

REPORT NUMBER: 214P-CAL-25-001

**SAFETY COMPLIANCE TESTING FOR FMVSS 214
DYNAMIC SIDE IMPACT PROTECTION
RIGID POLE TEST**

**Subaru Corporation
2025 Subaru Forester
Five Door SUV**

NHTSA No: C20255503

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



November 18, 2024

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
1200 NEW JERSEY AVE. S.E.
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 693JJ923D000043.

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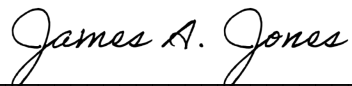
Prepared by: 
Quinn Porzio, Test Engineer

Date: November 18, 2024

Approved by: 
Vanessa Hansen, Operations Manager

Date: November 18, 2024

FINAL REPORT ACCEPTANCE BY OVSC:


Accepted by

Date: _____

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15. Supplementary Notes																										
16. Abstract A 31.00 km/h (19.3 mph), 75° oblique compliance test was conducted on the subject 2025 Subaru Forester 5Dr SUV in accordance with the specifications of the Office of Vehicle Safety Compliance TP-214P-01 for the determination of FMVSS No.214 Side Impact Protection compliance. The test was conducted at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on October 28, 2024. The impact velocity of the vehicle was 31.26 km/h, and the ambient temperature at the struck (passenger's) side of the target vehicle was 21°C. The target vehicle's maximum post-test static crush was 338 mm located at level 3. The test vehicle's occupant performance data is as follows: <table border="1" style="margin: 10px auto; width: 80%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="text-align: center;">Measurement Description</th> <th colspan="3" style="text-align: center;">Driver ATD (ES-2re)</th> </tr> <tr> <th style="text-align: center;">Units</th> <th style="text-align: center;">IARV</th> <th style="text-align: center;">Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">1000</td> <td style="text-align: center;">299.332</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td style="text-align: center;">mm</td> <td style="text-align: center;">44</td> <td style="text-align: center;">21.004</td> </tr> <tr> <td>Total Abdominal Force</td> <td style="text-align: center;">N</td> <td style="text-align: center;">2500</td> <td style="text-align: center;">739.522</td> </tr> <tr> <td>Pubic Symphysis Force</td> <td style="text-align: center;">N</td> <td style="text-align: center;">6000</td> <td style="text-align: center;">1808.453</td> </tr> </tbody> </table> 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.				Measurement Description	Driver ATD (ES-2re)			Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	299.332	Maximum Thoracic Rib Deflection	mm	44	21.004	Total Abdominal Force	N	2500	739.522	Pubic Symphysis Force	N	6000	1808.453
Measurement Description	Driver ATD (ES-2re)																									
	Units	IARV	Result																							
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Maximum Thoracic Rib Deflection	mm	44	21.004																							
Total Abdominal Force	N	2500	739.522																							
Pubic Symphysis Force	N	6000	1808.453																							
17. Key Words Compliance Testing Side Impact Protection Pole Test ES-2re SID-IIs		18. Distribution Statement <u>Copies of this report are available from:</u> National Highway Traffic Safety Administration Technical Information Services (TIS) Room E12-100 East Bldg. 1200 New Jersey Ave. Washington, D.C. 20590 Telephone No. (202) 366-2588																								
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Form DOT F1700.7 (8-72)

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SECTION 1

PURPOSE AND SUMMARY OF TEST

PURPOSE

This side impact test was conducted as part of the FY 2025 FMVSS 214 Side Impact Protection Compliance Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. 693JJ923D000043. The purpose of this test was to evaluate side impact protection in a 2025 Subaru Forester 5Dr SUV. The side impact test was conducted in accordance with the Office of Vehicle Safety Compliance's Laboratory Test Procedure, TP-214P-01 dated September 2012.

SUMMARY

A rigid pole side impact test was conducted on a 2025 Subaru Forester 5Dr SUV. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 31.26 km/h. The test was conducted by Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on October 28, 2024. Pre-test and post-test photographs of the test vehicle and side impact dummy (ES2re) are included in Appendix I of this report.

One Part 572U (ES2re) dummy was placed in the front passenger designated seating position according to instructions specified in the TP-214P-01 Test Procedure, dated September 2012. The side impact event was documented by nine High Speed Cameras and one real time camera.

The ES2re male dummy was instrumented accordingly:

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

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

Injury readings for the ES2re dummy were recorded as follows:

INJURY READINGS

Measurement Description	Driver ATD (ES2re)		
	Units	IARV	Result
HIC ₃₆		1000	299.332
Upper Rib Deflection	mm	44	21.004
Mid Rib Deflection	mm		20.988
Lower Rib Deflection	mm		18.980
Abdominal Load (front)	N		165.679
Abdominal Load (mid)	N		270.435
Abdominal Load (rear)	N		344.075
Sum of Abdomen Forces	N	2500	739.522
Pubic Symphysis	N	6000	1808.453

SECTION 2

OCCUPANT AND VEHICLE INFORMATION

This section contains information reporting for the following Data Sheets:

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DATA SHEET NO. 1
TEST VEHICLE INFORMATION AND OPTIONS

Test Vehicle: 2025 Subaru Forester 5Dr SUV
Test Facility: Calspan

NHTSA No.: C20255503
Test Date: 10/28/2024

TEST VEHICLE INFORMATION AND OPTIONS

Make	Subaru	Anti-Lock Brakes (ABS)	Yes
Model	Forester	All-Wheel Drive (AWD)	Yes
Body Style	5Dr SUV	Traction Control System (TCS)	Yes
VIN	JF2SLDACXSH426638	Electric Stability Control (ECS)	Yes
Body Color	Magnetite Gray Metallic	Curtain Airbags	Yes
Engine Displacement (L)	2.5	Torso Airbags – Front Seats	Yes
Type/No. Cylinders	I4	Torso Airbags – Rear Seats	No
Engine Placement	Transverse	Combination/Head Torso Bag	No
Transmission Type	Automatic	Pelvic Airbag – Front Seats	No
Transmission Speeds	CVT	Pelvis Airbag – Rear Seats	No
Overdrive	Yes	Knee Airbag – Driver	Yes
Final Drive	All Wheel Drive	Knee Airbag – Front Passenger	No
Odometer Reading (mi)	61 mi	Seat Belt Pretensioners – Front Seats	Yes
		Seat Belt Pretensioners – Rear Seats	Yes
		Seat Belt Load Limiter – Front Seats	Yes
		Seat Belt Load Limiter – Rear Seats	Yes
		Tire Pressure Monitoring System (TPMS)	Yes
		Tilt Steering Wheel	Yes
		Automatic Door Locks (ADL)	Yes
		Power Window Auto-reverse	Yes
		Power Seats	No

DATA FROM CERTIFICATION LABEL

Manufactured By	Subaru Corporation	GVWR (kg)	2223
Date of Manufacture	06/24	GAWR Front (kg)	1302
Vehicle Type	MPV	GAWR Rear (kg)	1130

VEHICLE SEATING AND CAPACITY WEIGHT DATA

Measured Parameter	Front	Rear	Third	Total
Type of Seats (Bench or Bucket)	Bucket	Split Bench	N/A	
Designated Seating Capacity (DSC)	2	3	N/A	5
Capacity Weight (VCW) (kg)				408
Cargo Weight (RCLW) (kg)				67.8

DATA SHEET NO. 2

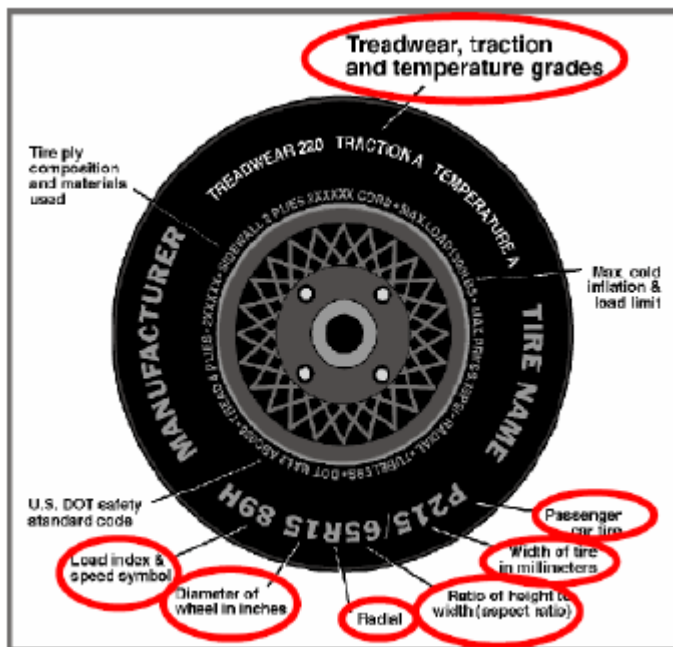
VEHICLE TIRE INFORMATION

Test Vehicle: 2025 Subaru Forester 5Dr SUV
Test Facility: Calspan

NHTSA No.: C20255503
Test Date: 10/28/2024

VEHICLE TIRE INFORMATION

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



TIRE SIDEWALL INFORMATION

Tire Placard	Front	Rear
Recommended Cold Pressure (kPa)	230	220
Recommended Tire Size	225/60R17	225/60R17
Tire Sidewall	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Tire Size on Vehicle	225/60R17	225/60R17
Tire Manufacturer Model	Yokohama	Yokohama
Tire Name	Geolander G91	Geolander G91
Tire Type	All Season	All Season
Tire Width	225	225
Aspect Ratio	60	60
Radial	Yes	Yes
Wheel Diameter	17"	17"
Load Index/Speed Symbol	99H	99H
Treadwear	280	280
Traction Grade	B	B
Temperature Grade	A	A

DATA SHEET NO. 3
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2025 Subaru Forester 5Dr SUV
Test Facility: Calspan

NHTSA No.: C20255503
Test Date: 10/28/2024

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	235	236	218	216
As Tested	kPa	230	230	220	220

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			Fully Loaded			As Tested		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	460	352		493	418		486	404	
Right	kg	462	320		475	362		500	345	
Ratio	%	57.8	42.2		55.4	44.6		56.8	43.2	
Totals	kg	922	672	1594	968	780	1748	986	749	1735

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
As Delivered Weight (UVW)	kg	1594	(A)
Weight of Test Dummy	kg	81	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	67.8	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1742.8	(A+B+C)

TEST VEHICLE ATTITUDES AND CG

Measurement Description	Units	As Delivered	Fully Loaded	As Tested
Left Door Sill Angle	Deg	-0.80	-0.80	-0.80
Right Door Sill Angle	Deg	-0.95	-0.95	-0.95
Front Bumper – Line Angle	Deg	-0.05	-0.15	-0.10
Rear Bumper – Line Angle	Deg	-0.05	-0.10	-0.05

ND = Nose Down (-), NU = Nose Up (+), LD = Left Down (-), LU = Left Up (+)

CALCULATION OF VERTICAL IMPACT REFERENCE LINE

Measured Parameter	Units	Value
Test Vehicle Wheelbase	mm	2670
Vertical Impact Reference Line Aft of Front Axle	mm	1253

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Trunk carpeting	14
Spare tire & jack	15
Right rear window	3
Ballast (if any)	40.8

DATA SHEET NO. 4
SEAT AND SEAT BELT ANCHORAGE ADJUSTMENT DATA

Test Vehicle: 2025 Subaru Forester 5Dr SUV
Test Facility: Calspan

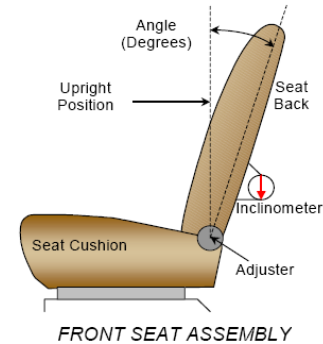
NHTSA No.: C20255503
Test Date: 10/28/2024

SEAT BACK ANGLE ADJUSTMENT

The driver and passenger seat backs are positioned to the manufacturer's designated angle provided in the Form1.

