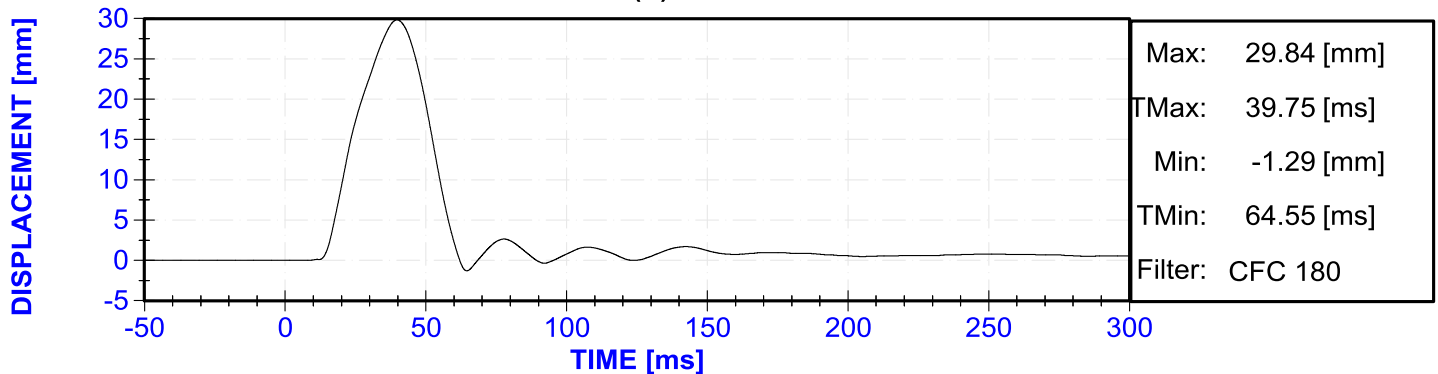
MDB Center of Gravity Acceleration (X)
MDB Center of Gravity Acceleration (Y)
MDB Center of Gravity Acceleration (Z)
MDB Rear Acceleration (X)
MDB Rear Acceleration (Y)
Left MDB Contact Switch
Right MDB Contact Switch



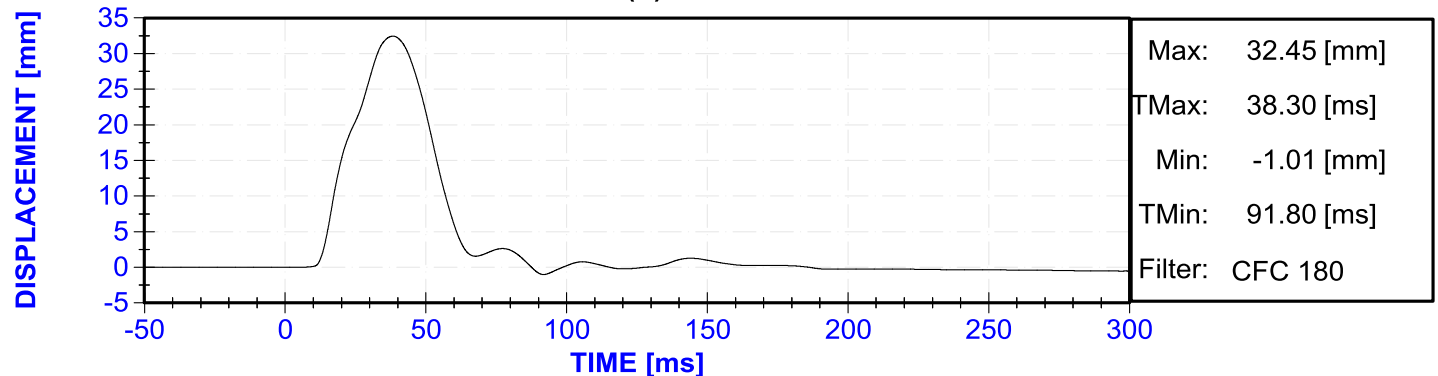
Driver Upper Thorax Rib Deflection (Y) vs. Time



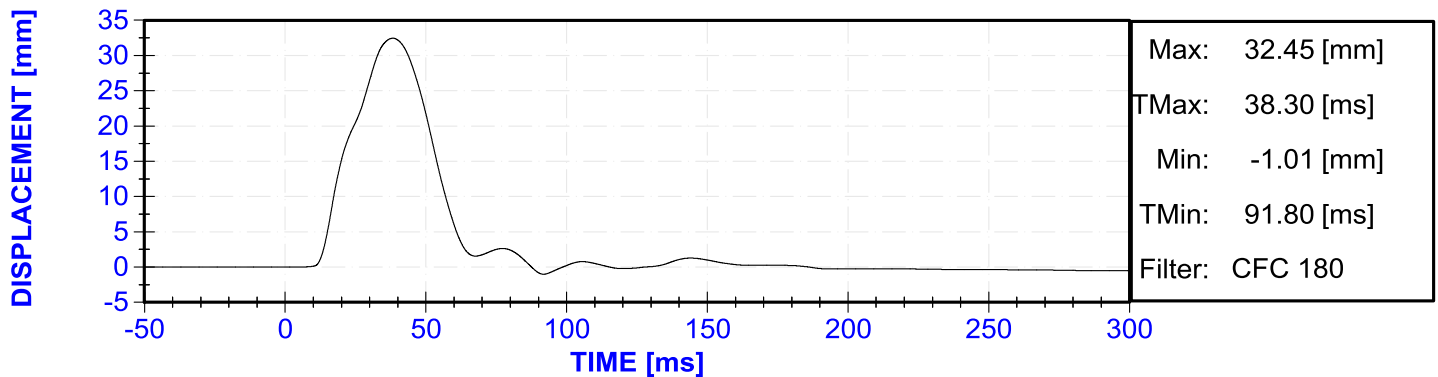
Driver Middle Thorax Rib Deflection (Y) vs. Time

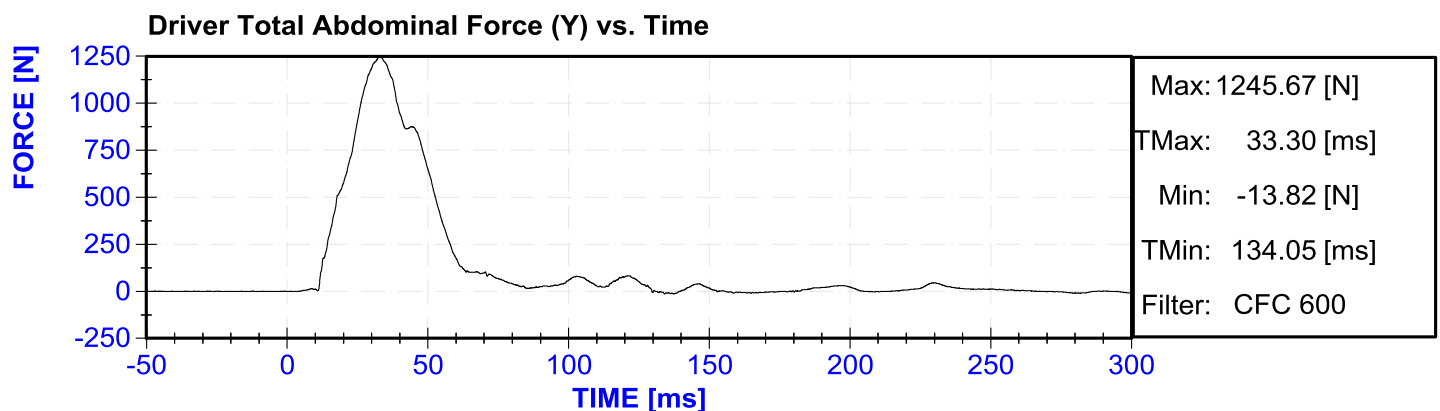
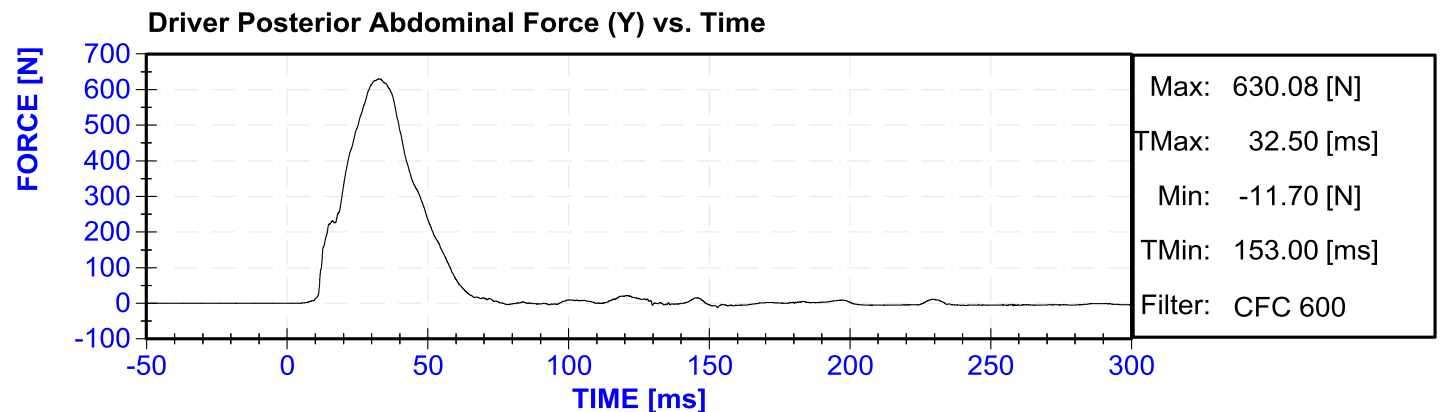
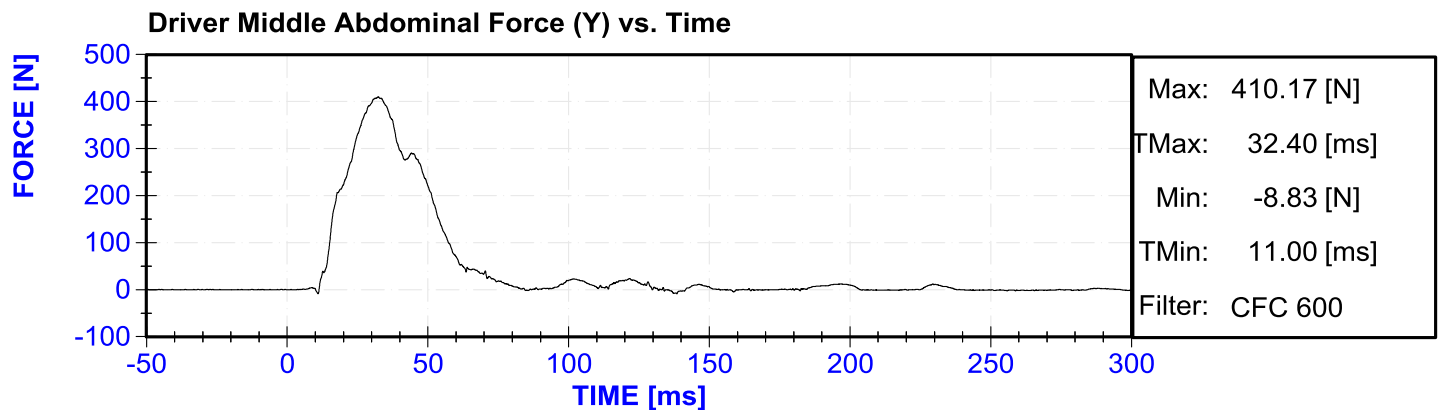
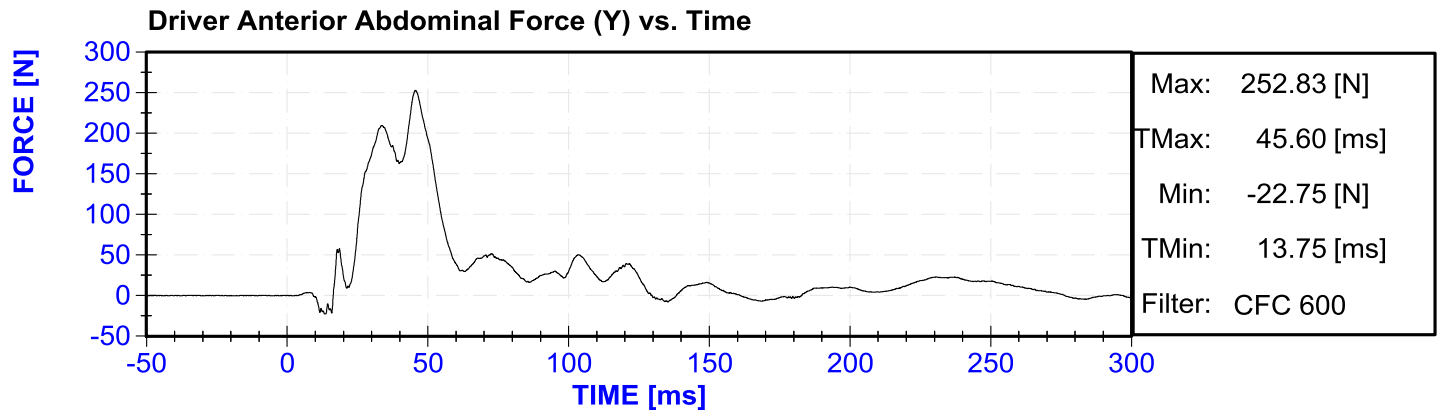


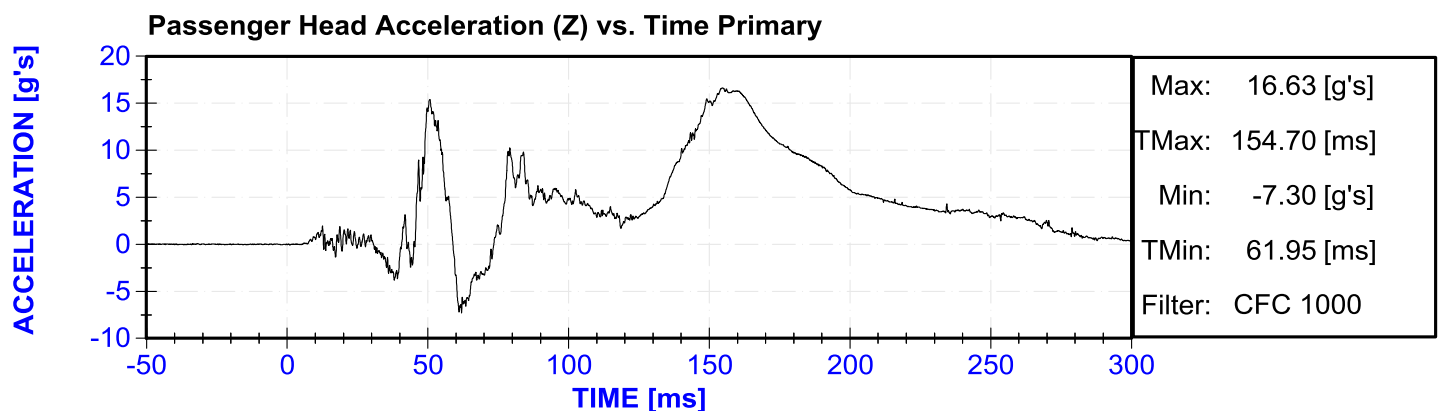
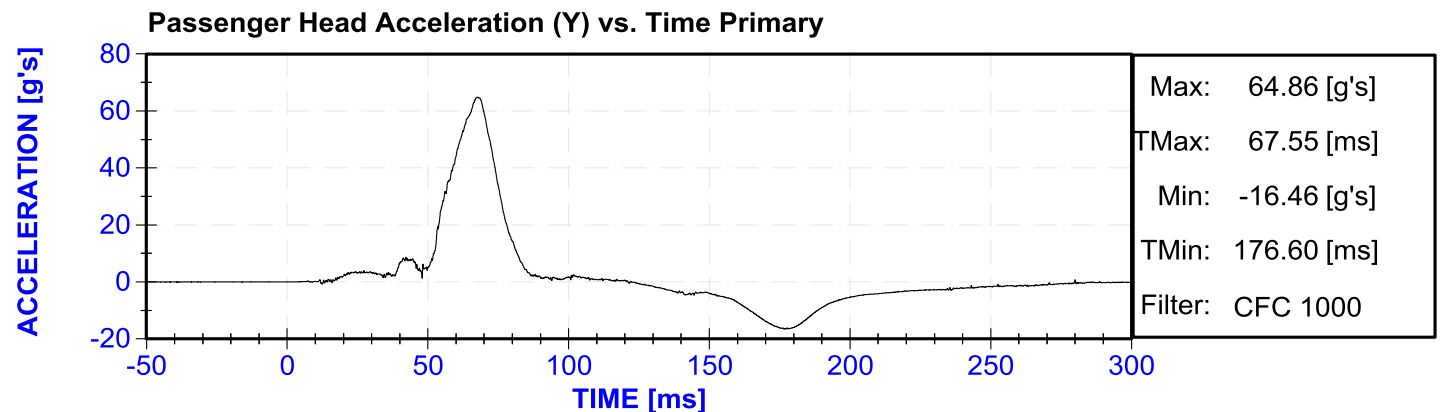
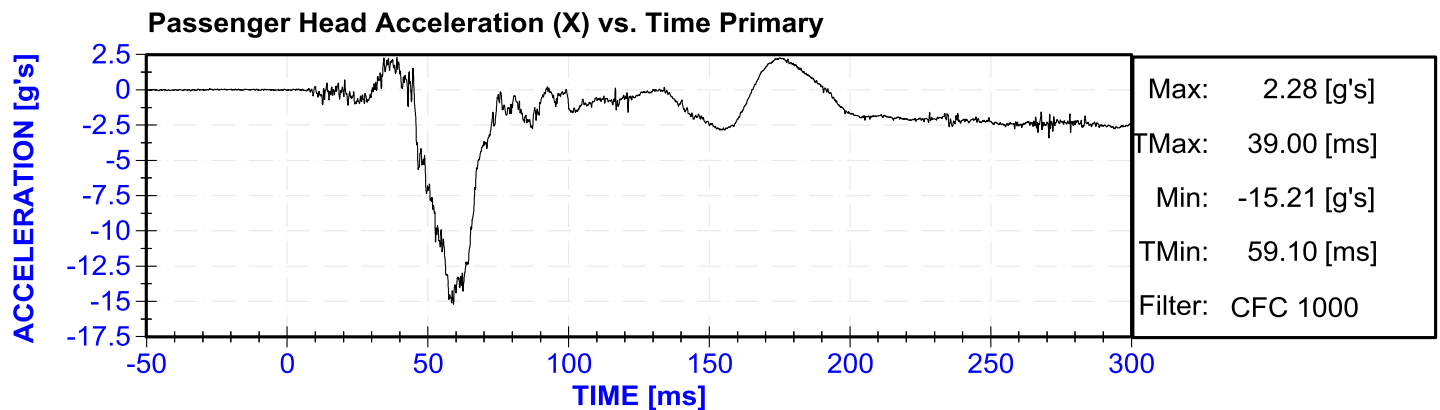
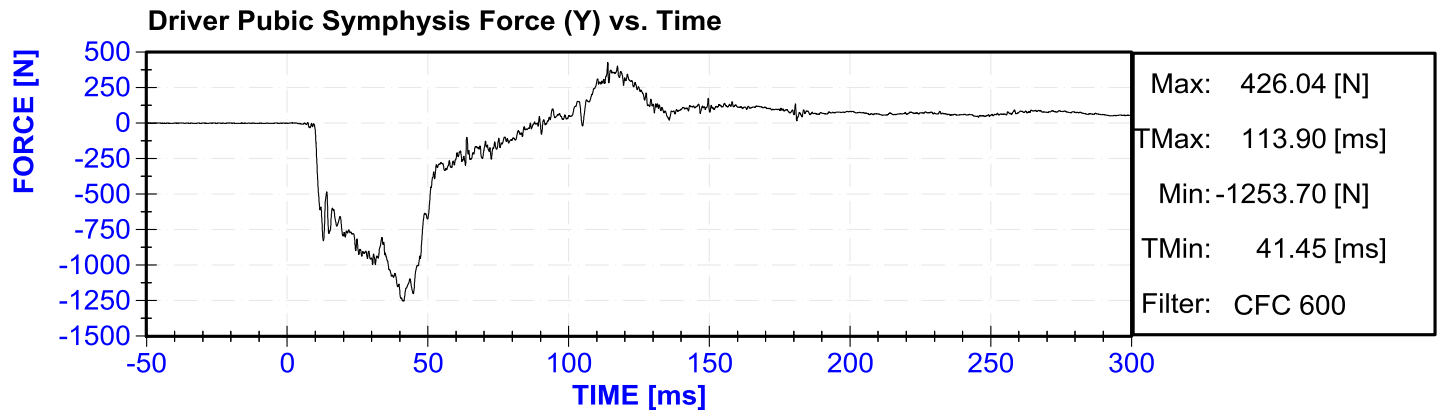
Driver Lower Thorax Rib Deflection (Y) vs. Time

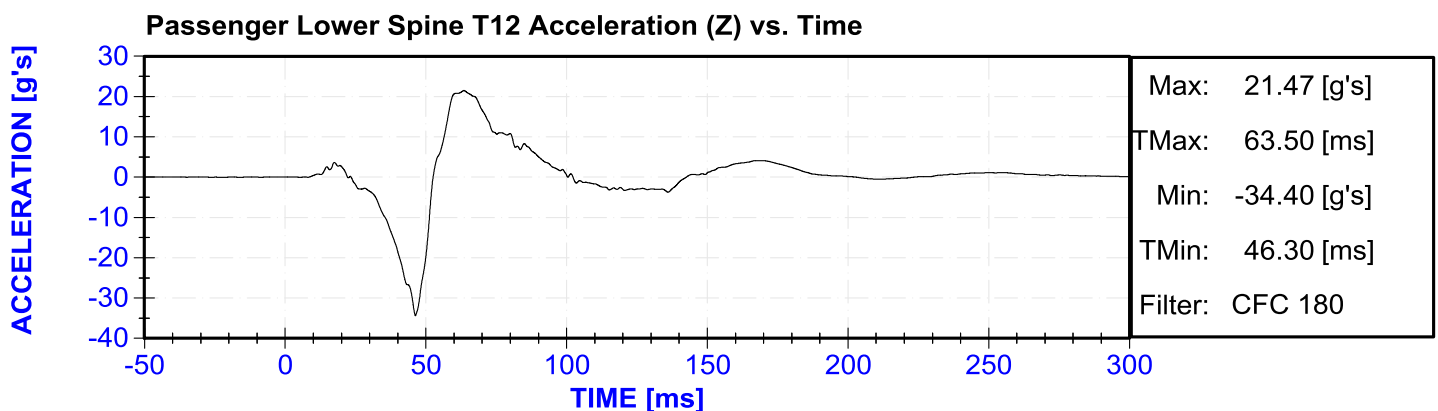
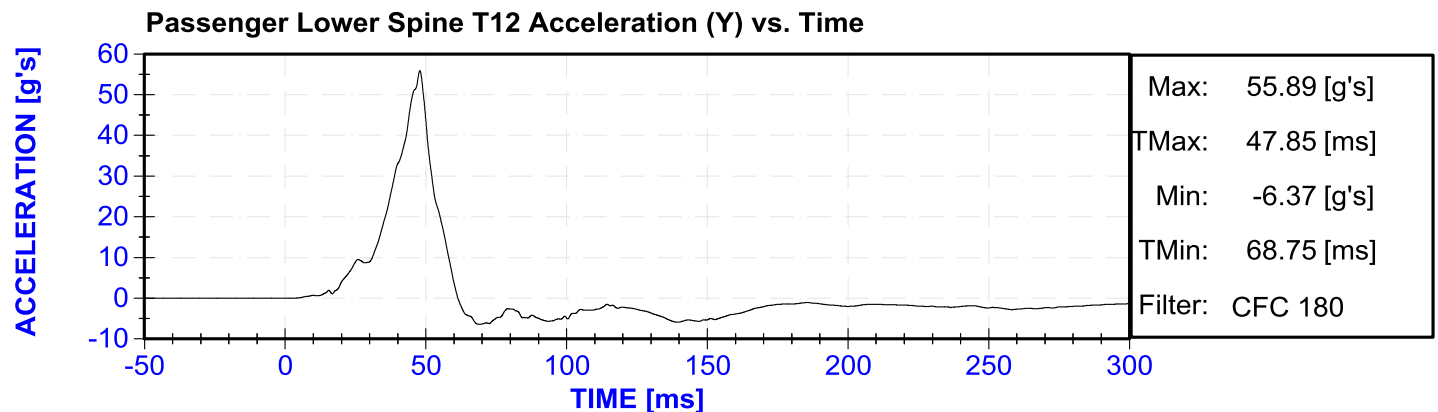
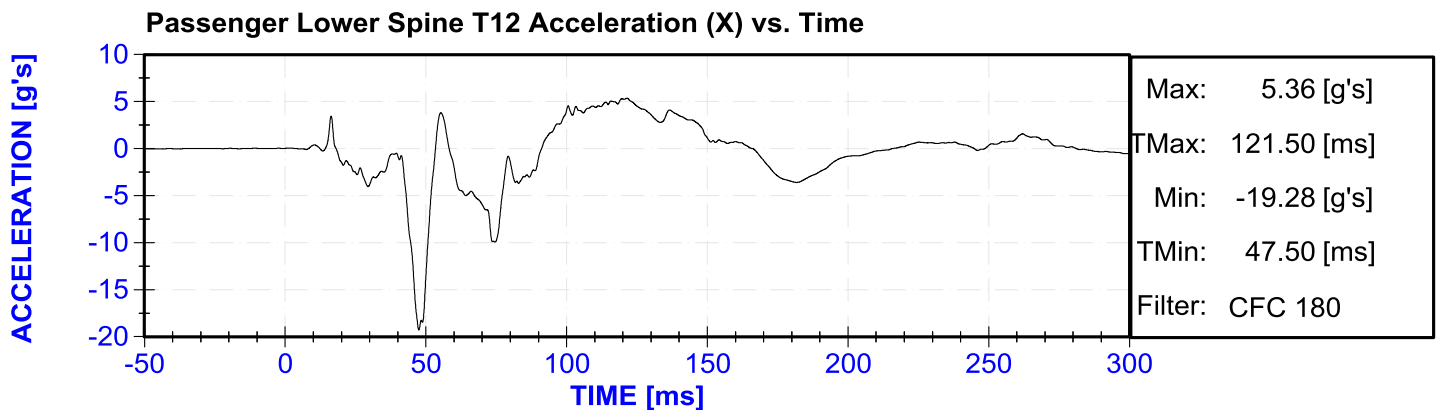
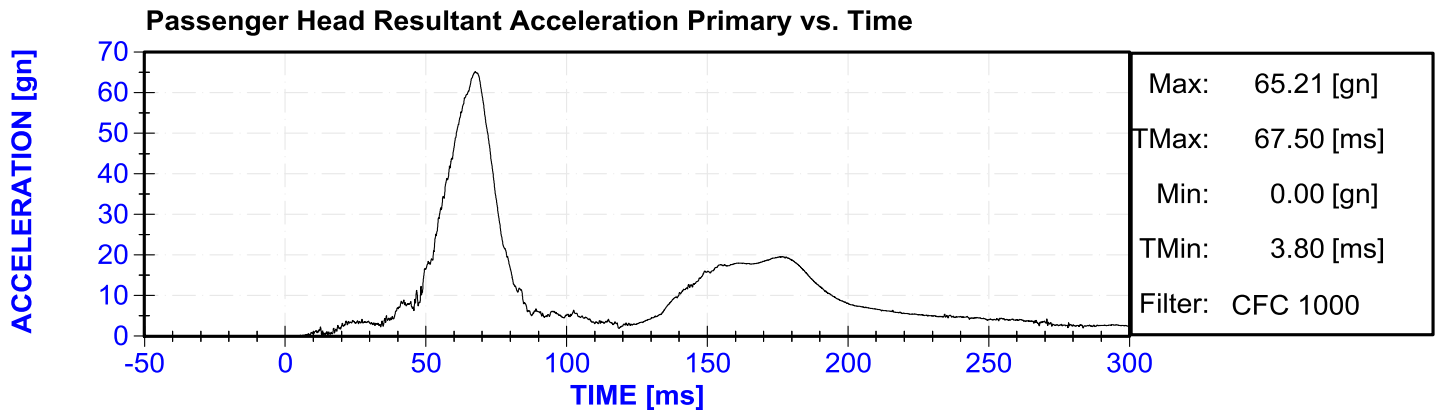


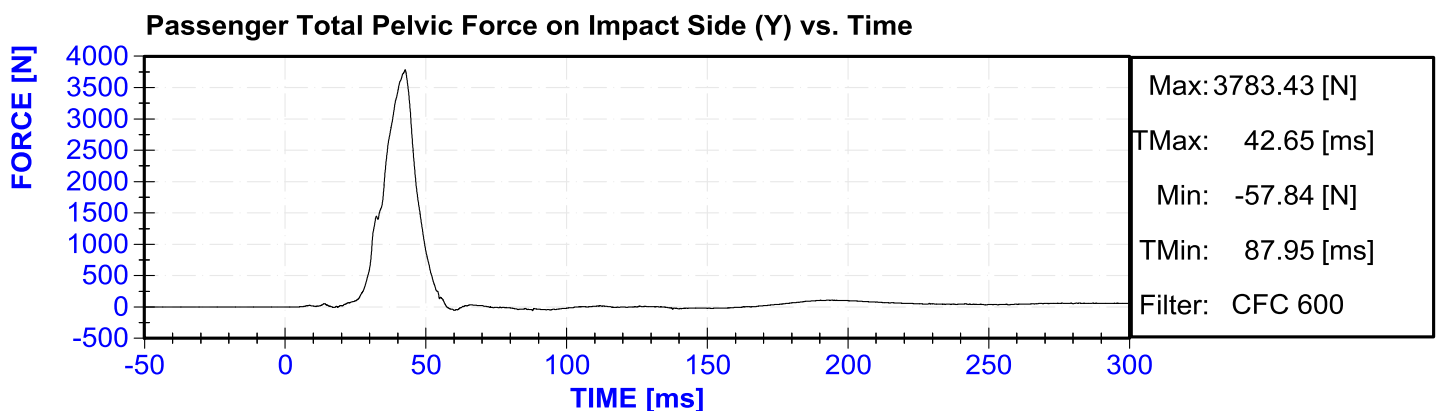
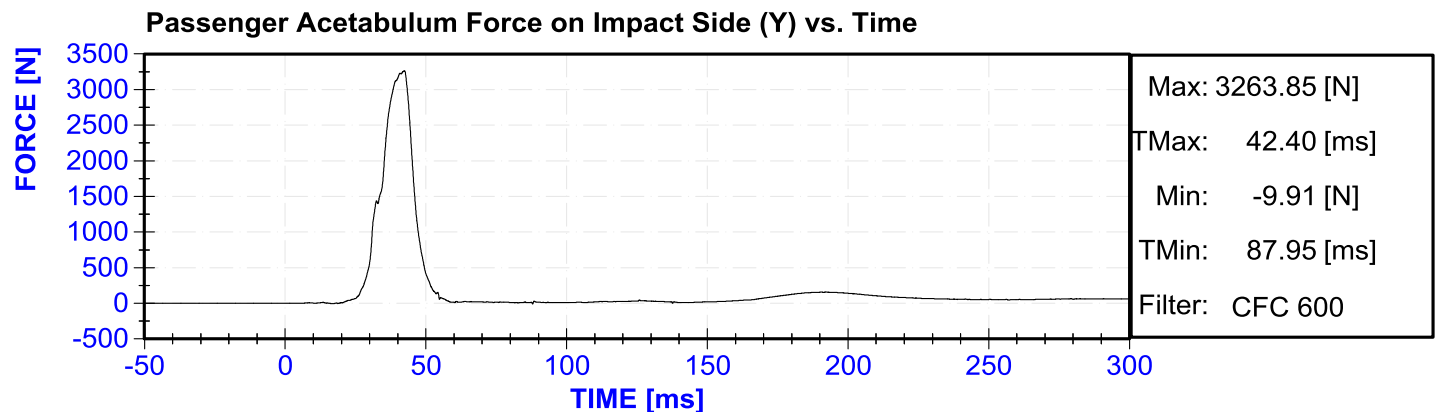
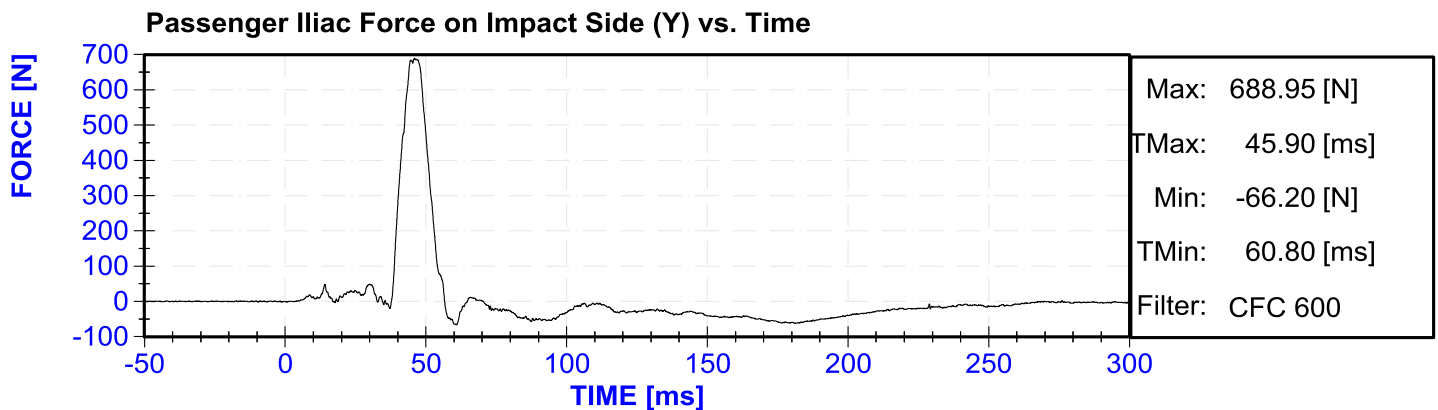
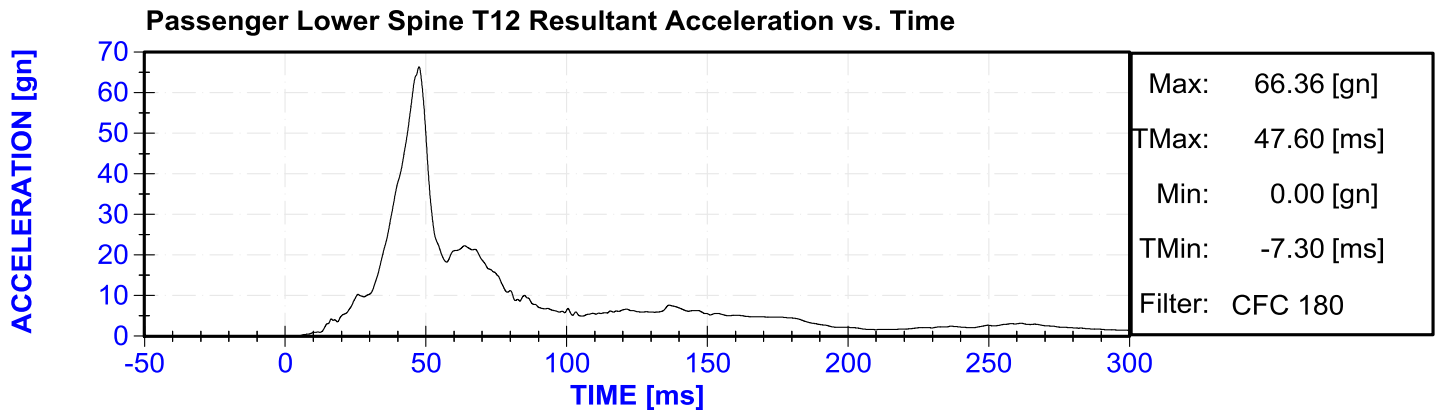
Driver Thorax Rib Deflection Maximum vs. Time











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)

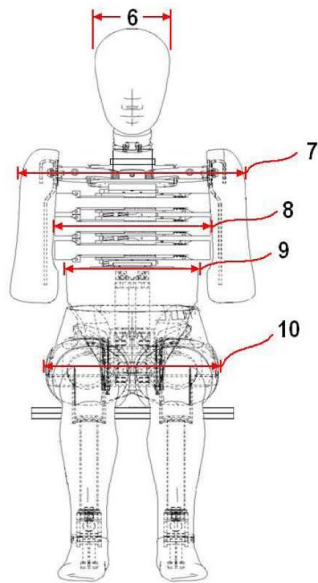


External Measurements - EuroSID-2re

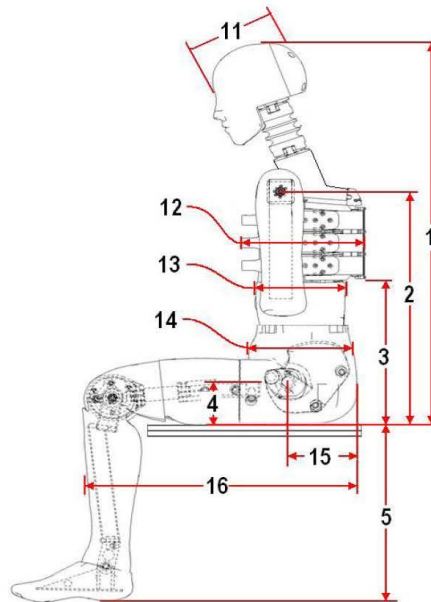
Technician: M.Hartung

Date: 11/14/2016

Dummy Serial Number: F034



FRONT VIEW



SIDE VIEW

Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	909	Pass
2	Seat to Shoulder Joint	558	572	568	Pass
3	Seat to Lower Face of Thoracic Spine Box	346	356	349	Pass
4	Seat to Hip Joint (center of bolt)	97	103	102	Pass
5	Sole to Seat, Sitting	333	451	419	Pass
6	Head Width	152	158	154	Pass
7	Shoulder/Arm Width	461	479	470	Pass
8	Thorax Width	322	332	330	Pass
9	Abdomen Width	273	287	280	Pass
10	Pelvis Lap Width	359	373	366	Pass
11	Head Depth	196	206	202	Pass
12	Thorax Depth	262	272	269	Pass
13	Abdomen Depth	194	204	201	Pass
14	Pelvis Depth	235	245	238	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150	160	153	Pass
16	Back of Buttocks to Front Knee	597	615	606	Pass

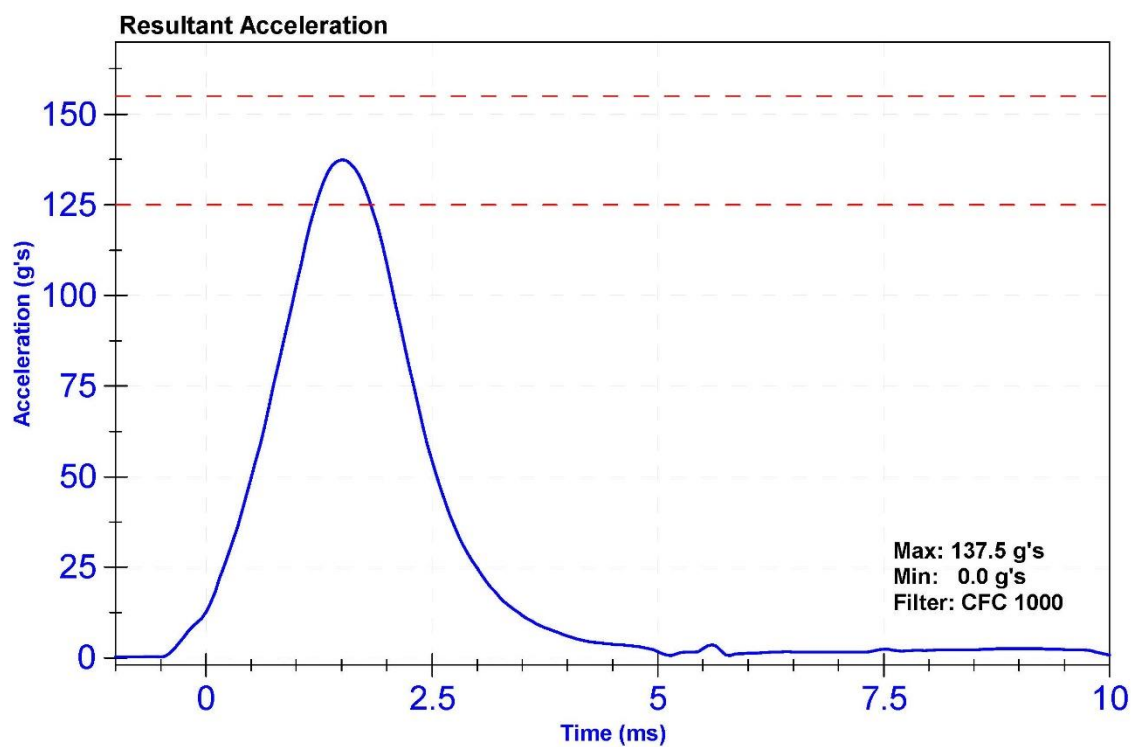
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

