REPORT NUMBER: SINCAP-CAL-20-014

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

FCA US LLC
2020 Ram 1500 Classic
Crew Cab Truck

NHTSA No: M20200312

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

November 30, 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

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Administration, in response to Contract Number DTNH22-14-D-00352.

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Prepared by: Matthew Pronko Date: November 30, 2020
Matthew Pronko, Test Engineer

Approved by: Vanessa Hansen Date: November 30, 2020
Vanessa Hansen, Operations Manager

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

Date: _____

TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No. SINCAP-CAL-20-014	***2. Government Accession No.***	***3. Recipient's Catalog No.***
4. Title and Subtitle Final Report of New Car Assessment Program Side Impact MDB Testing of a 2020 Ram 1500 Classic Crew Cab Truck Truck NHTSA No.: M20200312		***5. Report Date*** November 30, 2020 ***6. Performing Organization Code*** CAL
Matthew Pronko,Test Engineer Vanessa Hansen , Operations Manager		***8. Performing Organization Report No.*** CAL-DOT-2020-014
9. Performing Organization Name and Address Calspan Corporation Transportation Test Operations P.O. Box 400 Buffalo, New York 14225		***10. Work Unit No.*** ***11. Contract or Grant No.*** DTNH22-14-D-00352
12. Sponsoring Agency Name and Address 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		***13. Type of Report and Period Covered:*** Final Test Report August 24, 2020 - November 30, 2020 ***14. Sponsoring Agency Code*** NRM-110
15. ***Supplementary Notes***		

16. Abstract

A 55/28, (61.90kph / 38.5 mph), 90^0 Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2020 Ram 1500 Classic Crew 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 August 24, 2020.

The impact velocity of the Moving Deformable Barrier (MDB) was 61.72 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 290mm located at level 1. The test vehicle's occupant performance data is as follows:

Measurement Description	Driver ATD (ES-2re)		
	Units	IARV	Result
Head Injury Criteria (HIC_{36})	N/A	1000	15.696
Maximum Thoracic Rib Deflection	mm	44	18.069
Total Abdominal Force	N	2500	477.934
Pubic Symphysis Force	N	6000	580.612

Measurement Description	Passenger ATD (SID-IIs)		
	Units	IARV	Result
Head Injury Criteria (HIC_{36})	N/A	1000	57.574
Lower Spine Resultant Acceleration	G	82	31.564
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	952.882
Maximum Thoracic Rib Deflection	mm	38*	2.467
Maximum Abdominal Rib Deflection	mm	45*	3.783

* *Proposed IARV*

The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.

17. Key Words New Car Assessment Program (NCAP) Side Impact MDB ES-2re SID-IIs	***18. Distribution Statement*** Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division, 1200 New Jersey Ave. SE Washington, D.C. 20590

19. Security Class. (of this report)	***20. Security Class. (of this page)***	***21. No. of Pages***	***22. Price***
UNCLASSIFIED	UNCLASSIFIED	192	

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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 Ram 1500 Classic Crew 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 Ram 1500 Classic Crew 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 61.72 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 August 24, 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	15.696
Maximum Thorax Rib Deflection	mm	44	18.069
Combined Abdominal Force	N	2500	477.934
Pubic Symphysis Force	N	6000	580.612

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC36)		1000	57.574
Lower Spine (T12) Resultant Acceleration	G	82	31.564
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	952.882
Maximum Thoracic Rib Deflection	mm	38*	2.467
Maximum Abdominal Rib Deflection	mm	45*	3.783

*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	No		
Knee Air bag	No	N/A		
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 – F033
2. P4 serial number – 300

Data Anomalies:

The following channel was questionable for

- Left B-Pillar Lower Y Acceleration,Exceeded calibration range and saturated at 9.2 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 Ram 1500 Classic Crew Cab Truck NHTSA No.: M20200312
Test Program: NCAP Side MDB Impact Test Test Date: 8/24/2020

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20200312
Model Year	2020
Make	Ram
Model	1500 Classic
Body Style	Crew Cab Truck
VIN	1C6RR6LT4LS127775
Body Color	Gray
Odometer Reading (km/mi)	33 mi
Engine Displacement (L)	5.7
Type/No. Cylinders	V8
Engine Placement	Inline
Transmission Type	Automatic
Transmission Speeds	8-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	No
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	FCA US LLC
Date of Manufacture	2-20
Vehicle Type	Truck

GVWR (kg)	3130
GAWR Front (kg)	1679
GAWR Rear (kg)	1770

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	3	3	-	6	
Capacity Weight (VCW) (kg)				717	(A)
DSC X 68.04 kg				408.24	(B)
Cargo Weight (RCLW) (kg)				136	(A-B)

VEHICLE SEAT TYPE

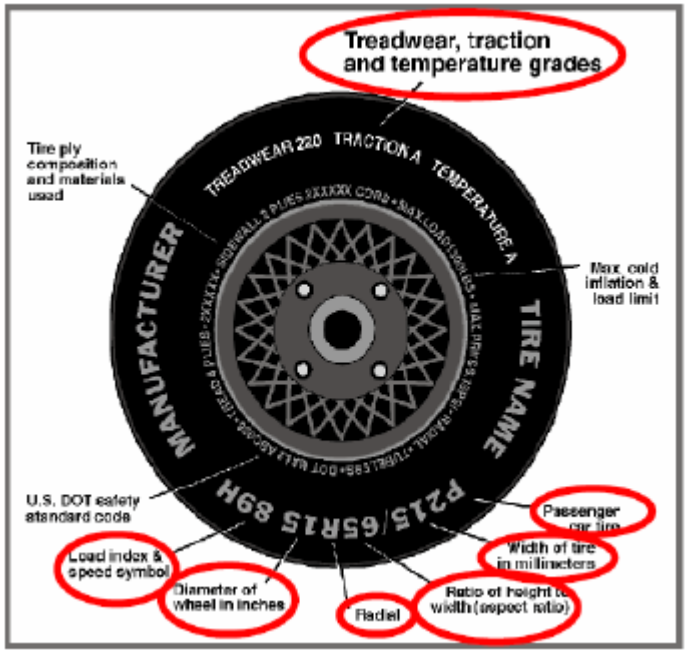
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						W/ Lever	W/ Knob
Front Seat	X					X	
Rear or Second Row Seat			X		X		
Third Row seat							

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

Test Vehicle:	2020 Ram 1500 Classic Crew Cab Truck	NHTSA No.:	M20200312
Test Program:	NCAP Side MDB Impact Test	Test Date:	8/24/2020

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)	270	270
Recommended Tire Size	P275/60R20	P275/60R20
Tire Size on Vehicle	P275/60R20	P275/60R20
Tire Manufacturer	Goodyear	Goodyear
Tire Model	Wrangler SRA	Wrangler SRA
Treadwear	500	500
Traction	A	A
Temperature Grade	B	B
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2Polyester, 2 Steel	2Polyester, 2 Steel
Load Index/Speed Symbol	114S	114S
Tire Material	Rubber	Rubber
DOT Safety Code Left	M6YNJD1R0520	M6YNJD1R0520
DOT Safety Code Right	M6YNJD1R0520	M6YNJD1R0520

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

Test Vehicle: 2020 Ram 1500 Classic Crew Cab Truck NHTSA No.: M20200312
Test Program: NCAP Side MDB Impact Test Test Date: 8/24/2020

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	268	265	267	264
Tire Placard	kPa	270	270	270	270
Owner's Manual	kPa	270	270	270	270
As Tested	kPa	270	270	270	270

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	681	540		743	628		780	650	
Right	kg	694	500		720	580		697	592	
Ratio	%	56.9	43.1		54.8	45.2		53.6	46.4	
Totals	kg	1375	1040	2415	1463	1208	2671	1437	1242	2679

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	2415	(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 (TVTW)	kg	2678	(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)? [X] **Yes** [ ] **No**

TEST VEHICLE ATTITUDES AND CG

Measurement Description	Units	Fully Loaded	As Tested	Meets Requirement**
LF	mm	1030	1028	Yes
RF	mm	1049	1040	Yes
RR	mm	1082	1076	Yes
LR	mm	1061	1068	Yes
Vehicle CG (Aft of Front Axle)	mm	1655	1615	
Vehicle CG (Left(+)/Right(-) from Longitudinal Centerline)	mm	33	23	

**** 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 Ram 1500 Classic Crew Cab Truck	NHTSA No.:	M20200312
Test Program:	NCAP Side MDB Impact Test	Test Date:	8/24/2020

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Nothing was removed	0
Ballast / Equipment Added	65.5

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

Test Vehicle:	2020 Ram 1500 Classic Crew Cab Truck	NHTSA No.:	M20200312
Test Program:	NCAP Side MDB Impact Test	Test Date:	8/24/2020

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*	Not Adjustable		
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*	Not Adjustable		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 Ram 1500 Classic Crew Cab Truck NHTSA No.: M20200312
Test Program: NCAP Side MDB Impact Test Test Date: 8/24/2020

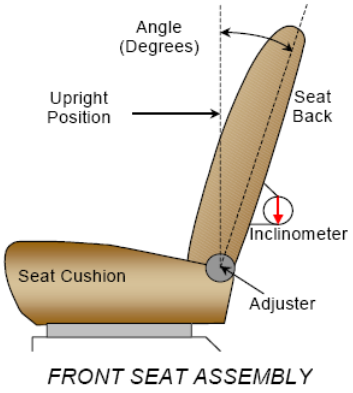
SEAT FORE / AFT POSITION

Seat	Total Fore / Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	230	24 (0-23)	120	12
Front Passenger Seat	230	24 (0-23)	120	12
Front Center Seat*	Not Adjustable			
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.



FRONT SEAT ASSEMBLY

Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detents*
Driver Seat w/ Seated Dummy	-12 to 44.2	-	+6.9	9
Front Passenger Seat	-11.8 to 44.3	-	+6.7	9
Front Center Seat*	FIXED	FIXED	FIXED	FIXED
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 Ram 1500 Classic Crew Cab Truck NHTSA No.: M20200312
Test Program: NCAP Side MDB Impact Test Test Date: 8/24/2020

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	5 (0-4)	0
Rear Seat	Fixed	Fixed

HEAD RESTRAINT ADJUSTMENT

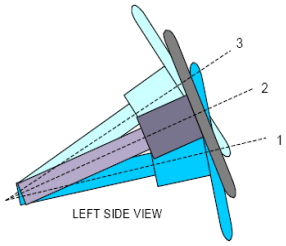
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

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

STEERING COLUMN ADJUSTMENT

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

	Degrees	Fore/Aft Position (mm)
Lowermost – Position 1	14.2	
Geometric Center – Position 2	21.8	
Uppermost – Position 3	31.2	
Telescoping Steering Wheel Travel		N/A
Test Position	21.8	N/A

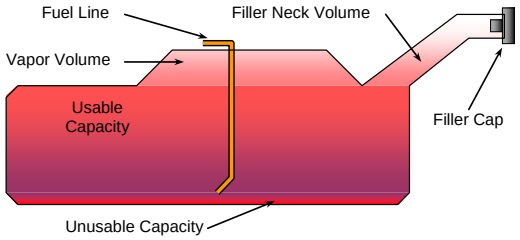


STEERING COLUMN ASSEMBLY

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.



VEHICLE FUEL TANK ASSEMBLY

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

Test Vehicle: 2020 Ram 1500 Classic Crew Cab Truck NHTSA No.: M20200312
Test Program: NCAP Side MDB Impact Test Test Date: 8/24/2020

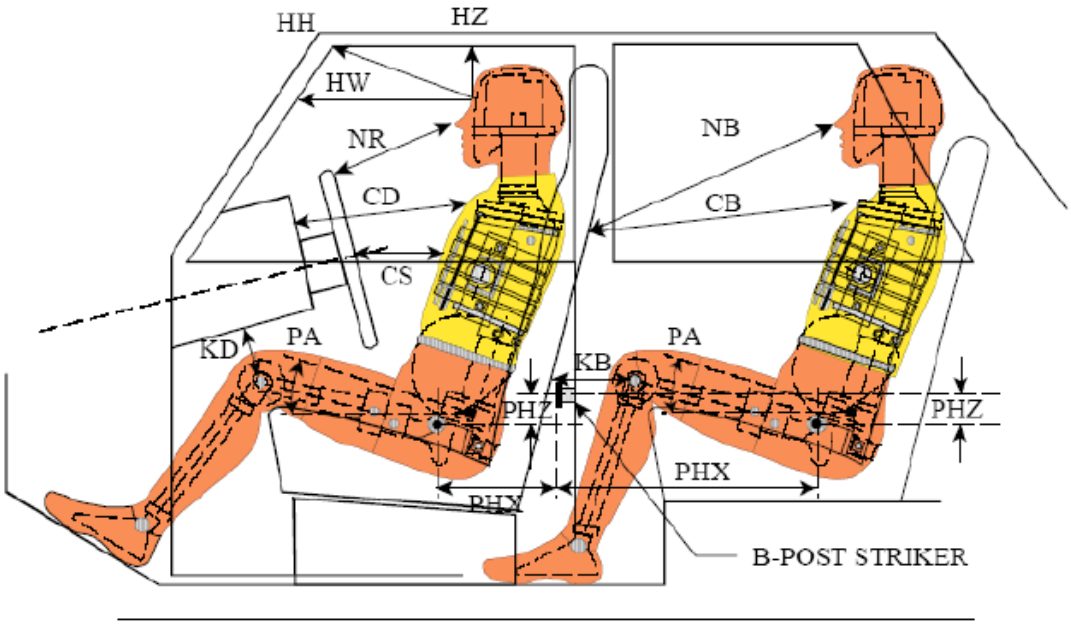
FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	98.4
Usable Capacity of "Optional Tank" (see Form No. 1)	121.2
Usable Capacity of Standard Tank (see Owner's Manual)	98.4
Usable Capacity of Optional Tank (see Owner's Manual)	121.2
93% of Usable Capacity	91.5
Actual Amount of Solvent Used in Test	91.5
1/3 of Usable Capacity	32.8

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

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle:	2020 Ram 1500 Classic Crew Cab Truck	NHTSA No.:	M20200312
Test Program:	NCAP Side MDB Impact Test	Test Date:	8/24/2020



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

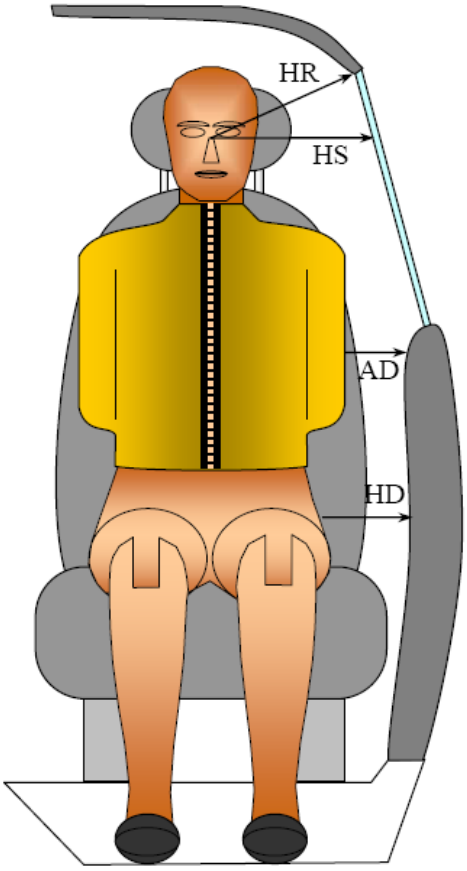
LEFT SIDE VIEW

DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Description	Driver (Serial No. F033)		Passenger (Serial No.300)	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	523			
HW		Header to Windshield	745			
HZ	HZ	Head to Roof Liner	235		313	
NR	NB	Nose to Rim/Seat Back	491		582	
CD	CB	Chest to Dash/Seat Back	616		597	
CS		Chest to Steering Wheel	386			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	155	19.0	347	1.2
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	135	23.5	351	0.8
PAX°	PAX°	Pelvic Tilt Angle X		23.5		20.7
	PAY°	Pelvic Tilt Angle Y				0.2
PHX	PHX	Hip Point to Striker (X-Axis)	185		195	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	5		25	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle:	2020 Ram 1500 Classic Crew Cab Truck	NHTSA No.:	M20200312
Test Program:	NCAP Side MDB Impact Test	Test Date:	8/24/2020



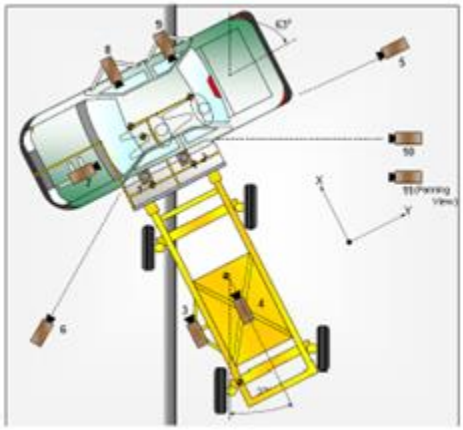
FRONT VIEW OF DUMMY

DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver (Serial No. F033)	Passenger (Serial No. 300)
HR	Head to Side Header	mm	208	265
HS	Head to Side Window	mm	340	375
AD	Arm to Door	mm	96	155
HD	Hip Point to Door	mm	152	178

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2020 Ram 1500 Classic Crew Cab Truck NHTSA No.: M20200312
Test Program: NCAP Side MDB Impact Test Test Date: 8/24/2020



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	550	-8353	28	1000
3	Left Impact Point (MDB)	-14710	0	-847	25	1000
4	Side Overall (MDB)	-1140	878	-1587	12.5	1000
5	Rear	0	10390	-1379	28	1000
6	Left Front	-2826	-5372	-1434	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.*

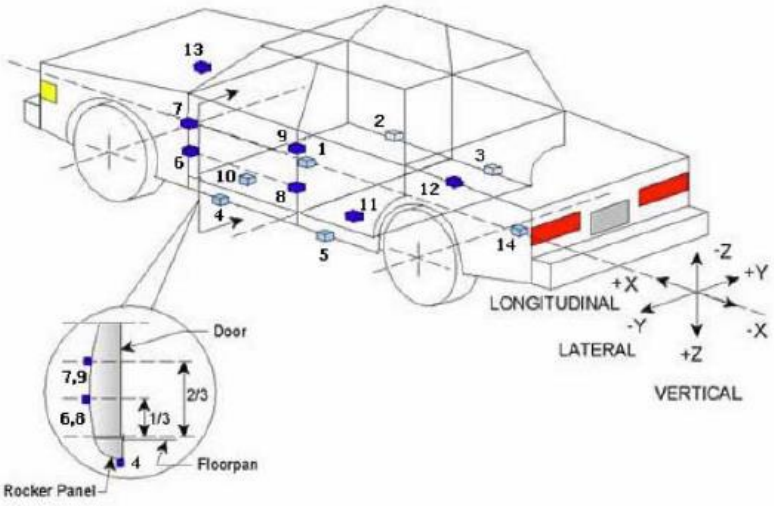
If applicable, explain why camera(s) did not operate as intended: All cameras operated normally

INSTRUMENTATION

Driver Dummy Channels	16
Passenger Dummy Channels	16
Vehicle Structure Accelerometers	23
MDB Accelerometers	7
Total	62

DATA SHEET NO. 6
TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2020 Ram 1500 Classic Crew Cab Truck NHTSA No.: M20200312
Test Program: NCAP Side MDB Impact Test Test Date: 8/24/2020



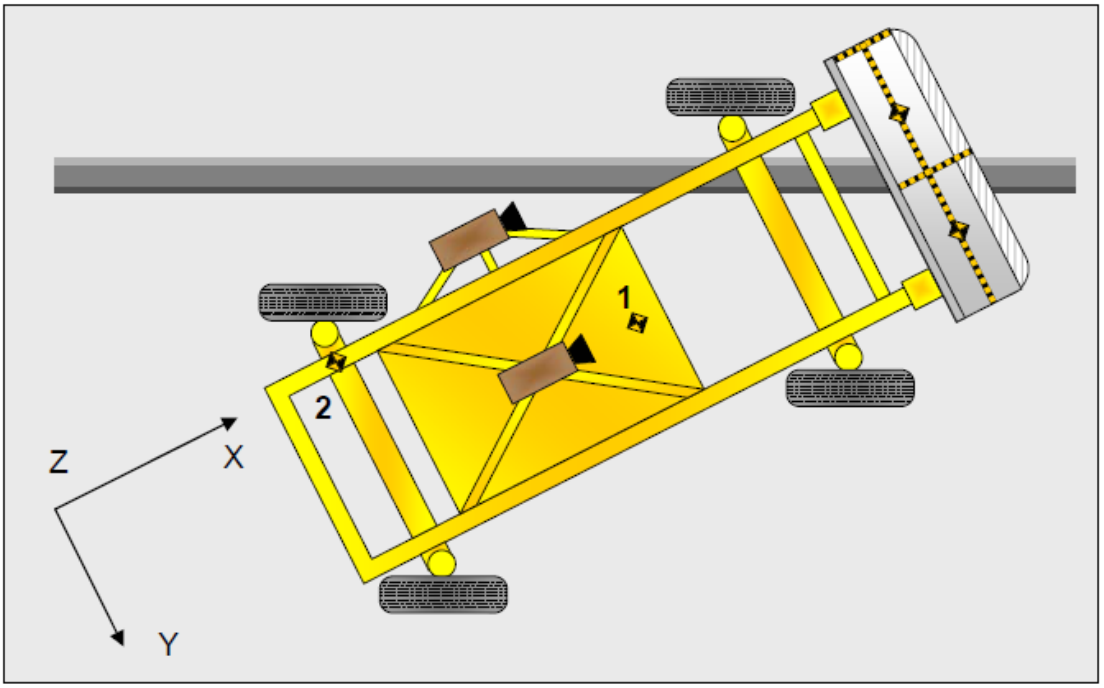
TEST VEHICLE ACCELEROMETER LOCATIONS

No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	3827	18	-214
2	Right Sill at Front Seat	4053	795	2
3	Right Sill at Rear Seat	2712	815	-15
4	Left Sill at Front Door	3873	-765	-4
5	Left Sill at Rear Door	2695	-800	-19
6	A-Post Lower	4177	-764	-335
7	A-Post Middle	4148	-738	-834
8	B-Post Lower	3134	-775	-417
9	B-Post Middle	3118	-758	-749
10	Front Seat Track	3238	-640	-148
11	Rear Seat Structure	2524	-704	-230
12	Rt. Rear Occ. Compartment	2907	458	-49
13	Engine Block	4809	59	-560
14	Rear Above Axle	1019	4	-295

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 Ram 1500 Classic Crew Cab Truck	NHTSA No.:	M20200312
Test Program:	NCAP Side MDB Impact Test	Test Date:	8/24/2020



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 Ram 1500 Classic Crew Cab Truck NHTSA No.: M20200312
Test Program: NCAP Side MDB Impact Test Test Date: 8/24/2020

TEST DUMMY INFORMATION AND CONTACT POINTS

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

POST-TEST DOOR PERFORMANCE

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

*Tailgate opened during impact but is still operational.

POST-TEST SEAT PERFORMANCE

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

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	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 Ram 1500 Classic Crew Cab Truck NHTSA No.: M20200312
Test Program: NCAP Side MDB Impact Test Test Date: 8/24/2020

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Driver		Struck Side Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Frontal Air bag	Yes	No		
Knee Air bag	No	N/A		
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		3570
Vertical Impact Reference Line (Aft of Front Axle - Intended Impact Point)	mm		508
Actual Impact Point (Aft of Frontal Axle)	mm		506
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact Point	+2
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact Point	+2

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle:	2020 Ram 1500 Classic Crew Cab Truck	NHTSA No.:	M20200312
Test Program:	NCAP Side MDB Impact Test	Test Date:	8/24/2020

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

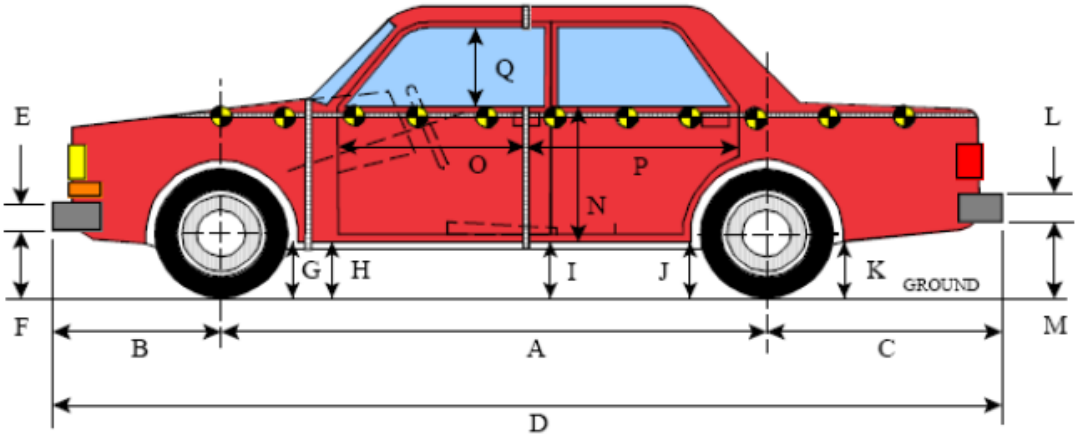
Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.10 to 62.70	61.72
Trap No. 2 Velocity (Redundant)	km/h	61.10 to 62.70	61.70
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90.0
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	63.0
MDB Crabbed angle 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	148
B	Top of Bumper	533	800	Left	164
C	Mid-Level	686	800	Left	135
D	Top of Stack	813	800	Right	183

DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle:	2020 Ram 1500 Classic Crew Cab Truck	NHTSA No.:	M20200312
Test Program:	NCAP Side MDB Impact Test	Test Date:	8/24/2020



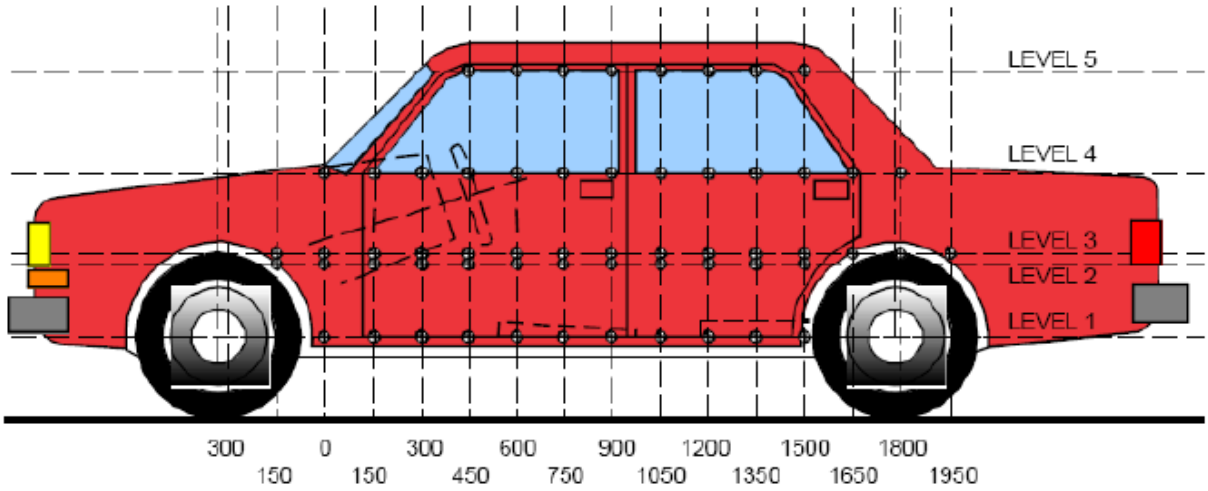
LEFT SIDE VIEW
All MEASUREMENTS IN (mm) WITH TOLERANCE OF ± 3mm

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Wheelbase	3570	3548	-22
B	Front Axle to FSOV	1032	1047	15
C	Rear Axle to RSOV	1233	1238	5
D	Total Length at Centerline	5837	5832	-5
E	Front Bumper Thickness	490	490	0
F	Front Bumper Bottom to Ground	292	304	12
G	Sill Height at Front Wheel Well	335	335	0
H	Sill Height at Front Door Leading Edge	341	340	-1
I	Sill Height at B Pillar	355	356	1
J1	Sill Height at Rear Wheel Well	341	302	-39
J2	Pinch Weld Height at Rear Wheel Well	366	351	-15
K	Sill Height Aft of Rear Wheel Well	445	399	-46
L	Rear Bumper Thickness	240	240	0
M	Rear Bumper Bottom to Ground	505	425	-80
N	Sill Height to Window Bottom of Front Window Sill	945	938	-7
O	Front Door Leading Edge to Impact CL	810	808	-2
P	Rear Door Trailing Edge to Impact CL	1331	1315	-16
Q	Front Window Opening	554	569	15
R	Right Side Length	5777	5776	-1
S	Left Side Length	5773	5762	-11
T	Maximum Vehicle Width	2010	1876	-134

DATA SHEET NO. 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle:	2020 Ram 1500 Classic Crew Cab Truck	NHTSA No.:	M20200312
Test Program:	NCAP Side MDB Impact Test	Test Date:	8/24/2020



LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	433	290	1800
2	Driver Hip Point	mm	949	145	750
3	Mid-Door	mm	885	168	1350
4	Window Sill	mm	1287	64	1200
5	Window Top	mm	1859	10	1950

*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 Ram 1500 Classic Crew Cab Truck NHTSA No.: M20200312
Test Program: NCAP Side MDB Impact Test Test Date: 8/24/2020

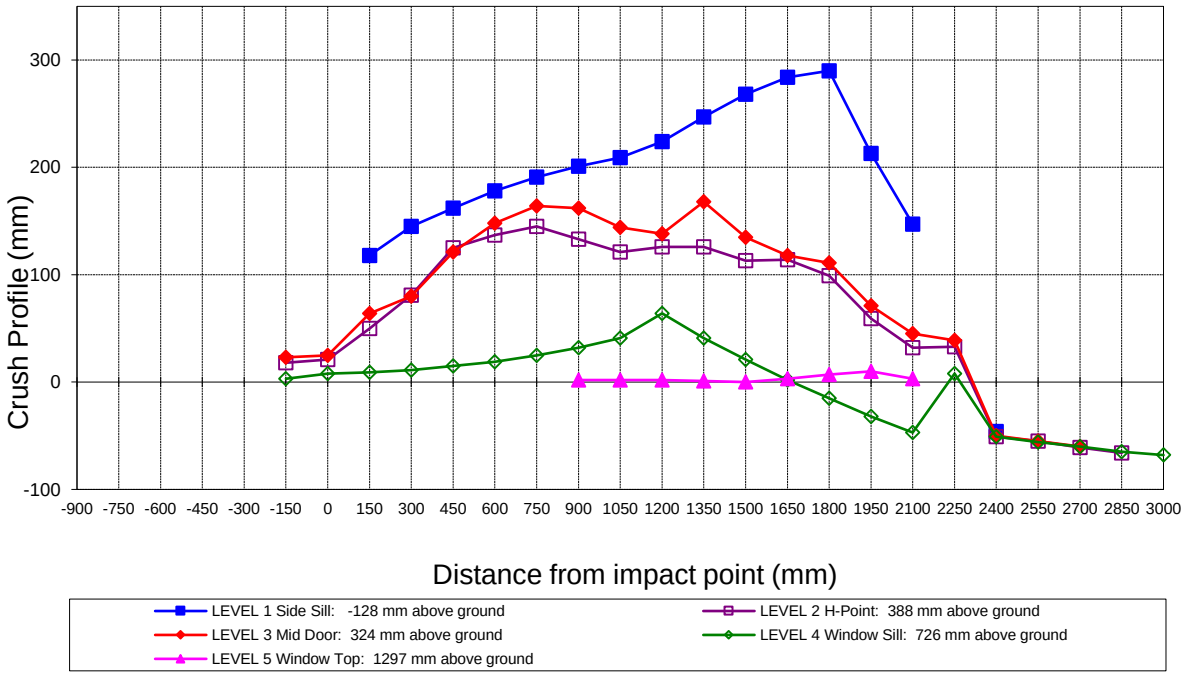
EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750															
-600															
-450															
-300															
-150		1002	1016	891			984	993	888			18	23	3	
0		1003	1003	903			982	975	895			21	28	8	
150	918	1006	998	909		800	956	934	900		118	50	64	9	
300	918	1005	998	915		773	924	918	904		145	81	80	11	
450	918	999	998	921		756	874	877	906		162	125	121	15	
600	919	998	998	927		741	861	850	908		178	137	148	19	
750	920	999	999	932		729	854	835	907		191	145	164	25	
900	921	1000	1001	937	701	720	867	839	905	699	201	133	162	32	2
1050	922	1002	1003	941	709	713	881	859	900	707	209	121	144	41	2
1200	920	1003	1003	945	714	696	877	865	881	712	224	126	138	64	2
1350	920	1004	1004	947	718	673	878	836	906	717	247	126	168	41	1
1500	920	1006	1005	950	721	652	893	870	929	721	268	113	135	21	0
1650	920	1006	1005	951	723	636	892	887	949	720	284	114	118	2	3
1800	916	1006	1005	953	724	626	907	894	968	717	290	99	111	-15	7
1950	916	1005	1005	953	724	703	946	934	985	714	213	59	71	-32	10
2100	916	1003	1002	954	721	769	971	957	1001	718	147	32	45	-47	3
2250		993	990	941			960	951	933			33	39	8	
2400	904	996	995	945		950	1047	1045	996		-46	-51	-50	-51	
2550		1003	1003	948			1058	1058	1004			-55	-55	-56	
2700		1023	1032	953			1084	1092	1013			-61	-60	-60	
2850		1036		954			1102		1019			-66		-65	
3000				956					1024					-68	

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

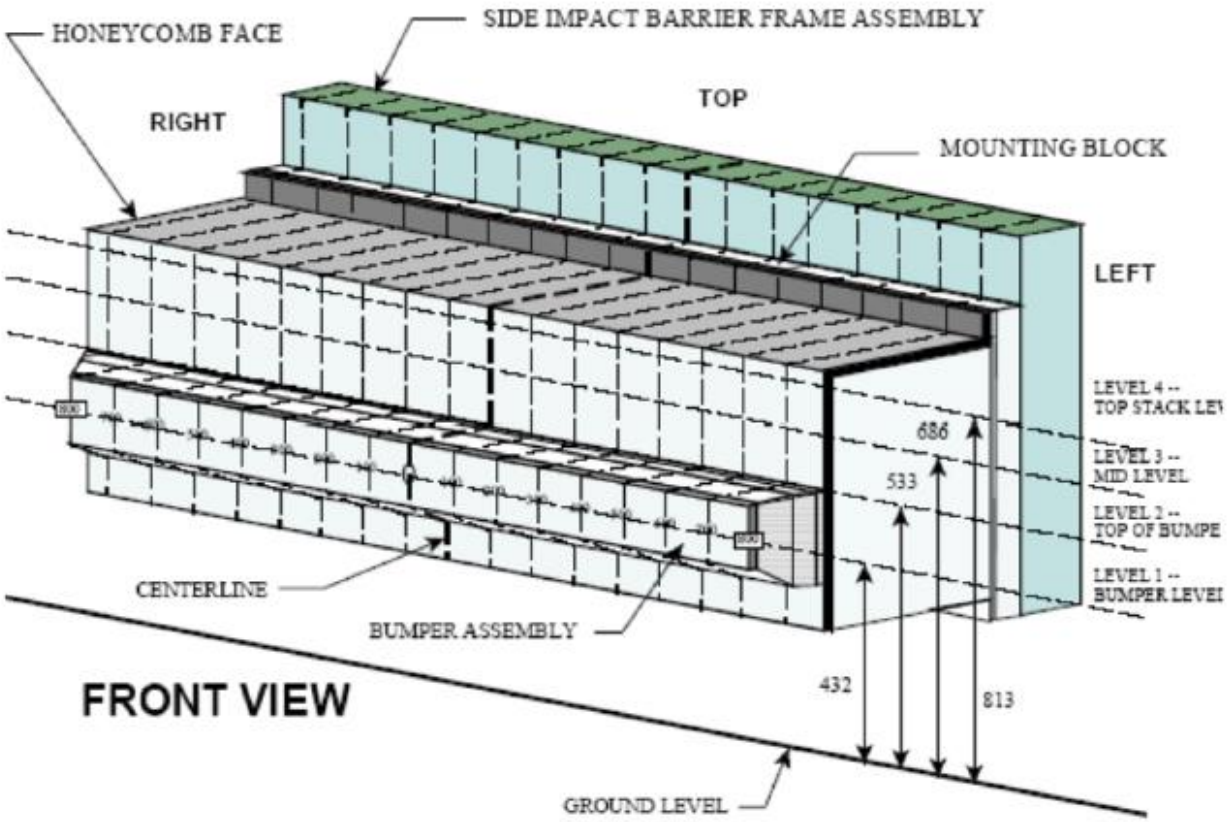
Test Vehicle:	2020 Ram 1500 Classic Crew Cab Truck	NHTSA No.:	M20200312
Test Program:	NCAP Side MDB Impact Test	Test Date:	8/24/2020



Vehicle Exterior Crush Measurements - Visual Representation

DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle:	2020 Ram 1500 Classic Crew Cab Truck	NHTSA No.:	M20200312
Test Program:	NCAP Side MDB Impact Test	Test Date:	8/24/2020



NOTE: Dimensions are shown in millimeters, mm

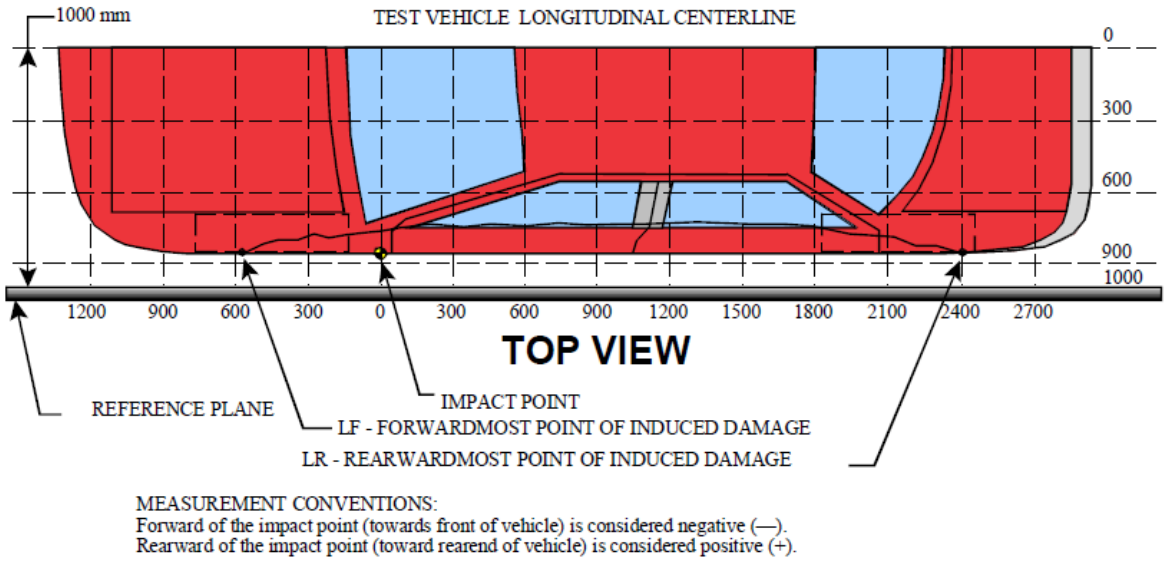
DEFORMABLE BARRIER STATIC CRUSH

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	800
1	23	27	34	43	53	62	71	81	91	91	95	104	112	121	129	138	148
2	51	49	56	60	66	66	65	68	73	75	89	104	120	135	149	155	164
3	123	84	58	49	44	59	77	79	74	68	68	72	78	84	93	111	135
4	183	145	113	94	96	111	144	117	96	97	107	105	109	112	126	149	168

DATA SHEET NO. 13
VEHICLE AND MDB DAMAGE PROFILE DISTANCES

Test Vehicle:	2020 Ram 1500 Classic Crew Cab Truck	NHTSA No.:	M20200312
Test Program:	NCAP Side MDB Impact Test	Test Date:	8/24/2020

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



MEASUREMENT CONVENTIONS:
Forward of the impact point (towards front of vehicle) is considered negative (—).
Rearward of the impact point (toward rearend of vehicle) is considered positive (+).

VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	-150	3	7	-16	23
2	420	3	115	2	113
3	990	3	149	-2	151
4	1560	3	123	-5	128
5	2130	3	44	0	44
6	2700	3	-92	-32	-60

MDB DAMAGE PROFILE DISTANCES

DPD	Distance From Center of MDB	Level	Post-Test (mm)*
1	800 mm left of center	1	148
2	480 mm left of center	1	119
3	160 mm left of center	1	93
4	160 mm right of center	1	75
5	480 mm right of center	1	45
6	800 mm right of center	1	23

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

Test Vehicle:	2020 Ram 1500 Classic Crew Cab Truck	NHTSA No.:	M20200312
Test Program:	NCAP Side MDB Impact Test	Test Date:	8/24/2020
Test Time:	12:34 PM	Temperature:	21˚C

A. From impact until vehicle motion ceases: (Maximum allowable is 1 oz.) — 0 oz.

B. For the 5-minute period after motion ceases: (Maximum allowable is 5 oz.) — 0 oz.

C. For the following 25 minutes: (Maximum allowable is 1 oz./minute) — 0 oz.

D. Spillage Details: — No Spillage Occurred

FMVSS NO. 301 STATIC ROLLOVER DATA

ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	67	300	367
90° to 180°	69	300	369
180° to 270°	66	300	366
270° to 360°	67	300	367

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE

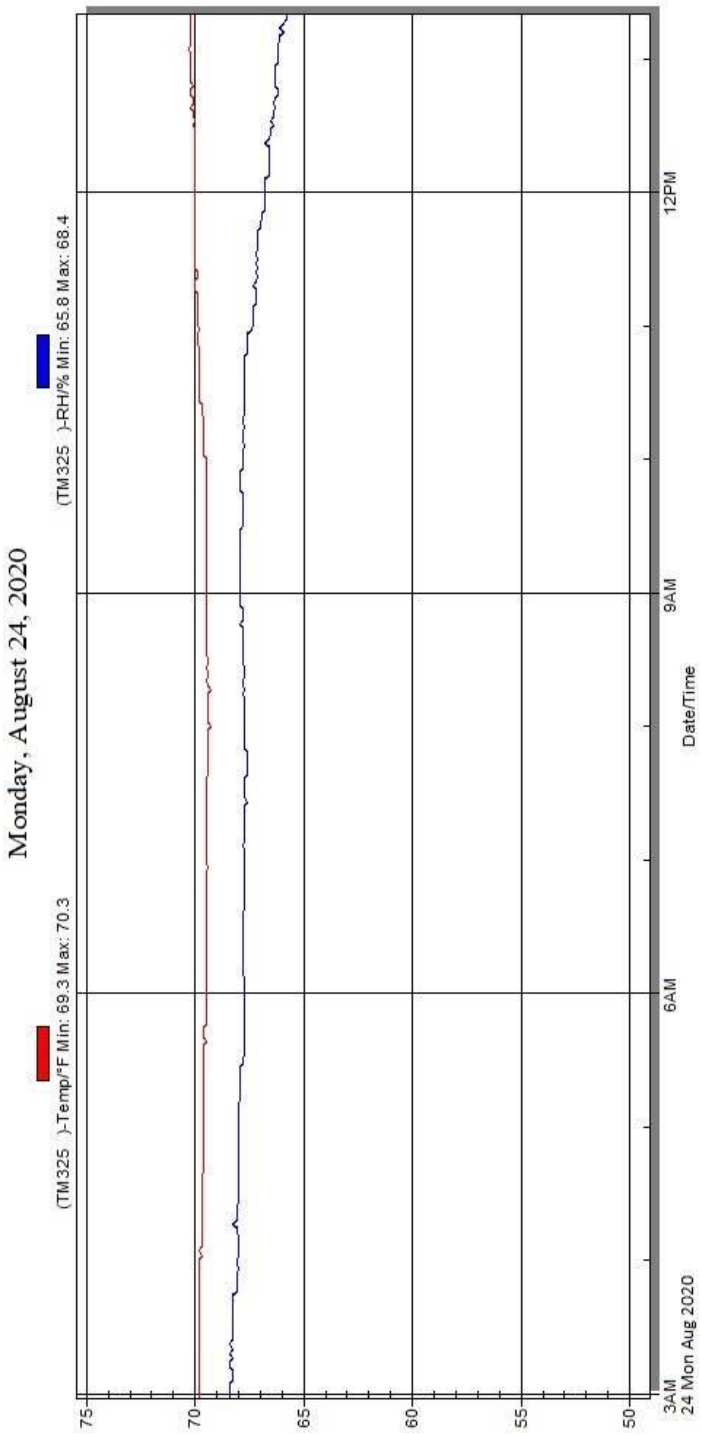
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° to 90°	0	0	0	
90° to 180°	0	0	0	
180° to 270°	0	0	0	
270° to 360°	0	0	0	

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 Ram 1500 Classic Crew Cab Truck	NHTSA No.:	M20200312
Test Program:	NCAP Side MDB Impact Test	Test Date:	8/24/2020



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

APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

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 ¾ View of Test Vehicle

Figure A-6: Post-Test Left Front ¾ View of Test Vehicle

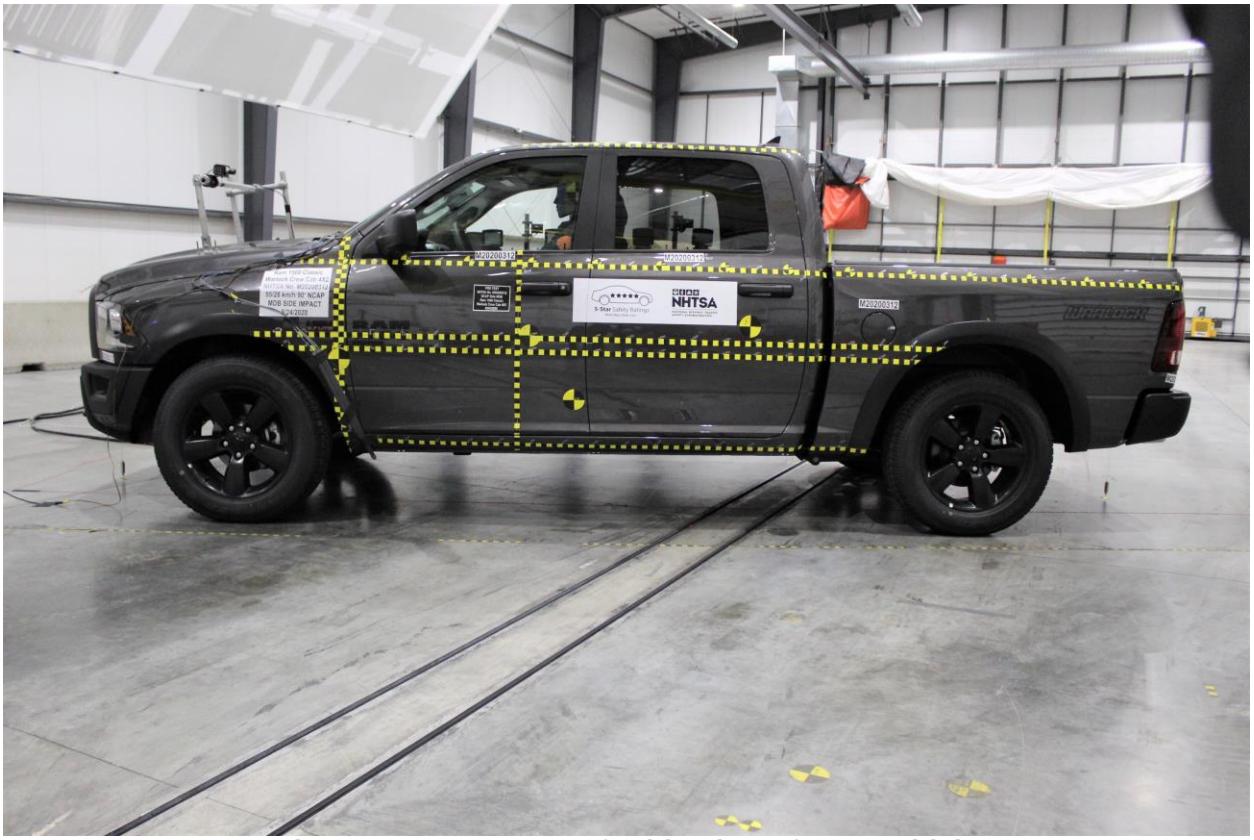


Figure A-7: Pre-Test Left Side View of Test Vehicle

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

Figure A-9: Pre-Test Left Rear ¾ View of Test Vehicle

Figure A-10: Post-Test Left Rear ¾ View of Test Vehicle

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

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

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

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

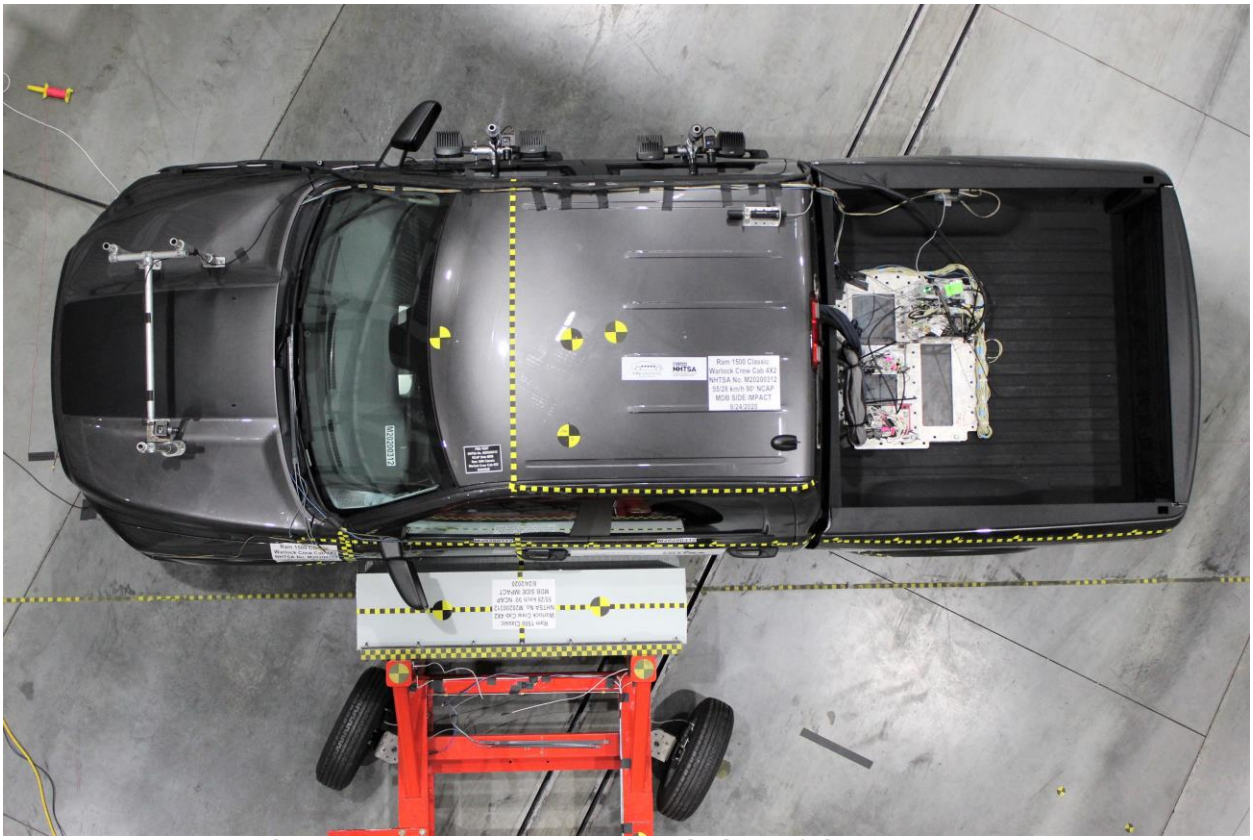


Figure A-15: Pre-Test Overhead View of the Test Area

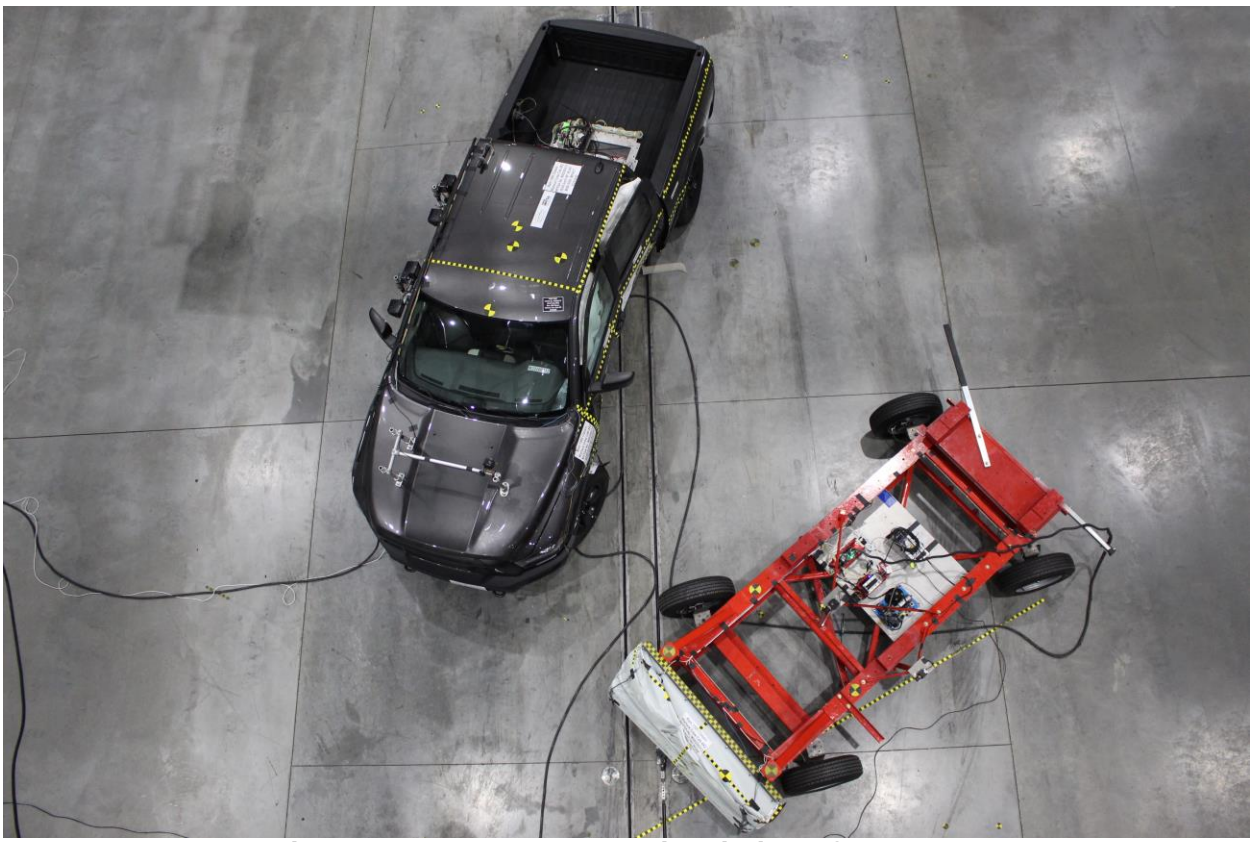


Figure A-16: Post-Test Overhead View of Test Area

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

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

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

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

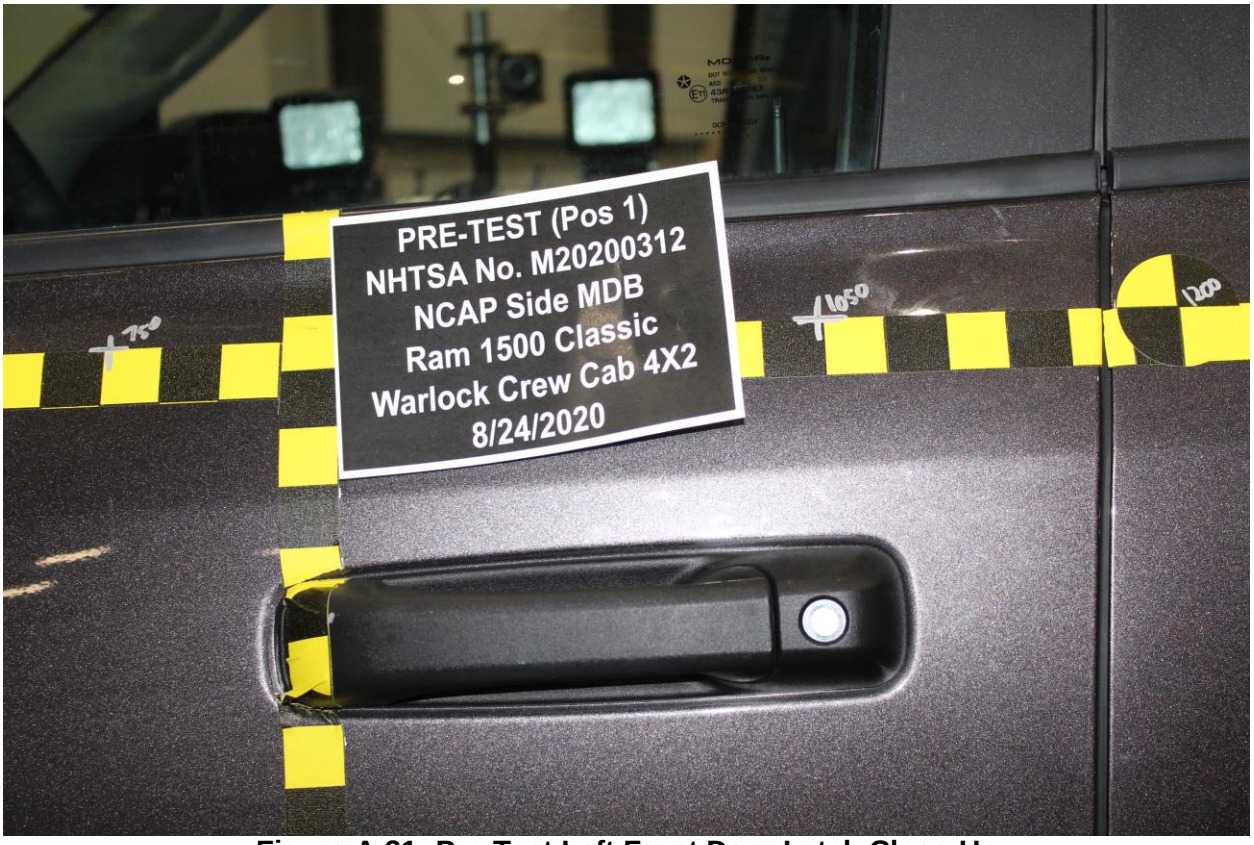


Figure A-21: Pre-Test Left Front Door Latch Close-Up

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

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

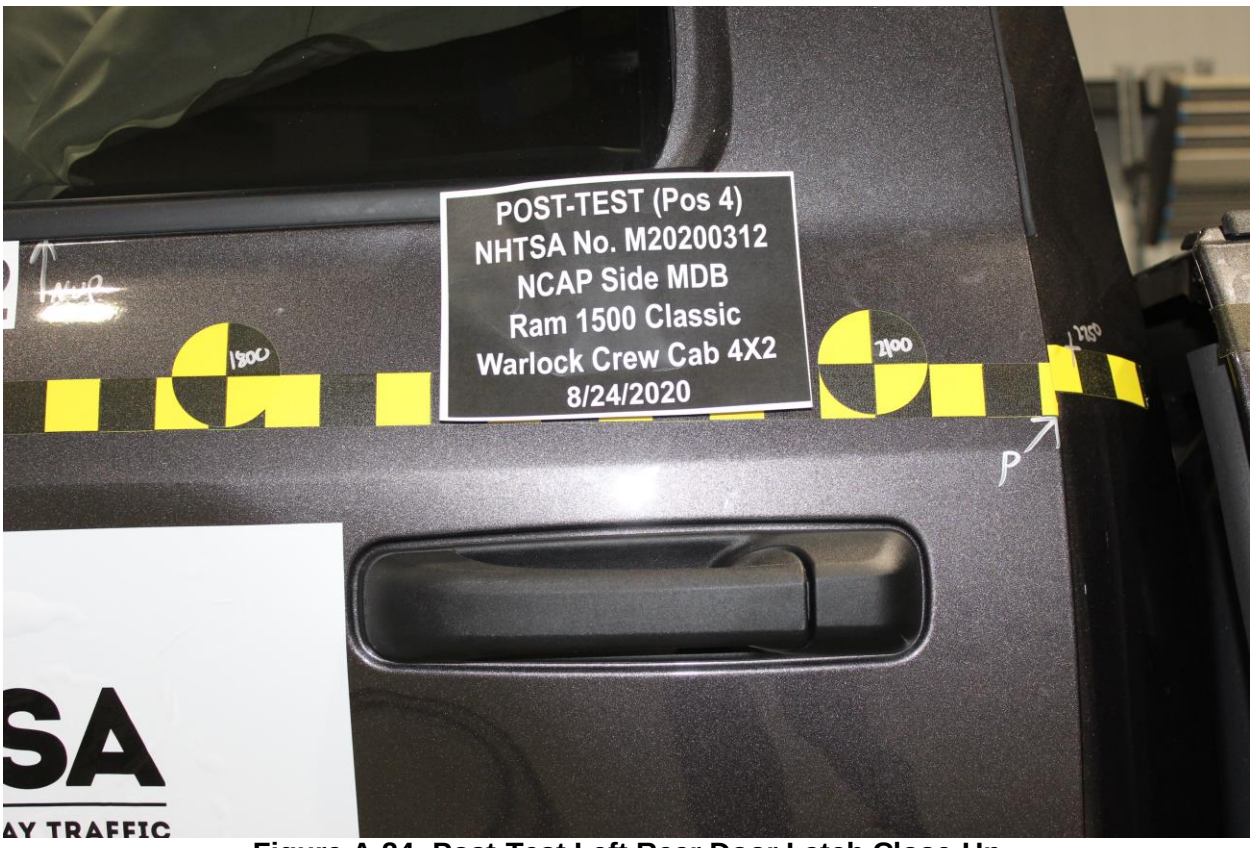


Figure A-24: Post-Test Left Rear Door Latch Close-Up

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

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

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

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

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

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

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

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

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

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

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

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

Figure A-37: View of Disengaged Parking Brake

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

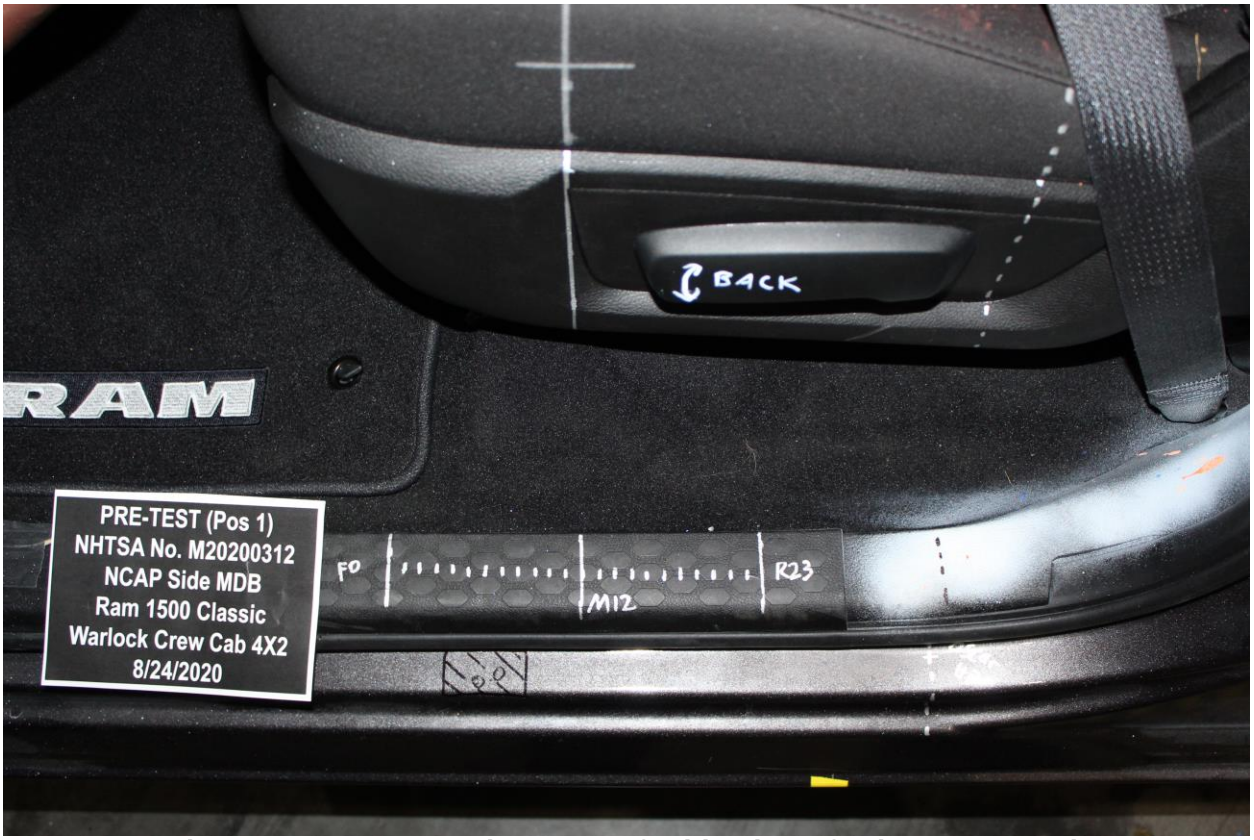


Figure A-39: Pre-test Close-Up Left Side View of Driver Seat Track

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

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

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

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

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

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

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

Figure A-47: Post-Test Driver Inner Door Panel View 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

