

**REPORT NUMBER: NCAP-CAL-19-008**

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

**FCA US LLC  
2019 Ram 1500 Quad Cab  
Truck**

**NHTSA No: M20190315**

**PREPARED BY:  
CALSPAN CORPORATION  
P.O. BOX 400  
BUFFALO, NEW YORK 104625**



**July 19, 2019**


**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**

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Administration, in response to Contract Number DTNH22-12-D-00260.

This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof.

If trade or manufacturers' names or products are mentioned it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared by:  Date: July 19, 2019  
Vince Paolini, Program Engineer

Approved by:  Date: July 19, 2019  
Vanessa Hansen, Operations Manager

**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: \_\_\_\_\_

**TECHNICAL REPORT DOCUMENTATION PAGE**

<b>1. Report No.</b> NCAP-CAL-19-008		<b>2. Government Accession No.</b>		<b>3. Recipient's Catalog No.</b>																																																					
<b>4. Title and Subtitle</b> Final Report of New Car Assessment Program Frontal Impact Testing of a 2019 Ram 1500 Quad Cab Truck NHTSA No.: M20190315				<b>5. Report Date</b> July 19, 2019																																																					
				<b>6. Performing Organization Code</b> CAL																																																					
<b>7. Author(s)</b> Vince Paolini, Project Engineer Vanessa Hansen, Operations Manager				<b>8. Performing Organization Report No.</b> CAL-DOT-2019-008																																																					
<b>9. Performing Organization Name and Address</b> Calspan Corporation Transportation Test Operations P.O. Box 400 Buffalo, New York 104625				<b>10. Work Unit No.</b>																																																					
				<b>11. Contract or Grant No.</b> DTNH22-12-D-00260																																																					
<b>12. Sponsoring Agency Name and Address</b> U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards (NRM-110) 1200 New Jersey Ave., SE, Room W43-410 Washington, D.C. 20590				<b>13. Type of Report and Period Covered:</b> Final Test Report May 1, 2019 - July 19, 2019																																																					
				<b>14. Sponsoring Agency Code</b> NRM-110																																																					
<b>15. Supplementary Notes</b>																																																									
<b>16. Abstract</b> A 56.30 km/h (35 mph), NCAP Frontal Impact Test was conducted on a 2019 Ram 1500 Quad Cab Truck 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 May 1, 2019.  The impact velocity of the vehicle was 56.23 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 621 mm at the vehicles centerline 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. 142)</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 (HIC<sub>15</sub>)</td> <td></td> <td>700</td> <td>230.921</td> <td>700</td> <td>282.923</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>-21.845</td> <td>52</td> <td>-12.315</td> </tr> <tr> <td>Nij</td> <td></td> <td>1</td> <td>0.348</td> <td>1</td> <td>0.485</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>4,170</td> <td>1781.739</td> <td>2,620</td> <td>1245.367</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>4,000</td> <td>-184.965</td> <td>2,520</td> <td>-453.029</td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>10,008</td> <td>-2205.718</td> <td>6,805</td> <td>-2021.132</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>10,008</td> <td>-2222.958</td> <td>6,805</td> <td>-682.458</td> </tr> </tbody> </table>						Measurement Description	Units	Driver ATD (Serial No. 142)		Passenger ATD (Serial No. 288)		Threshold	Result	Threshold	Result	Head Injury Criteria (HIC <sub>15</sub> )		700	230.921	700	282.923	Maximum Chest Compression	mm	63	-21.845	52	-12.315	Nij		1	0.348	1	0.485	Neck Tension	N	4,170	1781.739	2,620	1245.367	Neck Compression	N	4,000	-184.965	2,520	-453.029	Left Femur Force	N	10,008	-2205.718	6,805	-2021.132	Right Femur Force	N	10,008	-2222.958	6,805	-682.458
Measurement Description	Units	Driver ATD (Serial No. 142)		Passenger ATD (Serial No. 288)																																																					
		Threshold	Result	Threshold	Result																																																				
Head Injury Criteria (HIC <sub>15</sub> )		700	230.921	700	282.923																																																				
Maximum Chest Compression	mm	63	-21.845	52	-12.315																																																				
Nij		1	0.348	1	0.485																																																				
Neck Tension	N	4,170	1781.739	2,620	1245.367																																																				
Neck Compression	N	4,000	-184.965	2,520	-453.029																																																				
Left Femur Force	N	10,008	-2205.718	6,805	-2021.132																																																				
Right Femur Force	N	10,008	-2222.958	6,805	-682.458																																																				
<b>17. Key Words</b> 35 mph Frontal Barrier Impact Test New Car Assessment Program (NCAP)				<b>18. Distribution Statement</b> Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division, NPO-411 1200 New Jersey Ave, SE Washington, DC 20590																																																					
<b>19. Security Class. (of this report)</b>  UNCLASSIFIED		<b>20. Security Class. (of this page)</b>  UNCLASSIFIED		<b>21. No. of Pages</b>  161	<b>22. Price</b>																																																				

## TABLE OF CONTENTS

<u>Section</u>		<u>Page</u>
1	Purpose and Summary of the Test	1-1
2	Occupant and Vehicle Information / Data Sheets	2-1
<u>Data Sheet</u>		<u>Page</u>
1	General Test and Vehicle Parameter Data	2-2
2	Seat Adjustment, Fuel System, and Steering Wheel Data	2-6
3	Dummy Longitudinal Clearance Dimensions	2-8
4	Dummy Lateral Clearance Dimensions	2-9
5	Seat Belt Positioning Data	2-10
6	High-Speed Camera Locations and Data	2-11
7	Vehicle Accelerometer Locations	2-13
8	Photographic Reference Target Locations	2-14
9	Load Cell Locations on Fixed Barrier	2-15
10	Test Vehicle Summary of Results	2-16
11	Post-Test Observations	2-17
12	Vehicle Profile Measurements	2-18
13	Accident Investigation Division Data	2-20
14	Vehicle Intrusion Measurements	2-21
15	Summary of FMVSS 212, 219 (Partial), and 301 Data	2-23
16	FMVSS 301 Static Rollover Results	2-25
17	Dummy/Vehicle Temperature Stabilization Chart	2-26
<u>Appendix</u>		<u>Page</u>
A	Photographs	A-1
B	Dummy Response Data Traces	B-1
C	Dummy Calibration and Performance Verification Data	C-1

## 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 2019 Ram 1500 Quad Cab Truck at a velocity of 56.23 km/h. The test was performed at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on May 1, 2019. 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, 50<sup>th</sup> percentile male anthropomorphic test device (ATD), was placed in the driver seating position and one Part 572O 5<sup>th</sup> 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. 142) 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 136 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 621 mm at the vehicles centerline. 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 bolster.

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 glove box.

The occupant data is summarized below.

ATD Position	HIC <sub>15</sub>	Nij	Neck Tension (N)	Neck Comp. (N)	3ms Chest Clip (Gs)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver (50 <sup>th</sup> )	230.921	0.348	1781.739	-184.965	38.639	-21.845	-2205.718	-2222.958
Passenger (5 <sup>th</sup> )	282.923	0.485	1245.367	-453.029	39.534	-12.315	-2021.132	-682.458

**GENERAL COMMENTS:**

1. P1 (Driver) serial number - 142
2. P2 (Passenger) serial number - 288

**Data Anomalies:**

- Engine Top X Acceleration, Exceeded calibration range at 47.4 ms
- Barrier Load Cell B3 Fx, Questionable data after 100ms
- Barrier Load Cell B7 Fx, Questionable data after 115ms

## **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: 2019 Ram 1500 Quad Cab Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20190315  
 Test Date: 5/1/2019

**TEST VEHICLE INFORMATION AND OPTIONS**

NHTSA No.	M20190315
Model Year	2019
Make	Ram
Model	1500 Quad Cab
Body Style	Truck
VIN	1C6SRFCT0KN652265
Body Color	Silver
Odometer Reading (km /mi)	14 miles
Engine Displacement (L)	5.7
Type / No. Cylinders	V8
Engine Placement	Inline
Transmission Type	Automatic
Transmission Speeds	8-Speed
Overdrive	Yes
Final Drive	All Wheel Drive
Roof Rack	No
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes
Automatic Door Locks (ADLs)	Yes

Traction Control System (TCS)	Yes
Power Steering	Yes
Power Window Auto-Reverse	No
Driver Frontal Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	No
Front Pass. Frontal Airbag	Yes
Front Pass. Curtain Airbag	Yes
Front Pass. Head/Torso Airbag	No
Front Pass. Torso Airbag	No
Front Pass. Torso/Pelvis Airbag	Yes
Front Pass. Pelvis Airbag	No
Front Pass. Knee Airbag	No
Driver Pretensioner	Yes
Driver Load Limiter	Yes
Front Pass. Pretensioner	Yes
Front Pass. Load Limiter	Yes
Other	No

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

**No**

**DATA FROM CERTIFICATION LABEL**

Manufactured By	FCA US LLC
Date of Manufacture	12-18

GVWR (kg)	3221
GAWR Front (kg)	1770
GAWR Rear (kg)	1860

**VEHICLE SEATING AND WEIGHT CAPACITY DATA**

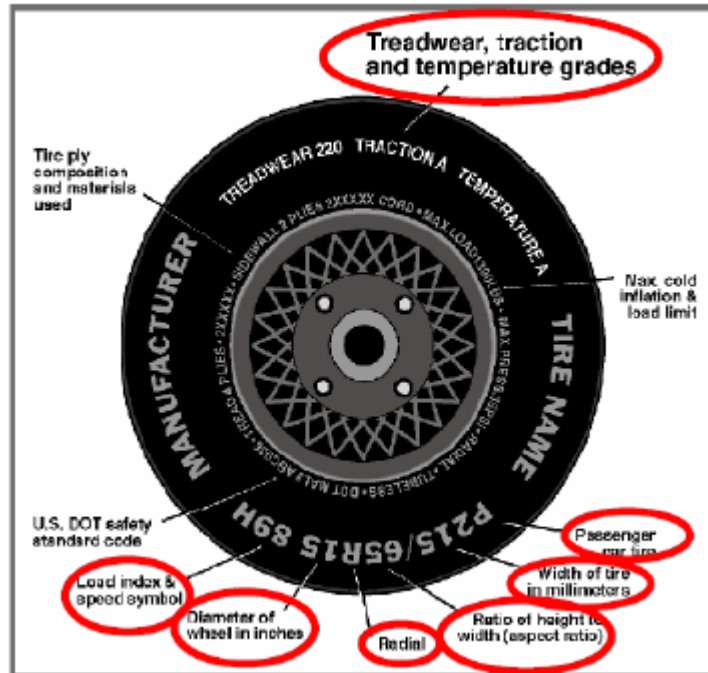
Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench	N/A	
Number of Occupants	3	3	N/A	6
Capacity Wt. (VCW) (kg)				842
Cargo Wt. (RCLW) (kg)				136

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

Test Vehicle: 2019 Ram 1500 Quad Cab Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20190315  
 Test Date: 5/1/2019

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



**VEHICLE TIRE INFORMATION**

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	250	250
Recommended Tire Size	275/65R18	275/65R18
Tire Size on Vehicle	275/65R18	275/65R18
Tire Manufacturer	Bridgestone	Bridgestone
Tire Model	Dueler H/T	Dueler H/T
Treadwear	520	520
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel, 1 Nylon	2 Polyester, 2 Steel, 1 Nylon
Load Index / Speed Symbol	116T	116T
Tire Material	Rubber	Rubber
DOT Safety Code Left	9BYJDHT3718	9BYJDHT3718
DOT Safety Code Right	9BYJDHT3718	9BYJDHT3718

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

Test Vehicle: 2019 Ram 1500 Quad Cab Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20190315  
 Test Date: 5/1/2019

**TEST VEHICLE WEIGHTS**

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	724	490		777	577	
Right	kg	695	475		728	573	
Ratio	%	60	40		57	43	
Totals	kg	1419	965	2384	1505	1150	2655

**TARGET TEST WEIGHT CALCULATION**

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	2384	(A)
Weight of 1 P572E ATD & 1 P572O ATD	kg	142	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	136	(C)
Calculated Vehicle Target Weight (TVTW)	kg	2662	(A+B+C)

**TEST VEHICLE ATTITUDES AND CG**

Condition	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	947	949	1006	1006	1448
As Tested	mm	935	932	978	974	1549
Post-Test	mm	951	951	981	975	

**GENERAL TEST VEHICLE DATA**

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	3576
Total Vehicle Length at Left Side	mm	5748
Total Vehicle Length at Centerline	mm	5814
Total Vehicle Length at Right Side	mm	5748
Weight of Ballast in Cargo Area	kg	66
Weight of Vehicle Components Removed	kg	0
Amount of Stoddard Solvent in Fuel Tank	L	116.2

**LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT:**

None

---



---



---

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

Test Vehicle: 2019 Ram 1500 Quad Cab Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20190315  
 Test Date: 5/1/2019

**TARGET VEHICLE STRUCTURAL MEASUREMENT**

No.	Description	Pre-Test
1	Total Length	5814
2	Total Width	2029
3*	Bumper Top Height	723
4*	Bumper Bottom Height	384
5*	Longitudinal Member Top Height	617
6	Distance Between Longitudinal Members	1001
7	Longitudinal Member Width	110
8*	Engine Top Height	1102
9*	Engine Bottom Height	328
10	Engine and Gearbox Width	616
11	Front Bumper-Engine Distance	902
12*	Front Shock Absorber Fixing Height	790
13*	Bonnet Leading Edge Height	1163
14	Front Shock Absorber Fixing Width	1043
15	Front Bumper – Front Axle Distance	1002
16	Front Axle – A Pillar Distance	561
17	A-Pillar – B-Pillar Distance	1149
18	B-Pillar – Rear Axle Distance	1866
19	B-Pillar – C-Pillar Distance	776
20*	Roof Sill Bottom Height	1790
21*	Roof Sill Top Height	1859
22*	Floor Sill Bottom Height	568
23*	Floor Sill Top Height	579

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

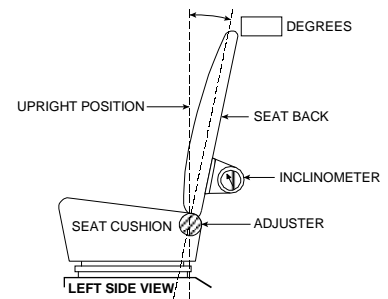
**DATA SHEET NO. 2**  
**SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA**

Test Vehicle: 2019 Ram 1500 Quad Cab Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20190315  
 Test Date: 5/1/2019

**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.



**FRONT SEAT ASSEMBLY**

Seating Position	Degrees
Driver Seat Back Angle	0.9
Passenger Seat Back Angle	2.6

**SEAT FORE / AFT POSITIONS**

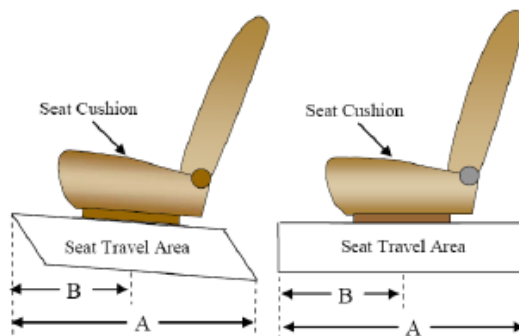
The driver's seat was positioned at the mid-point of fore/aft travel at its lowest position. The passenger's seat was positioned at the most forward position of fore/aft travel. Zero is defined as the forward most position.

Seating Position	Total Fore / Aft Travel	Placed in Position #
Driver Seat	33 (0-32)	16
Passenger Seat	33 (0-32)	0

**SEAT BELT UPPER ANCHORAGE**

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

Seating Position	Total # of Positions	Placed in Position #
Driver Seat	5	0
Passenger Seat	5	0



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

Test Vehicle: 2019 Ram 1500 Quad Cab Truck  
 Test Program: NCAP Frontal Barrier Impact Test

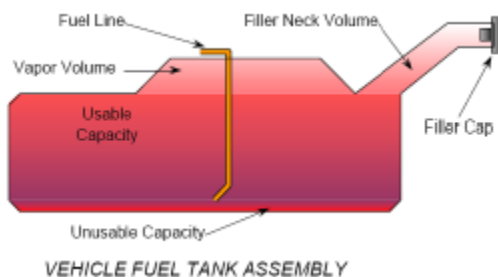
NHTSA No.: M20190315  
 Test Date: 5/1/2019

**FUEL TANK CAPACITY**

Description	Liters
Usable Capacity of "Standard Tank"	98.4
Usable Capacity of "Optional Tank"	124.9
92%-94% of Usable Capacity	114.9 – 117.4
Actual Amount of Solvent Used	116.2
1/3 of Usable Capacity	41.6

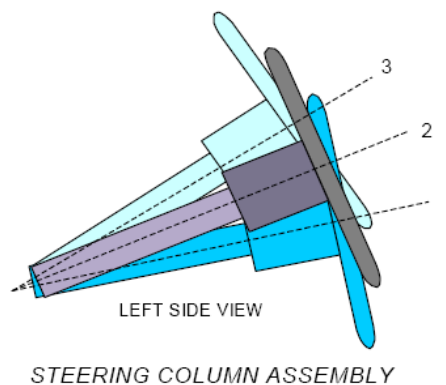
**FUEL PUMP**

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.



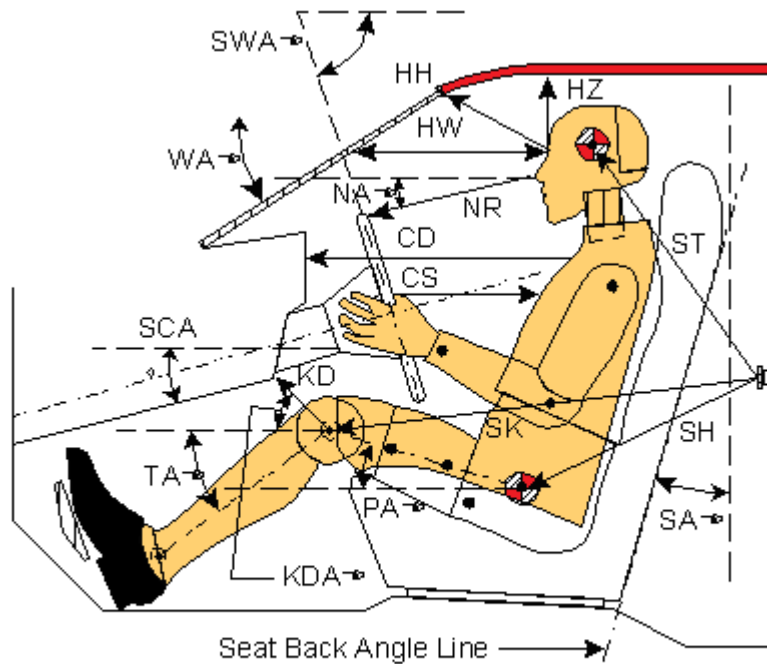
**STEERING COLUMN POSITIONS**

Description	Degrees	Fore / Aft Position (mm)
Lowermost position No. 1	21.0	
Geometric center position No. 2	23.5	
Uppermost position No. 3	25.7	
Telescoping Steering Wheel Travel		60
Test Position	23.5	30

**DATA SHEET NO. 3**  
**DUMMY LONGITUDINAL CLEARANCE DIMENSIONS**

Test Vehicle: 2019 Ram 1500 Quad Cab Truck  
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20190315  
Test Date: 5/1/2019



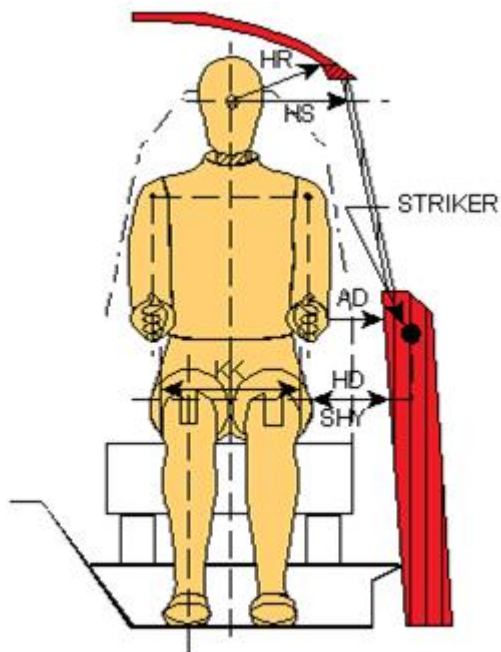
**Left Side View**

Code	Measurement Description	Driver (SN: 142)		Passenger (SN: 288)	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		32.3		
SWA°	Steering Wheel Angle		67.1		
SCA°	Steering Column Angle		22.9		
SA°	Seat Back Angle (on headrest post)		0.9		2.6
HZ	Head to Roof (Z)	219	90	281	90
HH	Head to Header	464	22	431	42.2
HW	Head to Windshield	732	0	770	0
NR	Nose to Rim	415	12.2	501	17.3
CD	Chest to Dash	560		413	
CS	Chest to Steering Hub	327	5.2		
RA	Rim to Abdomen	192	14.2		
KDL	Left Knee to Dash	178	16.2	75	18.8
KDR	Right Knee to Dash	144	16.8	82	19.2
PA°	Pelvic Angle		23.2		20.9
TA°	Tibia Angle		35.1		54.8
SK	Striker to Knee	580	2.3	678	3.0
ST	Striker to Head	618	79.8	577	68.9
SH	Striker to H-Point	198	23	340	10.2

**DATA SHEET NO. 4**  
**DUMMY LATERAL CLEARANCE DIMENSIONS**

Test Vehicle: 2019 Ram 1500 Quad Cab Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20190315  
 Test Date: 5/1/2019



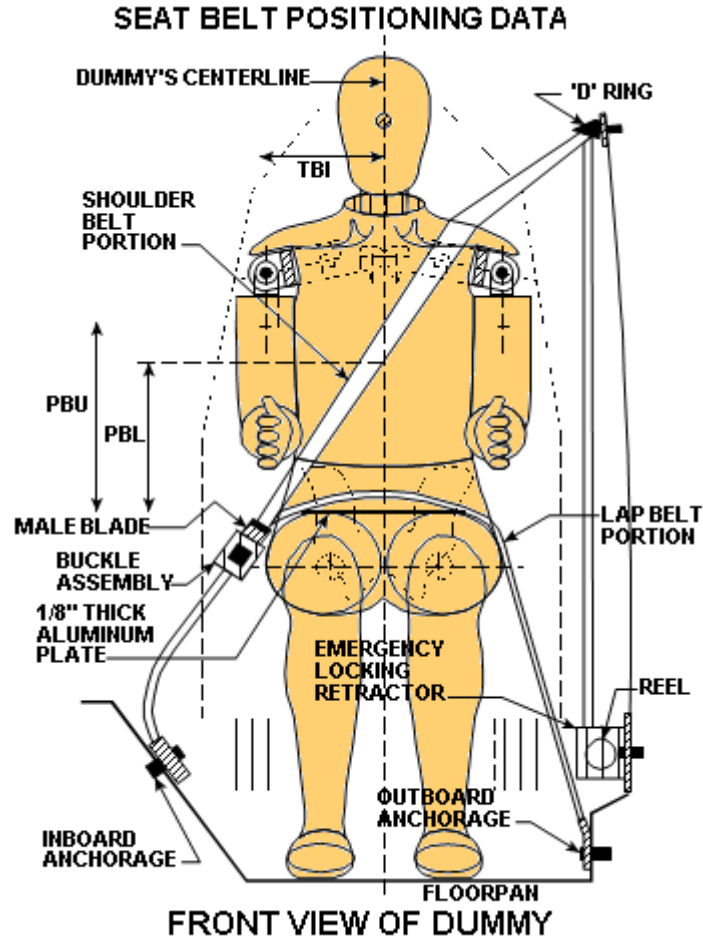
Front View

Code	Description	Driver (mm)	Passenger (mm)
AD	Arm to Door	125	77
HD	H-Point to Door	140	179
HR	Head to Side Header	222	291
HS	Head to Side Window	335	375
KK	Knee to Knee	330	230
SHY	Striker to H-Point (Y Direction)	240	250
AA	Ankle to Ankle	355	165

**DATA SHEET NO. 5  
SEAT BELT POSITIONING DATA**

Test Vehicle: 2019 Ram 1500 Quad Cab Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20190315  
 Test Date: 5/1/2019



**SEAT BELT POSITIONING MEASUREMENTS**

Measurement Description	Units	Driver	Passenger
<b>PBU</b> — Top surface of reference to belt upper edge	mm	355	285
<b>PBL</b> — Top surface of reference to belt lower edge	mm	280	210

**BELT LENGTH DATA**

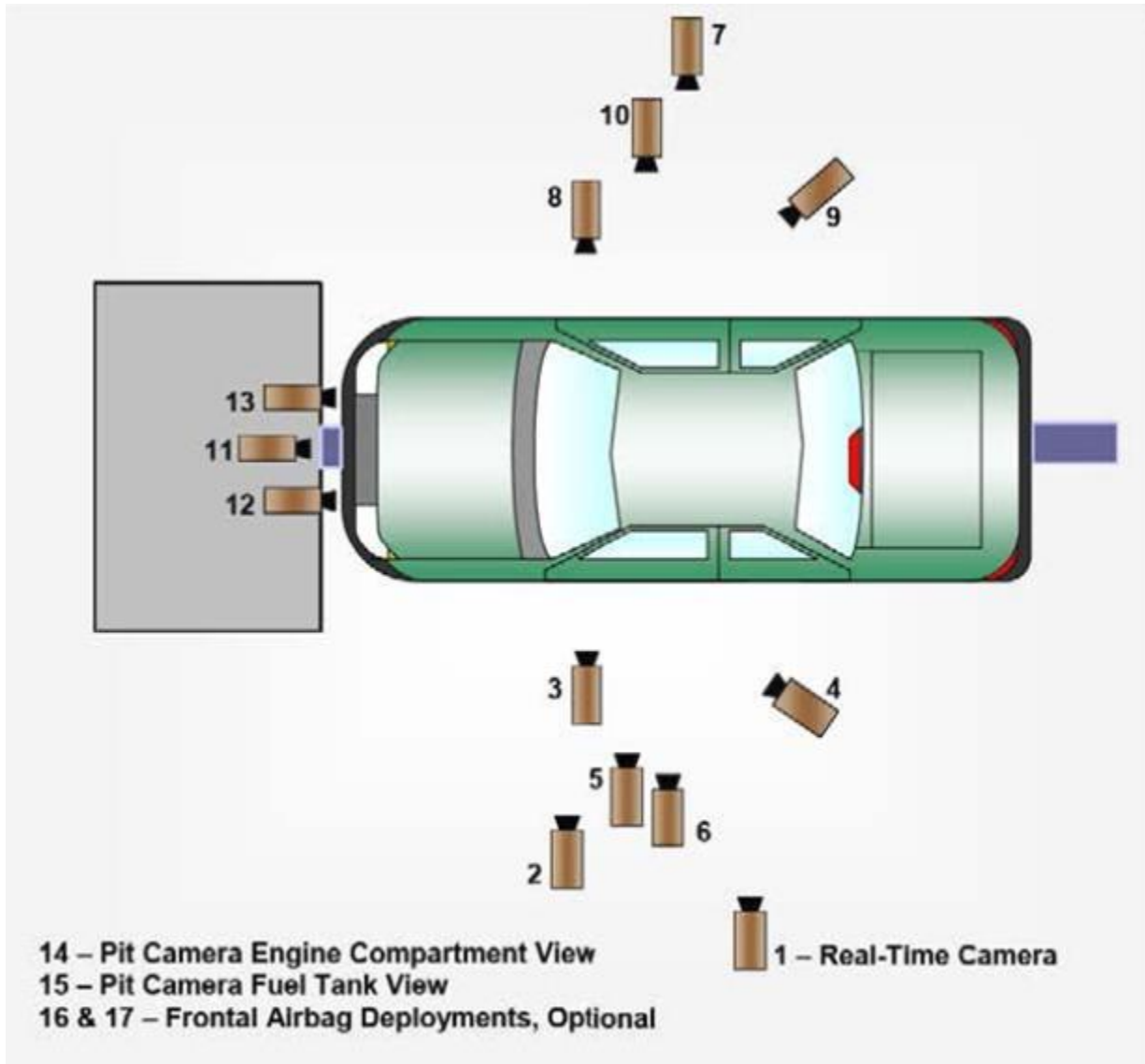
Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	835	895
Lap Belt Length as measured on ATD	mm	765	800
Remainder of belt on reel	mm	1100	1005
Total belt length for continuous webbing systems	mm	2700	2700

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

Test Vehicle: 2019 Ram 1500 Quad Cab Truck  
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20190315  
Test Date: 5/1/2019

**CAMERA POSITIONS FOR FRONTAL IMPACTS**



Top View

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

Test Vehicle: 2019 Ram 1500 Quad Cab Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20190315  
 Test Date: 5/1/2019

**CAMERA LOCATIONS**

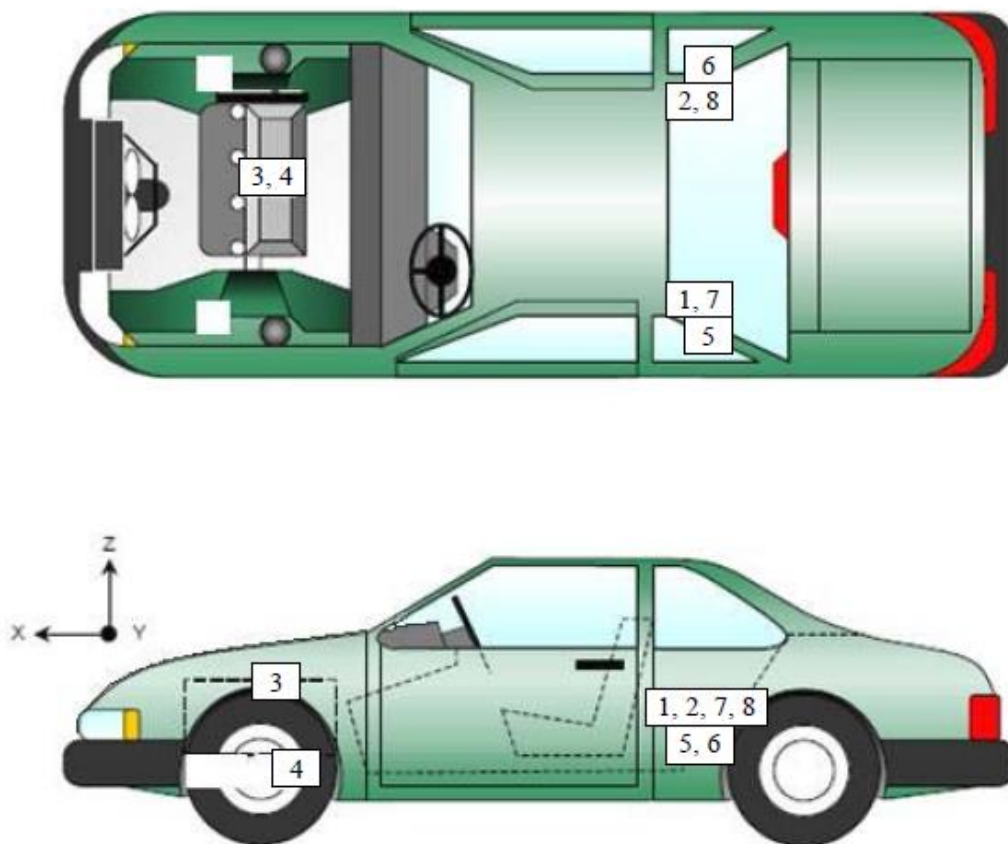
No.	Camera View	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall	-	-	-		60
2	Driver Close-Up	-1629	-6720	-1491	50	1000
3	Left Front Half	-1157	-6460	-1403	28	1000
4	Left Angle	-4397	-5304	-4907	50	1000
5	Steering Column - Top					
6	Steering Column - Bottom					
7	Right Overall	-2489	8874	-1334	24	1000
8	Passenger Close-Up	-1738	7104	-1684	50	1000
9	Right Front Half	-1064	6257	-1280	28	1000
10	Right Angle	4516	5030	-2645	50	1000
11	Windshield	670	0	-2331	8	1000
12	Driver Windshield	670	-450	-2331	12.5	1000
13	Passenger Windshield	670	450	-2331	12.5	1000
14	Pit Front	1478	0	-2446	12.5	1000
15	Pit Rear	3082	0	-2418	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: 2019 Ram 1500 Quad Cab Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20190315  
 Test Date: 5/1/2019



**VEHICLE ACCELEROMETER PRE-TEST LOCATIONS**

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Accelerometer – X Direction	2794	-467	-44
2	Right Rear Accelerometer – X Direction	2765	479	-49
3	Engine Top X	4813	41	-539
4	Engine Bottom X	4561	104	232
5	Left Rear Accelerometer – Z Direction	2794	-467	-44
6	Right Rear Accelerometer – Z Direction	2765	479	-49
7	Left Rear Accelerometer – X Direction Redundant	2794	-489	-44
8	Right Rear Accelerometer – X Direction Redundant	2766	500	-49

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

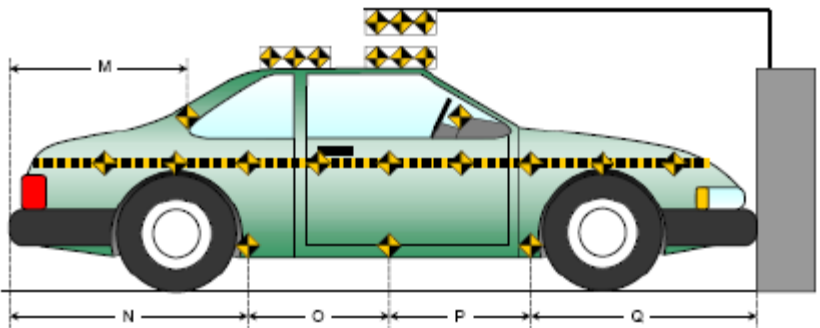
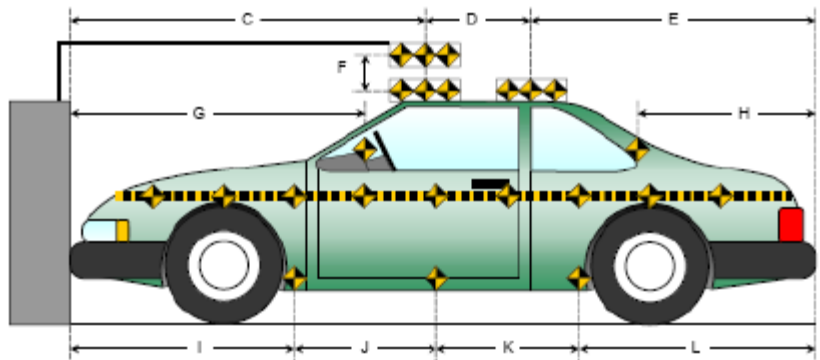
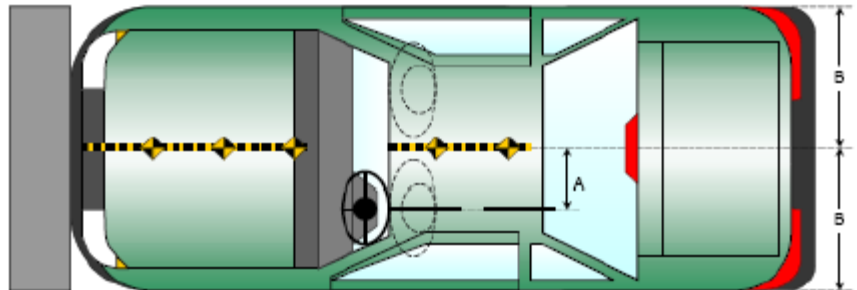
**DATA SHEET NO. 8**  
**PHOTOGRAPHIC REFERENCE TARGET LOCATIONS**

Test Vehicle: 2019 Ram 1500 Quad Cab Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20190315  
 Test Date: 5/1/2019

Item	Value
A	463
B	1014
C	2841
D	612
E	2361
F	196
G	1885
H	2348
I	1588
J	933
K	943
L	2350
M	2357
N	2354
O	935
P	934
Q	1591

All units in millimeters



**DATA SHEET NO. 9**  
**LOAD CELL LOCATIONS ON FIXED BARRIER**

Test Vehicle: 2019 Ram 1500 Quad Cab Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20190315  
 Test Date: 5/1/2019

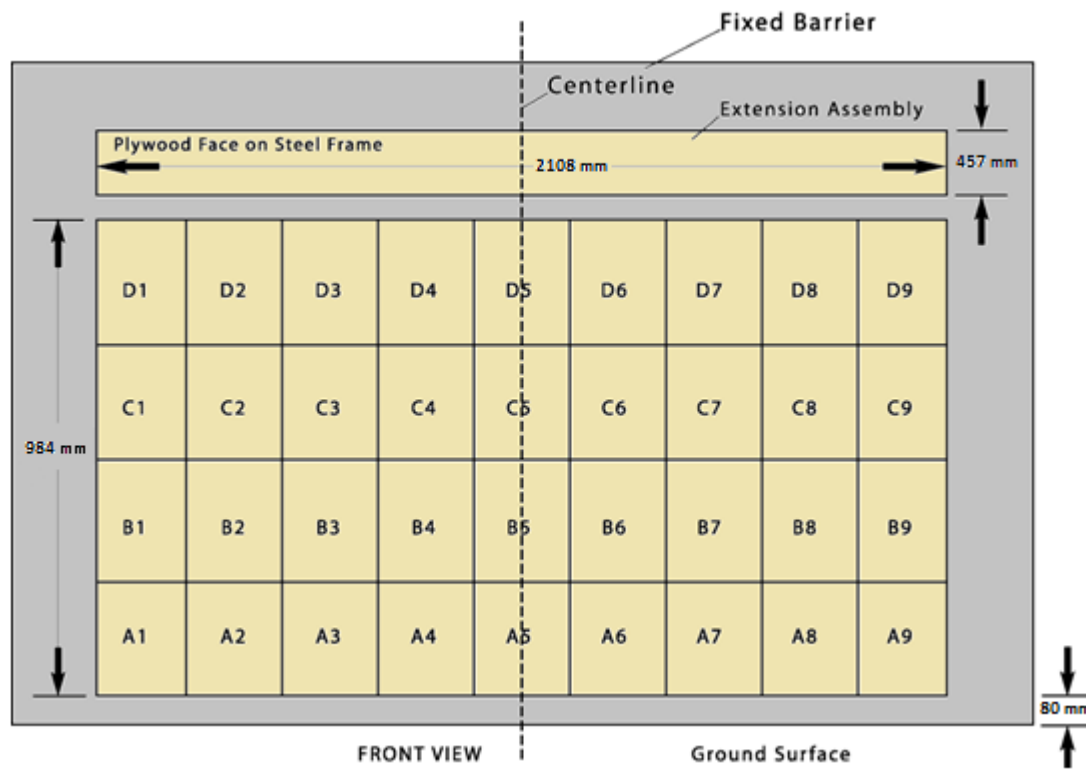


Figure 1 - Load Cell Locations on a 36-Load Cell Barrier with Plywood Height Extension\*

**DATA SHEET NO. 10**  
**TEST VEHICLE SUMMARY OF RESULTS**

Test Vehicle: 2019 Ram 1500 Quad Cab Truck  
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20190315  
Test Date: 5/1/2019

**INSTRUMENTATION**

<b>Instrumentation</b>	<b>Number of Channels Collected</b>
Driver Dummy Accelerometers	46
Passenger Dummy Accelerometers	46
Vehicle Structure Accelerometers	8
Barrier	36
<b>Total</b>	<b>136</b>

**CAMERA COVERAGE**

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

**DATA SHEET NO. 11  
POST-TEST OBSERVATIONS**

Test Vehicle: 2019 Ram 1500 Quad Cab Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20190315  
 Test Date: 5/1/2019

**TEST DUMMY INFORMATION AND CONTACT LOCATIONS**

Description	Driver	Passenger
Dummy Type / Serial No.	P572E 50 <sup>th</sup> Male / 142	P5720 5 <sup>th</sup> 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 Bolster	Glove Box
Right Knee Contact	Knee Bolster	Glove Box

**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	None
Window Damage	None
Other Notable Effects	None

**VEHICLE REBOUND FROM BARRIER**

Measured Parameter	Units	Value
Left Side	mm	232
Center	mm	228
Right Side	mm	200
Average	mm	220

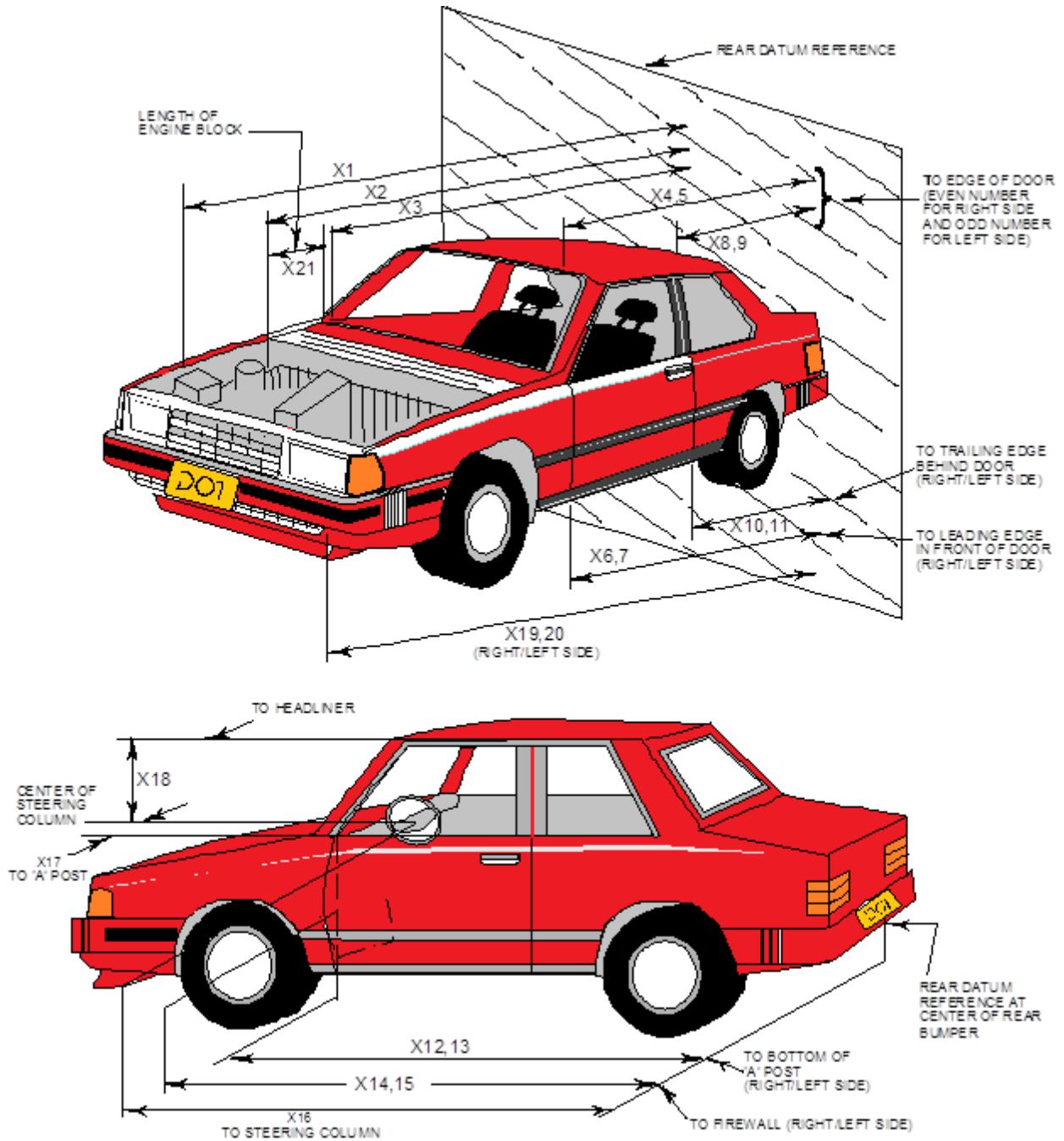
**SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION**

Restraint Type	Driver		Passenger	
	Installed	Deployed	Installed	Deployed
Front Airbag	Yes	Yes	Yes	Yes
Side Airbag 1 - Curtain	Yes	No	Yes	No
Side Airbag 2 - Torso/Pelvis Airbag	Yes	No	Yes	No
Knee Airbag	No	N/A	No	N/A
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: 2019 Ram 1500 Quad Cab Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20190315  
 Test Date: 5/1/2019



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

Test Vehicle: 2019 Ram 1500 Quad Cab Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20190315  
 Test Date: 5/1/2019

No.	Measurement Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	5814	5193	-621
2	Rear Surface of Vehicle (RSOV) to Front of Engine	4913	4865	-48
3	RSOV to Firewall	4700	4687	-13
4	RSOV to Upper Leading Edge of Right Door	4249	4236	-13
5	RSOV to Upper Leading Edge of Left Door	4251	4245	-6
6	RSOV to Lower Leading Edge of Right Door	4176	4177	1
7	RSOV to Lower Leading Edge of Left Door	4177	4185	8
8	RSOV to Upper Trailing Edge of Right Door	3107	3091	-16
9	RSOV to Upper Trailing Edge of Left Door	3107	3099	-8
10	RSOV to Lower Trailing Edge of Right Door	3104	3104	0
11	RSOV to Lower Trailing Edge of Left Door	3105	3112	7
12	RSOV to Bottom of "A" Post of Right Side	4217	4201	-16
13	RSOV to Bottom of "A" Post of Left Side	4217	4207	-10
14	RSOV to Firewall, Right Side	4658	4644	-14
15	RSOV to Firewall, Left Side	4658	4643	-15
16	RSOV to Steering Column	3734	3815	81
17	Center of Steering Column to "A" Post	276	276	0
18	Center of Steering Column to Headliner	450	469	19
19	RSOV to Right Side of Front Bumper	5766	5209	-557
20	RSOV to Left Side of Front Bumper	5764	5192	-572
21	Length of Engine Block	441	441	0
RD	RSOV to Right Side of Dash Panel	3956	3944	-12
CD	RSOV to Center of Dash Panel	3857	3855	-2
LD	RSOV to Left Side of Dash Panel	3949	3947	-2

All Dimensions in mm

**DATA SHEET NO. 13  
ACCIDENT INVESTIGATION DIVISION DATA**

Test Vehicle: 2019 Ram 1500 Quad Cab Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20190315  
 Test Date: 5/1/2019

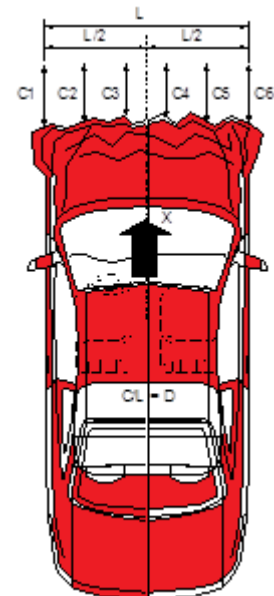
**VEHICLE INFORMATION**

VIN: 1C6SRFCT0KN652265  
 Vehicle Size Category: Truck

Wheelbase (mm): 3576  
 Test Weight (kg): 2,655

**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): 56.23  
 Velocity Change (km/h): 62.4  
 Time of Separation (ms): 176



**CRUSH PROFILE**

Collision Deformation Classification: 12FDEW3  
 Midpoint of Damage: C3  
 Damage Region Length (mm): 1531  
 Impact Mode: Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush Zone 1 at Left Side	mm	5595	5206	389
C2	Crush Zone 2 at Left Side	mm	5744	5207	537
C3	Crush Zone 3 at Left Side	mm	5786	5204	582
C4	Crush Zone 4 at Right Side	mm	5789	5210	579
C5	Crush Zone 5 at Right Side	mm	5753	5230	523
C6	Crush Zone 6 at Right Side	mm	5615	5194	421
L	C1 to C6	mm	1531	1600	-69

**DATA SHEET NO. 14  
VEHICLE INTRUSION MEASUREMENTS**

Test Vehicle: 2019 Ram 1500 Quad Cab Truck  
 Test Program: NCAP Frontal Barrier Impact Test

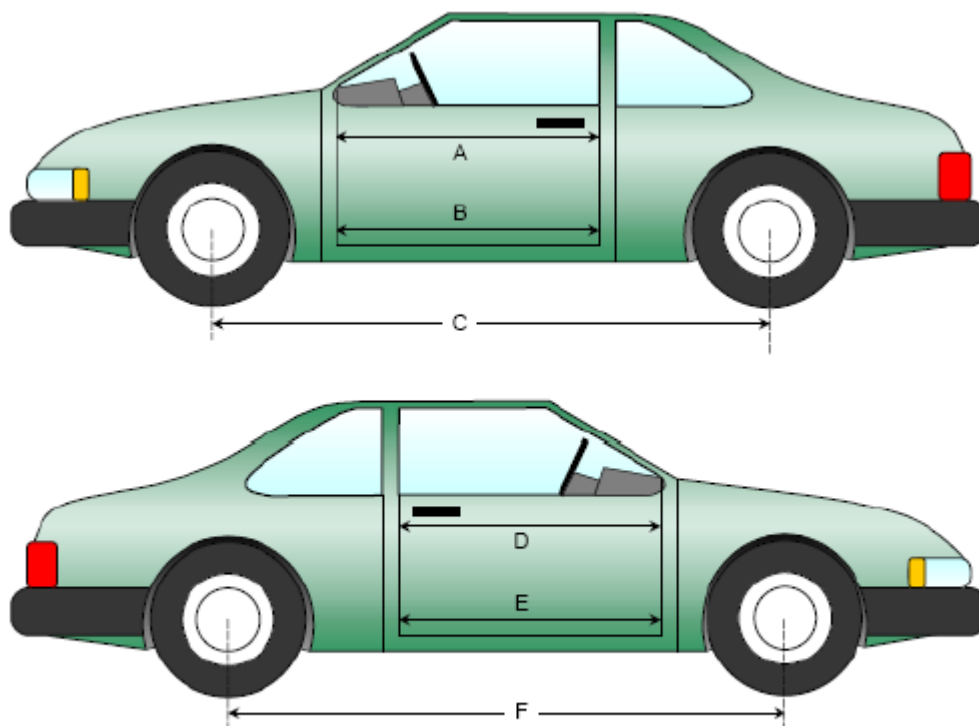
NHTSA No.: M20190315  
 Test Date: 5/1/2019

**DOOR OPENING WIDTH**

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	989	989	0
B	Left Side Lower	mm	892	893	1
D	Right Side Upper	mm	989	988	-1
E	Right Side Lower	mm	891	890	-1

**WHEELBASE MEASUREMENTS**

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	3576	3520	-56
F	Right Side Wheelbase	mm	3576	3529	-47



**Left & Right Side Views**

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

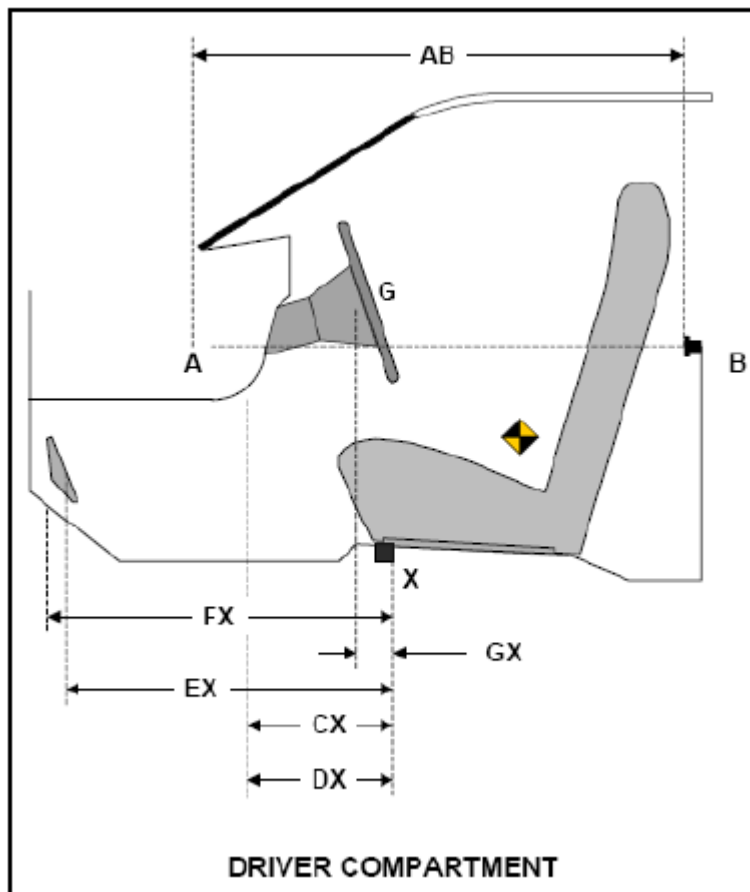
Test Vehicle: 2019 Ram 1500 Quad Cab Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20190315  
 Test Date: 5/1/2019

**DRIVER COMPARTMENT INTRUSION**

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	733	734	1
CX	Left Knee Bolster to X	mm	288	301	13
DX	Right Knee Bolster to X	mm	269	276	7
EX	Brake Pedal to X	mm	526	520	-6
FX	Foot Rest to X	mm	648	653	5
GX	Center of Steering Column Wheel Hub to X	mm	54	129	75

*X = Front of Seat Track (Stationary)*



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

Test Vehicle: 2019 Ram 1500 Quad Cab Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20190315  
 Test Date: 5/1/2019

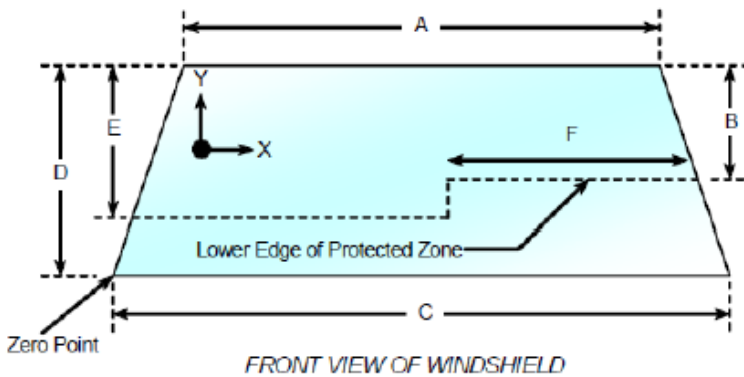
**Windshield Mounting Details:** A 0.8 mm trim surrounds the top and side of windshield while a plastic shroud is on the bottom.

