

**REPORT NUMBER: SINCAP-CAL-20-012**

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

**Toyota Motor Manufacturing, Texas, INC  
2020 Toyota Tacoma Extended Cab  
Truck**

**NHTSA No: M20205105**

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



**August 28, 2020**

**FINAL REPORT**

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

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Prepared by: Matthew Pronko  
Matthew Pronko, Test Engineer

Date: August 28, 2020

Approved by: Vanessa Hansen  
Vanessa Hansen, Operations Manager

Date: August 28, 2020

**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> SINCAP-CAL-20-012	<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 Side Impact MDB Testing of a 2020 Toyota Tacoma Extended Cab Truck NHTSA No.: M20205105		<b>5. Report Date</b> August 28, 2020																												
		<b>6. Performing Organization Code</b> CAL																												
Matthew Pronko, Test Engineer Vanessa Hansen, Operations Manager		<b>8. Performing Organization Report No.</b> CAL-DOT-2020-012																												
<b>9. Performing Organization Name and Address</b> Calspan Corporation Transportation Test Operations P.O. Box 400 Buffalo, New York 14225		<b>10. Work Unit No.</b>																												
		<b>11. Contract or Grant No.</b> DTNH22-14-D-00352																												
<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 28, 2020 - August 28, 2020																												
		<b>14. Sponsoring Agency Code</b> NRM-110																												
<b>15. Supplementary Notes</b>																														
<b>16. Abstract</b> <p>A 55/28, (61.90kph / 38.5 mph), 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2020 Toyota Tacoma Extended Cab Truck in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for the generation of consumer information on vehicle side crash protection. This test was conducted at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on May 28, 2020.</p> <p>The impact velocity of the Moving Deformable Barrier (MDB) was 61.81 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 21°C. The target vehicle's maximum post-test static crush was 159 mm located at level 1. The test vehicle's occupant performance data is as follows:</p>																														
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<p>* Proposed IARV</p> <p>The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.</p>																														
<b>17. Key Words</b> New Car Assessment Program (NCAP) Side Impact MDB ES-2re SID-IIs		<b>18. Distribution Statement</b> <u>Copies of this report are available from:</u> National Highway Traffic Safety Administration Technical Information Services Division 1200 New Jersey Ave. SE Washington, D.C. 20590																												
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## **SECTION 1**

### **TEST PURPOSE AND PROCEDURE**

This moving deformable barrier side impact test is part of the MY 2020 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract number DTNH22-14-D-00352. The purpose of this test is to generate comparative side impact performance in a 2020 Toyota Tacoma Extended Cab Truck. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated October 2015.

## SECTION 2

### SUMMARY OF TEST RESULTS

A 2020 Toyota Tacoma Extended Cab Truck was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.81 km/h. The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by the Calspan Corporation's Transportation Test Operations Center in Buffalo, New York on May 28, 2020. Pre-test and post-test photographs of the test vehicle, the MDB and the dummies (ES-2re and SID-IIs) are included in this report.

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

The Dummies were instrumented in the following manner:

#### DRIVER ATD (ES-2re)

Primary and redundant head CG tri-axial accelerometers

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

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

Lower spine (T12) tri-axial accelerometers

Public symphysis y-axis load cell

#### PASSENGER ATD (SID-IIs)

Primary and redundant head CG tri-axial accelerometers

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

Abdomen upper rib and lower rib y-axis displacement potentiometers

Lower spine (T12) tri-axial accelerometers

Acetabulum and iliac wing y-axis load cells

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

### DUMMY INJURY VALUES

Measurement Description	Driver ATD (ES-2re)		
	Units	Threshold	Result
Head Injury Criteria (HIC36)		1000	72.264
Maximum Thorax Rib Deflection	mm	44	29.562
Combined Abdominal Force	N	2500	726.246
Pubic Symphysis Force	N	6000	986.675

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC36)		1000	115.399
Lower Spine (T12) Resultant Acceleration	G	82	37.164
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2136.207
Maximum Thoracic Rib Deflection	mm	38*	23.913
Maximum Abdominal Rib Deflection	mm	45*	12.594

\*Proposed IARV

### SUPPLEMENTAL RESTRAINT INFORMATION

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

#### GENERAL COMMENTS:

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

#### Data Anomalies:

The following channel was questionable for

- Left Front Sill Y Acceleration, Exceeded calibration range at 7.2 ms 24.2 ms
- Left B-Pillar Lower Y Acceleration, Exceeded calibration range and saturated at 13.8 ms
- Left B-Pillar Middle Y Acceleration, Exceeded calibration range at 13.3 ms

**SECTION 3**  
**OCCUPANT AND VEHICLE INFORMATION**

This section contains information reporting for the following Data Sheets:

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

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

Data Sheet No. 3 – Dummy Longitudinal Clearance Dimensions

Data Sheet No. 4 – Dummy Lateral Clearance Dimensions

Data Sheet No. 5 – Camera and Instrumentation Data

Data Sheet No. 6 – Test Vehicle Accelerometer Locations

Data Sheet No. 7 – MDB Accelerometer Locations

Data Sheet No. 8 – Post-Test Observations

Data Sheet No. 9 – MDB Summary of Results

Data Sheet No. 10 – Test Vehicle Profile Measurements

Data Sheet No. 11 – Test Vehicle Exterior Crush Measurements

Data Sheet No. 12 – MDB Exterior Static Crush Measurements

Data Sheet No. 13 – Vehicle and MDB Damage Profile Distances

Data Sheet No. 14 – FMVSS No. 301 Static Rollover Results

Data Sheet No. 15 – Dummy/Vehicle Temperature and Humidity Stabilization Data

**DATA SHEET NO. 1  
GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2020 Toyota Tacoma Extended Cab Truck  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20205105  
 Test Date: 5/28/2020

**TEST VEHICLE INFORMATION AND OPTIONS**

NHTSA No.	M20205105
Model Year	2020
Make	Toyota
Model	Tacoma Extended Cab
Body Style	Truck
VIN	5TFRX5GN1LX172728
Body Color	Red
Odometer Reading (km/mi)	289 miles
Engine Displacement (L)	2.7
Type/No. Cylinders	I4
Engine Placement	Inline
Transmission Type	Automatic
Transmission Speeds	6-Speed
Overdrive	Yes
Final Drive	Rear Wheel Drive
Roof Rack	No
Sunroof/T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes

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

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

**DATA FROM CERTIFICATION LABEL**

Manufactured By	Toyota Motor Manufacturing, Texas, INC
Date of Manufacture	11/19
Vehicle Type	Truck

GVWR (kg)	2540
GAWR Front (kg)	1335
GAWR Rear (kg)	1490

**VEHICLE SEATING AND WEIGHT CAPACITY DATA**

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	2	-	4	
Capacity Weight (VCW) (kg)				680	(A)
DSC X 68.04 kg				272.16	(B)
Cargo Weight (RCLW) (kg)				136	(A-B)

**VEHICLE SEAT TYPE**

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

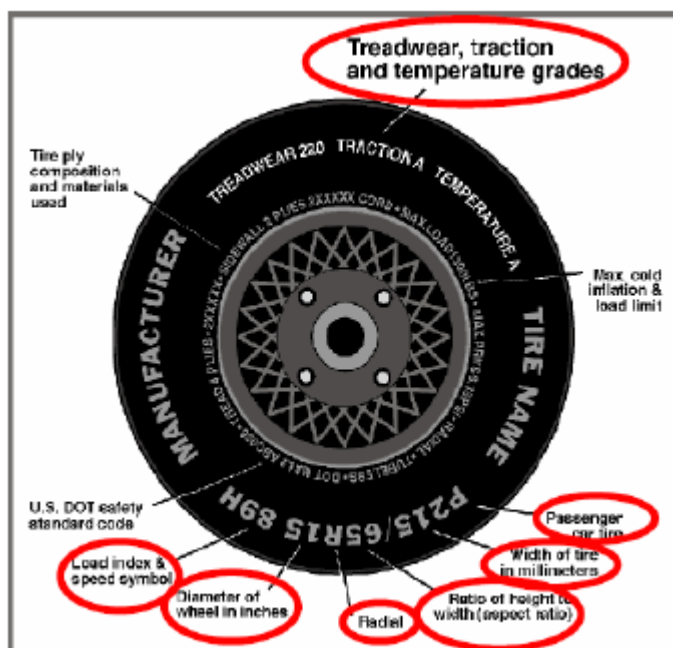
**DATA SHEET NO. 1 ... (CONTINUED)**  
**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2020 Toyota Tacoma Extended Cab Truck  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20205105  
 Test Date: 5/28/2020

**VEHICLE TIRE INFORMATION**

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



**TIRE SIDEWALL INFORMATION**

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	220	220
Recommended Tire Size	P245/75R16	P245/75R16
Tire Size on Vehicle	P245/75R16	P245/75R16
Tire Manufacturer	Hankook	Hankook
Tire Model	Dynapro HT	Dynapro HT
Treadwear	500	500
Traction	B	B
Temperature Grade	B	B
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Steel, 2 Polyester, 1 Nylon	2 Steel, 2 Polyester, 1 Nylon
Load Index/Speed Symbol	109S	109S
Tire Material	Rubber	Rubber
DOT Safety Code Left	5M9LHUH2119	5M9LHUH2119
DOT Safety Code Right	5M9LHUH2119	5M9LHUH2119



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

Test Vehicle: 2020 Toyota Tacoma Extended Cab Truck  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20205105  
 Test Date: 5/28/2020

**TIRE PRESSURES**

	Units	LF	RF	LR	RR
As Delivered	kPa	241	240	241	242
Tire Placard	kPa	220	220	220	220
Owner's Manual	kPa	220	220	220	220
As Tested	kPa	220	220	220	220

**MDB TIRE SPECIFICATIONS**

	Units	Requirement	LF	RF	LR	RR
Tire Size		P205/75R15	P205/75R15	P205/75R15	P205/75R15	P205/75R15
Tire Pressure	kPa	200 ± 21	207	207	207	207

**TEST VEHICLE WEIGHTS**

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	508	403		564	501		567	509	
Right	kg	495	392		511	478		502	486	
Ratio	%	55.8	44.2		52.3	47.7		51.8	48.2	
Totals	kg	1003	795	1798	1075	979	2054	1069	995	2064

**TARGET TEST WEIGHT CALCULATION**

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1798	(A)
Sum of Actual Weight of 1 ES2re and 1 P572 ATD (SID-IIs)	kg	127	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	136	(C)
Calculated Target Vehicle Test Weight (TVTWW)	kg	2061	(A+B+C)

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

**TEST VEHICLE ATTITUDES AND CG**

Measurement Description	Units	Fully Loaded	As Tested	Meets Requirement**
LF	mm	899	890	Yes
RF	mm	914	905	Yes
RR	mm	918	917	Yes
LR	mm	908	912	Yes
Vehicle CG (Aft of Front Axle)	mm	1569	1551	
Vehicle CG (Left+)/Right(-) from Longitudinal Centerline)	mm	34	30	

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

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

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

Test Vehicle: 2020 Toyota Tacoma Extended Cab Truck      NHTSA No.: M20205105  
Test Program: NCAP Side MDB Impact Test      Test Date: 5/28/2020

**WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW**

Component Description	Weight (kg)
Nothing was Removed	0
Ballast / Equipment Added	18

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

Test Vehicle: 2020 Toyota Tacoma Extended Cab Truck  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20205105  
 Test Date: 5/28/2020

**SEAT POSITIONING**

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

**SCRL ANGLE RANGE**

Seat	SCRL (°)		
	Max	Min	Mid
Driver Seat	Not Adjustable		
Front Passenger Seat	Not Adjustable		
Front Center Seat*			
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat*	Fixed	Fixed	Fixed

*\*if applicable*

**SEAT HEIGHT AND ANGLE**

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid-Fore/Aft	Forward-Most
Driver Seat	Not Adjustable		Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
Front Passenger Seat	Not Adjustable		Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
Front Center Seat*	N/A	N/A	Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
Struck Side Rear Seat	Fixed	Fixed	Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
Non-Struck Side Rear Seat	Fixed	Fixed	Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
Rear Center Seat*	Fixed	Fixed	Max	-	-	-
			Mid	-	-	-
			Min	-	-	-

*\*if applicable*

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

Test Vehicle: 2020 Toyota Tacoma Extended Cab Truck  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20205105  
 Test Date: 5/28/2020

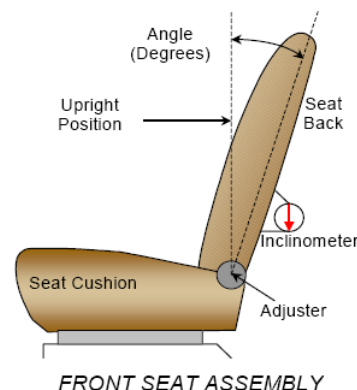
**SEAT FORE / AFT POSITION**

Seat	Total Fore / Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	240	17 (0-16)	120	8
Front Passenger Seat	240	17 (0-16)	120	8
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	FIXED	FIXED	FIXED	FIXED
Non-Struck Side Rear Seat	FIXED	FIXED	FIXED	FIXED
Rear Center Seat*	FIXED	FIXED	FIXED	FIXED

*\*if applicable*

**SEAT BACK ANGLE ADJUSTMENT**

*The driver's seat back is positioned to the manufacturer's designated design angle. The front center and front passenger's seat backs are positioned in a similar manner as the driver's seat back. The struck side rear seat back is positioned such that the dummy's head is level. The rear center and non-struck side rear outboard seat backs are positioned in a similar manner as the struck-side rear seat back.*



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detents*
Driver Seat w/ Seated Dummy	52.0	Powered	1.1	4
Front Passenger Seat	52.0	Powered	1.1	4
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat w/ Seated Dummy	FIXED	FIXED	FIXED	FIXED
Non-Struck Side Rear Seat	FIXED	FIXED	FIXED	FIXED
Rear Center Seat*	FIXED	FIXED	FIXED	FIXED

*\*if applicable*

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

Test Vehicle: 2020 Toyota Tacoma Extended Cab Truck  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20205105  
 Test Date: 5/28/2020

**SEAT BELT ANCHORAGE ADJUSTMENT**

*Seat belt anchorages are adjusted in accordance with the information provided by the manufacturer on Form No. 1. For this test zero is defined as the uppermost position.*

	Total # of Positions	Placed in Position #
Driver Seat	4 (0-3)	0 - Uppermost
Rear Seat	1	1 - Lowermost

**HEAD RESTRAINT ADJUSTMENT**

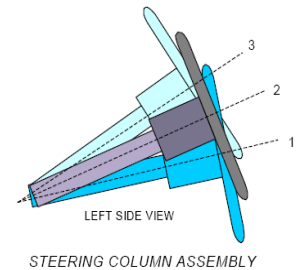
*The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.*

	Total # of Positions	Placed in Position #
Driver Seat	3 (0-2)	3 (Uppermost)
Rear Seat	1	1

**STEERING COLUMN ADJUSTMENT**

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

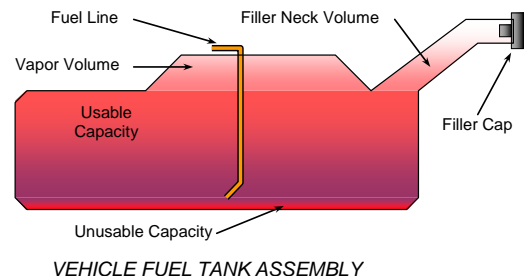
	Degrees	Fore/Aft Position (mm)
Lowermost – Position 1	22.5	
Geometric Center – Position 2	24.0	
Uppermost – Position 3	25.5	
Telescoping Steering Wheel Travel		30
Test Position	24.0	15



**FUEL PUMP**

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

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



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

Test Vehicle: 2020 Toyota Tacoma Extended Cab Truck  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20205105  
 Test Date: 5/28/2020

**FUEL TANK CAPACITY**

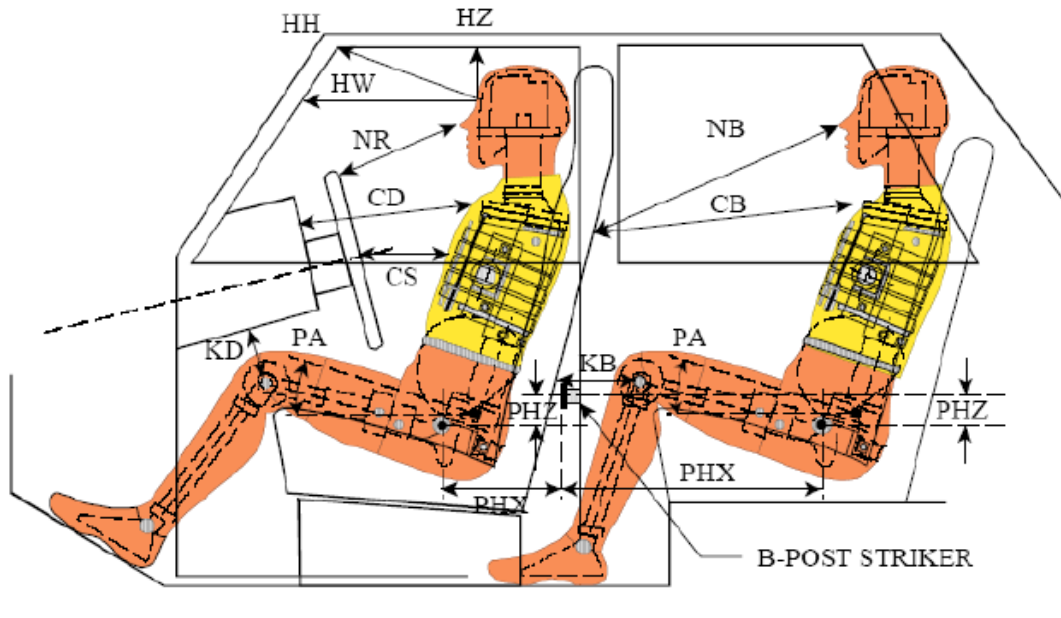
	<b>Liters</b>
Usable Capacity of "Standard Tank" (see Form No. 1)	79.9
Usable Capacity of "Optional Tank" (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	80
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	74.4
Actual Amount of Solvent Used in Test	74.4
1/3 of Usable Capacity	26.7

Is the Actual Amount of Solvent Used in the test equal to 93% ± 1% of the Usable Capacity stated in Form No. 1?     **Yes**         **No**

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

Test Vehicle: 2020 Toyota Tacoma Extended Cab Truck  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20205105  
 Test Date: 5/28/2020



**LEFT SIDE VIEW**

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

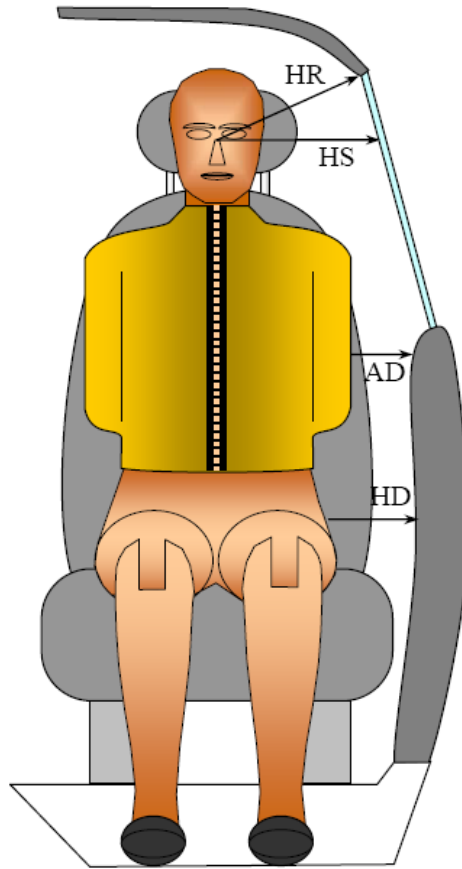
**DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION**

Driver Code	Pass. Code	Description	Driver (Serial No. F034)		Passenger (Serial No. DG8012)	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	399			
HW		Header to Windshield	603			
HZ	HZ	Head to Roof Liner	181		274	
NR	NB	Nose to Rim/Seat Back	461		289	
CD	CB	Chest to Dash/Seat Back	558		298	
CS		Chest to Steering Wheel	371			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	135	20.2	116	0.0
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	146	23.3	118	0.0
PAX°	PAX°	Pelvic Tilt Angle X		23.1		15.3
	PAY°	Pelvic Tilt Angle Y				0.3
PHX	PHX	Hip Point to Striker (X-Axis)	203		457	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	152		288	

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

Test Vehicle: 2020 Toyota Tacoma Extended Cab Truck  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20205105  
 Test Date: 5/28/2020



*FRONT VIEW OF DUMMY*

**DUMMY LATERAL CLEARANCE DIMENSION INFORMATION**

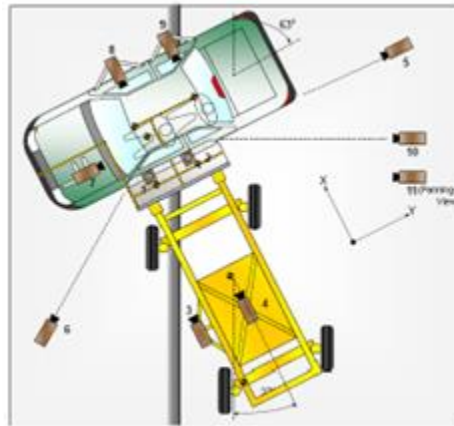
Code	Measurement Description	Units	Driver (Serial No. F034)	Passenger (Serial No. DG8012)
HR	Head to Side Header	mm	199	242
HS	Head to Side Window	mm	322	387
AD	Arm to Door	mm	90	161
HD	Hip Point to Door	mm	170	138



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

Test Vehicle: 2020 Toyota Tacoma Extended Cab Truck  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20205105  
 Test Date: 5/28/2020



**CAMERA LOCATIONS AND DATA**

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	0	0	-8353	12.5	1000
2	Overhead Close-up	0	584	-8353	28	1000
3	Left Impact Point (MDB)	-1470	0	-847	25	1000
4	Side Overall (MDB)	-1140	878	-1587	8	1000
5	Rear	0	9616	-2190	24	1000
6	Left Front	-2988	-4971	-1397	24	1000
7	Driver Front (OB)				25	1000
8	Driver Side (OB)				12.5	1000
9	Passenger Side (OB)				12.5	1000
10	Real-time Left Rear				Zoom	60
11	Real-time In run				Zoom	60

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

If applicable, explain why camera(s) did not operate as intended: Non-struck side curtain airbag  
Fired blocking profile onboard camera views for driver and rear passenger.

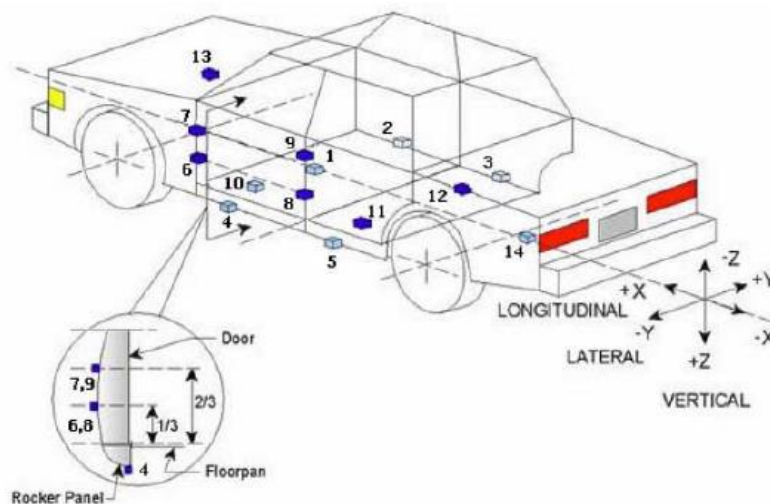
**INSTRUMENTATION**

Driver Dummy Channels	16
Passenger Dummy Channels	16
Vehicle Structure Accelerometers	23
MDB Accelerometers	7
<b>Total</b>	<b>62</b>

**DATA SHEET NO. 6**  
**TEST VEHICLE ACCELEROMETER LOCATIONS**

Test Vehicle: 2020 Toyota Tacoma Extended Cab Truck  
Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20205105  
Test Date: 5/28/2020



**TEST VEHICLE ACCELEROMETER LOCATIONS**

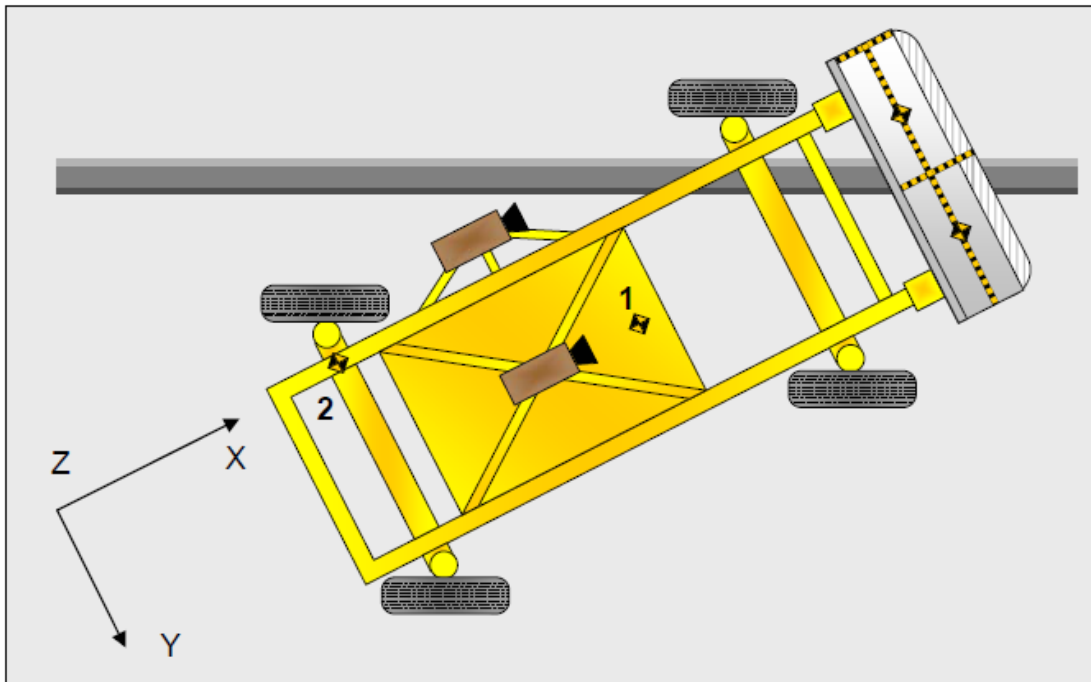
No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	3262	37	-293
2	Right Sill at Front Seat	3440	709	-42
3	Right Sill at Rear Seat	2587	704	-50
4	Left Sill at Front Door	3436	-705	-40
5	Left Sill at Rear Door	2564	-696	-46
6	A-Post Lower	3876	-663	-281
7	A-Post Middle	3775	-672	-761
8	B-Post Lower	2860	-696	-379
9	B-Post Middle	2828	-694	-663
10	Front Seat Track	3044	-573	-45
11	Rear Seat Structure	4636	84	-508
12	Rt. Rear Occ. Compartment	2595	428	-16
13	Engine Block	4636	85	-508
14	Rear Above Axle	1200	2	-265

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

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

Test Vehicle: 2020 Toyota Tacoma Extended Cab Truck  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20205105  
 Test Date: 5/28/2020



**MDB ACCELEROMETER LOCATIONS**

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

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

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

Test Vehicle: 2020 Toyota Tacoma Extended Cab Truck  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20205105  
 Test Date: 5/28/2020

**TEST DUMMY INFORMATION AND CONTACT POINTS**

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

**POST-TEST DOOR PERFORMANCE**

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

**POST-TEST SEAT PERFORMANCE**

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

**POST-TEST STRUCTURAL OBSERVATIONS**

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	B-Pillar Buckled
Sill Separation	None
Windshield Damage	None
Side Window Damage	None
Other Notable Effects	None

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

Test Vehicle: 2020 Toyota Tacoma Extended Cab Truck  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20205105  
 Test Date: 5/28/2020

**SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION**

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

**IMPACT POINT LOCATION DATA**

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		3254
Vertical Impact Reference Line (Aft of Front Axle - Intended Impact Point)	mm		1346
Actual Impact Point (Aft of Frontal Axle)	mm		1346
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact Point	0
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact Point	0

**DATA SHEET NO. 9  
MDB SUMMARY OF RESULTS**

Test Vehicle: 2020 Toyota Tacoma Extended Cab Truck  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20205105  
 Test Date: 5/28/2020

**MDB SPECIFICATIONS**

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

**MDB WEIGHTS**

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

**SPEED AND ANGLE AT IMPACT DATA**

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.10 to 62.70	61.81
Trap No. 2 Velocity (Redundant)	km/h	61.10 to 62.70	61.82
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90.0
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	63.0
MDB Crabbed angle to MDB Forward Line of Motion	degrees	26.0 to 28.0	27.0

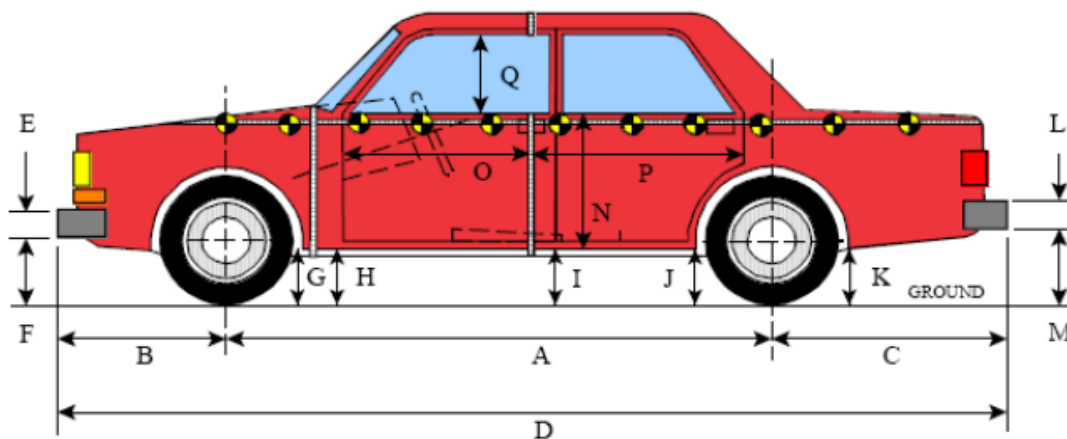
**MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE**

Vertical Location			From Centerline		Maximum Crush (mm)
Row	Description	Height (mm)	Distance (mm)	Direction	
A	Center of Bumper	432	800	Left	131
B	Top of Bumper	533	800	Left	146
C	Mid-Level	686	800	Right	205
D	Top of Stack	813	800	Right	223

**DATA SHEET NO. 10  
TEST VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2020 Toyota Tacoma Extended Cab Truck  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20205105  
 Test Date: 5/28/2020



**LEFT SIDE VIEW**

All MEASUREMENTS IN (mm) WITH TOLERANCE OF  $\pm 3$ mm

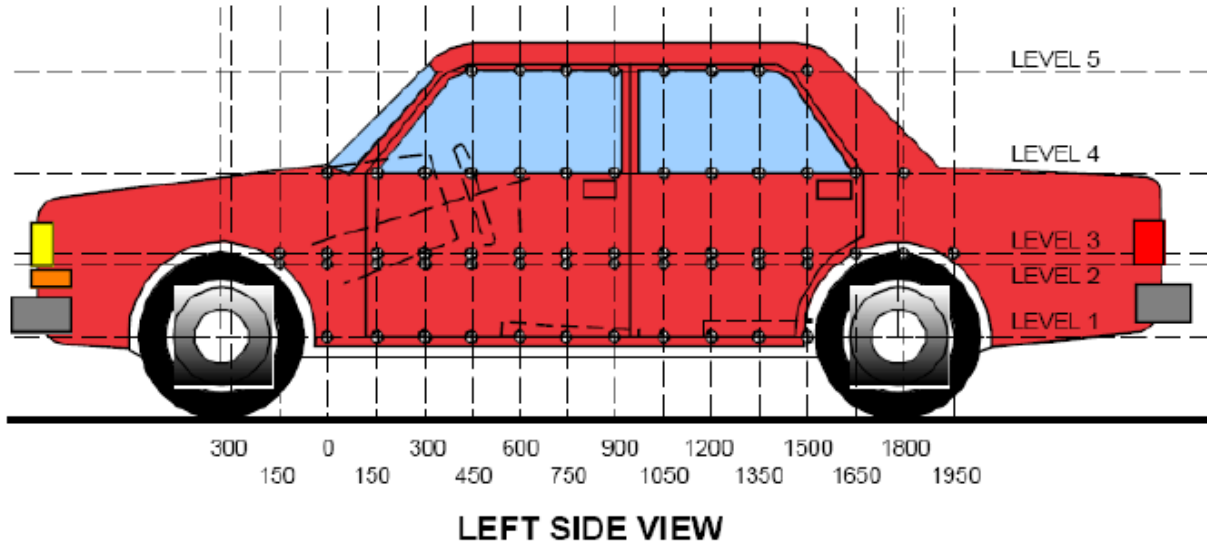
**VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION**

Code	Description	Pre-Test	Post-Test	Difference
A	Wheelbase	3254	3254	0
B	Front Axle to FSOV	919	930	11
C	Rear Axle to RSOV	1204	1191	-13
D	Total Length at Centerline	5378	5373	-5
E	Front Bumper Thickness	117	117	0
F	Front Bumper Bottom to Ground	519	529	10
G	Sill Height at Front Wheel Well	442	438	-4
H	Sill Height at Front Door Leading Edge	445	437	-8
I	Sill Height at B Pillar	457	446	-11
J1	Sill Height at Rear Wheel Well	454	446	-8
J2	Pinch Weld Height at Rear Wheel Well	425	435	10
K	Sill Height Aft of Rear Wheel Well	462	485	23
L	Rear Bumper Thickness	196	196	0
M	Rear Bumper Bottom to Ground	486	486	0
N	Sill Height to Window Bottom of Front Window Sill	727	724	-3
O	Front Door Leading Edge to Impact CL	745	744	-1
P	Rear Door Trailing Edge to Impact CL	995	968	-27
Q	Front Window Opening	446	444	-2
R	Right Side Length	5354	5333	-21
S	Left Side Length	5347	5328	-19
T	Maximum Vehicle Width	1802	1652	-150

**DATA SHEET NO. 11**  
**TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2020 Toyota Tacoma Extended Cab Truck  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20205105  
 Test Date: 5/28/2020



**MAXIMUM EXTERIOR CRUSH MEASUREMENTS**

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	524	159	1350
2	Driver Hip Point	mm	834	148	600
3	Mid-Door	mm	908	125	600
4	Window Sill	mm	1197	44	1200
5	Window Top	mm	1705	-8	1350

\*window top level bent outward from original position

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



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

Test Vehicle: 2020 Toyota Tacoma Extended Cab Truck  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20205105  
 Test Date: 5/28/2020

**EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL**

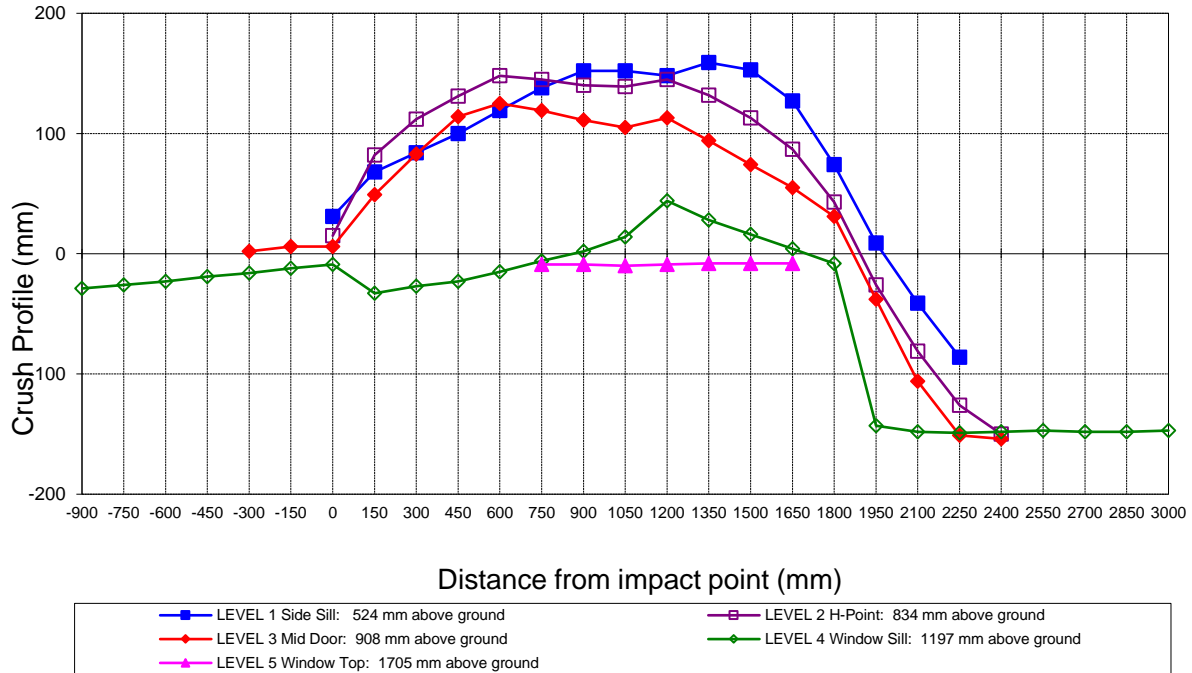
	Pre-Test					Post-Test					Difference					
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	
-900				748					777						-29	
-750				780					806						-26	
-600				797					820						-23	
-450				808					827						-19	
-300			940	816				938	832				2	-16		
-150			932	823				926	835				6	-12		
0	903	923	923	829		872	908	910	838		31	15	13	-9		
150	857	900	895	835		789	818	846	868		68	82	49	-33		
300	852	890	891	840		768	778	808	867		84	112	83	-27		
450	852	890	892	843		752	759	778	866		100	131	114	-23		
600	852	892	894	848		733	744	769	863		119	148	125	-15		
750	853	892	895	852	621	715	747	776	858	630	138	145	119	-6	-9	
900	854	894	896	855	642	702	754	785	853	651	152	140	111	2	-9	
1050	853	895	897	857	648	701	756	792	843	658	152	139	105	14	-10	
1200	852	896	898	860	652	704	751	785	816	661	148	145	113	44	-9	
1350	849	895	898	861	654	690	763	804	833	662	159	132	94	28	-8	
1500	847	894	897	863	654	694	781	823	847	662	153	113	74	16	-8	
1650	842	892	895	862	650	715	805	840	858	658	127	87	55	4	-8	
1800	834	879	883	853		760	836	852	861		74	43	31	-8		
1950	820	869	873	843		811	895	911	986		9	-26	-38	-143		
2100	819	878	879	842		860	959	985	990		-41	-81	106	-148		
2250	866	905	902	841		952	1031	1053	990		-86	126	151	-149		
2400		931	930	842			1081	1084	990			150	154	-148		
2550				843					990					147		
2700				845					993					-148		
2850				848					996					-148		
3000				851					998					-147		

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

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

Test Vehicle: 2020 Toyota Tacoma Extended Cab Truck  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20205105  
 Test Date: 5/28/2020

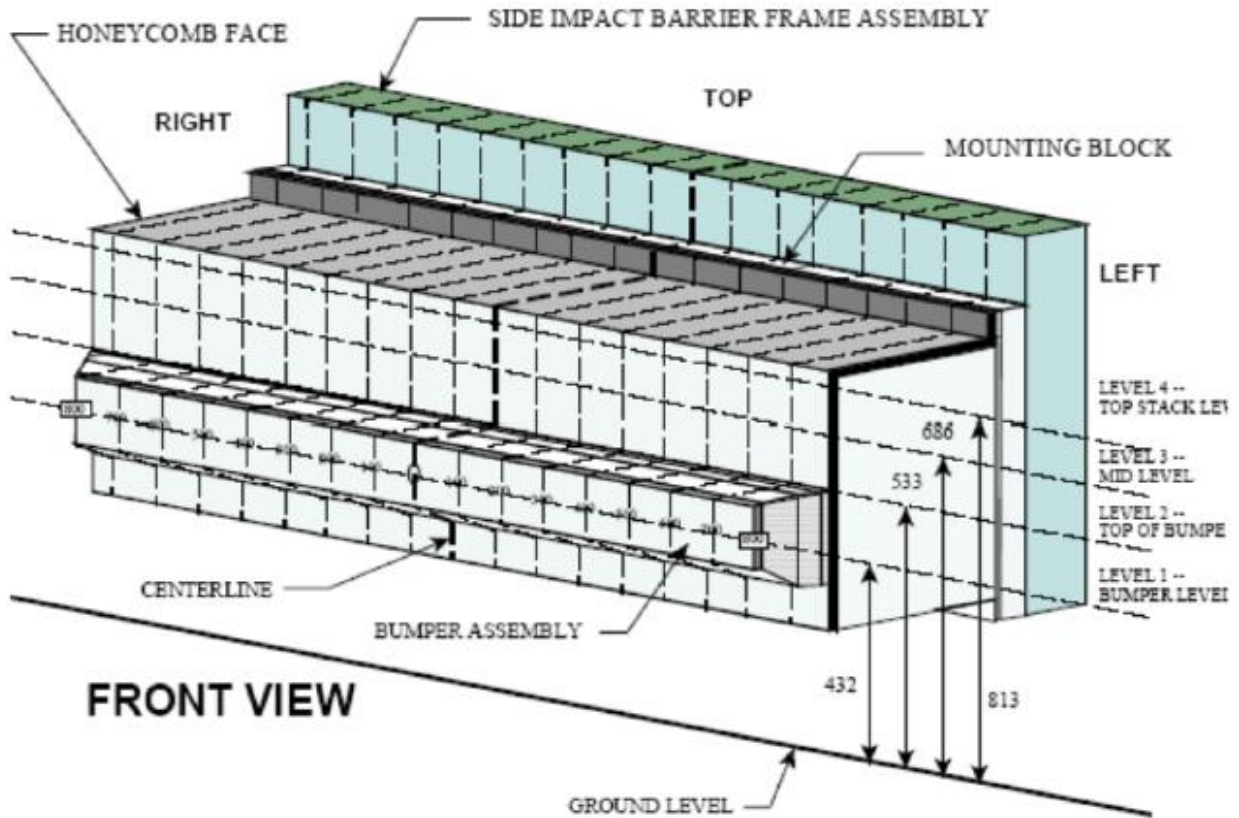


**Vehicle Exterior Crush Measurements - Visual Representation**

**DATA SHEET NO. 12  
MDB EXTERIOR STATIC CRUSH MEASUREMENTS**

Test Vehicle: 2020 Toyota Tacoma Extended Cab Truck  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20205105  
 Test Date: 5/28/2020



NOTE: Dimensions are shown in millimeters, mm

**DEFORMABLE BARRIER STATIC CRUSH**

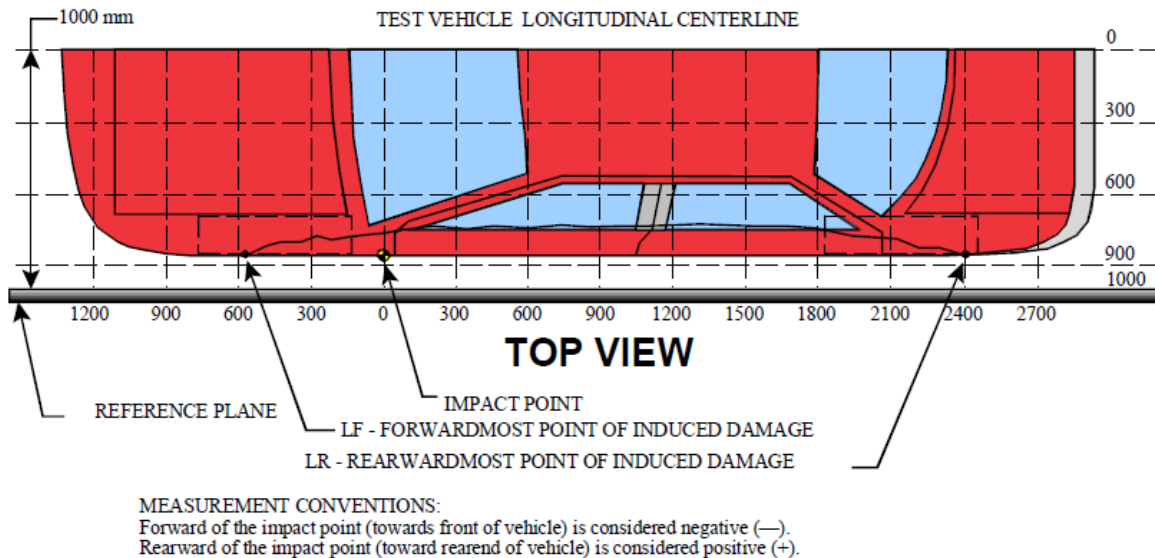
Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100		0	100	200	300	400	500	600	700
1	87	73	61	51	43	40	39	41	44	48	54	62	72	84	96	107	131
2	144	111	75	54	47	54	61	44	44	46	54	65	78	92	109	121	146
3	205	143	111	76	62	69	99	82	58	41	33	39	49	59	74	99	146
4	223	180	148	123	102	89	122	89	73	64	60	61	65	76	97	111	145

**DATA SHEET NO. 13  
VEHICLE AND MDB DAMAGE PROFILE DISTANCES**

Test Vehicle: 2020 Toyota Tacoma Extended Cab Truck  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20205105  
 Test Date: 5/28/2020

For guidance regarding damage profile distance measurements, please refer to the latest version of the *NHTSA Test Reference Guide, Volume 1: Vehicle Tests*.



**VEHICLE DAMAGE PROFILE DISTANCES**

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	-300	3	62	60	2
2	240	3	177	107	70
3	780	3	222	105	117
4	1320	3	200	102	98
5	1860	3	124	121	3
6	2400	3	-84	70	-154

**MDB DAMAGE PROFILE DISTANCES**

DPD	Distance From Center of MDB	Level	Post-Test (mm)*
1	800 mm left of center	1	131
2	480 mm left of center	1	82
3	160 mm left of center	1	52
4	160 mm right of center	1	40
5	480 mm right of center	1	49
6	800 mm right of center	1	87

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

Test Vehicle:	<u>2020 Toyota Tacoma Extended Cab Truck</u>	NHTSA No.:	<u>M20205105</u>
Test Program:	<u>NCAP Side MDB Impact Test</u>	Test Date:	<u>5/28/2020</u>
Test Time:	<u>10:55 AM</u>	Temperature:	<u>21°C</u>

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

**FMVSS NO. 301 STATIC ROLLOVER DATA**



**ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS**

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	68	300	368
90° to 180°	67	300	367
180° to 270°	68	300	368
270° to 360°	69	300	369

**FMVSS NO. 301 ROLLOVER SPILLAGE TABLE**

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

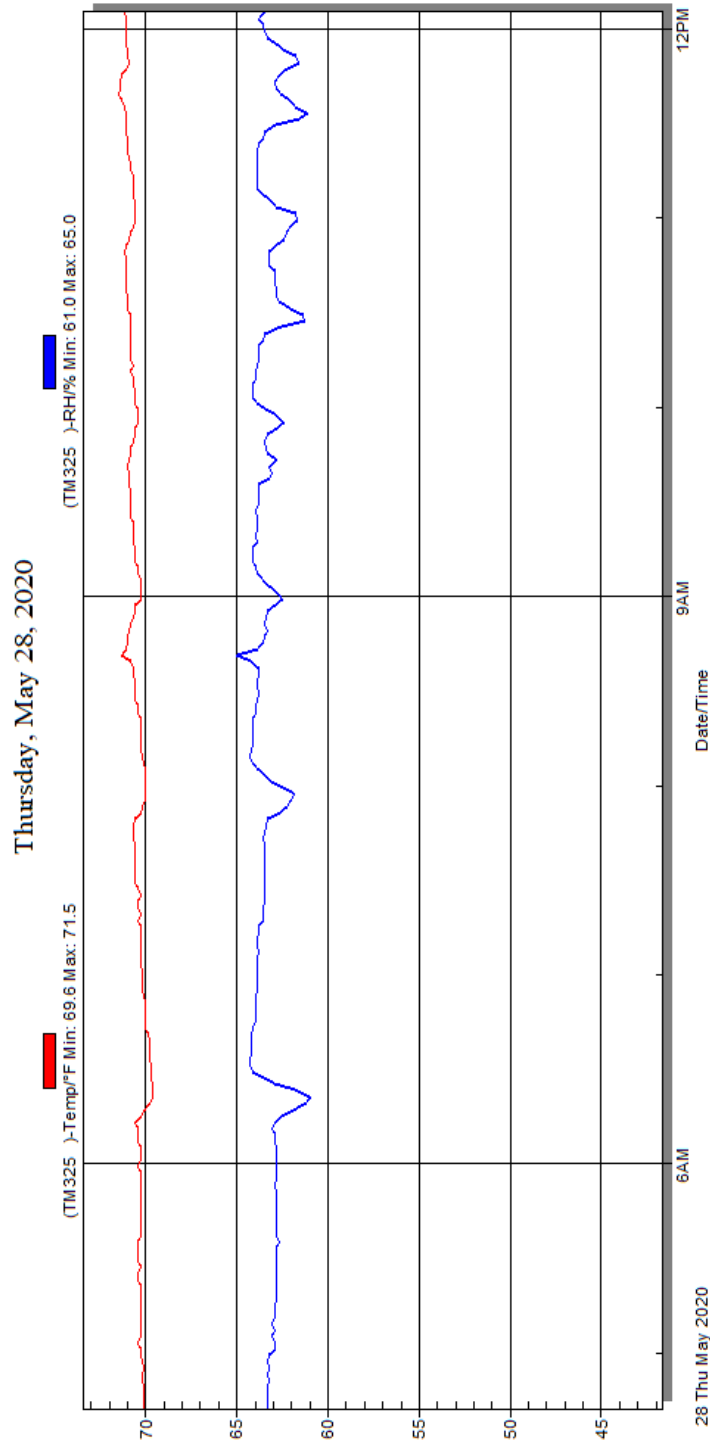
**ROLLOVER SOLVENT SPILLAGE LOCATION TABLE**

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

**DATA SHEET NO. 15**  
**DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA**

Test Vehicle: 2020 Toyota Tacoma Extended Cab Truck  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: M20205105  
 Test Date: 5/28/2020



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

**APPENDIX A**  
**PHOTOGRAPHS**

## TABLE OF PHOTOGRAPHS

Fig.	Description	Page
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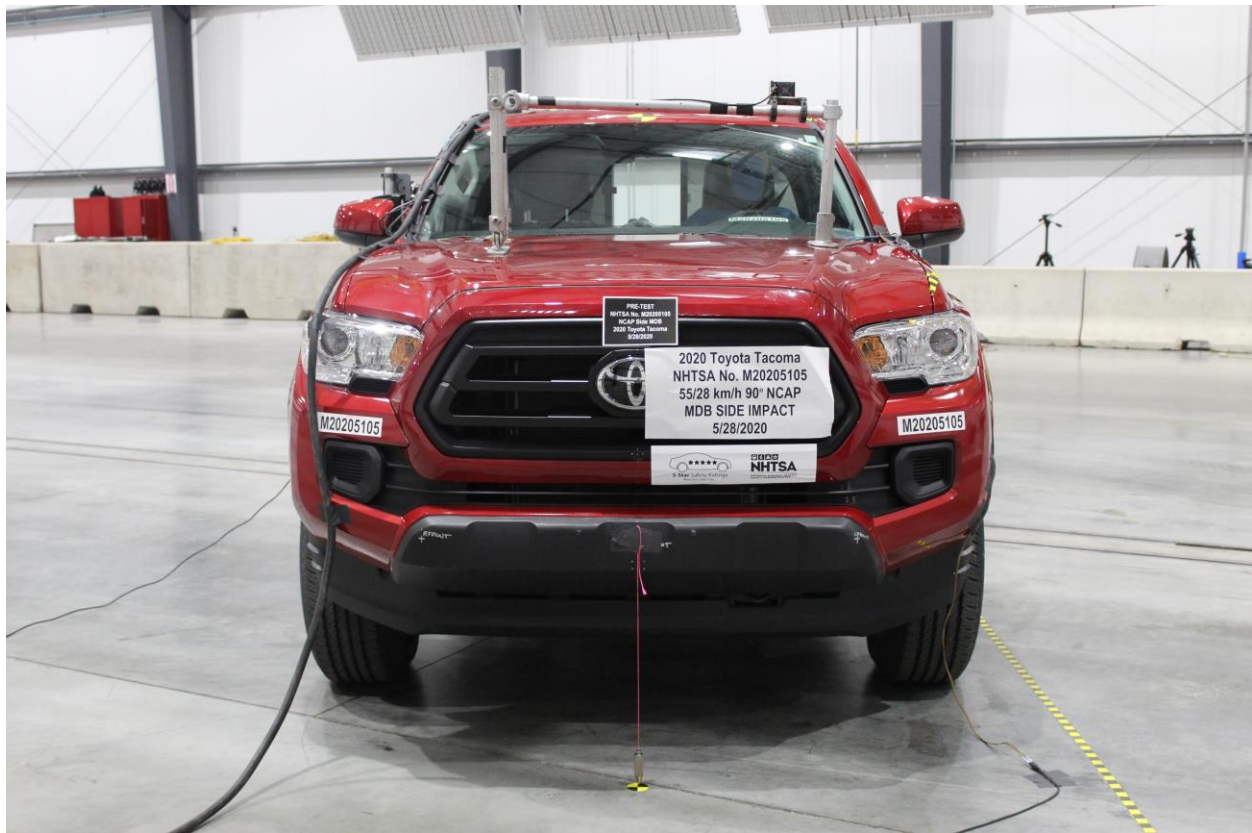