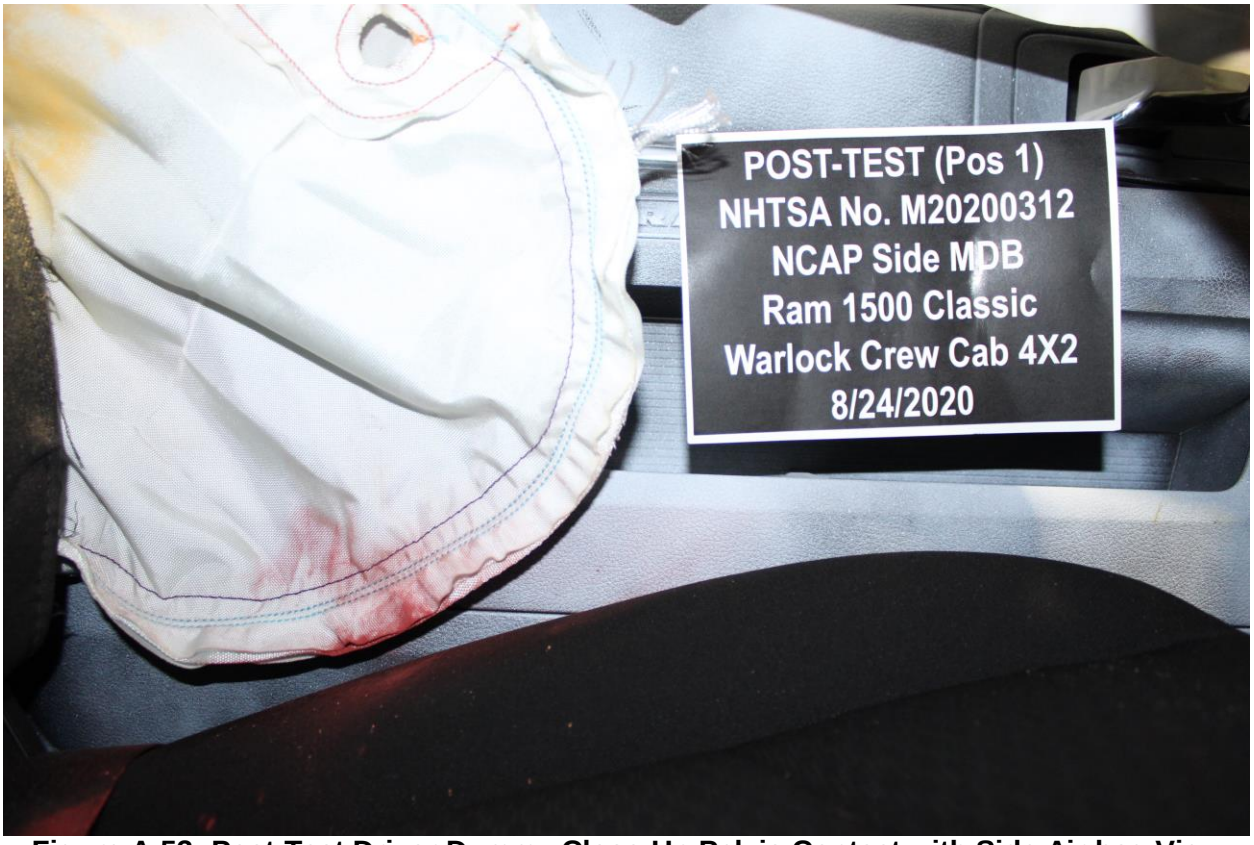


Figure A-53: Post-Test Driver Dummy Close-Up Pelvis Contact with Side Air bag View

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

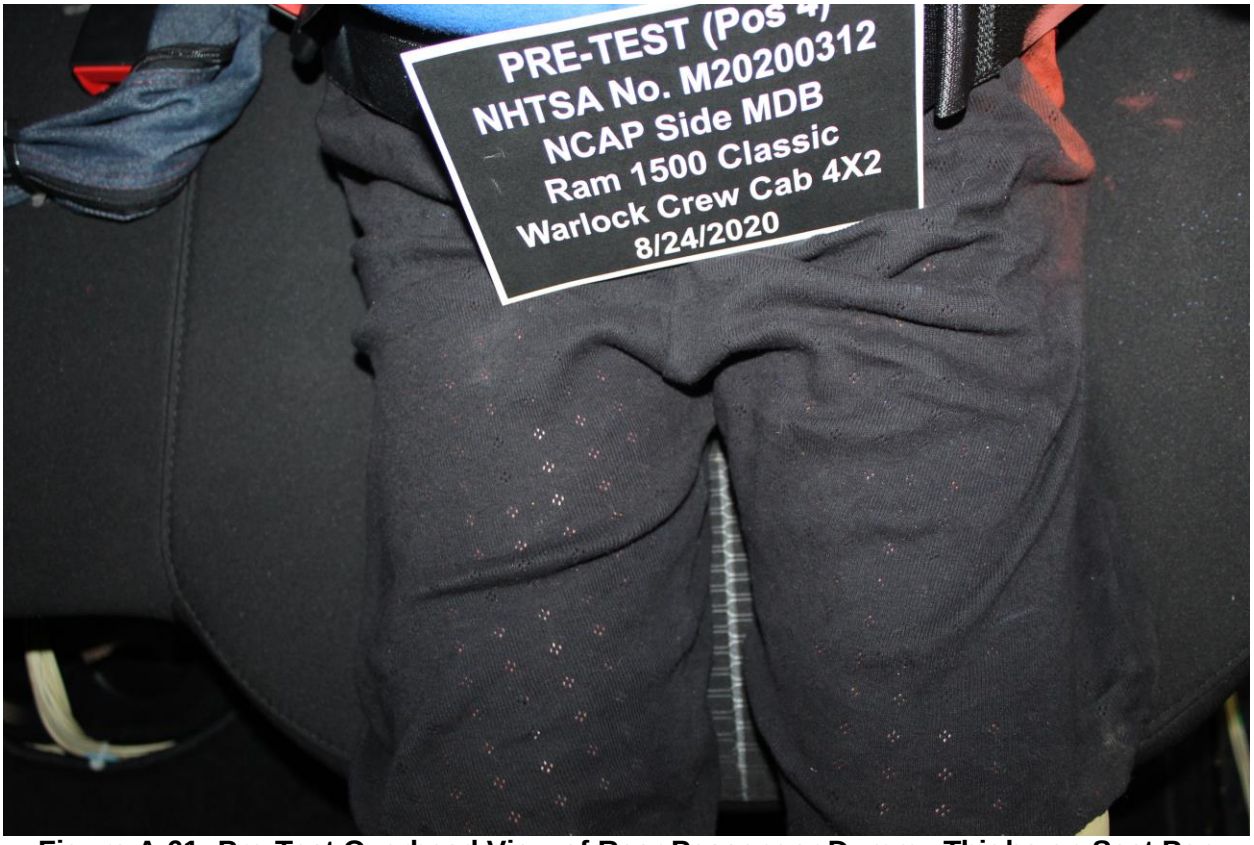


Figure A-61: Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan

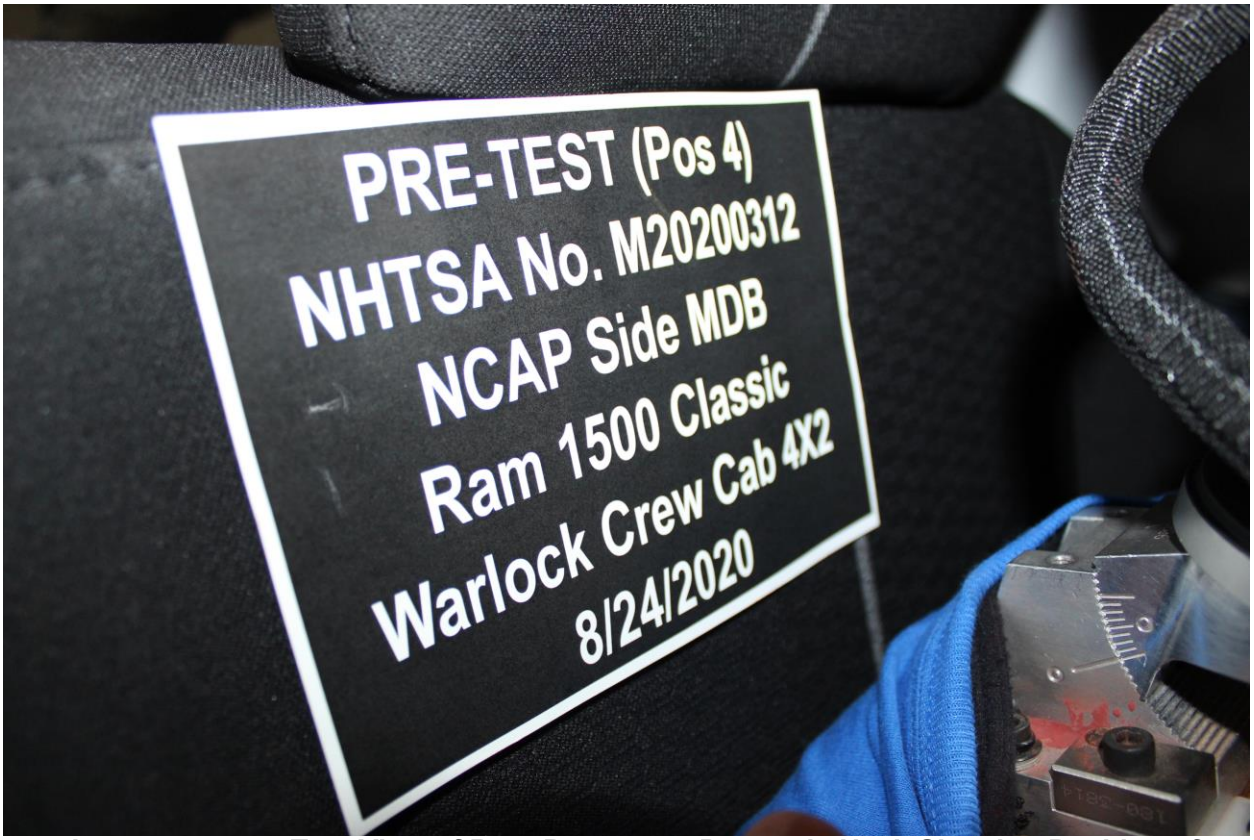


Figure A-62: Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket

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

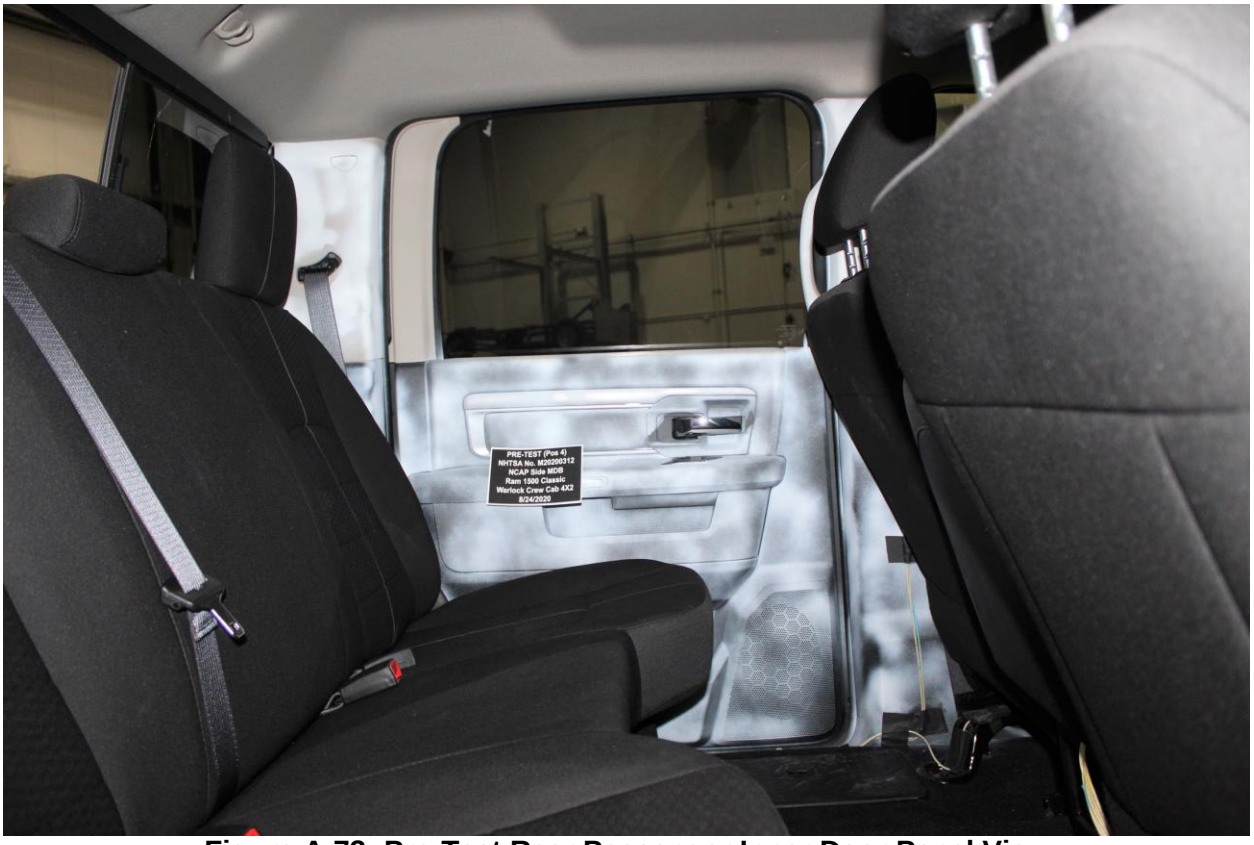


Figure A-73: Pre-Test Rear Passenger Inner Door Panel View

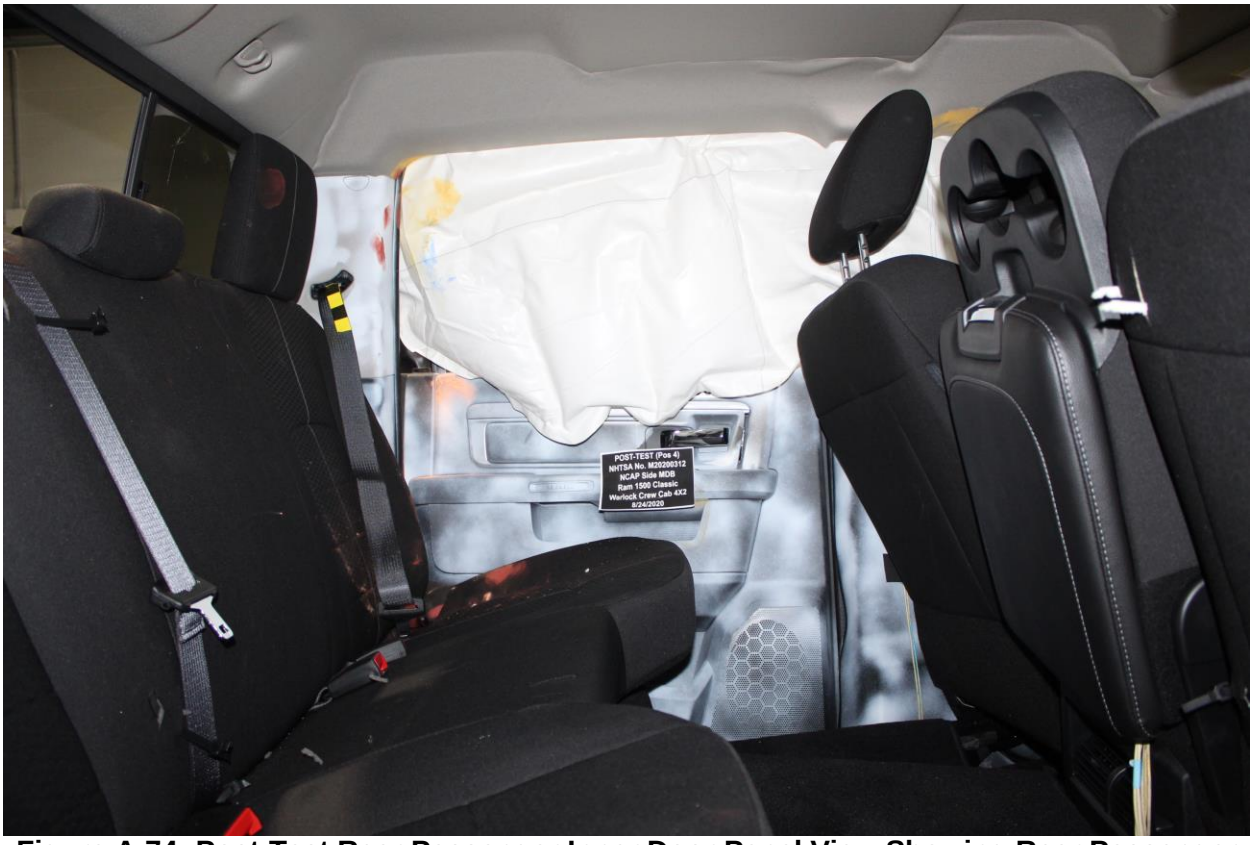


Figure A-74: Post-Test Rear Passenger Inner Door Panel View Showing Rear Passenger Dummy Contact Locations

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

Photo Not Applicable

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

Photo Not Applicable

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

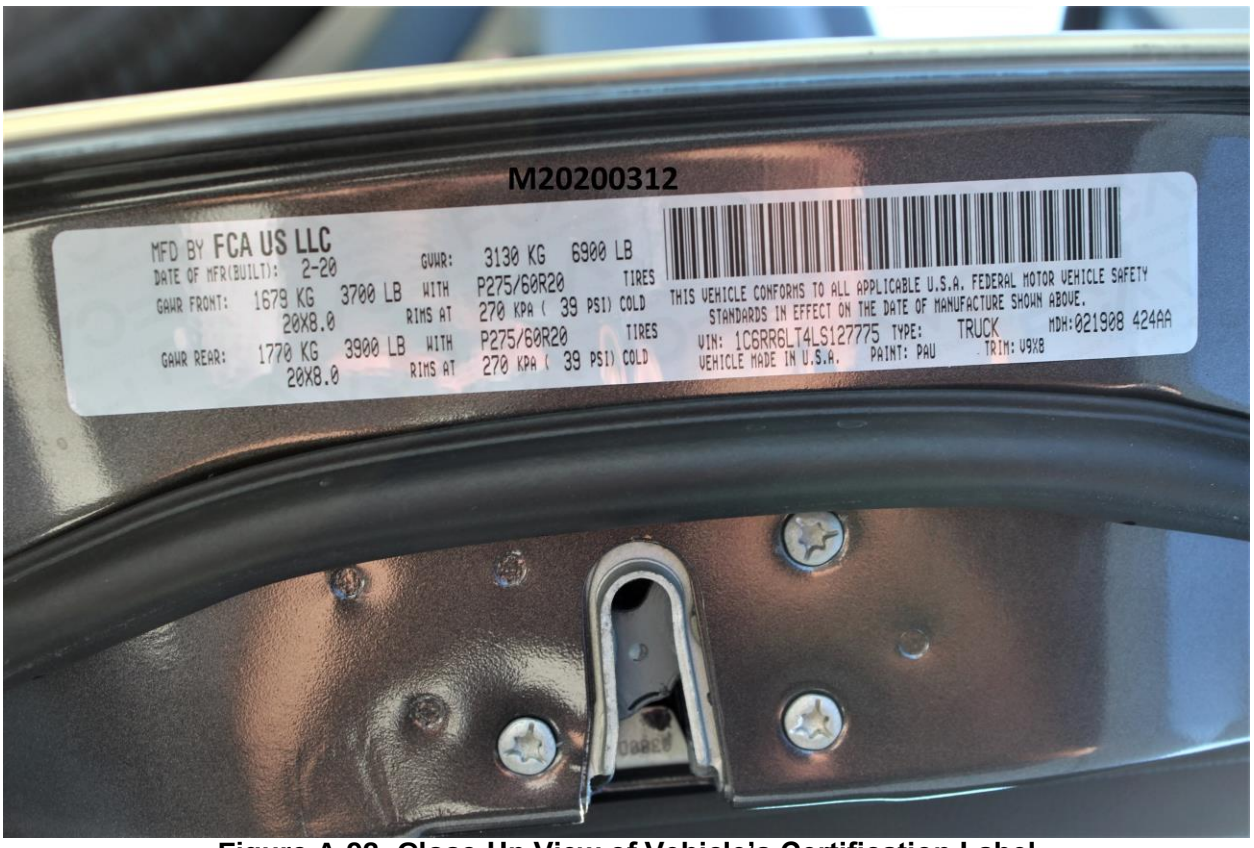


Figure A-92: Close-Up View of Vehicle's Certification Label

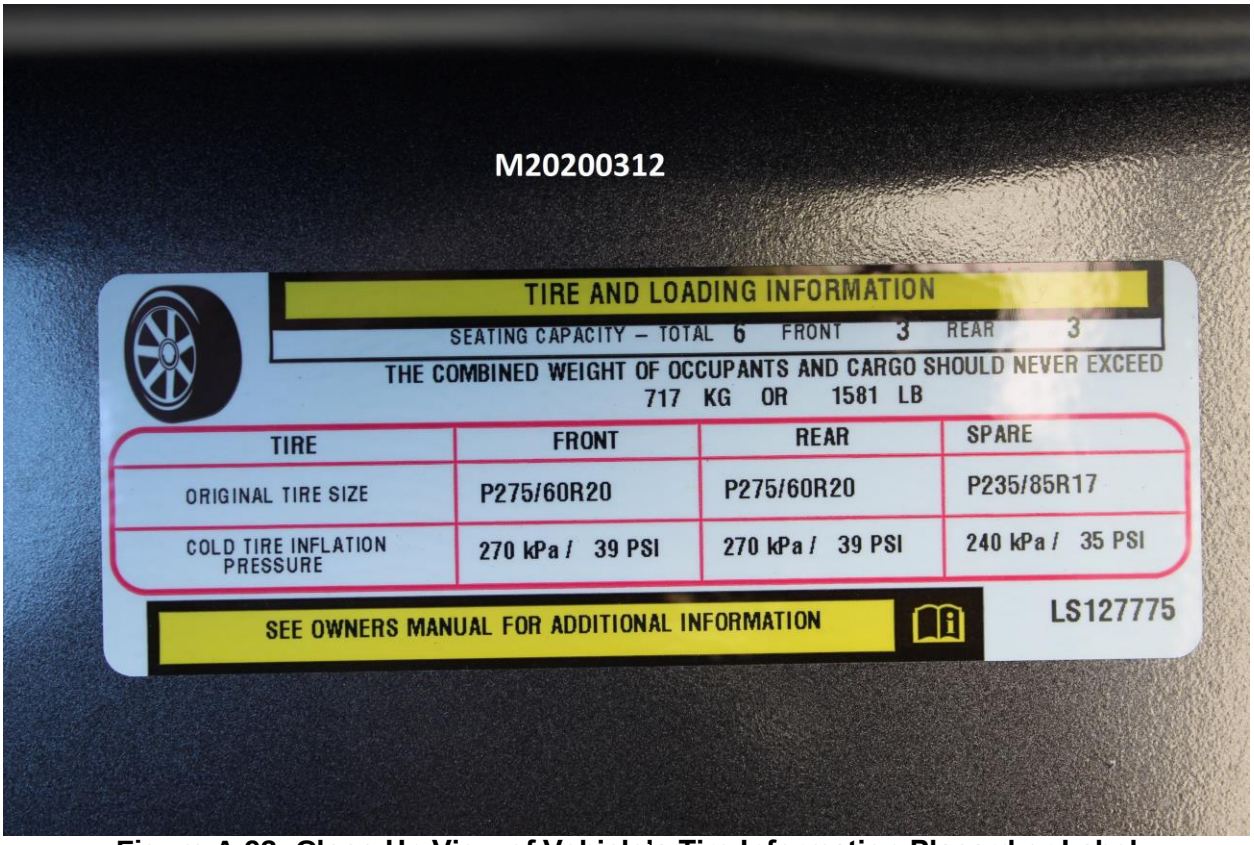


Figure A-93: Close-Up View of Vehicle's Tire Information Placard or Label

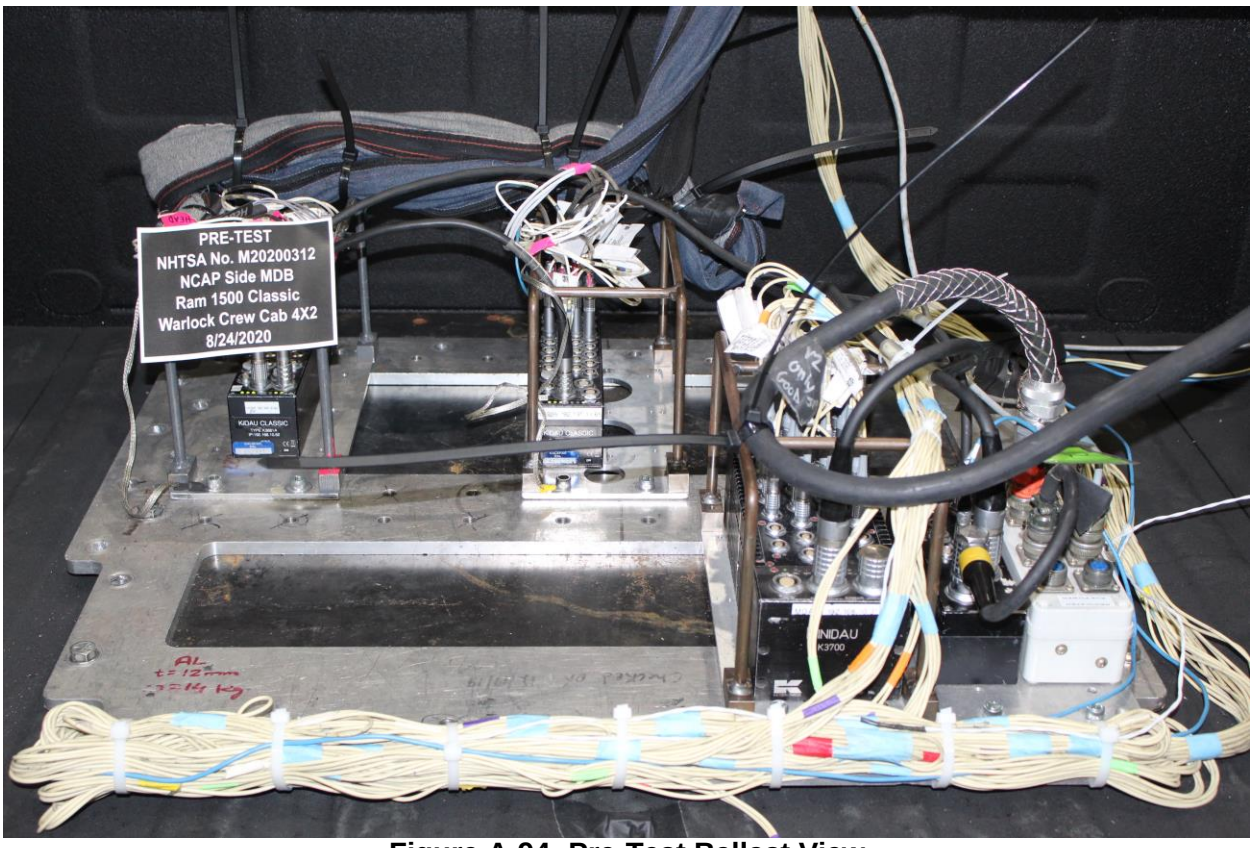


Figure A-94: Pre-Test Ballast View

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

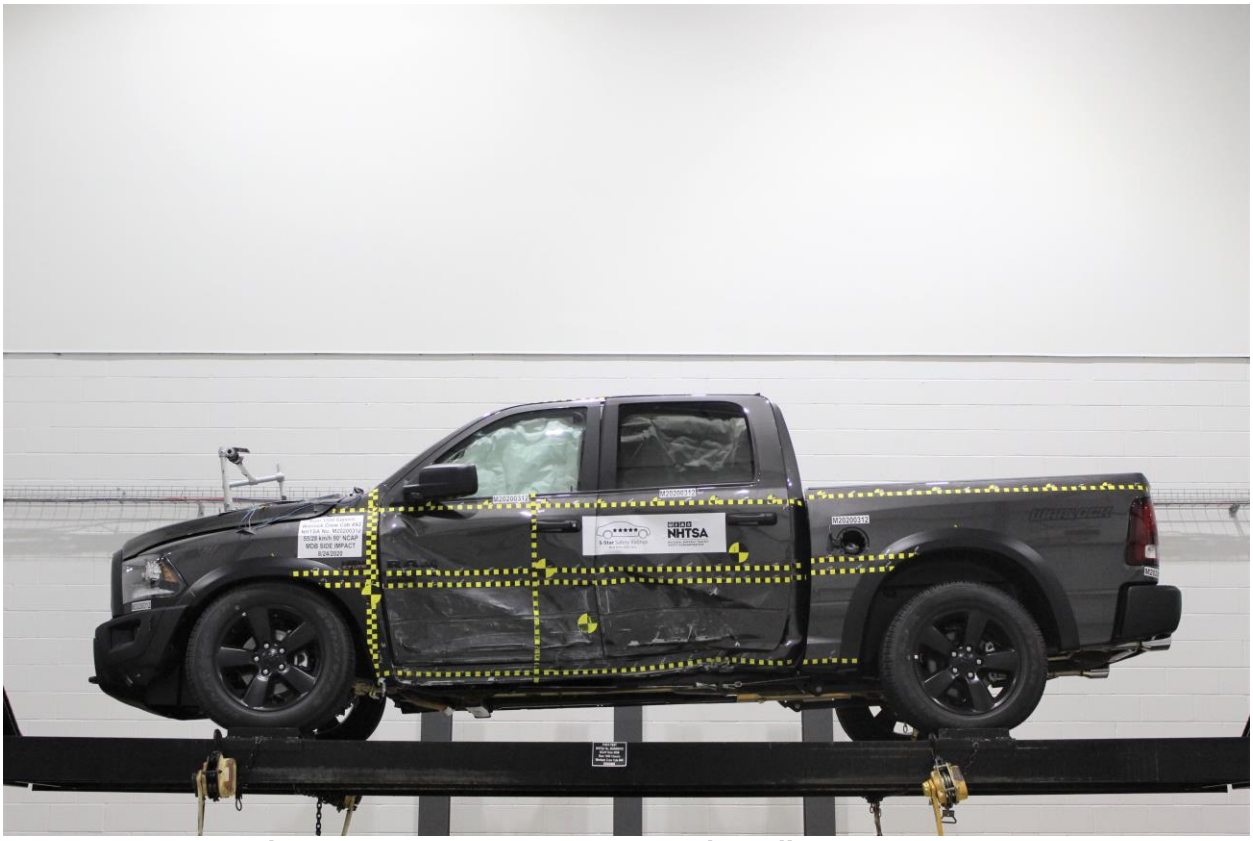


Figure A-96: FMVSS No. 301 Static Rollover 0 Degrees

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

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

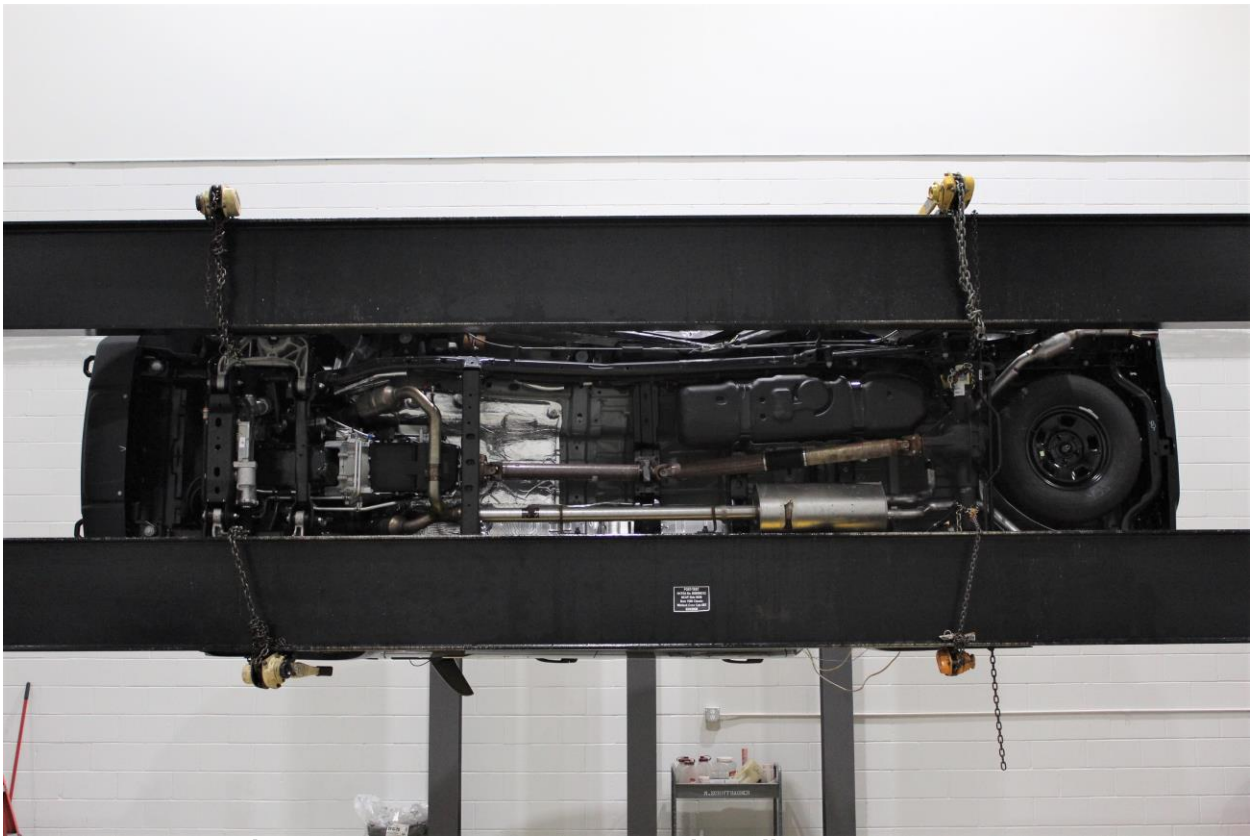


Figure A-99: FMVSS No. 301 Static Rollover 270 Degrees

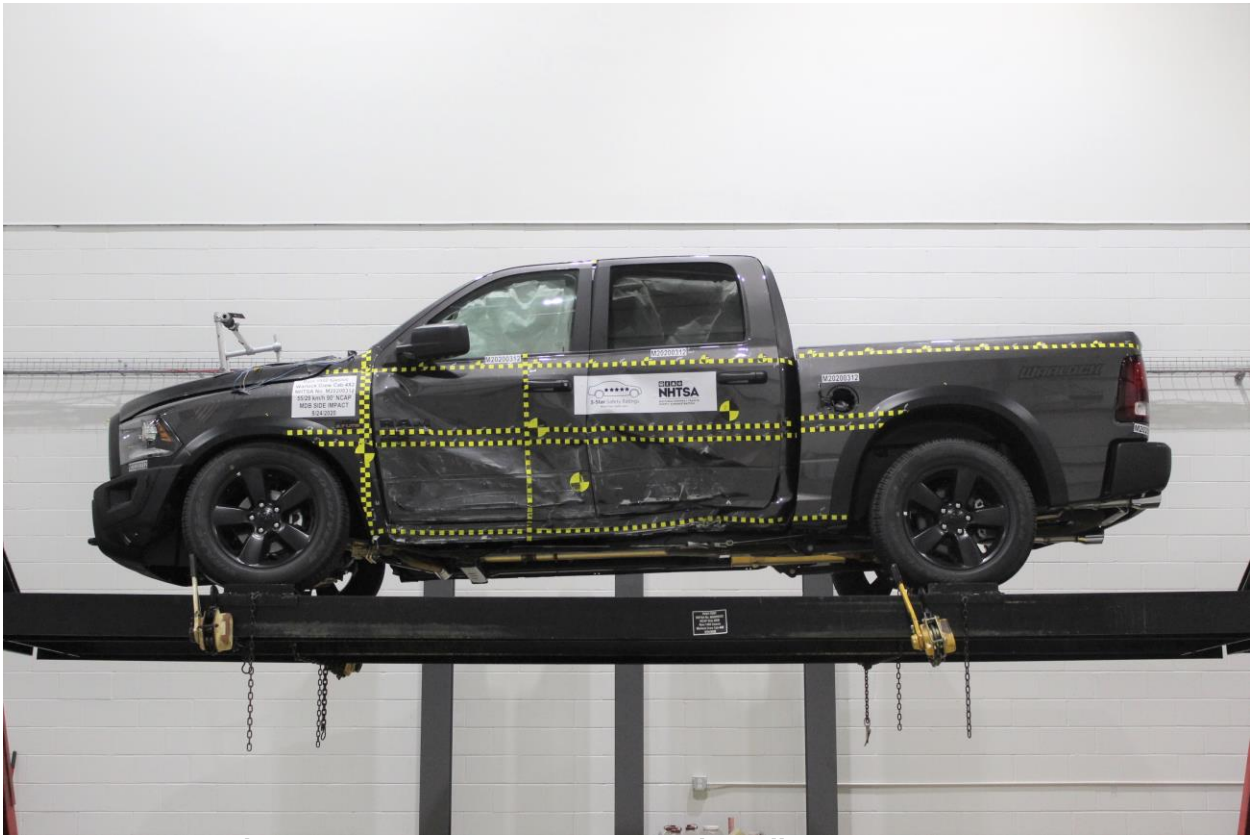
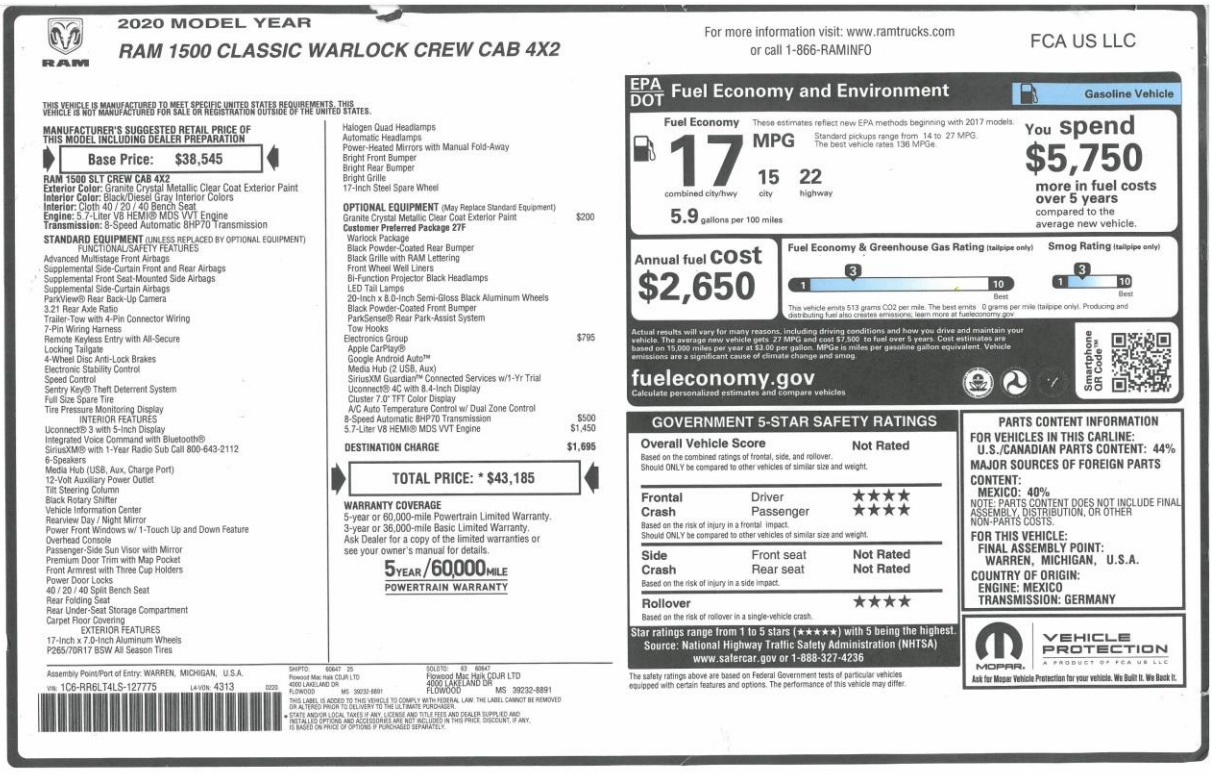


Figure A-100: FMVSS No. 301 Static Rollover 360 Degrees

Figure A-101: Impact Event



2020 MODEL YEAR

RAM 1500 CLASSIC WARLOCK CREW CAB 4X2

For more information visit: www.ramtrucks.com or call 1-866-RAMINFO

FCA US LLC

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

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

Base Price: $38,545

RAM 1500 SLT CREW CAB 4X2
Exterior Color: Granite Crystal Metallic Clear Coat Exterior Paint
Interior Color: Black/Diesel Gray Interior Colors
Interior: Cloth 40 / 20 / 40 Bench Seat
Engine: 5.7-Liter V8 HEMI® MDS VVT Engine
Transmission: 8-Speed Automatic 8HP70 Transmission

STANDARD EQUIPMENT (UNLESS REPLACED BY OPTIONAL EQUIPMENT)
FUNCTIONAL/SAFETY FEATURES
Advanced Multistage Front Airbags
Supplemental Side-Curtain Front and Rear Airbags
Supplemental Front Seat-Mounted Side Airbags
Supplemental Side-Curtain Airbags
ParkView® Rear Back-Up Camera
3.21 Rear Axle Ratio
Trailer-Tow with 4-Pin Connector Wiring
7-Pin Wiring Harness
Remote Keyless Entry with All-Secure
Locking Tailgate
4-Wheel Disc Anti-Lock Brakes
Electronic Stability Control
Speed Control
Sentry Key® Theft Deterrent System
Full Size Spare Tire
Tire Pressure Monitoring Display
INTERIOR FEATURES
Uconnect® 3 with 5-Inch Display
Integrated Voice Command with Bluetooth®
SiriusXM® with 1-Year Radio Sub Call 800-643-2112
6-Speakers
Media Hub (USB, Aux, Charge Port)
12-Volt Auxiliary Power Outlet
Tilt Steering Column
Black Rotary Shifter
Vehicle Information Center
Rearview Day / Night Mirror
Power Front Windows w/ 1-Touch Up and Down Feature
Overhead Console
Passenger-Side Sun Visor with Mirror
Premium Door Trim with Map Pocket
Front Armrest with Three Cup Holders
Power Door Locks
40 / 20 / 40 Split Bench Seat
Rear Folding Seat
Rear Under-Seat Storage Compartment
Carpet Floor Covering
EXTERIOR FEATURES
17-Inch x 7.0-Inch Aluminum Wheels
P265/70R17 BSW All Season Tires
Halogen Quad Headlamps
Automatic Headlamps
Power-Heated Mirrors with Manual Fold-Away
Bright Front Bumper
Bright Rear Bumper
Bright Grille
17-Inch Steel Spare Wheel

OPTIONAL EQUIPMENT (May Replace Standard Equipment)
Granite Crystal Metallic Clear Coat Exterior Paint $200
Customer Preferred Package 27F
Warlock Package
Black Powder-Coated Rear Bumper
Black Grille with RAM Lettering
Front Wheel Well Liners
Bi-Function Projector Black Headlamps
LED Tail Lamps
20-Inch x 8.0-Inch Semi-Gloss Black Aluminum Wheels
Black Powder-Coated Front Bumper
ParkSense® Rear Park-Assist System
Tow Hooks
Electronics Group $795
Apple CarPlay®
Google Android Auto™
Media Hub (2 USB, Aux)
SiriusXM Guardian™ Connected Services w/1-Yr Trial
Uconnect® 4C with 8.4-Inch Display
Cluster 7.0" TFT Color Display
A/C Auto Temperature Control w/ Dual Zone Control
8-Speed Automatic 8HP70 Transmission $500
5.7-Liter V8 HEMI® MDS VVT Engine $1,450

DESTINATION CHARGE $1,695

TOTAL PRICE: * $43,185

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

5YEAR/60,000MILE POWERTRAIN WARRANTY

Assembly Point/Port of Entry: WARREN, MICHIGAN, U.S.A.

VIN: 1C6-RR6LT4LS-127775 LA-VIN: 4313

SHIPTO: 60647 35 Flowood Mac Hak CDJR LTD 4000 LAKELAND DR FLOWOOD MS 39232-8891

SOLDTO: 63 60647 Flowood Mac Hak CDJR LTD 4000 LAKELAND DR FLOWOOD MS 39232-8891

THIS LABEL IS ADDED TO THIS VEHICLE TO COMPLY WITH FEDERAL LAW. THE LABEL CANNOT BE REMOVED OR ALTERED PRIOR TO DELIVERY TO THE ULTIMATE PURCHASER.

* STATE AND/OR LOCAL TAXES IF ANY, LICENSE AND TITLE FEES AND DEALER SUPPLIED AND INSTALLED OPTIONS AND ACCESSORIES ARE NOT INCLUDED IN THIS PRICE. DISCOUNT, IF ANY, IS BASED ON PRICE OF OPTIONS IF PURCHASED SEPARATELY.

EPA DOT Fuel Economy and Environment — Gasoline Vehicle

Fuel Economy: 17 MPG combined city/hwy (15 city, 22 highway); 5.9 gallons per 100 miles

These estimates reflect new EPA methods beginning with 2017 models. Standard pickups range from 14 to 27 MPG. The best vehicle rates 136 MPGe.

You spend $5,750 more in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost $2,650

Fuel Economy & Greenhouse Gas Rating (tailpipe only): 3 (1 Worst, 10 Best)

Smog Rating (tailpipe only): 3 (1 Worst, 10 Best)

This vehicle emits 513 grams CO2 per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also creates emissions; learn more at fueleconomy.gov

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 27 MPG and cost $7,500 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at $3.00 per gallon. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fueleconomy.gov
Calculate personalized estimates and compare vehicles

Smartphone QR Code™

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score: Not Rated
Based on the combined ratings of frontal, side, and rollover. Should ONLY be compared to other vehicles of similar size and weight.

Frontal Crash — Driver ★★★★ — Passenger ★★★★
Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.

Side Crash — Front seat: Not Rated — Rear seat: Not Rated
Based on the risk of injury in a side impact.

Rollover: ★★★★
Based on the risk of rollover in a single-vehicle crash.

Star ratings range from 1 to 5 stars (★★★★★) with 5 being the highest.
Source: National Highway Traffic Safety Administration (NHTSA)
www.safercar.gov or 1-888-327-4236

The safety ratings above are based on Federal Government tests of particular vehicles equipped with certain features and options. The performance of this vehicle may differ.

PARTS CONTENT INFORMATION
FOR VEHICLES IN THIS CARLINE:
U.S./CANADIAN PARTS CONTENT: 44%
MAJOR SOURCES OF FOREIGN PARTS
CONTENT:
MEXICO: 40%
NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.
FOR THIS VEHICLE:
FINAL ASSEMBLY POINT:
WARREN, MICHIGAN, U.S.A.
COUNTRY OF ORIGIN:
ENGINE: MEXICO
TRANSMISSION: GERMANY

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

Figure A-102: Monroney Label

Vehicles Equipped With Remote Start

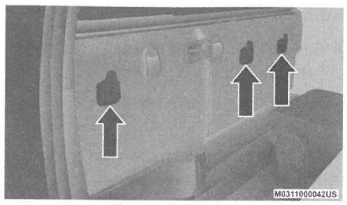
On models that are equipped with remote start, the ventilated seats can be programmed to come on during a remote start.

If your vehicle is equipped with a touchscreen, this feature can be programmed through the Uconnect system. Refer to "Uconnect Settings" in "Multimedia" for further information.

If your vehicle is not equipped with a touchscreen, this feature can be programmed through the instrument cluster display. Refer to "Instrument Cluster Display" in "Getting To Know Your Instrument Panel" for further information.

Plastic Grocery Bag Retainers (Regular Cab Models)

Retainer hooks which will hold plastic grocery bag handles are built into the back panel of the cab, behind the rear seat.



Grocery Bag Hooks

HEAD RESTRAINTS

Head restraints are designed to reduce the risk of injury by restricting head movement in the event of a rear impact. Head restraints should be adjusted so that the top of the head restraint is located above the top of your ear.

WARNING!

- All occupants, including the driver, should not operate a vehicle or sit in a vehicle's seat until the head restraints are placed in their proper positions in order to minimize the risk of neck injury in the event of a crash.

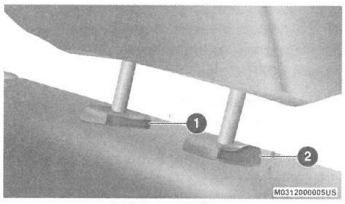
(Continued)

WARNING! *(Continued)*

- Head restraints should never be adjusted while the vehicle is in motion. Driving a vehicle with the head restraints improperly adjusted or removed could cause serious injury or death in the event of a collision.

Front Head Restraint Adjustment

To raise the head restraint, pull upward on the head restraint. To lower the head restraint, push the adjustment button located on the base of the head restraint and push downward on the head restraint.



Adjustment Buttons

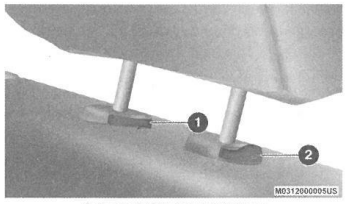
1 – Release Button
2 – Adjustment Button

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

NOTE:
Do not reposition the head restraint 180 degrees to the incorrect position in an attempt to gain additional clearance to the back of the head.

Rear Head Restraint Adjustment

The rear seats are equipped with adjustable and removable head restraints. To raise the head restraint, pull upward on the head restraint. To lower the head restraint, push the adjustment button located on the base of the head restraint and push downward on the head restraint.



Release/Adjustment Buttons

1 – Release Button
2 – Adjustment Button

NOTE:

- The rear center head restraint (Crew Cab and Quad Cab) has only one adjustment position that is used to aid in the routing of a tether. Refer to "Occupant Restraint Systems" in "Safety" for further information.
- Do not reposition the head restraint 180 degrees to the incorrect position in an attempt to gain additional clearance to the back of the head.

Front Head Restraint Removal

To remove the head restraint, raise it up as far as it can go. Then, push the adjustment button and the release button at the base of each post while pulling the head restraint up. To reinstall the head restraint, put the head restraint posts into the holes. Then, adjust it to the appropriate height.

NOTE:
Do not reposition the head restraint 180 degrees to the incorrect position in an attempt to gain additional clearance to the back of the head.

WARNING!

- A loose head restraint thrown forward in a collision or hard stop could cause serious injury or death to occupants of the vehicle. Always securely stow removed head restraints in a location outside the occupant compartment.
- ALL the head restraints MUST be reinstalled in the vehicle to properly protect the occupants. Follow the re-installation instructions above prior to operating the vehicle or occupying a seat.

2

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

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.