*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	2321.5	2321.5	100
Right Side	2321.5	2321.5	100
Total	4643	4643	100



Item	Units	Value
A	mm	1420
B	mm	474
C	mm	1547
D	mm	838
E	mm	501
F	mm	475

**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: 2019 Ram 1500 Quad Cab Truck  
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20190315  
Test Date: 5/1/2019

**FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA**

Temperature at Time of Impact: 21 ° C

Test Time: 9:42 AM

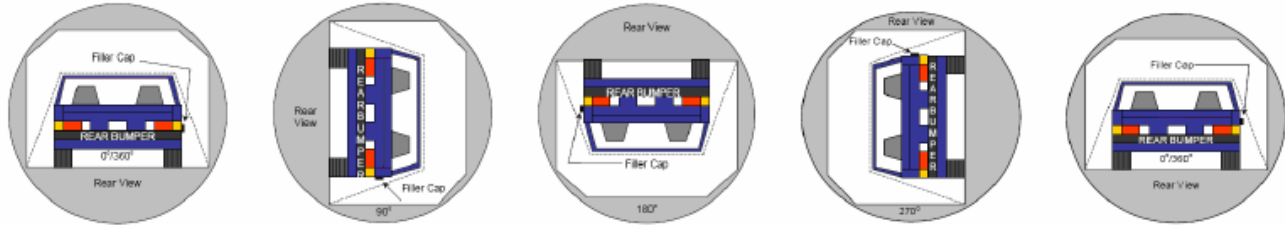
**STODDARD SOLVENT SPILLAGE MEASUREMENTS**

- 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: 2019 Ram 1500 Quad Cab Truck  
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20190315  
Test Date: 5/1/2019



0° TO 90°                      90° TO 180°                      180° TO 270°                      270° TO 360°

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°	66	300	366
90° to 180°	65	300	365
180° to 270°	67	300	367
270° to 360°	65	300	365

**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	

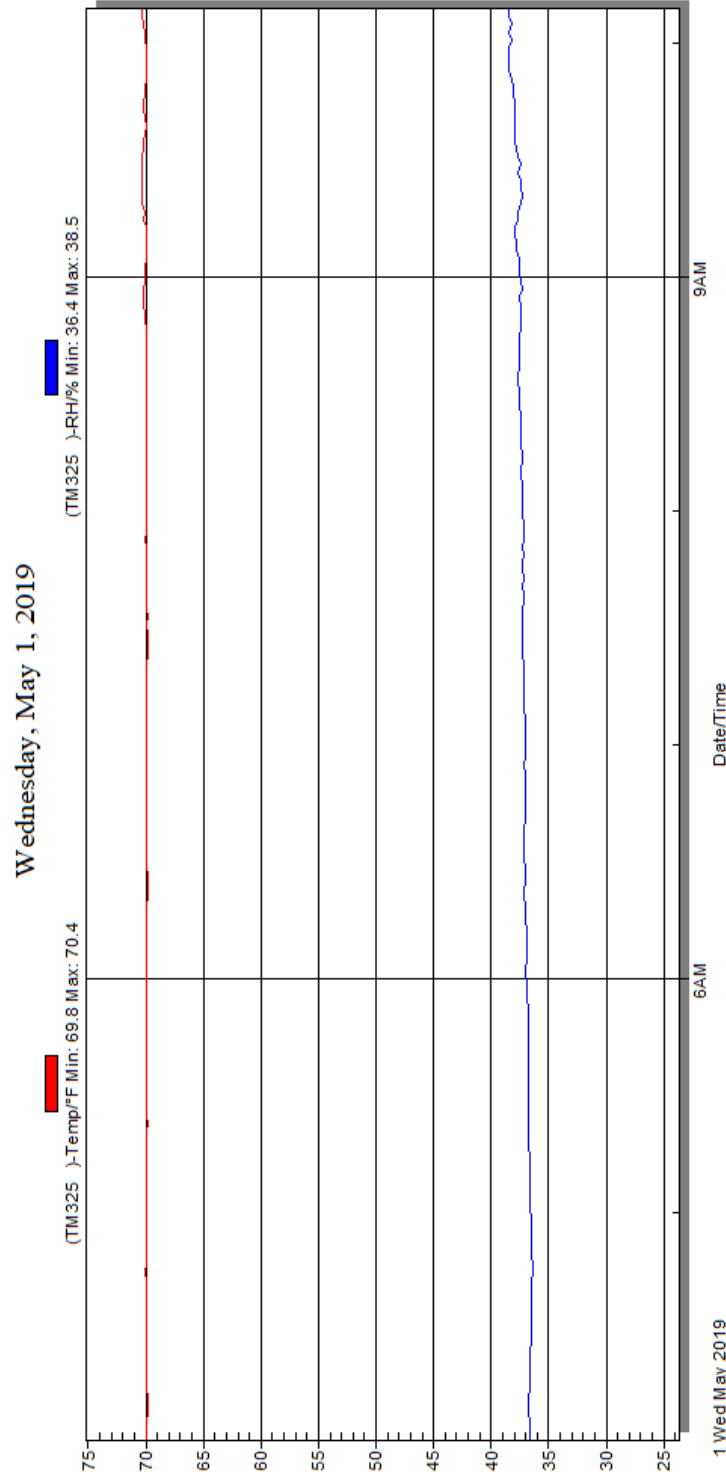
**SOLVENT SPILLAGE LOCATION TABLE**

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: 2019 Ram 1500 Quad Cab Truck  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20190315  
 Test Date: 5/1/2019



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

**APPENDIX A**  
**PHOTOGRAPHS**

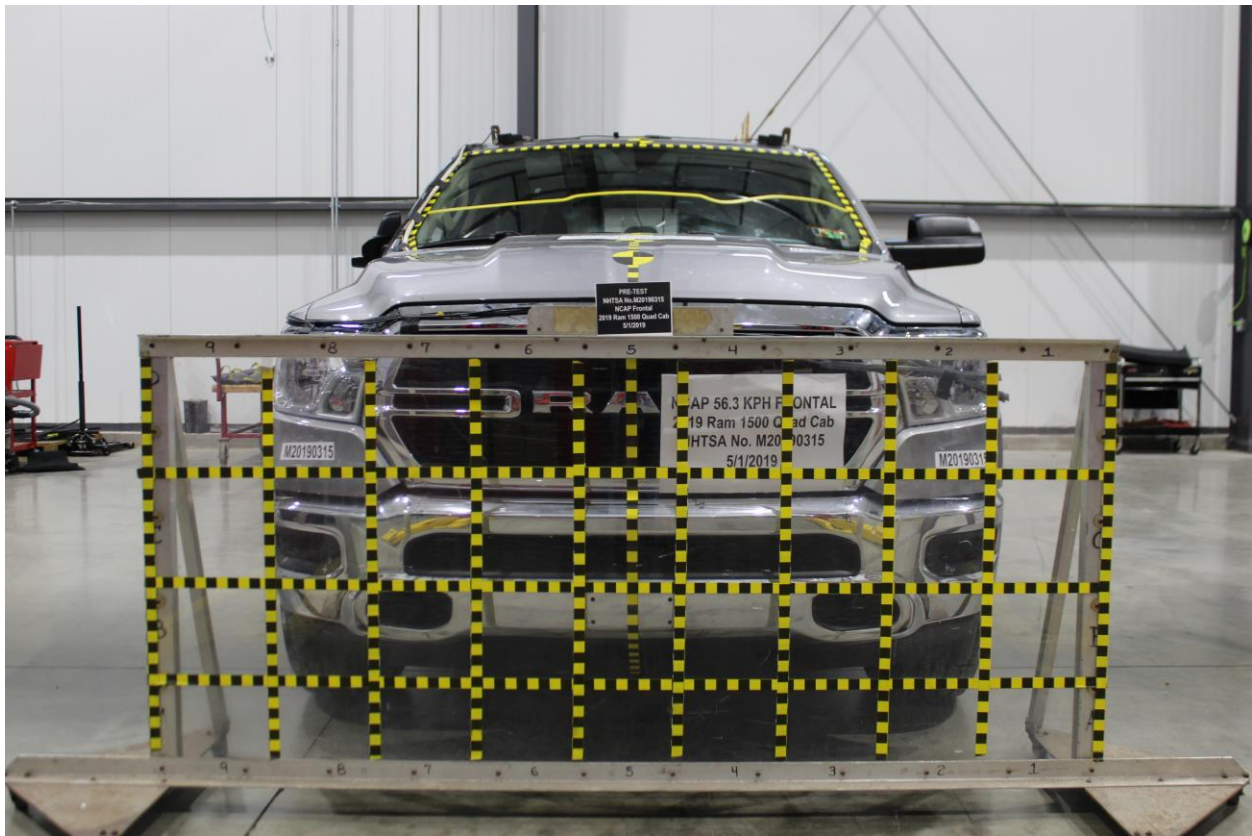
## TABLE OF PHOTOGRAPHS

<b>Fig.</b>	<b>Description</b>	<b>Page</b>
1	Load Cell Location	A-5
2	Pre-Test Load Cell Wall	A-5
3	Post-Test Load Cell Wall	A-6
4	Manufacturer's Label	A-6
5	Tire Placard	A-7
6	2019 Ram 1500 Frontal As Delivered	A-7
7	Left Rear 3-4 View, as Received	A-8
8	Pre-Test Front View of Test Vehicle	A-8
9	Post-Test Front View of Test Vehicle	A-9
10	Pre-Test Left View of Test Vehicle	A-9
11	Post-Test Left View of Test Vehicle	A-10
12	Pre-Test Right View of Test Vehicle	A-10
13	Post-Test Right View of Test Vehicle	A-11
14	Pre-Test Right Front 3-4 View	A-11
15	Post-Test Right Front 3-4 View	A-12
16	Pre-Test Left Rear 3-4 View	A-12
17	Post-Test Left Rear 3-4 View	A-13
18	Pre-Test Windshield View	A-13
19	Post-Test Windshield View	A-14
20	Pre-Test Engine Compartment View	A-14
21	Post-Test Engine Compartment View	A-15
22	Pre-Test Fuel Filler Cap View	A-15
23	Post-Test Fuel Filler Cap View	A-16
24	Pre-Test Front Underbody View <sup>1</sup>	A-16
25	Post-Test Front Underbody View <sup>1</sup>	A-17
26	Pre-Test Rear Underbody View <sup>1</sup>	A-17
27	Post-Test Rear Underbody View <sup>1</sup>	A-18
28	Pre-Test Dummy Cable Routing	A-18
29	Post-Test Dummy Cable Routing	A-19
30	Pre-Test Driver Dummy Front View	A-19
31	Post-Test Driver Dummy Front View	A-20
32	Pre-Test Driver Dummy Window View	A-20
33	Post-Test Driver Dummy Window View	A-21
34	Pre-Test Driver Dummy and Vehicle Interior View	A-21
35	Post-Test Driver Dummy and Vehicle Interior View	A-22

<b>Fig.</b>	<b>Description</b>	<b>Page</b>
36	Pre-Test Driver's Seat Fore-Aft Markings	A-22
37	Post-Test Driver's Seat Fore-Aft Markings	A-23
38	Pre-Test View of Belt Anchorage for Driver Dummy	A-23
39	Post-Test View of Belt Anchorage for Driver Dummy	A-24
40	Pre-Test Driver Dummy Feet	A-24
41	Post-Test Driver Dummy Feet	A-25
42	Pre-Test Driver's Side Knee Bolster	A-25
43	Post-Test Driver's Side Knee Bolster	A-26
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
50	Post-Test View of the Steering Wheel	A-29
51	Pre-Test Passenger Dummy Front View	A-30
52	Post-Test Passenger Dummy Front View	A-30
53	Pre-Test Passenger Dummy Window View	A-31
54	Post-Test Passenger Dummy Window View	A-31
55	Pre-Test Passenger Dummy and Vehicle Interior View	A-32
56	Post-Test Passenger Dummy and Vehicle Interior View	A-32
57	Pre-Test Passenger's Seat Fore-Aft Markings	A-33
58	Post-Test Passenger's Seat Fore-Aft Markings	A-33
59	Pre-Test View of Belt Anchorage for Passenger Dummy	A-34
60	Post-Test View of Belt Anchorage for Passenger Dummy	A-34
61	Pre-Test Passenger Dummy Feet	A-35
62	Post-Test Passenger Dummy Feet	A-35
63	Pre-Test Passenger's Side Knee Bolster	A-36
64	Post-Test Passenger's Side Knee Bolster	A-36
65	Pre-Test Passenger's Side Floorpan	A-37
66	Post-Test Passenger's Side Floorpan	A-37
67	Post-Test Passenger Dummy Face	A-38
68	Post-Test Passenger Dummy Contact With Airbag	A-38
69	Post-Test Passenger Dummy Contact With Headrest	A-39

<b>Fig.</b>	<b>Description</b>	<b>Page</b>
70	Photograph of Ballast Installed in Vehicle	A-39
71	Post-Test Stoddard Solvent Spillage Location View, if Required	A-40
72	Post-Test Speed Trap Read-Out	A-40
73	Vehicle at 0° on Static Rollover Device	A-41
74	Vehicle at 90° on Static Rollover Device	A-41
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	2019 Ram 1500 Frontal Impact Event	A-43
79	Monroney Label Photograph	A-44

**<sup>1</sup>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: 2019 Ram 1500 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



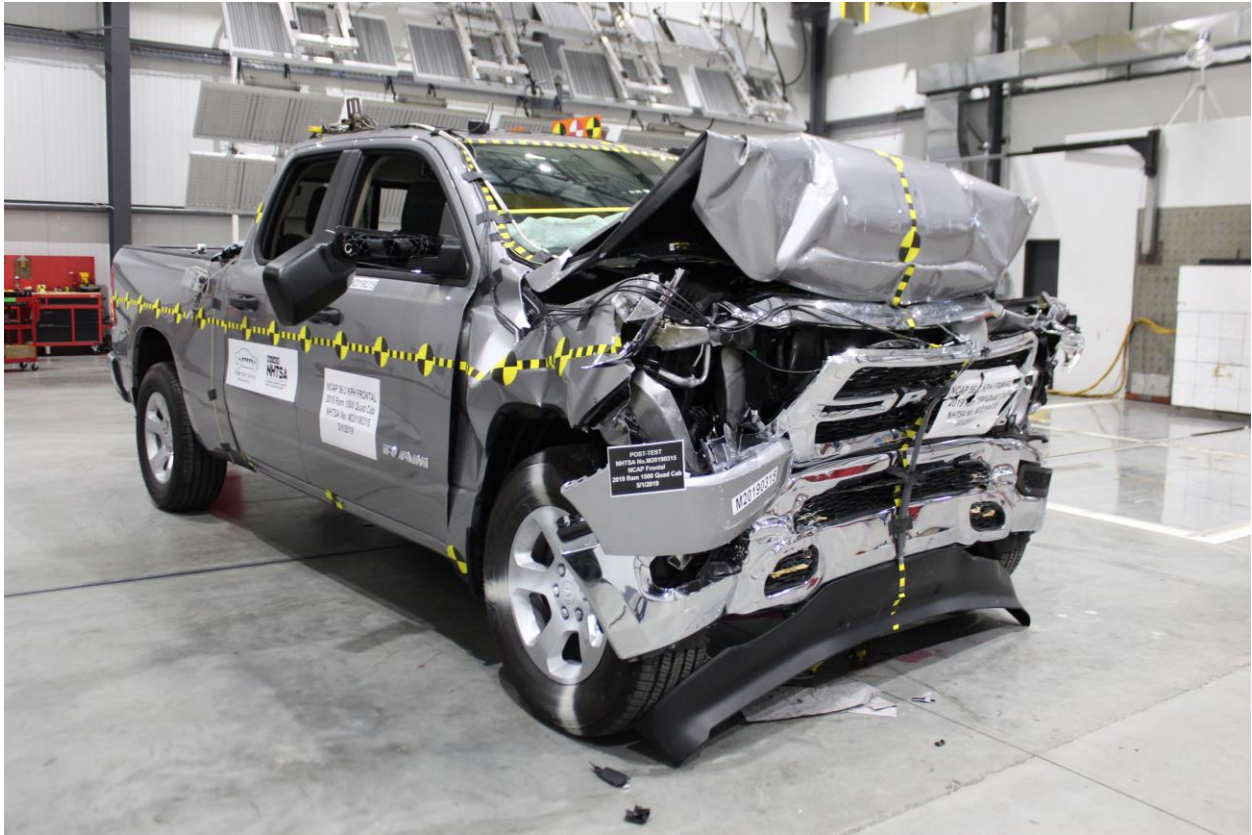
Figure A-12: Pre-Test Right View of Test Vehicle



**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

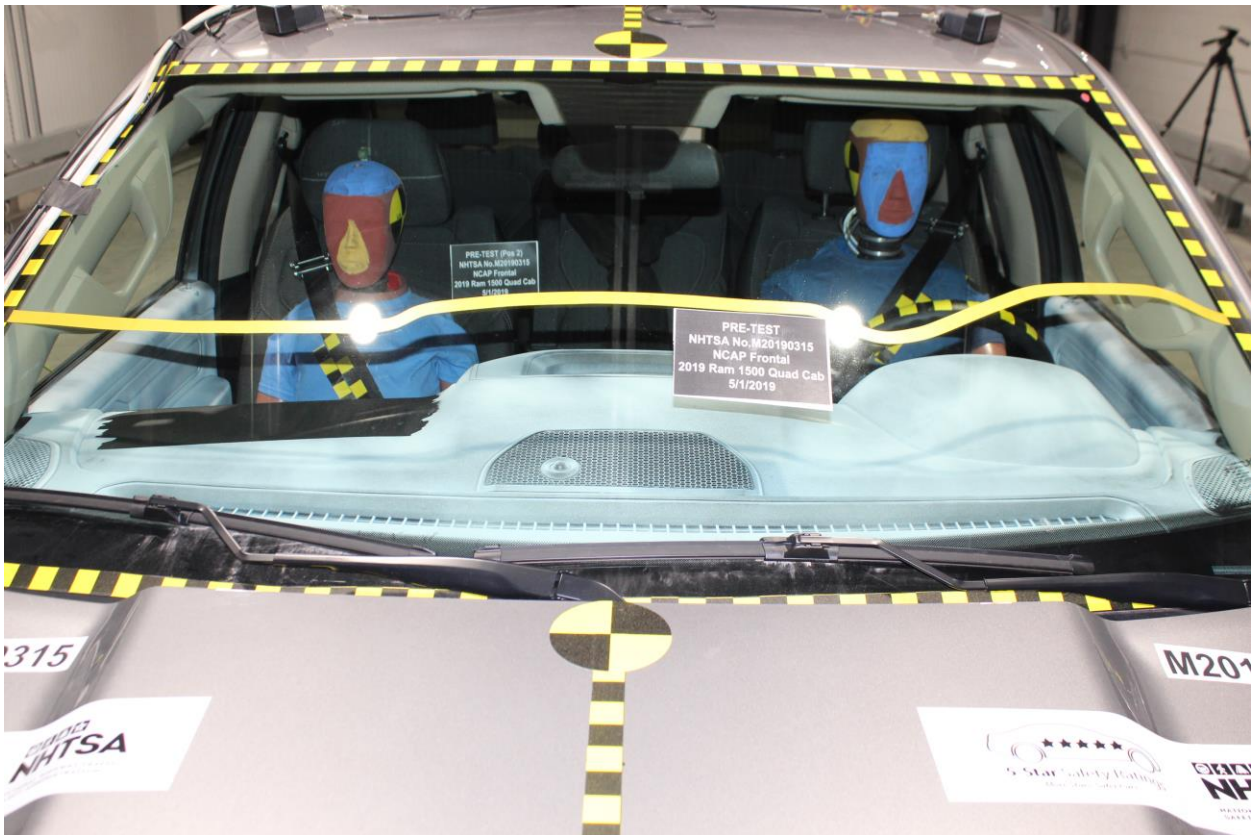


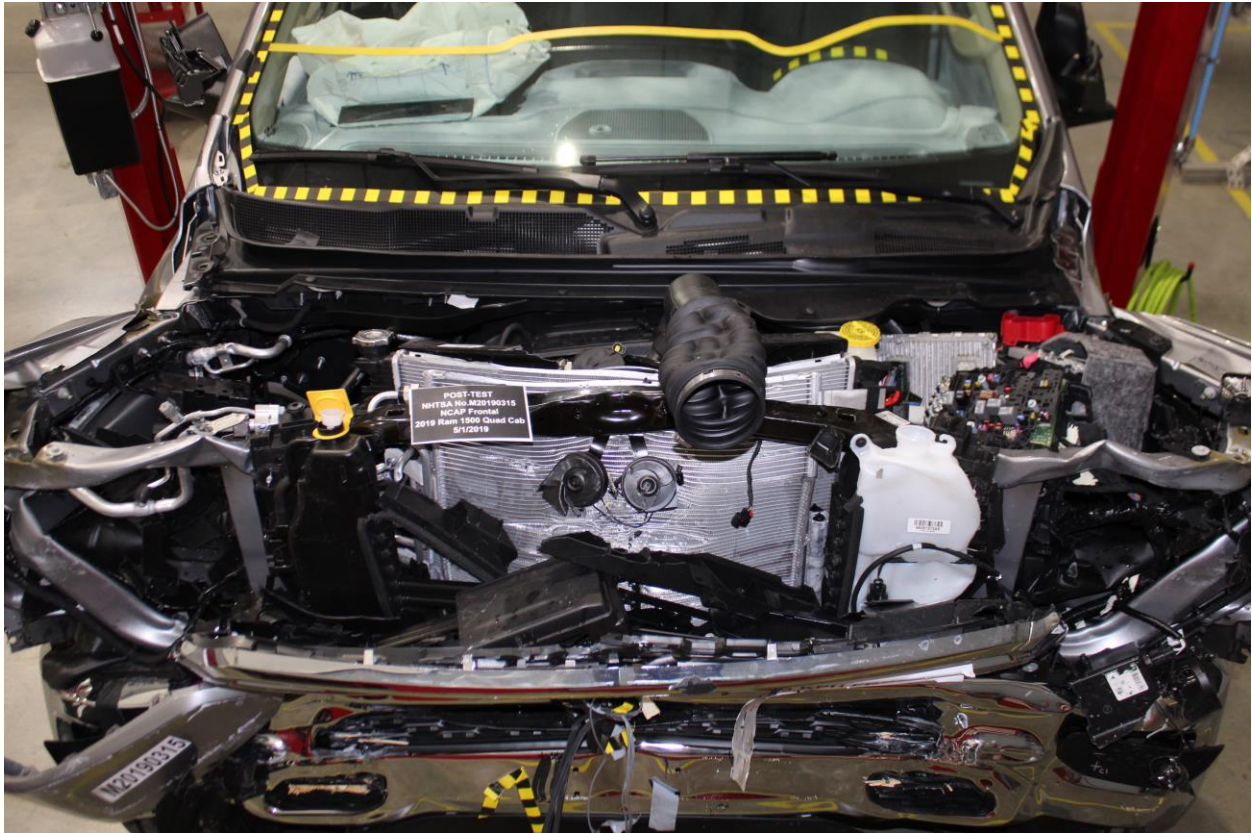
Figure A-18: Pre-Test Windshield View



**Figure A-19: Post-Test Windshield View**



**Figure A-20: Pre-Test Engine Compartment View**



**Figure A-21: Post-Test Engine Compartment View**



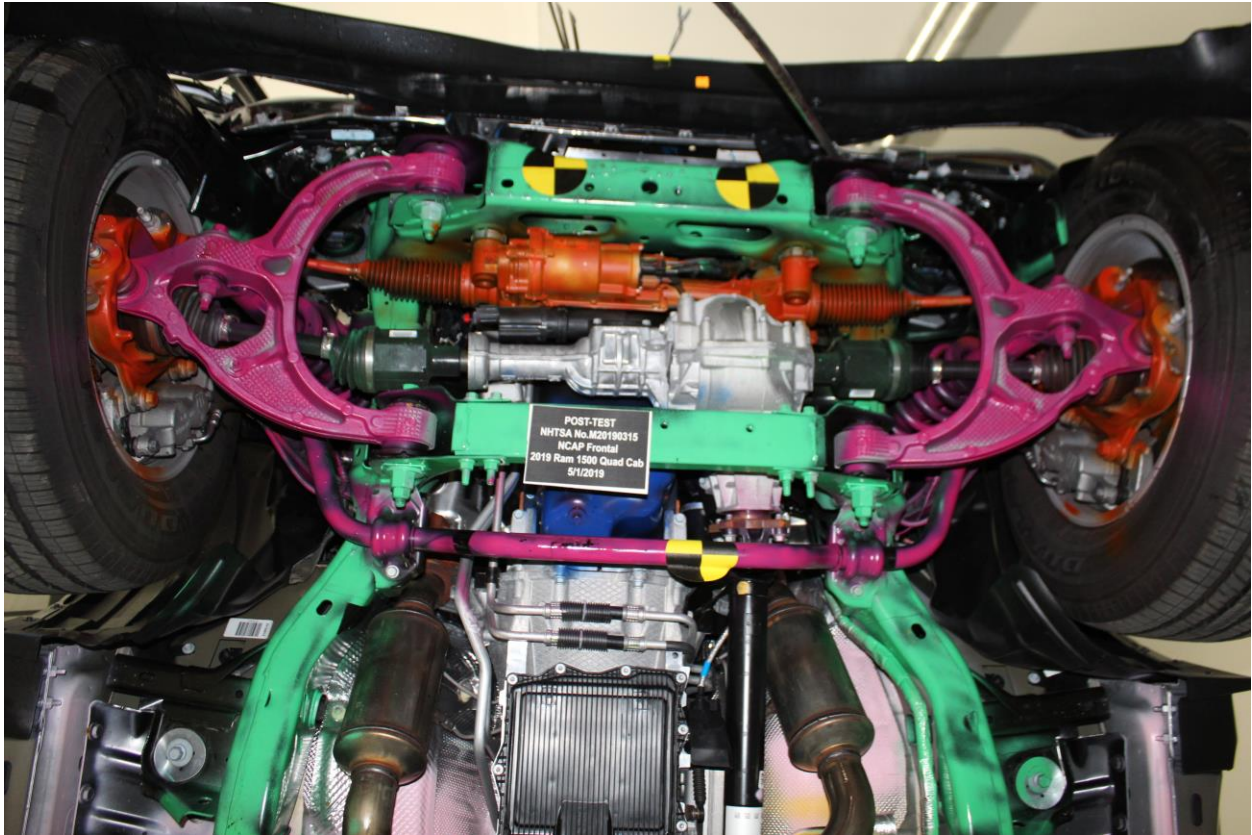
**Figure A-22: Pre-Test Fuel Filler Cap View**



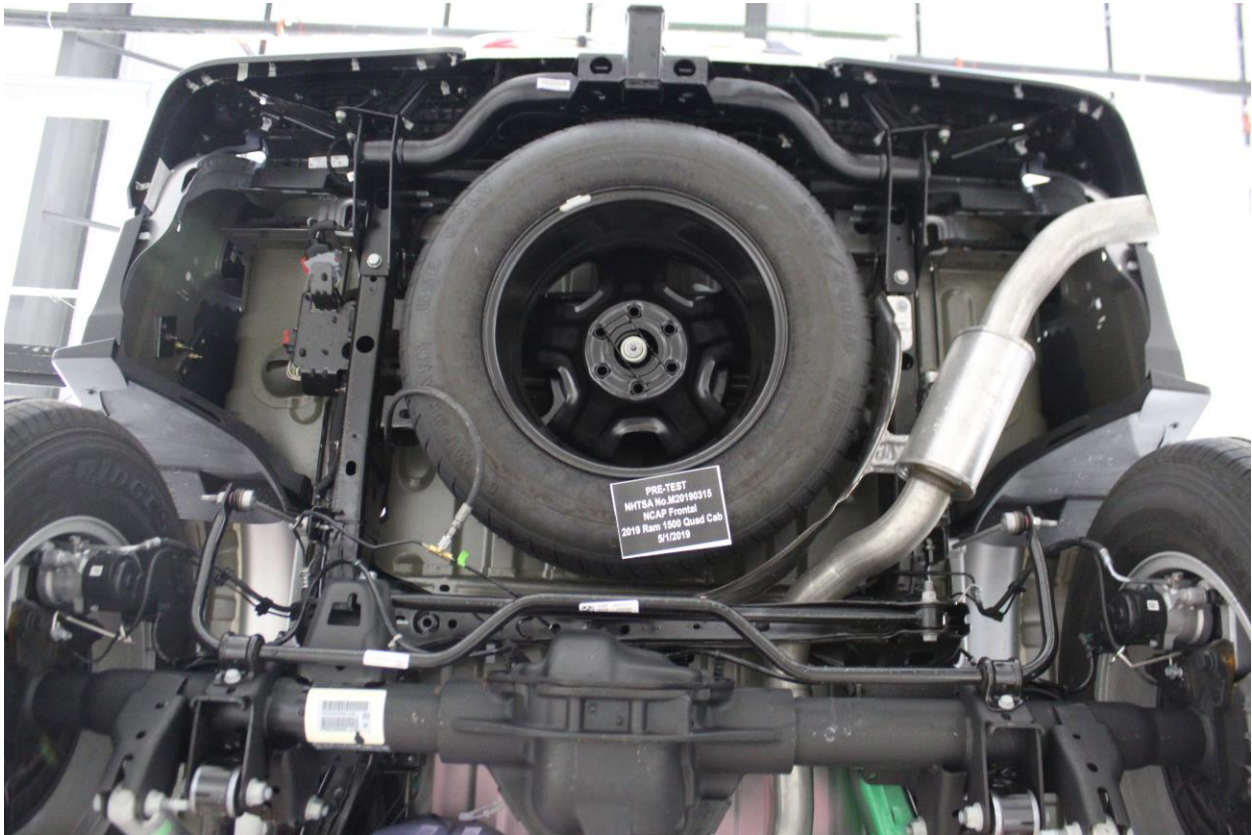
**Figure A-23: Post-Test Fuel Filler Cap View**



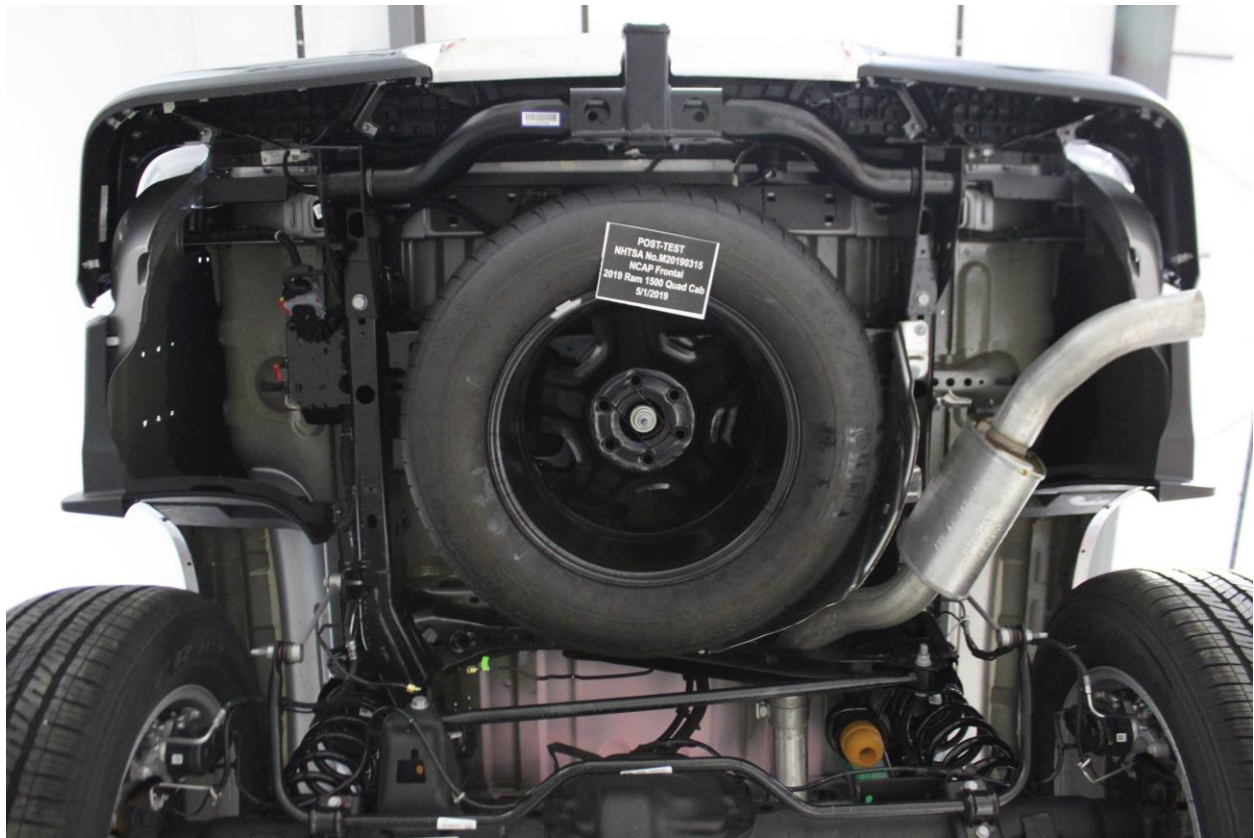
**Figure A-24: Pre-Test Front Underbody View**



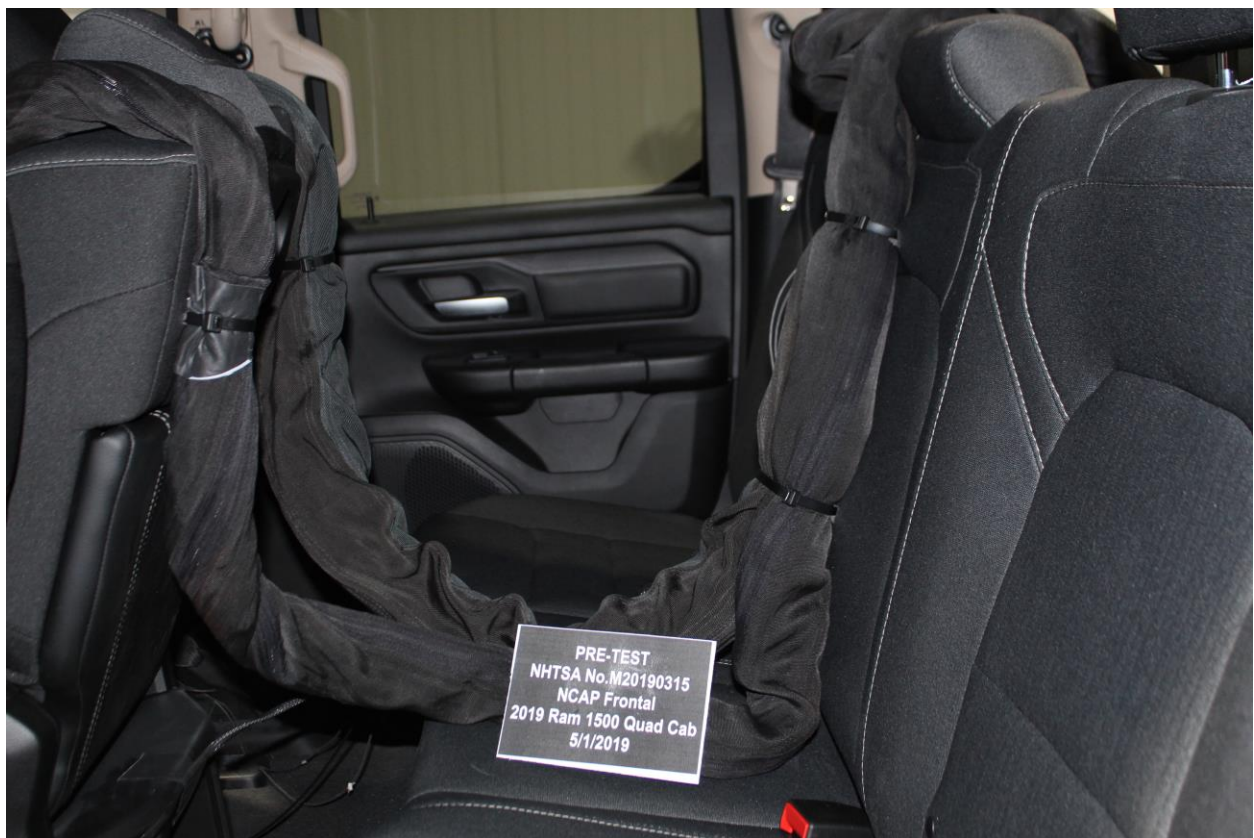
**Figure A-25: Post-Test Front Underbody View**



**Figure A-26: Pre-Test Rear Underbody View**



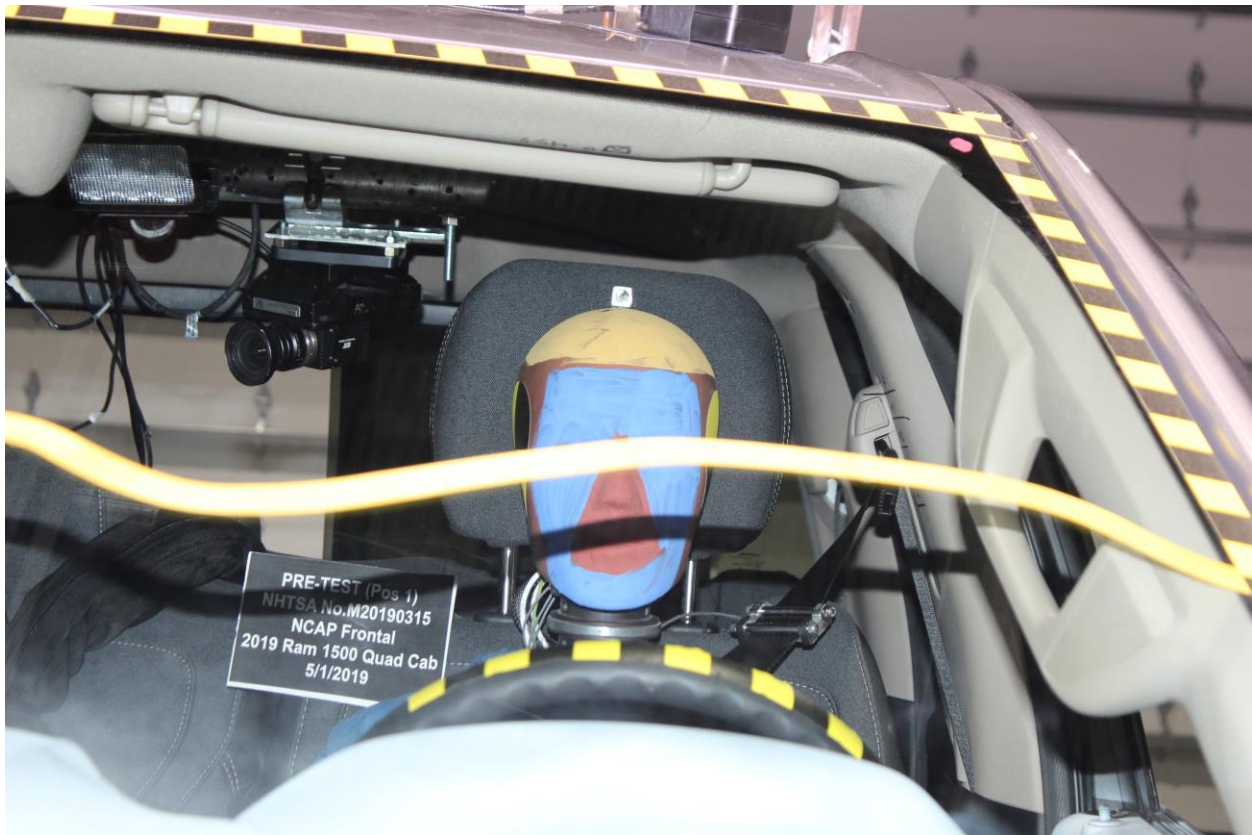
**Figure A-27: Post-Test Rear Underbody View**



**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**



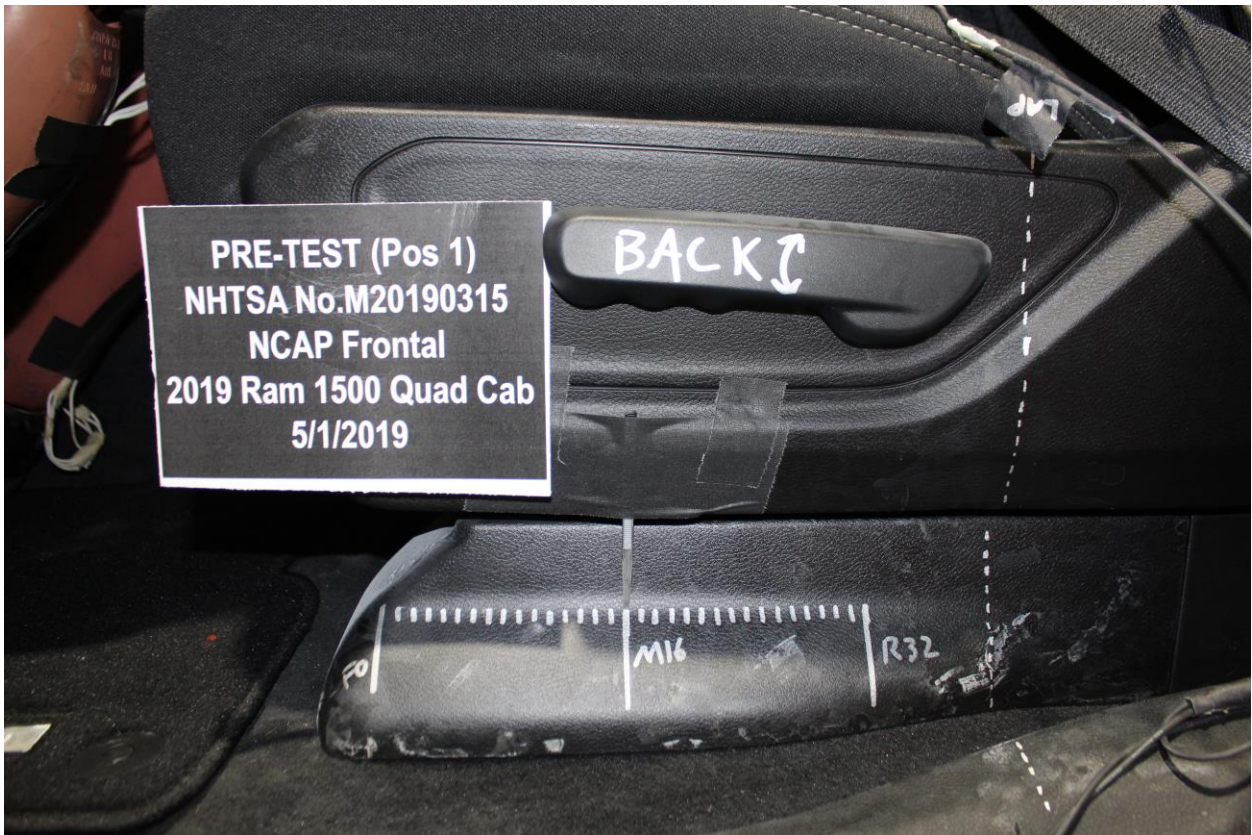
**Figure A-33: Post-Test Driver Dummy Window View**



**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

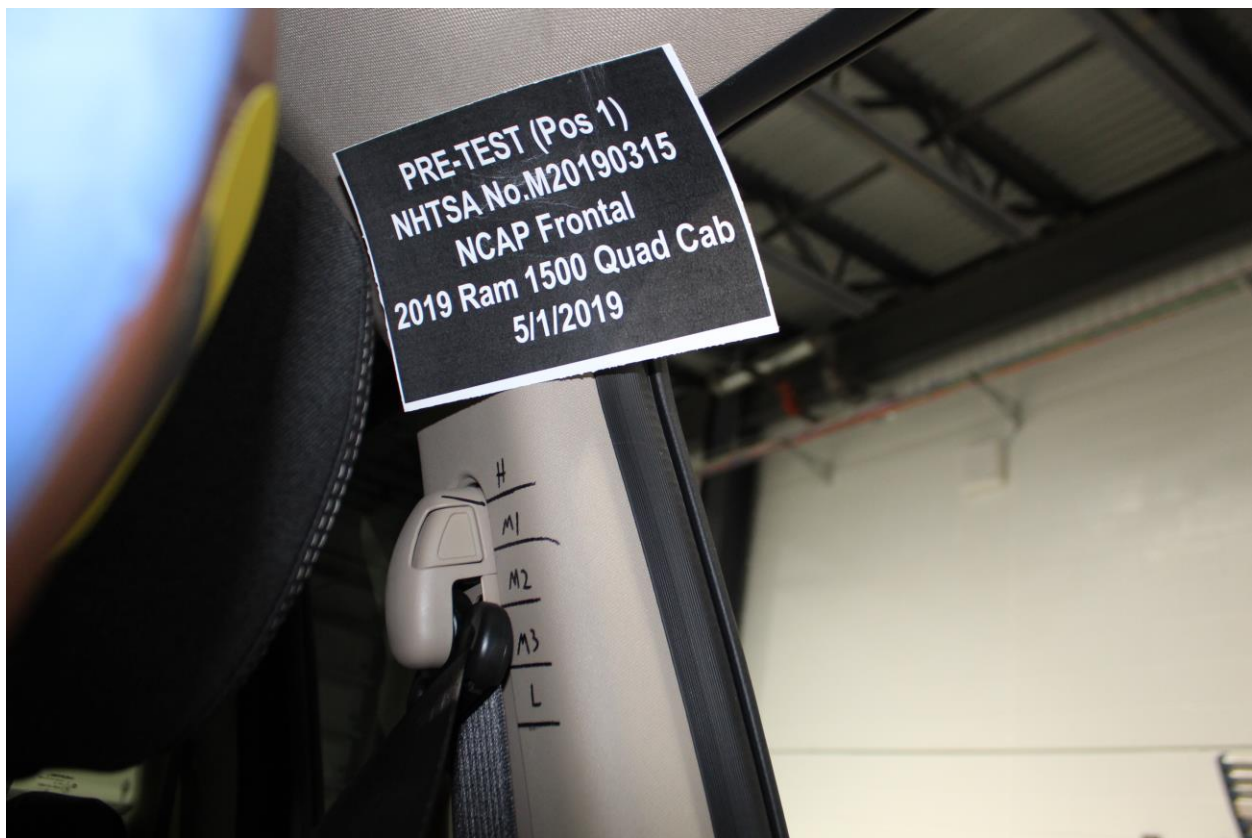


Figure A-38: Pre-Test View of Belt Anchorage for Driver Dummy



**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**



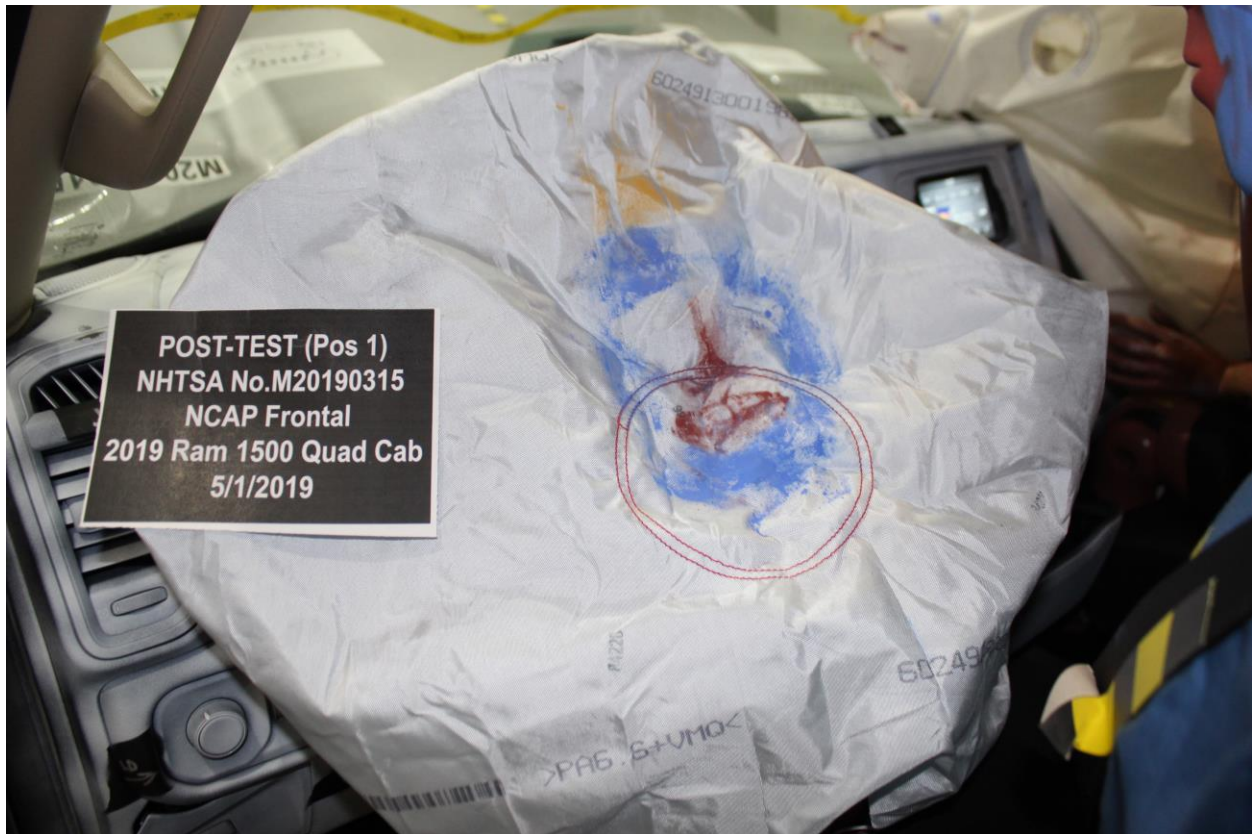
**Figure A-44: Pre-Test Driver's Side Floorpan**



**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**



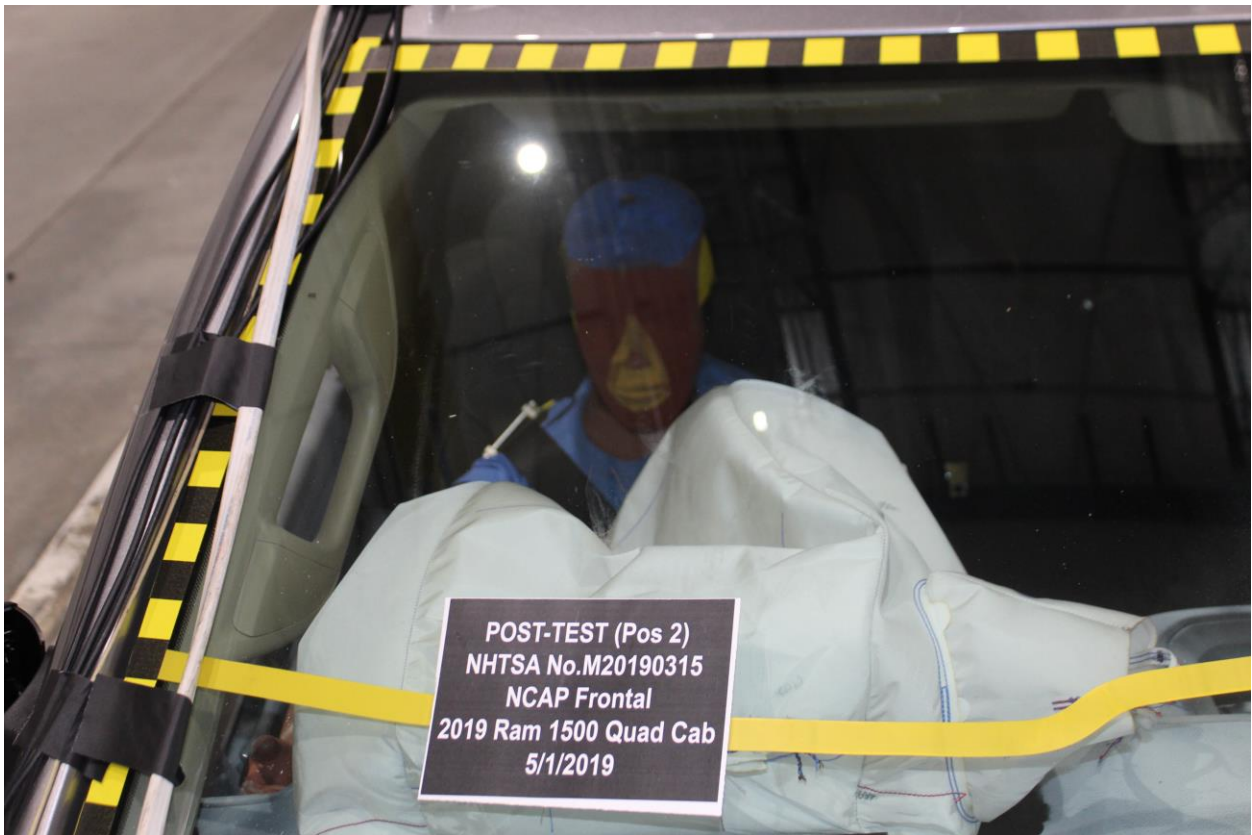
**Figure A-49: Pre-Test View of the Steering Wheel**



**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



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



**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**



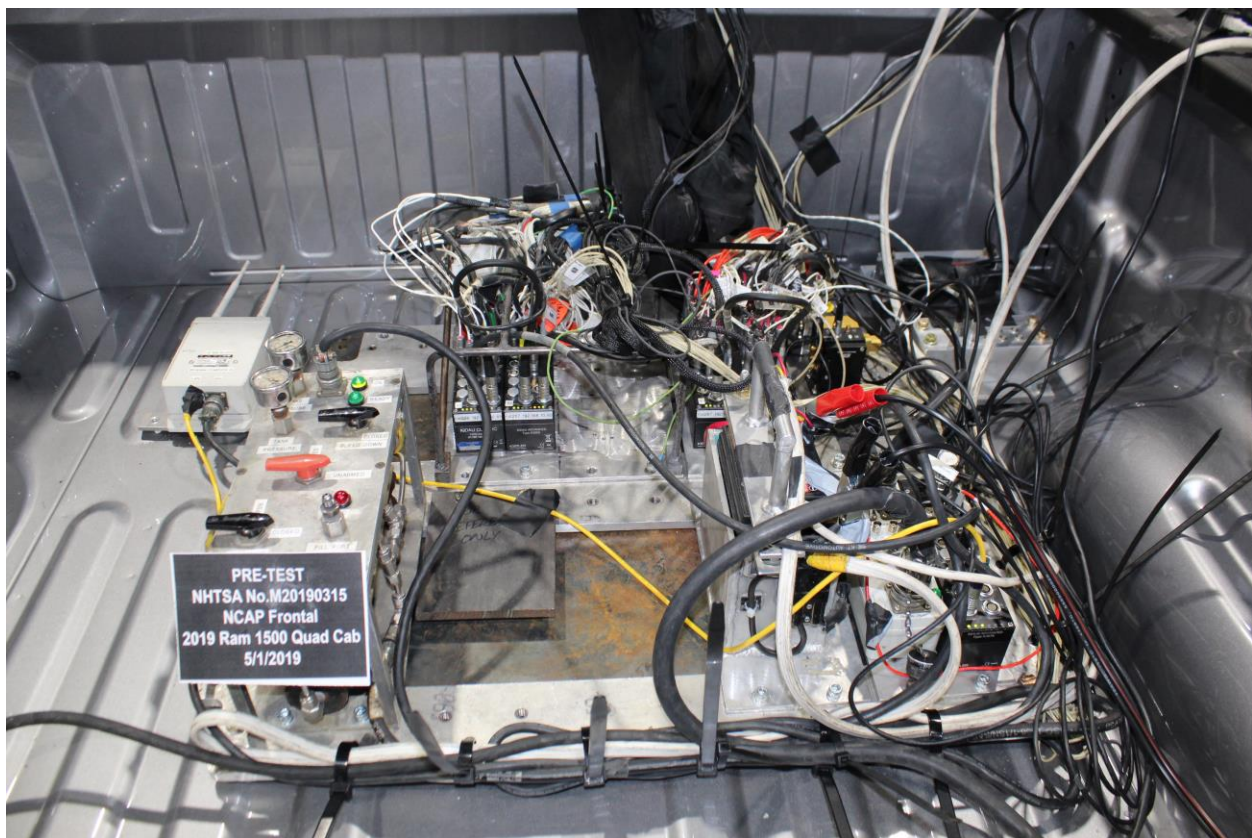
**Figure A-67: Post-Test Passenger Dummy Face**



**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

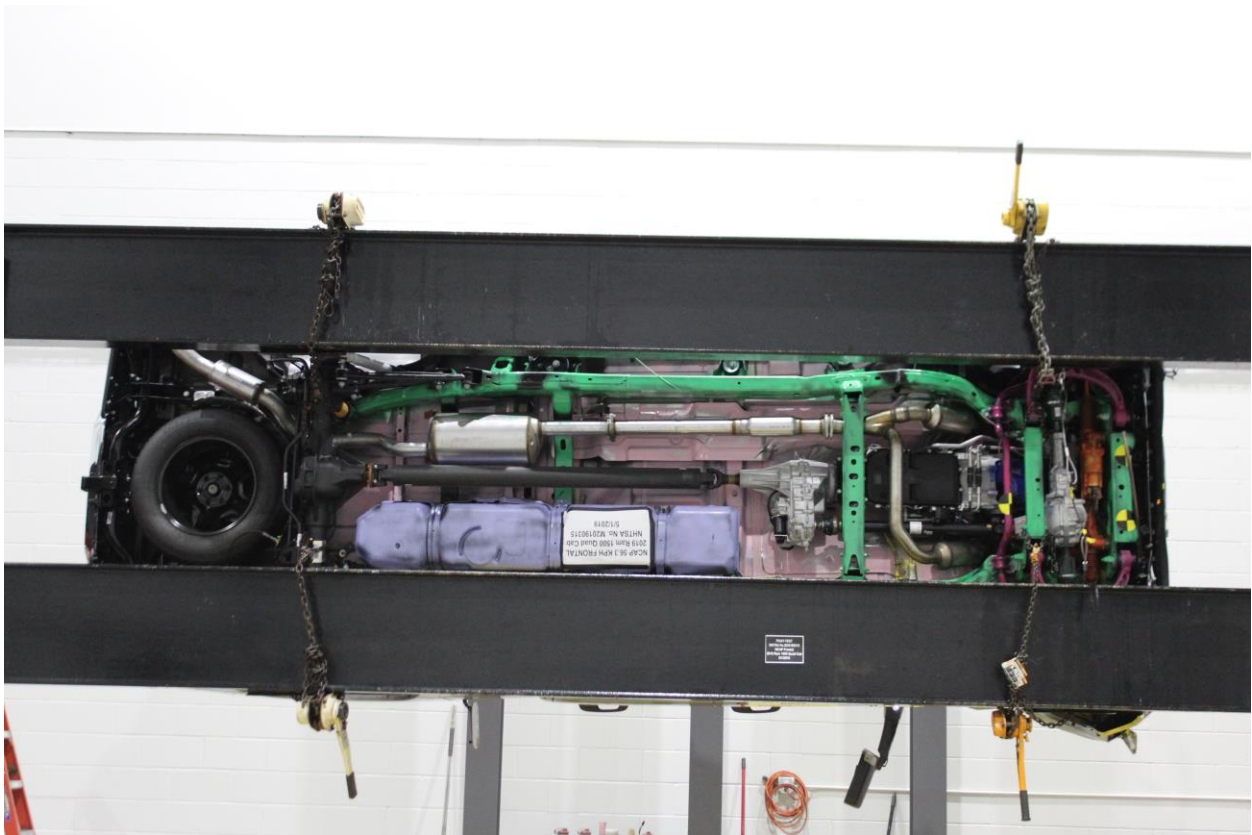
Figure A-71: Post-Test Stoddard Solvent Spillage Location View, If Required



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: 2019 Ram 1500 Frontal Impact Event**



**2019 MODEL YEAR**  
**RAM 1500 TRADESMAN QUAD CAB 4X4**

For more information visit: [www.ramtrucks.com](http://www.ramtrucks.com)  
or call 1-866-RAMINFO

FCA US LLC

THIS VEHICLE IS MANUFACTURED TO MEET SPECIFIC UNITED STATES REQUIREMENTS. THIS VEHICLE IS NOT MANUFACTURED FOR SALE OR REGISTRATION OUTSIDE OF THE UNITED STATES.