**Figure A-1: As-Delivered Right Front 3/4 View of Test Vehicle**



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





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



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





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



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





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



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





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



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



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



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





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

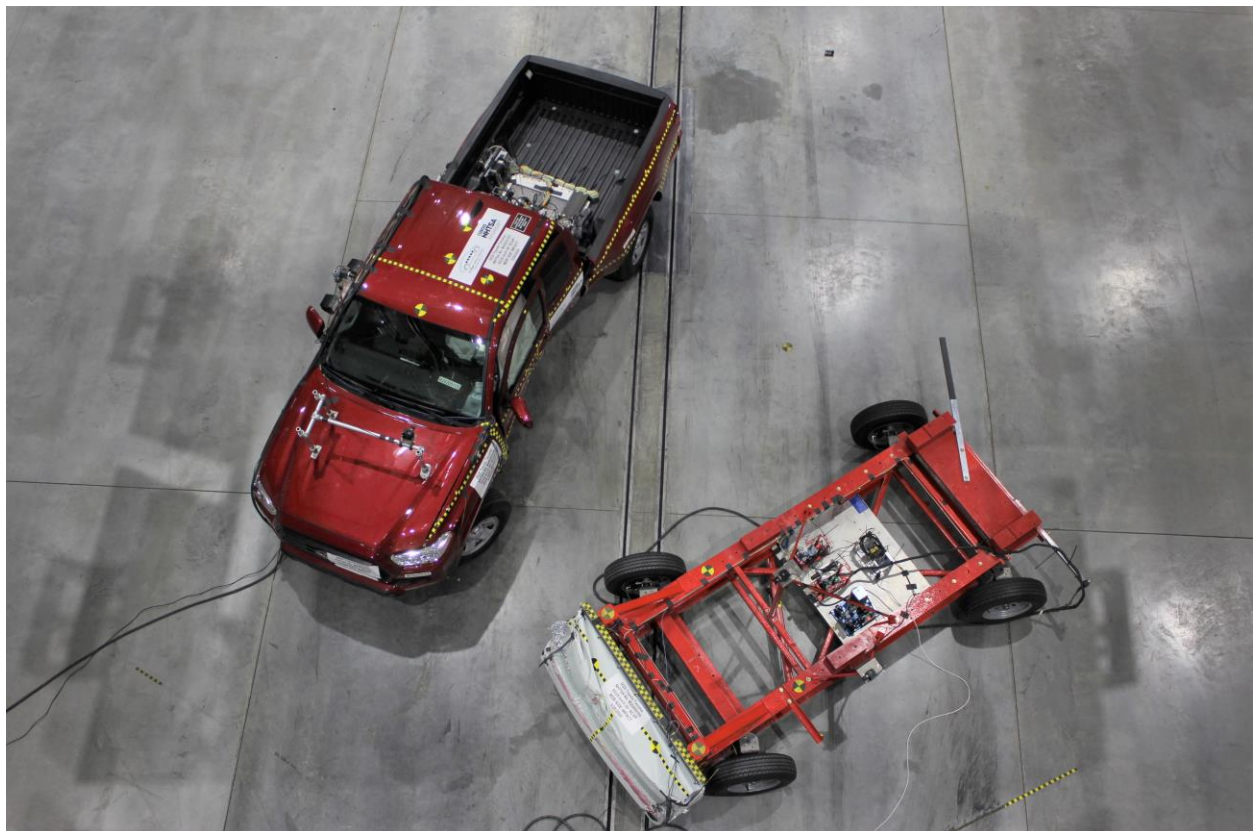


**Figure A-14: Post-Test Right Side View of Test Vehicle**





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



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



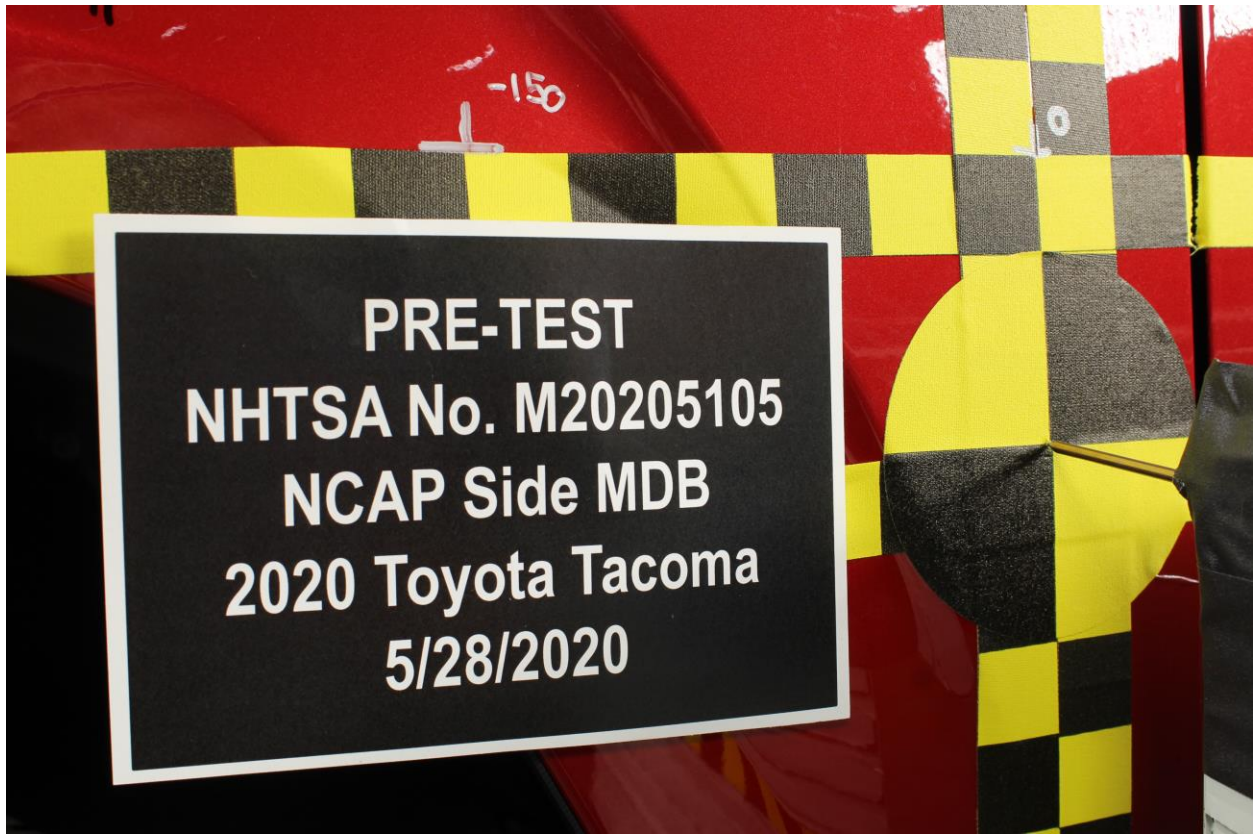


**Figure A-17: Pre-Test Left Side View of MDB Positioned Against Side of Test Vehicle**



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





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



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





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



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

**Photo Not Applicable**

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

**Photo Not Applicable**

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





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



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





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

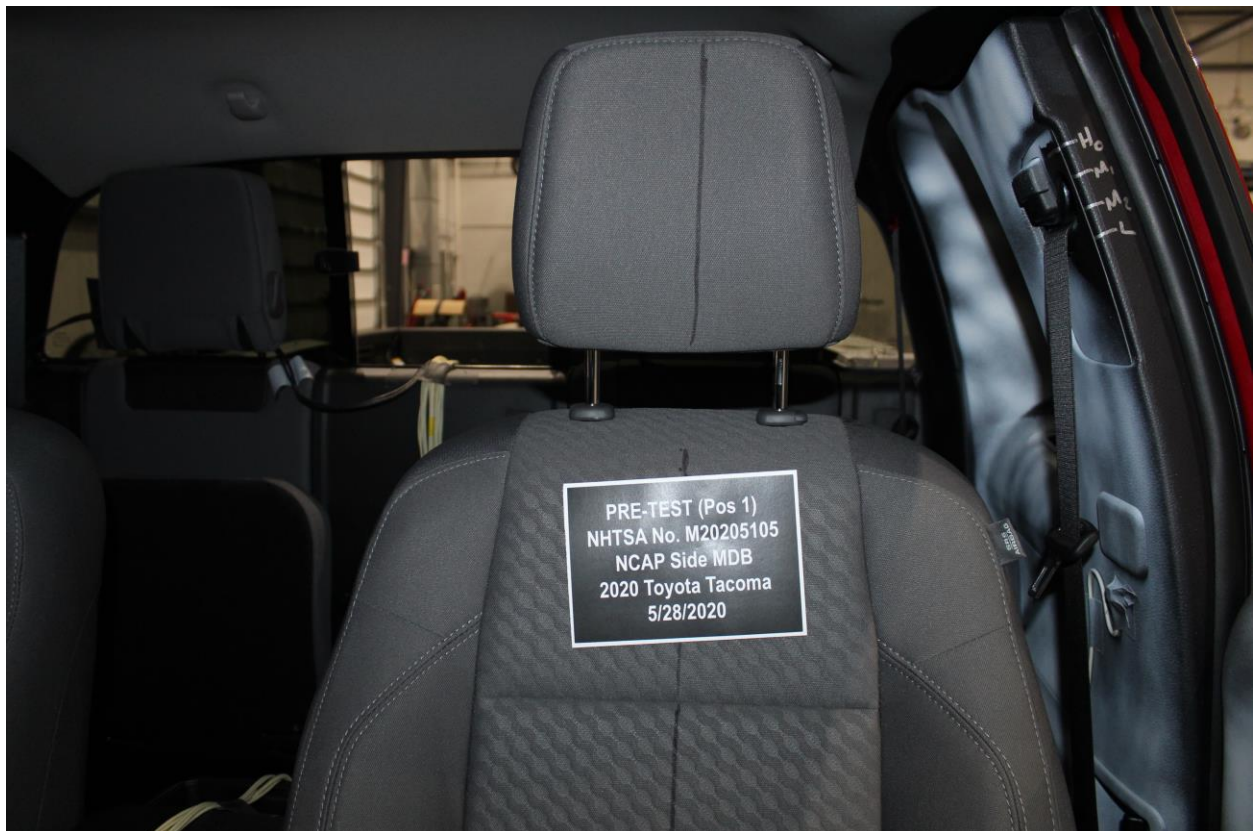


**Figure A-28: Pre-Test Left Side View of Driver Dummy Shoulder and Door Top View**





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



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



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

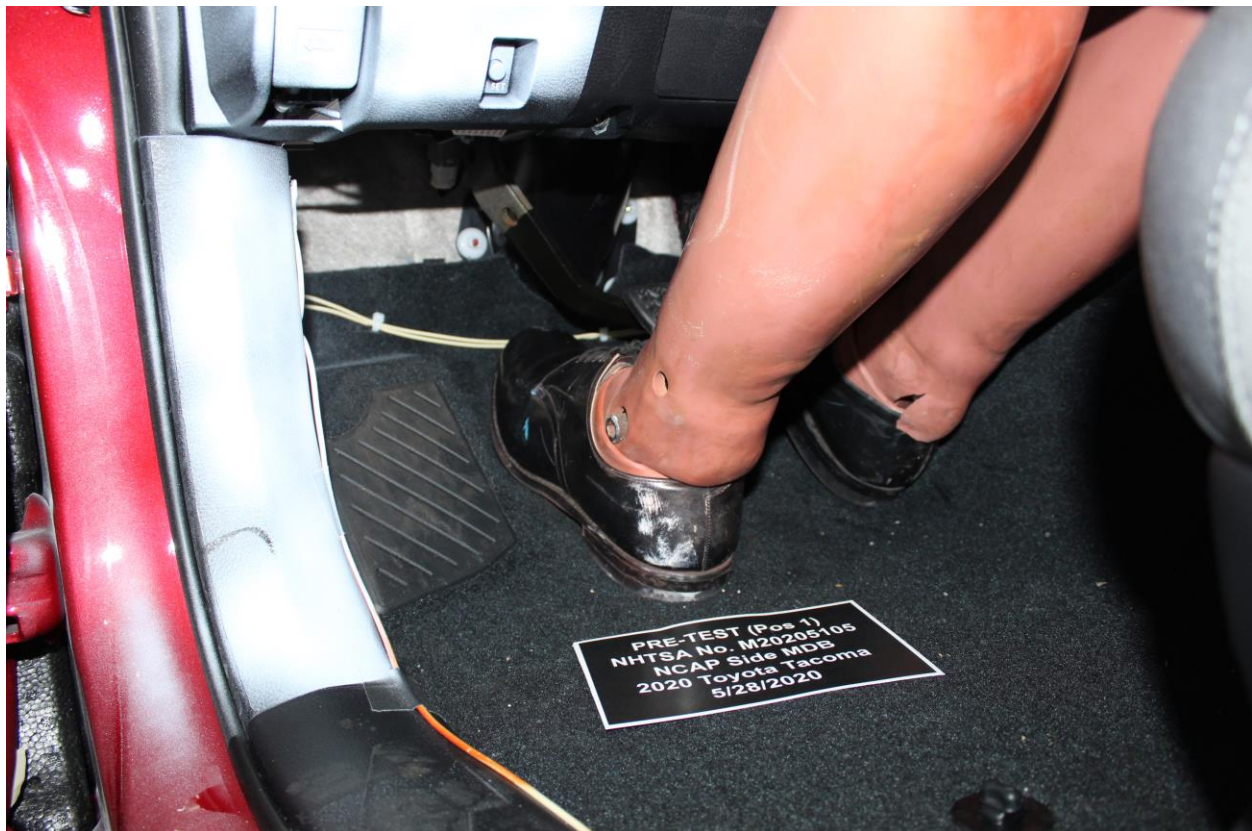


**Figure A-32: Pre-Test Frontal View of Driver Seat Pan Prior to Dummy Positioning**





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



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





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



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



**Figure A-37: View of Disengaged Parking Brake**



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





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

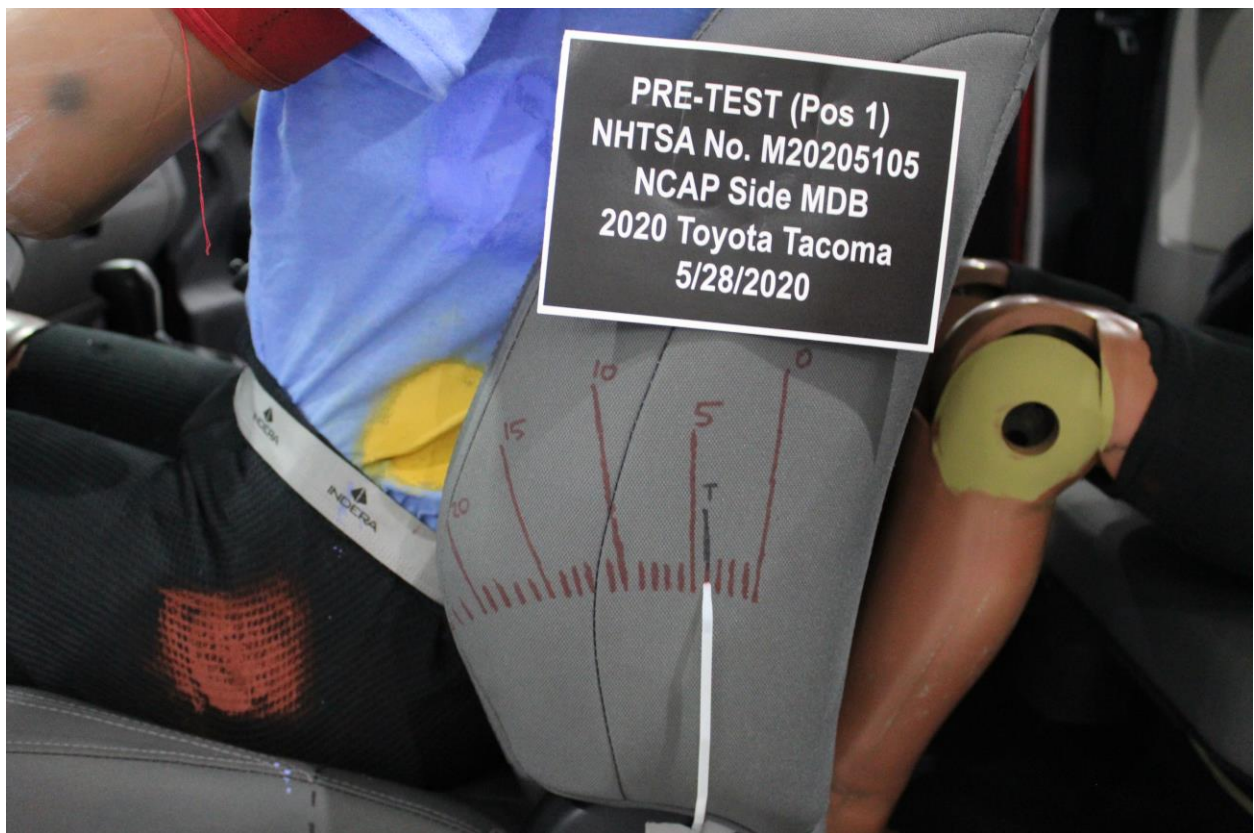


Figure A-40: Pre-Test Close-Up Left Side View of Driver Seat Back





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



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





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



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





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



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





**Figure A-47: Post-Test Driver Inner Door Panel View Showing Driver Dummy Contact Locations**



**Figure A-48: Post-Test Driver Dummy Close-Up Head Contact with Vehicle View**





**Figure A-49: Post-Test Driver Dummy Close-Up Head Contact with Side Air bag View**

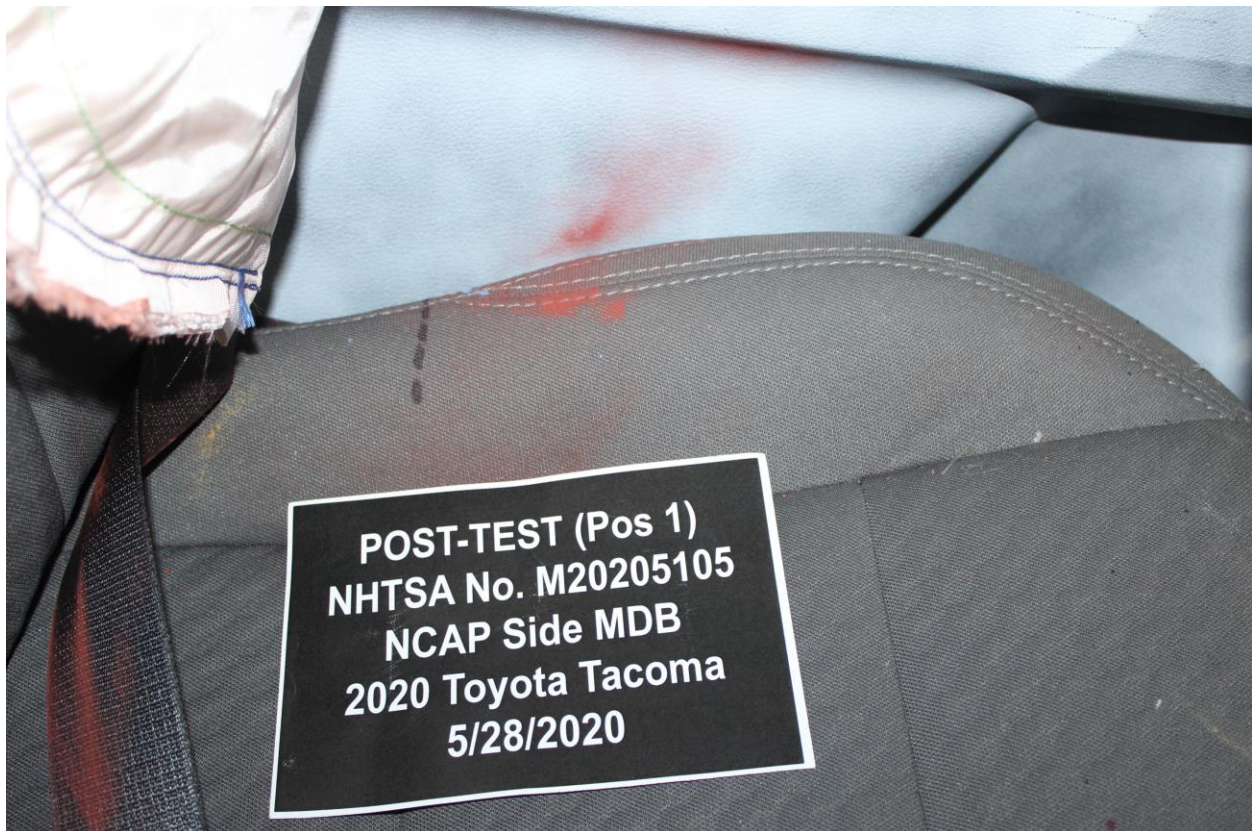


**Figure A-50: Post-Test Driver Dummy Close-Up Torso Contact with Vehicle Interior View**



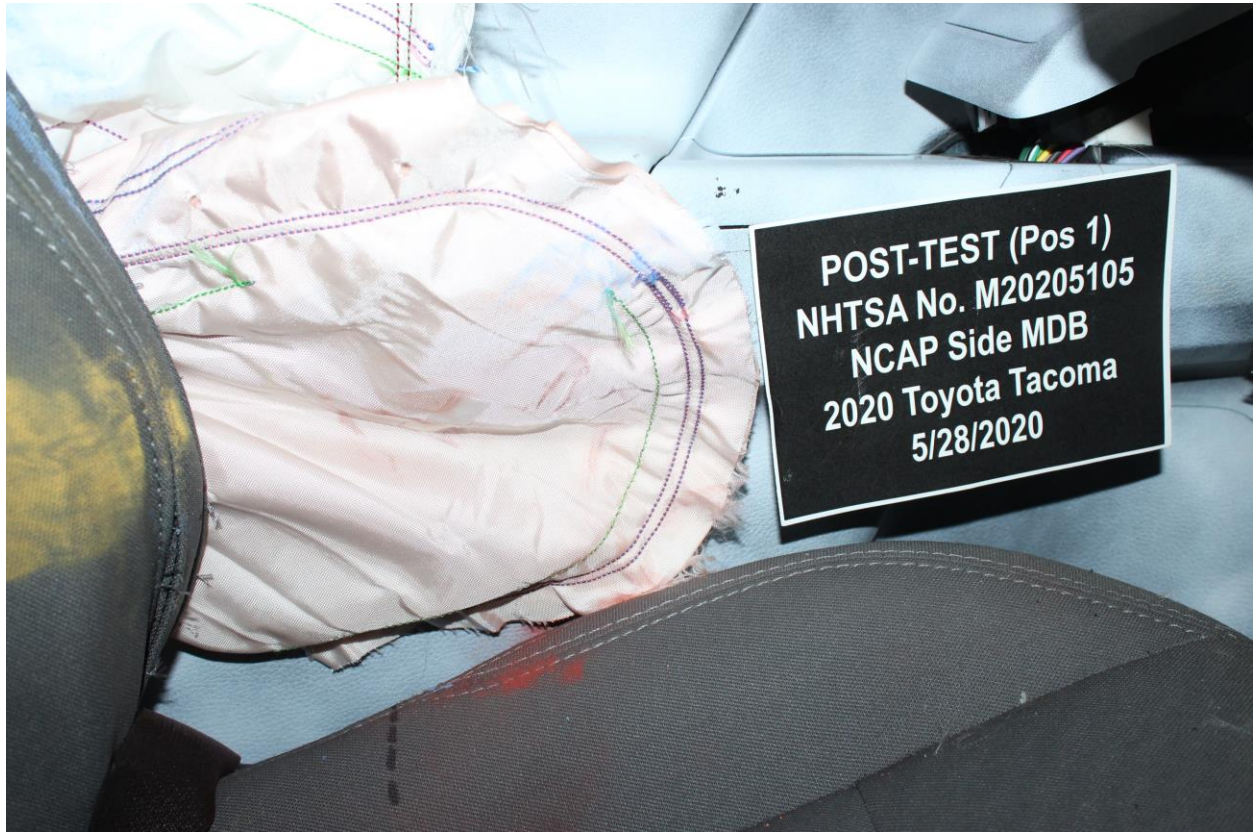


**Figure A-51: Post-Test Driver Dummy Close-Up Torso Contact with Side Air bag View**



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





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



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





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



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



**Figure A-57: Post-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View**



**Figure A-58: Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning**





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



**Figure A-60: Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning**





**Figure A-61: Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan**



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





**Figure A-63: Pre-Test View of Rear Passenger Dummy's Head Showing Dummy's Head is Level**



**Figure A-64: Pre-Test Placement of Rear Passenger Dummy's Feet**





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

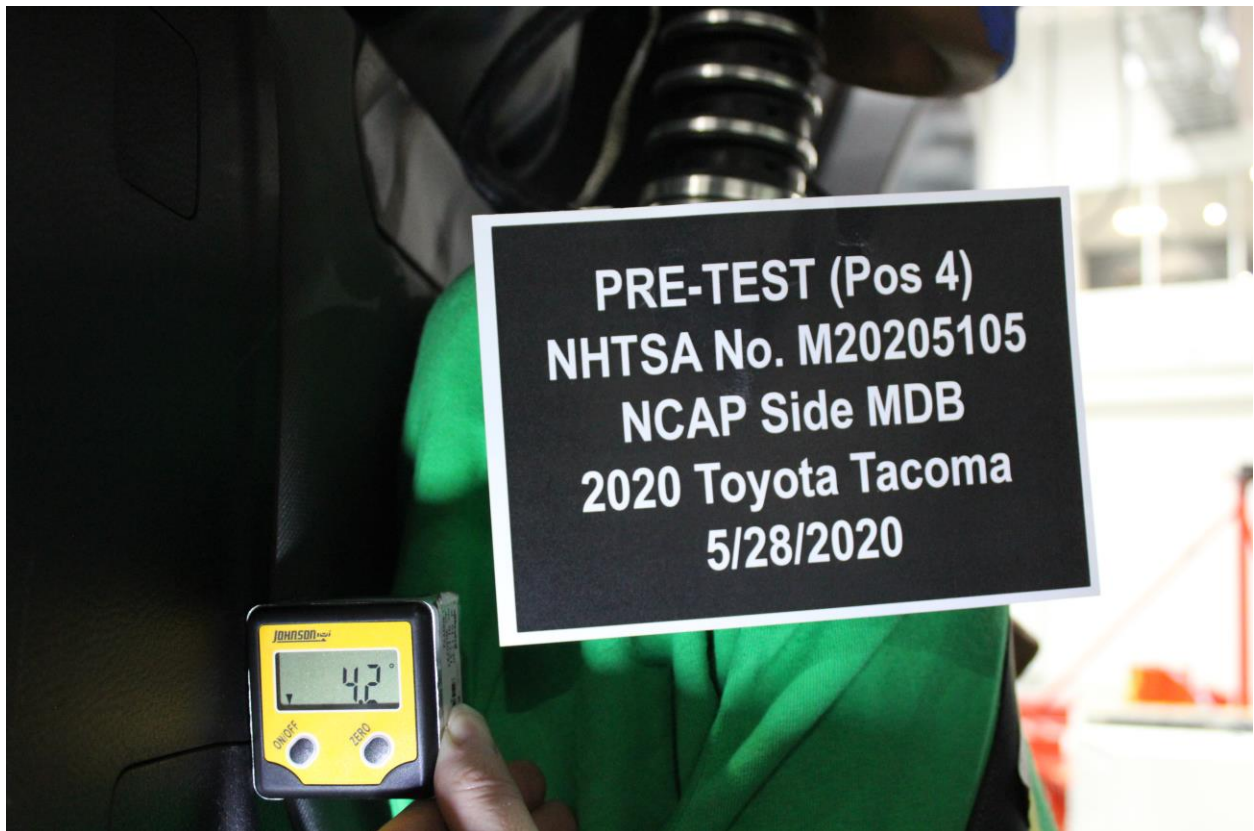


**Figure A-66: Pre-Test Close-Up Left Side View of Rear Passenger Seat Track**





**Figure A-67: Pre-Test Close-Up Left Side View of Rear Passenger Seat Back**



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





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



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





**Figure A-71: Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment**



**Figure A-72: Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment**





**Figure A-73: Pre-Test Rear Passenger Inner Door Panel View**



**Figure A-74: Post-Test Rear Passenger Inner Door Panel View Showing Rear Passenger Dummy Contact Locations**



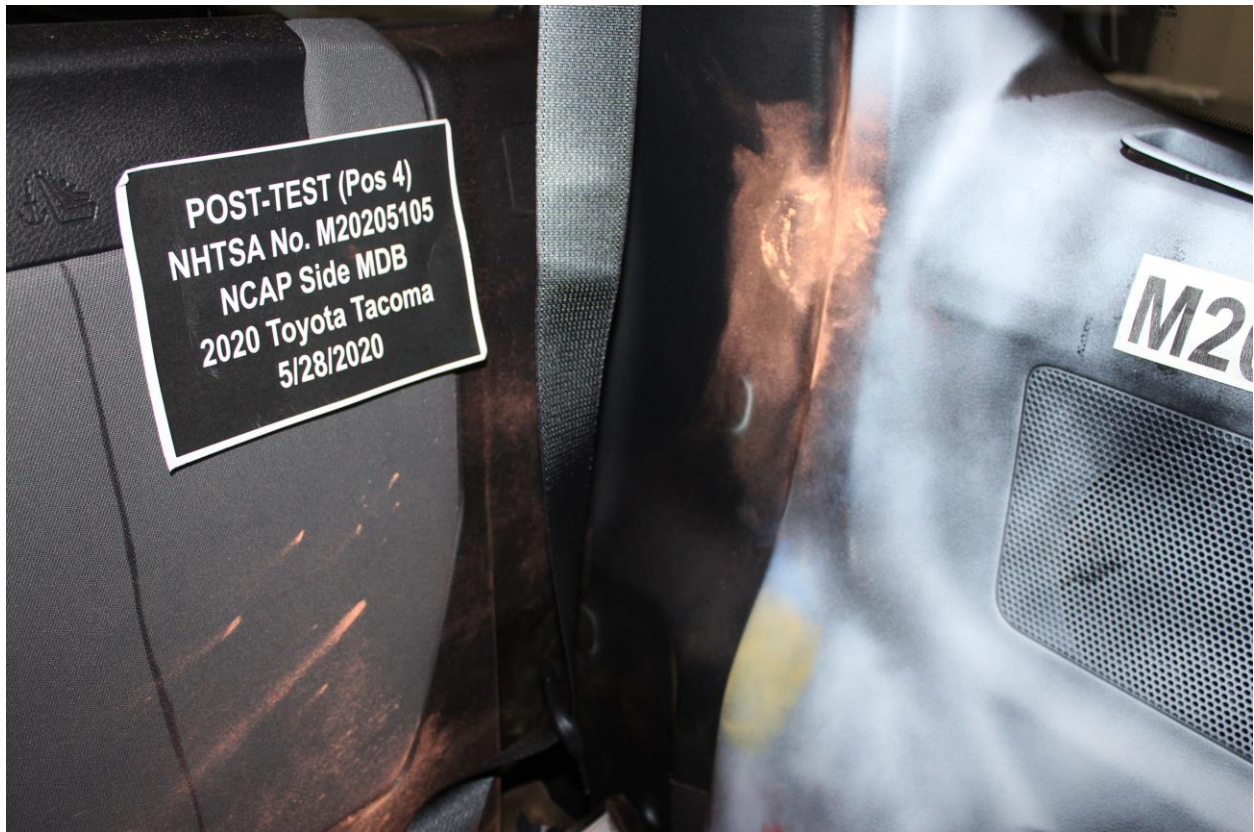


**Figure A-75: Post-Test Rear Passenger Dummy Close-Up Head Contact with Vehicle View**



**Figure A-76: Post-Test Rear Passenger Dummy Close-Up Head Contact with Side Air bag View**





**Figure A-77: Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Interior View**

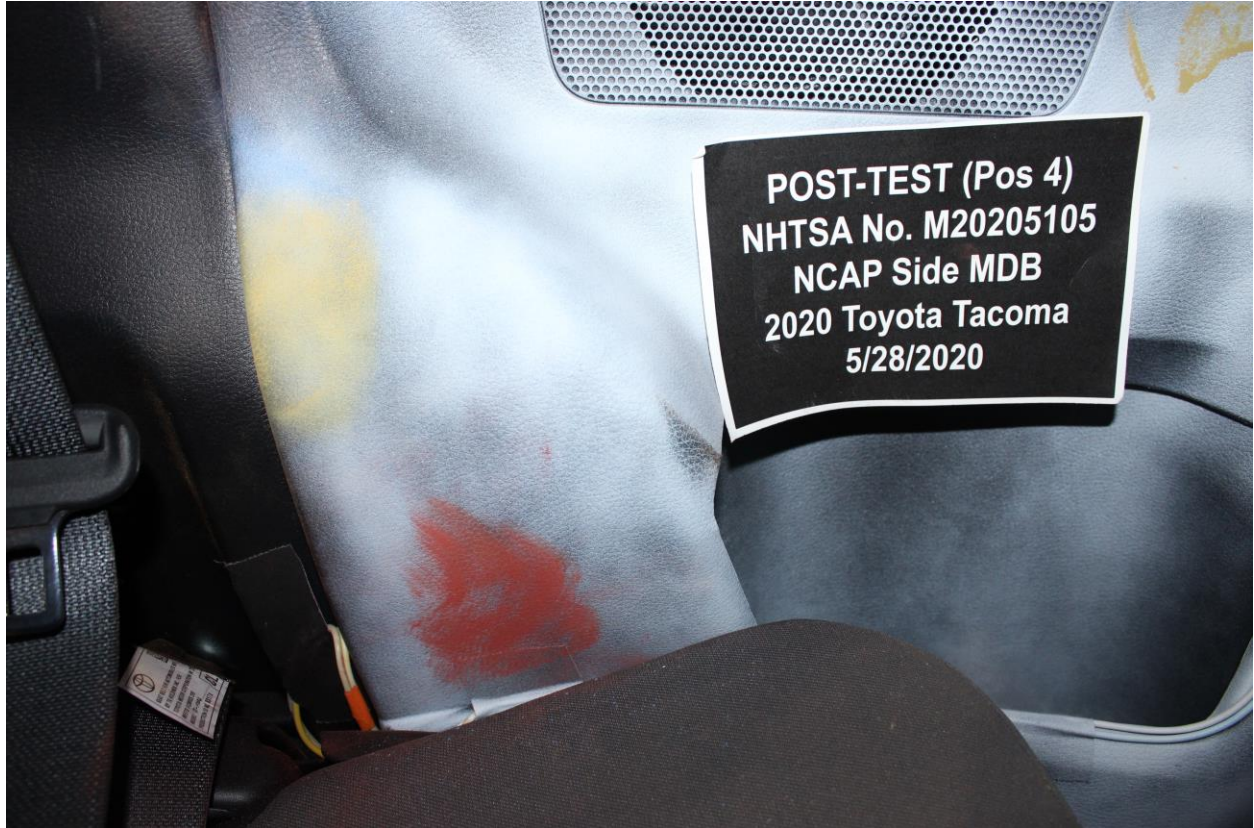


**Figure A-78: Post-Test Rear Passenger Dummy Close-Up Torso Contact with Side Air bag View**





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



**Figure A-80: Post-Test Rear Passenger Dummy Close-Up Pelvis Contact with Side Air bag View**





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



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





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



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



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



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





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



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





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



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





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

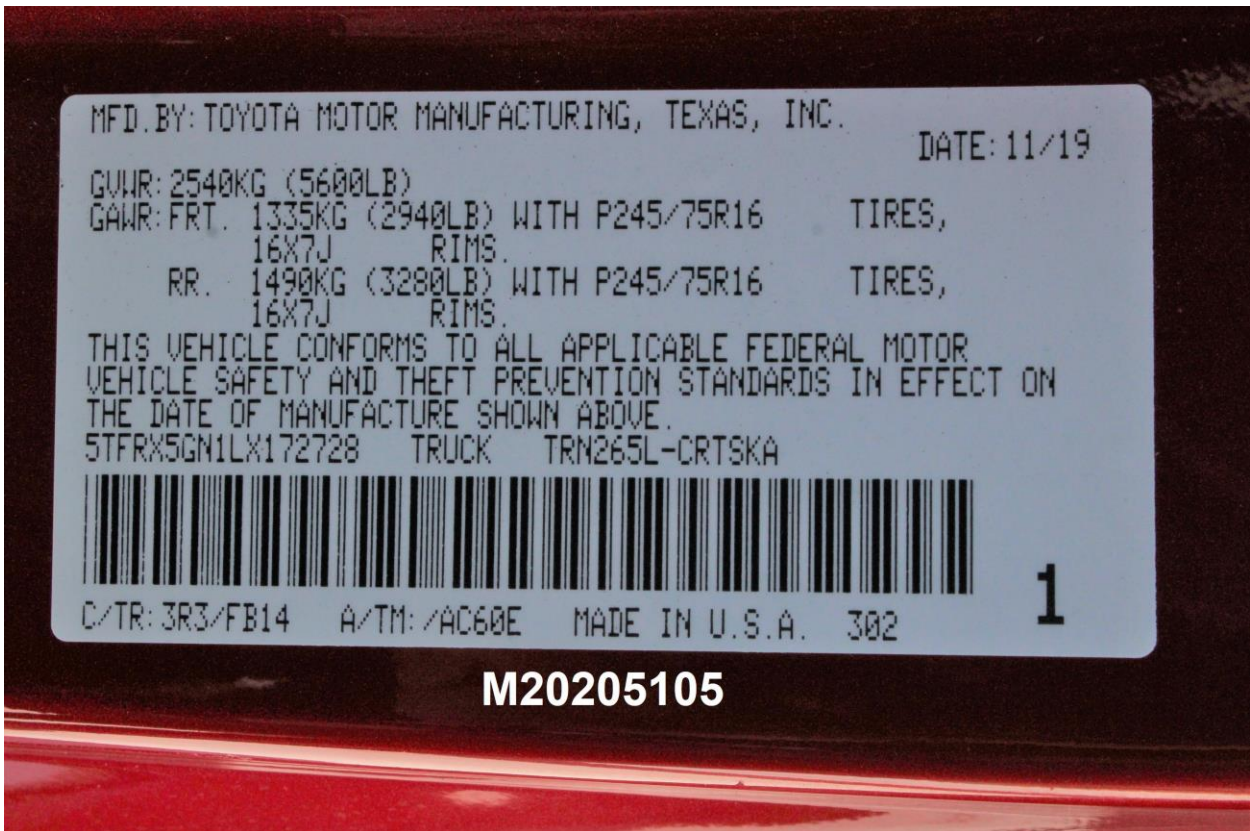


Figure A-92: Close-Up View of Vehicle's Certification Label



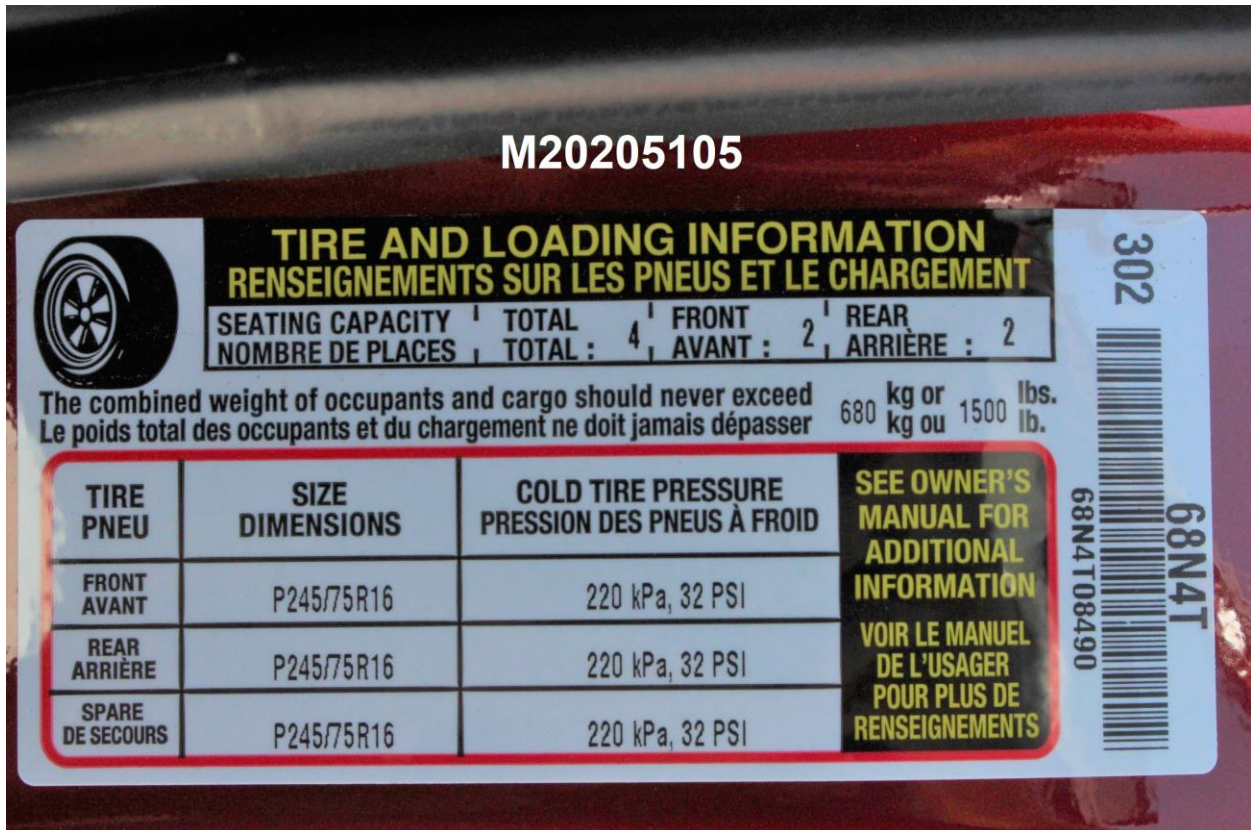


Figure A-93: Close-Up View of Vehicle's Tire Information Placard or Label



Figure A-94: Pre-Test Ballast View





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



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



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



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



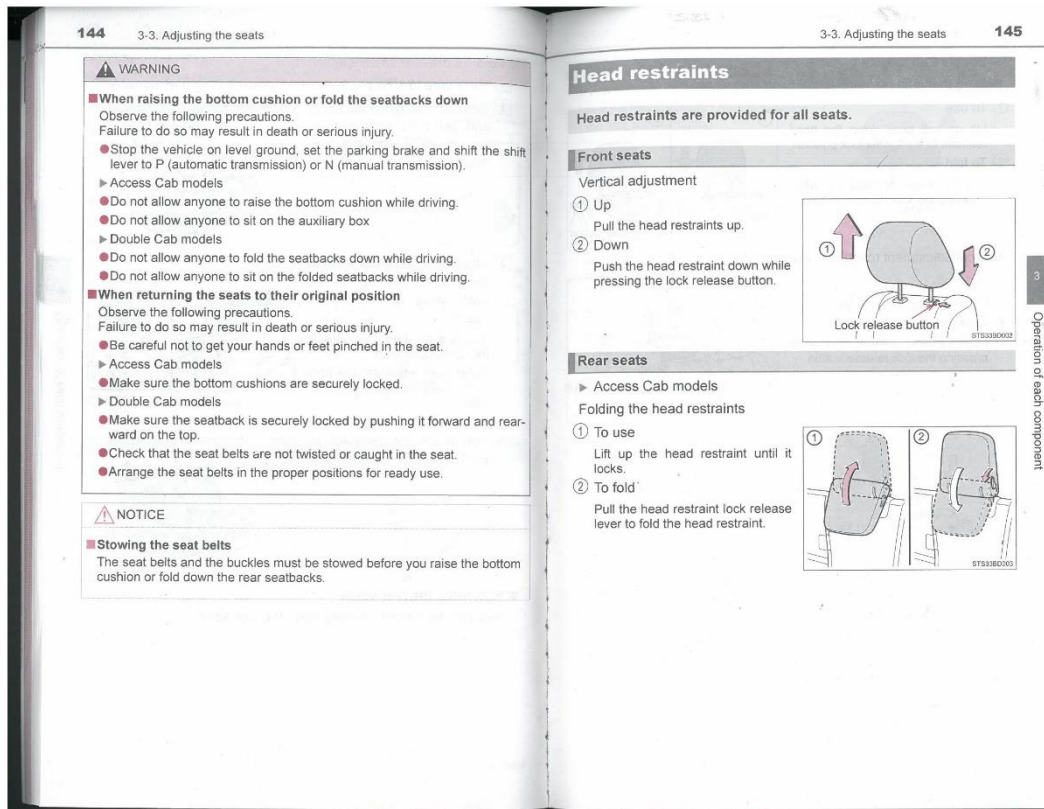




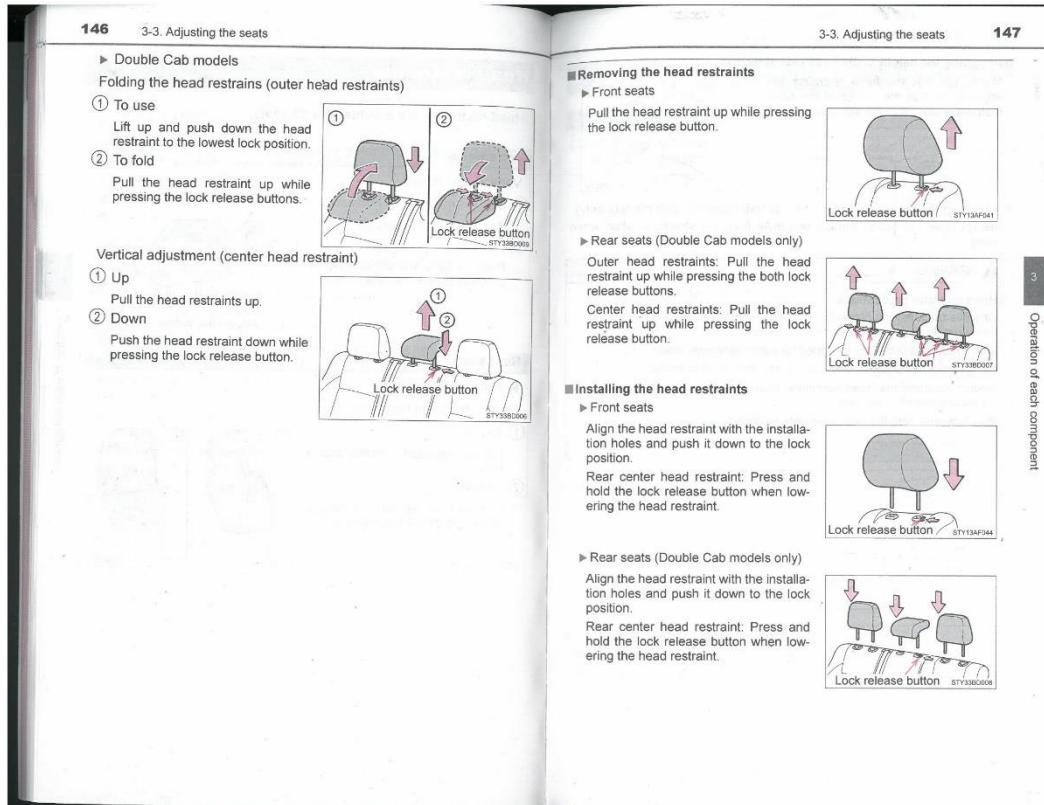
Figure A-101: Impact Event

<b>TOYOTA</b> Let's Go Places		<b>STANDARD EQUIPMENT</b>		<b>MANUFACTURER'S SUGGESTED RETAIL PRICE \$26,050.00</b>	
<b>MECHANICAL &amp; PERFORMANCE</b> - 2.7L I-4 18V 4Cyl Engine w/Dual VVTi 158hp @ 5200rpm/180 lb-ft @ 3800rpm - 8-Spd Automatic Transmission - Automatic Limited-Slip Differential		<b>SAFETY &amp; CONVENIENCE</b> - Toyota Safety Sense P: Pre-Collision Sys w/Pedestrian Detection, Dynamic Radar Cruise Control, Lane Departure Alert, Automatic High Beams - Star Safety System: Vehicle Stability Control, Traction Control, Anti-Lock Brake System with EBD, Brake Assist and Smart Stop Technology - Dr & Fr Pass Advanced Airbag System - Seat-Mounted Side & Side Curtain Airbags		<b>OPTIONAL EQUIPMENT</b> FE 50 State Emissions 230.00 LL SR Convenience Package: Remote Keyless Entry, Preferred Owner's Portfolio 110.00 DK Door Edge Guard 169.00 DS All Weather Floor Liners	
<b>GOVERNMENT 5-STAR SAFETY RATINGS</b> <b>Overall Vehicle Score Not Rated</b> Based on the combined ratings of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight.		<b>EXTERIOR</b> - 18" Styled Steel Wheels - Intermittent Wipers		<b>DELIVERY PROCESSING AND HANDLING FEE 1,120.00</b>	
<b>FRONTAL CRASH</b> Driver Not Rated Passenger Not Rated Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.		<b>INTERIOR</b> - Fabric Trim Seats w/Dr Lumbar Support - Audio, 7" Touch Screen, 8 Speakers, HandsFree Bluetooth Phone/Music, USB Media Port, USB Charge-Port, SiriusXM w/3-Month All Access Trial - Android Auto & Apple CarPlay Compatible - Connected Services: Safety Connect with 3-year Trial, Wi-Fi Connect with up to 2 GB within 3-mo Trial - Rear Backup Camera ***Full Tank of Gas***		<b>TOTAL \$27,679.00</b>	
<b>SALE PRICE \$1,950</b> Annual fuel cost. Fuel Economy & Greenhouse Gas Rating (tailpipe only) Smog Rating (tailpipe only).		<b>21 MPG</b> Small Pickup, ratings from 17 to 23 MPG. The best vehicle rate: 18 MPGe. combined city/hwy city highway 4.8 gallons per 100 miles		<b>You spend \$2,250 more in fuel costs over 5 years</b> compared to the average new vehicle.	
<b>fuel economy.gov</b> Calculate personalized estimates and compare vehicles.				<b>DELIVERED BY TRUCK 36</b> 12155 NAPLTON'S TOYOTA/URBANA 1101 NAPLTON WAY URBANA IL61802	

Figure A-102: Monroney Label



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



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

## **APPENDIX B**

### VEHICLE AND DUMMY RESPONSE DATA PLOTS



## TABLE OF DATA PLOTS

### Driver & Passenger Dummy Instrumentation Plots

<b>Fig.</b>	<b>Description</b>	<b>Page</b>
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3	Driver Head Acceleration (Z) Primary vs. Time	B-5
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7	Driver Lower Thorax Rib Deflection (Y) vs. Time	B-6
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18	Passenger Lower Spine T12 Acceleration (X) vs. Time	B-9
19	Passenger Lower Spine T12 Acceleration (Y) vs. Time	B-9
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21	Passenger Lower Spine T12 Resultant Acceleration vs. Time	B-10
22	Passenger Iliac Force on Impact Side (Y) vs. Time	B-10
23	Passenger Acetabulum Force on Impact Side (Y) vs. Time	B-10
24	Passenger Total Pelvic Force on Impact Side (Y) vs. Time	B-10

The following additional data for this test can be obtained from the Research and Development section of the NHTSA website. The website can be found at [www.NHTSA.gov](http://www.NHTSA.gov).

#### **Additional Driver & Passenger Dummy Instrumentation Data**

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

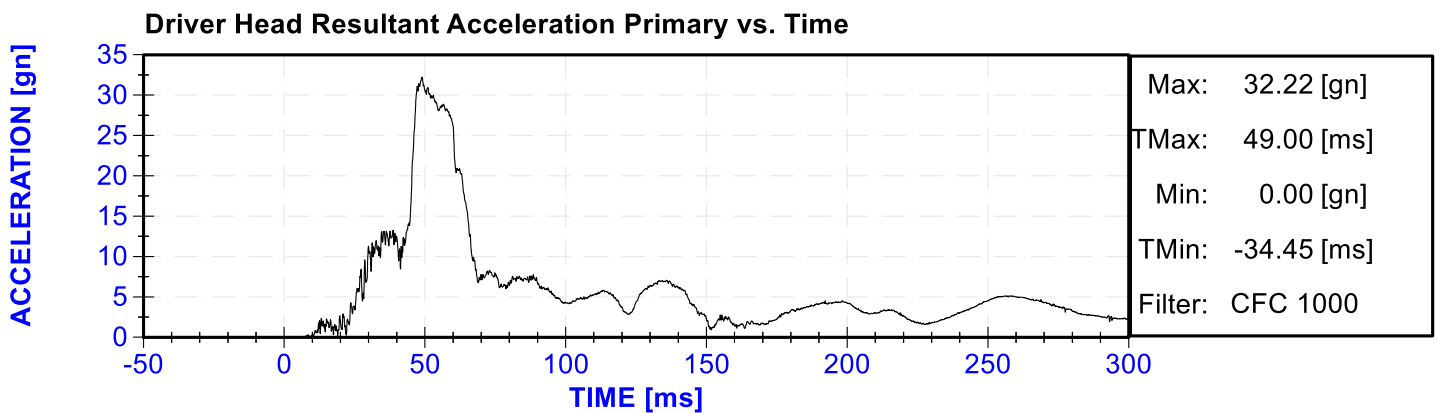
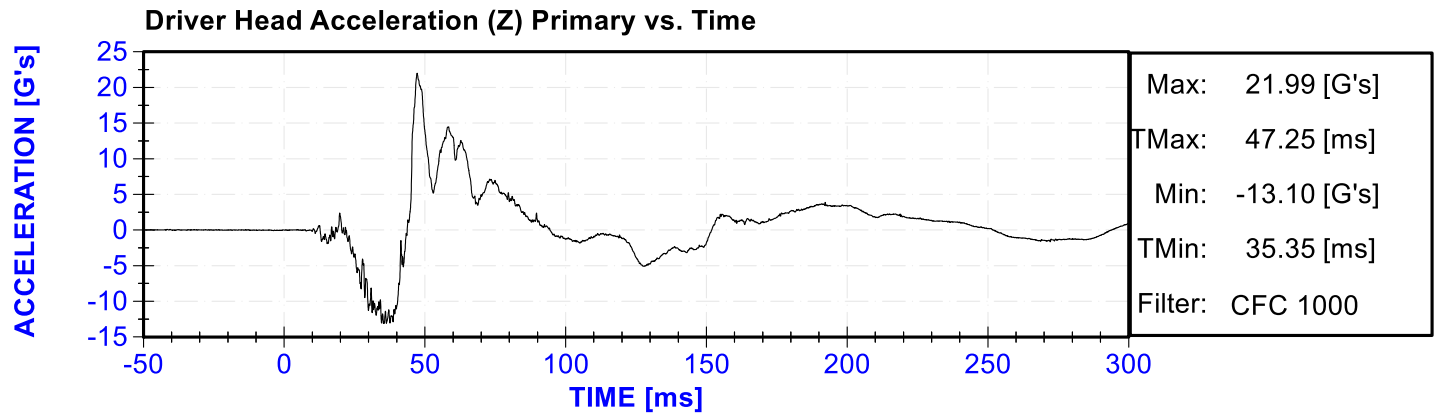
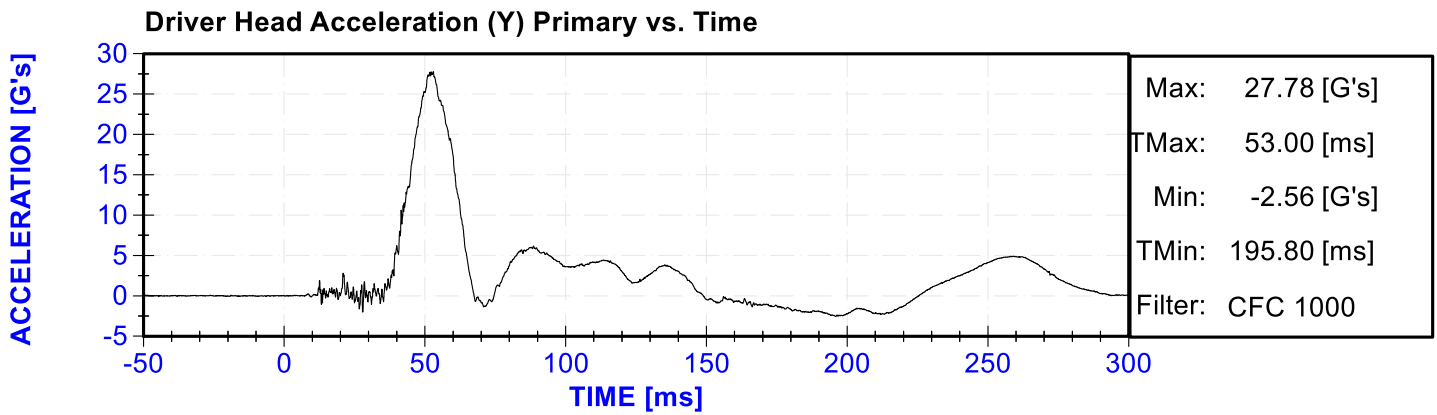
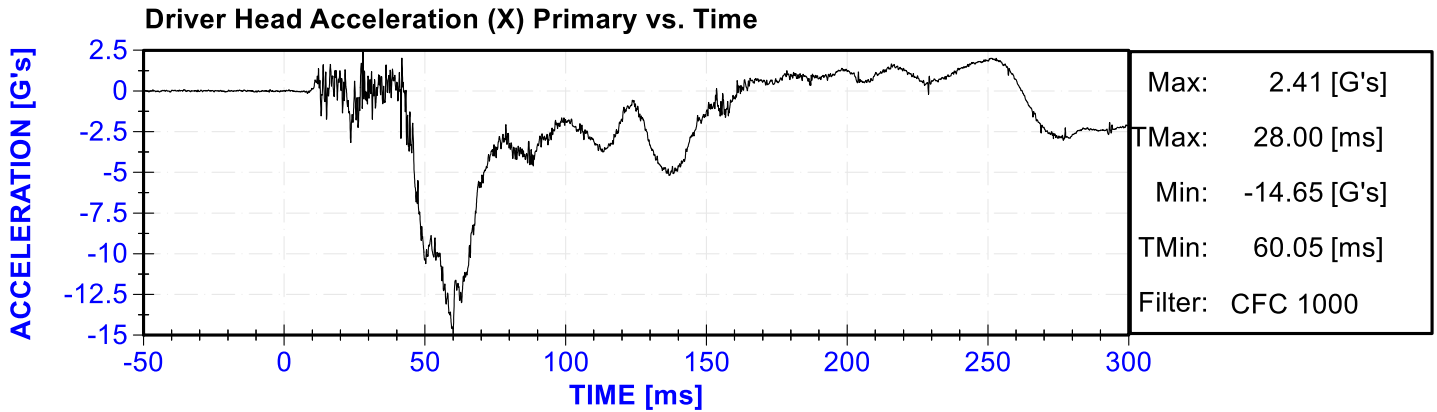
#### **Vehicle Instrumentation Data**

