

REPORT NUMBER: NCAP-CAL-17-004

**NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST**

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

NHTSA No: M20170103

**PREPARED BY:
CALSPAN CORPORATION
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January 3, 2017

FINAL REPORT

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

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Date: January 3, 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 56.30 km/h (35 mph), NCAP Frontal Impact Test was conducted on a 2017 Buick LaCrosse four door sedan in accordance with the specifications of the Office of Crashworthiness Standards Frontal NCAP Laboratory Test Procedure. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and foot well intrusion performance. The test was conducted at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on November 22, 2016. The impact velocity of the vehicle was 56.07 km/h, and the ambient temperature at the barrier face at the time of impact was 21°C. The target vehicle's maximum post-test static crush was 398 mm at C2 to the left side of the front bumper. The test vehicle's occupant performance data is as follows: <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th rowspan="2">Units</th> <th colspan="2">Driver ATD (Serial No. 1046)</th> <th colspan="2">Passenger ATD (Serial No. 288)</th> </tr> <tr> <th>Threshold</th> <th>Result</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₁₅)</td> <td></td> <td>700</td> <td>220.015</td> <td>700</td> <td>320.224</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>-22.078</td> <td>52</td> <td>-20.462</td> </tr> <tr> <td>Nij</td> <td></td> <td>1</td> <td>0.212</td> <td>1</td> <td>0.348</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>4,170</td> <td>942.694</td> <td>2,620</td> <td>868.594</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>4,000</td> <td>-91.702</td> <td>2,520</td> <td>-194.922</td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>10,008</td> <td>-750.297</td> <td>6,805</td> <td>-1540.380</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>10,008</td> <td>-1018.262</td> <td>6,805</td> <td>-1576.079</td> </tr> </tbody> </table>						Measurement Description	Units	Driver ATD (Serial No. 1046)		Passenger ATD (Serial No. 288)		Threshold	Result	Threshold	Result	Head Injury Criteria (HIC ₁₅)		700	220.015	700	320.224	Maximum Chest Compression	mm	63	-22.078	52	-20.462	Nij		1	0.212	1	0.348	Neck Tension	N	4,170	942.694	2,620	868.594	Neck Compression	N	4,000	-91.702	2,520	-194.922	Left Femur Force	N	10,008	-750.297	6,805	-1540.380	Right Femur Force	N	10,008	-1018.262	6,805	-1576.079
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SECTION 1

PURPOSE AND SUMMARY OF TEST

PURPOSE

This 56.3 km/h frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-12-D-00260. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for consumer information purposes.

The 56.3 km/h frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Frontal NCAP Laboratory Test procedure, dated October 2015.

SUMMARY

A ridged fixed barrier was impacted by a 2017 Buick LaCrosse four door sedan at a velocity of 56.07 km/h. The test was performed at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on November 22, 2016. Pre- and post-test photographs of the vehicle and dummies to document the test can be found in Appendix A. One real-time camera and 14 high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in Data Sheet 6 of this report.

One Part 572E, 50th percentile male anthropomorphic test device (ATD), was placed in the driver seating position and one Part 572O 5th percentile female ATD was placed in the right-front passenger seating position according to dummy placement instructions specified in the Frontal NCAP Laboratory Test Procedure. Both ATDs were fully instrumented with head, chest and pelvis tri-axial accelerometers, chest displacement potentiometers, upper neck transducers, right / left femur load cells, and lower leg instrumentation. The driver (position 1) ATD (Serial No. 1046) and the right-front passenger (position 2) ATD (Serial No. 288) were calibrated previous to this test. Certification details, along with instrumentation calibration data, can be found in Appendix C of this report.

The 100 channels of data were recorded on an on-board data acquisition system. Please refer to Appendix B for the dummy response data traces.

There was 100 percent windshield retention and no intrusion into the protected zone of the windshield during the event. There was a total of 0.0 grams of stoddard solvent leakage after

the event and including all phases of the static rollover. The maximum static crush of the test vehicle was 398 mm at C2 to the left side of front bumper. During and after the impact event, the driver's and passenger's side doors were closed and operational.

The driver's visible contact points were as follows: The driver's head contacted the frontal airbag and then the head restraint. The upper torso contacted the frontal airbag. Both knees contacted the knee air bag.

The passenger's visible contact points were as follows: The passenger's head contacted the frontal airbag and then the head restraint. The upper torso contacted the frontal airbag. Both knees contacted the knee airbag

The occupant data is summarized below.

ATD Position	HIC ₁₅	Nij	Neck Tension (N)	Neck Comp. (N)	3ms Chest Clip (Gs)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver (50 th)	220.015	0.212	942.694	-91.702	42.566	-22.078	-750.297	-1018.262
Passenger (5 th)	320.224	0.348	868.594	-194.922	34.374	-20.462	-1540.380	-1576.079

GENERAL COMMENTS:

1. P1 (Driver) serial number - 1046
2. P2 (Passenger) serial number - 288

Data Anomalies:

- Engine Bottom X Acceleration, questionable data from 31ms onwards

SECTION 2

OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

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 Adjustment, Fuel System, and Steering Wheel Data

Data Sheet No. 3 – Dummy Longitudinal Clearance Dimensions

Data Sheet No. 4 – Dummy Lateral Clearance Dimensions

Data Sheet No. 5 – Seat Belt Positioning Data

Data Sheet No. 6 – High-Speed Camera Locations and Data

Data Sheet No. 7 – Vehicle Accelerometer Locations

Data Sheet No. 8 – Photographic Reference Target Locations

Data Sheet No. 9 – Load Cell Locations on Fixed Barrier

Data Sheet No. 10 – Test Vehicle Summary of Results

Data Sheet No. 11 – Post-Test Observations

Data Sheet No. 12 – Vehicle Profile Measurements

Data Sheet No. 13 – Accident Investigation Division Data

Data Sheet No. 14 – Vehicle Intrusion Measurements

Data Sheet No. 15 – Summary of FMVSS 212, 219 (Partial), and 301 Data

Data Sheet No. 16 – FMVSS 301 Static Rollover Results

Data Sheet No. 17 – Dummy/Vehicle Temperature Stabilization Chart

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2017 Buick LaCrosse four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20170103
 Test Date: 11/22/2016

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20170103	Traction Control System (TCS)	Yes
Model Year	2017	Power Steering	Yes
Make	Buick	Power Window Auto-Reverse	No
Model	LaCrosse	Driver Frontal Airbag	Yes
Body Style	Four Door Sedan	Driver Curtain Airbag	Yes
VIN	1G4ZS5SS6HU125386	Driver Head/Torso Airbag	No
Body Color	Red	Driver Torso Airbag	No
Odometer Reading (km /mi)	19.3 km / 12 mi	Driver Torso/Pelvis Airbag	Yes
Engine Displacement (L)	3.6	Driver Pelvis Airbag	No
Type / No. Cylinders	V6	Driver Knee Airbag	Yes
Engine Placement	Transverse	Front Pass. Frontal Airbag	Yes
Transmission Type	Automatic	Front Pass. Curtain Airbag	Yes
Transmission Speeds	8-Speed	Front Pass. Head/Torso Airbag	No
Overdrive	Yes	Front Pass. Torso Airbag	No
Final Drive	All Wheel Drive	Front Pass. Torso/Pelvis Airbag	Yes
Roof Rack	No	Front Pass. Pelvis Airbag	No
Sunroof / T-Top	No	Front Pass. Knee Airbag	Yes
Running Boards	No	Driver Pretensioner	Yes
Tilt Steering Wheel	Yes	Driver Load Limiter	Yes
Power Seats	Yes	Front Pass. Pretensioner	Yes
Anti-Lock Brakes (ABS)	Yes	Front Pass. Load Limiter	Yes
Automatic Door Locks (ADLs)	Yes	Other	-

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

No

DATA FROM CERTIFICATION LABEL

Manufactured By	General Motors LLC	GVWR (kg)	2142
Date of Manufacture	08/16	GAWR Front (kg)	1099
		GAWR Rear (kg)	1043

VEHICLE SEATING AND WEIGHT CAPACITY DATA

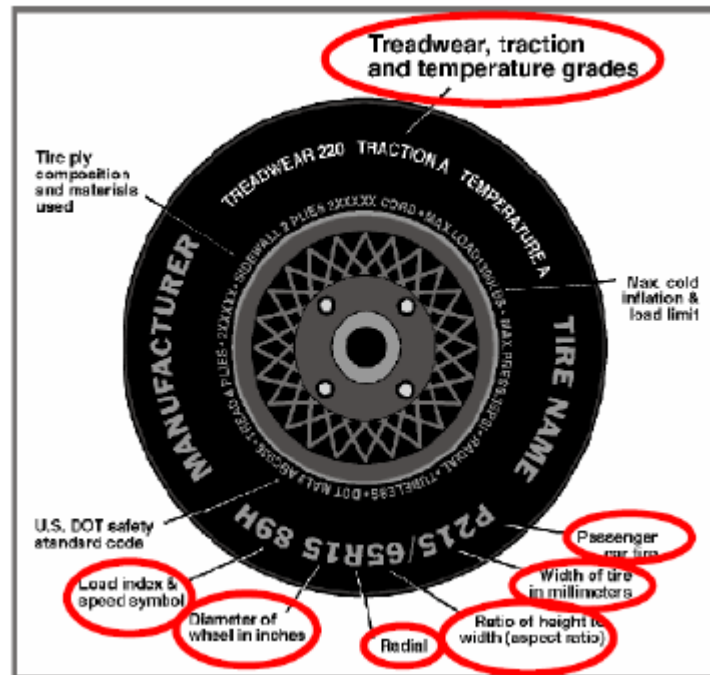
Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench	-	
Number of Occupants	2	3	-	5
Capacity Wt. (VCW) (kg)				416
Cargo Wt. (RCLW) (kg)				75.8

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

Test Vehicle: 2017 Buick LaCrosse four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20170103
 Test Date: 11/22/2016

Collect items circled in red, tire manufacturer, and tire name.



VEHICLE TIRE 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 TX	ProContact TX
Treadwear	400	400
Traction	A	A
Temperature Grades	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	A31PWBU32116	A31PWBU32116
DOT Safety Code Right	A31PWBU32116	A31PWBU32116

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

Test Vehicle: 2017 Buick LaCrosse four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20170103
 Test Date: 11/22/2016

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	513	357		545	440	
Right	kg	486	358		528	418	
Ratio	%	58	42		56	44	
Totals	kg	999	715	1714	1073	858	1931

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1714	(A)
Weight of 1 P572E ATD & 1 P572O ATD	kg	147	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	75.8	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1936.8	(A+B+C)

TEST VEHICLE ATTITUDES AND CG

Condition	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	735	741	740	749	1211
As Tested	mm	735	744	711	716	1290
Post-Test	mm	813	803	726	708	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2904
Total Vehicle Length at Left Side	mm	4889
Total Vehicle Length at Centerline	mm	5017
Total Vehicle Length at Right Side	mm	4889
Weight of Ballast in Cargo Area	kg	6
Weight of Vehicle Components Removed	kg	30
Amount of Stoddard Solvent in Fuel Tank	L	57

LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT:

Trunk carpeting, spare tire, jack, rear speaker, tail light

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

Test Vehicle: 2017 Buick LaCrosse four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20170103
 Test Date: 11/22/2016

TARGET VEHICLE STRUCTURAL MEASUREMENT

No.	Description	Pre-Test
1	Total Length	5017
2	Total Width	1858
3*	Bumper Top Height	459
4*	Bumper Bottom Height	338
5*	Longitudinal Member Top Height	532
6	Distance Between Longitudinal Members	1059
7	Longitudinal Member Width	79
8*	Engine Top Height	874
9*	Engine Bottom Height	195
10	Engine and Gearbox Width	441
11	Front Bumper-Engine Distance	533
12*	Front Shock Absorber Fixing Height	901
13*	Bonnet Leading Edge Height	817
14	Front Shock Absorber Fixing Width	1194
15	Front Bumper – Front Axle Distance	955
16	Front Axle – A Pillar Distance	495
17	A-Pillar – B-Pillar Distance	1186
18	B-Pillar – Rear Axle Distance	1221
19	B-Pillar – C-Pillar Distance	997
20*	Roof Sill Bottom Height	1327
21*	Roof Sill Top Height	1372
22*	Floor Sill Bottom Height	255
23*	Floor Sill Top Height	352

*Height Measurements are taken from the ground
 Note: All measurements are in millimeters

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

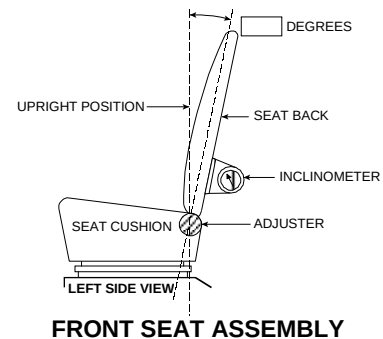
Test Vehicle: 2017 Buick LaCrosse four door sedan
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20170103
Test Date: 11/22/2016

NOMINAL DESIGN RIDING POSITION

The driver's seat back was set to the manufacturer's designated angle. The passenger's seat back was positioned in a similar manner as the driver's seat back. Seat back angles are measured at the headrest post bezel using a digital inclinometer.

Seating Position	Degrees
Driver Seat Back Angle	-12.6
Passenger Seat Back Angle	-15.7



SEAT FORE / AFT POSITIONS

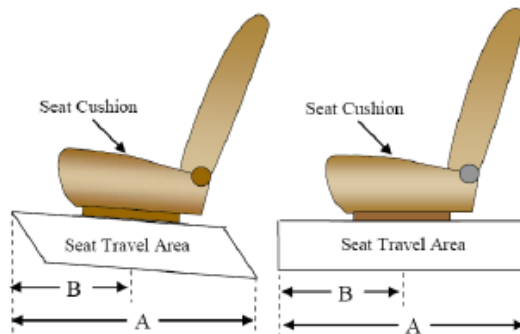
The driver's seat was positioned at the mid-point of fore/aft travel at its lowest position. The passenger's seat was positioned at the most forward position of fore/aft travel. Zero is defined as the forward most position.

Seating Position	Total Fore / Aft Travel	Placed in Position #
Driver Seat	334	167
Passenger Seat	335	0

SEAT BELT UPPER ANCHORAGE

The driver's seat belt anchorage was positioned according to the manufacturer's designated positioning for a 50th percentile adult male ATD. The passenger's seat belt anchorage was positioned according to the manufacturer's designated positioning for a 5th percentile adult female ATD. For this test zero is defined as the uppermost position.

Seating Position	Total # of Positions	Placed in Position #
Driver Seat	4	0 – Uppermost
Passenger Seat	4	0 – Uppermost



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

Test Vehicle: 2017 Buick LaCrosse four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

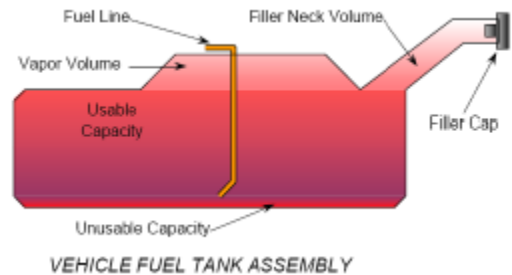
NHTSA No.: M20170103
 Test Date: 11/22/2016

FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank"	59.8
Usable Capacity of "Optional Tank"	61.3
92%-94% of Usable Capacity	56.4 – 57.6
Actual Amount of Solvent Used	57
1/3 of Usable Capacity	20.4

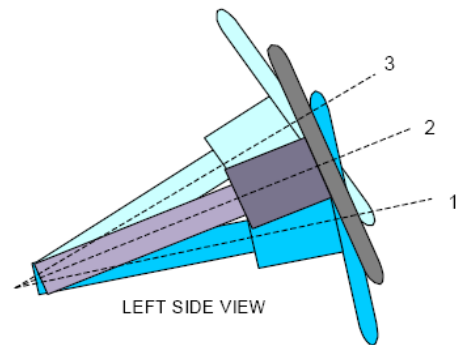
FUEL PUMP

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.



STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. For angular measurements, a digital inclinometer was used to measure a plate which was placed across the steering wheel rim. A tape measure was used to measure the telescoping steering wheel travel.



STEERING COLUMN ASSEMBLY

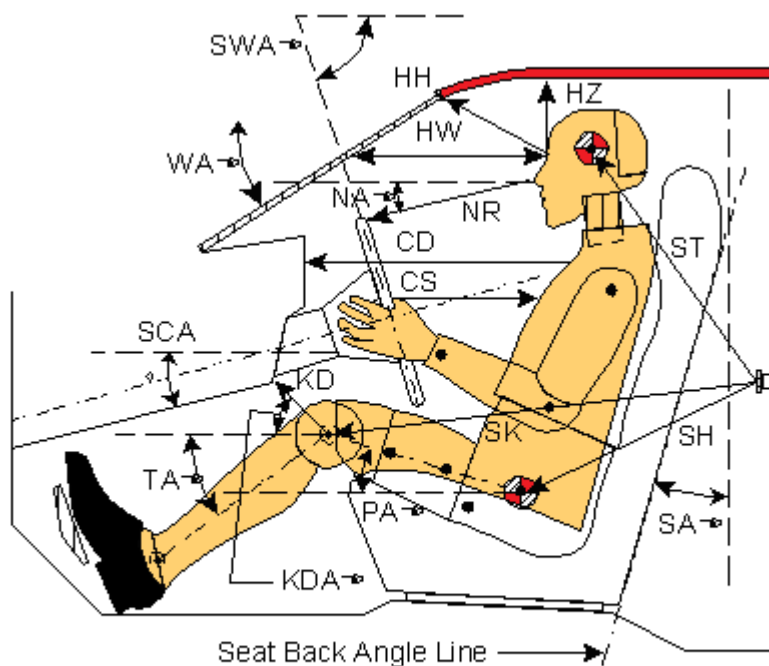
STEERING COLUMN POSITIONS

Description	Degrees	Fore / Aft Position (mm)
Lowermost position No. 1	20.3	
Geometric center position No. 2	22.75	
Uppermost position No. 3	25.2	
Telescoping Steering Wheel Travel		50
Test Position	22.75	25

DATA SHEET NO. 3 DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2017 Buick LaCrosse four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20170103
 Test Date: 11/22/2016



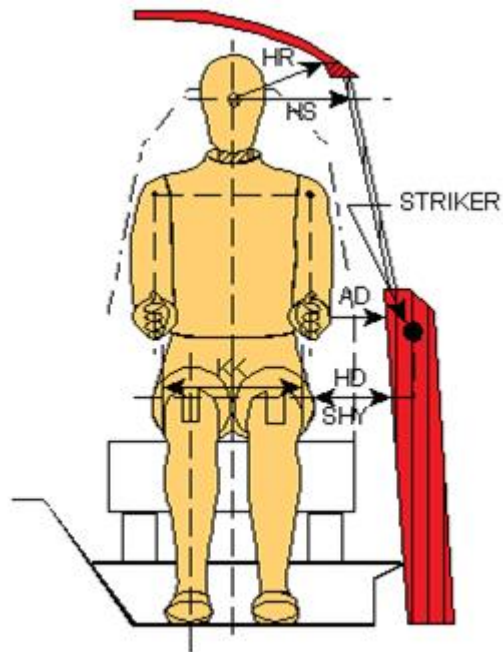
Left Side View

Code	Measurement Description	Driver (SN: 1046)		Passenger (SN: 288)	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		24.5		
SWA°	Steering Wheel Angle		22.5		
SCA°	Steering Column Angle		67.5		
SA°	Seat Back Angle (on headrest post)		-12.6		-15.7
HZ	Head to Roof (Z)	212	90	208	90
HH	Head to Header	395	26	315	41.7
HW	Head to Windshield	776	0	727	0
NR	Nose to Rim	443	4.3	480	31.2
CD	Chest to Dash	567		420	
CS	Chest to Steering Hub	362	3.7		
RA	Rim to Abdomen	250	0		
KDL	Left Knee to Dash	243	32.1	163	28.8
KDR	Right Knee to Dash	225	23.4	158	29.1
PA°	Pelvic Angle		24.1		19.7
TA°	Tibia Angle		22.2		38.9
SK	Striker to Knee	555	11.4	643	7.9
ST	Striker to Head	455	89.6	464	61
SH	Striker to H-Point	268	49.9	353	27.6

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2017 Buick LaCrosse four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20170103
 Test Date: 11/22/2016



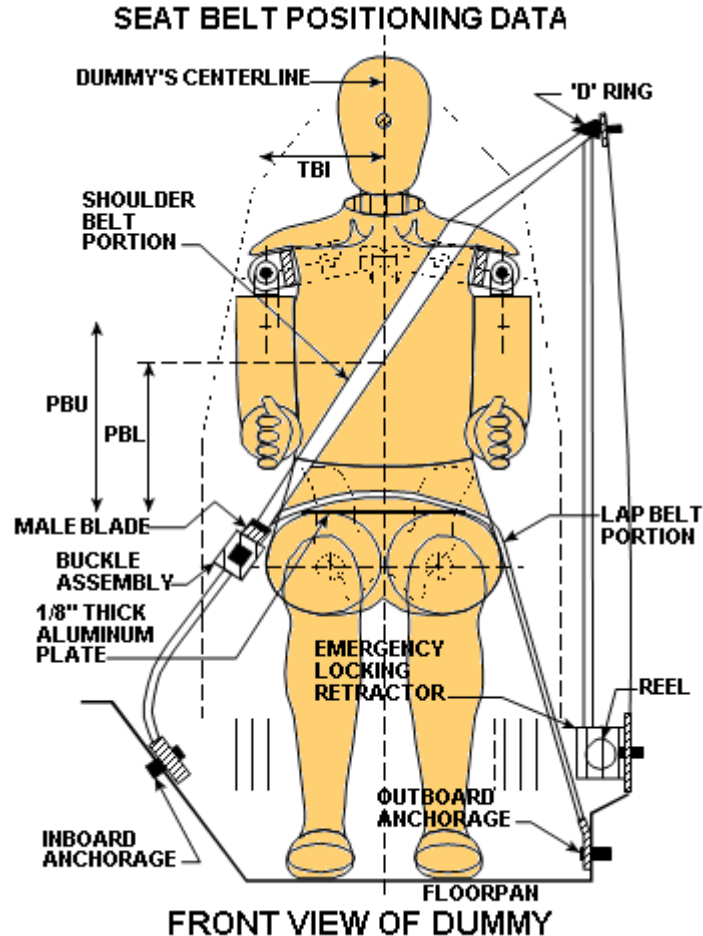
Front View

Code	Description	Driver (mm)	Passenger (mm)
AD	Arm to Door	143	74
HD	H-Point to Door	155	170
HR	Head to Side Header	232	243
HS	Head to Side Window	365	375
KK	Knee to Knee	350	163
SHY	Striker to H-Point (Y Direction)	255	260
AA	Ankle to Ankle	380	160

DATA SHEET NO. 5 SEAT BELT POSITIONING DATA

Test Vehicle: 2017 Buick LaCrosse four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20170103
 Test Date: 11/22/2016



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU — Top surface of reference to belt upper edge	mm	325	285
PBL — Top surface of reference to belt lower edge	mm	245	210

BELT LENGTH DATA

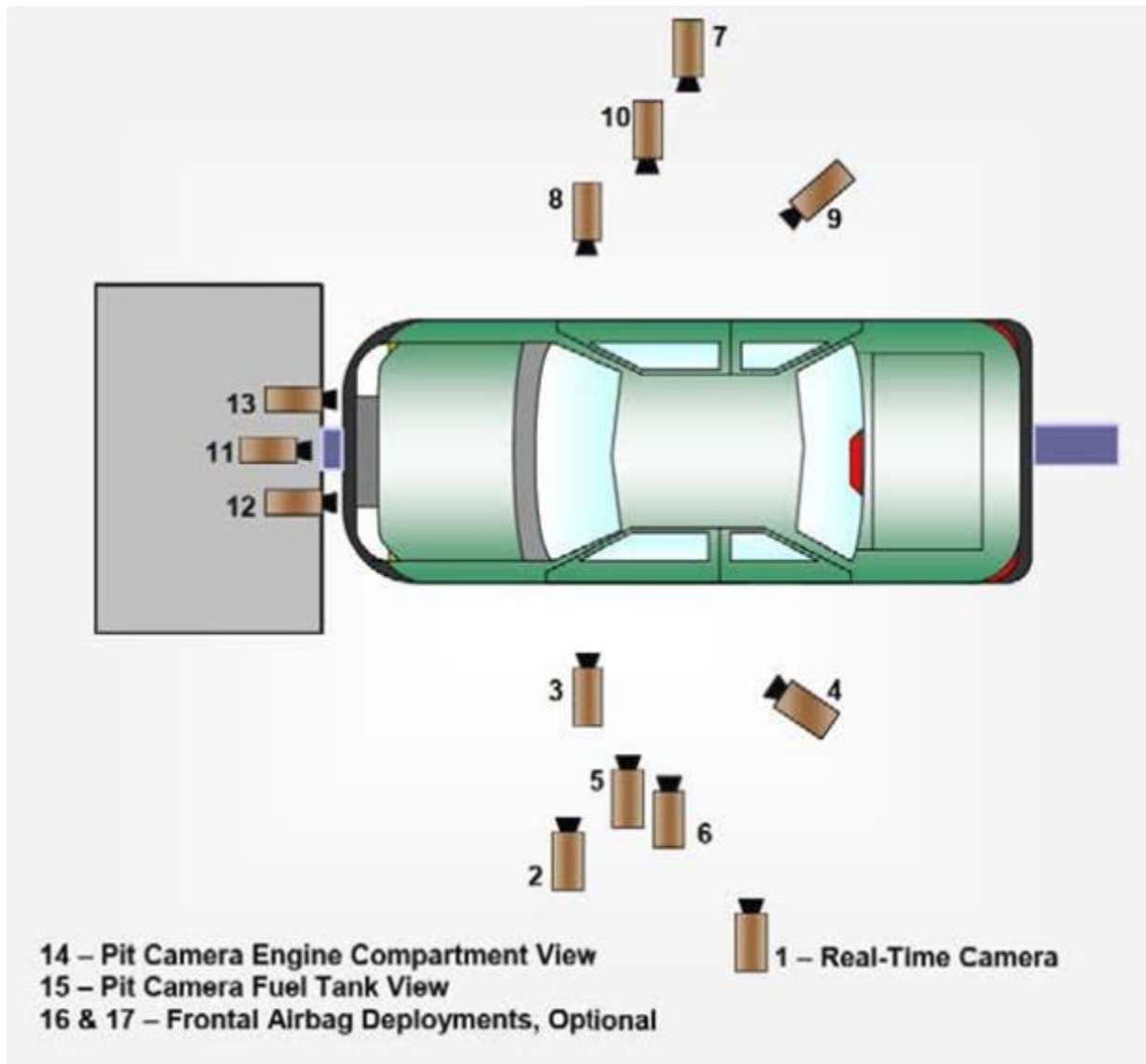
Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	830	905
Lap Belt Length as measured on ATD	mm	553	650
Remainder of belt on reel	mm	1017	845
Total belt length for continuous webbing systems	mm	2400	2400

DATA SHEET NO. 6
HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2017 Buick LaCrosse four door sedan
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20170103
Test Date: 11/22/2016

CAMERA POSITIONS FOR FRONTAL IMPACTS



Top View

DATA SHEET NO. 6 ... (CONTINUED)
HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2017 Buick LaCrosse four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20170103
 Test Date: 11/22/2016

CAMERA LOCATIONS

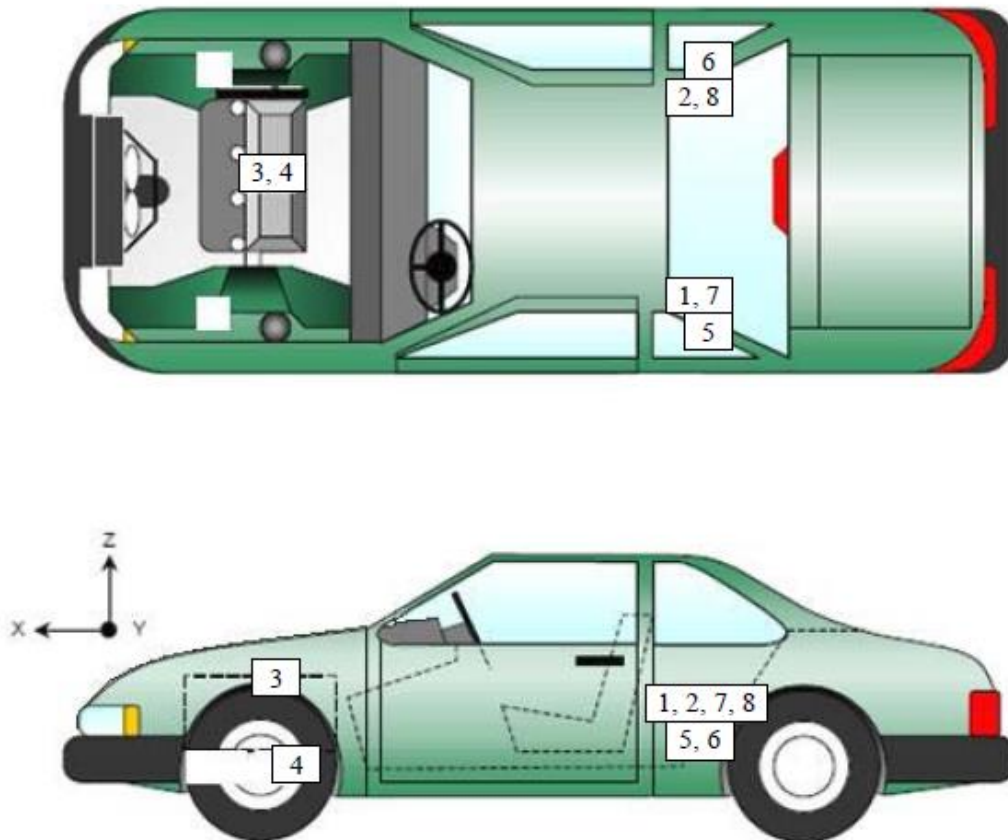
No.	Camera View	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall	-	-	-		60
2	Driver Close-Up	-1752	-9182	-1545	70	1000
3	Left Front Half	-1531	-8532	-1541	50	1000
4	Left Angle	-2600	-2998	-2310	24	1000
5	Steering Column - Top					
6	Steering Column - Bottom					
7	Right Overall	-2364	8859	-1181	24	1000
8	Passenger Close-Up	-1755	7820	-1186	50	1000
9	Right Front Half	-1241	6551	-1184	28	1000
10	Right Angle	-2544	2833	-2146	24	1000
11	Windshield	125	0	-3505	20	1000
12	Driver Windshield	-329	-600	-1955	12.5	1000
13	Passenger Windshield	-329	600	-1955	12.5	1000
14	Pit Front	-729	0	1250	12.5	1000
15	Pit Rear	-2701	0	1250	12.5	1000
16	Onboard Driver Airbag (Optional)				8	1000
17	Onboard Passenger Airbag (Optional)				8	1000

* COORDINATES: +X = forward of impact plane
 +Y = right of monorail center
 +Z = into ground

DATA SHEET NO. 7 **VEHICLE ACCELEROMETER LOCATIONS**

Test Vehicle: 2017 Buick LaCrosse four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20170103
 Test Date: 11/22/2016



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Accelerometer – X Direction	2049	-349	137
2	Right Rear Accelerometer – X Direction	2046	357	89
3	Engine Top X	4348	-111	-318
4	Engine Bottom X	4286	82	219
5	Left Rear Accelerometer – Z Direction	2049	-349	137
6	Right Rear Accelerometer – Z Direction	2046	357	89
7	Left Rear Accelerometer – X Direction Redundant	2049	-362	135
8	Right Rear Accelerometer – X Direction Redundant	2046	344	89

Reference Points: *X – Rear Surface of Vehicle (+ forward)*
 Y – Vehicle Centerline (+ to right)
 Z – Ground Plane (+ down)

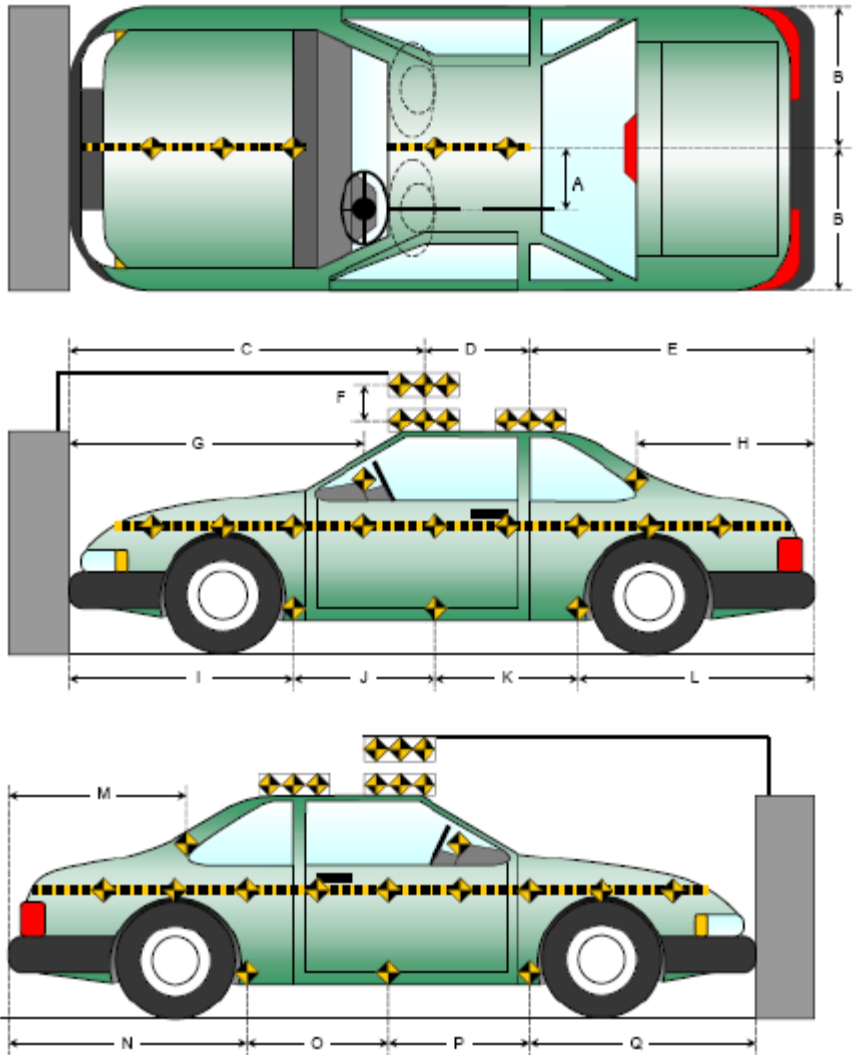
DATA SHEET NO. 8
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2017 Buick LaCrosse four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20170103
 Test Date: 11/22/2016

Item	Value
A	374
B	929
C	2895
D	610
E	1511
F	170
G	1837
H	972
I	1419
J	995
K	992
L	1611
M	973
N	1608
O	996
P	997
Q	1416

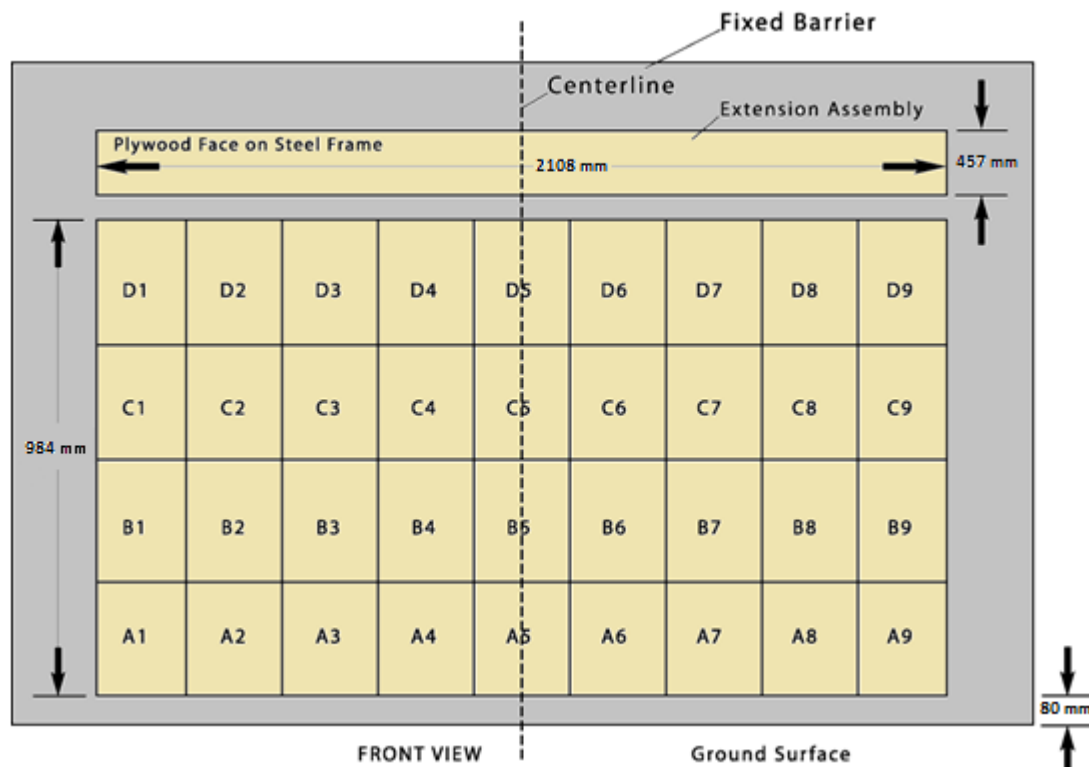
All units in millimeters



DATA SHEET NO. 9
LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2017 Buick LaCrosse four door sedan
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20170103
Test Date: 11/22/2016



*** Load cell Barrier was not used**

Figure 1 - Load Cell Locations on a 36-Load Cell Barrier with Plywood Height Extension*

DATA SHEET NO. 10
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2017 Buick LaCrosse four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20170103
 Test Date: 11/22/2016

INSTRUMENTATION

Instrumentation	Number of Channels Collected
Driver Dummy Accelerometers	46
Passenger Dummy Accelerometers	46
Vehicle Structure Accelerometers	8
Load Cell Barrier	0
Total	100

CAMERA COVERAGE

Type of Camera	Number Used in this Test
High-Speed Vehicle Onboard	2
High-Speed Offboard	12
Real-Time Panning	1
Total	15

DATA SHEET NO. 11
POST-TEST OBSERVATIONS

Test Vehicle: 2017 Buick LaCrosse four door sedan
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20170103
Test Date: 11/22/2016

TEST DUMMY INFORMATION AND CONTACT LOCATIONS

Description	Driver	Passenger
Dummy Type / Serial No.	P572E 50 th Male / 1046	P5720 5 th Female / 288
Head Contact	Front Airbag & Headrest	Front Airbag & Headrest
Upper Torso Contact	Front Airbag	Front Airbag
Lower Torso Contact	None	None
Left Knee Contact	Knee Airbag	Knee Airbag
Right Knee Contact	Knee Airbag	Knee Airbag

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Locked / Unlocked Doors	Unlocked	Unlocked
Front Door Opening	Closed & Operational	Closed & Operational
Rear Door Opening	Closed & Operational	Closed & Operational
Seat Track Shift (mm)	0	0
Seat Back Failure	No	No
Glazing Damage	None	None

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Windshield Damage	Remained in good condition
Window Damage	None
Other Notable Effects	None

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	724
Center	mm	715
Right Side	mm	712
Average	mm	717

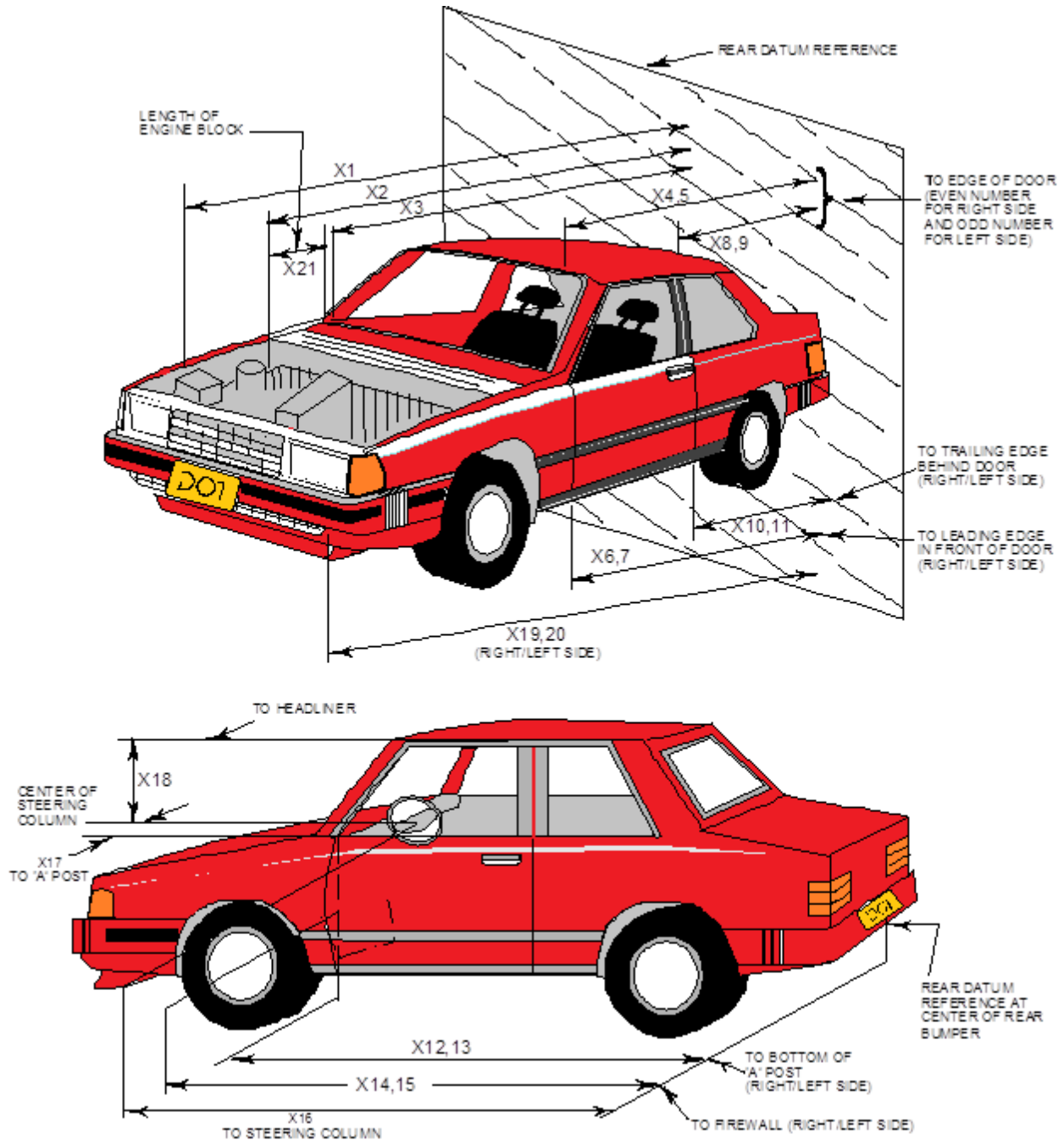
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Driver		Passenger	
	Installed	Deployed	Installed	Deployed
Front Airbag	Yes	Yes	Yes	Yes
Side Airbag 1 - Curtain	Yes	Yes	Yes	Yes
Side Airbag 2 - Torso/Pelvis Airbag	Yes	No	Yes	No
Knee Airbag	Yes	Yes	Yes	Yes
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Other				

DATA SHEET NO. 12
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2017 Buick LaCrosse four door sedan
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20170103
Test Date: 11/22/2016



DATA SHEET NO. 12 ... (CONTINUED)
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2017 Buick LaCrosse four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20170103
 Test Date: 11/22/2016

No.	Measurement Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	5017	4642	-375
2	Rear Surface of Vehicle (RSOV) to Front of Engine	4484	4227	-256
3	RSOV to Firewall	3929	3924	-5
4	RSOV to Upper Leading Edge of Right Door	3562	3565	2
5	RSOV to Upper Leading Edge of Left Door	3564	3565	1
6	RSOV to Lower Leading Edge of Right Door	3529	3530	1
7	RSOV to Lower Leading Edge of Left Door	3530	3531	1
8	RSOV to Upper Trailing Edge of Right Door	2385	2387	2
9	RSOV to Upper Trailing Edge of Left Door	2386	2386	0
10	RSOV to Lower Trailing Edge of Right Door	2395	2396	1
11	RSOV to Lower Trailing Edge of Left Door	2395	2397	2
12	RSOV to Bottom of "A" Post of Right Side	3589	3590	1
13	RSOV to Bottom of "A" Post of Left Side	3589	3590	1
14	RSOV to Firewall, Right Side	3965	3961	-4
15	RSOV to Firewall, Left Side	3966	3957	-8
16	RSOV to Steering Column	3023	3077	54
17	Center of Steering Column to "A" Post	279	275	-4
18	Center of Steering Column to Headliner	400	432	32
19	RSOV to Right Side of Front Bumper	4942	4612	-330
20	RSOV to Left Side of Front Bumper	4941	4500	-441
21	Length of Engine Block	377	377	0
RD	RSOV to Right Side of Dash Panel	3187	3187	0
CD	RSOV to Center of Dash Panel	3277	3274	-3
LD	RSOV to Left Side of Dash Panel	3190	3189	-1

*UR= Unrecoverable data point
 All Dimensions in mm

DATA SHEET NO. 13
ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2017 Buick LaCrosse four door sedan
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20170103
Test Date: 11/22/2016

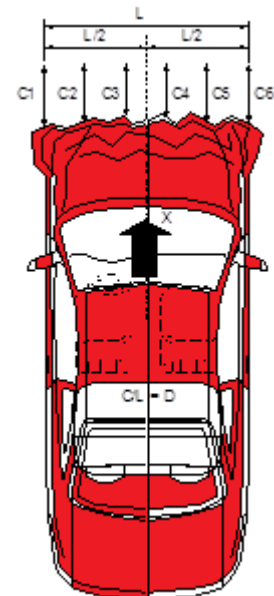
VEHICLE INFORMATION

VIN: 1G4ZS5SS6HU125386
Vehicle Size Category: Passenger

Wheelbase (mm): 2904
Test Weight (kg): 1931

ACCELEROMETER DATA

Accelerometer Locations: Please See Data Sheet No. 7
Cal. Procedure / Interval: Calspan Procedure / 6 month
Integration Algorithm: Trapezoidal
Linearity: > 99%
Impact Velocity (km/h): 56.07
Velocity Change (km/h): 56.07
Time of Separation (ms): 77



CRUSH PROFILE

Collision Deformation Classification: 12FDEW2
Midpoint of Damage: Vehicle Centerline
Damage Region Length (mm): 1401
Impact Mode: Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush Zone 1 at Left Side	mm	4799	4586	213
C2	Crush Zone 2 at Left Side	mm	4950	4552	398
C3	Crush Zone 3 at Left Side	mm	5009	4625	384
C4	Crush Zone 4 at Right Side	mm	5009	4648	361
C5	Crush Zone 5 at Right Side	mm	4952	4633	319
C6	Crush Zone 6 at Right Side	mm	4802	4600	202
L	C1 to C6	mm	1401	1466	-65

DATA SHEET NO. 14
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2017 Buick LaCrosse four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

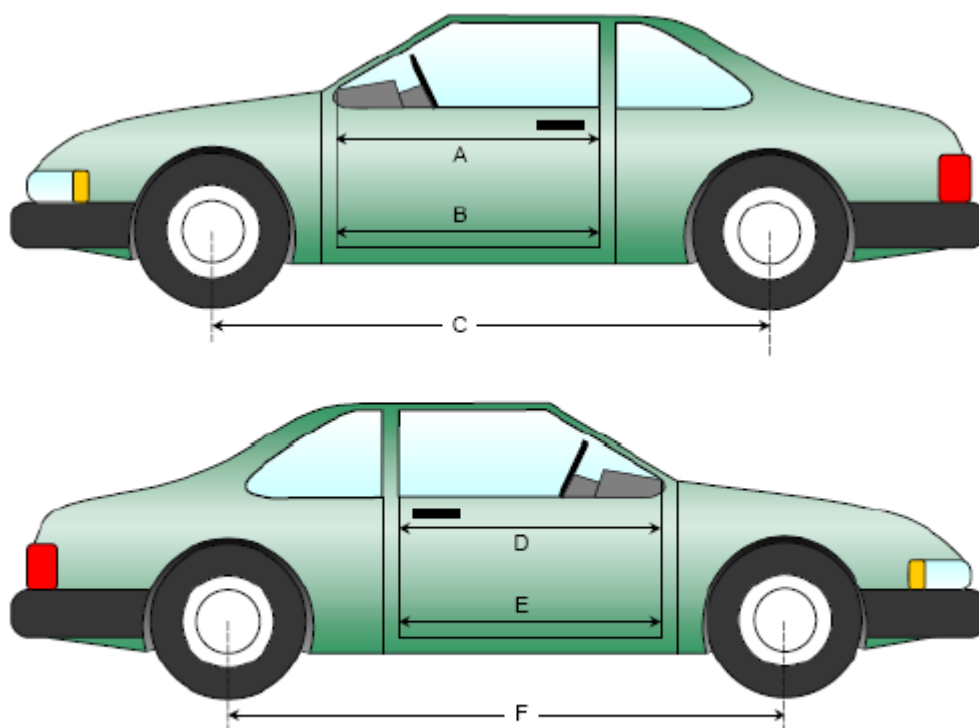
NHTSA No.: M20170103
 Test Date: 11/22/2016

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	1049	1048	-1
B	Left Side Lower	mm	899	899	0
D	Right Side Upper	mm	1049	1048	-1
E	Right Side Lower	mm	903	903	0

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2904	2856	-48
F	Right Side Wheelbase	mm	2904	2837	-67



Left & Right Side Views

DATA SHEET NO.14 ... (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

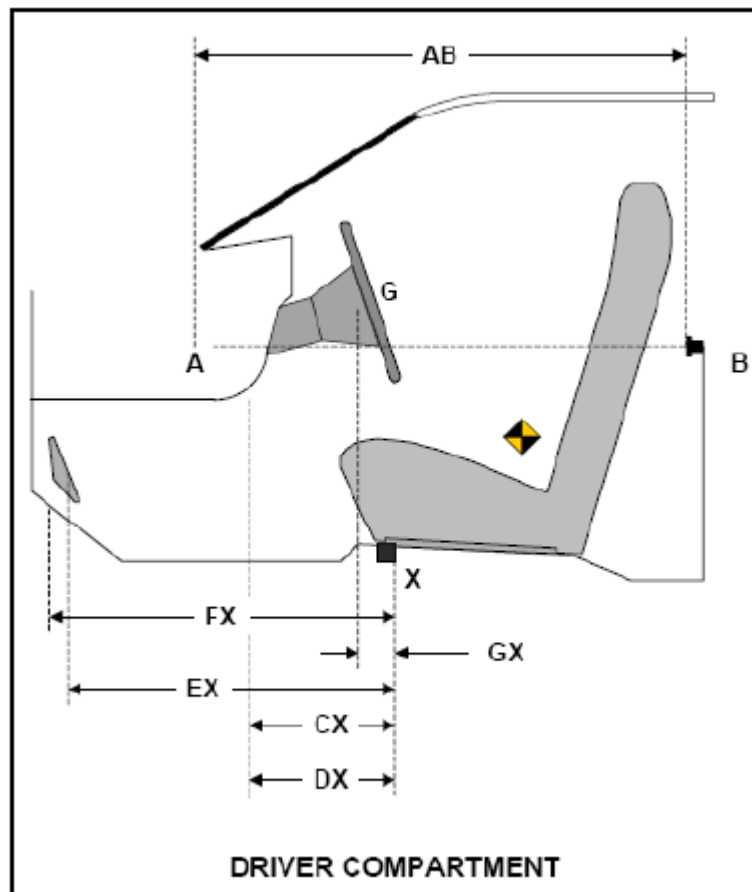
Test Vehicle: 2017 Buick LaCrosse four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20170103
 Test Date: 11/22/2016

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	856	857	1
CX	Left Knee Bolster to X	mm	310	307	-3
DX	Right Knee Bolster to X	mm	301	297	-4
EX	Brake Pedal to X	mm	583	629	46
FX	Foot Rest to X	mm	650	637	-13
GX	Center of Steering Column Wheel Hub to X	mm	90	144	54

X = Front of Seat Track (Stationary)



DATA SHEET NO. 15
SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA

Test Vehicle: 2017 Buick LaCrosse four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20170103
 Test Date: 11/22/2016

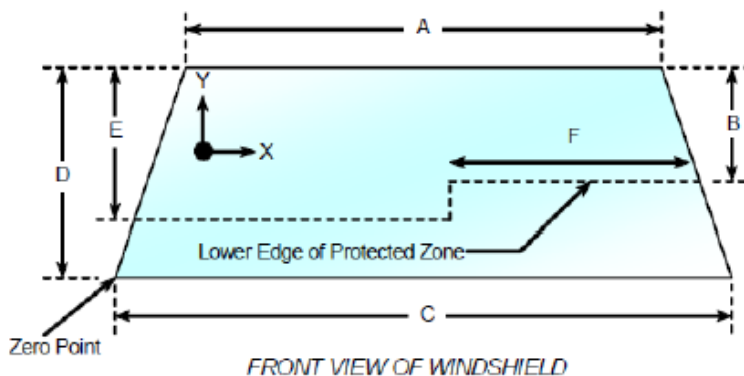
Windshield Mounting Details: A 0.8 mm trim surrounds the top and side of windshield while a plastic shroud is on the bottom.

The standard requires that the post-test retention measurement be a minimum of 75% of the pre-test total periphery measurement for vehicles not equipped with occupant passive restraints and 50% for each side of the windshield for vehicles which are equipped with occupant passive restraints.