**MANUFACTURER'S SUGGESTED RETAIL PRICE OF THIS MODEL, INCLUDING DEALER PREPARATION**

**Base Price: \$35,295**

**RAM 1500 TRADESMAN QUAD CAB 4X4**  
 Exterior Color: Silver Metallic, Clear-Coat Exterior Paint  
 Interior Color: Black Interior Color  
 Interior Cloth 40 / 20 / 40 Bench Seat  
 Engine: 5.7-Liter V8 HEMI® MDS VVT Engine  
 Transmission: 8-Speed Automatic 8HP75 Transmission

**FUNCTIONAL SAFETY FEATURES**  
 Advanced Multistage Front Air Bags  
 Supplemental Front Side Air Bags  
 Supplemental Side-Curtain Front / Rear Air Bags  
 3.21 Rear Axle Ratio  
 Keyless Go™  
 Remote Keyless Entry with All-Secure  
 ParkView® Rear Back-Up Camera  
 Sentry Key® Theft Deterrent System  
 4-Wheel Disc Anti-Lock Brakes  
 Electronic Park Brake  
 Ready-Alert Braking  
 Rain Brake Support  
 Tire-Fill Alert  
 Electronic Roll Mitigation  
 Electronic Stability Control  
 Trailer Sway Damping  
 Hill Start Assist  
 Speed Control  
 Black Rotary Shifter  
 Class III Receiver Hitch  
 7-Pin Wiring Harness  
 Capes Fuel-Fill

**INTERIOR FEATURES**  
 Uconnect® 3 with 5-inch Display  
 Cluster 3.5-inch TFT BAW Display  
 Integrated Voice Command with Bluetooth®  
 Media Hub-2 USB, Full Function, Aux  
 12-Volt Auxiliary Power Outlet  
 6-Speakers  
 4-Way Manual Adjustable Driver Seat  
 Front Passenger Seat - Manual Adjust 4-Way  
 Power Windows w/ Front 1-Touch Up and Down Feature  
 Front / Rear Climate-Control Outlets  
 Steering Wheel Mounted Shift Control  
 Tilt/Telescope Steering Column

**EXTERIOR FEATURES**  
 18.0-Inch x 7.5-Inch Steel Painted Wheels  
 27.5x5.5x18 BSW All-Season Tires  
 18-Inch Full Size Steel Spare Wheel  
 Power-Heated Mirrors with Manual Fold-Away

**OPTIONAL EQUIPMENT (May Replace Standard Equipment)**

Blind Spot Monitor, Clear-Coat Exterior Paint	\$200
Customer Preferred Package 2A	\$645
Trailer Tow Group	
Class IV Receiver Hitch	
Exterior Mirrors with Supplemental Signals	
Power Black Trailer-Tow Mirrors w/Manual Fold-Away	
Trailer Brake Control	
Chrome Appearance Group	\$995
18.0-Inch x 6.0-Inch Premium Paint Cast Wheels	
Bright Front Bumper	
Bright Rear Bumper	
Tradesman Chrome Grille	
Level 1 Equipment Group	\$1,555
Cloth 40 / 20 / 40 Bench Seat	
Front and Rear Floor Mats	
Concert Floor Coverings	
Rear Power Sliding Window	\$495
SiriusXM® with 1-Year Radio Sub Call 800-643-2112	
Three Rear Seat Head Restraints	
3.92 Rear Axle Ratio	\$95
Anti-Spin Differential Rear Axle	\$495
5.7-Liter V8 HEMI® MDS VVT Engine	\$1,195
28-Gallon Fuel Tank	
33-Gallon Fuel Tank	\$445

**DESTINATION CHARGE** \$1,695

**TOTAL PRICE: \*\$42,615**

**WARRANTY COVERAGE**  
 5-year or 60,000-mile Powertrain Limited Warranty  
 3-year or 36,000-mile Basic Limited Warranty  
 Ask Dealer for a copy of the limited warranties or see your owner's manual for details.

**5 Year / 60,000 Mile POWERTRAIN WARRANTY**

**EPA DOT Fuel Economy and Environment** Gasoline Vehicle

**Fuel Economy** These estimates reflect new EPA methods, beginning with 2017 models. Standard package range from 14 to 22 MPG. The best vehicle rates 136 MPG.

**17** 15 21  
 combined city/hwy city highway  
 5.9 gallons per 100 miles

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

**Annual fuel cost \$2,450**

**Fuel Economy & Greenhouse Gas Rating (tailpipe only)** Smog Rating (tailpipe only)

This vehicle emits 323 grams CO2 per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also creates emissions. Learn more at [fuelconomy.gov](http://fuelconomy.gov)

**Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 22 MPG and cost \$3,000 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$2.40 per gallon. Taxes at retail per gallon omitted. Vehicle emissions are a significant cause of climate change and smog.**

**fuelconomy.gov**  
 Calculate personalized estimates and compare vehicles

**GOVERNMENT 5-STAR SAFETY RATINGS**  
 This vehicle has not been rated by the government for frontal crash, side crash or rollover risk.

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

**PARTS CONTENT INFORMATION FOR VEHICLES IN THIS CARLINE:**  
 U.S./CANADIAN PARTS CONTENT: 57%  
 MAJOR SOURCES OF FOREIGN PARTS CONTENT:  
 MEXICO: 28%  
NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.  
**FOR THIS VEHICLE:**  
 FINAL ASSEMBLY POINT: STERLING HTS, MICH., U.S.A.  
 COUNTRY OF ORIGIN: ENGINE: MEXICO  
 TRANSMISSION: UNITED STATES

**MOPAR VEHICLE PROTECTION**  
 A PRODUCT OF FCA US LLC  
 Ask for Mopar Vehicle Protection for your vehicle. We Built It. We Back It.

Assembly Plant/Port of Entry: STERLING HTS, MICH., U.S.A.

106-SRFT0KN-632265 121008 8814

DATE: 08/22/18  
 BY: J. COOPER, J. COOPER, J. COOPER, J. COOPER  
 FOR: J. COOPER, J. COOPER, J. COOPER, J. COOPER  
 PA: 17331-5212

APPLY CHRYSLER, DODGE, JEEP, RAM  
 FULL LINE POWER ON  
 RAM/DOOR PA: 17331-5212

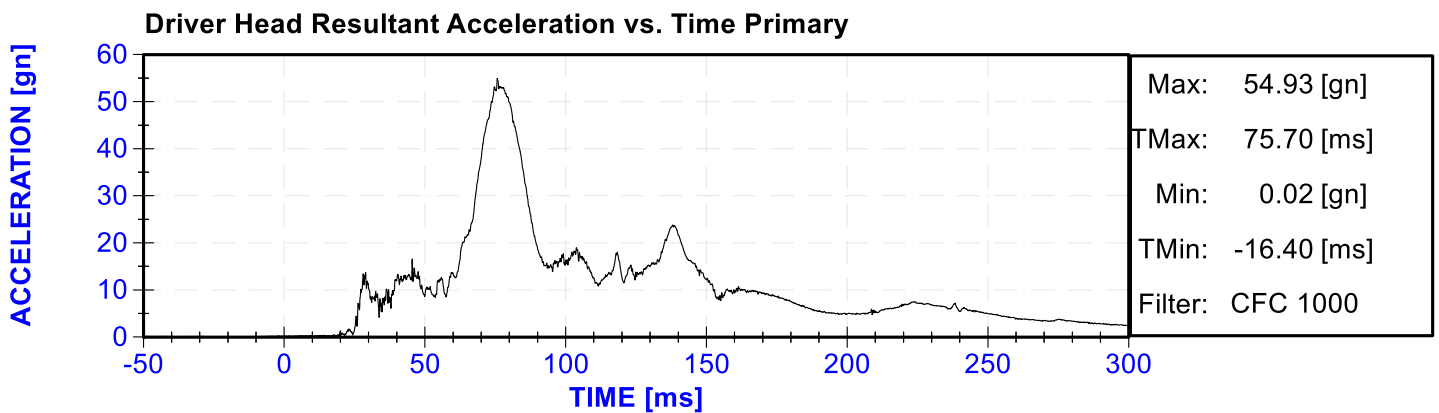
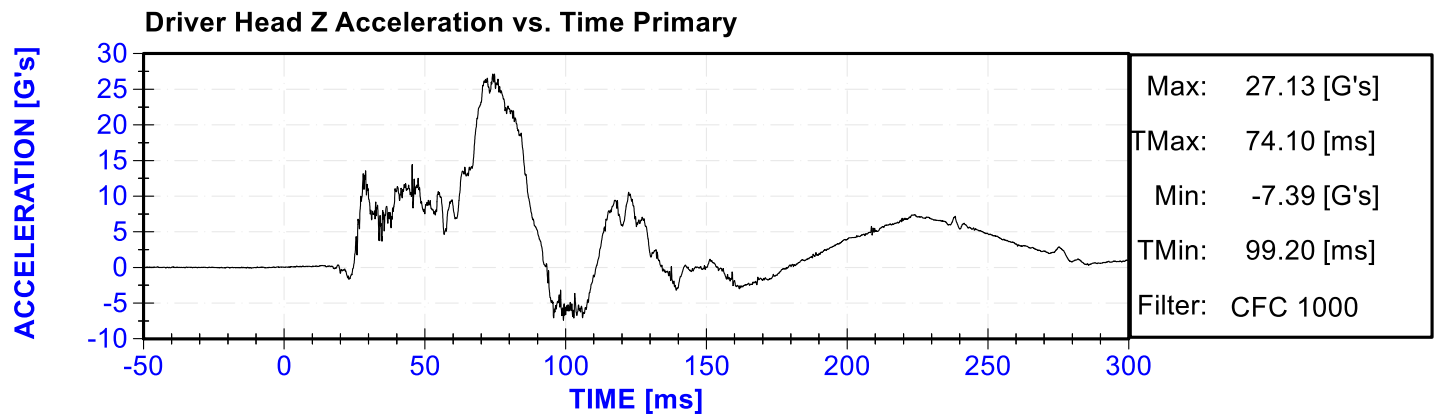
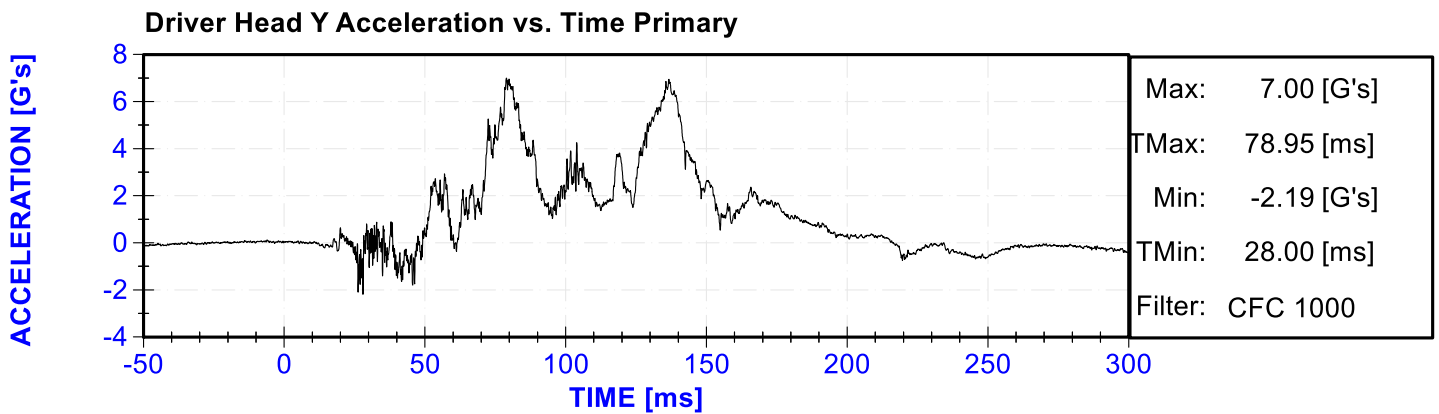
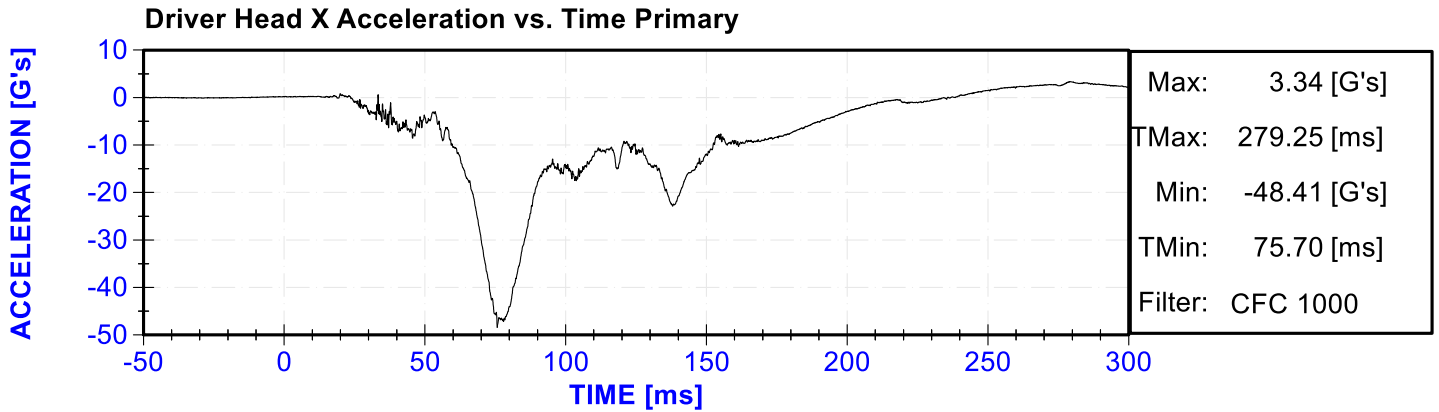
THIS LABEL IS SUBJECT TO THE TERMS OF FEDERAL LAW. THE LABEL CANNOT BE REMOVED  
 OR ALTERED. IT IS TO BE DELIVERED TO THE LEASER PURCHASER.  
 © 2018 FCA US LLC. ALL RIGHTS RESERVED. FCA AND MOPAR ARE TRADEMARKS OF FCA US LLC.  
 \*EXcludes phone and accessories not included in the price. Excludes 17-year  
 60,000-mile powertrain warranty. Excludes 3-year/36,000-mile basic warranty.

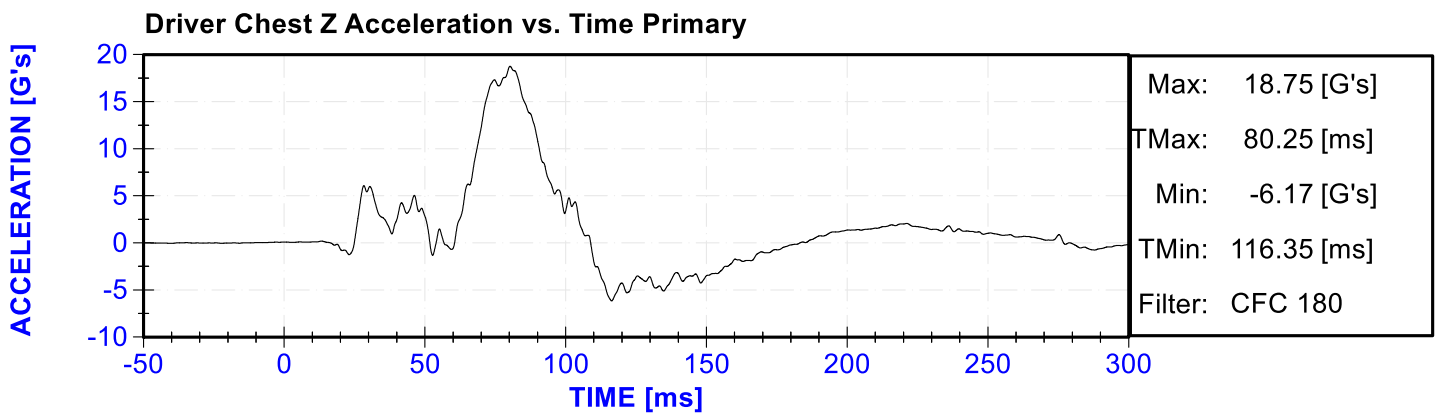
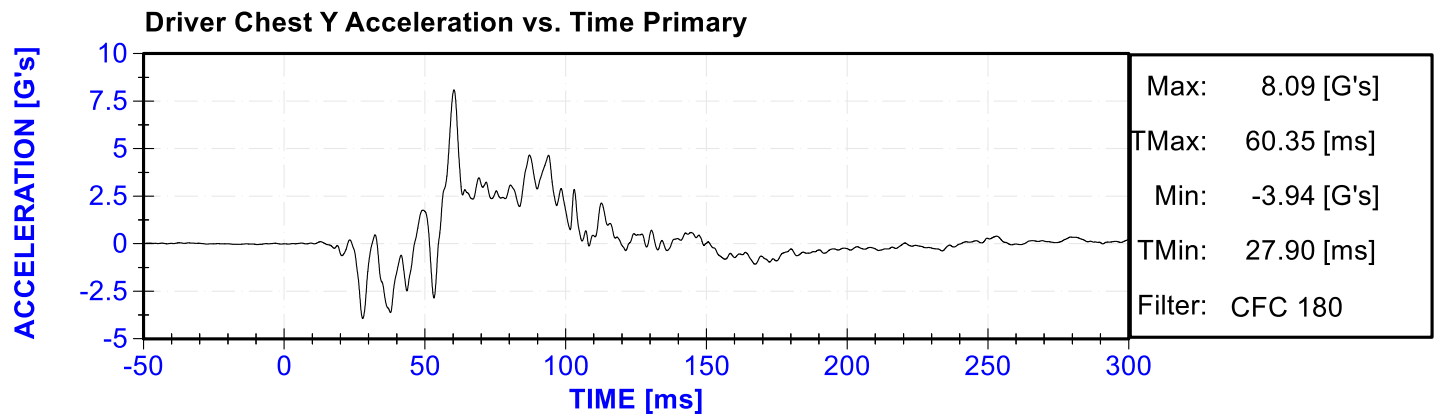
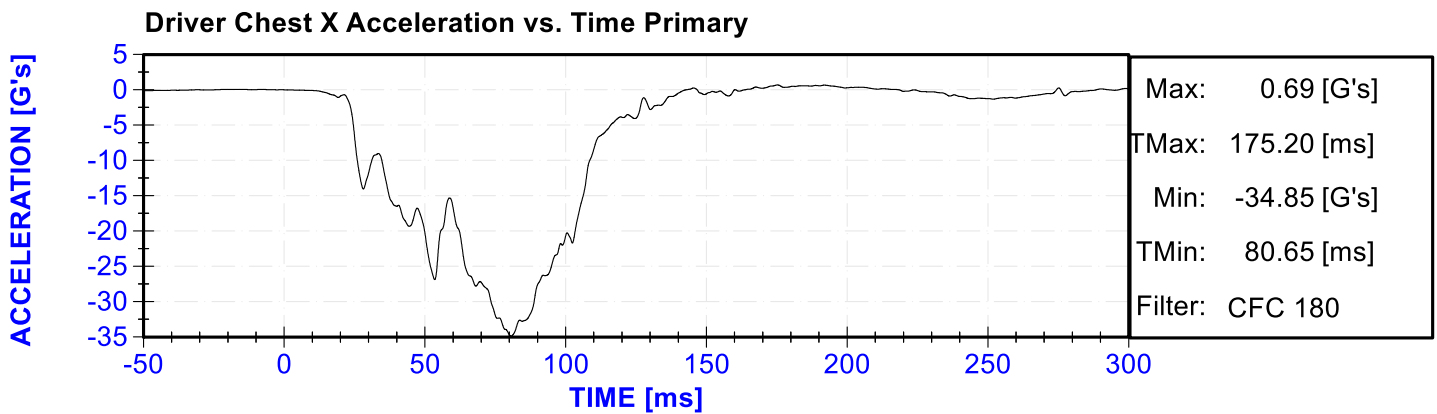
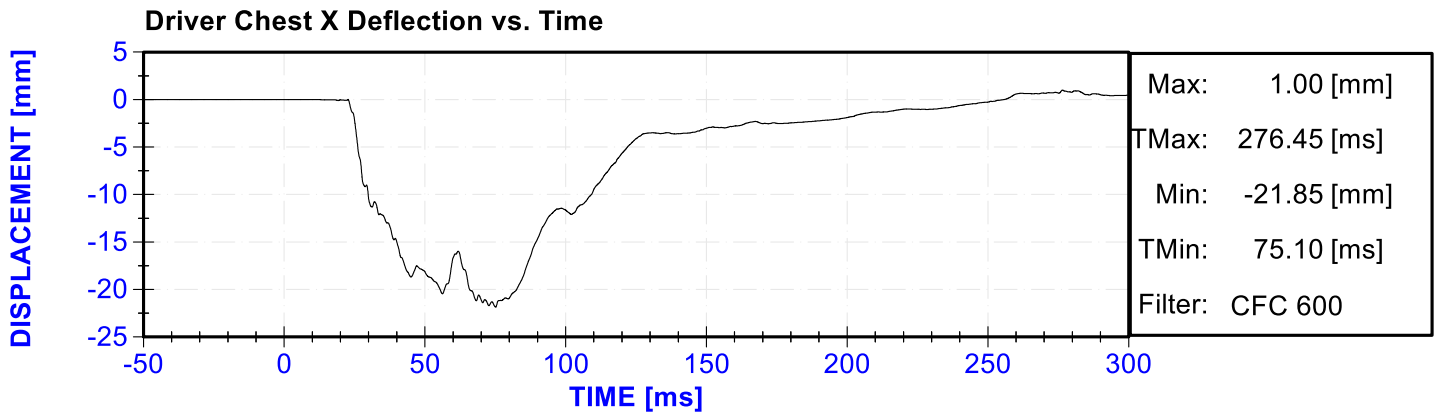
Figure A-79: Monroney Label Photograph

**APPENDIX B**  
**VEHICLE & DUMMY RESPONSE DATA TRACES**

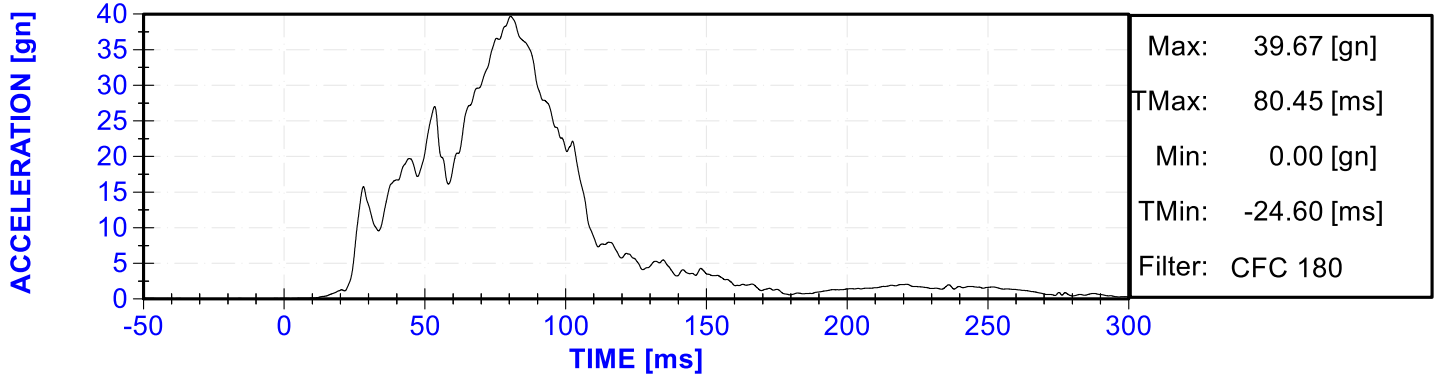
### Table of Data Plots

No.	Description	Page
Plot 1	Driver Head X Acceleration vs. Time Primary	B-3
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

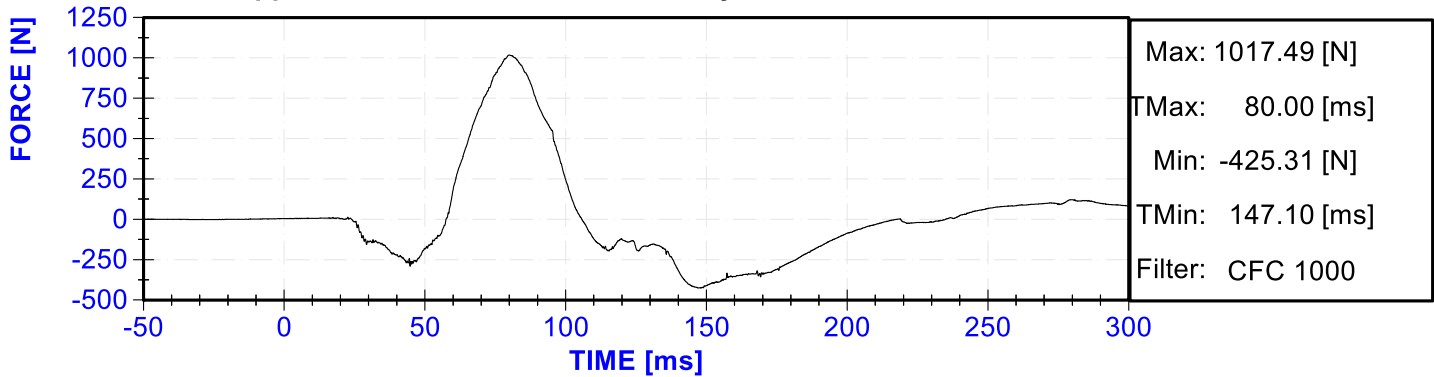




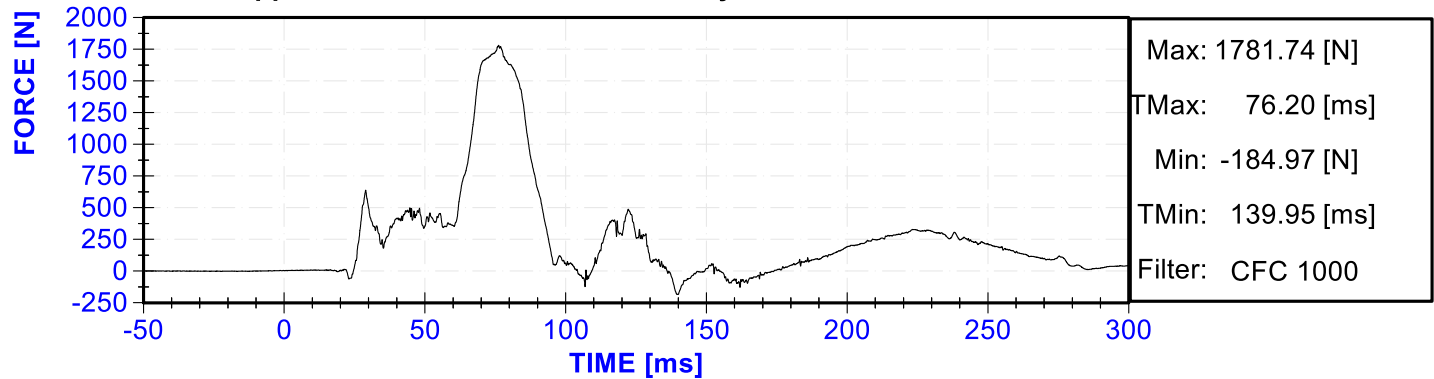
Driver Chest Resultant Acceleration vs. Time Primary



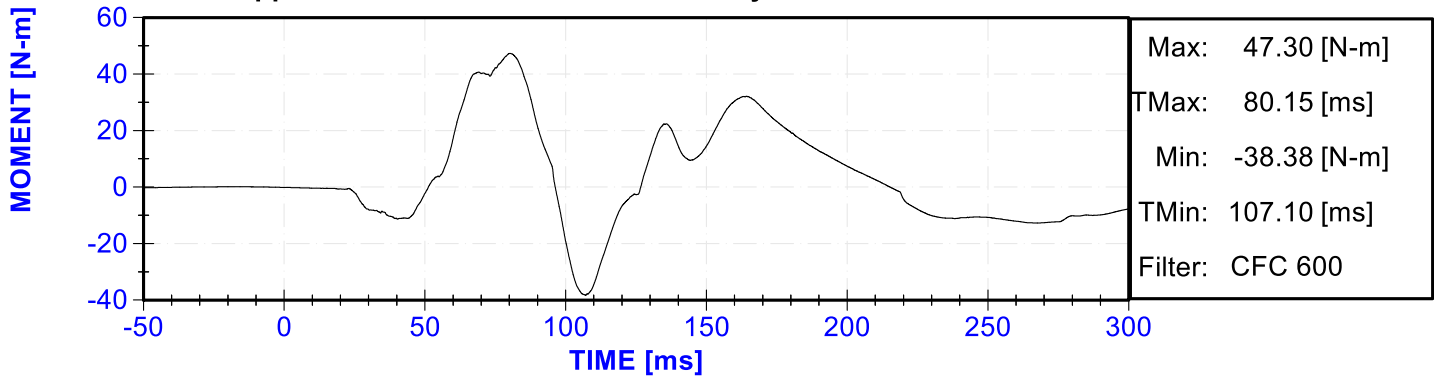
Driver Upper Neck Force X vs. Time Primary

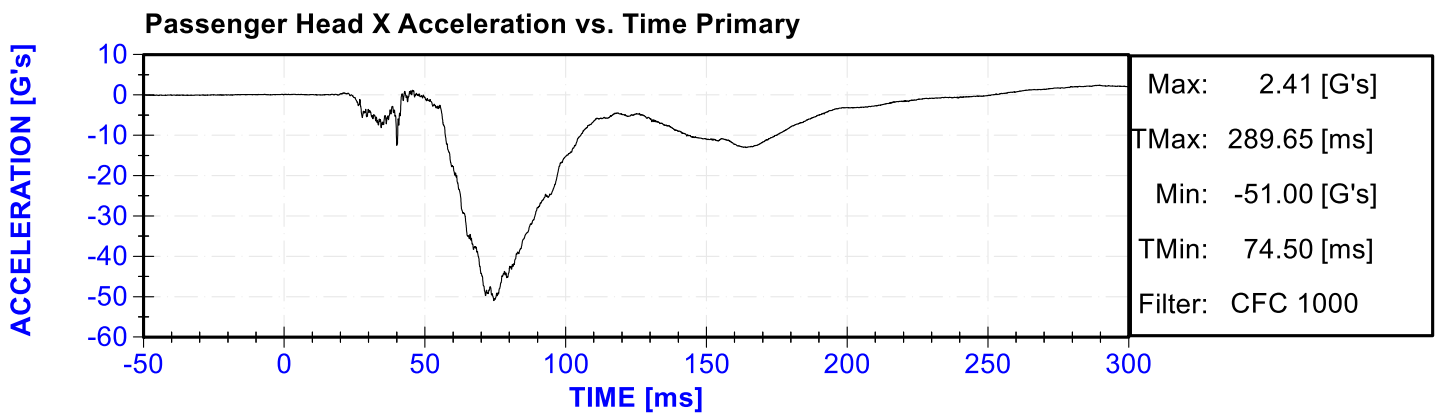
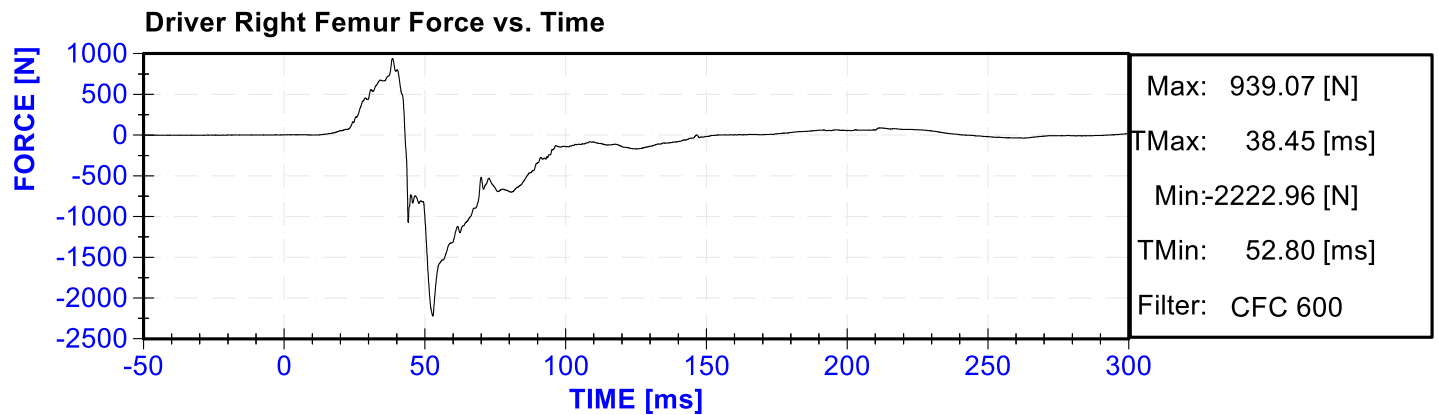
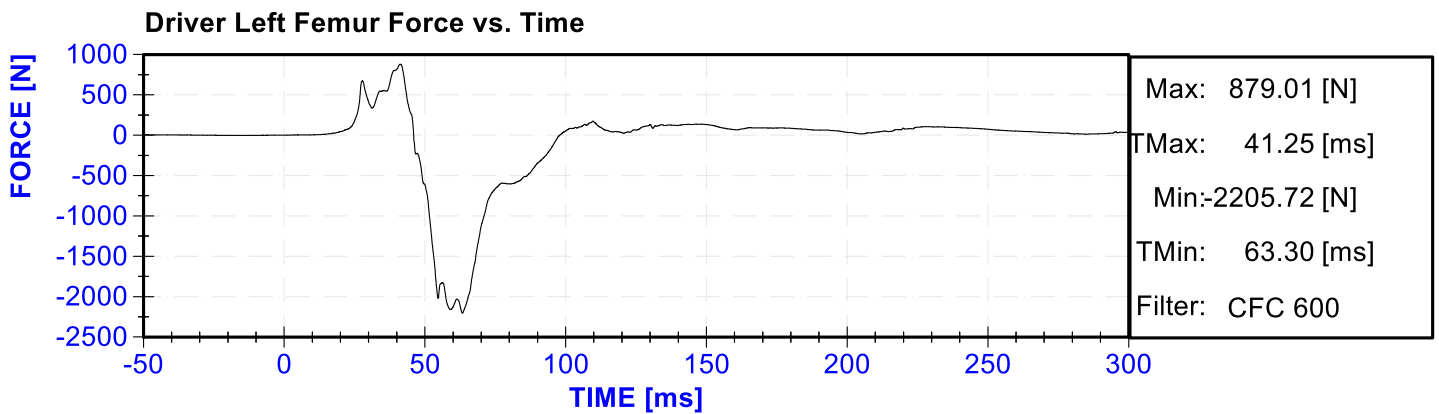
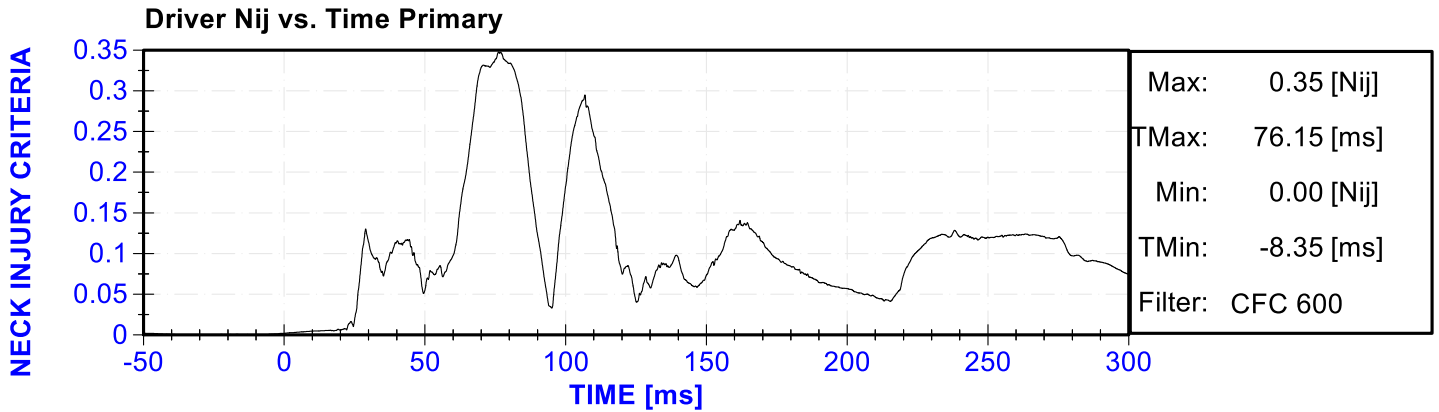


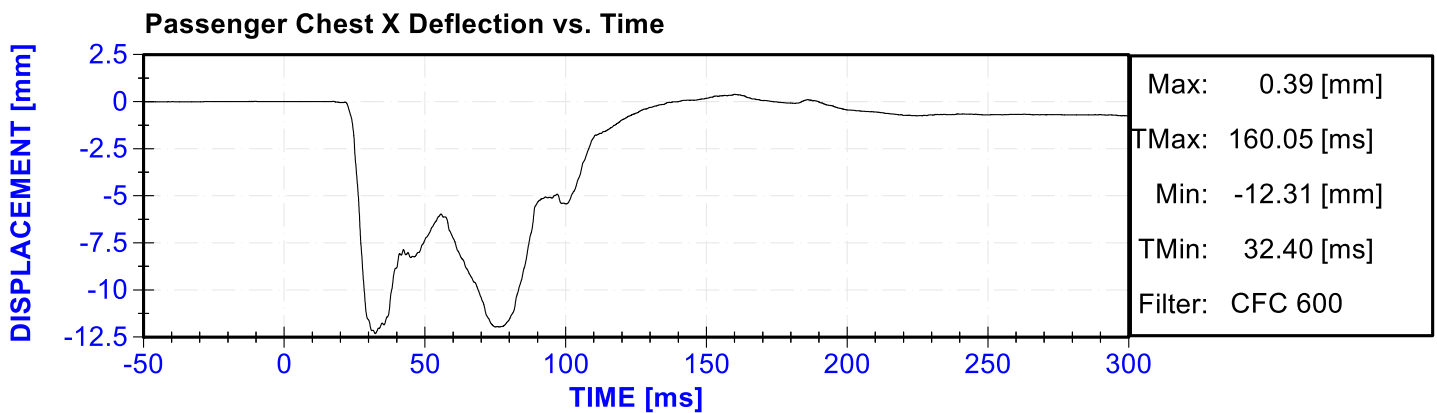
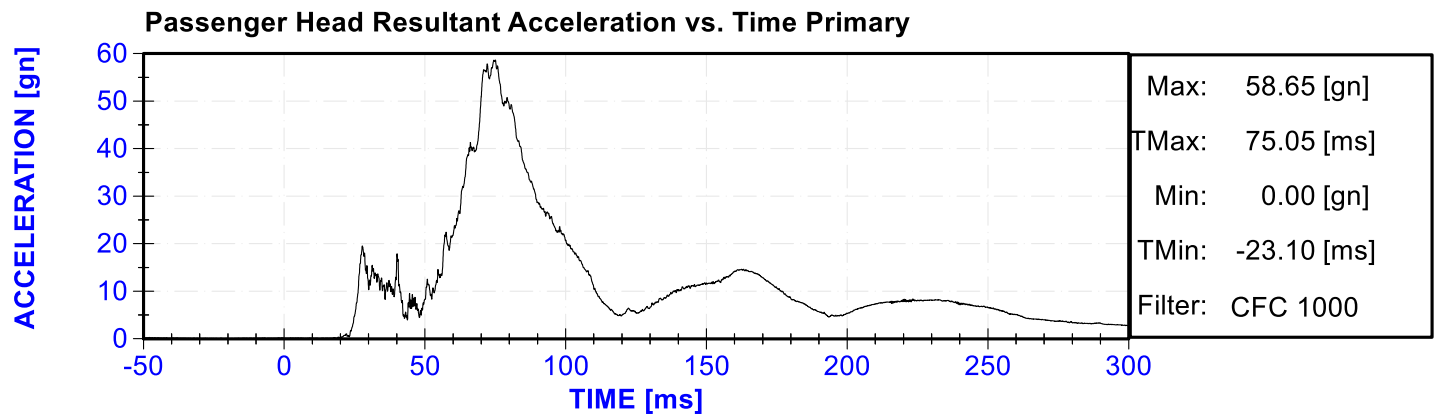
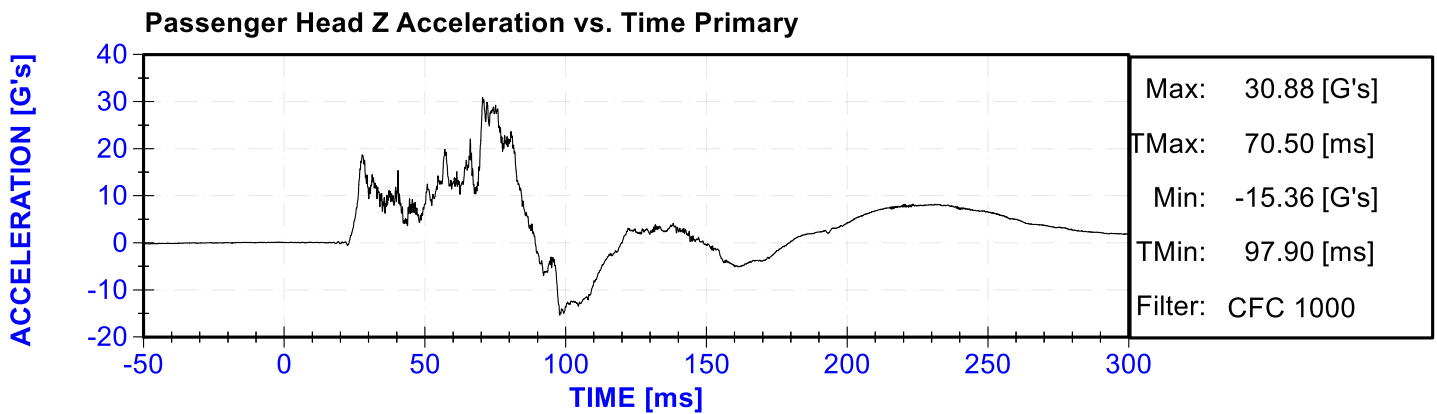
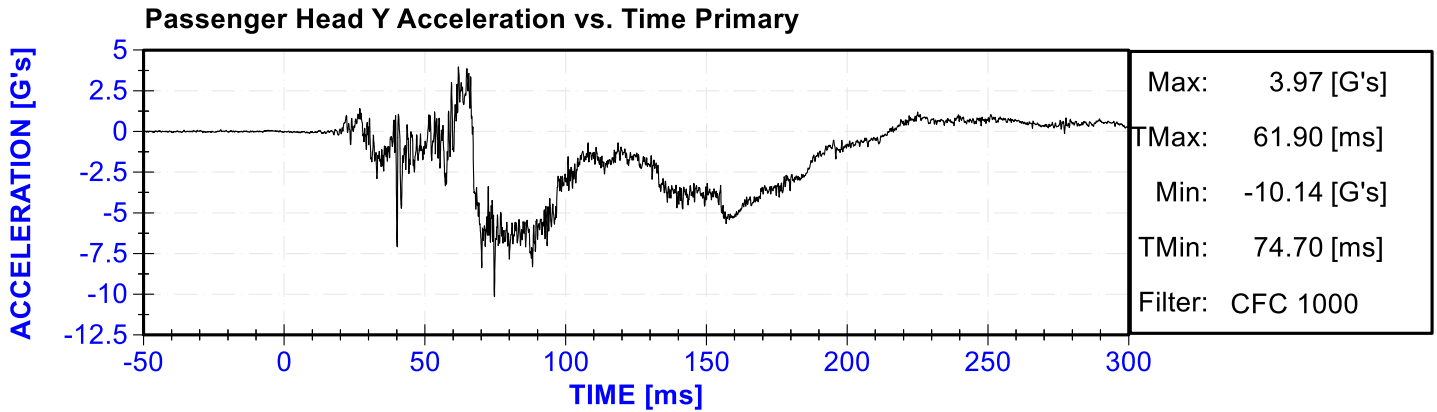
Driver Upper Neck Force Z vs. Time Primary

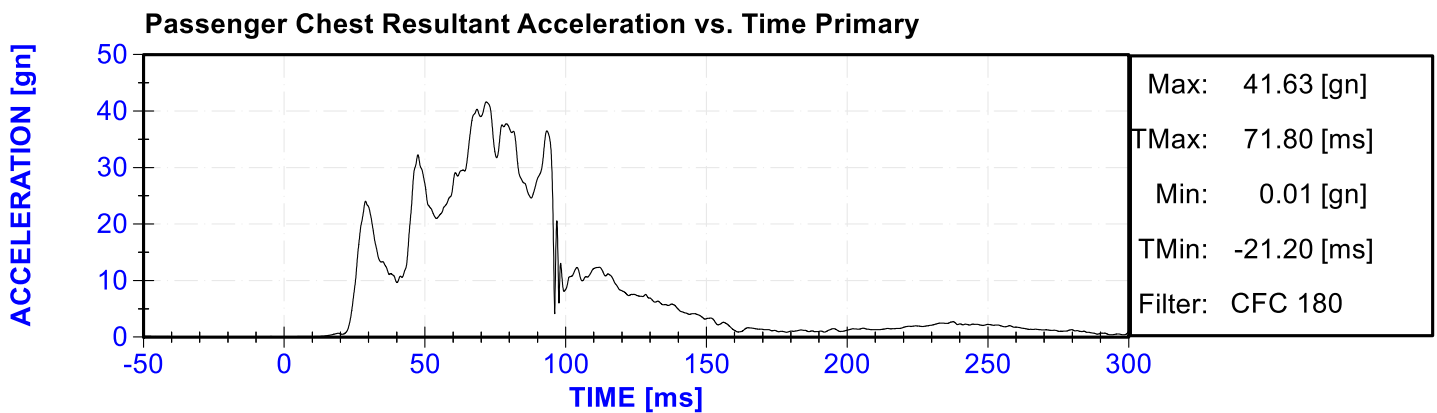
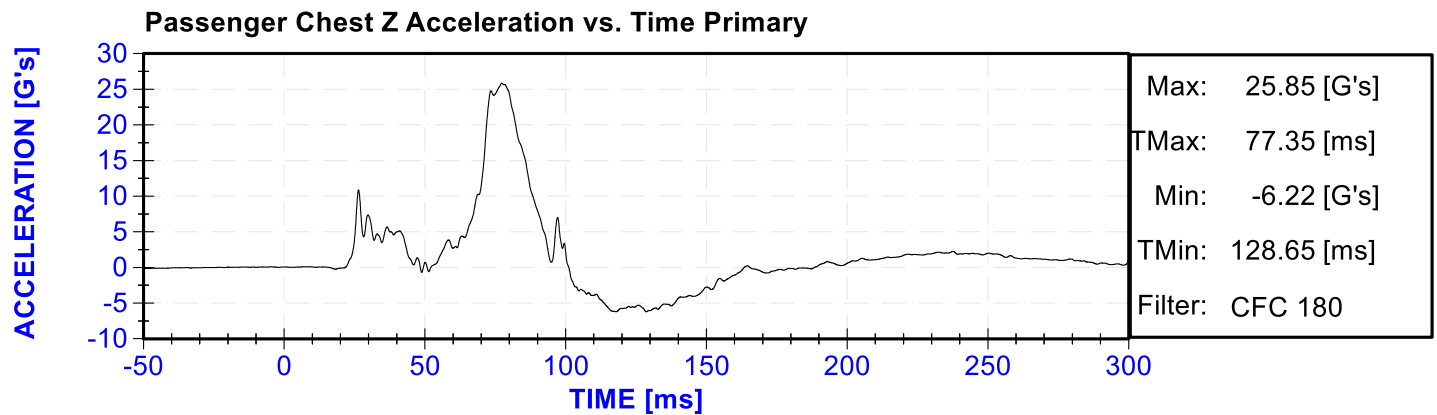
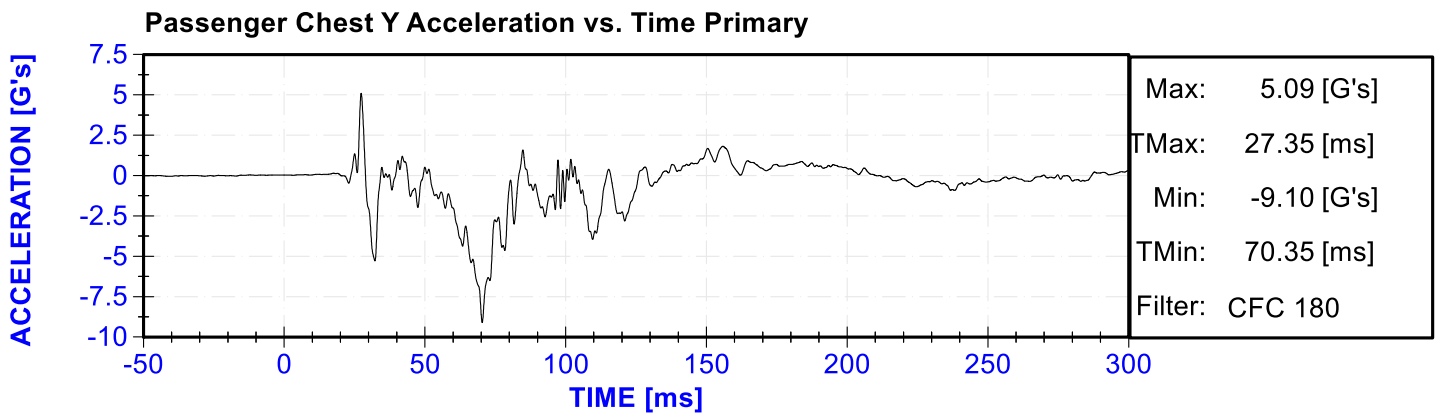
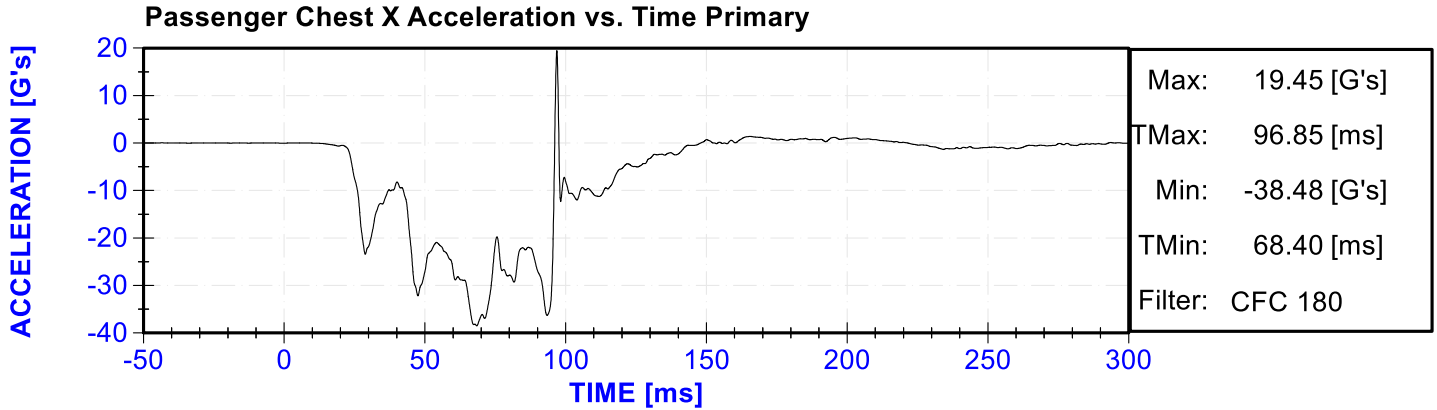


