REPORT NUMBER: SINCAP-CAL-25-003

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

Toyota Motor Corporation
2025 Toyota Land Cruiser
5 Door SUV

NHTSA No: M20255109

PREPARED BY:
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May 28, 2025

FINAL REPORT

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

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, in response to Contract Number 693JJ920D000016.

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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.*	*2. Government Accession No.*	*3. Recipient's Catalog No.*
SINCAP-CAL-25-003		

4. Title and Subtitle	*5. Report Date*
Final Report of New Car Assessment Program Side Impact MDB Testing & FMVSS 305 Indicant Testing of a 2025 Toyota Land Cruiser 5 Door SUV NHTSA No.: M20255109	May 28, 2025
	6. Performing Organization Code CAL
7. Author(s) Alexander Rudniski, Test Engineer Vanessa Hansen, Operations Manager	*8. Performing Organization Report No.* CAL-DOT-2025-003
9. Performing Organization Name and Address Calspan Corporation Transportation Test Operations P.O. Box 400 Buffalo, New York 14225	*10. Work Unit No.*
	11. Contract or Grant No. 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 Washington, D.C. 20590	*13. Type of Report and Period Covered:* Final Test Report March 19, 2025 - May 28, 2025
	14. Sponsoring Agency Code NRM-110

15. Supplementary Notes

16. Abstract

A 55/28, (61.90kph / 38.5 mph), 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2025 Toyota Land Cruiser 5 Door SUV in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for the generation of consumer information on vehicle side crash protection. This test was conducted at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on March 19, 2025.

The impact velocity of the Moving Deformable Barrier (MDB) was 62.07 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 156 mm located at level 2. The test vehicle's occupant performance data is as follows:

Measurement Description	Driver ATD (ES-2re)		
	Units	IARV	Result
Head Injury Criteria (HIC36)		1000	25.490
Maximum Thorax Rib Deflection	mm	44	8.174
Total Abdominal Force	N	2500	366.708
Pubic Symphysis Force	N	6000	484.733
Lower Spine (T12) Resultant Acceleration	G	82*	17.753

Measurement Description	Passenger ATD (SID-IIs)		
	Units	IARV	Result
Head Injury Criteria (HIC36)		1000	19.435
Maximum Thorax Rib Deflection	mm	38*	1.732
Lower Spine (T12) Resultant Acceleration	G	82	19.979
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	966.677
Maximum Abdominal Rib Deflection	mm	45*	1.277

**Proposed IARV*

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

17. Key Words	*18. Distribution Statement*
New Car Assessment Program (NCAP) Side Impact MDB ES-2re SID-IIs	Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division, NPO-411 1200 New Jersey Ave. SE Washington, D.C. 20590

19. Security Class. (of this report)	*20. Security Class. (of this page)*	*21. No. of Pages*	*22. Price*
UNCLASSIFIED	UNCLASSIFIED	222	

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SECTION 1

TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test is part of the MY 2025 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract number 693JJ920D000016. The purpose of this test is to generate comparative side impact performance in a 2025 Toyota Land Cruiser 5 Door SUV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated March 2020.

SECTION 2
SUMMARY OF TEST RESULTS

A 2025 Toyota Land Cruiser 5 Door SUV was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 62.07 km/h. The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by the Calspan Corporation's Transportation Test Operations Center in Buffalo, New York on March 19, 2025. Pre-test and post-test photographs of the test vehicle, the MDB and the dummies (ES-2re and SID-IIs) are included in this report.

Dummies were placed in the driver and left rear designated seating positions according to instructions specified in the OCWS Side Impact Laboratory Test Procedure, dated March 2020. The side impact event was documented by 9 high-speed and 2 real-time cameras. Camera locations are included in this report.

The Dummies were instrumented in the following manner:

DRIVER ATD (ES-2re)
Primary and redundant head CG tri-axial accelerometers
Chest upper rib, middle rib, and lower rib y-axis displacement potentiometers
Abdomen forward, middle, and rear y-axis load cells
Lower spine (T12) tri-axial accelerometers
Pubic symphysis y-axis load cell

PASSENGER ATD (SID-IIs)
Primary and redundant head CG tri-axial accelerometers
Chest upper rib, middle rib, and lower rib y-axis displacement potentiometers
Abdomen upper rib and lower rib y-axis displacement potentiometers
Lower spine (T12) tri-axial accelerometers
Acetabulum and iliac wing y-axis load cells

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

DUMMY INJURY VALUES

Measurement Description	Driver ATD (ES-2re)		
	Units	IARV	Result
Head Injury Criteria (HIC36)		1000	25.490
Maximum Thorax Rib Deflection	mm	44	8.174
Total Abdominal Force	N	2500	366.708
Pubic Symphysis Force	N	6000	484.733
Lower Spine (T12) Resultant Acceleration	G	82*	17.753

Measurement Description	Passenger ATD (SID-IIs)		
	Units	IARV	Result
Head Injury Criteria (HIC36)		1000	19.435
Maximum Thorax Rib Deflection	mm	38*	1.732
Lower Spine (T12) Resultant Acceleration	G	82	19.979
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	966.677
Maximum Abdominal Rib Deflection	mm	45*	1.277

*Proposed IARV

SUPPLEMENTAL RESTRAINT INFORMATION

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Front Airbag	Yes	Yes		
Knee Airbag	Yes	Yes		
Side Airbag 1 - Curtain	Yes	Yes	Yes	Yes
Side Airbag 2 - Torso/Pelvis Airbag	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 – F033
2. P4 serial number – DG8012

Data Anomalies:

The following channel was questionable for:

- Left B-Pillar Middle Y Acceleration, Exceeded calibration range at 12.6 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 - Test Vehicle Accelerometer Locations

Data Sheet No. 7- MDB Accelerometer Locations

Data Sheet No. 8 - Post-Test Observations

Data Sheet No. 9 - MDB Summary of Results

Data Sheet No. 10 - Test Vehicle Profile Measurements

Data Sheet No. 11 - Test Vehicle Exterior Crush Measurements

Data Sheet No. 12 - MDB Exterior Static Crush Measurements

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

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

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

Data Sheet No. 305-1 - General Test and Parameter Data for Indicant FMVSS No. 305 Testing

Data Sheet No. 305-2 - Pre-Impact Data for Indicant FMVSS No. 305 Testing

Data Sheet No. 305-3 - Pre-Impact Electrical Isolation Measurements and Calculations for Indicant FMVSS No. 305 Testing

Data Sheet No. 305-4 - Post-Impact Data for Indicant FMVSS No. 305 Testing

Data Sheet No. 305-5 - Static Rollover Test Data for Indicant FMVSS No. 305 Testing

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2025 Toyota Land Cruiser 5 Door SUV
NHTSA No.: M20255109
Test Program: NCAP Side MDB Impact Test
Test Date: 03/19/2025

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20255109
Model Year	2025
Make	Toyota
Model	Land Cruiser
Body Style	SUV
VIN	JTEABFAJ4SK025799
Body Color	Meteor Shower
Odometer Reading (km/mi)	112 miles
Engine Displacement (L)	2.4
Type / No. Cylinders	I4
Engine Placement	Inline
Transmission Type	Automatic
Transmission Speeds	8-Speed
Overdrive	Yes
Final Drive	Four 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	Yes
Other Optional Feature	N/A
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 - Passenger Seat Cushion	Yes

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Toyota Motor Corporation
Date of Manufacture	11/2024
Vehicle Type	MPV

GVWR (KG)	3050
GAWR Front (KG)	1605
GAWR Rear (KG)	1860

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3	N/A	5	
Vehicle Capacity Weight (VCW) (kg)				499	(A)
DSC x 68.04 kg				340	(B)
Cargo Weight (RCLW) (kg)				136	(A-B)

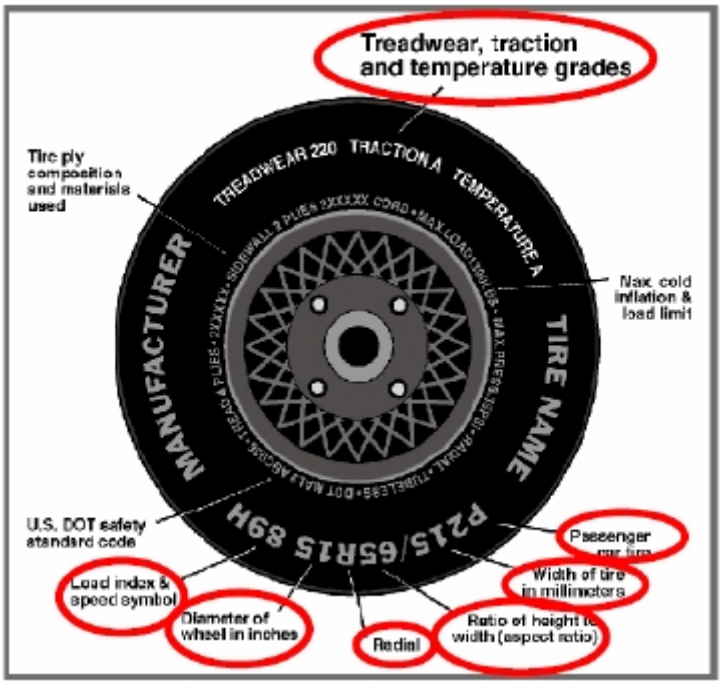
VEHICLE SEAT TYPE

Seating Location	Type Of Seat Pan				Type Of Seat Back		
	Bucket	Bench	Split Bench	Contour	Fixed	Adjustable	
						W/ Lever	W/ Knob
Front	X					X	
Rear or Second Row Seat			X			X	
Third Row Seat	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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

Test Vehicle:	2025 Toyota Land Cruiser 5 Door SUV	NHTSA No.:	M20255109
Test Program:	NCAP Side MDB Impact Test	Test Date:	03/19/2025

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)	230	230
Recommended Tire Size	245/70R18	245/70R18
Tire Size on Vehicle	245/70R18	245/70R18
Tire Manufacturer	Yokohama	Yokohama
Tire Model	Geolandar X-CV	Geolandar X-CV
Treadwear	520	520
Traction	B	B
Temperature Grades	A	A
Tire Plies Sidewall	2 polyester	2 polyester
Tire Plies Body	2 polyester, 2 steel, 1 Nylon	2 polyester, 2 steel, 1 Nylon
Load Index / Speed Symbol	110 H	110 H
Tire Material	Rubber	Rubber
DOT Safety Code Left	147 0MY ED2 4224	147 0MY ED2 4324
DOT Safety Code Right	147 0MY ED2 4224	147 0MY ED2 4324

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

Test Vehicle: 2025 Toyota Land Cruiser 5 Door SUV | NHTSA No.: M20255109
Test Program: NCAP Side MDB Impact Test | Test Date: 03/19/2025

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	250	245	252	248
Tire Placard	kPa	230	230	230	230
Owner's Manual	kPa	230	230	230	230
As Tested	kPa	230	230	230	230

MDB TIRE SPECIFICATIONS

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

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	613	606		651	723		650	735	
Right	kg	601	610		604	706		592	719	
Ratio	%	50	50		46.8	53.2		46.1	53.9	
Totals	kg	1214	1216	2430	1255	1429	2684	1242	1454	2696

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	2430	(A)
Sum of Actual Weight of 1 ES2re and 1 P572 ATD (SID-IIs)	kg	127	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	136	(C)
Calculated Vehicle Target Weight (TVTW)	kg	2692	(A+B+C)

Does the measured As Test Vehicle Weight lie within the required weight range

(i.e. Calculated Test Vehicle Target Weight – 4.5 kg to – 9 kg)? [X] **Yes** [ ] **No**

TEST VEHICLE ATTITUDES AND CG

Measurement Description	Units	Fully Loaded	As Tested	Meets Rqmt***
LF	mm	983	983	Yes
RF	mm	990	990	Yes
RR	mm	1000	1001	Yes
LR	mm	988	995	Yes
Vehicle CG (Aft of Front Axle)	mm	1540	1520	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	23	20	

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

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

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

Test Vehicle:	2025 Toyota Land Cruiser 5 Door SUV	NHTSA No.:	M20255109
Test Program:	NCAP Side MDB Impact Test	Test Date:	03/19/2025

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Truck carpeting	16
Ballast / Equipment Added	82

TEST SURFACE MARKINGS

	Distance from 63° Impact Location Line (mm)
Fore 25 mm target	1147
Aft 25 mm target	1150
Pre-Impact Angle Line	230

Parallel Track Target	X Location (mm)	Y Location (mm)
A	0	0
B	2955	1555
C	2955	3355
D	0	3000

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

Test Vehicle:	2025 Toyota Land Cruiser 5 Door SUV	NHTSA No.:	M20255109
Test Program:	NCAP Side MDB Impact Test	Test Date:	03/19/2025

SEAT POSITIONING

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

SCRL ANGLE RANGE

Seat	SCRL(°)		
	Max	Min	Mid
Driver Seat	17.4	11.8	14.6
Front Passenger Seat	17.4	12.3	14.85
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) (°)	As Tested SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid-Fore / Aft	Forward-Most
Driver Seat	14.6	14.1	Max	-	-	-
			Mid	-	-	-
			Min	15.2	14.1	13.1
Front Passenger Seat	14.85	15.1	Max	-	-	-
			Mid	-	-	-
			Min	14.0	15.1	15.1
Front Center Seat*			Max			
			Mid			
			Min			
Struck Side Rear Seat	Fixed	Fixed	Max			
			Mid			
			Min			
Non-Struck Side Rear Seat	Fixed	Fixed	Max			
			Mid			
			Min			
Rear Center Seat*	Fixed	Fixed	Max			
			Mid			
			Min			

**If applicable*

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

Test Vehicle:	2025 Toyota Land Cruiser 5 Door SUV	NHTSA No.:	M20255109
Test Program:	NCAP Side MDB Impact Test	Test Date:	03/19/2025

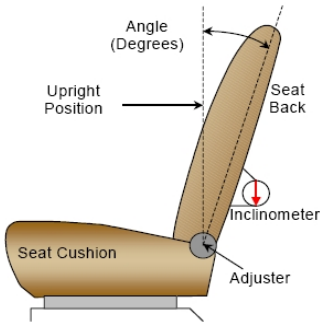
SEAT FORE / AFT POSITION

Seat	Total Fore / Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detents*
Driver Seat	220	23 (0-22)	110	11
Front Passenger Seat	240	25 (0-24)	120	12
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

**if applicable*

SEAT BACK ANGLE ADJUSTMENT

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



FRONT SEAT ASSEMBLY

Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detents*
Driver Seat w/ Seated Dummy	51.9	27 (0-26)	0.3	4
Front Passenger Seat	52.1	27 (0-26)	0.3	4
Front Center Seat*				
Struck Side Rear Seat w/ Seated Dummy	31.5	15 (0-14)	9.9	0
Non-Struck Side Rear Seat	31.5	15 (0-14)	9.9	0
Rear Center Seat*	31.5	15 (0-14)	9.9	0

**if applicable*

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

Test Vehicle:	2025 Toyota Land Cruiser 5 Door SUV	NHTSA No.:	M20255109
Test Program:	NCAP Side MDB Impact Test	Test Date:	03/19/2025

SEAT BELT ANCHORAGE ADJUSTMENT

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

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

HEAD RESTRAINT ADJUSTMENT

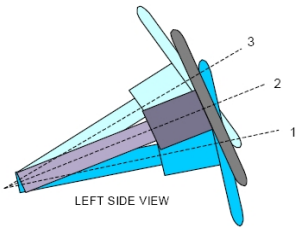
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

Seat	Total # of Positions	Placed in Position #
Driver Seat	4 (0-3)	Uppermost
Rear Seat	2 (0-1)	Lowermost

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 No. 1	19.9	
Geometric Center - Position No. 2	22.0	
Uppermost - Position No. 3	24.1	
Telescoping Steering Wheel Travel		60
Test Position	22.0	30

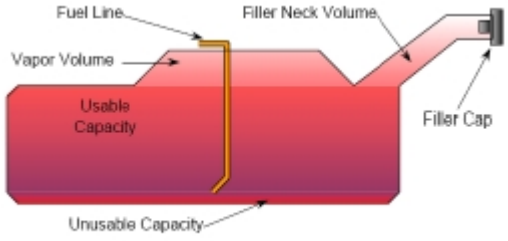


STEERING COLUMN ASSEMBLY

FUEL PUMP

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

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



VEHICLE FUEL TANK ASSEMBLY

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

Test Vehicle:	2025 Toyota Land Cruiser 5 Door SUV	NHTSA No.:	M20255109
Test Program:	NCAP Side MDB Impact Test	Test Date:	03/19/2025

FUEL TANK CAPACITY

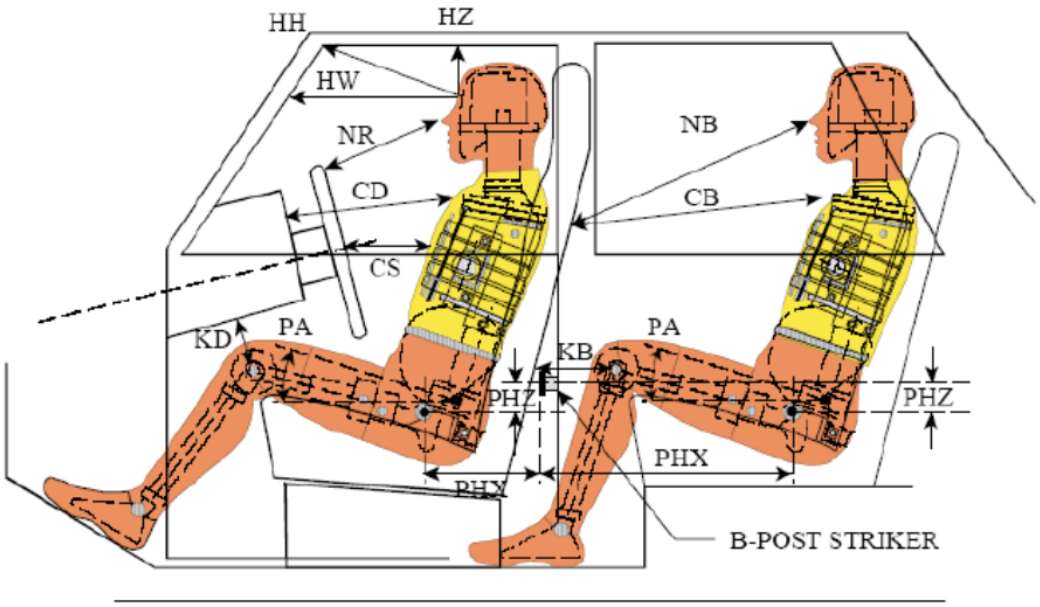
Description	Liters
Usable Capacity of “Standard Tank” (see Form No. 1)	66.89
Usable Capacity of “Optional Tank” (see Form No. 1)	N/A
Usable Capacity of “Standard Tank” (see Owner’s Manual)	N/A
Usable Capacity of “Optional Tank” (see Owner’s Manual)	66.89
93% of Usable Capacity	62.2
Actual Amount of Solvent Used in Test	62.2
1/3 of Usable Capacity	20.96

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** [ ] **N/A**

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle:	2025 Toyota Land Cruiser 5 Door SUV	NHTSA No.:	M20255109
Test Program:	NCAP Side MDB Impact Test	Test Date:	03/19/2025

DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION



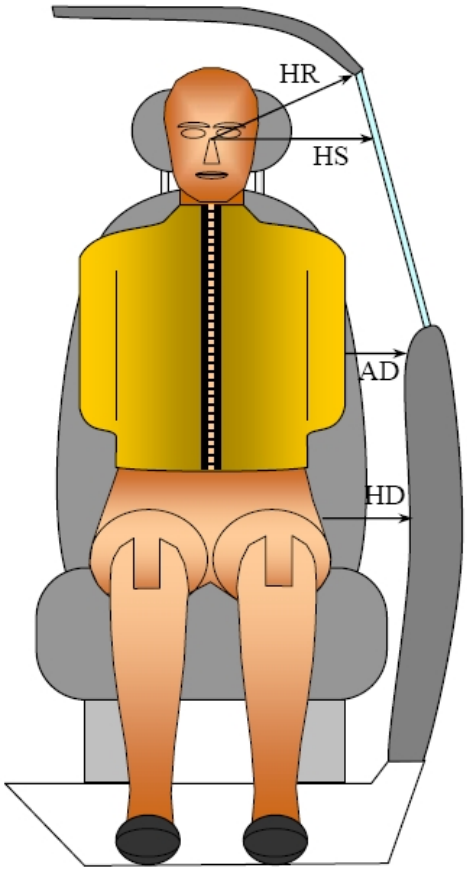
LEFT SIDE VIEW

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

Driver Code	Pass. Code	Description	Driver (Serial No. F033)		Left Rear Passenger (Serial No. DG8012)	
			Length (mm)	Angle (°)	Length (mm)	Angle (°)
HH		Header to Header	481			
HW		Header to Windshield	624			
HZ	HZ	Head to Roof Liner	197		298	
NR	NB	Nose to Rim/Seat Back	397		505	
CD	CB	Chest to Dash/Seat Back	560		525	
CS		Chest to Steering Wheel	343			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	205	25.6	297	15.5
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	190	1.0	297	15.0
PAX°	PAX°	Pelvic Tilt Angle X		16.7		19.5
	PAY°	Pelvic Tilt Angle Y				0.2
PHX	PHX	Hip Point to Striker (X-Axis)	163		229	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	113		183	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle:	2025 Toyota Land Cruiser 5 Door SUV	NHTSA No.:	M20255109
Test Program:	NCAP Side MDB Impact Test	Test Date:	03/19/2025



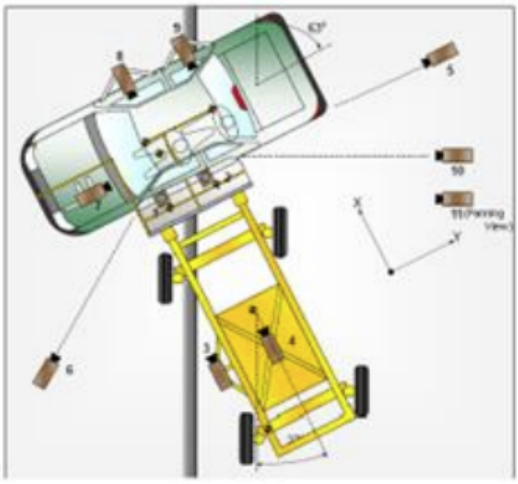
FRONT VIEW OF DUMMY

DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver (Serial No. F033)	Left Rear Passenger (Serial No. DG8012)
HR	Head to Side Header	mm	225	295
HS	Head to Side Window	mm	336	388
AD	Arm to Door	mm	88	162
HD	Hip Point to Door	mm	150	205

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2025 Toyota Land Cruiser 5 Door SUV
NHTSA No.: M20255109
Test Program: NCAP Side MDB Impact Test
Test Date: 03/19/2025



CAMERA LOCATIONS AND DATA

No.	Camera View	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Overhead Overall	0	-210	-8890	12.5	1000
2	Overhead Close-up	0	0	-8950	24	1000
3	Left Impact Point (MDB)	-1470	0	-847	25	1000
4	Side Overall (MDB)	-1140	878	-1587	8	1000
5	Rear	0	10700	-1505	28	1000
6	Left Front	-3650	-7000	-1520	24	1000
7	Driver Front (OB)				25	1000
8	Driver Side (OB)				12.5	1000
9	Passenger Side (OB)				12.5	1000
10	Real-time Left Rear				Zoom	60
11	Real-time In Run				Zoom	60

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

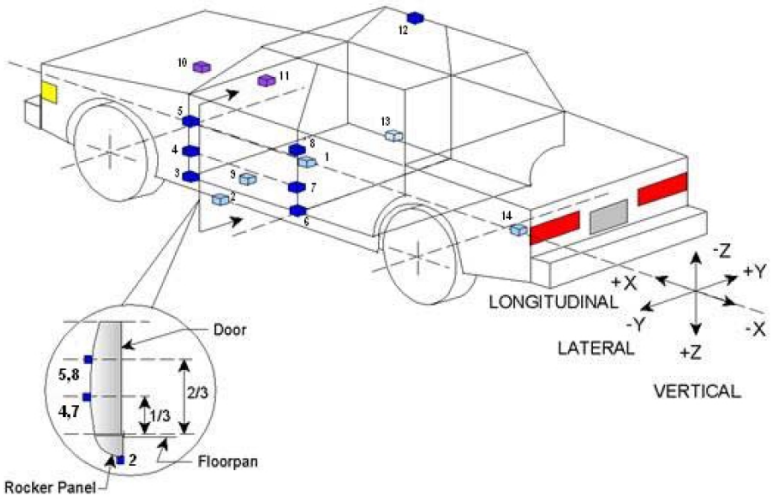
If applicable, explain why camera(s) did not operate as intended: All cameras operated as intended.

INSTRUMENTATION

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

DATA SHEET NO. 6
TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle:	2025 Toyota Land Cruiser 5 Door SUV	NHTSA No.:	M20255109
Test Program:	NCAP Side MDB Impact Test	Test Date:	03/19/2025



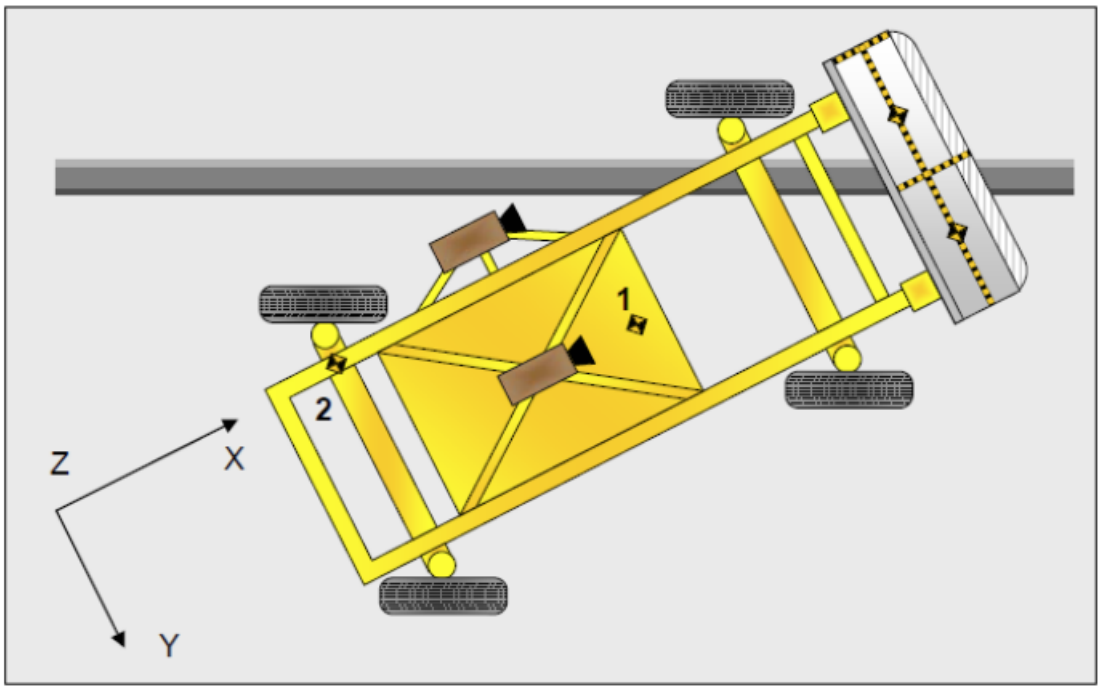
TEST VEHICLE ACCELEROMETER LOCATIONS

No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2220	-7	-94
2	Right Sill at Front Seat	3008	712	59
3	Right Sill at Rear Seat	2147	708	37
4	Left Sill at Front Door	3007	-693	71
5	Left Sill at Rear Door	2105	-688	48
6	A-Post Lower	3386	-665	9
7	A-Post Middle	3551	-644	-158
8	B-Post Lower	2333	-705	-49
9	B-Post Middle	2366	-715	-389
10	Front Seat Track	2521	-588	3
11	Rear Seat Structure	1941	-597	-79
12	Rt. Rear Occ. Compartment	2334	420	63
13	Engine Block	4149	3	-490
14	Rear Above Axle	581	-14	-96

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

DATA SHEET NO. 7
MDB ACCELEROMETER LOCATIONS

Test Vehicle:	2025 Toyota Land Cruiser 5 Door SUV	NHTSA No.:	M20255109
Test Program:	NCAP Side MDB Impact Test	Test Date:	03/19/2025



MDB ACCELEROMETER LOCATIONS

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

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

Width between left and right contact switches (mm): 1485

DATA SHEET NO. 8
POST-TEST OBSERVATIONS

Test Vehicle: 2025 Toyota Land Cruiser 5 Door SUV
NHTSA No.: M20255109
Test Program: NCAP Side MDB Impact Test
Test Date: 03/19/2025

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Front Seat Dummy (ES-2re)	Rear Seat Dummy (SID-IIs)
Face	None	None
Top of Head	Side Header	Curtain Airbag
Left Side of Head	Curtain Airbag & Side Header	Curtain Airbag
Back of Head	Curtain Airbag, Side Header & Headrest	Curtain Airbag & Headrest
Left Shoulder	Curtain Airbag & Torso/Pelvis Airbag	Curtain Airbag & Door Trim
Upper Torso	Seatback & Torso/Pelvis Airbag	Door Trim
Lower Torso	Seatback	Door Trim
Left Hip	Seat pan & Torso/Pelvis Airbag	Seatpan & Door Trim
Left Knee	Knee Airbag & Door Trim	Door Trim

POST-TEST DOOR PERFORMANCE

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

POST-TEST SEAT PERFORMANCE

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

POST-TEST STRUCTURAL OBSERVATIONS

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

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

Test Vehicle:	2025 Toyota Land Cruiser 5 Door SUV	NHTSA No.:	M20255109
Test Program:	NCAP Side MDB Impact Test	Test Date:	03/19/2025

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		2855
Vertical Impact Reference Line (Aft of Front Axle - Intended Impact Point)	mm		488
Actual Impact Point (Aft of Frontal Axle)	mm		477
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact Point	+11
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact Point	-4

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2025 Toyota Land Cruiser 5 Door SUV
NHTSA No.: M20255109
Test Program: NCAP Side MDB Impact Test
Test Date: 03/19/2025

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1250
Overall Length Including Honeycomb Frame	4120
Wheelbase of Framework Carriage	2591
CG Location of Front Axle	1122

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	396	291.5	687.5
Right	kg	377.5	301	678.5
Ratio	%	56.6	43.4	100
Totals	kg	773.5	592.5	1366

SPEED AND ANGLE AT IMPACT DATA

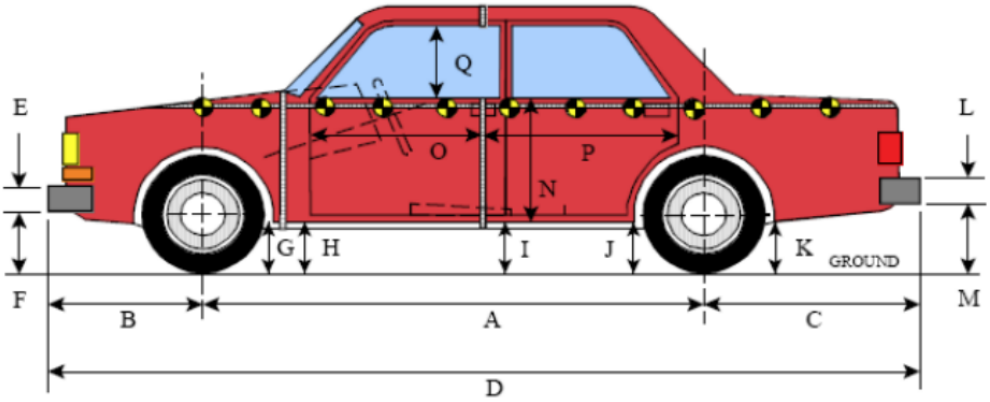
Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.10 to 62.70	62.07
Trap No. 2 Velocity (Redundant)	km/h	61.10 to 62.70	62.13
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90.0
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	63.0
MDB Crabbed angle to MDB Forward Line of Motion	degrees	26.0 to 28.0	27.0

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush (mm)
Row	Description	Height (mm)	Distance (mm)	Direction	
A	Center of Bumper	432	800	Left	238
B	Top of Bumper	533	800	Left	214
C	Mid-Level	686	800	Left	186
D	Top of Stack	813	300	Right	189

DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle:	2025 Toyota Land Cruiser 5 Door SUV	NHTSA No.:	M20255109
Test Program:	NCAP Side MDB Impact Test	Test Date:	03/19/2025



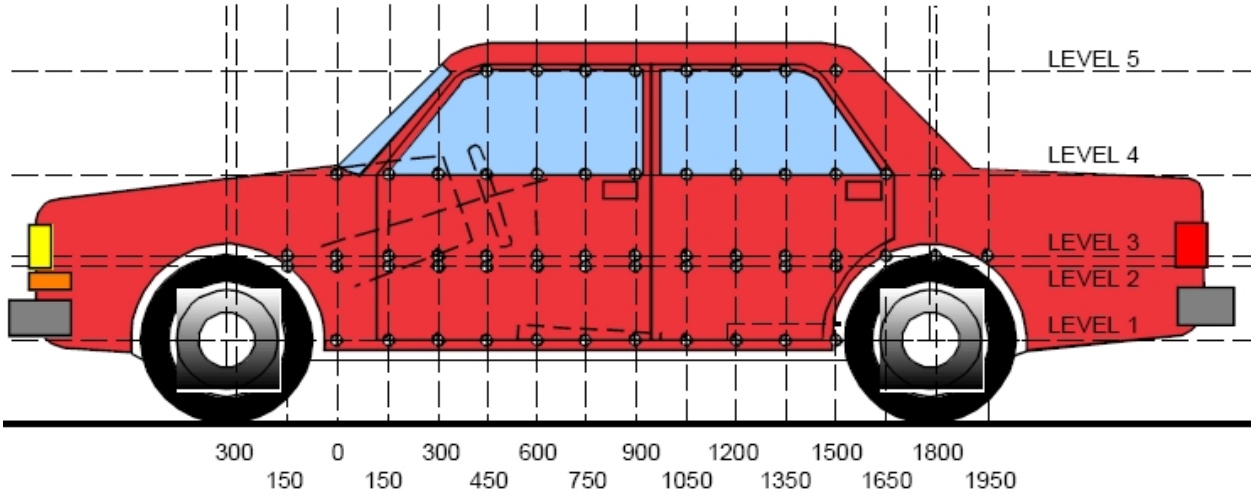
LEFT SIDE VIEW
All MEASUREMENTS IN (mm) WITH TOLERANCE OF ± 3mm

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code.	Measurement Description	Pre-Test	Post-Test	Change
A	Wheelbase	2855	2847	-8
B	Front Axle to FSOV	934	947	13
C	Rear Axle to RSOV	1194	1188	-6
D2	Total Length at Centerline	4982	4981	-1
E	Front Bumper Thickness	110	110	0
F	Front Bumper Bottom to Ground	688	713	25
G	Sill Height at Front Wheel Well	360	353	-7
H	Sill Height at Front Door Leading Edge	376	354	-22
I	Sill Height at B Pillar	395	344	-51
J1	Sill Height at Rear Wheel Well	381	331	-50
J2	Pinch Weld Height at Rear Wheel Well	386	353	-33
K	Sill Height Aft of Rear Wheel Well	388	343	-45
L	Rear Bumper Thickness	110	110	0
M	Rear Bumper Bottom to Ground	557	490	-67
N	Sill Height to Bottom of Front Window Sill	782	787	5
O	Front Door Leading Edge to Impact CL	665	667	2
P	Rear Door Trailing Edge to Impact CL	1376	1355	-21
Q	Front Window Opening	485	480	-5
R	Right Side Length	4867	4872	5
S	Left Side Length	4865	4857	-8
T	Vehicle Width at B-Pillars	1887	1792	-95
U	Front Wheel Track Width	1649	1642	-7
V	Rear Wheel Track Width	1645	1645	0

DATA SHEET NO.11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle:	2025 Toyota Land Cruiser 5 Door SUV	NHTSA No.:	M20255109
Test Program:	NCAP Side MDB Impact Test	Test Date:	03/19/2025



LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	509	104	1500
2	Occupant H-Point	mm	869	156	1500
3	Mid-Door	mm	947	153	1500
4	Window Sill	mm	1194	61	1350
5	Window Top	mm	1774	-2	2400

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

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

Test Vehicle: 2025 Toyota Land Cruiser 5 Door SUV
NHTSA No.: M20255109
Test Program: NCAP Side MDB Impact Test
Test Date: 03/19/2025

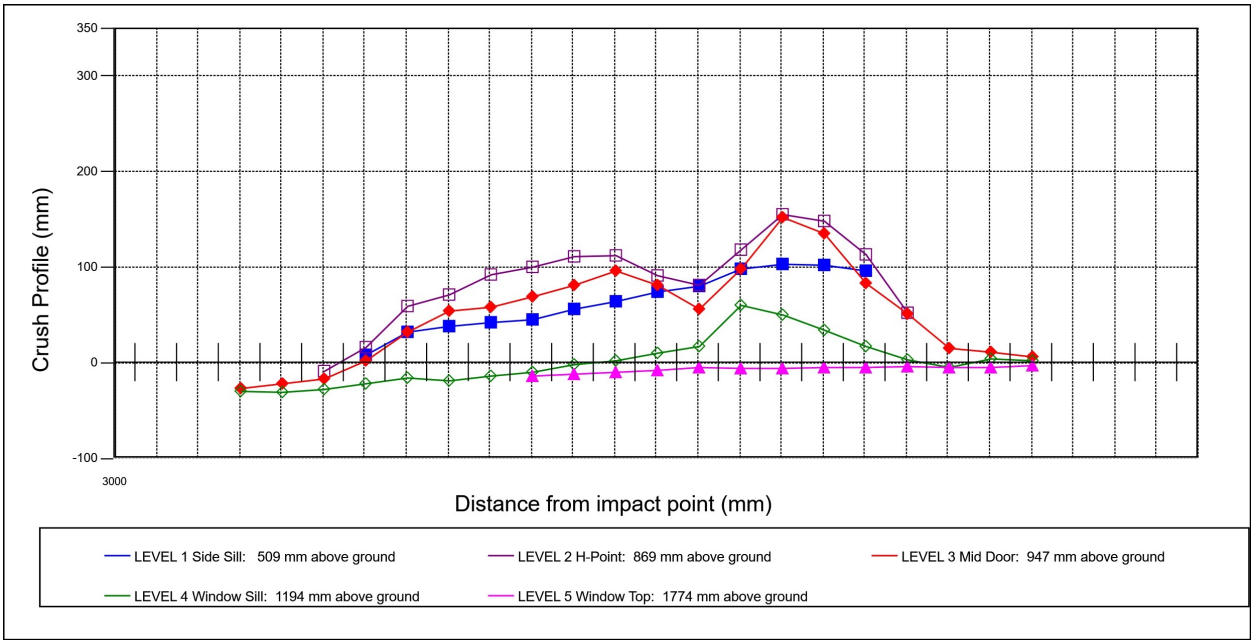
EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

	Pre-Test					Post-Test					Crush				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750															
-600															
-450			972	789				998	818				-26	-29	
-300			973	801				994	831				-21	-30	
-150		972	963	815			980	979	842			-8	-16	-27	
0	943	951	951	827		934	934	923	848		9	17	28	-21	
150	931	929	924	840		898	869	891	855		33	60	33	-15	
300	915	932	927	852		876	860	872	870		39	72	55	-18	
450	904	935	930	858		861	842	871	871		43	93	59	-13	
600	900	938	933	867	629	854	837	863	876	642	46	101	70	-9	-13
750	900	940	935	876	654	843	828	853	877	665	57	112	82	-1	-11
900	900	940	937	882	673	835	827	840	879	682	65	113	97	3	-9
1050	899	942	939	887	686	824	850	857	876	693	75	92	82	11	-7
1200	899	944	940	891	694	818	862	883	873	698	81	82	57	18	-4
1350	898	943	940	894	697	799	824	841	833	702	99	119	99	61	-5
1500	899	942	940	898	701	795	786	787	847	706	104	156	153	51	-5
1650	903	941	938	899	702	800	792	802	864	706	103	149	136	35	-4
1800	919	947	938	902	702	822	833	854	884	706	97	114	84	18	-4
1950		969	953	903	702		916	901	899	705		53	52	4	-3
2100			972	904	700			956	908	704			16	-4	-4
2250			973	903	697			961	898	701			12	5	-4
2400			972	901	694			965	898	696			7	3	-2
2550															
2700															
2850															
3000															

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

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

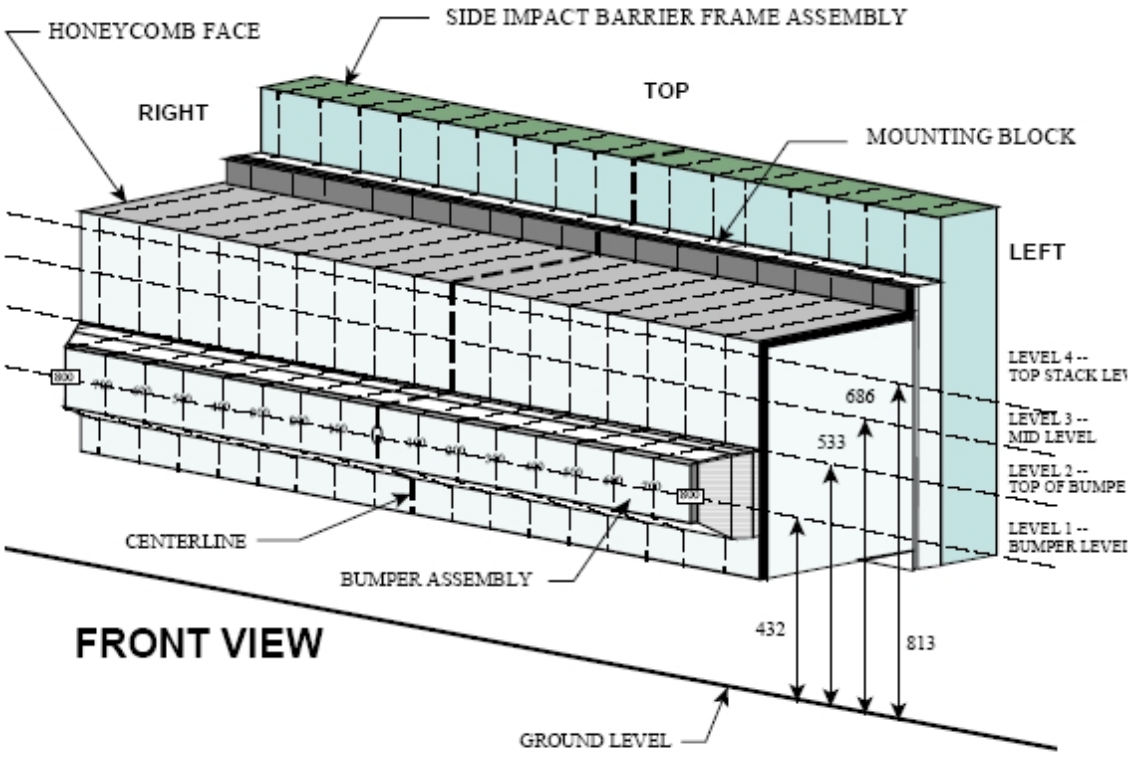
Test Vehicle:	2025 Toyota Land Cruiser 5 Door SUV	NHTSA No.:	M20255109
Test Program:	NCAP Side MDB Impact Test	Test Date:	03/19/2025



Vehicle Exterior Crush Measurements - Visual Representation

DATA SHEET NO.12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle:	2025 Toyota Land Cruiser 5 Door SUV	NHTSA No.:	M20255109
Test Program:	NCAP Side MDB Impact Test	Test Date:	03/19/2025



NOTE: Dimensions are shown in millimeters, mm

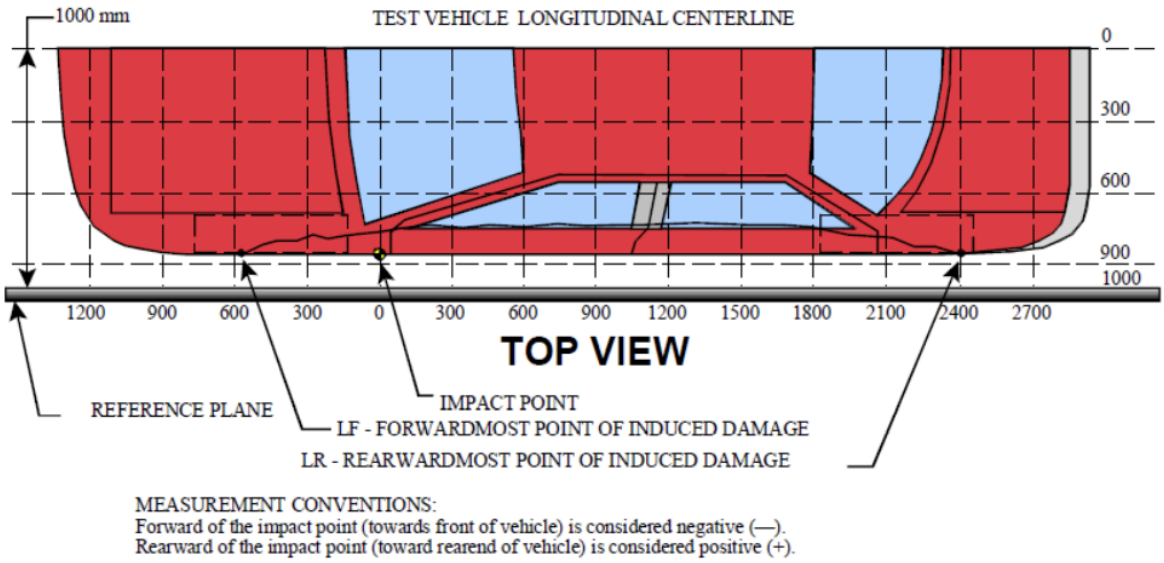
DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800
1	209	207	207	208	210	211	213	216	217	218	220	221	223	224	226	228	238
2	198	198	200	200	200	204	200	203	205	203	205	206	208	209	210	211	214
3	168	168	144	129	127	147	142	134	129	128	122	122	125	131	145	171	186
4	177	144	132	143	141	189	159	132	120	118	113	116	127	134	138	165	173

DATA SHEET NO.13
VEHICLE AND MDB DAMAGE PROFILE DISTANCE

Test Vehicle:	2025 Toyota Land Cruiser 5 Door SUV	NHTSA No.:	M20255109
Test Program:	NCAP Side MDB Impact Test	Test Date:	03/19/2025

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



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

VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	-450	3	2	28	-26
2	120	3	103	76	27
3	690	3	143	66	77
4	1260	3	134	60	74
5	1830	3	137	59	78
6	2400	3	35	28	7

MDB DAMAGE PROFILE DISTANCES

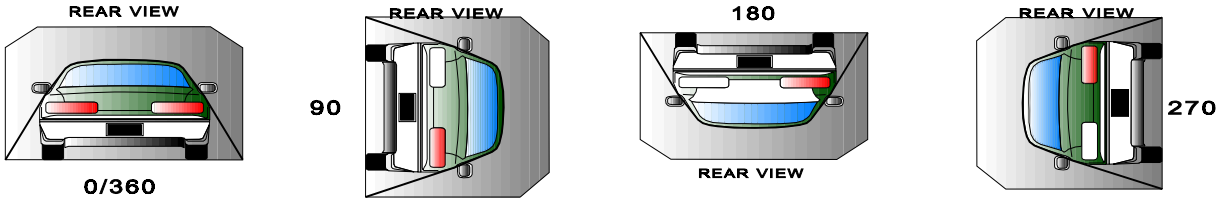
DPD	Distance From Center of MDB (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	800 mm left of center	1	267	505	-238
2	480 mm left of center	1	290	514	-224
3	160 mm left of center	1	295	514	-219
4	160 mm right of center	1	299	513	-214
5	480 mm right of center	1	305	513	-208
6	800 mm right of center	1	292	501	-209

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

Test Vehicle:	2025 Toyota Land Cruiser 5 Door SUV	NHTSA No.:	M20255109
Test Program:	NCAP Side MDB Impact Test	Test Date:	03/19/2025
Test Time:	11:15 AM	Temperature:	21 °C

A. From impact until vehicle motion ceases: 0 oz
(Maximum allowable is 1 oz.)
B. For the 5-minute period after motion ceases: 0 oz
(Maximum allowable is 5 oz.)
C. For the following 25 minutes: 0 oz
(Maximum allowable is 1 oz.)

D. Spillage Detail: No Spillage



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	68	300	368
90° to 180°	65	300	365
180° to 270°	68	300	368
270° to 360°	66	300	366

FMVSS 301 SPILLAGE TABLE

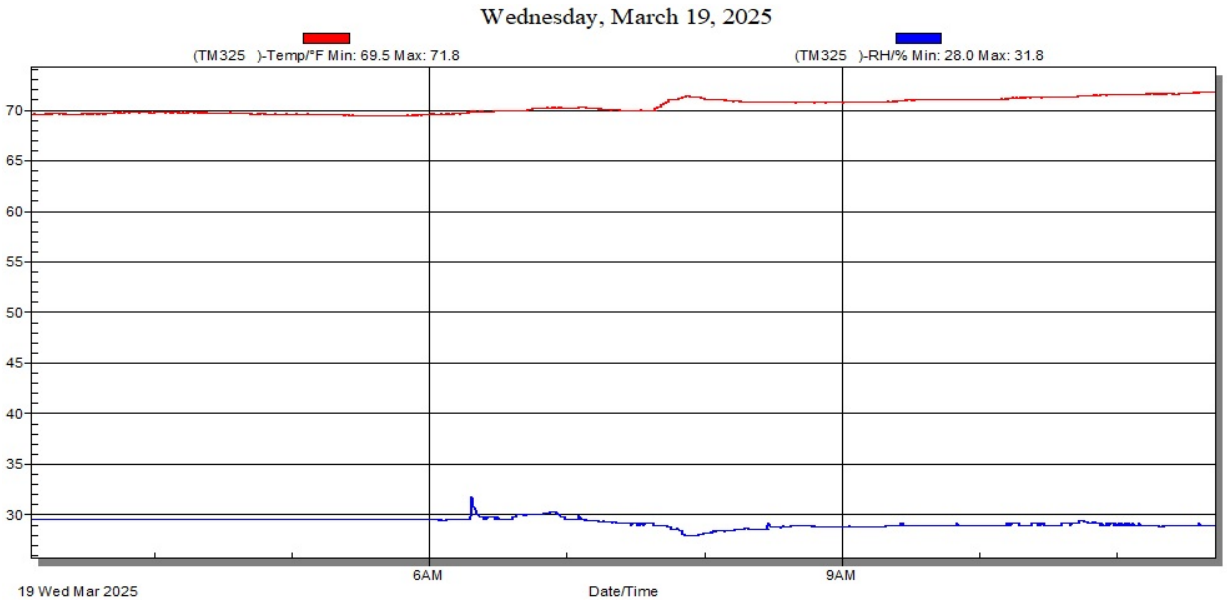
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° to 90°	0	0	0	
90° to 180°	0	0	0	
180° to 270°	0	0	0	
270° to 360°	0	0	0	

SOLVENT SPILLAGE LOCATION TABLE

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

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

Test Vehicle:	2025 Toyota Land Cruiser 5 Door SUV	NHTSA No.:	M20255109
Test Program:	NCAP Side MDB Impact Test	Test Date:	03/19/2025



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

DATA SHEET NO. 305-1
GENERAL TEST AND VEHICLE PARAMETER DATA FOR INDICANT FMVSS NO. 305 TESTING

Test Vehicle: 2025 Toyota Land Cruiser 5 Door SUV NHTSA No.: M20255109
Test Program: NCAP Side MDB Impact Test Test Date: 03/19/2025

ELECTRIC VEHICLE PROPULSION SYSTEM

Measured Parameter	Value
Type of Electric Vehicle (Electric/Gas-Electric Hybrid/Fuel Cell-Electric Hybrid)	Gas-Electric Hybrid
Propulsion Battery Type	Nickel Metal Hydride
Nominal Voltage (Volts)	288
Is this Vehicle equipped with an Automatic Propulsion Battery Disconnect?	Yes
Physical Location of Automatic Propulsion Battery Disconnect, if applicable	Inside Battery
Auxiliary Battery Type	LN3

PROPULSION BATTERY SYSTEM DATA (COTR SUPPLIED)

Measured Parameter	Value
Electrolyte Fluid Type	KOH
Electrolyte Fluid Specific Gravity	1.26 g/cm3
Electrolyte Fluid Kinematic Viscosity (centistokes)	1.8 cSt
Electrolyte Fluid Color	Clear
Propulsion Battery Coolant Type, Color and Specific Gravity (if applicable)	Air-cooled
Location of Battery Modules (Inside or Outside of Passenger Compartment?)	Inside Passenger Compartment

PROPULSION BATTERY STATE OF CHARGE

Measured Parameter	Units	Value
For all battery types: Voltage Range corresponding to **useable energy** of the battery:		
Minimum State of Charge	V	
Maximum State of Charge	V	
95% of Maximum	V	
Test Voltage *	V	
For batteries that are rechargeable ONLY by an energy source on the vehicle: Voltage range corresponding to **useable energy** of the battery:		
Minimum State of Charge	V	240
Maximum State of Charge	V	400
95% of Maximum	V	380
Test Voltage *	V	308.6

* *For all battery types-No less than 95% of Maximum Operating Voltage; for batteries that are rechargeable ONLY by an energy source on the vehicle-maximum practicable state of charge within normal operating range.*

DATA SHEET NO. 305-2
PRE-IMPACT DATA FOR INDICANT FMVSS NO. 305 TESTING

Test Vehicle:	2025 Toyota Land Cruiser 5 Door SUV	NHTSA No.:	M20255109
Test Program:	NCAP Side MDB Impact Test	Test Date:	03/19/2025

VEHICLE CHASSIS GROUND PT(S) LOCATION(S) & PROPULSION BATTERY SYSTEM

Measured Parameter	Value
Details of Vehicle Chassis Ground Points & Locations	Ground point was located on our vehicle plate in the trunk area
Details of Propulsion Battery Components	Battery is located inside the trunk area under the deck board assembly

DATA SHEET NO. 305-3
PRE-IMPACT ELECTRICAL ISOLATION MEASUREMENTS AND CALCULATIONS FOR INDICANT FMVSS NO. 305 TESTING

Test Vehicle:	2025 Toyota Land Cruiser 5 Door SUV	NHTSA No.:	M20255109
Test Program:	NCAP Side MDB Impact Test	Test Date:	03/19/2025

VOLTMETER INFORMATION

Measured Parameter	Units	Value
Make & Model		Fluke 1587
Serial No.		51800115
Internal Impedance Value	MΩ	10
Resolution	V	0.001
Last Calibration Date		06/20/2024

NOTES:

- *The voltmeter used in this test shall measure DC values and have an internal impedance of at least 10 M Ω*
- *An oscilloscope meeting the above requirements may need to be used to adequately measure voltage in some vehicles.*

PROPULSION BATTERY VOLTAGE, RESISTANCE & ELECTRICAL ISOLATION MEASUREMENTS & CALCULATIONS

Measured Parameter	Symbol	Units	Value
Normal operating voltage range specified by the manufacturer	V_b	V	240-400
Propulsion Battery Voltage: (ready to drive position)	V_b	V	309.0
Propulsion Battery to Vehicle Chassis	V_1	V	148.0
Propulsion Battery to Vehicle Chassis	V_2	V	155.0
Propulsion Battery to Vehicle Chassis Across Known Resistor	R_o	Ω	200,000
Propulsion Battery to Vehicle Chassis with R_o installed	V_1'	V	20.0
Propulsion Battery to Vehicle Chassis with R_o installed	V_2'	V	9.0
$R_{i1}= R_o*(1+V_2/V_1)*[(V_1-V_1')/V_1']$	R_{i1}	Ω	2,620,541
$R_{i2}= R_o*(1+V_1/V_2)*[(V_2-V_2')/V_2']$	R_{i2}	Ω	6,342,366
Lesser value of R_{i1} and R_{i2}	R_i	Ω	2,620,541
Electrical Isolation Value (Minimum E.I. Value is 500 Ω/V)	R_i/V_b	Ω/V	8,481

Is the Electrical Isolation Value ≥ 500 Ω/V (Yes/No)? [X] Yes [ ] No (Fail)

NOTES:

- *The measurement shall be made with the propulsion battery connected to the vehicle propulsion system, and the vehicle in the "ready-to-drive" (propulsion motor(s) activated) position.*
- *If the voltage measurement is not at the voltage or within the normal operating voltage range specified by the manufacturer, the battery must be charged.*
- *The known resistance Ro (in Ohms) should be approximately 500 times the nominal operating voltage of the vehicle (in volts) per SAE J1766*
- *If measured voltage is zero and results in a division by zero, record "Zero Volts." This "zero voltage" condition is considered as being compliant*

DATA SHEET NO. 305-4
POST-IMPACT DATA FOR INDICANT FMVSS NO. 305 TESTING

Test Vehicle:	2025 Toyota Land Cruiser 5 Door SUV	NHTSA No.:	M20255109
Test Program:	NCAP Side MDB Impact Test	Test Date:	03/19/2025

VOLTMETER INFORMATION

Measured Parameter	Units	Value
Make & Model		Fluke 1587
Serial No.		49210189
Internal Impedance Value	MΩ	10
Resolution	V	0.001
Last Calibration Date		04/06/2024

NOTES:

- *The voltmeter used in this test shall measure DC values and have an internal impedance of at least 10 M Ω*
- *An oscilloscope meeting the above requirements may need to be used to adequately measure voltage in some vehicles.*

ELECTRICAL ISOLATION MEASUREMENTS & IMPACT CALCULATIONS

Parameter	Value	Units		Value		Value	
V_b =	0.1	V	Time:	1	Minutes	13	Seconds
V_1 =	3.2	V	Time:	1	Minutes	21	Seconds
V_2 =	3.2	V	Time:	1	Minutes	29	Seconds
R_o =	200,000	Ω					
V_1' =	0.2	V	Time:	1	Minutes	34	Seconds
V_2' =	0.2	V	Time:	1	Minutes	38	Seconds
R_{i1} =	6,000,000	Ω	Time:	1	Minutes	34	Seconds
R_{i2} =	6,000,000	Ω	Time:	1	Minutes	38	Seconds
R_i =	6,000,000	Ω/V	Time:	1	Minutes	38	Seconds
R_i/V_b =	60,000,000	Ω/V	Time:	1	Minutes	38	Seconds

Is the Electrical Isolation Value ≥ 500 Ω/V (Yes/No)?	X	Yes		No (Fail)

NOTES:

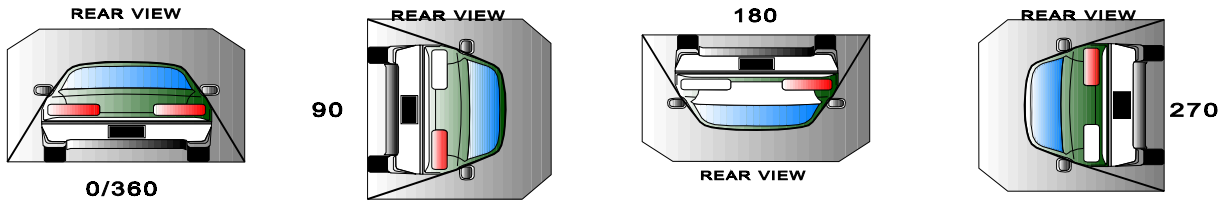
- *$R_{i1}= R_o*(1+V_2/V_1)*[(V_1-V_1')/V_1']$, $R_{i2}= R_o*(1+V_1/V_2)*[(V_2-V_2')/V_2']$, R_i = Lesser value of R_{i1} and R_{i2}*
- *If measured voltage is zero and results in a division by zero, record "Zero Volts." This "zero voltage" condition is considered as being compliant*
- *Minimum Electrical Isolation Value is 500 Ω/V*

PROPULSION BATTERY SYSTEM COMPONENTS

Measured Parameter	Comments	Passed	Failed
Propulsion Battery Module movement within the passenger compartment	None	X	
Intrusion of an outside Propulsion Battery Component into the passenger compartment	None	X	
Is propulsion battery electrolyte spillage visible in the passenger compartment?	None	X	

DATA SHEET NO. 305-5
STATIC ROLLOVER TEST DATA FOR INDICANT FMVSS NO. 305 TESTING

Test Vehicle:	2025 Toyota Land Cruiser 5 Door SUV	NHTSA No.:	M20255109
Test Program:	NCAP Side MDB Impact Test	Test Date:	03/19/2025



Rear View

DETERMINATION OF PROPULSION BATTERY ELECTROLYTE COLLECTION TIME PERIOD

Rollover Stage	Rotation Time (spec. 1 -3 min)		FMVSS 301 Hold Time	Total Time		Next Whole Minute Interval
	Minutes	Seconds	Minutes	Minutes	Seconds	Minutes
0° to 90°	1	8	5	6	8	7
90° to 180°	1	4	5	6	4	7
180° to 270°	1	8	5	6	8	7
270° to 360°	1	6	5	6	6	7

ACTUAL TEST VEHICLE PROPULSION BATTERY ELECTROLYTE SPILLAGE

Rollover Stage	Propulsion Battery Electrolyte Spillage	Units	Spillage Location
0° to 90°	0	Liters	None
90° to 180°	0	Liters	None
180° to 270°	0	Liters	None
270° to 360°	0	Liters	None
Total Spillage	0	Liters	None

** FMVSS 305 Requirements: Maximum allowable propulsion battery electrolyte spillage is **5.0 Liters***

Is the total spillage of propulsion battery electrolyte greater than 5.0 Liters?		Yes (Fail)	X	No
Is propulsion battery electrolyte spillage visible in the passenger compartment?		Yes (Fail)	X	No

VOLTMETER INFORMATION

Measured Parameter	Units	Value
Make & Model		Fluke 1587
Serial No.		49210189
Internal Impedance Value	MΩ	10
Resolution	V	0.001
Last Calibration Date		04/06/2024

NOTES:

- *The voltmeter used in this test shall measure DC values and have an internal impedance of at least 10 M Ω*
- *An oscilloscope meeting the above requirements may need to be used to adequately measure voltage in some vehicles.*

DATA SHEET NO. 305-5
STATIC ROLLOVER TEST DATA FOR INDICANT FMVSS NO. 305 TESTING (CONT'D)

Test Vehicle: 2025 Toyota Land Cruiser 5 Door SUV NHTSA No.: M20255109
Test Program: NCAP Side MDB Impact Test Test Date: 03/19/2025

ELECTRICAL ISOLATION MEASUREMENTS & CALCULATIONS

Parameter	Rollover Stage	Value	Units	R_o=200,000 Ω	Minutes	Seconds
V_b =	90°	0.0	V	Time:	2	48
	180°	0.0	V		8	52
	270°	0.0	V		15	5
	360°	0.0	V		21	12
V_1 =	90°	0.0	V	Time:	3	0
	180°	0.0	V		9	1
	270°	0.0	V		15	13
	360°	0.0	V		21	19
V_2 =	90°	0.0	V	Time:	3	6
	180°	0.0	V		9	10
	270°	0.0	V		15	19
	360°	0.0	V		21	24
V_1' =	90°	0.0	V	Time:	3	10
	180°	0.0	V		9	13
	270°	0.0	V		15	23
	360°	0.0	V		21	27
V_2' =	90°	0.0	V	Time:	3	13
	180°	0.0	V		9	17
	270°	0.0	V		15	27
	360°	0.0	V		21	30
R_{i1} =	90°	Zero Volts	Ω	Time:	3	10
	180°	Zero Volts	Ω		9	13
	270°	Zero Volts	Ω		15	23
	360°	Zero Volts	Ω		21	27
R_{i2} =	90°	Zero Volts	Ω	Time:	3	13
	180°	Zero Volts	Ω		9	17
	270°	Zero Volts	Ω		15	27
	360°	Zero Volts	Ω		21	30
R_i =	90°	Zero Volts	Ω/V	Time:	3	13
	180°	Zero Volts	Ω/V		9	17
	270°	Zero Volts	Ω/V		15	27
	360°	Zero Volts	Ω/V		21	30
R_i/V_b =	90°	Zero Volts	Ω/V	Time:	3	13
	180°	Zero Volts	Ω/V		9	17
	270°	Zero Volts	Ω/V		15	27
	360°	Zero Volts	Ω/V		21	30

Is the Electrical Isolation Value ≥ 500 Ω/V (Yes/No)? [X] Yes [ ] No (Fail)

APPENDIX A

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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 Side View of Test Vehicle



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



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



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

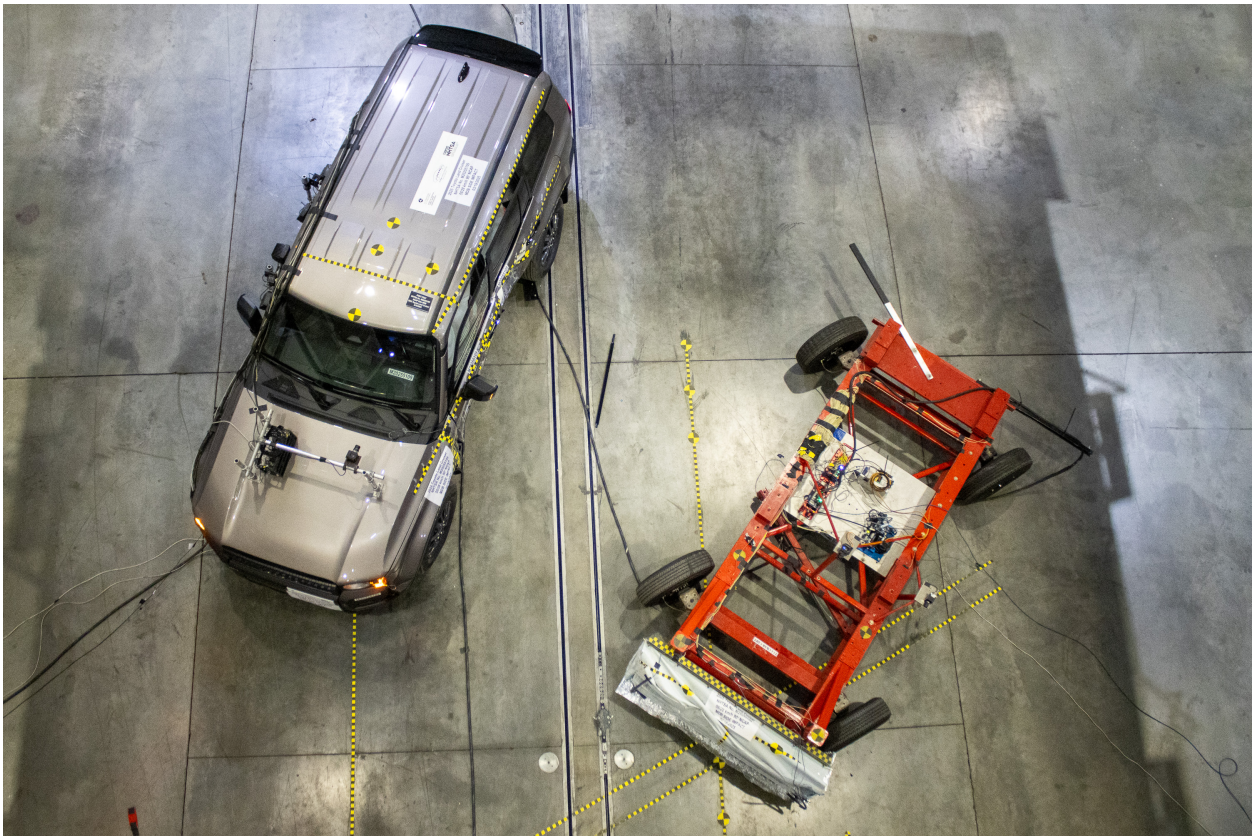


Figure A-16: Post-Test Overhead View of Test Area



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



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



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



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



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



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



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



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

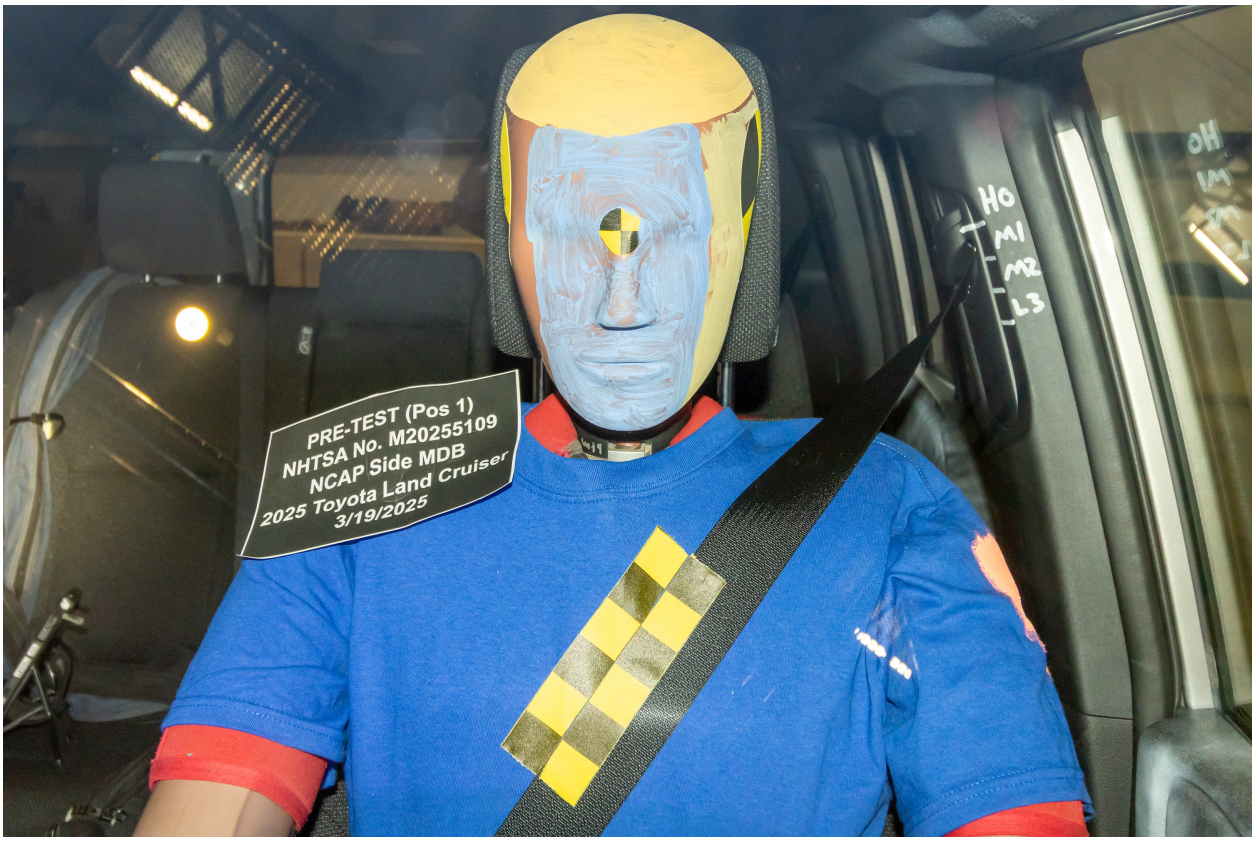


Figure A-25: Pre-Test Front Close-up View of Driver Dummy



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



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



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



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



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



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



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



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



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

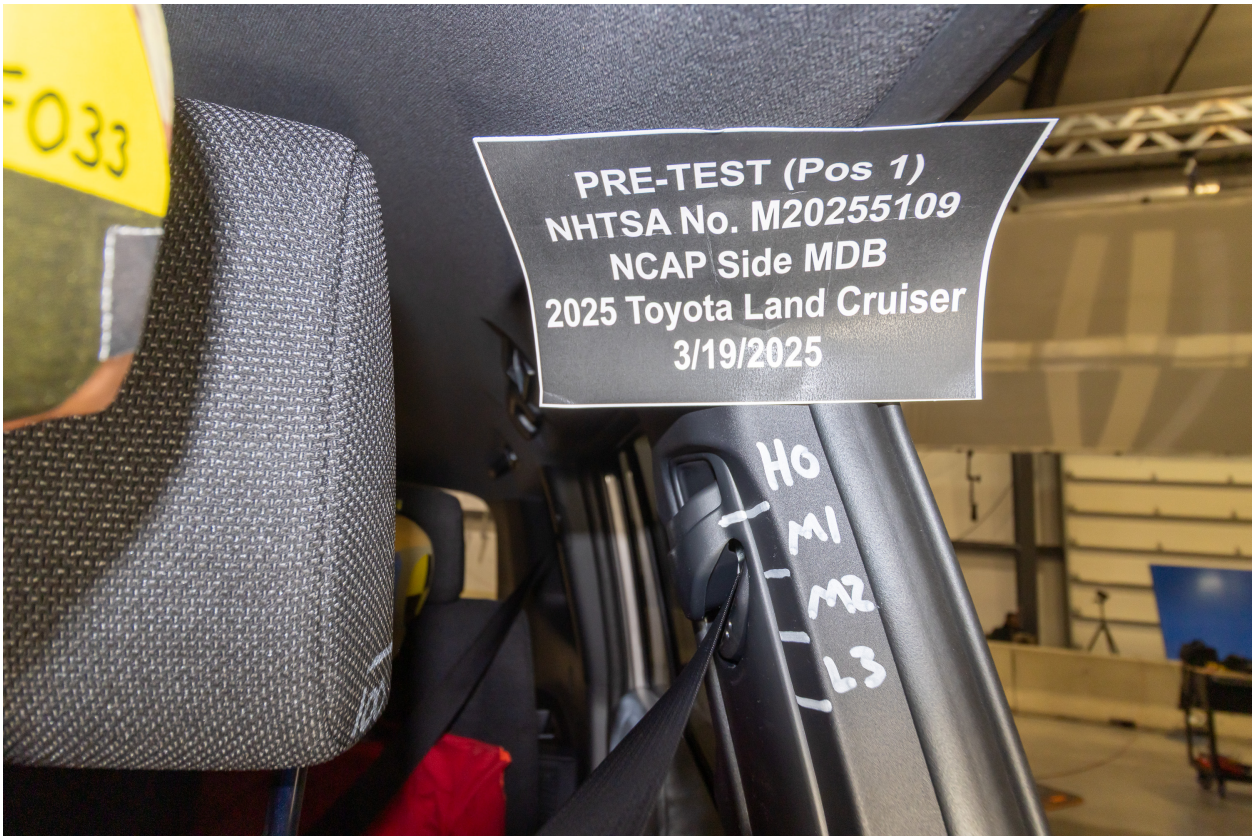


Figure A-35: Pre-Test View of Belt Anchorage for Driver Dummy



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



Figure A-37: View of Disengaged Parking Brake



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



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

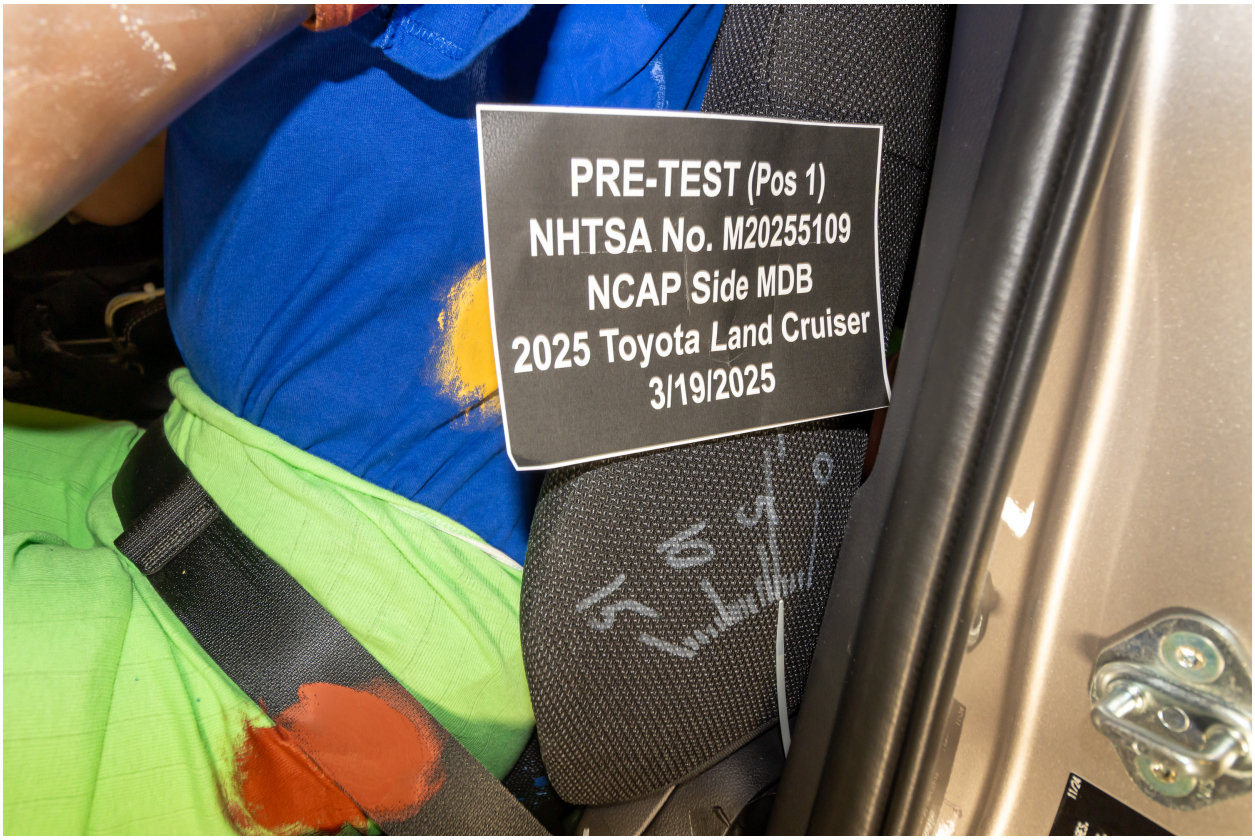


Figure A-40: Pre-Test Close-Up Left Side View of Driver Seat Back



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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

