REPORT NUMBER: SPNCAP-CAL-22-004

NEW CAR ASSESSMENT PROGRAM (NCAP)
SIDE IMPACT POLE TEST

Ford Motor CO.
2022 Ford Maverick XL
Four Door Truck

NHTSA No: M20220210

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

January 17, 2023

FINAL REPORT

PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
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Prepared by: Matthew Pronko Date: January 17, 2023
Matthew Pronko, Test Engineer

Approved by: Vanessa Hansen Date: January 17, 2023
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. SideNCAPPole-CAL-22-004	***2. Government Accession No.***	***3. Recipient's Catalog No.***
4. Title and Subtitle Final Report of New Car Assessment Program Side Impact Pole Testing of 2022 Ford Maverick XL Truck NHTSA No.: M20220210		***5. Report Date*** January 17, 2023 ***6. Performing Organization Code*** CAL
7. Author(s) Matthew Pronko, Test Engineer Vanessa Hansen, Operations Manager		***8. Performing Organization Report No.*** CAL-DOT-2022-004
9. Performing Organization Name and Address Calspan Corporation Transportation Test Operation P.O. Box 400 Buffalo, New York 14225		***10. Work Unit No.*** ***11. Contract or Grant No.*** 693JJ920D000016
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, June 24, 2022 - January 17, 2023 ***14. Sponsoring Agency Code*** NRM-100
15. *Supplementary Notes*		

16. Abstract

A 32.20 km/h (20 mph), 75˚ oblique impact Side NCAP Test was conducted on the subject 2022 Ford Maverick XL Truck in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP Pole Laboratory Test Procedure for the generation of consumer information on vehicle side pole crash protection. This test was conducted at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on June 24, 2022.

The impact velocity of the vehicle was 32.23 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle was 21°C. The target vehicle's maximum post-test static crush was 330 mm located at level 3. The test vehicle's occupant performance data is as follows:

Measurement Description	Driver ATD (SID-IIs) (Serial No. 300)		
	Units	Threshold	Result
Head Injury Criteria (HIC_{36})		1000	255.272
Resultant Lower Spine Acceleration	G	82	34.758
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2039.151
Maximum Thoracic Rib Deflection	mm	38	18.357
Maximum Abdomen Rib Deflection	mm	45	13.554

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 Pole Part 572V 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

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UNCLASSIFIED	UNCLASSIFIED	126	

Form DOT F1700.7 (8-72)

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SECTION 1

TEST PURPOSE AND PROCEDURE

This side impact test was conducted as part of the MY 2022 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. 693JJ920D000016. The purpose of this test is to generate comparative side impact performance in a 2022 Ford Maverick XL Truck. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Pole Laboratory Test Procedure, dated March 2020.

SECTION 2

SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2022 Ford Maverick XL Truck. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.23 km/h. The test was conducted by Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on June 24, 2022. Pre-test and post-test photographs of the test vehicle and side impact dummy (SID-IIs) are included in Appendix A of this report.

One Part 572V (SID-IIs) dummy was placed in the driver designated seating position according to instructions specified in the OCWS Side NCAP Pole Laboratory Test Procedure, dated March 2020. The side impact event was documented by 11 cameras. Camera locations and other pertinent camera information are included on page 3-11 in this report.

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

Head CG tri-axial accelerometers
Thorax upper, middle, and lower rib displacement potentiometers
Abdomen upper and lower rib displacement potentiometers
Lower spine tri-axial accelerometers
Iliac load cell
Acetabulum load cell

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

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

INJURY READINGS

Measurement Description	Driver ATD (SID-IIs)		
	Units	IARV	Result
Head Injury Criteria (HIC_{36})		1000	255.272
Resultant Lower Spine Acceleration	g	82	34.758
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2039.151
Maximum Thoracic Rib Deflection	mm	38*	18.357
Maximum Abdominal Rib Deflection	mm	45*	13.554

*****Proposed IARV

Supplemental restraint information was recorded as follows:

SUPPLEMENTAL RESTRAINT INFORMATION

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

GENERAL COMMENTS:

1. P1 serial number – 300

Data Anomalies:

- Driver Upper Thorax Rib Y Displacement, Questionable data from 33.1 ms to 38.1 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 Systems Data

Data Sheet No. 3 – Dummy Longitudinal Clearance Dimensions

Data Sheet No. 4 – Dummy Lateral Clearance Dimensions

Data Sheet No. 5 – Camera and instrumentation Data

Data Sheet No. 6 – Vehicle Accelerometer Data

Data Sheet No. 7 – Rigid Pole Load Cell Data

Data Sheet No. 8 – Post-Test Observations

Data Sheet No. 9 – Test Vehicle Profile Measurements

Data Sheet No. 10 – Test Vehicle Exterior Crush Measurements

Data Sheet No. 11 – Vehicle Damage Profile Distances

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

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

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2022 Ford Maverick XL Truck
NHTSA No.: M20220210
Test Program: NCAP Side Pole Impact Test
Test Date: 6/24/2022

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20220210
Model Year	2022
Make	Ford
Model	Maverick XL
Body Style	Truck
VIN	3FTTW8E97NRA55750
Body Color	Gray
Odometer Reading (km/mi)	3.6 miles
Engine Displacement (L)	2.0
Type / No. Cylinders	I4
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	8-Speed
Overdrive	Yes
Final Drive	Front Wheel Drive
Roof Rack	No
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	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 Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso / Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	Yes
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head / Torso Airbag	No
Rear Pass. Torso Airbag	No
Rear Pass. Torso / Pelvis Airbag	No
Rear Pass. Pelvis Airbag	No
Driver Seat Belt Pretensioner	Yes
Rear Pass. Seat Belt Pretensioner	Yes
Driver Load Limiter	Yes
Rear Pass. Load Limiter	Yes
Other Safety Restraint	-

Does owner's manual provide instructions to turn off automatic door locks? No

DATA FROM CERTIFICATION LABEL

Manufactured By	Ford Motor CO.
Date of Manufacture	04/22
Vehicle Type	Truck

GVWR (kg)	2304
GAWR Front (kg)	1188
GAWR Rear (kg)	1252

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3	-	5	
Capacity Weight (VCW) (kg)				704	(A)
DSC X 68.04 kg				340.2	(B)
Cargo Weight (RCLW) (kg)				136	(A-B)

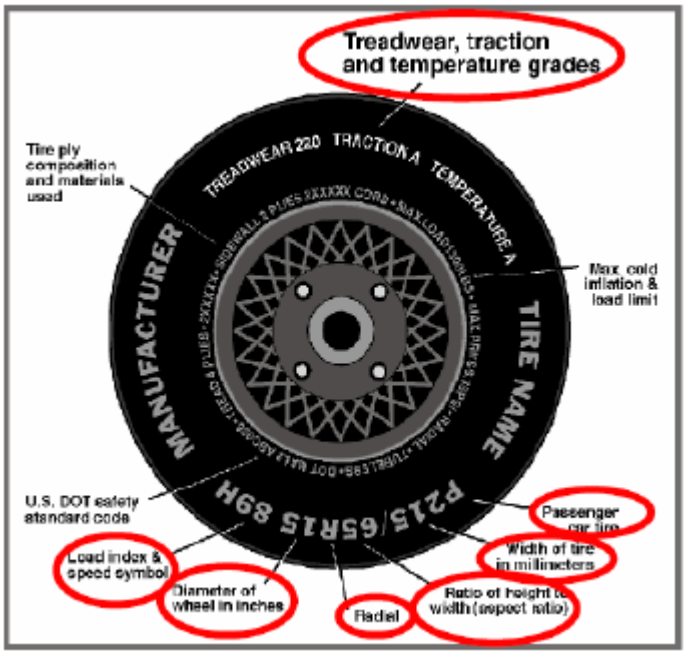
VEHICLE SEAT TYPE

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:	2022 Ford Maverick XL Truck	NHTSA No.:	M20220210
Test Program:	NCAP Side Pole Impact Test	Test Date:	6/24/2022

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



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	240	240
Recommended Tire Size	225/65R17	225/65R17
Tire Size on Vehicle	225/65R17	225/65R17
Tire Manufacturer	Continental	Continental
Tire Model	ProContact	ProContact
Treadwear	500	500
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	1 Polyester	1 Polyester
Tire Plies Body	1 Polyester, 2 Steel, 1 Polyamide	1 Polyester, 2 Steel, 1 Polyamide
Load Index/Speed Symbol	102H	102H
Tire Material	Rubber	Rubber
DOT Safety Code Left	1P50FBC3K1322	1P50FBC3K1322
DOT Safety Code Right	1P50FBC3K1422	1P50FBC3K1322

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

Test Vehicle: 2022 Ford Maverick XL Truck NHTSA No.: M20220210
Test Program: NCAP Side Pole Impact Test Test Date: 6/24/2022

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	267	268	267	264
Tire Placard	kPa	240	240	240	240
Owner's Manual	kPa	240	240	240	240
As Tested	kPa	240	240	240	240

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	478.5	336		497	410		494	422	
Right	kg	479	306.5		479	392		484	386	
Ratio	%	59.8	40.1		54.9	45.1		54.8	45.2	
Totals	kg	957.5	642.5	1600	976	802	1778	978	808	1786

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1600	(A)
Actual Weight of 1 P572V (SID-IIs) ATD Used	kg	50	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	136	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1786	(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	As Delivered	As Tested	Fully Loaded	Meets Rqmt***
Driver Door Sill Angle (front-to-rear)*	Deg	-0.65	-0.65	0.20	Yes
Front Passenger Sill Angle (front-to-rear)*	Deg	-0.20	-0.20	-0.20	Yes
Front Bumper-Line Angle (left-to-right)**	Deg	0.05	0.20	0.35	Yes
Rear Bumper-Line Angle (left-to-right)**	Deg	-0.10	-0.10	-0.70	Yes
Vehicle CG (Aft of Front Axle)	mm	1233	1385	1389	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	15	16	21	

* ND = Nose Down (-), NU = Nose Up (+)
** LD = Left Down (-), LU = Left Up (+)
*** The "As Tested" vehicle attitude measurements must be equal to or between the "As Delivered" and "Fully Loaded" vehicle attitude measurements. Indicate "Yes" or "No" for Meets Requirement"

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

Test Vehicle:	2022 Ford Maverick XL Truck	NHTSA No.:	M20220210
Test Program:	NCAP Side Pole Impact Test	Test Date:	6/24/2022

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
None	0
Ballast / Equipment Added	68

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

Test Surface Markings

	Distance from 75° Impact Location Line (mm)
Fore 25 mm target	954
Aft 25 mm target	953

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

Test Vehicle:	2022 Ford Maverick XL Truck	NHTSA No.:	M20220210
Test Program:	NCAP Side Pole Impact Test	Test Date:	6/24/2022

SEAT POSITIONING

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

SCRL ANGLE RANGE

Seat	SCRL (º)		
	Max	Min	Mid
Driver Seat	15.8	10.8	13.3
Front Passenger Seat	Not Adjustable		
Front Center Seat			
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (º)	As Tested SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid-Fore / Aft	Forward-Most
Driver Seat	13.3	21	Max	-	-	-
			Mid	12	17	21
			Min	-	-	-
Front Passenger Seat	Not Adjustable		Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
Front Center Seat	N/A	N/A	Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
Struck Side Rear Seat	Fixed	Fixed	Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
Non-Struck Side Rear Seat	Fixed	Fixed	Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
Rear Center Seat	Fixed	Fixed	Max	-	-	-
			Mid	-	-	-
			Min	-	-	-

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

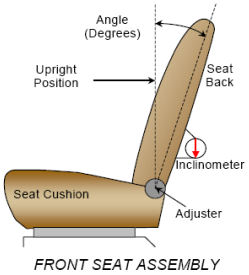
Test Vehicle: 2022 Ford Maverick XL Truck NHTSA No.: M20220210
Test Program: NCAP Side Pole Impact Test Test Date: 6/24/2022

SEAT FORE / AFT POSITION

Seat	Total Fore / Aft Travel		Test Position from Forward most Position	
	mm	Detents*	mm	Detents*
Driver Seat	242	36 (0-35)	0	0
Front Passenger Seat	253	38 (0-37)	0	0
Front Center Seat				
Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed	Fixed

SEAT BACK ANGLE ADJUSTMENT

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



FRONT SEAT ASSEMBLY

Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detents*
Driver Seat w/Seated Dummy	50.6	-	5.8	4
Front Passenger Seat	49.6	-	6.0	5
Front Center Seat				
Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed	Fixed

SEAT BELT ANCHORAGE ADJUSTMENT

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

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

HEAD RESTRAINT ADJUSTMENT

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

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

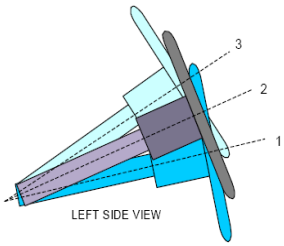
DATA SHEET NO. 2 … (CONTINUED)
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle:	2022 Ford Maverick XL Truck	NHTSA No.:	M20220210
Test Program:	NCAP Side Pole Impact Test	Test Date:	6/24/2022

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	21.9	
Geometric Center – Position 2	24.1	
Uppermost – Position 3	26.0	
Telescoping Steering Wheel Travel		55
Test Position	24.1	22.5

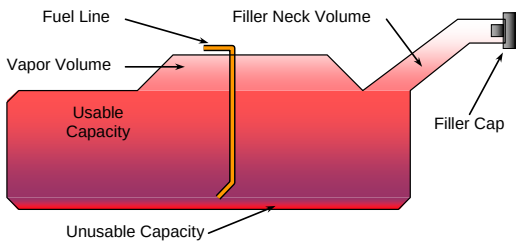


STEERING COLUMN ASSEMBLY

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

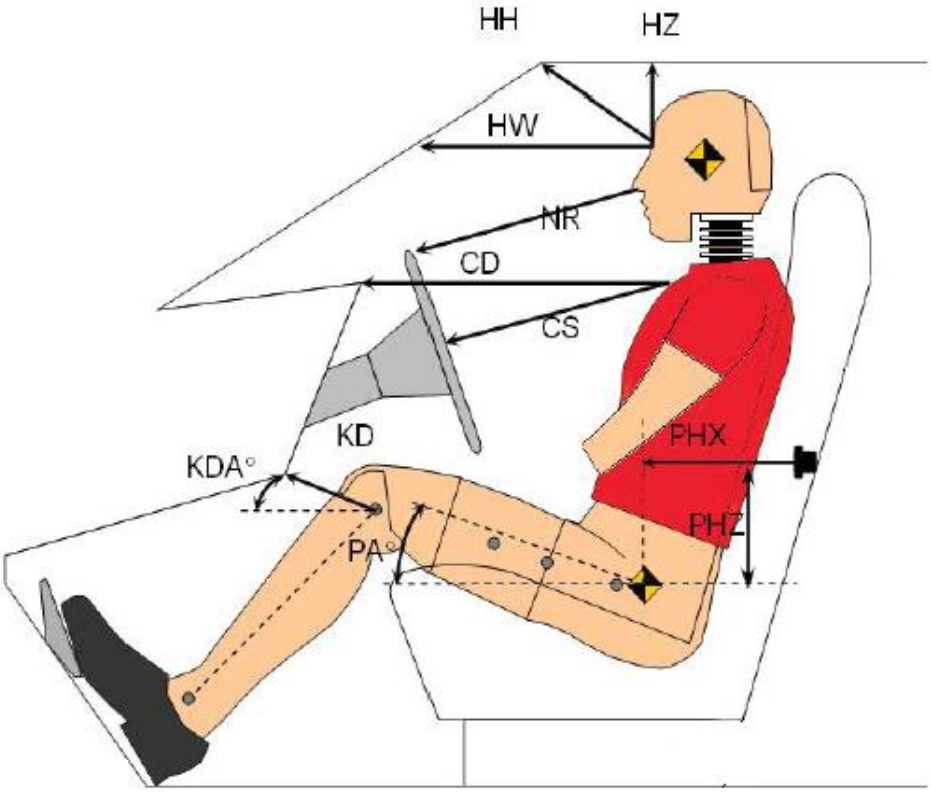
FUEL TANK CAPACITY DATA

Description			Liters
Usable Capacity of “Standard Tank”	-	see Form No. 1	62.5
Usable Capacity of “Optional Tank”	-	see Form No. 1	N/A
Usable Capacity of “Standard Tank”	-	see Owner’s Manual	62.5
Usable Capacity of “Optional Tank”	-	see Owner’s Manual	N/A
93% of Usable Capacity			58.1
Actual Amount of Solvent Used in Test			58.1
1/3 of Usable Capacity			20.8

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:	2022 Ford Maverick XL Truck	NHTSA No.:	M20220210
Test Program:	NCAP Side Pole Impact Test	Test Date:	6/24/2022



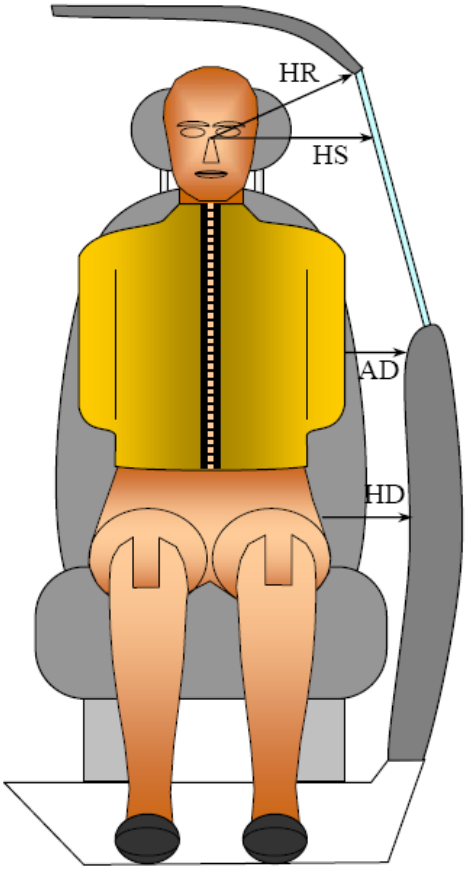
Left Side View

DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Description	Driver (Serial No. 300)	
		Length (mm)	Angle (◦)
HH	Head to Header	351	
HW	Head to Windshield	600	
HZ	Head to Roof Liner	240	
NR	Nose to Rim	232	
CD	Chest to Dash	409	
CS	Chest to Steering Wheel	181	
KD(L) / KDA(L)◦	Left Knee to Dash	151	32.1
KD(R) / KDA(R)◦	Right Knee to Dash	155	22.0
PAX◦	Pelvic Tilt Angle (X-Axis)		19.2
PAY◦	Pelvic Tilt Angle (Y-Axis)		0.2
PHX	Hip Point to Striker (X-Axis)	325	
PHZ	Hip Point to Striker (Z-Axis)	115	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle:	2022 Ford Maverick XL Truck	NHTSA No.:	M20220210
Test Program:	NCAP Side Pole Impact Test	Test Date:	6/24/2022



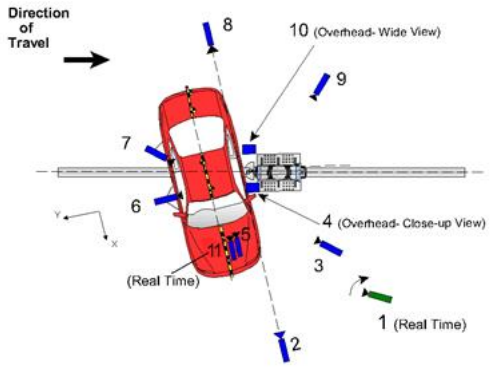
FRONT VIEW OF DUMMY

DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver - Length (Serial No. 300)
HR	Head To Side Header	mm	295
HS	Head to Side Window	mm	394
AD	Arm to Door	mm	170
HD	Hip Point to Door	mm	170

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2022 Ford Maverick XL Truck NHTSA No.: M20220210
Test Program: NCAP Side Pole Impact Test Test Date: 6/24/2022



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Real-time (24 - 30 fps) pan view of impact				Zoom	60
2	Front ground level - impact view	8103	0	-1463	28	1000
3	Impact side 45º - forward pole view	5098	-1321	-1570	24	1000
4	Overhead Close-up view of impact	0	0	-9375	24	1000
5	Onboard - dummy front view				25	1000
6	Onboard - dummy side view				12.5	1000
7	Onboard - dummy rear oblique view				12.5	1000
8	Rear ground level - impact view	-9020	0	-1469	28	1000
9	Impact side 45º - rearward pole view	-5295	-3894	-1592	24	1000
10	Overhead wide - view of impact	0	0	-9375	12.5	1000
11	Real-time (24 - 30 fps) - dummy front view				Zoom	60

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

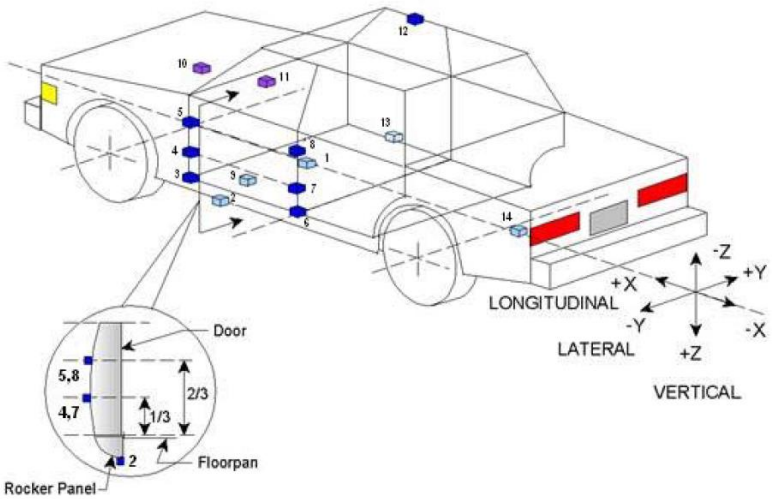
Comments: All cameras operated as intended.

INSTRUMENTATION

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

DATA SHEET NO. 6
VEHICLE ACCELEROMETER DATA

Test Vehicle: 2022 Ford Maverick XL Truck NHTSA No.: M20220210
Test Program: NCAP Side Pole Impact Test Test Date: 6/24/2022



TEST VEHICLE ACCELEROMETER LOCATIONS

No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	3111	3	-111
2	Left Floor Sill	3267	-671	100
3	A-Pillar Sill	3627	-645	94
4	A-Pillar Low	3722	-637	-64
5	A-Pillar Mid	3621	-674	-639
6	B-Pillar Sill	2599	-656	122
7	B-Pillar Low	2648	-698	-203
8	B-Pillar Mid	2602	-680	-565
9	Driver Seat Track	2920	-555	79
10	Engine Top	4381	247	-333
11	Firewall	3988	216	-221
12	Right Roof	2525	680	-1067
13	Right Floor Sill	3209	660	111
14	Rear Floorpan	1204	-8	-173

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

DATA SHEET NO. 7
RIGID POLE LOAD CELL DATA

Test Vehicle:	2022 Ford Maverick XL Truck	NHTSA No.:	M20220210
Test Program:	NCAP Side Pole Impact Test	Test Date:	6/24/2022

POLE BARRIER

RIGID POLE LOAD CELL LOCATIONS

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

DATA SHEET NO. 8
POST-TEST OBSERVATIONS

Test Vehicle: 2022 Ford Maverick XL Truck NHTSA No.: M20220210
Test Program: NCAP Side Pole Impact Test Test Date: 6/24/2022

TEST DUMMY INFORMATION AND CONTACT POINTS

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

POST-TEST DOOR PERFORMANCE

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

POST-TEST SEAT PERFORMANCE

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

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

Test Vehicle: 2022 Ford Maverick XL Truck NHTSA No.: M20220210
Test Program: NCAP Side Pole Impact Test Test Date: 6/24/2022

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	A-Pillar and B-Pillar Buckled
Sill Separation	Minor separation at Impact Location
Windshield Damage	Cracks Throughout, Propagating from Struck Side A-Pillar
Side Window Damage	Driver Window Shattered Completely
Other Notable Effects	None

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

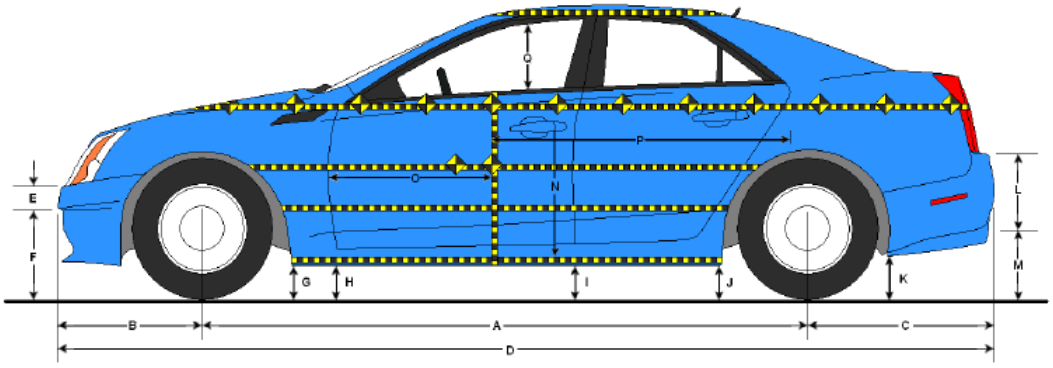
VEHICLE SPEED, VEHICLE ANGLE AT IMPACT AND IMPACT POINT LOCATION DATA

Measured Parameter		Units	Tolerance	Value
Vertical Impact Ref Line	- Aft of Front Axle, Intended Impact Pt	mm		1102
Actual Impact Point	- Aft of Front Axle	mm		1107
Horizontal Offset (+ forward / - rearward)		mm	+/- 38 *	-5
Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion		deg	75 +/- 3	75
Trap No. 1 Velocity	- Primary	kph	31.4 to 33.0	32.23
Trap No. 2 Velocity	- Redundant	kph	31.4 to 33.0	32.24

* Of Intended Impact Point

DATA SHEET NO. 9
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2022 Ford Maverick XL Truck
Test Program: NCAP Side Pole Impact Test
NHTSA No.: M20220210
Test Date: 6/24/2022



LEFT SIDE VIEW

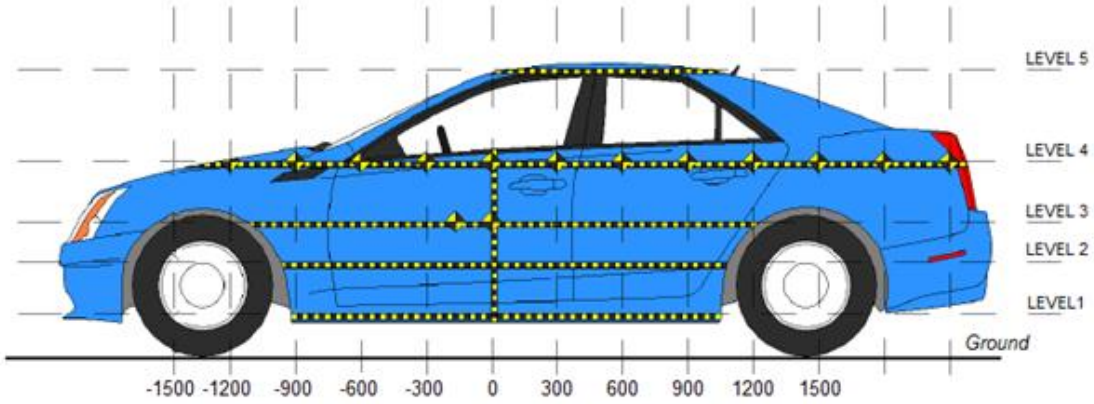
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Vehicle Wheelbase	3074	2984	90
B	Front Axle to FSOV	872	910	-38
C	Rear Axle to RSOV	1133	1141	-8
D	Total Length at Centerline	5078	5035	43
E	Front Bumper Thickness	110	110	0
F	Front Bumper Bottom to Ground	525	542	-17
G	Sill Height at Front Wheel Well	281	252	29
H	Sill Height at Front Door Leading Edge	281	246	35
I	Sill Height at B-Pillar	282	291	-9
J1	Sill Height at Rear Wheel Well	300	311	-11
J2	Pinch Weld Height at Rear Wheel Well	276	289	-13
K	Sill Height Aft of Rear Wheel Well	339	351	-12
L	Rear Bumper Thickness	227	227	0
M	Rear Bumper Bottom to Ground	361	367	-6
N	Sill Height to Bottom of Front Window Sill	742	741	1
O	Front Door Leading Edge to Impact CL	590	503	87
P	Rear Door Trailing Edge to Impact CL	1336	1254	82
Q	Front Window Opening	424	414	10
R	Right Side Length	4693	5021	-328
S	Left Side Length	3794	4957	-1163
T	Vehicle Width at B-Pillars	1824	1758	66
U	Front Wheel Track Width	1610	1618	-8
V	Rear Wheel Track Width	1600	1595	5

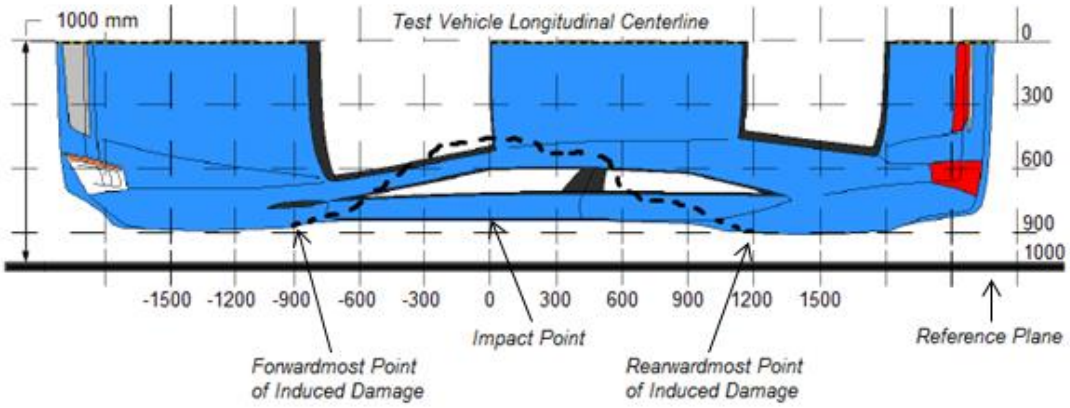
* All measurements in mm with tolerance of ± 3mm

DATA SHEET NO. 10
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2022 Ford Maverick XL Truck NHTSA No.: M20220210
Test Program: NCAP Side Pole Impact Test Test Date: 6/24/2022



Left Side View



Overhead View

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	406	263	0
2	Occupant Hip Point	mm	708	327	0
3	Mid - Door	mm	754	330	0
4	Window Sill	mm	1088	295	0
5	Window Top	mm	1604	166	0

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

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

Test Vehicle: 2022 Ford Maverick XL Truck NHTSA No.: M20220210
Test Program: NCAP Side Pole Impact Test Test Date: 6/24/2022

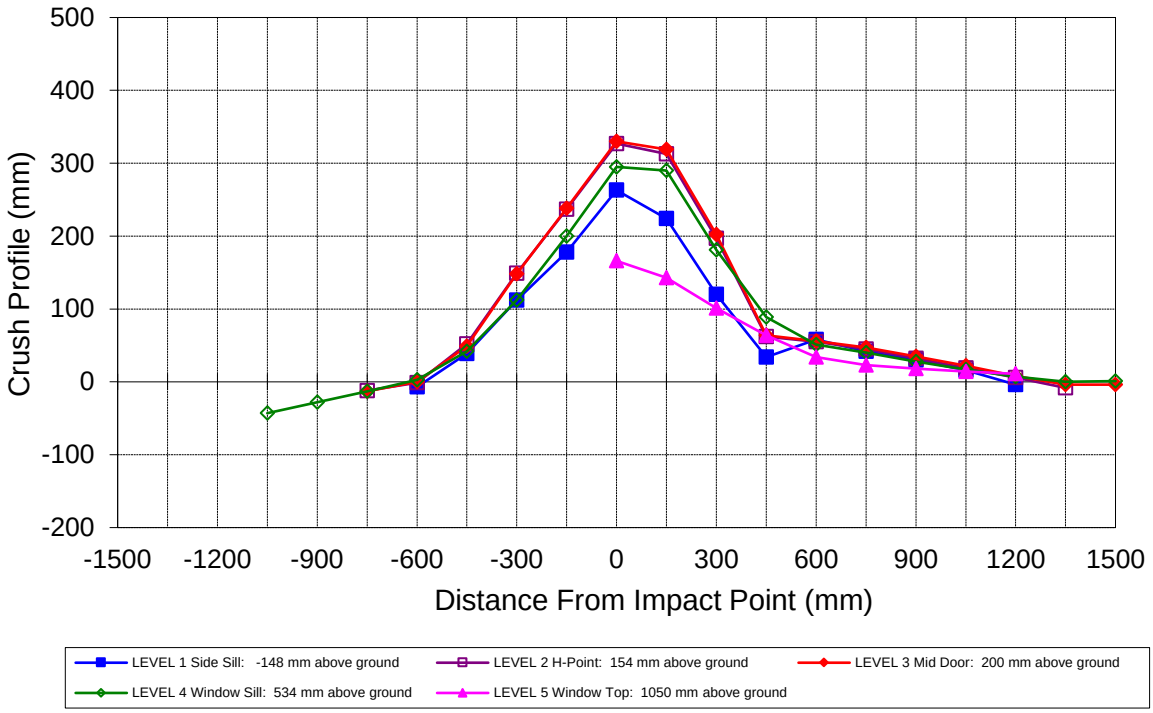
EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1500															
-1350															
-1200															
-1050				822					865					-43	
-900				836					864					-28	
-750		921	923	845			933	936	858			-12	-13	-13	
-600	899	921	919	849		906	922	919	846		-7	-1	0	3	
-450	877	914	914	840		838	862	865	798		39	52	49	42	
-300	865	913	913	849		753	764	765	737		112	149	148	112	
-150	859	914	914	854		681	677	676	654		178	237	238	200	
0	857	914	915	867	656	594	587	585	572	490	263	327	330	295	166
150	856	914	915	870	681	632	601	596	580	538	224	313	319	290	143
300	854	915	916	873	685	734	718	714	692	584	120	197	202	181	101
450	851	913	915	875	687	817	851	851	786	623	34	62	64	89	64
600	851	913	913	876	688	793	858	857	825	654	58	55	56	51	34
750	848	912	912	876	689	806	867	865	836	666	42	45	47	40	23
900	847	909	910	877	689	817	877	875	849	671	30	32	35	28	18
1050	843	907	908	876	690	827	888	886	859	676	16	19	22	17	14
1200	855	905	906	877	689	859	899	898	870	678	-4	6	8	7	11
1350		907	908	876			915	912	876			-8	-4	0	
1500			915	873				919	872				-4	1	

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

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

Test Vehicle:	2022 Ford Maverick XL Truck	NHTSA No.:	M20220210
Test Program:	NCAP Side Pole Impact Test	Test Date:	6/24/2022

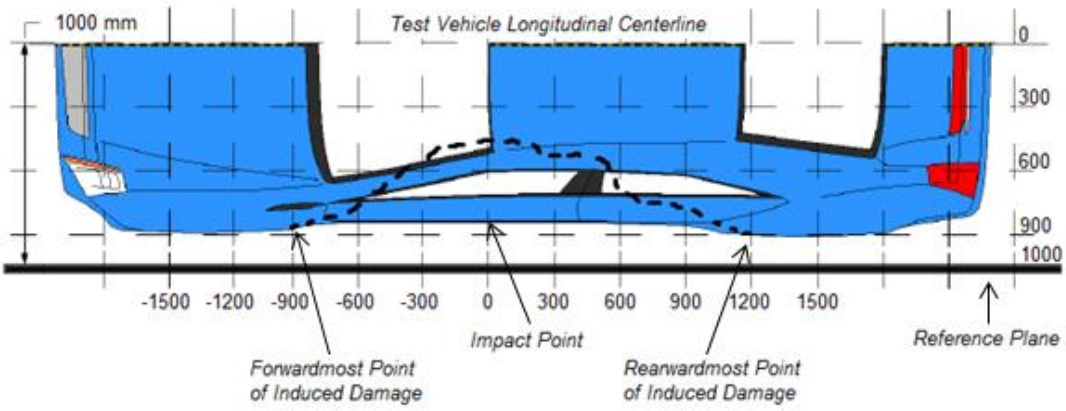


Vehicle Exterior Crush Measurements - Visual Representation

DATA SHEET NO. 11
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle:	2022 Ford Maverick XL Truck	NHTSA No.:	M20220210
Test Program:	NCAP Side Pole Impact Test	Test Date:	6/24/2022

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



Overhead View

VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	-750	3	64	77	-13
2	-300	3	235	87	148
3	150	3	404	85	319
4	600	3	143	87	56
5	1050	3	114	92	22
6	1500	3	81	85	-4

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

Test Vehicle:	2022 Ford Maverick XL Truck	NHTSA No.:	M20220210
Test Program:	NCAP Side MDB Impact Test	Test Date:	6/24/2022
Test Time:	9:32 AM	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°	77	300	377
90° to 180°	63	300	363
180° to 270°	69	300	369
270° to 360°	63	300	363