Temperature of windshield molding during test: 21° C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2217	2217	100
Right Side	2217	2217	100
Total	4434	4434	100



Item	Units	Value
A	mm	1246
B	mm	505
C	mm	1482
D	mm	853
E	mm	527
F	mm	616

AREAS OF PROTECTED ZONE FAILURES

A. *Provide coordinates of the area that the protected zone was penetrated more than .25 inches by a vehicle component other than one that is normally in contact with the windshield.*

- No Penetration

X	Y

B. *Provide coordinates of the area beneath the protected zone that the inner surface of the windshield was penetrated by a vehicle component.*

- No Penetration

X	Y

DATA SHEET NO. 15 ... (CONTINUED)
SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA

Test Vehicle: 2017 Buick LaCrosse four door sedan
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20170103
Test Date: 11/22/2016

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 21 ° C

Test Time: 11:00 AM

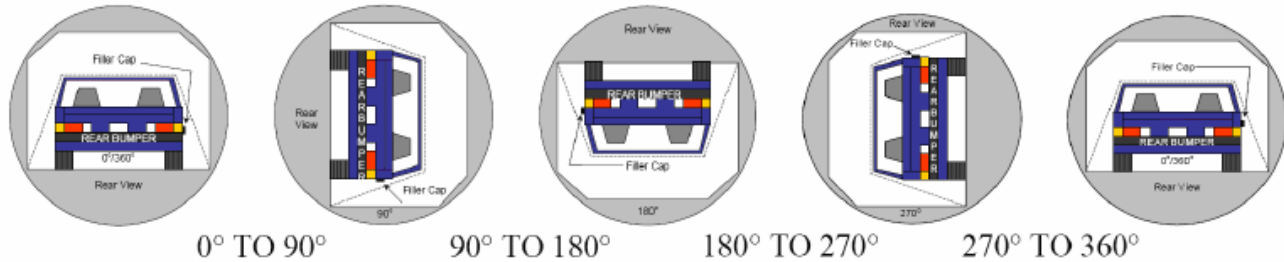
STODDARD SOLVENT SPILLAGE MEASUREMENTS

- 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: No Spillage Occurred

DATA SHEET NO. 16
FMVSS 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2017 Buick LaCrosse four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20170103
 Test Date: 11/22/2016



1. The specified fixture rollover rate for each 90° of rotation is 60 to 180 seconds.
2. The position hold time at each position is 300 seconds (minimum).
3. Details of Stoddard Solvent Spillage: No Spillage Occurred

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	72	300	372
90° to 180°	65	300	365
180° to 270°	62	300	362
270° to 360°	68	300	368

FMVSS 301 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	

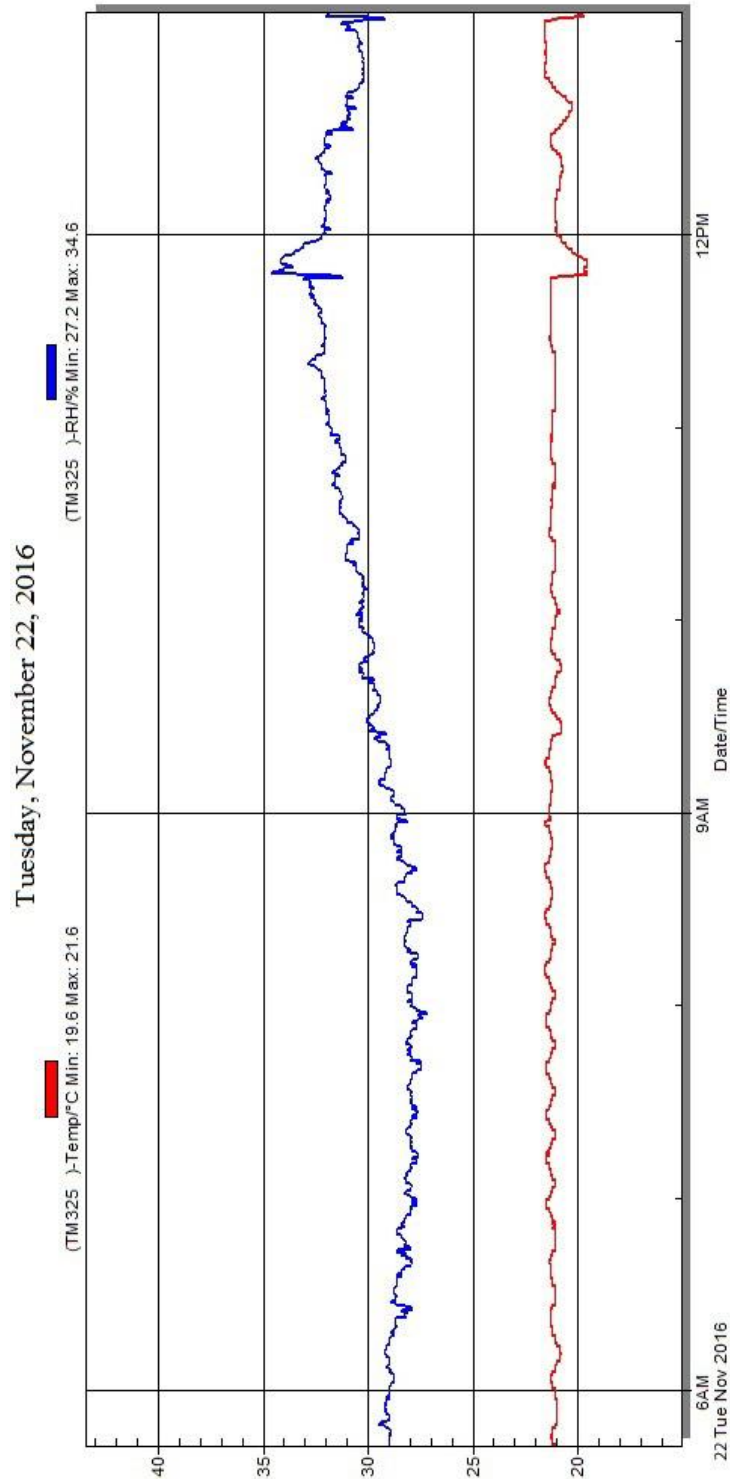
SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 17
DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART

Test Vehicle: 2017 Buick LaCrosse four door sedan
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20170103
Test Date: 11/22/2016



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

APPENDIX A
PHOTOGRAPHS

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7	Left Rear 3-4 View, as Received	A-8
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Fig.	Description	Page
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40	Pre-Test Driver Dummy Feet	A-24
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44	Pre-Test Driver's Side Floorpan	A-26
45	Post-Test Driver's Side Floorpan	A-27
46	Post-Test Driver Dummy Face	A-27
47	Post-Test Driver Dummy Contact With Airbag	A-28
48	Post-Test Driver Dummy Contact With Headrest	A-28
49	Pre-Test View of the Steering Wheel	A-29
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55	Pre-Test Passenger Dummy and Vehicle Interior View	A-32
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59	Pre-Test View of Belt Anchorage for Passenger Dummy	A-34
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61	Pre-Test Passenger Dummy Feet	A-35
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63	Pre-Test Passenger's Side Knee Bolster	A-36
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65	Pre-Test Passenger's Side Floorpan	A-37
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Fig.	Description	Page
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75	Vehicle at 180° on Static Rollover Device	A-42
76	Vehicle at 270° on Static Rollover Device	A-42
77	Vehicle at 360° on Static Rollover Device	A-43
78	2017 Buick LaCrosse Frontal Impact Event	A-43
79	Monroney Label Photograph	A-44

¹**NOTE:** *The underbody views should include the following vehicle components: fuel pump, fuel lines, sender unit, fuel tank filler pipe and any other visible system components.*

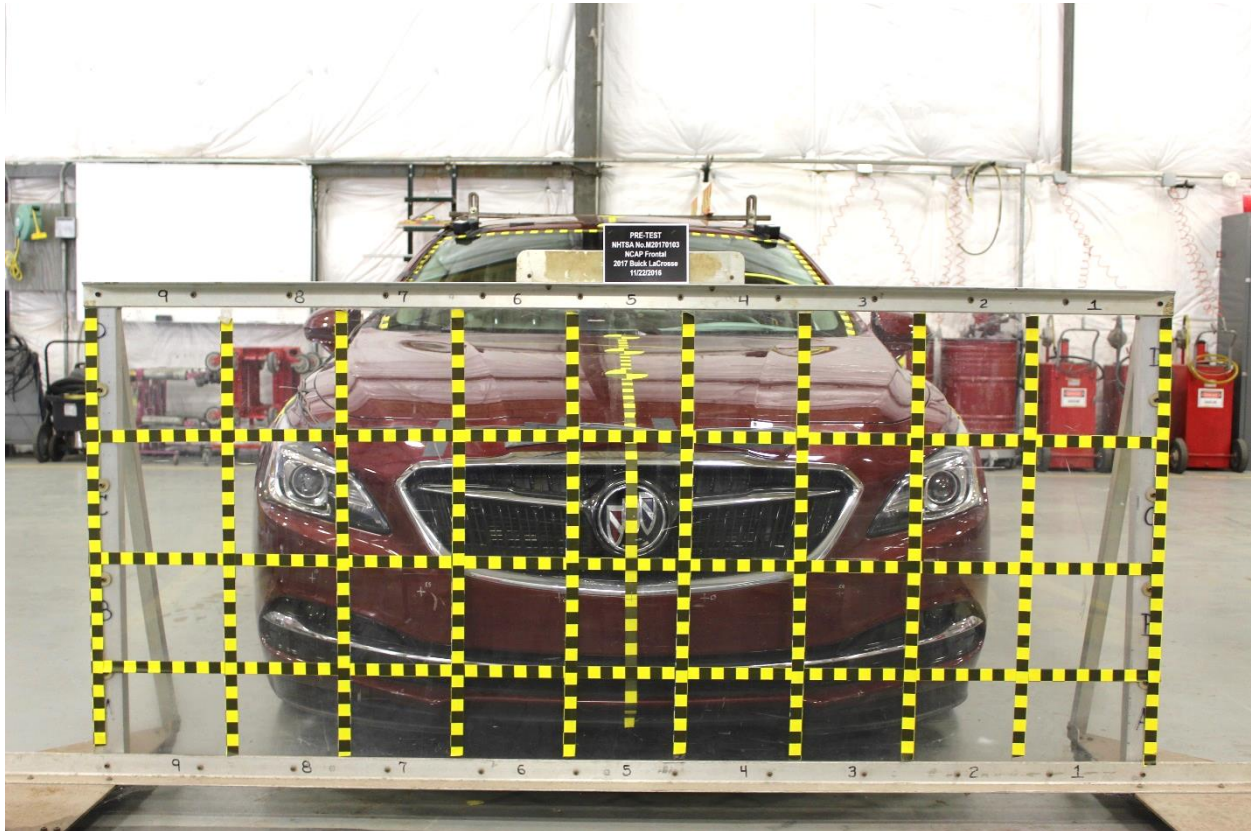


Figure A-1: Load Cell Location



Figure A-2: Pre-Test Load Cell Wall



Figure A-3: Post-Test Load Cell Wall

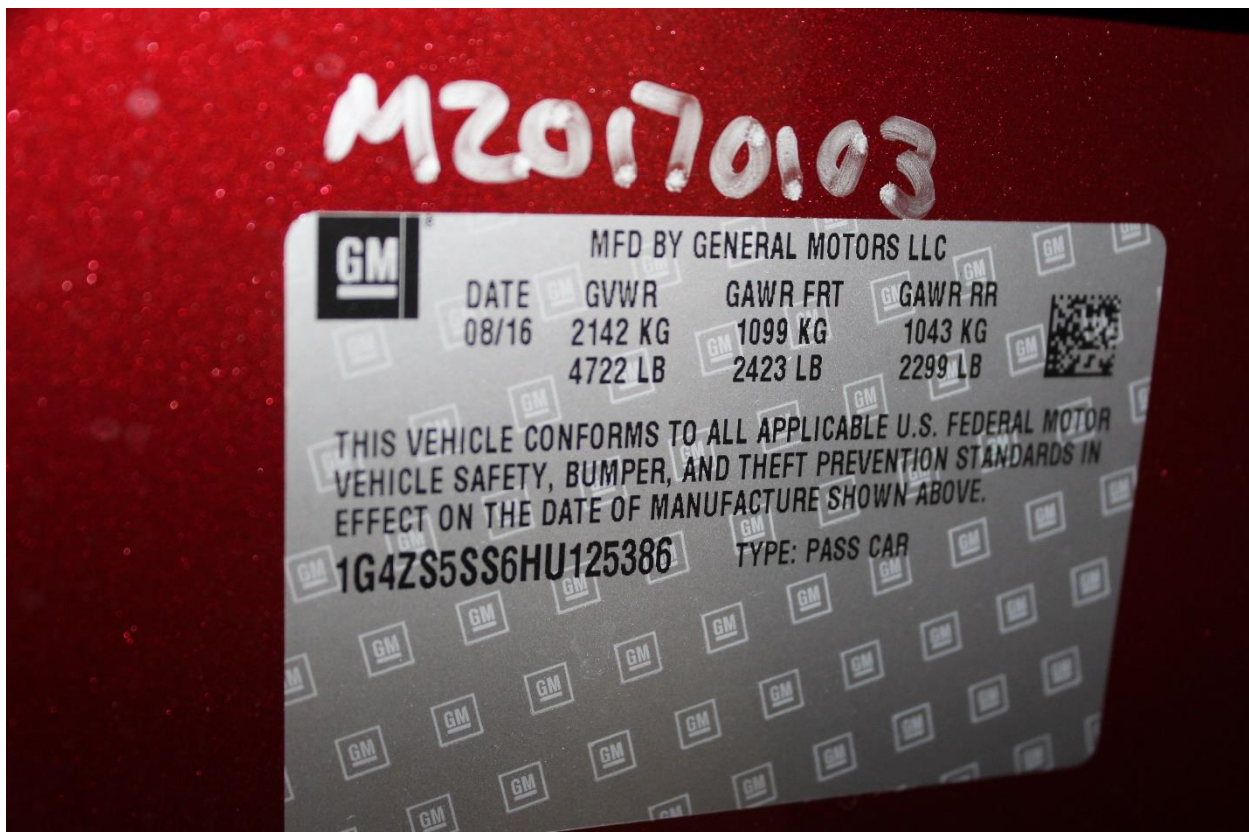


Figure A-4: Manufacturer's Label

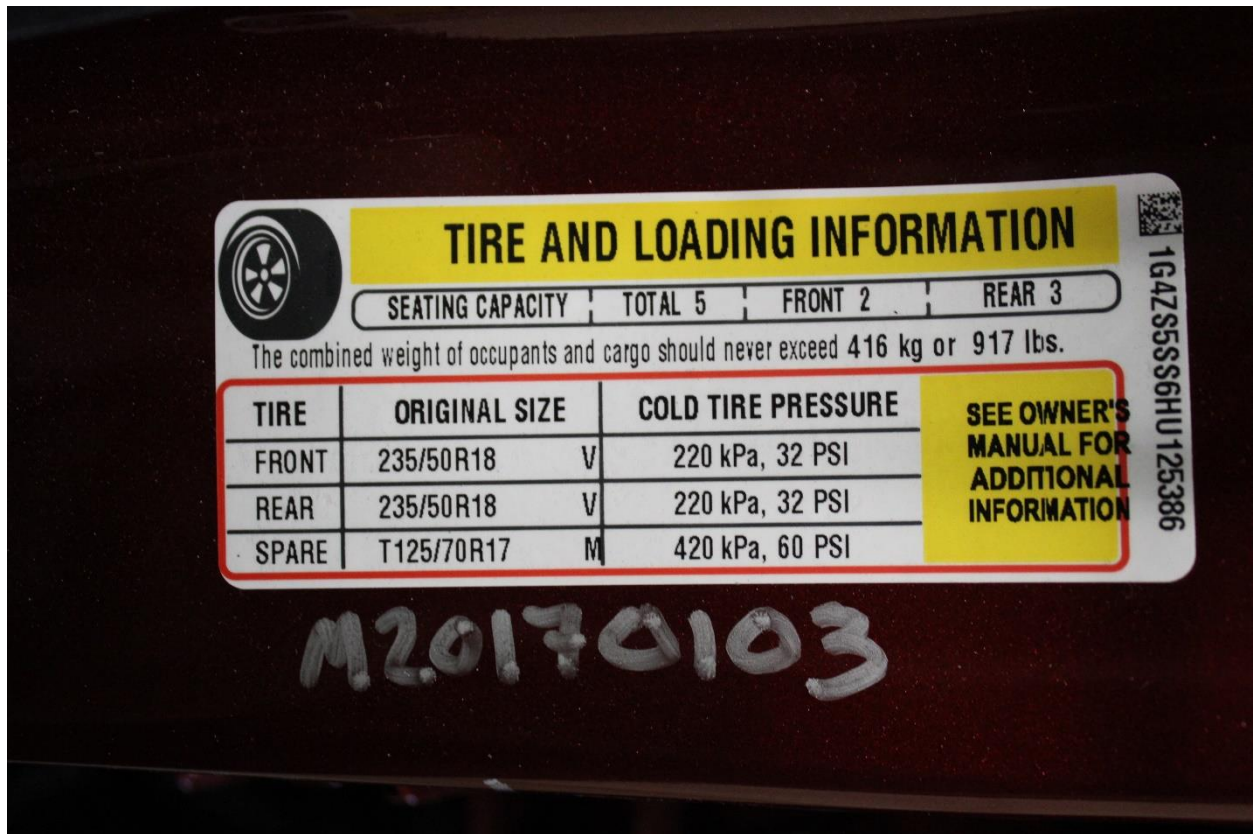


Figure A-5: Tire Placard



Figure A-6: 2017 Buick LaCrosse Frontal As Delivered



Figure A-7: Left Rear 3-4 View, As Received



Figure A-8: Pre-Test Front View of Test Vehicle

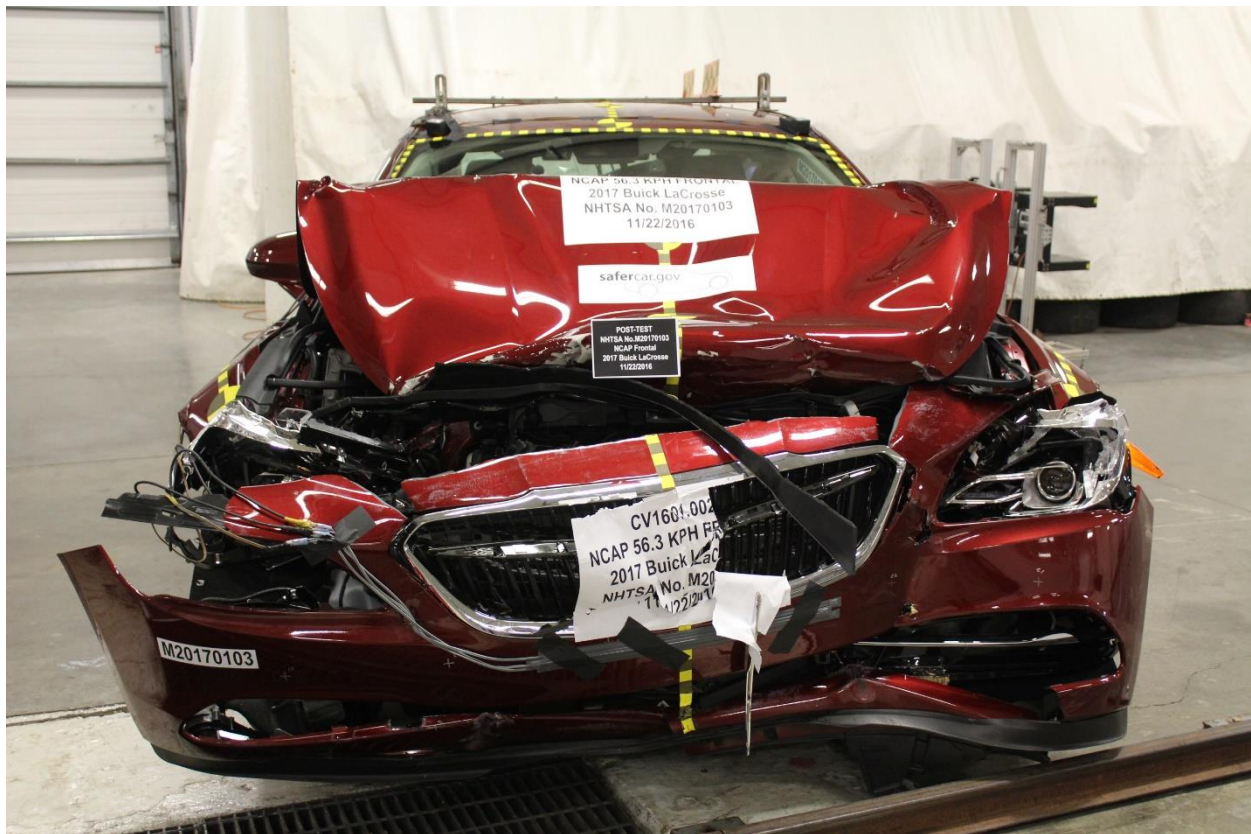


Figure A-9: Post-Test Front View of Test Vehicle



Figure A-10: Pre-Test Left View of Test Vehicle



Figure A-11: Post-Test Left View of Test Vehicle



Figure A-12: Pre-Test Right View of Test Vehicle



Figure A-13: Post-Test Right View of Test Vehicle



Figure A-14: Pre-Test Right Front 3-4 View



Figure A-15: Post-Test Right Front 3-4 View



Figure A-16: Pre-Test Left Rear 3-4 View



Figure A-17: Post-Test Left Rear 3-4 View



Figure A-18: Pre-Test Windshield View

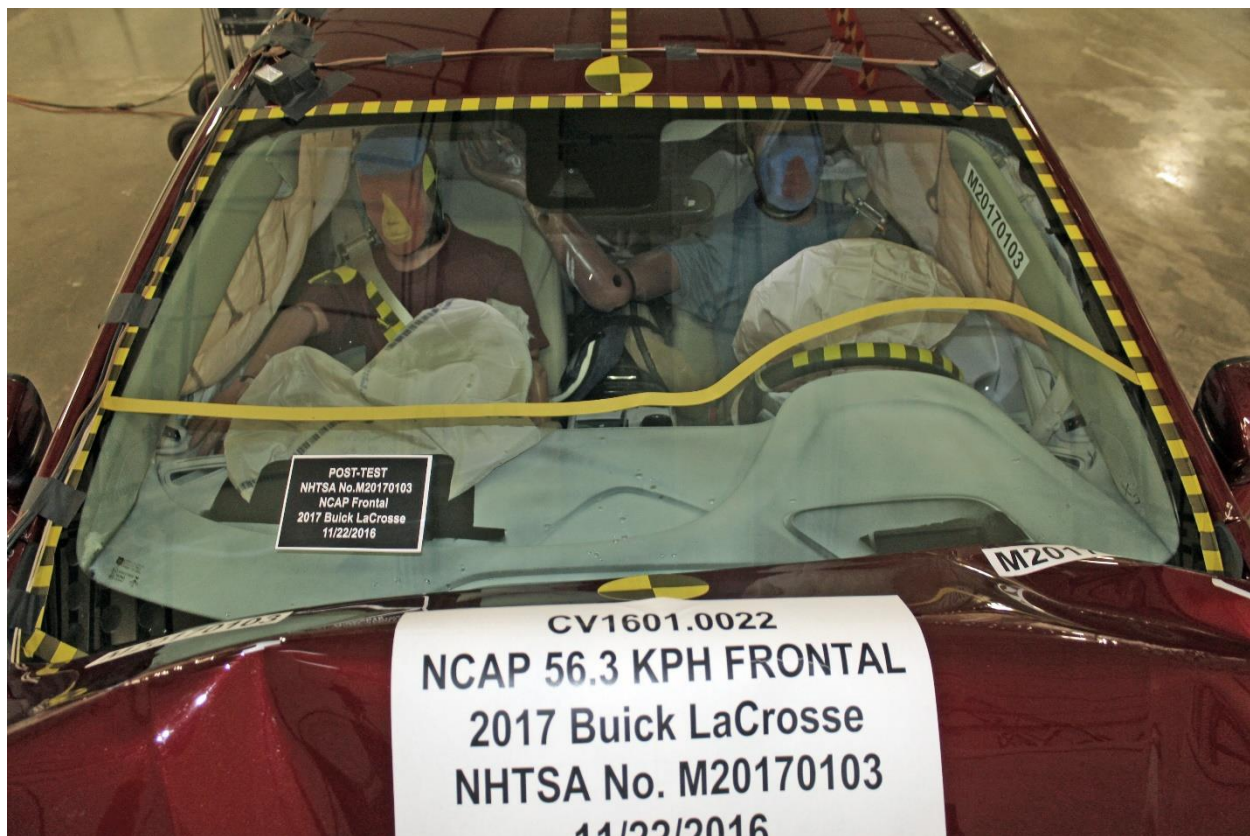


Figure A-19: Post-Test Windshield View



Figure A-20: Pre-Test Engine Compartment View



Figure A-21: Post-Test Engine Compartment View



Figure A-22: Pre-Test Fuel Filler Cap View



Figure A-23: Post-Test Fuel Filler Cap View



Figure A-24: Pre-Test Front Underbody View

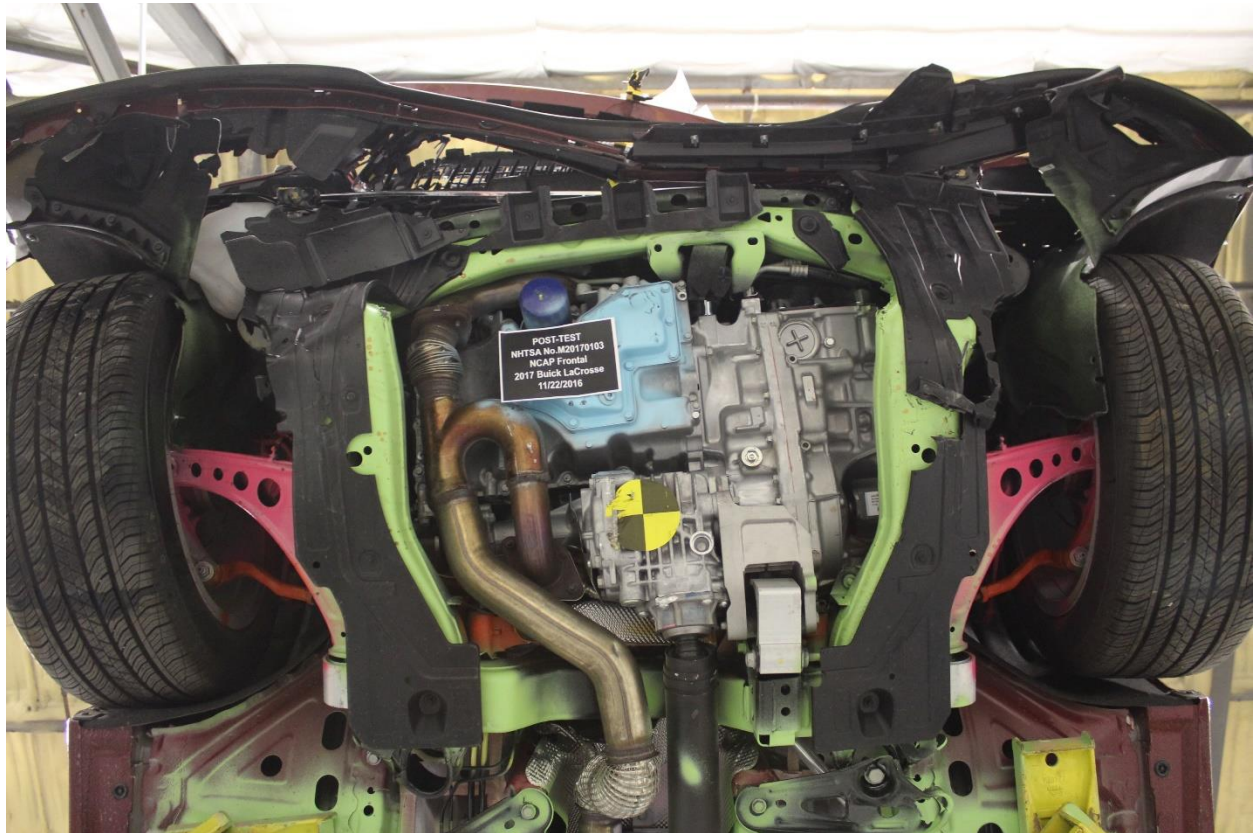


Figure A-25: Post-Test Front Underbody View

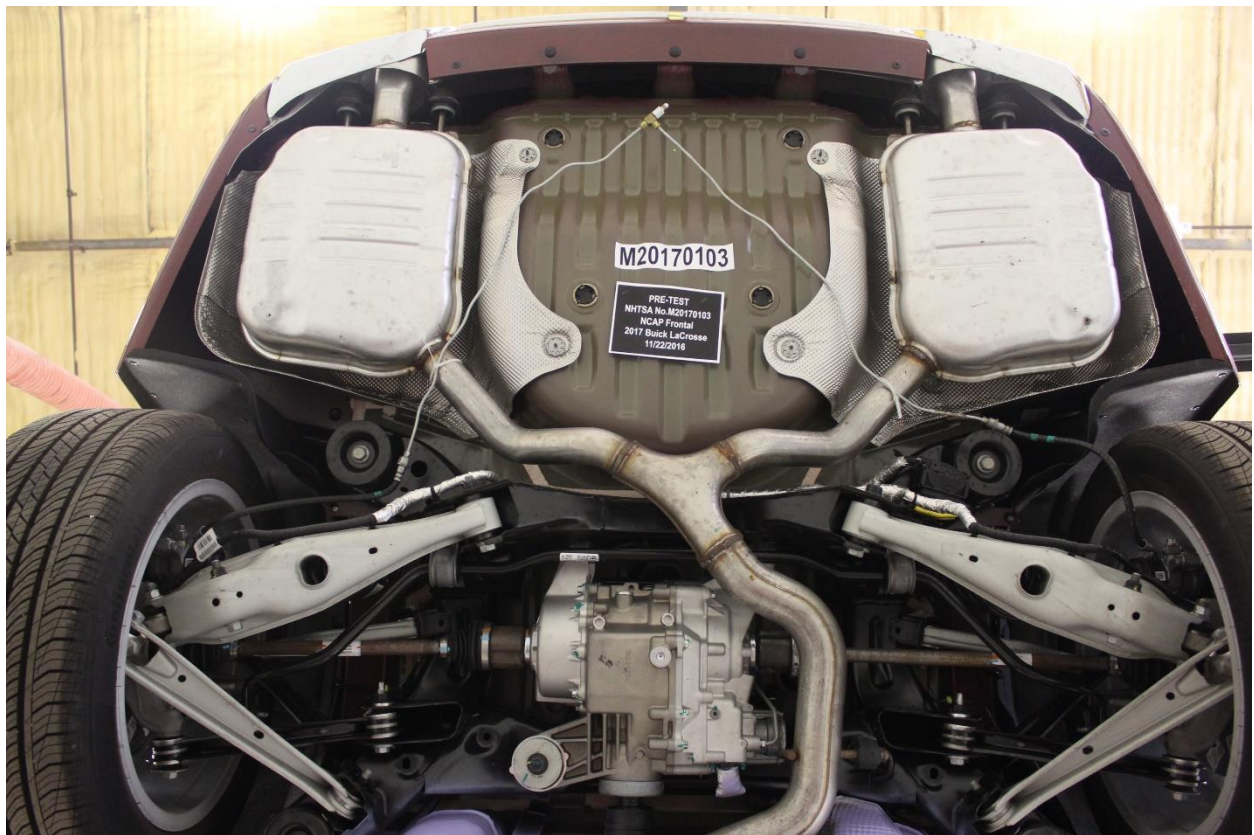


Figure A-26: Pre-Test Rear Underbody View

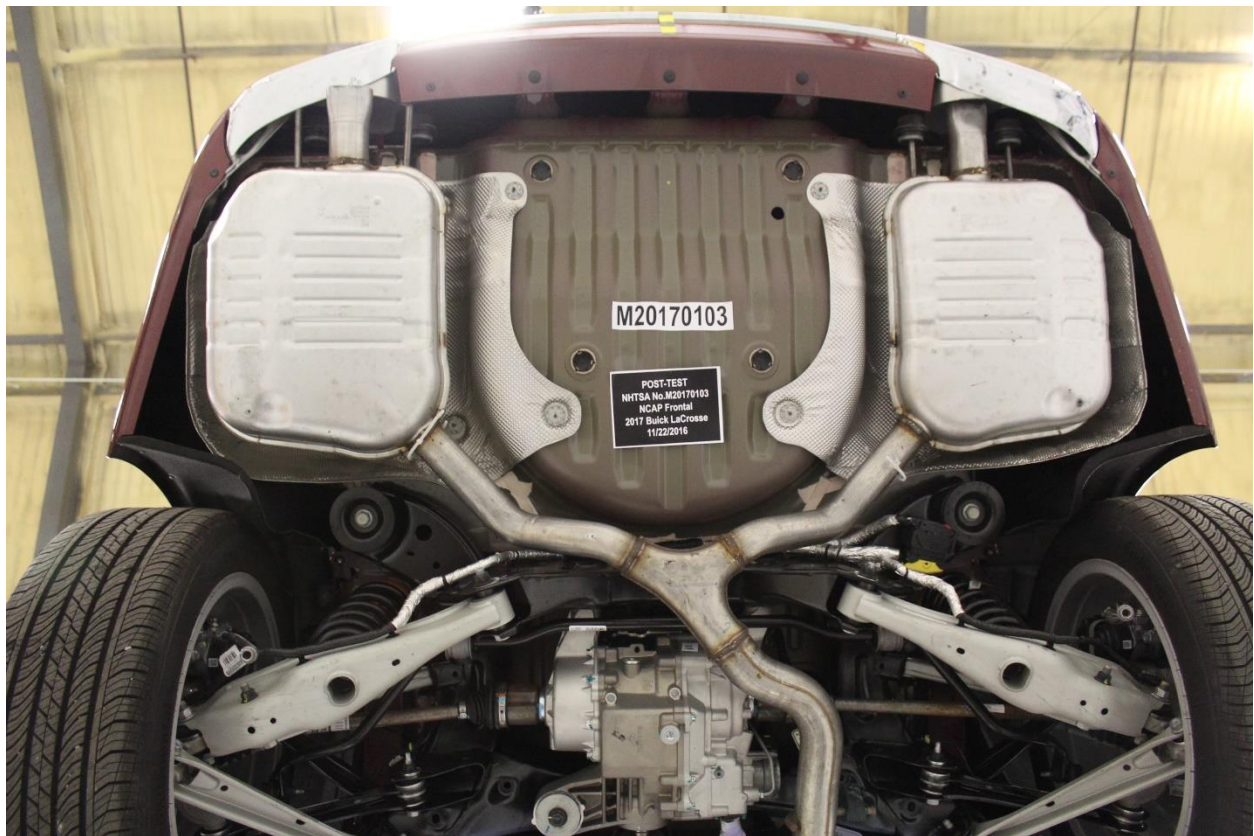


Figure A-27: Post-Test Rear Underbody View



Figure A-28: Pre-Test Dummy Cable Routing



Figure A-29: Post-Test Dummy Cable Routing

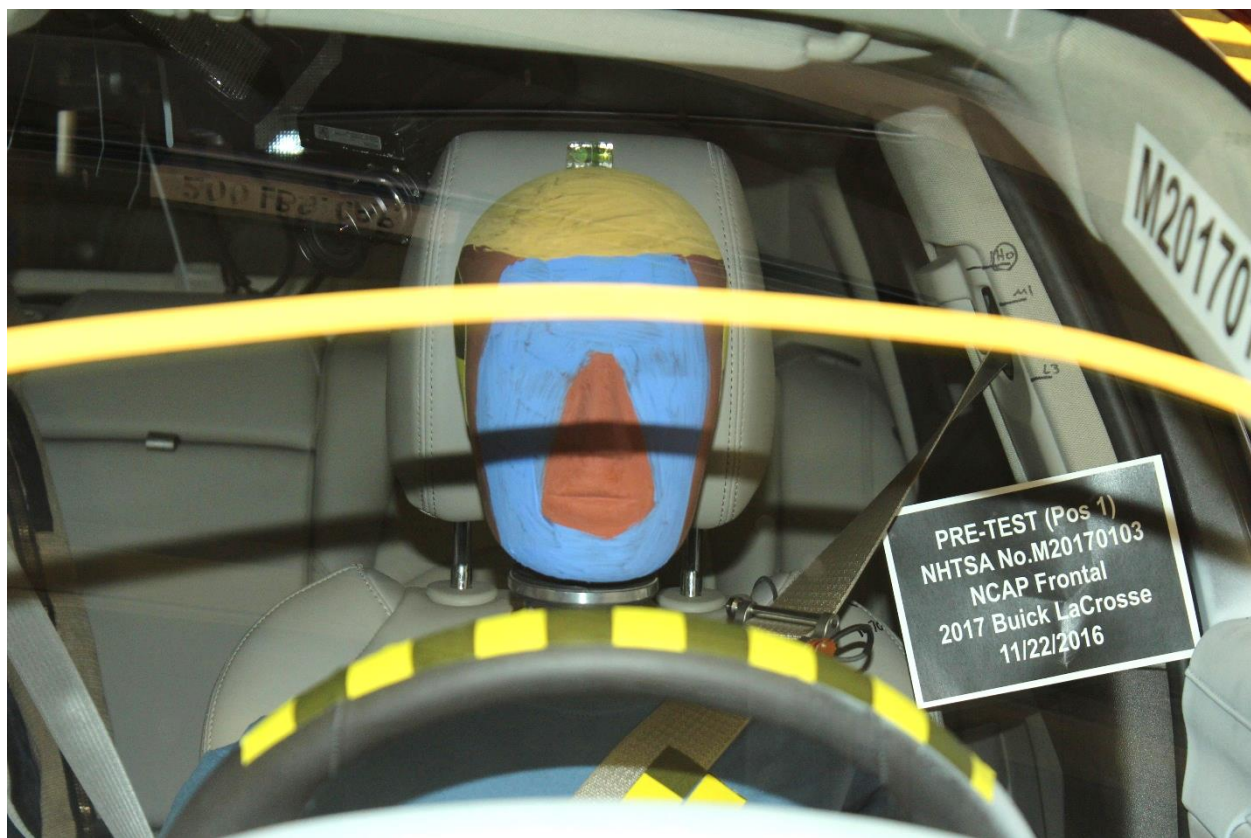


Figure A-30: Pre-Test Driver Dummy Front View



Figure A-31: Post-Test Driver Dummy Front View



Figure A-32: Pre-Test Driver Dummy Window View



Figure A-33: Post-Test Driver Dummy Window View



Figure A-34: Pre-Test Driver Dummy and Vehicle Interior View



Figure A-35: Post-Test Driver Dummy and Vehicle Interior View



Figure A-36: Pre-Test Driver's Seat Fore-Aft Markings



Figure A-37: Post-Test Driver's Seat Fore-Aft Markings

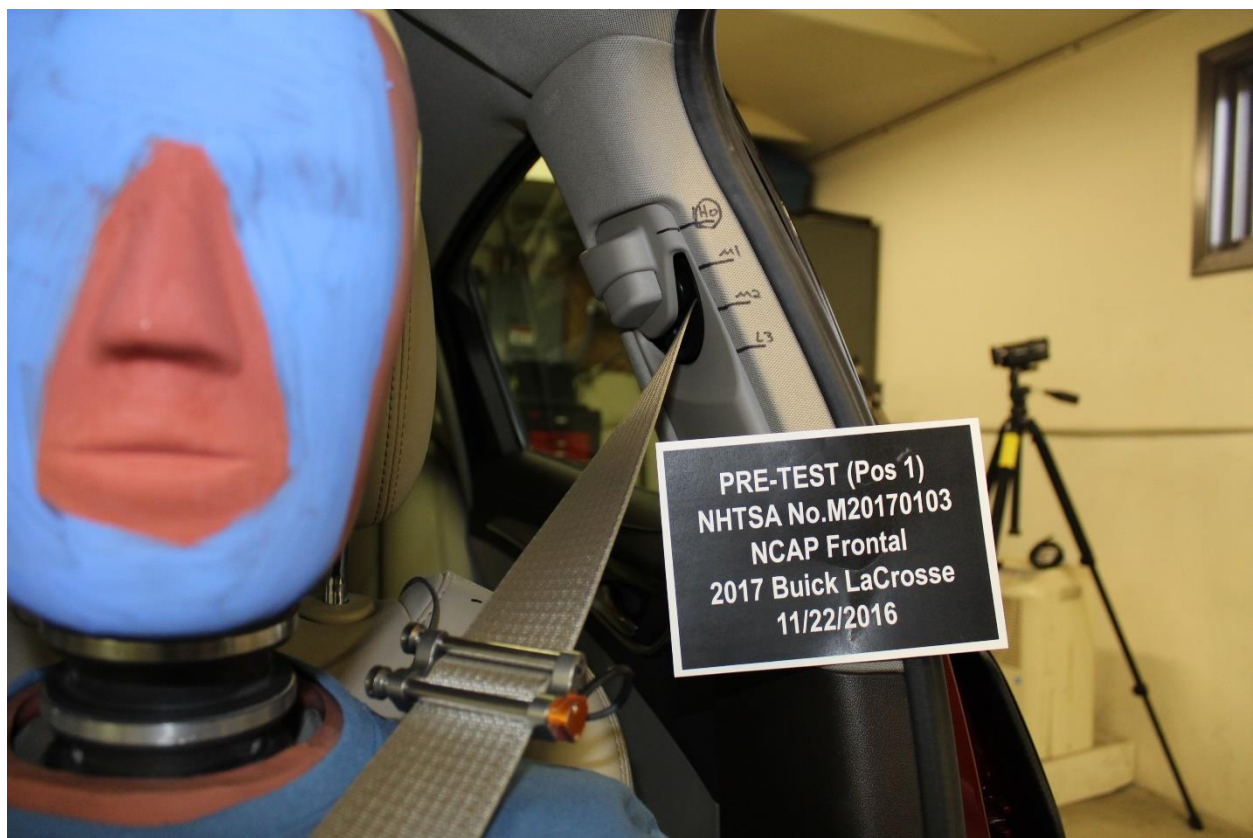


Figure A-38: Pre-Test View of Belt Anchorage for Driver Dummy

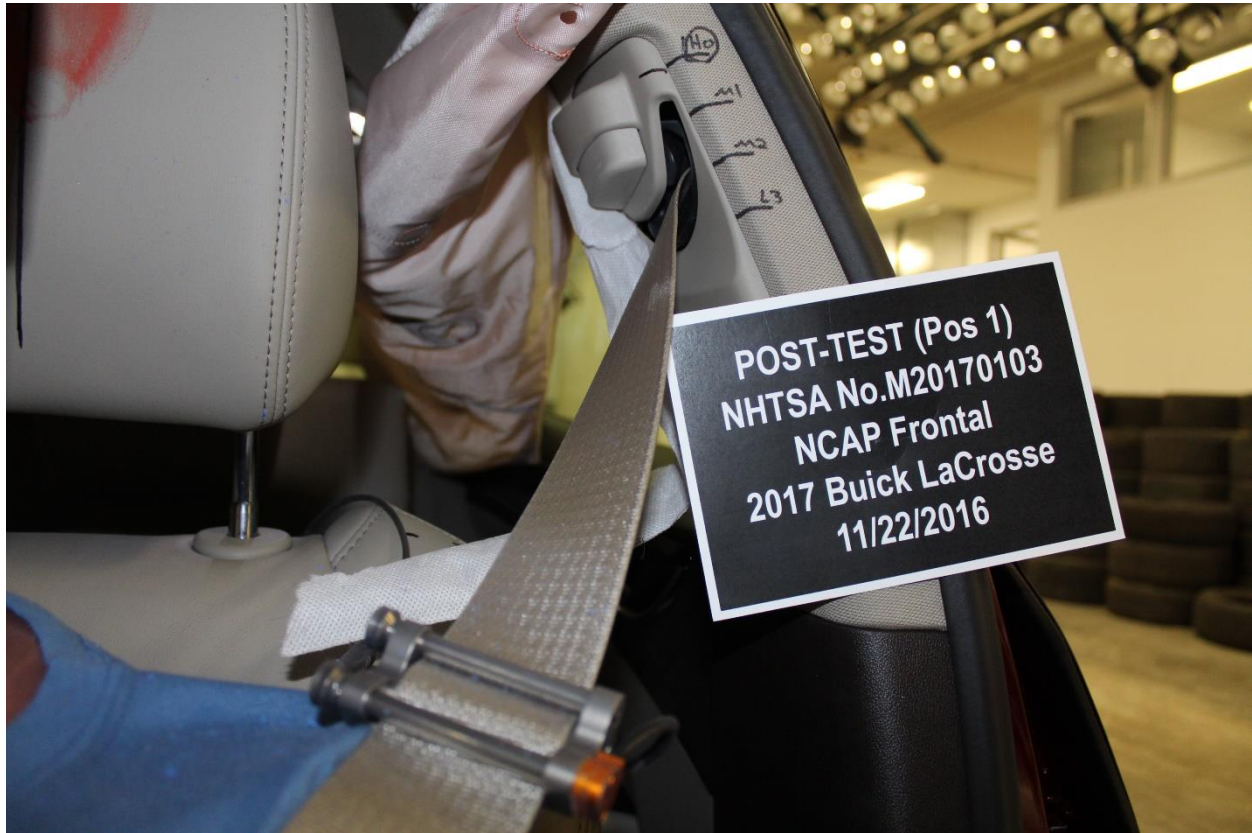


Figure A-39: Post-Test View of Belt Anchorage for Driver Dummy

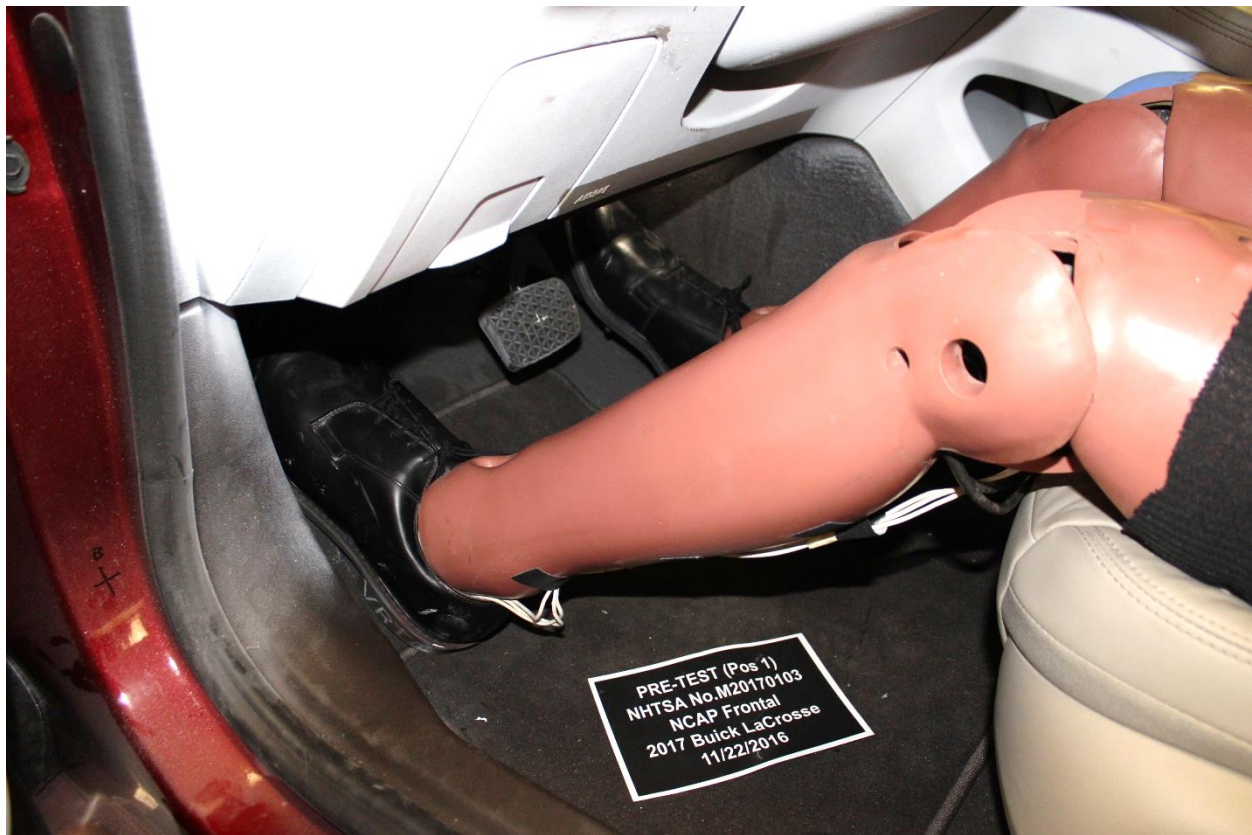


Figure A-40: Pre-Test Driver Dummy Feet



Figure A-41: Post-Test Driver Dummy Feet



Figure A-42: Pre-Test Driver's Side Knee Bolster



Figure A-43: Post-Test Driver's Side Knee Bolster



Figure A-44: Pre-Test Driver's Side Floorpan



Figure A-45: Post-Test Driver's Side Floorpan



Figure A-46: Post-Test Driver Dummy Face



Figure A-47: Post-Test Driver Dummy Contact With Airbag



Figure A-48: Post-Test Driver Dummy Contact With Headrest



Figure A-49: Pre-Test View of the Steering Wheel

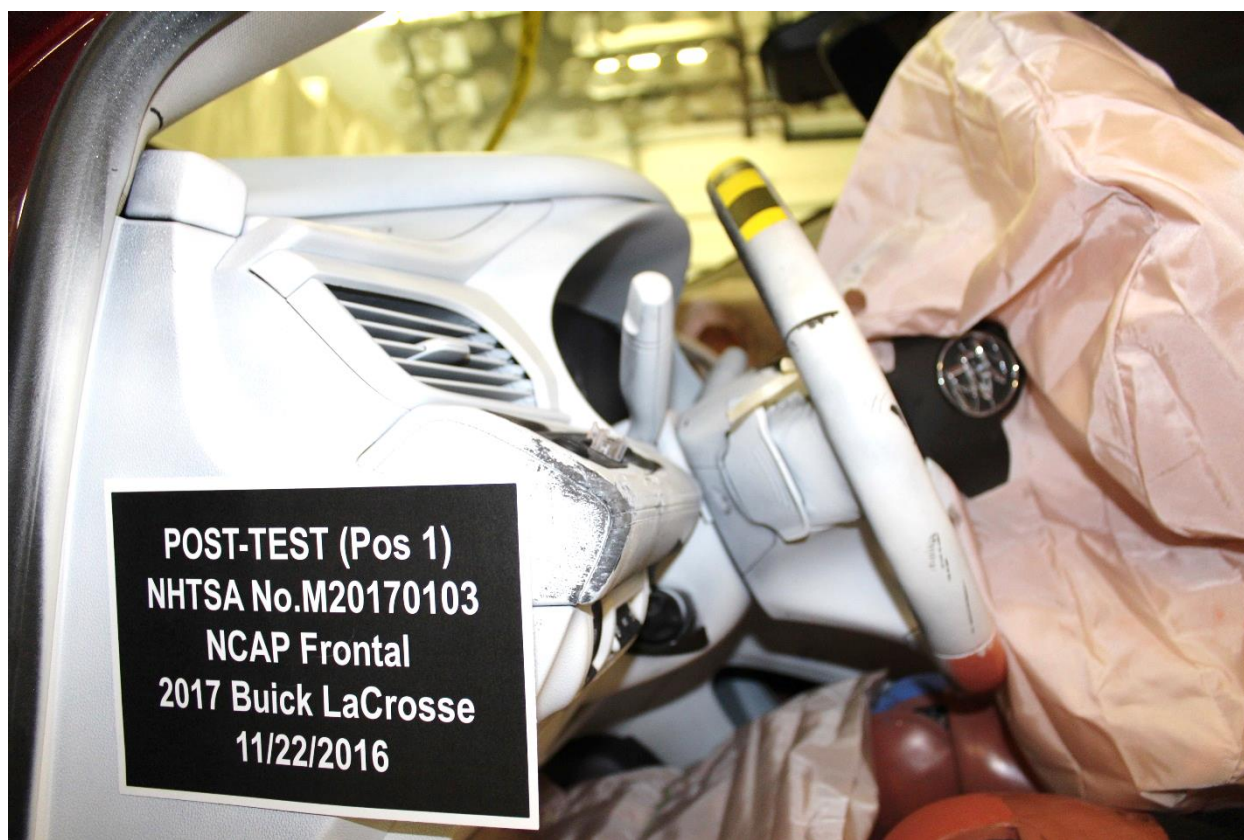


Figure A-50: Post-Test View of the Steering Wheel



Figure A-51: Pre-Test Passenger Dummy Front View



Figure A-52: Post-Test Passenger Dummy Front View



Figure A-53: Pre-Test Passenger Dummy Window View



Figure A-54: Post-Test Passenger Dummy Window View



Figure A-55: Pre-Test Passenger Dummy and Vehicle Interior View



Figure A-56: Post-Test Passenger Dummy and Vehicle Interior View

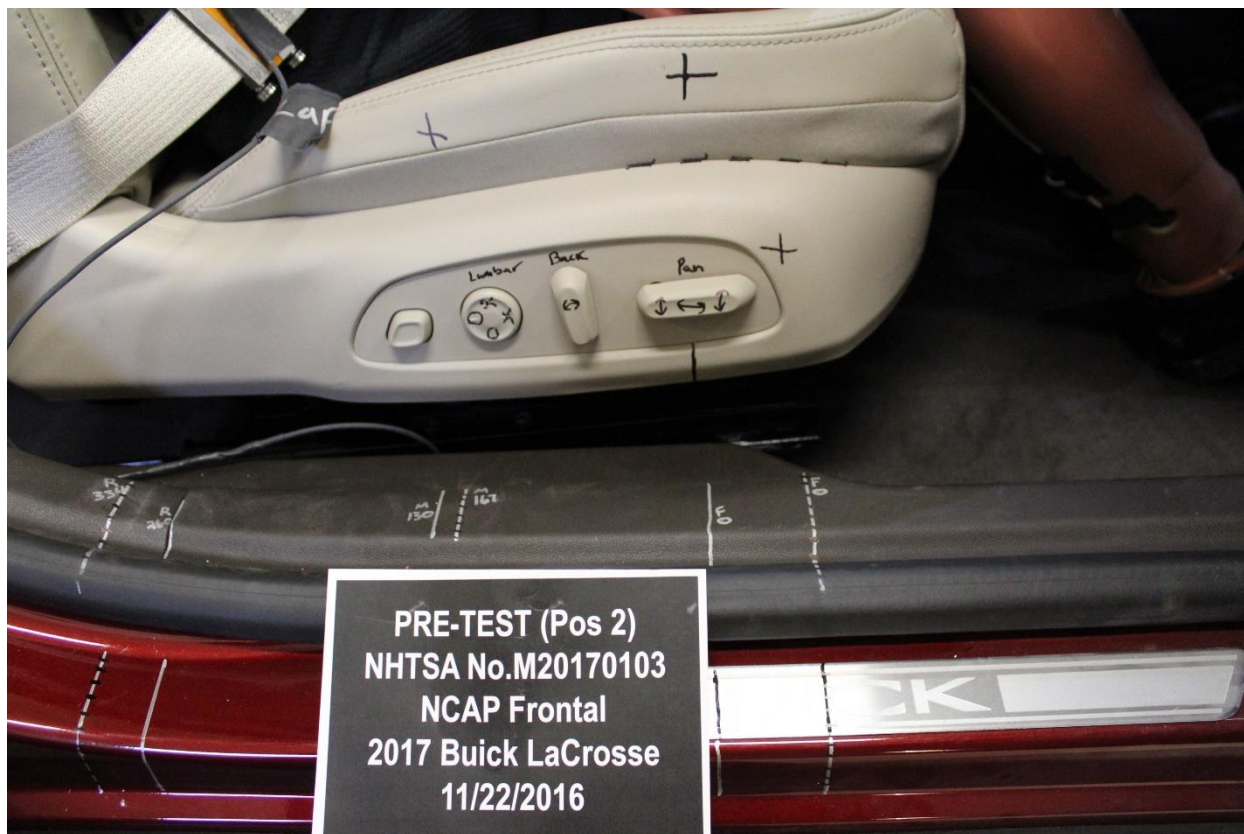
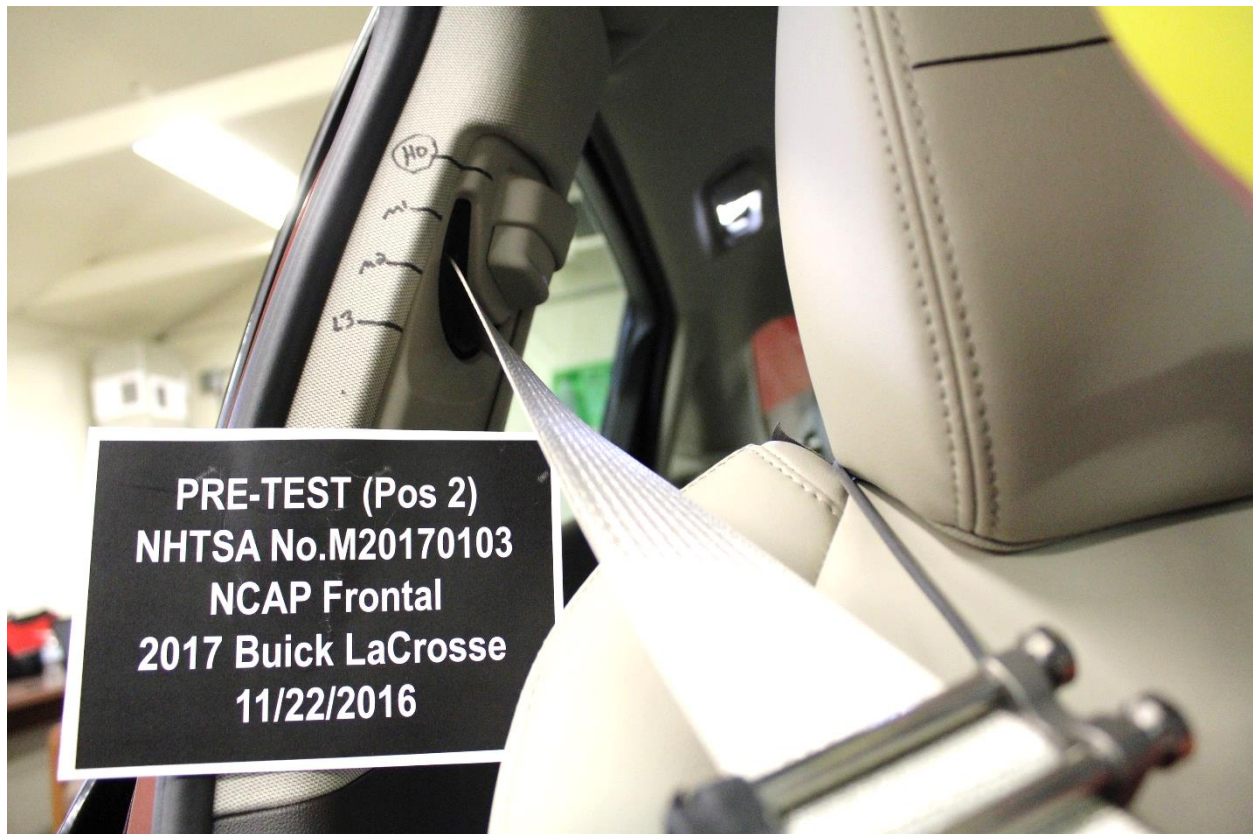