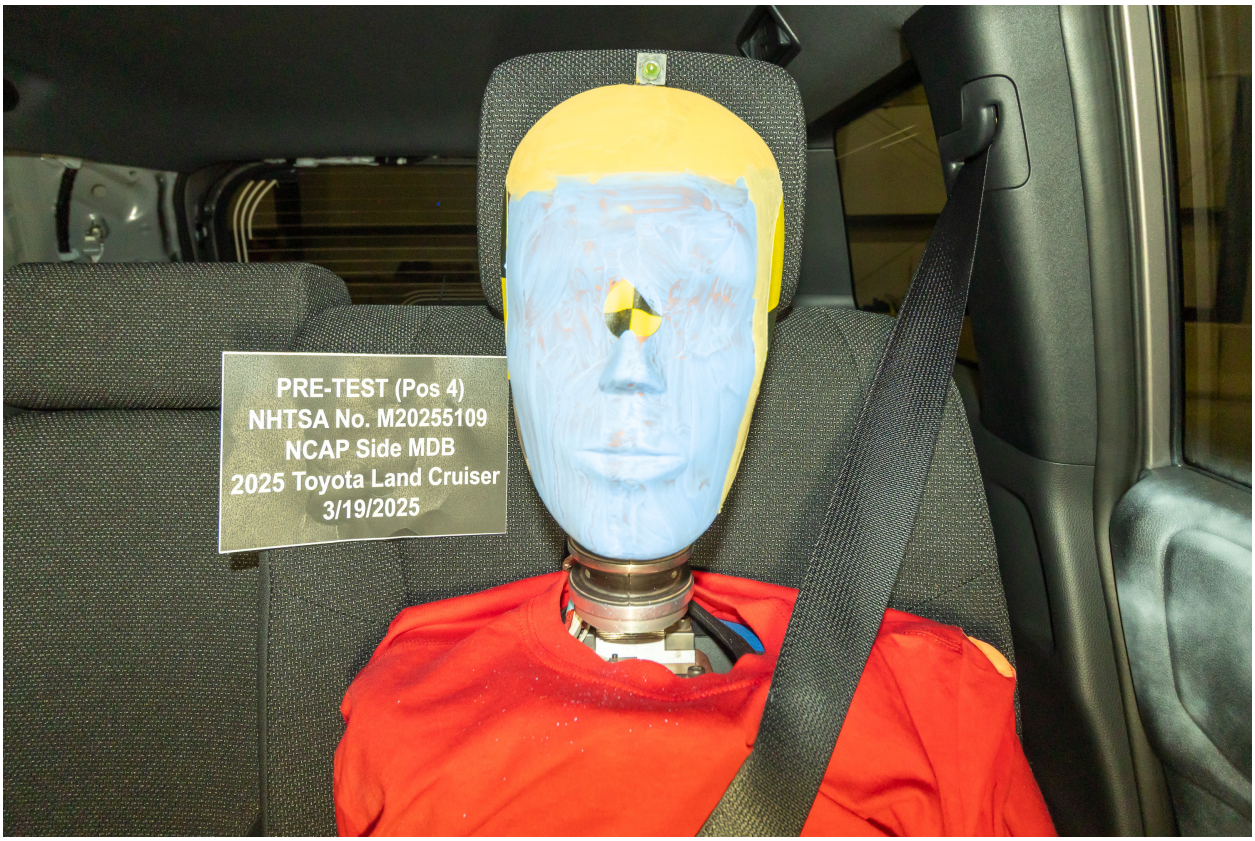


Figure A-59: Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint



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



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



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



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



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



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



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



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



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

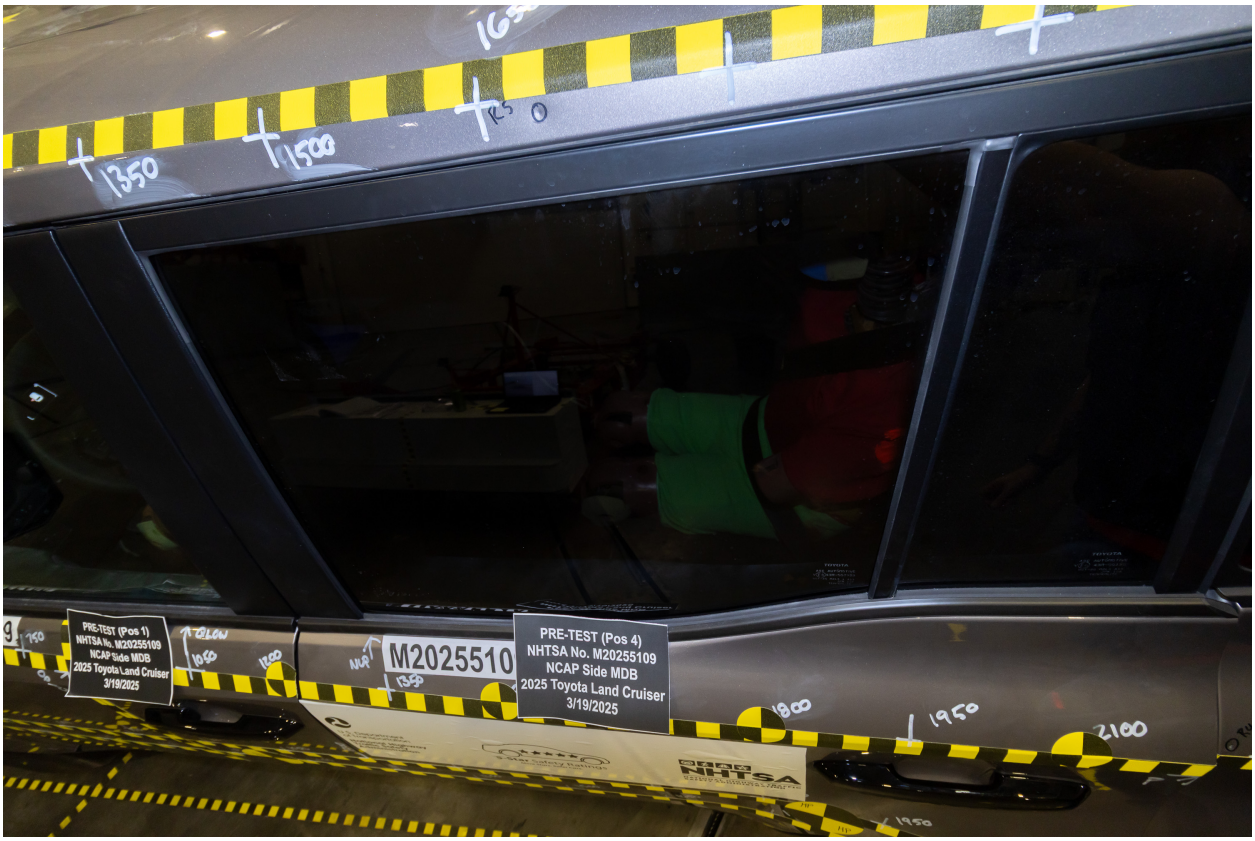


Figure A-69: Pre-Test Rear Passenger Dummy and Door Clearance View



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



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



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



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



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



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



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



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

Photo Not Applicable

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



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

Photo Not Applicable

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



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



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



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



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



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



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



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



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



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



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



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



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



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

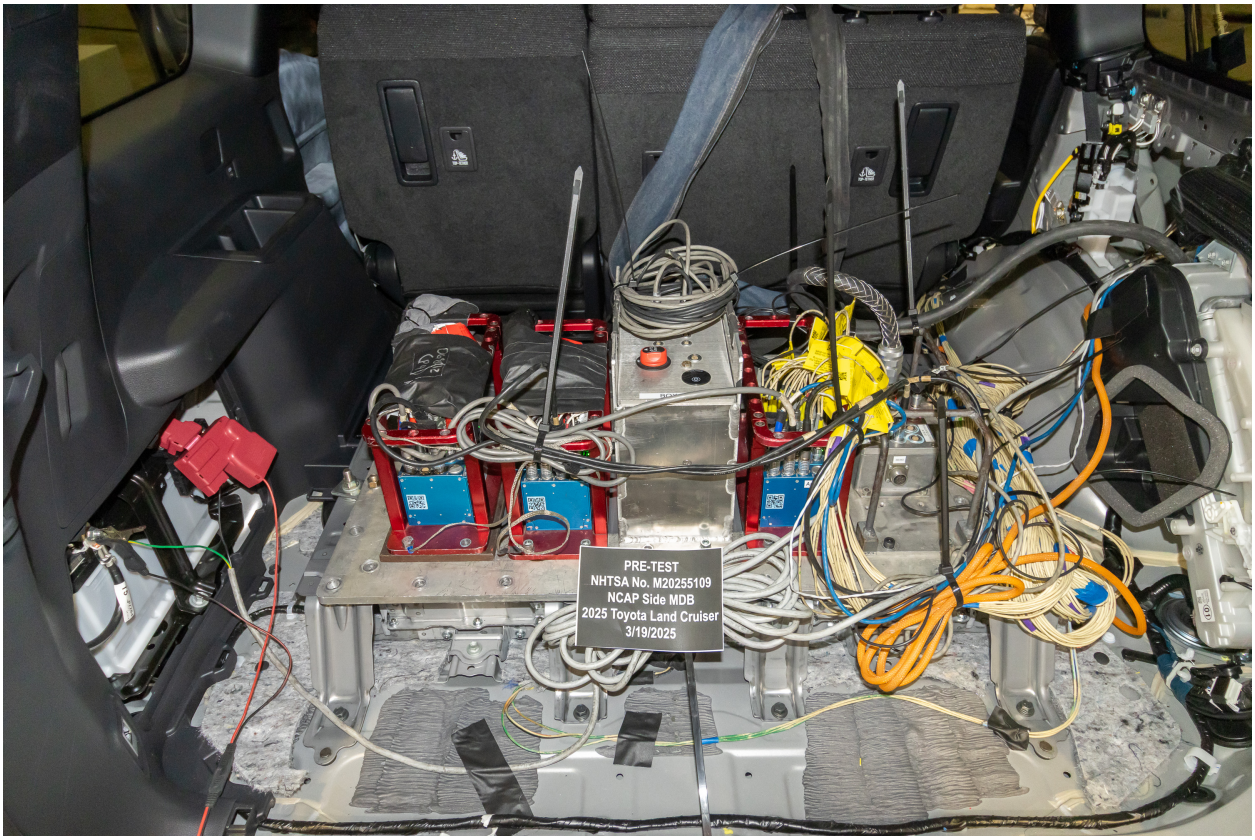


Figure A-94: Pre-Test Ballast View



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



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

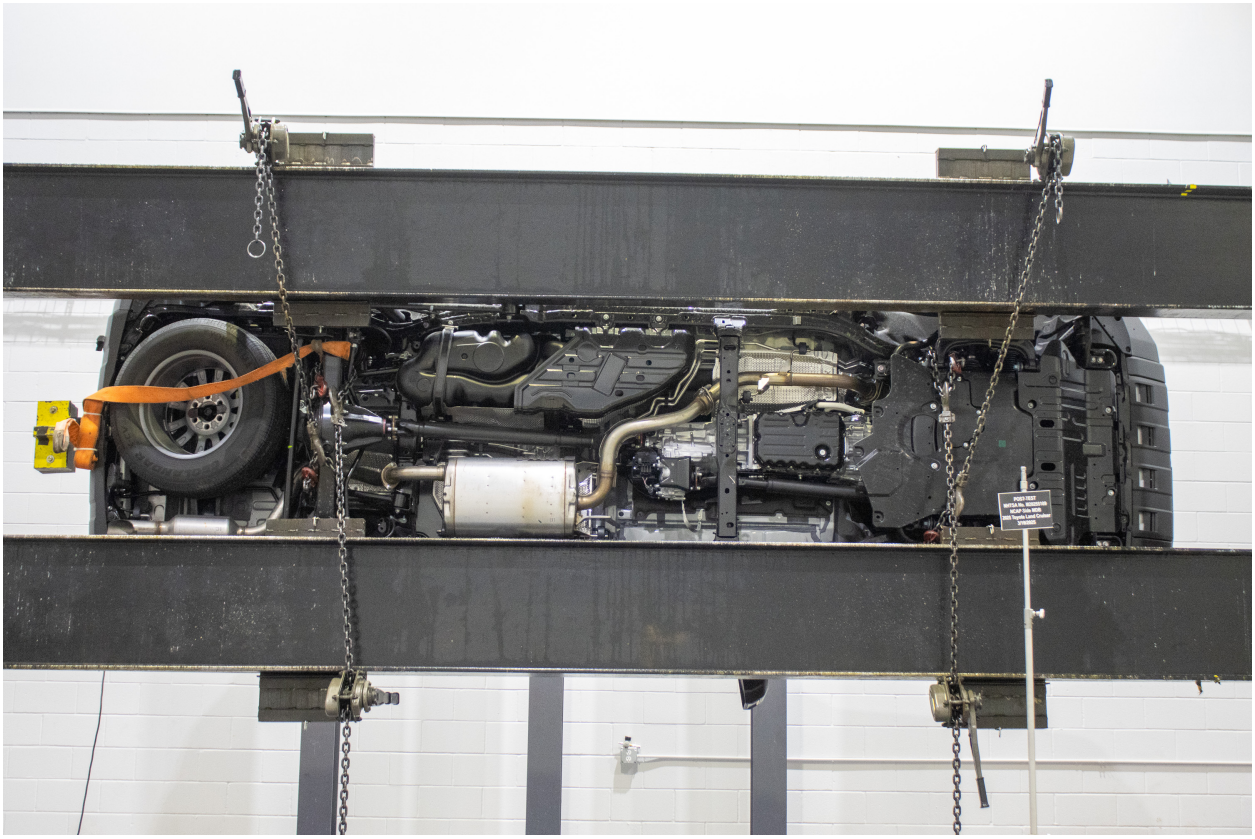


Figure A-97: FMVSS No. 301 Static Rollover 90 Degrees

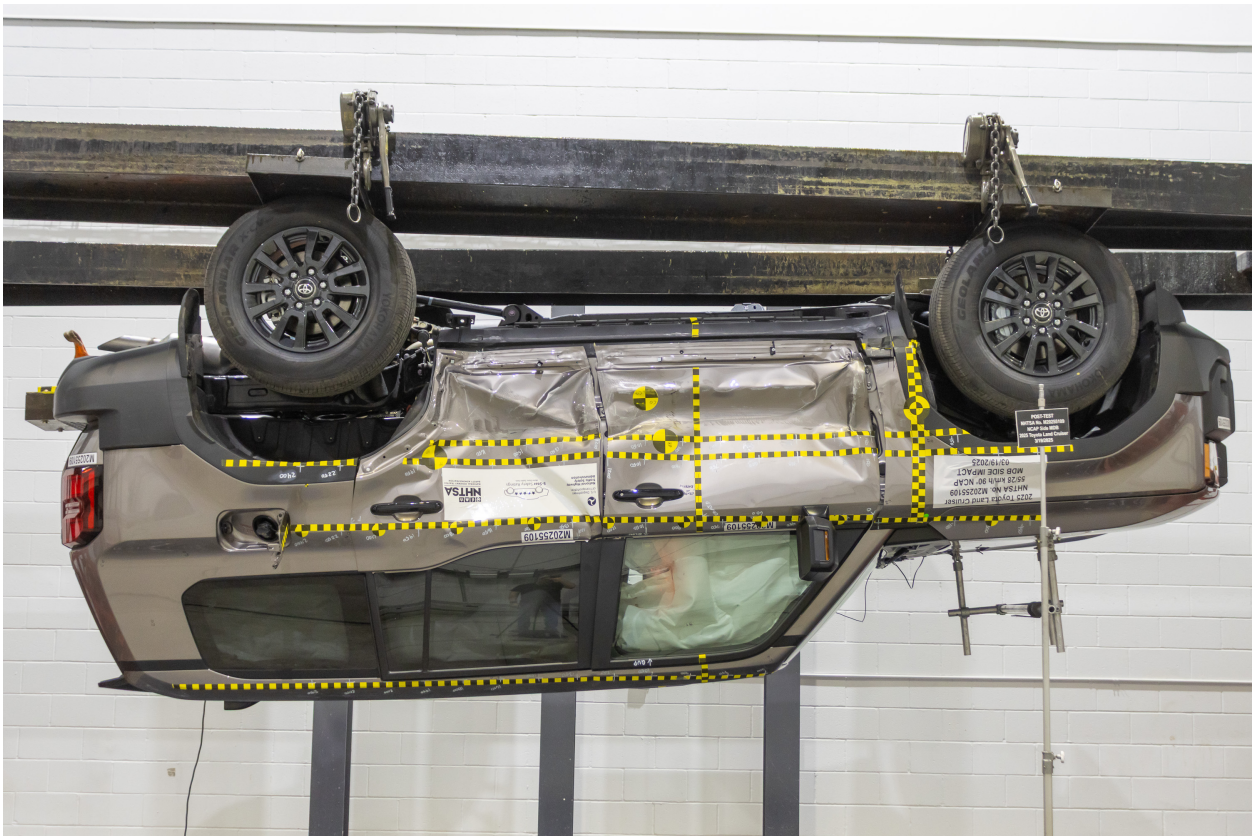


Figure A-98: FMVSS No. 301 Static Rollover 180 Degrees



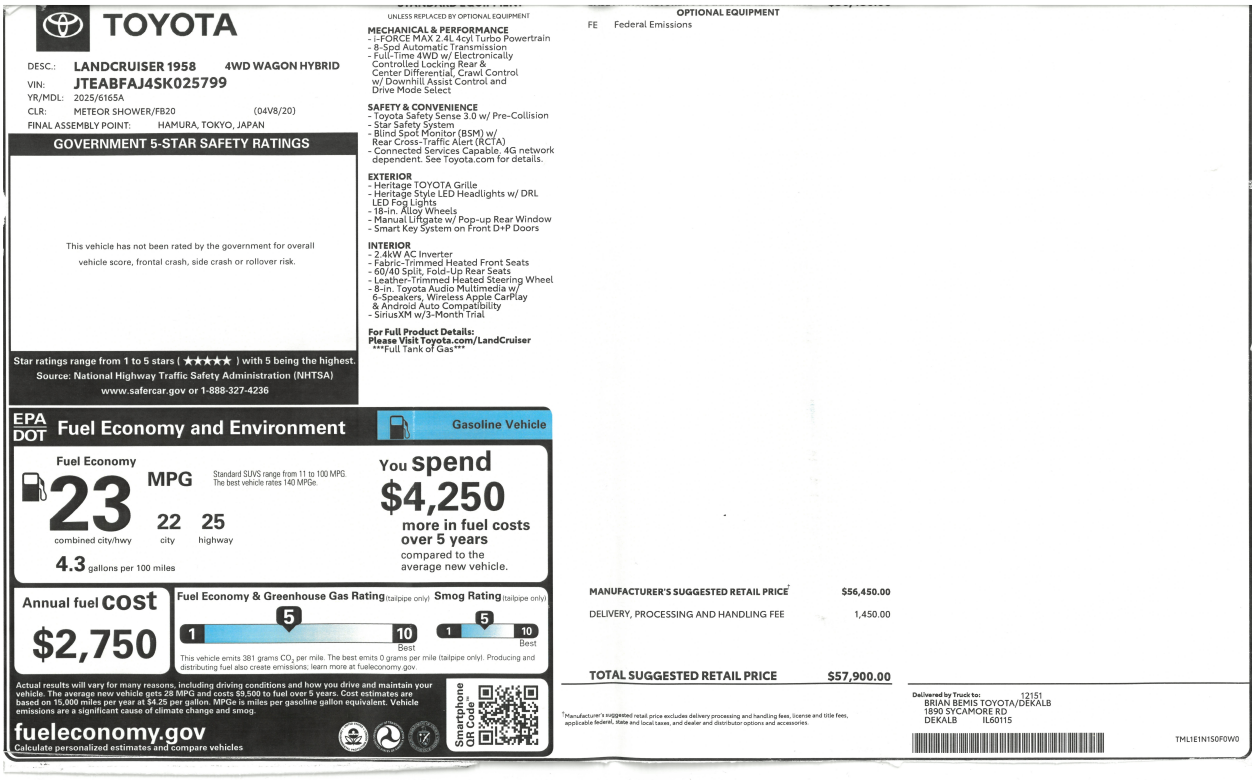
Figure A-99: FMVSS No. 301 Static Rollover 270 Degrees



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



Figure A-101: Impact Event


TOYOTA

DESC.: LANDCRUISER 1958 4WD WAGON HYBRID
VIN: JTEABFAJ4SK025799
YR/MDL: 2025/6165A
CLR: METEOR SHOWER/FB20 (04V8/20)
FINAL ASSEMBLY POINT: HAMURA, TOKYO, JAPAN

GOVERNMENT 5-STAR SAFETY RATINGS

This vehicle has not been rated by the government for overall vehicle score, frontal crash, side crash or rollover risk.

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

UNLESS REPLACED BY OPTIONAL EQUIPMENT

MECHANICAL & PERFORMANCE
- i-FORCE MAX 2.4L 4cyl Turbo Powertrain
- 8-Spd Automatic Transmission
- Full-Time 4WD w/ Electronically Controlled Locking Rear & Center Differential, Crawl Control w/ Downhill Assist Control and Drive Mode Select

SAFETY & CONVENIENCE
- Toyota Safety Sense 3.0 w/ Pre-Collision
- Star Safety System
- Blind Spot Monitor (BSM) w/ Rear Cross-Traffic Alert (RCTA)
- Connected Services Capable, 4G network dependent. See Toyota.com for details.

EXTERIOR
- Heritage TOYOTA Grille
- Heritage Style LED Headlights w/ DRL
- LED Fog Lights
- 18-in. Alloy Wheels
- Manual Liftgate w/ Pop-up Rear Window
- Smart Key System on Front D+P Doors

INTERIOR
- 2.4kW AC Inverter
- Fabric-Trimmed Heated Front Seats
- 60/40 Split, Fold-Up Rear Seats
- Leather-Trimmed Heated Steering Wheel
- 8-in. Toyota Audio Multimedia w/ 6-Speakers, Wireless Apple CarPlay & Android Auto Compatibility
- SiriusXM w/3-Month Trial

For Full Product Details:
Please Visit Toyota.com/LandCruiser
Full Tank of Gas

OPTIONAL EQUIPMENT
FE Federal Emissions

EPA DOT Fuel Economy and Environment — Gasoline Vehicle

Fuel Economy
23 MPG
combined city/hwy
22 city 25 highway
4.3 gallons per 100 miles

Standard SUVS range from 11 to 100 MPG.
The best vehicle rates 140 MPGe.

You spend $4,250 more in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost $2,750

Fuel Economy & Greenhouse Gas Rating (tailpipe only) 5 (1 — 10 Best)
Smog Rating (tailpipe only) 5 (1 — 10 Best)

This vehicle emits 381 grams CO_2 per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions; learn more at fueleconomy.gov.

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 28 MPG and costs $9,500 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at $4.25 per gallon. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fueleconomy.gov
Calculate personalized estimates and compare vehicles

Smartphone QR Code

MANUFACTURER'S SUGGESTED RETAIL PRICE† $56,450.00
DELIVERY, PROCESSING AND HANDLING FEE 1,450.00
TOTAL SUGGESTED RETAIL PRICE $57,900.00

†Manufacturer's suggested retail price excludes delivery processing and handling fees, license and title fees, applicable federal, state and local taxes, and dealer and distributor options and accessories.

Delivered by Truck to: 12151
BRIAN BEMIS TOYOTA/DEKALB
1890 SYCAMORE RD
DEKALB IL60115

TMLJE1N150F0W0

Figure A-102: Monroney Label

WARNING

- Check that there is no luggage and that there are no other people around the seat before folding operation.
- Conduct the procedure slowly and carefully.
- Do not insert hands or feet into the moving parts of the seat.
- Do not allow children to operate the seat.

■ After returning the third seatback to its original position

- Gently shake the third seatback and head restraint to the front and rear and check that they are secure.
- Do not pinch the seat belt.
- Make sure that the seat belt is removed from the hanger as before.

NOTICE

■ When folding down the third seatback (vehicles with luggage cover)

If there is a luggage cover attached to the vehicle, remove the luggage cover. (→P.492)

The third seat could strike the luggage cover and damage it.

Head restraints

Head restraints are provided for all seats.

WARNING

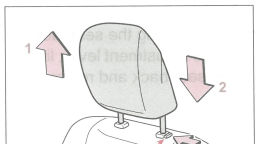
■ Head restraint precautions

Observe the following precautions regarding the head restraints. Failure to do so may result in death or serious injury.

- Use the head restraints designed for each respective seat.
- Adjust the head restraints to the correct position at all times.
- After adjusting the head restraints, push down on them and make sure they are locked in position.
- Do not drive with the head restraints removed.
- Vehicles with third seat: When sitting on the third seat, make sure that the head restraint is not folded.

Vertical adjustment

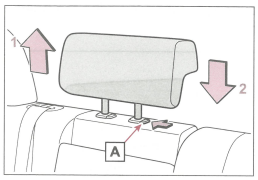
■ Front seats and outboard second seats



2 Down

Push the head restraint down while pressing the lock release button A.

■ Second center seat



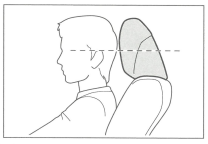
1 Up

2 Down

Push the head restraint down while pressing the lock release button A.

■ Adjusting the height of the head restraints (front seats and outboard second seats)

Make sure that the head restraints are adjusted so that the center of the head restraint is closest to the top of your ears.



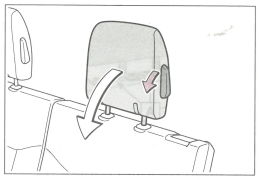
■ Using the second center seat head restraint

Always raise the head restraint one level from the stowed position when using

Folding the head restraint (third seats) (if equipped)

Operate the head restraint angle lever to fold the head restraint.

To return the head restraint, pull it up.

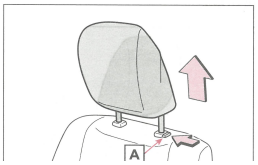


Removing the head restraints

■ Front seats and outboard second seats

Pull the head restraint up while pressing the lock release button A.

If the head restraint touches the ceiling, making the removal difficult, change the seat height or angle. (→P.155, 156)



3 Before driving

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

WARNING

- Check that there is no luggage and that there are no other people around the seat before folding operation.
- Conduct the procedure slowly and carefully.
- Do not insert hands or feet into the moving parts of the seat.
- Do not allow children to operate the seat.

■ After returning the third seatback to its original position

- Gently shake the third seatback and head restraint to the front and rear and check that they are secure.
- Do not pinch the seat belt.
- Make sure that the seat belt is removed from the hanger as before.

NOTICE

■ When folding down the third seatback (vehicles with luggage cover)

If there is a luggage cover attached to the vehicle, remove the luggage cover. (→P.492)

The third seat could strike the luggage cover and damage it.

Head restraints

Head restraints are provided for all seats.

WARNING

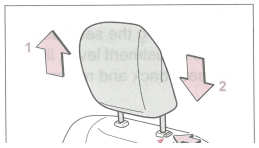
■ Head restraint precautions

Observe the following precautions regarding the head restraints. Failure to do so may result in death or serious injury.

- Use the head restraints designed for each respective seat.
- Adjust the head restraints to the correct position at all times.
- After adjusting the head restraints, push down on them and make sure they are locked in position.
- Do not drive with the head restraints removed.
- Vehicles with third seat: When sitting on the third seat, make sure that the head restraint is not folded.

Vertical adjustment

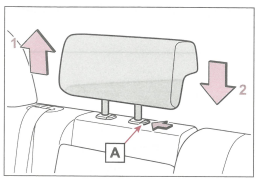
■ Front seats and outboard second seats



2 Down

Push the head restraint down while pressing the lock release button A.

■ Second center seat



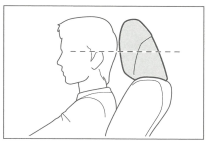
1 Up

2 Down

Push the head restraint down while pressing the lock release button A.

■ Adjusting the height of the head restraints (front seats and outboard second seats)

Make sure that the head restraints are adjusted so that the center of the head restraint is closest to the top of your ears.



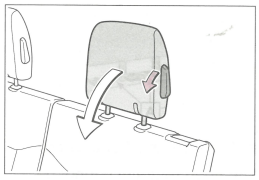
■ Using the second center seat head restraint

Always raise the head restraint one level from the stowed position when using

Folding the head restraint (third seats) (if equipped)

Operate the head restraint angle lever to fold the head restraint.

To return the head restraint, pull it up.

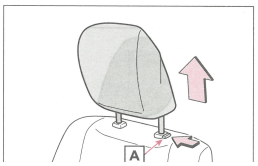


Removing the head restraints

■ Front seats and outboard second seats

Pull the head restraint up while pressing the lock release button A.

If the head restraint touches the ceiling, making the removal difficult, change the seat height or angle. (→P.155, 156)



3 Before driving

Figure A-104: Left Rear Passenger Head Restraint Use and Adjustment Information from Vehicle Owner's Manual



Figure 305-1: Auxiliary Power Module Warning Label

Photo Not Applicable

Figure 305-2: Power Inverter Warning Label



Figure 305-3 First Responder Warning Label



Figure 305-4: First Responder Warning Label Location

Photo Not Applicable

Figure 305-5: Other Vehicle Label(s) Related to Electrical Propulsion System



Figure 305-6: Manual High Voltage Service Disconnect in Place



Figure 305-7: Manual High Voltage Service Disconnect Removed (Plug)



Figure 305-8: Manual High Voltage Service Disconnect Removed (Location where removed)



Figure 305-9: Pre-Impact View of Propulsion Battery



Figure 305-10: Post-Impact Front View of Propulsion Battery



Figure 305-11: Post-Impact Rear View of Propulsion Battery (if any part of it is visible)



Figure 305-12: Pre-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules

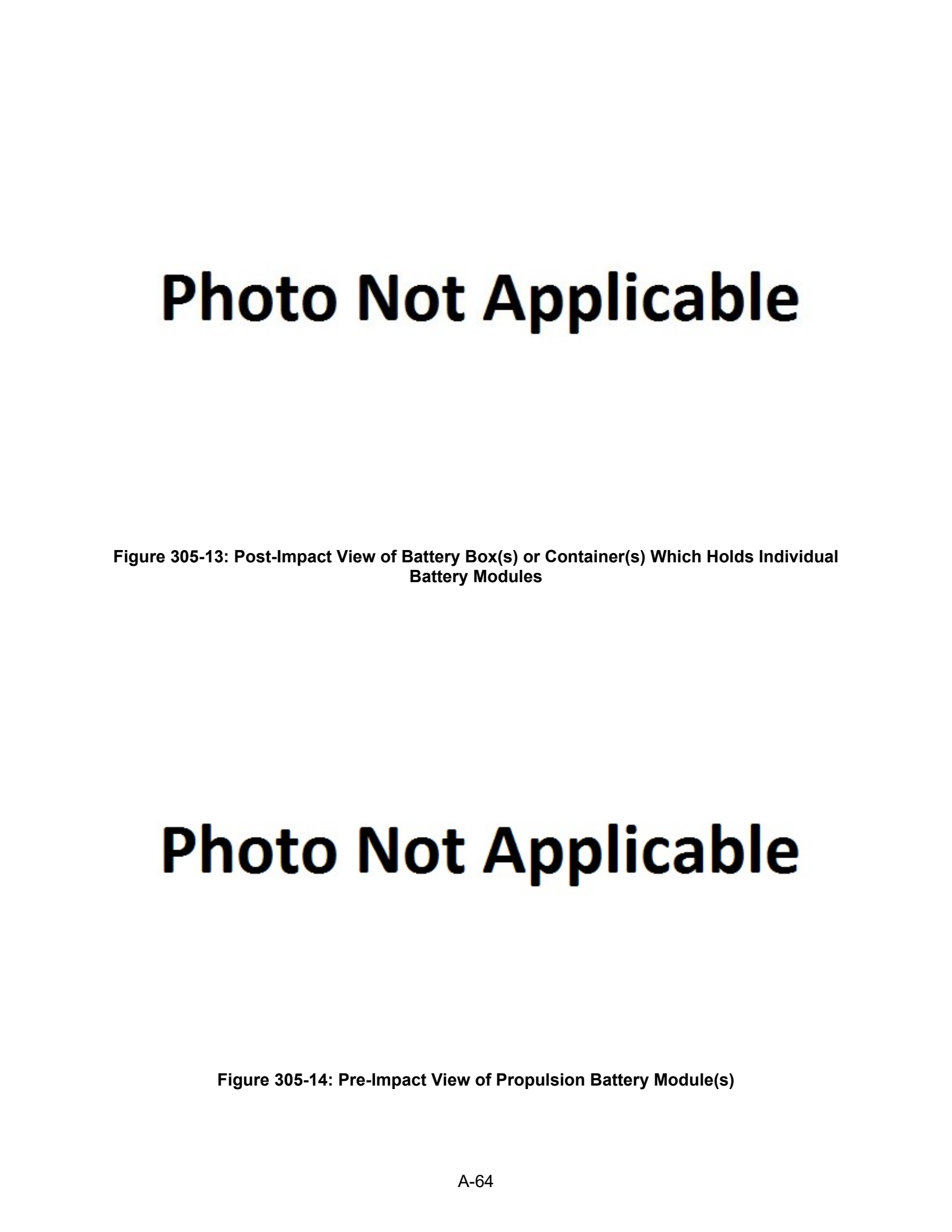


Figure 305-13: Post-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules

Figure 305-14: Pre-Impact View of Propulsion Battery Module(s)

Photo Not Applicable

Figure 305-15: Post-Impact View of Propulsion Battery Module(s)



Figure 305-16: Pre-Impact View of Electric Propulsion Drive



Figure 305-17: Post-Impact View of Electric Propulsion Drive

Photo Not Applicable

Figure 305-18: Pre-Impact View of High Voltage Interconnect(s)



Figure 305-19: Pre-Impact View Propulsion Venting System(s)

Photo Not Applicable

Figure 305-20: Pre-Impact View of Other Visible Electric Propulsion Components



Figure 305-21: Pre-Impact View of Ground Lead Attached



Figure 305-22: Pre-Impact View of High Voltage Leads Attached



Figure 305-23: Pre-Impact Close-Up View of High Voltage Leads Attached

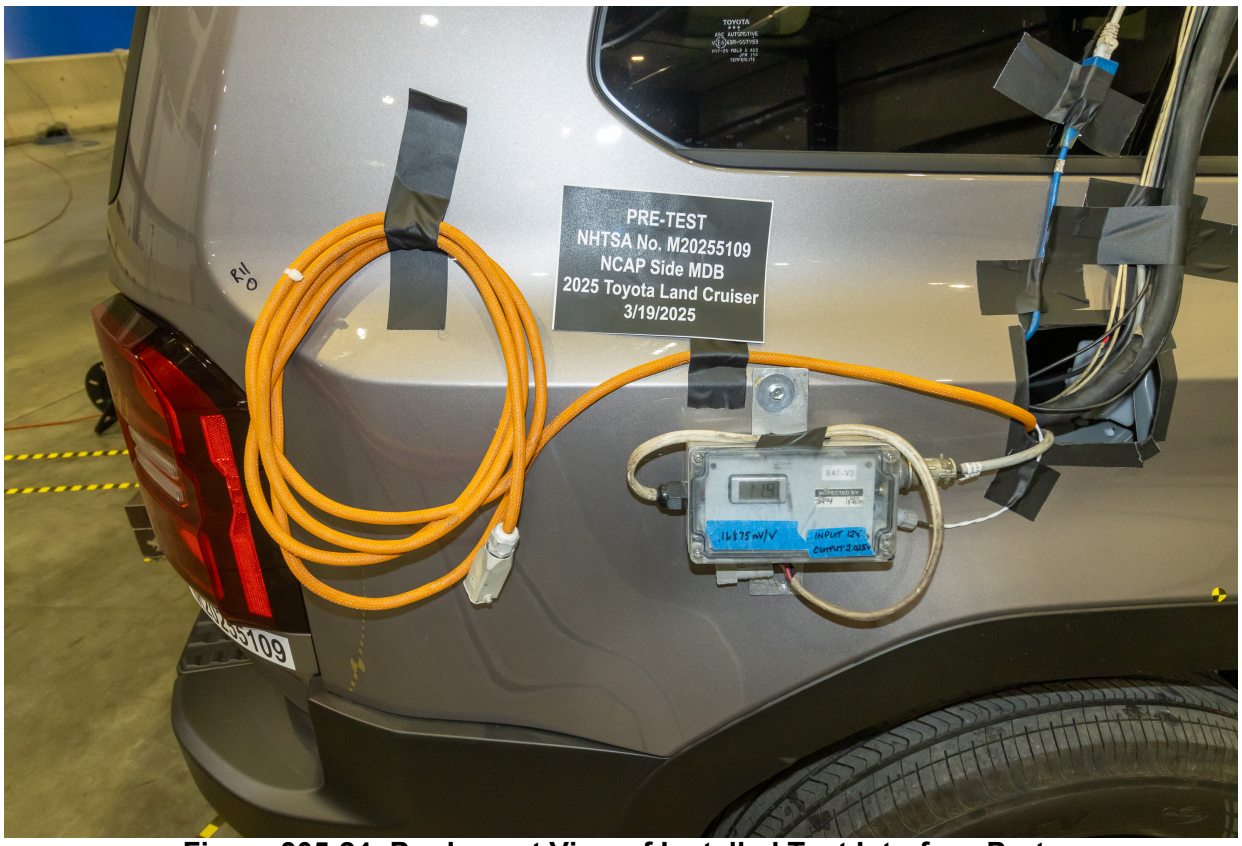


Figure 305-24: Pre-Impact View of Installed Test Interface Port

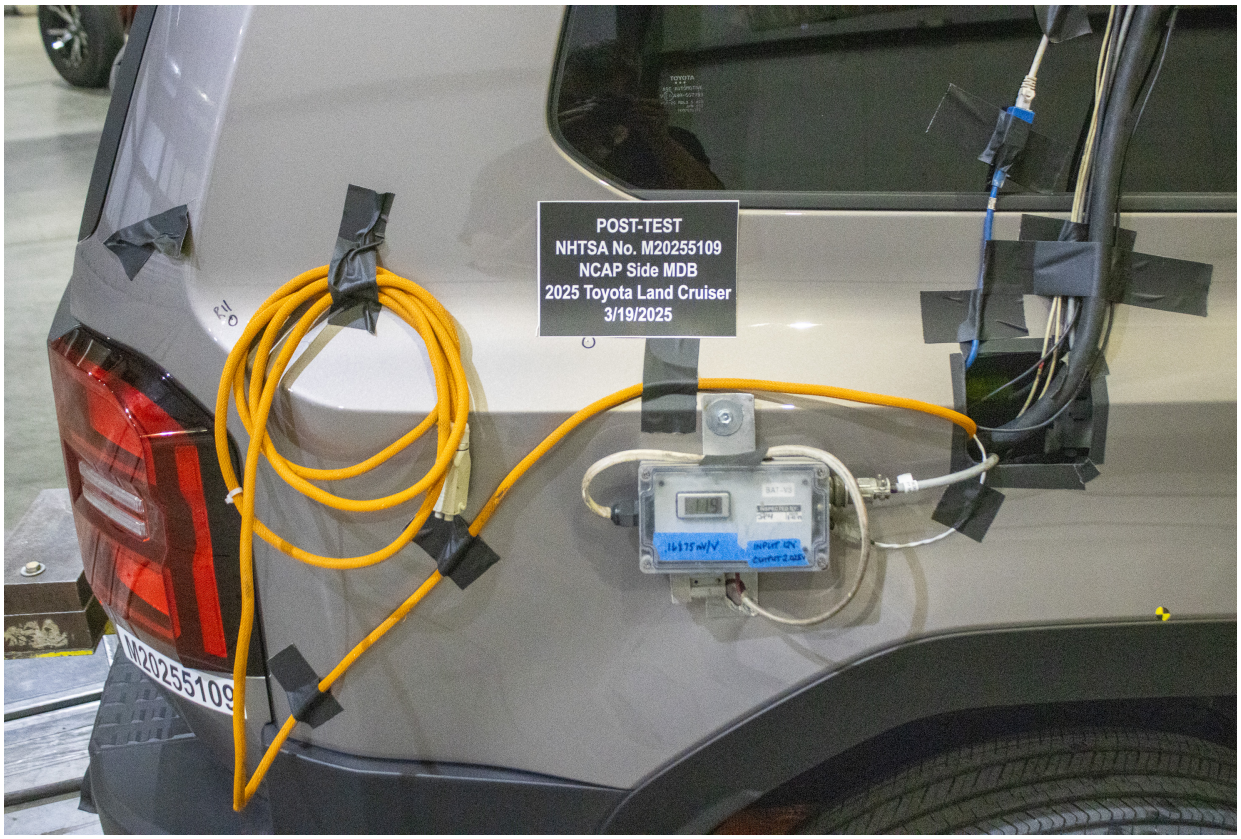


Figure 305-25: Post-Impact View of Installed Test Interface Port

Photo Not Applicable

Figure 305-26: Pre-Impact View of Other Test Devices

Photo Not Applicable

Figure 305-27: Post-Impact View of Other Test Devices

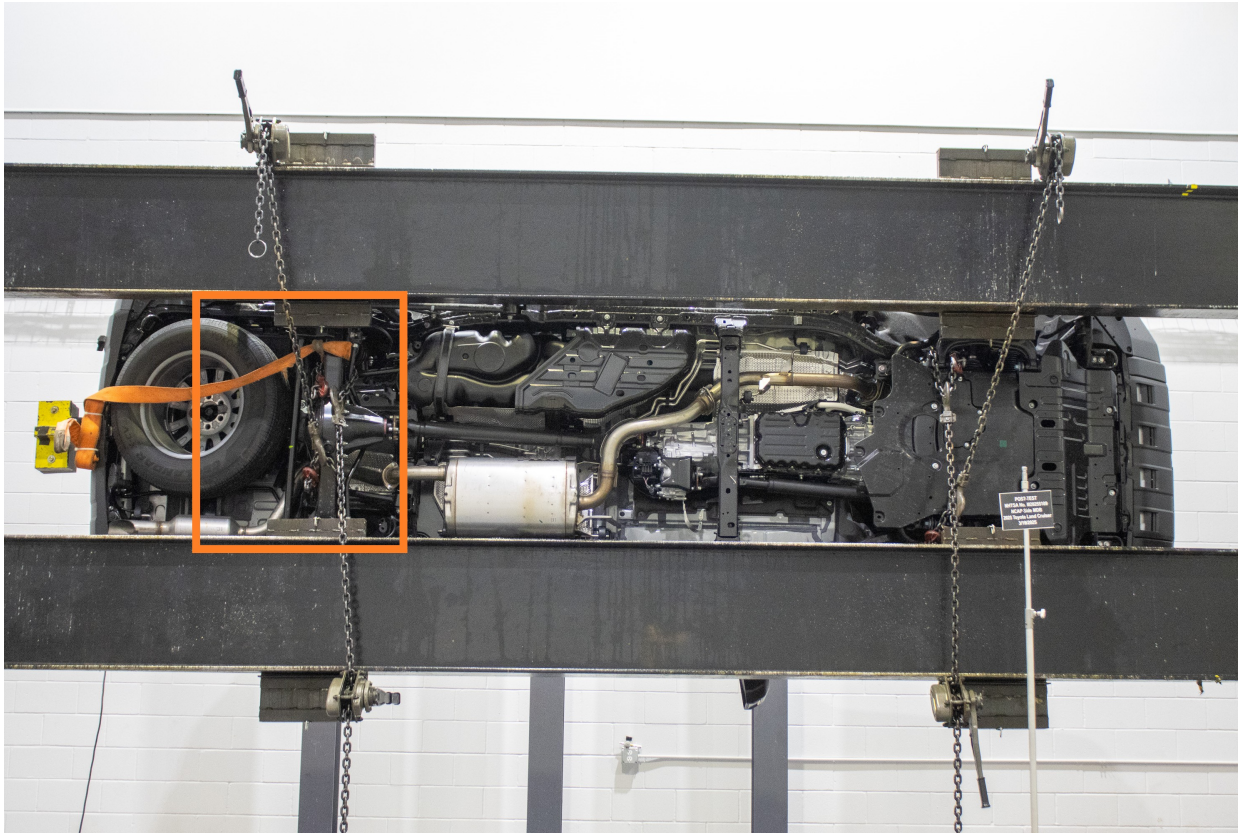


Figure 305-28: FMVSS No. 305 Static Rollover 90 Degrees

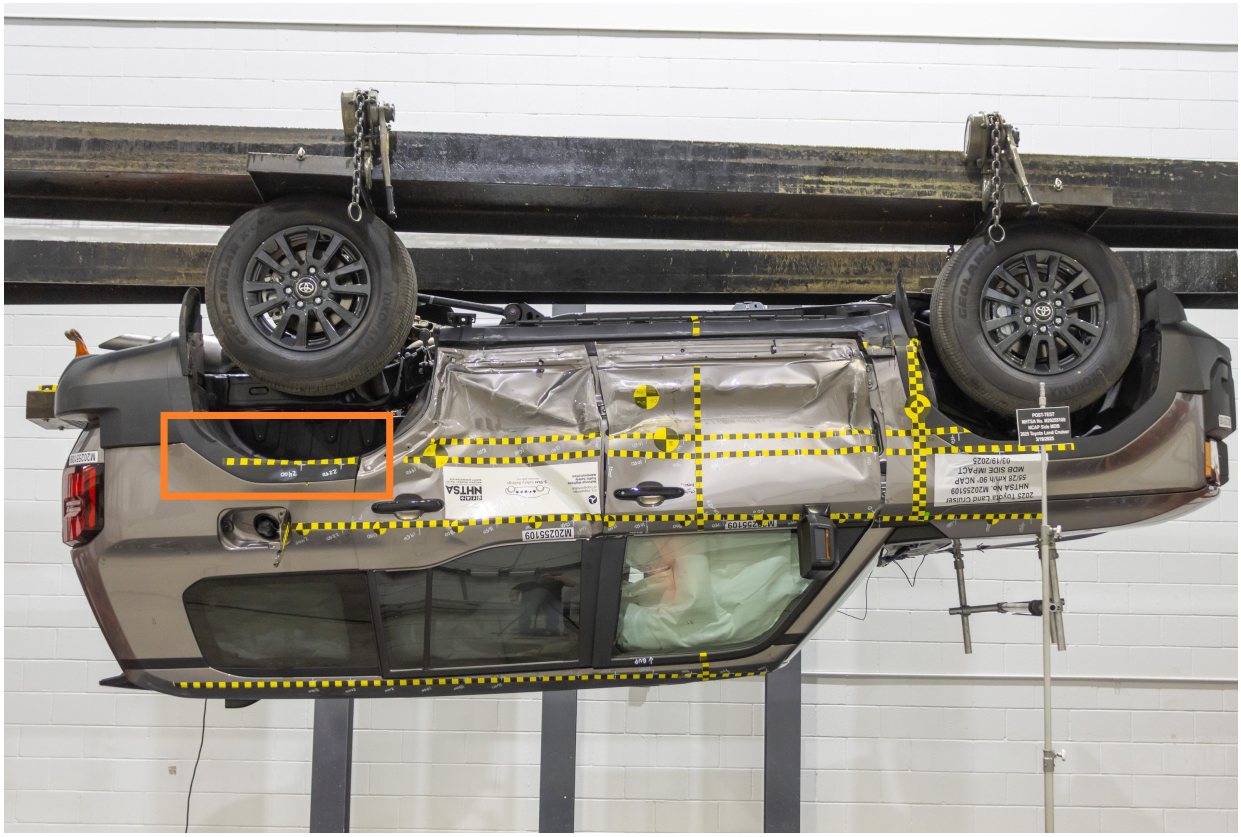


Figure 305-29: FMVSS No. 305 Static Rollover 180 Degrees



Figure 305-30: FMVSS No. 305 Static Rollover 270 Degrees



Figure 305-31: FMVSS No. 305 Static Rollover 360 Degrees



Figure 305-32: Pre-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery



Figure 305-33: Post-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery

Photo Not Applicable

Figure 305-34: Post-Impact Propulsion Battery System Mounting and-or Intrusion Failure(s)



Figure 305-35: Post-Impact View of Battery Component Intrusion (if applicable)

Figure 305-36: Post-Impact View of Battery Module Movement or Retention Loss (if applicable)



Figure 305-37: Post-Impact View of Propulsion Battery Electrolyte Spillage Location (Prior to static roll)

Figure 305-38: Post-Impact View of Propulsion Battery Electrolyte Spillage Location (After static roll)

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA TRACES

Table of Data Plots
Driver Dummy Instrumentation Plots

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Plot 2	Driver Head Acceleration (Y) Primary vs. Time	B-5
Plot 3	Driver Head Acceleration (Z) Primary vs. Time	B-5
Plot 4	Driver Head Resultant Acceleration Primary vs. Time	B-5
Plot 5	Driver Upper Thorax Rib Deflection (Y) vs. Time	B-6
Plot 6	Driver Middle Thorax Rib Deflection (Y) vs. Time	B-6
Plot 7	Driver Lower Thorax Rib Deflection (Y) vs. Time	B-6
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Plot 10	Driver Middle Abdominal Force (Y) vs. Time	B-7
Plot 11	Driver Posterior Abdominal Force (Y) vs. Time	B-7
Plot 12	Driver Total Abdominal Force (Y) vs. Time	B-7
Plot 13	Driver Pubic Symphysis Force (Y) vs. Time	B-8
Plot 14	Passenger Head Acceleration (X) vs. Time Primary	B-8
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Plot 16	Passenger Head Acceleration (Z) vs. Time Primary	B-8
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Plot 19	Passenger Lower Spine T12 Acceleration (Y) vs. Time	B-9
Plot 20	Passenger Lower Spine T12 Acceleration (Z) vs. Time	B-9
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Plot 22	Passenger Iliac Force on Impact Side (Y) vs. Time	B-10
Plot 23	Passenger Acetabulum Force on Impact Side (Y) vs. Time	B-10
Plot 24	Passenger Total Pelvic Force on Impact Side (Y) vs. Time	B-10

The following additional dummy and vehicle response data can be obtained from the Research and Development section of the NHTSA website. The website can be found at www.NHTSA.gov

Additional Driver & Passenger Dummy Instrumentation Data

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

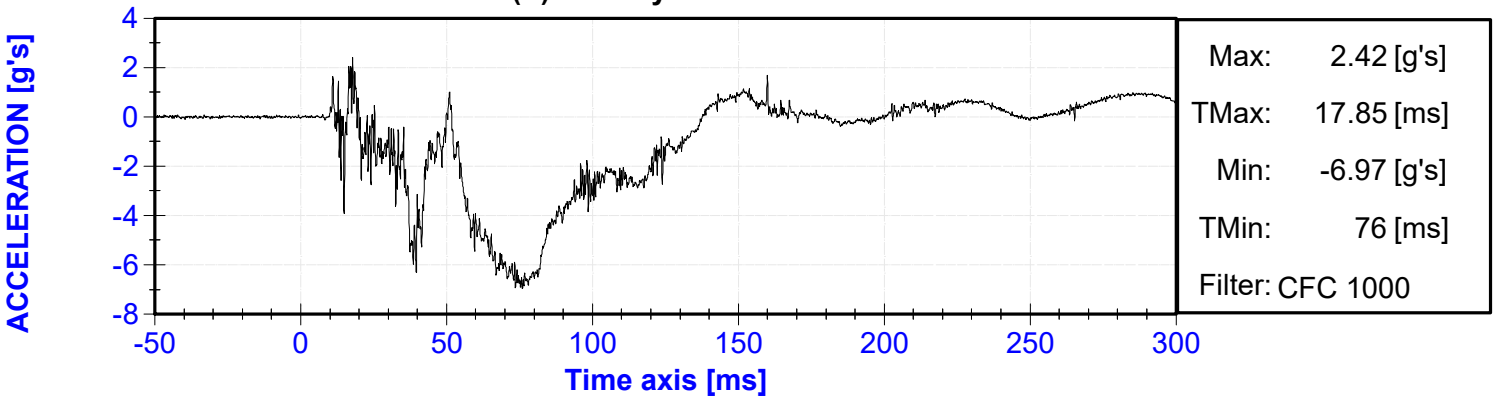
Vehicle Instrumentation Data

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

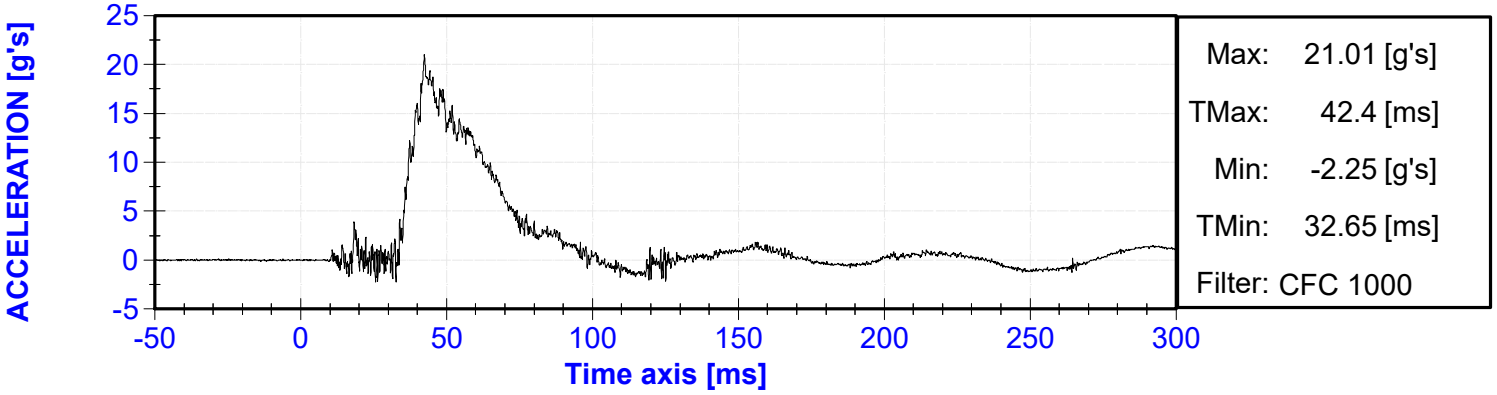
MDB Instrumentation Data

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

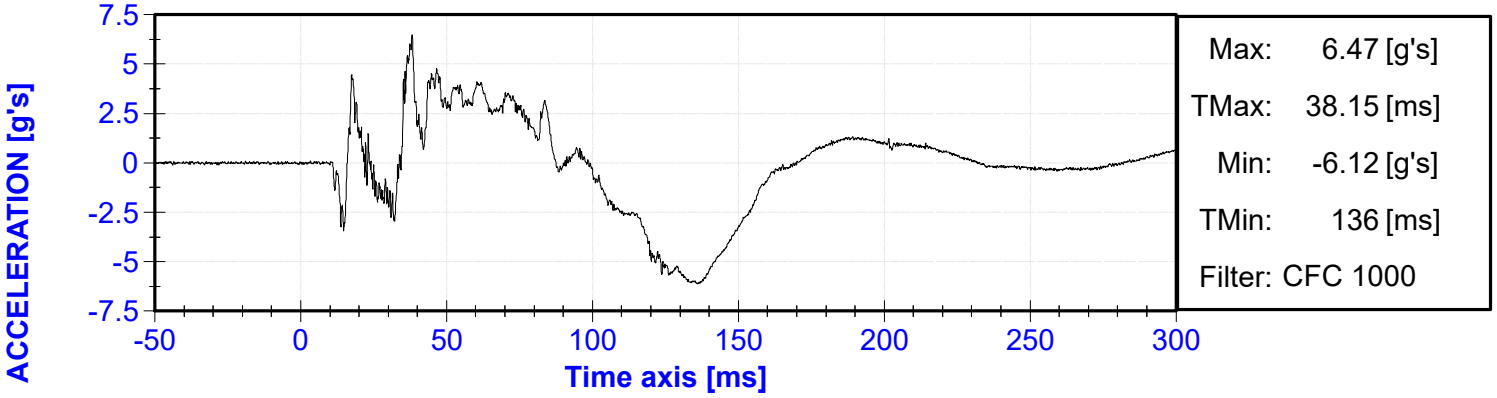
Driver Head Acceleration (X) Primary vs. Time



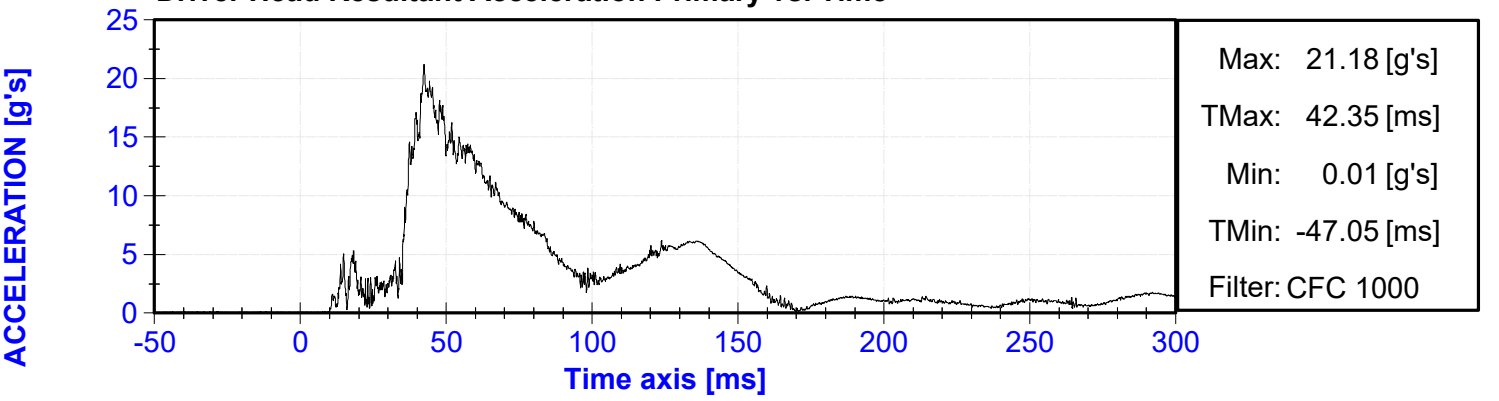
Driver Head Acceleration (Y) Primary vs. Time



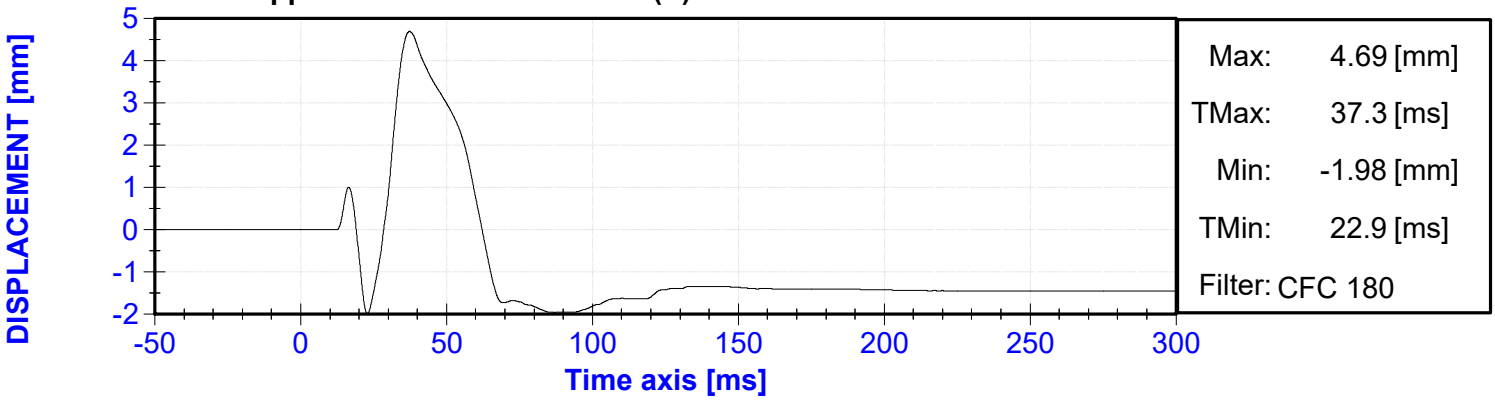
Driver Head Acceleration (Z) Primary vs. Time



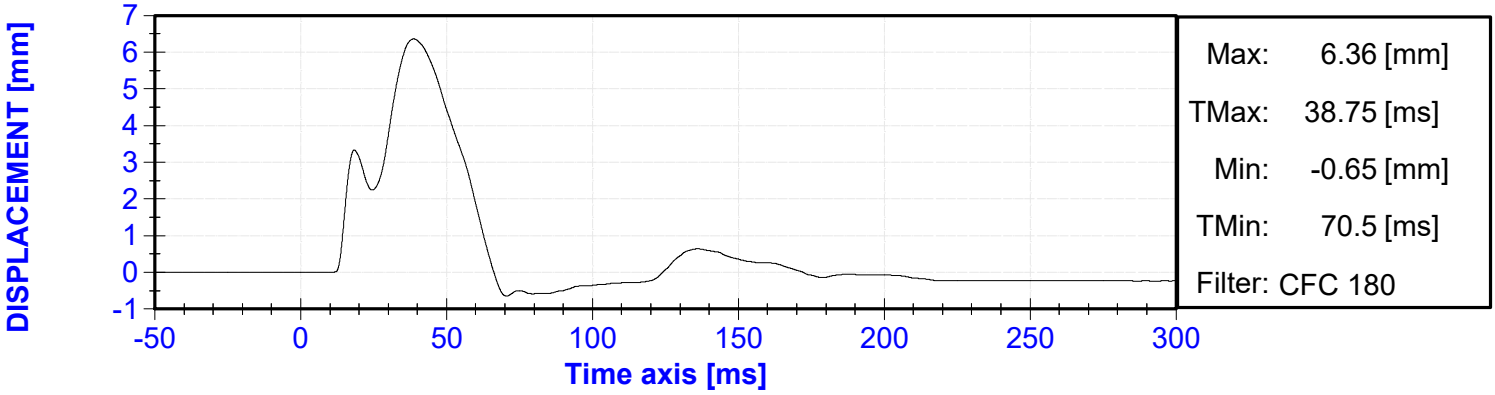
Driver Head Resultant Acceleration Primary vs. Time



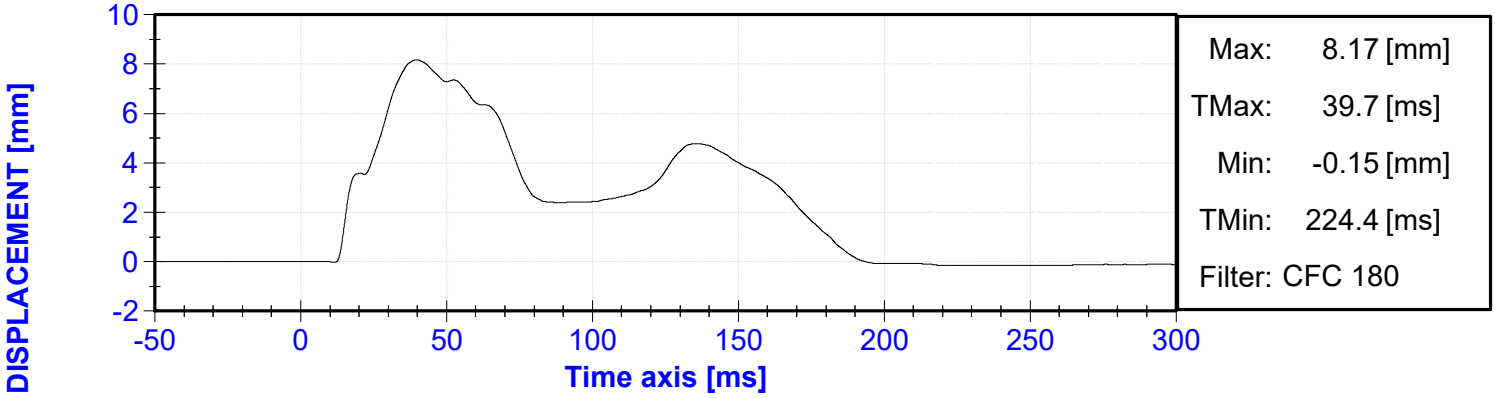
Driver Upper Thorax Rib Deflection (Y) vs. Time



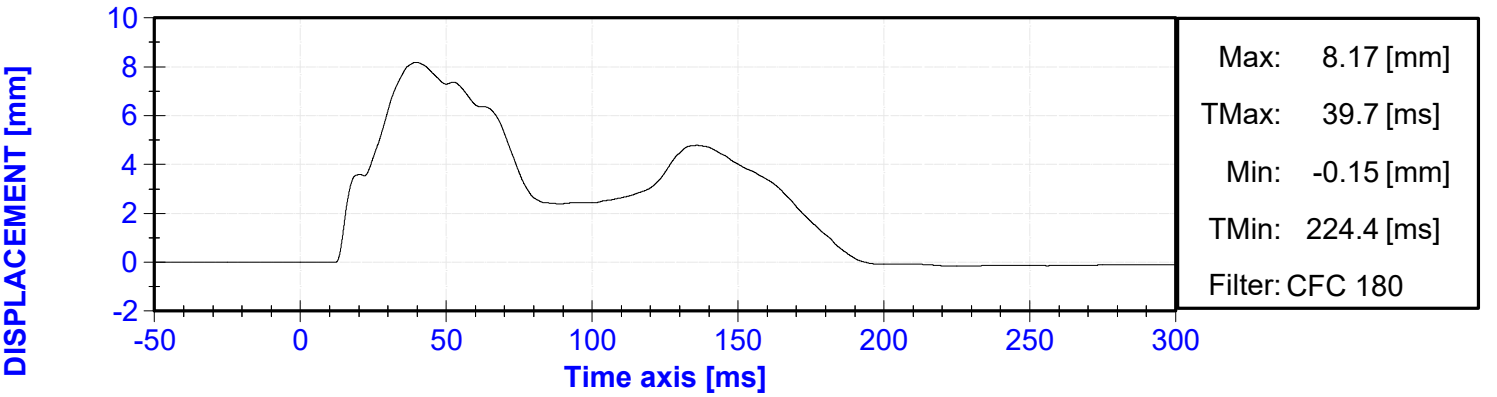
Driver Middle Thorax Rib Deflection (Y) vs. Time



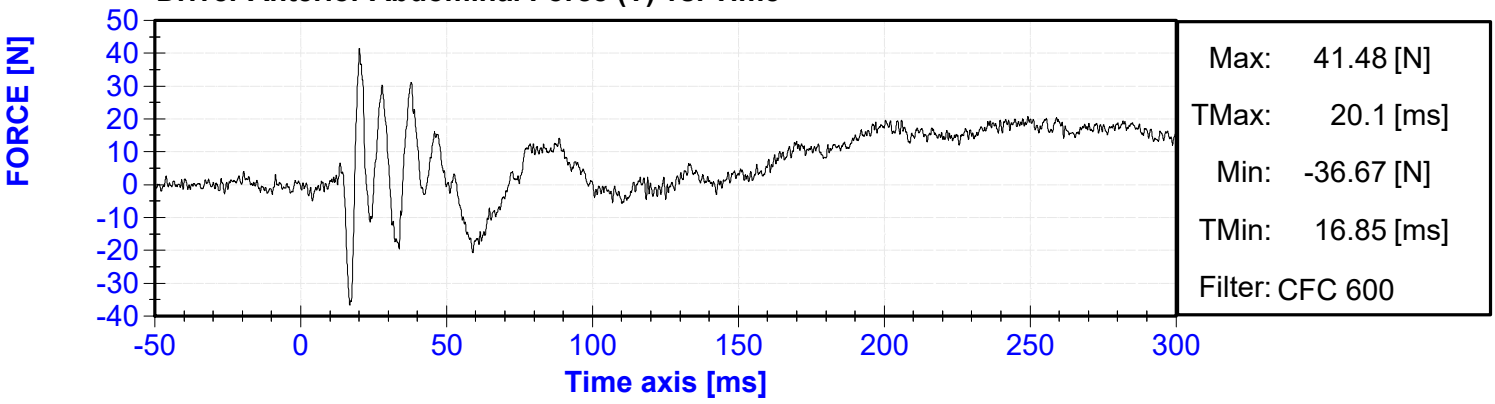
Driver Lower Thorax Rib Deflection (Y) vs. Time



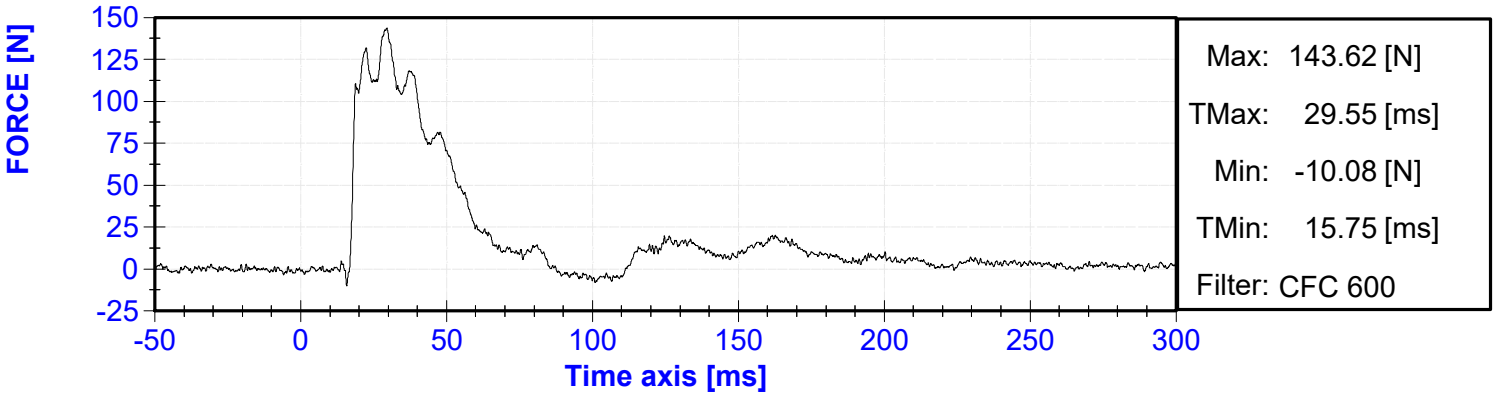
Driver Thorax Rib Deflection Maximum vs. Time



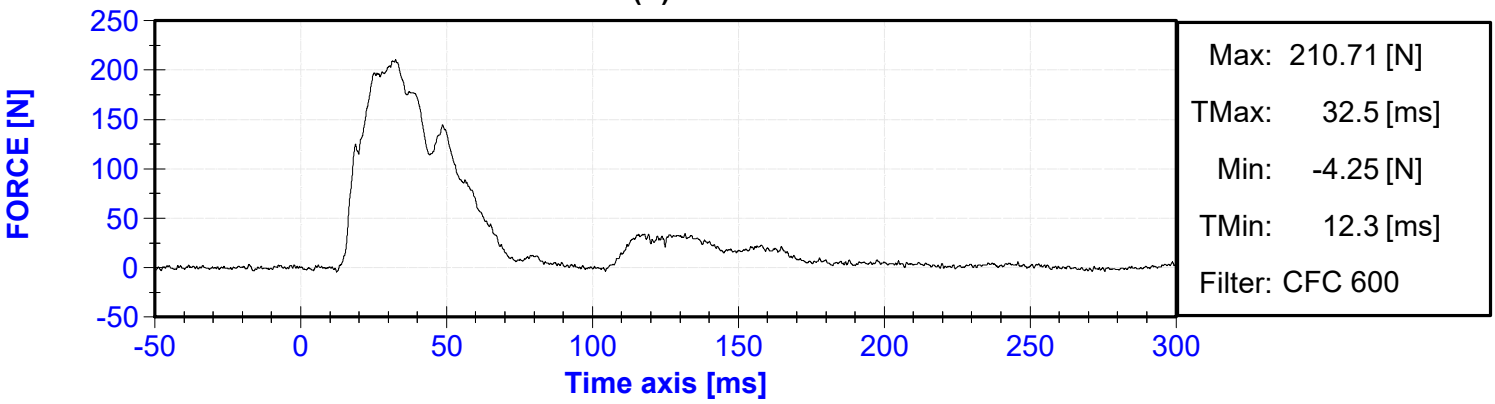
Driver Anterior Abdominal Force (Y) vs. Time



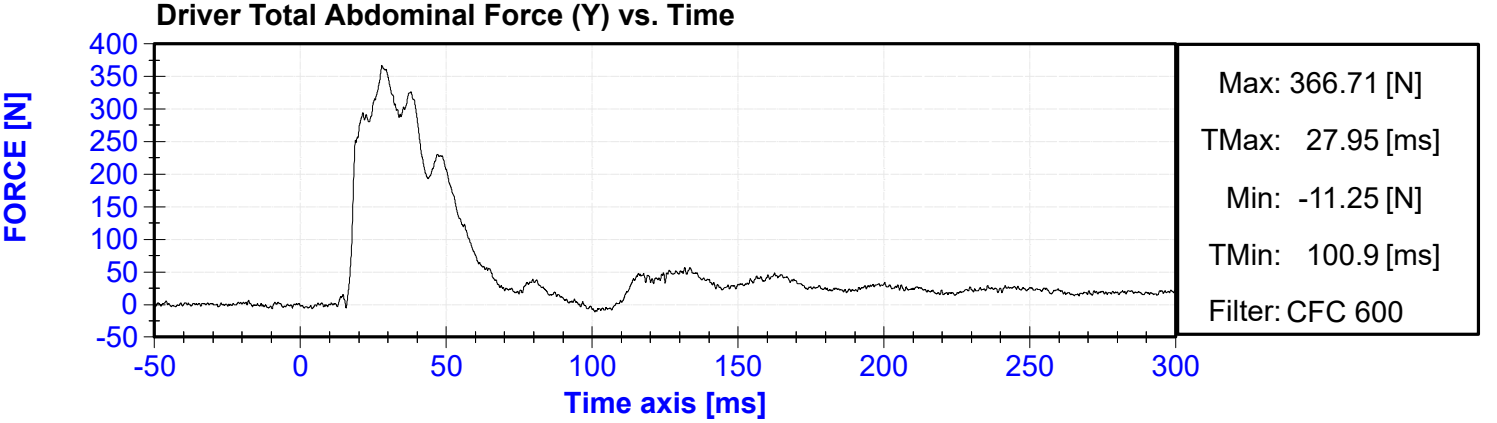
Driver Middle Abdominal Force (Y) vs. Time



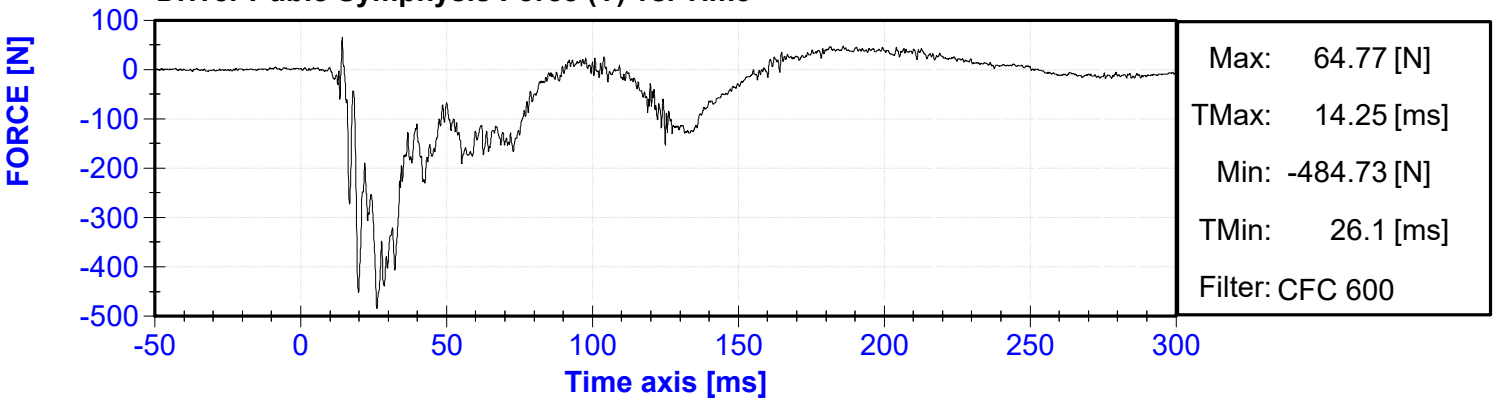
Driver Posterior Abdominal Force (Y) vs. Time



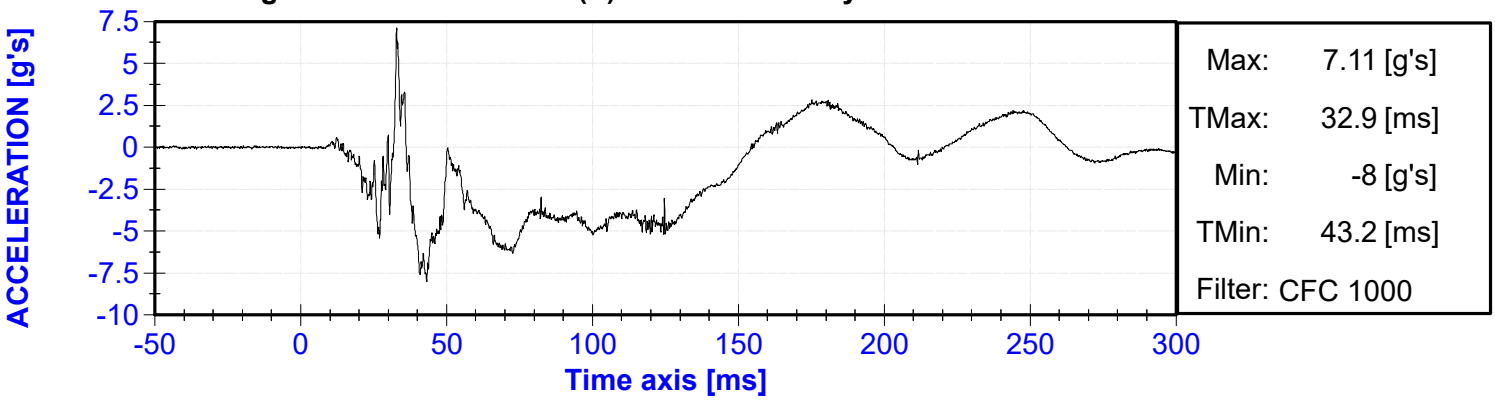
Driver Total Abdominal Force (Y) vs. Time



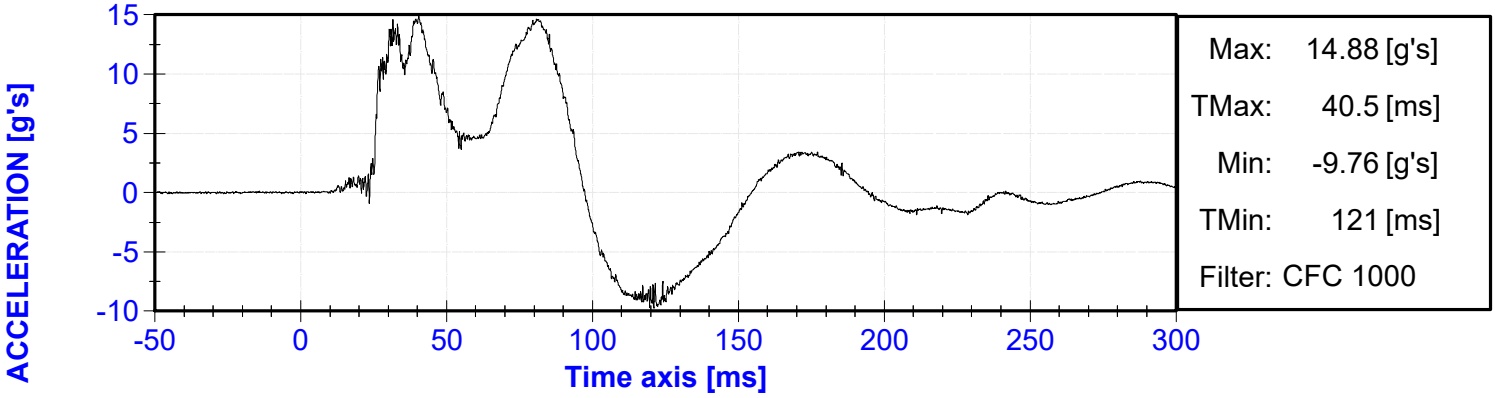
Driver Pubic Symphysis Force (Y) vs. Time



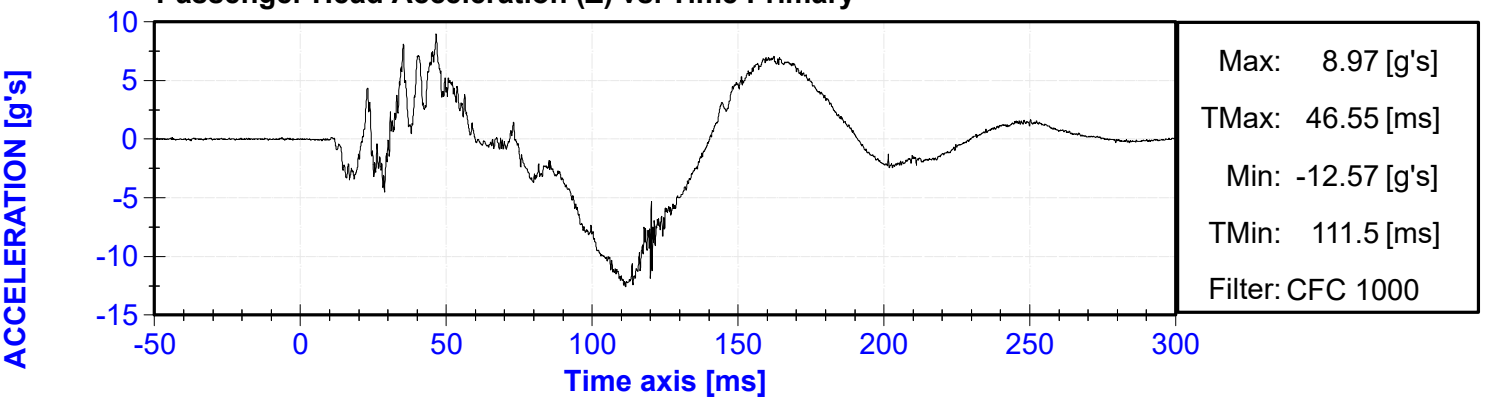
Passenger Head Acceleration (X) vs. Time Primary



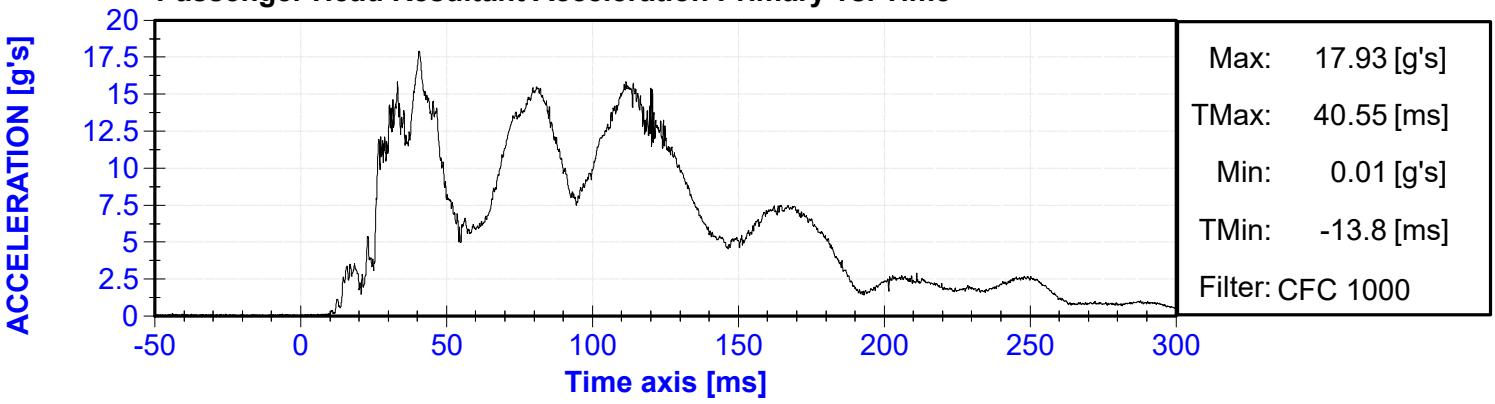
Passenger Head Acceleration (Y) vs. Time Primary



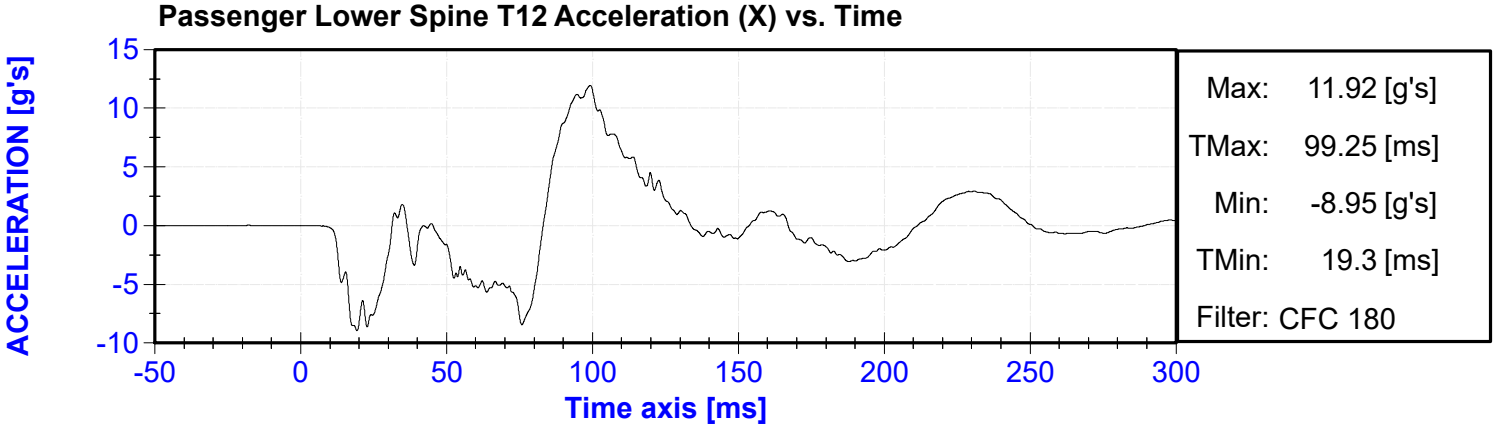
Passenger Head Acceleration (Z) vs. Time Primary



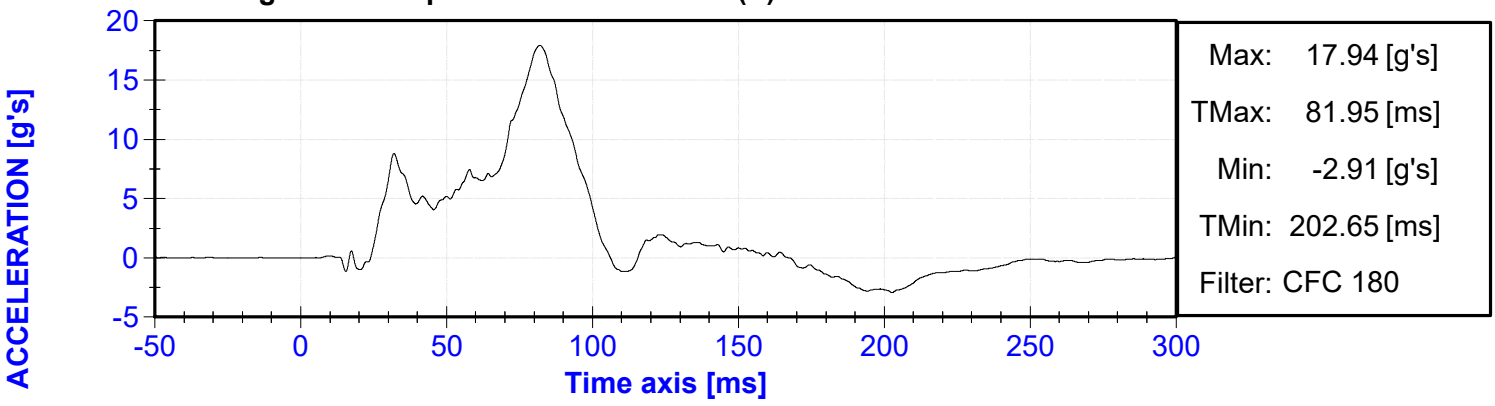
Passenger Head Resultant Acceleration Primary vs. Time



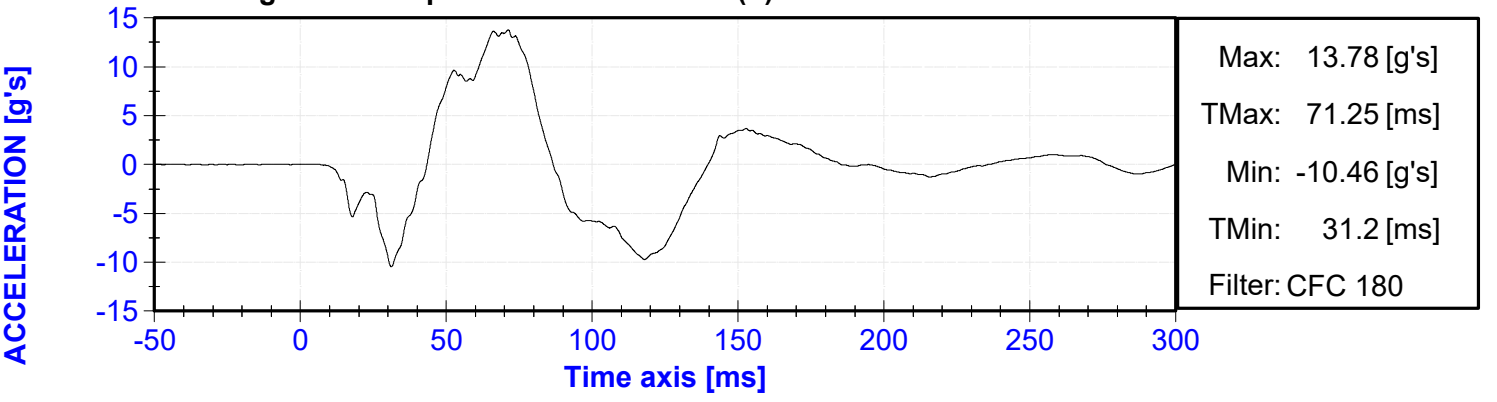
Passenger Lower Spine T12 Acceleration (X) vs. Time