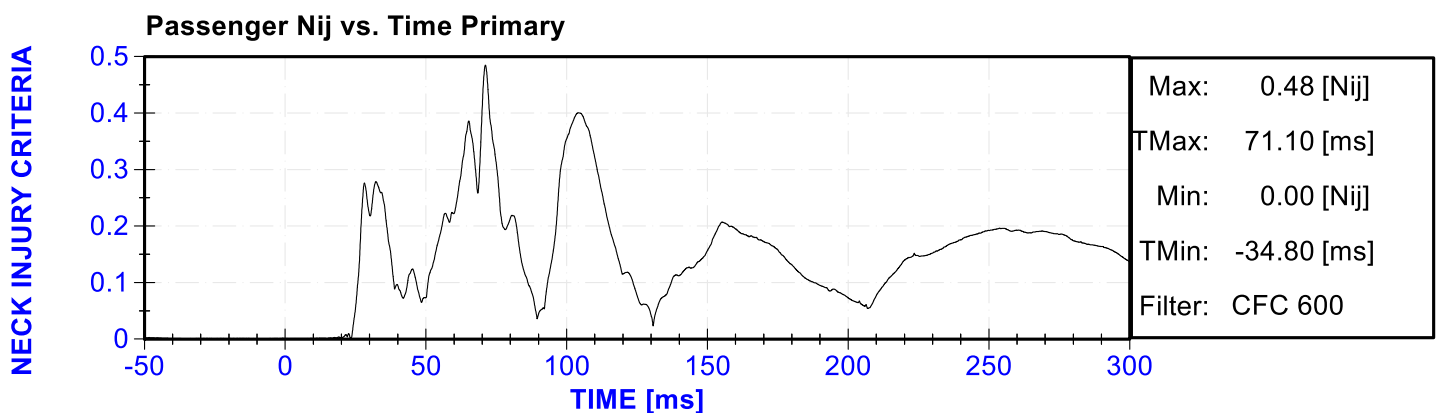
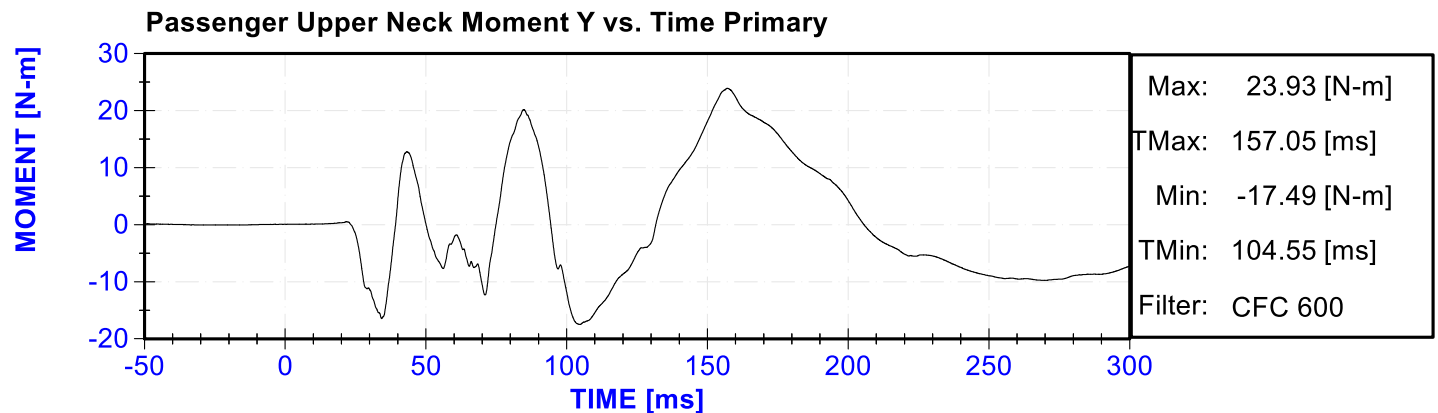
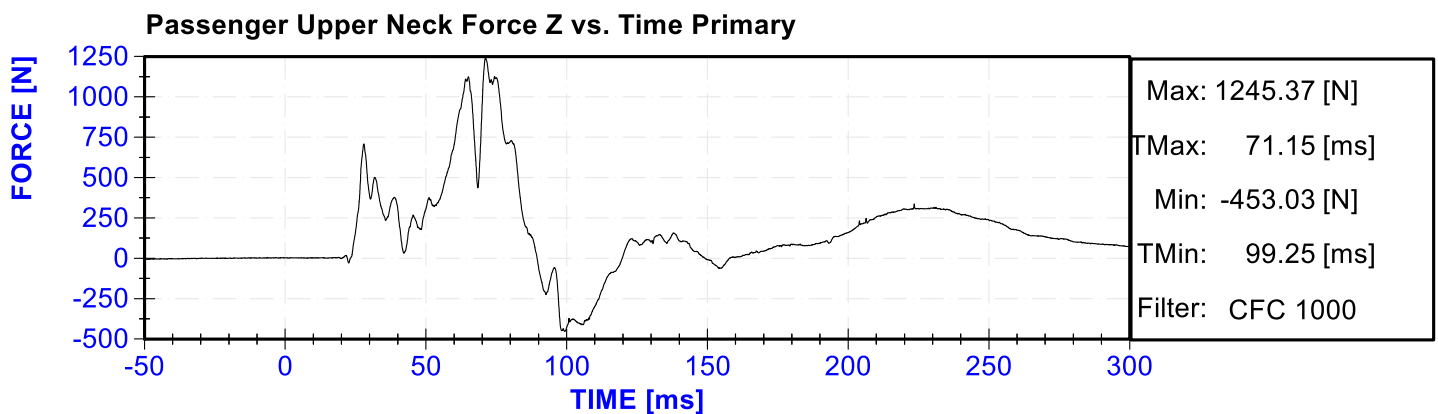
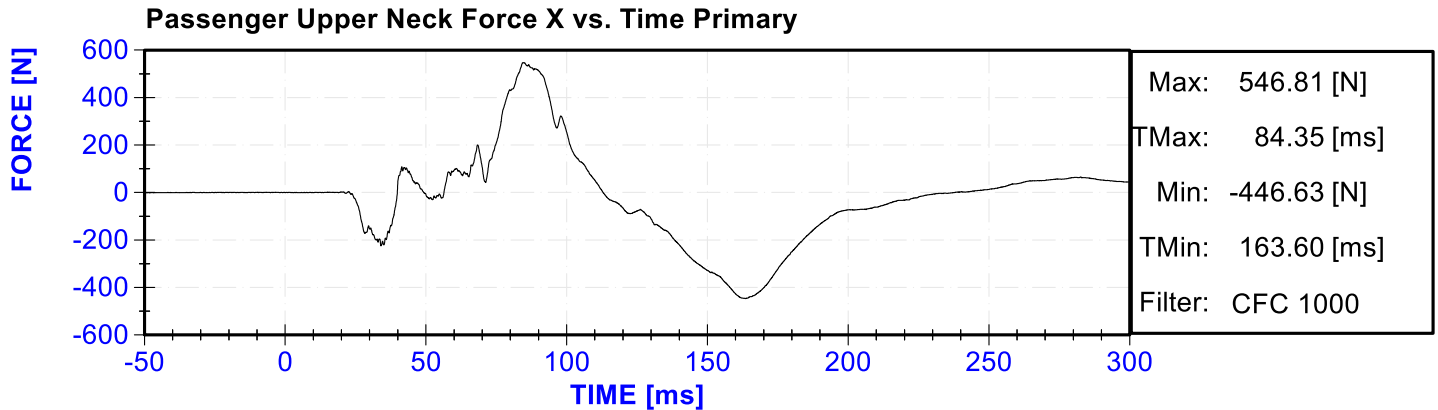
Driver Upper Neck Moment Y vs. Time Primary

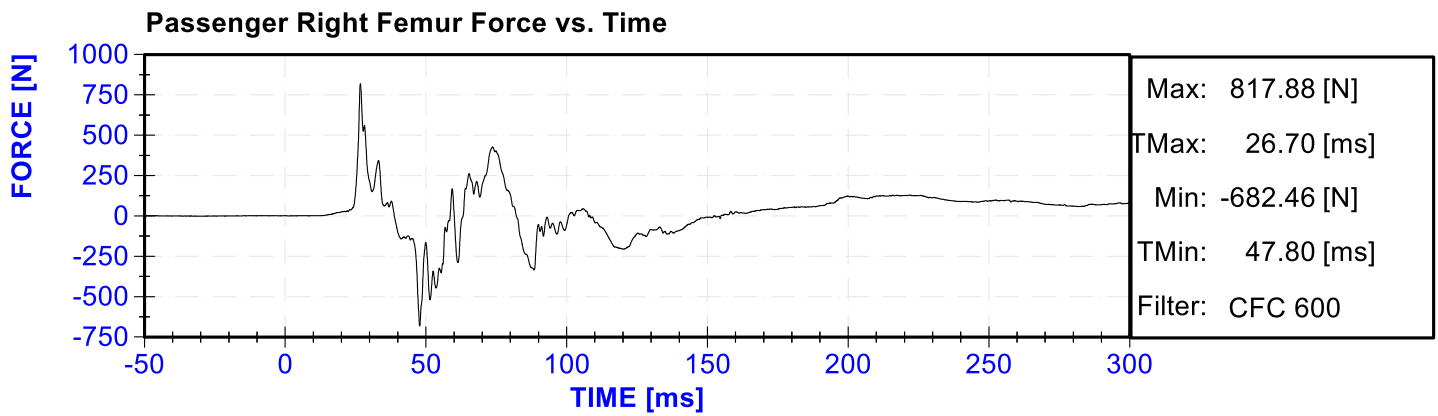
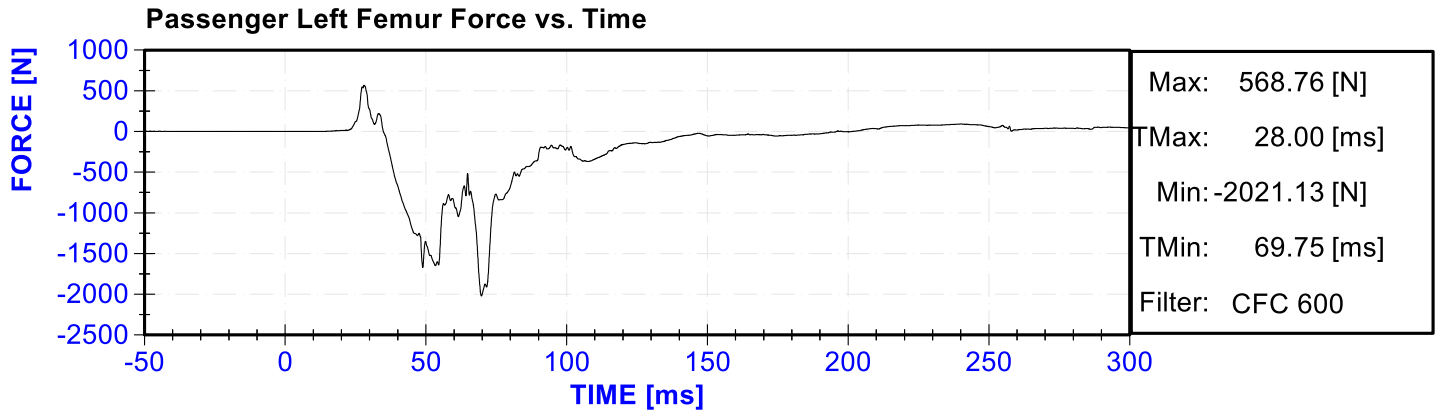












## **APPENDIX C**

### **DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA**

**CALIBRATION TEST RESULTS**

**PRE-TEST**

**HYBRID III 50<sup>TH</sup> PERCENTILE MALE - DRIVER ATD**

**SERIAL NO: 142**

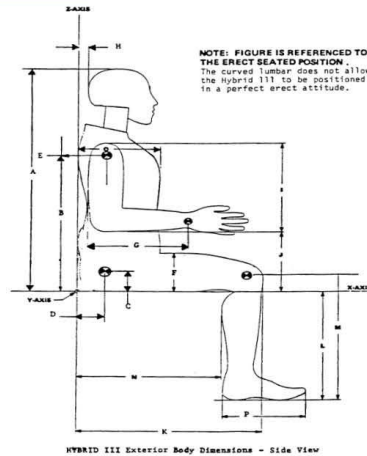
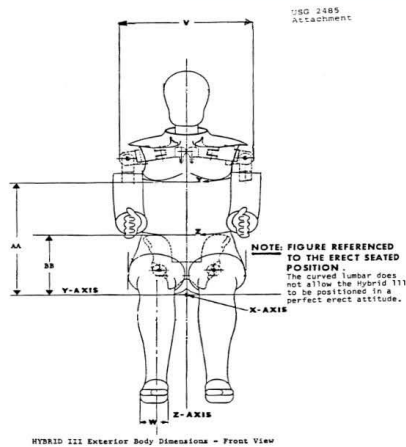


External Measurements - Hybrid 3 - 50th Male

Technician: K. Dutton

Date: 03/20/2019

Dummy Serial Number: 142



Symbol	Description	Specification (in)		Result (in)	Pass/Fail
A	Sitting Height	34.6	35.0	34.8	Pass
B	Shoulder Pivot Height	19.9	20.5	20.2	Pass
C	H-Point Height	3.3	3.5	3.4	Pass
D	H-Point from Backline	5.3	5.5	5.4	Pass
E	Shoulder Pivot from Backline	3.3	3.7	3.5	Pass
F	Thigh Clearance	5.5	6.1	5.8	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	13.4	Pass
J	Elbow Rest Height	7.5	8.3	8.0	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	18.4	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	16.7	Pass
W	Foot Breadth	3.6	4.2	3.9	Pass
Y	Chest Circumference with Jacket	38.2	39.4	38.9	Pass
Z	Waist Circumference	32.9	34.1	33.7	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

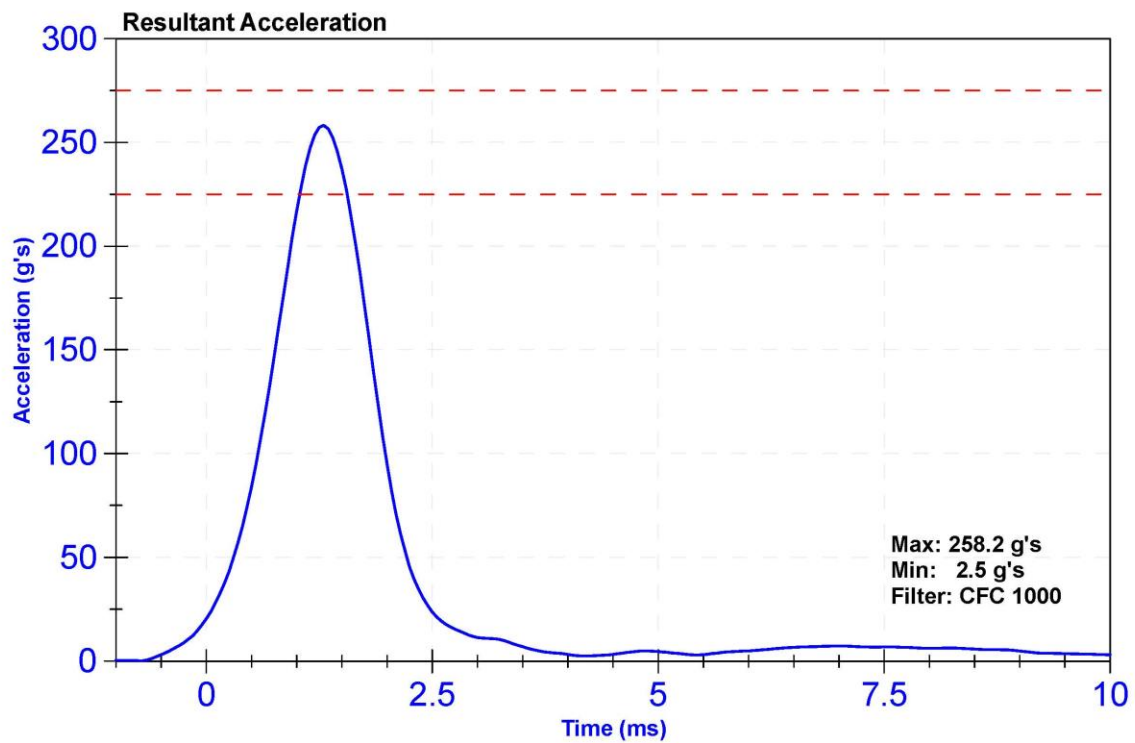
ATD Manufacturer	Humanetics	Test Technician	D.Reinhard
ATD Serial Number	142	Laboratory Supervisor	K.Brogan

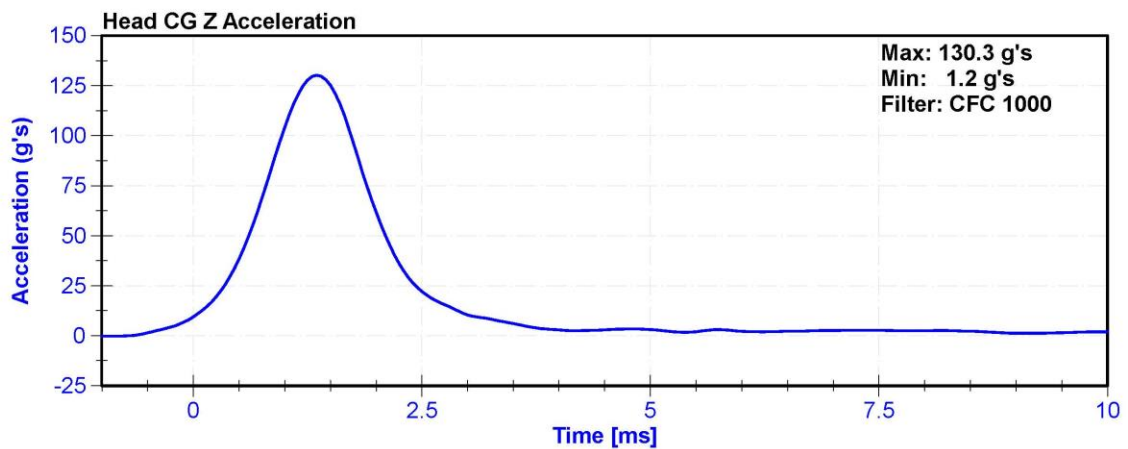
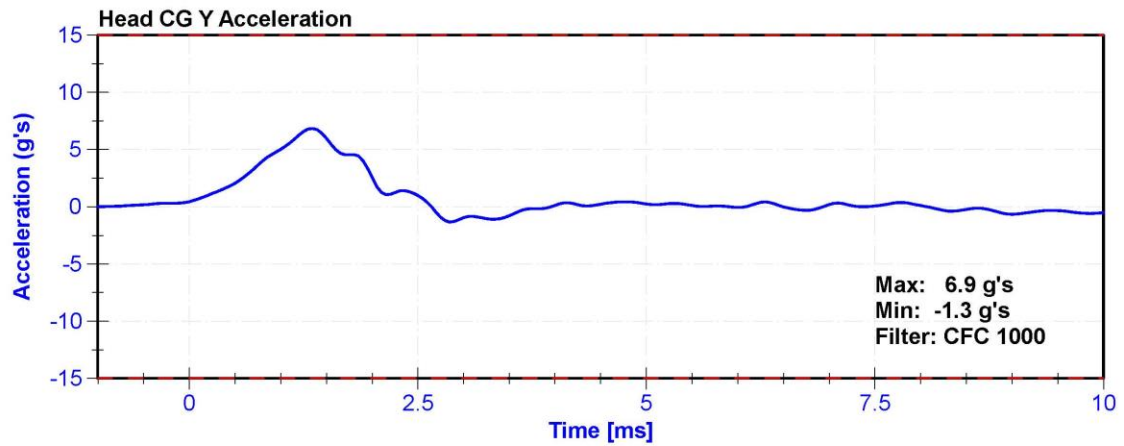
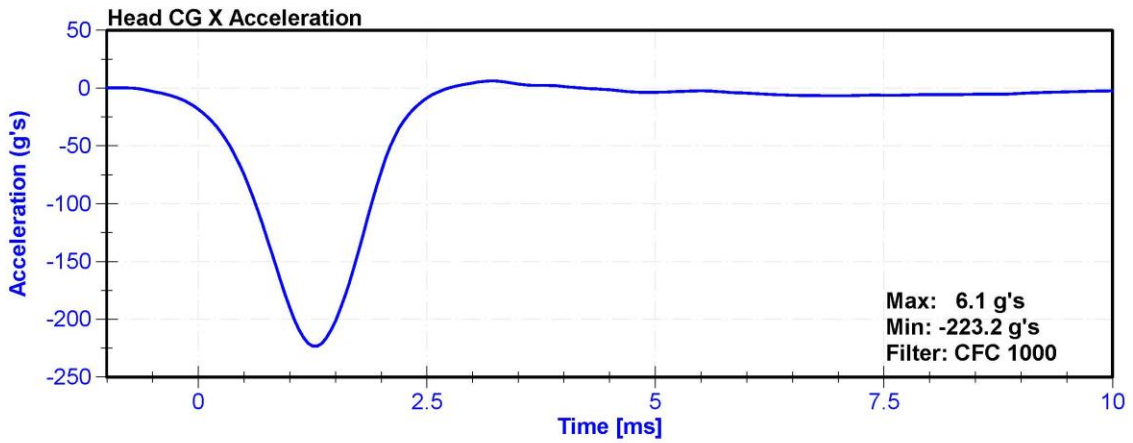
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	22.0	Pass
Humidity	10	70	%	22.2	Pass
Resultant Acceleration	225	275	g's	258.2	Pass
Oscillation	0	10	%	2.8	Pass
Lateral Acceleration	-15	15	g's	6.9	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P58998	10/5/2018	4/5/2019
Y Accelerometer	ENDEVCO 7264CT	AC-P51722	10/25/2018	4/25/2019
Z Accelerometer	ENDEVCO 7264CT	AC-P58997	10/6/2018	4/6/2019





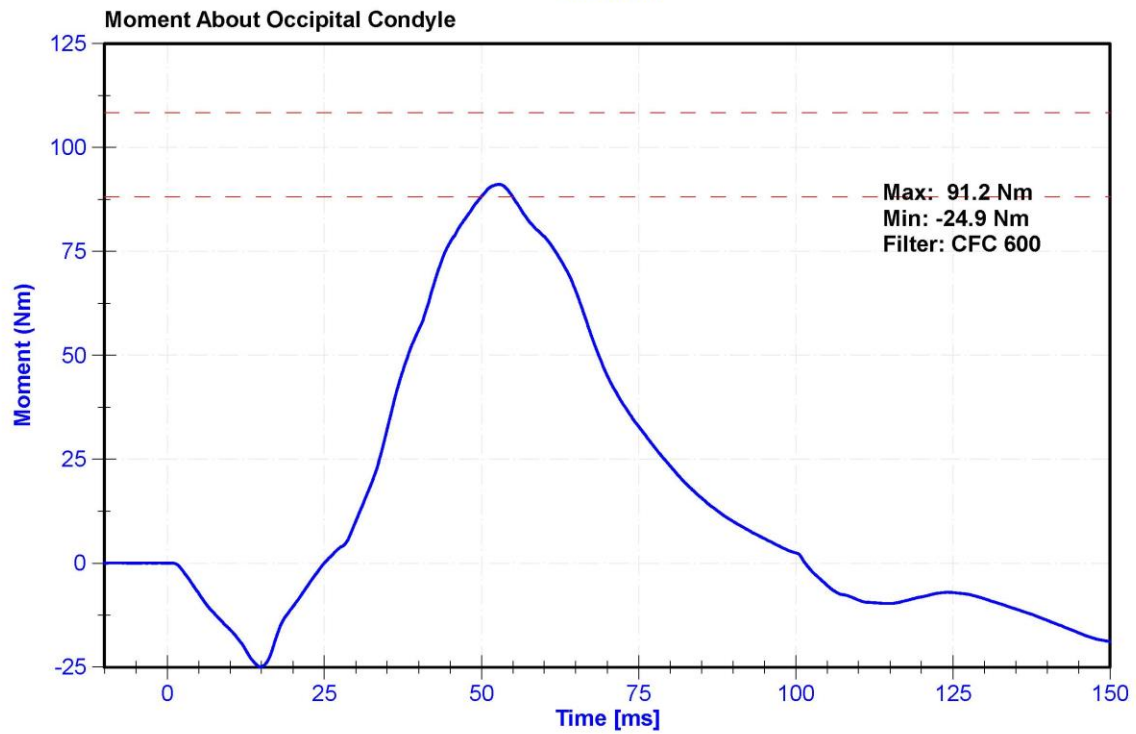
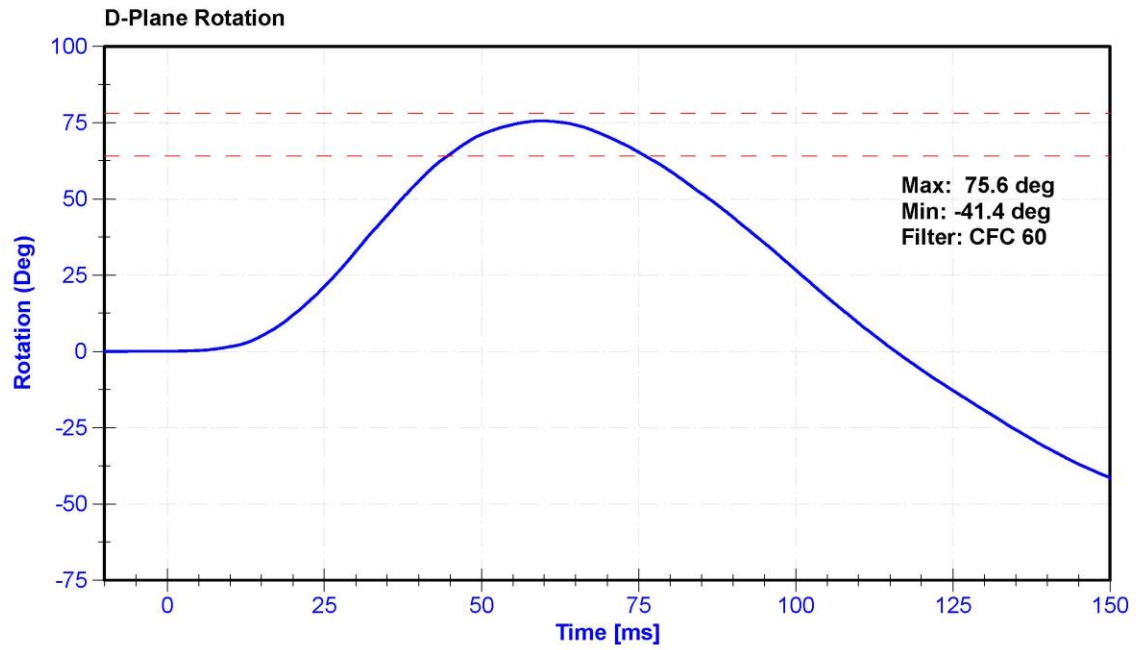
ATD Manufacturer	Humanetics	Test Technician	C. Mantell
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

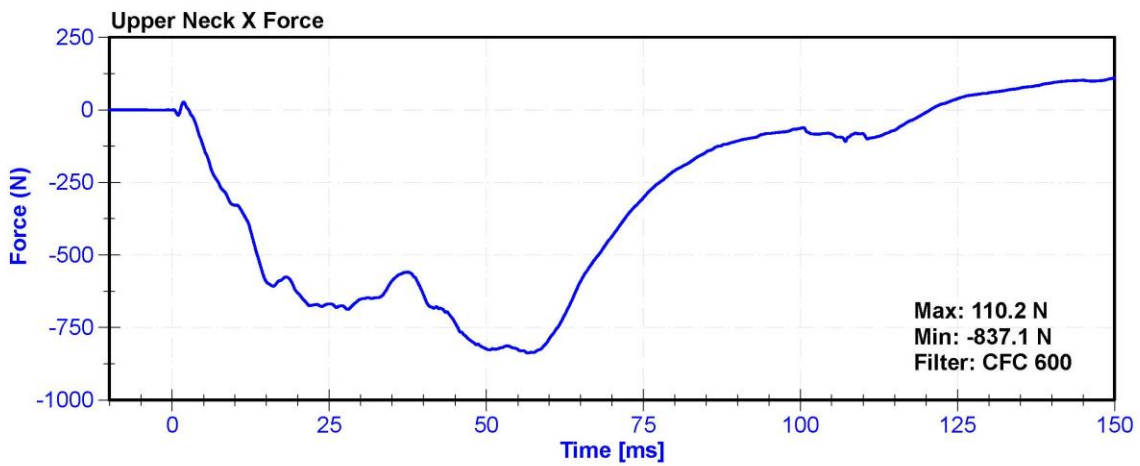
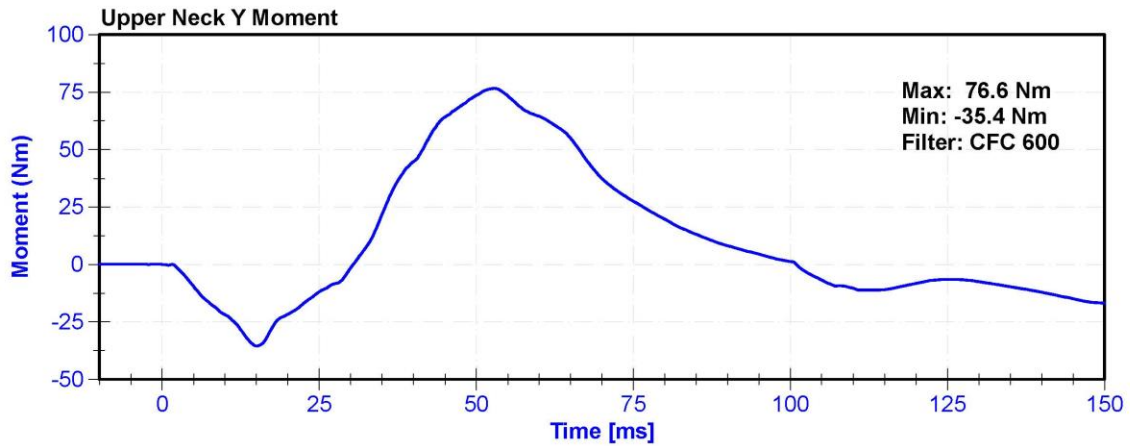
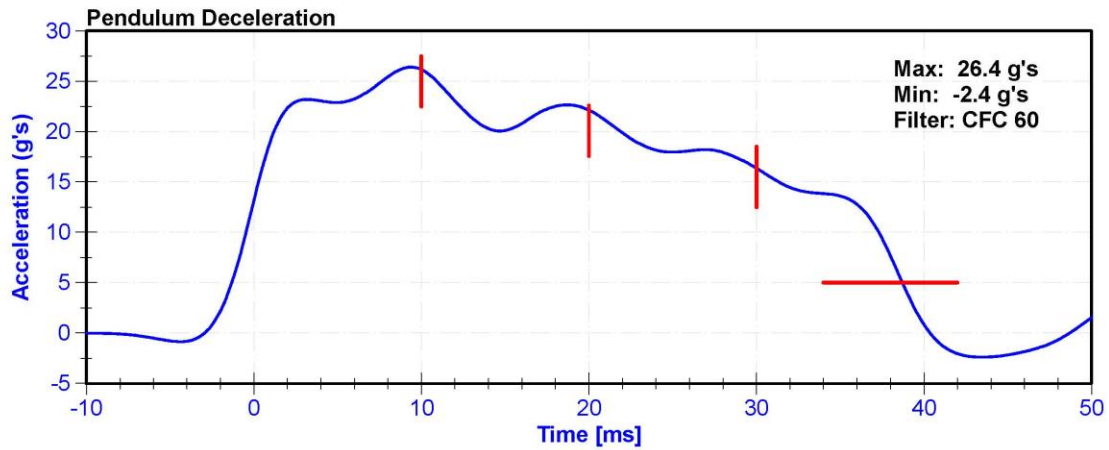
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.0	Pass
Humidity	10	70	%	24.3	Pass
Velocity	6.89	7.13	m/s	6.903	Pass
Pendulum Deceleration at 10ms	22.5	27.5	g's	26.17	Pass
Pendulum Deceleration at 20ms	17.6	22.6	g's	22.13	Pass
Pendulum Deceleration at 30ms	12.5	18.5	g's	16.37	Pass
Max. Pendulum Deceleration After 30ms	0	29	g's	26.4	Pass
Pendulum Deceleration Time to 5 g's	34	42	ms	38.7	Pass
Maximum D Plane Rotation	64	78	deg	75.6	Pass
Time to Maximum Rotation	57	64	ms	59.5	Pass
Rotation Decay to Zero	113	127	ms	115.9	Pass
Moment About Occipital Condyle	88.1	108.4	Nm	91.16	Pass
Time to Maximum Moment	47	58	ms	52.7	Pass
Moment Decay to Zero	97	107	ms	101.5	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5M9 Pend	1/29/2019	1/29/2020
Pendulum Potentiometer	ETI SP22G	DS-LABPOT1	11/15/2018	11/15/2019
Condyle Potentiometer	ETI SP22G	DS-LABPOT2	11/15/2018	11/15/2019
Upper Neck Load Cell	FTSS IF-205	LC-161Fx	9/28/2018	9/28/2019





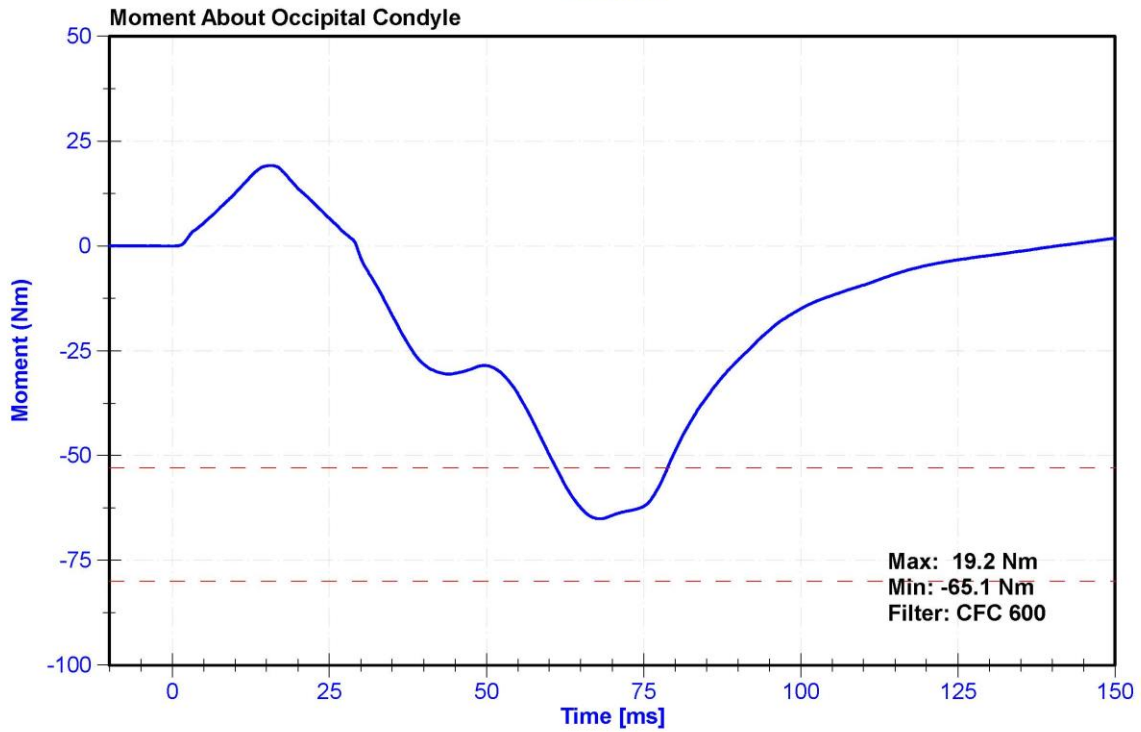
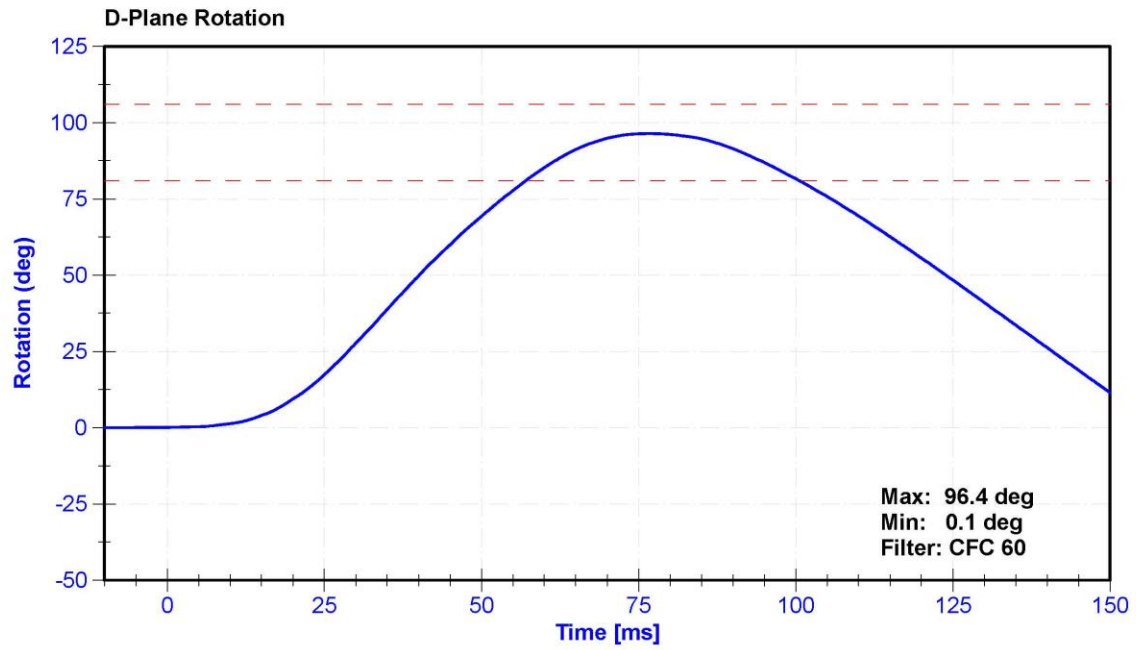
ATD Manufacturer	Humanetics	Test Technician	C. Mantell
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

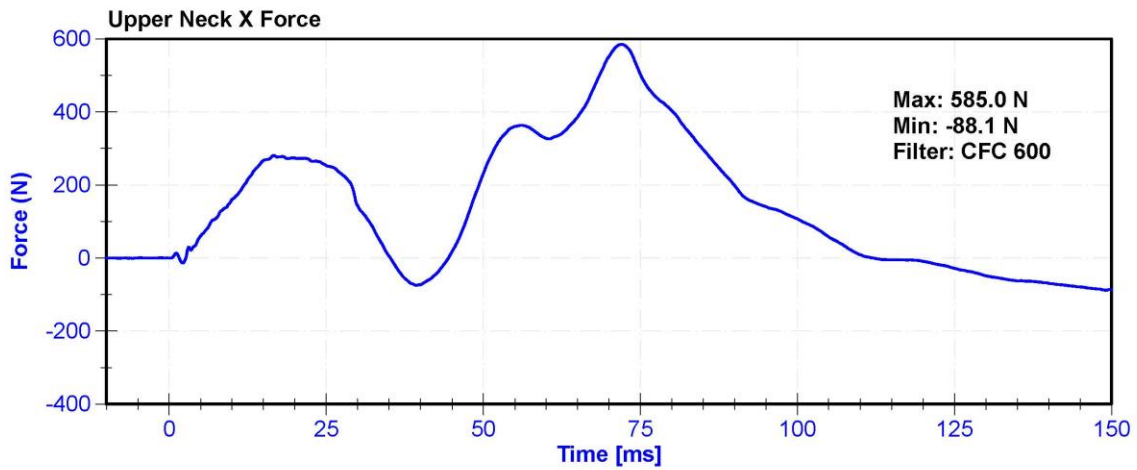
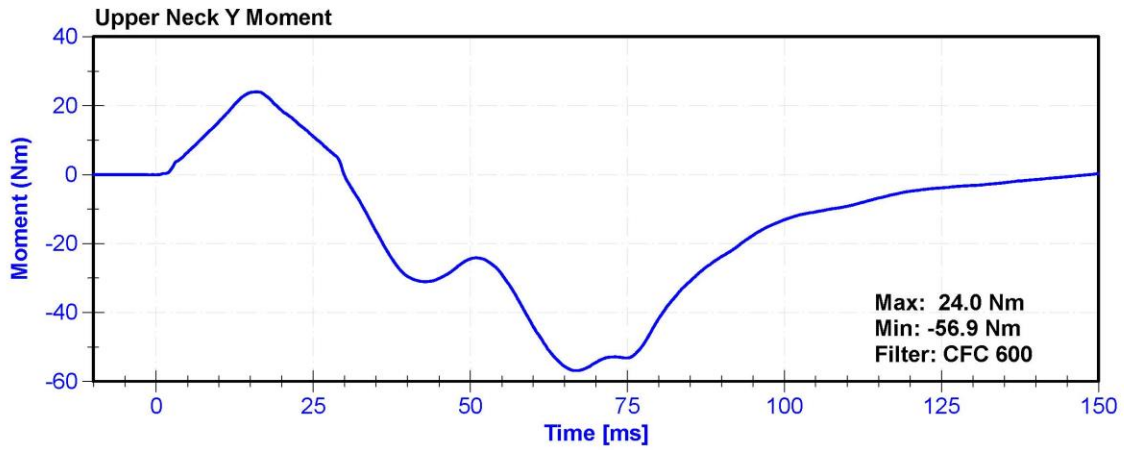
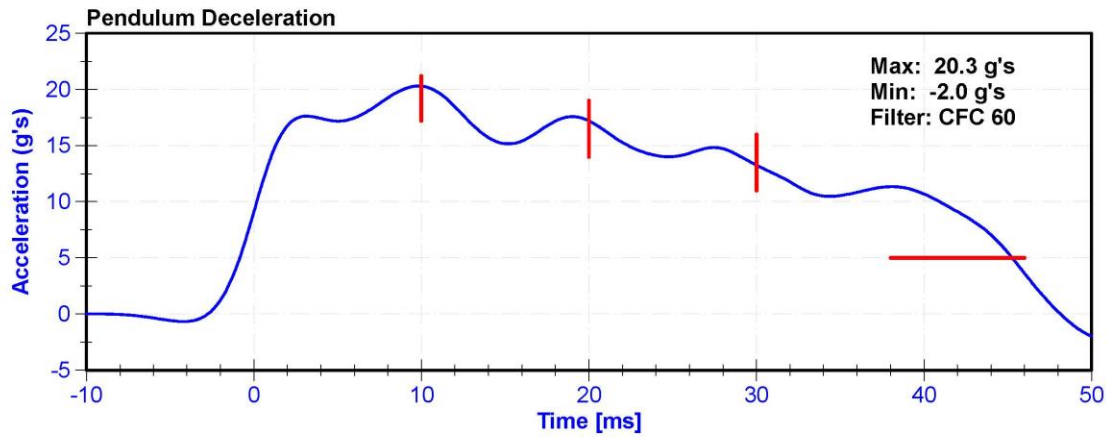
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22	Pass
Humidity	10	70	%	24.1	Pass
Velocity	5.94	6.19	m/s	5.964	Pass
Pendulum Deceleration at 10ms	17.2	21.2	g's	20.30	Pass
Pendulum Deceleration at 20ms	14	19	g's	17.2	Pass
Pendulum Deceleration at 30ms	11	16	g's	13.3	Pass
Max. Pendulum Deceleration After 30ms	0	22	g's	20.3	Pass
Pendulum Deceleration Time to 5 g's	38	46	ms	45.3	Pass
Maximum D Plane Rotation	81	106	deg	96.4	Pass
Time to Maximum Rotation	72	82	ms	76.7	Pass
Rotation Decay to Zero	147	174	ms	157.7	Pass
Minimum Moment About OC	-80	-52.9	Nm	-65.06	Pass
Time to Minimum Moment	65	79	ms	67.9	Pass
Moment Decay to Zero	120	148	ms	140.9	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5M9 Pend	1/29/2019	1/29/2020
Pendulum Potentiometer	ETI SP22G	DS-LABPOT1	11/15/2018	11/15/2019
Condyle Potentiometer	ETI SP22G	DS-LABPOT2	11/15/2018	11/15/2019
Upper Neck Load Cell	FTSS IF-205	LC-161Fx	9/28/2018	9/28/2019





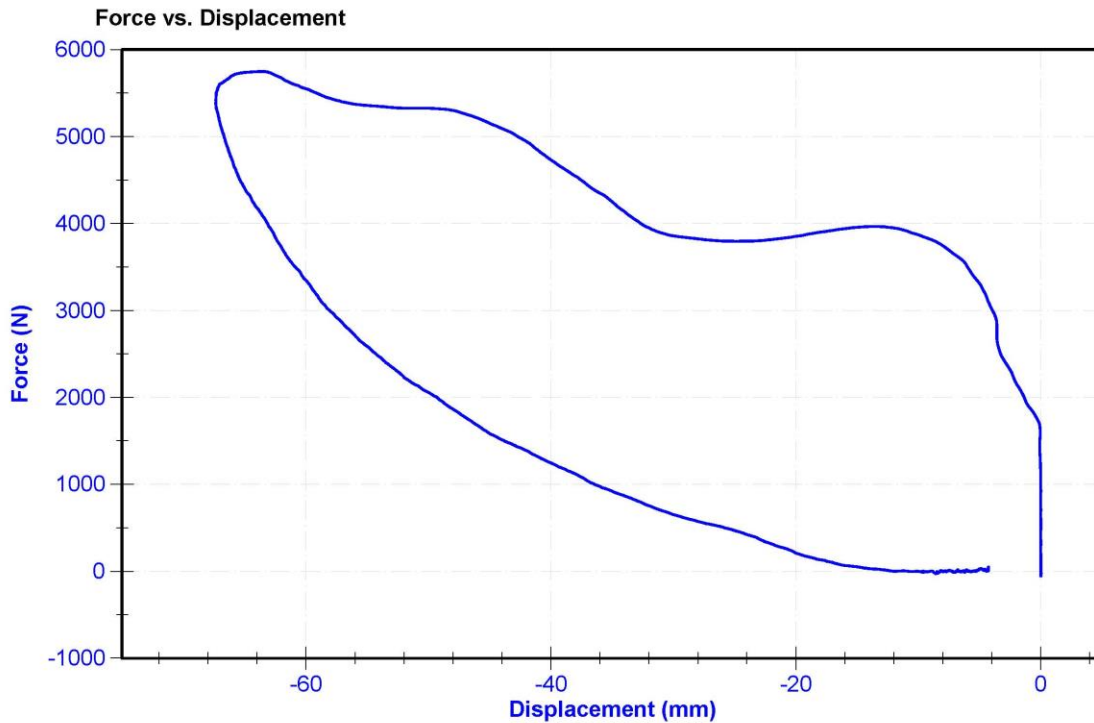
ATD Manufacturer	Humanetics	Test Technician	C. Mantell
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

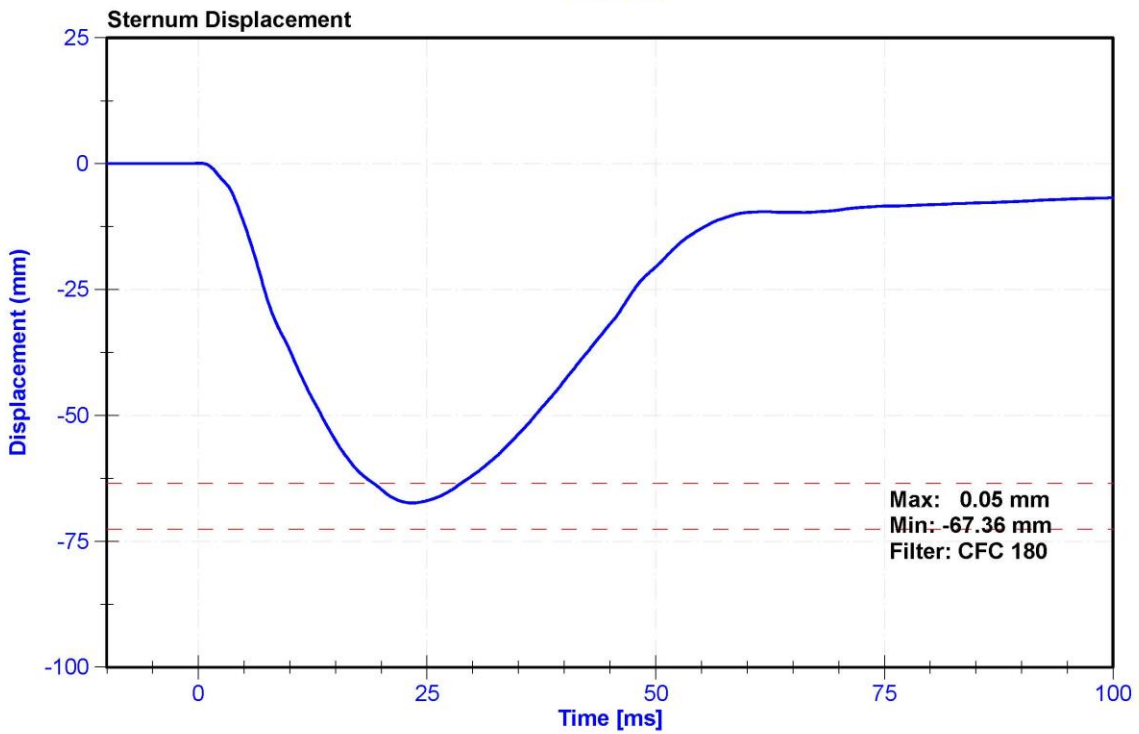
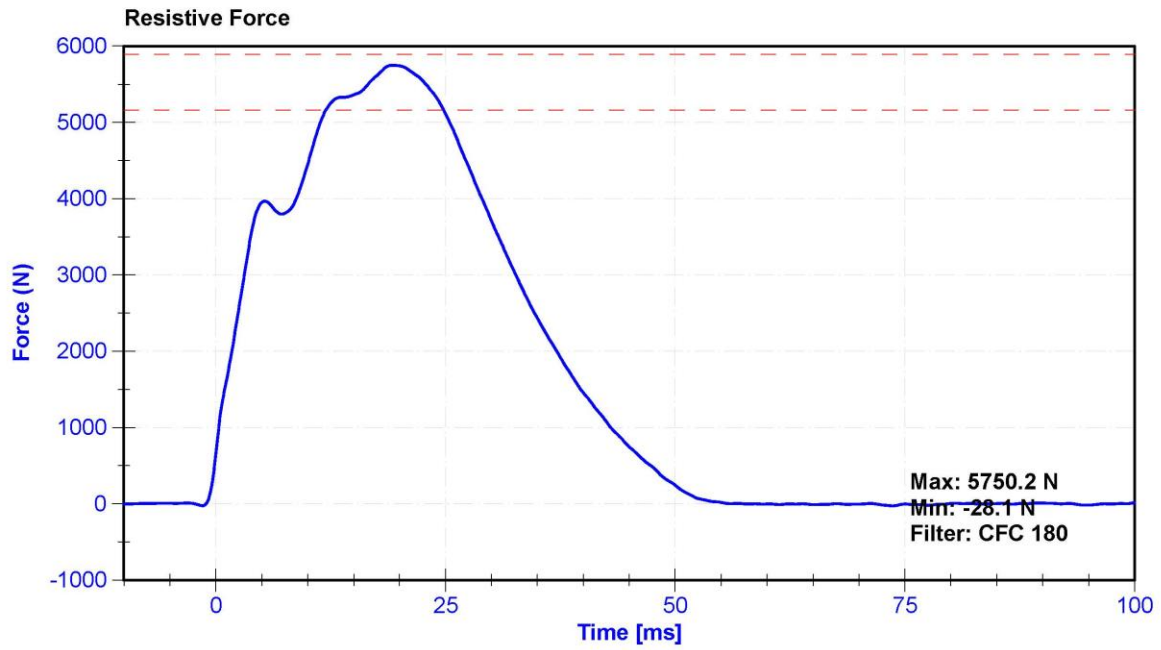
**Results**

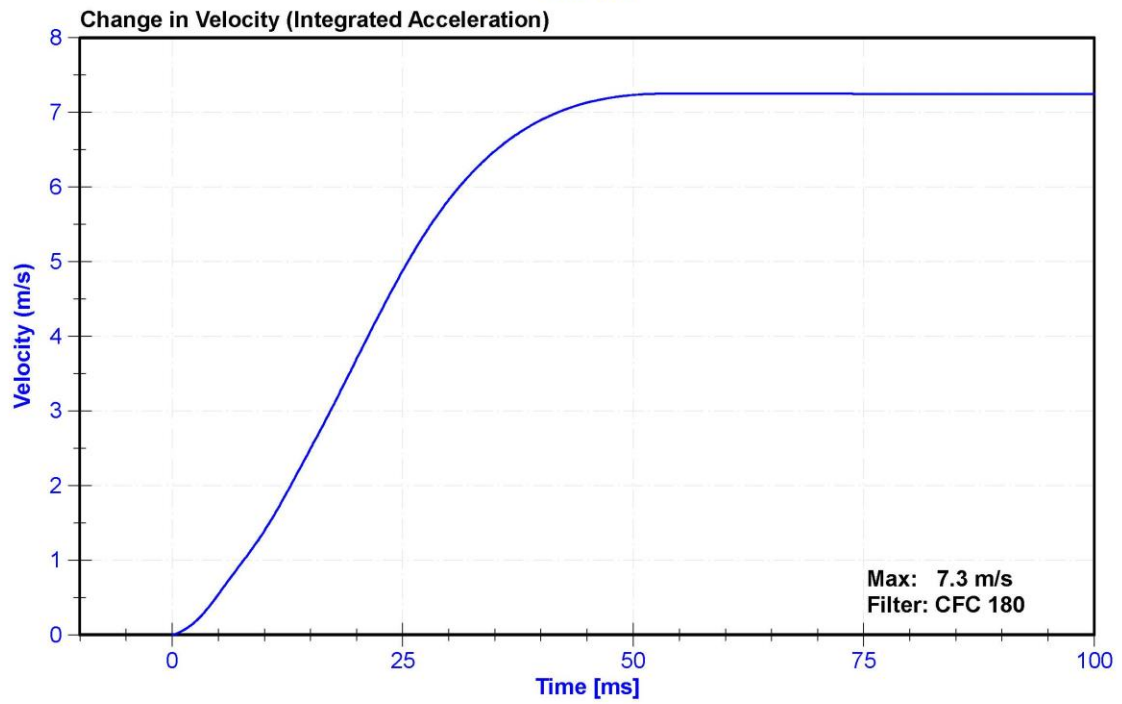
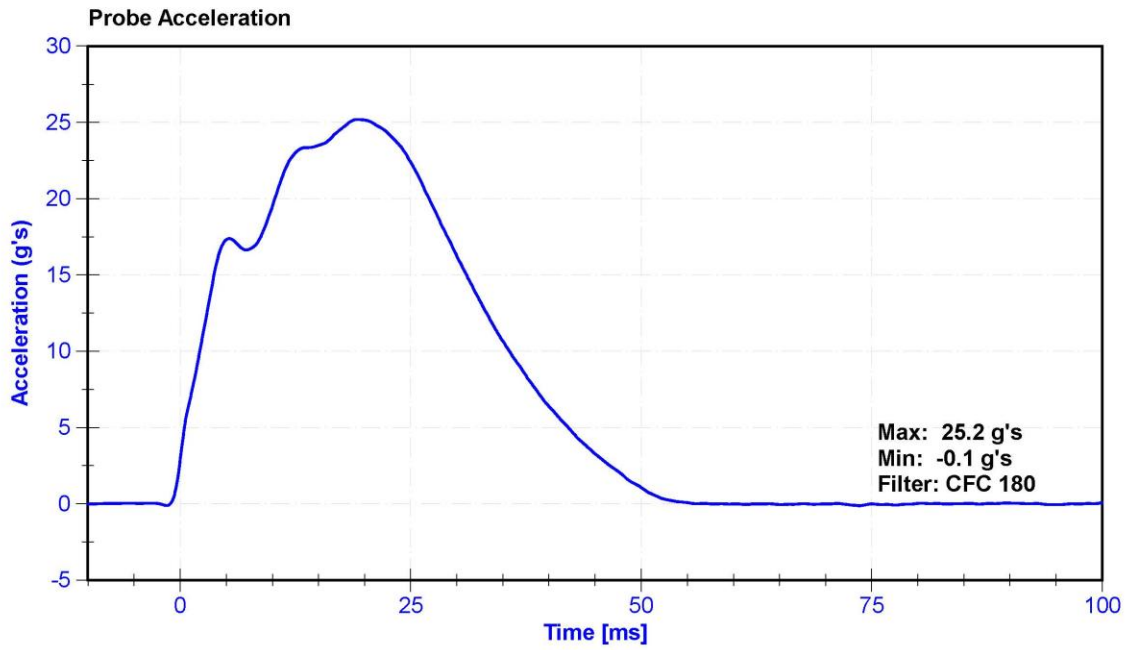
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	29.7	Pass
Velocity	6.59	6.83	m/s	6.655	Pass
Chest Displacement	-72.6	-63.5	mm	-67.36	Pass
Resistive Force	5160	5894	N	5750.2	Pass
Hysteresis	65	85	%	70.5	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco 7264C	AC-P94667	11/1/2018	11/1/2019
Chest Potentiometer	JDK 6209-2038	DS-142	10/22/2018	10/22/2019