	Units	Seat Back Angle
Driver Seat	deg	+3.0
Front Passenger Seat	deg	+1.7

**Measurement taken on seatback*



SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	SCRP Height Position	SCRP Height (mm)		
			Rearmost	Mid-Fore / Aft	Forward-Most
Driver Seat	11.0	Max	-	-	-
		Mid	-	-	-
		Min	20	23	27
Front Passenger Seat	Fixed	Max			
		Mid			
		Min			

SEAT FORE / AFT POSITION

Seat	Total Fore / Aft Travel		Placed in Position #	
	mm	Detents*	mm	Detents*
Driver Seat	309	27 (0-26)	165	13
Front Passenger Seat	260	27 (0-26)	130	13

SEAT BELT ANCHORAGE ADJUSTMENT

Seat	Total # of Positions	Placed in Position #
Driver Seat	4 (0-3)	1
Front Passenger Seat	4 (0-3)	1

HEAD RESTRAINT ADJUSTMENT

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

DATA SHEET NO. 5 FUEL SYSTEMS AND STEERING WHEEL POSITION DATA

Test Vehicle: 2025 Subaru Forester 5Dr SUV
Test Facility: Calspan

NHTSA No.: C20255503
Test Date: 10/28/2024

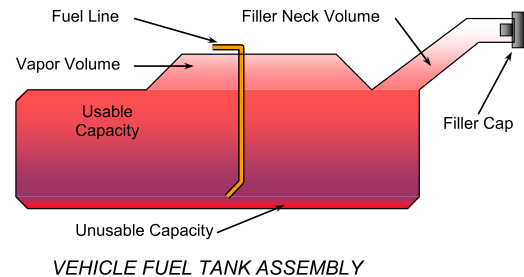
FUEL TANK CAPACITY DATA

Description	Liters
Usable Capacity (Form No. 1)	63.0
Usable Capacity (Owner's Manual)	63.0
92 - 94% of Usable Capacity	57.96 – 59.22
Actual Amount of Solvent Used in Test	58.59

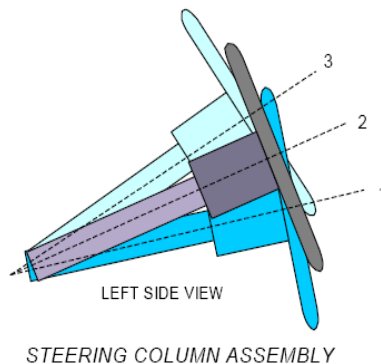
FUEL PUMP

Describe the operation of the fuel pump.

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



STEERING COLUMN ADJUSTMENT

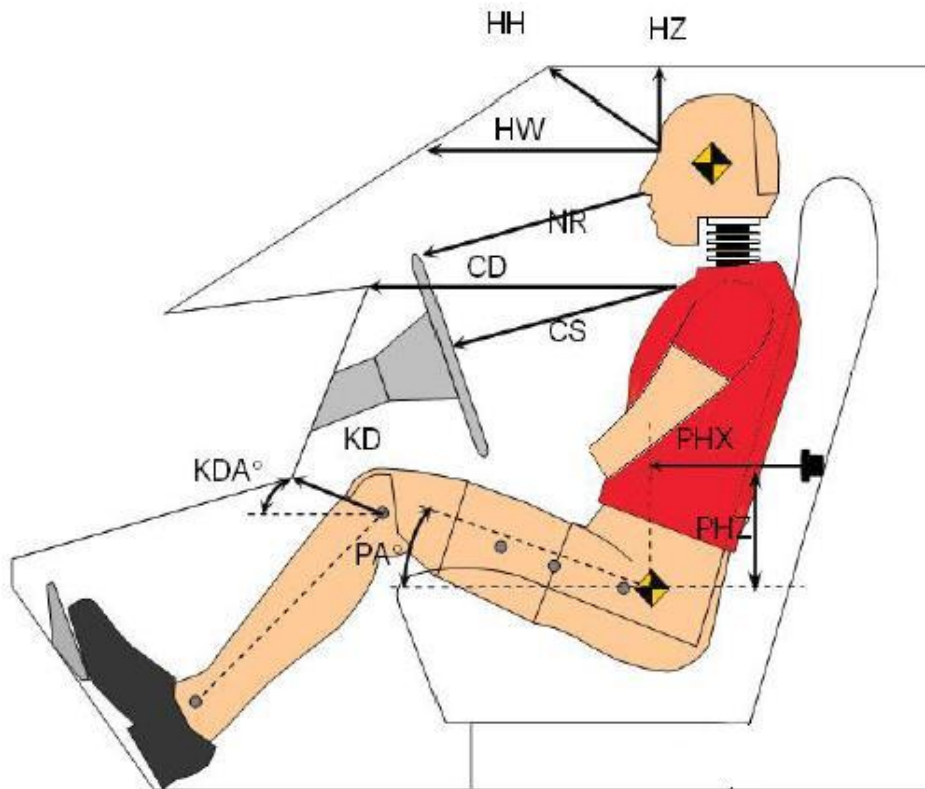


	Degrees	Fore / Aft Position (mm)
Lowermost – Position 1	24.7	
Geometric Center – Position 2	26.5	
Uppermost – Position 3	28.3	
Telescoping Steering Wheel Travel		58
Test Position	26.5	29

DATA SHEET NO. 6
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2025 Subaru Forester 5Dr SUV
 Test Facility: Calspan

NHTSA No.: C20255503
 Test Date: 10/28/2024



Left Side View

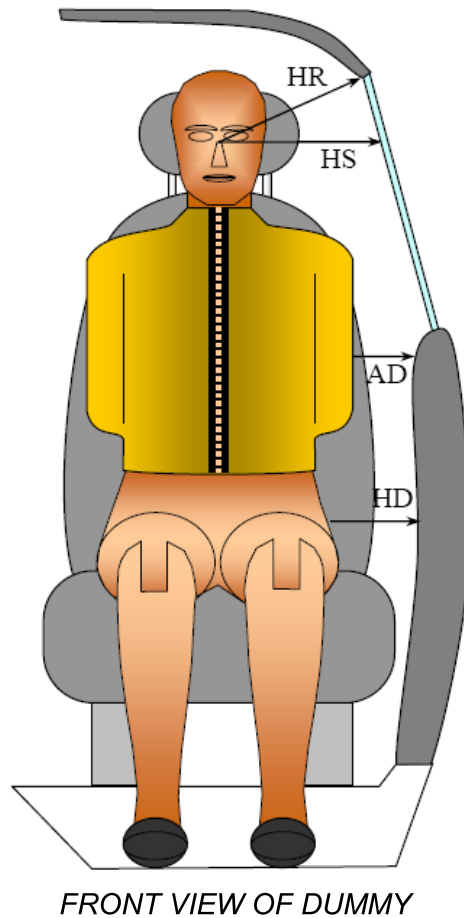
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Description	Driver	
		Length (mm)	Angle (°)
HH	Head to Header	410	
HW	Head to Windshield	659	
HZ	Head to Roof Liner	203	
NR	Nose to Rim	460	
CD	Chest to Dash	573	
CS	Chest to Steering Wheel	377	
KD(L) / KDA(L)°	Left Knee to Dash	179	30.6
KD(R) / KDA(R)°	Right Knee to Dash	147	56.0
PAX°	Pelvic Tilt Angle (X-Axis)		20.1
PAY°	Pelvic Tilt Angle (Y-Axis)		0.4
PHX	Hip Point to Striker (X-Axis)	208	
PHZ	Hip Point to Striker (Z-Axis)	187	

DATA SHEET NO. 7
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2025 Subaru Forester 5Dr SUV
Test Facility: Calspan

NHTSA No.: C20255503
Test Date: 10/28/2024



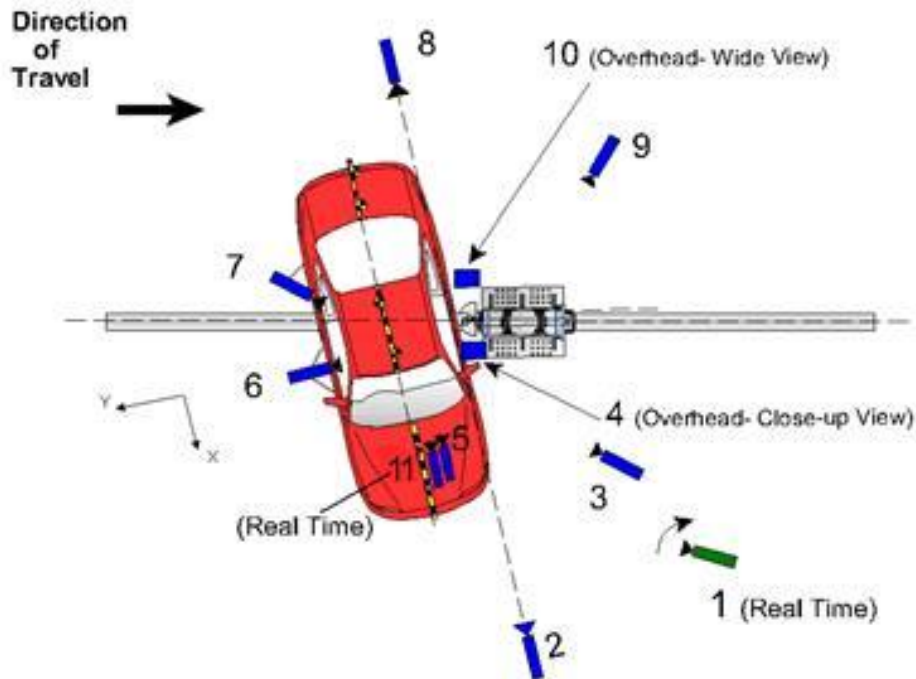
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver
HR	Head To Side Header	mm	220
HS	Head to Side Window	mm	342
AD	Arm to Door	mm	93
HD	Hip Point to Door	mm	158

DATA SHEET NO. 8 LOCATION OF CAMERAS

Test Vehicle: 2025 Subaru Forester 5Dr SUV
Test Facility: Calspan

NHTSA No.: C20255503
Test Date: 10/28/2024



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Real-time (24 - 30 fps) pan view of impact				Zoom	60
2	Front ground level - impact view	7211	0	-1515	28	1000
3	Impact side 45° - forward pole view	4349	1170	-1531	24	1000
4	Overhead Close-up view of impact	0	0	-8992	28	1000
5	Onboard - dummy front view				25	1000
6	Onboard - dummy side view				12.5	1000
7	Onboard - dummy rear oblique view				12.5	1000
8	Rear ground level - impact view	-8105	0	-1511	28	1000
9	Impact side 45° - rearward pole view	-4791	3510	-1503	24	1000
10	Overhead wide - view of impact	0	-209	-8992	16	1000

Notes: Reference - From Point of Impact for X and Y; from Ground for Z

+X = Forward of vehicle, +Y = Right of vehicle, +Z = Down

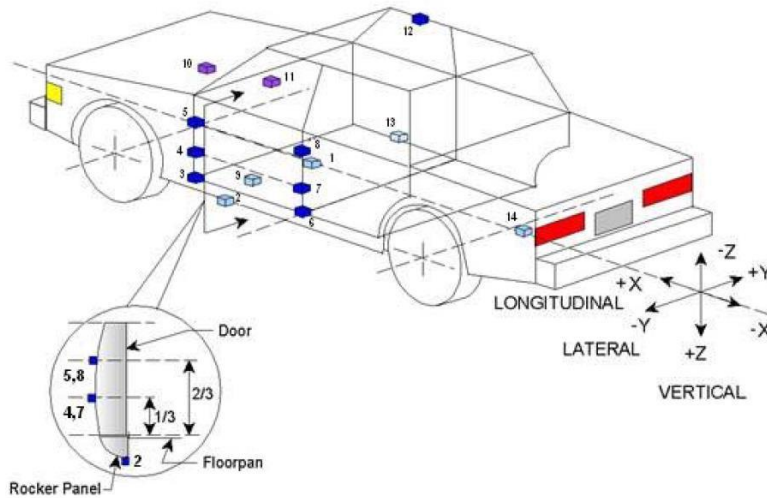
* All measurements accurate to ± 6 mm.

Vehicle is at a 75° angle to the rigid pole.