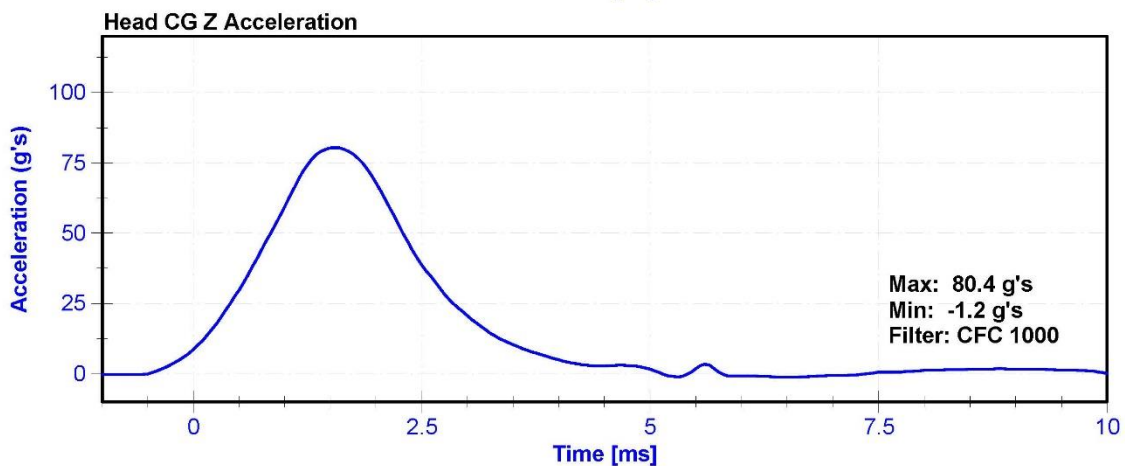
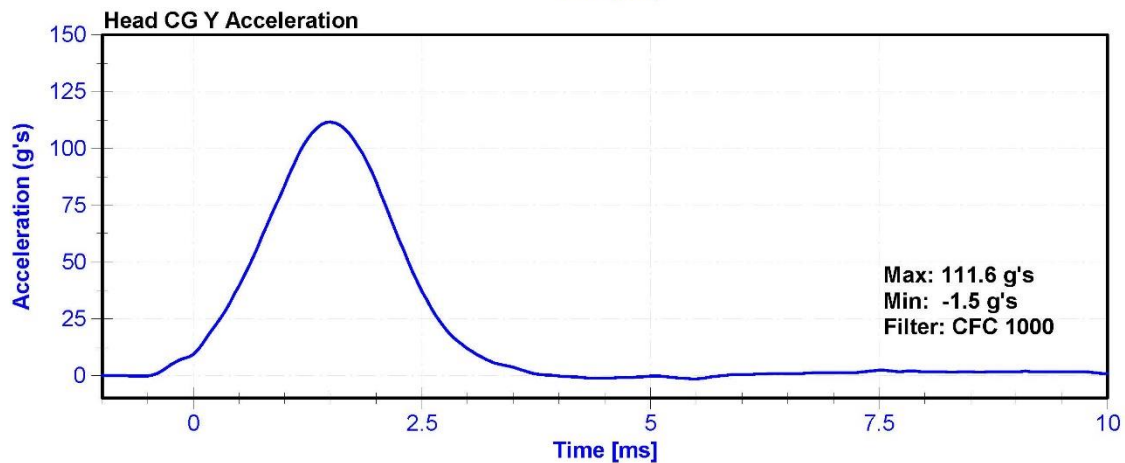
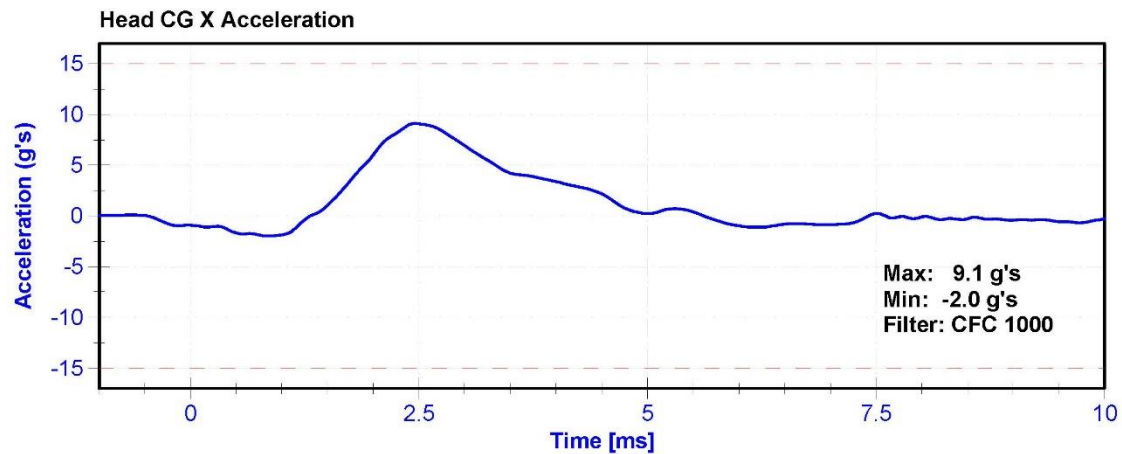
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	34.0	Pass
Resultant Acceleration	125	155	g's	137.5	Pass
Oscillation	0	15	%	2.66	Pass
Fore-Aft Acceleration	-15	15	g's	9.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P58904	6/20/2016	12/19/2016
Y Accelerometer	ENDEVCO 7264CT	AC-P58911	6/20/2016	12/19/2016
Z Accelerometer	ENDEVCO 7264CT	AC-P58776	6/20/2016	12/19/2016





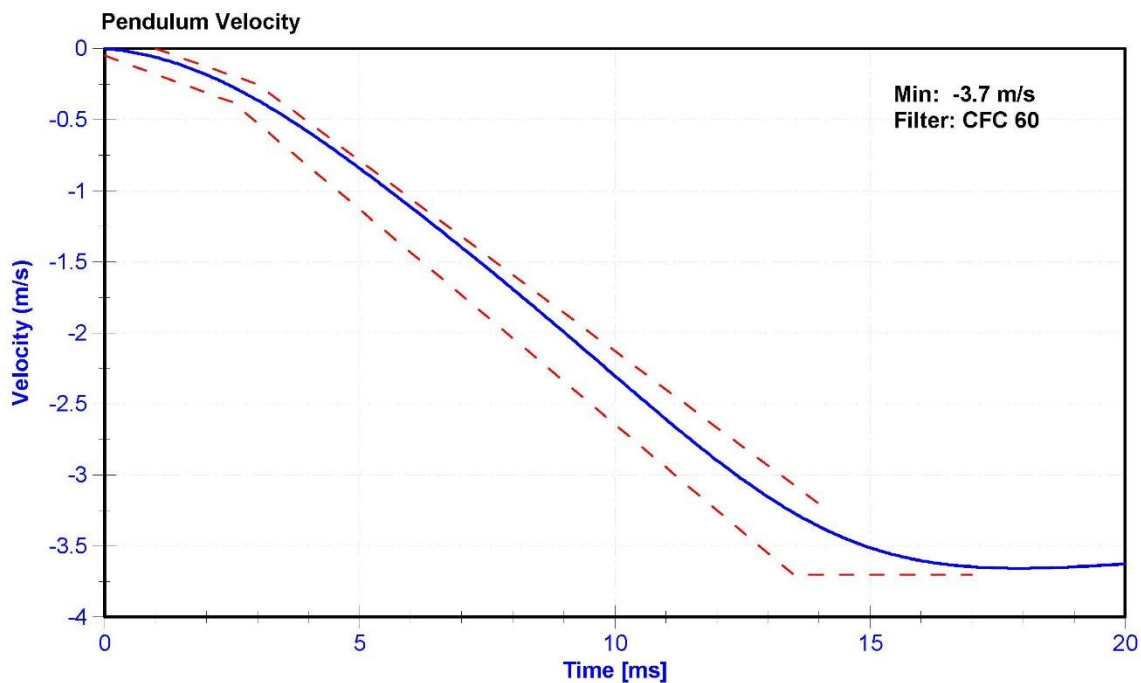
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ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

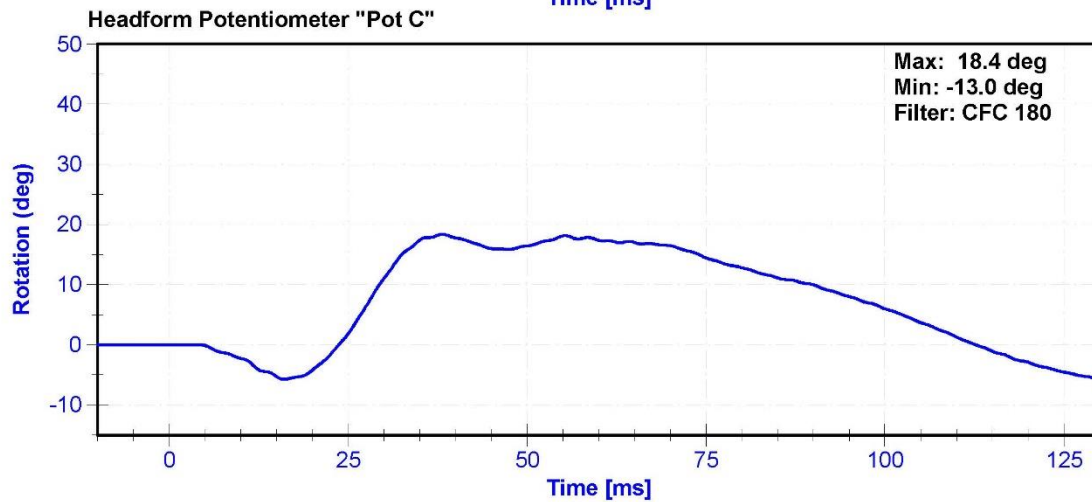
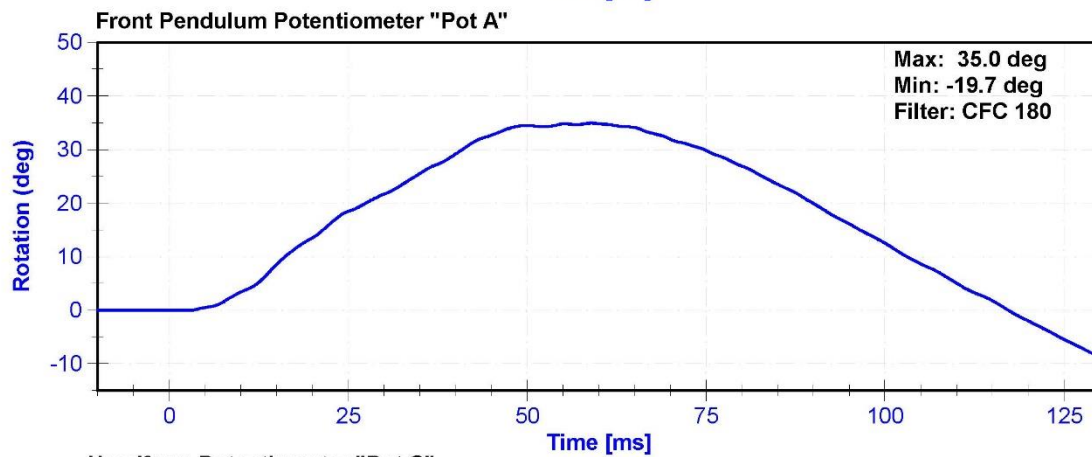
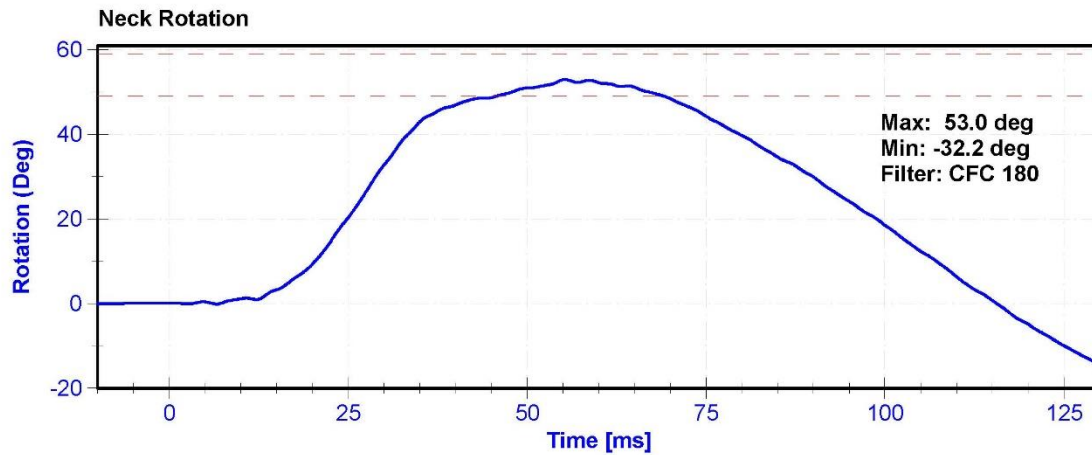
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	29.2	Pass
Velocity	3.3	3.5	m/s	3.45	Pass
Lateral Neck Rotation	49	59	deg	53.0	Pass
Time at Maximum Rotation	54	66	ms	55.3	Pass
Time of Rotation Decay from Maximum	53	88	ms	60.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/10/2016	5/10/2017
Front Pendulum Potentiometer	SP22G	DS-094	10/11/2016	10/11/2017
Headform Potentiometer	SP22G	DS-095	10/11/2016	10/11/2017





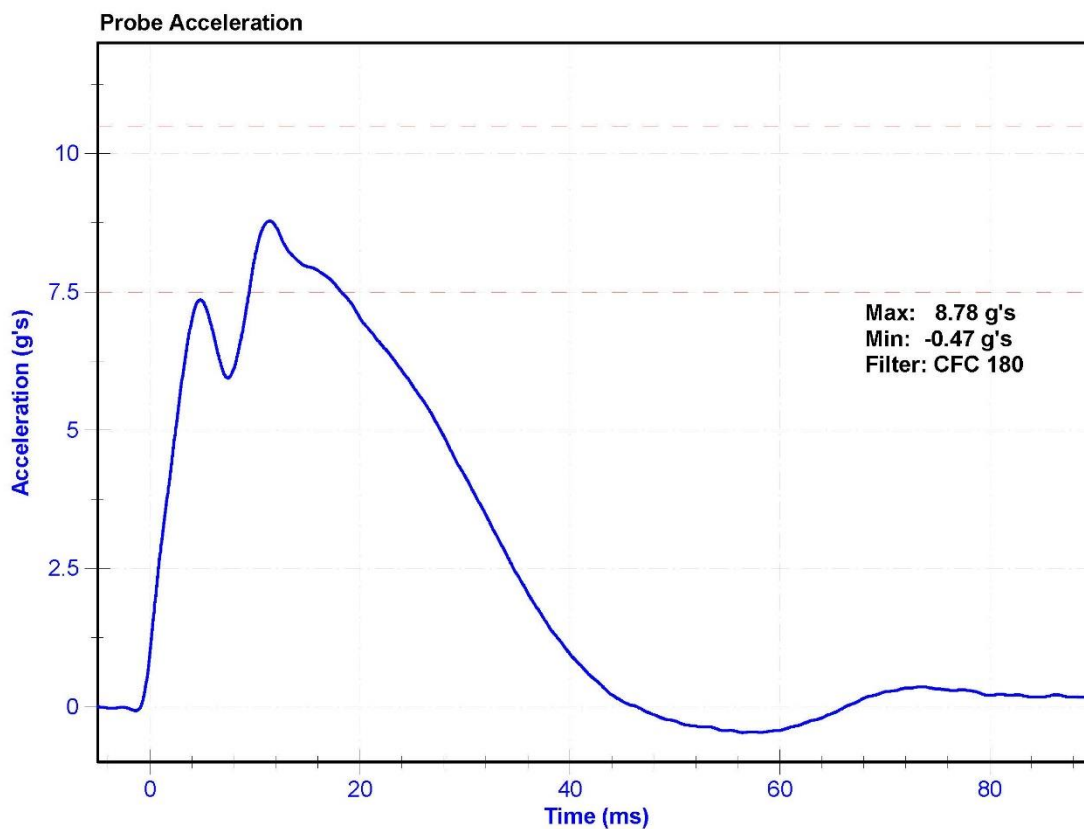
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	33.2	Pass
Velocity	4.2	4.4	m/s	4.22	Pass
Probe Acceleration	7.5	10.5	g's	8.78	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	11/25/2016



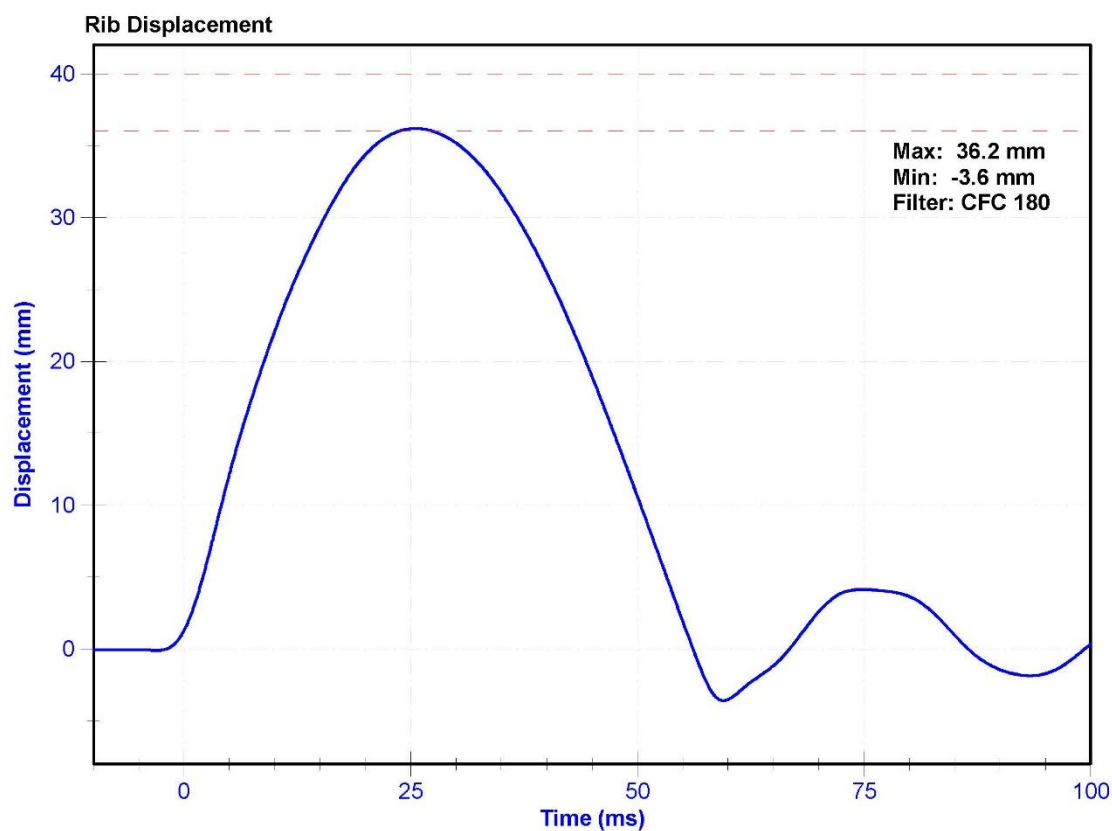
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	30.0	Pass
Rib Displacement	36	40	mm	36.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	6/20/2016	6/20/2017



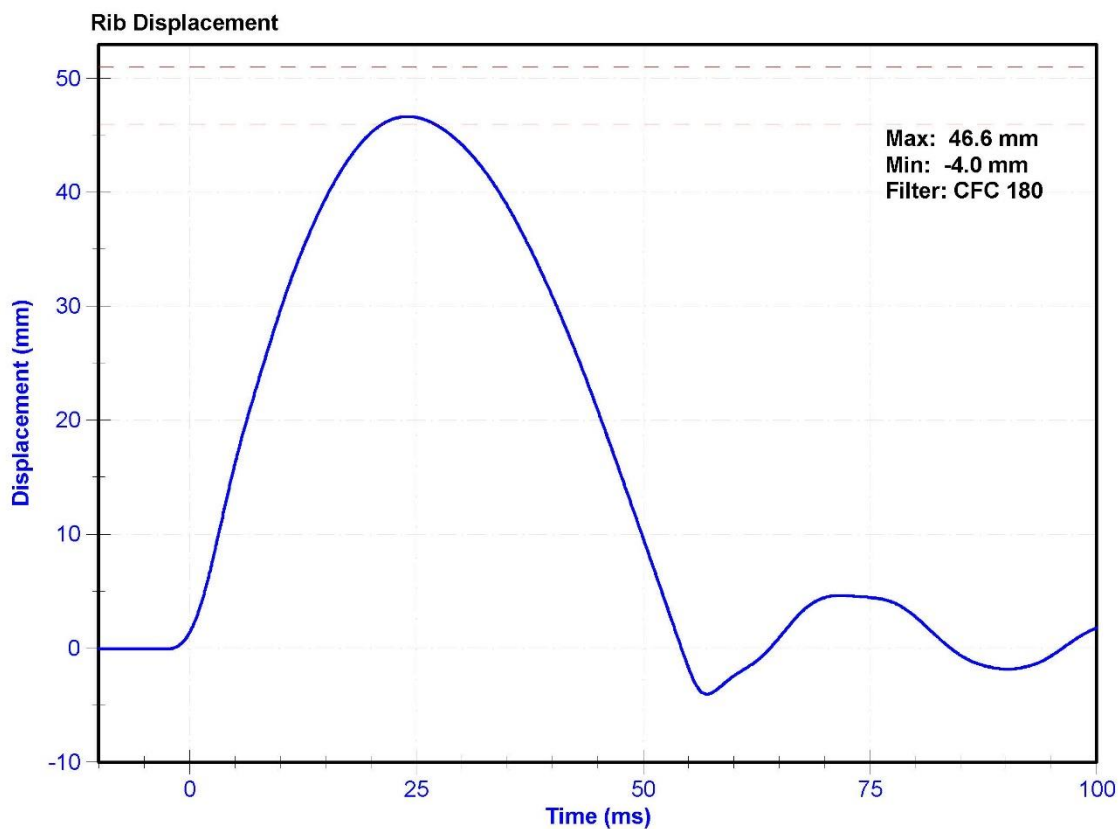
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	30.0	Pass
Rib Displacement	46	51	mm	46.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	6/20/2016	6/20/2017



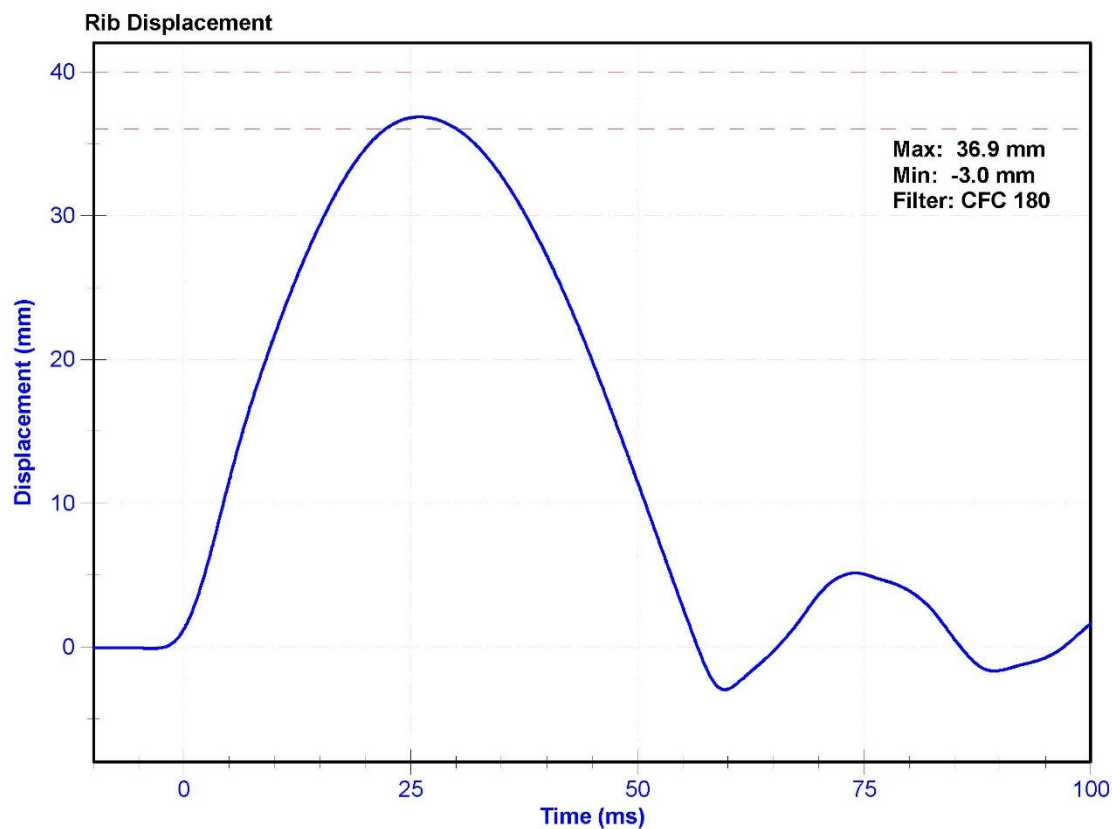
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	30.0	Pass
Rib Displacement	36	40	mm	36.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	6/20/2016	6/20/2017



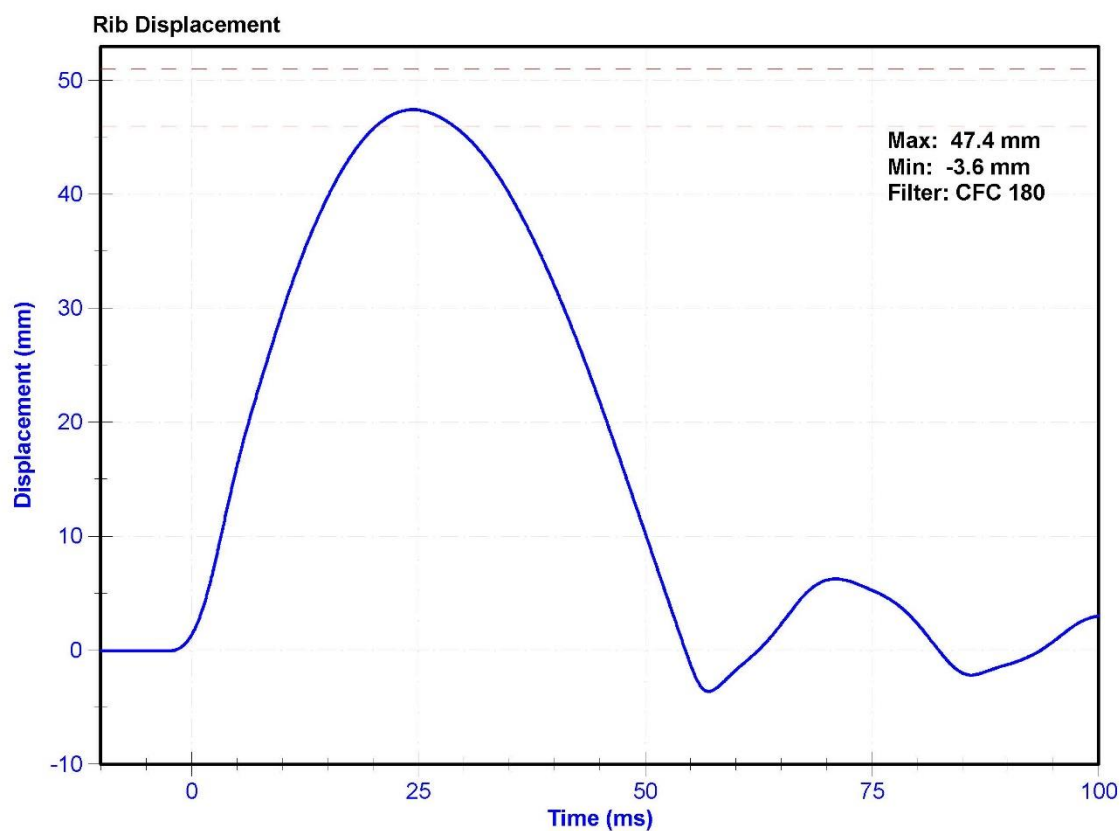
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	30.0	Pass
Rib Displacement	46	51	mm	47.4	Pass

Transducer Calibrations

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Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	6/20/2016	6/20/2017



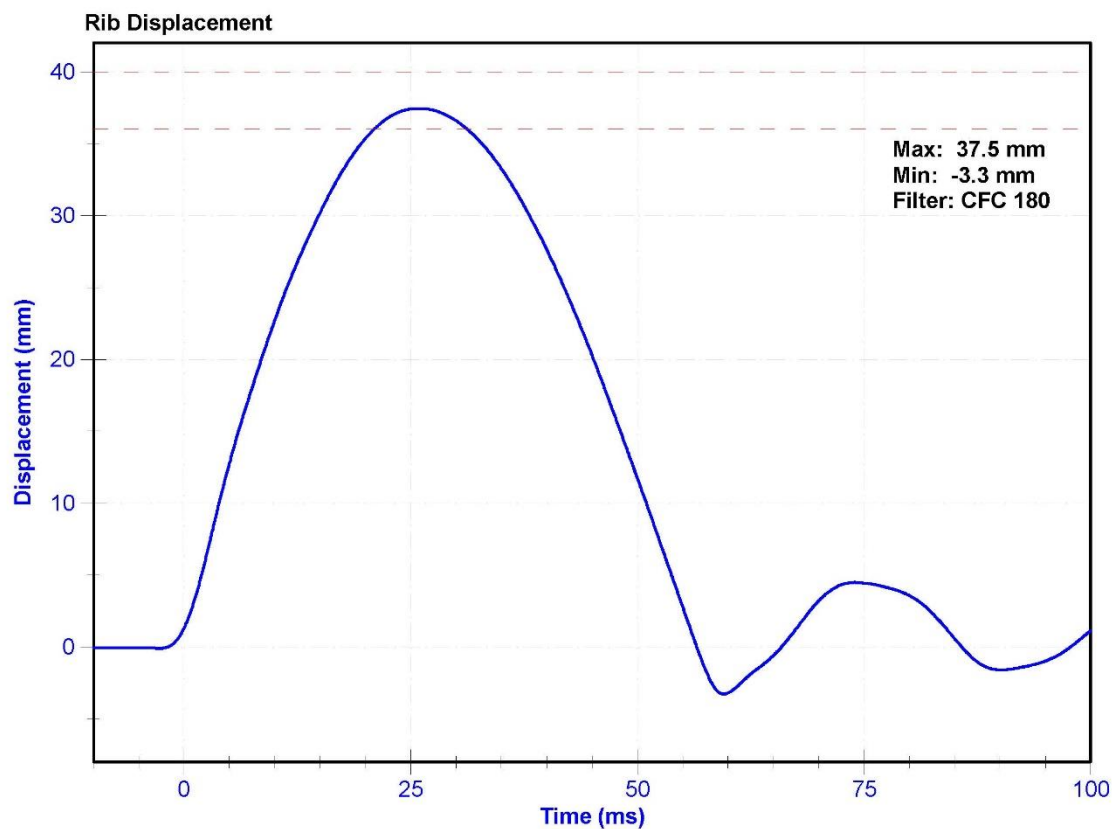
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ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	28.7	Pass
Rib Displacement	36	40	mm	37.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	6/20/2016	6/20/2017



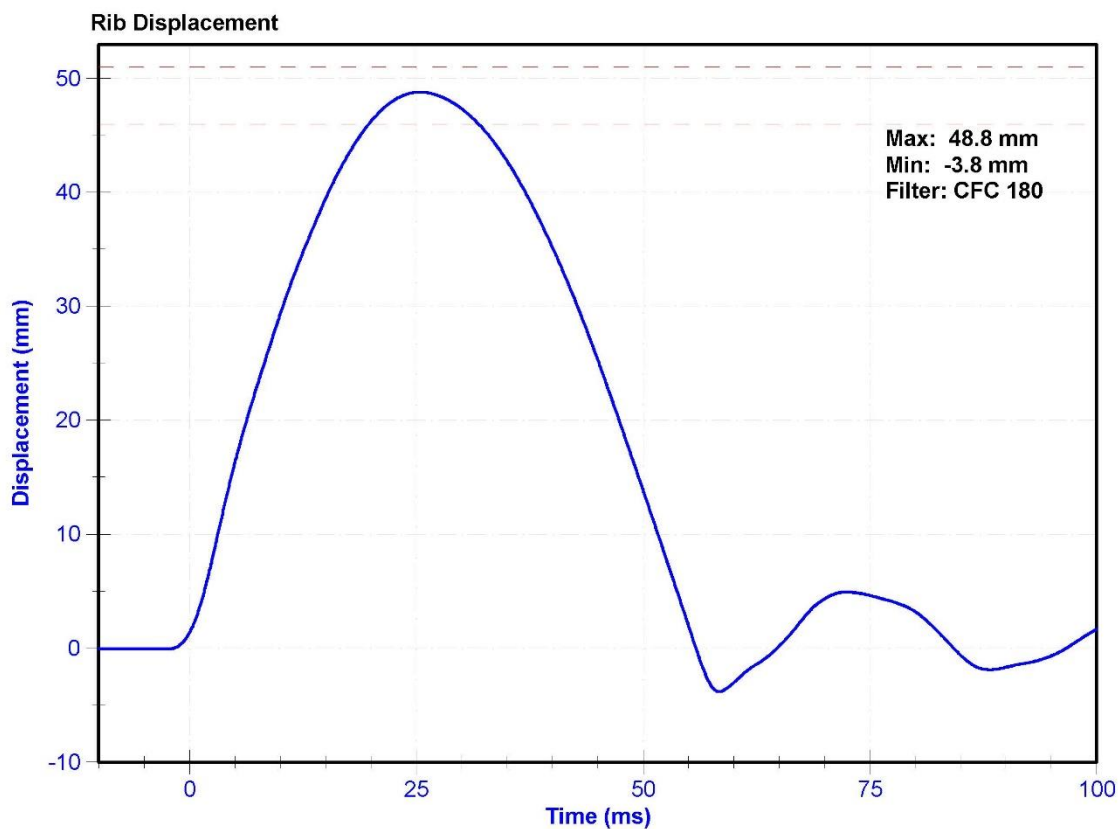
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	28.7	Pass
Rib Displacement	46	51	mm	48.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	6/20/2016	6/20/2017



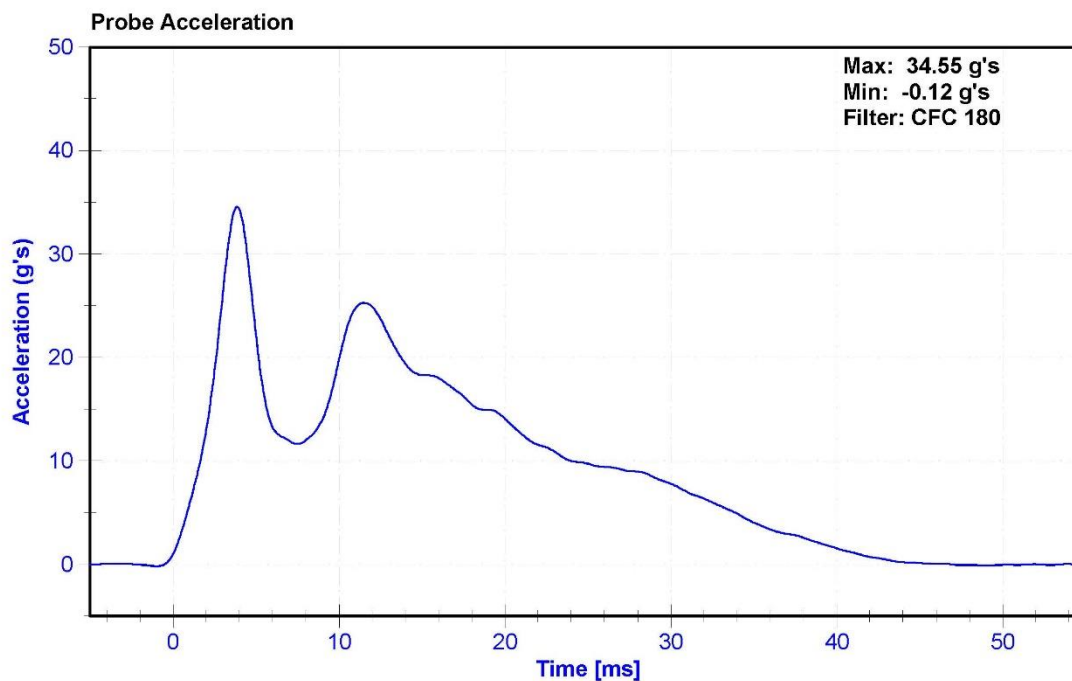
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ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

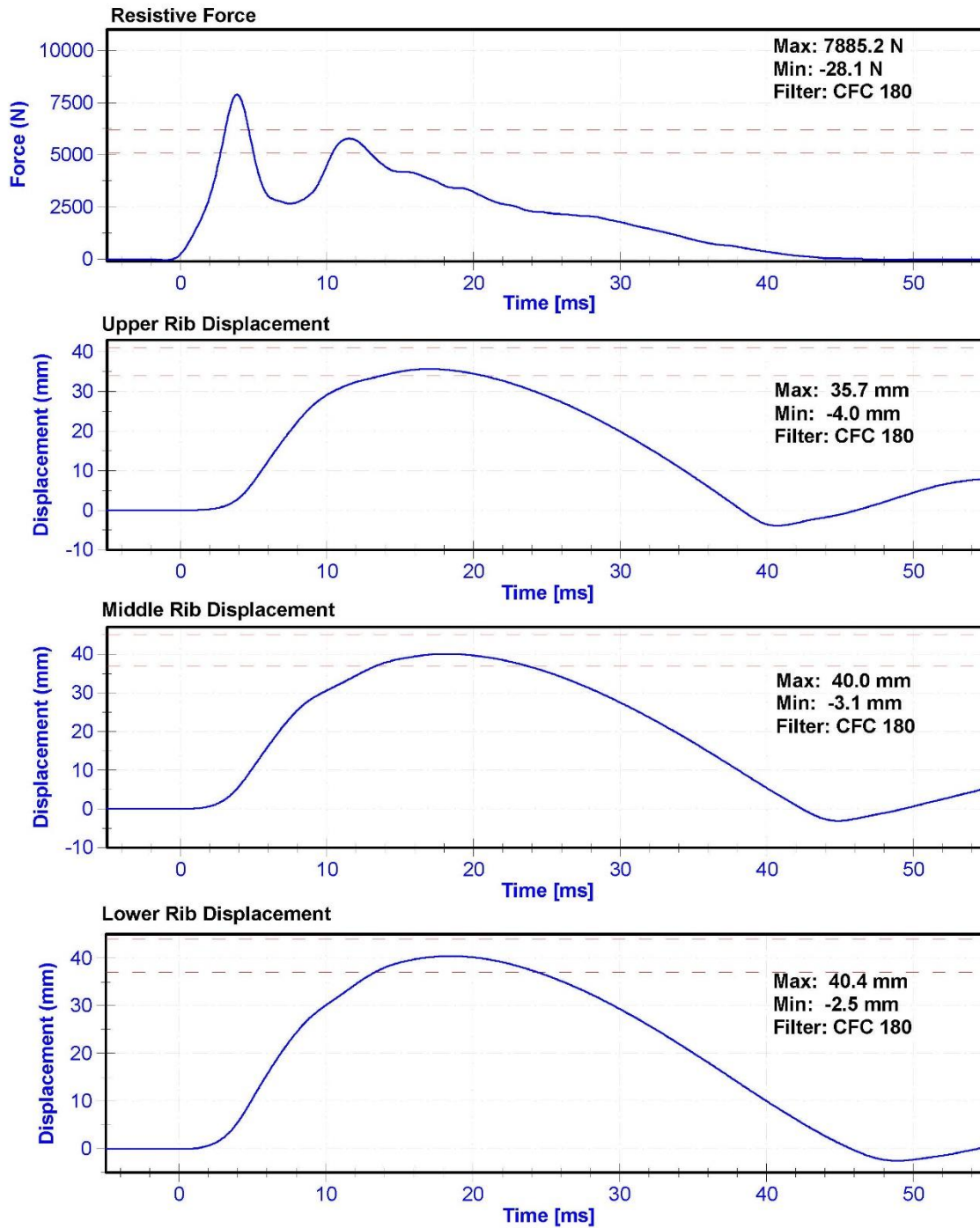
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	32.4	Pass
Velocity	5.4	5.6	m/s	5.51	Pass
Resistive Force after 6ms	5100	6200	N	5770.3	Pass
Upper Thorax Rib Deflection	34	41	mm	35.7	Pass
Mid Thorax Rib Deflection	37	45	mm	40.0	Pass
Lower Thorax Rib Deflection	37	44	mm	40.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	11/25/2016
Upper Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	6/20/2016	6/20/2017
Middle Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	6/20/2016	6/20/2017
Lower Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	6/20/2016	6/20/2017





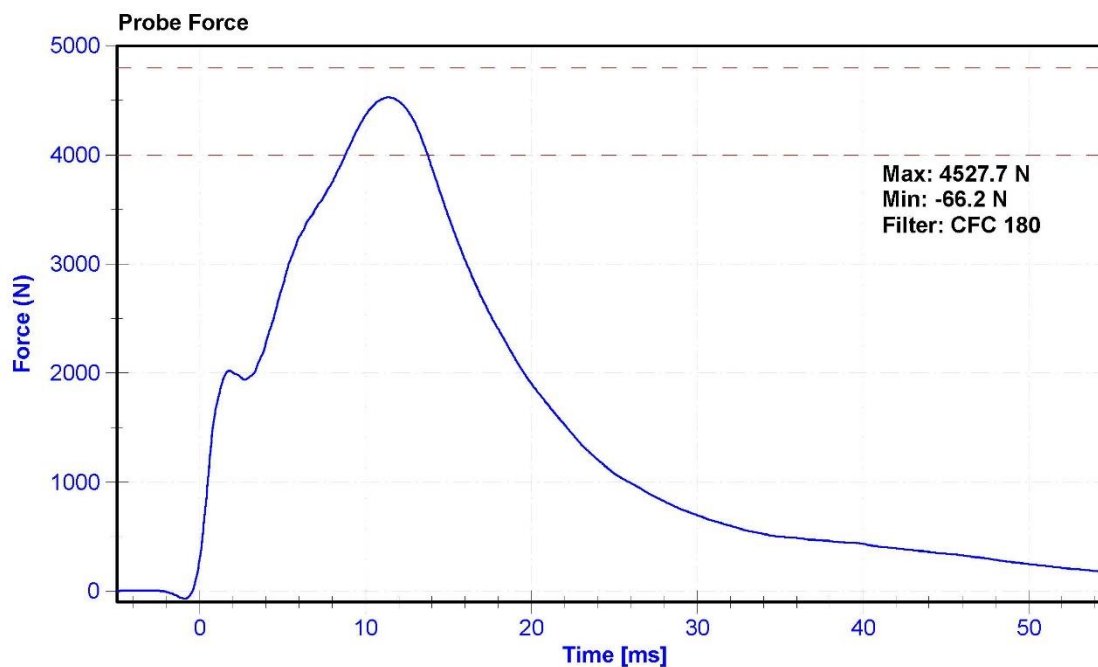
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