Figure A-57: Pre-Test Passenger's Seat Fore-Aft Markings



Figure A-58: Post-Test Passenger's Seat Fore-Aft Markings



**PRE-TEST (Pos 2)
NHTSA No.M20170103
NCAP Frontal
2017 Buick LaCrosse
11/22/2016**

Figure A-59: Pre-Test View of Belt Anchorage for Passenger Dummy



**POST-TEST (Pos 2)
NHTSA No.M2017010
NCAP Frontal
2017 Buick LaCrosse
11/22/2016**

Figure A-60: Post-Test View of Belt Anchorage for Passenger Dummy



Figure A-61: Pre-Test Passenger Dummy Feet



Figure A-62: Post-Test Passenger Dummy Feet



Figure A-63: Pre-Test Passenger's Side Knee Bolster



Figure A-64: Post-Test Passenger's Side Knee Bolster



Figure A-65: Pre-Test Passenger's Side Floorpan



Figure A-66: Post-Test Passenger's Side Floorpan



Figure A-67: Post-Test Passenger Dummy Face



Figure A-68: Post-Test Passenger Dummy Contact With Airbag



Figure A-69: Post-Test Passenger Dummy Contact With Headrest



Figure A-70: Photograph of Ballast Installed in Vehicle

Photo Not Applicable

Figure A-71: Post-Test Stoddard Solvent Spillage Location View, If Required



Figure A-72: Post-Test Speed Trap Read-Out



Figure A-73: Vehicle at 0° on Static Rollover Device

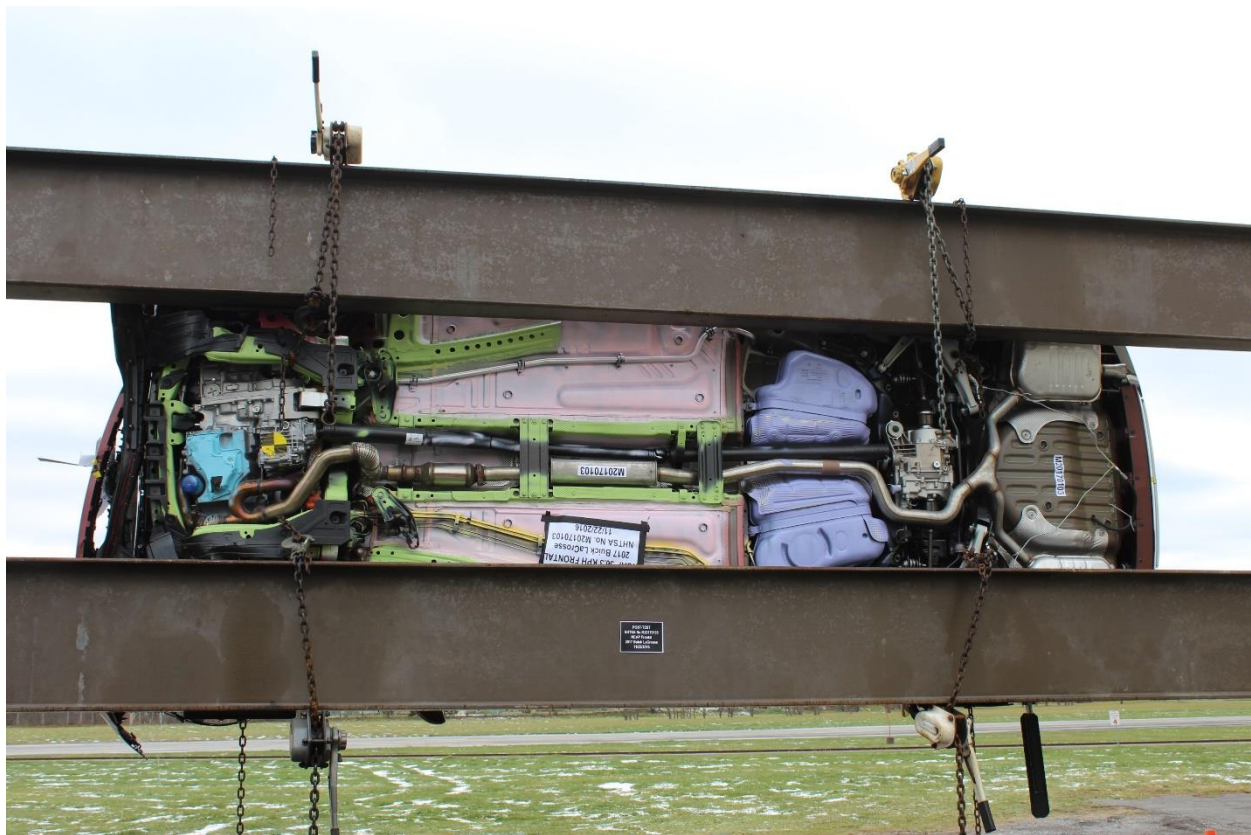


Figure A-74: Vehicle at 90° on Static Rollover Device



Figure A-75: Vehicle at 180° on Static Rollover Device



Figure A-76: Vehicle at 270° on Static Rollover Device



Figure A-77: Vehicle at 360° on Static Rollover Device



Figure A-78: 2017 Buick LaCrosse Frontal Impact Event



2017 LACROSSE PREMIUM AWD



EXTERIOR: CRIMSON RED TINTCOAT
INTERIOR: LT NEUTRAL/ DK BROWN
ACCENTS

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

Visit us at www.buick.com

STANDARD EQUIPMENT

ITEMS LISTED BELOW ARE INCLUDED AT NO EXTRA CHARGE IN THE STANDARD VEHICLE PRICE SHOWN

MECHANICAL

- ALL WHEEL DRIVE
- BRAKES, 4-WHEEL ANTILOCK
- 4-WHEEL DISC, DUAL-IFE ROTORS
- ENG CONTROL STOP/START SYS
- ENGINE, 3.6L V6, DI, VVT
- TRANSMISSION, 8-SPD AUTOMATIC
- TIRE, COMPACT SPARE

SAFETY & SECURITY

- TEEN DRIVER
- ULTRASONIC REAR PARK ASSIST
- FORWARD COLLISION ALERT
- REAR CROSS TRAFFIC ALERT
- LANE KEEP ASSIST
- LANE CHANGE ALERT WITH SIDE BLIND ZONE ALERT
- HEAD-UP DISPLAY
- REAR VISION CAMERA
- 10 AIR BAGS

INTERIOR

- MEMORY SETTINGS, DRIVER & PASS. SEAT, OUTSIDE MIRRORS & POWER STEERING COLUMN
- PWR SEAT ADJUST, DRIVER, 8-WAY
- SEAT, DRIVER MASSAGE CONTROL
- W 4-WAY POWER LUMBAR CONTROL
- PWR SEAT ADJUSTER, FRONT PASSENGER, 8-WAY
- SEAT, FRONT PASSENGER MASSAGE CONTROL, 4-WAY POWER LUMBAR
- DRIVER AND FRONT PASSENGER HEATED AND VENTILATED SEATS
- STEERING COLUMN, POWER TILT & TELESCOPIC
- HEATED STEERING WHEEL
- 8" DRIVER INFORMATION AND CLUSTER DISPLAY
- ELECTRONIC PRECISION SHIFTER

EXTERIOR

- POWER DUAL OUTSIDE MIRRORS, HEATED, AUTO DIMMING, TURN

- SIGNAL, DRIVER SIDE MEMORY
- WHEELS, 18" ULTRA-BRIGHT MACHINED-FACE ALUMINUM
- HEADLAMPS, ARTICULATING
- HIGH INTENSITY DISCHARGE
- SHUTTERS, FRONT LOWER GRILLE
- CAPLESS FUEL FILL
- FASCIA INTEGRATED EXHAUST

CONNECTIVITY FEATURES

- AUDIO SYSTEM, BUICK INTELLILINK RADIO, SELECT BLUETOOTH STREAMING, APPLE CARPLAY CAPABILITY & ANDROID AUTO CAPABILITY PROVIDED BY APPLE AND GOOGLE AVAILABLE W/ COMPATIBLE SMARTPHONES
- WIRELESS CHARGING
- XM RADIO + SERVICE SUBSCRIPTION SOLD SEPARATELY BY SATELLITE AFTER 3 MTHS
- ONSTAR(R) INCLUDES 5 YR BASIC PLAN PLUS 3 MTH SERVICE

W/ AUTOMATIC CRASH RESPONSE, NAVIGATION & MORE (SUBJECT TO TERMS SEE ONSTAR.COM)

- AUDIO SYSTEM, 8 SPEAKER
- ACTIVE NOISE CANCELLATION

OPTIONS & PRICING

MANUFACTURER'S SUGGESTED RETAIL PRICE

STANDARD VEHICLE PRICE **\$43,265.00**

OPTIONS INSTALLED BY THE MANUFACTURER MAY REPLACE STANDARD EQUIPMENT SHOWN

CRIMSON RED TINTCOAT 495.00

TOTAL OPTIONS \$495.00

TOTAL VEHICLE & OPTIONS \$43,760.00

DESTINATION CHARGE 925.00

TOTAL VEHICLE PRICE* \$44,685.00

EPA DOT Fuel Economy and Environment

These estimates reflect new EPA methods beginning with 2017 models.

Fuel Economy
23 MPG
combined city highway
4.3 gallons per 100 miles

Mid-size cars range from 13 to 114 MPG. The best vehicle rates 119 MPG.

Annual fuel cost
\$1,600

Fuel Economy & Greenhouse Gas Rating (telego onstar)

Smog Rating (telego onstar)

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 \$2.49 per gallon. MPGe is miles per gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fueleconomy.gov
Calculate personalized estimates and compare vehicles

Gasoline Vehicle

You spend \$1,000 more in fuel costs over 5 years compared to the average new vehicle.

Source: National Highway Traffic Safety Administration (NHTSA)

www.safercar.gov or 1-888-327-4236

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 COUNTRY:
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

This label has been applied pursuant to Federal law. Do not remove prior to delivery to the customer. If removed, the dealer is responsible for replacement. For details, see dealer's copy of the label. Do not alter, modify, or tamper with this label. Do not remove or destroy this label. Do not remove or destroy this label. Do not remove or destroy this label.

©2016 General Motors LLC. VIN: 1G4Z55SS8H125336. MSRP: \$44,685.00. 100T286429



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ORDER NO. 100T286429
SALES CODE: 100T286429
VIN: 1G4Z55SS8H125336
COUNTRY: U.S.A.

DEALERS TO WHOM DELIVERED:
BLAISE ALEXANDER CHEVROLET BUICK OF
113 WALTON ST
PHILIPSBURG, PA 16866-2525

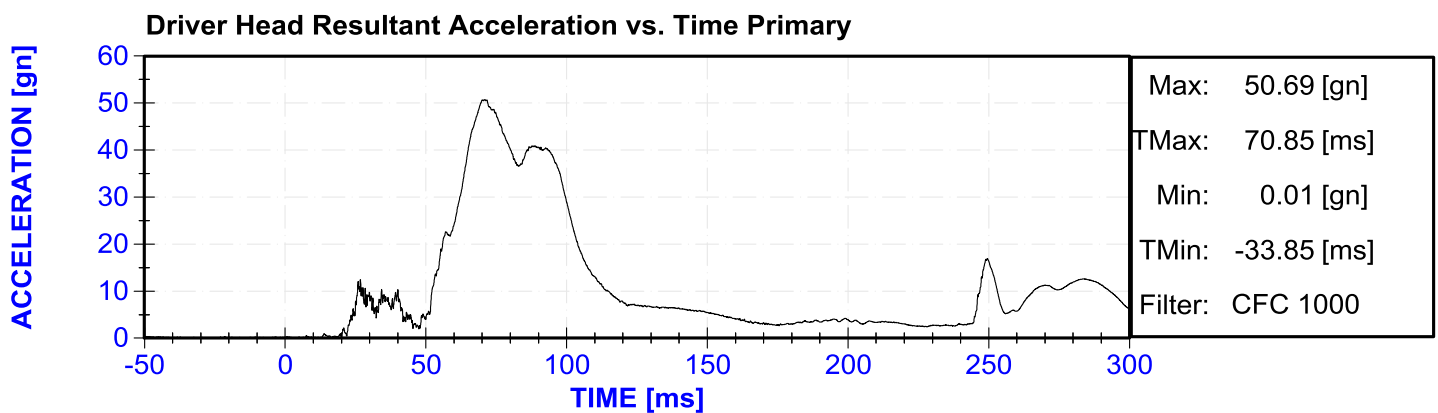
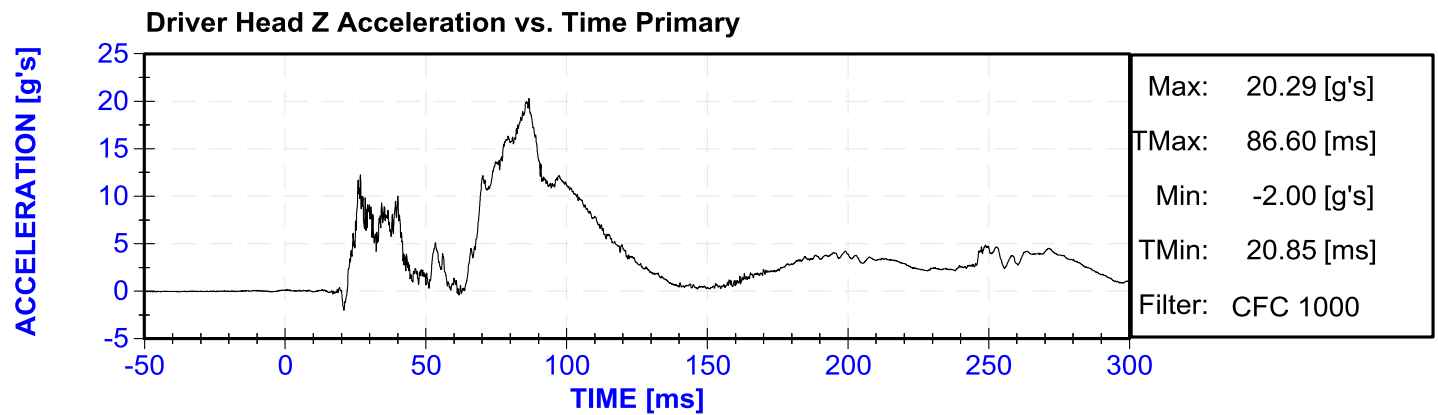
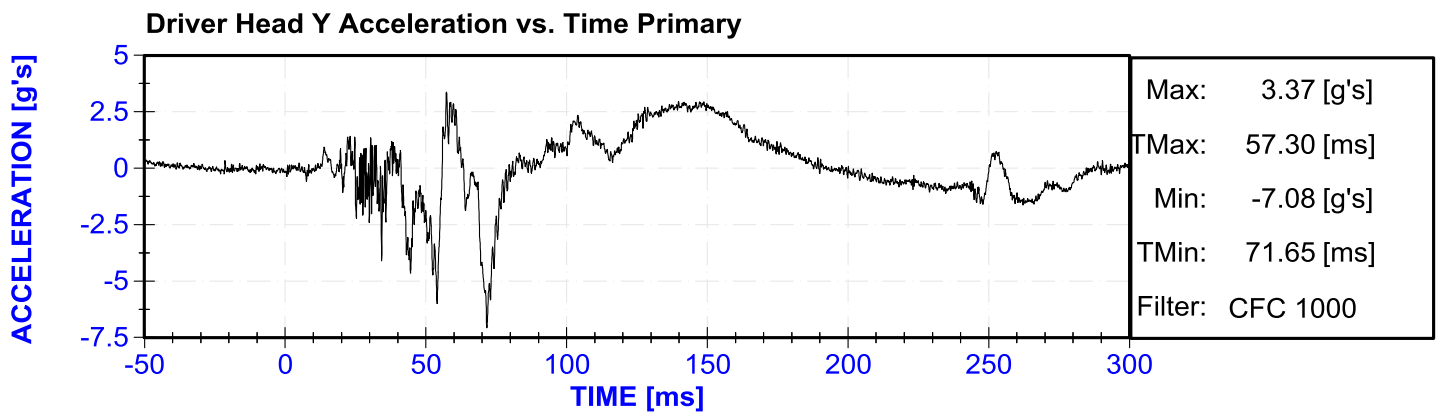
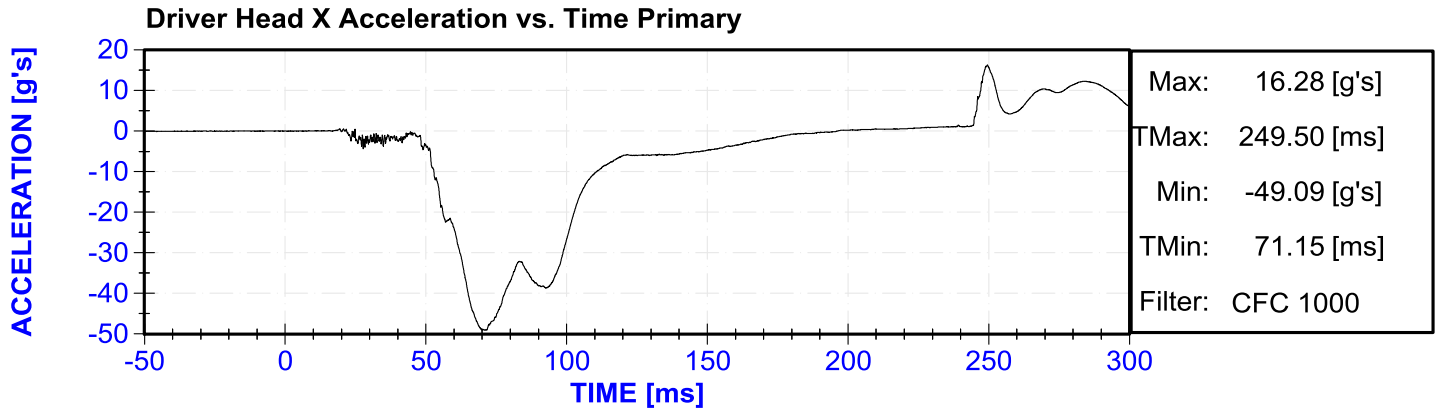
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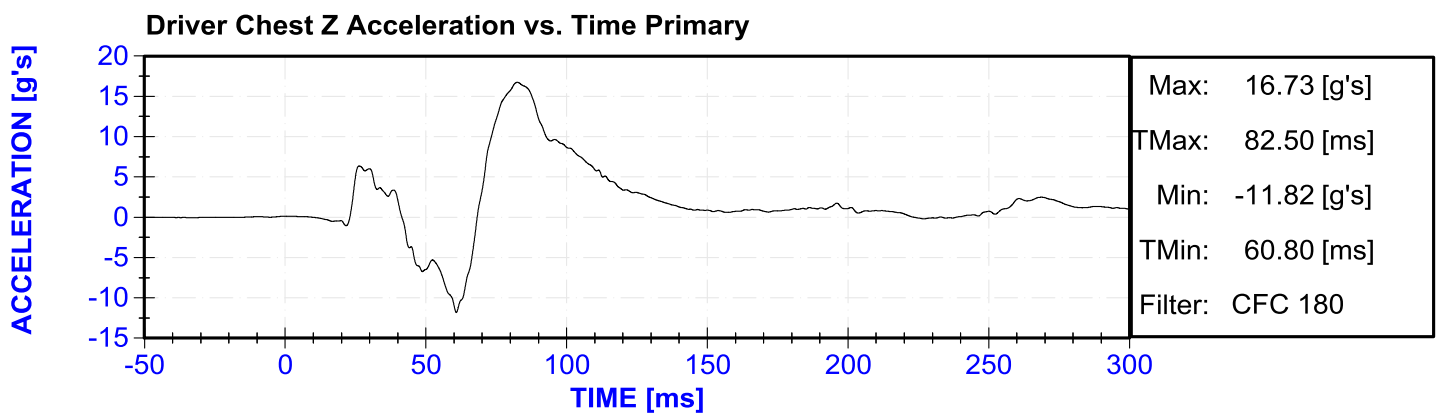
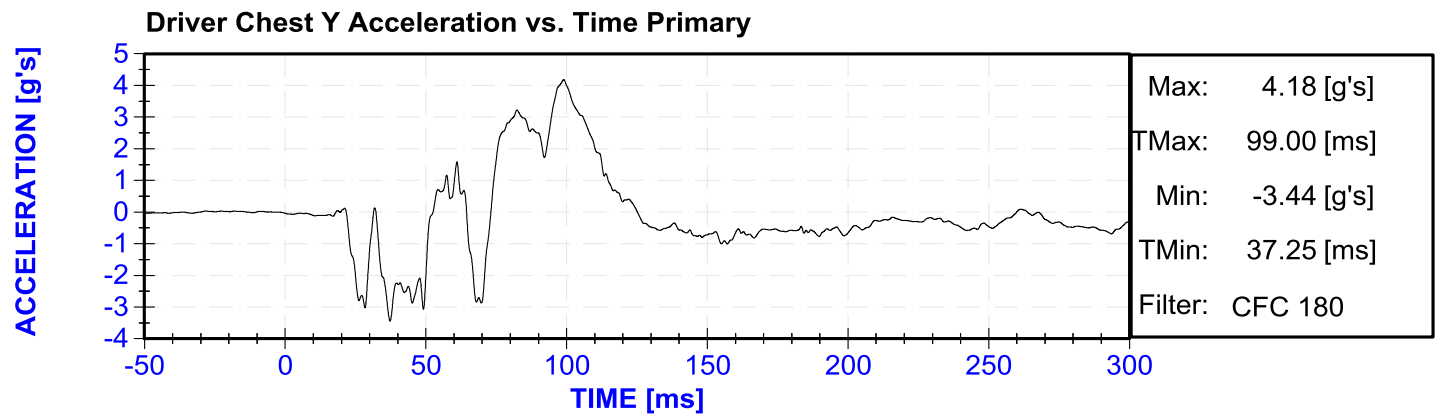
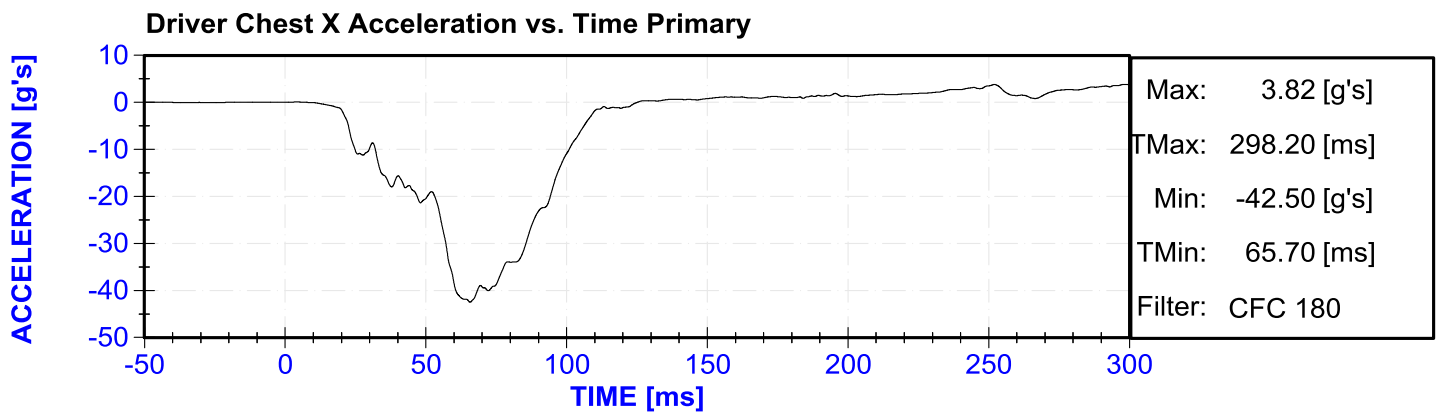
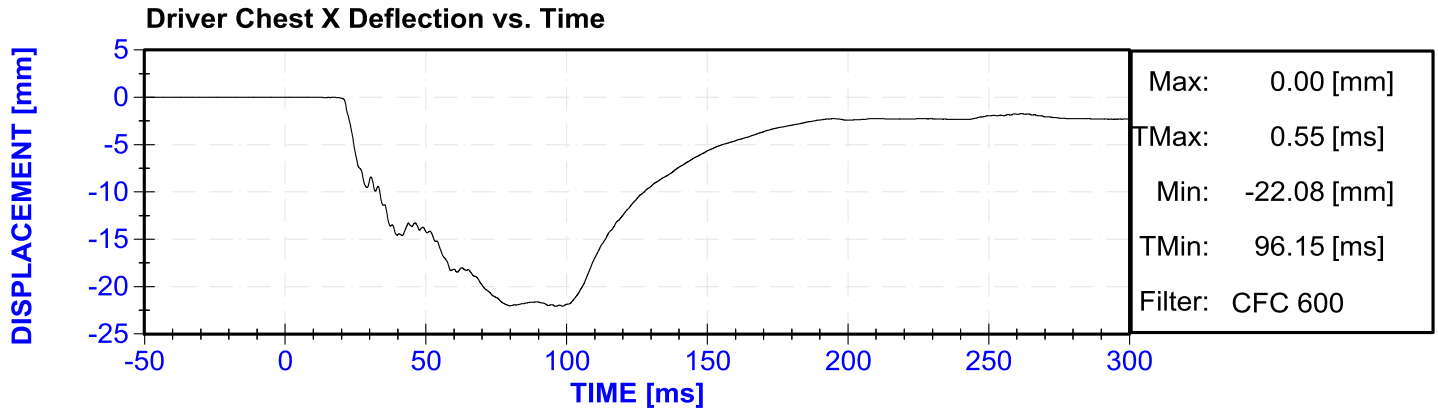
Figure A-79: Monroney Label Photograph

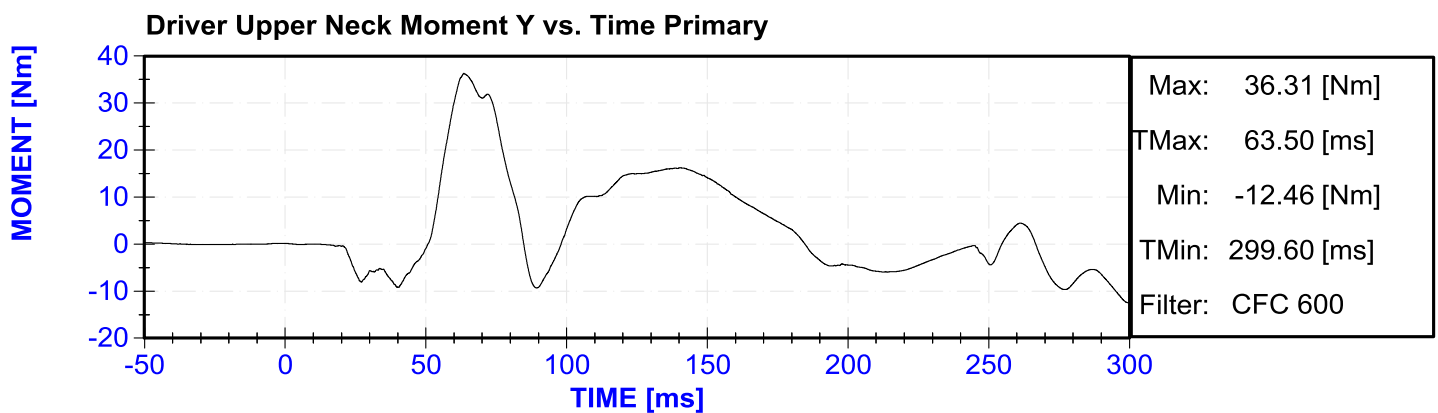
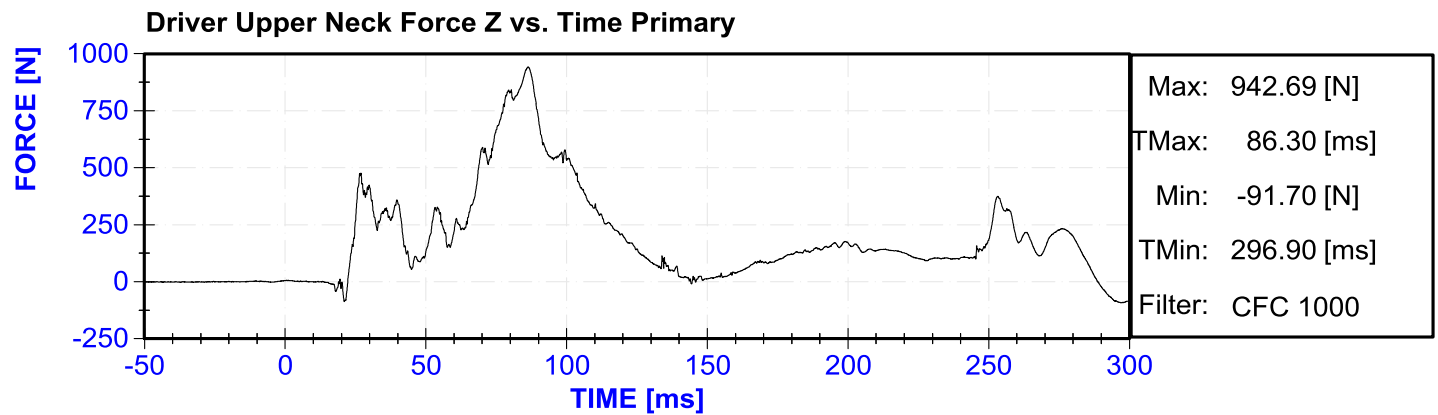
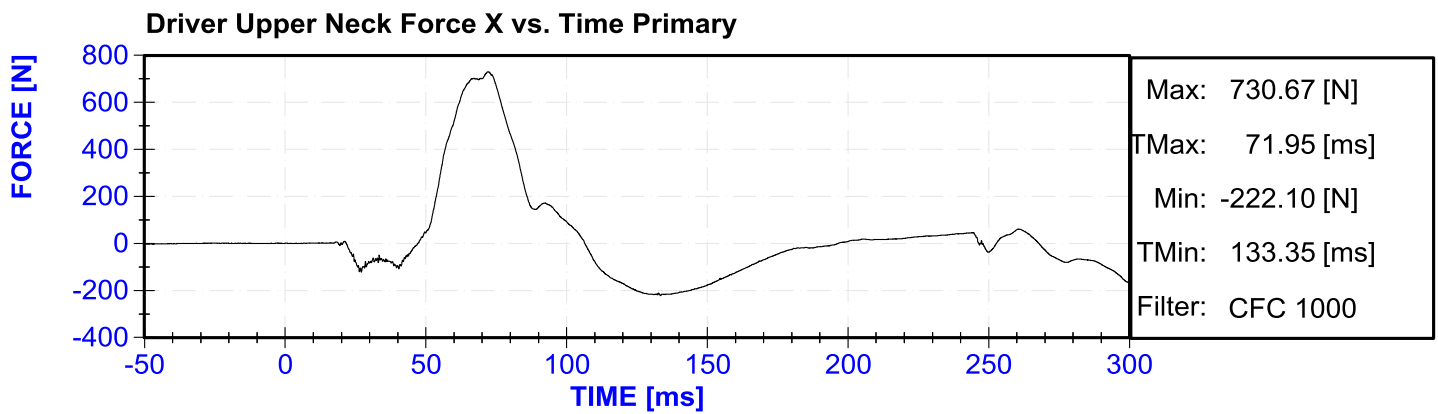
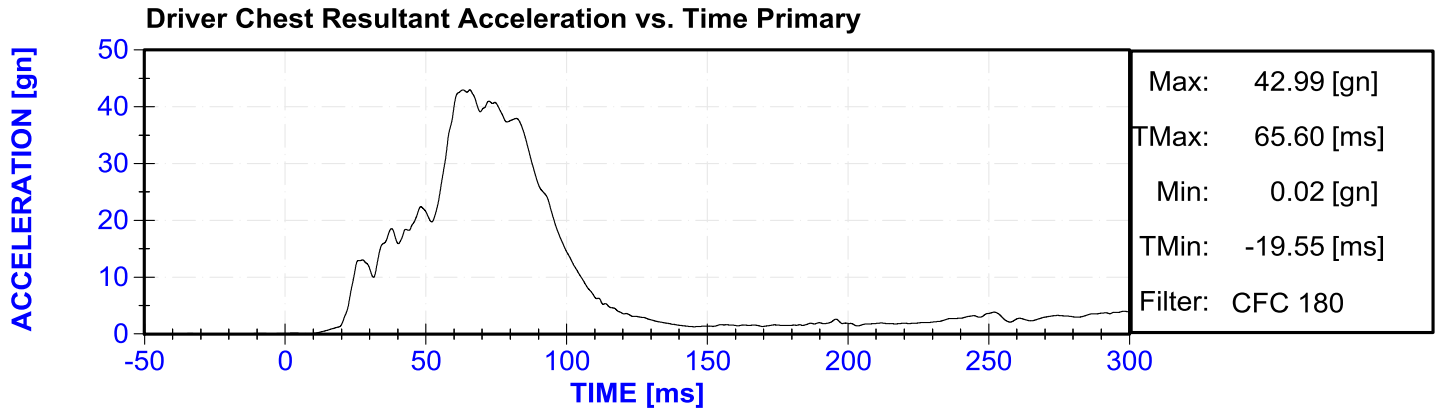
APPENDIX B
VEHICLE & DUMMY RESPONSE DATA TRACES

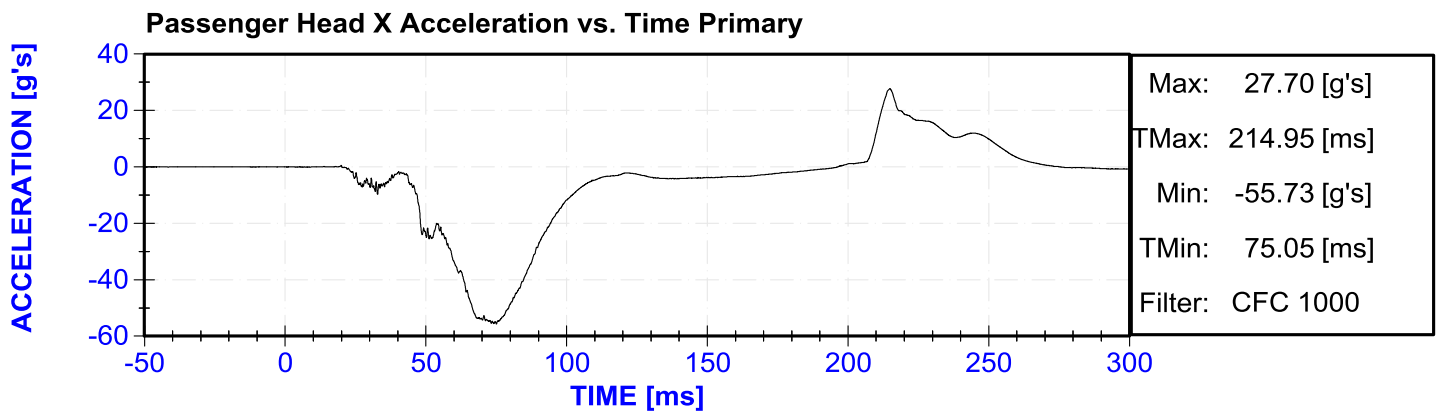
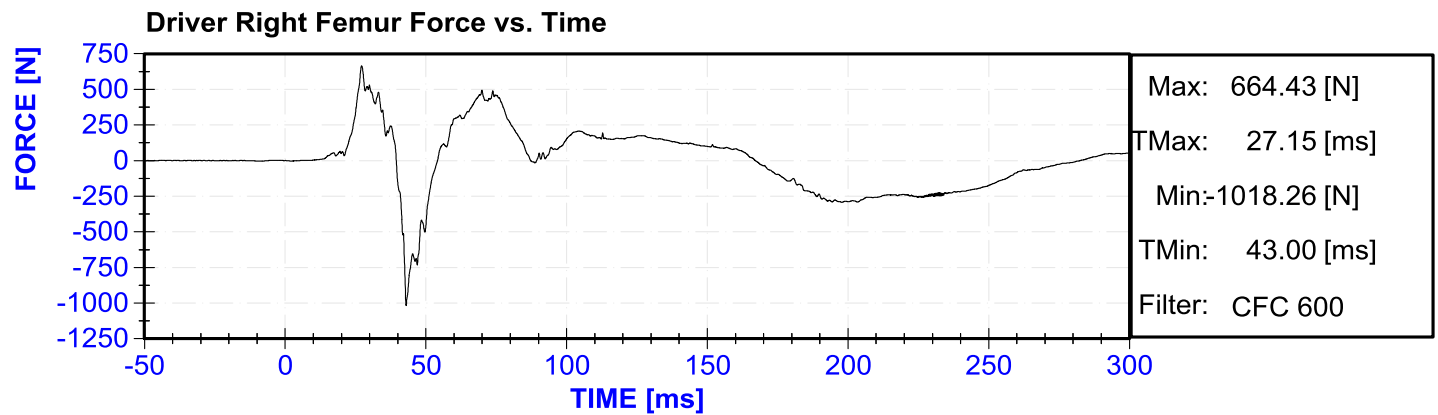
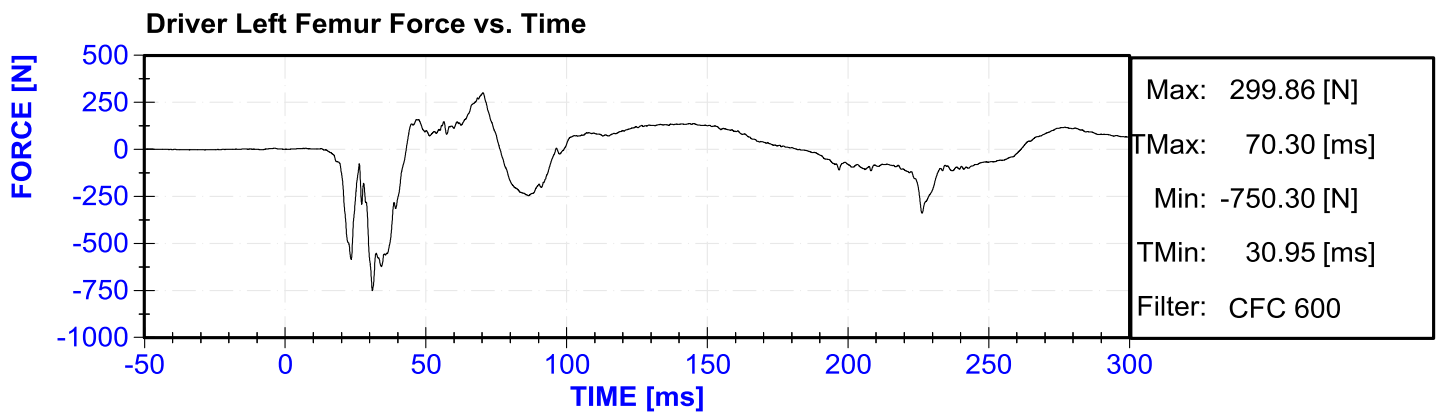
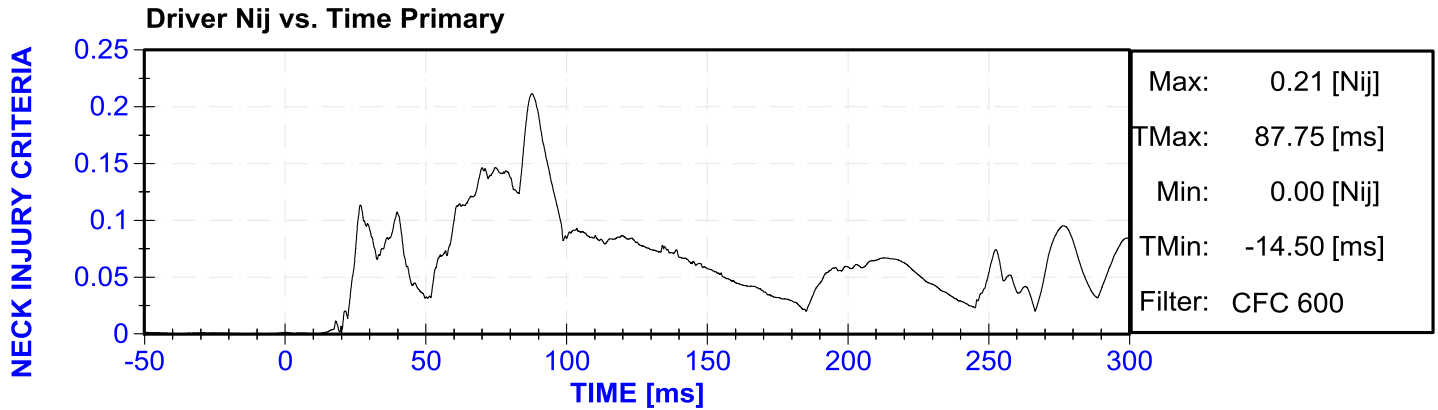
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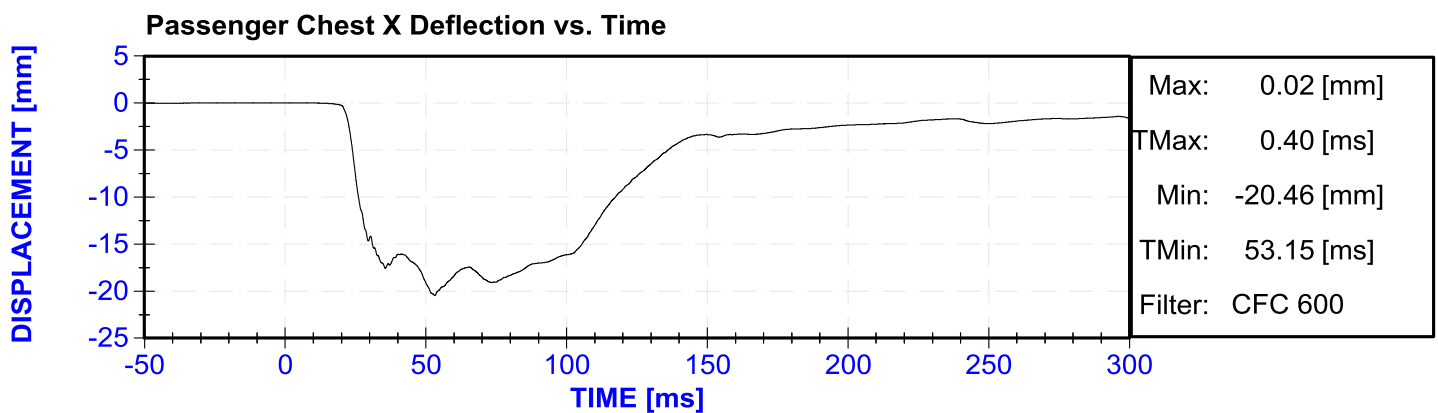
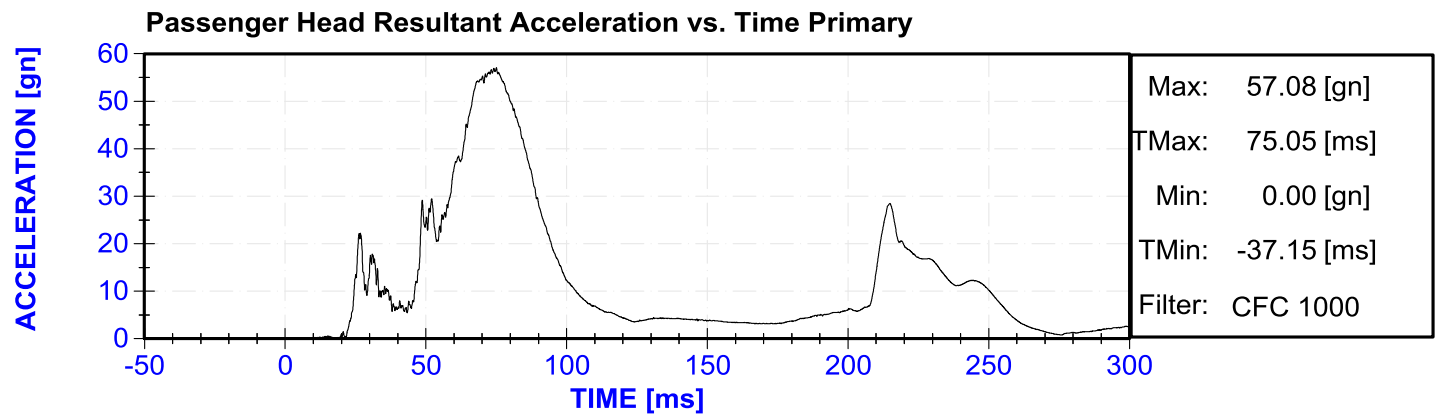
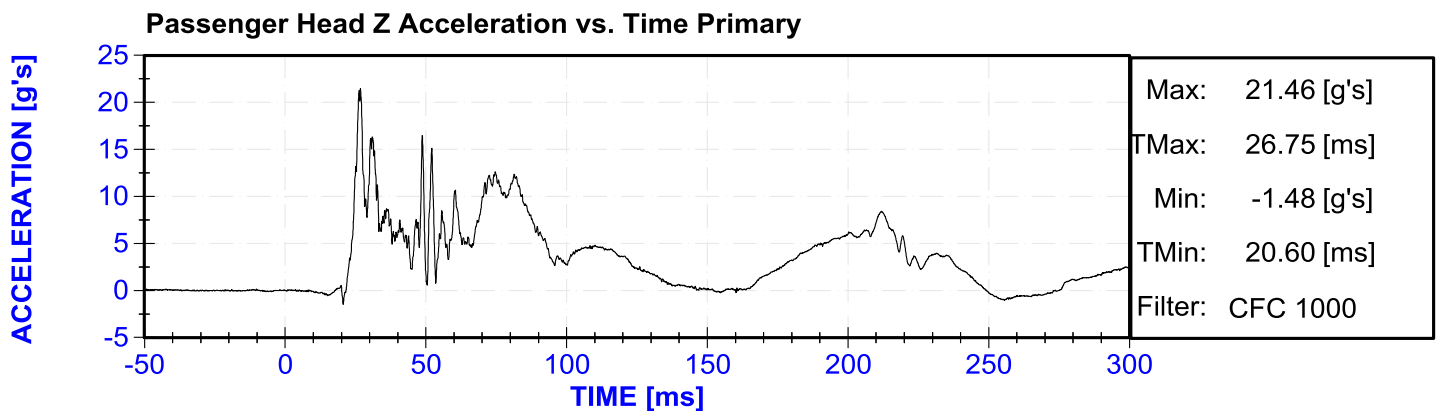
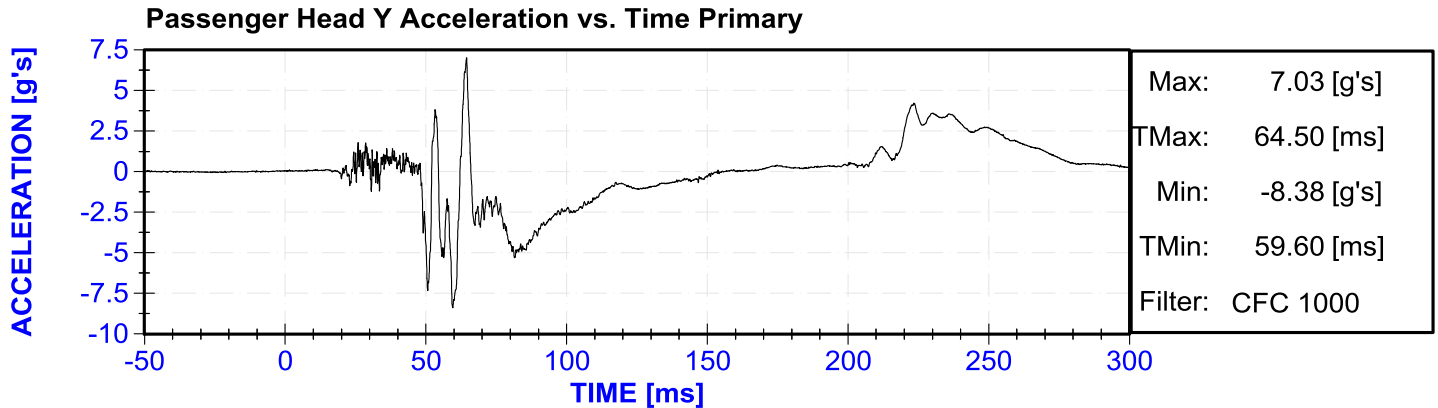
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Plot 2	Driver Head Y Acceleration vs. Time Primary	B-3
Plot 3	Driver Head Z Acceleration vs. Time Primary	B-3
Plot 4	Driver Head Resultant Acceleration vs. Time Primary	B-3
Plot 5	Driver Chest X Deflection vs. Time	B-4
Plot 6	Driver Chest X Acceleration vs. Time Primary	B-4
Plot 7	Driver Chest Y Acceleration vs. Time Primary	B-4
Plot 8	Driver Chest Z Acceleration vs. Time Primary	B-4
Plot 9	Driver Chest Resultant Acceleration vs. Time Primary	B-5
Plot 10	Driver Upper Neck Force X vs. Time Primary	B-5
Plot 11	Driver Upper Neck Force Z vs. Time Primary	B-5
Plot 12	Driver Upper Neck Moment Y vs. Time Primary	B-5
Plot 13	Driver Nij vs. Time Primary	B-6
Plot 14	Driver Left Femur Force vs. Time	B-6
Plot 15	Driver Right Femur Force vs. Time	B-6
Plot 16	Passenger Head X Acceleration vs. Time Primary	B-6
Plot 17	Passenger Head Y Acceleration vs. Time Primary	B-7
Plot 18	Passenger Head Z Acceleration vs. Time Primary	B-7
Plot 19	Passenger Head Resultant Acceleration vs. Time Primary	B-7
Plot 20	Passenger Chest X Deflection vs. Time	B-7
Plot 21	Passenger Chest X Acceleration vs. Time Primary	B-8
Plot 22	Passenger Chest Y Acceleration vs. Time Primary	B-8
Plot 23	Passenger Chest Z Acceleration vs. Time Primary	B-8
Plot 24	Passenger Chest Resultant Acceleration vs. Time Primary	B-8
Plot 25	Passenger Upper Neck Force X vs. Time Primary	B-9
Plot 26	Passenger Upper Neck Force Z vs. Time Primary	B-9
Plot 27	Passenger Upper Neck Moment Y vs. Time Primary	B-9
Plot 28	Passenger Nij vs. Time Primary	B-9
Plot 29	Passenger Left Femur Force vs. Time	B-10
Plot 30	Passenger Right Femur Force vs. Time	B-10

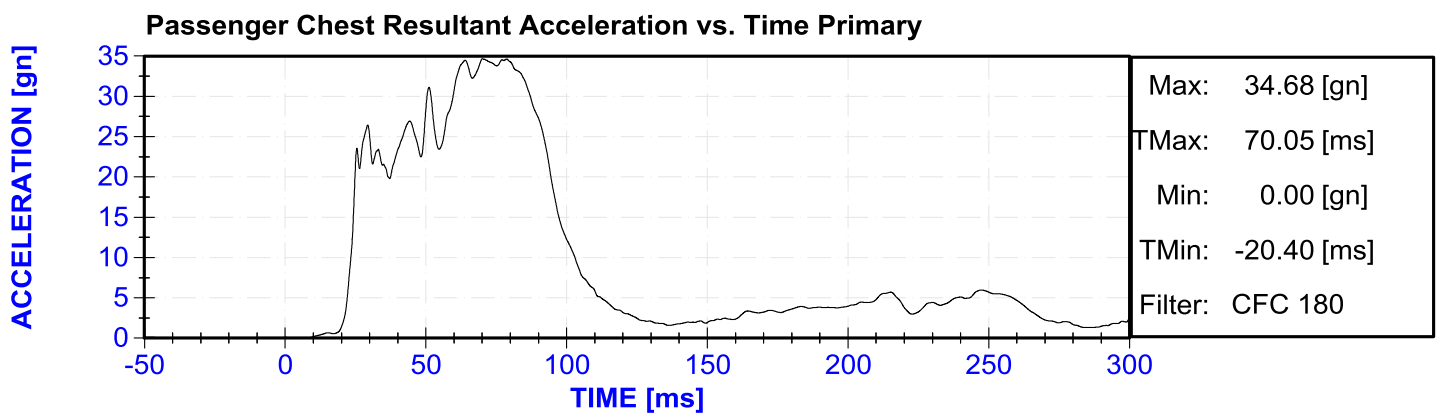
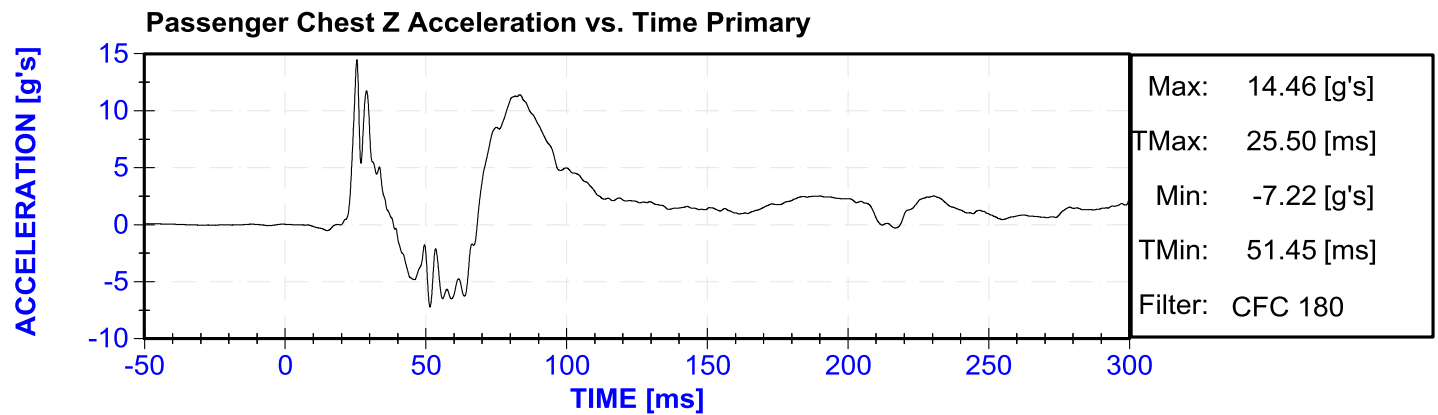
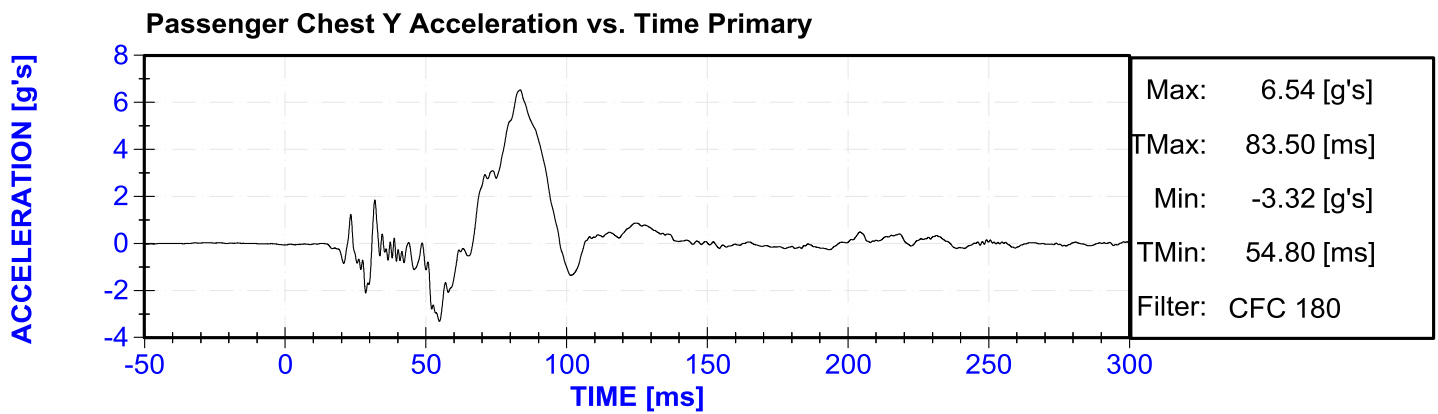
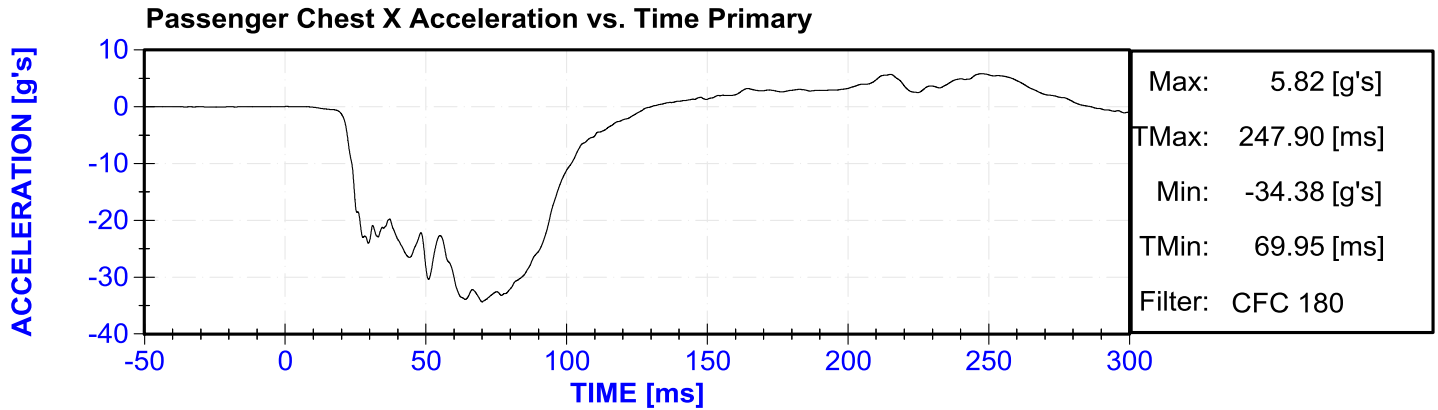