DATA SHEET NO. 9 **TEST VEHICLE ACCELEROMETER LOCATIONS**

Test Vehicle: 2025 Subaru Forester 5Dr SUV
 Test Facility: Calspan

NHTSA No.: C20255503
 Test Date: 10/28/2024



TEST VEHICLE ACCELEROMETER LOCATIONS

No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2565	2	-78
2	Left Floor Sill	2728	-721	162
3	A-Pillar Sill	3142	-631	160
4	A-Pillar Low	3167	-636	-5
5	A-Pillar Mid	3145	-652	-502
6	B-Pillar Sill	2164	-675	138
7	B-Pillar Low	2099	-683	-235
8	B-Pillar Mid	2056	-660	-484
9	Seat	2380	-566	146
10	Engine	3986	4	-66
11	Firewall	3430	-245	-227
12	Roof	1878	559	-1050
13	Right Floor Sill	2703	723	160
14	Rear Deck	927	2	-31

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

DATA SHEET NO. 10
TEST VEHICLE ACCELEROMETER DATA SUMMARY

Test Vehicle: 2025 Subaru Forester 5Dr SUV
 Test Facility: Calspan

NHTSA No.: C20255503
 Test Date: 10/28/2024

Loc No.	Description	Axes	Units	Peak Values (g's)			
				Max	Time (ms)	Max	Time (ms)
1	Vehicle CG	X	g	18.96	83.20	-30.39	79.30
		Y	g	27.90	35.55	-5.83	80.40
		Z	g	24.76	69.10	-21.91	64.50
		Resultant		30.92	79.30	0.06	-3.35
2	Floor Sill (Impact Side)	Y	g	69.56	14.95	-9.35	28.90
3	A Pillar Sill	Y	g	33.73	15.65	-21.13	102.80
4	A Pillar Low	Y	g	28.33	15.00	-8.49	47.30
5	A Pillar Mid	Y	g	96.87	22.10	-42.62	26.05
6	B Pillar Sill	Y	g	75.17	24.75	-28.83	37.70
7	B Pillar Low	Y	g	96.29	16.10	-62.00	12.20
8	B Pillar Mid	Y	g	51.08	22.85	-39.31	17.10
9	Seat	Y	g	83.51	30.85	-28.29	38.35
10	Engine	X	g	2.36	104.30	-13.48	51.65
		Y	g	11.69	47.90	-4.60	196.05
11	Firewall	Y	g	13.42	42.90	-0.62	3.10
12	Roof	Y	g	40.48	40.10	-4.46	16.80
13	Floor Sill	Y	g	19.14	17.45	-1.33	173.85
14	Rear Deck	X	g	5.87	104.35	-5.89	57.95
		Y	g	16.87	47.90	-1.65	175.50

DATA SHEET NO. 11
DUMMY INJURY RESPONSE DATA
(Subpart U, ES-2re)

Test Vehicle: 2025 Subaru Forester 5Dr SUV
 Test Facility: Calspan

NHTSA No.: C20255503
 Test Date: 10/28/2024

Dummy Serial No. D037

Description	Axes	Positive Direction		Negative Direction	
		Max	Time (ms)	Max	Time (ms)
HEAD ACCELERATION (g)					
Longitudinal	X	10.77	75.75	-22.88	50.85
Lateral	Y	41.59	59.15	-16.97	92.75
Vertical	Z	17.81	47.10	-4.72	98.50
Resultant	N/A	47.29	59.20		
HIC36 (t1, t2)	N/A	299.33		t1 = 39.80	t2 = 70.75
THORAX DEFLECTION (mm)					
Upper Rib	Y	21.00	55.90	-7.52	24.85
Middle Rib	Y	20.99	58.90	-0.57	23.35
Lower Rib	Y	18.98	58.70	-0.03	83.60
ABDOMINAL FORCES (N)					
Front	Y	165.68	55.75	-19.95	16.10
Middle	Y	270.44	55.25	-9.13	159.40
Rear	Y	344.08	45.65	-11.67	143.35
SUM	N/A	739.52	55.15		
PELVIS FORCES (N)					
Pubic Symphysis	Y	46.22	298.75	-1808.45	57.60

Reference: Positive Direction - Longitudinal (X) = forward
 - Lateral (Y) = to right
 - Vertical (Z) = down
 -

DATA SHEET NO. 12
POST-TEST OBSERVATIONS

Test Vehicle: 2025 Subaru Forester 5Dr SUV
Test Facility: Calspan

NHTSA No.: C20255503
Test Date: 10/28/2024

IMPACT POINT DATA

Measured Parameter	Units	Value
Vertical Impact Ref Line - Aft of Front Axle, Intended Impact Pt	mm	1253
Actual Impact Point - Aft of Front Axle	mm	1259
Difference	mm	6

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Front Passenger Seat Dummy (ES2re)
Head Contact	Curtain Airbag, Headliner & Headrest
Upper Torso Contact	Seatback & Torso/Pelvis Airbag
Lower Torso Contact	Seatback & Torso/Pelvis Airbag
Left Knee Contact	None
Right Knee Contact	Left Knee

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
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 Disengagement from Floor Pan	No	No	No	No
Seat Back Movement from Initial Position	No	No	No	No

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	A-Pillar & B-Pillar Buckled
Sill Separation	None
Windshield Damage	Cracked throughout
Side Window Damage	Driver window shattered

DATA SHEET NO. 12
POST-TEST OBSERVATIONS (CONTINUED)

Test Vehicle: 2025 Subaru Forester 5Dr SUV
Test Facility: Calspan

NHTSA No.: C20255503
Test Date: 10/28/2024

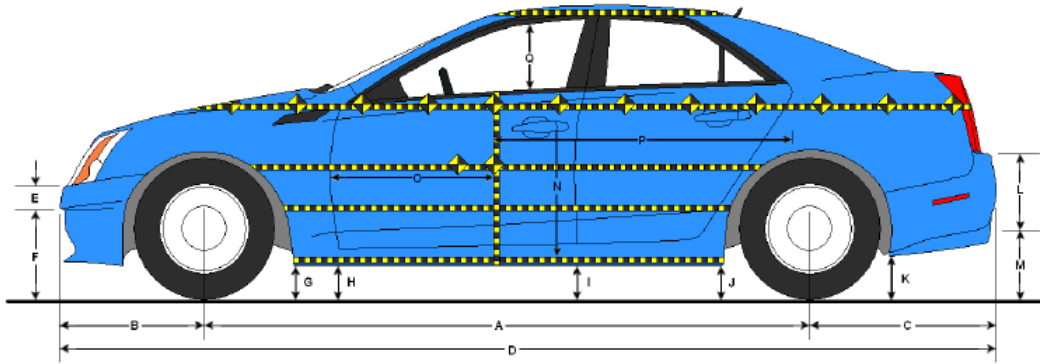
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Front Occupant	
	Mounted	Deployed
Frontal Airbag	Yes	No
Side Torso Airbag	Yes	Yes
Head Airbag*	No	N/A
Curtain Airbag	Yes	Yes
Seat Belt Pretensioner	Yes	Yes
Other – Passenger Seat Airbag	Yes	No

DATA SHEET NO. 13
VEHICLE PRE TEST AND POST TEST MEASUREMENTS

Test Vehicle: 2025 Subaru Forester 5Dr SUV
 Test Facility: Calspan

NHTSA No.: C20255503
 Test Date: 10/28/2024



LEFT SIDE VIEW

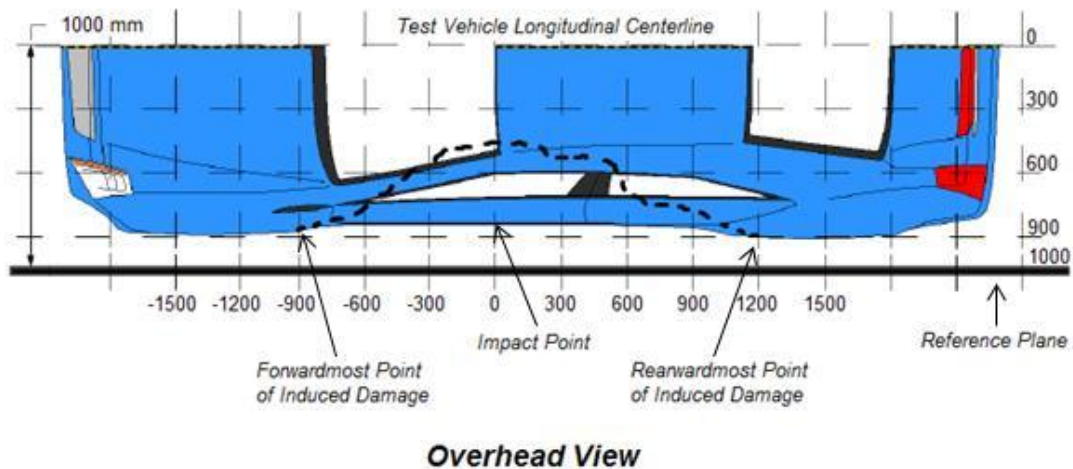
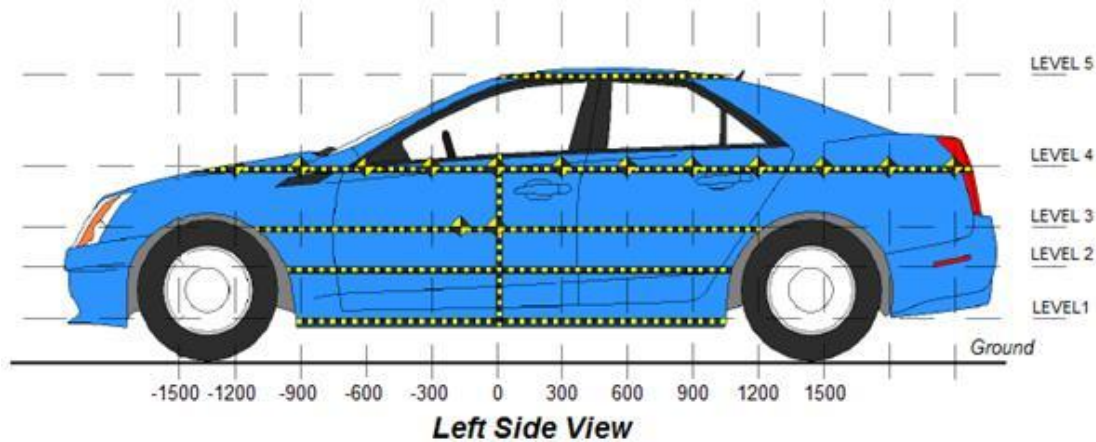
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Vehicle Wheelbase	2670	2610	-60
B	Front Axle to FSOV	2331	1028	-1304
C	Rear Axle to RSOV	2327	994	-1333
D	Total Length at Centerline	4658	4632	-26
E	Front Bumper Thickness	149	149	0
F	Front Bumper Bottom to Ground	421	442	21
G	Sill Height at Front Wheel Well	257	265	8
H	Sill Height at Front Door Leading Edge	266	237	-29
I	Sill Height at B-Pillar	258	273	15
J1	Sill Height at Rear Wheel Well	266	292	26
J2	Pinch Weld Height at Rear Wheel Well	253	283	30
K	Sill Height Aft of Rear Wheel Well	336	332	-4
L	Rear Bumper Thickness	165	165	0
M	Rear Bumper Bottom to Ground	479	464	-15
N	Sill Height to Bottom of Front Window Sill	845	849	3
O	Front Door Leading Edge to Impact CL	801	730	-70
P	Rear Door Trailing Edge to Impact CL	1323	1248	-75
Q	Front Window Opening	428	414	-14
R	Right Side Length	4617	4613	-4
S	Left Side Length	4612	4561	-51
T	Vehicle Width at B-Pillars	1825	1705	-120

DATA SHEET NO. 14 **TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2025 Subaru Forester 5Dr SUV
 Test Facility: Calspan

NHTSA No.: C20255503
 Test Date: 10/28/2024



MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	328	273	0
2	Occupant Hip Point	mm	693	336	0
3	Mid - Door	mm	738	338	0
4	Window Sill	mm	1070	287	0
5	Window Top	mm	1605	100	0

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

DATA SHEET NO. 14
VEHICLE EXTERIOR CRUSH MEASUREMENTS (CONTINUED)