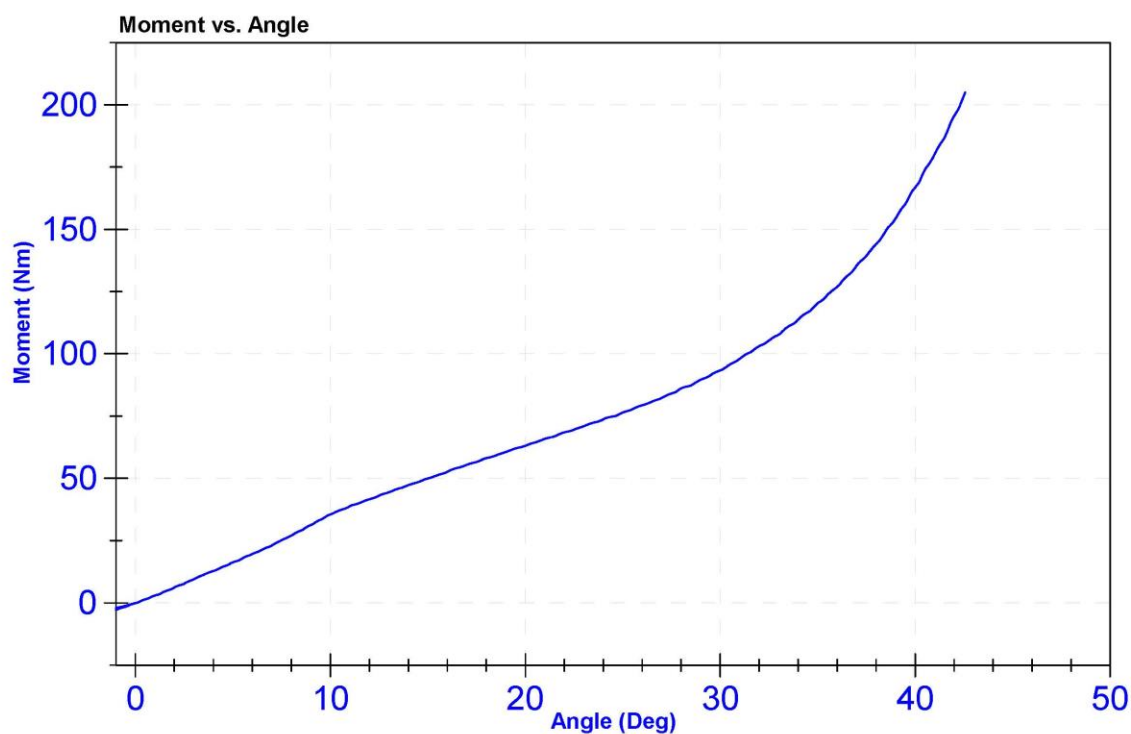
ATD Manufacturer	Humanetics	Test Technician	D.Reinhard
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	22.0	Pass
Humidity	10	70	%	23.0	Pass
Average Velocity	5	10	deg/s	7.0	Pass
Angle at 203Nm	40	50	deg	42.5	Pass
Moment at 30 degrees	0	94.9	Nm	93.3	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	ETI SP22	DS-0008	9/18/2018	9/18/2019
Load Cell	Key Trans 2301-02	LC-115 My	9/6/2018	9/6/2019



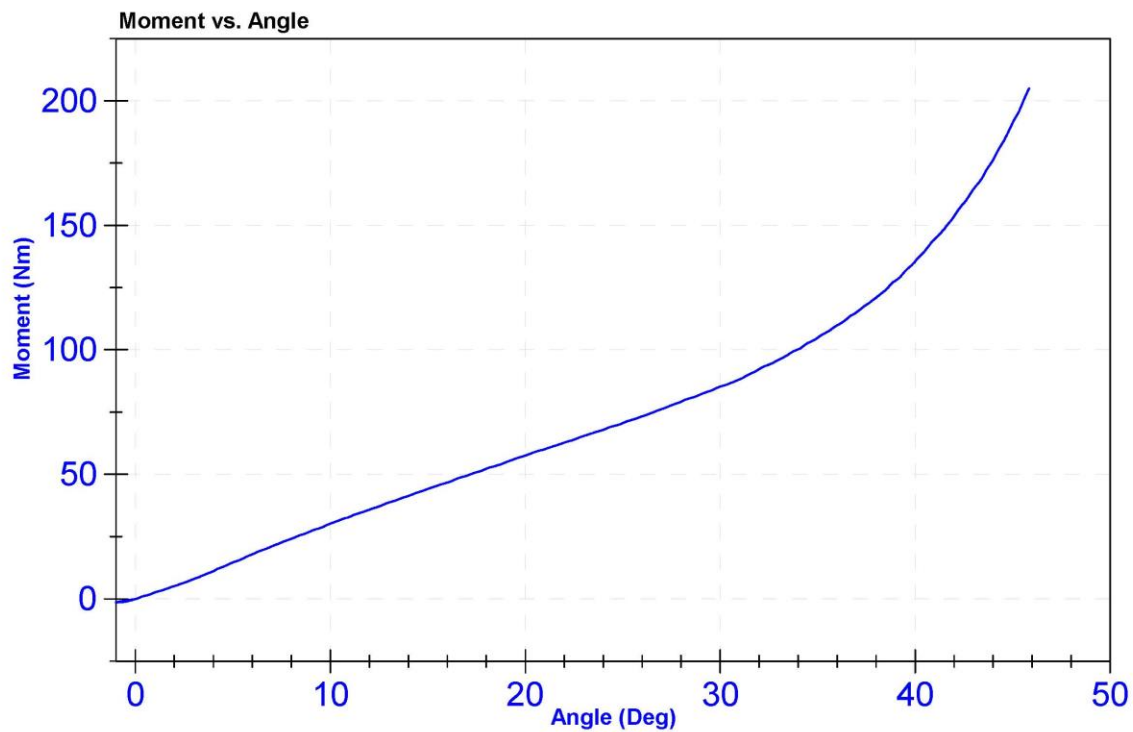
ATD Manufacturer	Humanetics	Test Technician	D.Reinhard
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	22.0	Pass
Humidity	10	70	%	22.9	Pass
Average Velocity	5	10	deg/s	7.4	Pass
Angle at 203Nm	40	50	deg	45.7	Pass
Moment at 30 degrees	0	94.9	Nm	85.2	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	ETI SP22	DS-0008	9/18/2018	9/18/2019
Load Cell	Key Trans 2301-02	LC-115 My	9/6/2018	9/6/2019



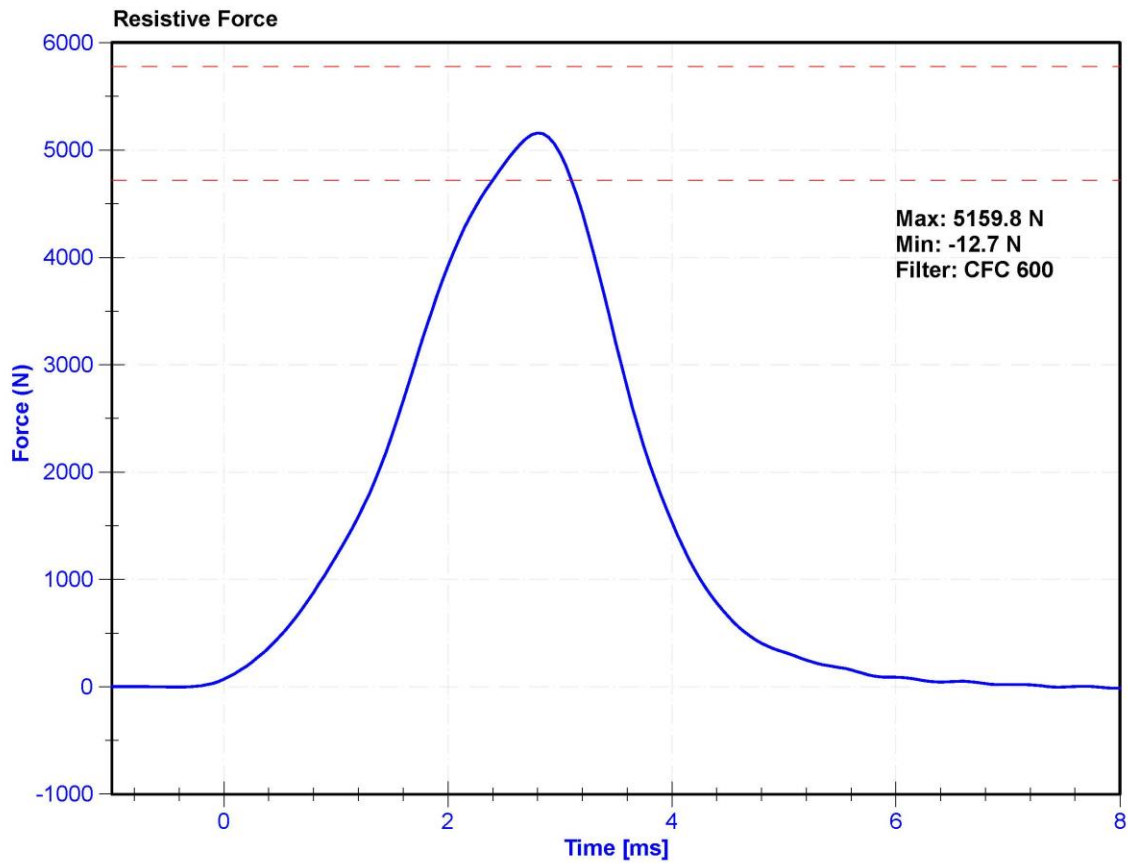
ATD Manufacturer	Humanetics	Test Technician	D.Reinhard
ATD Serial Number	142	Laboratory Supervisor	K.Brogan

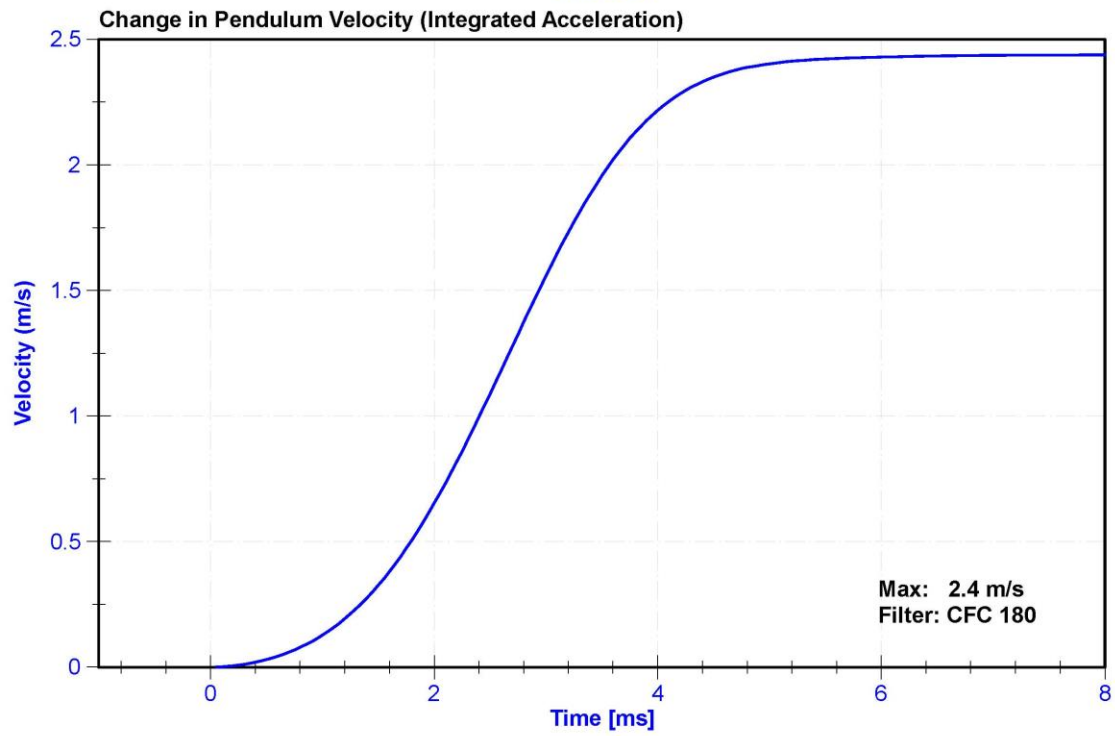
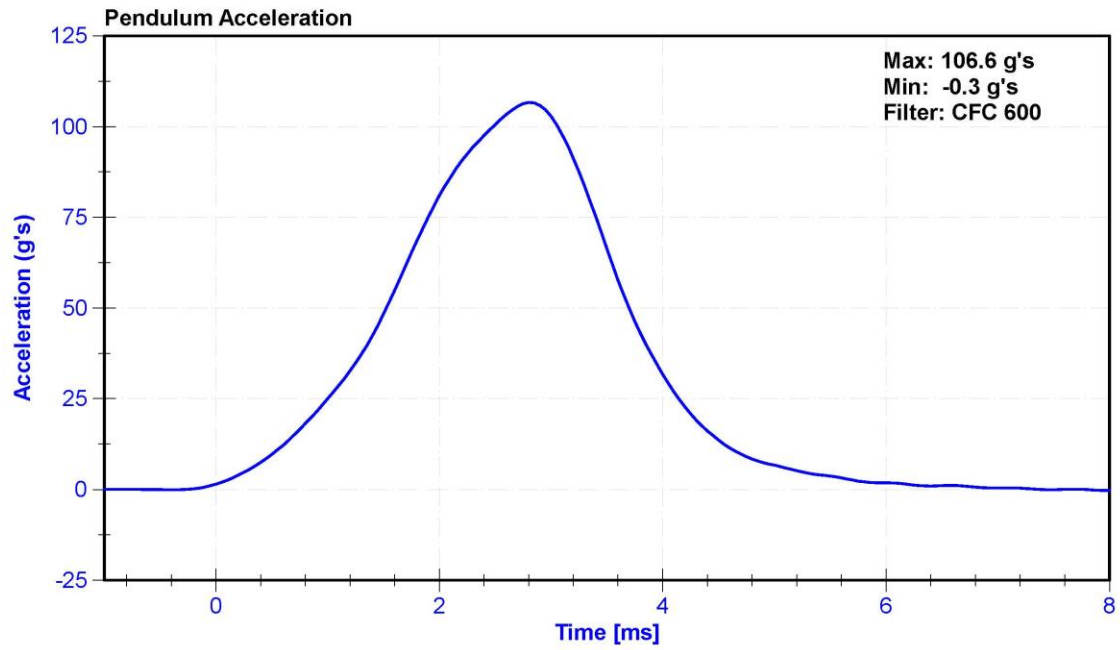
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	22	Pass
Humidity	10	70	%	21.4	Pass
Velocity	2.07	2.13	m/s	2.117	Pass
Maximum Resistive Force	4720	5780	N	5159.8	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P23904	11/1/2018	5/2/2019





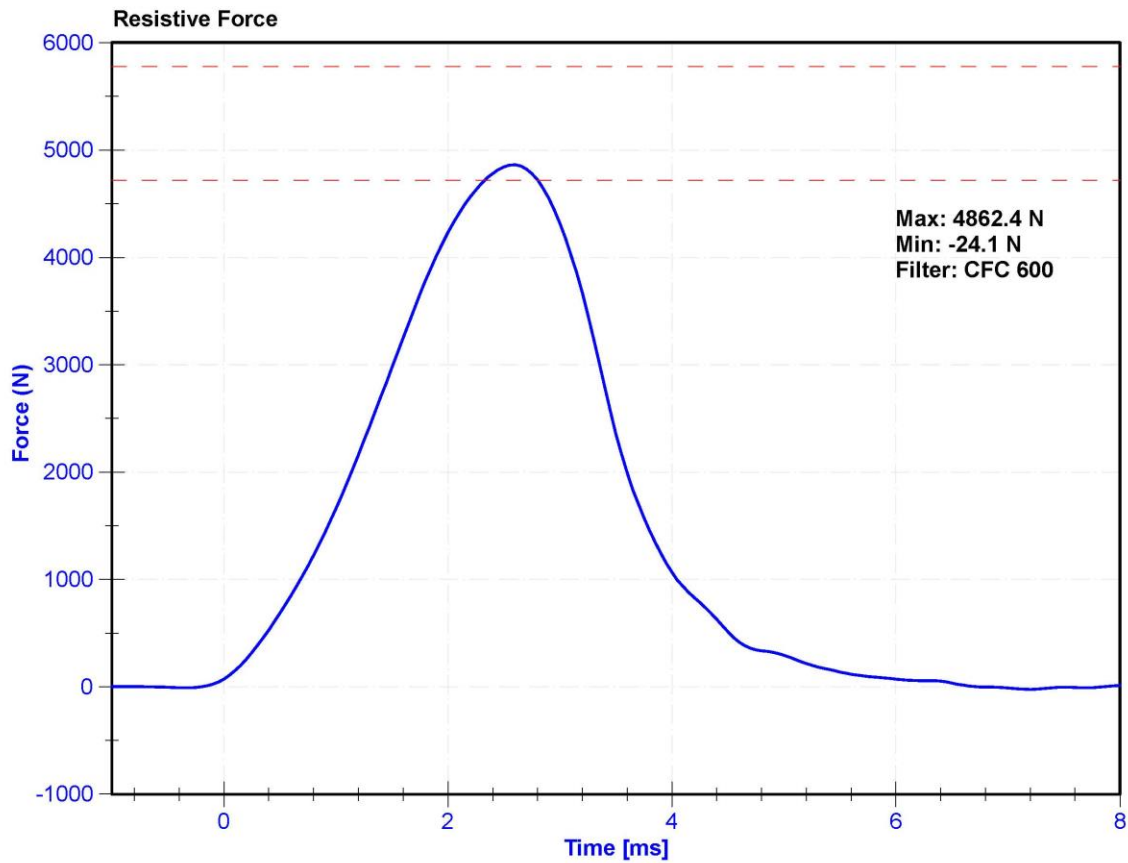
ATD Manufacturer	Humanetics	Test Technician	D.Reinhard
ATD Serial Number	142	Laboratory Supervisor	K.Brogan

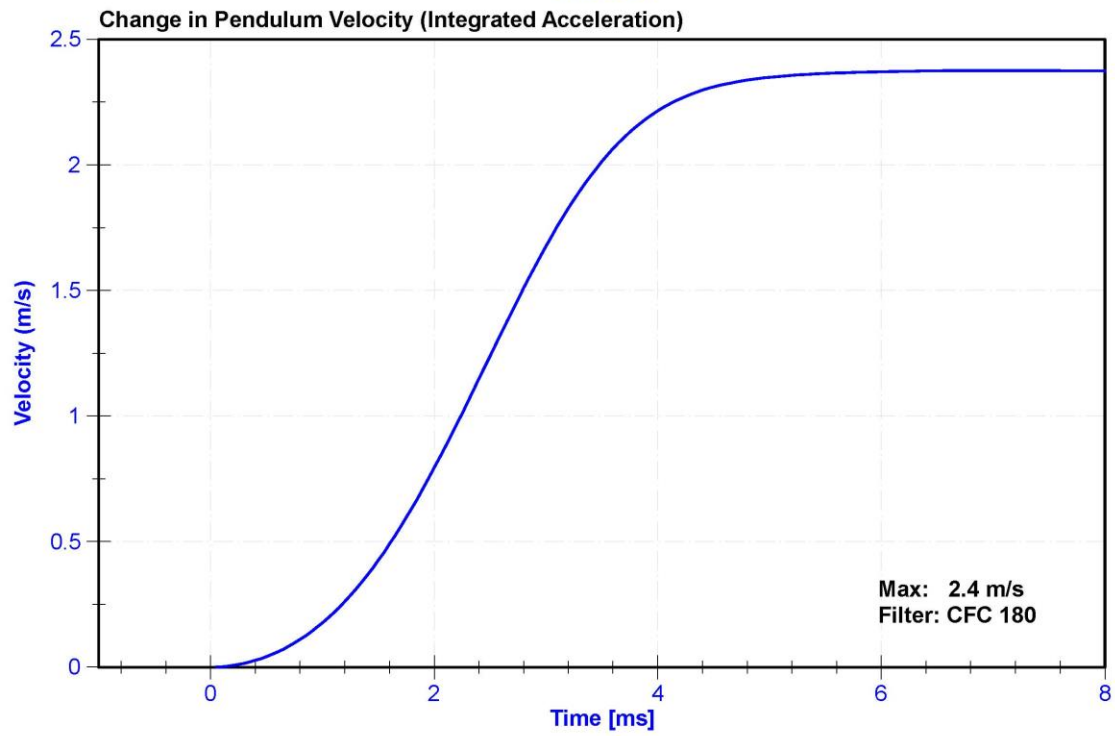
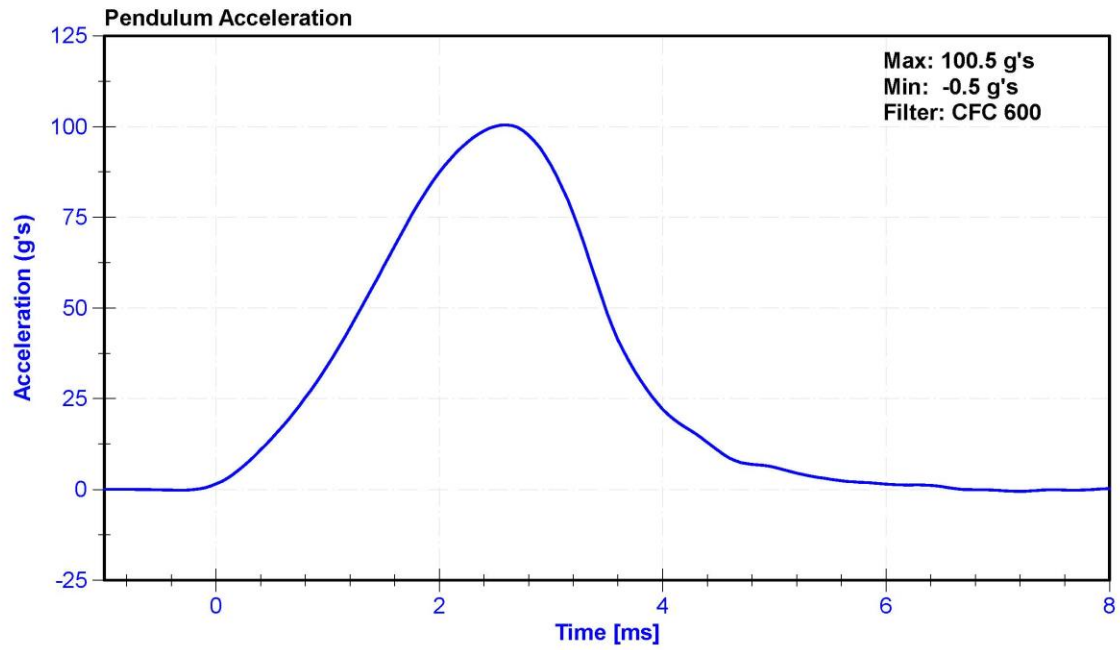
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	22	Pass
Humidity	10	70	%	22.7	Pass
Velocity	2.07	2.13	m/s	2.121	Pass
Maximum Resistive Force	4720	5780	N	4862.4	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P23904	11/1/2018	5/2/2019





**CALIBRATION TEST RESULTS**

**PRE-TEST**

**HYBRID III 5<sup>TH</sup> PERCENTILE - PASSENGER ATD**

**SERIAL NO: 288**

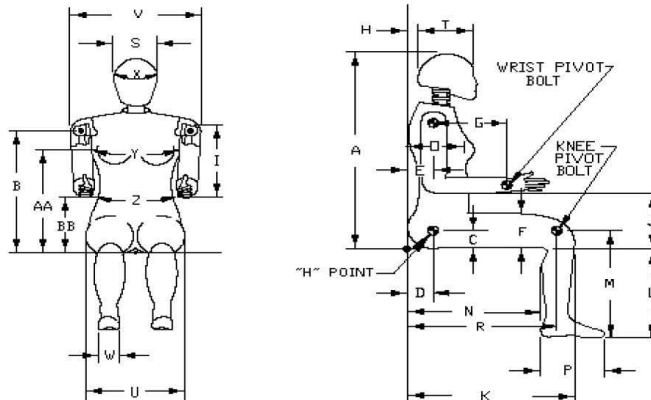


External Measurements - Hybrid 3 - 5th Female

Technician: K. Dutton

Date: 04/10/2019

Dummy Serial Number: 288



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	775	800	785	Pass
B	Shoulder Pivot Height	432	457	450	Pass
C	H-Point Height	81	86	84	Pass
D	H-Point from Backline	145	150	147	Pass
E	Shoulder Pivot from Backline	69	84	76	Pass
F	Thigh Clearance	119	135	126	Pass
G	Back of Elbow to Wrist Pivot	244	259	255	Pass
H	Head Back to Backline	43	48	46	Pass
I	Shoulder to Elbow Length	277	297	284	Pass
J	Elbow Rest Height	183	203	188	Pass
K	Buttock to Knee Length	521	546	538	Pass
L	Popliteal Height	356	376	365	Pass
M	Knee Pivot Height	394	419	405	Pass
N	Buttock Popliteal Length	414	439	430	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	465	Pass
S	Head Breadth	137	147	142	Pass
T	Head Depth	178	188	183	Pass
U	Hip Breadth	300	315	310	Pass
V	Shoulder Breadth	351	366	361	Pass
W	Foot Breadth	79	94	85	Pass
X	Head Circumference	528	549	537	Pass
Y	Chest Circumference with Jacket	851	881	865	Pass
Z	Waist Circumference	460	790	777	Pass
AA	Reference Location (Chest Circumference)	333	358	345	Pass
BB	Reference Location (Waist Circumference)	160	170	164	Pass

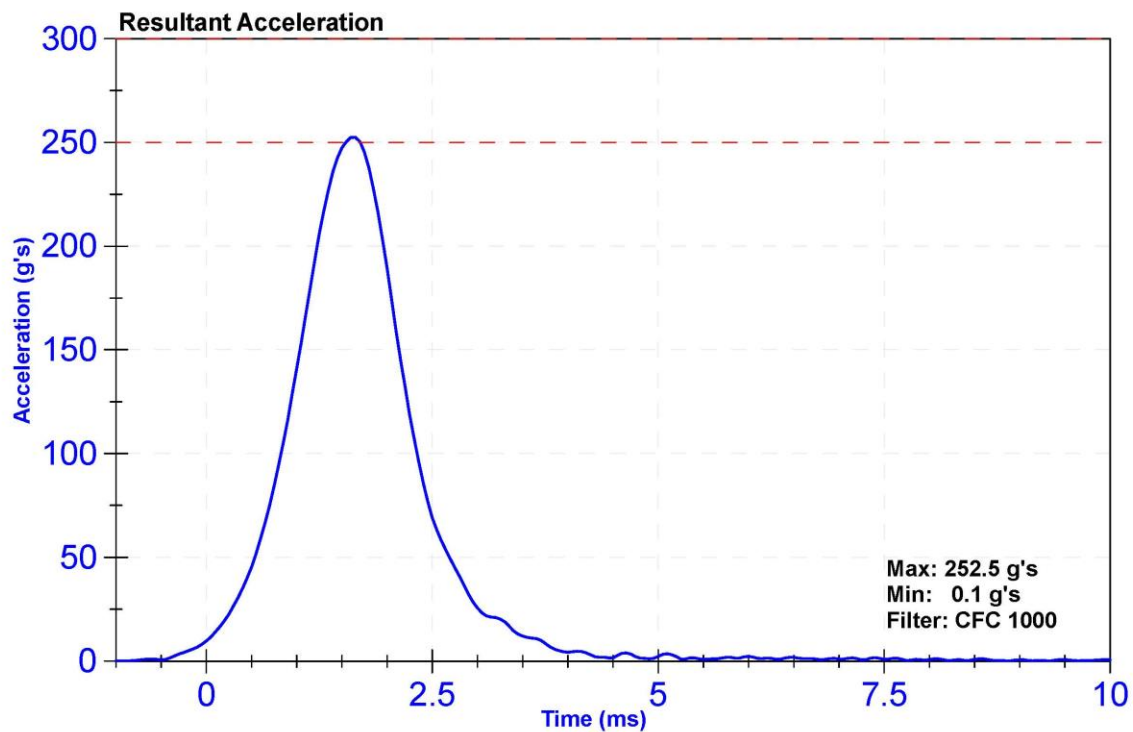
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	288	Laboratory Supervisor	K.Brogan

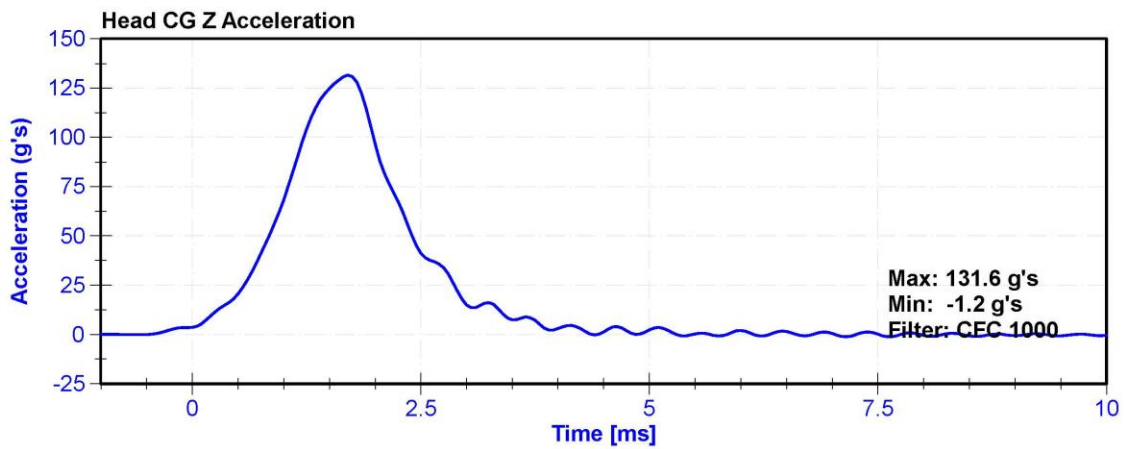
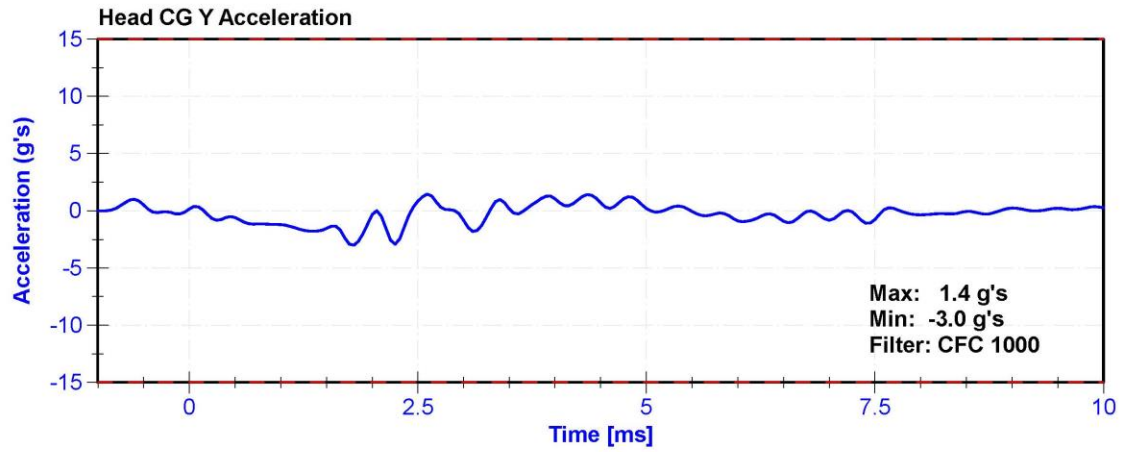
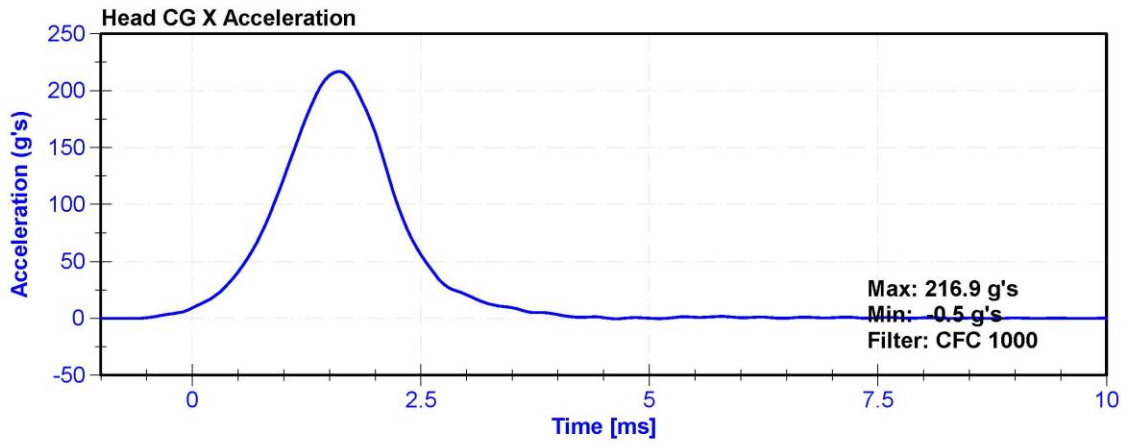
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	22	Pass
Humidity	10	70	%	29.6	Pass
Resultant Acceleration	250	300	g's	252.5	Pass
Oscillation	0	10	%	1.8	Pass
Lateral Acceleration	-15	15	g's	-3.0	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264	AC-P51303	10/15/2018	4/15/2019
Y Accelerometer	ENDEVCO 7264CT	AC-P49216	10/15/2018	4/15/2019
Z Accelerometer	ENDEVCO 7264	AC-P58868	10/15/2018	4/15/2019





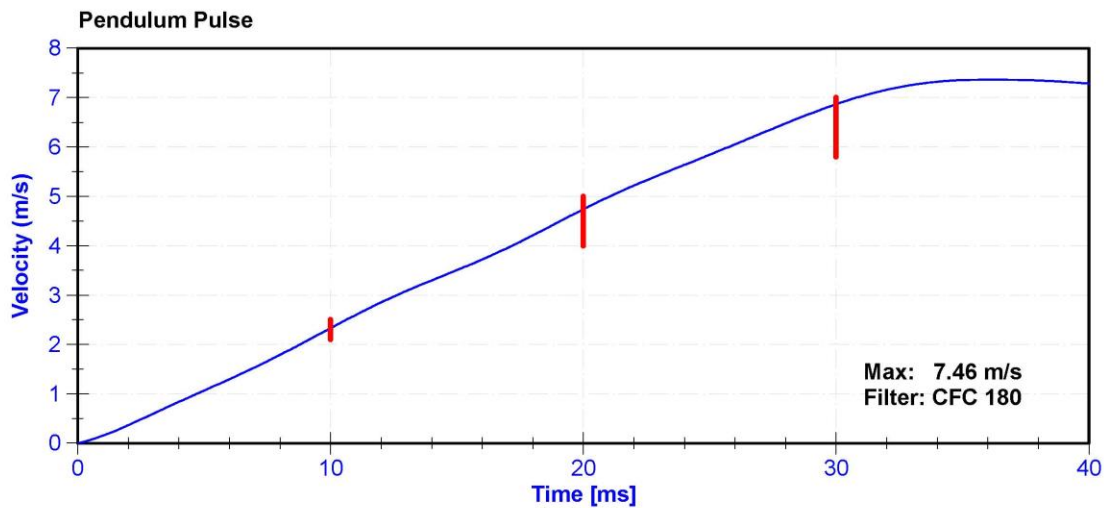
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	288	Laboratory Supervisor	K. Brogan

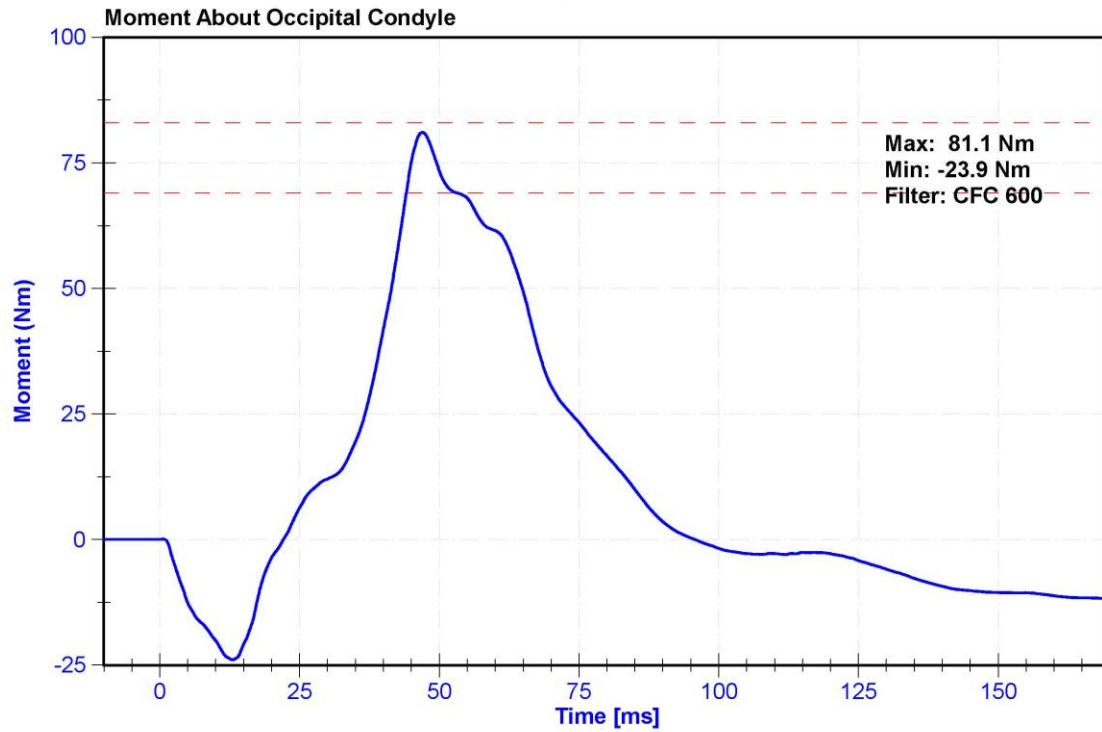
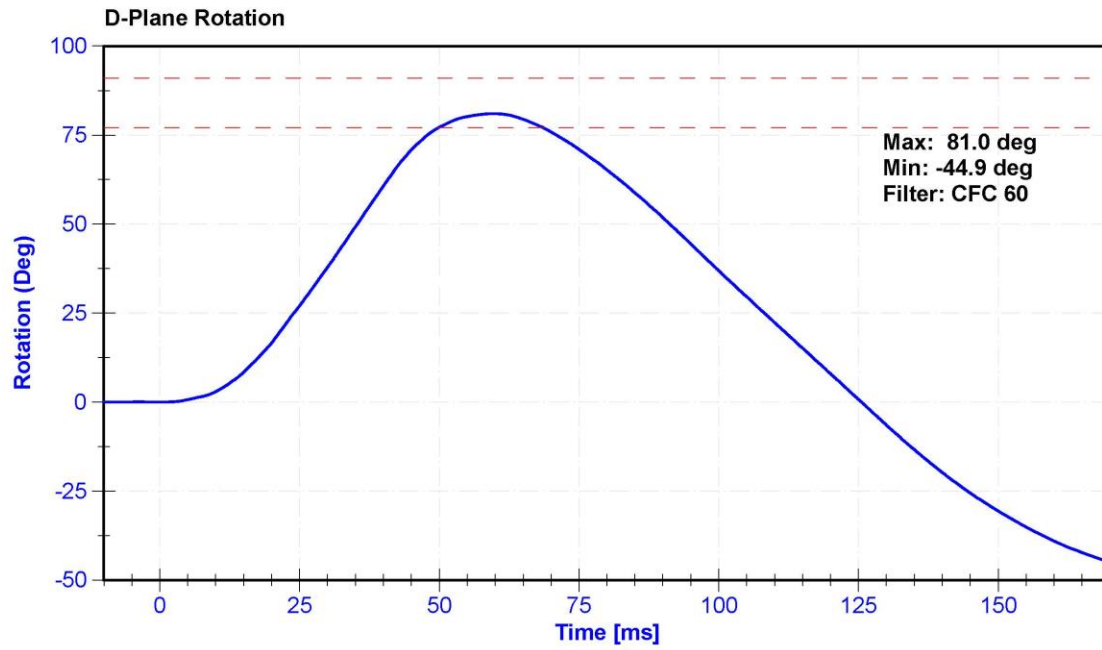
**Results**

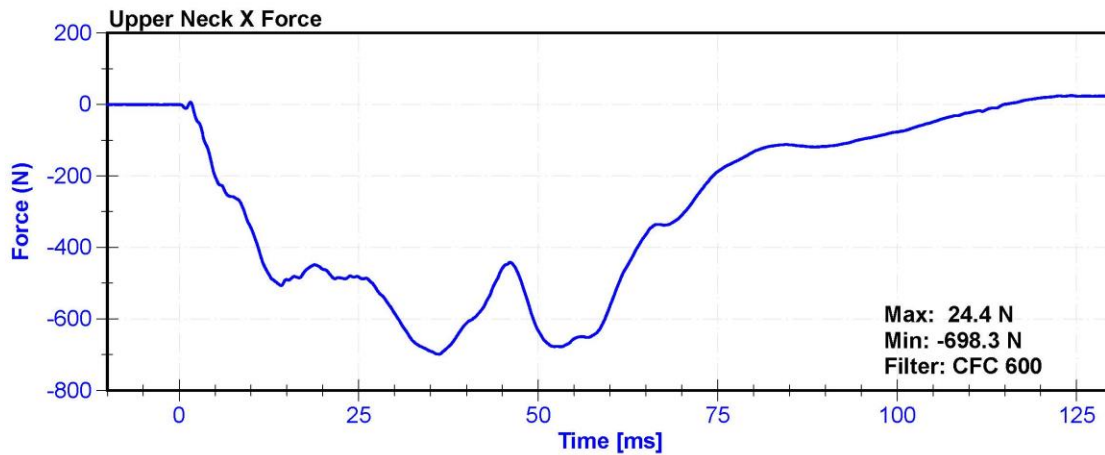
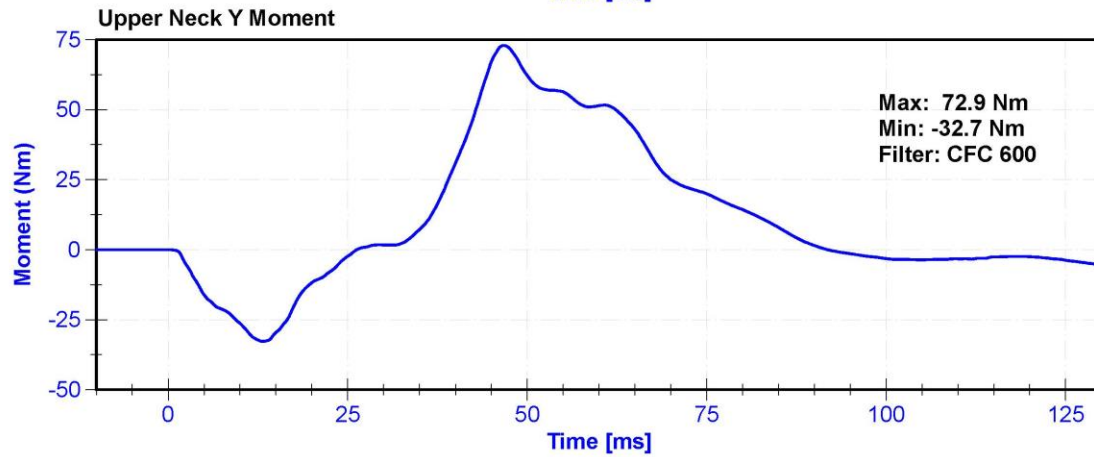
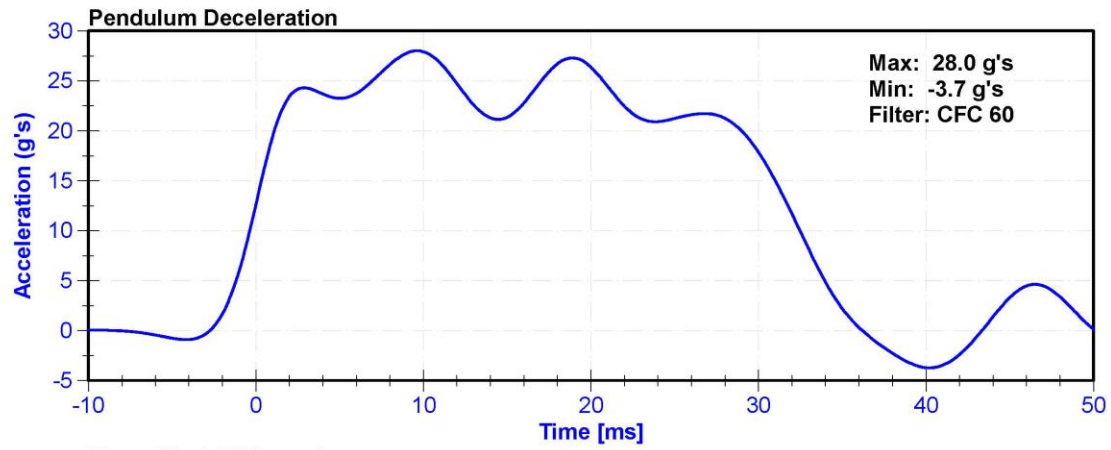
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.0	Pass
Humidity	10	70	%	18.0	Pass
Velocity	6.89	7.13	m/s	6.903	Pass
Pendulum Impulse at 10ms	2.1	2.5	m/s	2.33	Pass
Pendulum Impulse at 20ms	4.0	5.0	m/s	4.74	Pass
Pendulum Impulse at 30ms	5.8	7.0	m/s	6.87	Pass
Max D Plane Rotation	77	91	deg	81.0	Pass
Max Moment During Rotation Interval	69	83	Nm	81.1	Pass
Moment Decay to 10.0 Nm	80	100	ms	85.0	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5M9 Pend	1/29/2019	1/29/2020
Pendulum Potentiometer	ETI SP22G	DS-LABPOT1	11/15/2018	11/15/2019
Condyle Potentiometer	ETI SP22G	DS-LABPOT2	11/15/2018	11/15/2019
Upper Neck Load Cell	DENTON 1716A	LC-1591Fx	9/28/2018	9/28/2019







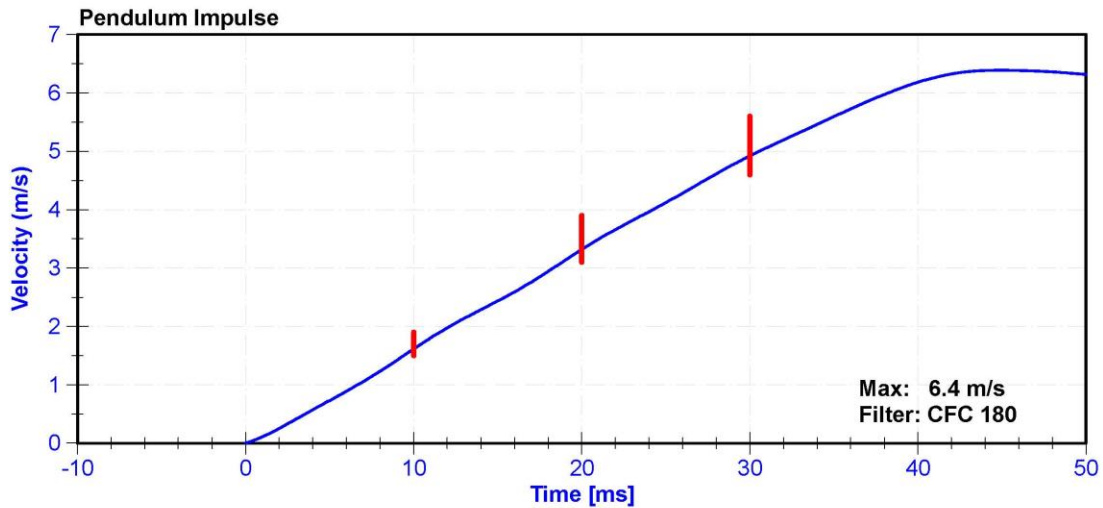
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	288	Laboratory Supervisor	K. Brogan

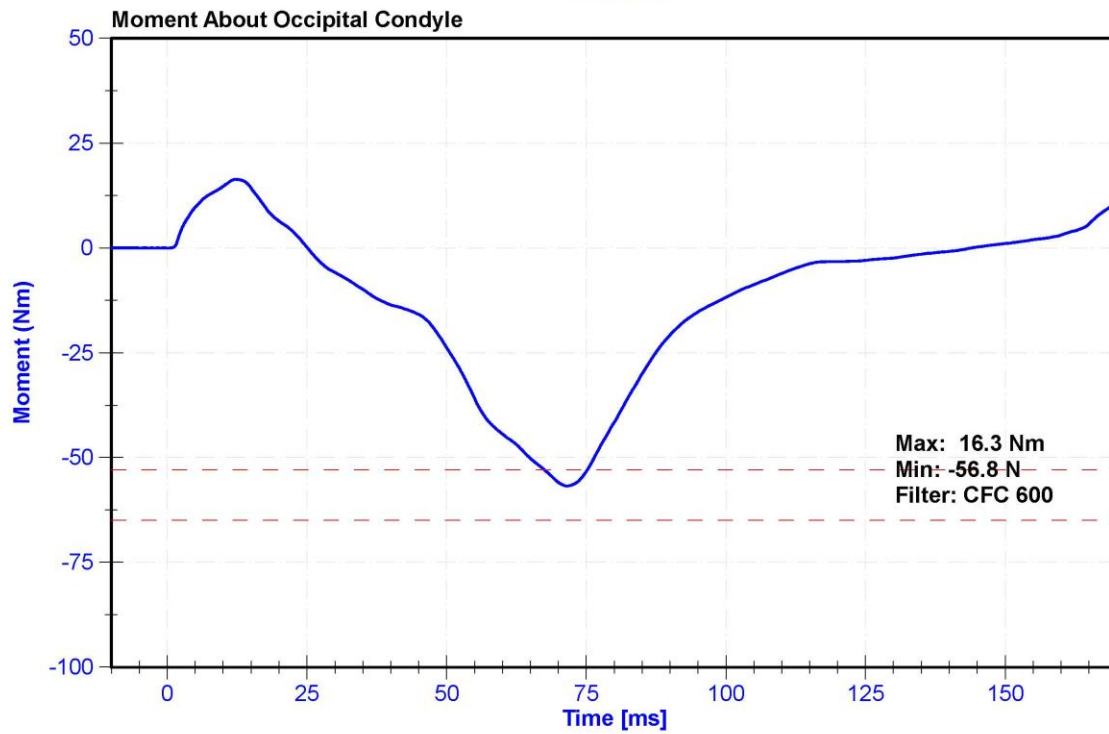
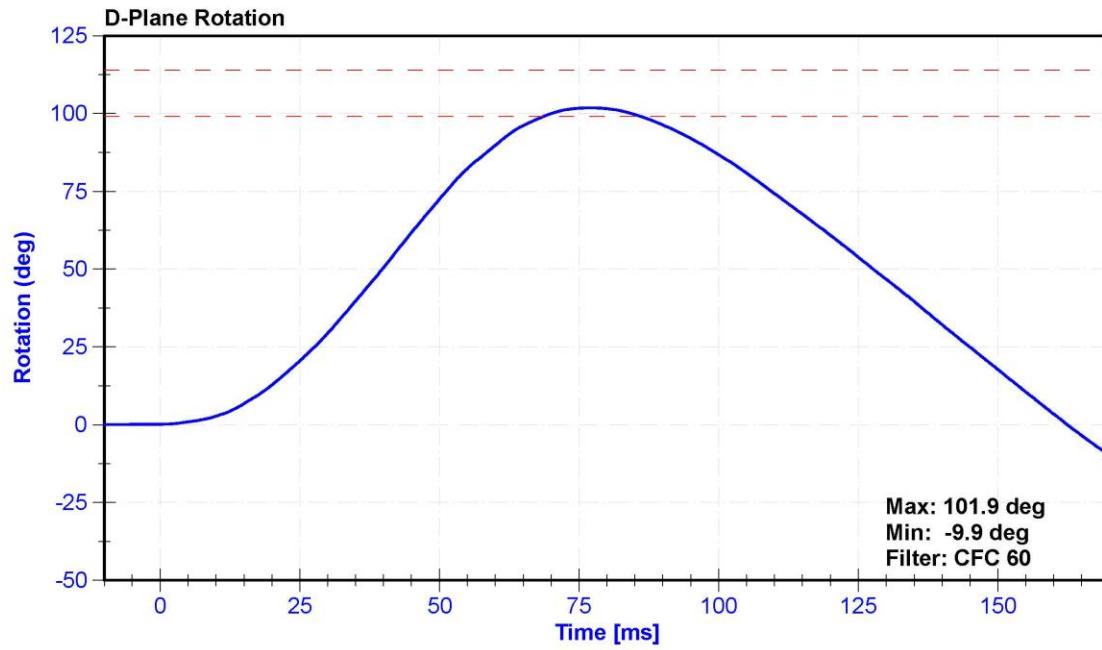
**Results**