Additional Driver & Passenger Dummy Instrumentation Data

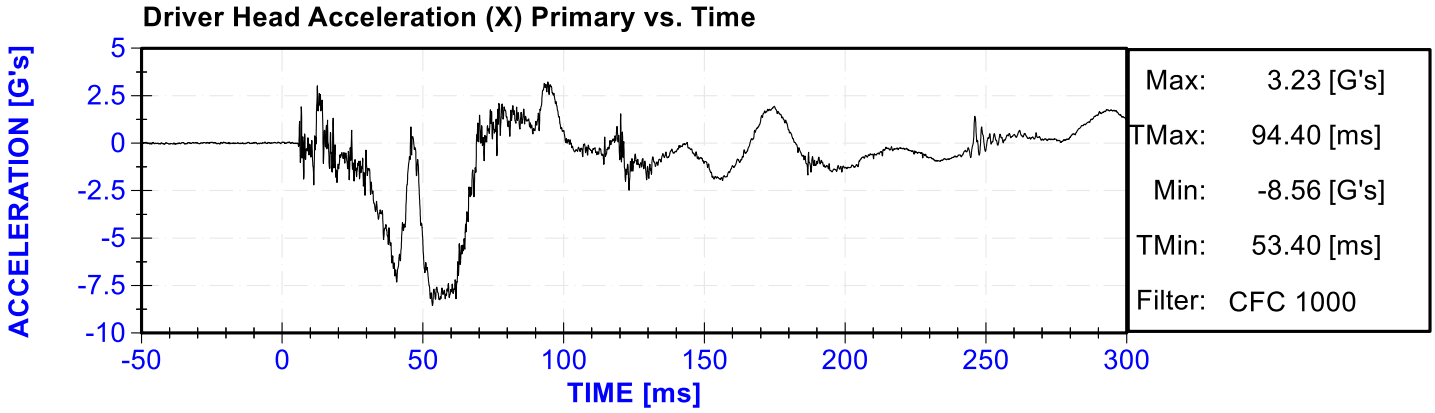
Driver Lower Spine T12 Acceleration (X)
Driver Lower Spine T12 Acceleration (Y)
Driver Lower Spine T12 Acceleration (Z)
Passenger Upper Thorax Rib Deflection (Y)
Passenger Middle Thorax Rib Deflection (Y)
Passenger Lower Thorax Rib Deflection (Y)
Passenger Upper Abdomen Rib Deflection (Y)
Passenger Lower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

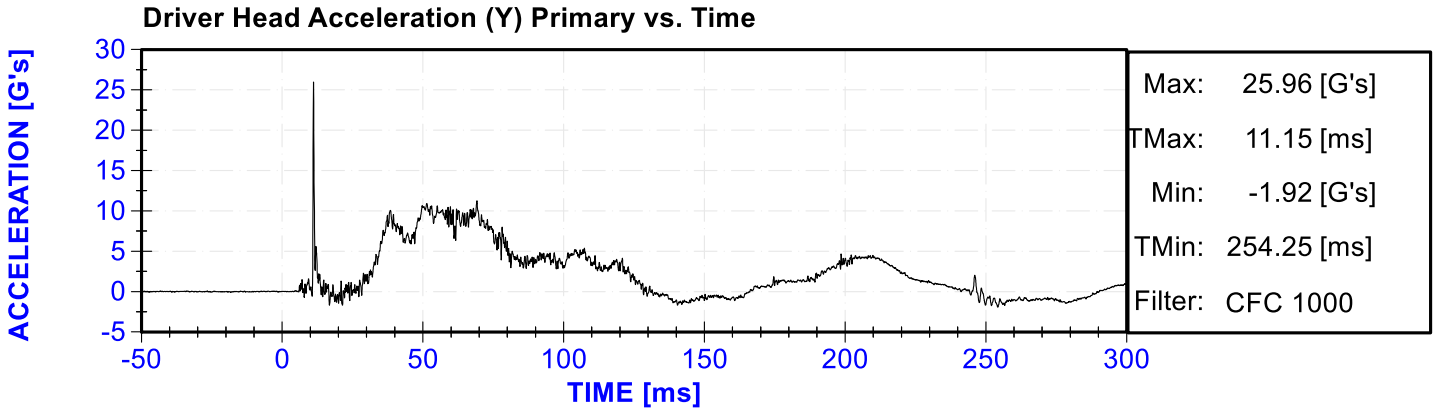
Vehicle Instrumentation Data

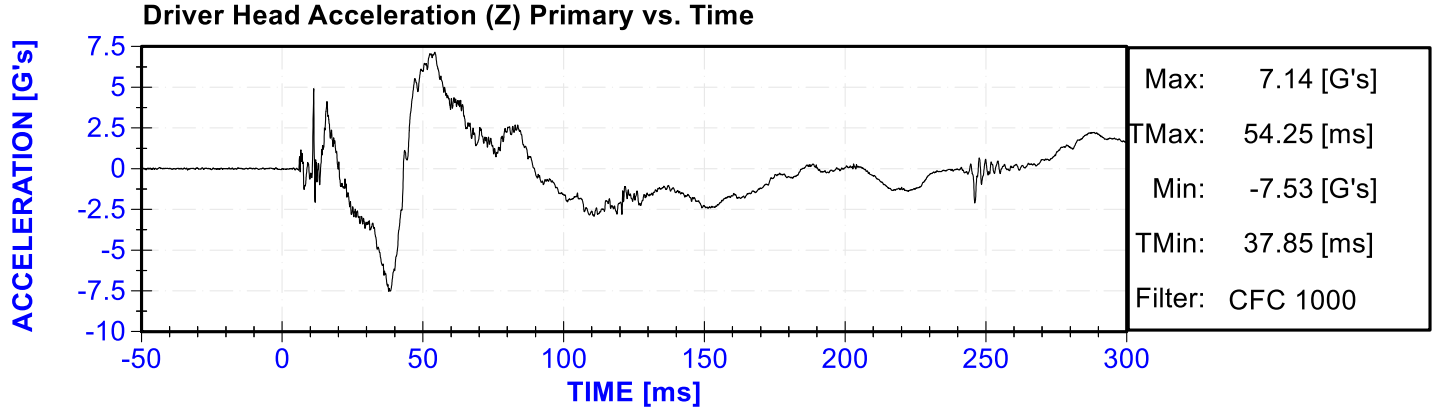
Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Right Side Sill at Front Seat Acceleration (X)
Right Side Sill at Front Seat Acceleration (Y)
Right Side Sill at Front Seat Acceleration (Z)
Right Side Sill at Rear Seat Acceleration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

MDB Instrumentation Data

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


Driver Head Acceleration (X) Primary vs. Time
ACCELERATION [G's]
TIME [ms]
Max: 3.23 [G's]
TMax: 94.40 [ms]
Min: -8.56 [G's]
TMin: 53.40 [ms]
Filter: CFC 1000


Driver Head Acceleration (Y) Primary vs. Time
ACCELERATION [G's]
TIME [ms]
Max: 25.96 [G's]
TMax: 11.15 [ms]
Min: -1.92 [G's]
TMin: 254.25 [ms]
Filter: CFC 1000


Driver Head Acceleration (Z) Primary vs. Time
ACCELERATION [G's]
TIME [ms]
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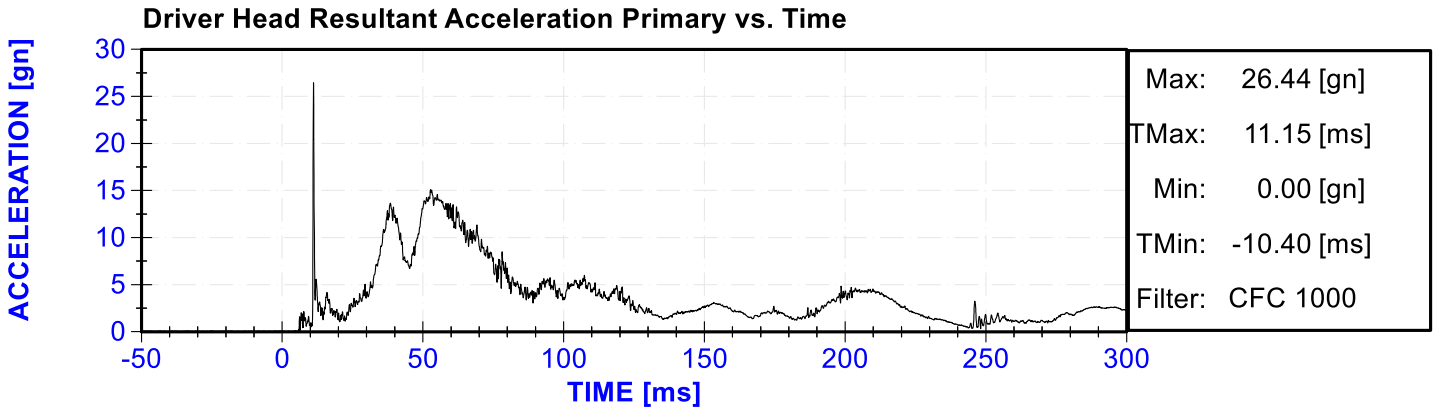
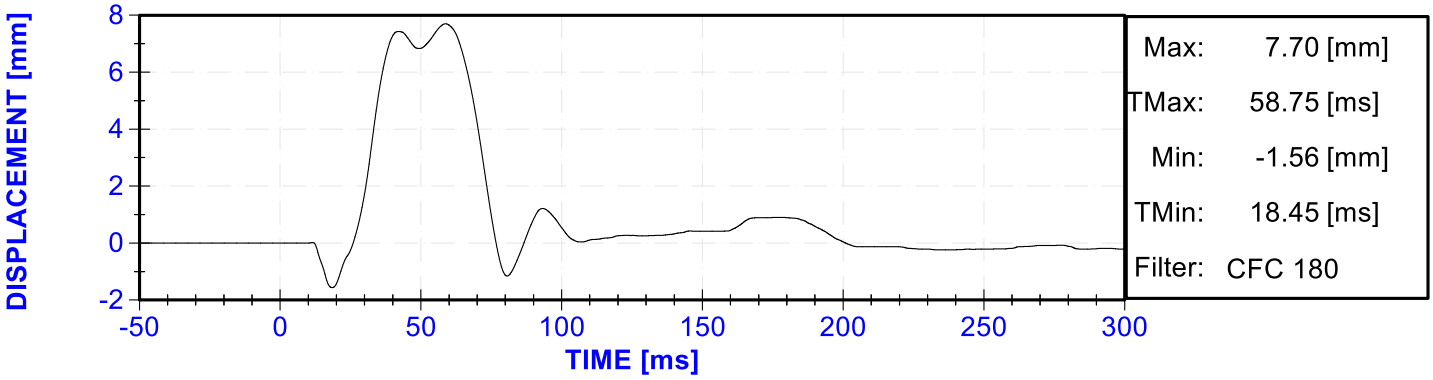
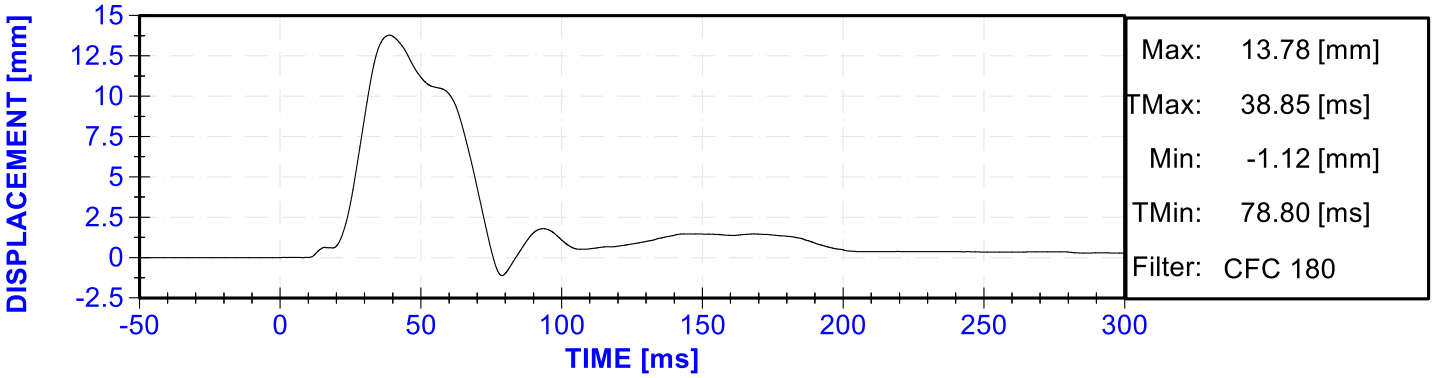
TMax: 54.25 [ms]
Min: -7.53 [G's]
TMin: 37.85 [ms]
Filter: CFC 1000


Driver Head Resultant Acceleration Primary vs. Time
ACCELERATION [gn]
TIME [ms]
Max: 26.44 [gn]
TMax: 11.15 [ms]
Min: 0.00 [gn]
TMin: -10.40 [ms]
Filter: CFC 1000

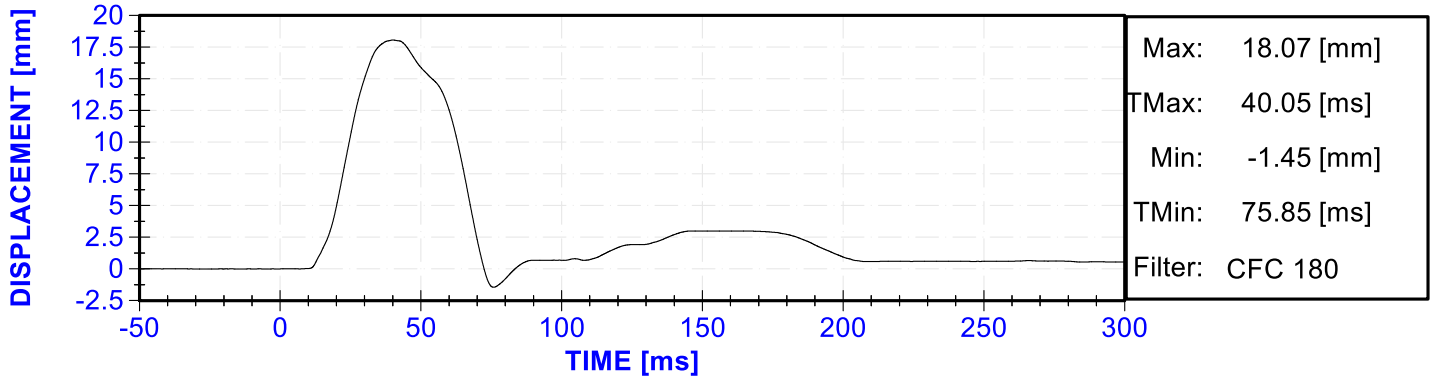
Driver Upper Thorax Rib Deflection (Y) vs. Time



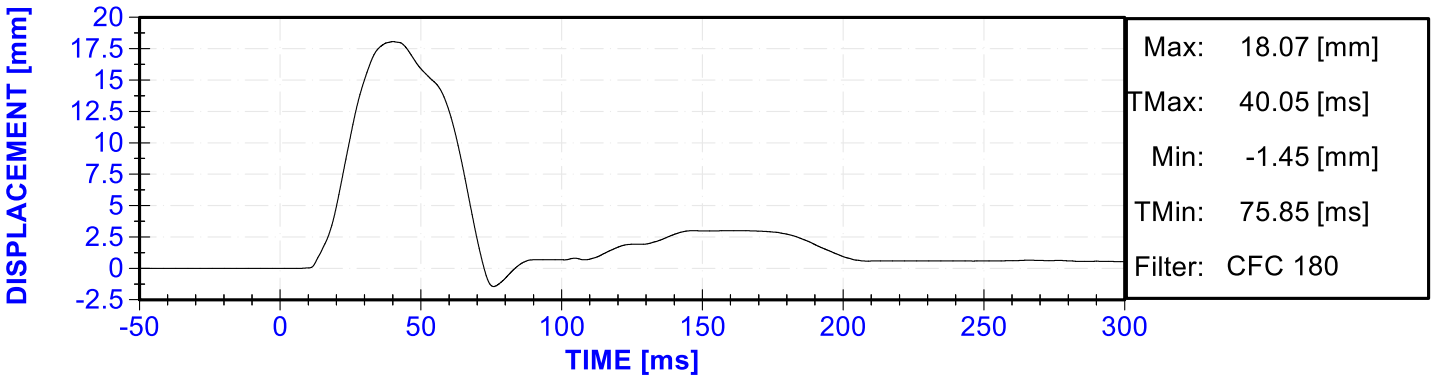
Driver Middle Thorax Rib Deflection (Y) vs. Time

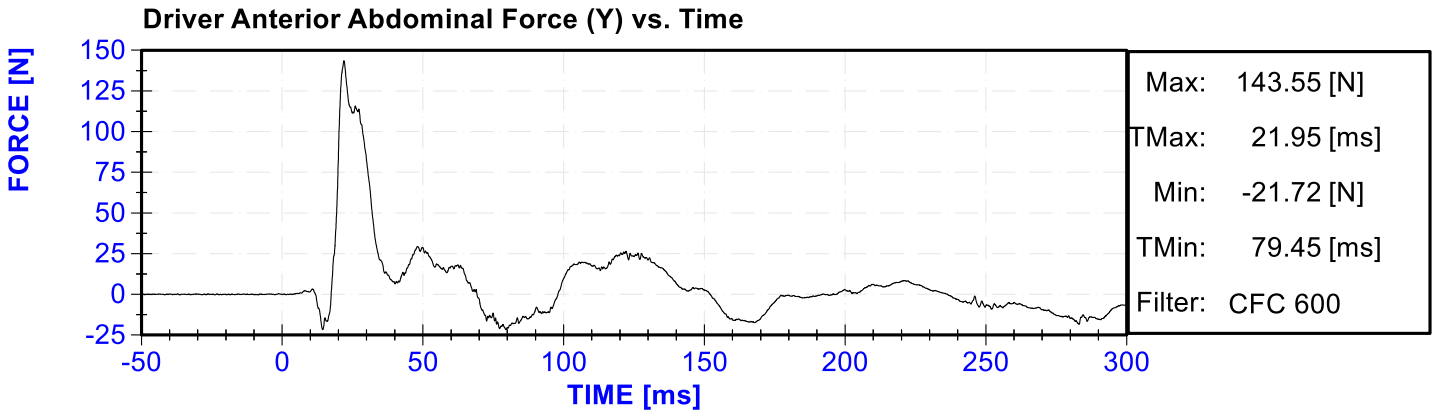


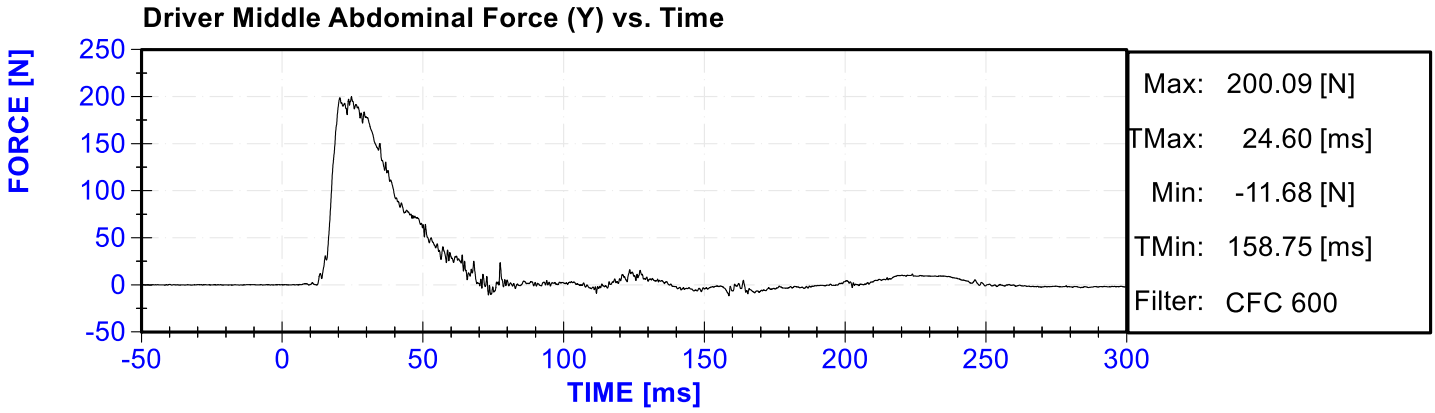
Driver Lower Thorax Rib Deflection (Y) vs. Time

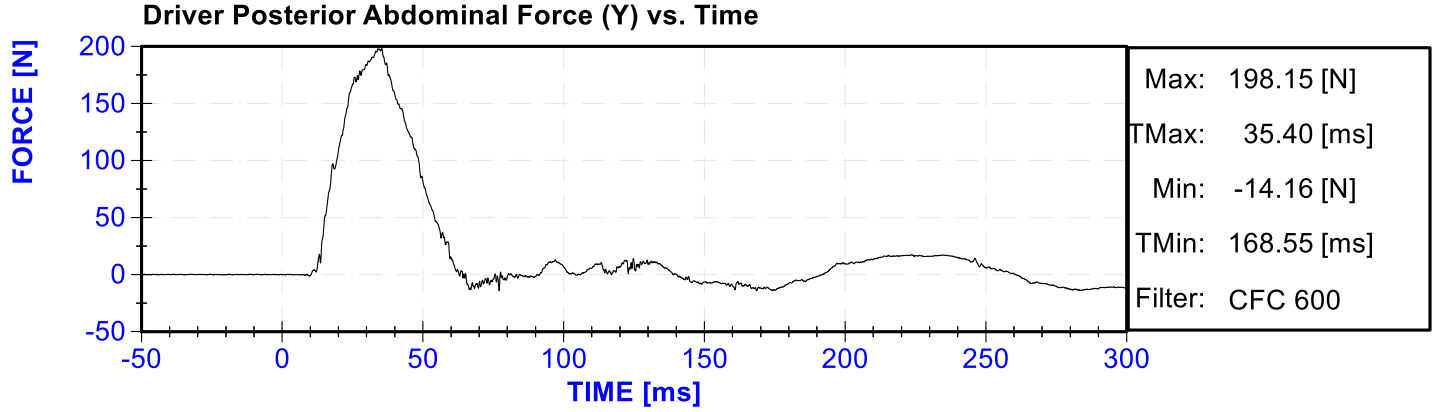


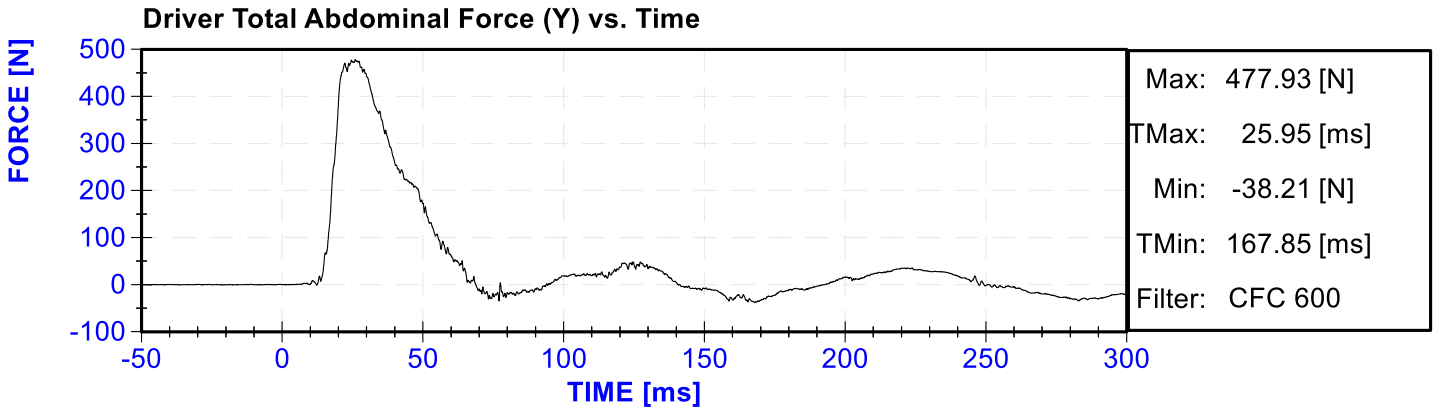
Driver Thorax Rib Deflection Maximum vs. Time

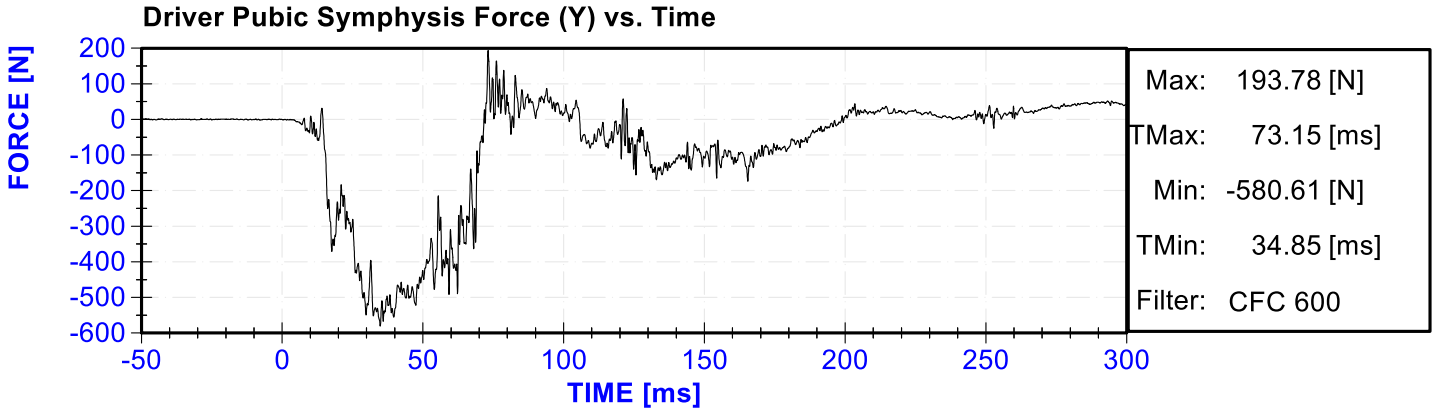


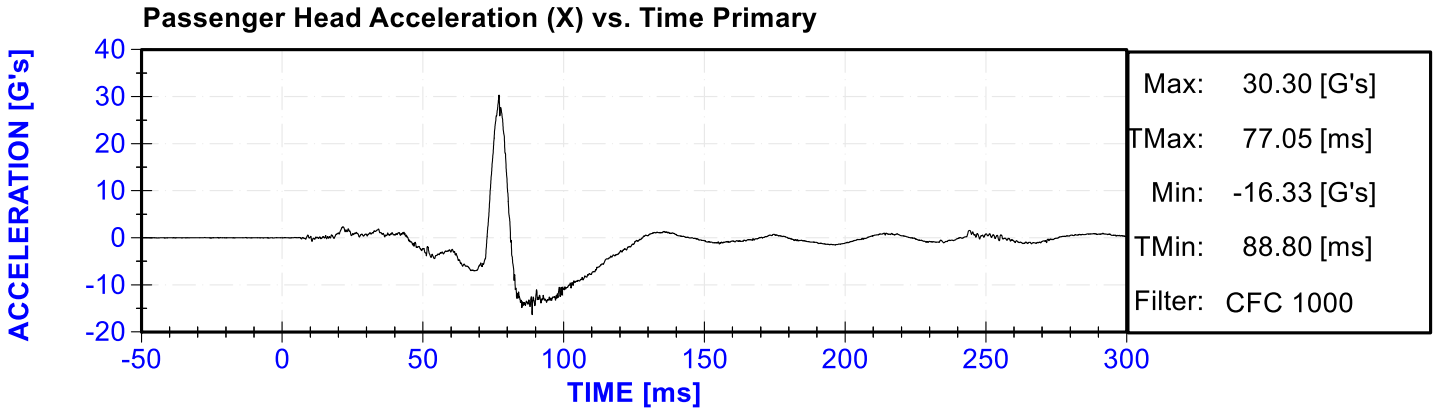

Driver Anterior Abdominal Force (Y) vs. Time
FORCE [N]
TIME [ms]
Max: 143.55 [N]
TMax: 21.95 [ms]
Min: -21.72 [N]
TMin: 79.45 [ms]
Filter: CFC 600

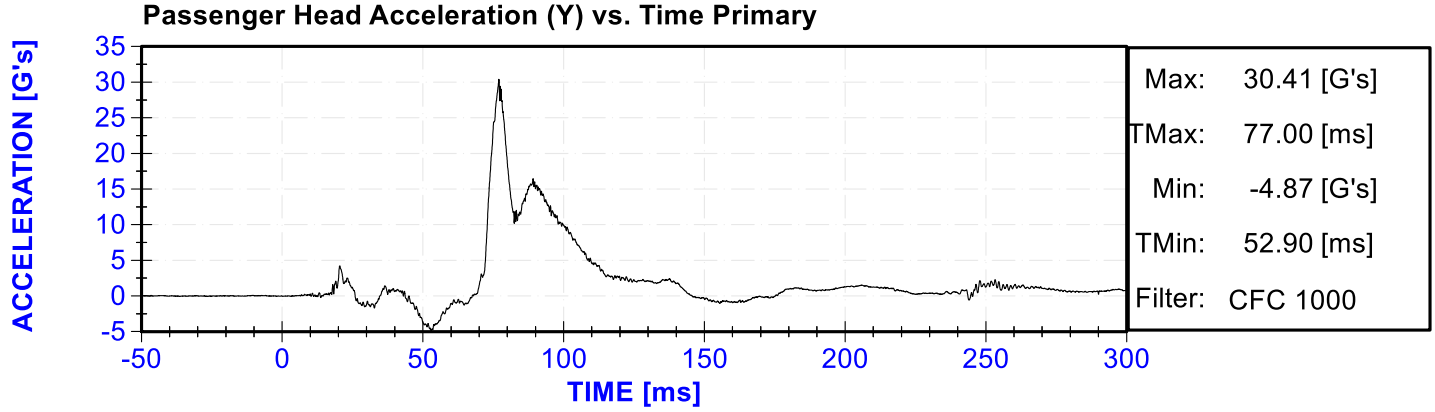

Driver Middle Abdominal Force (Y) vs. Time
FORCE [N]
TIME [ms]
Max: 200.09 [N]
TMax: 24.60 [ms]
Min: -11.68 [N]
TMin: 158.75 [ms]
Filter: CFC 600

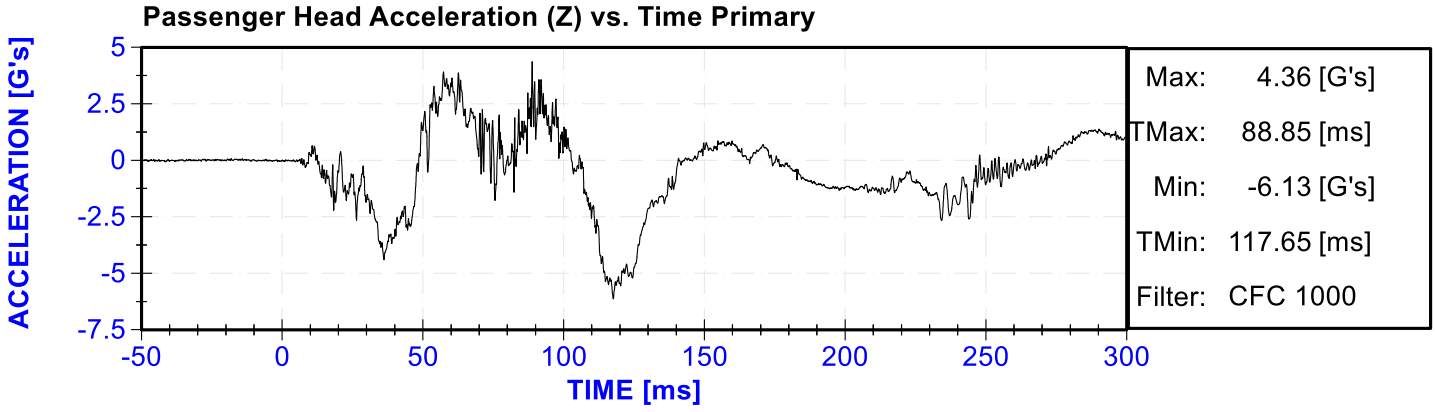

Driver Posterior Abdominal Force (Y) vs. Time
FORCE [N]
TIME [ms]
Max: 198.15 [N]
TMax: 35.40 [ms]
Min: -14.16 [N]
TMin: 168.55 [ms]
Filter: CFC 600


Driver Total Abdominal Force (Y) vs. Time
FORCE [N]
TIME [ms]
Max: 477.93 [N]
TMax: 25.95 [ms]
Min: -38.21 [N]
TMin: 167.85 [ms]
Filter: CFC 600

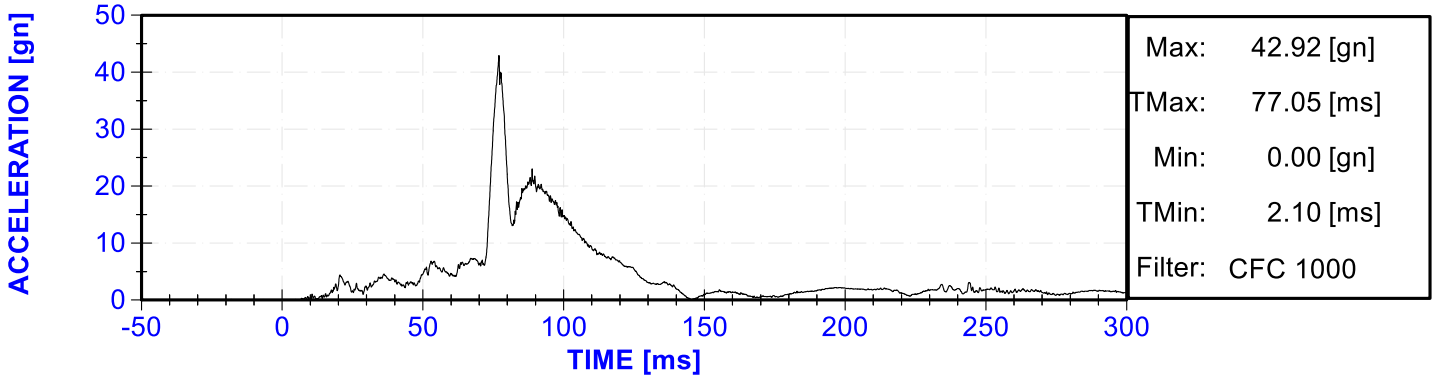

Driver Pubic Symphysis Force (Y) vs. Time
FORCE [N]
200
100
0
-100
-200
-300
-400
-500
-600
-50
0
50
100
150
200
250
300
TIME [ms]
Max: 193.78 [N]
TMax: 73.15 [ms]
Min: -580.61 [N]
TMin: 34.85 [ms]
Filter: CFC 600


Passenger Head Acceleration (X) vs. Time Primary
ACCELERATION [G's]
40
30
20
10
0
-10
-20
-50
0
50
100
150
200
250
300
TIME [ms]
Max: 30.30 [G's]
TMax: 77.05 [ms]
Min: -16.33 [G's]
TMin: 88.80 [ms]
Filter: CFC 1000

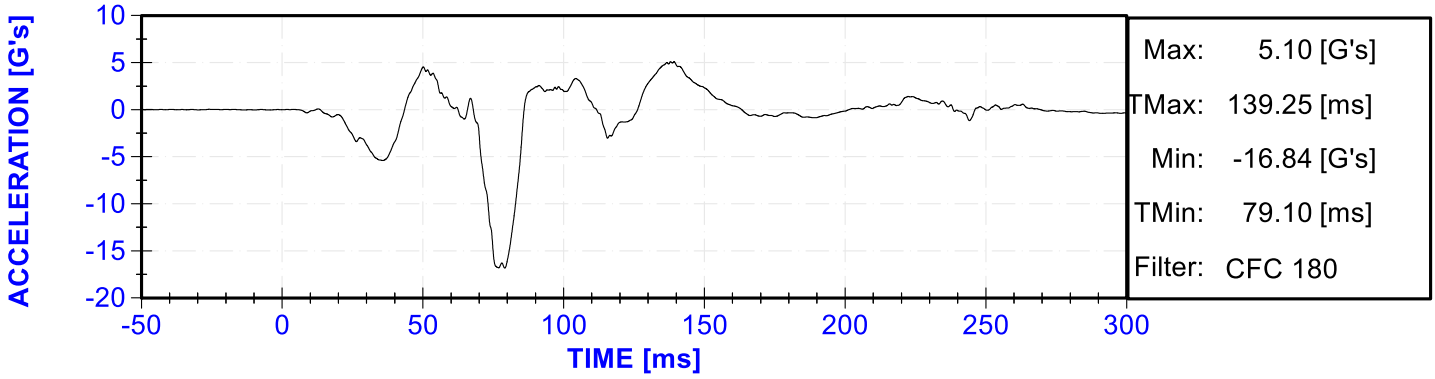

Passenger Head Acceleration (Y) vs. Time Primary
ACCELERATION [G's]
35
30
25
20
15
10
5
0
-5
-50
0
50
100
150
200
250
300
TIME [ms]
Max: 30.41 [G's]
TMax: 77.00 [ms]
Min: -4.87 [G's]
TMin: 52.90 [ms]
Filter: CFC 1000


Passenger Head Acceleration (Z) vs. Time Primary
ACCELERATION [G's]
5
2.5
0
-2.5
-5
-7.5
-50
0
50
100
150
200
250
300
TIME [ms]
Max: 4.36 [G's]
TMax: 88.85 [ms]
Min: -6.13 [G's]
TMin: 117.65 [ms]
Filter: CFC 1000

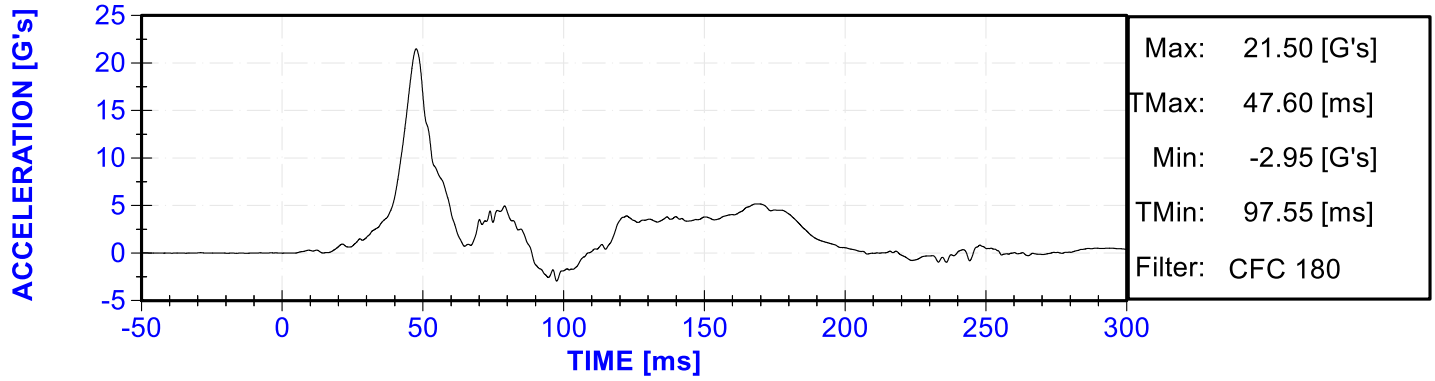
Passenger Head Resultant Acceleration Primary vs. Time



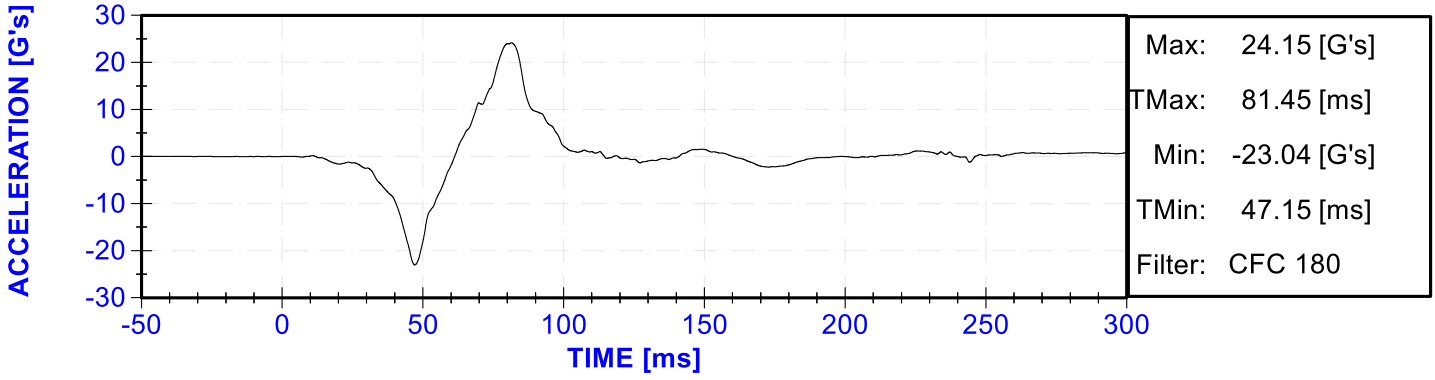
Passenger Lower Spine T12 Acceleration (X) vs. Time



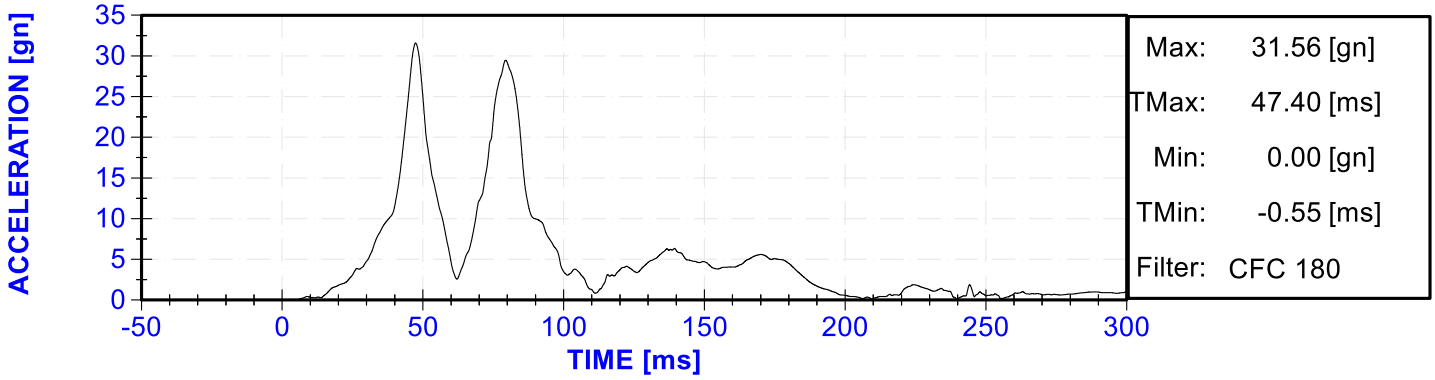
Passenger Lower Spine T12 Acceleration (Y) vs. Time



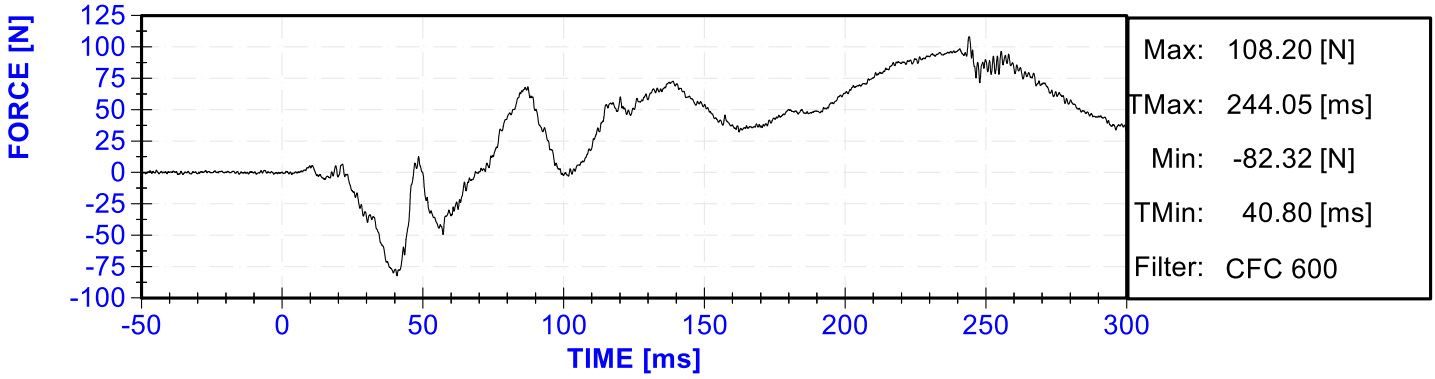
Passenger Lower Spine T12 Acceleration (Z) vs. Time



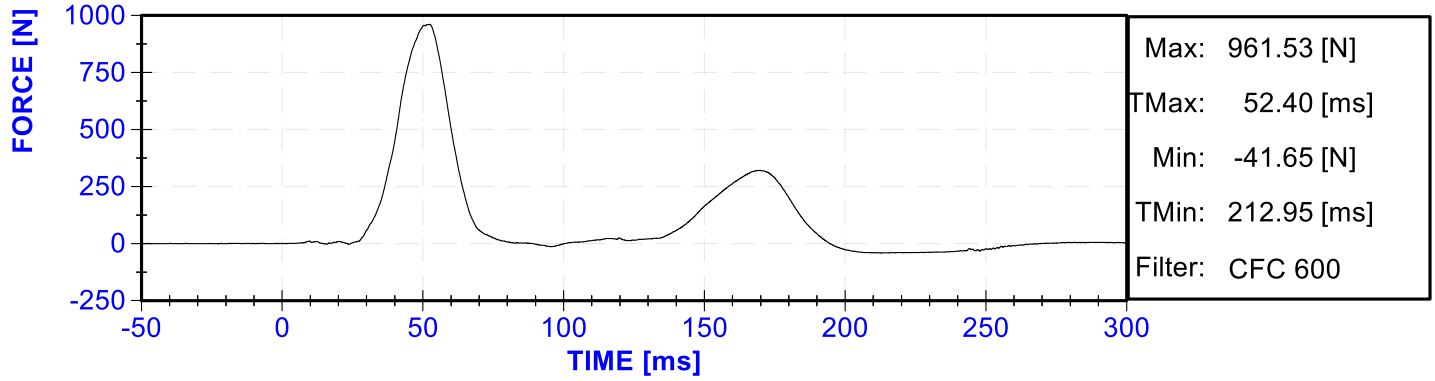
Passenger Lower Spine T12 Resultant Acceleration vs. Time



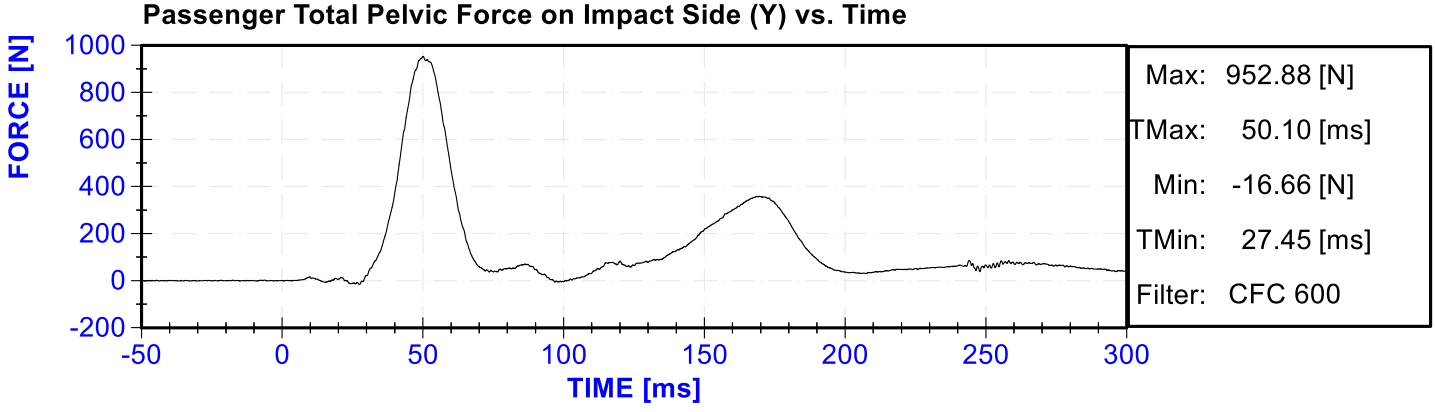
Passenger Iliac Force on Impact Side (Y) vs. Time



Passenger Acetabulum Force on Impact Side (Y) vs. Time



Passenger Total Pelvic Force on Impact Side (Y) vs. Time



APPENDIX C

DUMMY PERFORMANCE CALIBRATION TEST DATA

CALIBRATION TEST RESULTS

PRE-TEST

EUROSID 2 (ES-2RE) MALE – DRIVER ATD

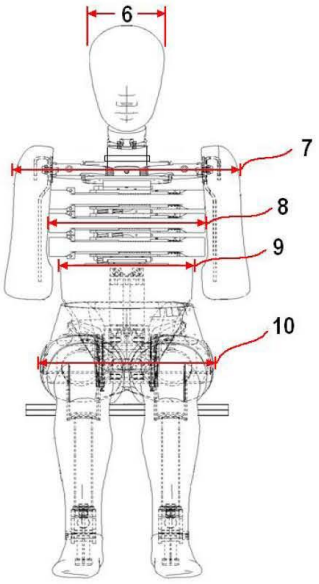
SERIAL NO: F033

(CONFIGURED FOR LEFT SIDE IMPACT)

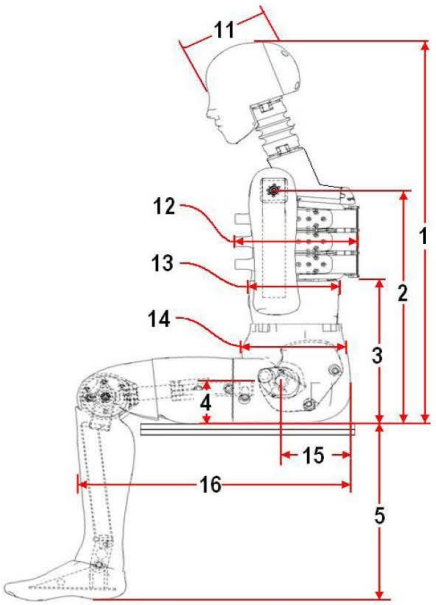
External Measurements - EuroSID-2re

Technician: K. Dutton Date: 08/14/2020

Dummy Serial Number: F033



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	424	Pass
6	Head Width	152	158	154	Pass
7	Shoulder/Arm Width	461	479	472	Pass
8	Thorax Width	322	332	328	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

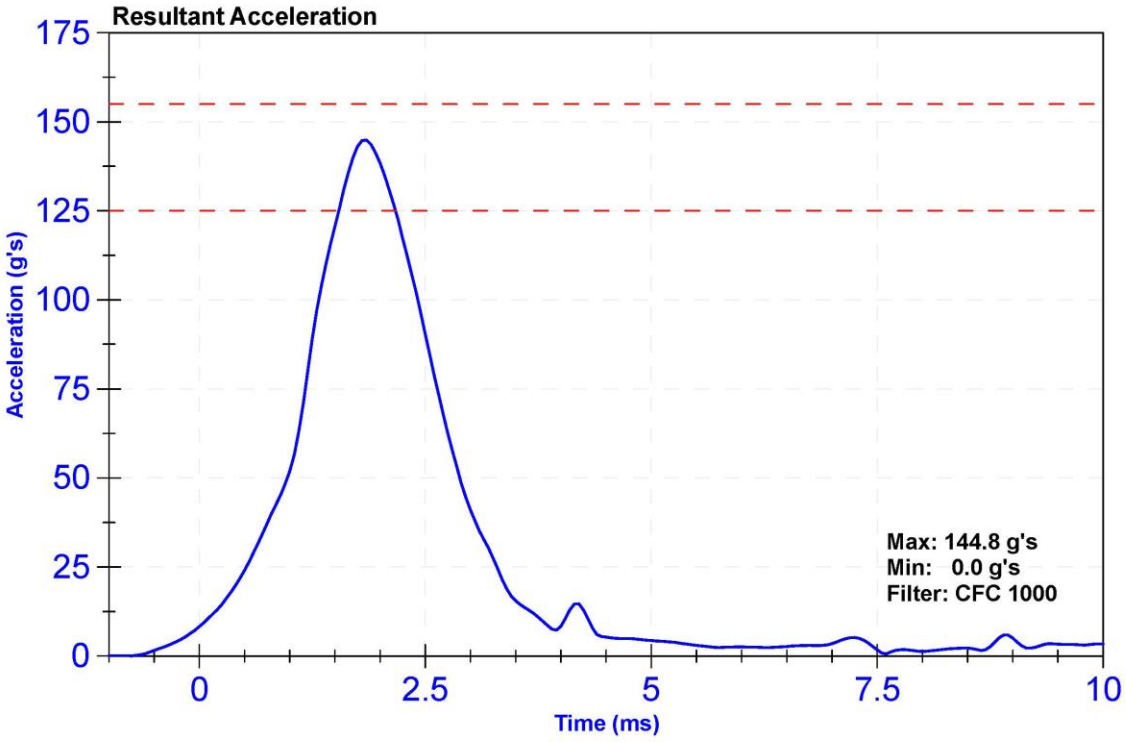
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

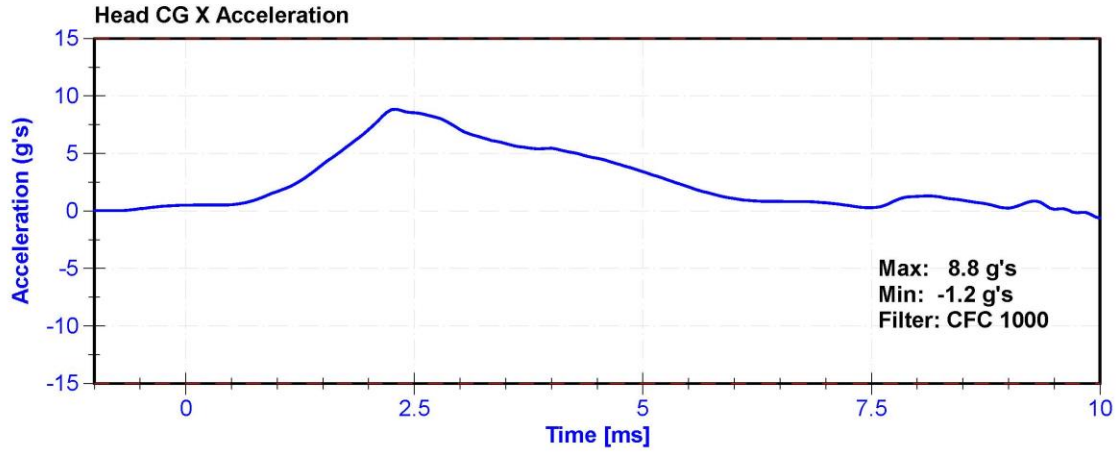
Results

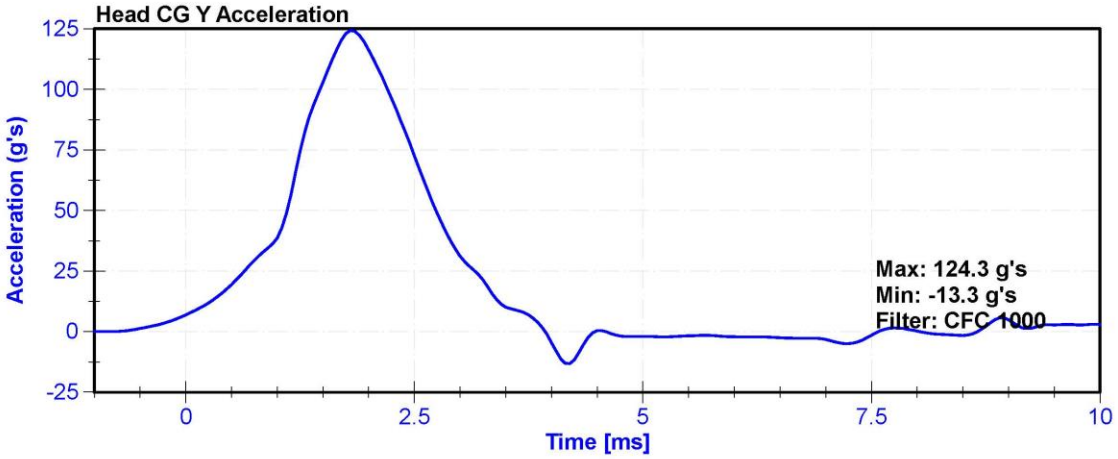
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.7	Pass
Humidity	10	70	%	59.0	Pass
Resultant Acceleration	125	155	g's	144.8	Pass
Oscillation	0	15	%	10.11	Pass
Fore-Aft Acceleration	-15	15	g's	8.8	Pass

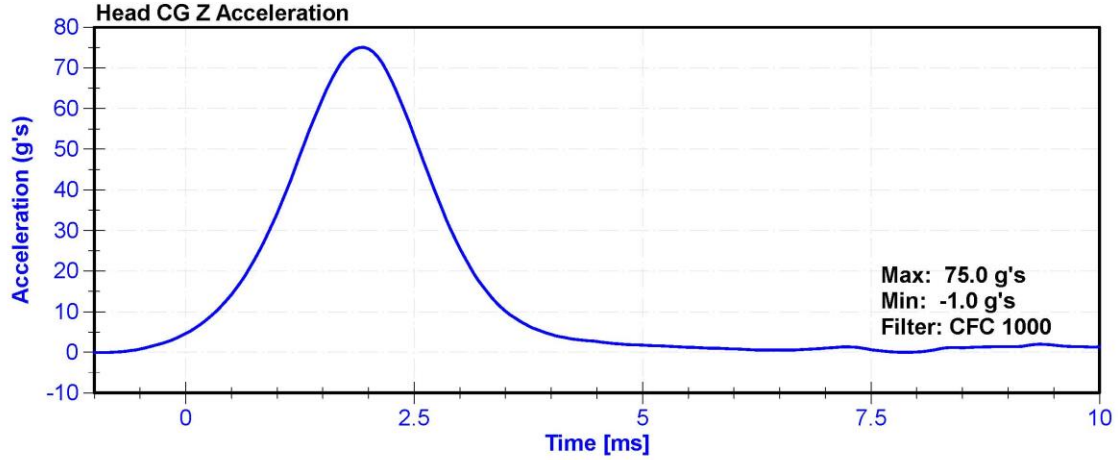
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P63861	5/19/2020	11/17/2020
Y Accelerometer	ENDEVCO 7264CT	AC-P49216	5/19/2020	11/17/2020
Z Accelerometer	ENDEVCO 7264	AC-P51303	5/19/2020	11/17/2020




Head CG X Acceleration
Acceleration (g's)
15
10
5
0
-5
-10
-15
0
2.5
5
7.5
10
Time [ms]
Max: 8.8 g's
Min: -1.2 g's
Filter: CFC 1000


Head CG Y Acceleration
Acceleration (g's)
125
100
75
50
25
0
-25
0
2.5
5
7.5
10
Time [ms]
Max: 124.3 g's
Min: -13.3 g's
Filter: CFC 1000


Head CG Z Acceleration
Acceleration (g's)
80
70
60
50
40
30
20
10
0
-10
0
2.5
5
7.5
10
Time [ms]
Max: 75.0 g's
Min: -1.0 g's
Filter: CFC 1000

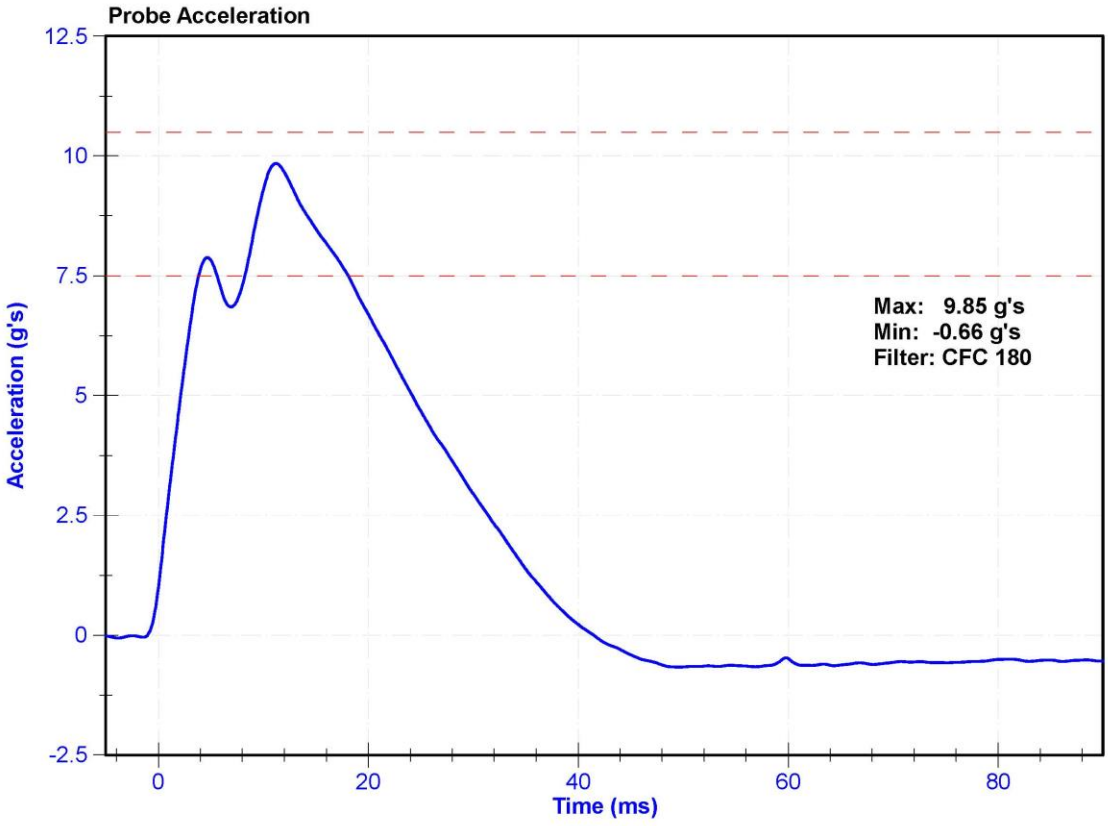
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.8	Pass
Humidity	10	70	%	59.0	Pass
Velocity	4.2	4.4	m/s	4.40	Pass
Probe Acceleration	7.5	10.5	g's	9.85	Pass

Transducer Calibrations

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



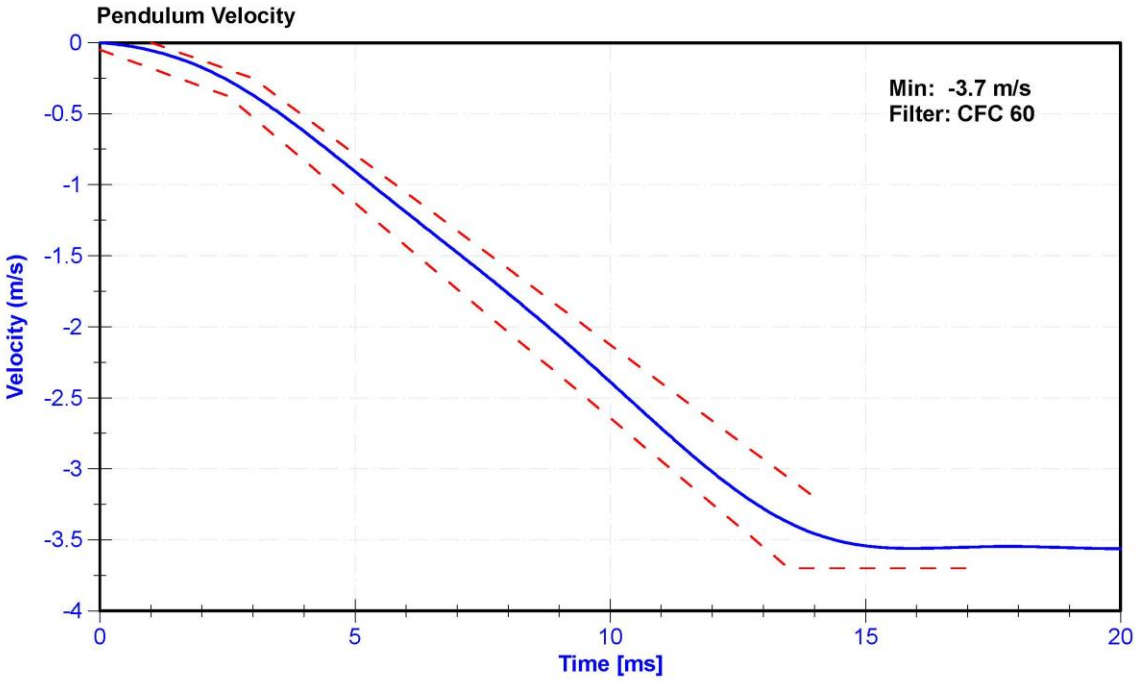
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

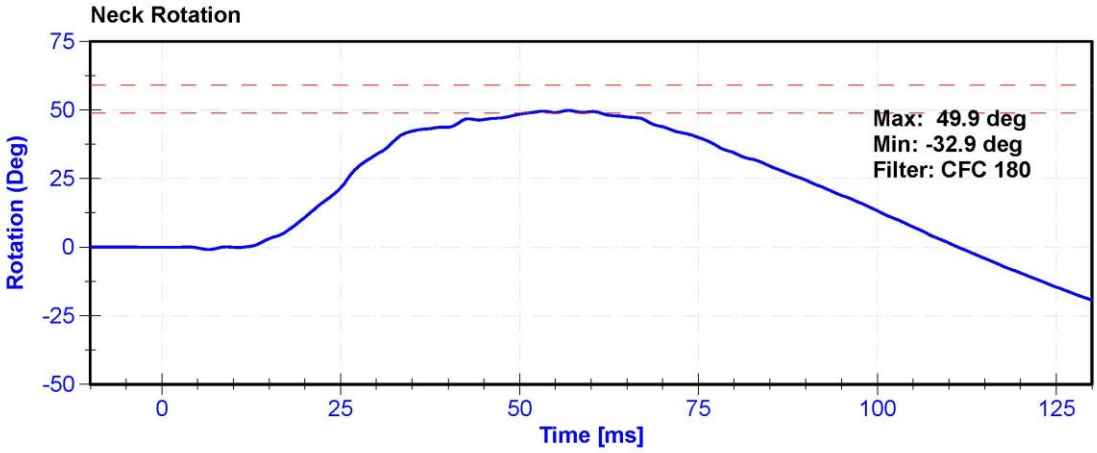
Results

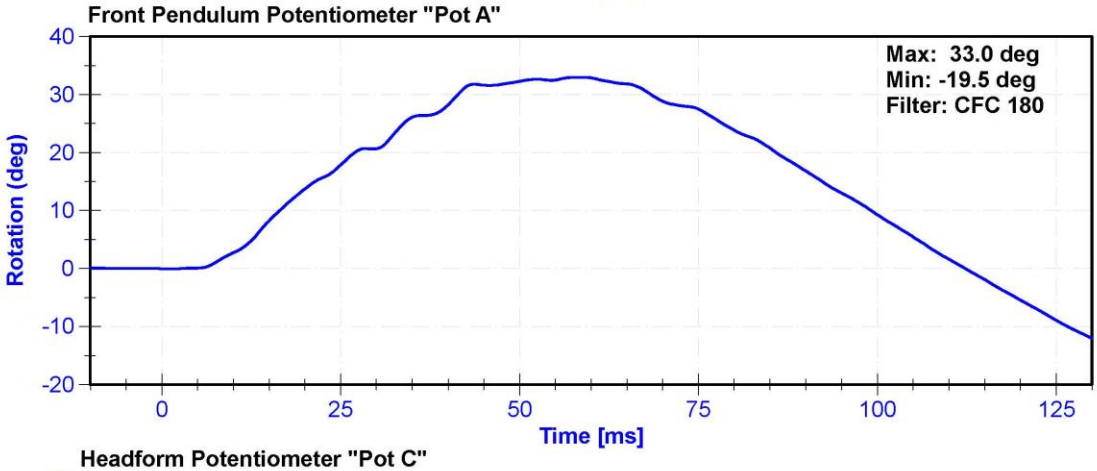
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.3	Pass
Humidity	10	70	%	62.1	Pass
Velocity	3.3	3.5	m/s	3.33	Pass
Lateral Neck Rotation	49	59	deg	49.9	Pass
Time at Maximum Rotation	54	66	ms	56.8	Pass
Time of Rotation Decay from Maximum	53	88	ms	54.5	Pass