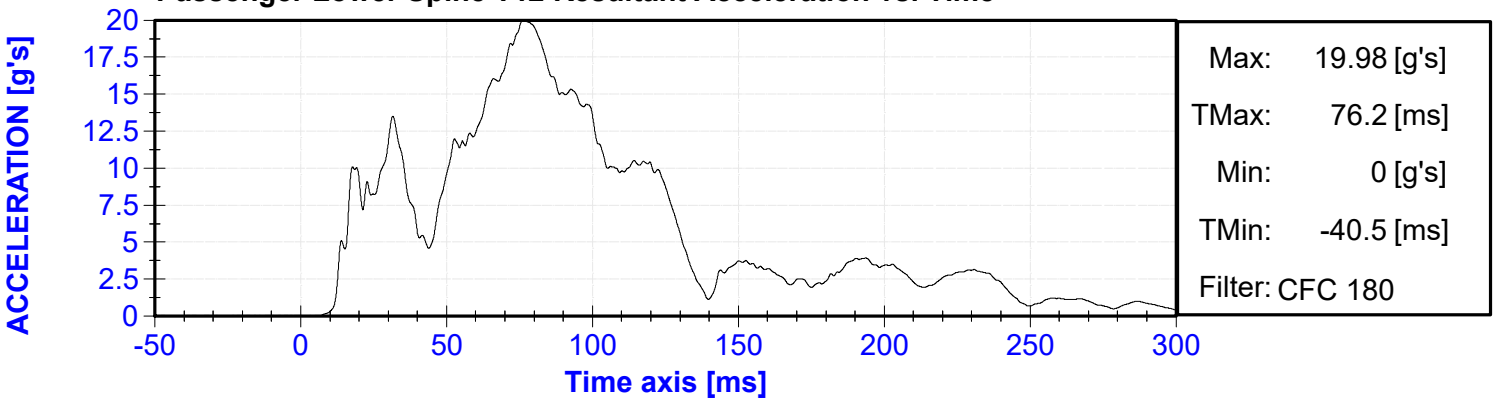
Passenger Lower Spine T12 Acceleration (Y) vs. Time



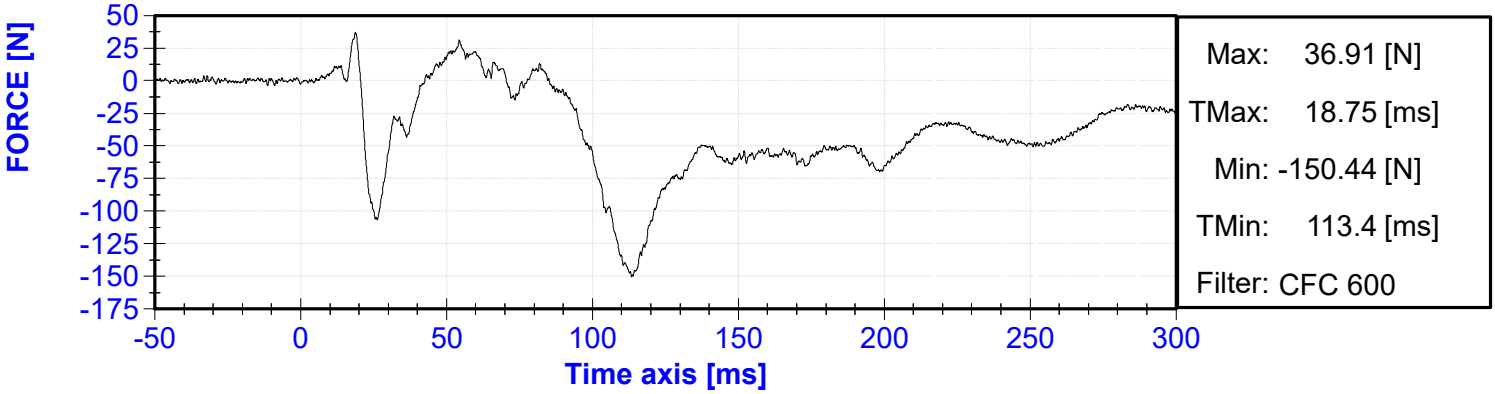
Passenger Lower Spine T12 Acceleration (Z) vs. Time



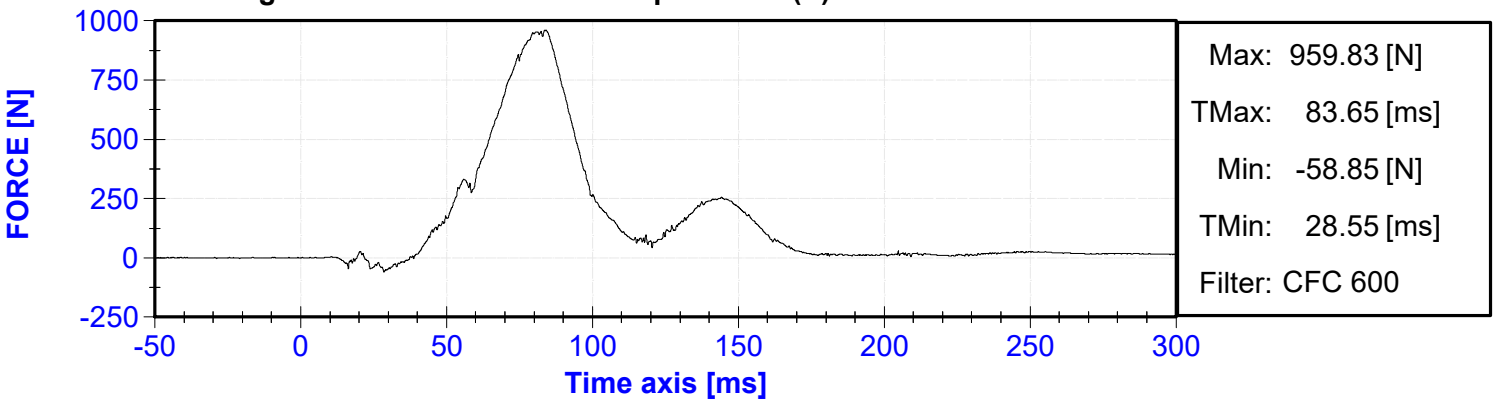
Passenger Lower Spine T12 Resultant Acceleration vs. Time



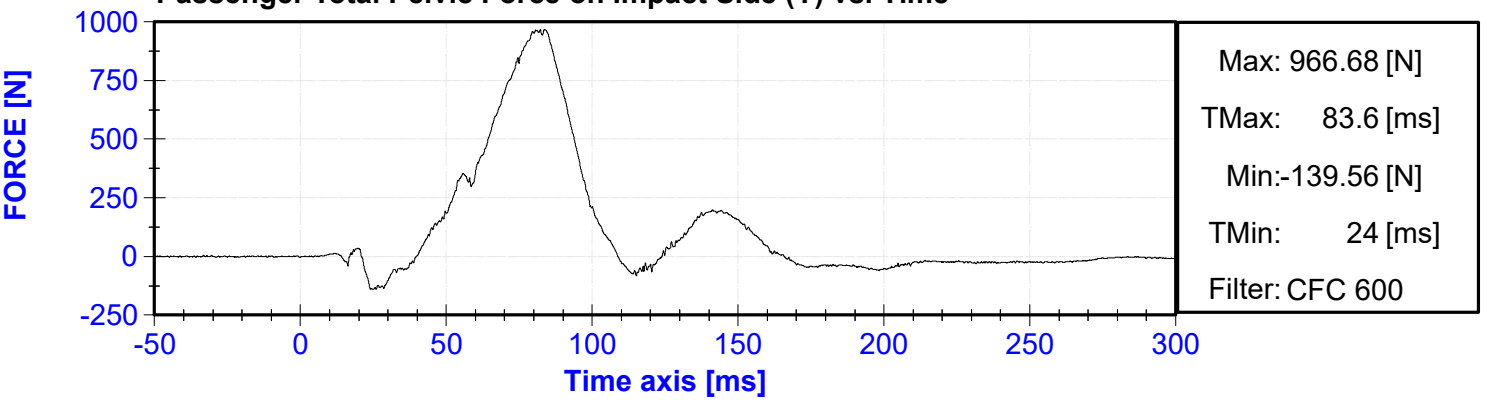
Passenger Iliac Force on Impact Side (Y) vs. Time



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



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



APPENDIX C

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

EUROSID 2 (ES-2RE) MALE – DRIVER ATD

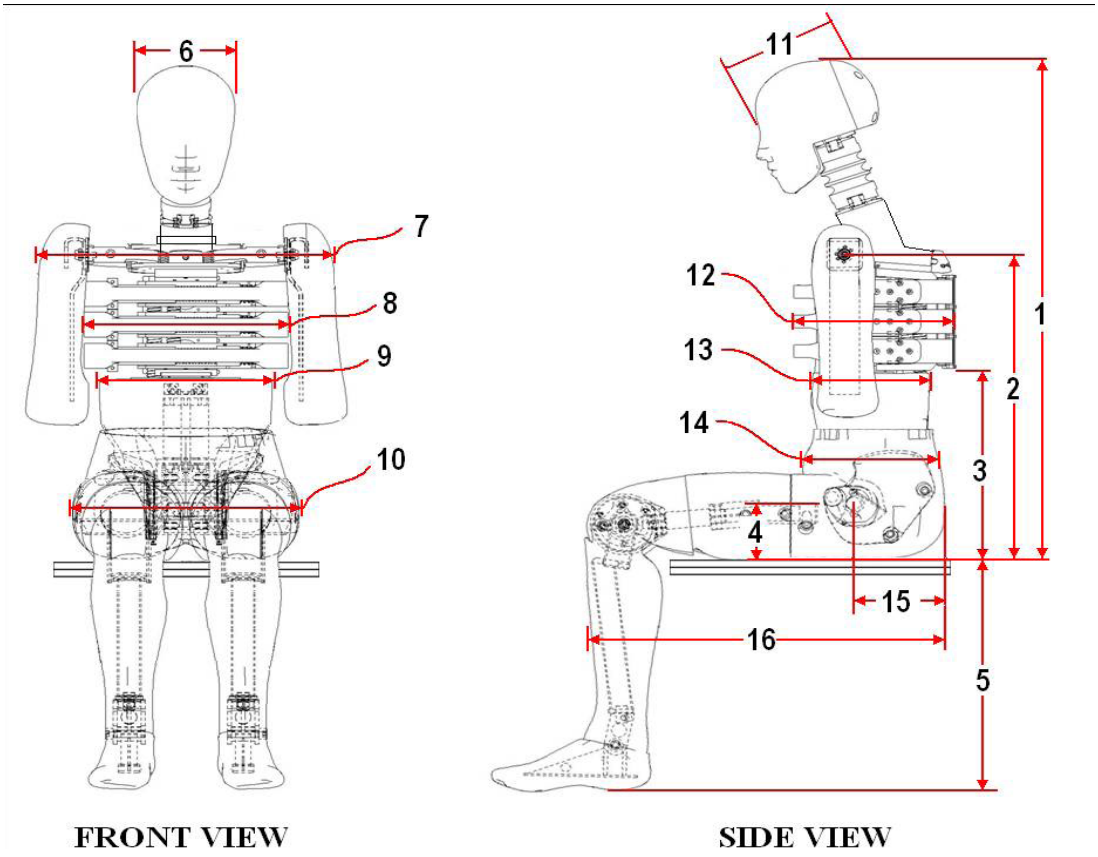
SERIAL NO:F033

(CONFIGURED FOR LEFT SIDE IMPACT)

External Measurements - EuroSID-2re

Technician: J. Rios Date: 2/13/2024

Dummy Serial Number: F033



FRONT VIEW SIDE VIEW

Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	912	Pass
2	Seat to Shoulder Joint	558	572	568	Pass
3	Seat to Lower Face of Thoracic Spine Box	346	356	352	Pass
4	Seat to Hip Joint (center of bolt)	97	103	101	Pass
5	Sole to Seat, Sitting	333	451	412	Pass
6	Head Width	152	158	155	Pass
7	Shoulder/Arm Width	461	479	470	Pass
8	Thorax Width	322	332	328	Pass
9	Abdomen Width	273	287	282	Pass
10	Pelvis Lap Width	359	373	363	Pass
11	Head Depth	196	206	202	Pass
12	Thorax Depth	262	272	271	Pass
13	Abdomen Depth	194	204	198	Pass
14	Pelvis Depth	235	245	241	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150	160	154	Pass
16	Back of Buttocks to Front Knee	597	615	601	Pass

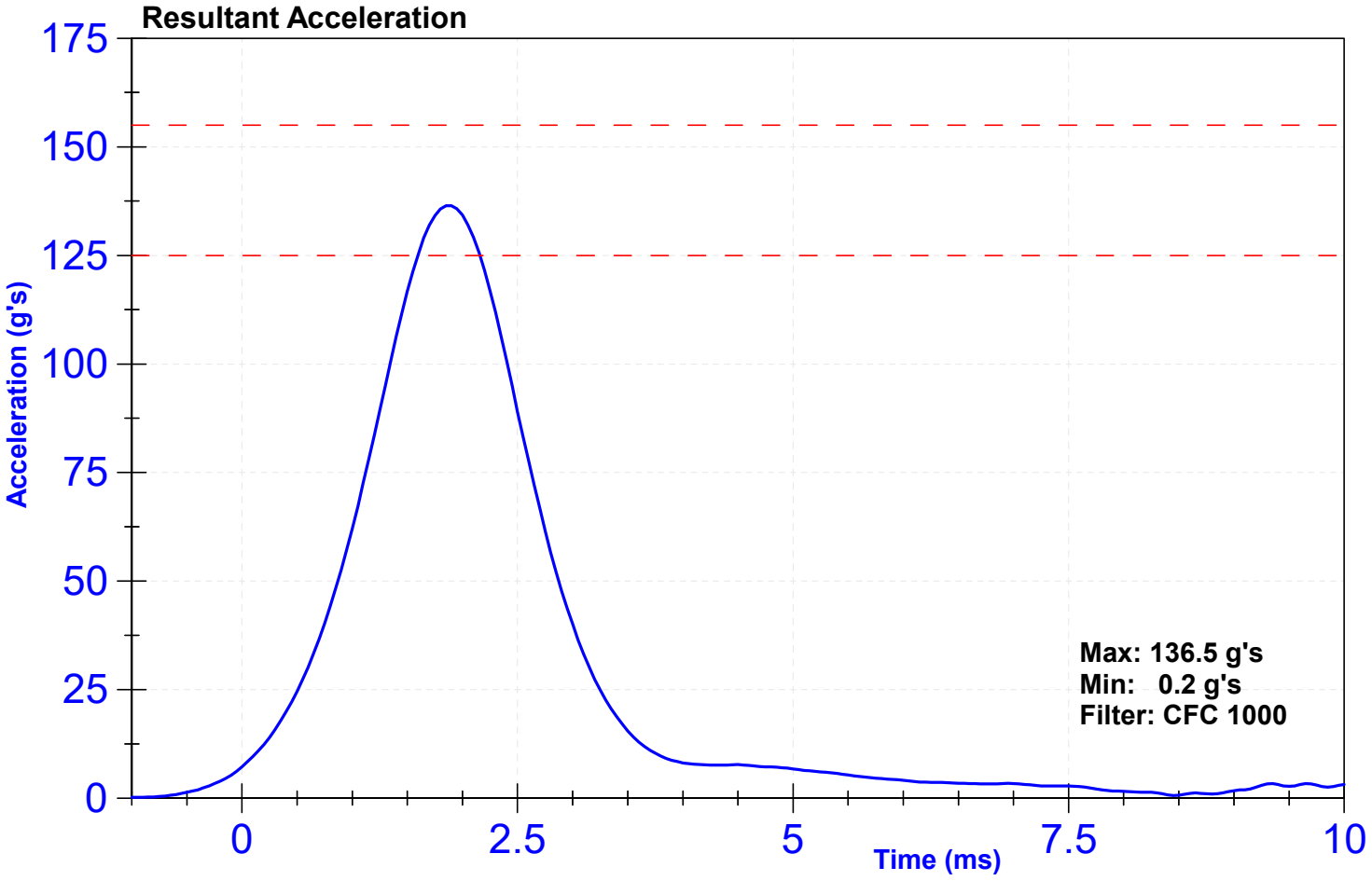
ATD Manufacturer	FTSS	Test Technician	K. Koineczny
ATD Serial Number	F033	Laboratory Supervisor	J. Kinderman

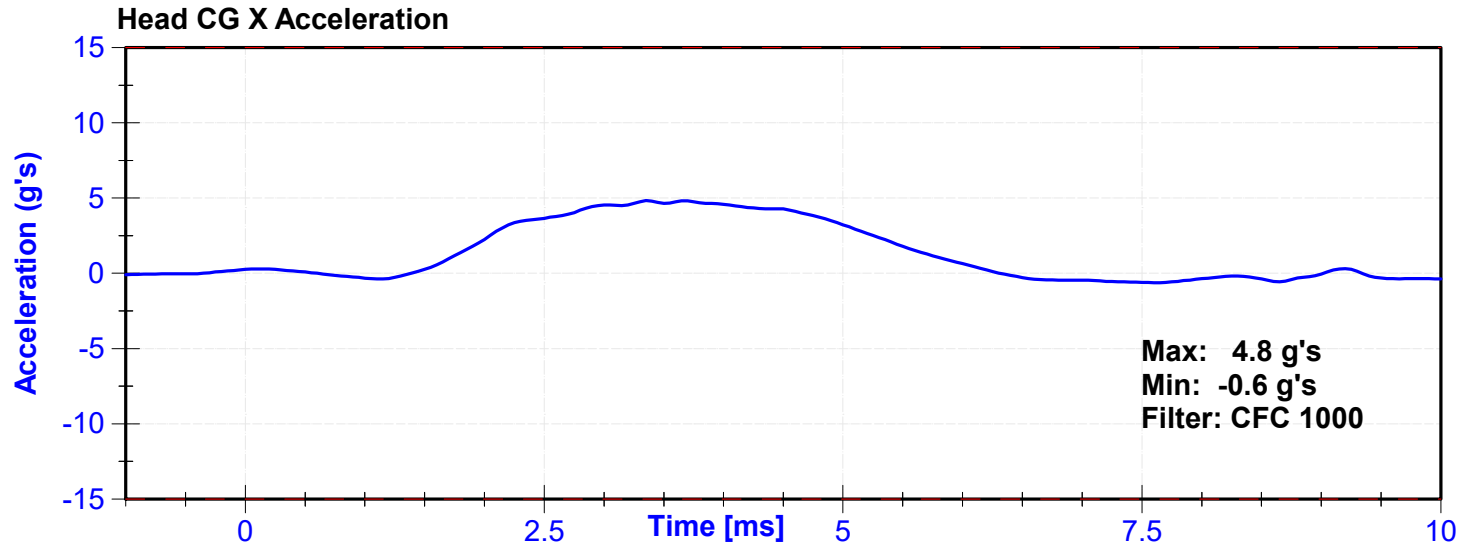
Results

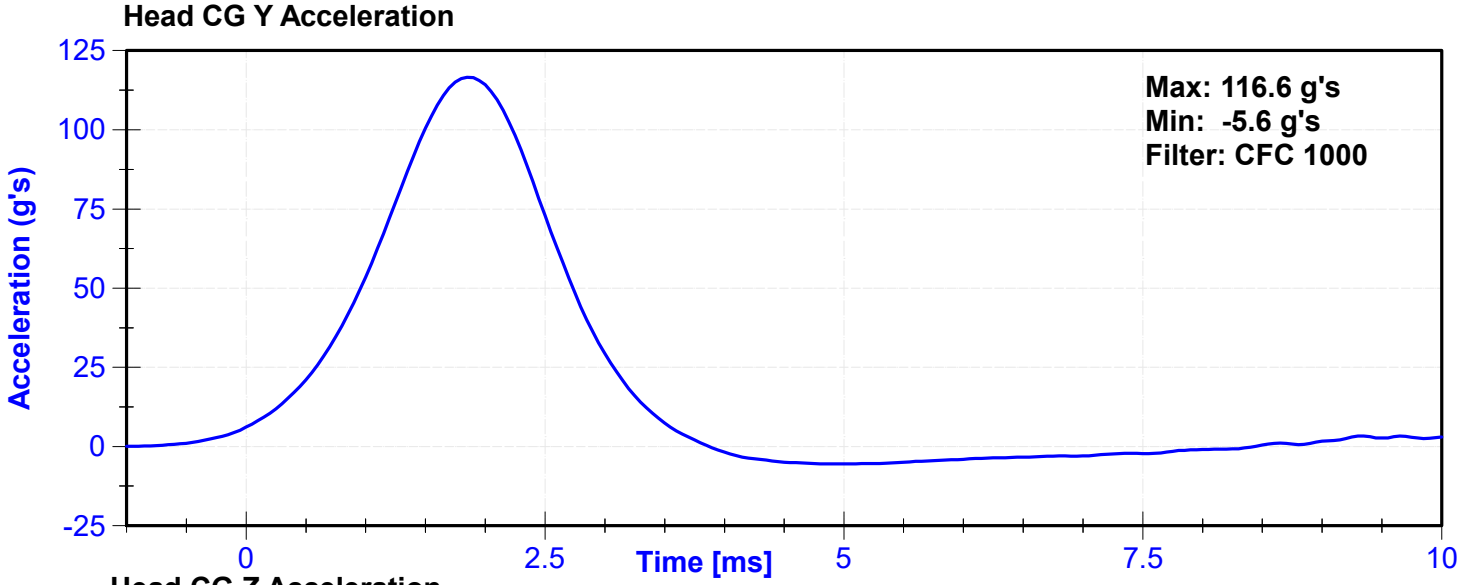
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21	Pass
Humidity	10	70	%	17	Pass
Resultant Acceleration	125	155	g's	136.5	Pass
Oscillation	0	15	%	5.65	Pass
Fore-Aft Acceleration	-15	15	g's	4.8	Pass

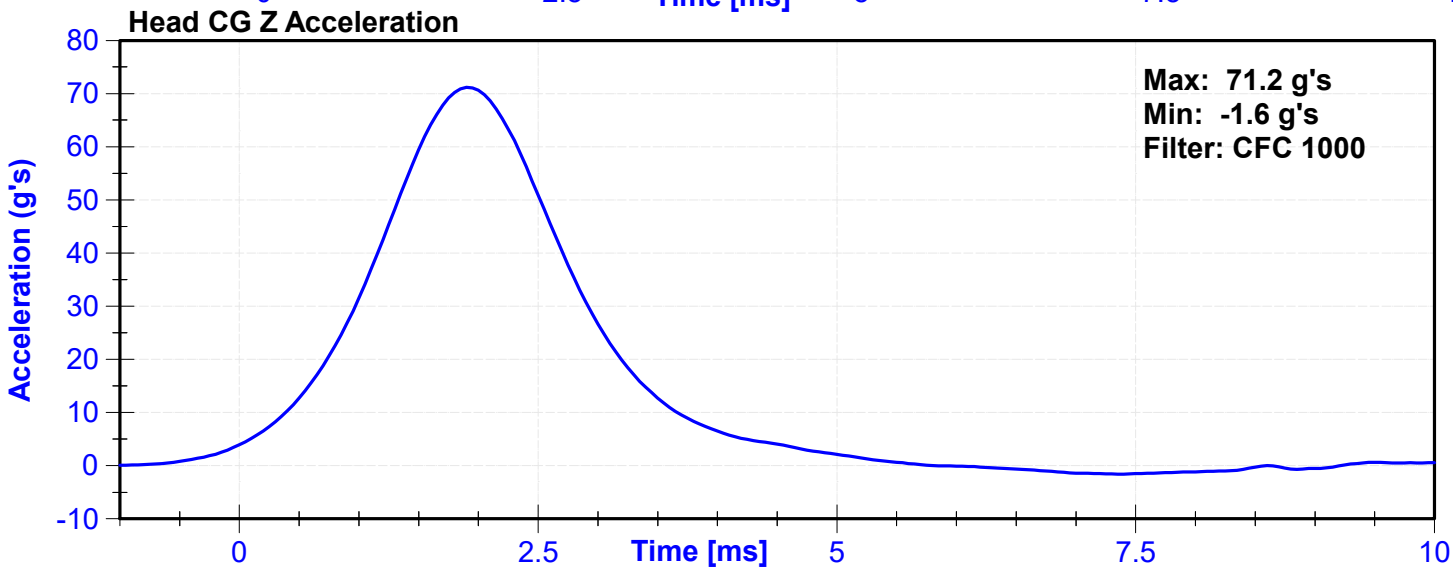
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	P63861	10/17/2024	4/15/2025
Y Accelerometer	Endevco	P49216	10/17/2024	4/15/2025
Z Accelerometer	Endevco	P51303	10/17/2024	4/15/2025




Head CG X Acceleration
Acceleration (g's)
15
10
5
0
-5
-10
-15
0
2.5
Time [ms]
5
7.5
10
Max: 4.8 g's
Min: -0.6 g's
Filter: CFC 1000


Head CG Y Acceleration
Acceleration (g's)
125
100
75
50
25
0
-25
0
2.5
Time [ms]
5
7.5
10
Max: 116.6 g's
Min: -5.6 g's
Filter: CFC 1000


Head CG Z Acceleration
Acceleration (g's)
80
70
60
50
40
30
20
10
0
-10
0
2.5
Time [ms]
5
7.5
10
Max: 71.2 g's
Min: -1.6 g's
Filter: CFC 1000

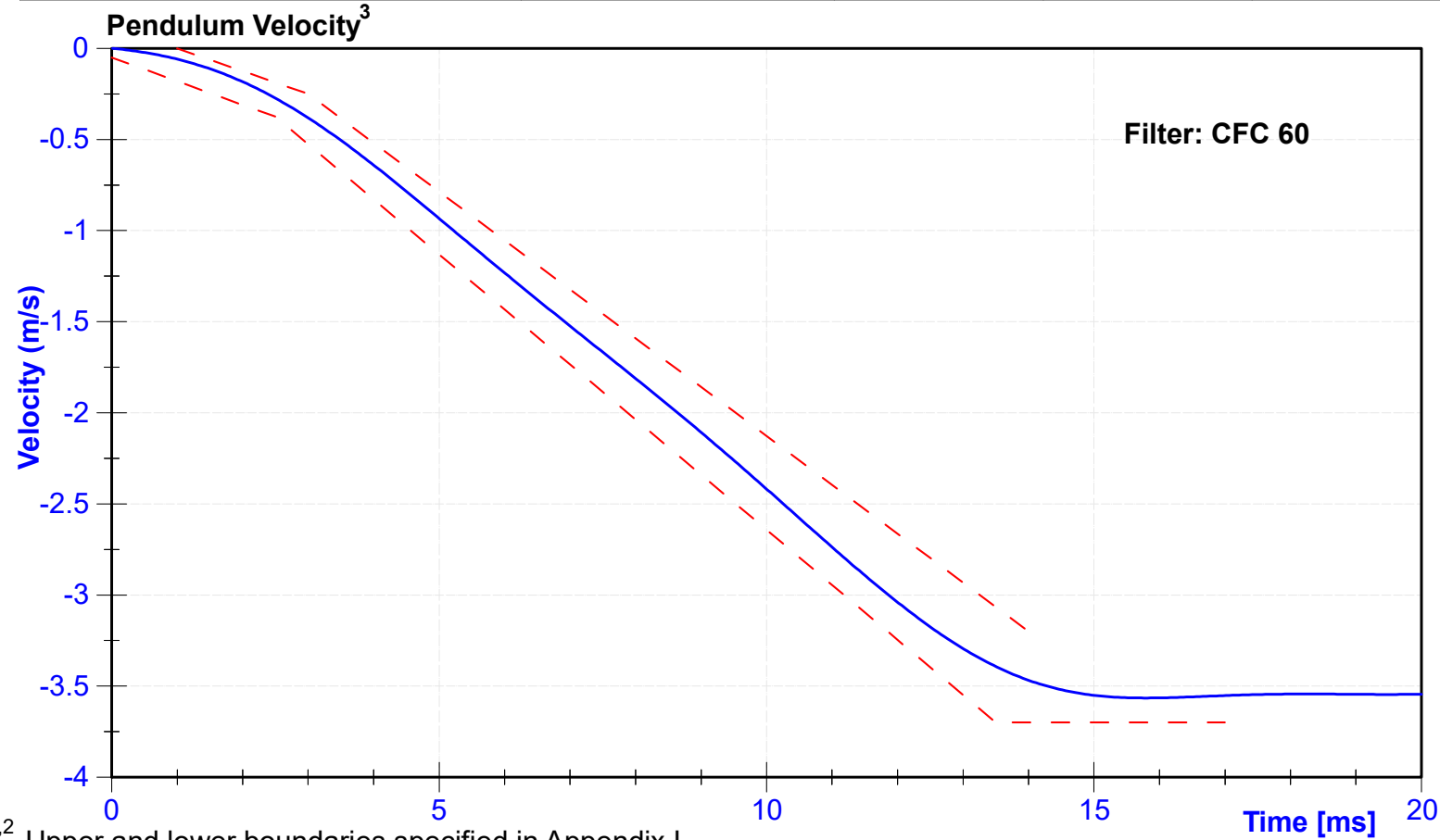
ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	F033	Laboratory Supervisor	J. Kinderman

Results

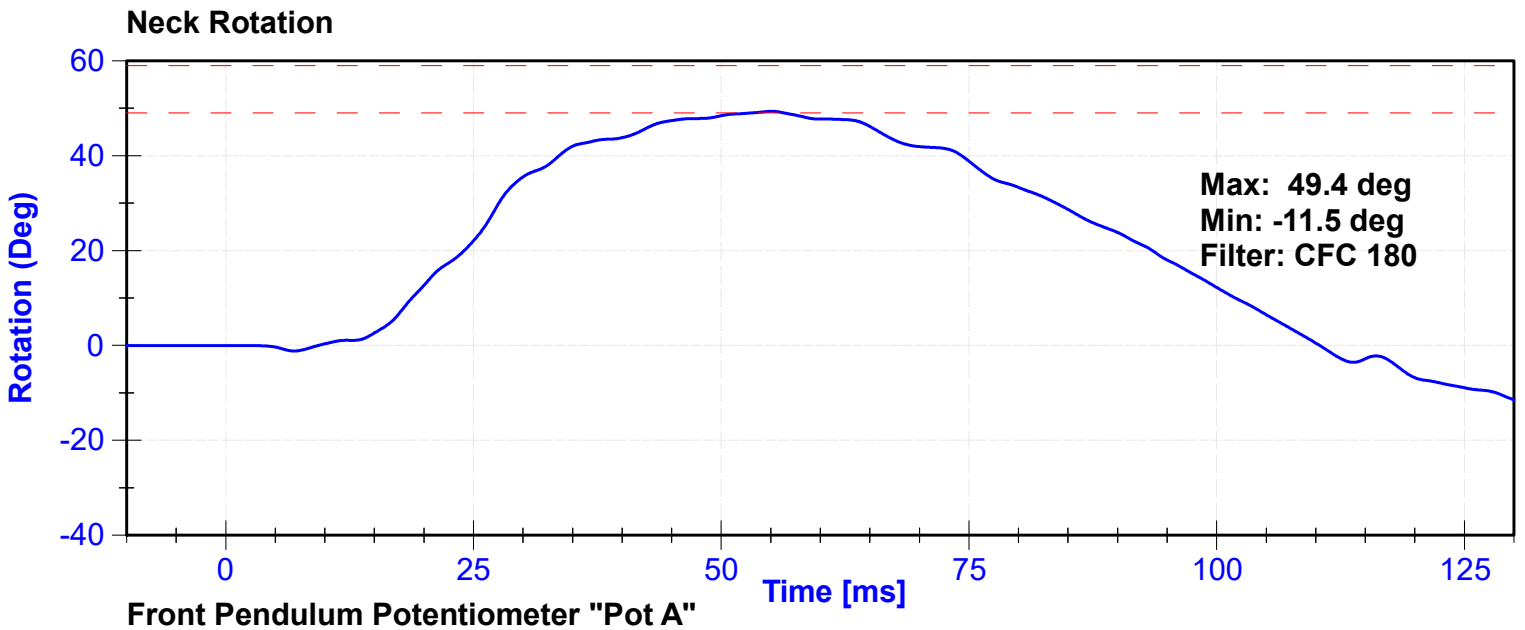
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.2	Pass
Humidity	10	70	%	17	Pass
Velocity	3.3	3.5	m/s	3.38	Pass
Lateral Neck Rotation	49	59	deg	49.4	Pass
Time at Maximum Rotation	54	66	ms	55.1	Pass
Time of Rotation Decay from Maximum	53	88	ms	55.3	Pass
Pendulum Velocity Overall Corridor	Lower Boundary[1]	Upper Boundary[2]	m/s	See Plot[3]	Pass

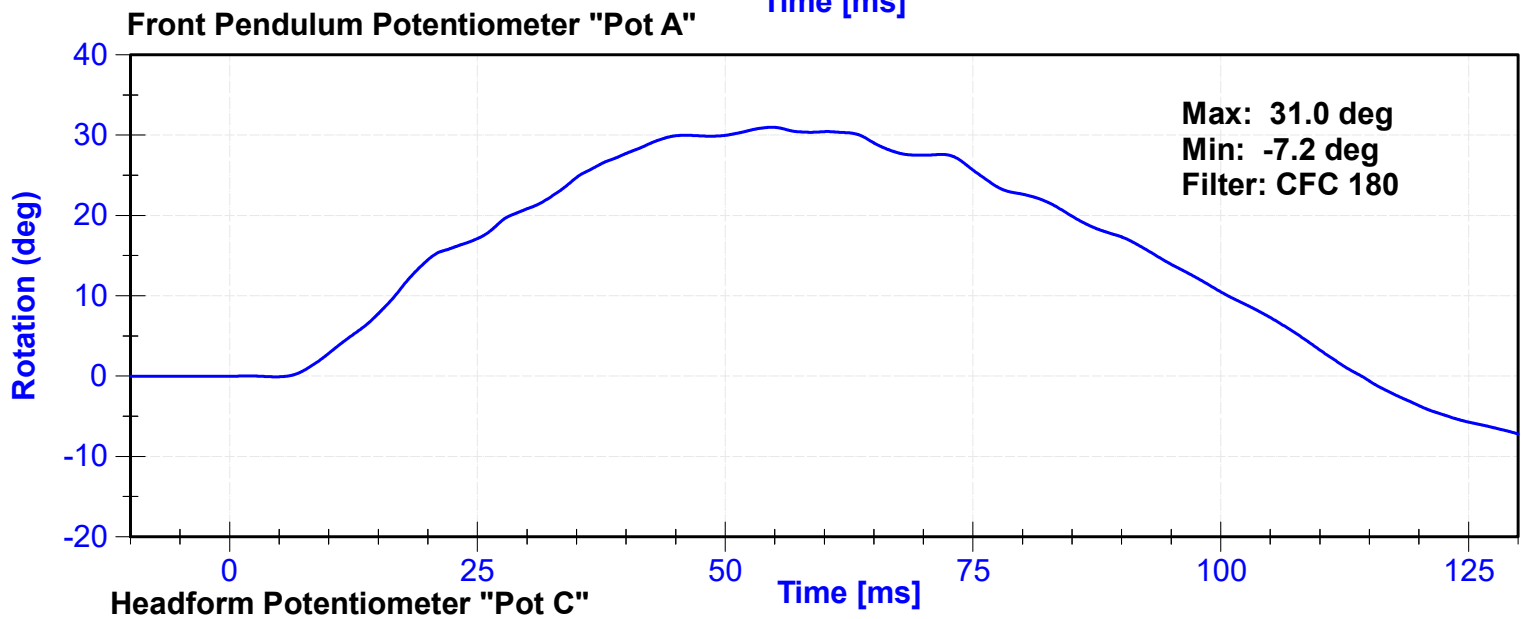
Transducer Calibrations

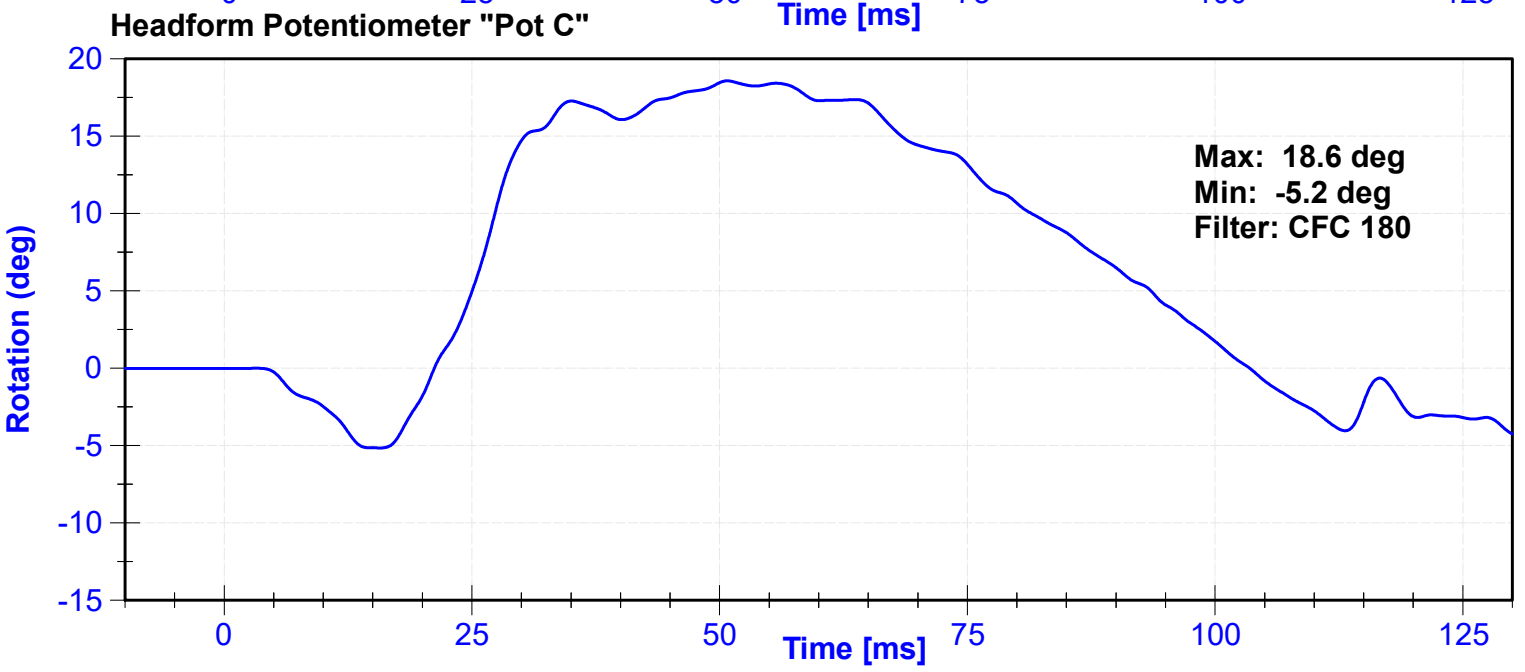
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16646	10/17/2024	4/15/2025
Front Pendulum Potentiometer	Sfernice	2247	9/13/2024	9/13/2025
Headform Potentiometer	Sfernice	095	9/13/2024	9/13/2025



[1,2] Upper and lower boundaries specified in Appendix I


Neck Rotation
Rotation (Deg)
Time [ms]
Max: 49.4 deg
Min: -11.5 deg
Filter: CFC 180


Front Pendulum Potentiometer "Pot A"
Rotation (deg)
Time [ms]
Max: 31.0 deg
Min: -7.2 deg
Filter: CFC 180


Headform Potentiometer "Pot C"
Rotation (deg)
Time [ms]
Max: 18.6 deg
Min: -5.2 deg
Filter: CFC 180

Appendix I

[2] Upper Boundary Corridor		[1] Lower Boundary Corridor	
Time (ms)	Velocity (m/s)	Time (ms)	Velocity (m/s)
1.0	0.00	0.0	-0.05
3.0	-0.25	2.5	-0.375
14.0	-3.20	13.5	-3.7
		17.0	-3.7

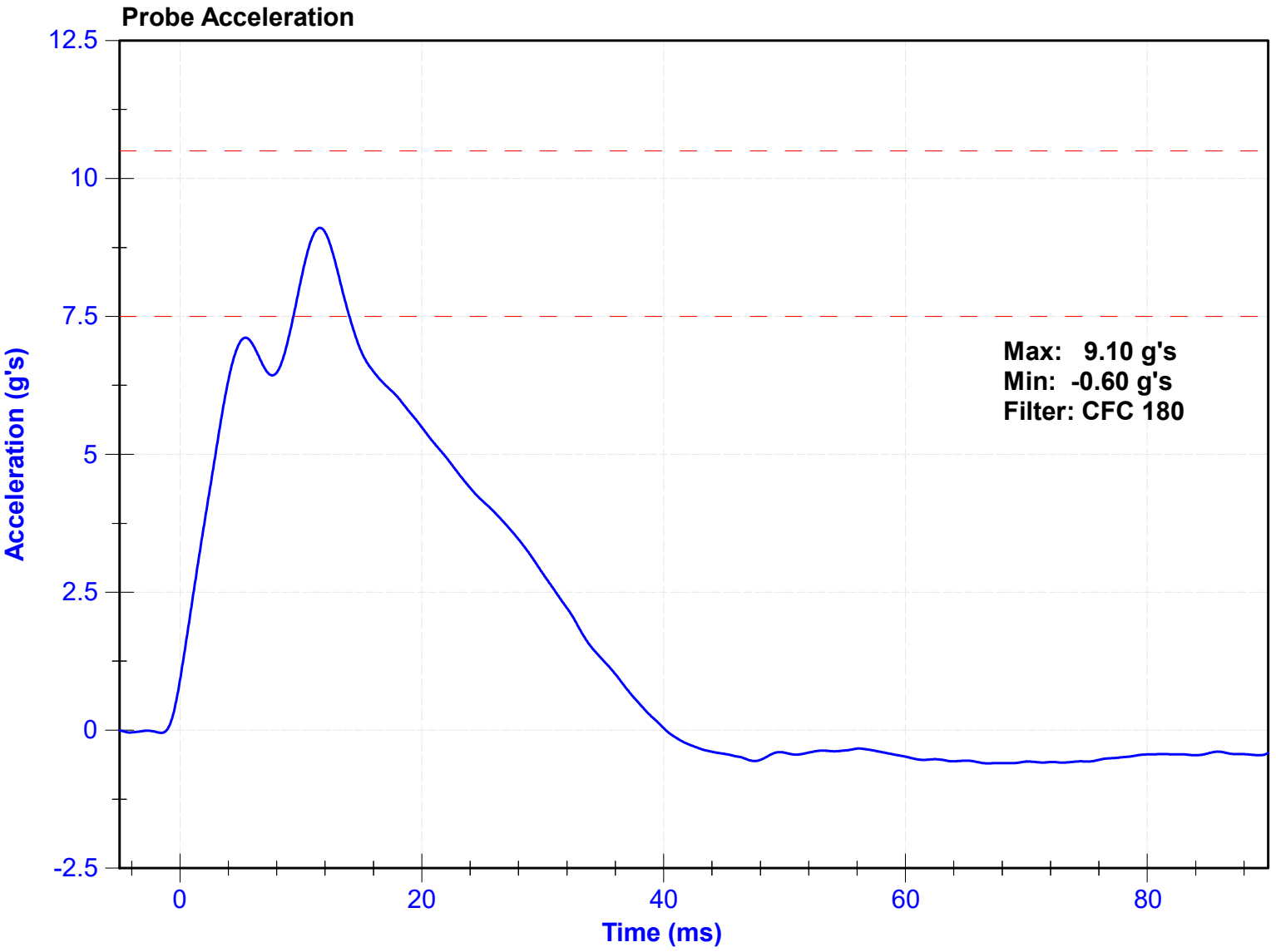
ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	F033	Laboratory Supervisor	J. Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.6	Pass
Humidity	10	70	%	23	Pass
Velocity	4.2	4.4	m/s	4.31	Pass
Probe Acceleration	7.5	10.5	g's	9.10	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	18566	11/26/2024	5/25/2025



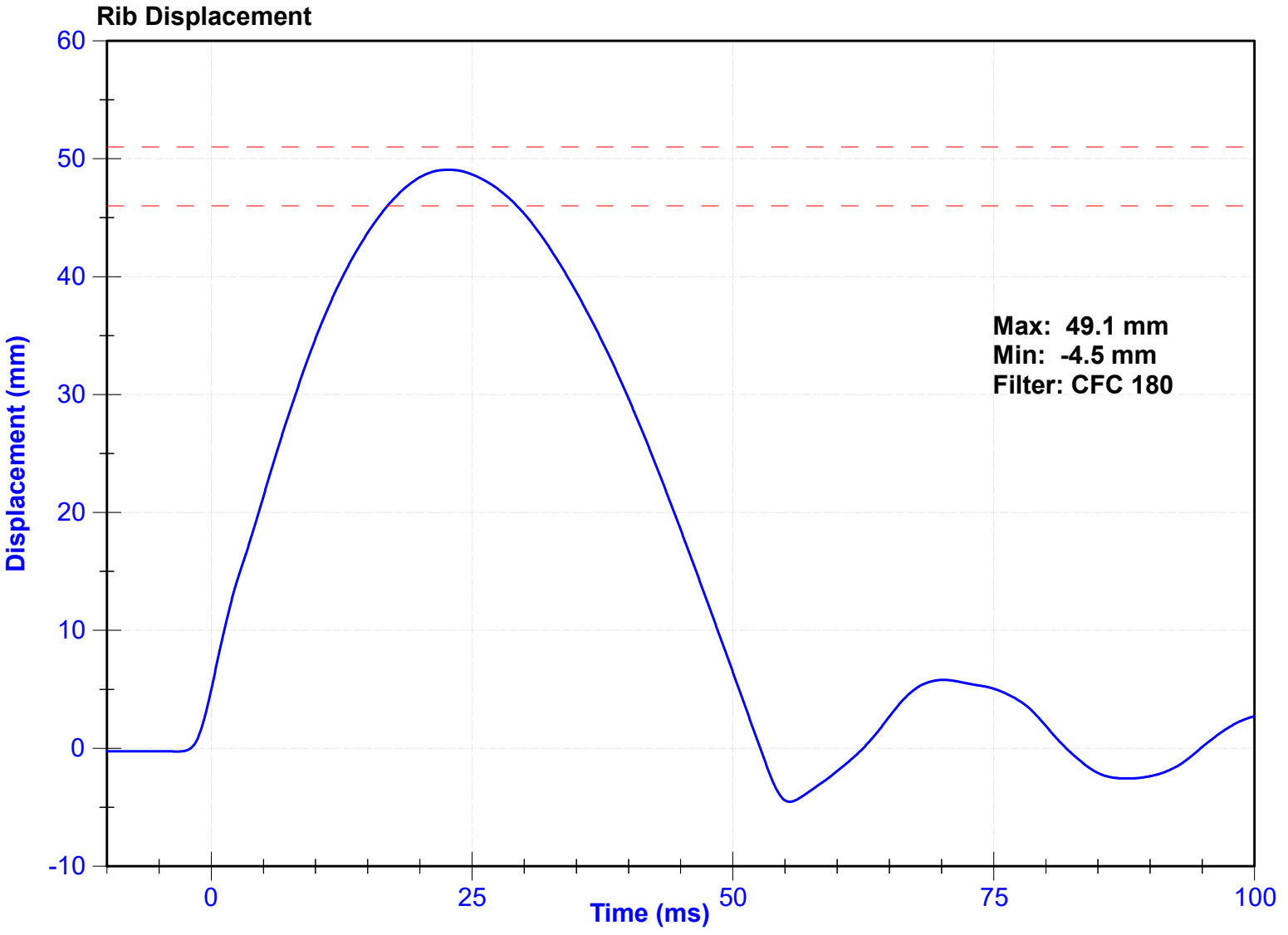
ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	F033	Laboratory Supervisor	J. Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21	Pass
Humidity	10	70	%	17	Pass
Rib Displacement	46	51	mm	49.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	179GFE	10/16/2024	4/16/2025



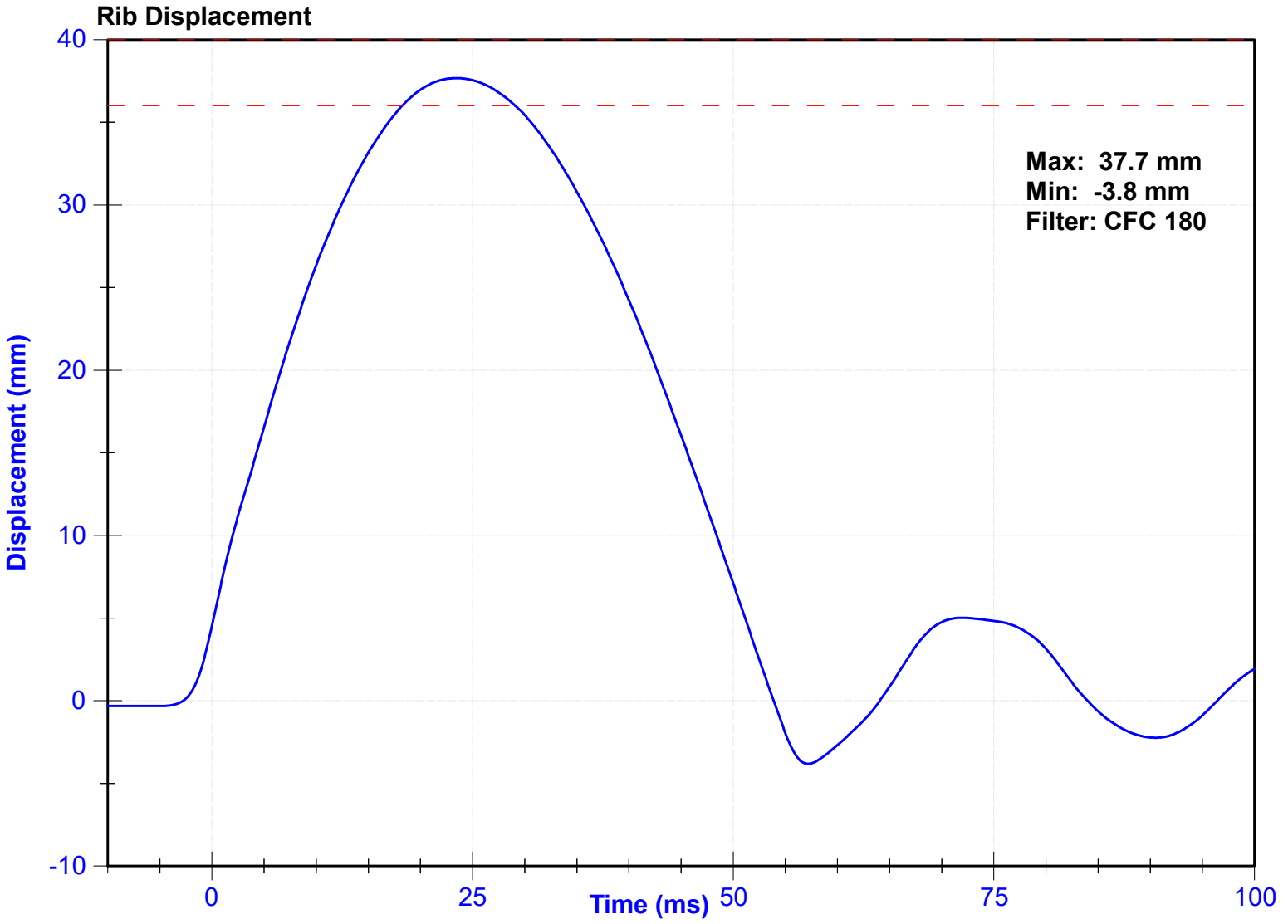
ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	F033	Laboratory Supervisor	J. Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21	Pass
Humidity	10	70	%	17	Pass
Rib Displacement	36	40	mm	37.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	179GFE	10/16/2024	4/16/2025



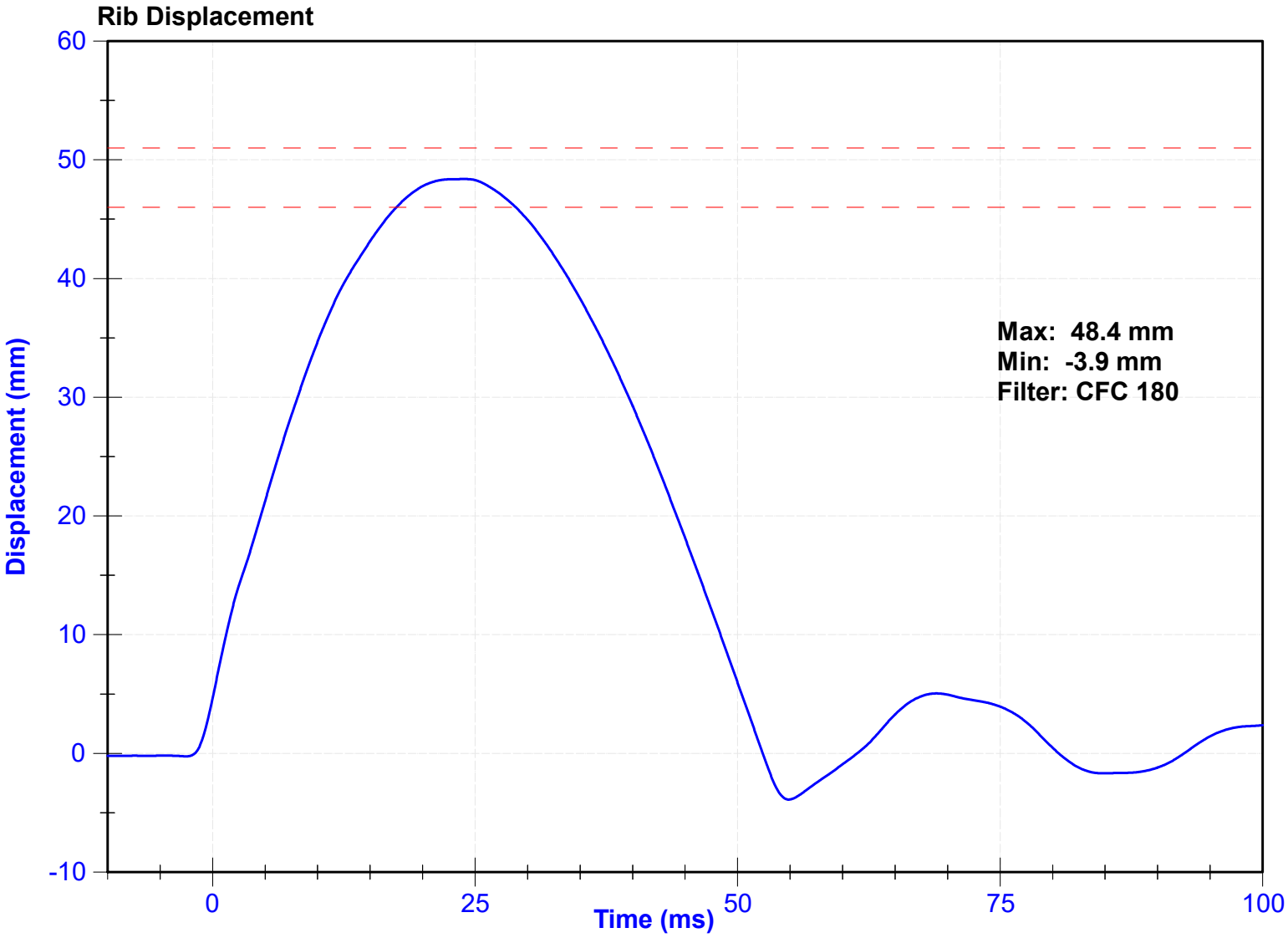
ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	F033	Laboratory Supervisor	J. Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21	Pass
Humidity	10	70	%	17	Pass
Rib Displacement	46	51	mm	48.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	185GFE	10/16/2024	4/16/2025



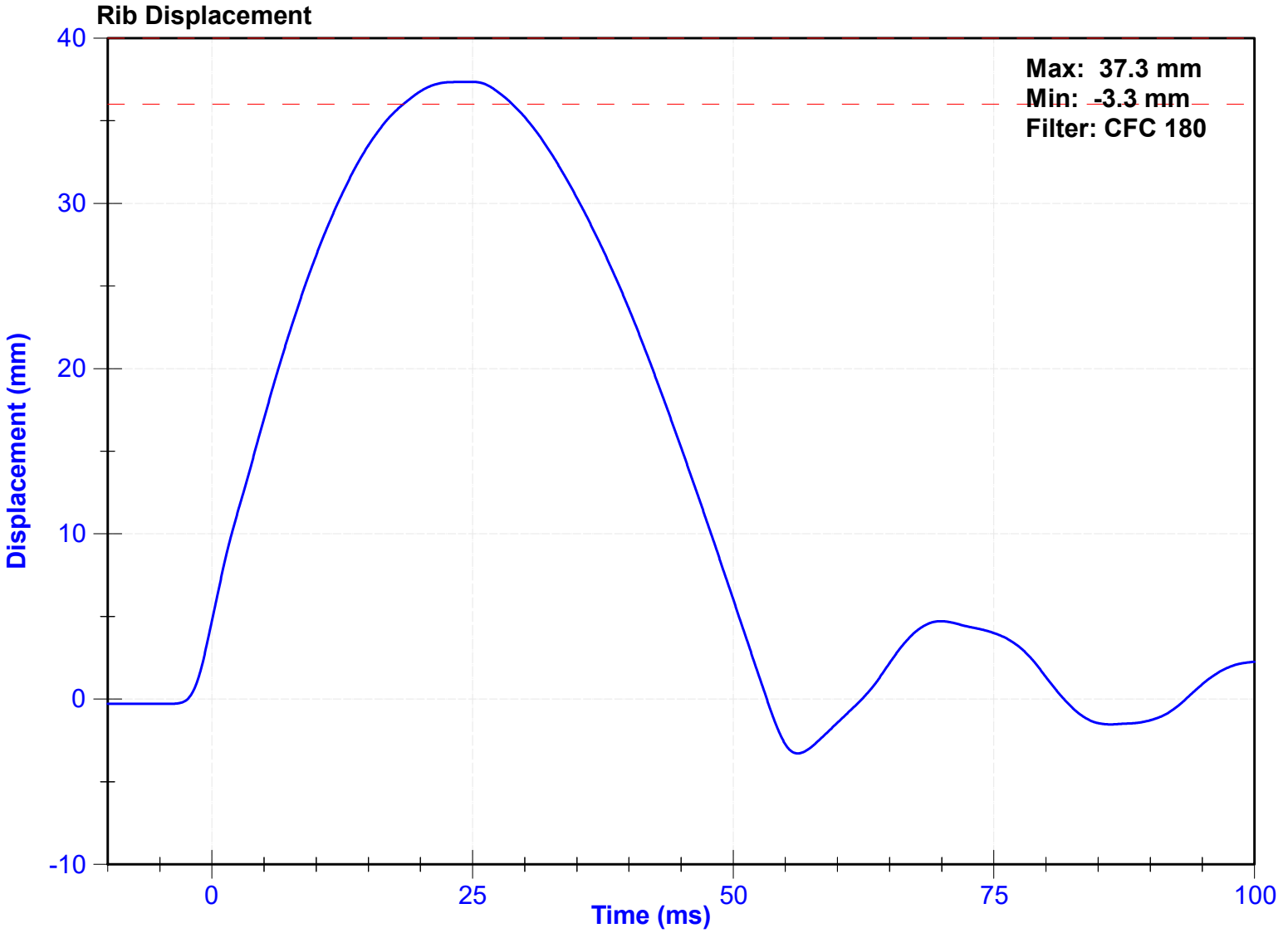
ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	F033	Laboratory Supervisor	J. Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21	Pass
Humidity	10	70	%	17	Pass
Rib Displacement	36	40	mm	37.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	185GFE	10/16/2024	4/16/2025



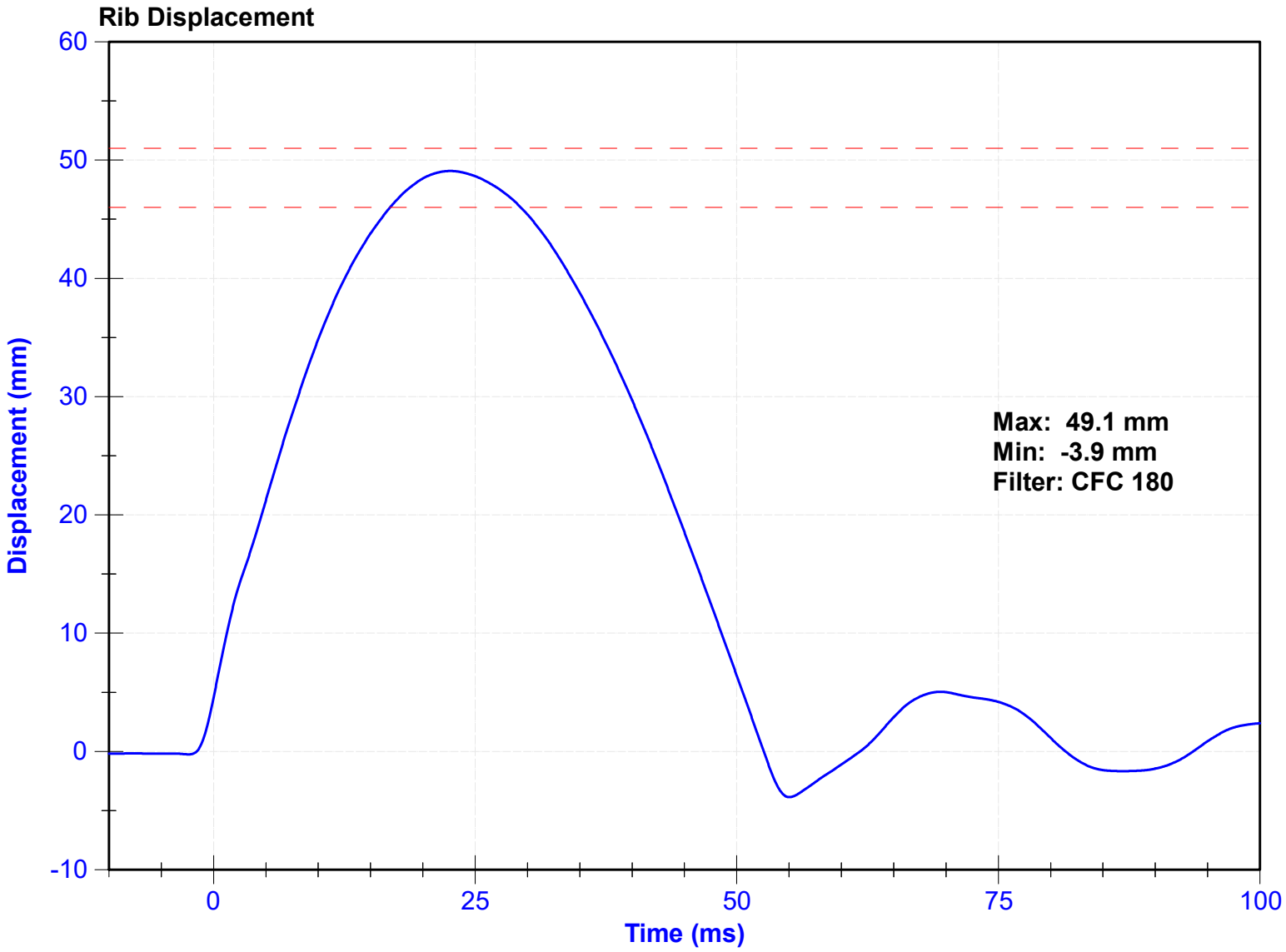
ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	F033	Laboratory Supervisor	J. Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21	Pass
Humidity	10	70	%	17	Pass
Rib Displacement	46	51	mm	49.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	184GFE	11/19/2024	5/20/2025



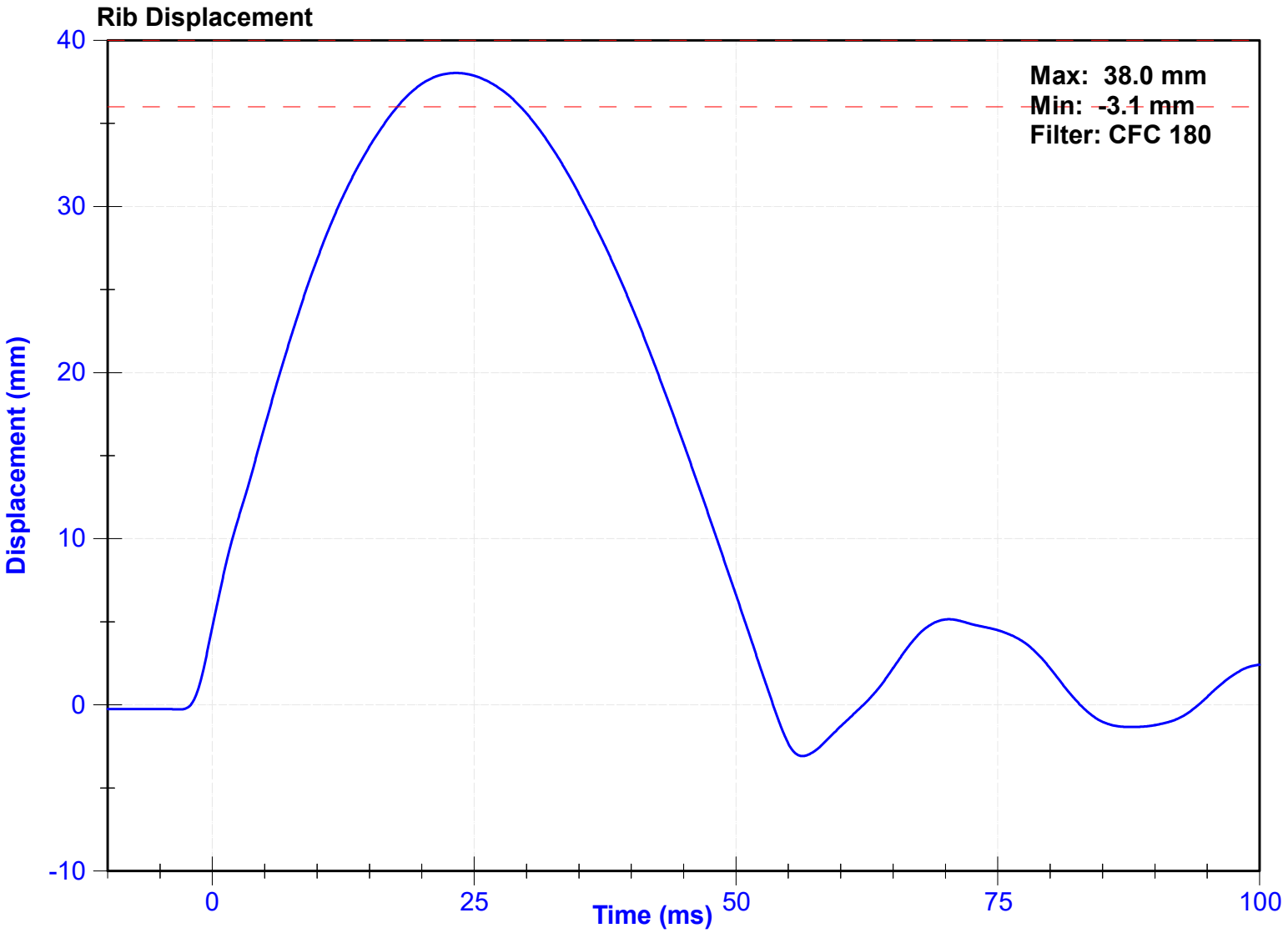
ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	F033	Laboratory Supervisor	J. Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21	Pass
Humidity	10	70	%	17	Pass
Rib Displacement	36	40	mm	38.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	184GFE	11/19/2024	5/20/2025



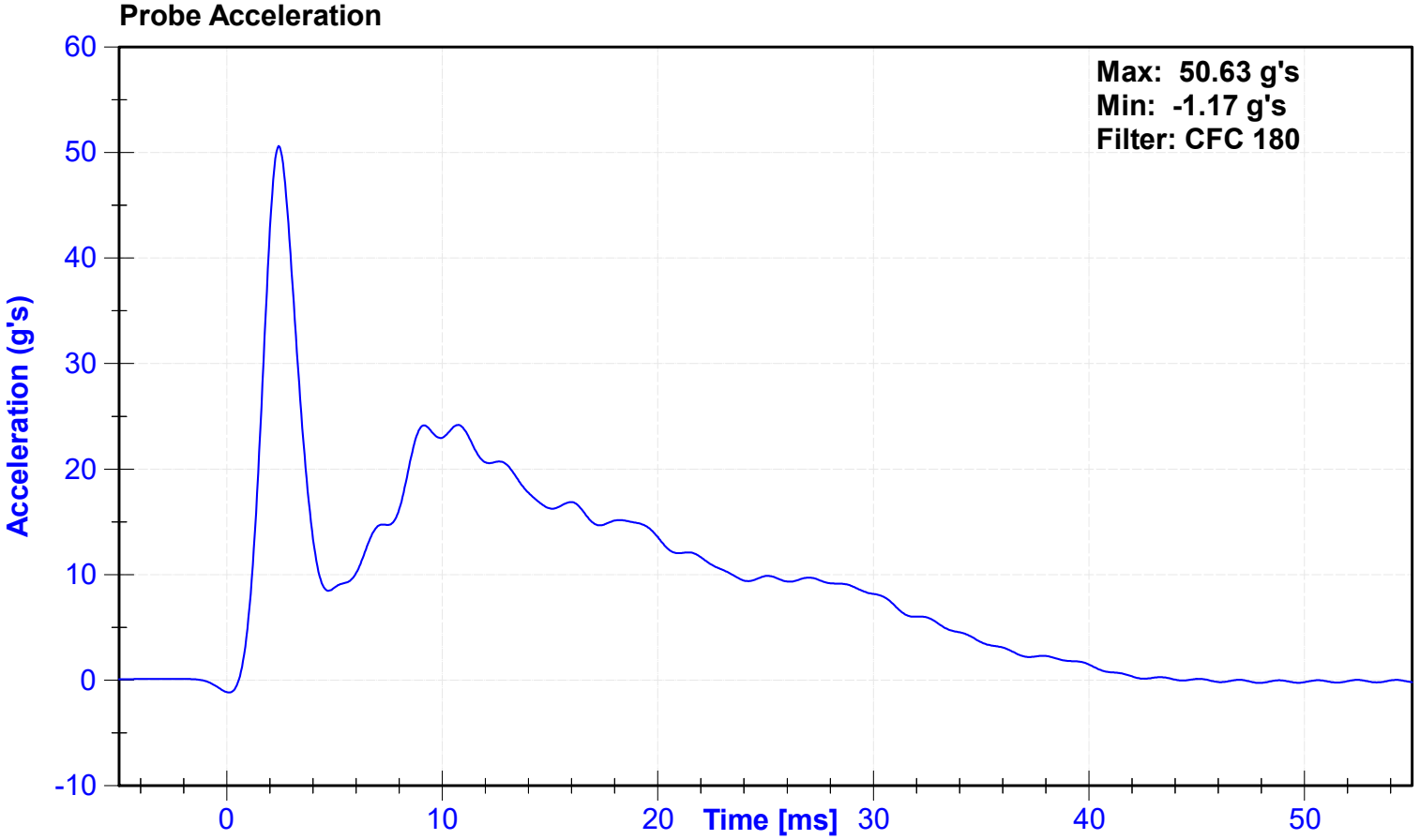
ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	F033	Laboratory Supervisor	J. Kinderman

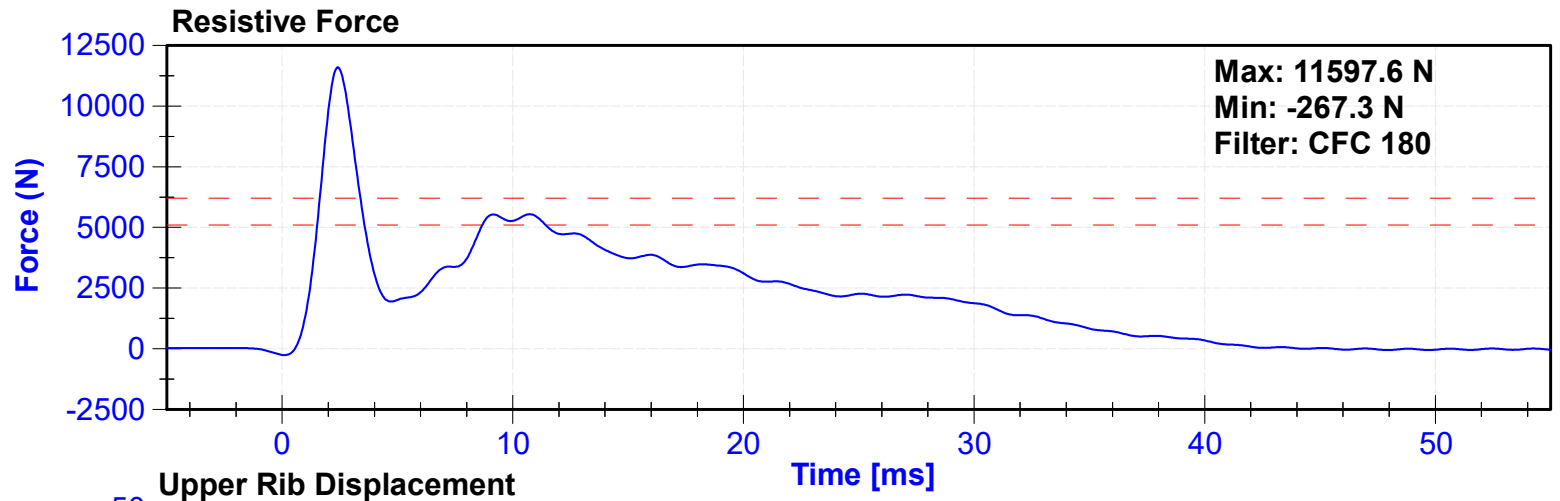
Results

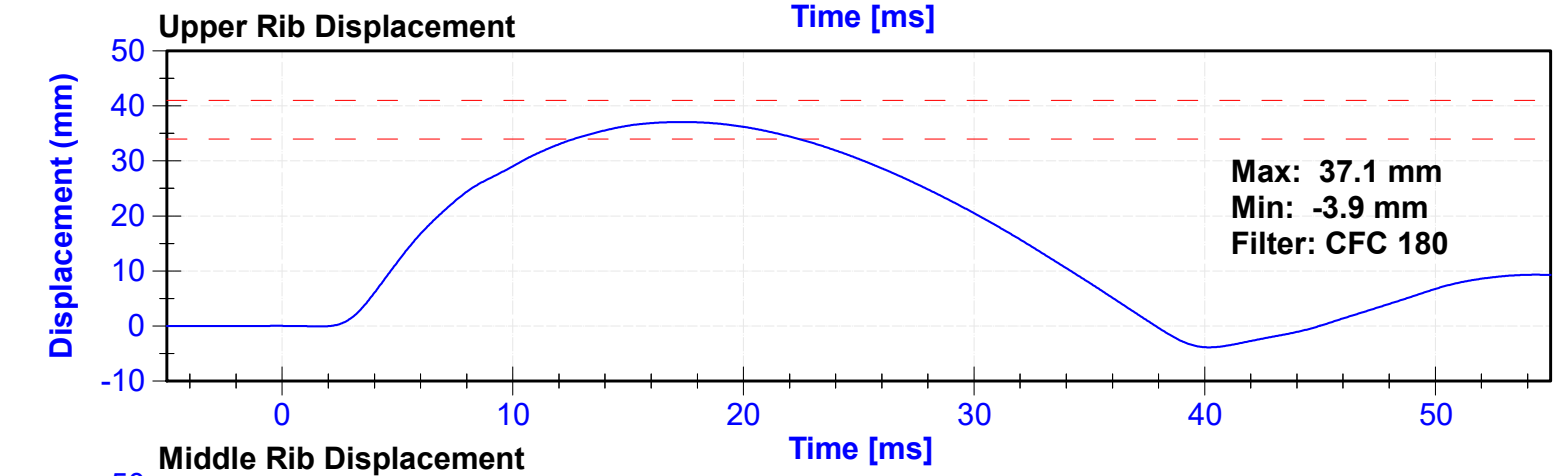
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.6	Pass
Humidity	10	70	%	23	Pass
Velocity	5.4	5.6	m/s	5.55	Pass
Resistive Force after 6ms	5100	6200	N	5541.4	Pass
Upper Thorax Rib Deflection	34	41	mm	37.1	Pass
Mid Thorax Rib Deflection	37	45	mm	41.0	Pass
Lower Thorax Rib Deflection	37	44	mm	41.2	Pass

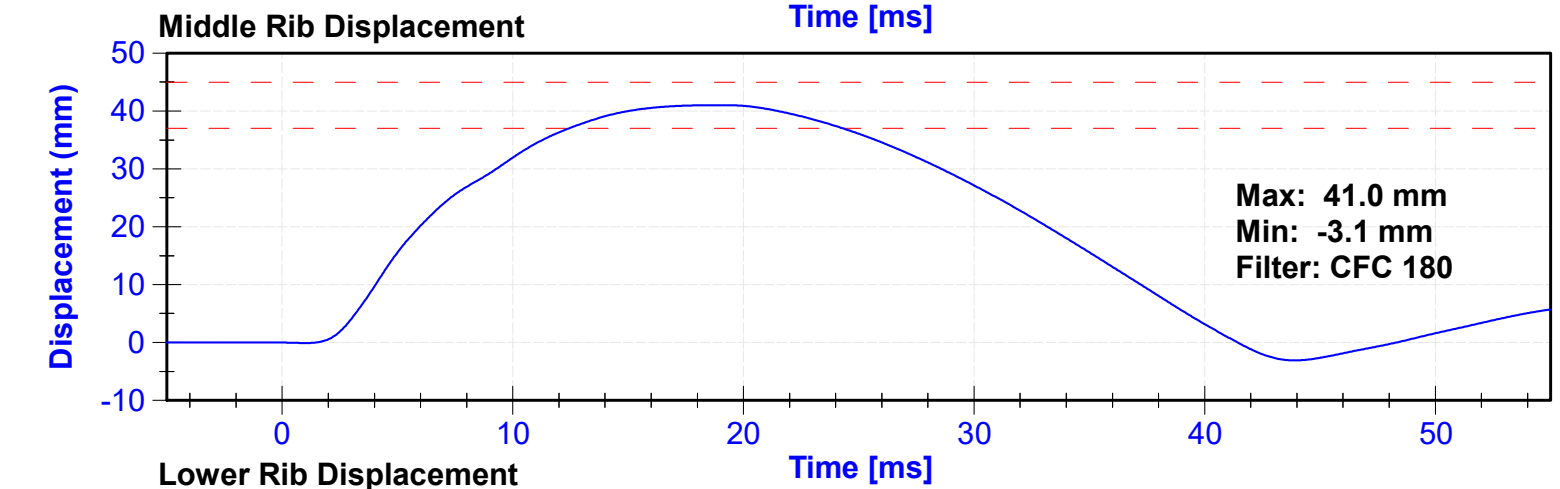
Transducer Calibrations

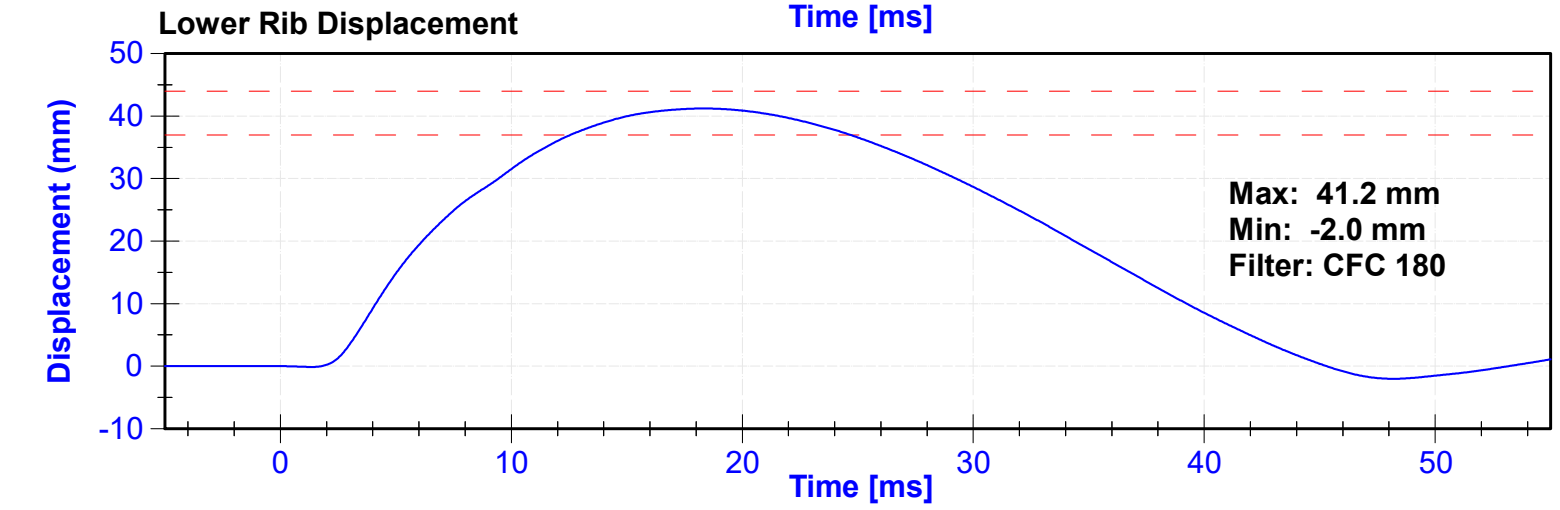
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	18566	11/26/2024	5/25/2025
Upper Thorax Rib Potentiometer	Honeywell	179GFE	10/16/2024	4/16/2025
Middle Thorax Rib Potentiometer	Honeywell	185GFE	10/16/2024	4/16/2025
Lower Thorax Rib Potentiometer	Honeywell	184GFE	11/19/2024	5/20/2025




Resistive Force
Force (N)
12500
10000
7500
5000
2500
0
-2500
0
10
20
30
40
50
Time [ms]
Max: 11597.6 N
Min: -267.3 N
Filter: CFC 180


Upper Rib Displacement
Displacement (mm)
50
40
30
20
10
0
-10
0
10
20
30
40
50
Time [ms]
Max: 37.1 mm
Min: -3.9 mm
Filter: CFC 180


Middle Rib Displacement
Displacement (mm)
50
40
30
20
10
0
-10
0
10
20
30
40
50
Time [ms]
Max: 41.0 mm
Min: -3.1 mm
Filter: CFC 180


Lower Rib Displacement
Displacement (mm)
50
40
30
20
10
0
-10
0
10
20
30
40
50
Time [ms]
Max: 41.2 mm
Min: -2.0 mm
Filter: CFC 180