Test Vehicle: 2025 Subaru Forester 5Dr SUV
 Test Facility: Calspan

NHTSA No.: C20255503
 Test Date: 10/28/2024

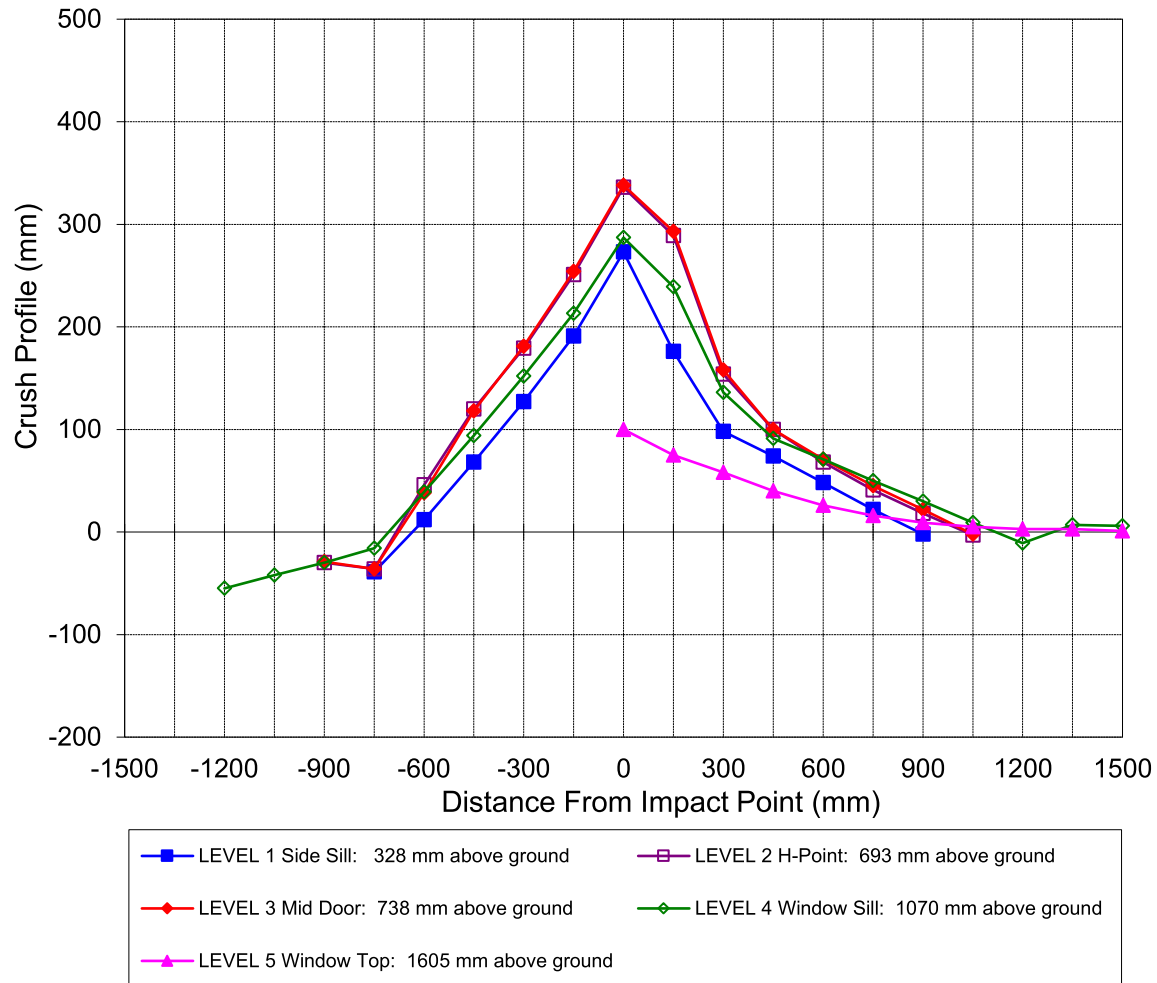
EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1500															
-1350															
-1200				807					862					-55	
-1050				819					861					-42	
-900		915	916	829			945	945	859			-30	-29	-30	
-750	877	914	913	836		916	950	949	852		-39	-36	-36	-16	
-600	885	912	911	815		873	866	873	776		12	46	38	39	
-450	897	911	912	820		829	791	794	726		68	120	118	94	
-300	898	913	913	830		771	734	732	678		127	179	181	152	
-150	898	913	914	839		707	662	660	626		191	251	254	213	
0	895	913	914	848	616	622	577	576	561	516	273	336	338	287	100
150	893	911	913	855	620	717	622	620	616	545	176	289	293	239	75
300	892	909	911	860	621	794	755	753	724	563	98	154	158	136	58
450	891	907	909	861	620	817	807	809	770	580	74	100	100	91	40
600	891	904	906	862	619	843	836	835	791	593	48	68	71	71	26
750	880	903	904	862	618	858	862	859	812	602	22	41	45	50	16
900	870	911	910	863	616	872	893	888	833	607	-2	18	22	30	9
1050		917	913	855	615		920	915	846	610		-3	-2	9	5
1200				869	614				880	611				-11	3
1350				858	612				851	609				7	3
1500				856	602				850	601				6	1

DATA SHEET NO. 14
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS (CONTINUED)

Test Vehicle: 2025 Subaru Forester 5Dr SUV
Test Facility: Calspan

NHTSA No.: C20255503
Test Date: 10/28/2024

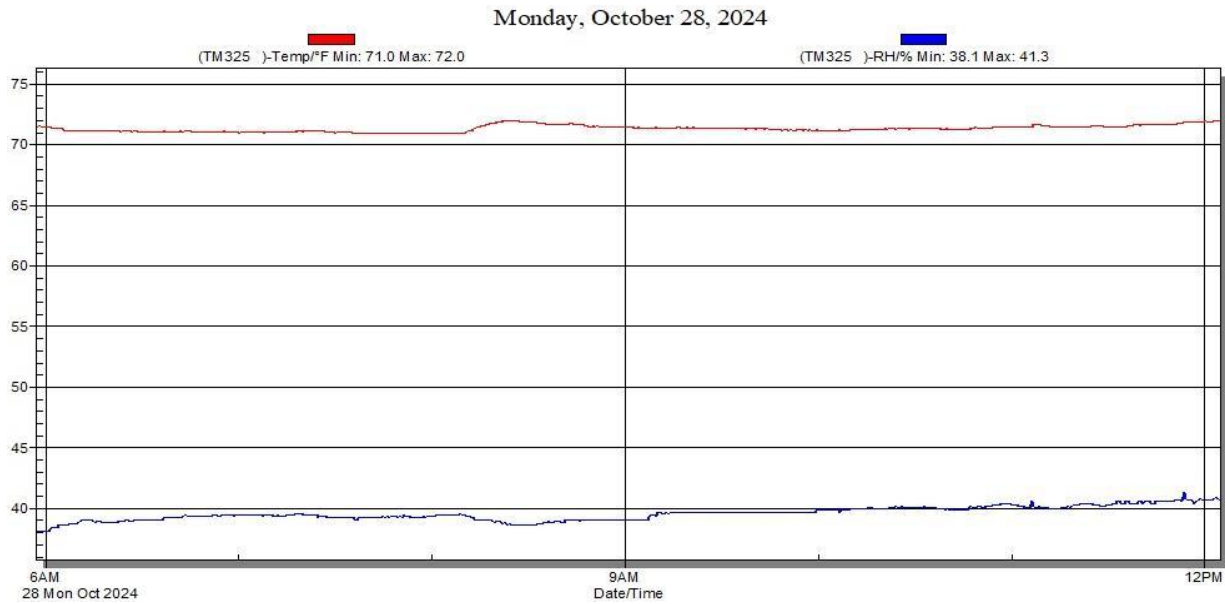


Vehicle Exterior Crush Measurements - Visual Representation

DATA SHEET NO. 16
DUMMY / VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle: 2025 Subaru Forester 5Dr SUV
Test Facility: Calspan

NHTSA No.: C20255503
Test Date: 10/28/2024



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

APPENDIX I
PHOTOGRAPHS

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6	Post-Test Impacted Side View of Test Vehicle	I-5
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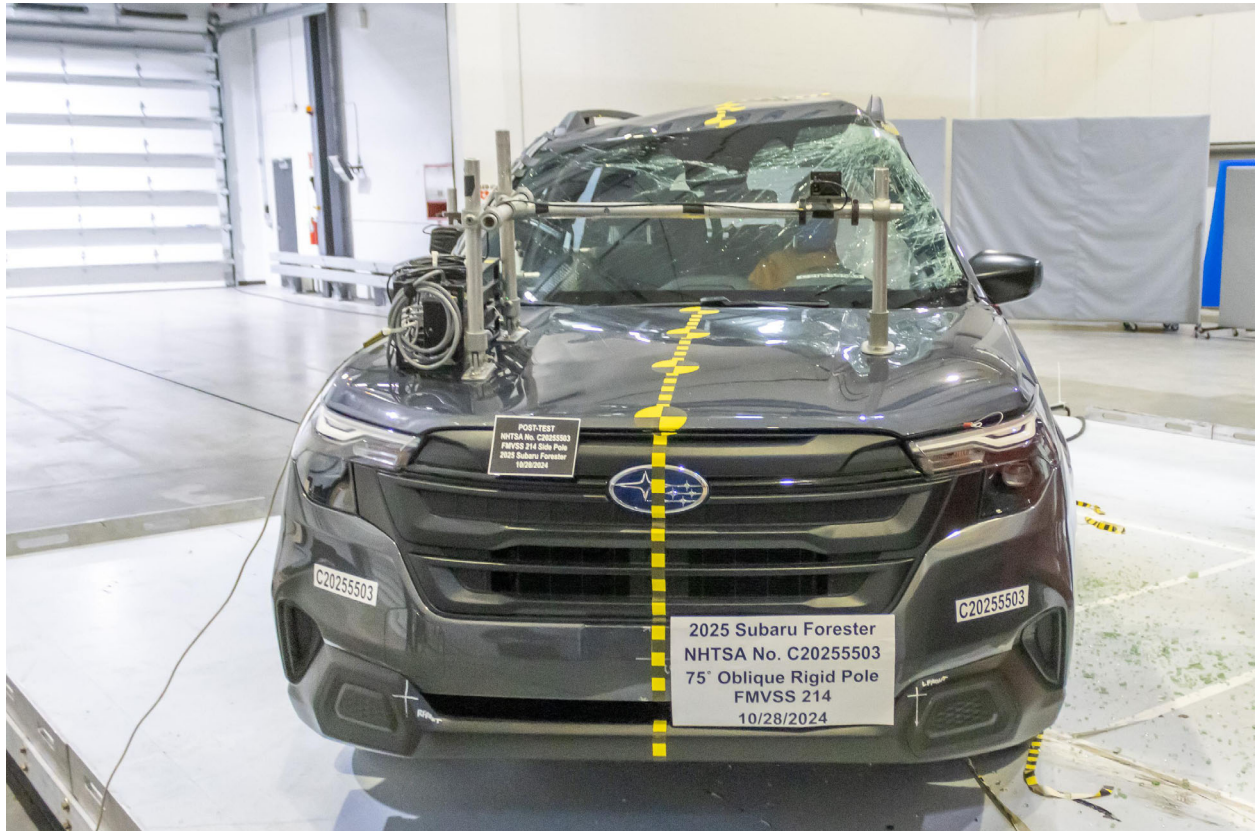