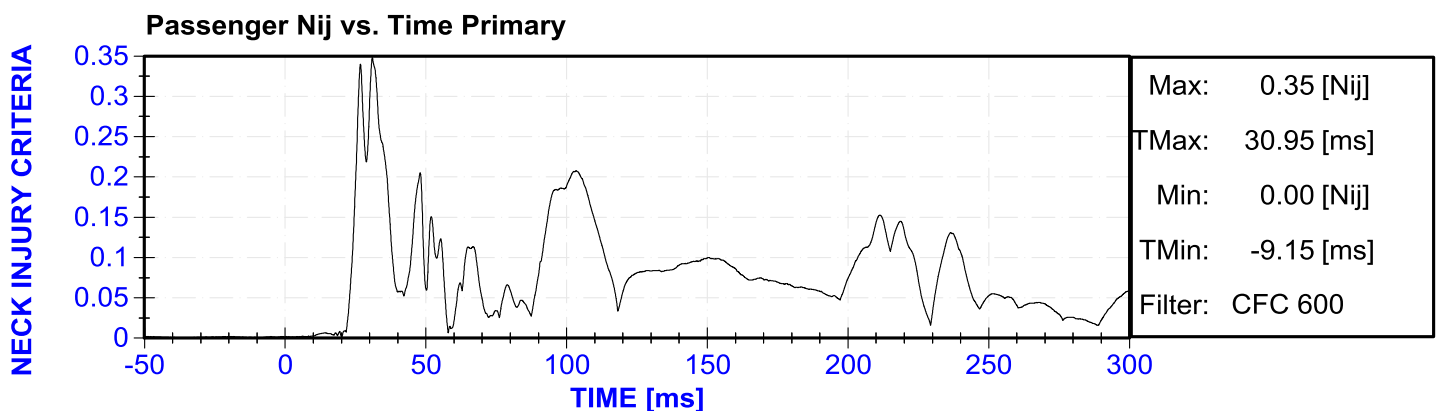
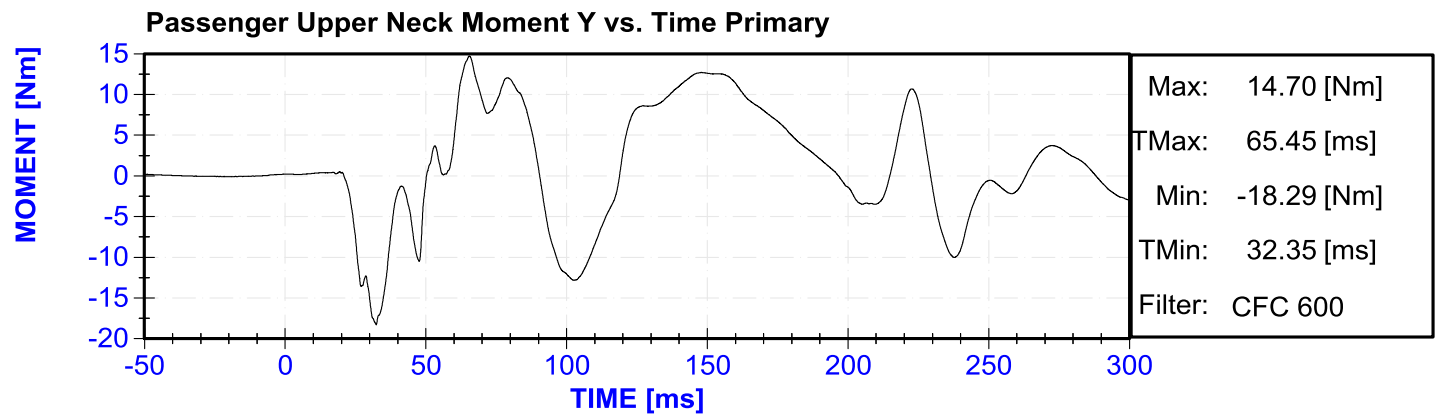
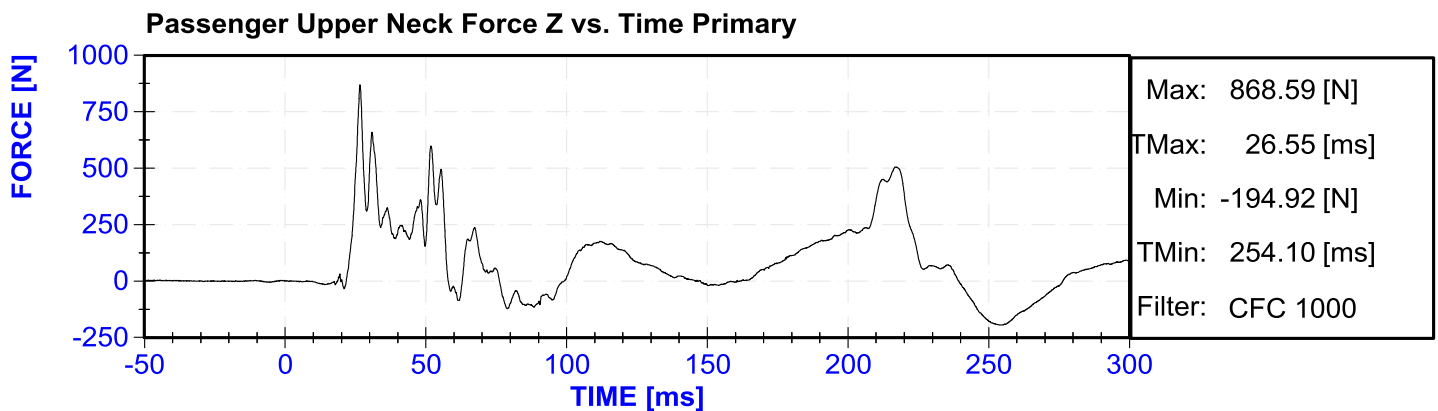
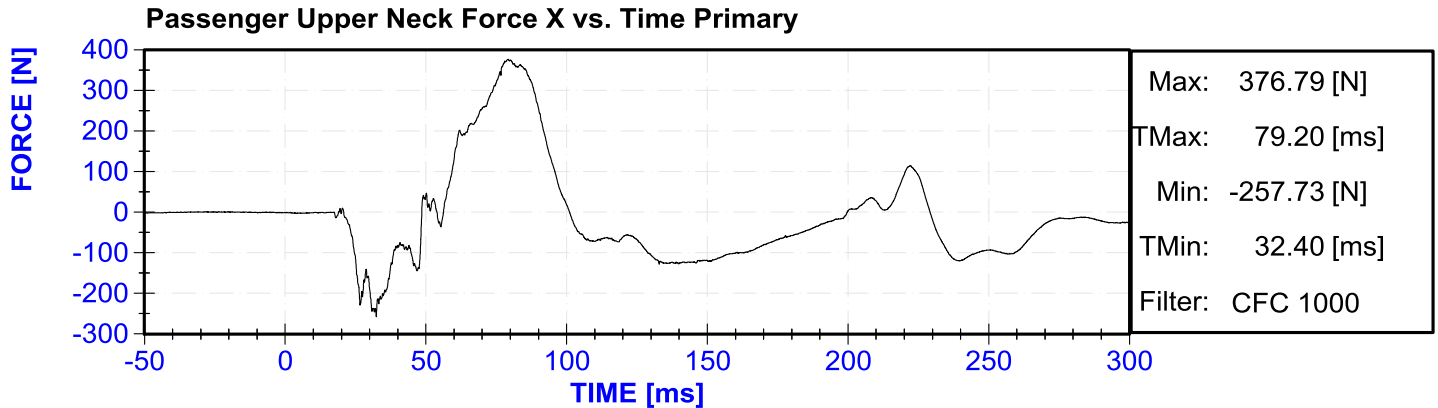


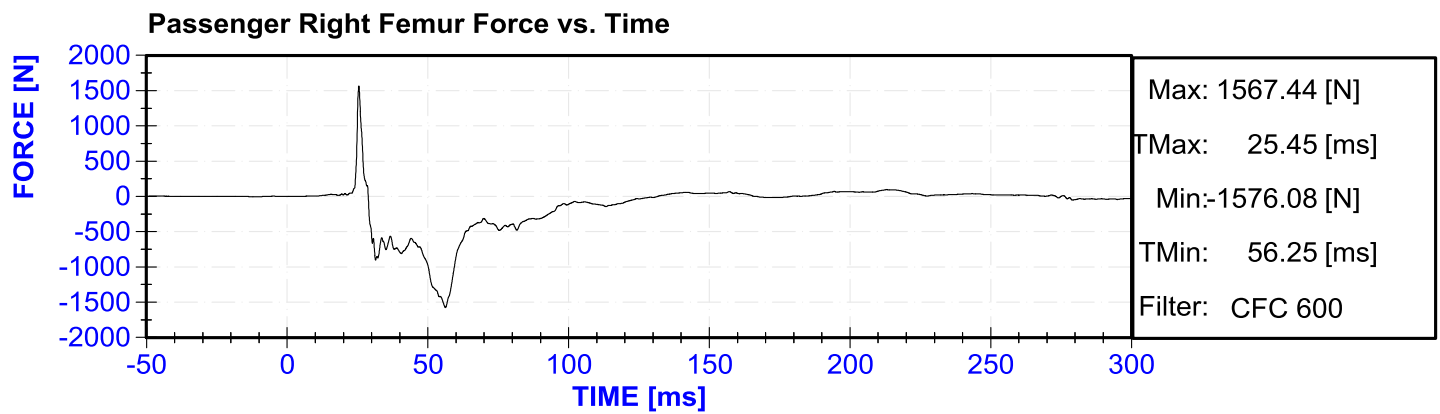
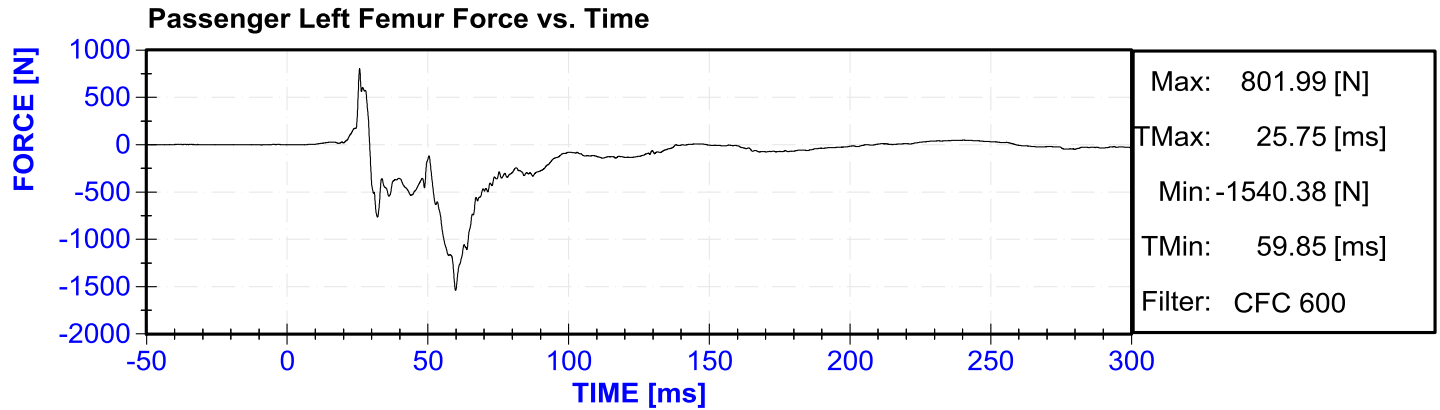












APPENDIX C

DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

HYBRID III 50TH PERCENTILE MALE - DRIVER ATD

SERIAL NO: 1046

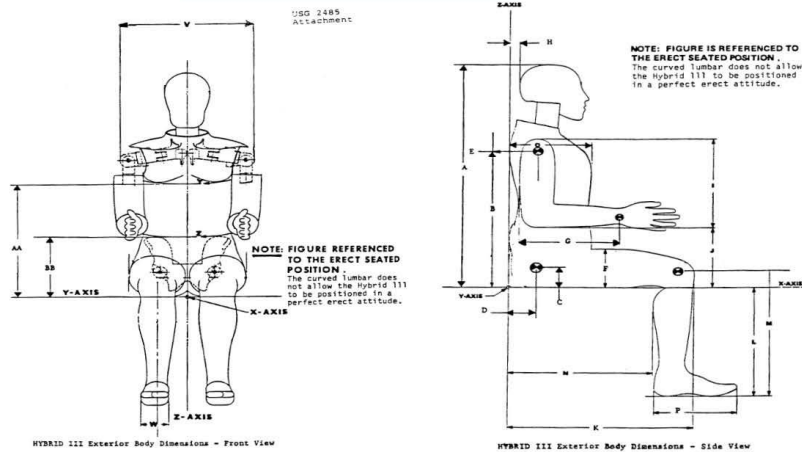


External Measurements - Hybrid 3 - 50th Male

Technician: **M.Hartung**

Date: **11/10/2016**

Dummy Serial Number: **1046**



Symbol	Description	Specification (in)		Result (in)	Pass/Fail
A	Sitting Height	34.6	35.0	34.7	Pass
B	Shoulder Pivot Height	19.9	20.5	20.3	Pass
C	H-Point Height	3.3	3.5	3.5	Pass
D	H-Point from Backline	5.3	5.5	5.4	Pass
E	Shoulder Pivot from Backline	3.3	3.7	3.6	Pass
F	Thigh Clearance	5.5	6.1	5.7	Pass
G	Back of Elbow to Wrist Pivot	11.4	12.0	11.7	Pass
H	Head Back to Backline	1.6	1.8	1.7	Pass
I	Shoulder to Elbow Length	13.0	13.6	13.2	Pass
J	Elbow Rest Height	7.5	8.3	7.8	Pass
K	Buttock to Knee Length	22.8	23.8	23.3	Pass
L	Popliteal Height	16.9	17.9	17.4	Pass
M	Knee Pivot Height	19.1	19.7	19.5	Pass
N	Buttock Popliteal Length	17.8	18.8	18.2	Pass
O	Chest Depth without Jacket	8.4	9.0	8.7	Pass
P	Foot Length (right)	9.9	10.5	10.3	Pass
V	Shoulder Breadth	16.3	17.2	16.8	Pass
W	Foot Breadth	3.6	4.2	4.0	Pass
Y	Chest Circumference with Jacket	38.2	39.4	39.0	Pass
Z	Waist Circumference	32.9	34.1	33.5	Pass
AA	Reference Location (Chest Circumference)	16.9	17.1	17.0	Pass
BB	Reference Location (Waist Circumference)	8.9	9.1	9.0	Pass

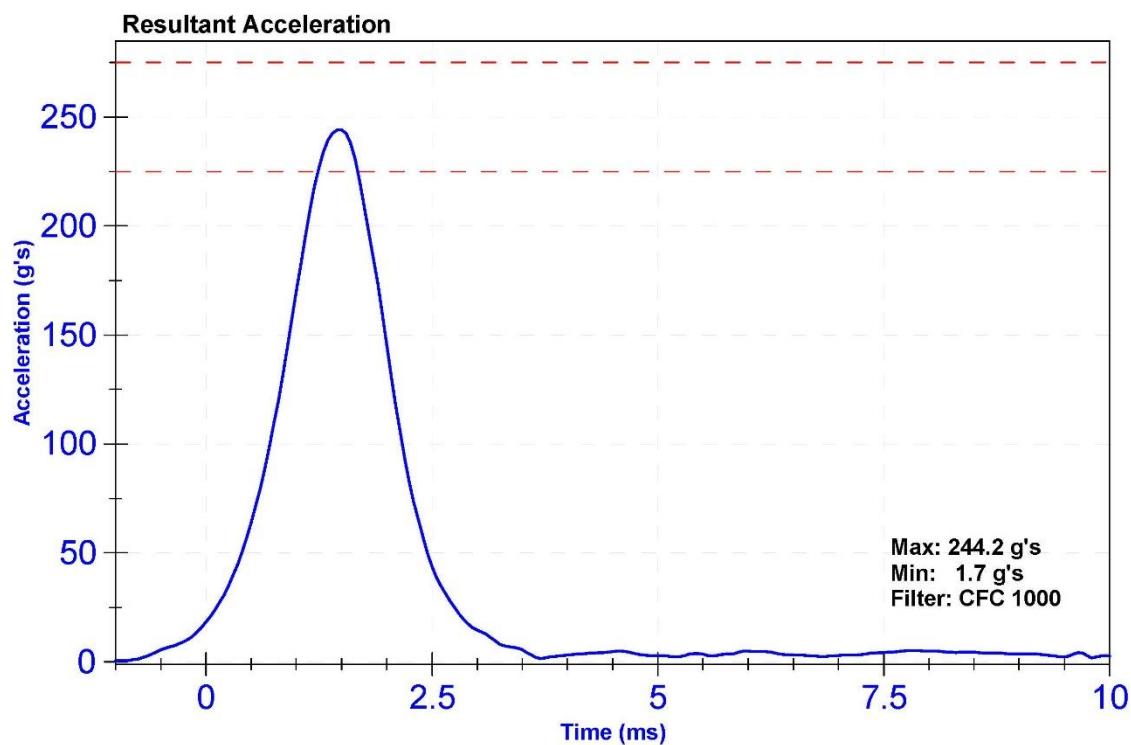
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	1046	Laboratory Supervisor	M. Goehle

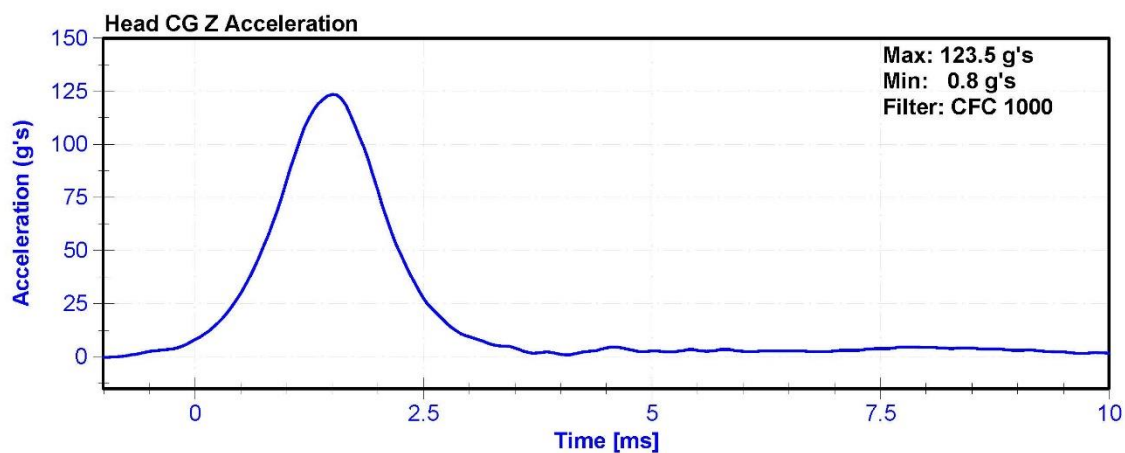
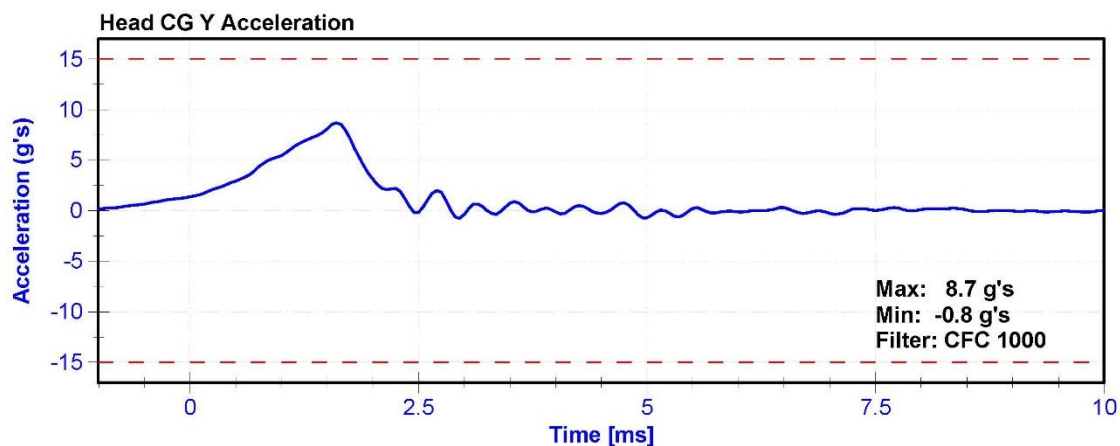
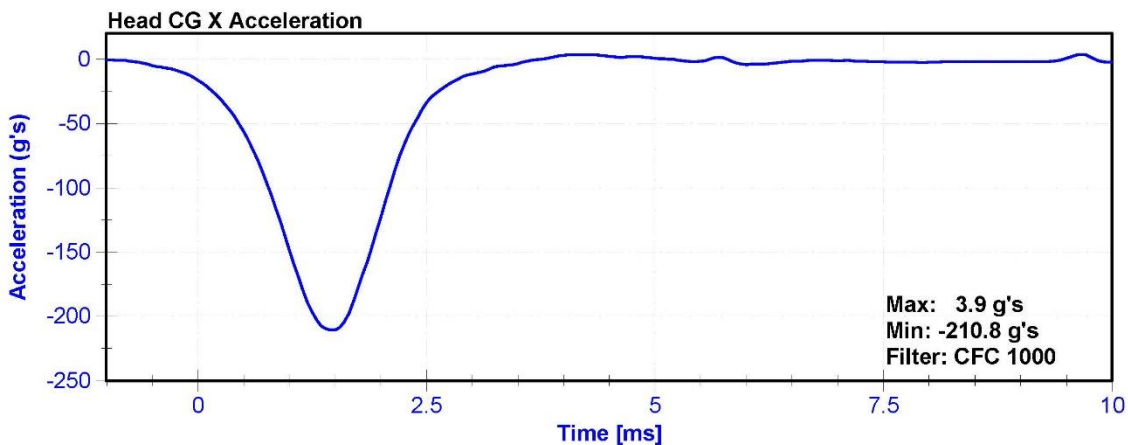
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.0	Pass
Humidity	10	70	%	38.6	Pass
Resultant Acceleration	225	275	g's	244.2	Pass
Oscillation	0	10	%	2.1	Pass
Lateral Acceleration	-15	15	g's	8.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P58871	9/19/2016	3/20/2017
Y Accelerometer	ENDEVCO 7264	AC-P12359	9/19/2016	3/20/2017
Z Accelerometer	ENDEVCO 7264CT	AC-P52133	9/19/2016	3/20/2017





ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	1046	Laboratory Supervisor	M.Goehle

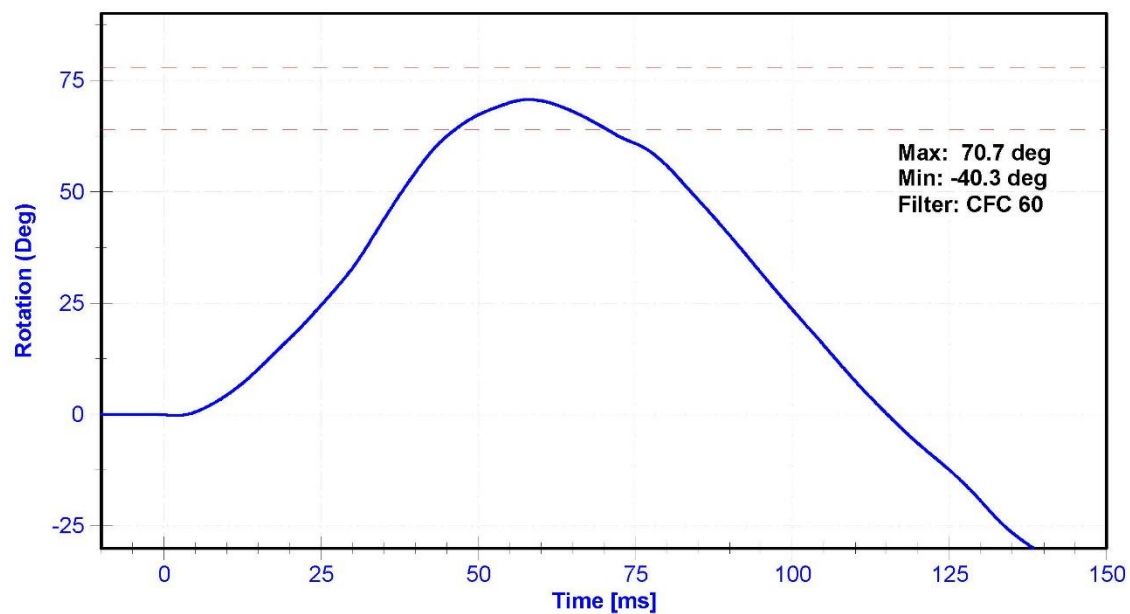
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	35.1	Pass
Velocity	6.89	7.13	m/s	6.979	Pass
Pendulum Deceleration at 10ms	22.5	27.5	g's	25.51	Pass
Pendulum Deceleration at 20ms	17.6	22.6	g's	20.38	Pass
Pendulum Deceleration at 30ms	12.5	18.5	g's	16.83	Pass
Max. Pendulum Deceleration After 30ms	0	29	g's	26.5	Pass
Pendulum Deceleration Time to 5 g's	34	42	ms	36.7	Pass
Maximum D Plane Rotation	64	78	deg	70.7	Pass
Time to Maximum Rotation	57	64	ms	58.0	Pass
Rotation Decay to Zero	113	127	ms	115.1	Pass
Moment About Occipital Condyle	88.1	108.4	Nm	92.30	Pass
Time to Maximum Moment	47	58	ms	53.4	Pass
Moment Decay to Zero	97	107	ms	98.7	Pass

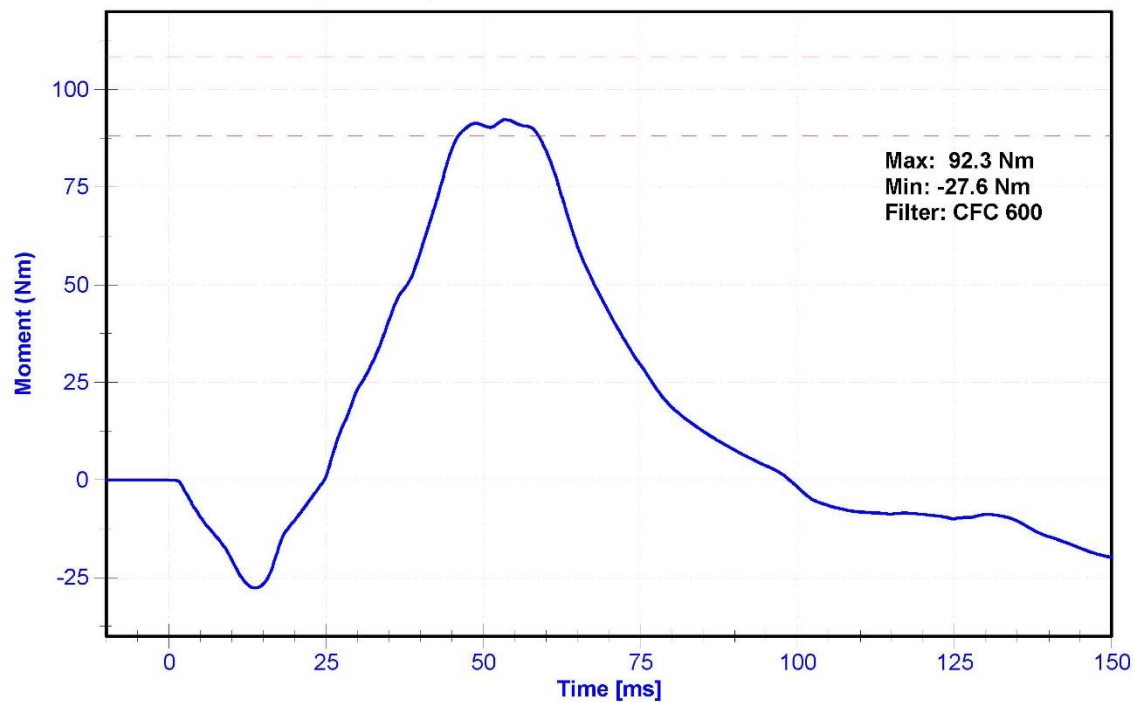
Transducer Calibrations

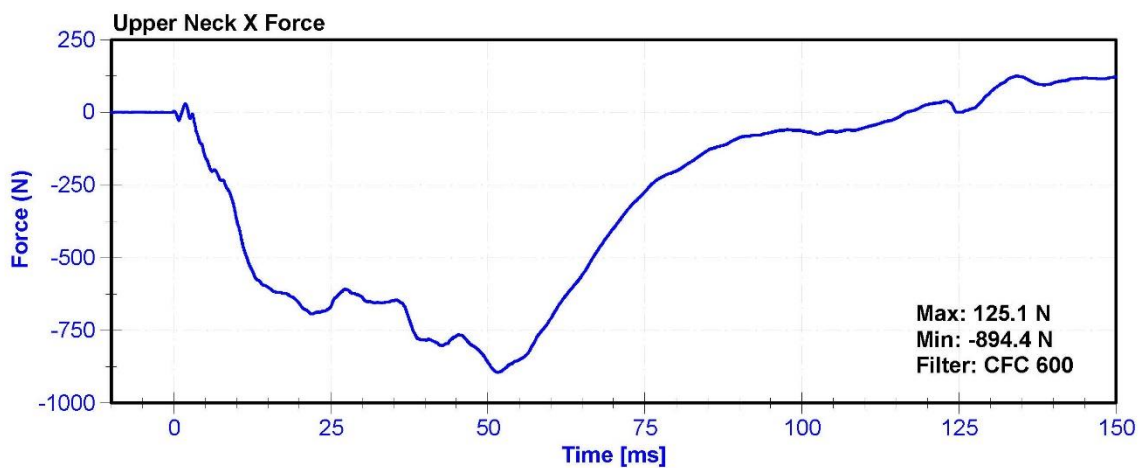
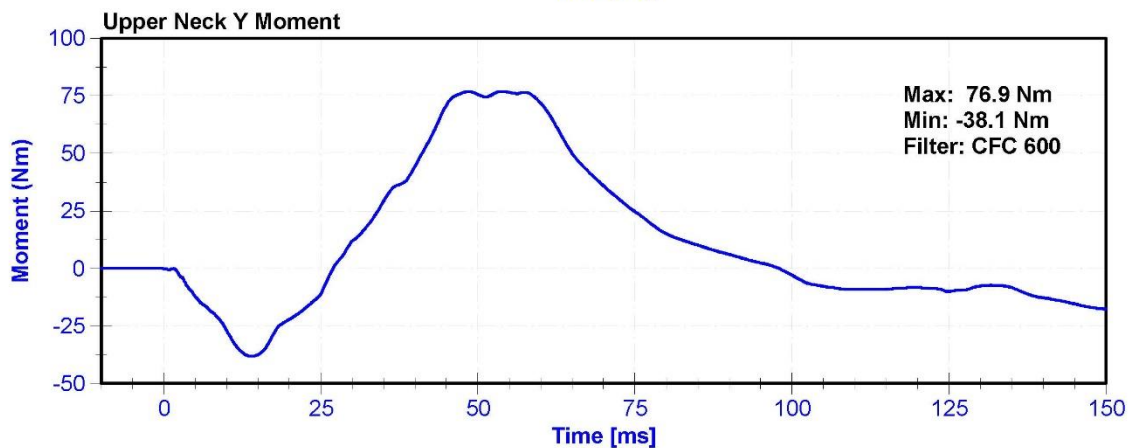
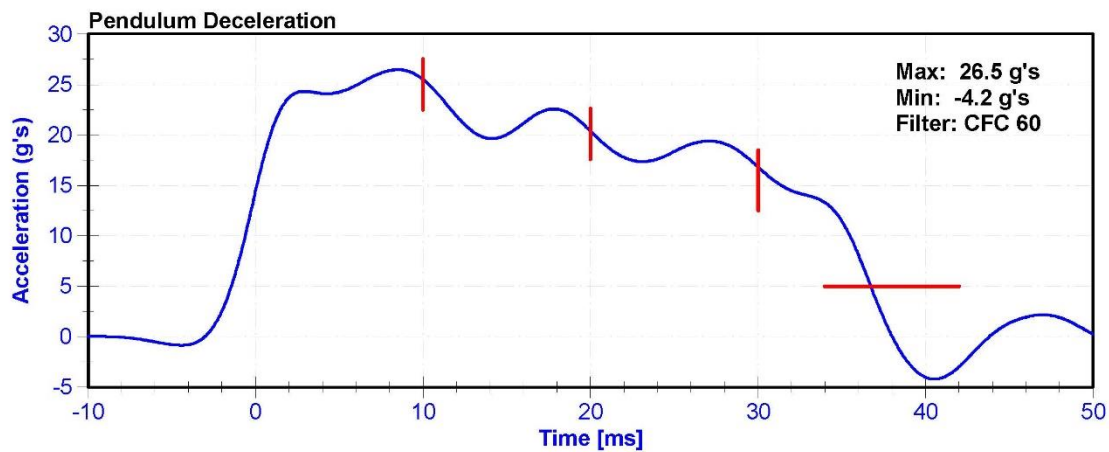
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/10/2016	5/10/2017
Pendulum Potentiometer	ETI SP22G	DS-PendPot	10/3/2016	10/3/2017
Condyle Potentiometer	ETI SP22G	DS-CondPot	10/3/2016	10/3/2017
Upper Neck Load Cell	DENTON 1716A	LC-2186Fx	5/24/2016	5/24/2017

D-Plane Rotation



Moment About Occipital Condyle





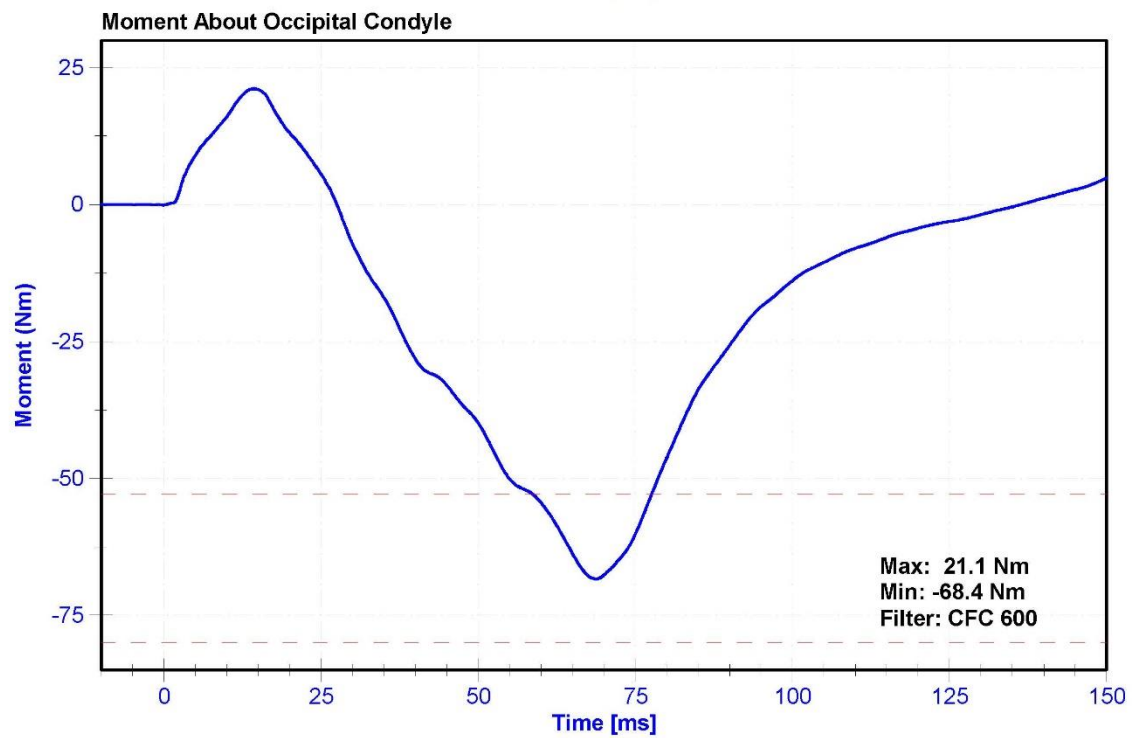
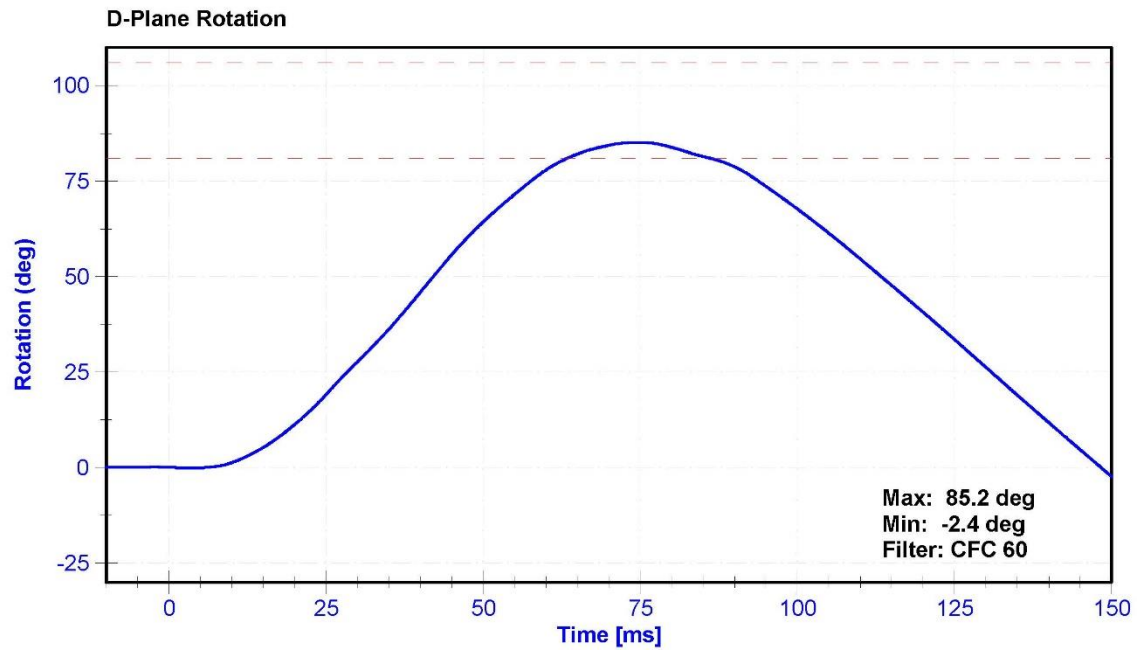
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	1046	Laboratory Supervisor	M.Goehle

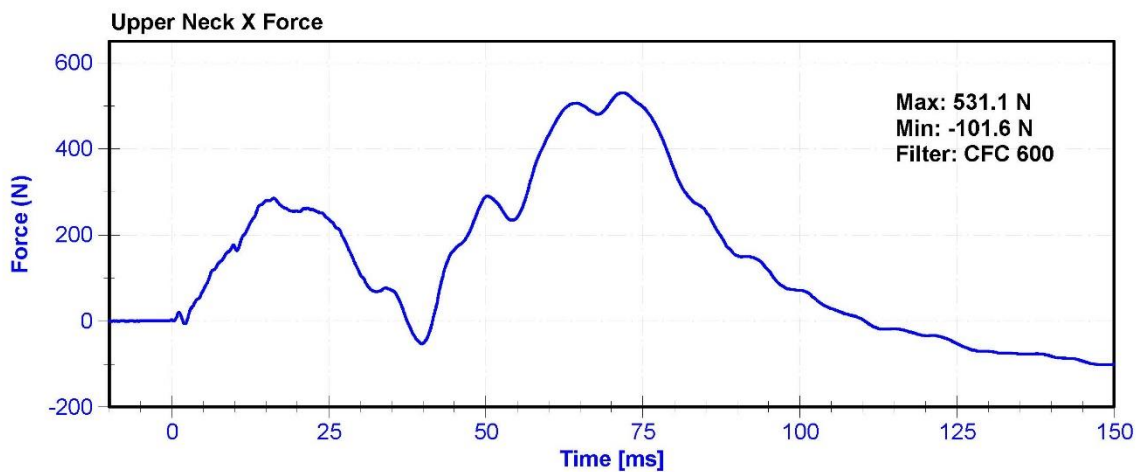
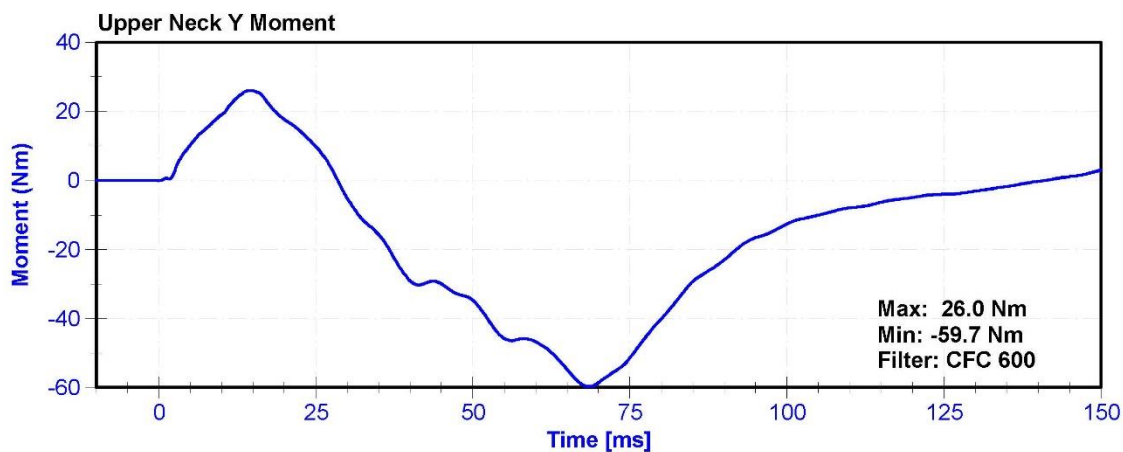
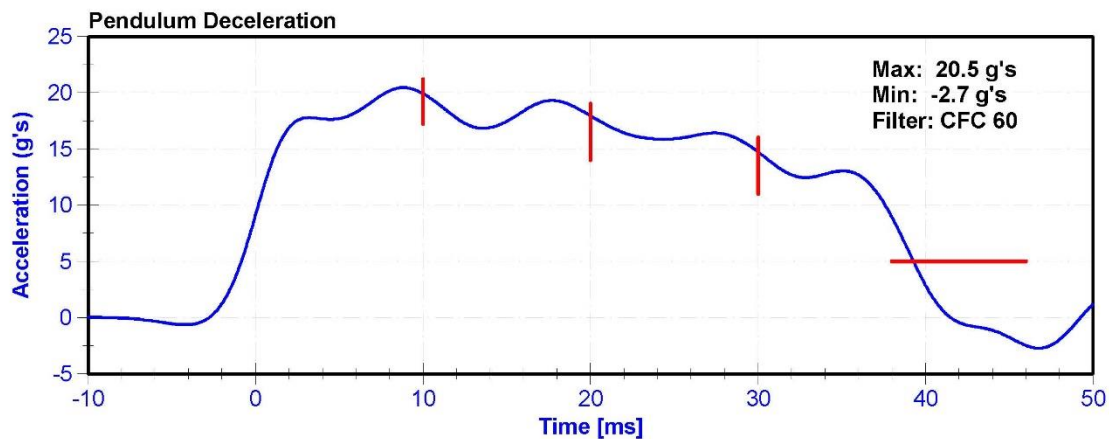
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	33.4	Pass
Velocity	5.94	6.19	m/s	6.068	Pass
Pendulum Deceleration at 10ms	17.2	21.2	g's	19.92	Pass
Pendulum Deceleration at 20ms	14	19	g's	17.9	Pass
Pendulum Deceleration at 30ms	11	16	g's	14.7	Pass
Max. Pendulum Deceleration After 30ms	0	22	g's	20.5	Pass
Pendulum Deceleration Time to 5 g's	38	46	ms	39.3	Pass
Maximum D Plane Rotation	81	106	deg	85.2	Pass
Time to Maximum Rotation	72	82	ms	74.7	Pass
Rotation Decay to Zero	147	174	ms	148.3	Pass
Minimum Moment About OC	-80	-52.9	Nm	-68.35	Pass
Time to Minimum Moment	65	79	ms	68.8	Pass
Moment Decay to Zero	120	148	ms	136.4	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	ETI SP22G	DS-PendPot	10/3/2016	10/3/2017
Condyle Potentiometer	ETI SP22G	DS-CondPot	10/3/2016	10/3/2017
Upper Neck Load Cell	DENTON 1716A	LC-2186Fx	5/24/2016	5/24/2017





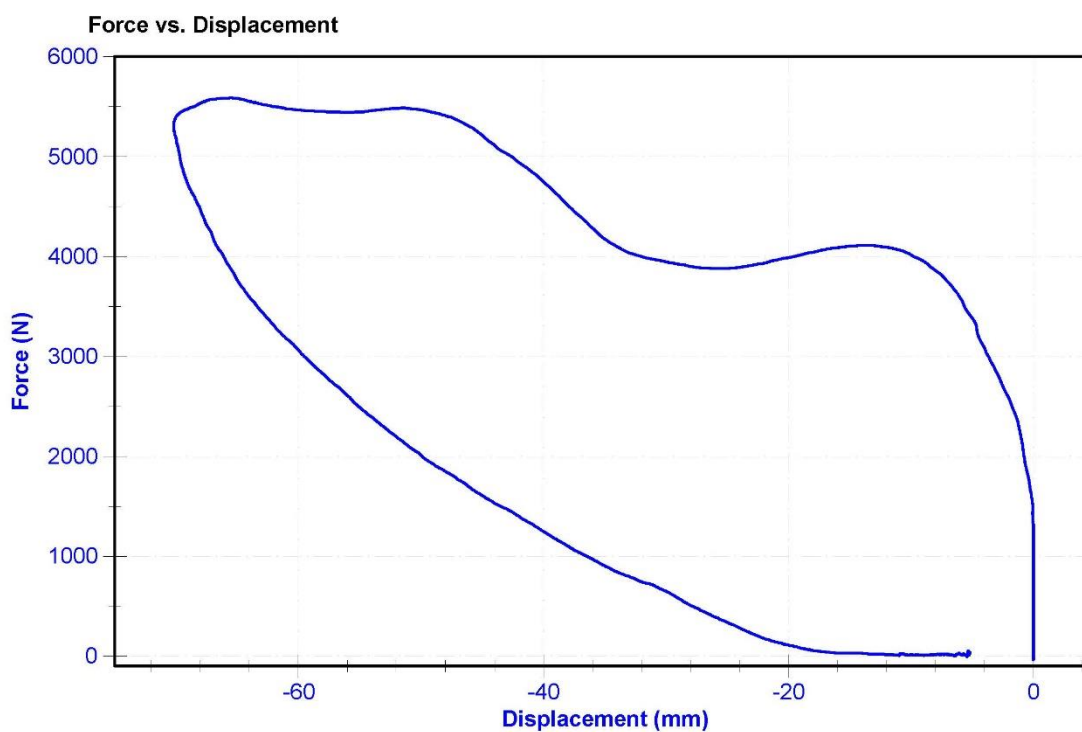
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	1046	Laboratory Supervisor	M.Goehle

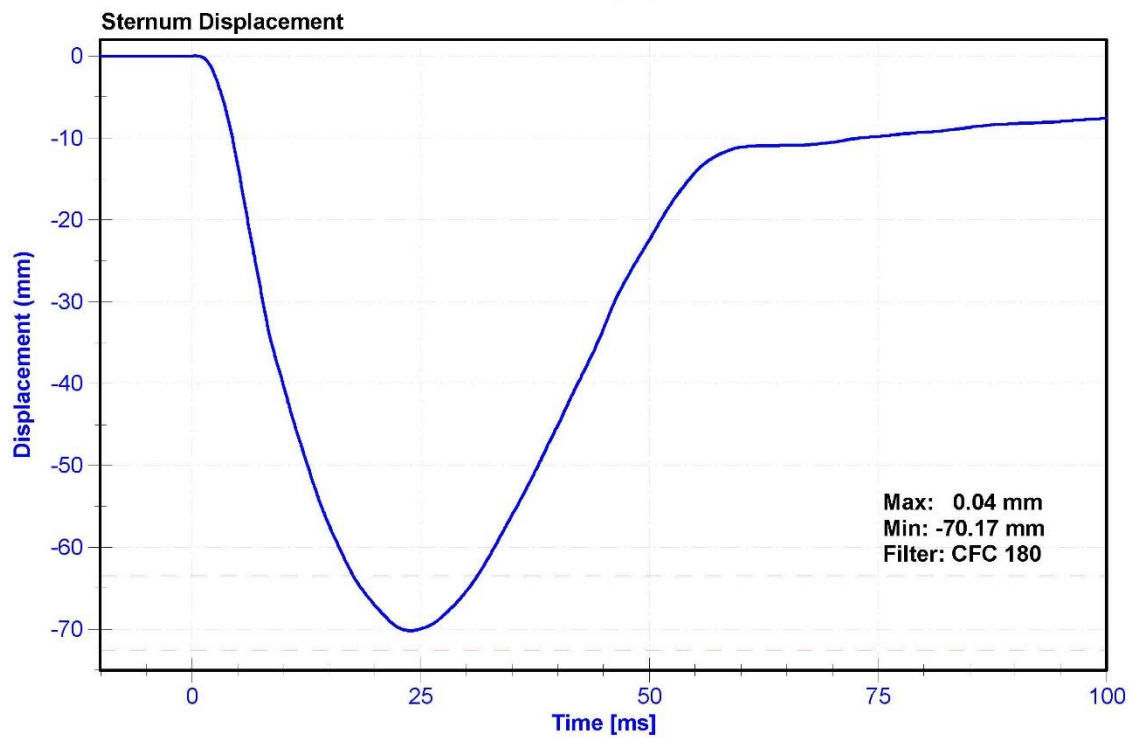
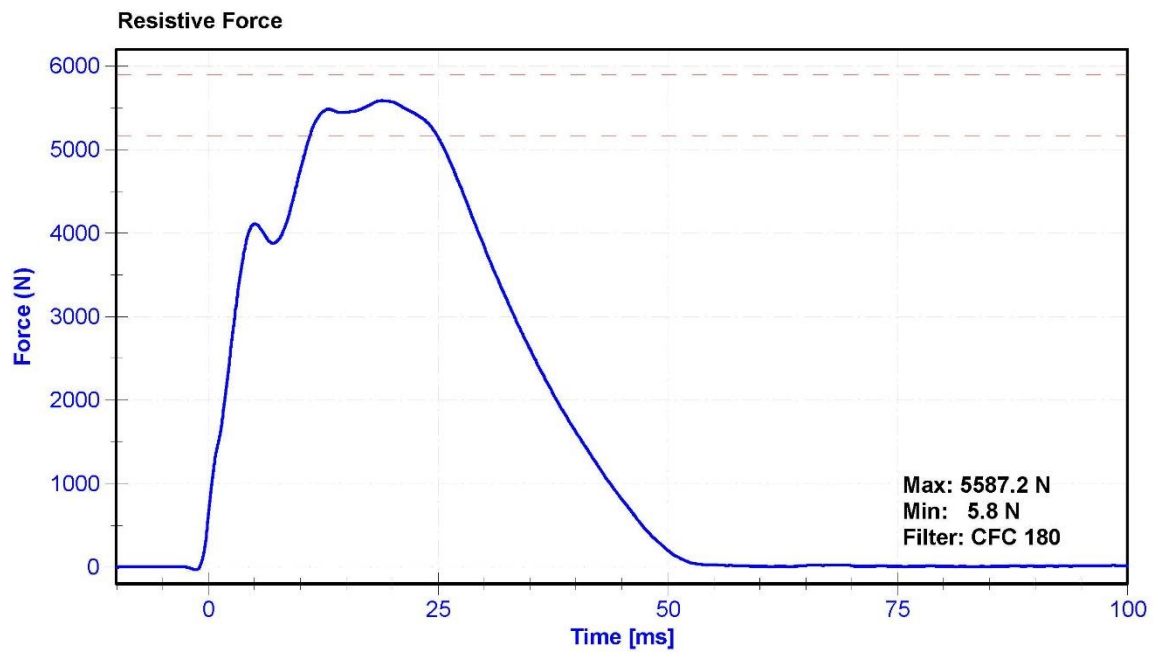
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.8	Pass
Humidity	10	70	%	37.3	Pass
Velocity	6.59	6.83	m/s	6.670	Pass
Chest Displacement	-72.6	-63.5	mm	-70.17	Pass
Resistive Force	5160	5894	N	5587.2	Pass
Hysteresis	65	85	%	70.3	Pass

