

REPORT NUMBER: SPNCAP-CAL-17-002

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

**General Motors LLC
2017 Cadillac XT5
SUV**

NHTSA No: M20170111

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



November 4, 2016

FINAL REPORT

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

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Date: November 4, 2016

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Date: November 4, 2016

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

Date: _____

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16. Abstract A 32.20 km/h (20 mph), 75° oblique impact Side NCAP Test was conducted on the subject 2017 Cadillac XT5 SUV in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP Pole Laboratory Test Procedure for the generation of consumer information on vehicle side pole crash protection. This test was conducted at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on October 11, 2016. The impact velocity of the vehicle was 32.79 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle was 21°C. The target vehicle's maximum post-test static crush was 314 mm located at level 3. The test vehicle's occupant performance data is as follows: <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th colspan="3">Driver ATD (SID-IIs) (Serial No. DG8012)</th> </tr> <tr> <th>Units</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td></td> <td>1000</td> <td>399.031</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td>G</td> <td>82</td> <td>39.198</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td>N</td> <td>5525</td> <td>3552.253</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38</td> <td>23.430</td> </tr> <tr> <td>Maximum Abdomen Rib Deflection</td> <td>mm</td> <td>45</td> <td>26.561</td> </tr> </tbody> </table> The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.				Measurement Description	Driver ATD (SID-IIs) (Serial No. DG8012)			Units	Threshold	Result	Head Injury Criteria (HIC ₃₆)		1000	399.031	Resultant Lower Spine Acceleration	G	82	39.198	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3552.253	Maximum Thoracic Rib Deflection	mm	38	23.430	Maximum Abdomen Rib Deflection	mm	45	26.561
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17. Key Words New Car Assessment Program (NCAP) Side Impact Pole Part 572V SID-IIs		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division, NPO-411 1200 New Jersey Ave. SE Washington, D.C. 20590 e-mail: tis@nhtsa.dot.gov FAX: 202-493-2833																												
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SECTION 1

TEST PURPOSE AND PROCEDURE

This side impact test was conducted as part of the MY 2017 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-14-D-00352. The purpose of this test is to generate comparative side impact performance in a 2017 Cadillac XT5 SUV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Pole Laboratory Test Procedure, dated October 2015.

SECTION 2

SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2017 Cadillac XT5 SUV. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.79 km/h. The test was conducted by Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on October 11, 2016. Pre-test and post-test photographs of the test vehicle and side impact dummy (SID-IIs) are included in Appendix A of this report.

One Part 572V (SID-IIs) dummy was placed in the driver designated seating position according to instructions specified in the OCWS Side NCAP Pole Laboratory Test Procedure, dated October 2015. Camera locations and other pertinent camera information are included on page 3-11 in this report.

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

- Head CG tri-axial accelerometers

- Thorax upper, middle, and lower rib displacement potentiometers

- Abdomen upper and lower rib displacement potentiometers

- Lower spine tri-axial accelerometers

- Iliac load cell

- Acetabulum load cell

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

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

INJURY READINGS

Measurement Description	Driver ATD (SID-IIs)		
	Units	IARV	Result
Head Injury Criteria (HIC ₃₆)		1000	399.031
Resultant Lower Spine Acceleration	g	82	39.198
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3552.253
Maximum Thoracic Rib Deflection	mm	38*	23.430
Maximum Abdominal Rib Deflection	mm	45*	26.561

*Proposed IARV

Supplemental restraint information was recorded as follows:

SUPPLEMENTAL RESTRAINT INFORMATION

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

GENERAL COMMENTS:

1. P1 serial number – DG8012

Data Anomalies:

- None

SECTION 3

OCCUPANT AND VEHICLE INFORMATION

This section contains information reporting for the following Data Sheets:

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

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

Data Sheet No. 3 – Dummy Longitudinal Clearance Dimensions

Data Sheet No. 4 – Dummy Lateral Clearance Dimensions

Data Sheet No. 5 – Camera and instrumentation Data

Data Sheet No. 6 – Vehicle Accelerometer Data

Data Sheet No. 7 – Rigid Pole Load Cell Data

Data Sheet No. 8 – Post-Test Observations

Data Sheet No. 9 – Test Vehicle Profile Measurements

Data Sheet No. 10 – Test Vehicle Exterior Crush Measurements

Data Sheet No. 11 – Vehicle Damage Profile Distances

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

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

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2017 Cadillac XT5 SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20170111
Test Date: 10/11/2016

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20170111
Model Year	2017
Make	Cadillac
Model	XT5
Body Style	SUV
VIN	1GYKNARSXHZ118353
Body Color	Blue
Odometer Reading (km/mi)	77.2 km / 48 mi
Engine Displacement (L)	3.6
Type / No. Cylinders	V6
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	8-Speed
Overdrive	Yes
Final Drive	Front Wheel Drive
Roof Rack	No
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	Yes

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

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

No

DATA FROM CERTIFICATION LABEL

Manufactured By	General Motors LLC
Date of Manufacture	06/16
Vehicle Type	MPV

GVWR (kg)	2722
GAWR Front (kg)	1350
GAWR Rear (kg)	1450

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	3	-	5
Capacity Weight (VCW) (kg)				895
DSC X 68.04 kg				340.2
Cargo Weight (RCLW) (kg)				136

(A)

(B)

(A-B)

VEHICLE SEAT TYPE

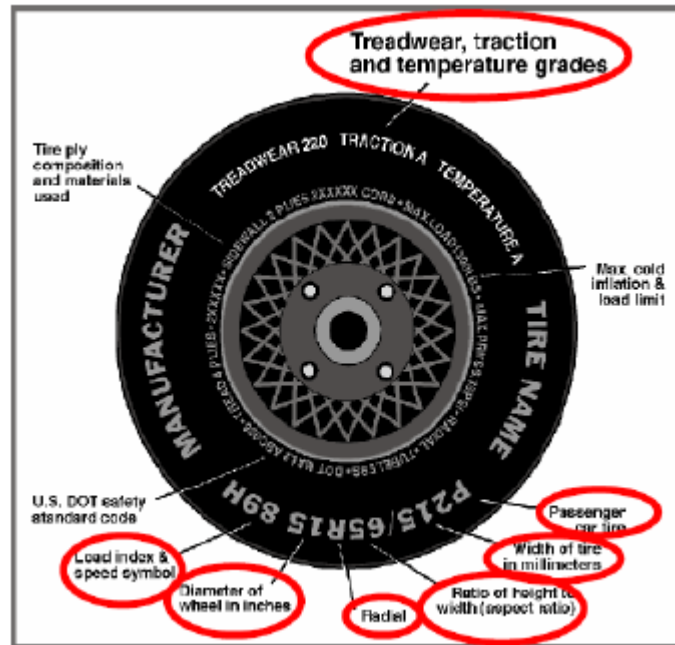
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						W/ Lever	W/ Knob
Front Seat	X						X
Rear or Second Row Seat			X		X		
Third Row seat							

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

Test Vehicle: 2017 Cadillac XT5 SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20170111
 Test Date: 10/11/2016

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



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	240	240
Recommended Tire Size	P235/65R18	P235/65R18
Tire Size on Vehicle	P235/65R18	P235/65R18
Tire Manufacturer	Michelin	Michelin
Tire Model	Premier LTX	Premier LTX
Treadwear	620	620
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 1 Polyamide, 2 Steel	2 Polyester, 1 Polyamide, 2 Steel
Load Index/Speed Symbol	106H	106H
Tire Material	Rubber	Rubber
DOT Safety Code Left	M3MB7B5X1416	M3MB7B5X1416
DOT Safety Code Right	M3MB7B5X1416	M3MB7B5X1416

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

Test Vehicle: 2017 Cadillac XT5 SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20170111
 Test Date: 10/11/2016

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	220	223	223	225
Tire Placard	kPa	240	240	240	240
Owner's Manual	kPa	240	240	240	240
As Tested	kPa	240	240	240	240

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	568	351		591	419		580	438	
Right	kg	533	347		517	446		535	427	
Ratio	%	61	39		56	44		56	44	
Totals	kg	1101	698	1799	1108	865	1973	1115	865	1980

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1799	(A)
Actual Weight of 1 P572V (SID-IIs) ATD Used	kg	44.12	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	136	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1979.12	(A+B+C)

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

TEST VEHICLE ATTITUDES AND CG

Measurement Description	Units	As Delivered	As Tested	Fully Loaded	Meets Rqmt***
Driver Door Sill Angle (front-to-rear)*	Deg	-0.7	-0.3	-0.2	Yes
Front Passenger Sill Angle (front-to-rear)*	Deg	-0.3	0	0.2	Yes
Front Bumper-Line Angle (left-to-right)**	Deg	-0.8	-0.7	-0.7	Yes
Rear Bumper-Line Angle (left-to-right)**	Deg	0.5	0.3	0.3	Yes
Vehicle CG (Aft of Front Axle)	mm	1108	1252	1248	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	18	20	23	

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

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

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

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

Test Vehicle: 2017 Cadillac XT5 SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20170111
 Test Date: 10/11/2016

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Trunk Carpeting	8
Spare Tire	6
Tail Light	2
Passenger Windows and door parts	18
Ballast / Equipment Added	95

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

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

Test Vehicle: 2017 Cadillac XT5 SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20170111
 Test Date: 10/11/2016

SEAT POSITIONING

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

SCRL ANGLE RANGE

Seat	SCRL (°)		
	Max	Min	Mid
Driver Seat	20	11.6	15.8
Front Passenger Seat	17.1	12.9	15
Front Center Seat	N/A	N/A	N/A
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid-Fore / Aft	Forward-Most
Driver Seat	15.8	28	Max	60	58	55
			Mid	30	28	28
			Min	0	0	0
Front Passenger Seat	15	25	Max	50	50	50
			Mid	25	25	25
			Min	0	0	0
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	-	-	-

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

Test Vehicle: 2017 Cadillac XT5 SUV
 Test Program: NCAP Side Pole Impact Test

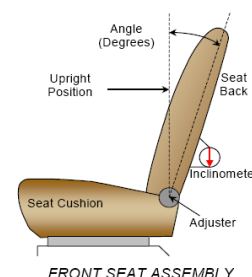
NHTSA No.: M20170111
 Test Date: 10/11/2016

SEAT FORE / AFT POSITION

Seat	Total Fore / Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detents*
Driver Seat	245	N/A	0	N/A
Front Passenger Seat	245	N/A	0	N/A
Front Center Seat	N/A	N/A	N/A	N/A
Struck Side Rear Seat	140	14	140	14
Non-Struck Side Rear Seat	140	14	140	14
Rear Center Seat	140	14	140	14

SEAT BACK ANGLE ADJUSTMENT

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



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detents*
Driver Seat w/Seated Dummy	-33.5 to 21.6	N/A	-26	N/A
Front Passenger Seat	-38 to 27.1	N/A	-26	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

SEAT BELT ANCHORAGE ADJUSTMENT

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

Seat	Total # of Positions	Placed in Position #
Driver Seat	4	0 - Uppermost

HEAD RESTRAINT ADJUSTMENT

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

Seat	Total # of Positions	Placed in Position #
Driver Seat	9 (0-8)	8 - Lowest

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

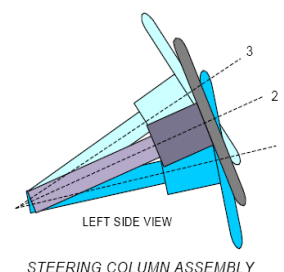
Test Vehicle: 2017 Cadillac XT5 SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20170111
 Test Date: 10/11/2016

STEERING COLUMN ADJUSTMENT

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

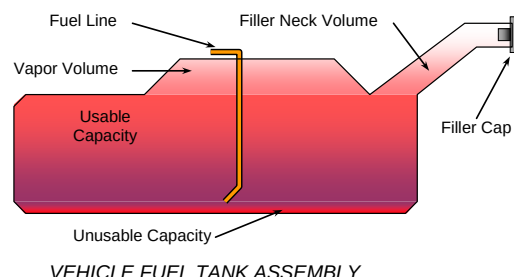
	Degrees	Fore / Aft Position (mm)
Lowermost – Position 1	20.1	
Geometric Center – Position 2	22.5	
Uppermost – Position 3	24.9	
Telescoping Steering Wheel Travel		50
Test Position	22.5	25



FUEL PUMP

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

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



FUEL TANK CAPACITY DATA

Description	Liters
Usable Capacity of "Standard Tank" - see Form No. 1	73.4
Usable Capacity of "Optional Tank" - see Form No. 1	78.4
Usable Capacity of "Standard Tank" - see Owner's Manual	73.4
Usable Capacity of "Optional Tank" - see Owner's Manual	82.1
93% of Usable Capacity	68.3
Actual Amount of Solvent Used in Test	68.3
1/3 of Usable Capacity	24.46

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

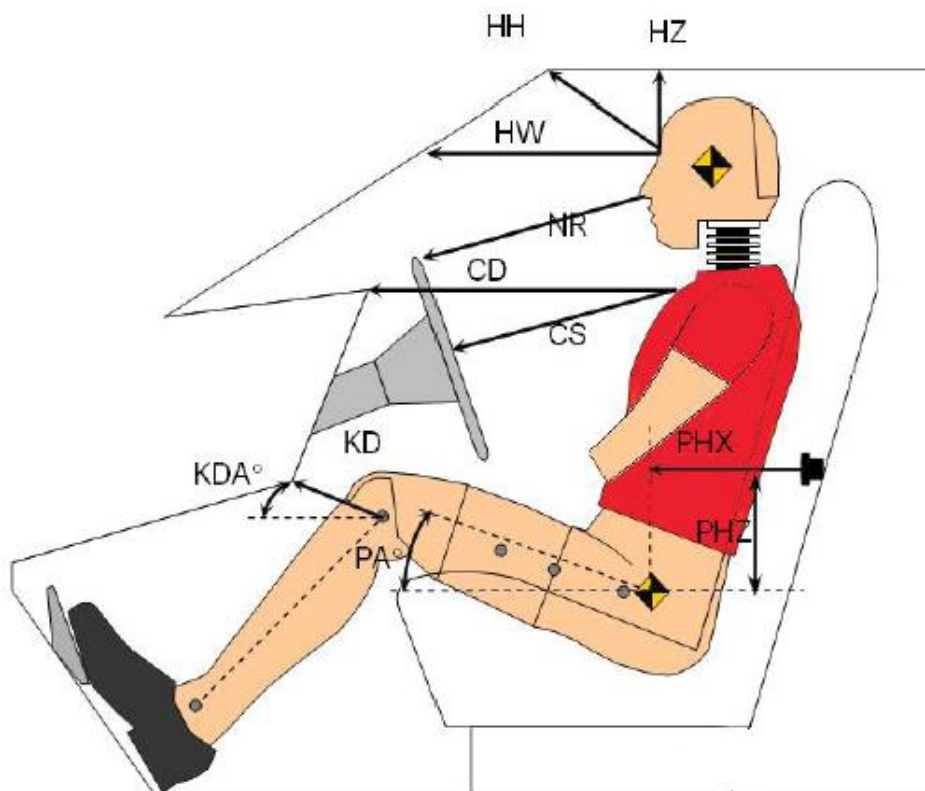


No

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2017 Cadillac XT5 SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20170111
 Test Date: 10/11/2016



Left Side View

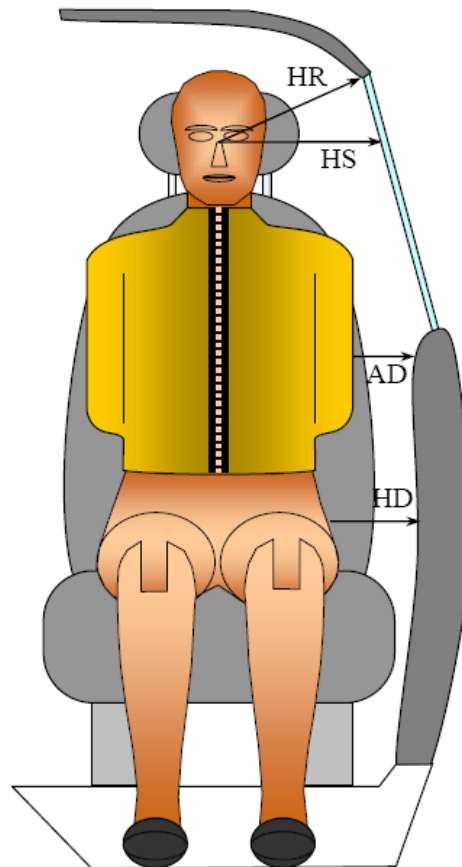
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Description	Driver (Serial No. DG8012)	
		Length (mm)	Angle (°)
HH	Head to Header	338	
HW	Head to Windshield	713	
HZ	Head to Roof Liner	219	
NR	Nose to Rim	265	
CD	Chest to Dash	438	
CS	Chest to Steering Wheel	218	
KD(L) / KDA(L)°	Left Knee to Dash	153	35.8
KD(R) / KDA(R)°	Right Knee to Dash	150	36.5
PAX°	Pelvic Tilt Angle (X-Axis)		19.4
PAY°	Pelvic Tilt Angle (Y-Axis)		0.3
PHX	Hip Point to Striker (X-Axis)	323	
PHZ	Hip Point to Striker (Z-Axis)	87	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2017 Cadillac XT5 SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20170111
Test Date: 10/11/2016



FRONT VIEW OF DUMMY

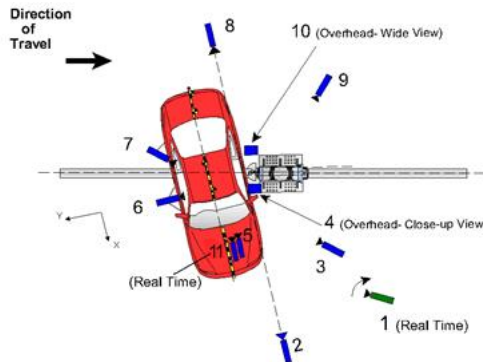
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver - Length (Serial No. DG8012)
HR	Head To Side Header	mm	267
HS	Head to Side Window	mm	388
AD	Arm to Door	mm	185
HD	Hip Point to Door	mm	178

DATA SHEET NO. 5 CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2017 Cadillac XT5 SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20170111
 Test Date: 10/11/2016



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Real-time (24 - 30 fps) pan view of impact				Zoom	60
2	Front ground level - impact view	6137	0	-1160	24	1000
3	Impact side 45° - forward pole view	5448	-1831	-1893	24	1000
4	Overhead Close-up view of impact	0	0	-5203	28	1000
5	Onboard - dummy front view				25	1000
6	Onboard - dummy side view				12.5	1000
7	Onboard - dummy rear oblique view				12.5	1000
8	Rear ground level - impact view	-7225	0	-1162	24	1000
9	Impact side 45° - rearward pole view	-3047	-4272	-1910	24	1000
10	Overhead wide - view of impact	-80	305	-5203	14	1000
11	Real-time (24 - 30 fps) - dummy front view				Zoom	60

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

Comments: All cameras operated as intended.

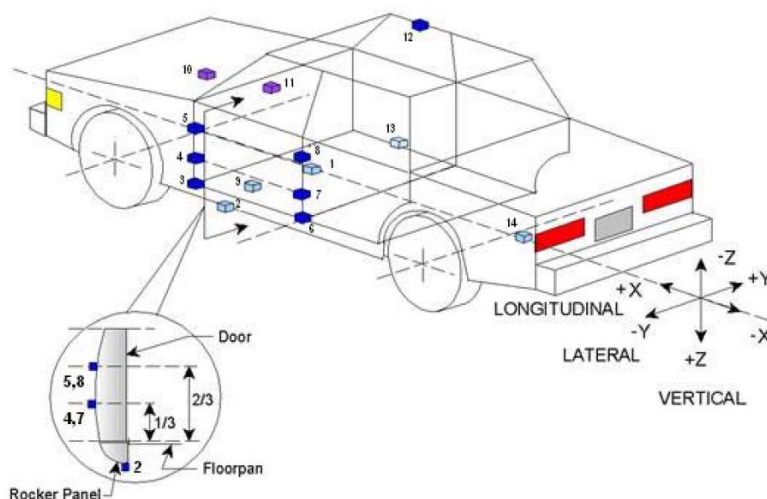
INSTRUMENTATION

Description	Number of Channels
Driver Dummy Channels	16
Vehicle Structure Accelerometers	18
Pole Load Cells	8
Total	42

DATA SHEET NO. 6 VEHICLE ACCELEROMETER DATA

Test Vehicle: 2017 Cadillac XT5 SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20170111
Test Date: 10/11/2016



TEST VEHICLE ACCELEROMETER LOCATIONS

No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2688	47	125
2	Left Floor Sill	2890	-720	-177
3	A-Pillar Sill	3308	-698	-167
4	A-Pillar Low	3323	-711	113
5	A-Pillar Mid	3248	-669	579
6	B-Pillar Sill	2210	-716	-176
7	B-Pillar Low	2242	-685	76
8	B-Pillar Mid	2207	-683	420
9	Driver Seat Track	2482	-572	-149
10	Engine Top	4203	-65	187
11	Firewall	3609	24	253
12	Right Roof	2308	476	1046
13	Right Floor Sill	2918	726	-177
14	Rear Floorpan	1093	3	-49

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

DATA SHEET NO. 7
RIGID POLE LOAD CELL DATA

Test Vehicle: 2017 Cadillac XT5 SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20170111
Test Date: 10/11/2016

POLE BARRIER



RIGID POLE LOAD CELL LOCATIONS

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

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

Test Vehicle: 2017 Cadillac XT5 SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20170111
Test Date: 10/11/2016

TEST DUMMY INFORMATION AND CONTACT POINTS

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

POST-TEST DOOR PERFORMANCE

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

POST-TEST SEAT PERFORMANCE

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

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

Test Vehicle: 2017 Cadillac XT5 SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20170111
Test Date: 10/11/2016

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	A-Pillar Buckled
Sill Separation	None
Windshield Damage	Cracks throughout with separation along driver's A-Pillar
Side Window Damage	Cracks throughout
Other Notable Effects	None

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

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

Measured Parameter	Units	Tolerance	Value
Vertical Impact Ref Line - Aft of Front Axle, Intended Impact Pt	mm		1158
Actual Impact Point - Aft of Front Axle	mm		1166
Horizontal Offset (+ forward / - rearward)	mm	+/- 38 *	-8
Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion	deg	75 +/- 3	75.0
Trap No. 1 Velocity - Primary	kph	31.4 to 33.0	32.79
Trap No. 2 Velocity - Redundant	kph	31.4 to 33.0	N/A**

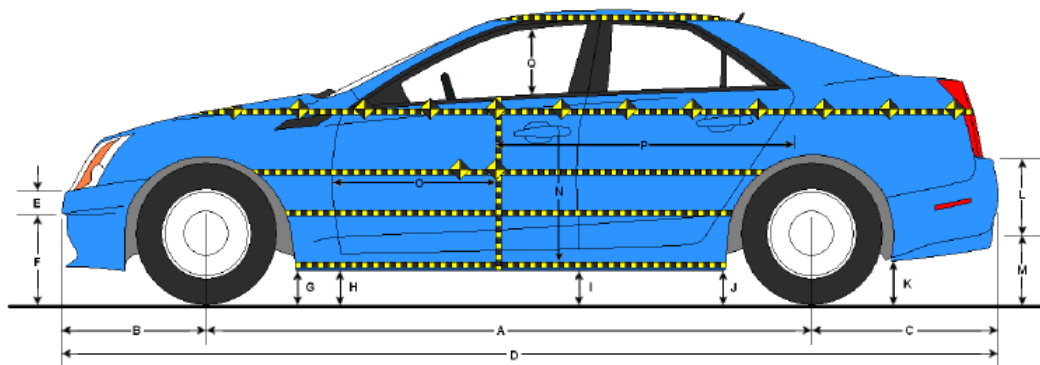
* Of Intended Impact Point

** Redundant speed trap malfunctioned

DATA SHEET NO. 9
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2017 Cadillac XT5 SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20170111
 Test Date: 10/11/2016



LEFT SIDE VIEW

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

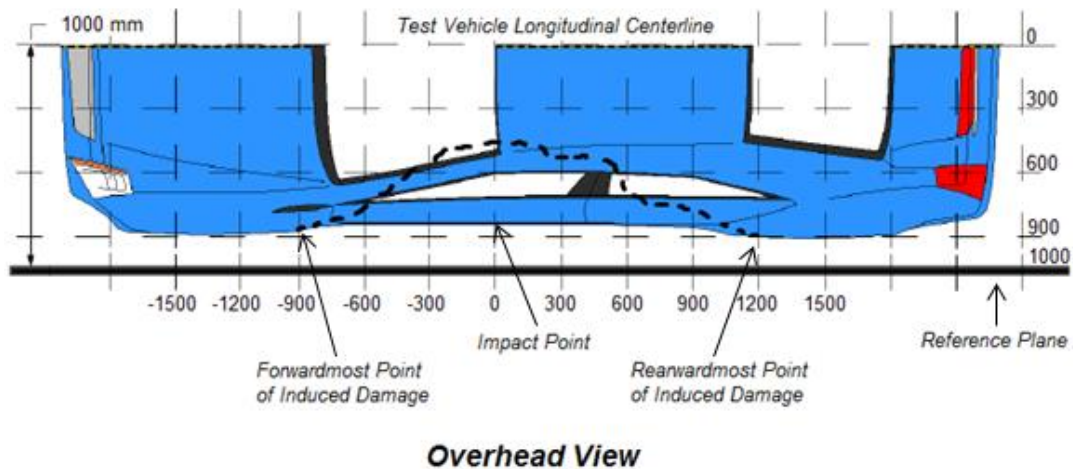
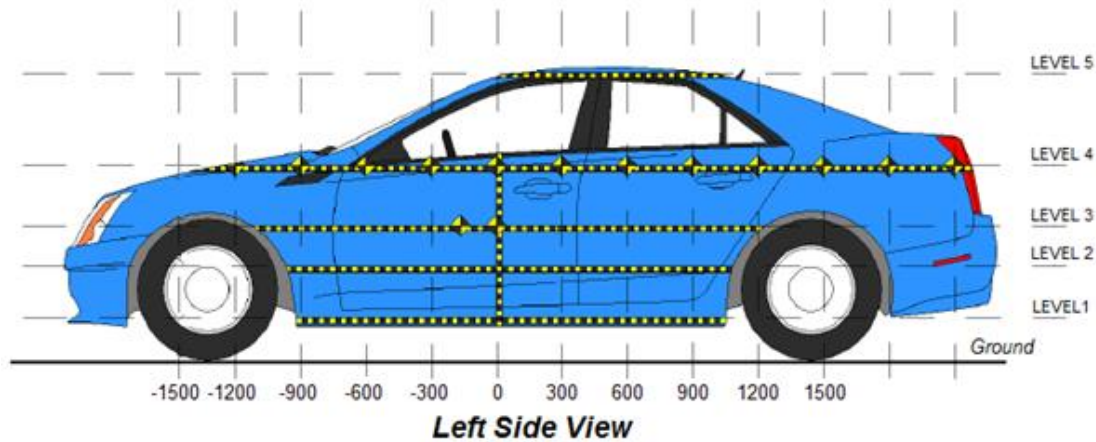
Code	Description	Pre-Test	Post-Test	Difference
A	Vehicle Wheelbase	2856	2766	90
B	Front Axle to FSOV	991	1067	-77
C	Rear Axle to RSOV	973	967	6
D	Total Length at Centerline	4819	4800	19
E	Front Bumper Thickness	120	120	0
F	Front Bumper Bottom to Ground	485	498	-13
G	Sill Height at Front Wheel Well	227	220	7
H	Sill Height at Front Door Leading Edge	236	233	3
I	Sill Height at B-Pillar	253	237	16
J1	Sill Height at Rear Wheel Well	260	265	-5
J2	Pinch Weld Height at Rear Wheel Well	284	300	-16
K	Sill Height Aft of Rear Wheel Well	308	303	5
L	Rear Bumper Thickness	170	170	0
M	Rear Bumper Bottom to Ground	457	438	19
N	Sill Height to Bottom of Front Window Sill	847	849	-2
O	Front Door Leading Edge to Impact CL	637	543	94
P	Rear Door Trailing Edge to Impact CL	1497	1426	71
Q	Front Window Opening	427	416	11
R	Right Side Length	4643	4635	8
S	Left Side Length	4647	4591	55
T	Vehicle Width at B-Pillars	1875	1807	68

* All measurements in mm with tolerance of $\pm 3\text{mm}$

DATA SHEET NO. 10
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2017 Cadillac XT5 SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20170111
 Test Date: 10/11/2016



MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	301	231	0
2	Occupant Hip Point	mm	676	312	0
3	Mid - Door	mm	731	314	0
4	Window Sill	mm	1077	278	0
5	Window Top	mm	1619	43	150

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

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

Test Vehicle: 2017 Cadillac XT5 SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20170111
 Test Date: 10/11/2016

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

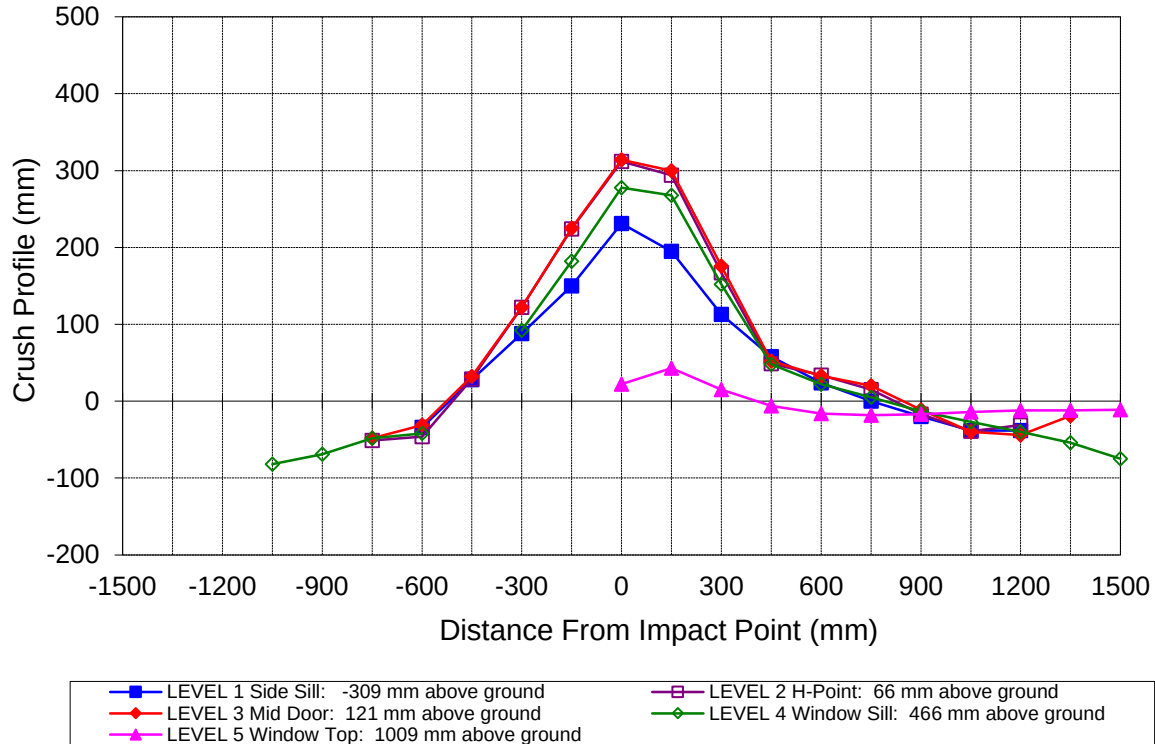
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1500															
-1350															
-1200															
-1050				825					907					-82	
-900				845					914					-69	
-750		948	945	851			999	993	899			-51	-48	-48	
-600	899	932	931	862		933	978	962	904		-34	-46	-31	-42	
-450	887	928	929			859	899	897			28	29	32		
-300	875	927	928	875		787	805	806	783		88	122	122	92	
-150	866	926	928	880		716	702	703	698		150	224	225	182	
0	861	926	928	883	563	630	614	614	605	541	231	312	314	278	22
150	856	926	928	884	592	661	632	628	616	549	195	294	300	268	43
300	849	925	927	884	599	736	758	751	732	584	113	167	176	152	15
450	842	924	927	887	602	784	875	875	839	608	58	49	52	48	-6
600	835	922	924	895	602	811	888	891	873	618	24	34	33	22	-16
750	830	920	922	896	601	830	905	902	891	619	0	15	20	5	-18
900	830	920	921	894	597	850	937	932	907	614	-20	-17	-11	-13	-17
1050	838	920	921	892	593	876	959	961	919	607	-38	-39	-40	-27	-14
1200	841	925	926	889	585	879	956	970	929	597	-38	-31	-44	-40	-12
1350			937	887	575			956	941	587			-19	-54	-12
1500				884	559				959	570				-75	-11

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

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

Test Vehicle: 2017 Cadillac XT5 SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20170111
 Test Date: 10/11/2016



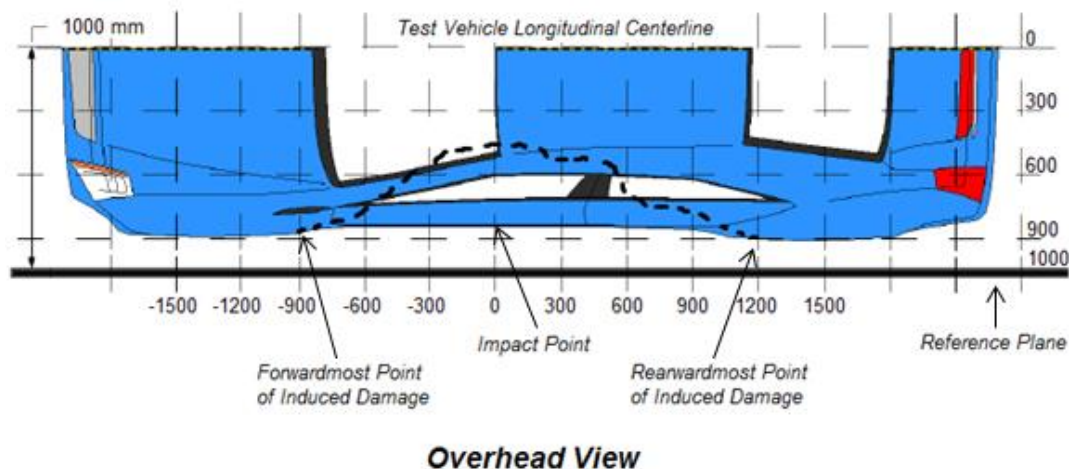
Vehicle Exterior Crush Measurements - Visual Representation

DATA SHEET NO. 11 VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2017 Cadillac XT5 SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20170111
Test Date: 10/11/2016

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	-750	3	7	55	-48
2	-330	3	176	72	104
3	90	3	378	72	306
4	510	3	119	74	45
5	930	3	62	79	-17
6	1350	3	44	63	-19

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

Test Vehicle: <u>2017 Cadillac XT5 SUV</u>	NHTSA No.: <u>M20170111</u>
Test Program: <u>NCAP Side MDB Impact Test</u>	Test Date: <u>10/11/2016</u>
Test Time: <u>11:05 AM</u>	Temperature: <u>21° C</u>

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

FMVSS NO. 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	74	300	374
90° to 180°	66	300	366
180° to 270°	61	300	361
270° to 360°	67	300	367