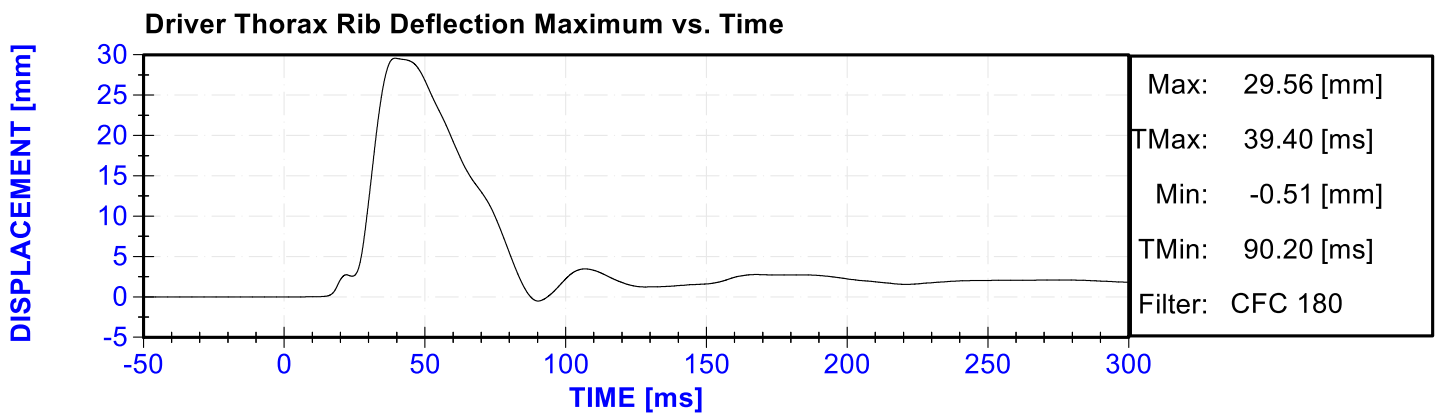
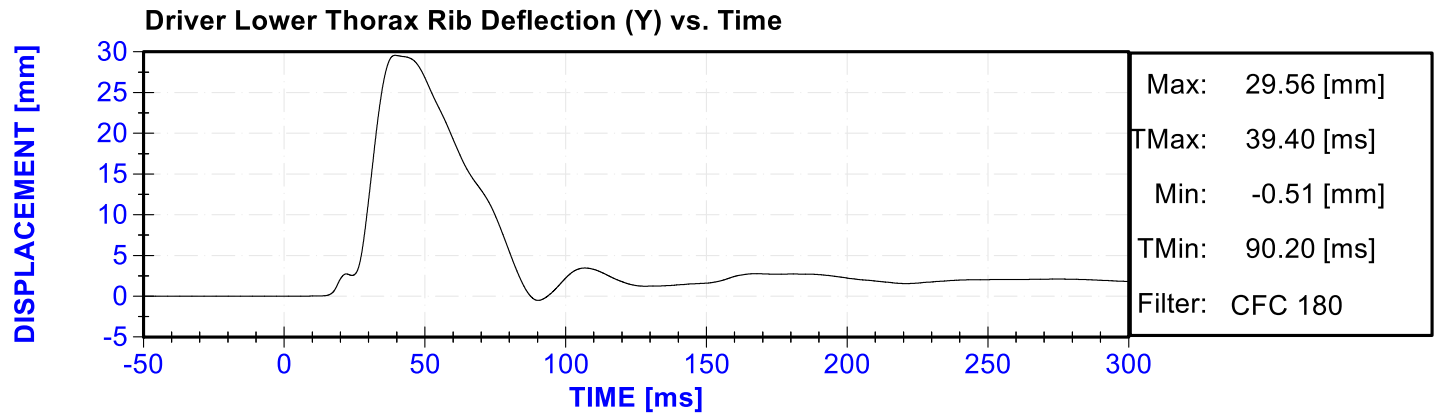
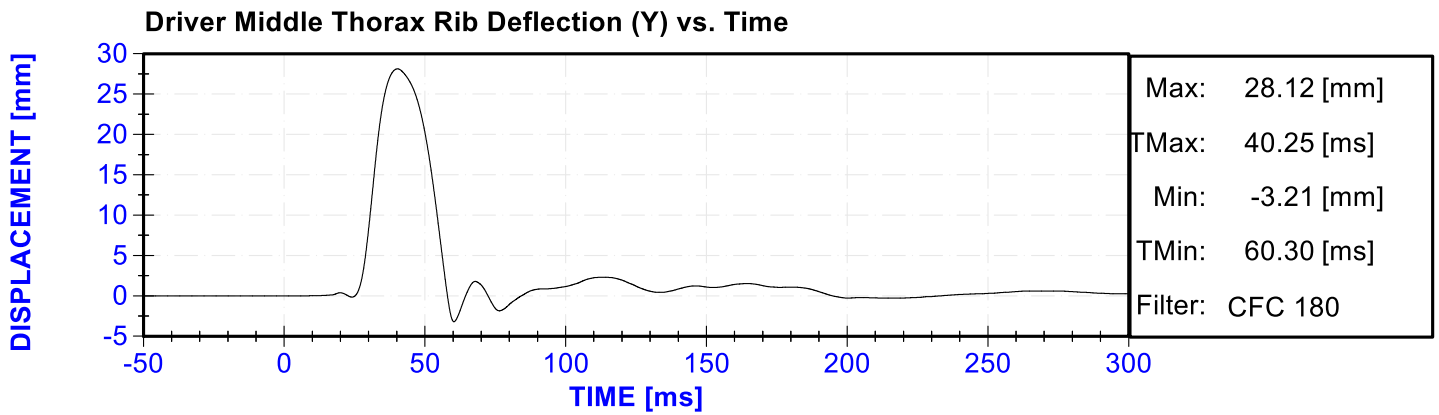
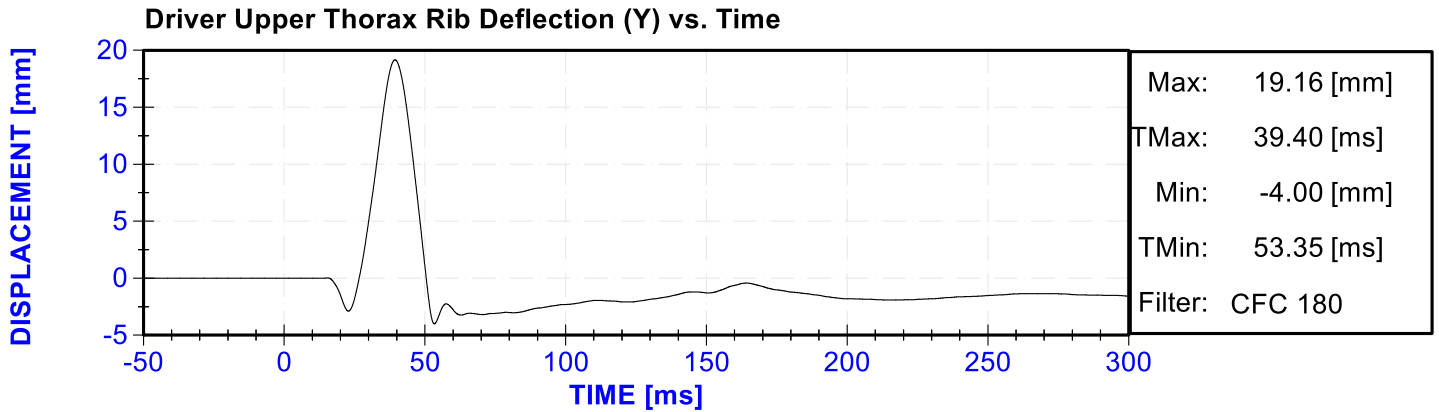
Vehicle Center of Gravity Acceleration (X)  
Vehicle Center of Gravity Acceleration (Y)  
Vehicle Center of Gravity Acceleration (Z)  
Right Side Sill at Front Seat Acceleration (X)  
Right Side Sill at Front Seat Acceleration (Y)  
Right Side Sill at Front Seat Acceleration (Z)  
Right Side Sill at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

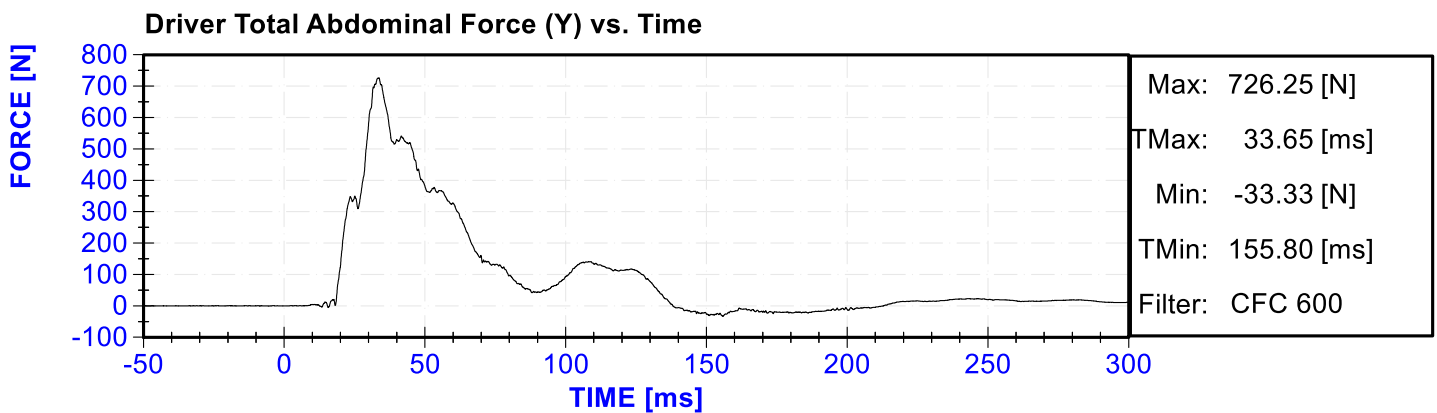
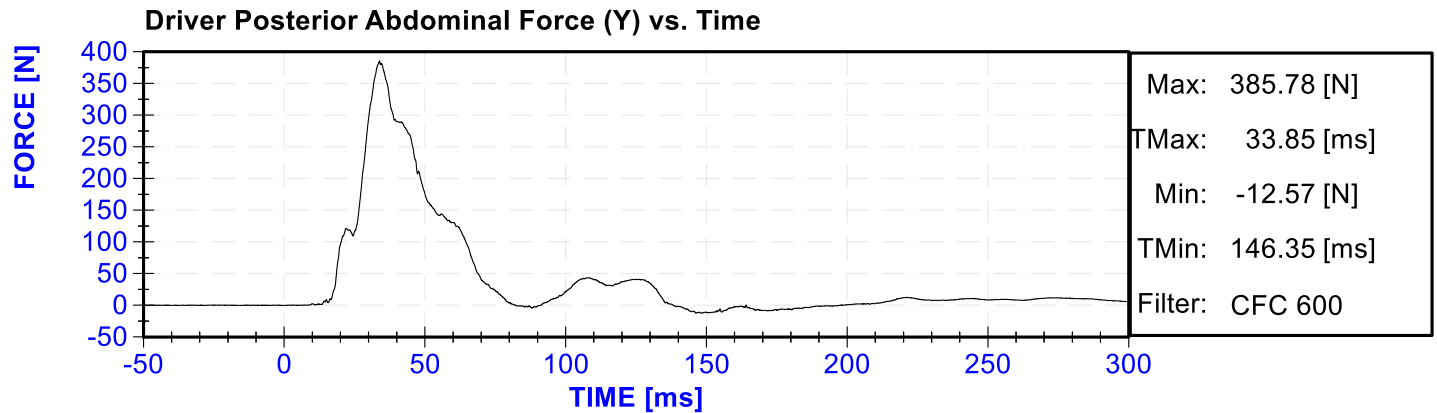
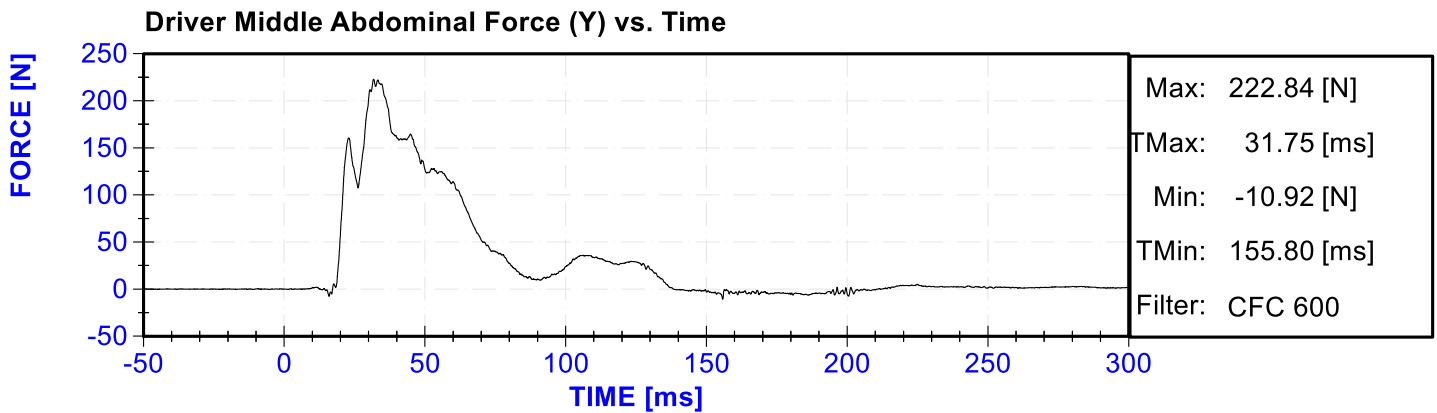
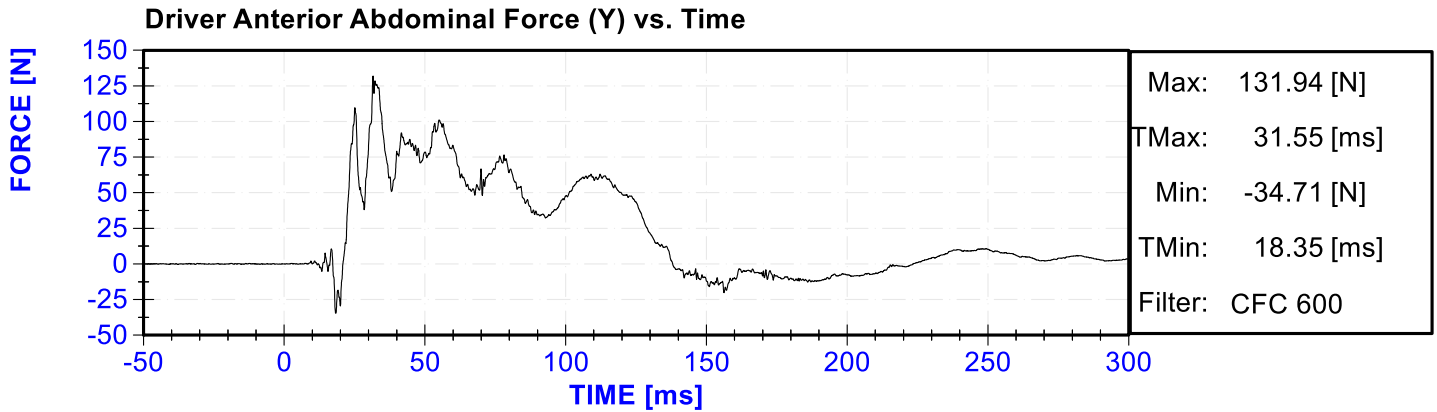
## **MDB Instrumentation Data**

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

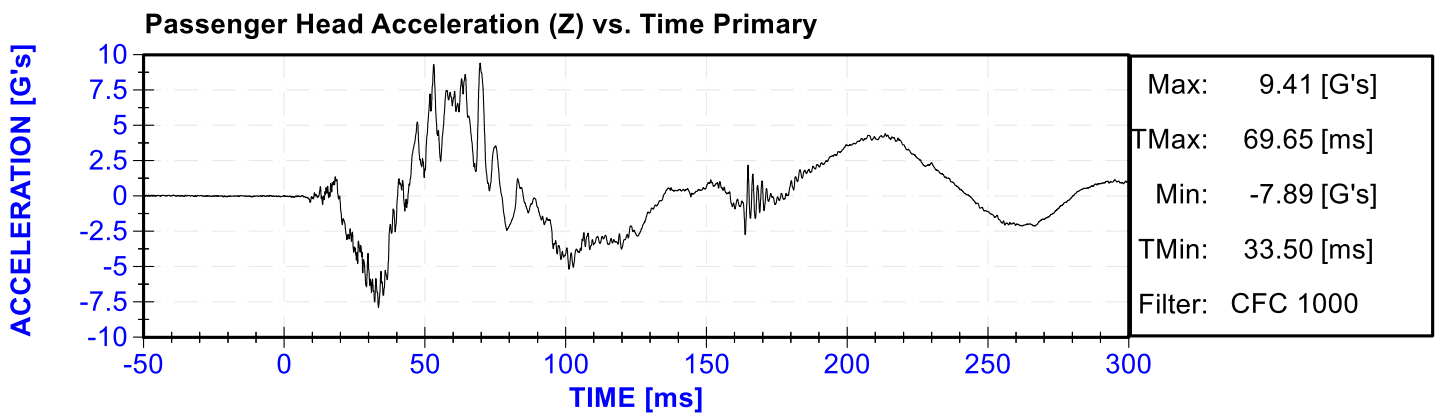
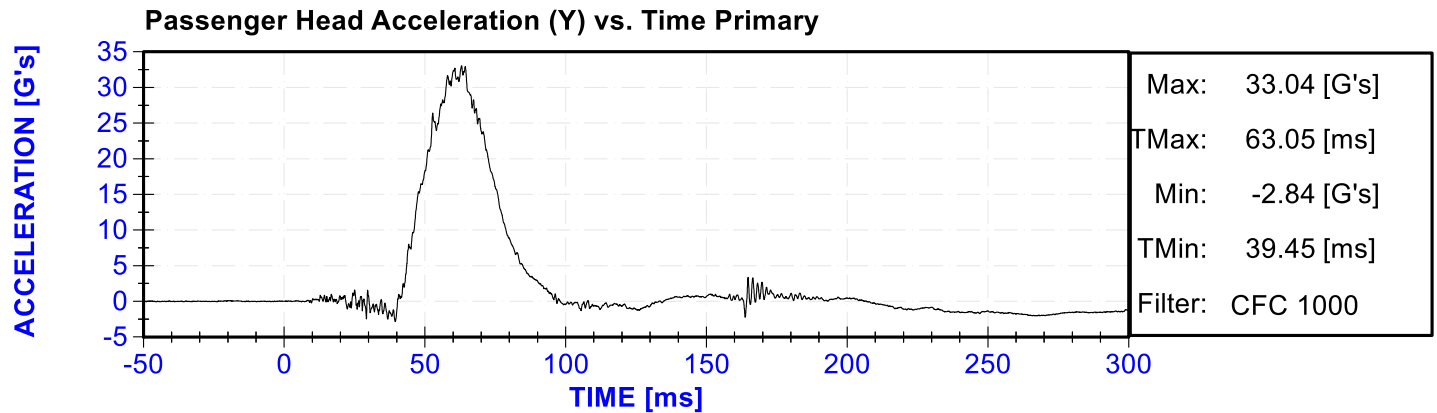
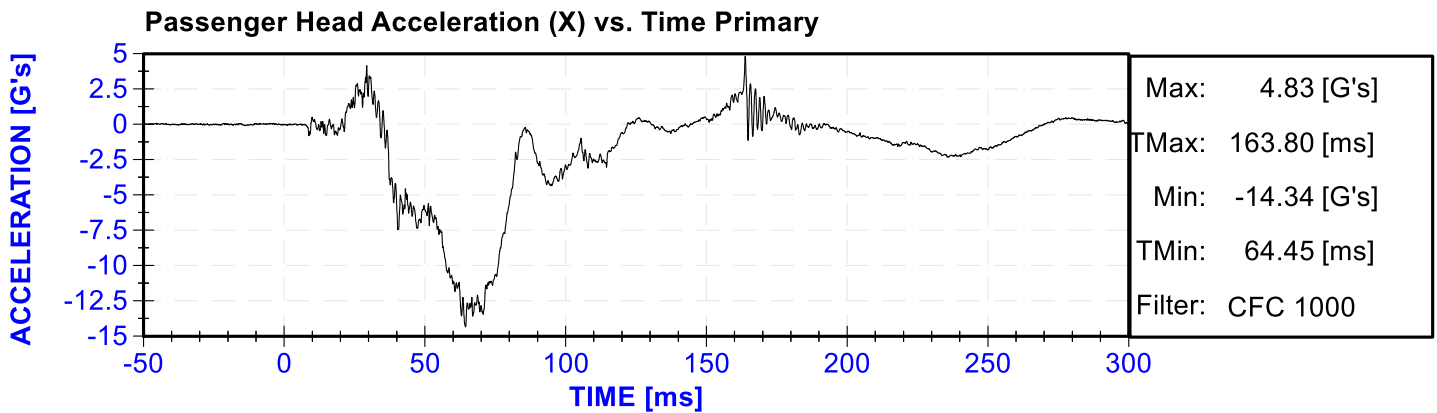
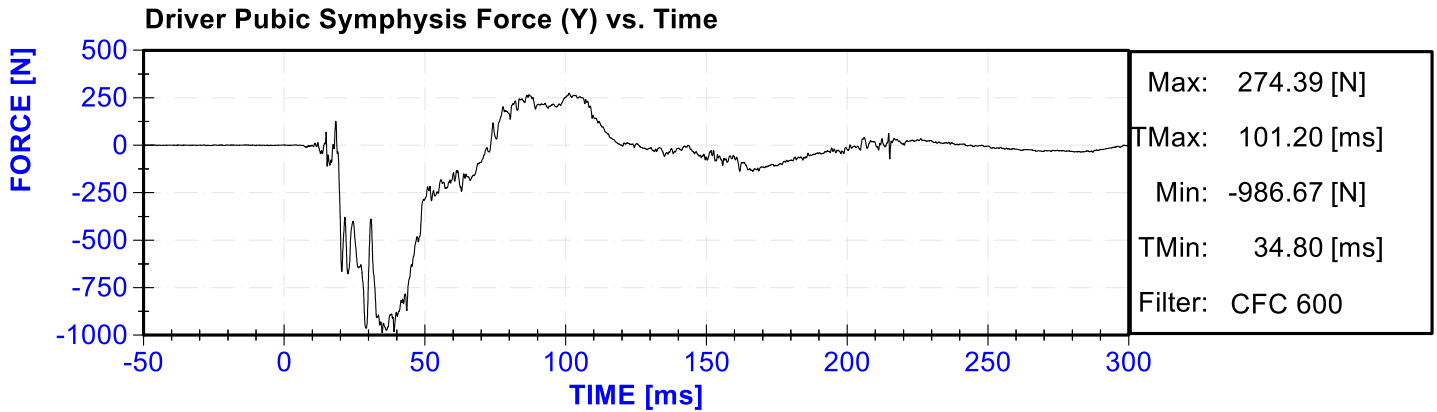




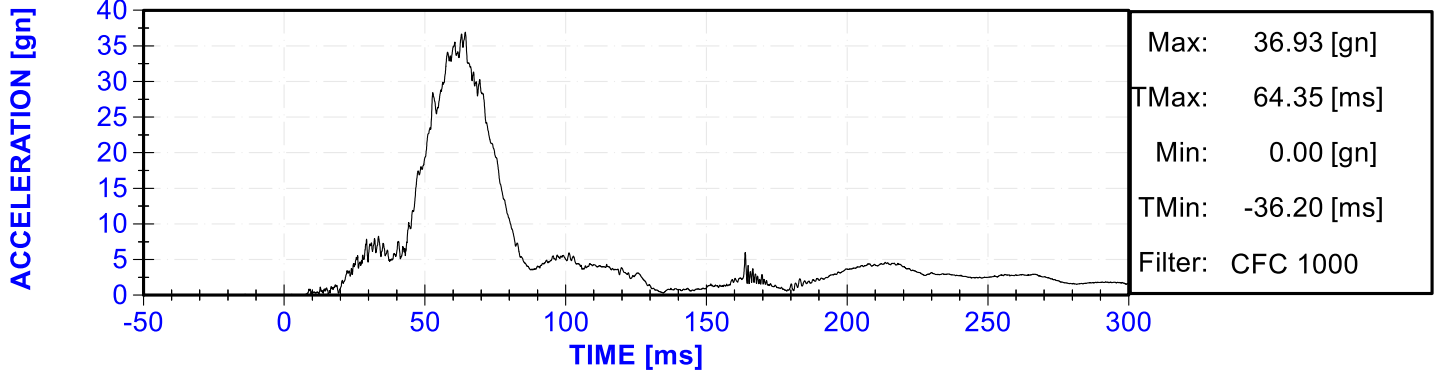




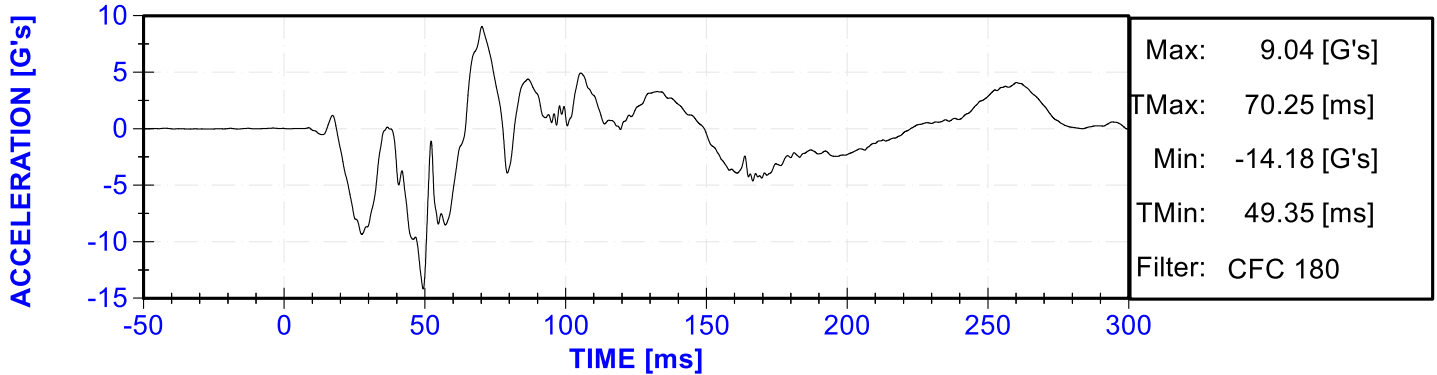




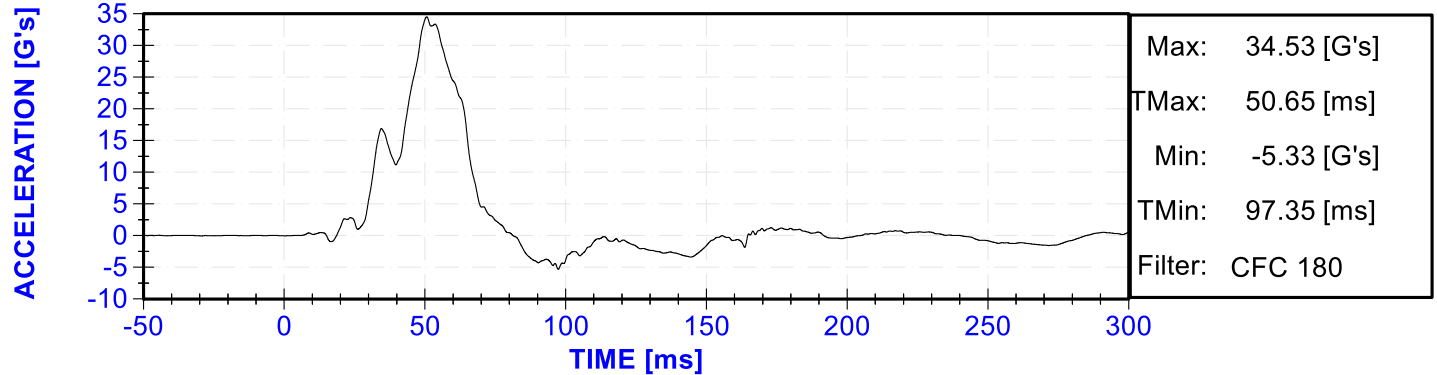
Passenger Head Resultant Acceleration Primary vs. Time



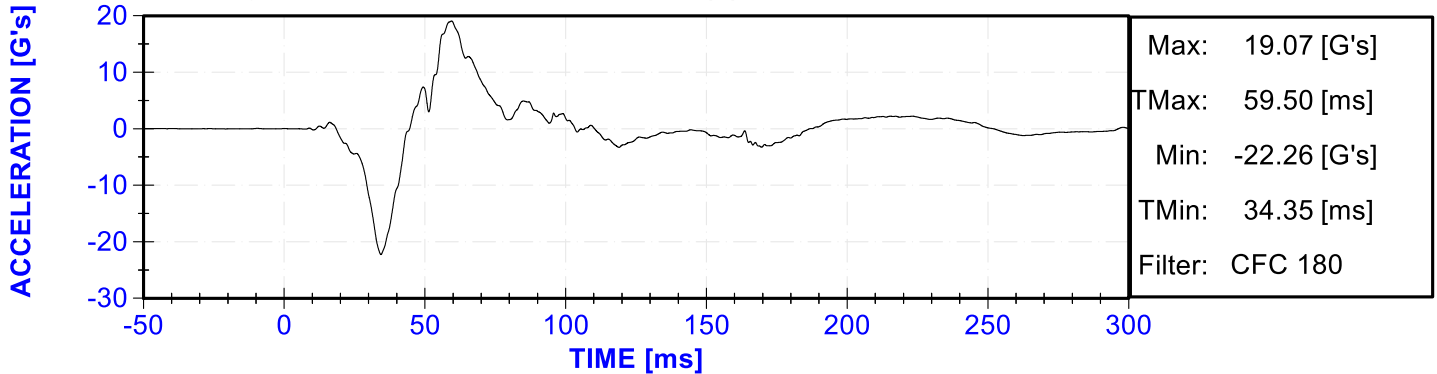
Passenger Lower Spine T12 Acceleration (X) vs. Time

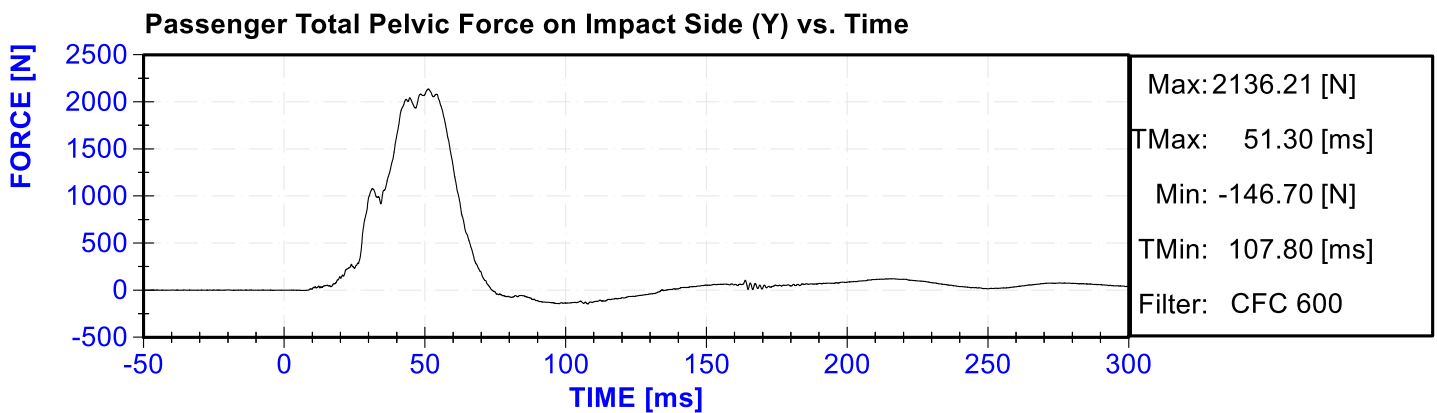
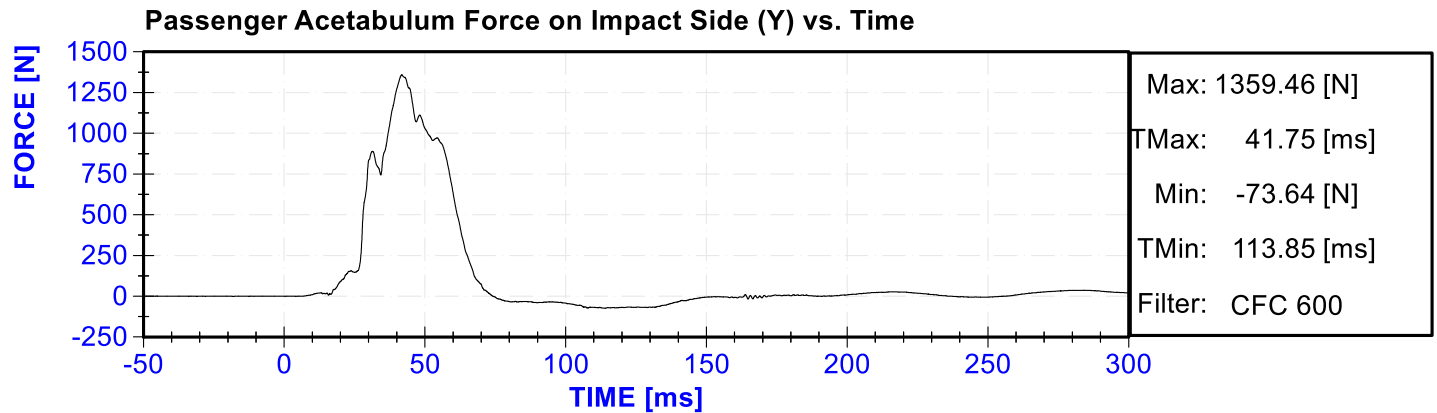
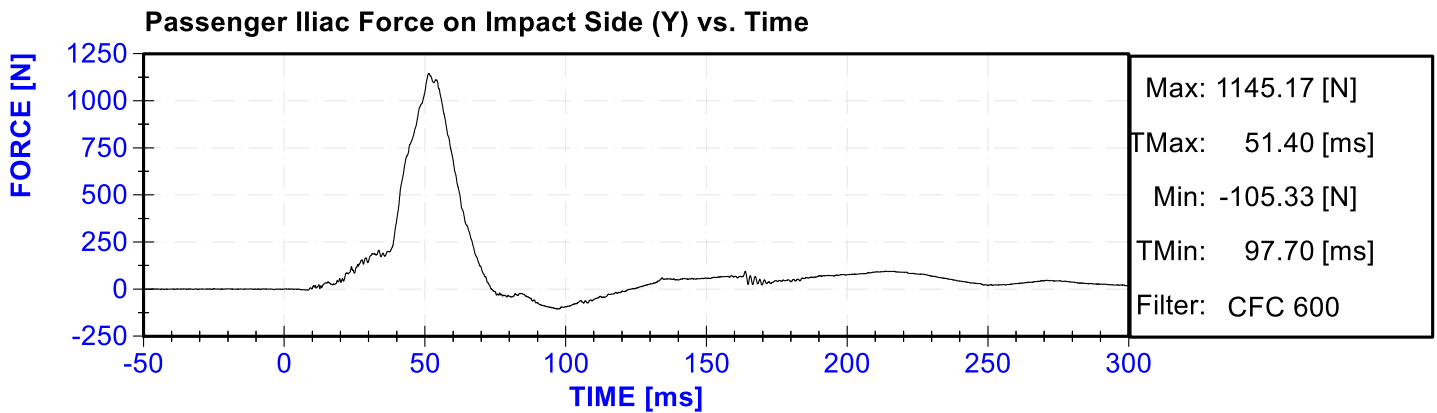
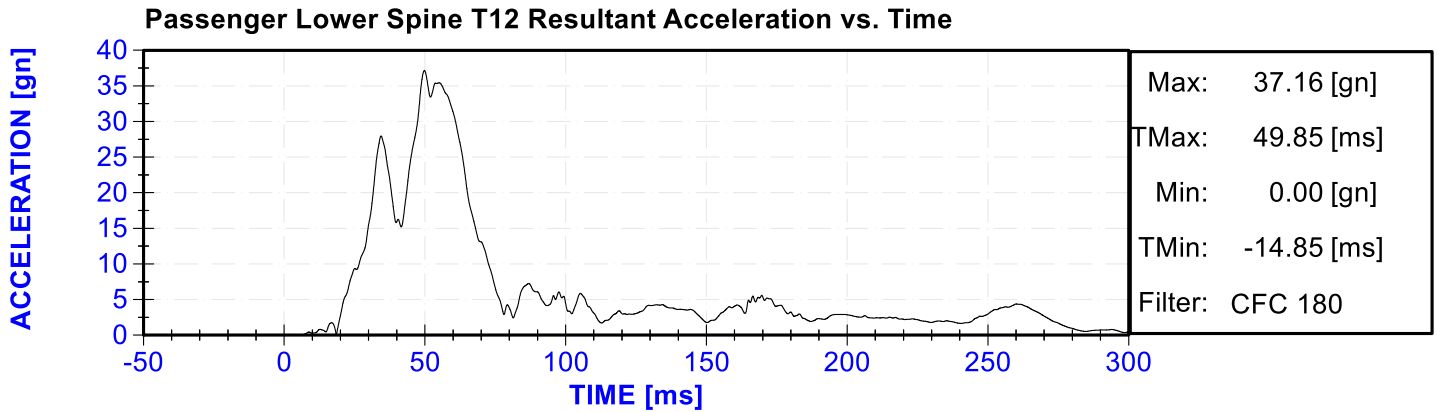


Passenger Lower Spine T12 Acceleration (Y) vs. Time



Passenger Lower Spine T12 Acceleration (Z) vs. Time







## APPENDIX C

### DUMMY PERFORMANCE CALIBRATION TEST DATA

**CALIBRATION TEST RESULTS**

**PRE-TEST**

**EUROSID 2 (ES-2RE) MALE – DRIVER ATD**

**SERIAL NO: F034**

**(CONFIGURED FOR LEFT SIDE IMPACT)**

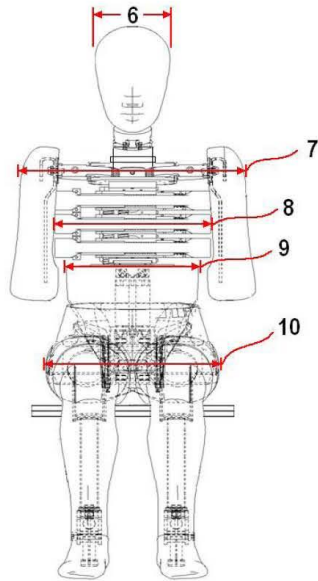


External Measurements - EuroSID-2re

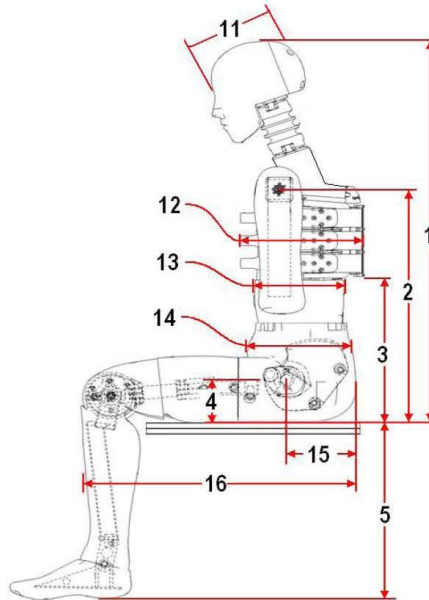
Technician: K. Dutton

Date: 05/20/2020

Dummy Serial Number: F034



FRONT VIEW



SIDE VIEW

Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	910	Pass
2	Seat to Shoulder Joint	558	572	569	Pass
3	Seat to Lower Face of Thoracic Spine Box	346	356	352	Pass
4	Seat to Hip Joint (center of bolt)	97	103	101	Pass
5	Sole to Seat, Sitting	333	451	421	Pass
6	Head Width	152	158	154	Pass
7	Shoulder/Arm Width	461	479	470	Pass
8	Thorax Width	322	332	329	Pass
9	Abdomen Width	273	287	285	Pass
10	Pelvis Lap Width	359	373	365	Pass
11	Head Depth	196	206	203	Pass
12	Thorax Depth	262	272	269	Pass
13	Abdomen Depth	194	204	202	Pass
14	Pelvis Depth	235	245	241	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150	160	155	Pass
16	Back of Buttocks to Front Knee	597	615	609	Pass



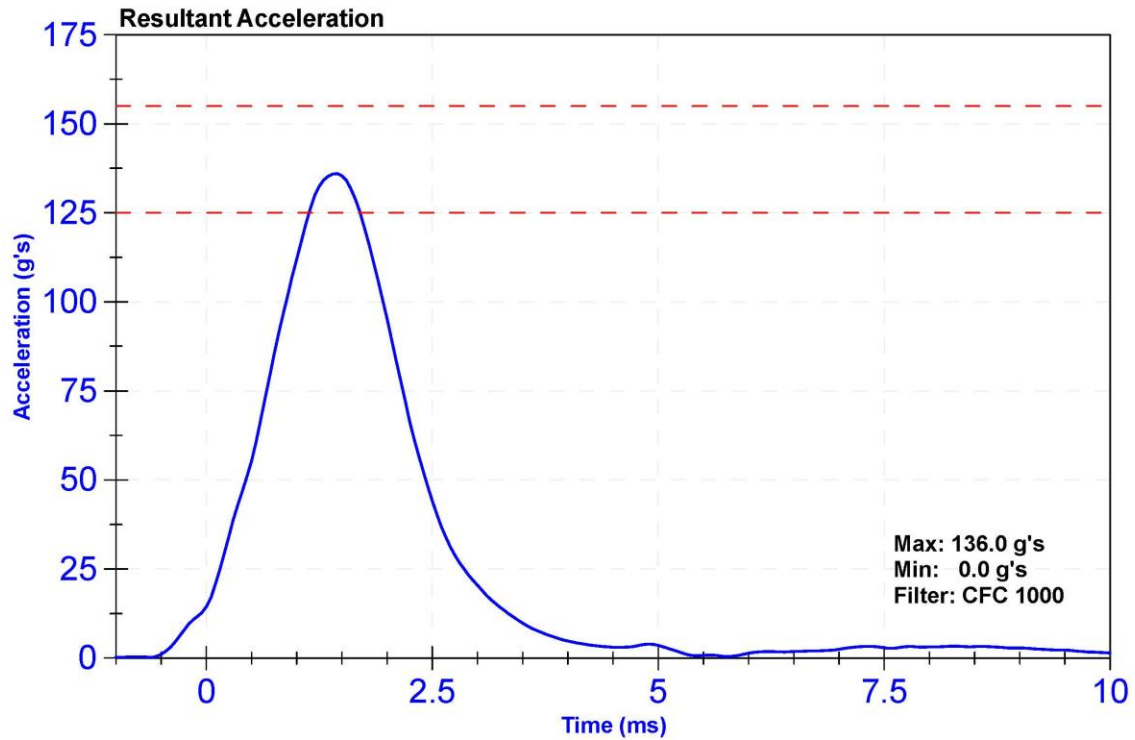
ATD Manufacturer	FTSS	Test Technician	K.Dutton
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

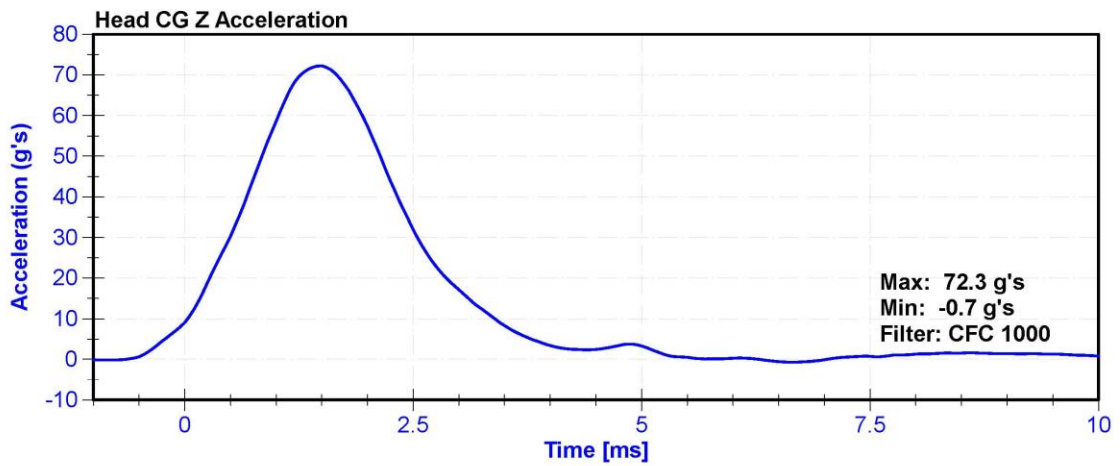
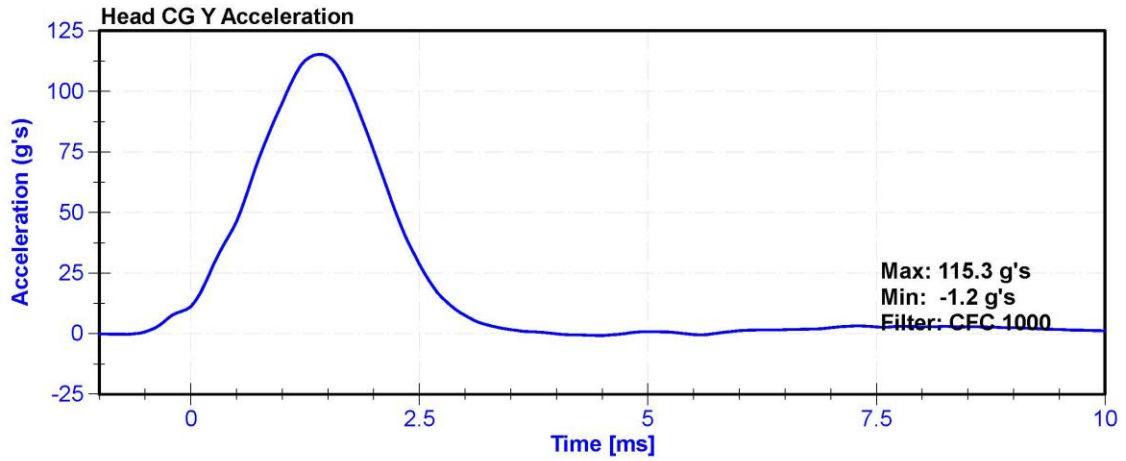
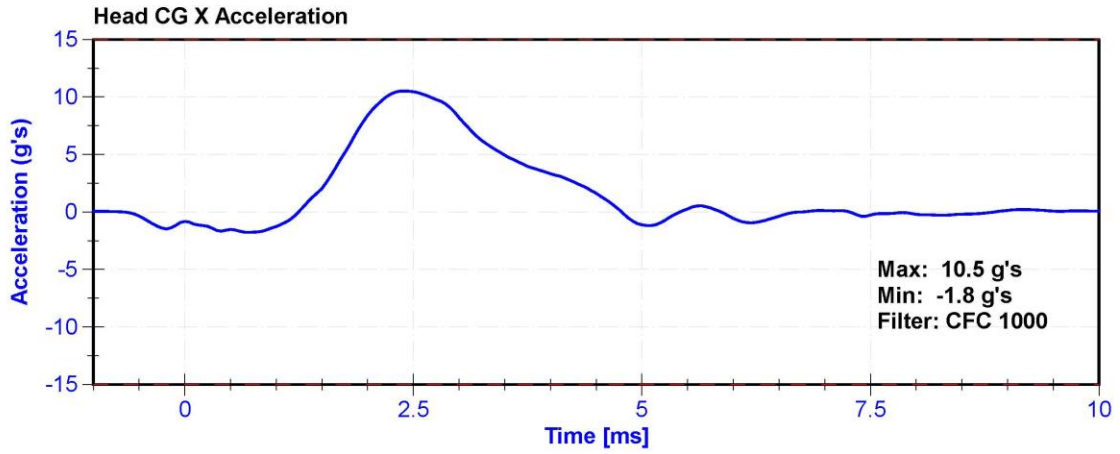
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	53.5	Pass
Resultant Acceleration	125	155	g's	136.0	Pass
Oscillation	0	15	%	2.86	Pass
Fore-Aft Acceleration	-15	15	g's	10.5	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264	AC-P49204	4/15/2020	10/14/2020
Y Accelerometer	ENDEVCO 7264	AC-P83437	4/15/2020	10/14/2020
Z Accelerometer	ENDEVCO 7264	AC-P64007	4/15/2020	10/14/2020





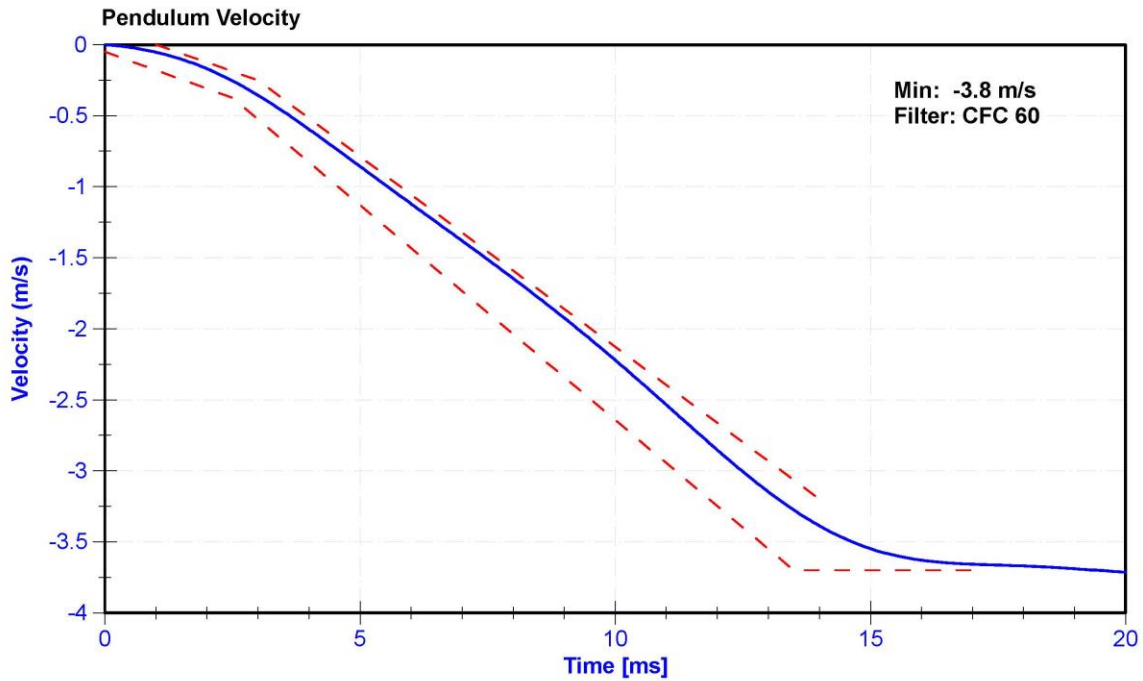
ATD Manufacturer	FTSS	Test Technician	C. Mantell
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

**Results**

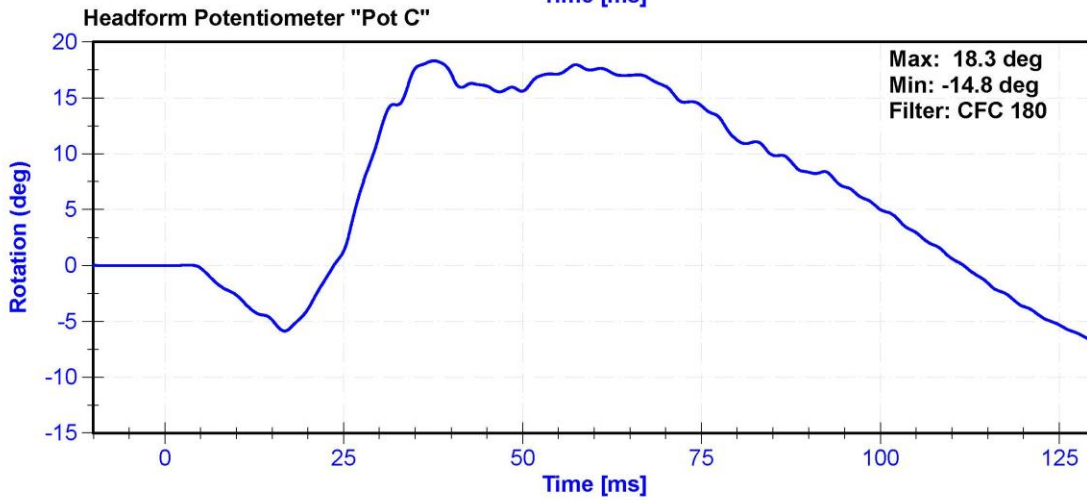
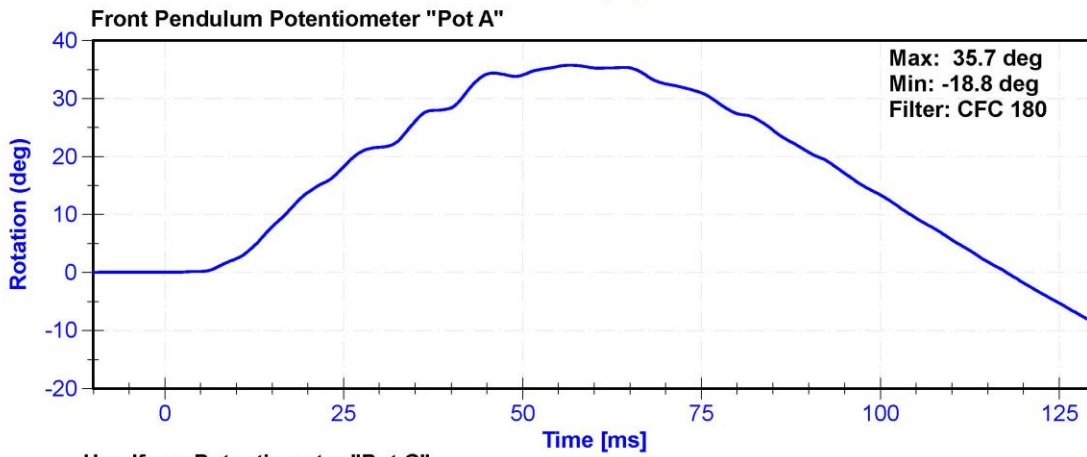
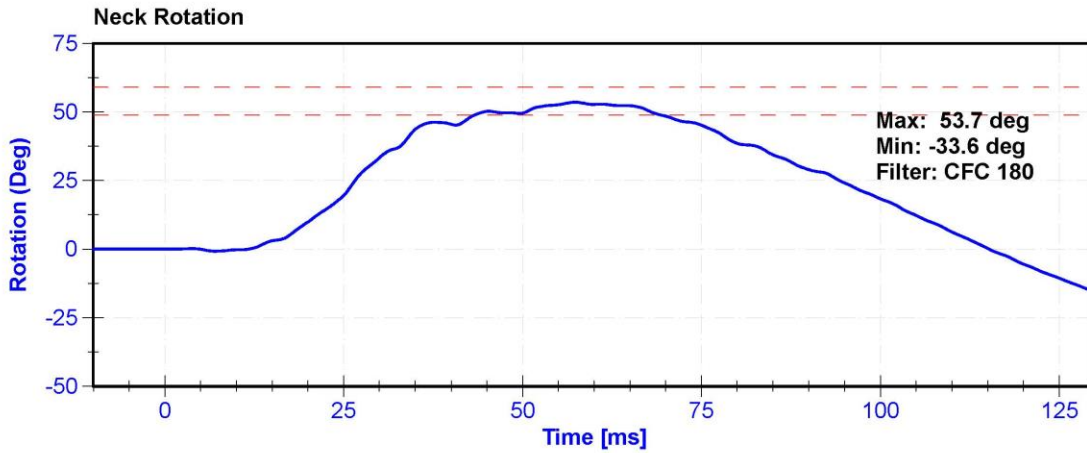
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	35.8	Pass
Velocity	3.3	3.5	m/s	3.40	Pass
Lateral Neck Rotation	49	59	deg	53.7	Pass
Time at Maximum Rotation	54	66	ms	57.3	Pass
Time of Rotation Decay from Maximum	53	88	ms	57.9	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CTAC-AH5M9 Pend		1/30/2020	1/29/2021
Front Pendulum Potentiometer	SP22G	DS-094	10/31/2019	10/30/2020
Headform Potentiometer	SP22G	DS-095	10/31/2019	10/30/2020







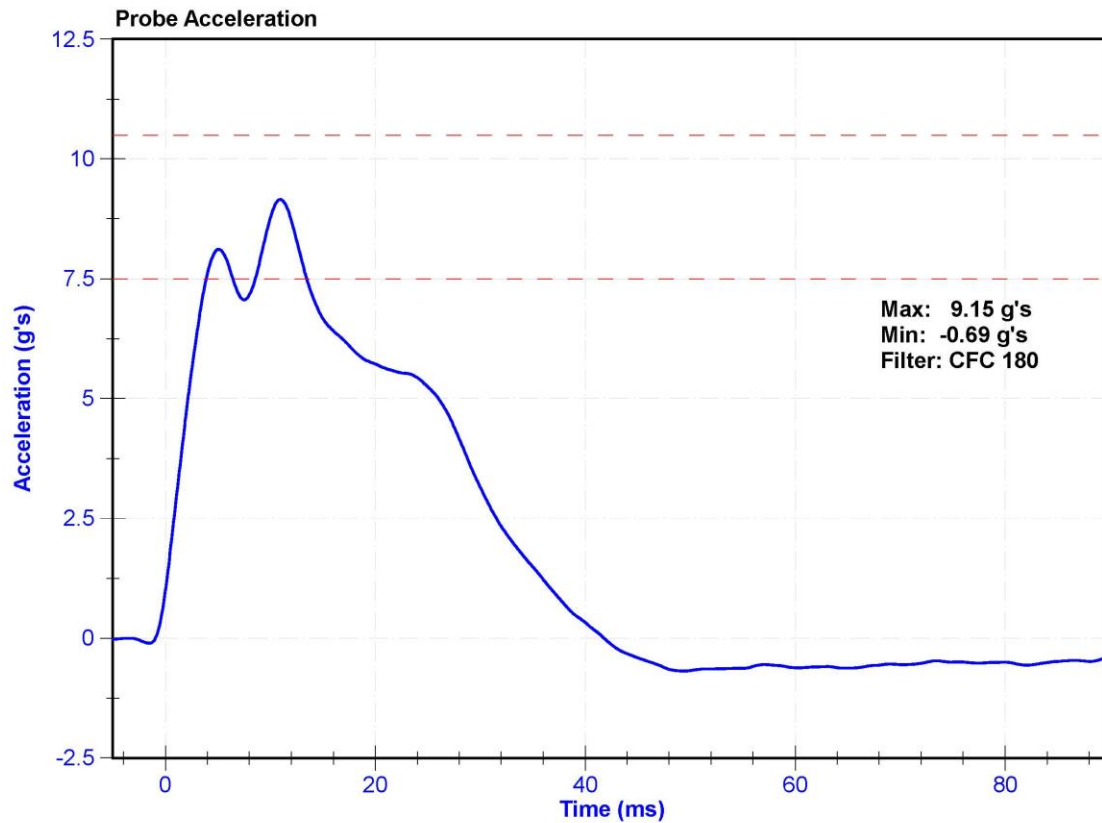
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	54.3	Pass
Velocity	4.2	4.4	m/s	4.40	Pass
Probe Acceleration	7.5	10.5	g's	9.15	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	MSI 64C-2000	A279031	5/8/2020	5/8/2021



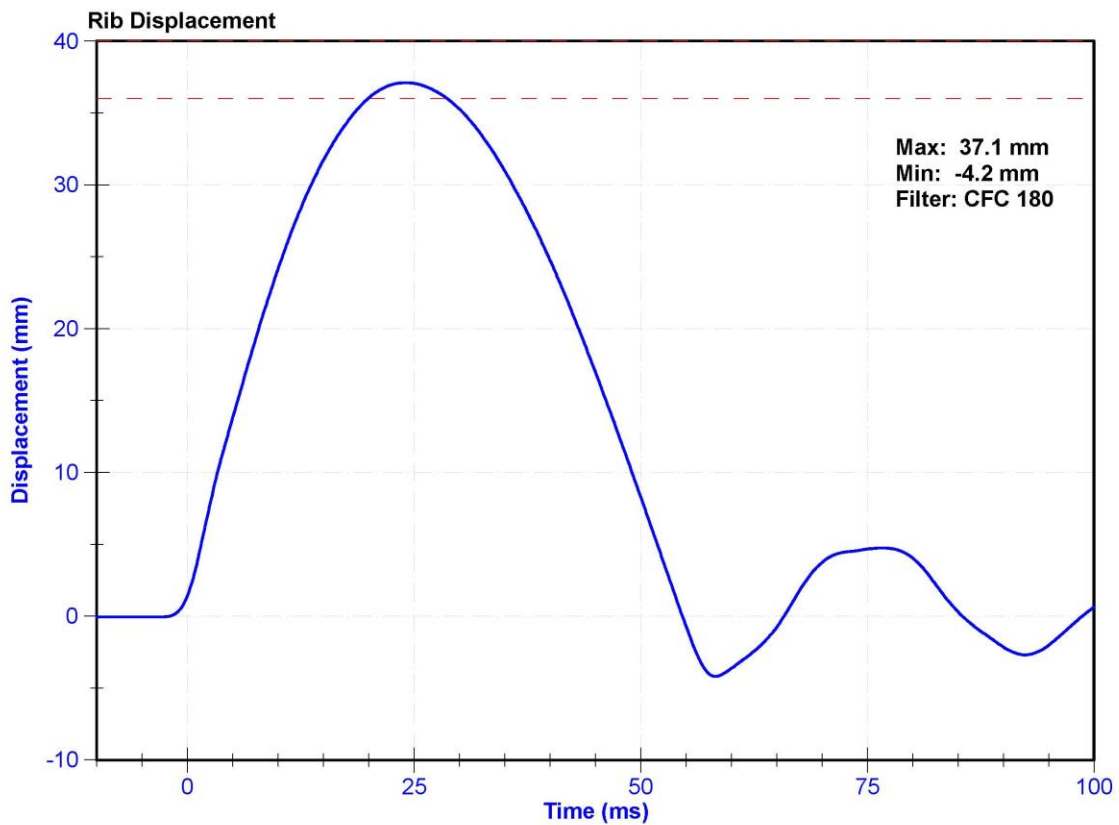
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	53.7	Pass
Rib Displacement	36	40	mm	37.1	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	4/14/2020	10/13/2020