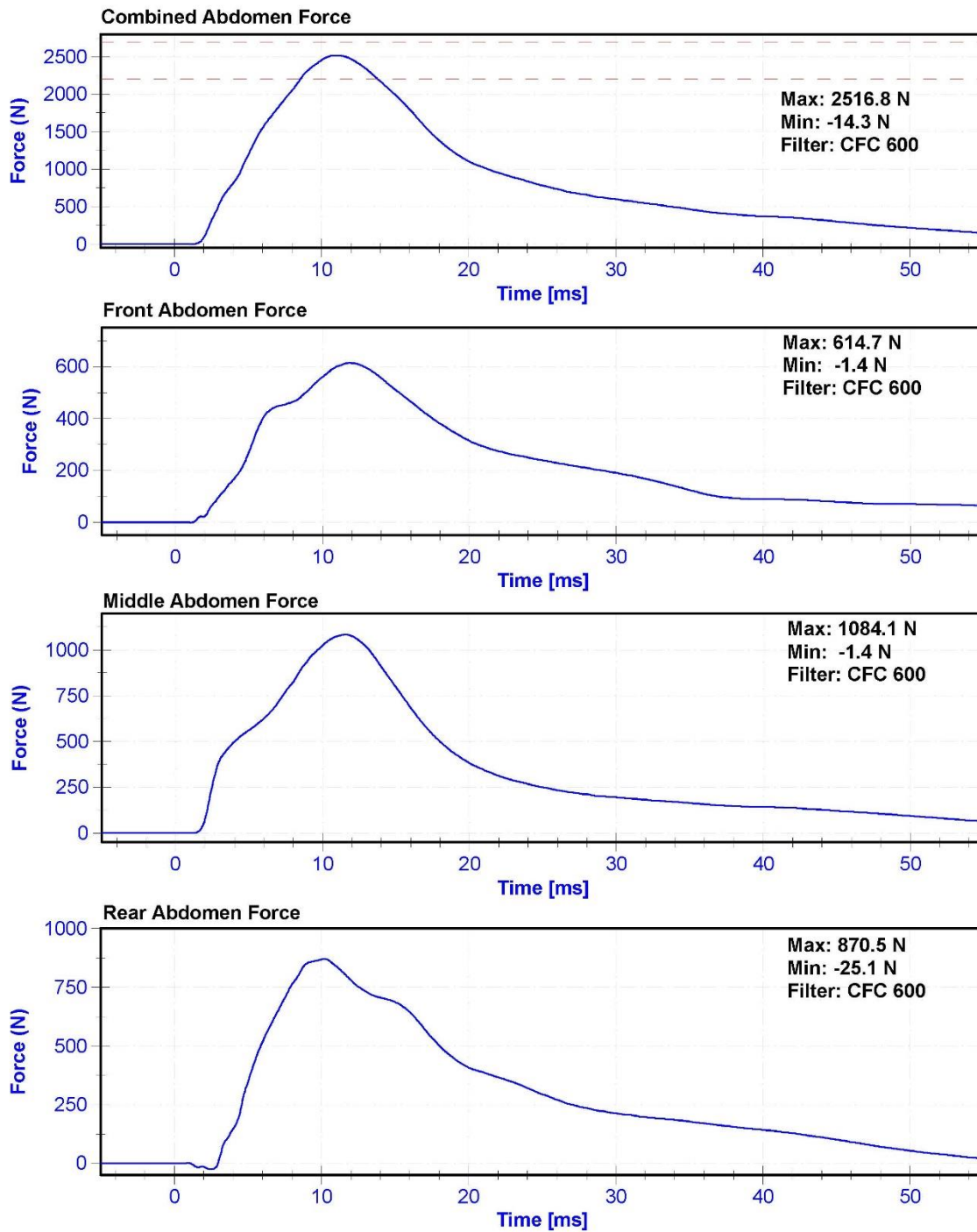
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	31.5	Pass
Velocity	3.9	4.1	m/s	4.02	Pass
Combined Abdomen Force	2200	2700	N	2516.8	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	10.95	Pass
Resistive Probe Force	4000	4800	N	4527.7	Pass
Time at Peak Resistive Force	10.6	13.0	ms	11.35	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	11/25/2016
Front Abdomen Load Cell	DENTON 2631	LC-1512	5/24/2016	5/24/2017
Middle Abdomen Load Cell	DENTON 2631	LC-1526	5/24/2016	5/24/2017
Rear Abdomen Load Cell	DENTON 2631	LC-1516	5/24/2016	5/24/2017







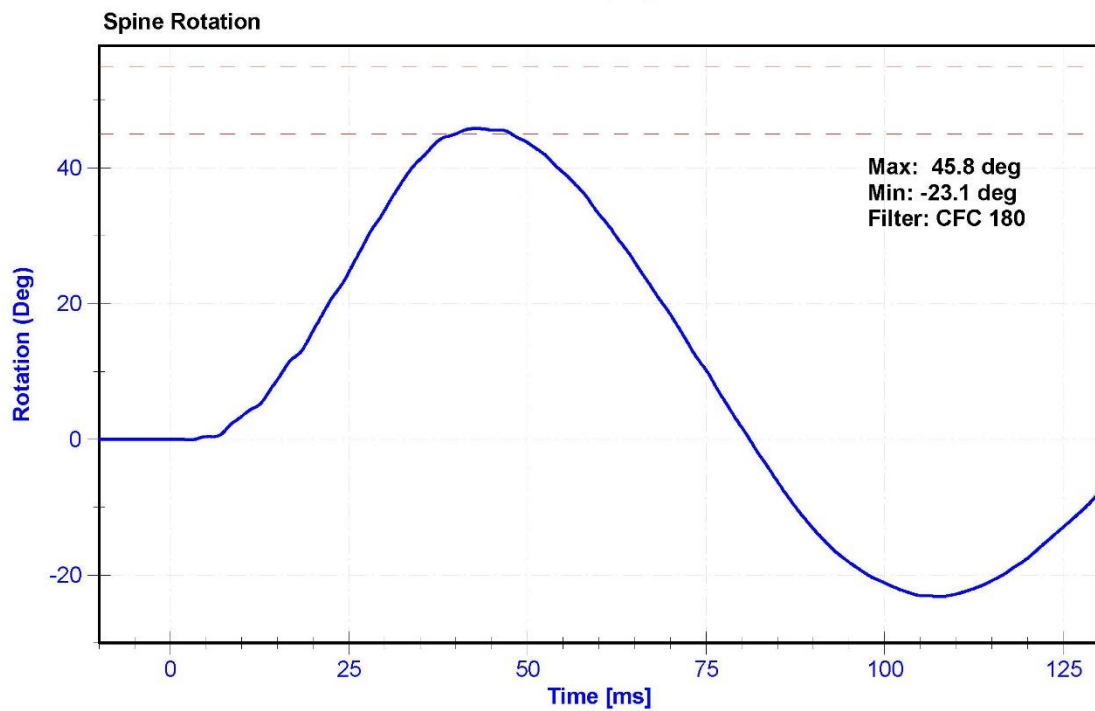
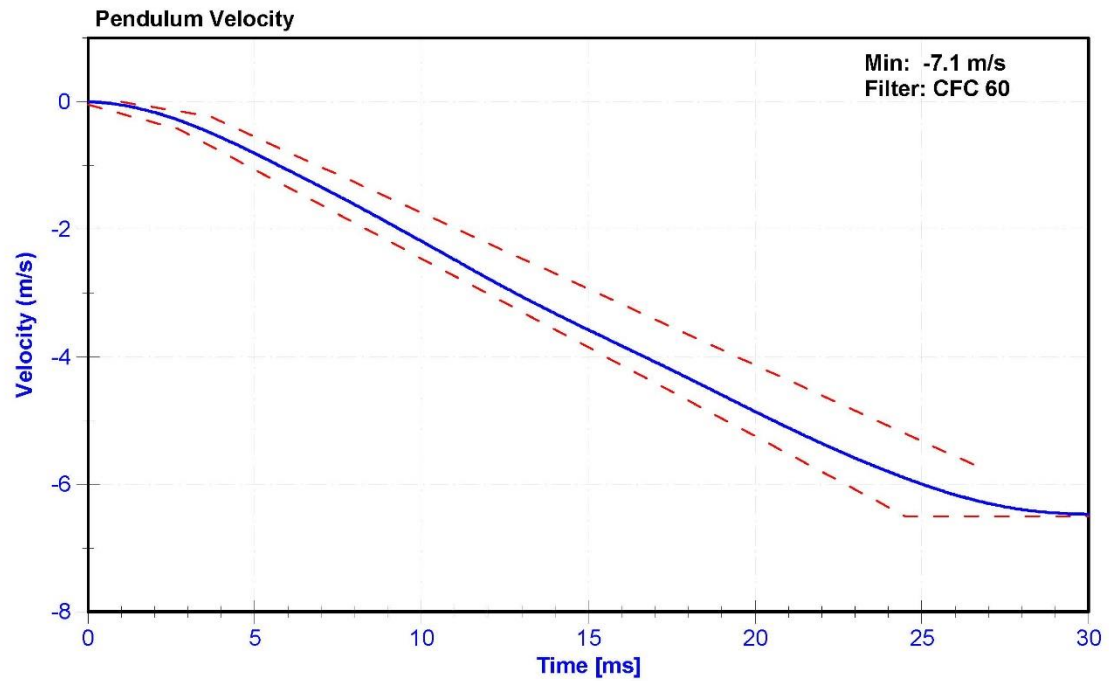
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

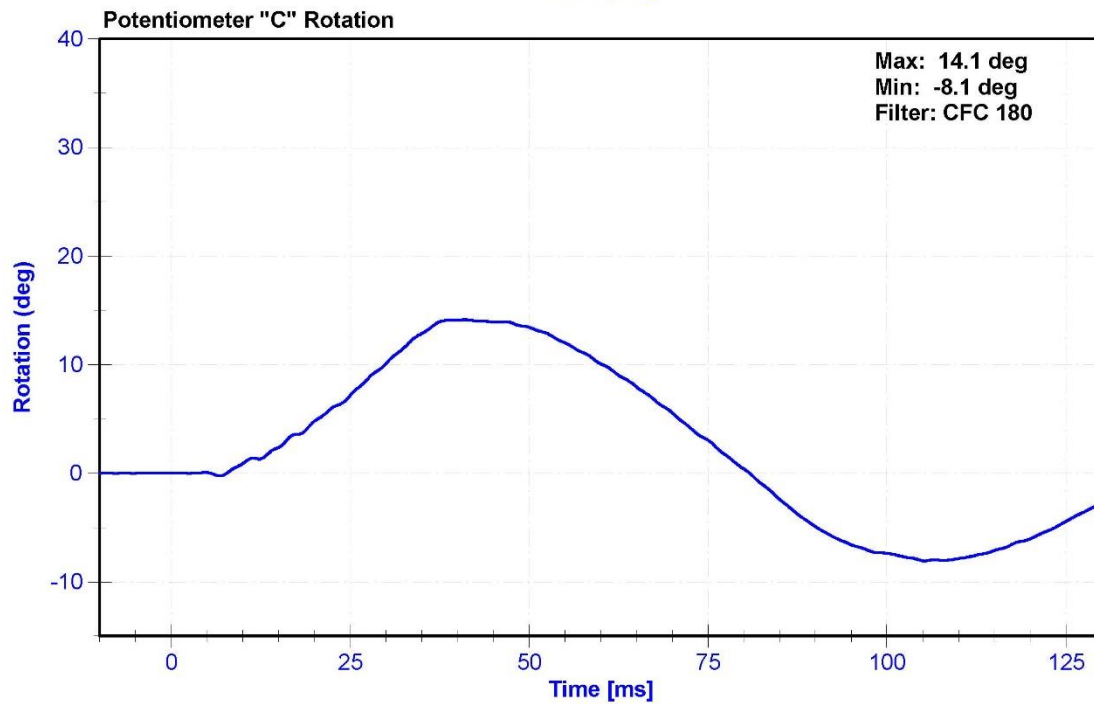
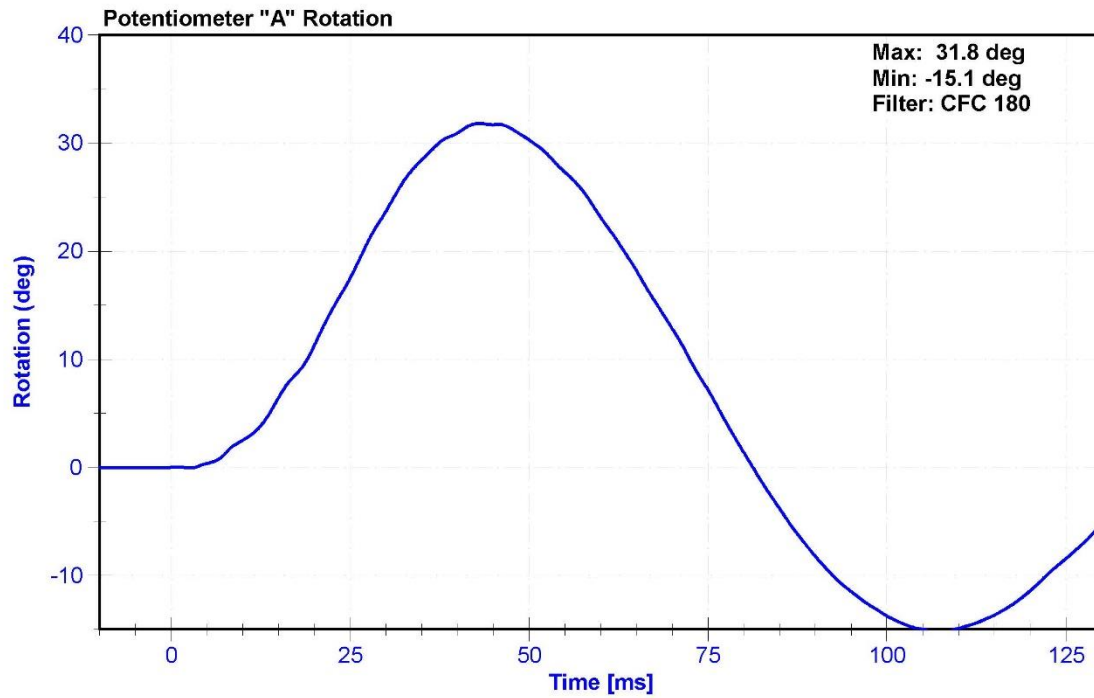
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	29.2	Pass
Velocity	5.95	6.15	m/s	6.113	Pass
Lateral Spine Rotation	45	55	deg	45.8	Pass
Time at Maximum Rotation	39	53	ms	42.8	Pass
Time of Decay to Zero Degrees	37	57	ms	38.3	Pass
Pulse within Corridor?	-	-	-		

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/10/2016	5/10/2017
Pendulum "A" Potentiometer	SP22G	DS-094	10/11/2016	10/11/2017
Condyle "B" Potentiometer	SP22G	DS-095	10/11/2016	10/11/2017





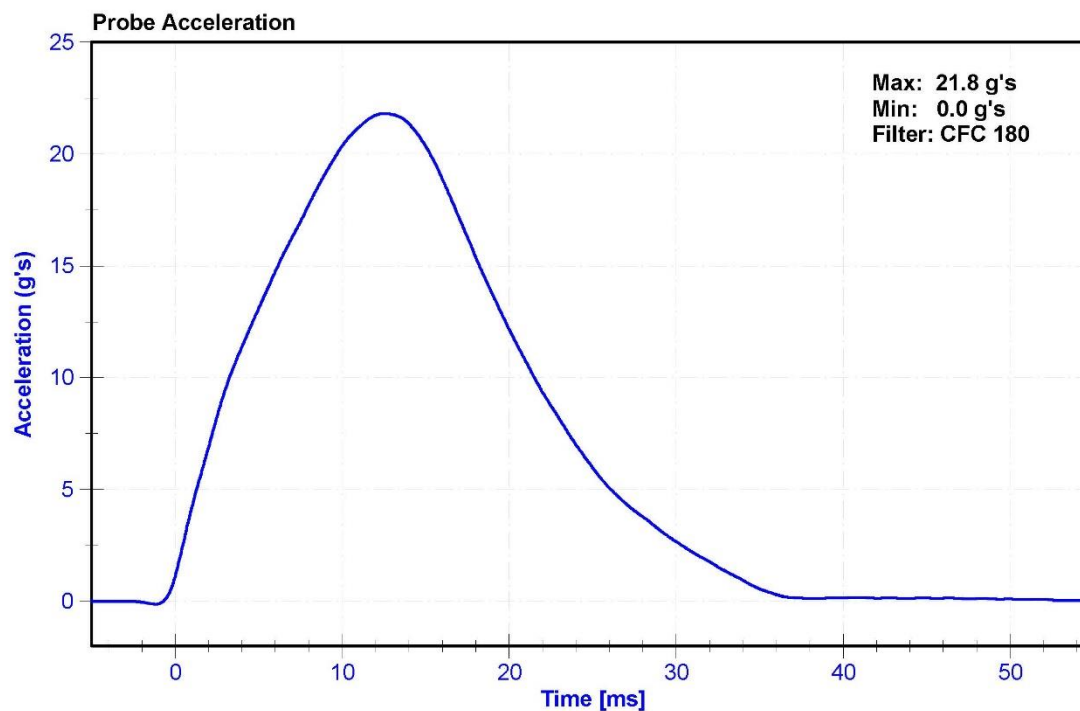
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

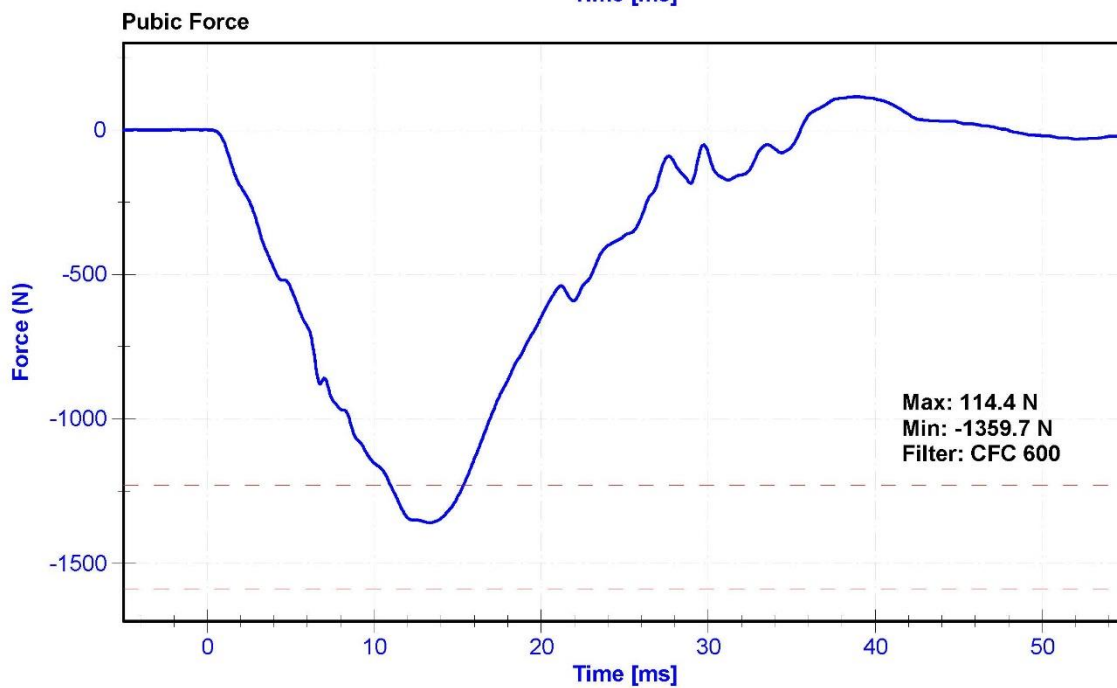
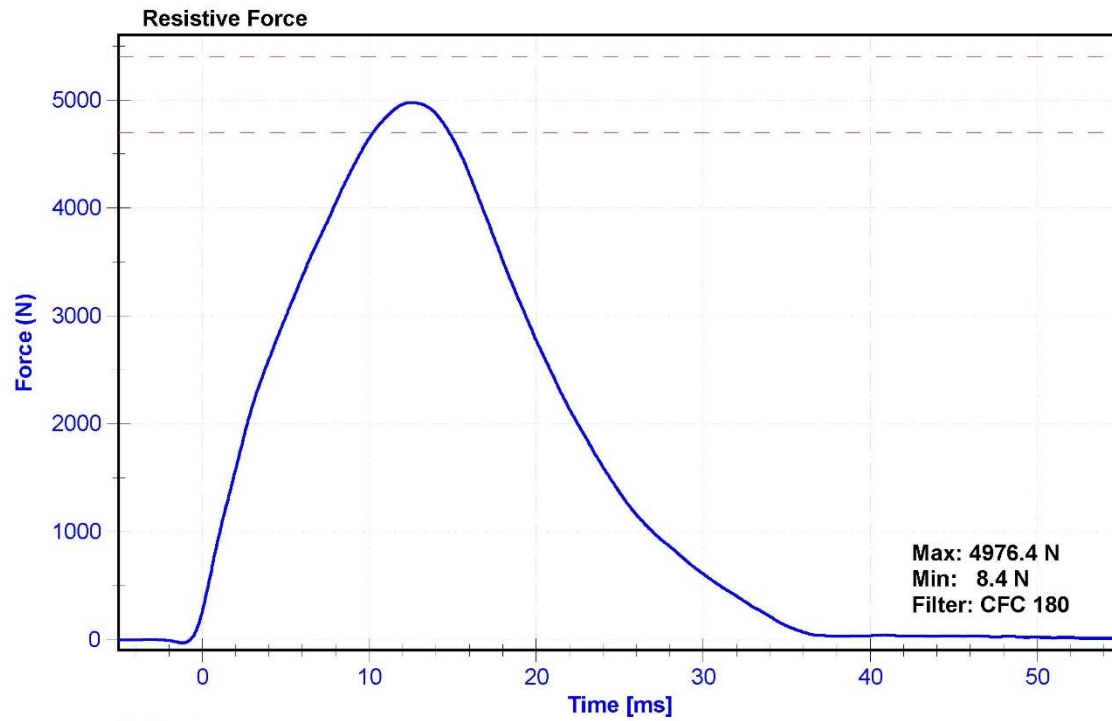
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	31.1	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Resistive Force	4700	5400	N	4976.4	Pass
Time at Peak Resistive Force	11.8	16.1	ms	12.50	Pass
Pubic Force	-1590	-1230	N	-1359.7	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-P21393	5/27/2016	11/25/2016
Pubic Load Cell	Denton 3096JFL	LC-465Fy	5/24/2016	5/24/2017





CALIBRATION TEST RESULTS

PRE-TEST

SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD

SERIAL No: DG8012

(CONFIGURED FOR LEFT SIDE IMPACT)

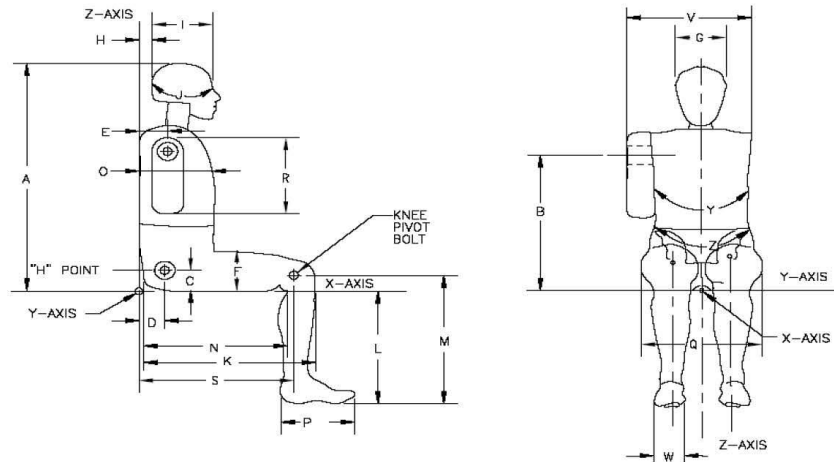


External Measurements - SID-IIs

Technician: MKG

Date: 11/14/2016

Dummy Serial Number: DG8012



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	781	Pass
B	Shoulder Pivot Height	437	453	445	Pass
C	H-point Height	79	89	86	Pass
D	H-point from seatback	141	151	146	Pass
E	Shoulder Pivot from Backline	97	107	102	Pass
F	Thigh Clearance	119	135	129	Pass
G	Head Breadth	140	148	144	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	182	Pass
J	Head Circumference	541	551	546	Pass
K	Buttock to Knee Length	514	540	530	Pass
L	Popliteal Height	343	369	351	Pass
M	Knee Pivot to floor height	392	409	400	Pass
N	Buttock Popliteal Length	416	442	430	Pass
O	Chest Depth w/o jacket	195	211	203	Pass
P	Foot Length	216	232	220	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	319	Pass
R	Arm Length	249	259	254	Pass
S	Knee Joint to seatback	477	493	485	Pass
V	Shoulder Width	341	357	348	Pass
W	Foot Width	78	94	86	Pass
Y	Chest Circumference w/jacket	851	881	861	Pass
Z	Waist Circumference	761	791	771	Pass

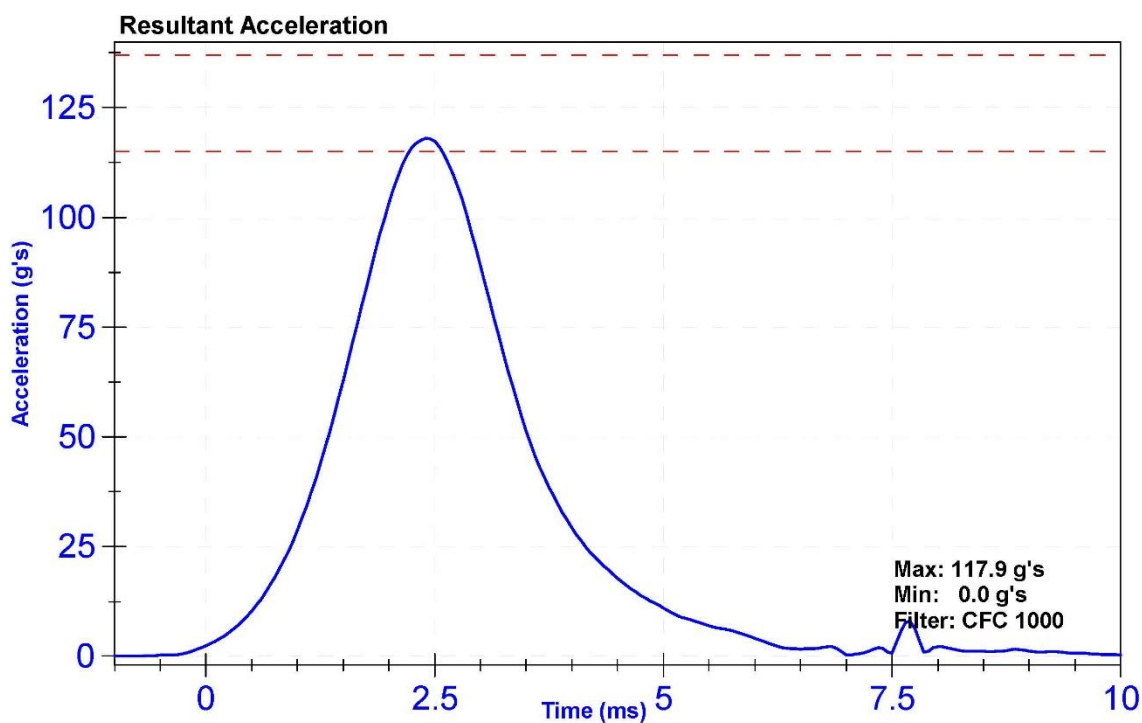
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

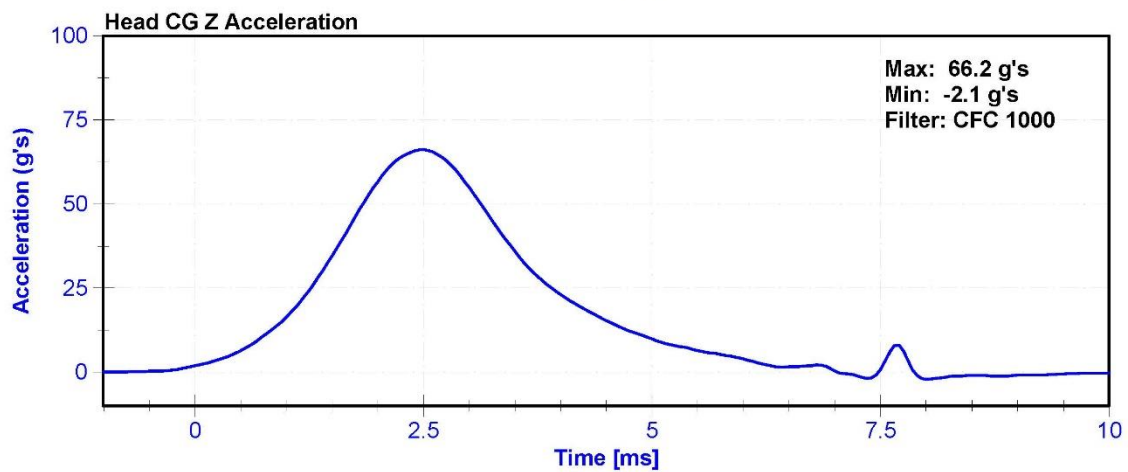
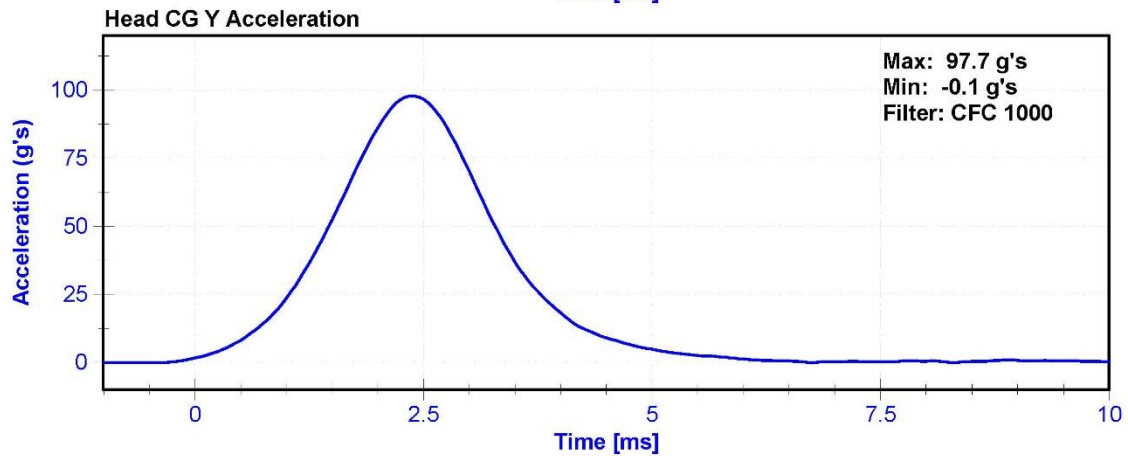
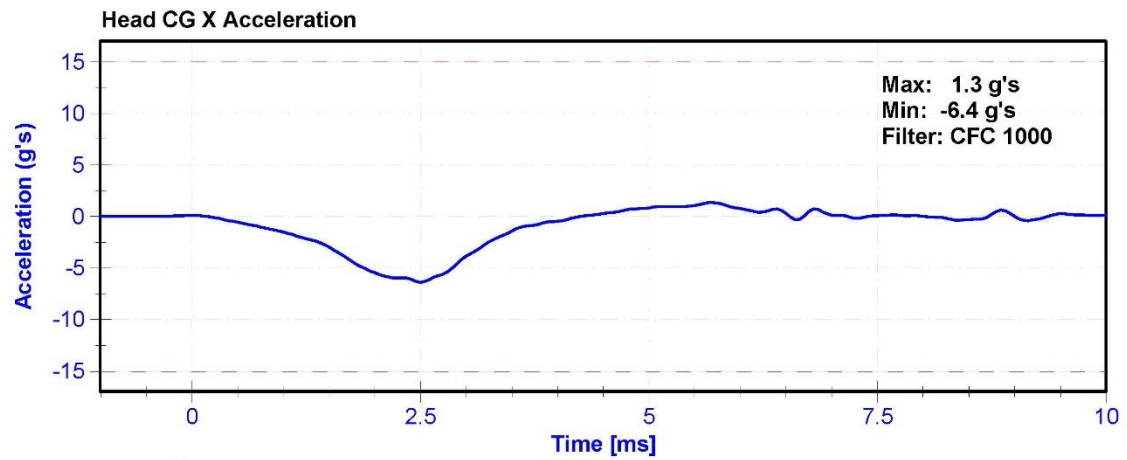
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	31.7	Pass
Resultant Acceleration	115	137	g's	117.9	Pass
Oscillation	0	15	%	6.7	Pass
Fore-Aft Acceleration	-15	15	g's	-6.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P51685	9/30/2016	3/31/2017
Y Accelerometer	ENDEVCO 7264CT	AC-P51682	9/30/2016	3/31/2017
Z Accelerometer	ENDEVCO 7264CT	AC-P51699	9/30/2016	3/31/2017





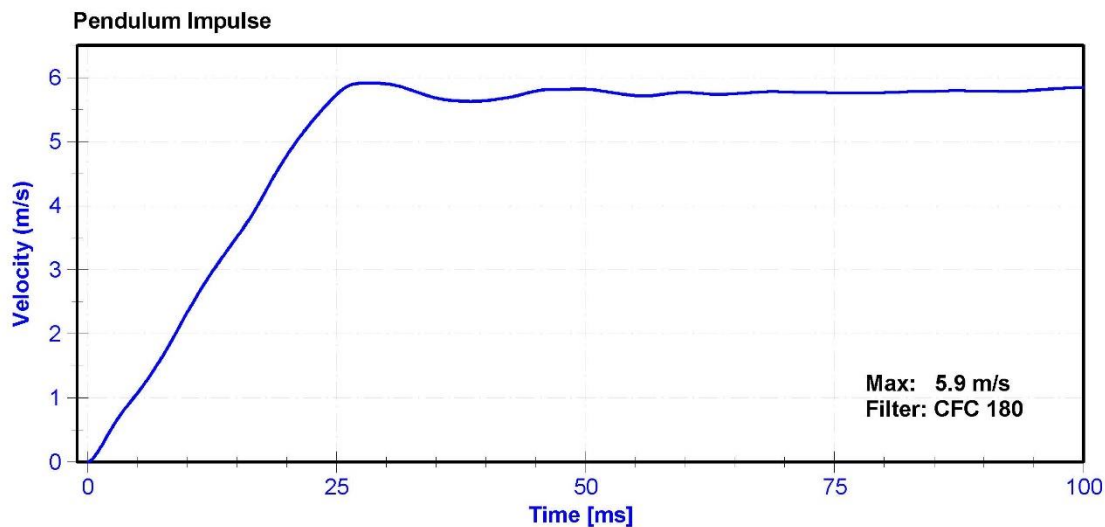
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

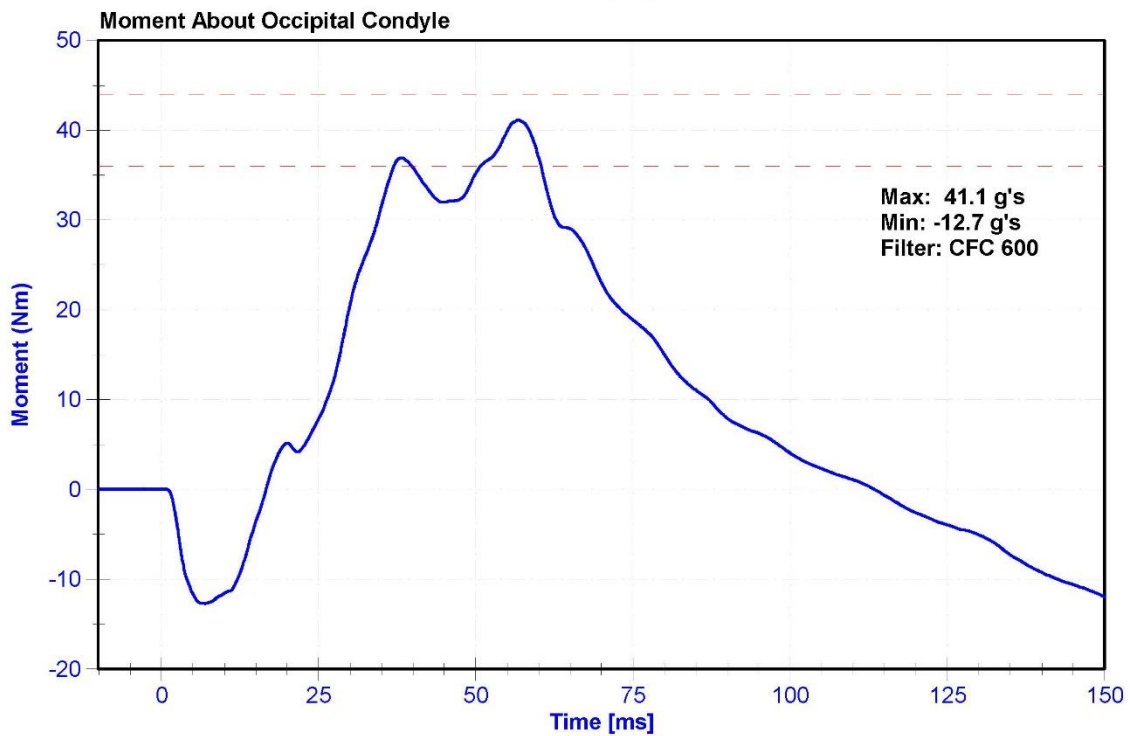
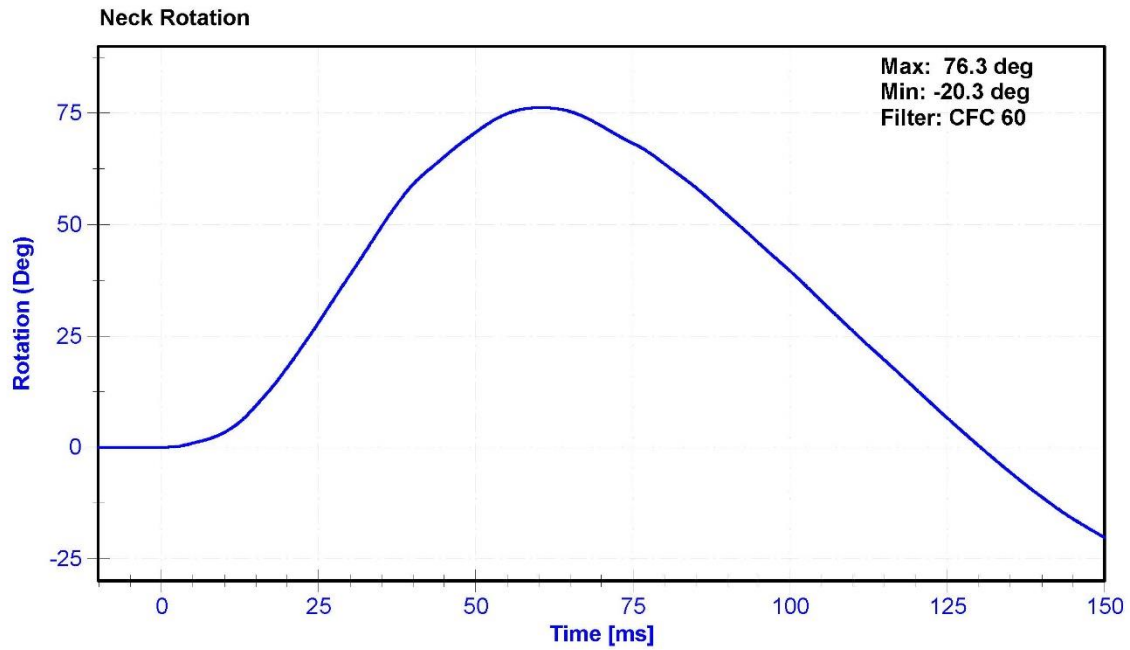
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	31.8	Pass
Velocity	5.51	5.63	m/s	5.620	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.33	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.51	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.78	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.73	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.91	Pass
Neck Rotation	71	81	deg	76.3	Pass
Time at Maximum Rotation	50	70	ms	60.3	Pass
Moment about the OC	36	44	Nm	41.1	Pass
Moment Decay to 0 Nm	102	126	ms	113.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/10/2016	5/10/2017
Pendulum Potentiometer	Denton 78051-342	DS-184Pend	10/12/2016	10/12/2017
Condyle Potentiometer	Denton 78051-342	DS-185Pend	10/12/2016	10/12/2017
Upper Neck Load Cell	Denton 1716A	LC-440Fy	5/24/2016	5/24/2017





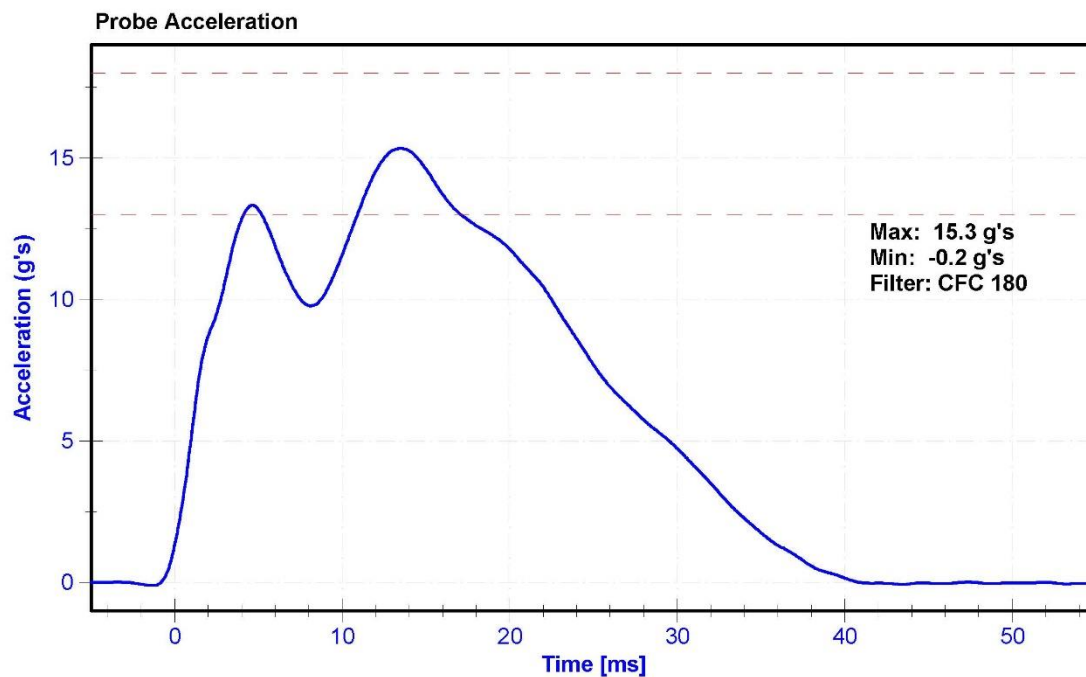
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