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE

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

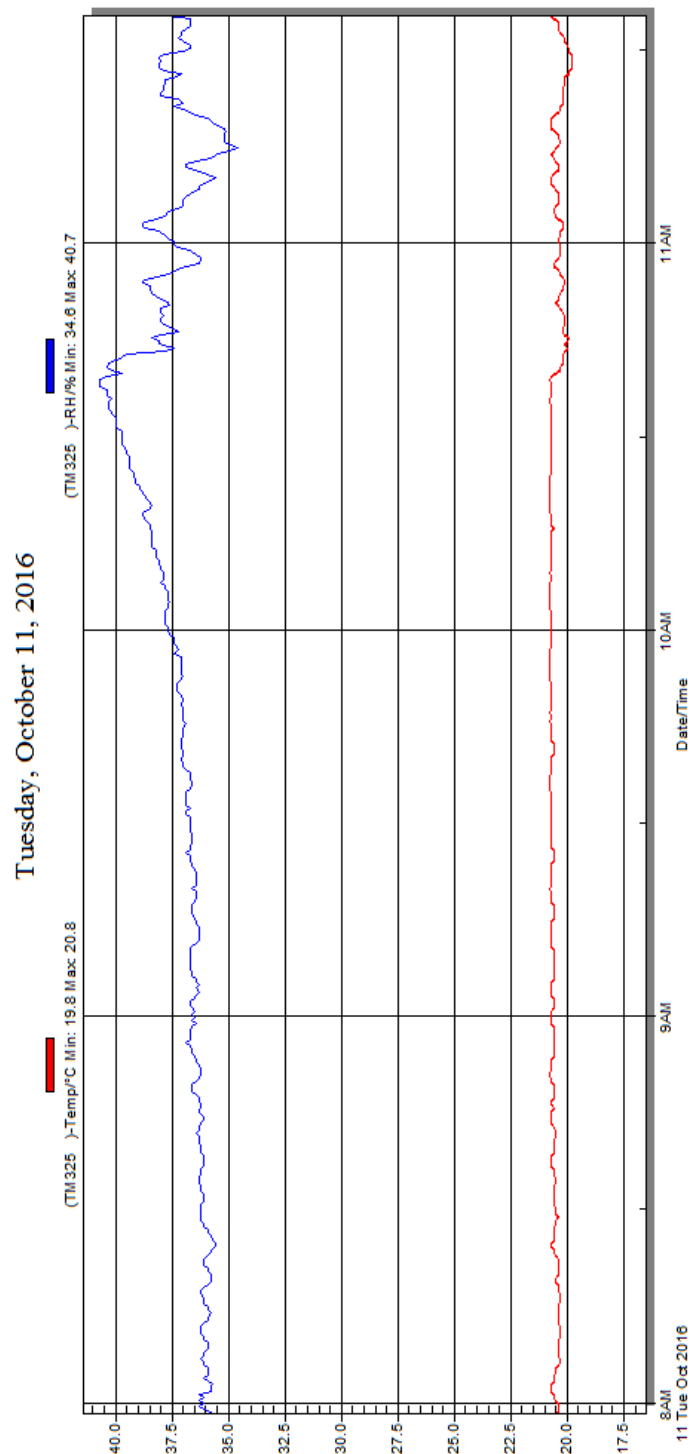
ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0° to 90°	No Spillage Occurred
90° to 180°	No Spillage Occurred
180° to 270°	No Spillage Occurred
270° to 360°	No Spillage Occurred

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

Test Vehicle: 2017 Cadillac XT5 SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20170111
 Test Date: 10/11/2016



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

APPENDIX A
PHOTOGRAPHS

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



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



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



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



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



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



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



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



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



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



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



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



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



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



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

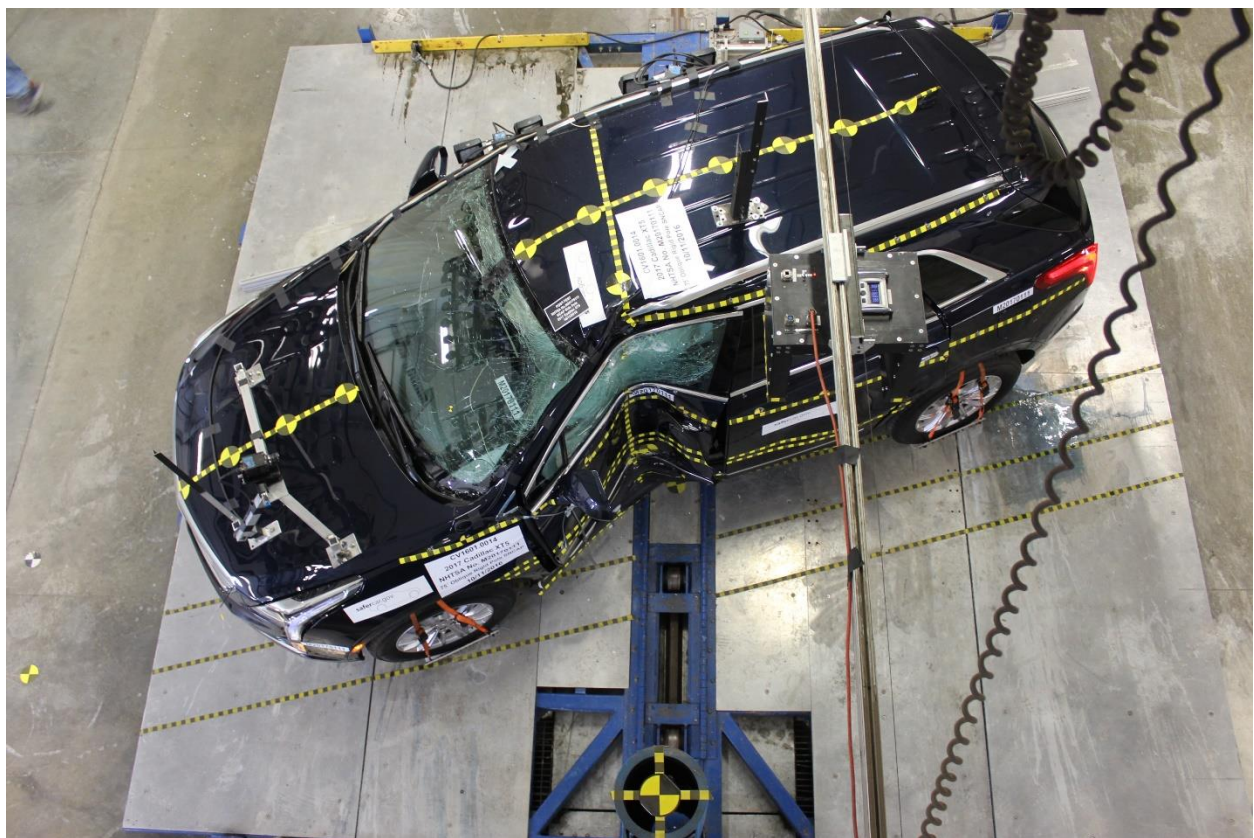


Figure A-16: Post-Test Overhead View of Test Area



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



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

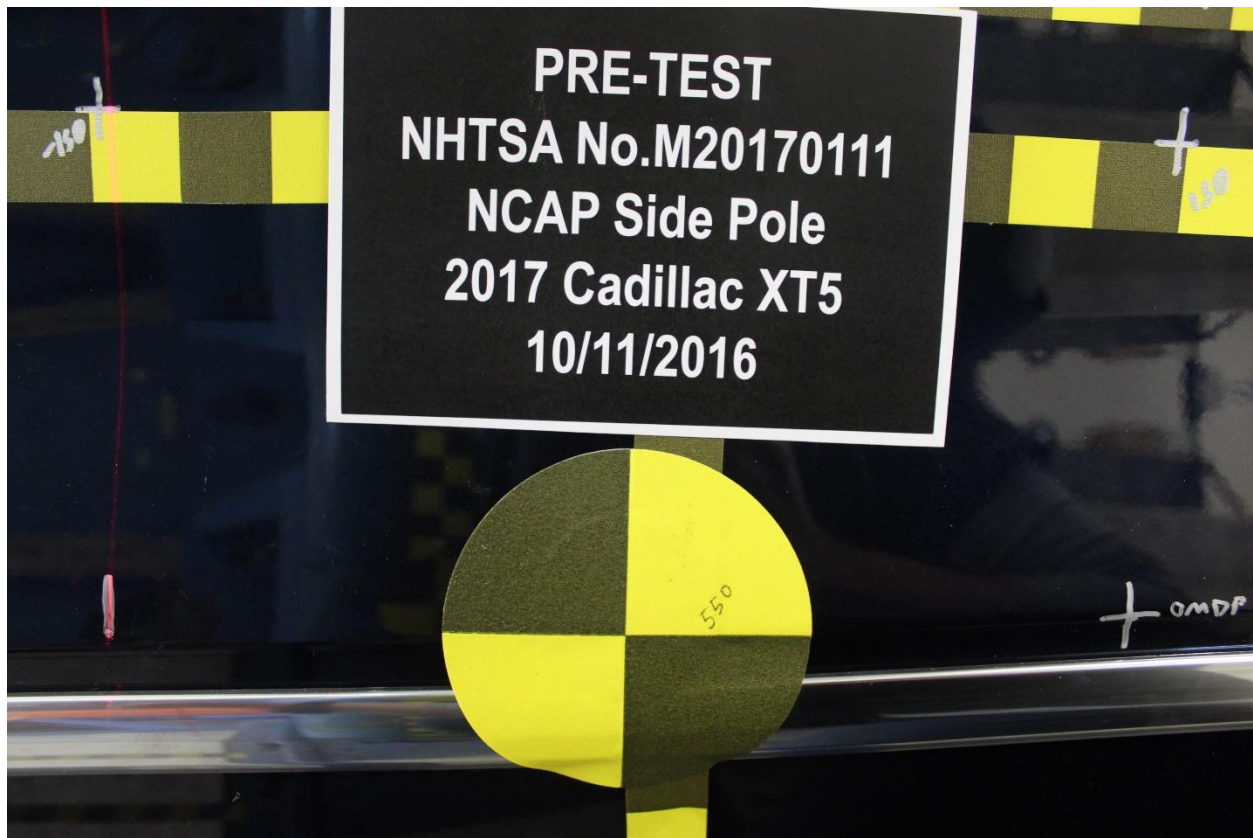


Figure A-19: Pre-Test Close-Up View of Impact Point Target



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



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



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



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

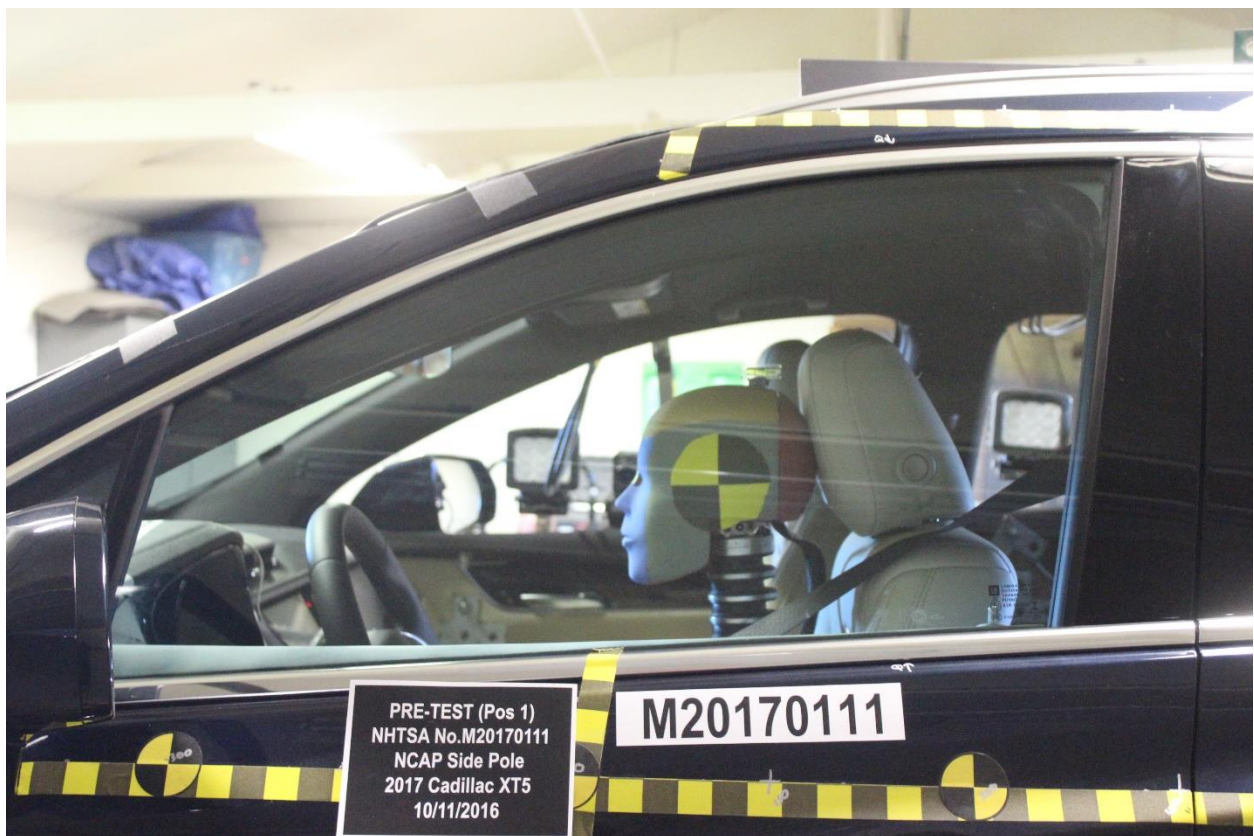


Figure A-24: Pre-Test Left Side View of Dummy Shoulder and Door Top View



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



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

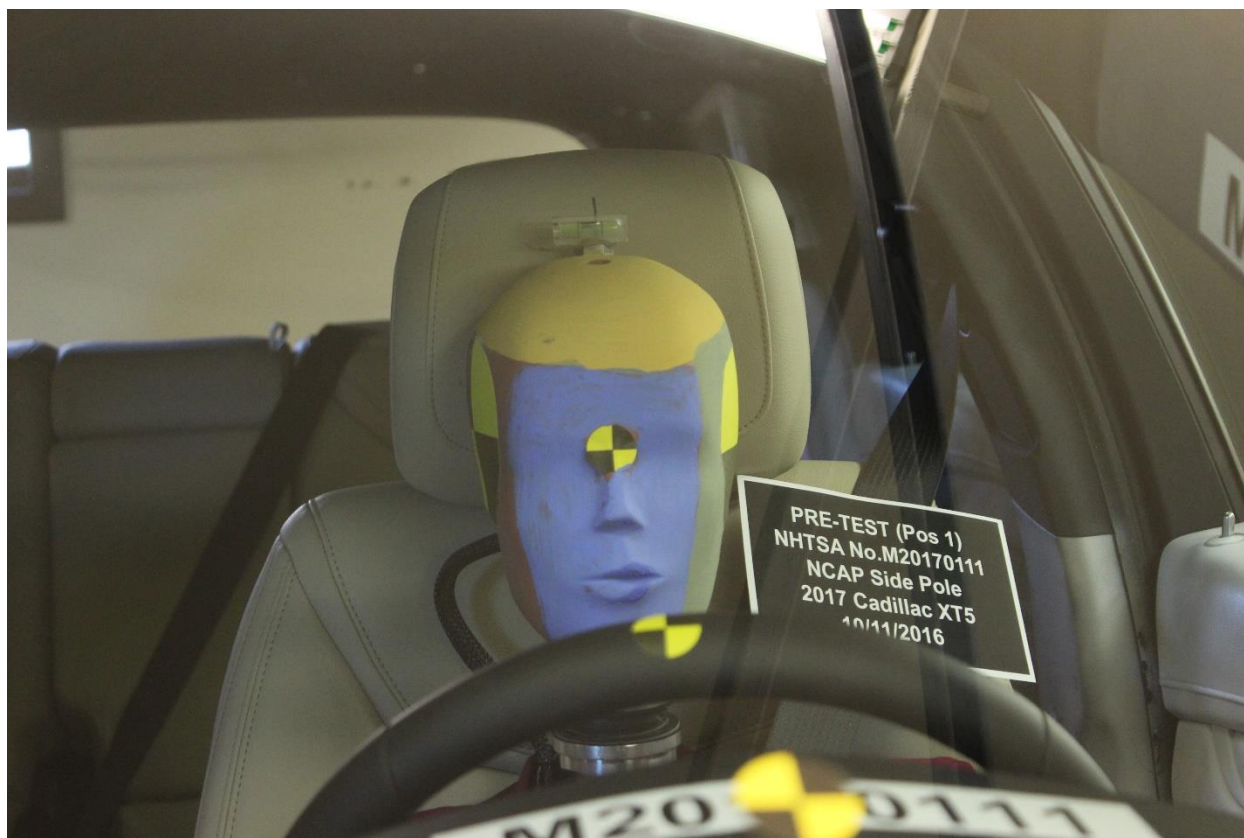


Figure A-27: Pre-Test Frontal Close-Up View of Dummy Head / Shoulders in Relation to Head Restraint



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



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

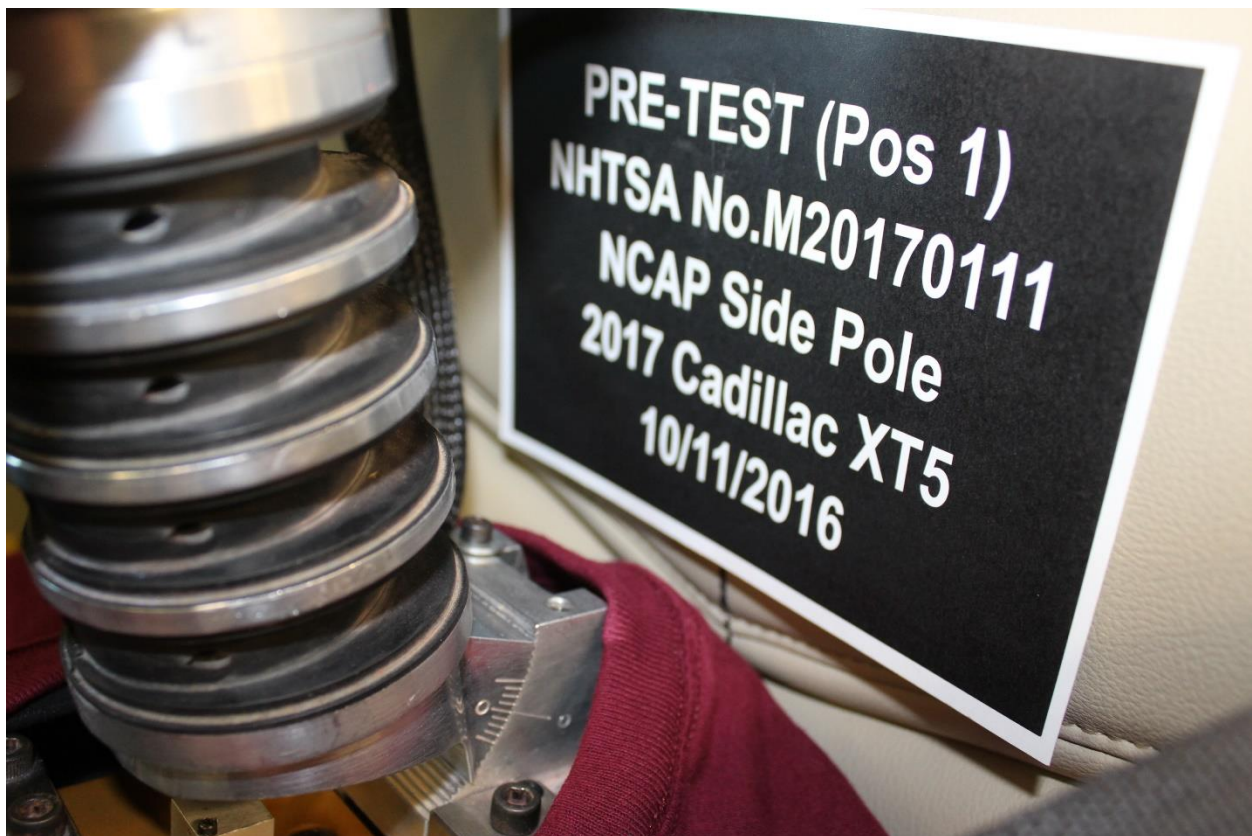


Figure A-30: Pre-Test Left Side View of Dummy's Neck Showing Position of Adjustable Neck Bracket

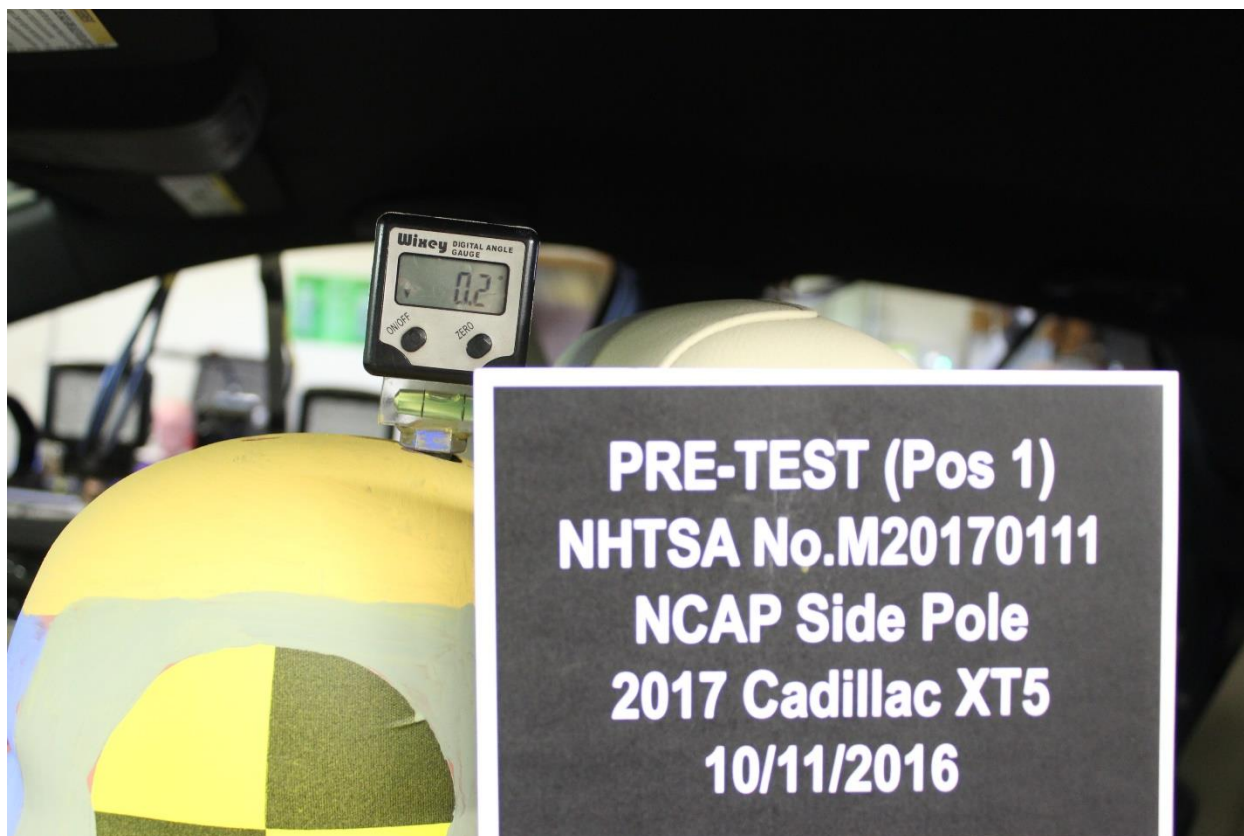


Figure A-31: Pre-Test Left Side View of Dummy's Head Showing Dummy's Head is Level