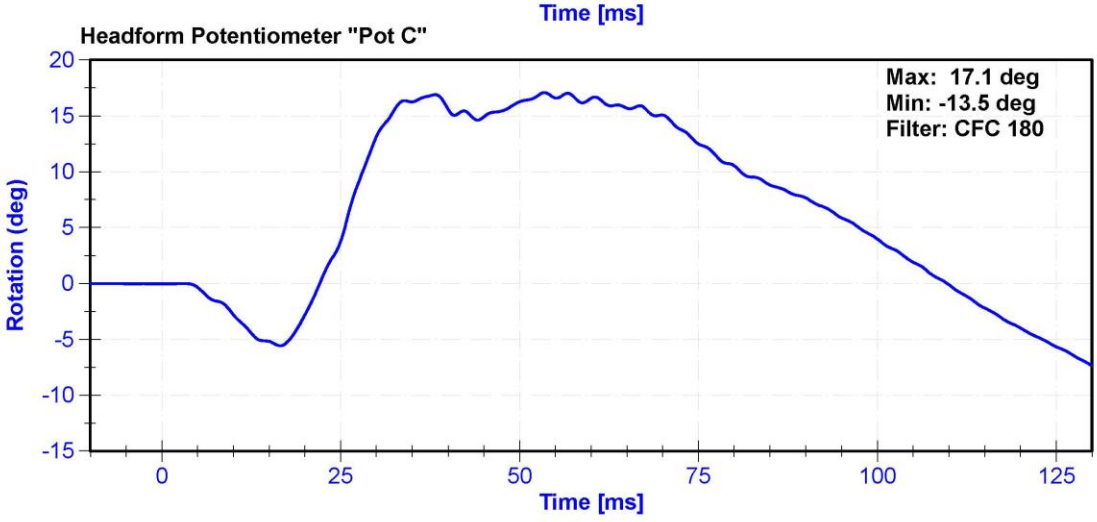
Transducer Calibrations

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




Neck Rotation
Rotation (Deg)
Time [ms]
Max: 49.9 deg
Min: -32.9 deg
Filter: CFC 180


Front Pendulum Potentiometer "Pot A"
Rotation (deg)
Time [ms]
Max: 33.0 deg
Min: -19.5 deg
Filter: CFC 180


Headform Potentiometer "Pot C"
Rotation (deg)
Time [ms]
Max: 17.1 deg
Min: -13.5 deg
Filter: CFC 180

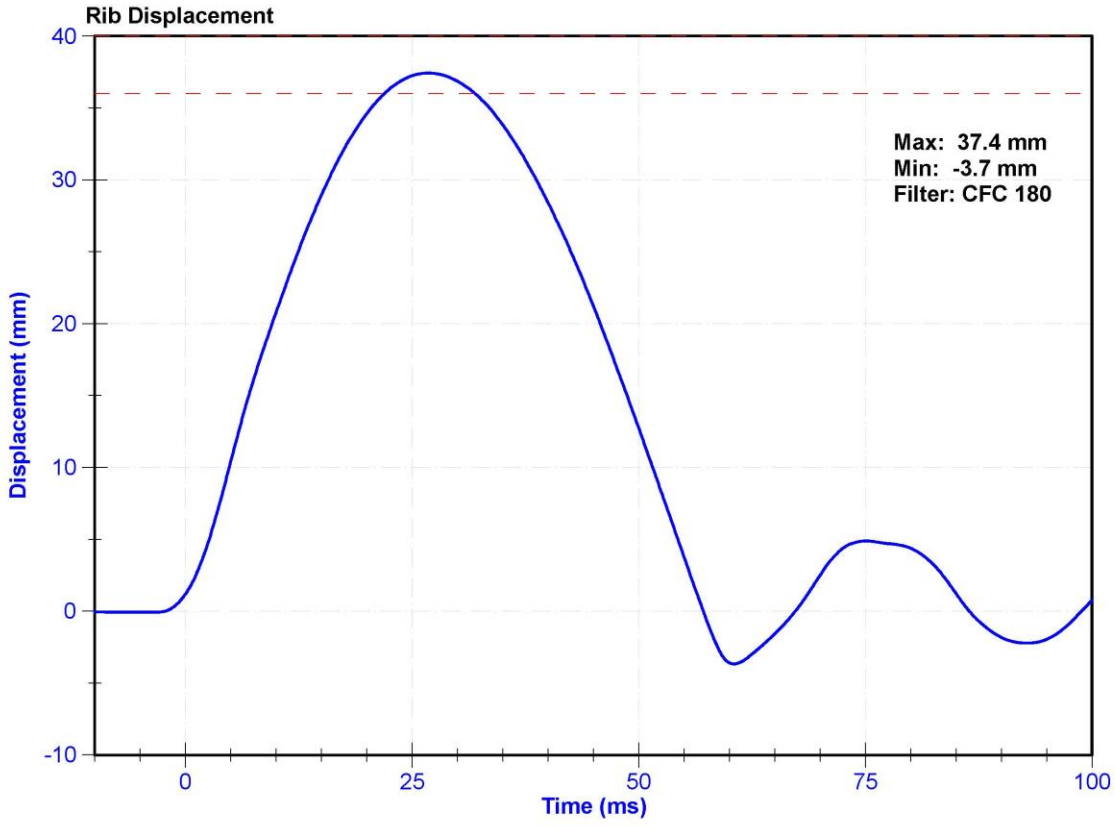
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.8	Pass
Humidity	10	70	%	57.0	Pass
Rib Displacement	36	40	mm	37.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-179GFE	5/20/2020	11/18/2020



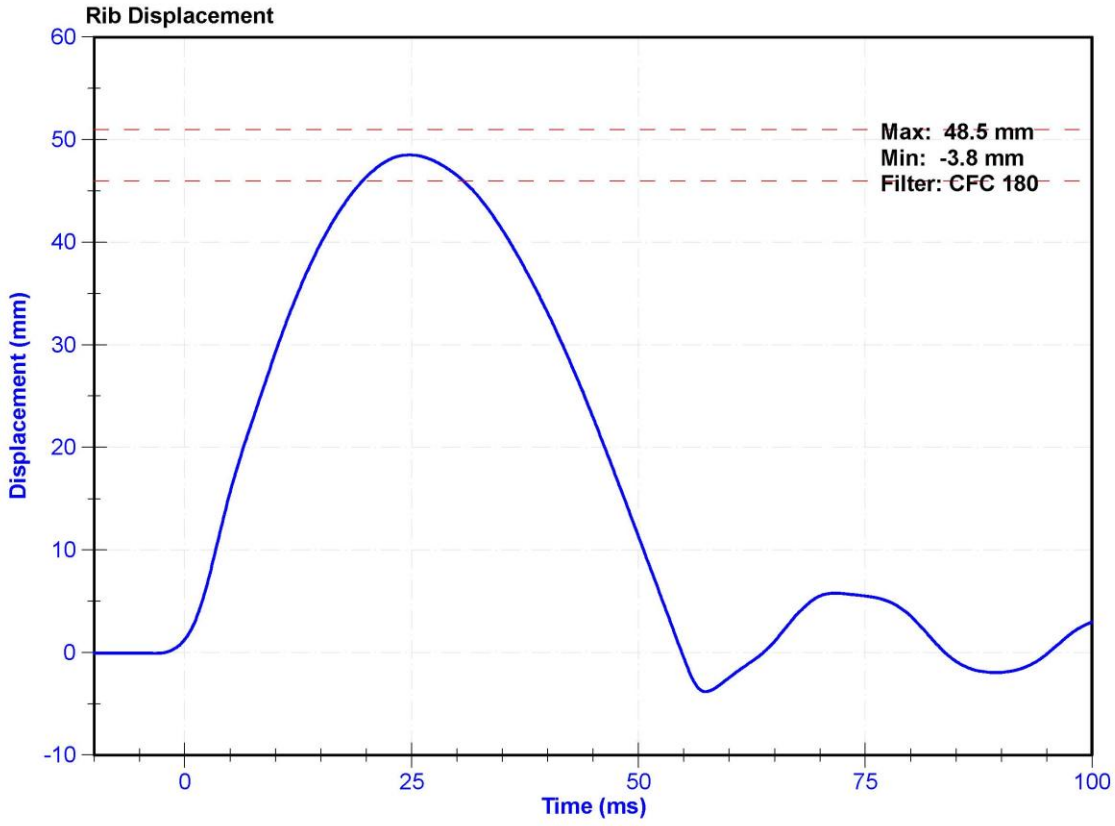
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.8	Pass
Humidity	10	70	%	58.0	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-179GFE	5/20/2020	11/18/2020



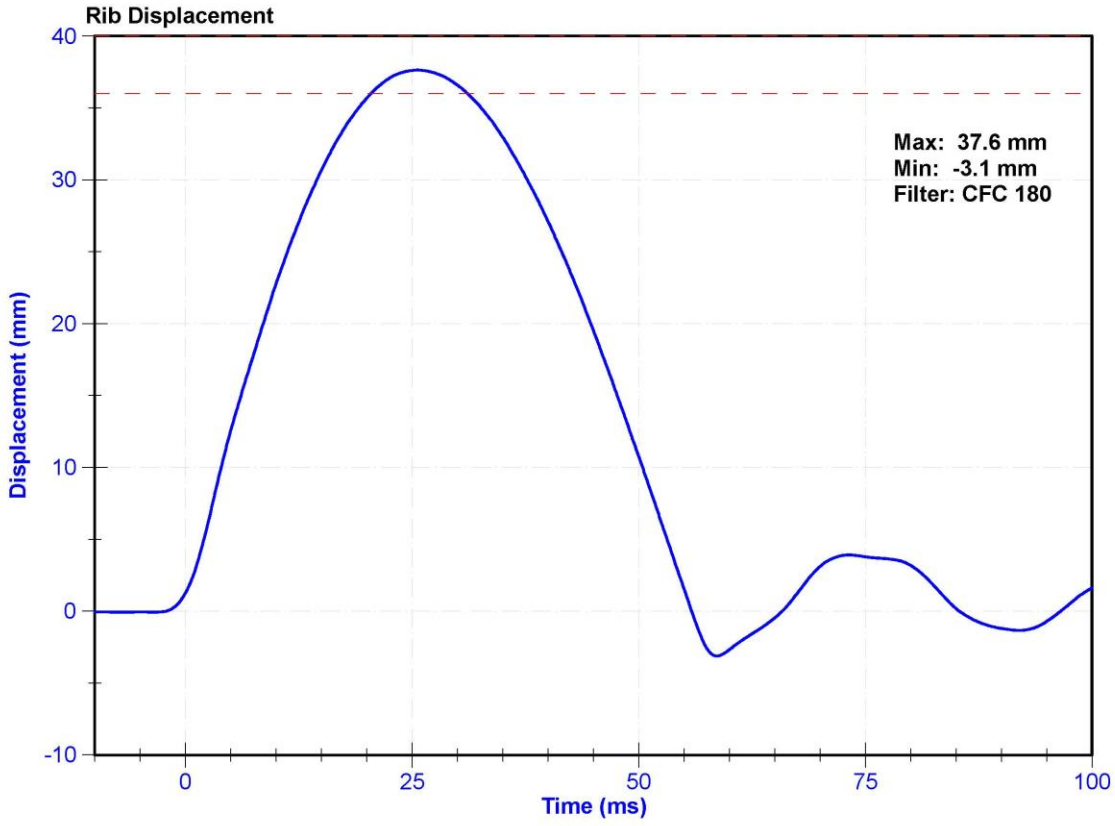
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.8	Pass
Humidity	10	70	%	58.0	Pass
Rib Displacement	36	40	mm	37.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-185GFE	5/20/2020	11/18/2020



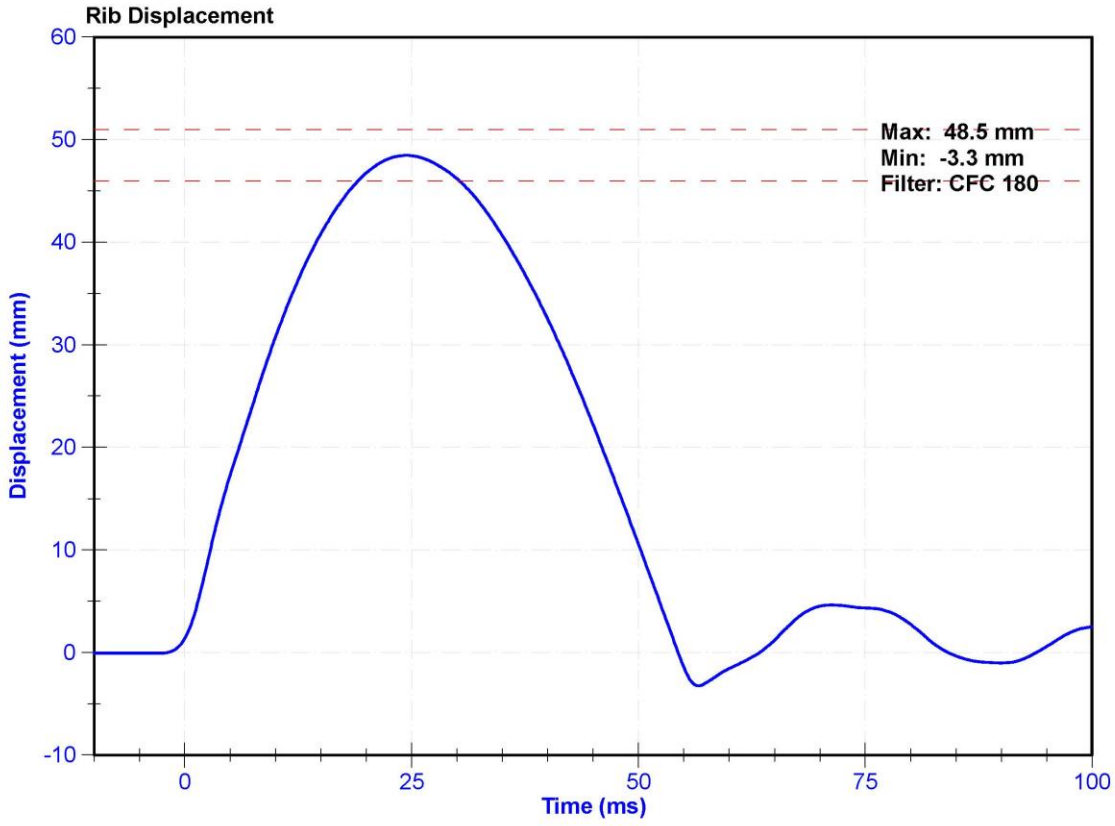
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.8	Pass
Humidity	10	70	%	59.0	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-185GFE	5/20/2020	11/18/2020



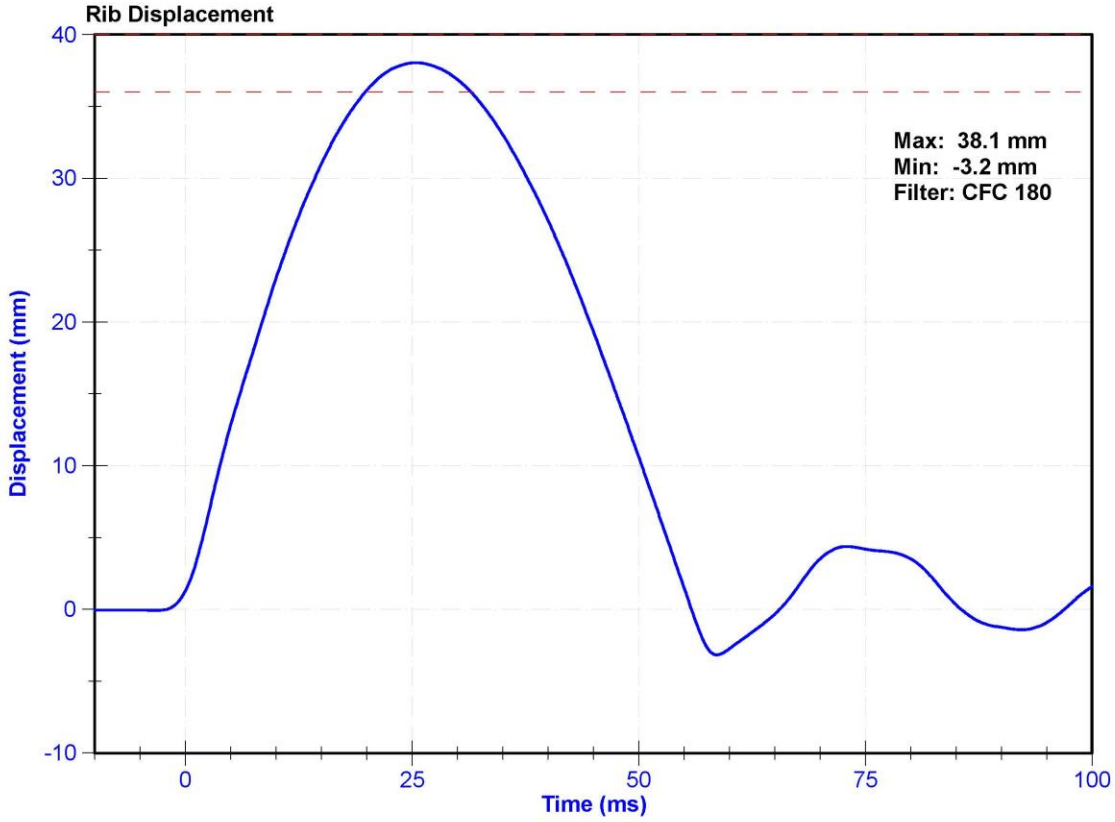
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.7	Pass
Humidity	10	70	%	57.0	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-178GFE	5/20/2020	11/18/2020



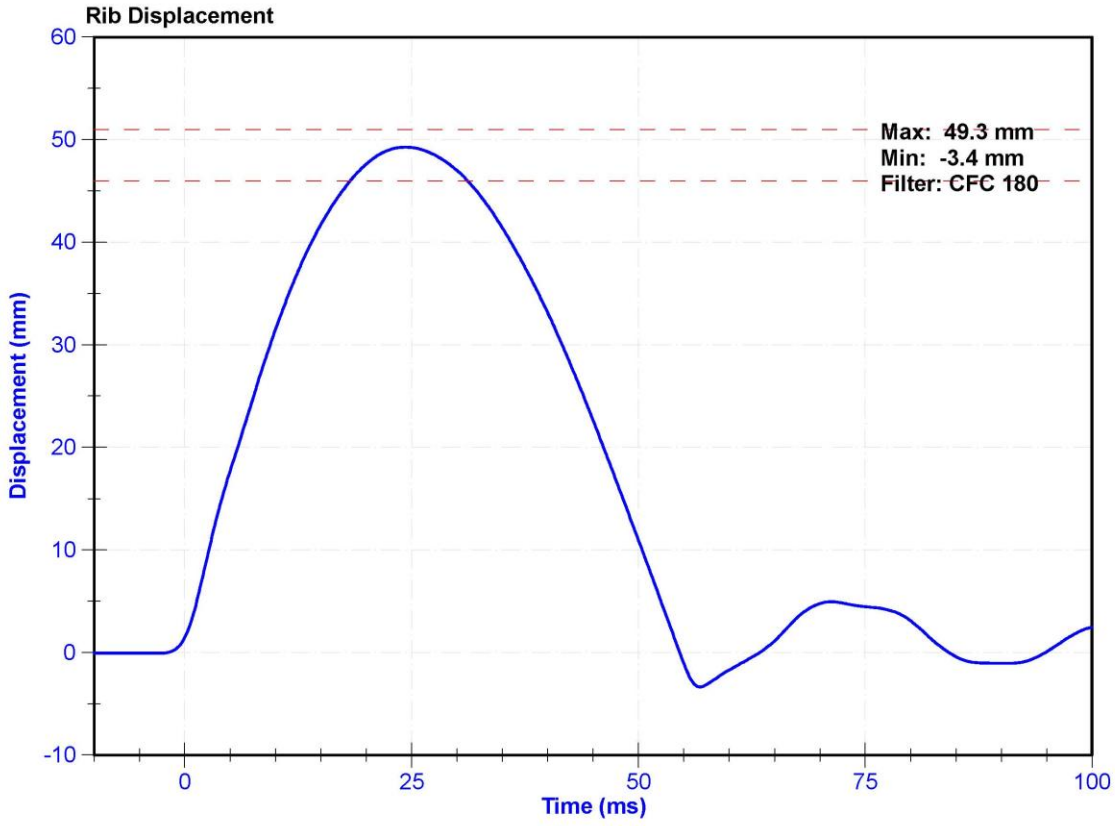
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.8	Pass
Humidity	10	70	%	57.0	Pass
Rib Displacement	46	51	mm	49.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-178GFE	5/20/2020	11/18/2020



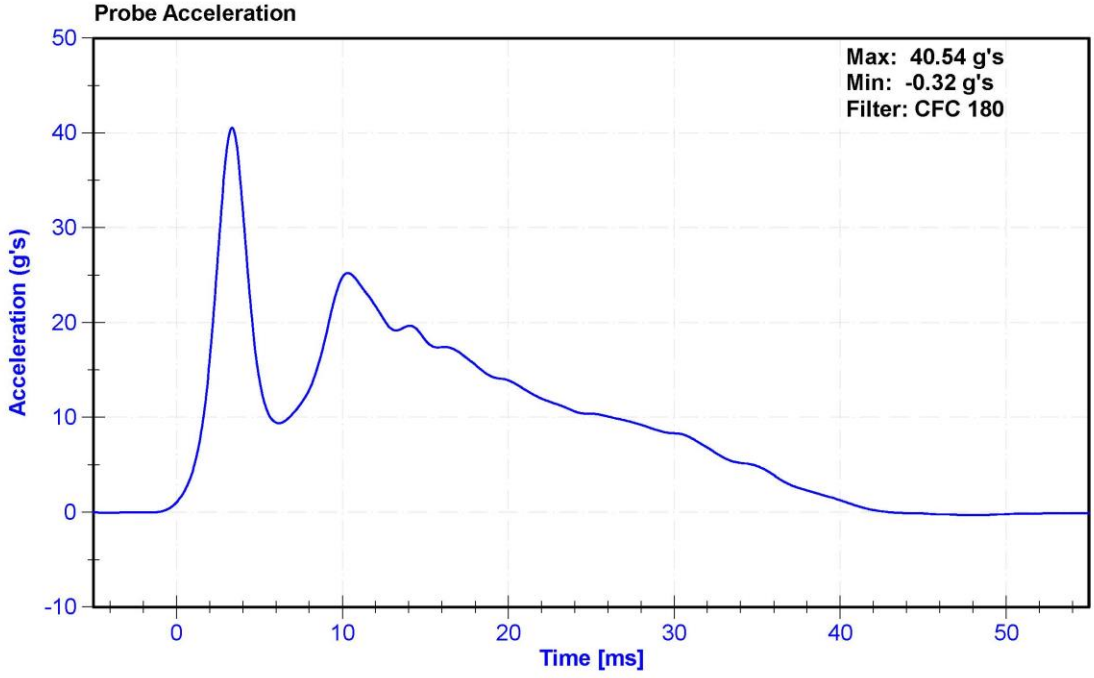
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

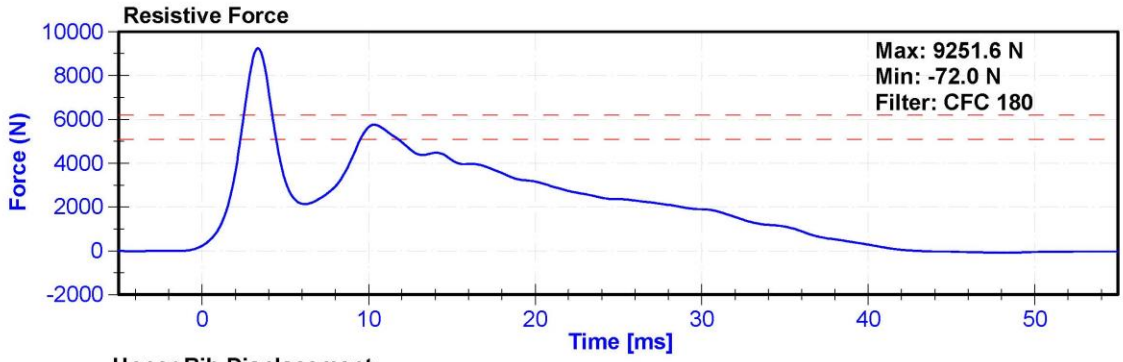
Results

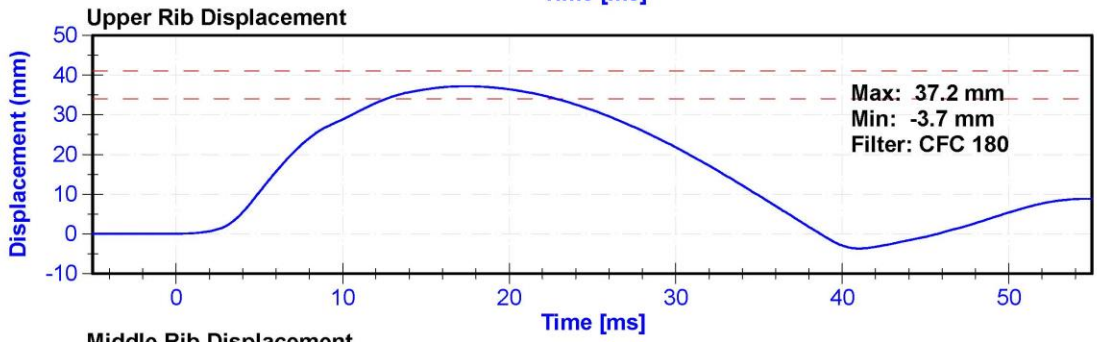
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.8	Pass
Humidity	10	70	%	57.0	Pass
Velocity	5.4	5.6	m/s	5.41	Pass
Resistive Force after 6ms	5100	6200	N	5756.7	Pass
Upper Thorax Rib Deflection	34	41	mm	37.2	Pass
Mid Thorax Rib Deflection	37	45	mm	40.1	Pass
Lower Thorax Rib Deflection	37	44	mm	39.2	Pass

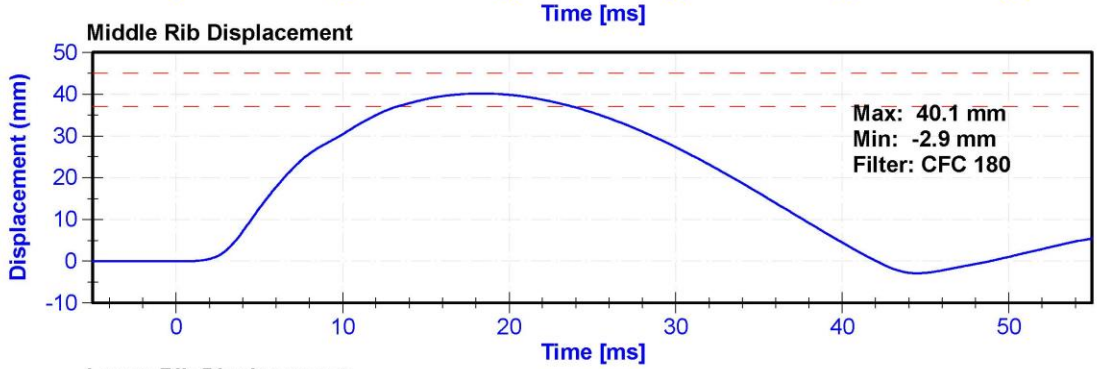
Transducer Calibrations

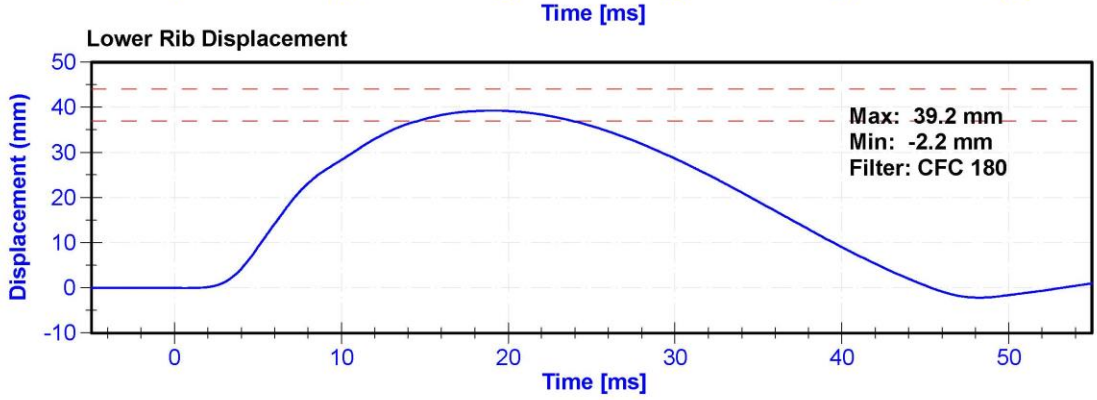
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	MSI 64C-2000	A279031	5/8/2020	5/8/2021
Upper Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-179GFE	5/20/2020	11/18/2020
Middle Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-185GFE	5/20/2020	11/18/2020
Lower Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-178GFE	5/20/2020	11/18/2020




Resistive Force
Max: 9251.6 N
Min: -72.0 N
Filter: CFC 180
Force (N)
Time [ms]


Upper Rib Displacement
Max: 37.2 mm
Min: -3.7 mm
Filter: CFC 180
Displacement (mm)
Time [ms]


Middle Rib Displacement
Max: 40.1 mm
Min: -2.9 mm
Filter: CFC 180
Displacement (mm)
Time [ms]


Lower Rib Displacement
Max: 39.2 mm
Min: -2.2 mm
Filter: CFC 180
Displacement (mm)
Time [ms]

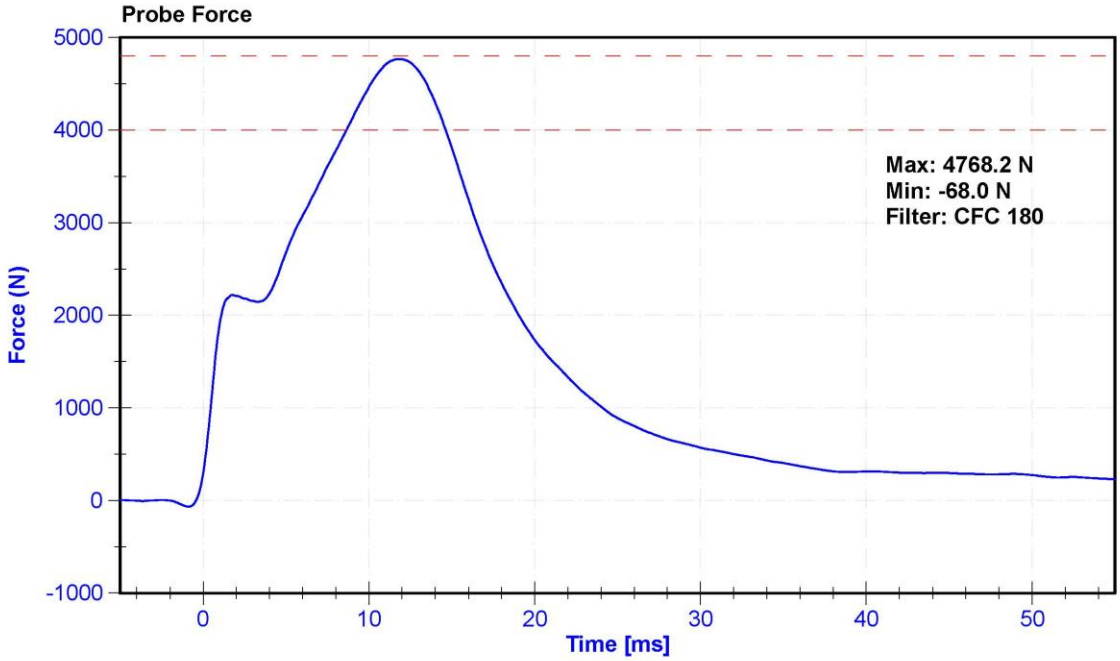
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K.Brogan

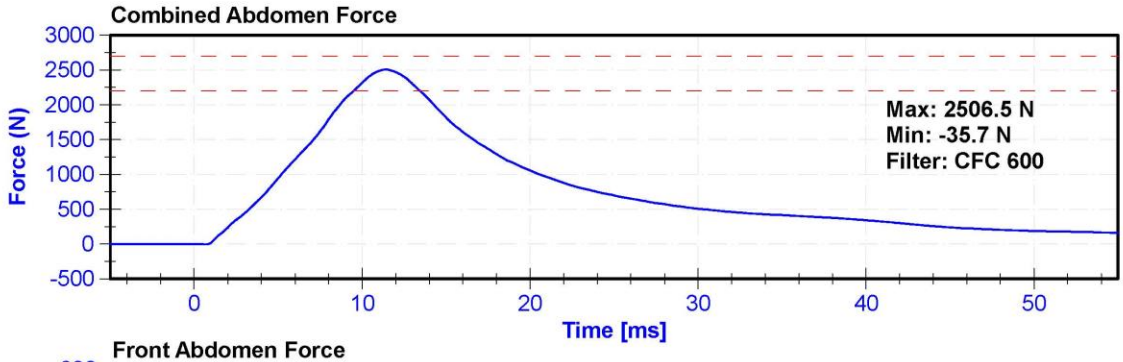
Results

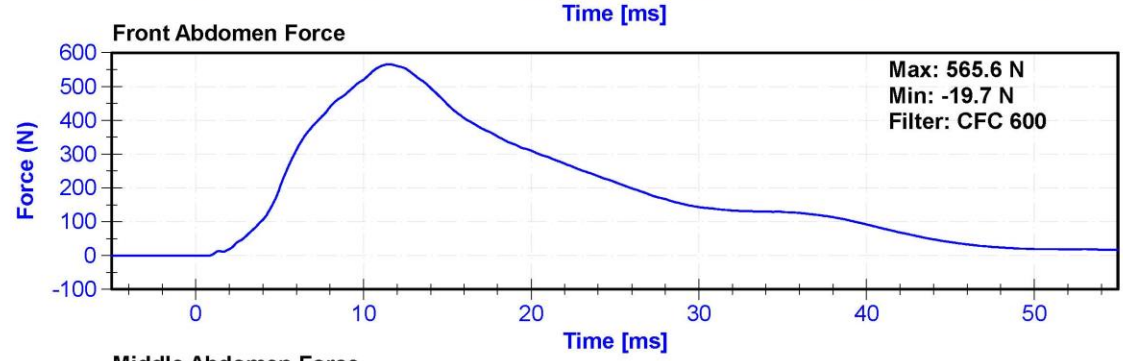
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.8	Pass
Humidity	10	70	%	56	Pass
Velocity	3.9	4.1	m/s	4.10	Pass
Combined Abdomen Force	2200	2700	N	2506.5	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	11.40	Pass
Resistive Probe Force	4000	4800	N	4768.2	Pass
Time at Peak Resistive Force	10.6	13.0	ms	11.85	Pass

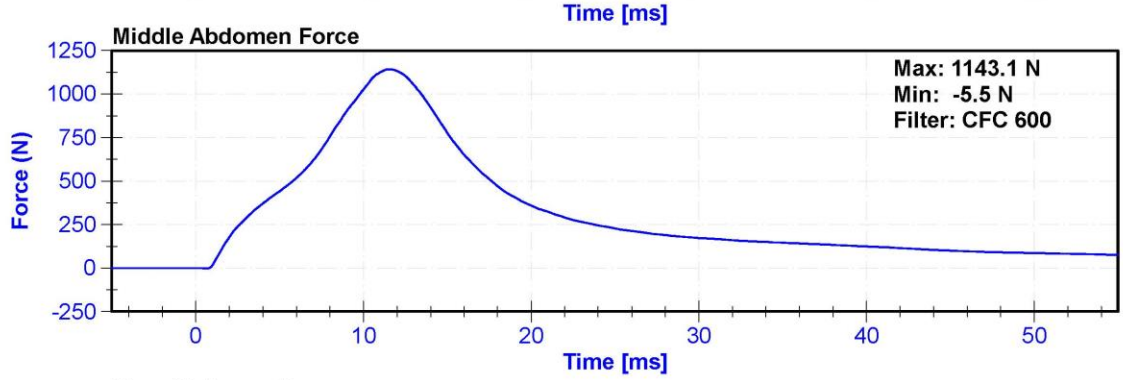
Transducer Calibrations

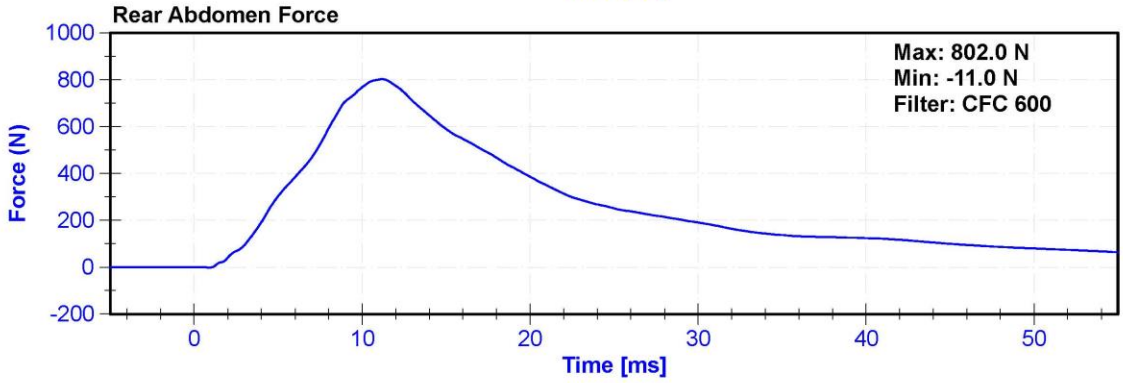
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A279031	5/8/2020	5/8/2021
Front Abdomen Load Cell	DENTON 2631J	26311512 GFE	3/19/2020	3/19/2021
Middle Abdomen Load Cell	DENTON 2631J	26311526 GFE	3/19/2020	3/19/2021
Rear Abdomen Load Cell	DENTON 2631J	26311516 GFE	3/19/2020	3/19/2021




Combined Abdomen Force
Force (N)
Time [ms]
Max: 2506.5 N
Min: -35.7 N
Filter: CFC 600


Front Abdomen Force
Force (N)
Time [ms]
Max: 565.6 N
Min: -19.7 N
Filter: CFC 600


Middle Abdomen Force
Force (N)
Time [ms]
Max: 1143.1 N
Min: -5.5 N
Filter: CFC 600


Rear Abdomen Force
Force (N)
Time [ms]
Max: 802.0 N
Min: -11.0 N
Filter: CFC 600

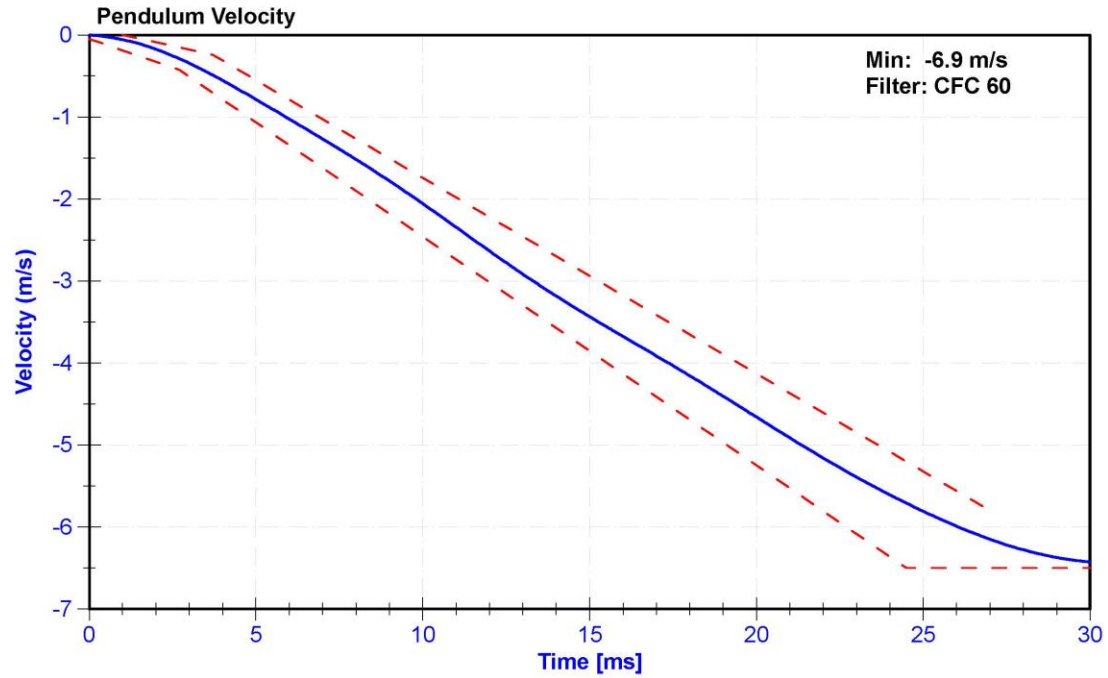
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

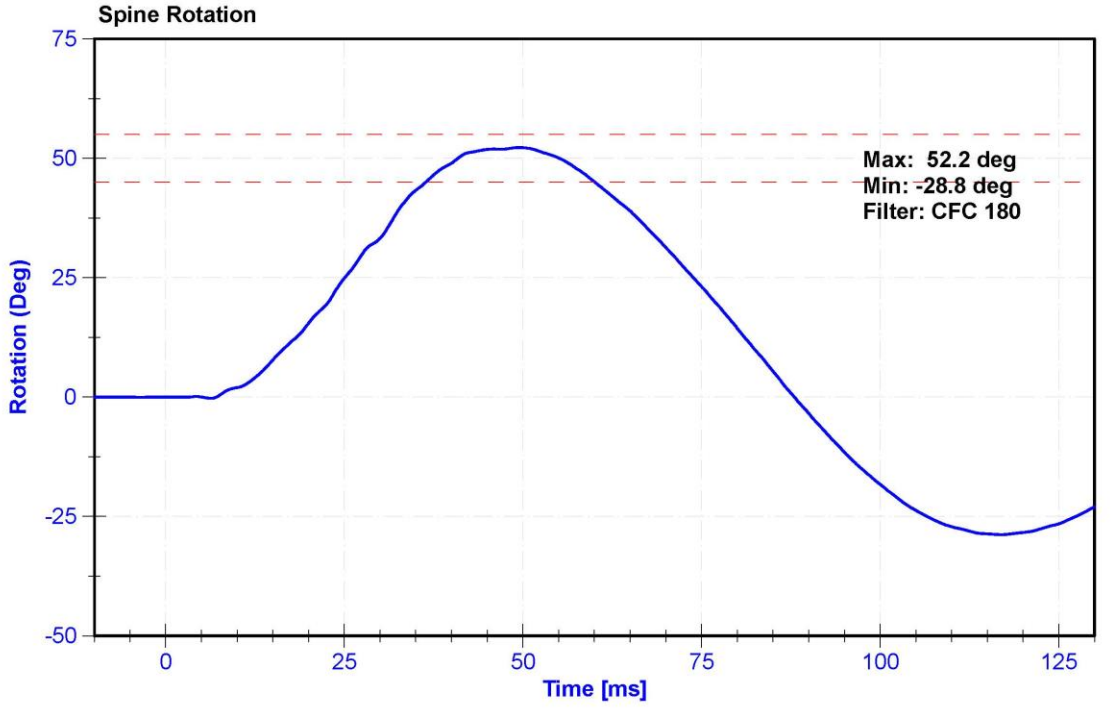
Results

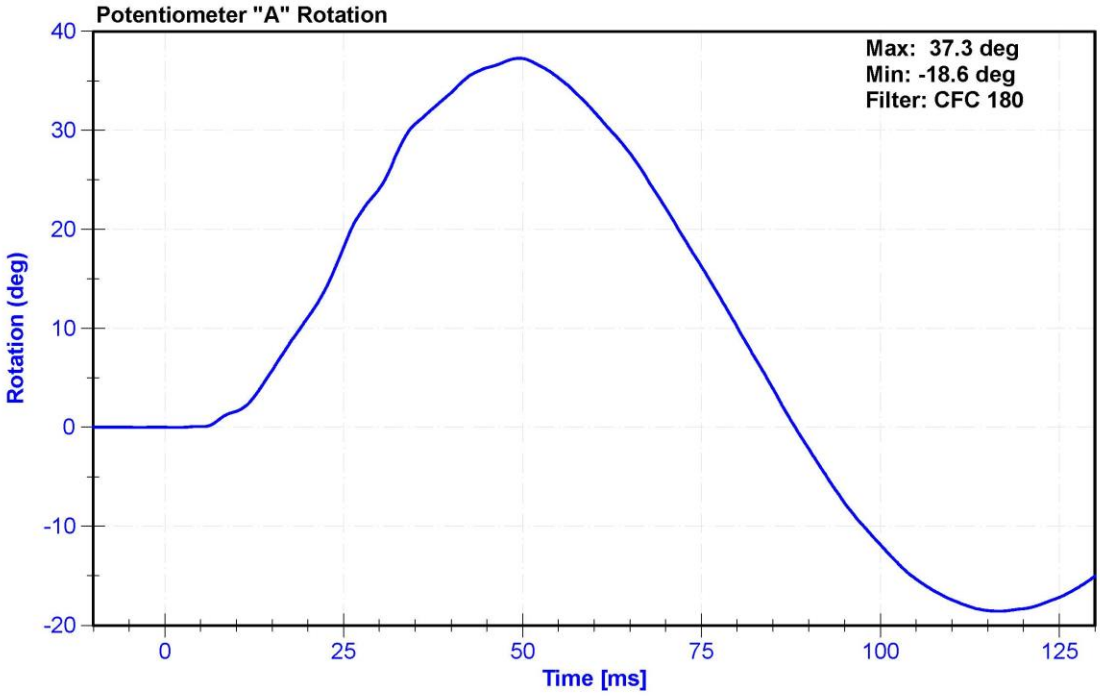
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.6	Pass
Humidity	10	70	%	60.6	Pass
Velocity	5.95	6.15	m/s	5.964	Pass
Lateral Spine Rotation	45	55	deg	52.2	Pass
Time at Maximum Rotation	39	53	ms	49.4	Pass
Time of Decay to Zero Degrees	37	57	ms	38.6	Pass
Pulse within Corridor?	-	-	-		

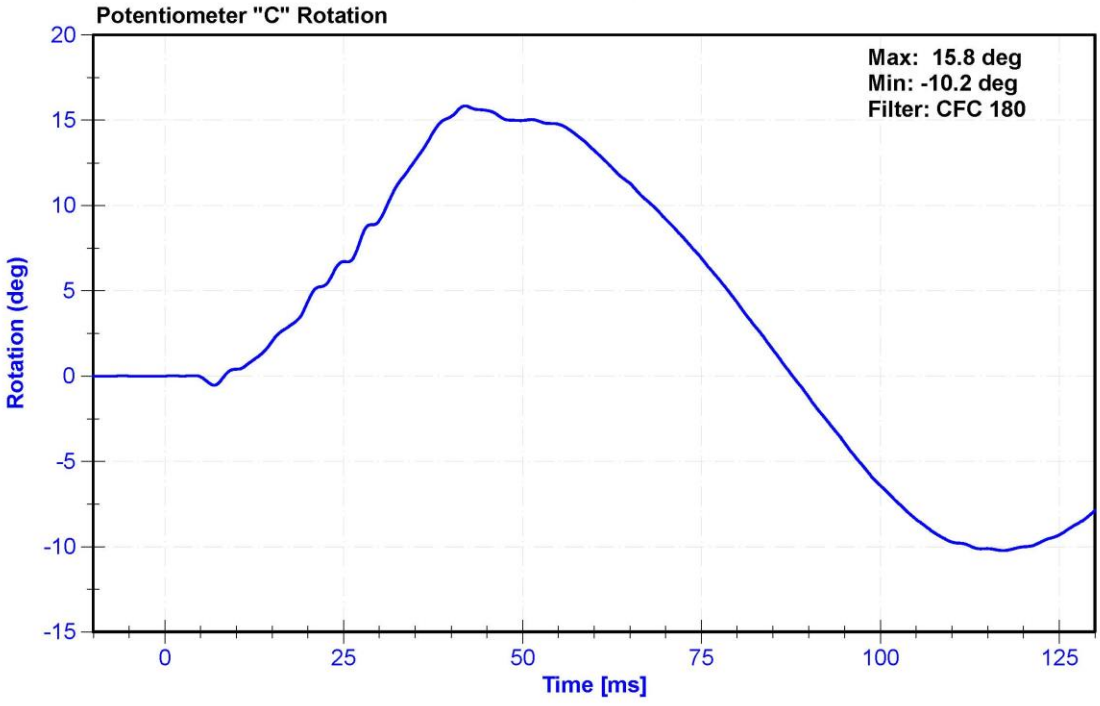
Transducer Calibrations

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


Pendulum Velocity
Min: -6.9 m/s
Filter: CFC 60
Velocity (m/s)
0
-1
-2
-3
-4
-5
-6
-7
0
5
10
15
20
25
30
Time [ms]


Spine Rotation
Max: 52.2 deg
Min: -28.8 deg
Filter: CFC 180
Rotation (Deg)
75
50
25
0
-25
-50
0
25
50
75
100
125
Time [ms]


Potentiometer "A" Rotation
Max: 37.3 deg
Min: -18.6 deg
Filter: CFC 180
Rotation (deg)
40
30
20
10
0
-10
-20
0
25
50
75
100
125
Time [ms]


Potentiometer "C" Rotation
Max: 15.8 deg
Min: -10.2 deg
Filter: CFC 180
Rotation (deg)
20
15
10
5
0
-5
-10
-15
0
25
50
75
100
125
Time [ms]

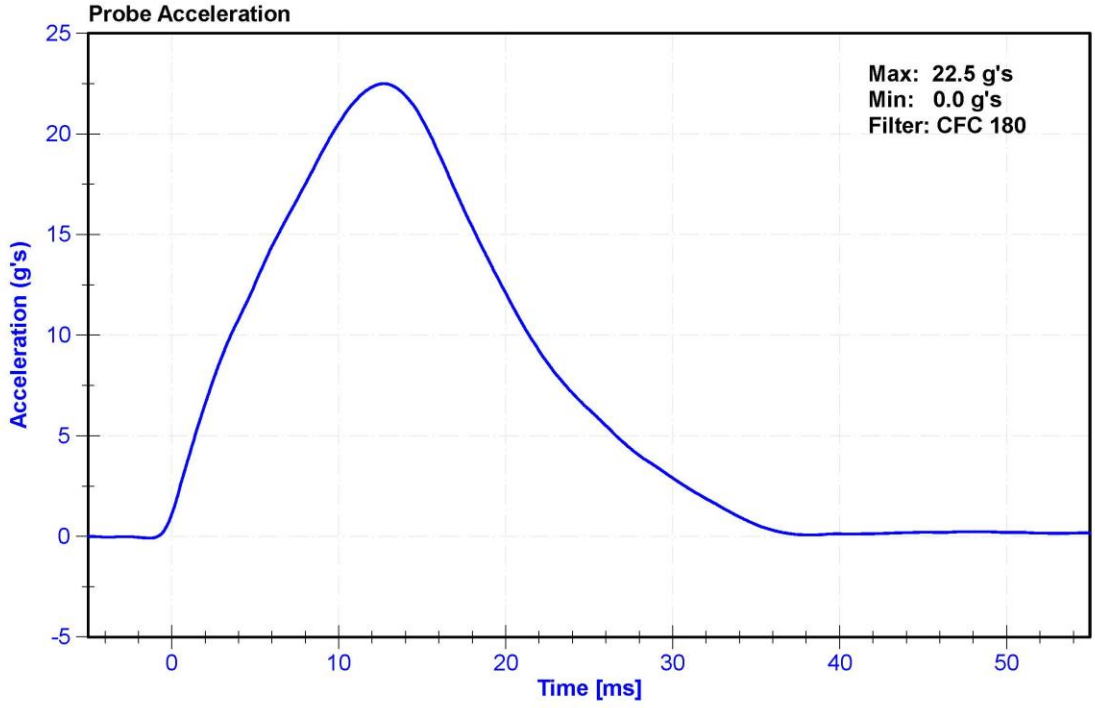
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

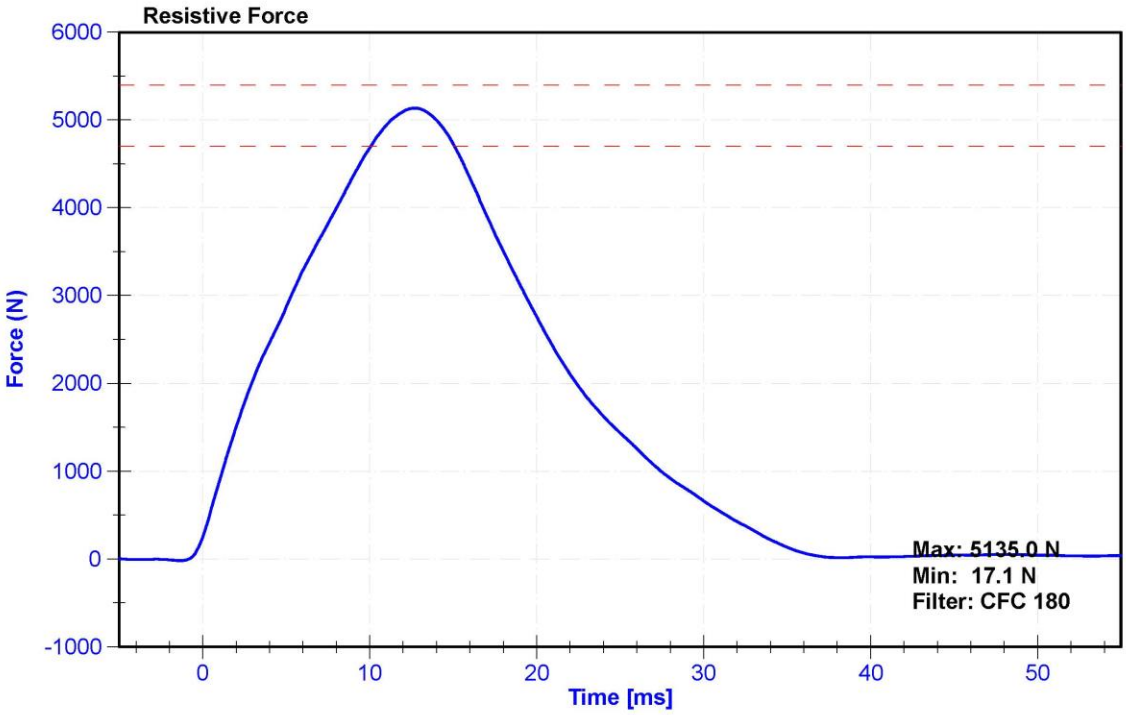
Results

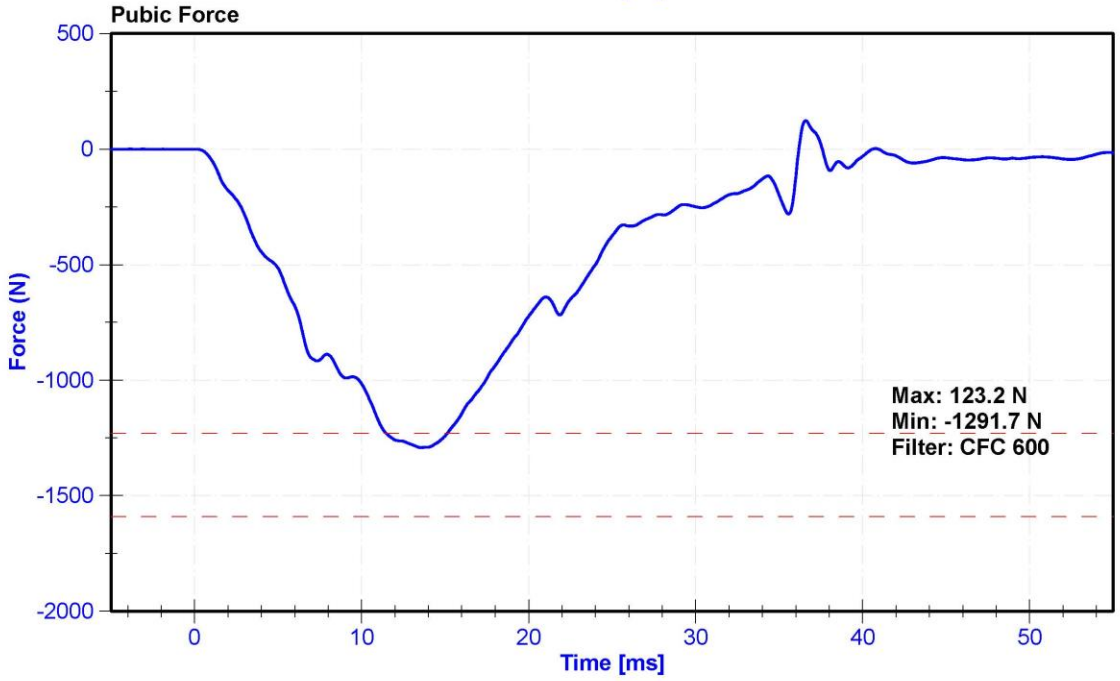
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.8	Pass
Humidity	10	70	%	59.0	Pass
Velocity	4.2	4.4	m/s	4.39	Pass
Resistive Force	4700	5400	N	5135.0	Pass
Time at Peak Resistive Force	11.8	16.1	ms	12.70	Pass
Pubic Force	-1590	-1230	N	-1291.7	Pass
Time at Peak Pubic Force	12.2	17.0	ms	13.55	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-456Fy	3/19/2020	3/19/2021




Resistive Force
Force (N)
Time [ms]
Max: 5135.0 N
Min: 17.1 N
Filter: CFC 180


Pubic Force
Force (N)
Time [ms]
Max: 123.2 N
Min: -1291.7 N
Filter: CFC 600

CALIBRATION TEST RESULTS

PRE-TEST

SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD

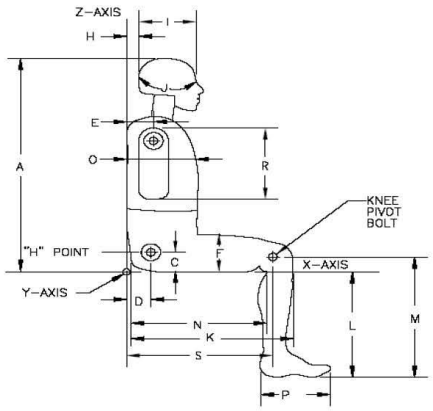
SERIAL No: 300

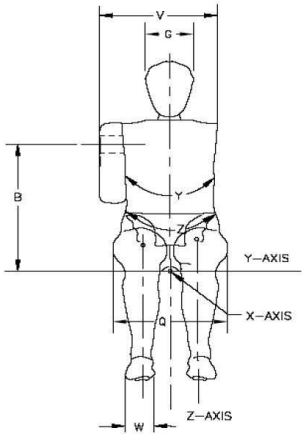
(CONFIGURED FOR LEFT SIDE IMPACT)

External Measurements - SID-IIs

Technician: K. Dutton Date: 08/13/2020

Dummy Serial Number: 300





Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	782	Pass
B	Shoulder Pivot Height	437	453	449	Pass
C	H-point Height	79	89	85	Pass
D	H-point from seatback	141	151	145	Pass
E	Shoulder Pivot from Backline	97	107	101	Pass
F	Thigh Clearance	119	135	126	Pass
G	Head Breadth	140	148	144	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	187	Pass
J	Head Circumference	541	551	544	Pass
K	Buttock to Knee Length	514	540	533	Pass
L	Popliteal Height	343	369	361	Pass
M	Knee Pivot to floor height	392	409	401	Pass
N	Buttock Popliteal Length	416	442	431	Pass
O	Chest Depth w/o jacket	195	211	207	Pass
P	Foot Length	216	232	220	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	317	Pass
R	Arm Length	249	259	253	Pass
S	Knee Joint to seatback	477	493	484	Pass
V	Shoulder Width	341	357	352	Pass
W	Foot Width	78	94	83	Pass
Y	Chest Circumference w/jacket	851	881	875	Pass
Z	Waist Circumference	761	791	773	Pass

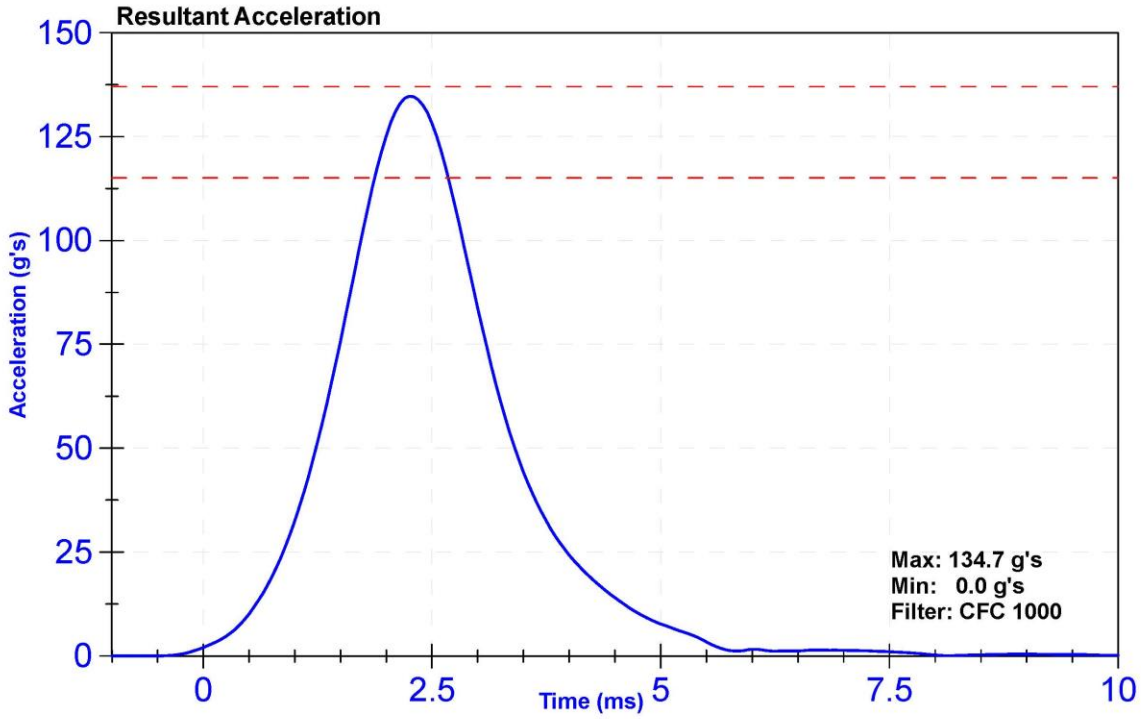
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