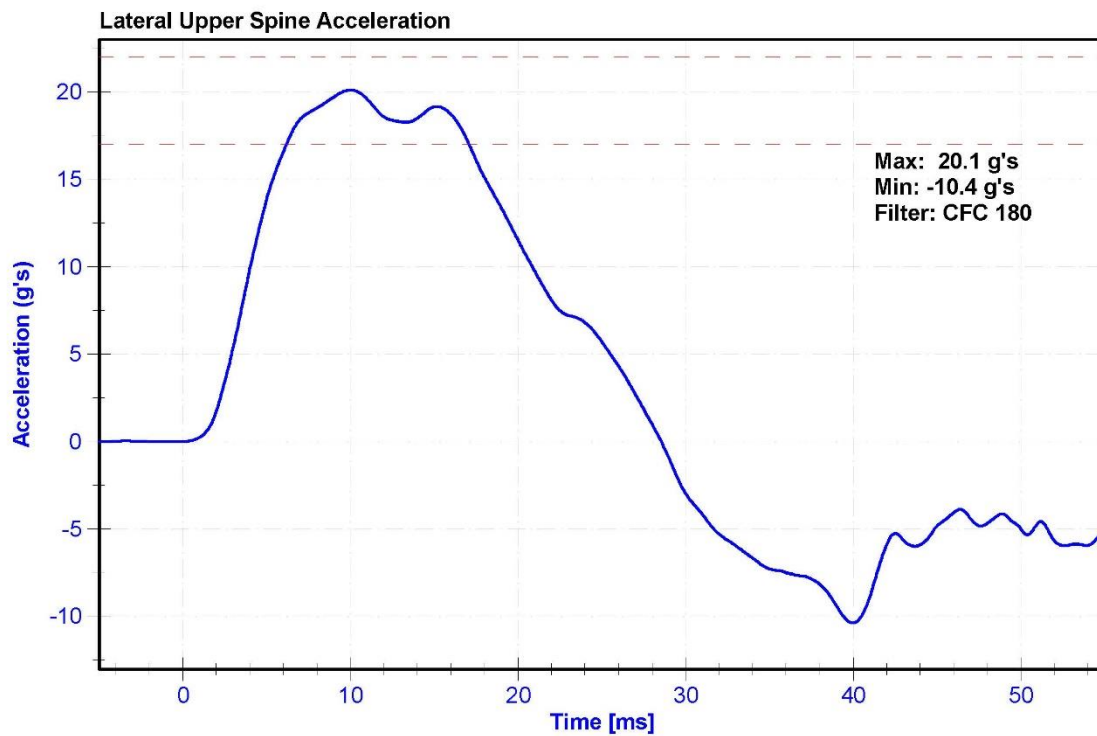
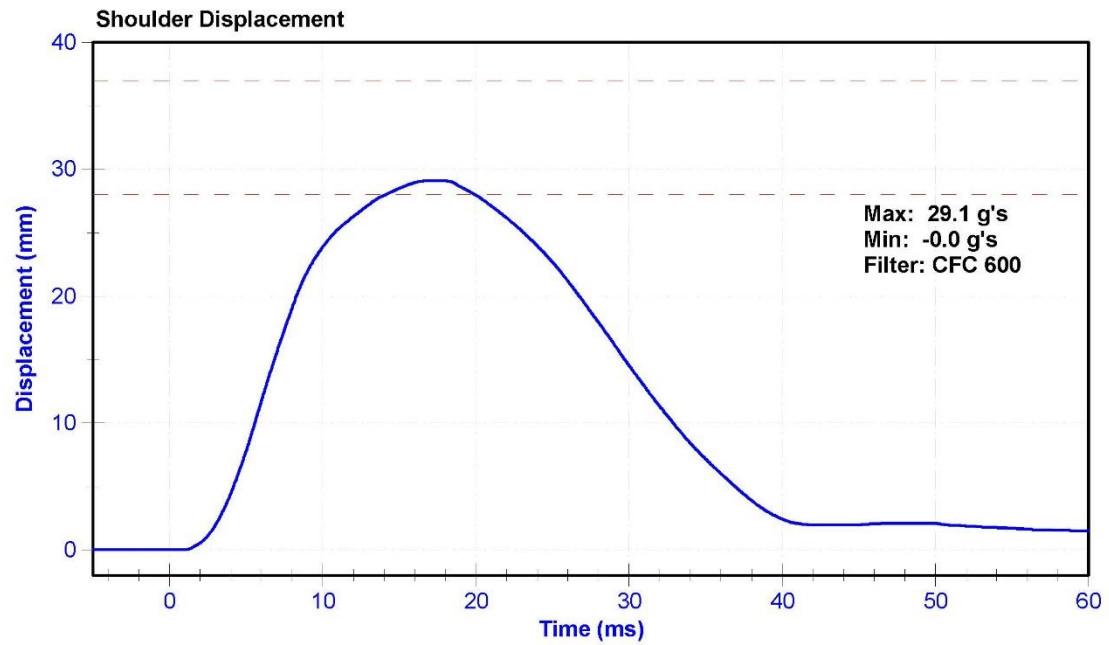
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	34	Pass
Velocity	4.2	4.4	m/s	4.28	Pass
Probe Acceleration	13	18	g's	15.3	Pass
Shoulder Deflection	28	37	mm	29.1	Pass
Lateral Upper Spine Acceleration	17	22	g's	20.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	11/25/2016
Shoulder Potentiometer	Servo 08TC1-3745	DS-1845GFE	6/15/2016	6/15/2017
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P51875	10/4/2016	4/4/2017





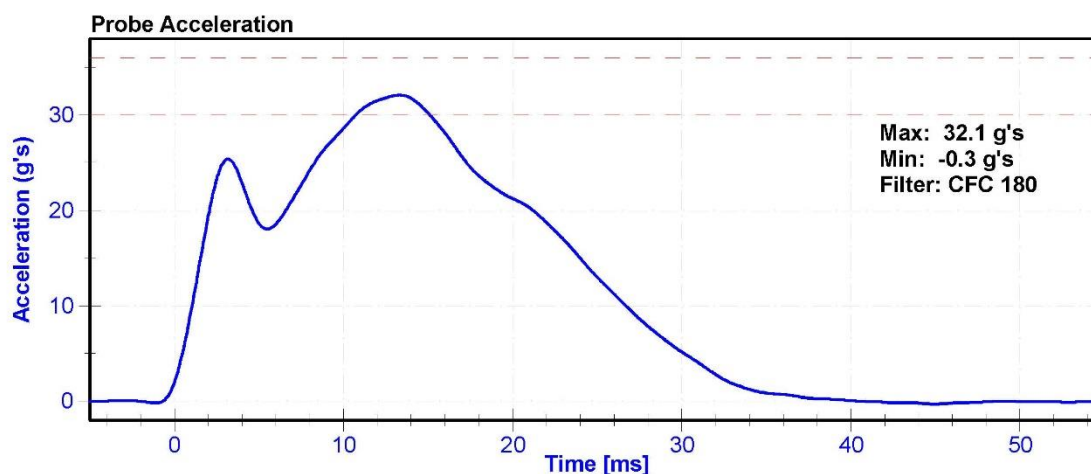
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

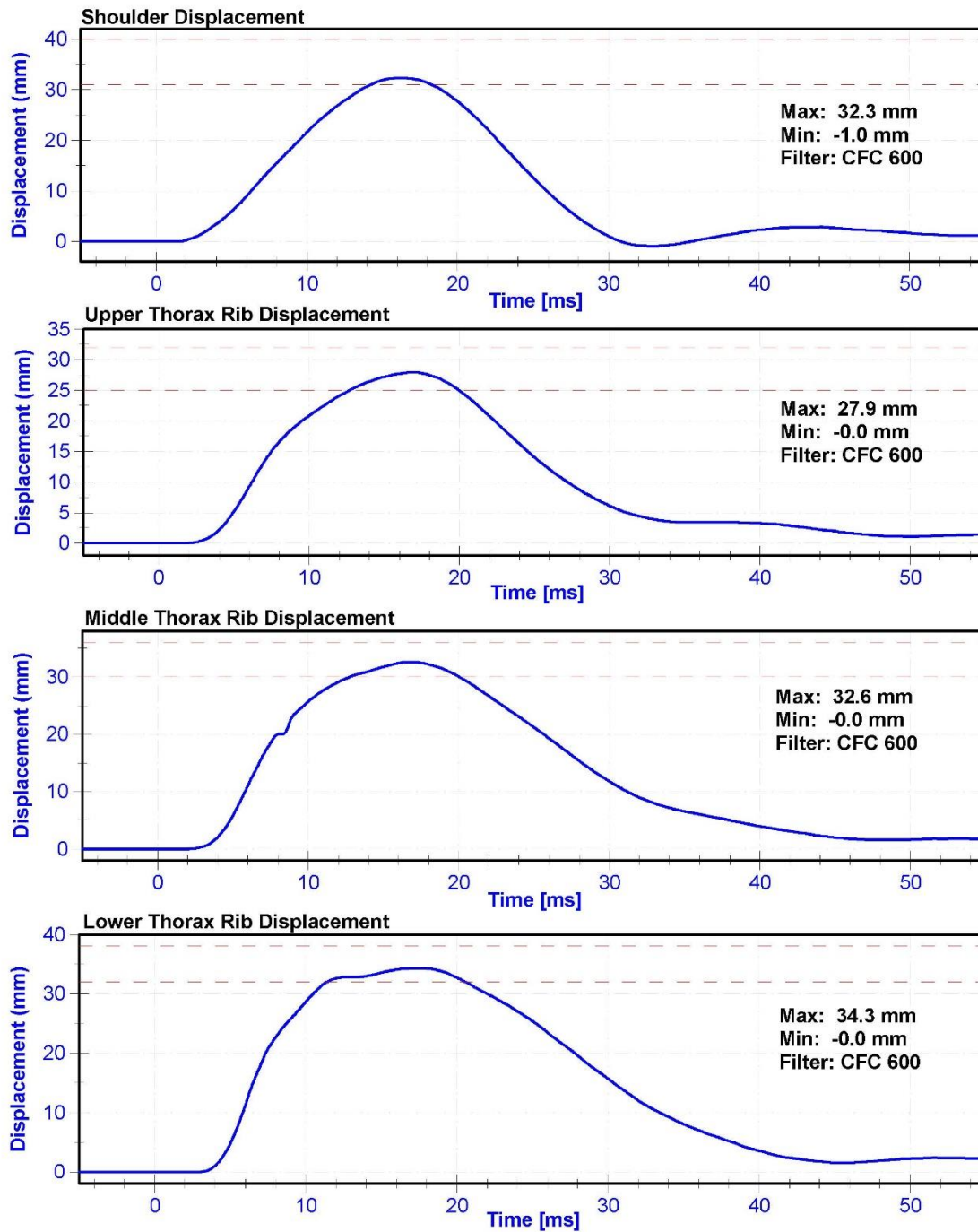
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	34.4	Pass
Velocity	6.6	6.8	m/s	6.68	Pass
Probe Acceleration after 5 ms	30	36	g's	32.1	Pass
Lateral Upper Spine Acceleration	34	43	g's	38.3	Pass
Lateral Lower Spine Acceleration	29	37	g's	33.0	Pass
Shoulder Deflection	31	40	mm	32.3	Pass
Upper Thorax Rib Deflection	25	32	mm	27.9	Pass
Mid Thorax Rib Deflection	30	36	mm	32.6	Pass
Lower Thorax Rib Deflection	32	38	mm	34.3	Pass

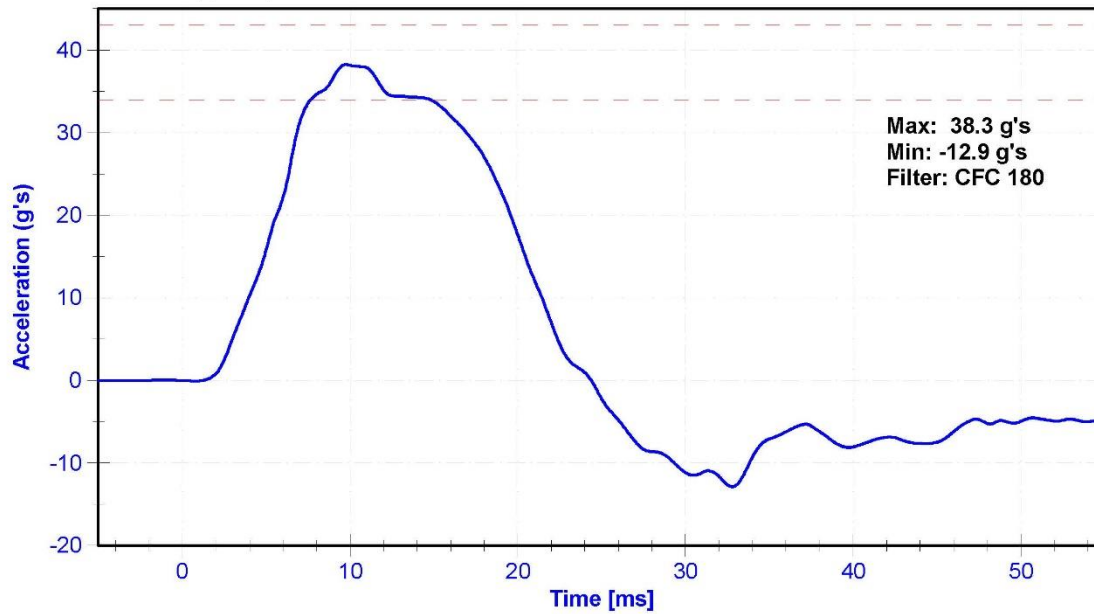
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	11/25/2016
Upper Spine T1 Y Accelerometer	ENDEVCO 7264CT	AC-P51875	10/4/2016	4/4/2017
Upper Spine T12 Y Accelerometer	ENDEVCO 7264	AC-P83319	10/4/2016	4/4/2017
Shoulder Potentiometer	Servo 08TC1-3745	DS-1845GFE	6/15/2016	6/15/2017
Upper Thorax Rib Potentiometer	Servo 08TC1-3621	DS-808GFE	6/15/2016	6/15/2017
Middle Thorax Rib Potentiometer	Servo 08TC1-3745	DS-1514GFE	6/15/2016	6/15/2017
Lower Thorax Rib Potentiometer	Servo 08TC1-3787	DS-011GFE	6/15/2016	6/15/2017

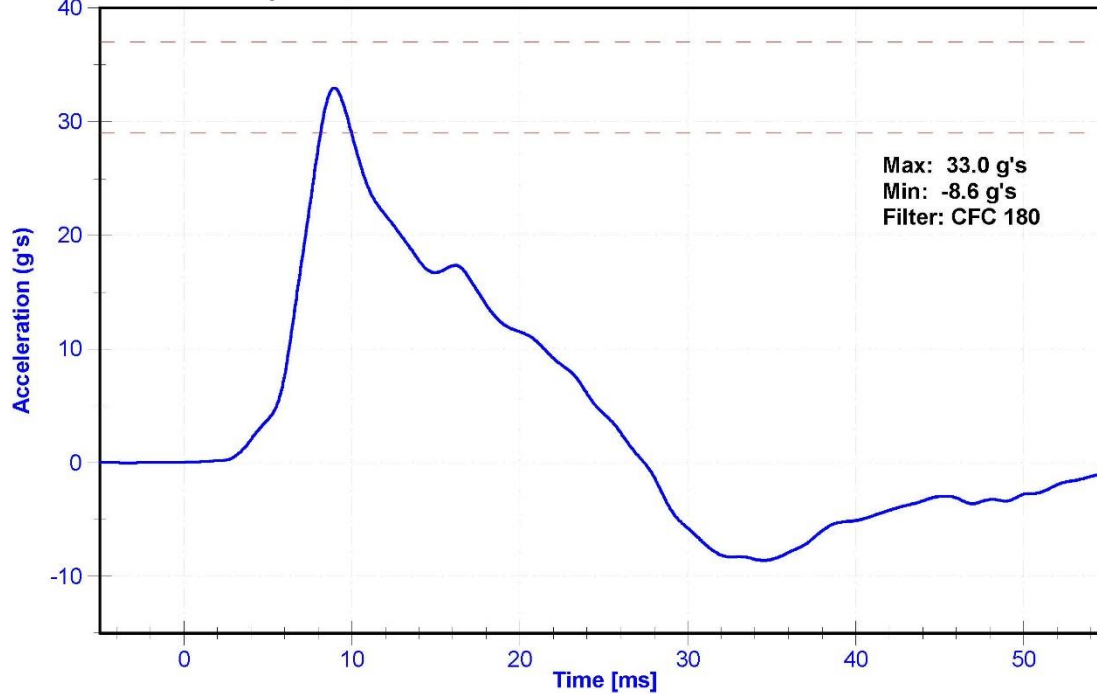




Lateral Upper Spine Acceleration



Lateral Lower Spine Acceleration



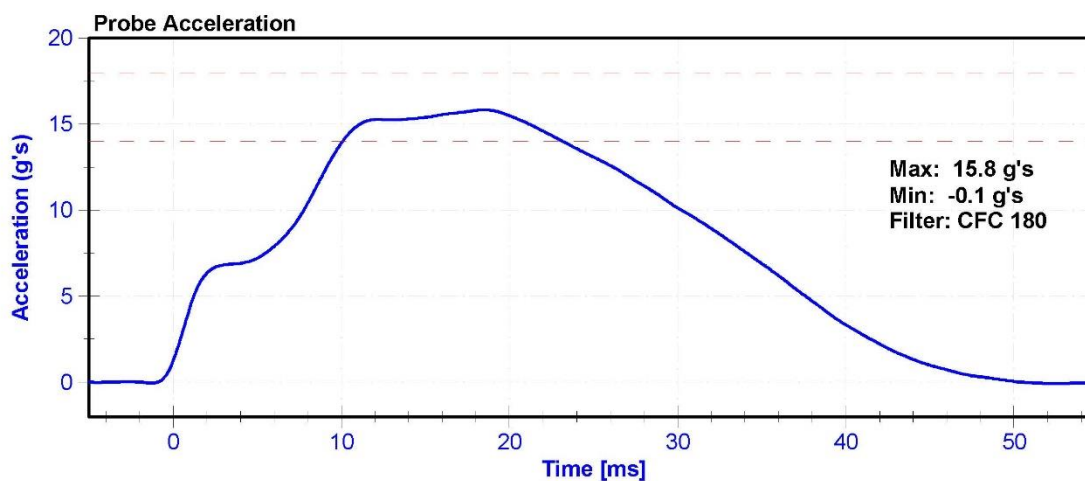
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

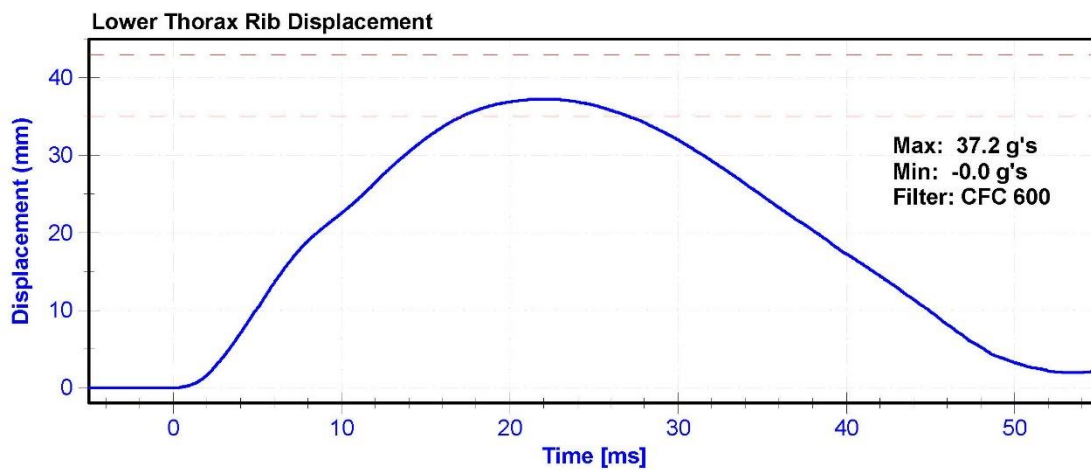
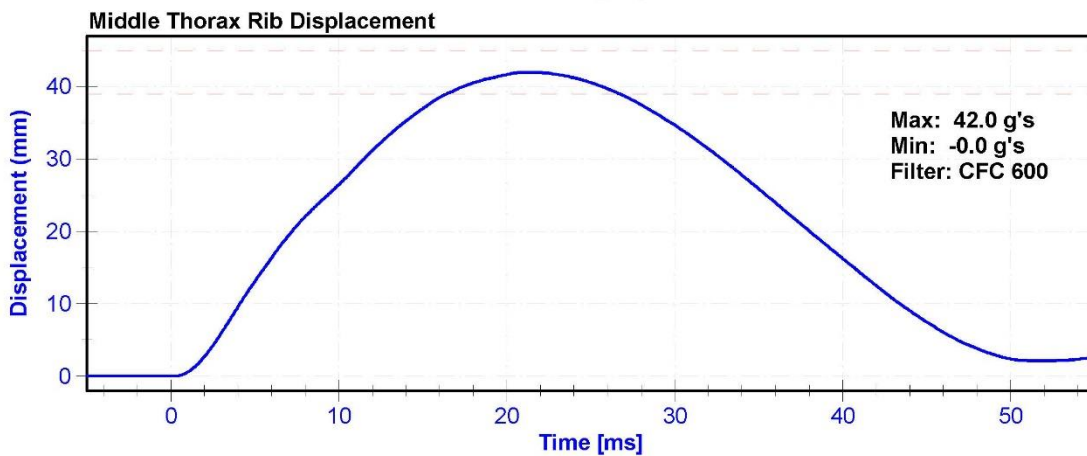
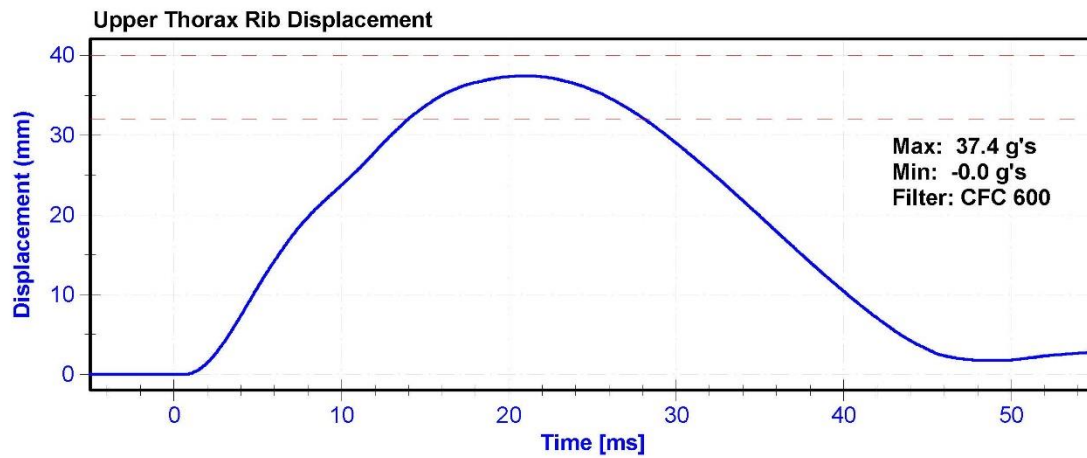
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	34.3	Pass
Velocity	4.2	4.4	m/s	4.30	Pass
Probe Acceleration	14	18	g's	15.8	Pass
Lateral Upper Spine Acceleration	13	17	g's	15.3	Pass
Lateral Lower Spine Acceleration	7	11	g's	9.5	Pass
Upper Thorax Rib Deflection	32	40	mm	37.4	Pass
Middle Thorax Rib Deflection	39	45	mm	42.0	Pass
Lower Thorax Rib Deflection	35	43	mm	37.2	Pass

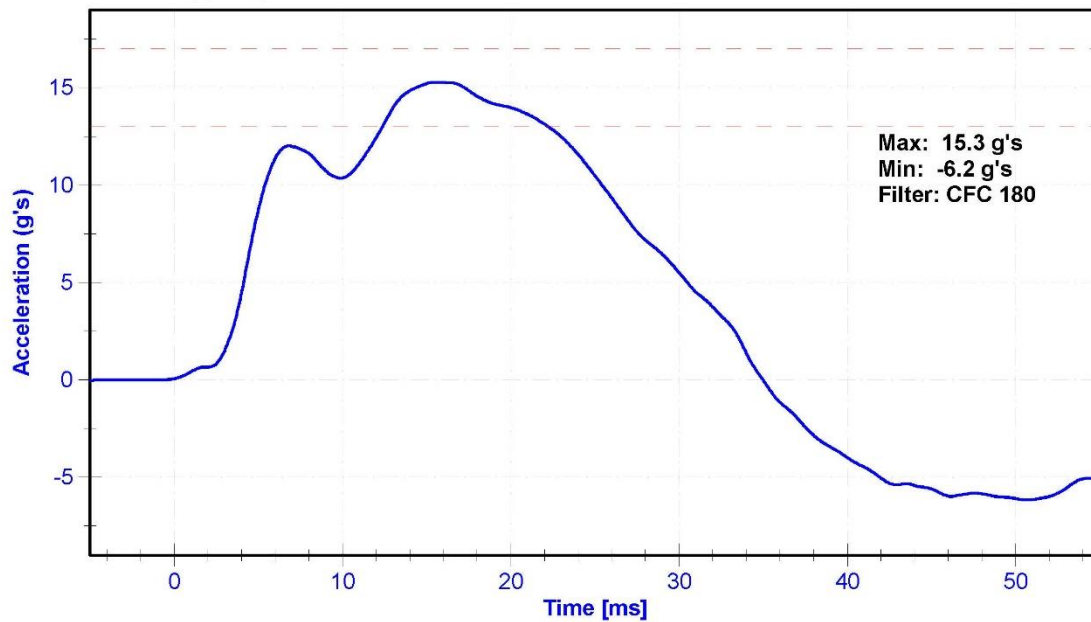
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	11/25/2016
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P51875	10/4/2016	4/4/2017
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P83319	10/4/2016	4/4/2017
Upper Thorax Rib Potentiometer	Servo 08TC1-3621	DS-808GFE	6/15/2016	6/15/2017
Middle Thorax Rib Potentiometer	Servo 08TC1-3745	DS-1514GFE	6/15/2016	6/15/2017
Lower Thorax Rib Potentiometer	Servo 08TC1-3787	DS-011GFE	6/15/2016	6/15/2017

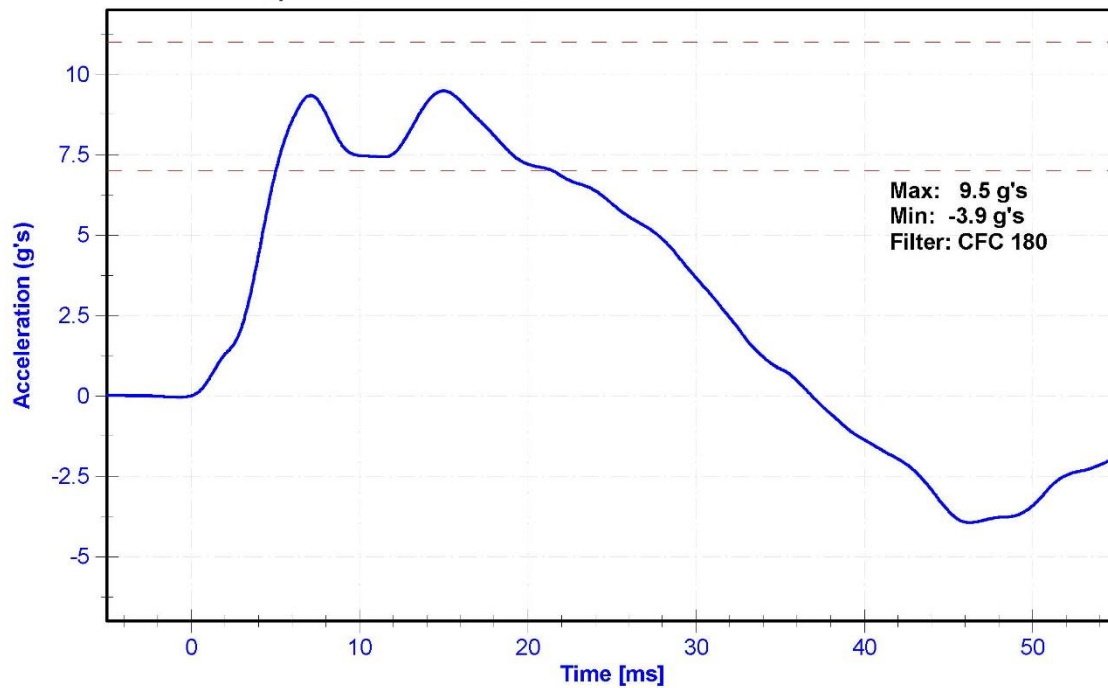




Lateral Upper Spine Acceleration



Lateral Lower Spine Acceleration



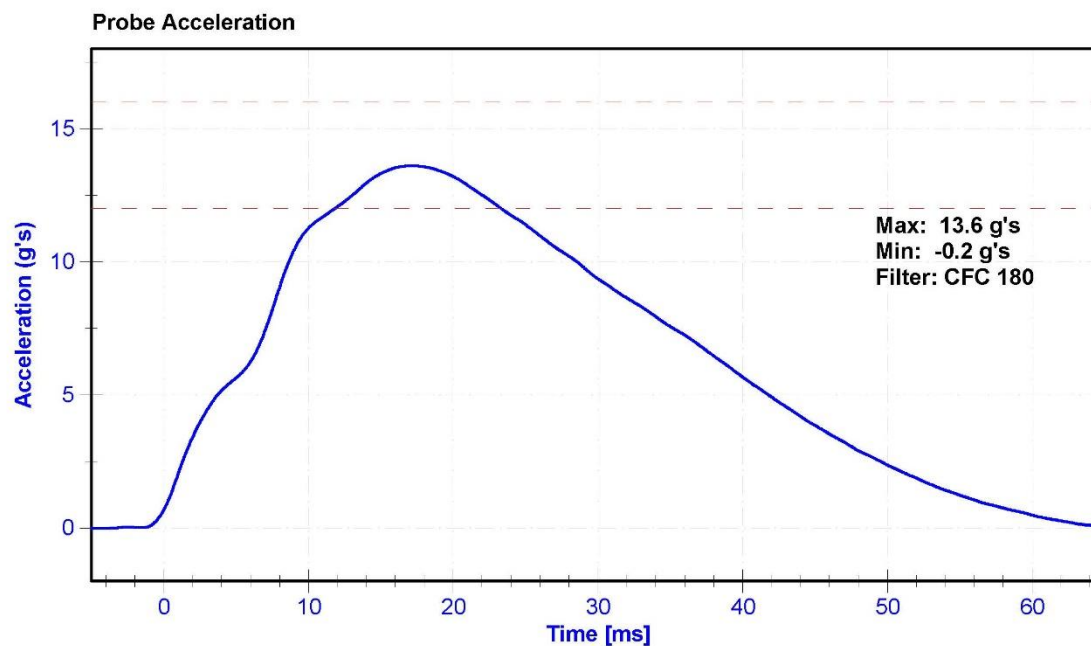
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

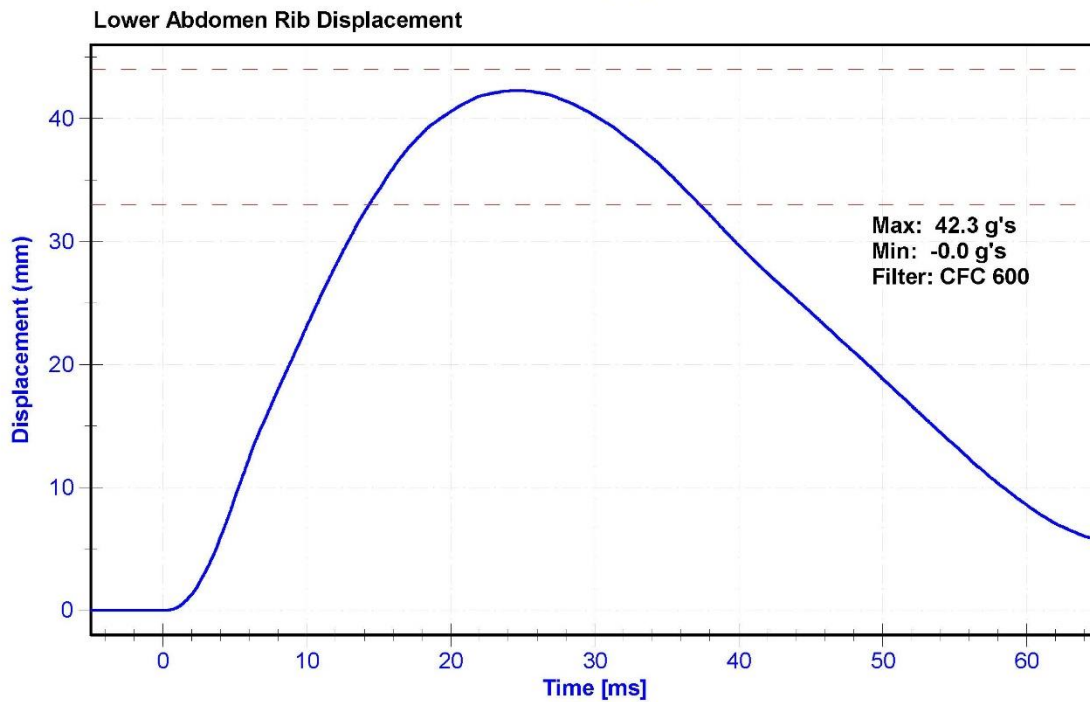
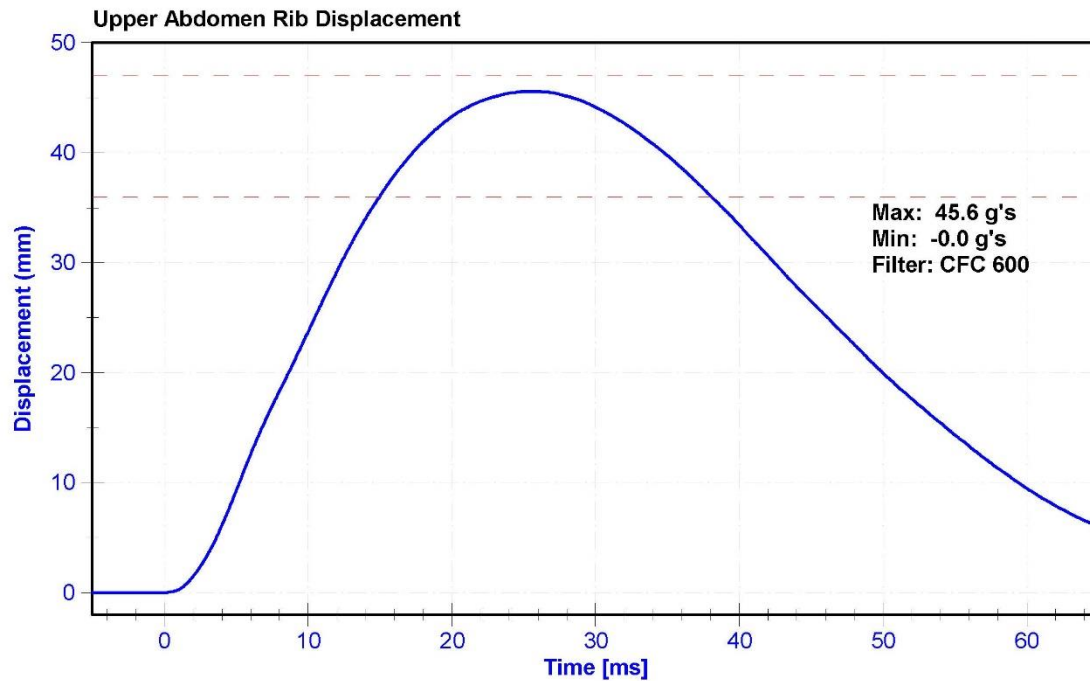
Results

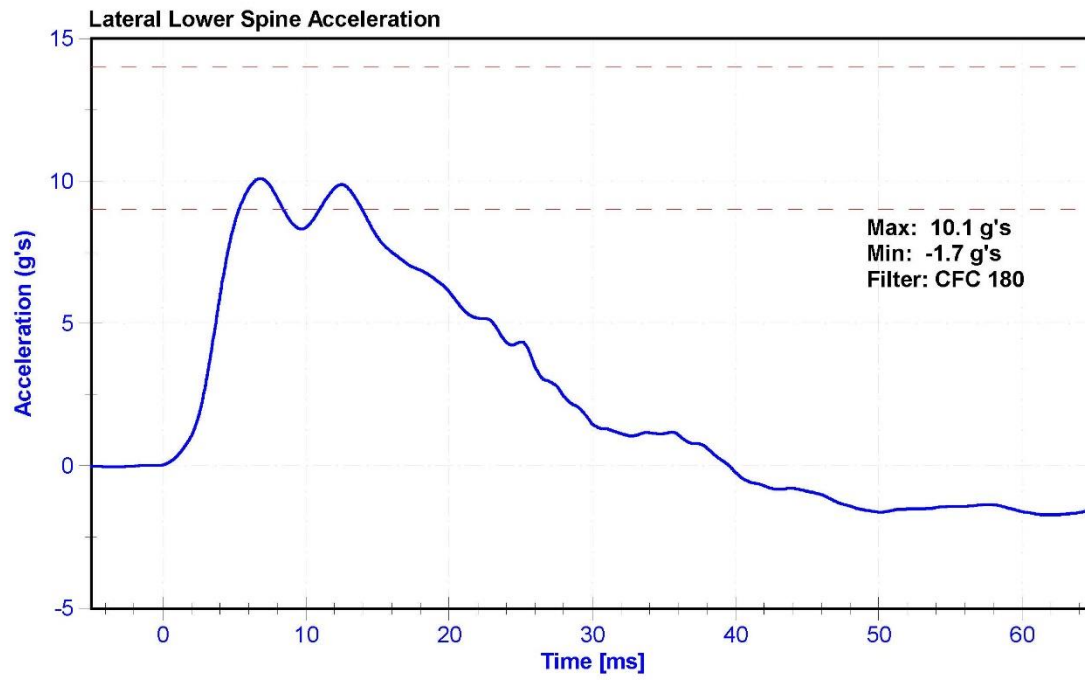
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.2	Pass
Humidity	10	70	%	30.8	Pass
Velocity	4.2	4.4	m/s	4.30	Pass
Probe Acceleration	12	16	g's	13.6	Pass
Lateral Lower Spine Acceleration	9	14	g's	10.1	Pass
Upper Abdomen Rib Deflection	36	47	mm	45.6	Pass
Lower Abdomen Rib Deflection	33	44	mm	42.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	11/25/2016
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P83319	10/4/2016	4/4/2017
Upper Abdomen Rib Potentiometer	Servo 08TC1-3787	DS-015GFE	6/15/2016	6/15/2017
Lower Abdomen Rib Potentiometer	Servo 08TC1-3745	DS-1774GFE	6/15/2016	6/15/2017







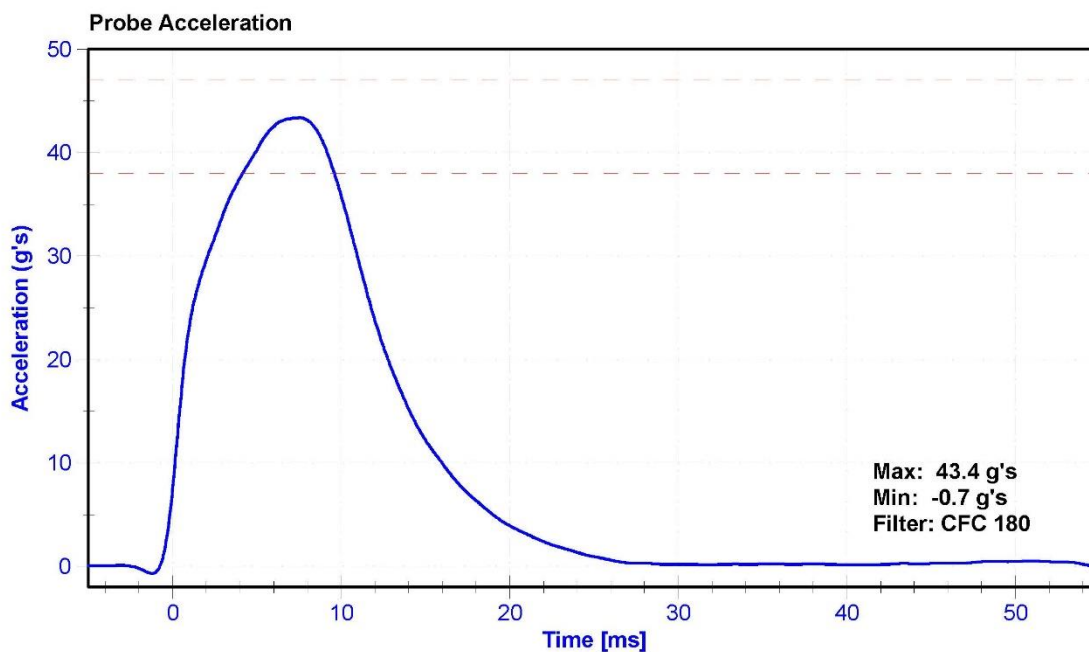
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

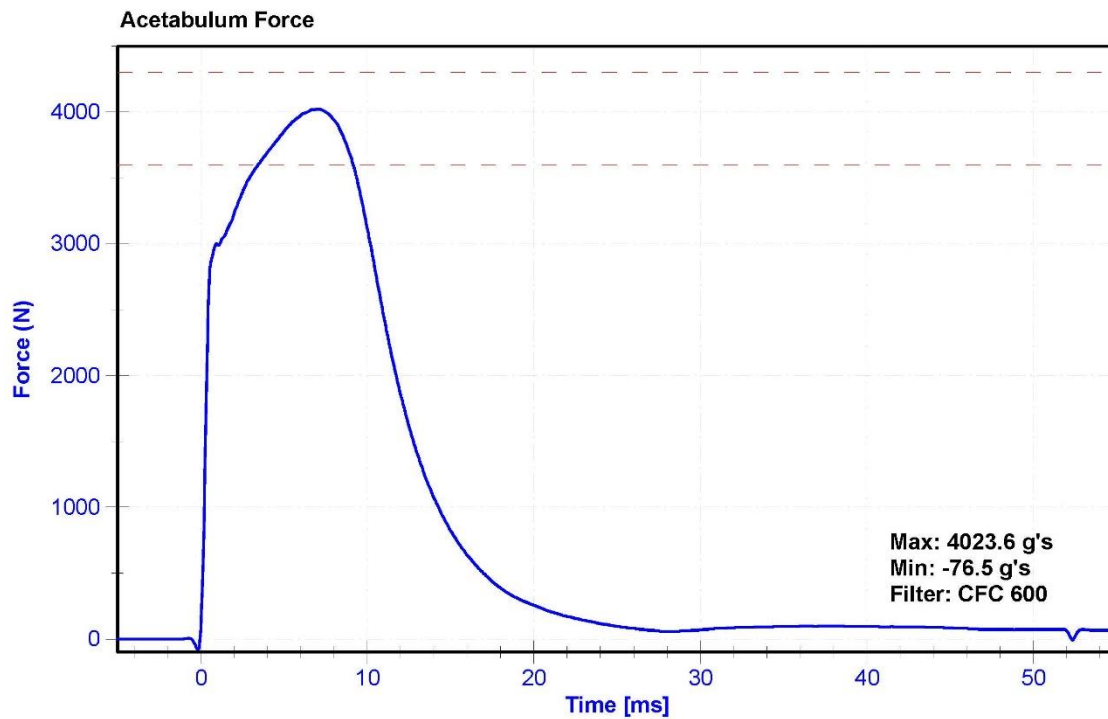
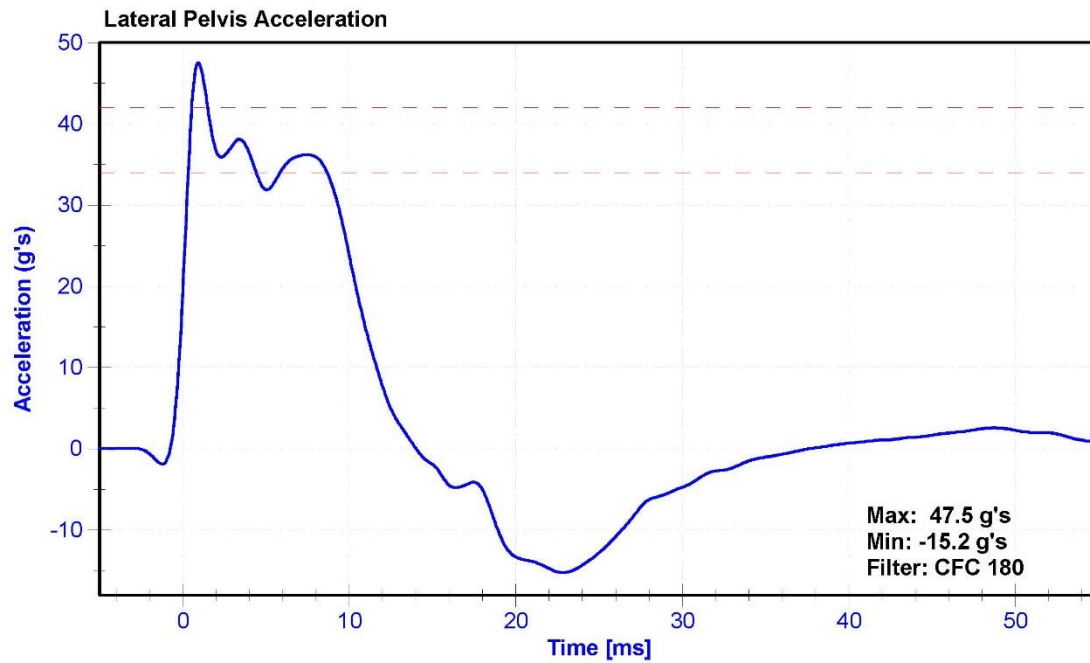
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	30.2	Pass
Velocity	6.6	6.8	m/s	6.66	Pass
Probe Acceleration	38	47	g's	43.4	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	36.2	Pass
Acetabulum Force	3600	4300	N	4023.6	Pass