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



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



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



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

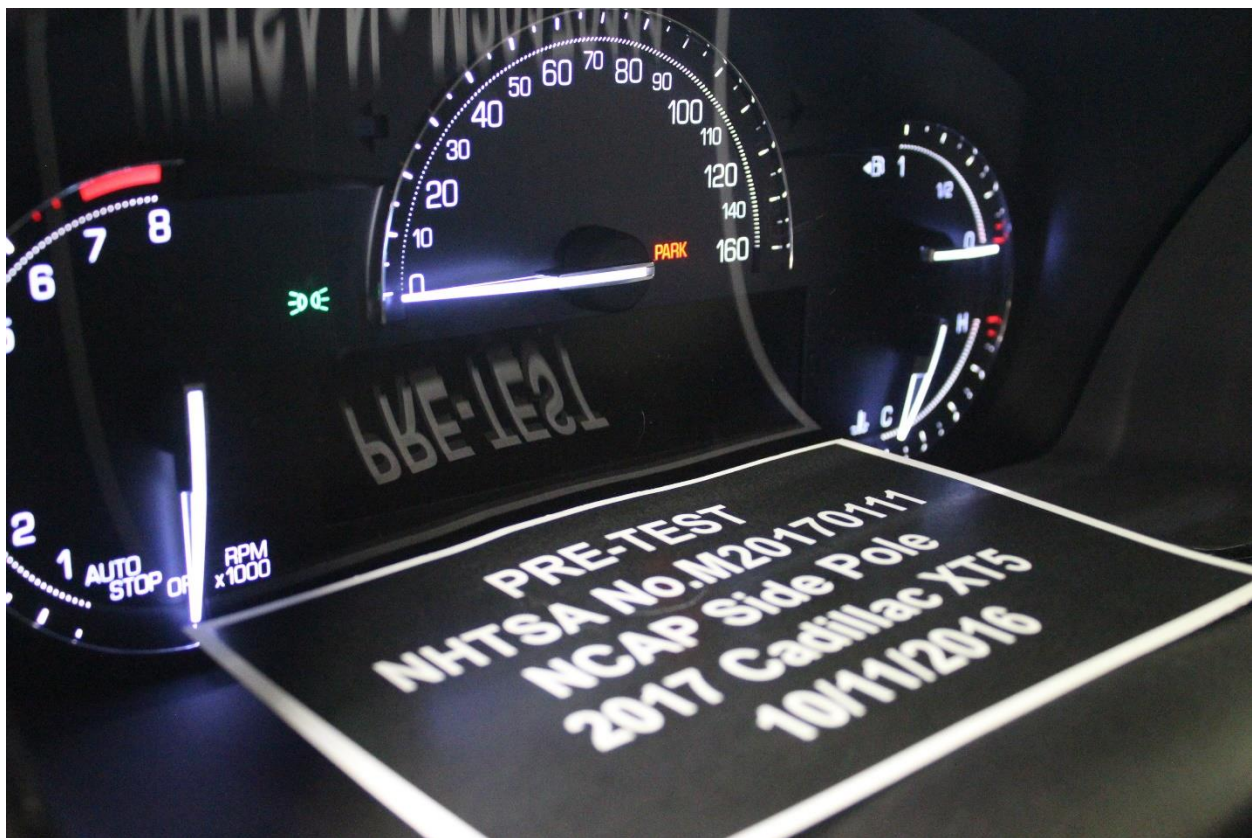


Figure A-36: Pre-Test View of Parking Brake



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

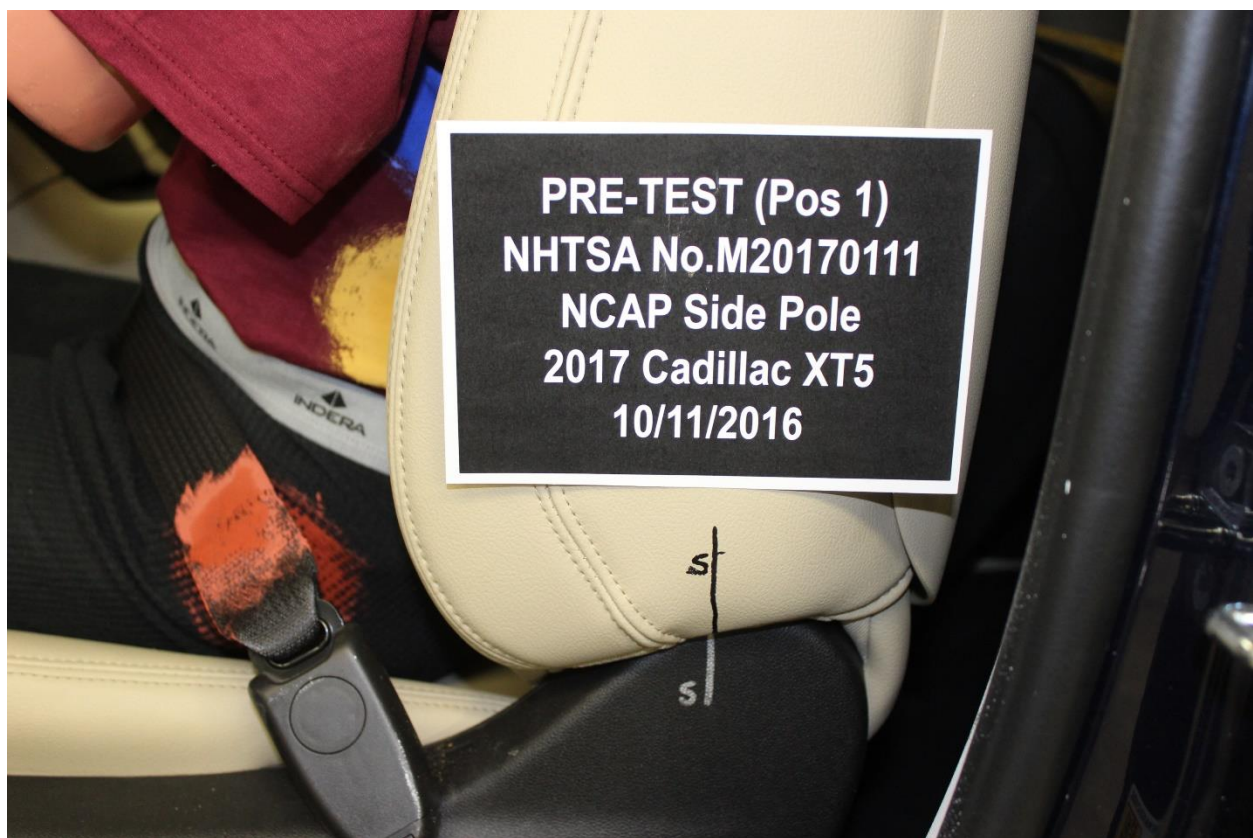


Figure A-38: Pre-Test Close-Up Left Side View of Driver Seat Back

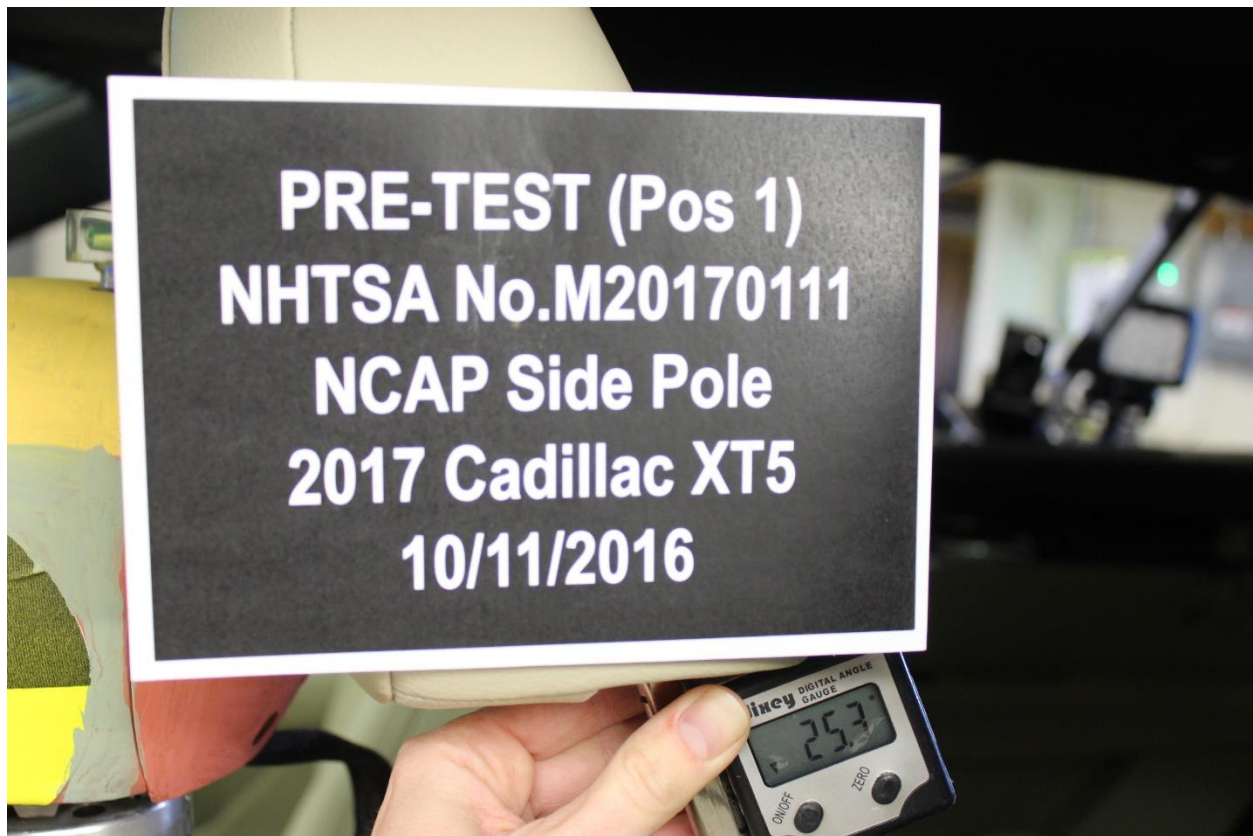


Figure A-39: Pre-Test Close-Up View of Driver Seat Back or Head Restraint

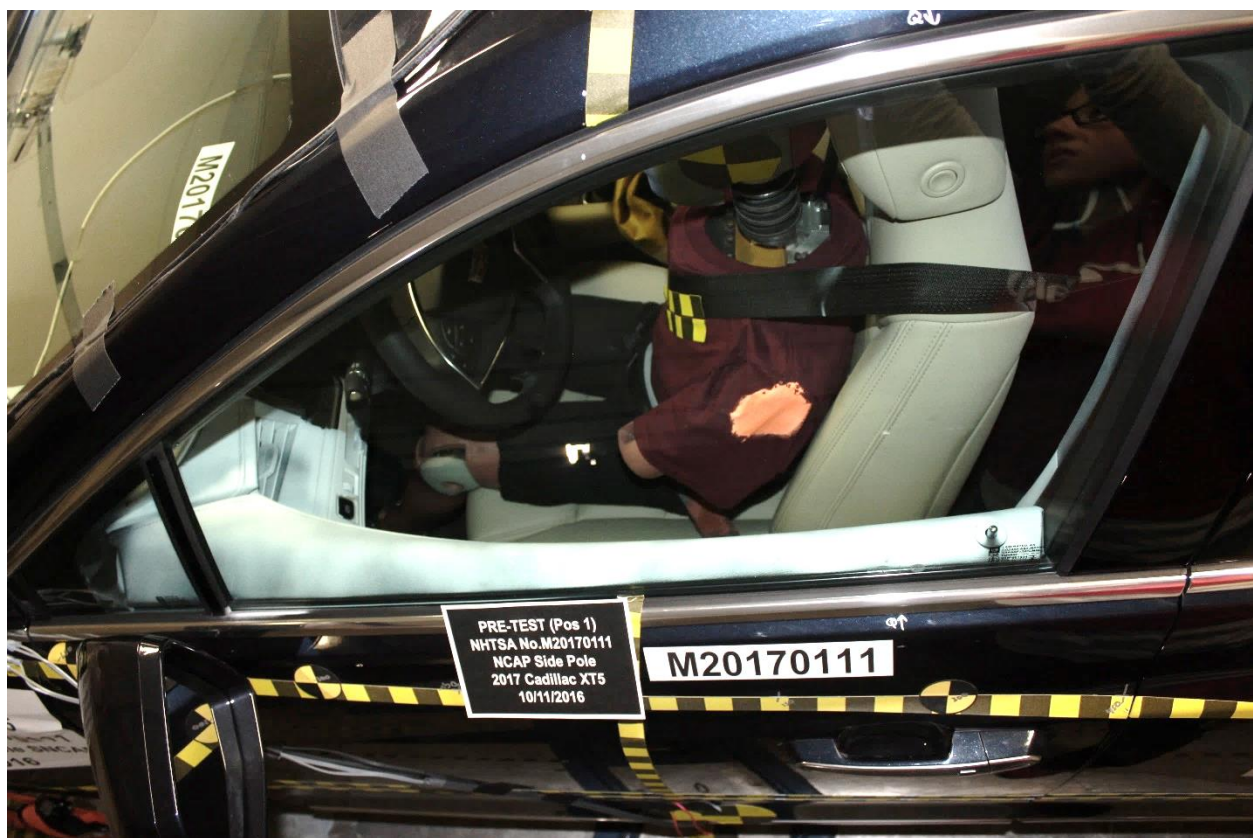


Figure A-40: Pre-Test Dummy and Door Clearance View

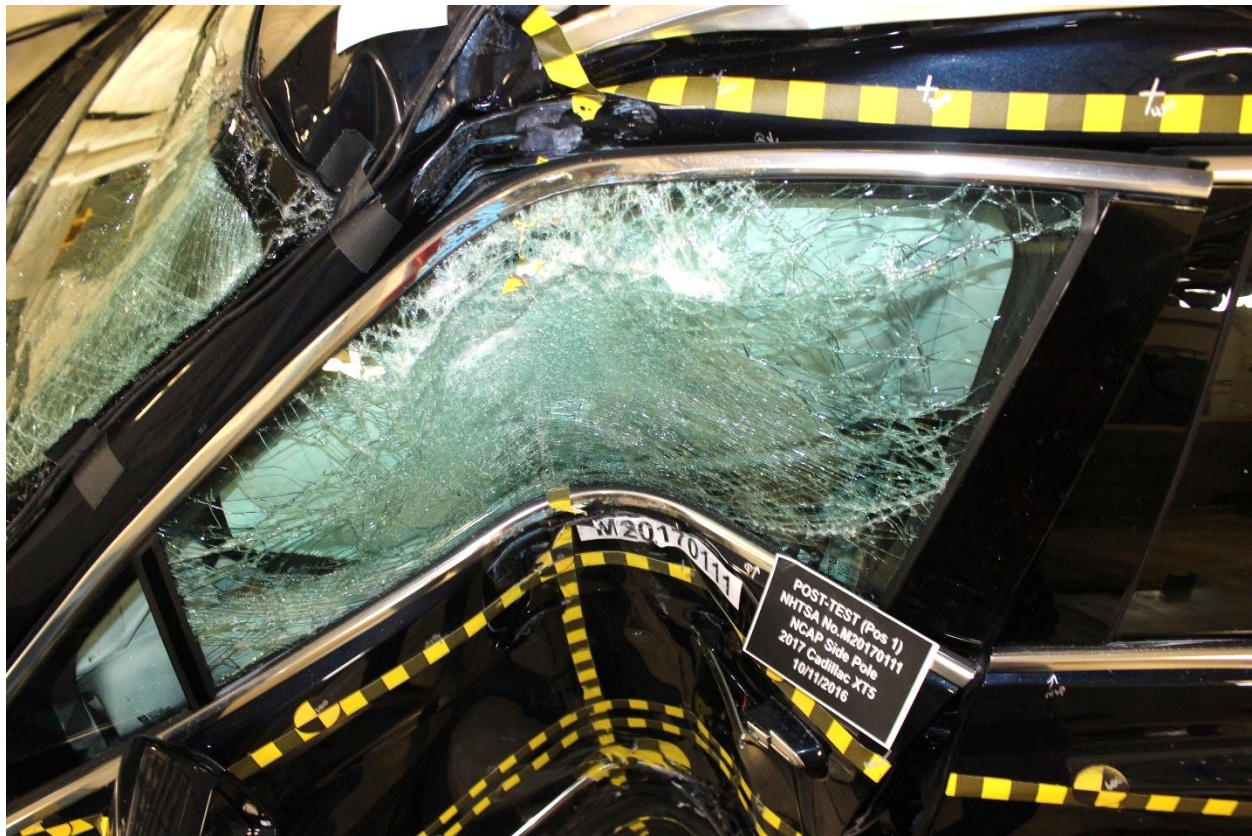


Figure A-41: Post-Test Dummy and Door Clearance View



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



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



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



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



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



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



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



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



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

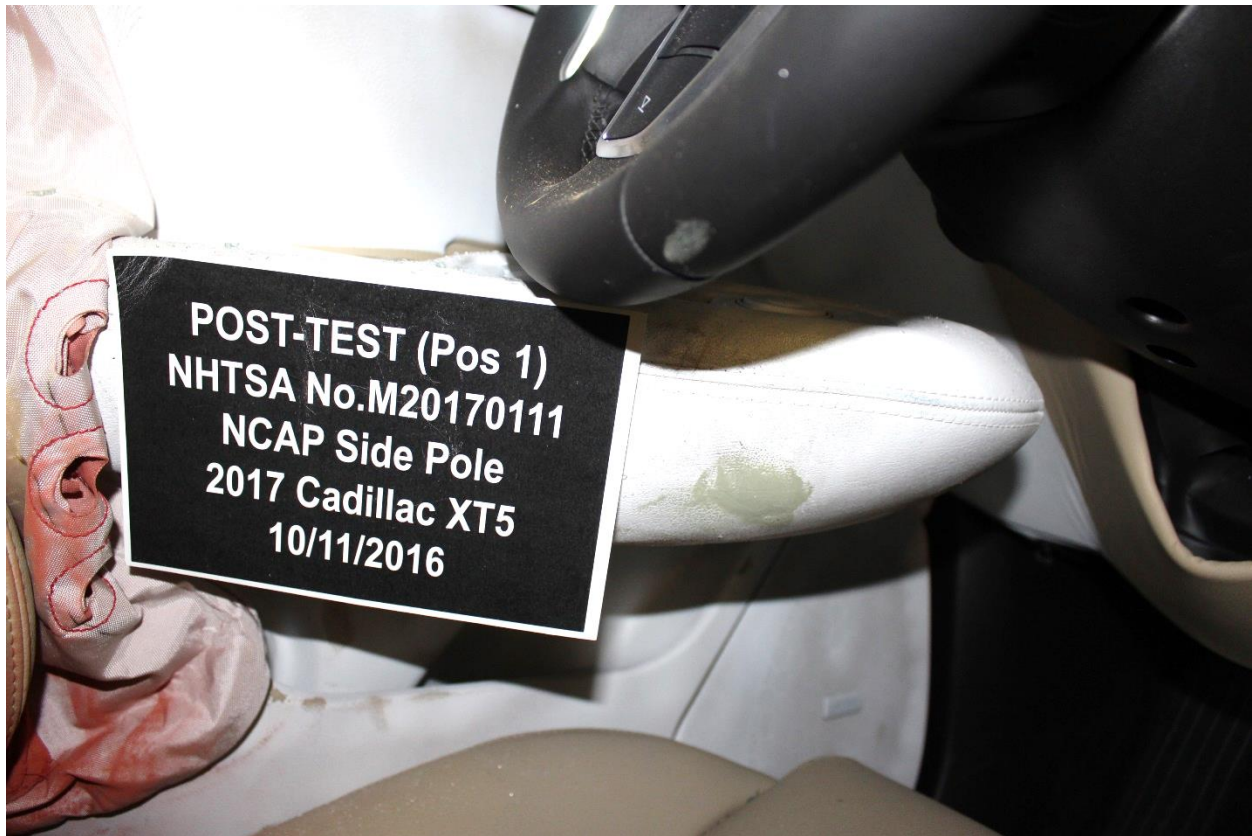


Figure A-51: Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View



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



Figure A-53: Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



Figure A-54: Post-Test View of Fuel Filler Cap or Fuel Filler Neck

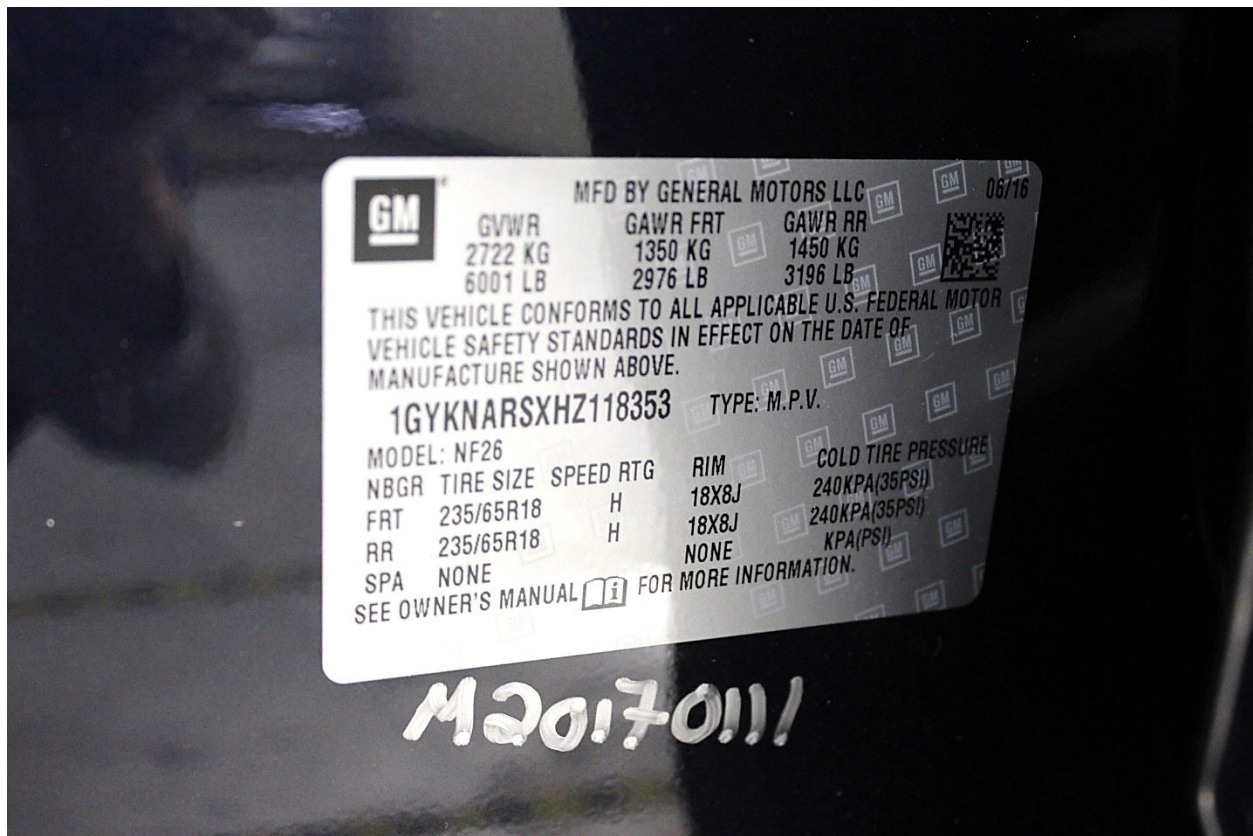


Figure A-55: Close-Up View of Vehicle's Certification Label

Photo Not Applicable

Figure A-55a: Close-Up View of Reduced Load Capacity Label

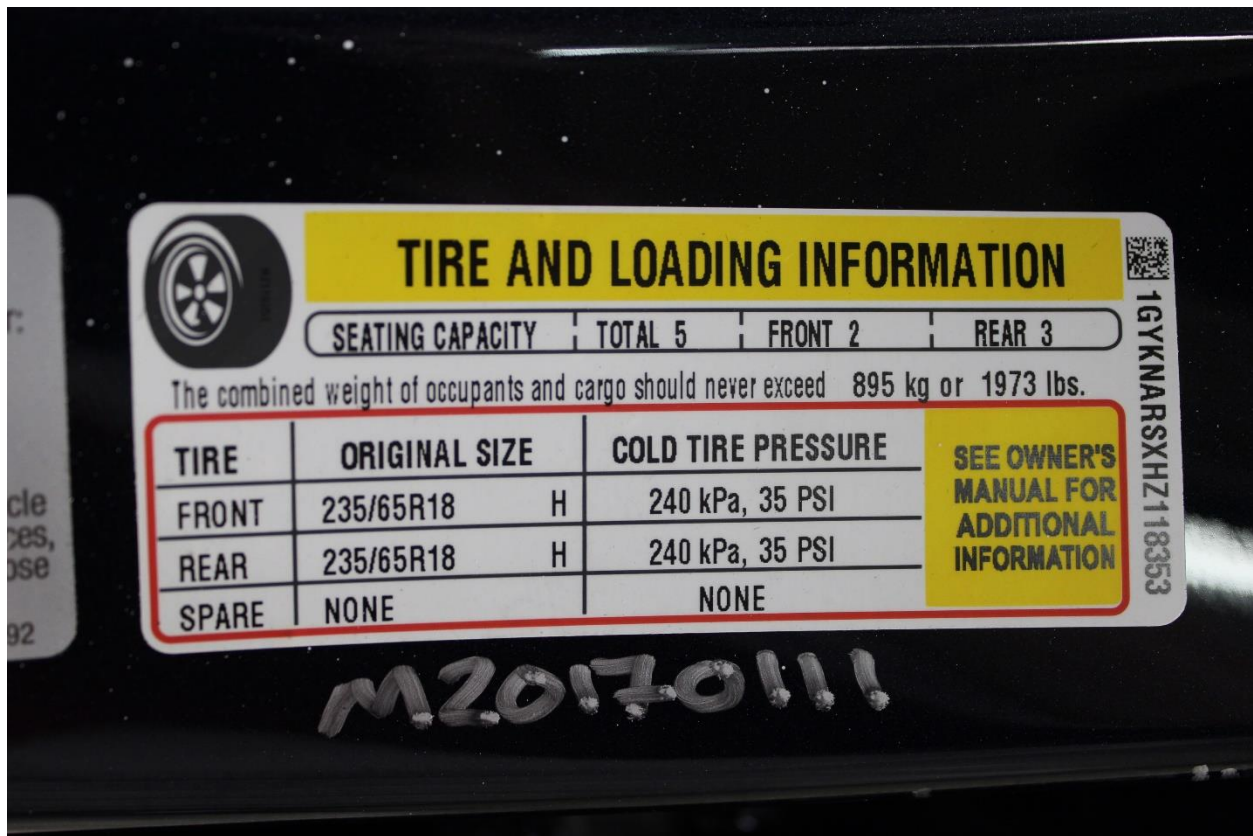


Figure A-56: Close-Up View of Vehicle's Tire Information Placard or Label

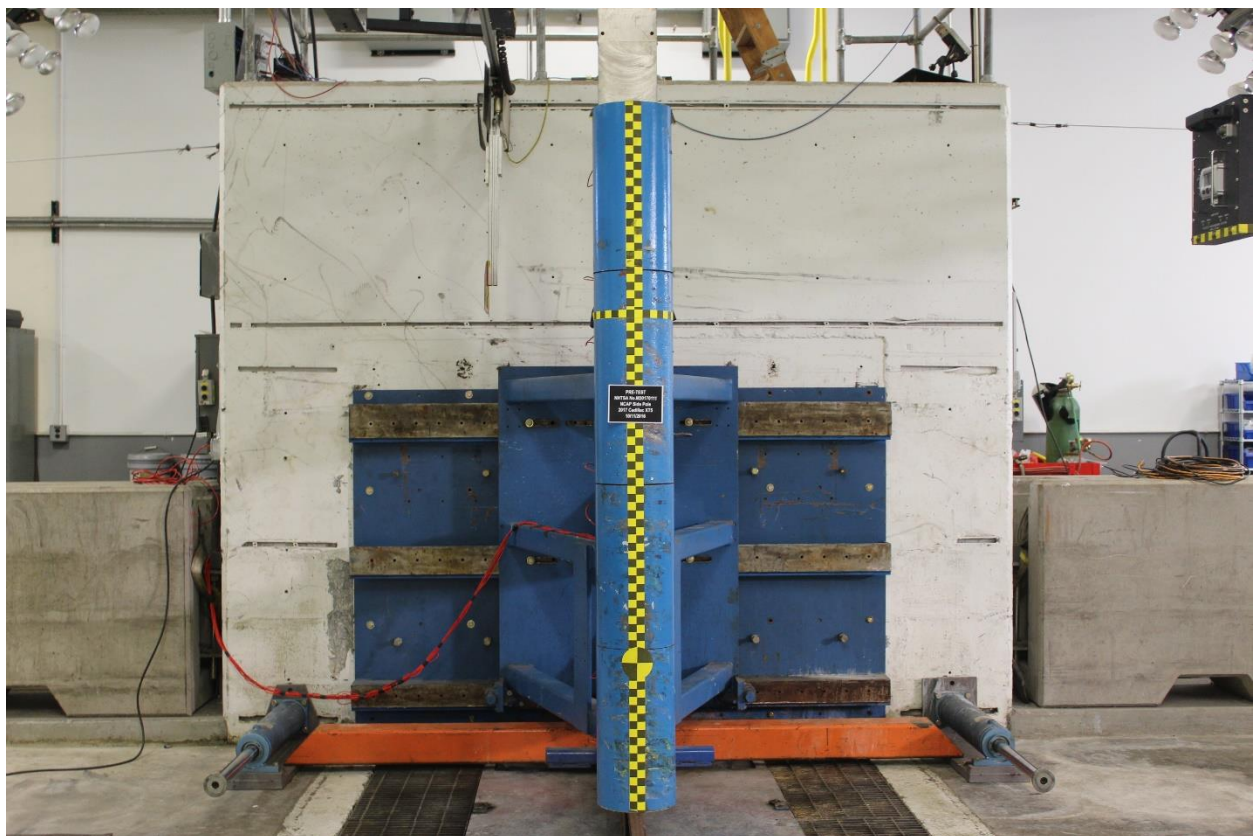


Figure A-57: Pre-Test Pole Barrier Front View

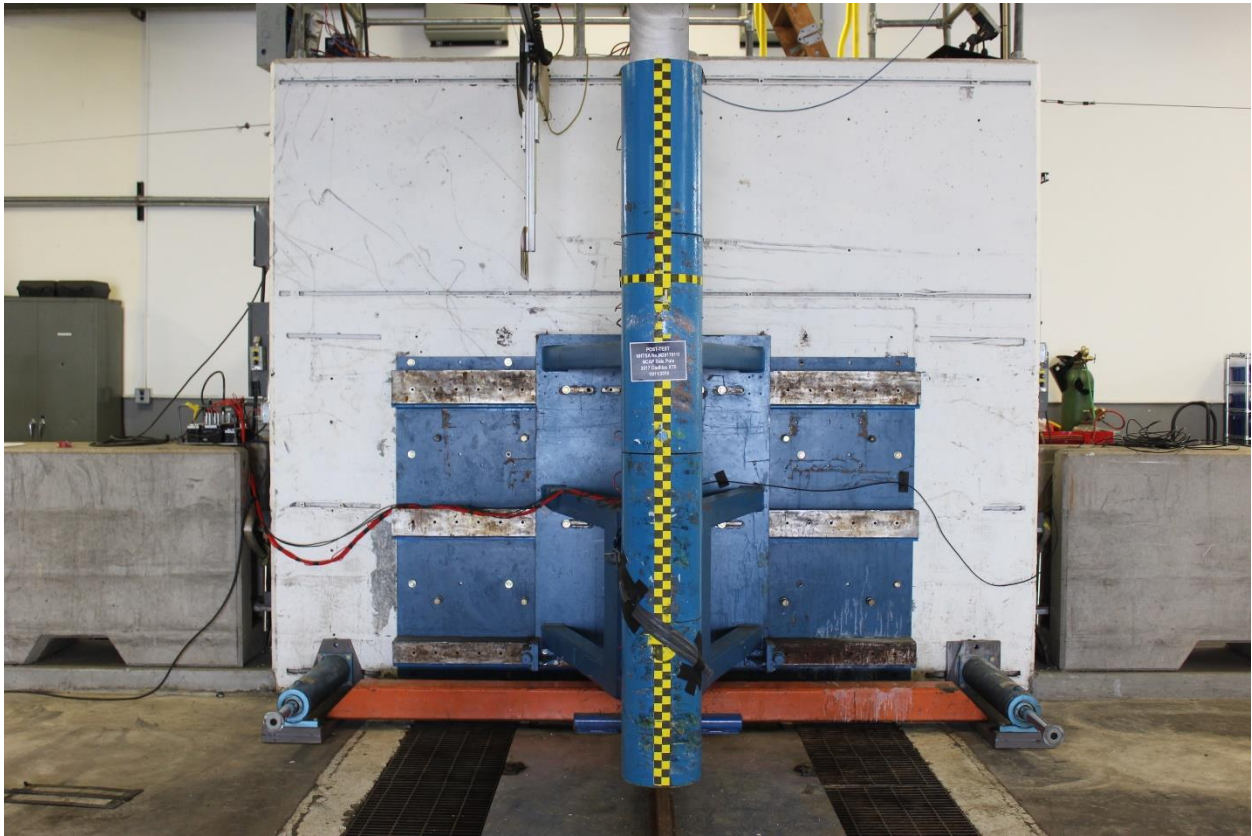


Figure A-58: Post-Test Pole Barrier Front View



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



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

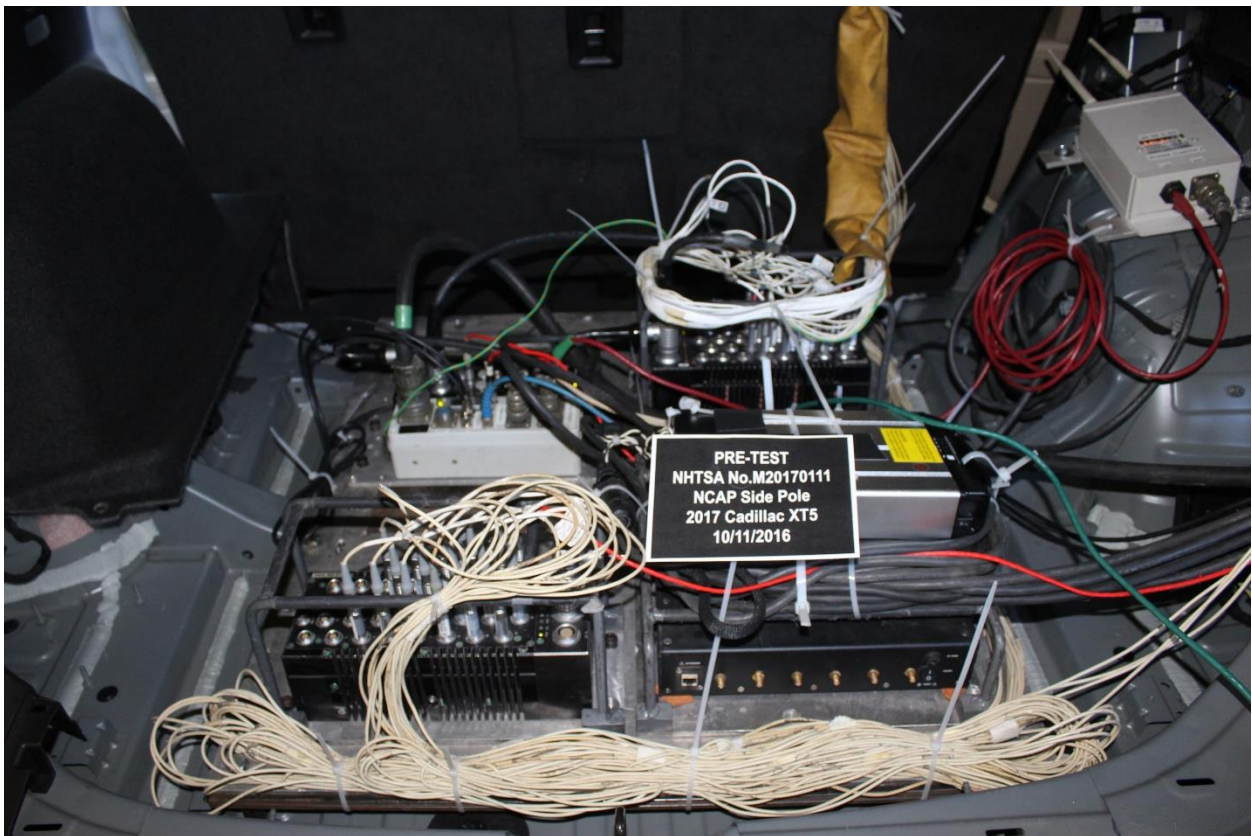


Figure A-61: Pre-Test Ballast View



Figure A-62: Post-Test Primary and Redundant Speed Trap Read-Out



Figure A-63: FMVSS No. 301 Static Rollover 0 Degrees

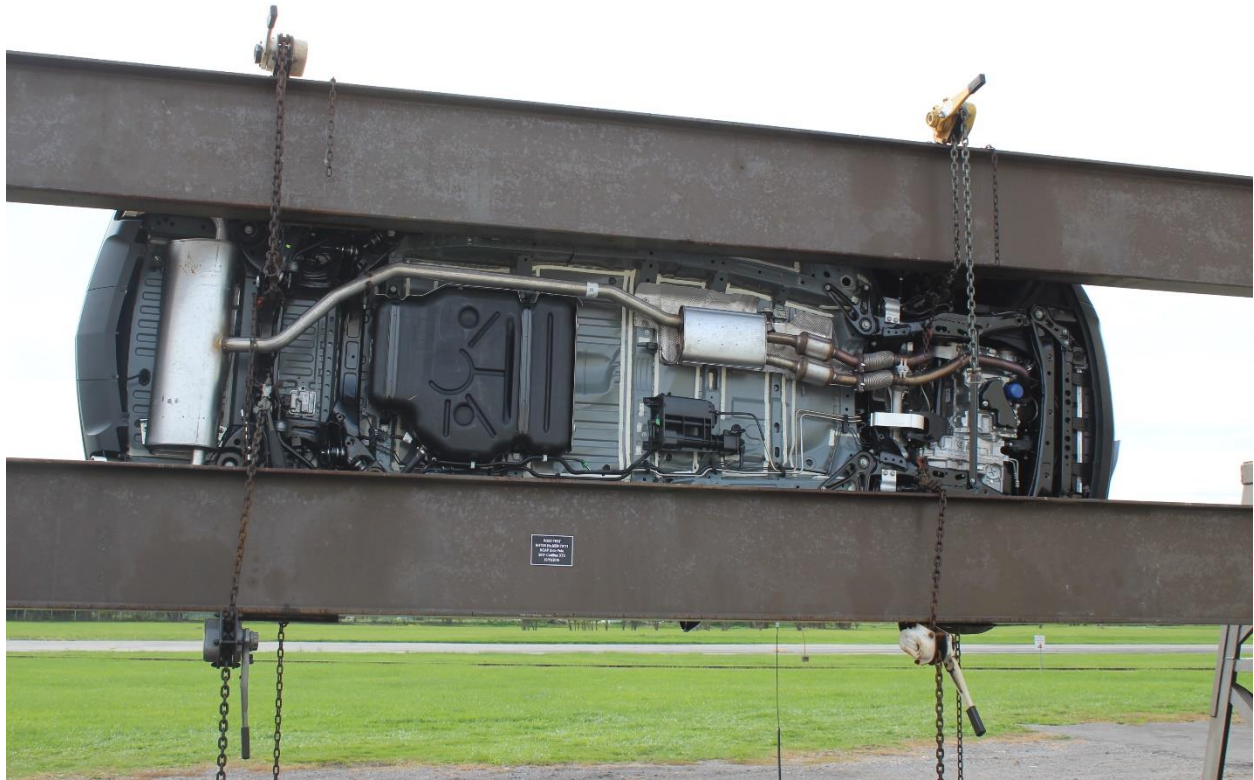


Figure A-64: FMVSS No. 301 Static Rollover 90 Degrees



Figure A-65: FMVSS No. 301 Static Rollover 180 Degrees



Figure A-66: FMVSS No. 301 Static Rollover 270 Degrees



Figure A-67: FMVSS No. 301 Static Rollover 360 Degrees



Figure A-68: Impact Event

2017 XT5 FWD

EXTERIOR: DARK ADRIATIC BLUE METALLIC
INTERIOR: SAHARA BEIGE/JET BLACK ACCENTS

ENGINE: 3.6L V6, DI, VVT, W/ TRANSMISSION: 8-SPD AUTOMATIC

STANDARD EQUIPMENT
(ITEMS FEATURED BELOW ARE INCLUDED AT NO EXTRA CHARGE IN THE STANDARD VEHICLE PRICE SHOWN.)

CADILLAC OWNER BENEFITS

- 4 YEAR / 50,000 MILE* BUMPER-TO-BUMPER LIMITED WARRANTY
- 4 YEAR / 50,000 MILE* PREMIUM CARE MAINTENANCE
- 6 YEAR / 70,000 MILE* COURTESY TRANSPORTATION
- 6 YEAR / 70,000 MILE* ROADSIDE ASSISTANCE
- 6 YEAR / 70,000 MILE* POWERTRAIN LIMITED WARRANTY
- *WHICHEVER COMES FIRST. SEE DEALER FOR DETAILS.
- ONSTAR(R) INCLUDES 5 YR BASIC PLAN PLUS 1 YR SERVICE BY AUTOMATIC CRASH RESPONSE, NAVIGATION & MORE. (SUBJECT TO TERMS SEE ONSTAR.COM)
- 4G LTE Wi-Fi(R) HOTSPOT WITH

PERFORMANCE

- ENGINE: 3.6L V6, DI, VVT, W/ AUTOMATIC STOP-START
- TRANSMISSION: 8-SPD AUTOMATIC
- WHEELS: 18" PAINTED CAST ALUMINUM

LUXURY & CONVENIENCE

- CUE(R) INFO & MEDIA CONTROL
- AM/FM STEREO WITH 8" COLOR DIAGONAL DISPLAY APPLE CARPLAY(R) CAPABILITY PROVIDED BY APPLE(R) AVAIL. WITH COMPATIBLE SMARTPHONES
- XM RADIO + SERVICE SUBSCRIPTION SOLD SEPARATELY BY SIRIUSXM(R) AFTER 3 MONTHS
- AUD. SYSTEM BOSE(R) 8 SPEAKER
- UNIVERSAL HOME REMOTE
- LIFTGATE, REAR POWER WITH

MEMORY HEIGHT

- WIRELESS DEVICE CHARGING
- EZ KEY PASSIVE ENTRY SYSTEM
- STEERING COLUMN, POWER TILT & TELESCOPIC

SAFETY & SECURITY

- AIR BAGS, DRIVER AND FRONT PASSENGER (DUAL STAGE PASS)
- FRONT AND REAR HEAD CURTAIN, DRIVER SIDE KNEE
- REAR VISION CAMERA
- REAR PARK ASSIST

OPTIONS & PRICING

MANUFACTURER'S SUGGESTED RETAIL PRICE

STANDARD VEHICLE PRICE	\$38,995.00
OPTIONS INSTALLED BY THE MANUFACTURER (DO NOT REPLACE STANDARD EQUIPMENT SHOWN)	
DARK ADRIATIC BLUE METALLIC	495.00
TOTAL OPTIONS	\$495.00

Visit us at www.cadillac.com

TOTAL VEHICLE & OPTIONS	\$39,490.00
DESTINATION CHARGE	995.00
TOTAL VEHICLE PRICE*	\$40,485.00

EPA DOT Fuel Economy and Environment
These estimates reflect new EPA methods beginning with 2017 models.

22 MPG
combined city/hwy

19 city 27 highway

4.5 gallons per 100 miles

You spend \$1,250 more in fuel costs over 5 years
compared to the average new vehicle.

GOVERNMENT 5-STAR SAFETY RATINGS

This vehicle has not been rated by the government for overall vehicle score, frontal crash, side crash or rollover risk.

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

PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS CARLINE:
U.S./CANADIAN PARTS CONTENT: 65%

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

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

Annual fuel cost \$1,650

Fuel Economy & Greenhouse Gas Rating (tailpipe only)

5 (Best)

This vehicle emits 330 grams CO₂ per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions. See www.fueleconomy.gov.

Smog Rating (tailpipe only)

5 (Best)

This vehicle emits 100 grams of smog-forming pollutants per mile (tailpipe only). The best emits 0 grams per mile (tailpipe only). Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 26 MPG and costs \$7,000 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$2.45 per gallon. MPGe is miles per gallon gasoline equivalent. Vehicle emissions are a significant cause of climate change and smog.

fueleconomy.gov
Calculate personalized estimates and compare vehicles

OnStar 4G LTE

Equipped with the safety and connectivity of OnStar:

Visit onstar.com for details

UL
1GA014691

DEALER TO WHOM DELIVERED
WEST HERR BUICK GMC CADILLAC OF EAS
555 MAIN ST
EAST AURORA, NY 14052-1703

Figure A-69: Monroney Label

Head Restraints

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

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.

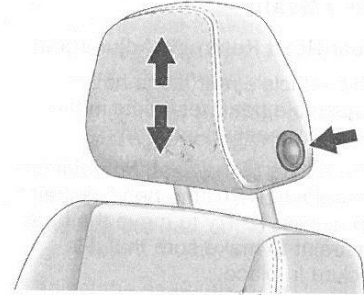
If your vehicle has rear head restraints that fold down, always return them to the full upright position whenever an occupant is seated in the seat.



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.