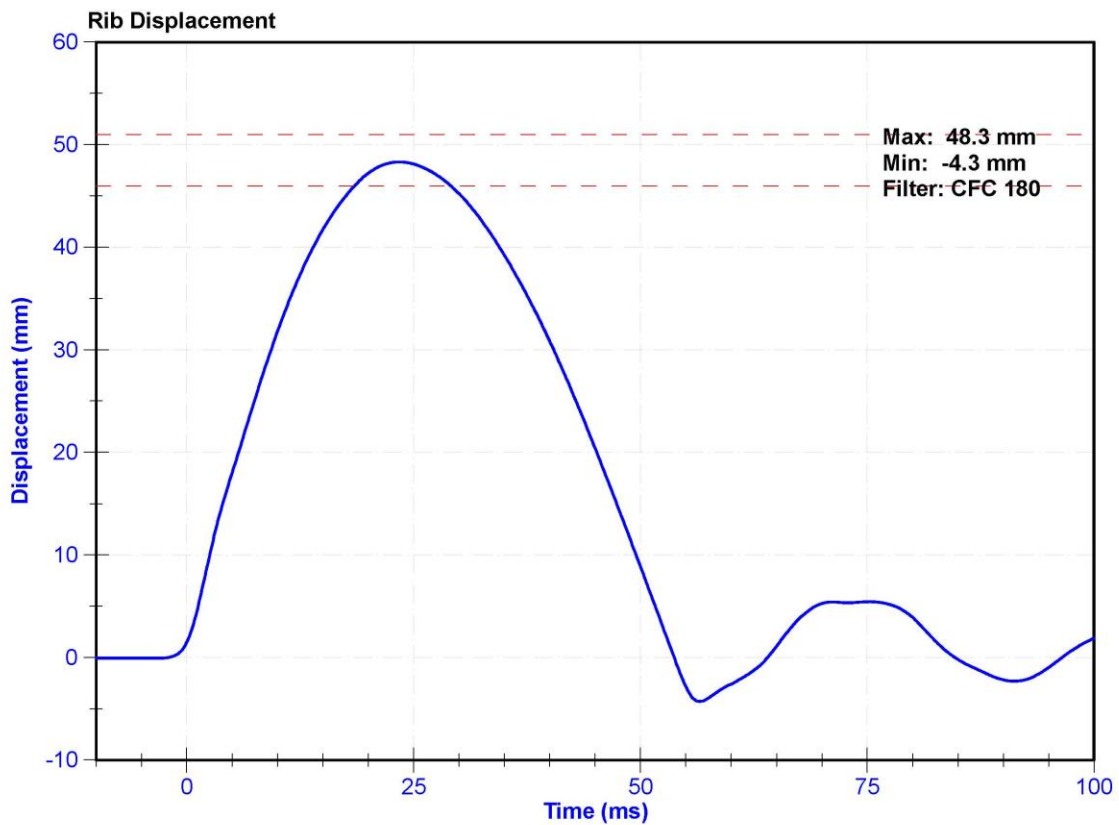
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	53.7	Pass
Rib Displacement	46	51	mm	48.3	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	4/14/2020	10/13/2020



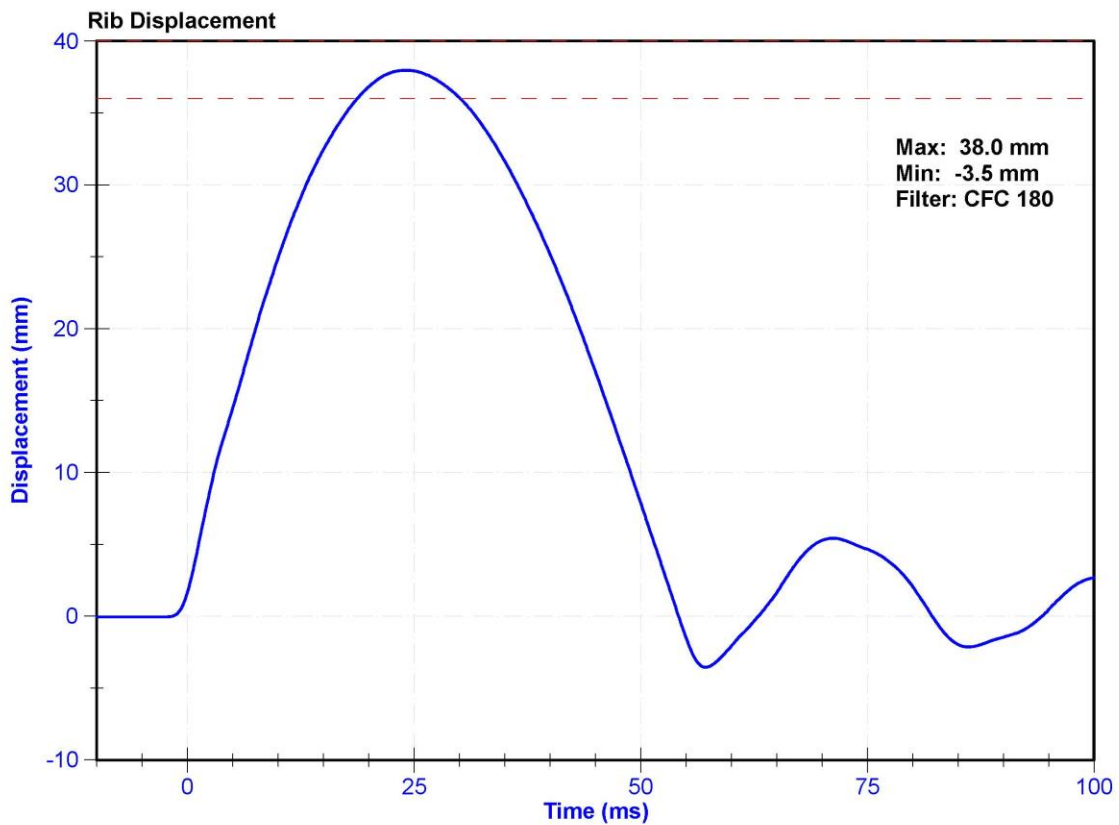
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	53.8	Pass
Rib Displacement	36	40	mm	38.0	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	4/14/2020	10/13/2020



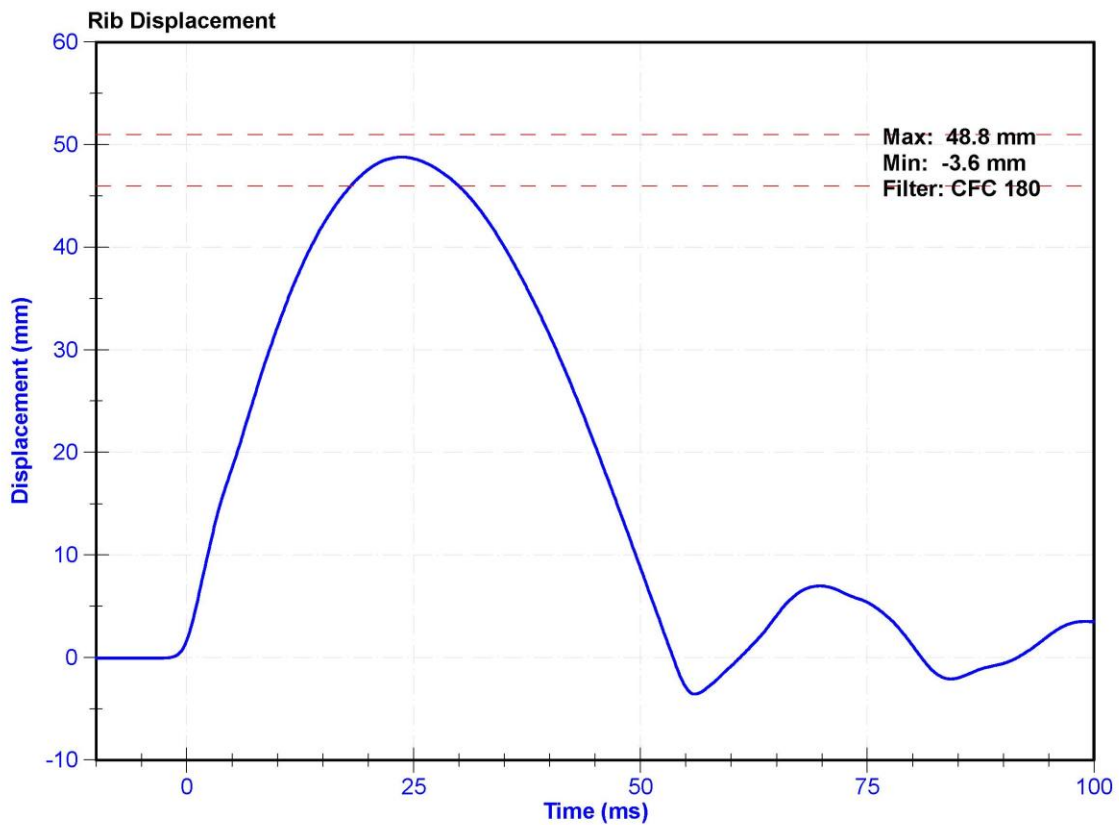
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.2	Pass
Humidity	10	70	%	53.7	Pass
Rib Displacement	46	51	mm	48.8	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	4/14/2020	10/13/2020





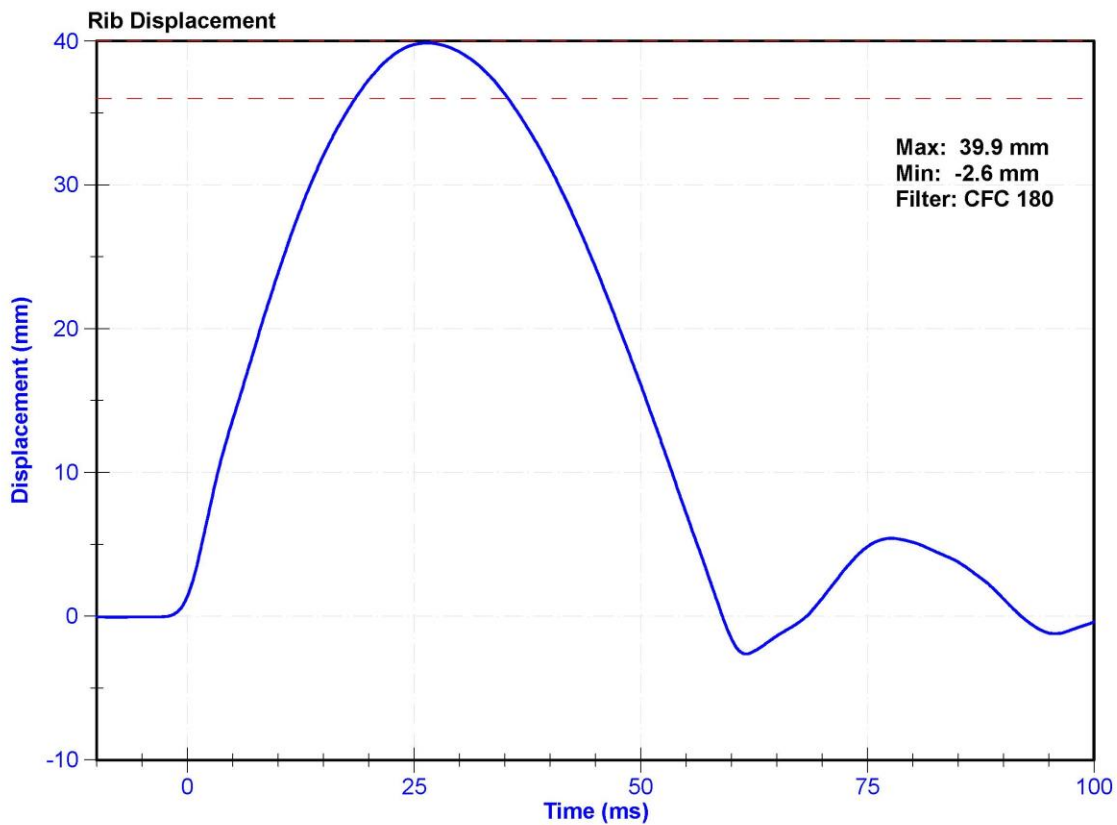
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	53.6	Pass
Rib Displacement	36	40	mm	39.9	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	4/14/2020	10/13/2020



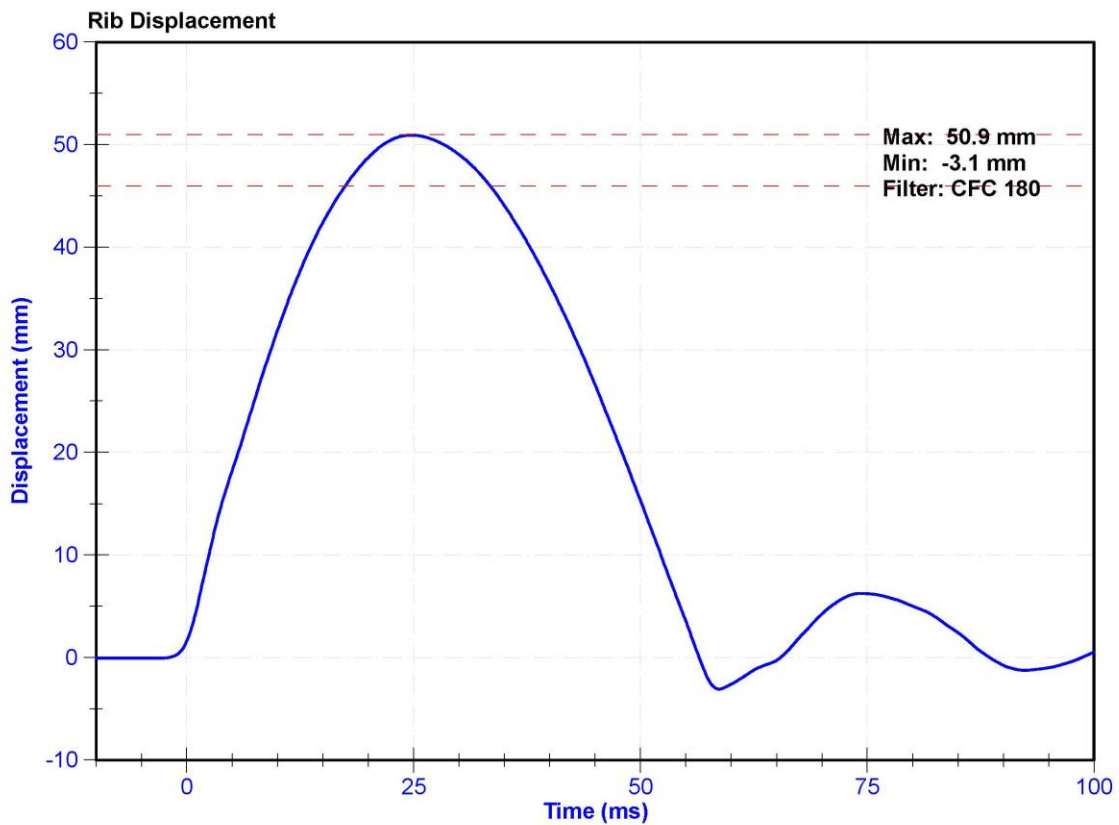
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	53.2	Pass
Rib Displacement	46	51	mm	50.9	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	4/14/2020	10/13/2020



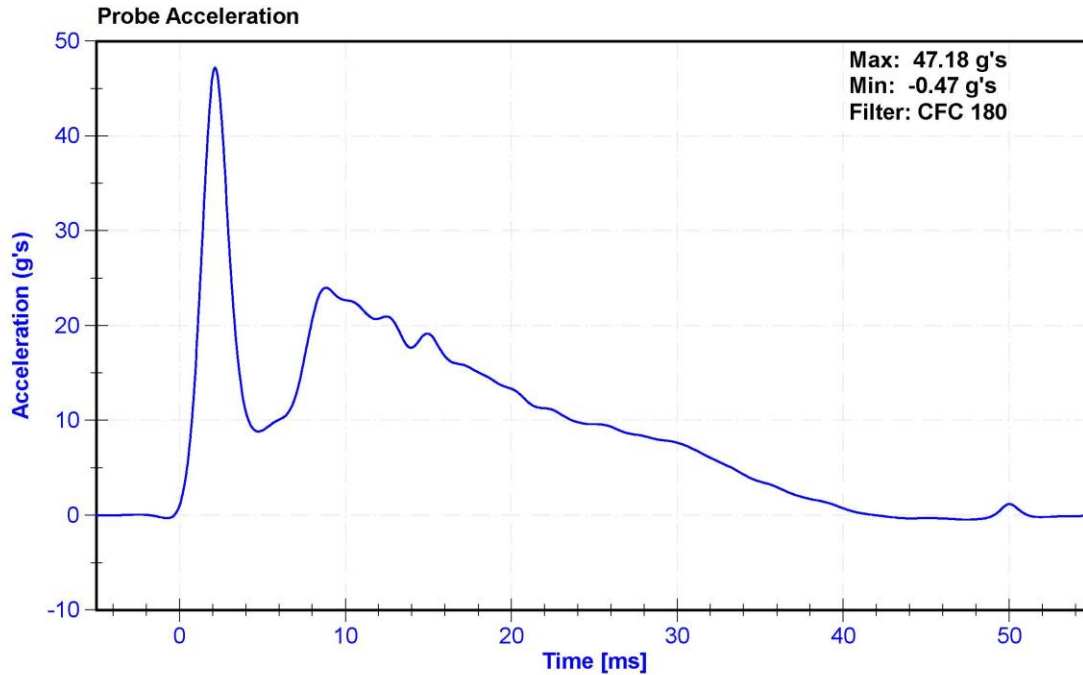
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

**Results**

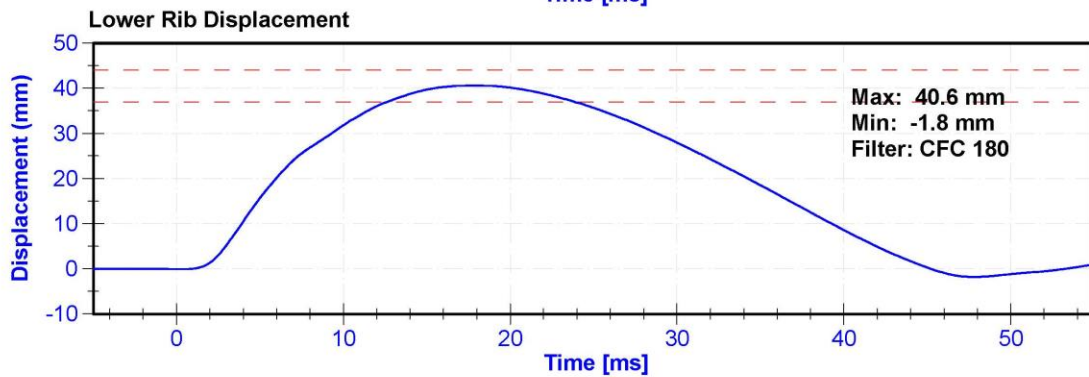
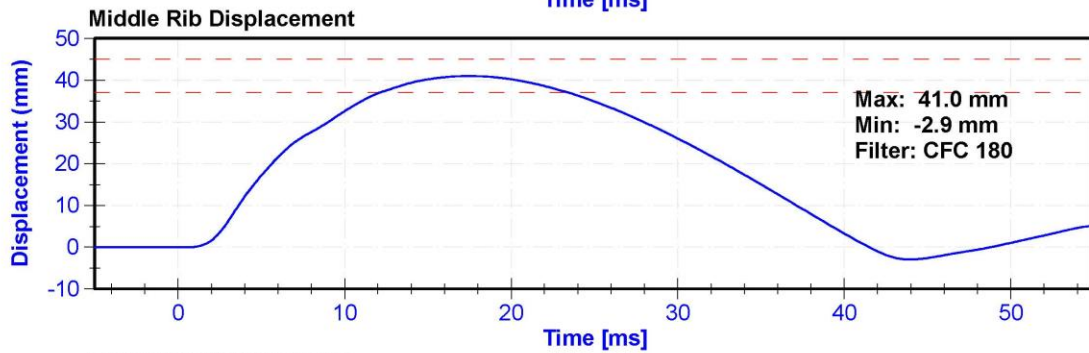
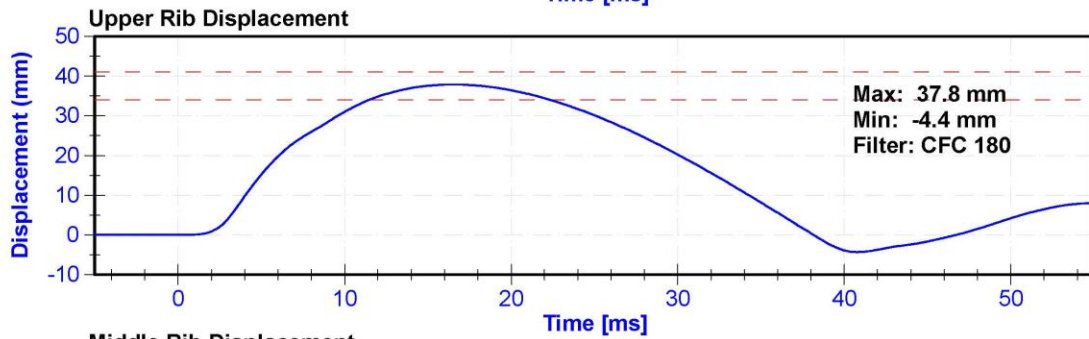
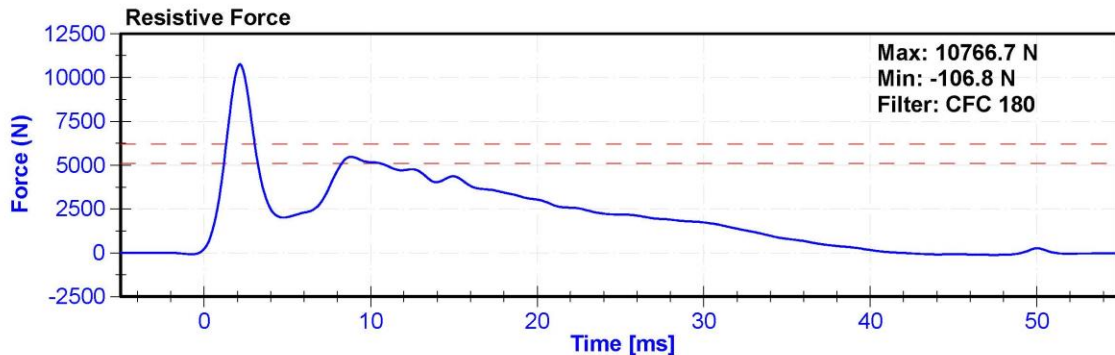
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	54.1	Pass
Velocity	5.4	5.6	m/s	5.42	Pass
Resistive Force after 6ms	5100	6200	N	5471.7	Pass
Upper Thorax Rib Deflection	34	41	mm	37.8	Pass
Mid Thorax Rib Deflection	37	45	mm	41.0	Pass
Lower Thorax Rib Deflection	37	44	mm	40.6	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	MSI 64C-2000	A279031	5/8/2020	5/8/2021
Upper Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	4/14/2020	10/13/2020
Middle Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	4/14/2020	10/13/2020
Lower Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	4/14/2020	10/13/2020







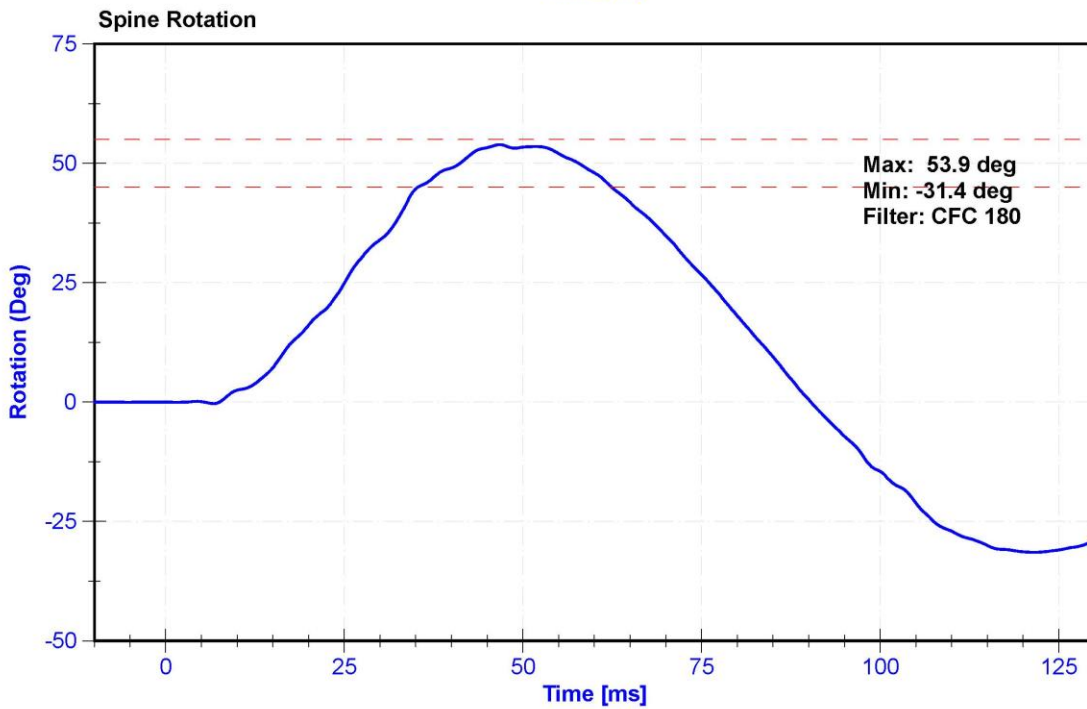
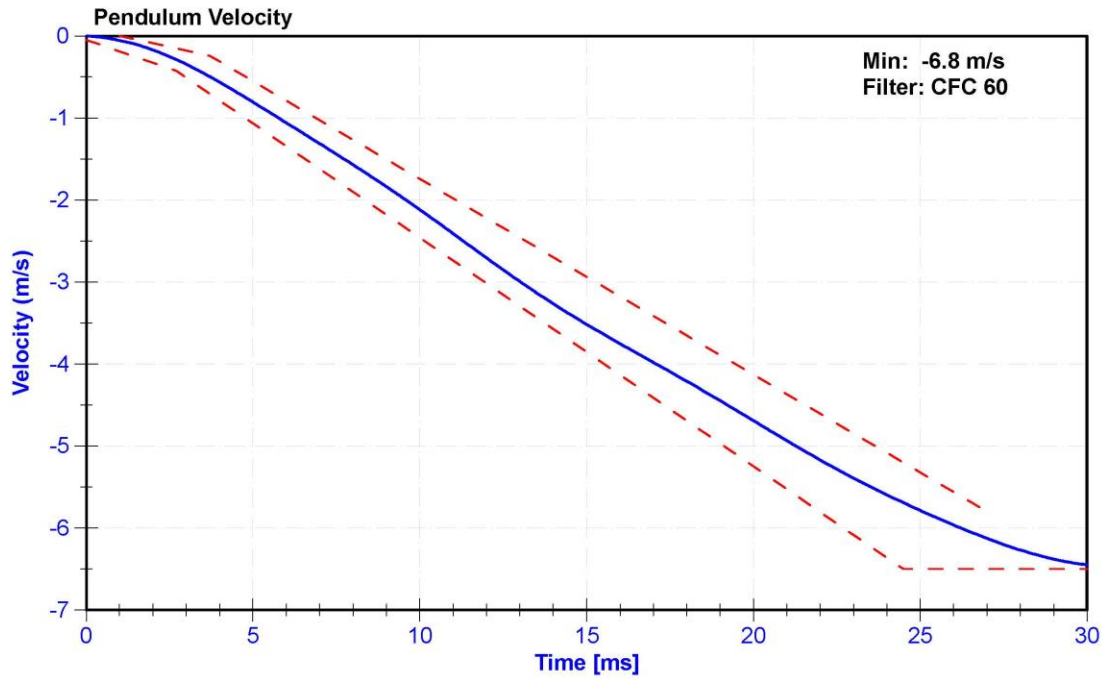
ATD Manufacturer	FTSS	Test Technician	C. Mantell
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

**Results**

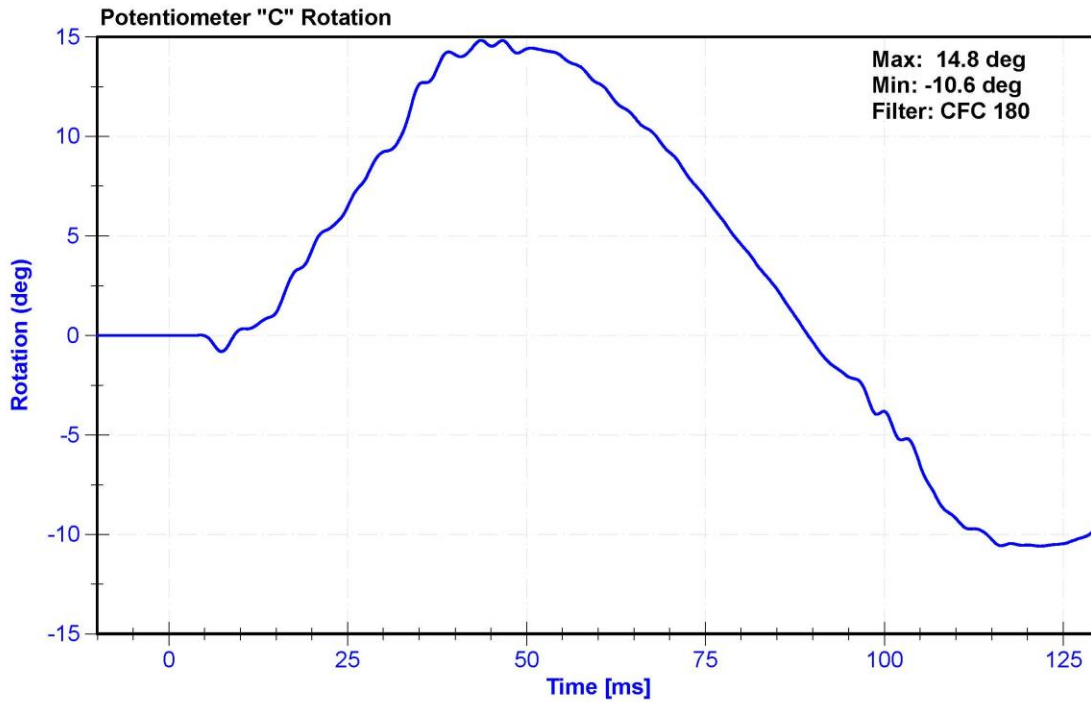
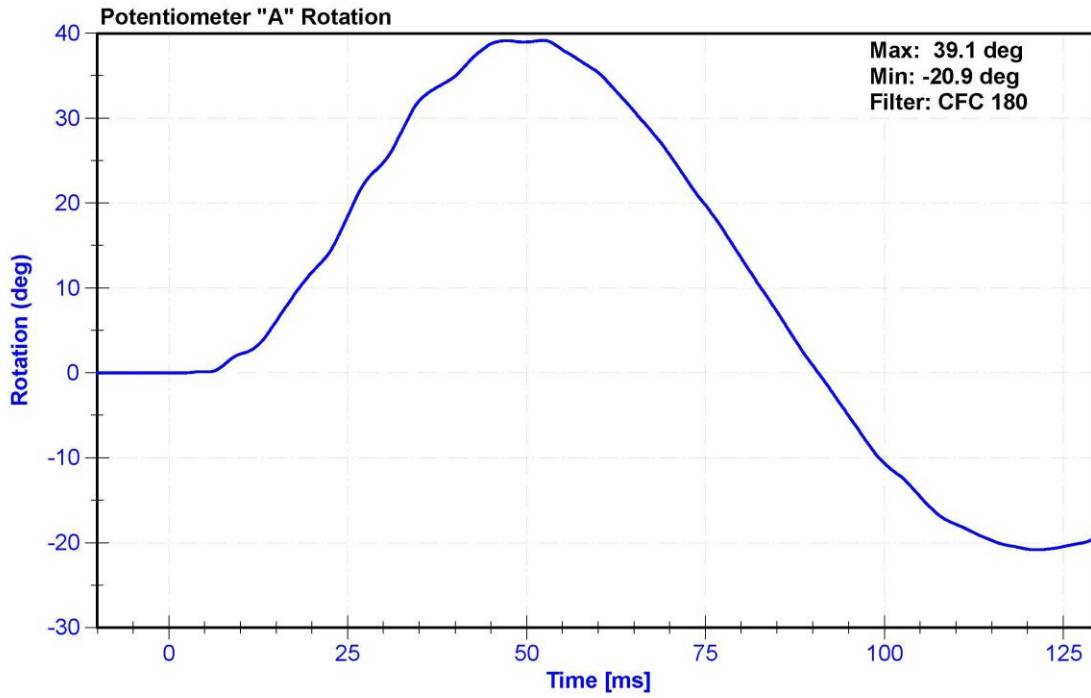
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	36.4	Pass
Velocity	5.95	6.15	m/s	6.005	Pass
Lateral Spine Rotation	45	55	deg	53.9	Pass
Time at Maximum Rotation	39	53	ms	46.7	Pass
Time of Decay to Zero Degrees	37	57	ms	43.6	Pass
Pulse within Corridor?	-	-	-		

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5M9 Pend	1/30/2020	1/29/2021
Pendulum "A" Potentiometer	SP22G	DS-094	10/31/2019	10/30/2020
Condyle "B" Potentiometer	SP22G	DS-095	10/31/2019	10/30/2020







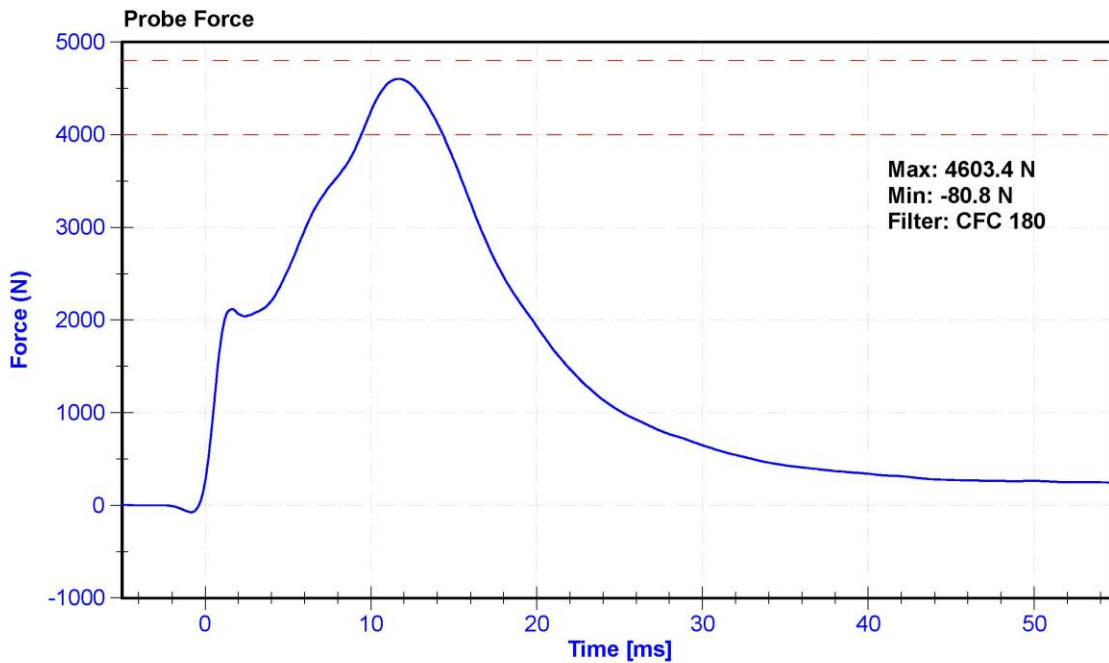
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

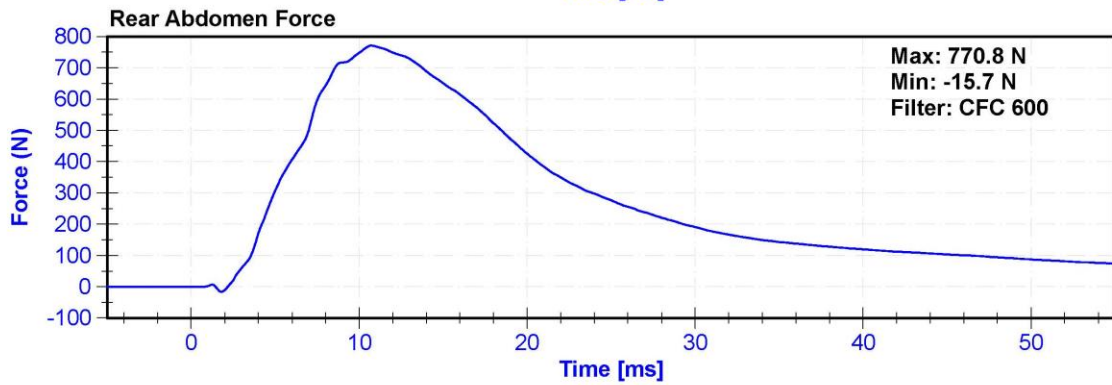
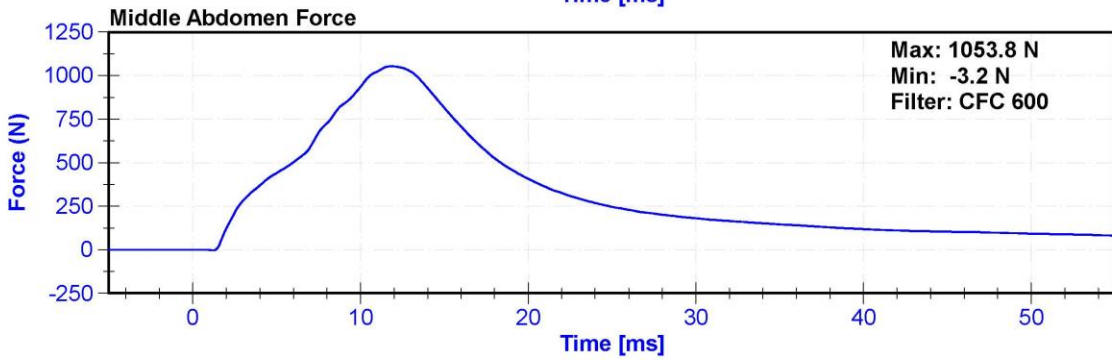
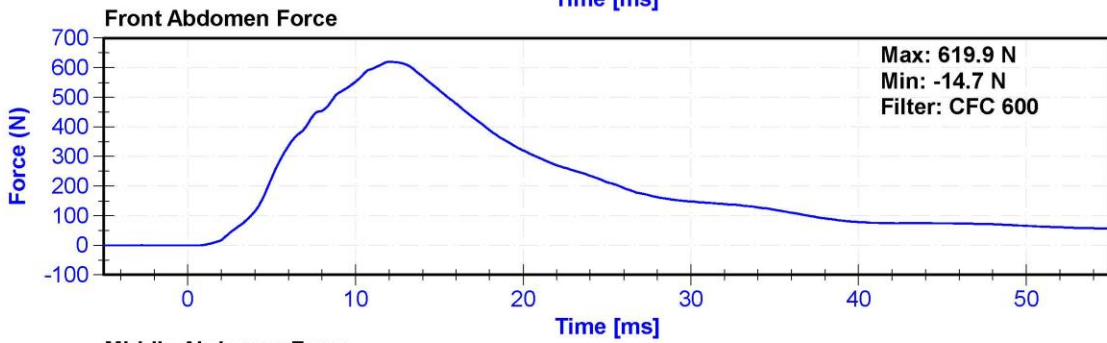
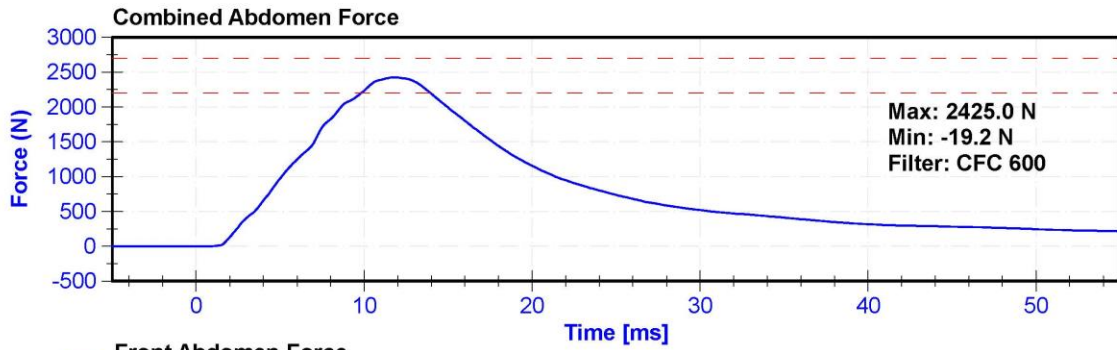
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	54.2	Pass
Velocity	3.9	4.1	m/s	4.10	Pass
Combined Abdomen Force	2200	2700	N	2425.0	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	11.80	Pass
Resistive Probe Force	4000	4800	N	4603.4	Pass
Time at Peak Resistive Force	10.6	13.0	ms	11.65	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A279031	5/8/2020	5/8/2021
Front Abdomen Load Cell	DENTON 2631	LC-1440	6/14/2019	6/13/2020
Middle Abdomen Load Cell	DENTON 2631	LC-1525	6/5/2019	6/4/2020
Rear Abdomen Load Cell	DENTON 2631	LC-1528	6/14/2019	6/13/2020







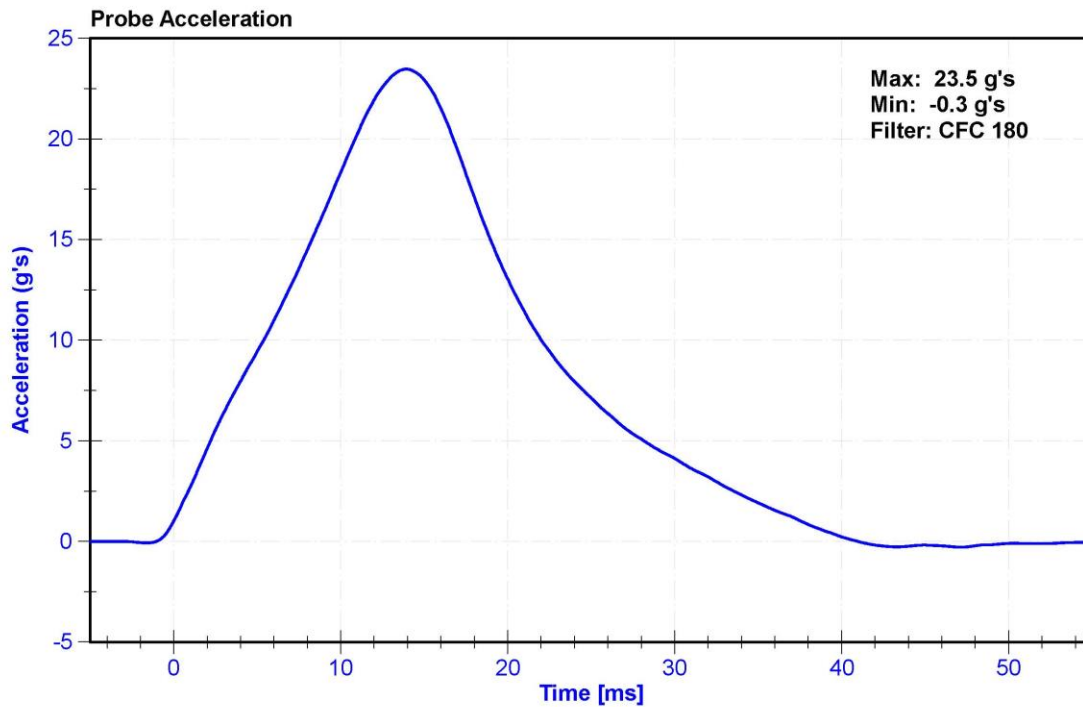
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

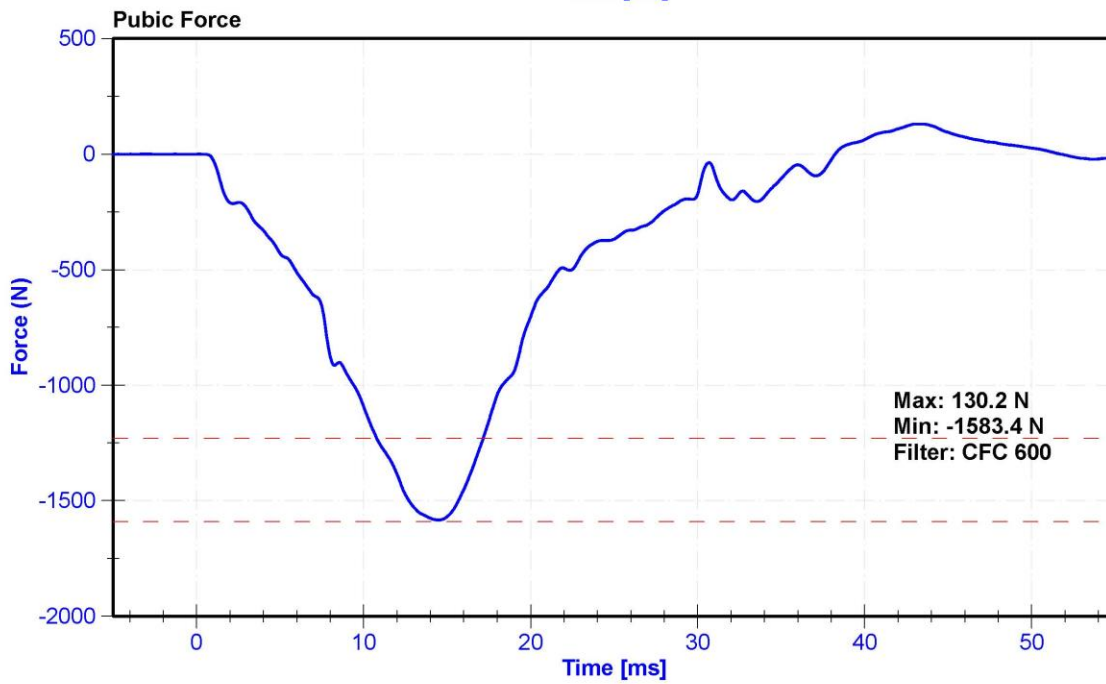
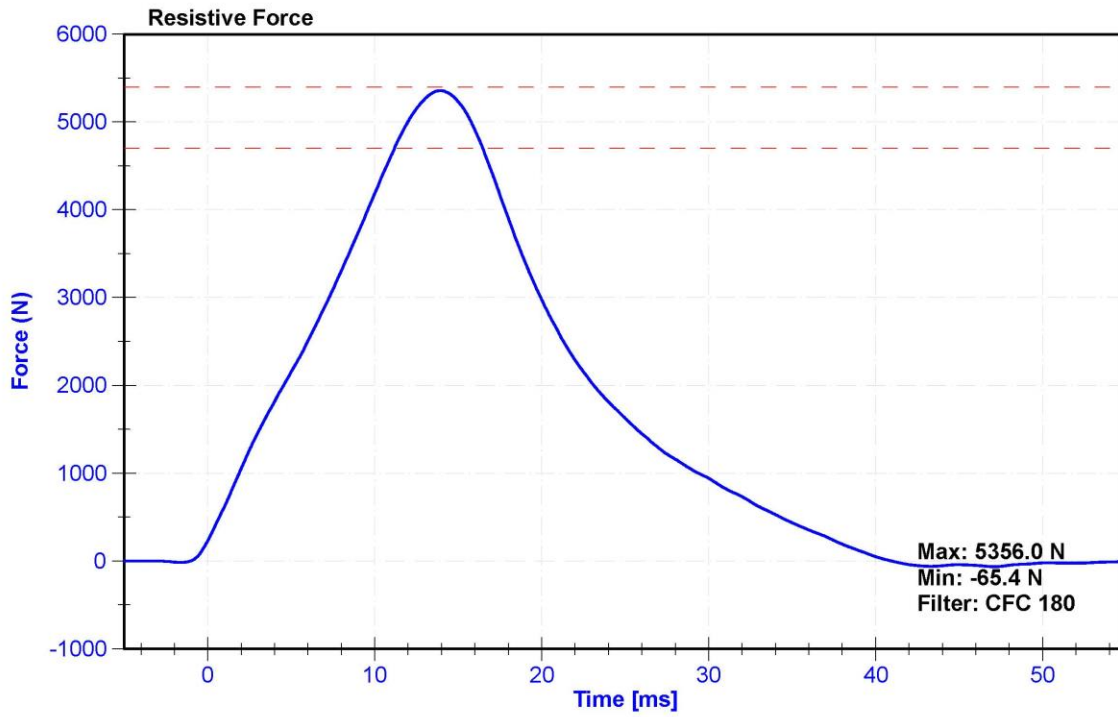
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	53.4	Pass
Velocity	4.2	4.4	m/s	4.39	Pass
Resistive Force	4700	5400	N	5356.0	Pass
Time at Peak Resistive Force	11.8	16.1	ms	13.90	Pass
Pubic Force	-1590	-1230	N	-1583.4	Pass
Time at Peak Pubic Force	12.2	17.0	ms	14.50	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A279031	5/8/2020	5/8/2021
Pubic Load Cell	Denton 3096JFL	LC-464fy	6/14/2019	6/13/2020





**CALIBRATION TEST RESULTS**

**PRE-TEST**

**SID-IIS 5<sup>TH</sup> PERCENTILE FEMALE - PASSENGER ATD**

**SERIAL No: DG8012**

**(CONFIGURED FOR LEFT SIDE IMPACT)**



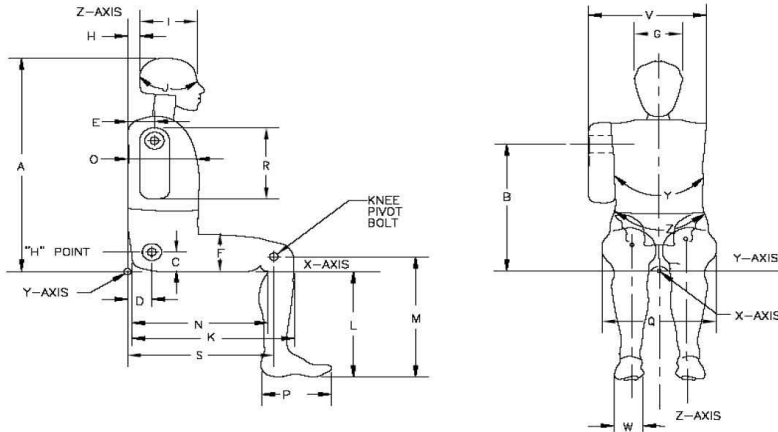


External Measurements - SID-IIs

Technician: K. Dutton

Date: 05/19/2020

Dummy Serial Number: DG8012



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	779	Pass
B	Shoulder Pivot Height	437	453	446	Pass
C	H-point Height	79	89	85	Pass
D	H-point from seatback	141	151	146	Pass
E	Shoulder Pivot from Backline	97	107	103	Pass
F	Thigh Clearance	119	135	125	Pass
G	Head Breadth	140	148	144	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	183	Pass
J	Head Circumference	541	551	547	Pass
K	Buttock to Knee Length	514	540	537	Pass
L	Popliteal Height	343	369	357	Pass
M	Knee Pivot to floor height	392	409	405	Pass
N	Buttock Popliteal Length	416	442	433	Pass
O	Chest Depth w/o jacket	195	211	205	Pass
P	Foot Length	216	232	224	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	319	Pass
R	Arm Length	249	259	255	Pass
S	Knee Joint to seatback	477	493	487	Pass
V	Shoulder Width	341	357	346	Pass
W	Foot Width	78	94	85	Pass
Y	Chest Circumference w/jacket	851	881	867	Pass
Z	Waist Circumference	761	791	781	Pass

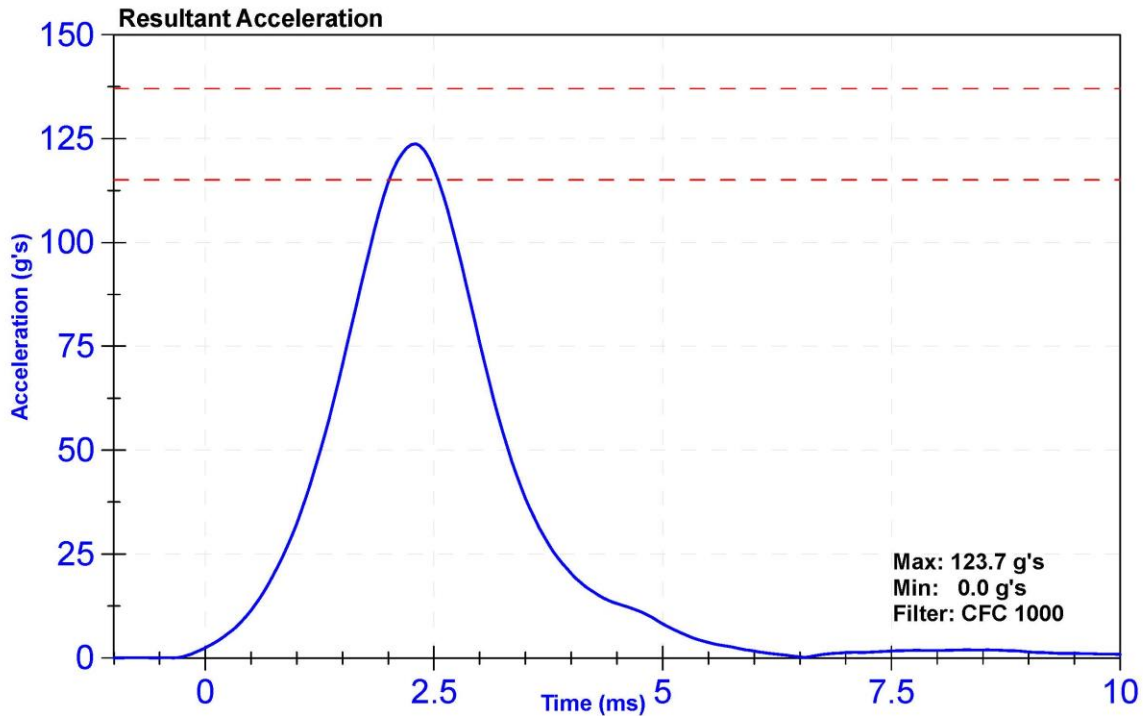
ATD Manufacturer	FTSS	Test Technician	M. Dudek
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