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE

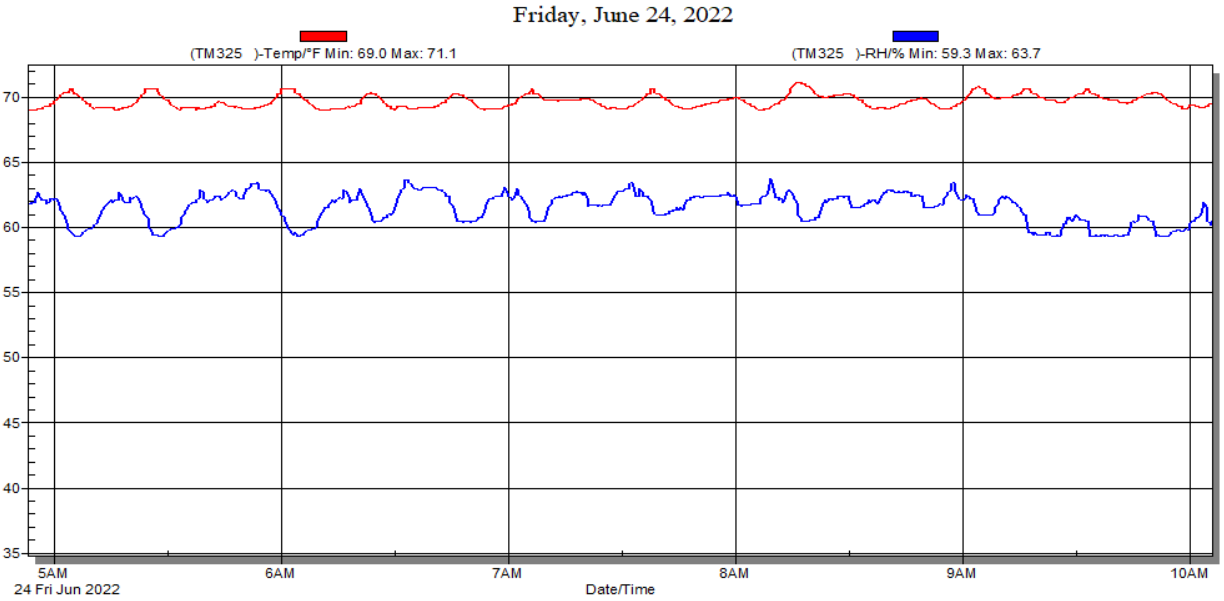
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° to 90°	0	0	0	
90° to 180°	0	0	0	
180° to 270°	0	0	0	
270° to 360°	0	0	0	

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. 13
DUMMY / VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle:	2022 Ford Maverick XL Truck	NHTSA No.:	M20220210
Test Program:	NCAP Side Pole Impact Test	Test Date:	6/24/2022



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

APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

Figure A-1: As Delivered Right Front ¾ View of Test Vehicle

Figure A-2: As Delivered Left Rear ¾ View of Test Vehicle

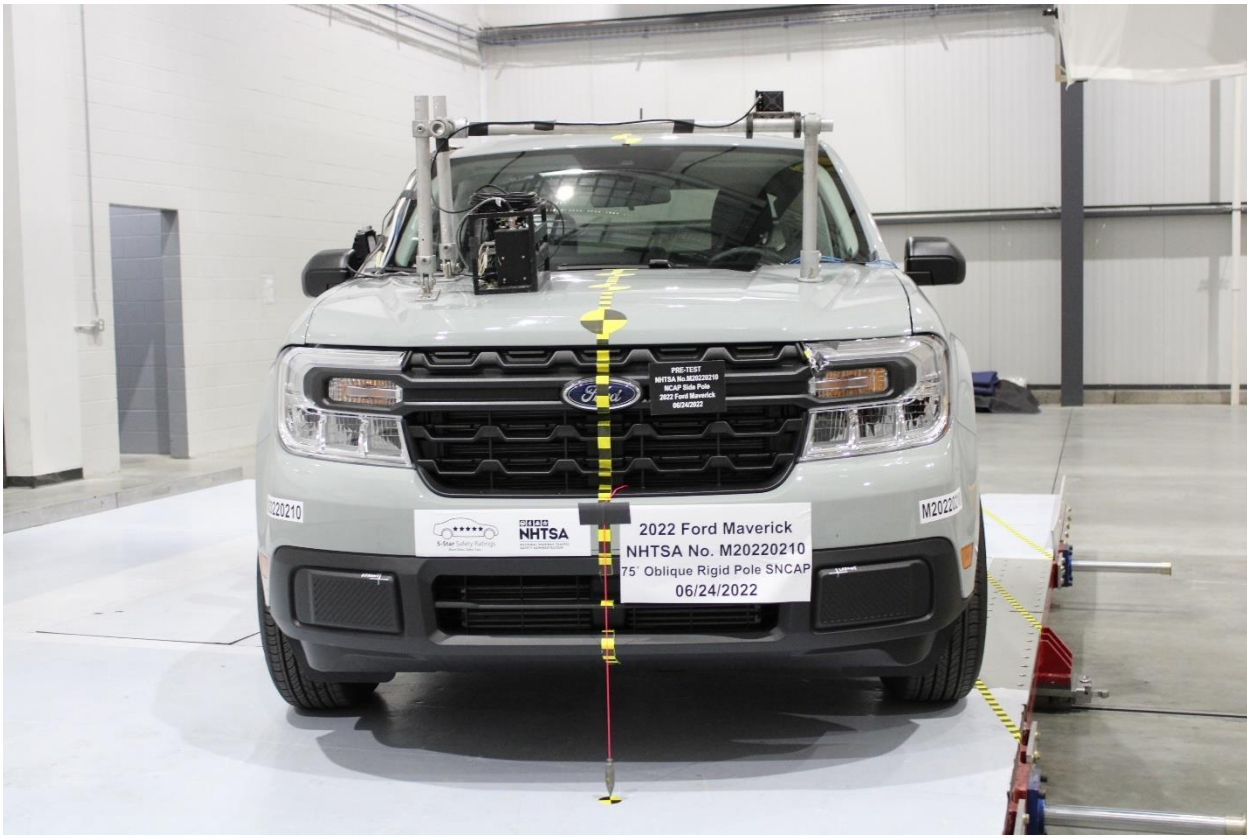


Figure A-3: Pre-Test Frontal View of Test Vehicle

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 View of Test Vehicle

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

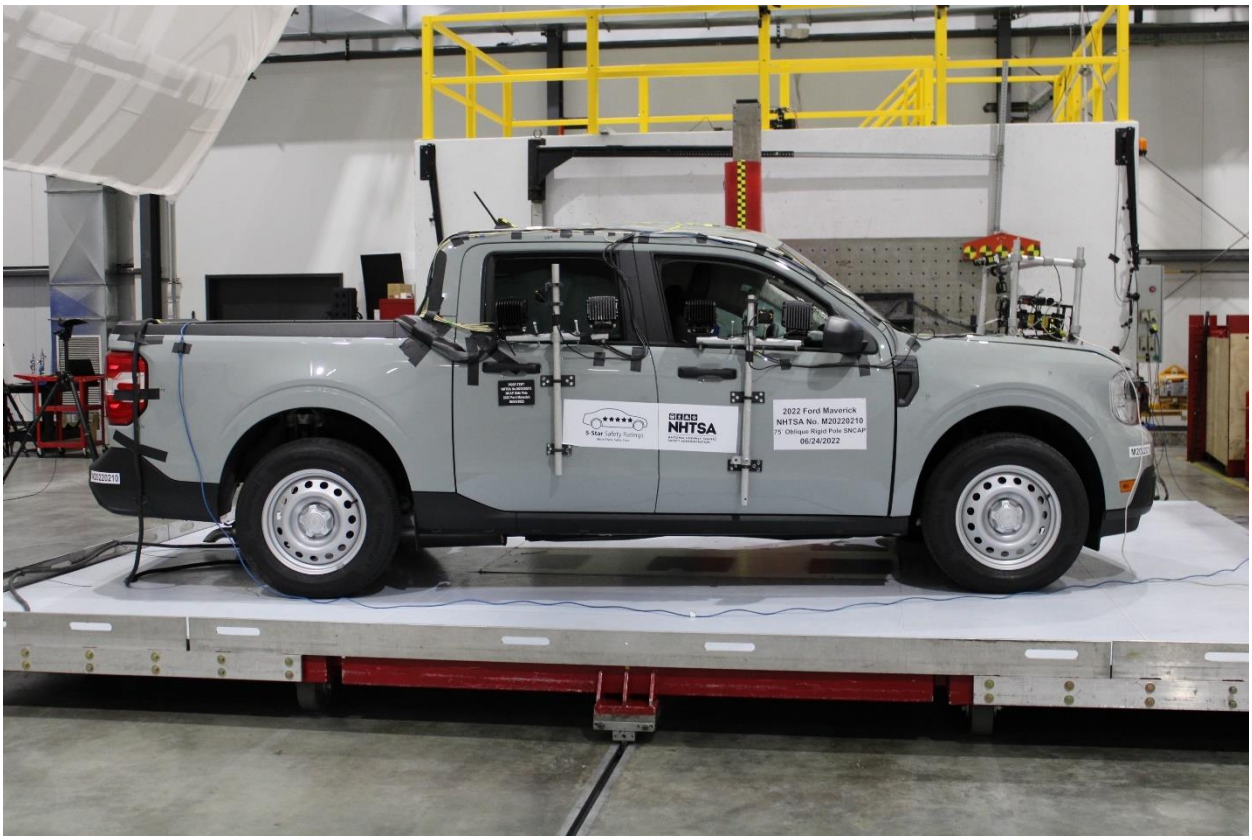


Figure A-14: Post-Test Right Side View of Test Vehicle

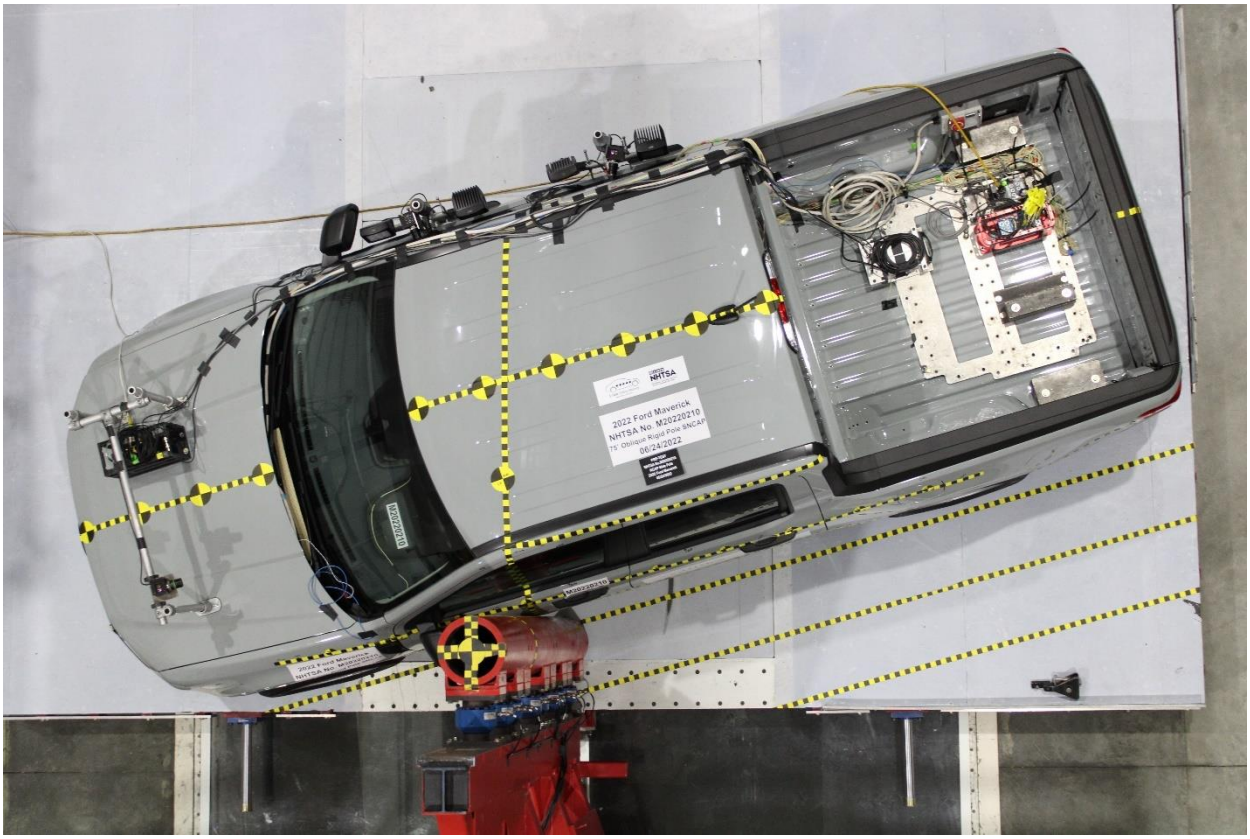


Figure A-15: Pre-Test Overhead View of Test Area

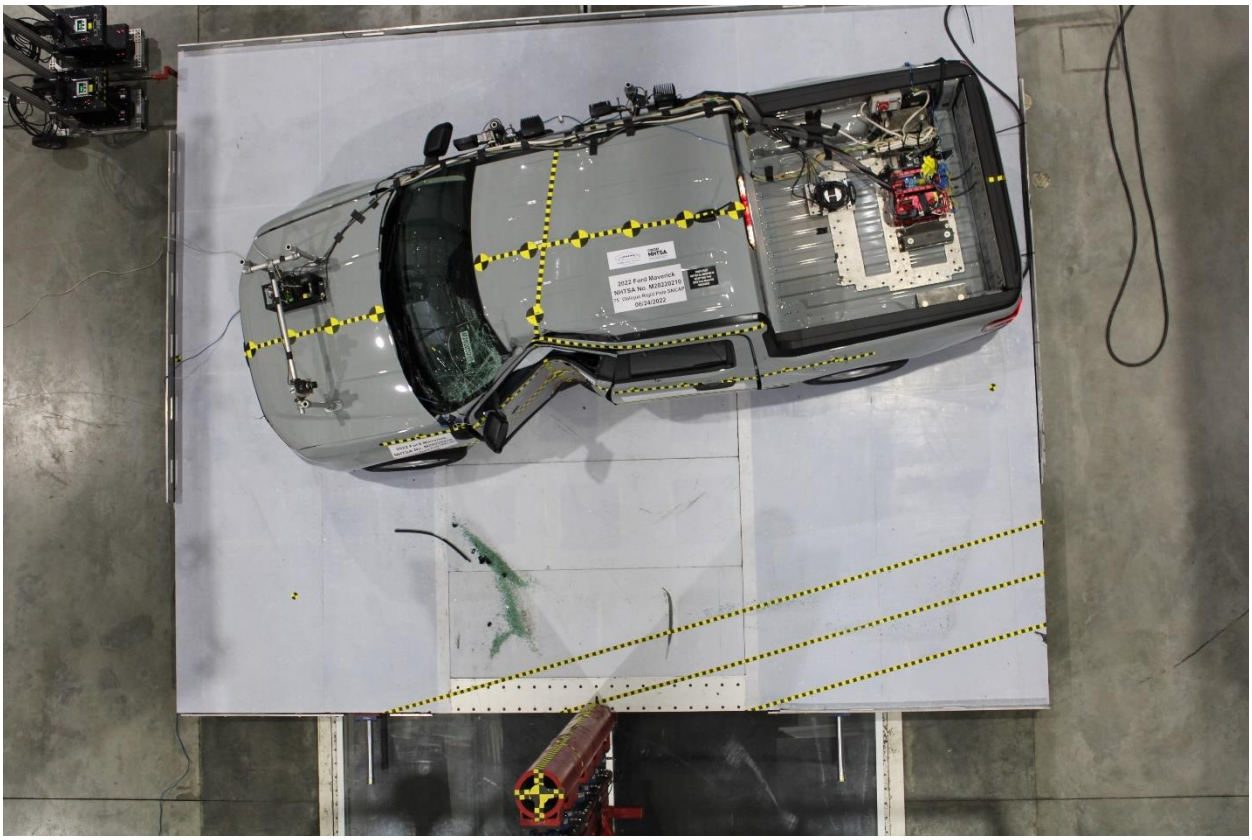


Figure A-16: Post-Test Overhead View of Test Area

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

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

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

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

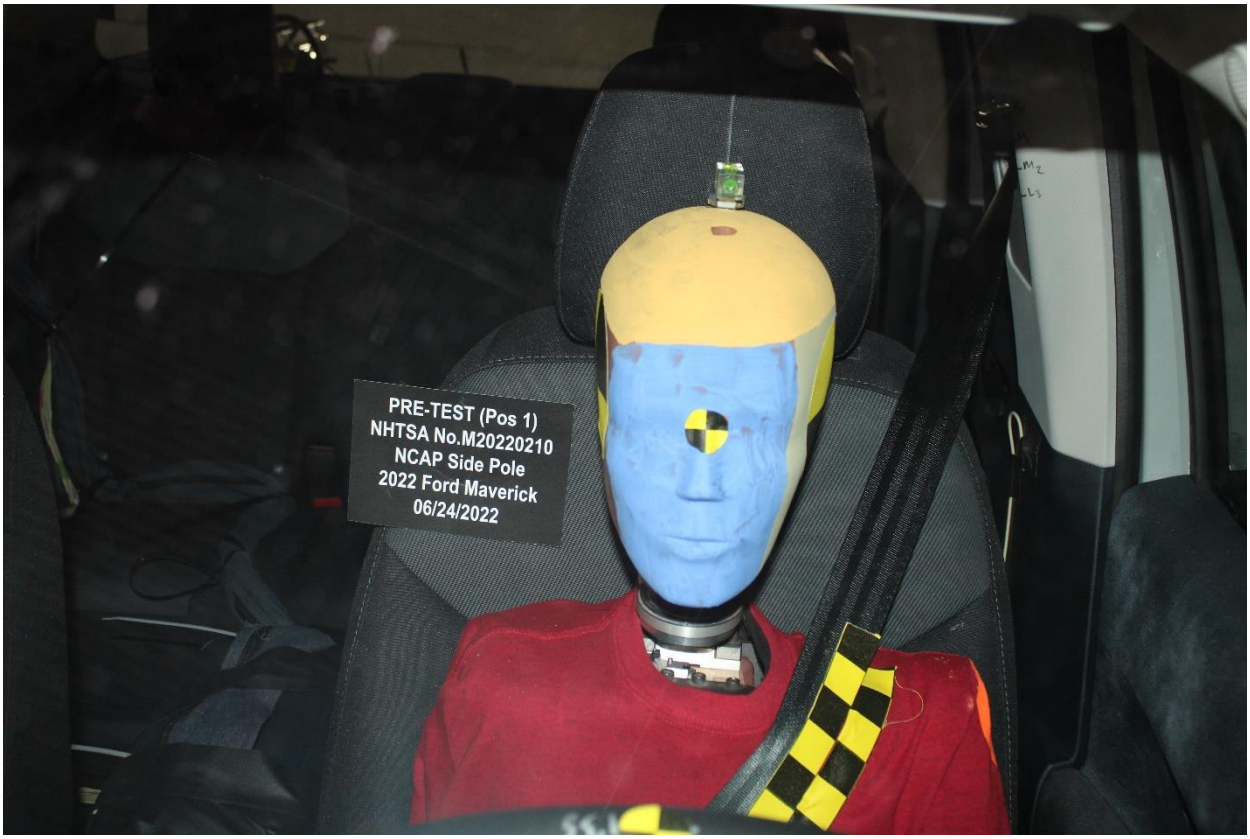


Figure A-21: Pre-Test Front Close-Up View of Dummy Head and Chest

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

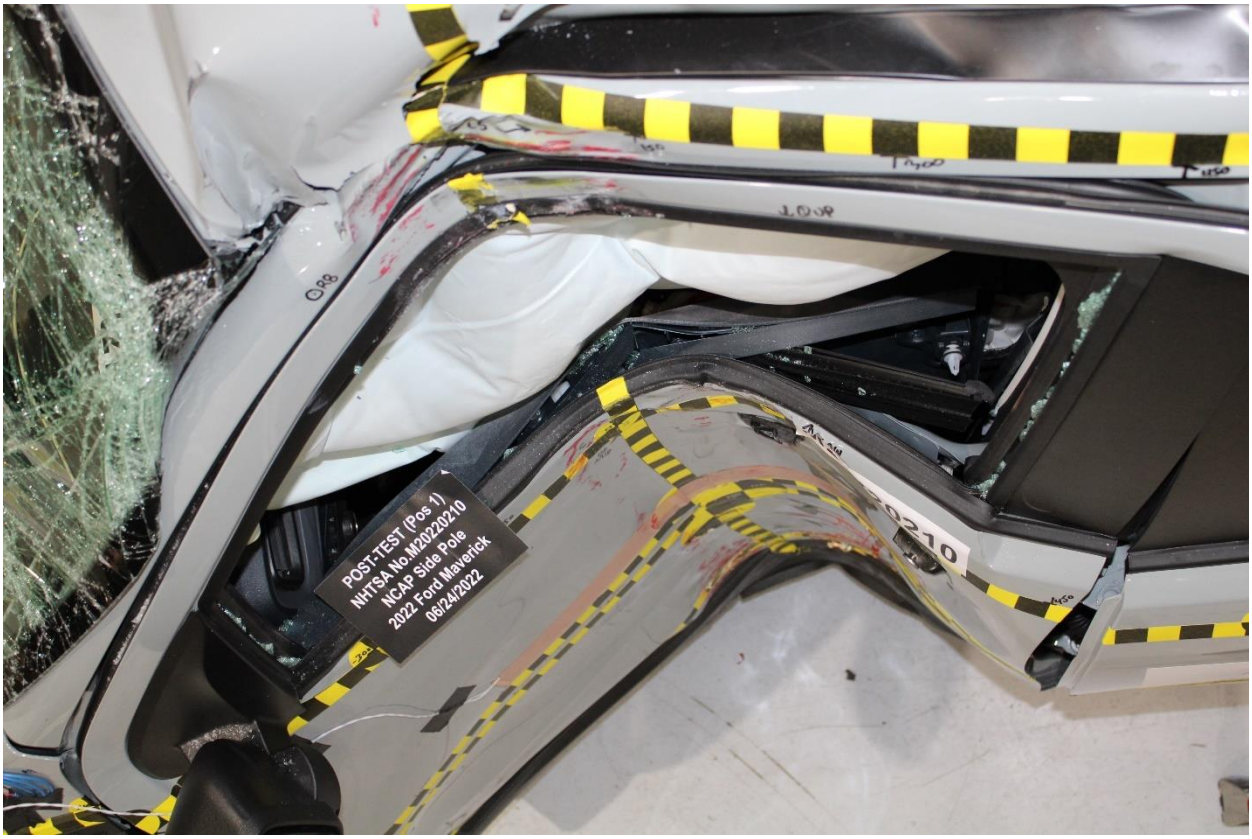


Figure A-41: Post-Test Dummy and Door Clearance View

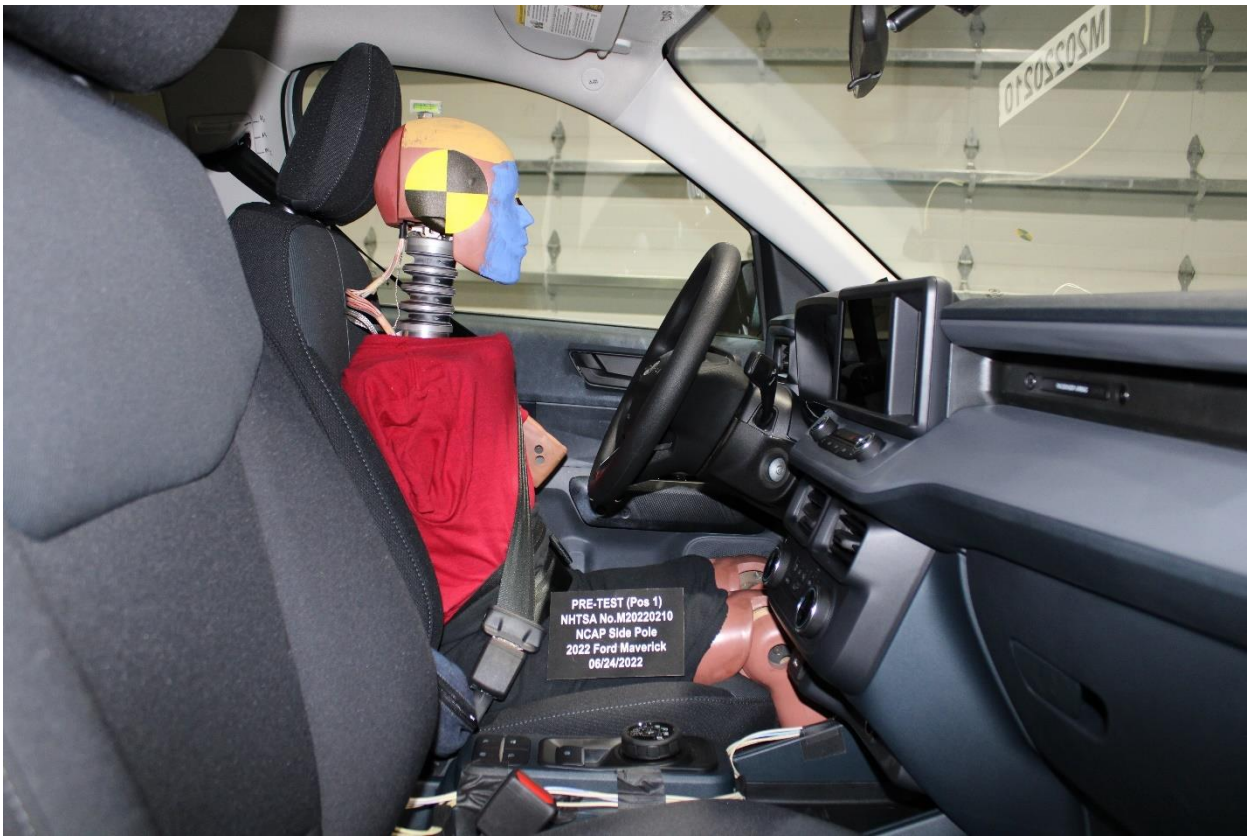


Figure A-42: Pre-Test Right Side View of Dummy and Front Seat of Occupant Compartment

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

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

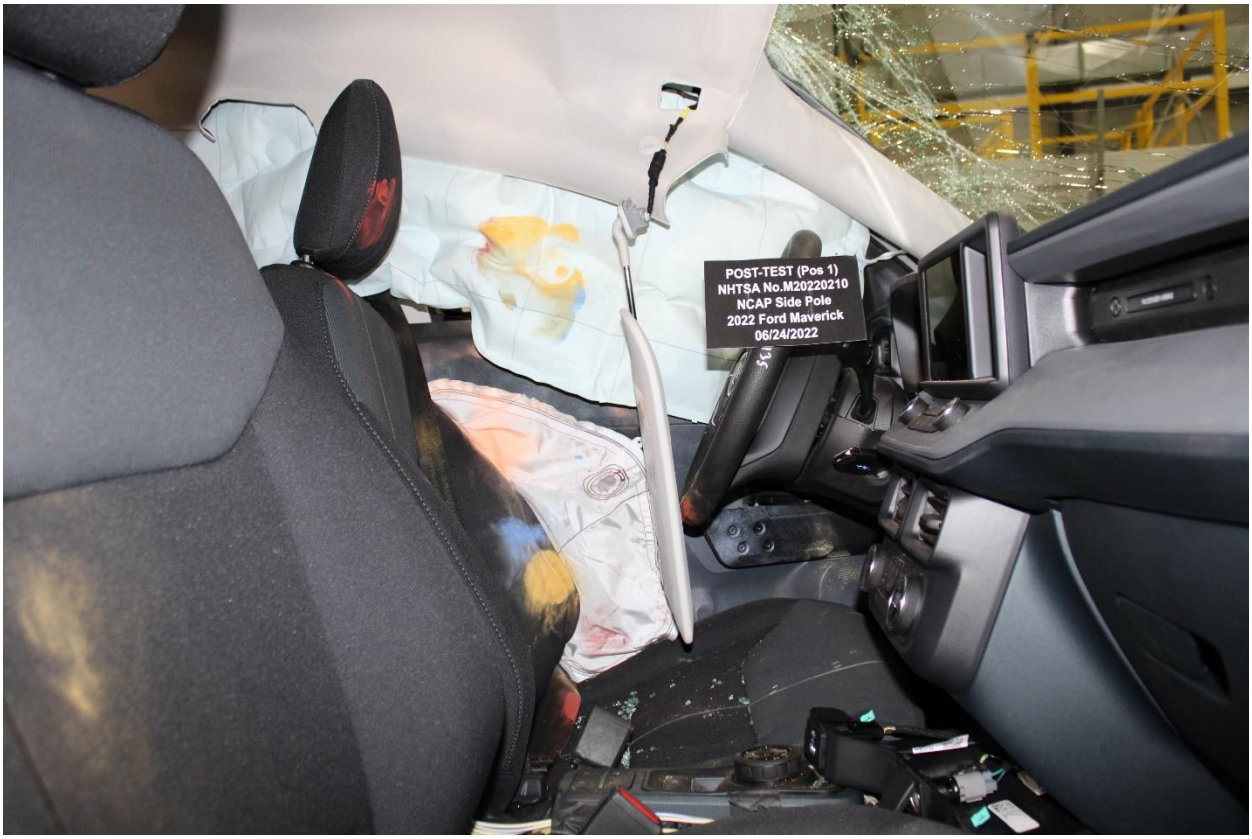


Figure A-45: Post-Test Inner Door Panel View Showing Dummy Contact Location

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

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

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

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

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

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

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

Figure A-53: Pre-Test Right Side View of Dummy and Rear Seat of Occupant Compartment