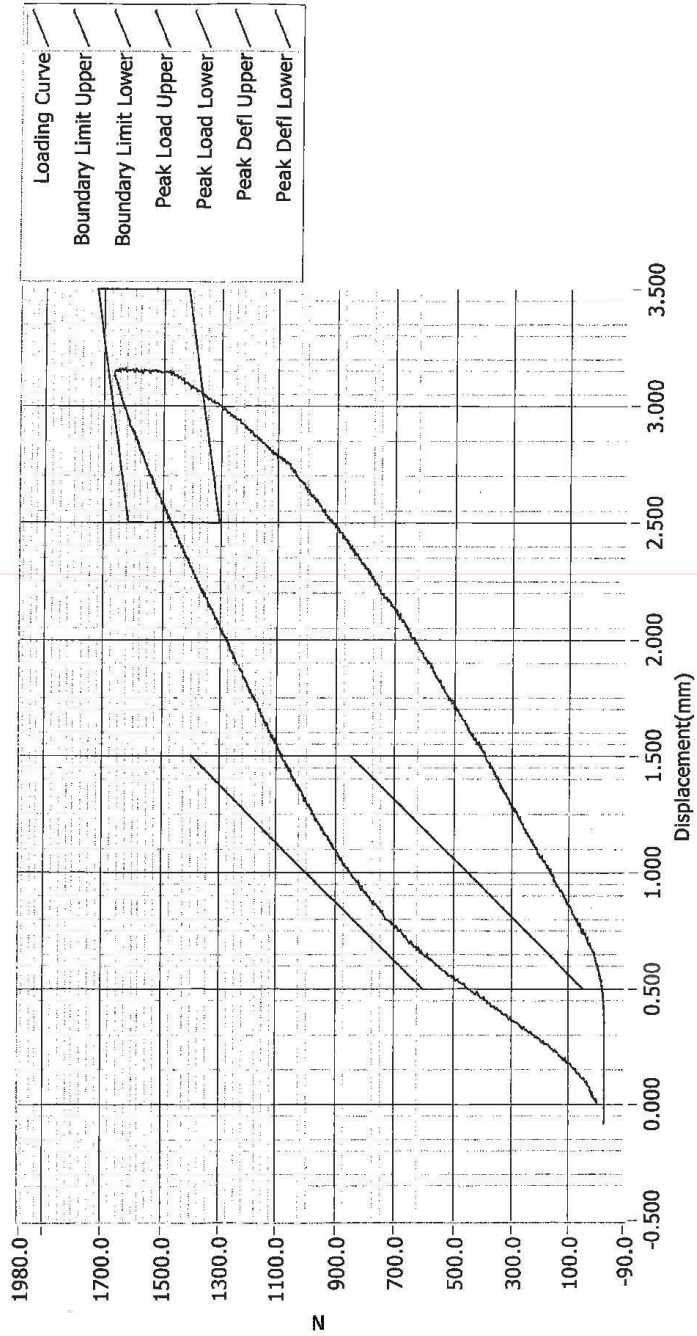
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	11/25/2016
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P63561	10/3/2016	4/3/2017
Acetabulum Load Cell	Denton 3249J	LC-267Fy	5/24/2016	5/24/2017
Certification Plug	Humanetics	81143	12/04/2014	N/A
Crash Test Plug	Humanetics	81134	12/04/2014	N/A





Resultant Data - SIDIIs Plug Compression



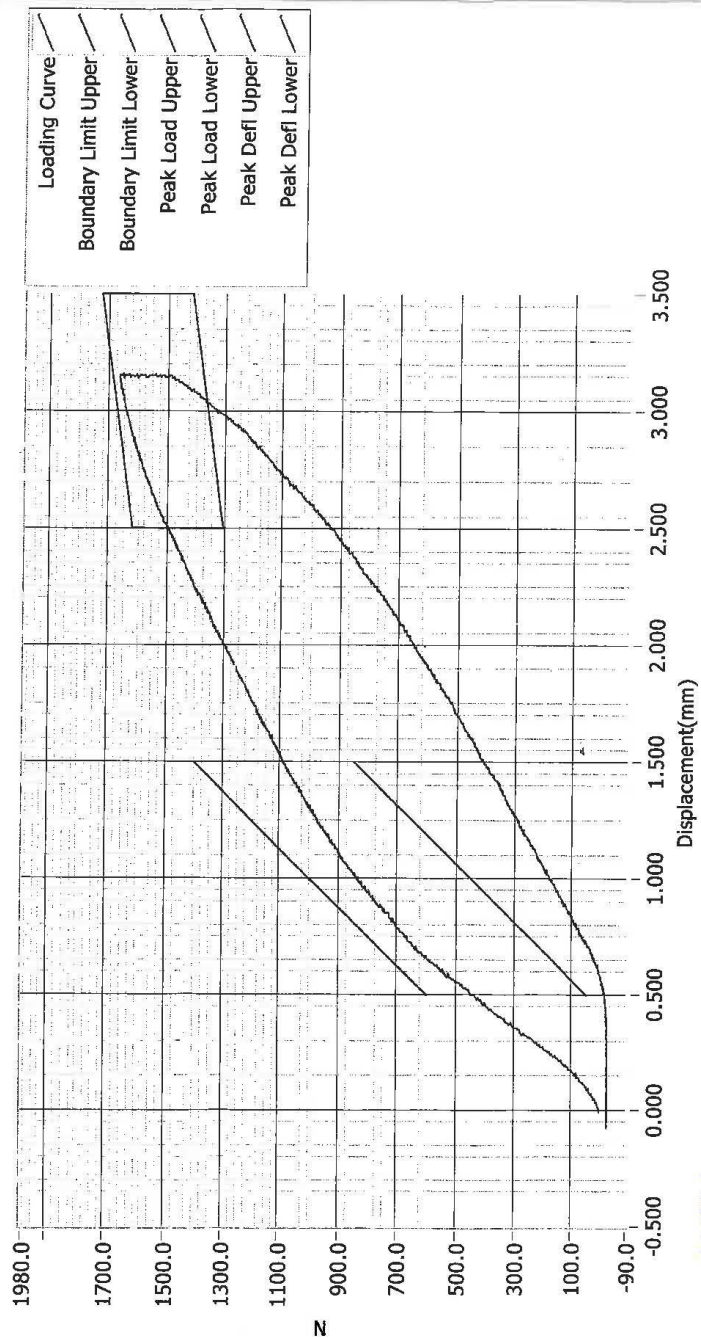
ATD Calibration Lab

Cert. Plug
1114116
MKG

Test ID	Part Serial Number	Test Date	Test Time
	81143	12/4/2014	11:53 PM
Cert ID	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

Current Date : 12/4/2014 Current Time : 23:54:43

Resultant Data - SIDIIs Plug Compression



1644N

ATD Calibration Lab

CRASH PLUG

11/14/16

MKG

Test ID	Part Serial Number	Test Date	Test Time
	81134	12/4/2014	11:30 PM
Cert ID	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

Current Date : 12/4/2014 Current Time : 23:31:34

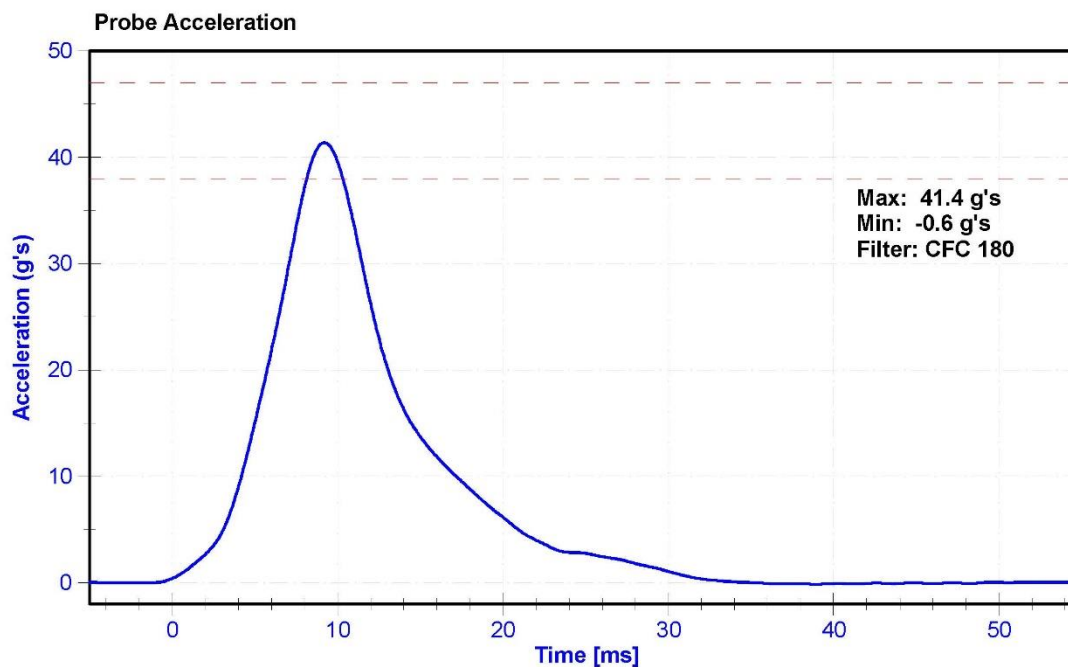
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

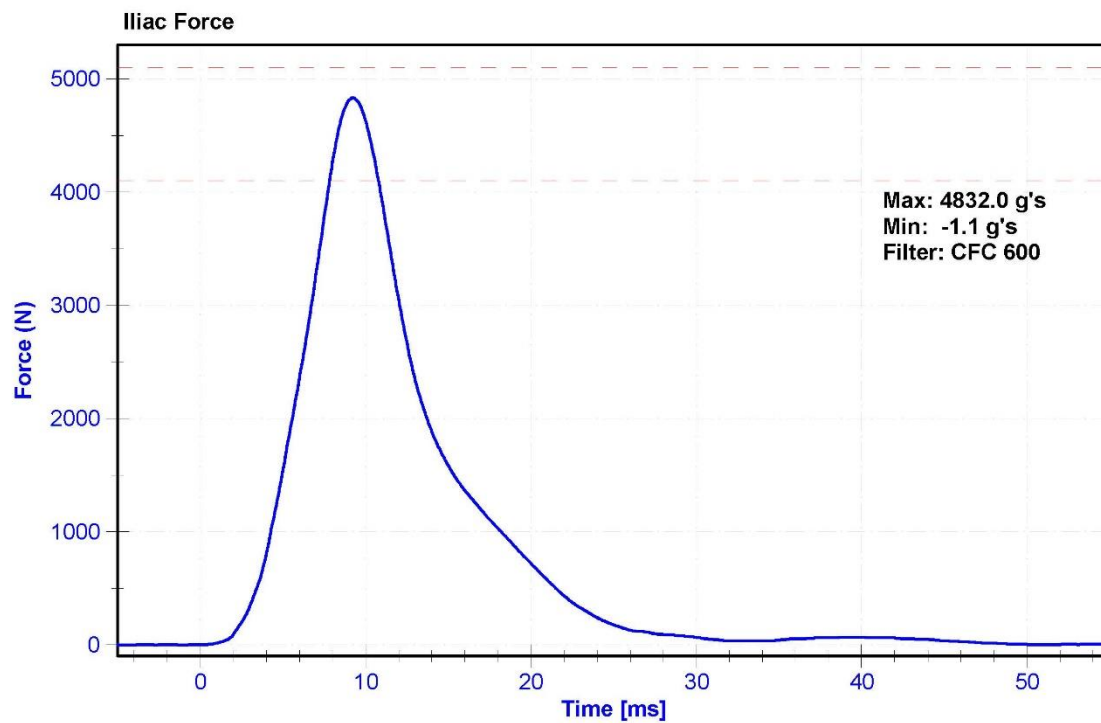
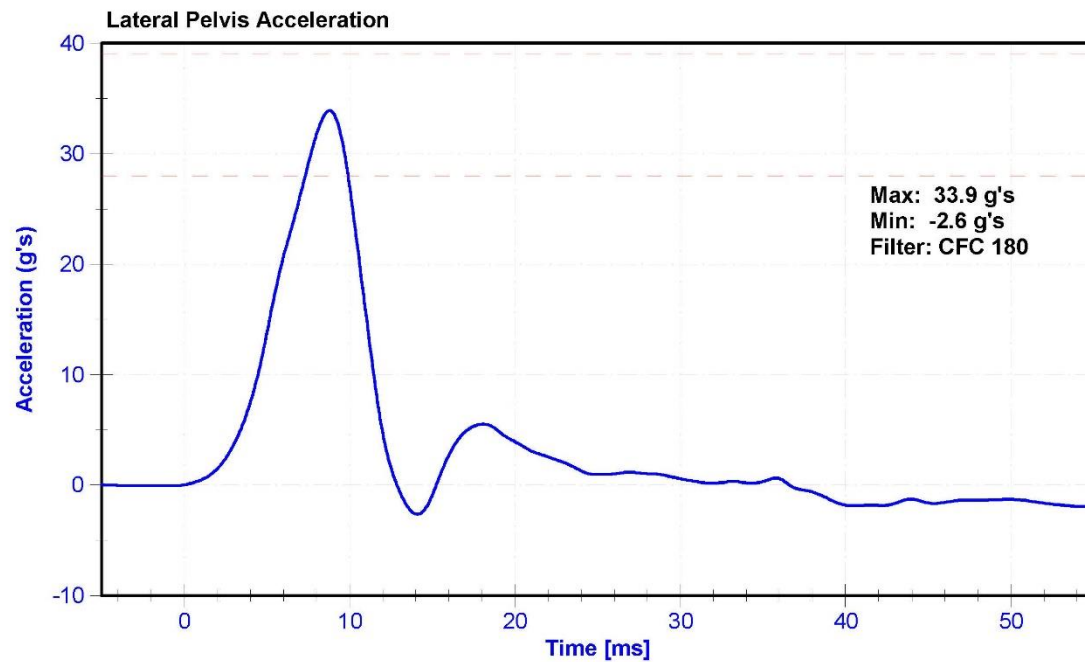
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	29.7	Pass
Velocity	4.2	4.4	m/s	4.31	Pass
Probe Acceleration	36	45	g's	41.4	Pass
Lateral Pelvis Acceleration	28	39	g's	33.9	Pass
Iliac Force	4100	5100	N	4832.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	11/25/2016
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P63561	10/3/2016	4/3/2017
Iliac Load Cell	DENTON 3228J	LC-281Fy	5/24/2016	5/24/2017





CALIBRATION TEST RESULTS

POST-TEST

EUROSID 2 (ES-2RE) MALE – DRIVER ATD

SERIAL NO: F034

(CONFIGURED FOR LEFT SIDE IMPACT)

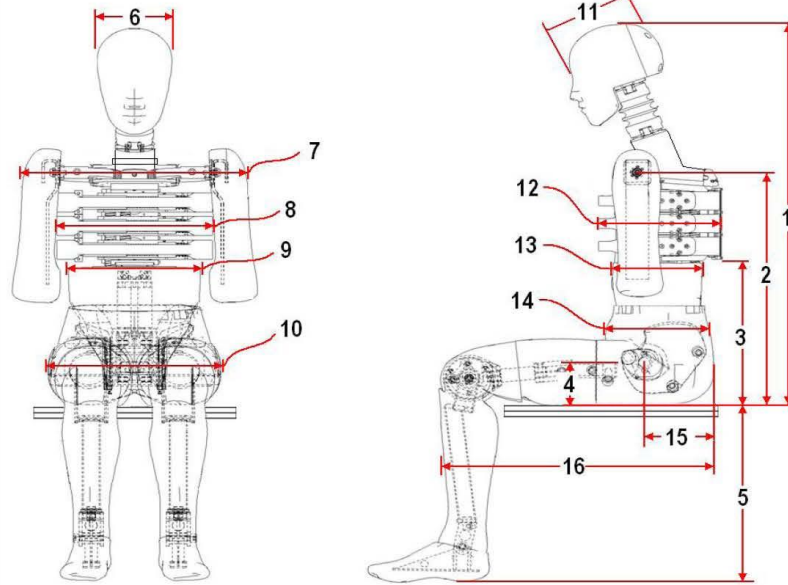


External Measurements - EuroSID-2re

Technician: M.Hartung

Date: 12/1/2016

Dummy Serial Number: F034



FRONT VIEW

SIDE VIEW

Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	910	Pass
2	Seat to Shoulder Joint	558	572	568	Pass
3	Seat to Lower Face of Thoracic Spine Box	346	356	350	Pass
4	Seat to Hip Joint (center of bolt)	97	103	101	Pass
5	Sole to Seat, Sitting	333	451	421	Pass
6	Head Width	152	158	155	Pass
7	Shoulder/Arm Width	461	479	470	Pass
8	Thorax Width	322	332	326	Pass
9	Abdomen Width	273	287	281	Pass
10	Pelvis Lap Width	359	373	368	Pass
11	Head Depth	196	206	202	Pass
12	Thorax Depth	262	272	267	Pass
13	Abdomen Depth	194	204	201	Pass
14	Pelvis Depth	235	245	240	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150	160	154	Pass
16	Back of Buttocks to Front Knee	597	615	606	Pass

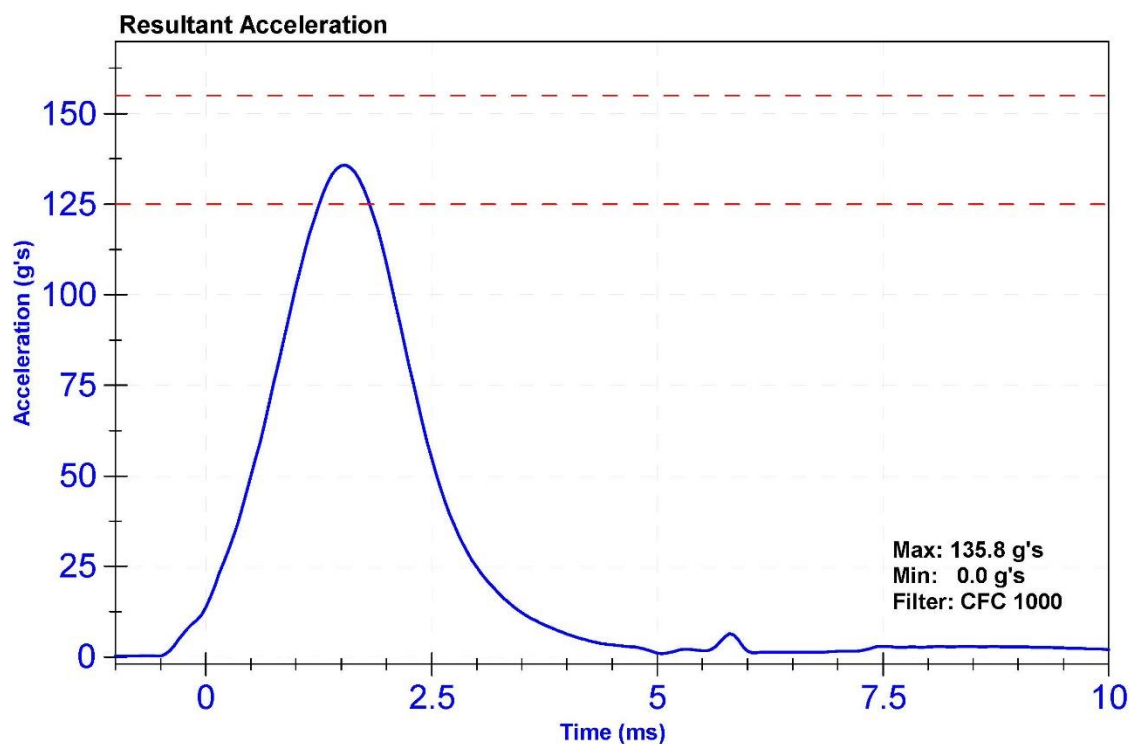
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

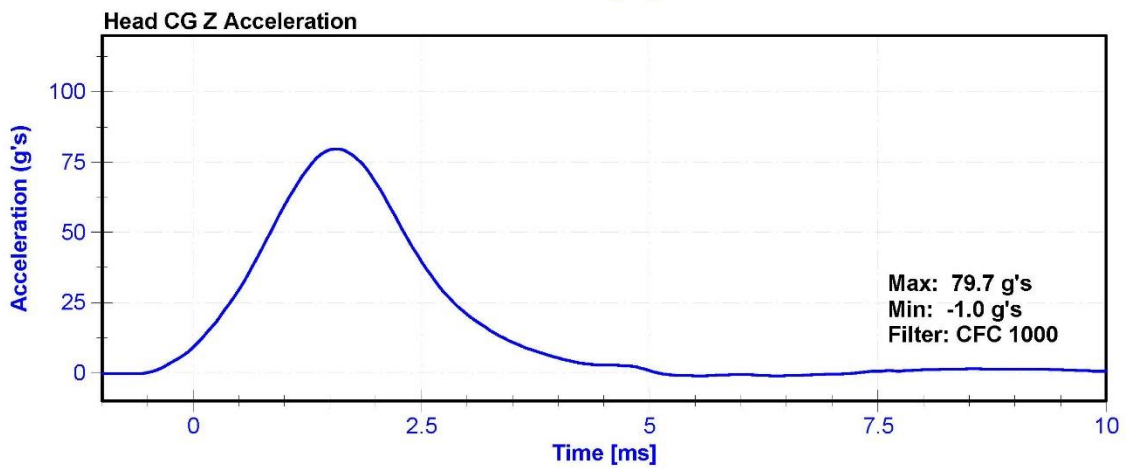
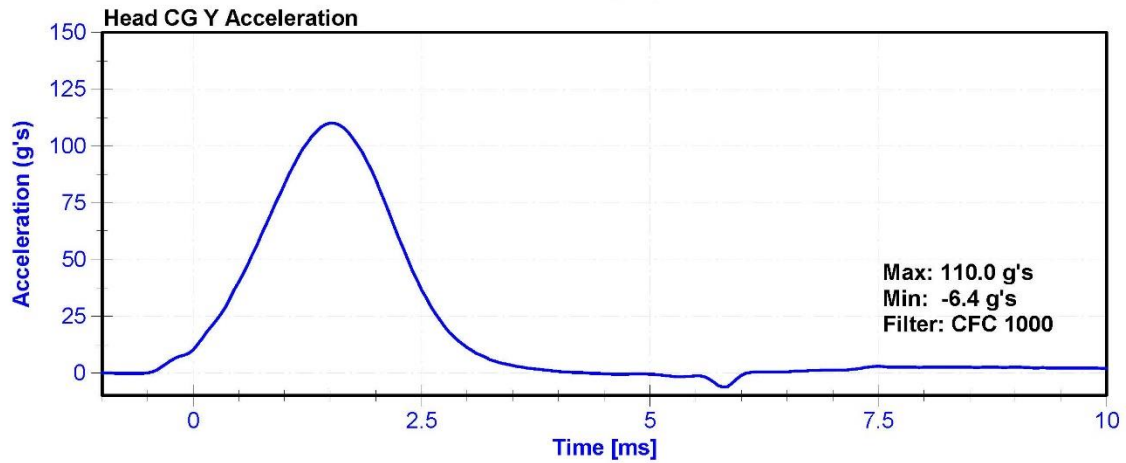
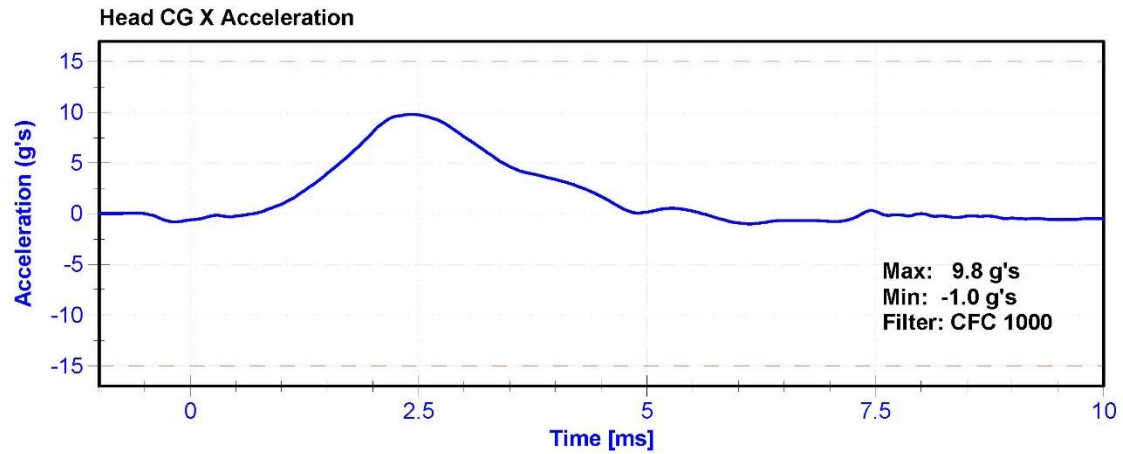
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	39.6	Pass
Resultant Acceleration	125	155	g's	135.8	Pass
Oscillation	0	15	%	4.72	Pass
Fore-Aft Acceleration	-15	15	g's	9.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P58904	6/20/2016	12/19/2016
Y Accelerometer	ENDEVCO 7264CT	AC-P58911	6/20/2016	12/19/2016
Z Accelerometer	ENDEVCO 7264CT	AC-P58776	6/20/2016	12/19/2016





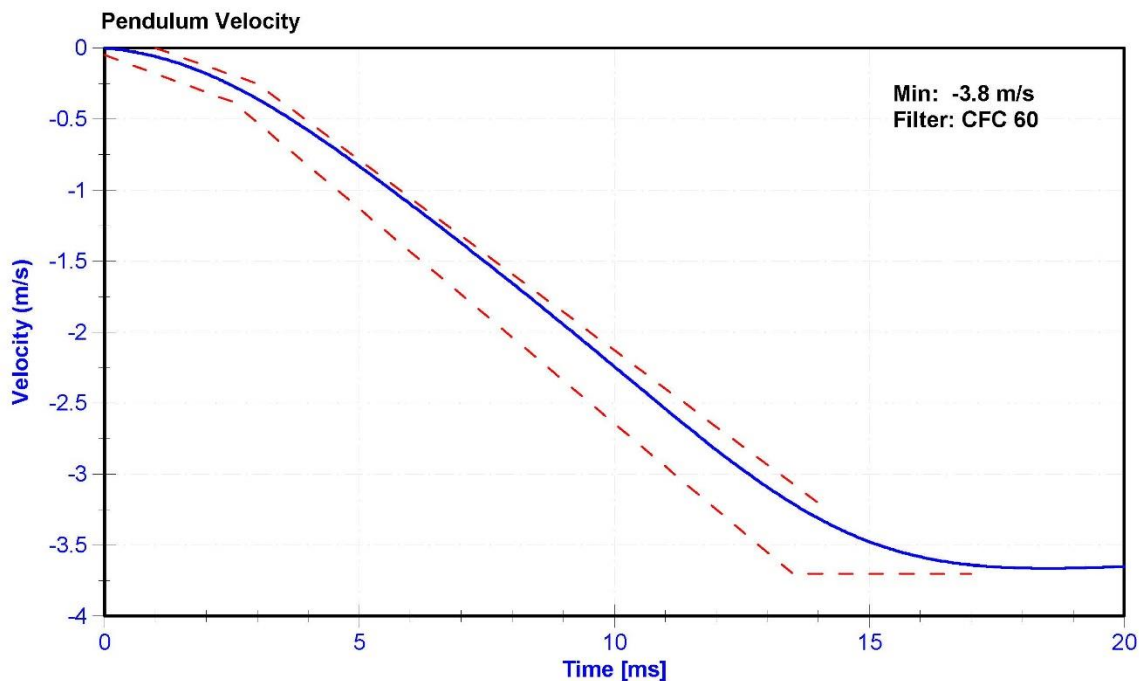
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

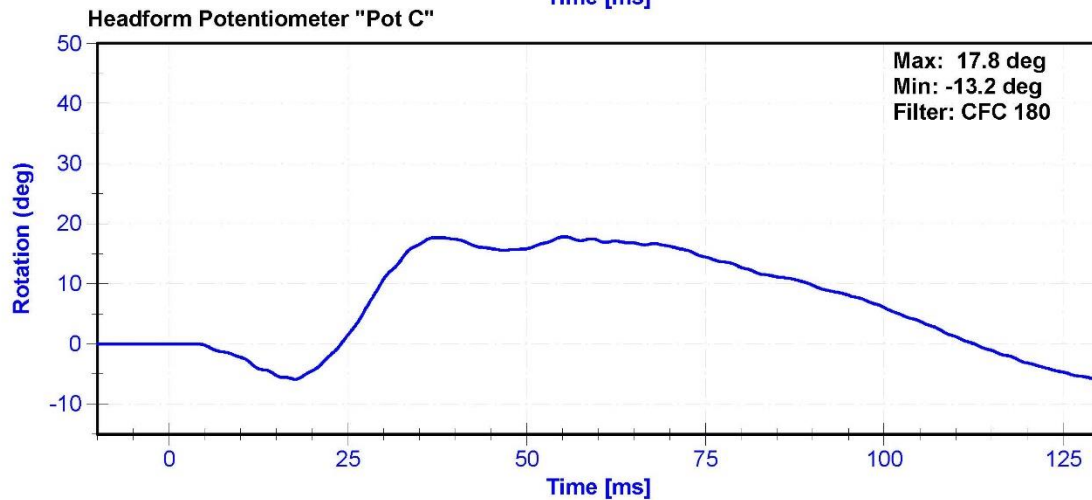
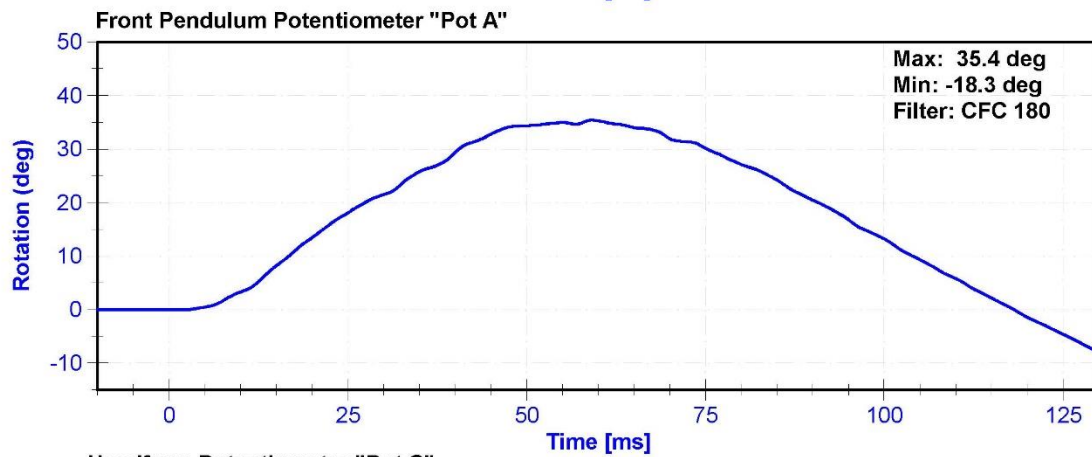
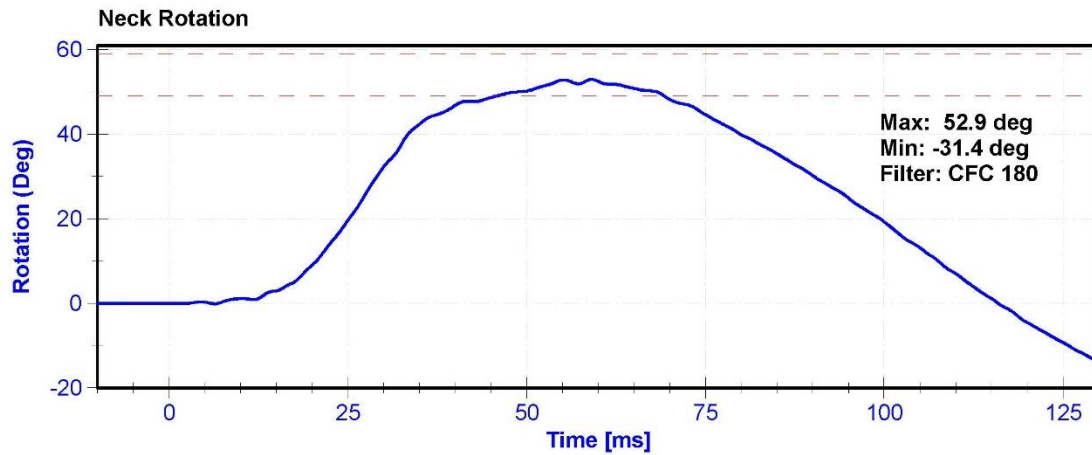
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	40.5	Pass
Velocity	3.3	3.5	m/s	3.43	Pass
Lateral Neck Rotation	49	59	deg	52.9	Pass
Time at Maximum Rotation	54	66	ms	59.1	Pass
Time of Rotation Decay from Maximum	53	88	ms	56.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/10/2016	5/10/2017
Front Pendulum Potentiometer	SP22G	DS-094	10/11/2016	10/11/2017
Headform Potentiometer	SP22G	DS-095	10/11/2016	10/11/2017





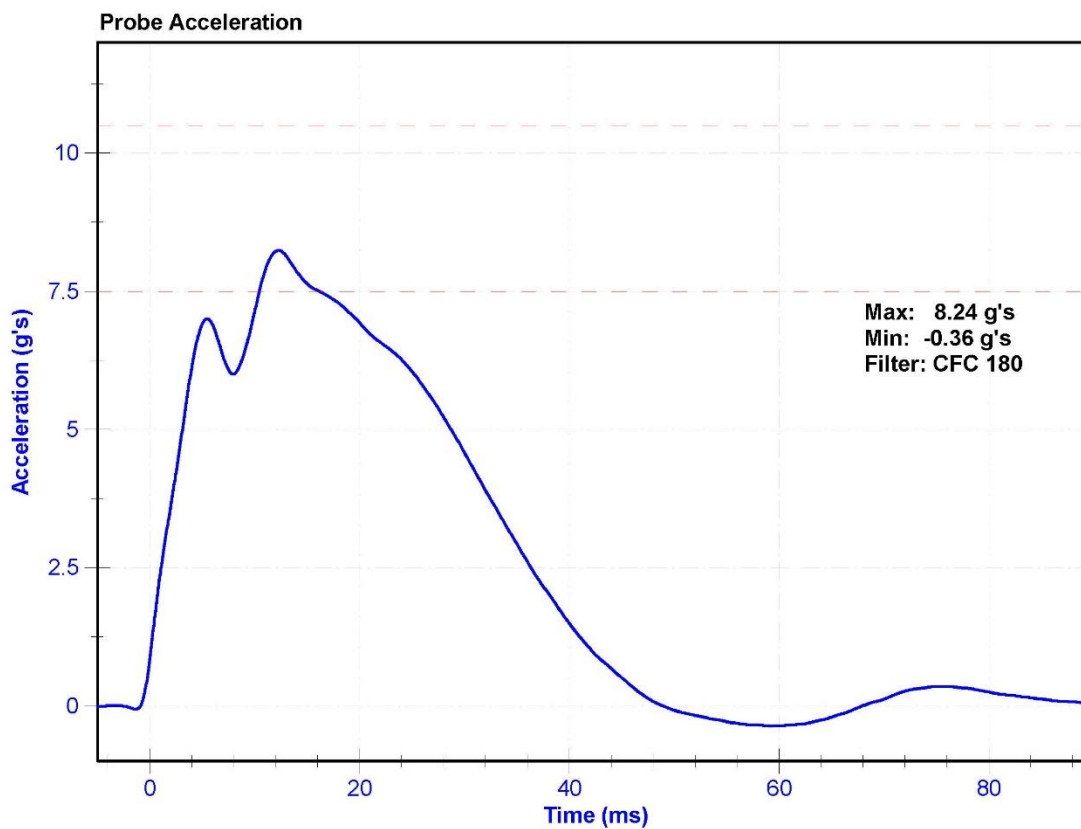
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	39.4	Pass
Velocity	4.2	4.4	m/s	4.22	Pass
Probe Acceleration	7.5	10.5	g's	8.24	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017



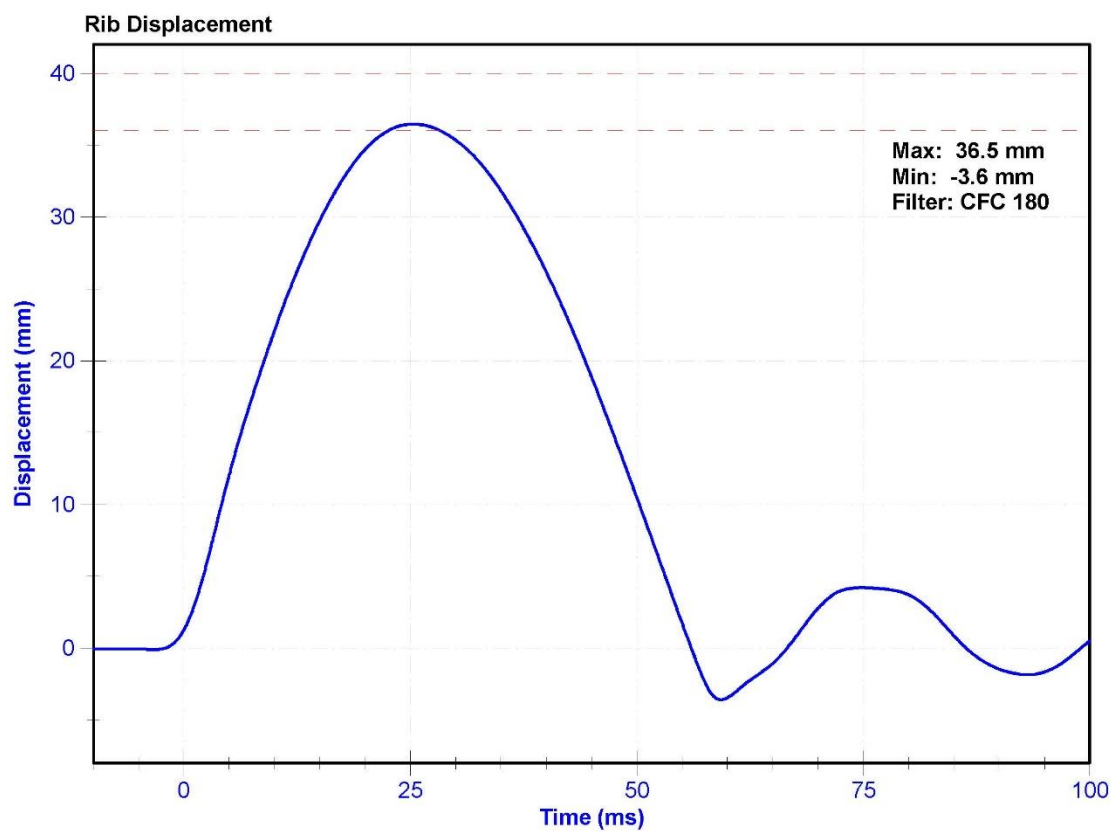
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	40.2	Pass
Rib Displacement	36	40	mm	36.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	6/20/2016	6/20/2017



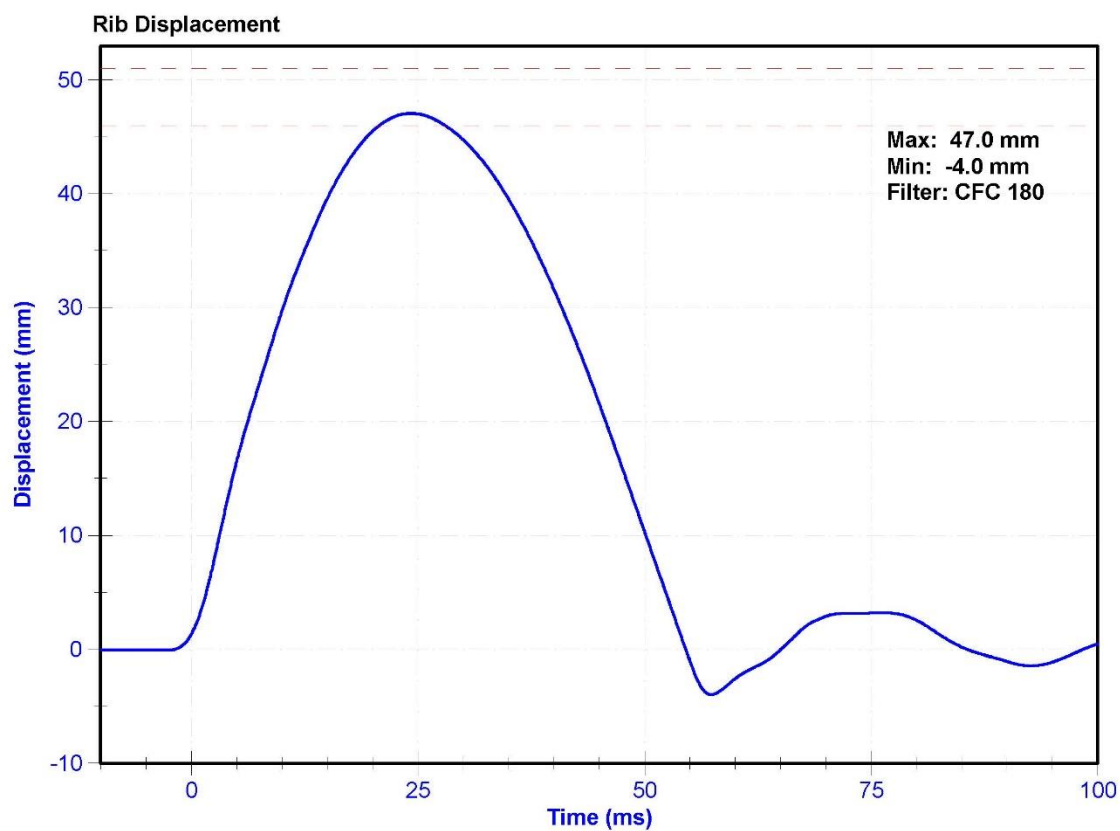
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	40.2	Pass
Rib Displacement	46	51	mm	47.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	6/20/2016	6/20/2017