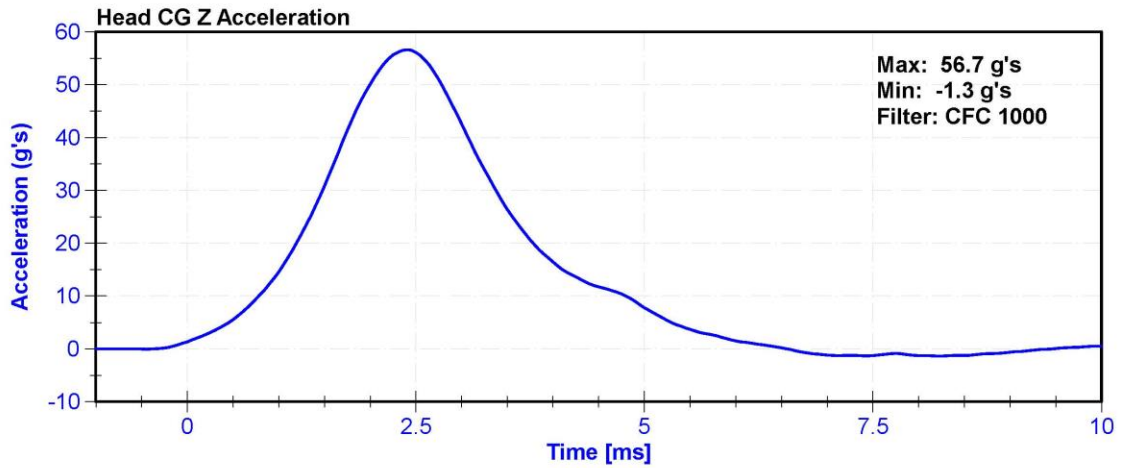
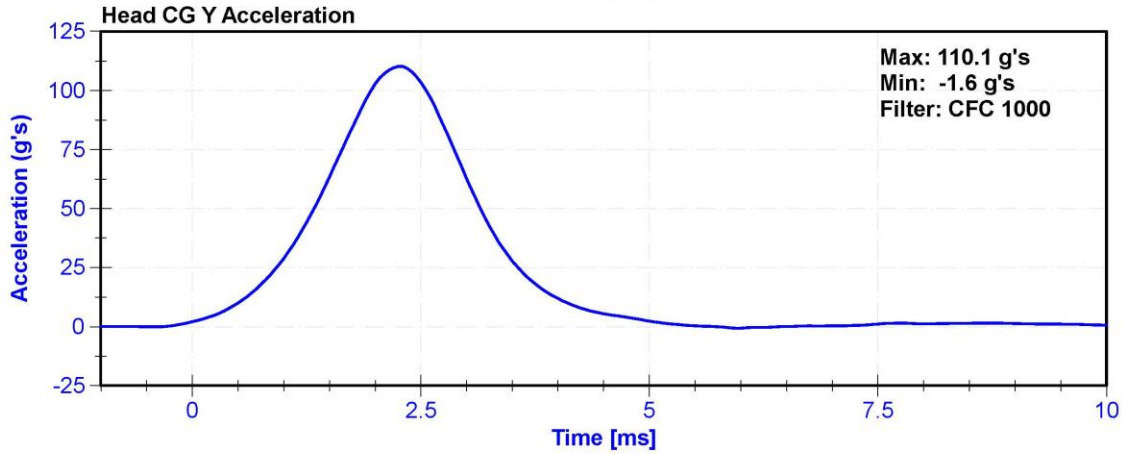
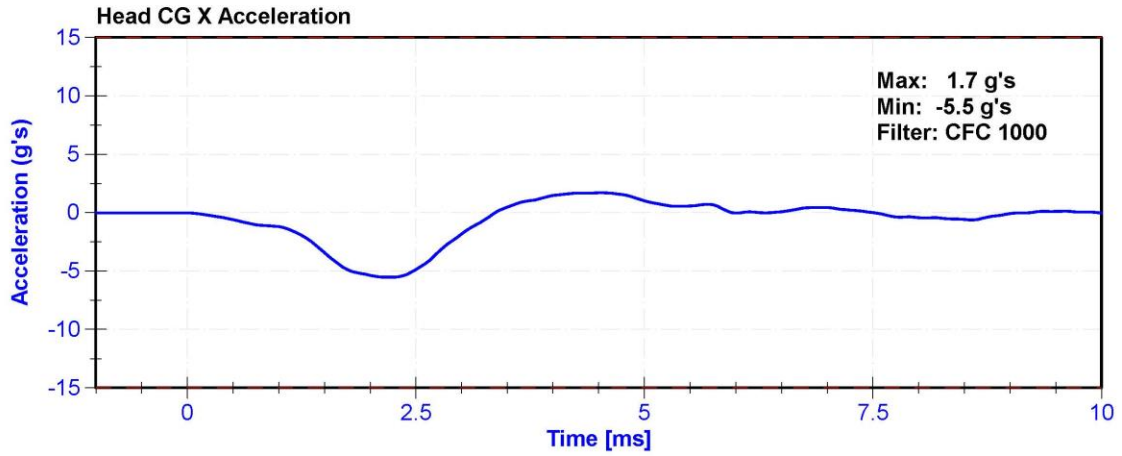
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	36.7	Pass
Resultant Acceleration	115	137	g's	123.7	Pass
Oscillation	0	15	%	1.6	Pass
Fore-Aft Acceleration	-15	15	g's	-5.5	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264	AC-P74788	4/16/2020	10/15/2020
Y Accelerometer	ENDEVCO 7264CT	AC-P83432	4/16/2020	10/15/2020
Z Accelerometer	ENDEVCO 7264	AC-P83319	4/16/2020	10/15/2020







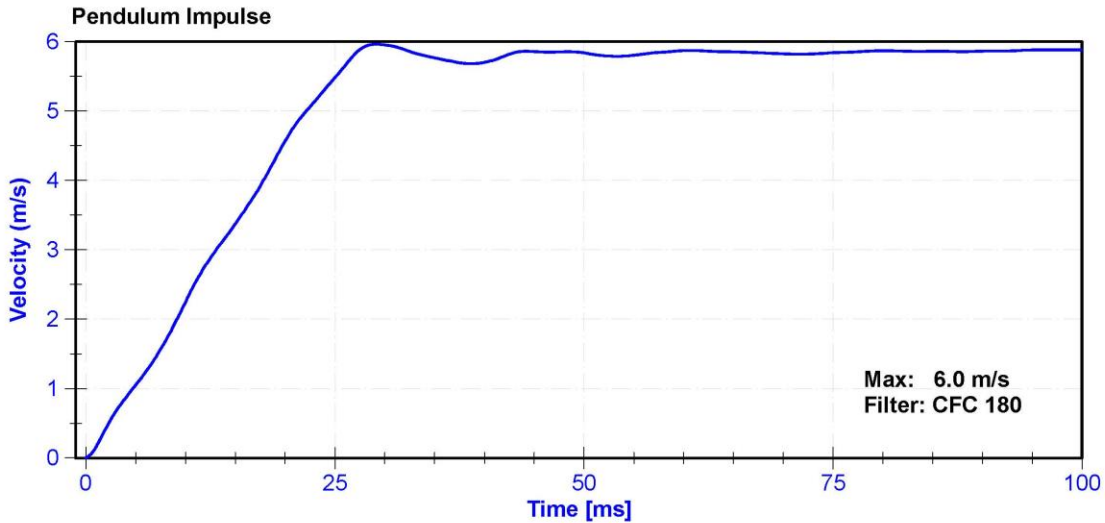
ATD Manufacturer	FTSS	Test Technician	C. Mantell
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

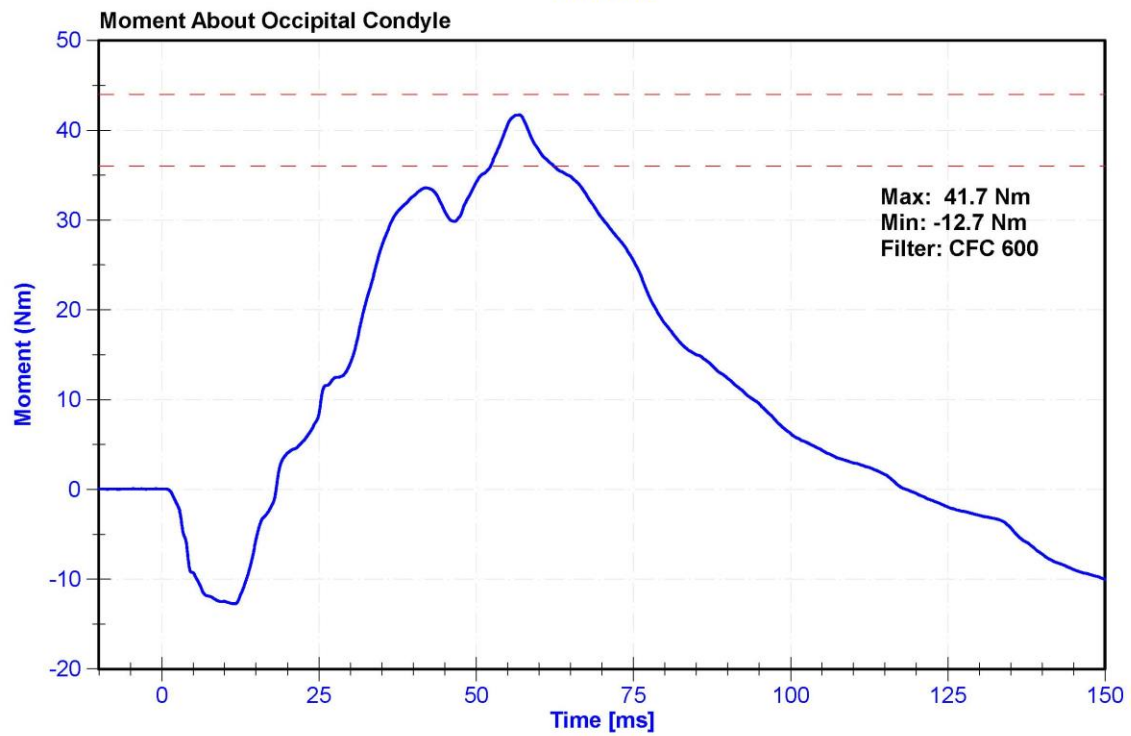
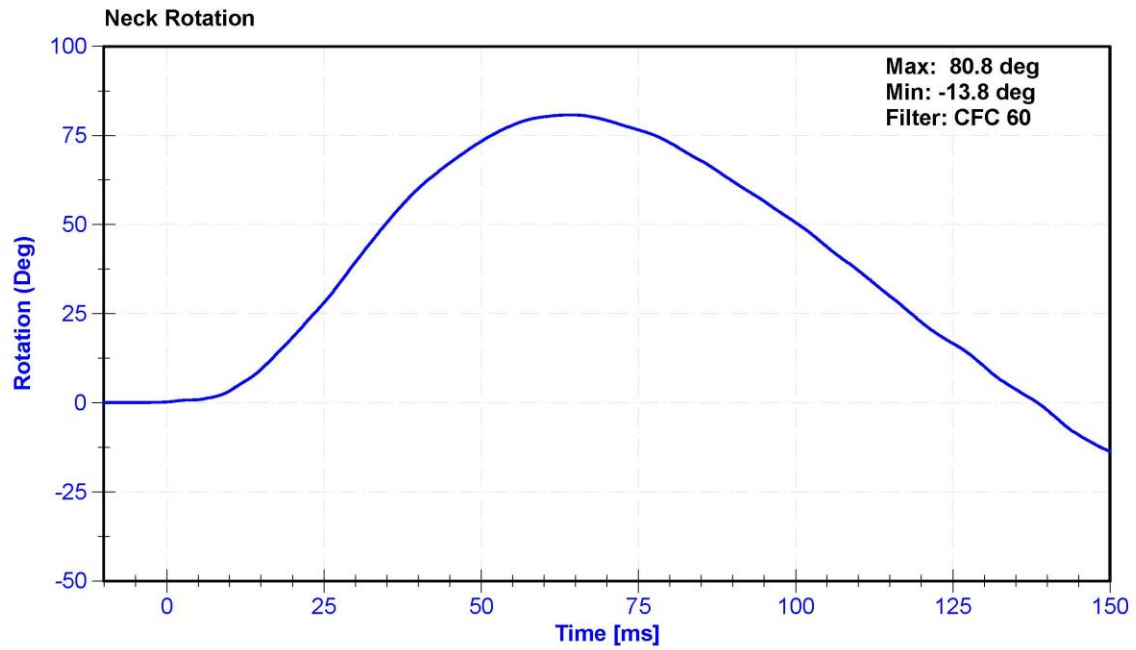
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	36	Pass
Velocity	5.51	5.63	m/s	5.549	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.25	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.37	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.56	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.48	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.96	Pass
Neck Rotation	71	81	deg	80.8	Pass
Time at Maximum Rotation	50	70	ms	64.3	Pass
Moment about the OC	36	44	Nm	41.7	Pass
Moment Decay to 0 Nm	102	126	ms	118.5	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5M9 Pend	1/30/2020	1/29/2021
Pendulum Potentiometer	Denton 78051-342	DS-184Pend	11/4/2019	11/3/2020
Condyle Potentiometer	Denton 78051-342	DS-185Pend	11/4/2019	11/3/2020
Upper Neck Load Cell	Denton 1716A	LC-2192Fy	6/20/2019	6/19/2020





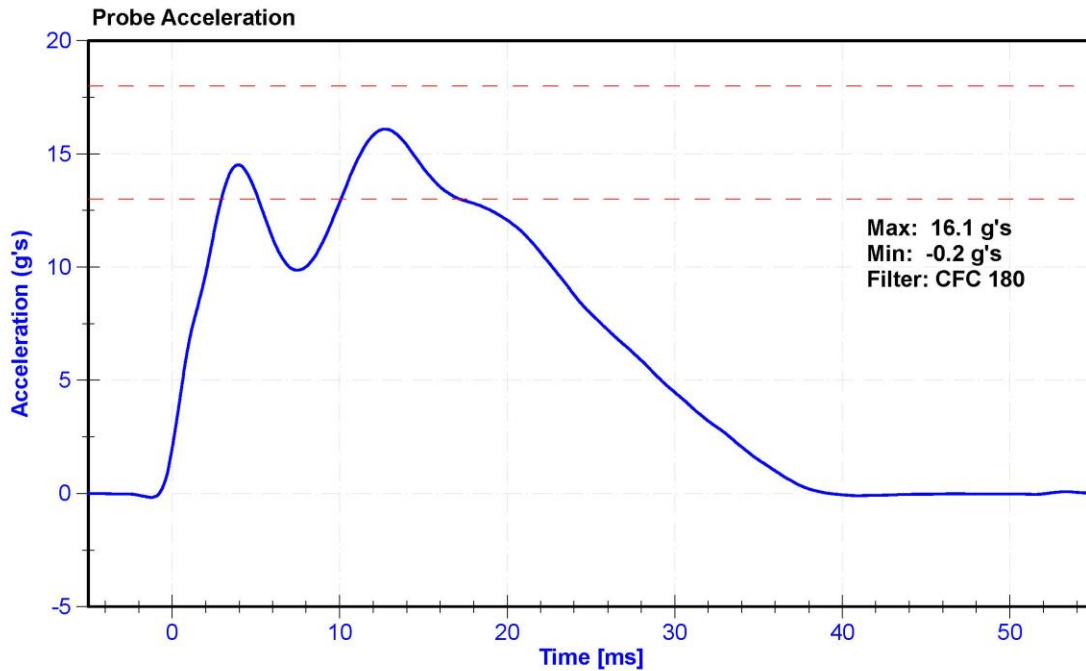
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

**Results**

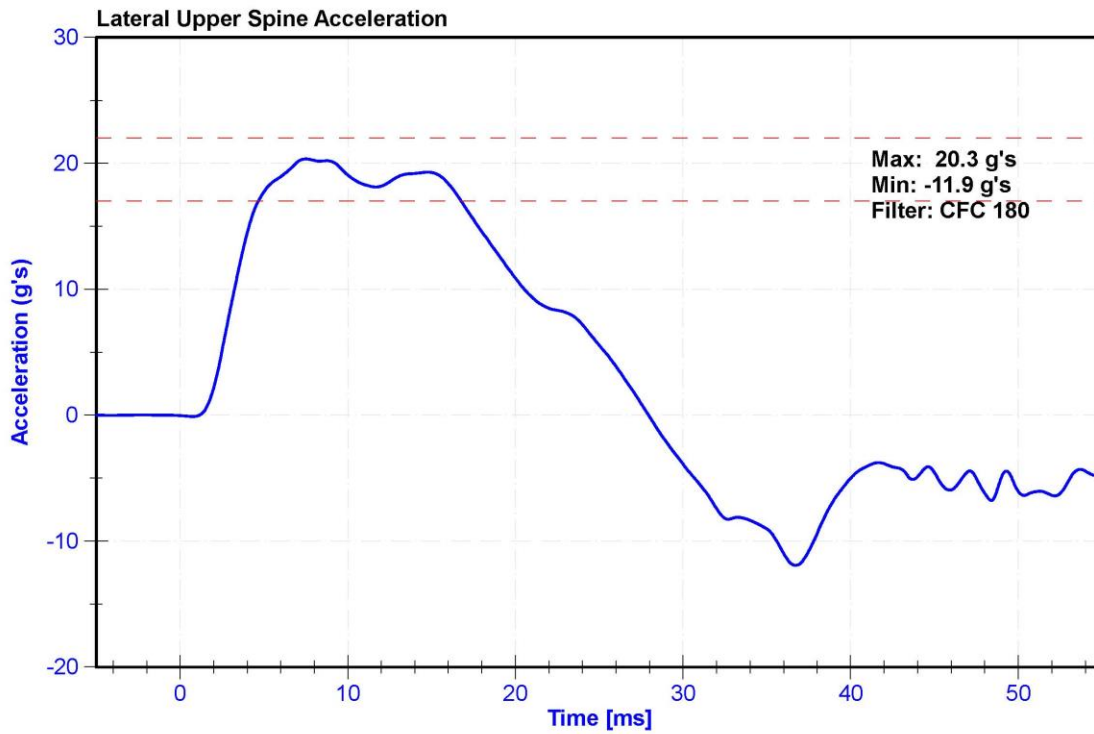
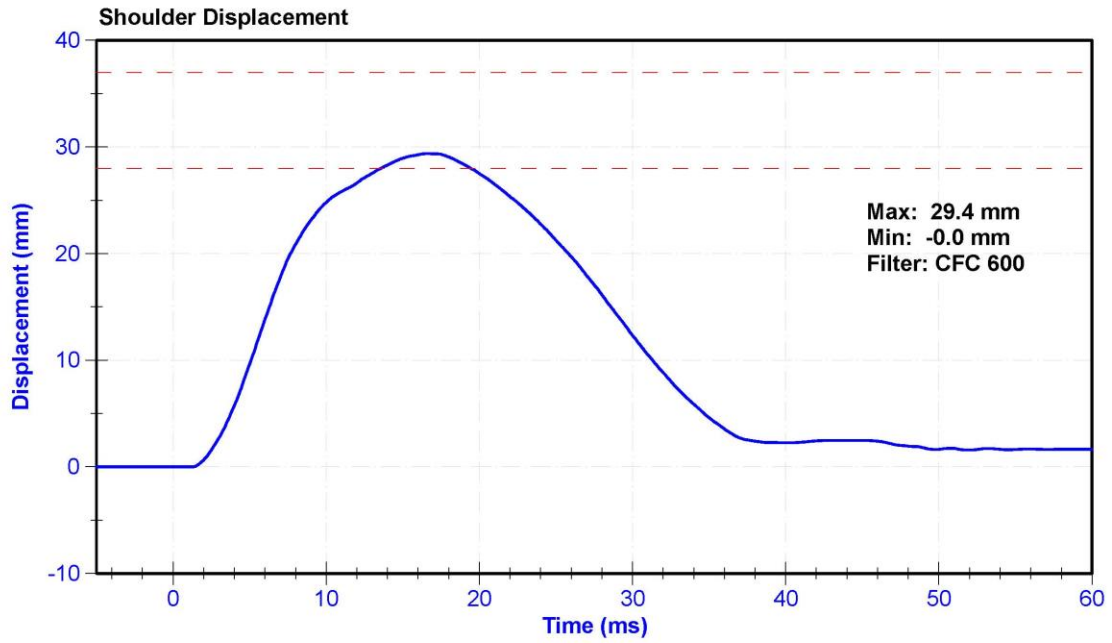
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	29	Pass
Velocity	4.2	4.4	m/s	4.38	Pass
Probe Acceleration	13	18	g's	16.1	Pass
Shoulder Deflection	28	37	mm	29.4	Pass
Lateral Upper Spine Acceleration	17	22	g's	20.3	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A286228	1/29/2020	7/29/2020
Shoulder Potentiometer	Servo 08TC1-3745	DS-1845GFE	5/6/2020	11/4/2020
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P64148	4/16/2020	10/15/2020







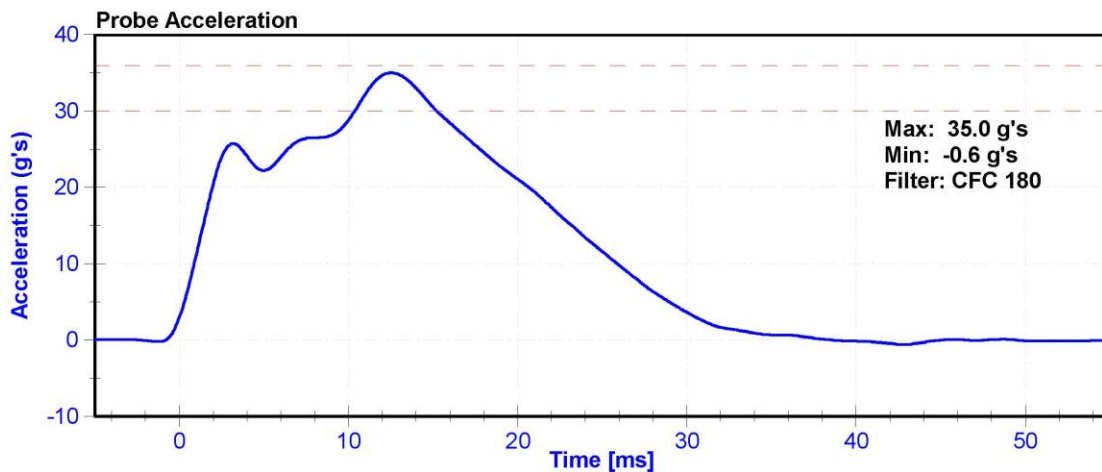
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

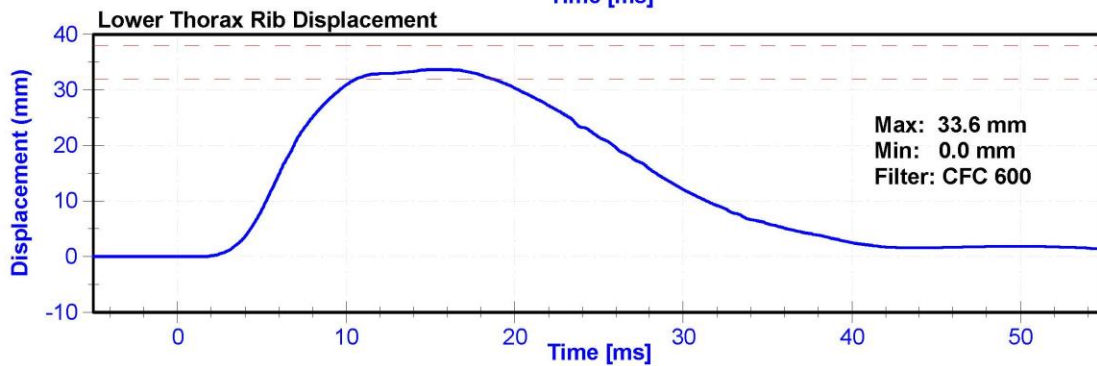
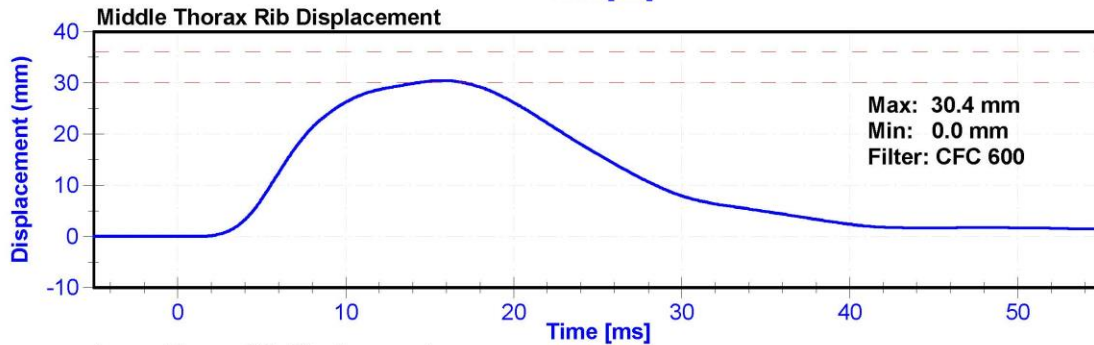
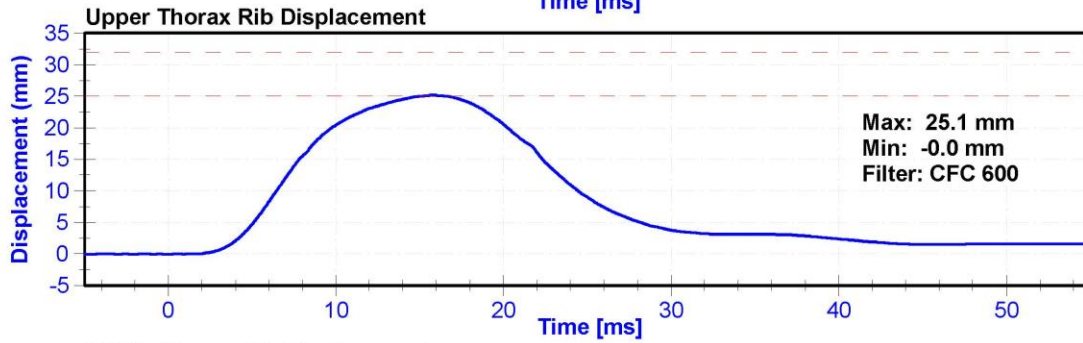
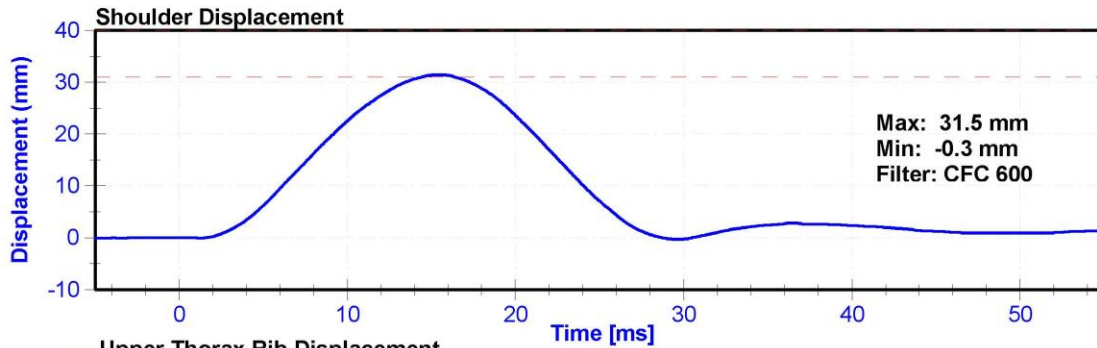
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	29.0	Pass
Velocity	6.6	6.8	m/s	6.66	Pass
Probe Acceleration after 5 ms	30	36	g's	35.0	Pass
Lateral Upper Spine Acceleration	34	43	g's	39.0	Pass
Lateral Lower Spine Acceleration	29	37	g's	34.3	Pass
Shoulder Deflection	31	40	mm	31.5	Pass
Upper Thorax Rib Deflection	25	32	mm	25.1	Pass
Mid Thorax Rib Deflection	30	36	mm	30.4	Pass
Lower Thorax Rib Deflection	32	38	mm	33.6	Pass

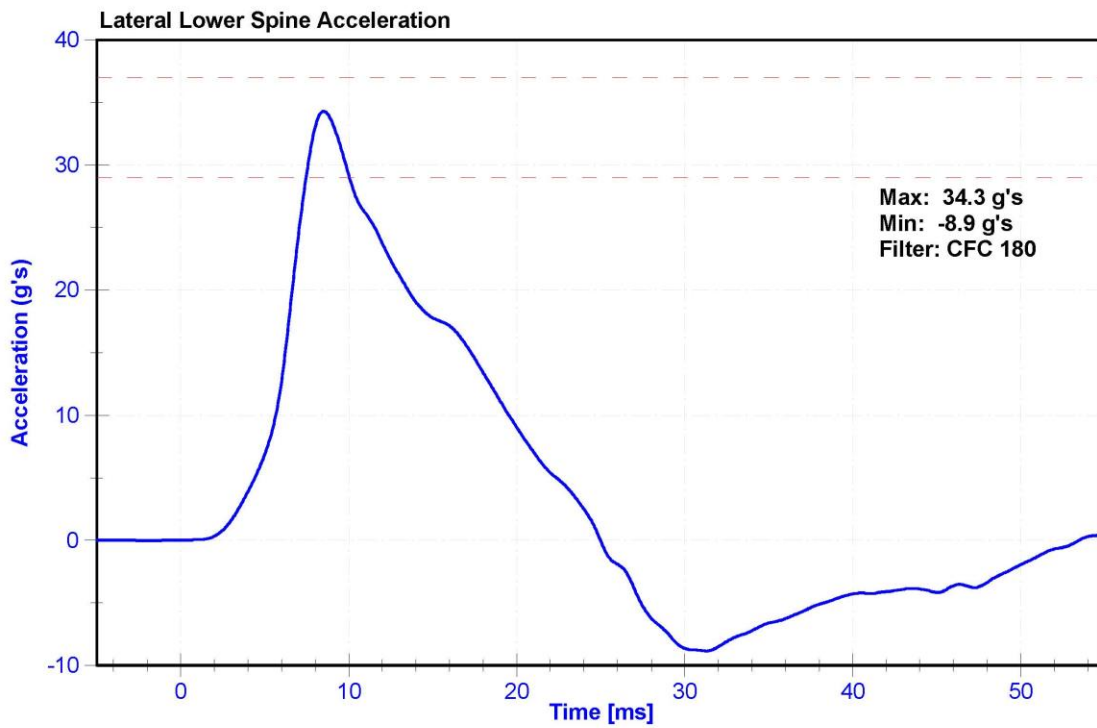
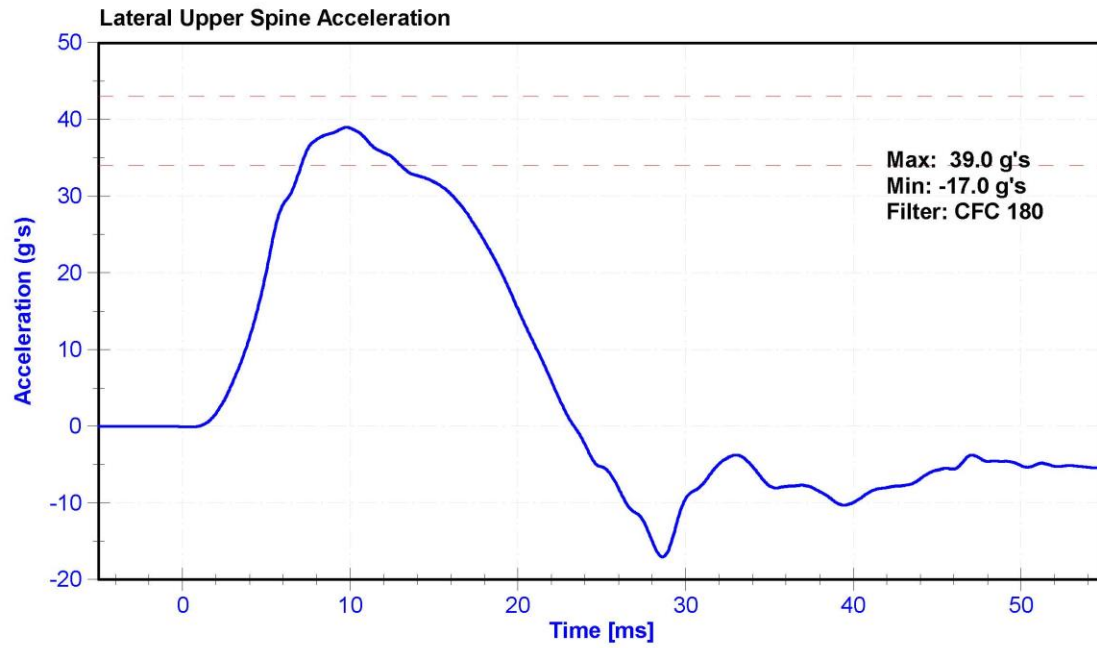
**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A286228	1/29/2020	7/29/2020
Upper Spine T1 Y Accelerometer	ENDEVCO 7264CT	AC-P64148	4/16/2020	10/15/2020
Upper Spine T12 Y Accelerometer	ENDEVCO 7264CT	AC-P51327	4/16/2020	10/15/2020
Shoulder Potentiometer	Servo 08TC1-3745	DS-1845GFE	5/6/2020	11/4/2020
Upper Thorax Rib Potentiometer	Servo 1246	DS-2165GFE	5/6/2020	11/4/2020
Middle Thorax Rib Potentiometer	Servo 08TC1-3621	DS-45 GFE	5/6/2020	11/4/2020
Lower Thorax Rib Potentiometer	Servo 08TC1-3787	DS-011GFE	5/6/2020	11/4/2020









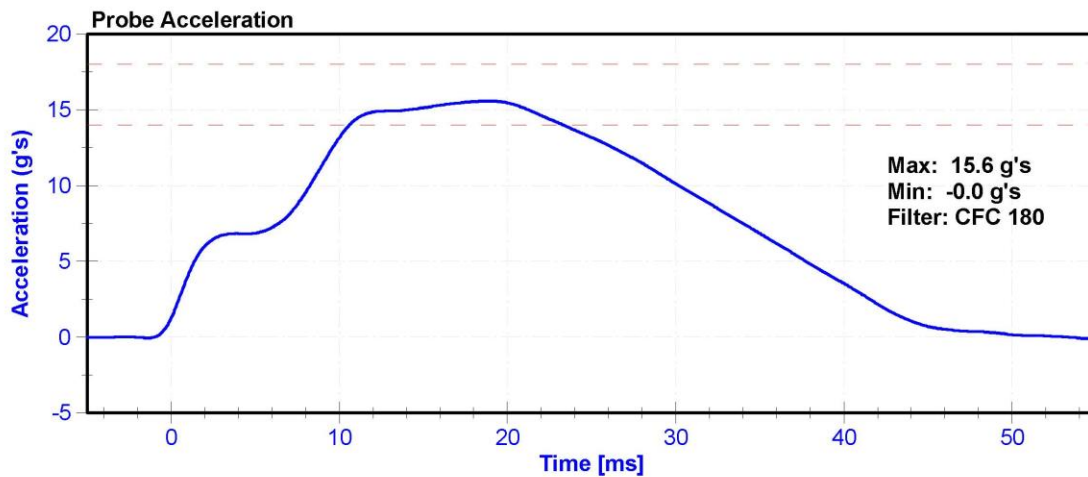
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

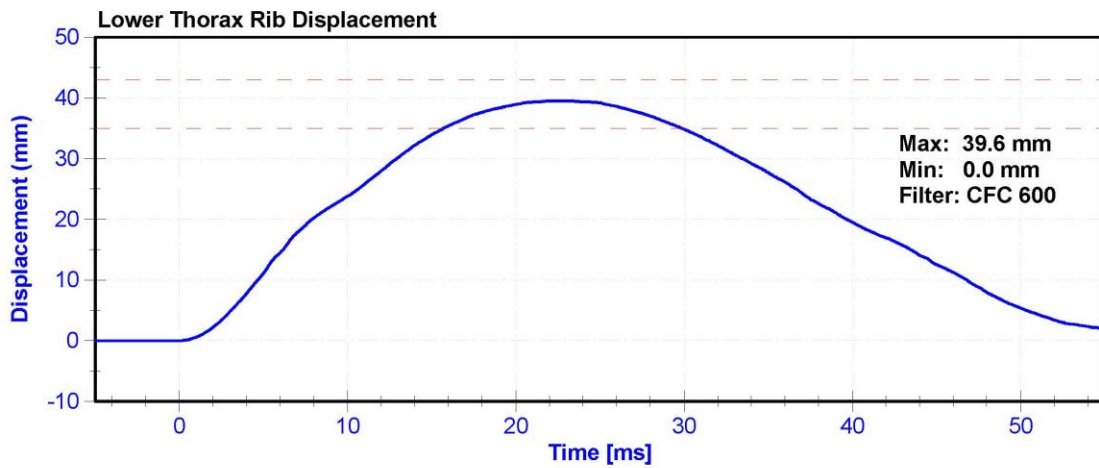
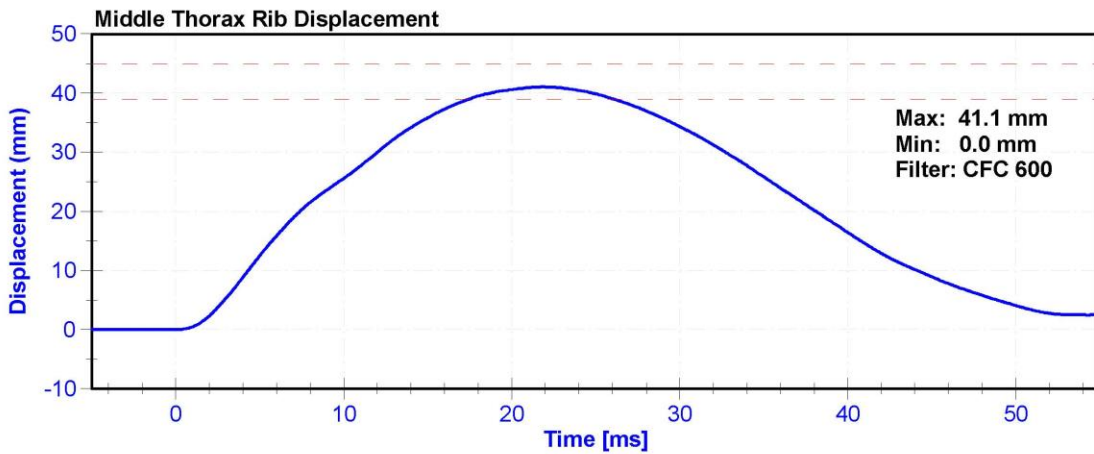
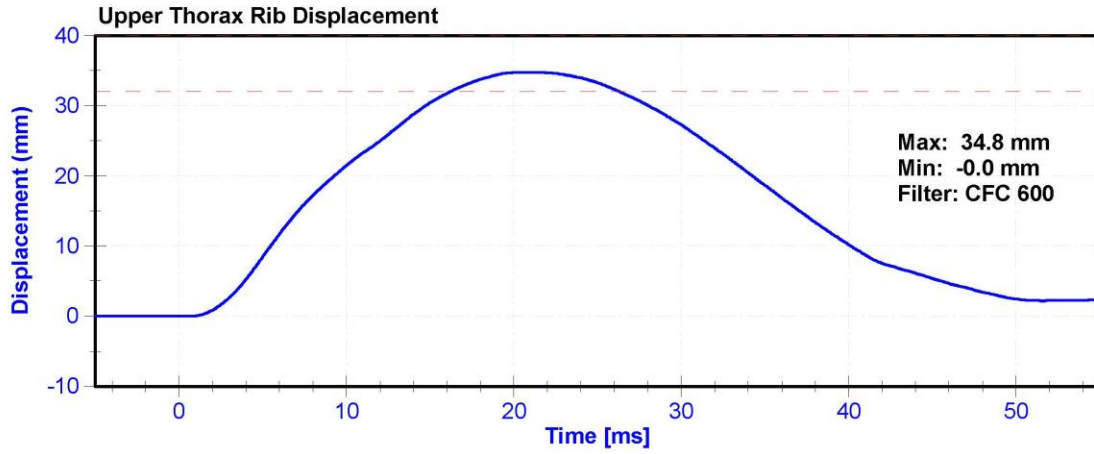
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	29	Pass
Velocity	4.2	4.4	m/s	4.21	Pass
Probe Acceleration	14	18	g's	15.6	Pass
Lateral Upper Spine Acceleration	13	17	g's	14.7	Pass
Lateral Lower Spine Acceleration	7	11	g's	8.6	Pass
Upper Thorax Rib Deflection	32	40	mm	34.8	Pass
Middle Thorax Rib Deflection	39	45	mm	41.1	Pass
Lower Thorax Rib Deflection	35	43	mm	39.6	Pass

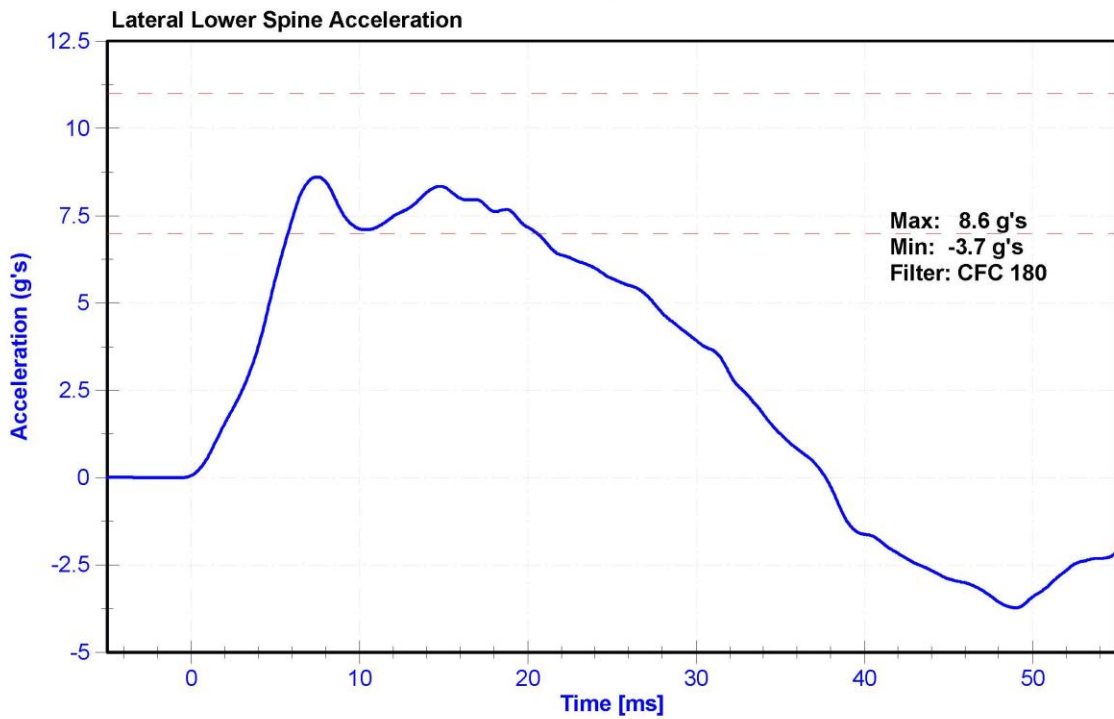
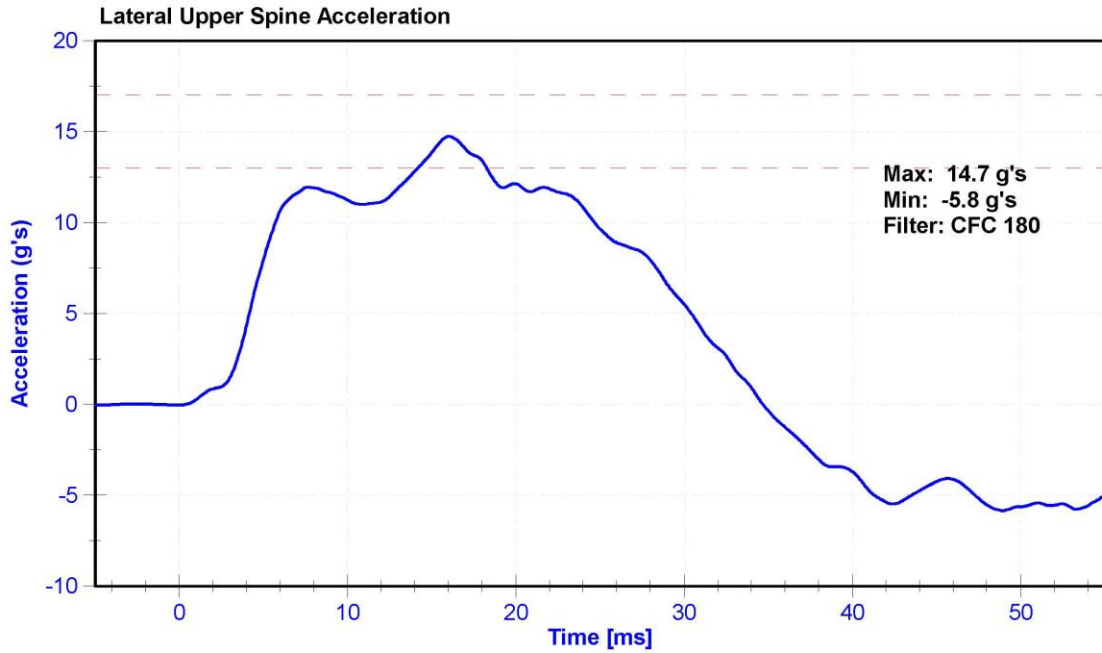
**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A286228	1/29/2020	7/29/2020
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P64148	4/16/2020	10/15/2020
Lower Spine Y Accelerometer	ENDEVCO 7264CT	AC-P51327	4/16/2020	10/15/2020
Upper Thorax Rib Potentiometer	Servo 1246	DS-2165GFE	5/6/2020	11/4/2020
Middle Thorax Rib Potentiometer	Servo 08TC1-3621	DS-45 GFE	5/6/2020	11/4/2020
Lower Thorax Rib Potentiometer	Servo 08TC1-3787	DS-011GFE	5/6/2020	11/4/2020









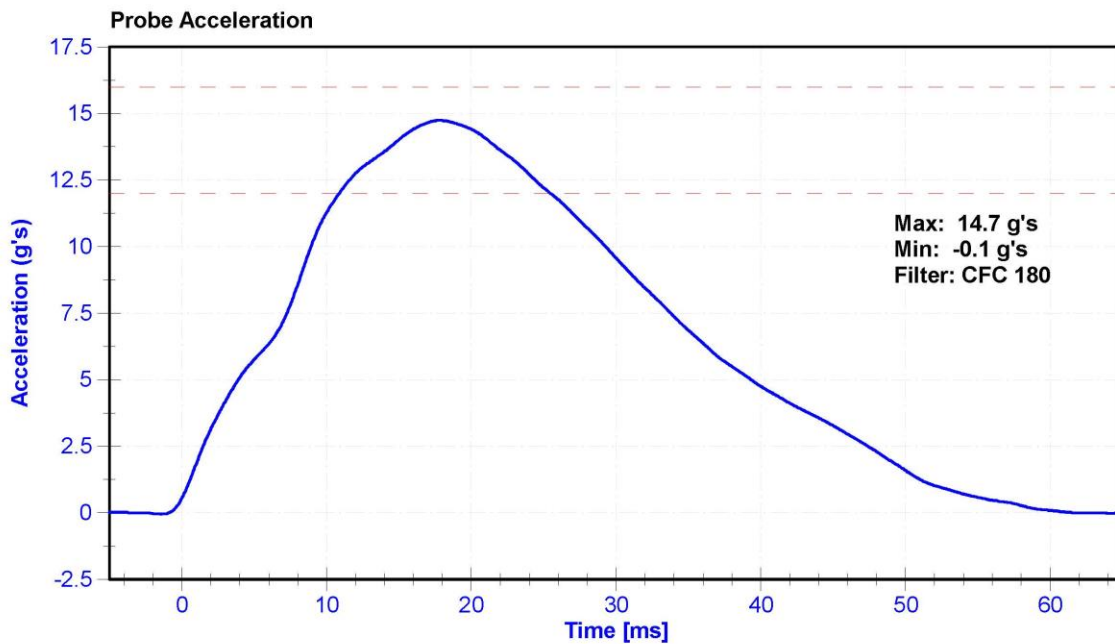
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

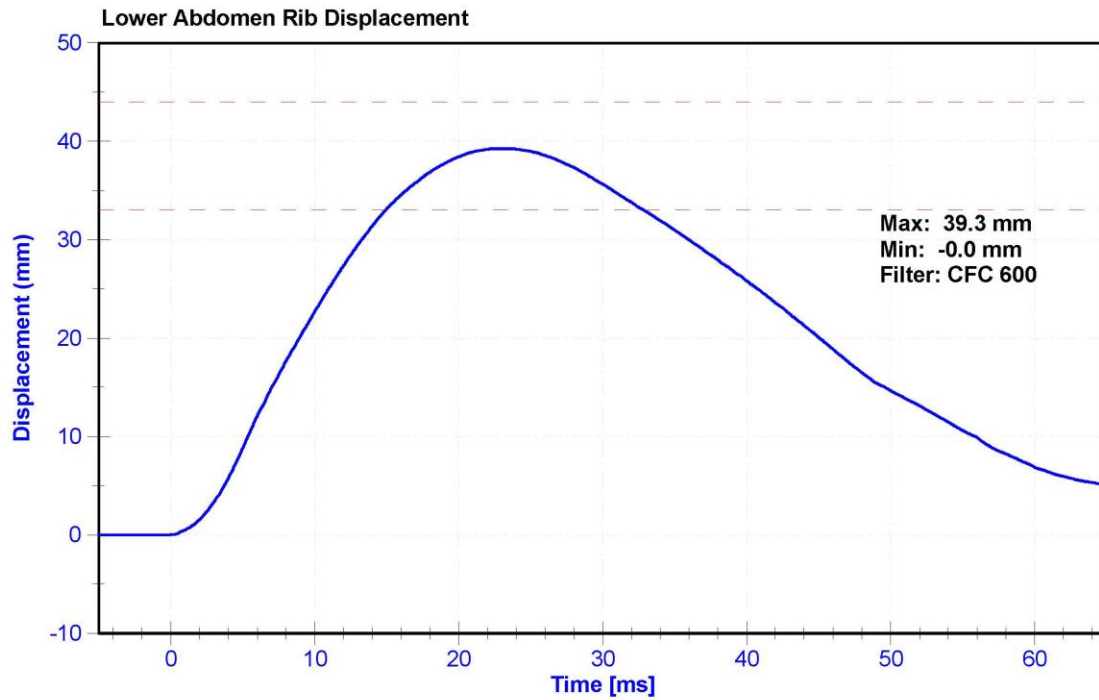
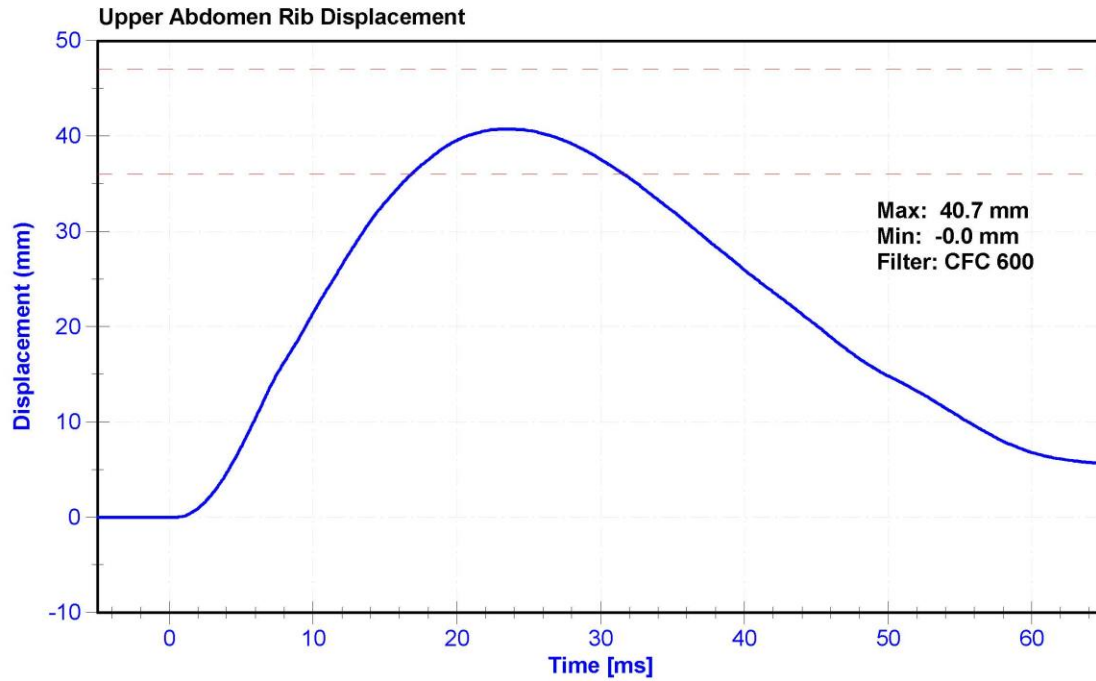
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	30.0	Pass
Velocity	4.2	4.4	m/s	4.22	Pass
Probe Acceleration	12	16	g's	14.7	Pass
Lateral Lower Spine Acceleration	9	14	g's	11.1	Pass
Upper Abdomen Rib Deflection	36	47	mm	40.7	Pass
Lower Abdomen Rib Deflection	33	44	mm	39.3	Pass

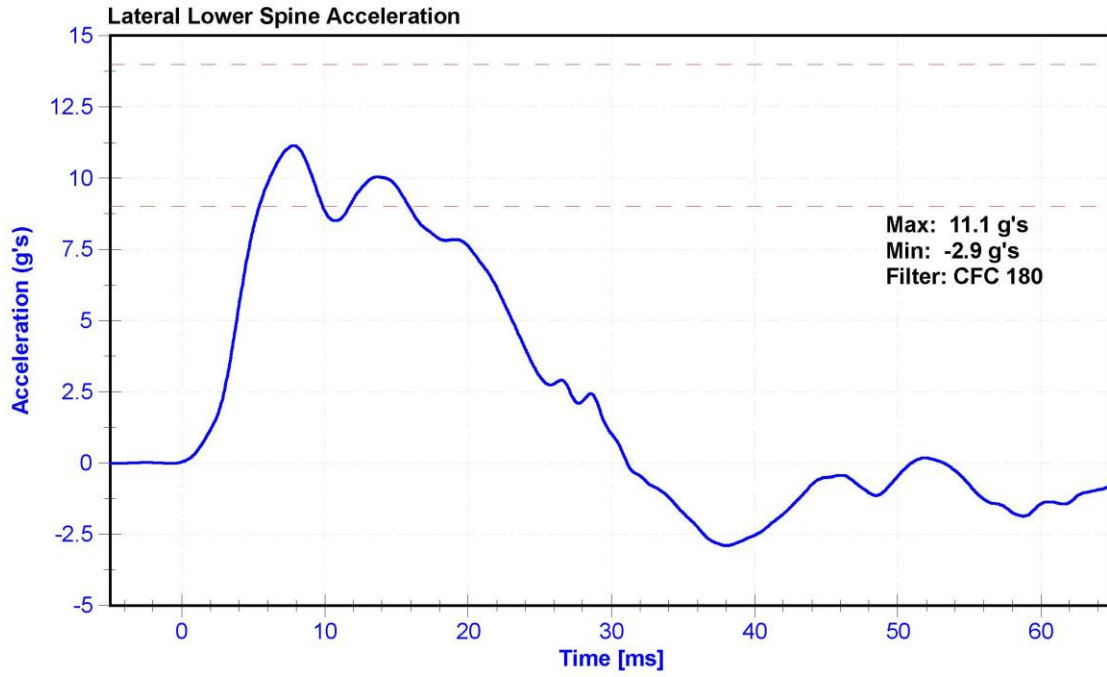
**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	MSI 64C-2000	A286228	1/29/2020	7/29/2020
Lower Spine Y Accelerometer	ENDEVCO 7264CT	AC-P51327	4/16/2020	10/15/2020
Upper Abdomen Rib Potentiometer	Servo 08TC1-3725	DS-008GFE	5/6/2020	11/4/2020
Lower Abdomen Rib Potentiometer	Servo 08TC1-3745	DS-1774GFE	5/6/2020	11/4/2020









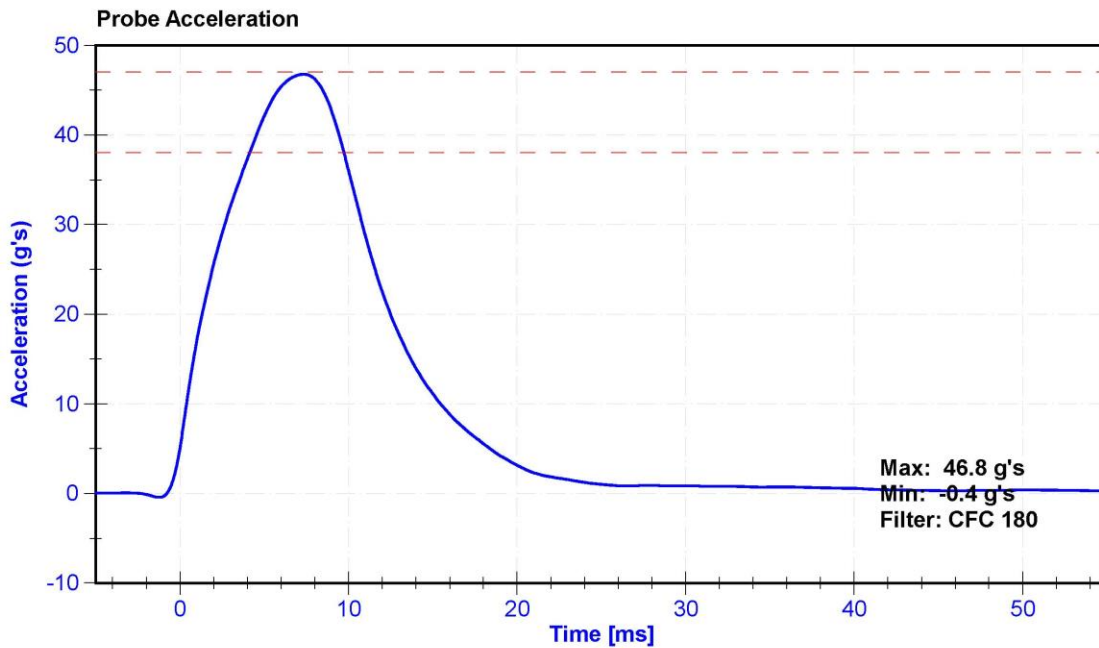
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