Photo Not Applicable

Figure A-54: Post-Test Inner Rear Passenger Torso Air Bag Deployment View

Figure A-55: Pre-Test View of Fuel Filler Cap or Fuel Filler Neck

Figure A-56: Post-Test View of Fuel Filler Cap or Fuel Filler Neck

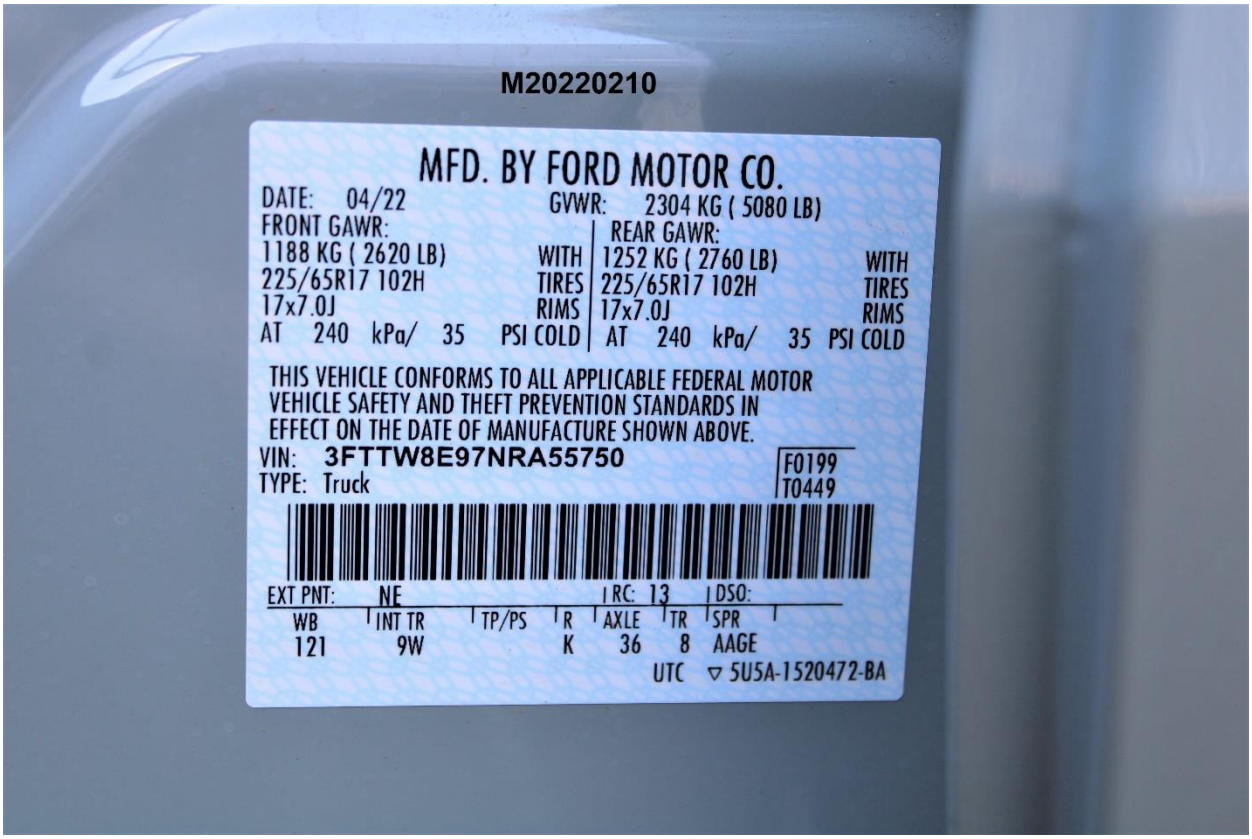


Figure A-57: Close-Up View of Vehicle's Certification Label

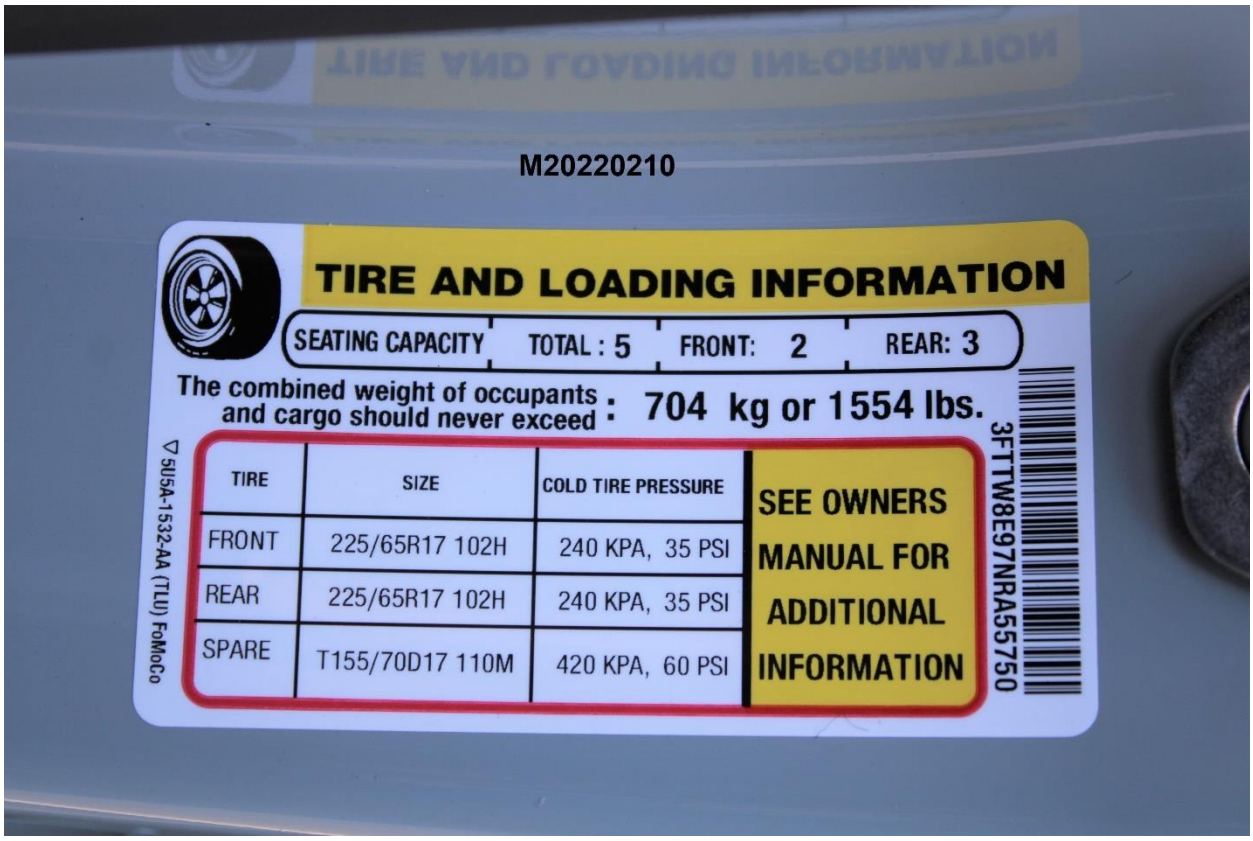


Figure A-58: Close-Up View of Vehicle's Tire Information Placard or Label

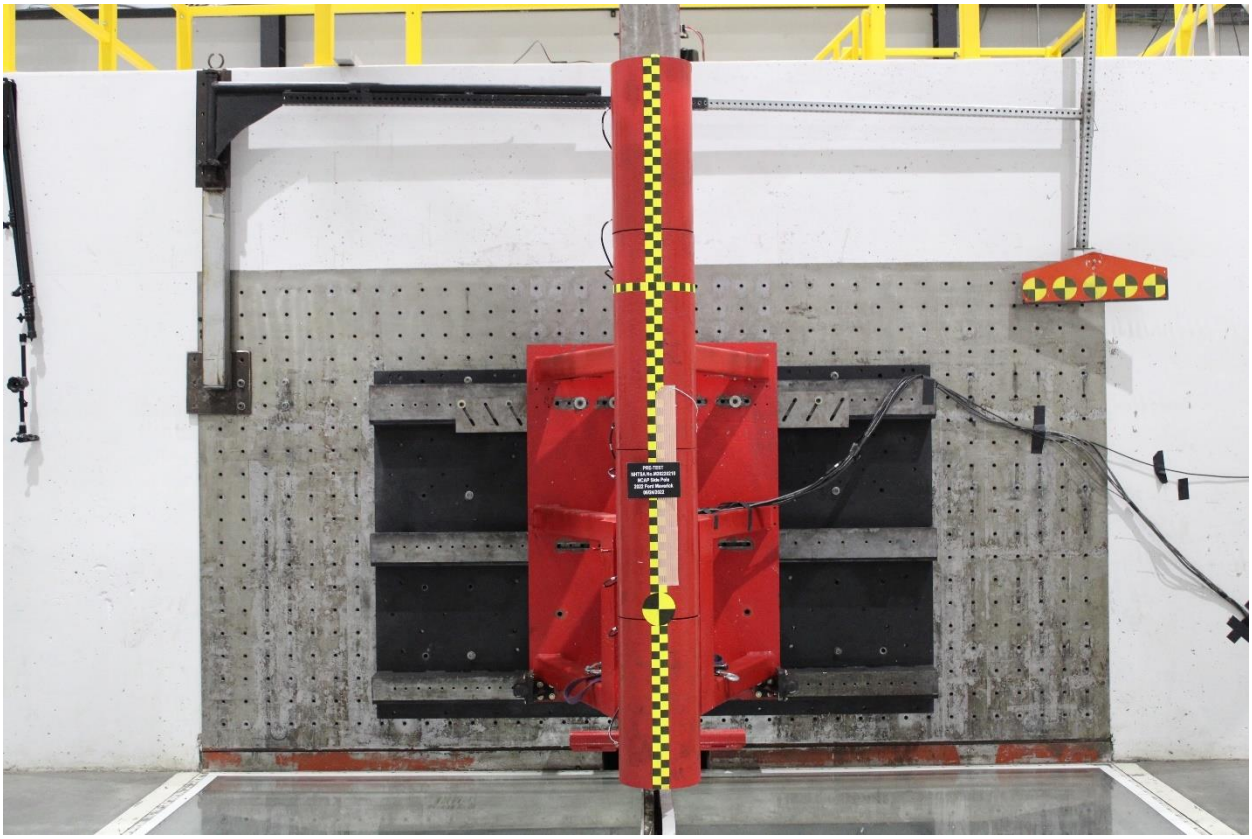


Figure A-59: Pre-Test Pole Barrier Front View

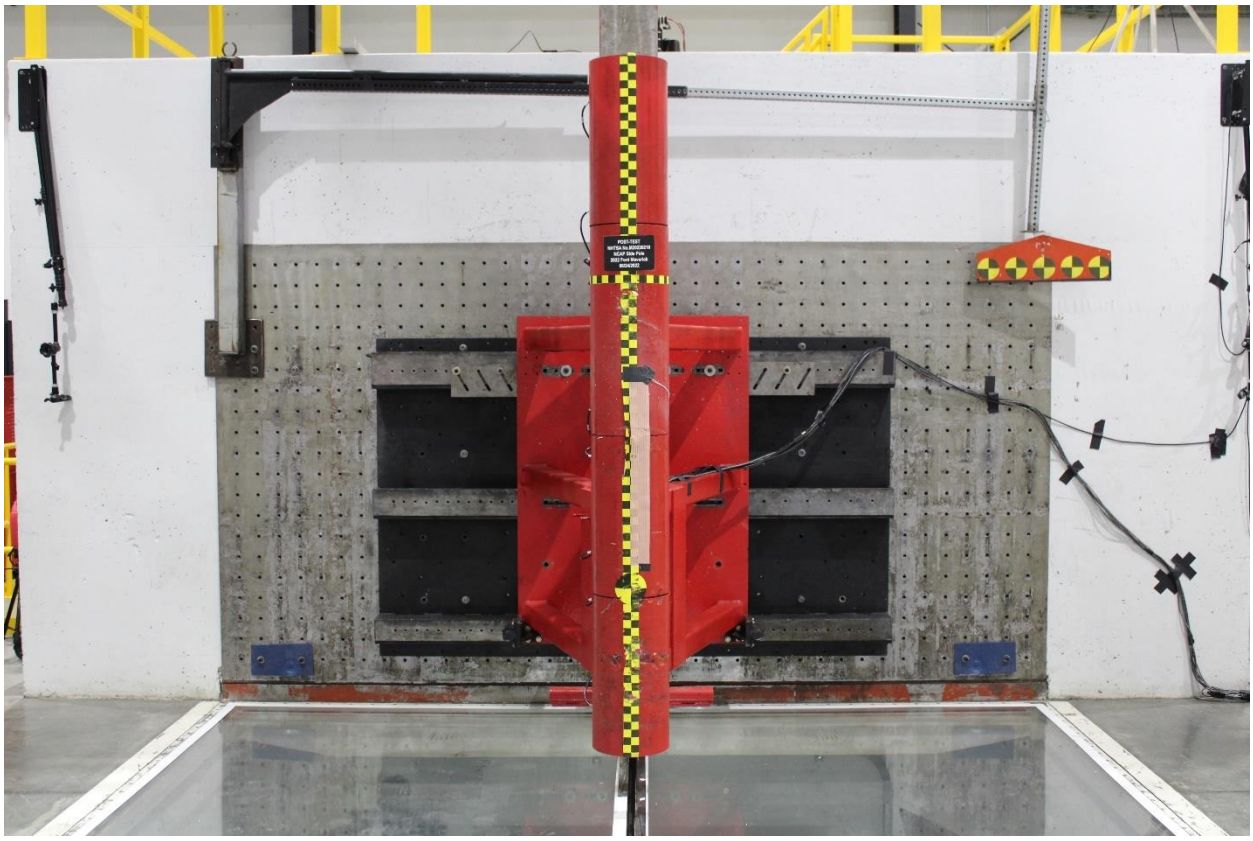


Figure A-60: Post-Test Pole Barrier Front View

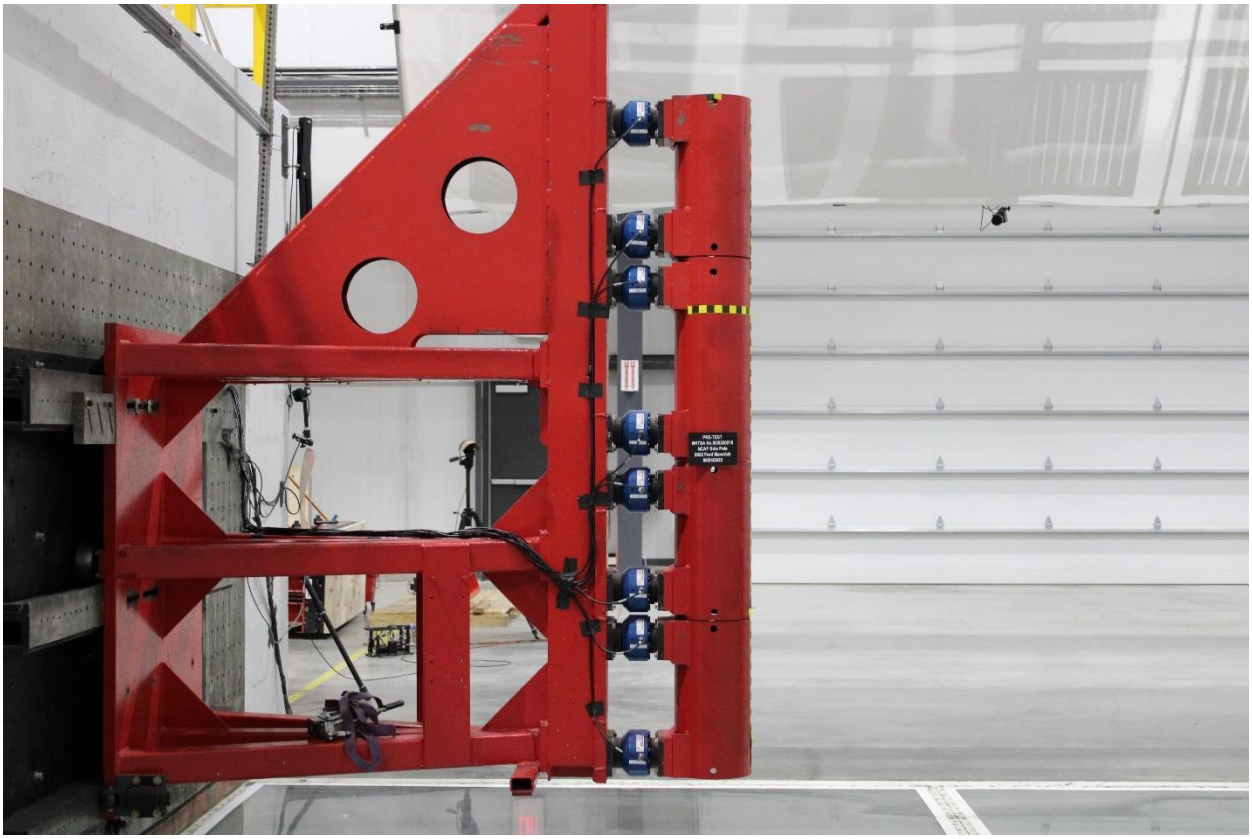


Figure A-61: Pre-Test Pole Barrier Side View

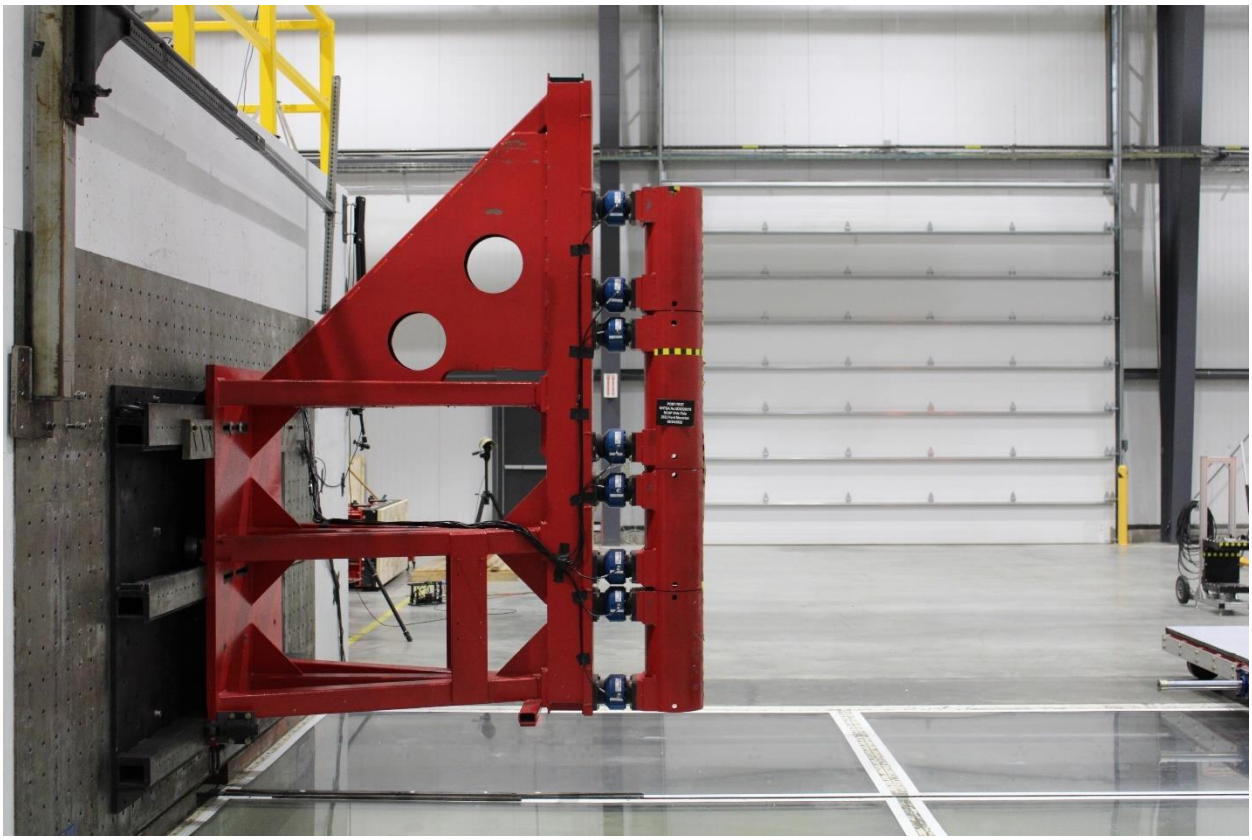


Figure A-62: Post-Test Pole Barrier Side View

Figure A-63: Pre-Test Ballast View

Figure A-64: Post-Test Primary and Redundant Speed Trap Read-Out

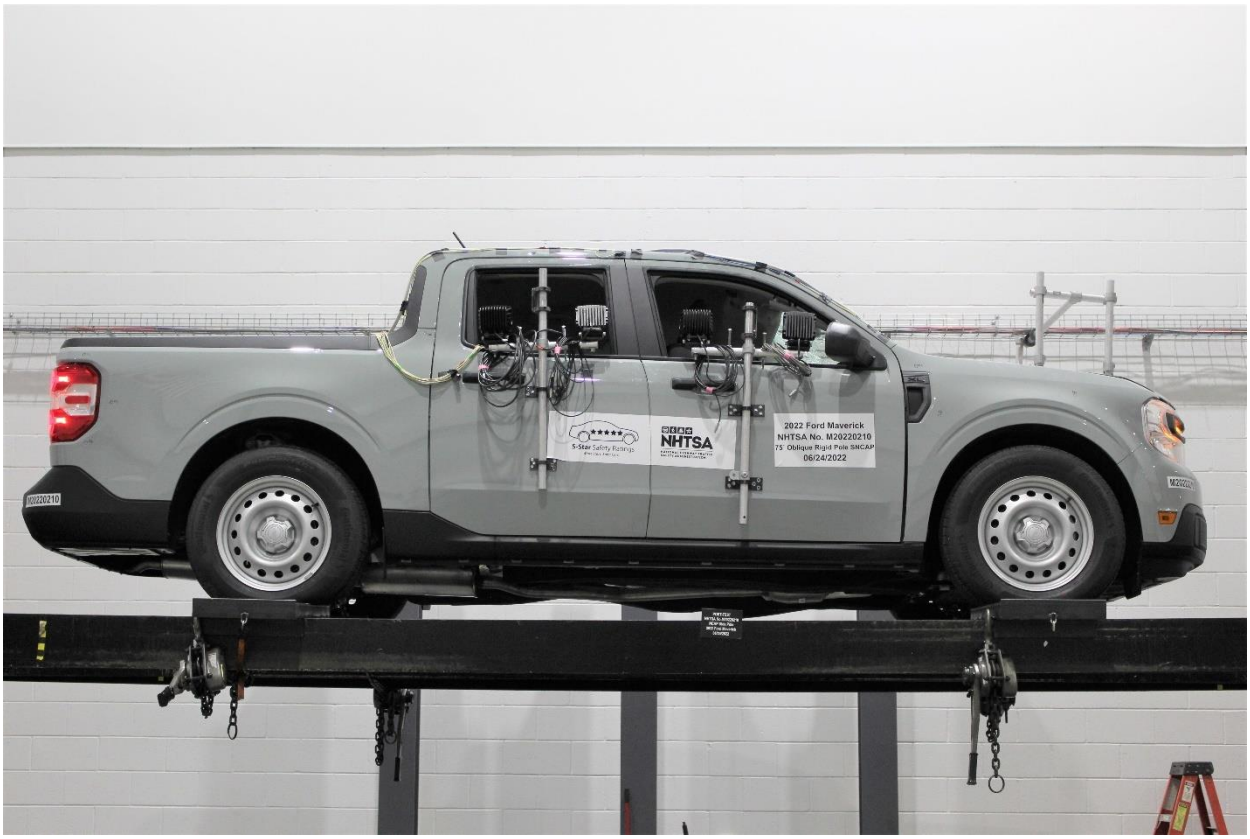


Figure A-65: FMVSS No. 301 Static Rollover 0 Degrees

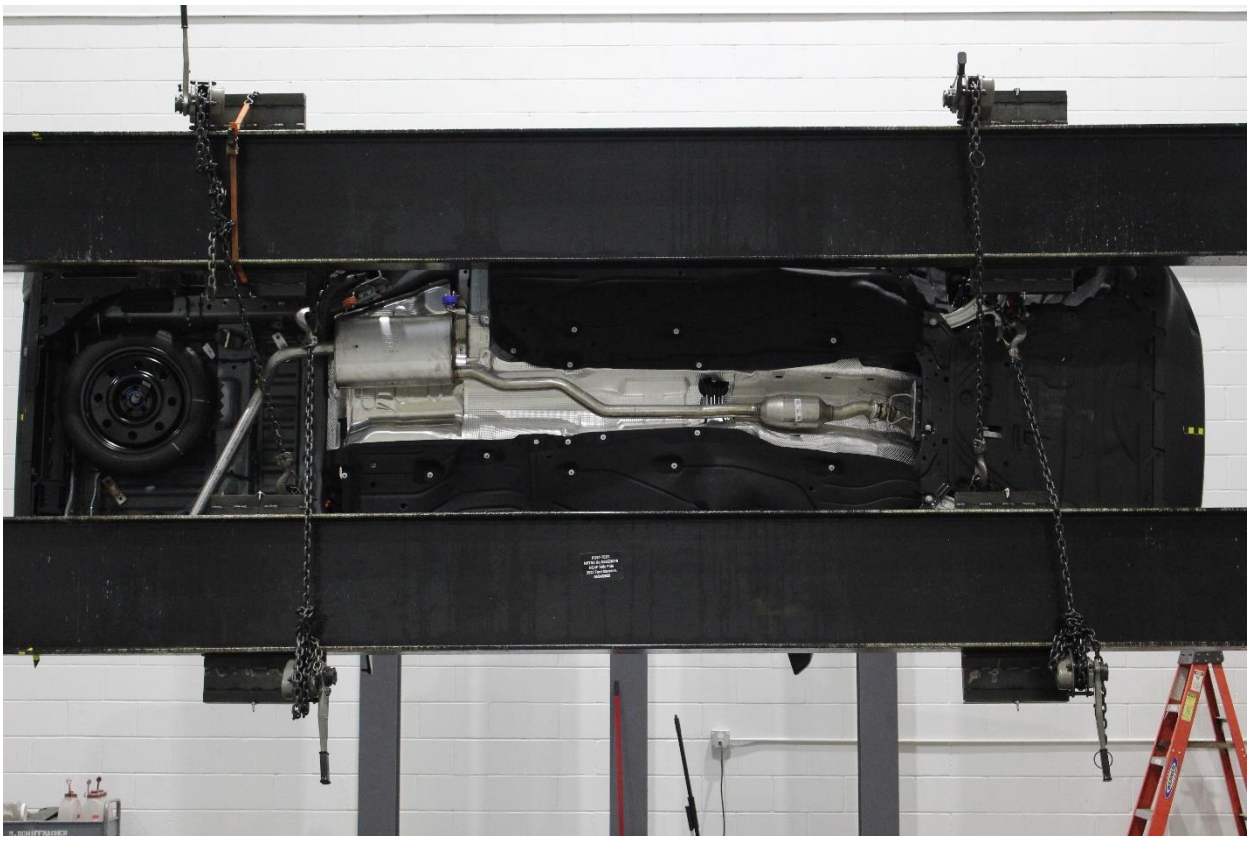


Figure A-66: FMVSS No. 301 Static Rollover 90 Degrees

Figure A-67: FMVSS No. 301 Static Rollover 180 Degrees

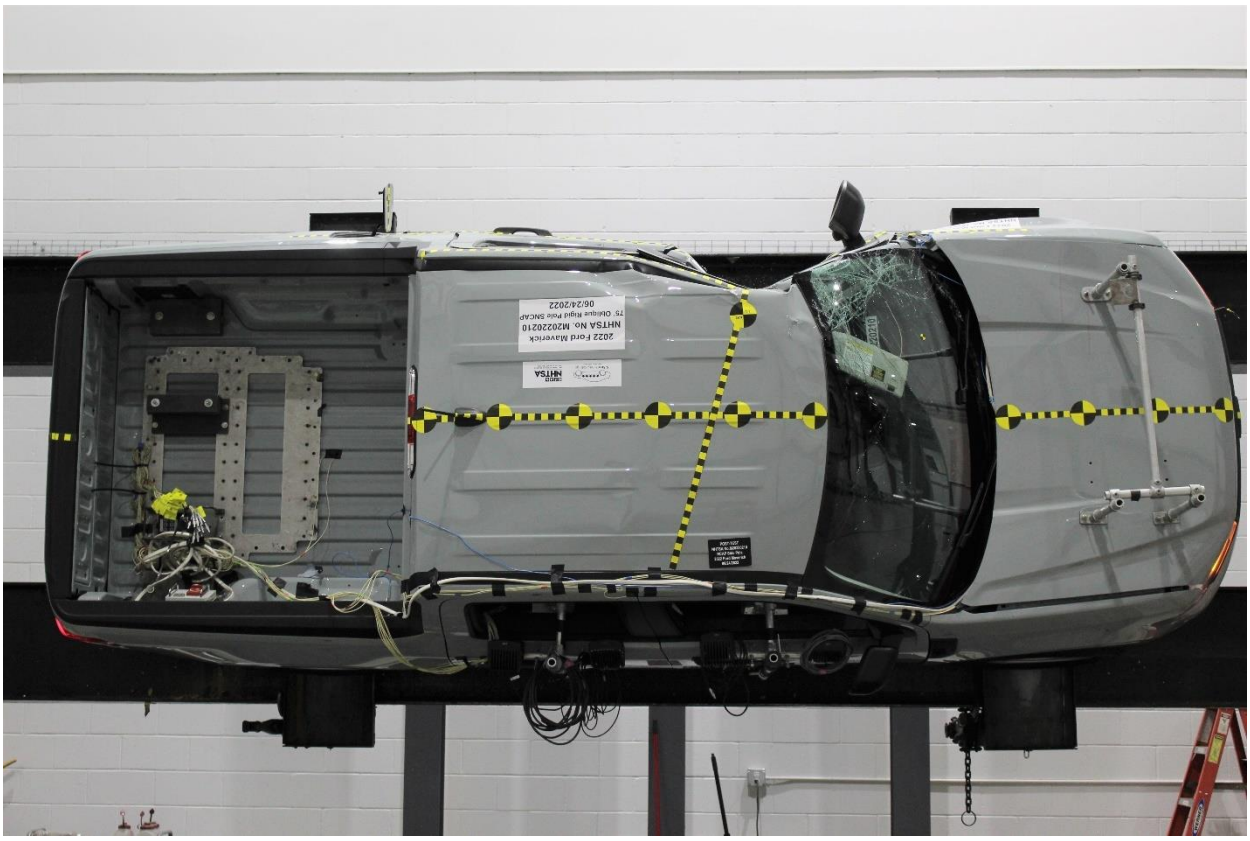


Figure A-68: FMVSS No. 301 Static Rollover 270 Degrees

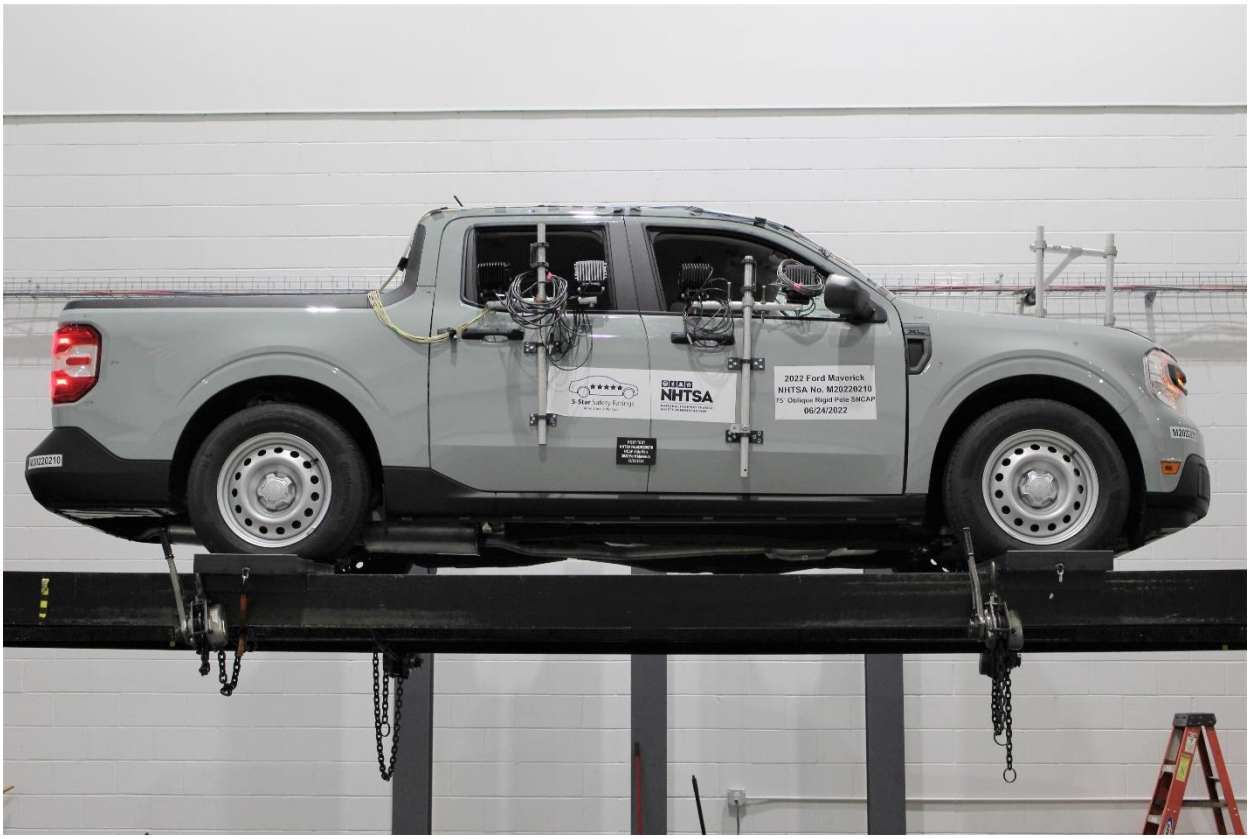


Figure A-69: FMVSS No. 301 Static Rollover 360 Degrees

Figure A-70: Impact Event

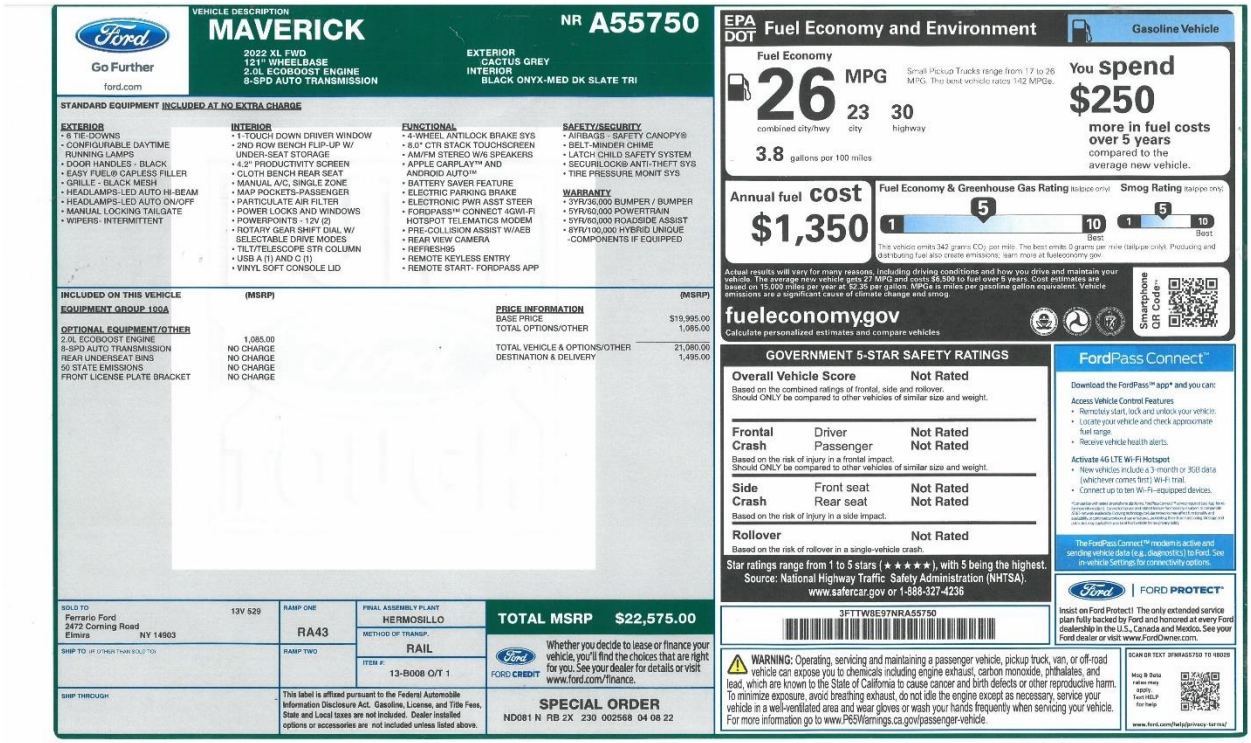


Figure A-71: Monroney Label

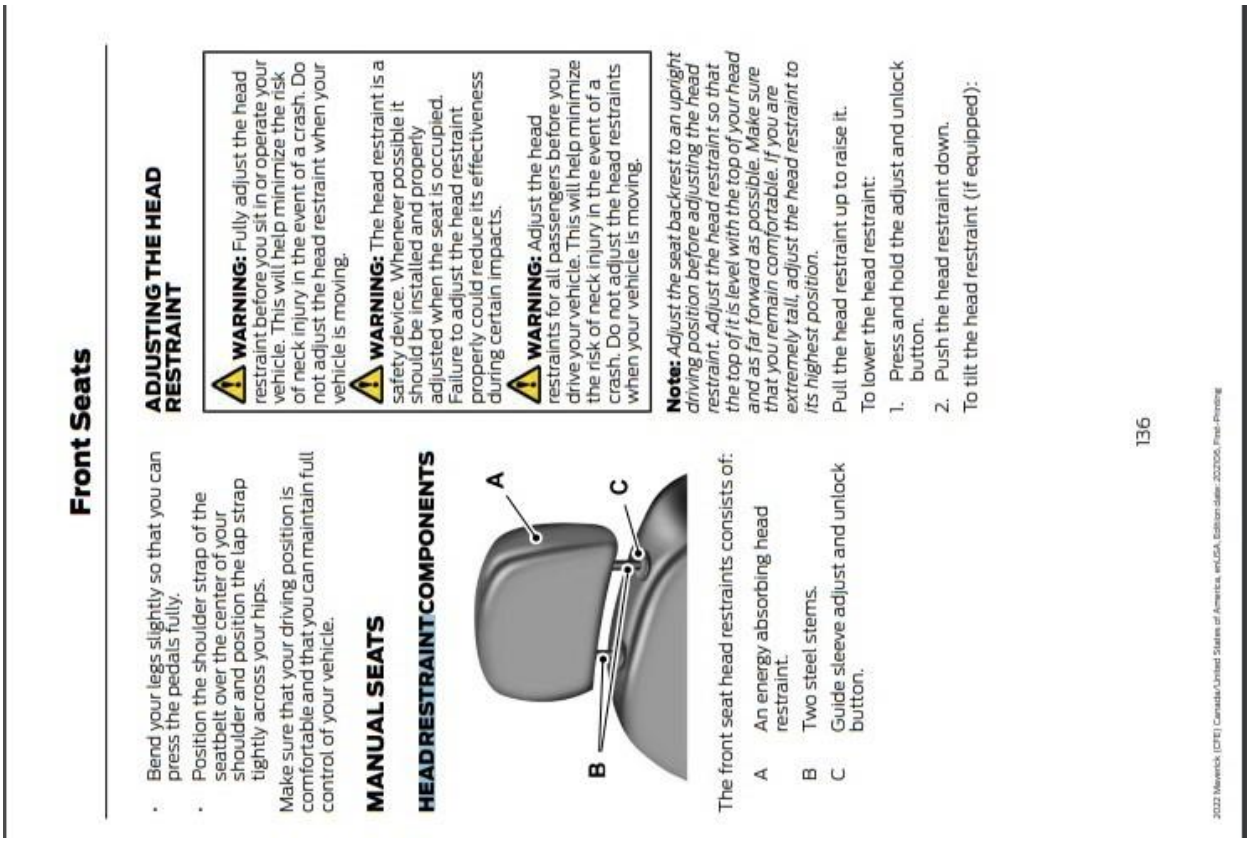


Figure A-72: Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

Figure A-73: Post-Test View of Shattered Vehicle Inner Door Panel

APPENDIX B

VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

Driver 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 Dummy Instrumentation Data

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

Vehicle Instrumentation Data

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

Pole Instrumentation Data

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

APPENDIX C

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

SID-IIS 5TH PERCENTILE FEMALE - DRIVER ATD

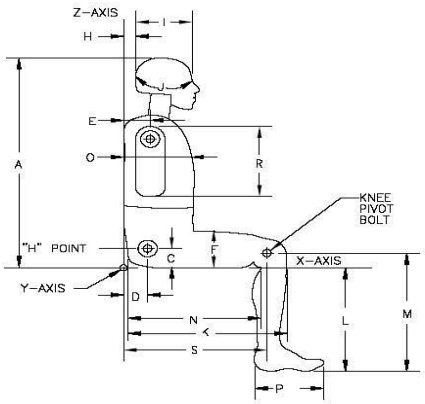
SERIAL NO: 300

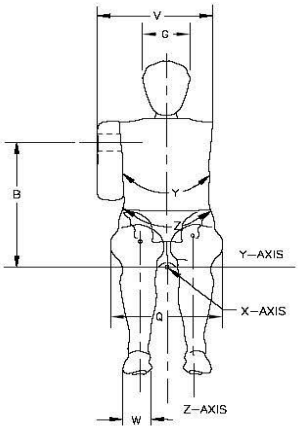
(CONFIGURED FOR LEFT SIDE IMPACT)

External Measurements - SID-IIs

Technician: K. Brogan Date: 06/02/2022

Dummy Serial Number: 300





Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	778	Pass
B	Shoulder Pivot Height	437	453	445	Pass
C	H-point Height	79	89	84	Pass
D	H-point from seatback	141	151	145	Pass
E	Shoulder Pivot from Backline	97	107	105	Pass
F	Thigh Clearance	119	135	125	Pass
G	Head Breadth	140	148	145	Pass
H	Head Back from Backline	40	46	42	Pass
I	Head Depth	178	188	182	Pass
J	Head Circumference	541	551	545	Pass
K	Buttock to Knee Length	514	540	528	Pass
L	Popliteal Height	343	369	362	Pass
M	Knee Pivot to floor height	392	409	400	Pass
N	Buttock Popliteal Length	416	442	432	Pass
O	Chest Depth w/o jacket	195	211	202	Pass
P	Foot Length	216	232	221	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	315	Pass
R	Arm Length	249	259	250	Pass
S	Knee Joint to seatback	477	493	486	Pass
V	Shoulder Width	341	357	350	Pass
W	Foot Width	78	94	86	Pass
Y	Chest Circumference w/jacket	851	881	879	Pass
Z	Waist Circumference	761	791	775	Pass

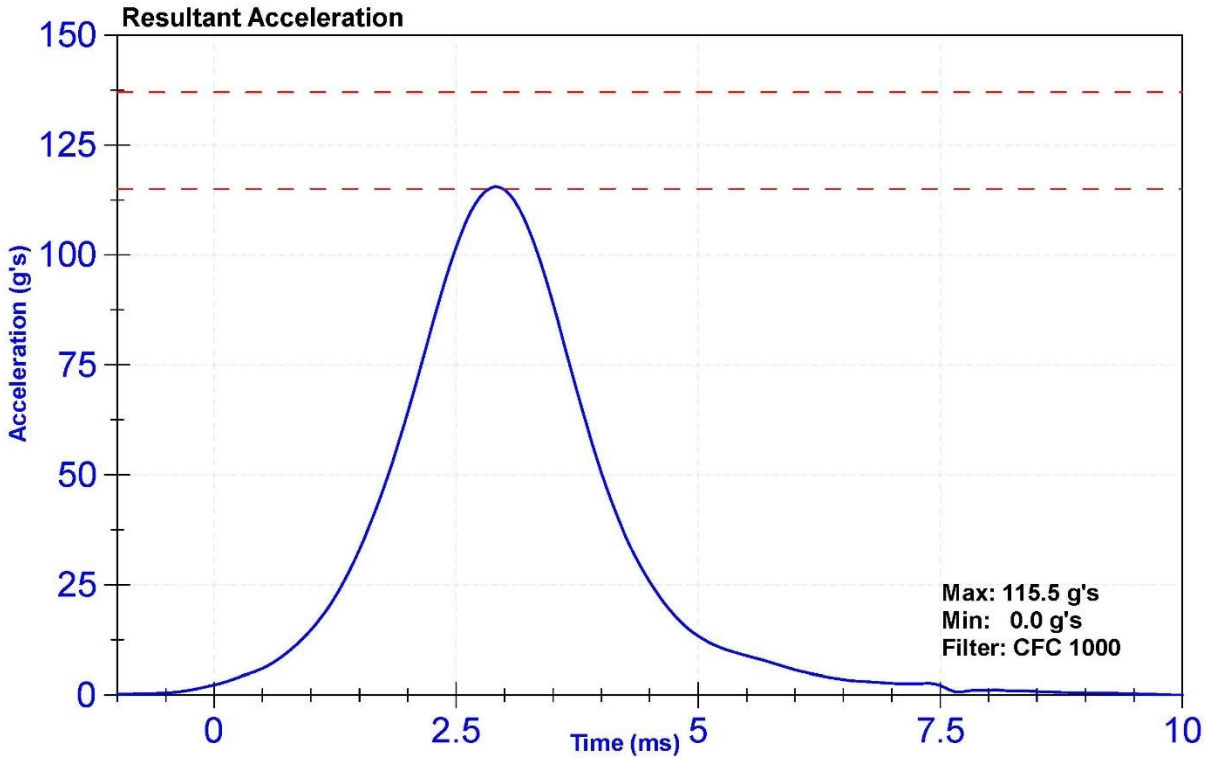
ATD Manufacturer	FTSS	Test Technician	T. Roseman
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