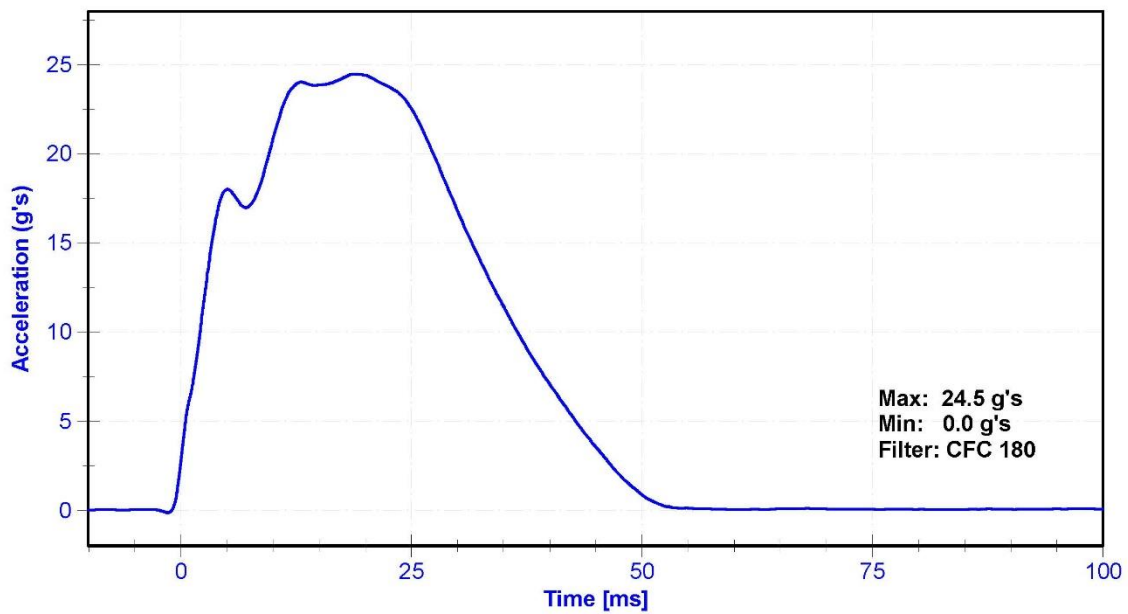
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	11/25/2016
Chest Potentiometer	Servo 14CB1-2897	DS-1046	9/19/2016	9/19/2017

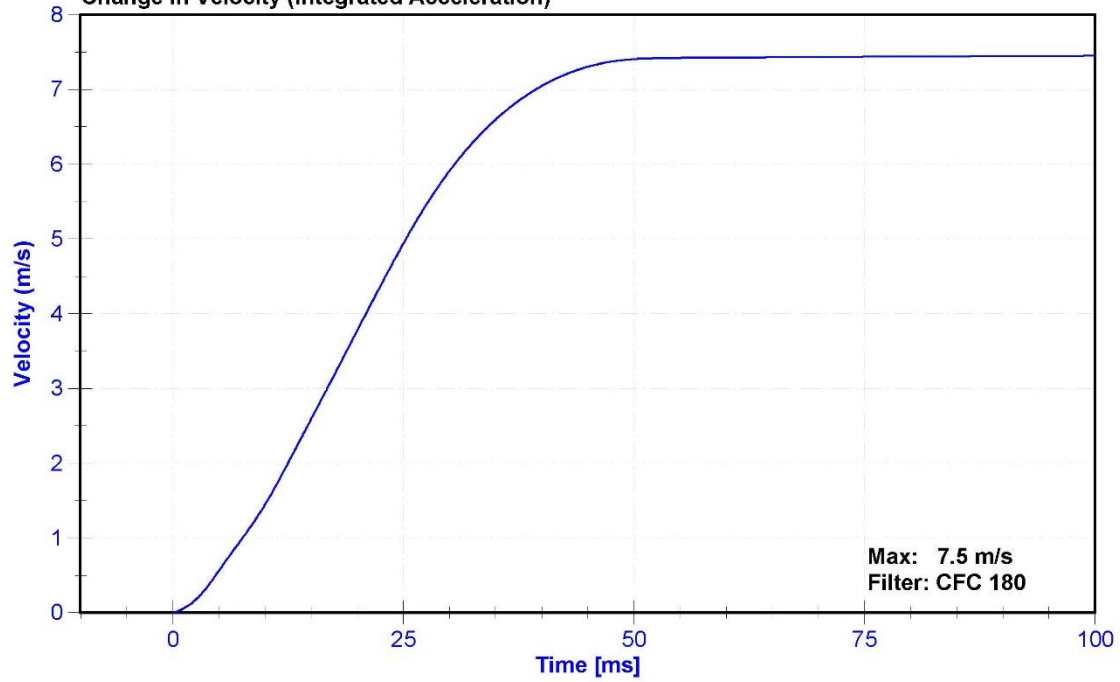




Probe Acceleration



Change in Velocity (Integrated Acceleration)



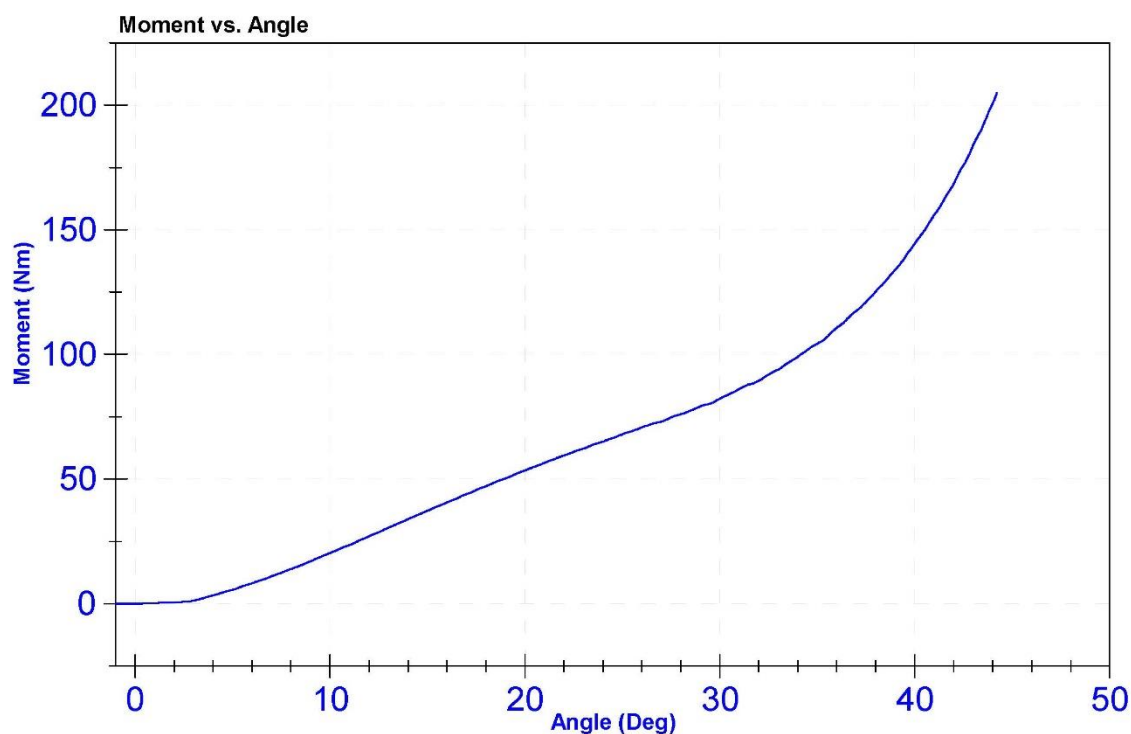
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	1046	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.8	Pass
Humidity	10	70	%	34.5	Pass
Average Velocity	5	10	deg/s	7.5	Pass
Angle at 203Nm	40	50	deg	44.1	Pass
Moment at 30 degrees	0	94.9	Nm	82.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	ETI SP22	DS-0008	4/4/2016	4/4/2017
Load Cell	Key Trans 2301-02	LC-115 My	4/21/2016	4/21/2017



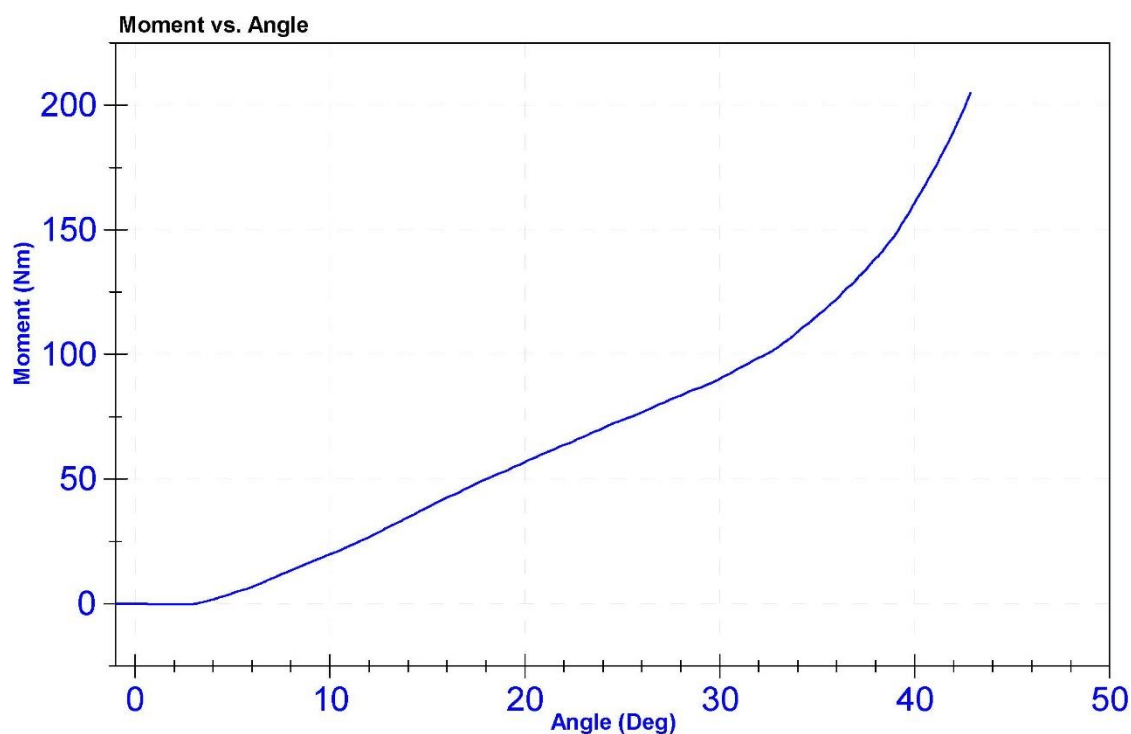
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	1046	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.8	Pass
Humidity	10	70	%	34.5	Pass
Average Velocity	5	10	deg/s	7.3	Pass
Angle at 203Nm	40	50	deg	42.8	Pass
Moment at 30 degrees	0	94.9	Nm	90.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	ETI SP22	DS-0008	4/4/2016	4/4/2017
Load Cell	Key Trans 2301-02	LC-115 My	4/21/2016	4/21/2017



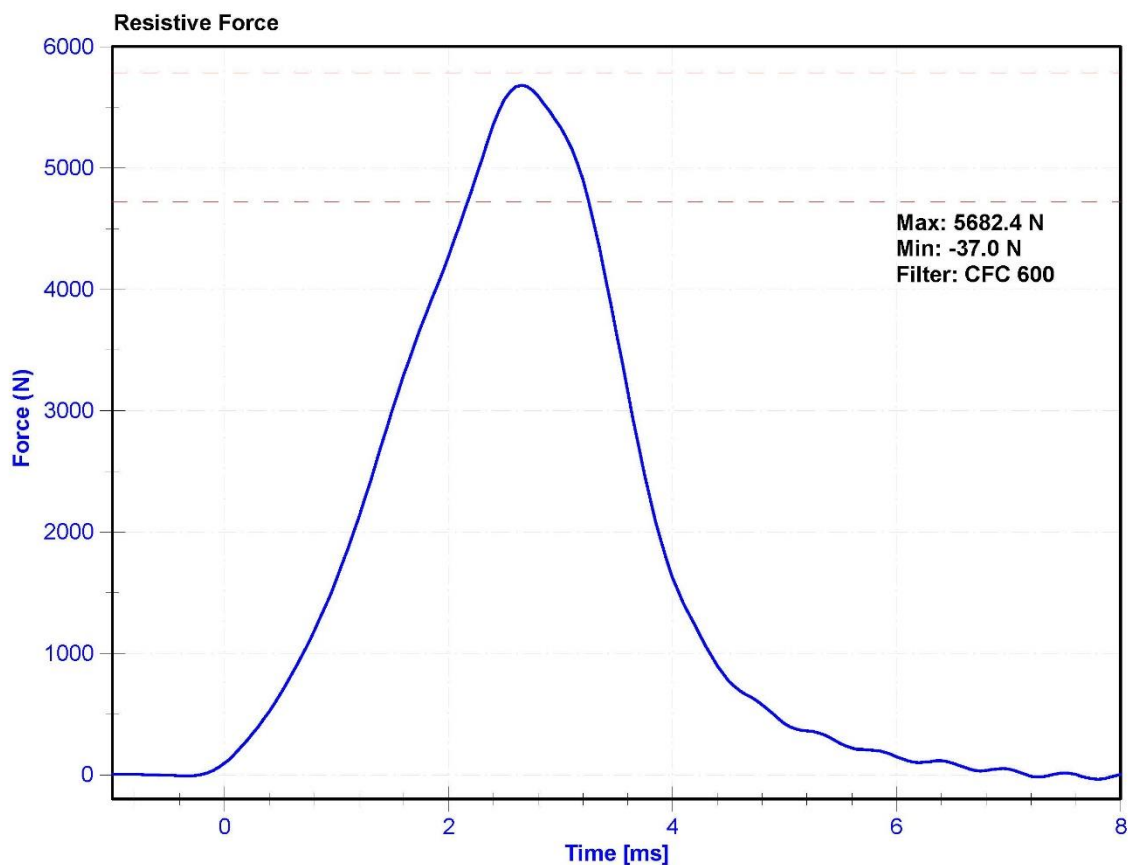
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	1046	Laboratory Supervisor	M. Goehle

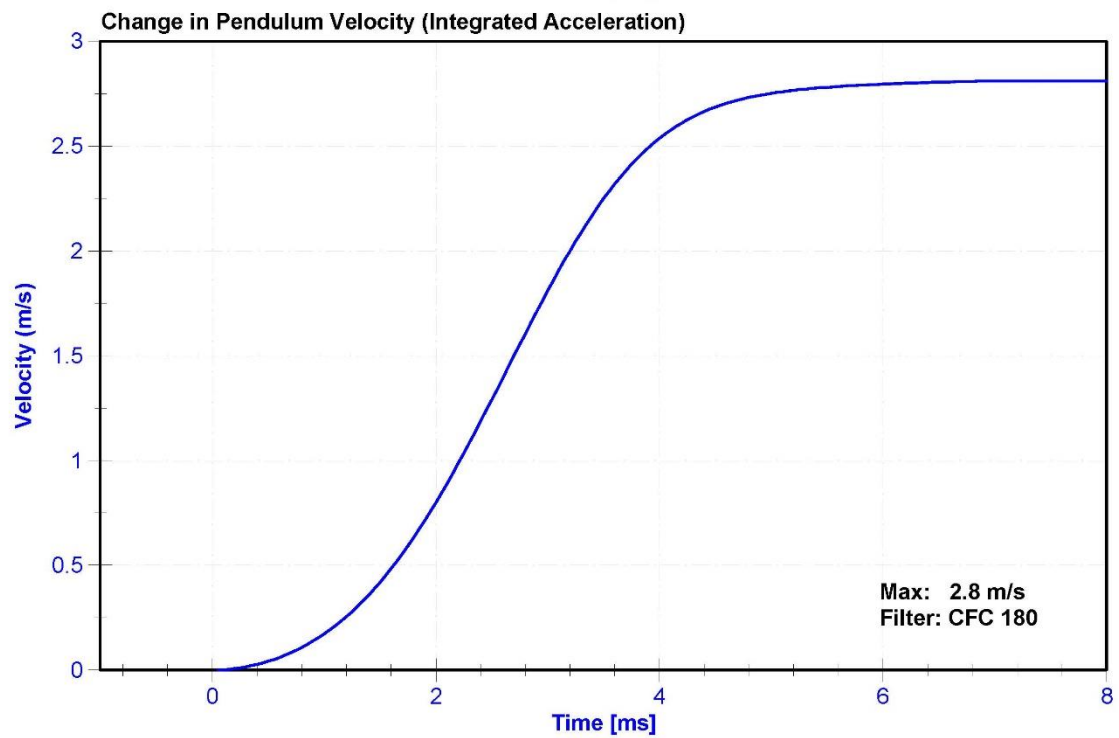
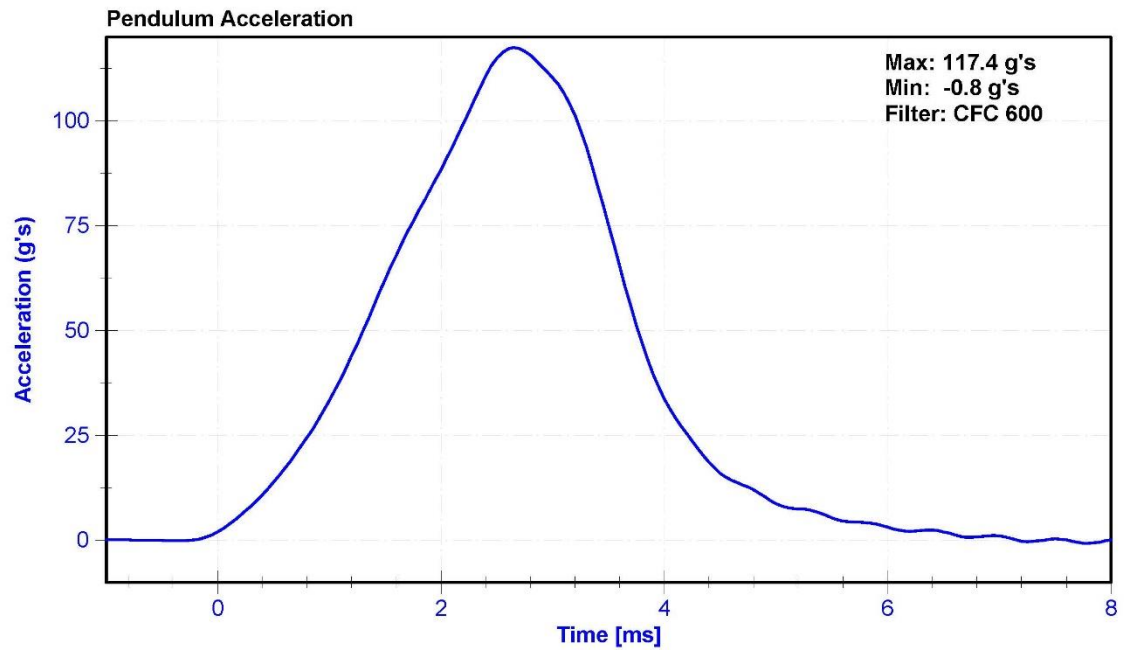
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.5	Pass
Humidity	10	70	%	35.6	Pass
Velocity	2.07	2.13	m/s	2.082	Pass
Maximum Resistive Force	4720	5780	N	5682.4	Pass

Transducer Calibrations

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





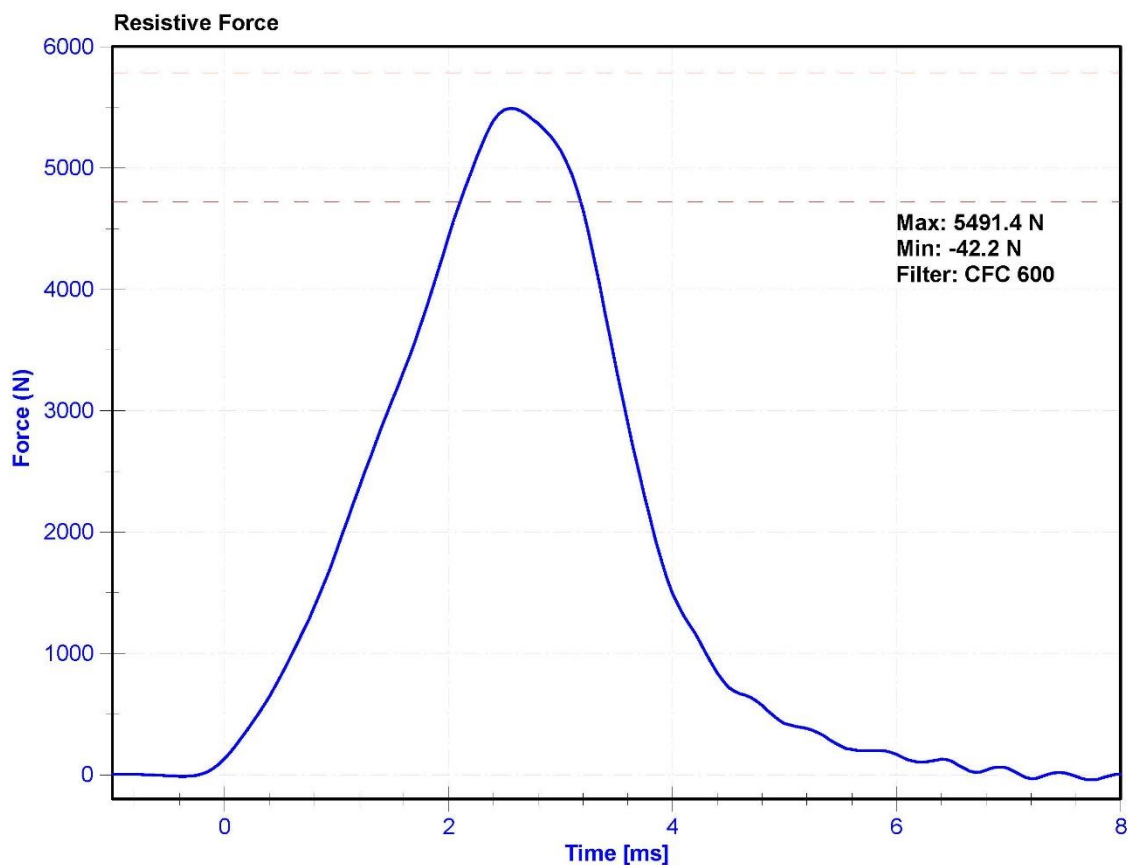
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	1046	Laboratory Supervisor	M. Goehle

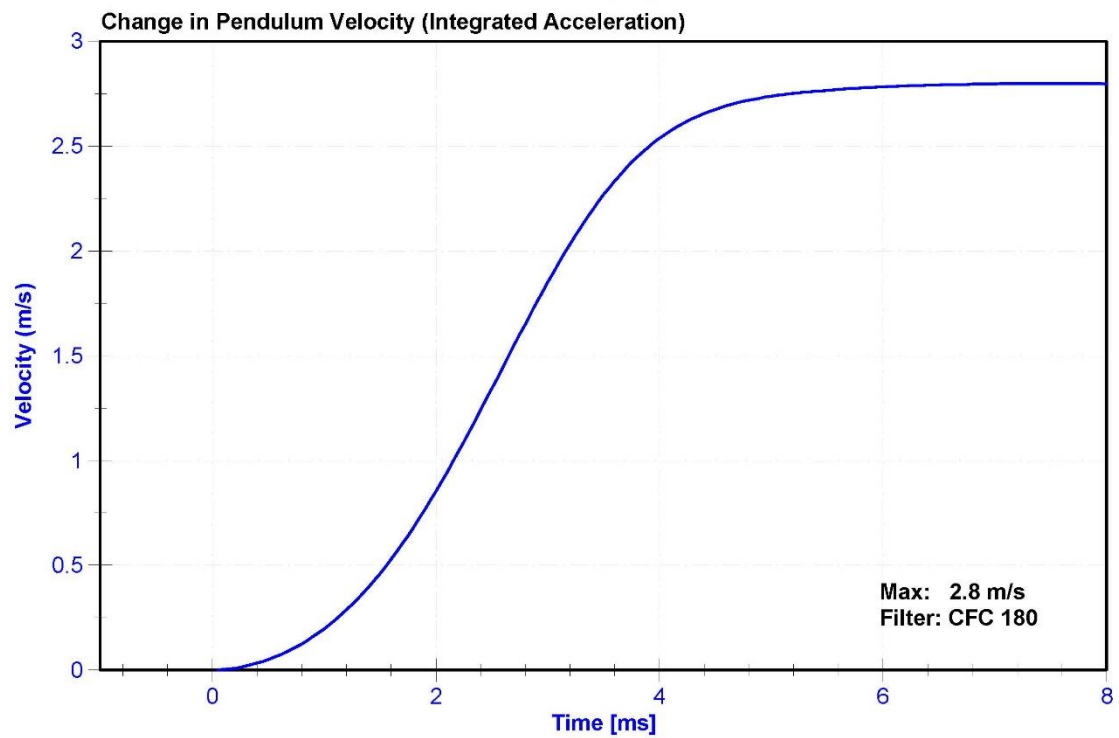
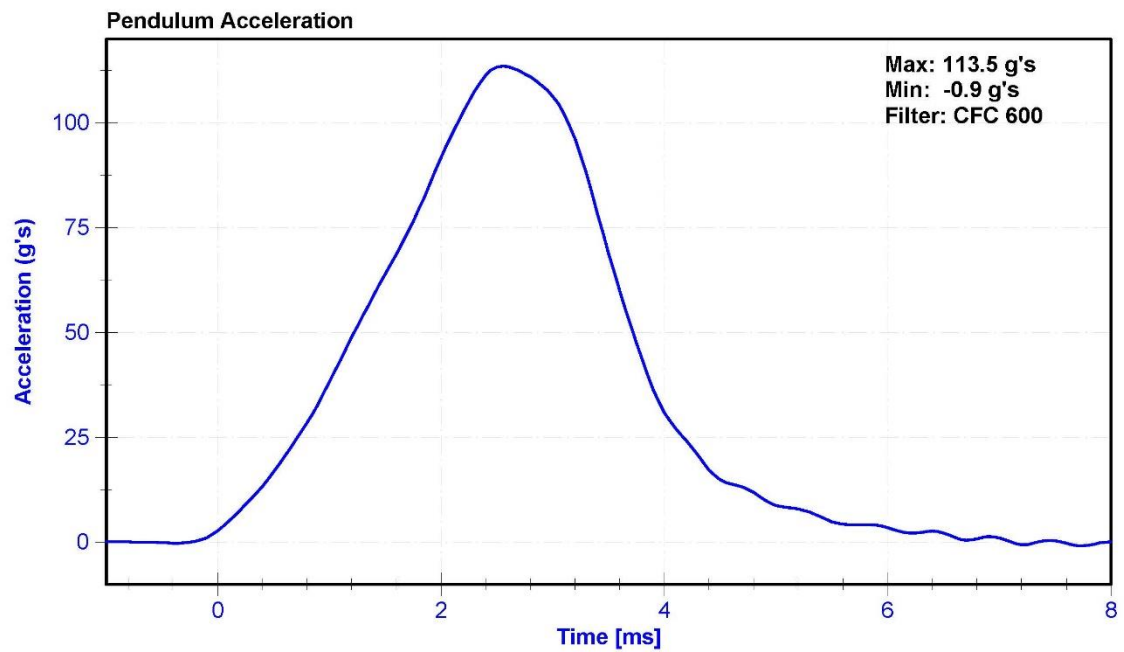
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.5	Pass
Humidity	10	70	%	36.4	Pass
Velocity	2.07	2.13	m/s	2.082	Pass
Maximum Resistive Force	4720	5780	N	5491.4	Pass

Transducer Calibrations

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





CALIBRATION TEST RESULTS

PRE-TEST

HYBRID III 5TH PERCENTILE - PASSENGER ATD

SERIAL NO: 288

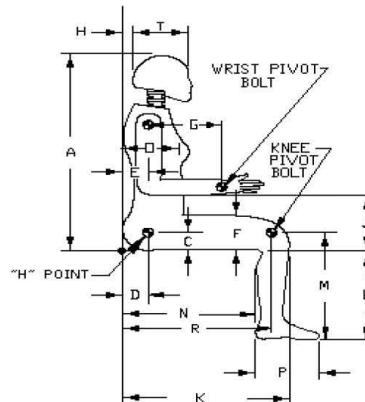
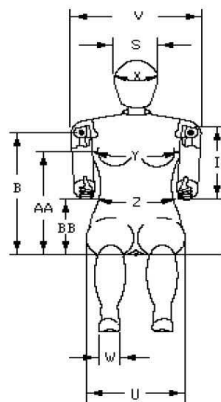


External Measurements - Hybrid 3 - 5th Female

Technician: MKG

Date: 11/10/2016

Dummy Serial Number: 288



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	775	800	780	Pass
B	Shoulder Pivot Height	432	457	441	Pass
C	H-Point Height	81	86	83	Pass
D	H-Point from Backline	145	150	147	Pass
E	Shoulder Pivot from Backline	69	84	76	Pass
F	Thigh Clearance	119	135	124	Pass
G	Back of Elbow to Wrist Pivot	244	259	250	Pass
H	Head Back to Backline	43	48	46	Pass
I	Shoulder to Elbow Length	277	297	283	Pass
J	Elbow Rest Height	183	203	188	Pass
K	Buttock to Knee Length	521	546	542	Pass
L	Popliteal Height	356	376	363	Pass
M	Knee Pivot Height	394	419	398	Pass
N	Buttock Popliteal Length	414	439	429	Pass
O	Chest Depth without Jacket	175	191	180	Pass
P	Foot Length (right)	219	234	220	Pass
R	Buttock To Knee Pivot Length	457	483	462	Pass
S	Head Breadth	137	147	142	Pass
T	Head Depth	178	188	180	Pass
U	Hip Breadth	300	315	304	Pass
V	Shoulder Breadth	351	366	362	Pass
W	Foot Breadth	79	94	84	Pass
X	Head Circumference	528	549	536	Pass
Y	Chest Circumference with Jacket	851	881	853	Pass
Z	Waist Circumference	460	790	779	Pass
AA	Reference Location (Chest Circumference)	333	358	345	Pass
BB	Reference Location (Waist Circumference)	160	170	165	Pass

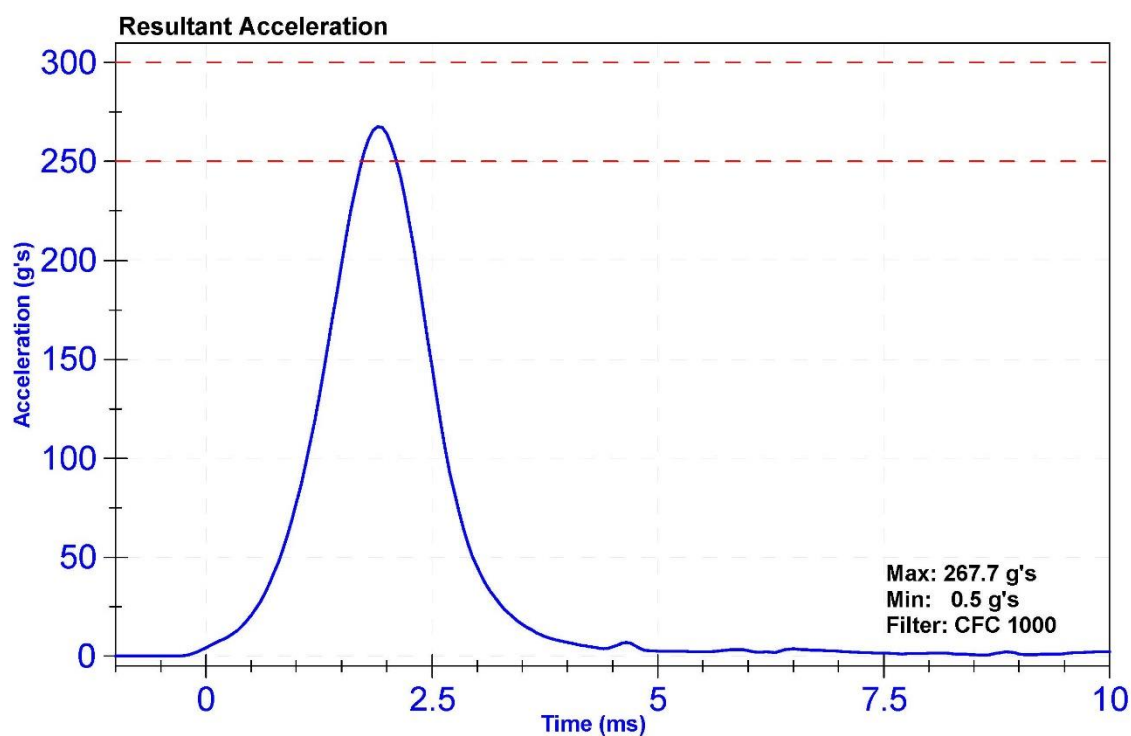
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	288	Laboratory Supervisor	M. Goehle

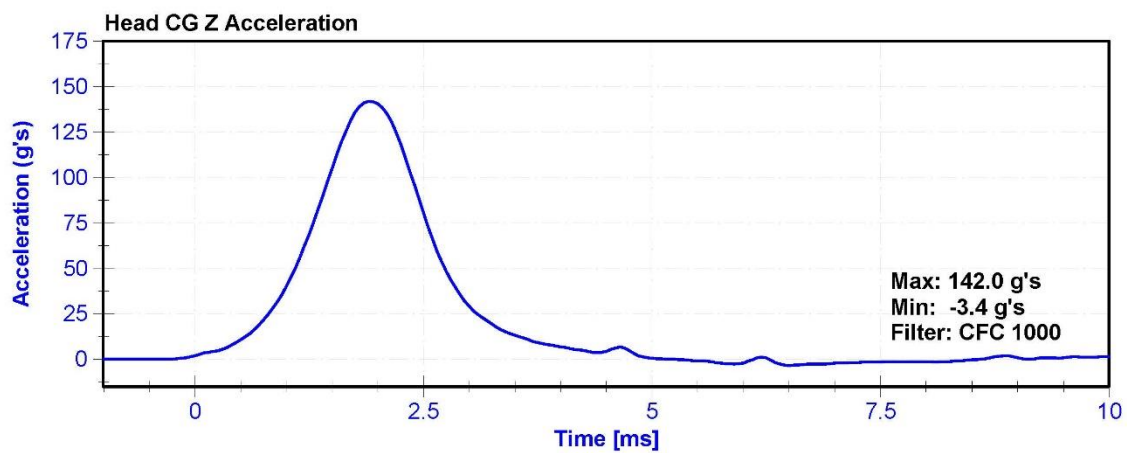
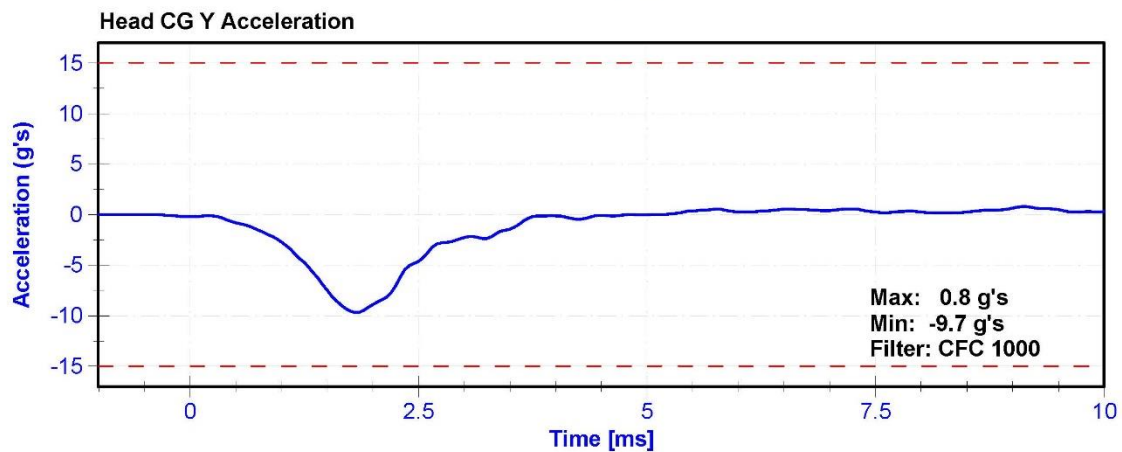
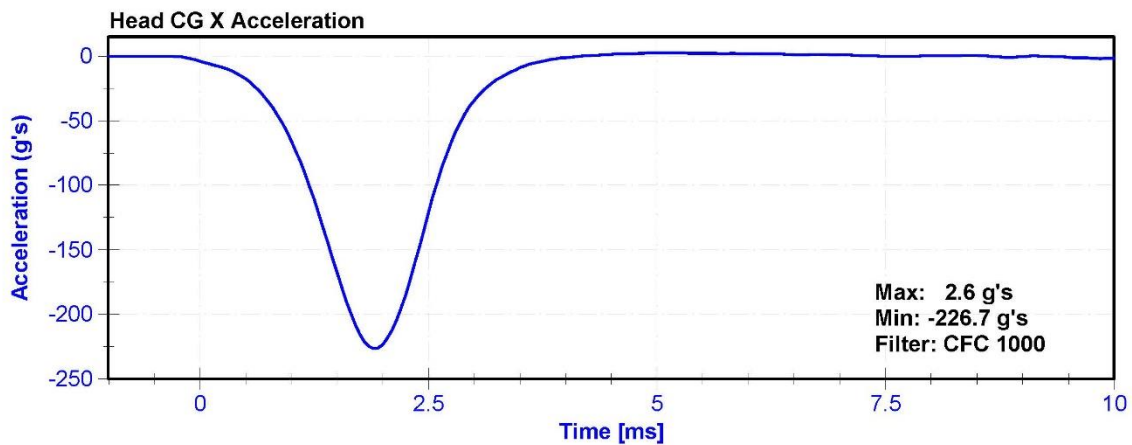
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.7	Pass
Humidity	10	70	%	36	Pass
Resultant Acceleration	250	300	g's	267.7	Pass
Oscillation	0	10	%	2.5	Pass
Lateral Acceleration	-15	15	g's	-9.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264	AC-P80337	10/3/2016	4/3/2017
Y Accelerometer	ENDEVCO 7264CT	AC-P80265	10/3/2016	4/3/2017
Z Accelerometer	ENDEVCO 7264CT	AC-P83418	10/3/2016	4/3/2017





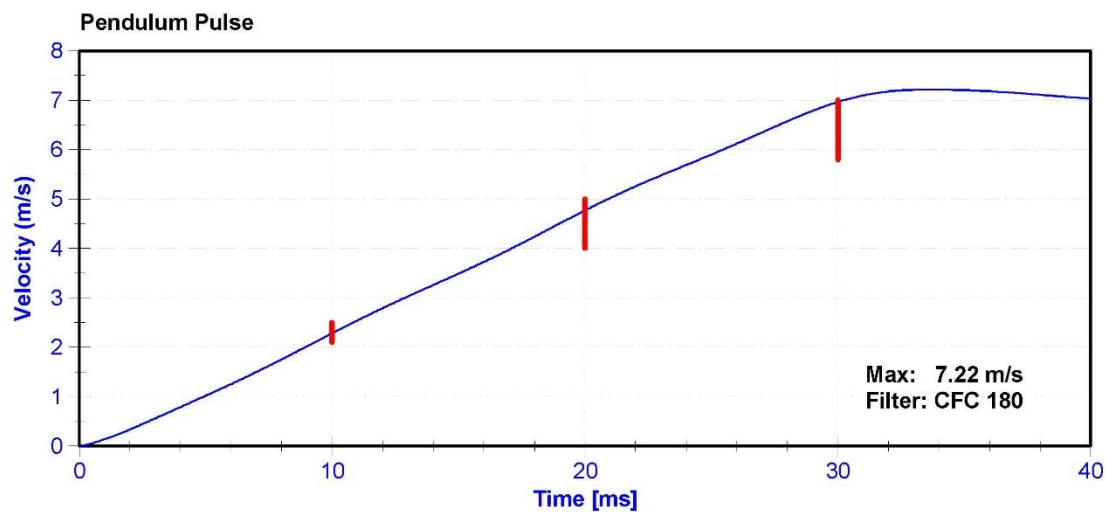
ATD Manufacturer	FTSS	Test Technician	S. Keller
ATD Serial Number	288	Laboratory Supervisor	M. Goehle

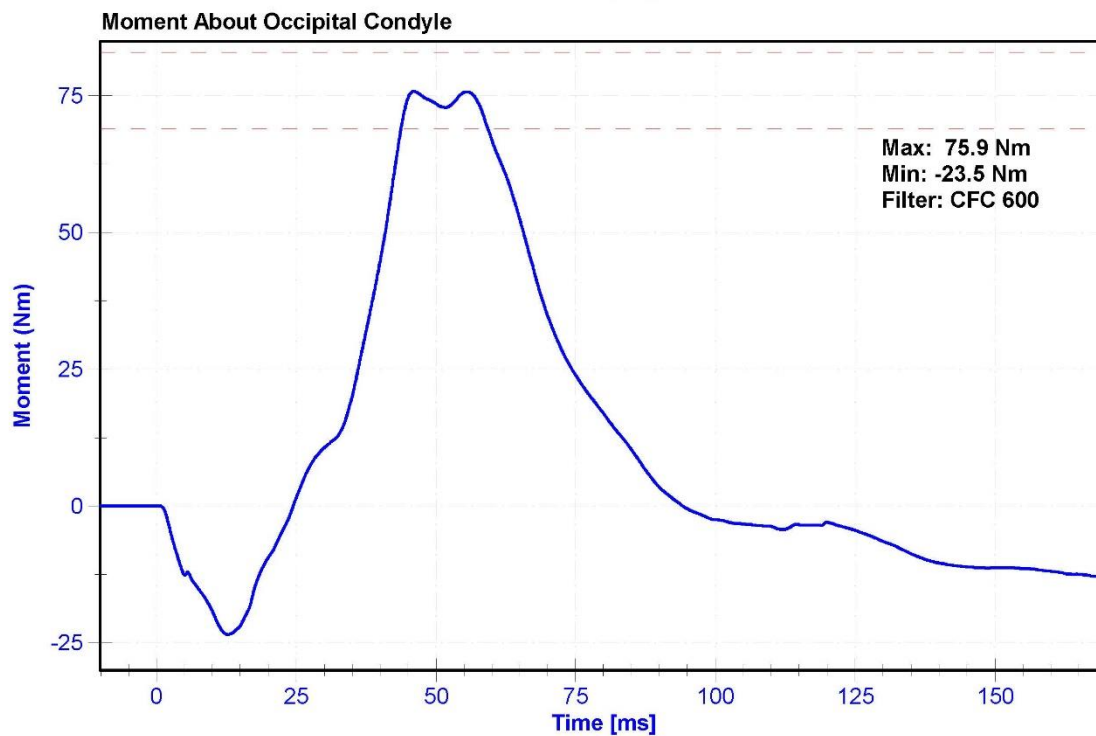
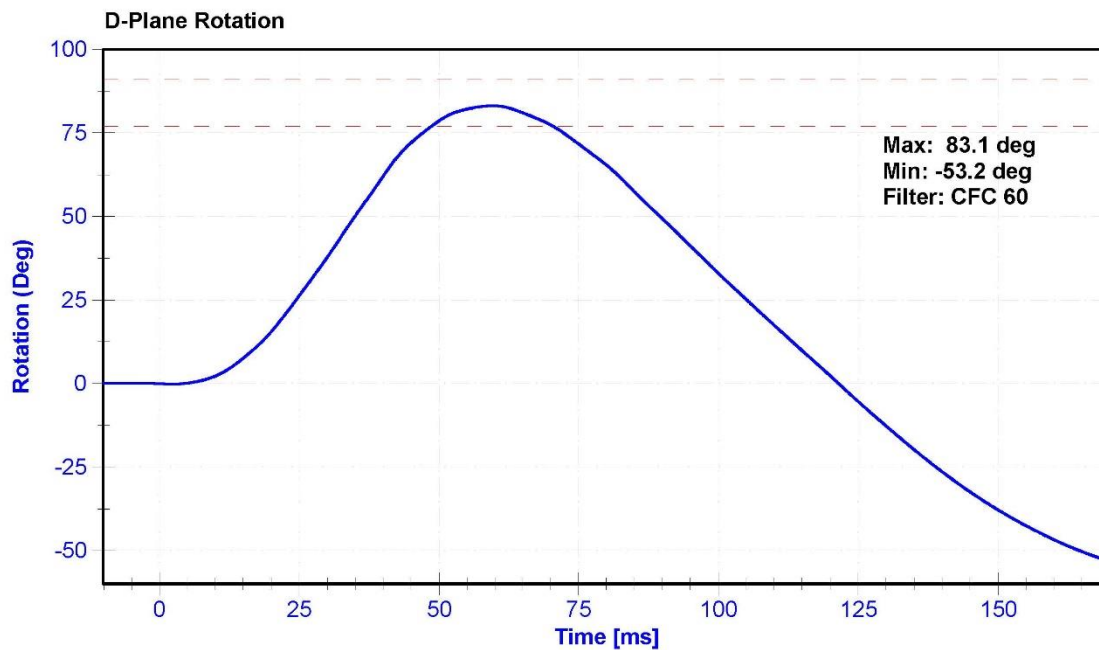
Results

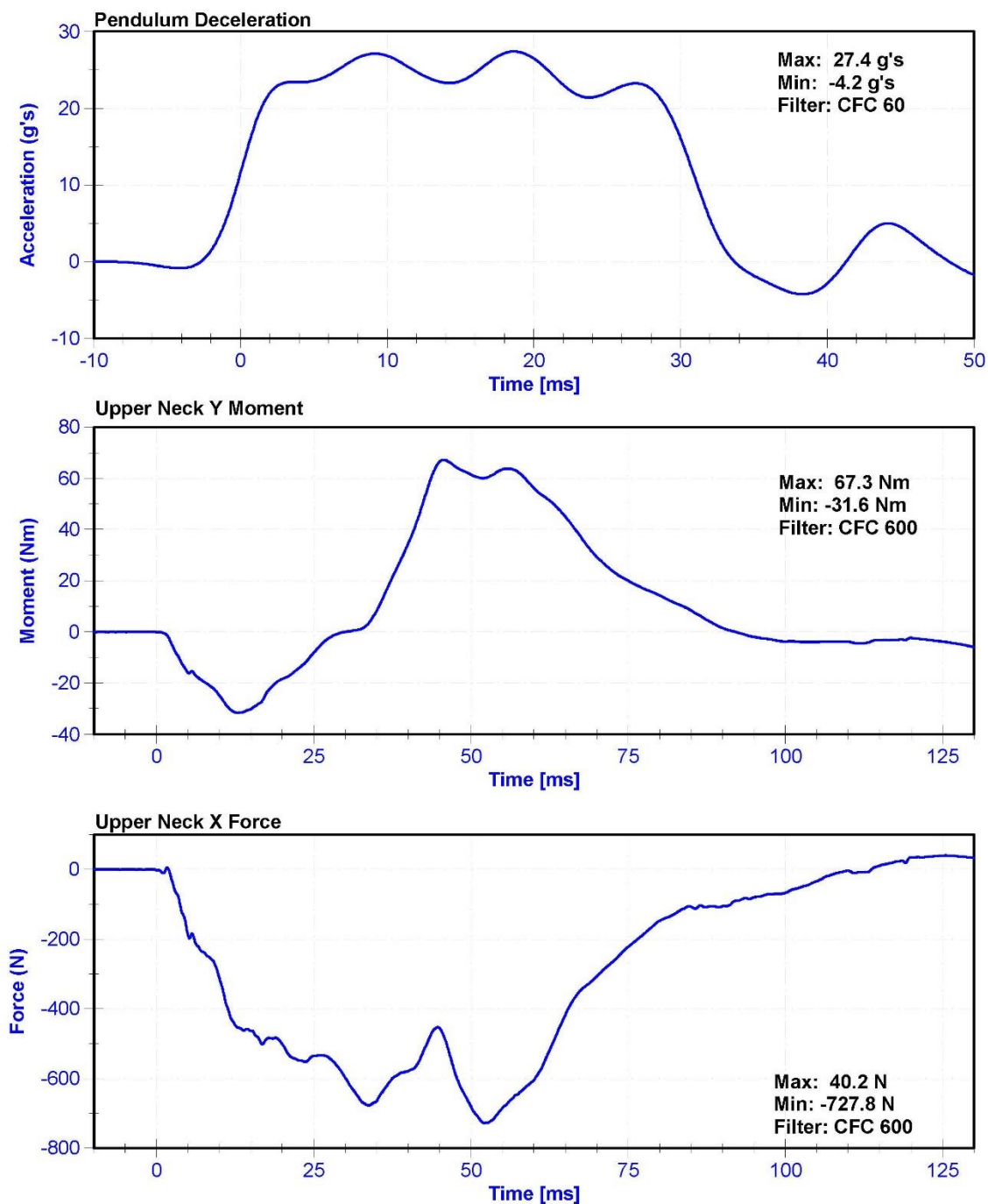
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	41.4	Pass
Velocity	6.89	7.13	m/s	7.037	Pass
Pendulum Impulse at 10ms	2.1	2.5	m/s	2.28	Pass
Pendulum Impulse at 20ms	4.0	5.0	m/s	4.77	Pass
Pendulum Impulse at 30ms	5.8	7.0	m/s	6.96	Pass
Max D Plane Rotation	77	91	deg	83.1	Pass
Max Moment During Rotation Interval	69	83	Nm	75.9	Pass
Moment Decay to 10.0 Nm	80	100	ms	85.2	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	ETI SP22G	DS-PendPot	10/3/2016	10/3/2017
Condyle Potentiometer	ETI SP22G	DS-CondPot	10/3/2016	10/3/2017
Upper Neck Load Cell	DENTON 1716A	LC-2206Fx	5/24/2016	5/24/2017







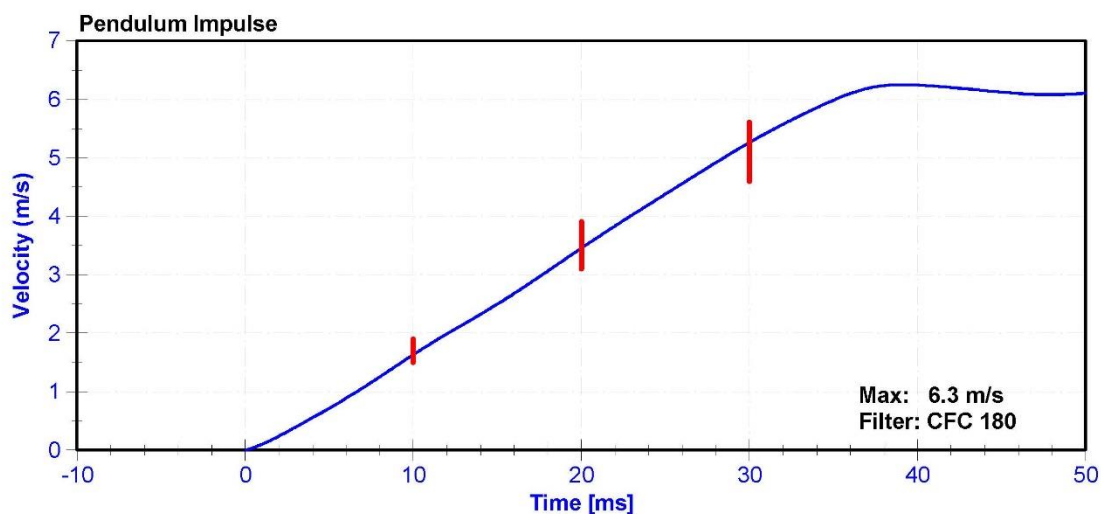
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	288	Laboratory Supervisor	M. Goehle

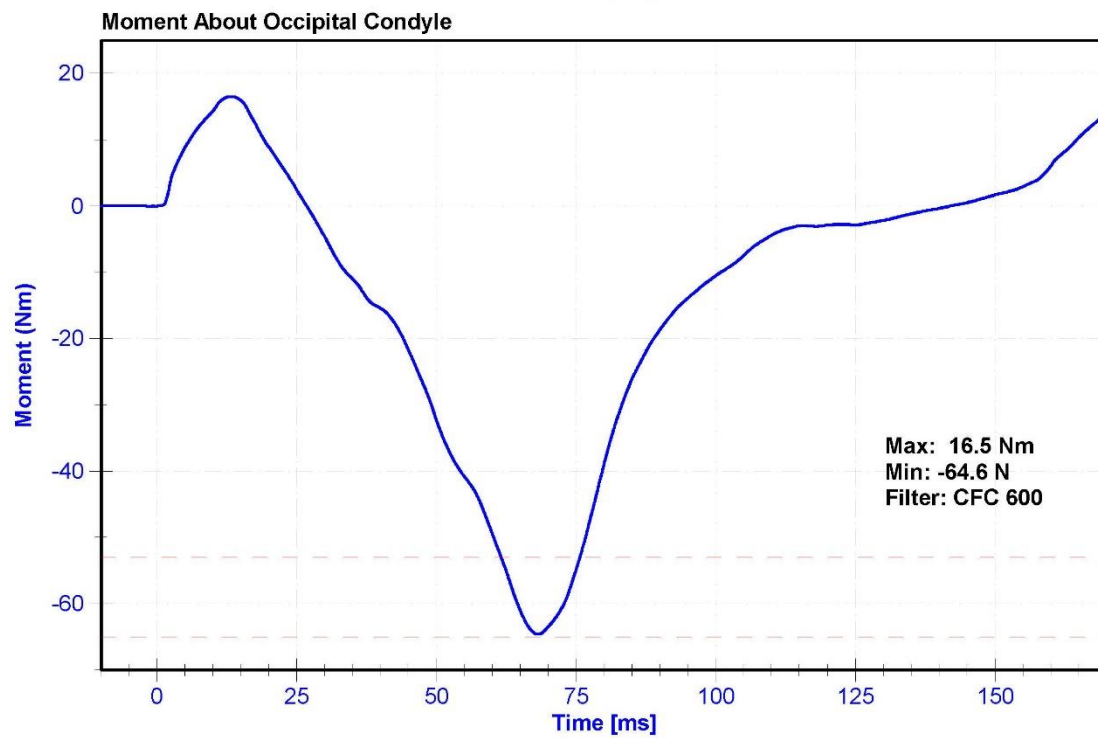
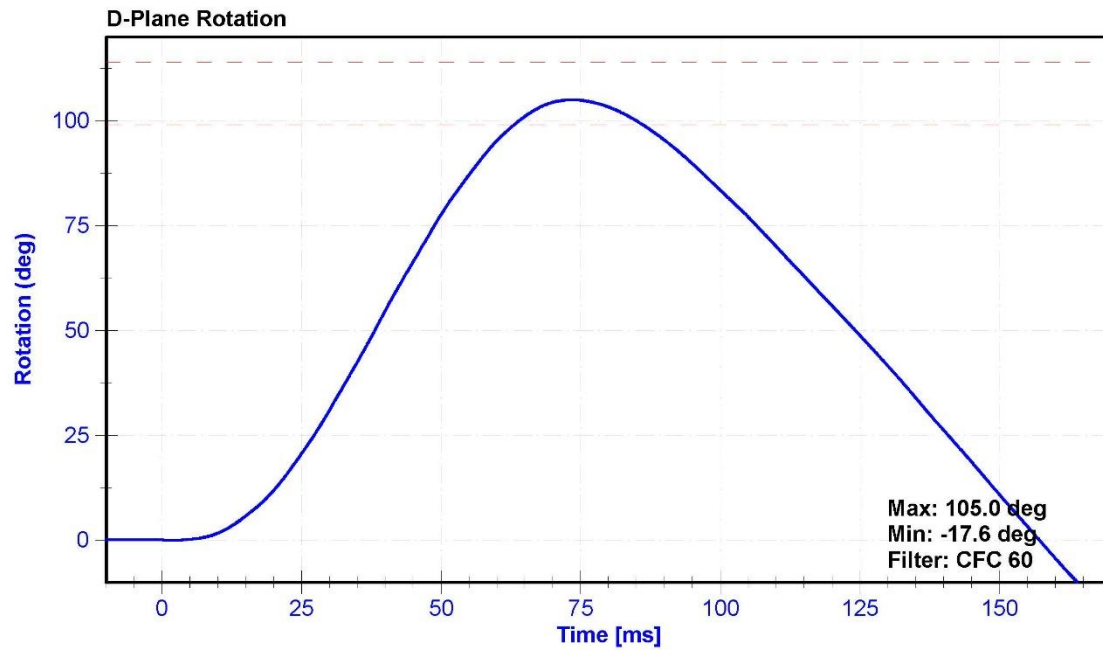
Results