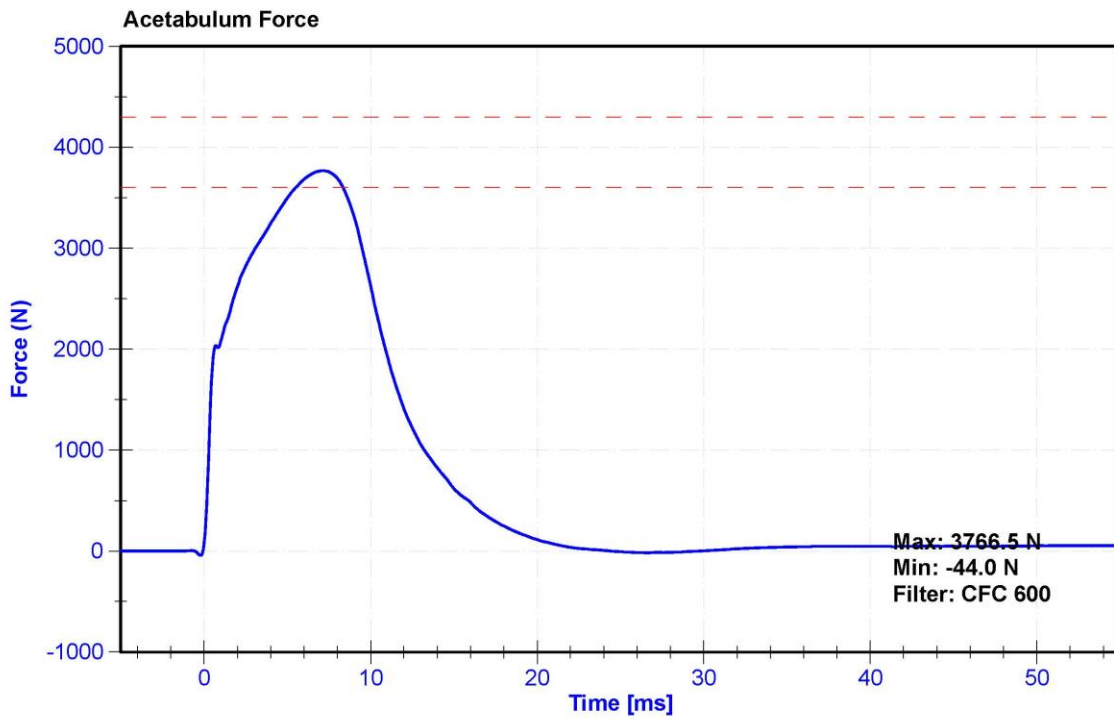
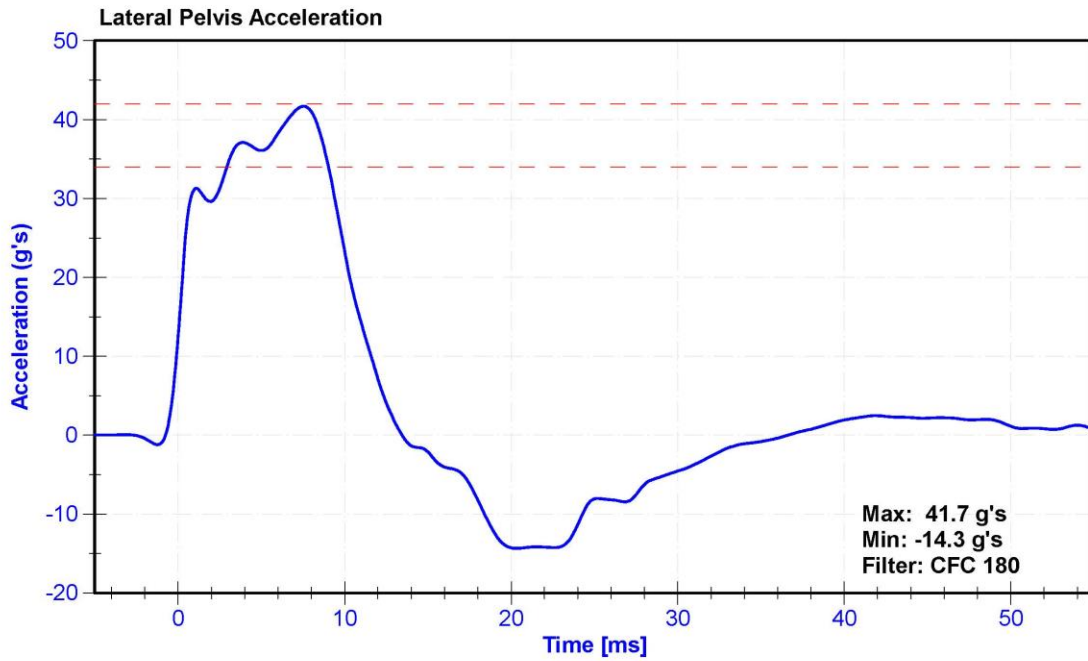
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	30	Pass
Velocity	6.6	6.8	m/s	6.63	Pass
Probe Acceleration	38	47	g's	46.8	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	41.7	Pass
Acetabulum Force	3600	4300	N	3766.5	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A286228	1/29/2020	7/29/2020
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P51875	4/16/2020	10/15/2020
Acetabulum Load Cell	Denton 3249J	LC-4986Fy	6/14/2019	6/13/2020
Certification Plug	SACO	13207	8/8/2019	N/A
Crash Test Plug	SACO	12603	9/20/2019	N/A









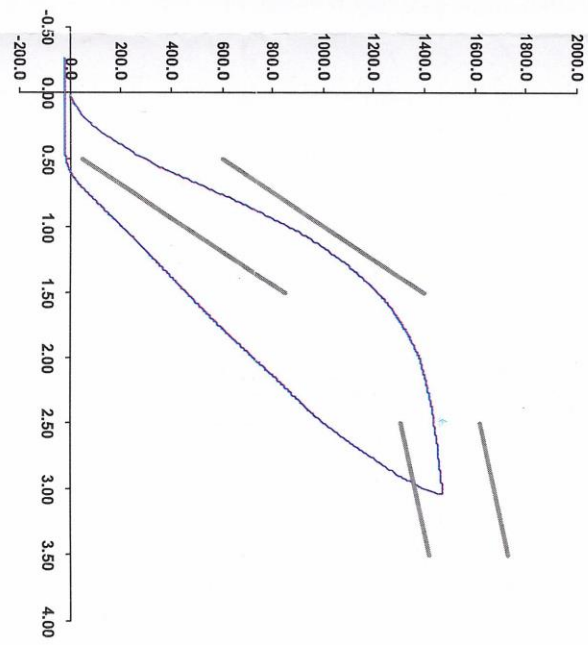
cert 2  
D68018  
5/19/20

### SID-11s Pelvis Plug Certification Test

Plug S/N 13207  
Test Number 10602  
Report Number 10637  
Test Date 8/8/2019 1:13:27 PM

Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	50.00	600.00
Force @ 1.5 mm (N)	850.00	1,400.00
Force @ 2.5 mm (N)	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,361.00	1,673.00

Testing Machine STM-20 5965542  
 Load Cell S/N (F1360947), Units (LBS) 1000  
 Crosshead Speed (mm / min) or Rate 127  
 Extension or Position Measured by XHD\_100 (XHD100)



Notes:

Operator \_\_\_\_\_

Part Number 180-4450

Template No 107      08-Aug-19

SACO Research

By: DC      Date: 8/8/2019

SACO Research 41735 Elm St #401 Murrieta, CA 92562      Tel 310-694-2082 FAX



*Crash Test 5/19/20*

### SID-11s Pelvis Plug Certification Test

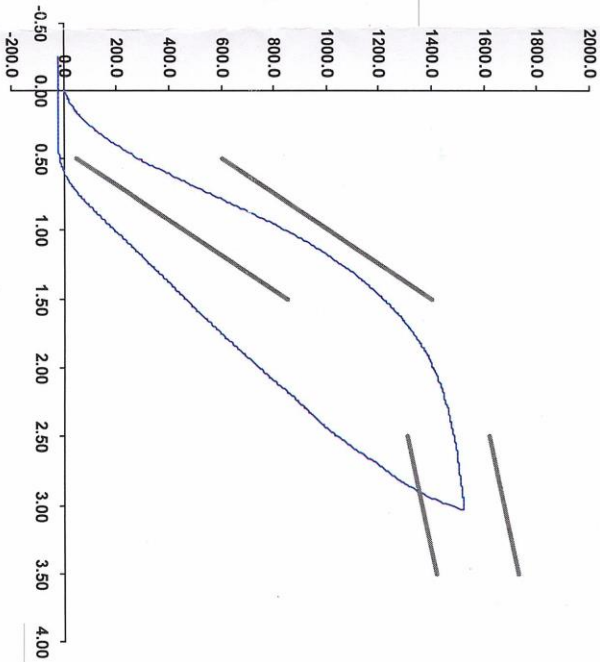
Plug S/N 13405  
Test Number 11047  
Report Number 11085  
Test Date 9/20/2019 7:09:46 AM

Force (-N) vs Extension (-mm)

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	295.08	50.00	600.00
Force @ 1.5 mm (N)	1,220.05	850.00	1,400.00
Force @ 2.5 mm (N)	1,484.34	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,521.89	1,361.00	1,673.00

Testing Machine STM-20 5965542  
Load Cell S/N (F1360947), Units (LBS) 1000  
Crosshead Speed (mm/min) or Rate 12.7  
Extension or Position Measured by XHD\_100 (XHD100)

Notes:



Operator  
Part Number 180-4450

Template No 107 20-Sep-19  
SACO Research

By: *BC* Date: *9/20/2019*  
SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 FAX

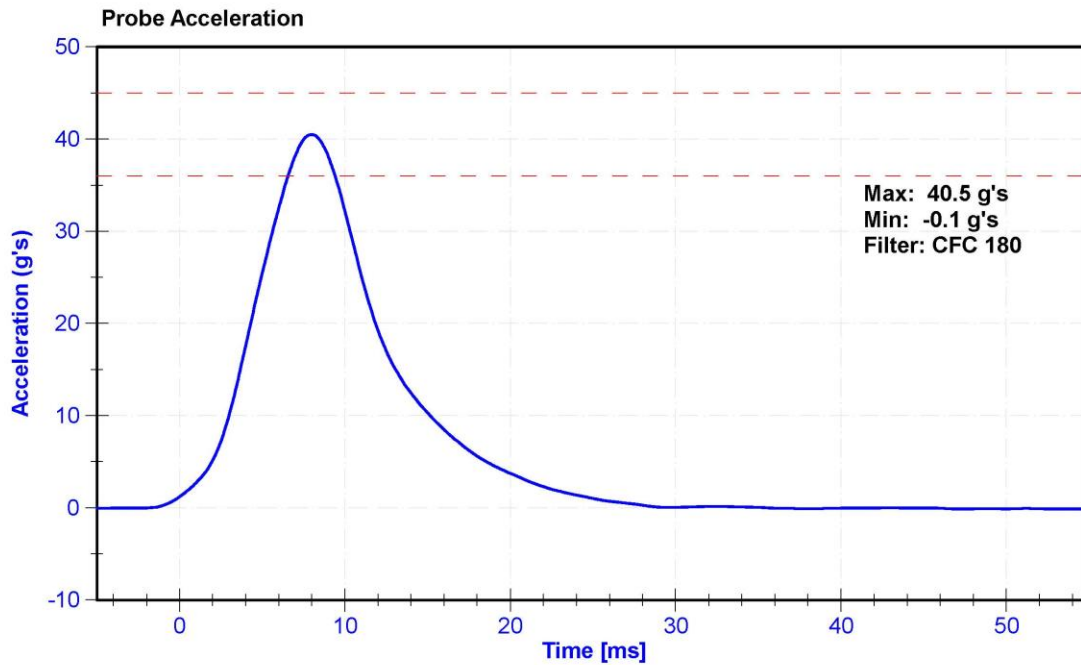
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

**Results**

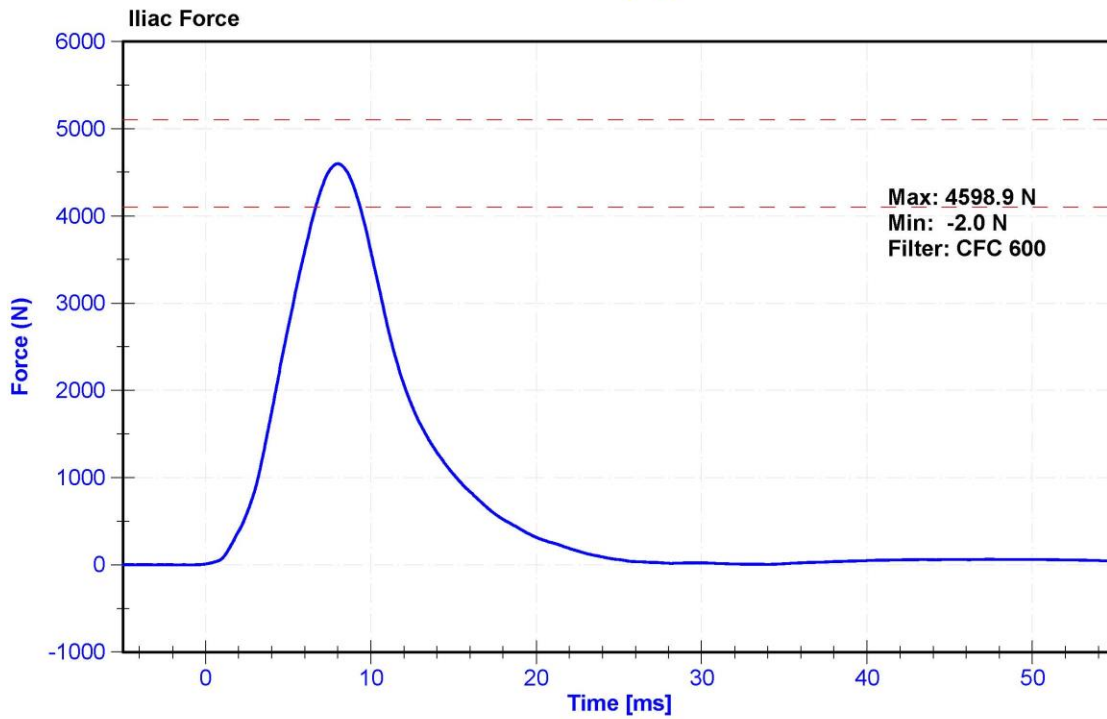
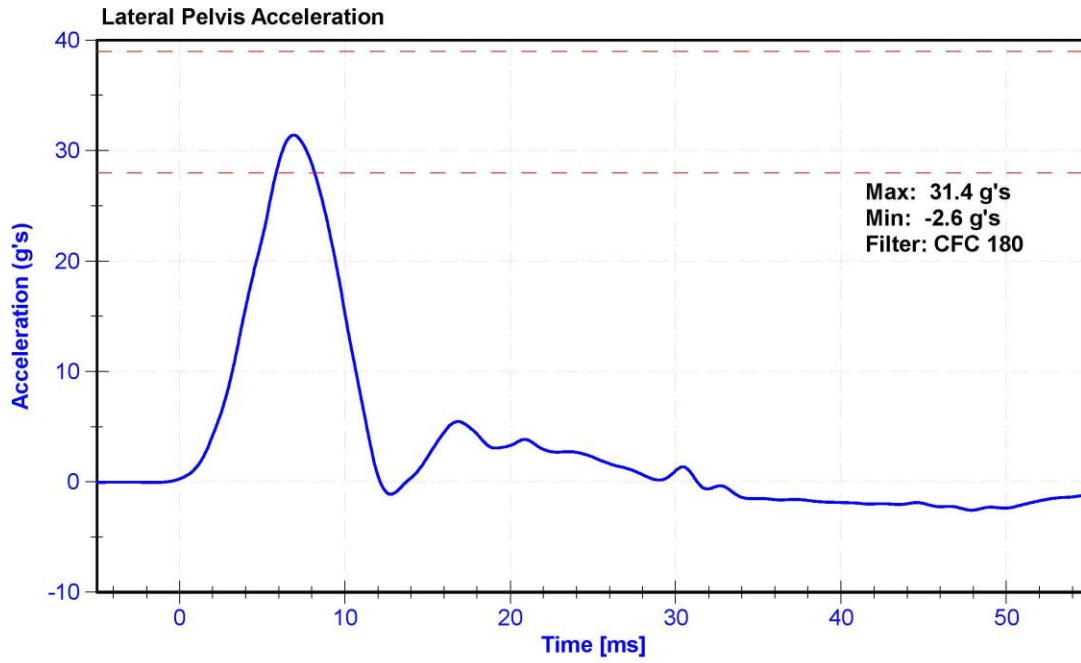
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	29.0	Pass
Velocity	4.2	4.4	m/s	4.37	Pass
Probe Acceleration	36	45	g's	40.5	Pass
Lateral Pelvis Acceleration	28	39	g's	31.4	Pass
Iliac Force	4100	5100	N	4598.9	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A286228	1/29/2020	7/29/2020
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P51875	4/16/2020	10/15/2020
Iliac Load Cell	DENTON 3228J	LC-290Fy	9/25/2019	9/24/2020







**CALIBRATION TEST RESULTS**

**POST-TEST**

**EUROSID 2 (ES-2RE) MALE – DRIVER ATD**

**SERIAL NO: F034**

**(CONFIGURED FOR LEFT SIDE IMPACT)**

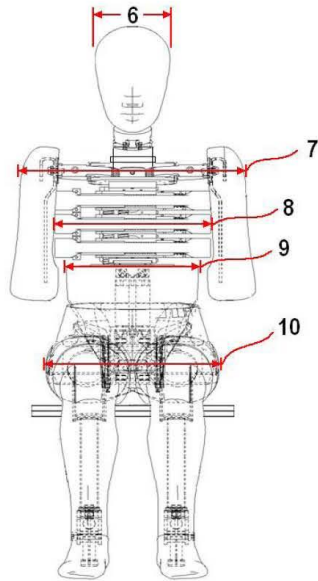


External Measurements - EuroSID-2re

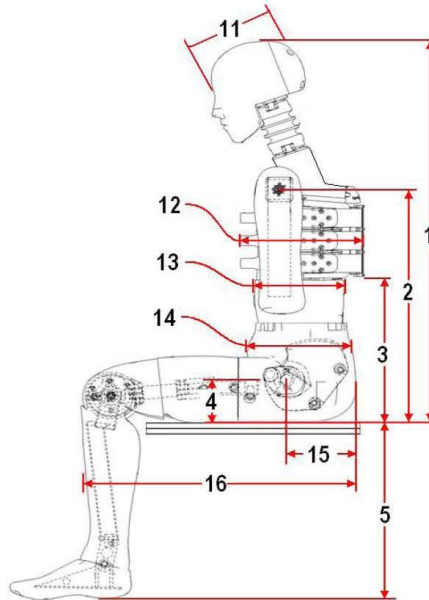
Technician: K. Dutton

Date: 06/01/2020

Dummy Serial Number: F034



FRONT VIEW



SIDE VIEW

Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	910	Pass
2	Seat to Shoulder Joint	558	572	569	Pass
3	Seat to Lower Face of Thoracic Spine Box	346	356	352	Pass
4	Seat to Hip Joint (center of bolt)	97	103	100	Pass
5	Sole to Seat, Sitting	333	451	421	Pass
6	Head Width	152	158	154	Pass
7	Shoulder/Arm Width	461	479	472	Pass
8	Thorax Width	322	332	329	Pass
9	Abdomen Width	273	287	285	Pass
10	Pelvis Lap Width	359	373	365	Pass
11	Head Depth	196	206	202	Pass
12	Thorax Depth	262	272	269	Pass
13	Abdomen Depth	194	204	202	Pass
14	Pelvis Depth	235	245	240	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150	160	155	Pass
16	Back of Buttocks to Front Knee	597	615	609	Pass



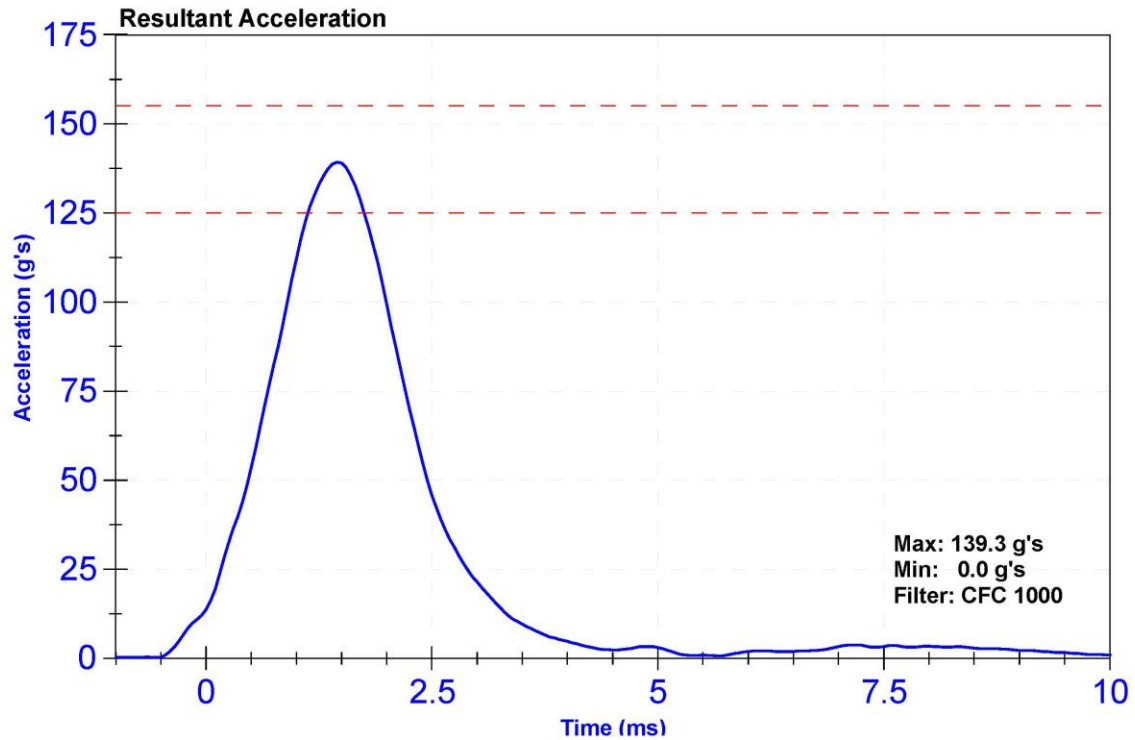
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

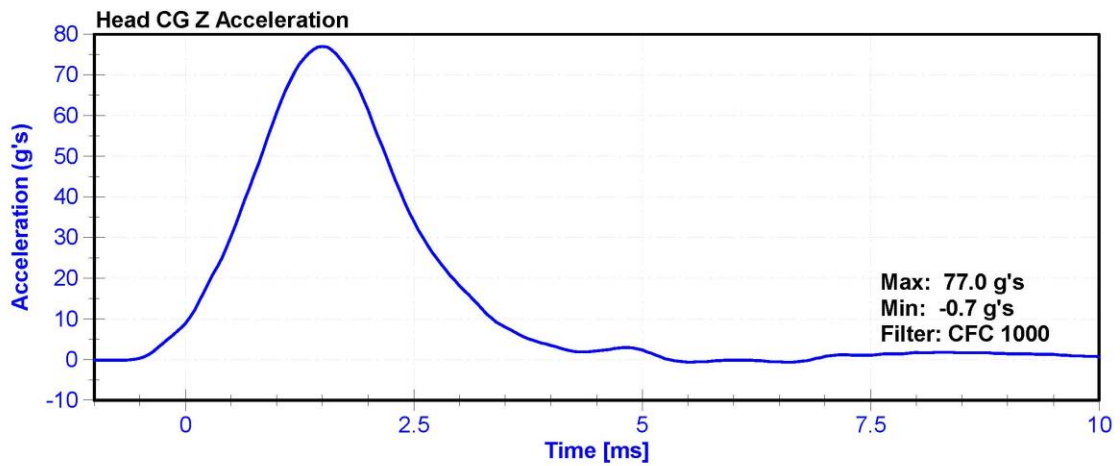
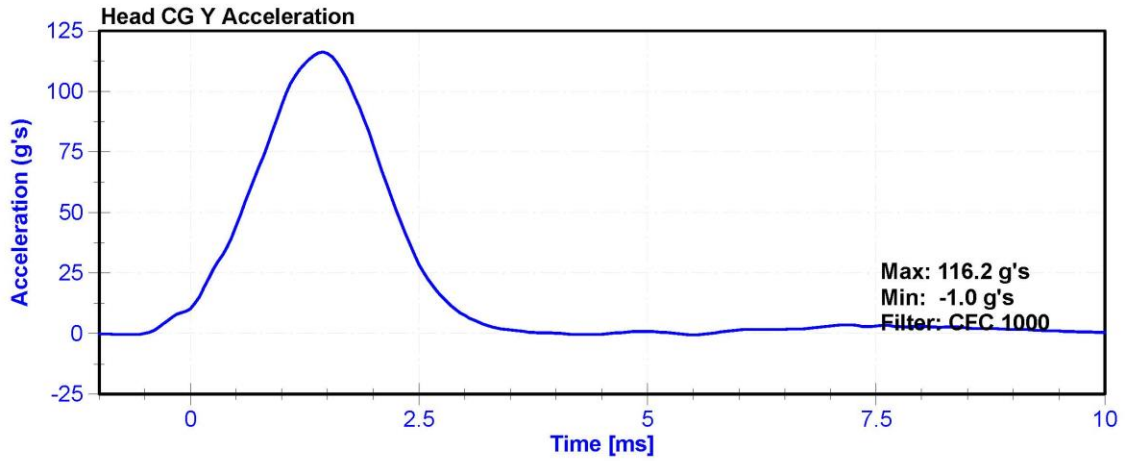
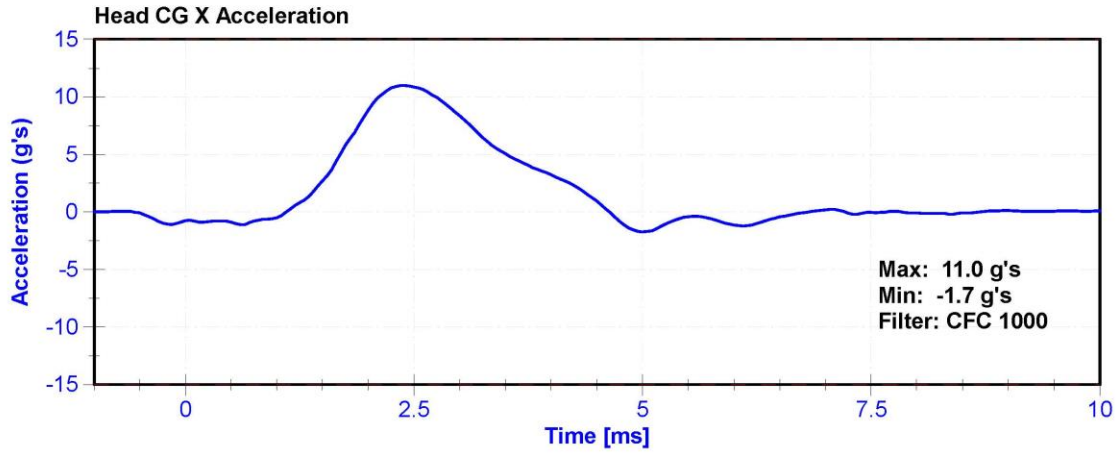
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	43.0	Pass
Resultant Acceleration	125	155	g's	139.3	Pass
Oscillation	0	15	%	2.68	Pass
Fore-Aft Acceleration	-15	15	g's	11.0	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264	AC-P49204	4/15/2020	10/14/2020
Y Accelerometer	ENDEVCO 7264	AC-P83437	4/15/2020	10/14/2020
Z Accelerometer	ENDEVCO 7264	AC-P64007	4/15/2020	10/14/2020





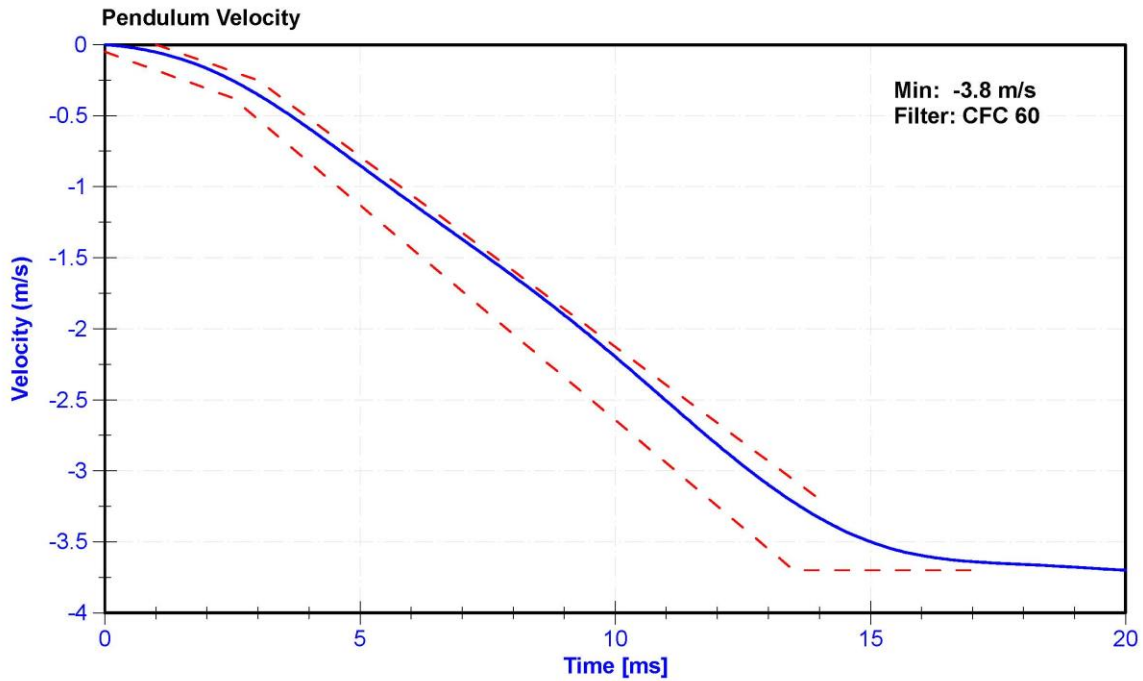
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

**Results**

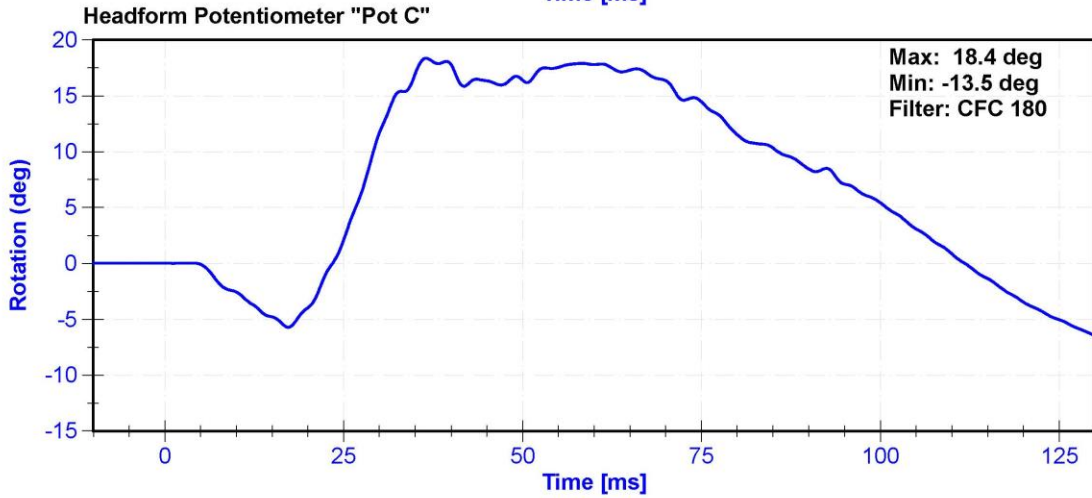
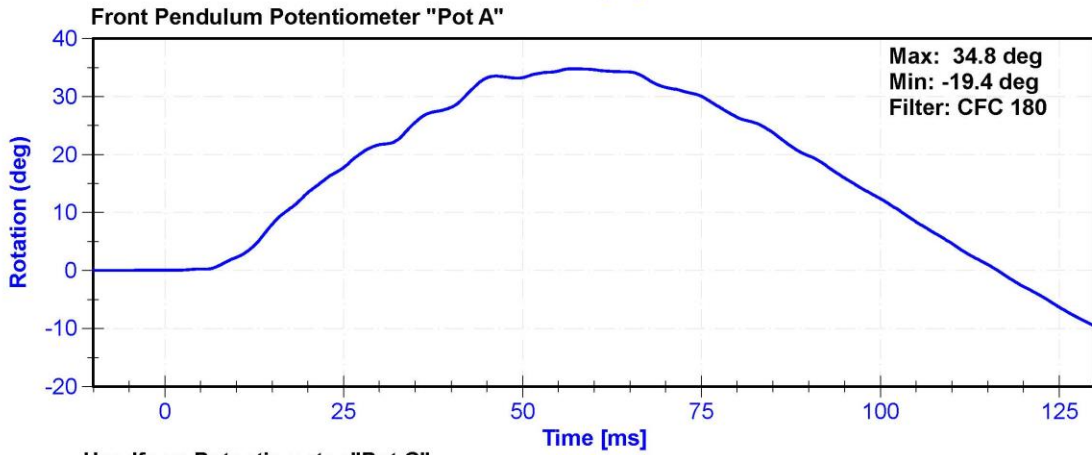
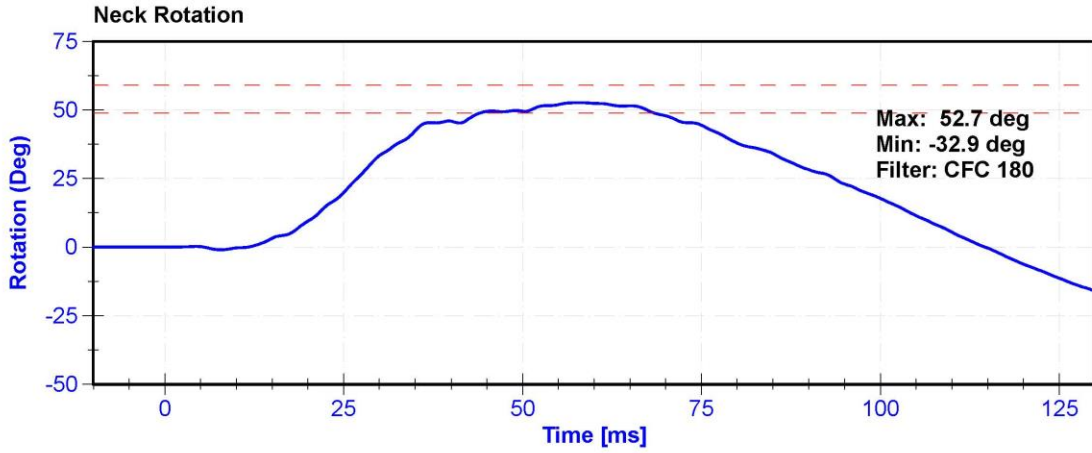
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	43	Pass
Velocity	3.3	3.5	m/s	3.38	Pass
Lateral Neck Rotation	49	59	deg	52.7	Pass
Time at Maximum Rotation	54	66	ms	58.2	Pass
Time of Rotation Decay from Maximum	53	88	ms	56.5	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231C	AC-AH5M9	1/30/2020	1/29/2021
Front Pendulum Potentiometer	SP22G	DS-094	10/31/2019	10/30/2020
Headform Potentiometer	SP22G	DS-095	10/31/2019	10/30/2020







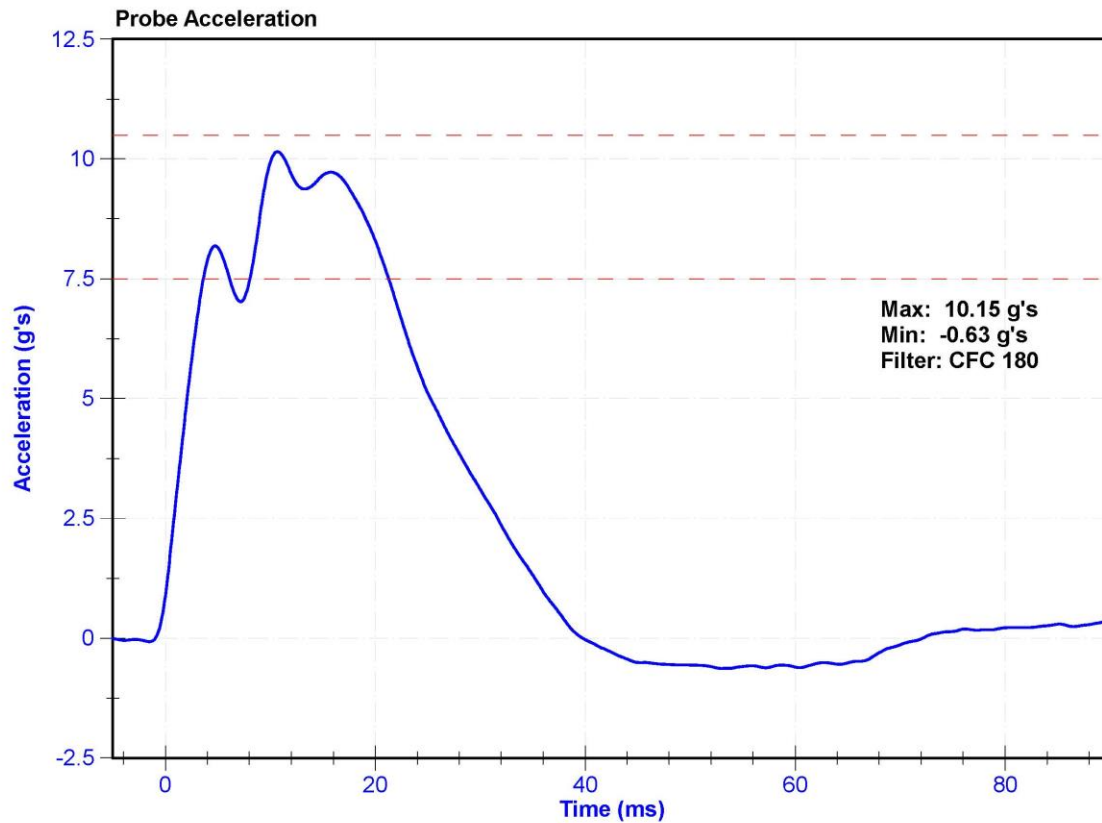
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	43.0	Pass
Velocity	4.2	4.4	m/s	4.39	Pass
Probe Acceleration	7.5	10.5	g's	10.15	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	MSI 64C-2000	A286228	1/29/2020	7/29/2020



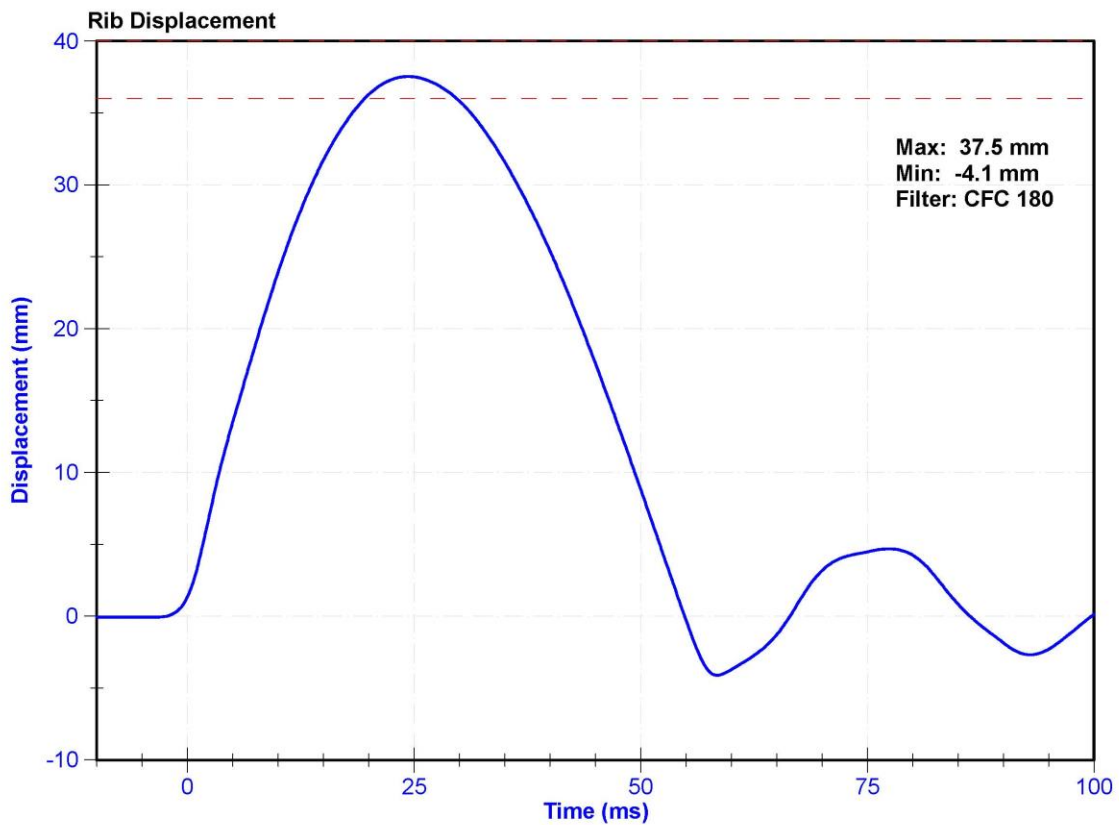
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	43.0	Pass
Rib Displacement	36	40	mm	37.5	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	4/14/2020	10/13/2020





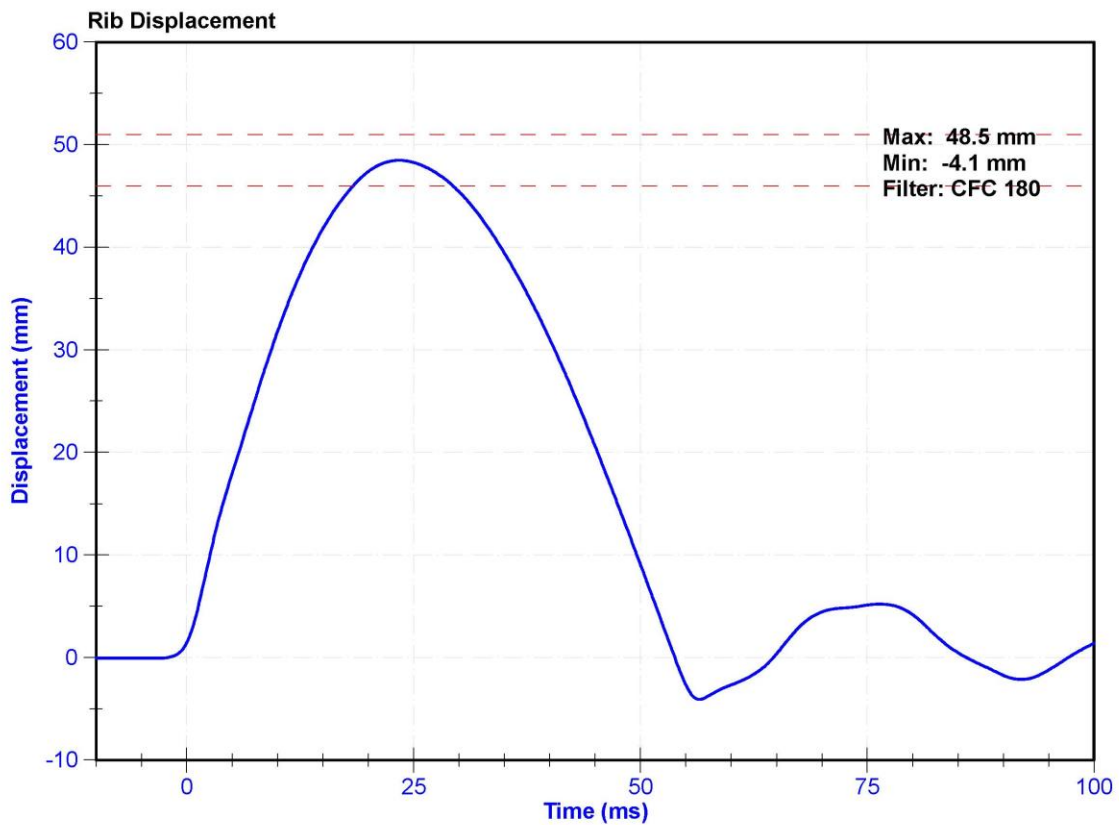
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	49.0	Pass
Rib Displacement	46	51	mm	48.5	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	4/14/2020	10/13/2020



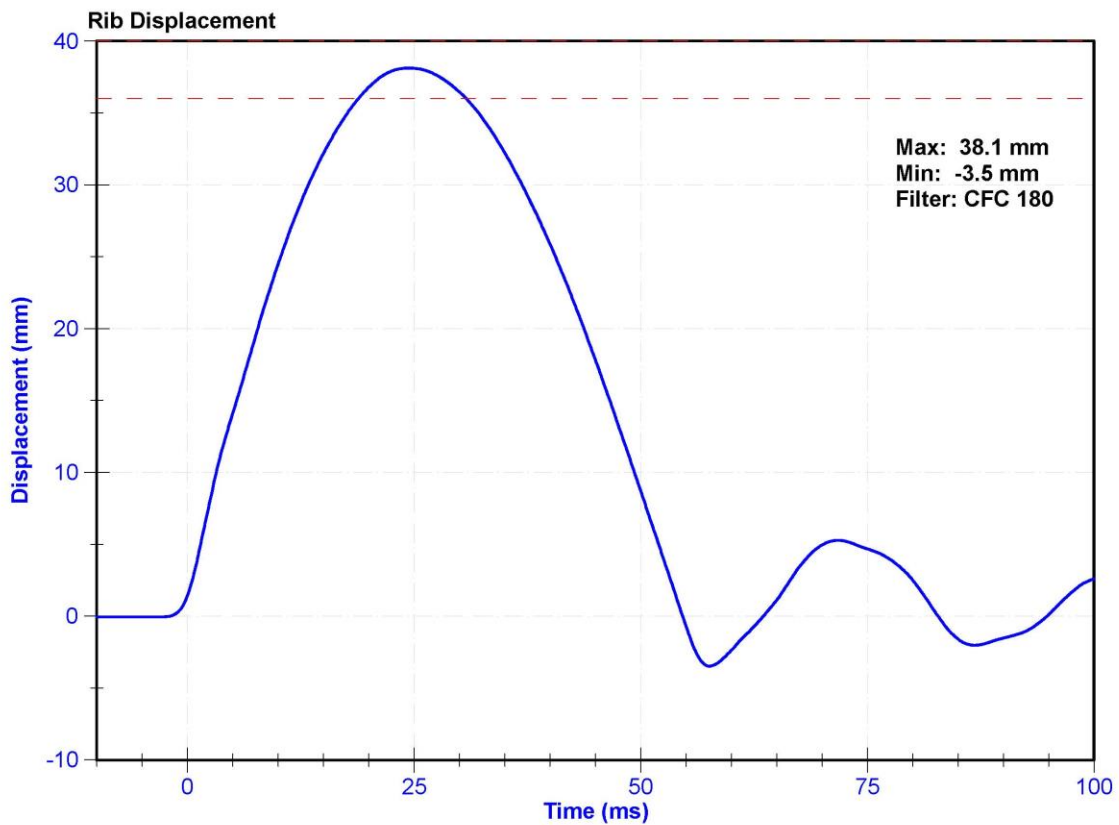
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	43.0	Pass
Rib Displacement	36	40	mm	38.1	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	4/14/2020	10/13/2020



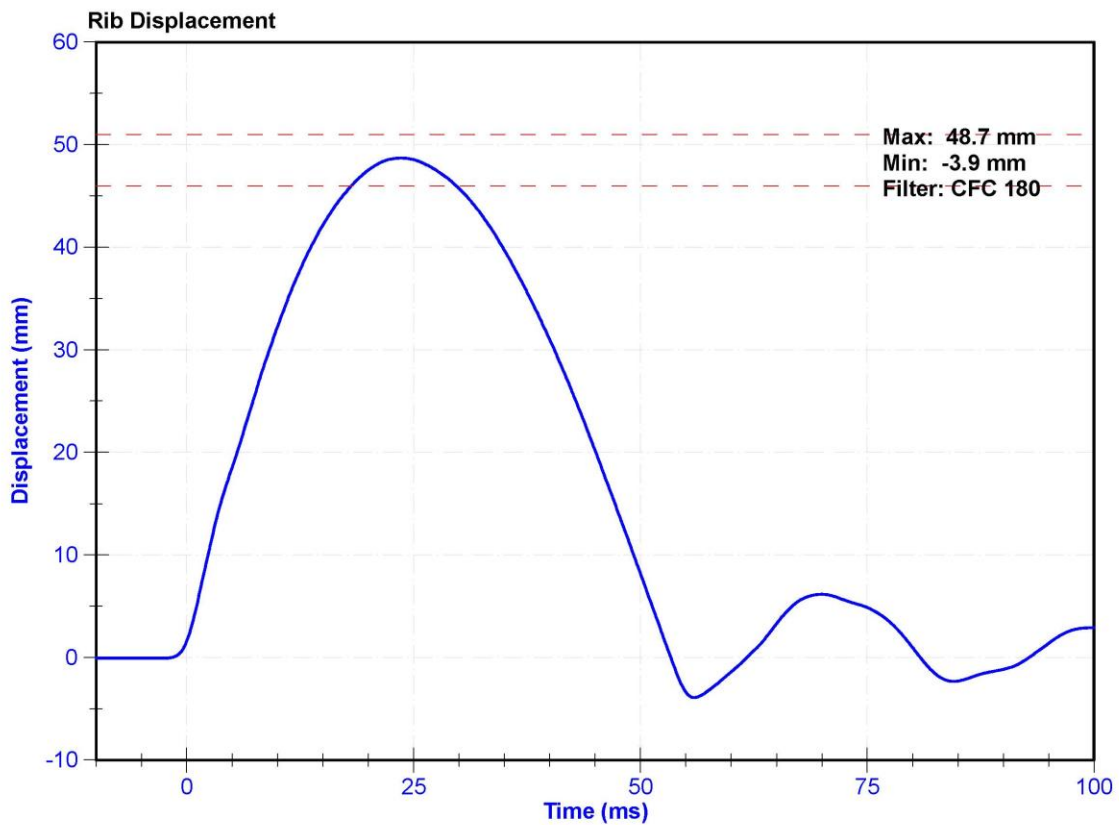
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	47.0	Pass
Rib Displacement	46	51	mm	48.7	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	4/14/2020	10/13/2020



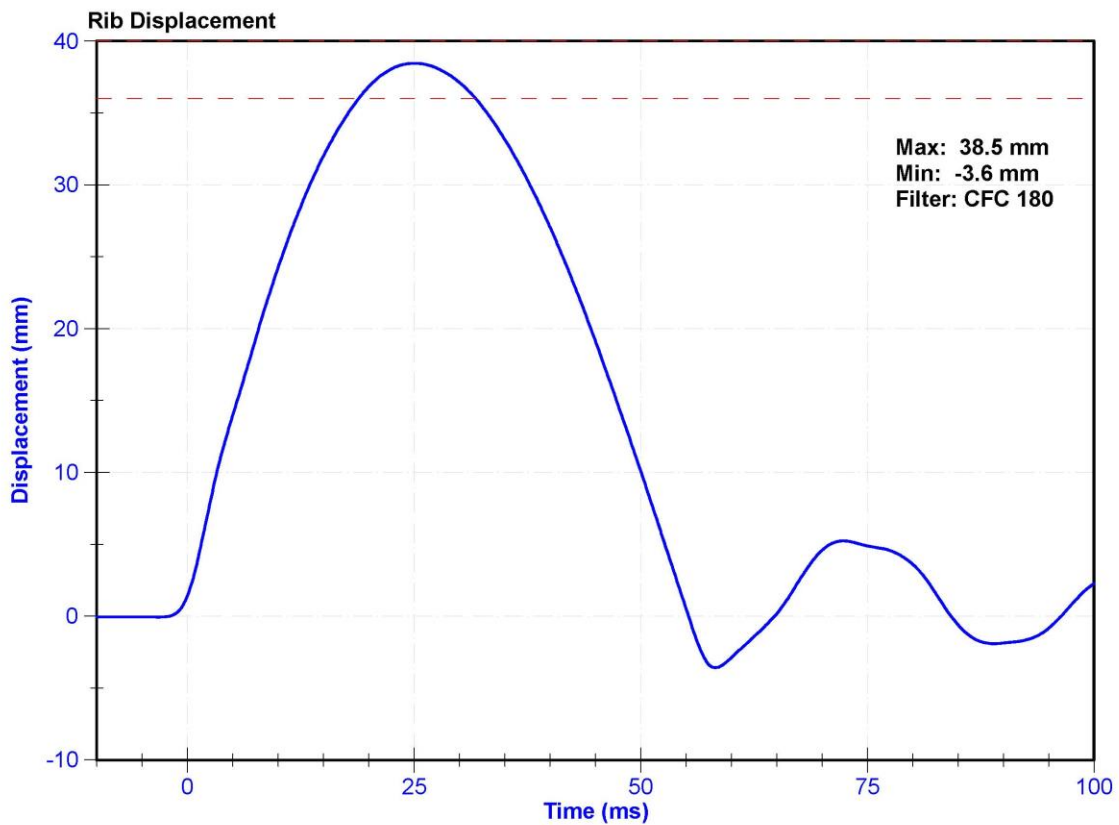
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	43.0	Pass
Rib Displacement	36	40	mm	38.5	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	4/14/2020	10/13/2020





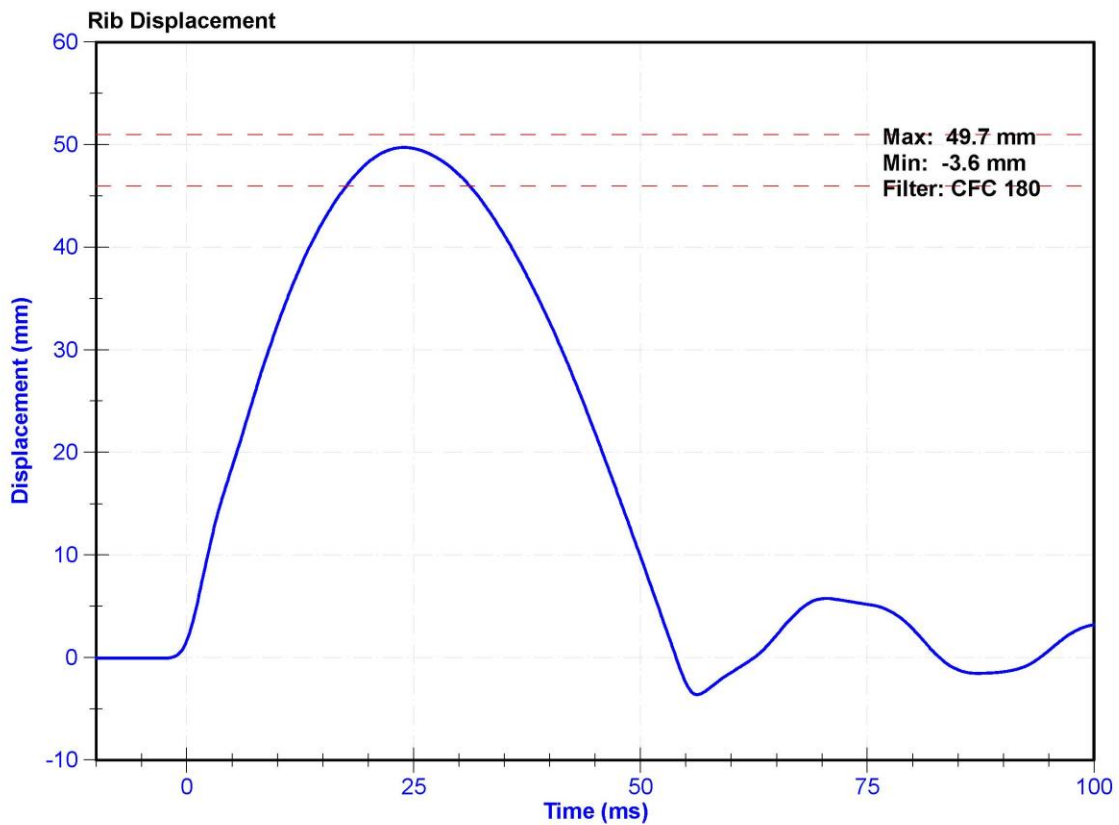
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	43.0	Pass
Rib Displacement	46	51	mm	49.7	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	4/14/2020	10/13/2020



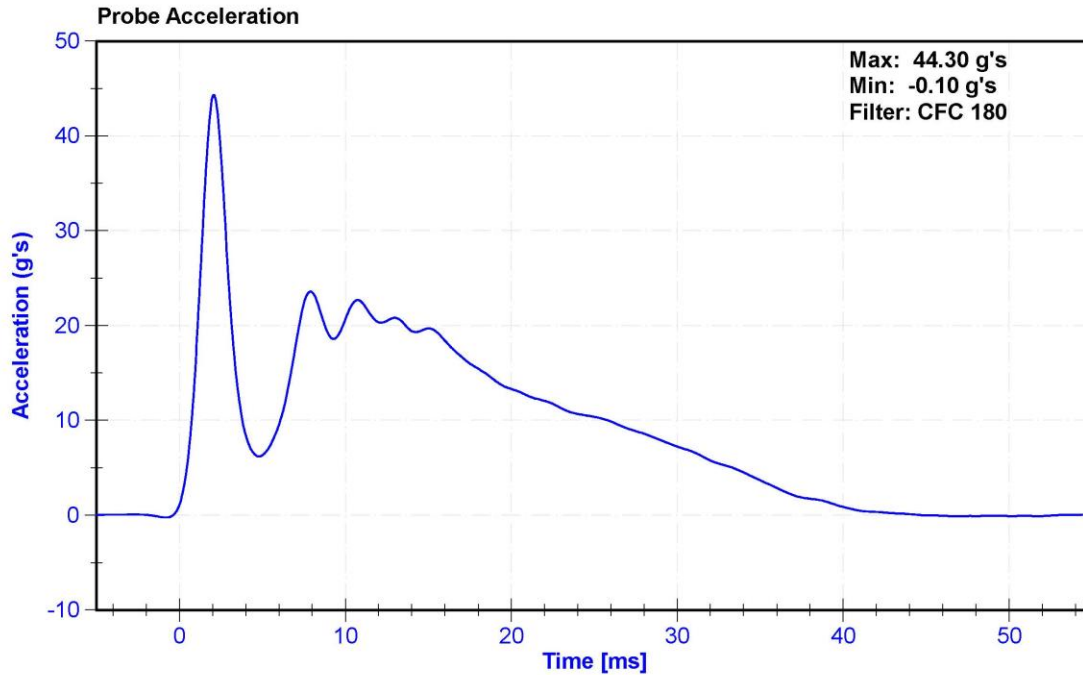
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