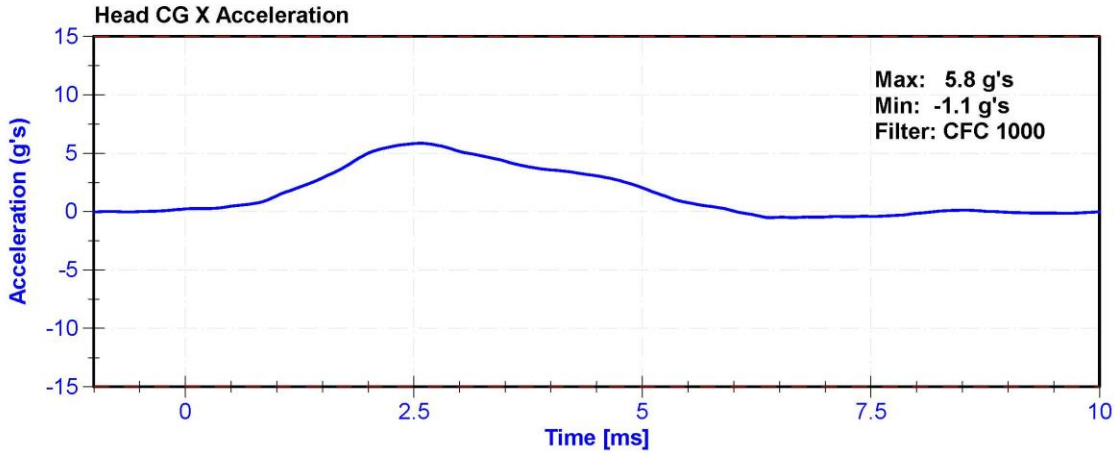
Results

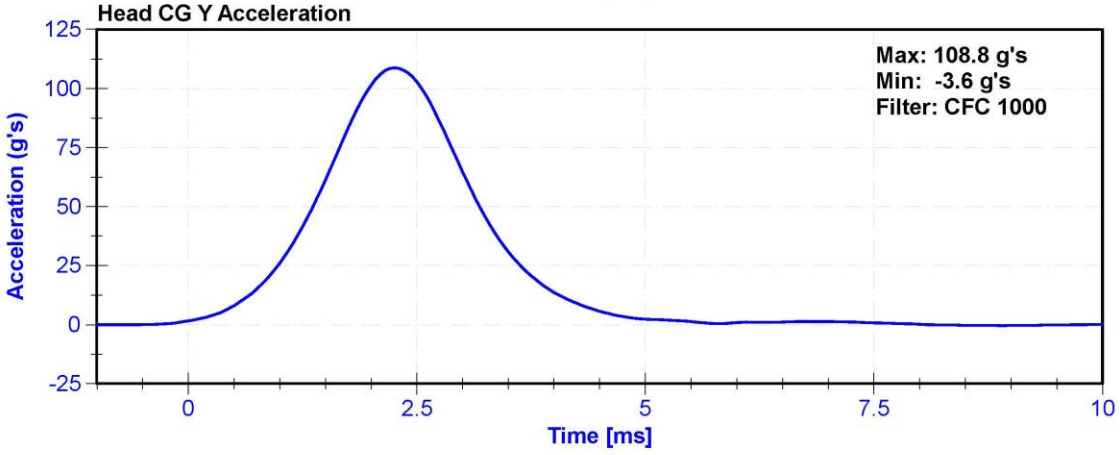
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.8	Pass
Humidity	10	70	%	57	Pass
Resultant Acceleration	115	137	g's	134.7	Pass
Oscillation	0	15	%	3.5	Pass
Fore-Aft Acceleration	-15	15	g's	5.8	Pass

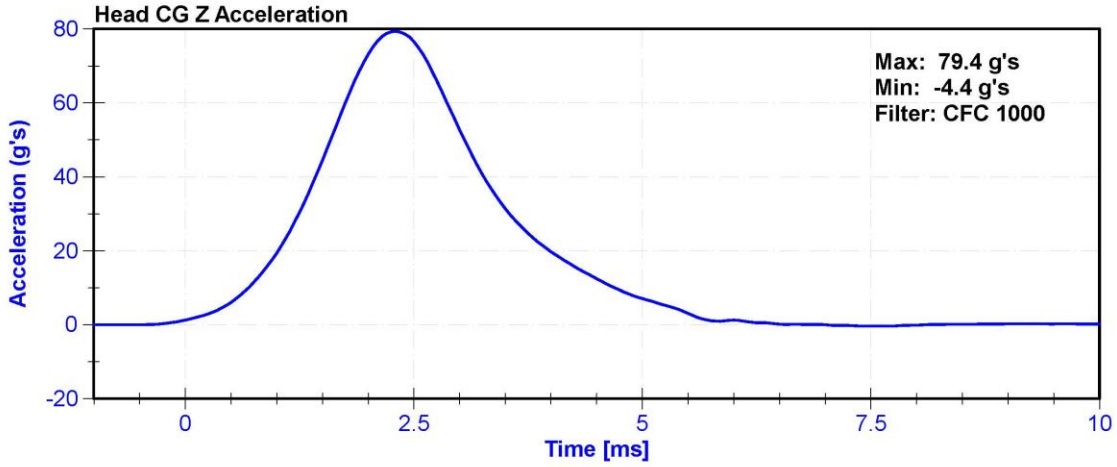
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P59018	4/20/2020	10/19/2020
Y Accelerometer	ENDEVCO 7264	AC-P79189	4/20/2020	10/19/2020
Z Accelerometer	ENDEVCO 7264CT	AC-P58777	4/20/2020	10/19/2020




Head CG X Acceleration
Max: 5.8 g's
Min: -1.1 g's
Filter: CFC 1000
Acceleration (g's)
15
10
5
0
-5
-10
-15
0
2.5
5
7.5
10
Time [ms]


Head CG Y Acceleration
Max: 108.8 g's
Min: -3.6 g's
Filter: CFC 1000
Acceleration (g's)
125
100
75
50
25
0
-25
0
2.5
5
7.5
10
Time [ms]


Head CG Z Acceleration
Max: 79.4 g's
Min: -4.4 g's
Filter: CFC 1000
Acceleration (g's)
80
60
40
20
0
-20
0
2.5
5
7.5
10
Time [ms]

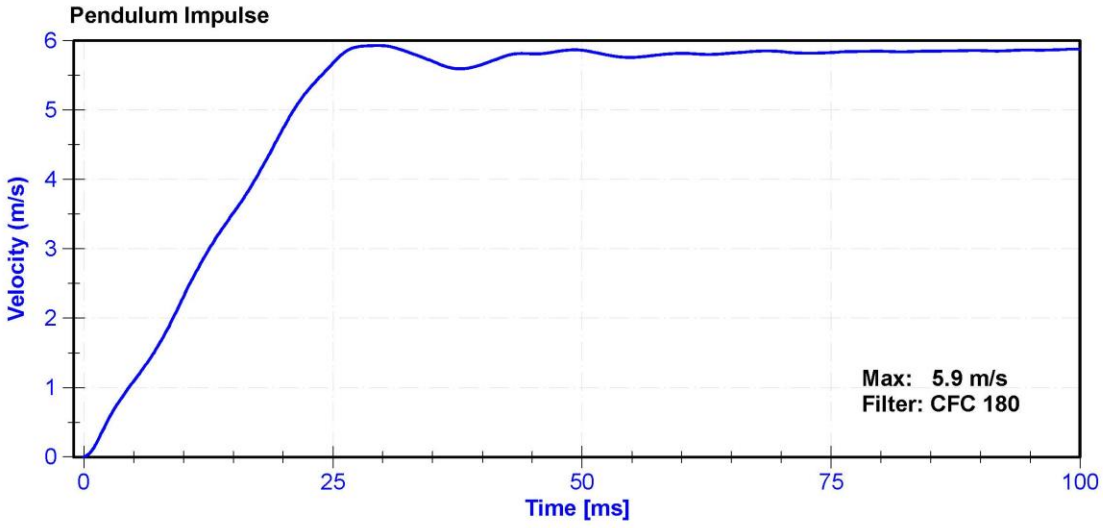
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

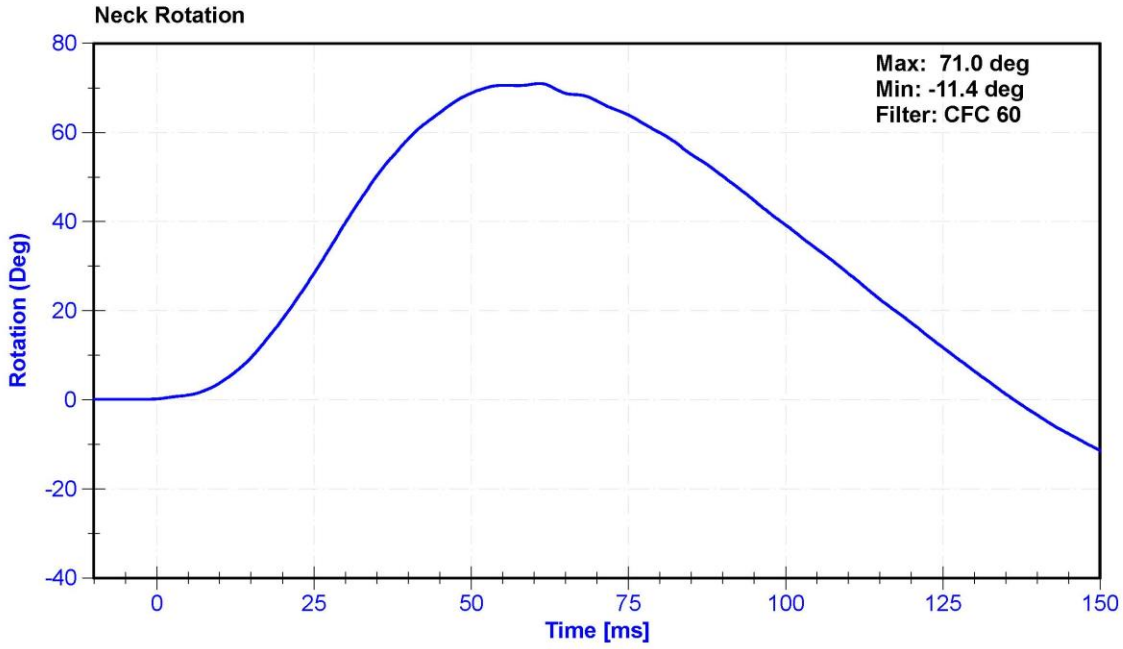
Results

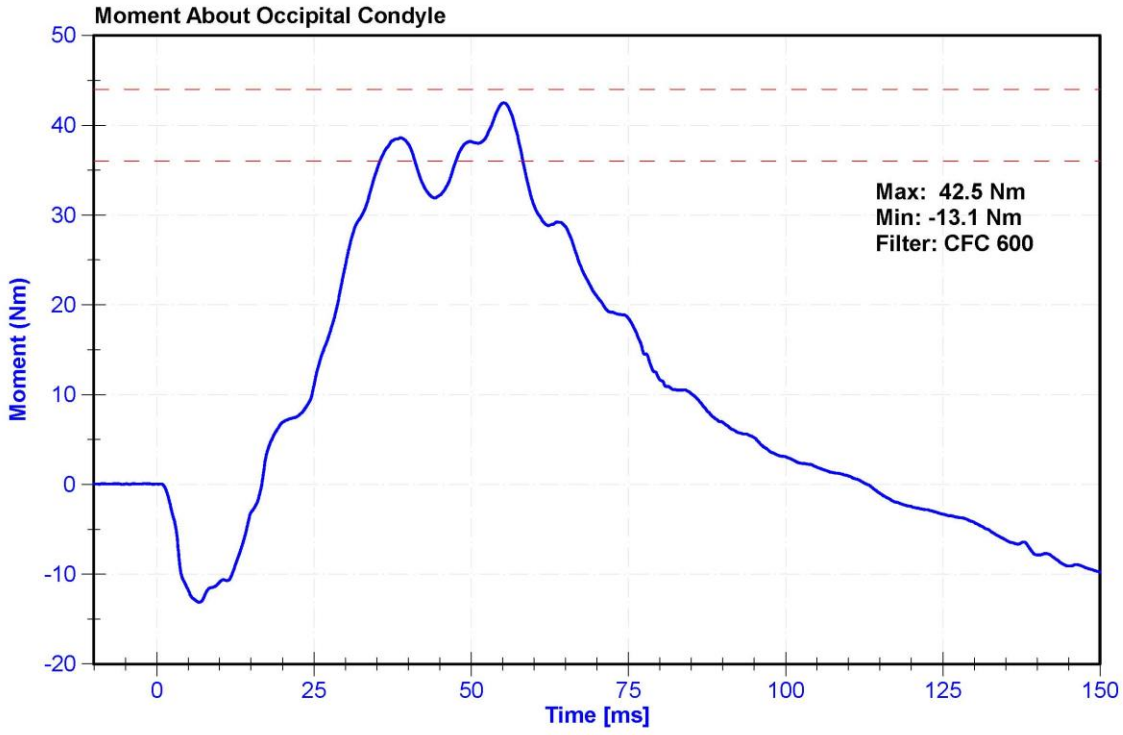
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.7	Pass
Humidity	10	70	%	62.3	Pass
Velocity	5.51	5.63	m/s	5.549	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.31	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.51	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.73	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.67	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.92	Pass
Neck Rotation	71	81	deg	71.0	Pass
Time at Maximum Rotation	50	70	ms	60.9	Pass
Moment about the OC	36	44	Nm	42.5	Pass
Moment Decay to 0 Nm	102	126	ms	113.1	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 1716	17162019 FY	3/18/2020	3/18/2021




Neck Rotation
Max: 71.0 deg
Min: -11.4 deg
Filter: CFC 60
Rotation (Deg)
80
60
40
20
0
-20
-40
0
25
50
75
100
125
150
Time [ms]


Moment About Occipital Condyle
Max: 42.5 Nm
Min: -13.1 Nm
Filter: CFC 600
Moment (Nm)
50
40
30
20
10
0
-10
-20
0
25
50
75
100
125
150
Time [ms]

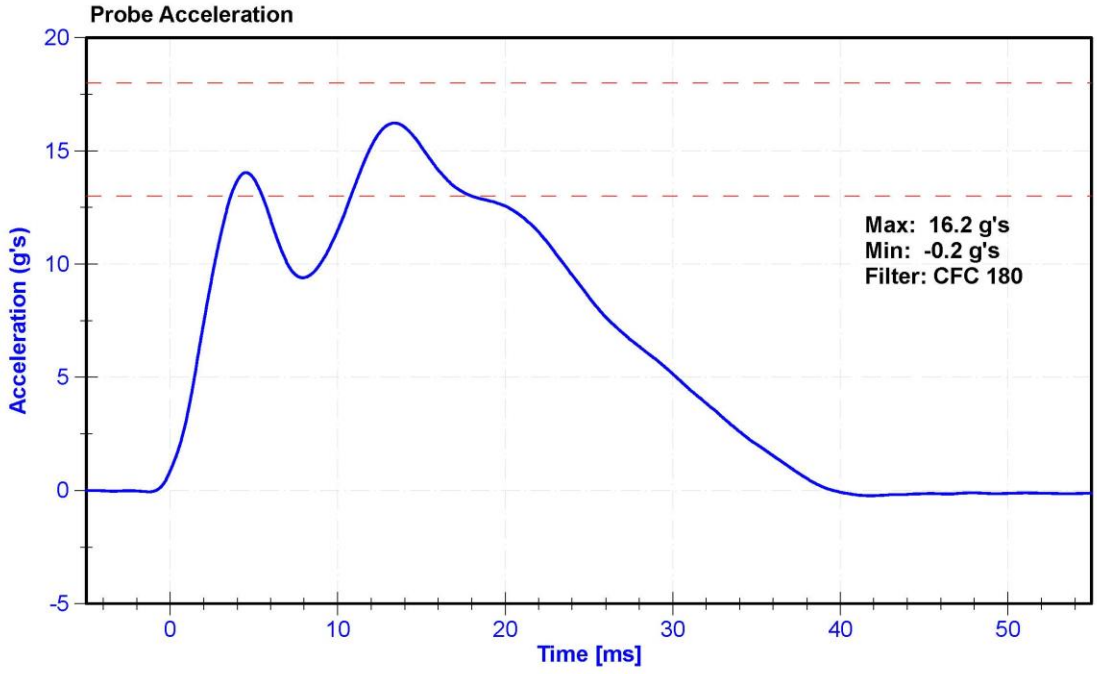
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

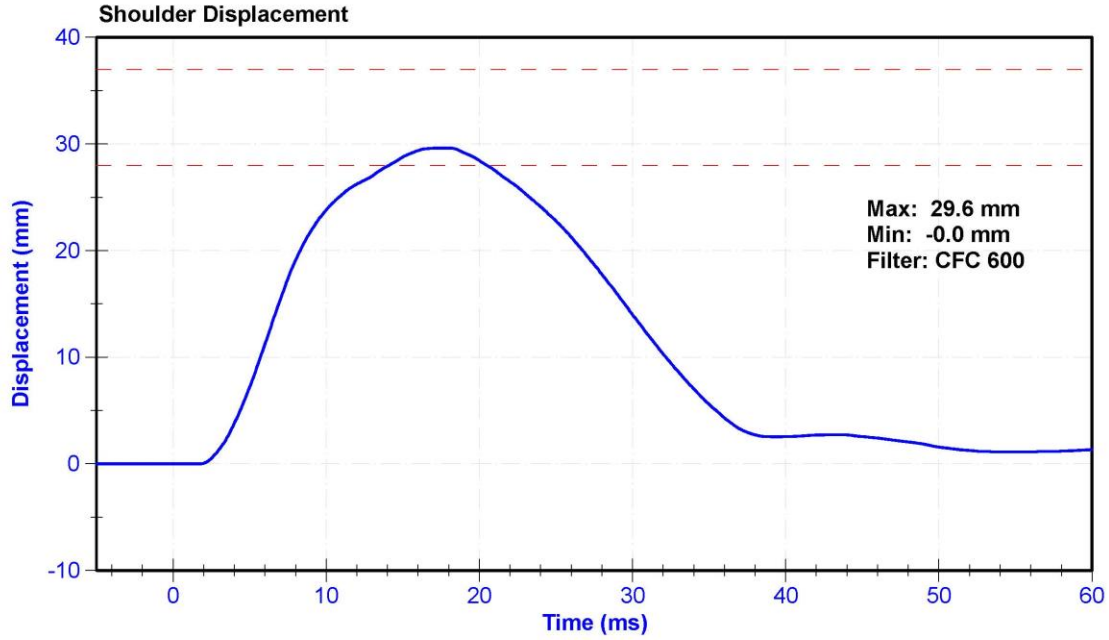
Results

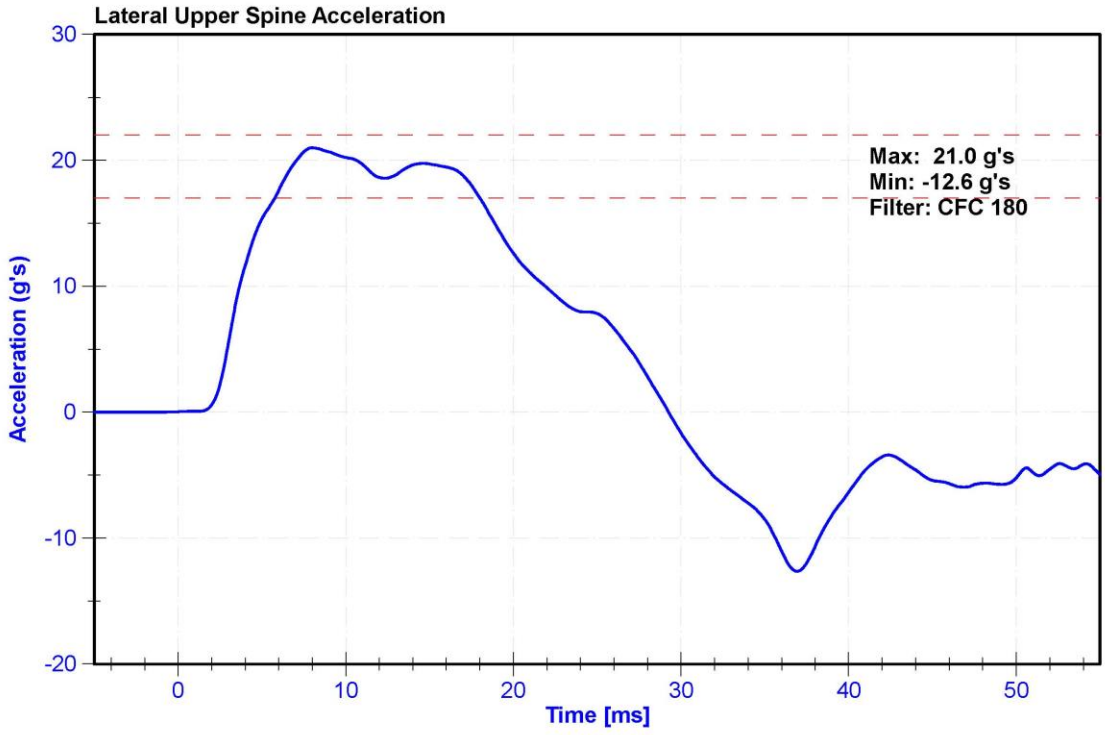
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.6	Pass
Humidity	10	70	%	57	Pass
Velocity	4.2	4.4	m/s	4.29	Pass
Probe Acceleration	13	18	g's	16.2	Pass
Shoulder Deflection	28	37	mm	29.6	Pass
Lateral Upper Spine Acceleration	17	22	g's	21.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A279031	5/8/2020	5/8/2021
Shoulder Potentiometer	Servo 08CT1-3725	DS-053 GFE	4/30/2020	10/29/2020
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P71281	7/30/2020	1/28/2021




Shoulder Displacement
Displacement (mm)
Time (ms)
Max: 29.6 mm
Min: -0.0 mm
Filter: CFC 600
40
30
20
10
0
-10
0
10
20
30
40
50
60


Lateral Upper Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 21.0 g's
Min: -12.6 g's
Filter: CFC 180
30
20
10
0
-10
-20
0
10
20
30
40
50

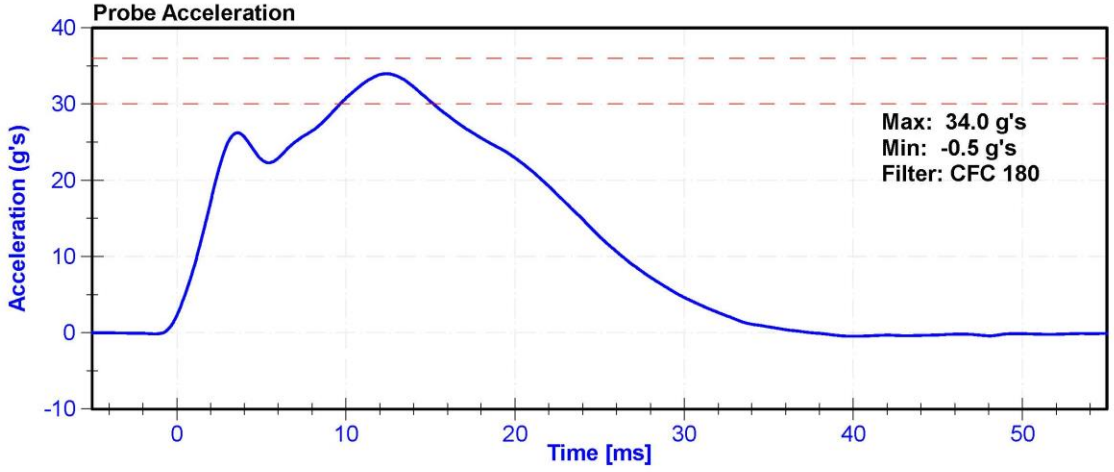
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

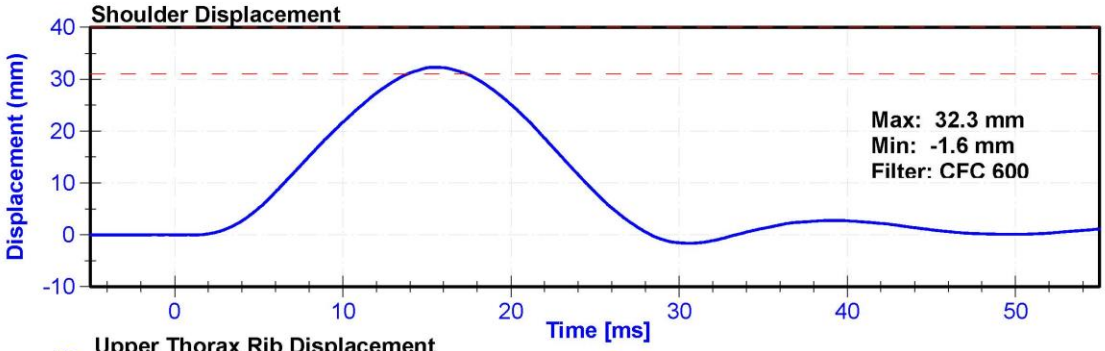
Results

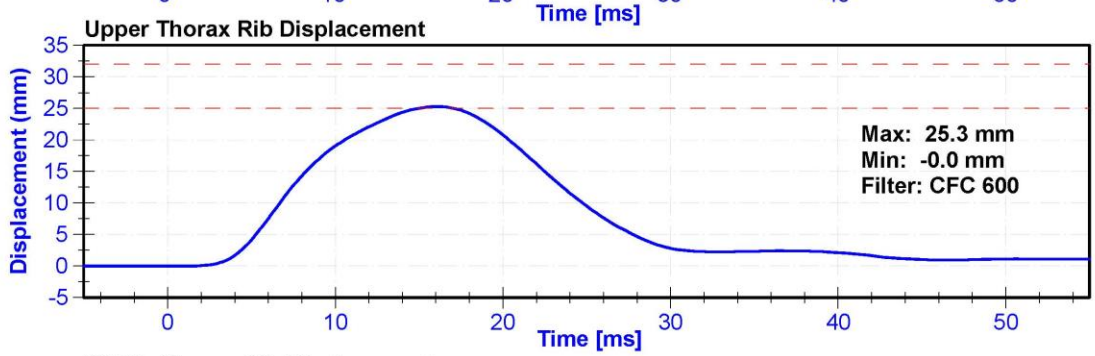
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.7	Pass
Humidity	10	70	%	57.0	Pass
Velocity	6.6	6.8	m/s	6.67	Pass
Probe Acceleration after 5 ms	30	36	g's	34.0	Pass
Lateral Upper Spine Acceleration	34	43	g's	41.7	Pass
Lateral Lower Spine Acceleration	29	37	g's	32.0	Pass
Shoulder Deflection	31	40	mm	32.3	Pass
Upper Thorax Rib Deflection	25	32	mm	25.3	Pass
Mid Thorax Rib Deflection	30	36	mm	31.4	Pass
Lower Thorax Rib Deflection	32	38	mm	34.2	Pass

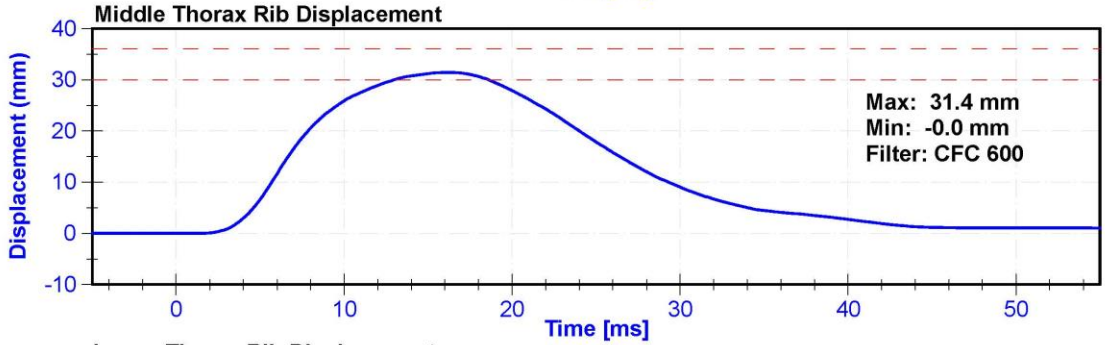
Transducer Calibrations

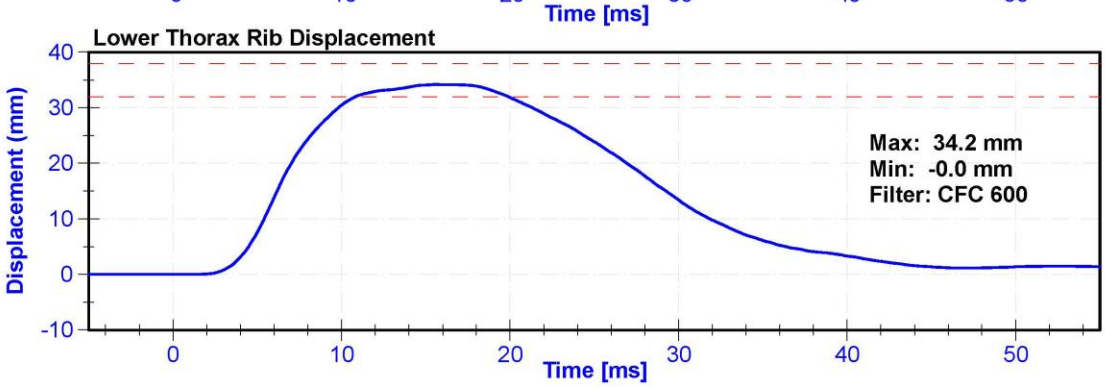
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A279031	5/8/2020	5/8/2021
Upper Spine T1 Y Accelerometer	ENDEVCO 7264CT	AC-P71281	7/30/2020	1/28/2021
Upper Spine T12 Y Accelerometer	ENDEVCO 7264	AC-P64147	4/20/2020	10/19/2020
Shoulder Potentiometer	Servo 08CT1-3725	DS-053 GFE	4/30/2020	10/29/2020
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	4/30/2020	10/29/2020
Middle Thorax Rib Potentiometer	Servo 08TC1-3745	DS-040GFE	4/30/2020	10/29/2020
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	4/30/2020	10/29/2020

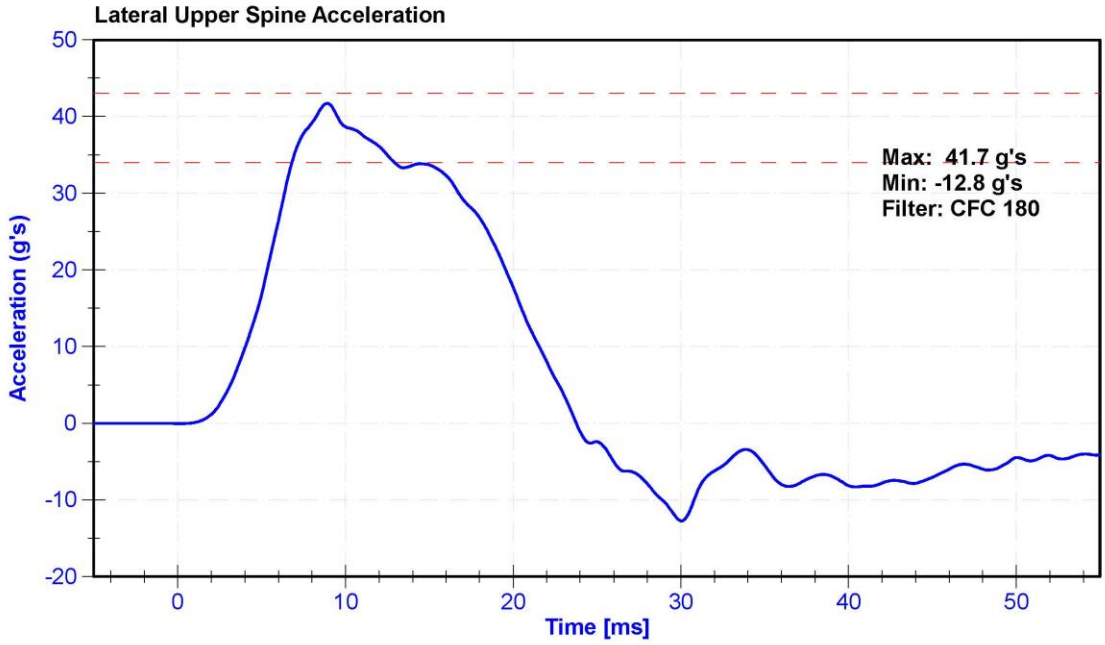


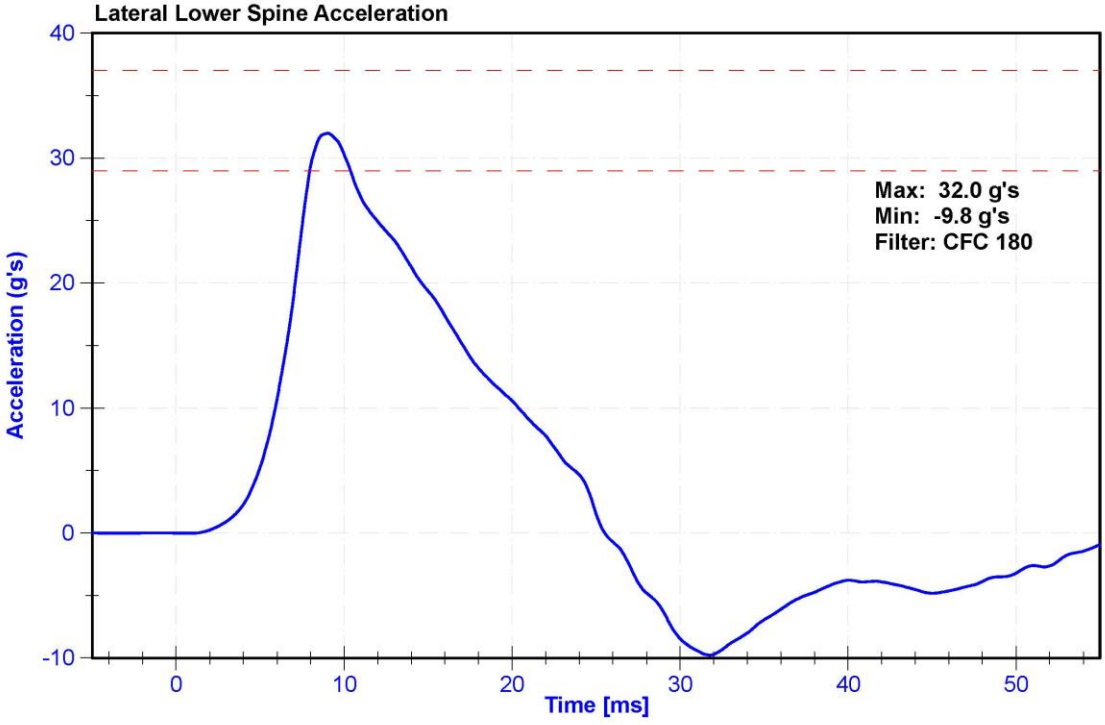

Shoulder Displacement
Displacement (mm)
Time [ms]
Max: 32.3 mm
Min: -1.6 mm
Filter: CFC 600


Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 25.3 mm
Min: -0.0 mm
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 31.4 mm
Min: -0.0 mm
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 34.2 mm
Min: -0.0 mm
Filter: CFC 600


Lateral Upper Spine Acceleration
Max: 41.7 g's
Min: -12.8 g's
Filter: CFC 180
Acceleration (g's)
Time [ms]


Lateral Lower Spine Acceleration
Max: 32.0 g's
Min: -9.8 g's
Filter: CFC 180
Acceleration (g's)
Time [ms]

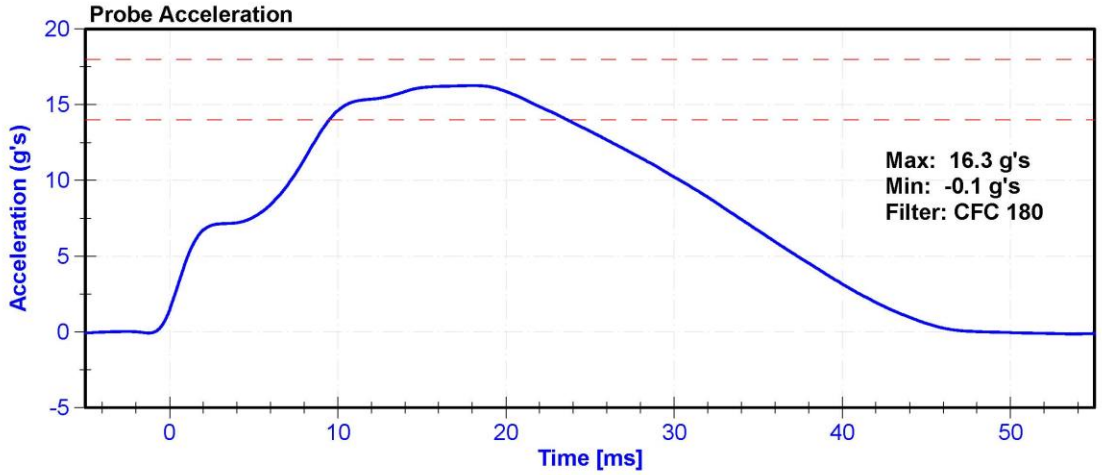
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

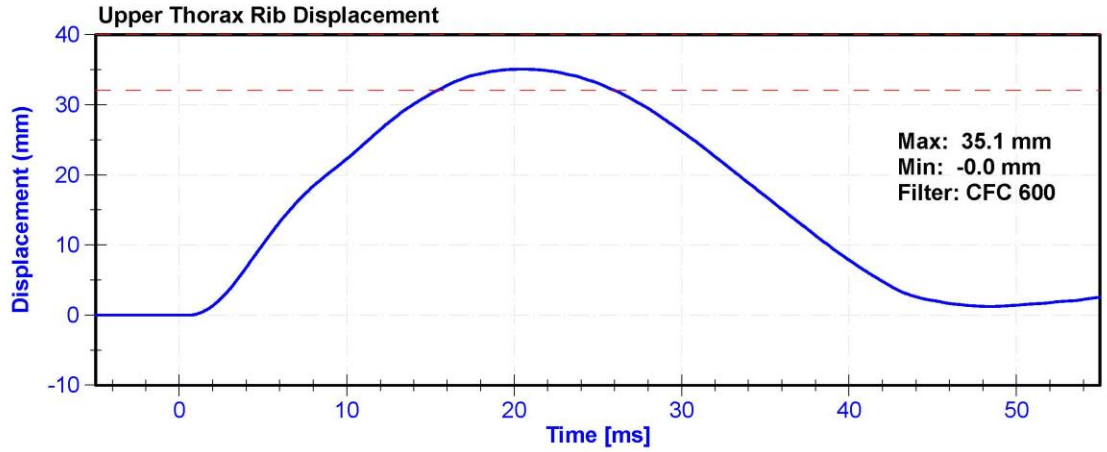
Results

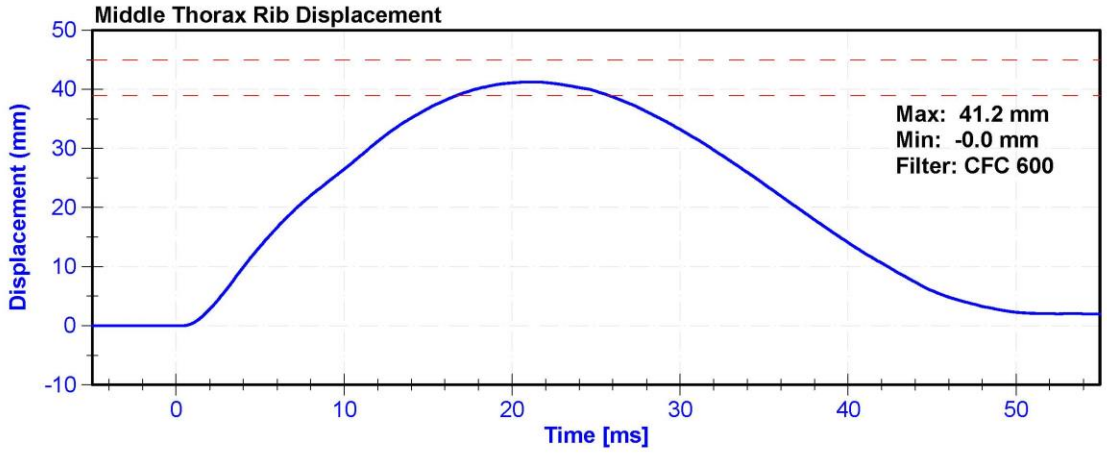
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.8	Pass
Humidity	10	70	%	58	Pass
Velocity	4.2	4.4	m/s	4.36	Pass
Probe Acceleration	14	18	g's	16.3	Pass
Lateral Upper Spine Acceleration	13	17	g's	14.8	Pass
Lateral Lower Spine Acceleration	7	11	g's	10.3	Pass
Upper Thorax Rib Deflection	32	40	mm	35.1	Pass
Middle Thorax Rib Deflection	39	45	mm	41.2	Pass
Lower Thorax Rib Deflection	35	43	mm	37.9	Pass

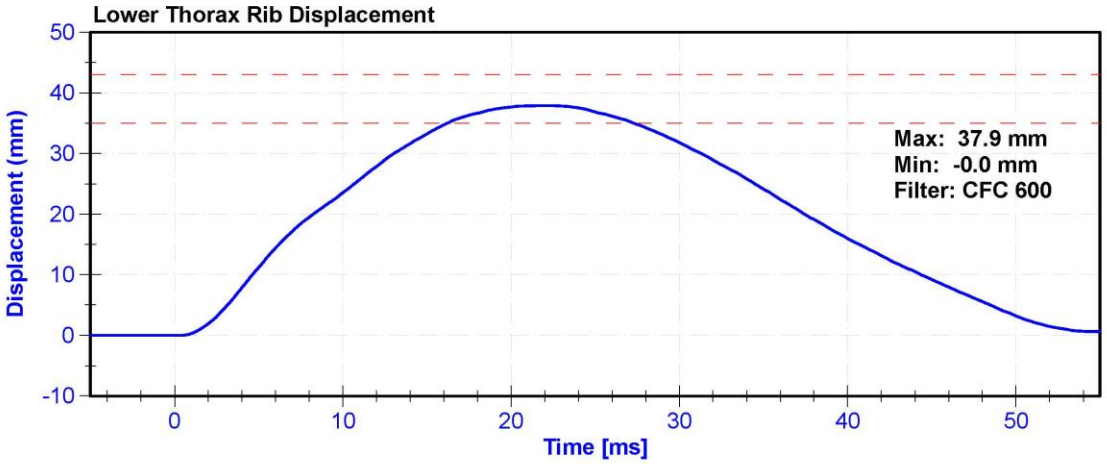
Transducer Calibrations

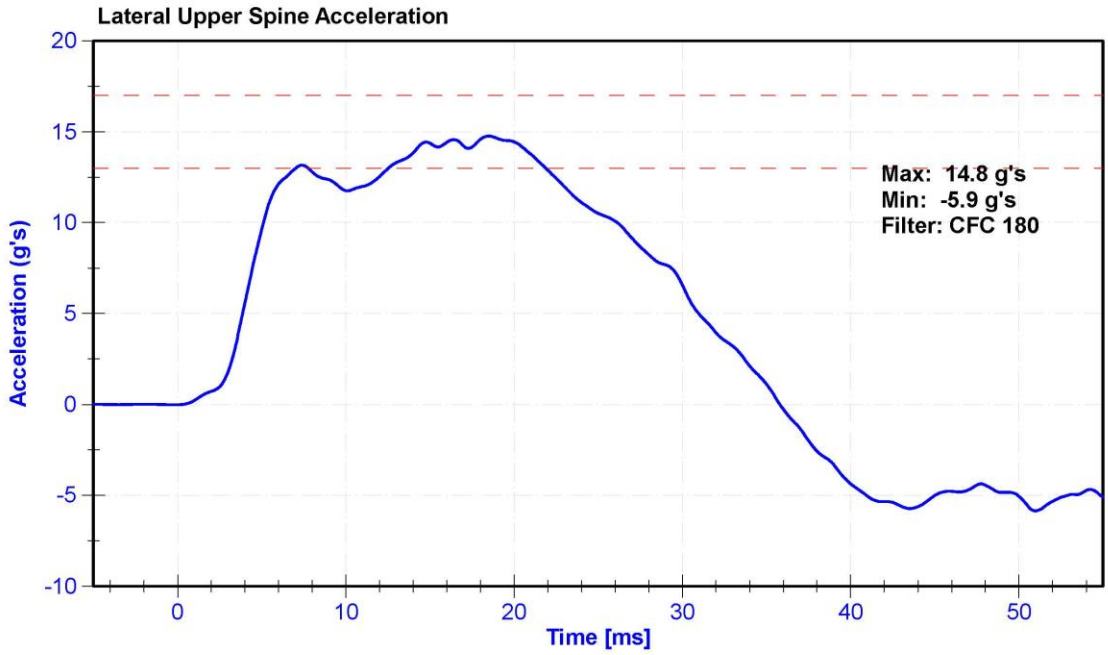
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A279031	5/8/2020	5/8/2021
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P71281	7/30/2020	1/28/2021
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	4/20/2020	10/19/2020
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	4/30/2020	10/29/2020
Middle Thorax Rib Potentiometer	Servo 08TC1-3745	DS-040GFE	4/30/2020	10/29/2020
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	4/30/2020	10/29/2020

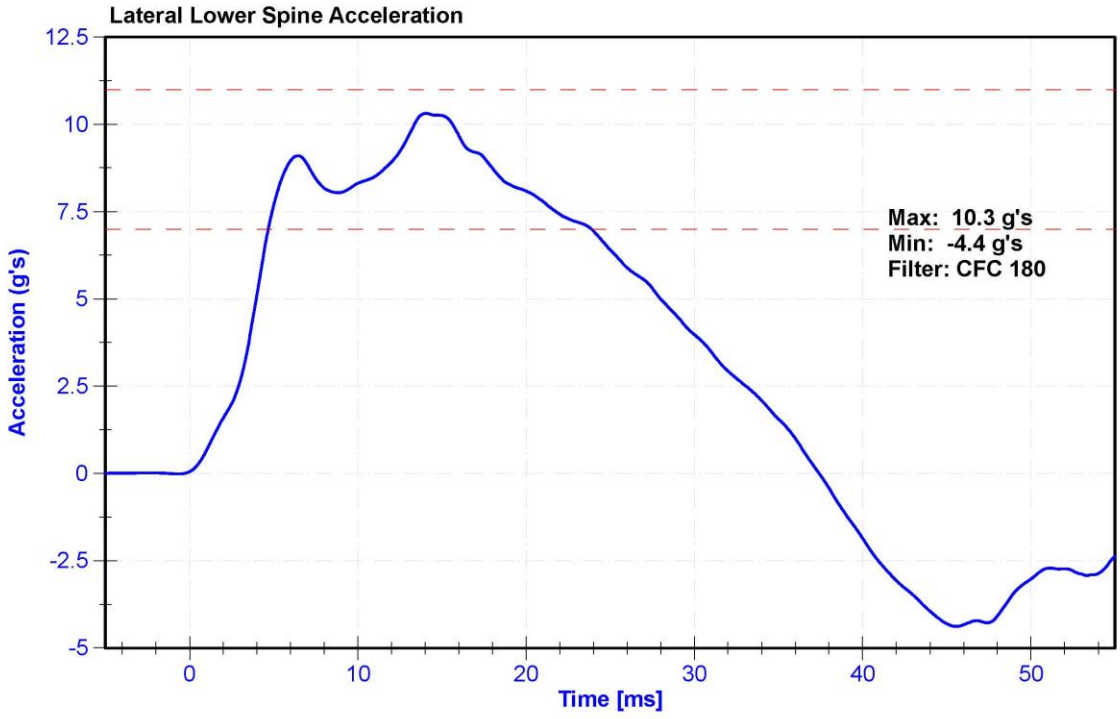



Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 35.1 mm
Min: -0.0 mm
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 41.2 mm
Min: -0.0 mm
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 37.9 mm
Min: -0.0 mm
Filter: CFC 600


Lateral Upper Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 14.8 g's
Min: -5.9 g's
Filter: CFC 180


Lateral Lower Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 10.3 g's
Min: -4.4 g's
Filter: CFC 180

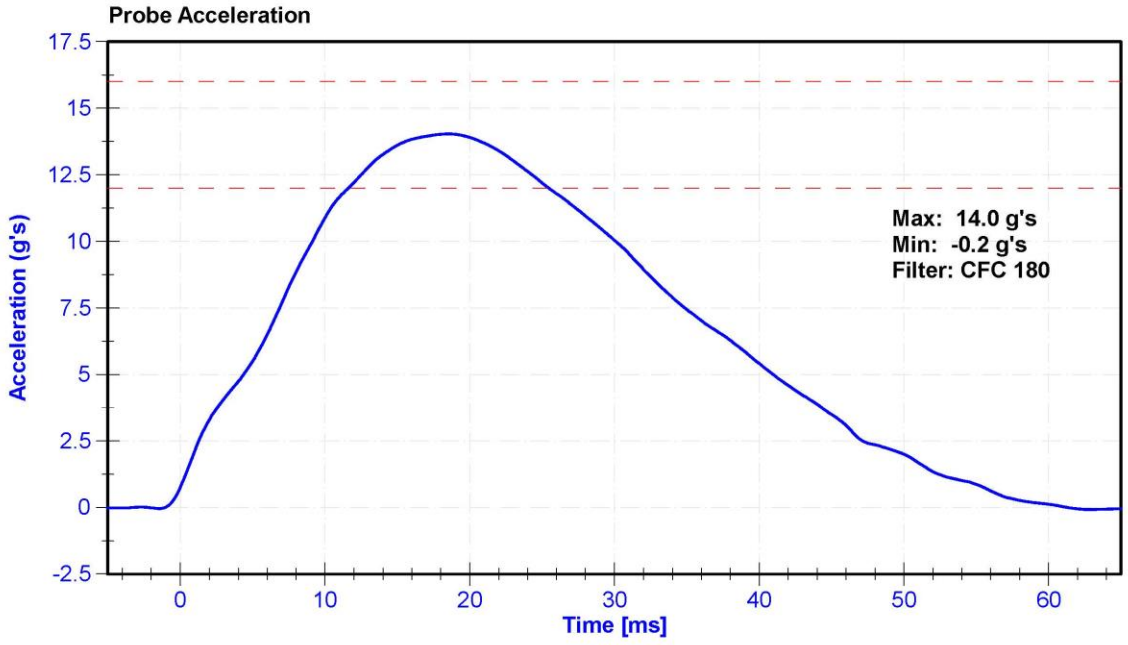
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

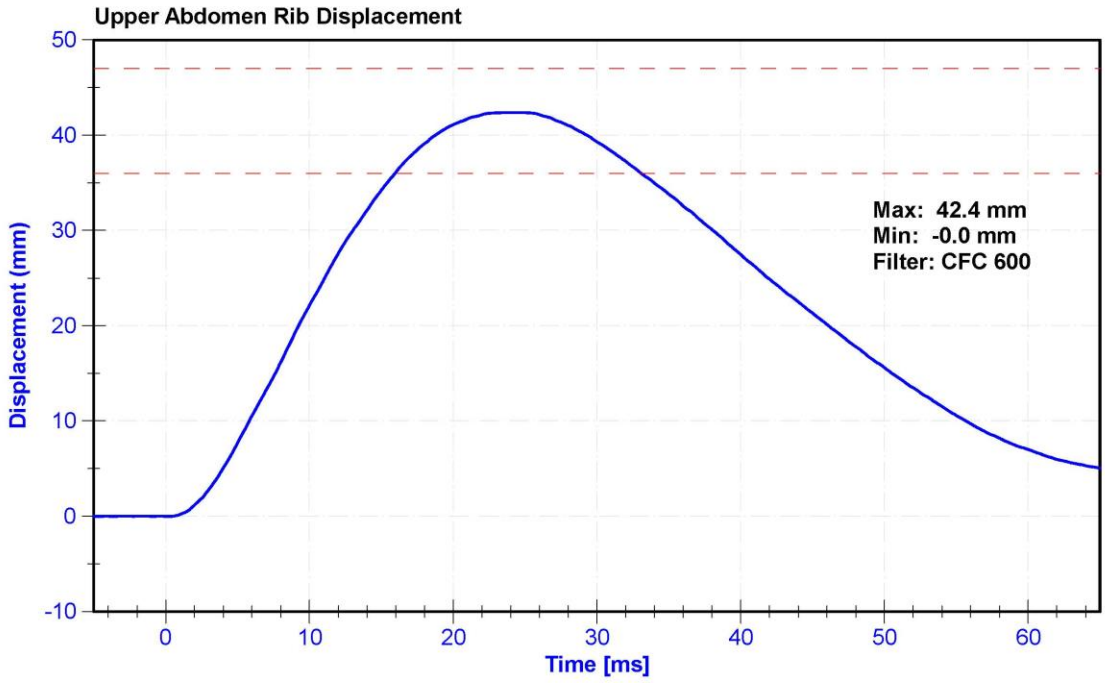
Results

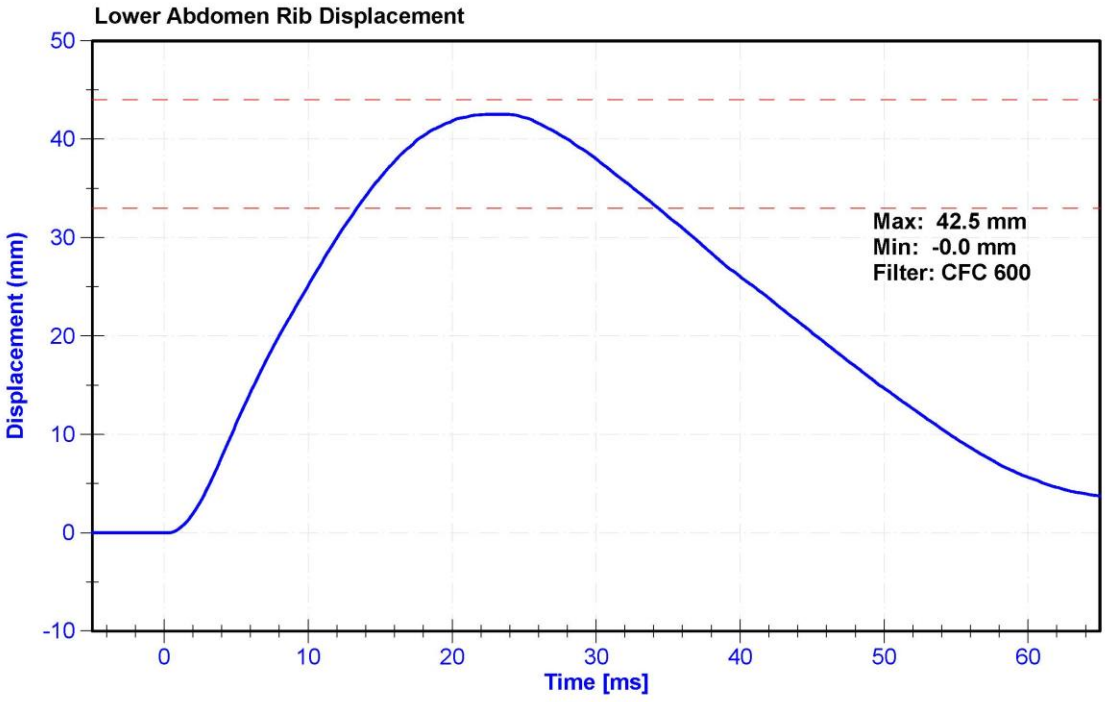
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.8	Pass
Humidity	10	70	%	57.0	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Probe Acceleration	12	16	g's	14.0	Pass
Lateral Lower Spine Acceleration	9	14	g's	10.6	Pass
Upper Abdomen Rib Deflection	36	47	mm	42.4	Pass
Lower Abdomen Rib Deflection	33	44	mm	42.5	Pass

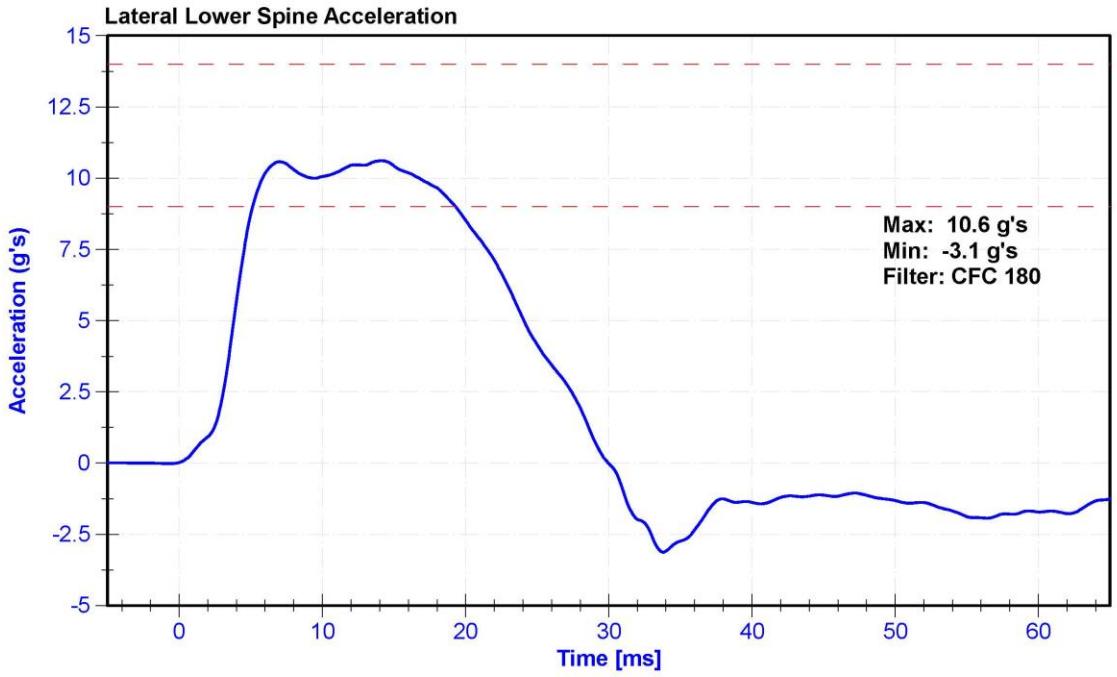
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	MSI 64C-2000	A279031	5/8/2020	5/8/2021
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	4/20/2020	10/19/2020
Upper Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-308GFE	4/30/2020	10/29/2020
Lower Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-307GFE	4/30/2020	10/29/2020




Upper Abdomen Rib Displacement
Displacement (mm)
Time [ms]
Max: 42.4 mm
Min: -0.0 mm
Filter: CFC 600


Lower Abdomen Rib Displacement
Displacement (mm)
Time [ms]
Max: 42.5 mm
Min: -0.0 mm
Filter: CFC 600


Lateral Lower Spine Acceleration
Acceleration (g's)
15
12.5
10
7.5
5
2.5
0
-2.5
-5
0
10
20
30
40
50
60
Time [ms]
Max: 10.6 g's
Min: -3.1 g's
Filter: CFC 180

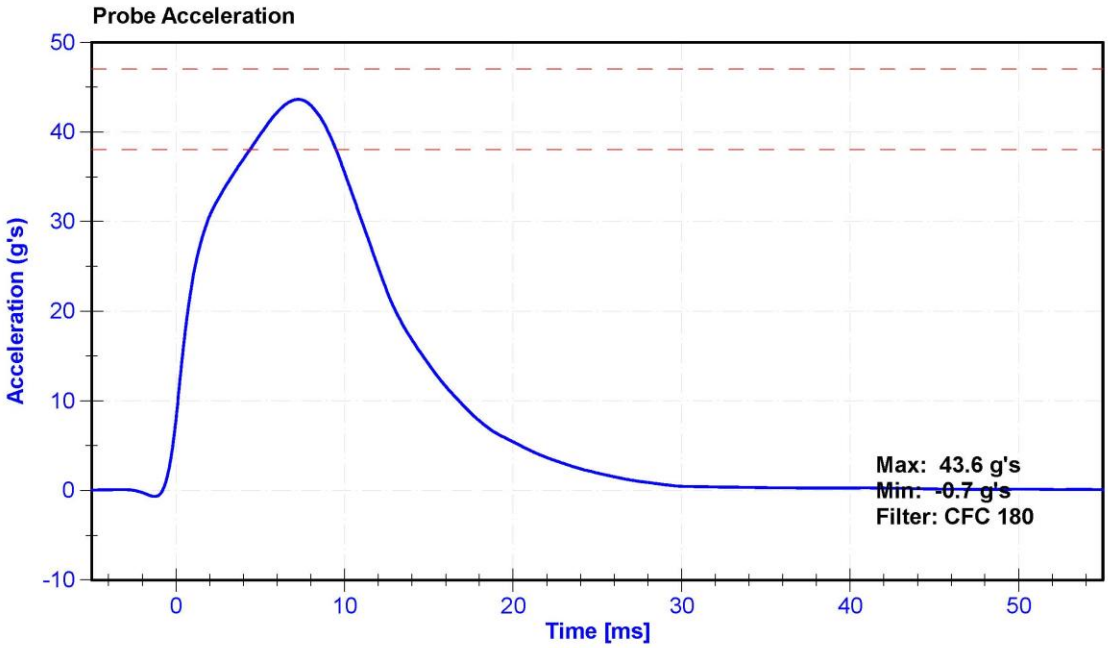
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