Figure A-70: Head Restraint Use and Adjustment Information from Vehicle Owner's Manual



Figure A-71: Post-Test View of Shattered Vehicle Inner Door Panel (if applicable)

APPENDIX B

VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

Driver Dummy Instrumentation Plots

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

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

Additional Driver Dummy Instrumentation Data

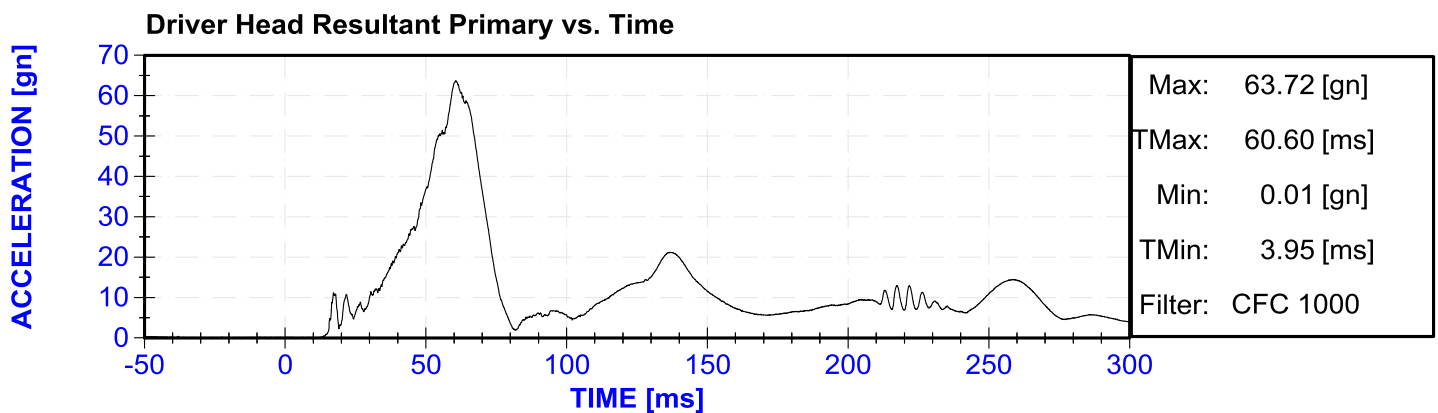
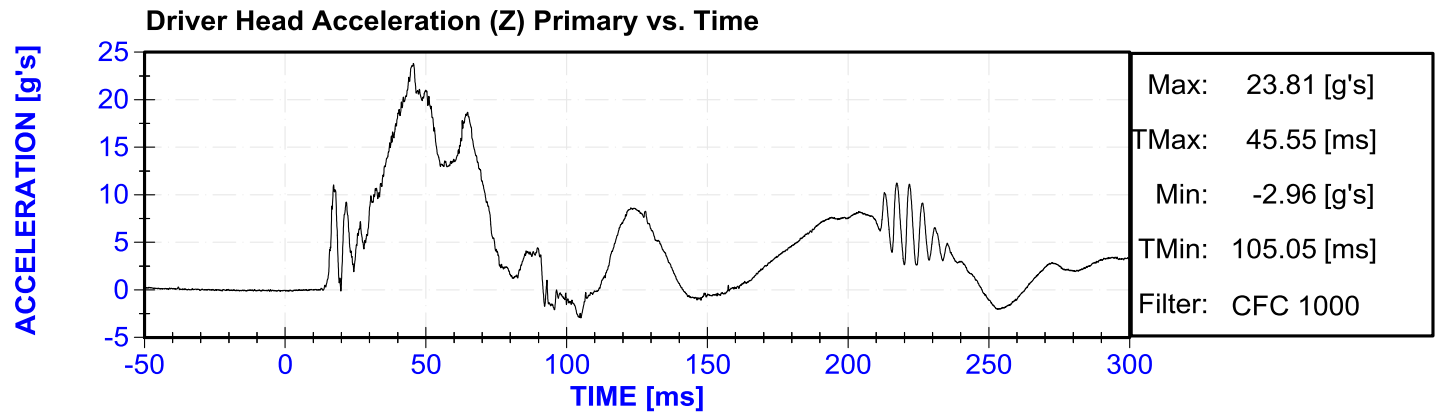
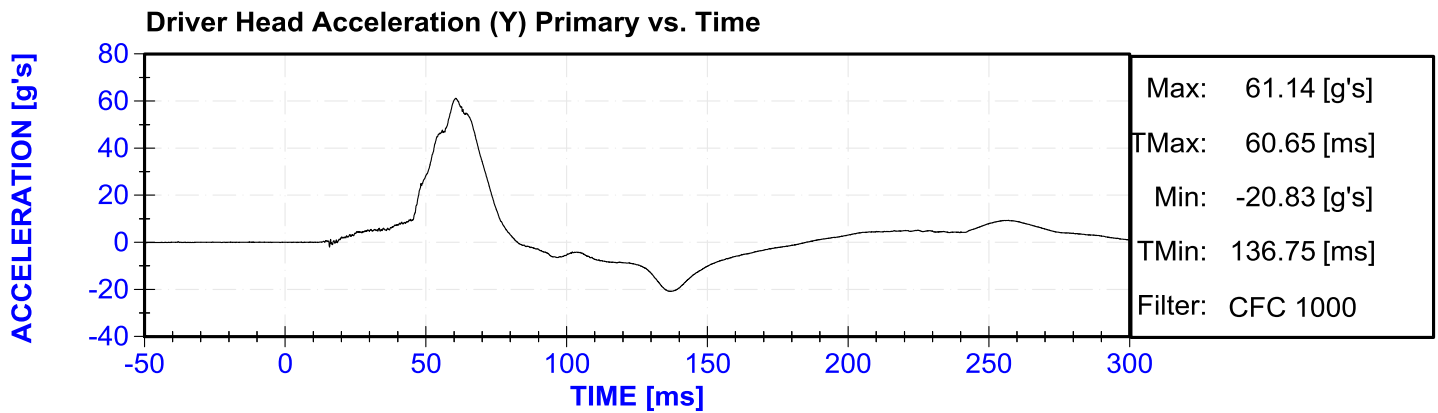
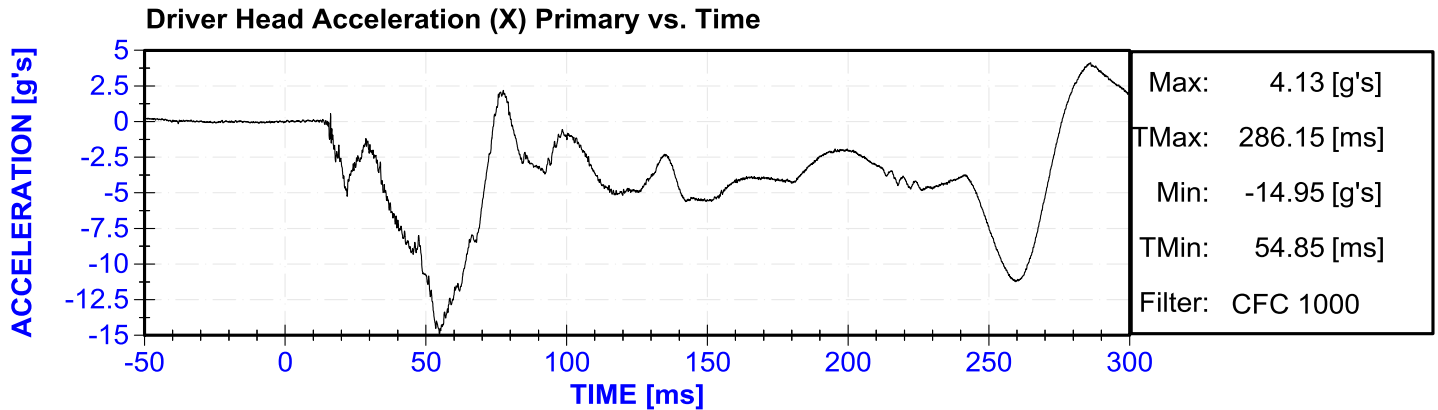
Driver Head Acceleration Redundant (X)
Driver Head Acceleration Redundant (Y)
Driver Head Acceleration Redundant (Z)
Driver Upper Thorax Rib Deflection (Y)
Driver Middle Thorax Rib Deflection (Y)
Driver Lower Thorax Rib Deflection (Y)
Driver Upper Abdomen Rib Deflection (Y)
Driver Lower Abdomen Rib Deflection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

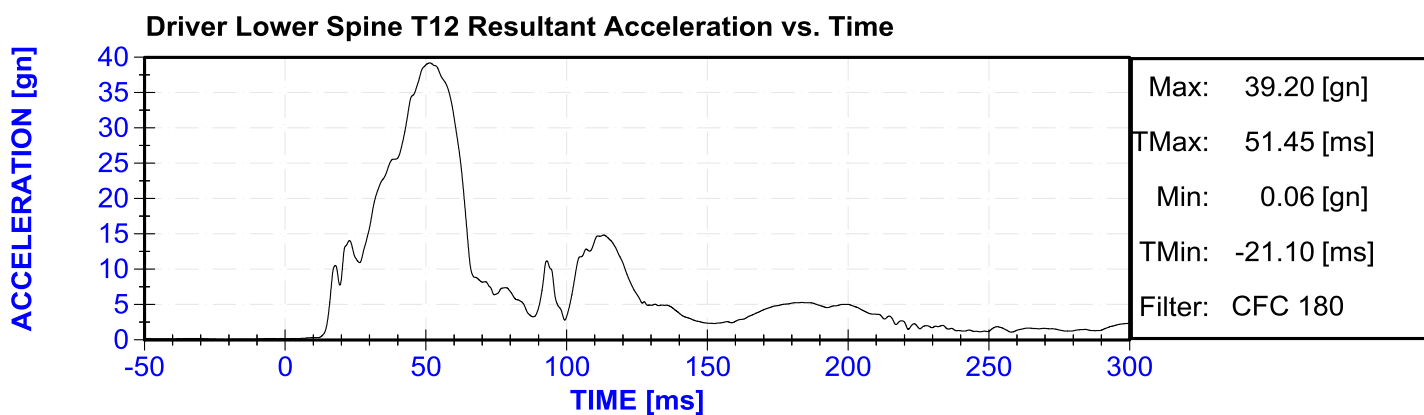
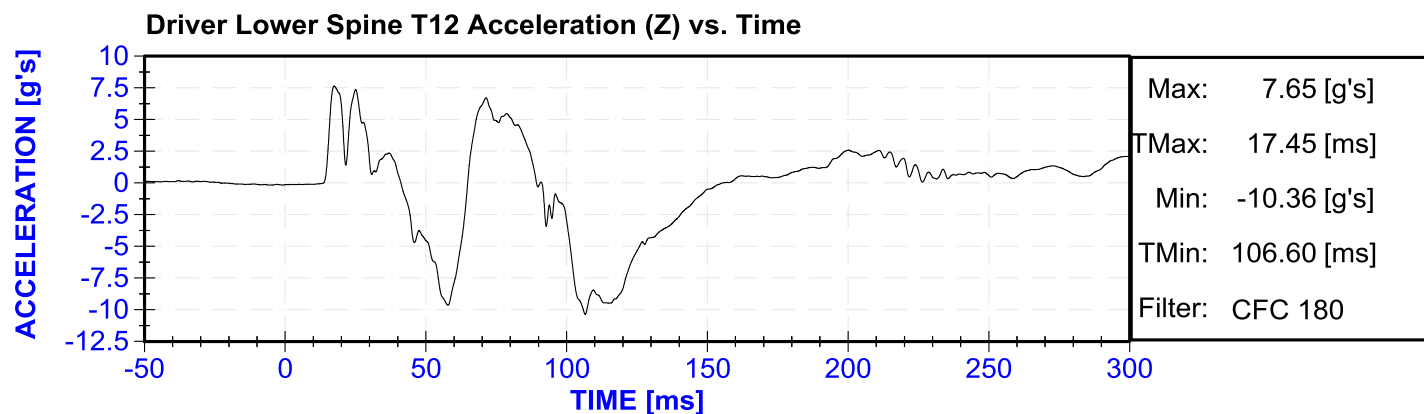
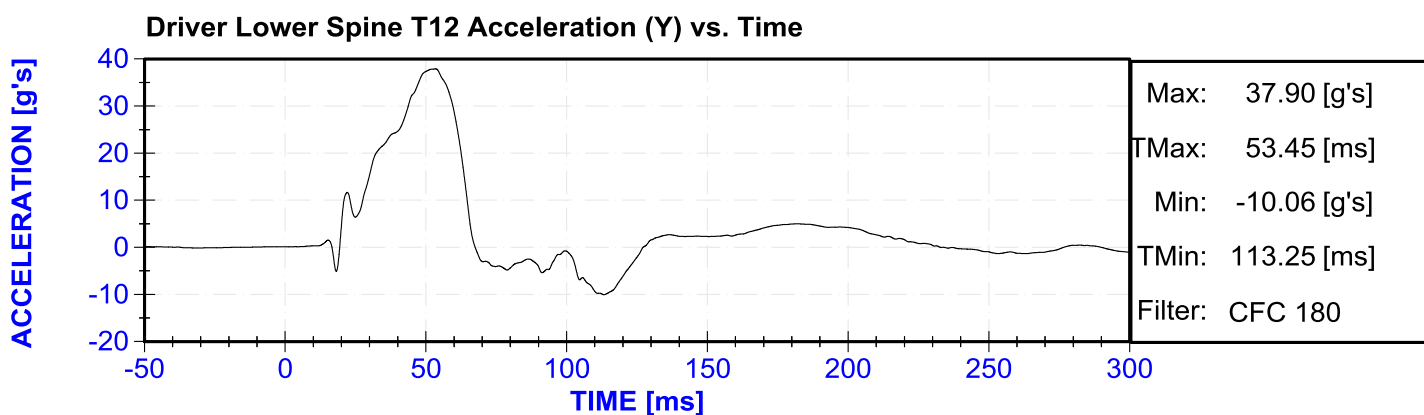
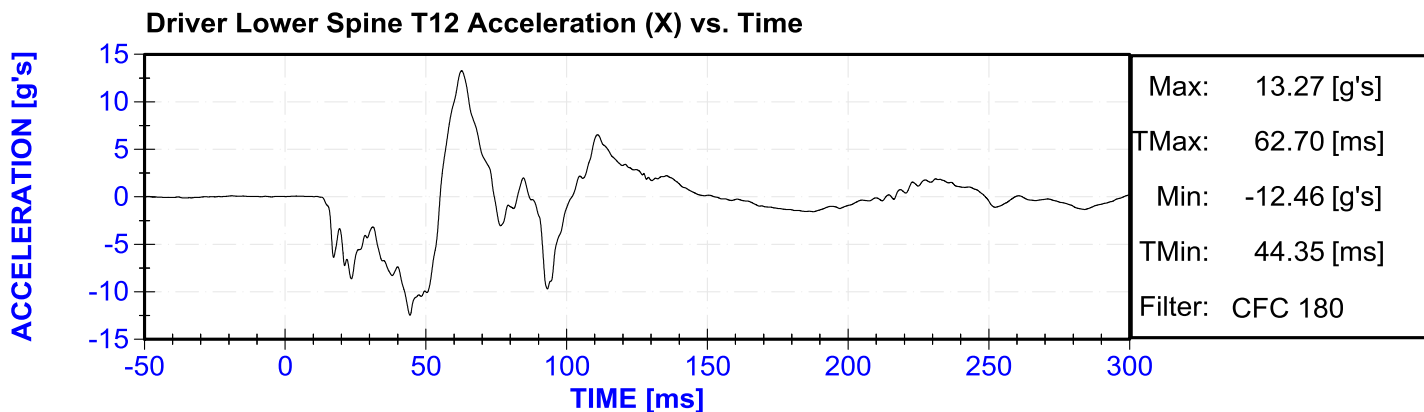
Vehicle Instrumentation Data

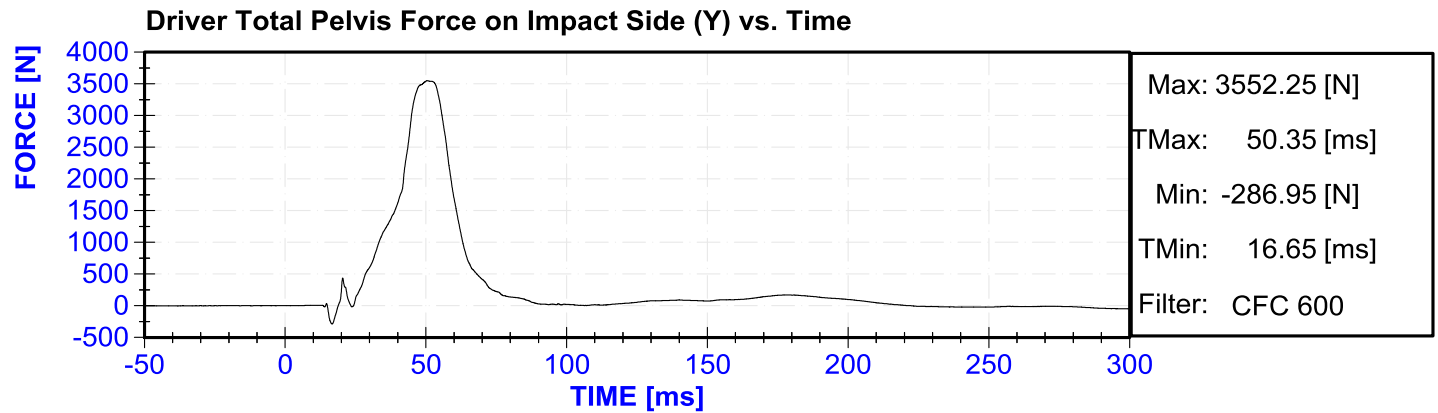
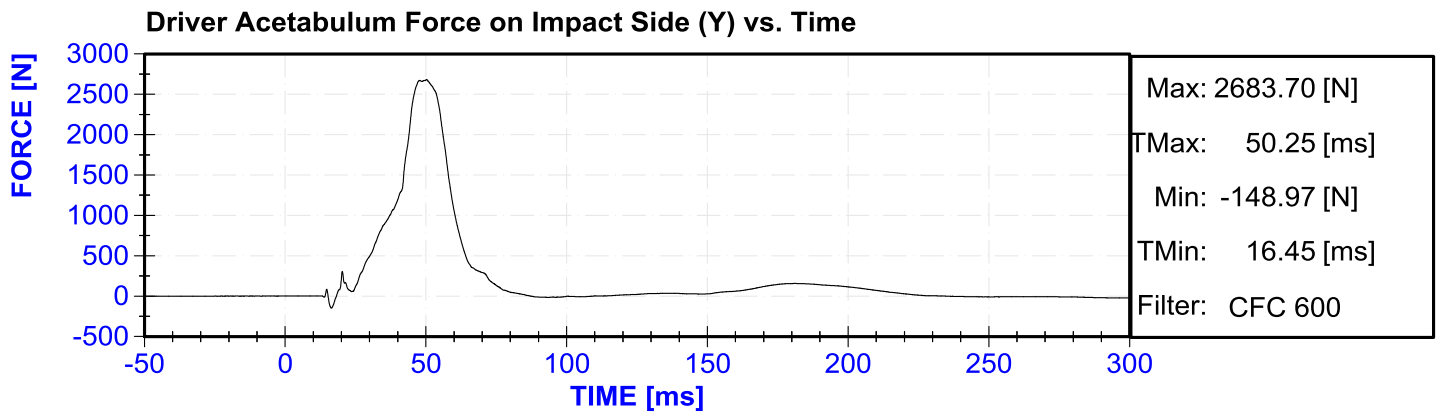
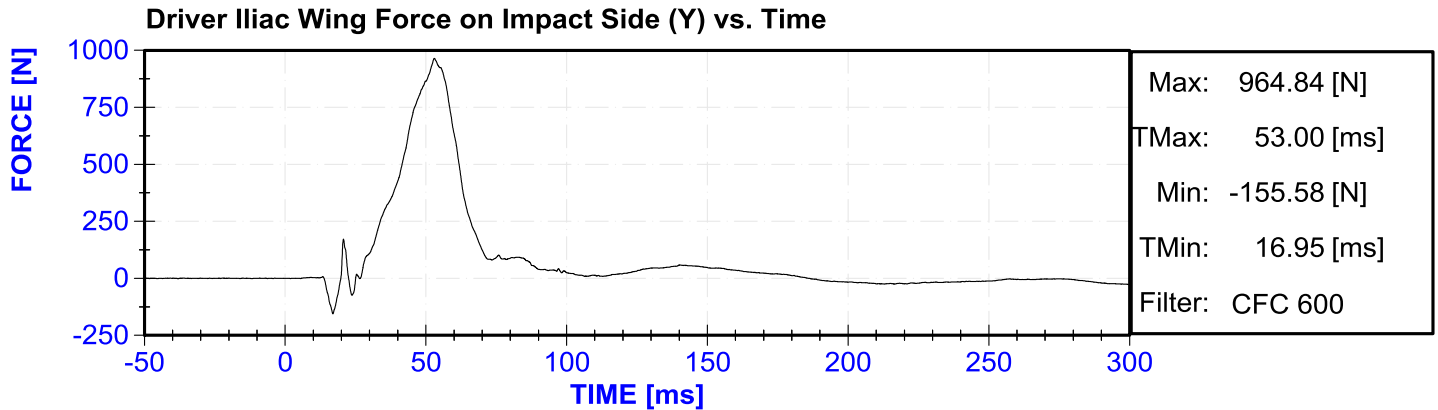
Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Left Floor Sill Acceleration (Y)
Left A-Pillar Sill Acceleration (Y)
Left Lower A-Pillar Acceleration (Y)
Left Mid A-Pillar Acceleration (Y)
Left B-Pillar Sill Acceleration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

Pole Instrumentation Data

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







APPENDIX C

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

SID-IIS 5TH PERCENTILE FEMALE - DRIVER ATD

SERIAL NO: DG8012

(CONFIGURED FOR LEFT SIDE IMPACT)

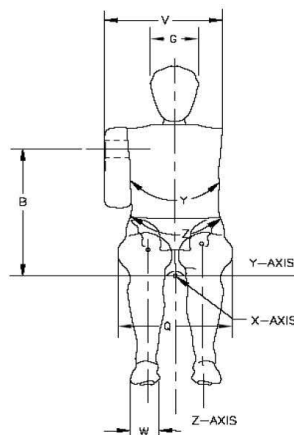
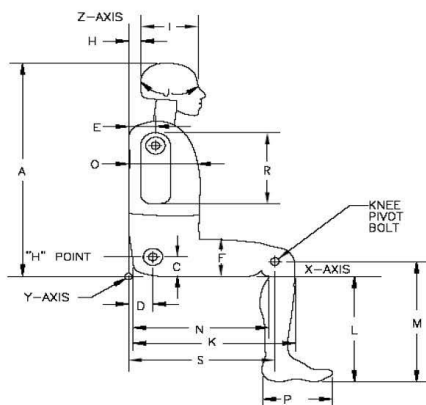


External Measurements - SID-IIs

Technician: DG8012

Date: 9/30/2016

Dummy Serial Number: M. Geesey



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	781	Pass
B	Shoulder Pivot Height	437	453	446	Pass
C	H-point Height	79	89	86	Pass
D	H-point from seatback	141	151	148	Pass
E	Shoulder Pivot from Backline	97	107	103	Pass
F	Thigh Clearance	119	135	128	Pass
G	Head Breadth	140	148	145	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	182	Pass
J	Head Circumference	541	551	546	Pass
K	Buttock to Knee Length	514	540	530	Pass
L	Popliteal Height	343	369	350	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	206	Pass
P	Foot Length	216	232	220	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	320	Pass
R	Arm Length	249	259	252	Pass
S	Knee Joint to seatback	477	493	481	Pass
V	Shoulder Width	341	357	352	Pass
W	Foot Width	78	94	85	Pass
Y	Chest Circumference w/jacket	851	881	861	Pass
Z	Waist Circumference	761	791	770	Pass

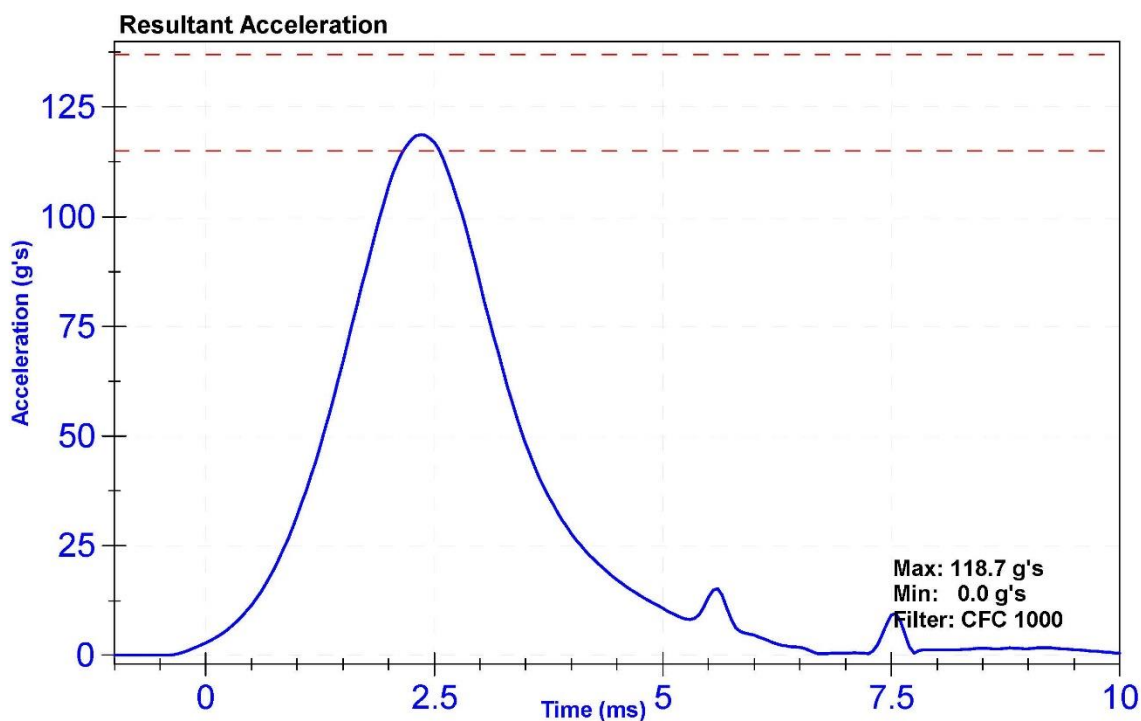
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ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

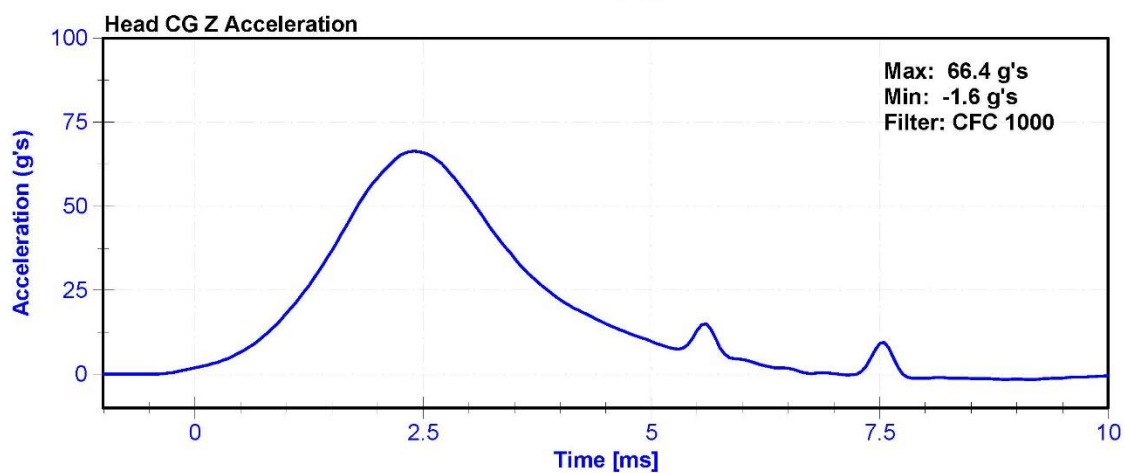
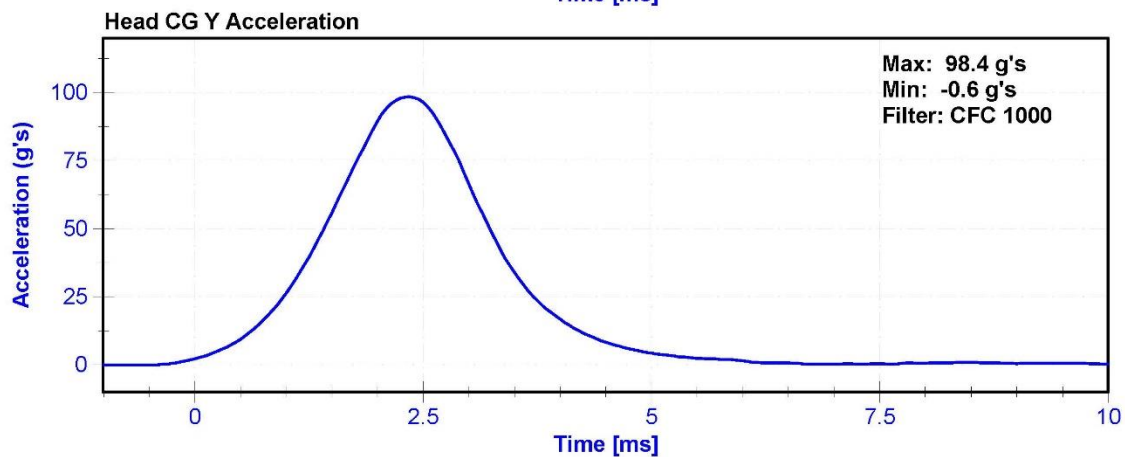
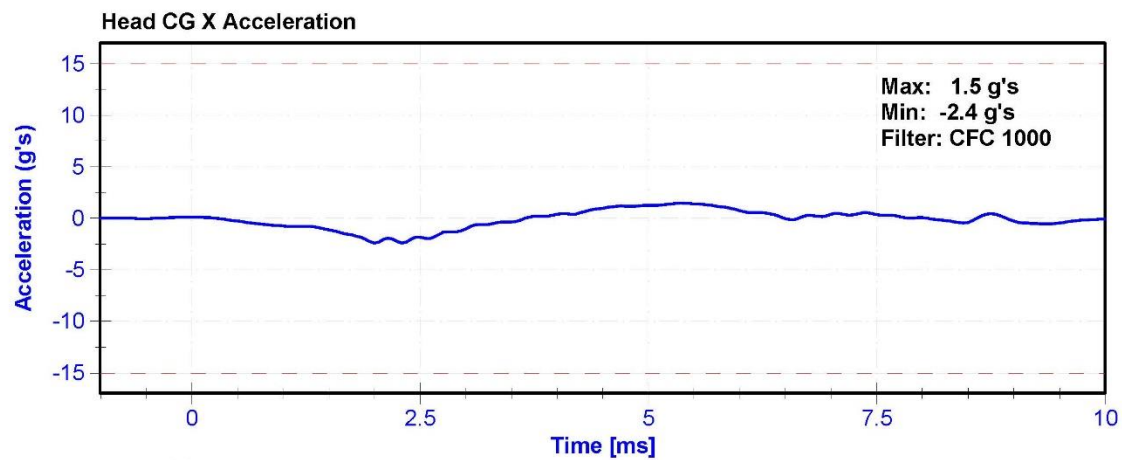
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	41.8	Pass
Resultant Acceleration	115	137	g's	118.7	Pass
Oscillation	0	15	%	12.	Pass
Fore-Aft Acceleration	-15	15	g's	-2.4	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





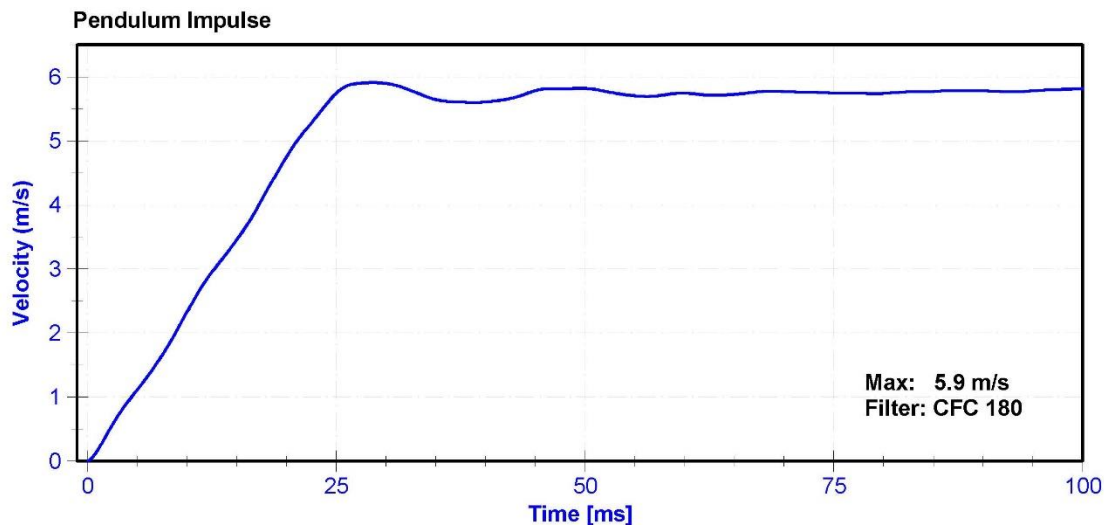
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

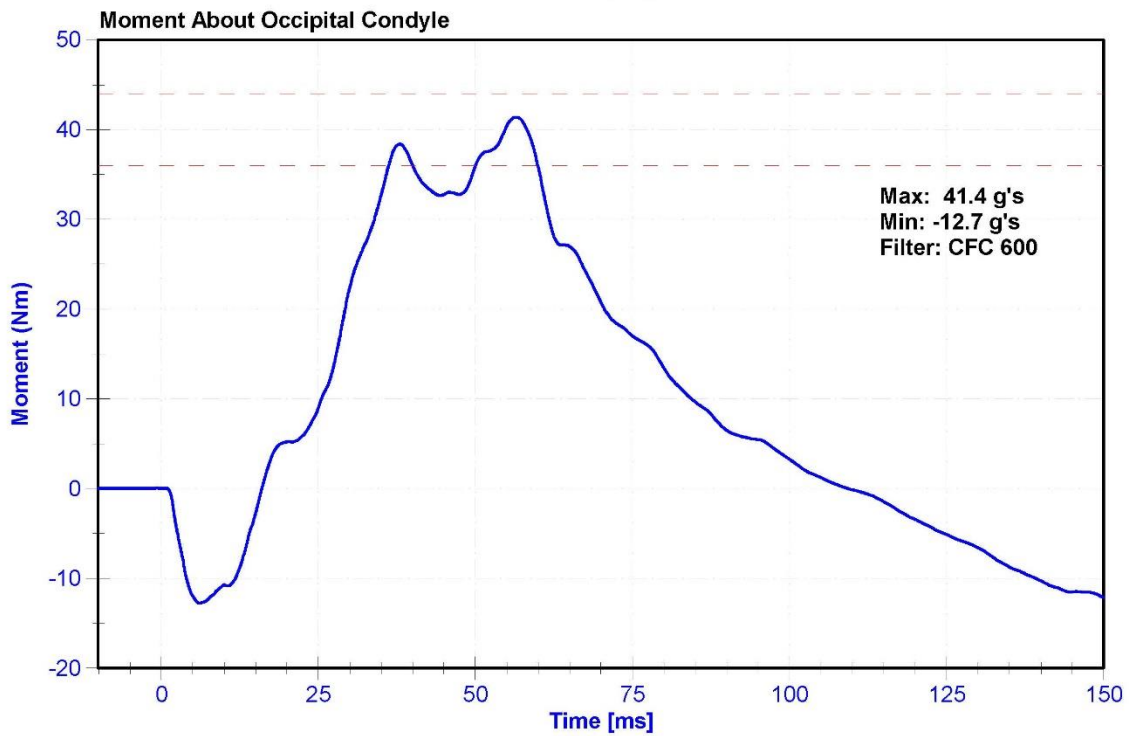
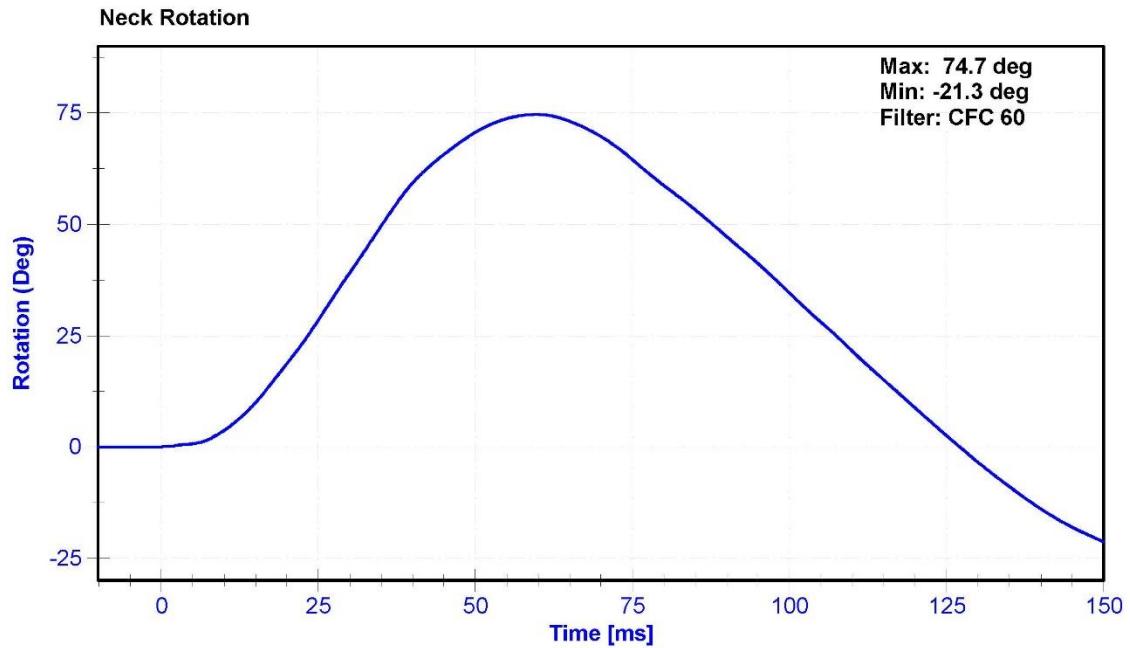
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	46	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	3.46	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.75	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.75	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.91	Pass
Neck Rotation	71	81	deg	74.7	Pass
Time at Maximum Rotation	50	70	ms	59.6	Pass
Moment about the OC	36	44	Nm	41.4	Pass
Moment Decay to 0 Nm	102	126	ms	109.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/10/2016	5/10/2017
Pendulum Potentiometer	Denton 78051-342	DS-184Pend	10/24/2015	10/23/2016
Condyle Potentiometer	Denton 78051-342	DS-185Pend	10/25/2015	10/24/2016
Upper Neck Load Cell	Denton 1716A	LC-440Fy	5/24/2016	5/24/2017