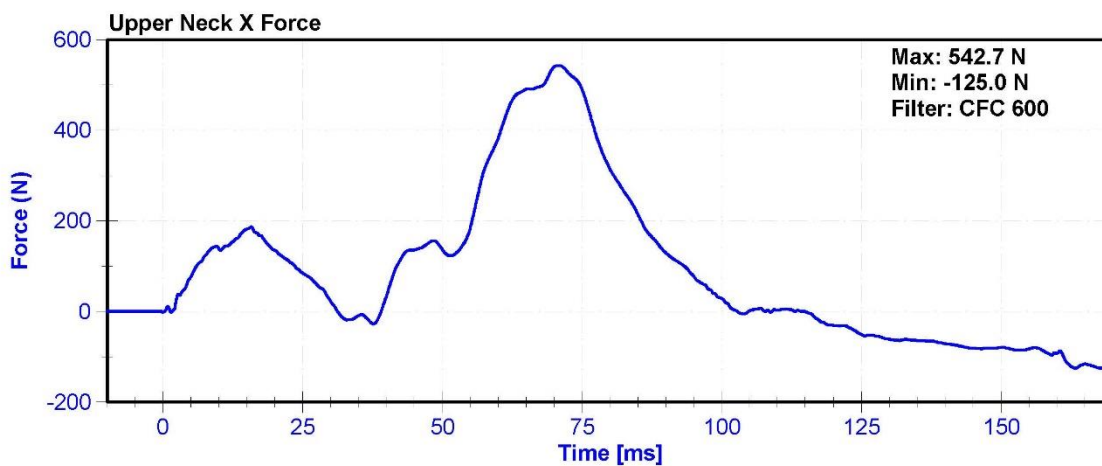
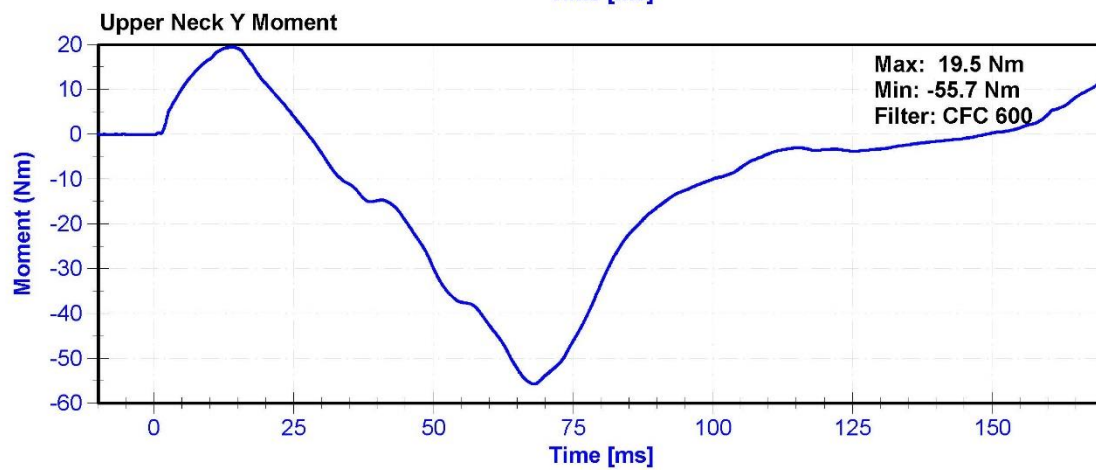
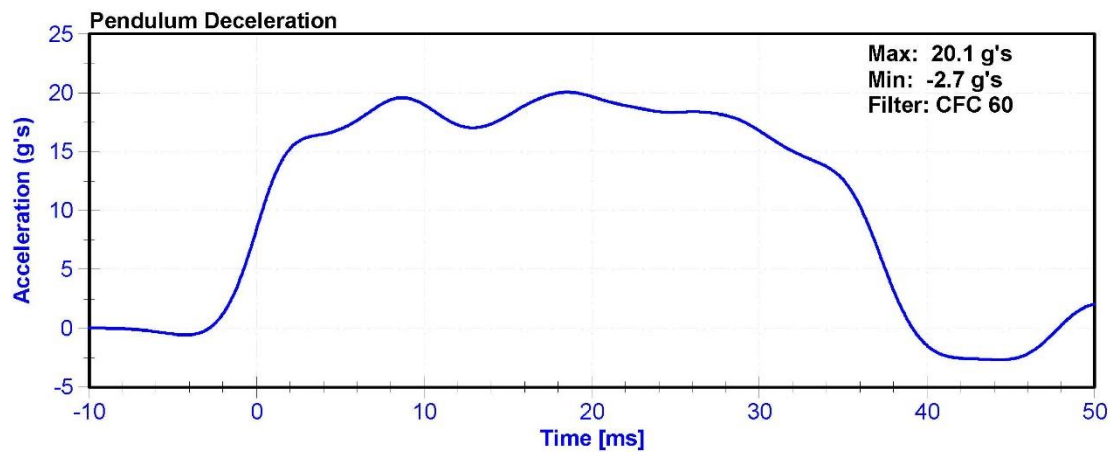
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	37.5	Pass
Velocity	5.95	6.19	m/s	6.068	Pass
Pendulum Impulse at 10ms	1.5	1.9	m/s	1.63	Pass
Pendulum Impulse at 20ms	3.1	3.9	m/s	3.45	Pass
Pendulum Impulse at 30ms	4.6	5.6	m/s	5.26	Pass
D Plane Rotation	99	114	deg	105.0	Pass
Moment During Rotation Interval	-65	-53	Nm	-64.6	Pass
Moment Decay to -10Nm	94	114	ms	101.0	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	ETI SP22G	DS-PendPot	10/3/2016	10/3/2017
Condyle Potentiometer	ETI SP22G	DS-CondPot	10/3/2016	10/3/2017
Upper Neck Load Cell	DENTON 1716A	LC-2206Fx	5/24/2016	5/24/2017







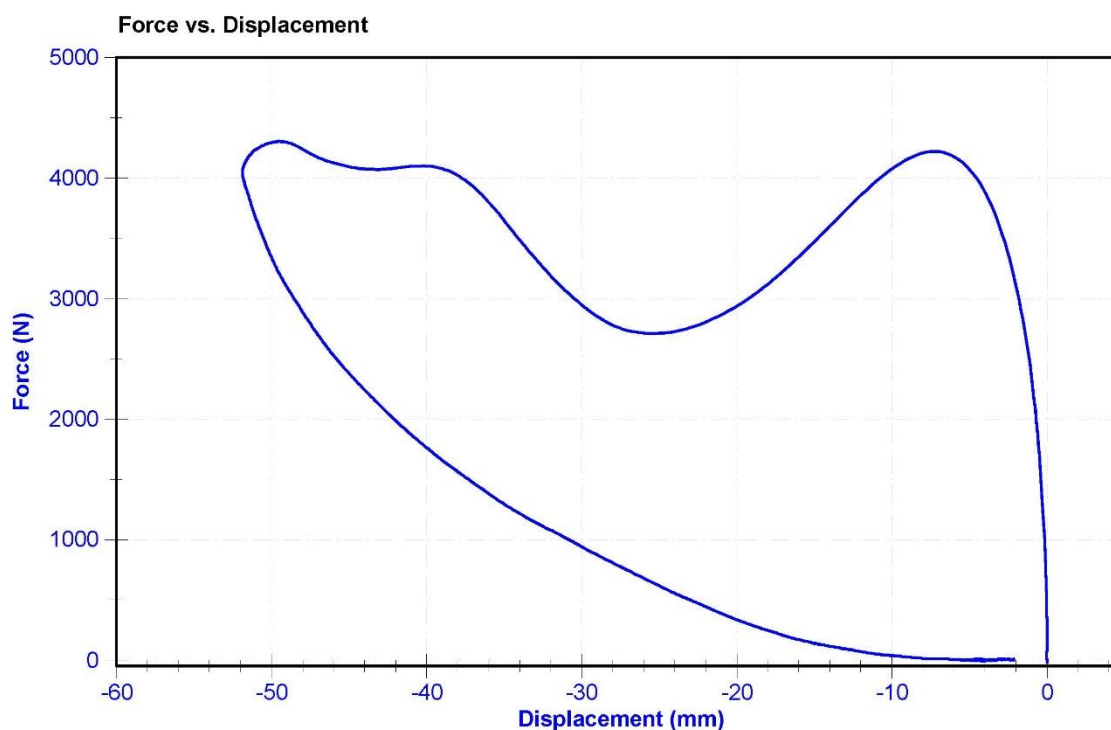
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	288	Laboratory Supervisor	M. Goehle

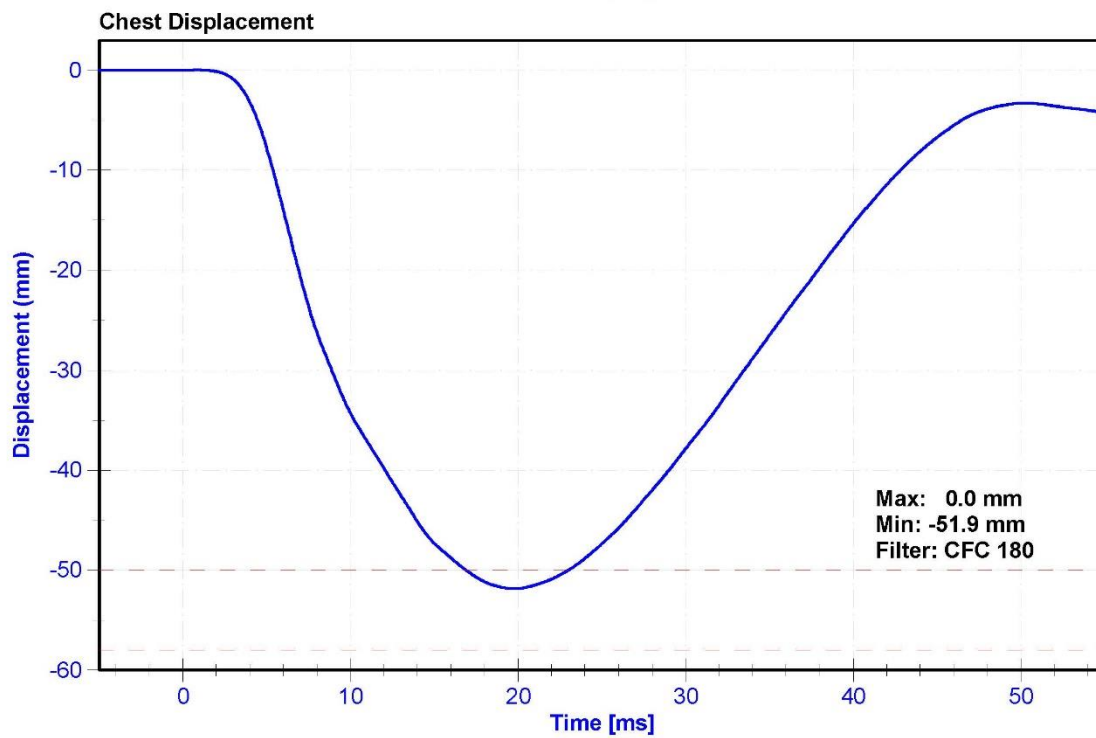
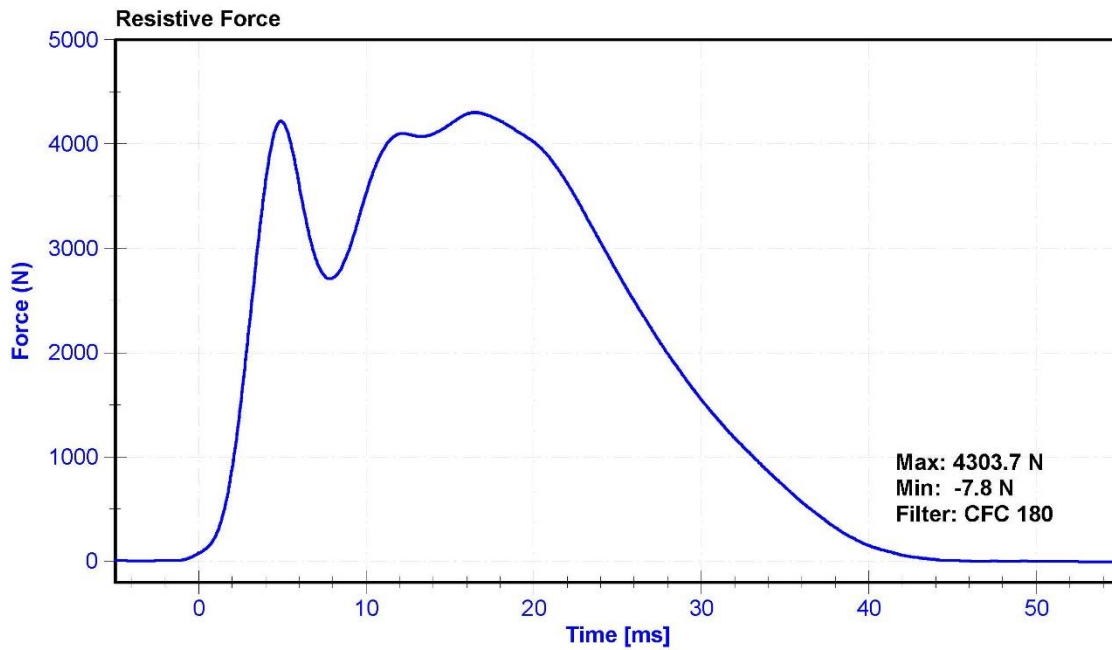
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	34.4	Pass
Velocity	6.59	6.83	m/s	6.641	Pass
Chest Deflection	-58	-50	mm	-51.9	Pass
Maximum Resistive Force (50 to 58mm)	3900	4400	N	4296.4	Pass
Maximum Resistive Force (18 to 50mm)	0	4600	N	4303.7	Pass
Hysteresis	69	85	%	71.7	Pass

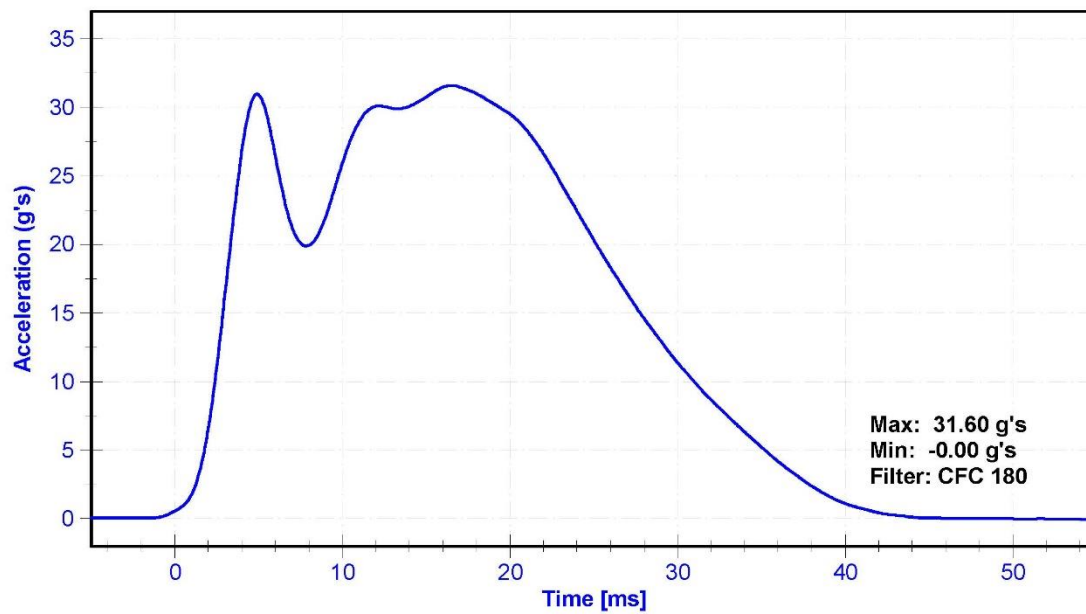
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	11/25/2016
Chest Potentiometer	SERVO 14CB1-2897	DS-288	9/30/2016	9/30/2017

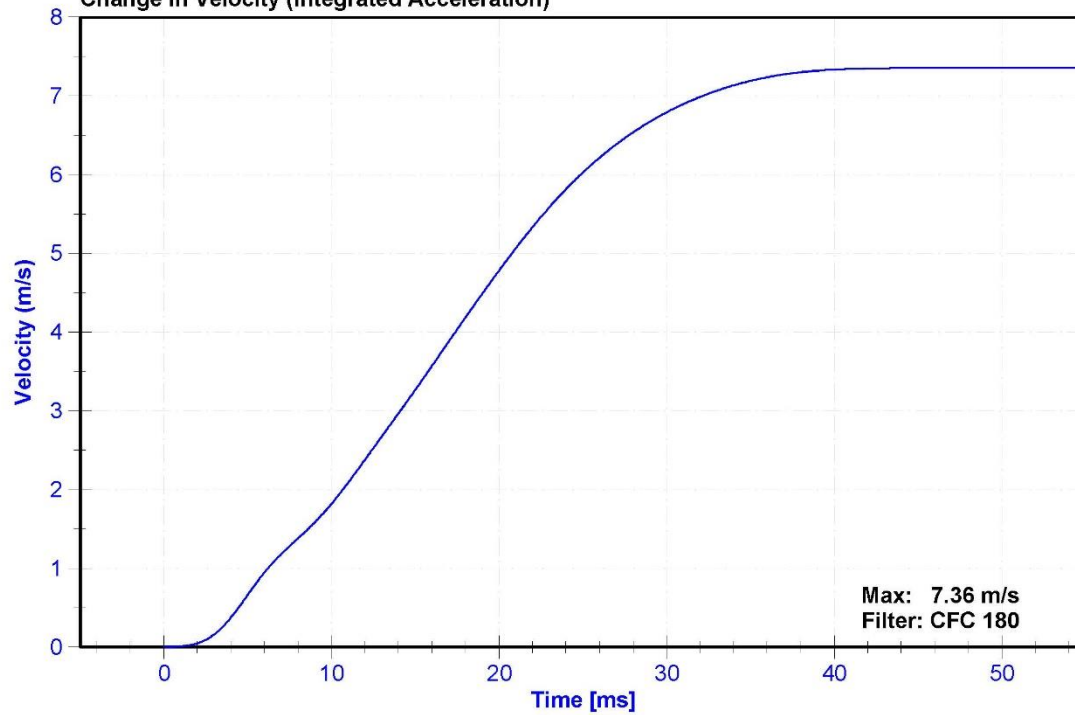




Probe Acceleration



Change in Velocity (Integrated Acceleration)



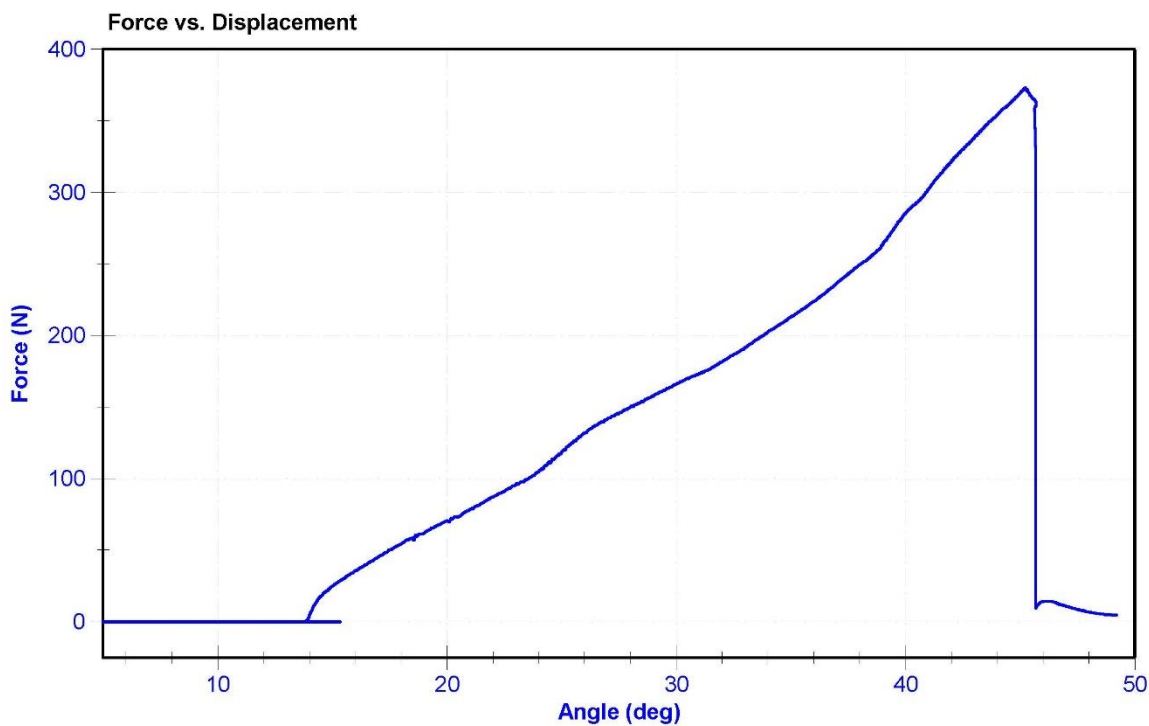
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	288	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.6	25.6	°C	21	Pass
Humidity	10	70	%	40.3	Pass
Initial Angle	0	20	deg	13.9	Pass
Force at 45 Degrees	320	390	N	373.0	Pass
Return Angle Relative to Initial	0	8	deg	4.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	Rieker N4C-1	DS-13051548	9/7/2016	9/7/2017
Load Cell	Interface SML-200	LC-493319	9/7/2016	9/7/2017



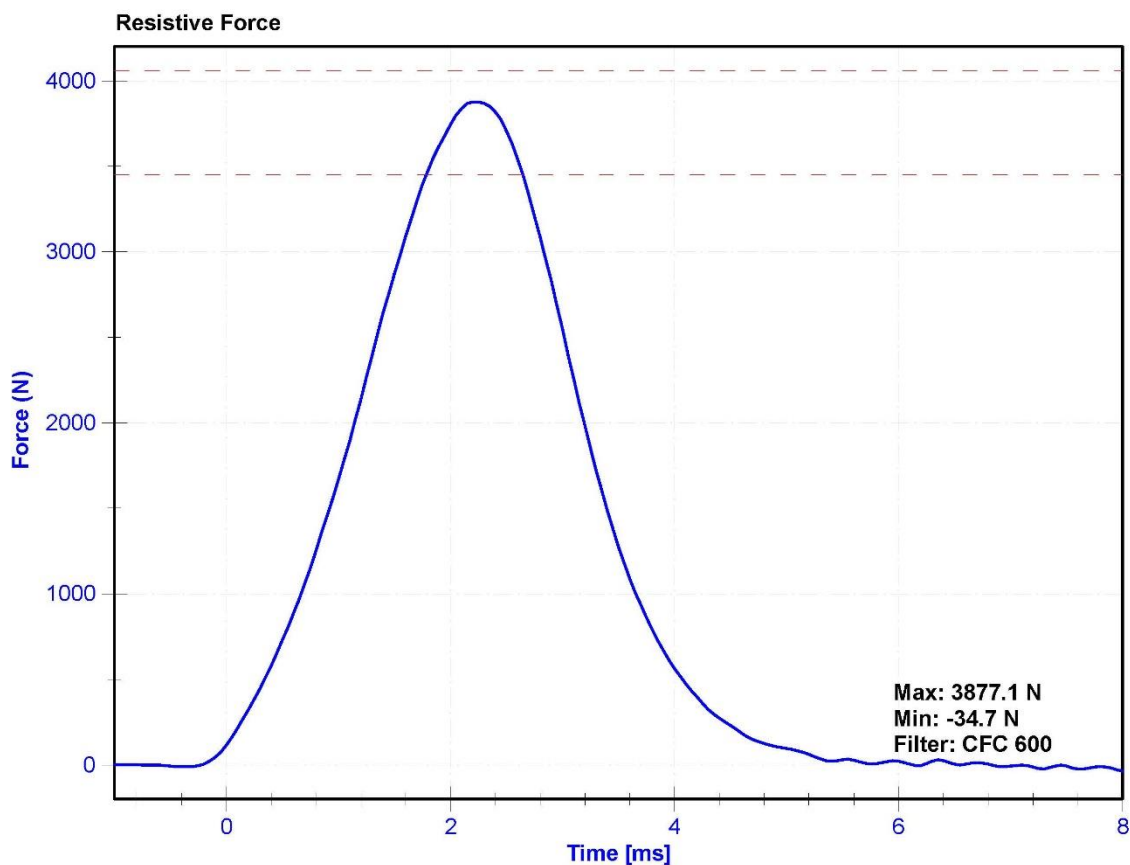
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	288	Laboratory Supervisor	M. Goehle

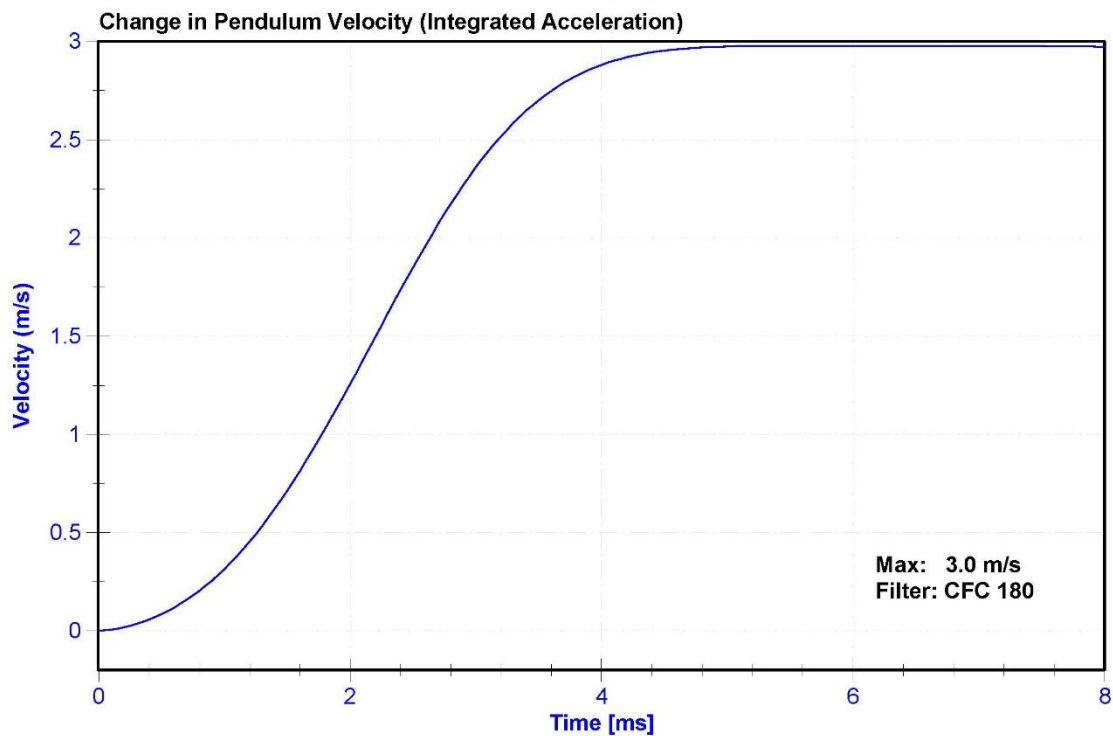
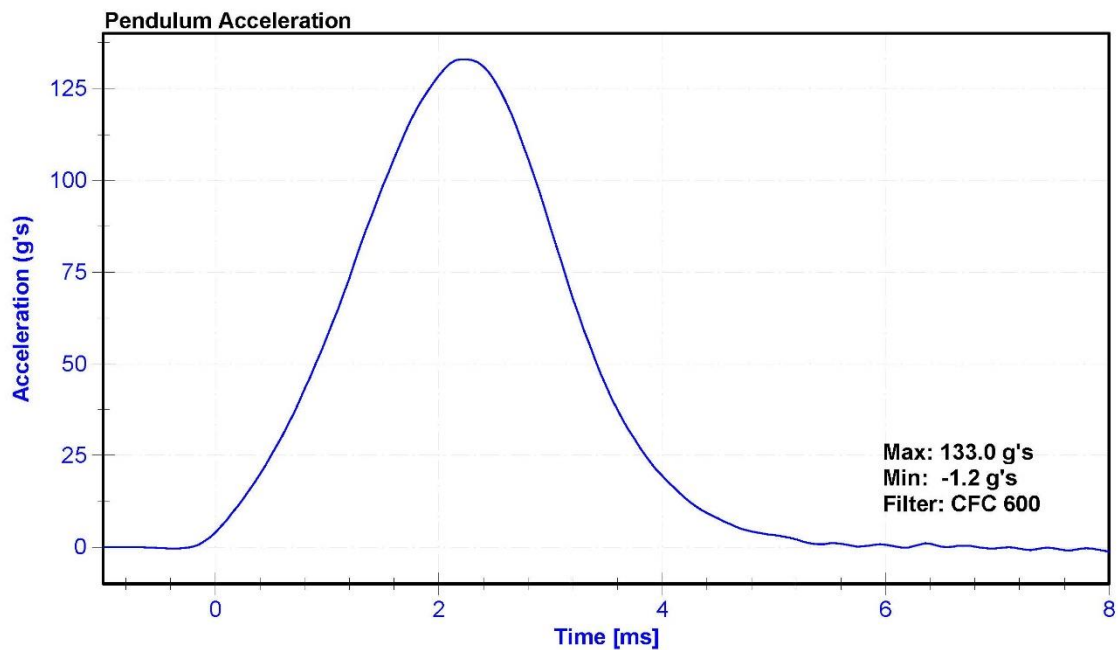
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.0	Pass
Humidity	10	70	%	33.7	Pass
Velocity	2.07	2.13	m/s	2.112	Pass
Resistive Force	3450	4060	N	3877.1	Pass

Transducer Calibrations

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





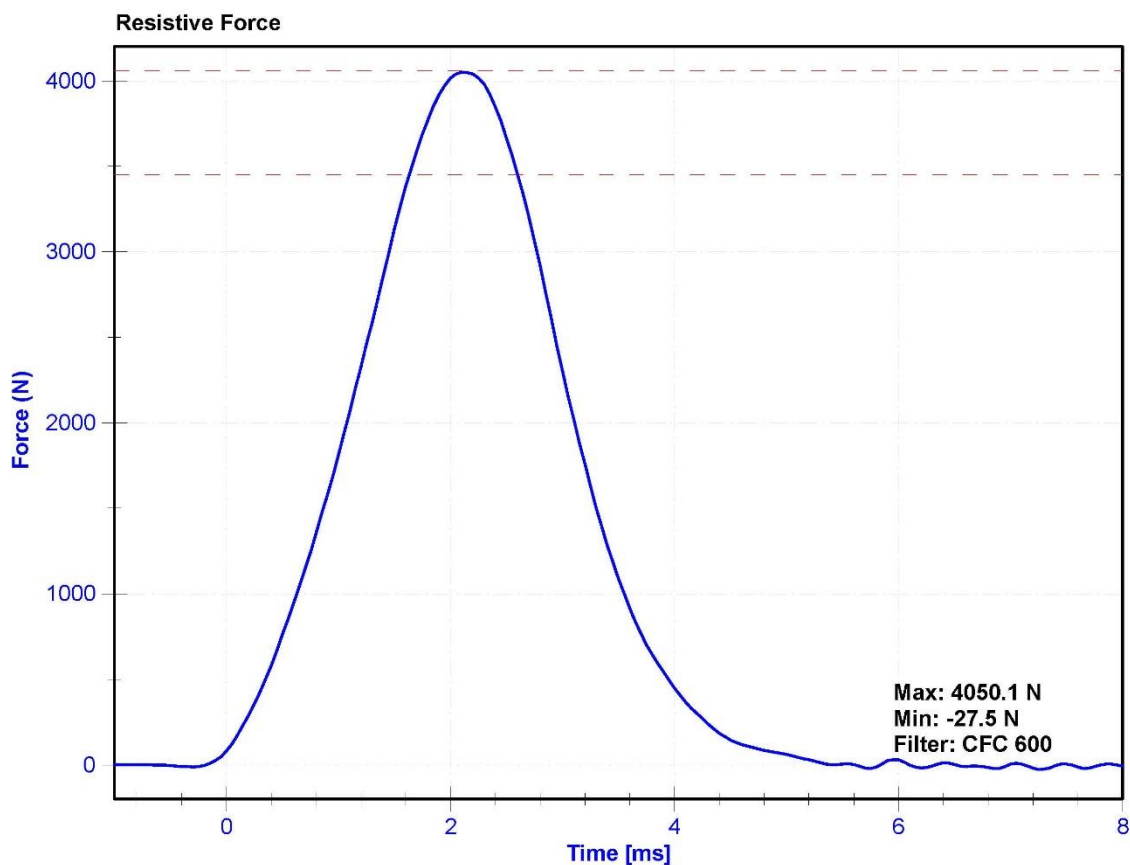
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	288	Laboratory Supervisor	M. Goehle

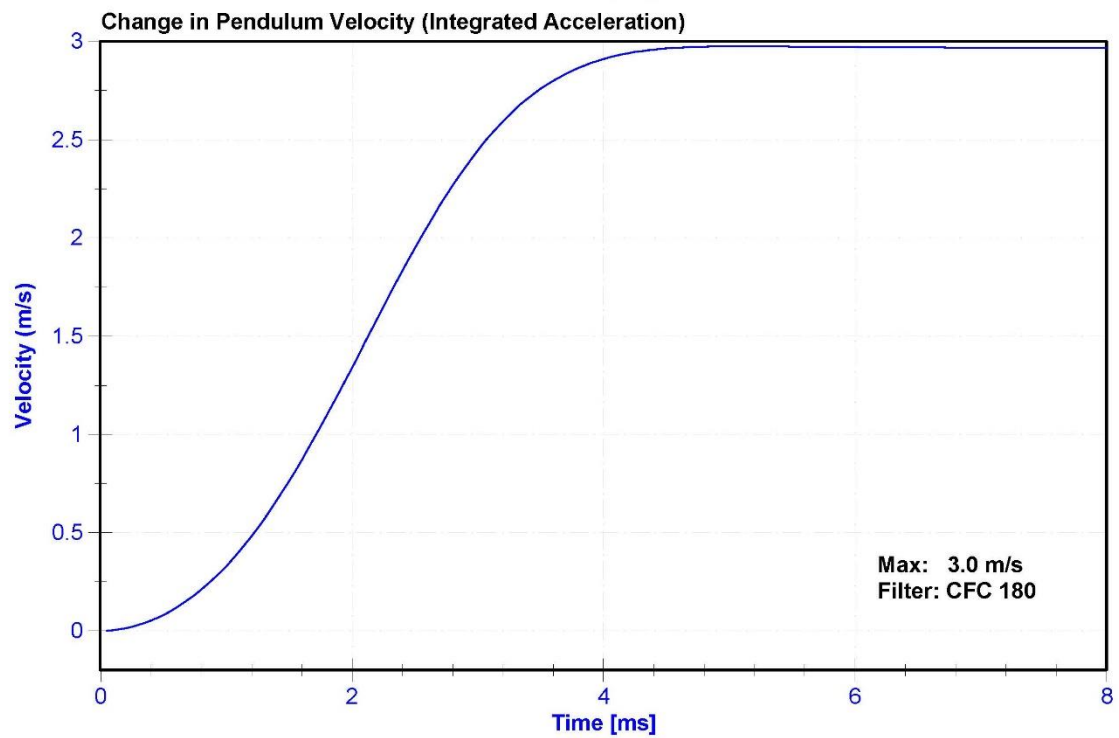
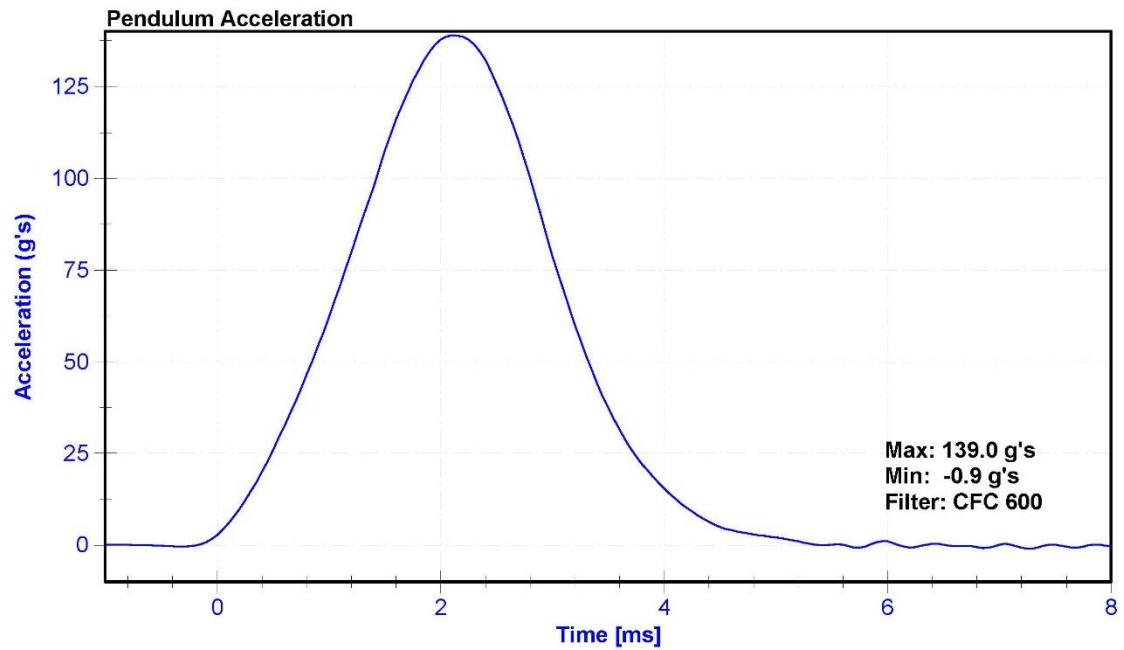
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.1	Pass
Humidity	10	70	%	33.8	Pass
Velocity	2.07	2.13	m/s	2.114	Pass
Resistive Force	3450	4060	N	4050.1	Pass

Transducer Calibrations

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





CALIBRATION TEST RESULTS

POST-TEST

HYBRID III 50TH PERCENTILE MALE - DRIVER ATD

SERIAL NO: 1046

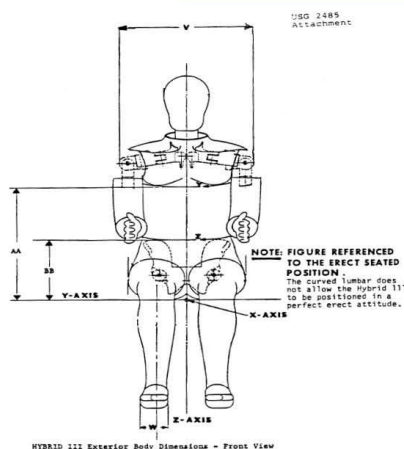


External Measurements - Hybrid 3 - 50th Male

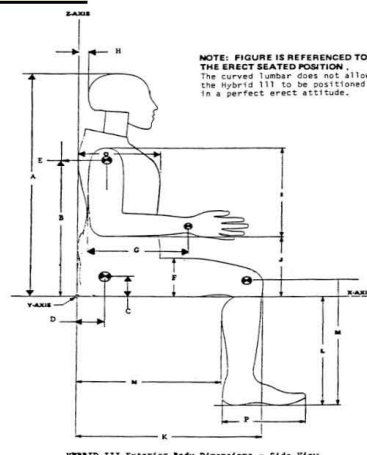
Technician: M.Hartung

Date: 11/28/2016

Dummy Serial Number: 1046



HYBRID III Exterior Body Dimensions - Front View



HYBRID III Exterior Body Dimensions - Side View

Symbol	Description	Specification (in)		Result (in)	Pass/Fail
A	Sitting Height	34.6	35.0	34.7	Pass
B	Shoulder Pivot Height	19.9	20.5	20.2	Pass
C	H-Point Height	3.3	3.5	3.5	Pass
D	H-Point from Backline	5.3	5.5	5.5	Pass
E	Shoulder Pivot from Backline	3.3	3.7	3.6	Pass
F	Thigh Clearance	5.5	6.1	5.8	Pass
G	Back of Elbow to Wrist Pivot	11.4	12.0	11.8	Pass
H	Head Back to Backline	1.6	1.8	1.8	Pass
I	Shoulder to Elbow Length	13.0	13.6	13.3	Pass
J	Elbow Rest Height	7.5	8.3	7.9	Pass
K	Buttock to Knee Length	22.8	23.8	23.3	Pass
L	Popliteal Height	16.9	17.9	17.4	Pass
M	Knee Pivot Height	19.1	19.7	19.4	Pass
N	Buttock Popliteal Length	17.8	18.8	18.2	Pass
O	Chest Depth without Jacket	8.4	9.0	8.6	Pass
P	Foot Length (right)	9.9	10.5	10.2	Pass
V	Shoulder Breadth	16.3	17.2	16.6	Pass
W	Foot Breadth	3.6	4.2	3.9	Pass
Y	Chest Circumference with Jacket	38.2	39.4	39.1	Pass
Z	Waist Circumference	32.9	34.1	33.2	Pass
AA	Reference Location (Chest Circumference)	16.9	17.1	17.0	Pass
BB	Reference Location (Waist Circumference)	8.9	9.1	9.0	Pass

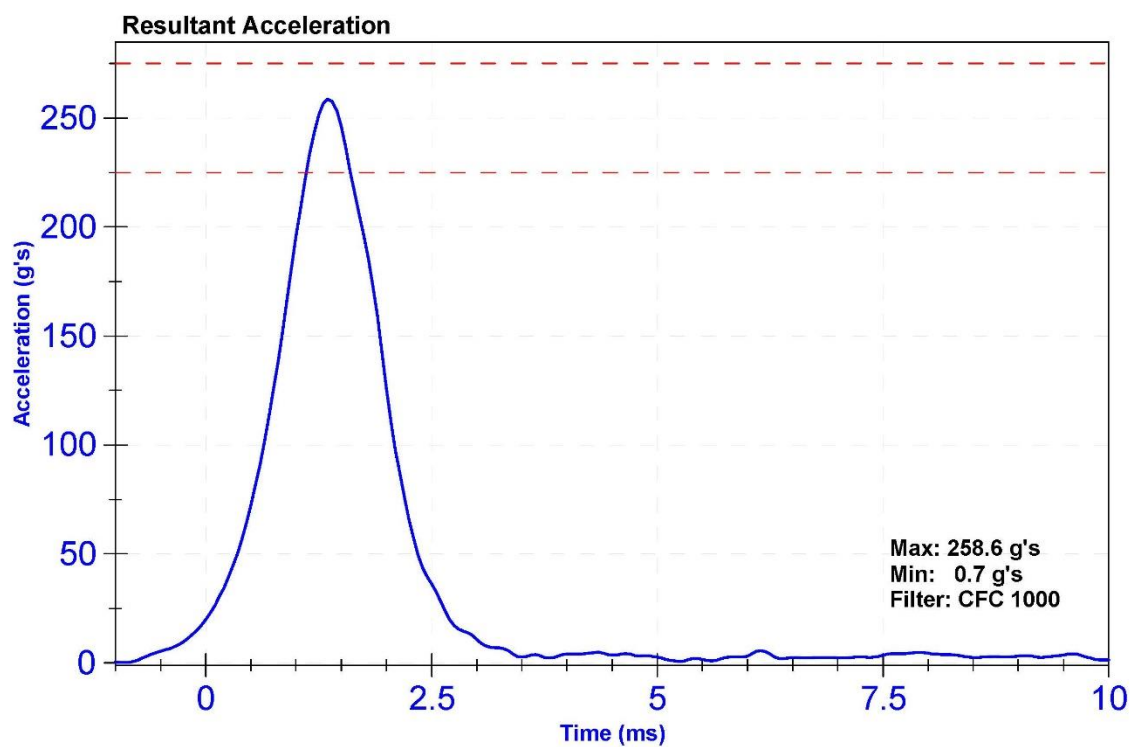
ATD Manufacturer	FTSS	Test Technician	S. Keller
ATD Serial Number	1046	Laboratory Supervisor	M. Goehle

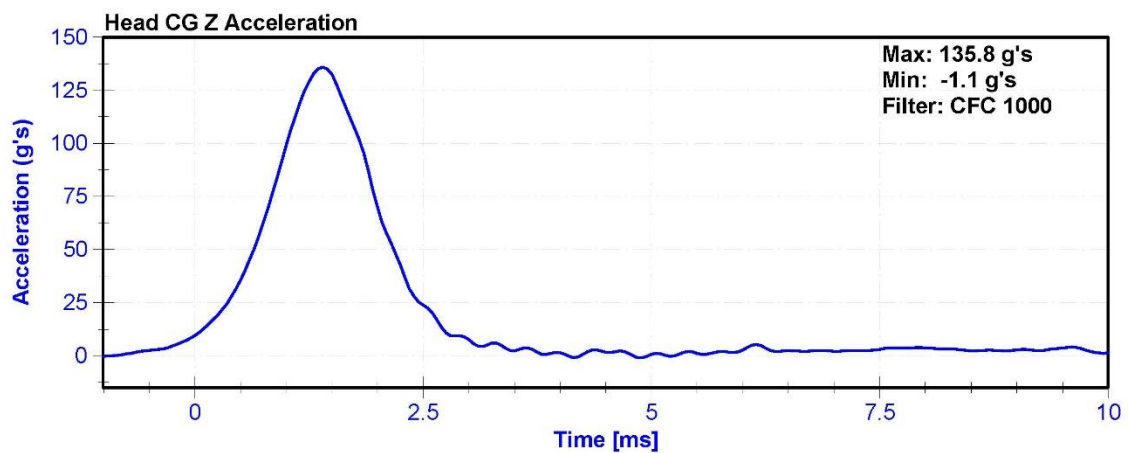
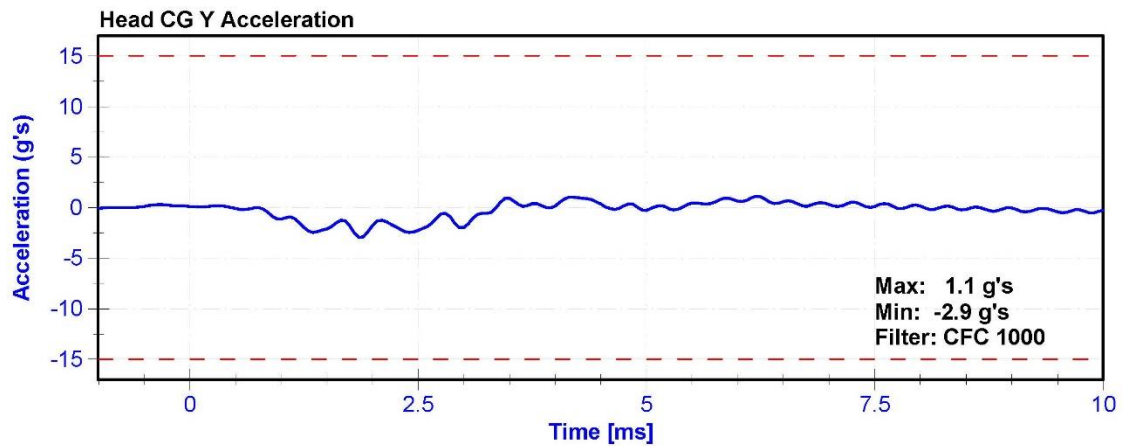
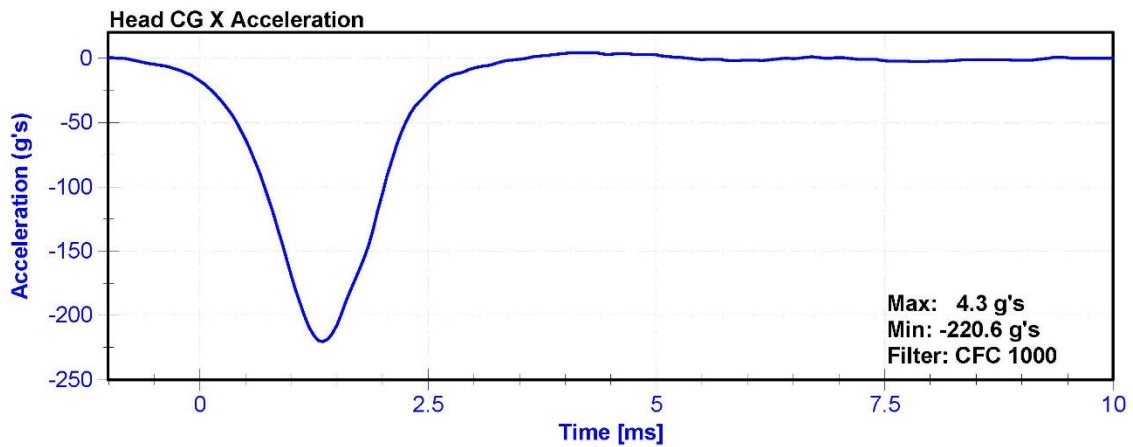
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.6	Pass
Humidity	10	70	%	26.4	Pass
Resultant Acceleration	225	275	g's	258.6	Pass
Oscillation	0	10	%	2.2	Pass
Lateral Acceleration	-15	15	g's	-2.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P58871	9/19/2016	3/20/2017
Y Accelerometer	ENDEVCO 7264	AC-P12359	9/19/2016	3/20/2017
Z Accelerometer	ENDEVCO 7264CT	AC-P52133	9/19/2016	3/20/2017





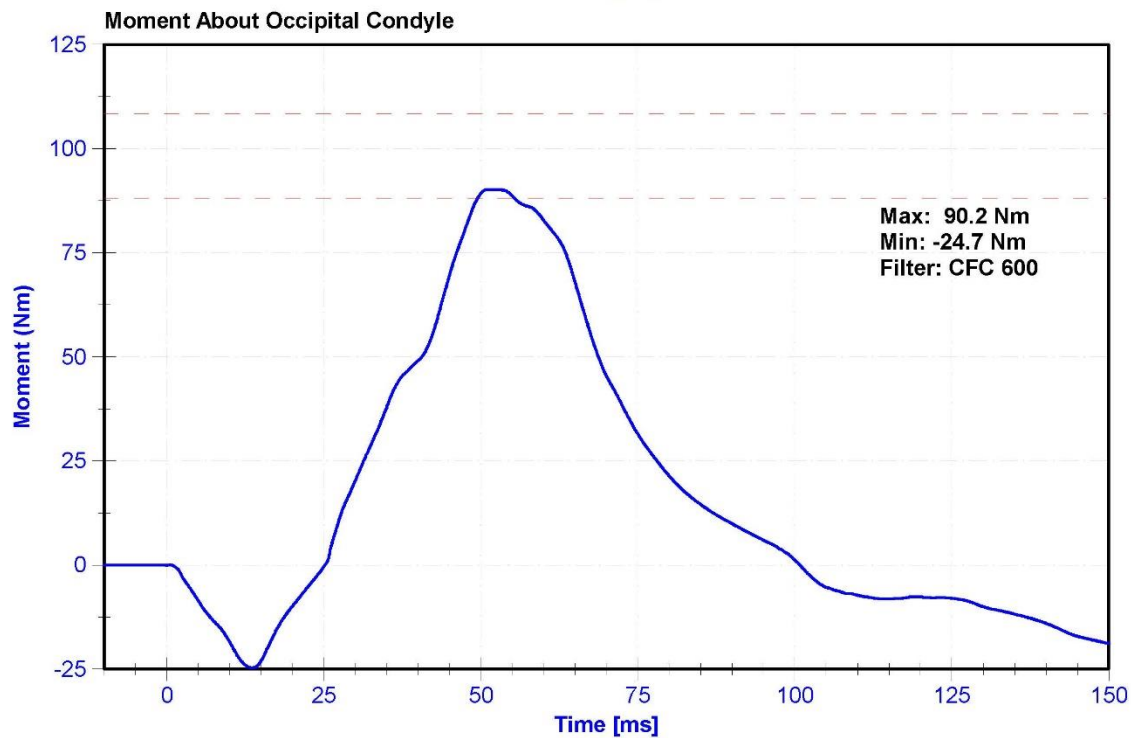
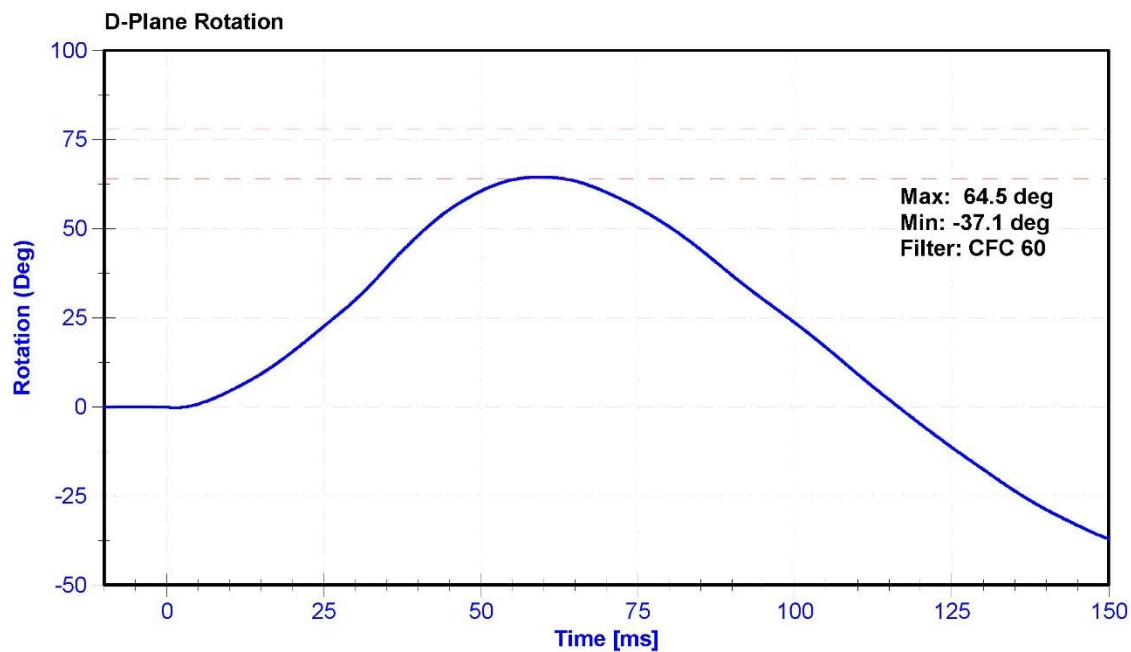
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	1046	Laboratory Supervisor	M.Goehle