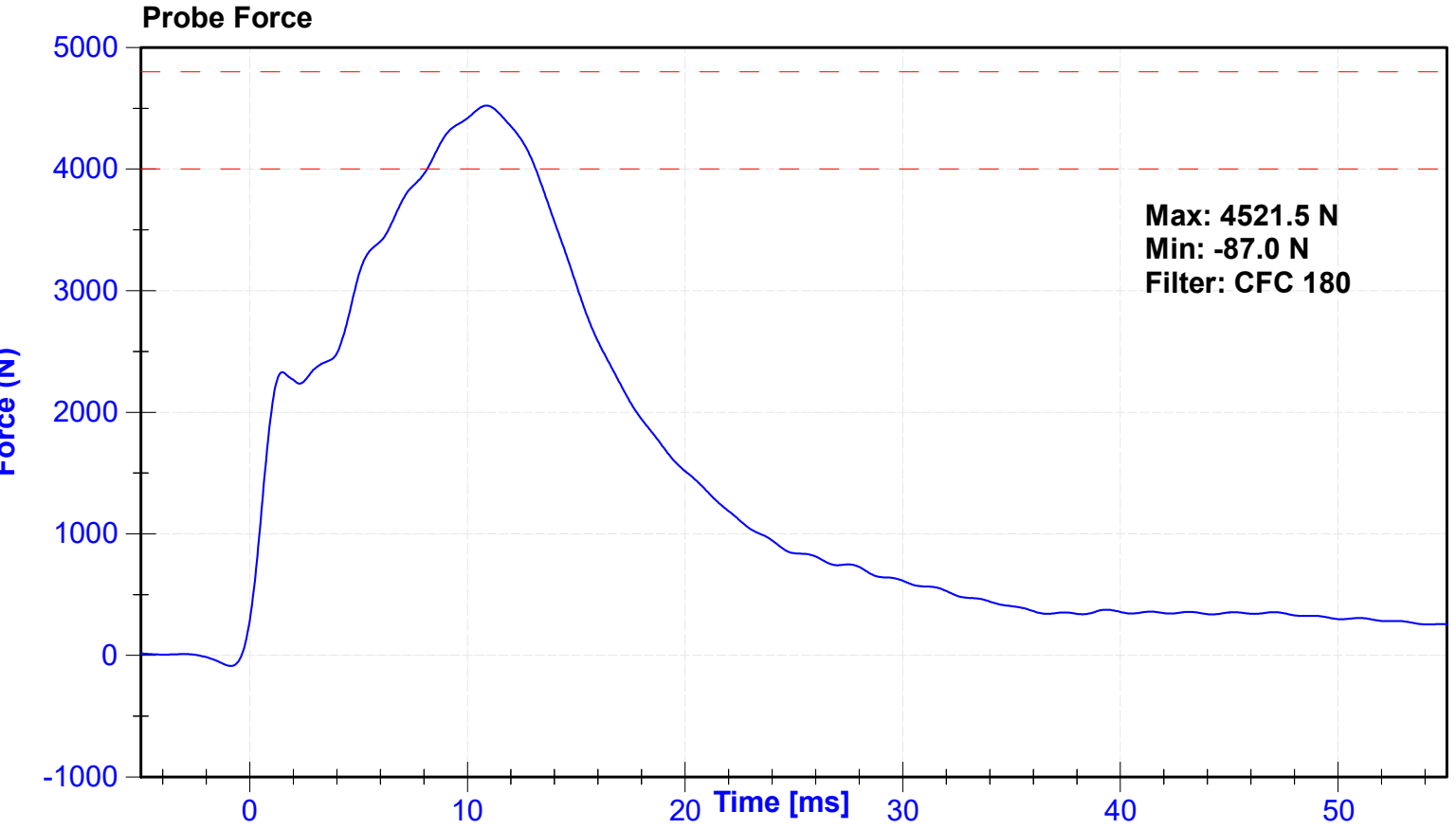
ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	F033	Laboratory Supervisor	J. Kinderman

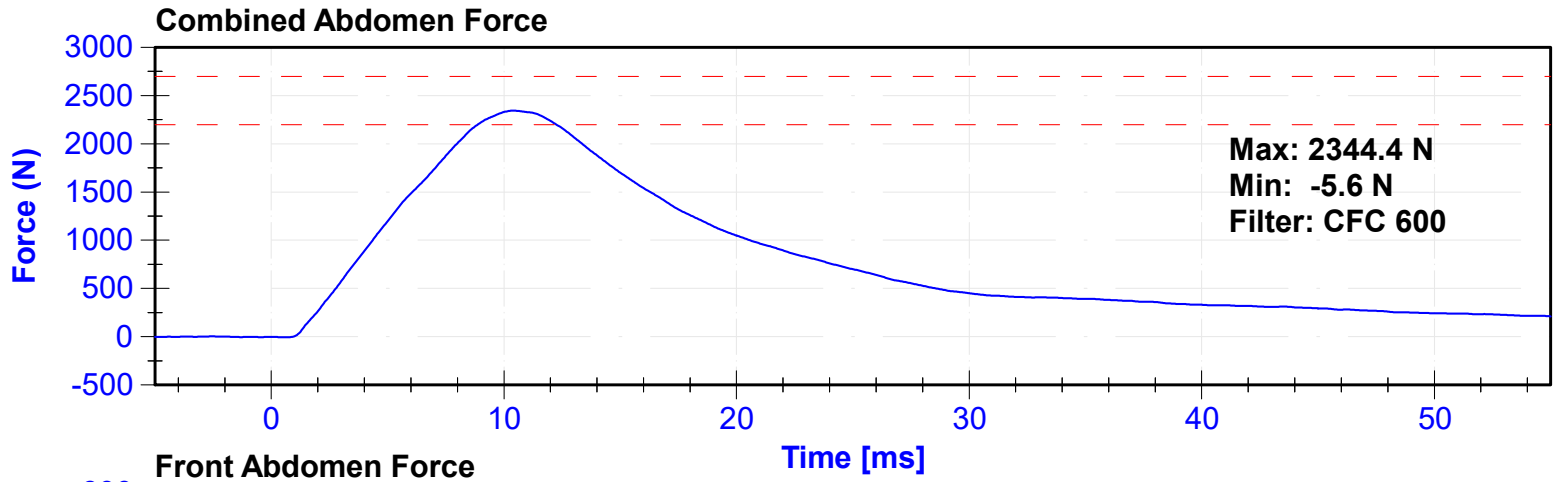
Results

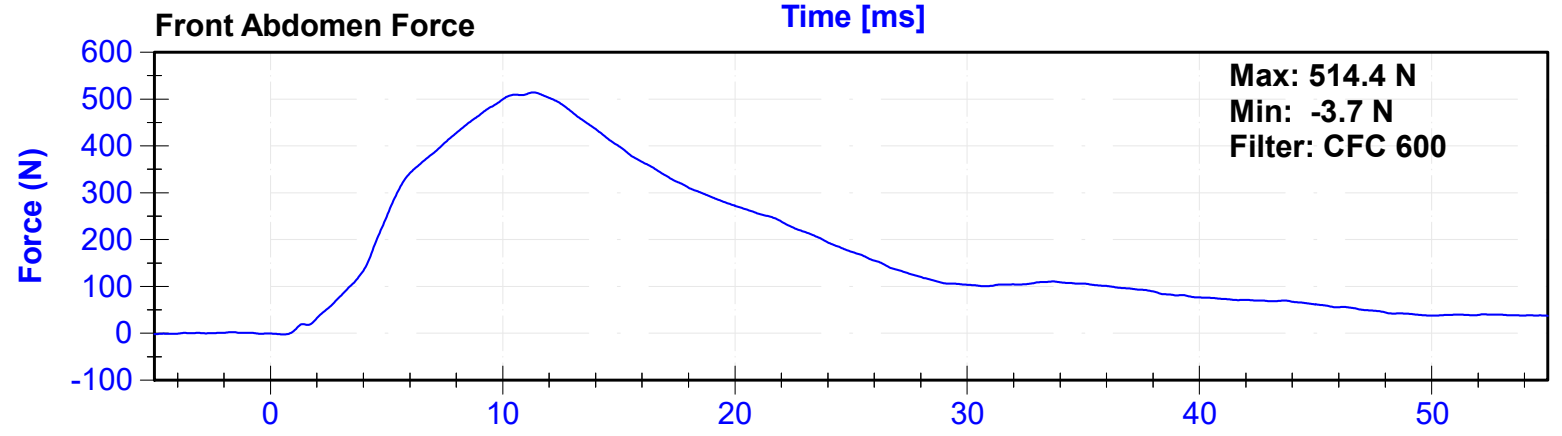
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.6	Pass
Humidity	10	70	%	23	Pass
Velocity	3.9	4.1	m/s	4.02	Pass
Combined Abdomen Force	2200	2700	N	2344.4	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	10.40	Pass
Resistive Probe Force	4000	4800	N	4521.5	Pass
Time at Peak Resistive Force	10.6	13.0	ms	10.90	Pass

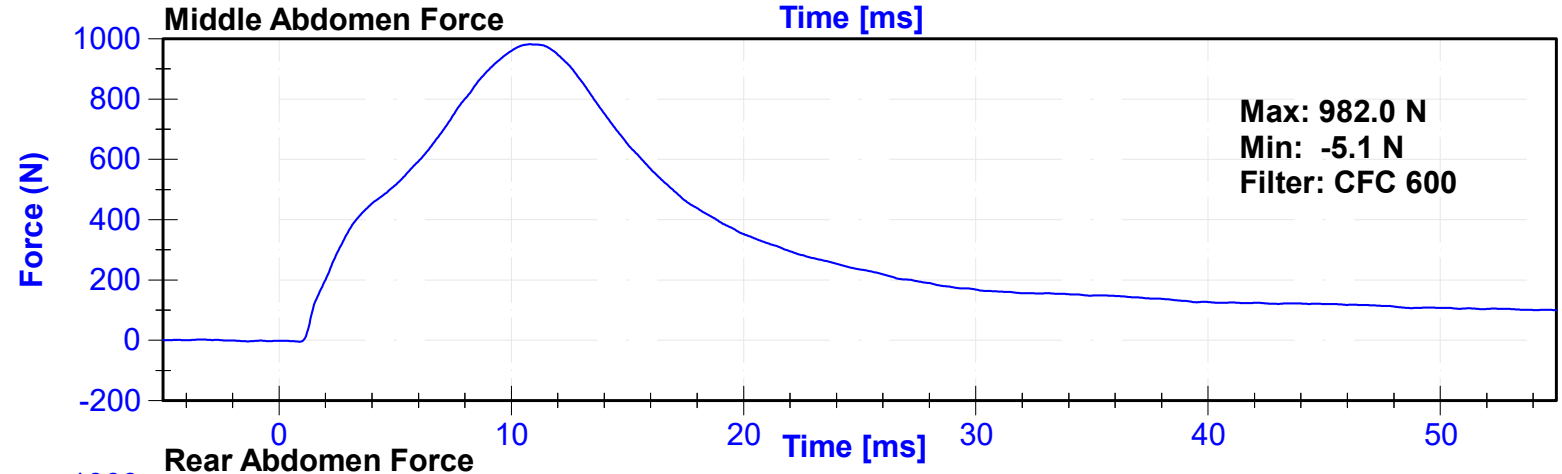
Transducer Calibrations

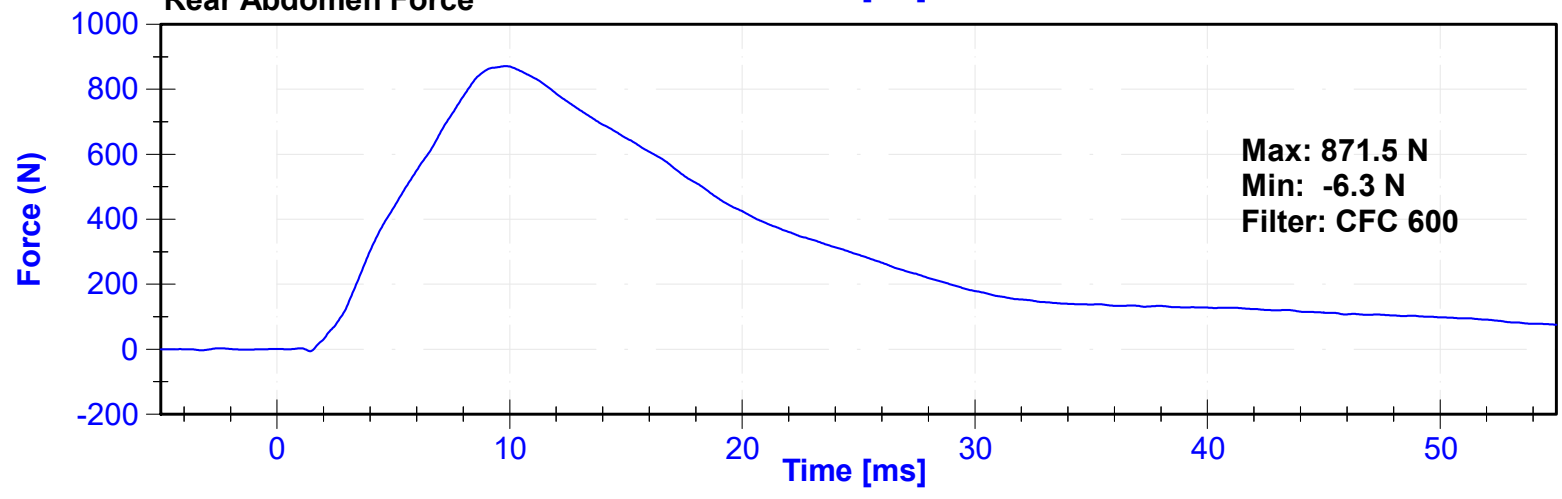
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18566	11/26/2024	5/25/2025
Front Abdomen Load Cell	Denton	1523	10/28/2024	10/28/2025
Middle Abdomen Load Cell	Denton	1524	10/28/2024	10/28/2025
Rear Abdomen Load Cell	Denton	1530	10/28/2024	10/28/2025




Combined Abdomen Force
Force (N)
Time [ms]
Max: 2344.4 N
Min: -5.6 N
Filter: CFC 600


Front Abdomen Force
Force (N)
Time [ms]
Max: 514.4 N
Min: -3.7 N
Filter: CFC 600


Middle Abdomen Force
Force (N)
Time [ms]
Max: 982.0 N
Min: -5.1 N
Filter: CFC 600


Rear Abdomen Force
Force (N)
Time [ms]
Max: 871.5 N
Min: -6.3 N
Filter: CFC 600

ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	F033	Laboratory Supervisor	J. Kinderman

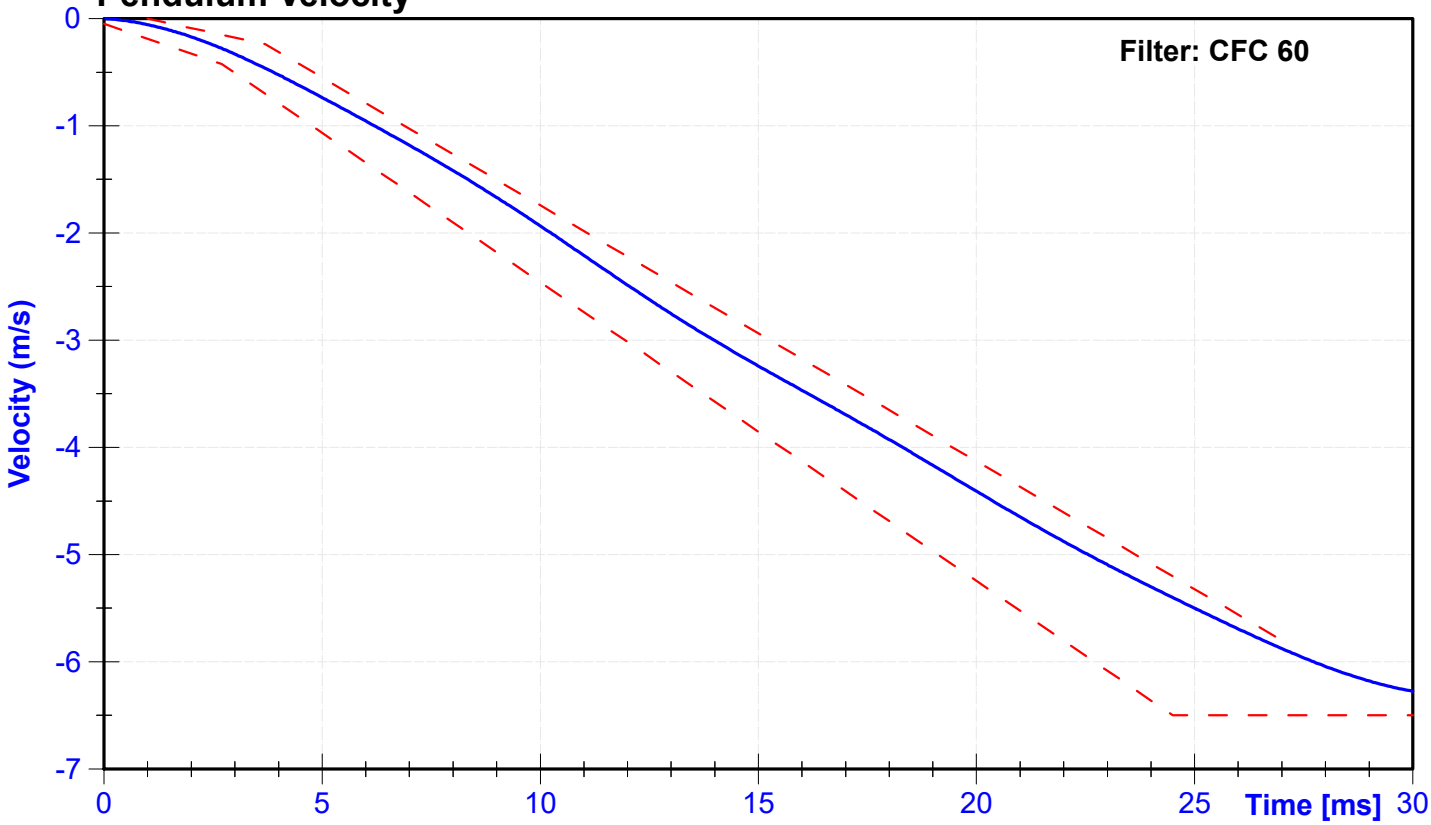
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.2	Pass
Humidity	10	70	%	17	Pass
Velocity	5.95	6.15	m/s	6.045	Pass
Lateral Spine Rotation	45	55	deg	48.6	Pass
Time at Maximum Rotation	39	53	ms	46.2	Pass
Time of Decay to Zero Degrees	37	57	ms	37.2	Pass
Pendulum Velocity Overall Corridor	Lower Boundary[1]	Upper Boundary[2]	m/s	See Plot[3]	Pass

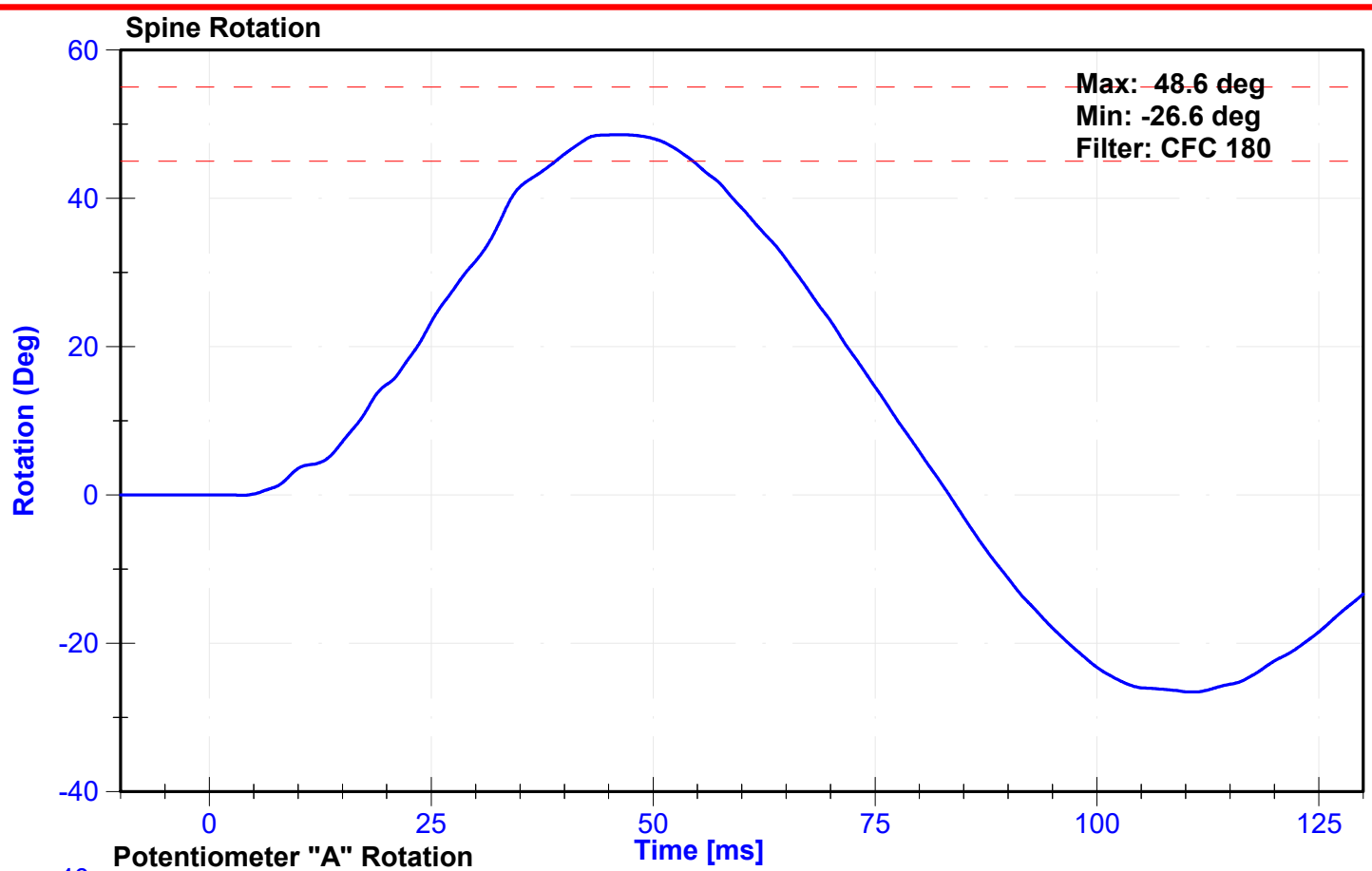
Transducer Calibrations

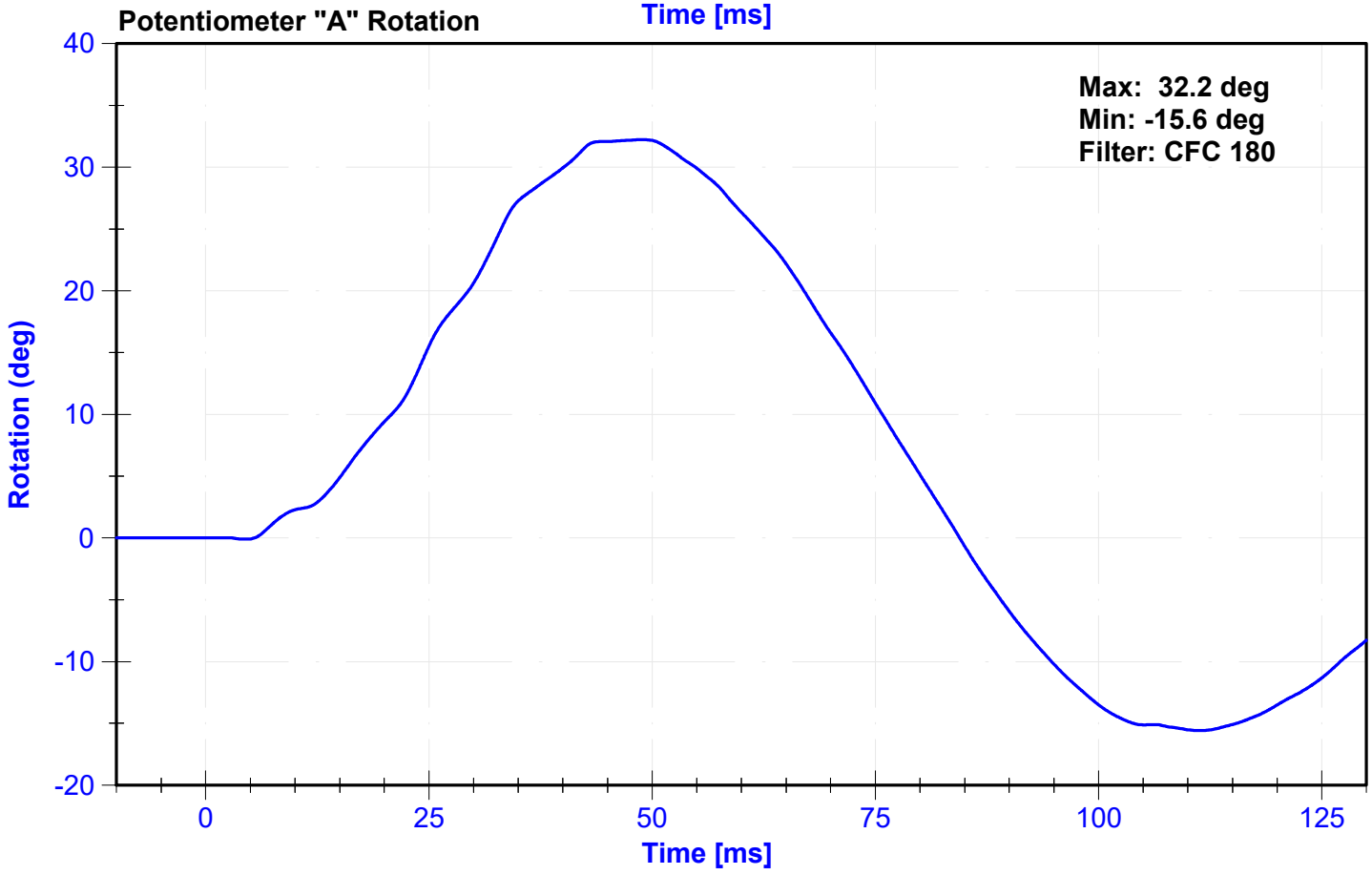
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16646	10/17/2024	4/15/2025
Pendulum "A" Potentiometer	Sfernice	2247	9/13/2024	9/13/2025
Condyle "B" Potentiometer	Sfernice	095	9/13/2024	9/13/2025

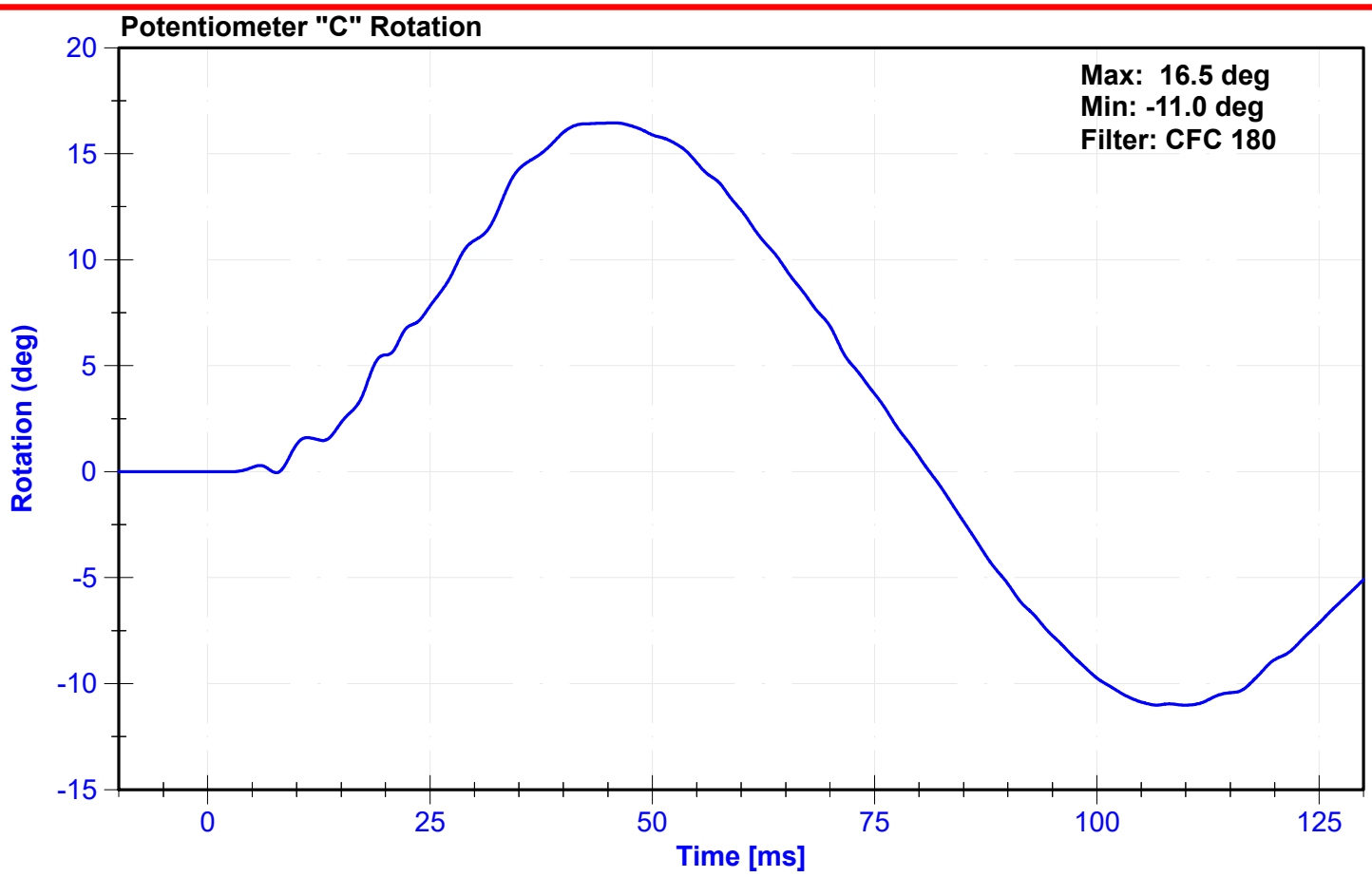
Pendulum Velocity[3]



[1,2] Upper and lower boundaries specified in Appendix I


Spine Rotation
Max: 48.6 deg
Min: -26.6 deg
Filter: CFC 180
Rotation (Deg)
60
40
20
0
-20
-40
0
25
50
75
100
125
Time [ms]


Potentiometer "A" Rotation
Max: 32.2 deg
Min: -15.6 deg
Filter: CFC 180
Rotation (deg)
40
30
20
10
0
-10
-20
0
25
50
75
100
125
Time [ms]



Appendix I

[2] Upper Boundary Corridor		[1] Lower Boundary Corridor	
Time (ms)	Velocity (m/s)	Time (ms)	Velocity (m/s)
1.0	0.00	0.0	-0.05
3.7	-0.24	2.7	-0.425
27.0	-5.80	24.5	-6.5
		30.0	-6.5

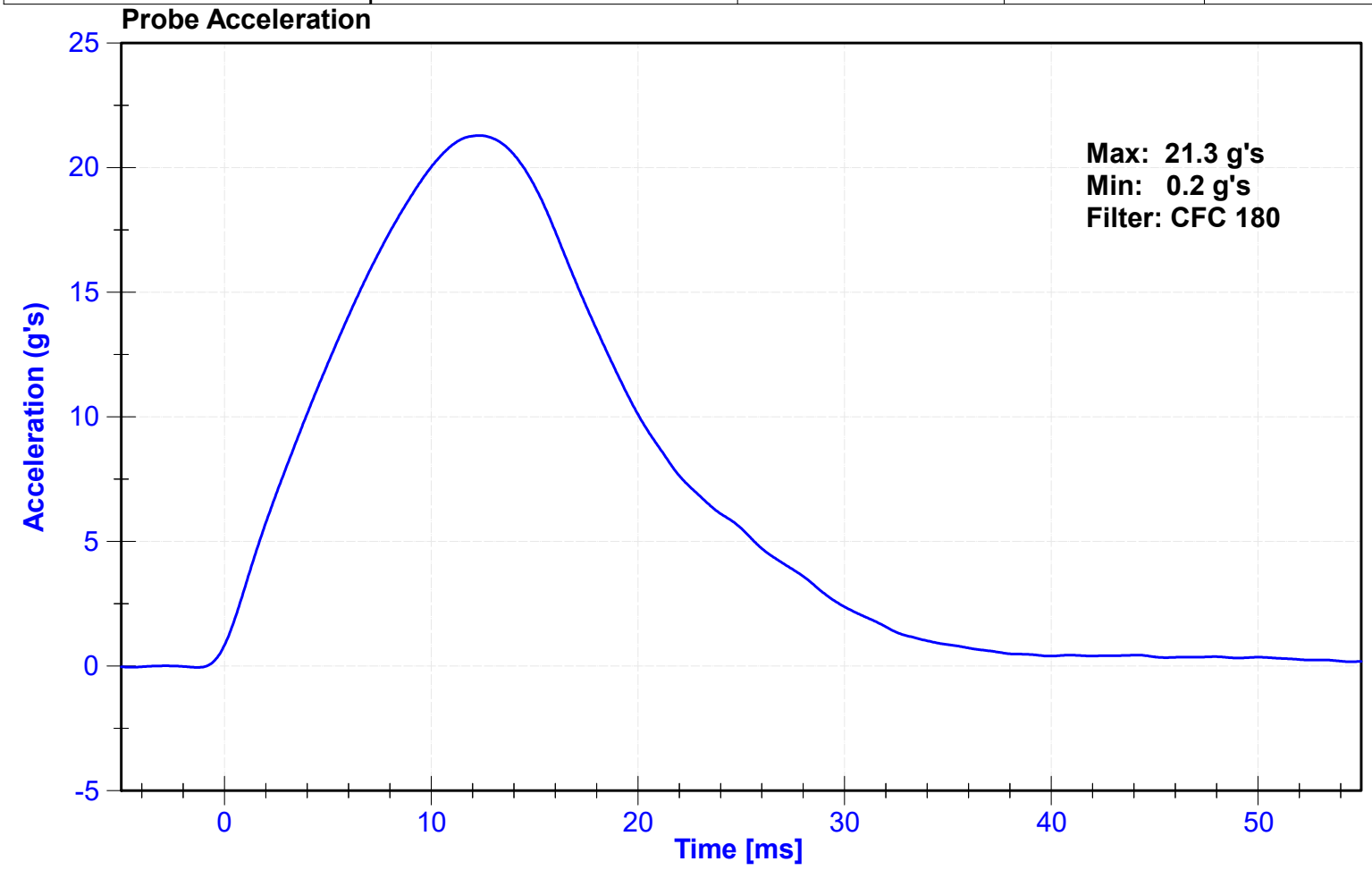
ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	F033	Laboratory Supervisor	J. Kinderman

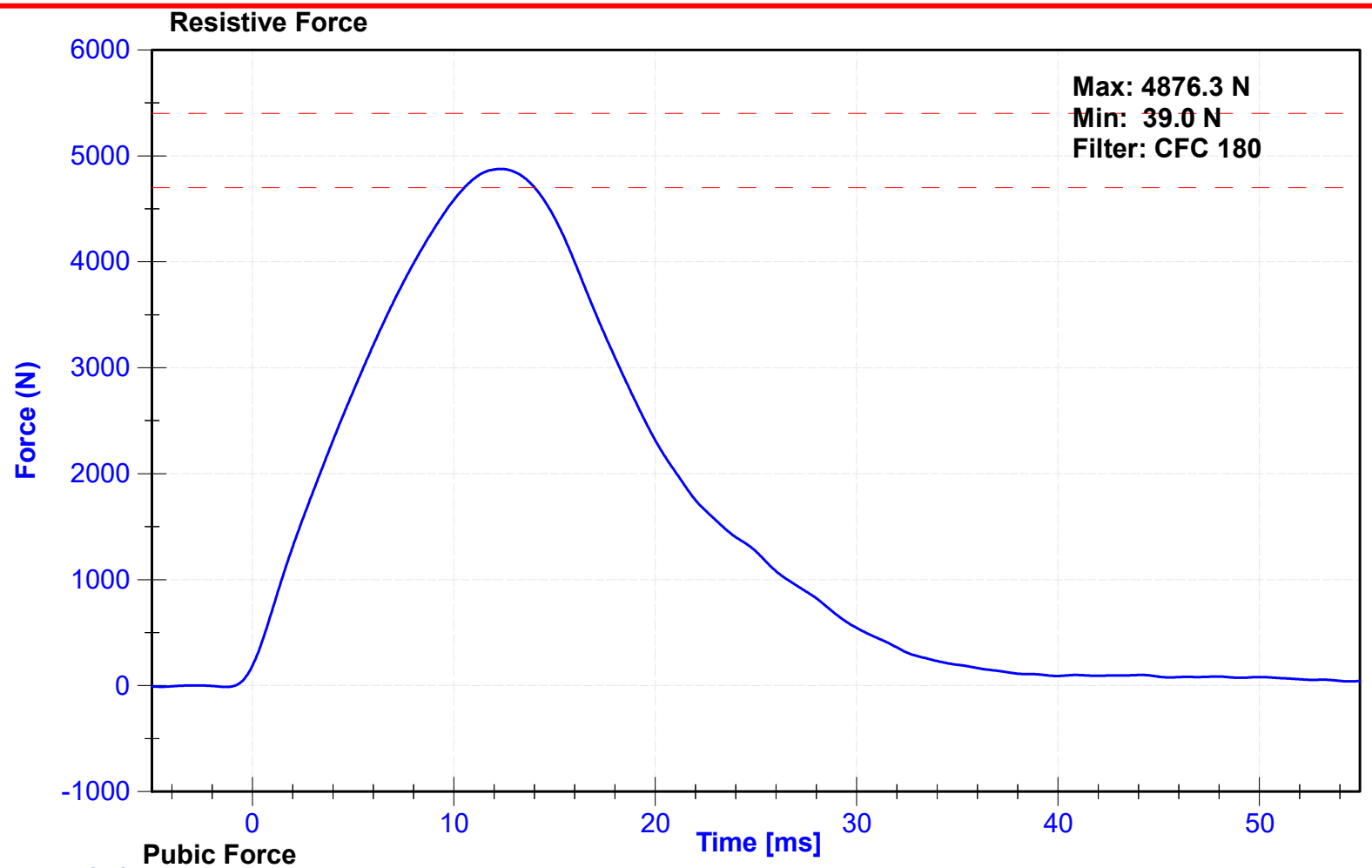
Results

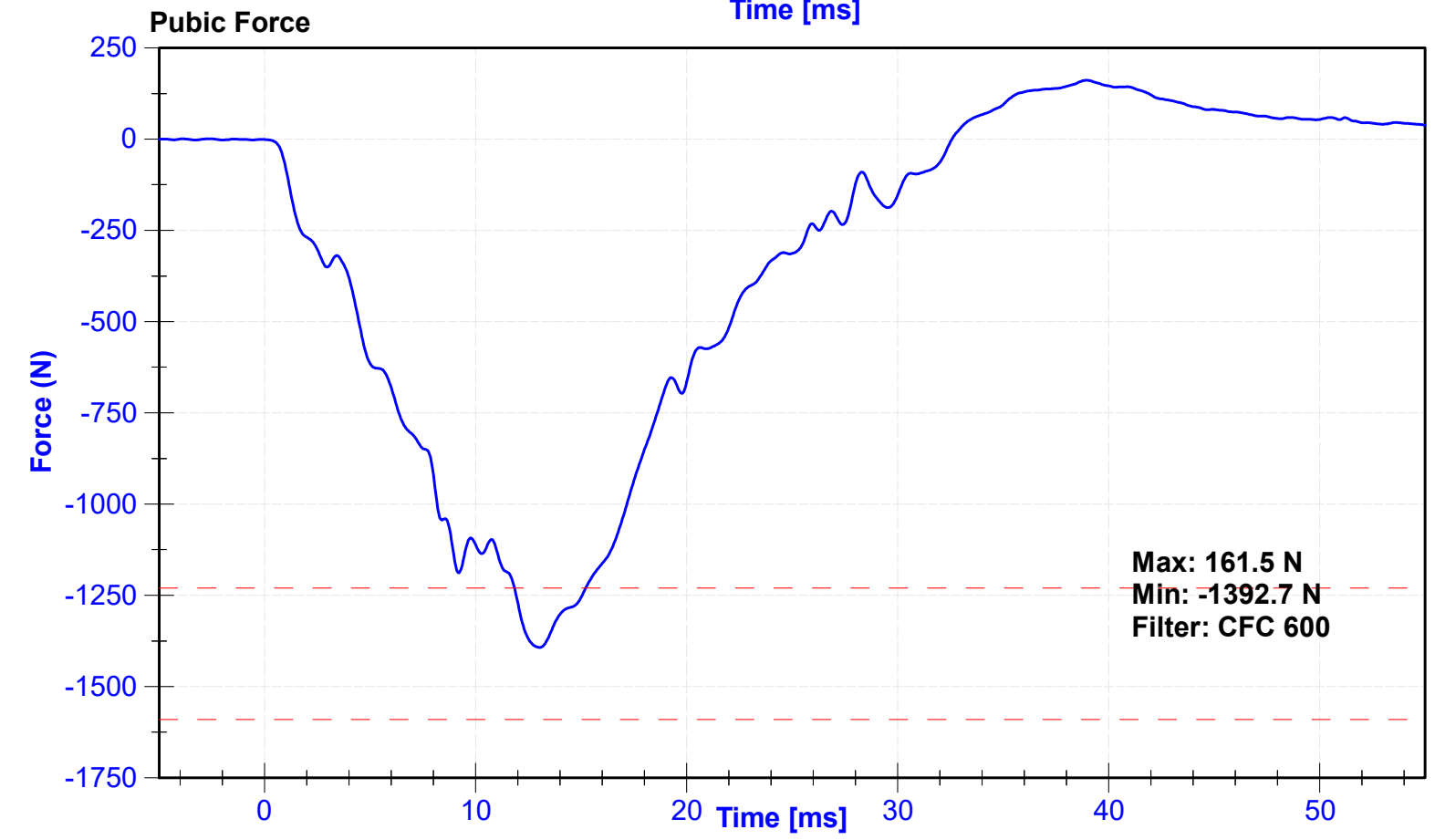
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.6	Pass
Humidity	10	70	%	23	Pass
Velocity	4.2	4.4	m/s	4.24	Pass
Resistive Force	4700	5400	N	4876.3	Pass
Time at Peak Resistive Force	11.8	16.1	ms	12.35	Pass
Pubic Force	-1590	-1230	N	-1392.7	Pass
Time at Peak Pubic Force	12.2	17.0	ms	13.00	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18566	11/26/2024	5/25/2025
Pubic Load Cell	Denton	458-FY	10/28/2024	10/28/2025




Resistive Force
Max: 4876.3 N
Min: 39.0 N
Filter: CFC 180
Force (N)
6000
5000
4000
3000
2000
1000
0
-1000
0
10
20
30
40
50
Time [ms]


Pubic Force
Max: 161.5 N
Min: -1392.7 N
Filter: CFC 600
Force (N)
250
0
-250
-500
-750
-1000
-1250
-1500
-1750
0
10
20
30
40
50
Time [ms]

CALIBRATION TEST RESULTS

PRE-TEST

SID-IIS 5TH PERCENTILE FEMALE – PASSENGER ATD

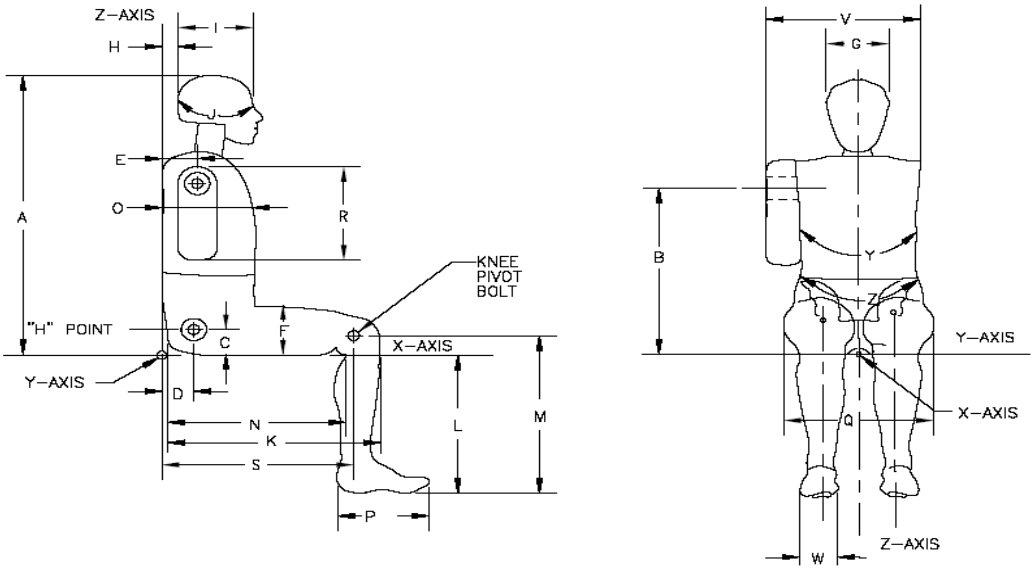
SERIAL NO:DG8012

(CONFIGURED FOR LEFT SIDE IMPACT)

External Measurements - SID-IIs

Technician: J. Rios Date: 1/15/2025

Dummy Serial Number: DG8012



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	782	Pass
B	Shoulder Pivot Height	437	453	445	Pass
C	H-point Height	79	89	88	Pass
D	H-point from seatback	141	151	144	Pass
E	Shoulder Pivot from Backline	97	107	105	Pass
F	Thigh Clearance	119	135	121	Pass
G	Head Breadth	140	148	142	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	179	Pass
J	Head Circumference	541	551	547	Pass
K	Buttock to Knee Length	514	540	522	Pass
L	Popliteal Height	343	369	355	Pass
M	Knee Pivot to floor height	392	409	402	Pass
N	Buttock Popliteal Length	416	442	428	Pass
O	Chest Depth w/o jacket	195	211	204	Pass
P	Foot Length	216	232	222	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	319	Pass
R	Arm Length	249	259	252	Pass
S	Knee Joint to seatback	477	493	483	Pass
V	Shoulder Width	341	357	348	Pass
W	Foot Width	78	94	85	Pass
Y	Chest Circumference w/jacket	851	881	869	Pass
Z	Waist Circumference	761	791	781	Pass

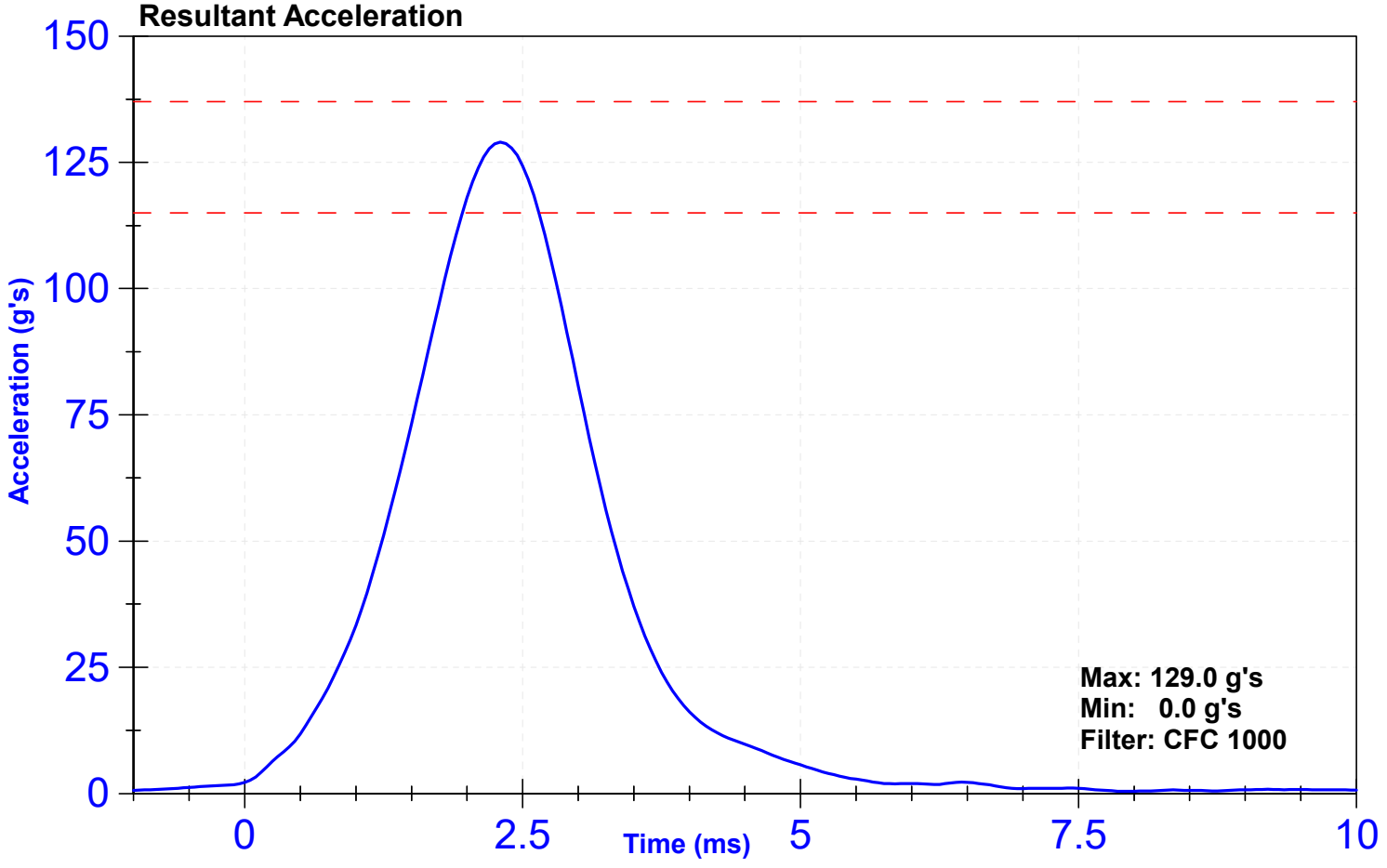
ATD Manufacturer	FTSS	Test Technician	E. Andruczyk
ATD Serial Number	DG8012	Laboratory Supervisor	J. Kinderman

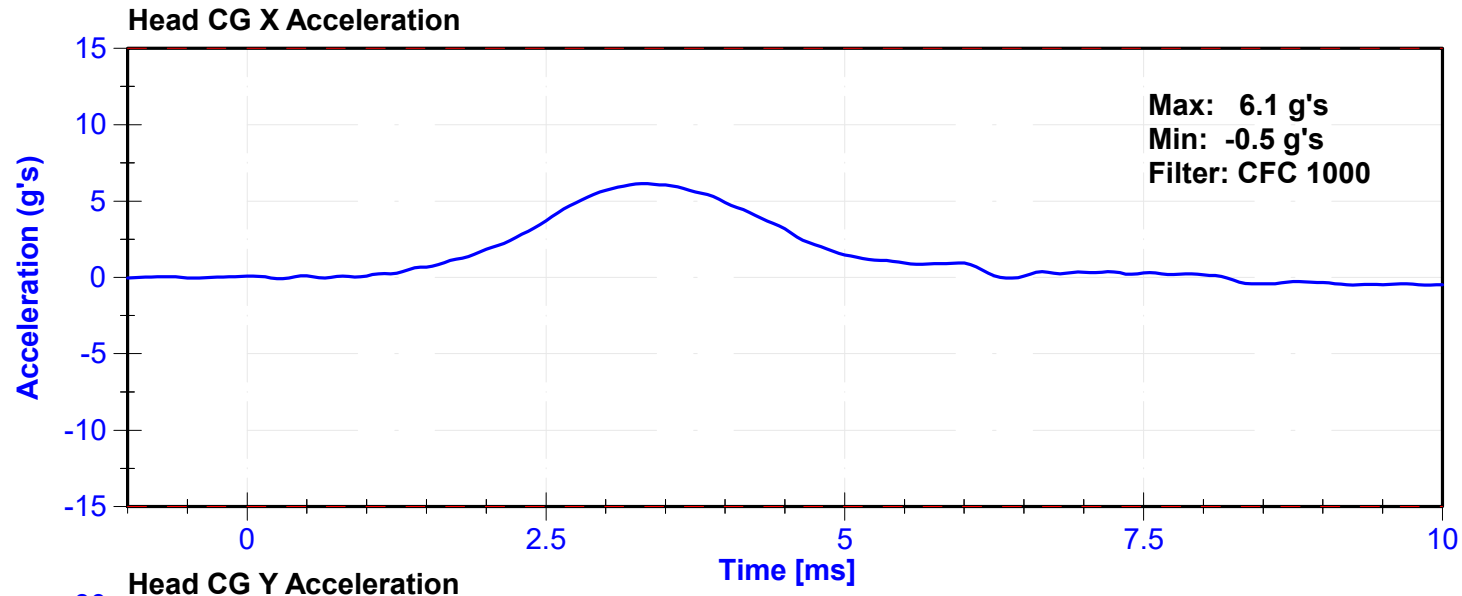
Results

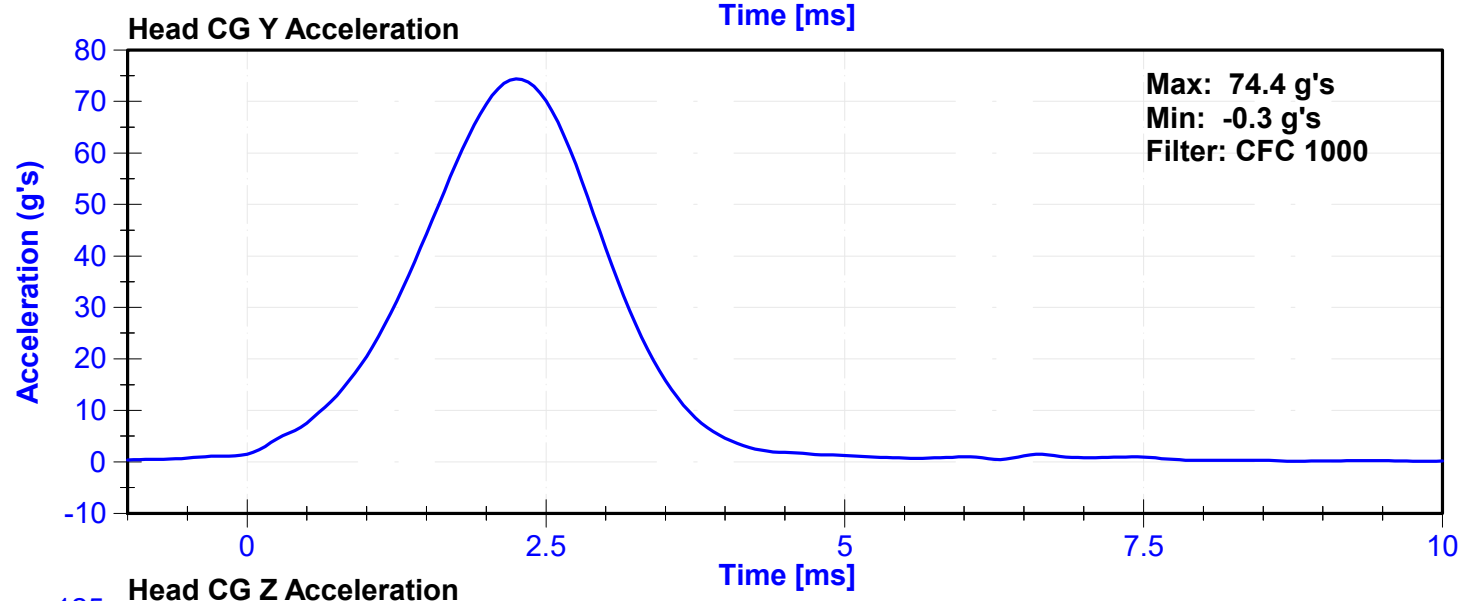
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21	Pass
Humidity	10	70	%	20	Pass
Resultant Acceleration	115	137	g's	129.0	Pass
Oscillation	0	15	%	1.7	Pass
Fore-Aft Acceleration	-15	15	g's	6.1	Pass

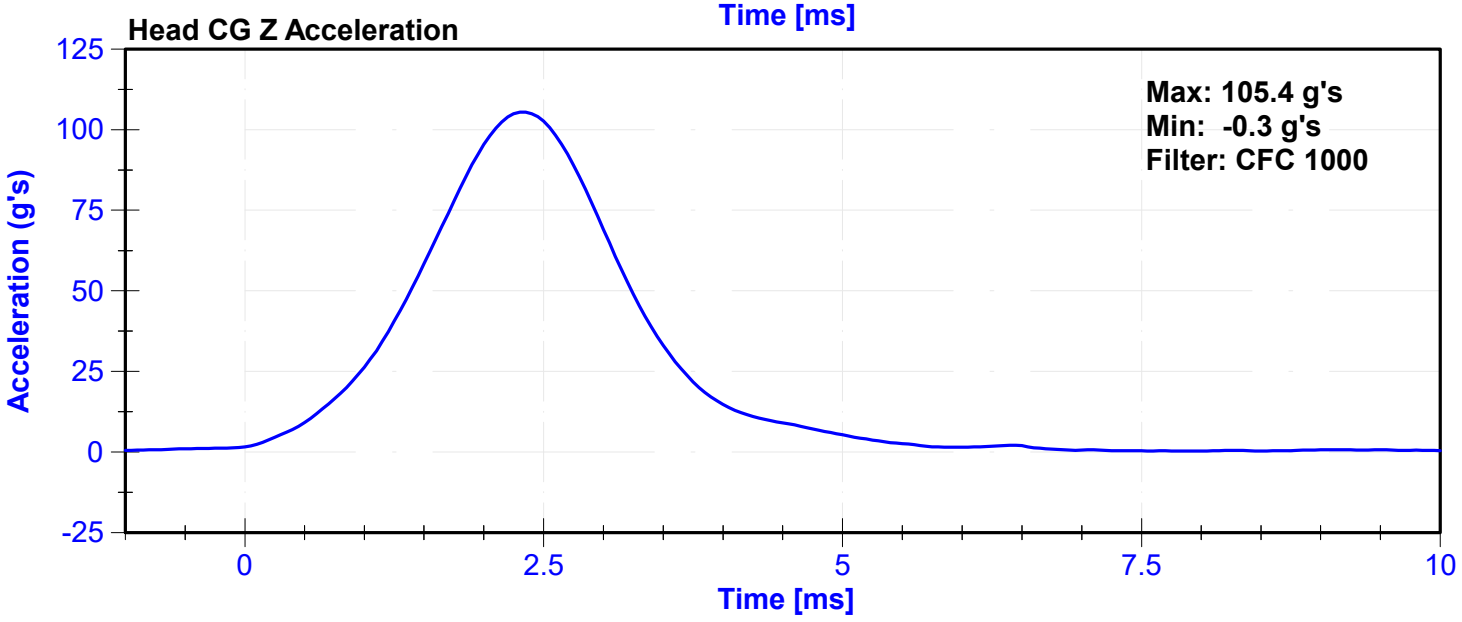
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibratio Date	Calibratio Due Date
X Accelerometer	Endevco	T21184	10/17/2024	4/15/2025
Y Accelerometer	Endevco	T31030	10/17/2024	4/15/2025
Z Accelerometer	Endevco	P83319	10/17/2024	4/15/2025




Head CG X Acceleration
Max: 6.1 g's
Min: -0.5 g's
Filter: CFC 1000
Acceleration (g's)
Time [ms]


Head CG Y Acceleration
Max: 74.4 g's
Min: -0.3 g's
Filter: CFC 1000
Acceleration (g's)
Time [ms]


Head CG Z Acceleration
Max: 105.4 g's
Min: -0.3 g's
Filter: CFC 1000
Acceleration (g's)
Time [ms]

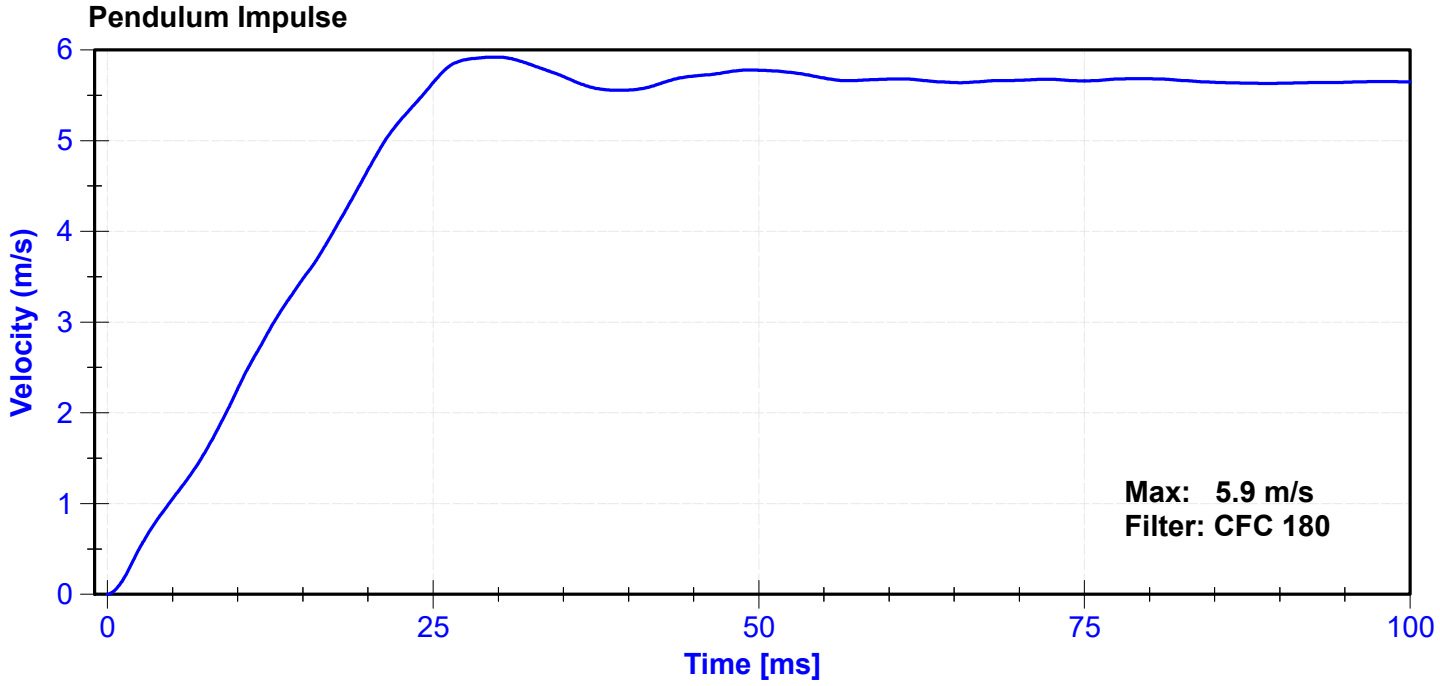
ATD Manufacturer	Humanetics	Test Technician	J. Rios
ATD Serial Number	DG8012	Laboratory Supervisor	J. Kinderman

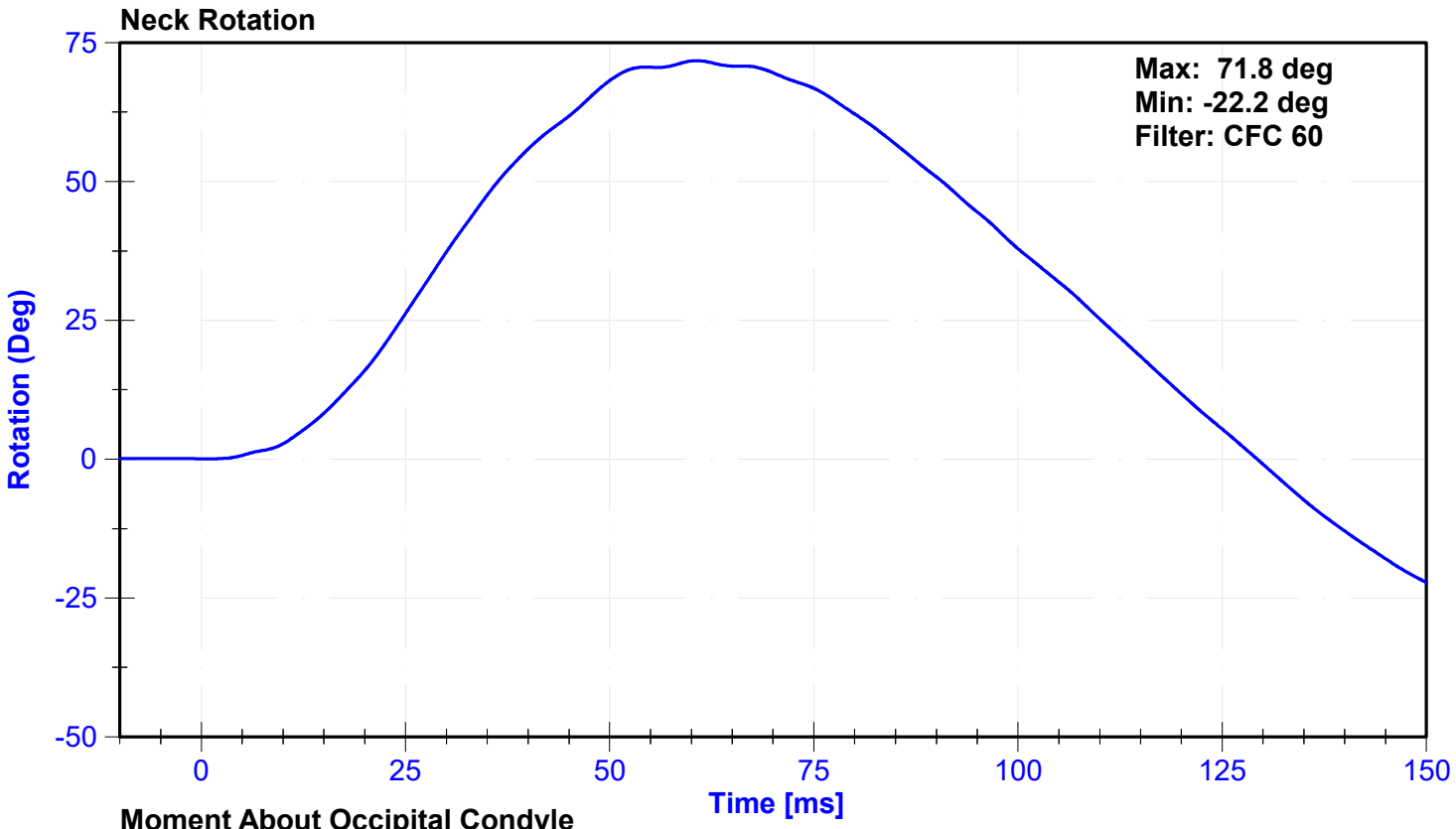
Results

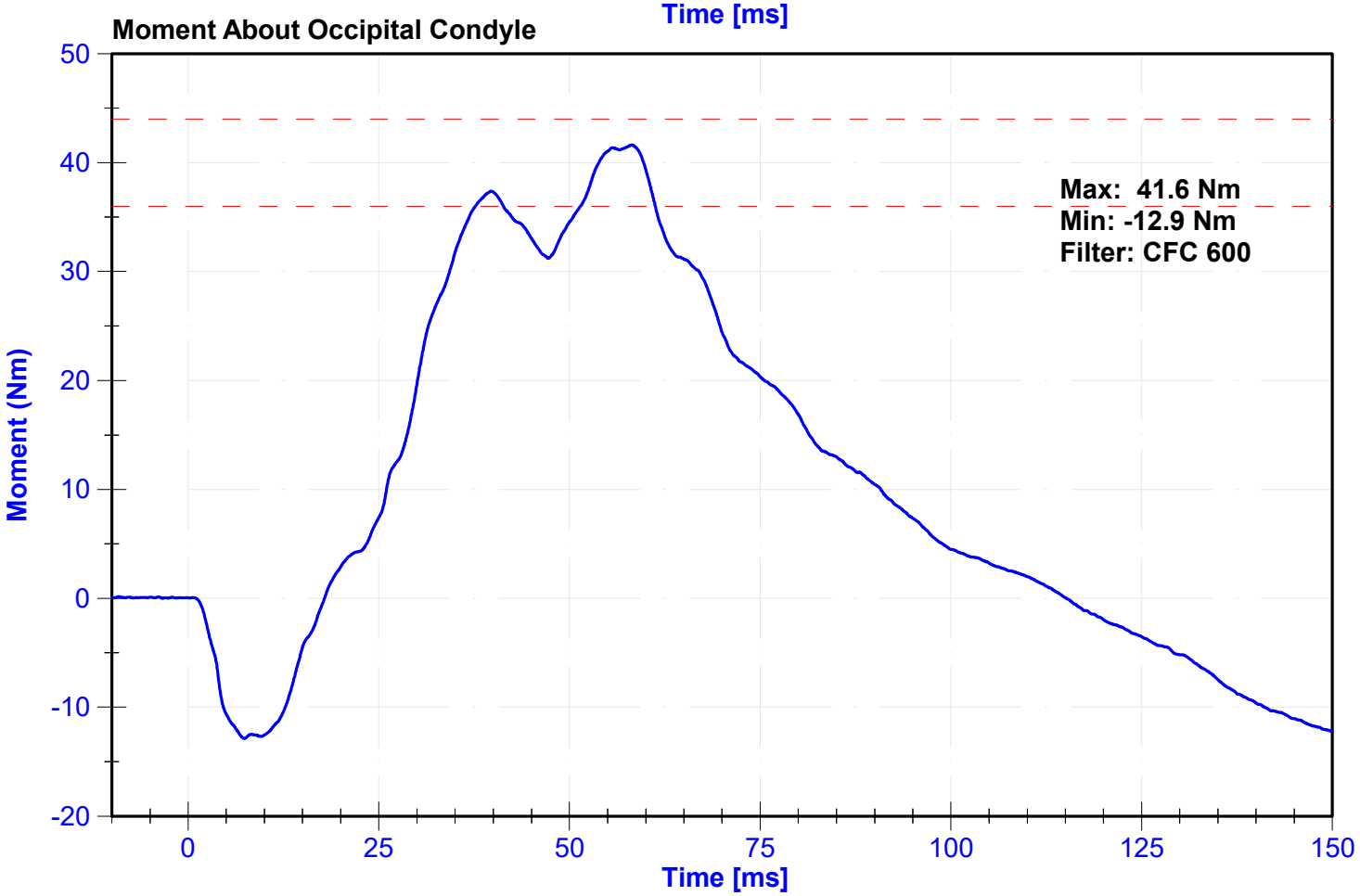
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.7	Pass
Humidity	10	70	%	29	Pass
Velocity	5.51	5.63	m/s	5.564	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.27	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.48	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.68	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.64	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.92	Pass
Neck Rotation	71	81	deg	71.8	Pass
Time at Maximum Rotation	50	70	ms	60.7	Pass
Moment about the OC	36	44	Nm	41.6	Pass
Moment Decay to 0 Nm	102	126	ms	115.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	7231C-750	10/30/2024	4/28/2025
Pendulum Potentiometer	Servo	4961	9/23/2024	9/23/2025
Condyle Potentiometer	Servo	DS185	9/23/2024	9/23/2025
Upper Neck Load Cell	Kistler	M555A6CFM_1935H01696-FY	1/2/2025	1/2/2026




Neck Rotation
Max: 71.8 deg
Min: -22.2 deg
Filter: CFC 60
Rotation (Deg)
75
50
25
0
-25
-50
0
25
50
75
100
125
150
Time [ms]


Moment About Occipital Condyle
Max: 41.6 Nm
Min: -12.9 Nm
Filter: CFC 600
Moment (Nm)
50
40
30
20
10
0
-10
-20
0
25
50
75
100
125
150
Time [ms]

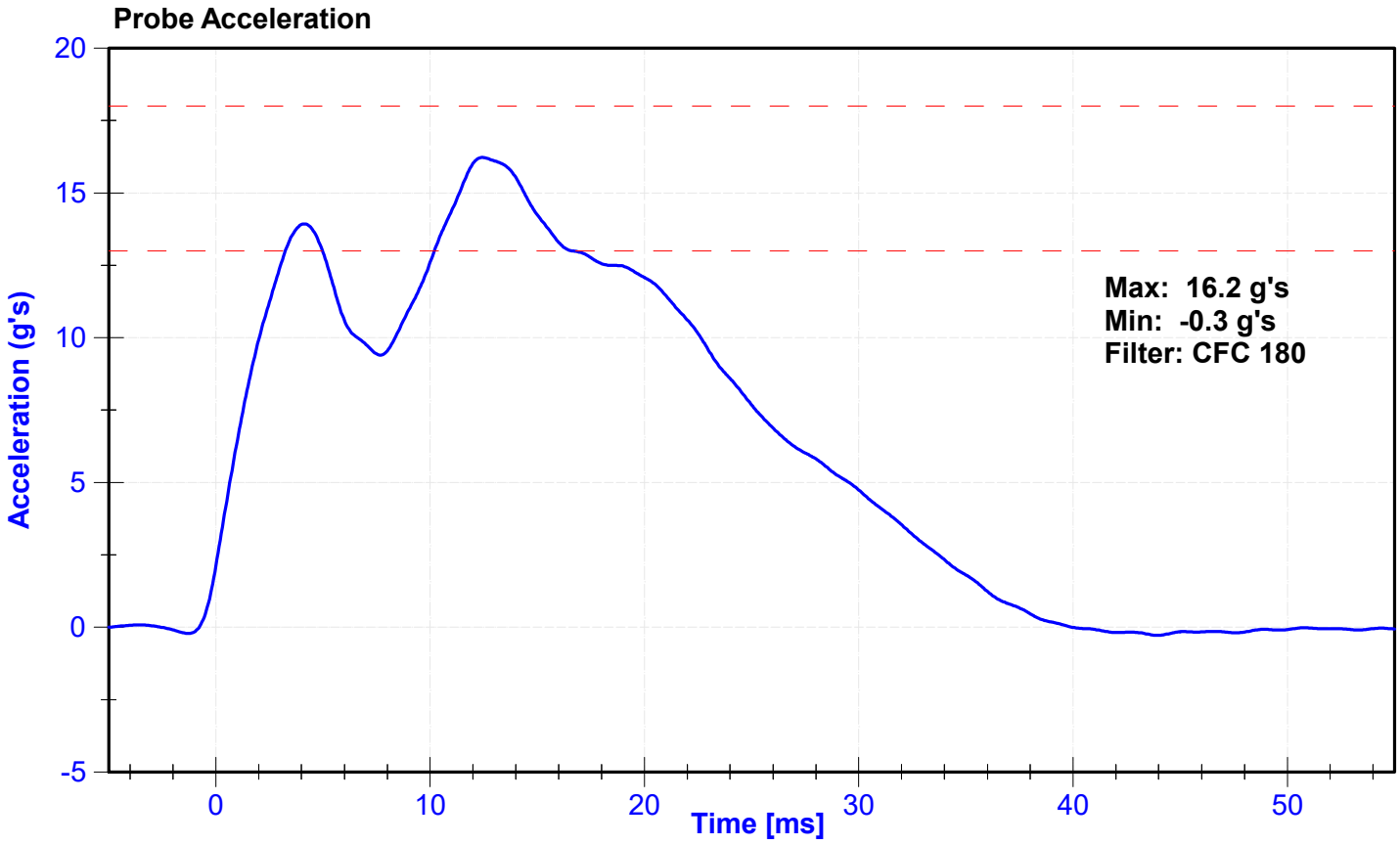
ATD Manufacturer	FTSS	Test Technician	E. Andruczyk
ATD Serial Number	DG8012	Laboratory Supervisor	J. Kinderman

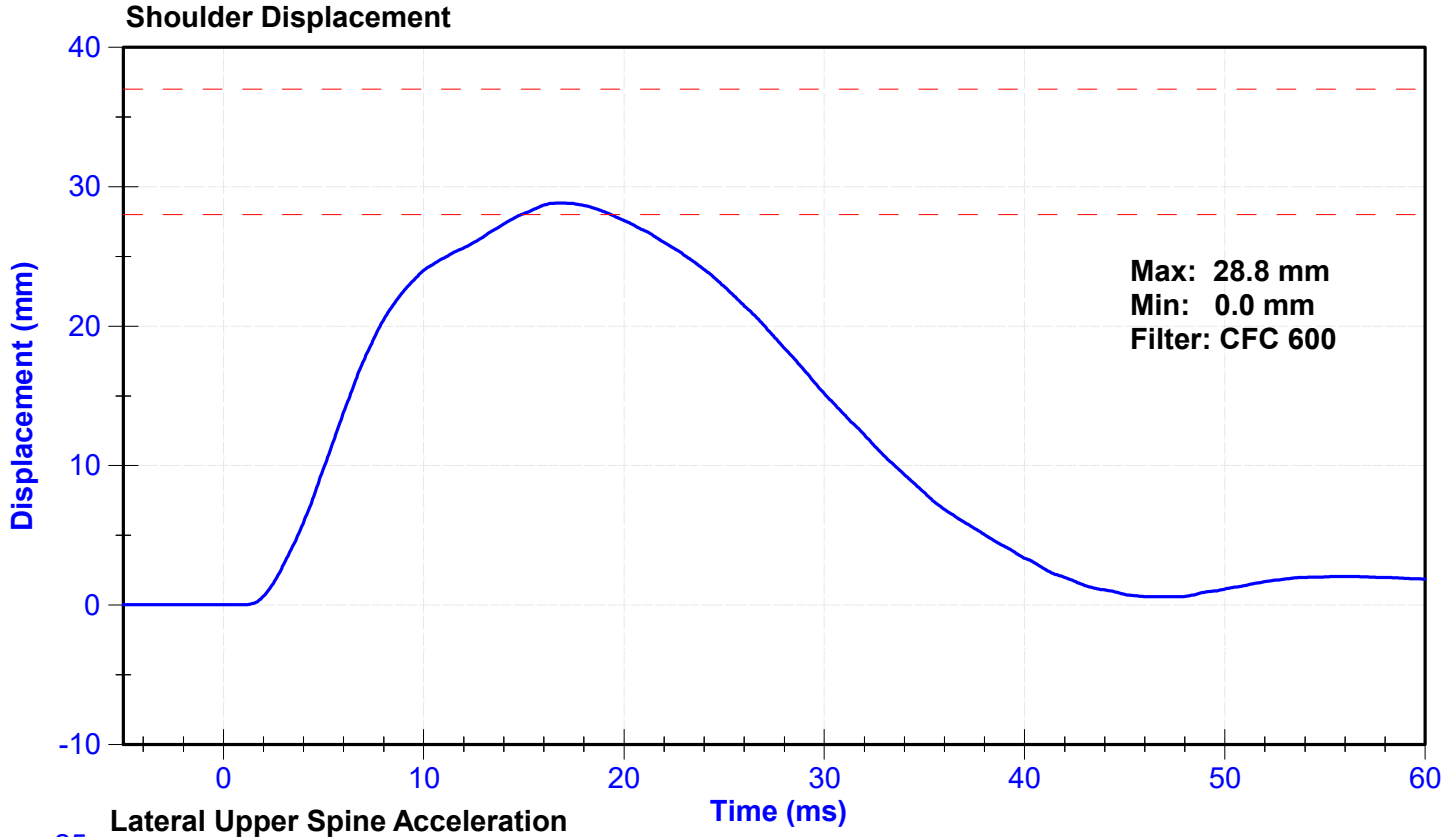
Results

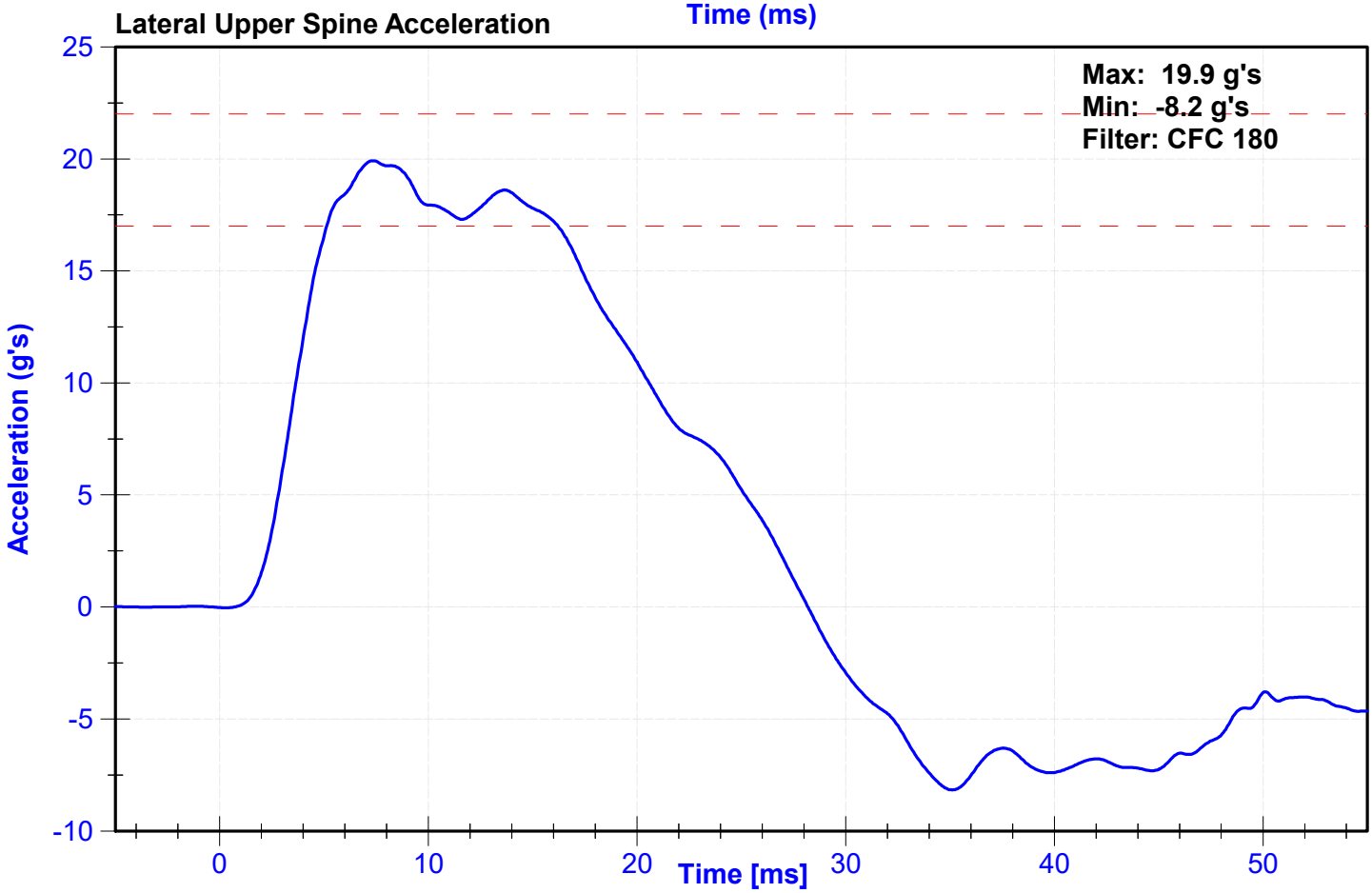
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21	Pass
Humidity	10	70	%	20	Pass
Velocity	4.2	4.4	m/s	4.28	Pass
Probe Acceleration	13	18	g's	16.2	Pass
Shoulder Deflection	28	37	mm	28.8	Pass
Lateral Upper Spine Acceleration	17	22	g's	19.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18527	8/2/2024	1/29/2025
Shoulder Potentiometer	Servo	1274GFE	10/16/2024	4/16/2025
Upper Spine Y Accelerometer	Endevco	P64148	10/17/2024	4/15/2025




Shoulder Displacement
Displacement (mm)
Time (ms)
Max: 28.8 mm
Min: 0.0 mm
Filter: CFC 600


Lateral Upper Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 19.9 g's
Min: -8.2 g's
Filter: CFC 180