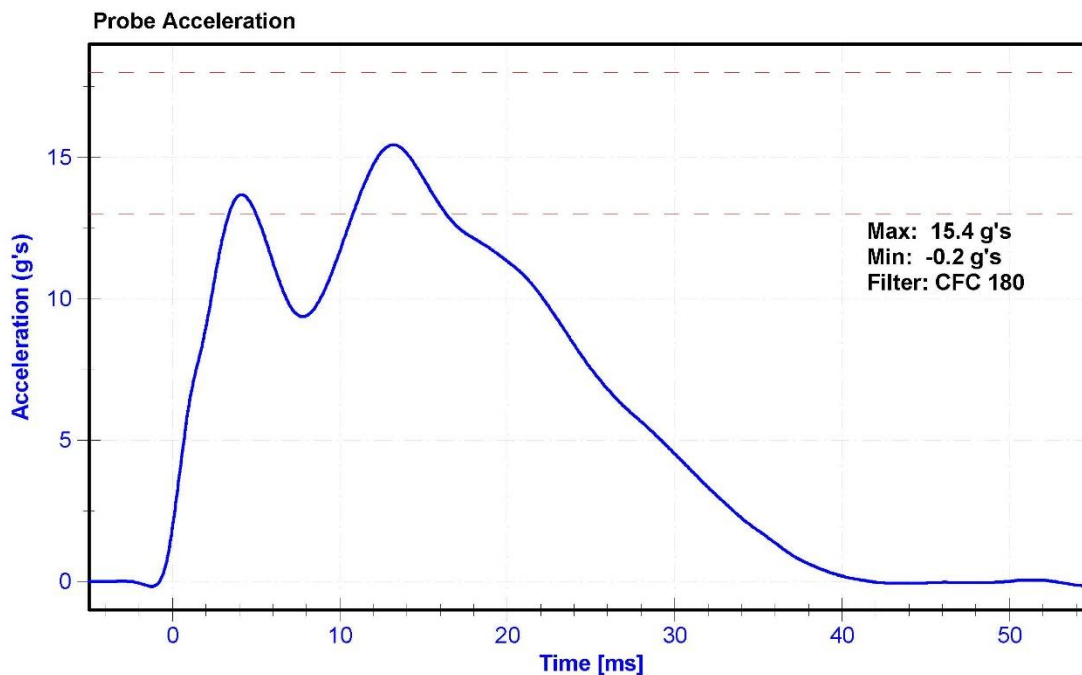
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ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

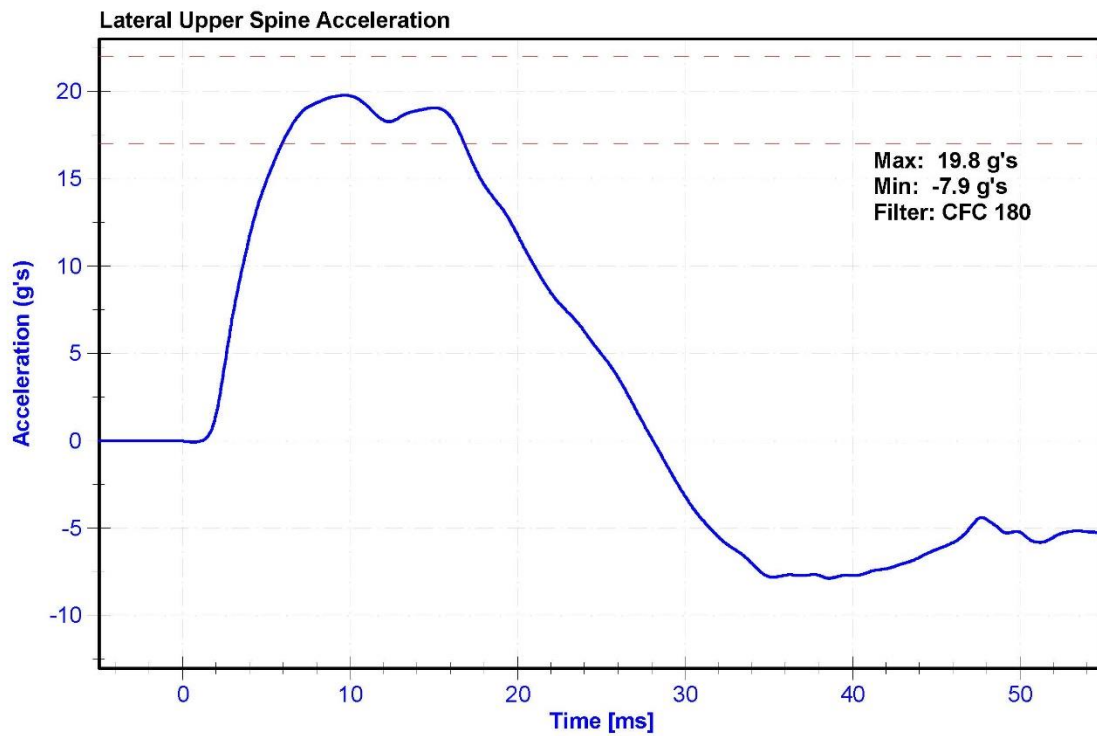
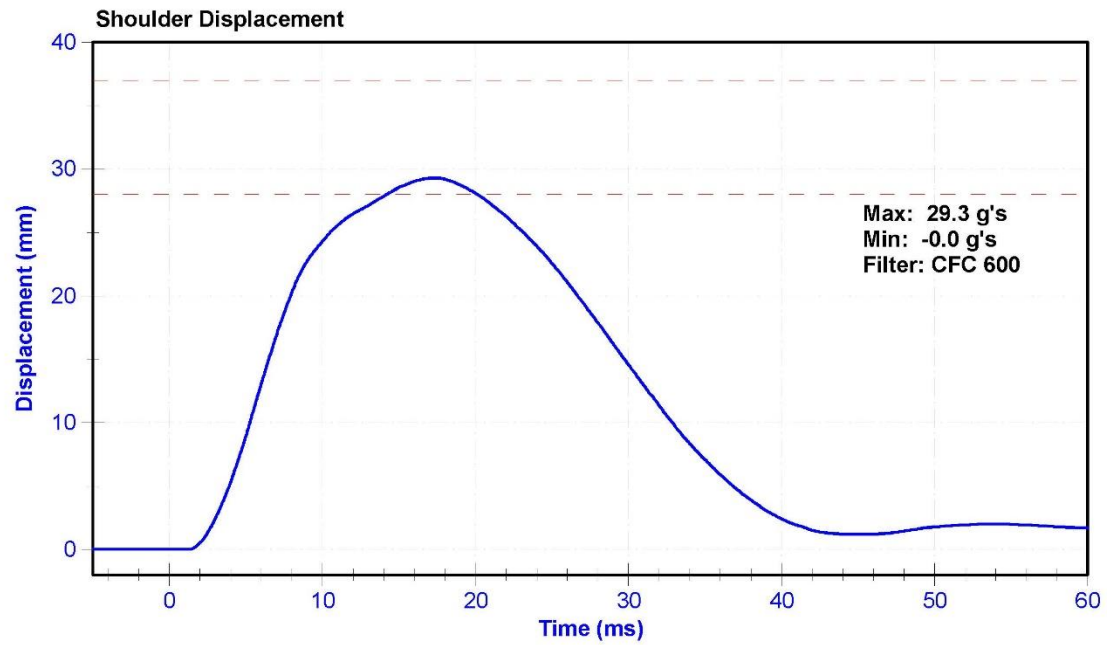
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22	Pass
Humidity	10	70	%	38.1	Pass
Velocity	4.2	4.4	m/s	4.25	Pass
Probe Acceleration	13	18	g's	15.4	Pass
Shoulder Deflection	28	37	mm	29.3	Pass
Lateral Upper Spine Acceleration	17	22	g's	19.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P16593	4/1/2016	4/1/2017
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





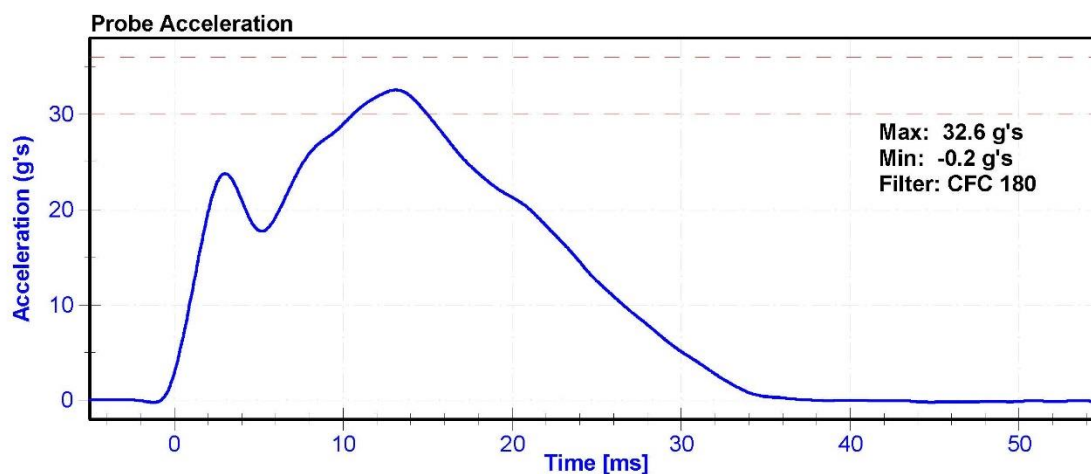
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ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

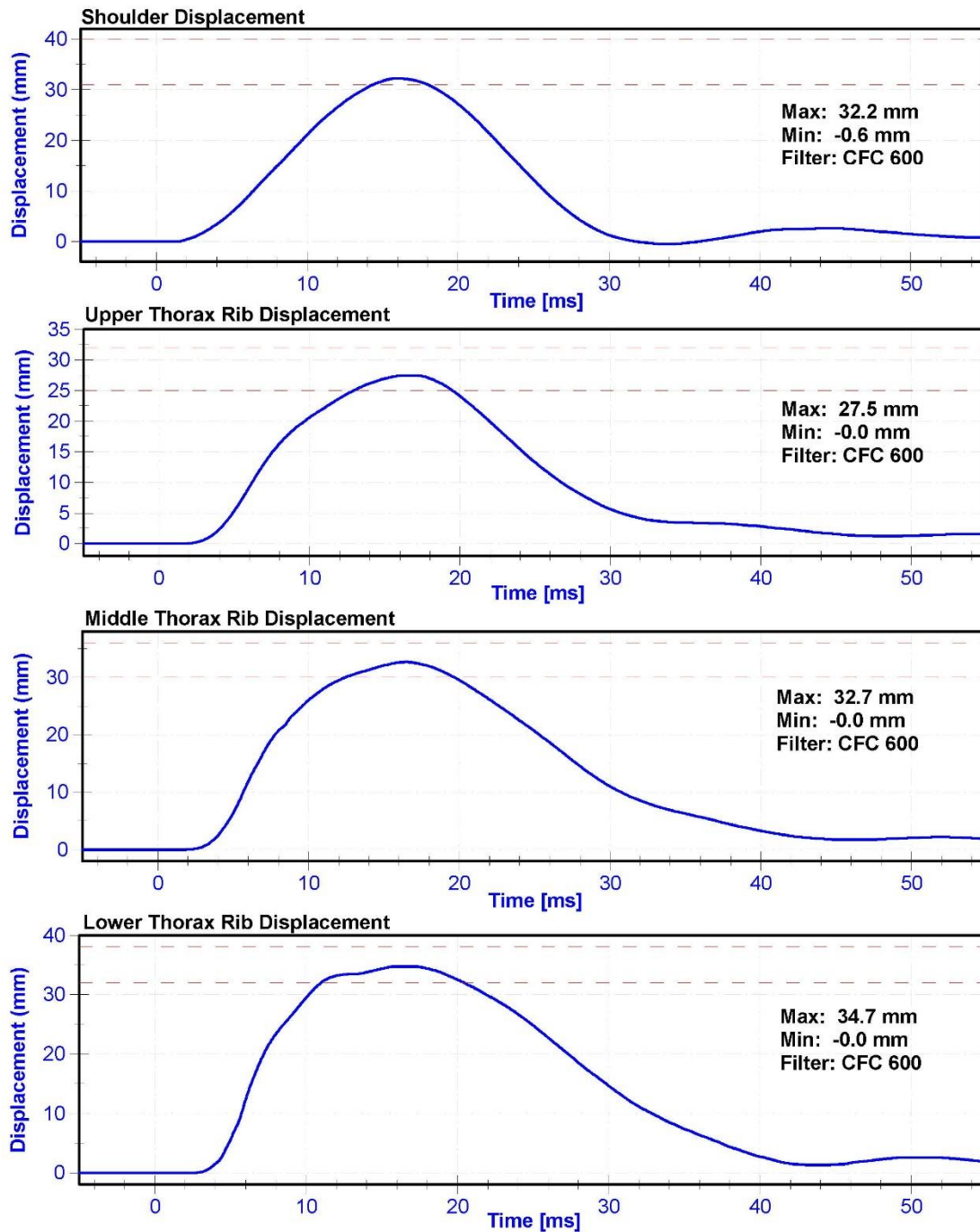
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.0	Pass
Humidity	10	70	%	43.1	Pass
Velocity	6.6	6.8	m/s	6.66	Pass
Probe Acceleration after 5 ms	30	36	g's	32.6	Pass
Lateral Upper Spine Acceleration	34	43	g's	38.6	Pass
Lateral Lower Spine Acceleration	29	37	g's	33.0	Pass
Shoulder Deflection	31	40	mm	32.2	Pass
Upper Thorax Rib Deflection	25	32	mm	27.5	Pass
Mid Thorax Rib Deflection	30	36	mm	32.7	Pass
Lower Thorax Rib Deflection	32	38	mm	34.7	Pass

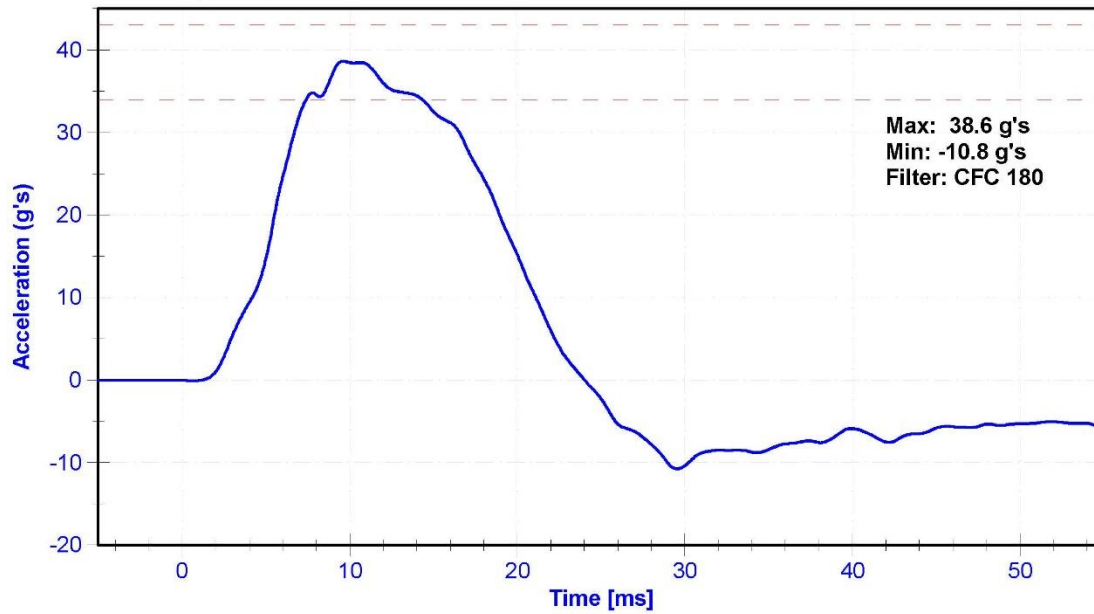
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P16593	4/1/2016	4/1/2017
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

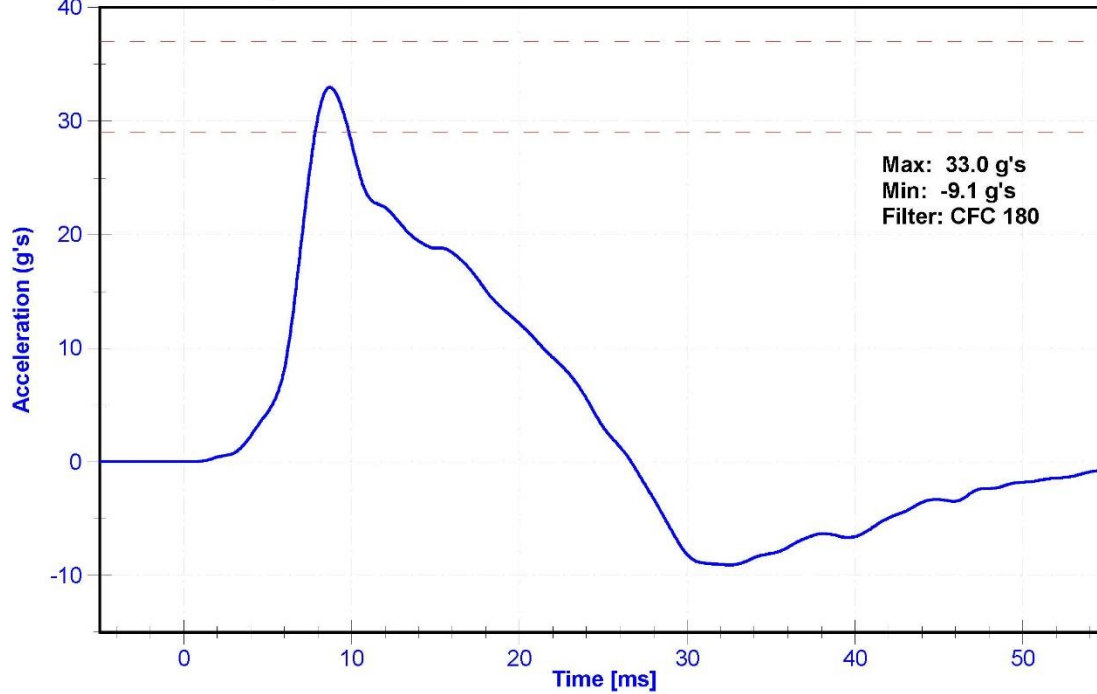




Lateral Upper Spine Acceleration



Lateral Lower Spine Acceleration



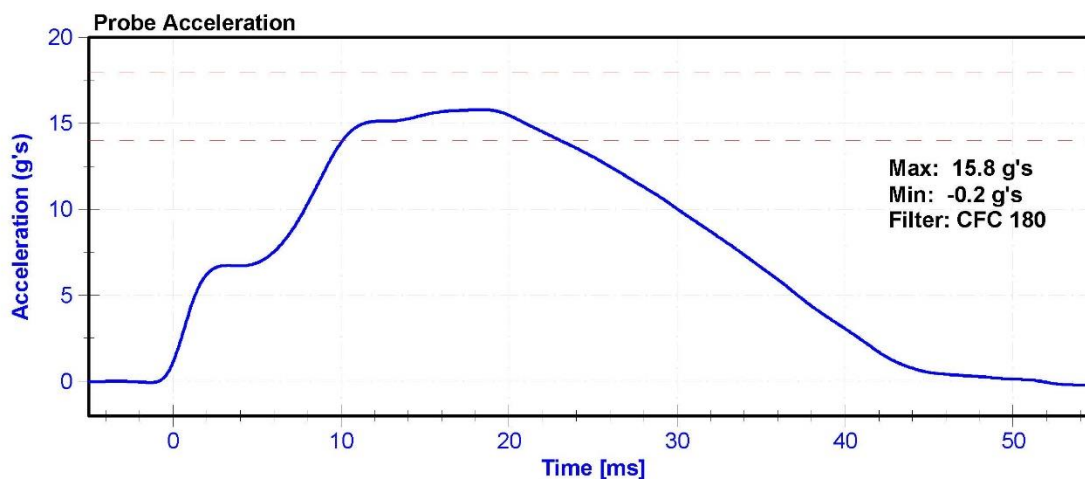
ATD Manufacturer	FTSS	Test Technician	M. Goehle
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

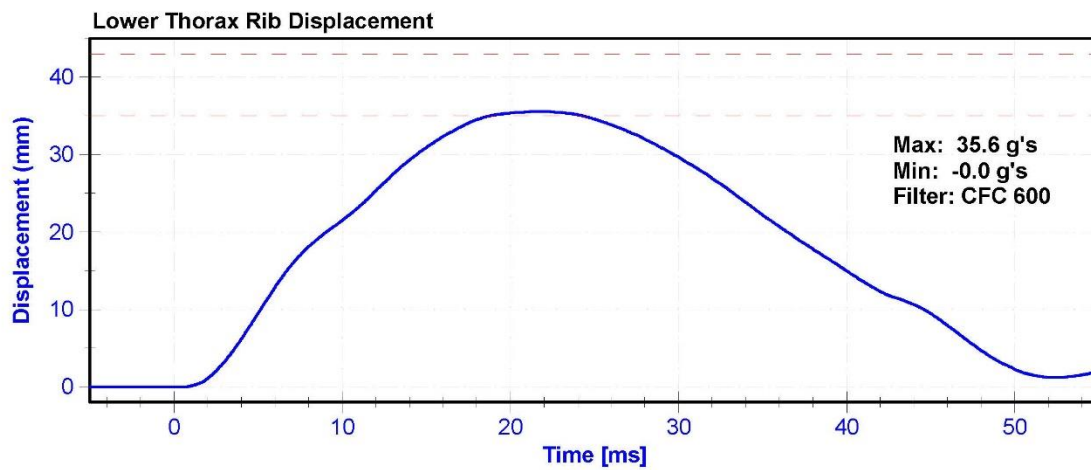
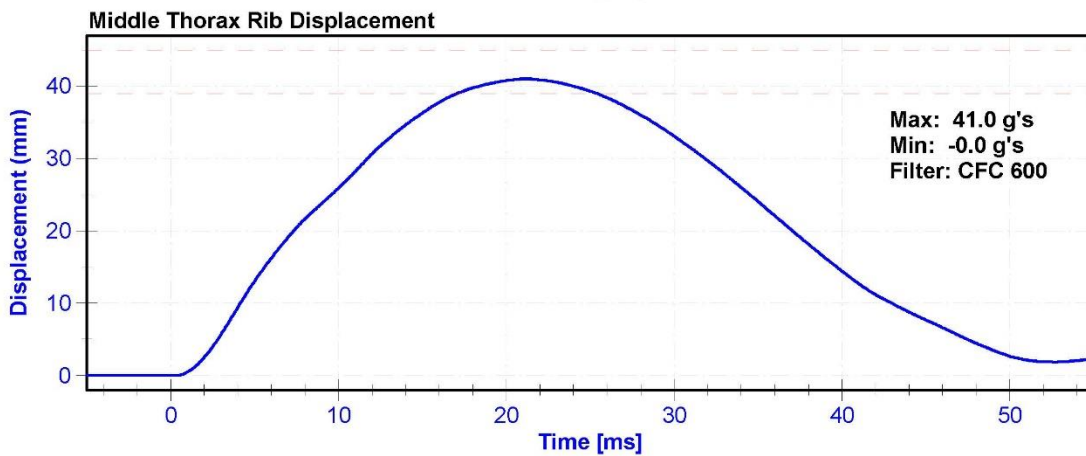
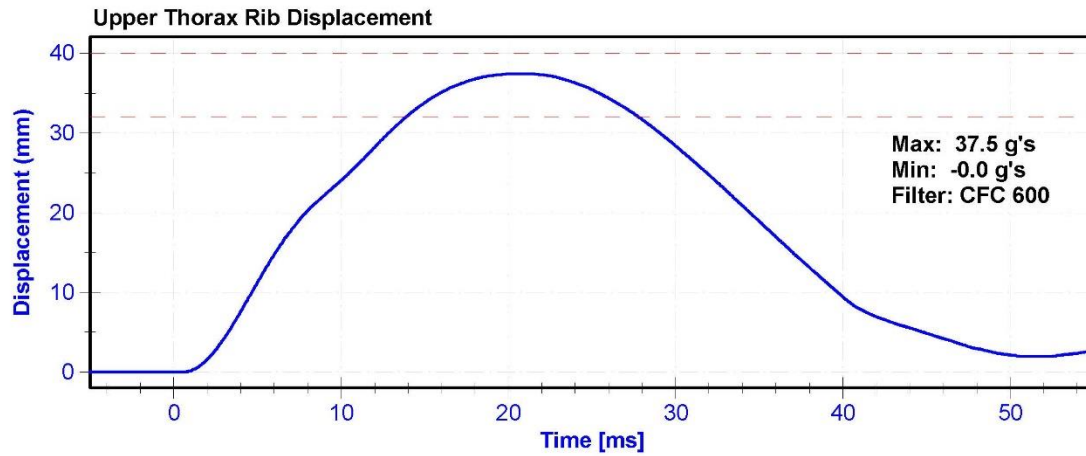
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22	Pass
Humidity	10	70	%	38.1	Pass
Velocity	4.2	4.4	m/s	4.25	Pass
Probe Acceleration	14	18	g's	15.8	Pass
Lateral Upper Spine Acceleration	13	17	g's	15.2	Pass
Lateral Lower Spine Acceleration	7	11	g's	9.9	Pass
Upper Thorax Rib Deflection	32	40	mm	37.5	Pass
Middle Thorax Rib Deflection	39	45	mm	41.0	Pass
Lower Thorax Rib Deflection	35	43	mm	35.6	Pass

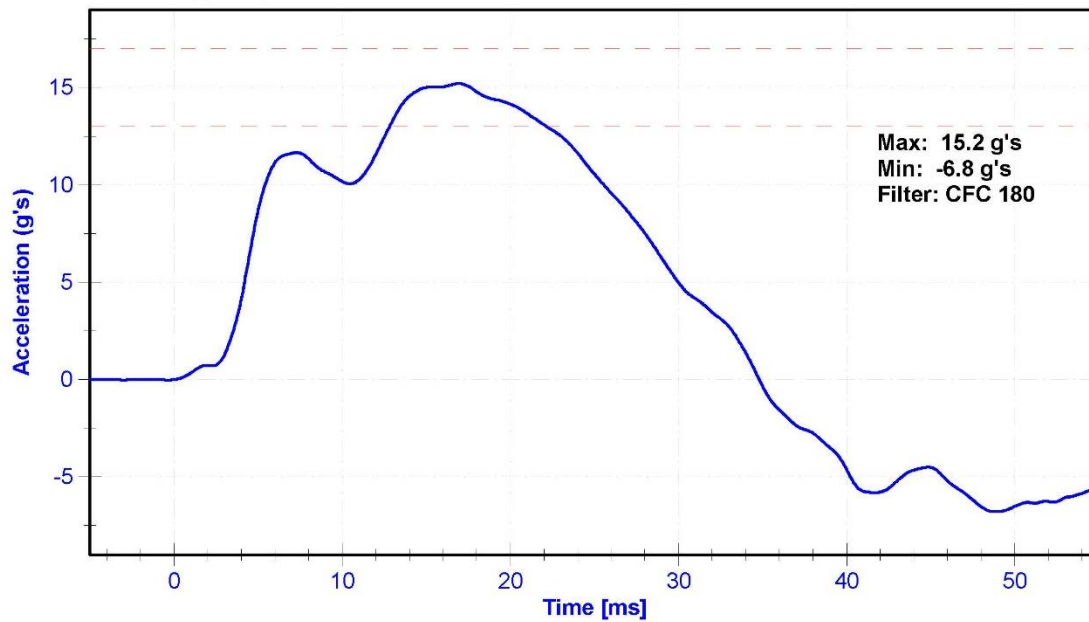
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P16593	4/1/2016	4/1/2017
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

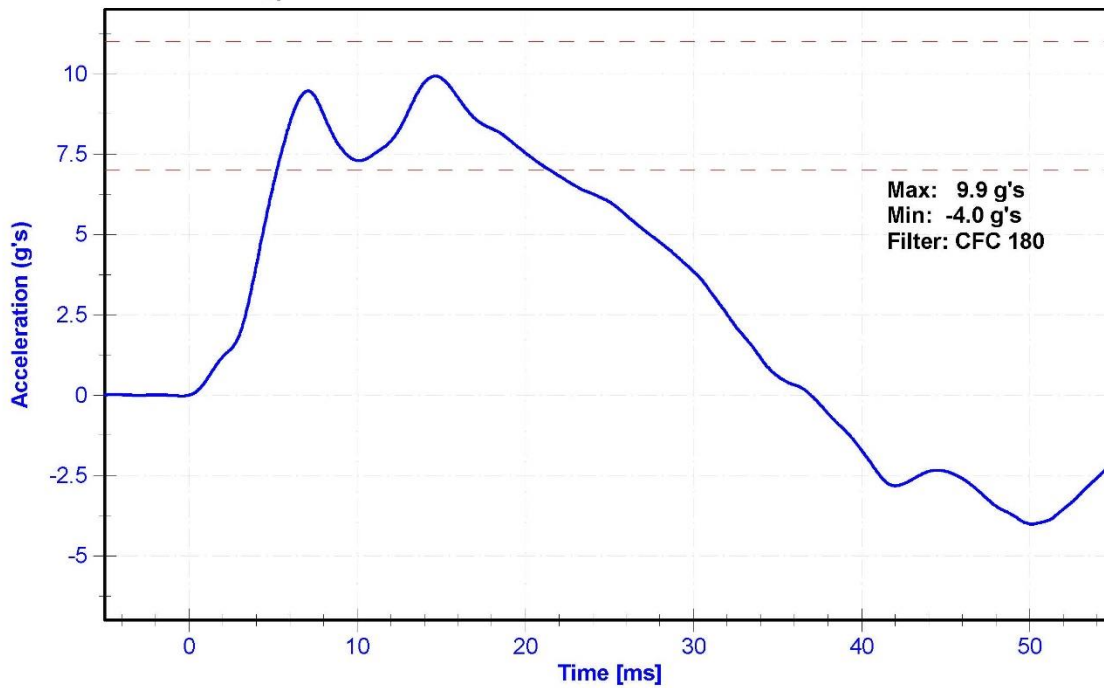




Lateral Upper Spine Acceleration



Lateral Lower Spine Acceleration



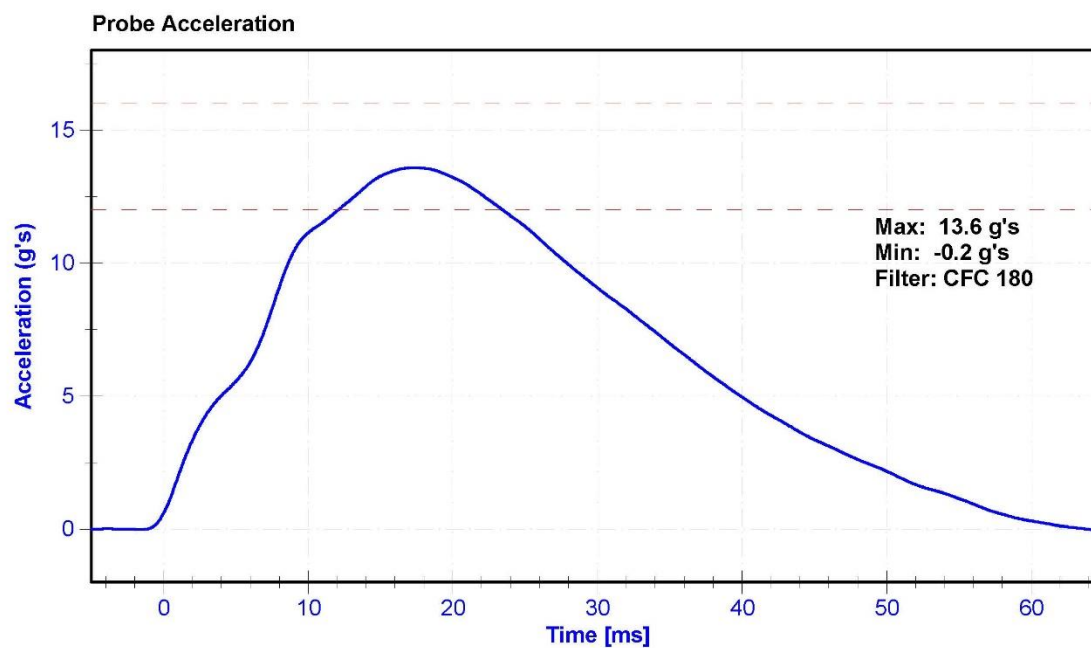
ATD Manufacturer	FTSS	Test Technician	M. Goehle
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

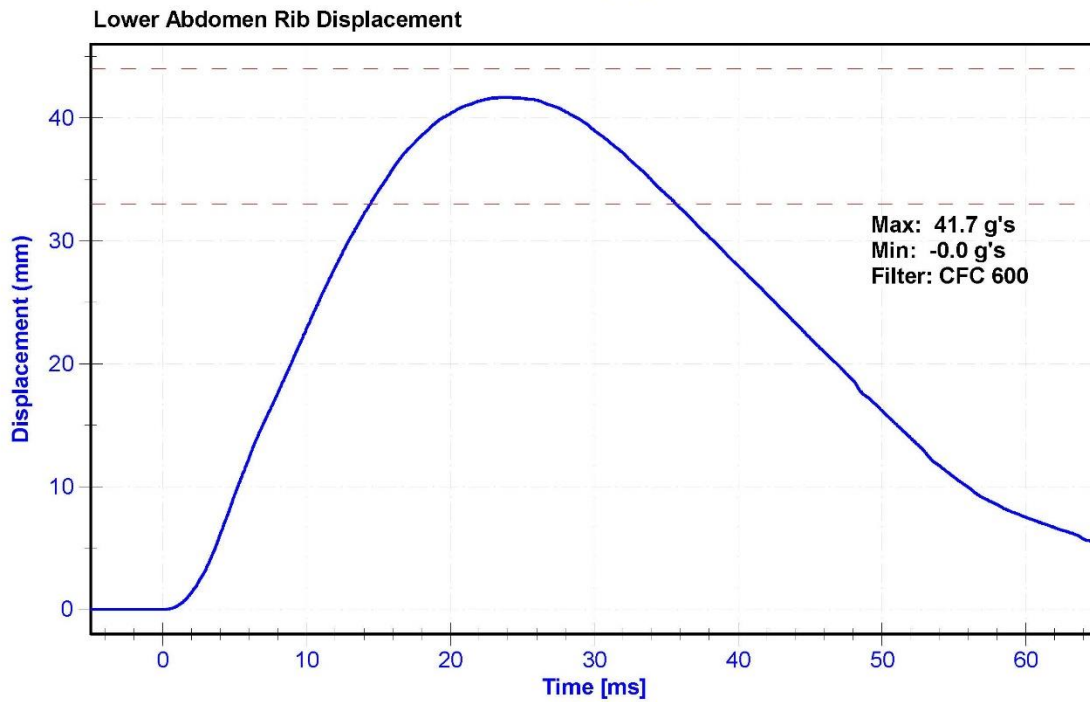
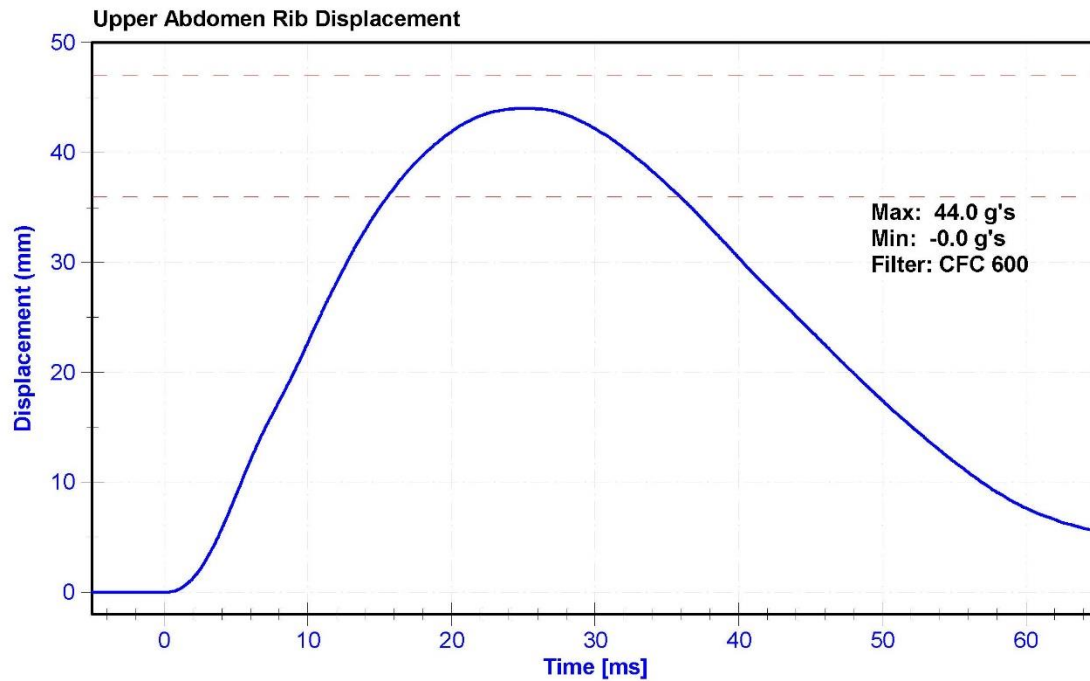
Results