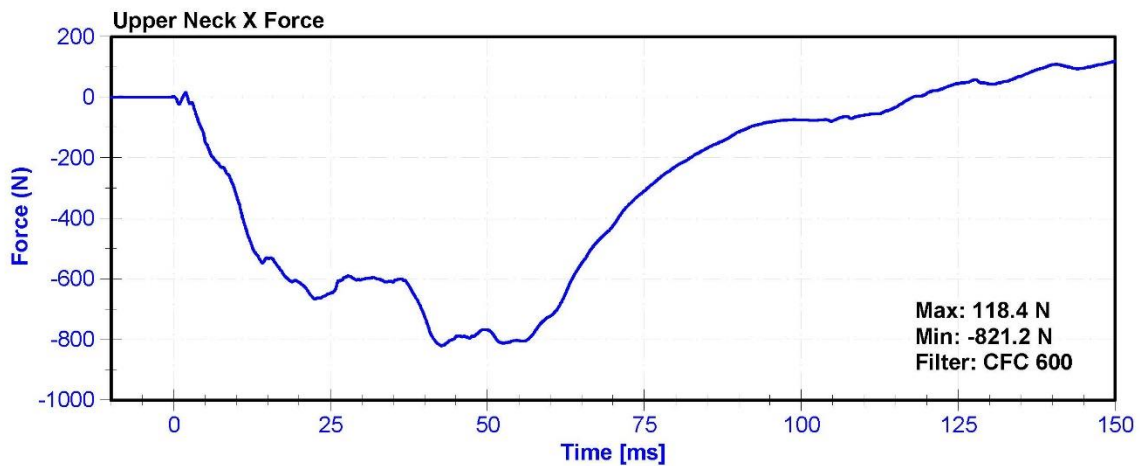
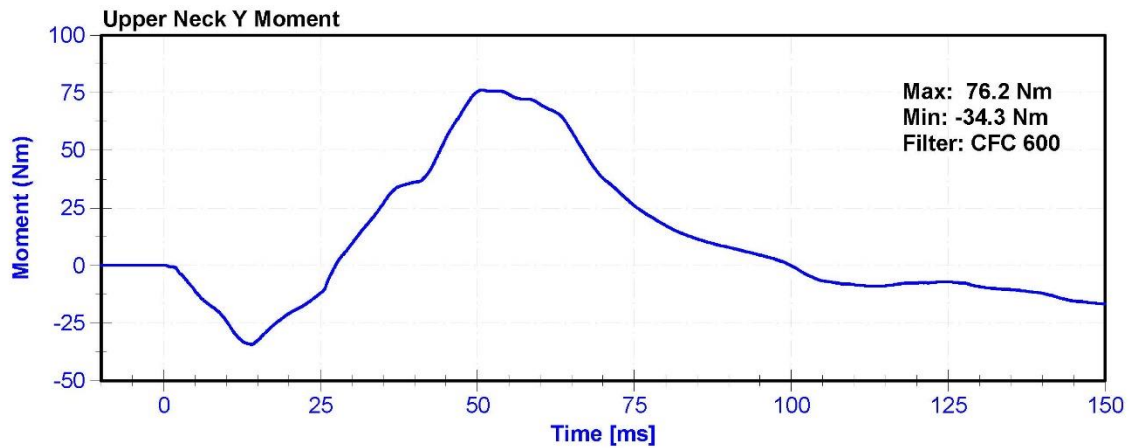
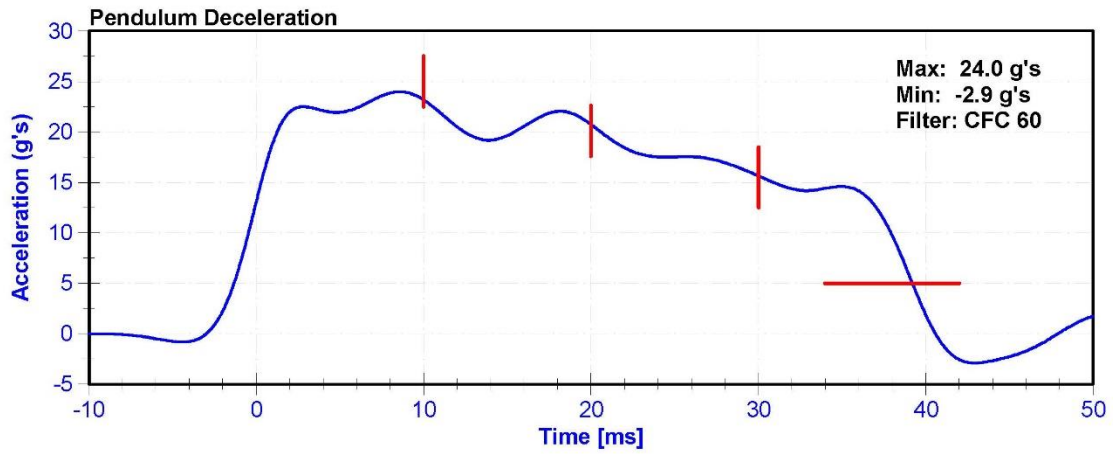
Results

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	6.89	7.13	m/s	6.979	Pass
Pendulum Deceleration at 10ms	22.5	27.5	g's	23.17	Pass
Pendulum Deceleration at 20ms	17.6	22.6	g's	20.74	Pass
Pendulum Deceleration at 30ms	12.5	18.5	g's	15.64	Pass
Max. Pendulum Deceleration After 30ms	0	29	g's	24.0	Pass
Pendulum Deceleration Time to 5 g's	34	42	ms	39.2	Pass
Maximum D Plane Rotation	64	78	deg	64.5	Pass
Time to Maximum Rotation	57	64	ms	59.7	Pass
Rotation Decay to Zero	113	127	ms	116.6	Pass
Moment About Occipital Condyle	88.1	108.4	Nm	90.15	Pass
Time to Maximum Moment	47	58	ms	51.1	Pass
Moment Decay to Zero	97	107	ms	100.9	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	ETI SP22G	DS-PendPot	10/3/2016	10/3/2017
Condyle Potentiometer	ETI SP22G	DS-CondPot	10/3/2016	10/3/2017
Upper Neck Load Cell	DENTON 1716A	LC-2186Fx	5/24/2016	5/24/2017





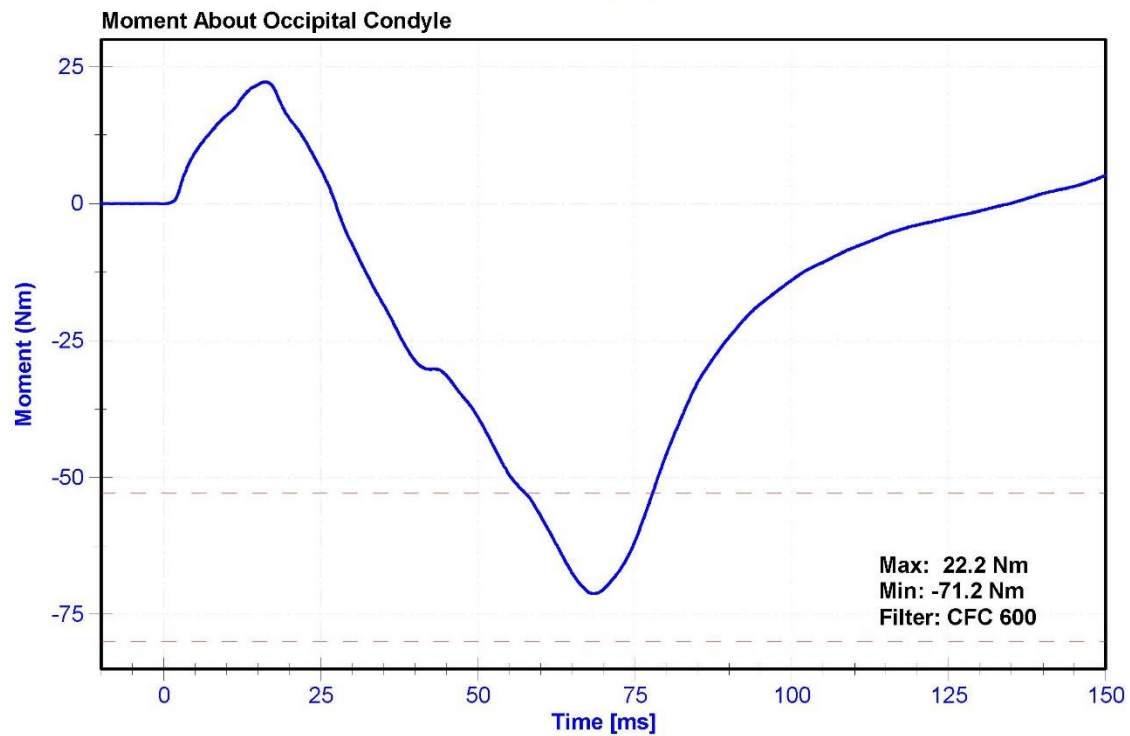
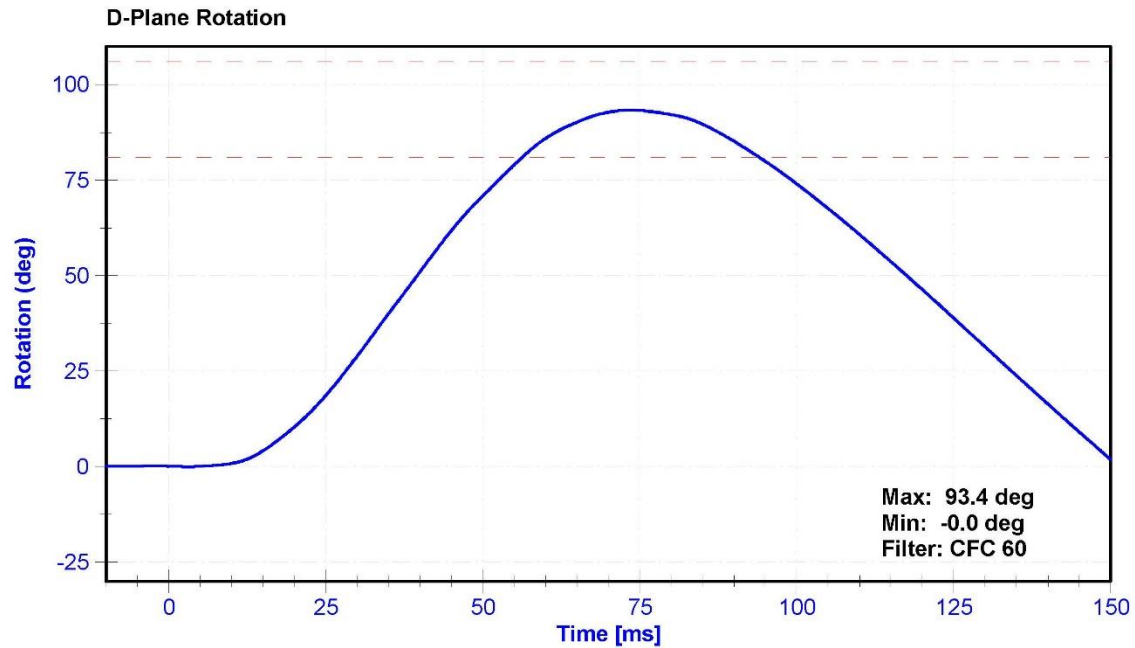
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	1046	Laboratory Supervisor	M.Goehle

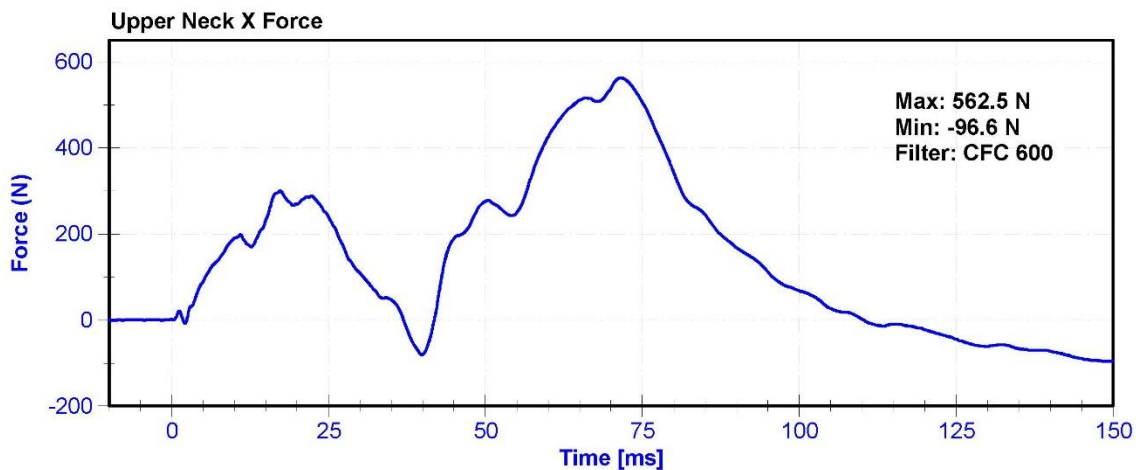
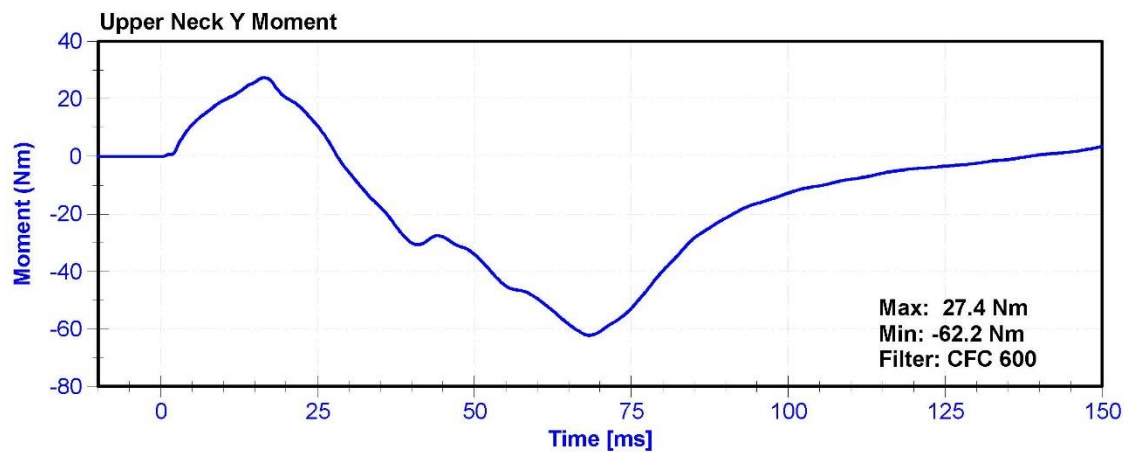
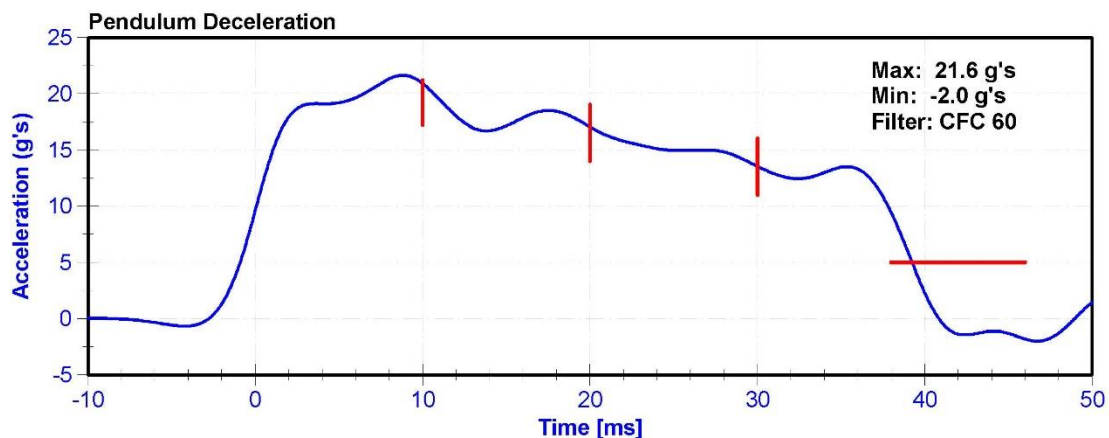
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	31	Pass
Velocity	5.94	6.19	m/s	6.068	Pass
Pendulum Deceleration at 10ms	17.2	21.2	g's	20.91	Pass
Pendulum Deceleration at 20ms	14	19	g's	17.0	Pass
Pendulum Deceleration at 30ms	11	16	g's	13.5	Pass
Max. Pendulum Deceleration After 30ms	0	22	g's	21.6	Pass
Pendulum Deceleration Time to 5 g's	38	46	ms	39.2	Pass
Maximum D Plane Rotation	81	106	deg	93.4	Pass
Time to Maximum Rotation	72	82	ms	73.5	Pass
Rotation Decay to Zero	147	174	ms	151.2	Pass
Minimum Moment About OC	-80	-52.9	Nm	-71.23	Pass
Time to Minimum Moment	65	79	ms	68.5	Pass
Moment Decay to Zero	120	148	ms	134.9	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	ETI SP22G	DS-PendPot	10/3/2016	10/3/2017
Condyle Potentiometer	ETI SP22G	DS-CondPot	10/3/2016	10/3/2017
Upper Neck Load Cell	DENTON 1716A	LC-2186Fx	5/24/2016	5/24/2017





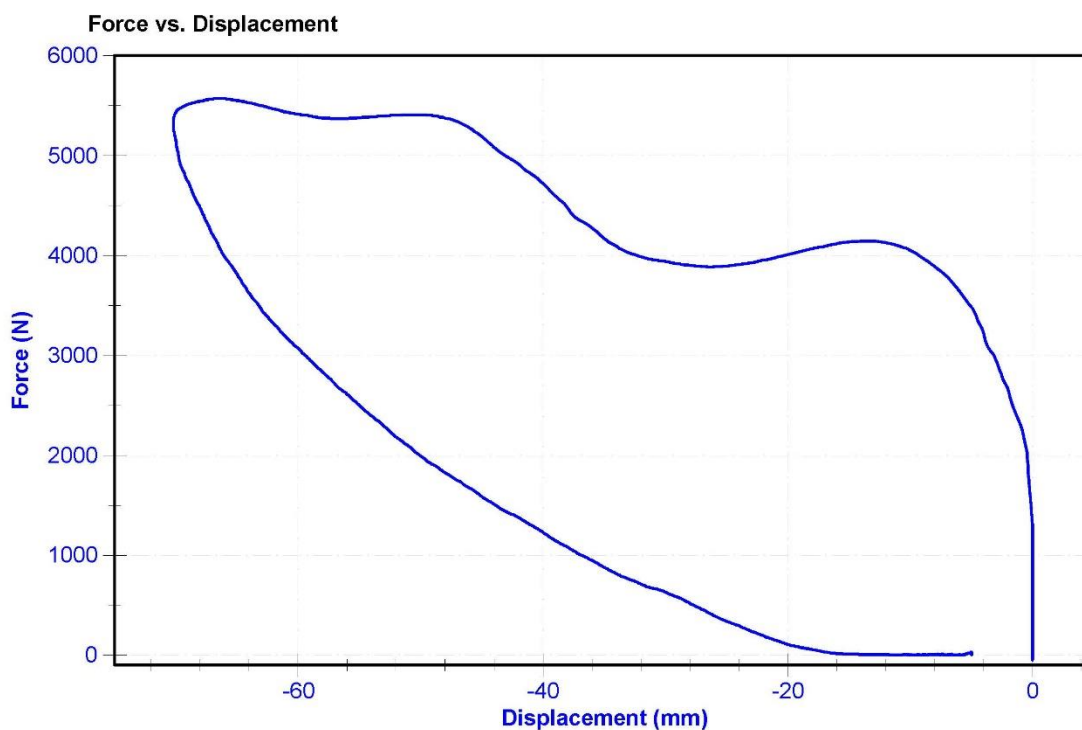
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	1046	Laboratory Supervisor	M.Goehle

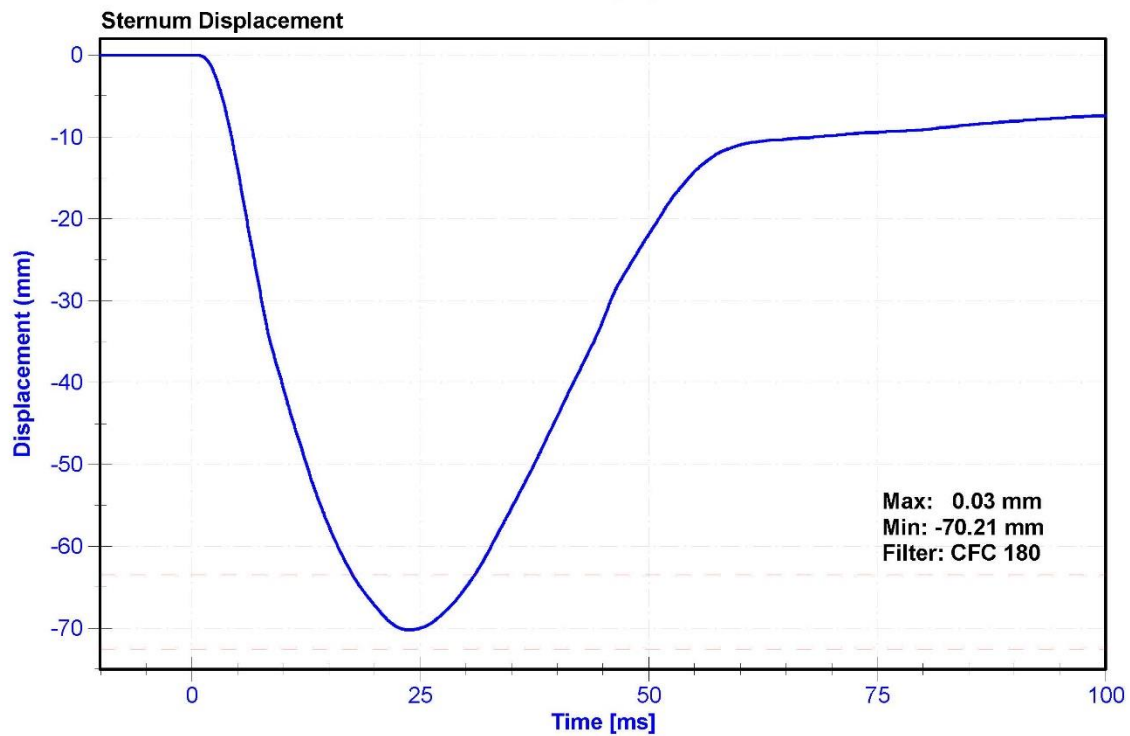
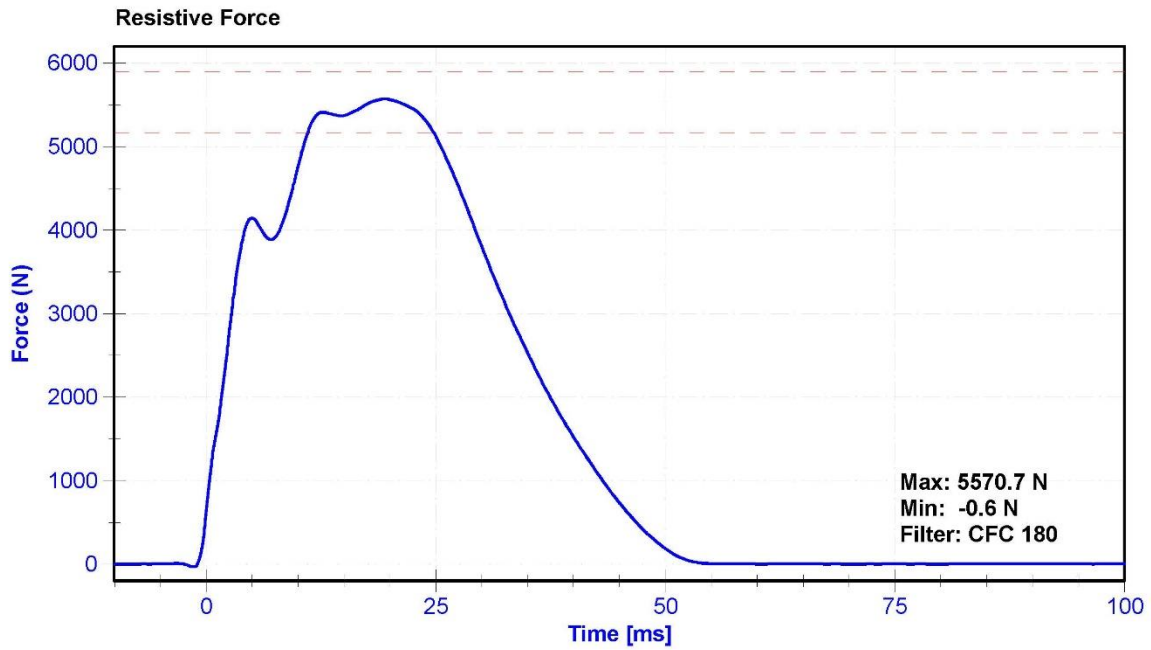
Results

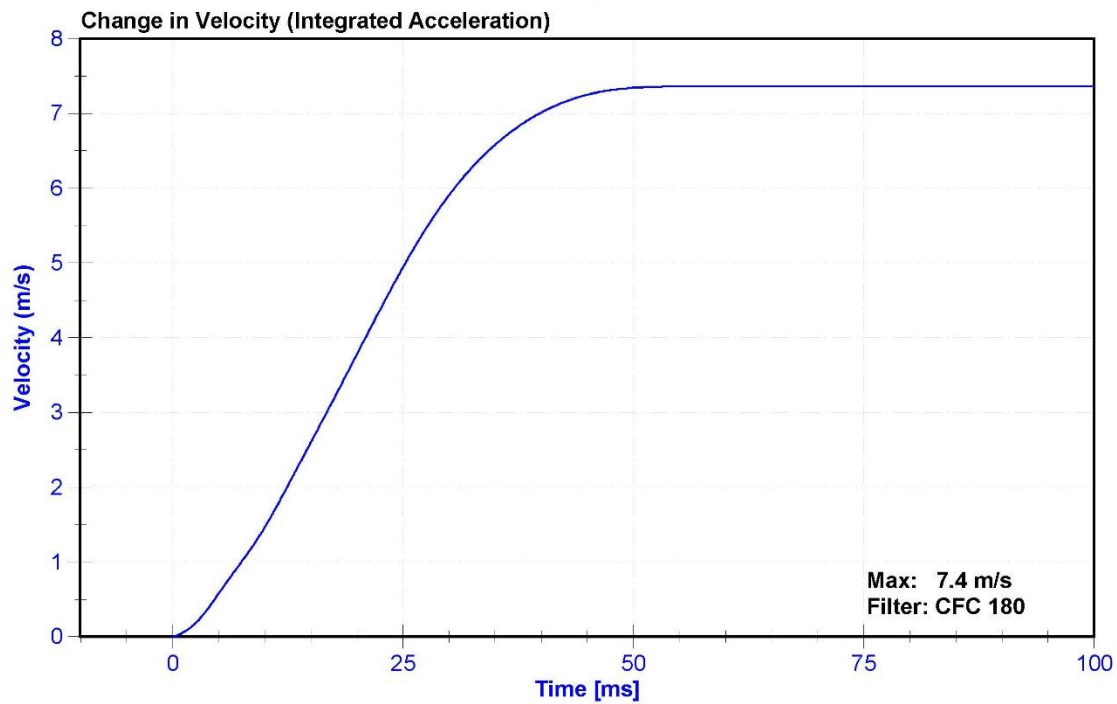
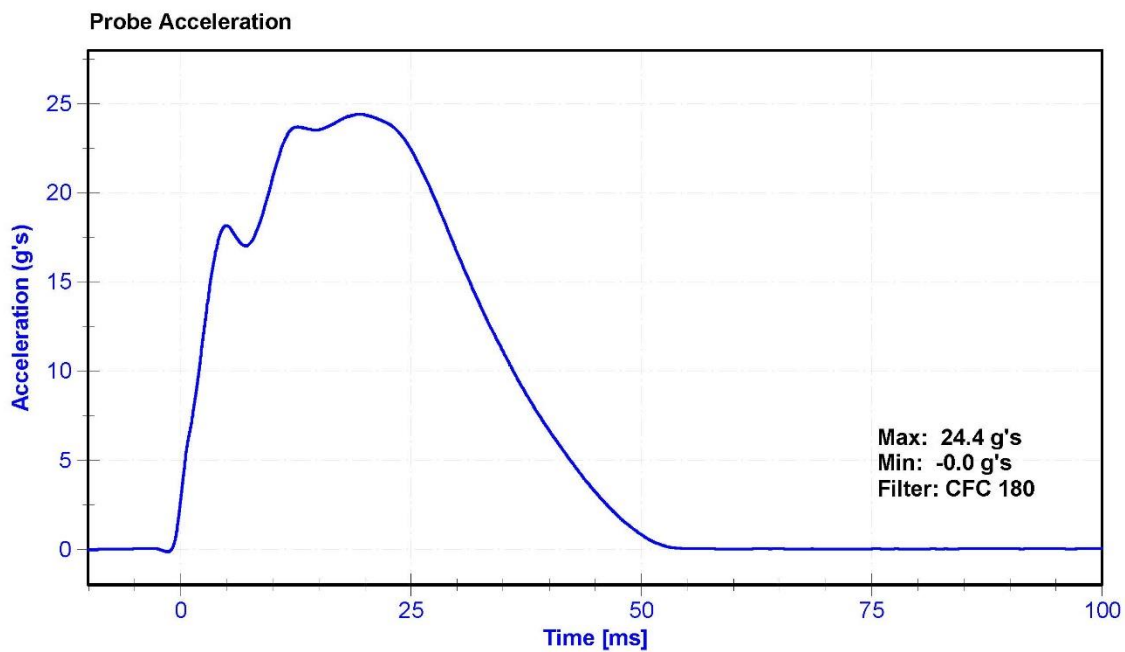
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	27.7	Pass
Velocity	6.59	6.83	m/s	6.670	Pass
Chest Displacement	-72.6	-63.5	mm	-70.21	Pass
Resistive Force	5160	5894	N	5570.7	Pass
Hysteresis	65	85	%	70.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Chest Potentiometer	Servo 14CB1-2897	DS-1046	9/19/2016	9/19/2017







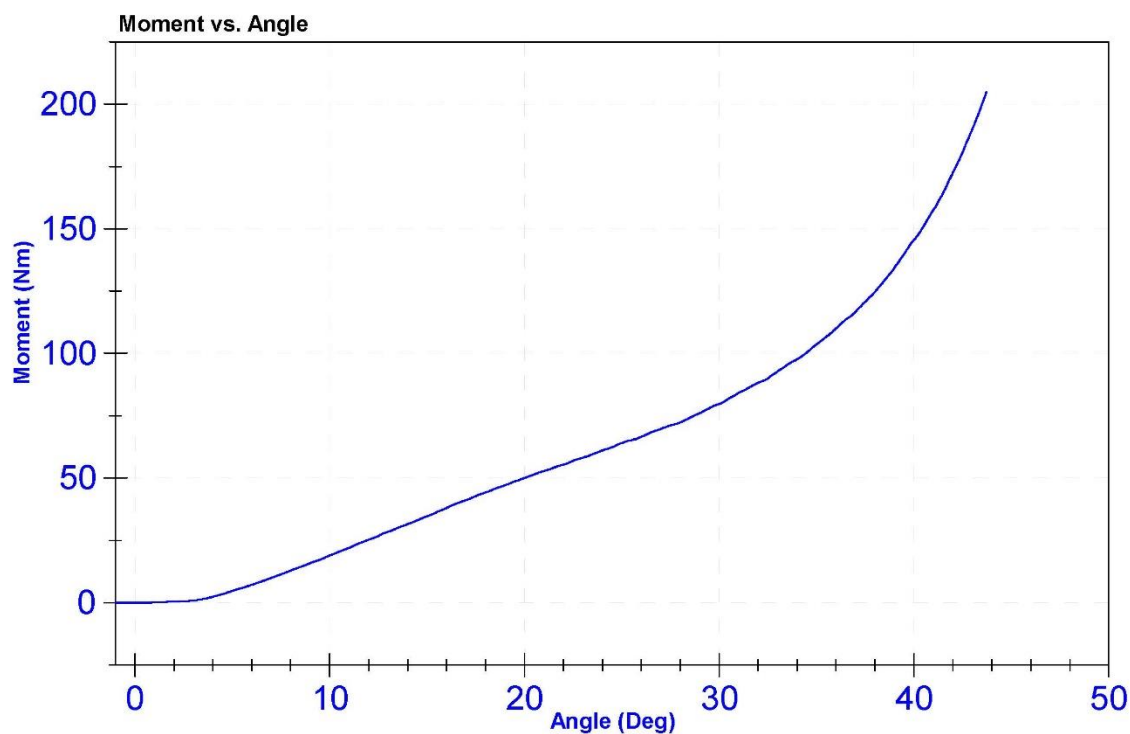
ATD Manufacturer	FTSS	Test Technician	S Keller
ATD Serial Number	1046	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.9	Pass
Humidity	10	70	%	26.5	Pass
Average Velocity	5	10	deg/s	7.4	Pass
Angle at 203Nm	40	50	deg	43.6	Pass
Moment at 30 degrees	0	94.9	Nm	79.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	ETI SP22	DS-0008	4/4/2016	4/4/2017
Load Cell	Key Trans 2301-02	LC-115 My	4/21/2016	4/21/2017



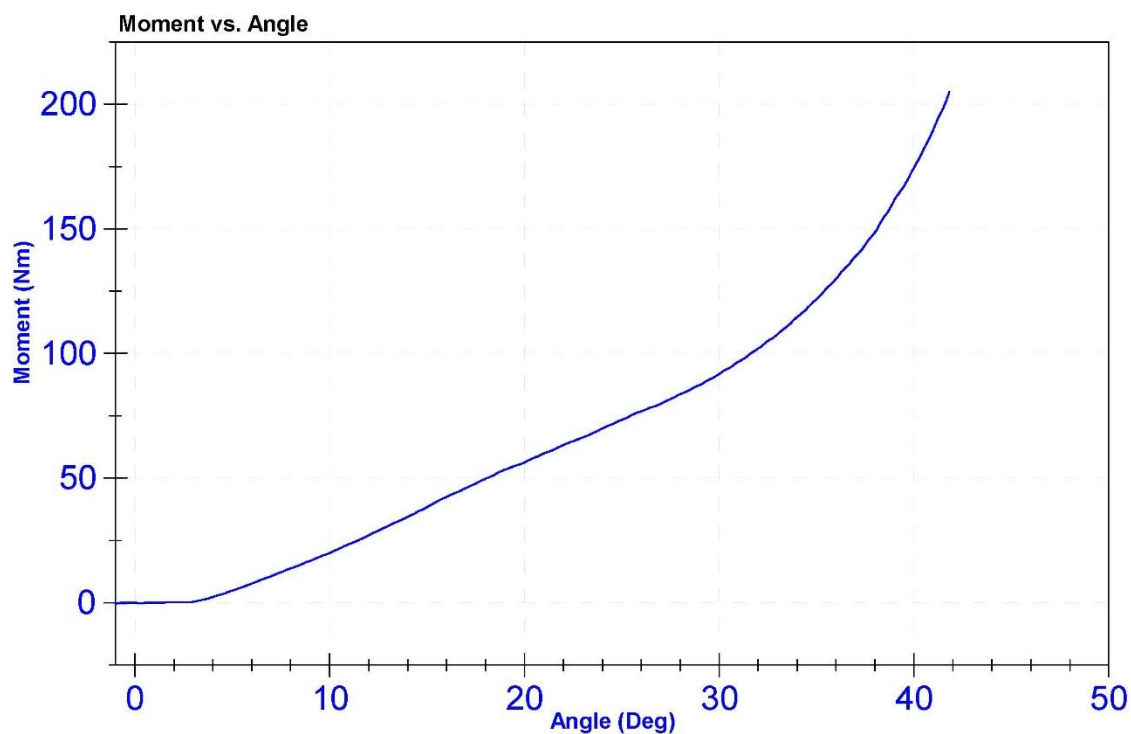
ATD Manufacturer	FTSS	Test Technician	S. Keller
ATD Serial Number	1046	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.8	Pass
Humidity	10	70	%	26.4	Pass
Average Velocity	5	10	deg/s	7.1	Pass
Angle at 203Nm	40	50	deg	41.7	Pass
Moment at 30 degrees	0	94.9	Nm	91.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	ETI SP22	DS-0008	4/4/2016	4/4/2017
Load Cell	Key Trans 2301-02	LC-115 My	4/21/2016	4/21/2017



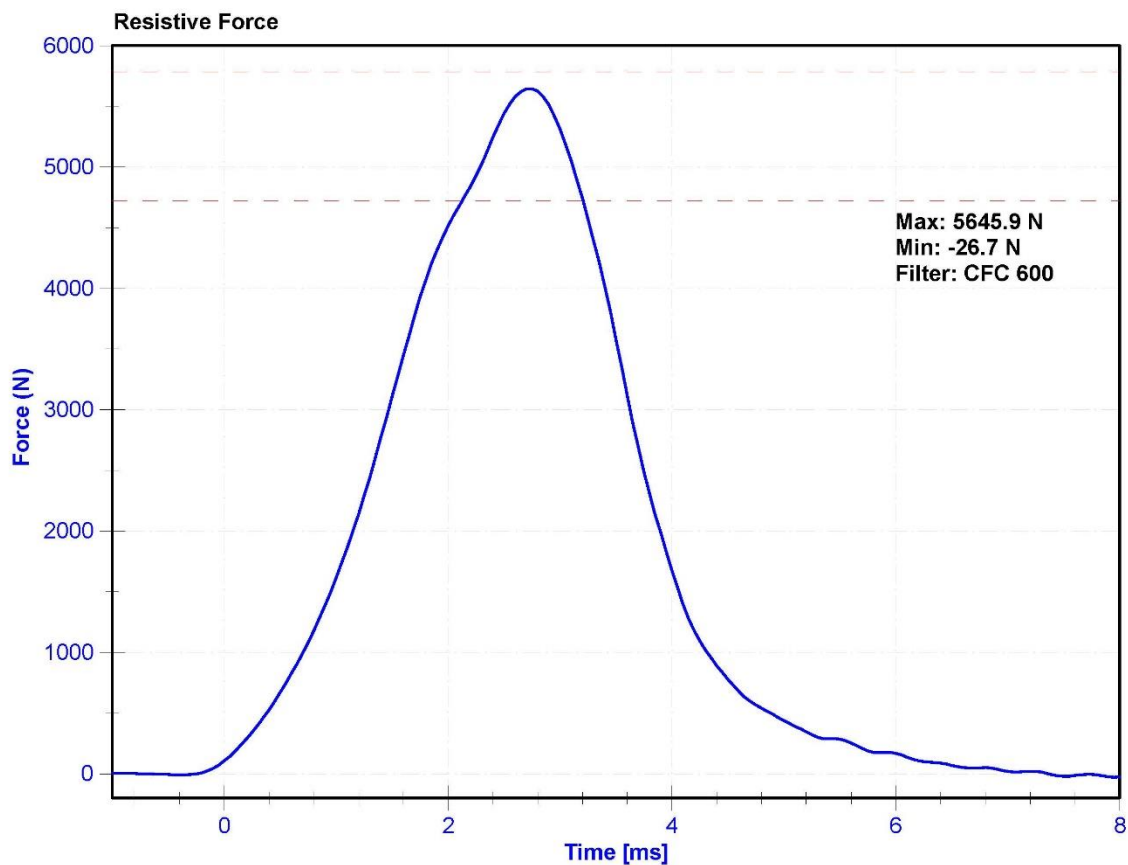
ATD Manufacturer	FTSS	Test Technician	S. Keller
ATD Serial Number	1046	Laboratory Supervisor	M. Goehle

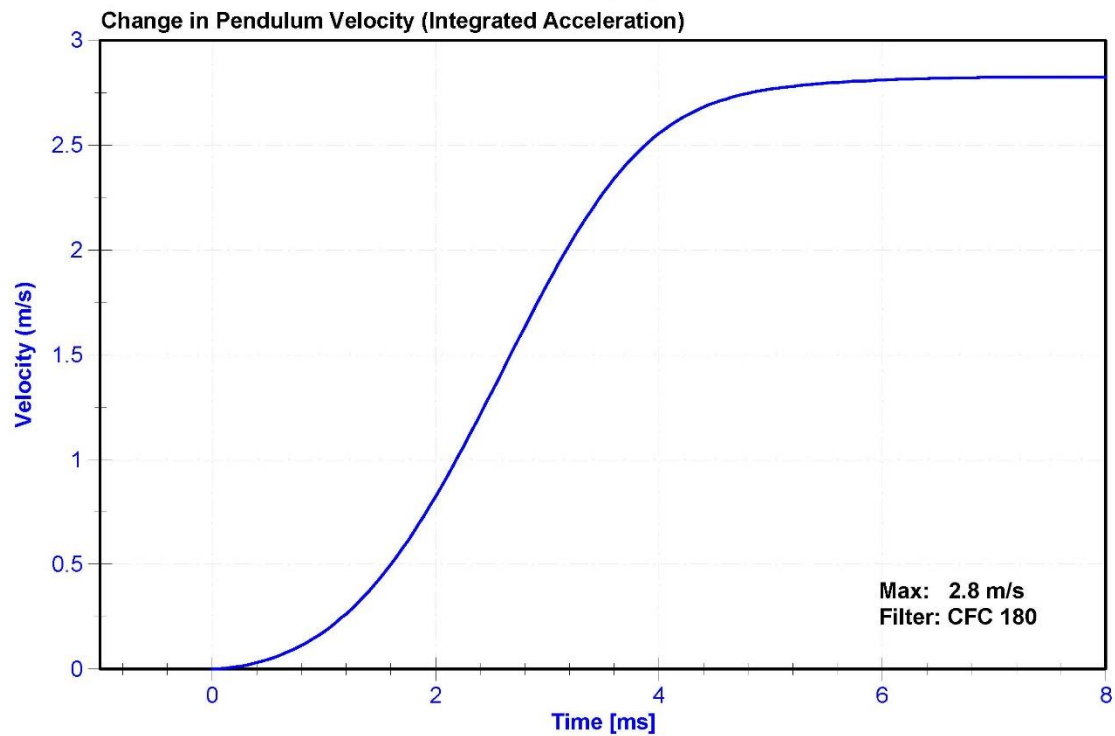
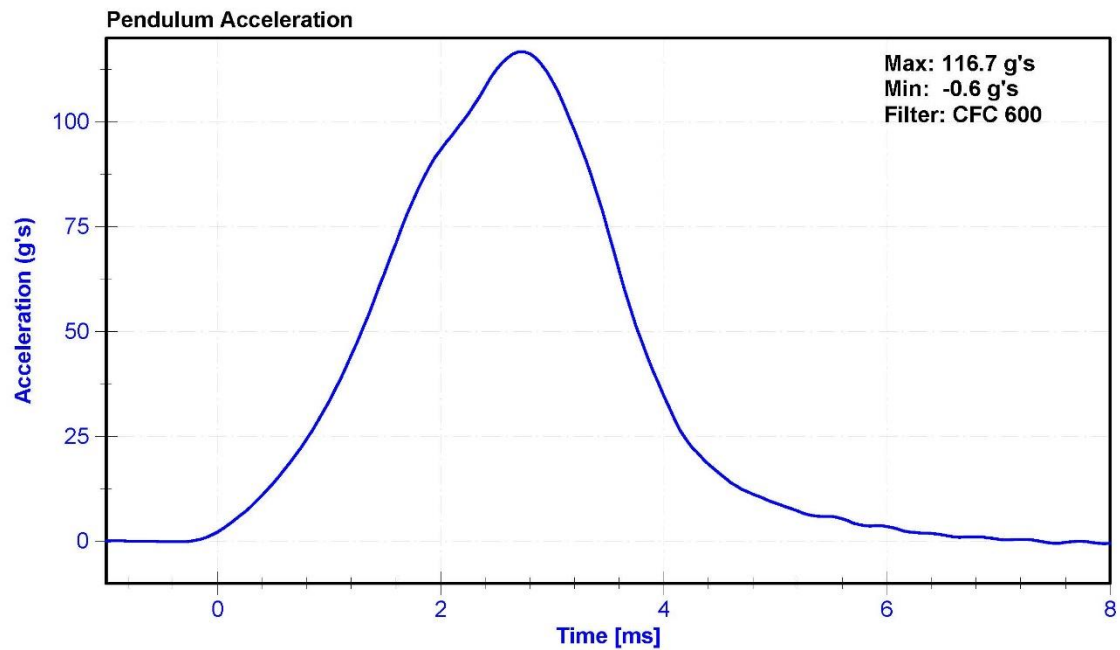
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.1	Pass
Humidity	10	70	%	22.5	Pass
Velocity	2.07	2.13	m/s	2.098	Pass
Maximum Resistive Force	4720	5780	N	5645.9	Pass

Transducer Calibrations

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





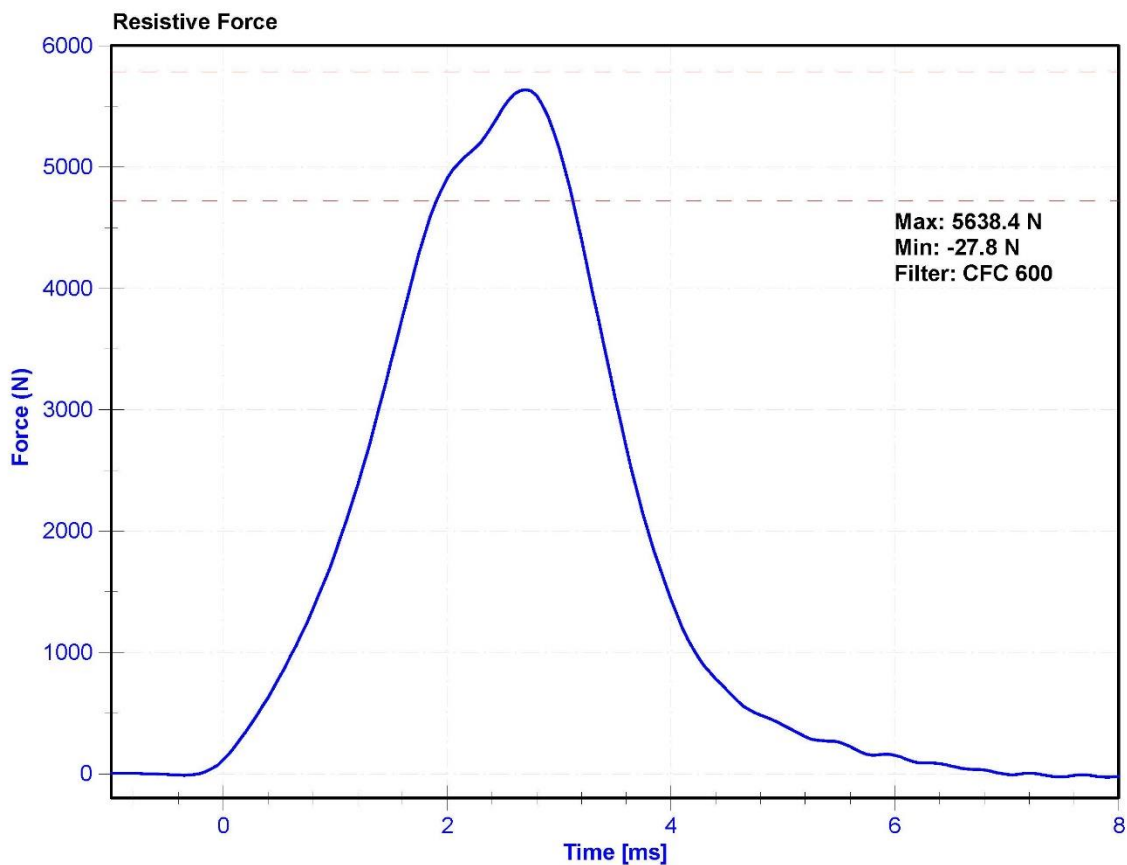
ATD Manufacturer	FTSS	Test Technician	S. Keller
ATD Serial Number	1046	Laboratory Supervisor	M. Goehle

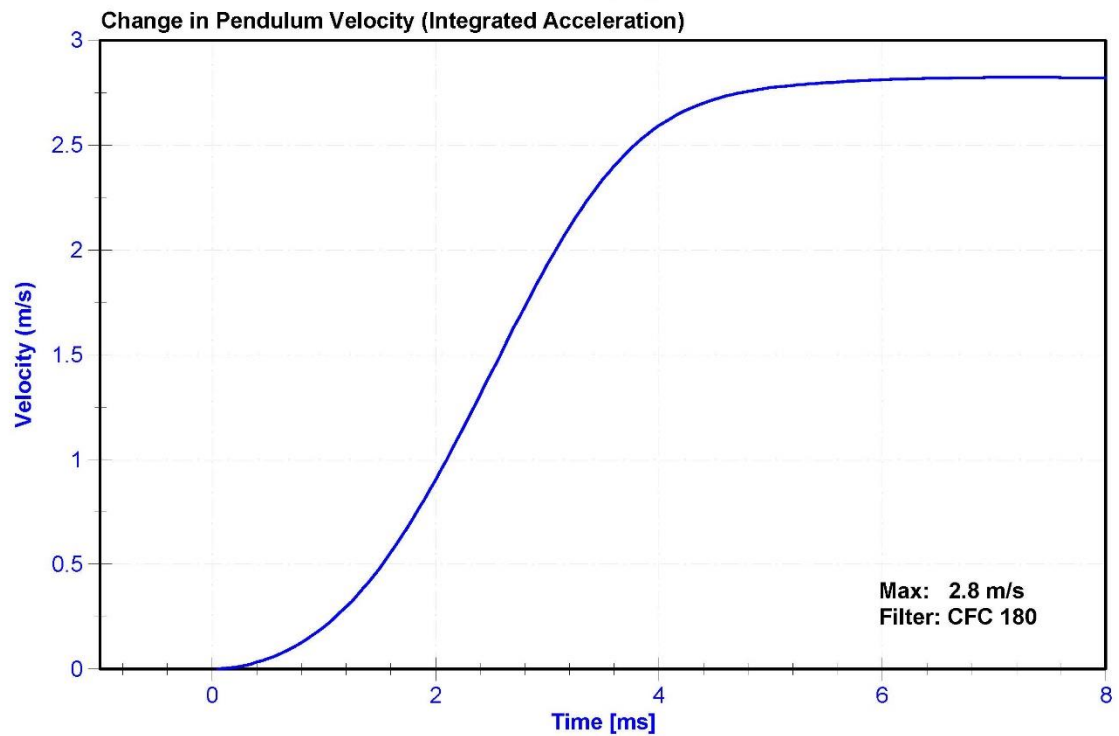
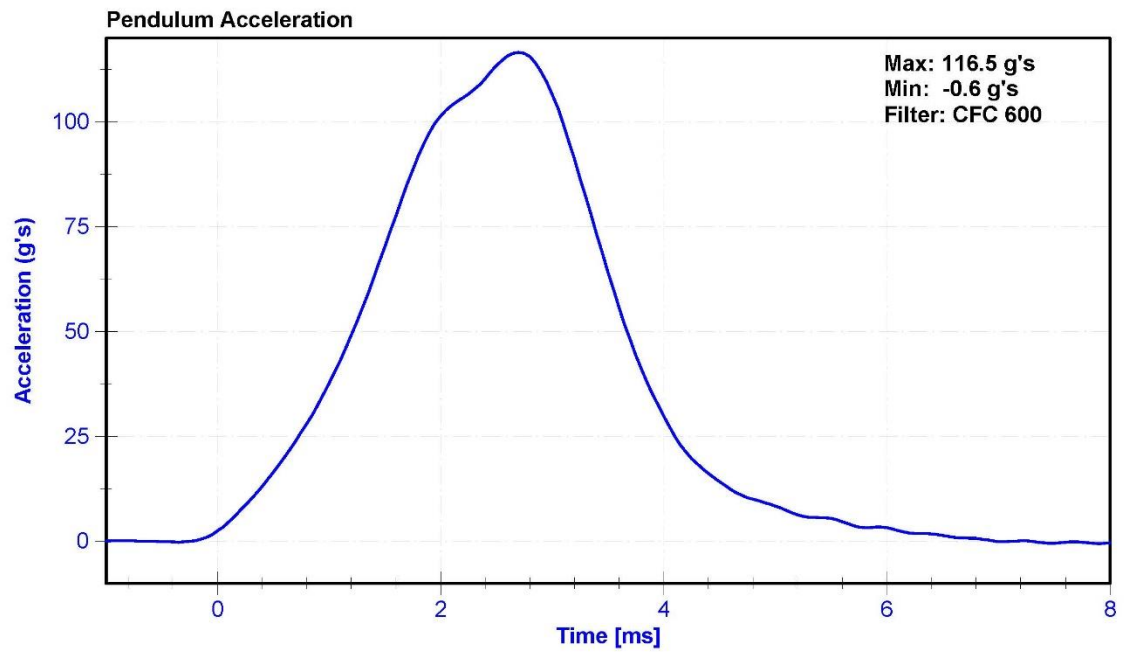
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.6	Pass
Humidity	10	70	%	23.1	Pass
Velocity	2.07	2.13	m/s	2.099	Pass
Maximum Resistive Force	4720	5780	N	5638.4	Pass

Transducer Calibrations

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





CALIBRATION TEST RESULTS

POST-TEST

HYBRID III 5TH PERCENTILE FEMALE - PASSENGER ATD

SERIAL NO: 288

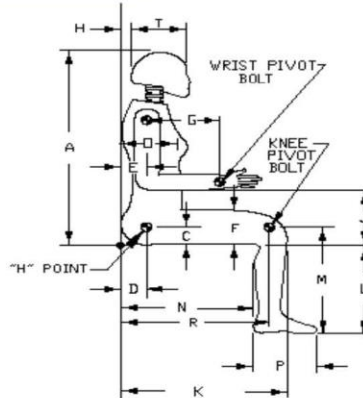
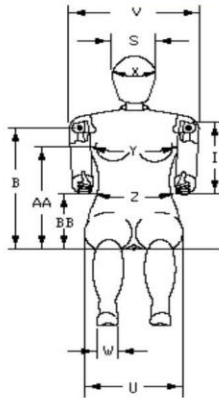


External Measurements - Hybrid 3 - 5th Female

Technician: M. Goehle

Date: 11/29/2016

Dummy Serial Number: 288



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	775	800	780	Pass
B	Shoulder Pivot Height	432	457	440	Pass
C	H-Point Height	81	86	83	Pass
D	H-Point from Backline	145	150	147	Pass
E	Shoulder Pivot from Backline	69	84	76	Pass
F	Thigh Clearance	119	135	124	Pass
G	Back of Elbow to Wrist Pivot	244	259	250	Pass
H	Head Back to Backline	43	48	46	Pass
I	Shoulder to Elbow Length	277	297	283	Pass
J	Elbow Rest Height	183	203	188	Pass
K	Buttock to Knee Length	521	546	538	Pass
L	Popliteal Height	356	376	363	Pass
M	Knee Pivot Height	394	419	398	Pass
N	Buttock Popliteal Length	414	439	429	Pass
O	Chest Depth without Jacket	175	191	180	Pass
P	Foot Length (right)	219	234	220	Pass
R	Buttock To Knee Pivot Length	457	483	462	Pass
S	Head Breadth	137	147	142	Pass
T	Head Depth	178	188	180	Pass
U	Hip Breadth	300	315	304	Pass
V	Shoulder Breadth	351	366	362	Pass
W	Foot Breadth	79	94	84	Pass
X	Head Circumference	528	549	536	Pass
Y	Chest Circumference with Jacket	851	881	853	Pass
Z	Waist Circumference	460	790	782	Pass
AA	Reference Location (Chest Circumference)	333	358	345	Pass
BB	Reference Location (Waist Circumference)	160	170	165	Pass