Figure A-1: Pre-Test Frontal View of Test Vehicle

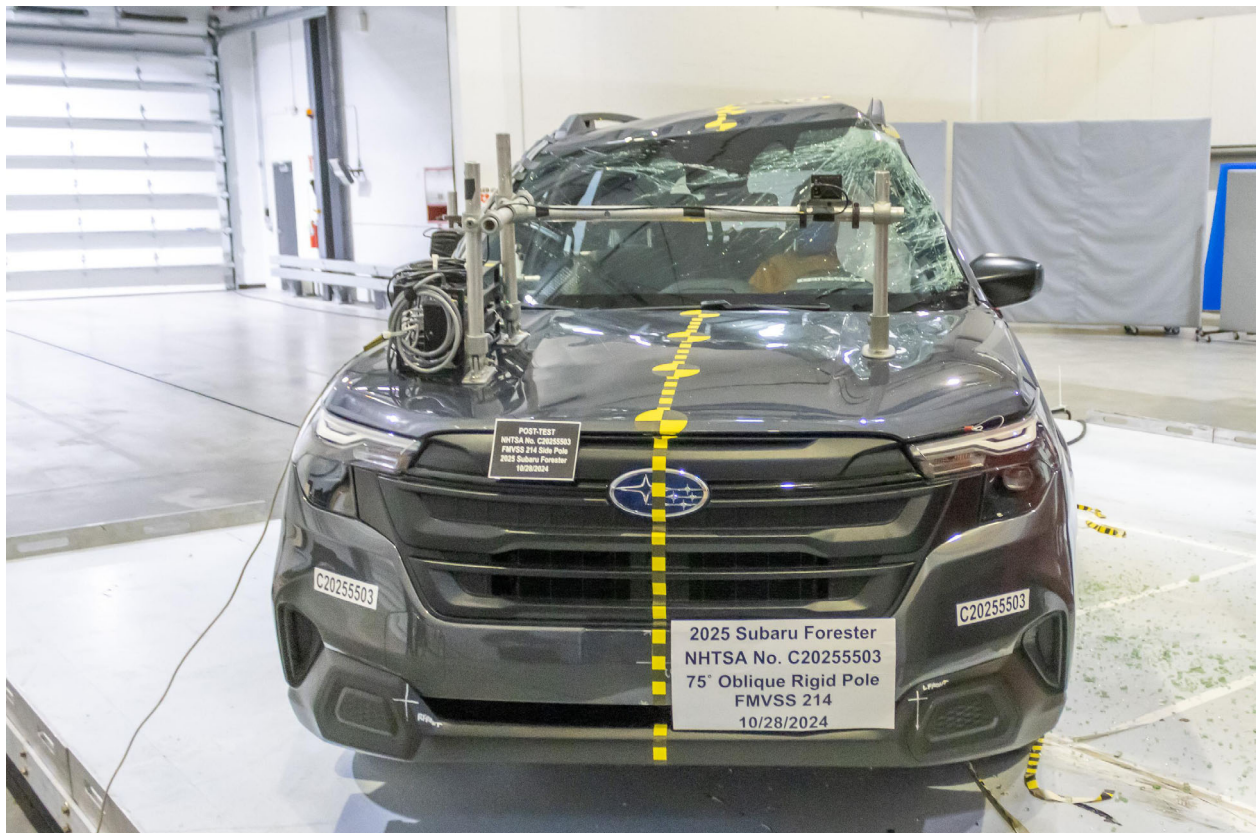


Figure A-2: Post Test Frontal View of Test Vehicle

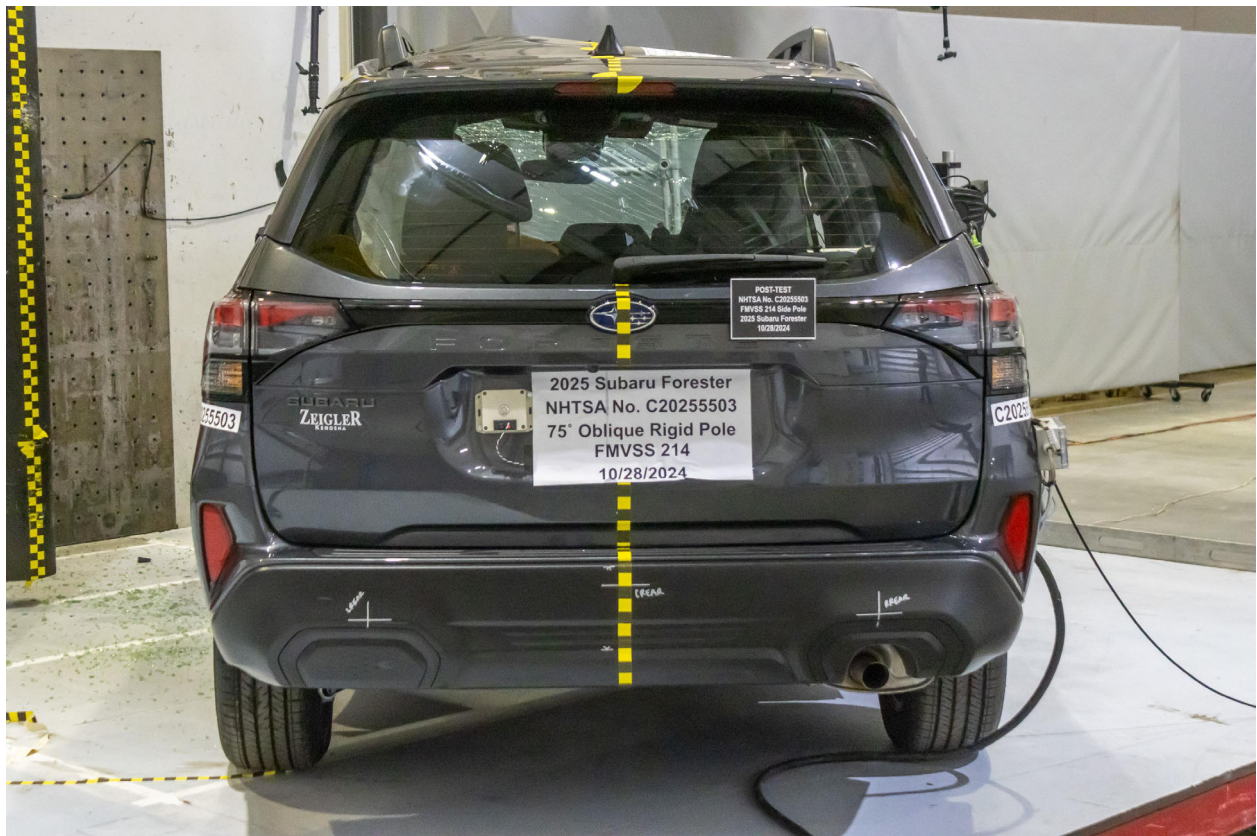


Figure A-3: Pre-Test Rear View of Test Vehicle

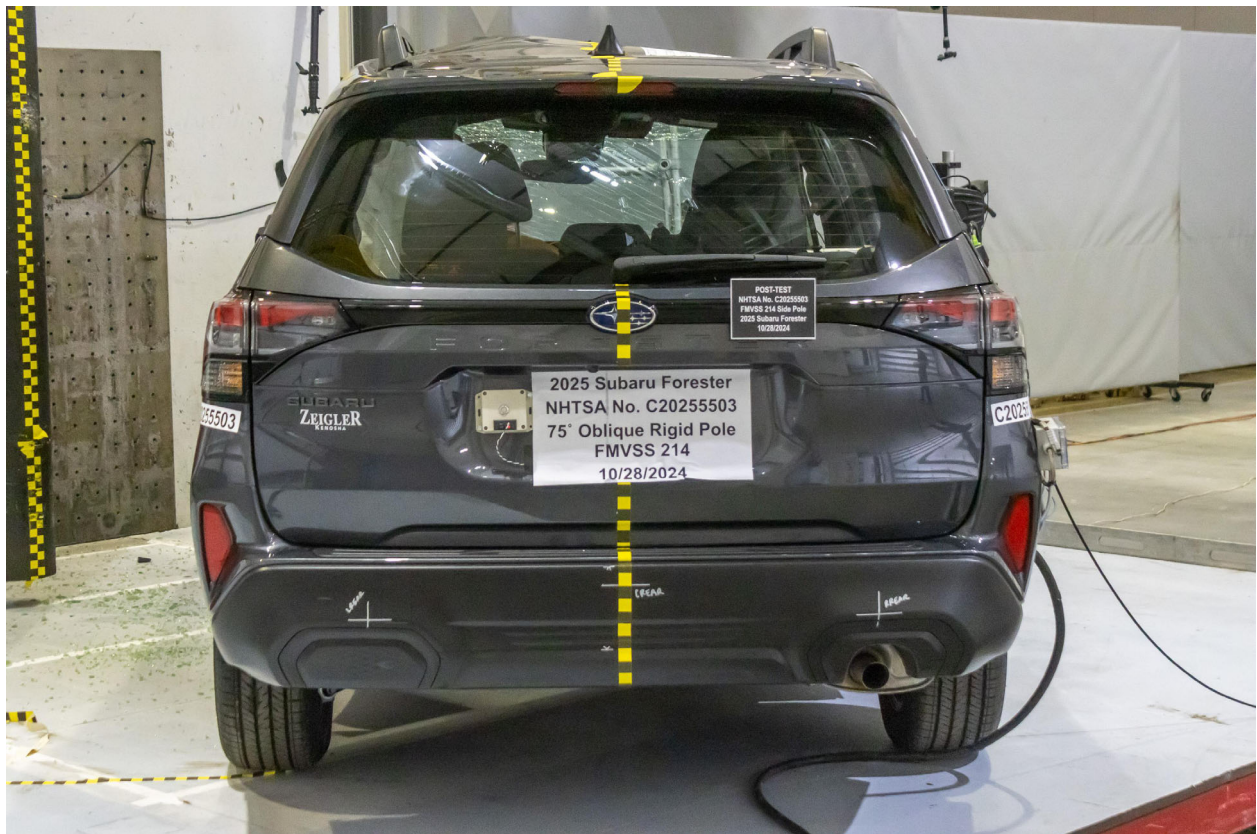


Figure A-4: Post-Test Rear View of Test Vehicle



Figure A-5: Pre-Test Impacted Side View of Test Vehicle



Figure A-6: Post-Test Impacted Side View of Test Vehicle



Figure A-7: Pre-Test Left $\frac{3}{4}$ Front View of Vehicle and Pole



Figure A-8: Pre-Test Left $\frac{3}{4}$ Rear View of Vehicle and Pole

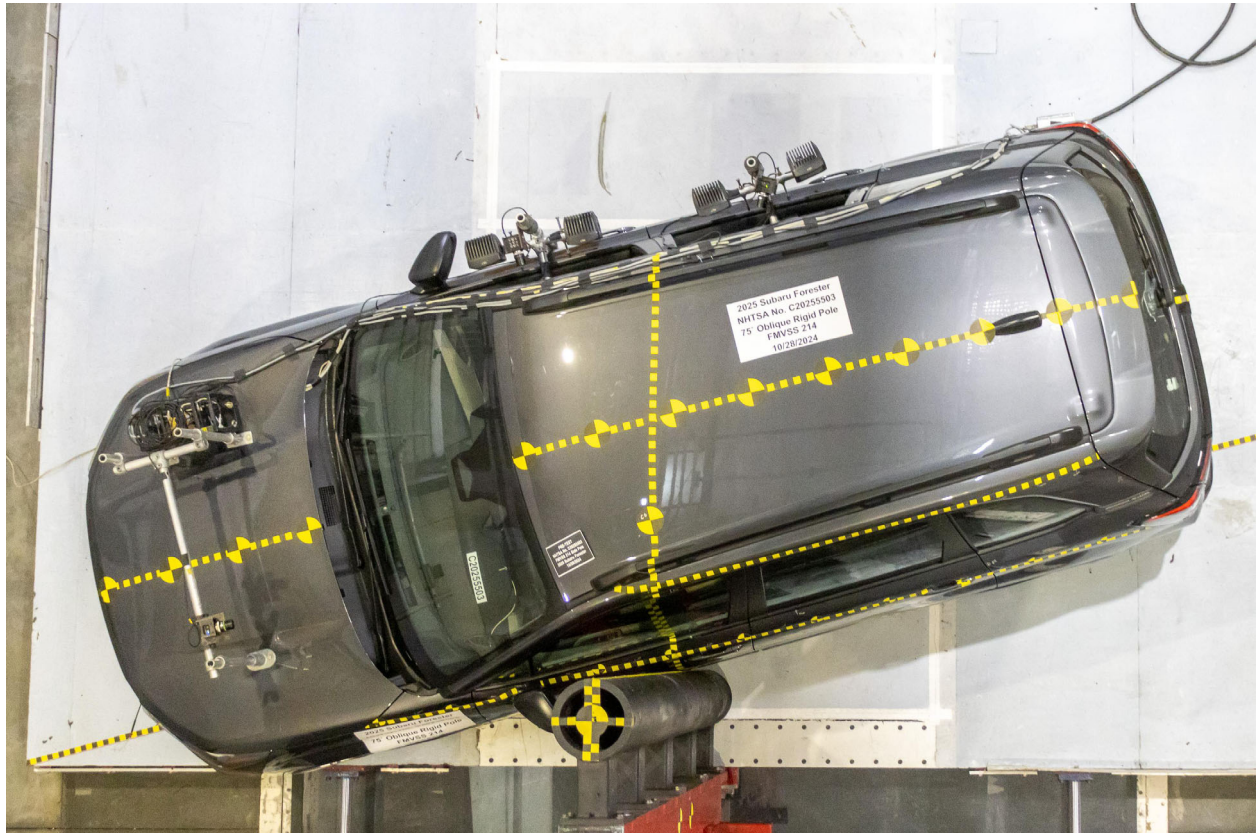


Figure A-9: Pre-Test Overhead View of Test Vehicle

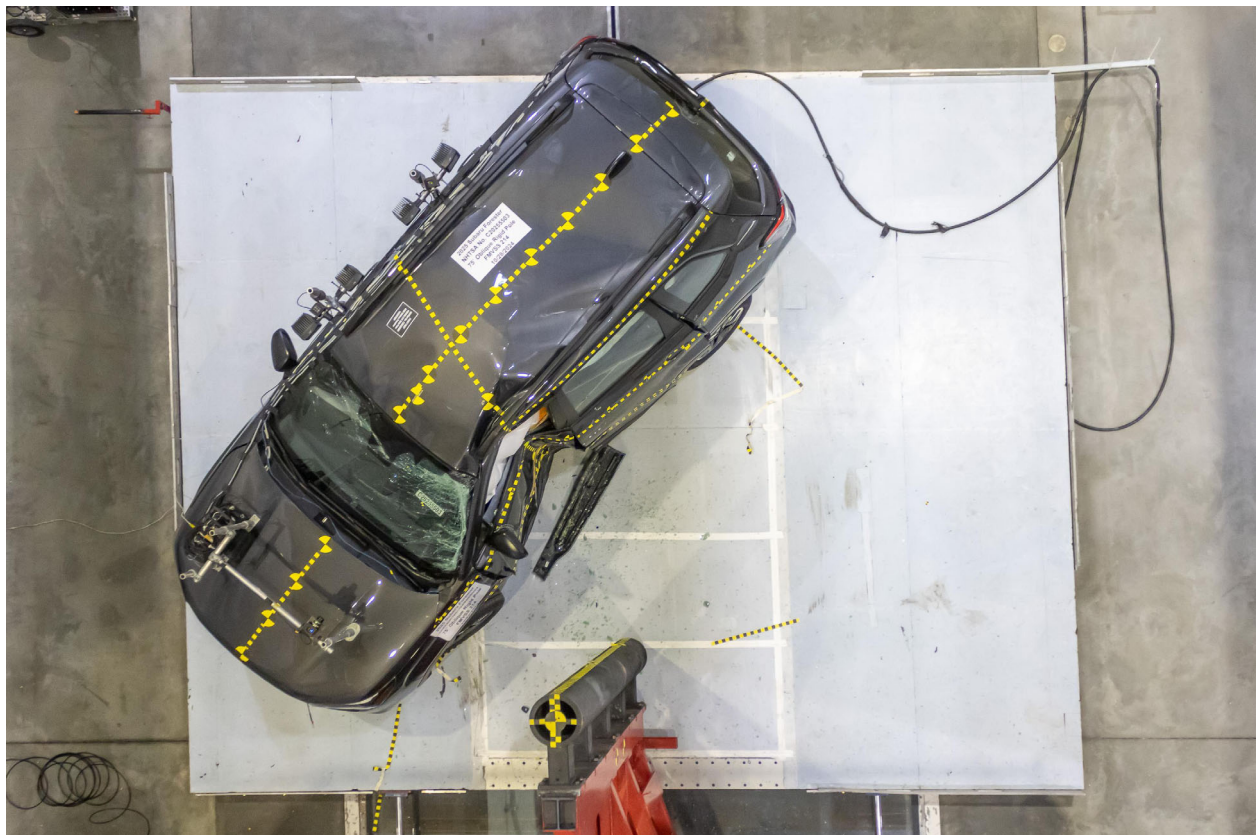


Figure A-10: Post-Test Overhead View of Test Vehicle



Figure A-11: Pre-Test Dummy Through Opposite Window



Figure A-12: Post-Test Dummy Through Opposite Window



Figure A-13: Pre-Test Close-Up of Dummy with Door Closed (Impact Side)



Figure A-14: Post-Test Close-Up of Dummy with Door Closed (Impact Side)



Figure A-15: Pre-Test Dummy with Door Open



Figure A-16: Pre-Test Dummy Shoulder and Door Top View

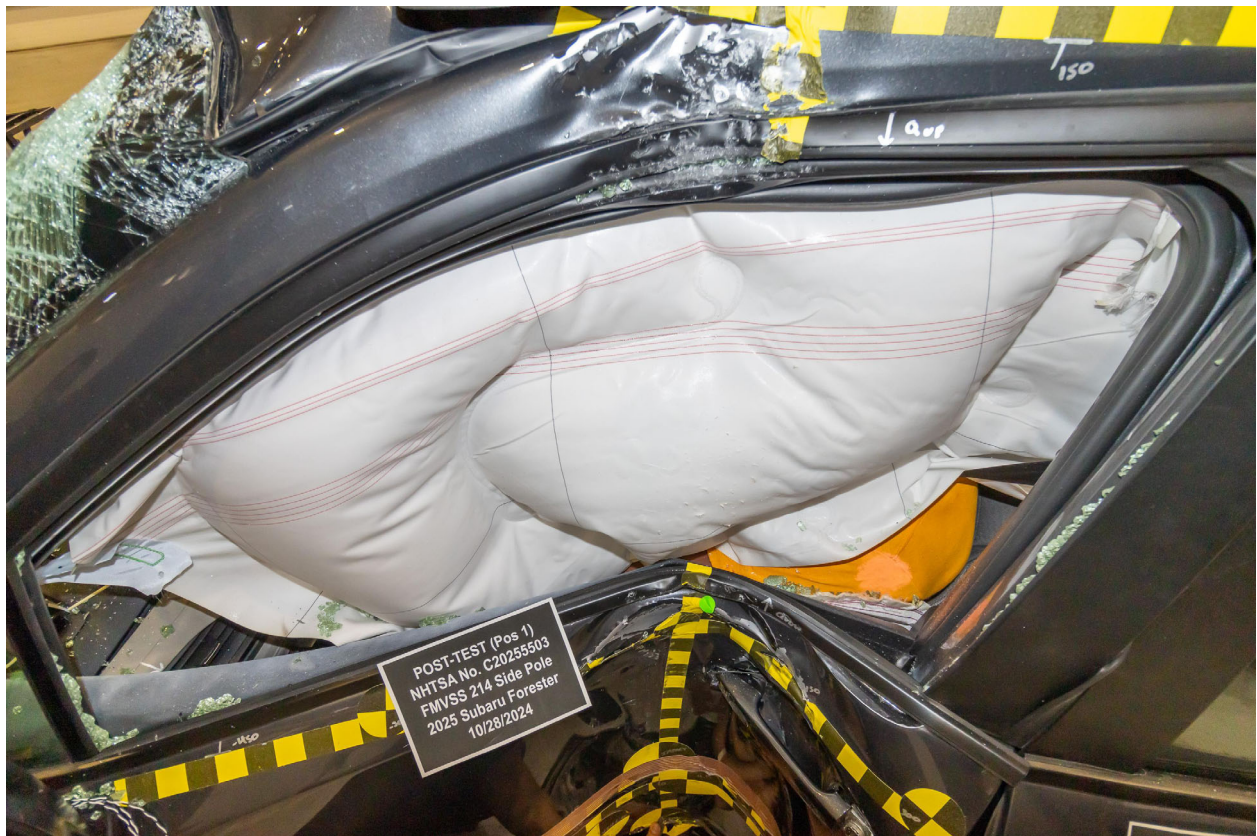


Figure A-17: Post-Test Dummy Shoulder and Door Top View



Figure A-18: Pre-Test Interior of Front Door Closed (through opposite window)