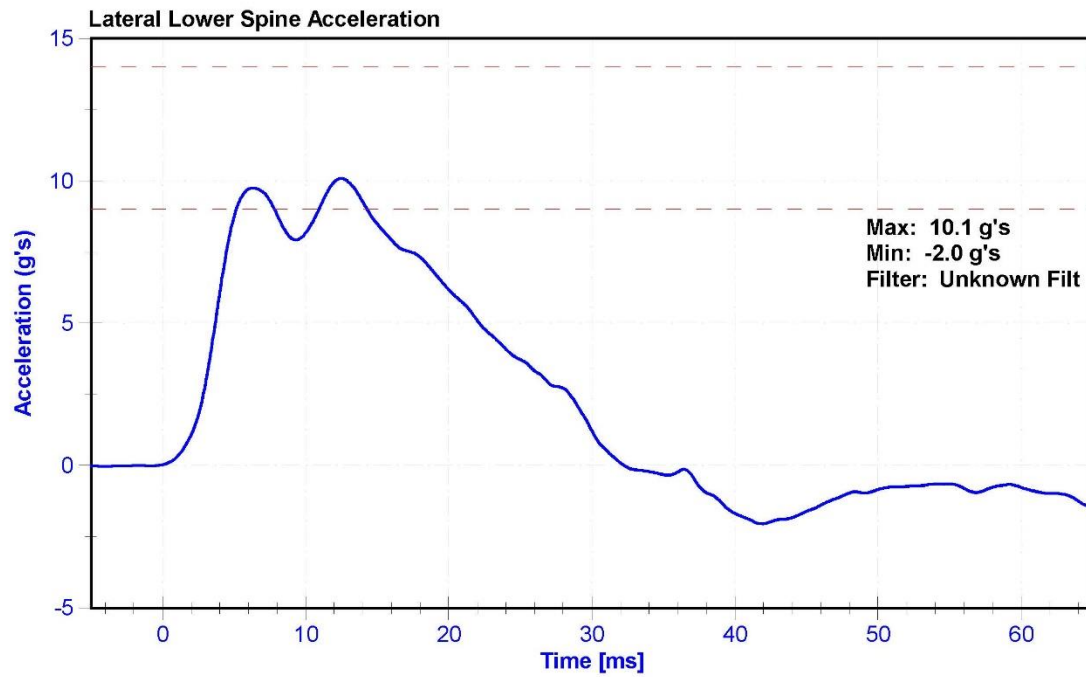
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.0	Pass
Humidity	10	70	%	42.0	Pass
Velocity	4.2	4.4	m/s	4.25	Pass
Probe Acceleration	12	16	g's	13.6	Pass
Lateral Lower Spine Acceleration	9	14	g's	10.1	Pass
Upper Abdomen Rib Deflection	36	47	mm	44.0	Pass
Lower Abdomen Rib Deflection	33	44	mm	41.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7264CT	AC-P16593	4/1/2016	4/1/2017
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P83322	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







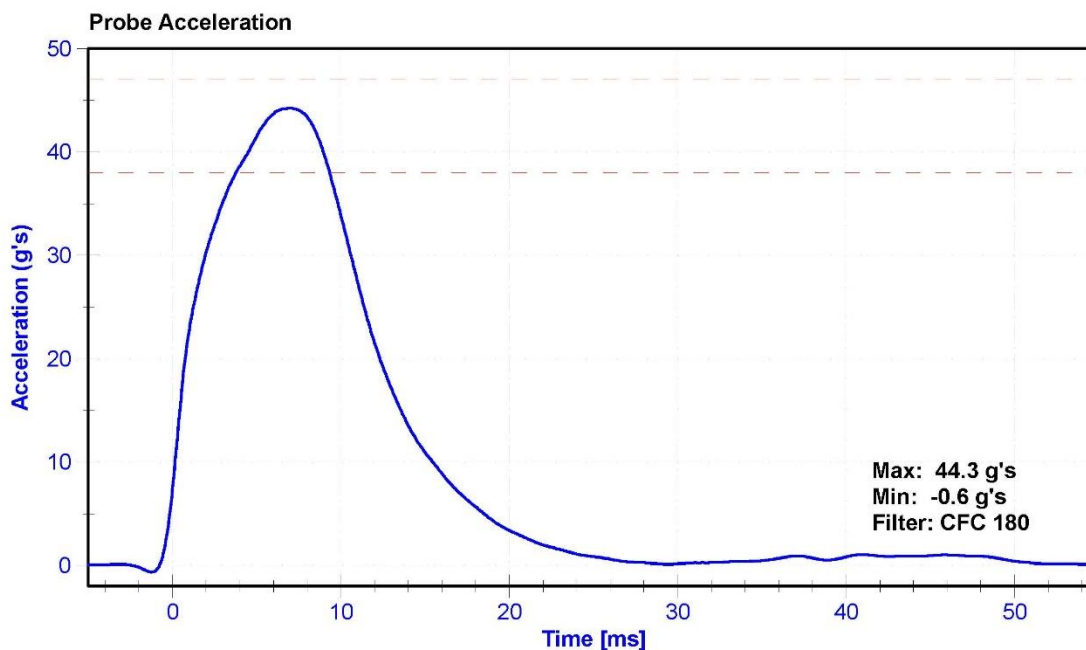
ATD Manufacturer	FTSS	Test Technician	M. Goehle
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

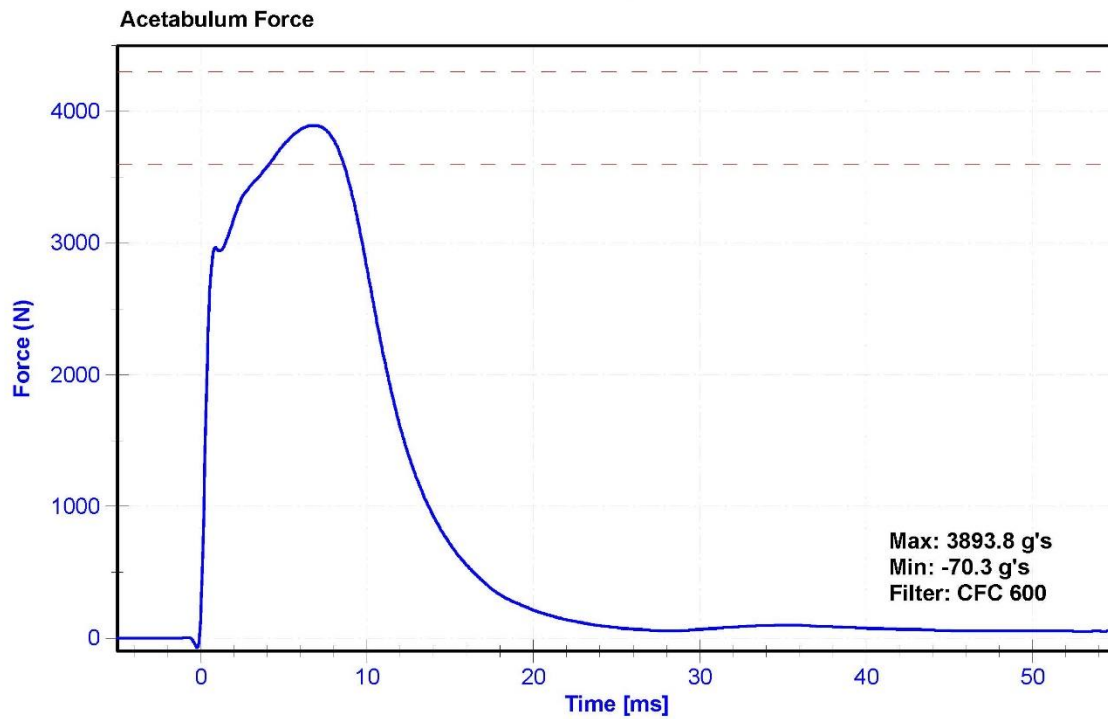
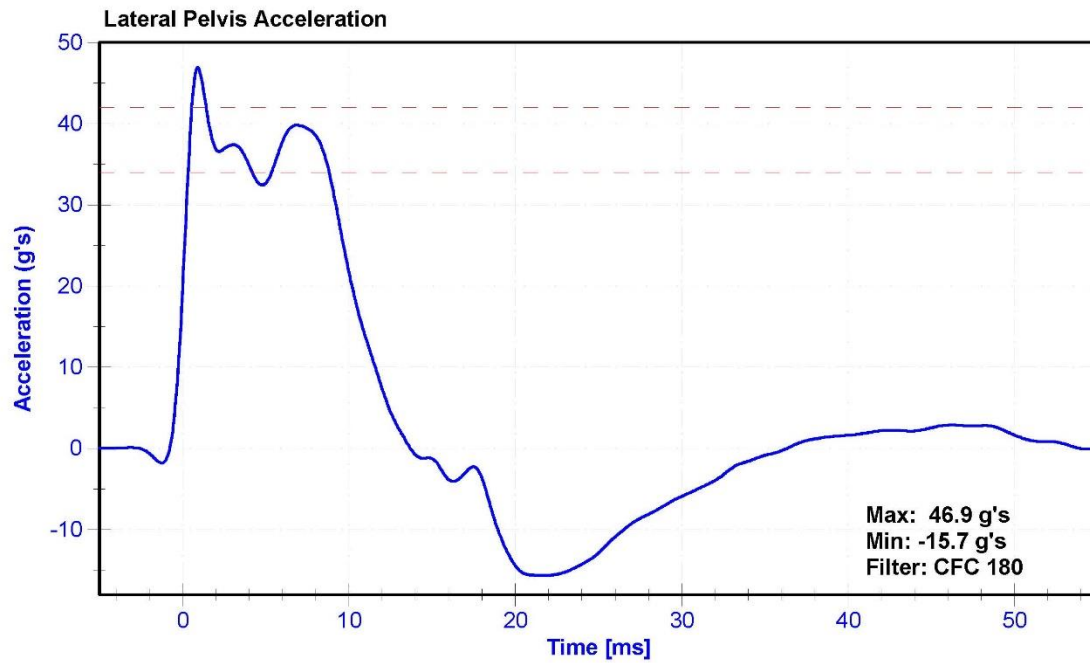
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	47.3	Pass
Velocity	6.6	6.8	m/s	6.63	Pass
Probe Acceleration	38	47	g's	44.3	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	39.8	Pass
Acetabulum Force	3600	4300	N	3893.8	Pass

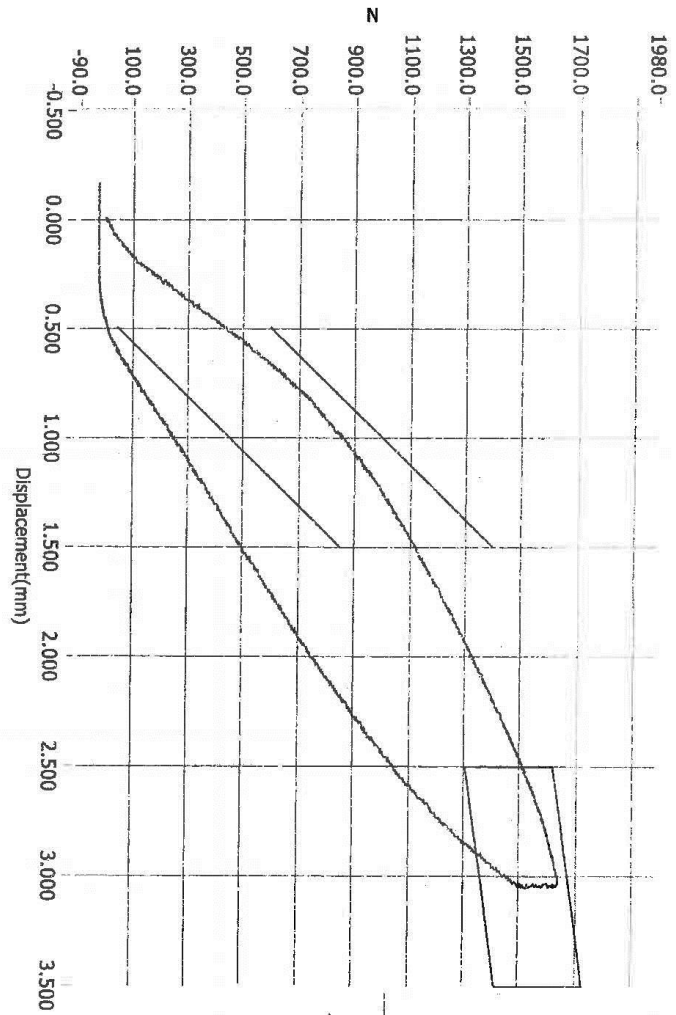
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P16593	4/1/2016	4/1/2017
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	79611	11/5/2014	N/A
Crash Test Plug	Humanetics	70965	12/13/13	N/A





Resultant Data - SIDIIS Plug Compression



- Loading Curve ✓
- Boundary Limit Upper ✓
- Boundary Limit Lower ✓
- Peak Load Upper ✓
- Peak Load Lower ✓
- Peak Defl Upper ✓
- Peak Defl Lower ✓

1634N
CRASH

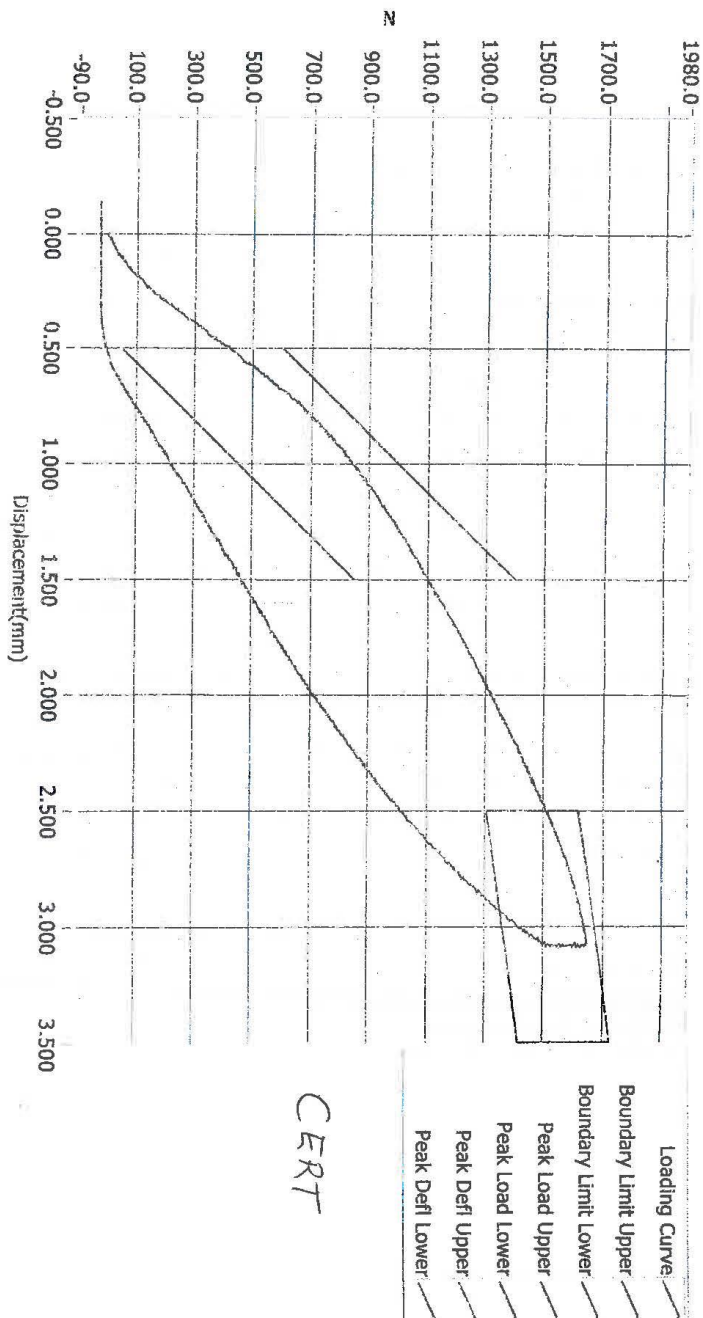
ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
	70965	12/13/2013	10:34 PM
Cert ID	ATD Serial Number	ATD Type	
	N/A	SIDIIS	

Current Date : 12/13/2013

Current Time : 22:34:49

Resultant Data - SIDIIs Plug Compression



CERT

ATD Calibration Lab

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

Current Date : 11/5/2014

Current Time : 22:28:42

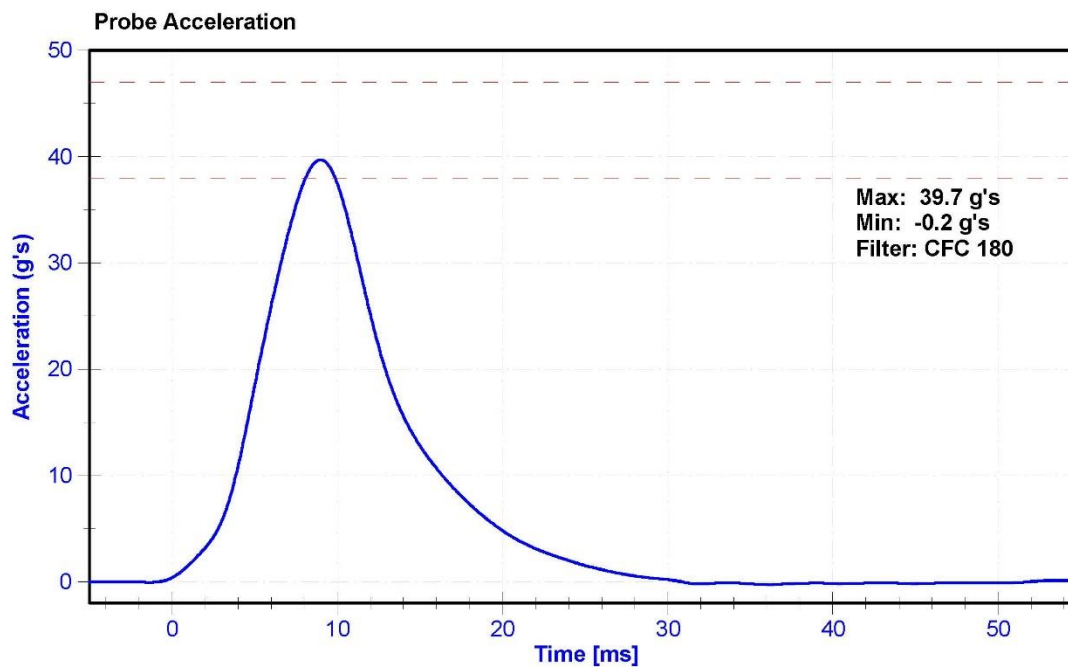
ATD Manufacturer	FTSS	Test Technician	M. Goehle
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

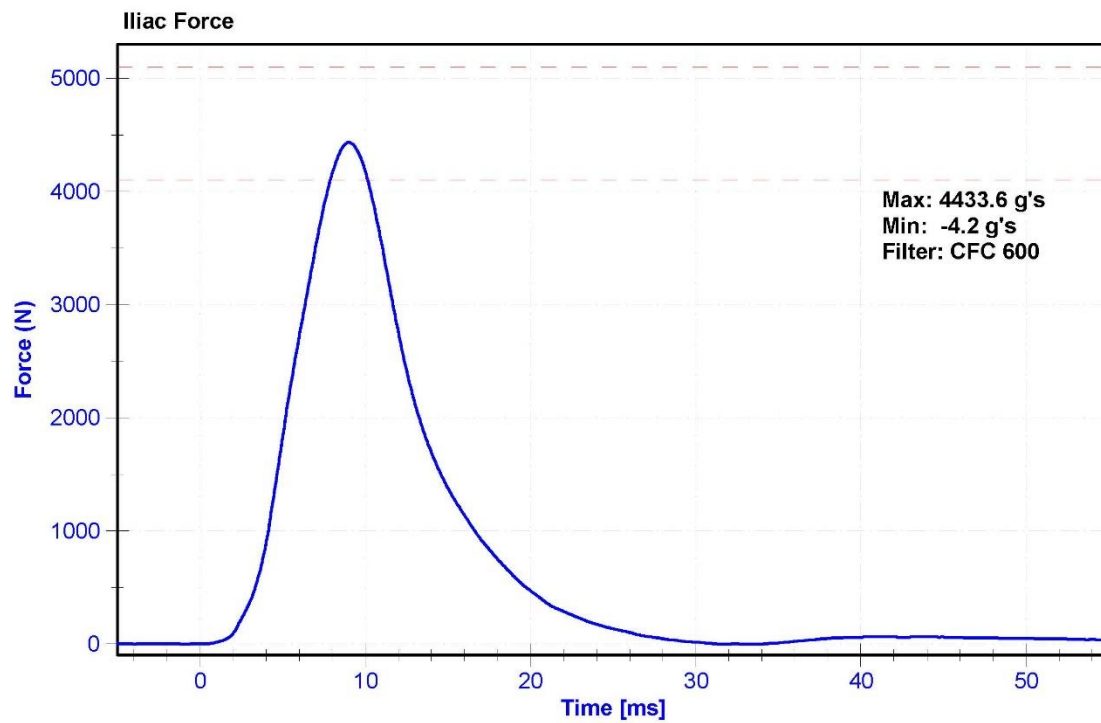
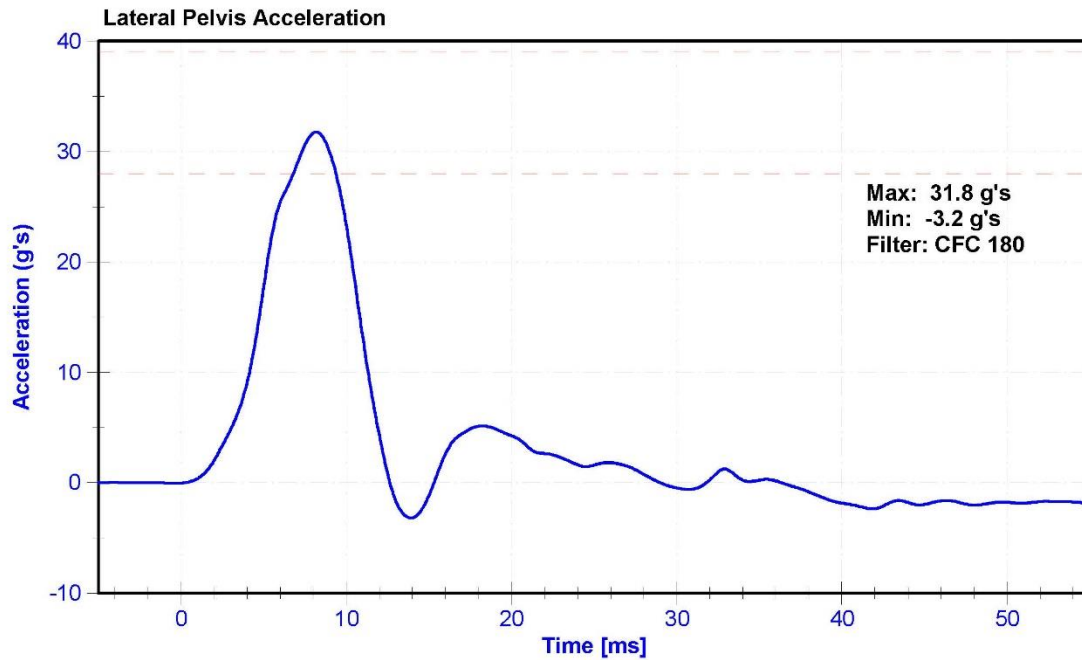
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.0	Pass
Humidity	10	70	%	42.2	Pass
Velocity	4.2	4.4	m/s	4.28	Pass
Probe Acceleration	36	45	g's	39.7	Pass
Lateral Pelvis Acceleration	28	39	g's	31.8	Pass
Iliac Force	4100	5100	N	4433.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P16593	4/1/2016	4/1/2017
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





CALIBRATION TEST RESULTS

POST-TEST

SID-IIS 5TH PERCENTILE FEMALE - DRIVER ATD

SERIAL NO: DG8012

(CONFIGURED FOR LEFT SIDE IMPACT)

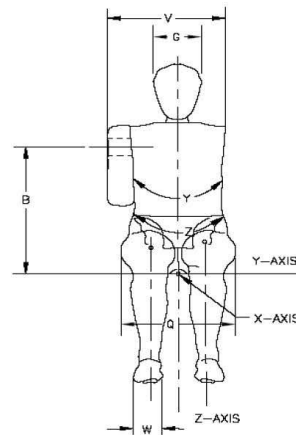
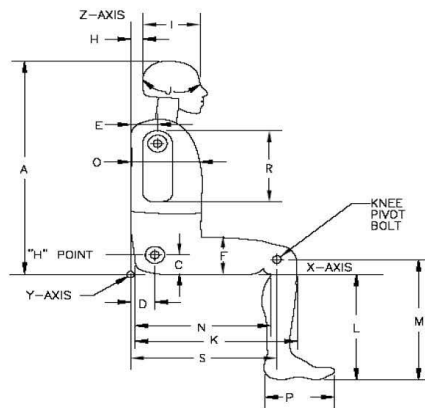


External Measurements - SID-IIs

Technician: M. Geesey

Date: 10/13/2016

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	445	Pass
C	H-point Height	79	89	86	Pass
D	H-point from seatback	141	151	147	Pass
E	Shoulder Pivot from Backline	97	107	102	Pass
F	Thigh Clearance	119	135	128	Pass
G	Head Breadth	140	148	144	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	183	Pass
J	Head Circumference	541	551	546	Pass
K	Buttock to Knee Length	514	540	531	Pass
L	Popliteal Height	343	369	351	Pass
M	Knee Pivot to floor height	392	409	400	Pass
N	Buttock Popliteal Length	416	442	429	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	318	Pass
R	Arm Length	249	259	254	Pass
S	Knee Joint to seatback	477	493	485	Pass
V	Shoulder Width	341	357	349	Pass
W	Foot Width	78	94	86	Pass
Y	Chest Circumference w/jacket	851	881	862	Pass
Z	Waist Circumference	761	791	772	Pass

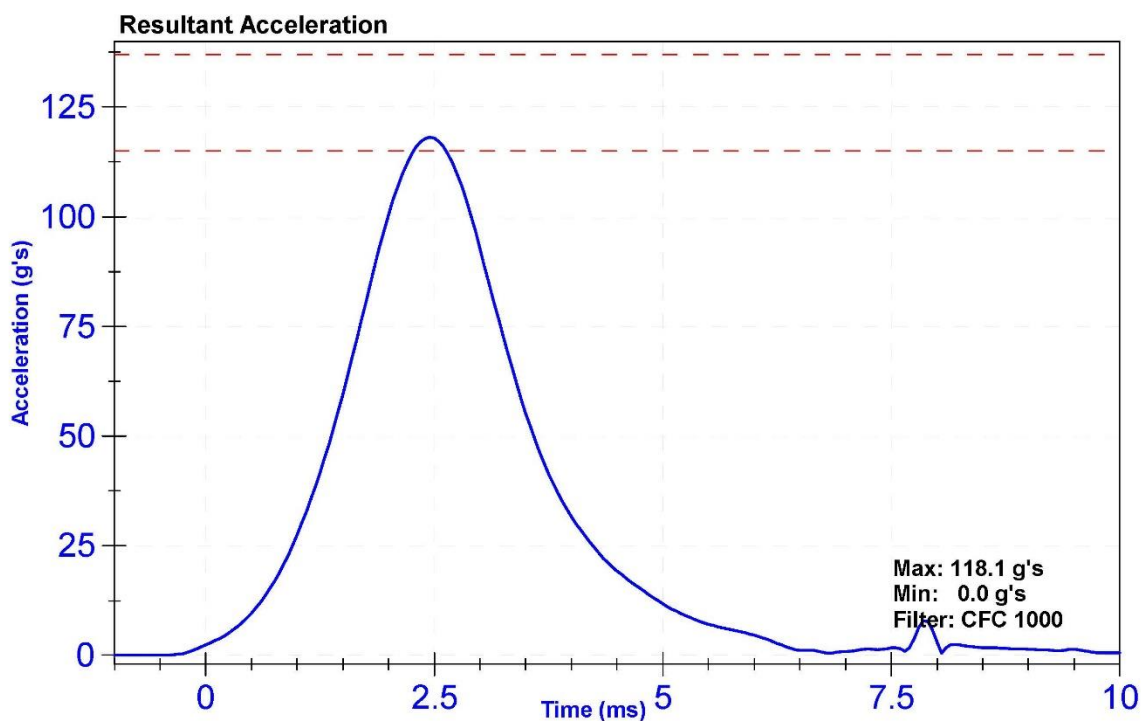
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

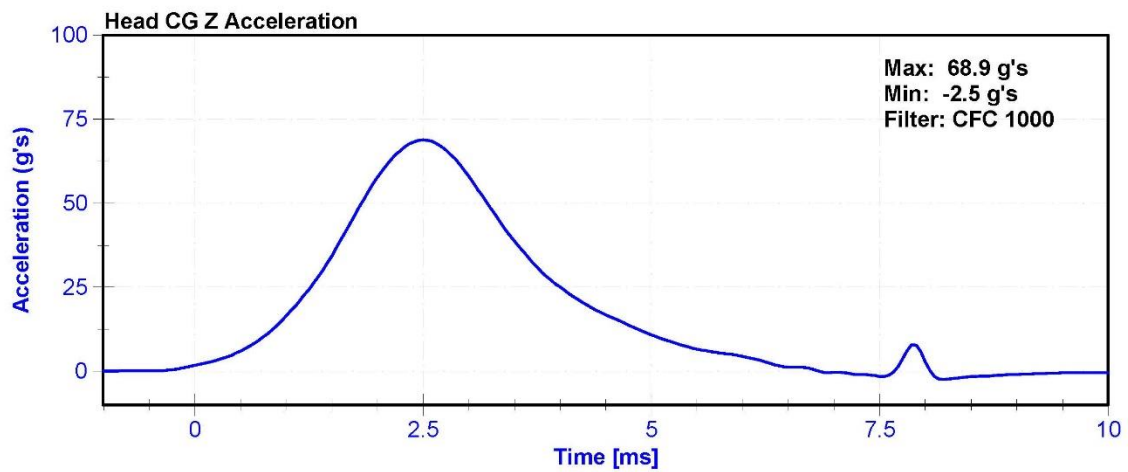
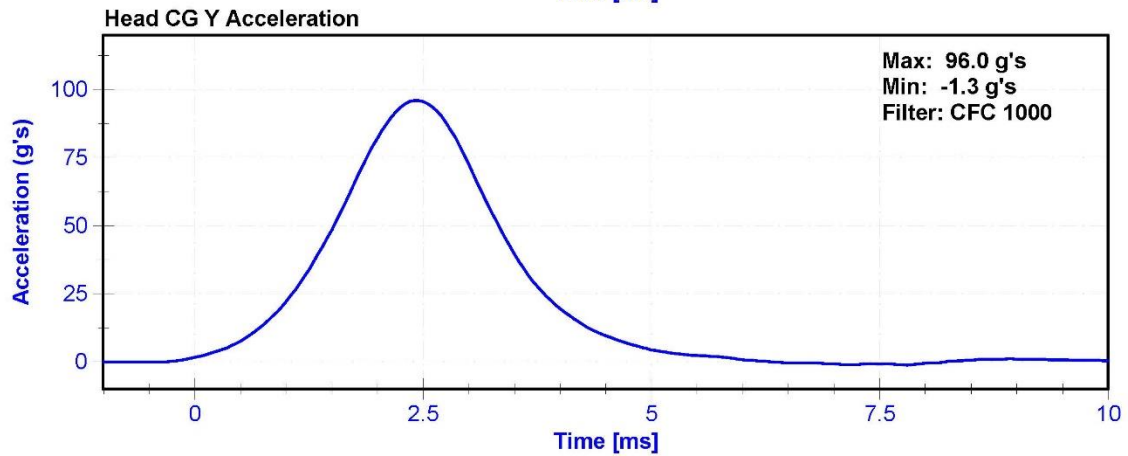
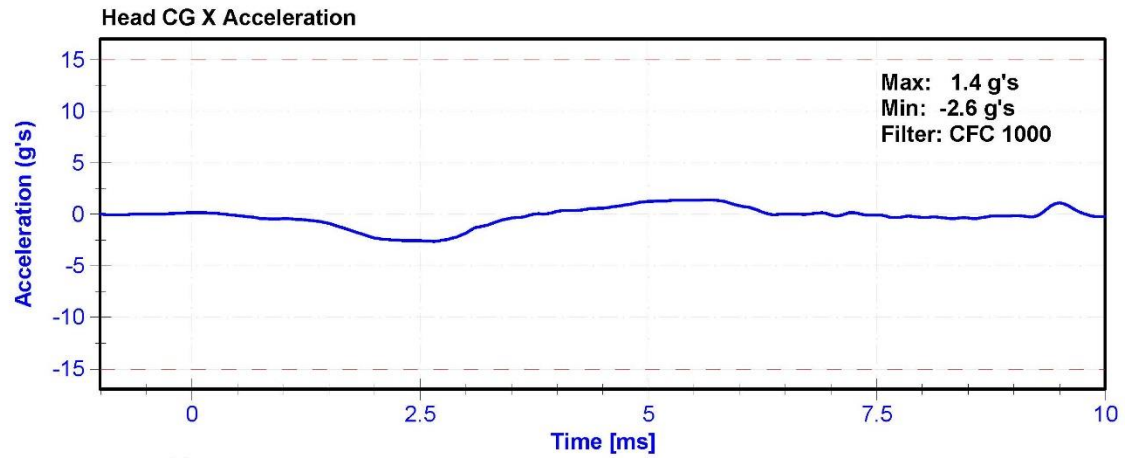
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	41.9	Pass
Resultant Acceleration	115	137	g's	118.1	Pass
Oscillation	0	15	%	6.6	Pass
Fore-Aft Acceleration	-15	15	g's	-2.6	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