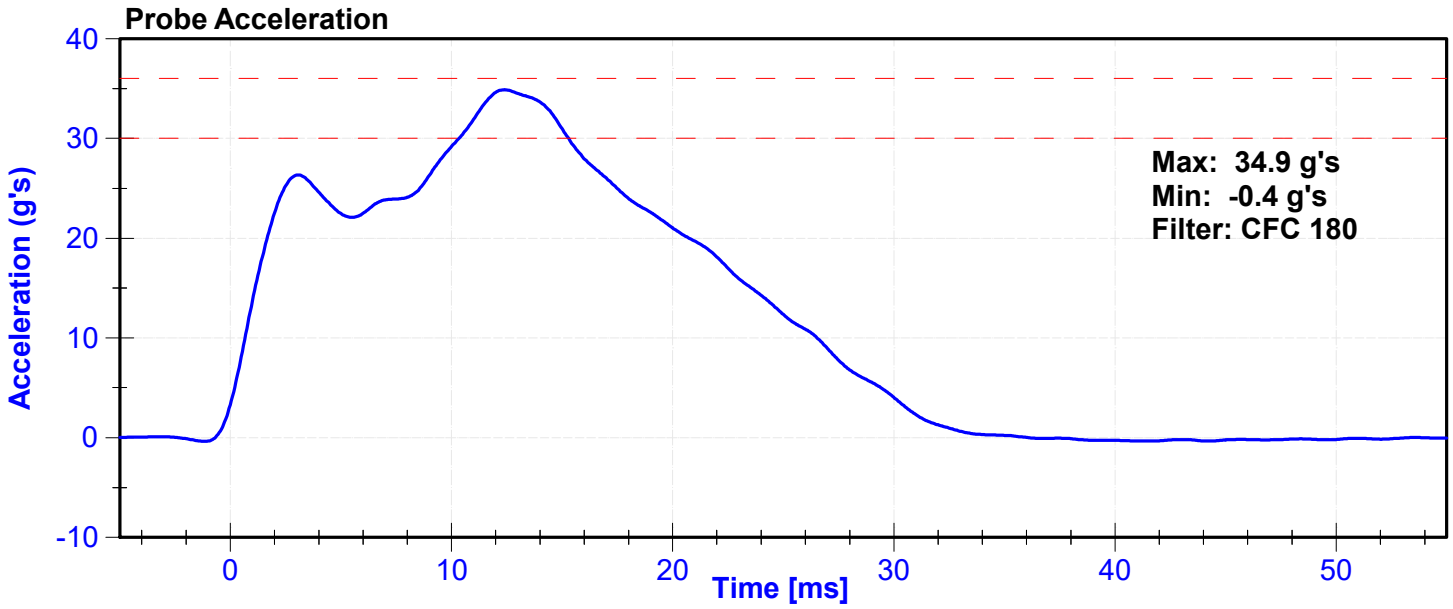
ATD Manufacturer	FTSS	Test Technician	E. Andruczyk
ATD Serial Number	DG8012	Laboratory Supervisor	J. Kinderman

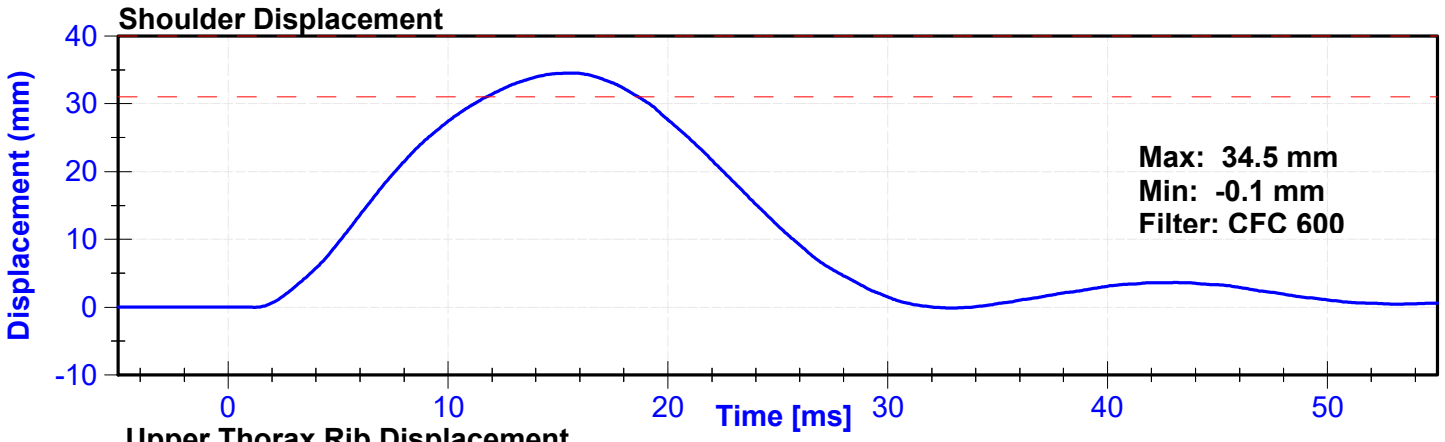
Results

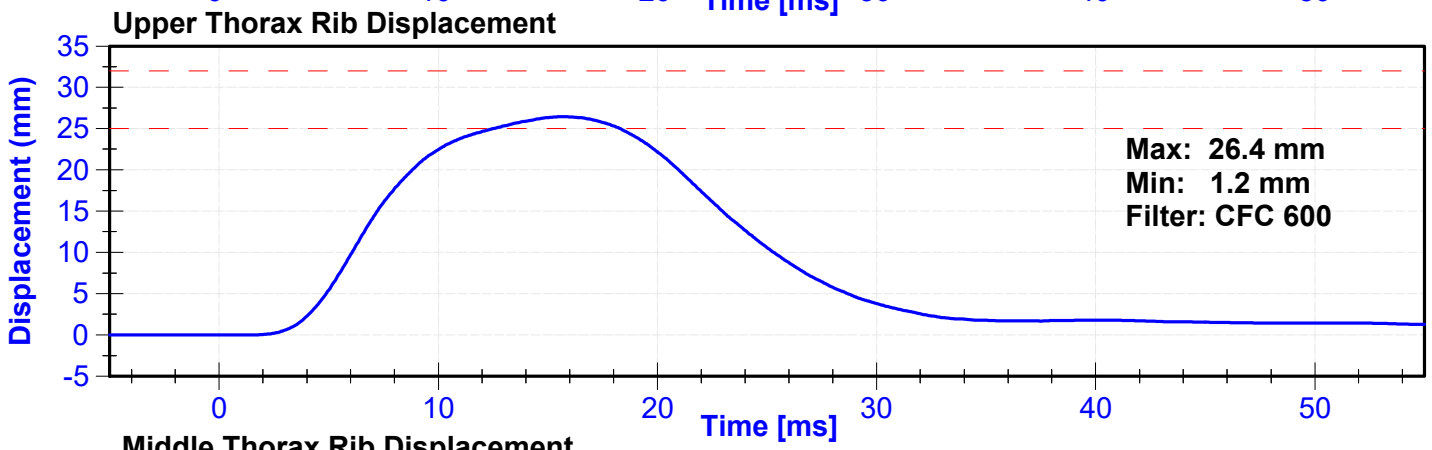
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21	Pass
Humidity	10	70	%	20	Pass
Velocity	6.6	6.8	m/s	6.63	Pass
Probe Acceleration after 5 ms	30	36	g's	34.9	Pass
Lateral Upper Spine Acceleration	34	43	g's	39.0	Pass
Lateral Lower Spine Acceleration	29	37	g's	34.8	Pass
Shoulder Deflection	31	40	mm	34.5	Pass
Upper Thorax Rib Deflection	25	32	mm	26.4	Pass
Mid Thorax Rib Deflection	30	36	mm	30.1	Pass
Lower Thorax Rib Deflection	32	38	mm	32.3	Pass

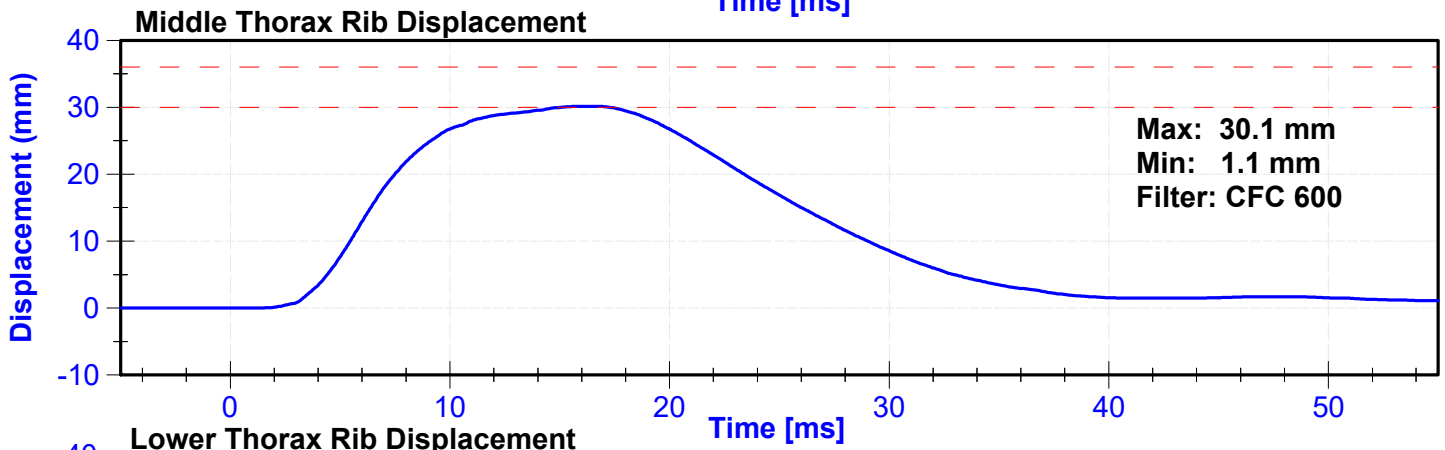
Transducer Calibrations

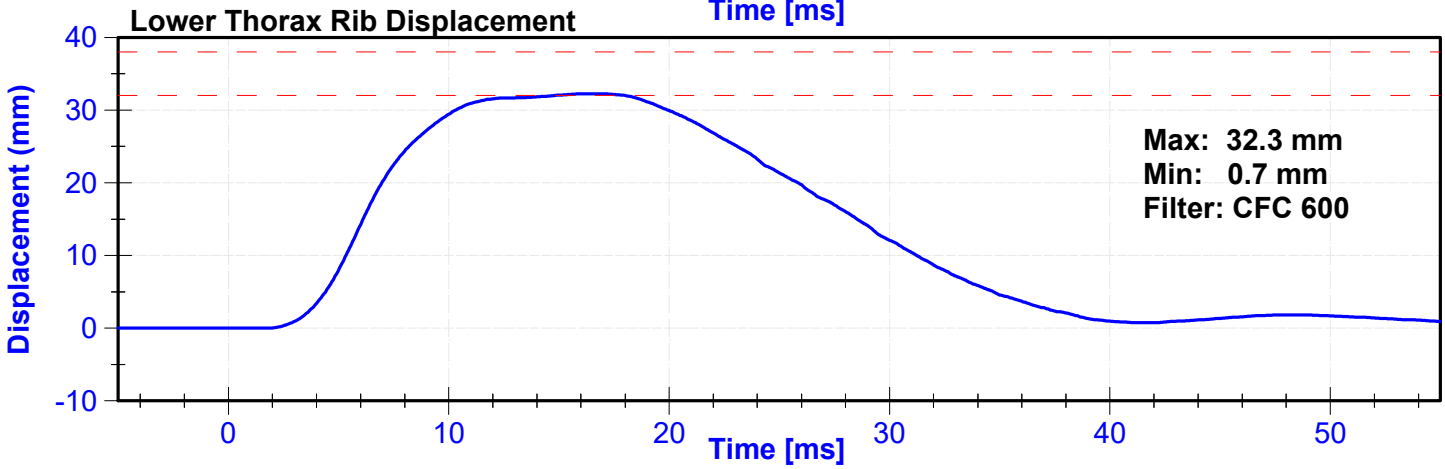
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18527	8/2/2024	1/29/2025
Upper Spine T1 Y Accelerometer	Endevco	P64148	10/17/2024	4/15/2025
Upper Spine T12 Y Accelerometer	Endevco	P51327	10/17/2024	4/15/2025
Shoulder Potentiometer	Servo	1274GFE	10/16/2024	4/16/2025
Upper Thorax Rib Potentiometer	Servo	1199GFE	10/16/2024	4/16/2025
Middle Thorax Rib Potentiometer	Servo	1246GFE	10/16/2024	4/16/2025
Lower Thorax Rib Potentiometer	Servo	011GFE	10/16/2024	4/16/2025

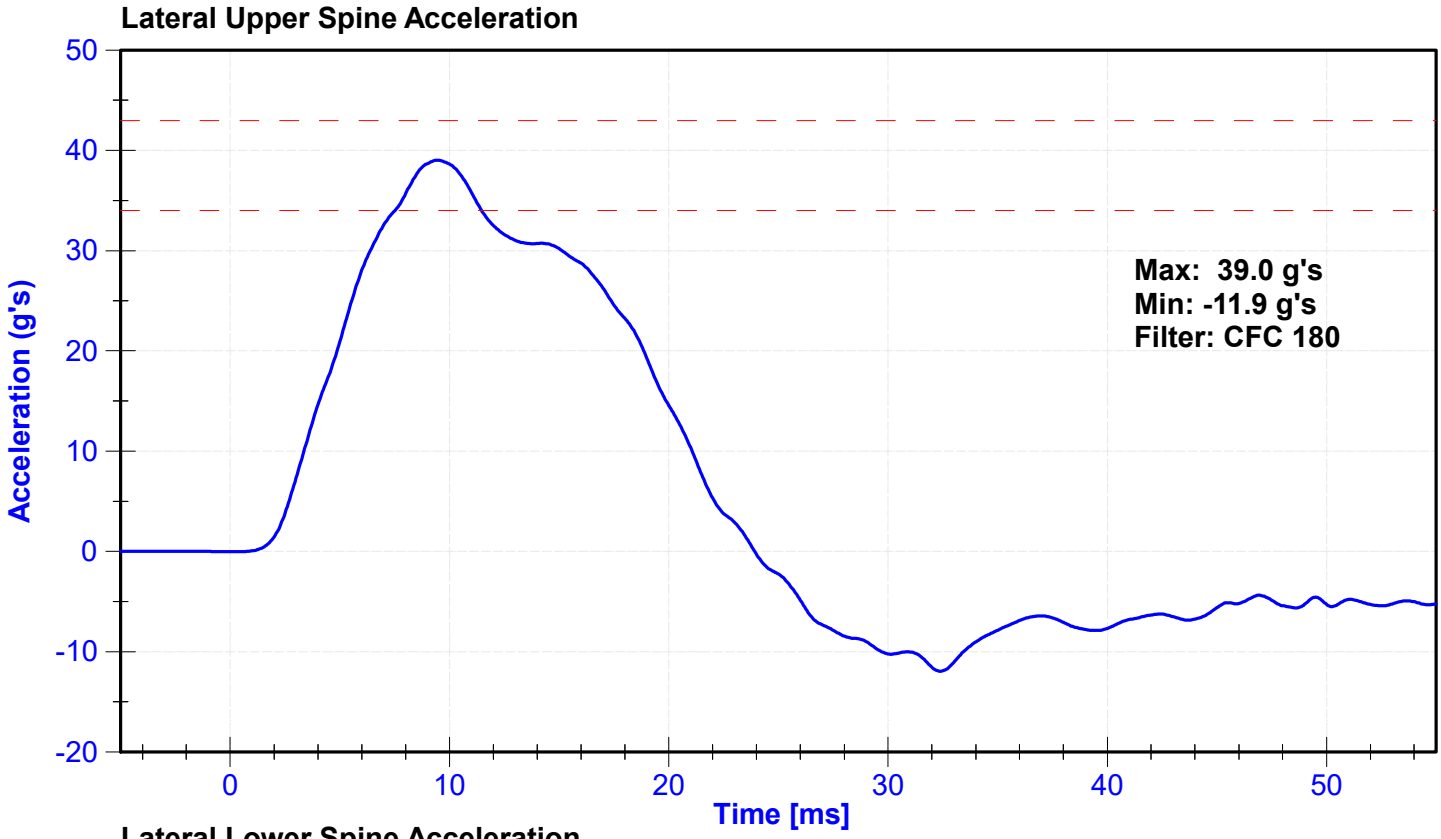


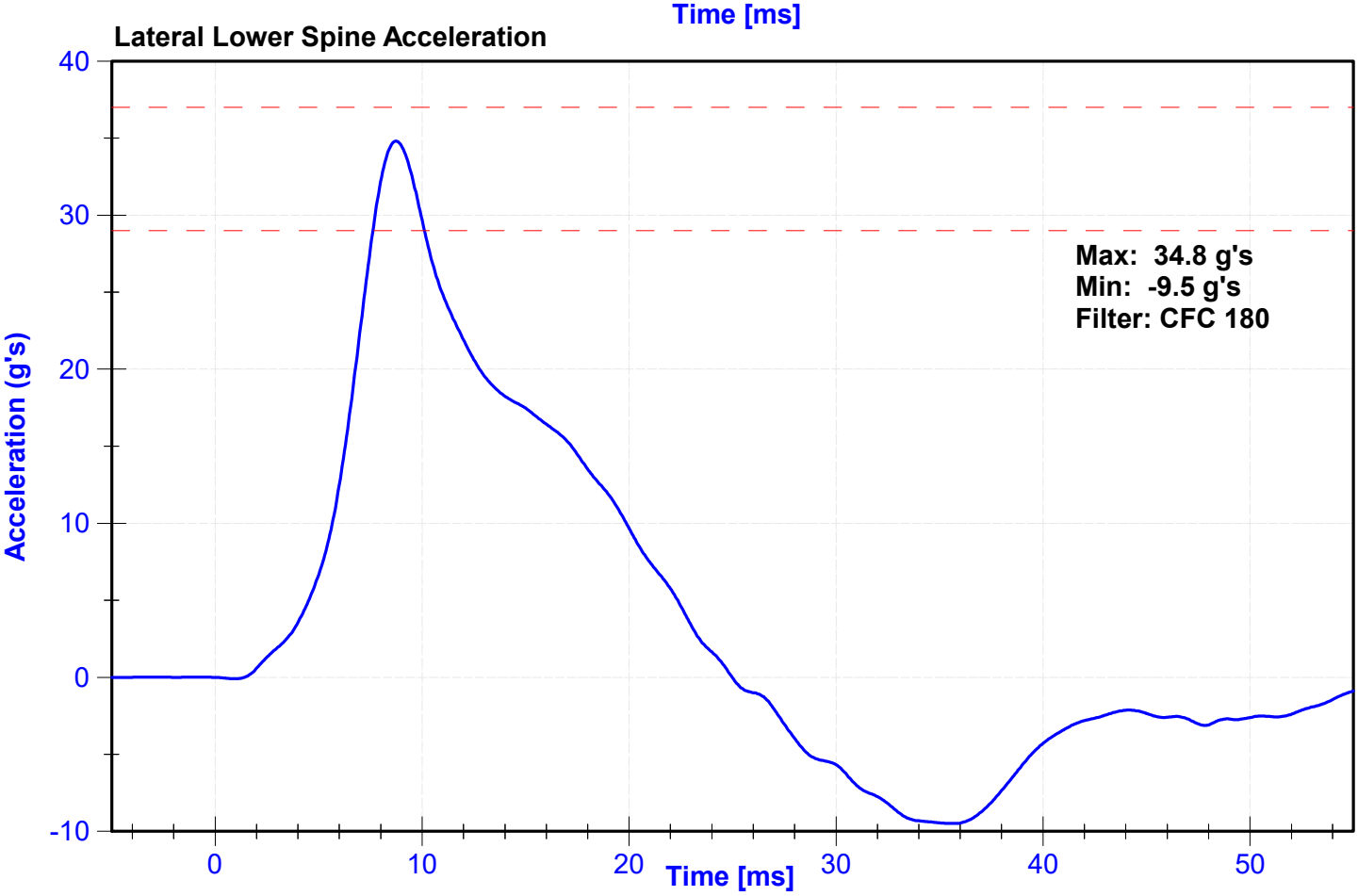

Shoulder Displacement
Displacement (mm)
Time [ms]
Max: 34.5 mm
Min: -0.1 mm
Filter: CFC 600


Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 26.4 mm
Min: 1.2 mm
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 30.1 mm
Min: 1.1 mm
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 32.3 mm
Min: 0.7 mm
Filter: CFC 600


Lateral Upper Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 39.0 g's
Min: -11.9 g's
Filter: CFC 180


Lateral Lower Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 34.8 g's
Min: -9.5 g's
Filter: CFC 180

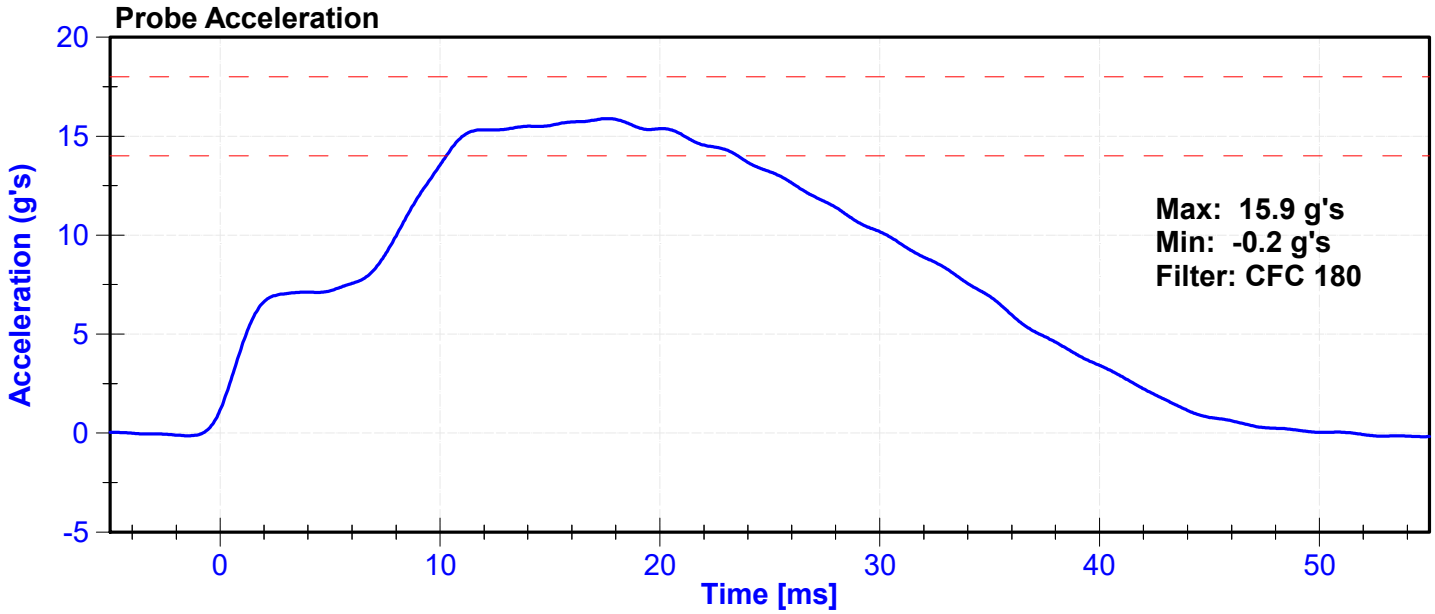
ATD Manufacturer	FTSS	Test Technician	E. Andruczyk
ATD Serial Number	DG8012	Laboratory Supervisor	J. Kinderman

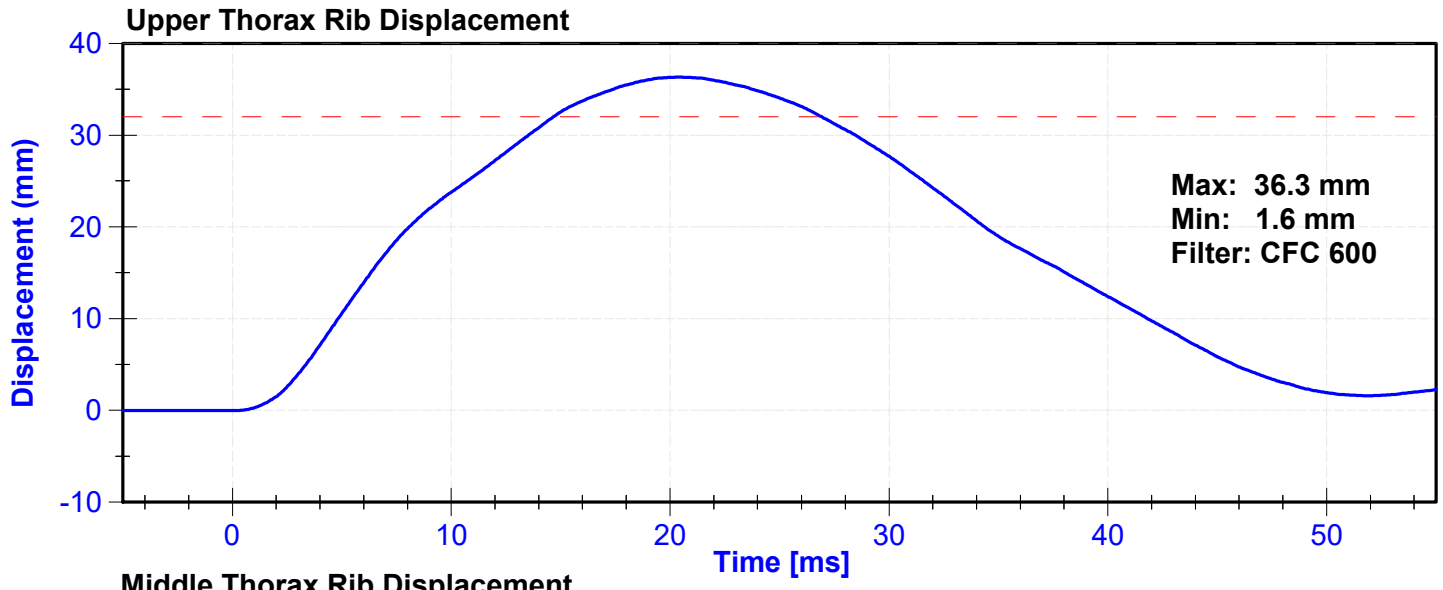
Results

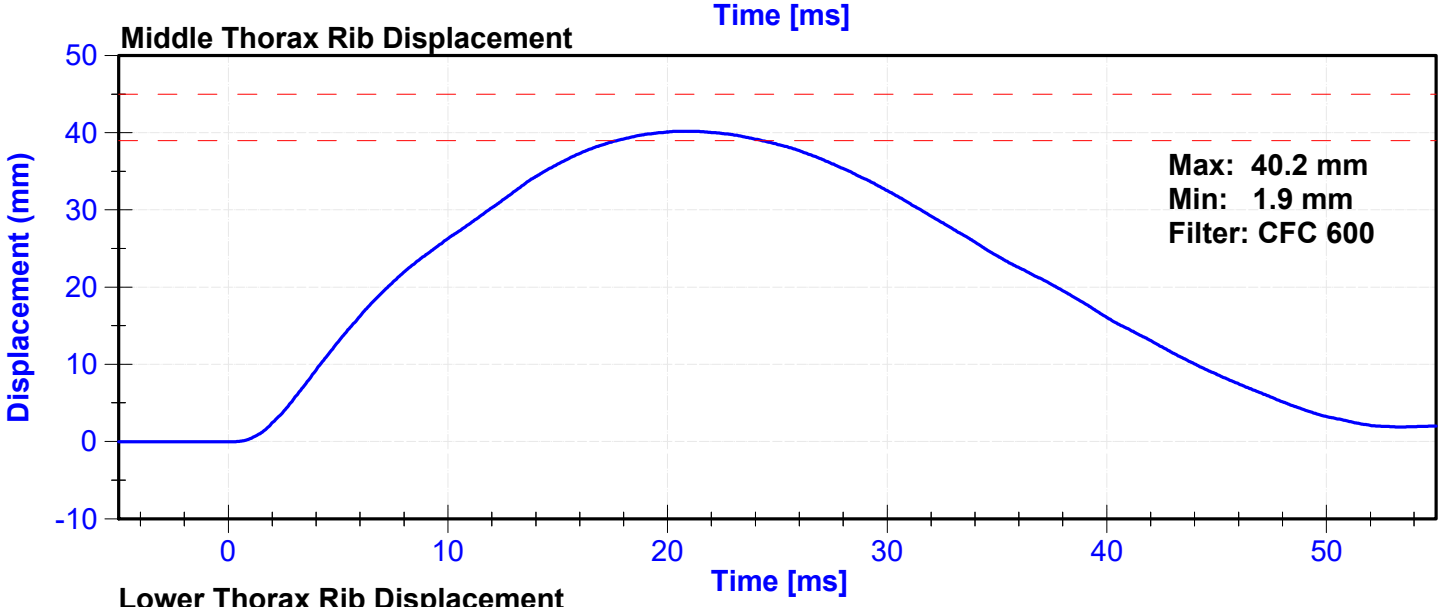
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21	Pass
Humidity	10	70	%	20	Pass
Velocity	4.2	4.4	m/s	4.29	Pass
Probe Acceleration	14	18	g's	15.9	Pass
Lateral Upper Spine Acceleration	13	17	g's	14.7	Pass
Lateral Lower Spine Acceleration	7	11	g's	9.1	Pass
Upper Thorax Rib Deflection	32	40	mm	36.3	Pass
Middle Thorax Rib Deflection	39	45	mm	40.2	Pass
Lower Thorax Rib Deflection	35	43	mm	37.1	Pass

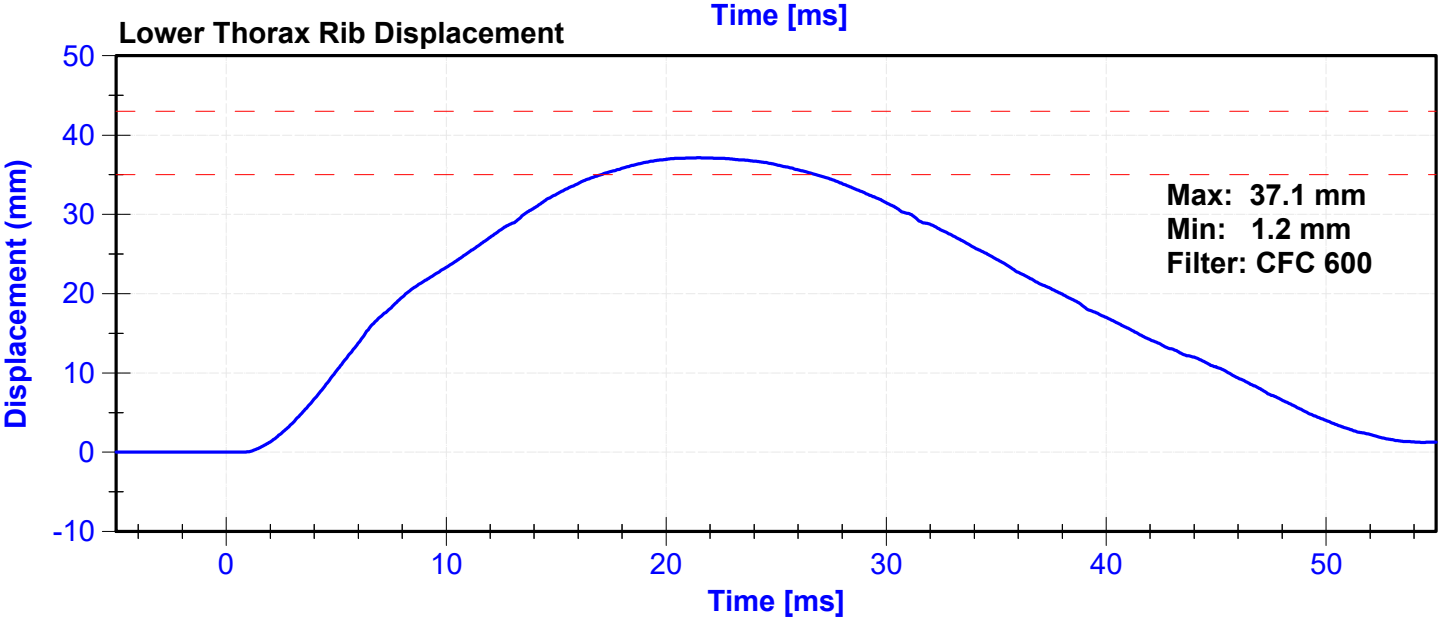
Transducer Calibrations

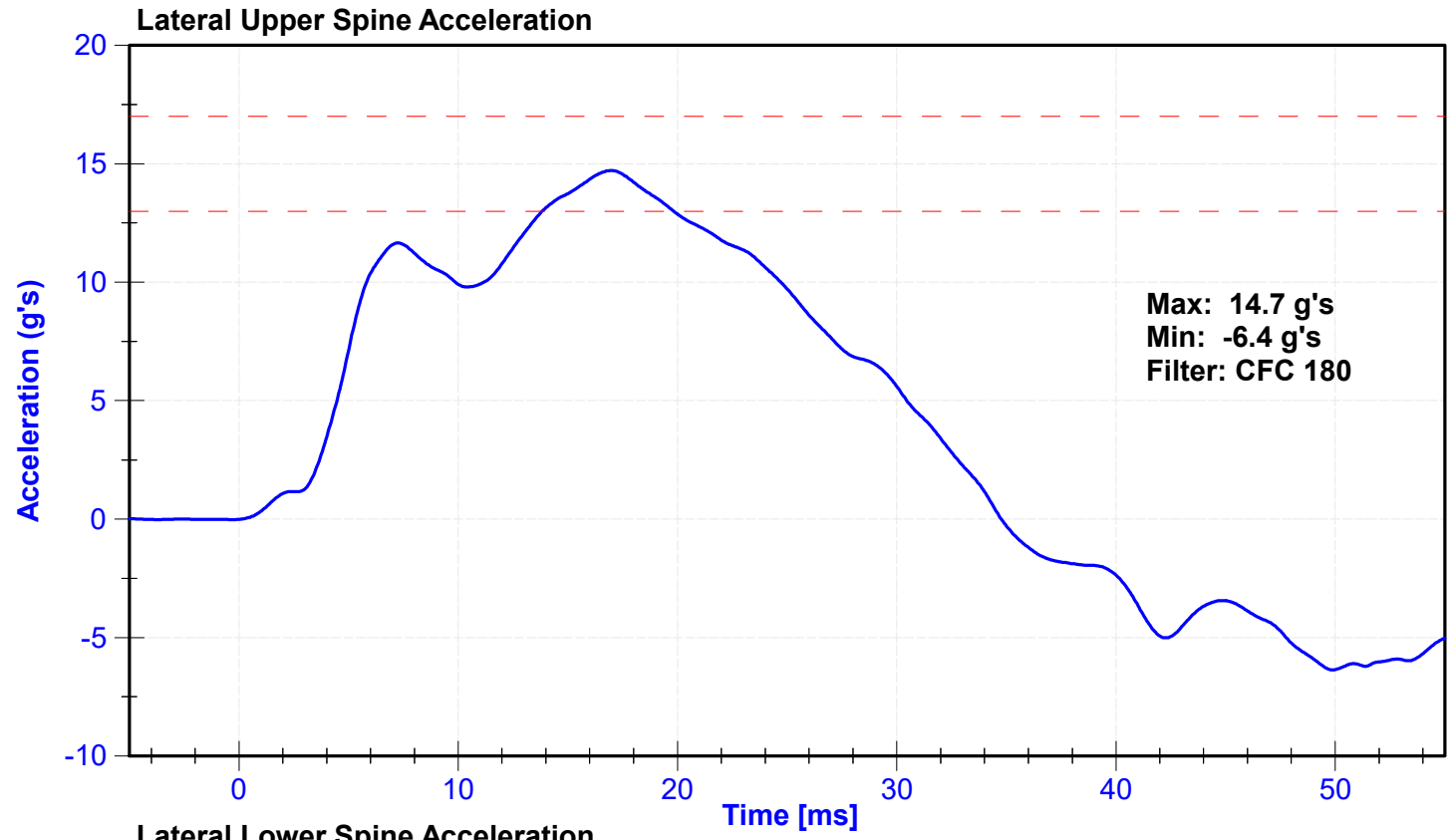
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18527	8/2/2024	1/29/2025
Upper Spine Y Accelerometer	Endevco	P64148	10/17/2024	4/15/2025
Lower Spine Y Accelerometer	Endevco	P51327	10/17/2024	4/15/2025
Upper Thorax Rib Potentiometer	Servo	1199GFE	10/16/2024	4/16/2025
Middle Thorax Rib Potentiometer	Servo	1246GFE	10/16/2024	4/16/2025
Lower Thorax Rib Potentiometer	Servo	011GFE	10/16/2024	4/16/2025

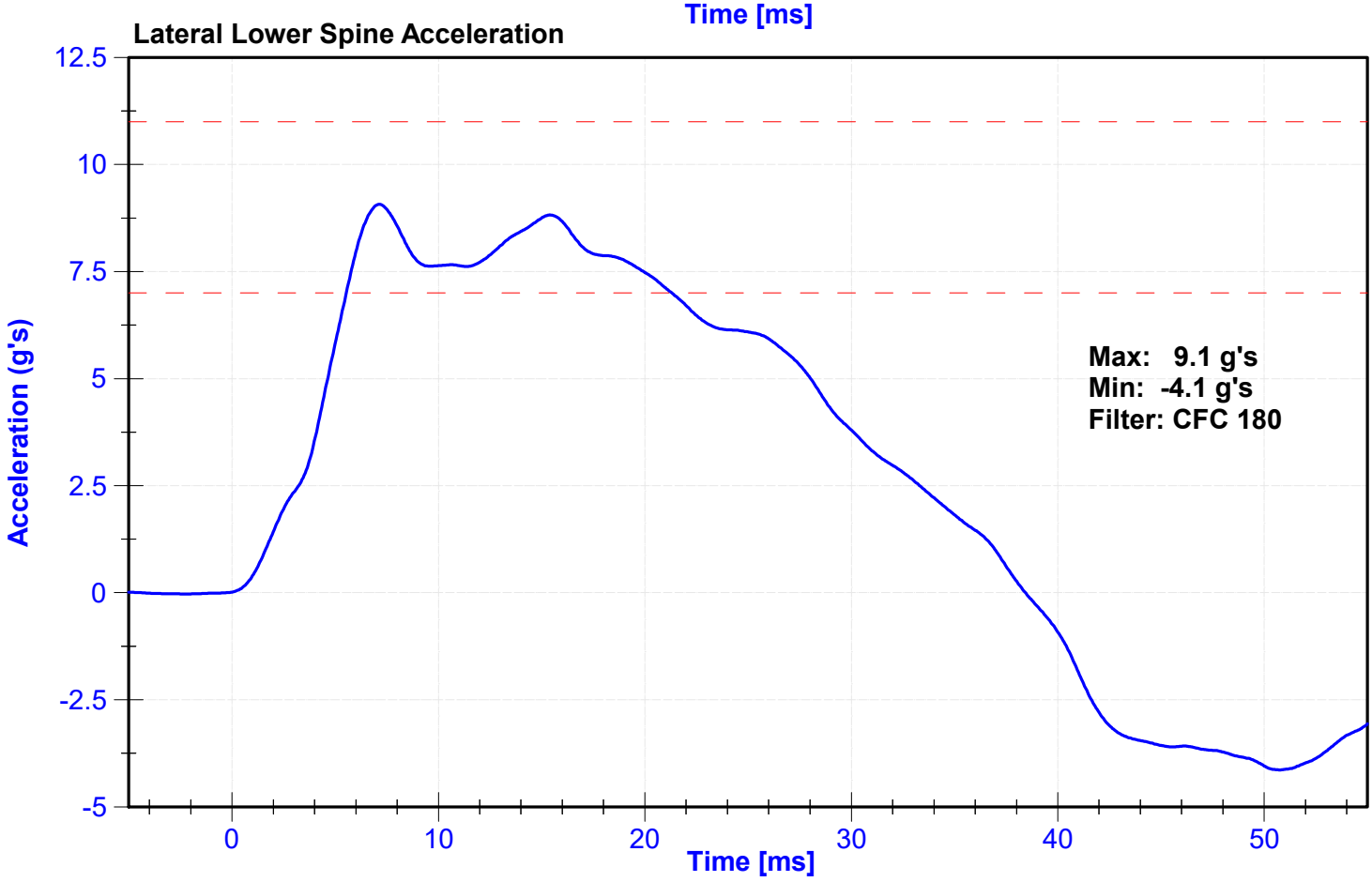



Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 36.3 mm
Min: 1.6 mm
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 40.2 mm
Min: 1.9 mm
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 37.1 mm
Min: 1.2 mm
Filter: CFC 600


Lateral Upper Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 14.7 g's
Min: -6.4 g's
Filter: CFC 180


Lateral Lower Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 9.1 g's
Min: -4.1 g's
Filter: CFC 180

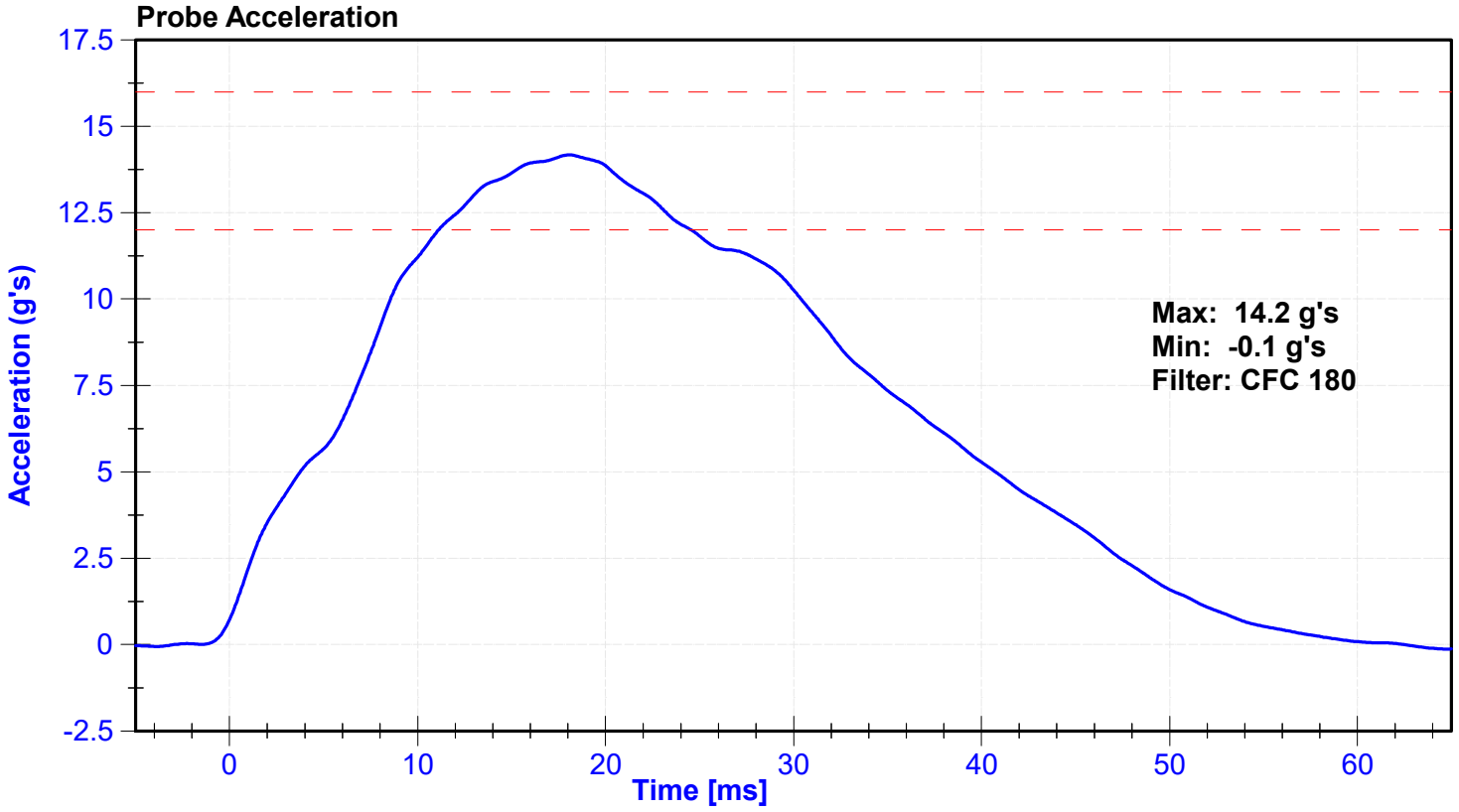
ATD Manufacturer	FTSS	Test Technician	E. Andruczyk
ATD Serial Number	DG8012	Laboratory Supervisor	J. Kinderman

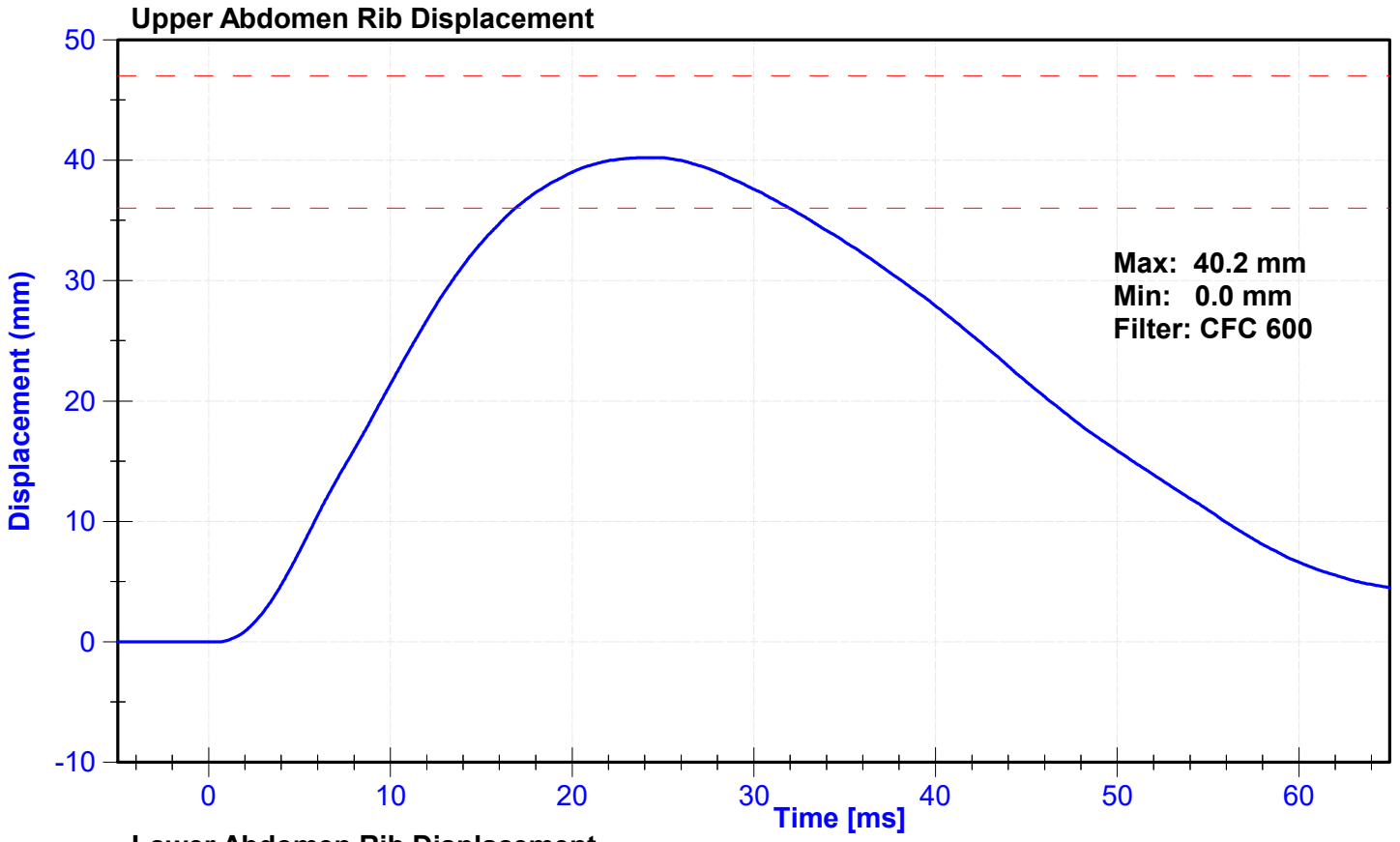
Results

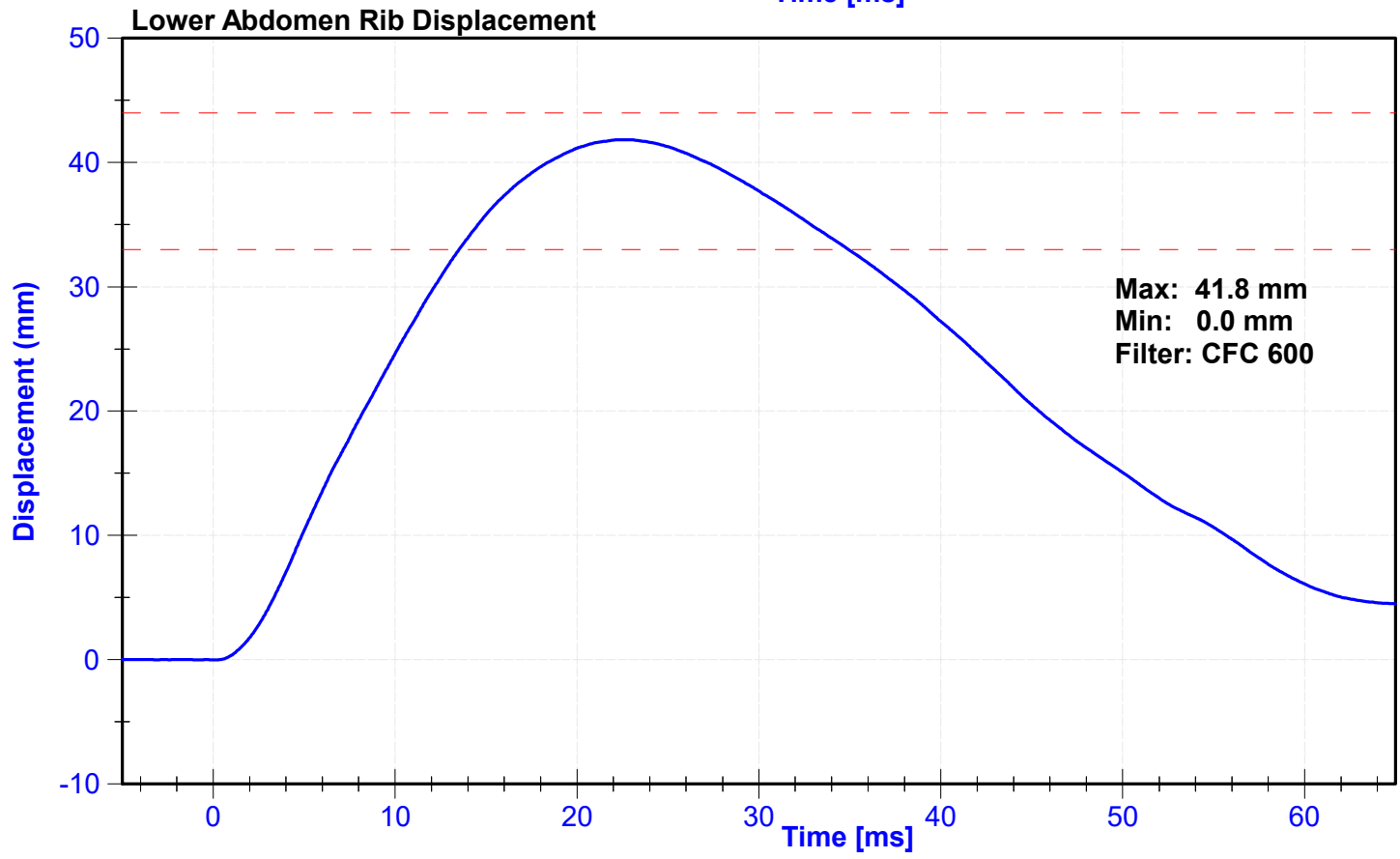
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21	Pass
Humidity	10	70	%	20	Pass
Velocity	4.2	4.4	m/s	4.28	Pass
Probe Acceleration	12	16	g's	14.2	Pass
Lateral Lower Spine Acceleration	9	14	g's	10.2	Pass
Upper Abdomen Rib Deflection	36	47	mm	40.2	Pass
Lower Abdomen Rib Deflection	33	44	mm	41.8	Pass

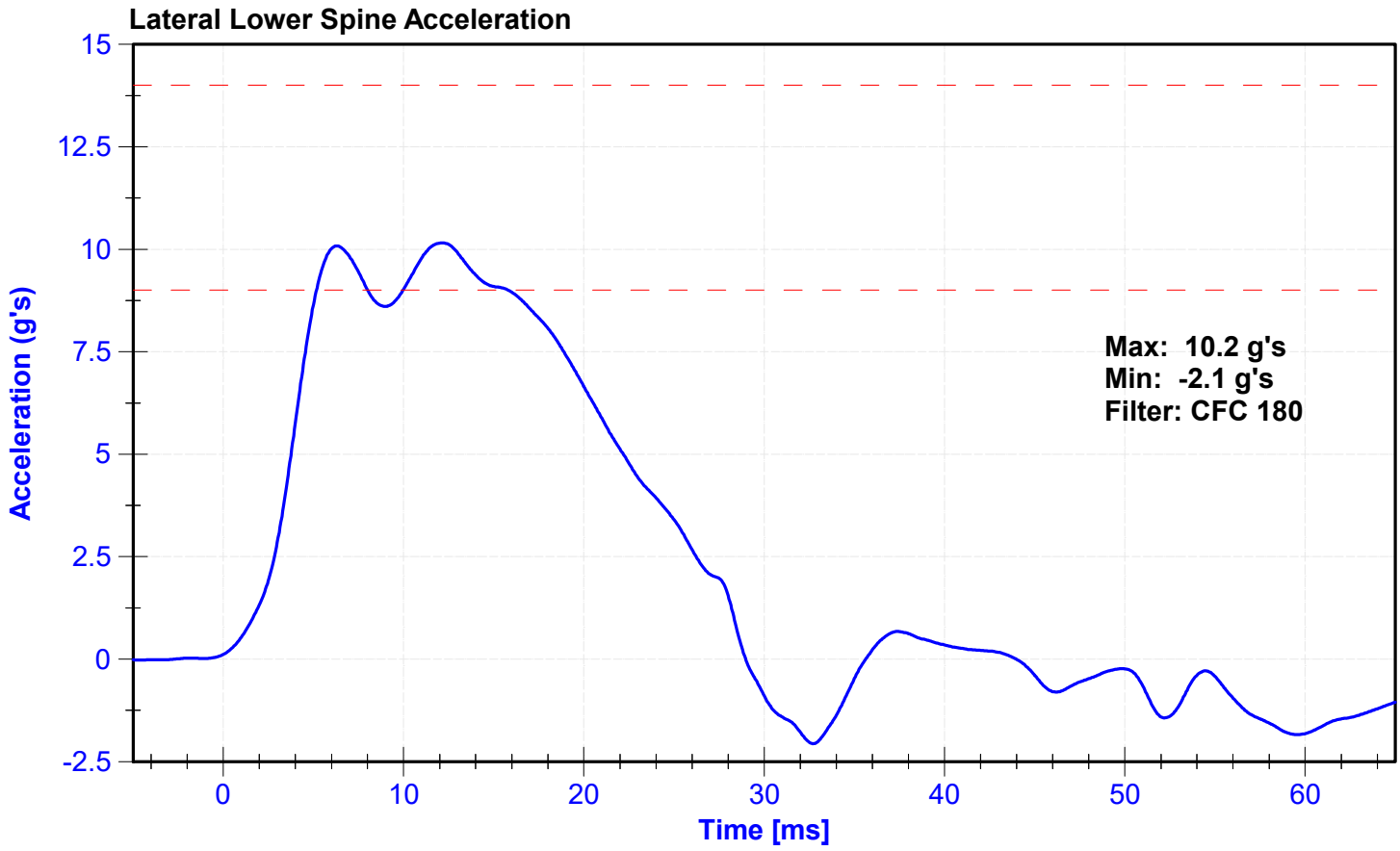
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	18527	8/2/2024	1/29/2025
Lower Spine Y Accelerometer	Endevco	P51327	10/17/2024	4/15/2025
Upper Abdomen Rib Potentiometer	Servo	008GFE	10/16/2024	4/16/2025
Lower Abdomen Rib Potentiometer	Servo	046GFE	10/16/2024	4/16/2025




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


Lower Abdomen Rib Displacement
Displacement (mm)
Time [ms]
Max: 41.8 mm
Min: 0.0 mm
Filter: CFC 600


Lateral Lower Spine Acceleration
Acceleration (g's)
15
12.5
10
7.5
5
2.5
0
-2.5
0
10
20
30
40
50
60
Time [ms]
Max: 10.2 g's
Min: -2.1 g's
Filter: CFC 180

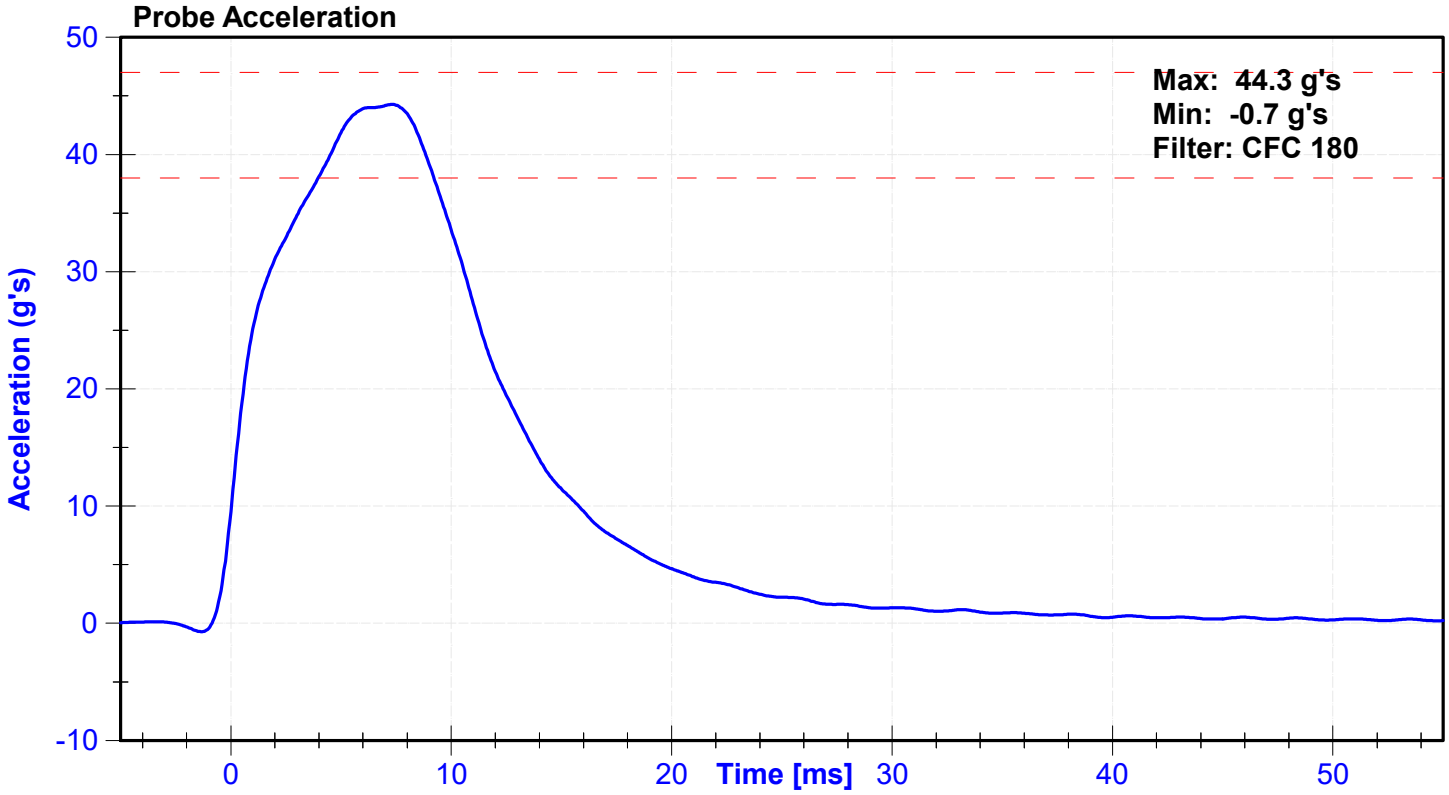
ATD Manufacturer	FTSS	Test Technician	E. Andruczyk
ATD Serial Number	DG8012	Laboratory Supervisor	J. Kinderman

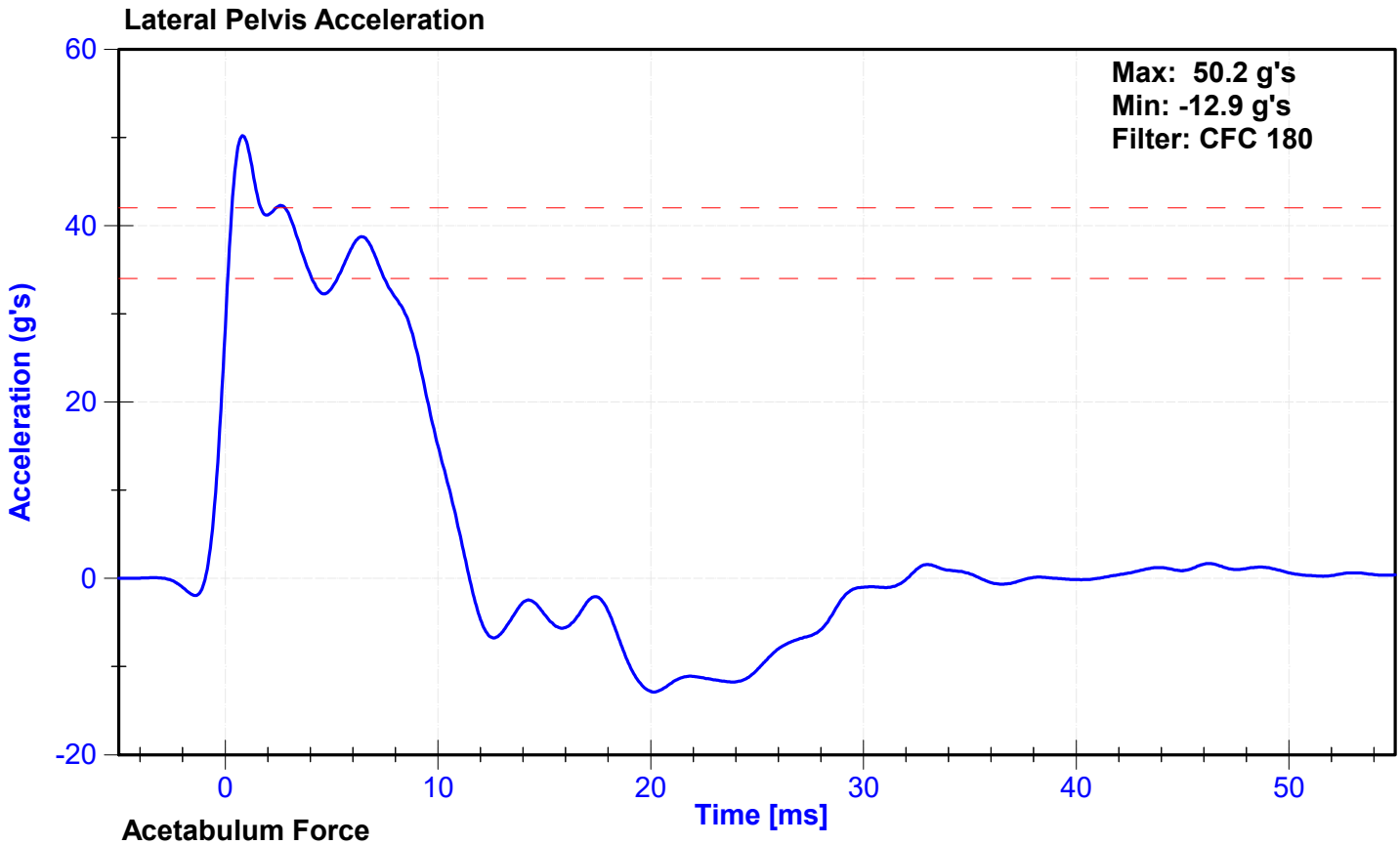
Results

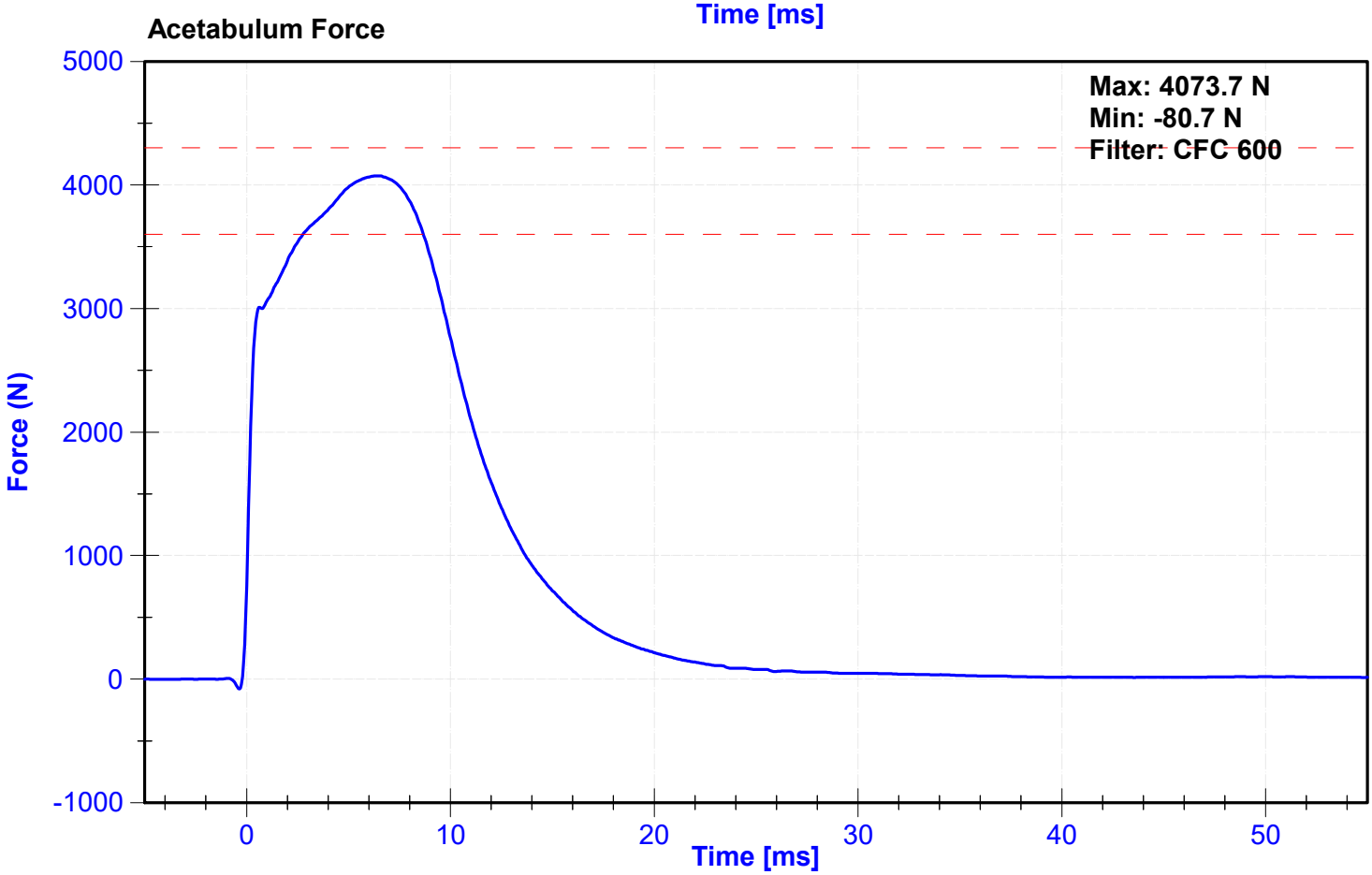
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21	Pass
Humidity	10	70	%	20	Pass
Velocity	6.6	6.8	m/s	6.62	Pass
Probe Acceleration	38	47	g's	44.3	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	38.7	Pass
Acetabulum Force	3600	4300	N	4073.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18527	8/2/2024	1/29/2025
Pelvis Y Accelerometer	Endevco	T20860	10/17/2024	4/15/2025
Acetabulum Load Cell	Denton	270-FY	9/16/2024	9/16/2025
Certification Plug	SACO			N/A
Crash Test Plug	SACO			N/A




Lateral Pelvis Acceleration
Max: 50.2 g's
Min: -12.9 g's
Filter: CFC 180
Acceleration (g's)
60
40
20
0
-20
0
10
20
30
40
50
Time [ms]


Acetabulum Force
Max: 4073.7 N
Min: -80.7 N
Filter: CFC 600
Force (N)
5000
4000
3000
2000
1000
0
-1000
0
10
20
30
40
50
Time [ms]

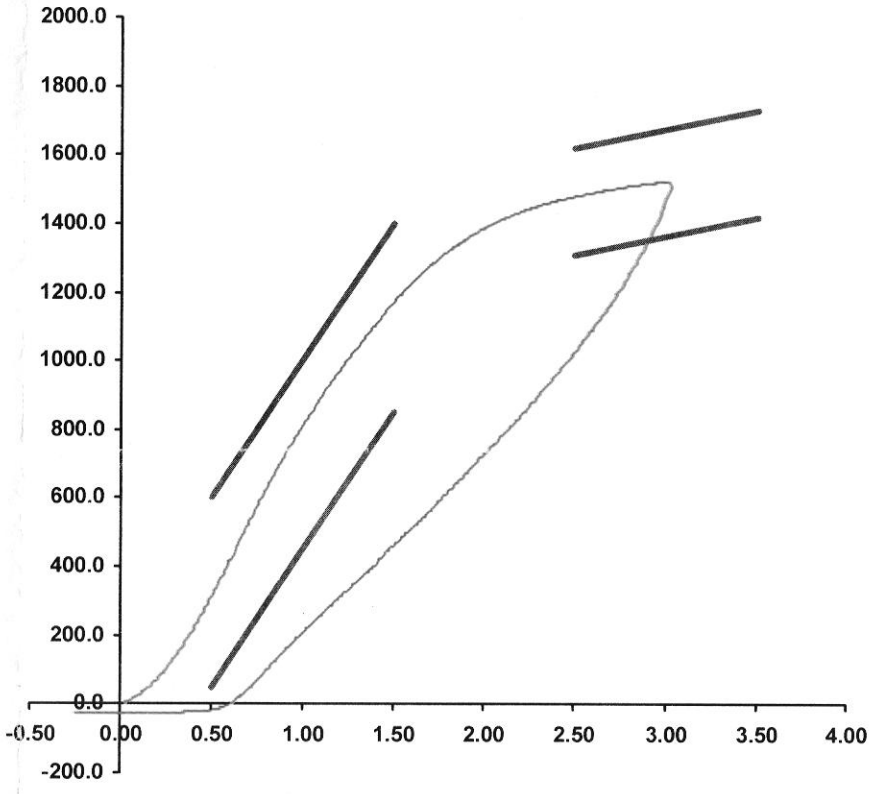
Gert
DA8012
1-15-2025

SID-IIs Pelvis Plug Certification Test

Plug S/N 16753
Test Number 23556
Report Number 23613
Test Date 7/22/2022 1:40:32 PM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	316	50	600
Force @ 1.5 mm (N)	1,170	850	1,400
Force @ 2.5 mm (N)	1,479	1,306	1,618
Force @ 3.0 mm (N)	1,523	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 22-Jul-22
SACO Research

By : DC Date : 7/22/22

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

C-44

Impact
DC8012
1-15-2025

SID-IIs Pelvis Plug Certification Test

Plug S/N 16721
Test Number 23521
Report Number 23578
Test Date 7/22/2022 12:24:32 PM

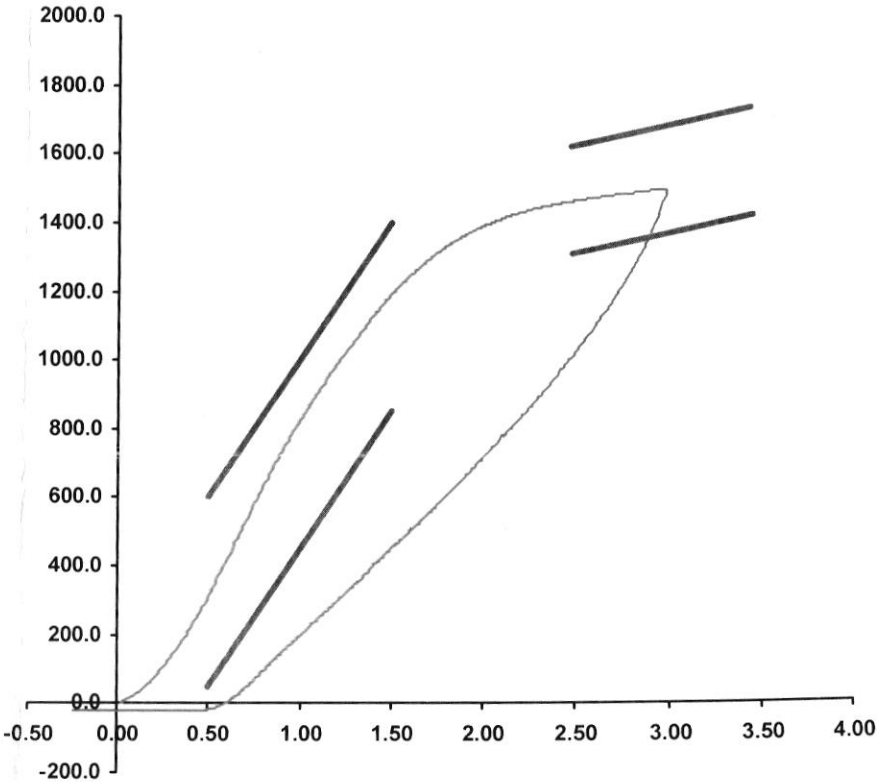
	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	317	50	600
Force @ 1.5 mm (N)	1,190	850	1,400
Force @ 2.5 mm (N)	1,460	1,306	1,618
Force @ 3.0 mm (N)	1,492	1,361	1,673

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:

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107 22-Jul-22
SACO Research

By : DC Date : 7/22/22

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

C-45

Non Impact
DG8012
1-15-2025

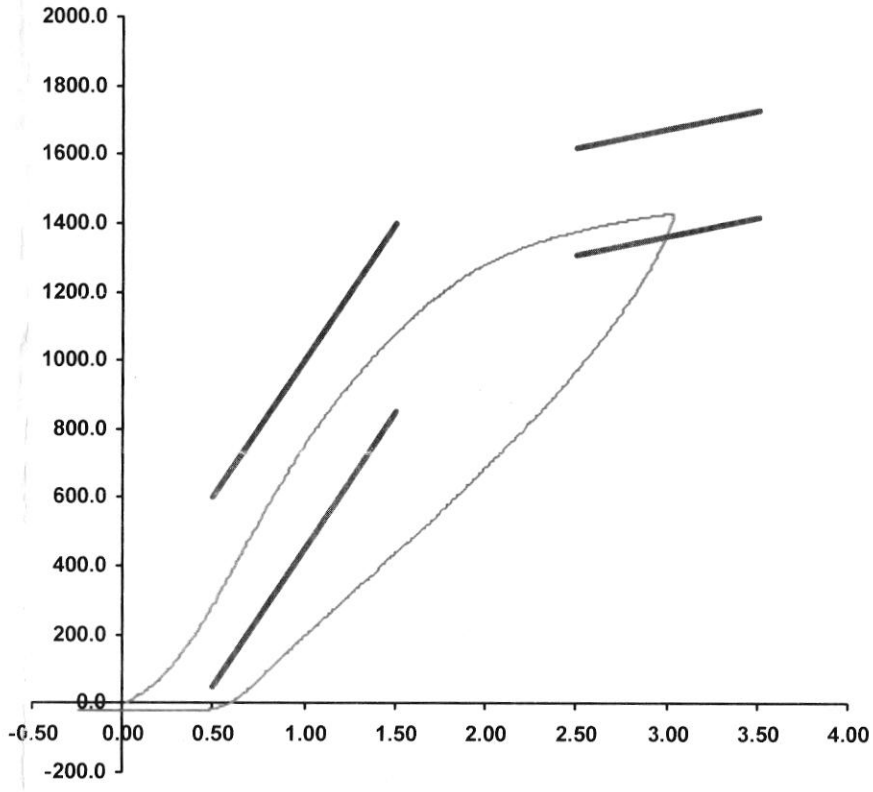
SACO RESEARCH

SID-IIs Pelvis Plug Certification Test

Plug S/N 16695
Test Number 23495
Report Number 23552
Test Date 7/22/2022 11:05:39 AM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	289	50	600
Force @ 1.5 mm (N)	1,076	850	1,400
Force @ 2.5 mm (N)	1,377	1,306	1,618
Force @ 3.0 mm (N)	1,428	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 22-Jul-22
SACO Research

By : DG Date : 7/22/22

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

C-46

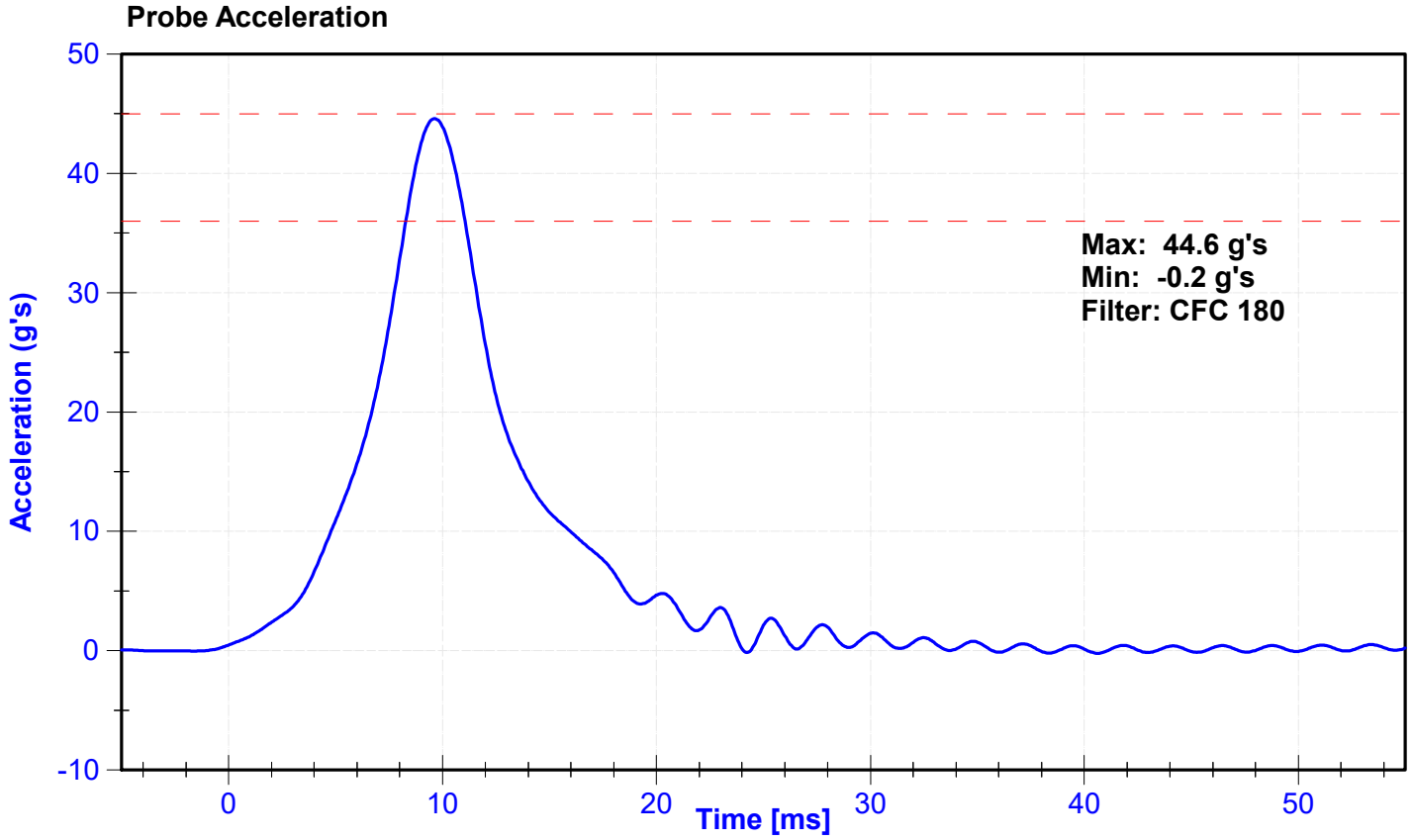
ATD Manufacturer	FTSS	Test Technician	E. Andruczyk
ATD Serial Number	DG8012	Laboratory Supervisor	J. Kinderman