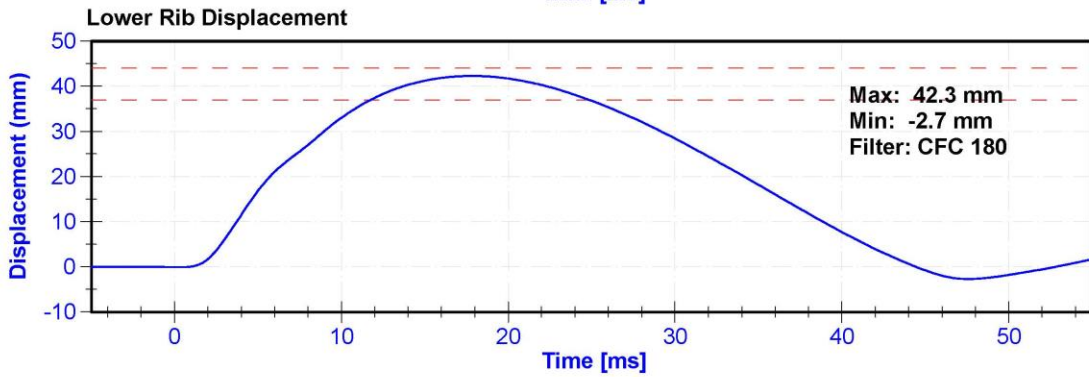
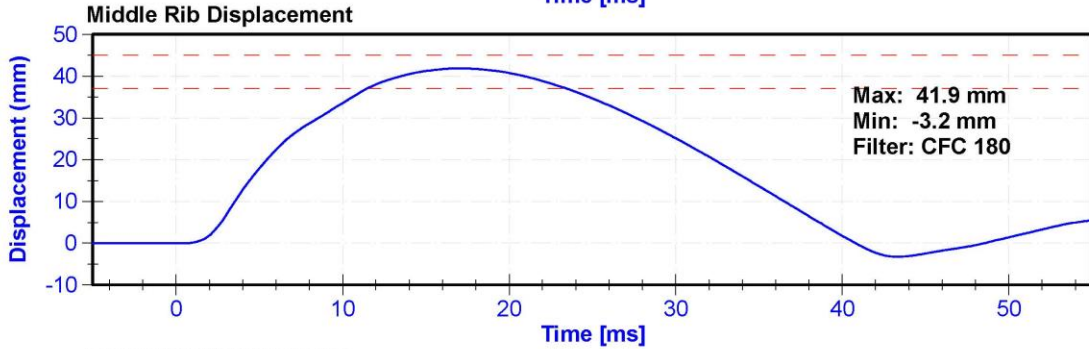
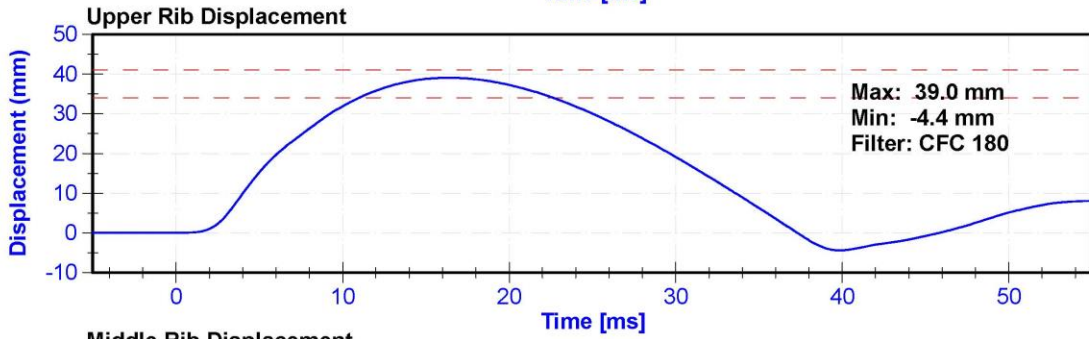
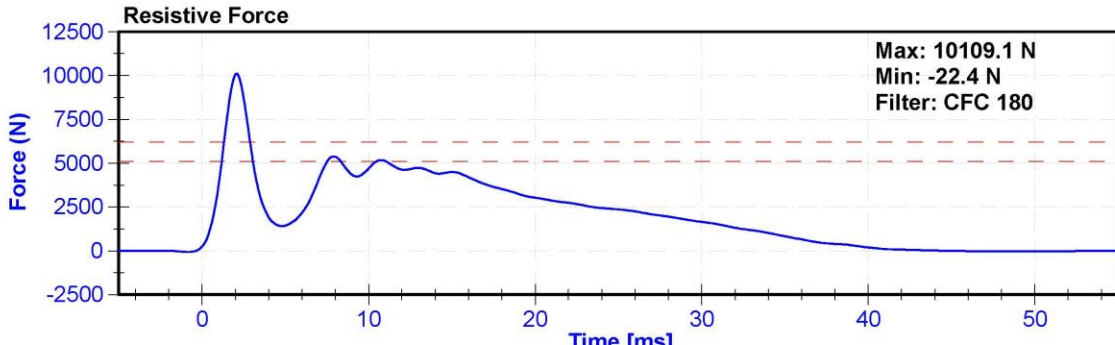
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	43.0	Pass
Velocity	5.4	5.6	m/s	5.42	Pass
Resistive Force after 6ms	5100	6200	N	5384.0	Pass
Upper Thorax Rib Deflection	34	41	mm	39.0	Pass
Mid Thorax Rib Deflection	37	45	mm	41.9	Pass
Lower Thorax Rib Deflection	37	44	mm	42.3	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	MSI 64C-2000	A286228	1/29/2020	7/29/2020
Upper Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-183GFE	4/14/2020	10/13/2020
Middle Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-184GFE	4/14/2020	10/13/2020
Lower Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-182GFE	4/14/2020	10/13/2020





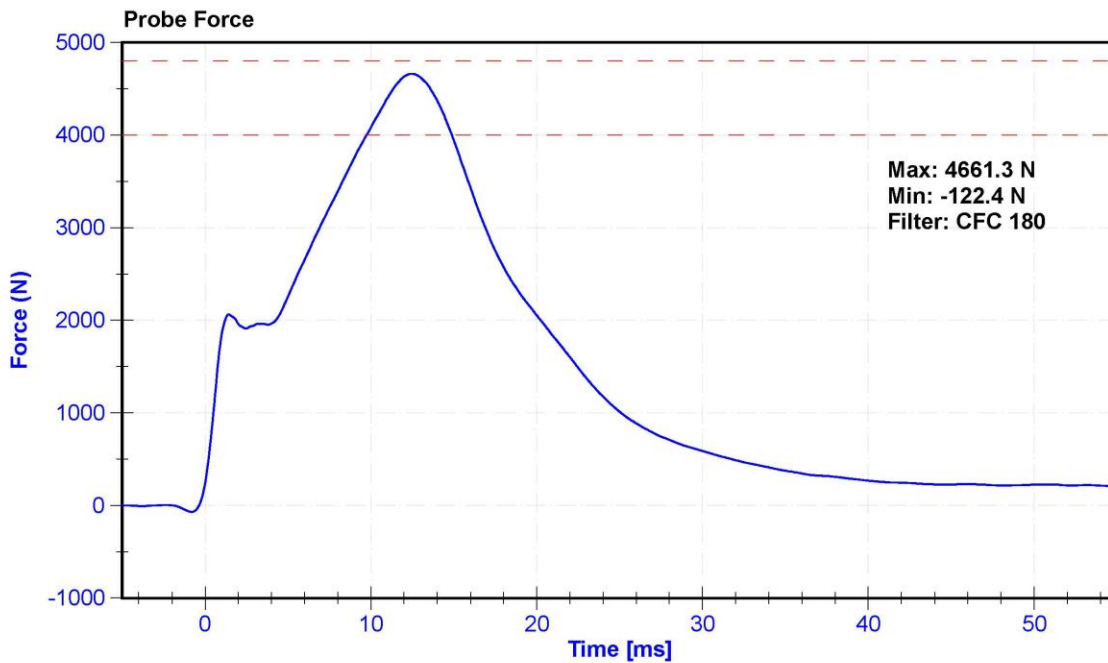
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F034	Laboratory Supervisor	K.Brogan

**Results**

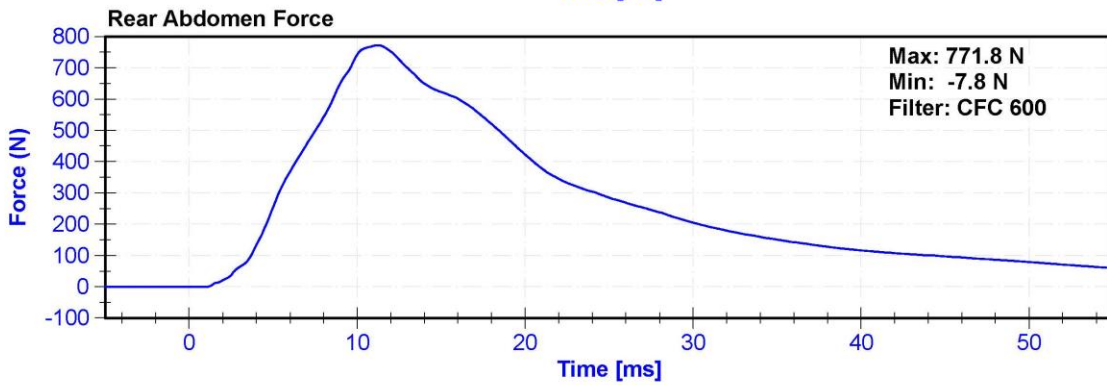
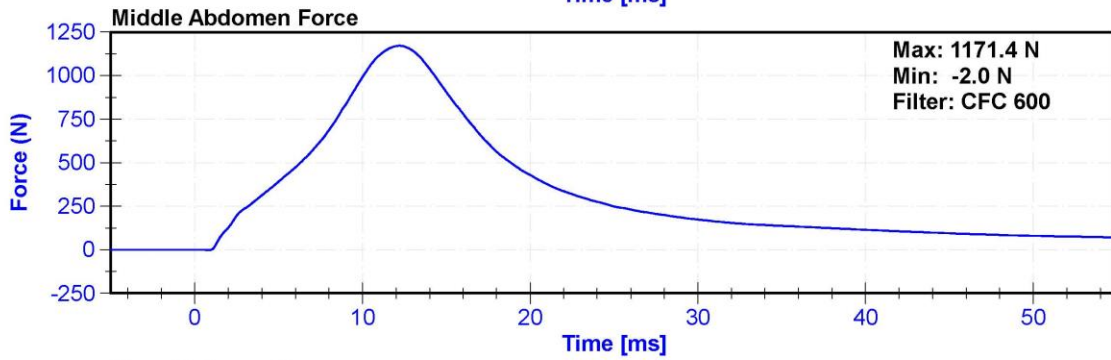
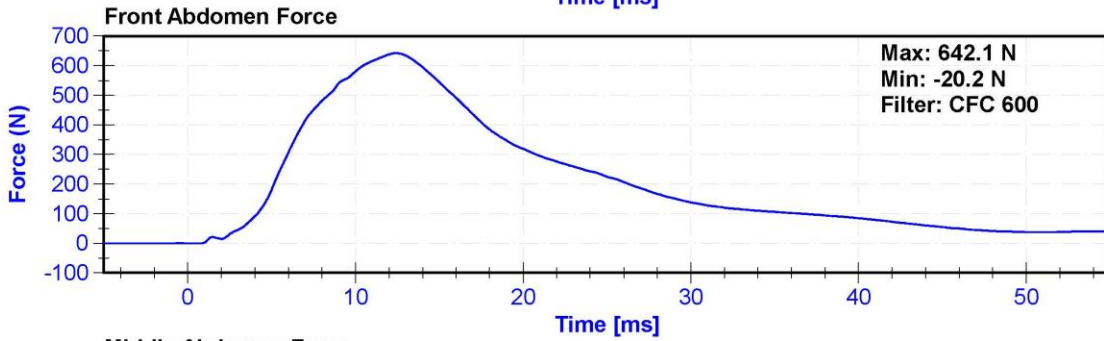
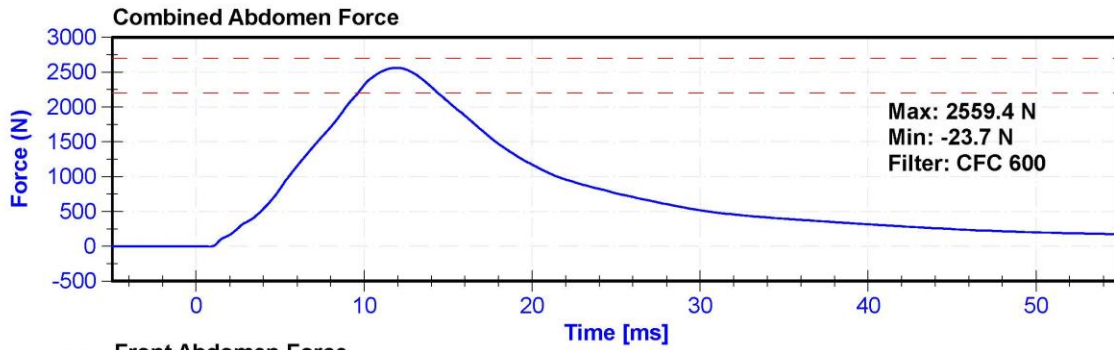
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	43	Pass
Velocity	3.9	4.1	m/s	4.07	Pass
Combined Abdomen Force	2200	2700	N	2559.4	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	11.95	Pass
Resistive Probe Force	4000	4800	N	4661.3	Pass
Time at Peak Resistive Force	10.6	13.0	ms	12.45	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A286228	1/29/2020	7/29/2020
Front Abdomen Load Cell	DENTON 2631	LC-1440	6/14/2019	6/13/2020
Middle Abdomen Load Cell	DENTON 2631	LC-1525	6/5/2019	6/4/2020
Rear Abdomen Load Cell	DENTON 2631	LC-1528	6/14/2019	6/13/2020







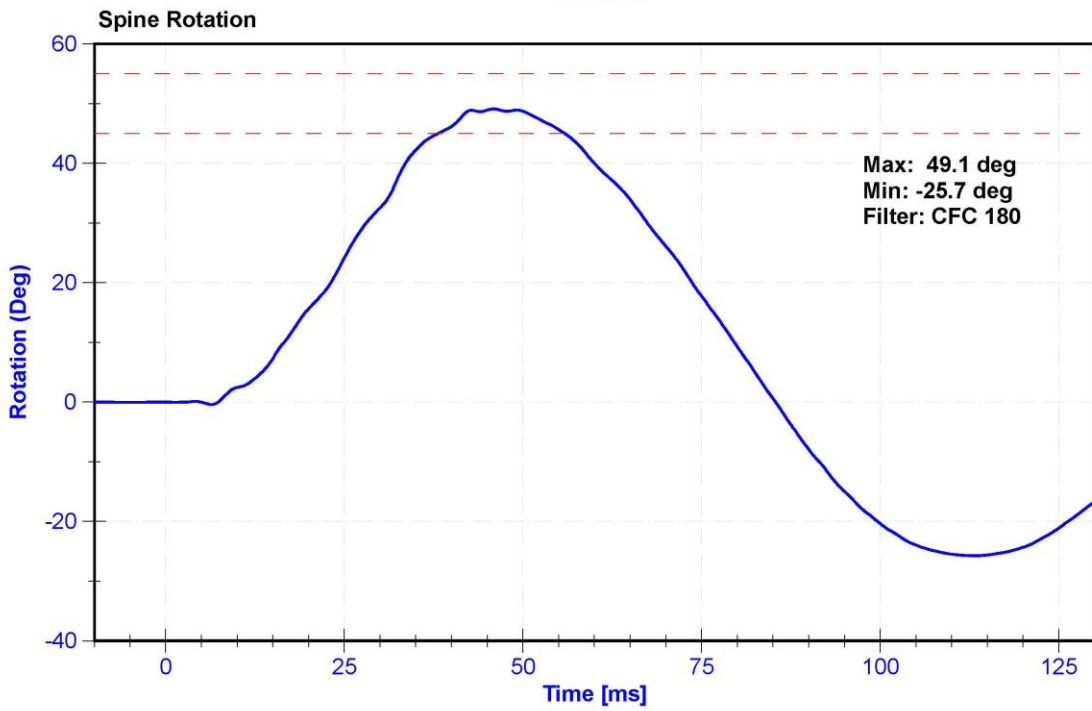
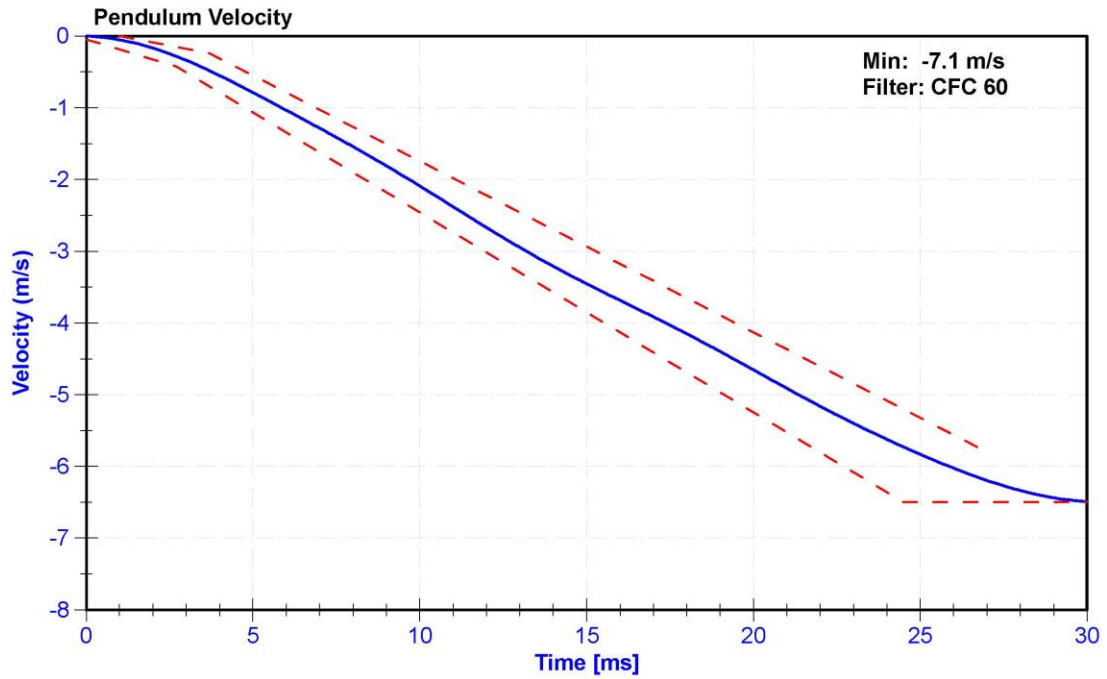
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

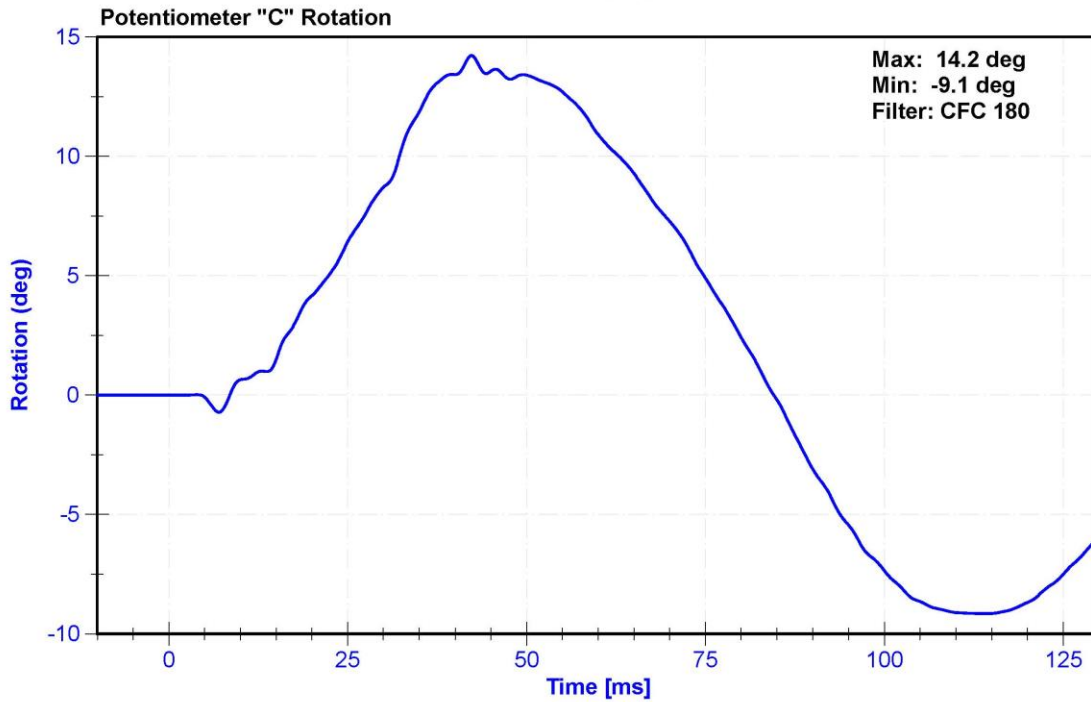
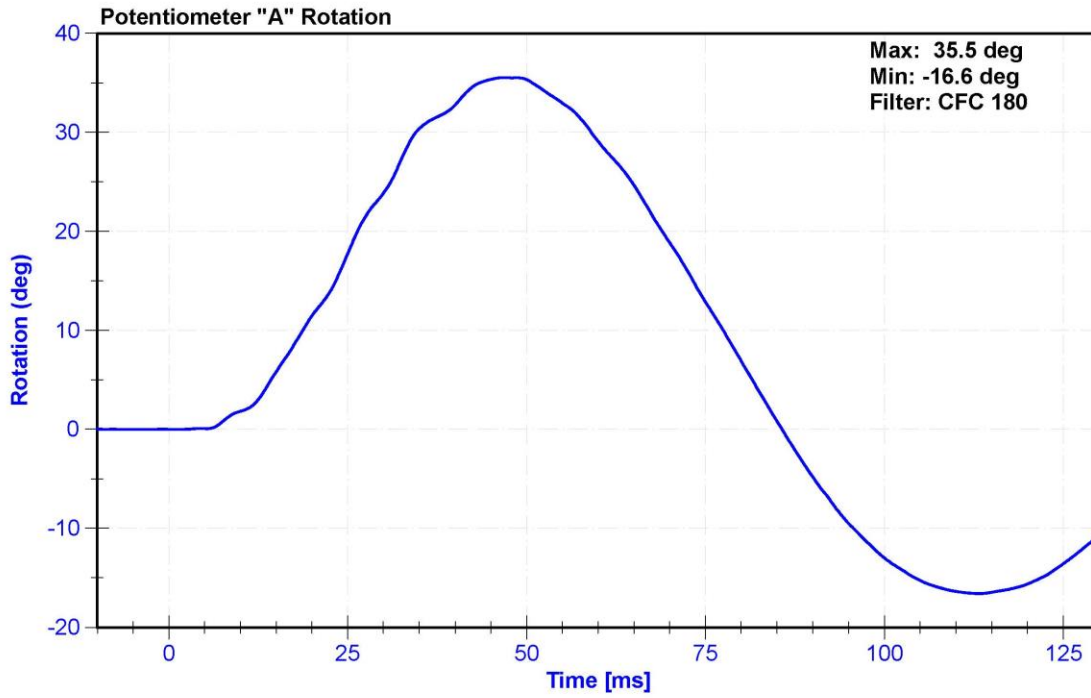
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	43.0	Pass
Velocity	5.95	6.15	m/s	6.046	Pass
Lateral Spine Rotation	45	55	deg	49.1	Pass
Time at Maximum Rotation	39	53	ms	45.9	Pass
Time of Decay to Zero Degrees	37	57	ms	39.5	Pass
Pulse within Corridor?	-	-	-		

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5M9 Pend	1/30/2020	1/29/2021
Pendulum "A" Potentiometer	SP22G	DS-094	10/31/2019	10/30/2020
Condyle "B" Potentiometer	SP22G	DS-095	10/31/2019	10/30/2020







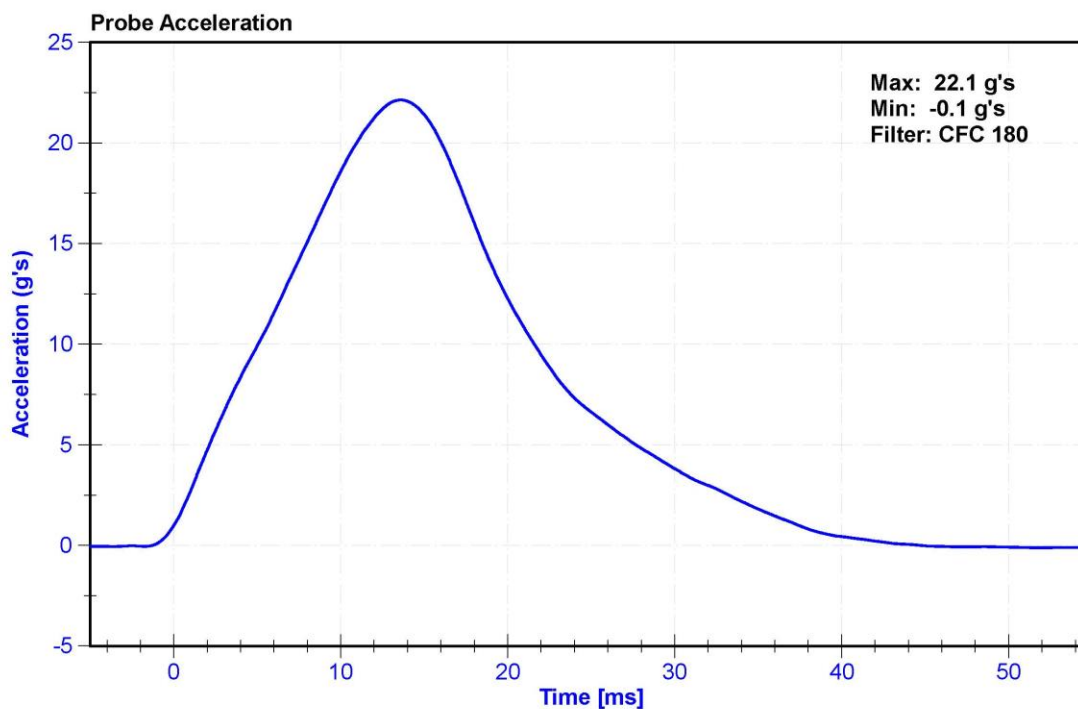
ATD Manufacturer	FTSS	Test Technician	D. Reinhard
ATD Serial Number	F034	Laboratory Supervisor	K. Brogan

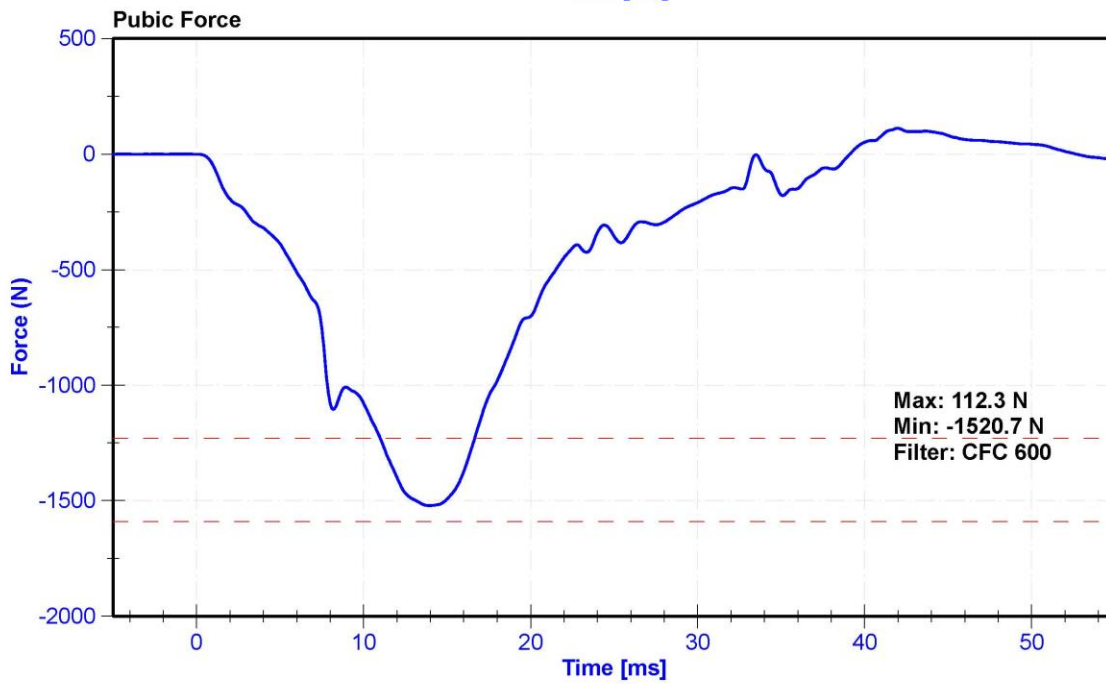
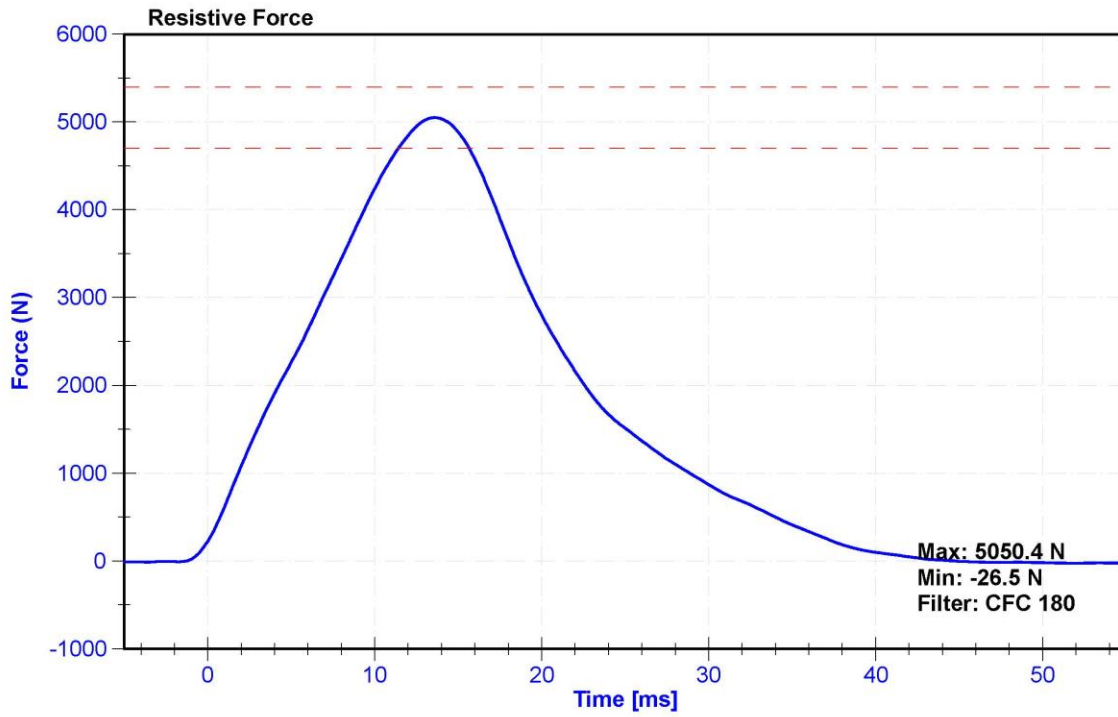
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	43.0	Pass
Velocity	4.2	4.4	m/s	4.39	Pass
Resistive Force	4700	5400	N	5050.4	Pass
Time at Peak Resistive Force	11.8	16.1	ms	13.60	Pass
Pubic Force	-1590	-1230	N	-1520.7	Pass
Time at Peak Pubic Force	12.2	17.0	ms	13.90	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A286228	1/29/2020	7/29/2020
Pubic Load Cell	Denton 3096JFL	LC-464fy	6/14/2019	6/13/2020





**CALIBRATION TEST RESULTS**

**POST-TEST**

**SID-IIS 5<sup>TH</sup> PERCENTILE FEMALE - PASSENGER ATD**

**SERIAL No: DG8012**

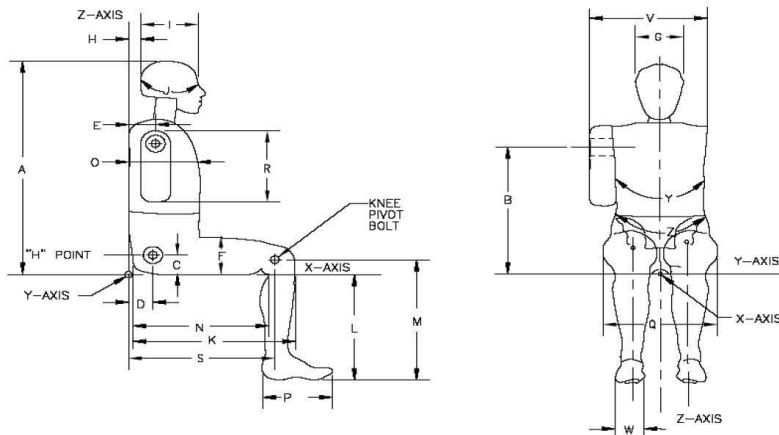


External Measurements - SID-IIs

Technician: K. Dutton

Date: 05/29/2020

Dummy Serial Number: DG8012



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	779	Pass
B	Shoulder Pivot Height	437	453	446	Pass
C	H-point Height	79	89	84	Pass
D	H-point from seatback	141	151	146	Pass
E	Shoulder Pivot from Backline	97	107	103	Pass
F	Thigh Clearance	119	135	127	Pass
G	Head Breadth	140	148	144	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	183	Pass
J	Head Circumference	541	551	547	Pass
K	Buttock to Knee Length	514	540	537	Pass
L	Popliteal Height	343	369	357	Pass
M	Knee Pivot to floor height	392	409	403	Pass
N	Buttock Popliteal Length	416	442	433	Pass
O	Chest Depth w/o jacket	195	211	205	Pass
P	Foot Length	216	232	224	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	319	Pass
R	Arm Length	249	259	255	Pass
S	Knee Joint to seatback	477	493	487	Pass
V	Shoulder Width	341	357	346	Pass
W	Foot Width	78	94	85	Pass
Y	Chest Circumference w/jacket	851	881	867	Pass
Z	Waist Circumference	761	791	781	Pass



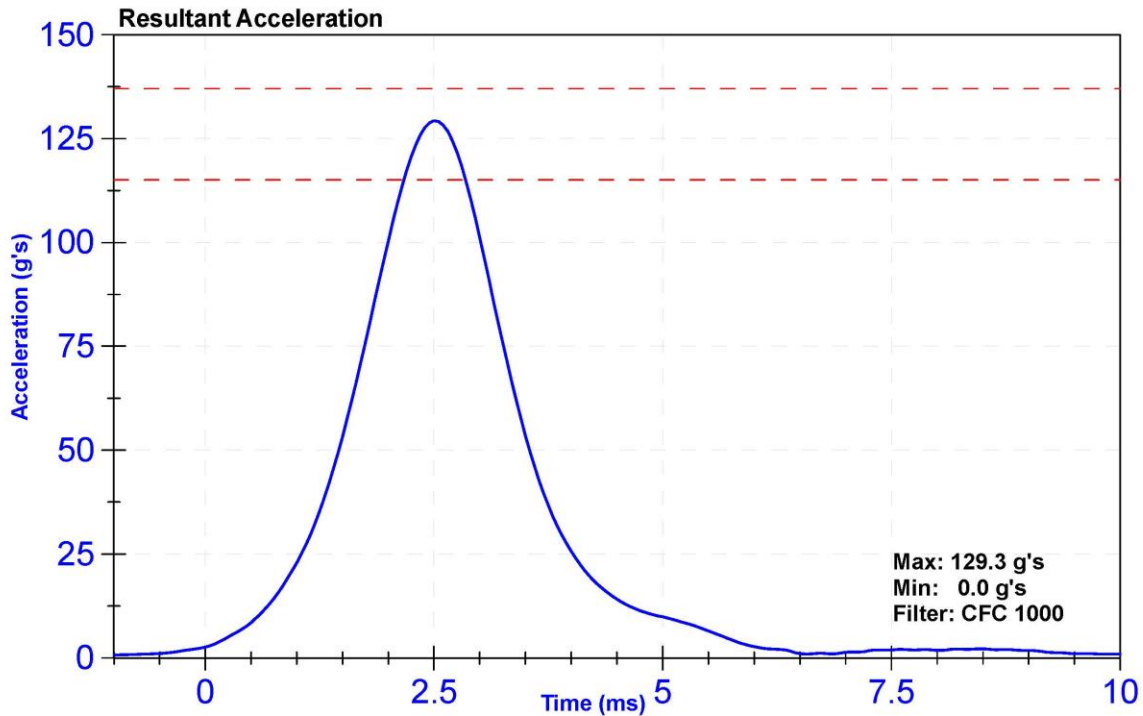
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

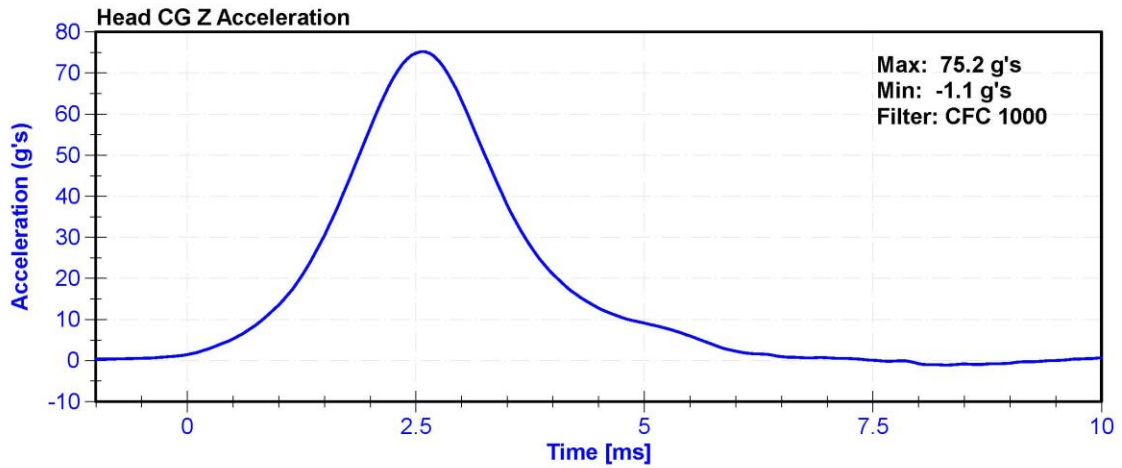
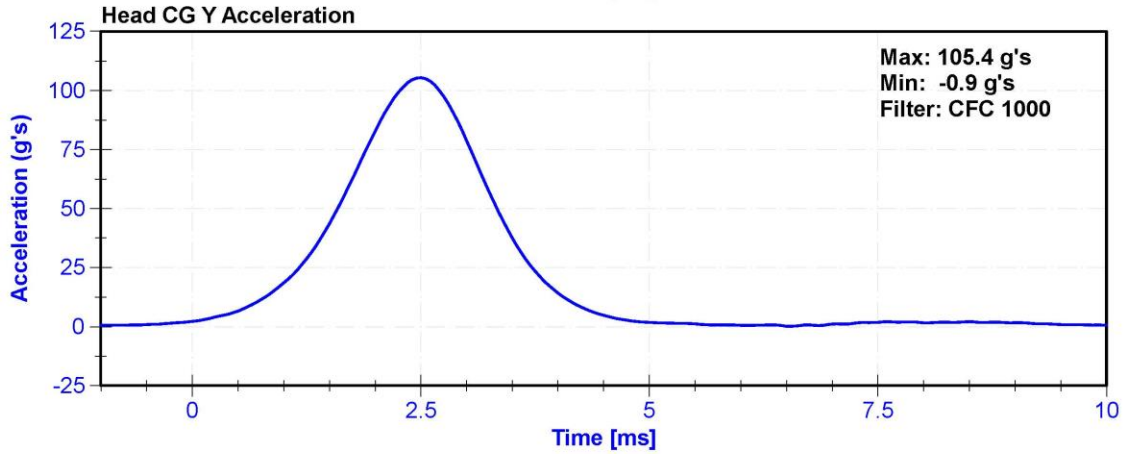
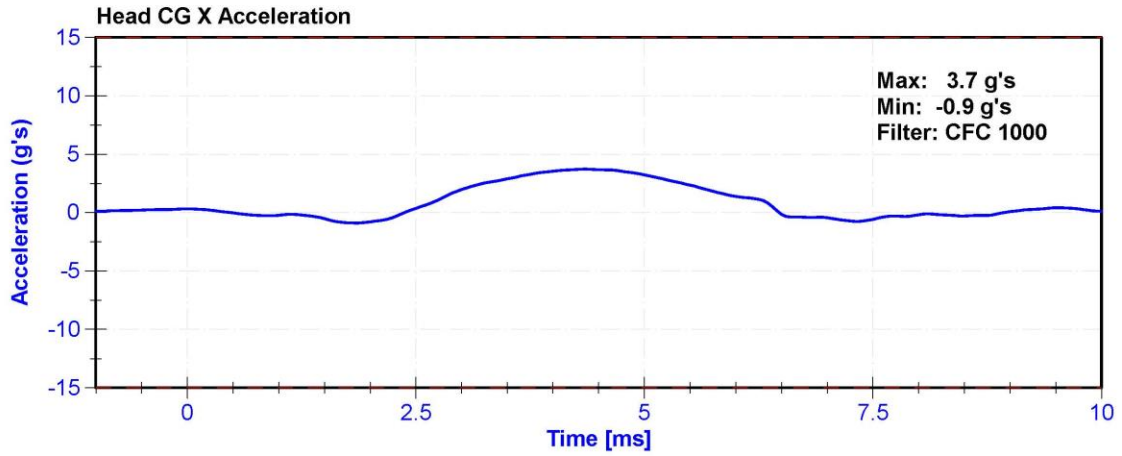
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	60	Pass
Resultant Acceleration	115	137	g's	129.3	Pass
Oscillation	0	15	%	1.7	Pass
Fore-Aft Acceleration	-15	15	g's	3.7	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264	AC-P74788	4/16/2020	10/15/2020
Y Accelerometer	ENDEVCO 7264CT	AC-P83432	4/16/2020	10/15/2020
Z Accelerometer	ENDEVCO 7264	AC-P83319	4/16/2020	10/15/2020





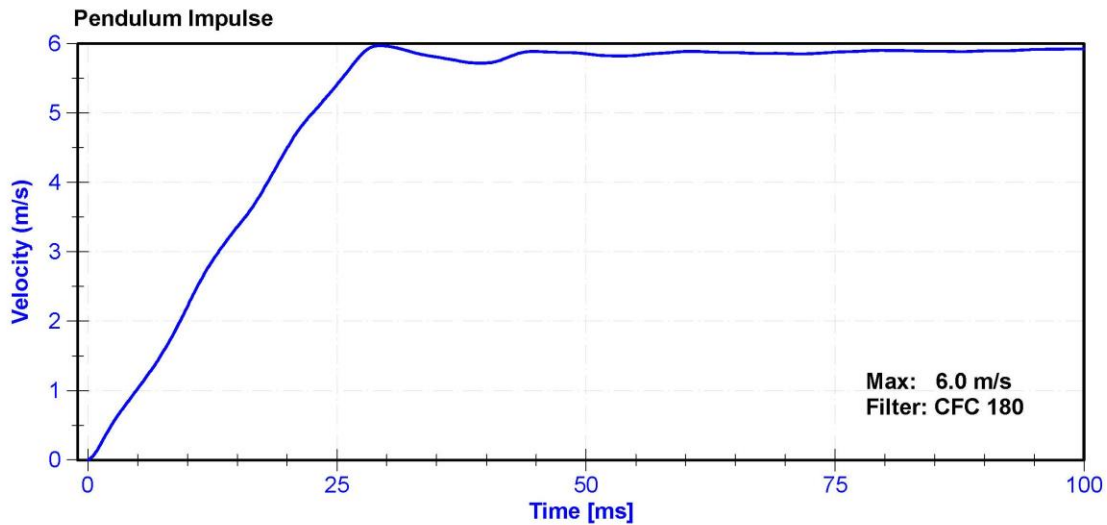
ATD Manufacturer	FTSS	Test Technician	M. Dudek
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

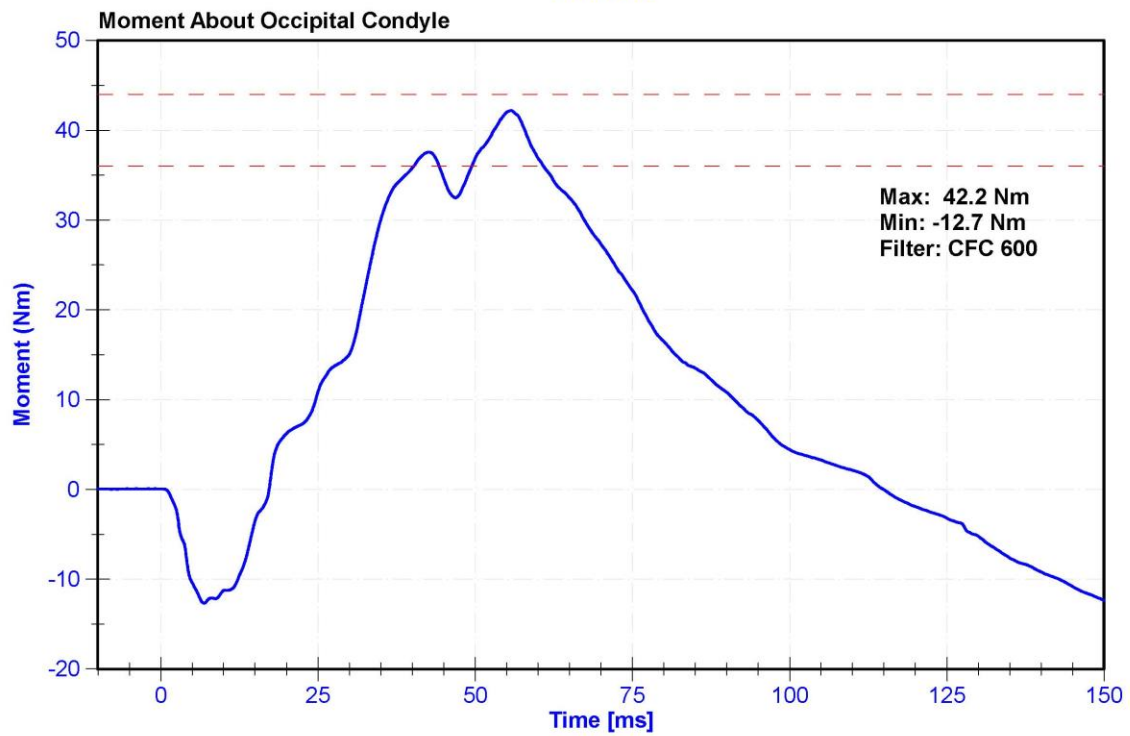
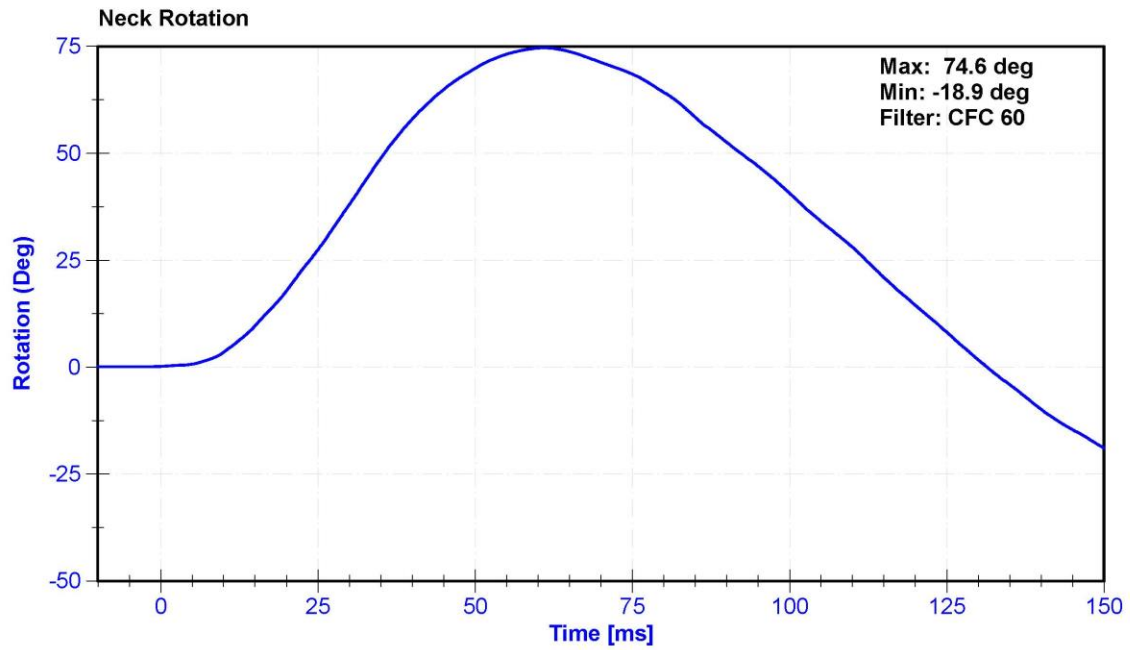
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	66.2	Pass
Velocity	5.51	5.63	m/s	5.549	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.21	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.36	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.49	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.41	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.97	Pass
Neck Rotation	71	81	deg	74.6	Pass
Time at Maximum Rotation	50	70	ms	60.9	Pass
Moment about the OC	36	44	Nm	42.2	Pass
Moment Decay to 0 Nm	102	126	ms	115.0	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5M9 Pend	1/30/2020	1/29/2021
Pendulum Potentiometer	Denton 78051-342	DS-184Pend	11/4/2019	11/3/2020
Condyle Potentiometer	Denton 78051-342	DS-185Pend	11/4/2019	11/3/2020
Upper Neck Load Cell	Denton 1716A	LC-2192Fy	6/20/2019	6/19/2020







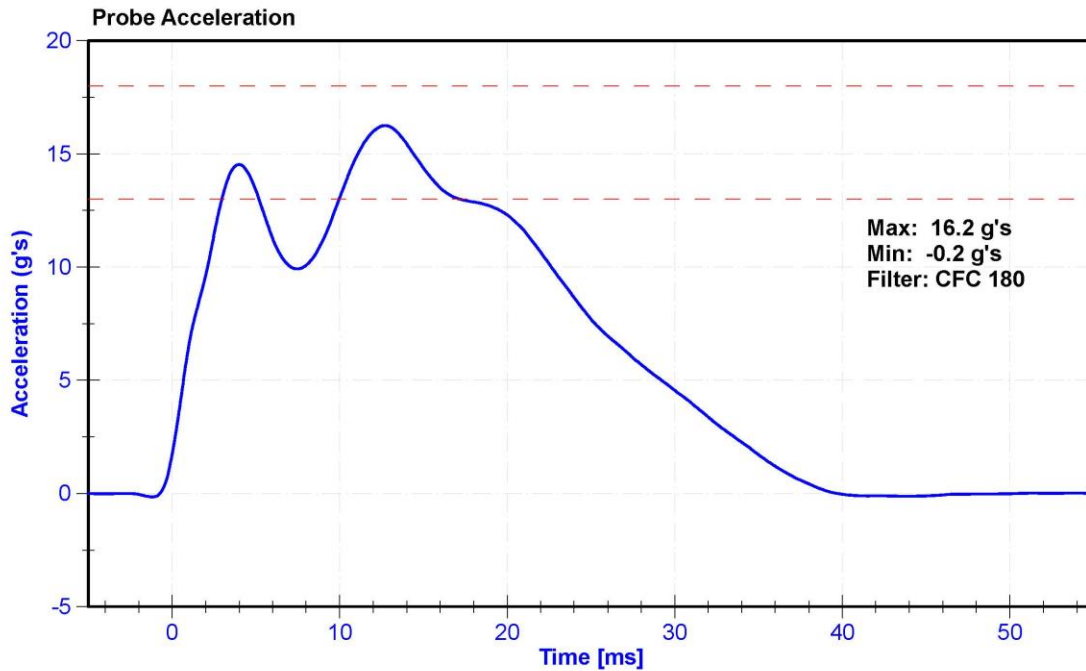
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

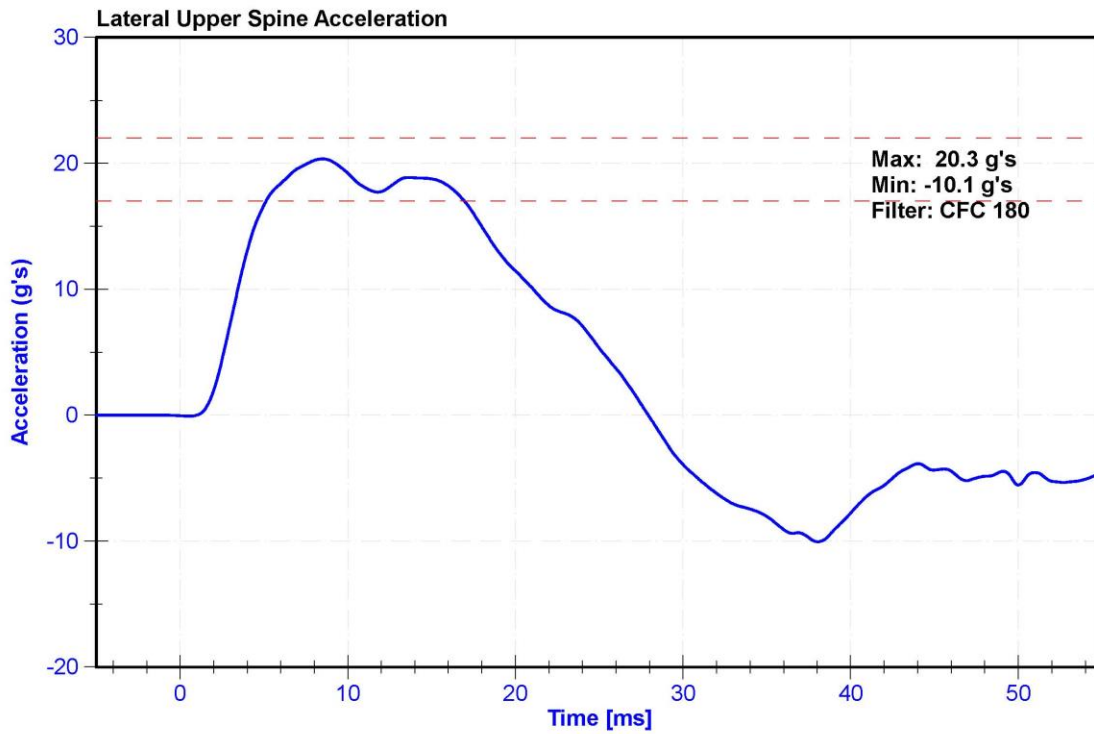
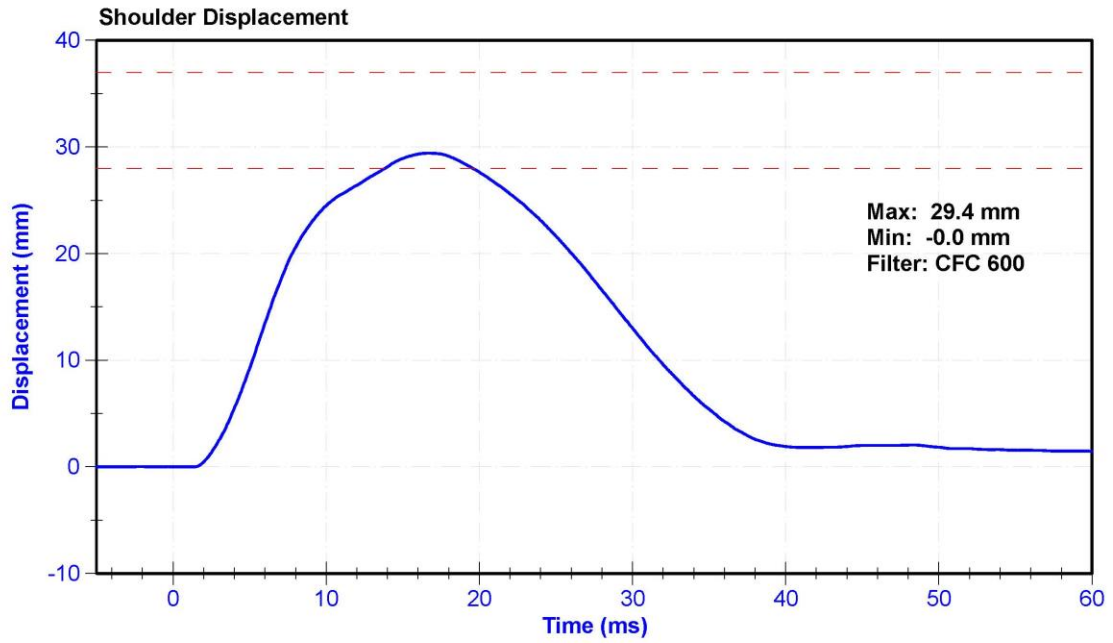
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	65	Pass
Velocity	4.2	4.4	m/s	4.37	Pass
Probe Acceleration	13	18	g's	16.2	Pass
Shoulder Deflection	28	37	mm	29.4	Pass
Lateral Upper Spine Acceleration	17	22	g's	20.3	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A286228	1/29/2020	7/29/2020
Shoulder Potentiometer	Servo 08TC1-3745	DS-1845GFE	5/6/2020	11/4/2020
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P64148	4/16/2020	10/15/2020





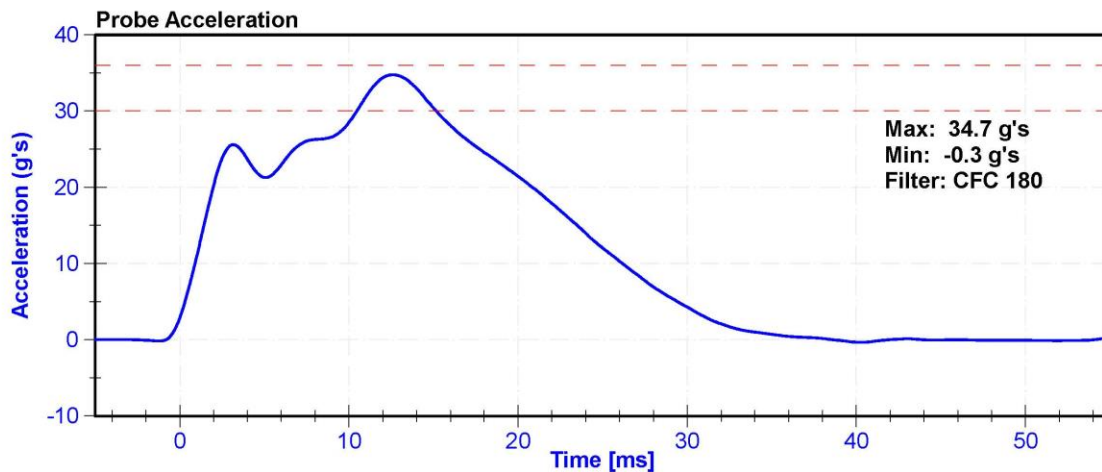
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	DG-8012	Laboratory Supervisor	K. Brogan