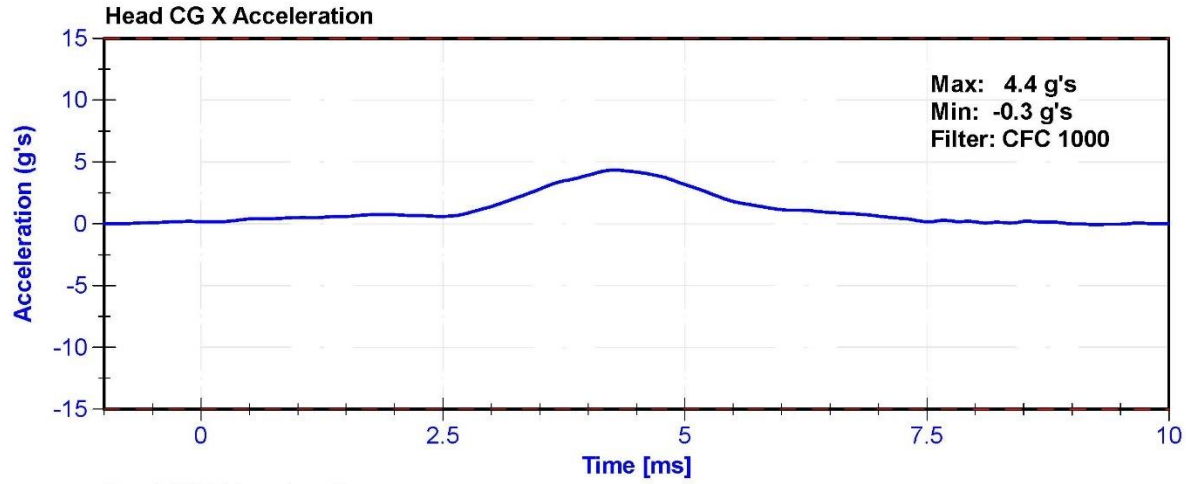
Results

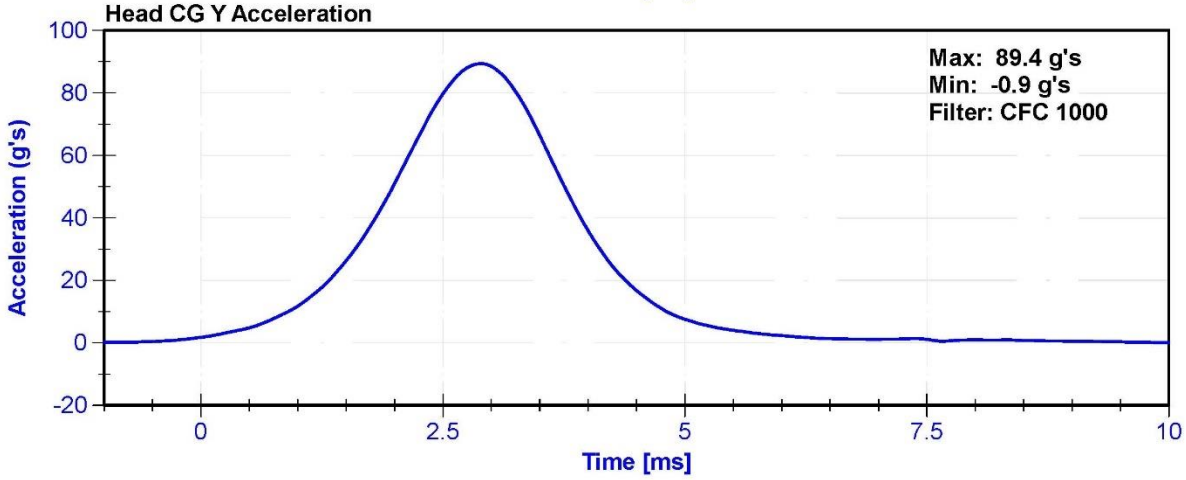
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.5	Pass
Humidity	10	70	%	60.8	Pass
Resultant Acceleration	115	137	g's	115.5	Pass
Oscillation	0	15	%	2.3	Pass
Fore-Aft Acceleration	-15	15	g's	4.4	Pass

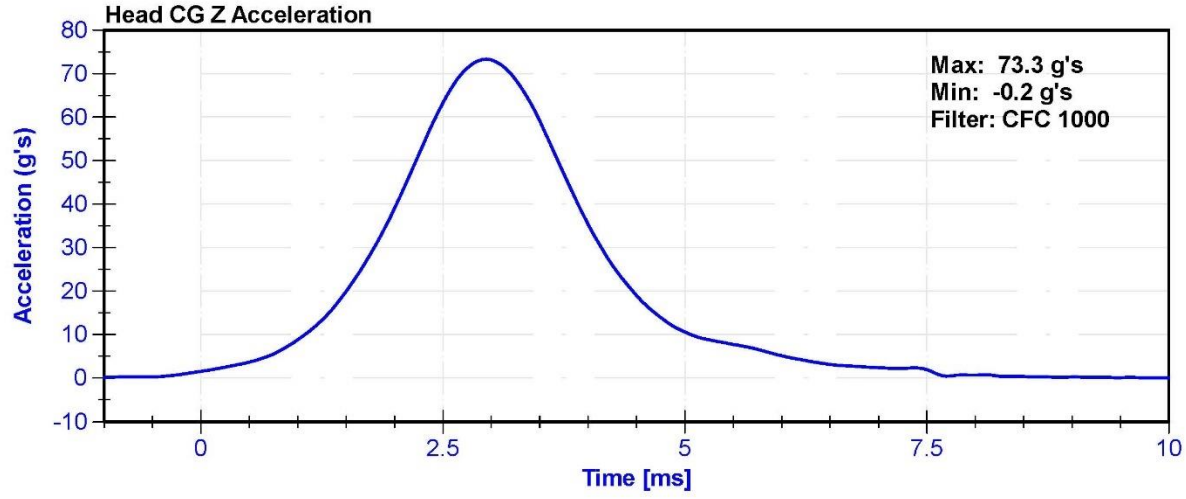
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibratio Date	Calibratio Due Date
X Accelerometer	Endevco	P59018	5/17/2022	11/13/2022
Y Accelerometer	Endevco	P79189	5/17/2022	11/13/2022
Z Accelerometer	Endevco	P58777	5/17/2022	11/13/2022




Head CG X Acceleration
Max: 4.4 g's
Min: -0.3 g's
Filter: CFC 1000
Acceleration (g's)
Time [ms]


Head CG Y Acceleration
Max: 89.4 g's
Min: -0.9 g's
Filter: CFC 1000
Acceleration (g's)
Time [ms]


Head CG Z Acceleration
Max: 73.3 g's
Min: -0.2 g's
Filter: CFC 1000
Acceleration (g's)
Time [ms]

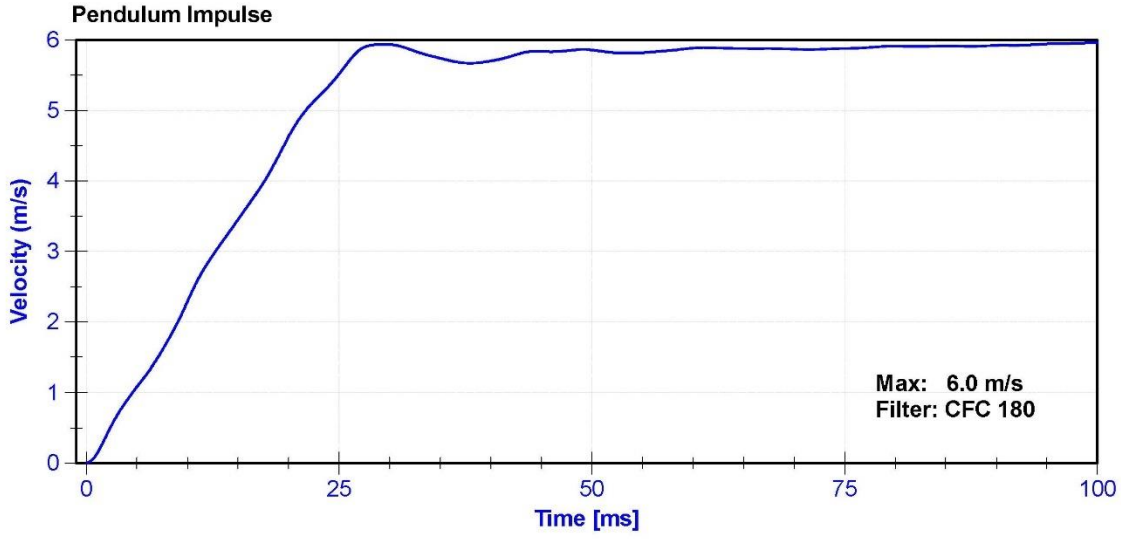
ATD Manufacturer	FTSS	Test Technician	S. Vacanti
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

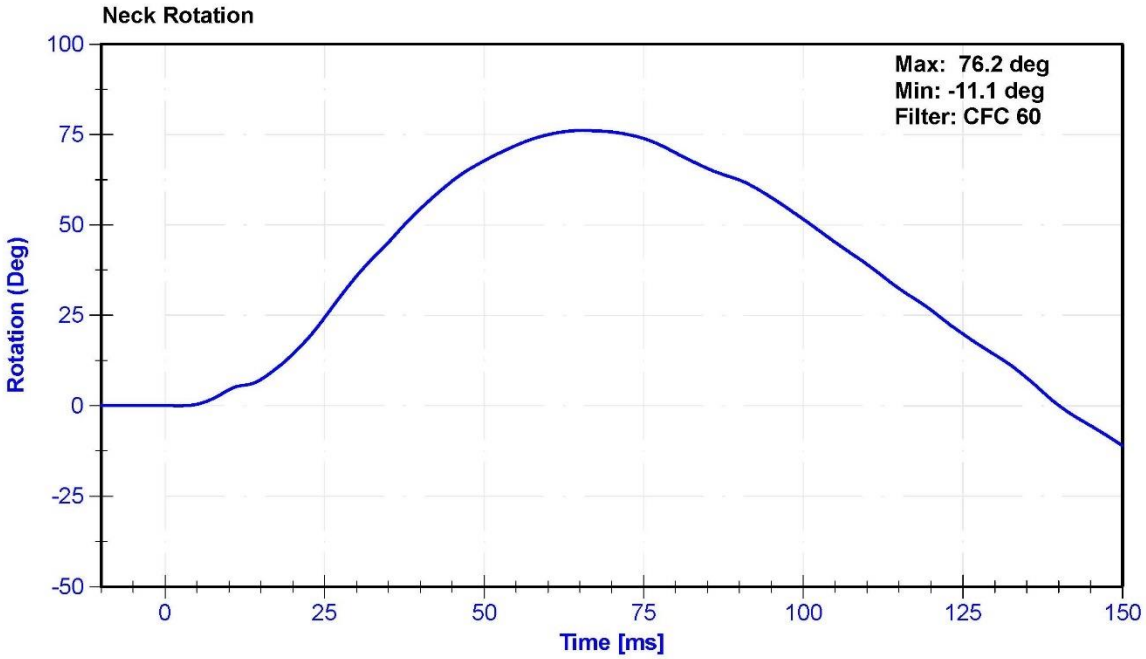
Results

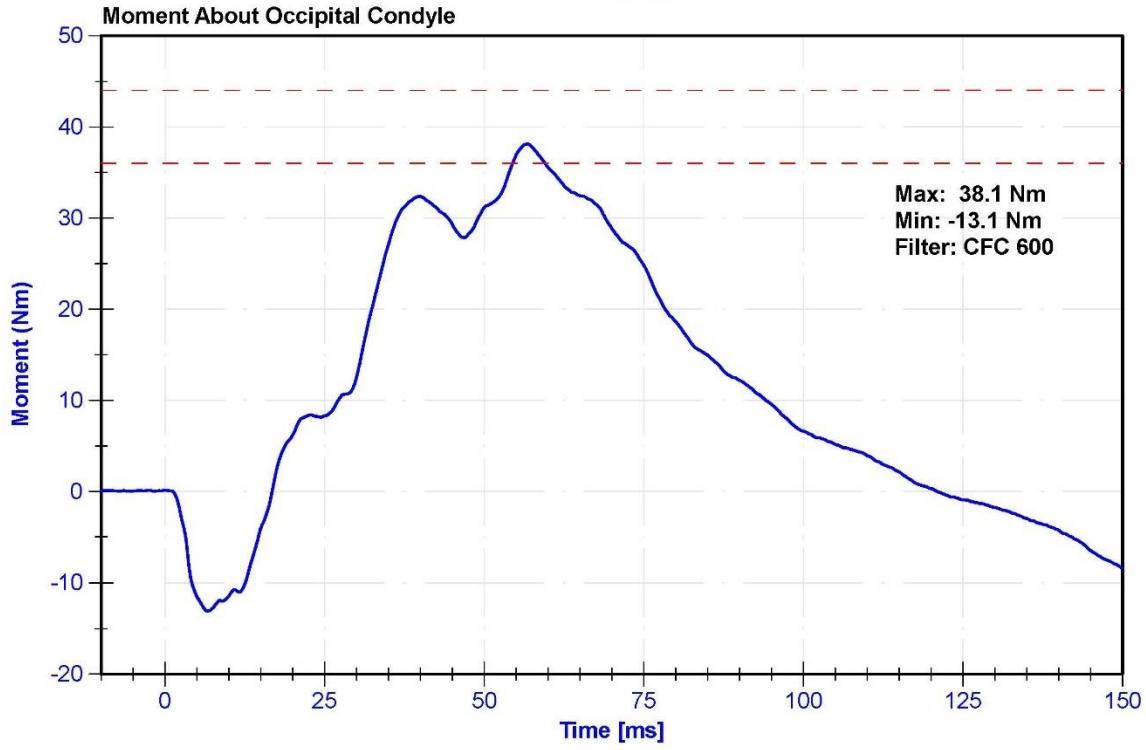
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.2	Pass
Humidity	10	70	%	59	Pass
Velocity	5.51	5.63	m/s	5.565	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.29	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.45	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.63	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.52	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.96	Pass
Neck Rotation	71	81	deg	76.2	Pass
Time at Maximum Rotation	50	70	ms	65.3	Pass
Moment about the OC	36	44	Nm	38.1	Pass
Moment Decay to 0 Nm	102	126	ms	121.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	7231CT	10/28/2021	10/28/2022
Pendulum Potentiometer	Servo	4961	2/23/2022	2/23/2023
Condyle Potentiometer	Servo	DS185	11/12/2021	11/12/2022
Upper Neck Load Cell	Denton	1716A-1037-FY	6/29/2021	6/29/2022




Neck Rotation
Max: 76.2 deg
Min: -11.1 deg
Filter: CFC 60
Rotation (Deg)
100
75
50
25
0
-25
-50
0
25
50
75
100
125
150
Time [ms]


Moment About Occipital Condyle
Max: 38.1 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]

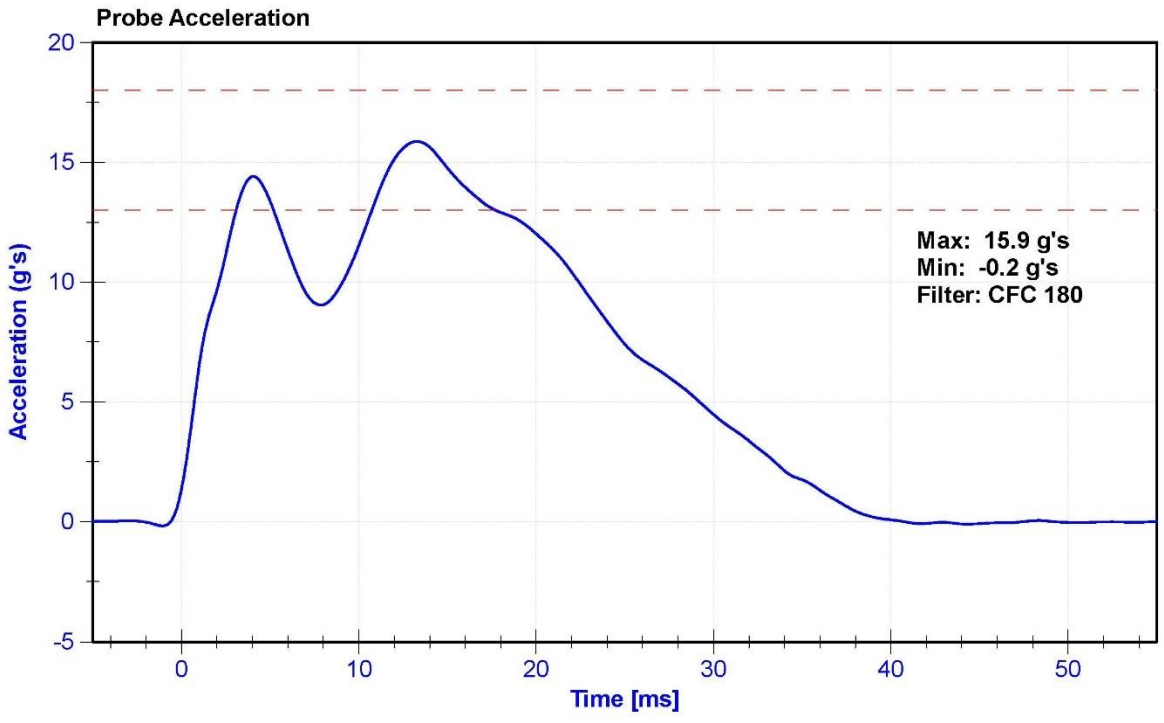
ATD Manufacturer	FTSS	Test Technician	T. Roseman
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

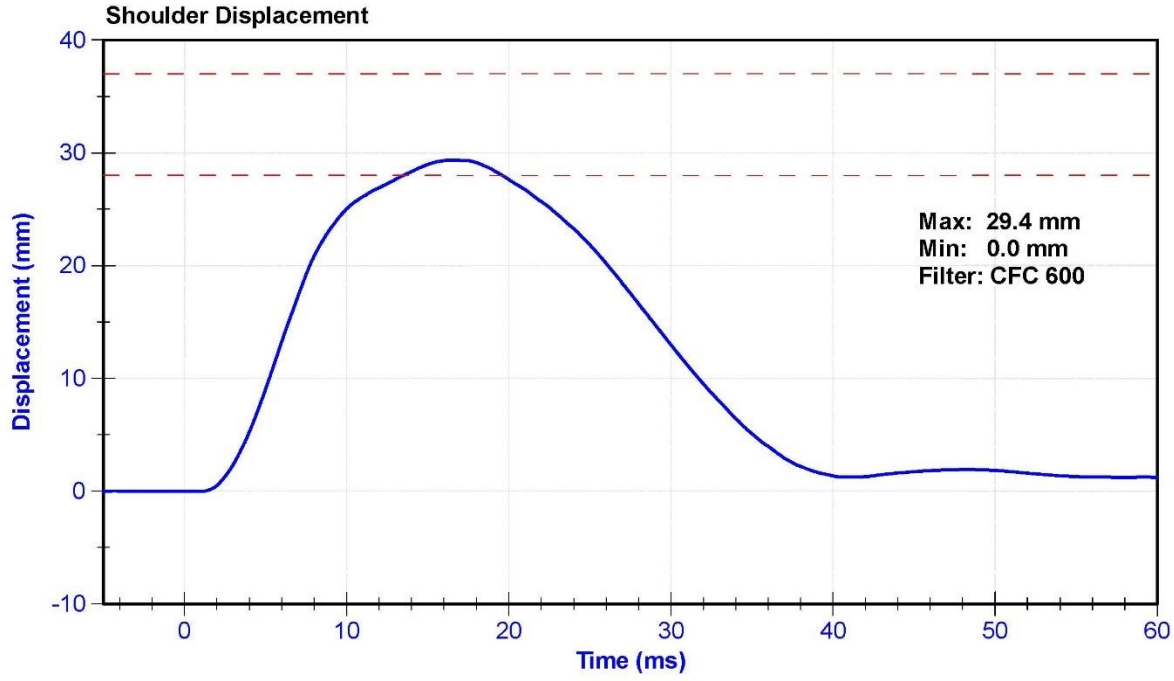
Results

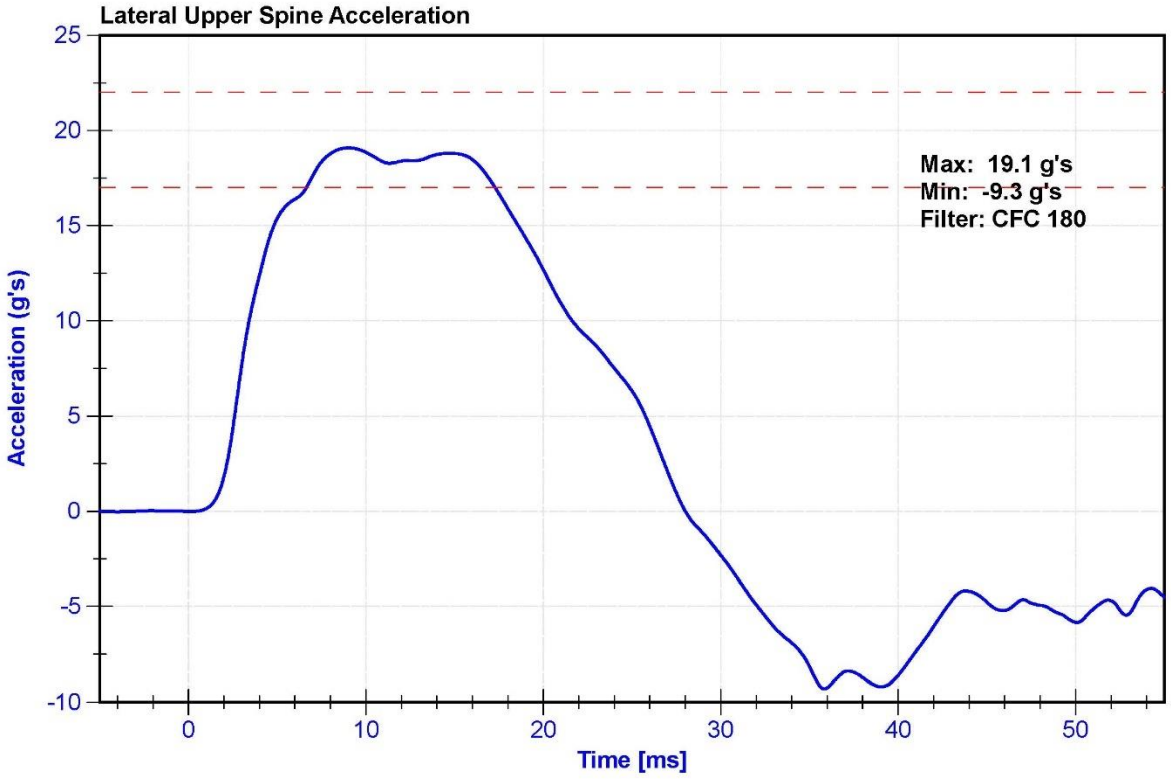
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.6	Pass
Humidity	10	70	%	60.9	Pass
Velocity	4.2	4.4	m/s	4.33	Pass
Probe Acceleration	13	18	g's	15.9	Pass
Shoulder Deflection	28	37	mm	29.4	Pass
Lateral Upper Spine Acceleration	17	22	g's	19.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25885	10/25/2021	10/25/2022
Shoulder Potentiometer	Servo	053GFE	5/18/2022	11/16/2022
Upper Spine Y Accelerometer	Endevco	T20880	5/17/2022	11/13/2022




Shoulder Displacement
Displacement (mm)
Time (ms)
Max: 29.4 mm
Min: 0.0 mm
Filter: CFC 600


Lateral Upper Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 19.1 g's
Min: -9.3 g's
Filter: CFC 180

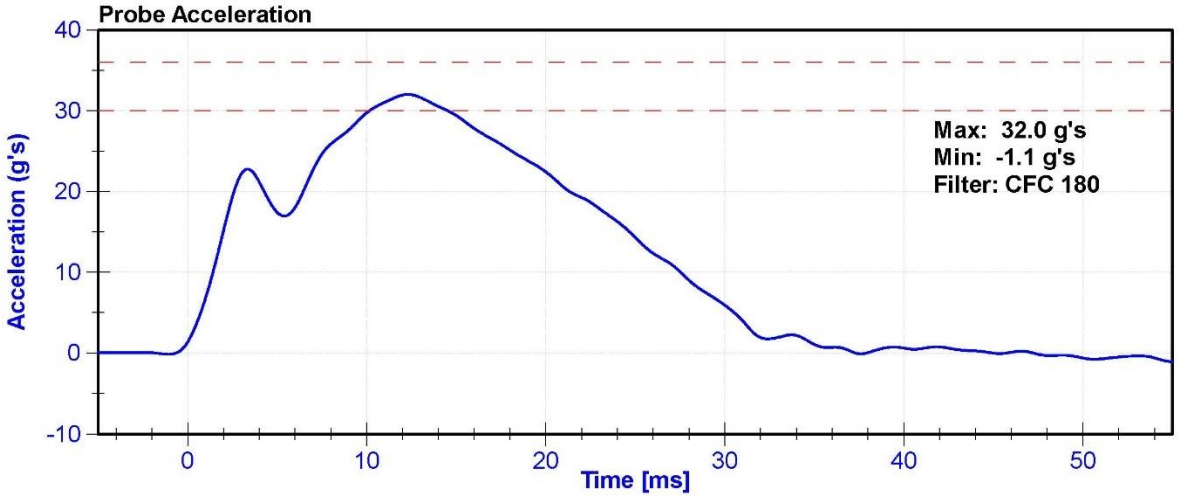
ATD Manufacturer	FTSS	Test Technician	T. Roseman
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

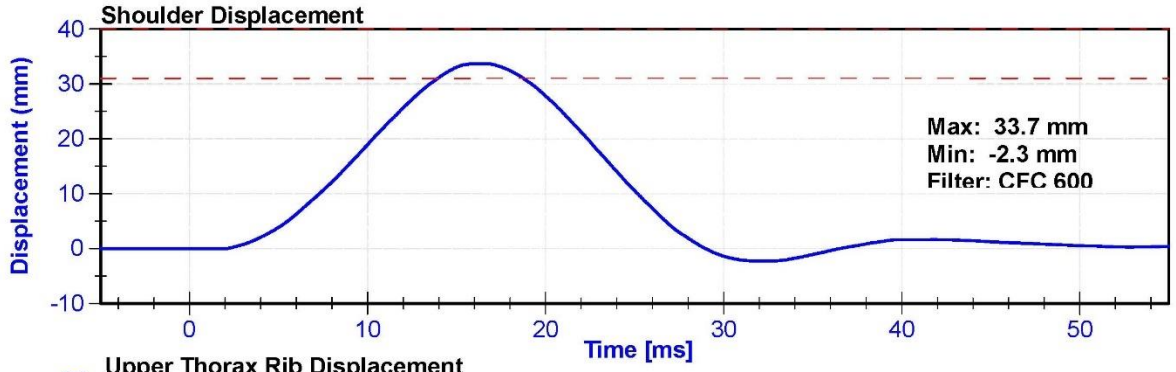
Results

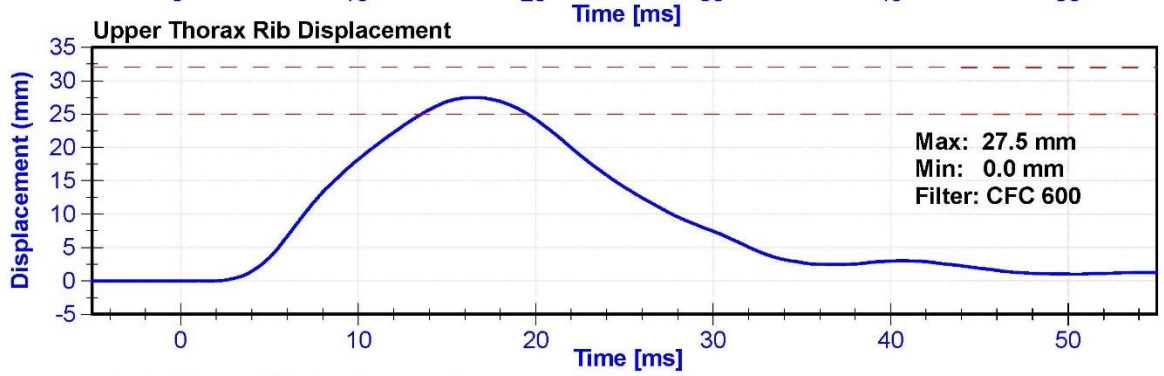
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.6	Pass
Humidity	10	70	%	60.9	Pass
Velocity	6.6	6.8	m/s	6.75	Pass
Probe Acceleration after 5 ms	30	36	g's	32.0	Pass
Lateral Upper Spine Acceleration	34	43	g's	36.1	Pass
Lateral Lower Spine Acceleration	29	37	g's	29.0	Pass
Shoulder Deflection	31	40	mm	33.7	Pass
Upper Thorax Rib Deflection	25	32	mm	27.5	Pass
Mid Thorax Rib Deflection	30	36	mm	31.6	Pass
Lower Thorax Rib Deflection	32	38	mm	33.7	Pass

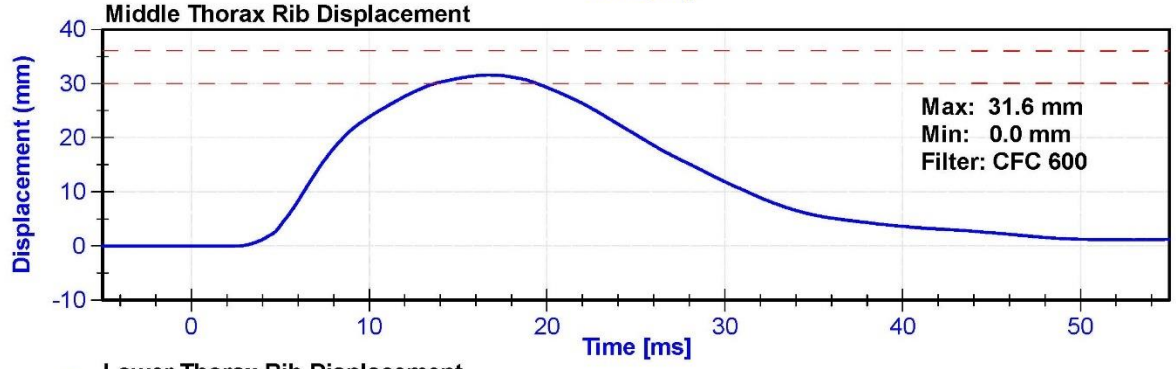
Transducer Calibrations

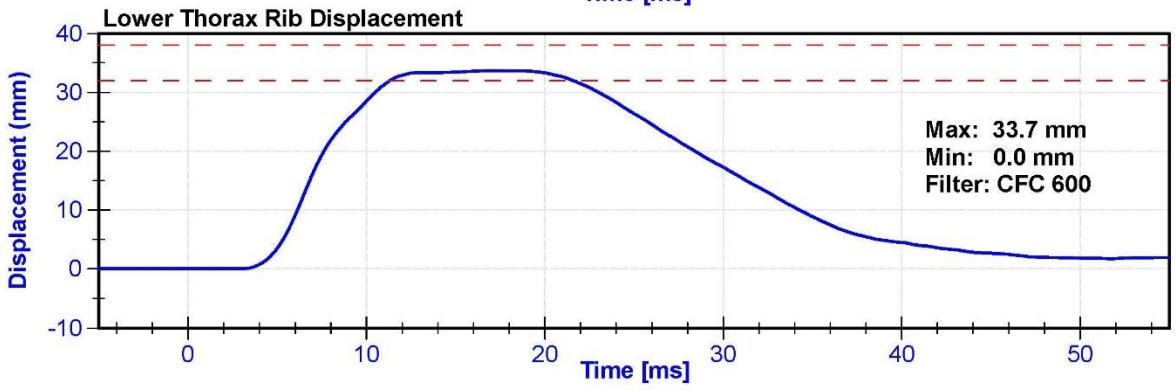
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25885	10/25/2021	10/25/2022
Upper Spine T1 Y Accelerometer	Endevco	T20880	5/17/2022	11/13/2022
Upper Spine T12 Y Accelerometer	Endevco	P52071	5/17/2022	11/13/2022
Shoulder Potentiometer	Servo	053GFE	5/18/2022	11/16/2022
Upper Thorax Rib Potentiometer	Servo	451GFE	5/18/2022	11/16/2022
Middle Thorax Rib Potentiometer	Servo	040GFE	5/18/2022	11/16/2022
Lower Thorax Rib Potentiometer	Servo	1156GFE	5/18/2022	11/16/2022

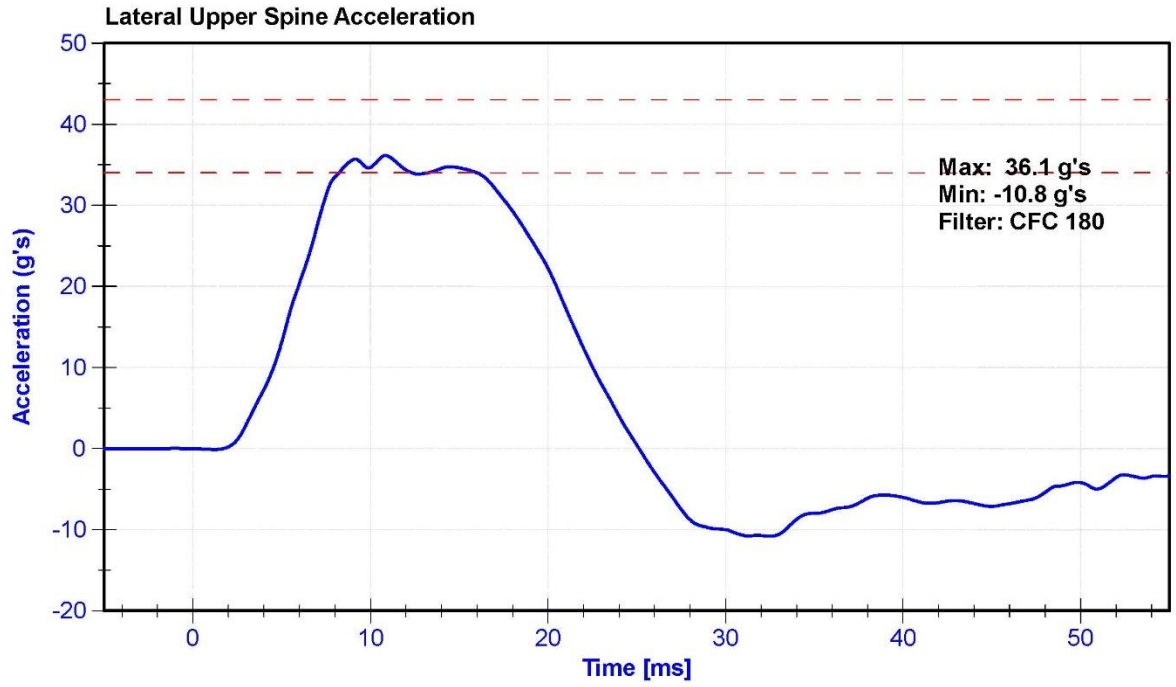


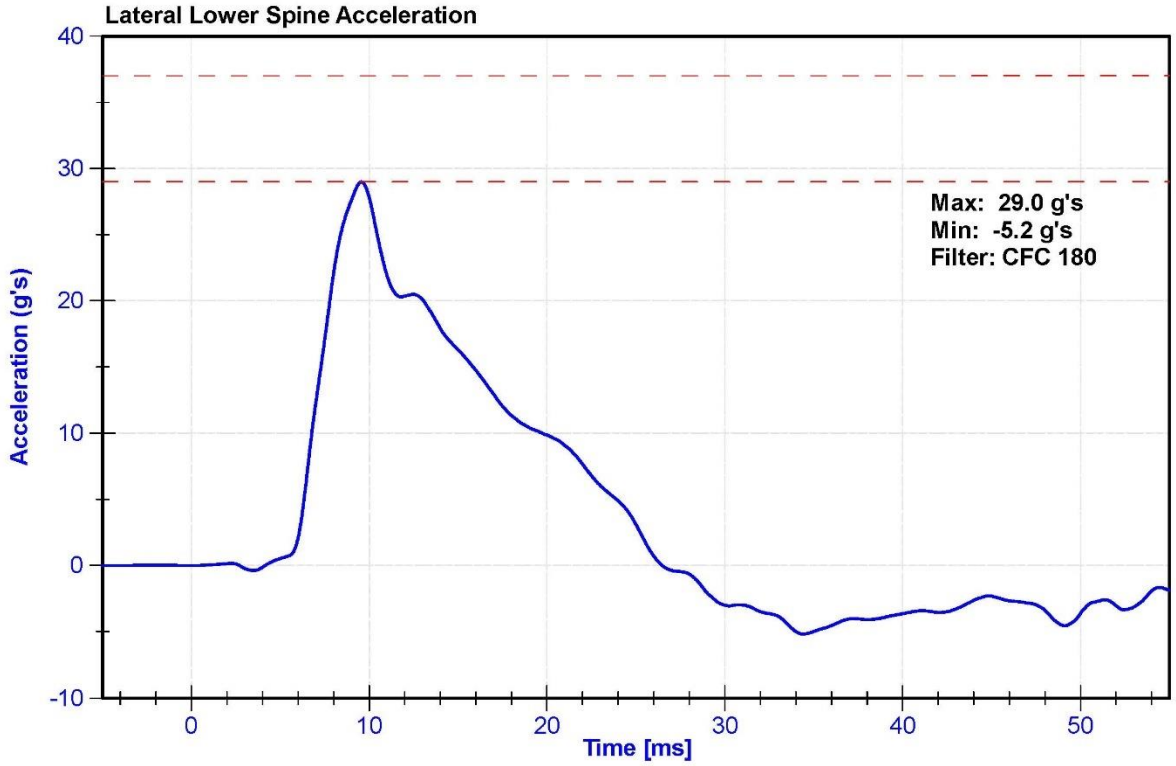

Shoulder Displacement
Displacement (mm)
Time [ms]
Max: 33.7 mm
Min: -2.3 mm
Filter: CFC 600


Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 27.5 mm
Min: 0.0 mm
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 31.6 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: 36.1 g's
Min: -10.8 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: 29.0 g's
Min: -5.2 g's
Filter: CFC 180
Acceleration (g's)
Time [ms]
40
30
20
10
0
-10
0
10
20
30
40
50

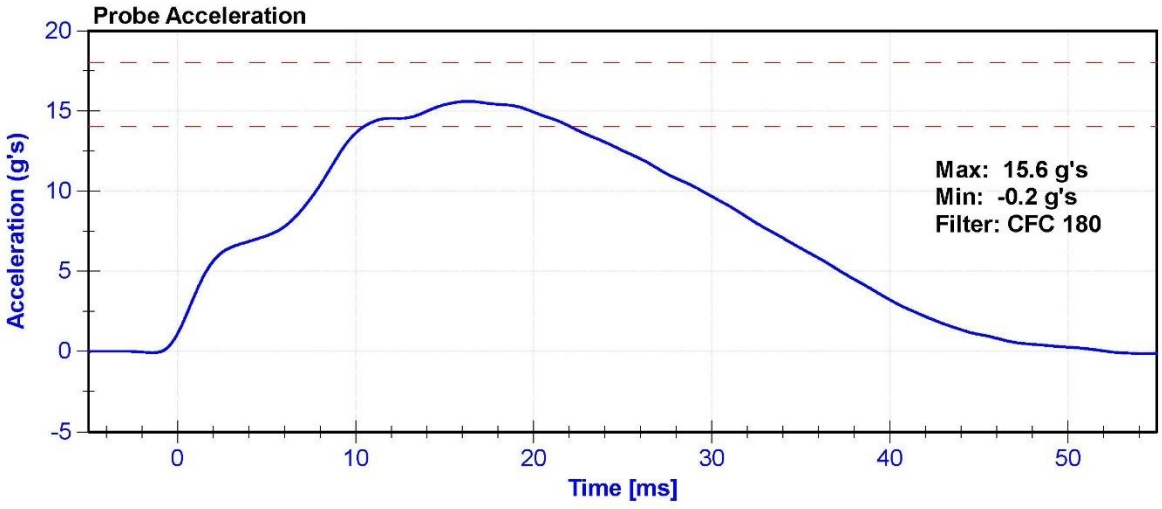
ATD Manufacturer	FTSS	Test Technician	T. Roseman
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

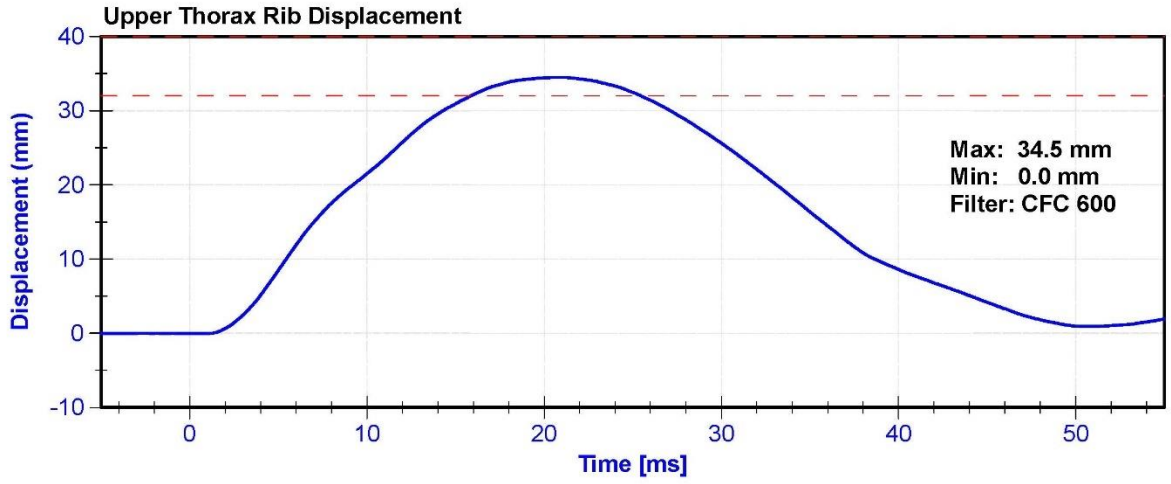
Results

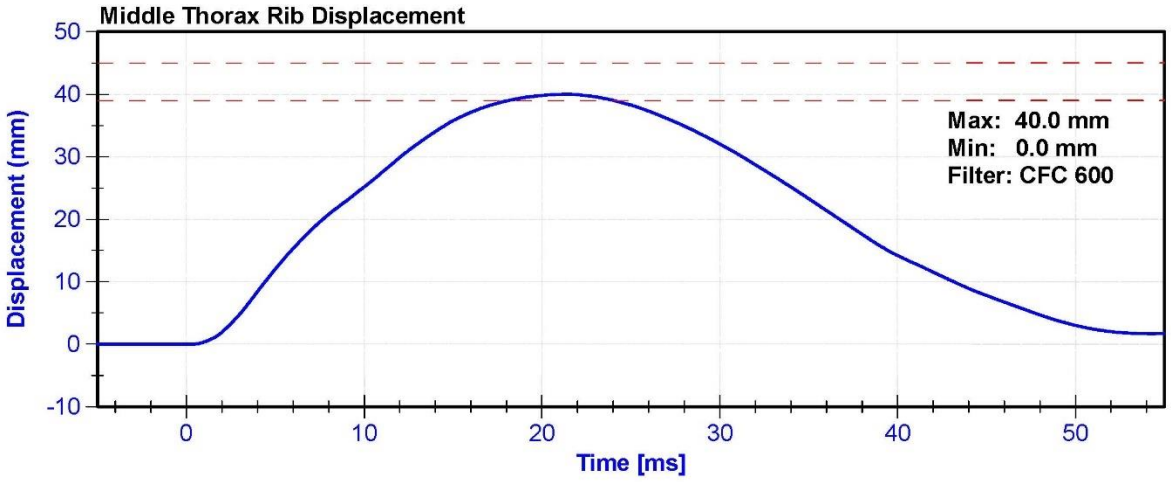
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.6	Pass
Humidity	10	70	%	60.9	Pass
Velocity	4.2	4.4	m/s	4.35	Pass
Probe Acceleration	14	18	g's	15.6	Pass
Lateral Upper Spine Acceleration	13	17	g's	15.0	Pass
Lateral Lower Spine Acceleration	7	11	g's	7.8	Pass
Upper Thorax Rib Deflection	32	40	mm	34.5	Pass
Middle Thorax Rib Deflection	39	45	mm	40.0	Pass
Lower Thorax Rib Deflection	35	43	mm	38.2	Pass

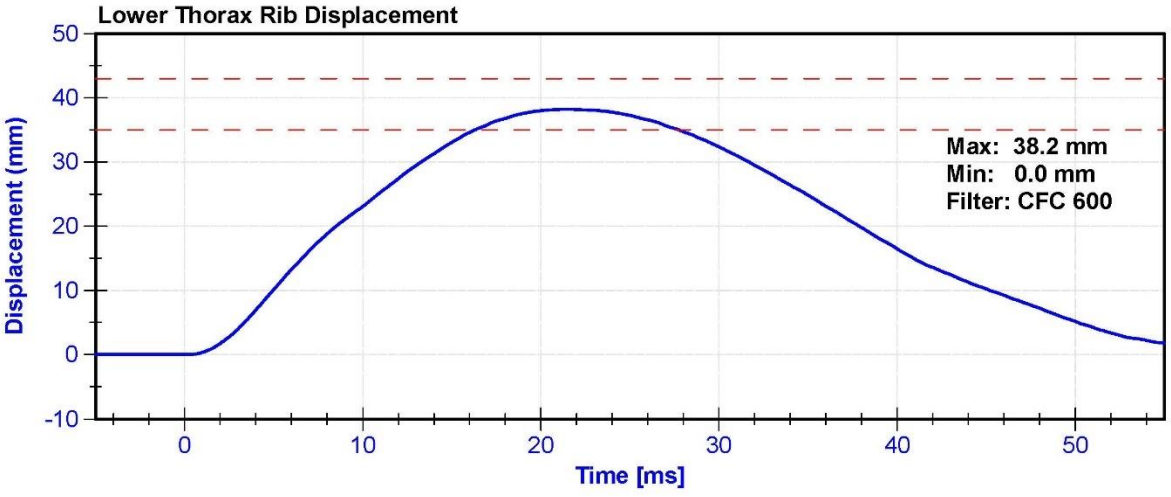
Transducer Calibrations

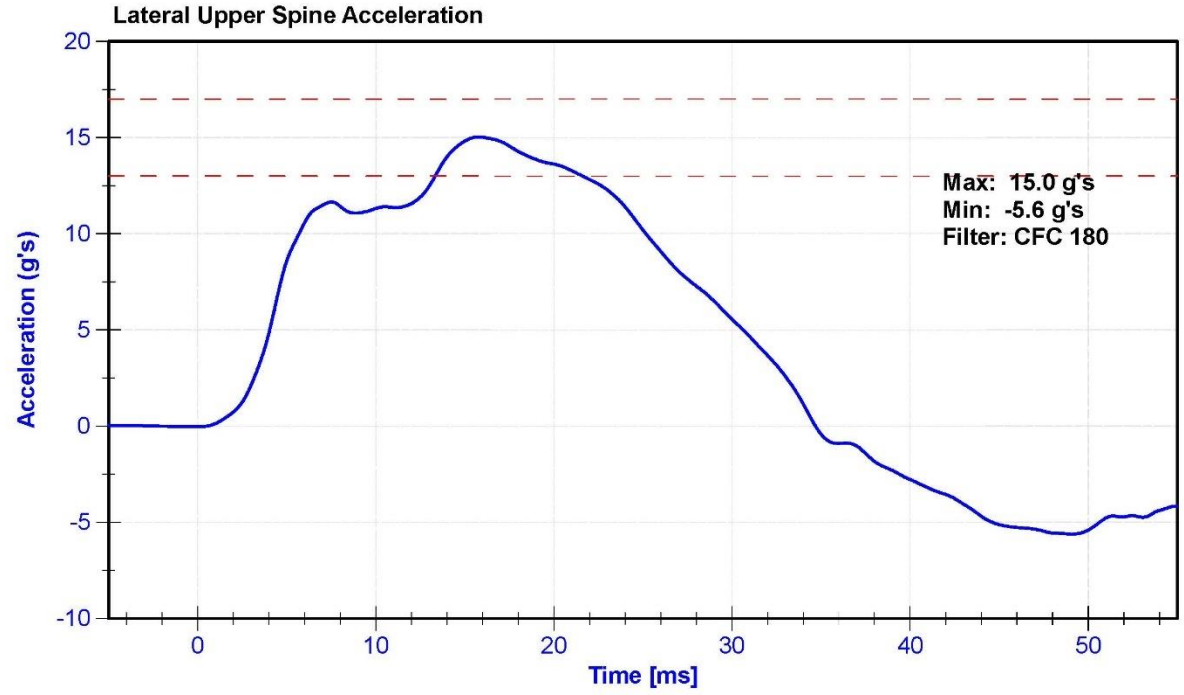
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25885	10/25/2021	10/25/2022
Upper Spine Y Accelerometer	Endevco	T20880	5/17/2022	11/13/2022
Lower Spine Y Accelerometer	Endevco	P52071	5/17/2022	11/13/2022
Upper Thorax Rib Potentiometer	Servo	451GFE	5/18/2022	11/16/2022
Middle Thorax Rib Potentiometer	Servo	040GFE	5/18/2022	11/16/2022
Lower Thorax Rib Potentiometer	Servo	1156GFE	5/18/2022	11/16/2022

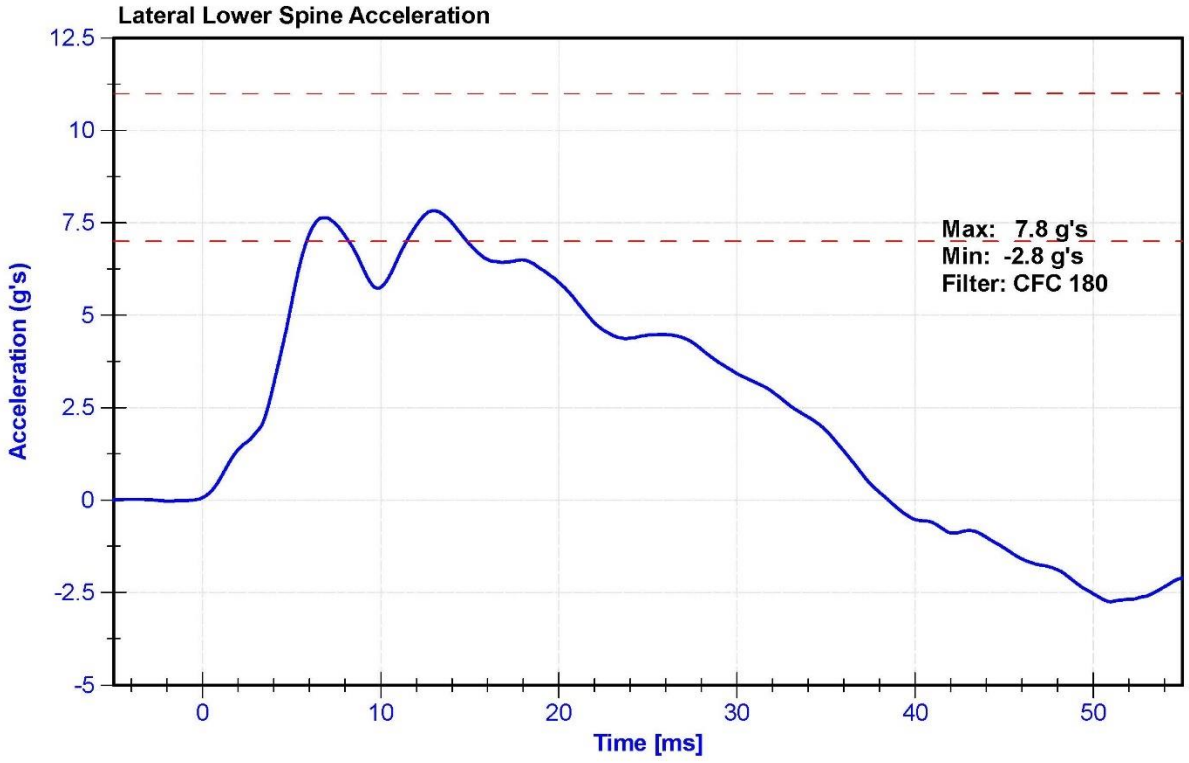



Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 34.5 mm
Min: 0.0 mm
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 40.0 mm
Min: 0.0 mm
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 38.2 mm
Min: 0.0 mm
Filter: CFC 600


Lateral Upper Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 15.0 g's
Min: -5.6 g's
Filter: CFC 180


Lateral Lower Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 7.8 g's
Min: -2.8 g's
Filter: CFC 180

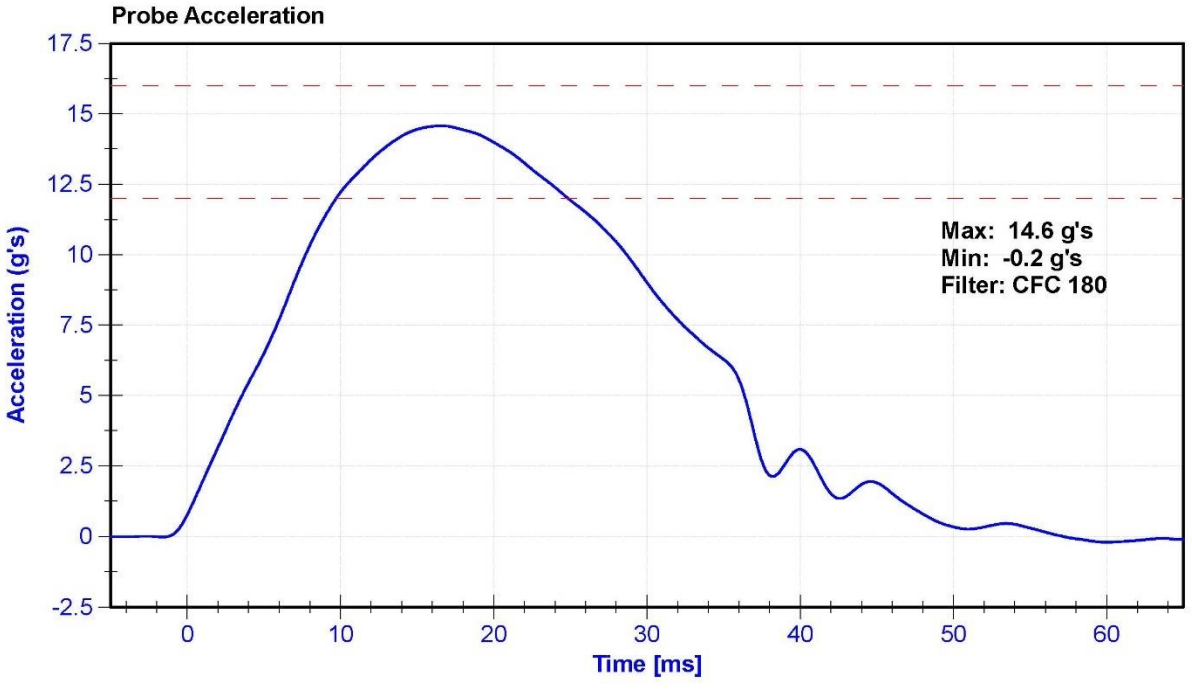
ATD Manufacturer	FTSS	Test Technician	T. Roseman
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

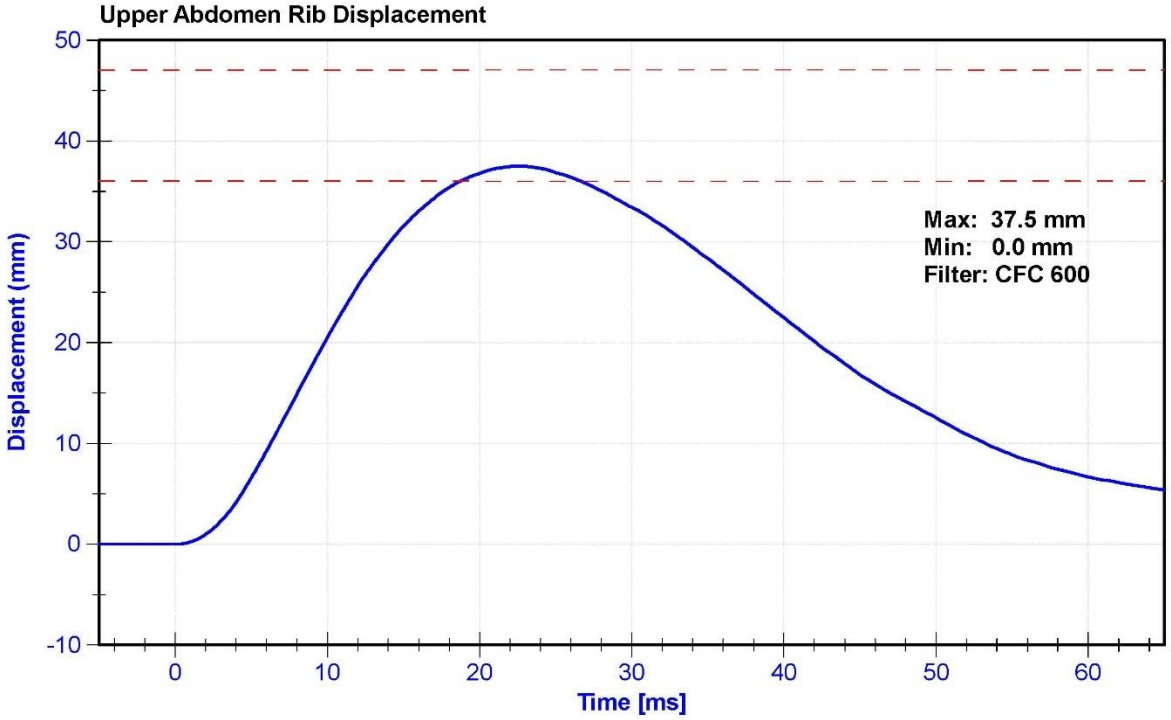
Results

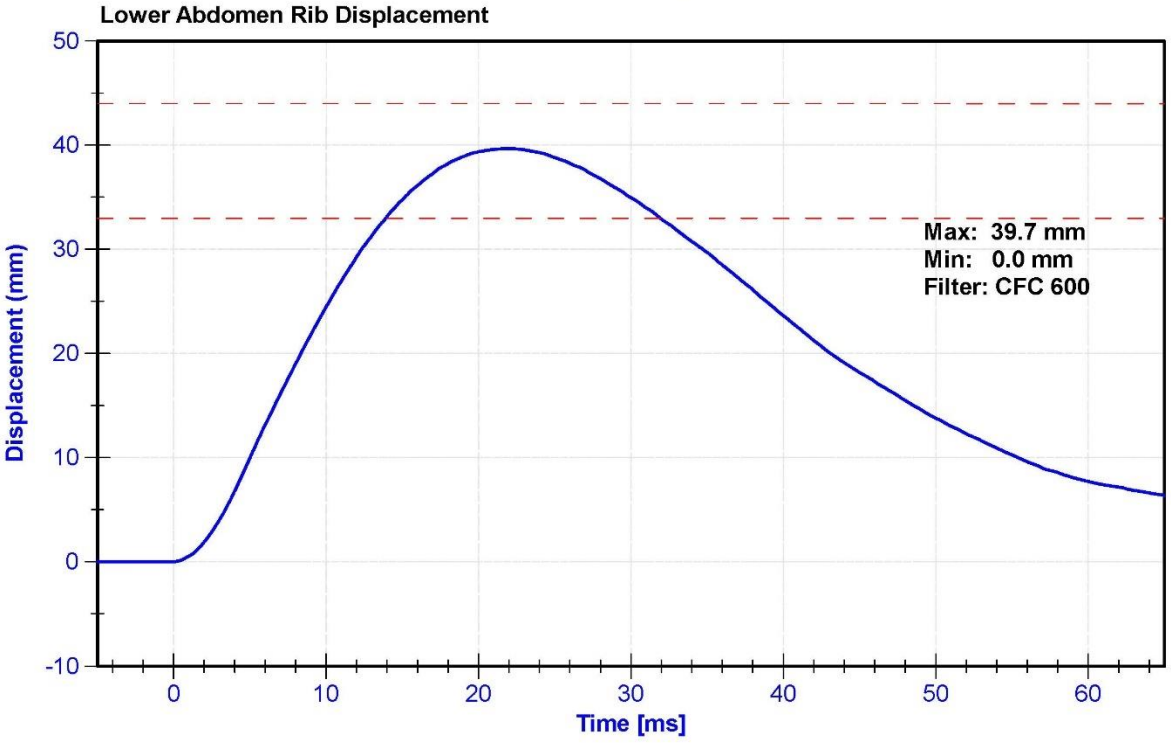
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.6	Pass
Humidity	10	70	%	60.9	Pass
Velocity	4.2	4.4	m/s	4.34	Pass
Probe Acceleration	12	16	g's	14.6	Pass
Lateral Lower Spine Acceleration	9	14	g's	13.0	Pass
Upper Abdomen Rib Deflection	36	47	mm	37.5	Pass
Lower Abdomen Rib Deflection	33	44	mm	39.7	Pass

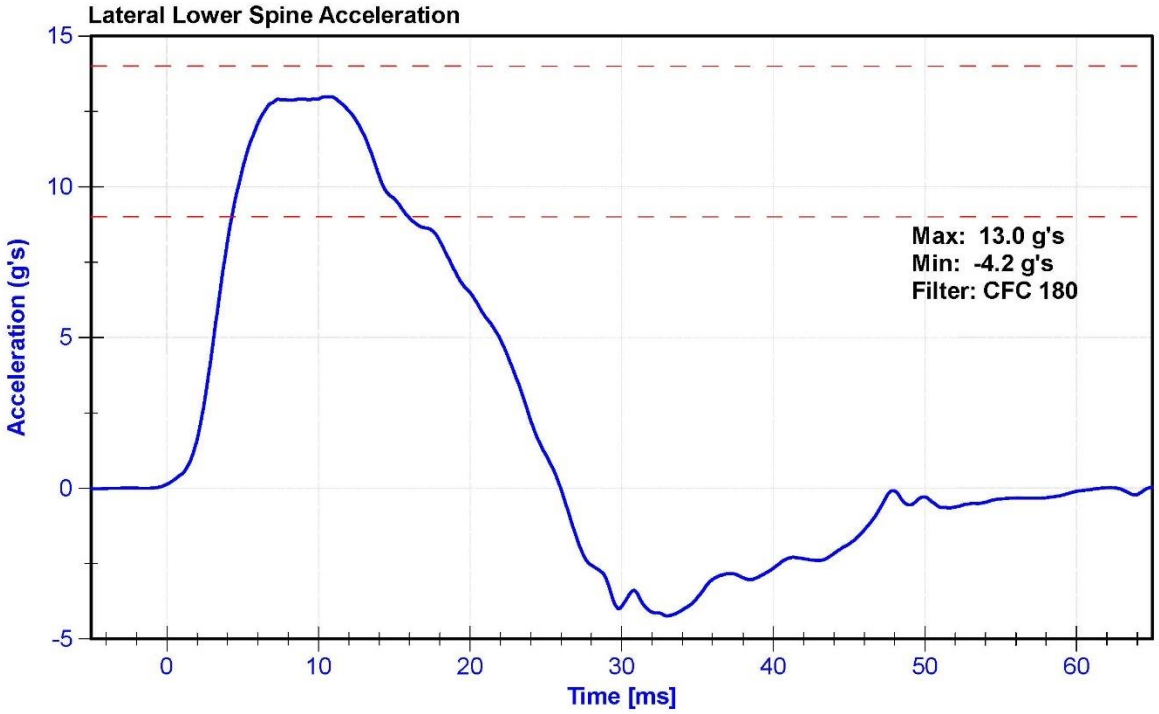
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	T25885	10/25/2021	10/25/2022
Lower Spine Y Accelerometer	Endevco	P52071	5/17/2022	11/13/2022
Upper Abdomen Rib Potentiometer	Servo	307GFE	5/20/2022	11/18/2022
Lower Abdomen Rib Potentiometer	Servo	308GFE	5/18/2022	11/16/2022




Upper Abdomen Rib Displacement
Displacement (mm)
Time [ms]
Max: 37.5 mm
Min: 0.0 mm
Filter: CFC 600


Lower Abdomen Rib Displacement
Displacement (mm)
Time [ms]
Max: 39.7 mm
Min: 0.0 mm
Filter: CFC 600


Lateral Lower Spine Acceleration
Max: 13.0 g's
Min: -4.2 g's
Filter: CFC 180
Acceleration (g's)
Time [ms]
15
10
5
0
-5
0
10
20
30
40
50
60

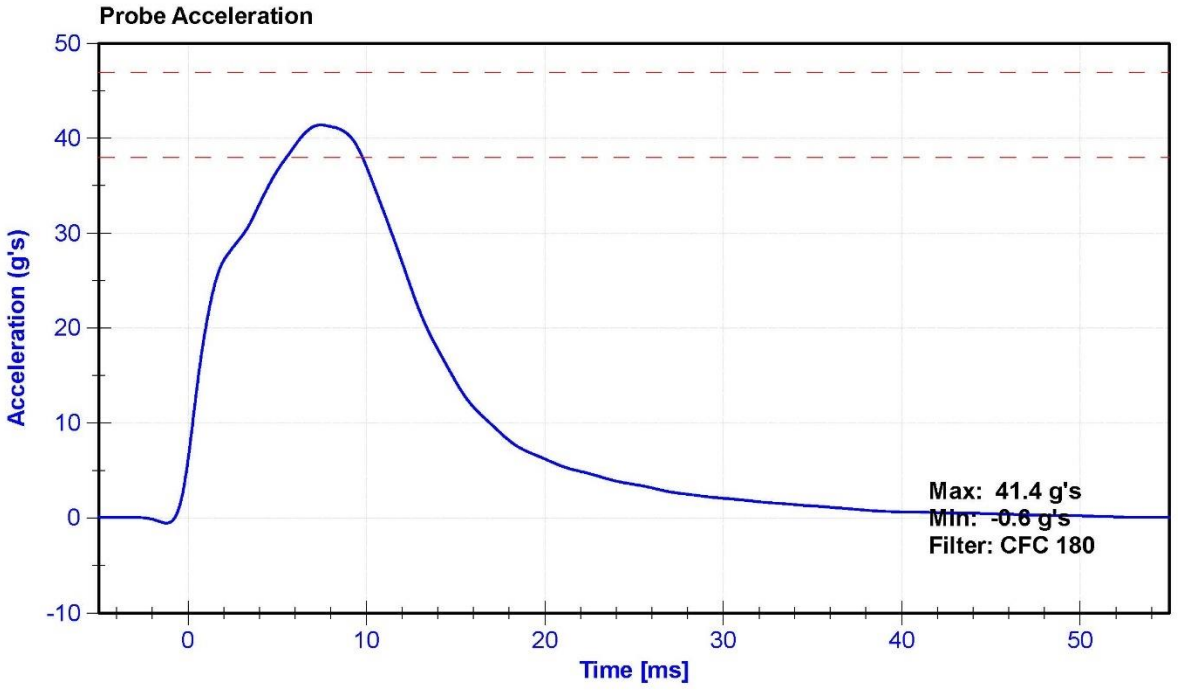
ATD Manufacturer	FTSS	Test Technician	T. Roseman
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

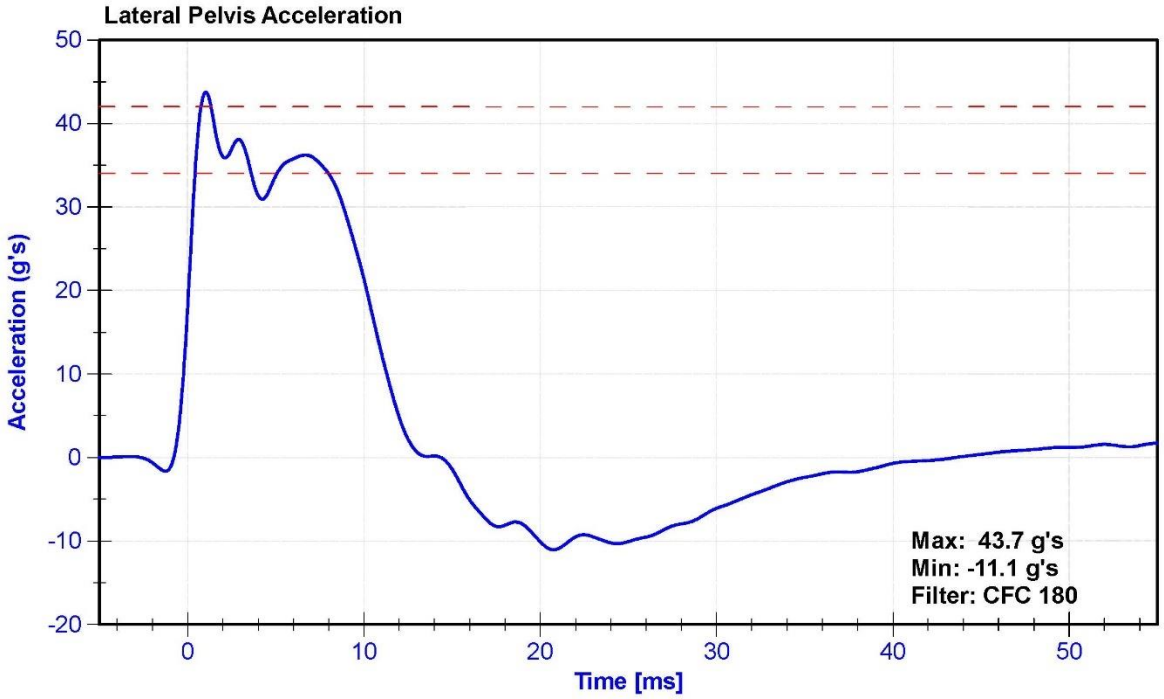
Results

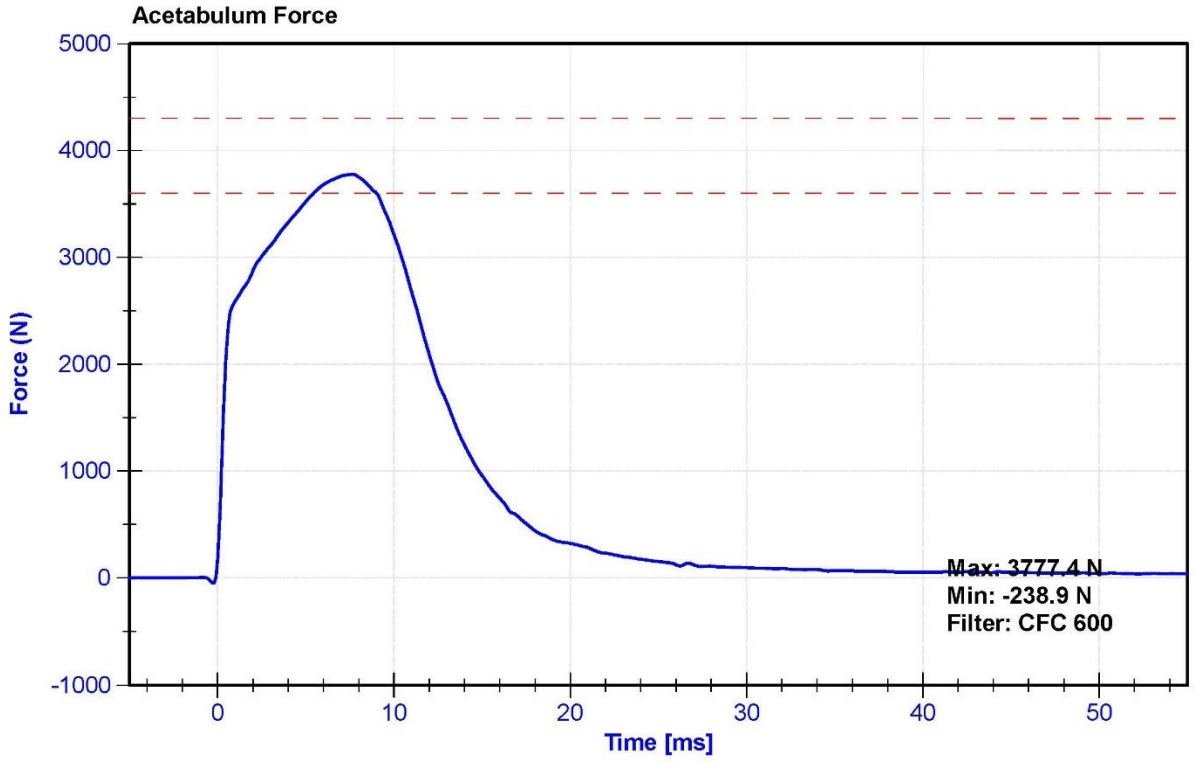
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.6	Pass
Humidity	10	70	%	60.9	Pass
Velocity	6.6	6.8	m/s	6.76	Pass
Probe Acceleration	38	47	g's	41.4	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	36.2	Pass
Acetabulum Force	3600	4300	N	3777.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25885	10/25/2021	10/25/2022
Pelvis Y Accelerometer	Endevco	P51731	5/17/2022	11/13/2022
Acetabulum Load Cell	Denton	275-FY	9/14/2021	9/14/2022
Certification Plug	SACO			N/A
Crash Test Plug	SACO			N/A