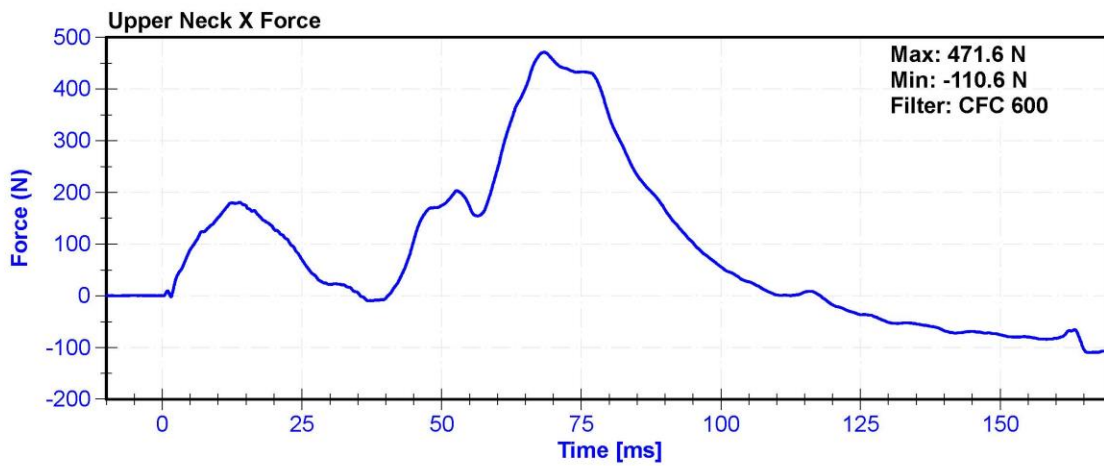
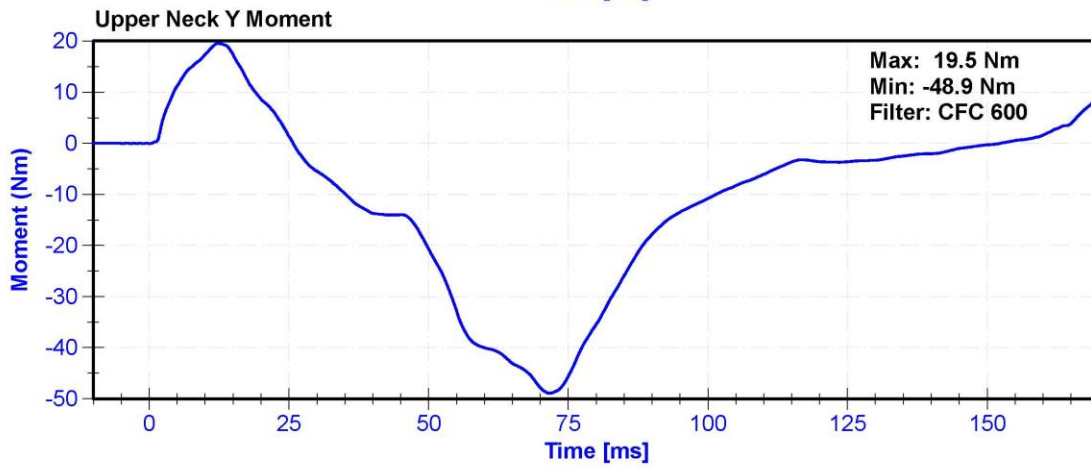
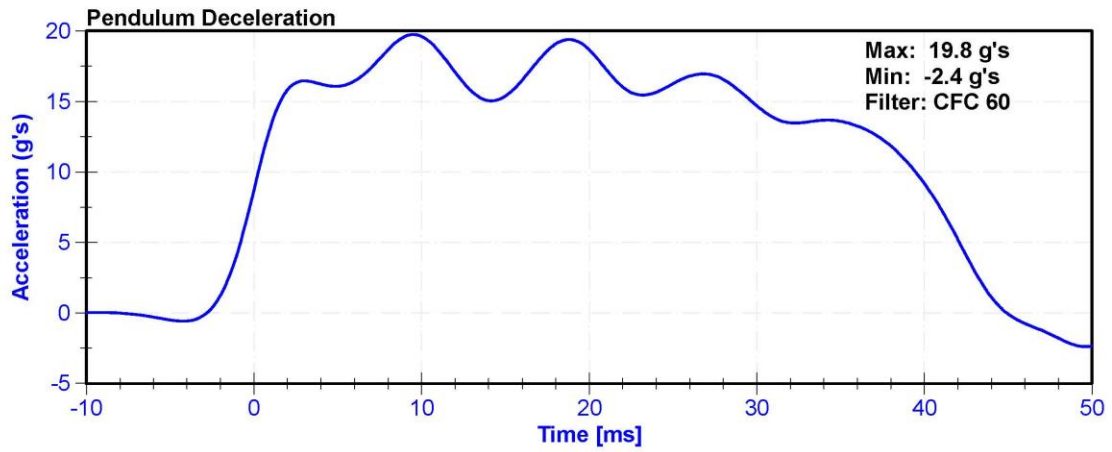
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.0	Pass
Humidity	10	70	%	18.0	Pass
Velocity	5.95	6.19	m/s	5.964	Pass
Pendulum Impulse at 10ms	1.5	1.9	m/s	1.61	Pass
Pendulum Impulse at 20ms	3.1	3.9	m/s	3.32	Pass
Pendulum Impulse at 30ms	4.6	5.6	m/s	4.92	Pass
D Plane Rotation	99	114	deg	101.9	Pass
Moment During Rotation Interval	-65	-53	Nm	-56.8	Pass
Moment Decay to -10Nm	94	114	ms	102.8	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5M9 Pend	1/29/2019	1/29/2020
Pendulum Potentiometer	ETI SP22G	DS-LABPOT1	11/15/2018	11/15/2019
Condyle Potentiometer	ETI SP22G	DS-LABPOT2	11/15/2018	11/15/2019
Upper Neck Load Cell	DENTON 1716A	LC-1591Fx	9/28/2018	9/28/2019







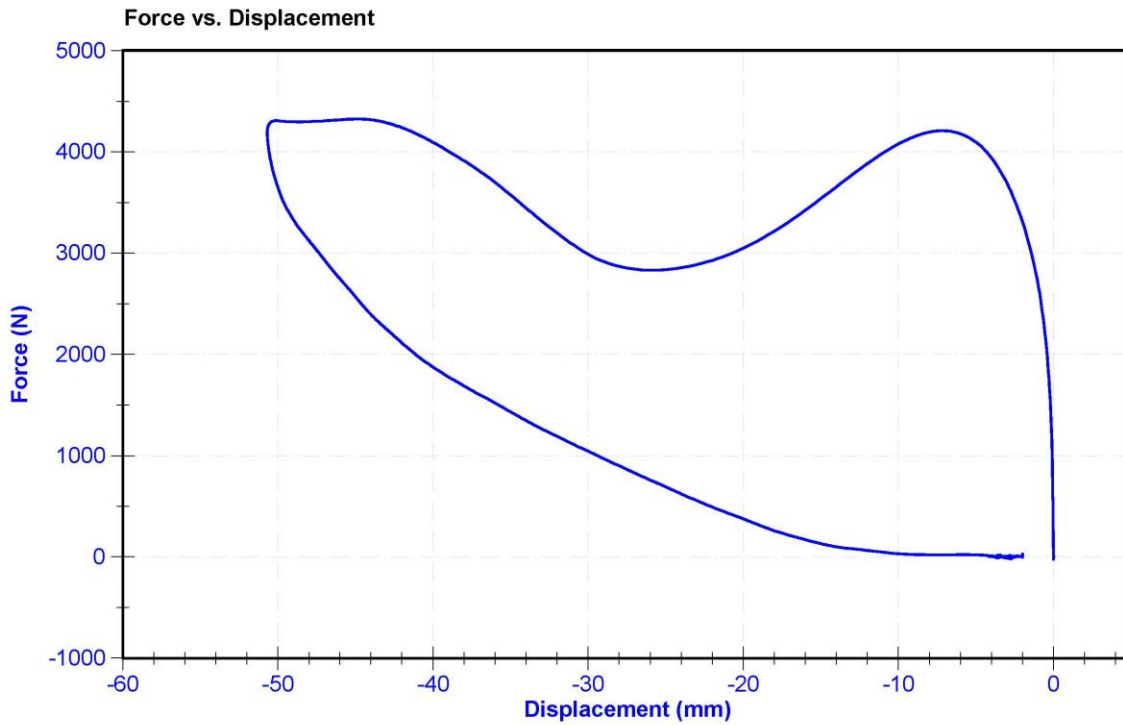
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	288	Laboratory Supervisor	K.Brogan

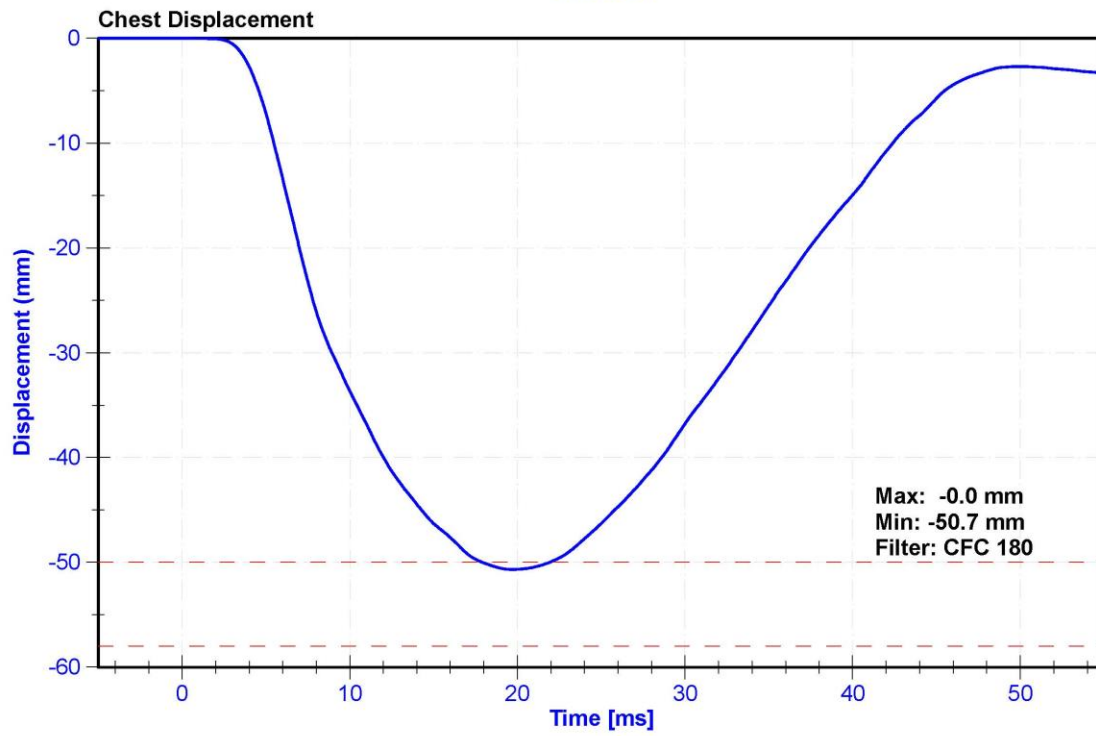
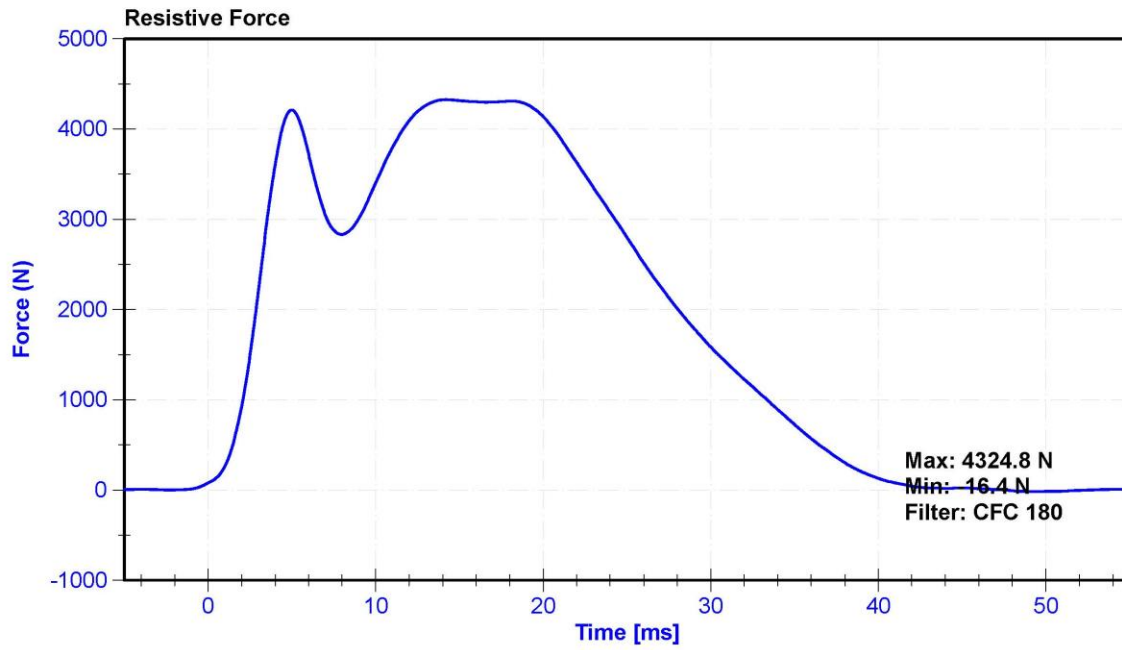
**Results**

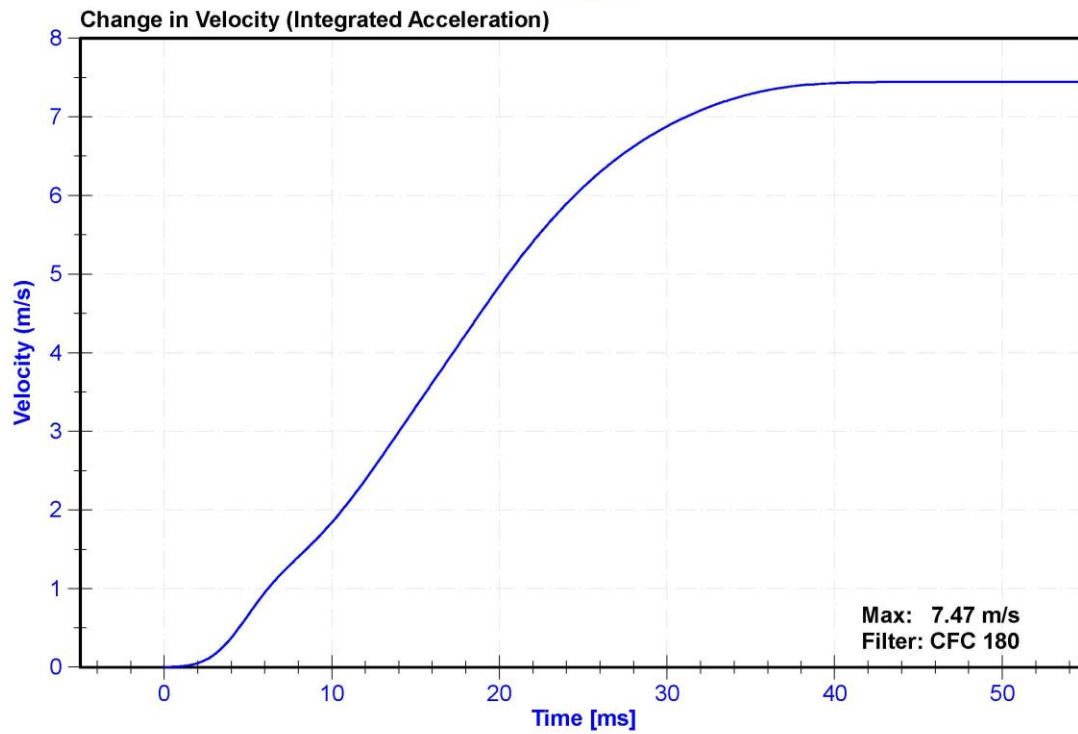
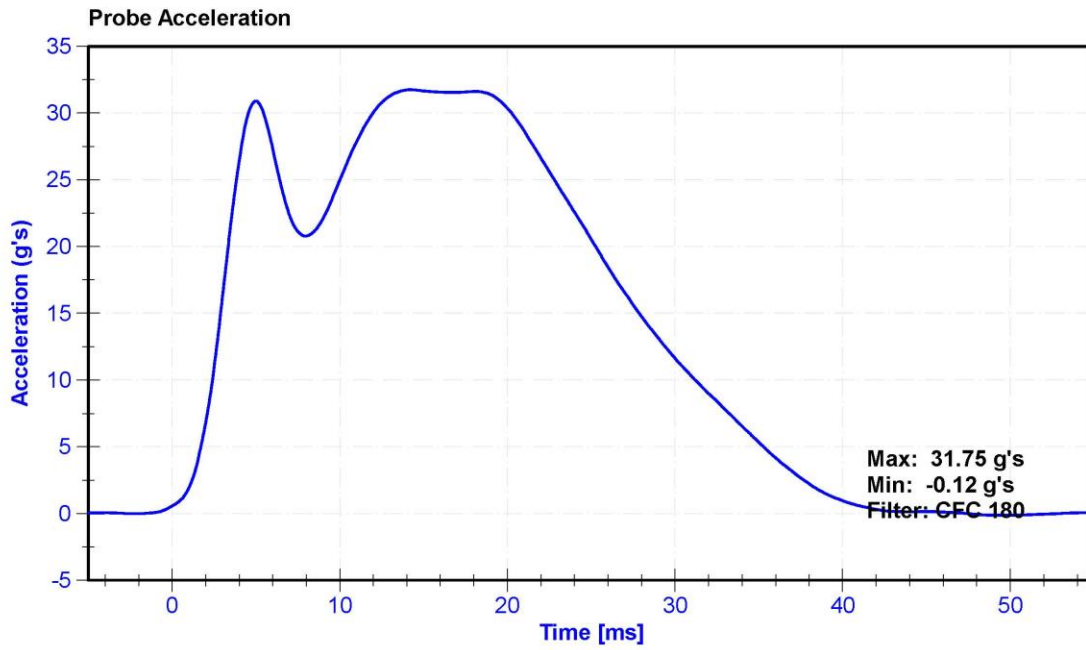
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22	Pass
Humidity	10	70	%	42.9	Pass
Velocity	6.59	6.83	m/s	6.670	Pass
Chest Deflection	-58	-50	mm	-50.7	Pass
Maximum Resistive Force (50 to 58mm)	3900	4400	N	4308.1	Pass
Maximum Resistive Force (18 to 50mm)	0	4600	N	4324.8	Pass
Hysteresis	69	85	%	71.7	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A260487	2/21/2019	8/22/2019
Chest Potentiometer	SERVO 14CB1-2897	DS-288	10/22/2018	10/22/2019







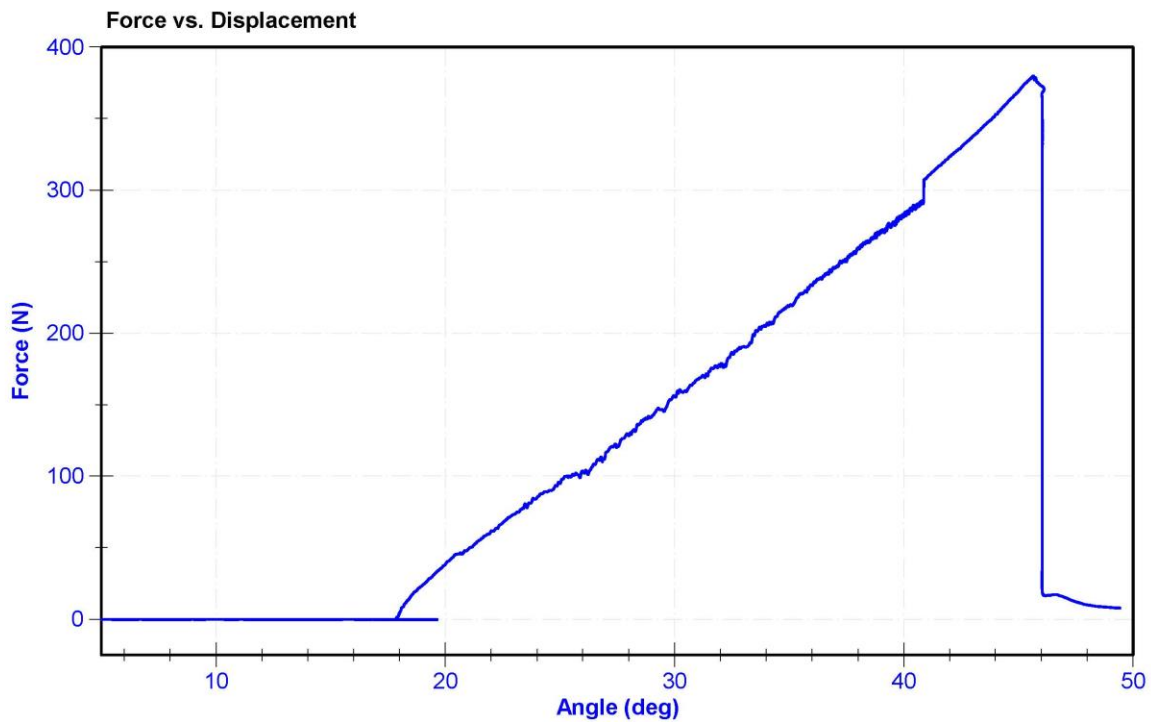
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	288	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.6	25.6	°C	21.3	Pass
Humidity	10	70	%	38.5	Pass
Initial Angle	0	20	deg	17.8	Pass
Force at 45 Degrees	320	390	N	379.9	Pass
Return Angle Relative to Initial	0	8	deg	1.9	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	Rieker N4C-1	DS-13051548	10/25/2018	10/25/2019
Load Cell	Interface SML-200	LC-493319	10/25/2018	10/25/2019



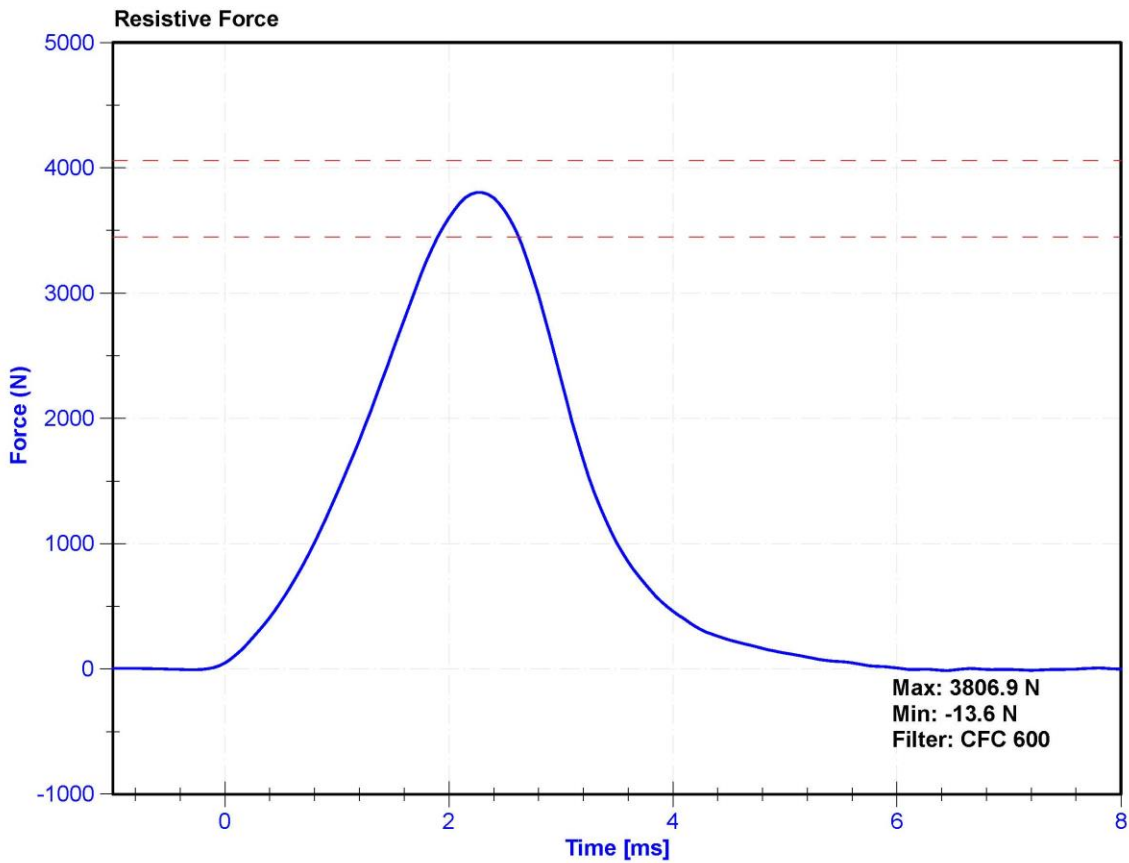
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	288	Laboratory Supervisor	K.Brogan

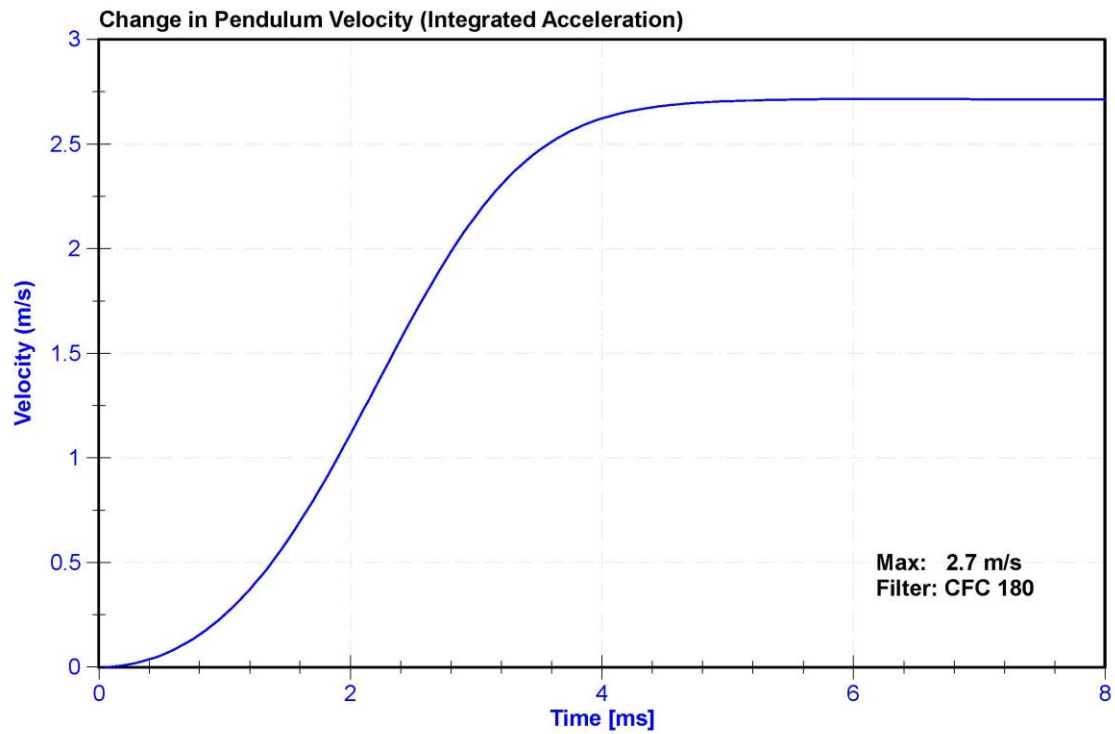
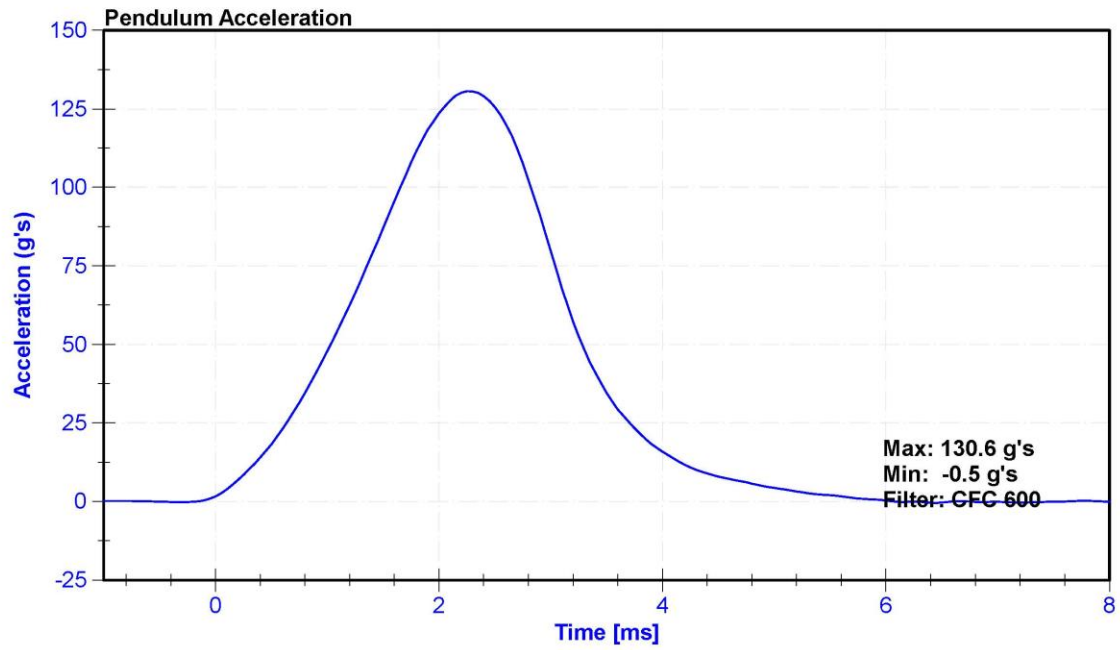
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.0	Pass
Humidity	10	70	%	33.1	Pass
Velocity	2.07	2.13	m/s	2.092	Pass
Resistive Force	3450	4060	N	3806.9	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P71278	12/14/2018	12/14/2019





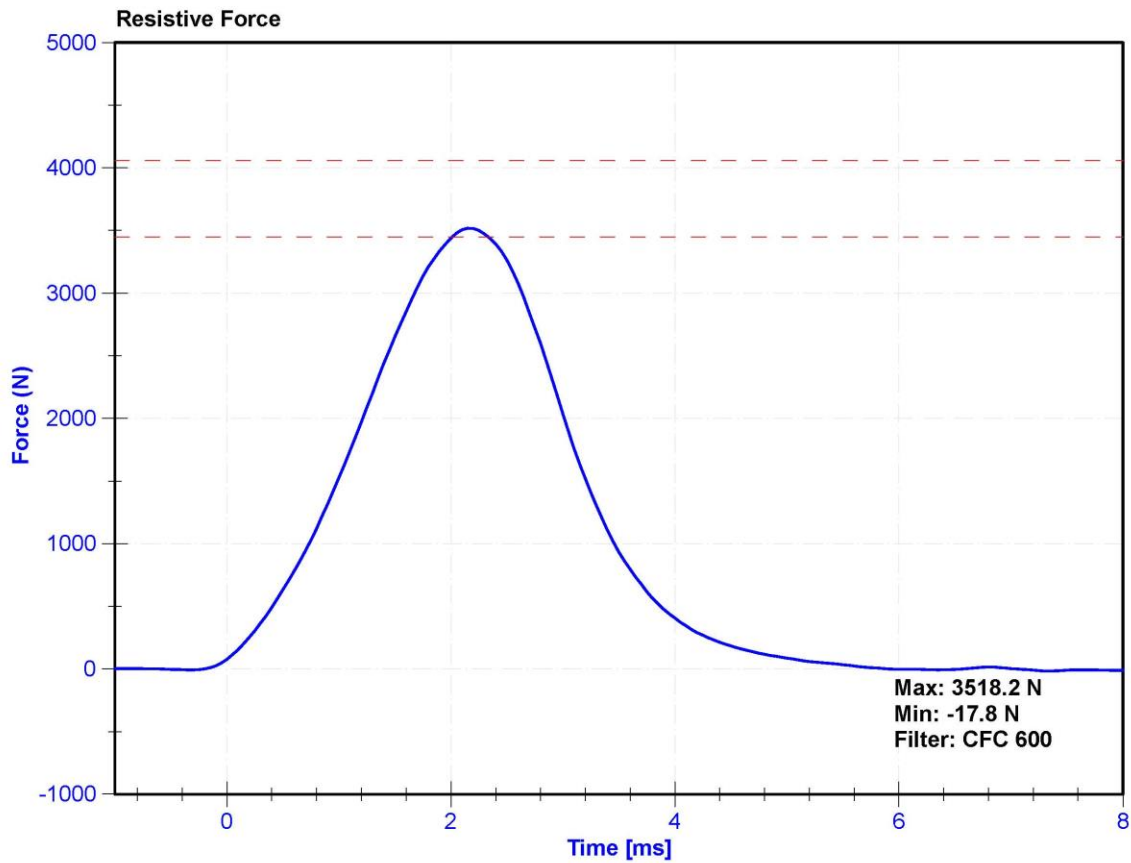
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	288	Laboratory Supervisor	K.Brogan

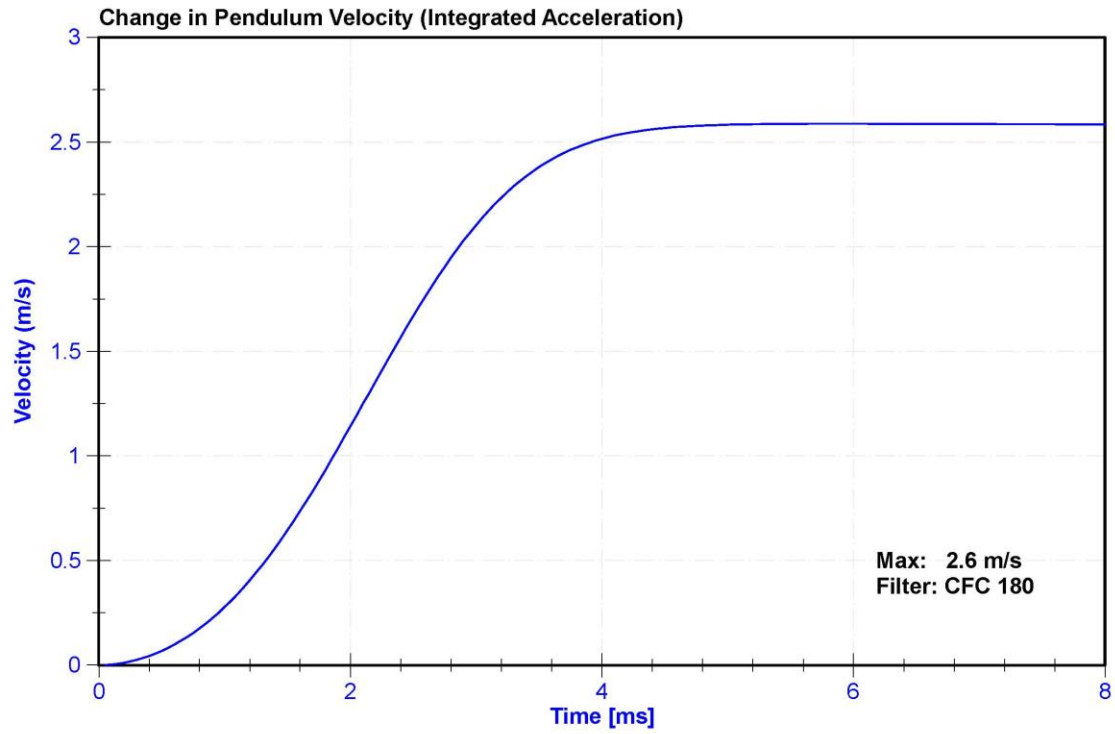
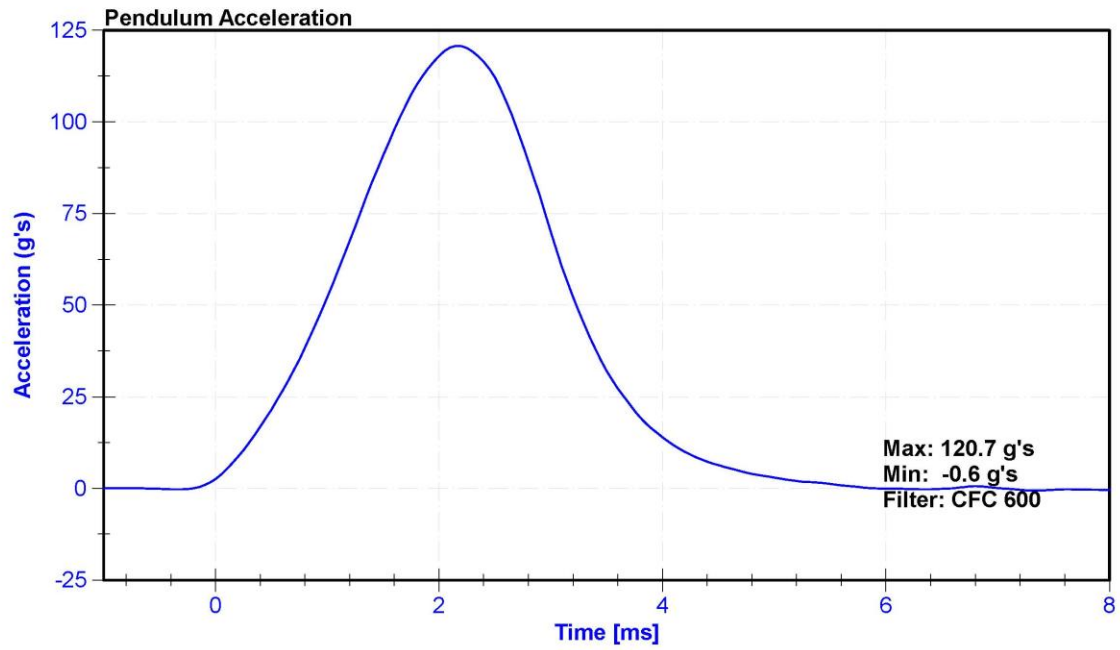
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	22.0	Pass
Humidity	10	70	%	24.0	Pass
Velocity	2.07	2.13	m/s	2.093	Pass
Resistive Force	3450	4060	N	3518.2	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P71278	12/14/2018	12/14/2019





**CALIBRATION TEST RESULTS**

**POST-TEST**

**HYBRID III 50<sup>TH</sup> PERCENTILE MALE - DRIVER ATD**

**SERIAL NO: 142**

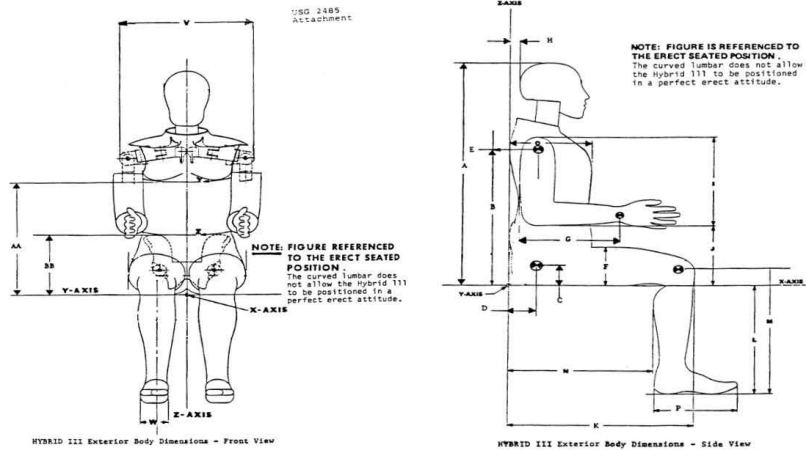


External Measurements - Hybrid 3 - 50th Male

Technician: K. Dutton

Date: 05/02/2019

Dummy Serial Number: 142



Symbol	Description	Specification (in)		Result (in)	Pass/Fail
A	Sitting Height	34.6	35.0	34.8	Pass
B	Shoulder Pivot Height	19.9	20.5	20.3	Pass
C	H-Point Height	3.3	3.5	3.4	Pass
D	H-Point from Backline	5.3	5.5	5.4	Pass
E	Shoulder Pivot from Backline	3.3	3.7	3.5	Pass
F	Thigh Clearance	5.5	6.1	5.8	Pass
G	Back of Elbow to Wrist Pivot	11.4	12.0	11.6	Pass
H	Head Back to Backline	1.6	1.8	1.7	Pass
I	Shoulder to Elbow Length	13.0	13.6	13.4	Pass
J	Elbow Rest Height	7.5	8.3	8.0	Pass
K	Buttock to Knee Length	22.8	23.8	23.4	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	18.4	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	16.7	Pass
W	Foot Breadth	3.6	4.2	3.9	Pass
Y	Chest Circumference with Jacket	38.2	39.4	38.9	Pass
Z	Waist Circumference	32.9	34.1	33.7	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

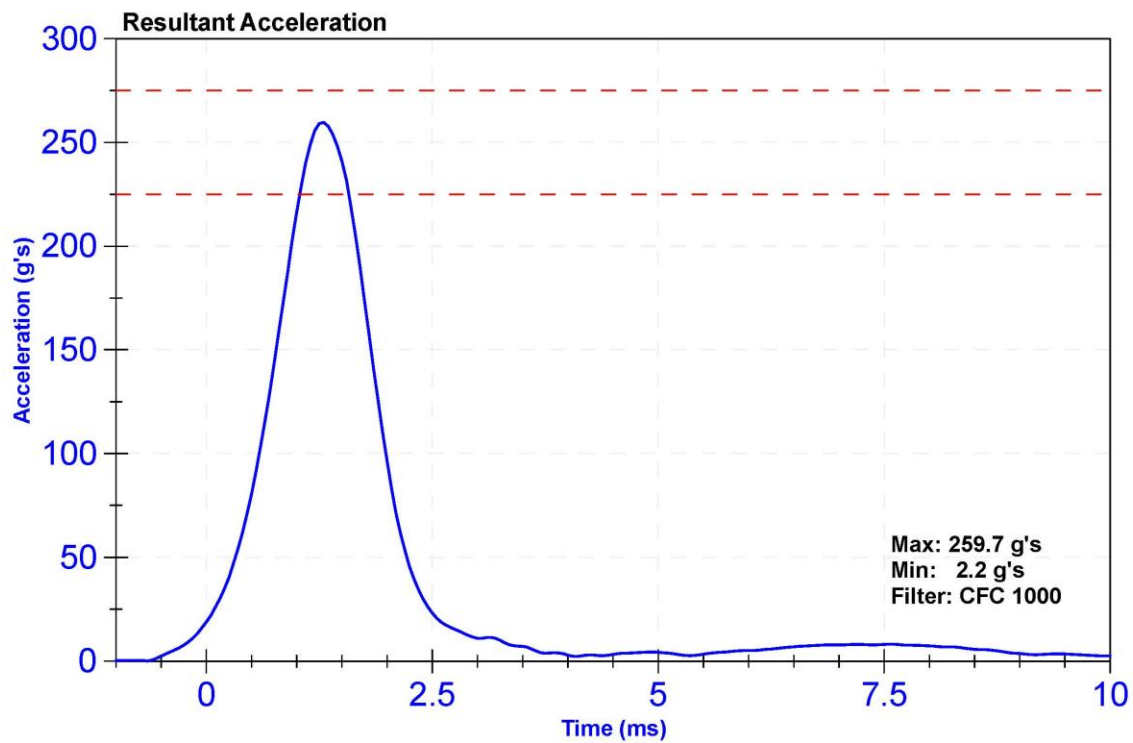
ATD Manufacturer	Humanetics	Test Technician	C. Mantell
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

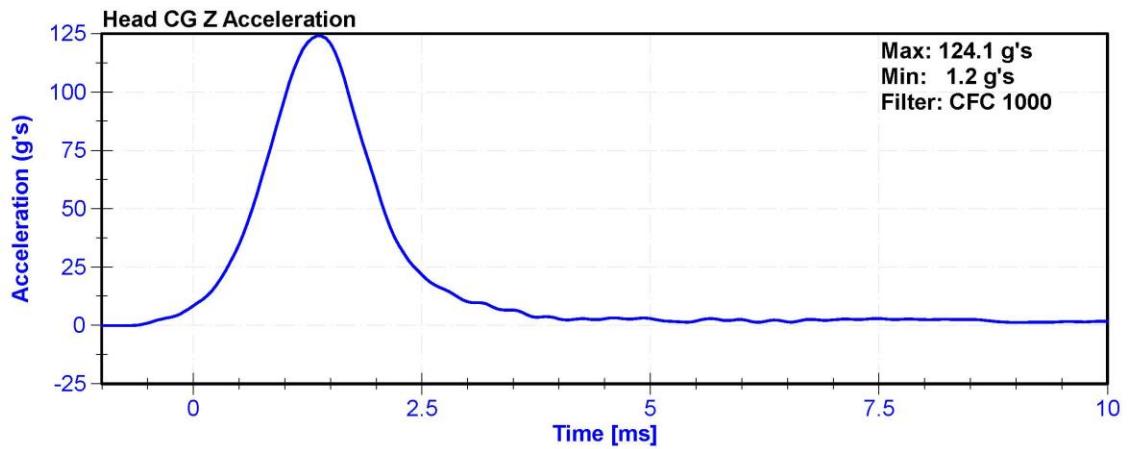
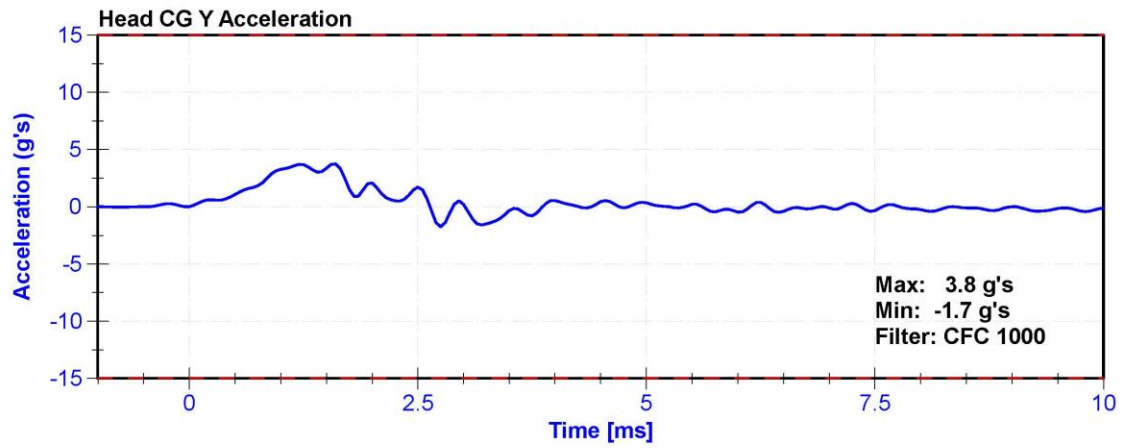
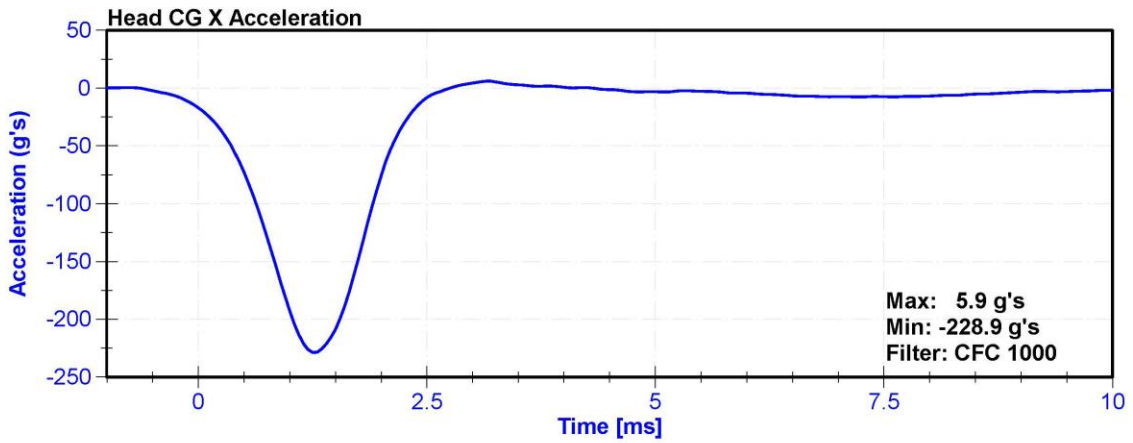
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	22.0	Pass
Humidity	10	70	%	58.0	Pass
Resultant Acceleration	225	275	g's	259.7	Pass
Oscillation	0	10	%	4.4	Pass
Lateral Acceleration	-15	15	g's	3.8	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P58998	4/19/2019	10/18/2019
Y Accelerometer	ENDEVCO 7264CT	AC-P51722	4/19/2019	10/18/2019
Z Accelerometer	ENDEVCO 7264CT	AC-P58997	4/19/2019	10/18/2019





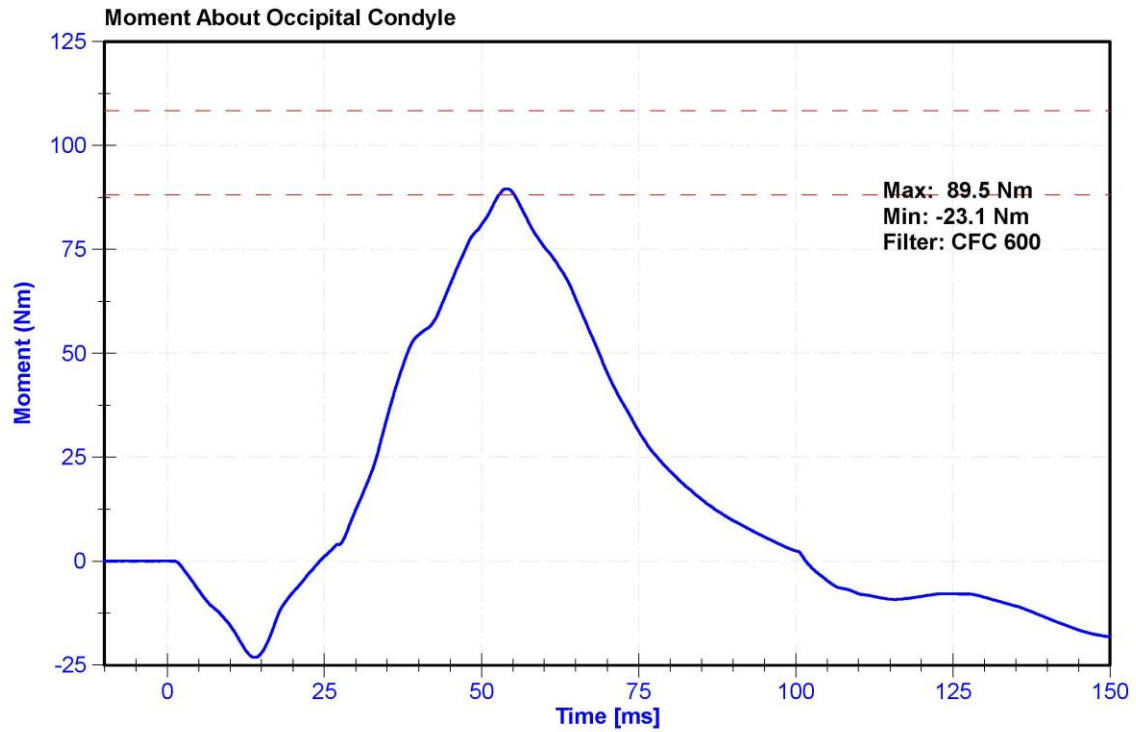
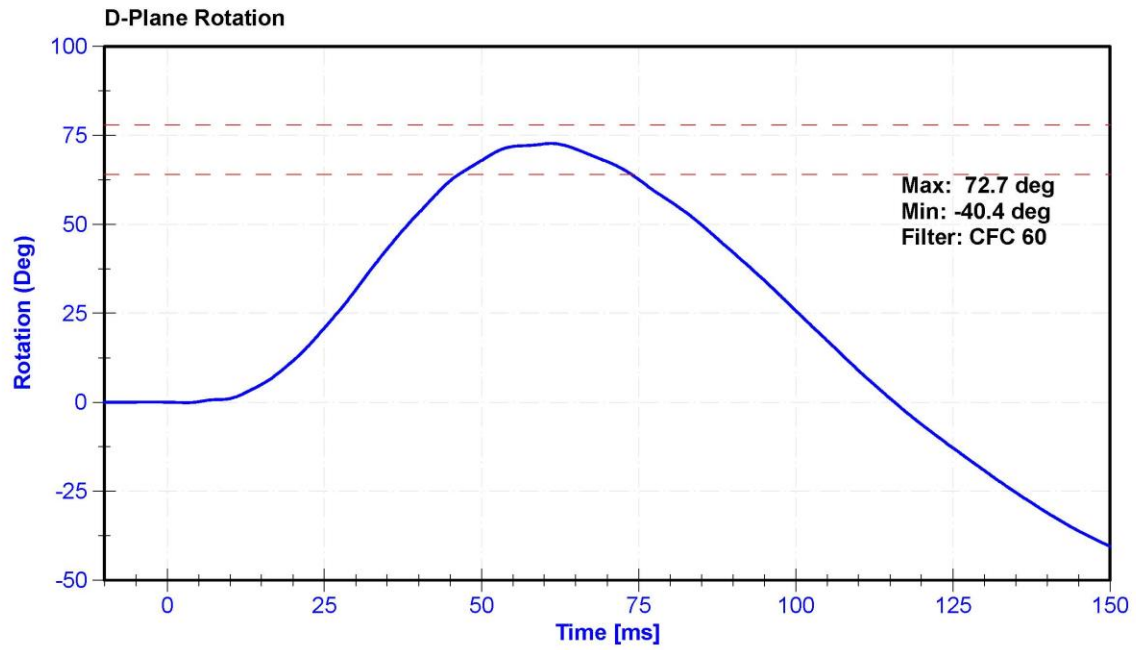
ATD Manufacturer	Humanetics	Test Technician	C. Mantell
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