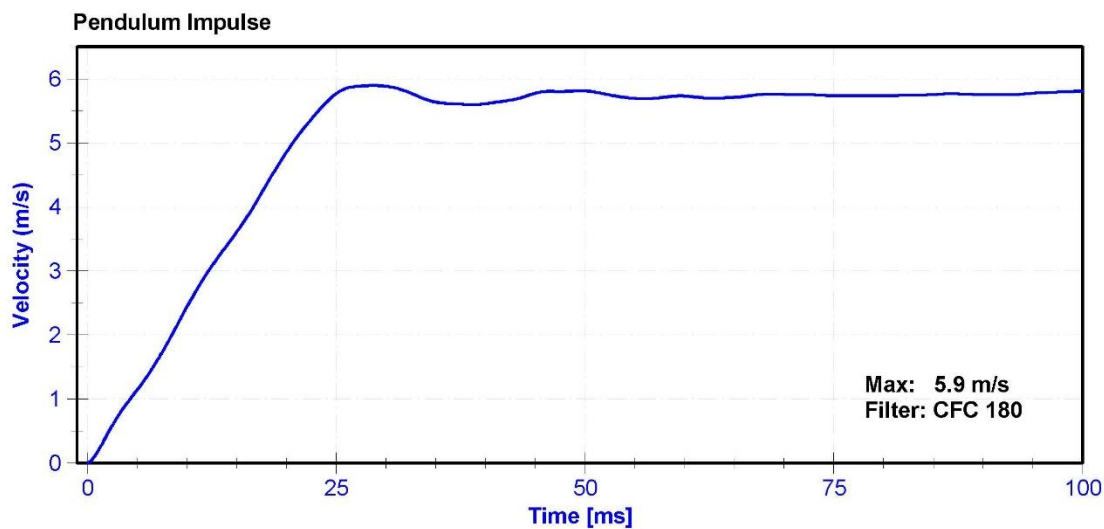
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

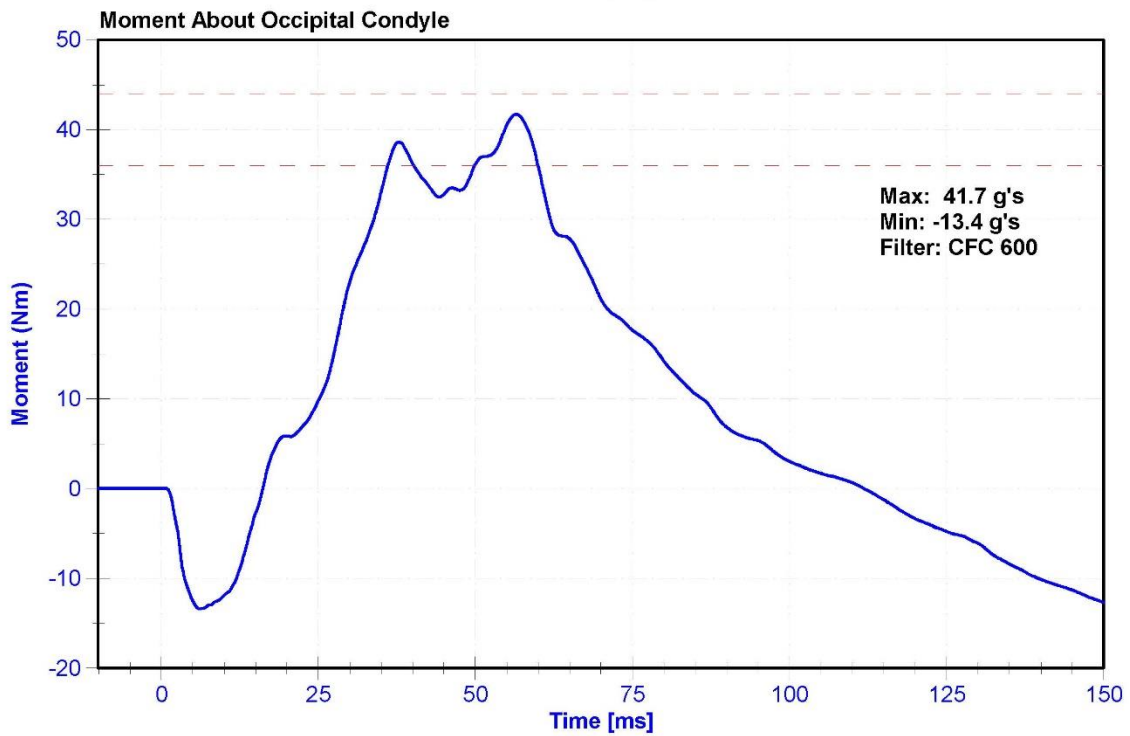
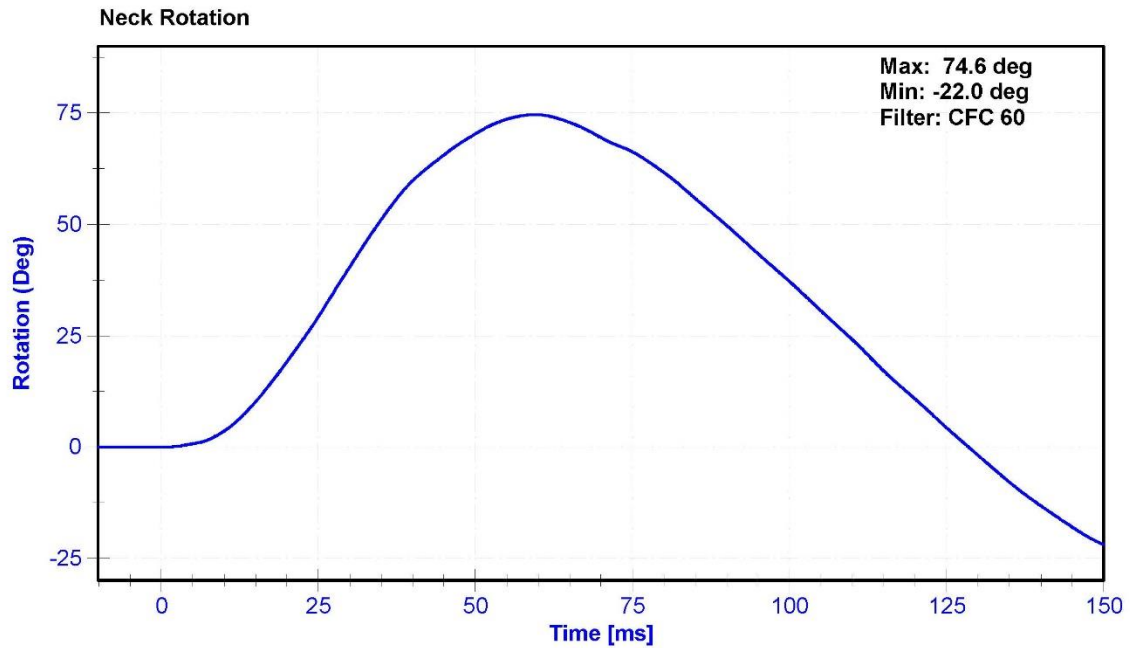
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	46.1	Pass
Velocity	5.51	5.63	m/s	5.620	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.44	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.61	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.86	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.77	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.89	Pass
Neck Rotation	71	81	deg	74.6	Pass
Time at Maximum Rotation	50	70	ms	59.4	Pass
Moment about the OC	36	44	Nm	41.7	Pass
Moment Decay to 0 Nm	102	126	ms	111.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/10/2016	5/10/2017
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-1629Fy	5/24/2016	5/24/2017





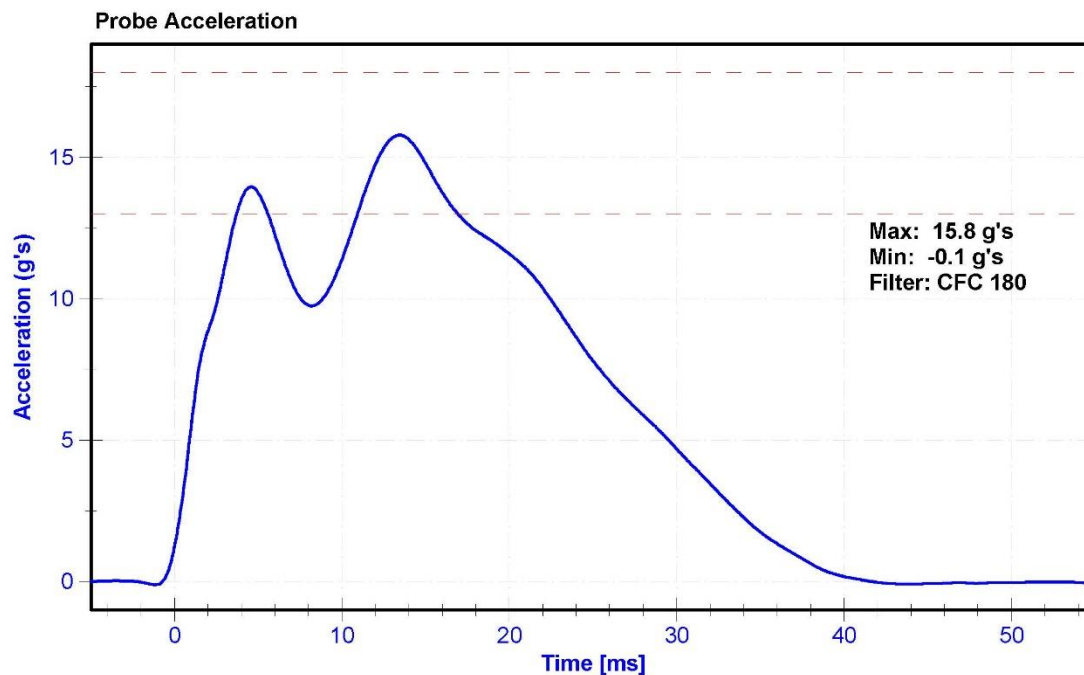
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

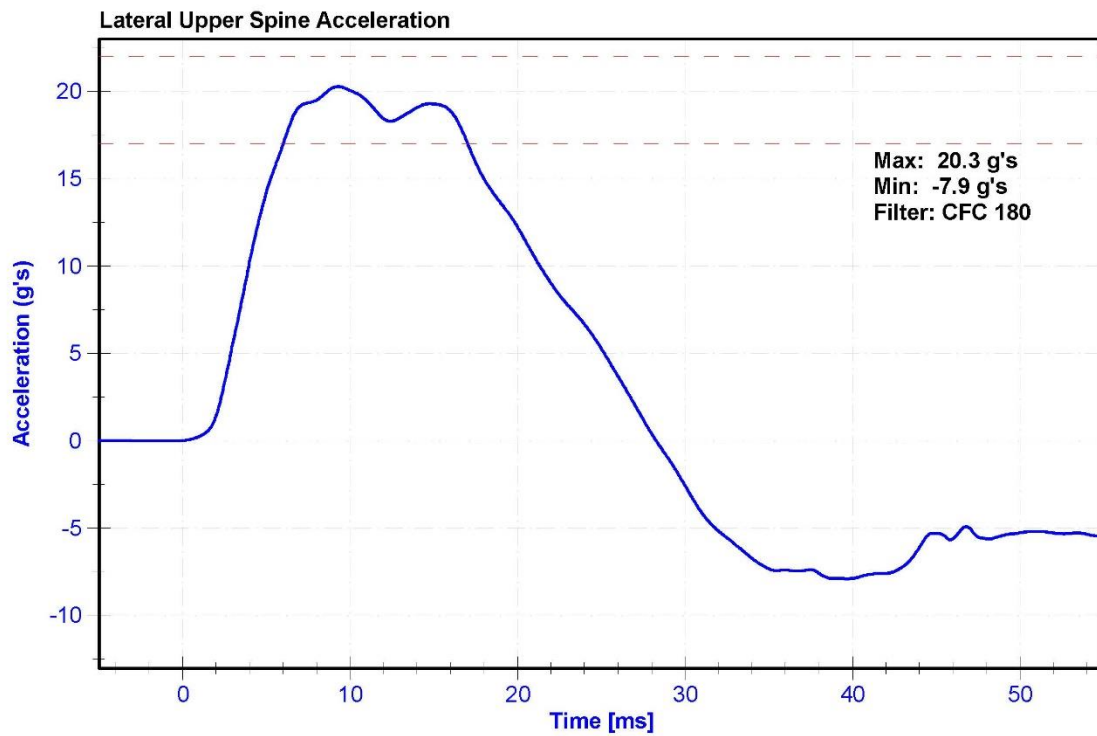
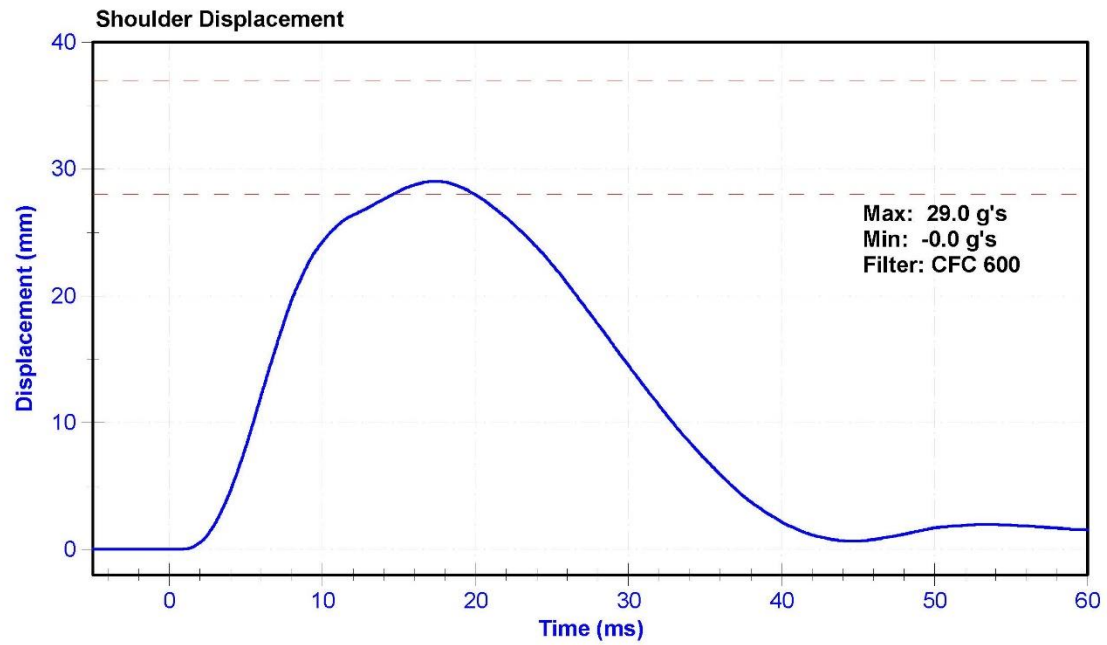
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.2	Pass
Humidity	10	70	%	36.8	Pass
Velocity	4.2	4.4	m/s	4.31	Pass
Probe Acceleration	13	18	g's	15.8	Pass
Shoulder Deflection	28	37	mm	29.0	Pass
Lateral Upper Spine Acceleration	17	22	g's	20.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P16593	4/1/2016	4/1/2017
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





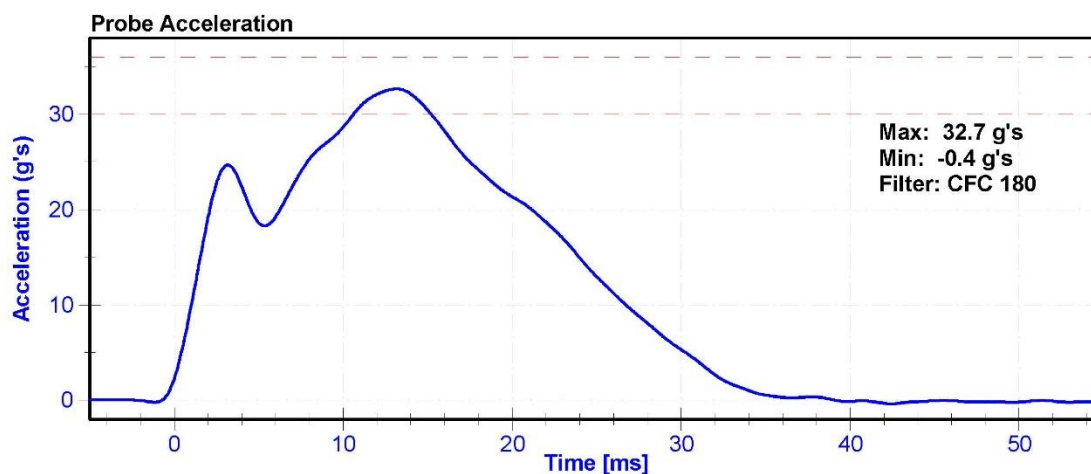
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

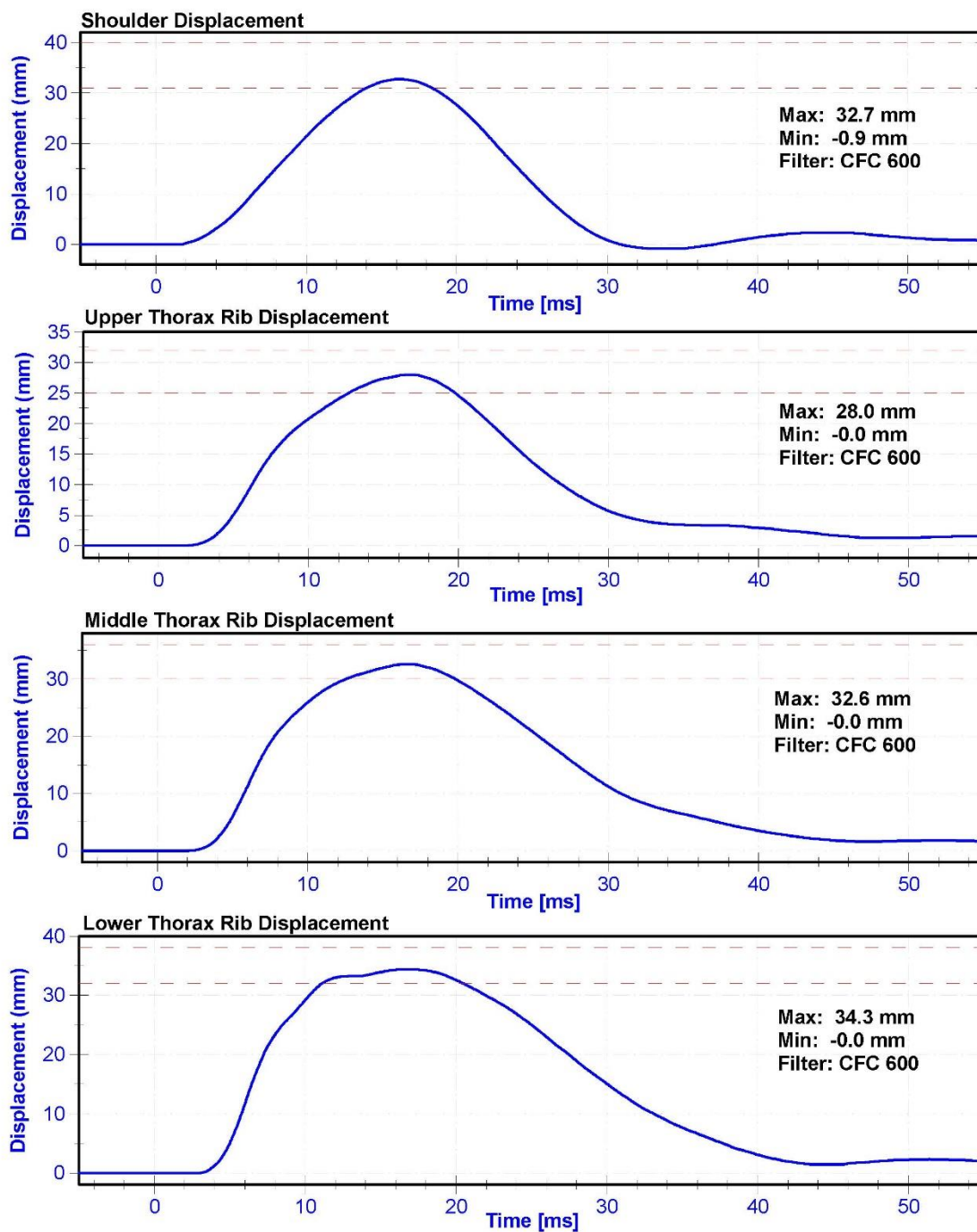
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.2	Pass
Humidity	10	70	%	38.1	Pass
Velocity	6.6	6.8	m/s	6.68	Pass
Probe Acceleration after 5 ms	30	36	g's	32.7	Pass
Lateral Upper Spine Acceleration	34	43	g's	38.4	Pass
Lateral Lower Spine Acceleration	29	37	g's	33.7	Pass
Shoulder Deflection	31	40	mm	32.7	Pass
Upper Thorax Rib Deflection	25	32	mm	28.0	Pass
Mid Thorax Rib Deflection	30	36	mm	32.6	Pass
Lower Thorax Rib Deflection	32	38	mm	34.3	Pass

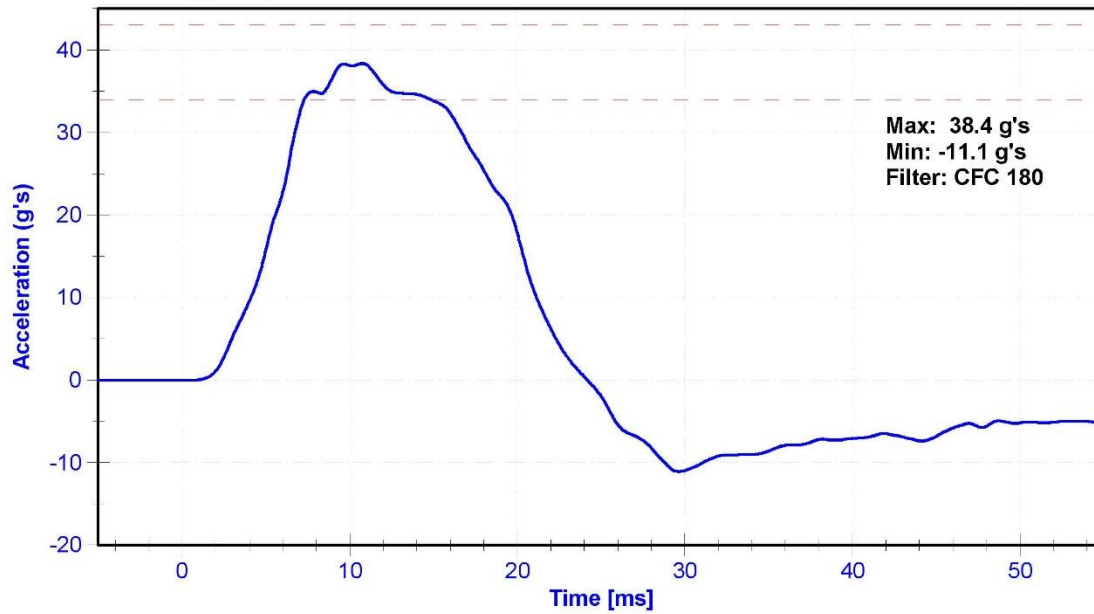
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P16593	4/1/2016	4/1/2017
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

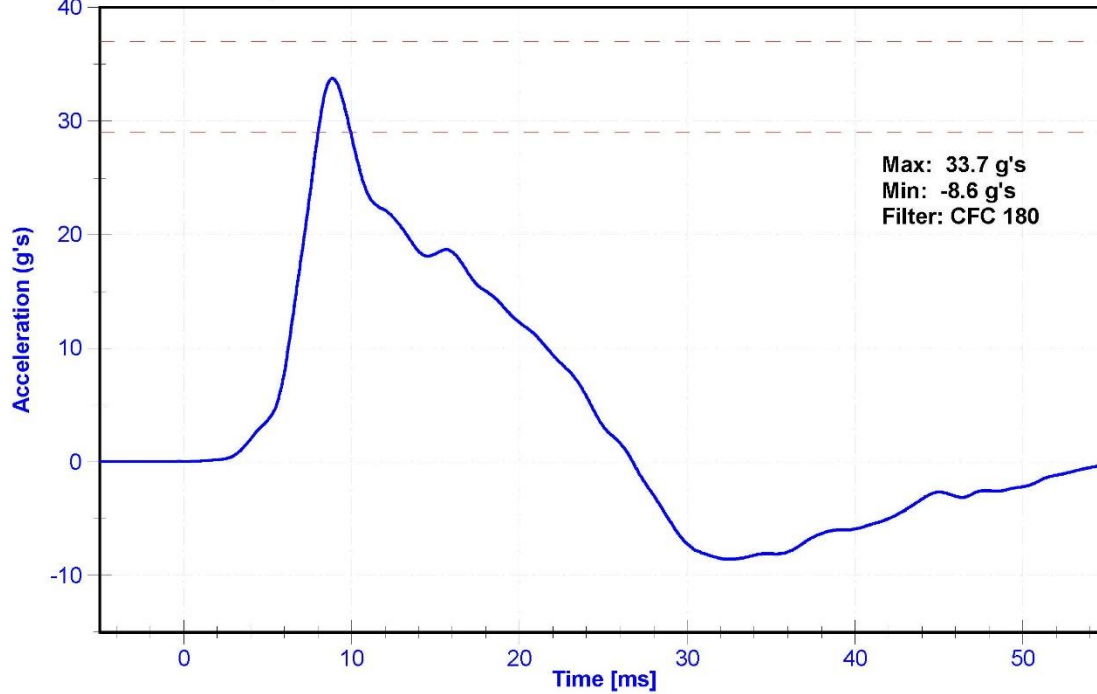




Lateral Upper Spine Acceleration



Lateral Lower Spine Acceleration



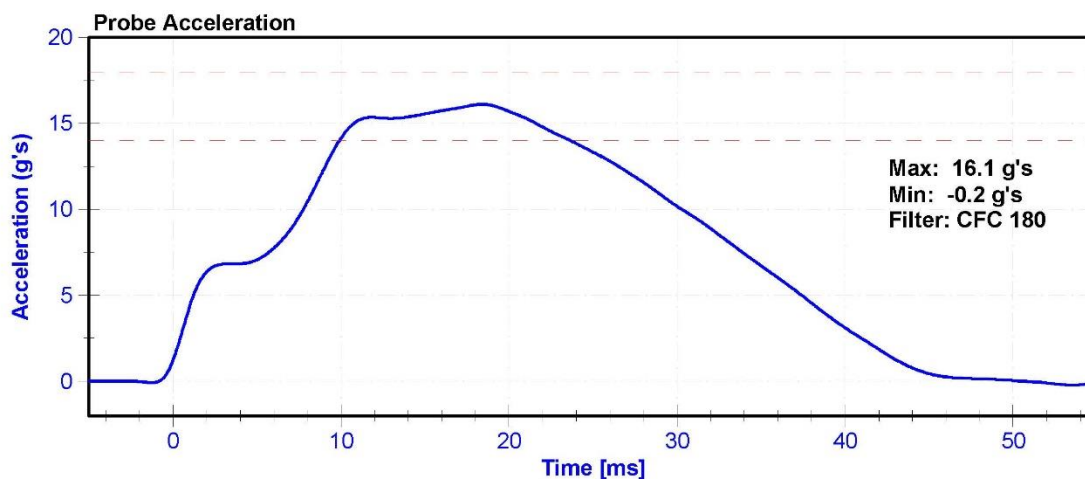
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

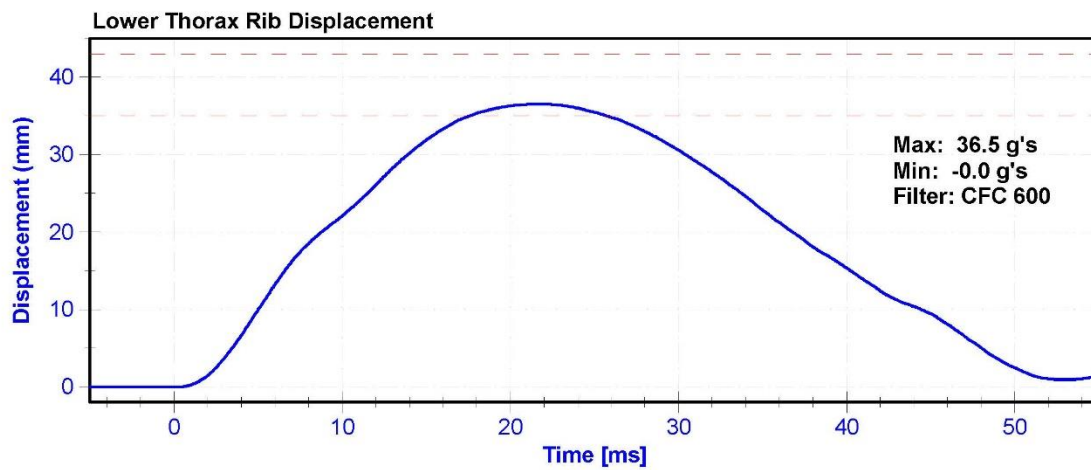
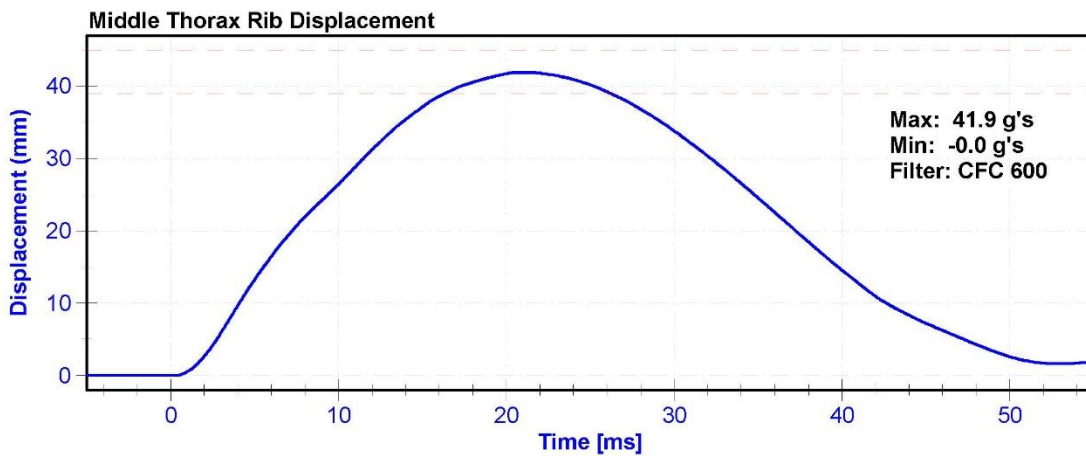
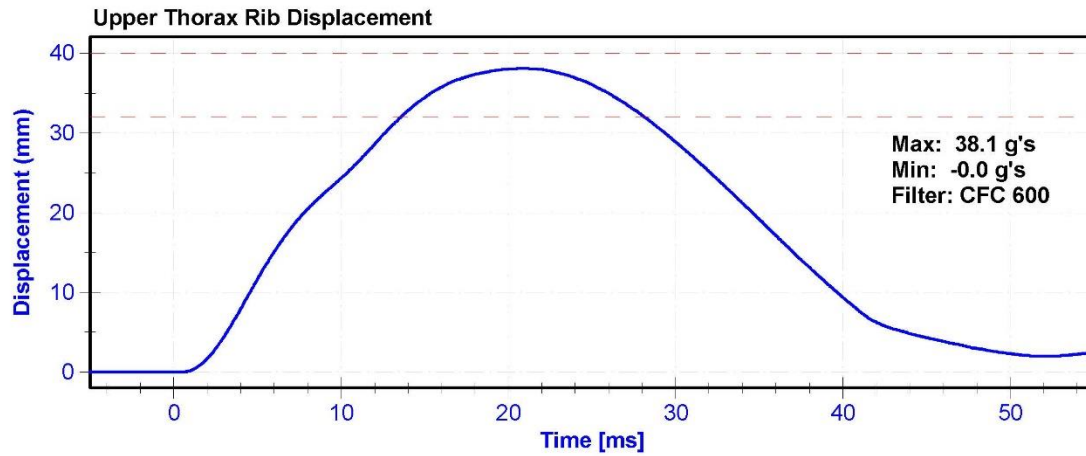
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.2	Pass
Humidity	10	70	%	42.3	Pass
Velocity	4.2	4.4	m/s	4.31	Pass
Probe Acceleration	14	18	g's	16.1	Pass
Lateral Upper Spine Acceleration	13	17	g's	15.9	Pass
Lateral Lower Spine Acceleration	7	11	g's	9.8	Pass
Upper Thorax Rib Deflection	32	40	mm	38.1	Pass
Middle Thorax Rib Deflection	39	45	mm	41.9	Pass
Lower Thorax Rib Deflection	35	43	mm	36.5	Pass

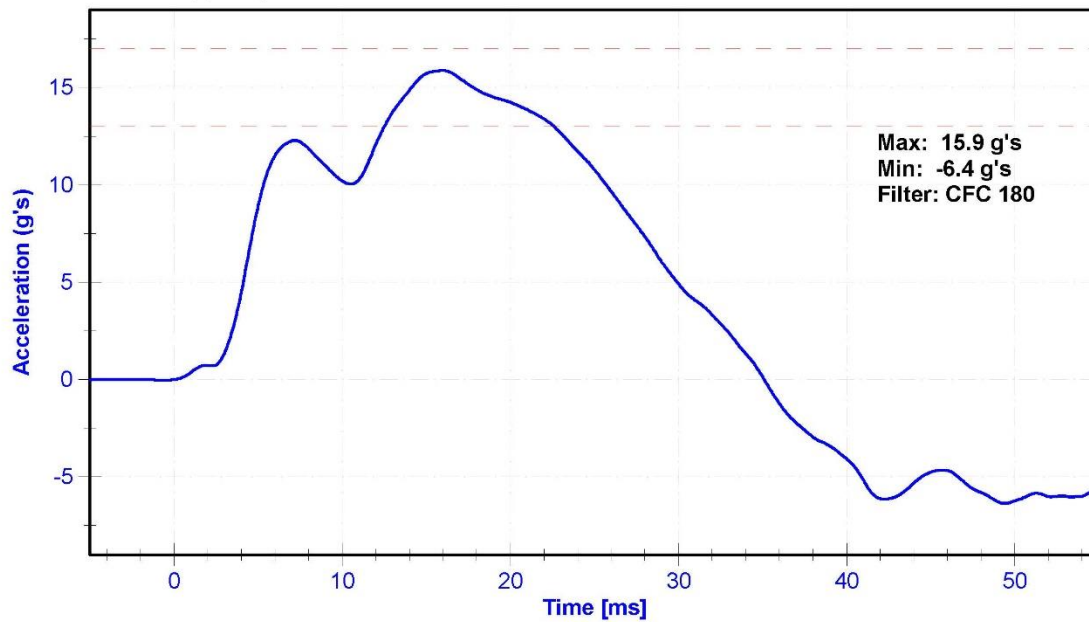
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P16593	4/1/2016	4/1/2017
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