Lateral Pelvis Acceleration
Acceleration (g's)
50
40
30
20
10
0
-10
-20
0
10
20
30
40
50
Time [ms]
Max: 43.7 g's
Min: -11.1 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: 3777.4 N
Min: -238.9 N
Filter: CFC 600

NHTSA 300 CERT 6/2/2021

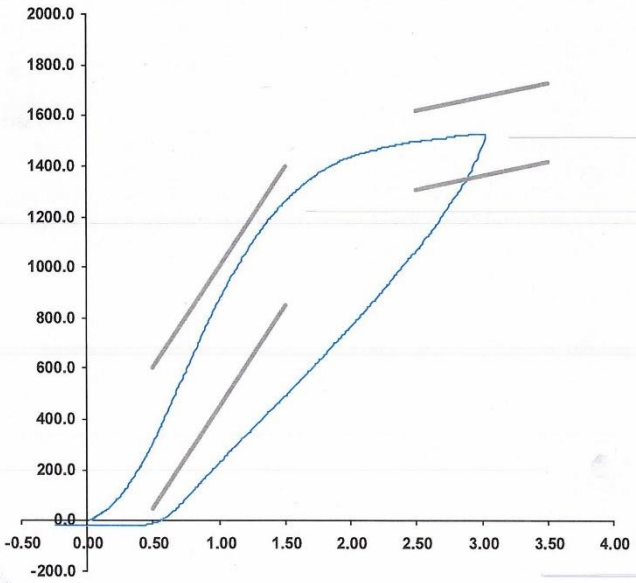
SACO RESEARCH

SID-IIs Pelvis Plug Certification Test

Plug S/N 13967
Test Number 13441
Report Number 13486
Test Date 5/22/2020 9:04:40 AM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	311	50	600
Force @ 1.5 mm (N)	1,263	850	1,400
Force @ 2.5 mm (N)	1,497	1,306	1,618
Force @ 3.0 mm (N)	1,528	1,361	1,673

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

Part Number 180-4450

Template No 107 08-Jul-21
SACO Research

By : _____ Date : _____

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

NHTSA 300 CRASH 6/2/2022

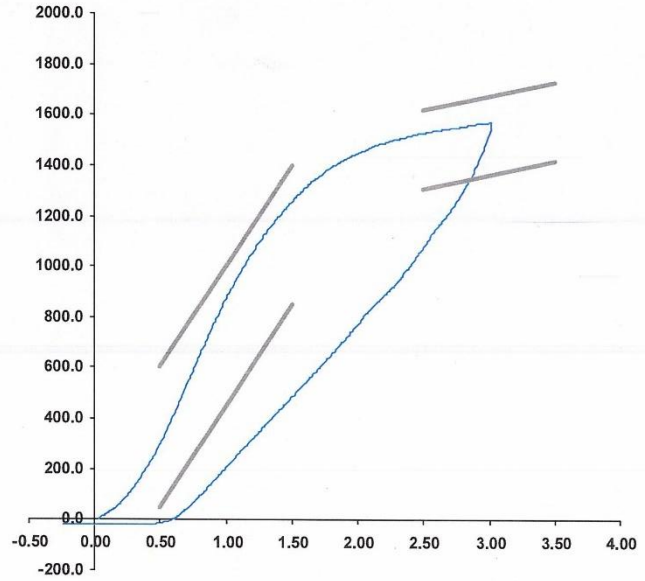
SACO RESEARCH

SID-IIs Pelvis Plug Certification Test

Plug S/N 13663
Test Number 11311
Report Number 11349
Test Date 9/26/2019 12:43:03 PM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	300	50	600
Force @ 1.5 mm (N)	1,261	850	1,400
Force @ 2.5 mm (N)	1,528	1,306	1,618
Force @ 3.0 mm (N)	1,570	1,361	1,673

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

Part Number 180-4450

Template No 107 08-Jul-21
SACO Research

By : _____ Date : _____

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

SACO RESEARCH

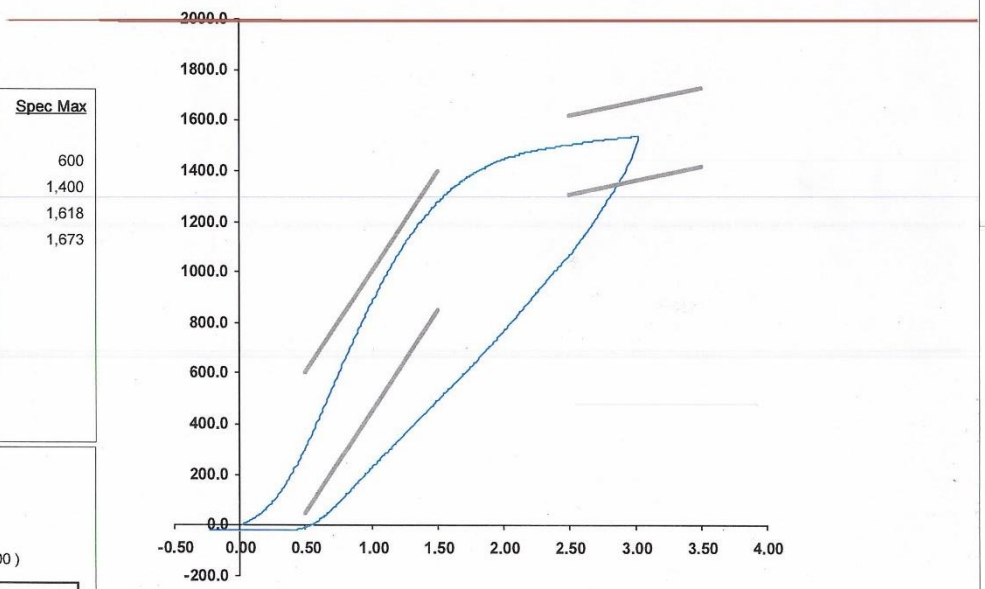
NHTSA 300 Non-Impact 6/2/2022

SID-IIs Pelvis Plug Certification Test

Plug S/N 13891
Test Number 13365
Report Number 13410
Test Date 5/20/2020 8:13:29 PM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	313	50	600
Force @ 1.5 mm (N)	1,276	850	1,400
Force @ 2.5 mm (N)	1,505	1,306	1,618
Force @ 3.0 mm (N)	1,537	1,361	1,673

Force (-N) vs Extension (-mm)



Testing Machine STM-20 5965542
Load Cell S/N (FI360947), Units (LBS) 1000
Preload Value (-N) 22.24
Crosshead Speed (mm / min) or Rate 12.7
Extension or Position Measured by XHD_100 (XHD100)

Notes:

Operator

Part Number 180-4450

Template No 107 08-Jul-21
SACO Research

By : _____ Date : _____

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

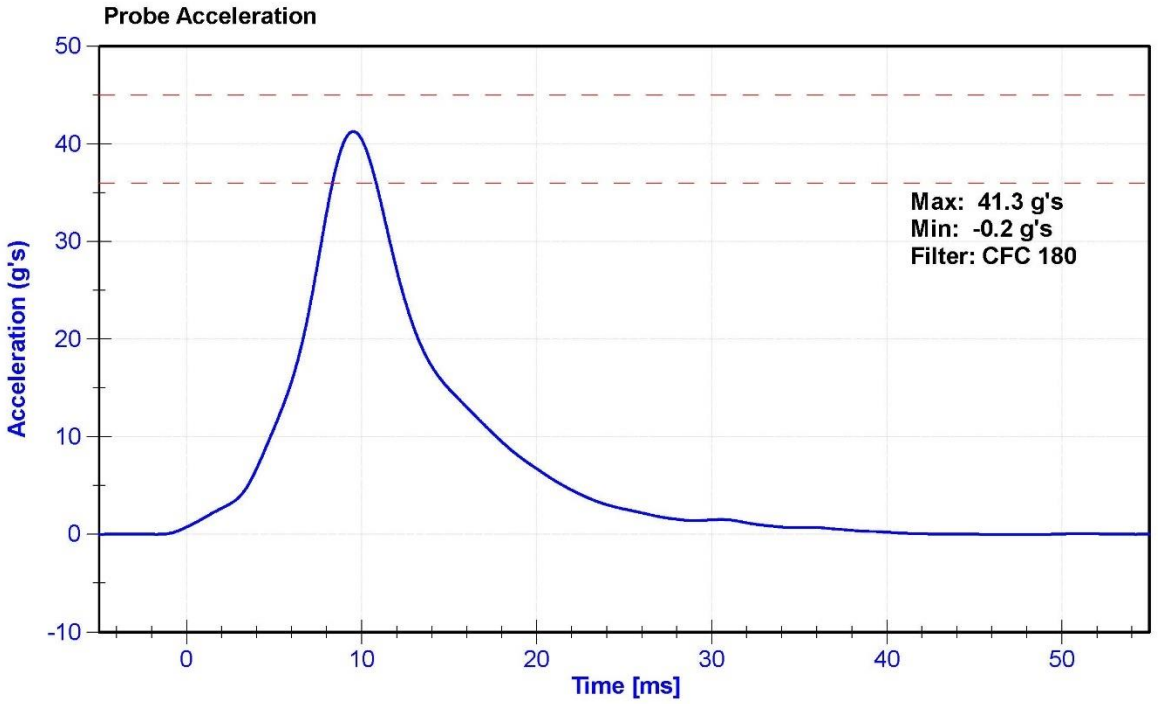
ATD Manufacturer	FTSS	Test Technician	T. Roseman
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

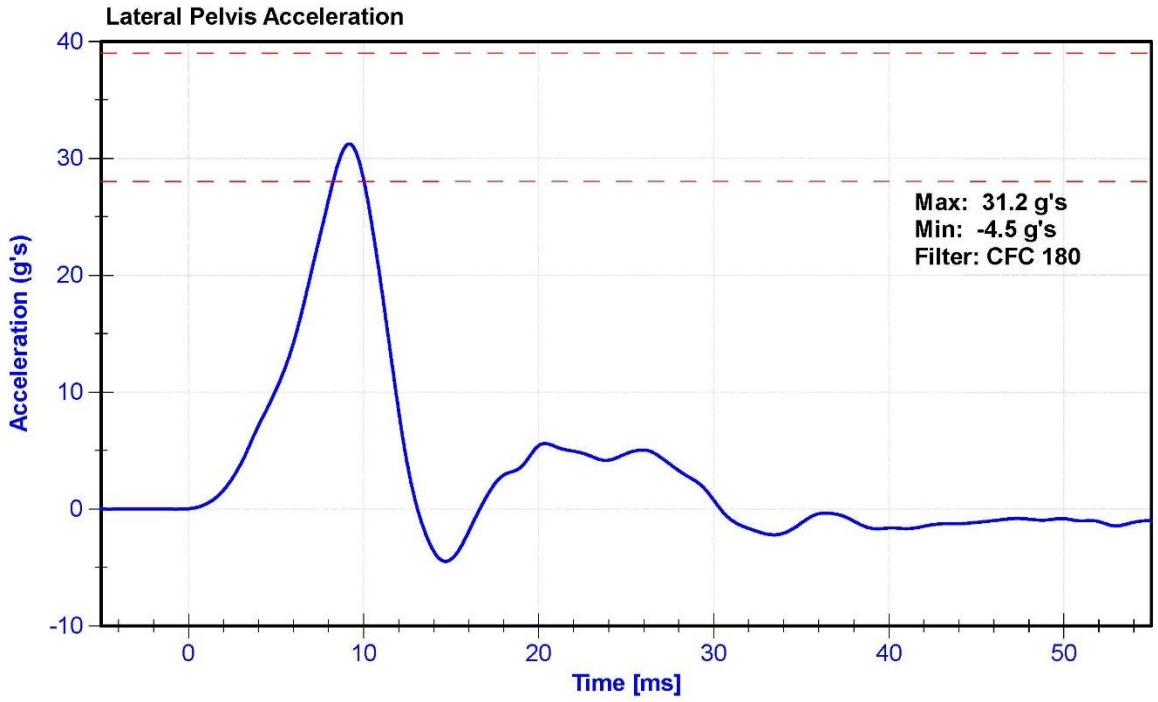
Results

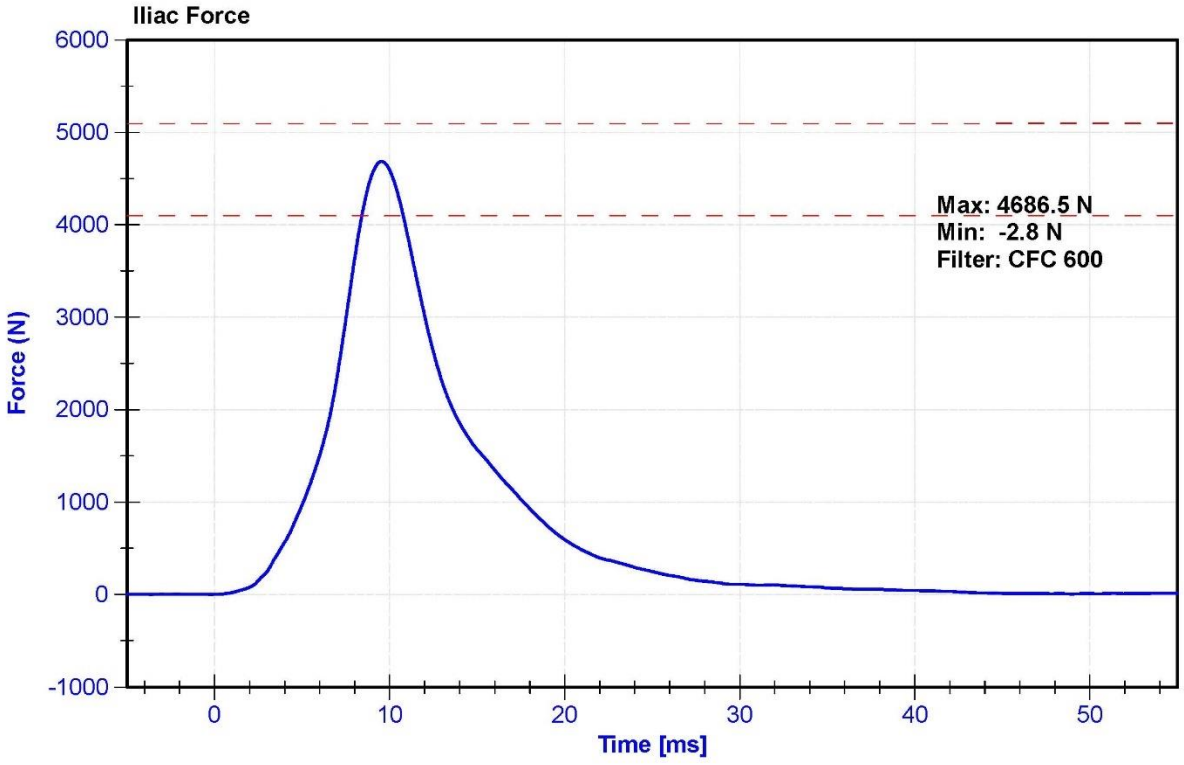
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.6	Pass
Humidity	10	70	%	60.9	Pass
Velocity	4.2	4.4	m/s	4.33	Pass
Probe Acceleration	36	45	g's	41.3	Pass
Lateral Pelvis Acceleration	28	39	g's	31.2	Pass
Iliac Force	4100	5100	N	4686.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25885	10/25/2021	10/25/2022
Pelvis Y Accelerometer	Endevco	P51731	5/17/2022	11/13/2022
Iliac Load Cell	Denton	279-FY	9/14/2021	9/14/2022




Lateral Pelvis Acceleration
Acceleration (g's)
Time [ms]
Max: 31.2 g's
Min: -4.5 g's
Filter: CFC 180


Iliac Force
Force (N)
Time [ms]
Max: 4686.5 N
Min: -2.8 N
Filter: CFC 600

CALIBRATION TEST RESULTS

POST-TEST

SID-IIS 5TH PERCENTILE FEMALE - DRIVER ATD

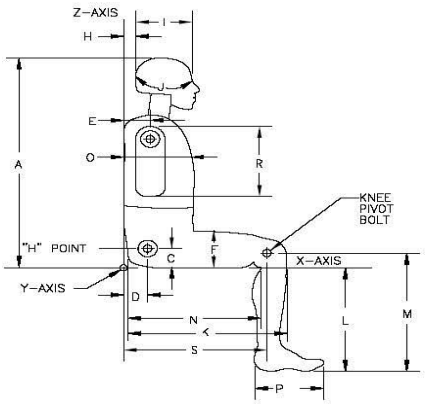
SERIAL NO: 300

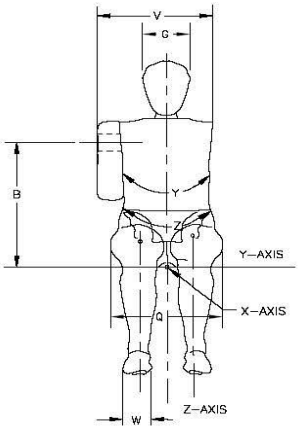
(CONFIGURED FOR LEFT SIDE IMPACT)

External Measurements - SID-IIs

Technician: K. Brogan Date: 06/28/2022

Dummy Serial Number: 300





Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	778	Pass
B	Shoulder Pivot Height	437	453	445	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	105	Pass
F	Thigh Clearance	119	135	125	Pass
G	Head Breadth	140	148	145	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	182	Pass
J	Head Circumference	541	551	546	Pass
K	Buttock to Knee Length	514	540	528	Pass
L	Popliteal Height	343	369	362	Pass
M	Knee Pivot to floor height	392	409	400	Pass
N	Buttock Popliteal Length	416	442	432	Pass
O	Chest Depth w/o jacket	195	211	204	Pass
P	Foot Length	216	232	223	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	315	Pass
R	Arm Length	249	259	250	Pass
S	Knee Joint to seatback	477	493	486	Pass
V	Shoulder Width	341	357	350	Pass
W	Foot Width	78	94	86	Pass
Y	Chest Circumference w/jacket	851	881	879	Pass
Z	Waist Circumference	761	791	775	Pass

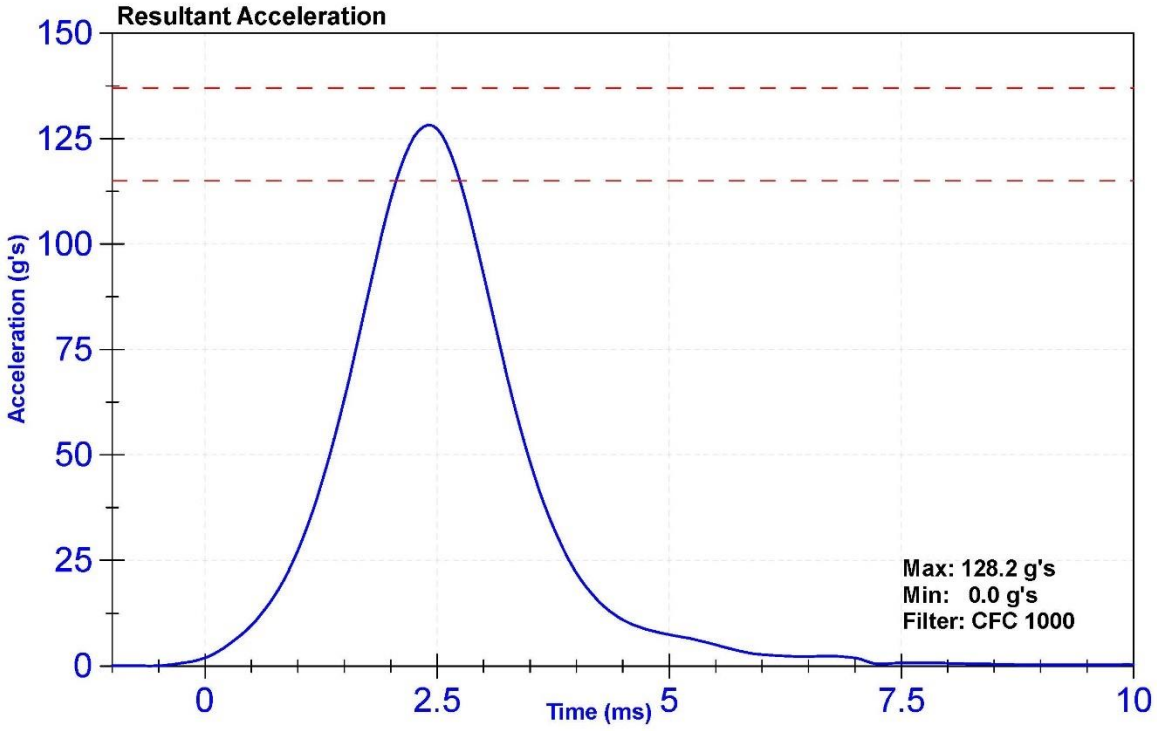
ATD Manufacturer	FTSS	Test Technician	D. Sakona
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

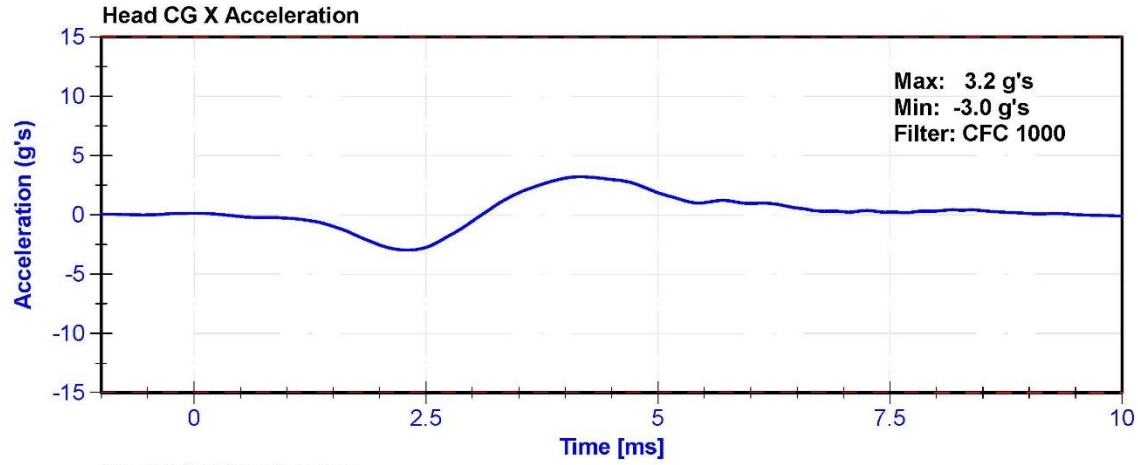
Results

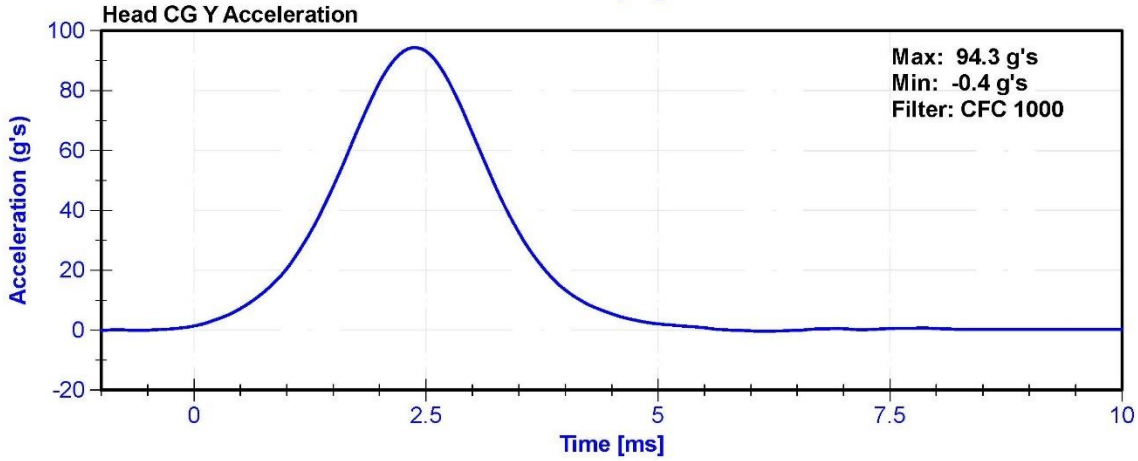
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.7	Pass
Humidity	10	70	%	56	Pass
Resultant Acceleration	115	137	g's	128.2	Pass
Oscillation	0	15	%	1.8	Pass
Fore-Aft Acceleration	-15	15	g's	3.2	Pass

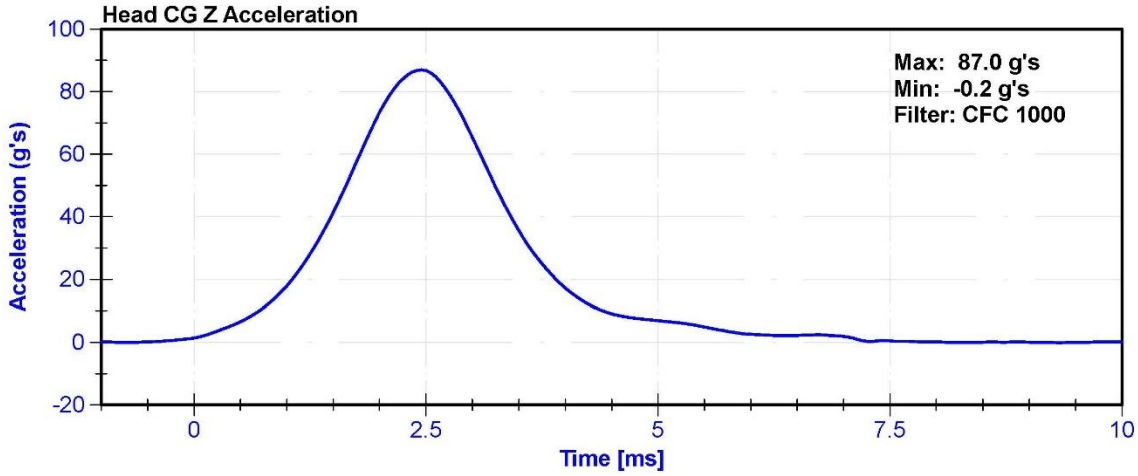
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibratio Date	Calibratio Due Date
X Accelerometer	Endevco	P59018	5/17/2022	11/13/2022
Y Accelerometer	Endevco	P79189	5/17/2022	11/13/2022
Z Accelerometer	Endevco	P58777	5/17/2022	11/13/2022




Head CG X Acceleration
Max: 3.2 g's
Min: -3.0 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: 94.3 g's
Min: -0.4 g's
Filter: CFC 1000
Acceleration (g's)
100
80
60
40
20
0
-20
0
2.5
5
7.5
10
Time [ms]


Head CG Z Acceleration
Max: 87.0 g's
Min: -0.2 g's
Filter: CFC 1000
Acceleration (g's)
100
80
60
40
20
0
-20
0
2.5
5
7.5
10
Time [ms]

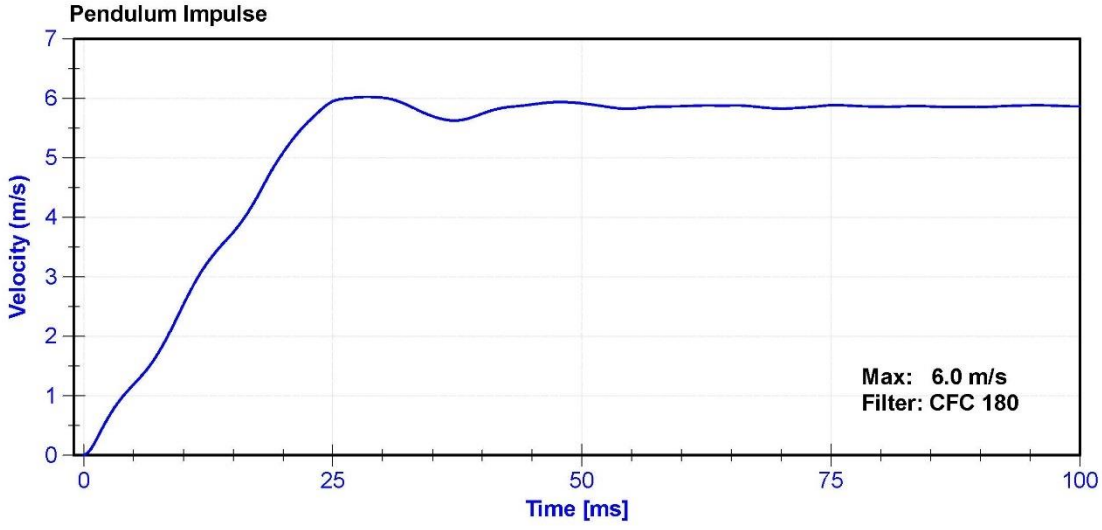
ATD Manufacturer	FTSS	Test Technician	T. Roseman
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

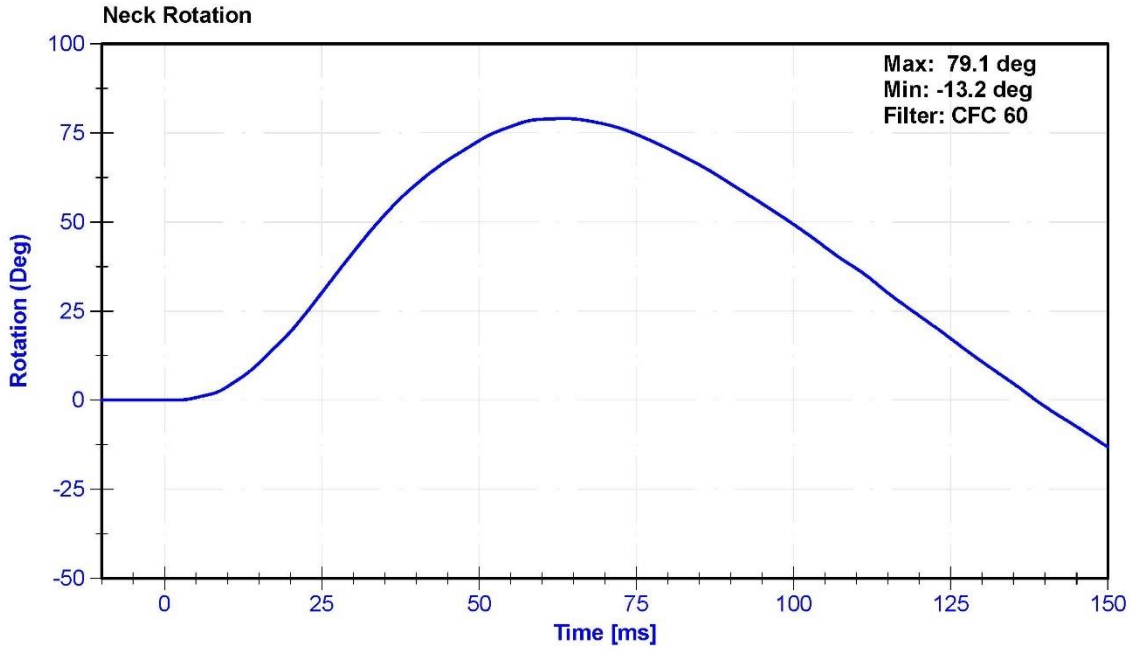
Results

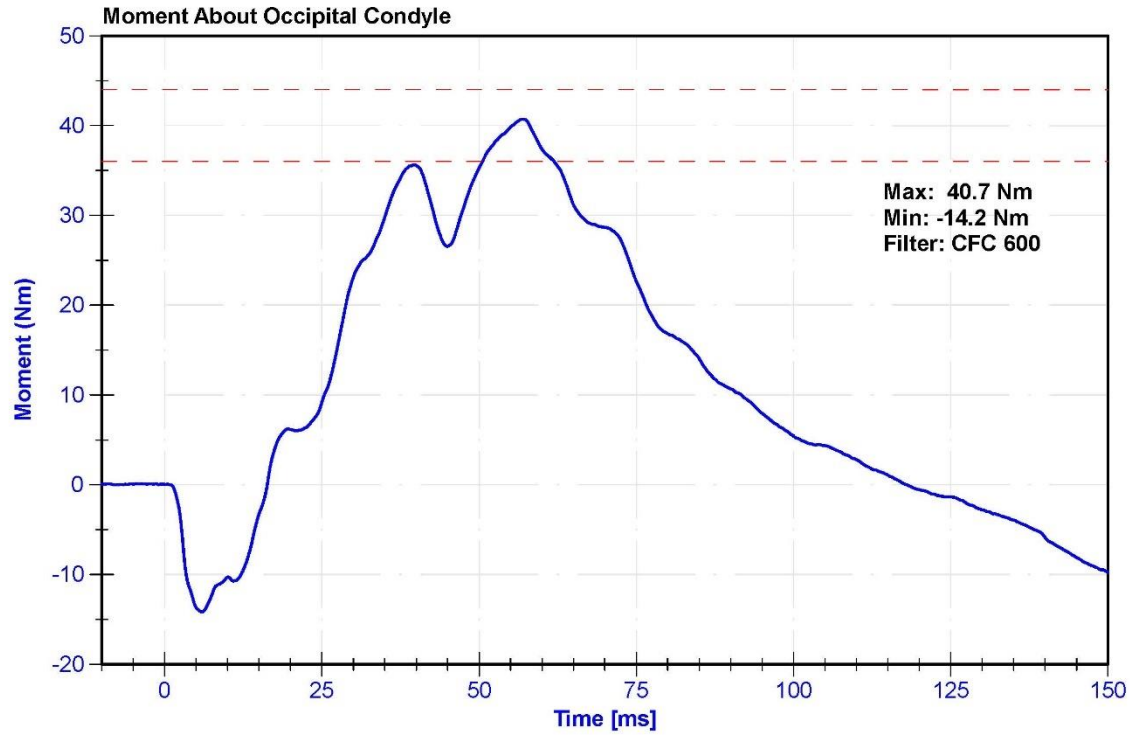
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.8	Pass
Humidity	10	70	%	57.8	Pass
Velocity	5.51	5.63	m/s	5.627	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.53	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.75	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	5.09	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.95	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	6.02	Pass
Neck Rotation	71	81	deg	79.1	Pass
Time at Maximum Rotation	50	70	ms	63.6	Pass
Moment about the OC	36	44	Nm	40.7	Pass
Moment Decay to 0 Nm	102	126	ms	118.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	7231C-750	1/31/2022	7/30/2022
Pendulum Potentiometer	Servo	4961	2/23/2022	2/23/2023
Condyle Potentiometer	Servo	DS185	11/12/2021	11/12/2022
Upper Neck Load Cell	Denton	1716A-1037-FY	6/29/2021	6/29/2022




Neck Rotation
Max: 79.1 deg
Min: -13.2 deg
Filter: CFC 60
Rotation (Deg)
100
75
50
25
0
-25
-50
0
25
50
75
100
125
150
Time [ms]


Moment About Occipital Condyle
Max: 40.7 Nm
Min: -14.2 Nm
Filter: CFC 600
Moment (Nm)
50
40
30
20
10
0
-10
-20
0
25
50
75
100
125
150
Time [ms]

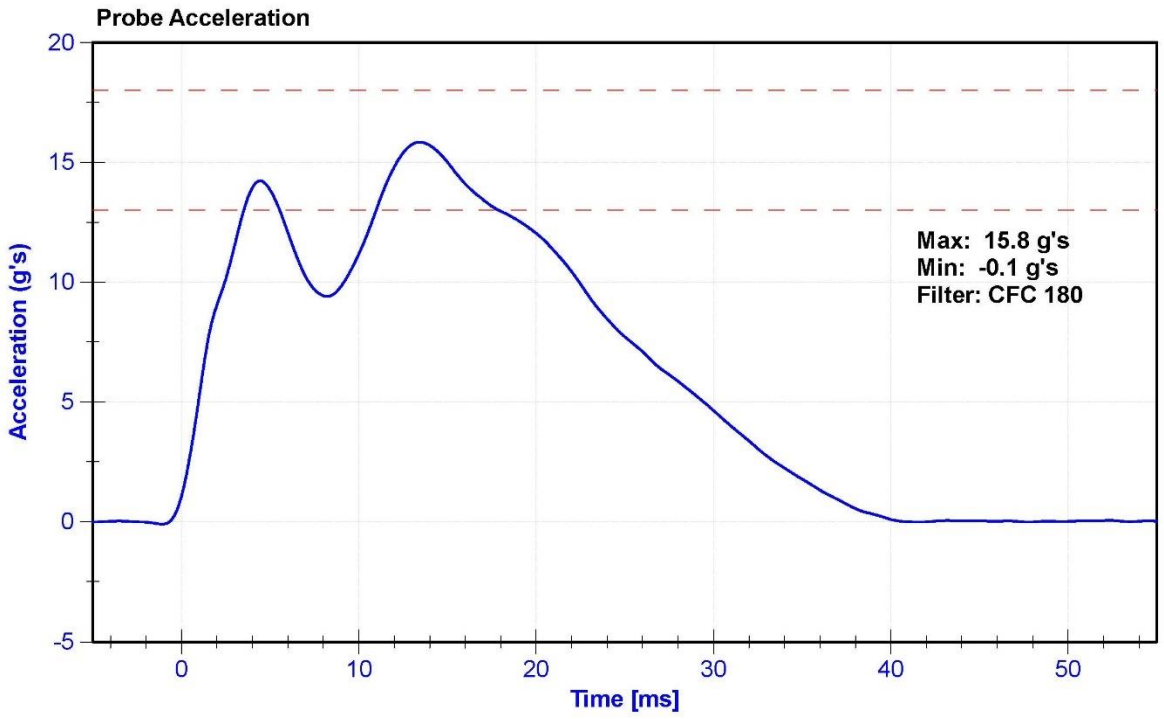
ATD Manufacturer	FTSS	Test Technician	T. Roseman
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