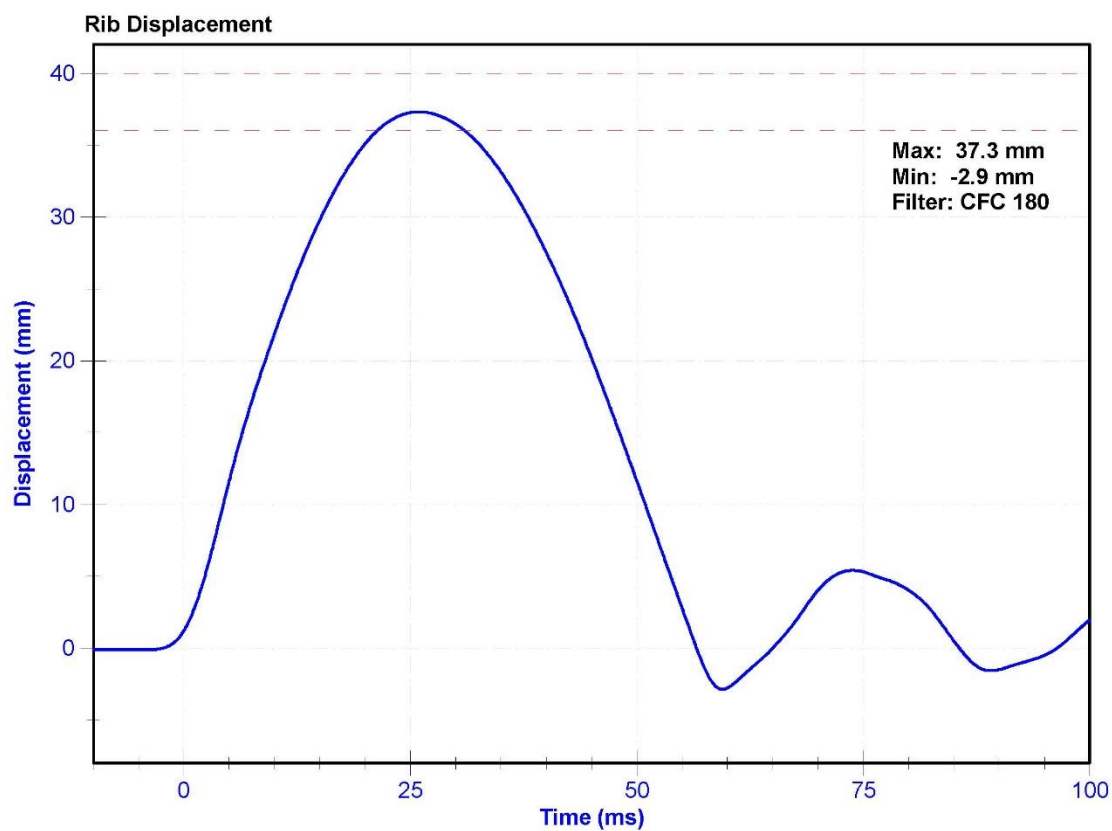
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	40.2	Pass
Rib Displacement	36	40	mm	37.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	6/20/2016	6/20/2017



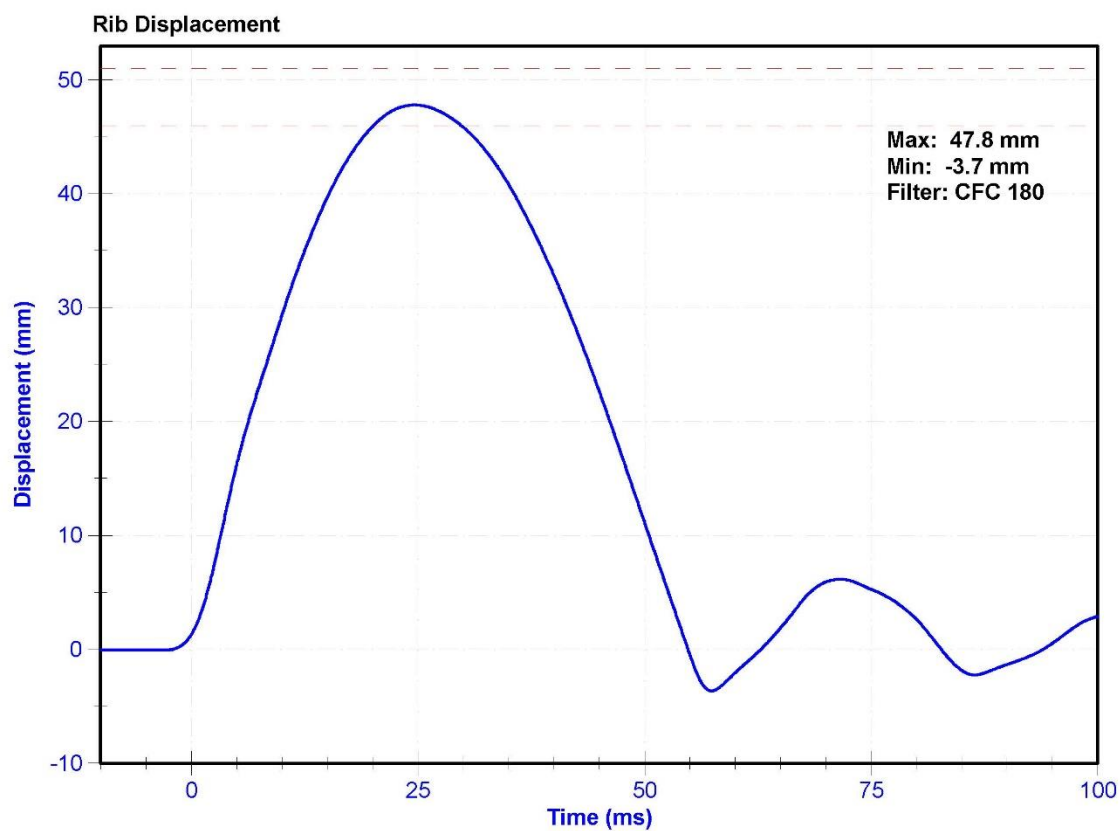
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	40.2	Pass
Rib Displacement	46	51	mm	47.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	6/20/2016	6/20/2017



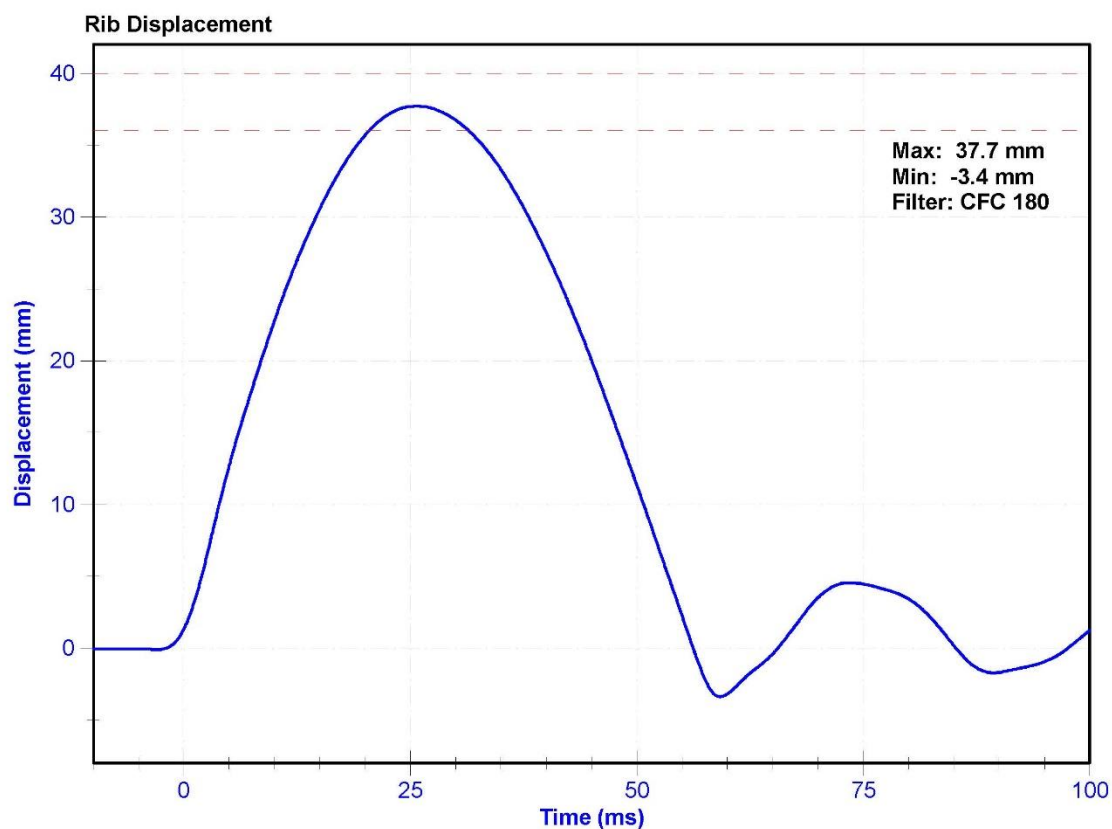
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	40.2	Pass
Rib Displacement	36	40	mm	37.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	6/20/2016	6/20/2017



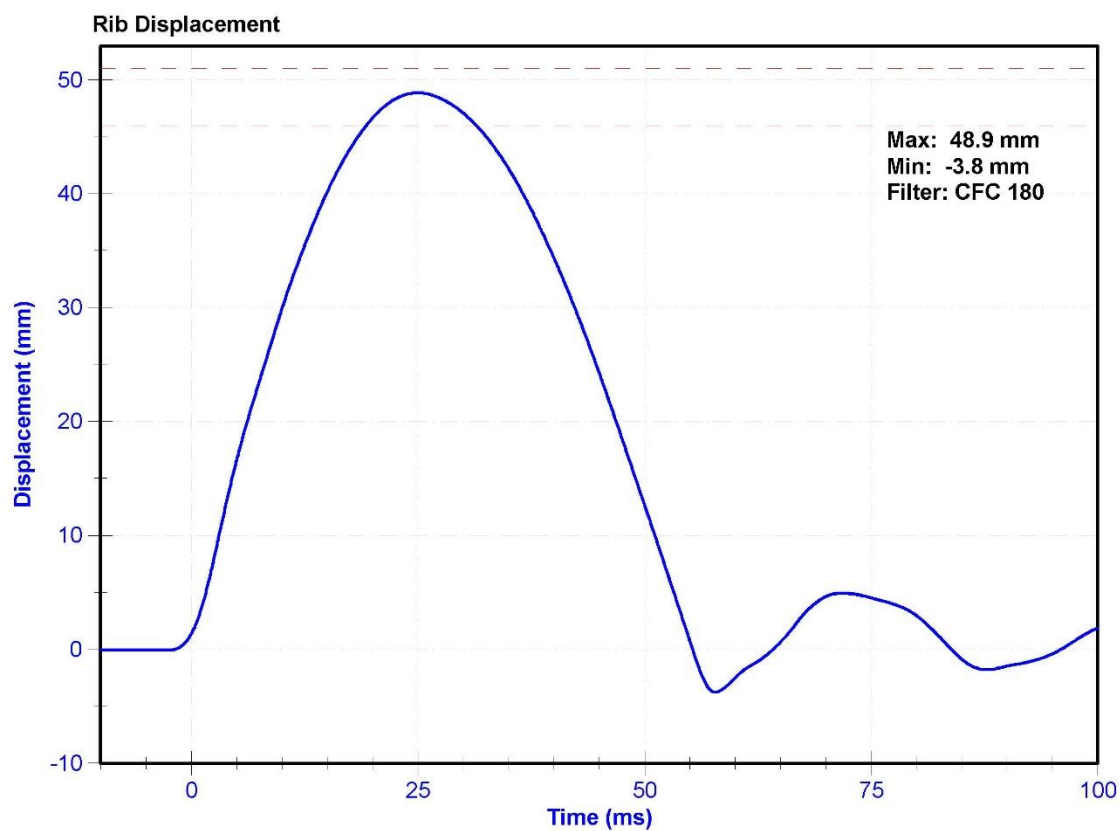
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	40.2	Pass
Rib Displacement	46	51	mm	48.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	6/20/2016	6/20/2017



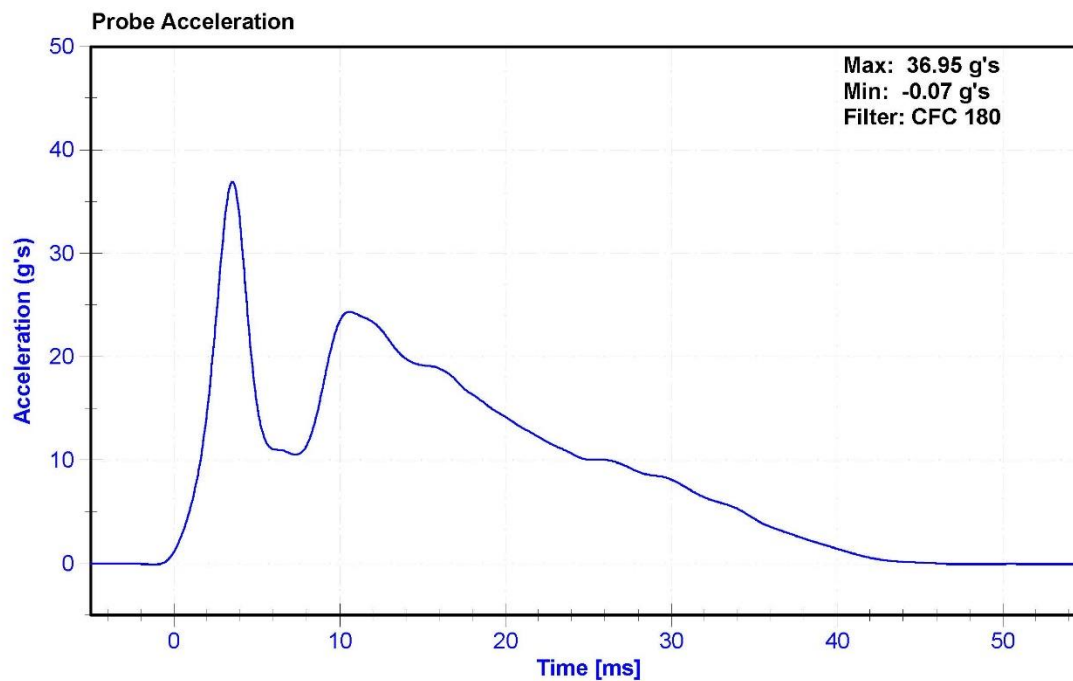
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

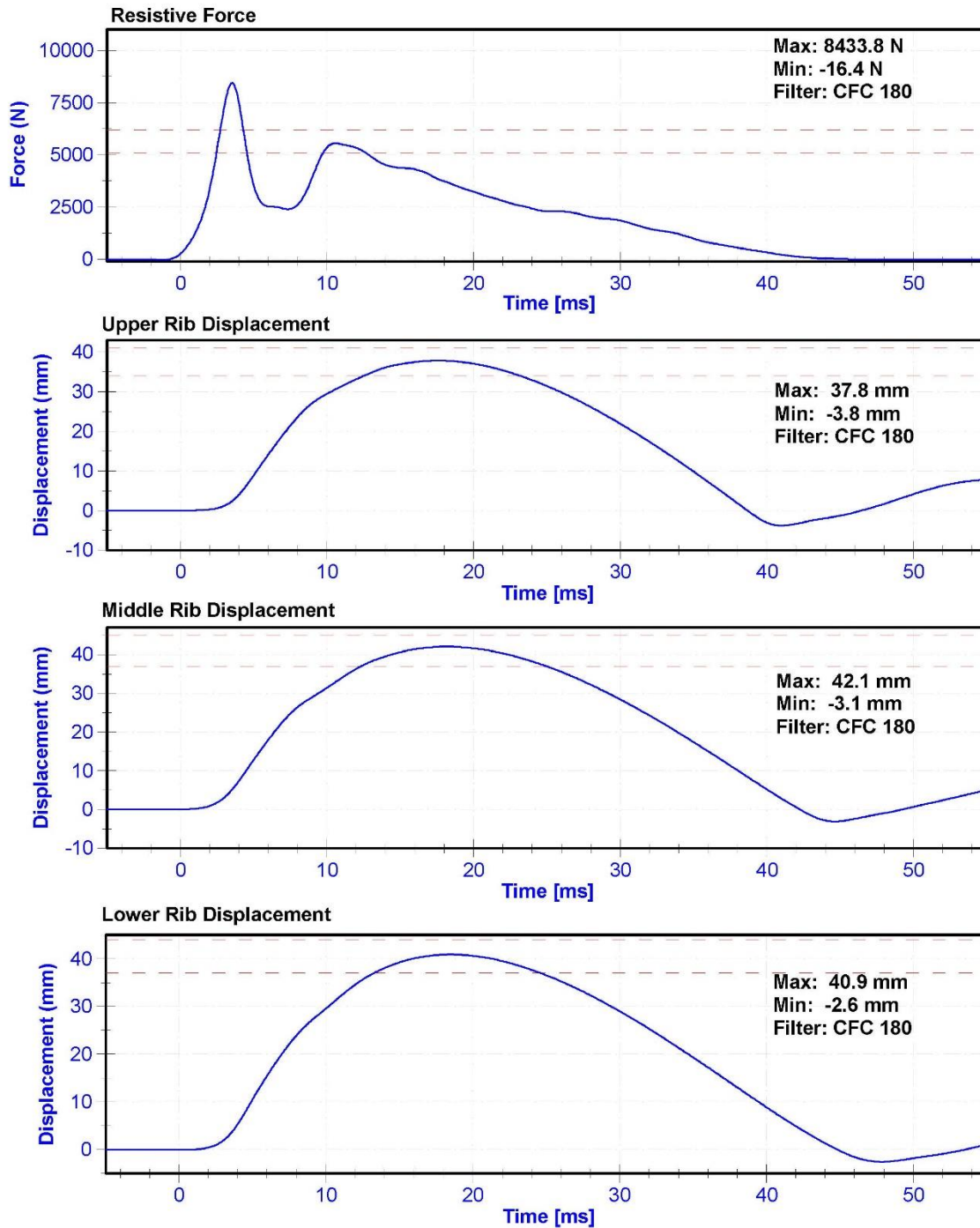
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.1	Pass
Humidity	10	70	%	39.2	Pass
Velocity	5.4	5.6	m/s	5.51	Pass
Resistive Force after 6ms	5100	6200	N	5552.2	Pass
Upper Thorax Rib Deflection	34	41	mm	37.8	Pass
Mid Thorax Rib Deflection	37	45	mm	42.1	Pass
Lower Thorax Rib Deflection	37	44	mm	40.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Upper Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	6/20/2016	6/20/2017
Middle Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	6/20/2016	6/20/2017
Lower Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	6/20/2016	6/20/2017





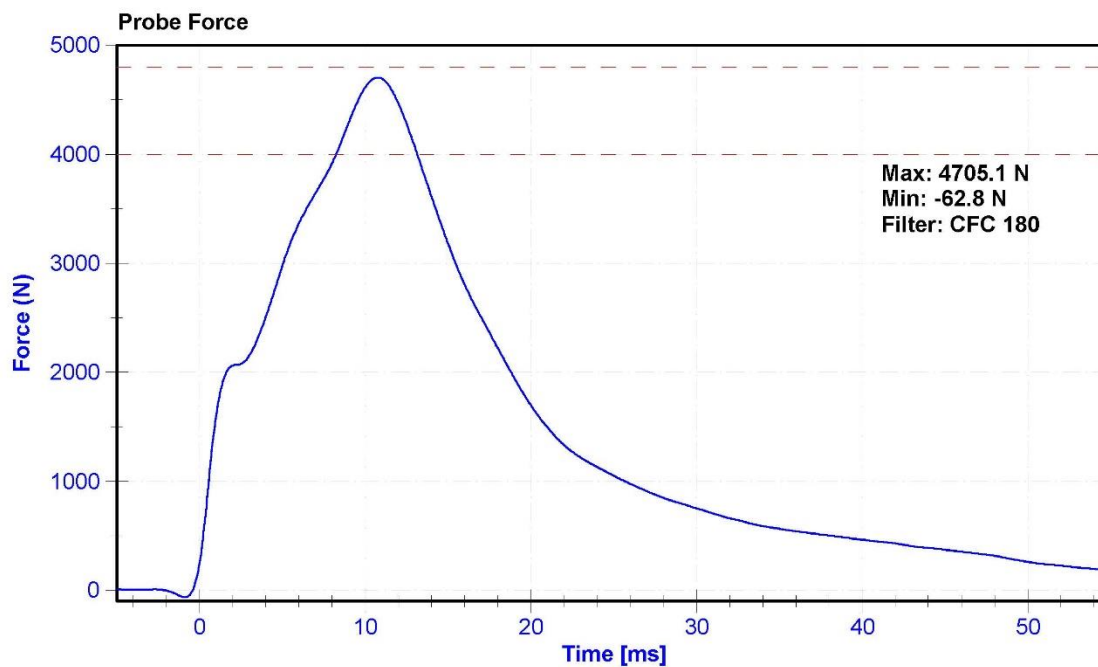
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

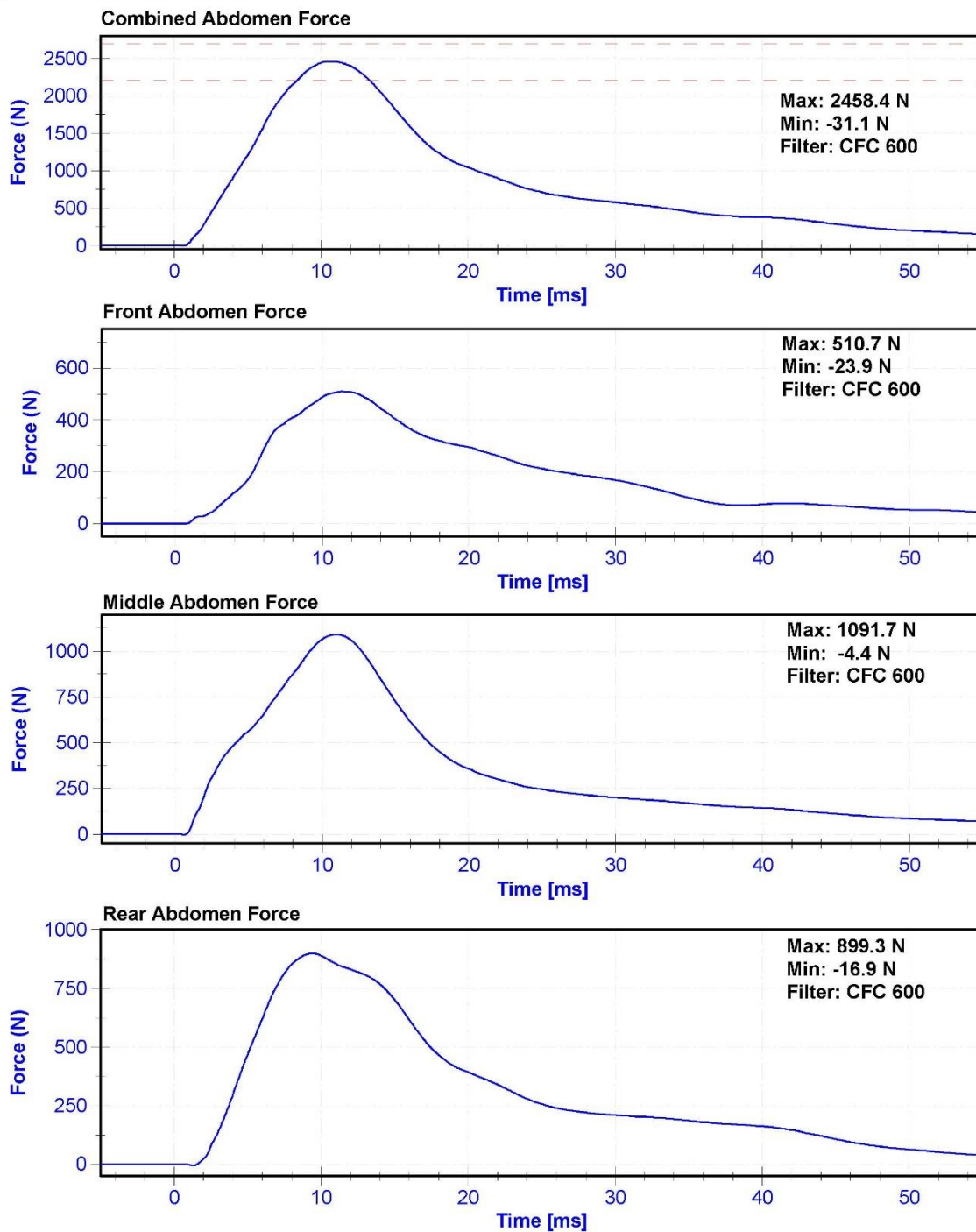
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	37.9	Pass
Velocity	3.9	4.1	m/s	4.02	Pass
Combined Abdomen Force	2200	2700	N	2458.4	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	10.60	Pass
Resistive Probe Force	4000	4800	N	4705.1	Pass
Time at Peak Resistive Force	10.6	13.0	ms	10.75	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Front Abdomen Load Cell	DENTON 2631	LC-1512	5/24/2016	5/24/2017
Middle Abdomen Load Cell	DENTON 2631	LC-1526	5/24/2016	5/24/2017
Rear Abdomen Load Cell	DENTON 2631	LC-1516	5/24/2016	5/24/2017





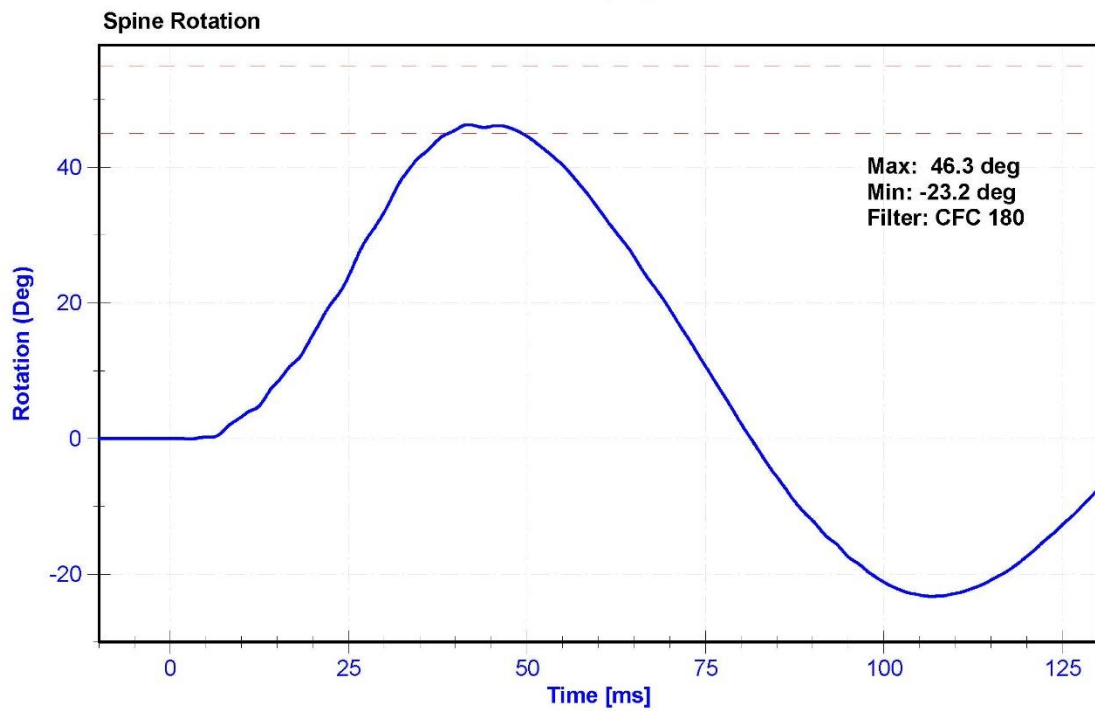
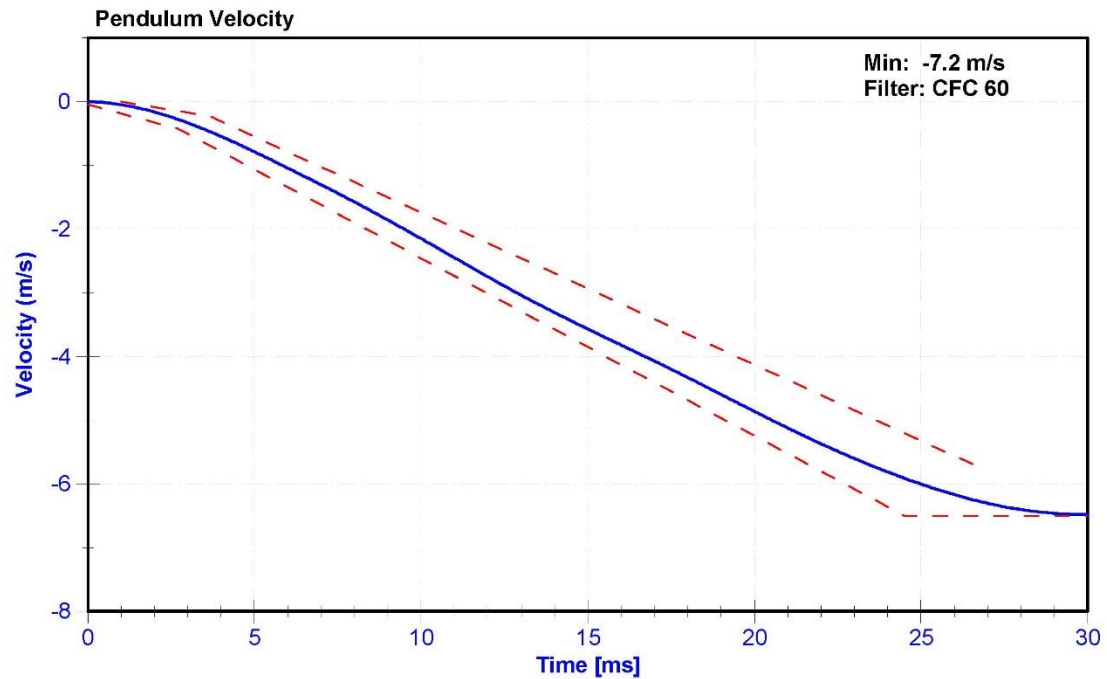
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

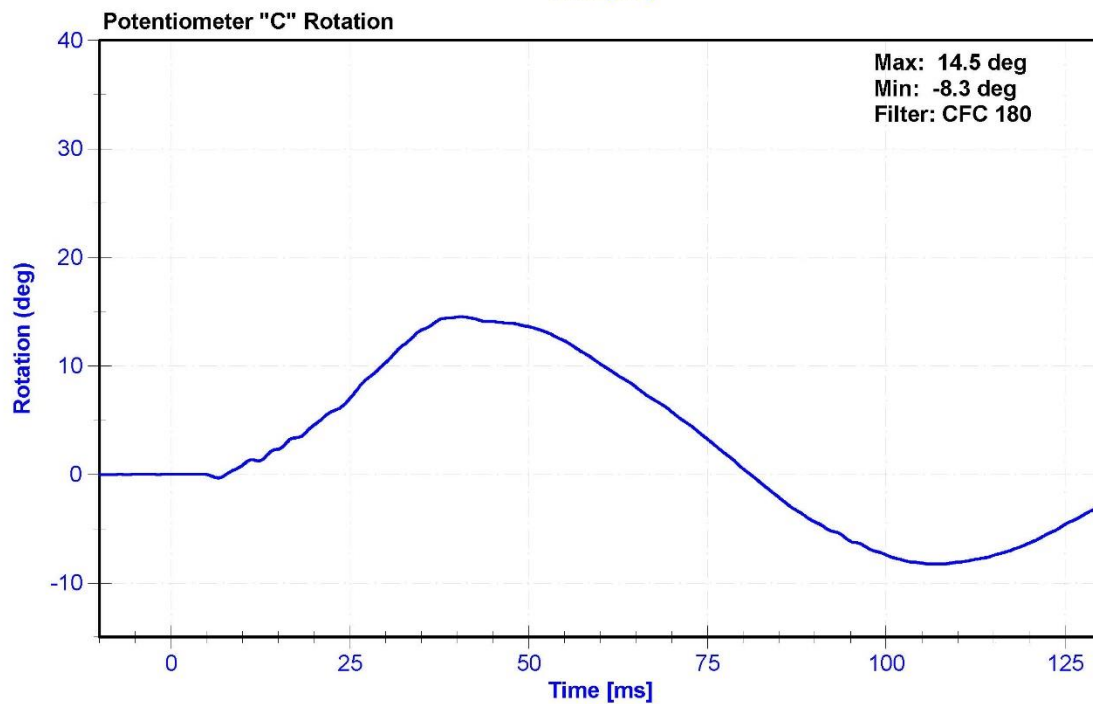
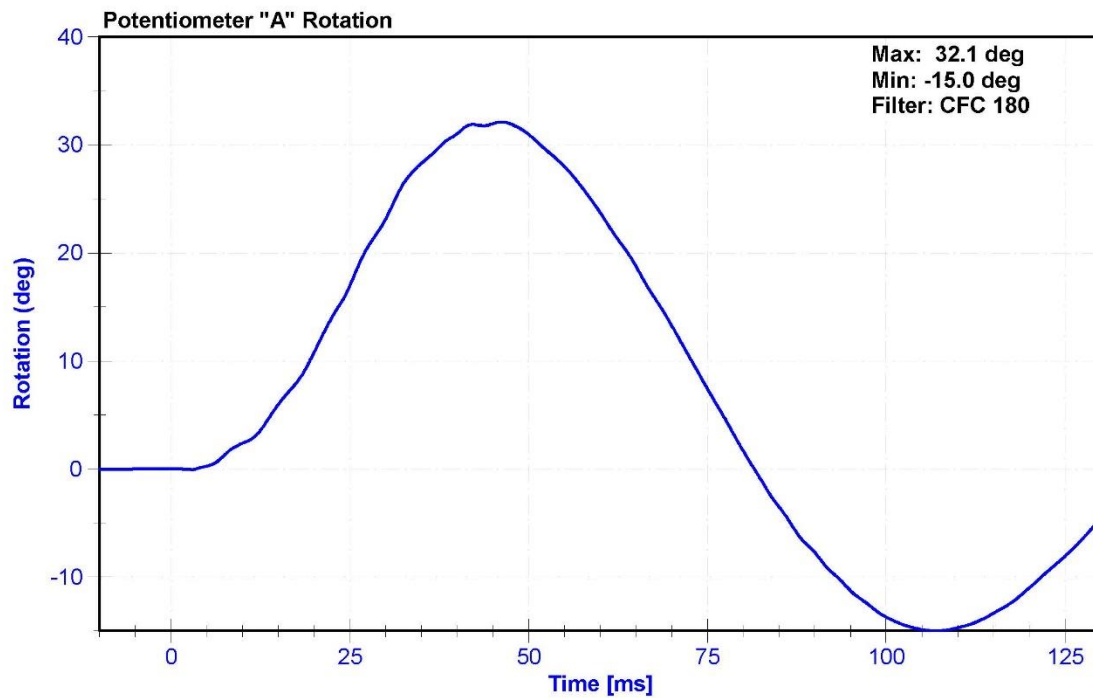
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	42.0	Pass
Velocity	5.95	6.15	m/s	6.113	Pass
Lateral Spine Rotation	45	55	deg	46.3	Pass
Time at Maximum Rotation	39	53	ms	41.8	Pass
Time of Decay to Zero Degrees	37	57	ms	39.6	Pass
Pulse within Corridor?	-	-	-		

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/10/2016	5/10/2017
Pendulum "A" Potentiometer	SP22G	DS-094	10/11/2016	10/11/2017
Condyle "B" Potentiometer	SP22G	DS-095	10/11/2016	10/11/2017





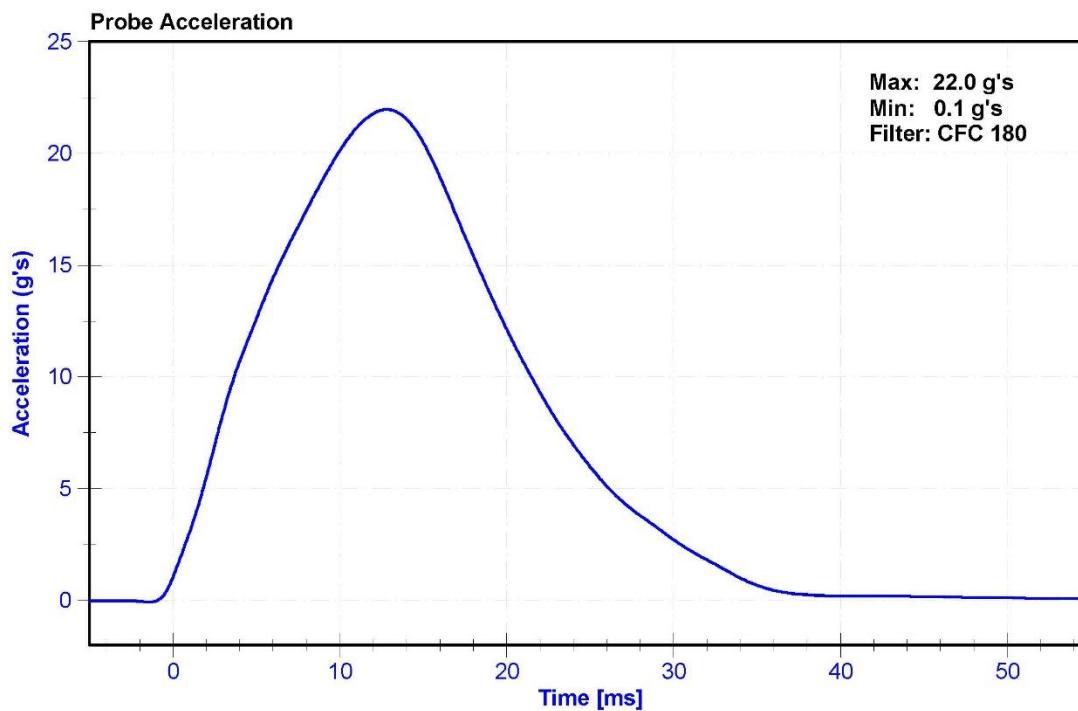
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	F034	Laboratory Supervisor	M.Goehle

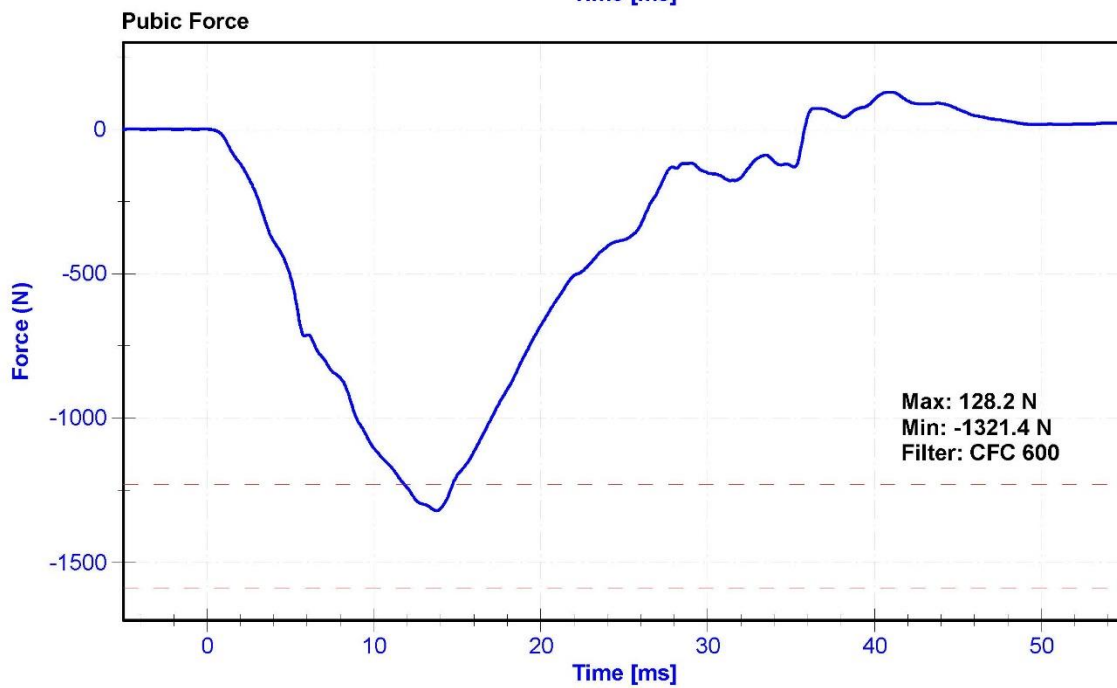
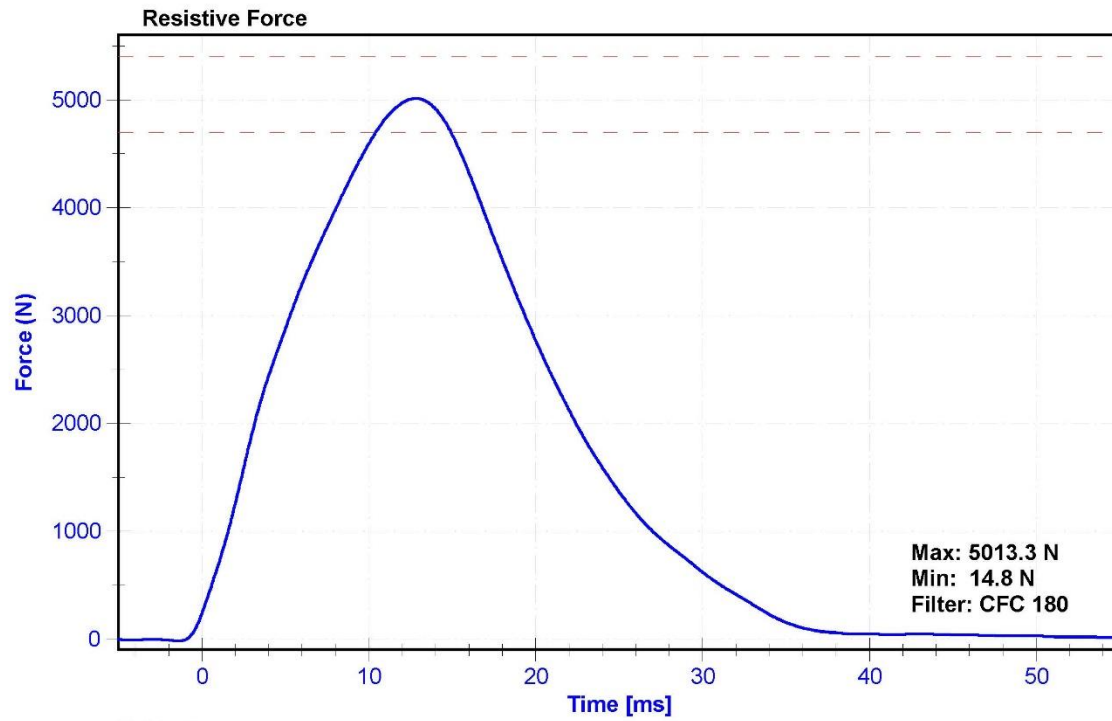
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	38.6	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Resistive Force	4700	5400	N	5013.3	Pass
Time at Peak Resistive Force	11.8	16.1	ms	12.80	Pass
Pubic Force	-1590	-1230	N	-1321.4	Pass
Time at Peak Pubic Force	12.2	17.0	ms	13.75	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Pubic Load Cell	Denton 3096JFL	LC-465Fy	5/24/2016	5/24/2017