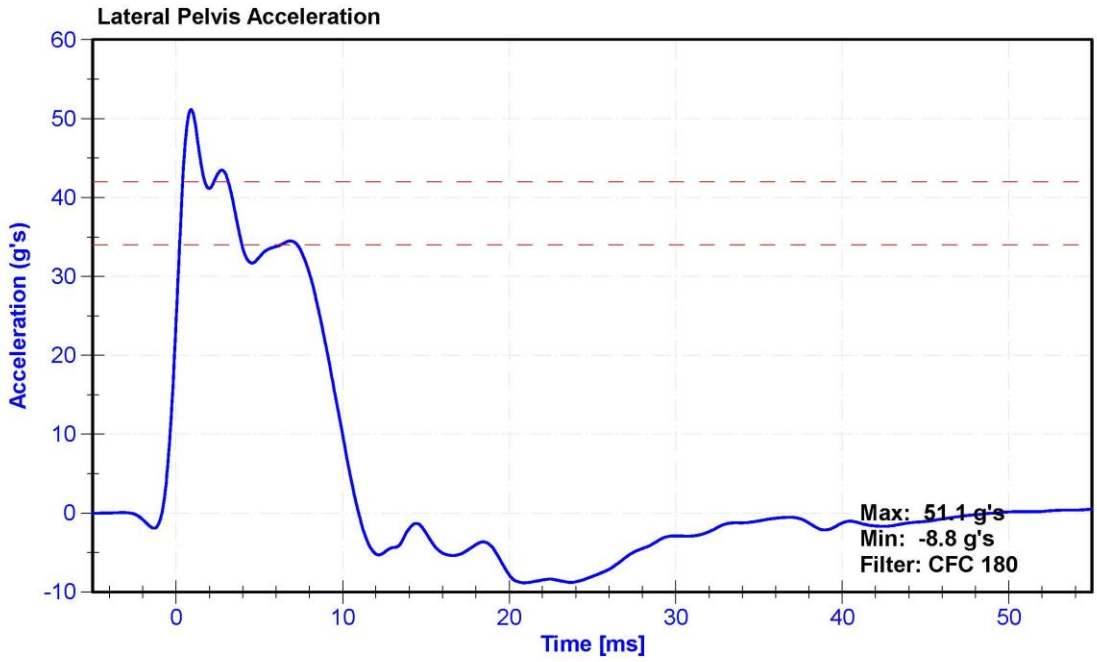
Results

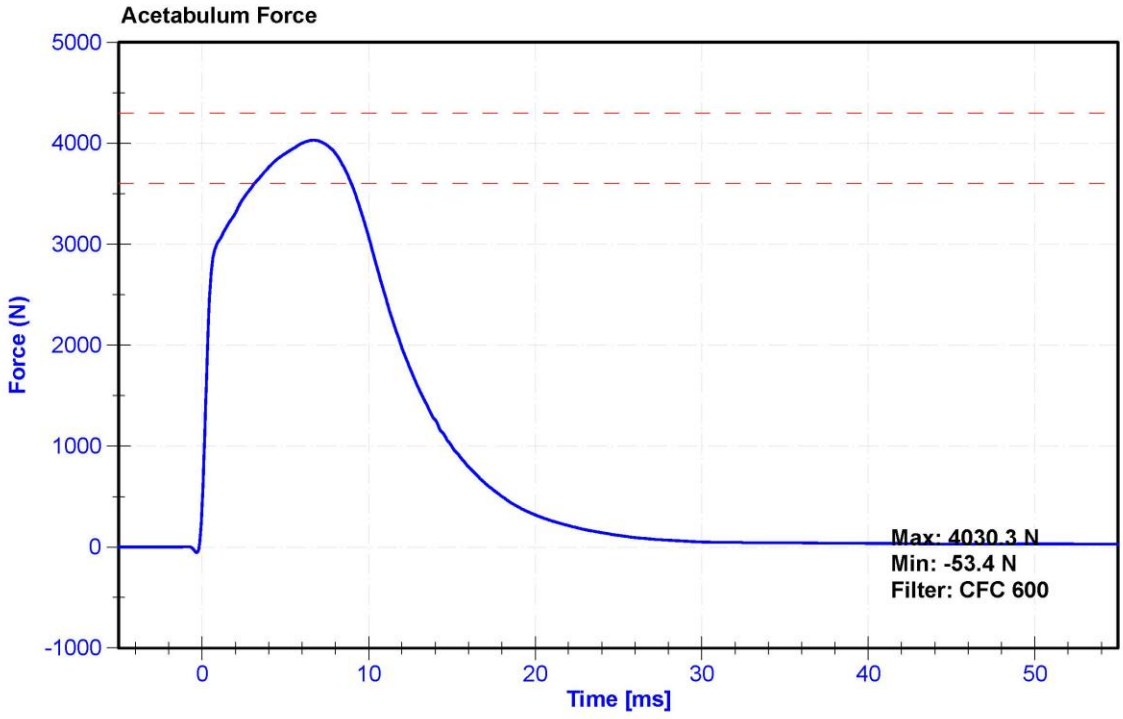
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.8	Pass
Humidity	10	70	%	57	Pass
Velocity	6.6	6.8	m/s	6.64	Pass
Probe Acceleration	38	47	g's	43.6	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	34.5	Pass
Acetabulum Force	3600	4300	N	4030.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A279031	5/8/2020	5/8/2021
Pelvis Y Accelerometer	ENDEVCO 7264C	AC-P51731	4/20/2020	10/19/2020
Acetabulum Load Cell	Denton IF-520	LC-236Fy	3/18/2020	3/18/2021
Certification Plug	SACO	13194	8/8/2019	N/A
Crash Test Plug	SACO	13268	8/12/2019	N/A




Lateral Pelvis Acceleration
Acceleration (g's)
60
50
40
30
20
10
0
-10
0
10
20
30
40
50
Time [ms]
Max: 51.1 g's
Min: -8.8 g's
Filter: CFC 180


Acetabulum Force
Force (N)
5000
4000
3000
2000
1000
0
-1000
0
10
20
30
40
50
Time [ms]
Max: 4030.3 N
Min: -53.4 N
Filter: CFC 600

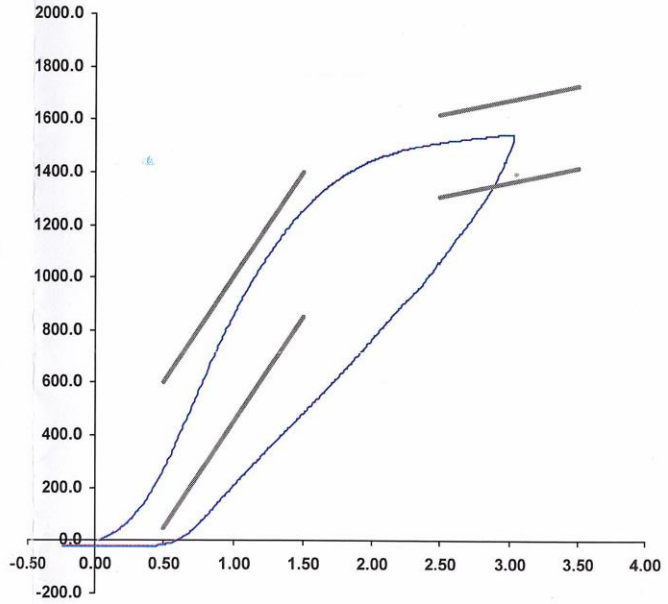
300
crash
8/13/2020

SID-IIs Pelvis Plug Certification Test

Plug S/N 13268
Test Number 10691
Report Number 10728
Test Date 8/12/2019 10:19:00 AM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	287.48	50.00	600.00
Force @ 1.5 mm (N)	1,258.98	850.00	1,400.00
Force @ 2.5 mm (N)	1,513.66	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,544.45	1,361.00	1,673.00

Force (-N) vs Extension (-mm)



Testing Machine STM-20 5965542
Load Cell S/N (FI360947), Units (LBS 1000

Crosshead Speed (mm / min) or Rat 12.7
Extension or Position Measured by XHD_100 (XHD100)

Notes:

Operator

Part Number 180-4450

Template No 107 12-Aug-19
SACO Research

By : DC Date : 8/12/2019

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

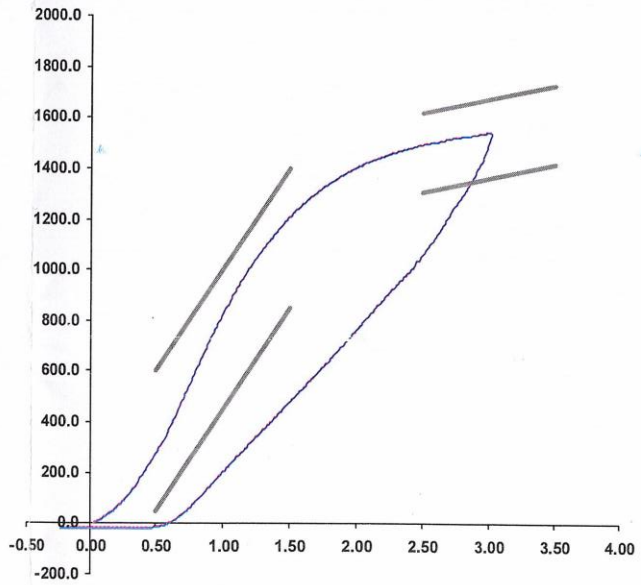
300
Cert 2
6/14/2020

SID-IIs Pelvis Plug Certification Test

Plug S/N 13194
Test Number 10589
Report Number 10624
Test Date 8/8/2019 12:50:37 PM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	287.41	50.00	600.00
Force @ 1.5 mm (N)	1,214.87	850.00	1,400.00
Force @ 2.5 mm (N)	1,494.96	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,542.77	1,361.00	1,673.00

Force (-N) vs Extension (-mm)



Testing Machine STM-20 5965542
Load Cell S/N (FI360947), Units (LBS) 1000

Crosshead Speed (mm / min) or Rate 12.7
Extension or Position Measured by XHD_100 (XHD100)

Notes:

Operator 131

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

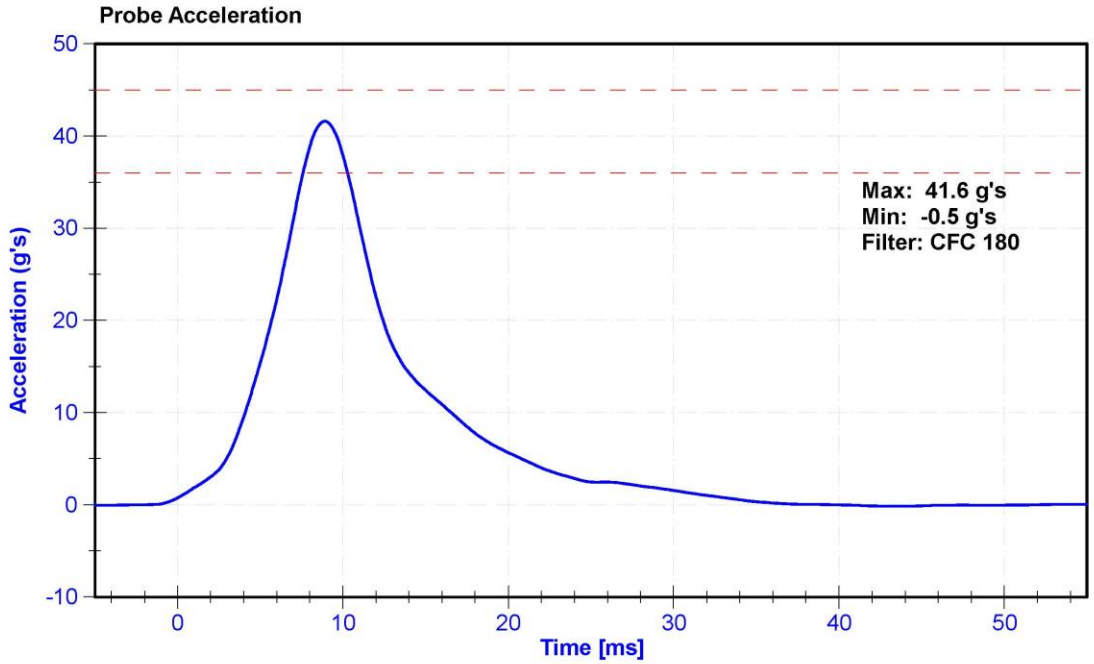
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	300	Laboratory Supervisor	D.Reinhard

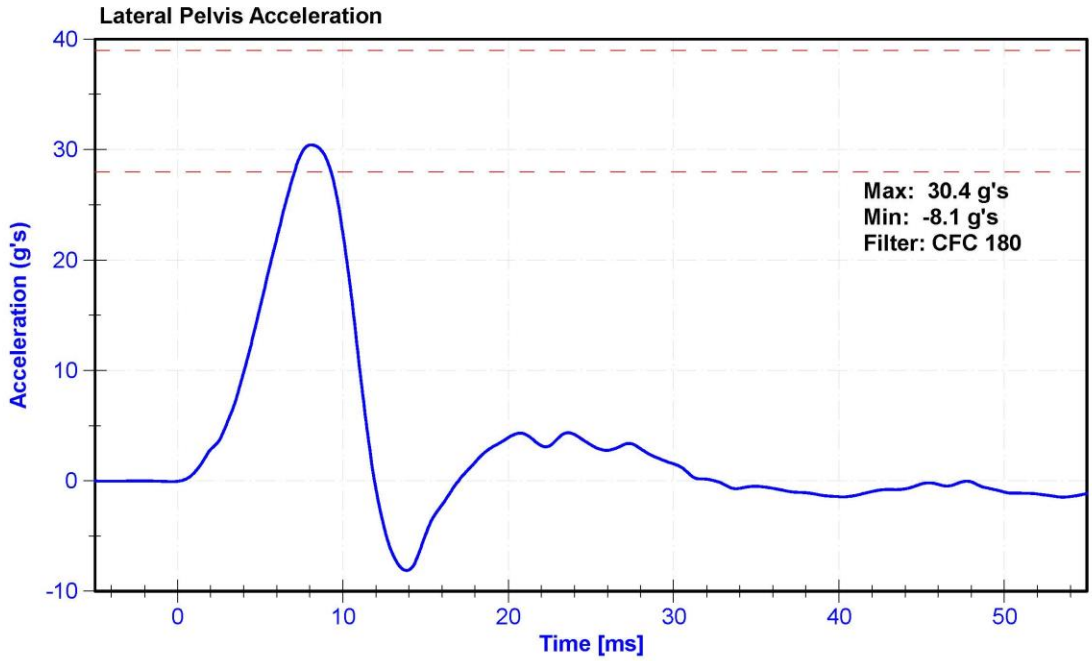
Results

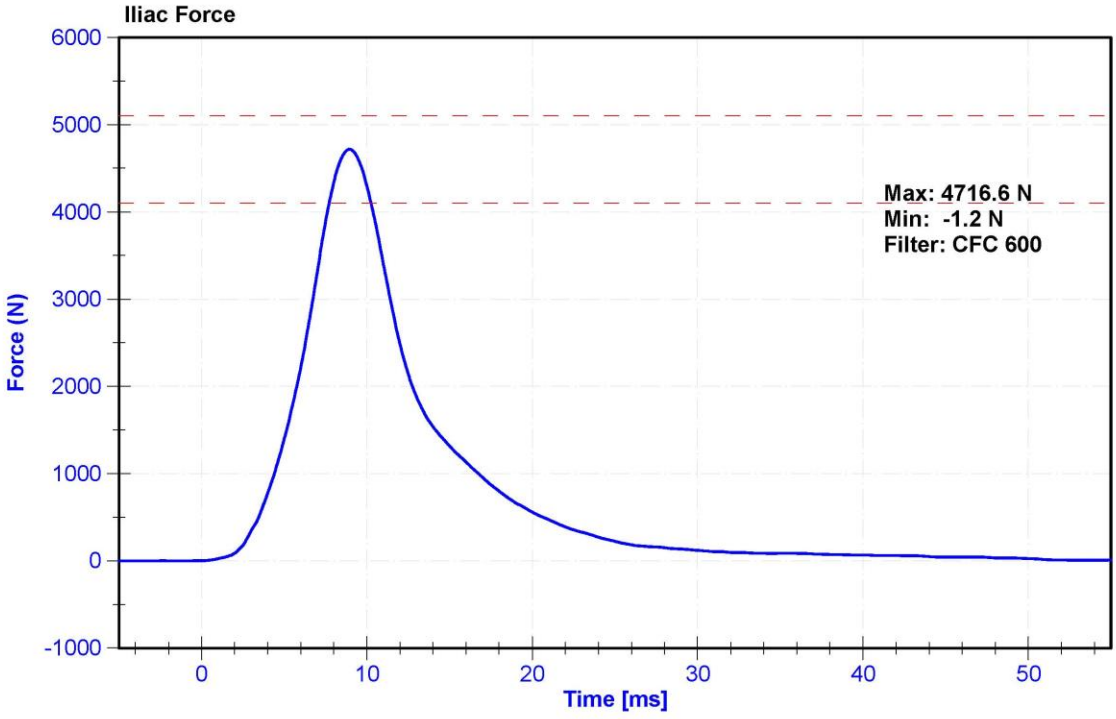
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.8	Pass
Humidity	10	70	%	56.0	Pass
Velocity	4.2	4.4	m/s	4.22	Pass
Probe Acceleration	36	45	g's	41.6	Pass
Lateral Pelvis Acceleration	28	39	g's	30.4	Pass
Iliac Force	4100	5100	N	4716.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A279031	5/8/2020	5/8/2021
Pelvis Y Accelerometer	ENDEVCO 7264C	AC-P51731	4/20/2020	10/19/2020
Iliac Load Cell	DENTON 3228J	LC-281Fy	3/19/2020	3/19/2021




Lateral Pelvis Acceleration
Acceleration (g's)
Time [ms]
Max: 30.4 g's
Min: -8.1 g's
Filter: CFC 180


Iliac Force
Force (N)
Time [ms]
Max: 4716.6 N
Min: -1.2 N
Filter: CFC 600

CALIBRATION TEST RESULTS

POST-TEST

EUROSID 2 (ES-2RE) MALE – DRIVER ATD

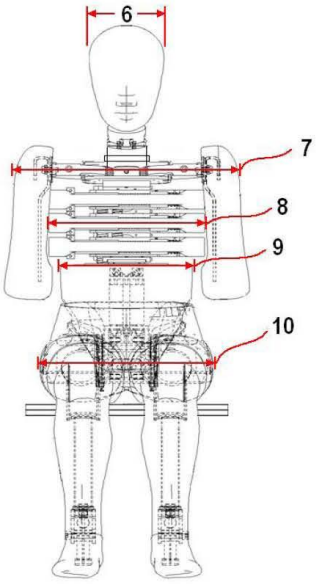
SERIAL NO: F033

(CONFIGURED FOR LEFT SIDE IMPACT)

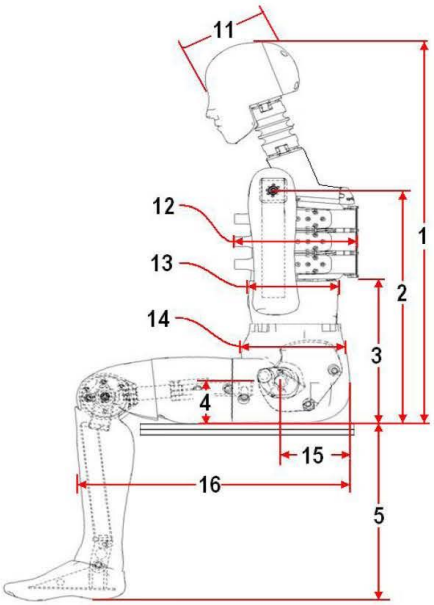
External Measurements - EuroSID-2re

Technician: K. Dutton Date: 08/24/2020

Dummy Serial Number: F033



FRONT VIEW



SIDE VIEW

Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	911	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	426	Pass
6	Head Width	152	158	154	Pass
7	Shoulder/Arm Width	461	479	472	Pass
8	Thorax Width	322	332	328	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	239	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

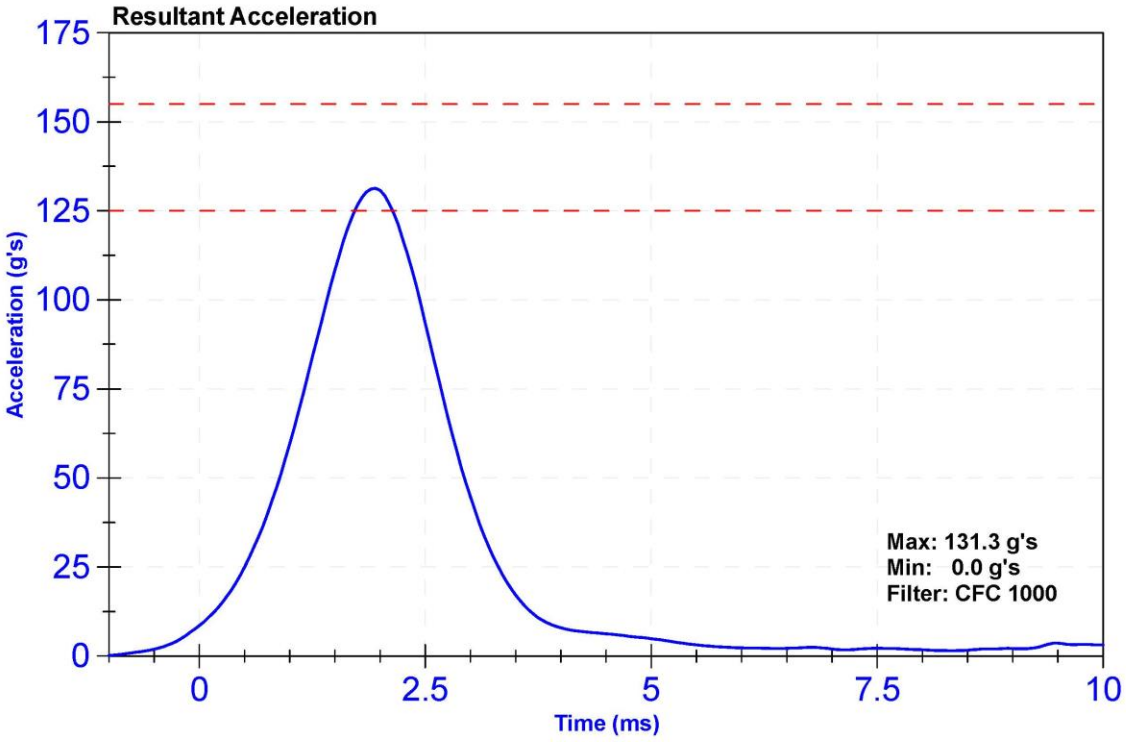
ATD Manufacturer	FTSS	Test Technician	C. Mantell
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

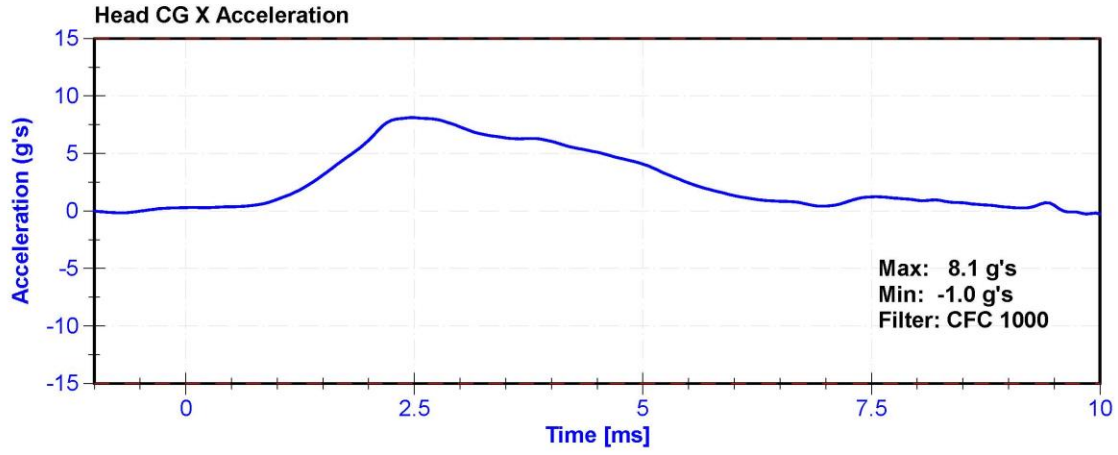
Results

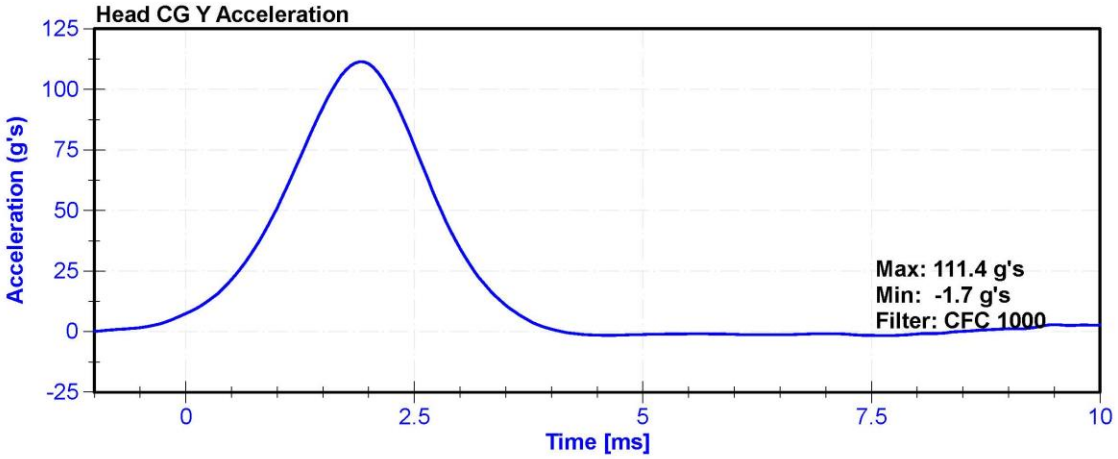
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.7	Pass
Humidity	10	70	%	55.0	Pass
Resultant Acceleration	125	155	g's	131.3	Pass
Oscillation	0	15	%	2.77	Pass
Fore-Aft Acceleration	-15	15	g's	8.1	Pass

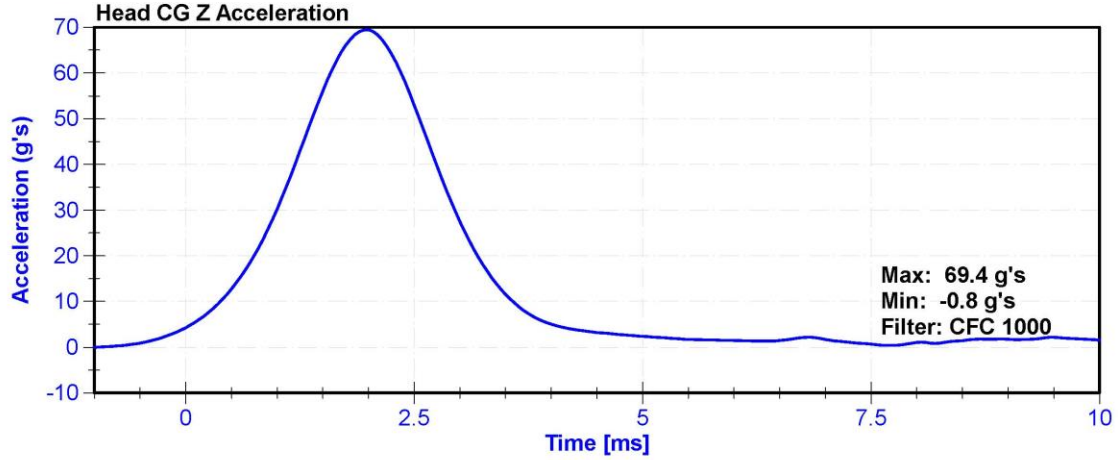
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P63861	5/19/2020	11/17/2020
Y Accelerometer	ENDEVCO 7264CT	AC-P49216	5/19/2020	11/17/2020
Z Accelerometer	ENDEVCO 7264	AC-P51303	5/19/2020	11/17/2020




Head CG X Acceleration
Acceleration (g's)
15
10
5
0
-5
-10
-15
0
2.5
5
7.5
10
Time [ms]
Max: 8.1 g's
Min: -1.0 g's
Filter: CFC 1000


Head CG Y Acceleration
Acceleration (g's)
125
100
75
50
25
0
-25
0
2.5
5
7.5
10
Time [ms]
Max: 111.4 g's
Min: -1.7 g's
Filter: CFC 1000


Head CG Z Acceleration
Acceleration (g's)
70
60
50
40
30
20
10
0
-10
0
2.5
5
7.5
10
Time [ms]
Max: 69.4 g's
Min: -0.8 g's
Filter: CFC 1000

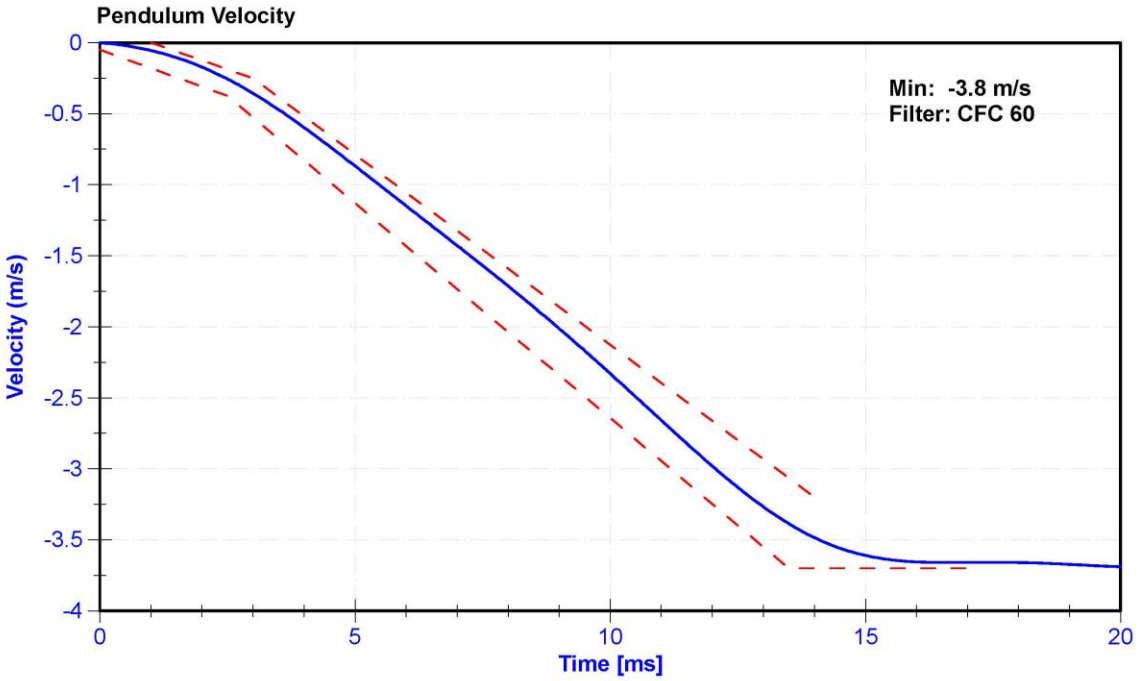
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

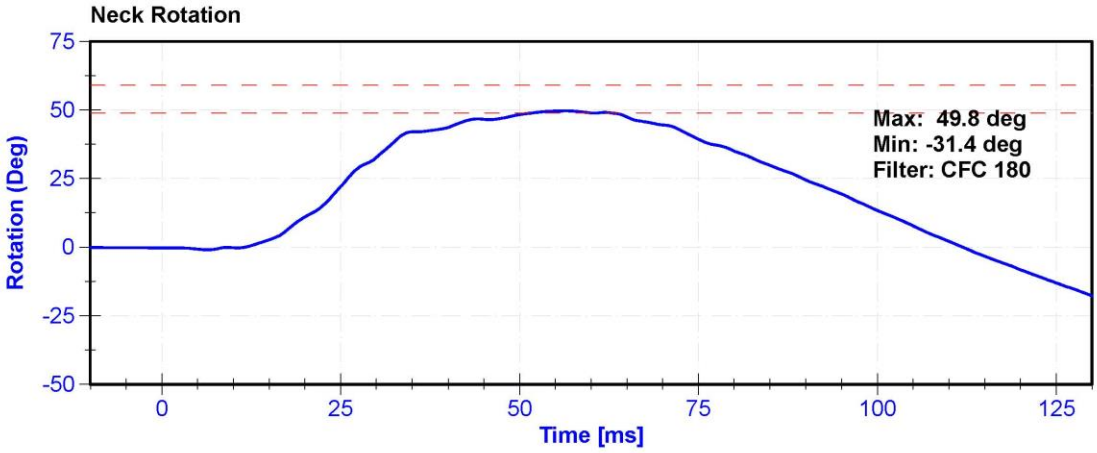
Results

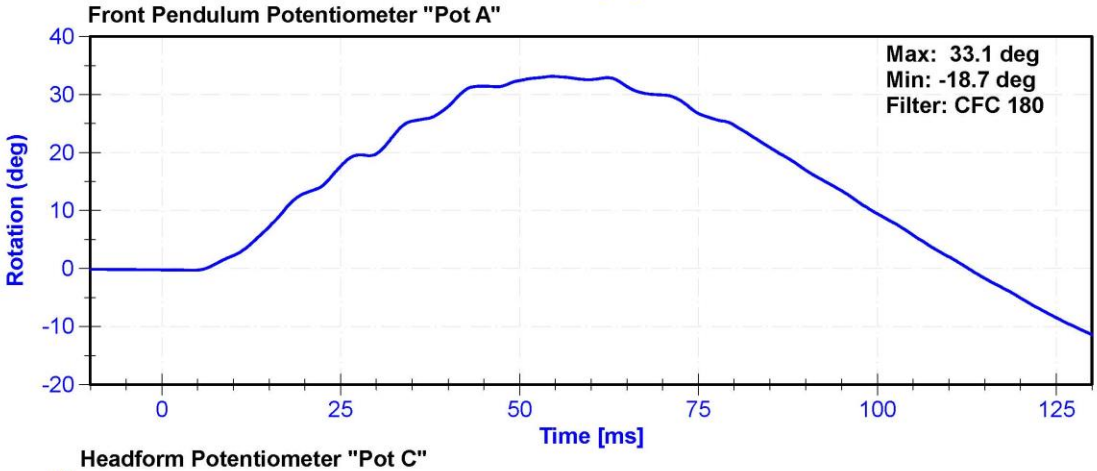
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.4	Pass
Humidity	10	70	%	53.4	Pass
Velocity	3.3	3.5	m/s	3.36	Pass
Lateral Neck Rotation	49	59	deg	49.8	Pass
Time at Maximum Rotation	54	66	ms	56.5	Pass
Time of Rotation Decay from Maximum	53	88	ms	55.5	Pass

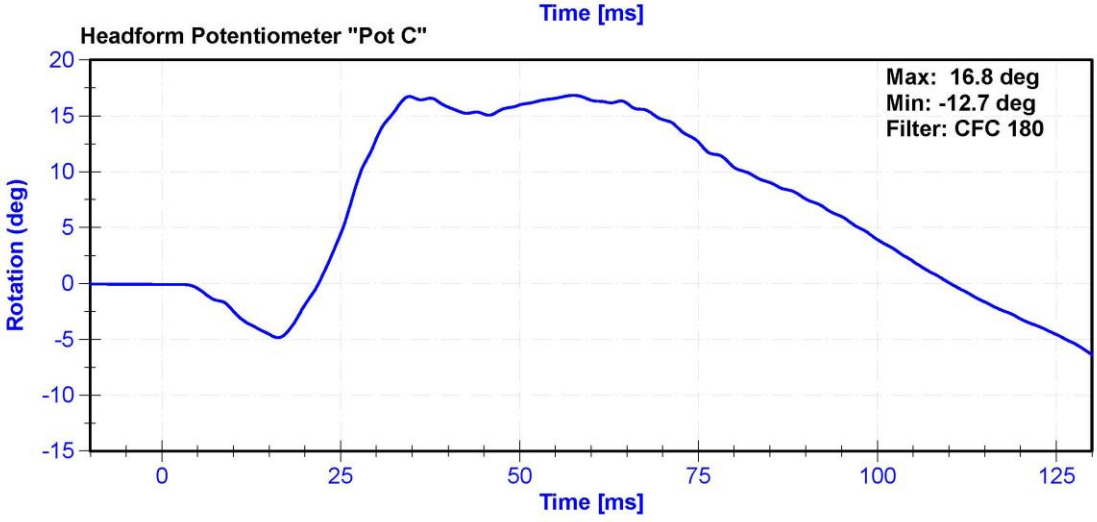
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C16503	2/6/2020	2/5/2021
Front Pendulum Potentiometer	SP22G	DS-094	8/18/2020	8/18/2021
Headform Potentiometer	SP22G	DS-095	8/18/2020	8/18/2021




Neck Rotation
Rotation (Deg)
Time [ms]
Max: 49.8 deg
Min: -31.4 deg
Filter: CFC 180


Front Pendulum Potentiometer "Pot A"
Rotation (deg)
Time [ms]
Max: 33.1 deg
Min: -18.7 deg
Filter: CFC 180


Headform Potentiometer "Pot C"
Rotation (deg)
Time [ms]
Max: 16.8 deg
Min: -12.7 deg
Filter: CFC 180

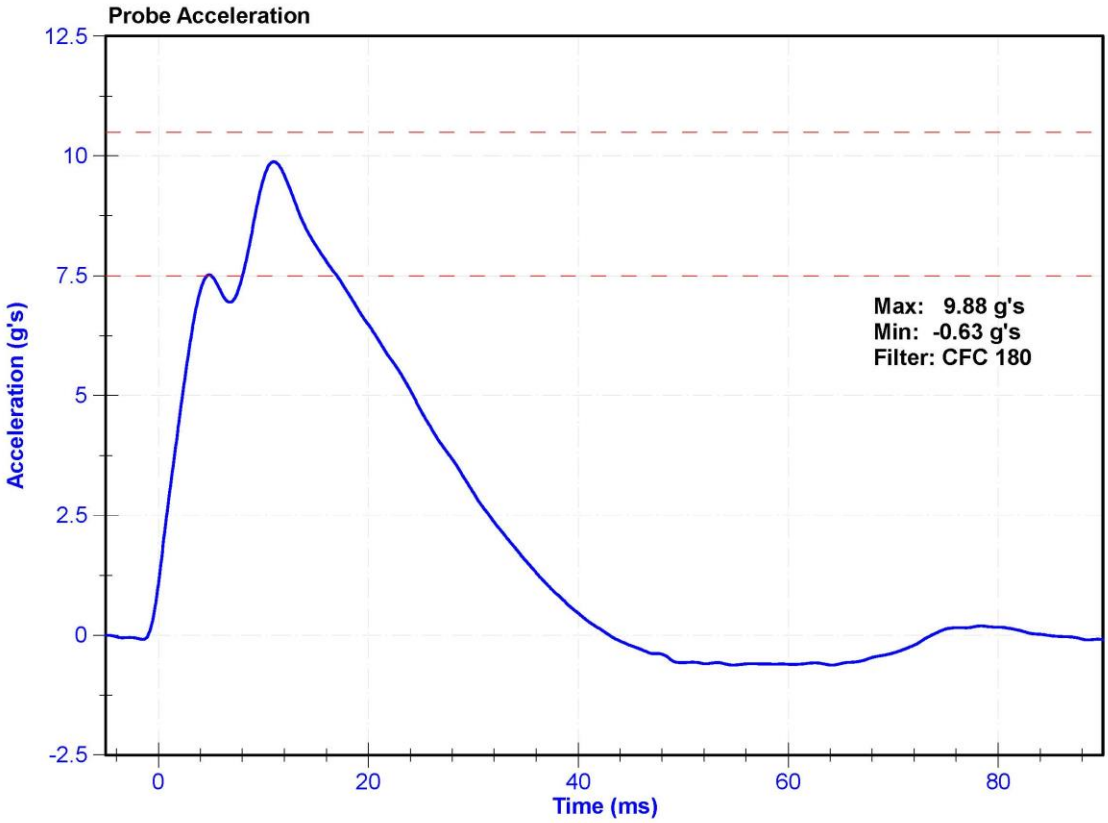
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.8	Pass
Humidity	10	70	%	63.0	Pass
Velocity	4.2	4.4	m/s	4.39	Pass
Probe Acceleration	7.5	10.5	g's	9.88	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	MSI 64C-2000	A286228	1/29/2020	1/28/2021



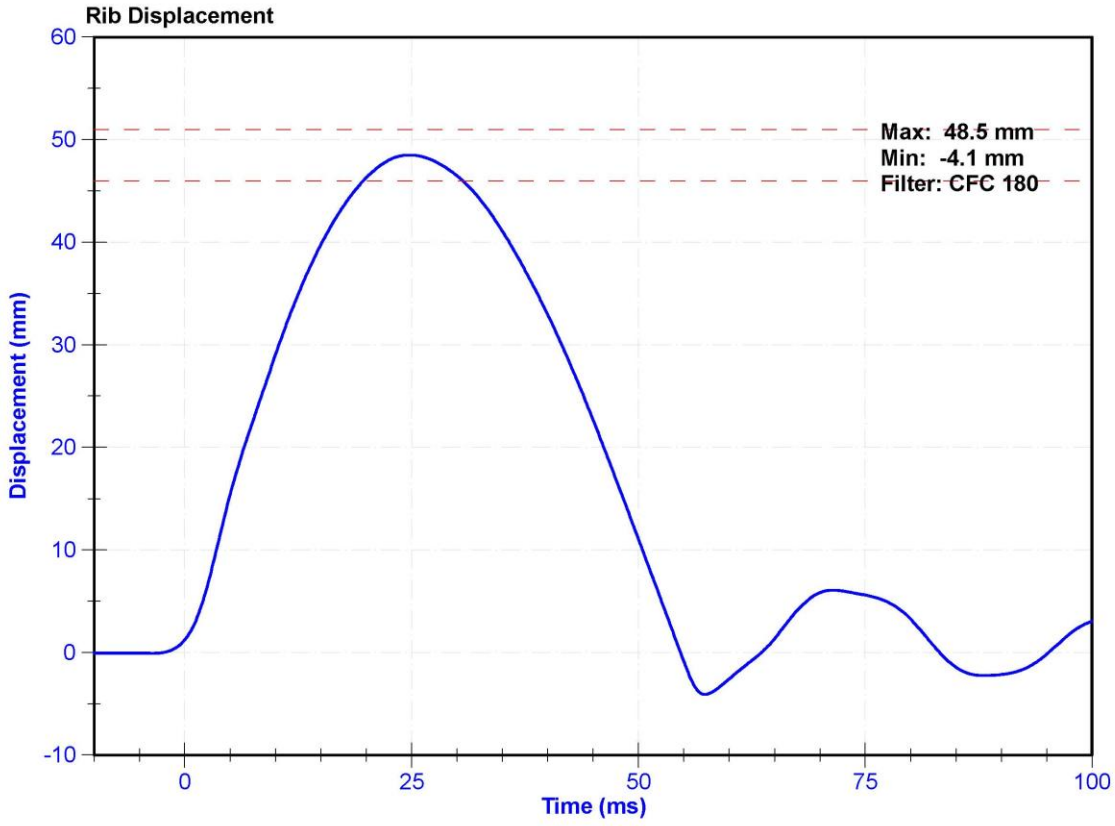
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.6	Pass
Humidity	10	70	%	64.0	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-179GFE	5/20/2020	11/18/2020



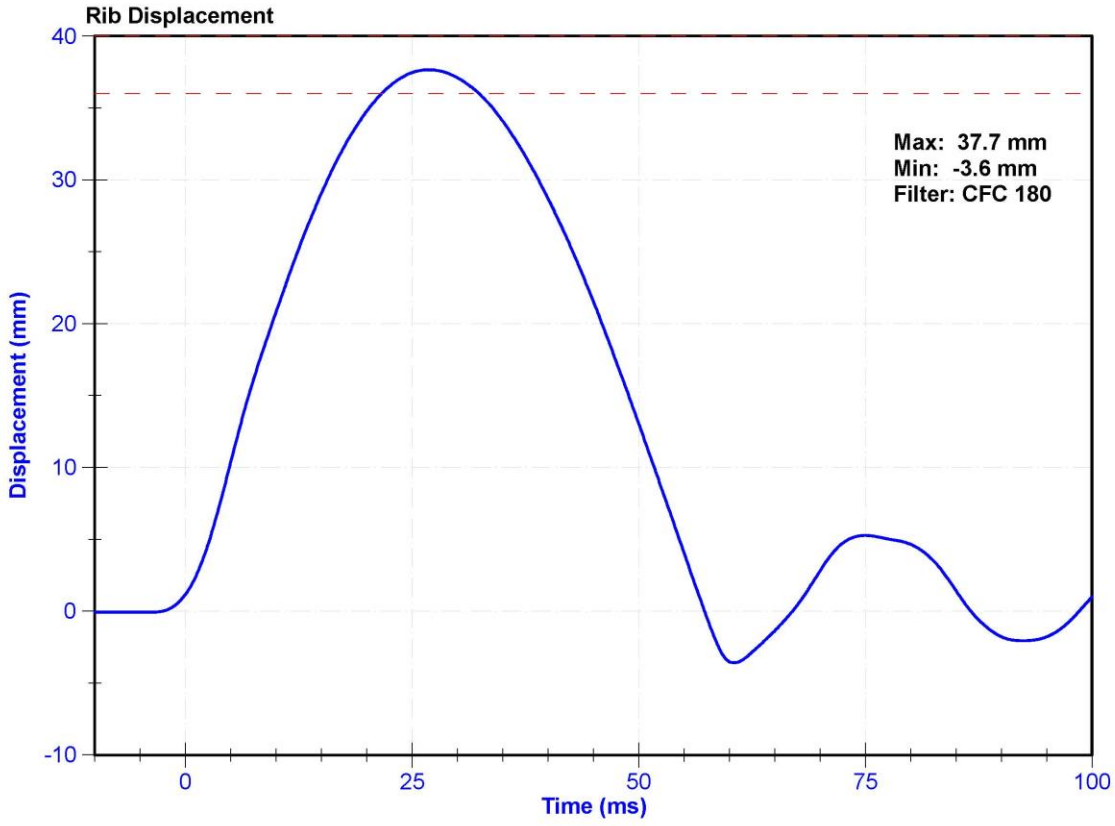
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.6	Pass
Humidity	10	70	%	64.0	Pass
Rib Displacement	36	40	mm	37.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-179GFE	5/20/2020	11/18/2020



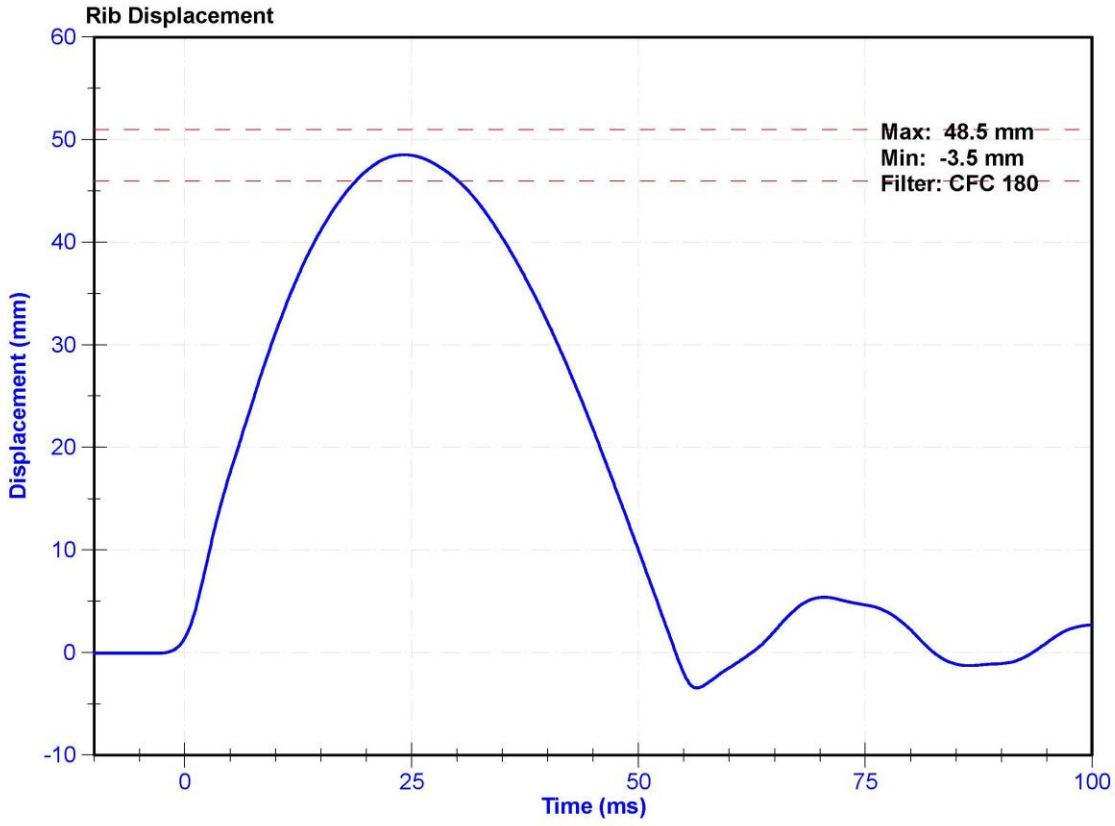
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.8	Pass
Humidity	10	70	%	68.0	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-185GFE	5/20/2020	11/18/2020



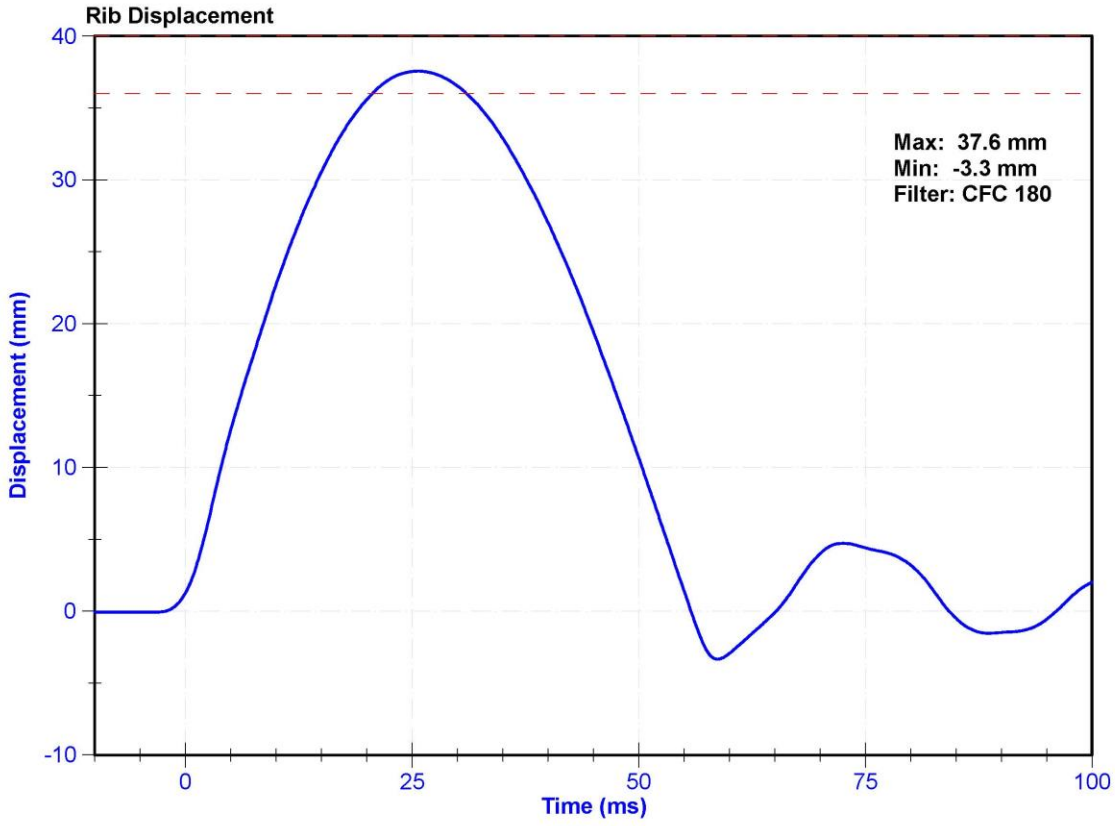
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.6	Pass
Humidity	10	70	%	67.0	Pass
Rib Displacement	36	40	mm	37.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-185GFE	5/20/2020	11/18/2020



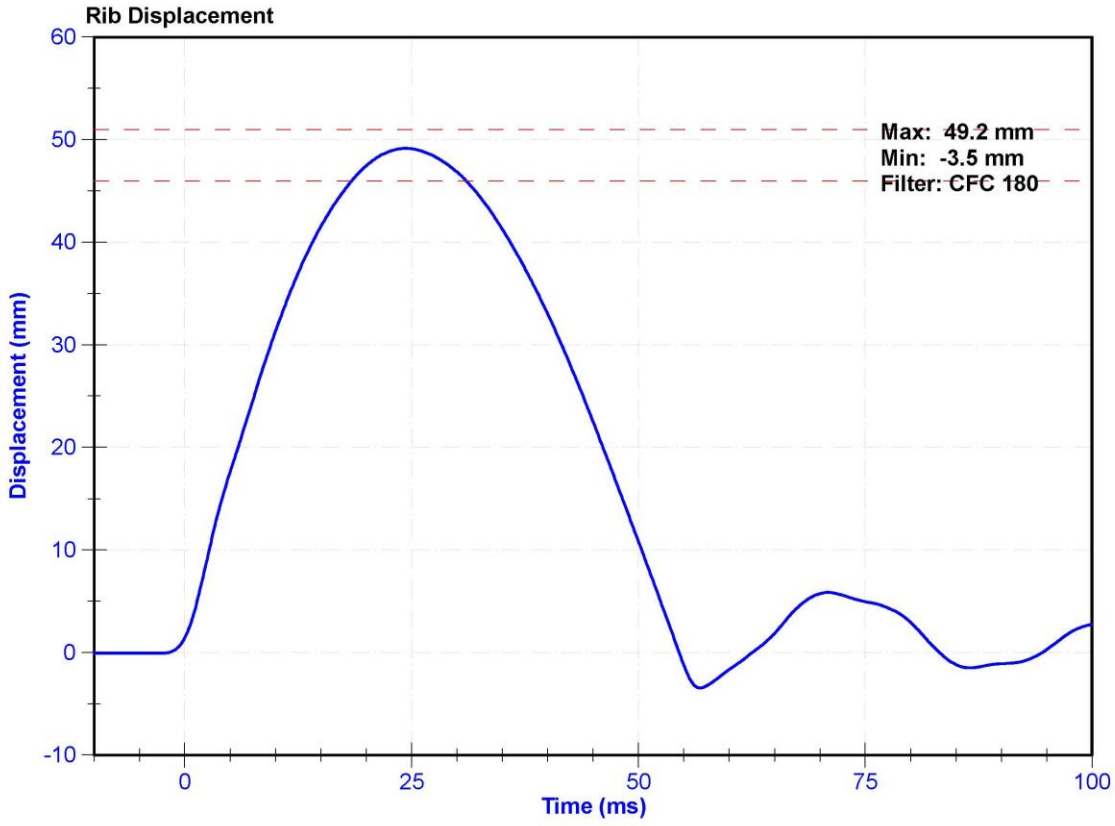
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.8	Pass
Humidity	10	70	%	56.0	Pass
Rib Displacement	46	51	mm	49.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell MLT-38000203	DS-178GFE	5/20/2020	11/18/2020



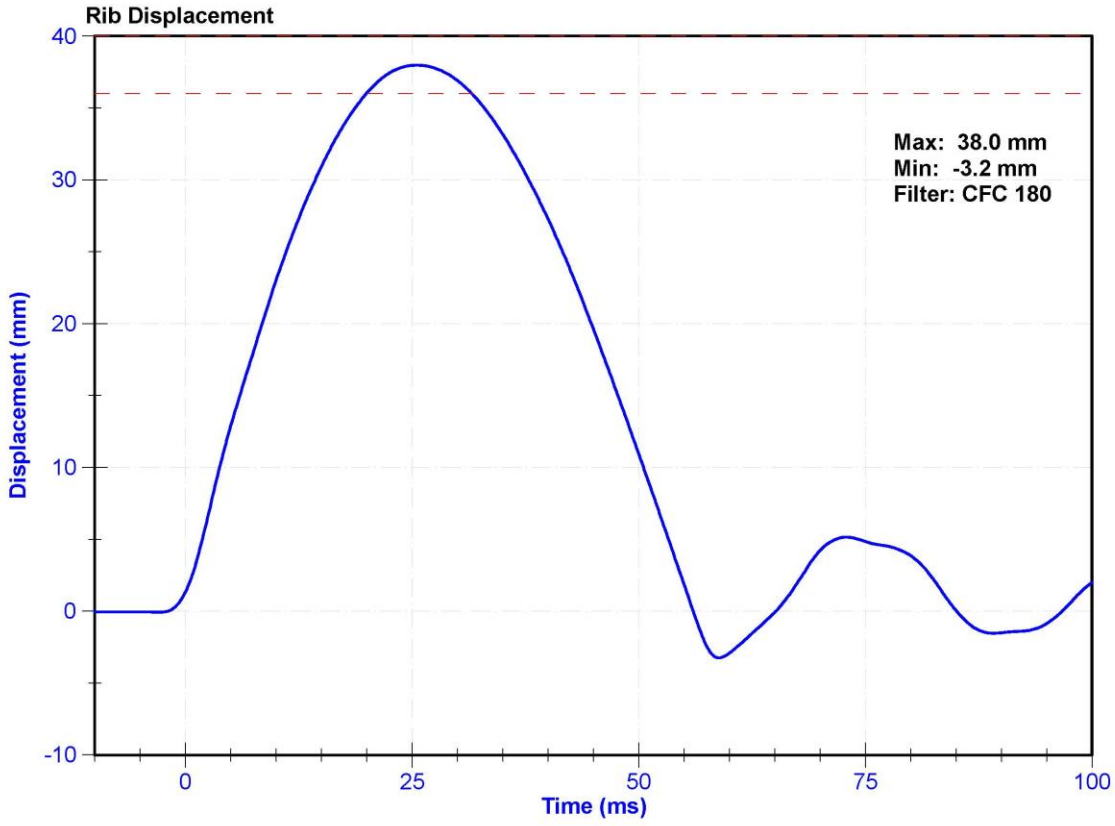
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.7	Pass
Humidity	10	70	%	54.0	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-178GFE	5/20/2020	11/18/2020



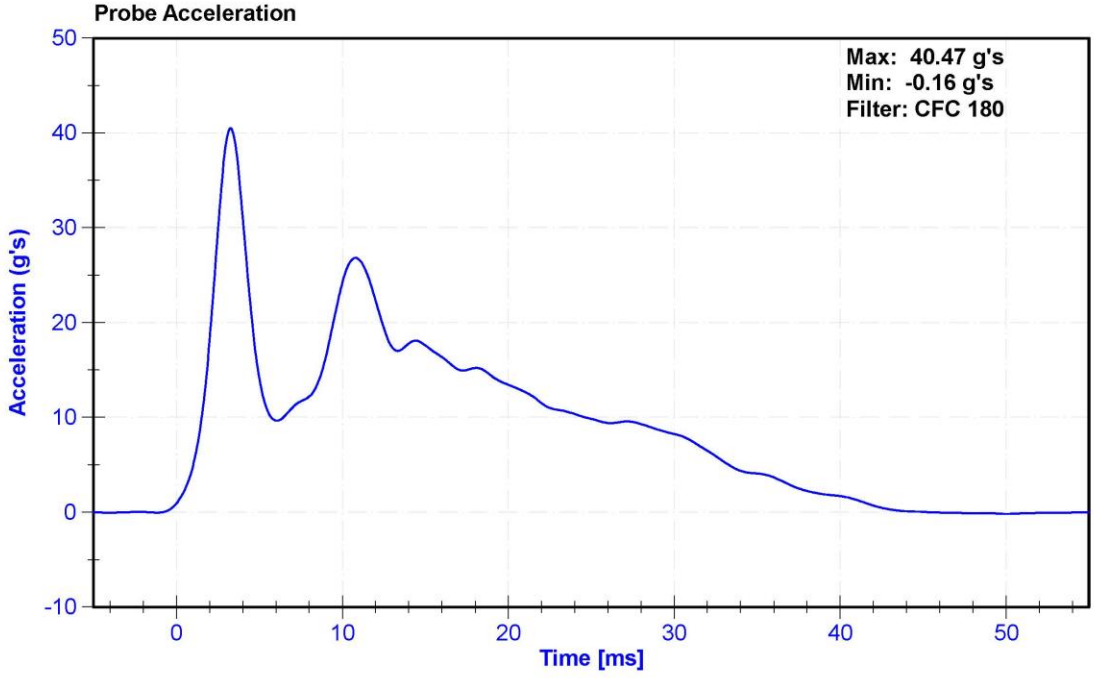
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