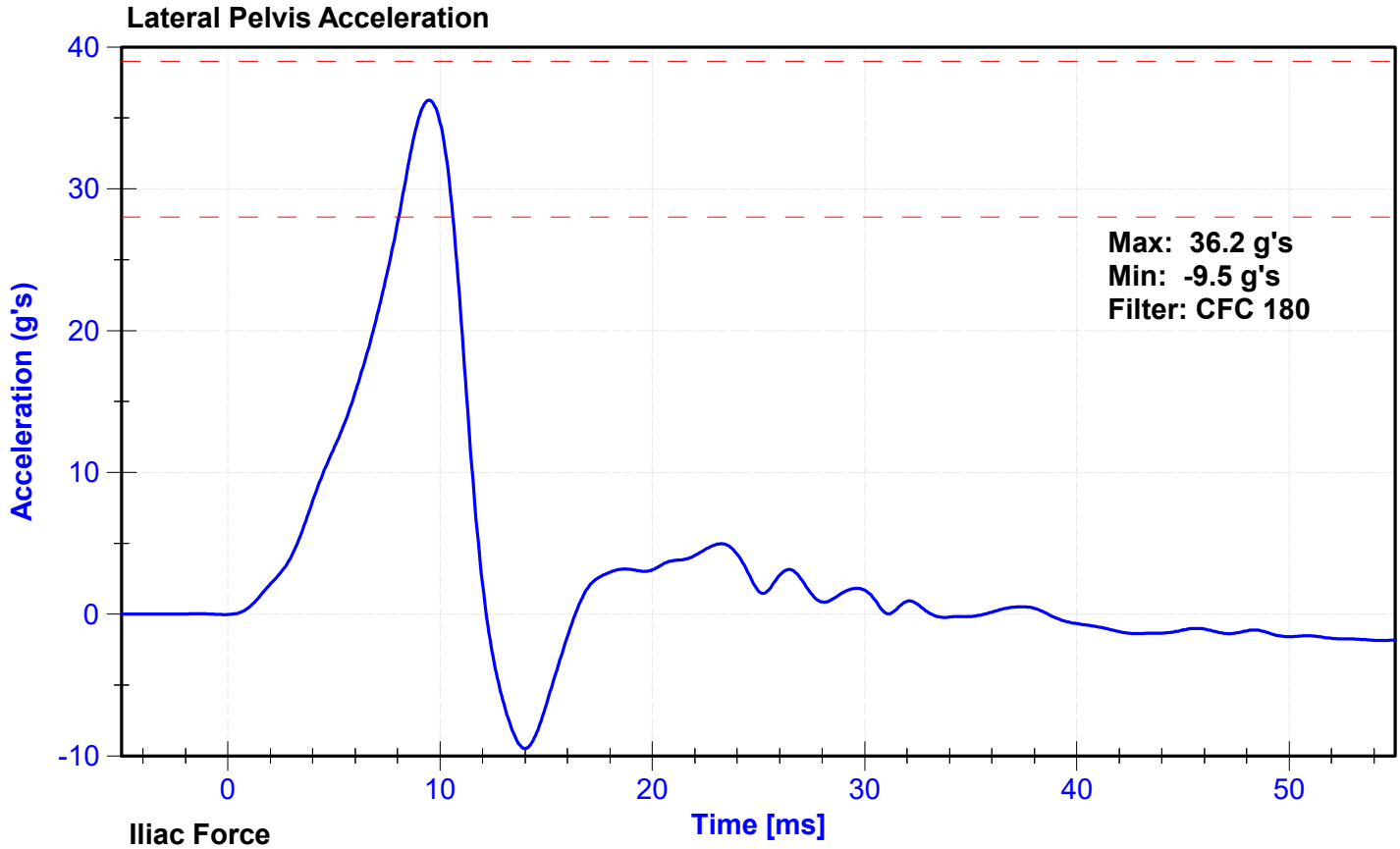
Results

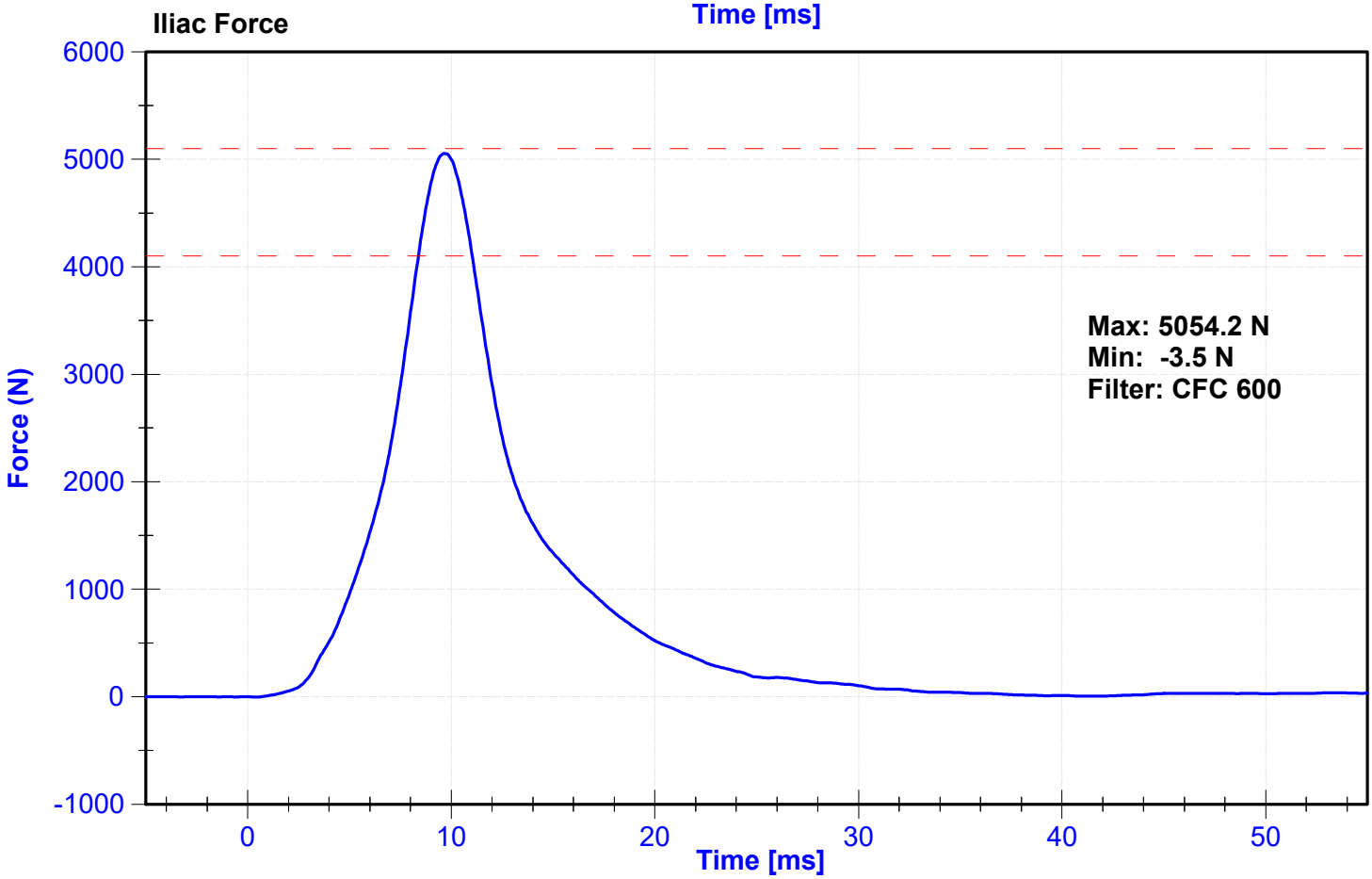
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21	Pass
Humidity	10	70	%	20	Pass
Velocity	4.2	4.4	m/s	4.21	Pass
Probe Acceleration	36	45	g's	44.6	Pass
Lateral Pelvis Acceleration	28	39	g's	36.2	Pass
Iliac Force	4100	5100	N	5054.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18527	8/2/2024	1/29/2025
Pelvis Y Accelerometer	Endevco	T20860	10/17/2024	4/15/2025
Iliac Load Cell	Denton	321	9/16/2024	9/16/2025




Lateral Pelvis Acceleration
Acceleration (g's)
Time [ms]
Max: 36.2 g's
Min: -9.5 g's
Filter: CFC 180


Iliac Force
Force (N)
Time [ms]
Max: 5054.2 N
Min: -3.5 N
Filter: CFC 600

CALIBRATION TEST RESULTS

POST-TEST

EUROSID 2 (ES-2RE) MALE – DRIVER ATD

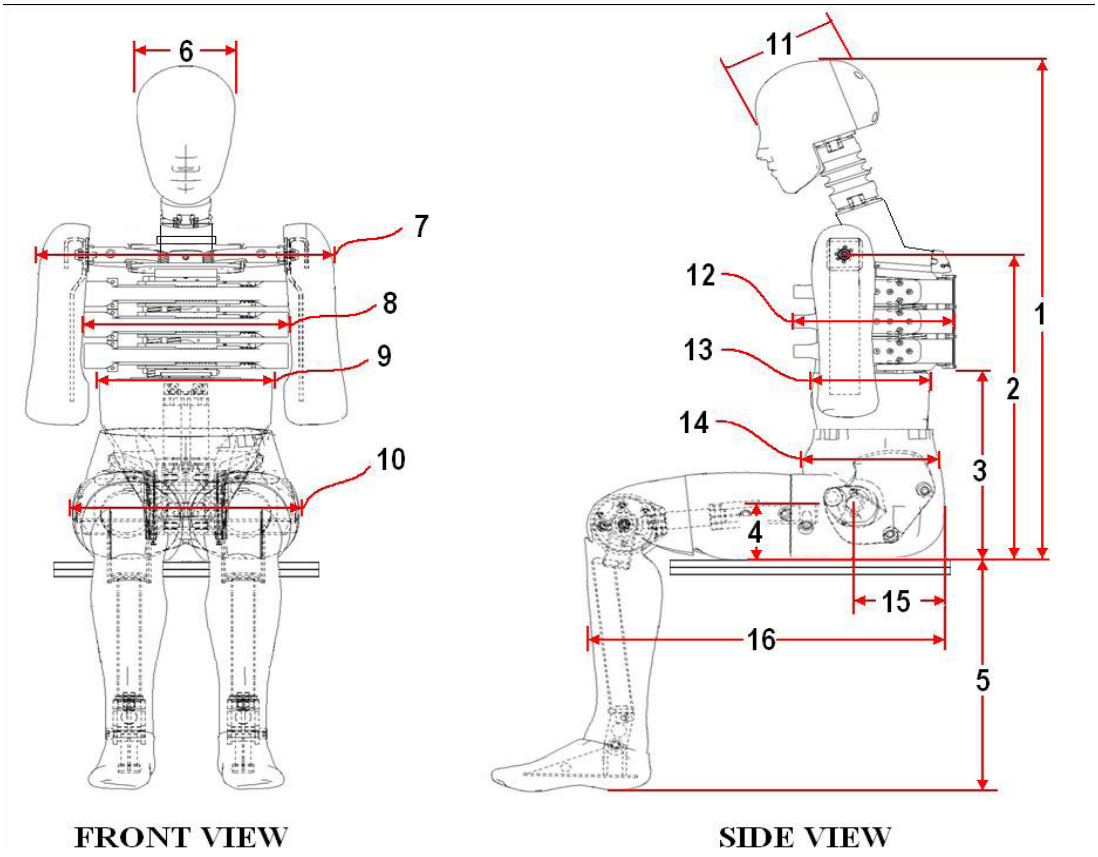
SERIAL NO:F033

(CONFIGURED FOR LEFT SIDE It

External Measurements - EuroSID-2re

Technician: J. Rios Date: 3/25/2025

Dummy Serial Number: F033



FRONT VIEW SIDE VIEW

Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	911	Pass
2	Seat to Shoulder Joint	558	572	563	Pass
3	Seat to Lower Face of Thoracic Spine Box	346	356	353	Pass
4	Seat to Hip Joint (center of bolt)	97	103	101	Pass
5	Sole to Seat, Sitting	333	451	412	Pass
6	Head Width	152	158	153	Pass
7	Shoulder/Arm Width	461	479	465	Pass
8	Thorax Width	322	332	325	Pass
9	Abdomen Width	273	287	284	Pass
10	Pelvis Lap Width	359	373	363	Pass
11	Head Depth	196	206	200	Pass
12	Thorax Depth	262	272	270	Pass
13	Abdomen Depth	194	204	197	Pass
14	Pelvis Depth	235	245	239	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150	160	156	Pass
16	Back of Buttocks to Front Knee	597	615	608	Pass

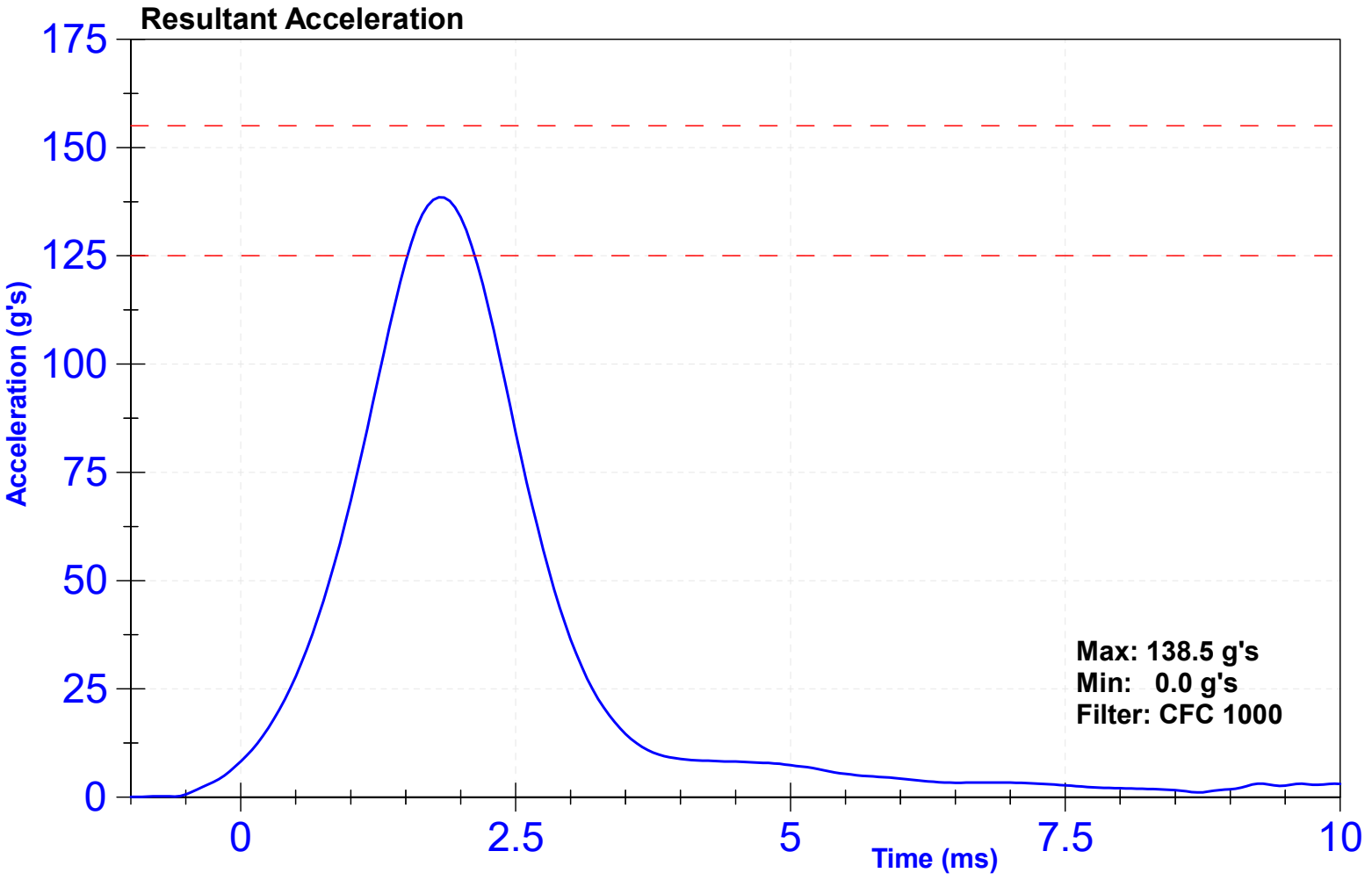
ATD Manufacturer	FTSS	Test Technician	J. Miller
ATD Serial Number	F033	Laboratory Supervisor	J. Kinderman

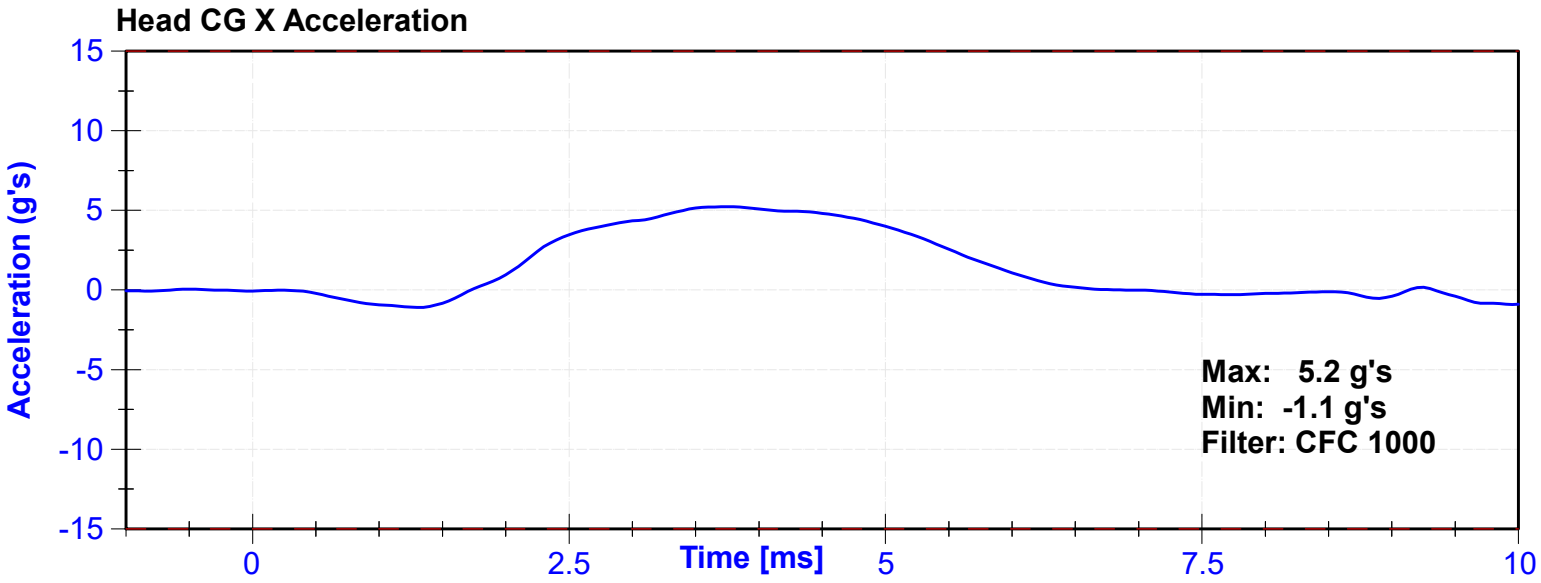
Results

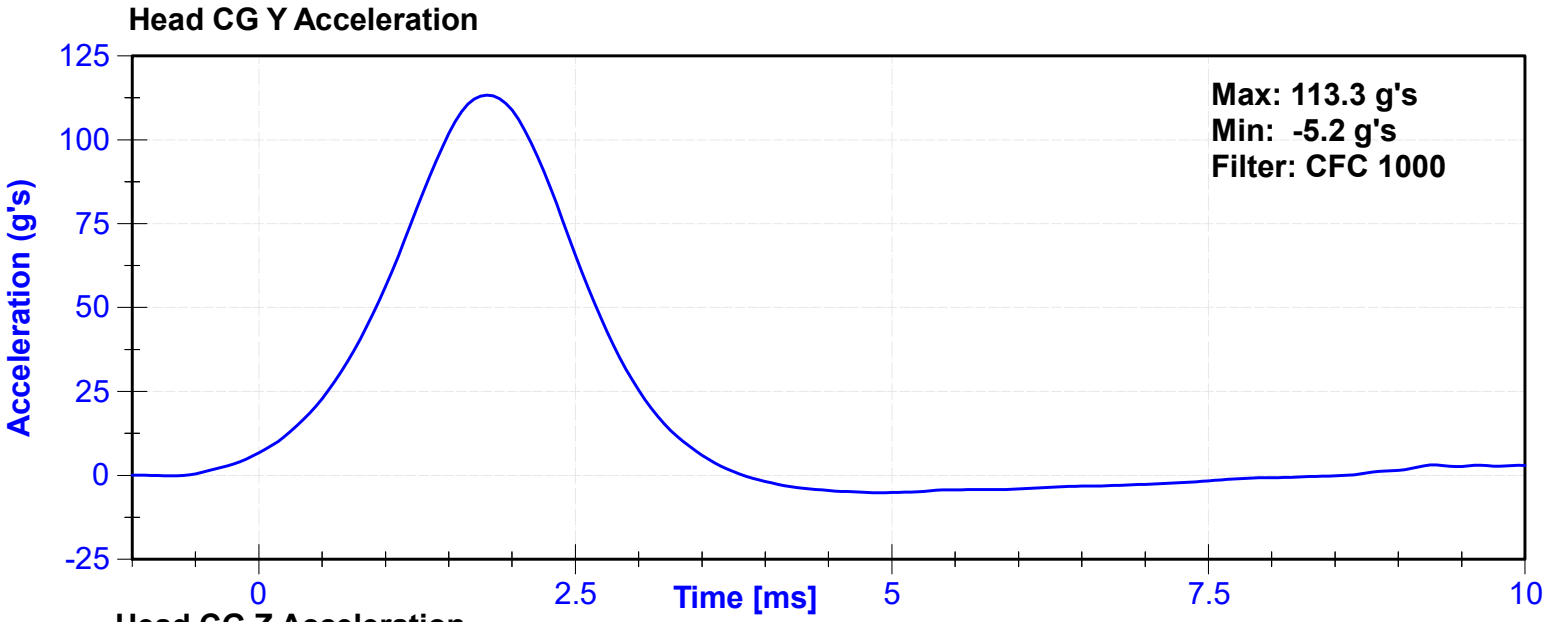
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.6	Pass
Humidity	10	70	%	25	Pass
Resultant Acceleration	125	155	g's	138.5	Pass
Oscillation	0	15	%	3.01	Pass
Fore-Aft Acceleration	-15	15	g's	5.2	Pass

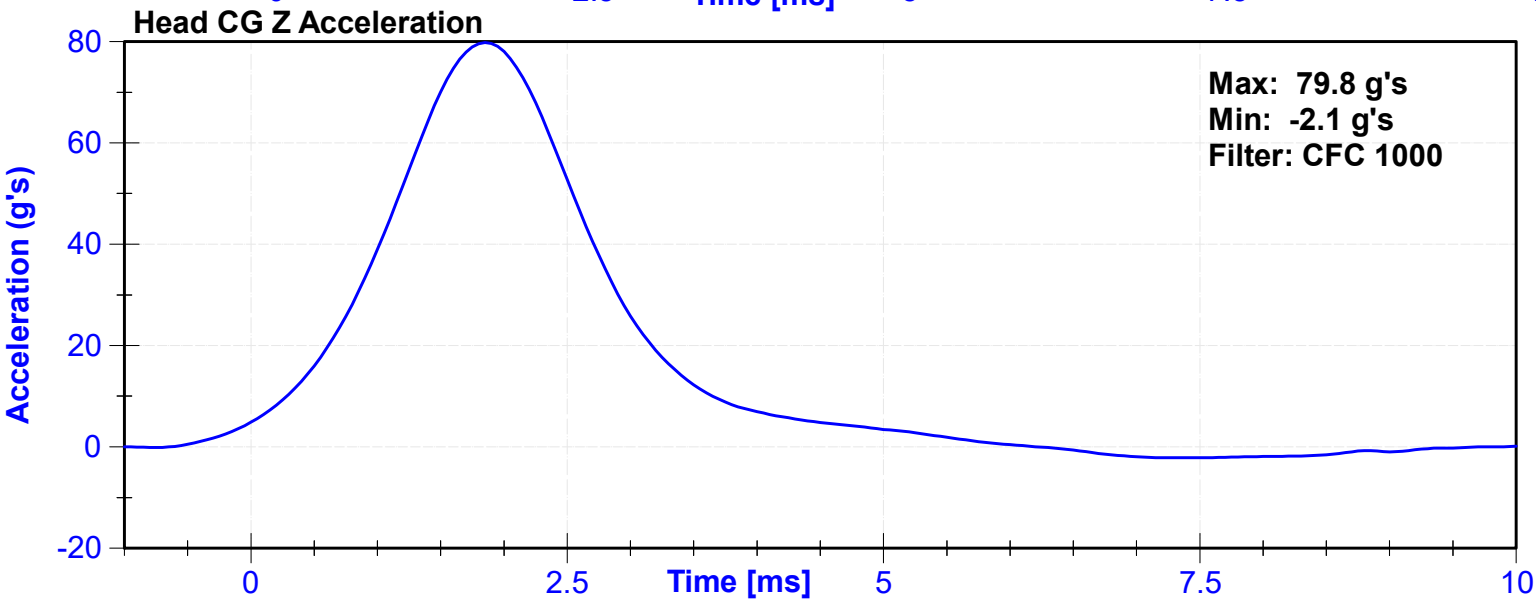
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	P63861	10/17/2024	4/15/2025
Y Accelerometer	Endevco	P49216	10/17/2024	4/15/2025
Z Accelerometer	Endevco	P51303	10/17/2024	4/15/2025




Head CG X Acceleration
Acceleration (g's)
15
10
5
0
-5
-10
-15
0
2.5
Time [ms]
5
7.5
10
Max: 5.2 g's
Min: -1.1 g's
Filter: CFC 1000


Head CG Y Acceleration
Acceleration (g's)
125
100
75
50
25
0
-25
0
2.5
Time [ms]
5
7.5
10
Max: 113.3 g's
Min: -5.2 g's
Filter: CFC 1000


Head CG Z Acceleration
Acceleration (g's)
80
60
40
20
0
-20
0
2.5
Time [ms]
5
7.5
10
Max: 79.8 g's
Min: -2.1 g's
Filter: CFC 1000

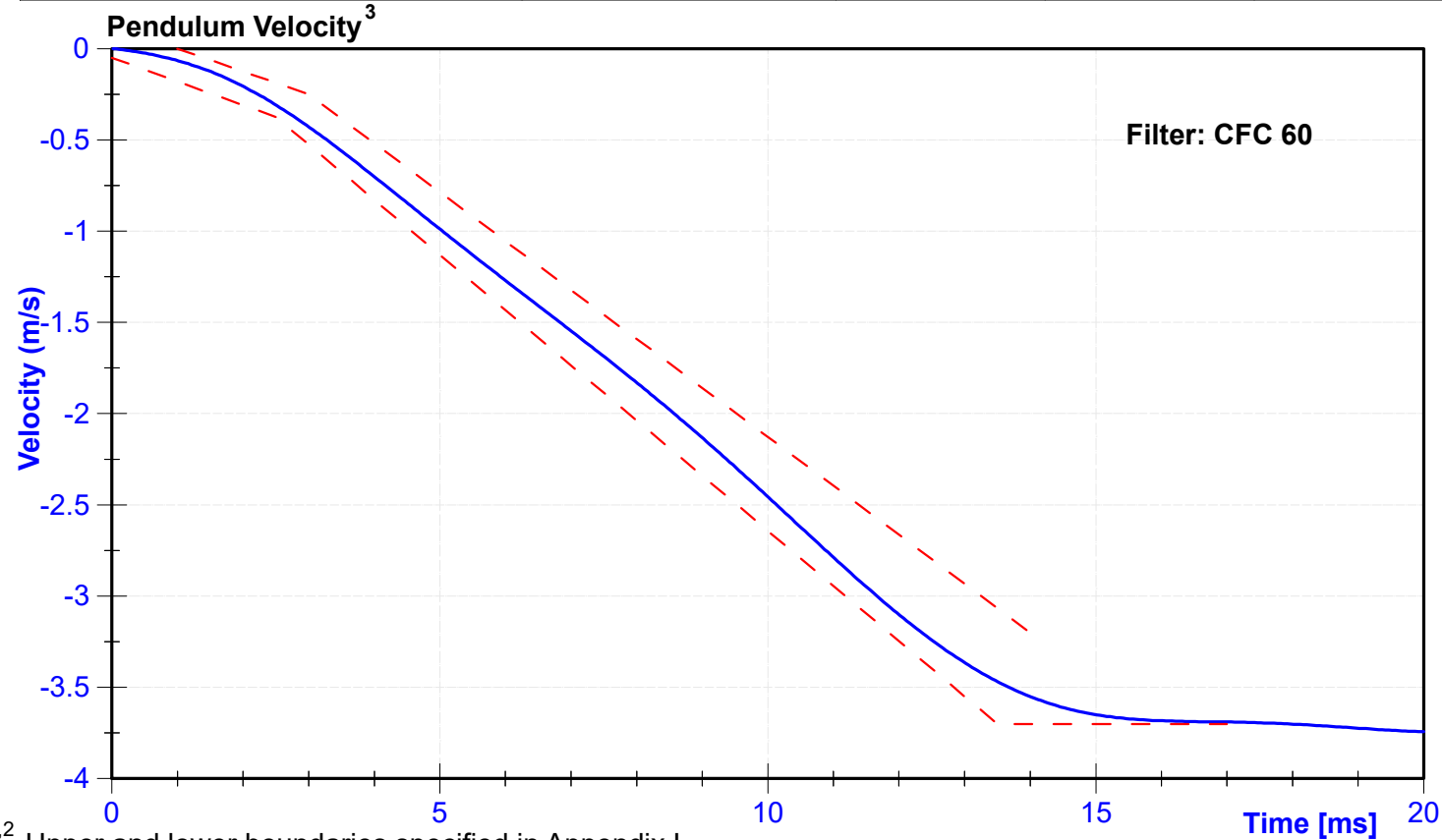
ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	F033	Laboratory Supervisor	J. Kinderman

Results

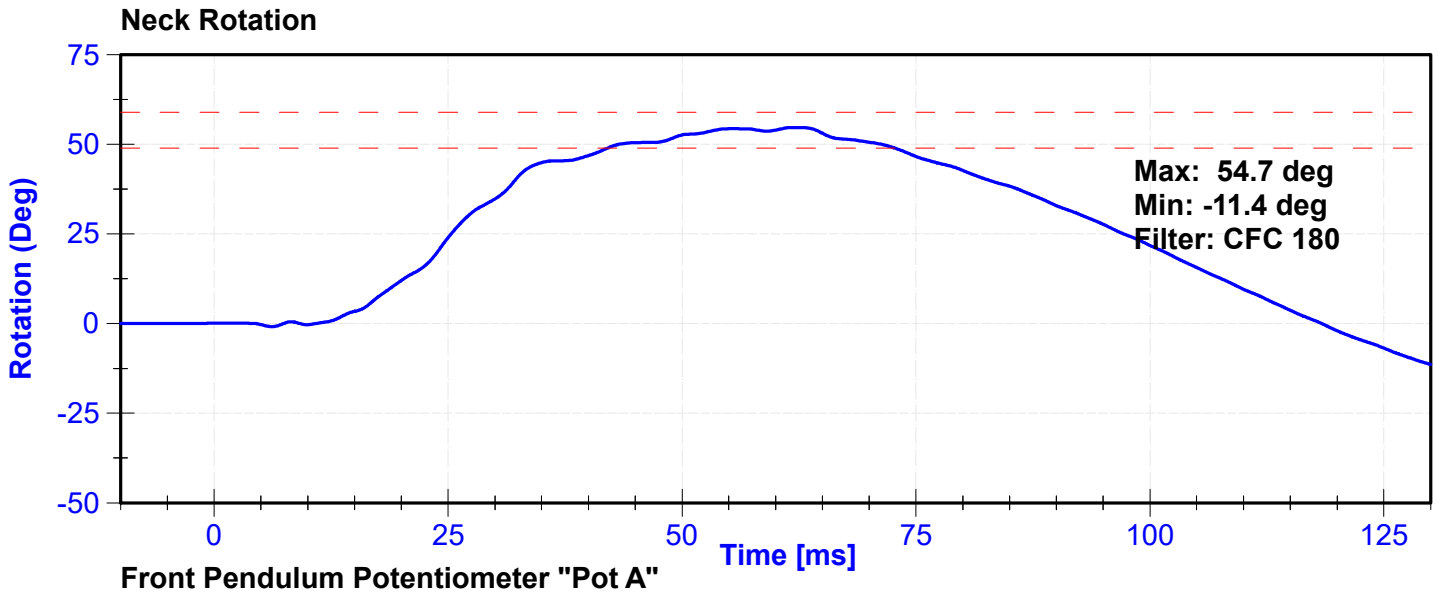
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.9	Pass
Humidity	10	70	%	25	Pass
Velocity	3.3	3.5	m/s	3.48	Pass
Lateral Neck Rotation	49	59	deg	54.7	Pass
Time at Maximum Rotation	54	66	ms	61.9	Pass
Time of Rotation Decay from Maximum	53	88	ms	56.5	Pass
Pendulum Velocity Overall Corridor	Lower Boundary[1]	Upper Boundary[2]	m/s	See Plot[3]	Pass

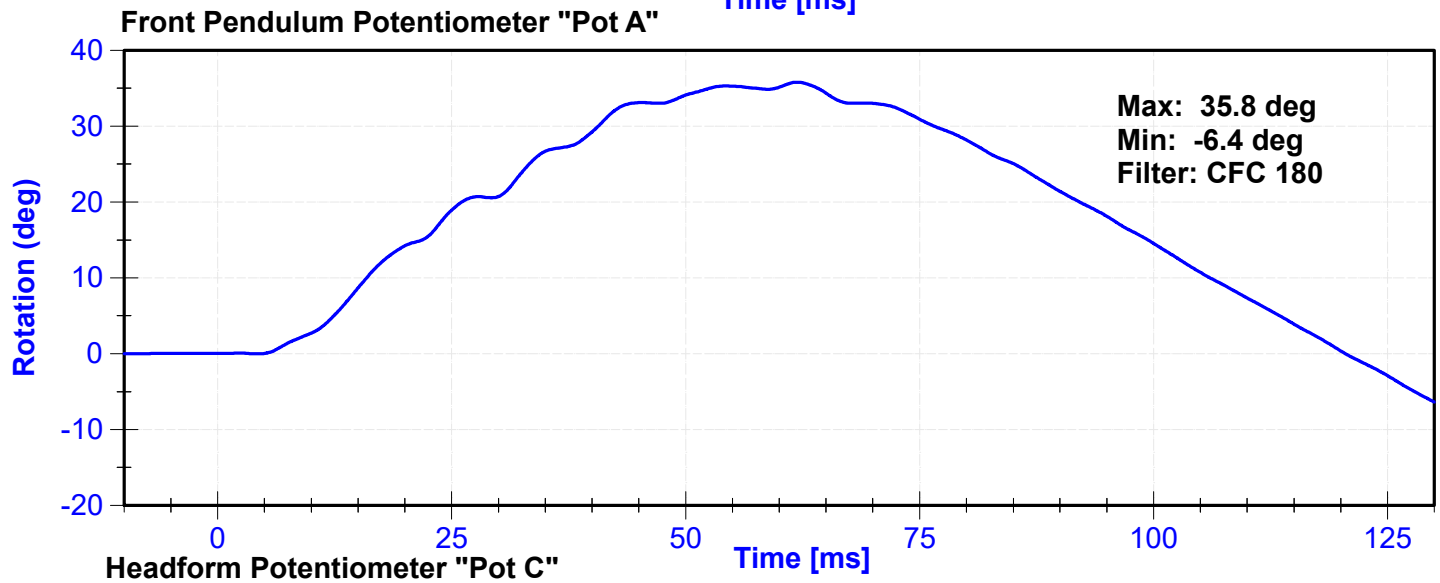
Transducer Calibrations

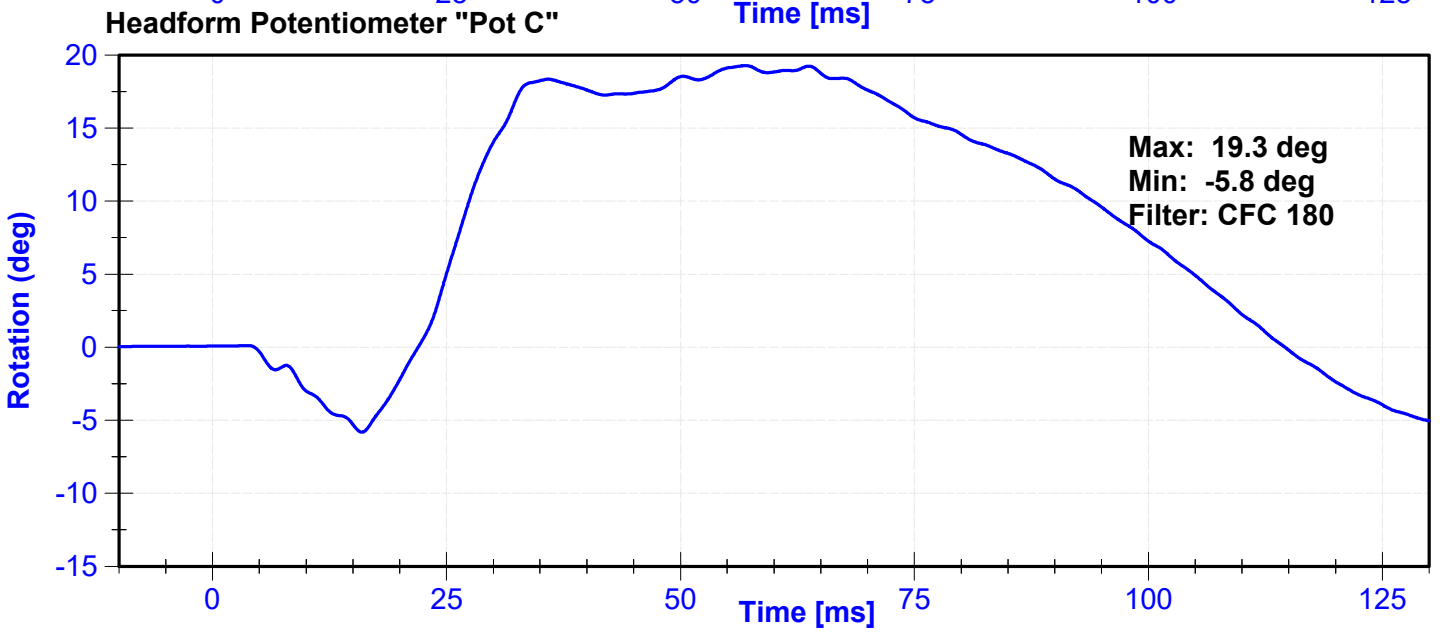
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16646	10/17/2024	4/15/2025
Front Pendulum Potentiometer	Sfernice	2247	9/13/2024	9/13/2025
Headform Potentiometer	Sfernice	095	9/13/2024	9/13/2025



[1,2] Upper and lower boundaries specified in Appendix I


Neck Rotation
Rotation (Deg)
75
50
25
0
-25
-50
0
25
50
75
100
125
Time [ms]
Max: 54.7 deg
Min: -11.4 deg
Filter: CFC 180


Front Pendulum Potentiometer "Pot A"
Rotation (deg)
40
30
20
10
0
-10
-20
0
25
50
75
100
125
Time [ms]
Max: 35.8 deg
Min: -6.4 deg
Filter: CFC 180


Headform Potentiometer "Pot C"
Rotation (deg)
20
15
10
5
0
-5
-10
-15
0
25
50
75
100
125
Time [ms]
Max: 19.3 deg
Min: -5.8 deg
Filter: CFC 180

Appendix I

[2] Upper Boundary Corridor		[1] Lower Boundary Corridor	
Time (ms)	Velocity (m/s)	Time (ms)	Velocity (m/s)
1.0	0.00	0.0	-0.05
3.0	-0.25	2.5	-0.375
14.0	-3.20	13.5	-3.7
		17.0	-3.7

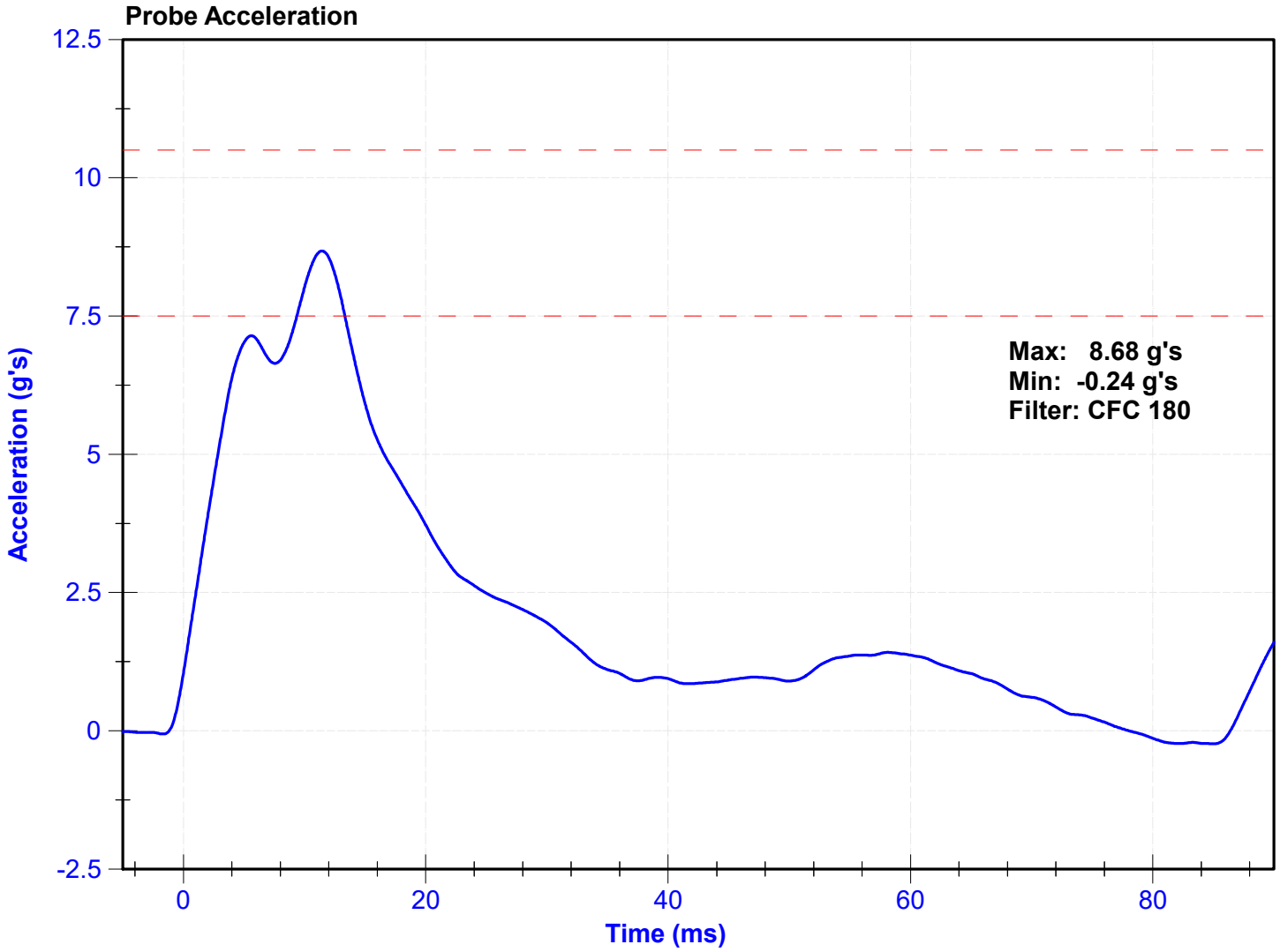
ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	F033	Laboratory Supervisor	J. Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21	Pass
Humidity	10	70	%	23	Pass
Velocity	4.2	4.4	m/s	4.28	Pass
Probe Acceleration	7.5	10.5	g's	8.68	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	18566	11/26/2024	5/25/2025



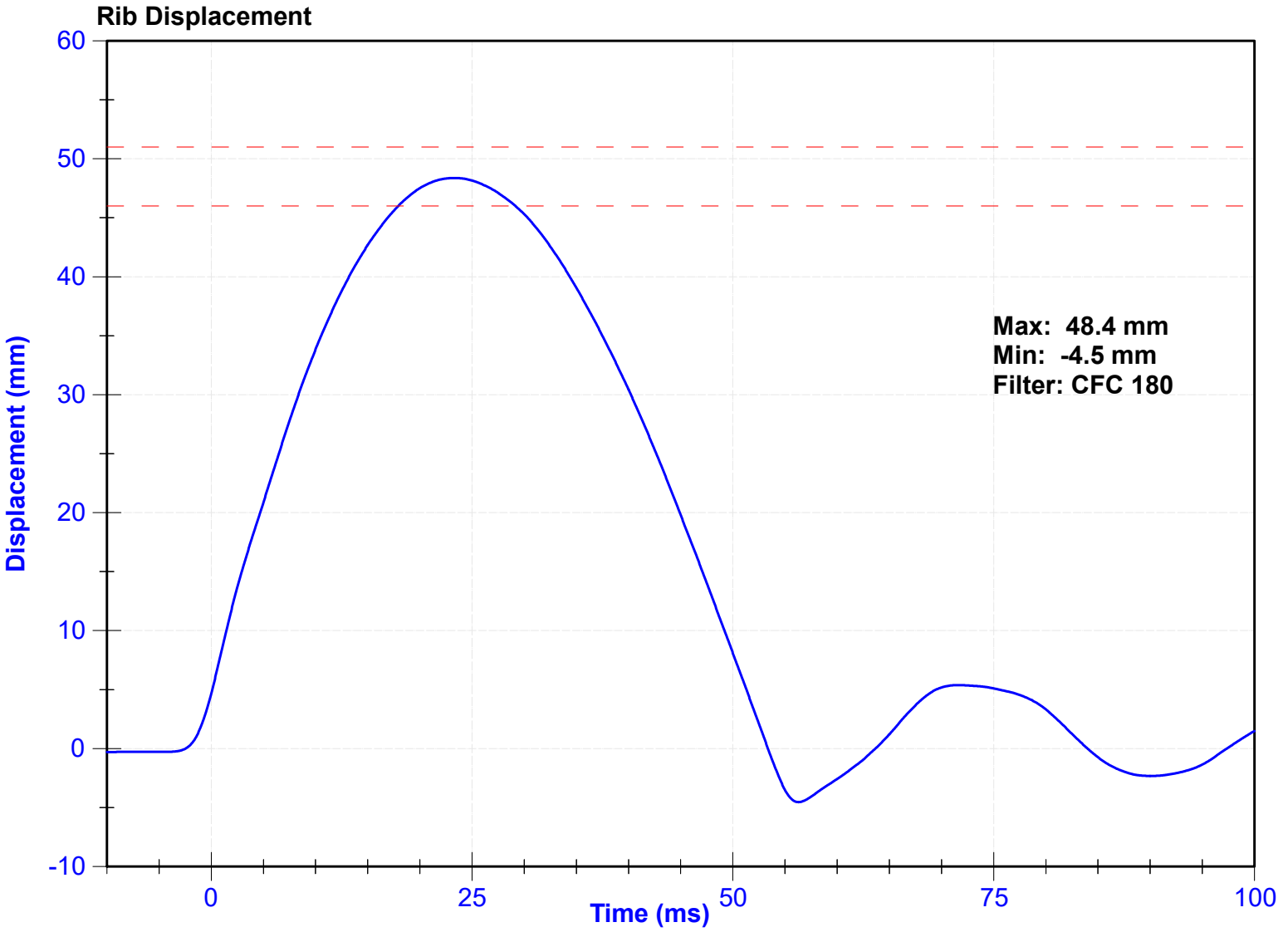
ATD Manufacturer	FTSS	Test Technician	Z. Nyhart
ATD Serial Number	F033	Laboratory Supervisor	J. Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.2	Pass
Humidity	10	70	%	23	Pass
Rib Displacement	46	51	mm	48.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	179GFE	10/16/2024	4/16/2025



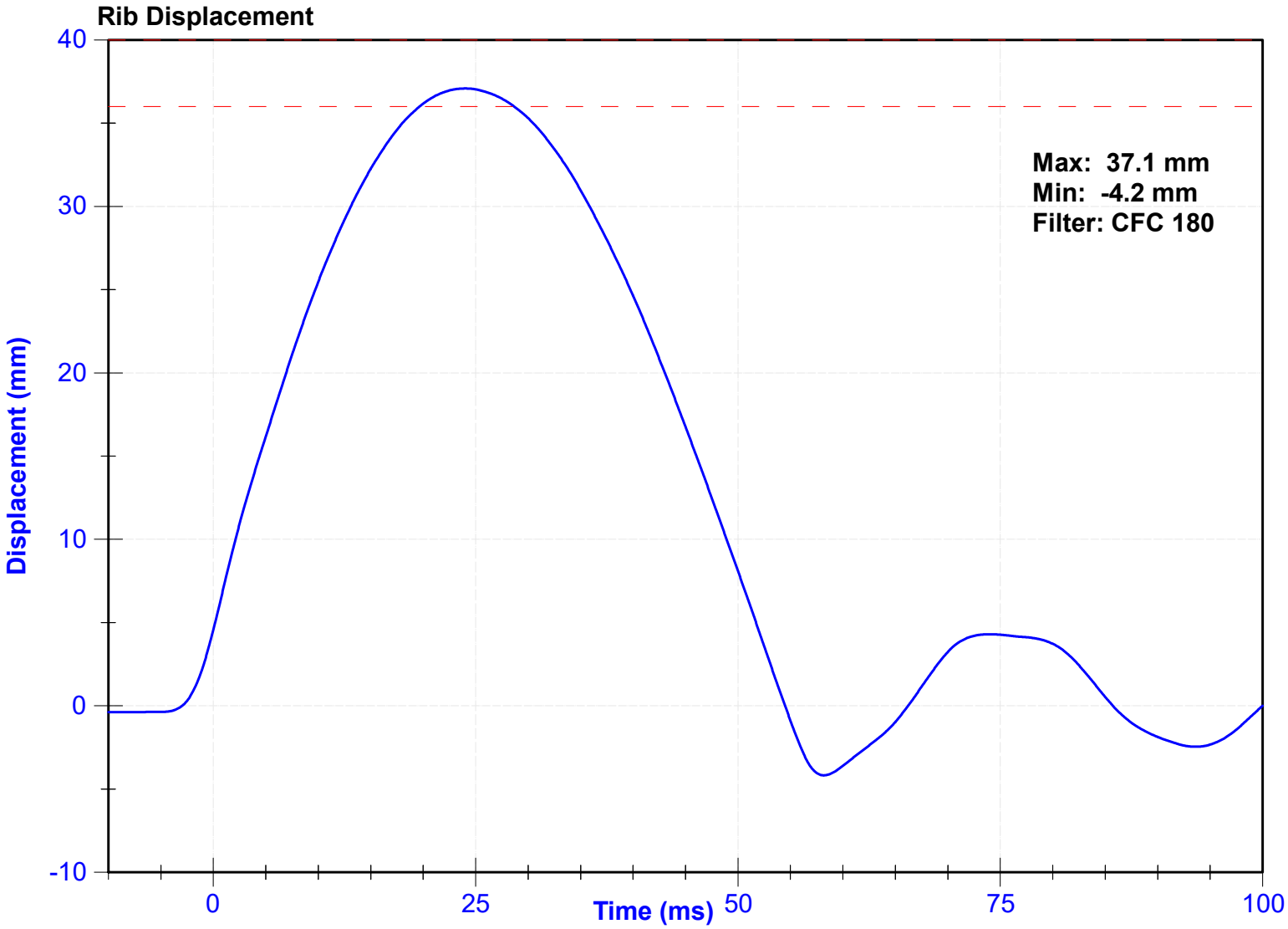
ATD Manufacturer	FTSS	Test Technician	Z. Nyhart
ATD Serial Number	F033	Laboratory Supervisor	J. Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.2	Pass
Humidity	10	70	%	23	Pass
Rib Displacement	36	40	mm	37.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	179GFE	10/16/2024	4/16/2025



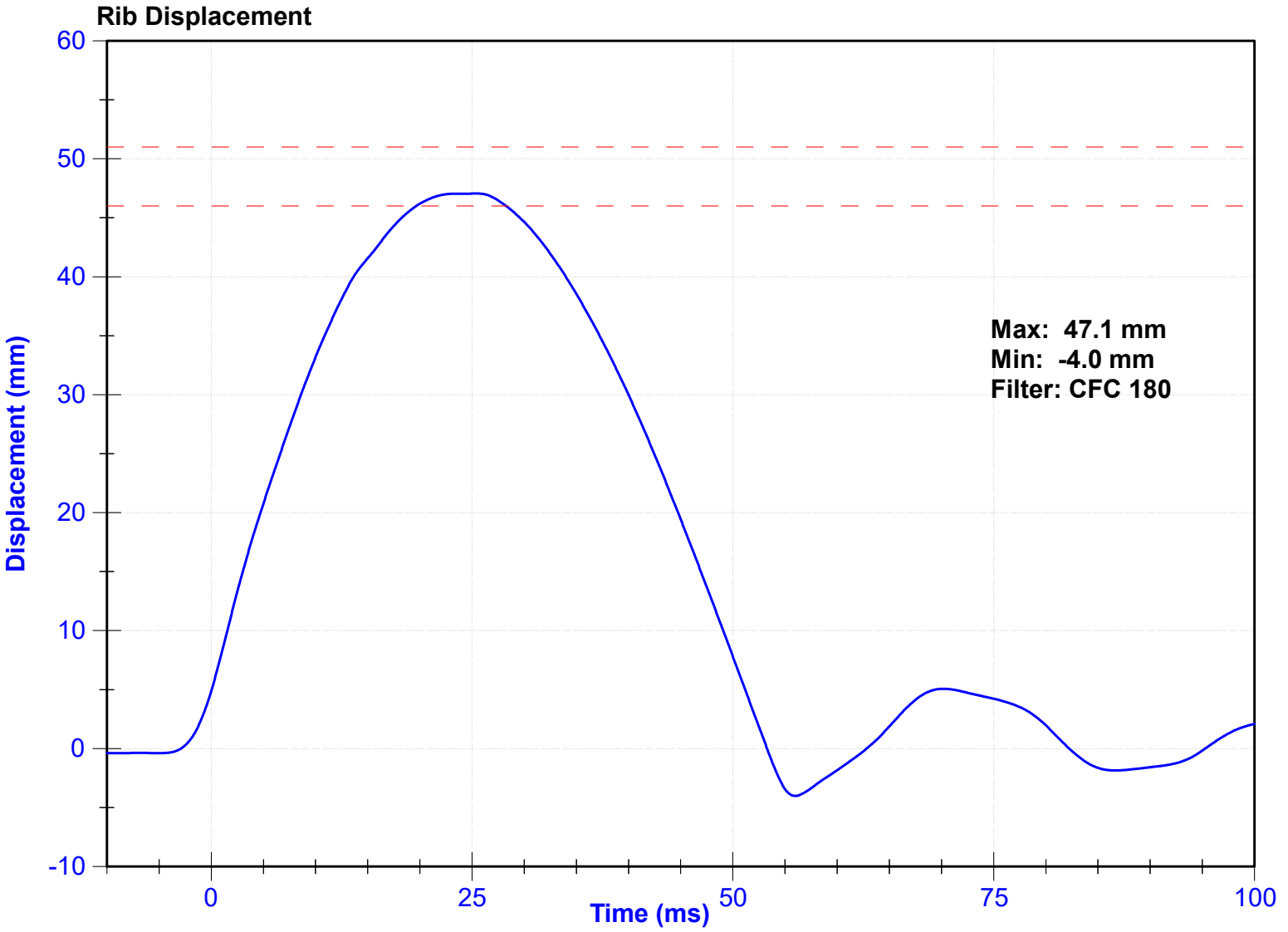
ATD Manufacturer	FTSS	Test Technician	Z. Nyhart
ATD Serial Number	F033	Laboratory Supervisor	J. Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.2	Pass
Humidity	10	70	%	23	Pass
Rib Displacement	46	51	mm	47.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	185GFE	10/16/2024	4/16/2025



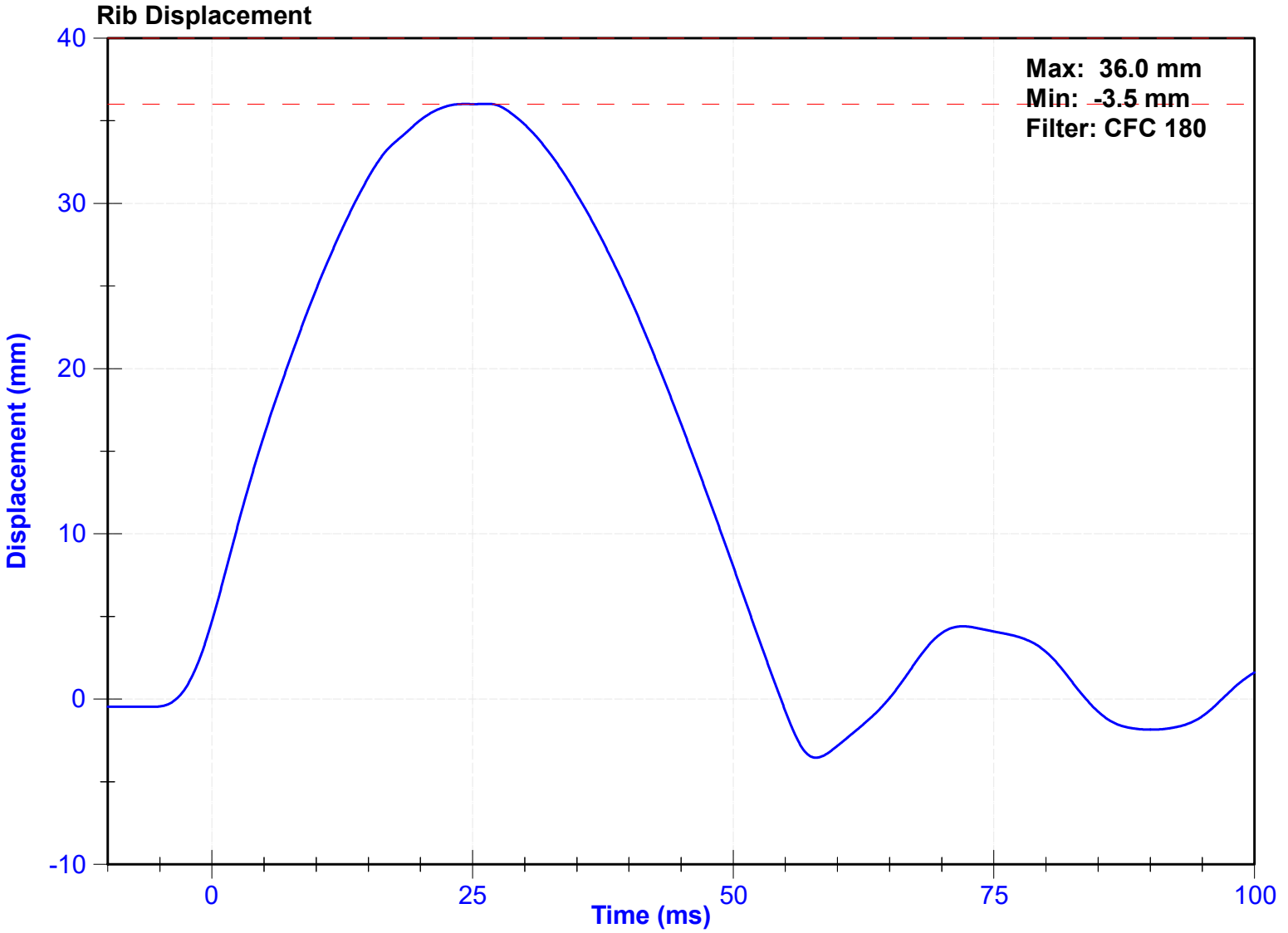
ATD Manufacturer	FTSS	Test Technician	Z. Nyhart
ATD Serial Number	F033	Laboratory Supervisor	J. Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.2	Pass
Humidity	10	70	%	23	Pass
Rib Displacement	36	40	mm	36.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	185GFE	10/16/2024	4/16/2025



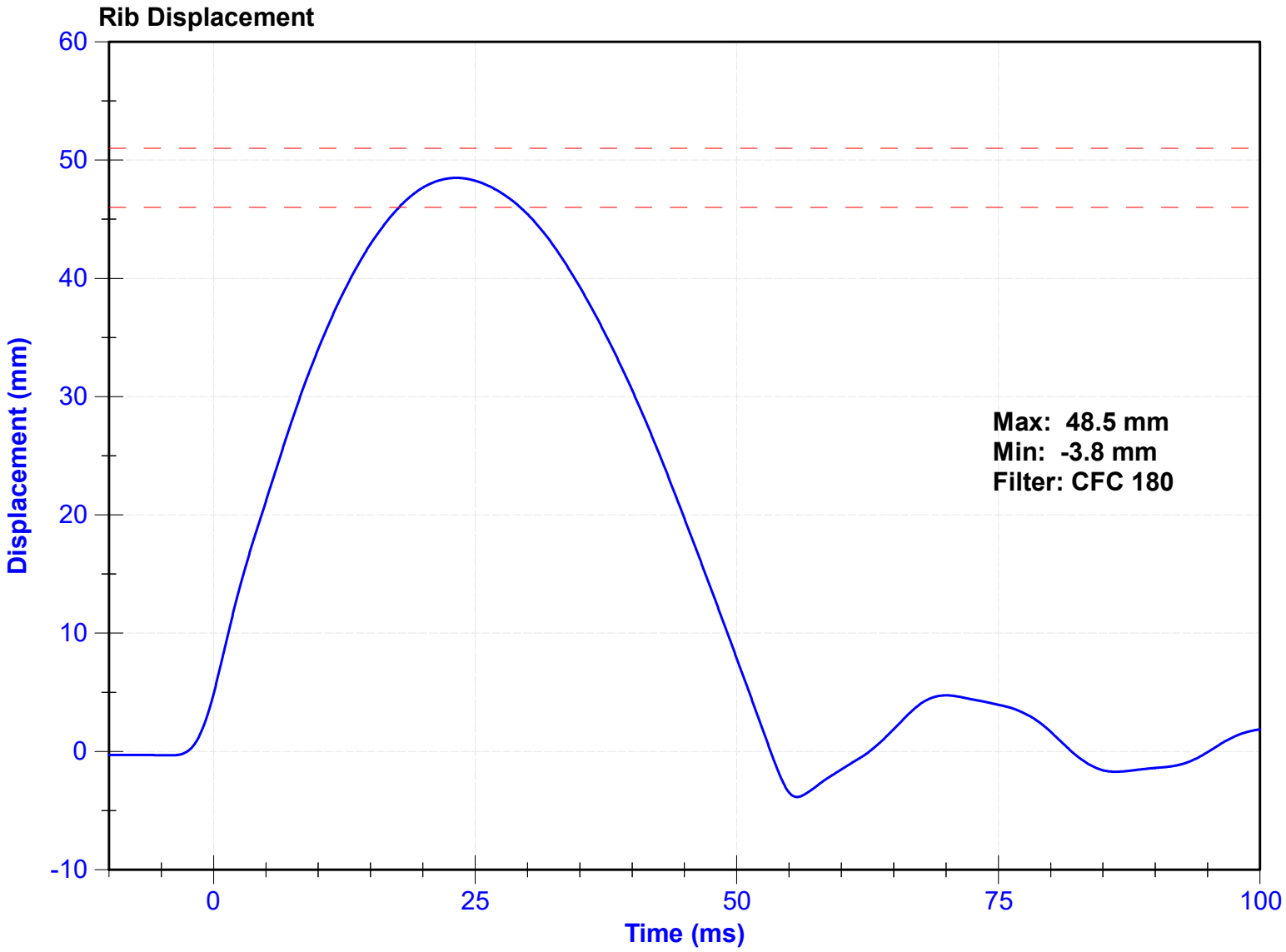
ATD Manufacturer	FTSS	Test Technician	Z. Nyhart
ATD Serial Number	F033	Laboratory Supervisor	J. Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.2	Pass
Humidity	10	70	%	23	Pass
Rib Displacement	46	51	mm	48.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	184GFE	11/19/2024	5/20/2025



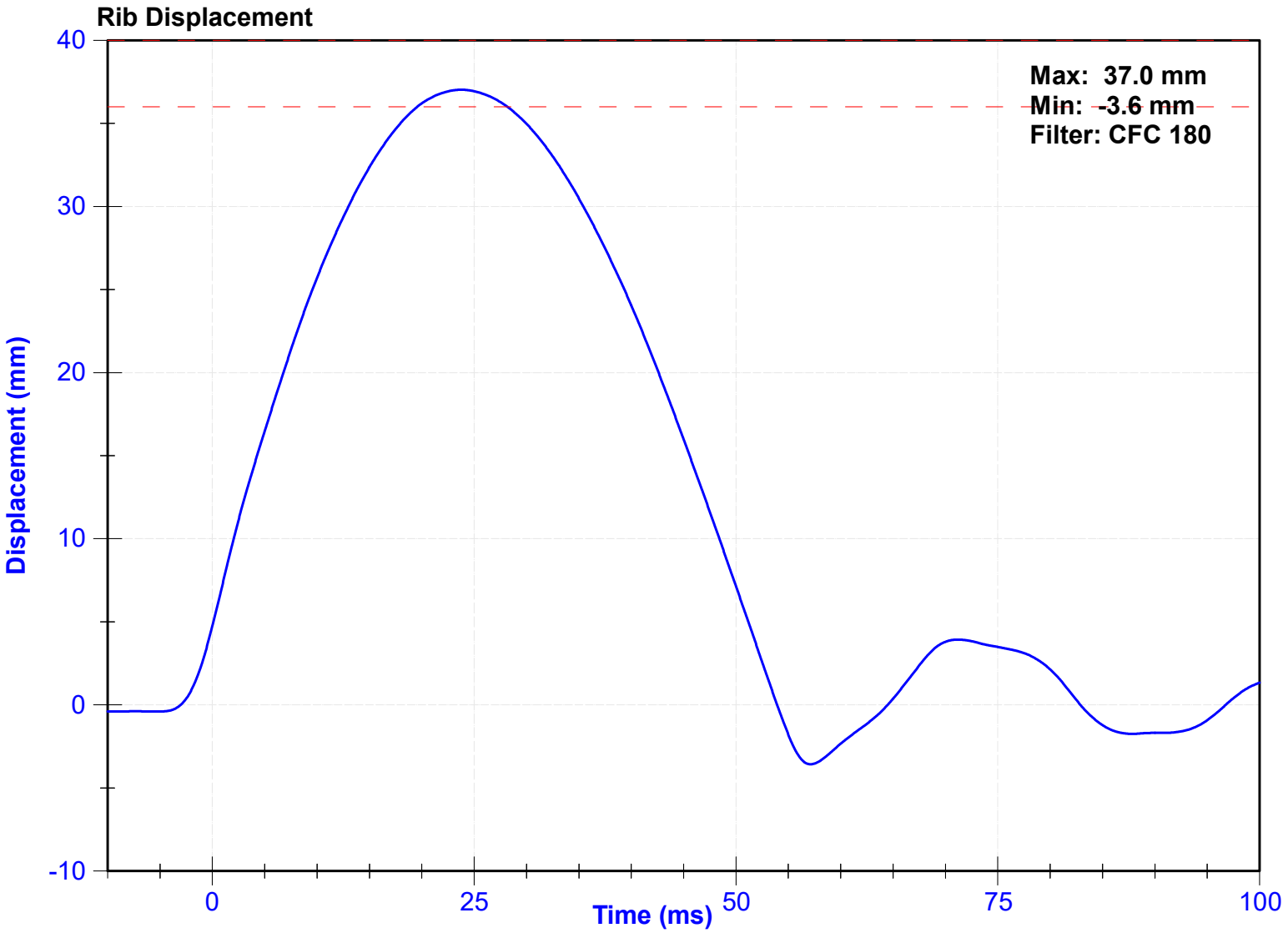
ATD Manufacturer	FTSS	Test Technician	Z. Nyhart
ATD Serial Number	F033	Laboratory Supervisor	J. Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21.2	Pass
Humidity	10	70	%	23	Pass
Rib Displacement	36	40	mm	37.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	184GFE	11/19/2024	5/20/2025



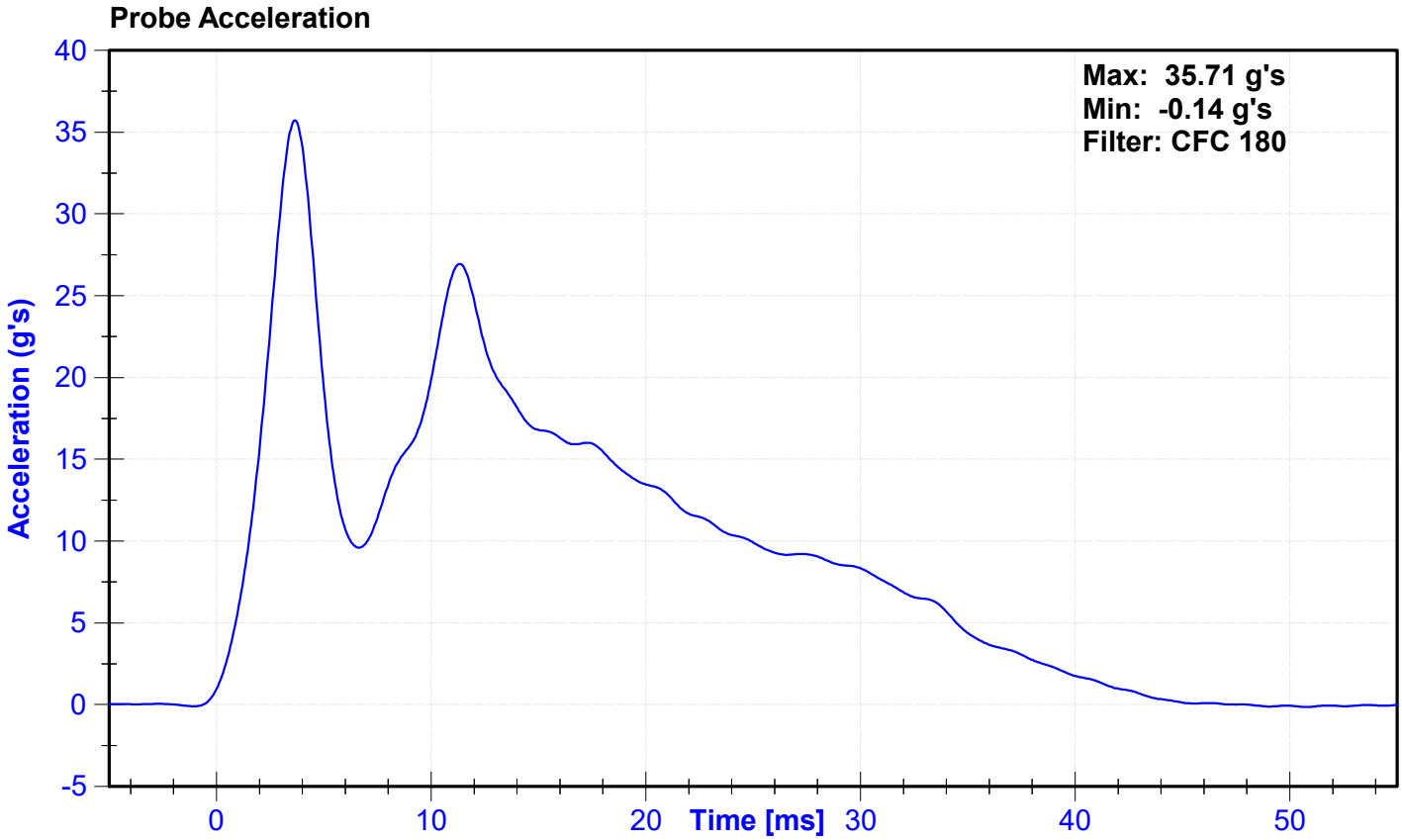
ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	F033	Laboratory Supervisor	J. Kinderman

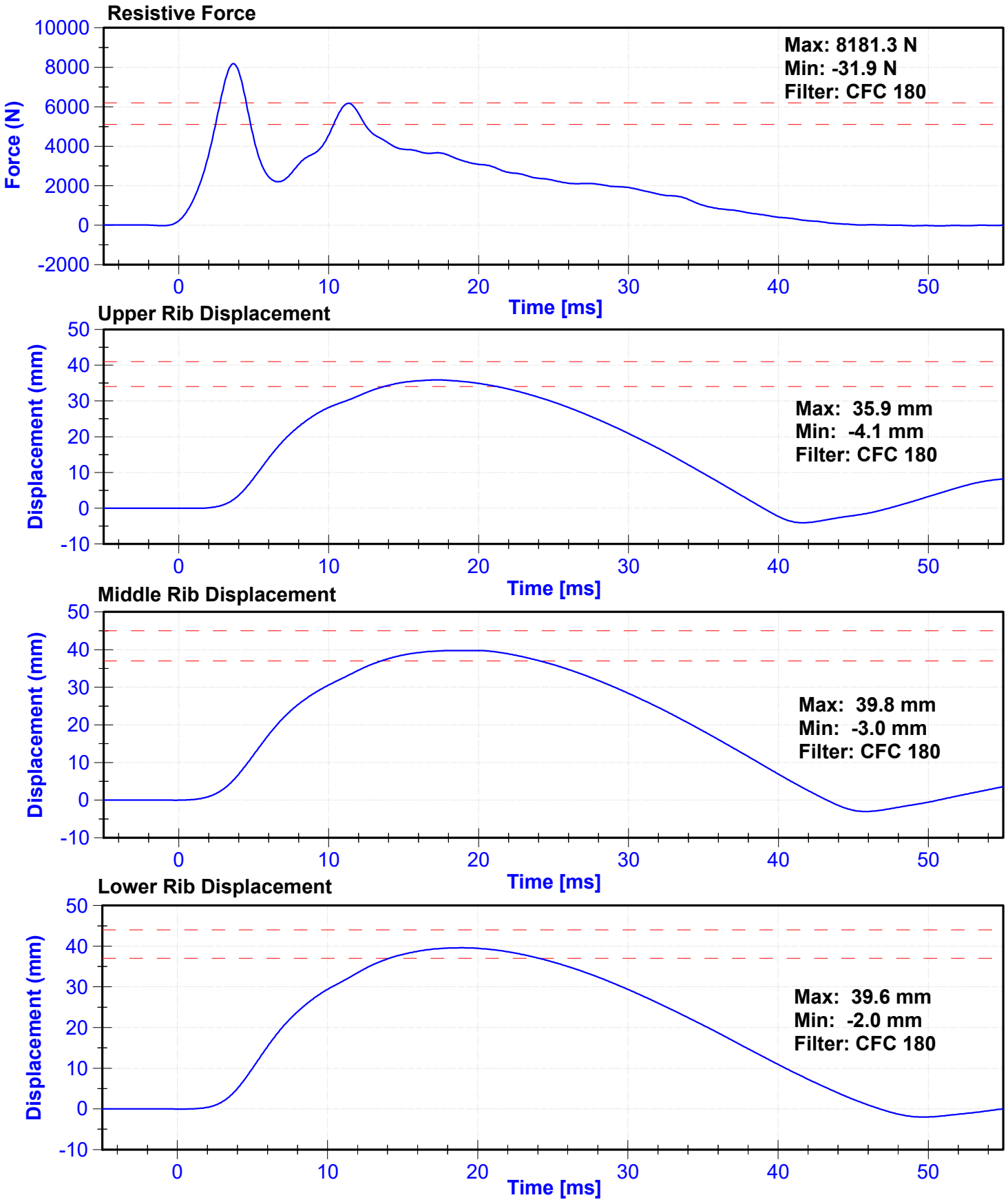
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21	Pass
Humidity	10	70	%	23	Pass
Velocity	5.4	5.6	m/s	5.53	Pass
Resistive Force after 6ms	5100	6200	N	6172.9	Pass
Upper Thorax Rib Deflection	34	41	mm	35.9	Pass
Mid Thorax Rib Deflection	37	45	mm	39.8	Pass
Lower Thorax Rib Deflection	37	44	mm	39.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	18566	11/26/2024	5/25/2025
Upper Thorax Rib Potentiometer	Honeywell	179GFE	10/16/2024	4/16/2025
Middle Thorax Rib Potentiometer	Honeywell	185GFE	10/16/2024	4/16/2025
Lower Thorax Rib Potentiometer	Honeywell	184GFE	11/19/2024	5/20/2025




Resistive Force
Max: 8181.3 N
Min: -31.9 N
Filter: CFC 180
Force (N)
Time [ms]
Upper Rib Displacement
Max: 35.9 mm
Min: -4.1 mm
Filter: CFC 180
Displacement (mm)
Time [ms]
Middle Rib Displacement
Max: 39.8 mm
Min: -3.0 mm
Filter: CFC 180
Displacement (mm)
Time [ms]
Lower Rib Displacement
Max: 39.6 mm
Min: -2.0 mm
Filter: CFC 180
Displacement (mm)
Time [ms]

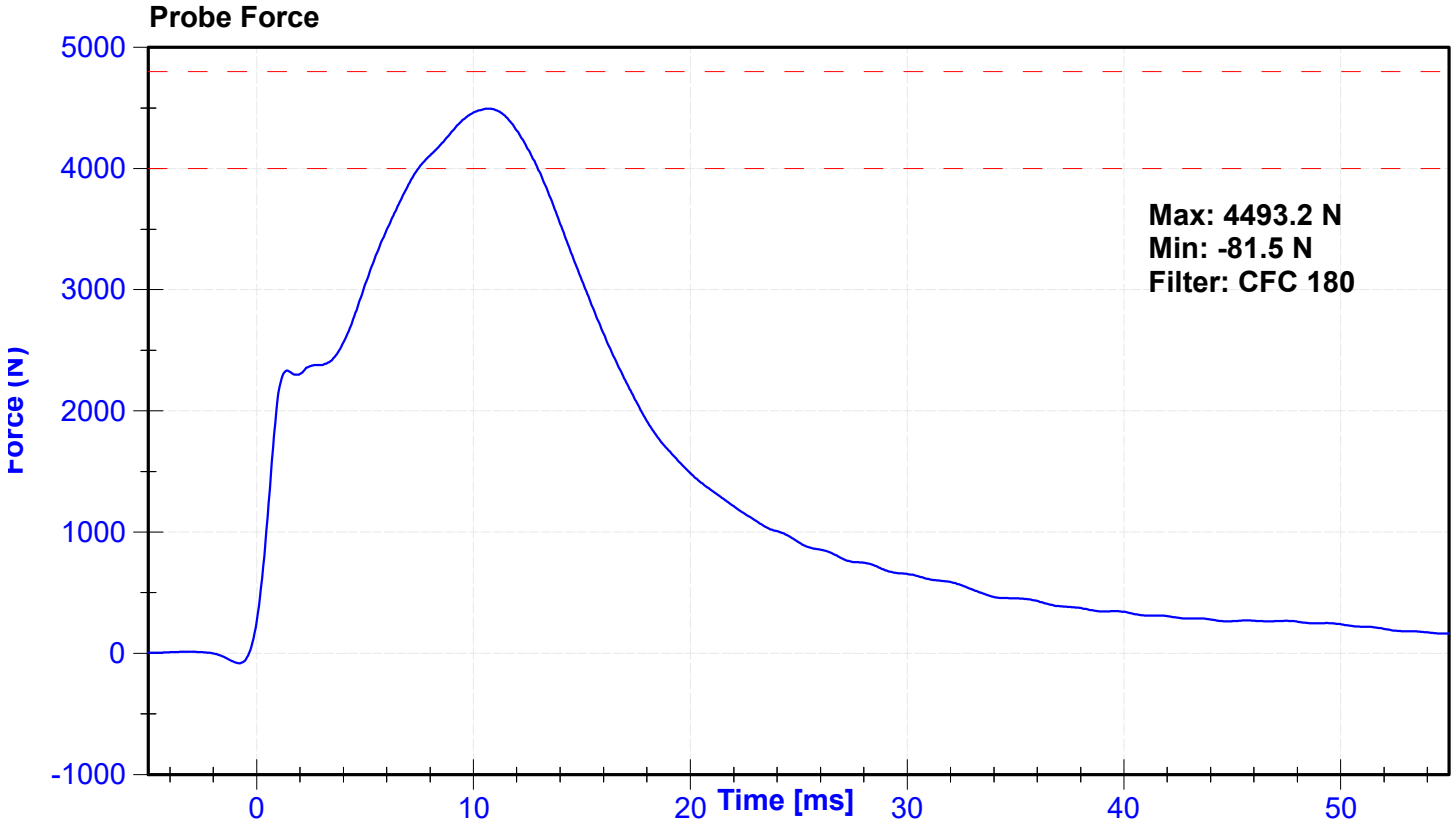
ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	F033	Laboratory Supervisor	J. Kinderman

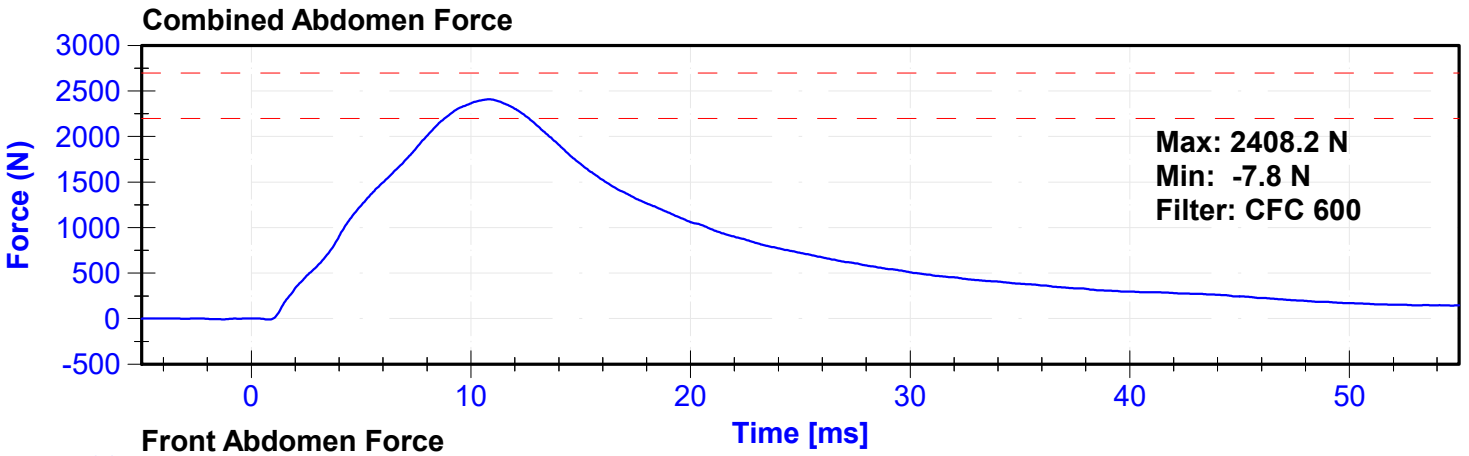
Results

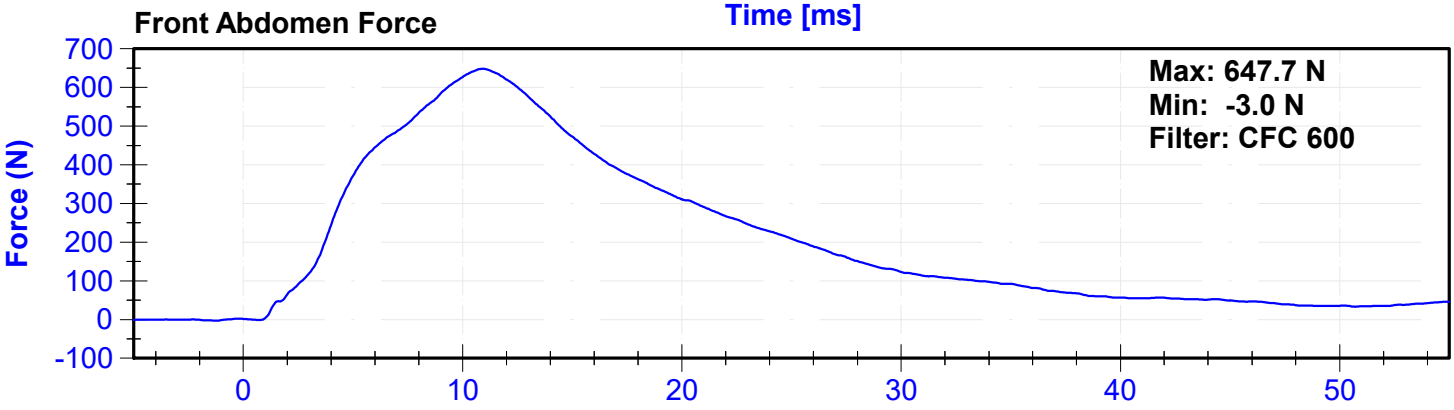
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21	Pass
Humidity	10	70	%	23	Pass
Velocity	3.9	4.1	m/s	4.02	Pass
Combined Abdomen Force	2200	2700	N	2408.2	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	10.85	Pass
Resistive Probe Force	4000	4800	N	4493.2	Pass
Time at Peak Resistive Force	10.6	13.0	ms	10.70	Pass