CALIBRATION TEST RESULTS

POST-TEST

SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD

SERIAL No: DG8012

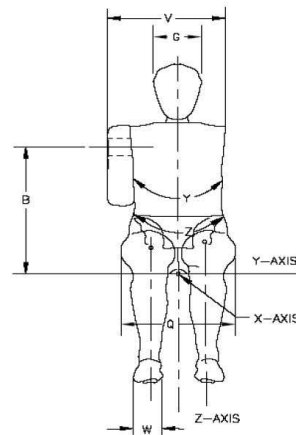
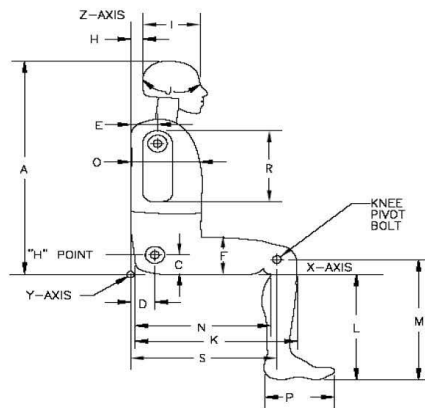


External Measurements - SID-IIs

Technician: M.Hartung

Date: 12/1/2016

Dummy Serial Number: DG8012



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	780	Pass
B	Shoulder Pivot Height	437	453	444	Pass
C	H-point Height	79	89	85	Pass
D	H-point from seatback	141	151	147	Pass
E	Shoulder Pivot from Backline	97	107	102	Pass
F	Thigh Clearance	119	135	129	Pass
G	Head Breadth	140	148	145	Pass
H	Head Back from Backline	40	46	44	Pass
I	Head Depth	178	188	182	Pass
J	Head Circumference	541	551	547	Pass
K	Buttock to Knee Length	514	540	531	Pass
L	Popliteal Height	343	369	352	Pass
M	Knee Pivot to floor height	392	409	401	Pass
N	Buttock Popliteal Length	416	442	431	Pass
O	Chest Depth w/o jacket	195	211	201	Pass
P	Foot Length	216	232	221	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	321	Pass
R	Arm Length	249	259	253	Pass
S	Knee Joint to seatback	477	493	484	Pass
V	Shoulder Width	341	357	347	Pass
W	Foot Width	78	94	87	Pass
Y	Chest Circumference w/jacket	851	881	862	Pass
Z	Waist Circumference	761	791	780	Pass

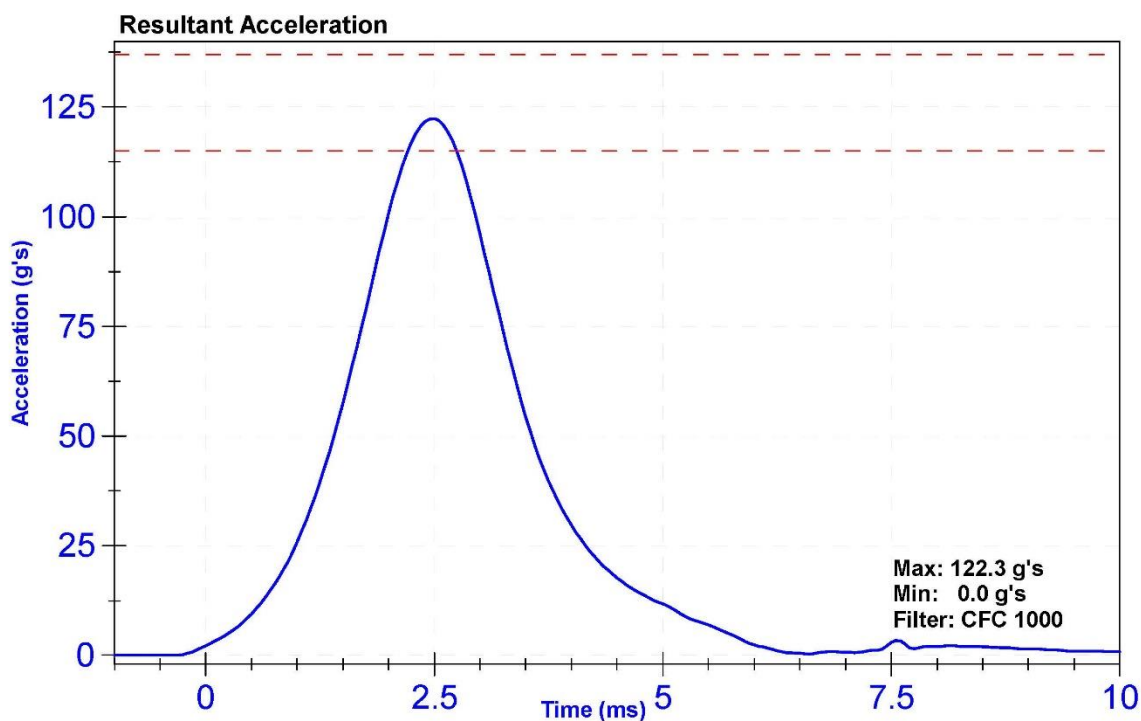
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	DG8012	Laboratory Supervisor	M.Goehle

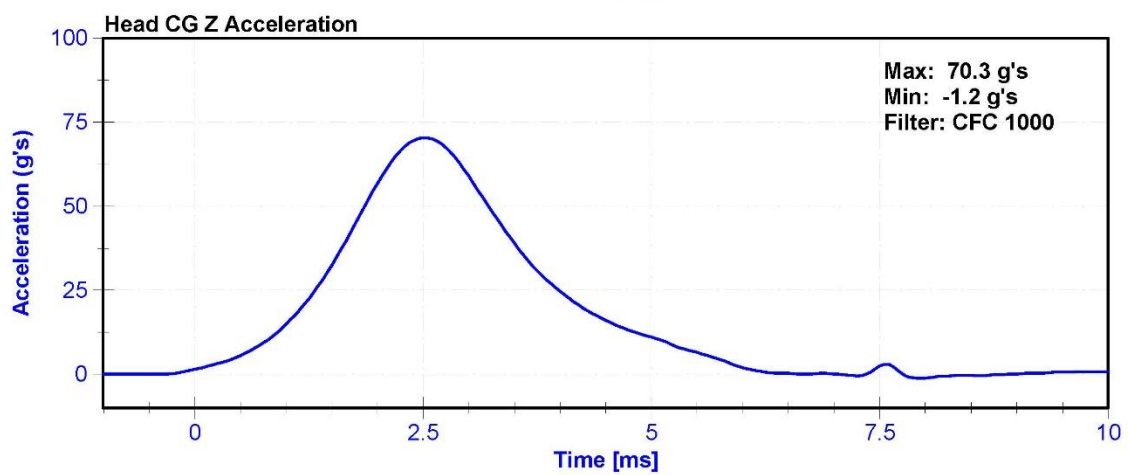
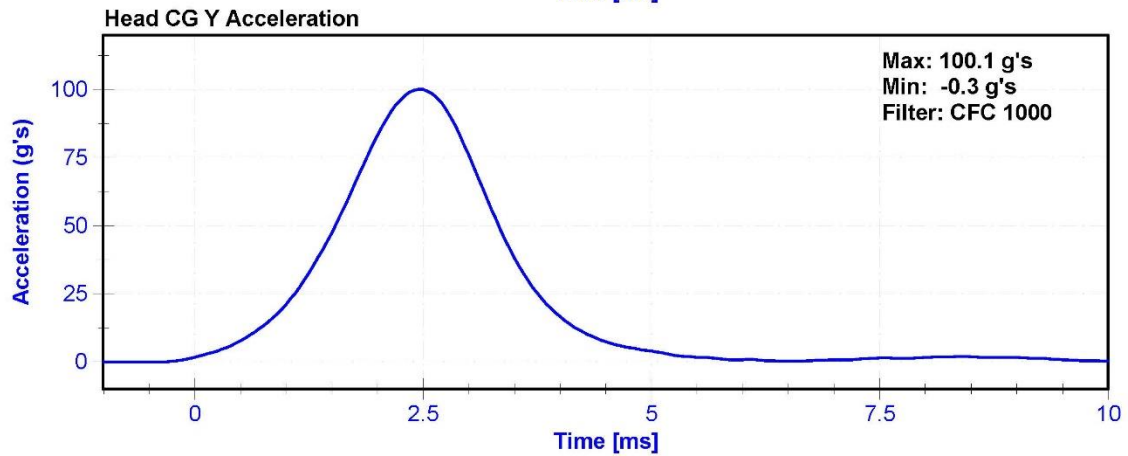
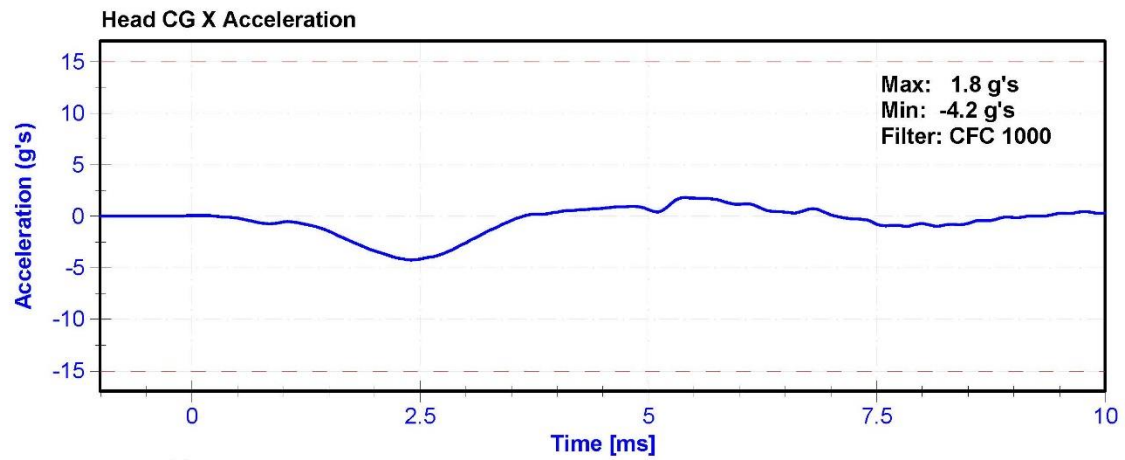
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	37.3	Pass
Resultant Acceleration	115	137	g's	122.3	Pass
Oscillation	0	15	%	2.8	Pass
Fore-Aft Acceleration	-15	15	g's	-4.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P51685	9/30/2016	3/31/2017
Y Accelerometer	ENDEVCO 7264CT	AC-P51682	9/30/2016	3/31/2017
Z Accelerometer	ENDEVCO 7264CT	AC-P51699	9/30/2016	3/31/2017





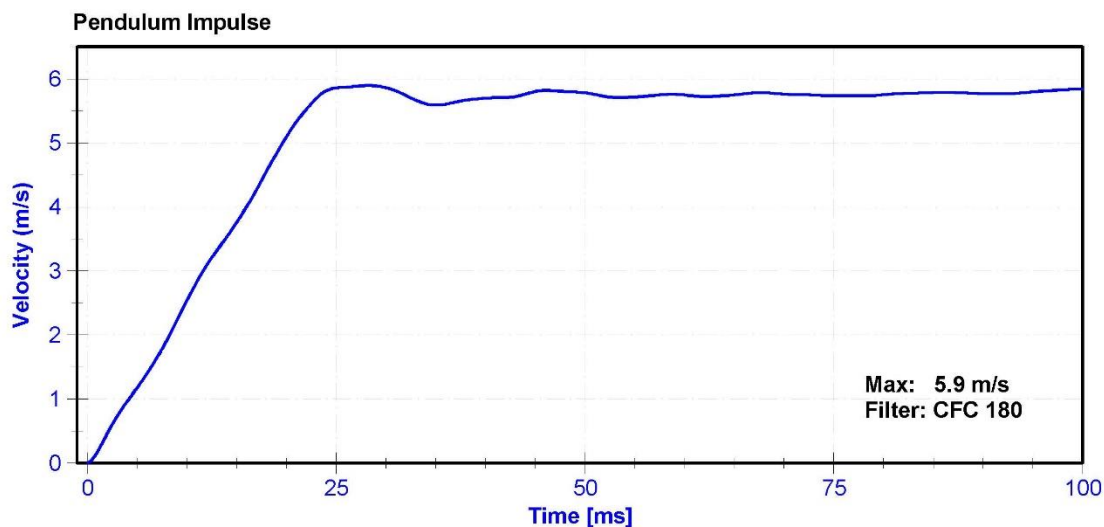
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	DG8012	Laboratory Supervisor	M.Goehle

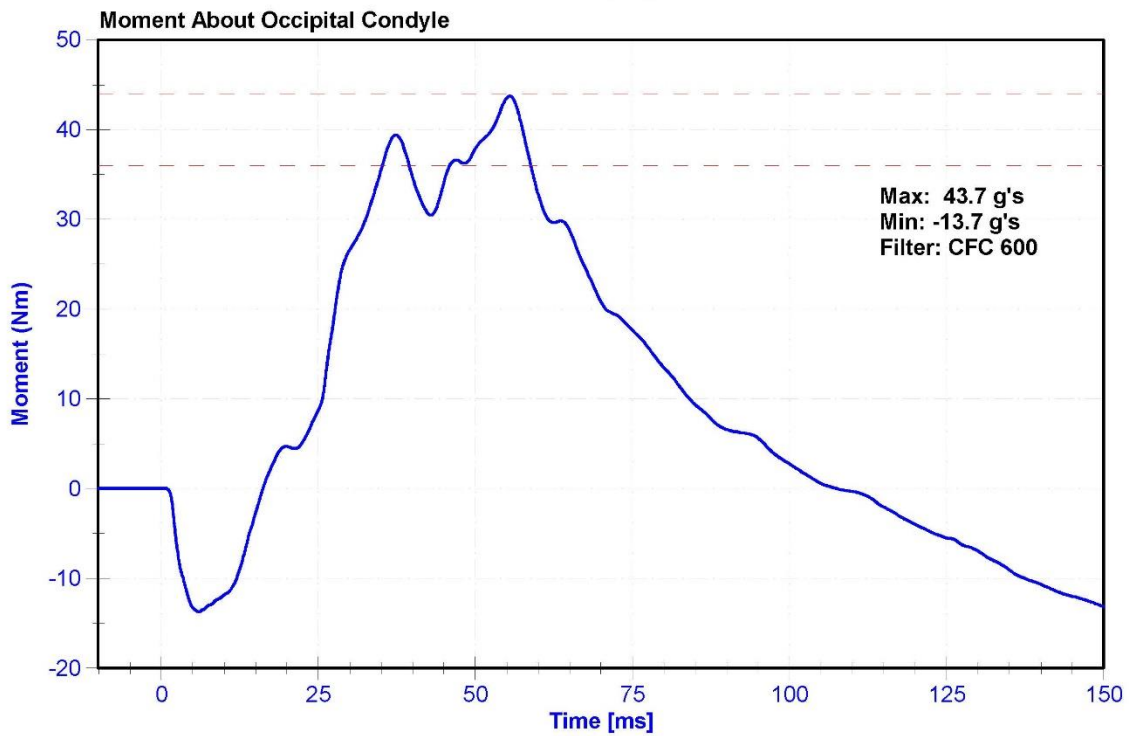
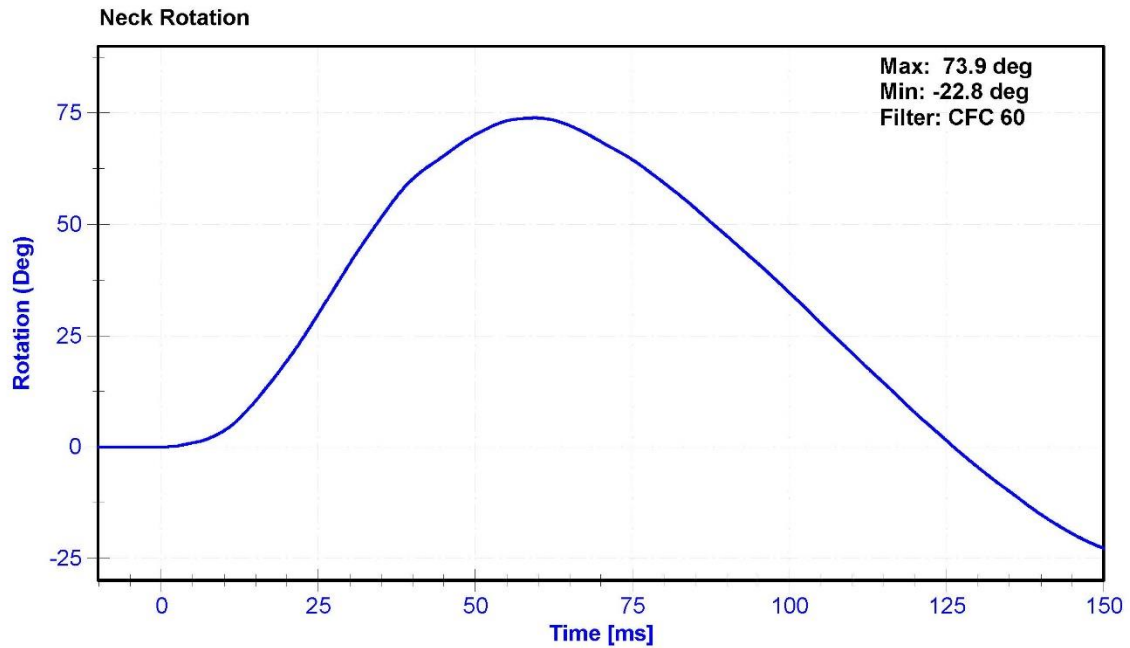
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	34.5	Pass
Velocity	5.51	5.63	m/s	5.620	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.54	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.76	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	5.10	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.86	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.89	Pass
Neck Rotation	71	81	deg	73.9	Pass
Time at Maximum Rotation	50	70	ms	59.5	Pass
Moment about the OC	36	44	Nm	43.7	Pass
Moment Decay to 0 Nm	102	126	ms	107.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/10/2016	5/10/2017
Pendulum Potentiometer	Denton 78051-342	DS-184Pend	10/12/2016	10/12/2017
Condyle Potentiometer	Denton 78051-342	DS-185Pend	10/12/2016	10/12/2017
Upper Neck Load Cell	Denton 1716A	LC-440Fy	5/24/2016	5/24/2017





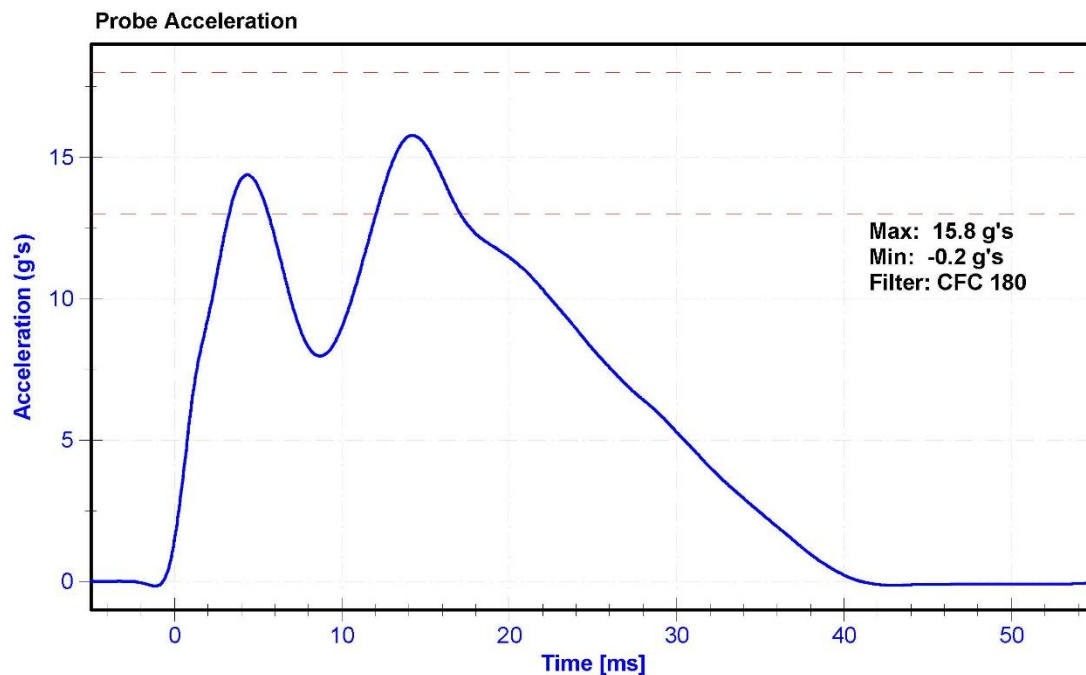
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	DG8012	Laboratory Supervisor	M.Goehle

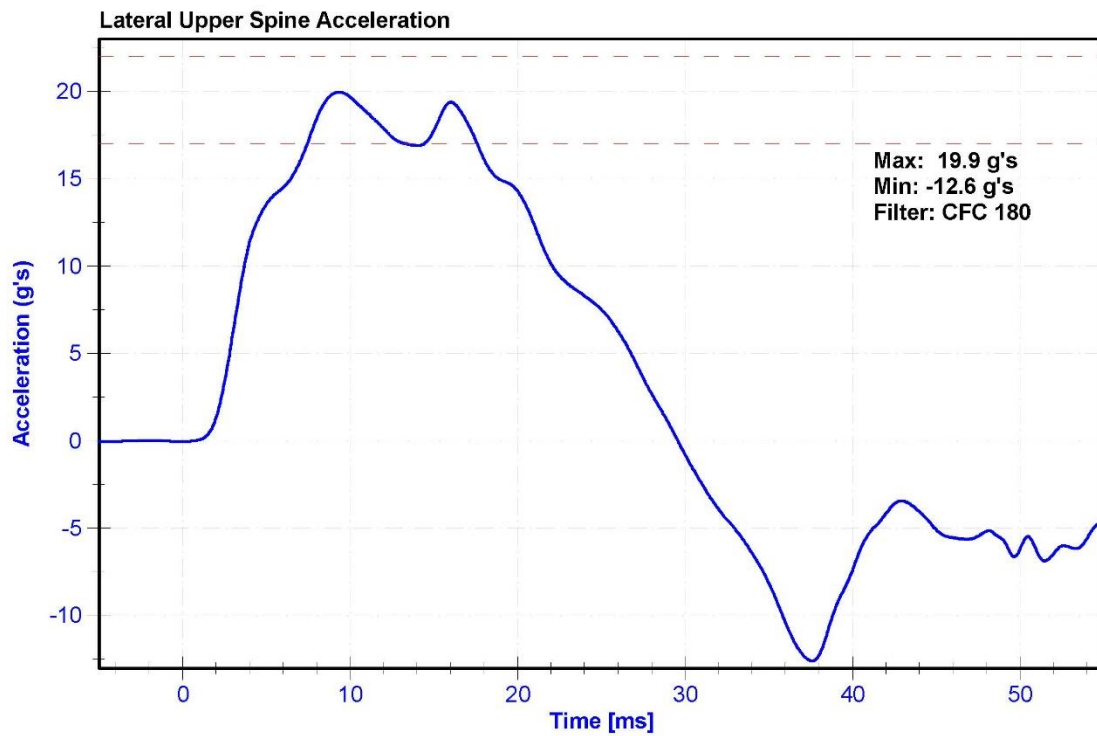
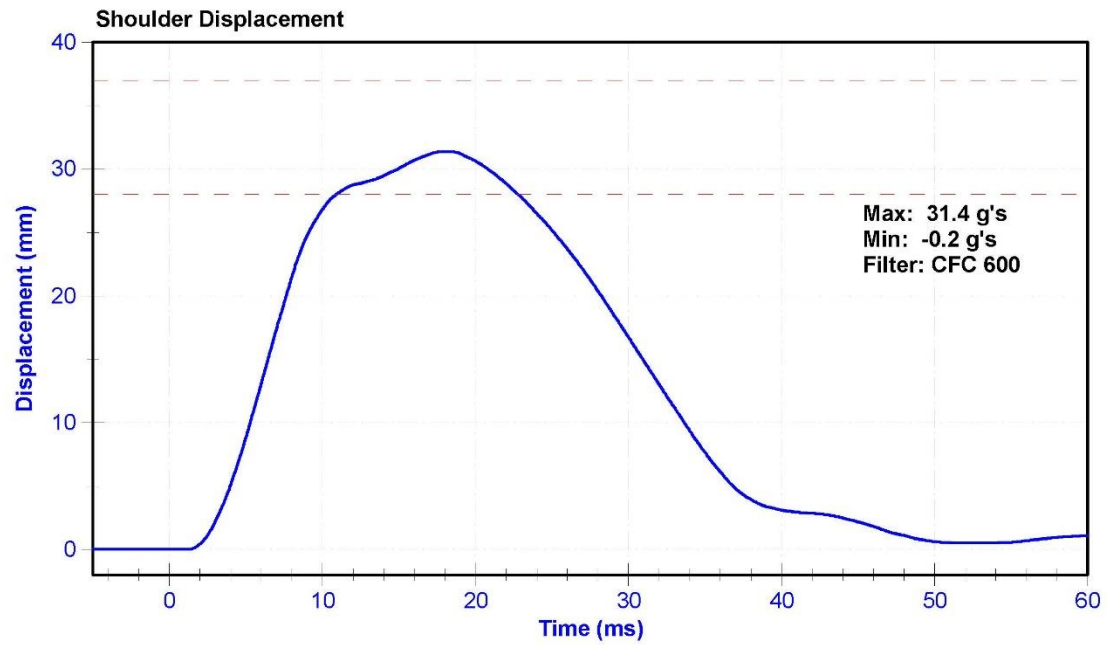
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.1	Pass
Humidity	10	70	%	40.9	Pass
Velocity	4.2	4.4	m/s	4.37	Pass
Probe Acceleration	13	18	g's	15.8	Pass
Shoulder Deflection	28	37	mm	31.4	Pass
Lateral Upper Spine Acceleration	17	22	g's	19.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Shoulder Potentiometer	Servo 08TC1-3745	DS-1845GFE	6/15/2016	6/15/2017
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P51875	10/4/2016	4/4/2017





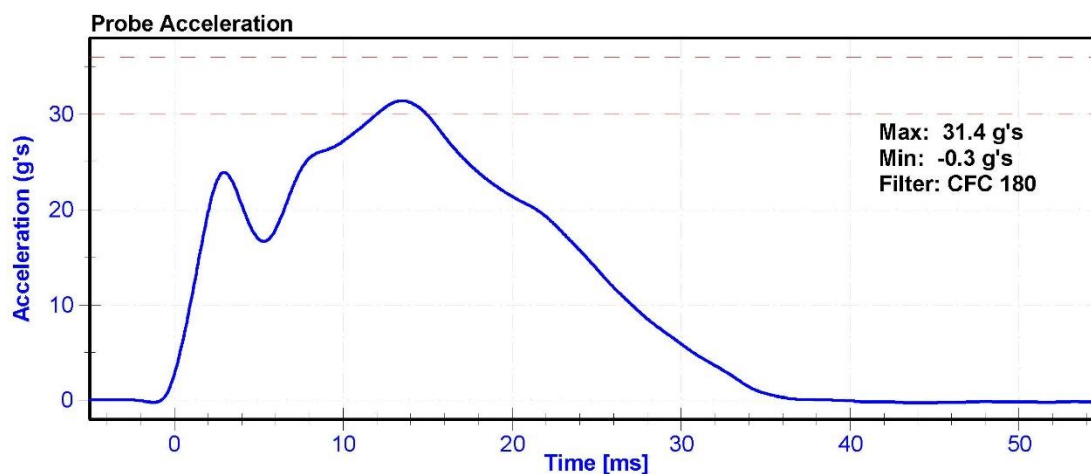
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	DG8012	Laboratory Supervisor	M.Goehle

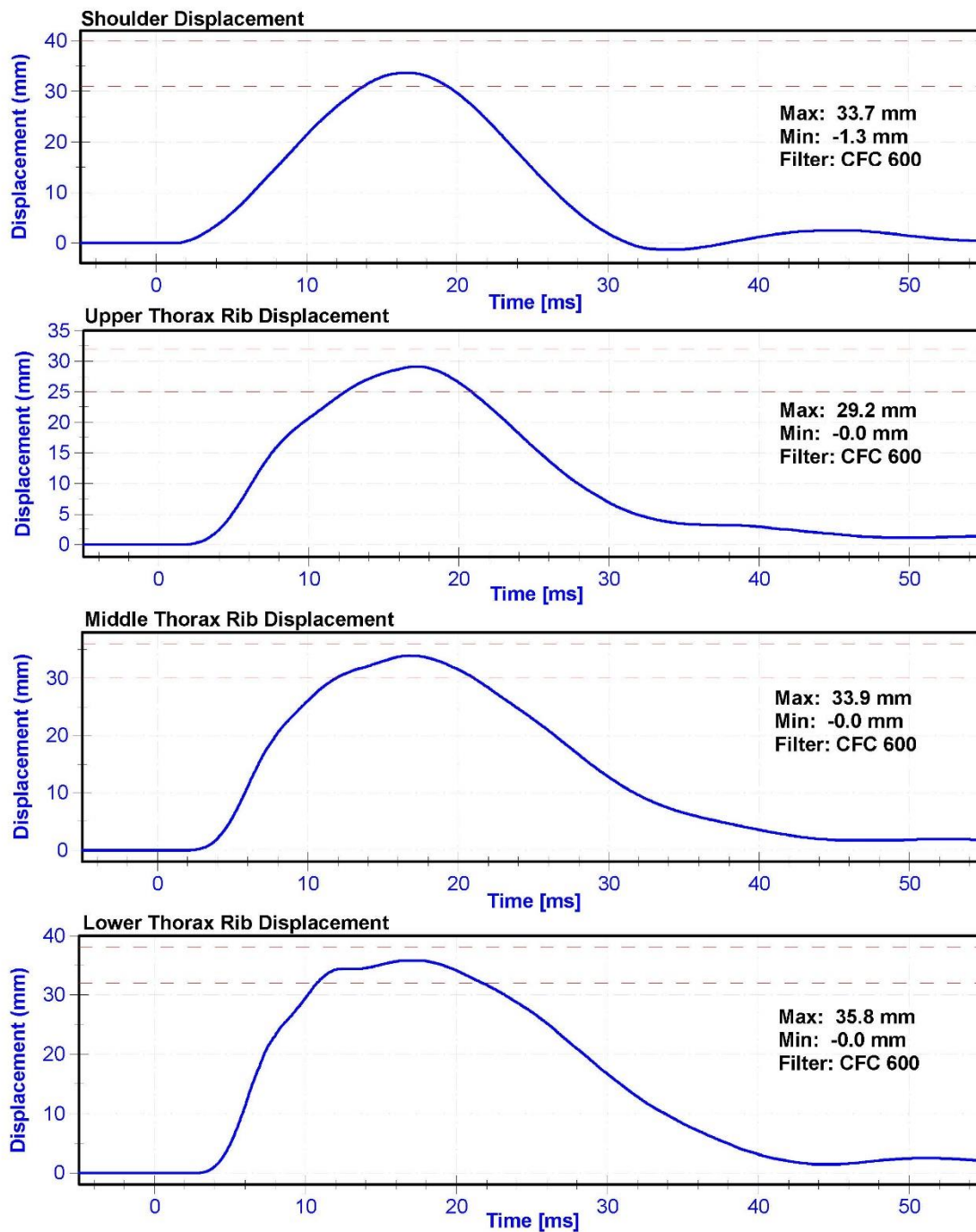
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.1	Pass
Humidity	10	70	%	36.6	Pass
Velocity	6.6	6.8	m/s	6.68	Pass
Probe Acceleration after 5 ms	30	36	g's	31.4	Pass
Lateral Upper Spine Acceleration	34	43	g's	37.4	Pass
Lateral Lower Spine Acceleration	29	37	g's	33.3	Pass
Shoulder Deflection	31	40	mm	33.7	Pass
Upper Thorax Rib Deflection	25	32	mm	29.2	Pass
Mid Thorax Rib Deflection	30	36	mm	33.9	Pass
Lower Thorax Rib Deflection	32	38	mm	35.8	Pass

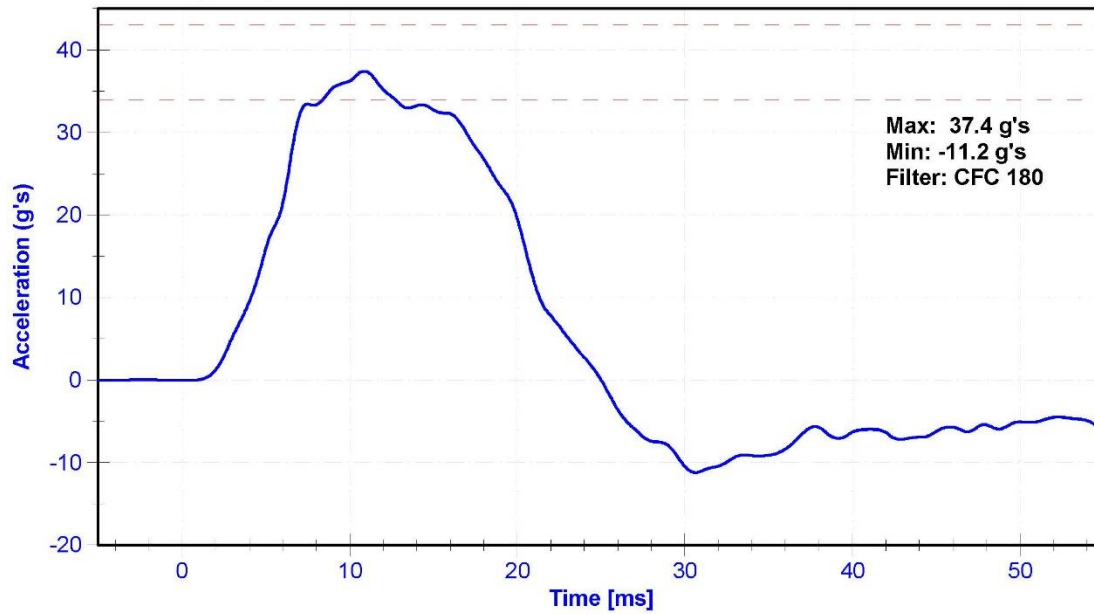
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Upper Spine T1 Y Accelerometer	ENDEVCO 7264CT	AC-P51875	10/4/2016	4/4/2017
Upper Spine T12 Y Accelerometer	ENDEVCO 7264	AC-P83319	10/4/2016	4/4/2017
Shoulder Potentiometer	Servo 08TC1-3745	DS-1845GFE	6/15/2016	6/15/2017
Upper Thorax Rib Potentiometer	Servo 08TC1-3621	DS-808GFE	6/15/2016	6/15/2017
Middle Thorax Rib Potentiometer	Servo 08TC1-3745	DS-1514GFE	6/15/2016	6/15/2017
Lower Thorax Rib Potentiometer	Servo 08TC1-3787	DS-011GFE	6/15/2016	6/15/2017

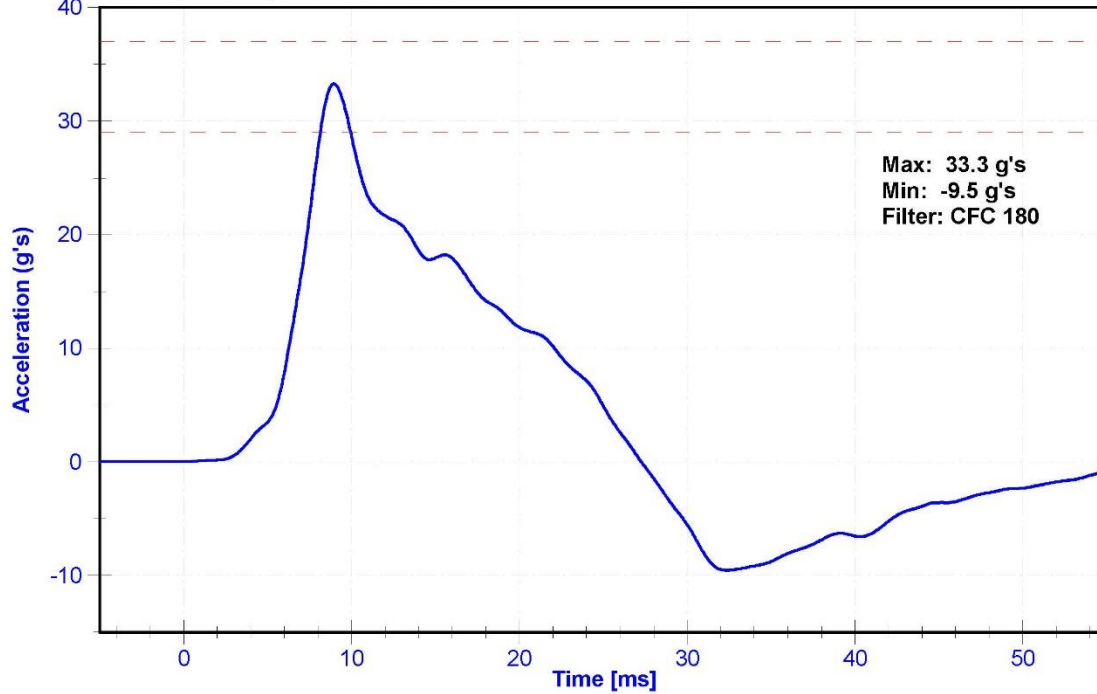




Lateral Upper Spine Acceleration



Lateral Lower Spine Acceleration



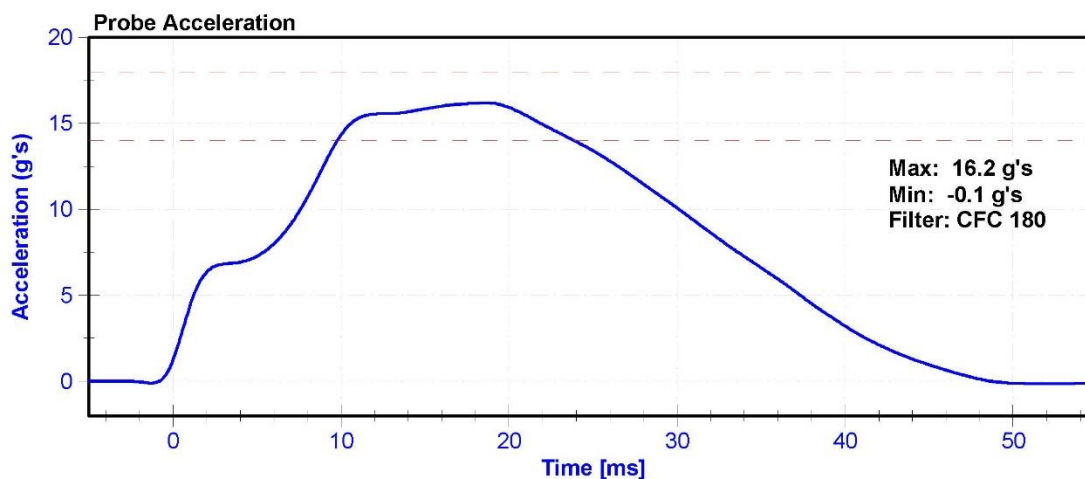
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	DG8012	Laboratory Supervisor	M.Goehle

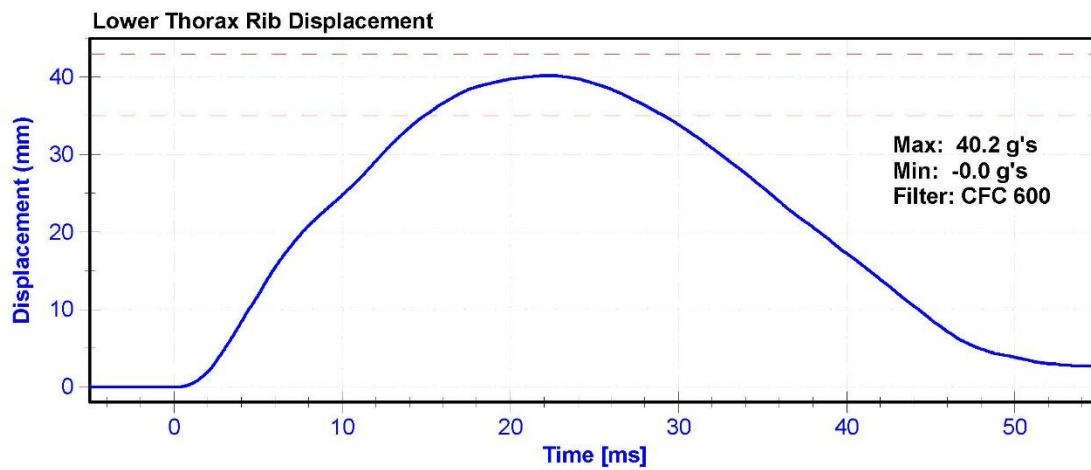
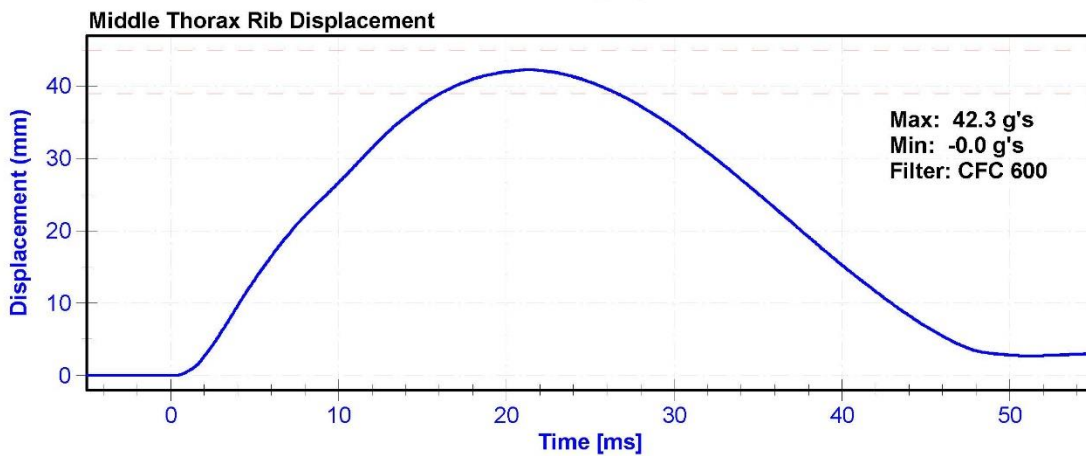
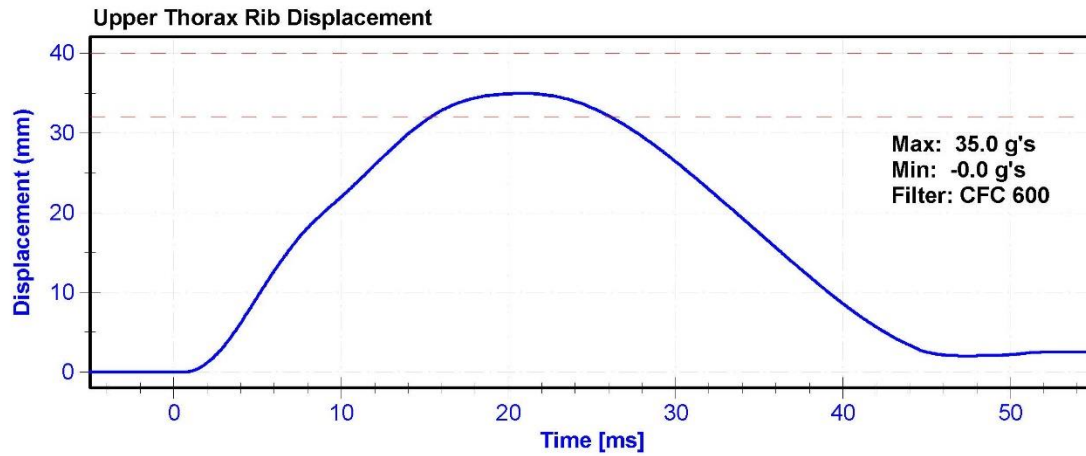
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.1	Pass
Humidity	10	70	%	36.6	Pass
Velocity	4.2	4.4	m/s	4.36	Pass
Probe Acceleration	14	18	g's	16.2	Pass
Lateral Upper Spine Acceleration	13	17	g's	15.6	Pass
Lateral Lower Spine Acceleration	7	11	g's	10.3	Pass
Upper Thorax Rib Deflection	32	40	mm	35.0	Pass
Middle Thorax Rib Deflection	39	45	mm	42.3	Pass
Lower Thorax Rib Deflection	35	43	mm	40.2	Pass