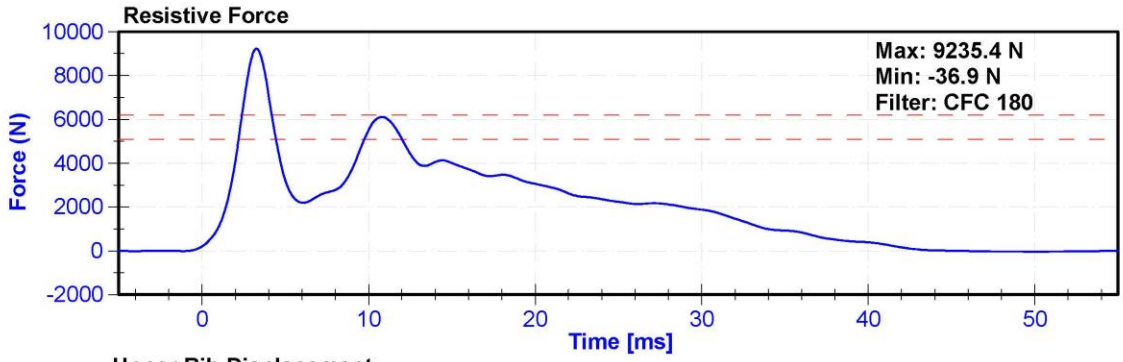
Results

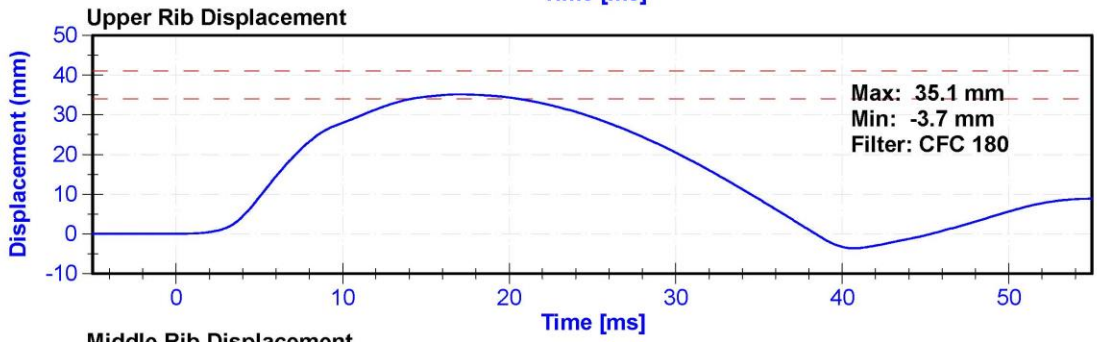
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.6	Pass
Humidity	10	70	%	56.0	Pass
Velocity	5.4	5.6	m/s	5.46	Pass
Resistive Force after 6ms	5100	6200	N	6120.6	Pass
Upper Thorax Rib Deflection	34	41	mm	35.1	Pass
Mid Thorax Rib Deflection	37	45	mm	39.5	Pass
Lower Thorax Rib Deflection	37	44	mm	39.5	Pass

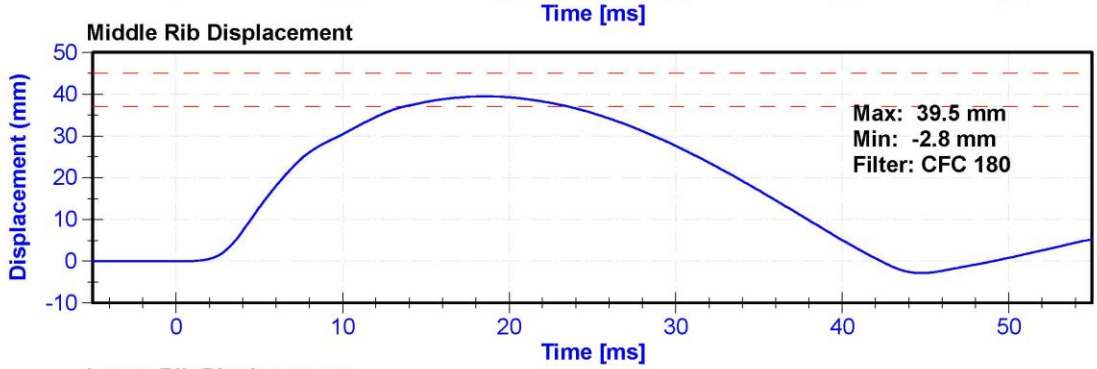
Transducer Calibrations

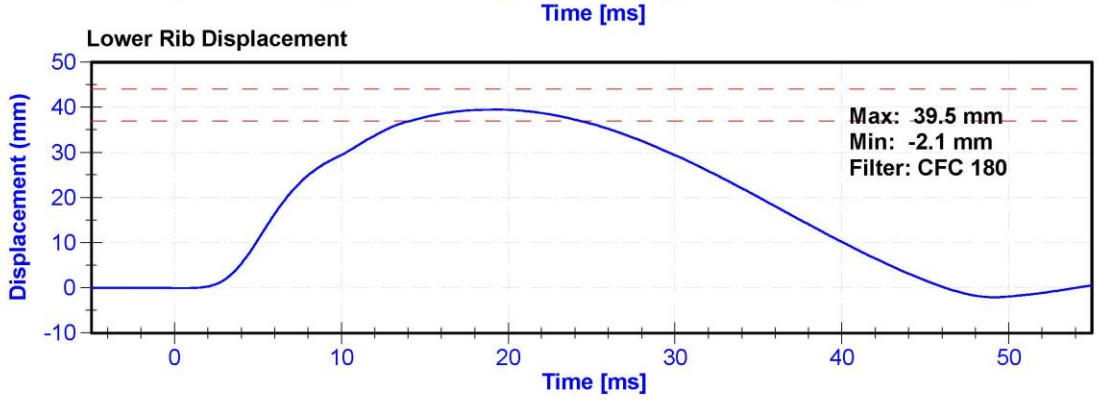
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	MSI 64C-2000	A286228	1/29/2020	1/28/2021
Upper Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-179GFE	5/20/2020	11/18/2020
Middle Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-185GFE	5/20/2020	11/18/2020
Lower Thorax Rib Potentiometer	Honeywell MLT-38000203	DS-178GFE	5/20/2020	11/18/2020




Resistive Force
Max: 9235.4 N
Min: -36.9 N
Filter: CFC 180
Force (N)
Time [ms]


Upper Rib Displacement
Max: 35.1 mm
Min: -3.7 mm
Filter: CFC 180
Displacement (mm)
Time [ms]


Middle Rib Displacement
Max: 39.5 mm
Min: -2.8 mm
Filter: CFC 180
Displacement (mm)
Time [ms]


Lower Rib Displacement
Max: 39.5 mm
Min: -2.1 mm
Filter: CFC 180
Displacement (mm)
Time [ms]

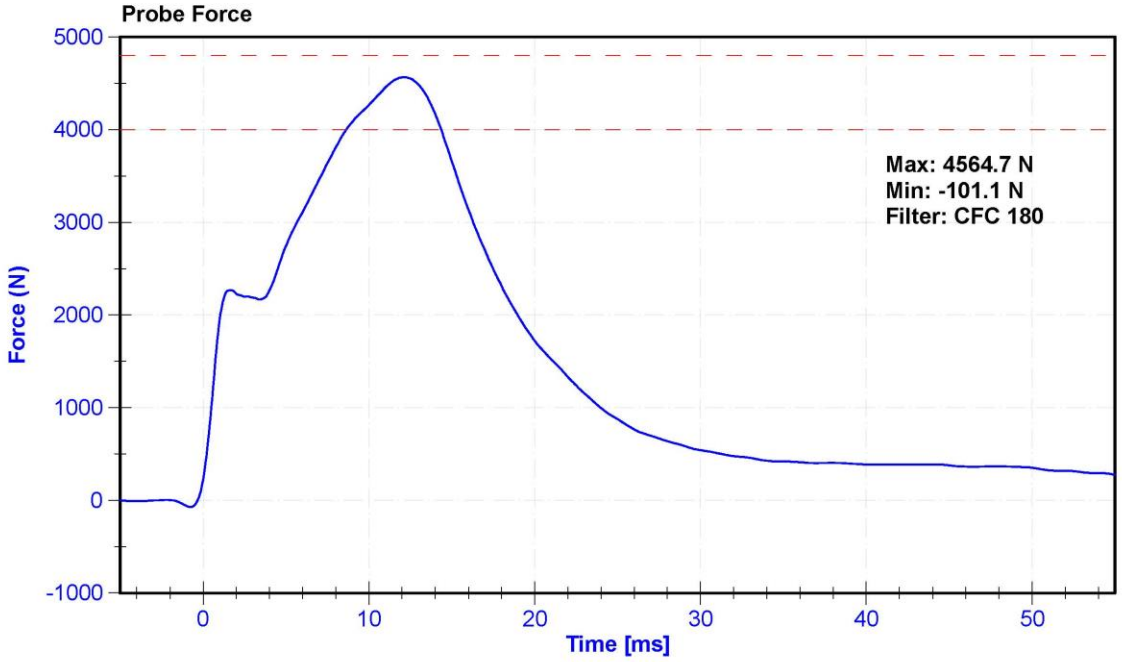
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K.Brogan

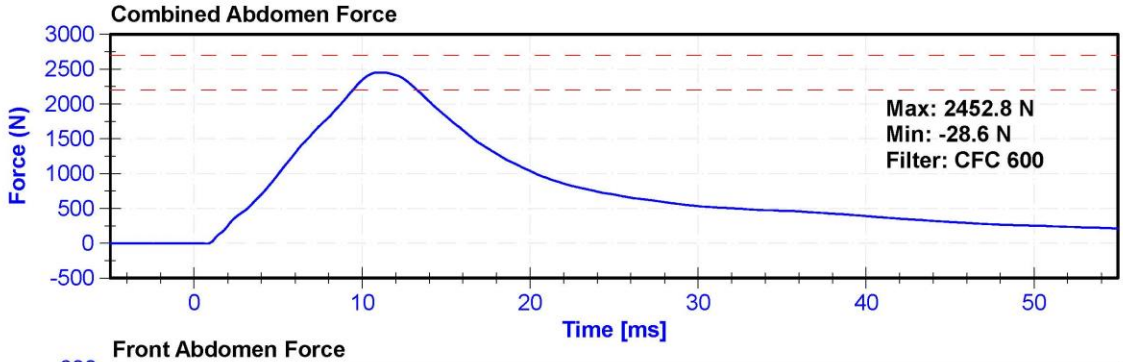
Results

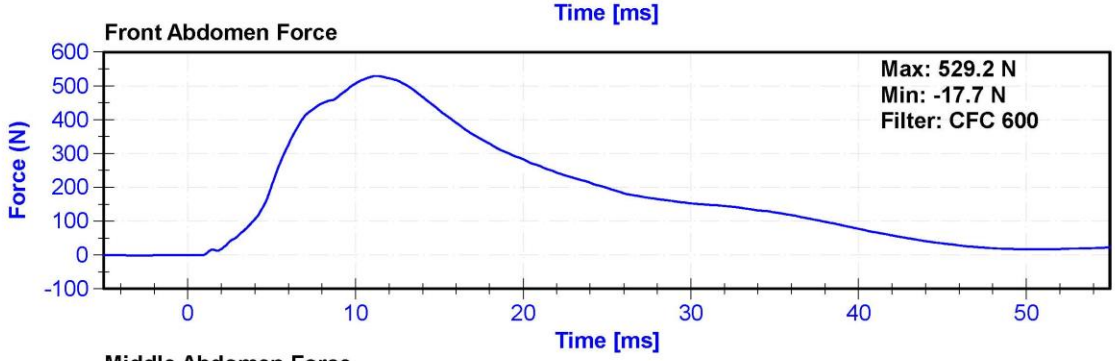
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.7	Pass
Humidity	10	70	%	56	Pass
Velocity	3.9	4.1	m/s	4.10	Pass
Combined Abdomen Force	2200	2700	N	2452.8	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	11.05	Pass
Resistive Probe Force	4000	4800	N	4564.7	Pass
Time at Peak Resistive Force	10.6	13.0	ms	12.10	Pass

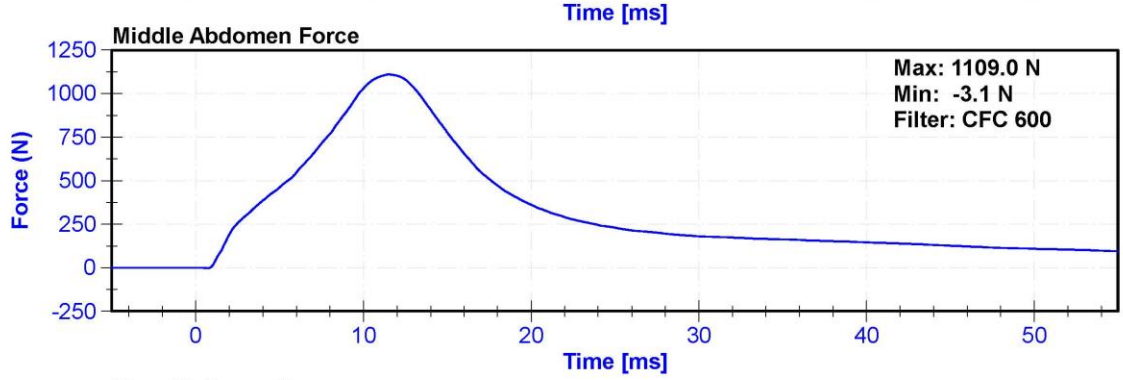
Transducer Calibrations

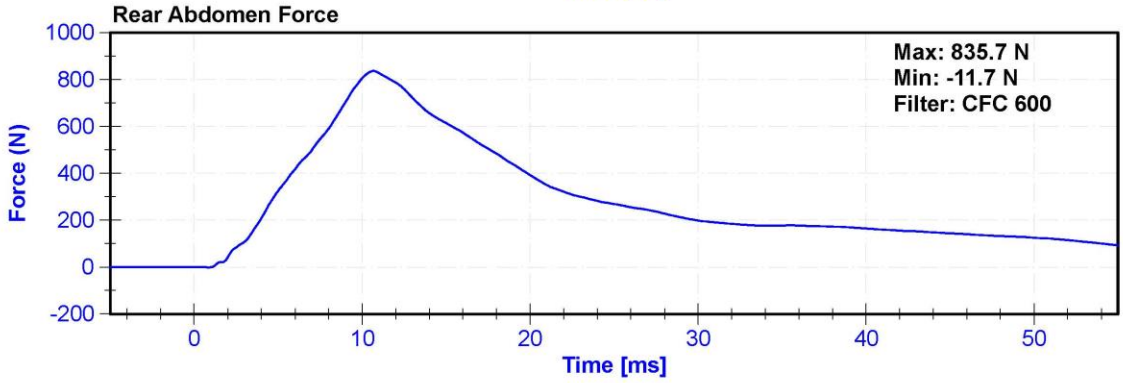
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A286228	1/29/2020	1/28/2021
Front Abdomen Load Cell	DENTON 2631J	26311512 GFE	3/19/2020	3/19/2021
Middle Abdomen Load Cell	DENTON 2631J	26311526 GFE	3/19/2020	3/19/2021
Rear Abdomen Load Cell	DENTON 2631J	26311516 GFE	3/19/2020	3/19/2021




Combined Abdomen Force
Force (N)
Time [ms]
Max: 2452.8 N
Min: -28.6 N
Filter: CFC 600


Front Abdomen Force
Force (N)
Time [ms]
Max: 529.2 N
Min: -17.7 N
Filter: CFC 600


Middle Abdomen Force
Force (N)
Time [ms]
Max: 1109.0 N
Min: -3.1 N
Filter: CFC 600


Rear Abdomen Force
Force (N)
Time [ms]
Max: 835.7 N
Min: -11.7 N
Filter: CFC 600

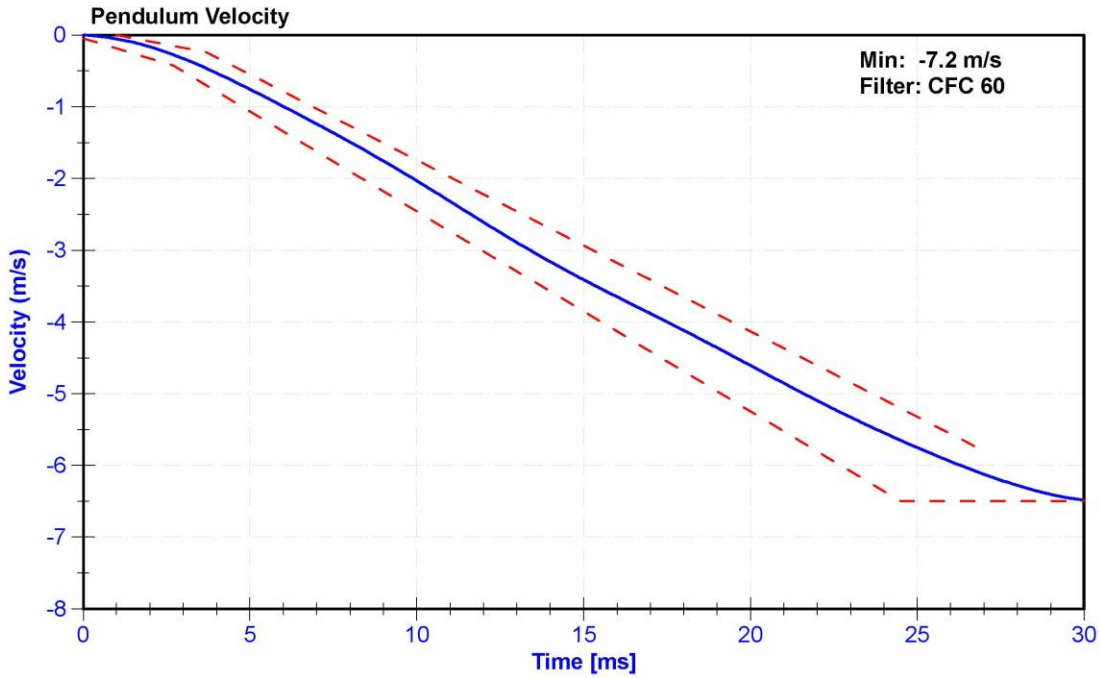
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

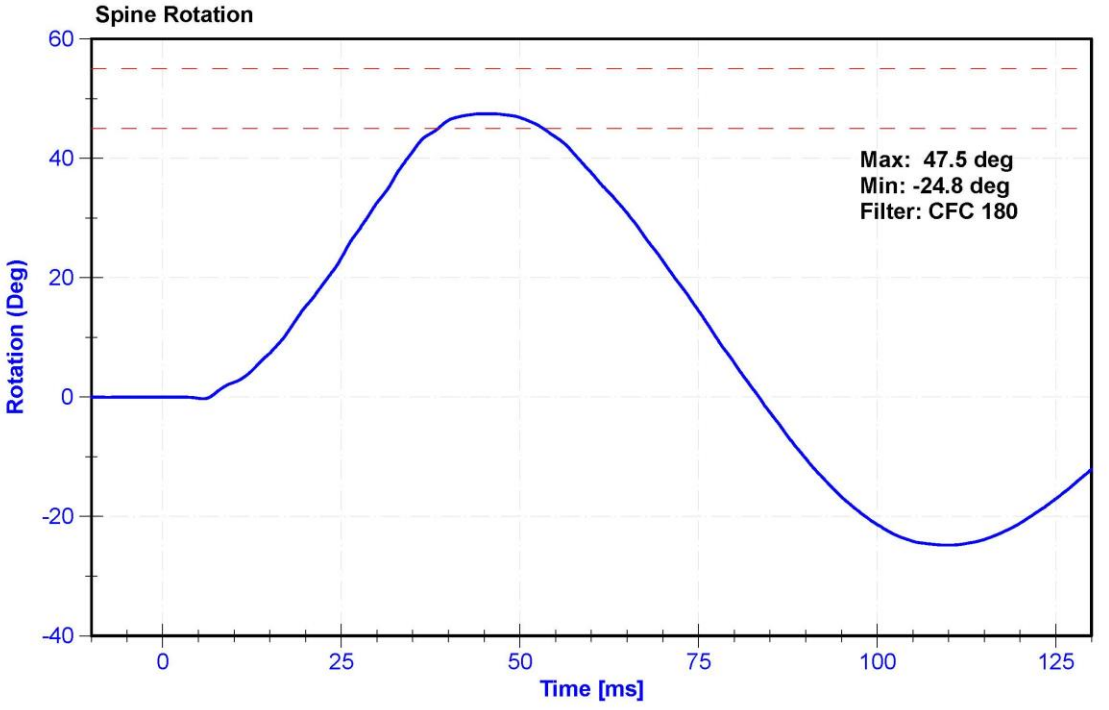
Results

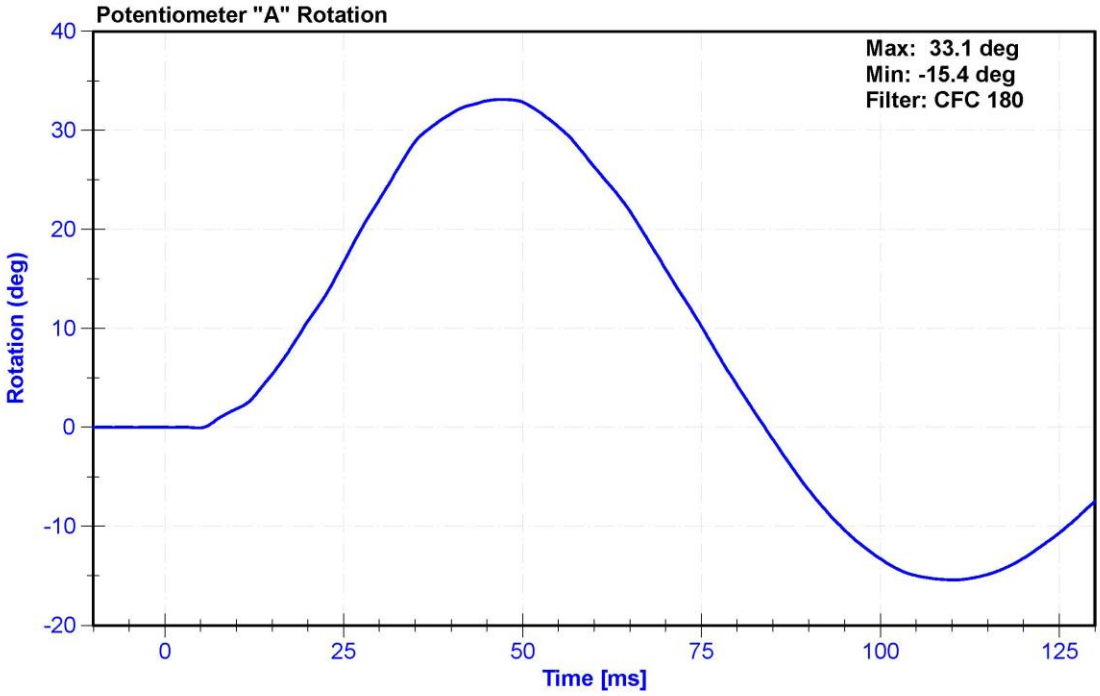
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.6	Pass
Humidity	10	70	%	60.6	Pass
Velocity	5.95	6.15	m/s	6.005	Pass
Lateral Spine Rotation	45	55	deg	47.5	Pass
Time at Maximum Rotation	39	53	ms	44.6	Pass
Time of Decay to Zero Degrees	37	57	ms	38.9	Pass
Pulse within Corridor?	-	-	-		

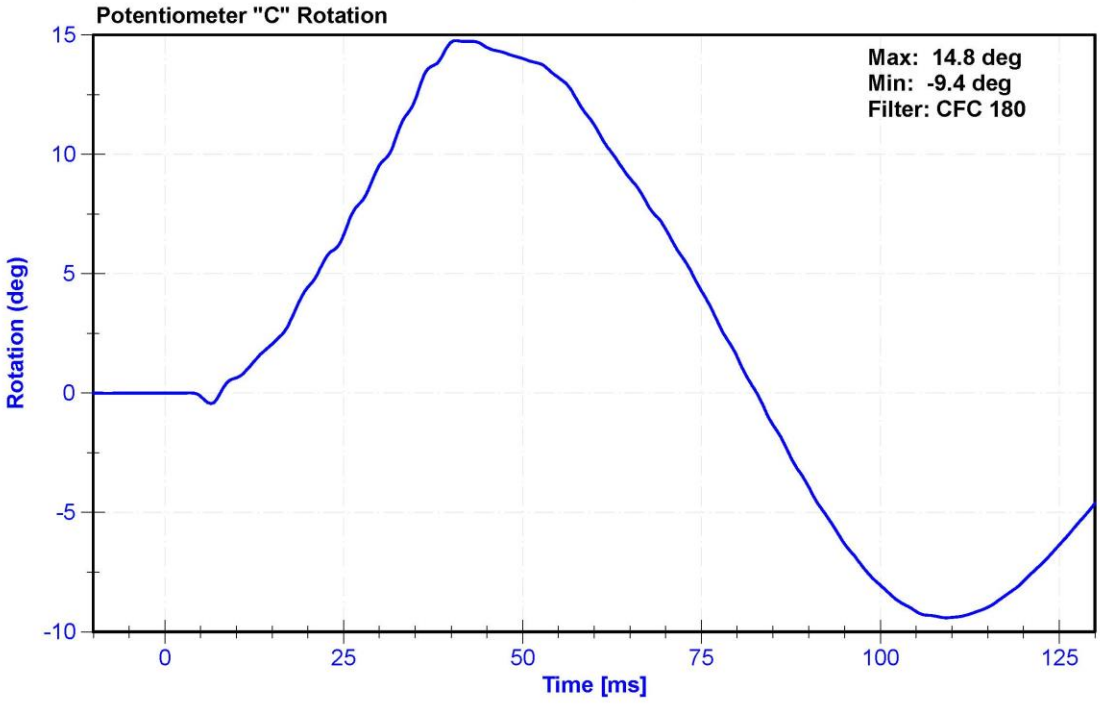
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C16503 Striker	2/6/2020	2/5/2021
Pendulum "A" Potentiometer	SP22G	DS-094	8/18/2020	8/18/2021
Condyle "B" Potentiometer	SP22G	DS-095	8/18/2020	8/18/2021


Pendulum Velocity
Min: -7.2 m/s
Filter: CFC 60
Velocity (m/s)
0
-1
-2
-3
-4
-5
-6
-7
-8
0
5
10
15
20
25
30
Time [ms]


Spine Rotation
Max: 47.5 deg
Min: -24.8 deg
Filter: CFC 180
Rotation (Deg)
60
40
20
0
-20
-40
0
25
50
75
100
125
Time [ms]


Potentiometer "A" Rotation
Max: 33.1 deg
Min: -15.4 deg
Filter: CFC 180
Rotation (deg)
40
30
20
10
0
-10
-20
0
25
50
75
100
125
Time [ms]


Potentiometer "C" Rotation
Max: 14.8 deg
Min: -9.4 deg
Filter: CFC 180
Rotation (deg)
15
10
5
0
-5
-10
0
25
50
75
100
125
Time [ms]

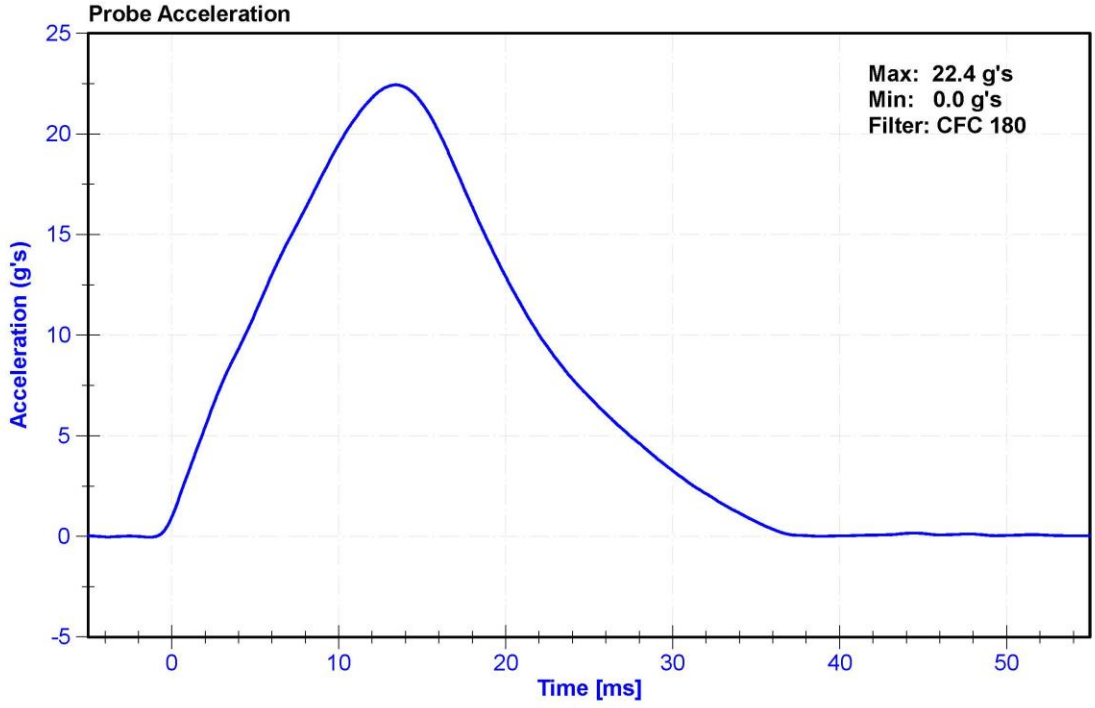
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	F033	Laboratory Supervisor	K. Brogan

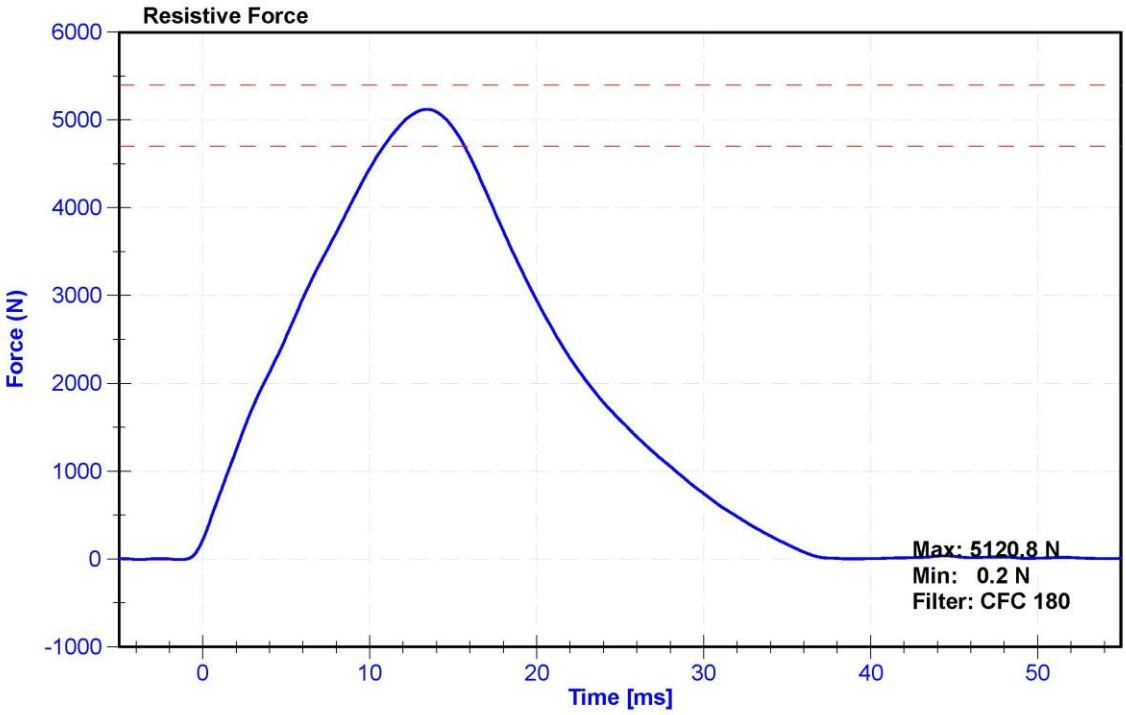
Results

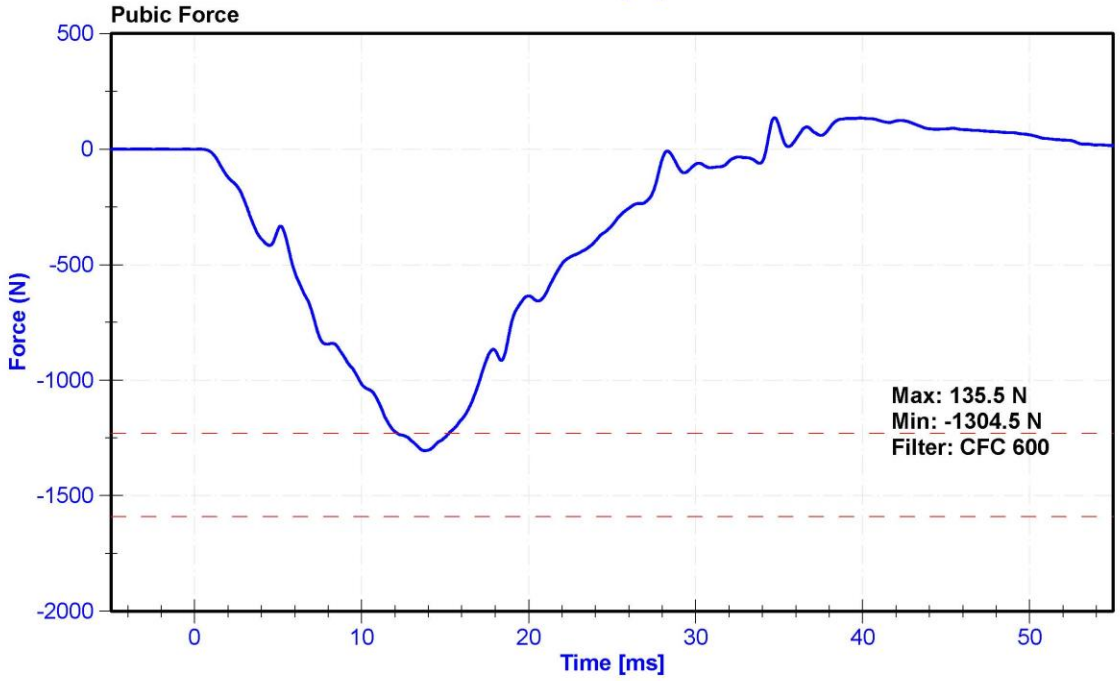
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.7	Pass
Humidity	10	70	%	64.0	Pass
Velocity	4.2	4.4	m/s	4.39	Pass
Resistive Force	4700	5400	N	5120.8	Pass
Time at Peak Resistive Force	11.8	16.1	ms	13.45	Pass
Pubic Force	-1590	-1230	N	-1304.5	Pass
Time at Peak Pubic Force	12.2	17.0	ms	13.80	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A286228	1/29/2020	1/28/2021
Pubic Load Cell	Denton	LC-464fy	7/23/2020	7/23/2021




Resistive Force
Force (N)
Time [ms]
Max: 5120.8 N
Min: 0.2 N
Filter: CFC 180


Pubic Force
Force (N)
Time [ms]
Max: 135.5 N
Min: -1304.5 N
Filter: CFC 600

CALIBRATION TEST RESULTS

POST-TEST

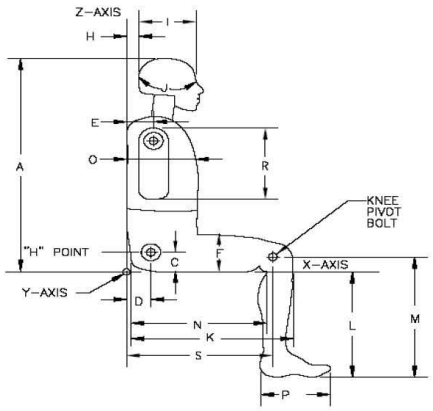
SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD

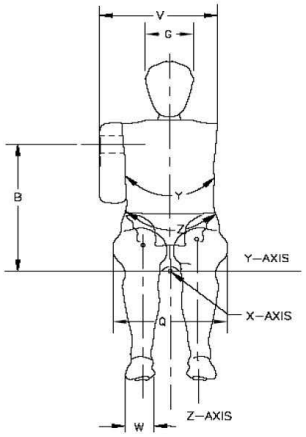
SERIAL No: 300

External Measurements - SID-IIs

Technician: K. Dutton Date: 08/25/2020

Dummy Serial Number: 300





Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	782	Pass
B	Shoulder Pivot Height	437	453	442	Pass
C	H-point Height	79	89	85	Pass
D	H-point from seatback	141	151	145	Pass
E	Shoulder Pivot from Backline	97	107	101	Pass
F	Thigh Clearance	119	135	126	Pass
G	Head Breadth	140	148	144	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	187	Pass
J	Head Circumference	541	551	544	Pass
K	Buttock to Knee Length	514	540	532	Pass
L	Popliteal Height	343	369	361	Pass
M	Knee Pivot to floor height	392	409	401	Pass
N	Buttock Popliteal Length	416	442	431	Pass
O	Chest Depth w/o jacket	195	211	208	Pass
P	Foot Length	216	232	220	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	317	Pass
R	Arm Length	249	259	253	Pass
S	Knee Joint to seatback	477	493	484	Pass
V	Shoulder Width	341	357	352	Pass
W	Foot Width	78	94	83	Pass
Y	Chest Circumference w/jacket	851	881	875	Pass
Z	Waist Circumference	761	791	773	Pass

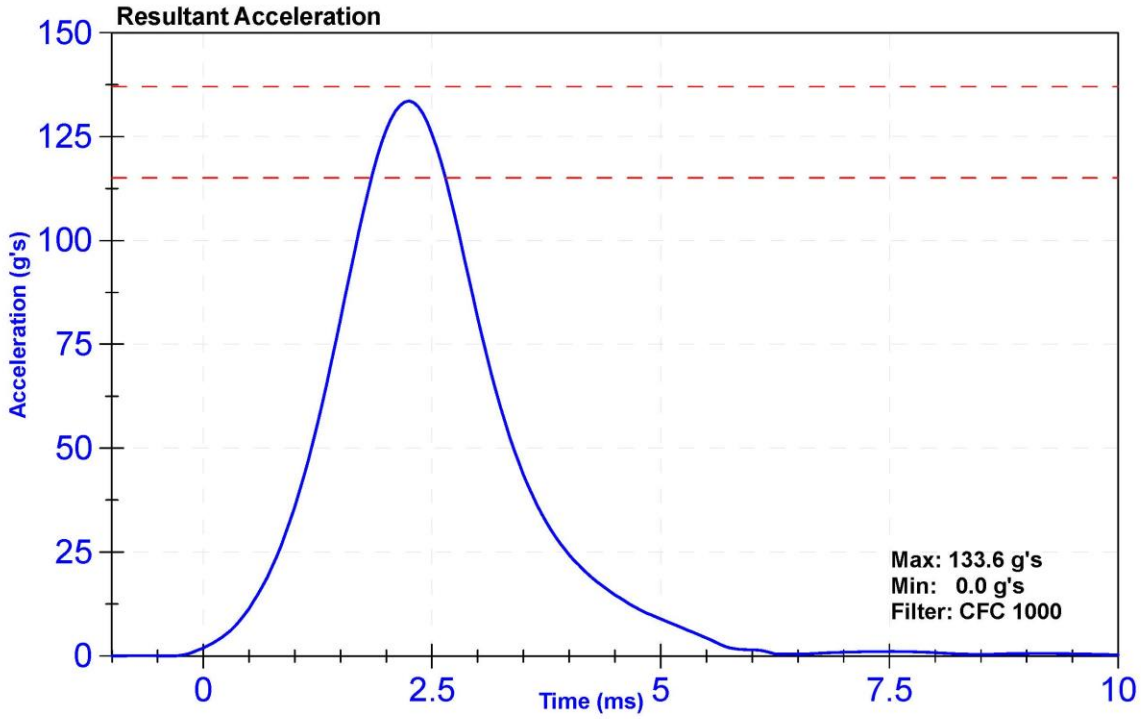
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

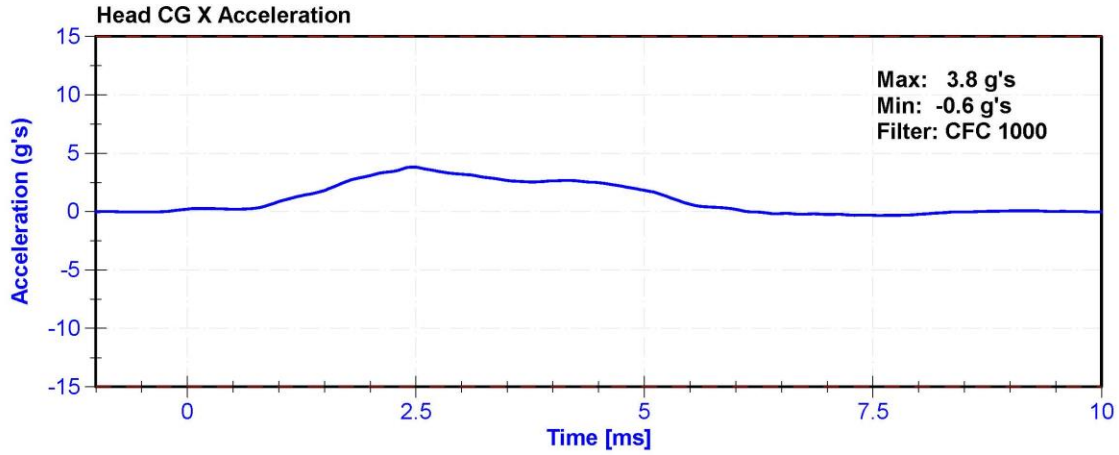
Results

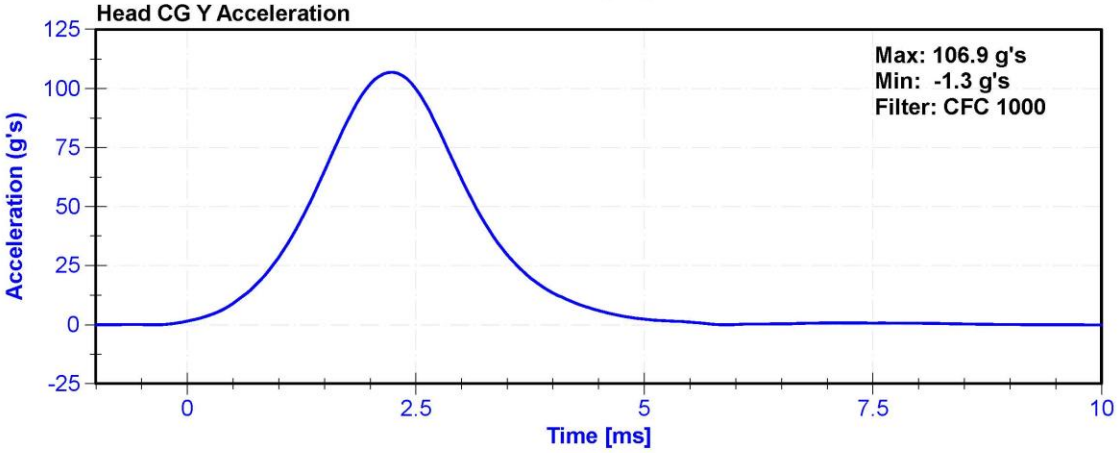
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.9	Pass
Humidity	10	70	%	63	Pass
Resultant Acceleration	115	137	g's	133.6	Pass
Oscillation	0	15	%	0.9	Pass
Fore-Aft Acceleration	-15	15	g's	3.8	Pass

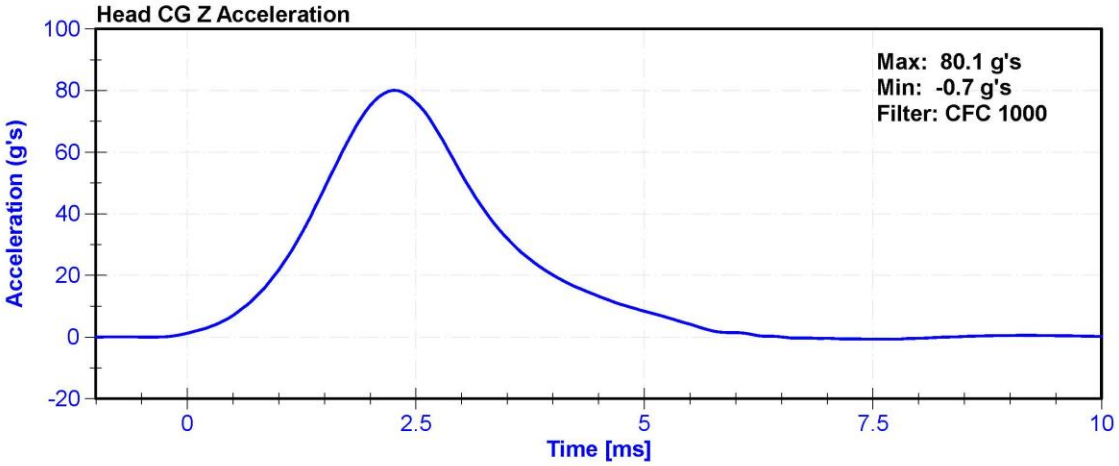
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P59018	4/20/2020	10/19/2020
Y Accelerometer	ENDEVCO 7264	AC-P79189	4/20/2020	10/19/2020
Z Accelerometer	ENDEVCO 7264CT	AC-P58777	4/20/2020	10/19/2020




Head CG X Acceleration
Max: 3.8 g's
Min: -0.6 g's
Filter: CFC 1000
Acceleration (g's)
15
10
5
0
-5
-10
-15
0
2.5
5
7.5
10
Time [ms]


Head CG Y Acceleration
Max: 106.9 g's
Min: -1.3 g's
Filter: CFC 1000
Acceleration (g's)
125
100
75
50
25
0
-25
0
2.5
5
7.5
10
Time [ms]


Head CG Z Acceleration
Max: 80.1 g's
Min: -0.7 g's
Filter: CFC 1000
Acceleration (g's)
100
80
60
40
20
0
-20
0
2.5
5
7.5
10
Time [ms]

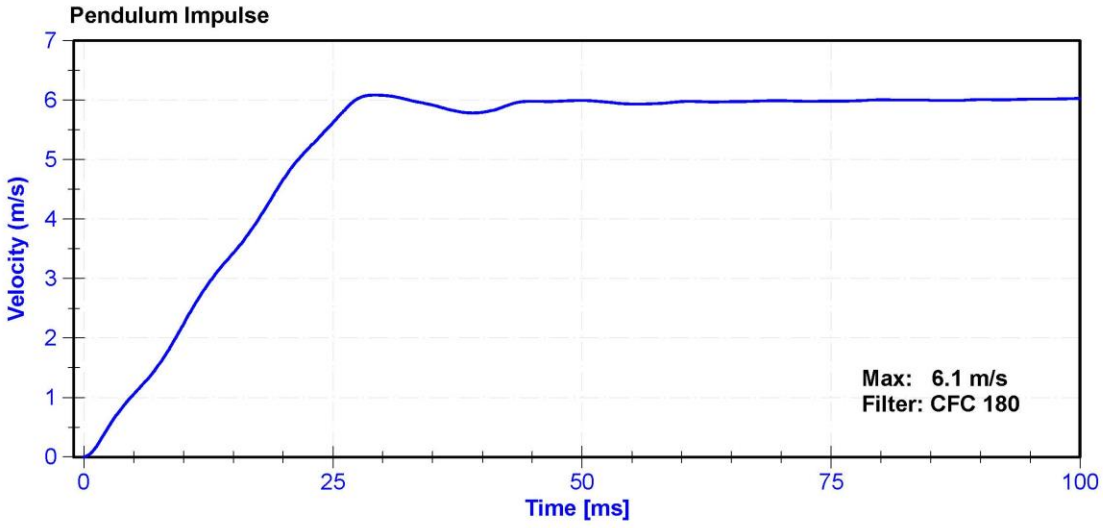
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

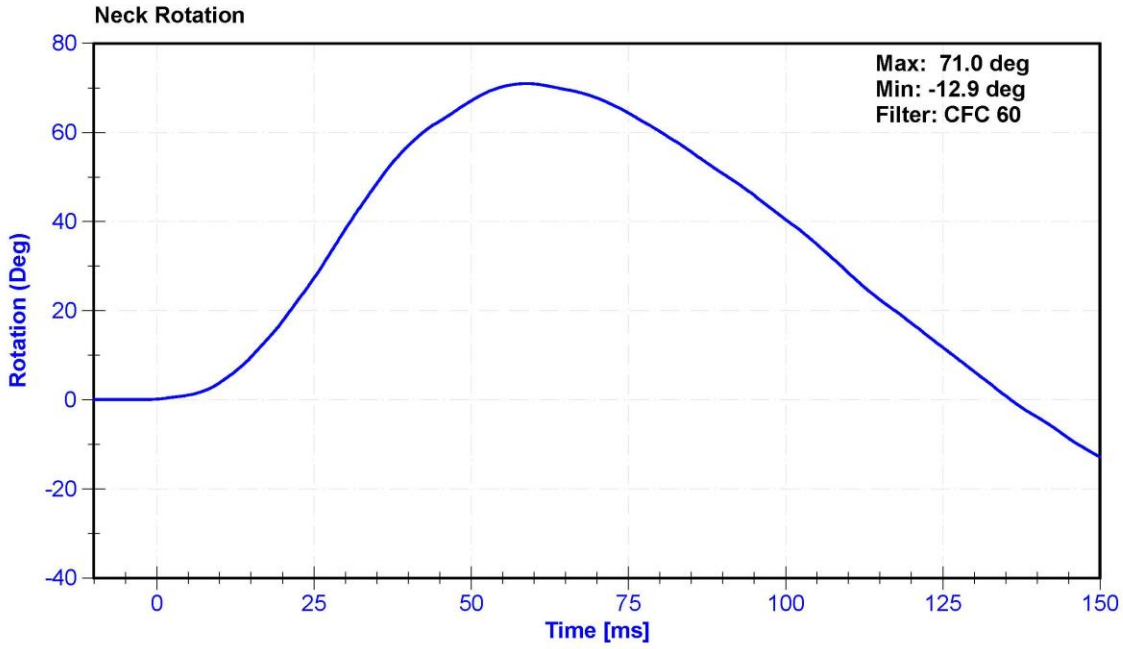
Results

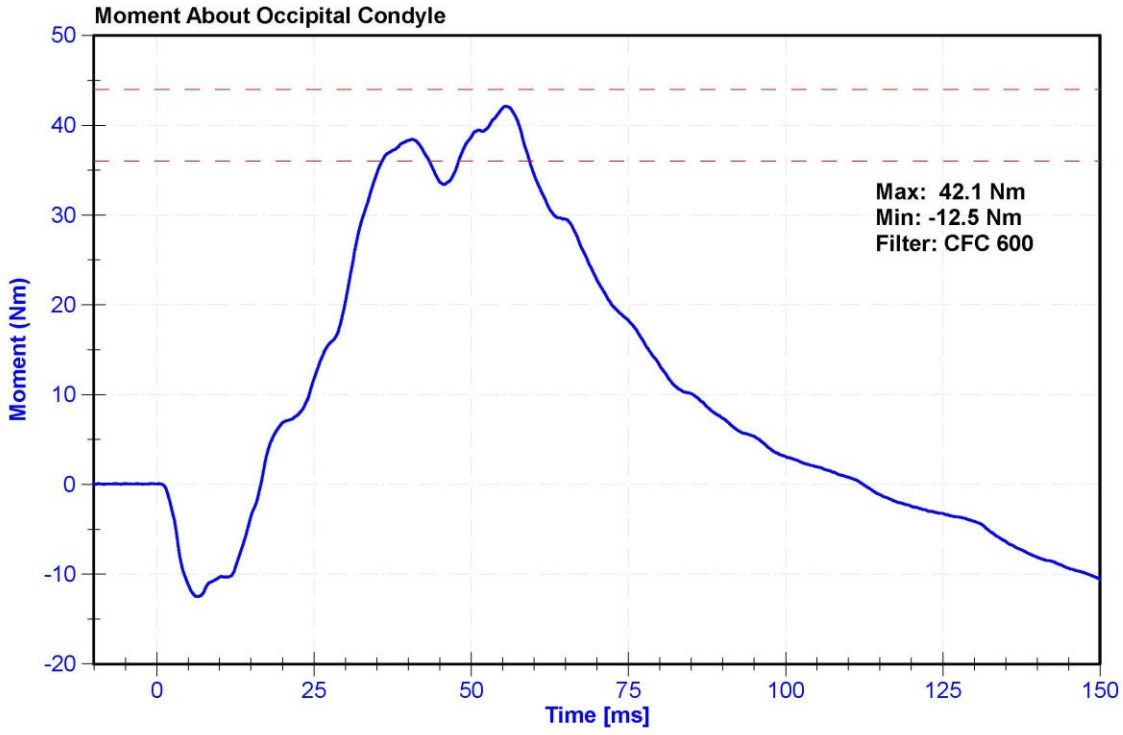
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.4	Pass
Humidity	10	70	%	60.2	Pass
Velocity	5.51	5.63	m/s	5.549	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.23	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.43	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.66	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.62	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	6.08	Pass
Neck Rotation	71	81	deg	71.0	Pass
Time at Maximum Rotation	50	70	ms	58.8	Pass
Moment about the OC	36	44	Nm	42.1	Pass
Moment Decay to 0 Nm	102	126	ms	112.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C16503 Striker	2/6/2020	2/5/2021
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 1716	17162019 FY	3/18/2020	3/18/2021




Neck Rotation
Max: 71.0 deg
Min: -12.9 deg
Filter: CFC 60
Rotation (Deg)
80
60
40
20
0
-20
-40
0
25
50
75
100
125
150
Time [ms]


Moment About Occipital Condyle
Max: 42.1 Nm
Min: -12.5 Nm
Filter: CFC 600
Moment (Nm)
50
40
30
20
10
0
-10
-20
0
25
50
75
100
125
150
Time [ms]

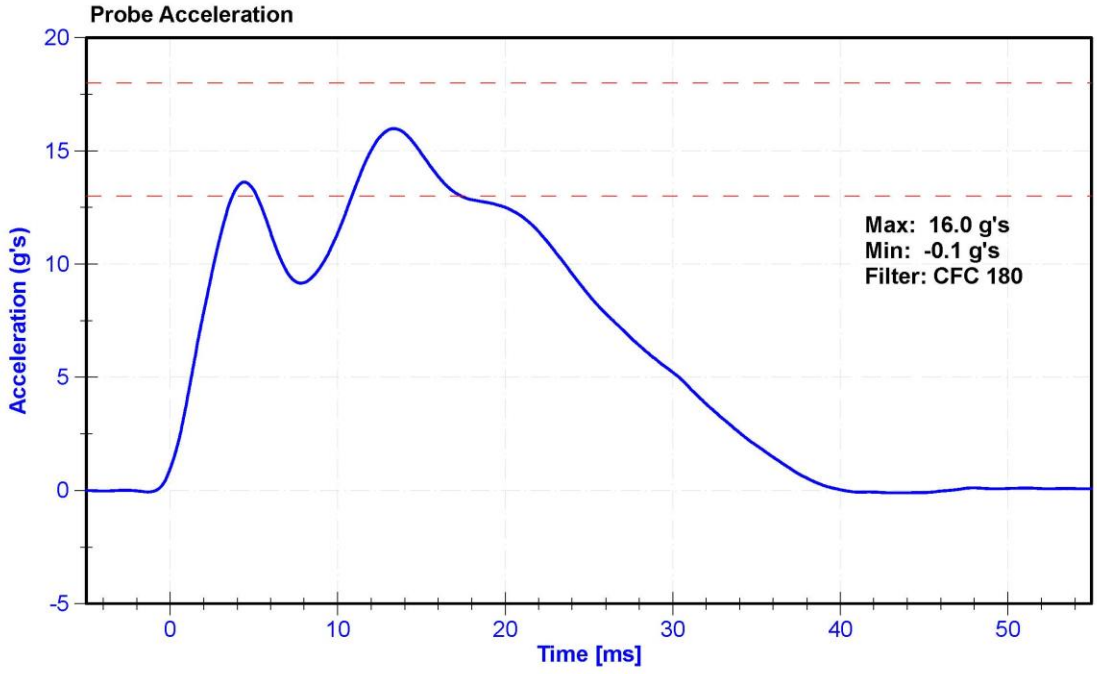
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

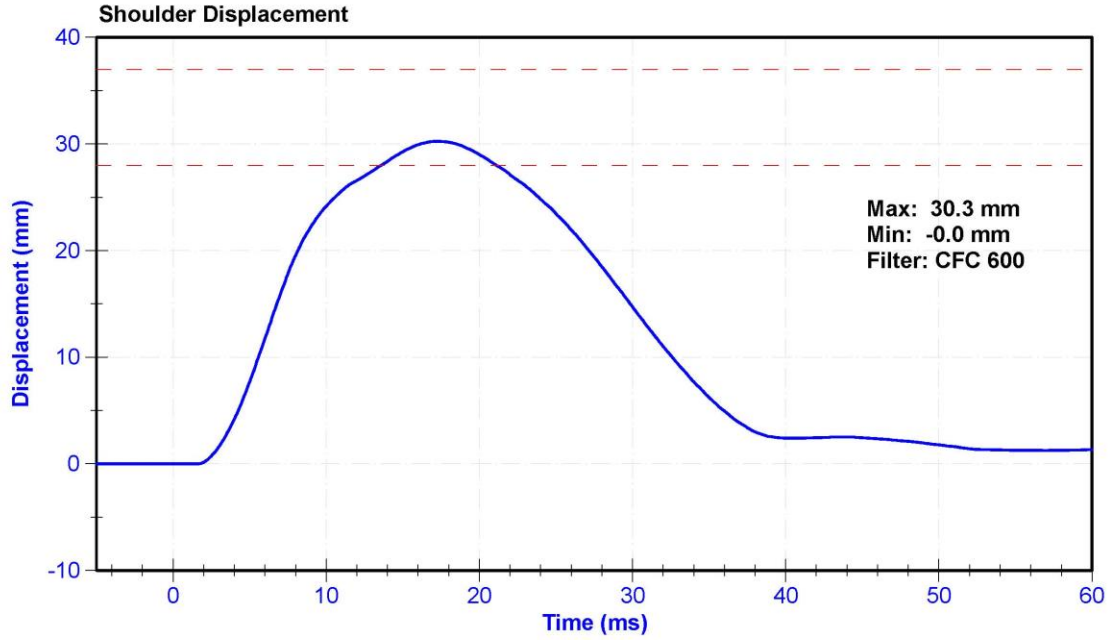
Results

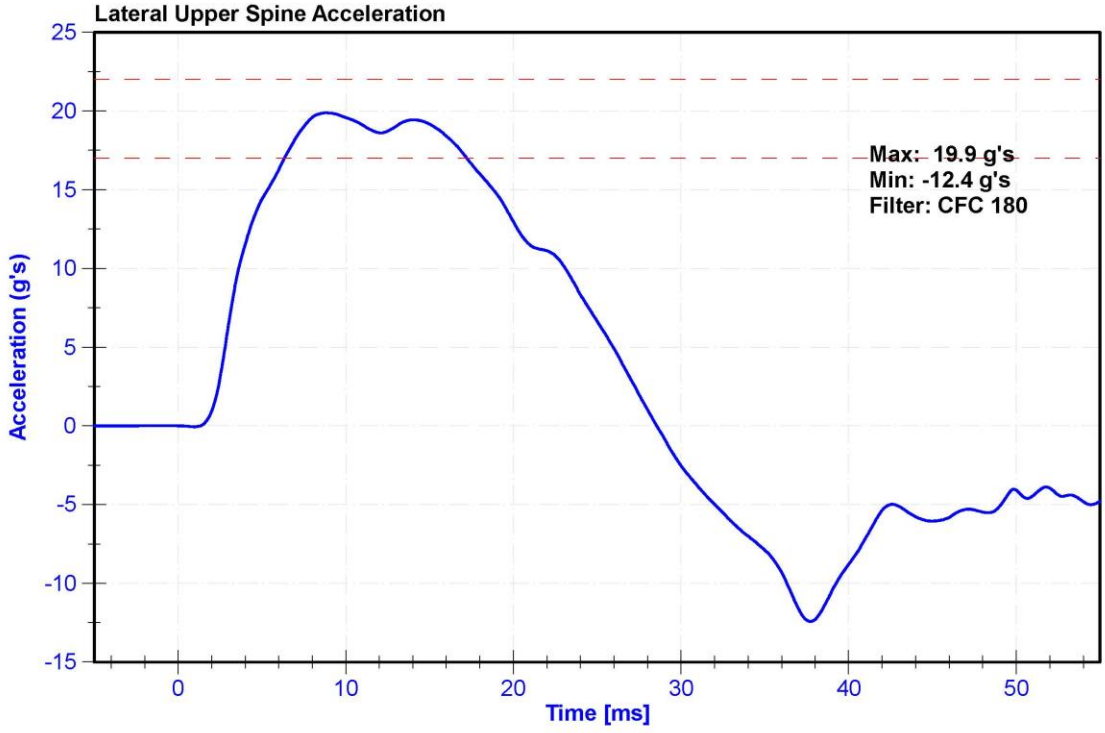
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.7	Pass
Humidity	10	70	%	57	Pass
Velocity	4.2	4.4	m/s	4.29	Pass
Probe Acceleration	13	18	g's	16.0	Pass
Shoulder Deflection	28	37	mm	30.3	Pass
Lateral Upper Spine Acceleration	17	22	g's	19.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A286228	1/29/2020	1/28/2021
Shoulder Potentiometer	Servo 08CT1-3725	DS-053 GFE	4/30/2020	10/29/2020
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P71281	7/30/2020	1/28/2021




Shoulder Displacement
Displacement (mm)
Time (ms)
Max: 30.3 mm
Min: -0.0 mm
Filter: CFC 600


Lateral Upper Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 19.9 g's
Min: -12.4 g's
Filter: CFC 180