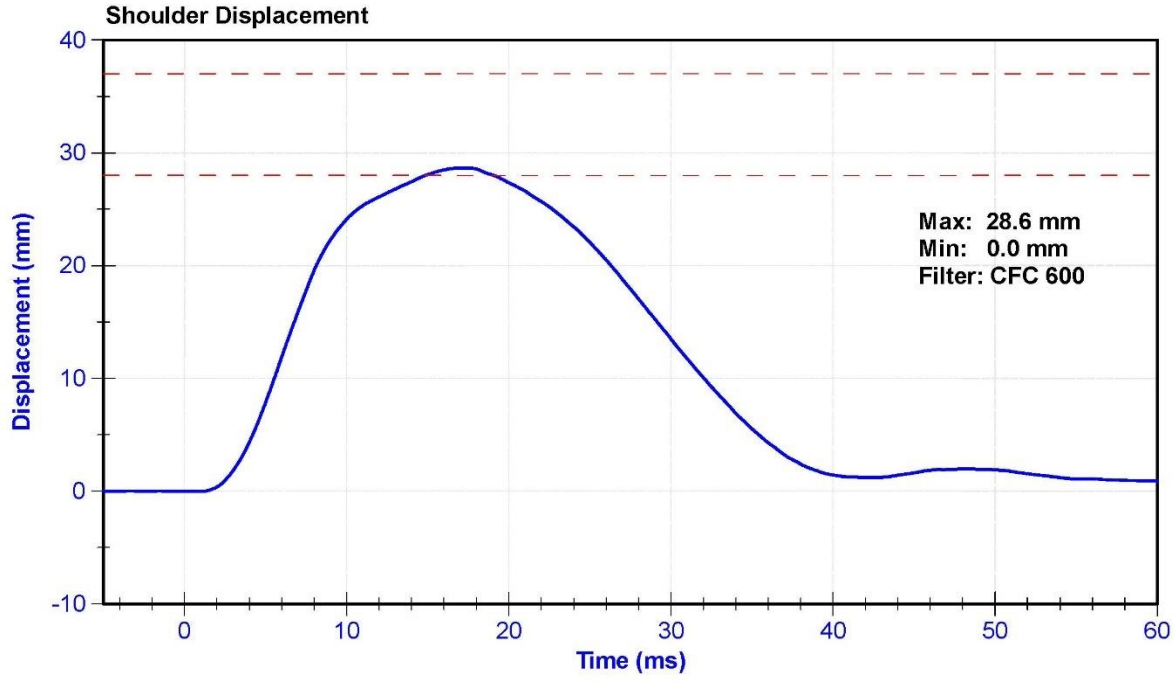
Results

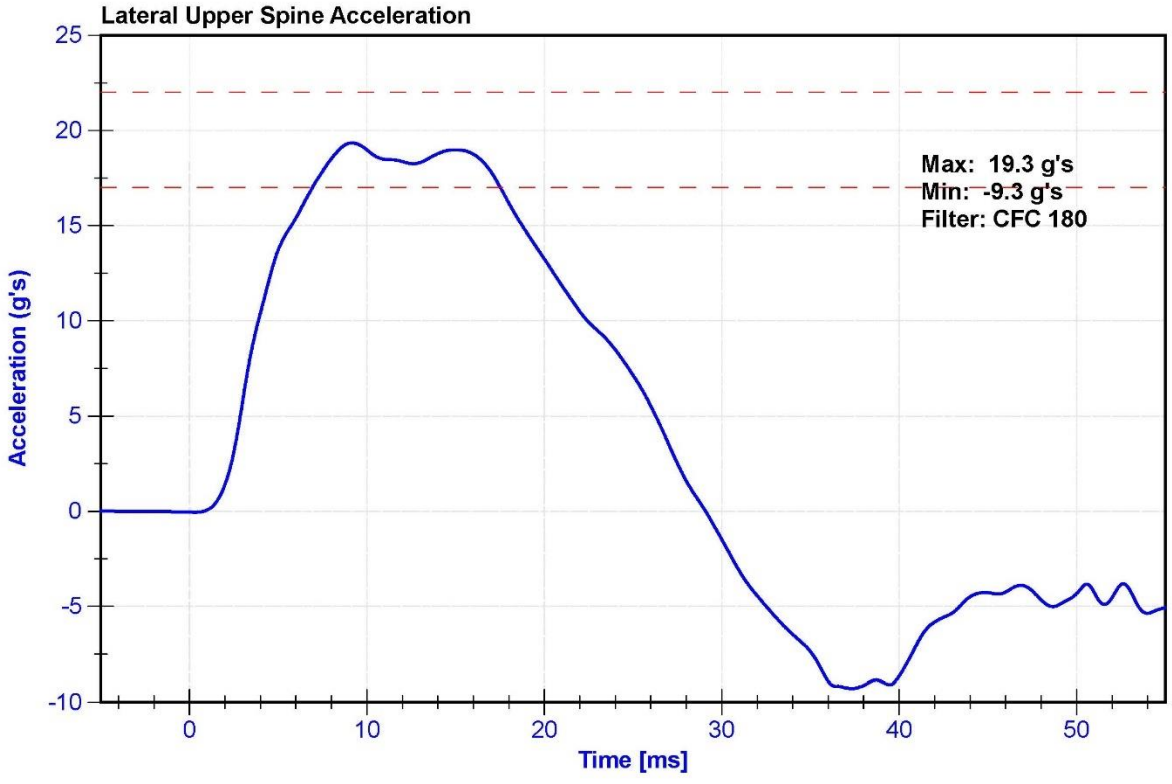
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.0	Pass
Humidity	10	70	%	47.2	Pass
Velocity	4.2	4.4	m/s	4.35	Pass
Probe Acceleration	13	18	g's	15.8	Pass
Shoulder Deflection	28	37	mm	28.6	Pass
Lateral Upper Spine Acceleration	17	22	g's	19.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25885	10/25/2021	10/25/2022
Shoulder Potentiometer	Servo	053GFE	5/18/2022	11/16/2022
Upper Spine Y Accelerometer	Endevco	T20880	5/17/2022	11/13/2022




Shoulder Displacement
Displacement (mm)
Time (ms)
Max: 28.6 mm
Min: 0.0 mm
Filter: CFC 600


Lateral Upper Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 19.3 g's
Min: -9.3 g's
Filter: CFC 180

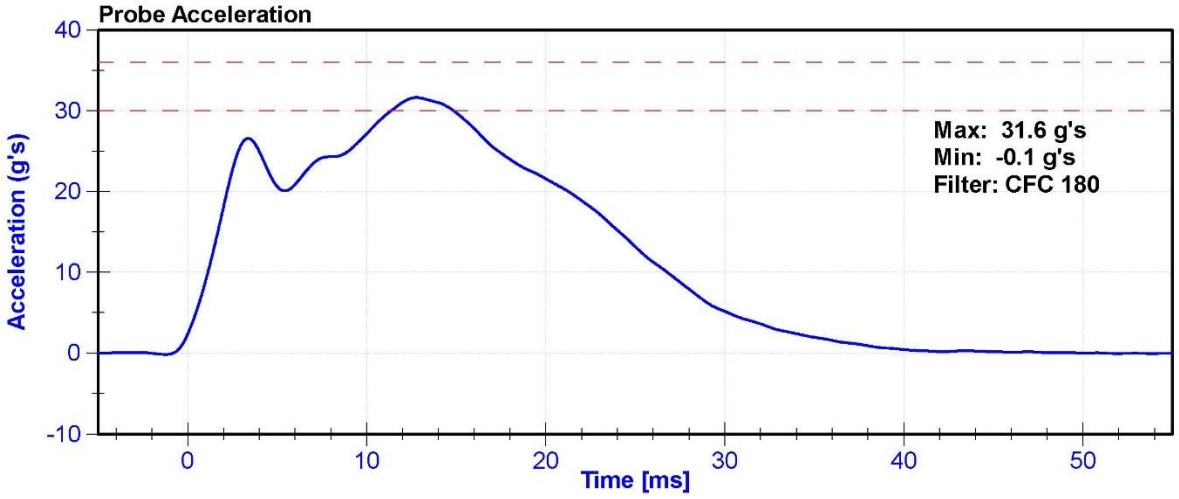
ATD Manufacturer	FTSS	Test Technician	T. Roseman
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

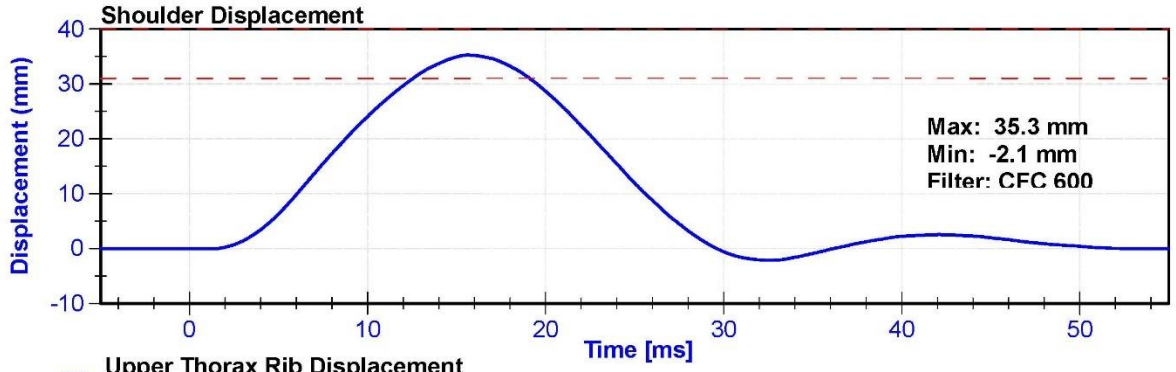
Results

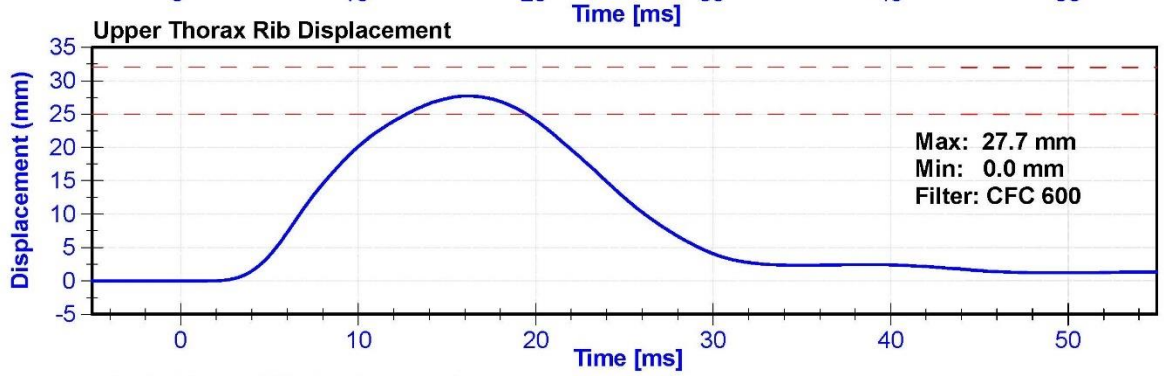
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.0	Pass
Humidity	10	70	%	47.2	Pass
Velocity	6.6	6.8	m/s	6.74	Pass
Probe Acceleration after 5 ms	30	36	g's	31.6	Pass
Lateral Upper Spine Acceleration	34	43	g's	36.9	Pass
Lateral Lower Spine Acceleration	29	37	g's	30.6	Pass
Shoulder Deflection	31	40	mm	35.3	Pass
Upper Thorax Rib Deflection	25	32	mm	27.7	Pass
Mid Thorax Rib Deflection	30	36	mm	33.6	Pass
Lower Thorax Rib Deflection	32	38	mm	35.7	Pass

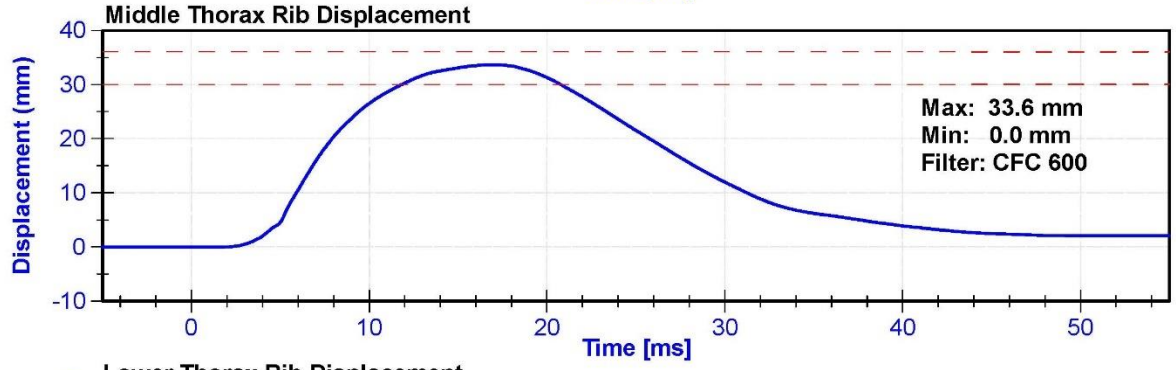
Transducer Calibrations

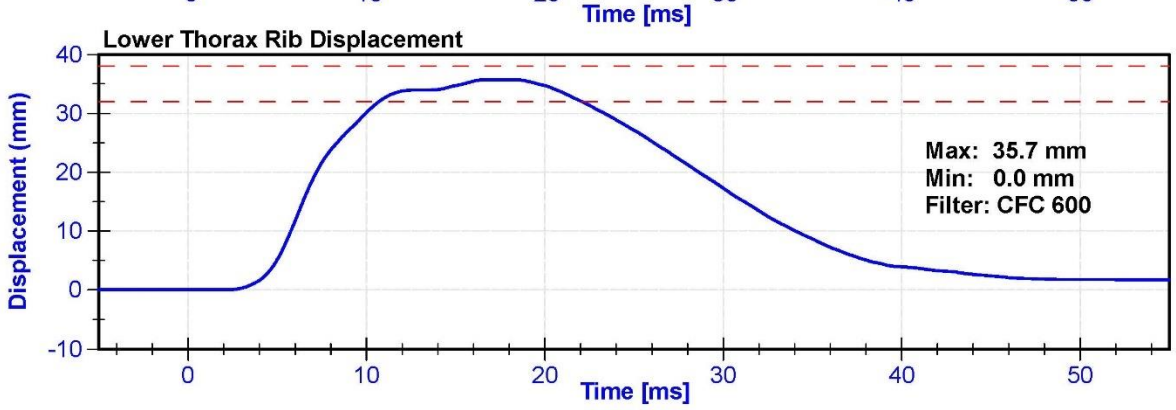
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25885	10/25/2021	10/25/2022
Upper Spine T1 Y Accelerometer	Endevco	T20880	5/17/2022	11/13/2022
Upper Spine T12 Y Accelerometer	Endevco	P52071	5/17/2022	11/13/2022
Shoulder Potentiometer	Servo	053GFE	5/18/2022	11/16/2022
Upper Thorax Rib Potentiometer	Servo	2316GFE	6/27/2022	12/26/2022
Middle Thorax Rib Potentiometer	Servo	040GFE	5/18/2022	11/16/2022
Lower Thorax Rib Potentiometer	Servo	1156GFE	5/18/2022	11/16/2022

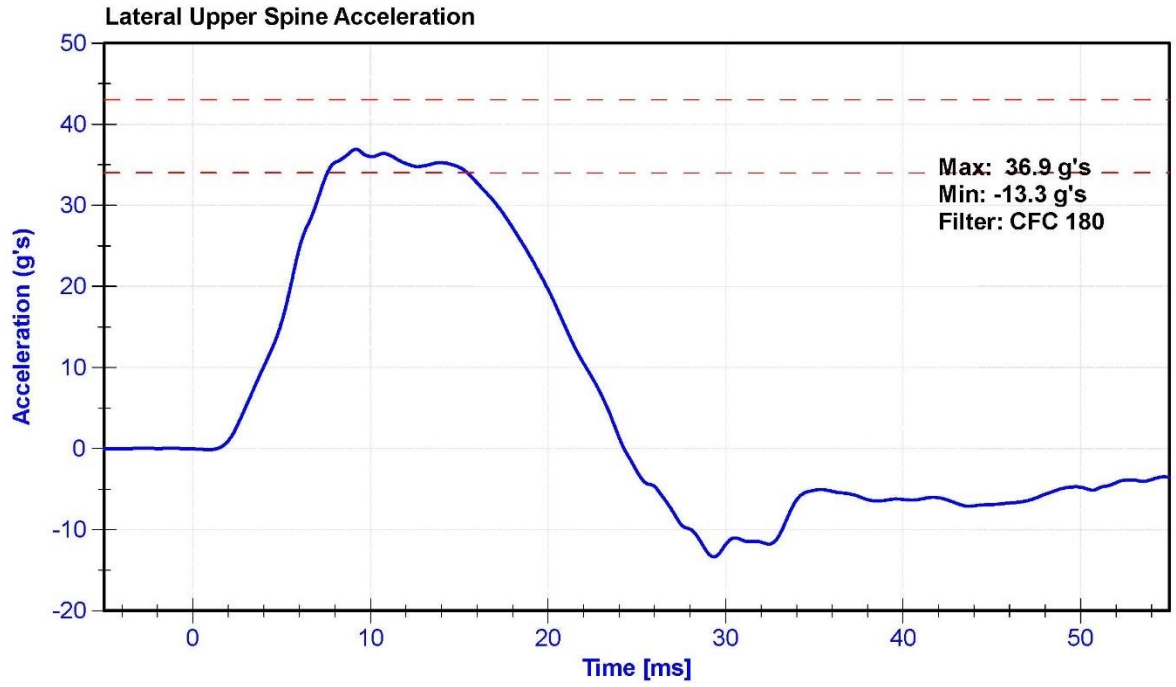


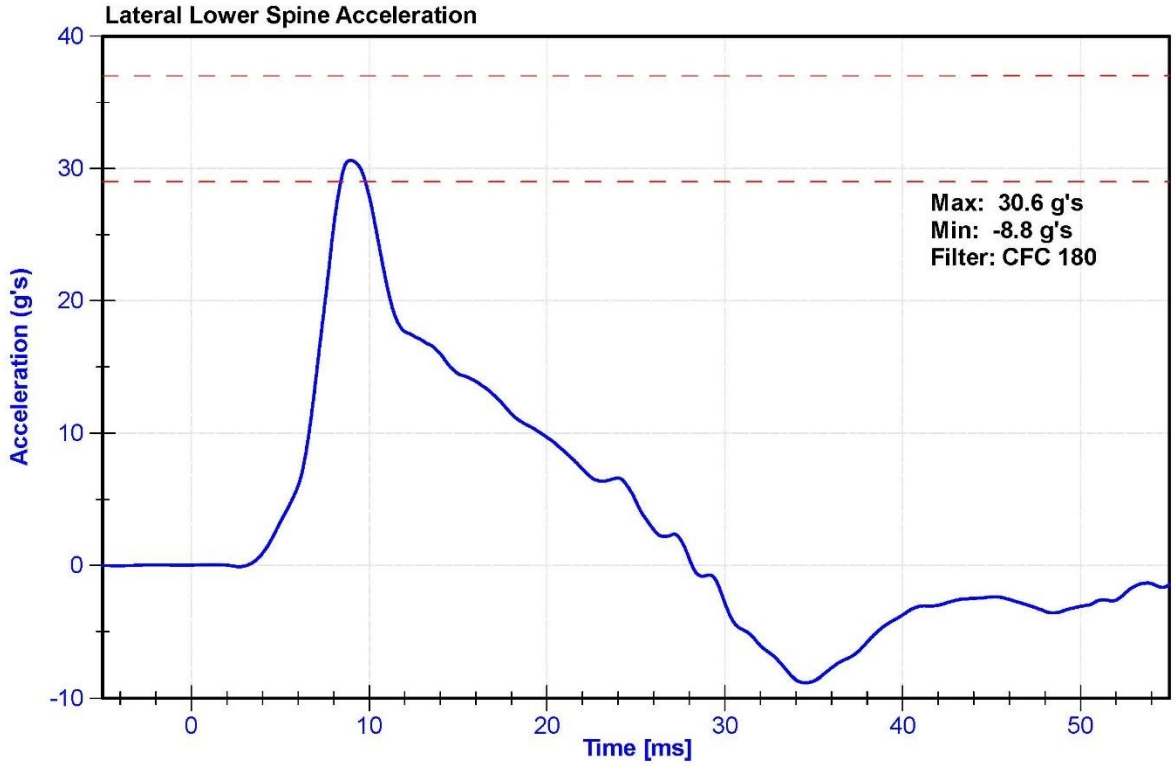

Shoulder Displacement
Displacement (mm)
Time [ms]
Max: 35.3 mm
Min: -2.1 mm
Filter: CFC 600


Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 27.7 mm
Min: 0.0 mm
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 33.6 mm
Min: 0.0 mm
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 35.7 mm
Min: 0.0 mm
Filter: CFC 600


Lateral Upper Spine Acceleration
Max: 36.9 g's
Min: -13.3 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: 30.6 g's
Min: -8.8 g's
Filter: CFC 180
Acceleration (g's)
Time [ms]
40
30
20
10
0
-10
0
10
20
30
40
50

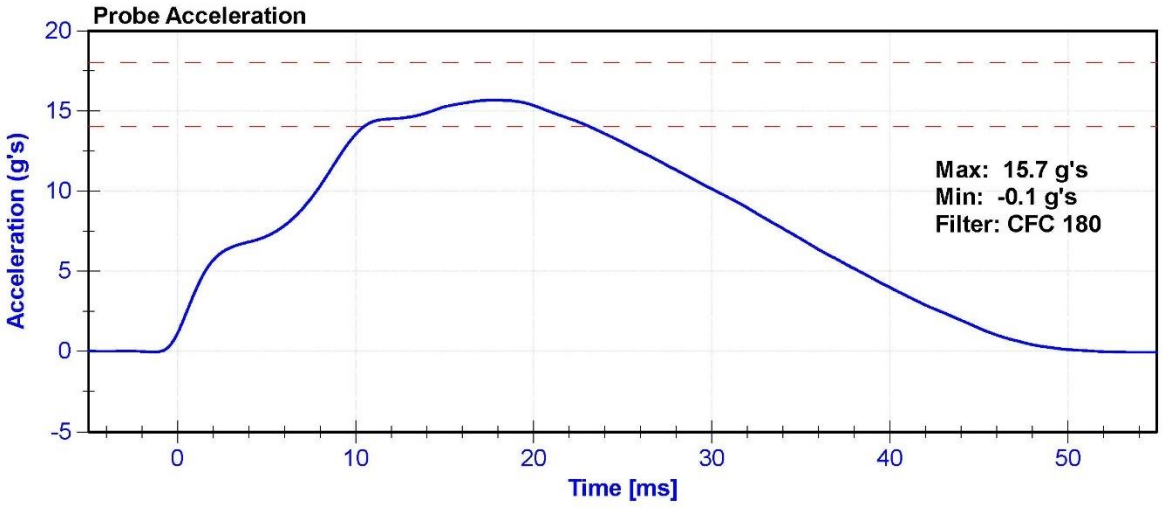
ATD Manufacturer	FTSS	Test Technician	T. Roseman
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

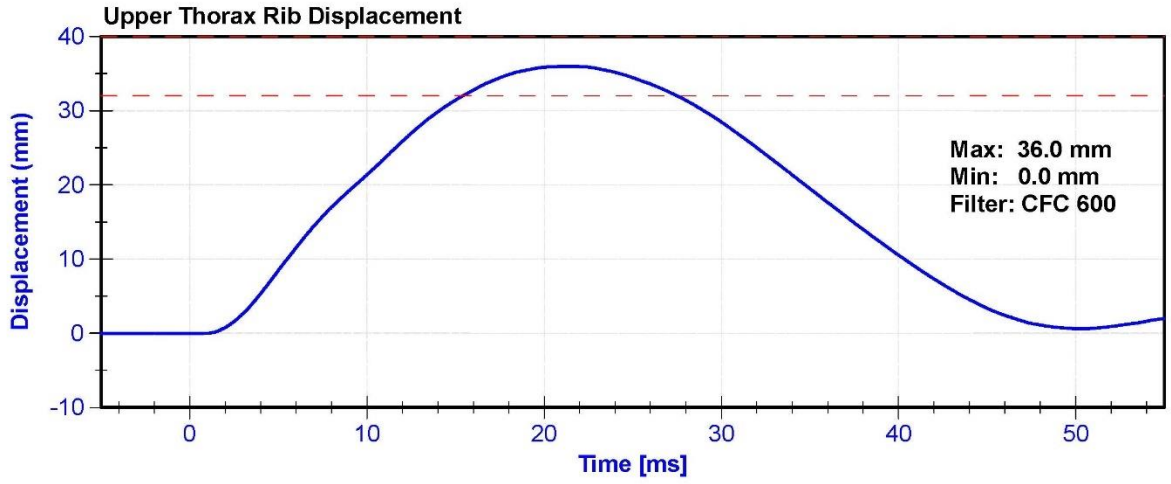
Results

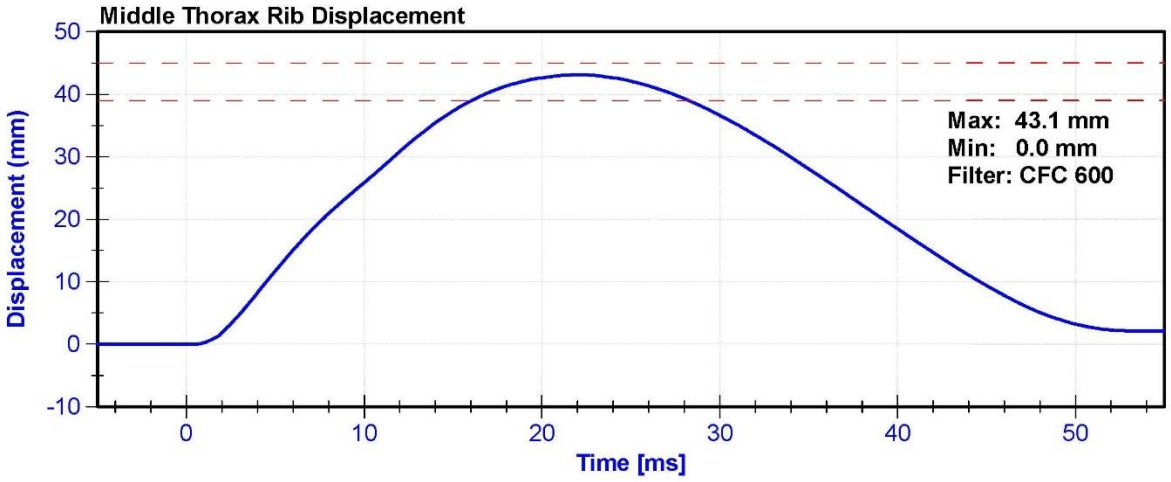
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.0	Pass
Humidity	10	70	%	47.2	Pass
Velocity	4.2	4.4	m/s	4.34	Pass
Probe Acceleration	14	18	g's	15.7	Pass
Lateral Upper Spine Acceleration	13	17	g's	14.7	Pass
Lateral Lower Spine Acceleration	7	11	g's	8.2	Pass
Upper Thorax Rib Deflection	32	40	mm	36.0	Pass
Middle Thorax Rib Deflection	39	45	mm	43.1	Pass
Lower Thorax Rib Deflection	35	43	mm	40.2	Pass

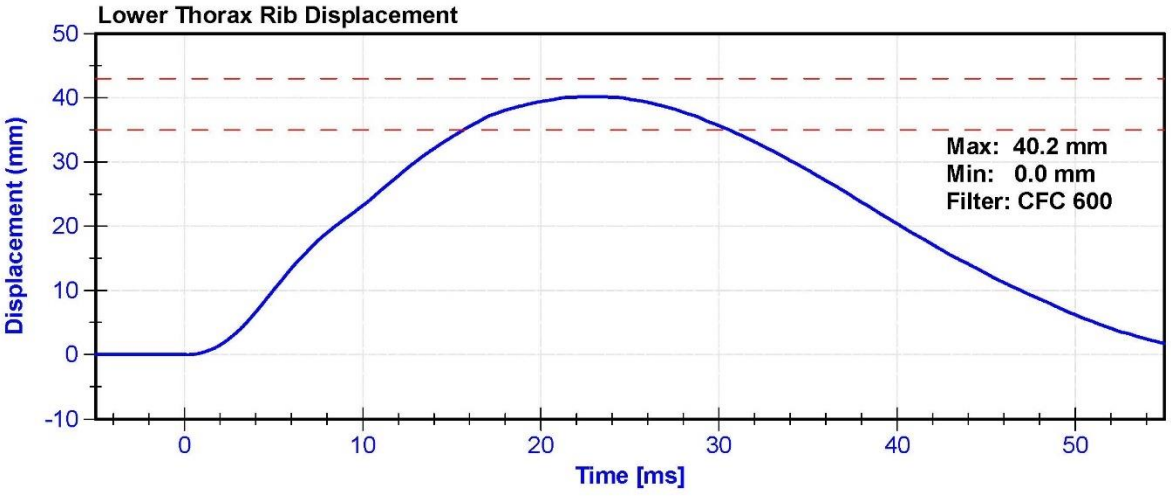
Transducer Calibrations

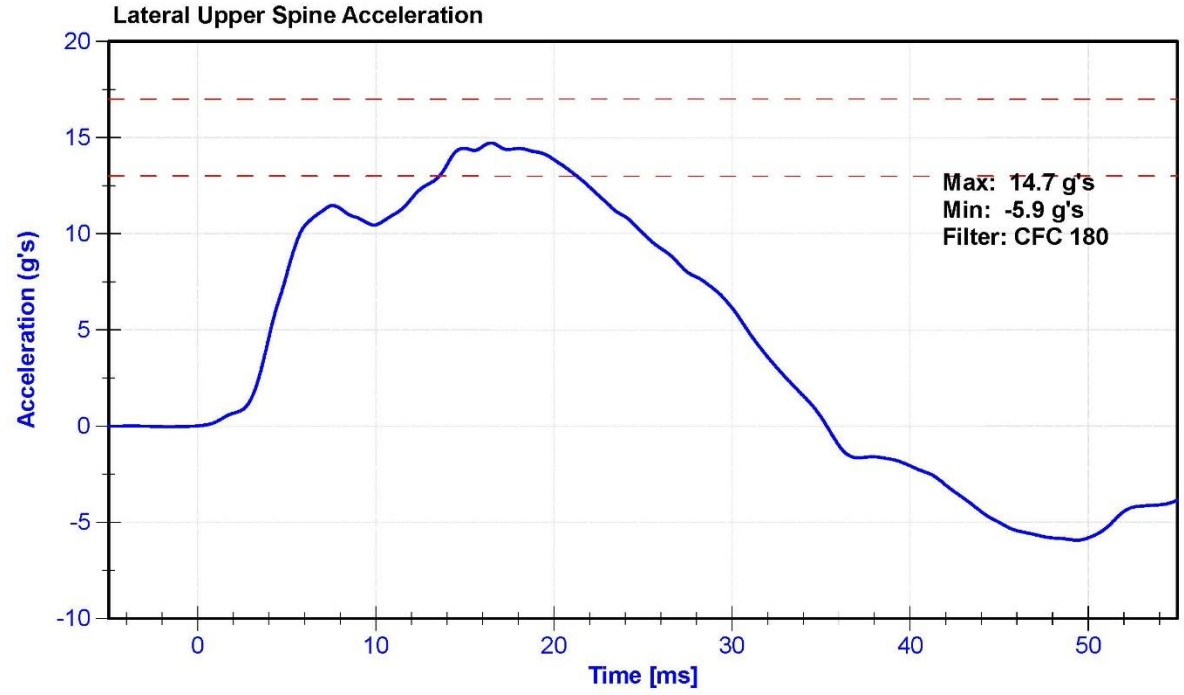
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25885	10/25/2021	10/25/2022
Upper Spine Y Accelerometer	Endevco	T20880	5/17/2022	11/13/2022
Lower Spine Y Accelerometer	Endevco	P52071	5/17/2022	11/13/2022
Upper Thorax Rib Potentiometer	Servo	2316GFE	6/27/2022	12/26/2022
Middle Thorax Rib Potentiometer	Servo	040GFE	5/18/2022	11/16/2022
Lower Thorax Rib Potentiometer	Servo	1156GFE	5/18/2022	11/16/2022

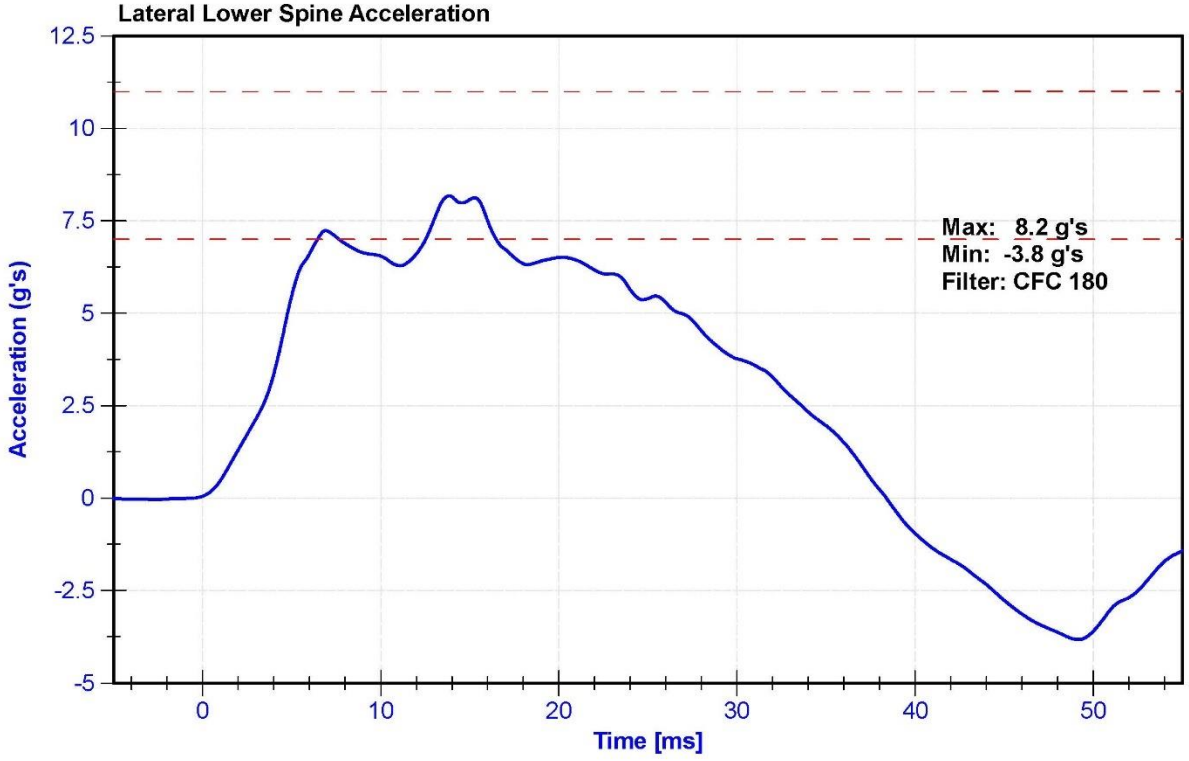



Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 36.0 mm
Min: 0.0 mm
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 43.1 mm
Min: 0.0 mm
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 40.2 mm
Min: 0.0 mm
Filter: CFC 600


Lateral Upper Spine Acceleration
Max: 14.7 g's
Min: -5.9 g's
Filter: CFC 180
Acceleration (g's)
Time [ms]
20
15
10
5
0
-5
-10
0
10
20
30
40
50


Lateral Lower Spine Acceleration
Max: 8.2 g's
Min: -3.8 g's
Filter: CFC 180
Acceleration (g's)
Time [ms]
12.5
10
7.5
5
2.5
0
-2.5
-5
0
10
20
30
40
50