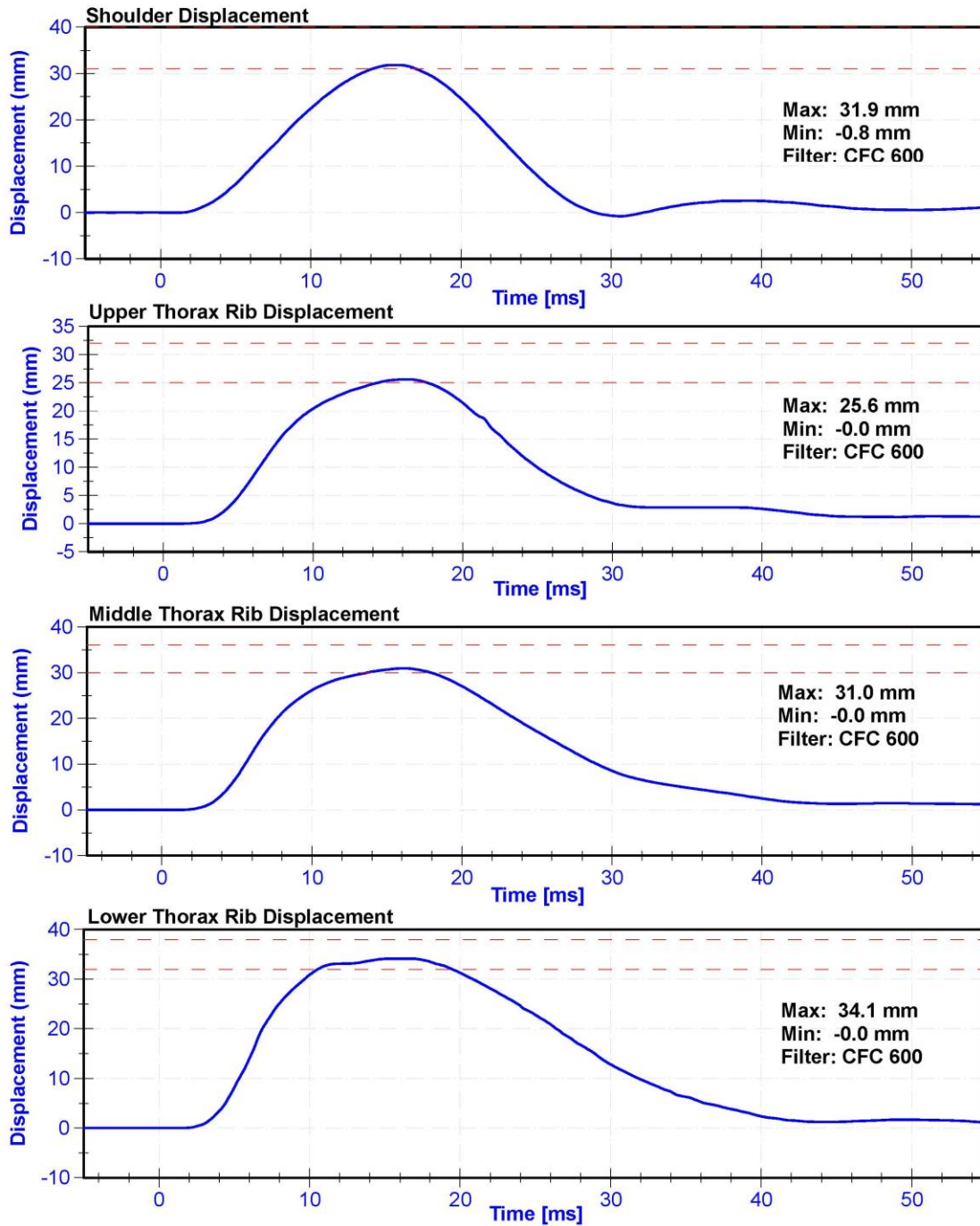
**Results**

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	65.0	Pass
Velocity	6.6	6.8	m/s	6.66	Pass
Probe Acceleration after 5 ms	30	36	g's	34.7	Pass
Lateral Upper Spine Acceleration	34	43	g's	39.2	Pass
Lateral Lower Spine Acceleration	29	37	g's	34.2	Pass
Shoulder Deflection	31	40	mm	31.9	Pass
Upper Thorax Rib Deflection	25	32	mm	25.6	Pass
Mid Thorax Rib Deflection	30	36	mm	31.0	Pass
Lower Thorax Rib Deflection	32	38	mm	34.1	Pass

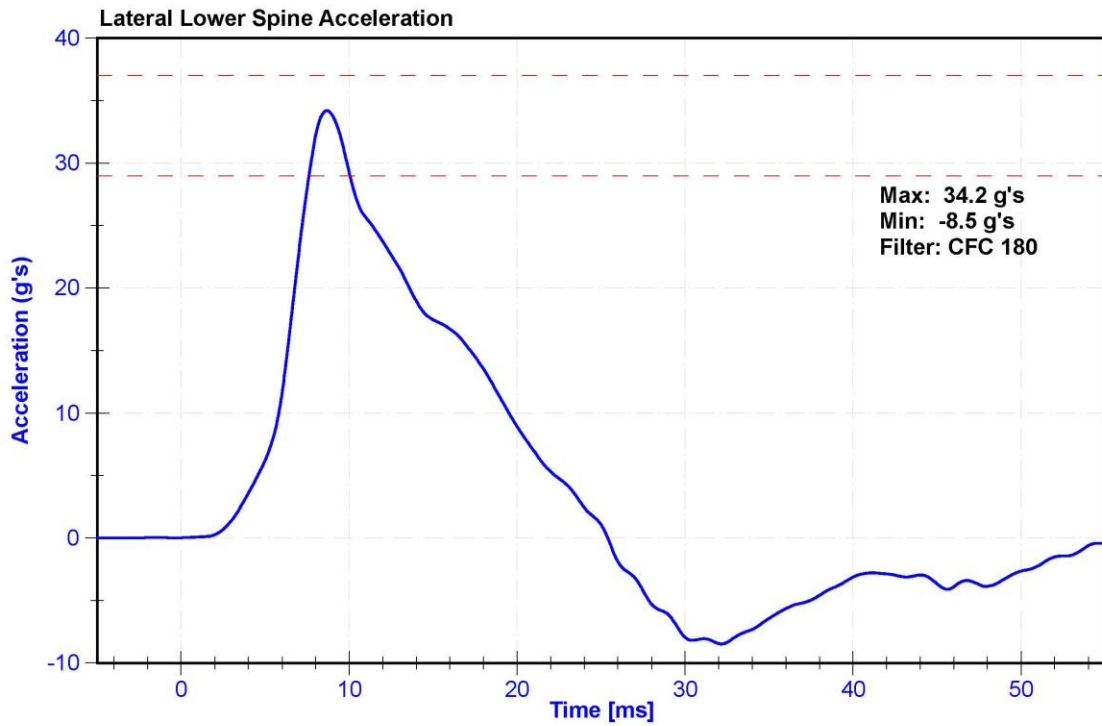
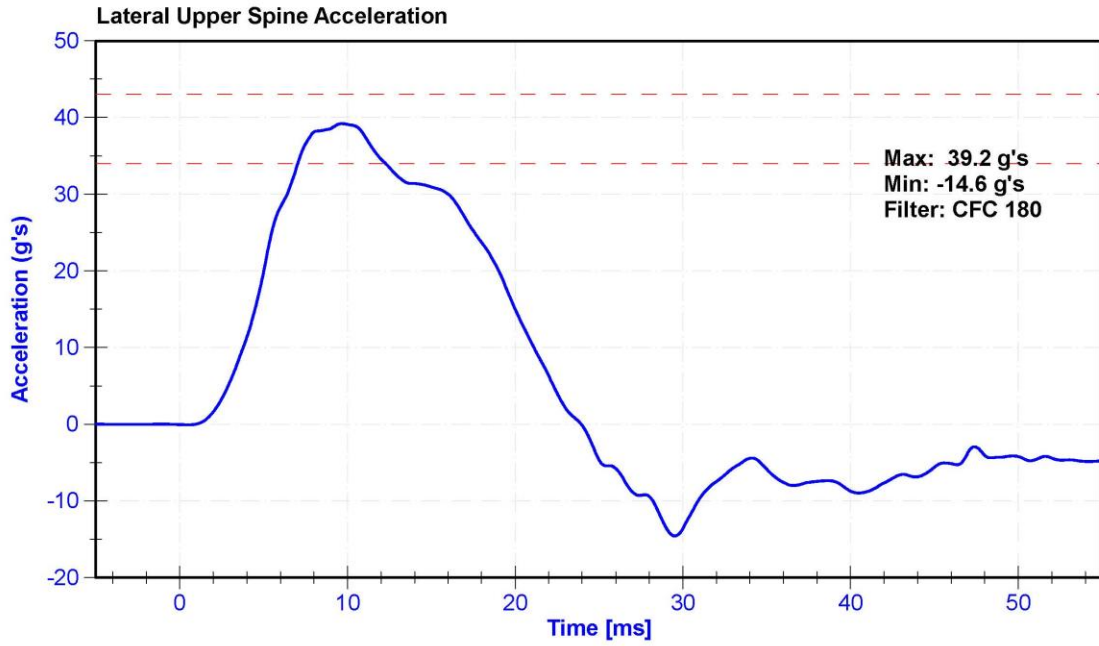
**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A286228	1/29/2020	7/29/2020
Upper Spine T1 Y Accelerometer	ENDEVCO 7264CT	AC-P64148	4/16/2020	10/15/2020
Upper Spine T12 Y Accelerometer	ENDEVCO 7264C-2K-TZ2	AC-P51327	4/16/2020	10/15/2020
Shoulder Potentiometer	Servo 08TC1-3745	DS-1845GFE	5/6/2020	11/4/2020
Upper Thorax Rib Potentiometer	Servo 1246	DS-2165GFE	5/6/2020	11/4/2020
Middle Thorax Rib Potentiometer	Servo 08TC1-3621	DS-45 GFE	5/6/2020	11/4/2020
Lower Thorax Rib Potentiometer	Servo 08TC1-3787	DS-011GFE	5/6/2020	11/4/2020









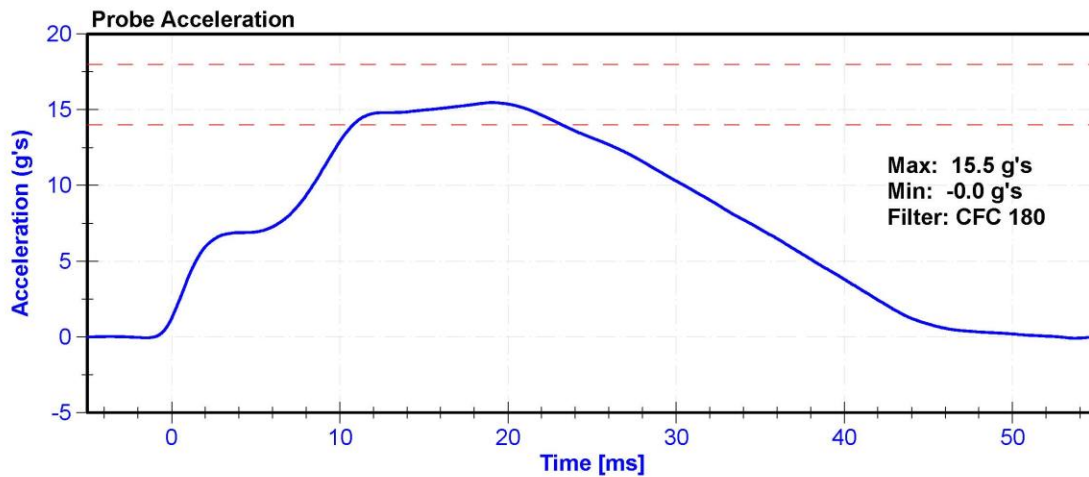
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

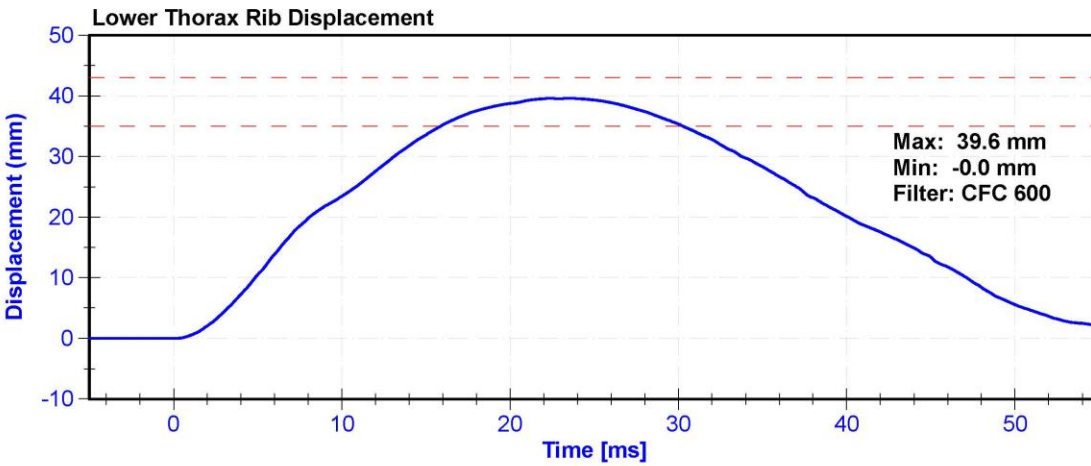
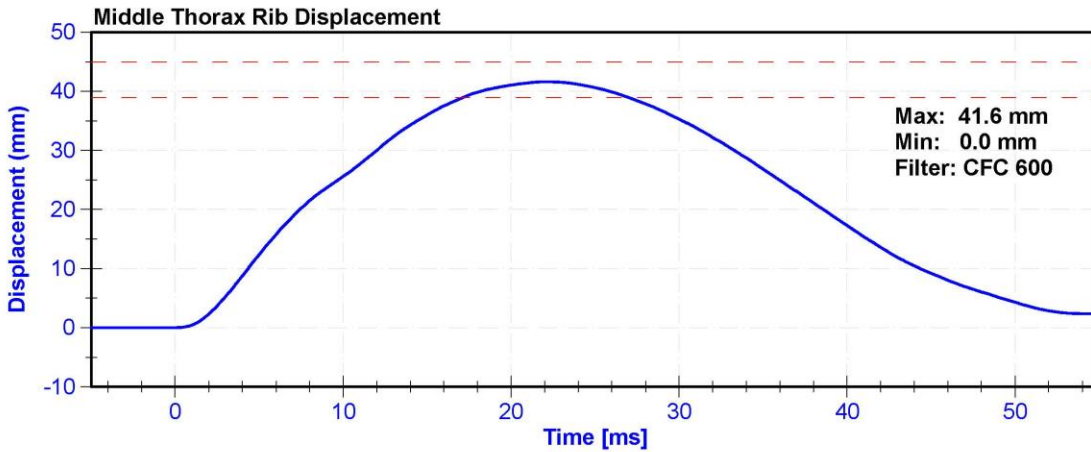
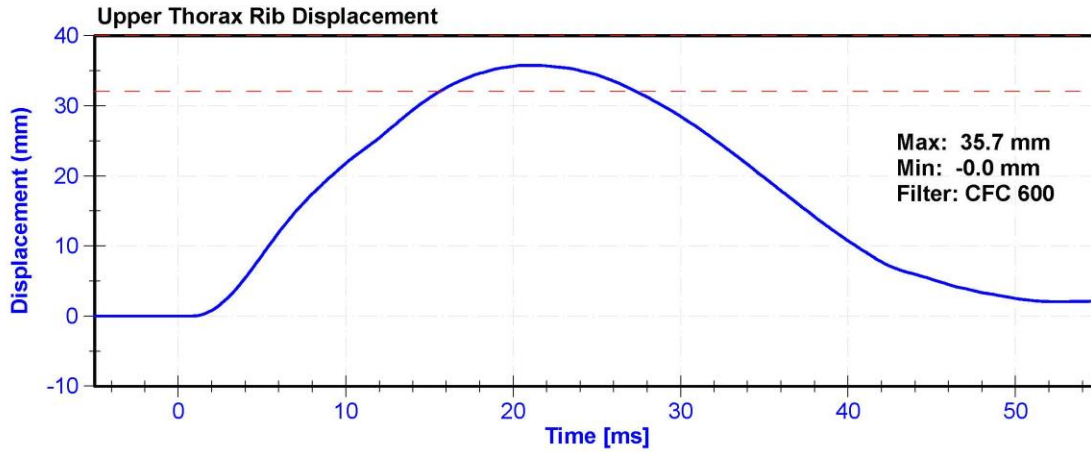
**Results**

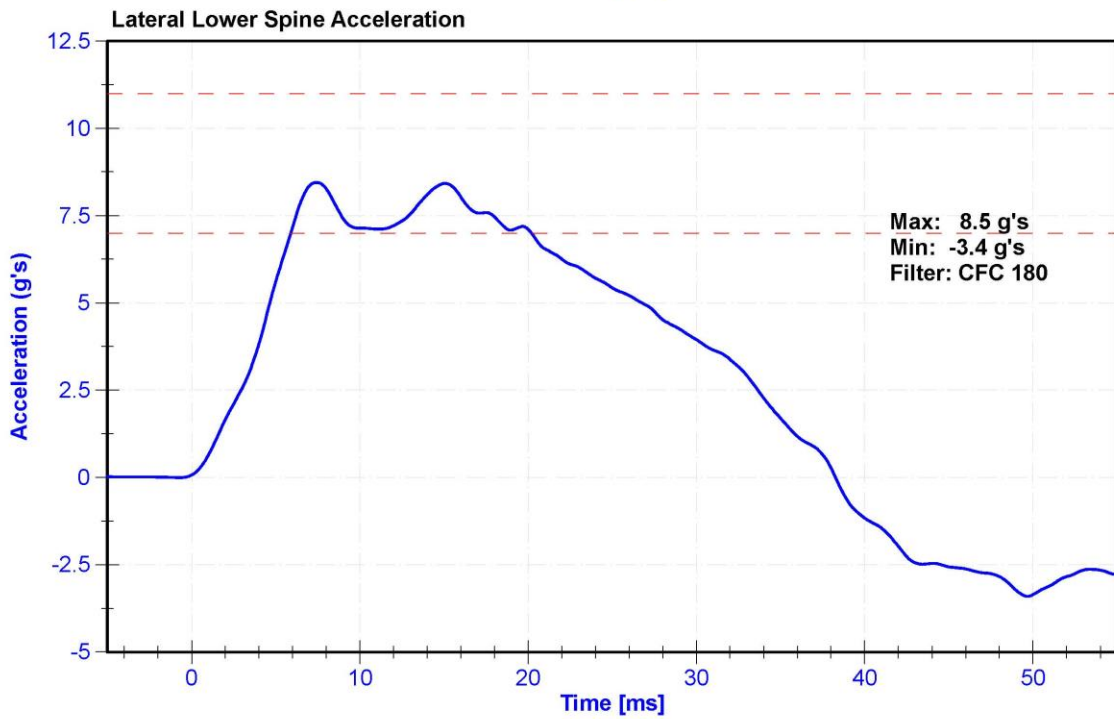
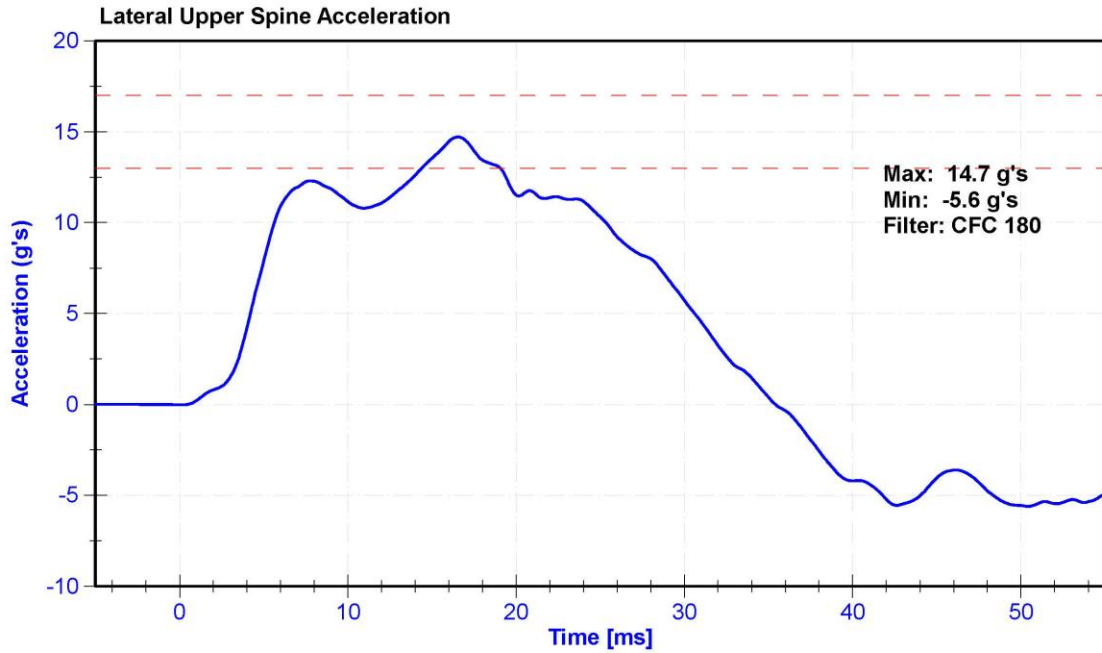
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	35	Pass
Velocity	4.2	4.4	m/s	4.22	Pass
Probe Acceleration	14	18	g's	15.5	Pass
Lateral Upper Spine Acceleration	13	17	g's	14.7	Pass
Lateral Lower Spine Acceleration	7	11	g's	8.5	Pass
Upper Thorax Rib Deflection	32	40	mm	35.7	Pass
Middle Thorax Rib Deflection	39	45	mm	41.6	Pass
Lower Thorax Rib Deflection	35	43	mm	39.6	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A286228	1/29/2020	7/29/2020
Upper Spine Y Accelerometer	ENDEVCO 7264C	AC-P64148	4/16/2020	10/15/2020
Lower Spine Y Accelerometer	ENDEVCO 7264C	AC-P51327	4/16/2020	10/15/2020
Upper Thorax Rib Potentiometer	Servo 1246	DS-2165GFE	5/6/2020	11/4/2020
Middle Thorax Rib Potentiometer	Servo 08TC1-3621	DS-45 GFE	5/6/2020	11/4/2020
Lower Thorax Rib Potentiometer	Servo 08TC1-3787	DS-011GFE	5/6/2020	11/4/2020









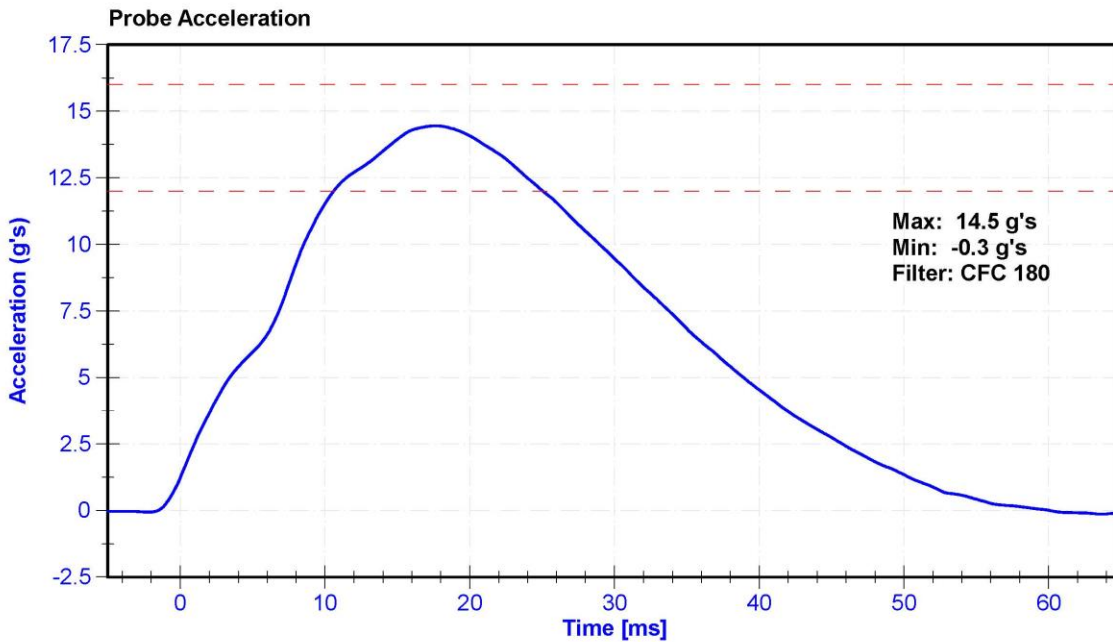
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

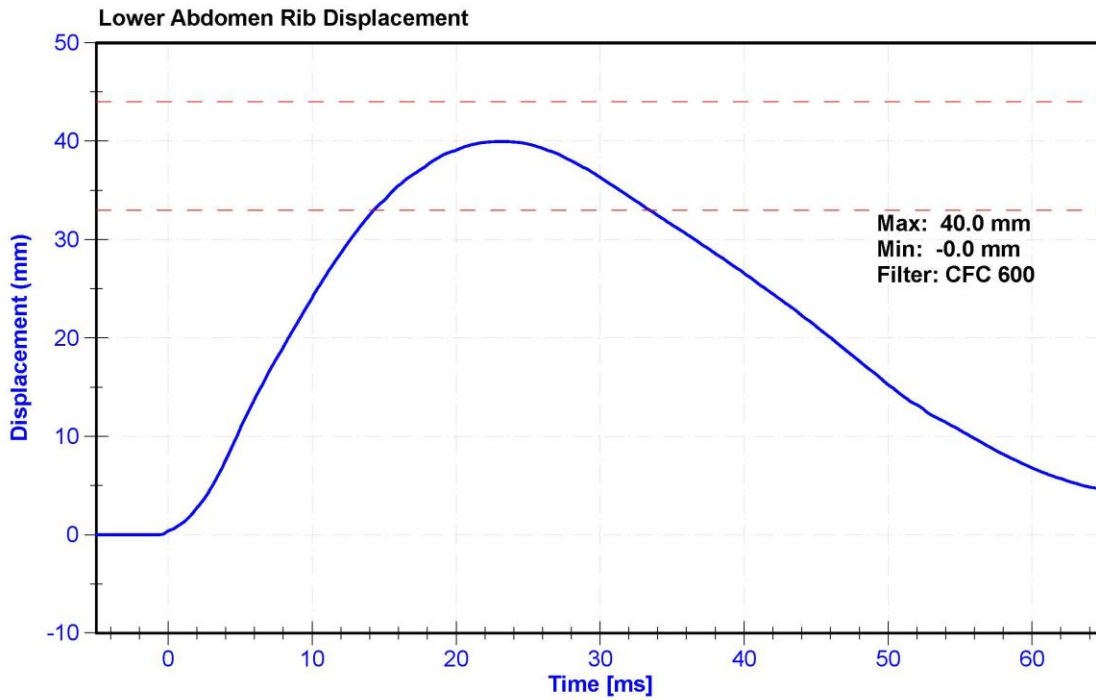
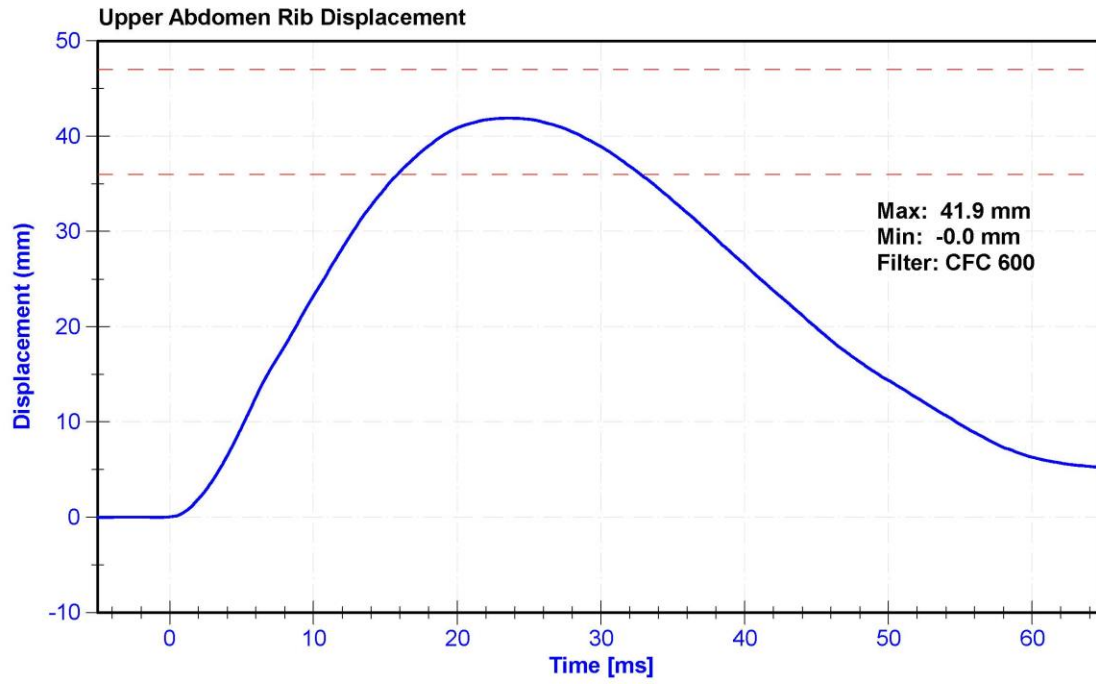
**Results**

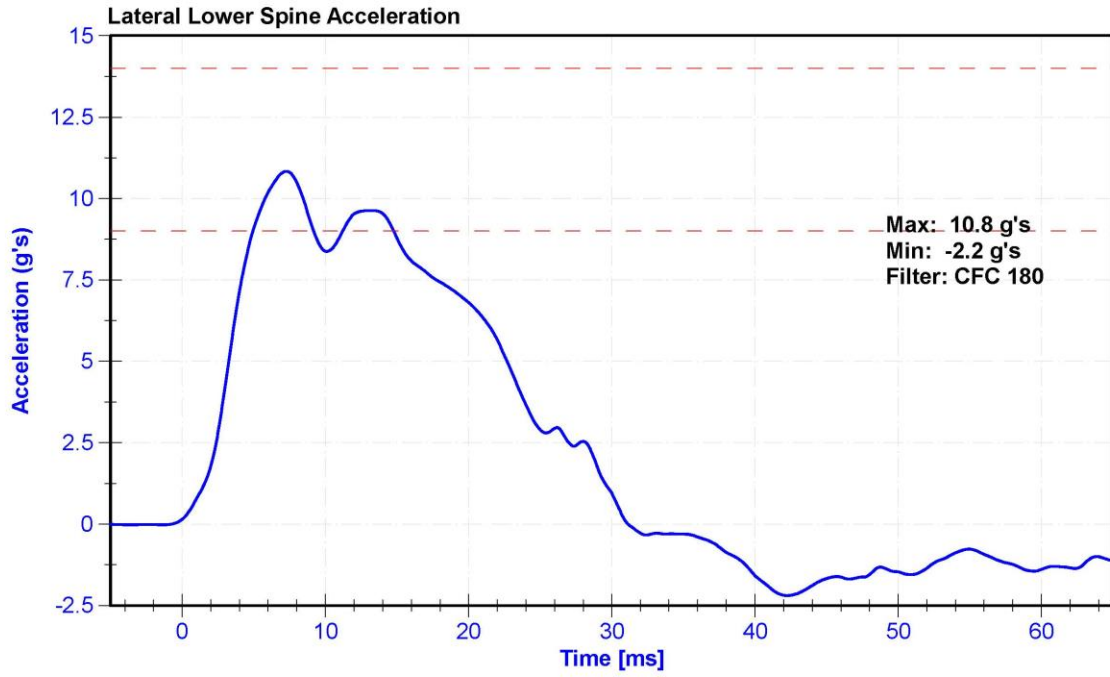
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	65.0	Pass
Velocity	4.2	4.4	m/s	4.22	Pass
Probe Acceleration	12	16	g's	14.5	Pass
Lateral Lower Spine Acceleration	9	14	g's	10.8	Pass
Upper Abdomen Rib Deflection	36	47	mm	41.9	Pass
Lower Abdomen Rib Deflection	33	44	mm	40.0	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	MSI 64C-2000	A286228	1/29/2020	7/29/2020
Lower Spine Y Accelerometer	ENDDEVCO 7264C-2K-TZAC-P51327	ZAC-P51327	4/16/2020	10/15/2020
Upper Abdomen Rib Potentiometer	Servo 08TC1-3725	DS-008GFE	5/6/2020	11/4/2020
Lower Abdomen Rib Potentiometer	Servo 08TC1-3745	DS-1774GFE	5/6/2020	11/4/2020







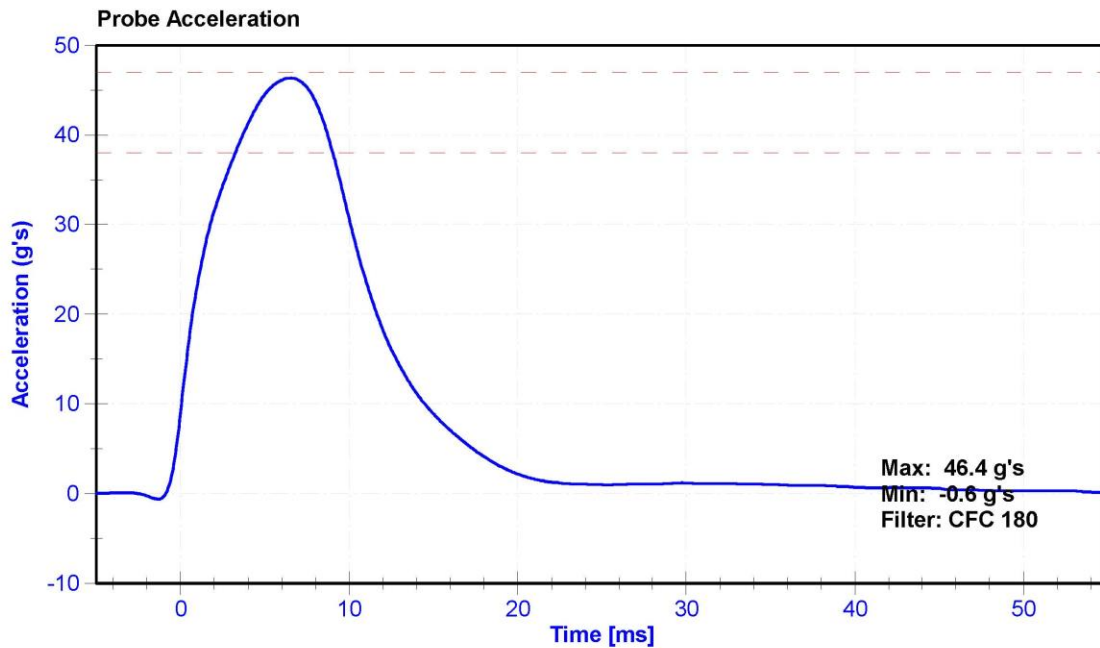
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

**Results**

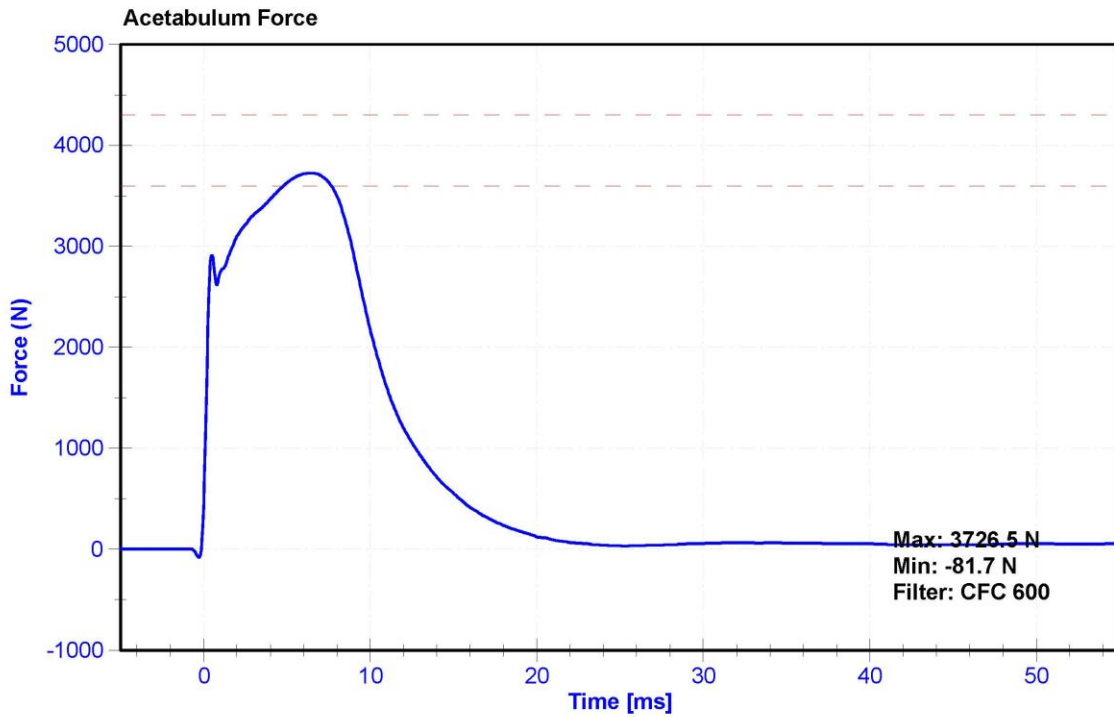
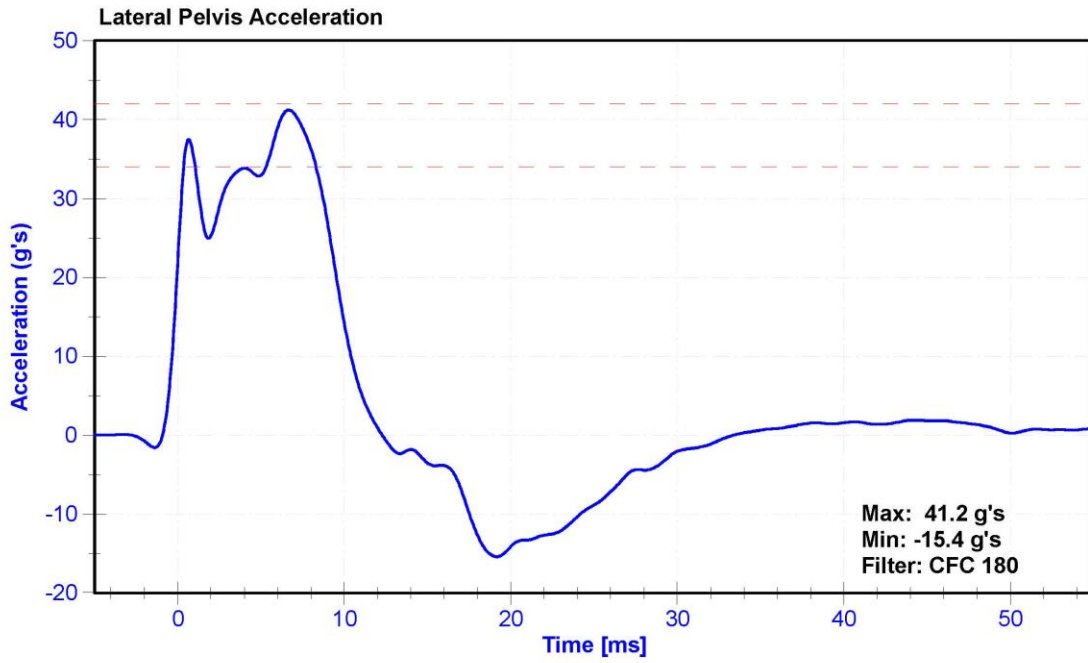
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	65	Pass
Velocity	6.6	6.8	m/s	6.64	Pass
Probe Acceleration	38	47	g's	46.4	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	41.2	Pass
Acetabulum Force	3600	4300	N	3726.5	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A286228	1/29/2020	7/29/2020
Pelvis Y Accelerometer	ENDEVCO 7264C	AC-P51875	4/16/2020	10/15/2020
Acetabulum Load Cell	Denton 3249J	LC-4986Fy	6/14/2019	6/13/2020
Certification Plug	SACO	13113	8/5/2019	N/A
Crash Test Plug	SACO	13212	8/8/2019	N/A









*Desora  
Crush  
5/29/19*

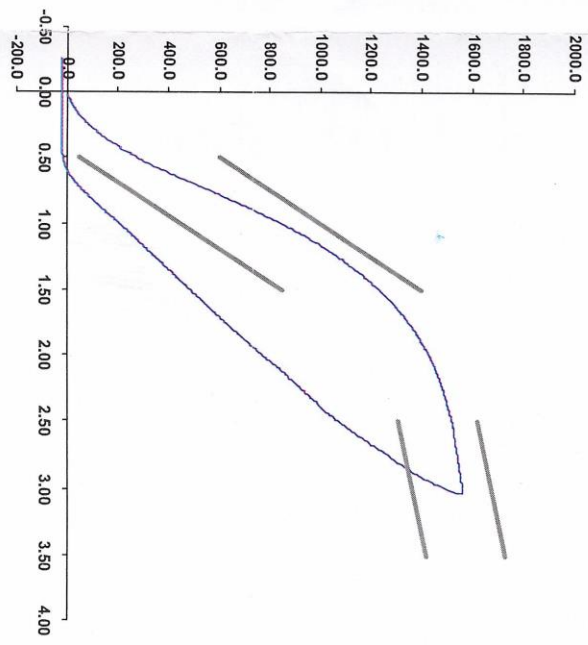
**SID-IIs Pelvis Plug Certification Test**

Plug S/N 13212  
Test Number 10607  
Report Number 10642  
Test Date 8/8/2019 1:20:19 PM

Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	50.00	600.00
Force @ 1.5 mm (N)	850.00	1,400.00
Force @ 2.5 mm (N)	1,305.00	1,618.00
Force @ 3.0 mm (N)	1,361.00	1,673.00

Testing Machine STM-20 5965542  
 Load Cell S/N (F1360947), Units (LBS) 1000  
 Crosshead Speed (mm / min) or Rate 12.7  
 Extension or Position Measured by XHD\_100 (XHD100)

Notes:



Operator

Part Number 180-4450

Template No 107 08-Aug-19  
SACO Research

By: *DC* Date: *8/8/2019*  
SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 FAX



SID-IIs Pelvis Plug Certification Test

Plug S/N 13113  
Test Number 10474  
Report Number 10510  
Test Date 8/5/2019 10:21:40 AM

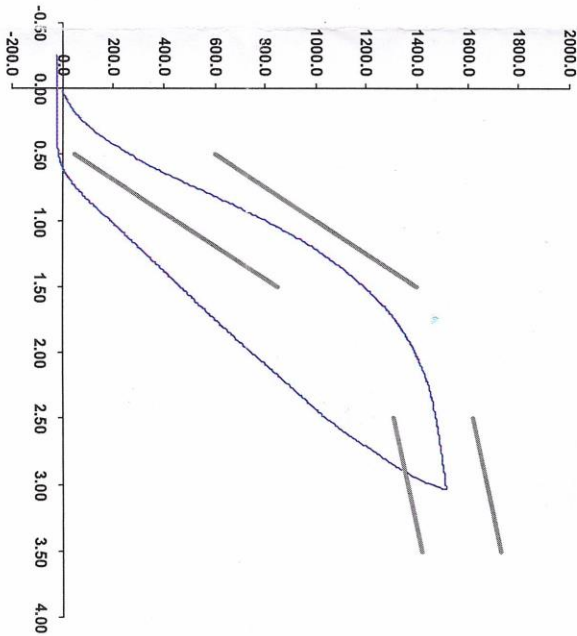
Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	50.00	600.00
Force @ 1.5 mm (N)	850.00	1,400.00
Force @ 2.5 mm (N)	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,391.00	1,673.00

Testing Machine STM-20 5965542  
 Load Cell S/N (F1360947), Units (LBS) 1000  
 Crosshead Speed (mm / min) or Rate 127  
 Extension or Position Measured by XHD\_100 (XHD100)

Notes:

Force (-N) vs Extension (-mm)

*Cert 2  
D68012  
5/29/2020*



Operator

Part Number 180-4450

Template No 107 05-Aug-19  
SACO Research

By: *DC*

Date: *8/5/2019*

SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 FAX

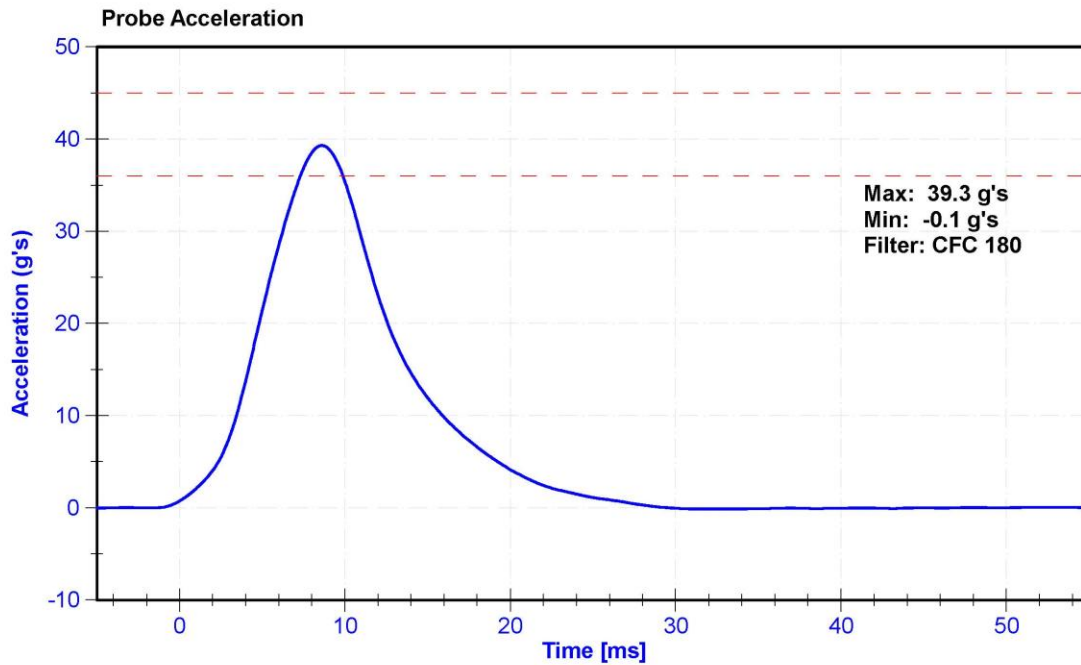
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	DG8012	Laboratory Supervisor	K. Brogan

**Results**

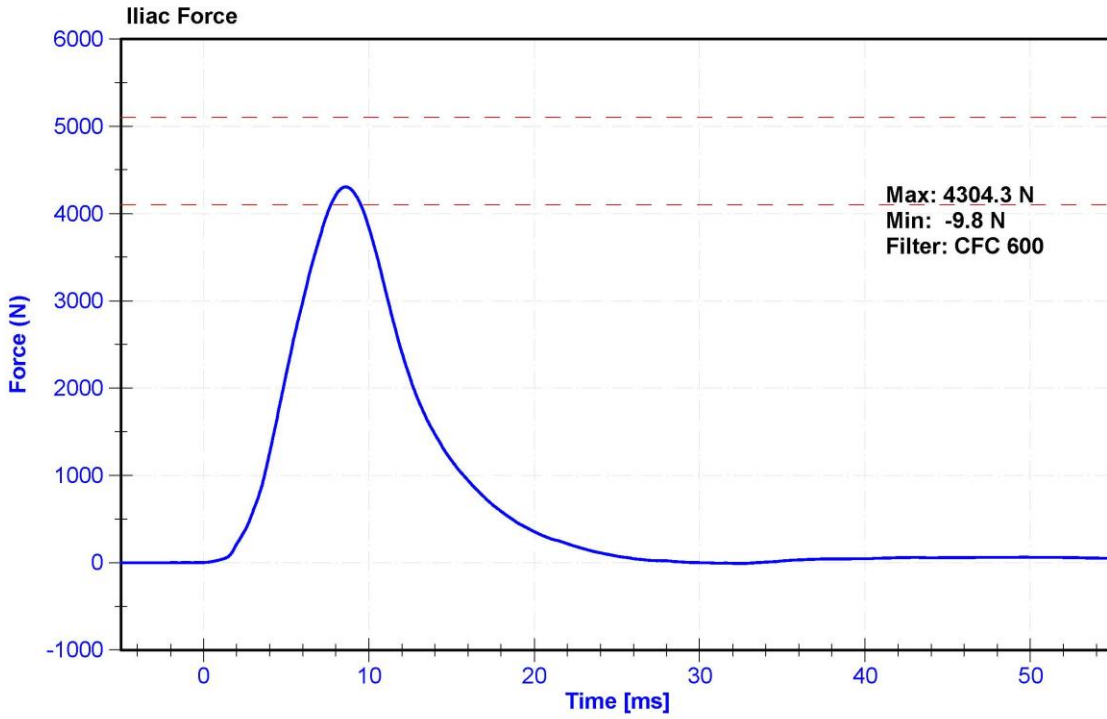
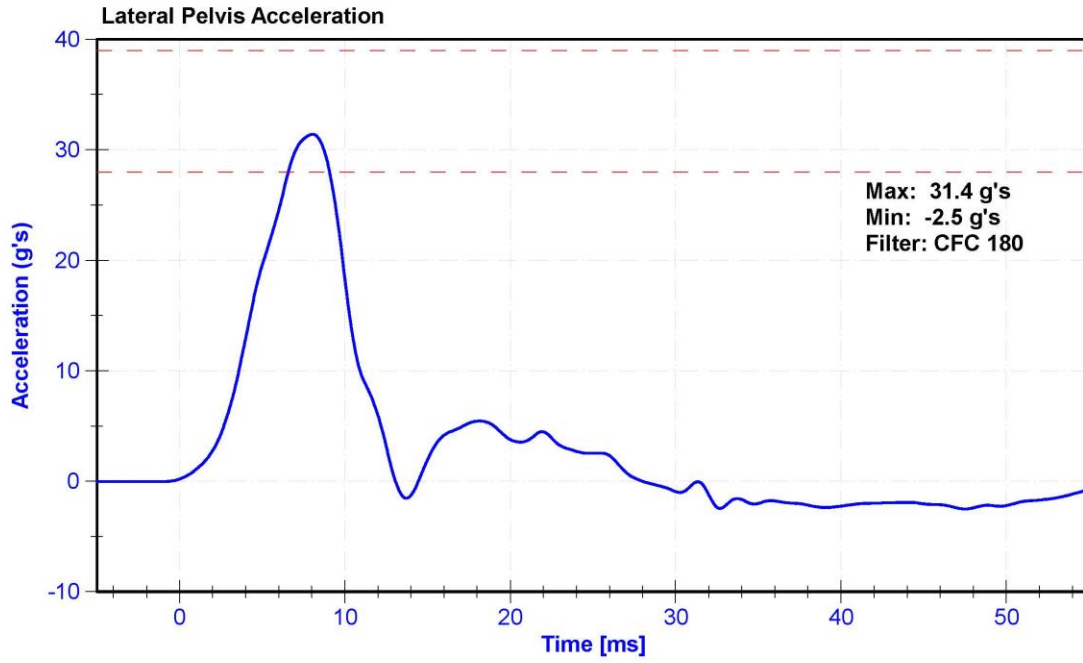
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	29	Pass
Velocity	4.2	4.4	m/s	4.35	Pass
Probe Acceleration	36	45	g's	39.3	Pass
Lateral Pelvis Acceleration	28	39	g's	31.4	Pass
Iliac Force	4100	5100	N	4304.3	Pass

**Transducer Calibrations**

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A286228	1/29/2020	7/29/2020
Pelvis Y Accelerometer	ENDEVCO 7264C-2K	AC-P51875	4/16/2020	10/15/2020
Iliac Load Cell	DENTON 3228J	LC-290Fy	9/25/2019	9/24/2020







**APPENDIX D**

**TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA**

**Table 1 – Dummy Instrumentation (ES-2re)**

				ES-2re S/N: F034		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers	Primary	X	AC-P49204	ENDEVCO	4/15/2020	
		Y	AC-P83437	ENDEVCO	4/15/2020	
		Z	AC-P64007	ENDEVCO	4/15/2020	
	Redundant	X	AC-P52003	ENDEVCO	4/15/2020	
		Y	AC-P63981	ENDEVCO	4/15/2020	
		Z	AC-P51962	ENDEVCO	4/15/2020	
Thorax Rib Displacement Potentiometers	Upper	Y	DS-183GFE	Honeywell	4/14/2020	
	Middle	Y	DS-184GFE	Honeywell	4/14/2020	
	Lower	Y	DS-182GFE	Honeywell	4/14/2020	
Abdomen Load Cells	Forward	Y	LC-1440	DENTON	6/14/2019	
	Middle	Y	LC-1525	DENTON	6/5/2019	
	Rear	Y	LC-1528	DENTON	6/14/2019	
Lower Spine Accelerometers (T12)		X	AC-P17299	ENDEVCO	4/15/2020	
		Y	AC-P39731	ENDEVCO	4/15/2020	
		Z	AC-P22639	ENDEVCO	4/15/2020	
Pubic Symphysis Load Cell		Y	LC-464fy	Denton	6/14/2019	

**Table 2 – Dummy Instrumentation (SID-IIs)**

				SID-IIs S/N: DG8012		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers	Primary	X	AC-P74788	ENDEVCO	4/16/2020	
		Y	AC-P83432	ENDEVCO	4/16/2020	
		Z	AC-P83319	ENDEVCO	4/16/2020	
	Redundant	X	AC-P80334	ENDEVCO	4/16/2020	
		Y	AC-P52155	ENDEVCO	4/16/2020	
		Z	AC-P83322	ENDEVCO	4/16/2020	
Displacement Potentiometers	Thoracic Rib	Upper	Y	DS-2165GFE	Servo	5/6/2020
		Middle	Y	DS-45 GFE	Servo	5/6/2020
		Lower	Y	DS-011GFE	Servo	5/6/2020
	Abdominal Rib	Upper	Y	DS-008GFE	Servo	5/6/2020
		Lower	Y	DS-1774GFE	Servo	5/6/2020
Lower Spine Accelerometers (T12)		X	AC-P52040	ENDEVCO	5/19/2020	
		Y	AC-P51327	ENDEVCO	4/16/2020	
		Z	AC-P52067	ENDEVCO	4/16/2020	
Acetabulum Load Cell		Y	LC-4986Fy	Denton	6/14/2019	
Iliac Wing Load Cell		Y	LC-290Fy	Denton	9/25/2019	
Pelvis Plug (struck side)			13405	SACO	9/20/2019	
Pelvis Plug (non-struck side)			-	-	-	

**Table 3 – Vehicle Instrumentation**

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	A315009	MSI 1201-1000	3/16/2020
	Vehicle Center of Gravity	Y	A315018	MSI 1201-1000	3/16/2020
	Vehicle Center of Gravity	Z	A315963	MSI 1201-1000	3/16/2020
2	Right Sill at Front Seat	X	A315014	MSI 1201-1000	3/16/2020
	Right Sill at Front Seat	Y	A315198	MSI 1201-1000	3/16/2020
	Right Sill at Front Seat	Z	A315988	MSI 1201-1000	3/16/2020
3	Right Sill at Rear Seat	X	A315832	MSI 1201-1000	3/9/2020
	Right Sill at Rear Seat	Y	A315871	MSI 1201-1000	3/9/2020
	Right Sill at Rear Seat	Z	A315935	MSI 1201-1000	3/6/2020
4	Left Sill at Front Door	Y	A315849	MSI 1201-1000	3/20/2020
5	Left Sill at Rear Door	Y	A315930	MSI 1201-1000	3/31/2020
6	Left A-Post Lower	Y	A315737	MSI 1201-1000	3/30/2020
7	Left A-Post Middle	Y	A315949	MSI 1201-1000	5/6/2020
8	Left B-Post Lower	Y	A315003	MSI 1201-1000	5/6/2020
9	Left B-Post Middle	Y	A284985	MSI 1201-1000	3/26/2020
10	Front Seat Track	Y	AC-A280192	MSI 1201-1000	3/25/2020
11	Rear Seat Track or Structure	Y	A315199	MSI 1201-1000	3/17/2020
12	Right Rear Occ. Compartment	Y	AC-A280024	MSI 1201-1000	3/27/2020
13	Engine Block	X	A315721	MSI 1201-1000	3/31/2020
	Engine Block	Y	A315921	MSI 1201-1000	3/7/2020
14	Rear Floorpan Above Axle	X	A315183	MSI 1201-1000	3/18/2020
	Rear Floorpan Above Axle	Y	A315719	MSI 1201-1000	3/6/2020
	Rear Floorpan Above Axle	Z	A315878	MSI 1201-1000	3/18/2020

**TABLE 4 – MDB Instrumentation**

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	A315087	MSI 1201-1000	3/16/2020
MDB Center of Gravity	Y	A315096	MSI 1201-1000	3/17/2020
MDB Center of Gravity	Z	A315733	MSI 1201-1000	3/17/2020
Left Frame at Rear Axle Centerline	X	A315182	MSI 1201-1000	3/30/2020
Left Frame at Rear Axle Centerline	Y	A315715	MSI 1201-1000	3/30/2020