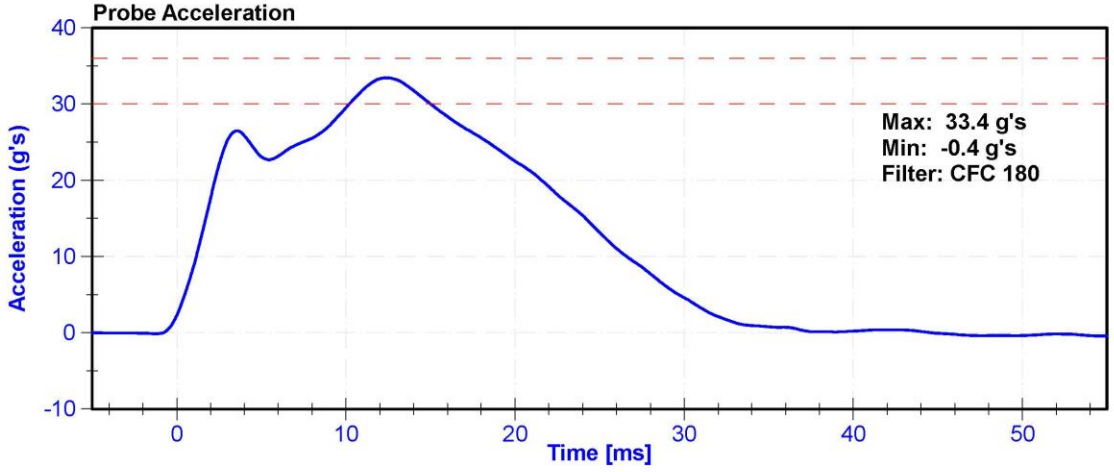
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

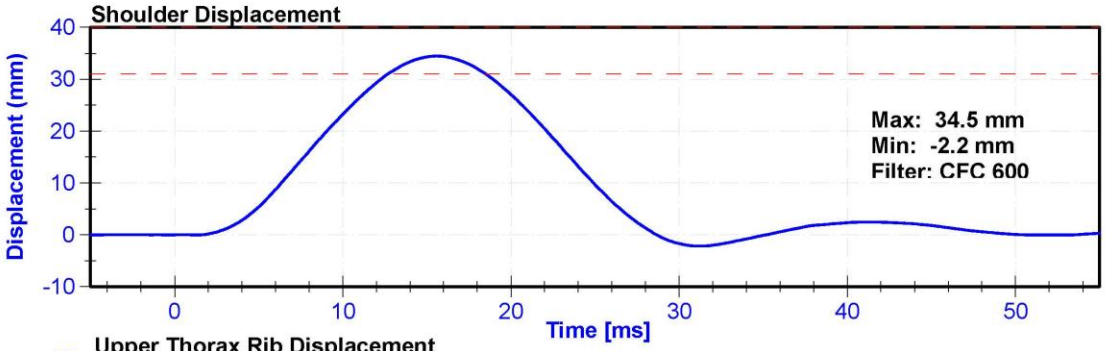
Results

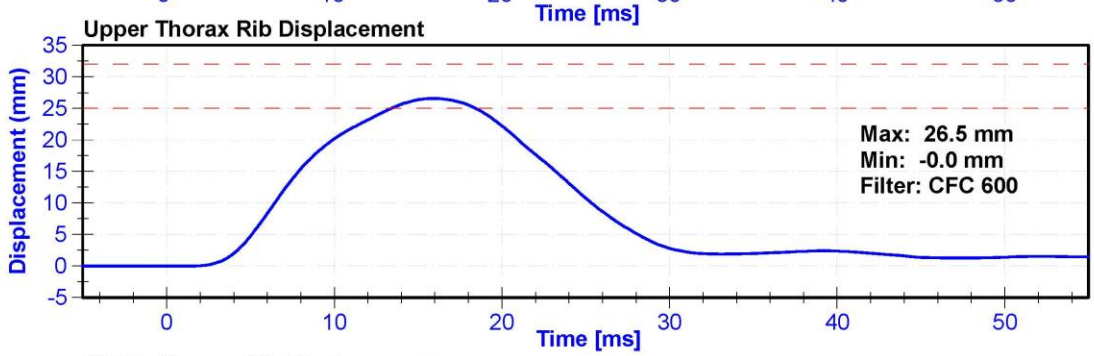
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.7	Pass
Humidity	10	70	%	58.0	Pass
Velocity	6.6	6.8	m/s	6.73	Pass
Probe Acceleration after 5 ms	30	36	g's	33.4	Pass
Lateral Upper Spine Acceleration	34	43	g's	37.1	Pass
Lateral Lower Spine Acceleration	29	37	g's	32.0	Pass
Shoulder Deflection	31	40	mm	34.5	Pass
Upper Thorax Rib Deflection	25	32	mm	26.5	Pass
Mid Thorax Rib Deflection	30	36	mm	32.1	Pass
Lower Thorax Rib Deflection	32	38	mm	33.7	Pass

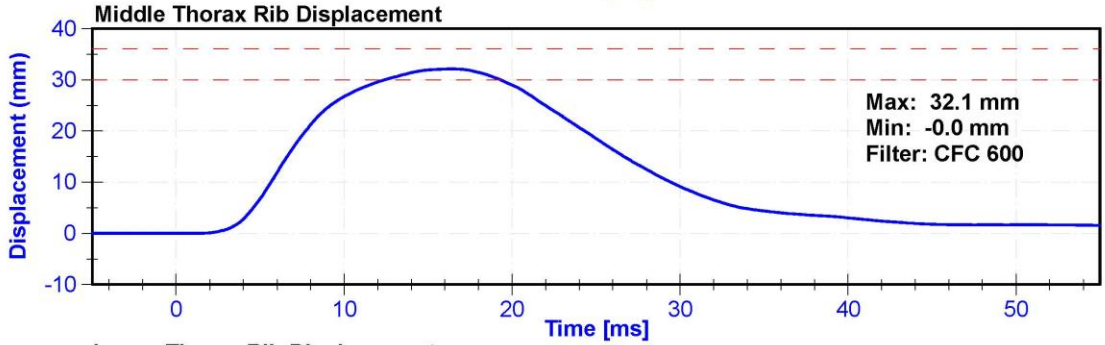
Transducer Calibrations

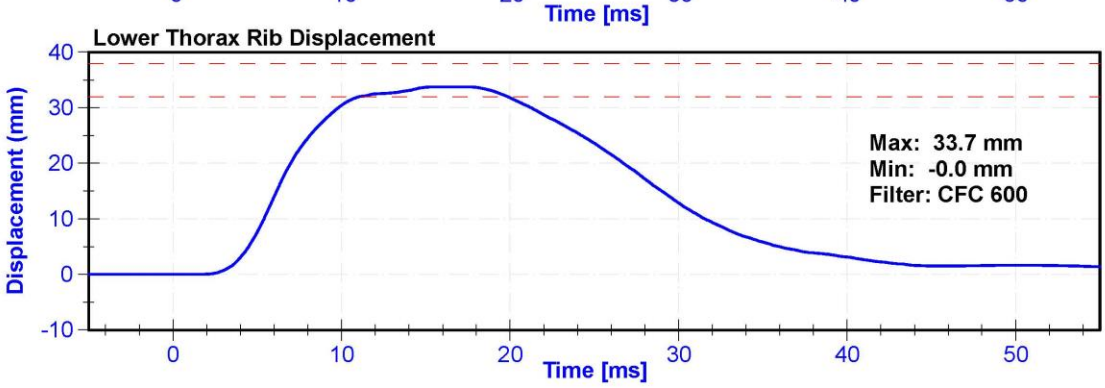
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A286228	1/29/2020	1/28/2021
Upper Spine T1 Y Accelerometer	ENDEVCO 7264CT	AC-P71281	7/30/2020	1/28/2021
Upper Spine T12 Y Accelerometer	ENDEVCO 7264	AC-P64147	4/20/2020	10/19/2020
Shoulder Potentiometer	Servo 08CT1-3725	DS-053 GFE	4/30/2020	10/29/2020
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	4/30/2020	10/29/2020
Middle Thorax Rib Potentiometer	Servo 08TC1-3745	DS-040GFE	4/30/2020	10/29/2020
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	4/30/2020	10/29/2020

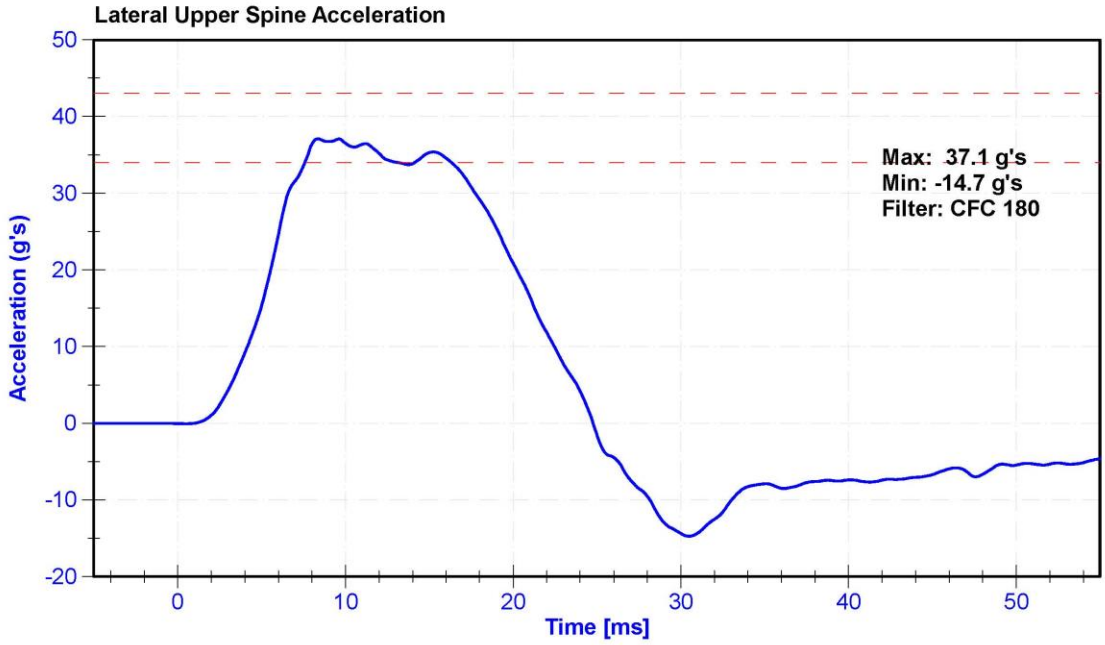


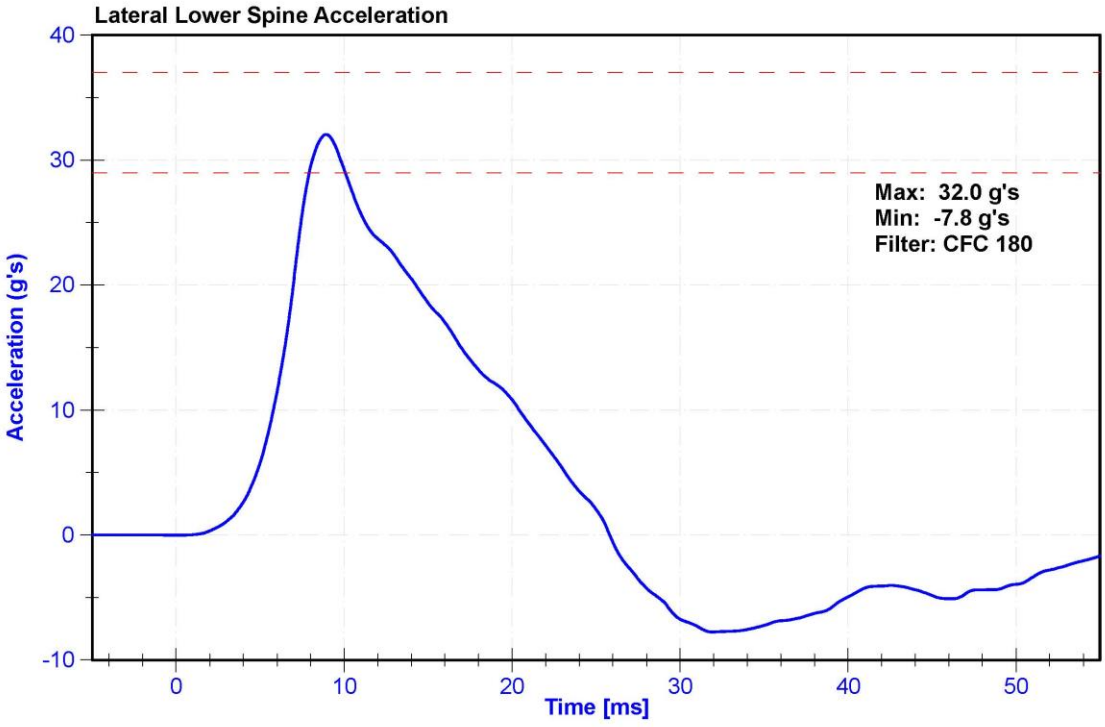

Shoulder Displacement
Displacement (mm)
Time [ms]
Max: 34.5 mm
Min: -2.2 mm
Filter: CFC 600


Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 26.5 mm
Min: -0.0 mm
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 32.1 mm
Min: -0.0 mm
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 33.7 mm
Min: -0.0 mm
Filter: CFC 600


Lateral Upper Spine Acceleration
Max: 37.1 g's
Min: -14.7 g's
Filter: CFC 180
Acceleration (g's)
Time [ms]
50
40
30
20
10
0
-10
-20
0
10
20
30
40
50


Lateral Lower Spine Acceleration
Max: 32.0 g's
Min: -7.8 g's
Filter: CFC 180
Acceleration (g's)
Time [ms]
40
30
20
10
0
-10
0
10
20
30
40
50

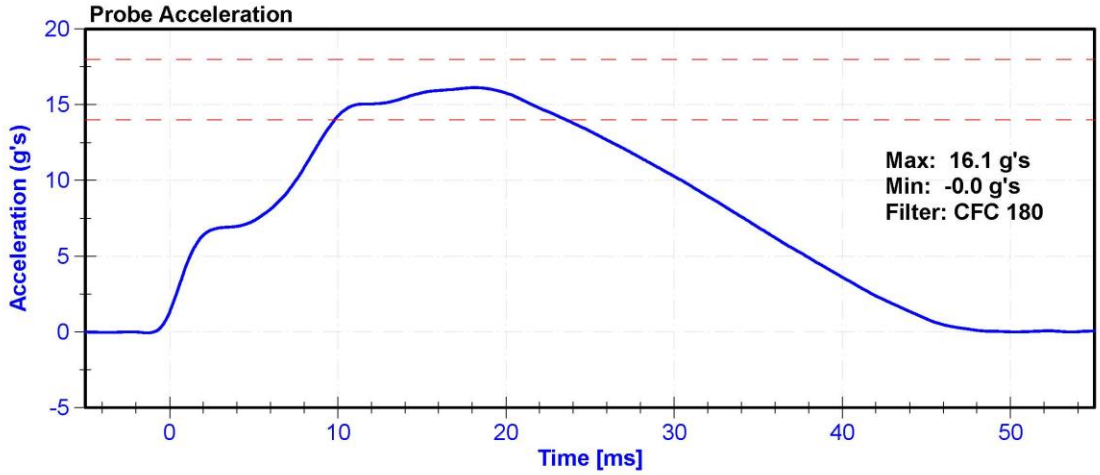
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

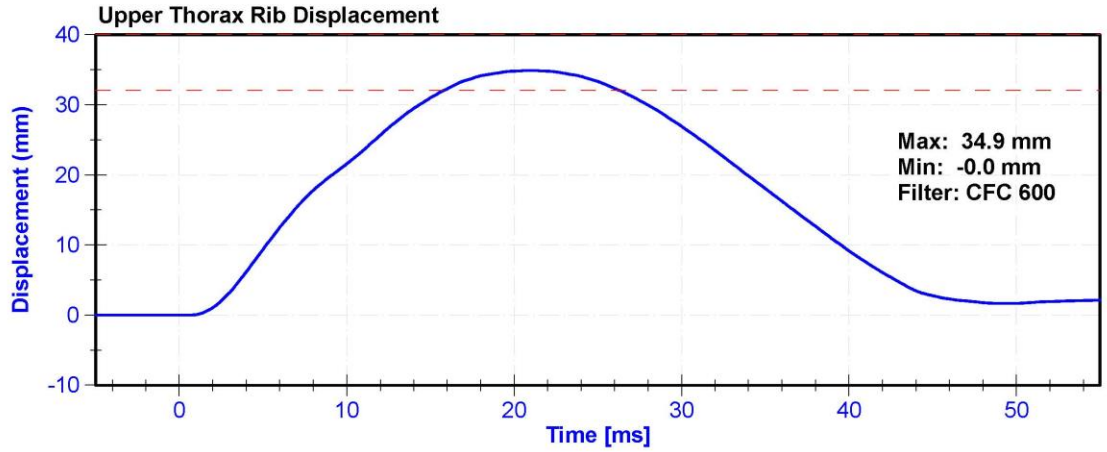
Results

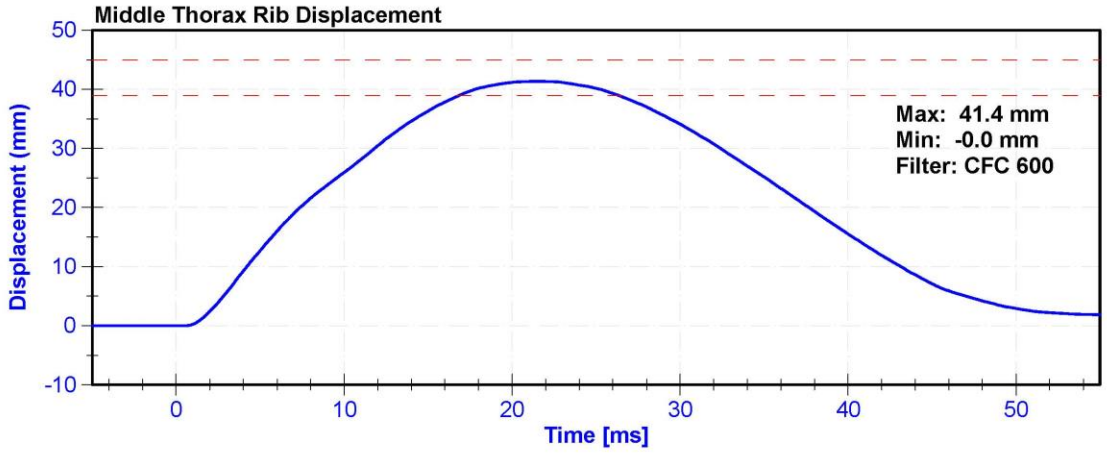
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.8	Pass
Humidity	10	70	%	62	Pass
Velocity	4.2	4.4	m/s	4.36	Pass
Probe Acceleration	14	18	g's	16.1	Pass
Lateral Upper Spine Acceleration	13	17	g's	15.1	Pass
Lateral Lower Spine Acceleration	7	11	g's	10.1	Pass
Upper Thorax Rib Deflection	32	40	mm	34.9	Pass
Middle Thorax Rib Deflection	39	45	mm	41.4	Pass
Lower Thorax Rib Deflection	35	43	mm	38.5	Pass

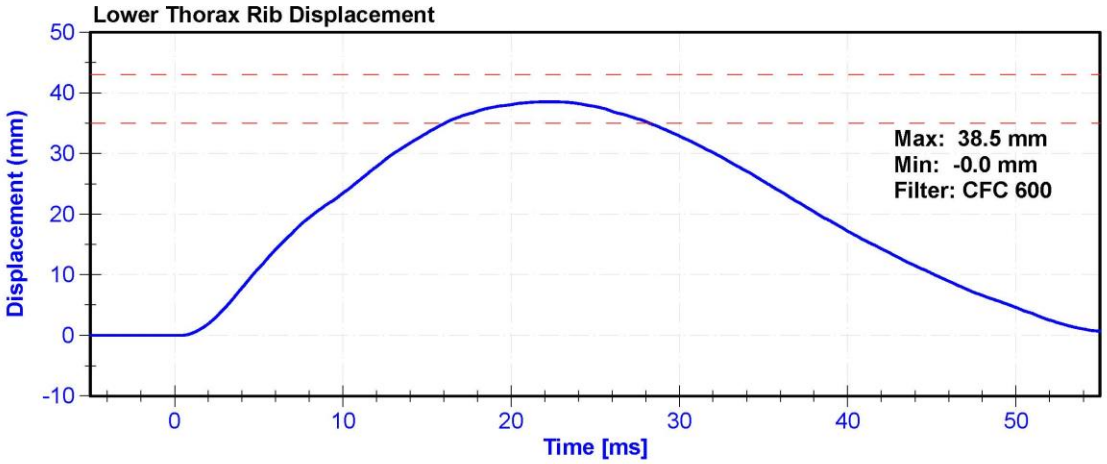
Transducer Calibrations

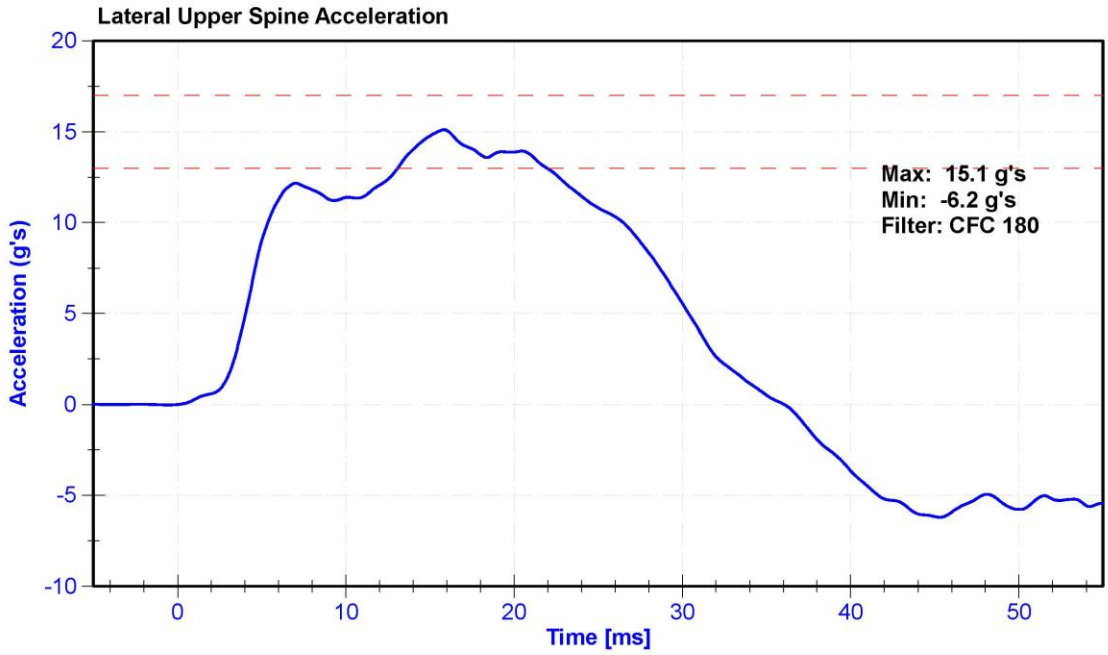
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A286228	1/29/2020	1/28/2021
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P71281	7/30/2020	1/28/2021
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	4/20/2020	10/19/2020
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	4/30/2020	10/29/2020
Middle Thorax Rib Potentiometer	Servo 08TC1-3745	DS-040GFE	4/30/2020	10/29/2020
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	4/30/2020	10/29/2020

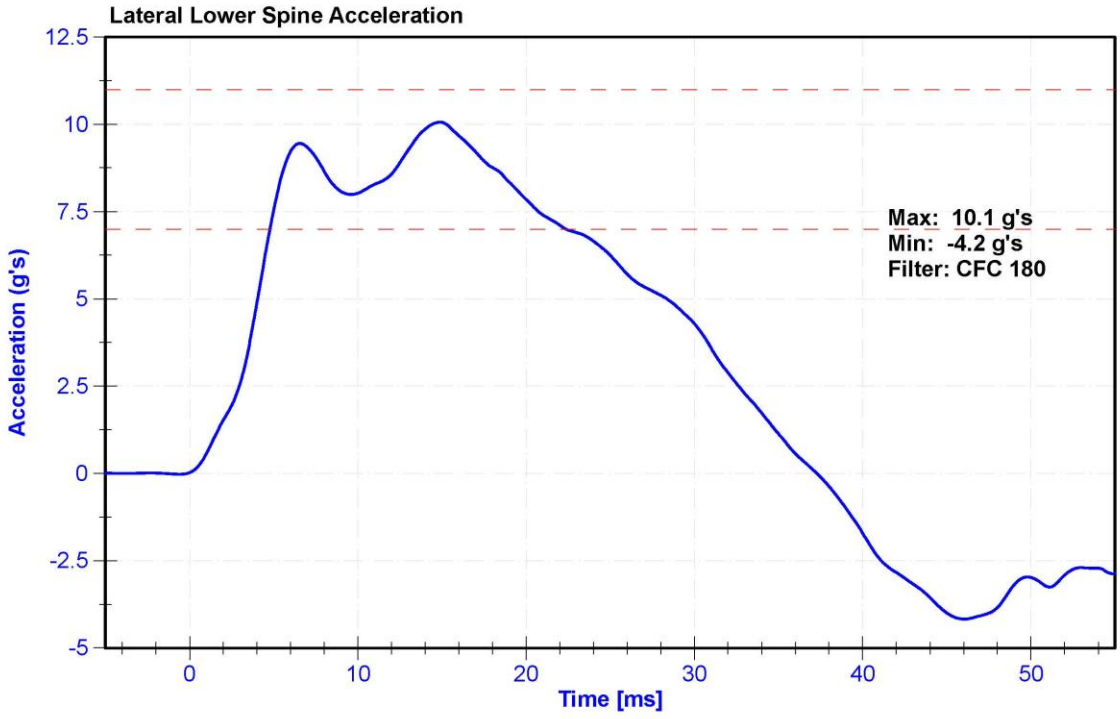



Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 34.9 mm
Min: -0.0 mm
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 41.4 mm
Min: -0.0 mm
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 38.5 mm
Min: -0.0 mm
Filter: CFC 600


Lateral Upper Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 15.1 g's
Min: -6.2 g's
Filter: CFC 180


Lateral Lower Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 10.1 g's
Min: -4.2 g's
Filter: CFC 180

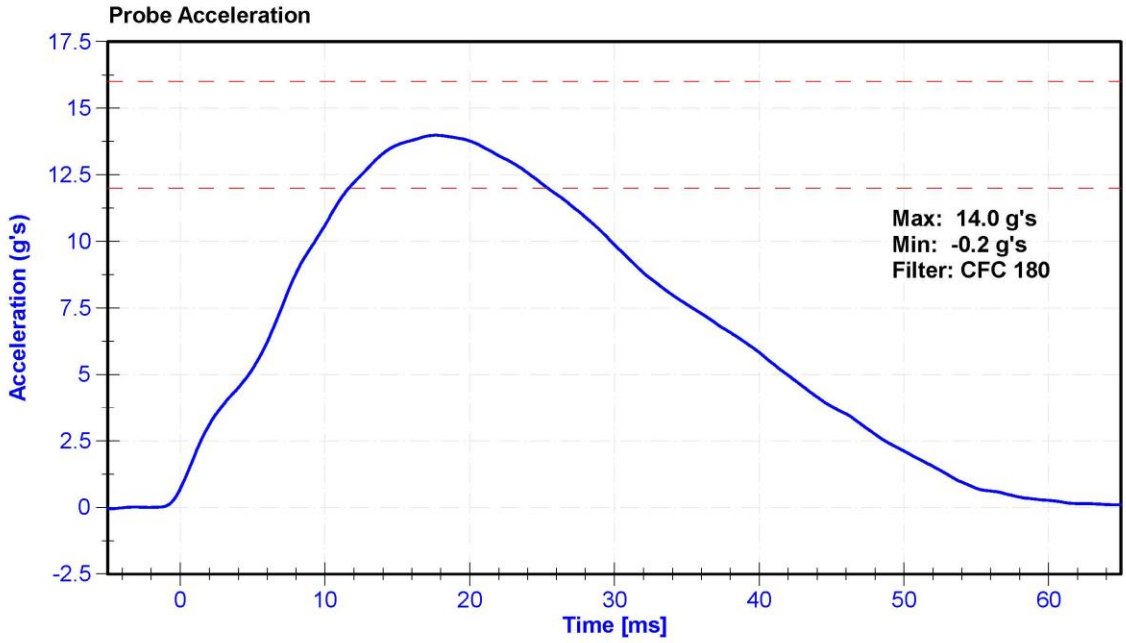
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

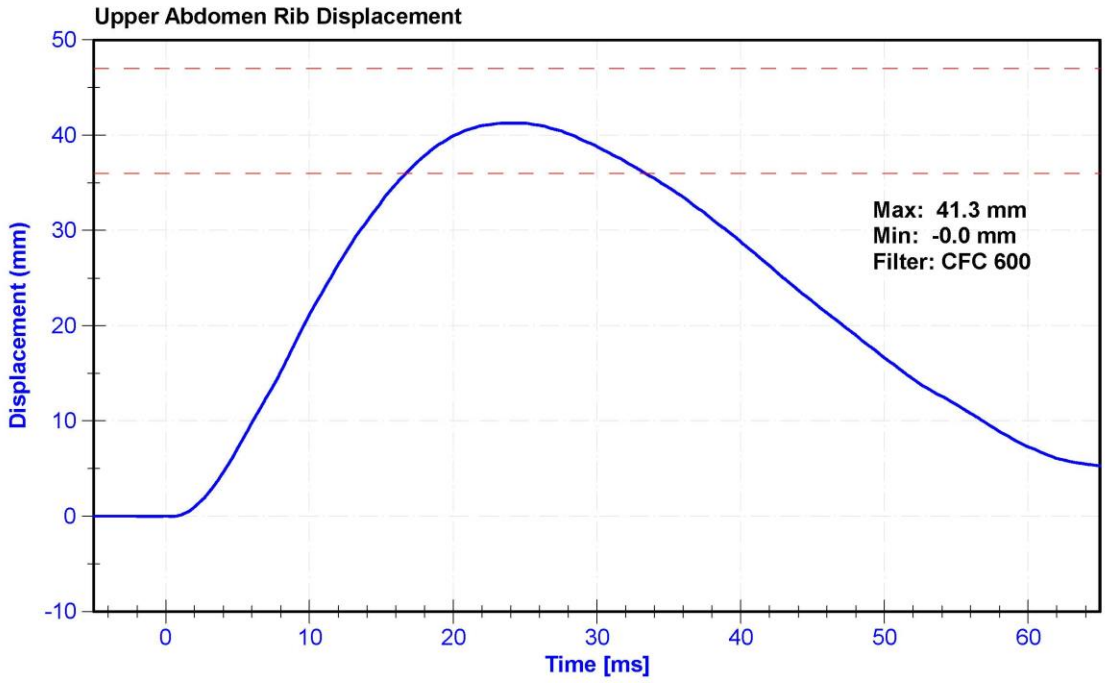
Results

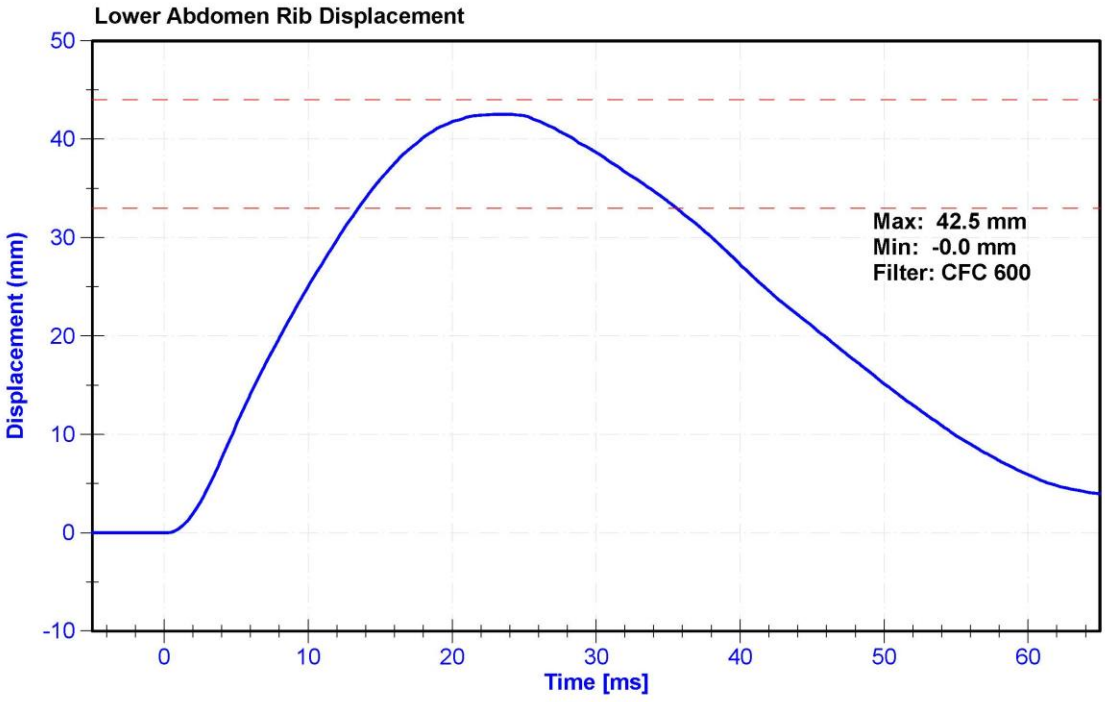
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.8	Pass
Humidity	10	70	%	64.0	Pass
Velocity	4.2	4.4	m/s	4.28	Pass
Probe Acceleration	12	16	g's	14.0	Pass
Lateral Lower Spine Acceleration	9	14	g's	10.5	Pass
Upper Abdomen Rib Deflection	36	47	mm	41.3	Pass
Lower Abdomen Rib Deflection	33	44	mm	42.5	Pass

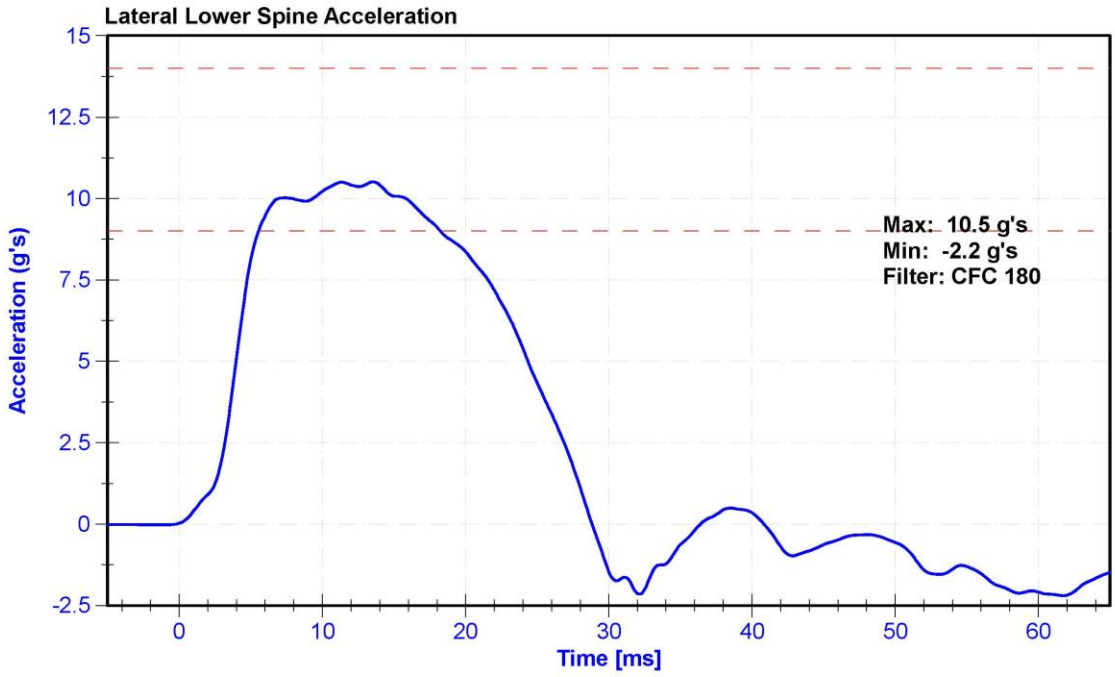
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	MSI 64C-2000	A286228	1/29/2020	1/28/2021
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	4/20/2020	10/19/2020
Upper Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-308GFE	4/30/2020	10/29/2020
Lower Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-307GFE	4/30/2020	10/29/2020




Upper Abdomen Rib Displacement
Displacement (mm)
Time [ms]
Max: 41.3 mm
Min: -0.0 mm
Filter: CFC 600


Lower Abdomen Rib Displacement
Displacement (mm)
Time [ms]
Max: 42.5 mm
Min: -0.0 mm
Filter: CFC 600


Lateral Lower Spine Acceleration
Acceleration (g's)
15
12.5
10
7.5
5
2.5
0
-2.5
0
10
20
30
40
50
60
Time [ms]
Max: 10.5 g's
Min: -2.2 g's
Filter: CFC 180

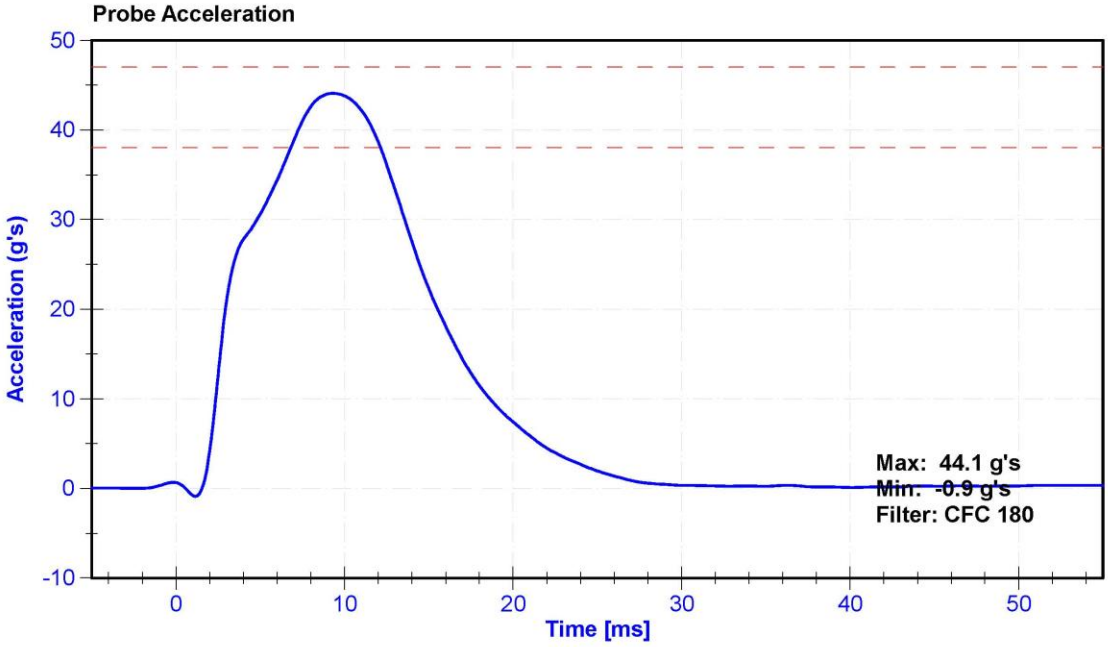
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

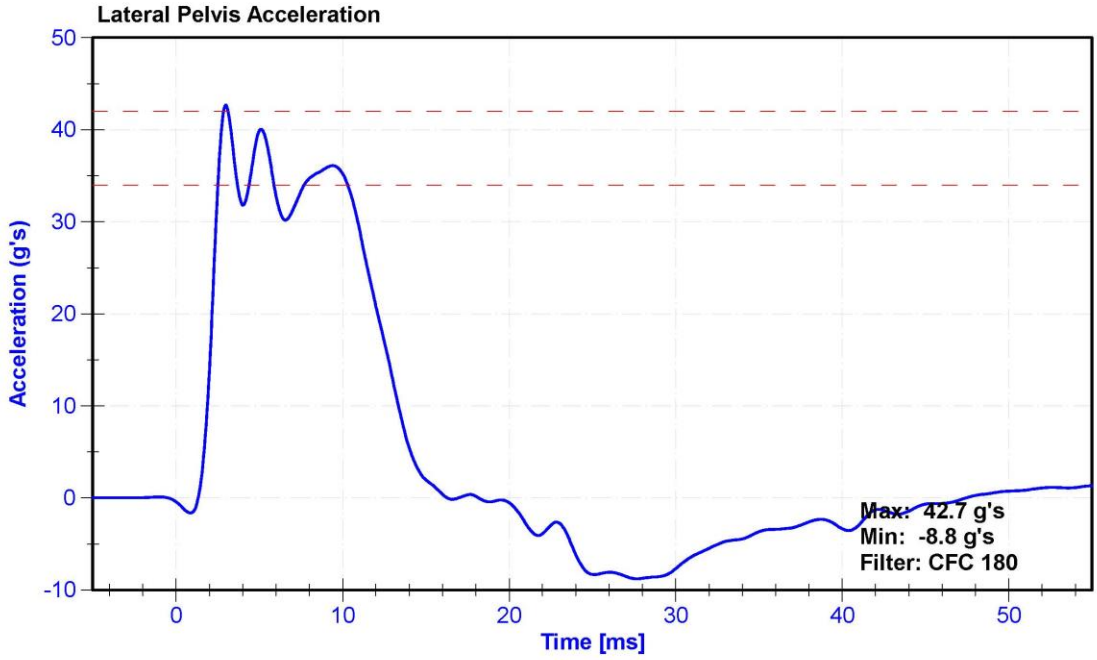
Results

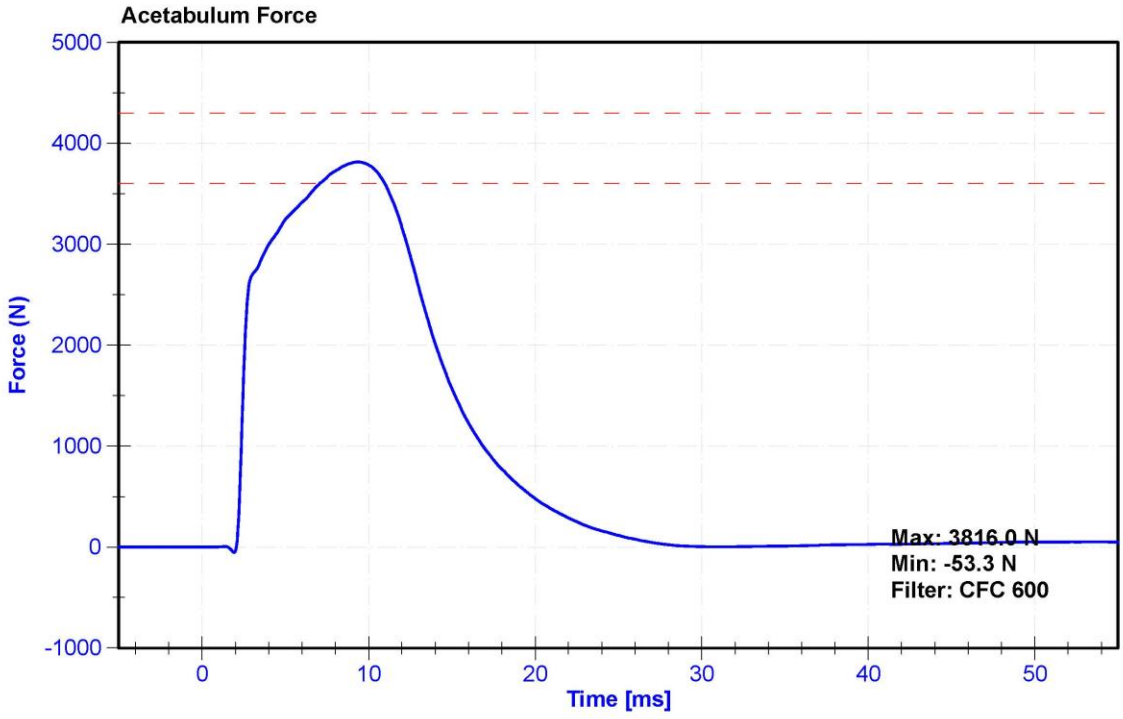
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.7	Pass
Humidity	10	70	%	65	Pass
Velocity	6.6	6.8	m/s	6.66	Pass
Probe Acceleration	38	47	g's	44.1	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	36.1	Pass
Acetabulum Force	3600	4300	N	3816.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A286228	1/29/2020	1/28/2021
Pelvis Y Accelerometer	ENDEVCO 7264C	AC-P51731	4/20/2020	10/19/2020
Acetabulum Load Cell	Denton IF-520	LC-236Fy	3/18/2020	3/18/2021
Certification Plug	SACO	13506	9/23/2019	N/A
Crash Test Plug	SACO	13485	9/23/2019	N/A




Lateral Pelvis Acceleration
Acceleration (g's)
50
40
30
20
10
0
-10
0
10
20
30
40
50
Time [ms]
Max: 42.7 g's
Min: -8.8 g's
Filter: CFC 180


Acetabulum Force
Force (N)
5000
4000
3000
2000
1000
0
-1000
0
10
20
30
40
50
Time [ms]
Max: 3816.0 N
Min: -53.3 N
Filter: CFC 600

300
cert1
6/25/2020

SID-IIs Pelvis Plug Certification Test

Plug S/N 13506
Test Number 11149
Report Number 11187
Test Date 9/23/2019 10:10:10 AM

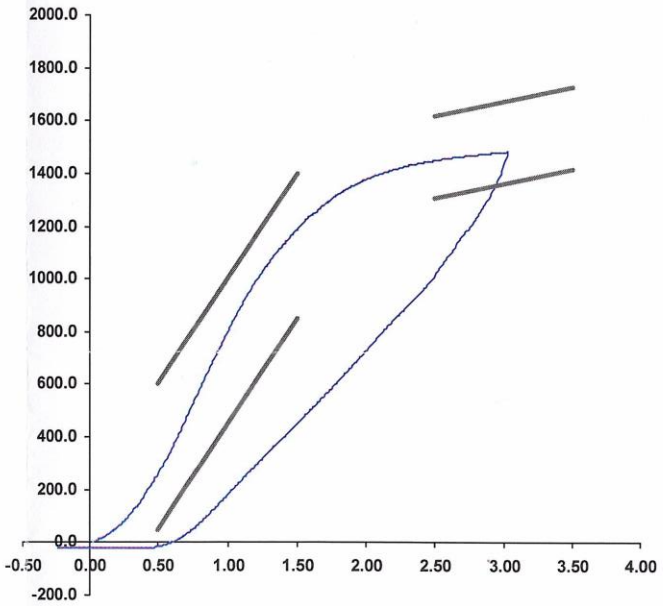
	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	276.52	50.00	600.00
Force @ 1.5 mm (N)	1,193.44	850.00	1,400.00
Force @ 2.5 mm (N)	1,450.45	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,482.35	1,361.00	1,673.00

Testing Machine STM-20 5965542
Load Cell S/N (FI360947), Units (LBS 1000

Crosshead Speed (mm / min) or Rat 12.7
Extension or Position Measured by XHD_100 (XHD100)

Notes:

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107 23-Sep-19
SACO Research

By : DC Date : 9/23/2019

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

SACO RESEARCH

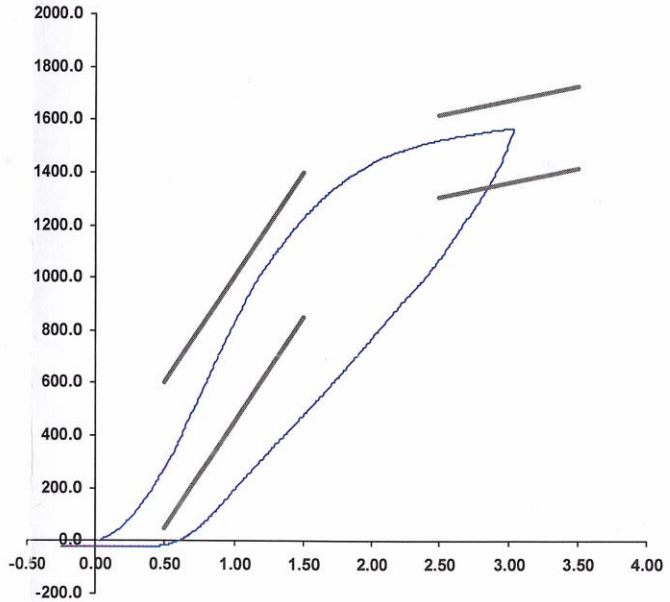
300, Crush 8/25/2020

SID-IIs Pelvis Plug Certification Test

Plug S/N 13485
Test Number 11128
Report Number 11166
Test Date 9/23/2019 8:28:39 AM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	283.85	50.00	600.00
Force @ 1.5 mm (N)	1,227.49	850.00	1,400.00
Force @ 2.5 mm (N)	1,524.61	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,567.56	1,361.00	1,673.00

Force (-N) vs Extension (-mm)



Testing Machine STM-20 5965542
Load Cell S/N (FI360947), Units (LBS 1000

Crosshead Speed (mm / min) or Rat 12.7
Extension or Position Measured by XHD_100 (XHD100)

Notes:

Operator

Part Number 180-4450

Template No 107 23-Sep-19
SACO Research

By : DC Date : 9/23/2019

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

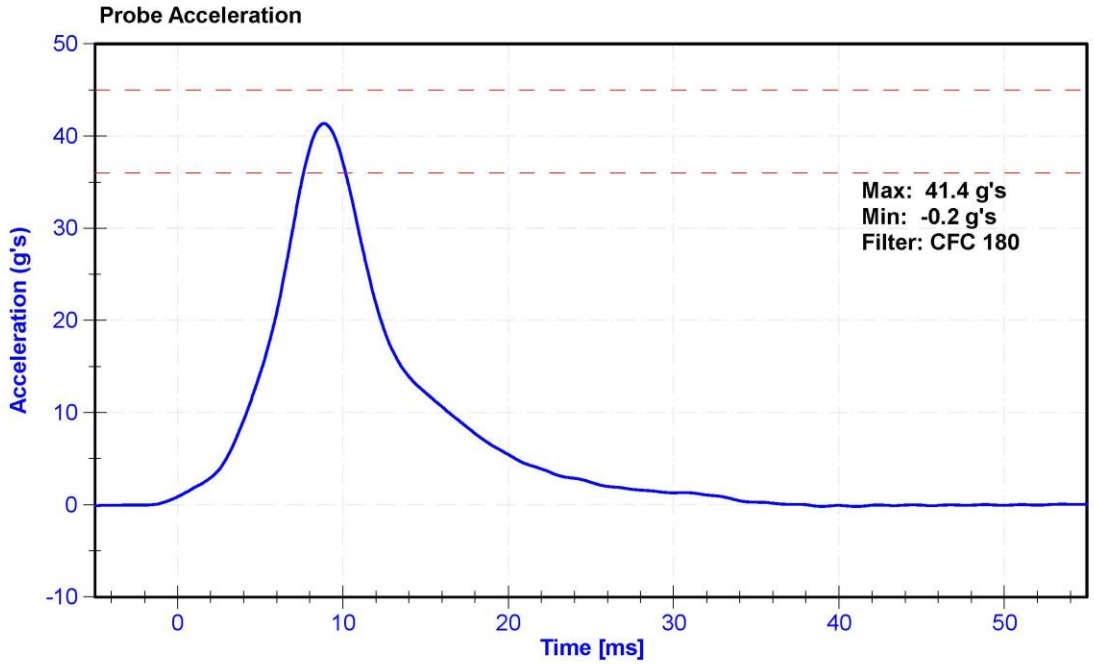
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	300	Laboratory Supervisor	D.Reinhard

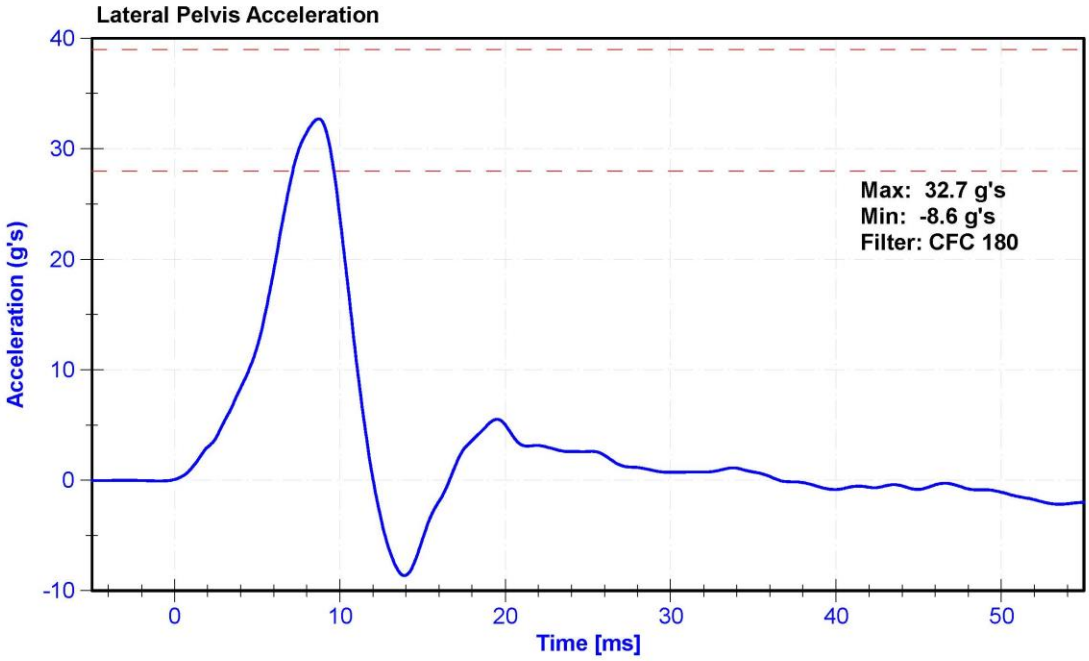
Results

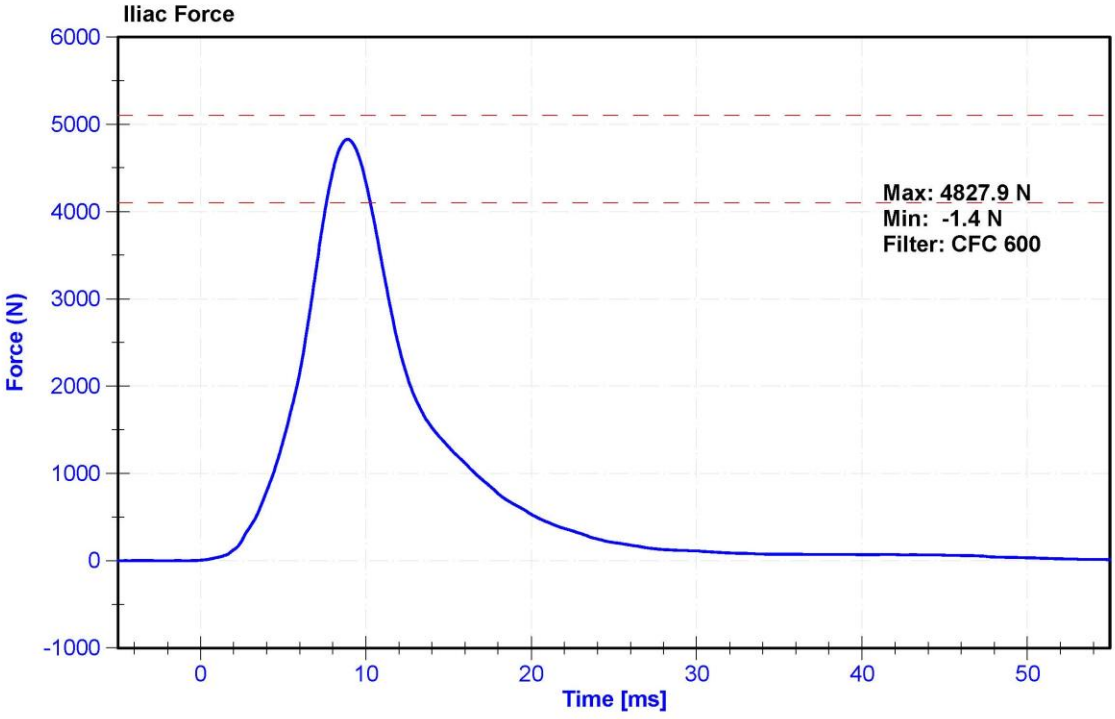
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.8	Pass
Humidity	10	70	%	67.0	Pass
Velocity	4.2	4.4	m/s	4.25	Pass
Probe Acceleration	36	45	g's	41.4	Pass
Lateral Pelvis Acceleration	28	39	g's	32.7	Pass
Iliac Force	4100	5100	N	4827.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A286228	1/29/2020	1/28/2021
Pelvis Y Accelerometer	ENDEVCO 7264C	AC-P51731	4/20/2020	10/19/2020
Iliac Load Cell	DENTON 3228J	LC-281Fy	3/19/2020	3/19/2021




Lateral Pelvis Acceleration
Acceleration (g's)
Time [ms]
Max: 32.7 g's
Min: -8.6 g's
Filter: CFC 180


Iliac Force
Force (N)
Time [ms]
Max: 4827.9 N
Min: -1.4 N
Filter: CFC 600

APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation (ES-2re)

			ES-2re S/N: F033		
			Serial Number	**Manufacturer**	**Calibration Date**
Head Accelerometers	Primary	X	AC-P63861	ENDEVCO	5/19/2020
		Y	AC-P49216	ENDEVCO	5/19/2020
		Z	AC-P51303	ENDEVCO	5/19/2020
	Redundant	X	AC-P58868	ENDEVCO	5/19/2020
		Y	AC-P16755	ENDEVCO	5/19/2020
		Z	AC-P52132	ENDEVCO	5/19/2020
Thorax Rib Displacement Potentiometers	Upper	Y	DS-179GFE	Honeywell	5/20/2020
	Middle	Y	DS-185GFE	Honeywell	5/20/2020
	Lower	Y	DS-178GFE	Honeywell	5/20/2020
Abdomen Load Cells	Forward	Y	26311512 GFE	DENTON	3/19/2020
	Middle	Y	26311526 GFE	DENTON	3/19/2020
	Rear	Y	26311516 GFE	DENTON	3/19/2020
Lower Spine Accelerometers (T12)		X	AC-P52009	ENDEVCO	5/15/2020
		Y	AC-P49163	ENDEVCO	5/15/2020
		Z	AC-P52033	ENDEVCO	5/15/2020
Pubic Symphysis Load Cell		Y	LC-464fy	DENTON	7/23/2020

Table 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N: 300		
				Serial Number	**Manufacturer**	**Calibration Date**
Head Accelerometers		Primary	X	AC-P59018	ENDEVCO	4/20/2020
			Y	AC-P79189	ENDEVCO	4/20/2020
			Z	AC-P58777	ENDEVCO	4/20/2020
		Redundant	X	AC-P68057	ENDEVCO	4/20/2020
			Y	AC-P58986	ENDEVCO	4/20/2020
			Z	AC-P52025	ENDEVCO	4/20/2020
Displacement Potentiometers	Thoracic Rib	Upper	Y	DS-451GFE	Servo	4/30/2020
		Middle	Y	DS-040GFE	Servo	4/30/2020
		Lower	Y	DS-1156GFE	Servo	4/30/2020
	Abdominal Rib	Upper	Y	DS-308GFE	Servo	4/30/2020
		Lower	Y	DS-307GFE	Servo	4/30/2020
Lower Spine Accelerometers (T12)			X	AC-P64003	ENDEVCO	4/20/2020
			Y	AC-P64147	ENDEVCO	4/20/2020
			Z	AC-P58786	ENDEVCO	4/20/2020
Acetabulum Load Cell			Y	LC-236Fy	DENTON	3/18/2020
Iliac Wing Load Cell			Y	LC-281Fy	DENTON	3/19/2020
Pelvis Plug (struck side)				13268	SACO	8/12/2019
Pelvis Plug (non-struck side)				-	-	-

Table 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	A262923	MSI 1201-1000	8/18/2020
	Vehicle Center of Gravity	Y	A280876	MSI 1201-1000	8/18/2020
	Vehicle Center of Gravity	Z	A281016	MSI 1201-1000	8/18/2020
2	Right Sill at Front Seat	X	A315189	MSI 1201-1000	3/17/2020
	Right Sill at Front Seat	Y	A315749	MSI 1201-1000	3/17/2020
	Right Sill at Front Seat	Z	A315900	MSI 1201-1000	3/17/2020
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	A284376	MSI 1201-1000	3/26/2020
5	Left Sill at Rear Door	Y	A315899	MSI 1201-1000	3/30/2020
6	Left A-Post Lower	Y	A315010	MSI 1201-1000	3/31/2020
7	Left A-Post Middle	Y	A315011	MSI 1201-1000	3/7/2020
8	Left B-Post Lower	Y	A280925	MSI 1201-1000	8/18/2020
9	Left B-Post Middle	Y	A284327	MSI 1201-1000	5/6/2020
10	Front Seat Track	Y	A315783	MSI 1201-1000	3/20/2020
11	Rear Seat Track or Structure	Y	A280911	MSI 1201-1000	8/18/2020
12	Right Rear Occ. Compartment	Y	A315807	MSI 1201-1000	3/4/2020
13	Engine Block	X	A315703	MSI 1201-1000	3/5/2020
	Engine Block	Y	A315764	MSI 1201-1000	3/20/2020
14	Rear Floorpan Above Axle	X	A315099	MSI 1201-1000	3/17/2020
	Rear Floorpan Above Axle	Y	A315761	MSI 1201-1000	3/17/2020
	Rear Floorpan Above Axle	Z	A315856	MSI 1201-1000	3/17/2020

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