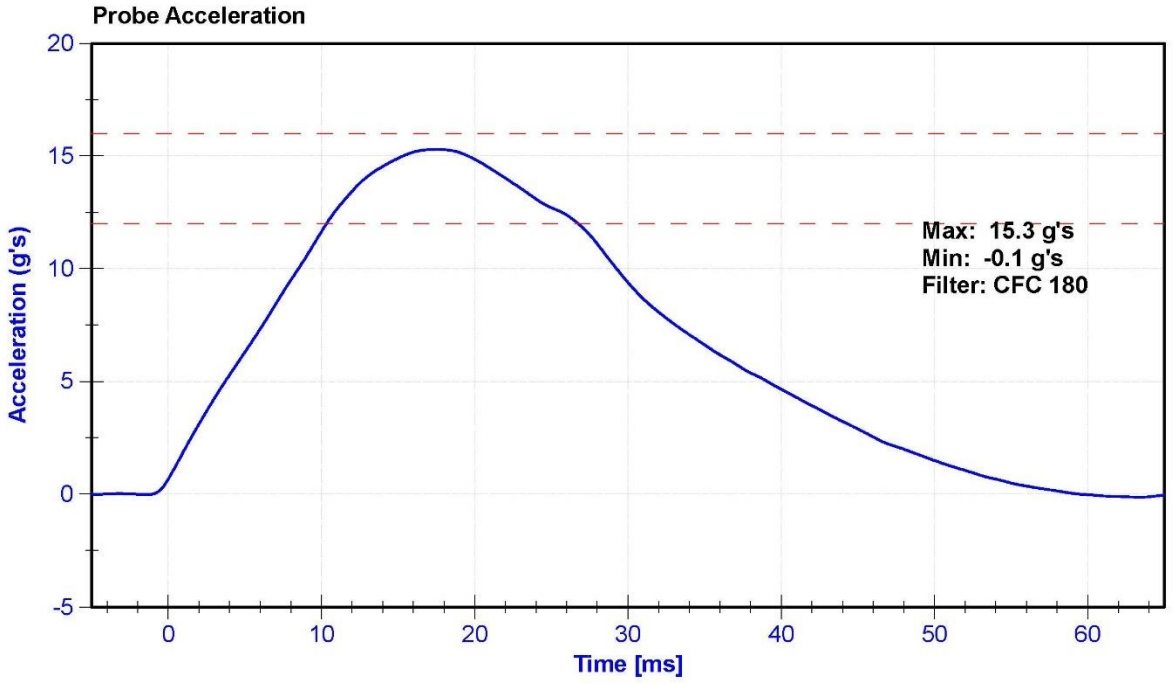
ATD Manufacturer	FTSS	Test Technician	T. Roseman
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

Results

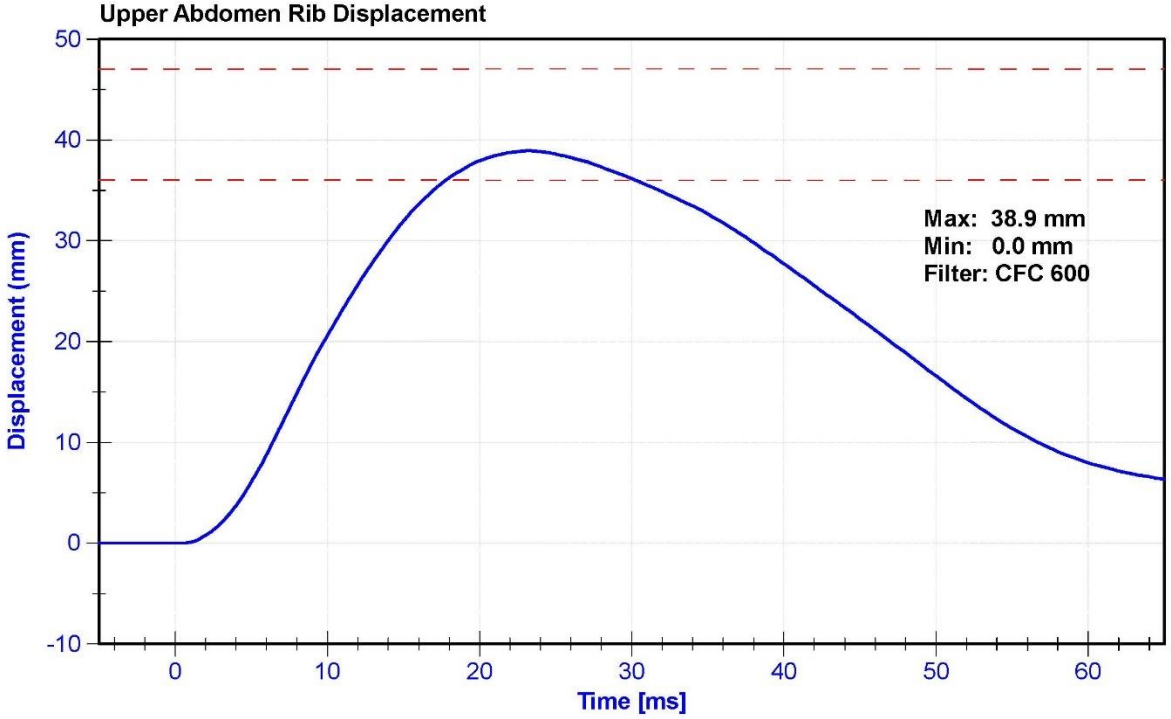
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.0	Pass
Humidity	10	70	%	47.2	Pass
Velocity	4.2	4.4	m/s	4.34	Pass
Probe Acceleration	12	16	g's	15.3	Pass
Lateral Lower Spine Acceleration	9	14	g's	12.7	Pass
Upper Abdomen Rib Deflection	36	47	mm	38.9	Pass
Lower Abdomen Rib Deflection	33	44	mm	41.5	Pass

Transducer Calibrations

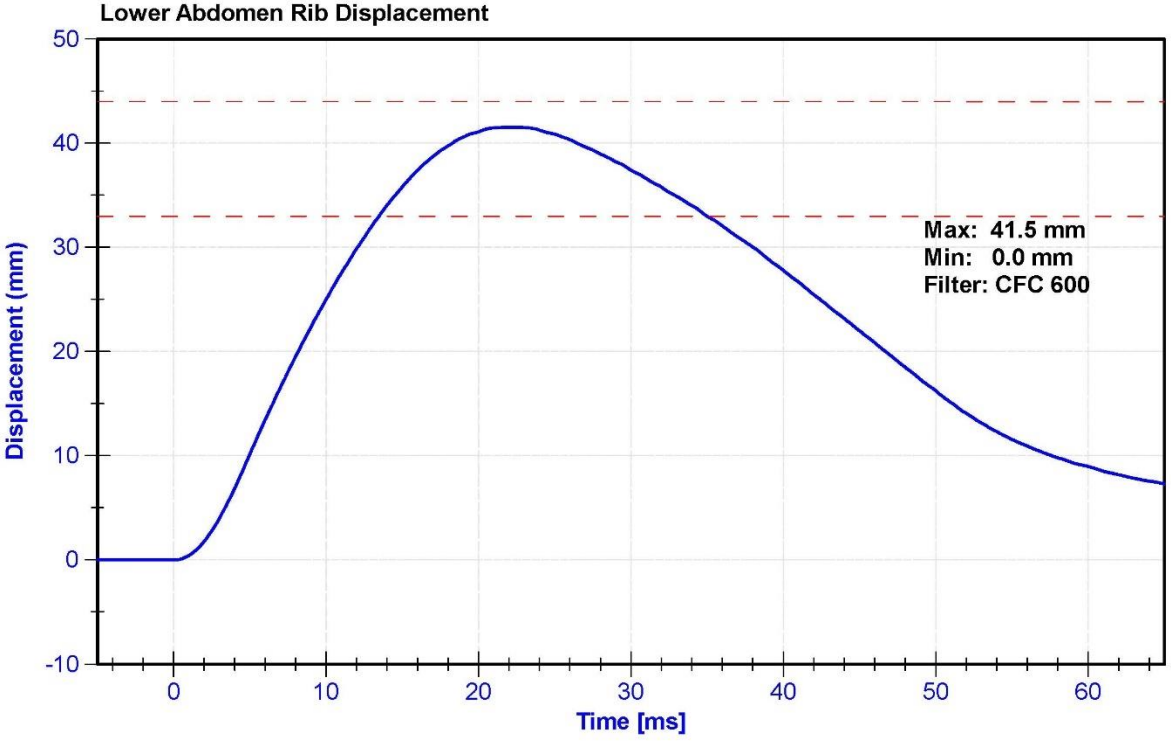
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	T25885	10/25/2021	10/25/2022
Lower Spine Y Accelerometer	Endevco	P52071	5/17/2022	11/13/2022
Upper Abdomen Rib Potentiometer	Servo	307GFE	5/20/2022	11/18/2022
Lower Abdomen Rib Potentiometer	Servo	308GFE	5/18/2022	11/16/2022

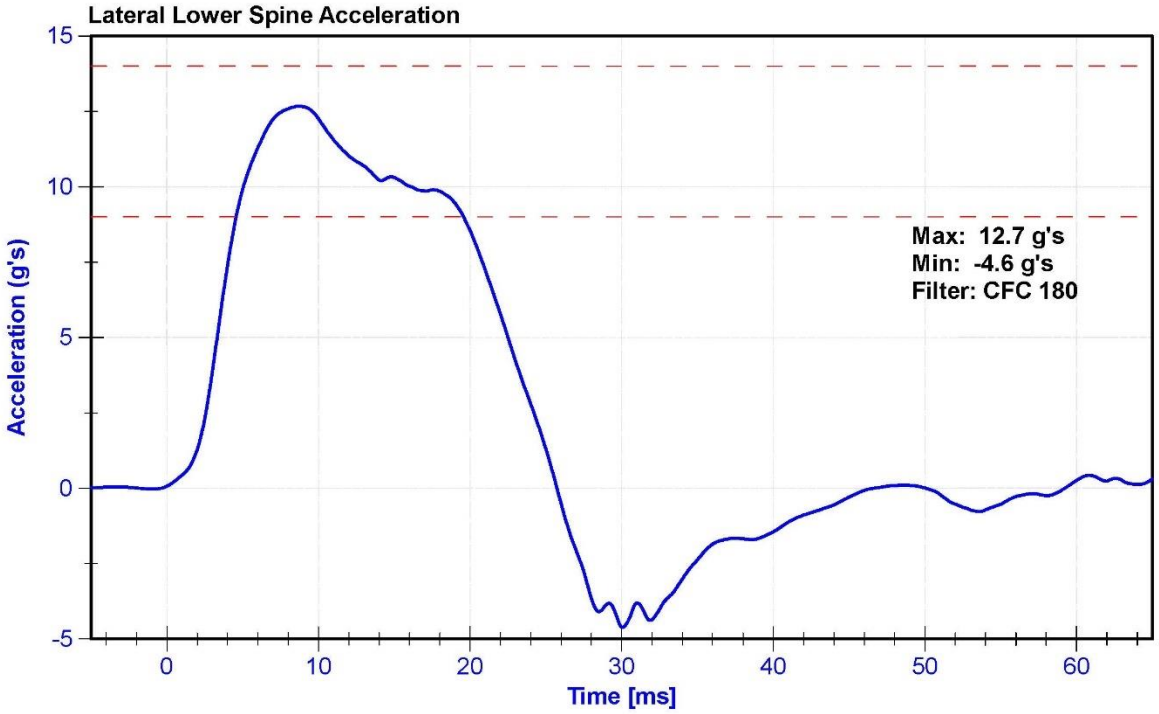


Upper Abdomen Rib Displacement



Lower Abdomen Rib Displacement




Lateral Lower Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 12.7 g's
Min: -4.6 g's
Filter: CFC 180
15
10
5
0
-5
0
10
20
30
40
50
60

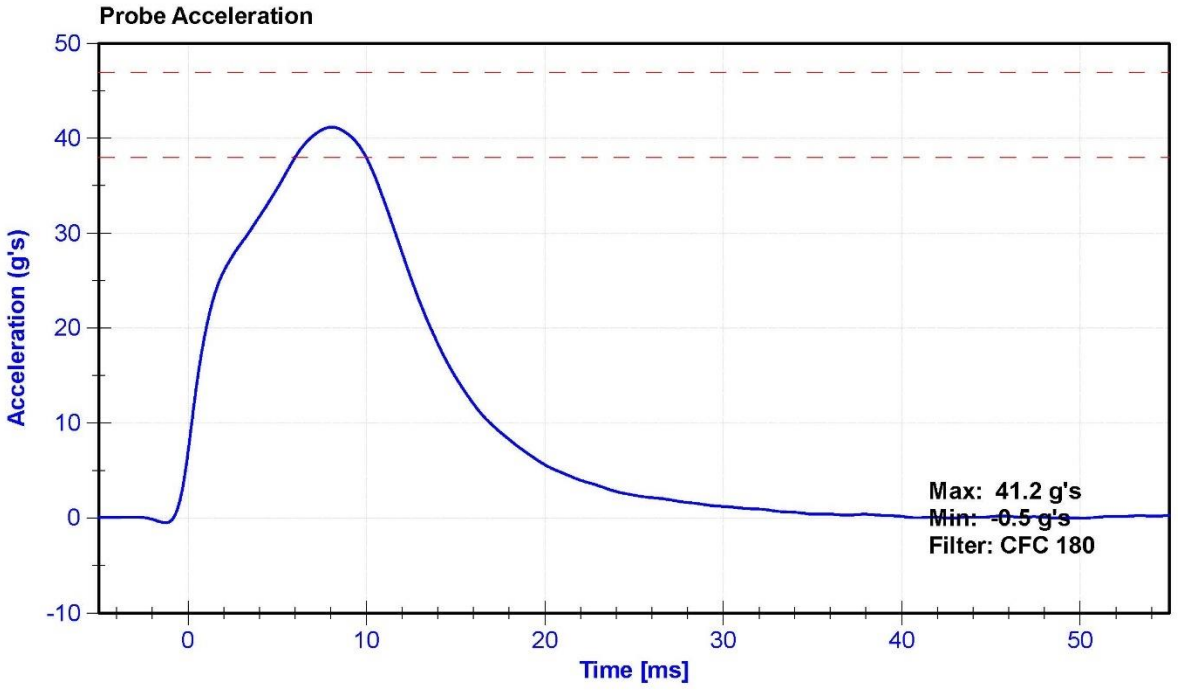
ATD Manufacturer	FTSS	Test Technician	T. Roseman
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

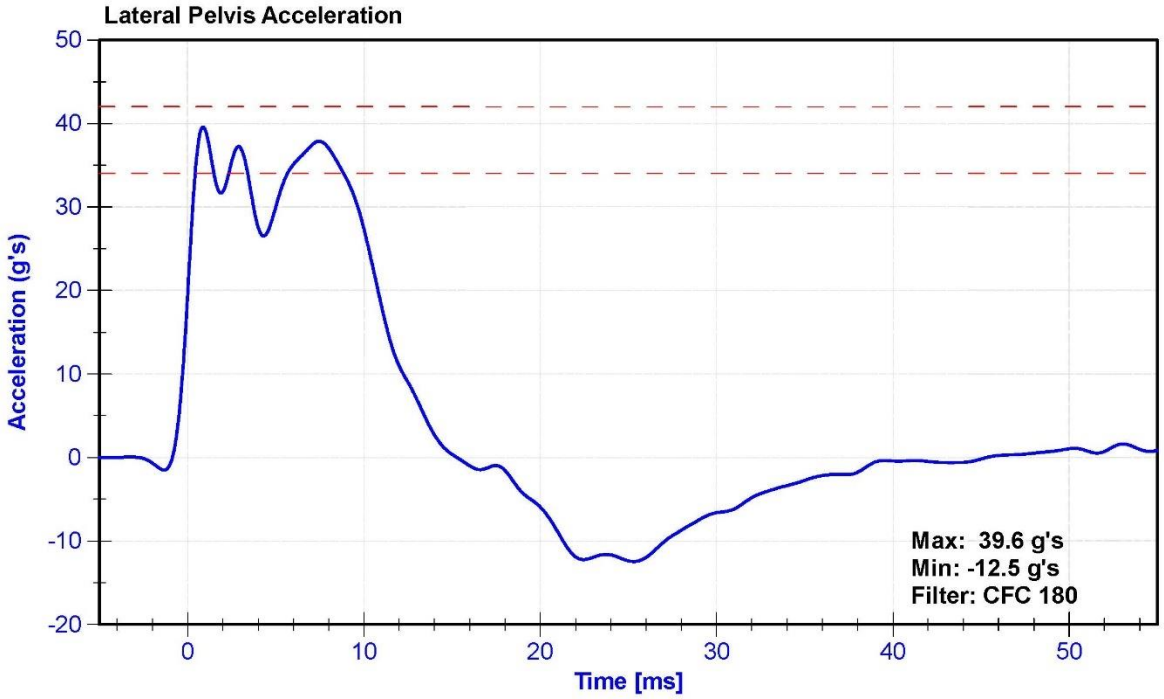
Results

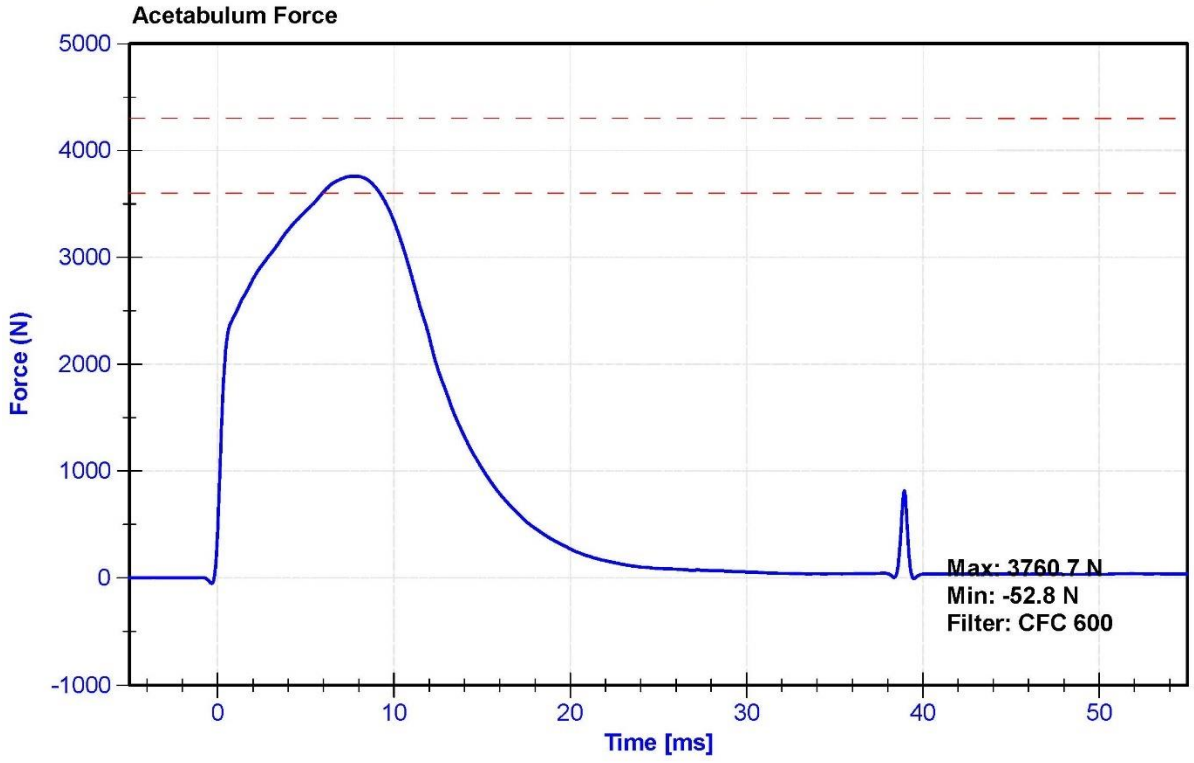
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.0	Pass
Humidity	10	70	%	47.2	Pass
Velocity	6.6	6.8	m/s	6.75	Pass
Probe Acceleration	38	47	g's	41.2	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	37.9	Pass
Acetabulum Force	3600	4300	N	3760.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25885	10/25/2021	10/25/2022
Pelvis Y Accelerometer	Endevco	P51731	5/17/2022	11/13/2022
Acetabulum Load Cell	Denton	275-FY	9/14/2021	9/14/2022
Certification Plug	SACO			N/A
Crash Test Plug	SACO			N/A




Lateral Pelvis Acceleration
Acceleration (g's)
50
40
30
20
10
0
-10
-20
0
10
20
30
40
50
Time [ms]
Max: 39.6 g's
Min: -12.5 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: 3760.7 N
Min: -52.8 N
Filter: CFC 600

6/28/2022
CERT - 300

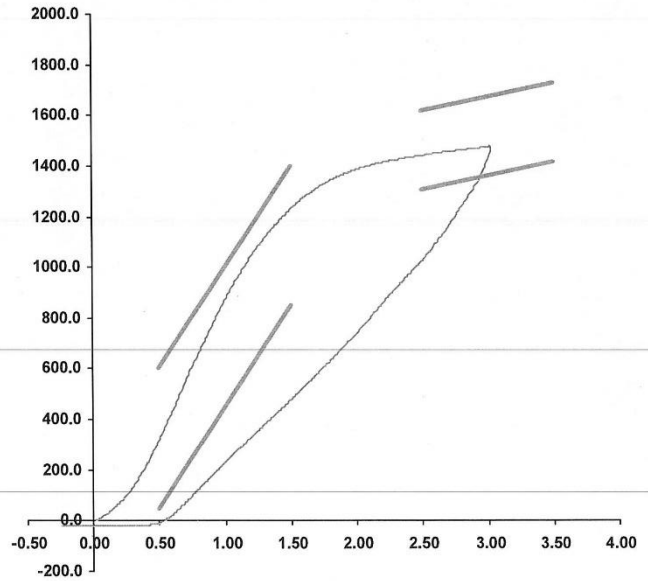
SACO RESEARCH

SID-IIs Pelvis Plug Certification Test

Plug S/N 14085
Test Number 13559
Report Number 13604
Test Date 5/25/2020 12:03:36 PM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	321	50	600
Force @ 1.5 mm (N)	1,231	850	1,400
Force @ 2.5 mm (N)	1,442	1,306	1,618
Force @ 3.0 mm (N)	1,476	1,361	1,673

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 14061

Part Number 180-4450

Template No 107 08-Jul-21
SACO Research

By : _____ Date : _____

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

SACO RESEARCH

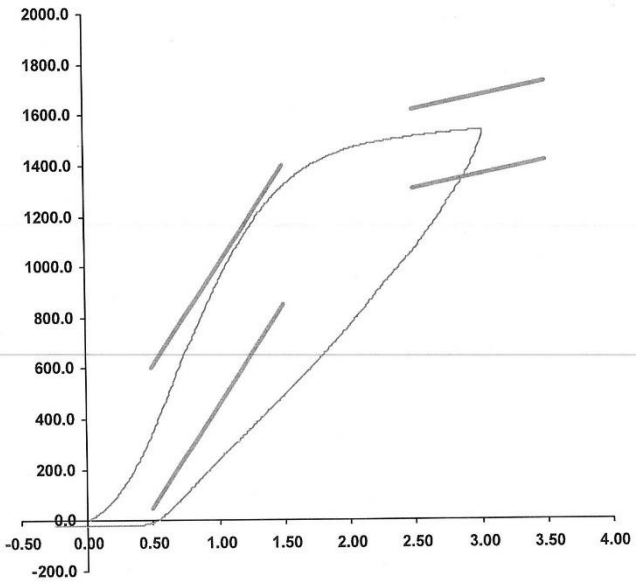
6/28/2022
CRASH1 -300

SID-IIs Pelvis Plug Certification Test

Plug S/N 14075
Test Number 13549
Report Number 13594
Test Date 5/25/2020 11:41:52 AM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	348	50	600
Force @ 1.5 mm (N)	1,317	850	1,400
Force @ 2.5 mm (N)	1,512	1,306	1,618
Force @ 3.0 mm (N)	1,539	1,361	1,673

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 14061

Part Number 180-4450

Template No 107 08-Jul-21
SACO Research

By : _____ Date : _____

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

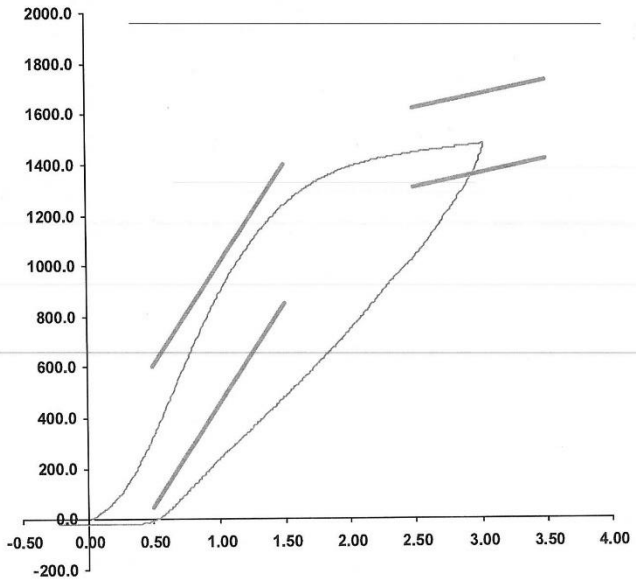
6/28/2021
Non-Impact - 300

SID-IIs Pelvis Plug Certification Test

Plug S/N 13942
Test Number 13416
Report Number 13461
Test Date 5/20/2020 10:19:50 PM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	333	50	600
Force @ 1.5 mm (N)	1,242	850	1,400
Force @ 2.5 mm (N)	1,445	1,306	1,618
Force @ 3.0 mm (N)	1,477	1,361	1,673

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

Part Number 180-4450

Template No 107 08-Jul-21
SACO Research

By : _____ Date : _____

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

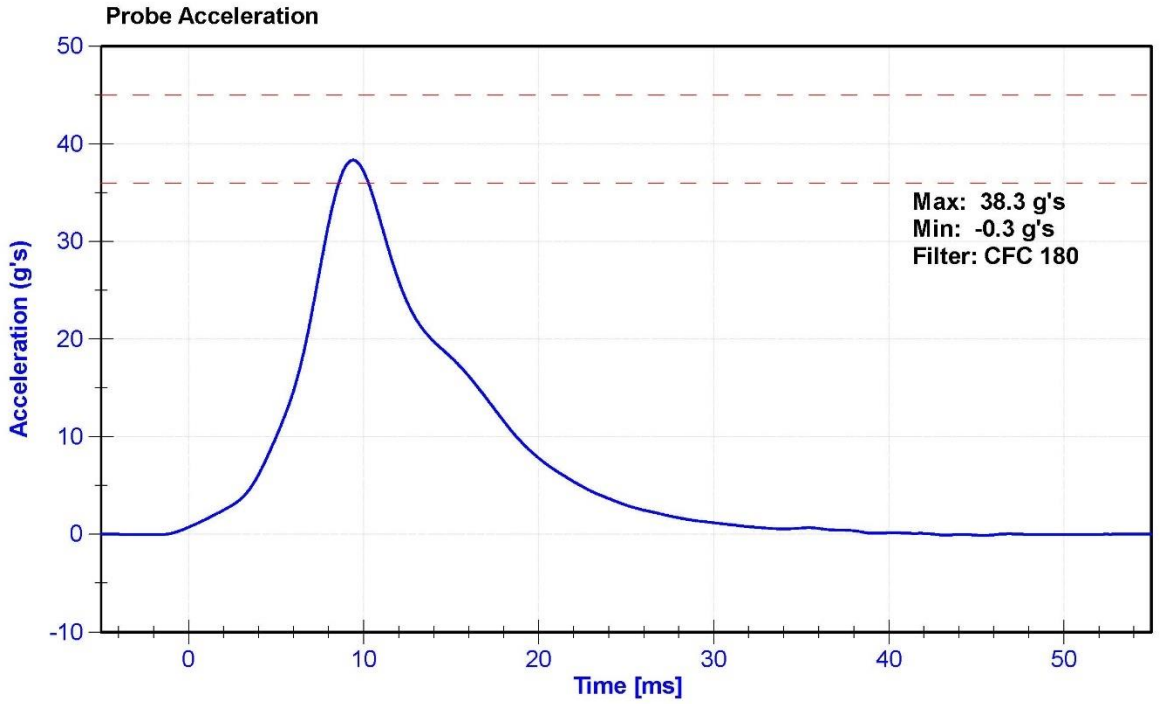
ATD Manufacturer	FTSS	Test Technician	T. Roseman
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

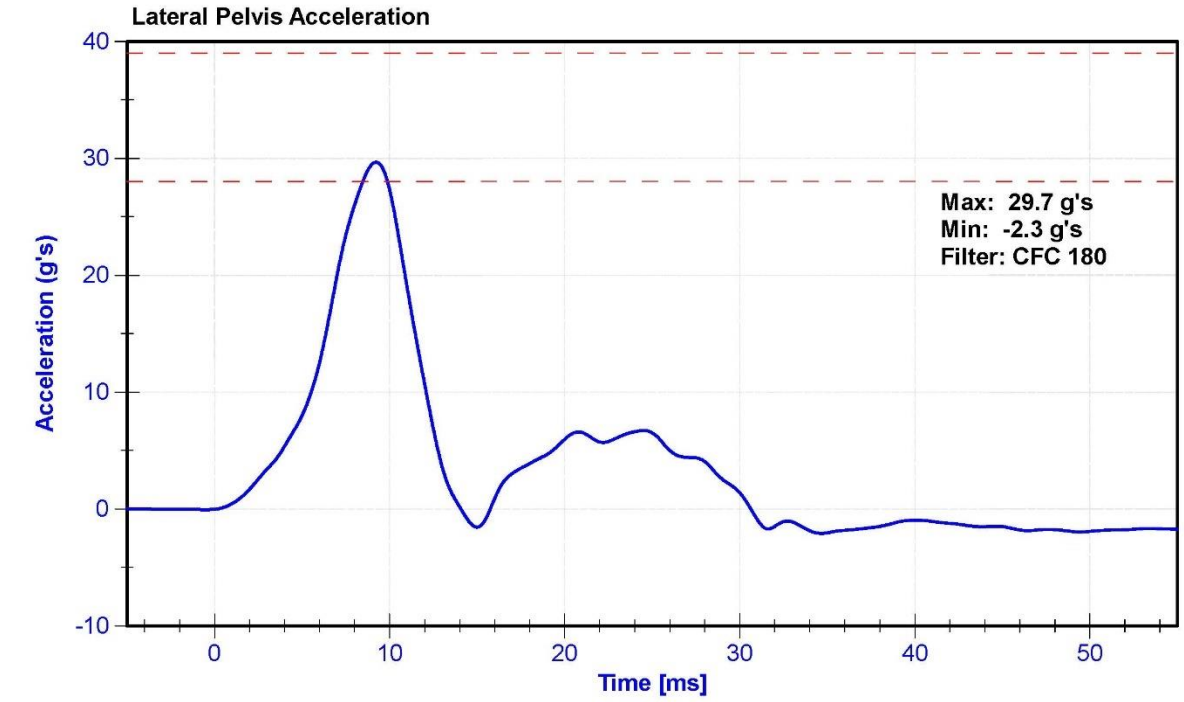
Results

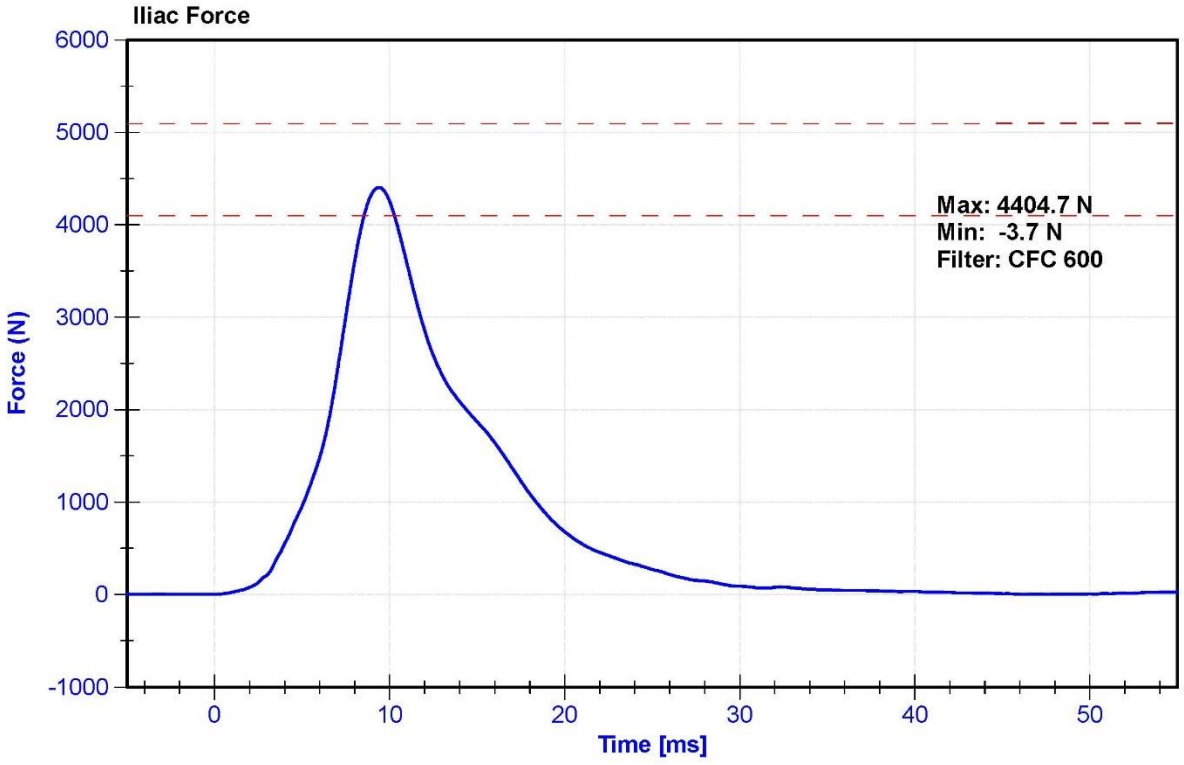
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.0	Pass
Humidity	10	70	%	47.2	Pass
Velocity	4.2	4.4	m/s	4.36	Pass
Probe Acceleration	36	45	g's	38.3	Pass
Lateral Pelvis Acceleration	28	39	g's	29.7	Pass
Iliac Force	4100	5100	N	4404.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25885	10/25/2021	10/25/2022
Pelvis Y Accelerometer	Endevco	P51731	5/17/2022	11/13/2022
Iliac Load Cell	Denton	279-FY	9/14/2021	9/14/2022




Lateral Pelvis Acceleration
Acceleration (g's)
Time [ms]
Max: 29.7 g's
Min: -2.3 g's
Filter: CFC 180


Iliac Force
Force (N)
Time [ms]
Max: 4404.7 N
Min: -3.7 N
Filter: CFC 600

APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N:300		
				Serial Number	**Manufacturer**	**Calibration Date**
Head Accelerometers			X	P59018	Endevco	5/17/2022
			Y	P79189	Endevco	5/17/2022
			Z	P58777	Endevco	5/17/2022
Head Accelerometers - Redundant			X	P68057	Endevco	5/17/2022
			Y	P58986	Endevco	5/17/2022
			Z	P52025	Endevco	5/17/2022
Displacement Potentiometer	Shoulder		Y			
	Thoracic Rib	Upper	Y	451GFE	Servo	5/18/2022
		Middle	Y	040GFE	Servo	5/18/2022
		Lower	Y	1156GFE	Servo	5/18/2022
	Abdominal Rib	Upper	Y	307GFE	Servo	5/20/2022
		Lower	Y	308GFE	Servo	5/18/2022
Lower Spine Accelerometers (T12)			X	P64003	Endevco	5/17/2022
			Y	P52071	Endevco	5/17/2022
			Z	P17283	Endevco	5/17/2022
Acetabulum Load Cell			Y	275-FY	Denton	9/14/2021
Lilac Wing Load Cell			Y	279-FY	Denton	9/14/2021
Pelvis Plug (Struck Side)				13663	SACO	9/26/2019
Pelvis Plug (Non-Struck Side)				13891	SACO	5/20/2020

Table 2 – Vehicle Instrumentation

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	A281026	Measurement Specialties	5/12/2022
Vehicle Center of Gravity	Y	A281027	Measurement Specialties	5/12/2022
Vehicle Center of Gravity	Z	A315799	Measurement Specialties	5/12/2022
Left Floor Sill	Y	A414767	Measurement Specialties	5/18/2022
A-Pillar Sill	Y	A399996	Measurement Specialties	2/18/2022
A-Pillar Low	Y	A400743	Measurement Specialties	3/11/2022
A-Pillar Mid	Y	A431375	Measurement Specialties	3/22/2022
B-Pillar Sill	Y	A431214	Measurement Specialties	3/21/2022
B-Pillar Low	Y	A431201	Measurement Specialties	3/21/2022
B-Pillar Mid	Y	A431205	Measurement Specialties	3/21/2022
Driver Seat	Y	A405572	Measurement Specialties	3/11/2022
Engine Top	X	A373180	Measurement Specialties	5/13/2022
Engine Top	Y	A373188	Measurement Specialties	5/13/2022
Firewall	Y	A431370	Measurement Specialties	3/22/2022
Right Roof	Y	A431379	Measurement Specialties	3/22/2022
Right Floor Sill	Y	A431350	Measurement Specialties	3/22/2022
Rear Floorpan	X	A431213	Measurement Specialties	3/21/2022
Rear Floorpan	Y	A431218	Measurement Specialties	3/21/2022

Table 3 – Pole Instrumentation

Pole Instrumentation	Serial Number	Manufacturer	Calibration Date
Load Cell 1	1220AF-1117023-F0	Interface	8/5/2021
Load Cell 2	1220AF-1117006-F0	Interface	8/5/2021
Load Cell 3	1220AF-1117025-F0	Interface	7/28/2021
Load Cell 4	1220AF-1117019-F0	Interface	8/2/2021
Load Cell 5	1220AF-1117011-F0	Interface	8/2/2021
Load Cell 6	1220AF-1117017-F0	Interface	8/2/2021
Load Cell 7	1220AF-1117035-F0	Interface	8/2/2021
Load Cell 8	1220AF-1057559-F0	Interface	8/2/2021