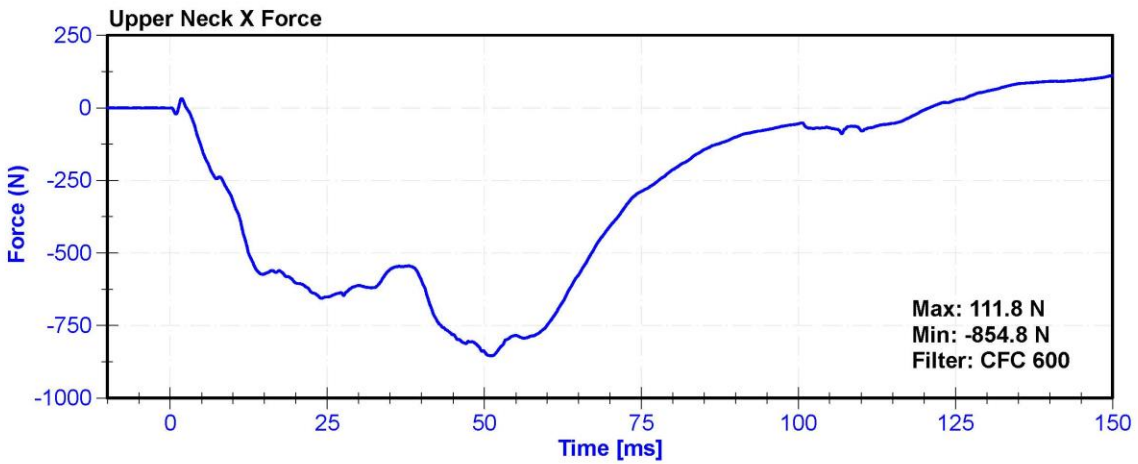
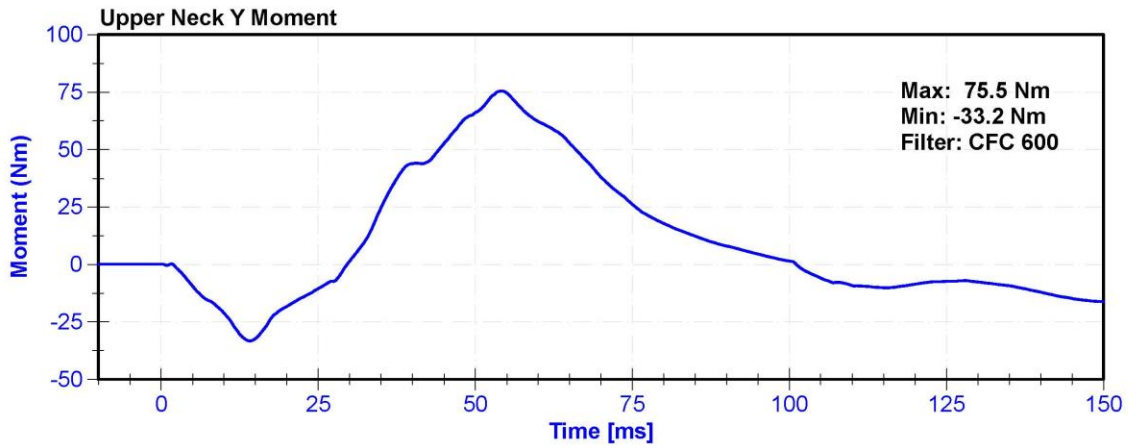
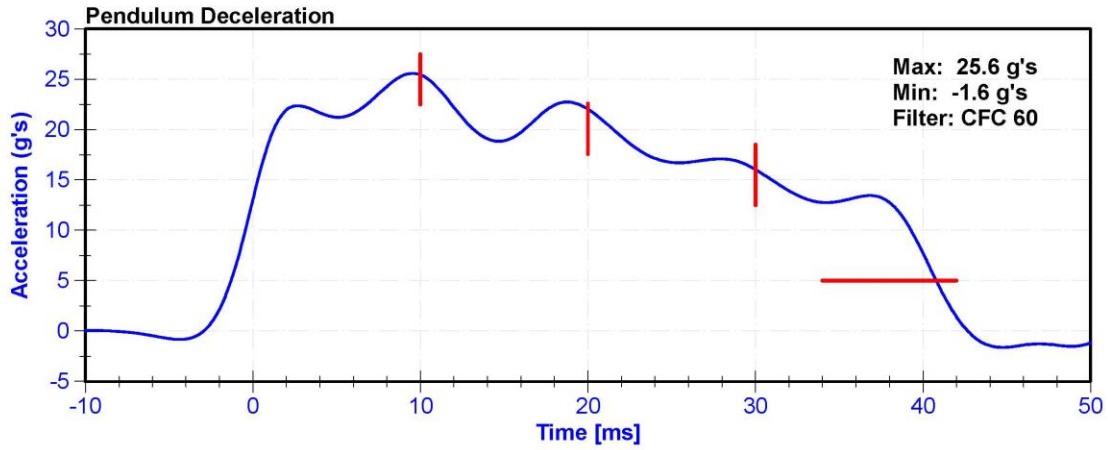
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	56.4	Pass
Velocity	6.89	7.13	m/s	6.903	Pass
Pendulum Deceleration at 10ms	22.5	27.5	g's	25.45	Pass
Pendulum Deceleration at 20ms	17.6	22.6	g's	22.03	Pass
Pendulum Deceleration at 30ms	12.5	18.5	g's	16.04	Pass
Max. Pendulum Deceleration After 30ms	0	29	g's	25.6	Pass
Pendulum Deceleration Time to 5 g's	34	42	ms	40.8	Pass
Maximum D Plane Rotation	64	78	deg	72.7	Pass
Time to Maximum Rotation	57	64	ms	61.1	Pass
Rotation Decay to Zero	113	127	ms	115.8	Pass
Moment About Occipital Condyle	88.1	108.4	Nm	89.54	Pass
Time to Maximum Moment	47	58	ms	54.1	Pass
Moment Decay to Zero	97	107	ms	101.7	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5M9 Pend	1/29/2019	1/29/2020
Pendulum Potentiometer	ETI SP22G	DS-LABPOT1	11/15/2018	11/15/2019
Condyle Potentiometer	ETI SP22G	DS-LABPOT2	11/15/2018	11/15/2019
Upper Neck Load Cell	FTSS IF-205	LC-161Fx	9/28/2018	9/28/2019





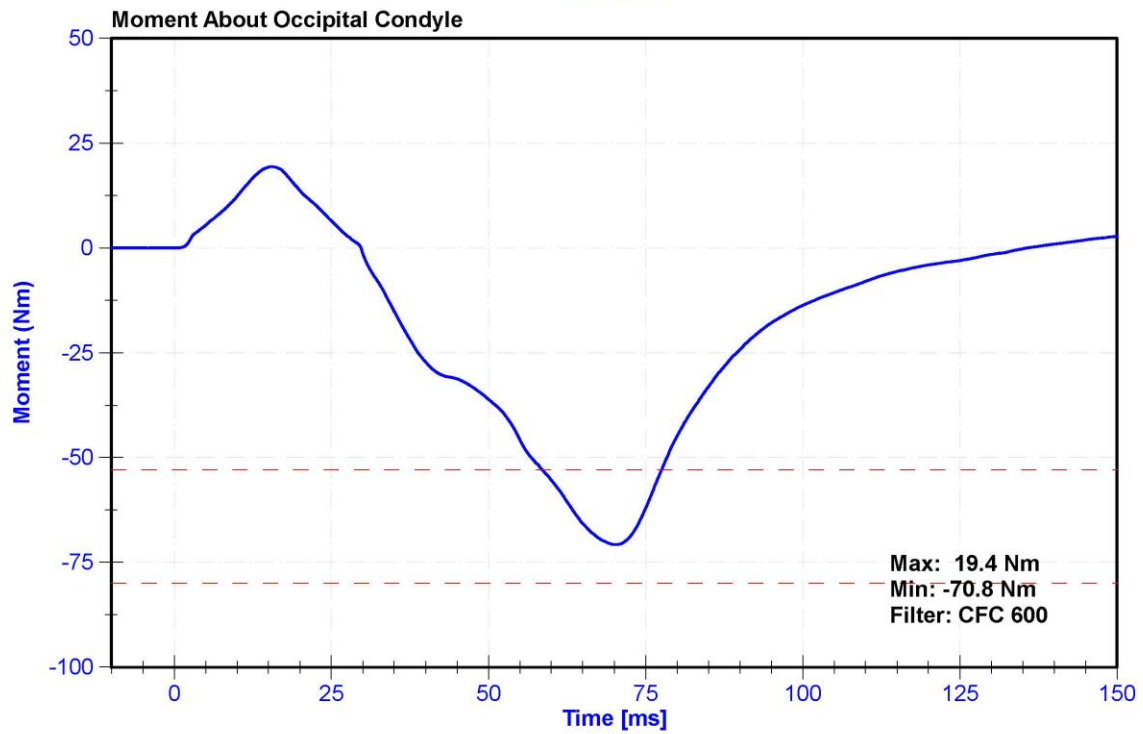
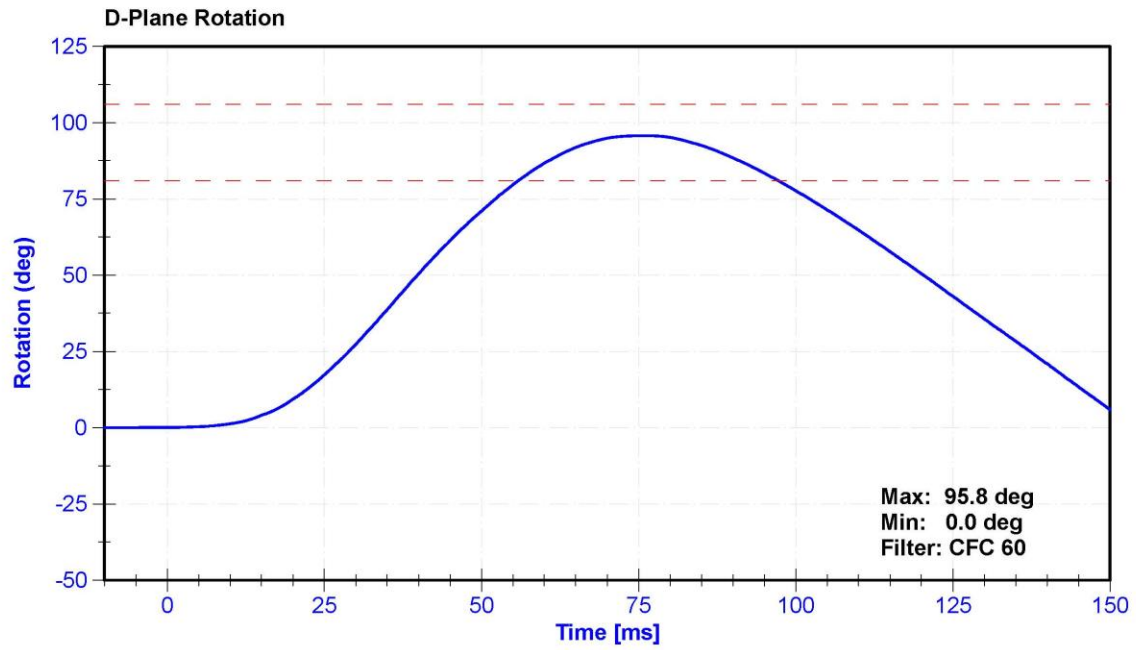
ATD Manufacturer	Humanetics	Test Technician	C. Mantell
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

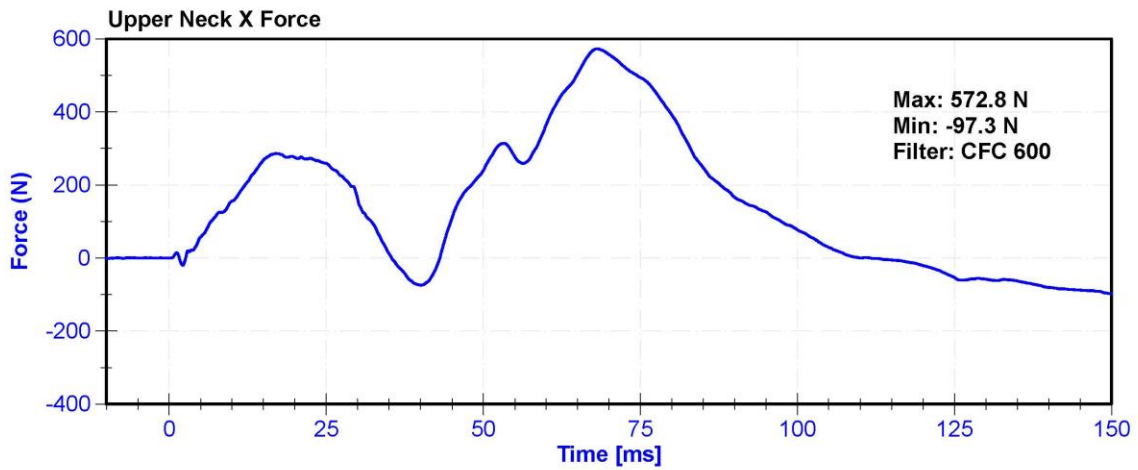
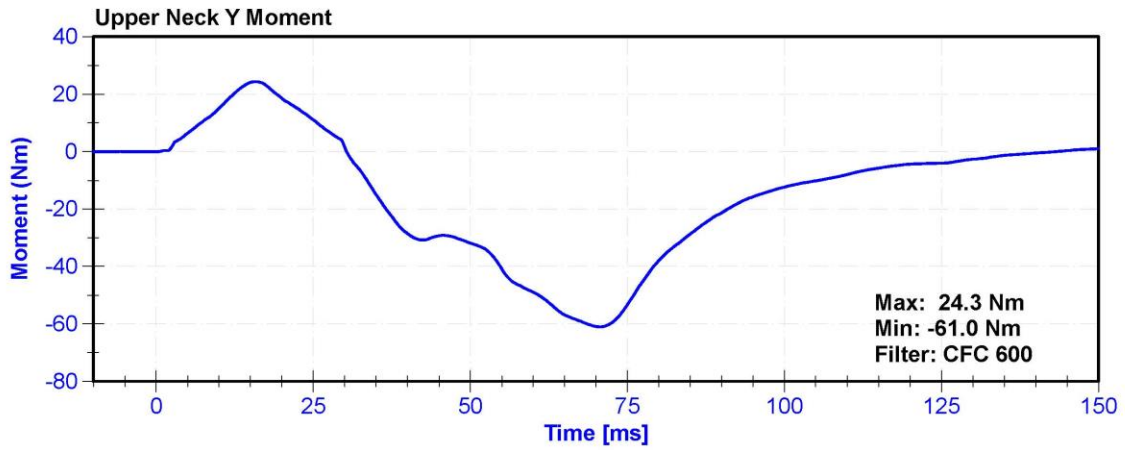
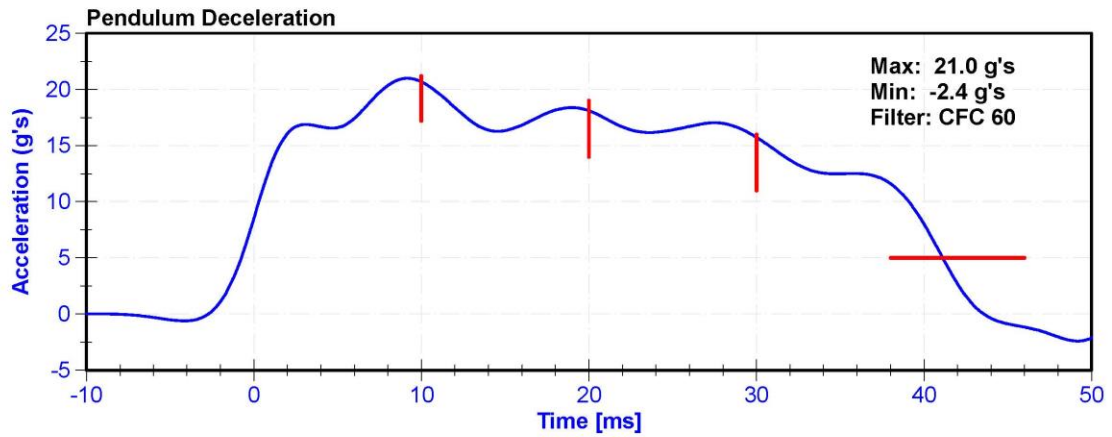
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22	Pass
Humidity	10	70	%	53.6	Pass
Velocity	5.94	6.19	m/s	5.964	Pass
Pendulum Deceleration at 10ms	17.2	21.2	g's	20.68	Pass
Pendulum Deceleration at 20ms	14	19	g's	18.1	Pass
Pendulum Deceleration at 30ms	11	16	g's	15.7	Pass
Max. Pendulum Deceleration After 30ms	0	22	g's	21.0	Pass
Pendulum Deceleration Time to 5 g's	38	46	ms	41.1	Pass
Maximum D Plane Rotation	81	106	deg	95.8	Pass
Time to Maximum Rotation	72	82	ms	75.8	Pass
Rotation Decay to Zero	147	174	ms	154.0	Pass
Minimum Moment About OC	-80	-52.9	Nm	-70.79	Pass
Time to Minimum Moment	65	79	ms	70.3	Pass
Moment Decay to Zero	120	148	ms	135.8	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5M9 Pend	1/29/2019	1/29/2020
Pendulum Potentiometer	ETI SP22G	DS-LABPOT1	11/15/2018	11/15/2019
Condyle Potentiometer	ETI SP22G	DS-LABPOT2	11/15/2018	11/15/2019
Upper Neck Load Cell	FTSS IF-205	LC-161Fx	9/28/2018	9/28/2019





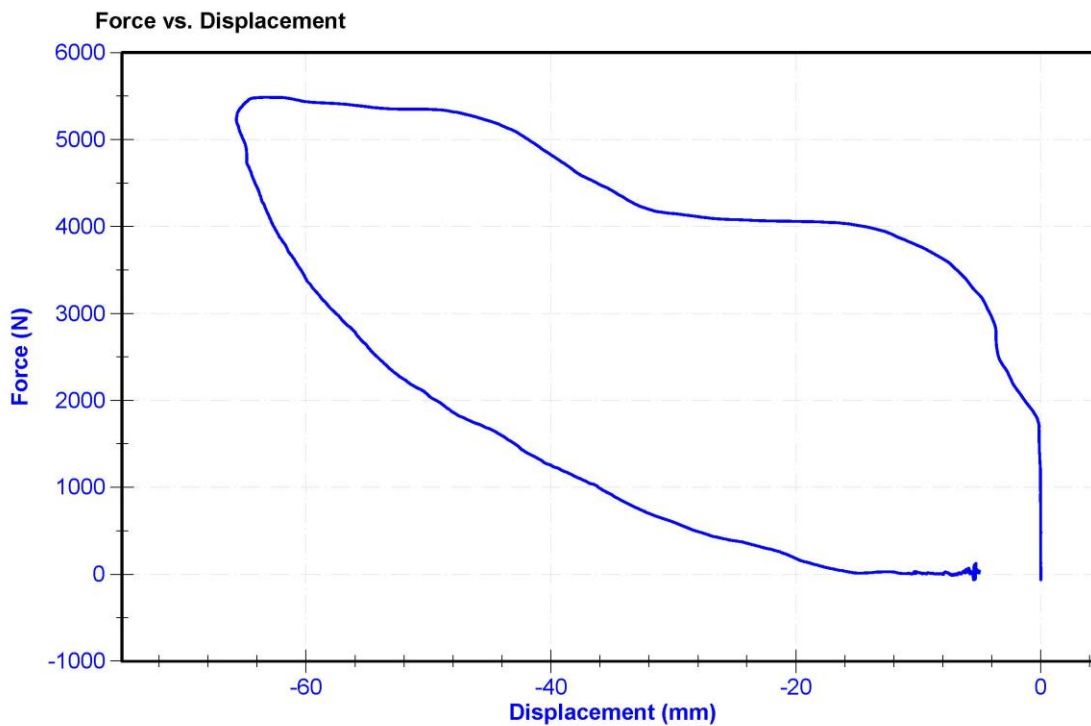
ATD Manufacturer	Humanetics	Test Technician	C. Mantell
ATD Serial Number	142	Laboratory Supervisor	K.Brogan

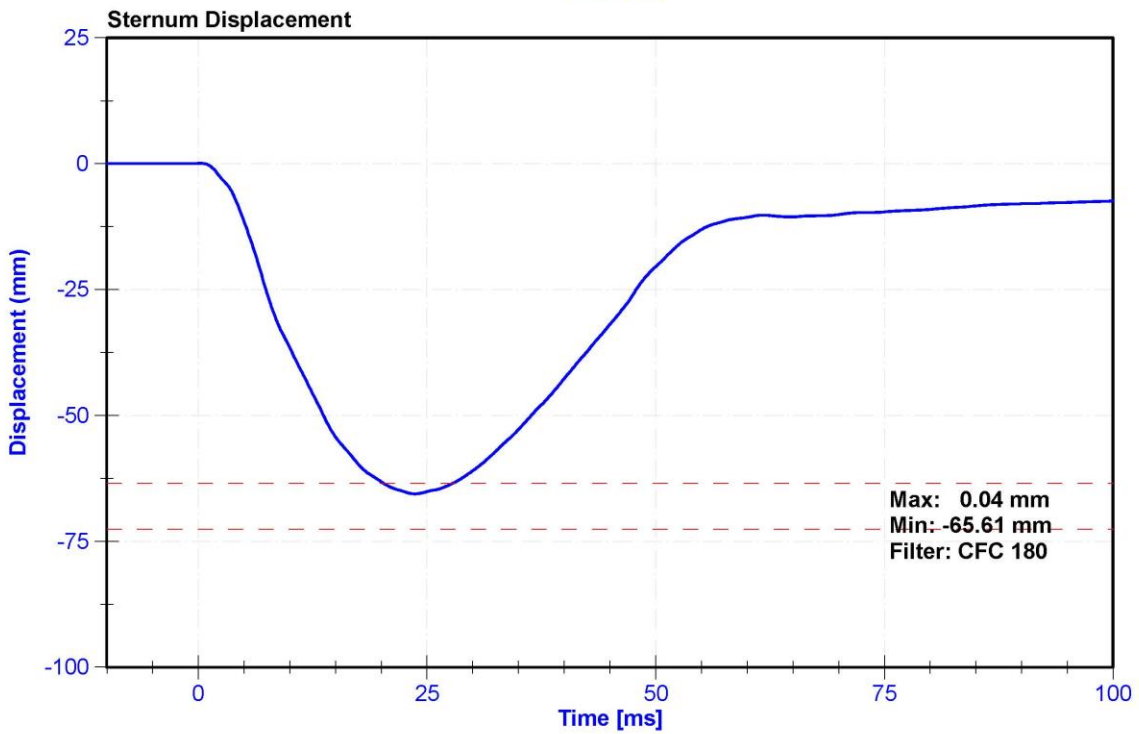
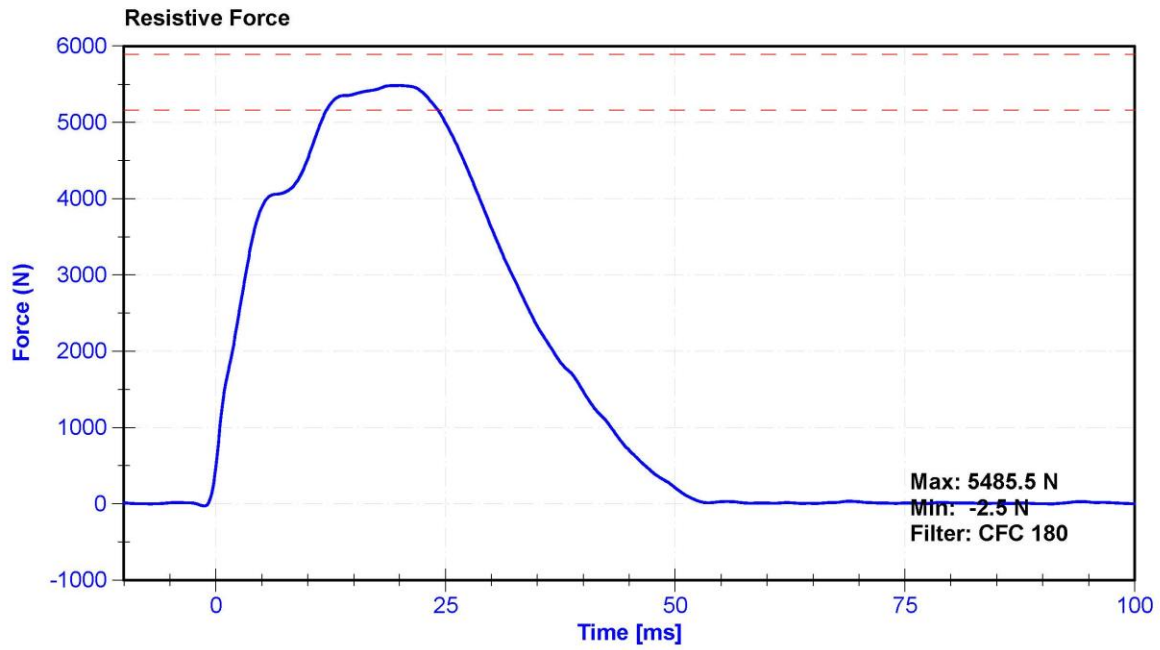
**Results**

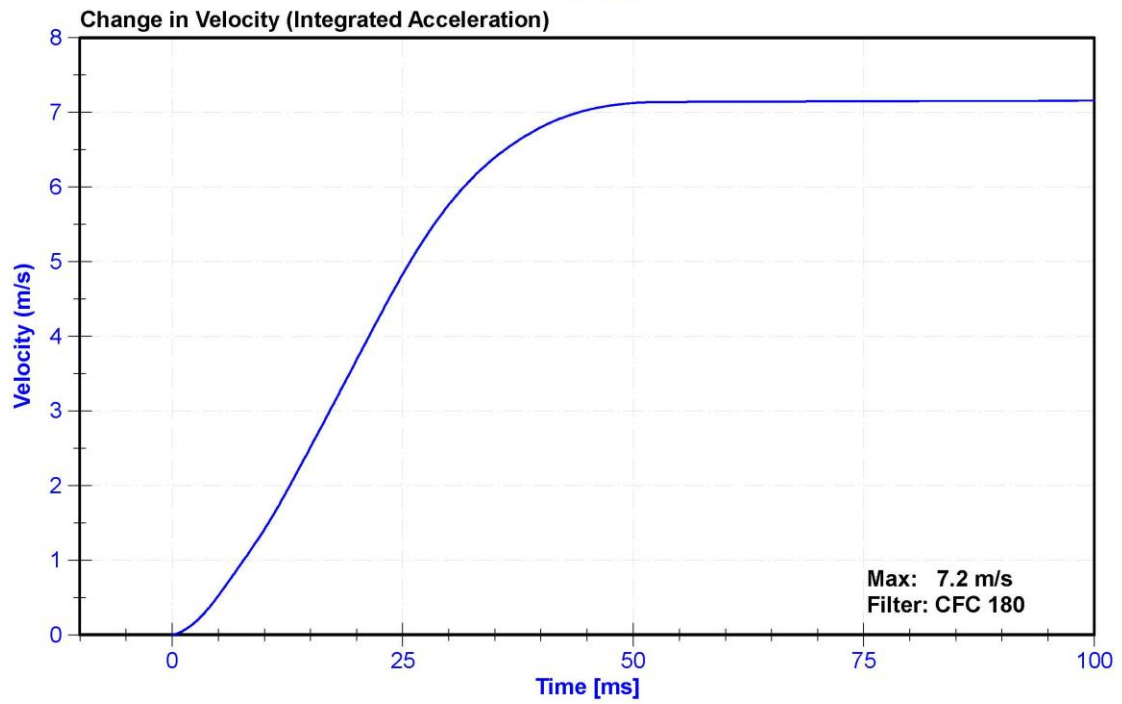
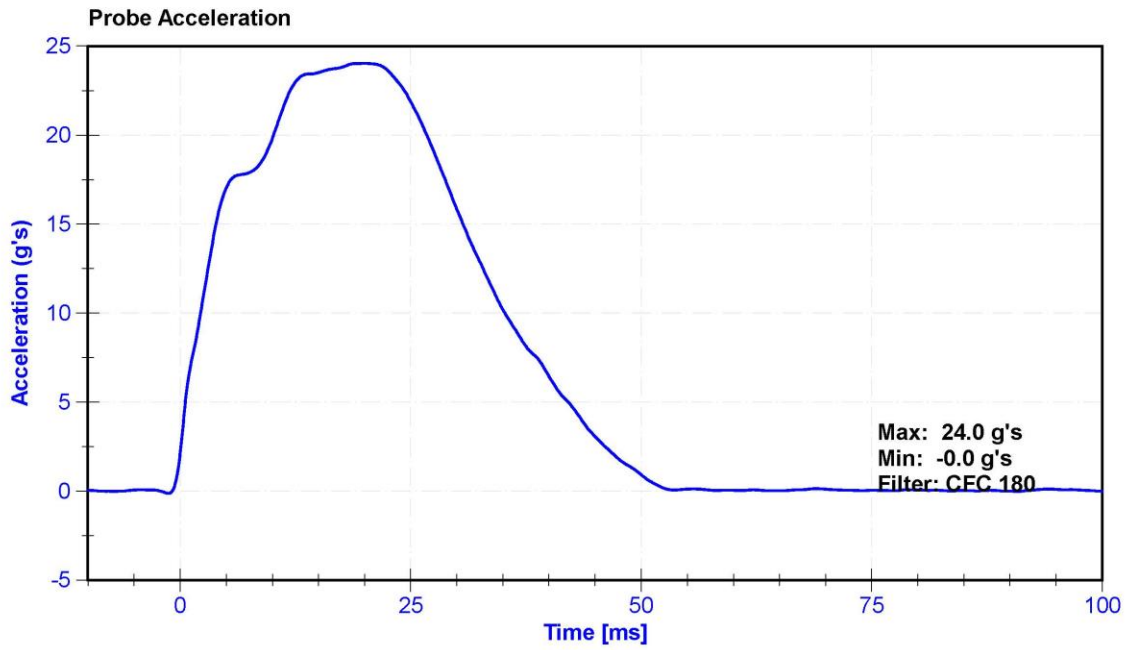
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	57.6	Pass
Velocity	6.59	6.83	m/s	6.597	Pass
Chest Displacement	-72.6	-63.5	mm	-65.61	Pass
Resistive Force	5160	5894	N	5485.5	Pass
Hysteresis	65	85	%	72.5	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P71278	12/14/2018	12/14/2019
Chest Potentiometer	JDK 6209-2038	DS-142	10/22/2018	10/22/2019







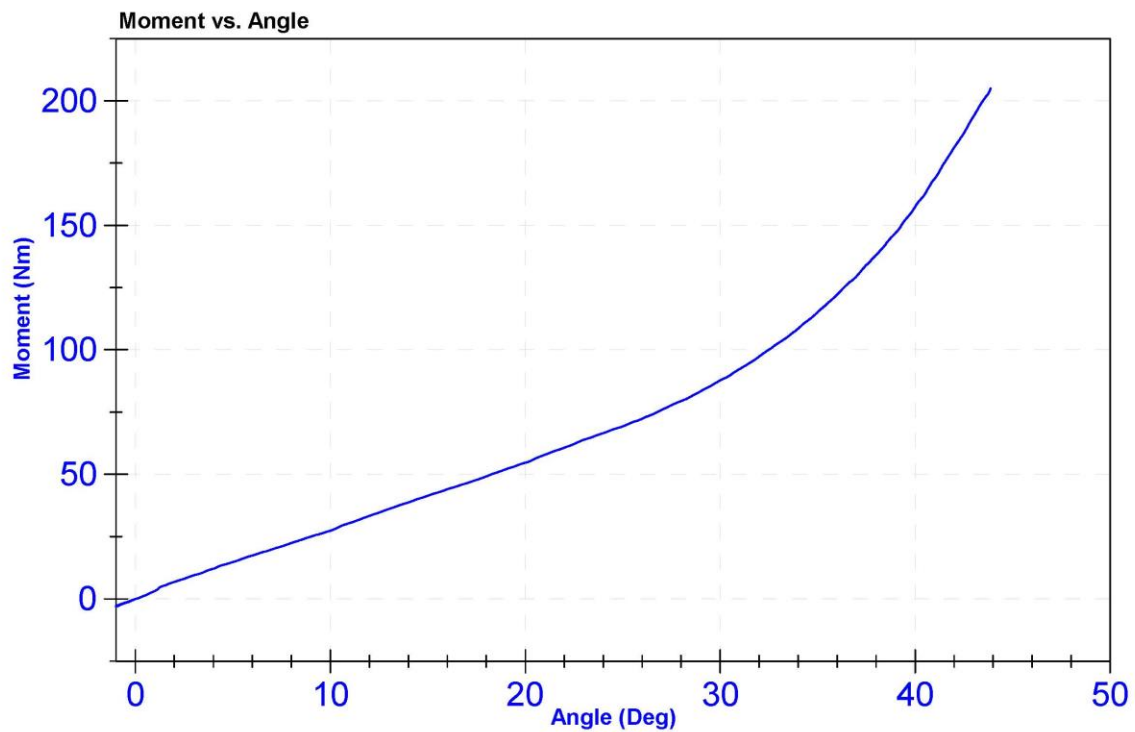
ATD Manufacturer	Humanetics	Test Technician	K. Dutton
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	22.0	Pass
Humidity	10	70	%	53.8	Pass
Average Velocity	5	10	deg/s	7.2	Pass
Angle at 203Nm	40	50	deg	43.8	Pass
Moment at 30 degrees	0	94.9	Nm	87.8	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	ETI SP22	DS-0008	9/18/2018	9/18/2019
Load Cell	Key Trans 2301-02	LC-115 My	9/6/2018	9/6/2019



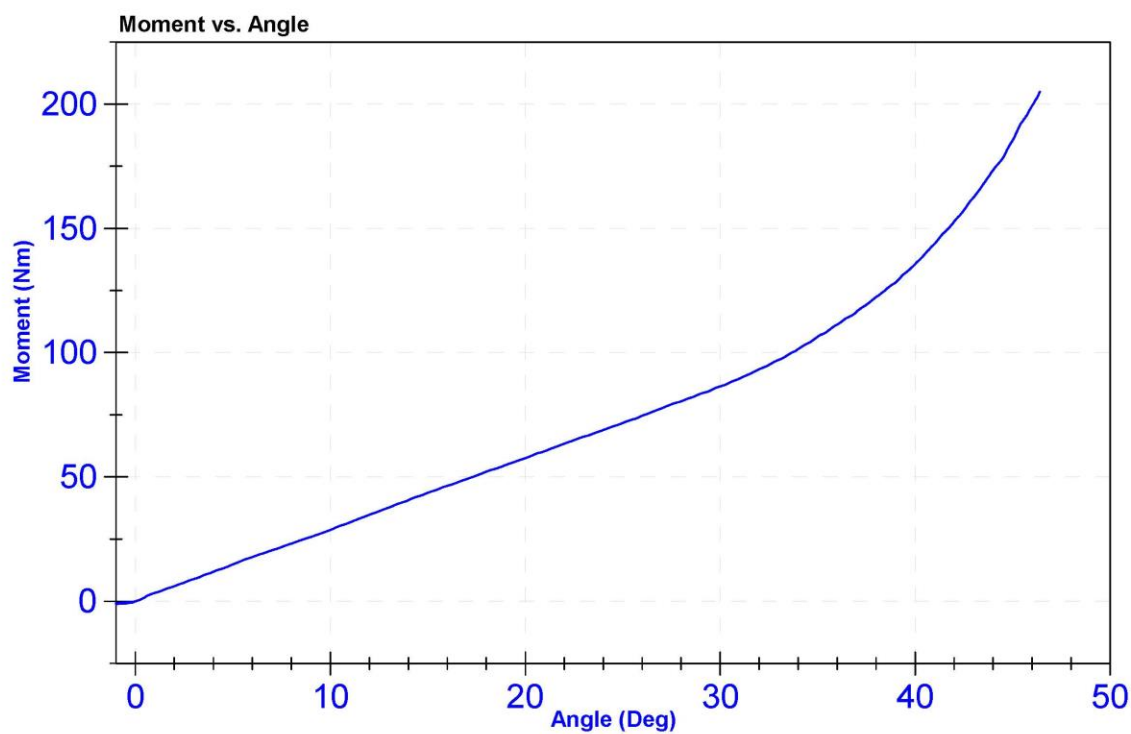
ATD Manufacturer	Humanetics	Test Technician	K. Dutton
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	22.0	Pass
Humidity	10	70	%	53.5	Pass
Average Velocity	5	10	deg/s	7.4	Pass
Angle at 203Nm	40	50	deg	46.3	Pass
Moment at 30 degrees	0	94.9	Nm	86.4	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	ETI SP22	DS-0008	9/18/2018	9/18/2019
Load Cell	Key Trans 2301-02	LC-115 My	9/6/2018	9/6/2019



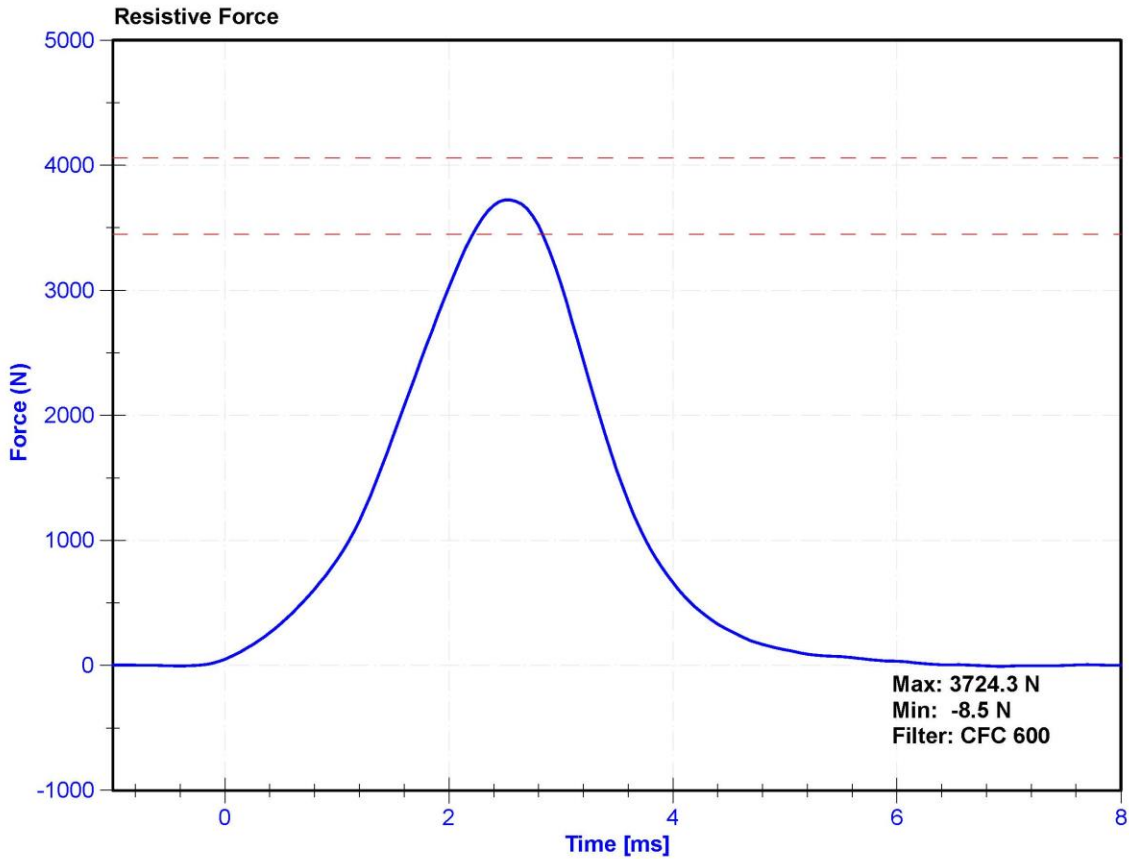
ATD Manufacturer	Humanetics	Test Technician	C. Mantell
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

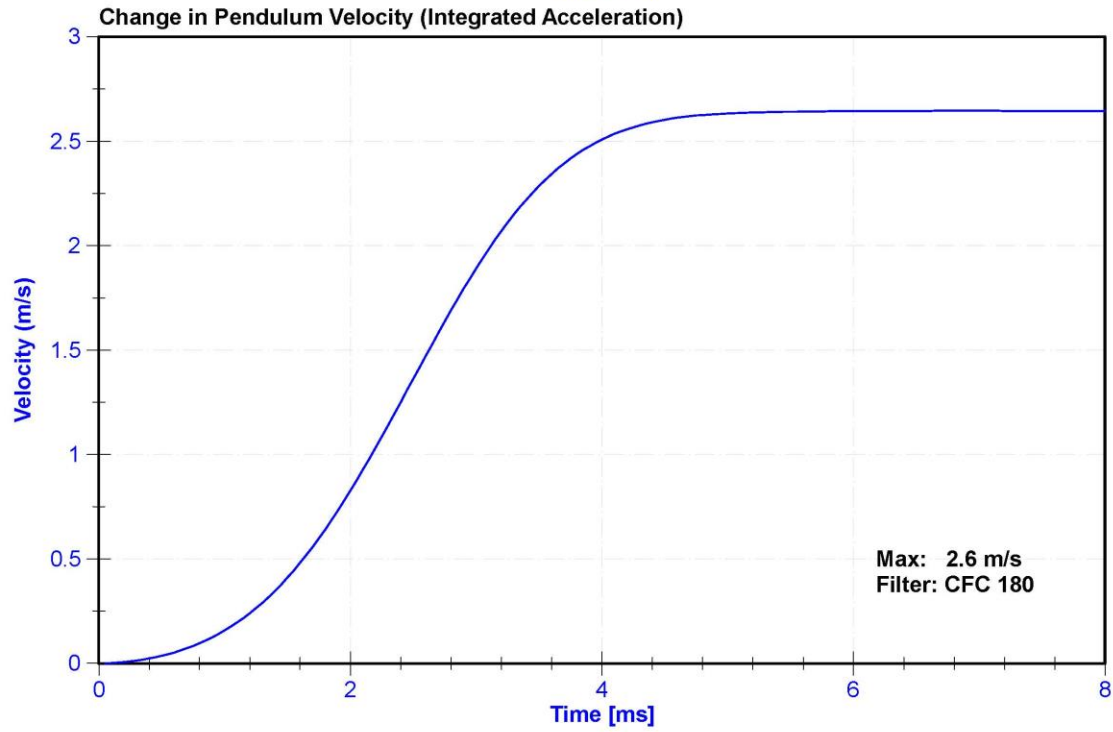
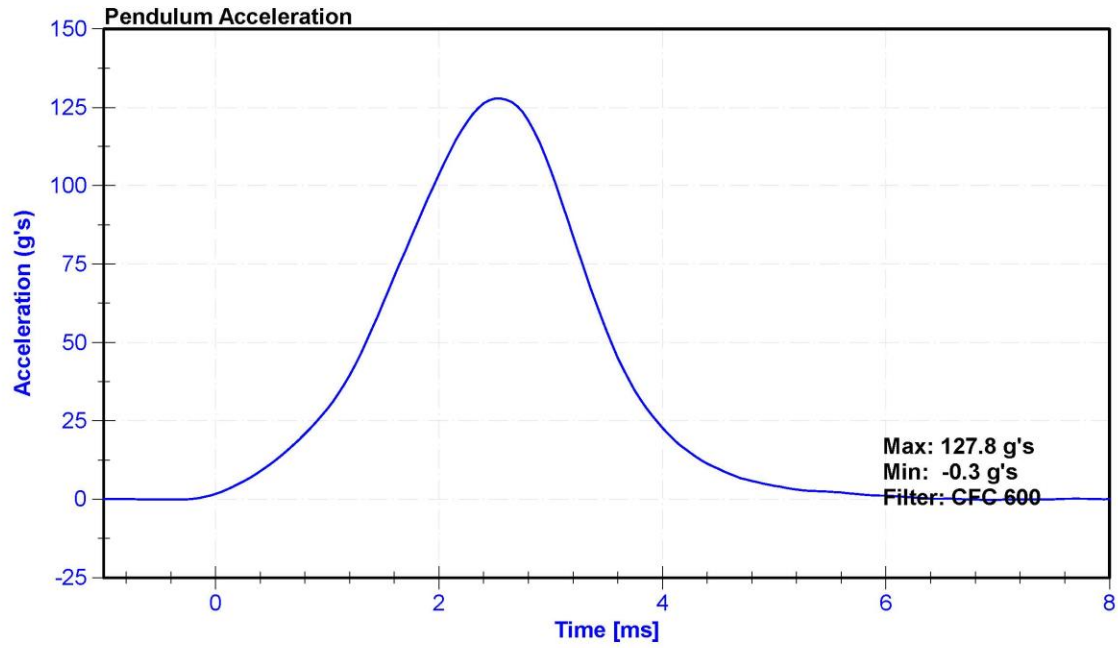
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.8	Pass
Humidity	10	70	%	53.7	Pass
Velocity	2.07	2.13	m/s	2.126	Pass
Resistive Force	3450	4060	N	3724.3	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P71278	12/14/2018	12/14/2019





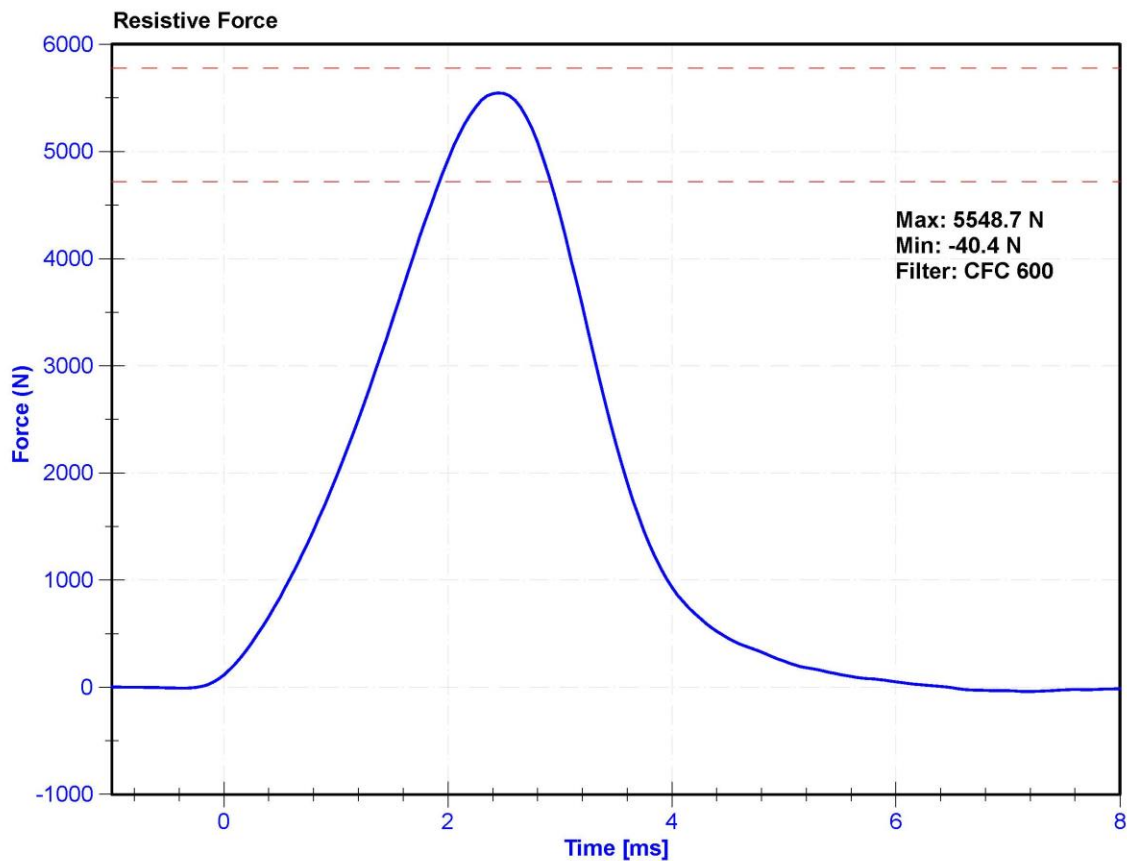
ATD Manufacturer	Humanetics	Test Technician	C. Mantell
ATD Serial Number	142	Laboratory Supervisor	K. Brogan

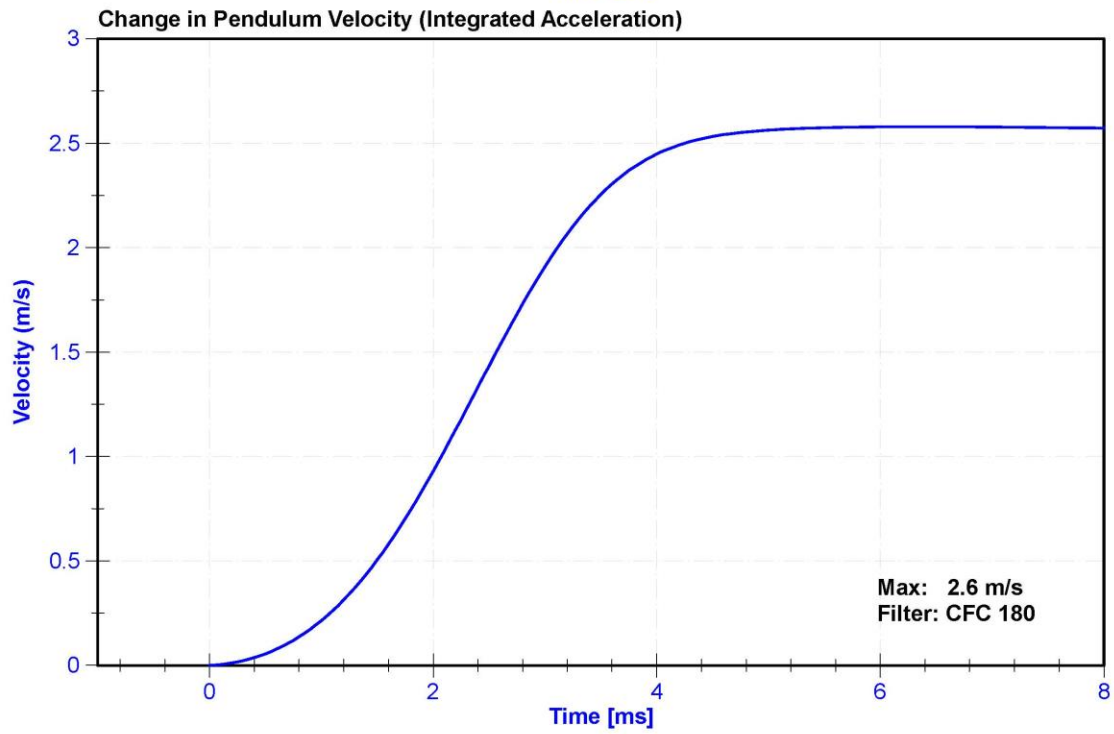
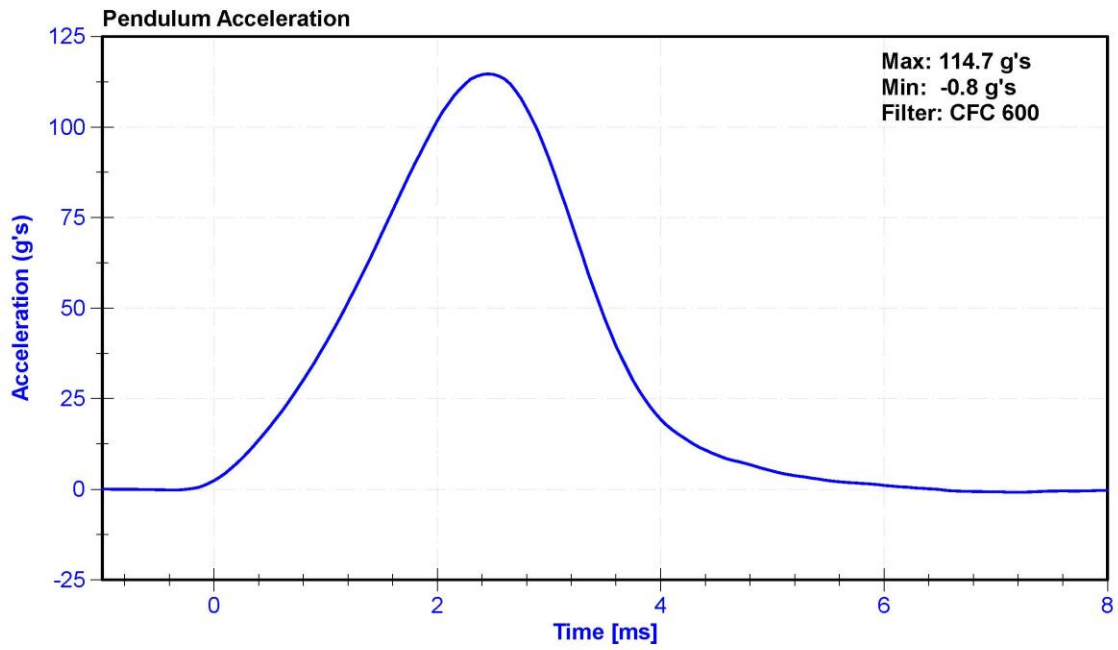
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.8	Pass
Humidity	10	70	%	54.3	Pass
Velocity	2.07	2.13	m/s	2.127	Pass
Maximum Resistive Force	4720	5780	N	5548.7	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P71278	12/14/2018	12/14/2019





**CALIBRATION TEST RESULTS**

**POST-TEST**

**HYBRID III 5<sup>TH</sup> PERCENTILE FEMALE - PASSENGER ATD**

**SERIAL NO: 288**

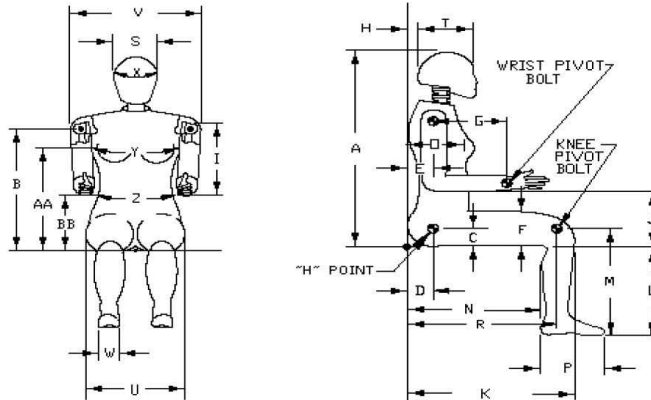


External Measurements - Hybrid 3 - 5th Female

Technician: K. Dutton

Date: 05/02/2019

Dummy Serial Number: 288



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	775	800	787	Pass
B	Shoulder Pivot Height	432	457	450	Pass
C	H-Point Height	81	86	84	Pass
D	H-Point from Backline	145	150	147	Pass
E	Shoulder Pivot from Backline	69	84	77	Pass
F	Thigh Clearance	119	135	126	Pass
G	Back of Elbow to Wrist Pivot	244	259	255	Pass
H	Head Back to Backline	43	48	45	Pass
I	Shoulder to Elbow Length	277	297	284	Pass
J	Elbow Rest Height	183	203	190	Pass
K	Buttock to Knee Length	521	546	538	Pass
L	Popliteal Height	356	376	365	Pass
M	Knee Pivot Height	394	419	405	Pass
N	Buttock Popliteal Length	414	439	430	Pass
O	Chest Depth without Jacket	175	191	180	Pass
P	Foot Length (right)	219	234	221	Pass
R	Buttock To Knee Pivot Length	457	483	465	Pass
S	Head Breadth	137	147	142	Pass
T	Head Depth	178	188	183	Pass
U	Hip Breadth	300	315	310	Pass
V	Shoulder Breadth	351	366	361	Pass
W	Foot Breadth	79	94	85	Pass
X	Head Circumference	528	549	537	Pass
Y	Chest Circumference with Jacket	851	881	865	Pass
Z	Waist Circumference	460	790	777	Pass
AA	Reference Location (Chest Circumference)	333	358	345	Pass
BB	Reference Location (Waist Circumference)	160	170	164	Pass

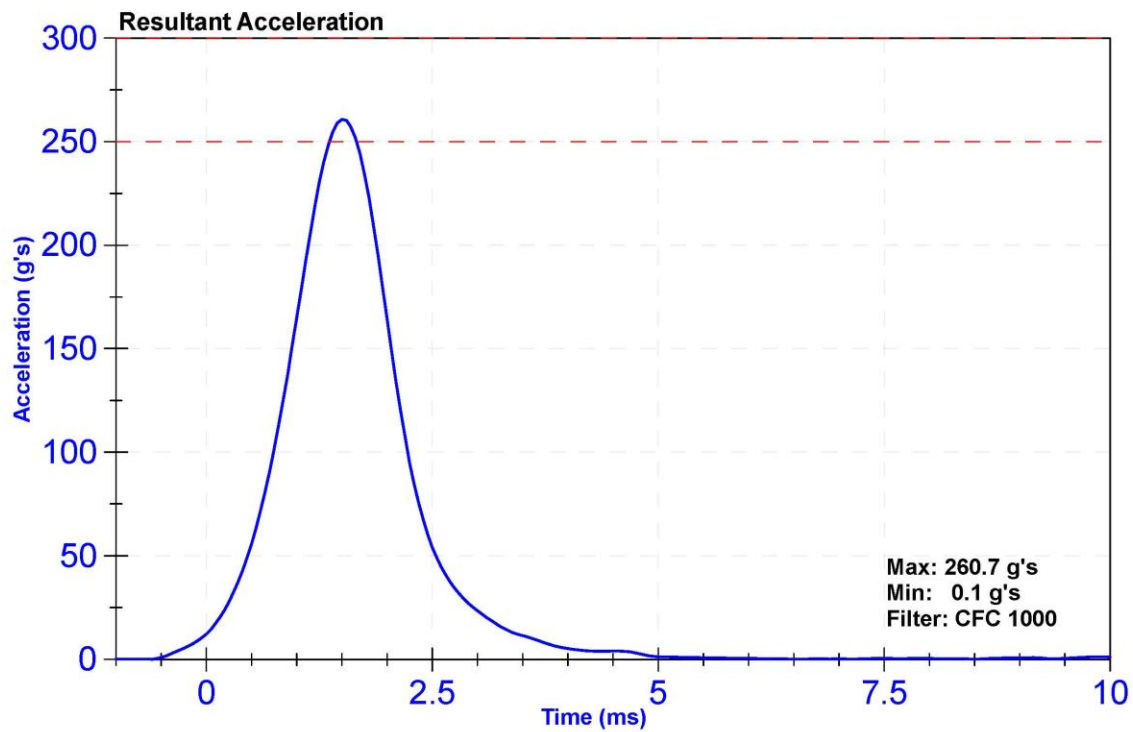
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	288	Laboratory Supervisor	K. Brogan