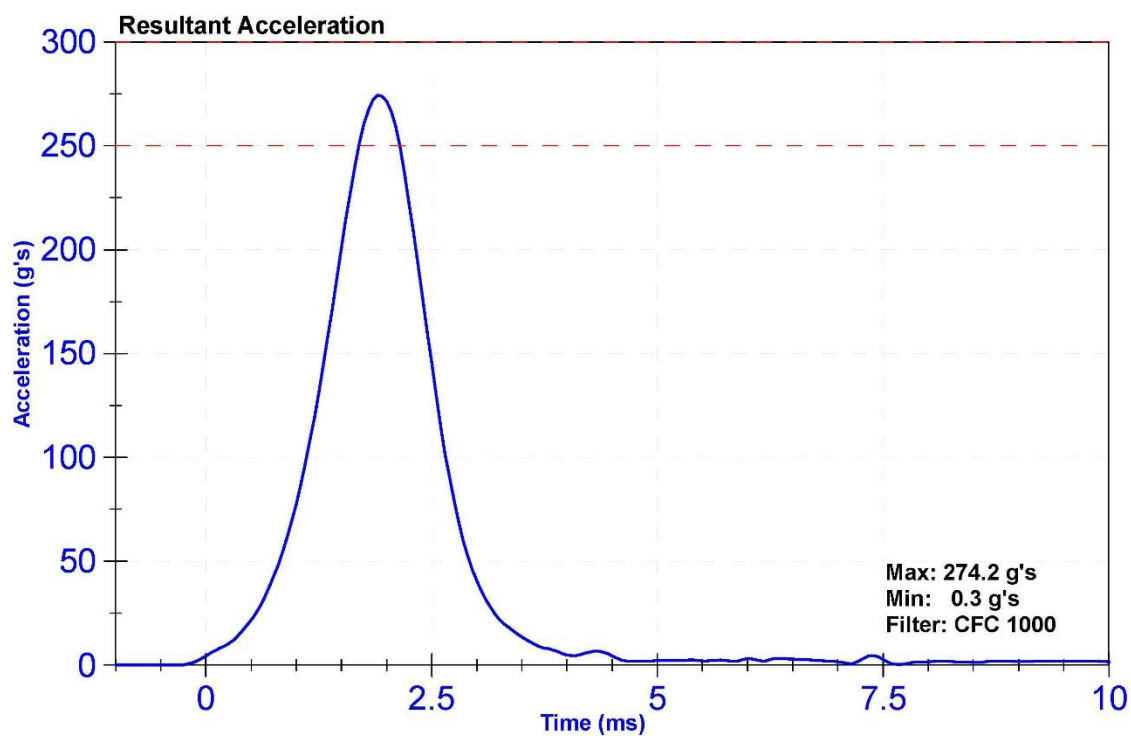
ATD Manufacturer	FTSS	Test Technician	S. Keller
ATD Serial Number	288	Laboratory Supervisor	M. Goehle

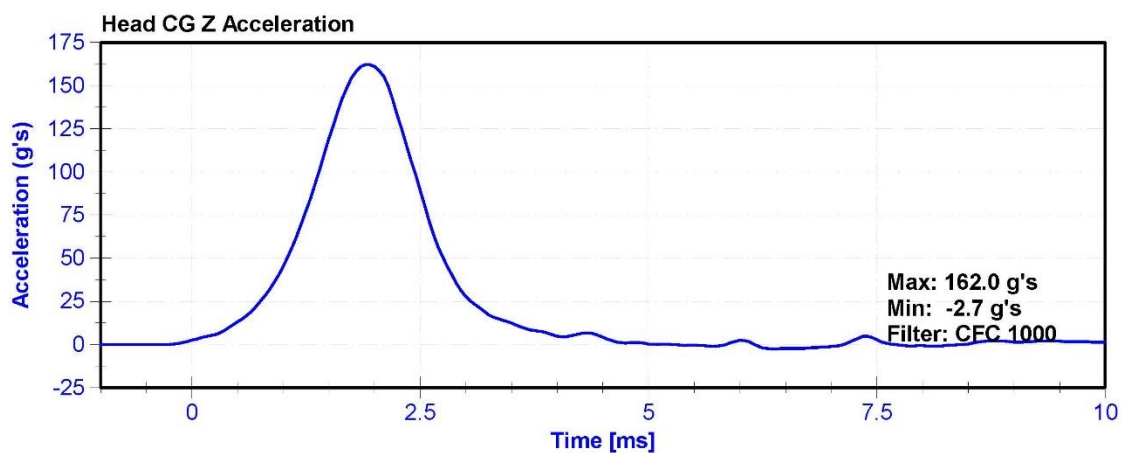
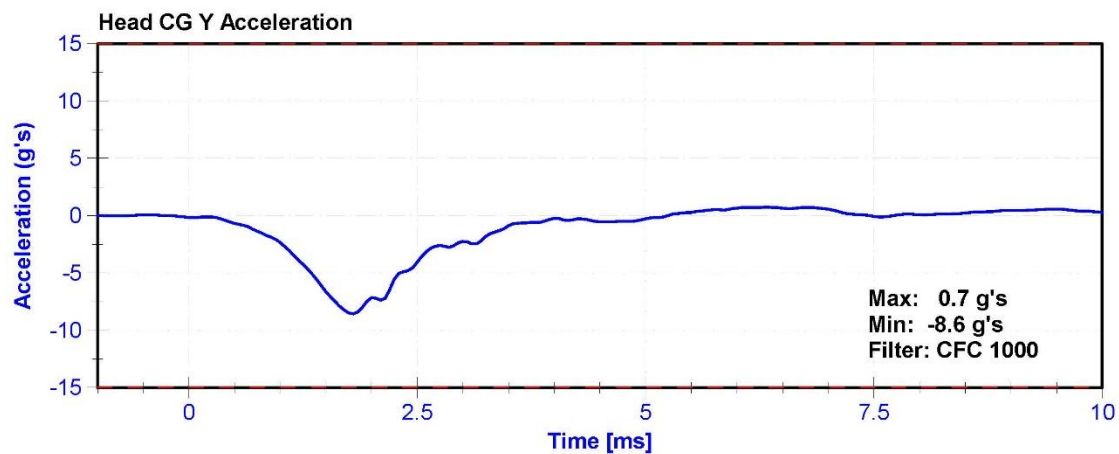
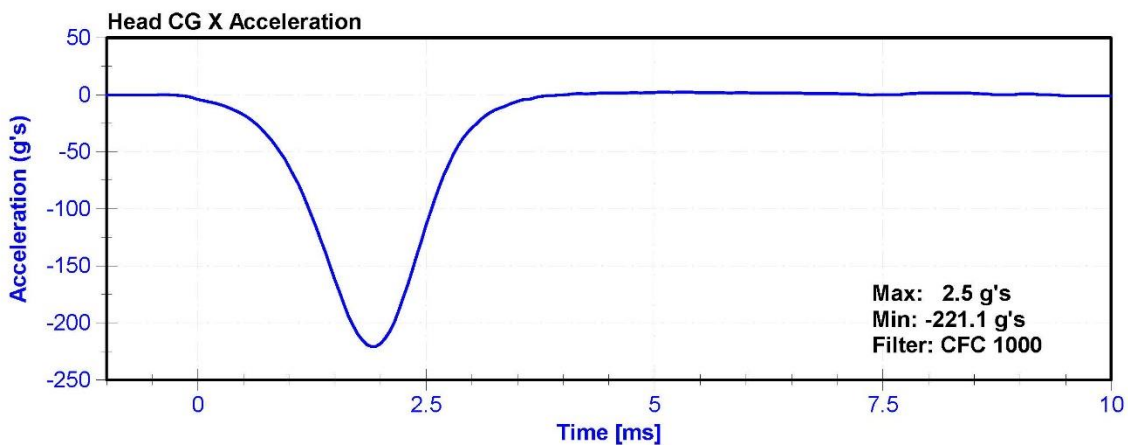
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.8	Pass
Humidity	10	70	%	26.7	Pass
Resultant Acceleration	250	300	g's	274.2	Pass
Oscillation	0	10	%	2.4	Pass
Lateral Acceleration	-15	15	g's	-8.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264	AC-P80337	10/3/2016	4/3/2017
Y Accelerometer	ENDEVCO 7264CT	AC-P80265	10/3/2016	4/3/2017
Z Accelerometer	ENDEVCO 7264CT	AC-P83418	10/3/2016	4/3/2017





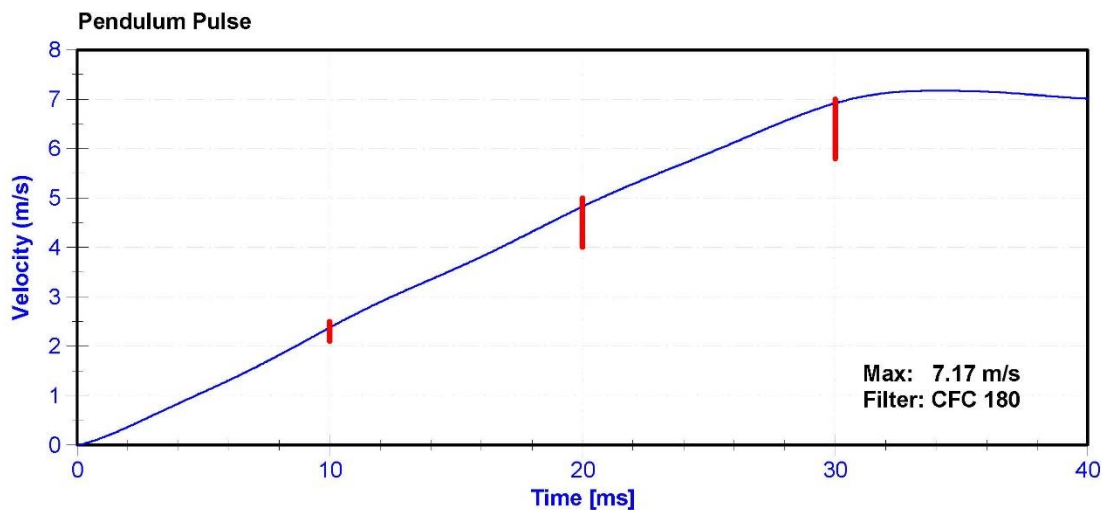
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	288	Laboratory Supervisor	M.Goehle

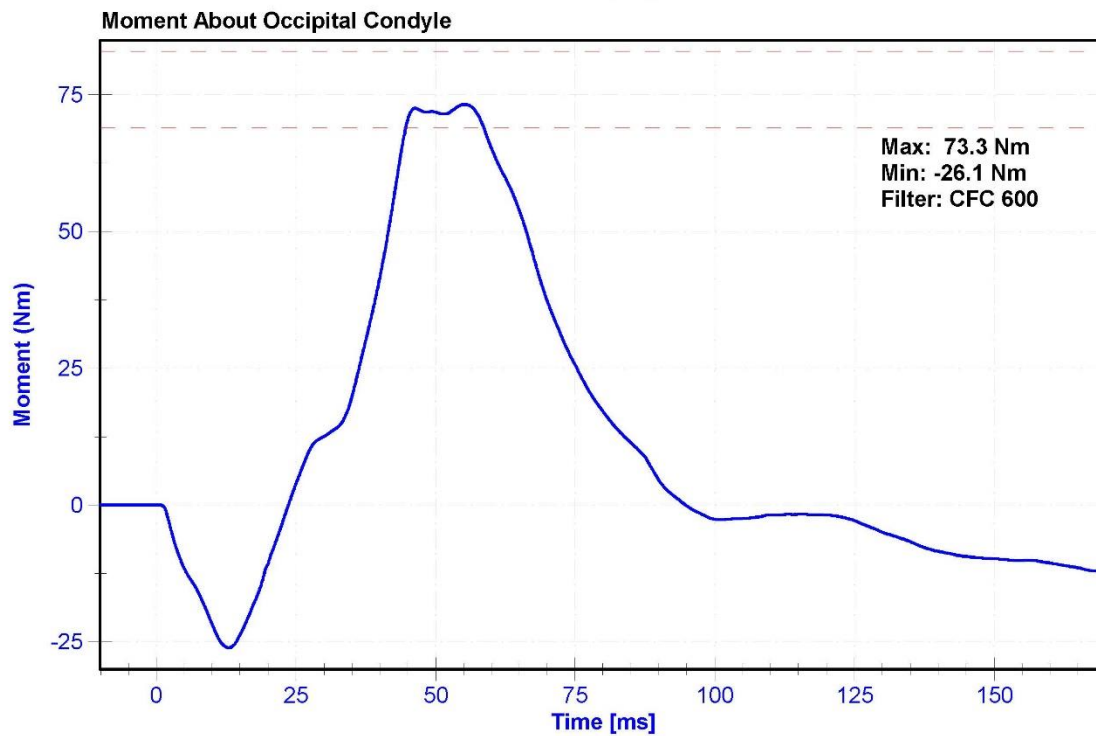
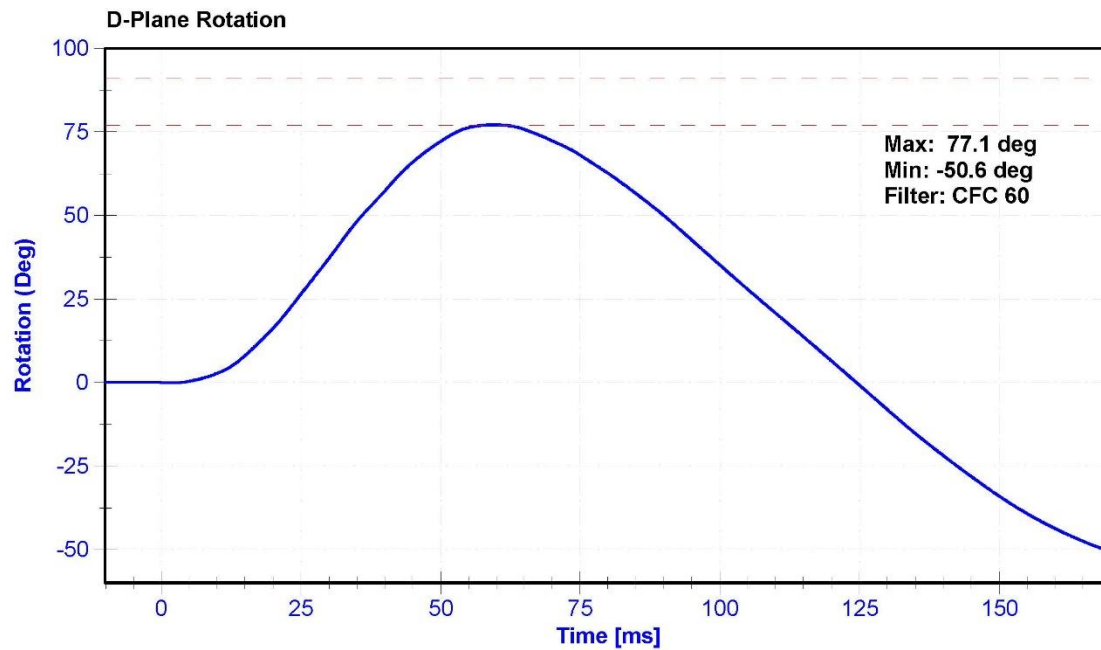
Results

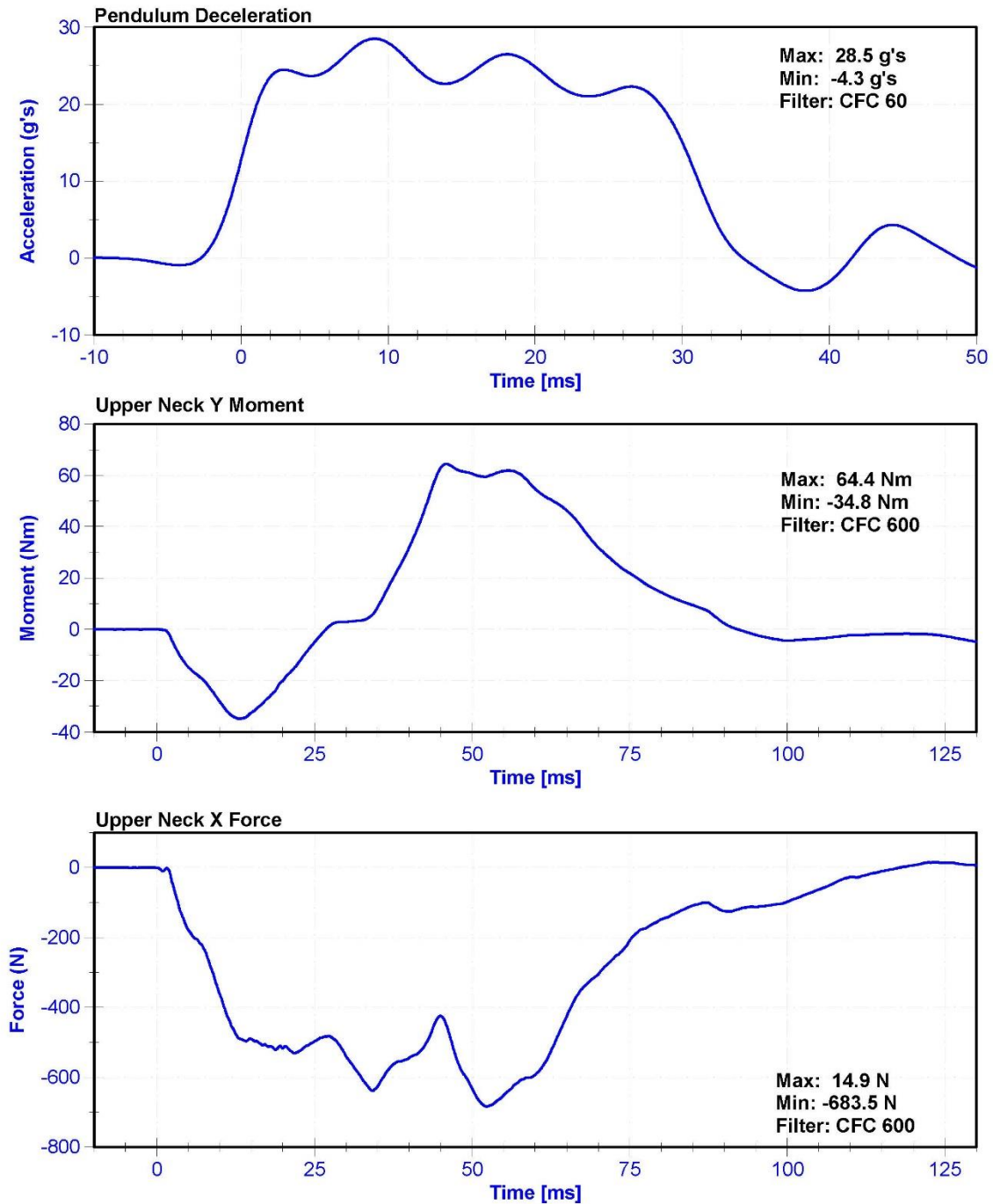
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	28.6	Pass
Velocity	6.89	7.13	m/s	7.037	Pass
Pendulum Impulse at 10ms	2.1	2.5	m/s	2.38	Pass
Pendulum Impulse at 20ms	4.0	5.0	m/s	4.83	Pass
Pendulum Impulse at 30ms	5.8	7.0	m/s	6.92	Pass
Max D Plane Rotation	77	91	deg	77.1	Pass
Max Moment During Rotation Interval	69	83	Nm	73.3	Pass
Moment Decay to 10.0 Nm	80	100	ms	86.4	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	ETI SP22G	DS-PendPot	10/3/2016	10/3/2017
Condyle Potentiometer	ETI SP22G	DS-CondPot	10/3/2016	10/3/2017
Upper Neck Load Cell	DENTON 1716A	LC-2206Fx	5/24/2016	5/24/2017







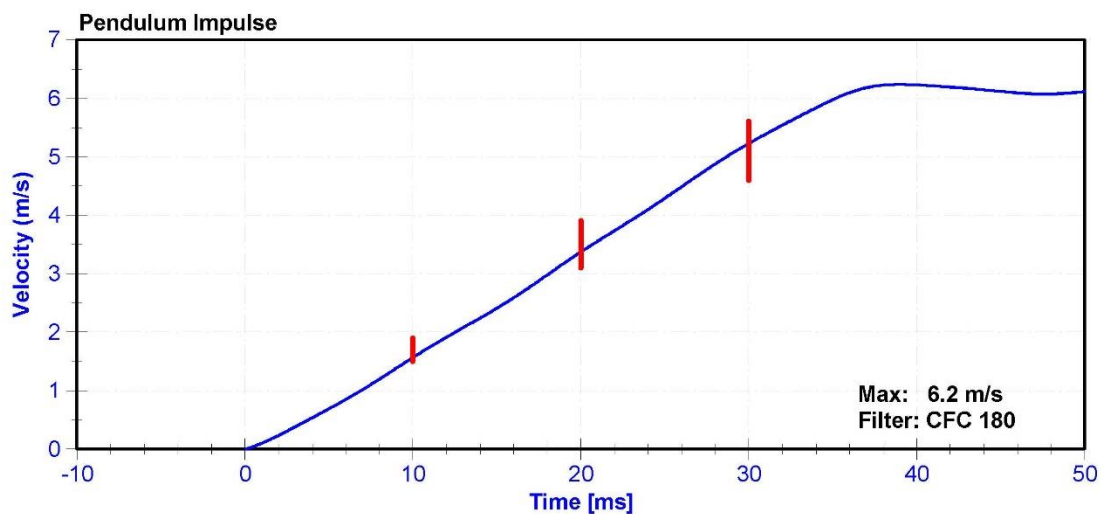
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	288	Laboratory Supervisor	M.Goehle

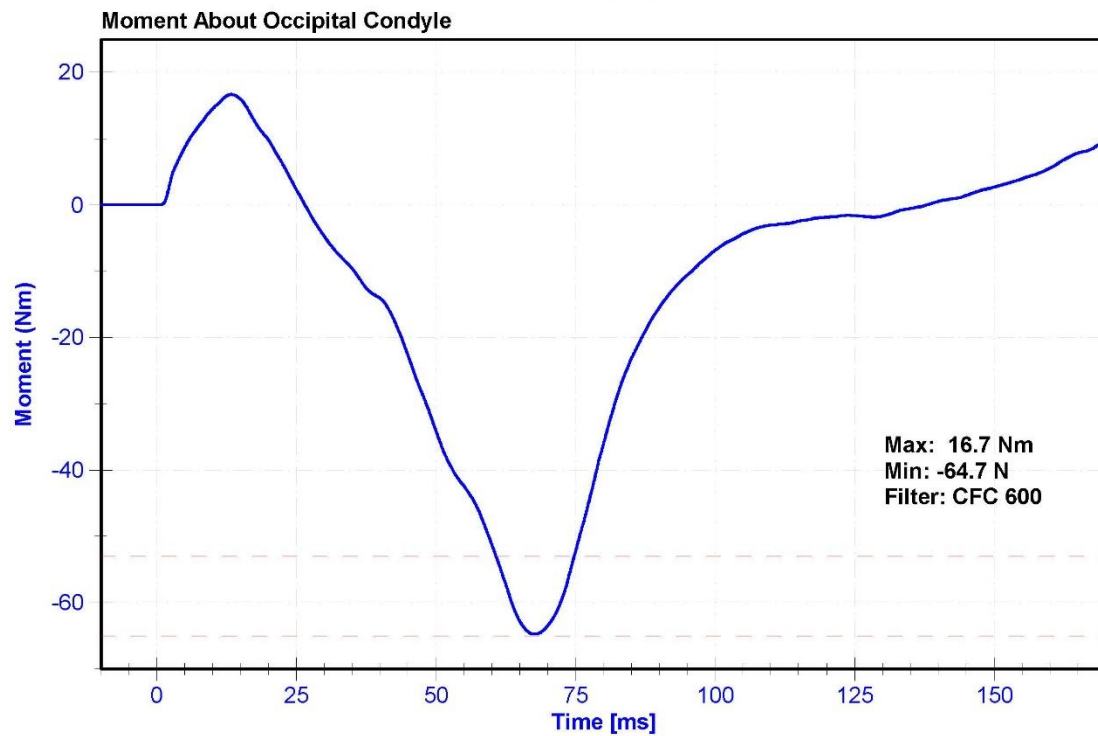
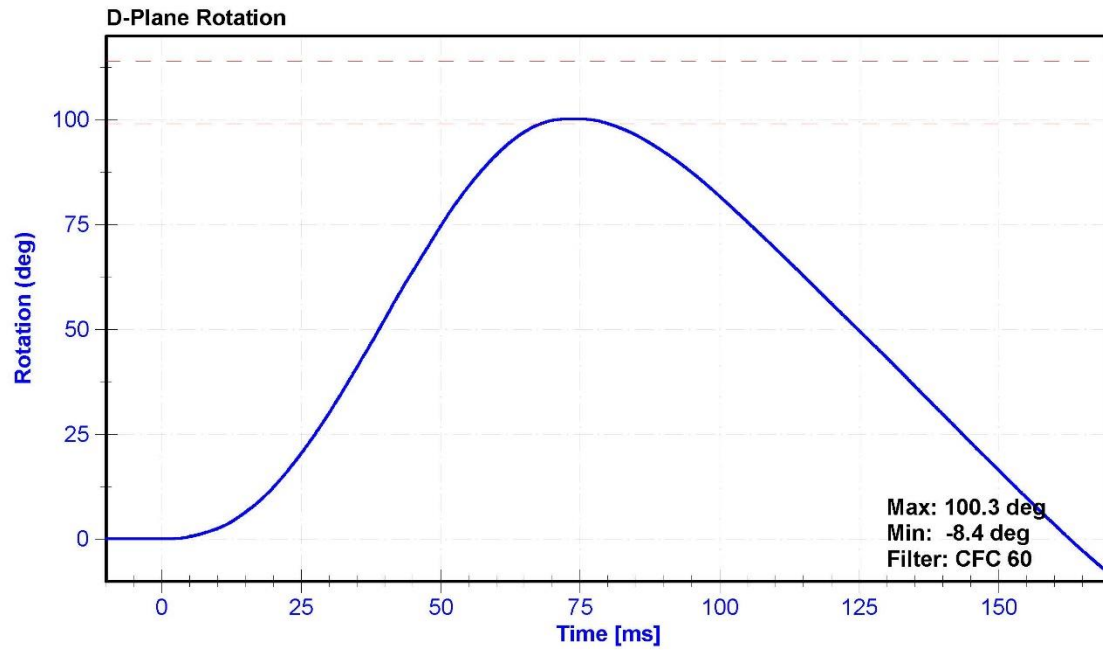
Results

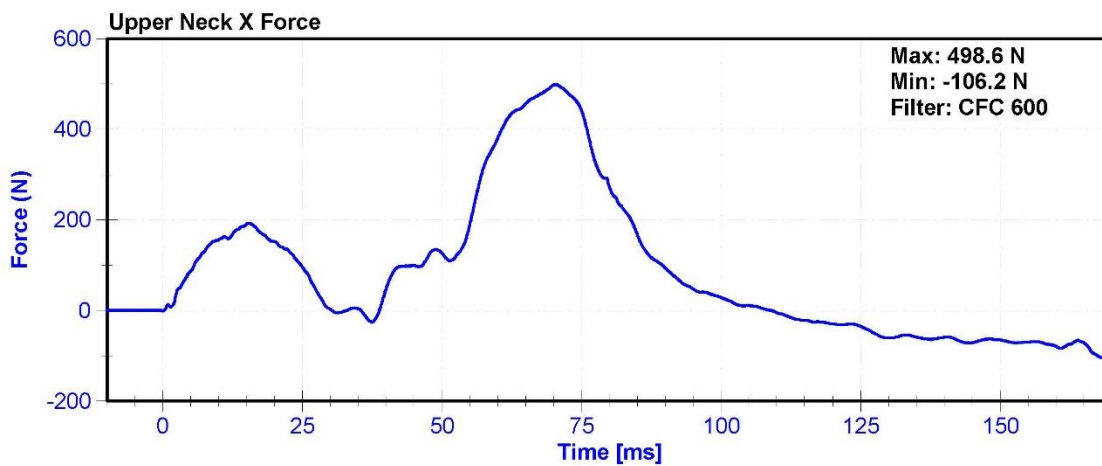
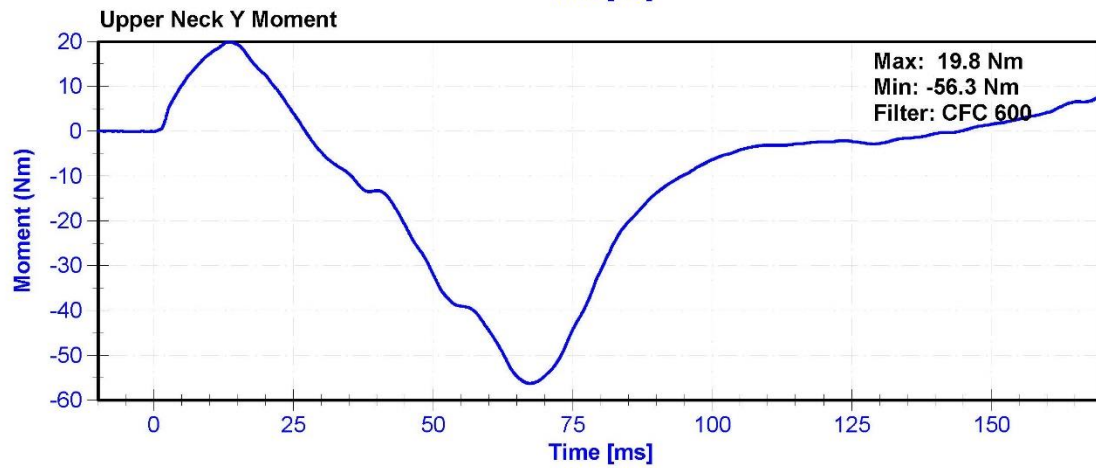
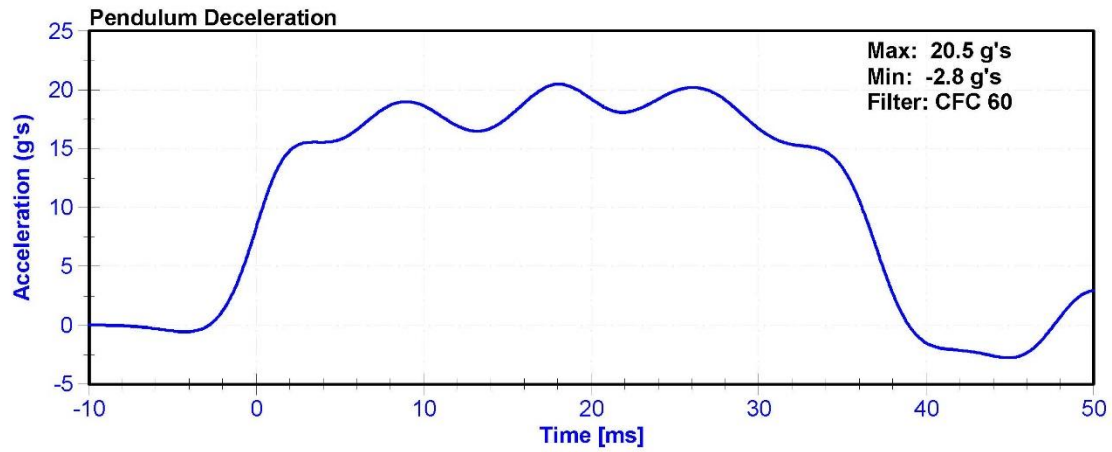
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	28.4	Pass
Velocity	5.95	6.19	m/s	6.025	Pass
Pendulum Impulse at 10ms	1.5	1.9	m/s	1.57	Pass
Pendulum Impulse at 20ms	3.1	3.9	m/s	3.37	Pass
Pendulum Impulse at 30ms	4.6	5.6	m/s	5.23	Pass
D Plane Rotation	99	114	deg	100.3	Pass
Moment During Rotation Interval	-65	-53	Nm	-64.7	Pass
Moment Decay to -10Nm	94	114	ms	95.9	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	ETI SP22G	DS-PendPot	10/3/2016	10/3/2017
Condyle Potentiometer	ETI SP22G	DS-CondPot	10/3/2016	10/3/2017
Upper Neck Load Cell	DENTON 1716A	LC-2206Fx	5/24/2016	5/24/2017







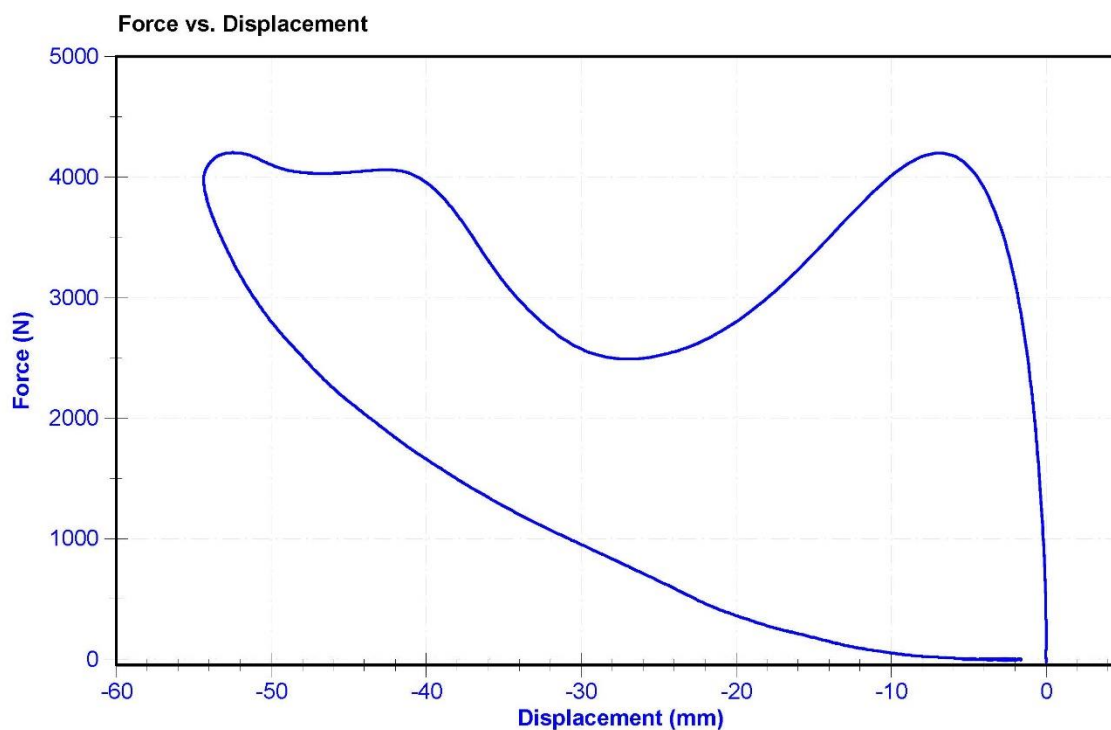
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	288	Laboratory Supervisor	M. Goehle

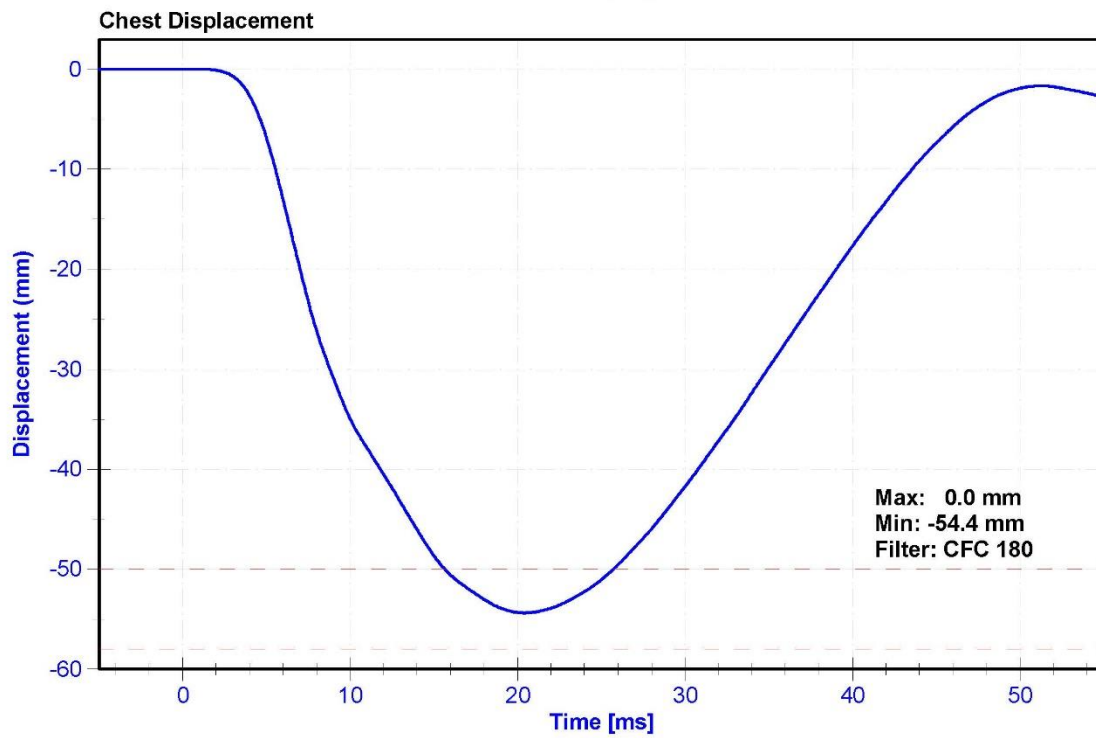
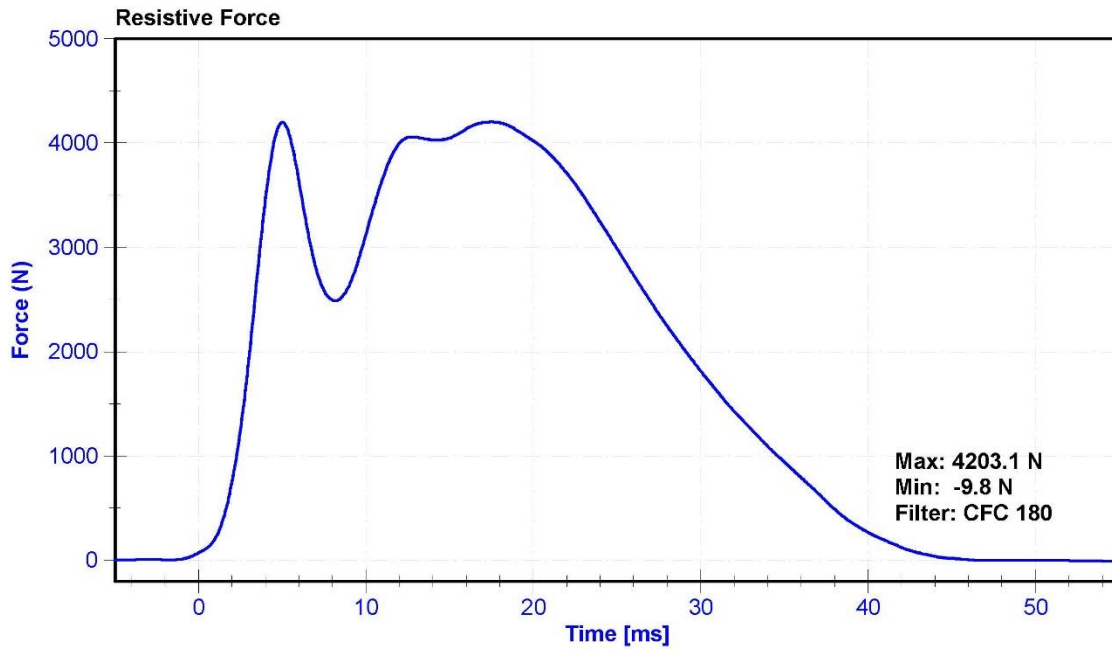
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	22.4	Pass
Velocity	6.59	6.83	m/s	6.655	Pass
Chest Deflection	-58	-50	mm	-54.4	Pass
Maximum Resistive Force (50 to 58mm)	3900	4400	N	4203.1	Pass
Maximum Resistive Force (18 to 50mm)	0	4600	N	4097.4	Pass
Hysteresis	69	85	%	69.3	Pass

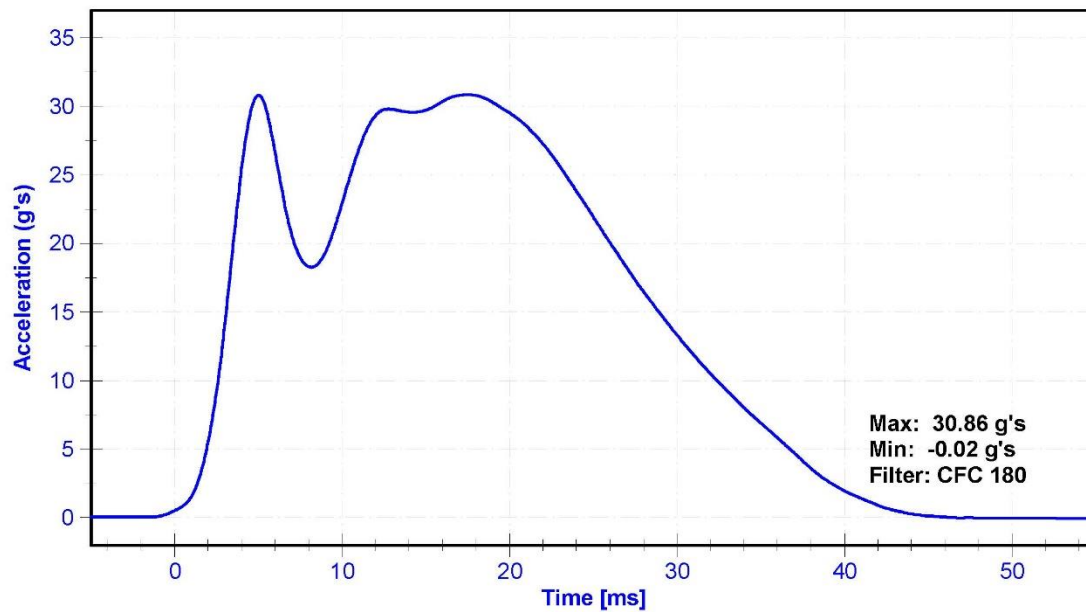
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Chest Potentiometer	SERVO 14CB1-2897	DS-288	9/30/2016	9/30/2017

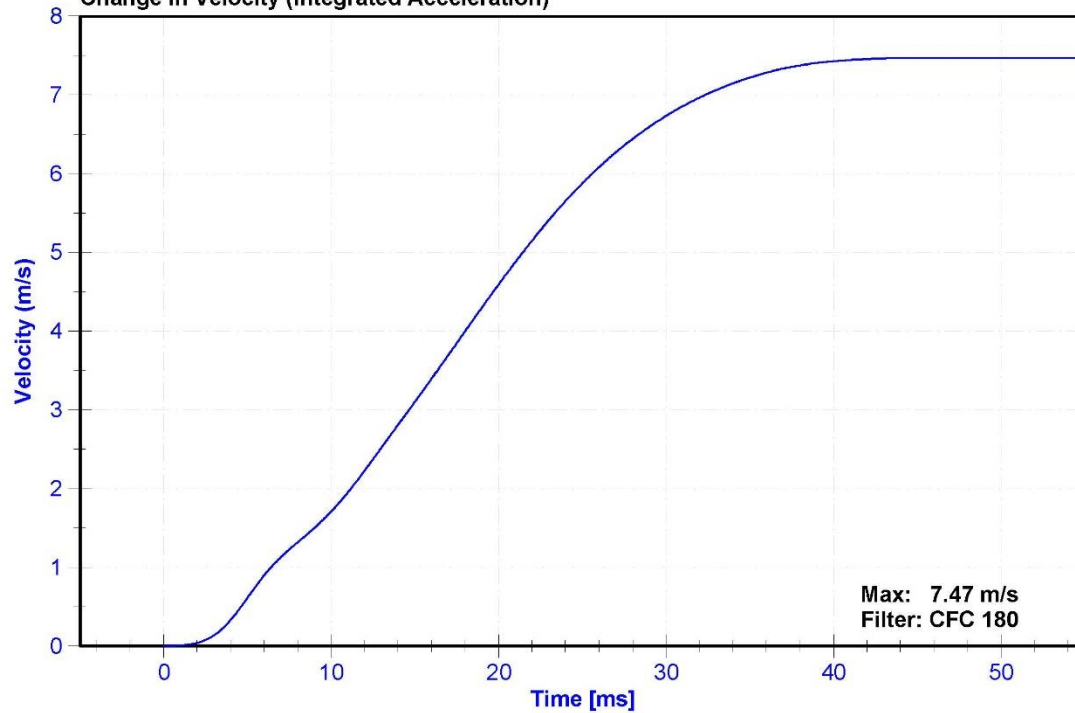




Probe Acceleration



Change in Velocity (Integrated Acceleration)



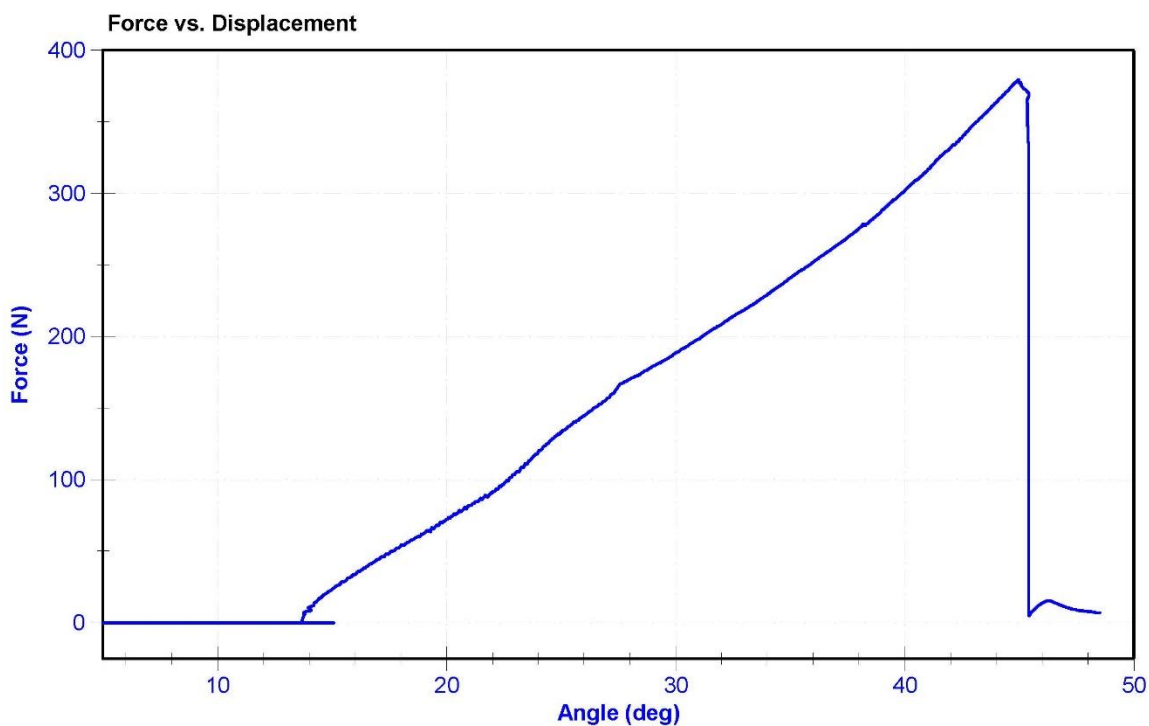
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	288	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.6	25.6	°C	21.4	Pass
Humidity	10	70	%	28	Pass
Initial Angle	0	20	deg	13.6	Pass
Force at 45 Degrees	320	390	N	379.3	Pass
Return Angle Relative to Initial	0	8	deg	5.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	Rieker N4C-1	DS-13051548	9/7/2016	9/7/2017
Load Cell	Interface SML-200	LC-493319	9/7/2016	9/7/2017



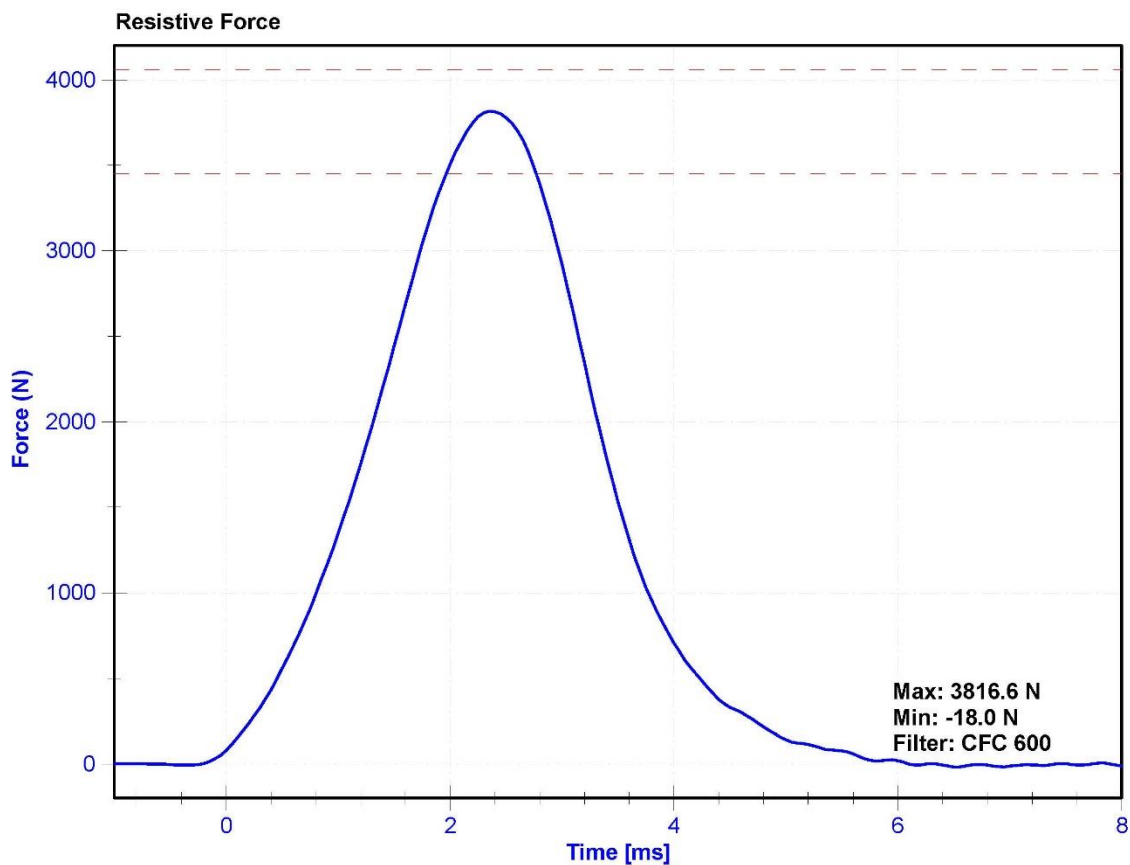
ATD Manufacturer	FTSS	Test Technician	S. Keller
ATD Serial Number	288	Laboratory Supervisor	M. Goehle

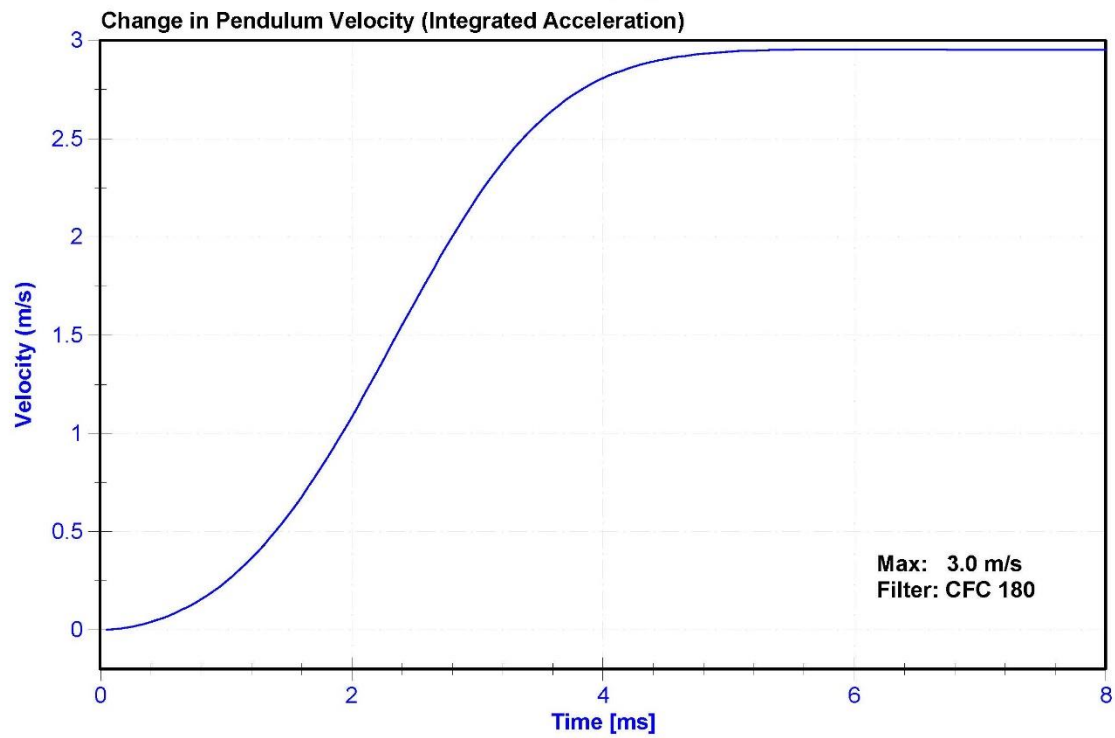
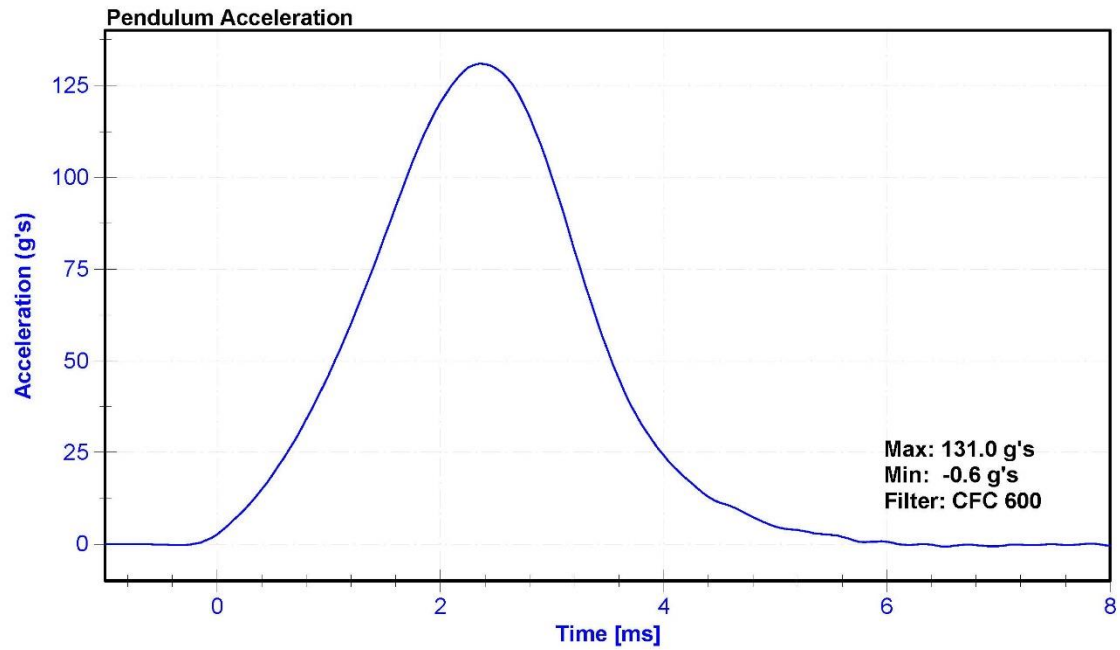
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.2	Pass
Humidity	10	70	%	21.9	Pass
Velocity	2.07	2.13	m/s	2.104	Pass
Resistive Force	3450	4060	N	3816.6	Pass

Transducer Calibrations

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





ATD Manufacturer	FTSS	Test Technician	S. Keller
ATD Serial Number	288	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.2	Pass
Humidity	10	70	%	21.9	Pass
Velocity	2.07	2.13	m/s	2.102	Pass
Resistive Force	3450	4060	N	3669.4	Pass

Transducer Calibrations

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