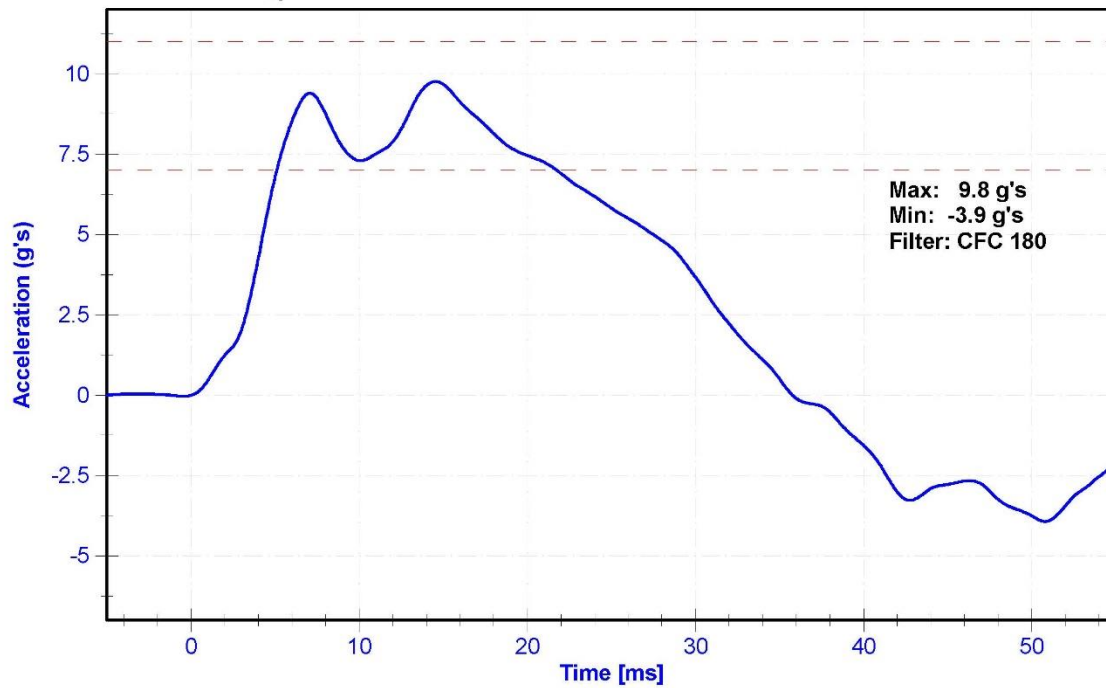




Lateral Upper Spine Acceleration



Lateral Lower Spine Acceleration



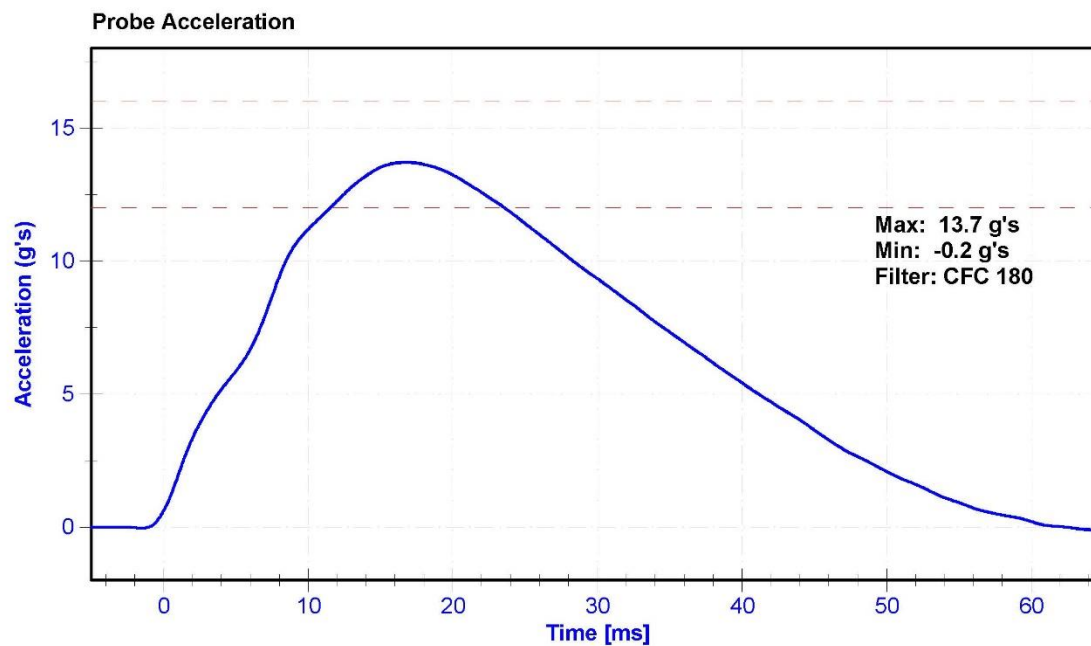
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

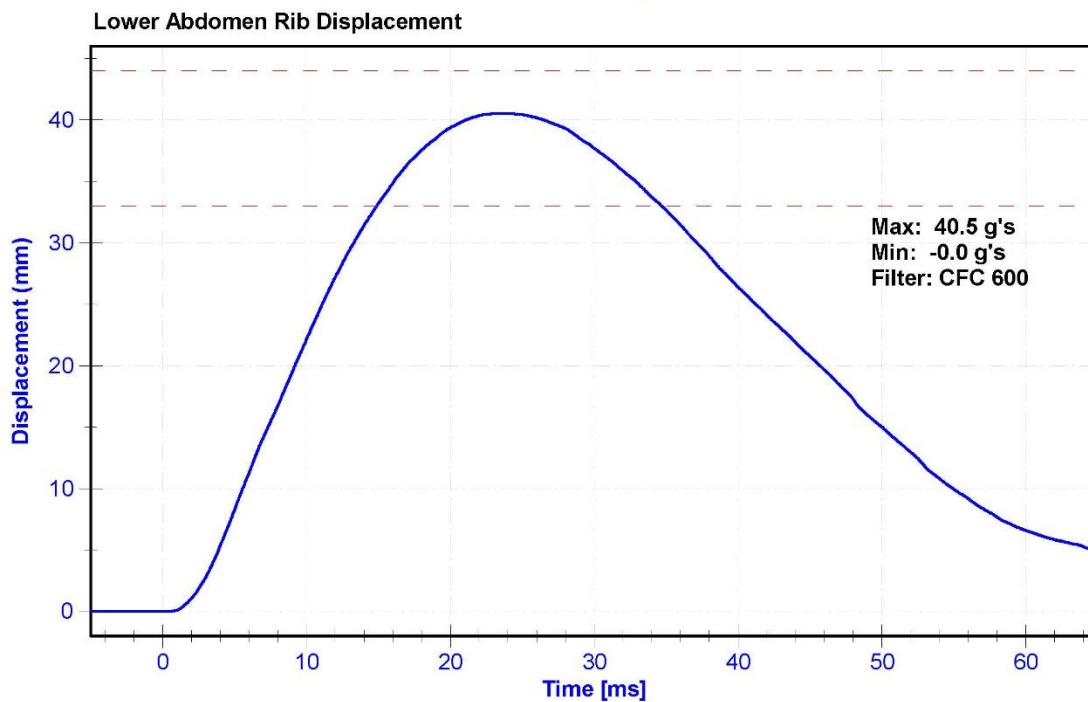
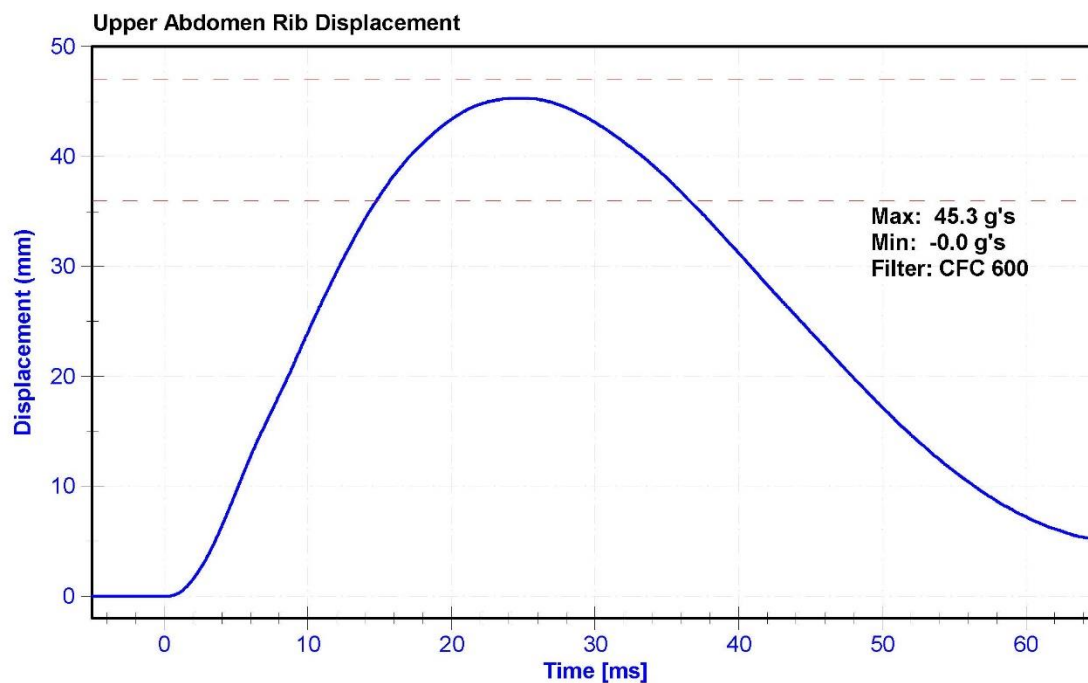
Results

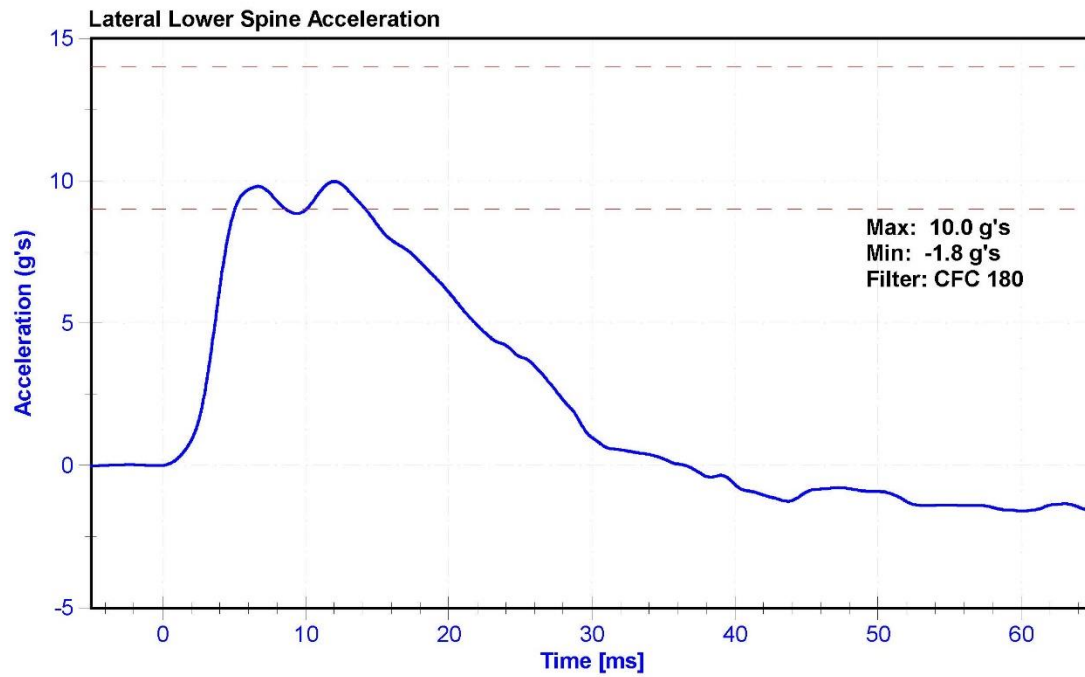
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.2	Pass
Humidity	10	70	%	40.6	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Probe Acceleration	12	16	g's	13.7	Pass
Lateral Lower Spine Acceleration	9	14	g's	10.0	Pass
Upper Abdomen Rib Deflection	36	47	mm	45.3	Pass
Lower Abdomen Rib Deflection	33	44	mm	40.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7264CT	AC-P16593	4/1/2016	4/1/2017
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







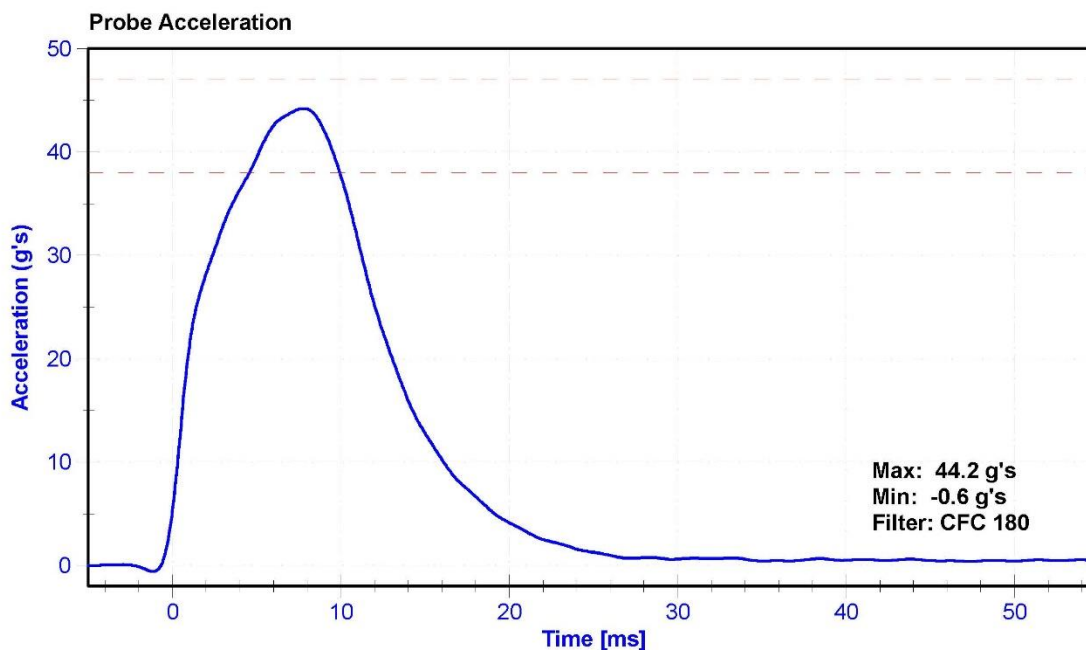
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

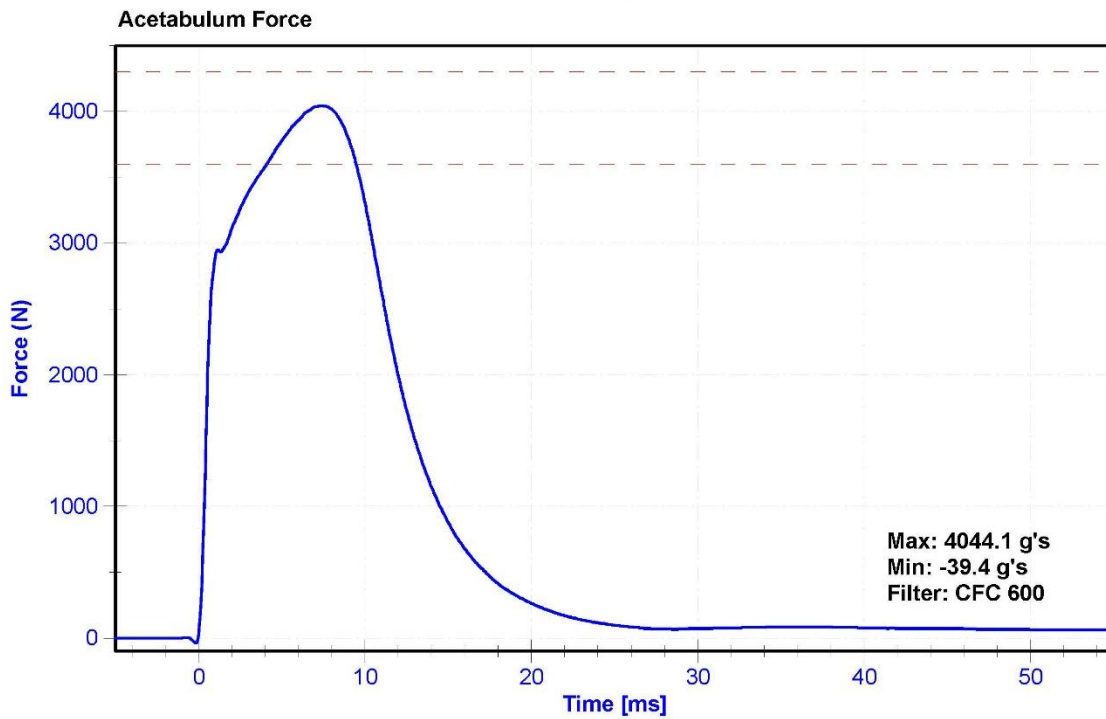
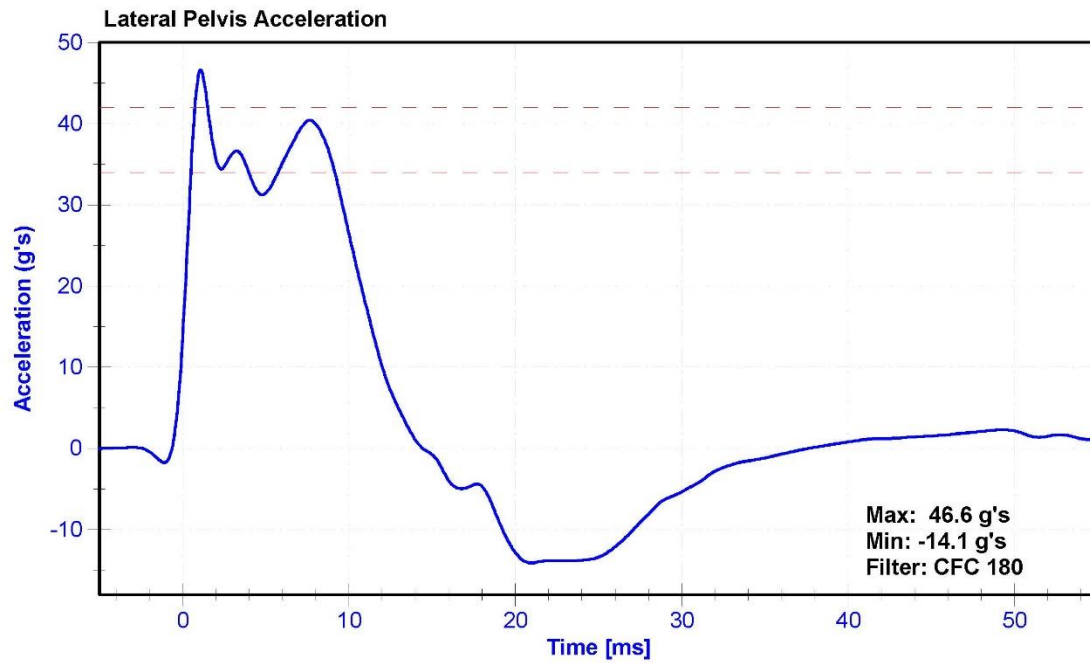
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	39.5	Pass
Velocity	6.6	6.8	m/s	6.66	Pass
Probe Acceleration	38	47	g's	44.2	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	40.4	Pass
Acetabulum Force	3600	4300	N	4044.1	Pass

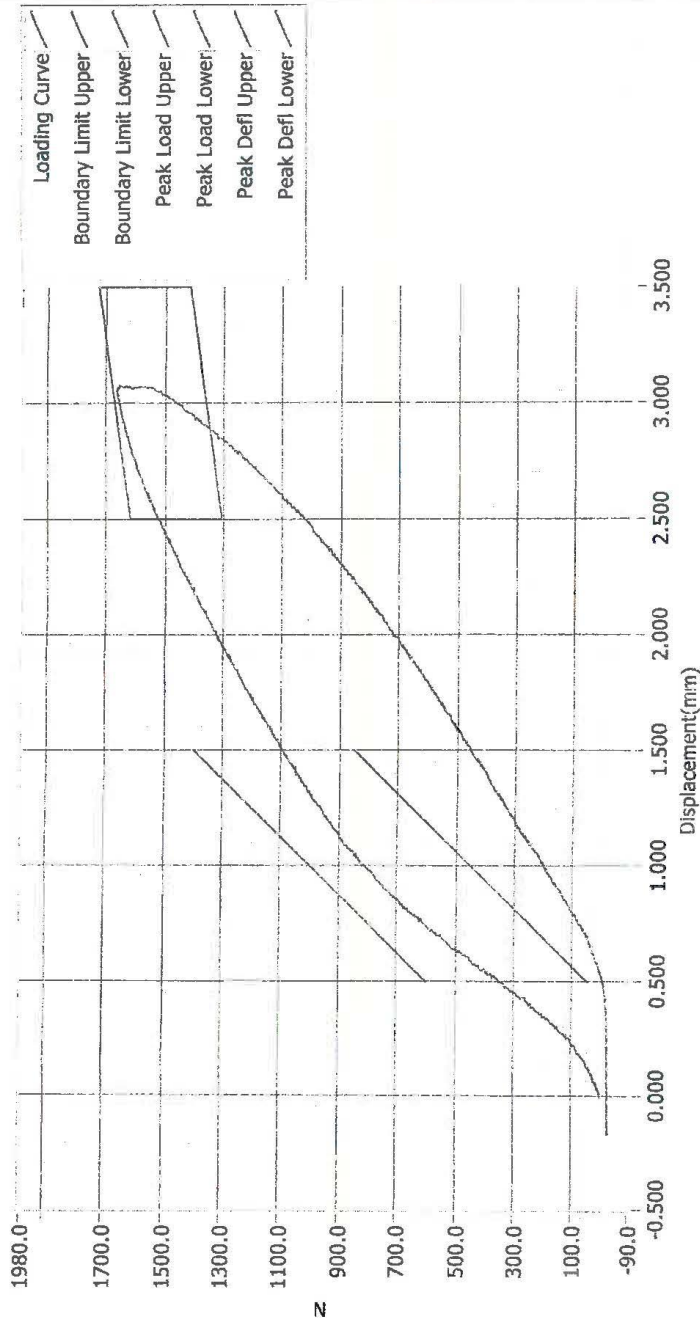
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P16593	4/1/2016	4/1/2017
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	79515	11/05/2014	N/A
Crash Test Plug	Humanetics	79582	11/05/2014	N/A





Resultant Data - SIDIIs Plug Compression

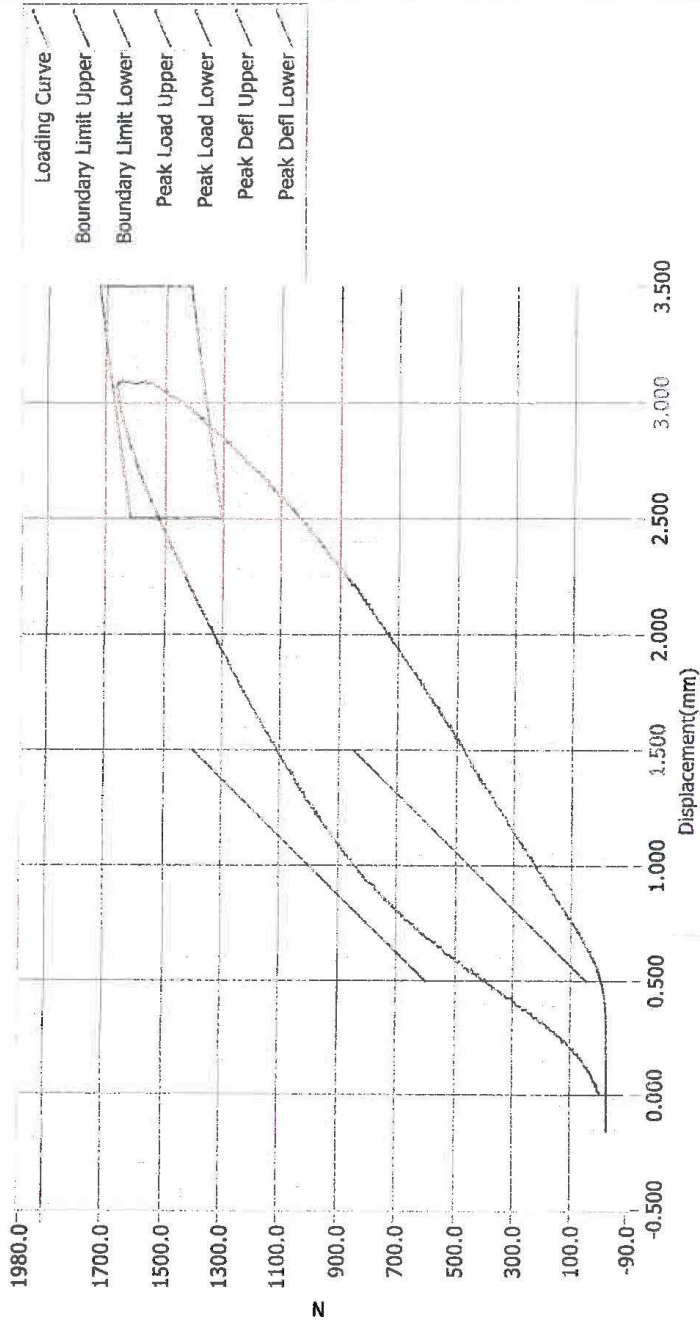


ATD Calibration Lab
 CERTIFICATION
 1655N
 10/12/16 MWG

Test ID	Part Serial Number	Test Date	Test Time
	79515	11/5/2014	5:37 PM
Cert ID	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

Current Date : 11/5/2014 Current Time : 17:42:29

Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

CRA6 H
1655N
10/11/16 MKG

Test ID	Part Serial Number	Test Date	Test Time
Cert ID	79582	11/5/2014	8:56 PM
	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

Current Date : 11/5/2014 Current Time : 20:58:14

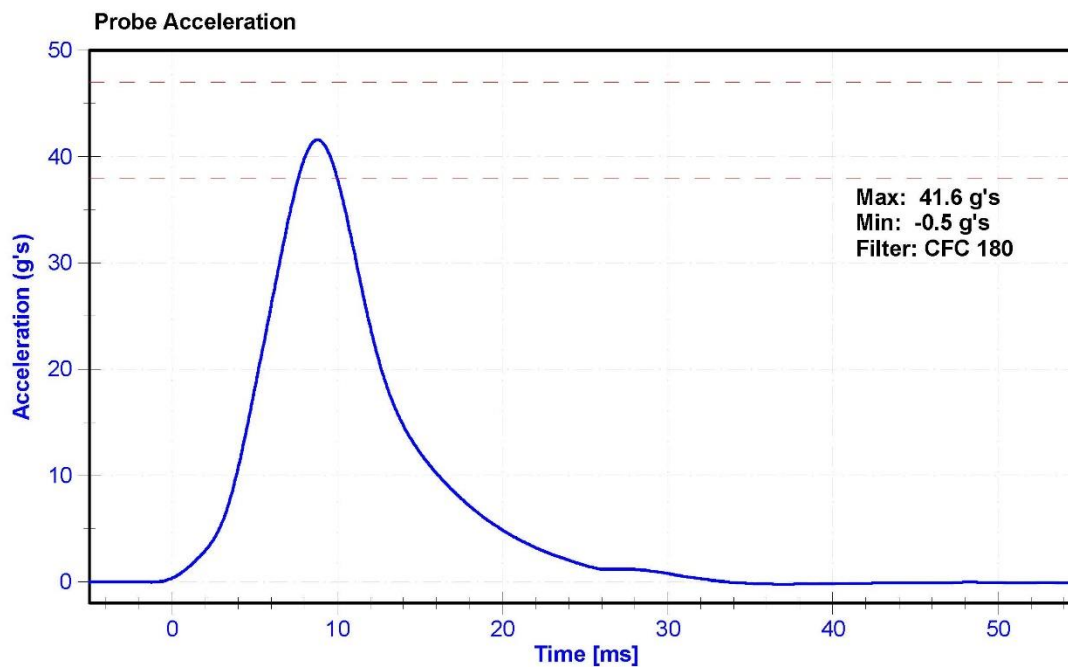
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

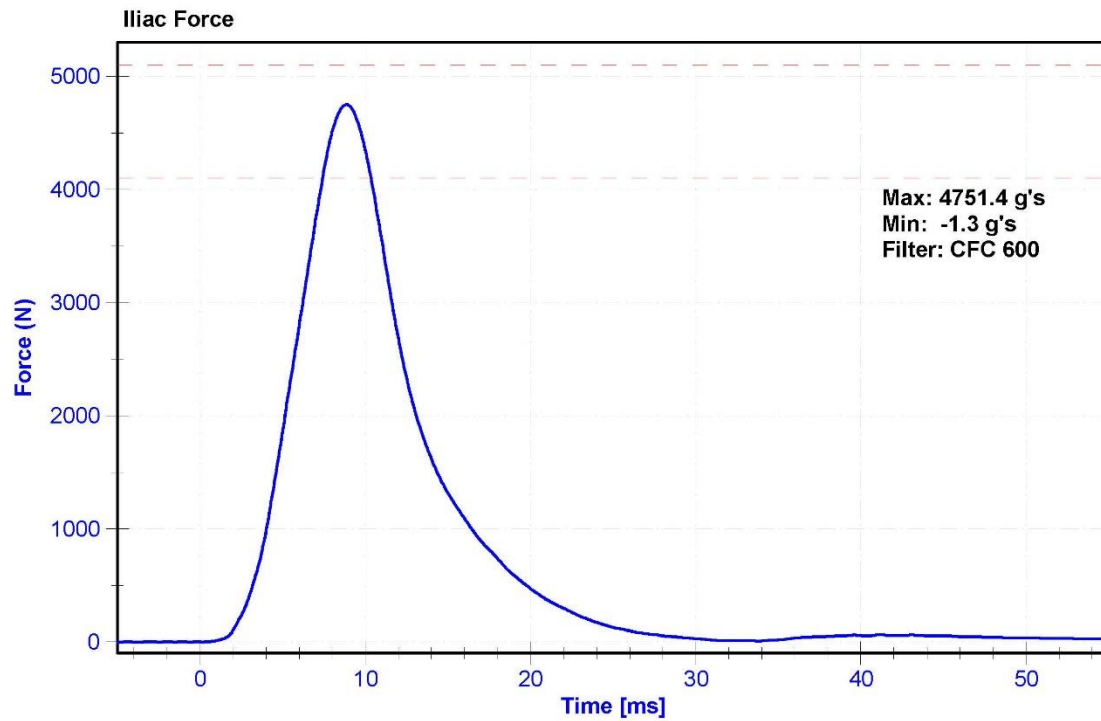
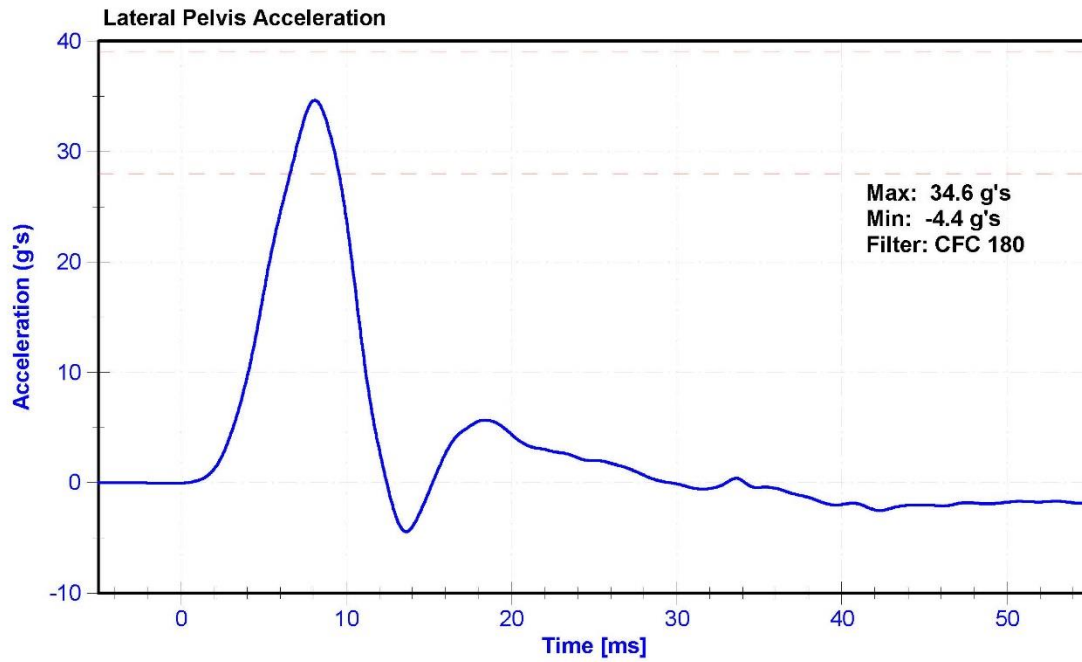
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.1	Pass
Humidity	10	70	%	42.9	Pass
Velocity	4.2	4.4	m/s	4.31	Pass
Probe Acceleration	36	45	g's	41.6	Pass
Lateral Pelvis Acceleration	28	39	g's	34.6	Pass
Iliac Force	4100	5100	N	4751.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P16593	4/1/2016	4/1/2017
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 (SID-IIs)

				SID-IIs S/N: DG8012		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers			X	AC-P51685	ENDEVCO	9/30/2016
			Y	AC-P51682	ENDEVCO	9/30/2016
			Z	AC-P51699	ENDEVCO	9/30/2016
Head Accelerometers - Redundant			X	AC-P51701	ENDEVCO	9/30/2016
			Y	AC-P45019	ENDEVCO	9/30/2016
			Z	AC-P51690	ENDEVCO	9/30/2016
Displacement Potentiometer	Shoulder		Y			
	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
Lilac Wing Load Cell			Y	LC-281Fy	DENTON	5/24/2016
Pelvis Plug (Struck Side)				79582	HUMANETICS	11/5/2014
Pelvis Plug (Non-Struck Side)						

Table 2 – Vehicle Instrumentation

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	AC-A196989	MSI 1201-1000	5/17/2016
Vehicle Center of Gravity	Y	AC-A196992	MSI 1201-1000	5/17/2016
Vehicle Center of Gravity	Z	AC-A196997	MSI 1201-1000	5/17/2016
Left Floor Sill	Y	AC-A120631	MSI 1201	4/19/2016
A-Pillar Sill	Y	AC-A197057	MSI 1201-1000	5/17/2016
A-Pillar Low	Y	AC-A197031	MSI 1201-1000	5/13/2016
A-Pillar Mid	Y	AC-A197052	MSI 1201-1000	5/17/2016
B-Pillar Sill	Y	AC-A189608	MSI 1201-1000	7/13/2016
B-Pillar Low	Y	AC-A189616	MSI 1201-1000	4/19/2016
B-Pillar Mid	Y	AC-A189622	MSI 1201-1000	4/19/2016
Driver Seat	Y	AC-A156946	MSI 1201	4/19/2016
Engine Top	X	AC-A197006	MSI 1201-1000	5/17/2016
Engine Top	Y	AC-A197023	MSI 1201-1000	5/17/2016
Firewall	Y	AC-A197035	MSI 1201-1000	5/17/2016
Right Roof	Y	AC-A197017	MSI 1201-1000	5/17/2016
Right Floor Sill	Y	AC-A156932	MSI 1201	4/19/2016
Rear Floorpan	X	AC-A189595	MSI 1201-1000	7/13/2016
Rear Floorpan	Y	AC-A189587	MSI 1201-1000	7/13/2016

Table 3 – Pole Instrumentation

Pole Instrumentation	Serial Number	Manufacturer	Calibration Date
Load Cell 1	LC-18879	INTERFACE	6/30/2016
Load Cell 2	LC-18852	INTERFACE	6/30/2016
Load Cell 3	LC-46955	INTERFACE	6/30/2016
Load Cell 4	LC-18882	INTERFACE	6/30/2016
Load Cell 5	LC-18864	INTERFACE	6/30/2016
Load Cell 6	LC-18847	INTERFACE	6/30/2016
Load Cell 7	LC-62086	INTERFACE	6/30/2016
Load Cell 8	LC-46962	INTERFACE	6/30/2016