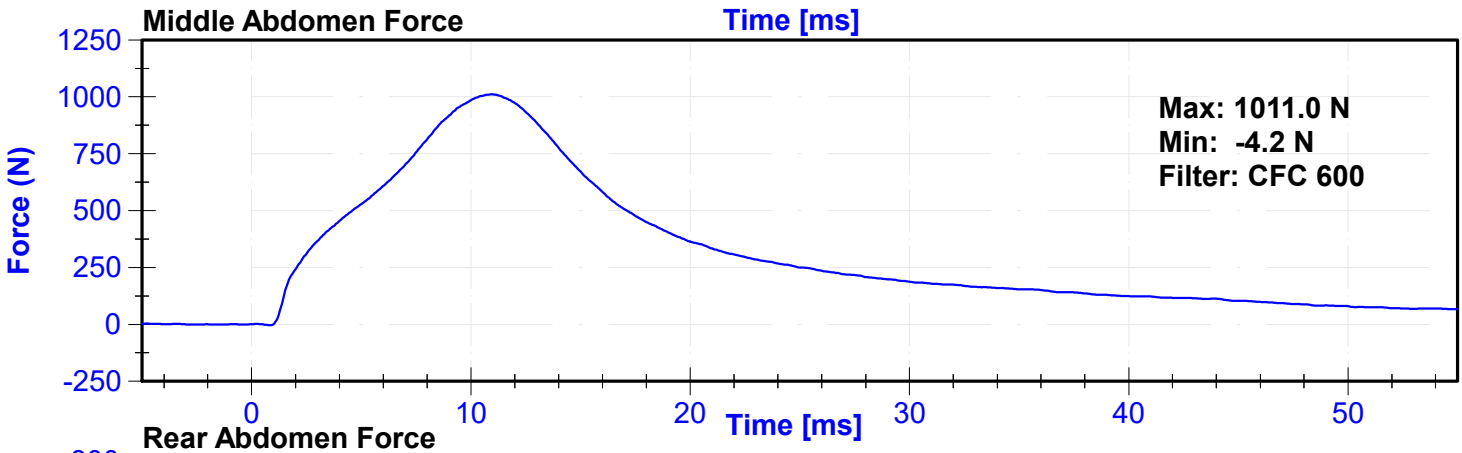
Transducer Calibrations

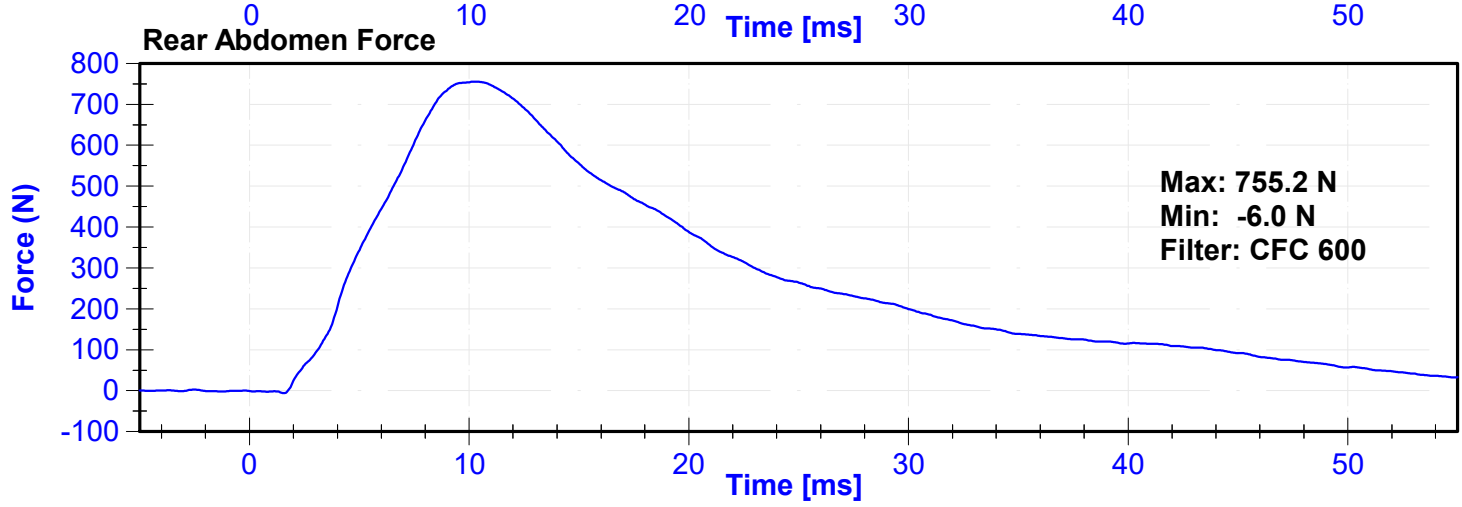
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18566	11/26/2024	5/25/2025
Front Abdomen Load Cell	Denton	1523	10/28/2024	10/28/2025
Middle Abdomen Load Cell	Denton	1524	10/28/2024	10/28/2025
Rear Abdomen Load Cell	Denton	1530	10/28/2024	10/28/2025




Combined Abdomen Force
Force (N)
Time [ms]
Max: 2408.2 N
Min: -7.8 N
Filter: CFC 600


Front Abdomen Force
Force (N)
Time [ms]
Max: 647.7 N
Min: -3.0 N
Filter: CFC 600


Middle Abdomen Force
Force (N)
Time [ms]
Max: 1011.0 N
Min: -4.2 N
Filter: CFC 600


Rear Abdomen Force
Force (N)
Time [ms]
Max: 755.2 N
Min: -6.0 N
Filter: CFC 600

ATD Manufacturer	FTSS	Test Technician	J. Rios
ATD Serial Number	F033	Laboratory Supervisor	J. Kinderman

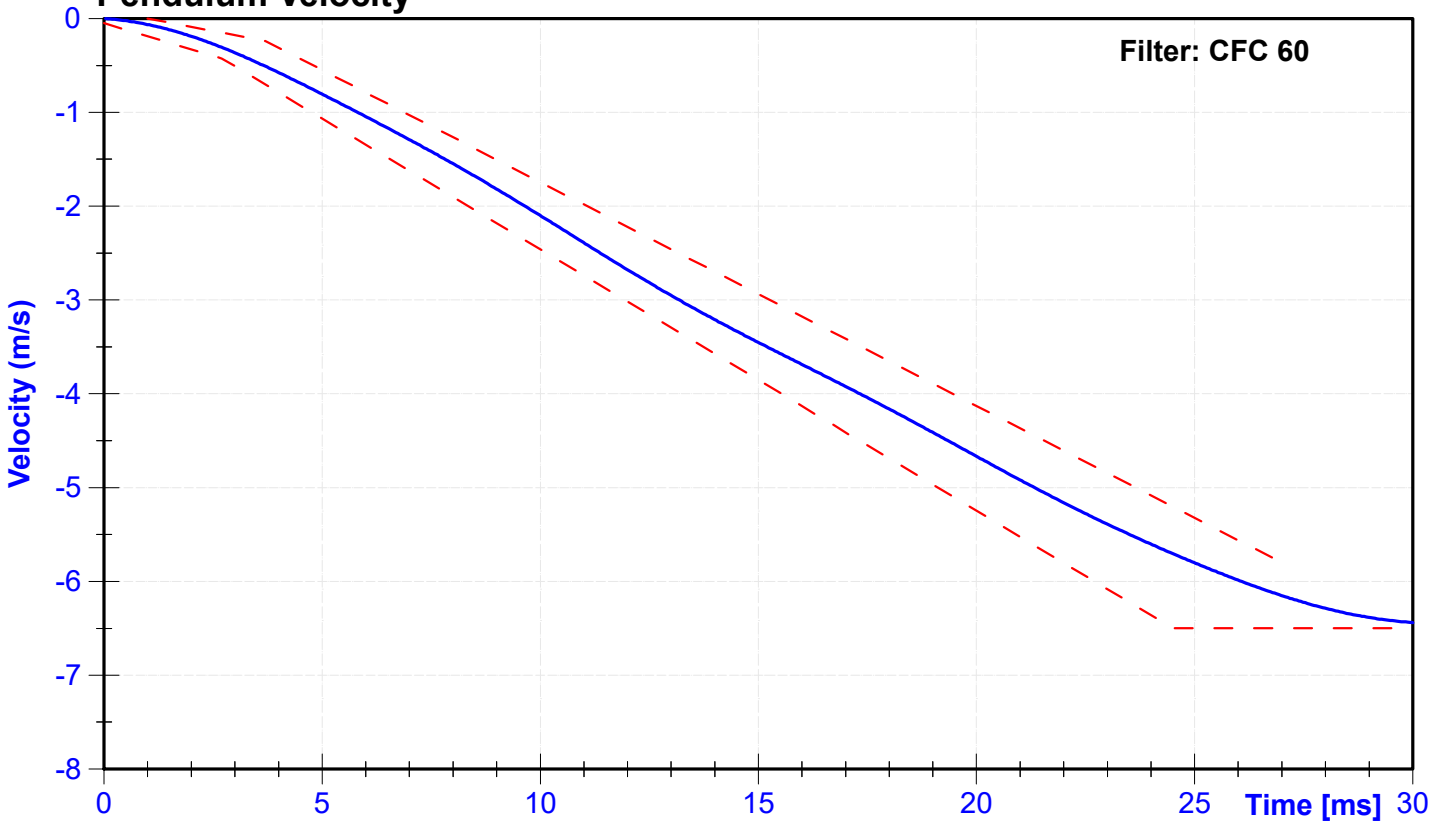
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.9	Pass
Humidity	10	70	%	25	Pass
Velocity	5.95	6.15	m/s	6.049	Pass
Lateral Spine Rotation	45	55	deg	46.3	Pass
Time at Maximum Rotation	39	53	ms	42.1	Pass
Time of Decay to Zero Degrees	37	57	ms	38.3	Pass
Pendulum Velocity Overall Corridor	Lower Boundary[1]	Upper Boundary[2]	m/s	See Plot[3]	Pass

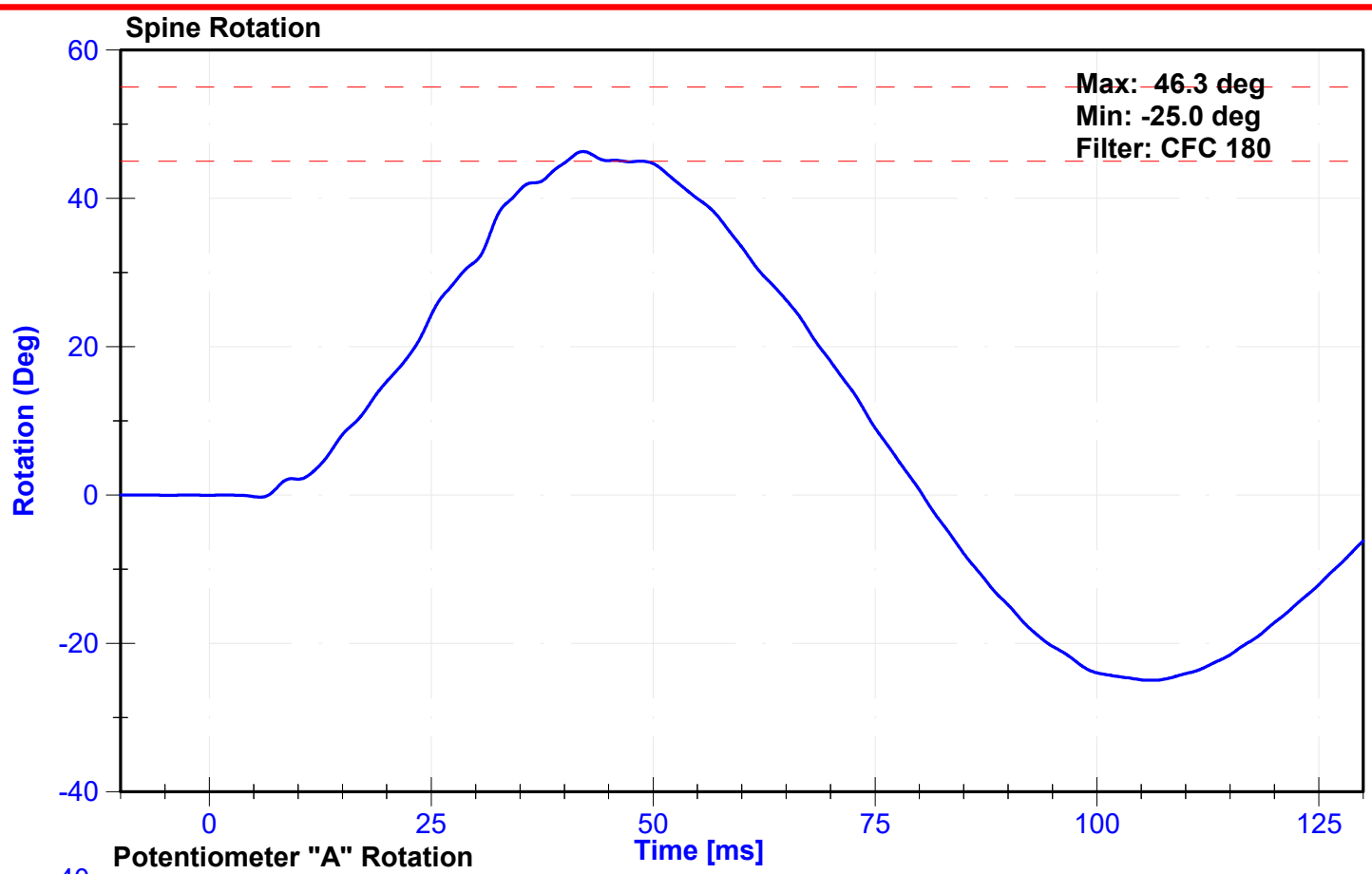
Transducer Calibrations

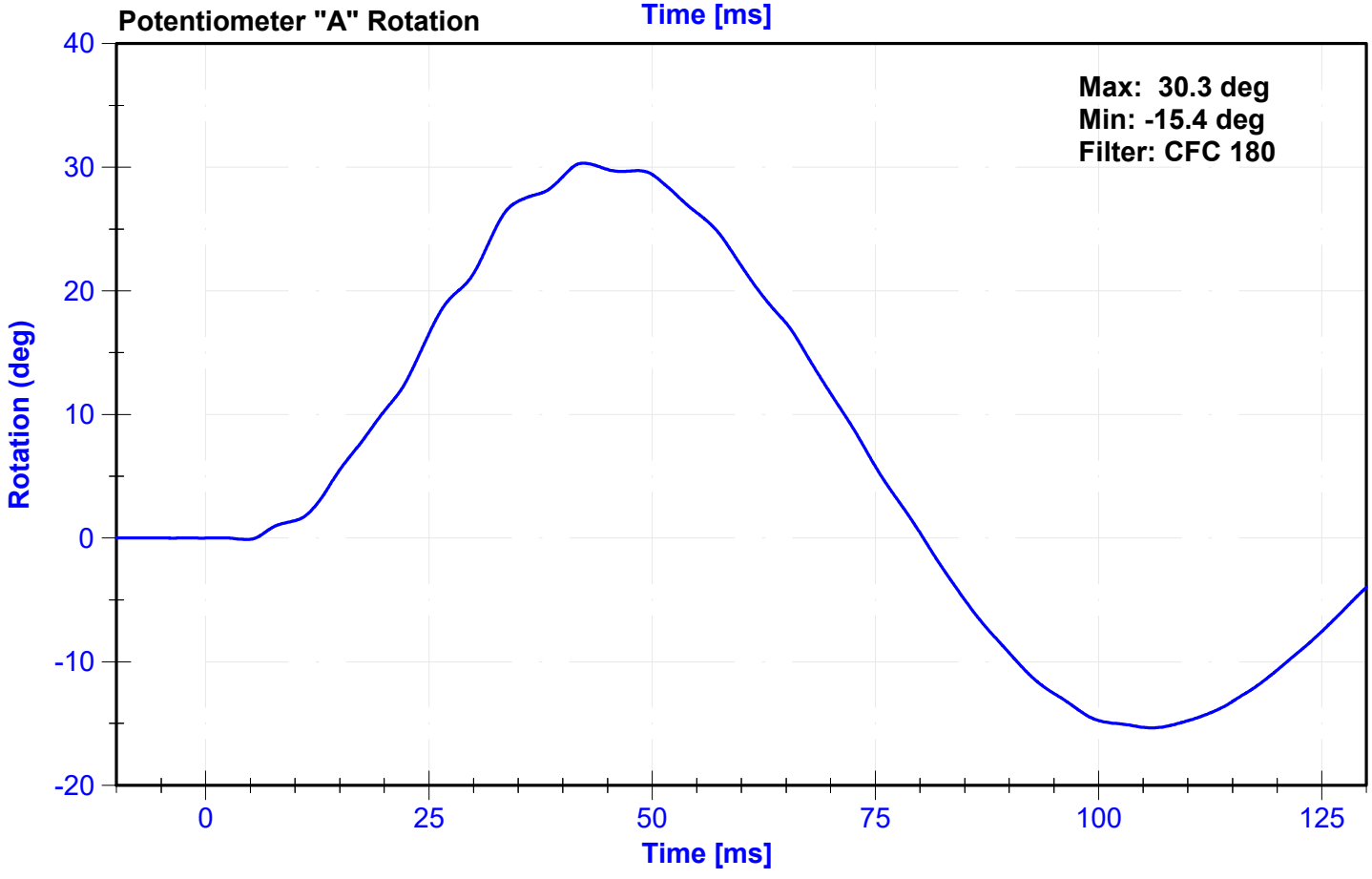
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16646	10/17/2024	4/15/2025
Pendulum "A" Potentiometer	Sfernice	2247	9/13/2024	9/13/2025
Condyle "B" Potentiometer	Sfernice	095	9/13/2024	9/13/2025

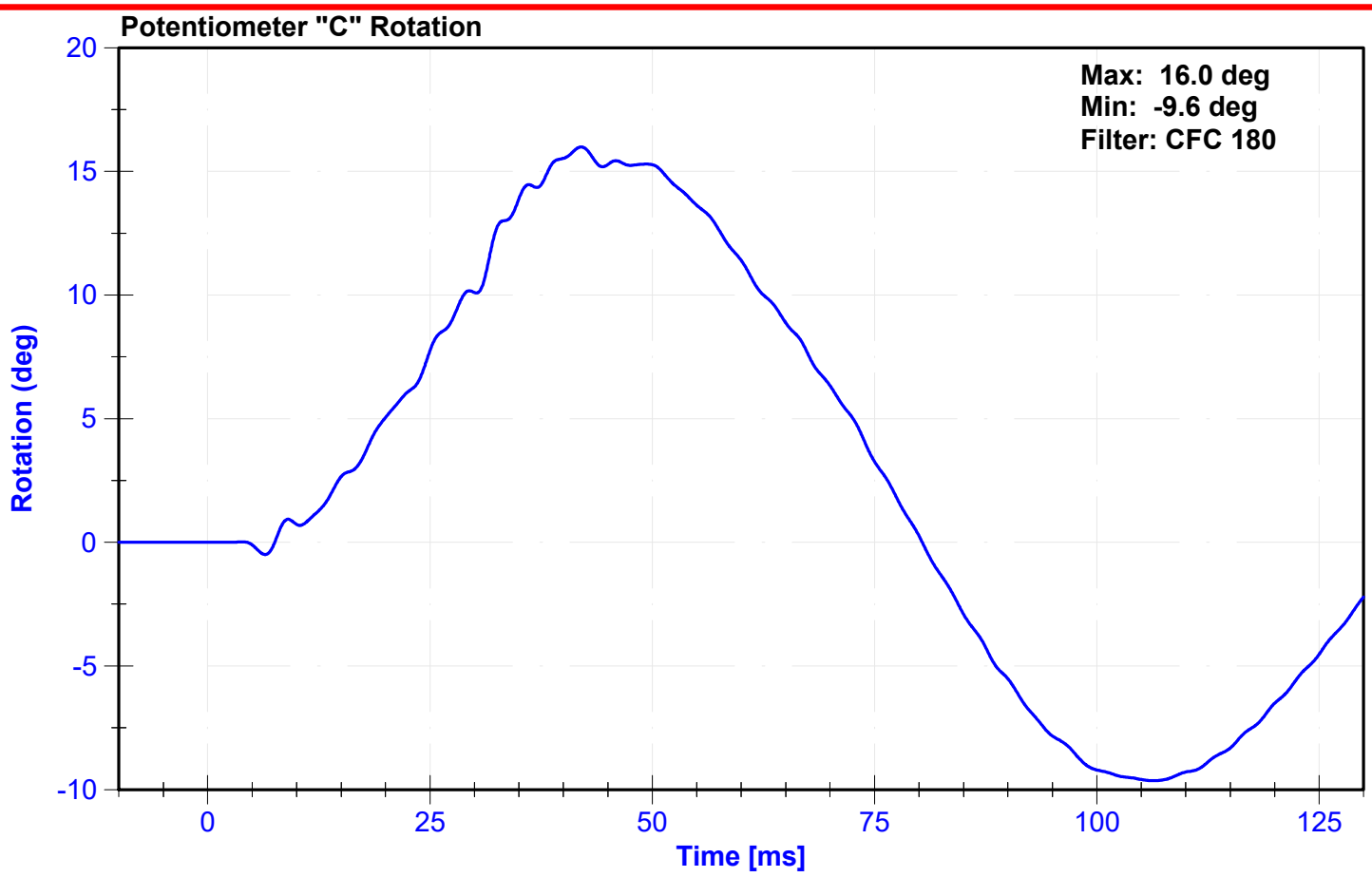
Pendulum Velocity[3]



[1,2] Upper and lower boundaries specified in Appendix I


Spine Rotation
Max: 46.3 deg
Min: -25.0 deg
Filter: CFC 180
Rotation (Deg)
60
40
20
0
-20
-40
0
25
50
75
100
125
Time [ms]


Potentiometer "A" Rotation
Max: 30.3 deg
Min: -15.4 deg
Filter: CFC 180
Rotation (deg)
40
30
20
10
0
-10
-20
0
25
50
75
100
125
Time [ms]



Appendix I

[2] Upper Boundary Corridor		[1] Lower Boundary Corridor	
Time (ms)	Velocity (m/s)	Time (ms)	Velocity (m/s)
1.0	0.00	0.0	-0.05
3.7	-0.24	2.7	-0.425
27.0	-5.80	24.5	-6.5
		30.0	-6.5

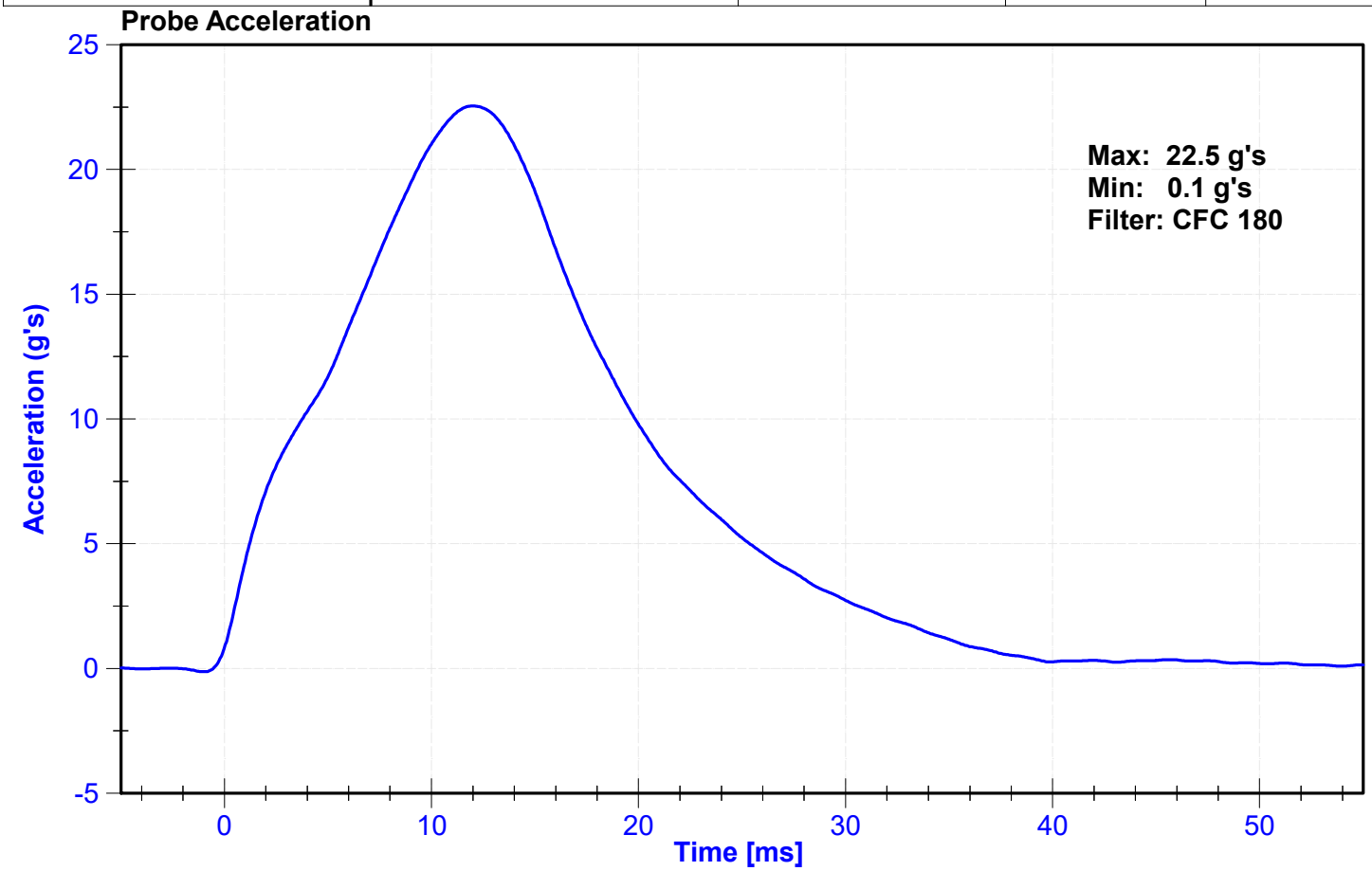
ATD Manufacturer	FTSS	Test Technician	K. Konieczny
ATD Serial Number	F033	Laboratory Supervisor	J. Kinderman

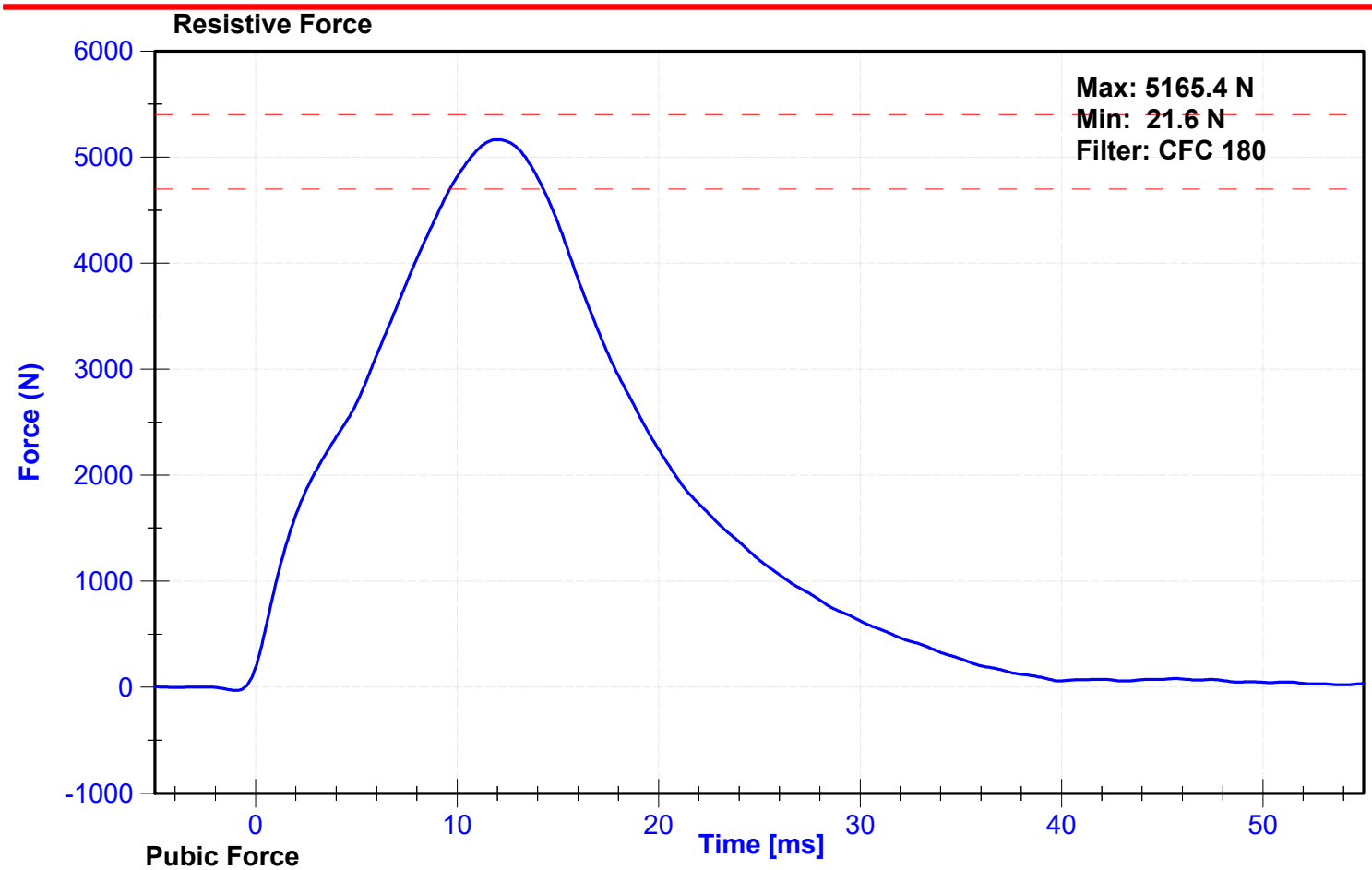
Results

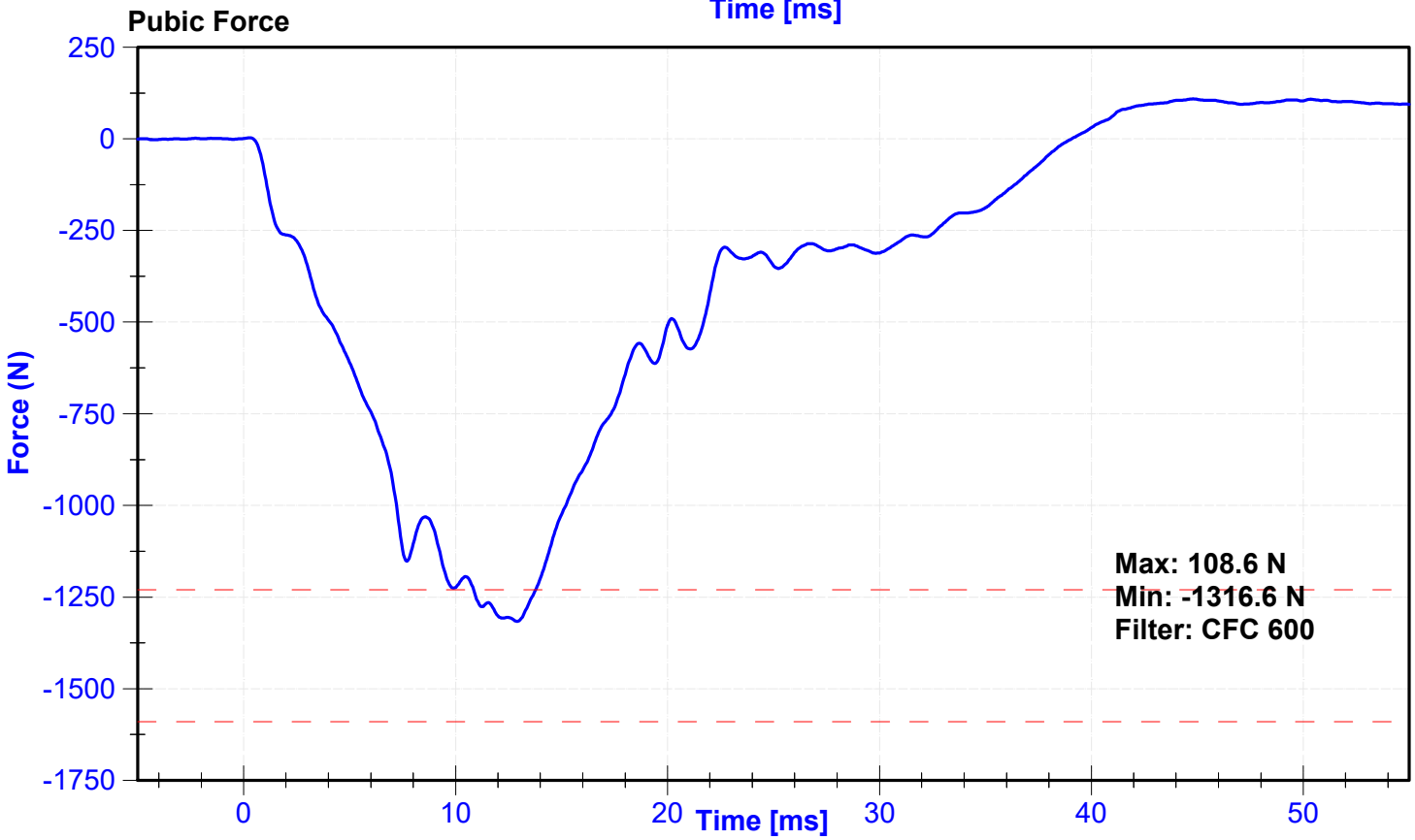
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	21	Pass
Humidity	10	70	%	23	Pass
Velocity	4.2	4.4	m/s	4.33	Pass
Resistive Force	4700	5400	N	5165.4	Pass
Time at Peak Resistive Force	11.8	16.1	ms	12.00	Pass
Pubic Force	-1590	-1230	N	-1316.6	Pass
Time at Peak Pubic Force	12.2	17.0	ms	12.90	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25962	2/15/2025	8/14/2025
Pubic Load Cell	Denton	458-FY	10/28/2024	10/28/2025




Resistive Force
Max: 5165.4 N
Min: 21.6 N
Filter: CFC 180
Force (N)
6000
5000
4000
3000
2000
1000
0
-1000
0
10
20
30
40
50
Time [ms]


Pubic Force
Max: 108.6 N
Min: -1316.6 N
Filter: CFC 600
Force (N)
250
0
-250
-500
-750
-1000
-1250
-1500
-1750
0
10
20
30
40
50
Time [ms]

CALIBRATION TEST RESULTS

POST-TEST

SID-IIS 5TH PERCENTILE FEMALE – PASSENGER ATD

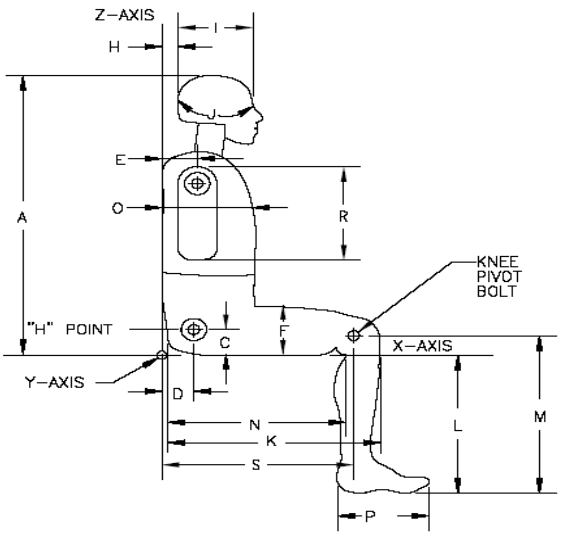
SERIAL NO:DG8012

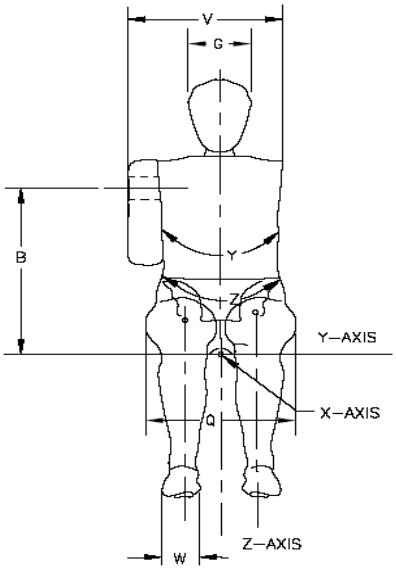
(CONFIGURED FOR LEFT SIDE IMPACT)

External Measurements - SID-IIs

Technician: J. Rios Date: 3/25/2025

Dummy Serial Number: DG8012





Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	775	Pass
B	Shoulder Pivot Height	437	453	444	Pass
C	H-point Height	79	89	88	Pass
D	H-point from seatback	141	151	144	Pass
E	Shoulder Pivot from Backline	97	107	106	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	184	Pass
J	Head Circumference	541	551	550	Pass
K	Buttock to Knee Length	514	540	529	Pass
L	Popliteal Height	343	369	352	Pass
M	Knee Pivot to floor height	392	409	403	Pass
N	Buttock Popliteal Length	416	442	431	Pass
O	Chest Depth w/o jacket	195	211	207	Pass
P	Foot Length	216	232	226	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	320	Pass
R	Arm Length	249	259	256	Pass
S	Knee Joint to seatback	477	493	485	Pass
V	Shoulder Width	341	357	352	Pass
W	Foot Width	78	94	85	Pass
Y	Chest Circumference w/jacket	851	881	872	Pass
Z	Waist Circumference	761	791	780	Pass

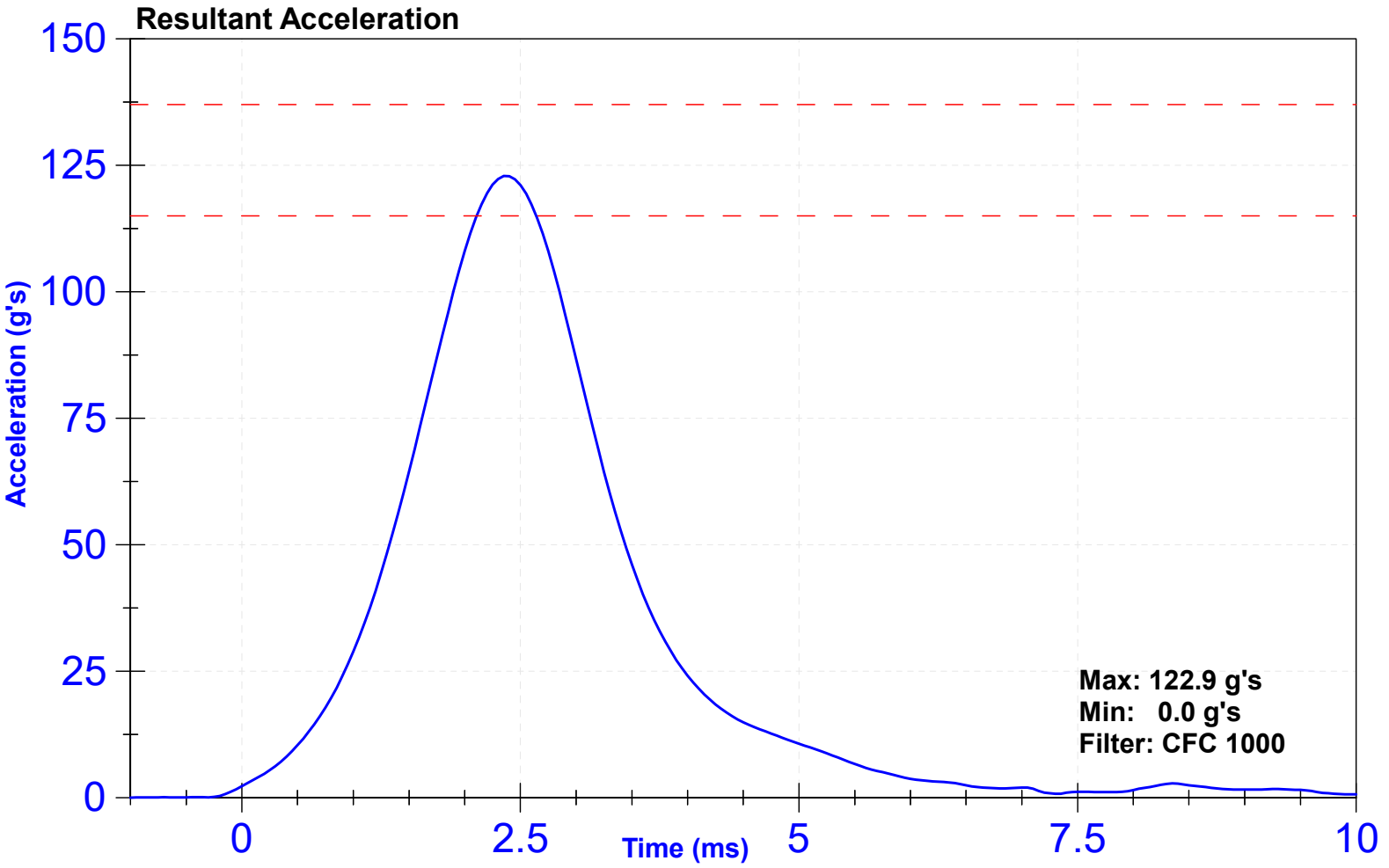
ATD Manufacturer	FTSS	Test Technician	Z. Nyhart
ATD Serial Number	DG8012	Laboratory Supervisor	J. Kinderman

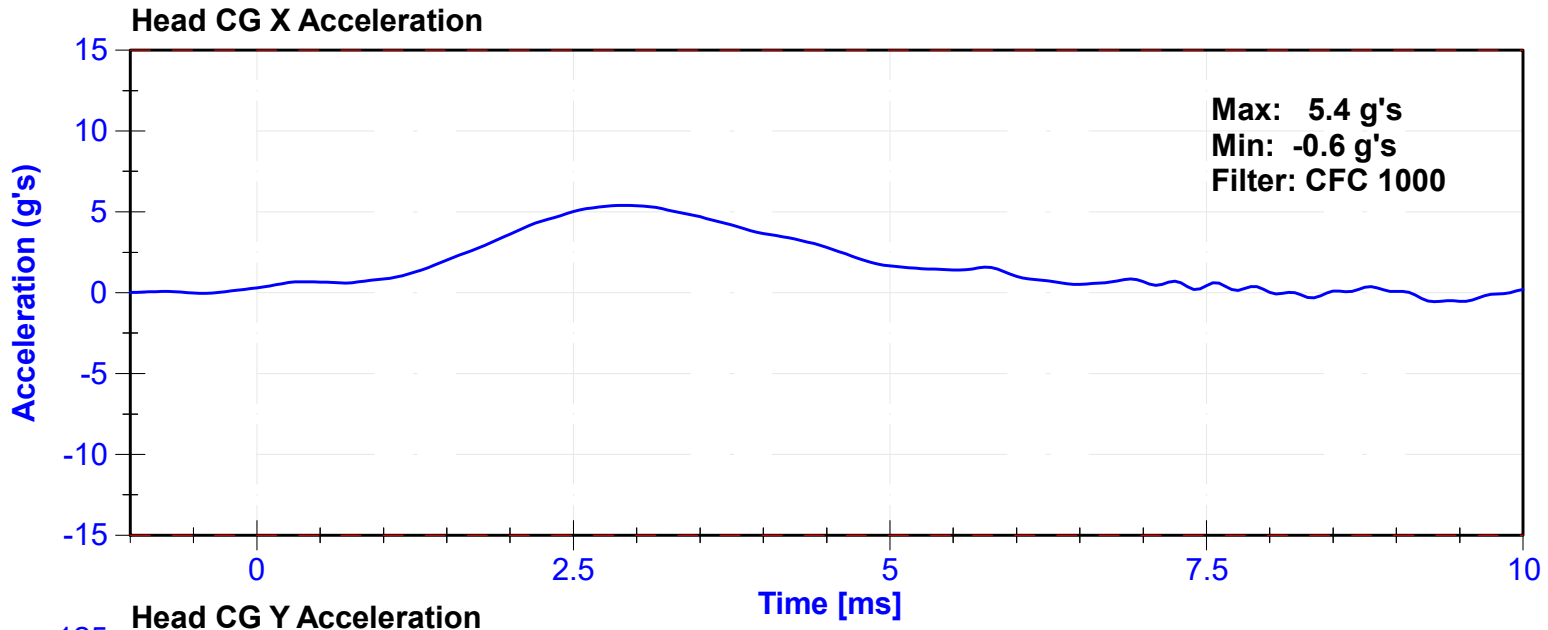
Results

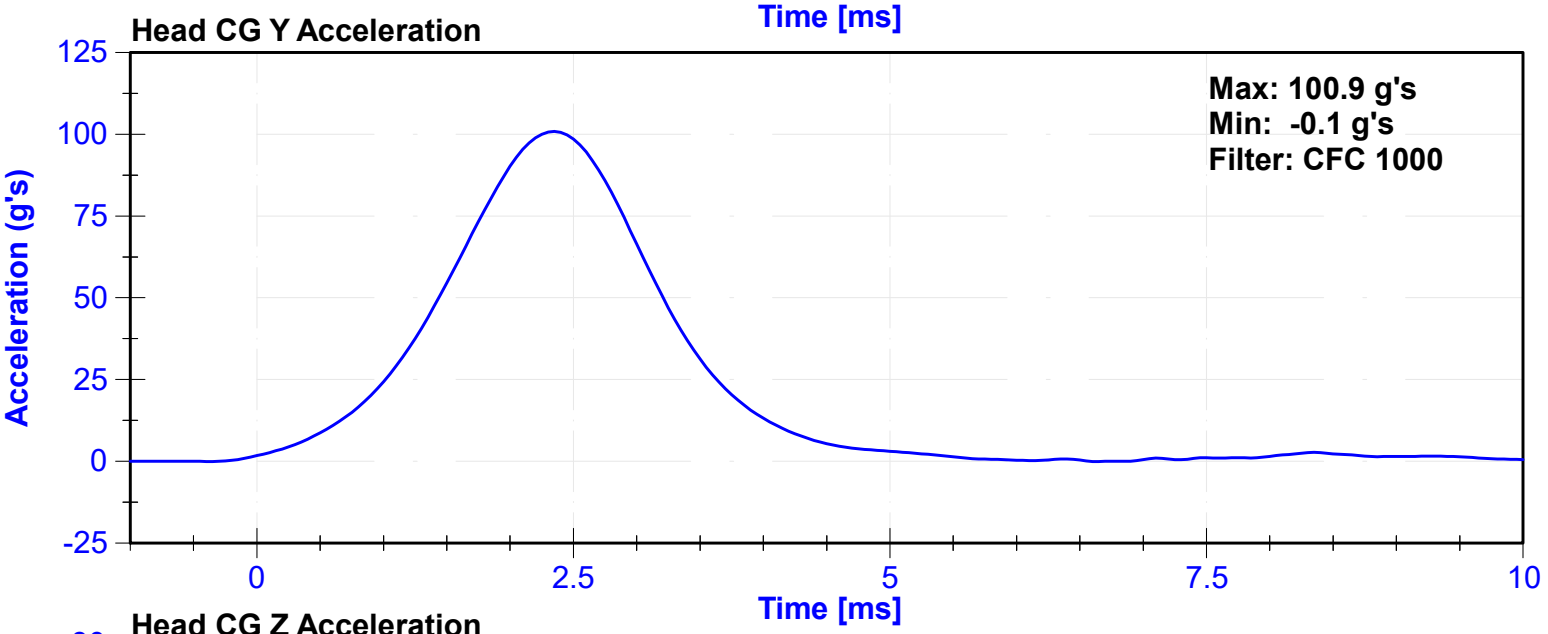
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.8	Pass
Humidity	10	70	%	22	Pass
Resultant Acceleration	115	137	g's	122.9	Pass
Oscillation	0	15	%	2.2	Pass
Fore-Aft Acceleration	-15	15	g's	5.4	Pass

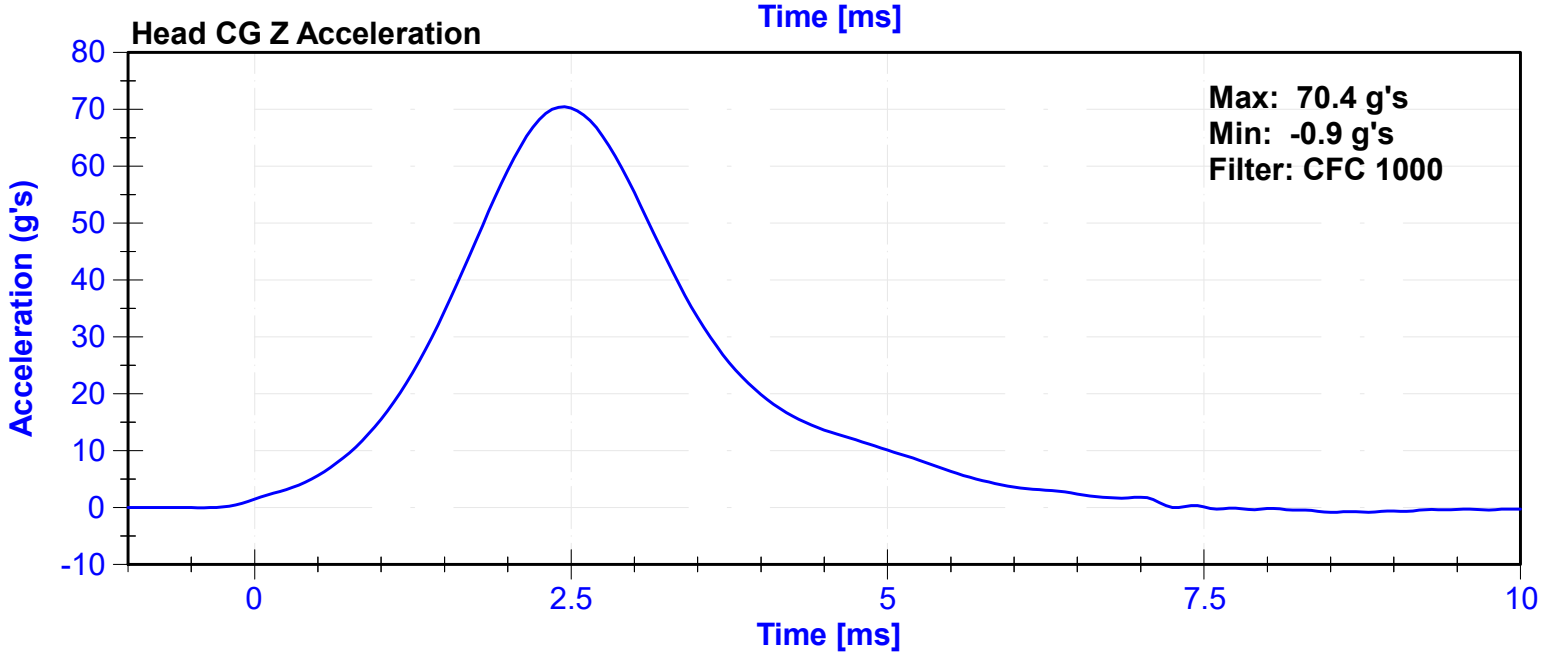
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibratio Date	Calibratio Due Date
X Accelerometer	Endevco	T21184	10/17/2024	4/15/2025
Y Accelerometer	Endevco	T31030	10/17/2024	4/15/2025
Z Accelerometer	Endevco	P83319	10/17/2024	4/15/2025




Head CG X Acceleration
Max: 5.4 g's
Min: -0.6 g's
Filter: CFC 1000
Acceleration (g's)
Time [ms]


Head CG Y Acceleration
Max: 100.9 g's
Min: -0.1 g's
Filter: CFC 1000
Acceleration (g's)
Time [ms]


Head CG Z Acceleration
Max: 70.4 g's
Min: -0.9 g's
Filter: CFC 1000
Acceleration (g's)
Time [ms]

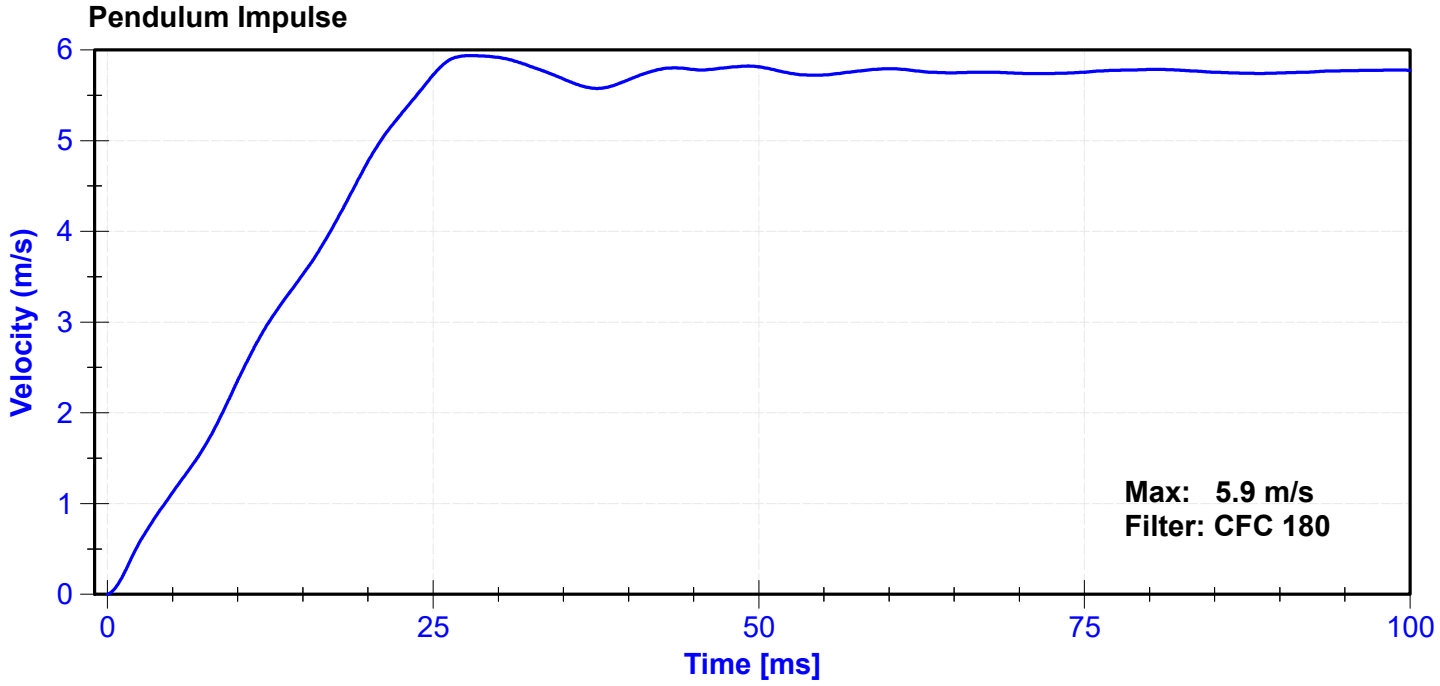
ATD Manufacturer	Humanetics	Test Technician	Z. Nyhart
ATD Serial Number	DG8012	Laboratory Supervisor	J. Kinderman

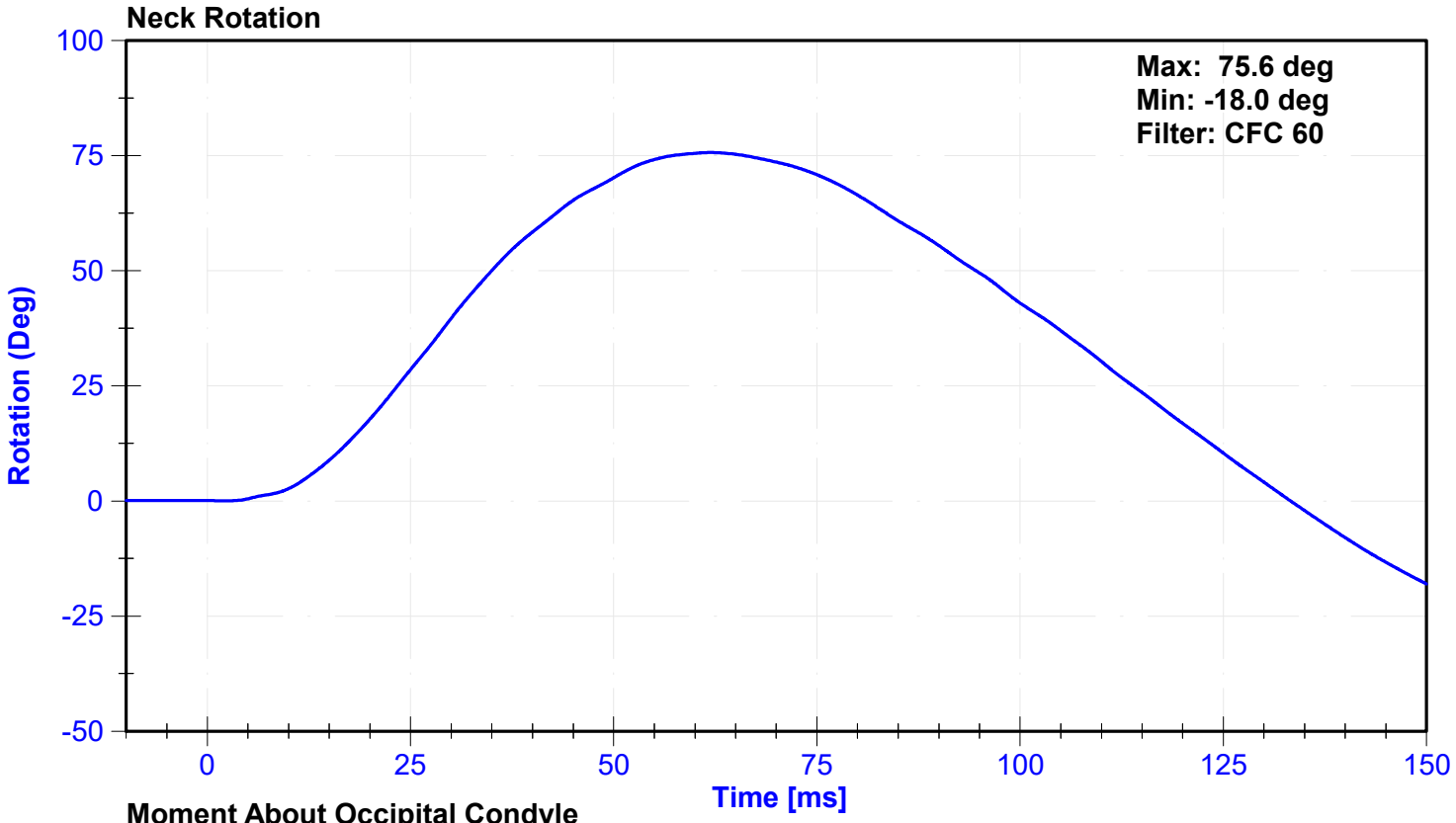
Results

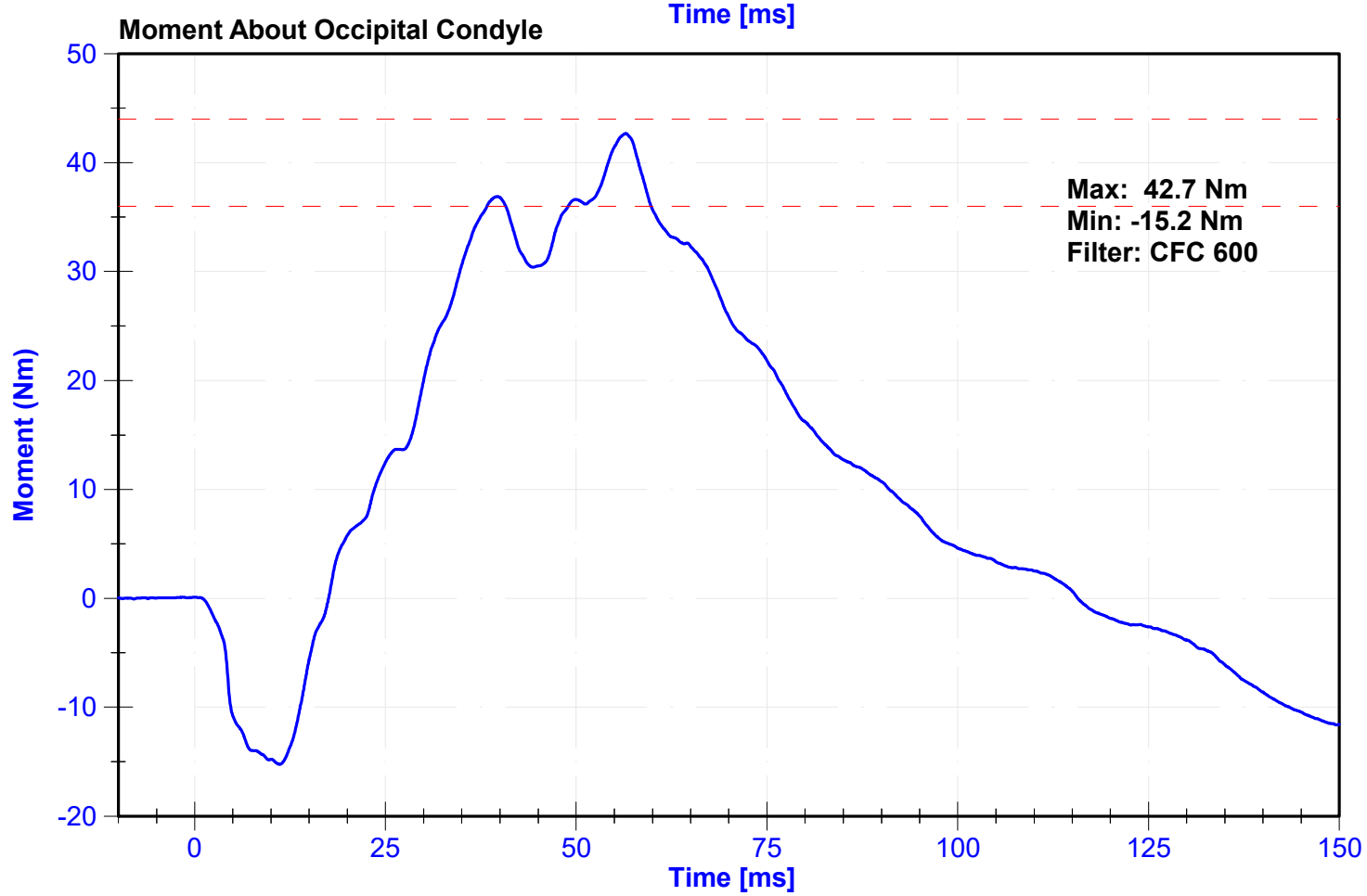
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	20.9	Pass
Humidity	10	70	%	23	Pass
Velocity	5.51	5.63	m/s	5.540	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.36	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.53	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.77	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.72	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.93	Pass
Neck Rotation	71	81	deg	75.6	Pass
Time at Maximum Rotation	50	70	ms	61.9	Pass
Moment about the OC	36	44	Nm	42.7	Pass
Moment Decay to 0 Nm	102	126	ms	115.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	7231C-750	10/17/2024	4/15/2025
Pendulum Potentiometer	Servo	4961	9/23/2024	9/23/2025
Condyle Potentiometer	Servo	DS185	9/23/2024	9/23/2025
Upper Neck Load Cell	Denton	1716A_2187-FY	2/25/2025	2/25/2026




Neck Rotation
Max: 75.6 deg
Min: -18.0 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: 42.7 Nm
Min: -15.2 Nm
Filter: CFC 600
Moment (Nm)
50
40
30
20
10
0
-10
-20
0
25
50
75
100
125
150
Time [ms]

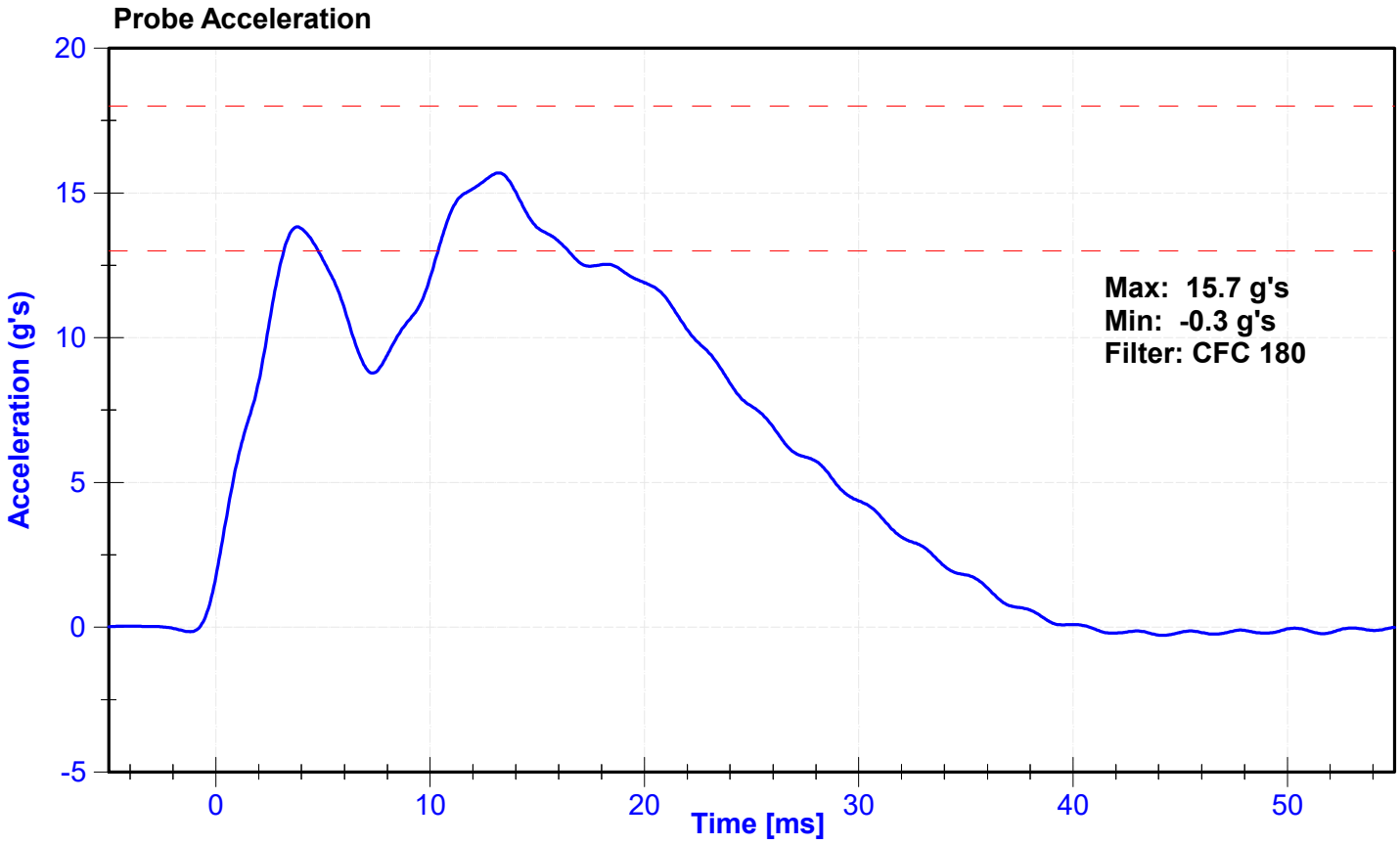
ATD Manufacturer	FTSS	Test Technician	W. Brokx
ATD Serial Number	DG8012	Laboratory Supervisor	J. Kinderman

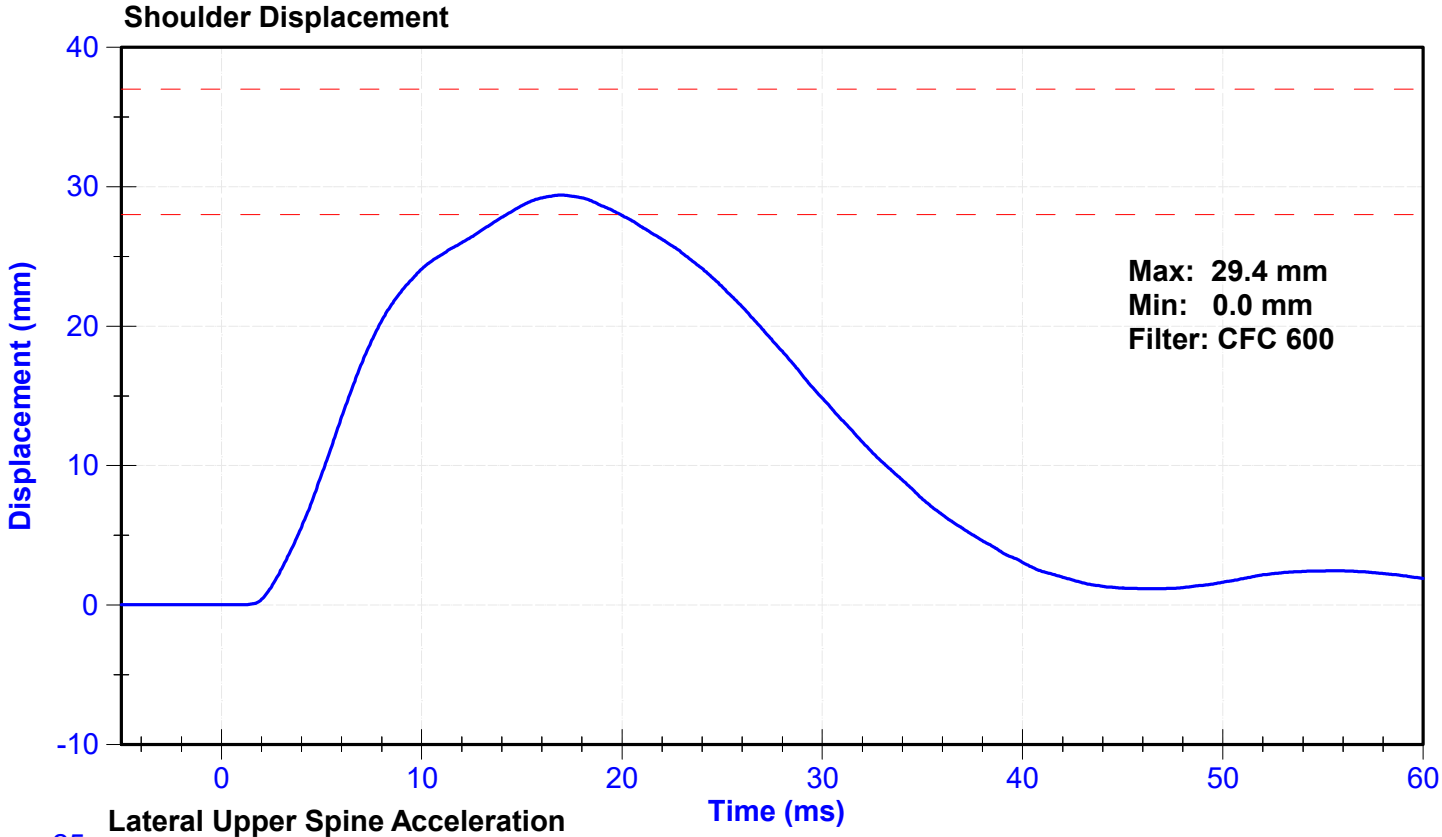
Results

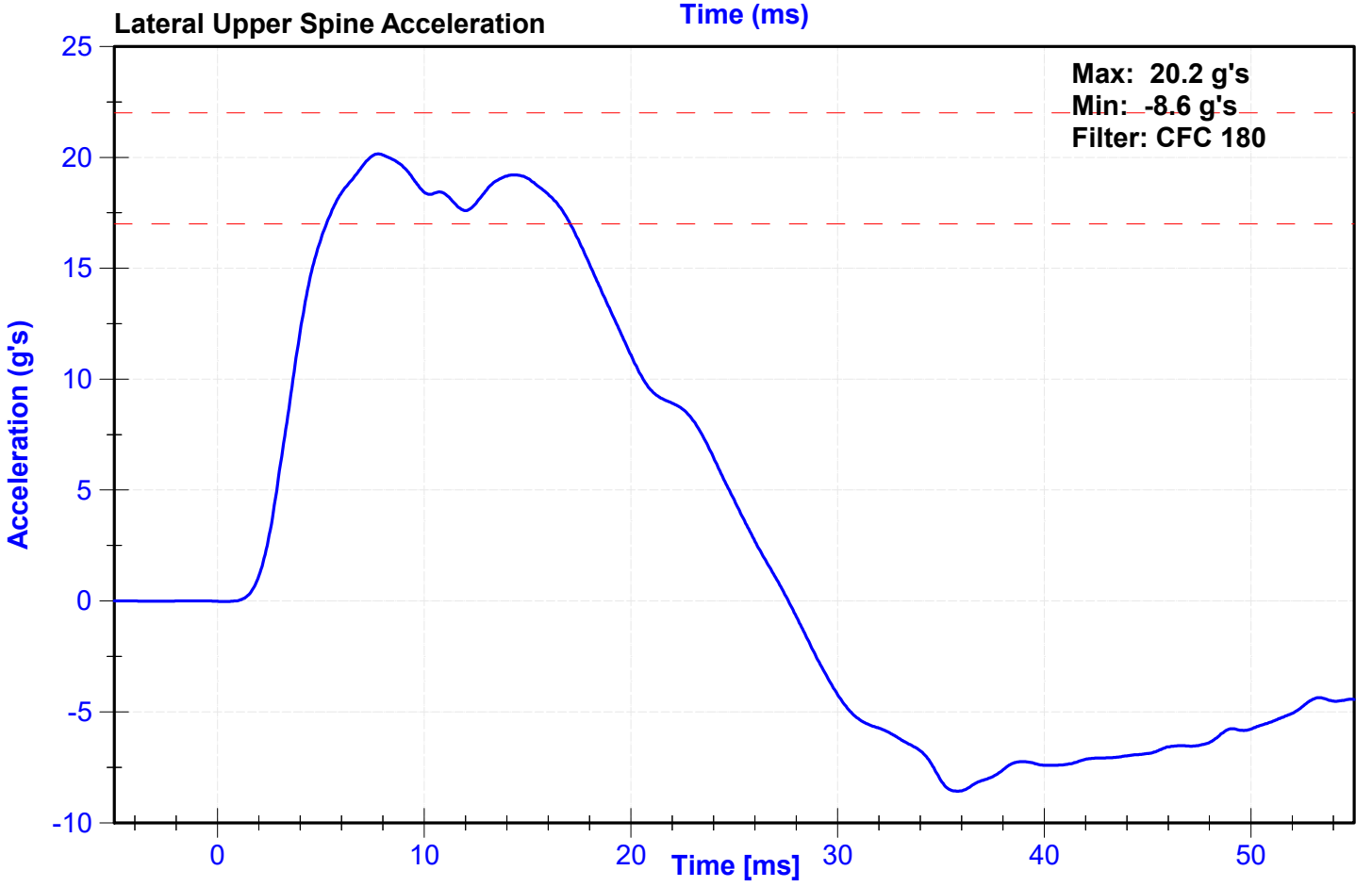
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	22.0	Pass
Humidity	10	70	%	25.0	Pass
Velocity	4.2	4.4	m/s	4.28	Pass
Probe Acceleration	13	18	g's	15.7	Pass
Shoulder Deflection	28	37	mm	29.4	Pass
Lateral Upper Spine Acceleration	17	22	g's	20.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25962	2/15/2025	8/14/2025
Shoulder Potentiometer	Servo	1274GFE	10/16/2024	4/16/2025
Upper Spine Y Accelerometer	Endevco	P64148	10/17/2024	4/15/2025




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: 20.2 g's
Min: -8.6 g's
Filter: CFC 180

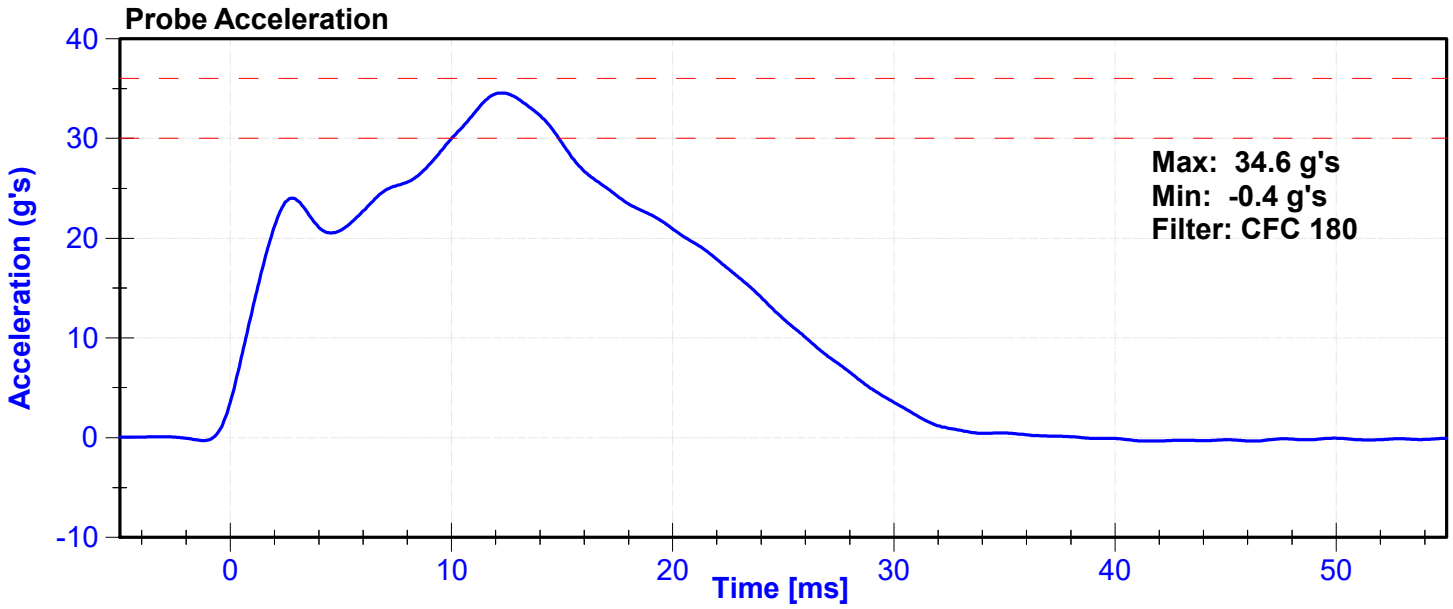
ATD Manufacturer	FTSS	Test Technician	W. Brokx
ATD Serial Number	DG8012	Laboratory Supervisor	J. Kinderman

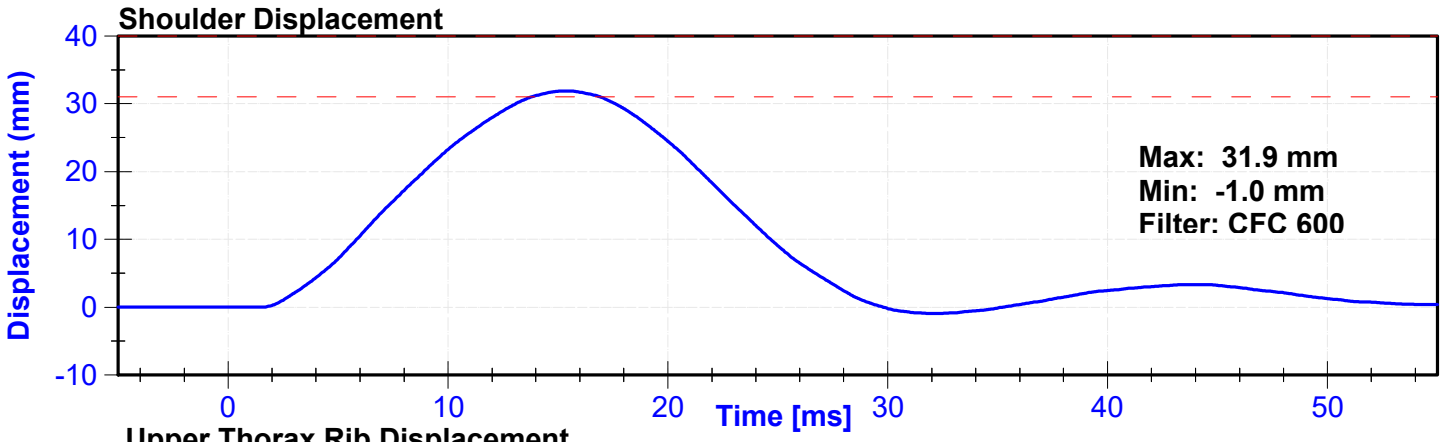
Results

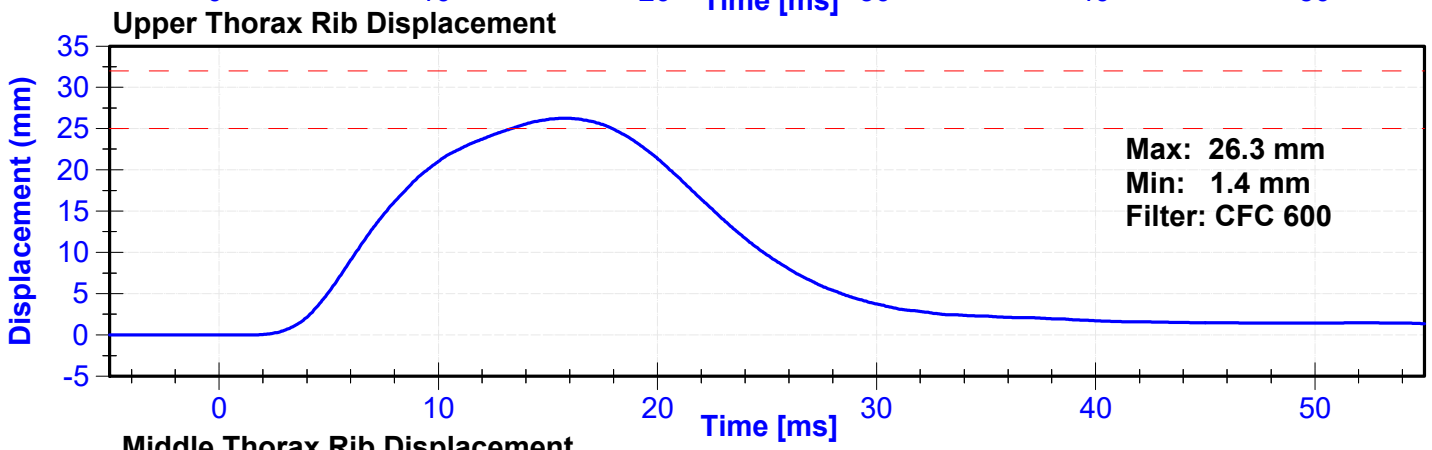
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	22.0	Pass
Humidity	10	70	%	25.0	Pass
Velocity	6.6	6.8	m/s	6.65	Pass
Probe Acceleration after 5 ms	30	36	g's	34.6	Pass
Lateral Upper Spine Acceleration	34	43	g's	39.5	Pass
Lateral Lower Spine Acceleration	29	37	g's	32.5	Pass
Shoulder Deflection	31	40	mm	31.9	Pass
Upper Thorax Rib Deflection	25	32	mm	26.3	Pass
Mid Thorax Rib Deflection	30	36	mm	31.5	Pass
Lower Thorax Rib Deflection	32	38	mm	35.0	Pass

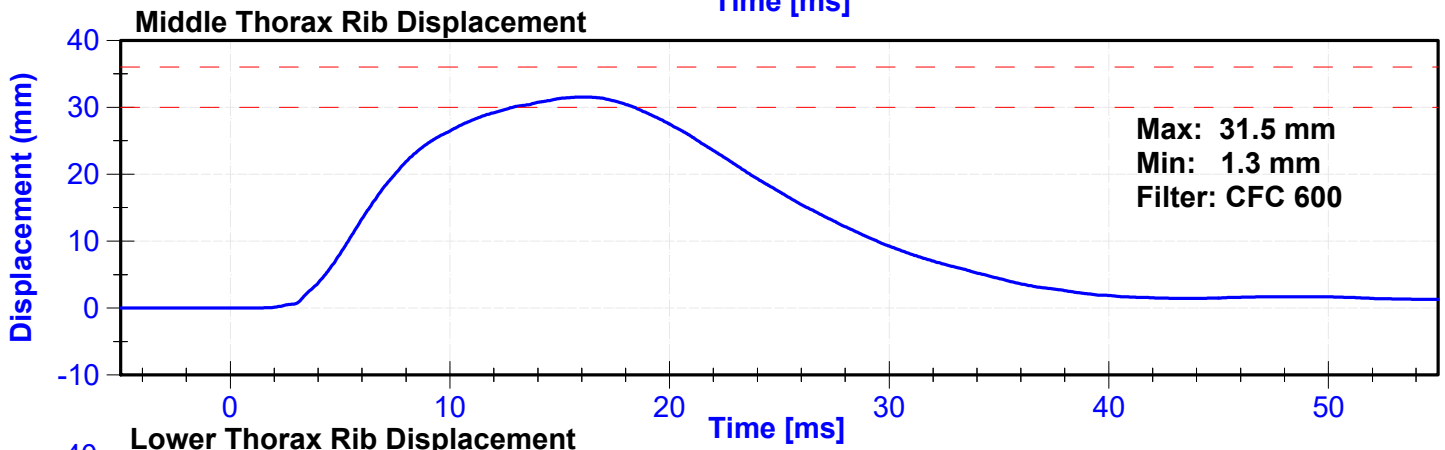
Transducer Calibrations

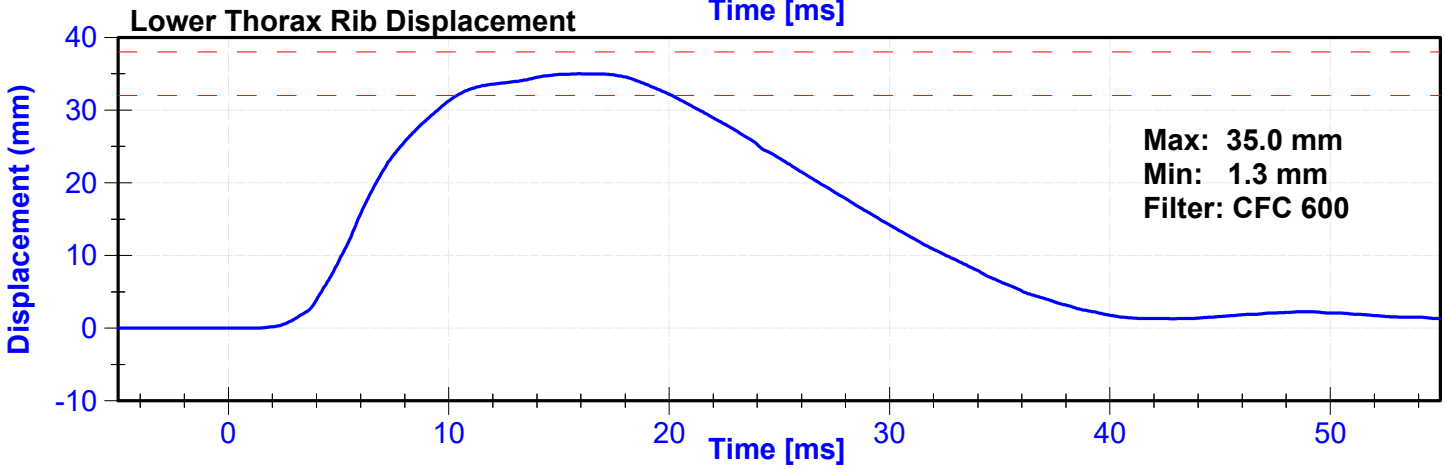
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25962	2/15/2025	8/14/2025
Upper Spine T1 Y Accelerometer	Endevco	P64148	10/17/2024	4/15/2025
Upper Spine T12 Y Accelerometer	Endevco	P51327	10/17/2024	4/15/2025
Shoulder Potentiometer	Servo	1274GFE	10/16/2024	4/16/2025
Upper Thorax Rib Potentiometer	Servo	1199GFE	10/16/2024	4/16/2025
Middle Thorax Rib Potentiometer	Servo	1246GFE	10/16/2024	4/16/2025
Lower Thorax Rib Potentiometer	Servo	011GFE	10/16/2024	4/16/2025