Figure A-19: Post-Test Interior of Front Door Showing Dummy Impact Locations



Figure A-20: Impact Event



Figure A-21: Post-Test Impact Zone Close-Up View



Figure A-22: Post-Test $\frac{3}{4}$ Front View of Impact Zone



Figure A-23: Post-Test ¾ Rear View of Impact Zone



Figure A-24: Post-Test Close-Up View of Impact Point Target

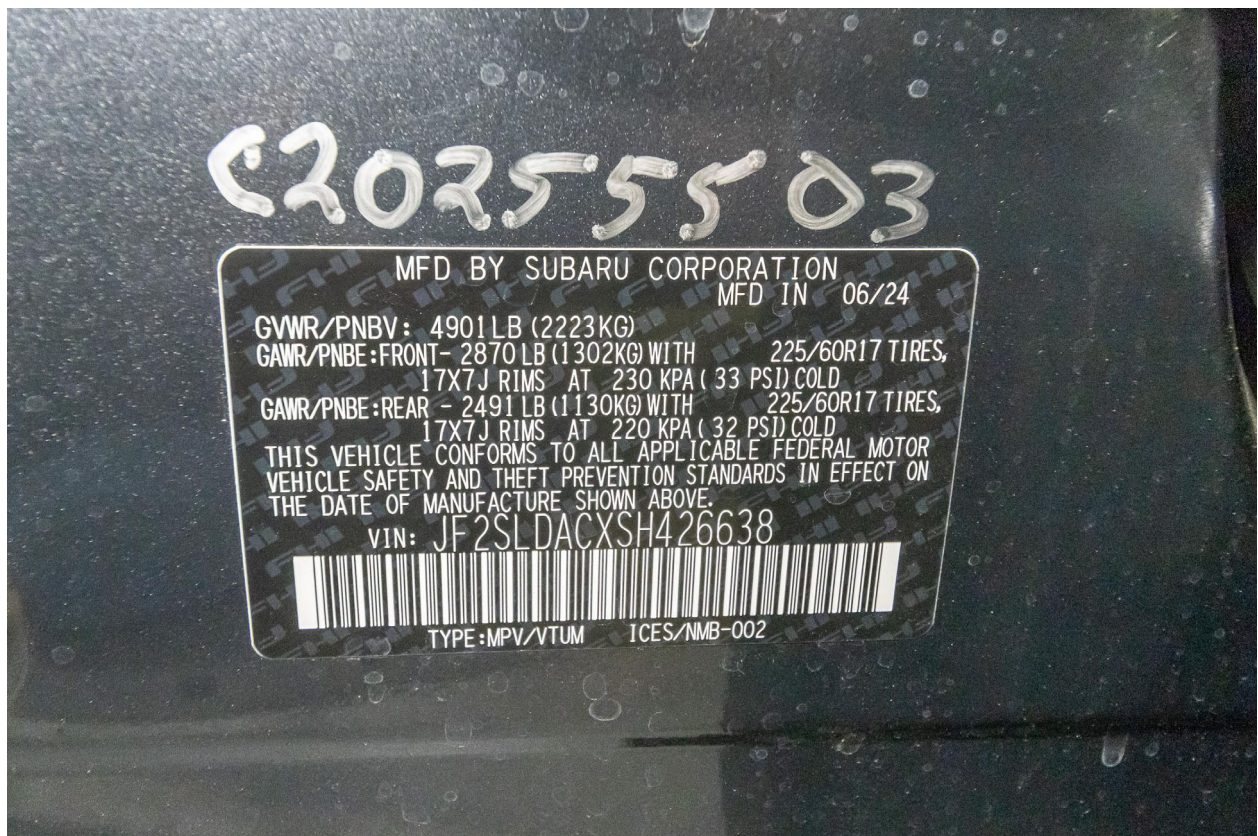


Figure A-25: Close-Up View of Vehicle's Certification Label

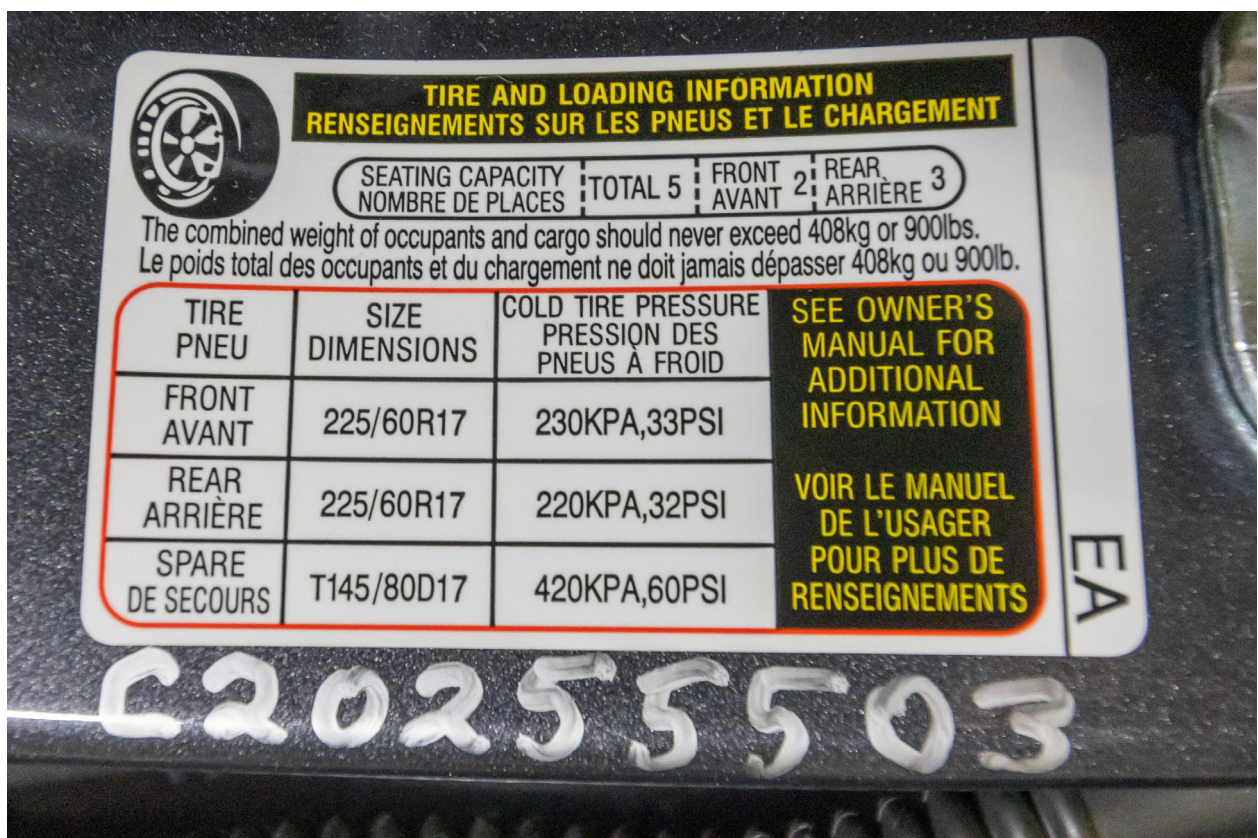


Figure A-26: Close-Up View of Vehicle's Tire Placard Label

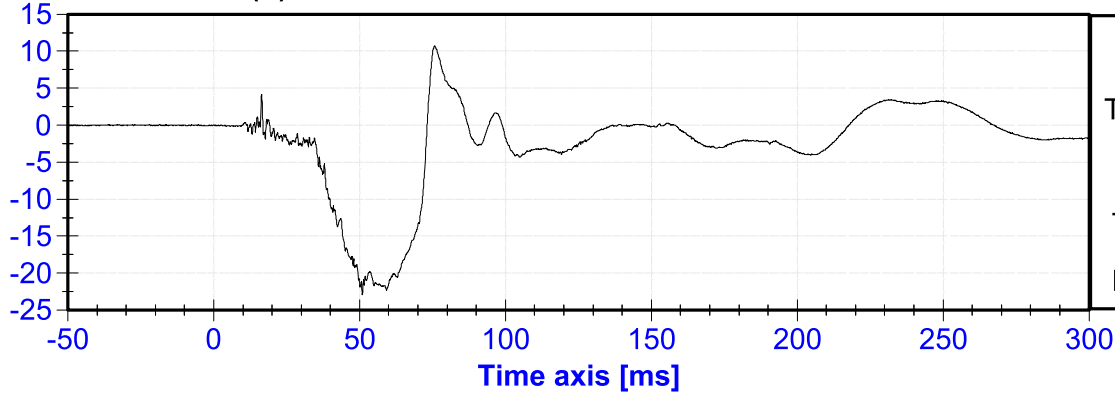
APPENDIX II
ES-2re DUMMY RESPONSE DATA TRACES

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14	ES-2re Front Abdomen Force (Y) vs. Time	II-6