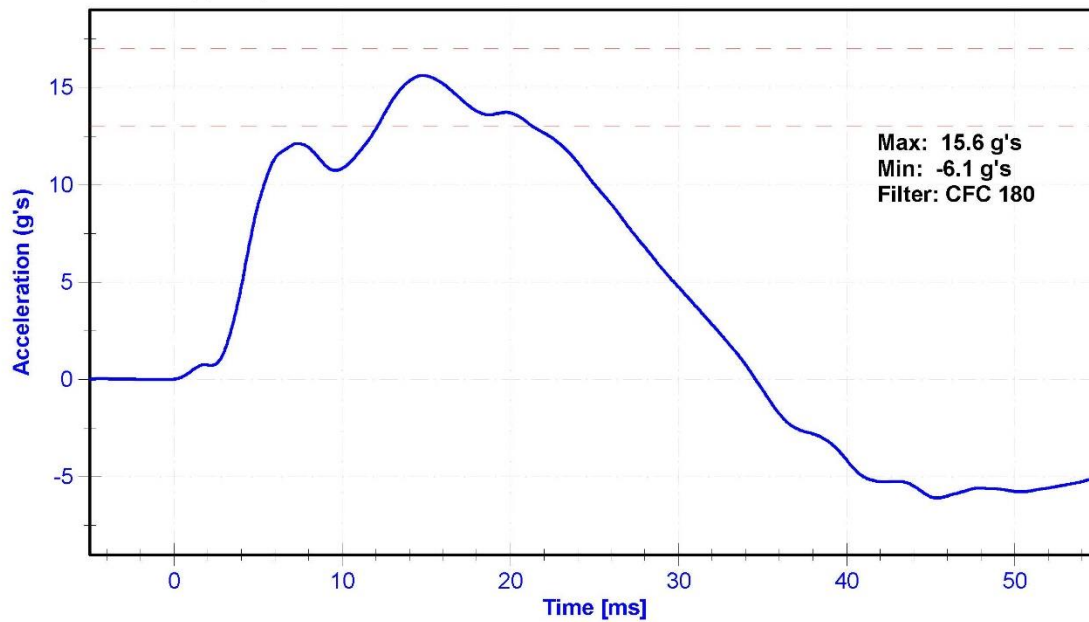
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P51875	10/4/2016	4/4/2017
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P83319	10/4/2016	4/4/2017
Upper Thorax Rib Potentiometer	Servo 08TC1-3621	DS-808GFE	6/15/2016	6/15/2017
Middle Thorax Rib Potentiometer	Servo 08TC1-3745	DS-1514GFE	6/15/2016	6/15/2017
Lower Thorax Rib Potentiometer	Servo 08TC1-3787	DS-011GFE	6/15/2016	6/15/2017

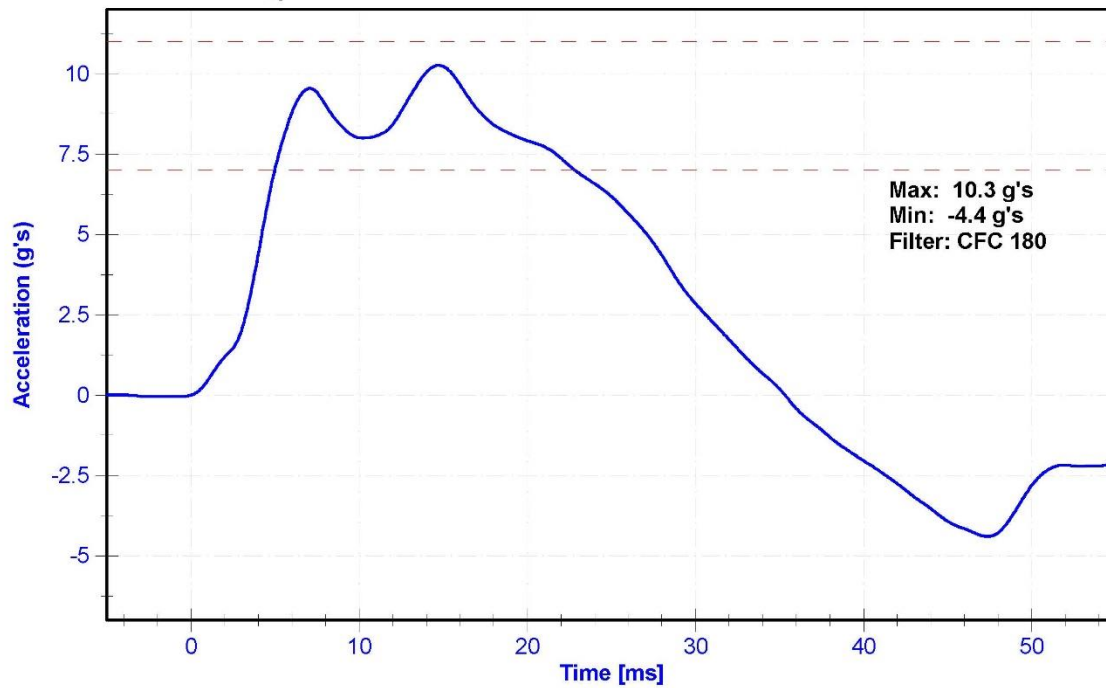




Lateral Upper Spine Acceleration



Lateral Lower Spine Acceleration



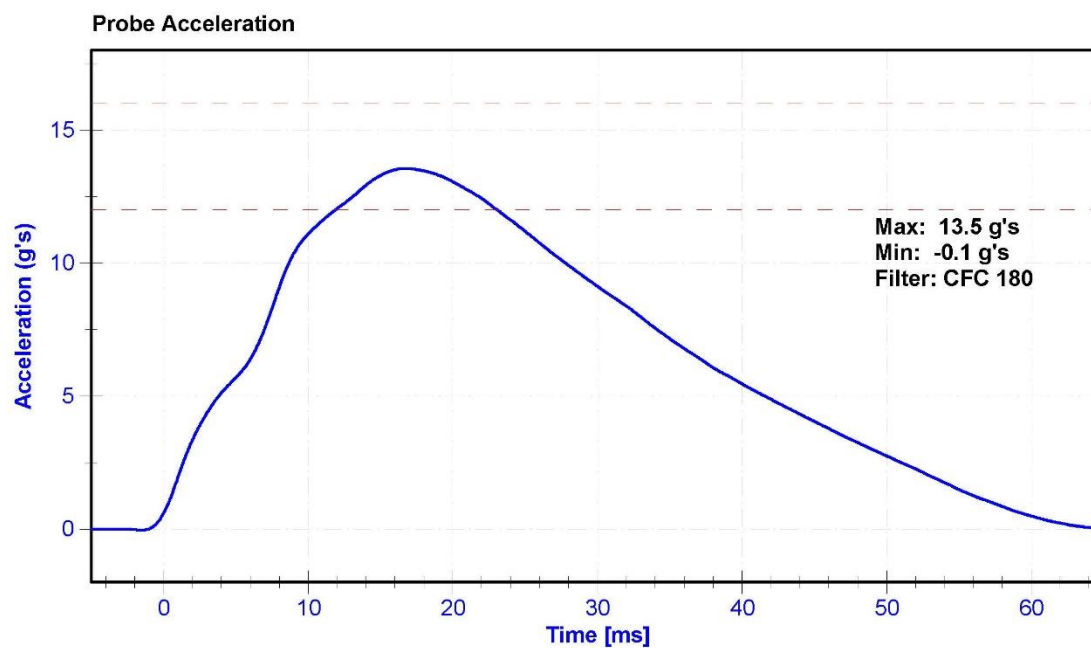
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	DG8012	Laboratory Supervisor	M.Goehle

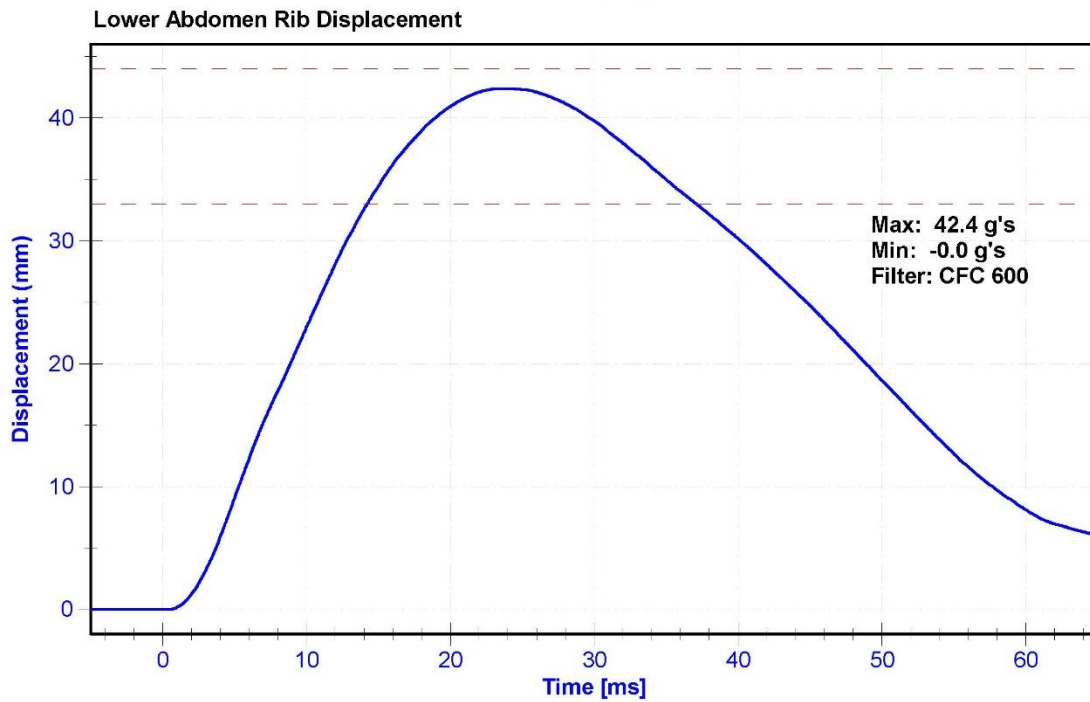
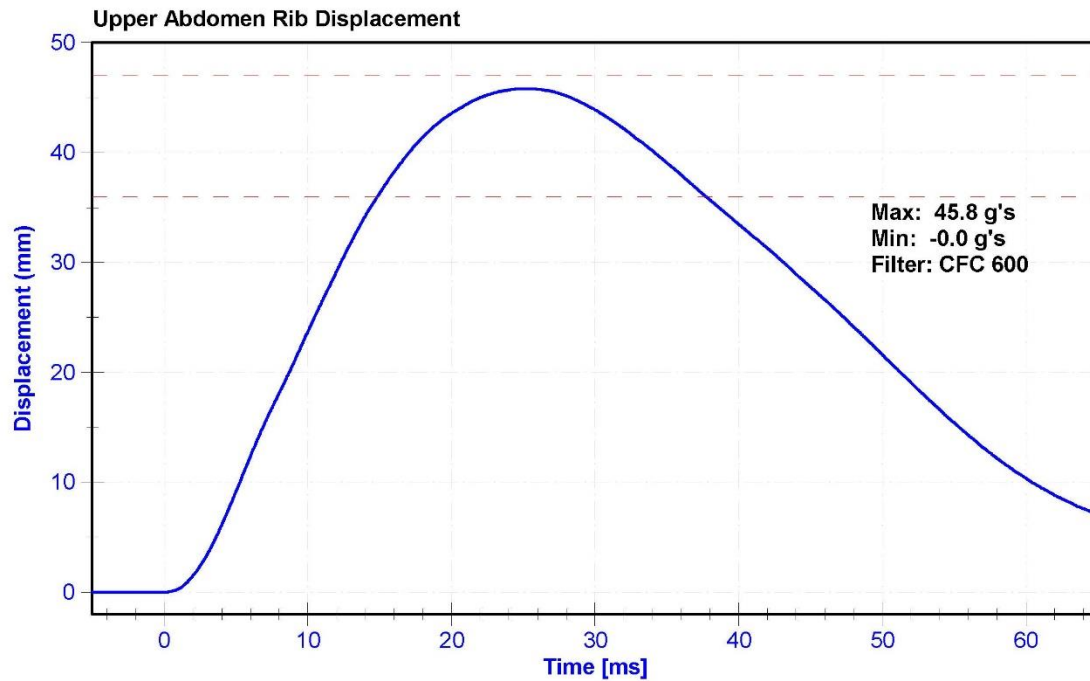
Results

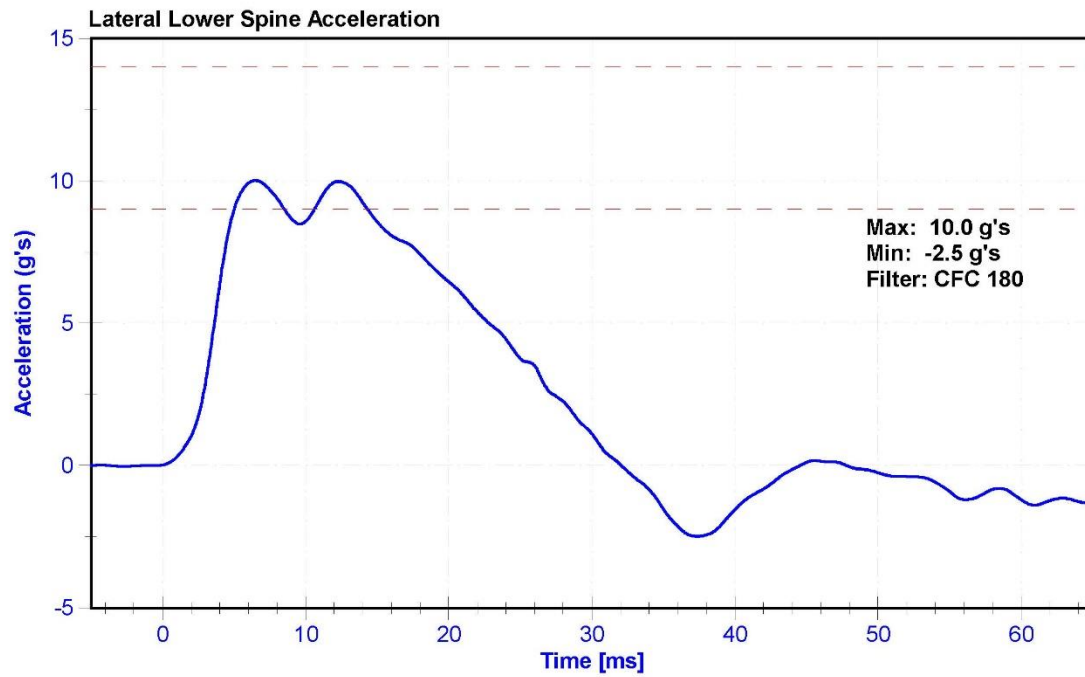
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.1	Pass
Humidity	10	70	%	35.9	Pass
Velocity	4.2	4.4	m/s	4.35	Pass
Probe Acceleration	12	16	g's	13.5	Pass
Lateral Lower Spine Acceleration	9	14	g's	10.0	Pass
Upper Abdomen Rib Deflection	36	47	mm	45.8	Pass
Lower Abdomen Rib Deflection	33	44	mm	42.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P83319	10/4/2016	4/4/2017
Upper Abdomen Rib Potentiometer	Servo 08TC1-3787	DS-015GFE	6/15/2016	6/15/2017
Lower Abdomen Rib Potentiometer	Servo 08TC1-3745	DS-1774GFE	6/15/2016	6/15/2017







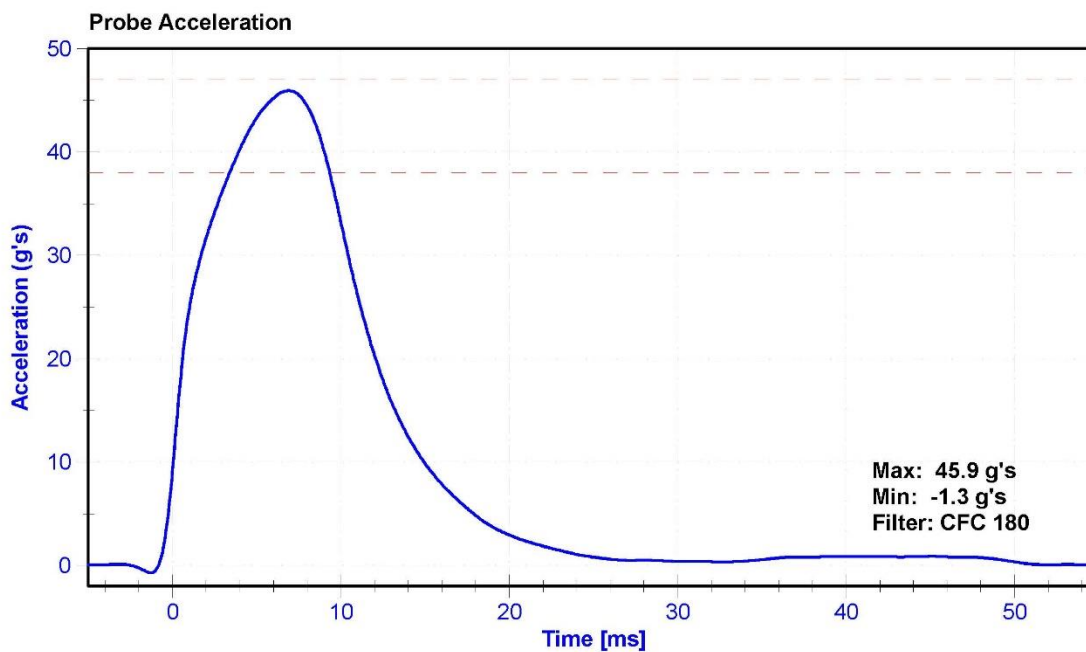
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

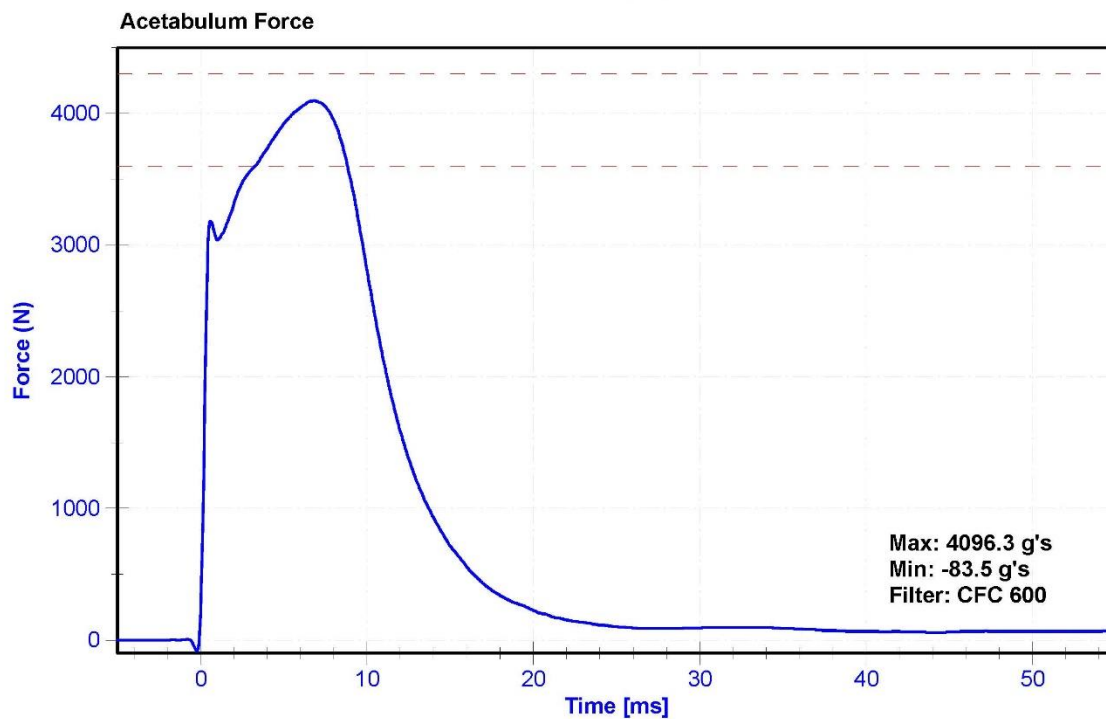
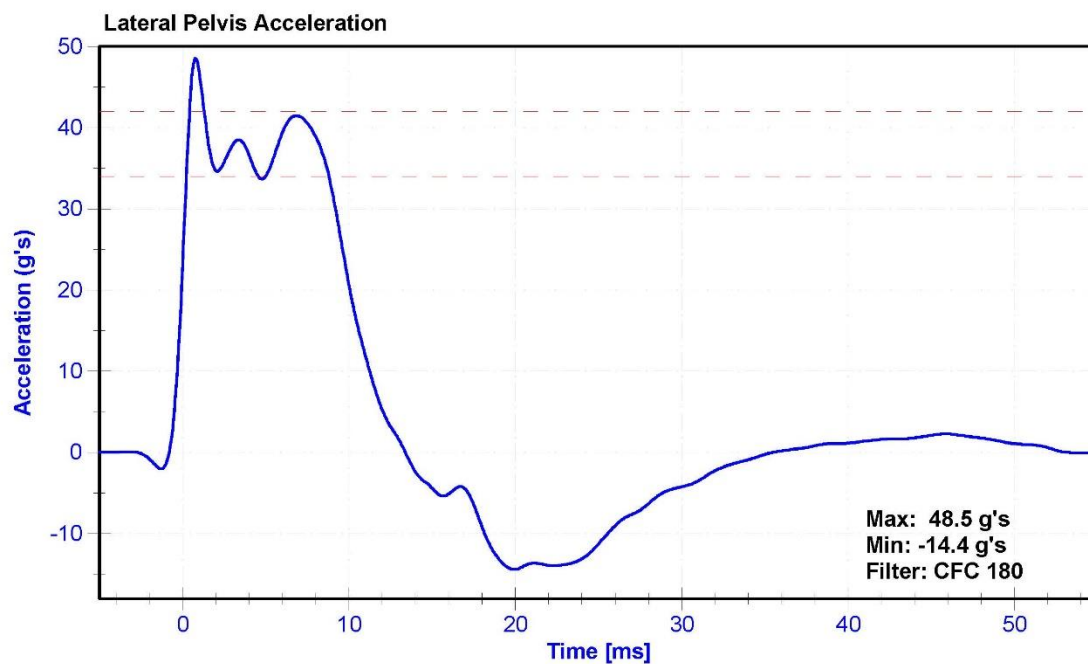
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	35.5	Pass
Velocity	6.6	6.8	m/s	6.64	Pass
Probe Acceleration	38	47	g's	45.9	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	41.5	Pass
Acetabulum Force	3600	4300	N	4096.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P63561	10/3/2016	4/3/2017
Acetabulum Load Cell	Denton 3249J	LC-267Fy	5/24/2016	5/24/2017
Certification Plug	Humanetics	3177	7/20/2009	N/A
Crash Test Plug	Humanetics	3161	7/13/2009	N/A







DENTON ATD, INC.
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SID-Its Pelvis Plug Quasi-static Certification

Specimen ID (Serial No.) 3177

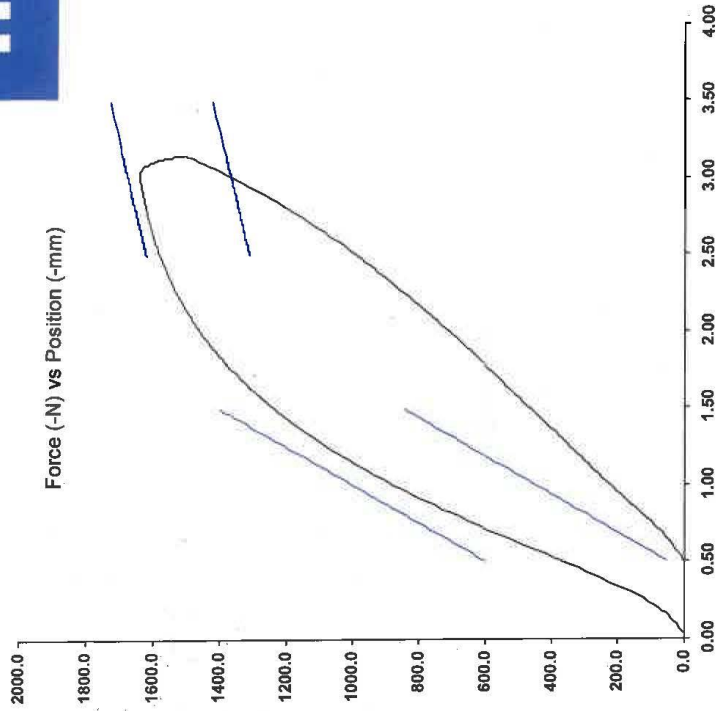
Test Number 6499

Report Number 2404

Test Date and Time 7/20/2009 6:47:09 AM

Test Results		Spec Min	Spec Max
Force @ 0.5 mm (N)	369.8	50.0	600.0
Force @ 1.5 mm (N)	1,236.3	850.0	1,400.0
Force @ 2.5 mm (N)	1,579.4	1,306.0	1,618.0
Force @ 3.0 mm (N)	1,640.8	1,361.0	1,673.0

Testing Machine SFM-20K	
Load Cell S/N (318607A), Units (N)	5000
Grosshead Speed (-mm / min) or Rate	25
Extension or Position Measured by	SFM-20K (02022512)



By: H. Ball Date: 8-3-09

Operator D. Resor D.R. Part Number 180-4450

Template No 107 20-Jul-09 Target Density (pcf) 4.66

Denton ATD, Inc.

Carl Da Silva 11/30/09



DENTON
10317 U.S. Highway 250 North • Milan, OH 44848-9570
Tel: (419) 625-3000 • Fax: (419) 625-5335 • email: info@dentonohio.com • www.dentonohio.com

Test Results

SID-11s Pelvis Plug Quasi-static Certification

Specimen ID (Serial No.) 3161

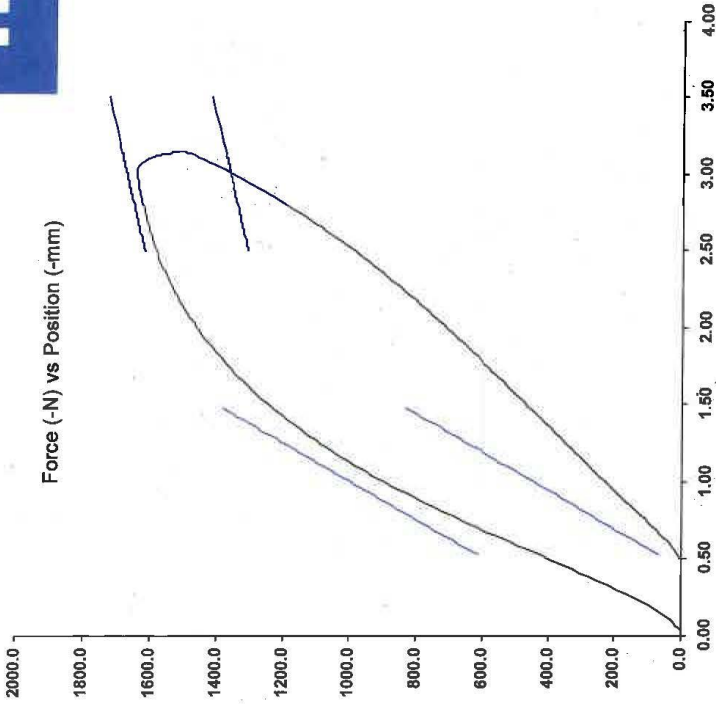
Test Number 6449

Report Number 2358

Test Date and Time 7/13/2009 7:36:54 AM

Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	50.0	600.0
Force @ 1.5 mm (N)	850.0	1,400.0
Force @ 2.5 mm (N)	1,306.0	1,618.0
Force @ 3.0 mm (N)	1,361.0	1,673.0

Testing Machine SFM-20K	
Load Cell S/N (318607A), Units (N)	5000
Crosshead Speed (-mm / min) or Rate	25
Extension or Position Measured by	SFM-20K (02022512)



By: H. Ball Date: 8-3-09

Operator D. Resor D.A. Part Number 180-4450

Template No 107 13-Jul-09 Target Density (pcf) 4.55

Denton ATD, Inc.

Cash Dg 8012. 11/30/06

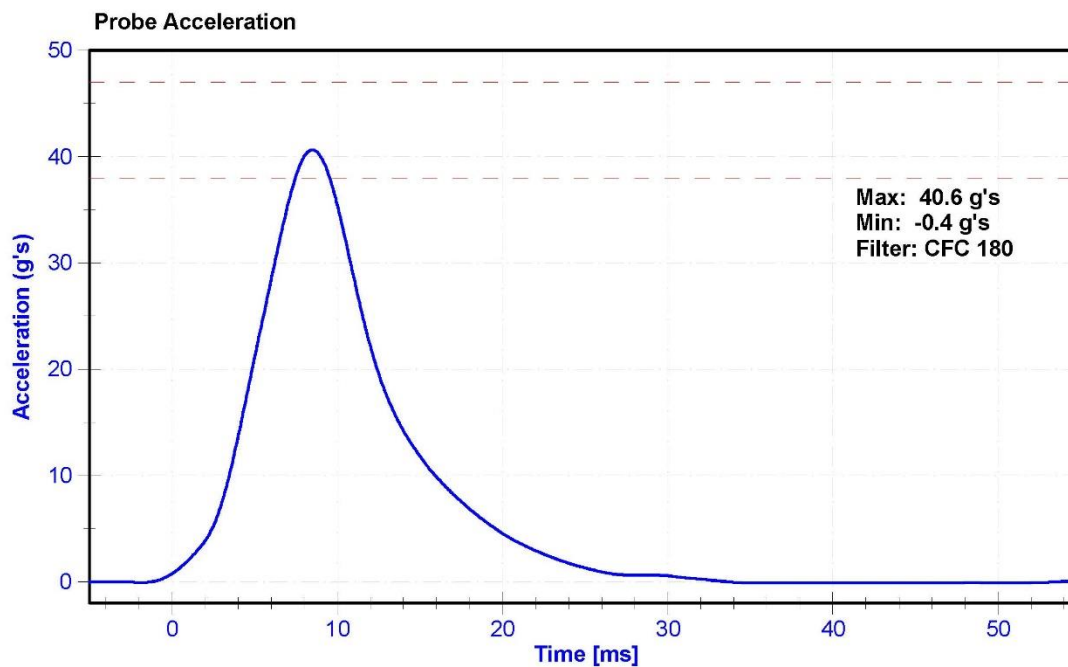
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	DG8012	Laboratory Supervisor	M.Goehle

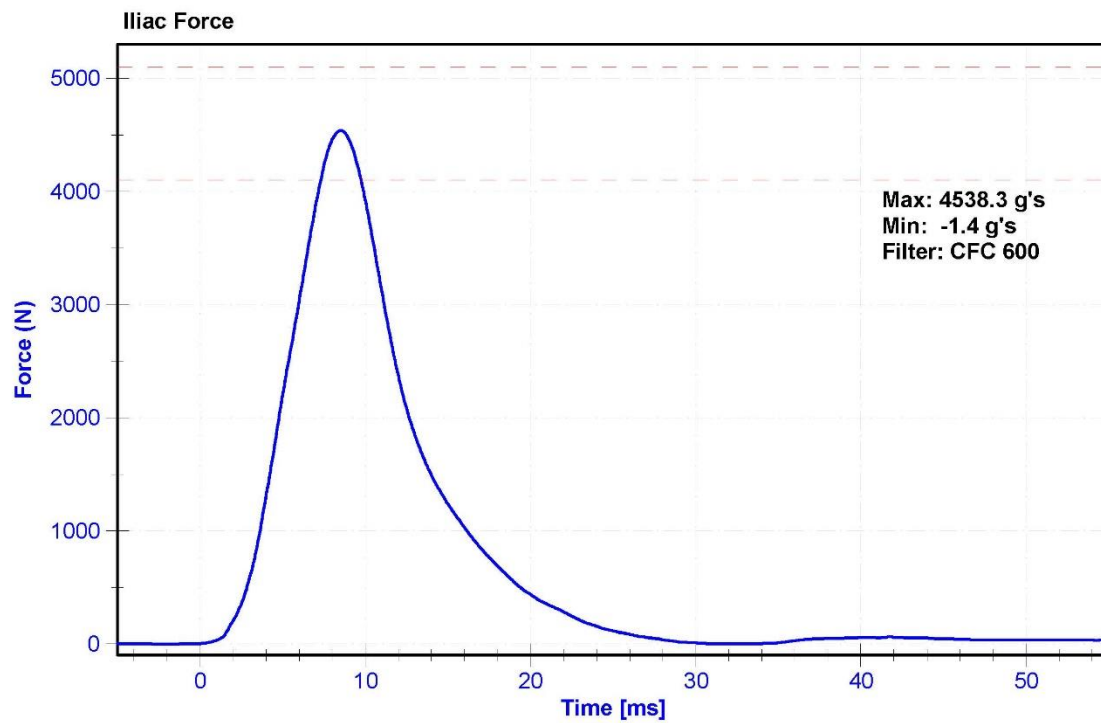
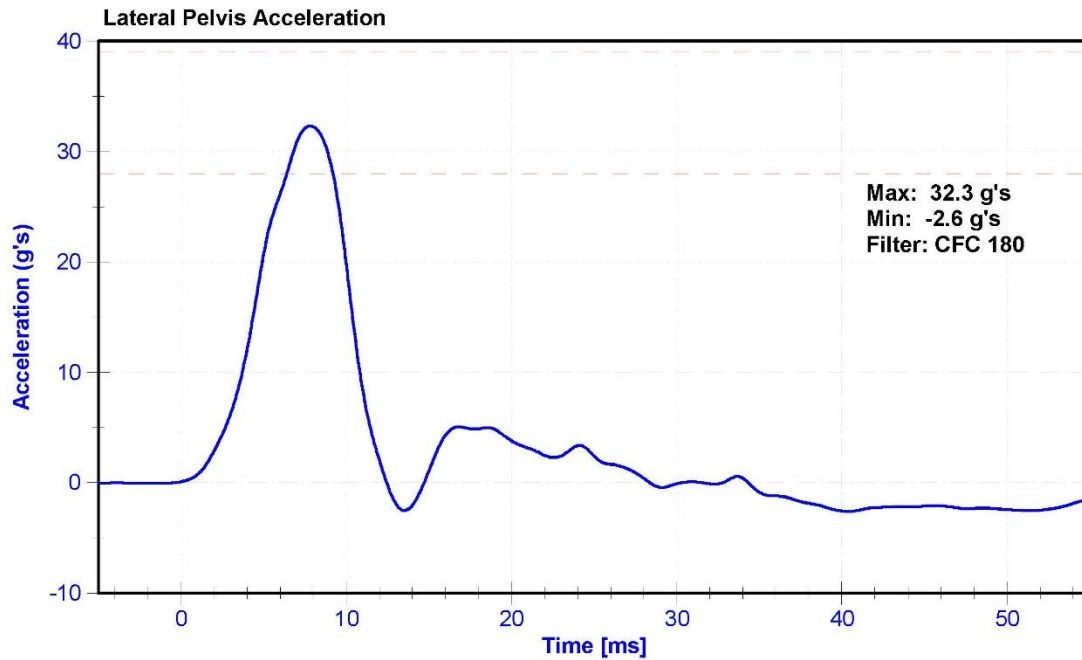
Results

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	4.2	4.4	m/s	4.32	Pass
Probe Acceleration	36	45	g's	40.6	Pass
Lateral Pelvis Acceleration	28	39	g's	32.3	Pass
Iliac Force	4100	5100	N	4538.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P63561	10/3/2016	4/3/2017
Iliac Load Cell	DENTON 3228J	LC-281Fy	5/24/2016	5/24/2017





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	6/20/2016
		Y	AC-P58911	ENDEVCO	6/20/2016
		Z	AC-P58776	ENDEVCO	6/20/2016
	Redundant	X	AC-P58887	ENDEVCO	6/20/2016
		Y	AC-P58888	ENDEVCO	6/20/2016
		Z	AC-P51734	ENDEVCO	6/20/2016
Thorax Rib Displacement Potentiometers	Upper	Y	DS-183GFE	HONEYWELL	6/20/2016
	Middle	Y	DS-184GFE	HONEYWELL	6/20/2016
	Lower	Y	DS-182GFE	HONEYWELL	6/20/2016
Abdomen Load Cells	Forward	Y	LC-1512	DENTON	5/24/2016
	Middle	Y	LC-1526	DENTON	5/24/2016
	Rear	Y	LC-1516	DENTON	5/24/2016
Lower Spine Accelerometers (T12)		X	AC-P52079	ENDEVCO	6/20/2016
		Y	AC-P51948	ENDEVCO	6/20/2016
		Z	AC-P51269	ENDEVCO	6/20/2016
Pubic Symphysis Load Cell		Y	LC-465Fy	DENTON	5/24/2016

Table 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N: 300		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers		Primary	X	AC-P51685	ENDEVCO	9/30/2016
			Y	AC-P51682	ENDEVCO	9/30/2016
			Z	AC-P51699	ENDEVCO	9/30/2016
		Redundant	X	AC-P51701	ENDEVCO	9/30/2016
			Y	AC-P45019	ENDEVCO	9/30/2016
			Z	AC-P51690	ENDEVCO	9/30/2016
Displacement Potentiometers	Thoracic Rib	Upper	Y	DS-808GFE	SERVO	6/15/2016
		Middle	Y	DS-1514GFE	SERVO	6/15/2016
		Lower	Y	DS-011GFE	SERVO	6/15/2016
	Abdominal Rib	Upper	Y	DS-015GFE	SERVO	6/15/2016
		Lower	Y	DS-1774GFE	SERVO	6/15/2016
Lower Spine Accelerometers (T12)			X	AC-P74788	ENDEVCO	10/4/2016
			Y	AC-P83319	ENDEVCO	10/4/2016
			Z	AC-P83432	ENDEVCO	10/4/2016
Acetabulum Load Cell			Y	LC-267Fy	DENTON	5/24/2016
Iliac Wing Load Cell			Y	LC-281Fy	DENTON	5/24/2016
Pelvis Plug (struck side)				81134	Humanetics	12/4/2014
Pelvis Plug (non-struck side)				-	-	-

Table 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	AC-A192209	MSI 1201-1000	10/19/2016
	Vehicle Center of Gravity	Y	AC-A192221	MSI 1201-1000	10/19/2016
	Vehicle Center of Gravity	Z	AC-A192229	MSI 1201-1000	10/19/2016
2	Right Sill at Front Seat	X	AC-A196979	MSI 1201-1000	10/26/2016
	Right Sill at Front Seat	Y	AC-A197030	MSI 1201-1000	10/26/2016
	Right Sill at Front Seat	Z	AC-A197050	MSI 1201-1000	10/26/2016
3	Right Sill at Rear Seat	X	AC-A184937	MSI 1201-1000	10/25/2016
	Right Sill at Rear Seat	Y	AC-A207259	MSI 1201-1000	10/25/2016
	Right Sill at Rear Seat	Z	AC-A209366	MSI 1201-1000	10/25/2016
4	Left Sill at Front Door	Y	AC-A196993	MSI 1201-1000	10/26/2016
5	Left Sill at Rear Door	Y	AC-A213654	MSI 1201-1000	10/25/2016
6	Left A-Post Lower	Y	AC-A192228	MSI 1201-1000	10/13/2016
7	Left A-Post Middle	Y	AC-A192195	MSI 1201-1000	10/13/2016
8	Left B-Post Lower	Y	AC-A197044	MSI 1201-1000	10/26/2016
9	Left B-Post Middle	Y	AC-A197054	MSI 1201-1000	10/26/2016
10	Front Seat Track	Y	AC-A197029	MSI 1201-1000	10/26/2016
11	Rear Seat Track or Structure	Y	AC-A213655	MSI 1201-1000	10/25/2016
12	Right Rear Occ. Compartment	Y	AC-A196608	MSI 1201-1000	10/25/2016
13	Engine Block	X	AC-A192211	MSI 1201-1000	10/13/2016
	Engine Block	Y	AC-A192217	MSI 1201-1000	10/13/2016
14	Rear Floorpan Above Axle	X	AC-A189598	MSI 1201-1000	7/14/2016
	Rear Floorpan Above Axle	Y	AC-A189609	MSI 1201-1000	7/14/2016
	Rear Floorpan Above Axle	Z	AC-A197048	MSI 1201-1000	10/25/2016

TABLE 4 – MDB Instrumentation

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	AC-C14901	ENDEVCO	10/7/2016
MDB Center of Gravity	Y	AC-CP30	ENDEVCO	10/7/2016
MDB Center of Gravity	Z	AC-C16680	ENDEVCO	10/7/2016
Left Frame at Rear Axle Centerline	X	AC-AH5M8	ENDEVCO	10/7/2016
Left Frame at Rear Axle Centerline	Y	AC-C16499	ENDEVCO	10/7/2016