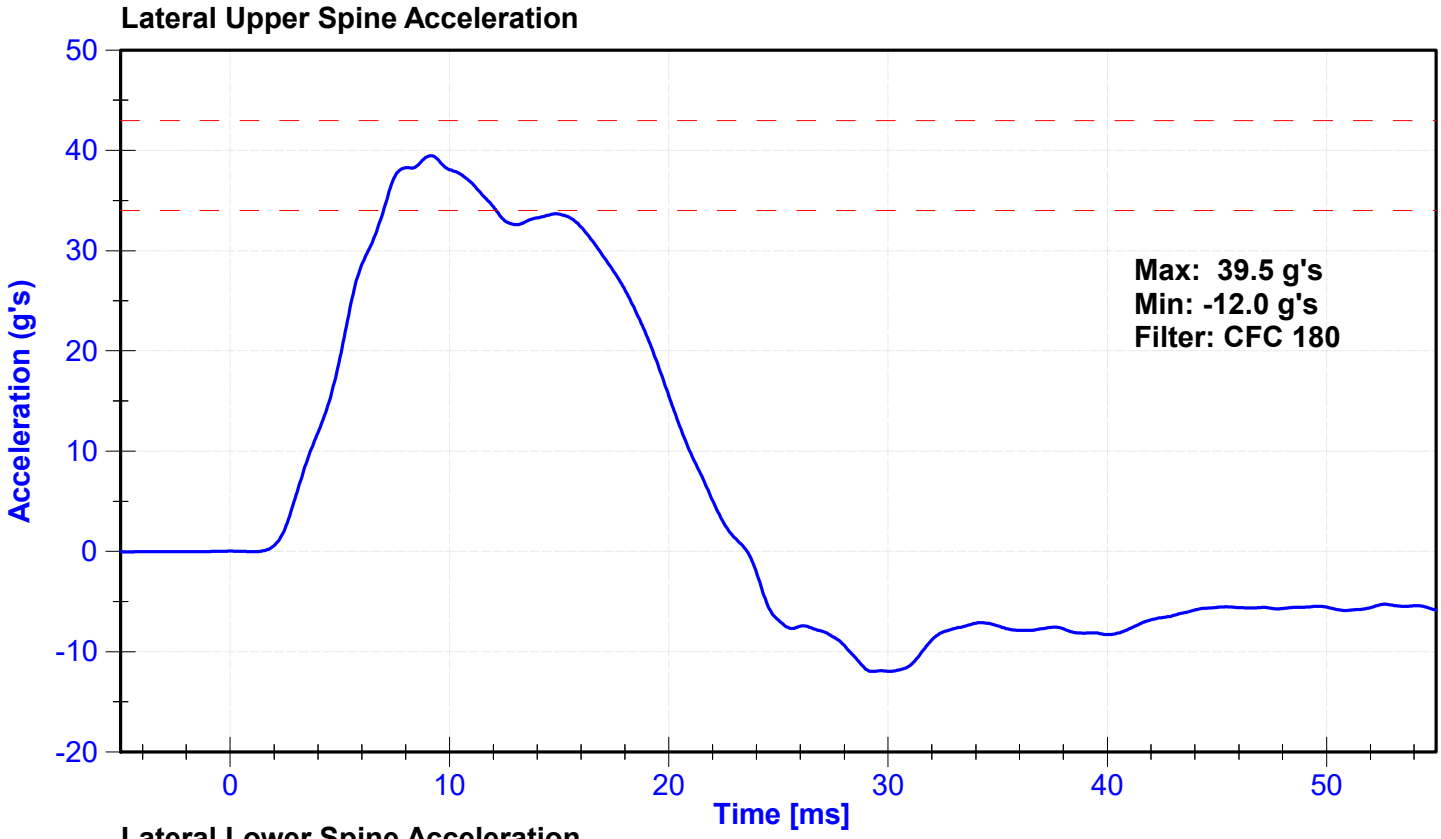


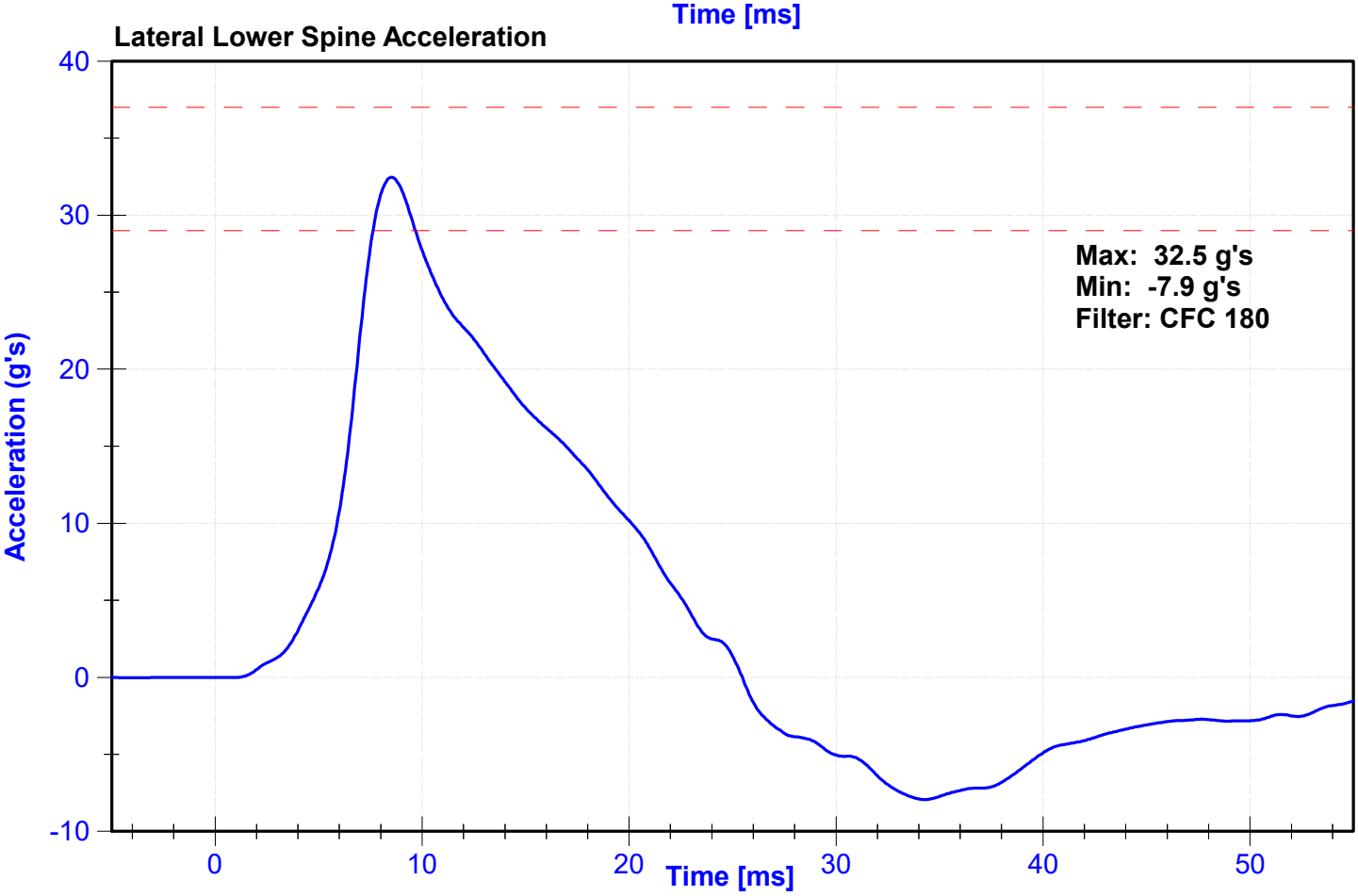

Shoulder Displacement
Displacement (mm)
Time [ms]
Max: 31.9 mm
Min: -1.0 mm
Filter: CFC 600


Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 26.3 mm
Min: 1.4 mm
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 31.5 mm
Min: 1.3 mm
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 35.0 mm
Min: 1.3 mm
Filter: CFC 600


Lateral Upper Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 39.5 g's
Min: -12.0 g's
Filter: CFC 180


Lateral Lower Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 32.5 g's
Min: -7.9 g's
Filter: CFC 180

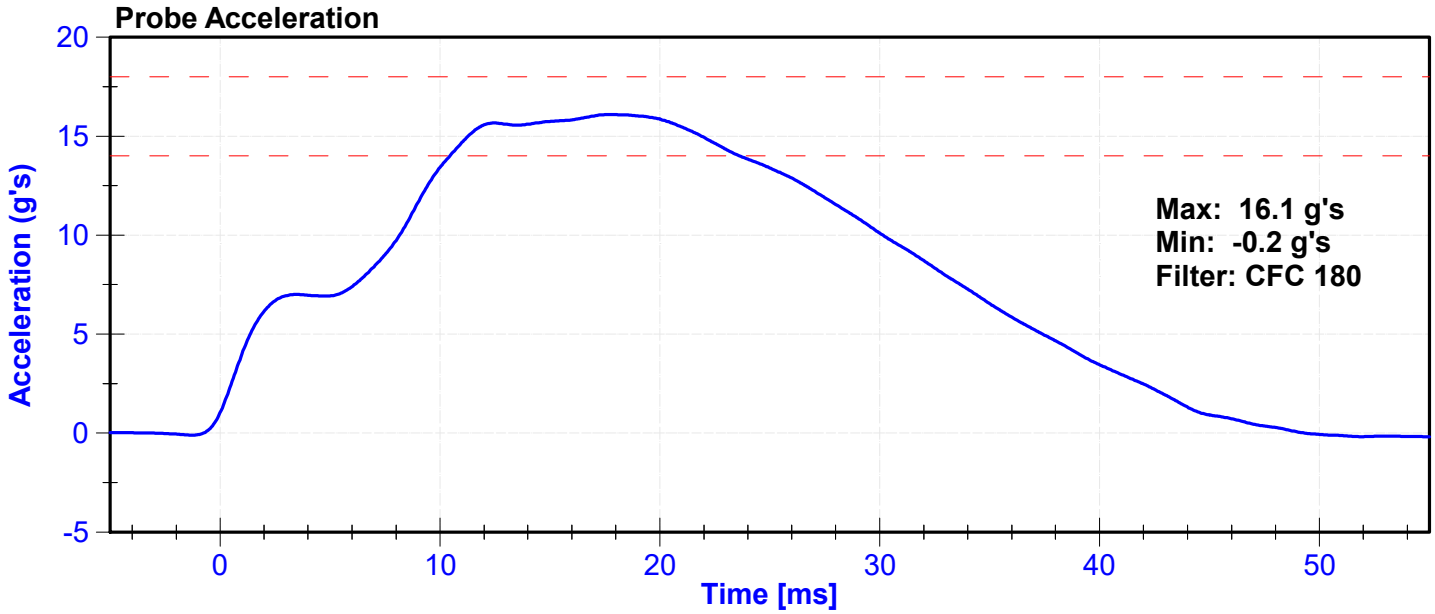
ATD Manufacturer	FTSS	Test Technician	W. Brokx
ATD Serial Number	DG8012	Laboratory Supervisor	J. Kinderman

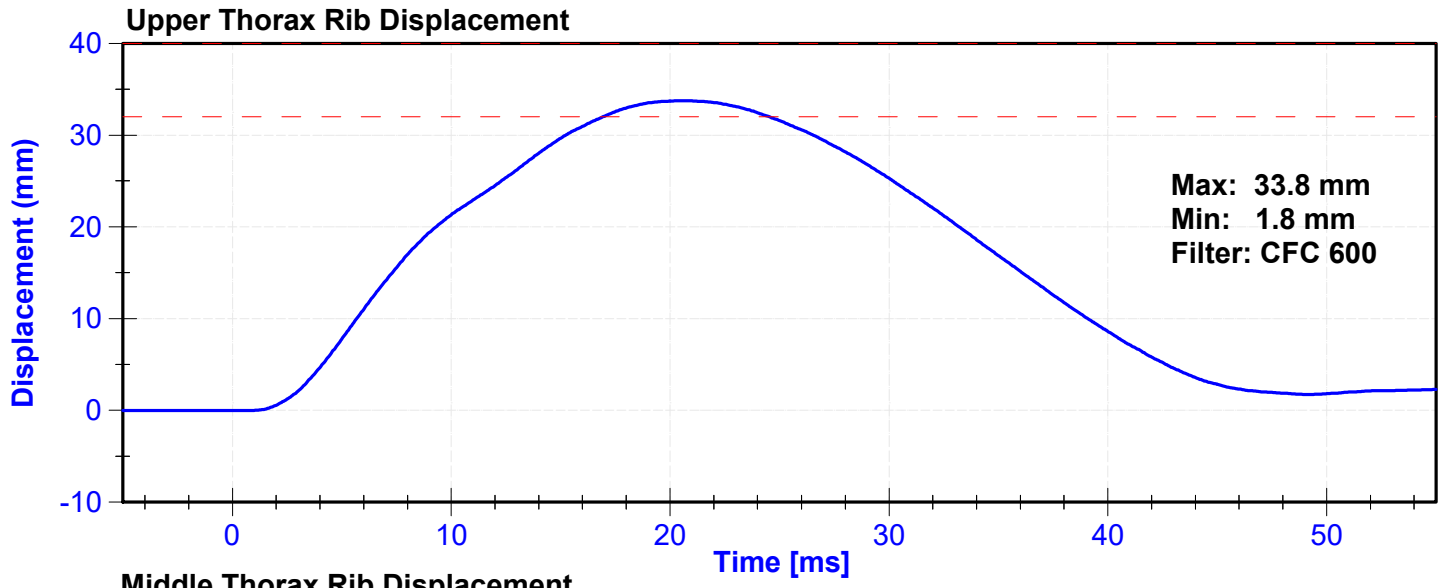
Results

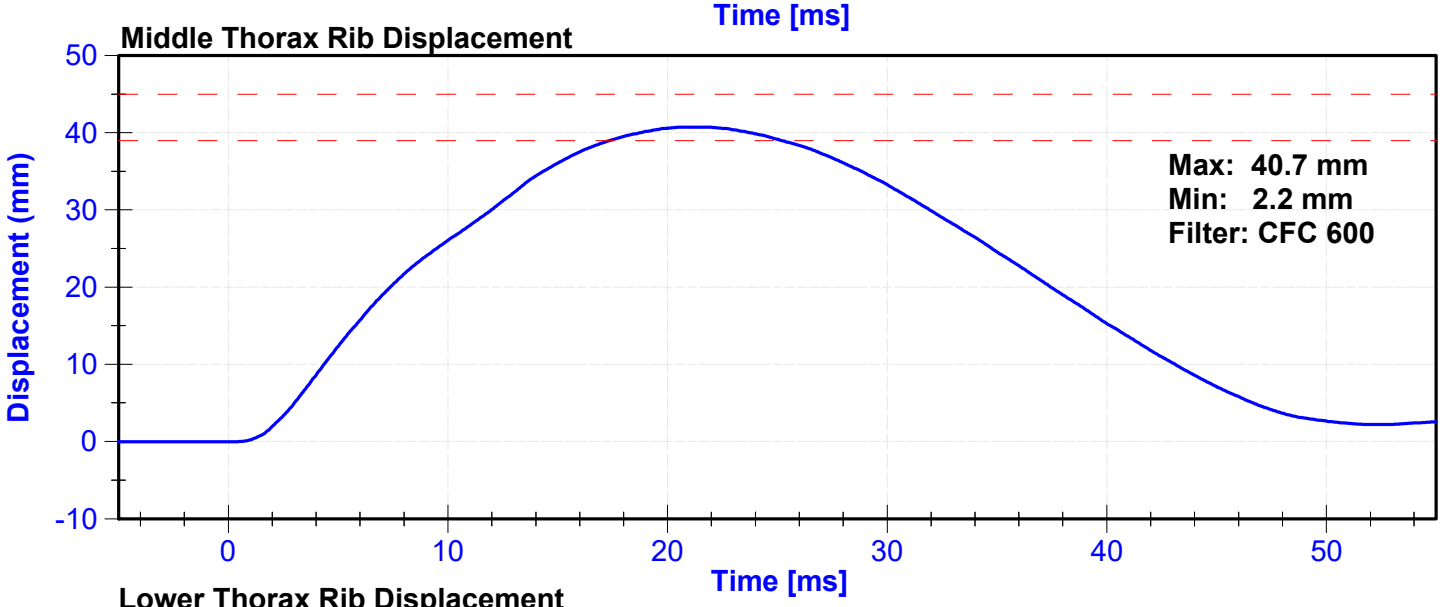
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	22.0	Pass
Humidity	10	70	%	25.0	Pass
Velocity	4.2	4.4	m/s	4.28	Pass
Probe Acceleration	14	18	g's	16.1	Pass
Lateral Upper Spine Acceleration	13	17	g's	14.9	Pass
Lateral Lower Spine Acceleration	7	11	g's	9.4	Pass
Upper Thorax Rib Deflection	32	40	mm	33.8	Pass
Middle Thorax Rib Deflection	39	45	mm	40.7	Pass
Lower Thorax Rib Deflection	35	43	mm	40.6	Pass

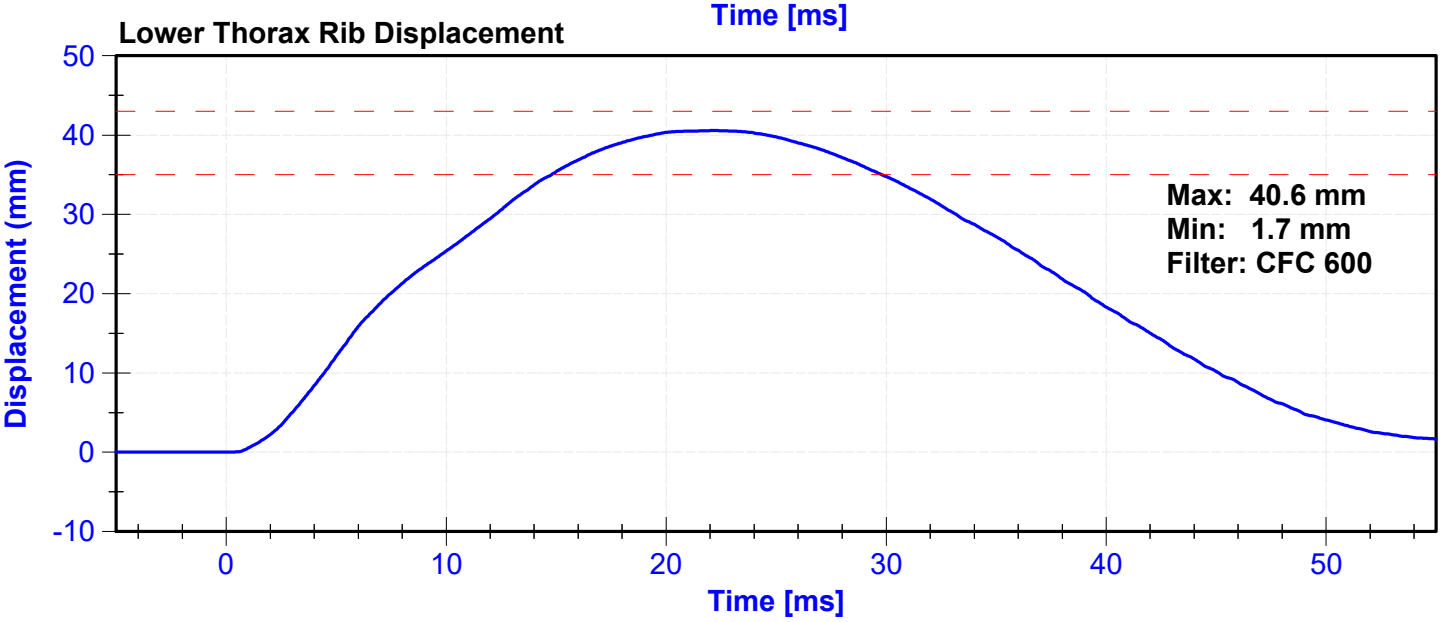
Transducer Calibrations

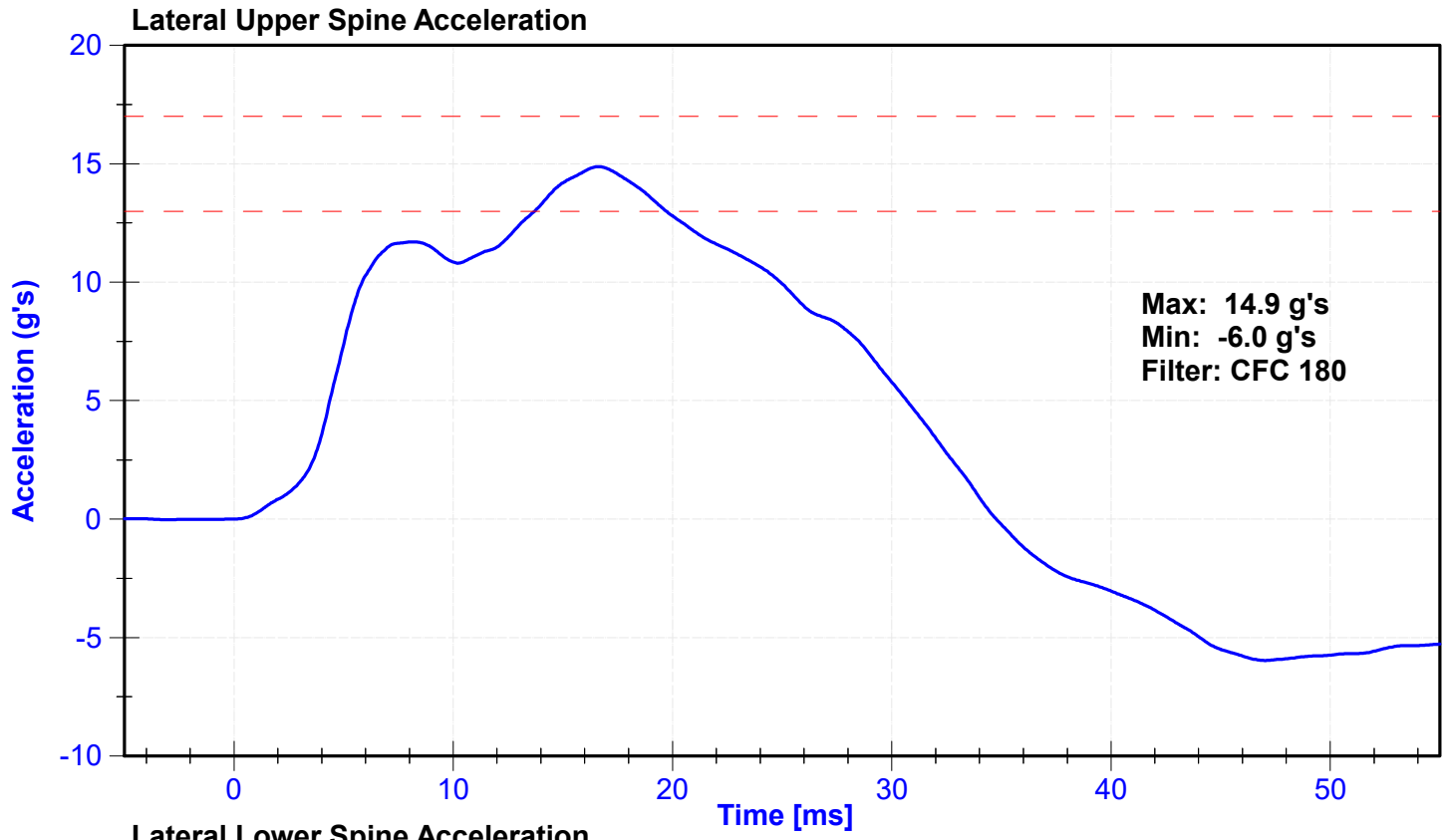
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25962	2/15/2025	8/14/2025
Upper Spine Y Accelerometer	Endevco	P64148	10/17/2024	4/15/2025
Lower Spine Y Accelerometer	Endevco	P51327	10/17/2024	4/15/2025
Upper Thorax Rib Potentiometer	Servo	1199GFE	10/16/2024	4/16/2025
Middle Thorax Rib Potentiometer	Servo	1246GFE	10/16/2024	4/16/2025
Lower Thorax Rib Potentiometer	Servo	011GFE	10/16/2024	4/16/2025

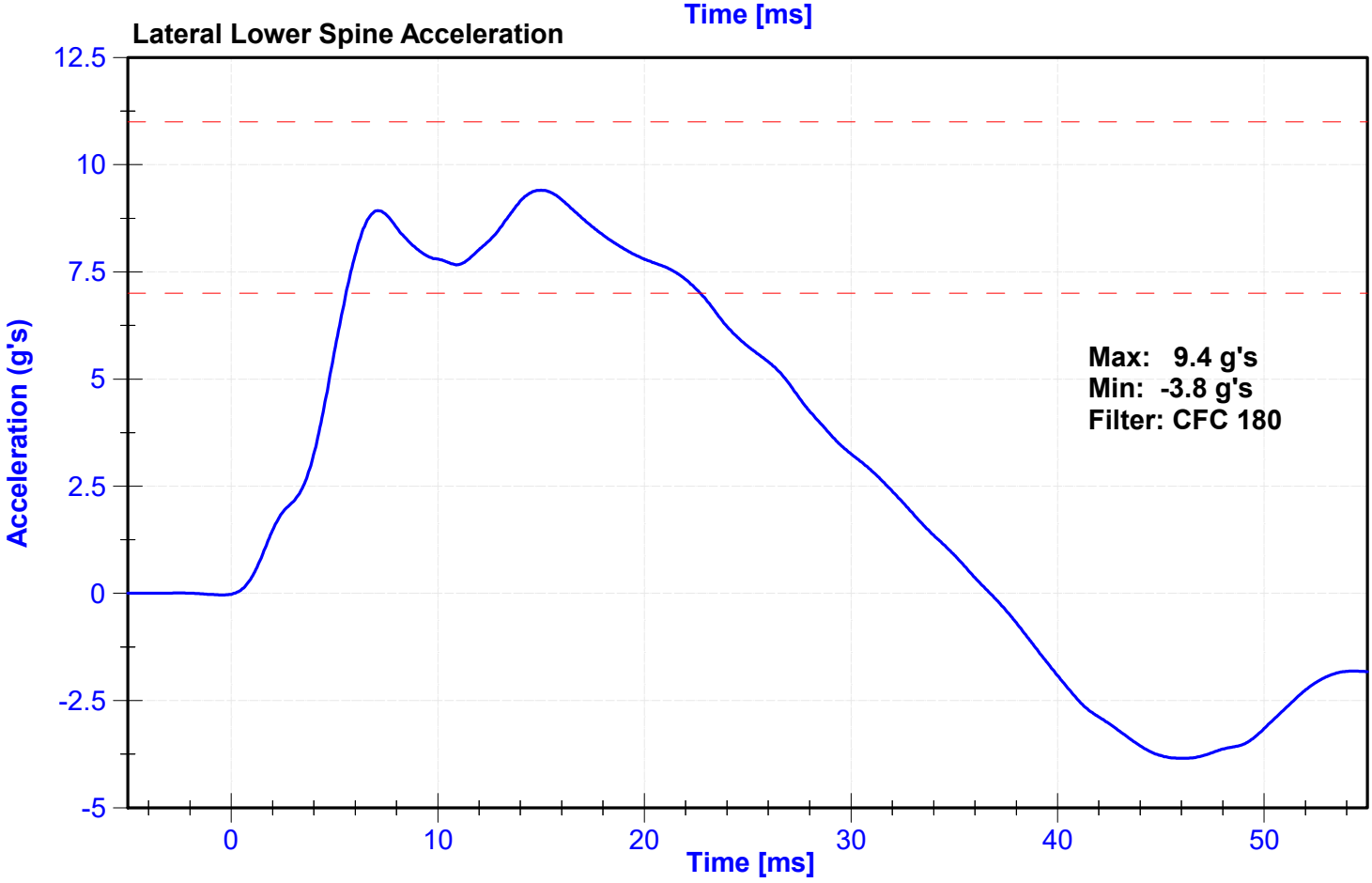



Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 33.8 mm
Min: 1.8 mm
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 40.7 mm
Min: 2.2 mm
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 40.6 mm
Min: 1.7 mm
Filter: CFC 600


Lateral Upper Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 14.9 g's
Min: -6.0 g's
Filter: CFC 180


Lateral Lower Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 9.4 g's
Min: -3.8 g's
Filter: CFC 180

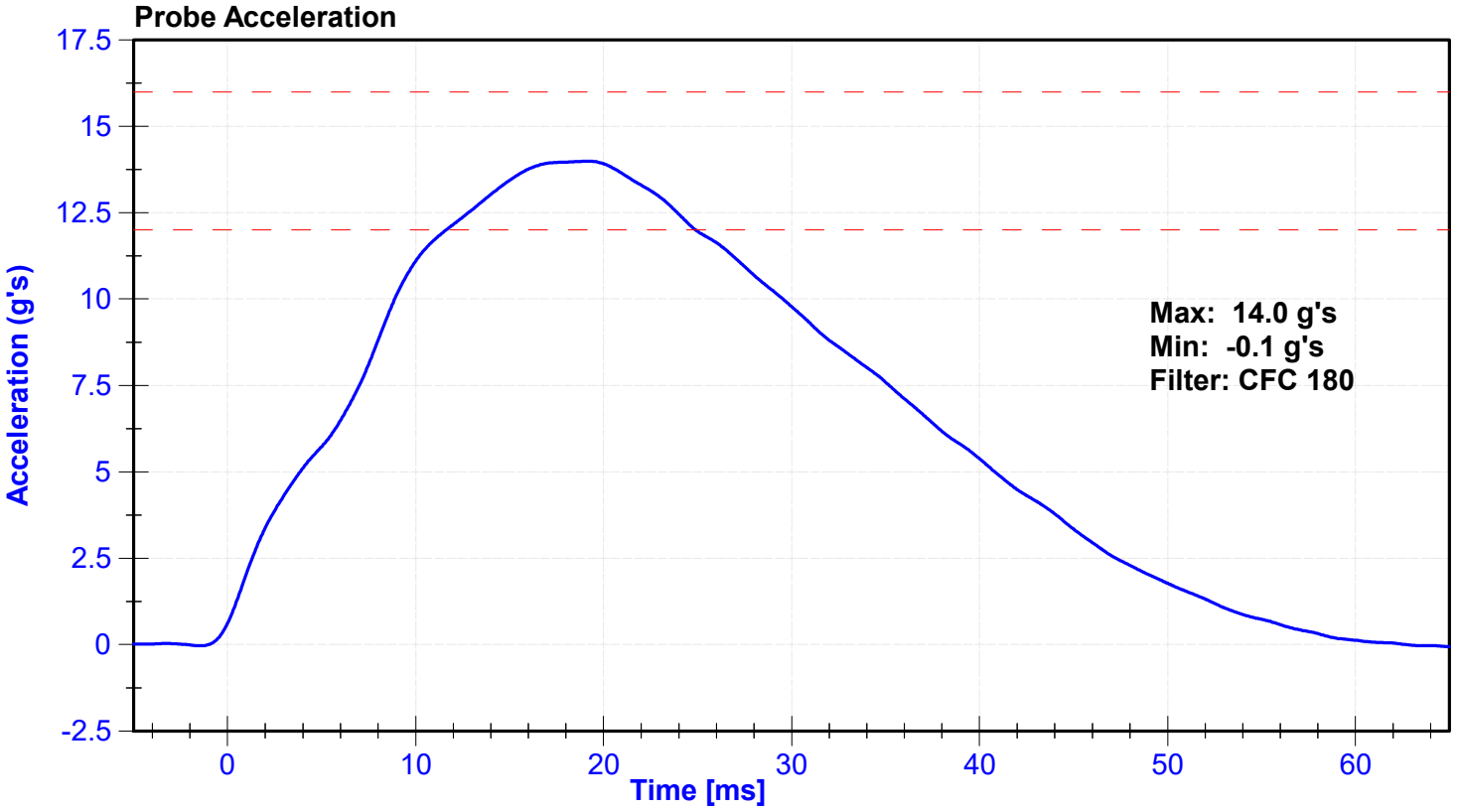
ATD Manufacturer	FTSS	Test Technician	W. Brokx
ATD Serial Number	DG8012	Laboratory Supervisor	J. Kinderman

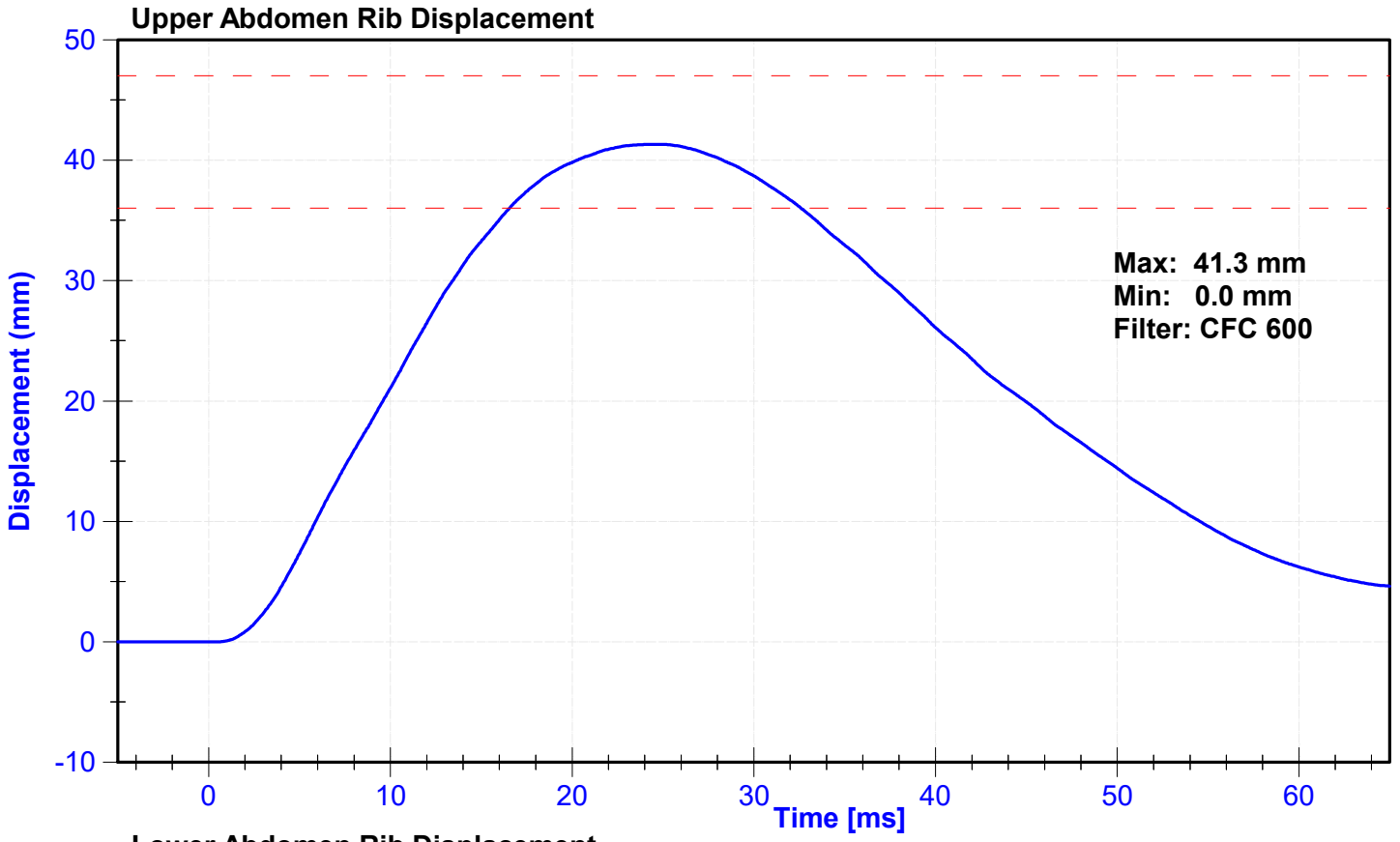
Results

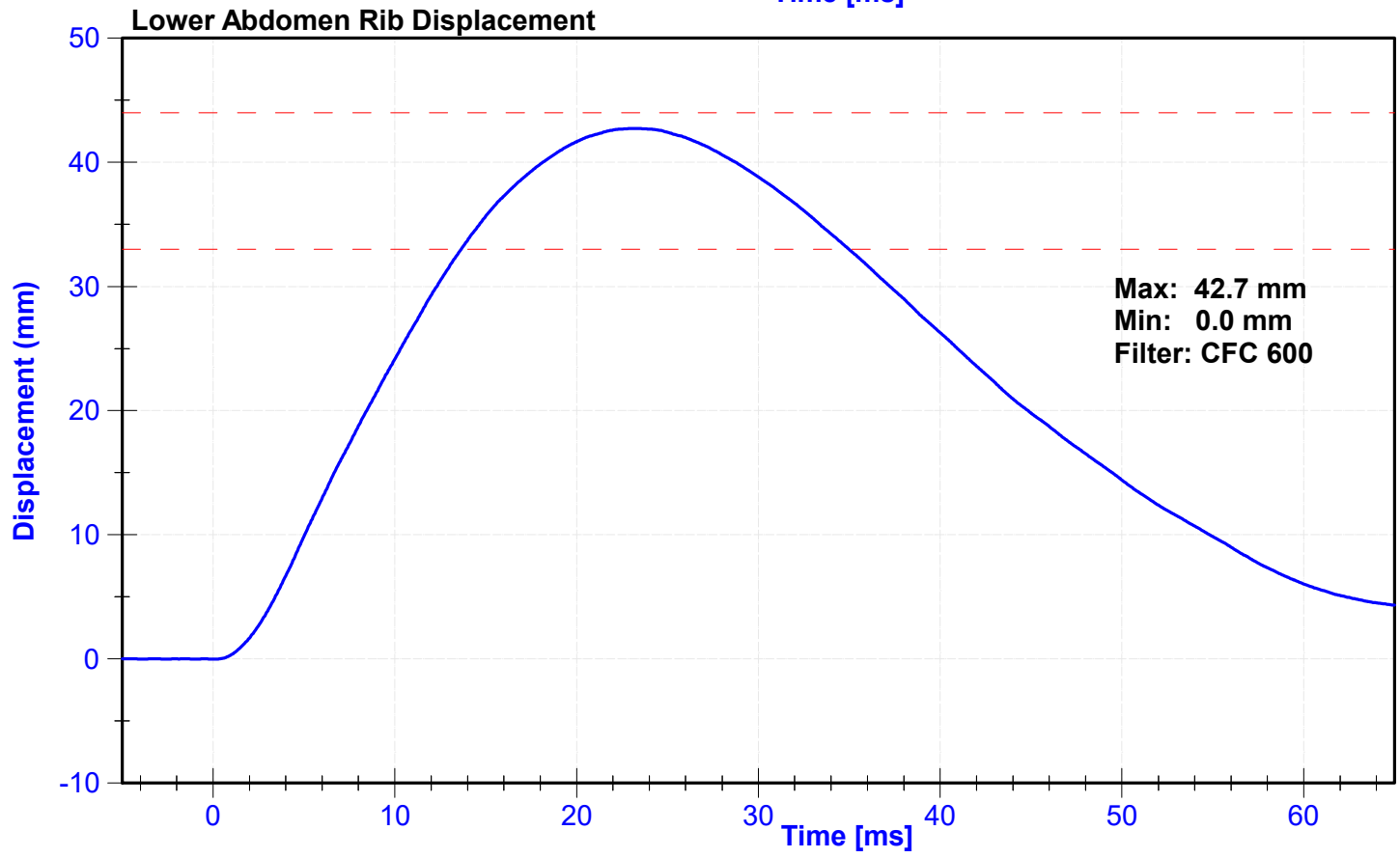
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	22.0	Pass
Humidity	10	70	%	25.0	Pass
Velocity	4.2	4.4	m/s	4.28	Pass
Probe Acceleration	12	16	g's	14.0	Pass
Lateral Lower Spine Acceleration	9	14	g's	10.1	Pass
Upper Abdomen Rib Deflection	36	47	mm	41.3	Pass
Lower Abdomen Rib Deflection	33	44	mm	42.7	Pass

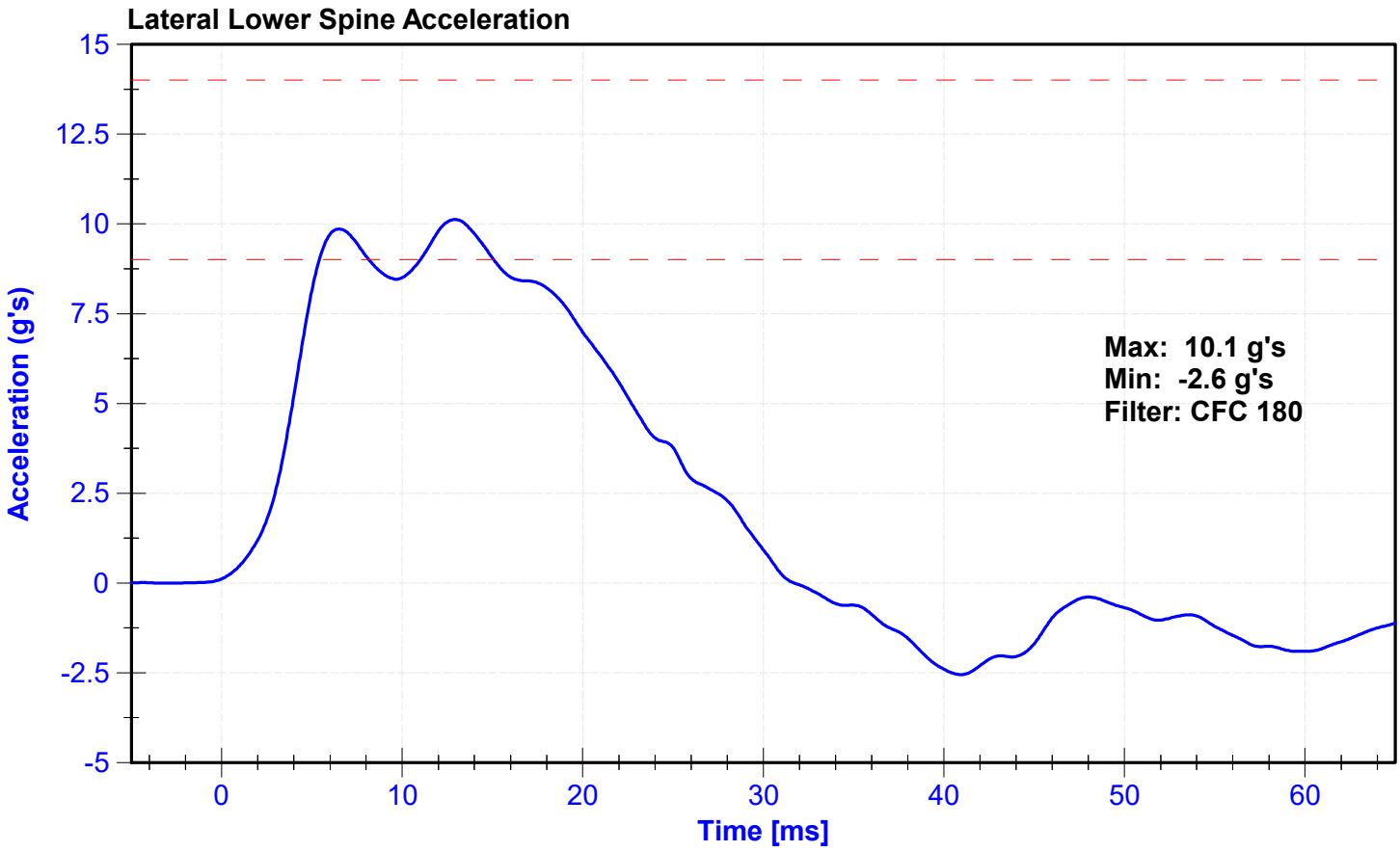
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	T25962	2/15/2025	8/14/2025
Lower Spine Y Accelerometer	Endevco	P51327	10/17/2024	4/15/2025
Upper Abdomen Rib Potentiometer	Servo	008GFE	10/16/2024	4/16/2025
Lower Abdomen Rib Potentiometer	Servo	046GFE	10/16/2024	4/16/2025




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


Lower Abdomen Rib Displacement
Displacement (mm)
Time [ms]
Max: 42.7 mm
Min: 0.0 mm
Filter: CFC 600


Lateral Lower Spine Acceleration
Acceleration (g's)
15
12.5
10
7.5
5
2.5
0
-2.5
-5
0
10
20
30
40
50
60
Time [ms]
Max: 10.1 g's
Min: -2.6 g's
Filter: CFC 180

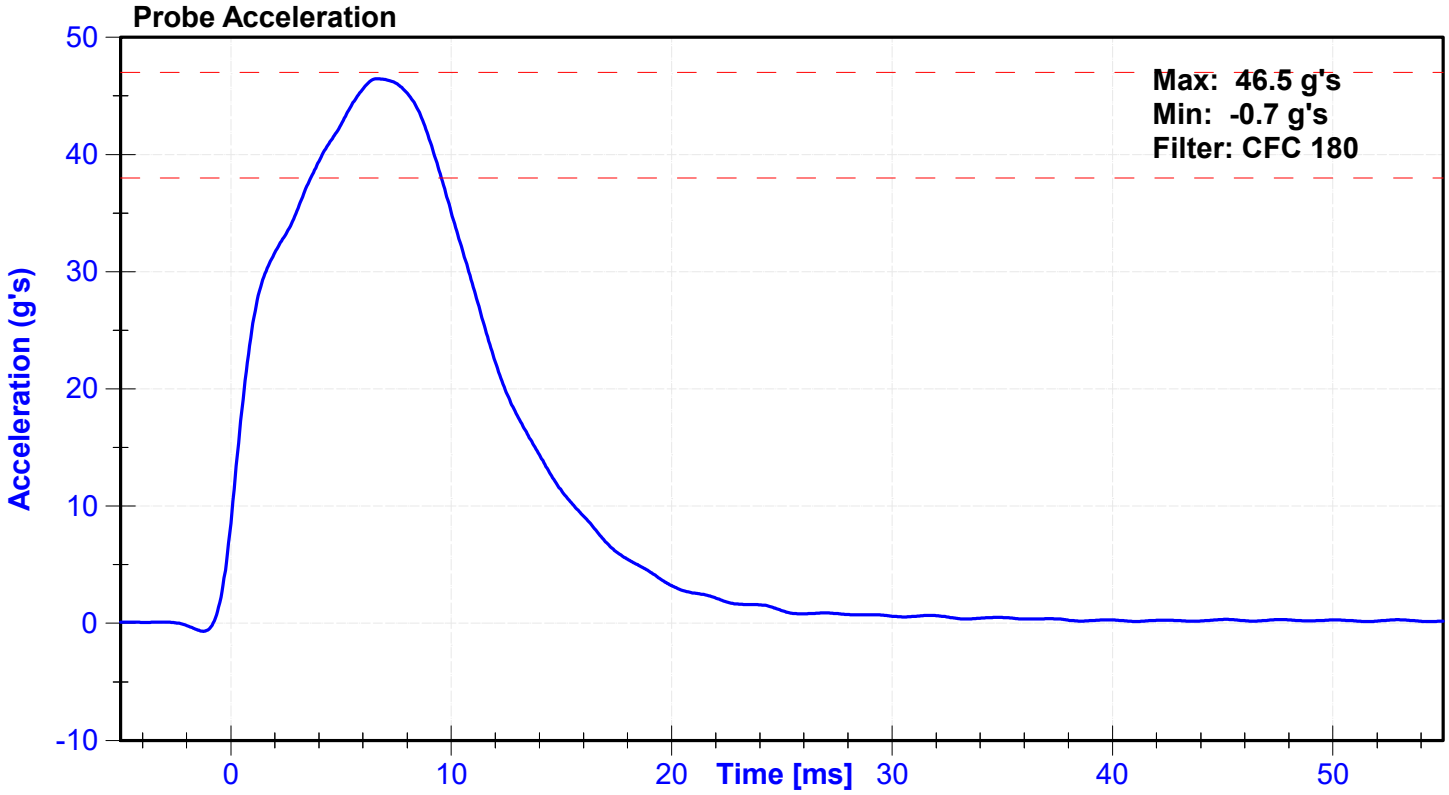
ATD Manufacturer	FTSS	Test Technician	W. Brokx
ATD Serial Number	DG8012	Laboratory Supervisor	J. Kinderman

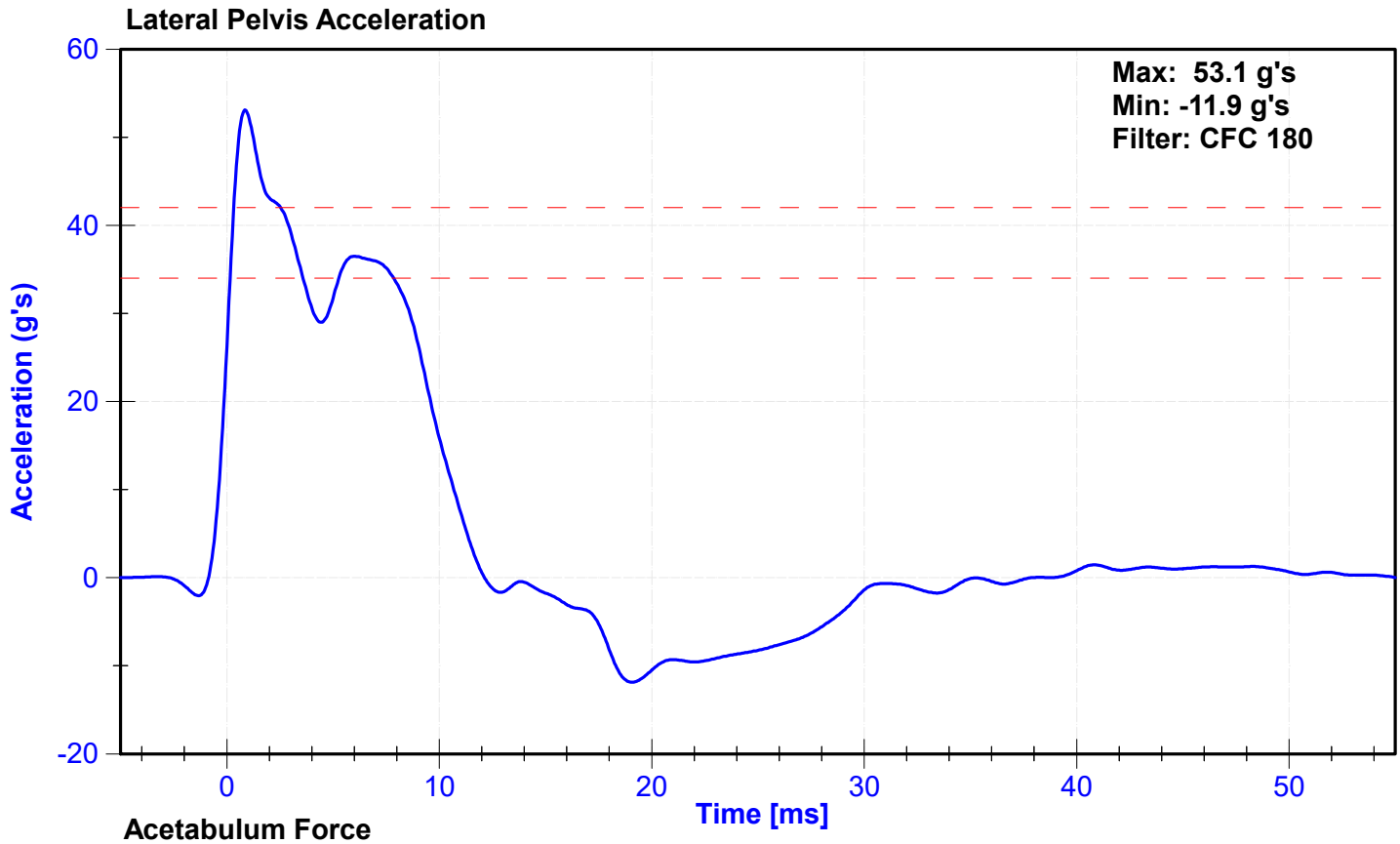
Results

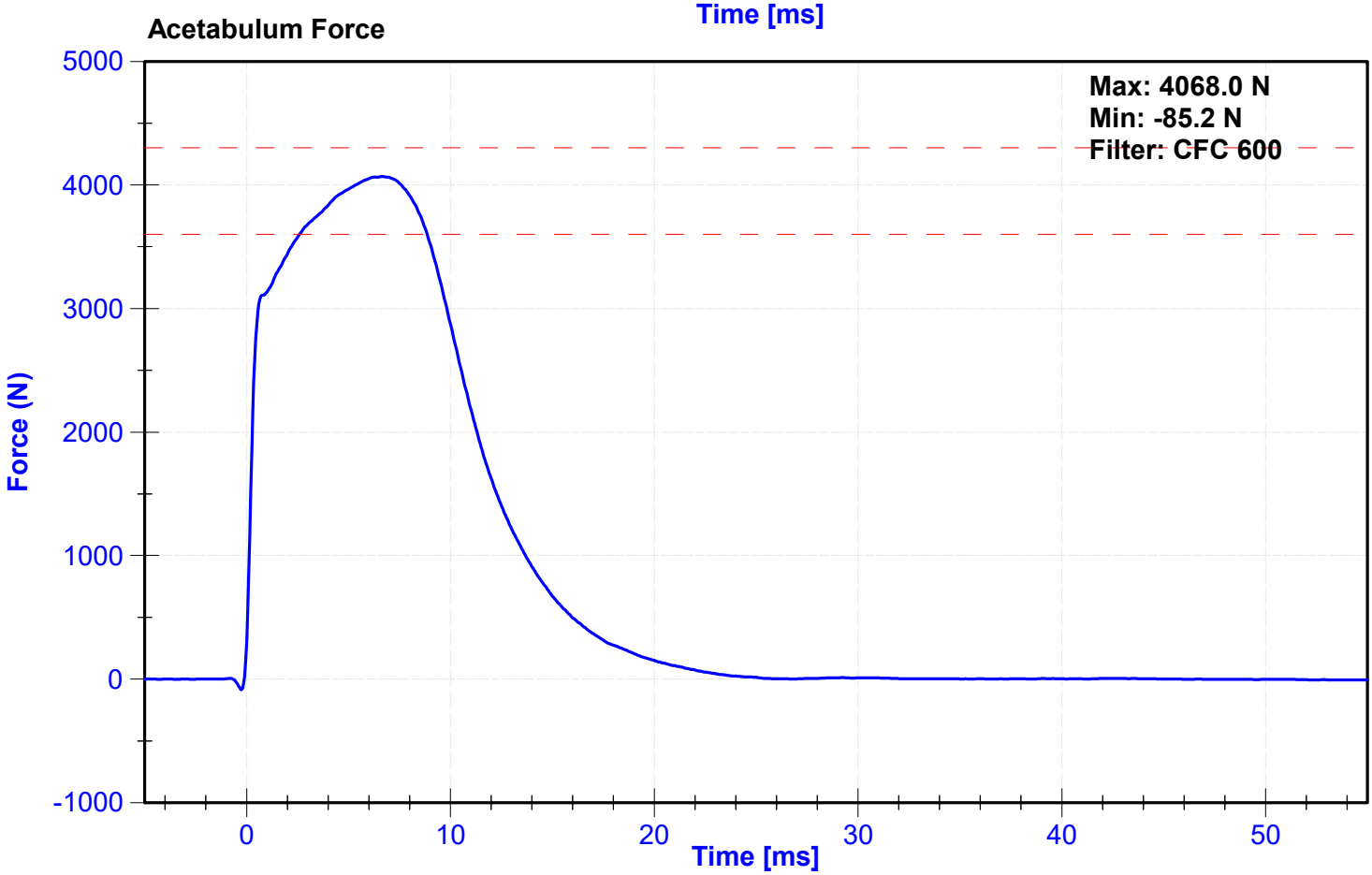
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	22.0	Pass
Humidity	10	70	%	25.0	Pass
Velocity	6.6	6.8	m/s	6.67	Pass
Probe Acceleration	38	47	g's	46.5	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	36.5	Pass
Acetabulum Force	3600	4300	N	4068.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25962	2/15/2025	8/14/2025
Pelvis Y Accelerometer	Endevco	T20860	10/17/2024	4/15/2025
Acetabulum Load Cell	Denton	270-FY	9/16/2024	9/16/2025
Certification Plug	SACO			N/A
Crash Test Plug	SACO			N/A




Lateral Pelvis Acceleration
Max: 53.1 g's
Min: -11.9 g's
Filter: CFC 180
Acceleration (g's)
60
40
20
0
-20
0
10
20
30
40
50
Time [ms]


Acetabulum Force
Max: 4068.0 N
Min: -85.2 N
Filter: CFC 600
Force (N)
5000
4000
3000
2000
1000
0
-1000
0
10
20
30
40
50
Time [ms]

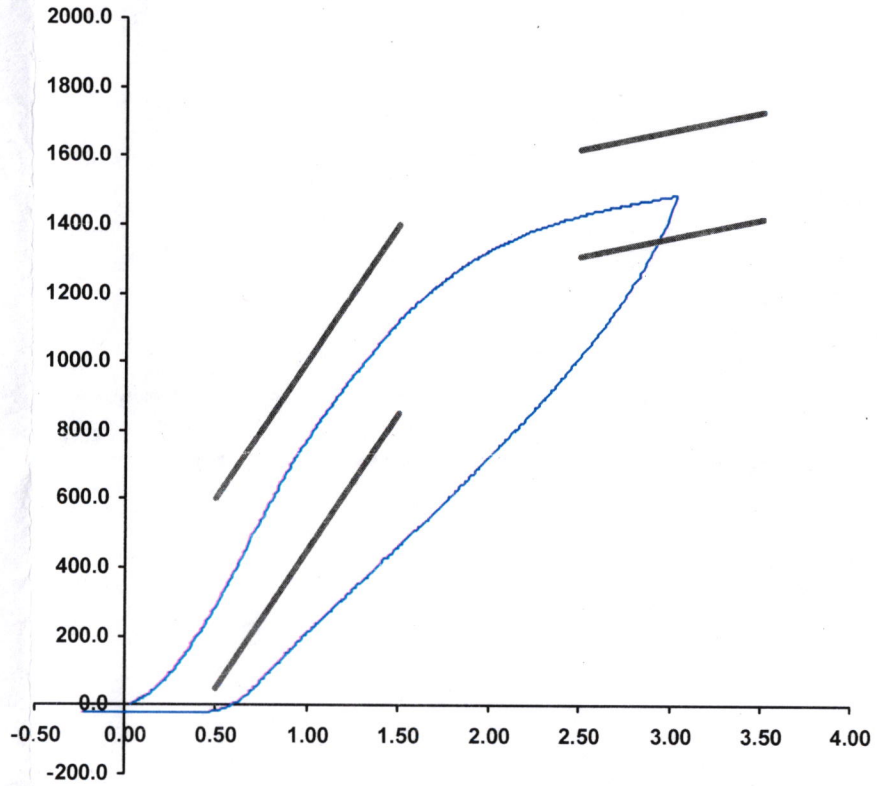
SACO RESEARCH

SID-IIs Pelvis Plug Certification Test

Plug S/N 16814
Test Number 23625
Report Number 23682
Test Date 7/25/2022 9:29:44 AM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	296	50	600
Force @ 1.5 mm (N)	1,121	850	1,400
Force @ 2.5 mm (N)	1,428	1,306	1,618
Force @ 3.0 mm (N)	1,484	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: Cert Plug DG8012 3-25-25

Operator

Part Number 180-4450

Template No 107 25-Jul-22
SACO Research

By : DC Date : 7/25/22

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

C-89

SACO RESEARCH

SID-IIs Pelvis Plug Certification Test

Plug S/N 16815
Test Number 23626
Report Number 23683
Test Date 7/25/2022 9:31:11 AM

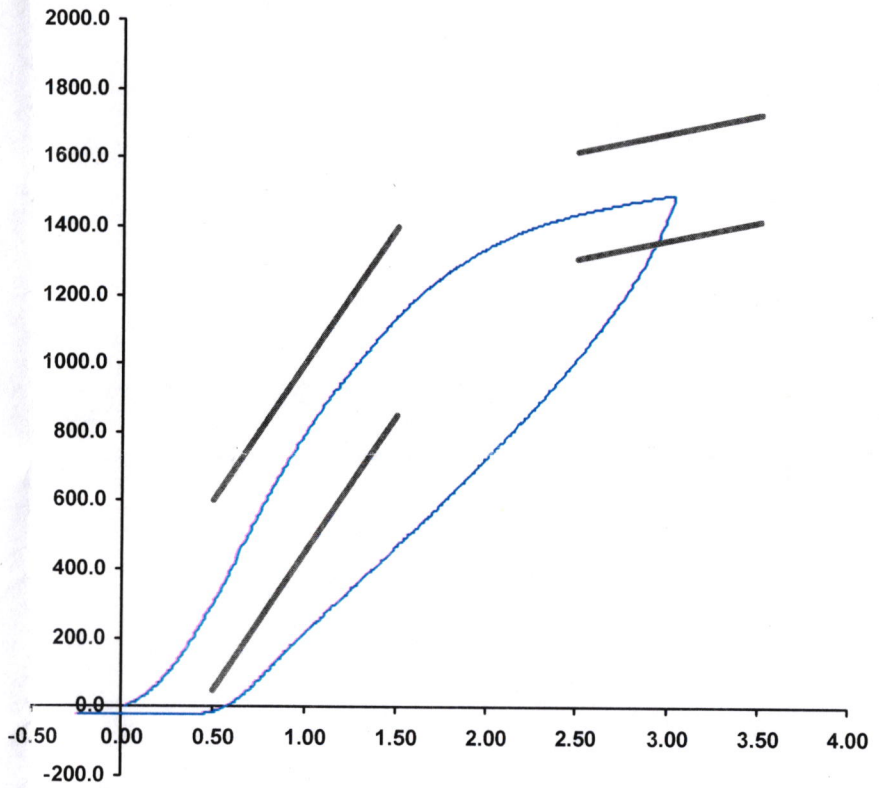
	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	306	50	600
Force @ 1.5 mm (N)	1,137	850	1,400
Force @ 2.5 mm (N)	1,439	1,306	1,618
Force @ 3.0 mm (N)	1,493	1,361	1,673

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:
Impact Plug DG8012 3-25-25

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107 25-Jul-22
SACO Research

By : DC Date : 7/25/22

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

C-90

SACO RESEARCH

SID-IIs Pelvis Plug Certification Test

Plug S/N 16833
Test Number 23644
Report Number 23701
Test Date 7/25/2022 10:20:49 AM

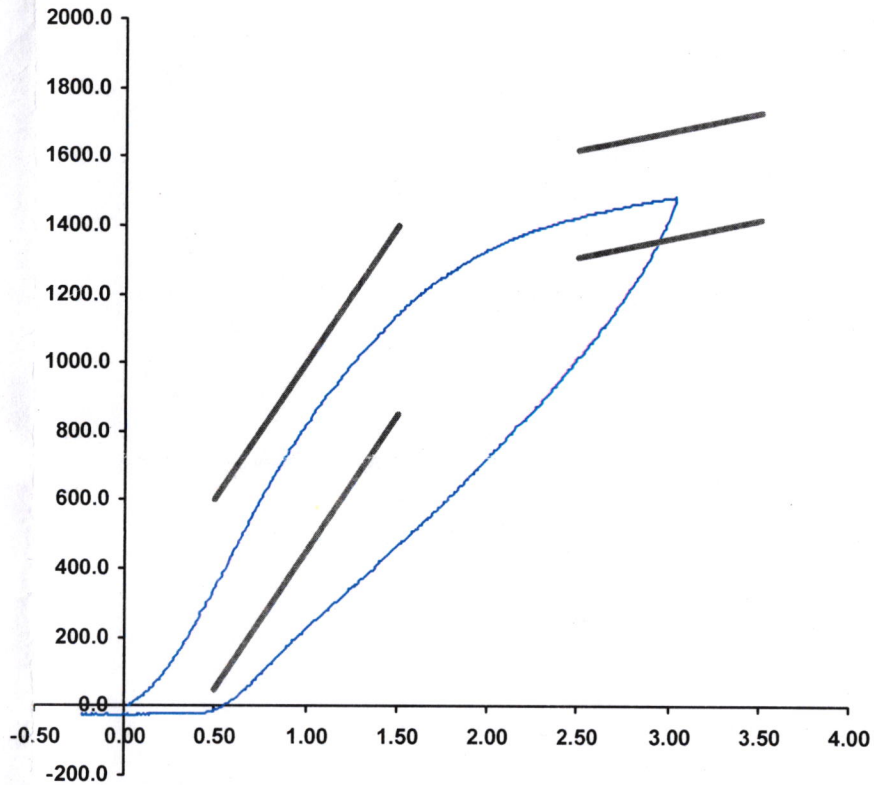
	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	348	50	600
Force @ 1.5 mm (N)	1,145	850	1,400
Force @ 2.5 mm (N)	1,426	1,306	1,618
Force @ 3.0 mm (N)	1,482	1,361	1,673

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:
DG8012 NON IMPACT 3-25-25

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107 25-Jul-22
SACO Research

By : DC Date : 7/25/22

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

C-91

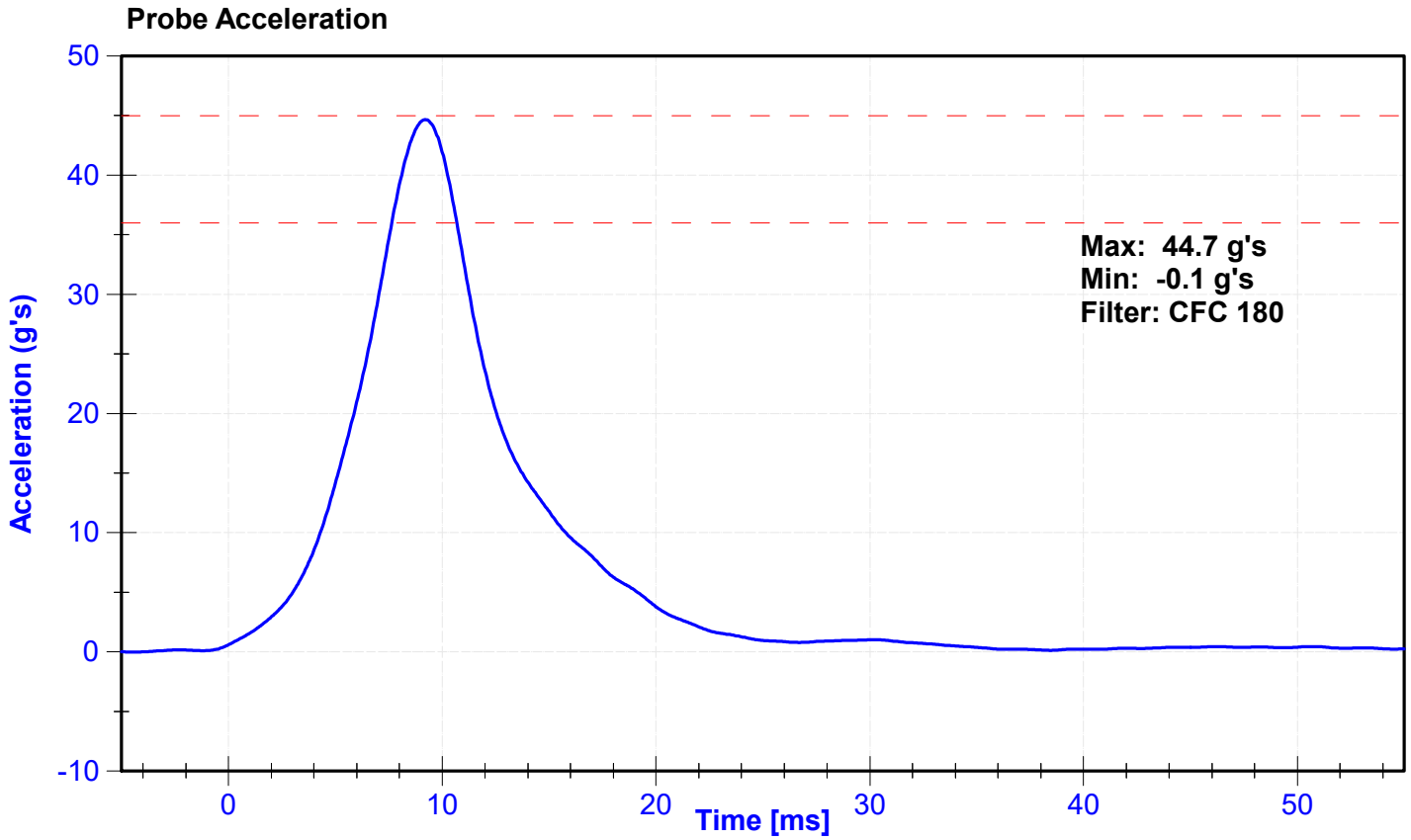
ATD Manufacturer	FTSS	Test Technician	W. Brokx
ATD Serial Number	DG8012	Laboratory Supervisor	J. Kinderman

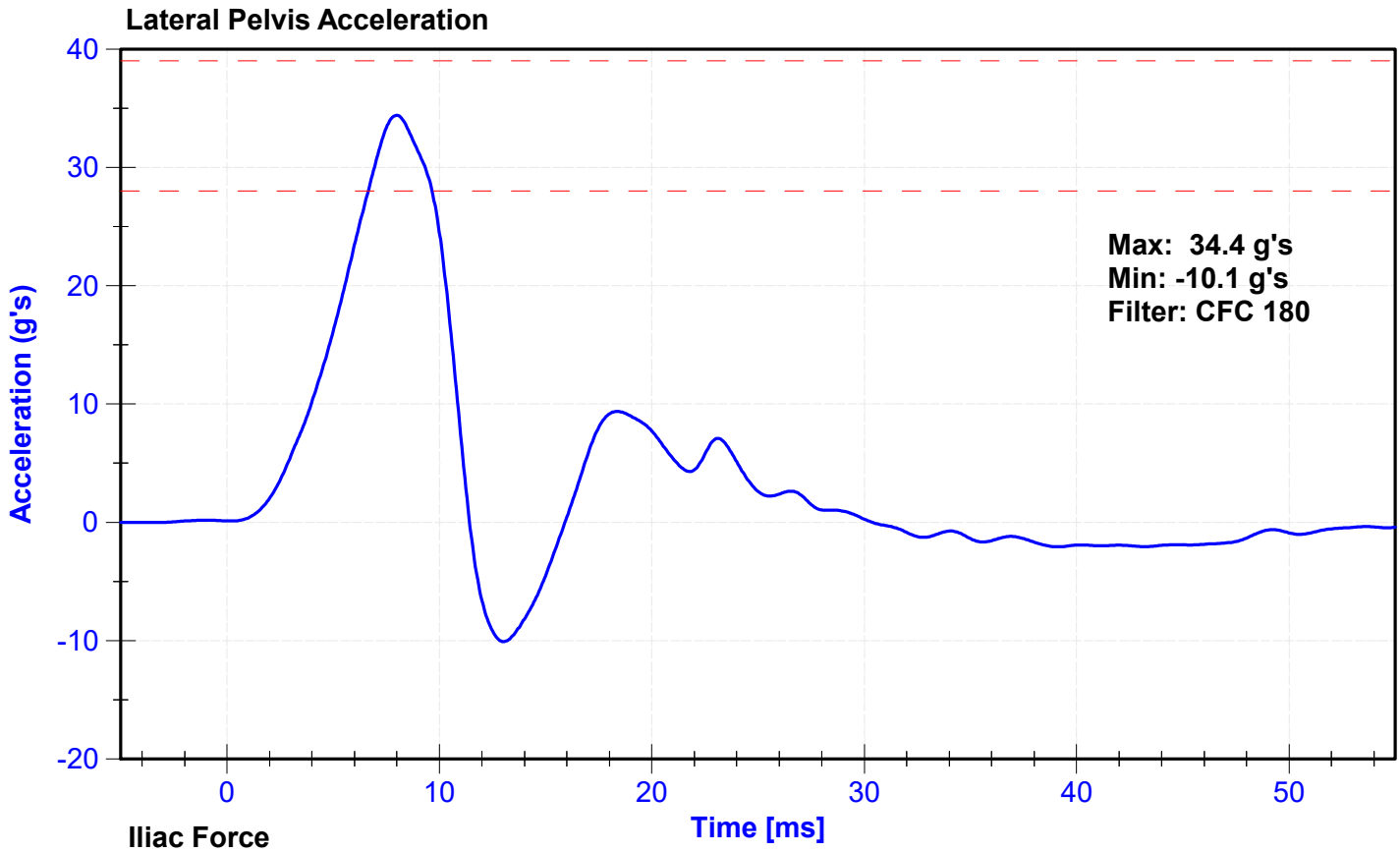
Results

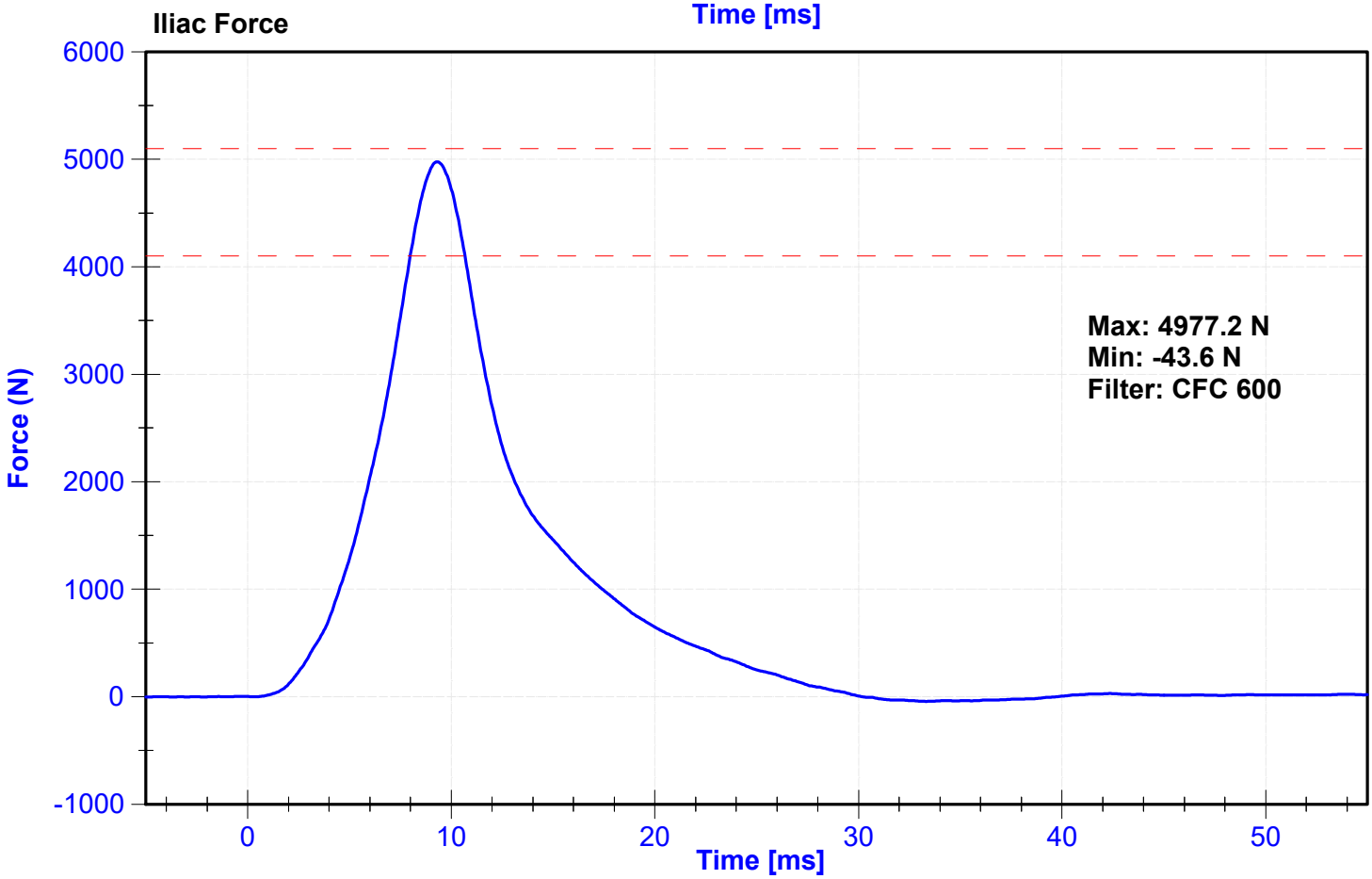
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	ºC	22.0	Pass
Humidity	10	70	%	25.0	Pass
Velocity	4.2	4.4	m/s	4.20	Pass
Probe Acceleration	36	45	g's	44.7	Pass
Lateral Pelvis Acceleration	28	39	g's	34.4	Pass
Iliac Force	4100	5100	N	4977.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25962	2/15/2025	8/14/2025
Pelvis Y Accelerometer	Endevco	T20860	10/17/2024	4/15/2025
Iliac Load Cell	Denton	321	9/16/2024	9/16/2025




Lateral Pelvis Acceleration
Acceleration (g's)
Time [ms]
Max: 34.4 g's
Min: -10.1 g's
Filter: CFC 180


Iliac Force
Force (N)
Time [ms]
Max: 4977.2 N
Min: -43.6 N
Filter: CFC 600

APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

TABLE 1 – Dummy Instrumentation (ES-2re)

			ES-2re S/N F033		
			Serial Number	**Manufacturer**	**Calibration Date**
Head Accelerometers	Primary	X	P63861	Endevco	10/17/2024
		Y	P49216	Endevco	10/17/2024
		Z	P51303	Endevco	10/17/2024
	Redundant	X	P58868	Endevco	10/17/2024
		Y	P59020	Endevco	10/17/2024
		Z	P52132	Endevco	10/17/2024
Thorax Rib Displacement Potentiometers	Upper	Y	179GFE	Honeywell	10/16/2024
	Middle	Y	185GFE	Honeywell	10/16/2024
	Lower	Y	184GFE	Honeywell	11/19/2024
Abdomen Load Cells	Forward	Y	1523	Denton	10/28/2024
	Middle	Y	1524	Denton	10/28/2024
	Rear	Y	1530	Denton	10/28/2024
Lower Spine Accelerometers (T12)		X	P35790	Endevco	10/17/2024
		Y	T31029	Endevco	10/17/2024
		Z	P52033	Endevco	10/17/2024
Pubic Symphysis Load Cell		Y	458-FY	Denton	10/28/2024

TABLE 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N DG8012		
				Serial Number	**Manufacturer**	**Calibration Date**
Head Accelerometers		Primary	X	T21184	Endevco	10/17/2024
			Y	T31030	Endevco	10/17/2024
			Z	P83319	Endevco	10/17/2024
		Redundant	X	T21354	Endevco	10/17/2024
			Y	P12566	Endevco	12/30/2024
			Z	P83322	Endevco	10/17/2024
Displacement Potentiometers	Thoracic Rib	Upper	Y	1199GFE	Servo	10/16/2024
		Middle	Y	1246GFE	Servo	10/16/2024
		Lower	Y	011GFE	Servo	10/16/2024
	Abdominal Rib	Upper	Y	008GFE	Servo	10/16/2024
		Lower	Y	046GFE	Servo	10/16/2024
Lower Spine Accelerometers (T12)			X	P71272	Endevco	10/17/2024
			Y	P51327	Endevco	10/17/2024
			Z	T30065	Endevco	12/03/2024
Acetabulum Load Cell			Y	270-FY	Denton	09/16/2024
Iliac Wing Load Cell			Y	321	Denton	09/16/2024
Pelvis Plug (struck side)				16721	SACO	07/22/2022
Pelvis Plug (non-struck side)				16695	SACO	07/22/2022

TABLE 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	G24328	Endevco	02/14/2025
	Vehicle Center of Gravity	Y	G25006	Endevco	10/08/2024
	Vehicle Center of Gravity	Z	A315756	Measurement Specialties	11/20/2024
2	Right Sill at Front Seat	X	G24185	Endevco	10/21/2024
	Right Sill at Front Seat	Y	G25570	Endevco	10/10/2024
	Right Sill at Front Seat	Z	A413594	Measurement Specialties	10/10/2024
3	Right Sill at Rear Seat	X	G22428	Endevco	10/11/2024
	Right Sill at Rear Seat	Y	A405532	Measurement Specialties	10/15/2024
	Right Sill at Rear Seat	Z	A428014	Measurement Specialties	10/11/2024
4	Left Sill at Front Door	Y	A396613	Measurement Specialties	02/14/2025
5	Left Sill at Rear Door	Y	A315889	Measurement Specialties	11/18/2024
6	Left A-Post Lower	Y	G22618	Endevco	02/14/2025
7	Left A-Post Middle	Y	G22639	Endevco	11/04/2024
8	Left B-Post Lower	Y	G24614	Endevco	11/20/2024
9	Left B-Post Middle	Y	A335440	Measurement Specialties	11/21/2024
10	Front Seat Track	Y	G23693	Endevco	11/04/2024
11	Rear Seat Track or Structure	Y	G24037	Endevco	02/12/2025
12	Right Rear Occ. Compartment	Y	G22406	Endevco	02/20/2025
13	Engine Block	X	A280874	Measurement Specialties	12/17/2024
	Engine Block	Y	A280894	Measurement Specialties	12/17/2024
14	Rear Floorpan Above Axle	X	A280966	Measurement Specialties	10/21/2024
	Rear Floorpan Above Axle	Y	A284983	Measurement Specialties	10/21/2024
	Rear Floorpan Above Axle	Z	A315865	Measurement Specialties	10/21/2024

TABLE 4 – MDB Instrumentation

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	G22621	Endevco	12/17/2024
MDB Center of Gravity	Y	A374224	Measurement Specialties	12/17/2024
MDB Center of Gravity	Z	A431195	Measurement Specialties	12/17/2024
Left Frame at Rear Axle Centerline	X	G23827	Endevco	12/16/2024
Left Frame at Rear Axle Centerline	Y	G23844	Endevco	12/16/2024