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16	ES-2re Rear Abdomen Force (Y) vs. Time	II-6
17	ES-2re Sum of Abdomen Forces vs. Time	II-7
18	ES-2re Pubic Symphysis Force (Y) vs. Time	II-7

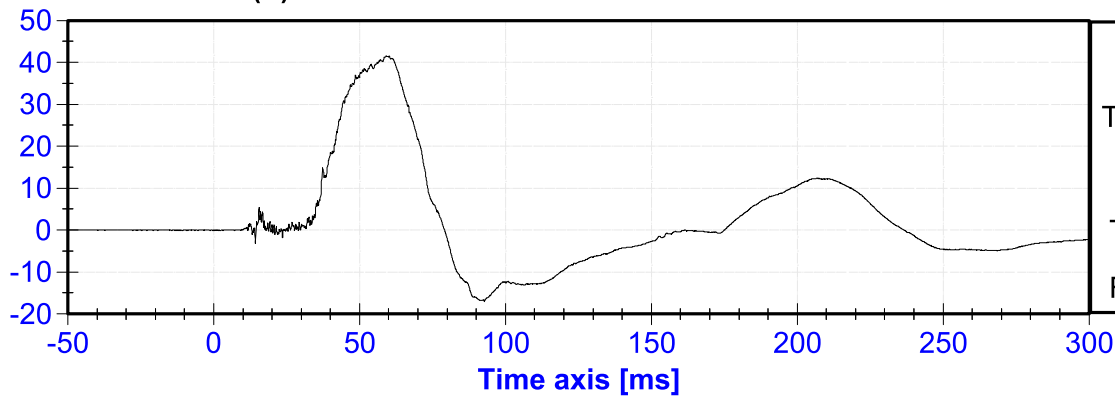
ACCELERATION [g's]

ES-2re Head (X) Acceleration vs. Time



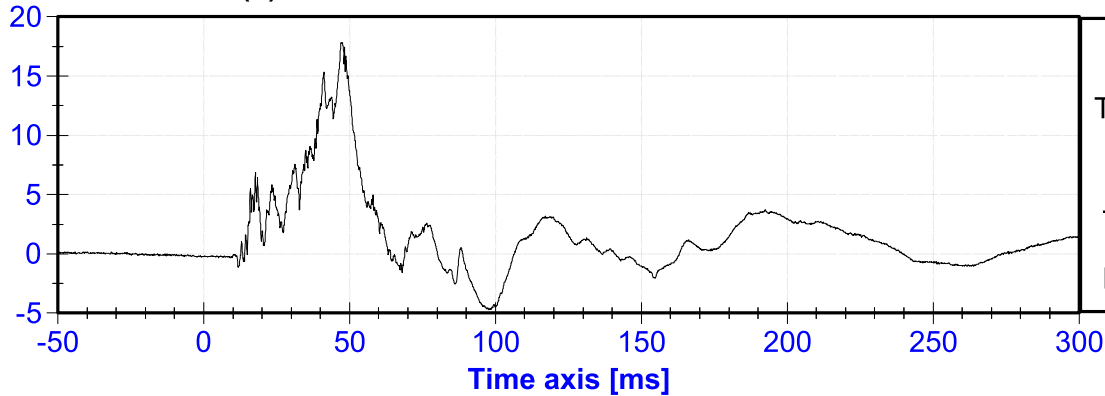
ACCELERATION [g's]

ES-2re Head (Y) Acceleration vs. Time



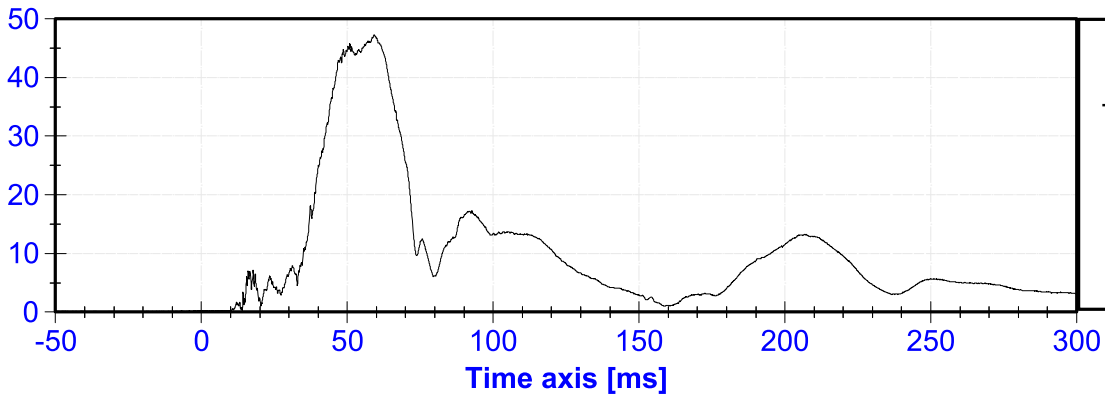
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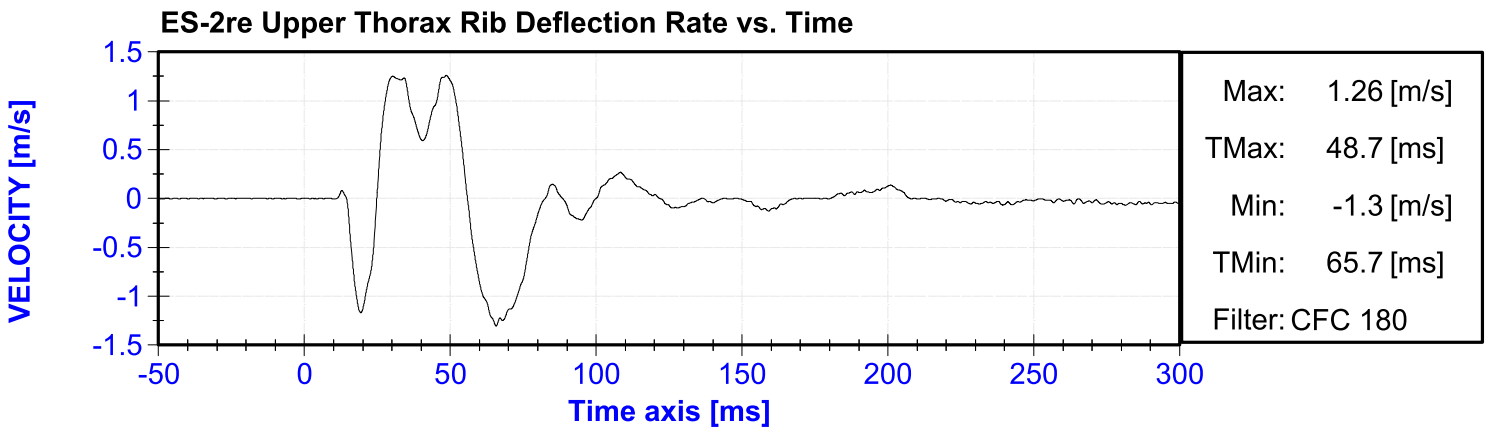
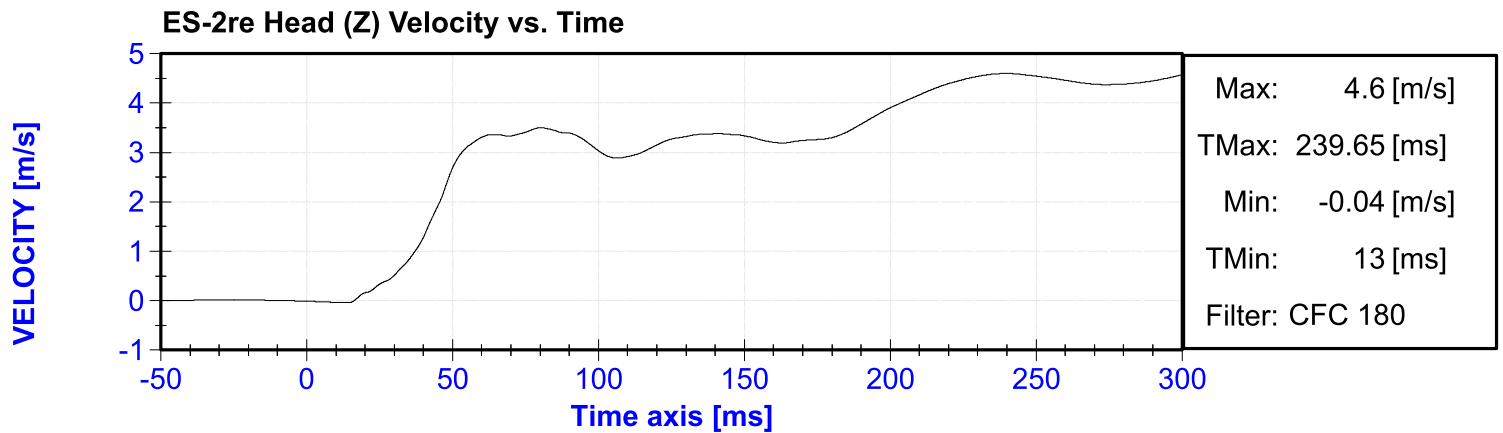
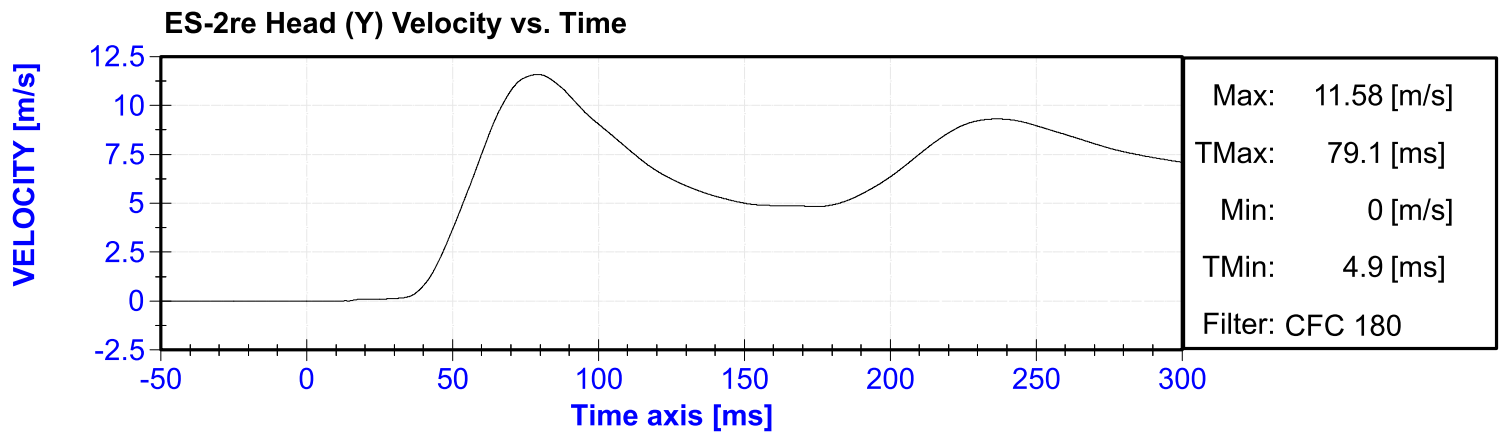
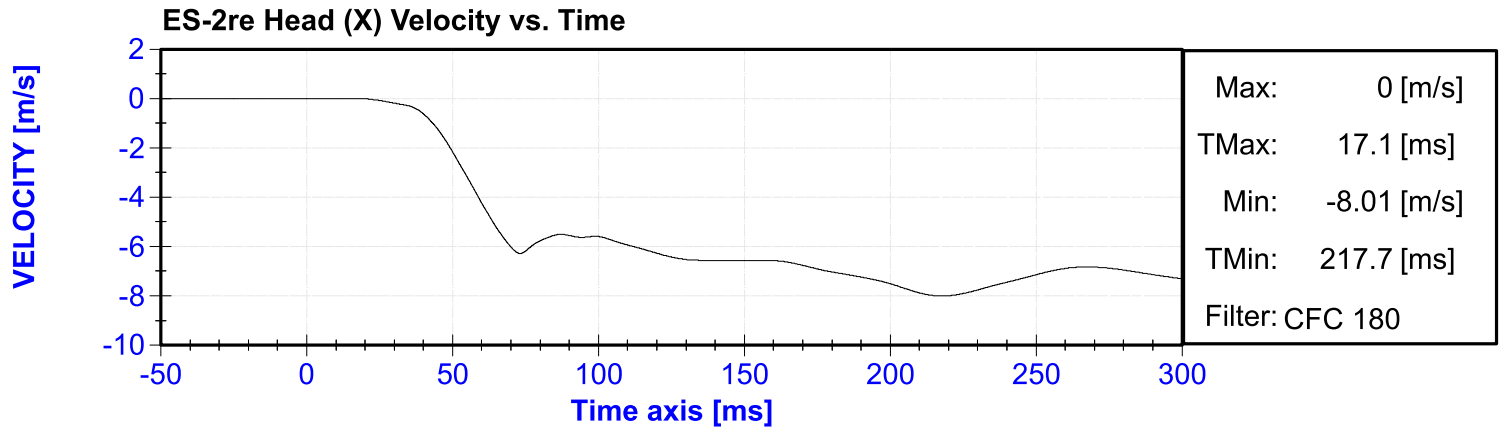
ES-2re Head (Z) Acceleration vs. Time