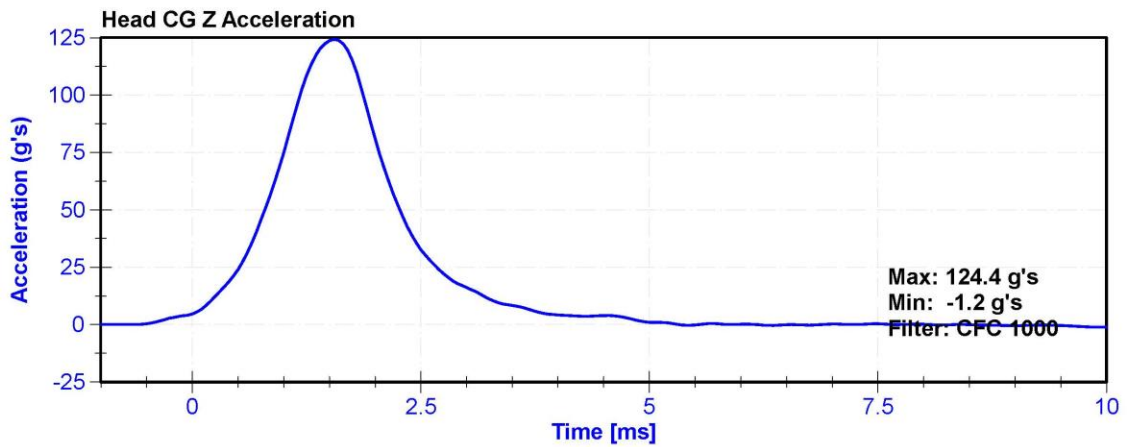
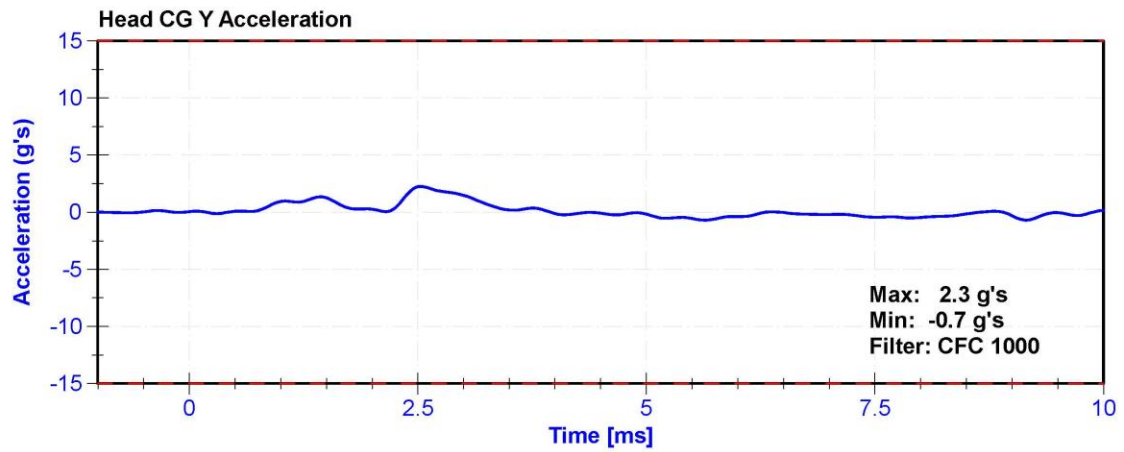
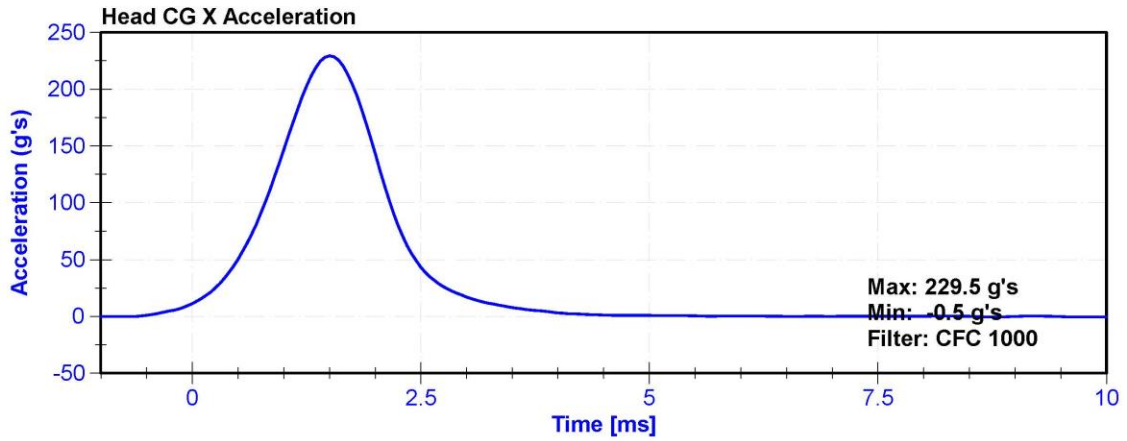
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.6	Pass
Humidity	10	70	%	53.9	Pass
Resultant Acceleration	250	300	g's	260.7	Pass
Oscillation	0	10	%	1.5	Pass
Lateral Acceleration	-15	15	g's	2.3	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264	AC-P51303	4/8/2019	10/8/2019
Y Accelerometer	ENDEVCO 7264CT	AC-P49216	4/8/2019	10/8/2019
Z Accelerometer	ENDEVCO 7264	AC-P58868	4/8/2019	10/8/2019





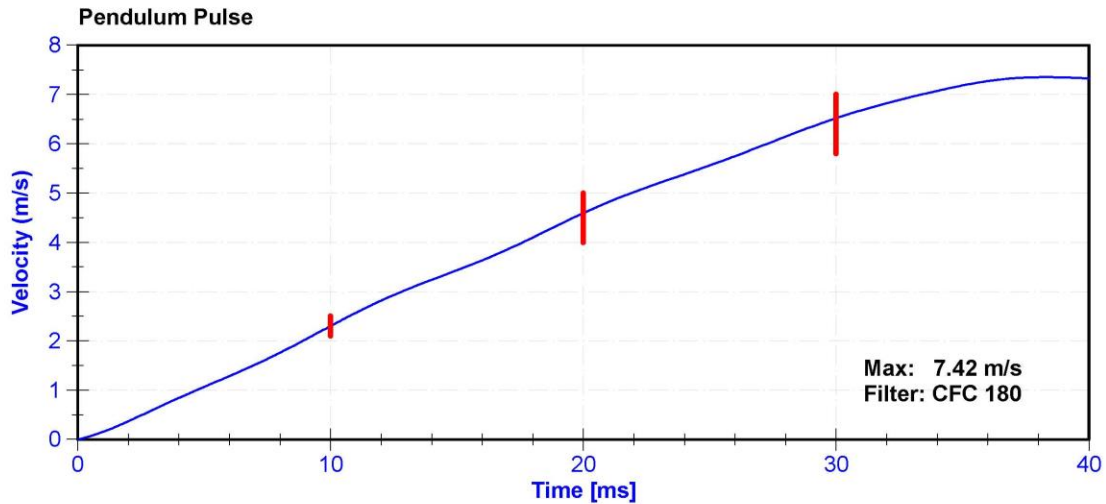
ATD Manufacturer	FTSS	Test Technician	C. Mantell
ATD Serial Number	288	Laboratory Supervisor	K. Brogan

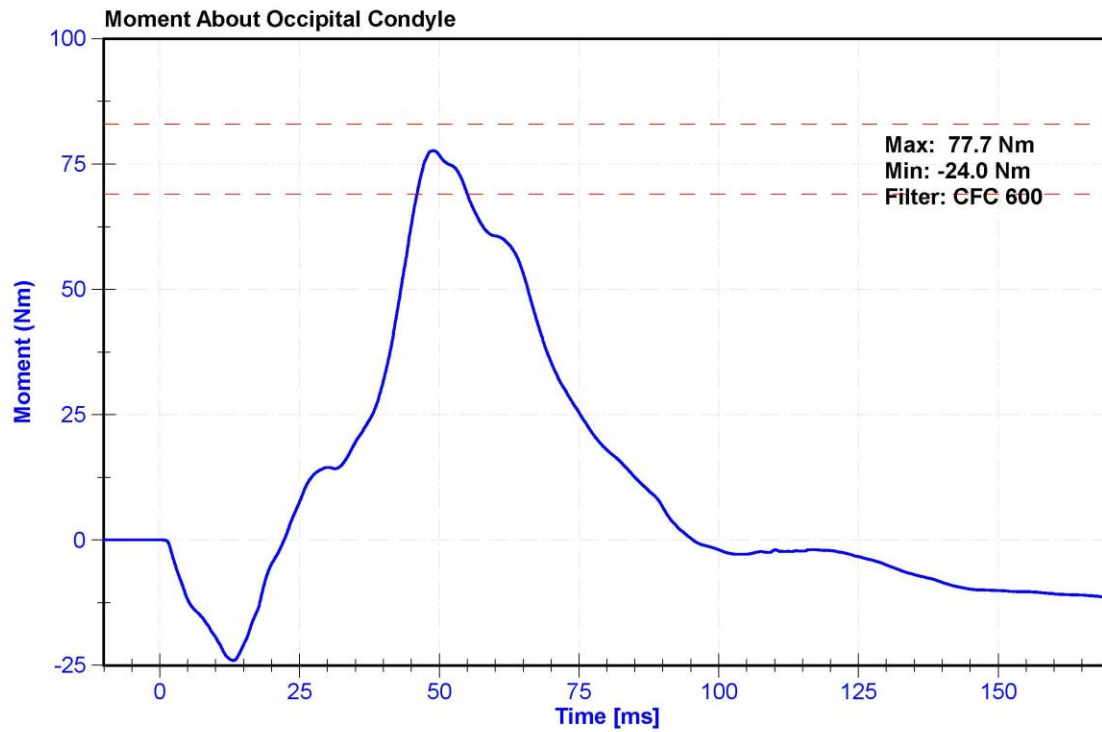
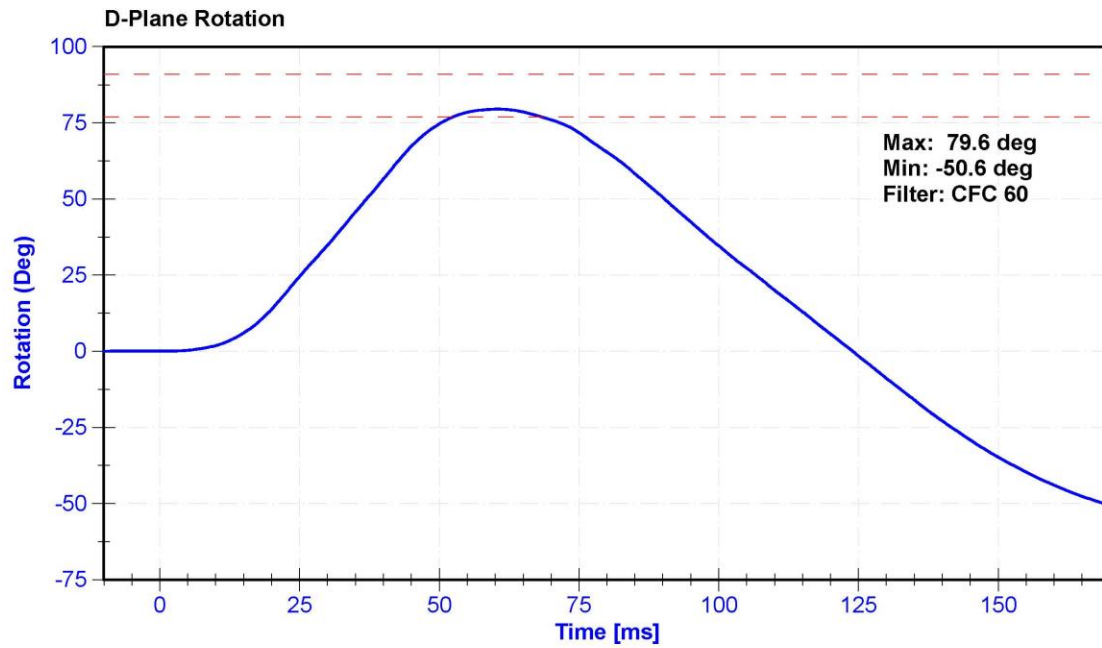
**Results**

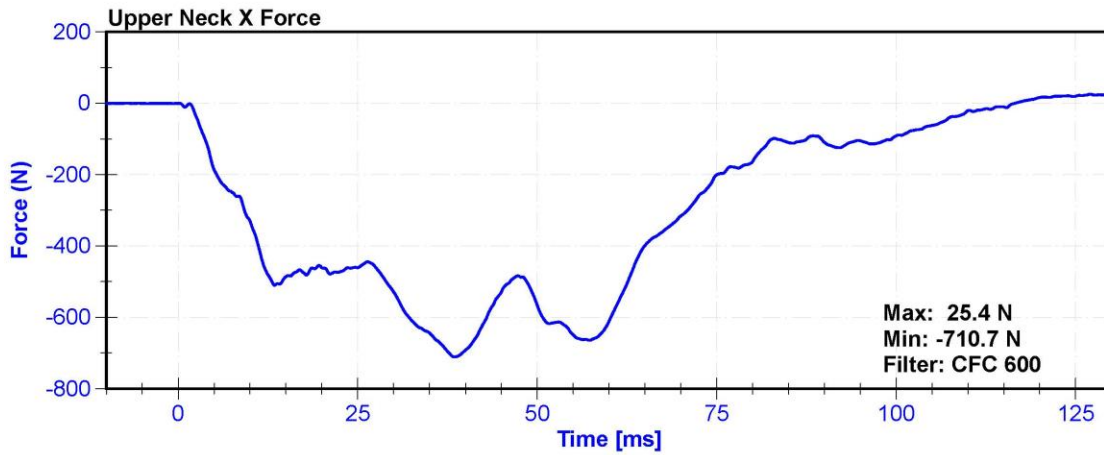
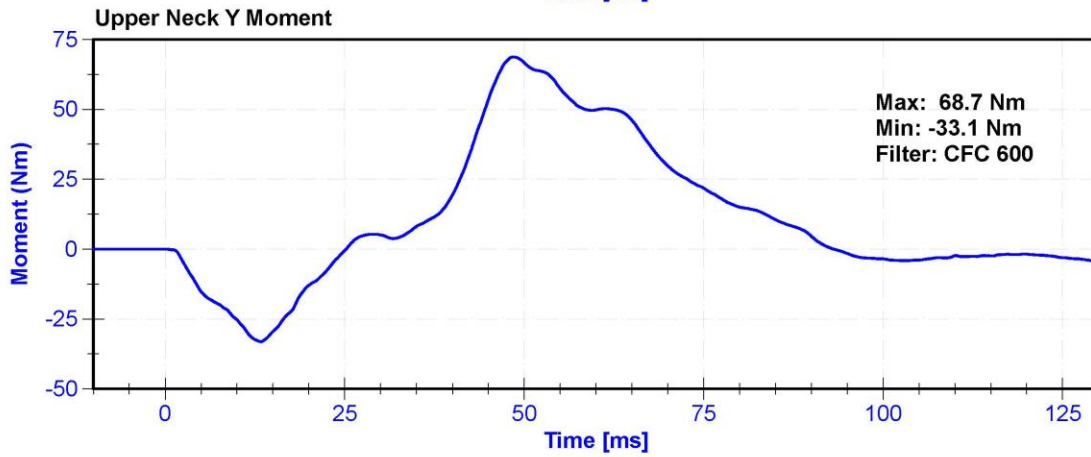
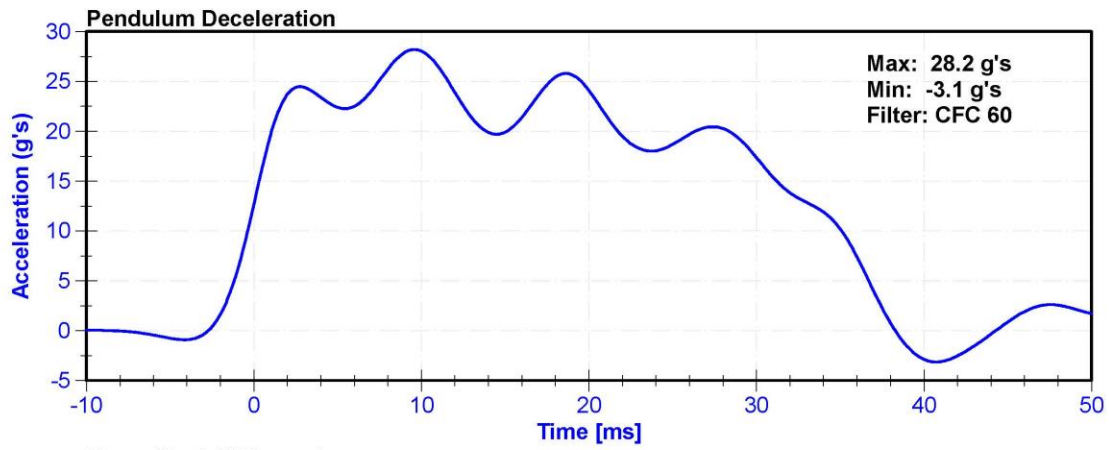
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	59.0	Pass
Velocity	6.89	7.13	m/s	6.903	Pass
Pendulum Impulse at 10ms	2.1	2.5	m/s	2.30	Pass
Pendulum Impulse at 20ms	4.0	5.0	m/s	4.59	Pass
Pendulum Impulse at 30ms	5.8	7.0	m/s	6.52	Pass
Max D Plane Rotation	77	91	deg	79.6	Pass
Max Moment During Rotation Interval	69	83	Nm	77.7	Pass
Moment Decay to 10.0 Nm	80	100	ms	87.3	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5M9 Pend	1/29/2019	1/29/2020
Pendulum Potentiometer	ETI SP22G	DS-LABPOT1	11/15/2018	11/15/2019
Condyle Potentiometer	ETI SP22G	DS-LABPOT2	11/15/2018	11/15/2019
Upper Neck Load Cell	DENTON 1716A	LC-1591Fx	9/28/2018	9/28/2019







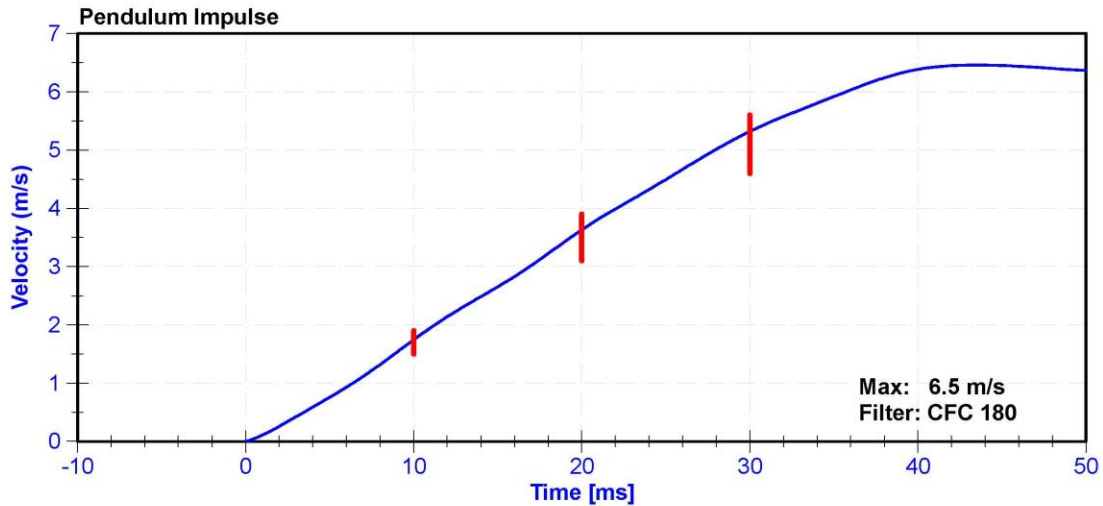
ATD Manufacturer	FTSS	Test Technician	C. Mantell
ATD Serial Number	288	Laboratory Supervisor	K. Brogan

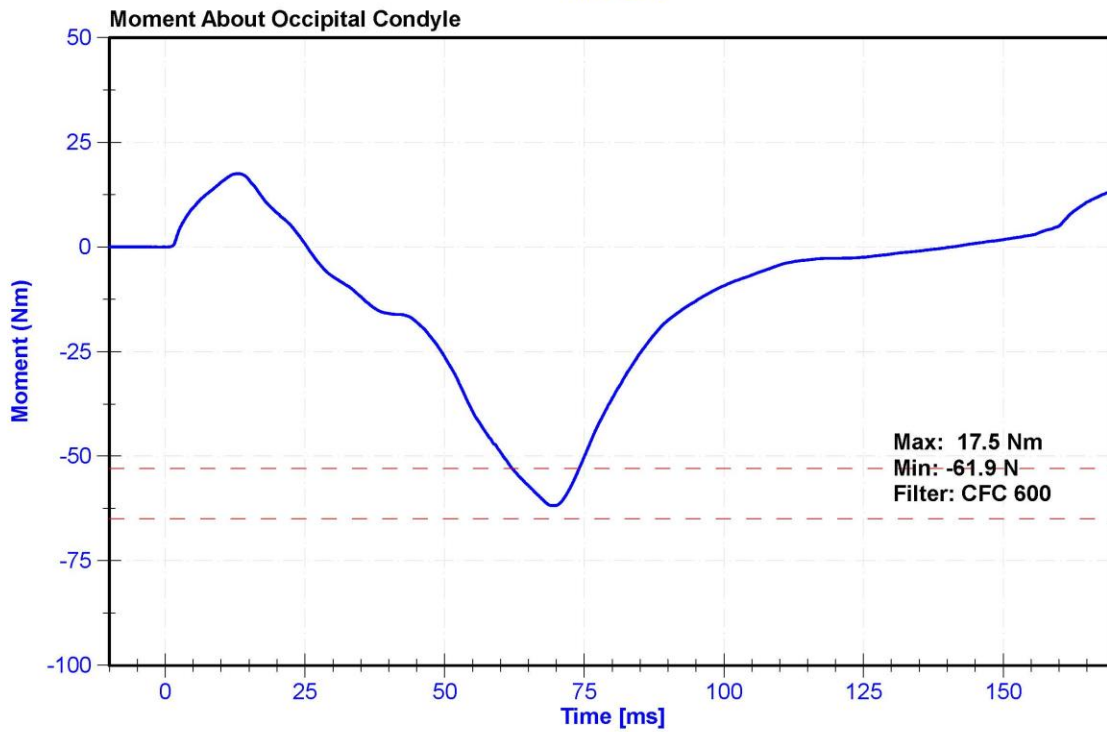
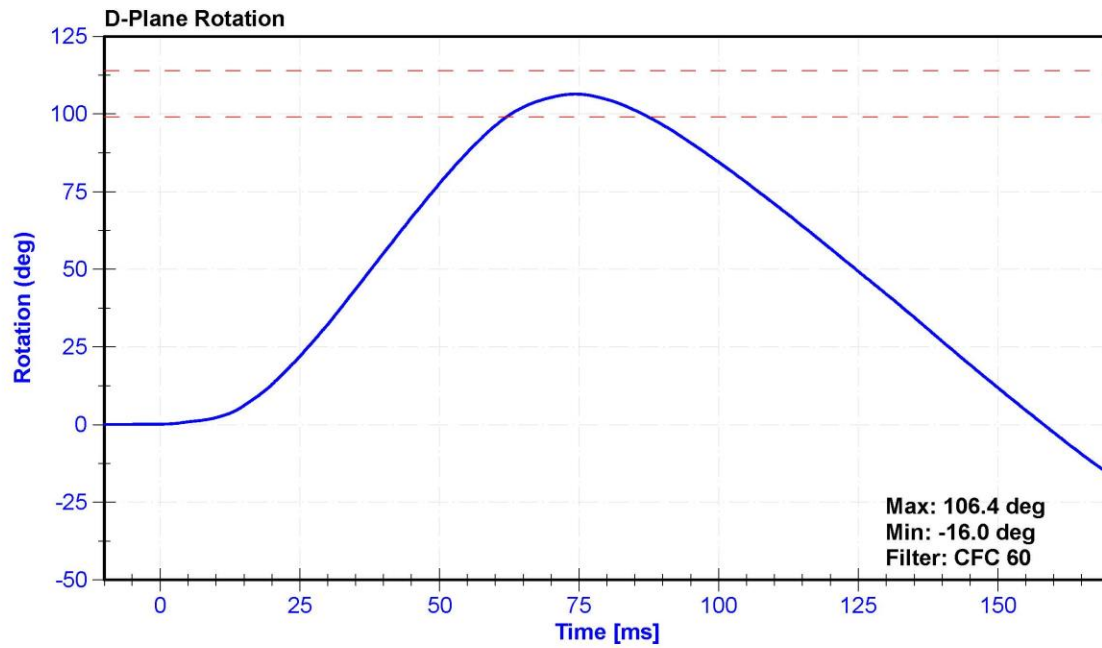
**Results**

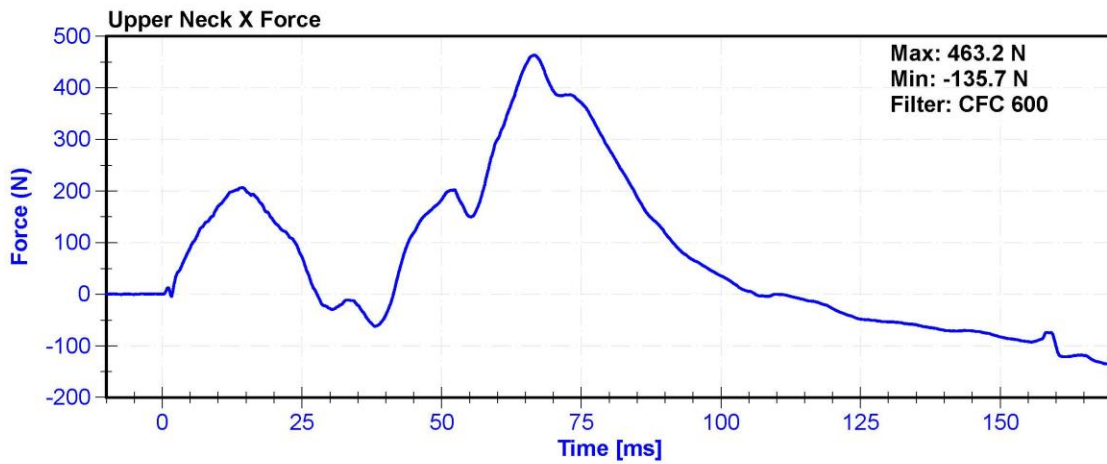
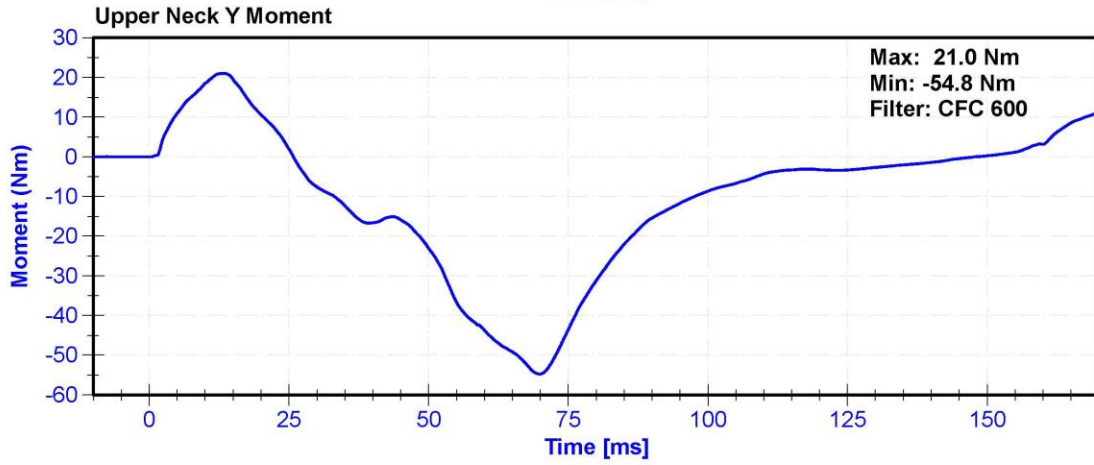
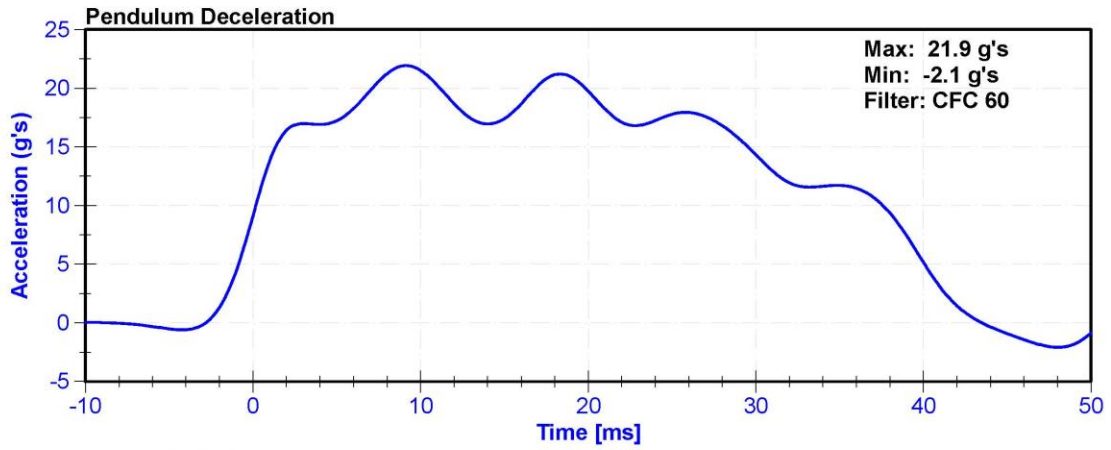
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	54.8	Pass
Velocity	5.95	6.19	m/s	6.005	Pass
Pendulum Impulse at 10ms	1.5	1.9	m/s	1.74	Pass
Pendulum Impulse at 20ms	3.1	3.9	m/s	3.63	Pass
Pendulum Impulse at 30ms	4.6	5.6	m/s	5.32	Pass
D Plane Rotation	99	114	deg	106.4	Pass
Moment During Rotation Interval	-65	-53	Nm	-61.9	Pass
Moment Decay to -10Nm	94	114	ms	98.9	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5M9 Pend	1/29/2019	1/29/2020
Pendulum Potentiometer	ETI SP22G	DS-LABPOT1	11/15/2018	11/15/2019
Condyle Potentiometer	ETI SP22G	DS-LABPOT2	11/15/2018	11/15/2019
Upper Neck Load Cell	DENTON 1716A	LC-1591Fx	9/28/2018	9/28/2019







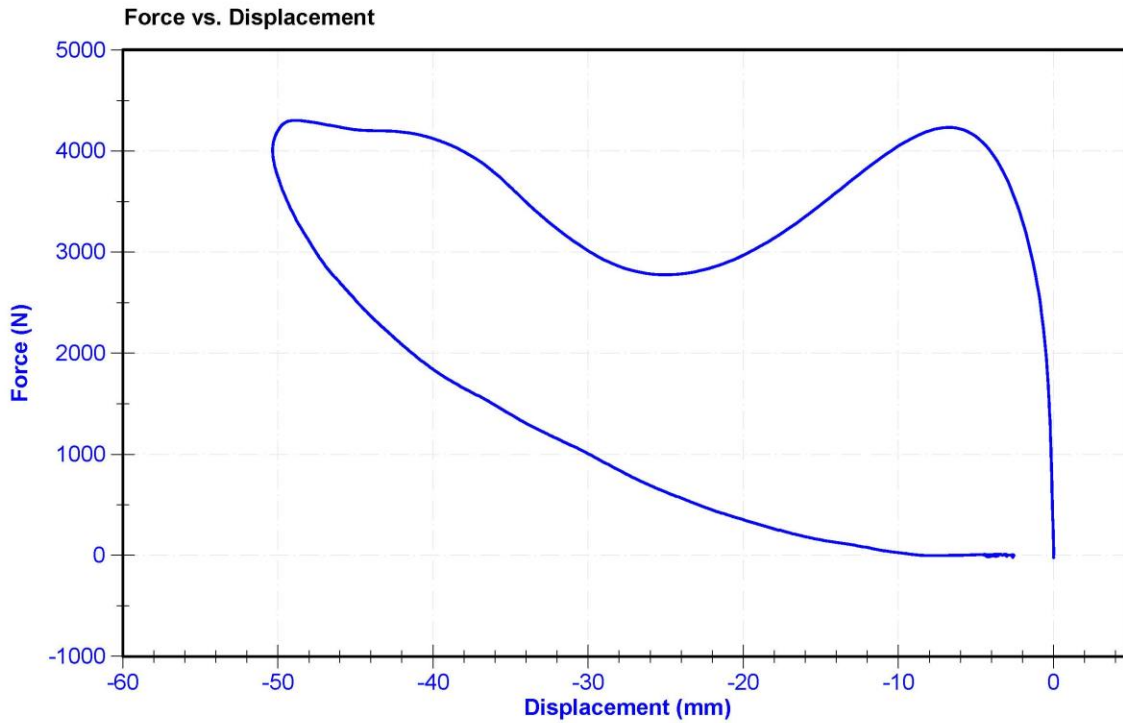
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	288	Laboratory Supervisor	K. Brogan

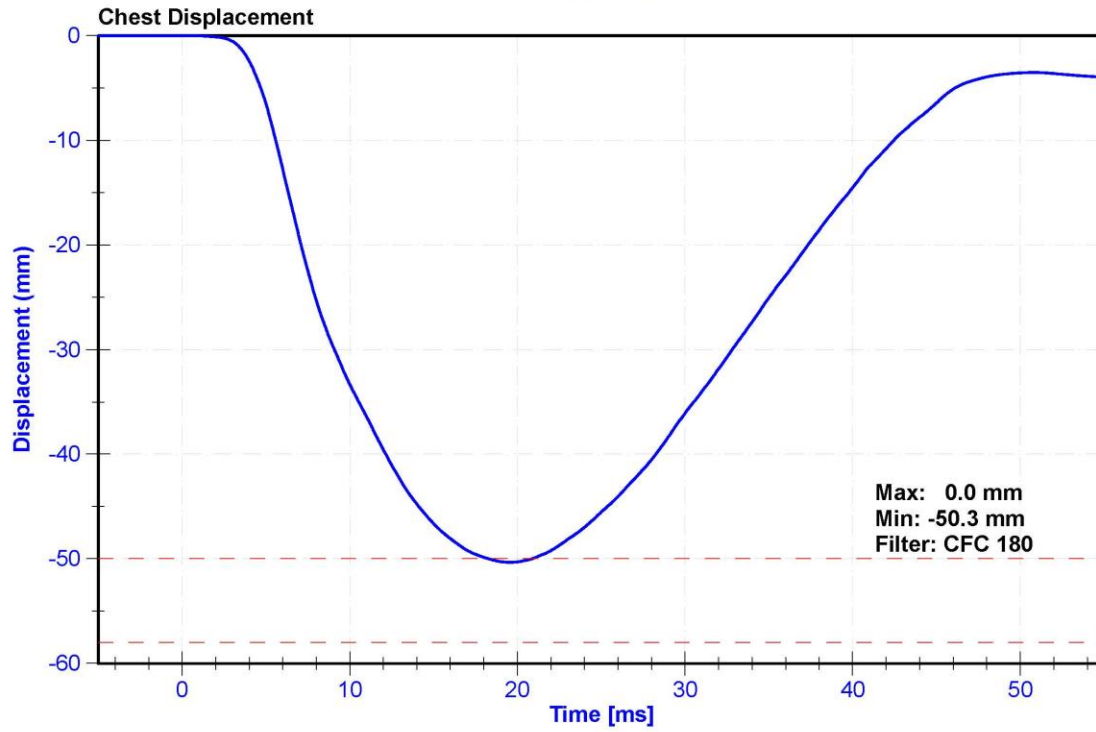
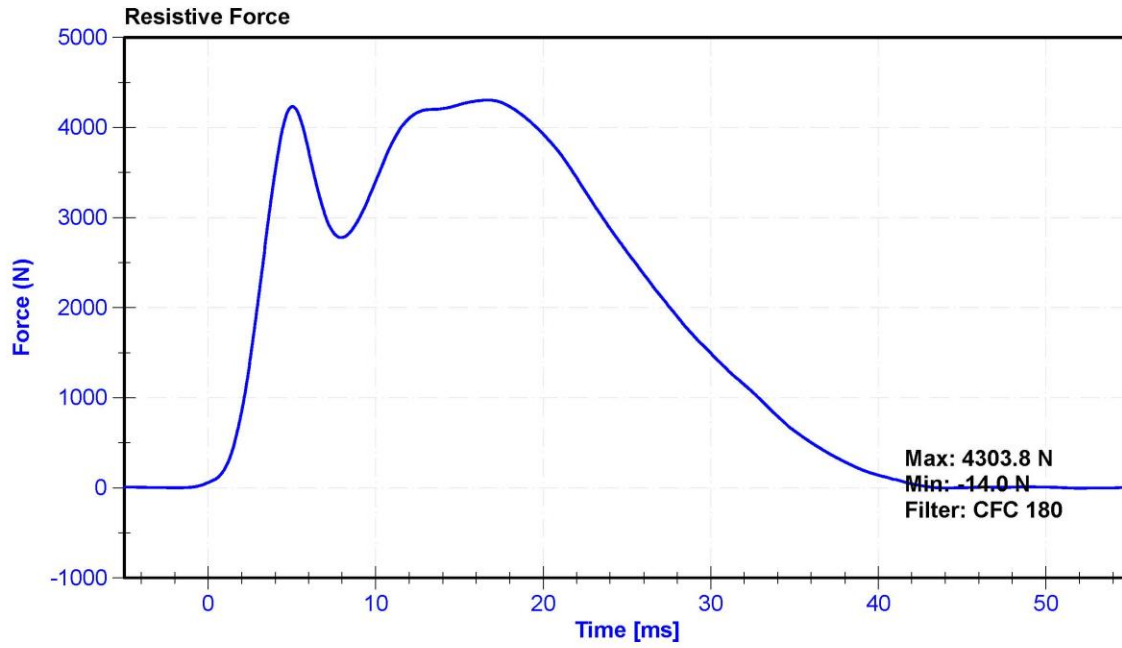
**Results**

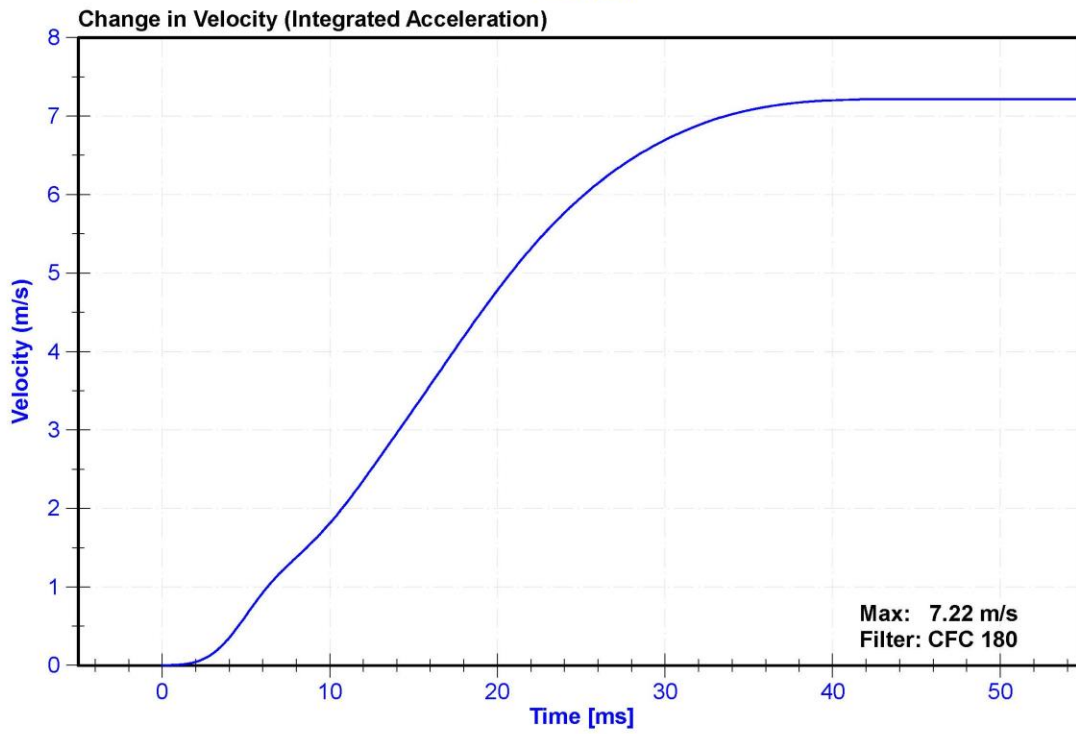
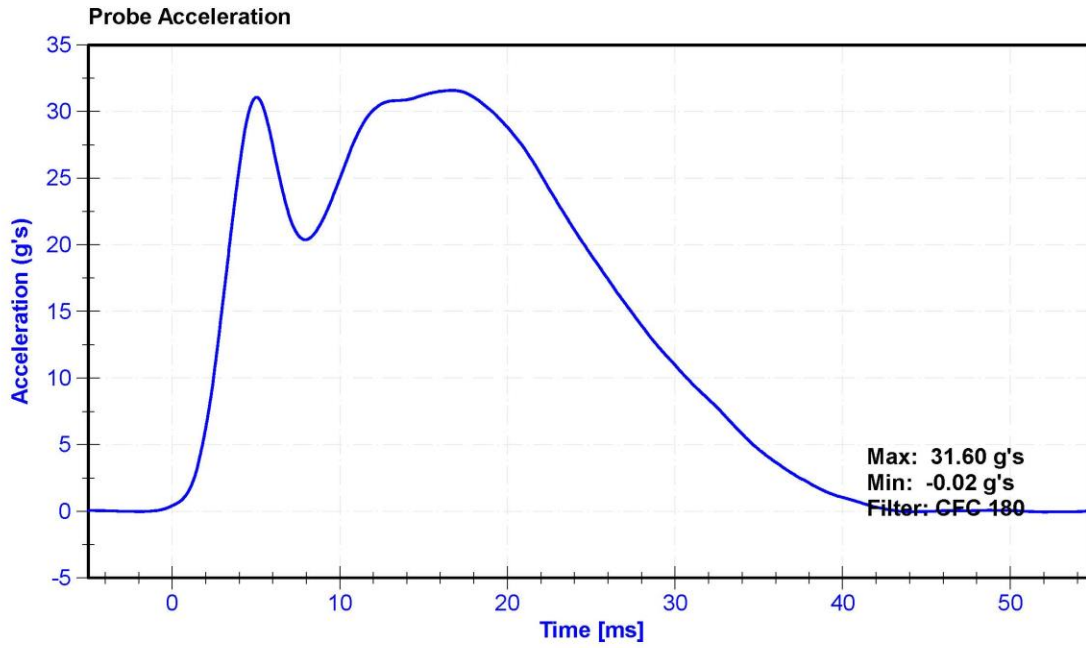
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	53.4	Pass
Velocity	6.59	6.83	m/s	6.670	Pass
Chest Deflection	-58	-50	mm	-50.3	Pass
Maximum Resistive Force (50 to 58mm)	3900	4400	N	4202.9	Pass
Maximum Resistive Force (18 to 50mm)	0	4600	N	4303.8	Pass
Hysteresis	69	85	%	72.6	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P71278	12/14/2018	12/14/2019
Chest Potentiometer	SERVO 14CB1-2897	DS-288	10/22/2018	10/22/2019







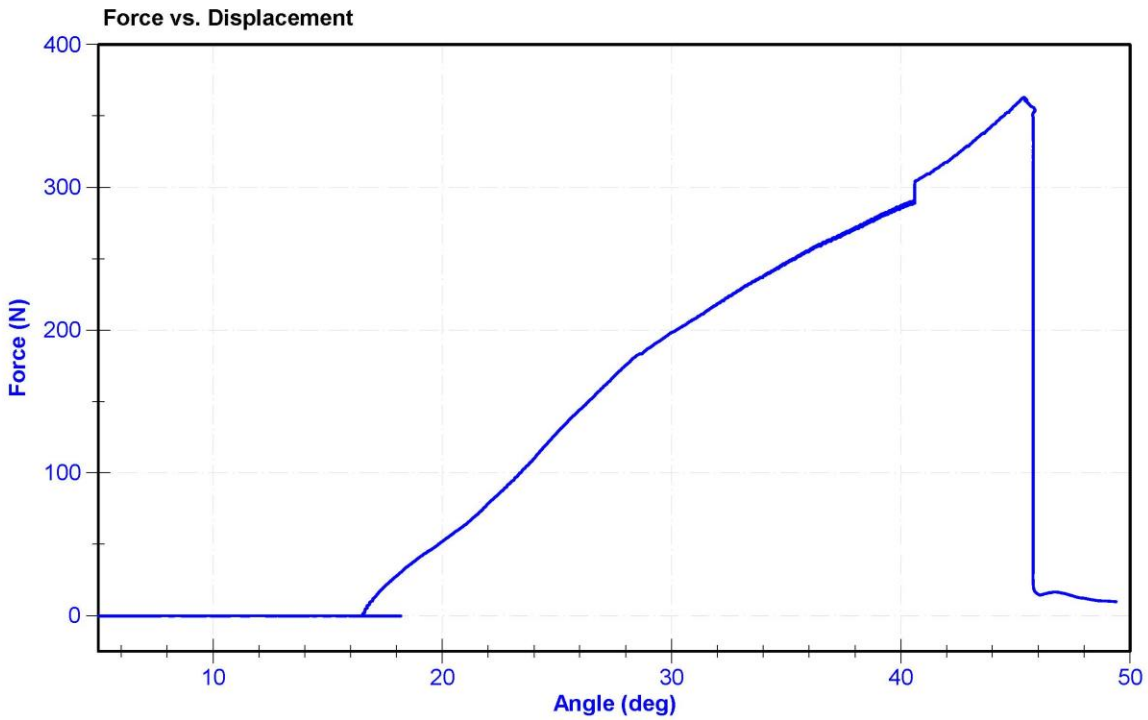
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	288	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.6	25.6	°C	21	Pass
Humidity	10	70	%	56	Pass
Initial Angle	0	20	deg	16.4	Pass
Force at 45 Degrees	320	390	N	362.8	Pass
Return Angle Relative to Initial	0	8	deg	4.2	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	Rieker N4C-1	DS-13051548	10/25/2018	10/25/2019
Load Cell	Interface SML-200	LC-493319	10/25/2018	10/25/2019



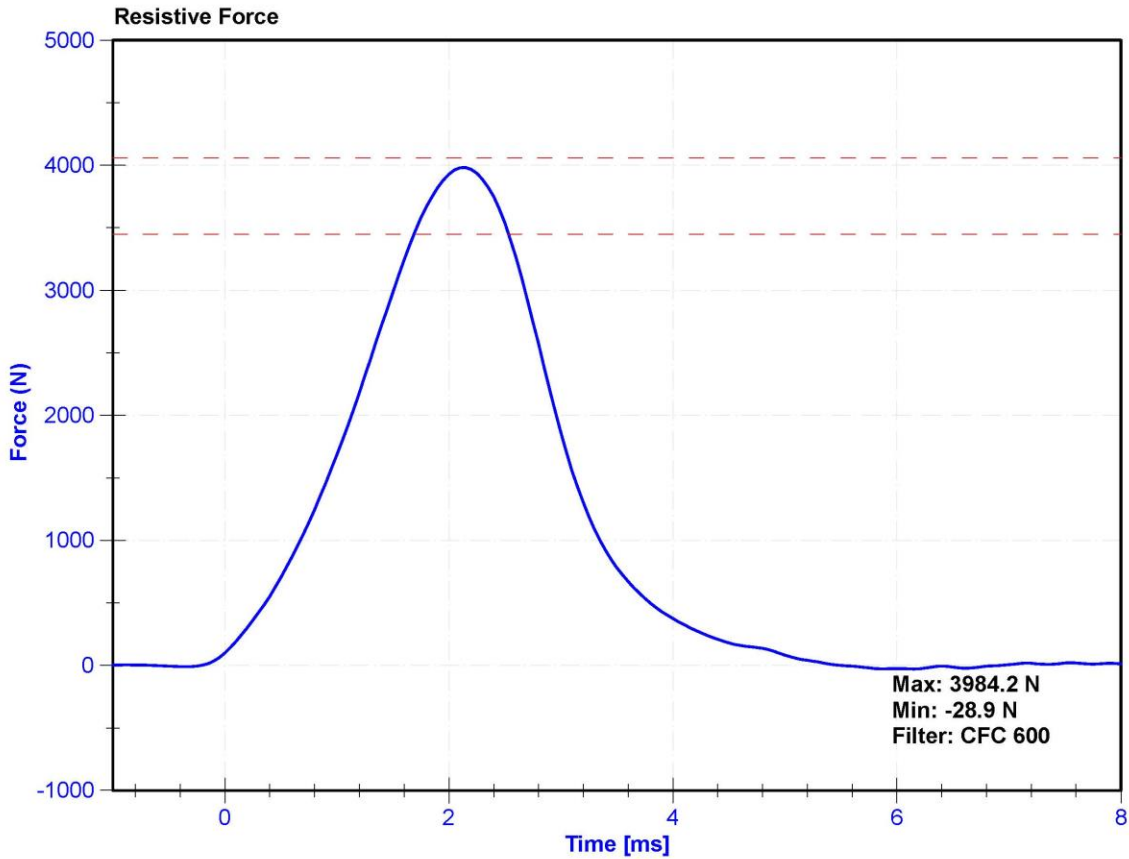
ATD Manufacturer	FTSS	Test Technician	C. Mantell
ATD Serial Number	288	Laboratory Supervisor	K. Brogan

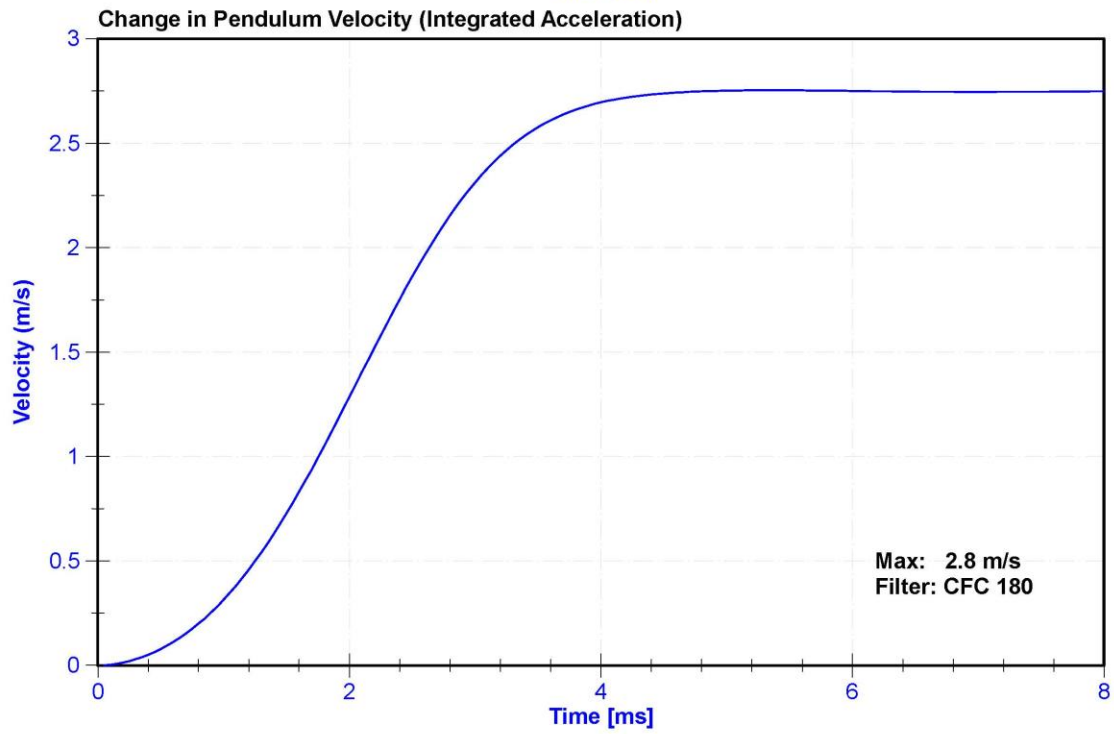
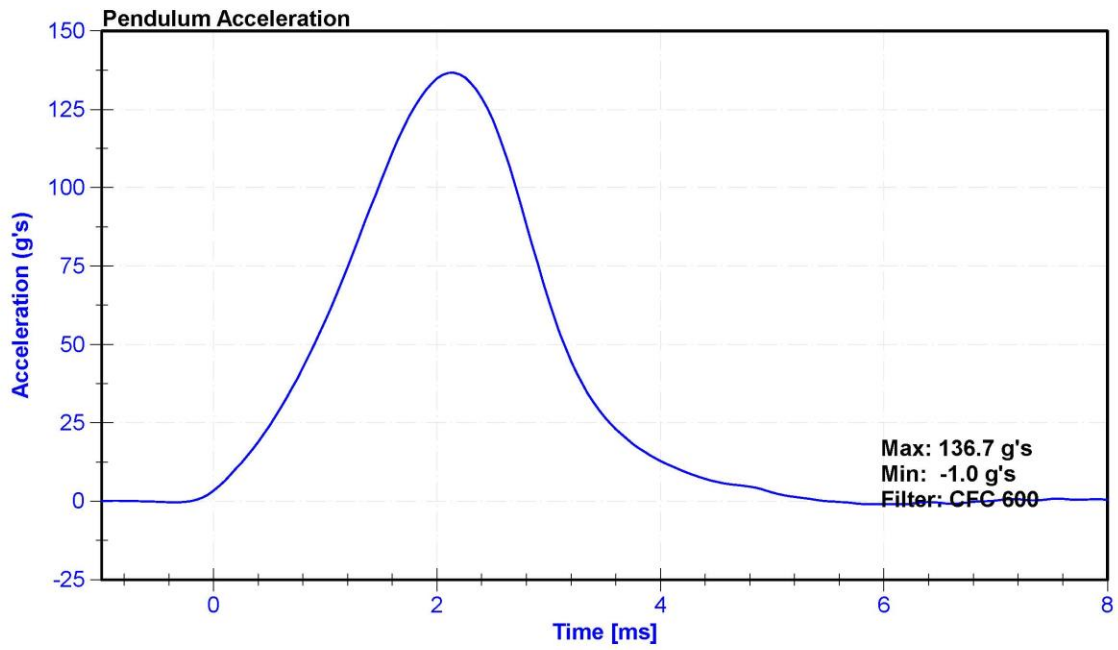
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.3	Pass
Humidity	10	70	%	56.0	Pass
Velocity	2.07	2.13	m/s	2.130	Pass
Resistive Force	3450	4060	N	3984.2	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P71278	12/14/2018	12/14/2019





ATD Manufacturer	FTSS	Test Technician	C. Mantell
ATD Serial Number	288	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.9	Pass
Humidity	10	70	%	54.2	Pass
Velocity	2.07	2.13	m/s	2.128	Pass
Resistive Force	3450	4060	N	3912.7	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P71278	12/14/2018	12/14/2019