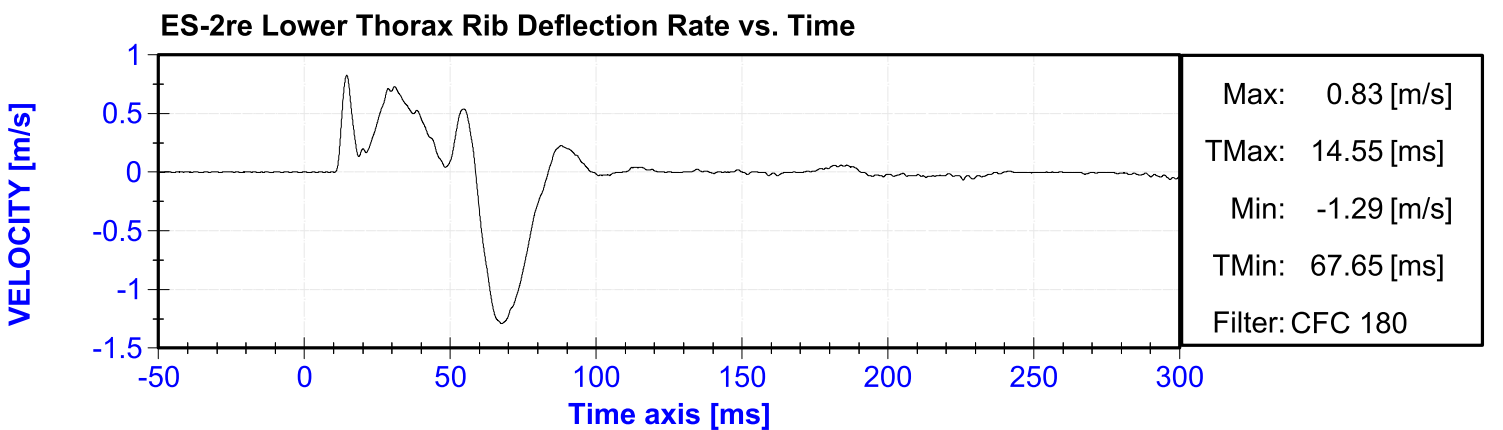
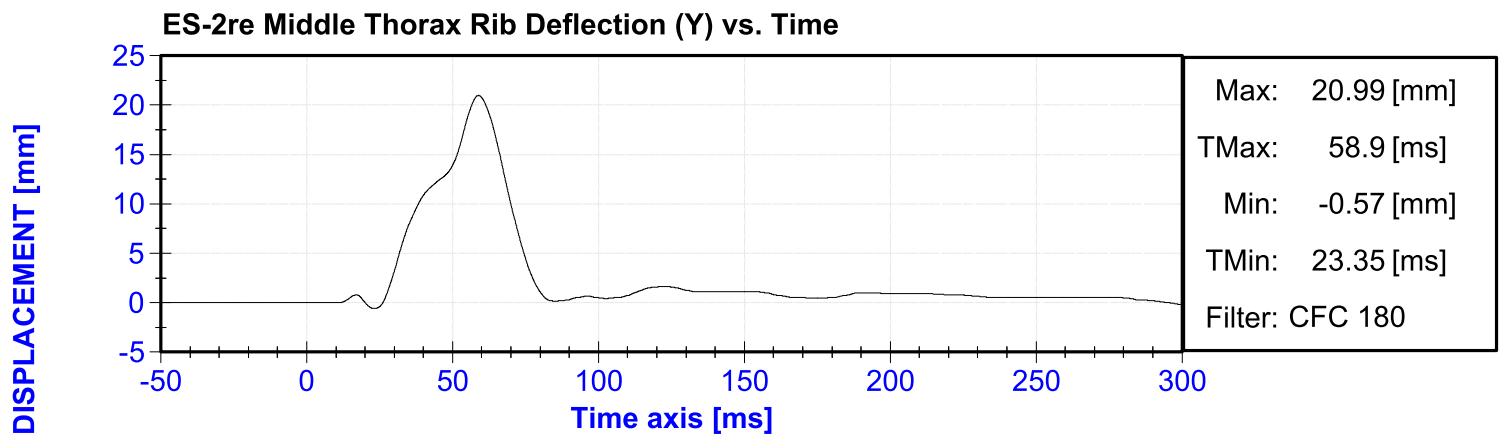
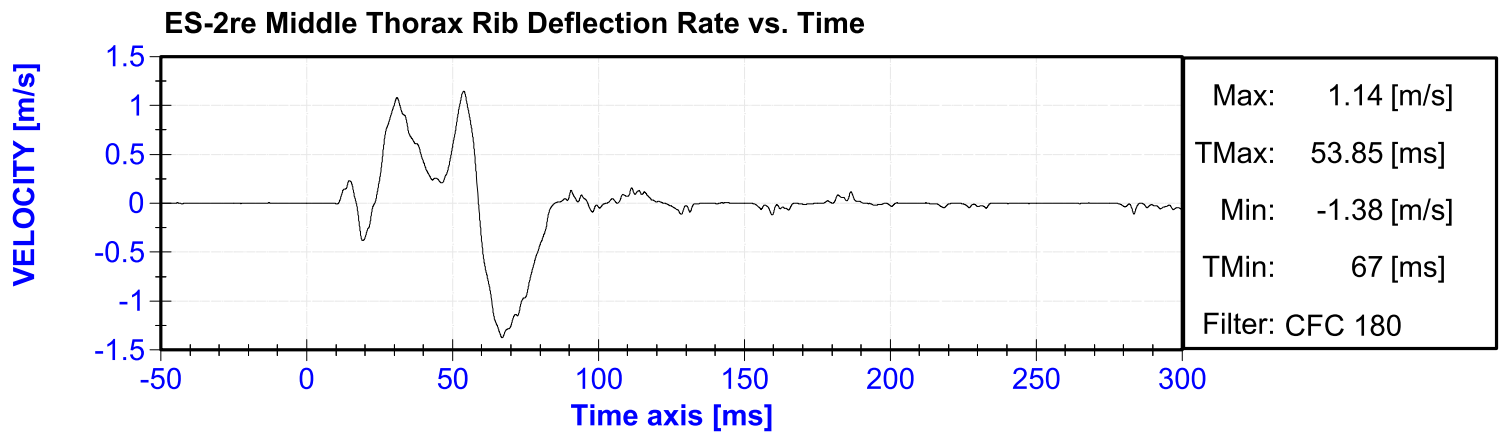
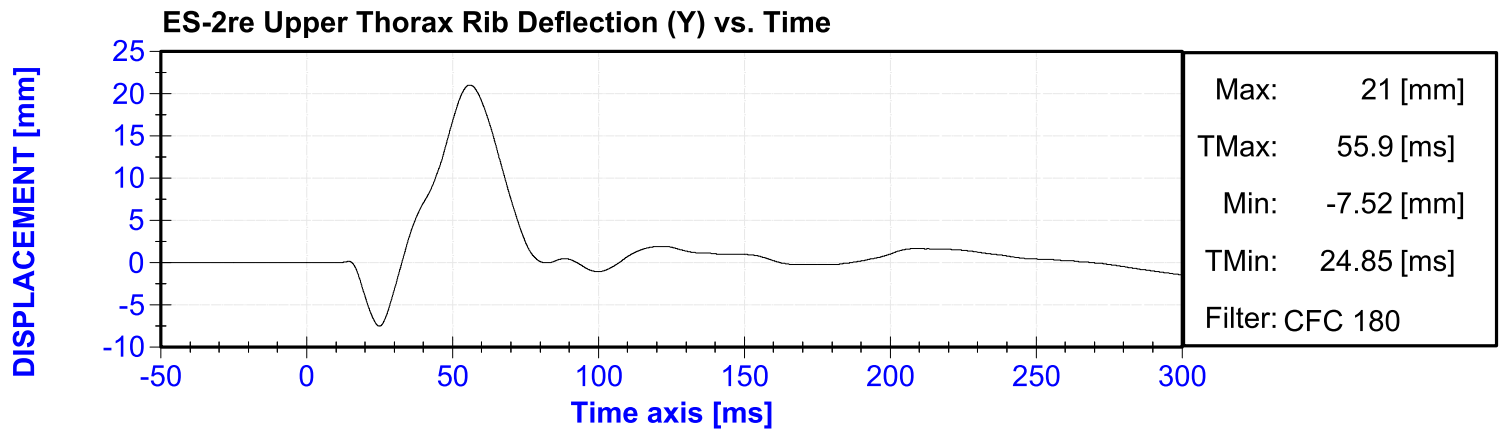


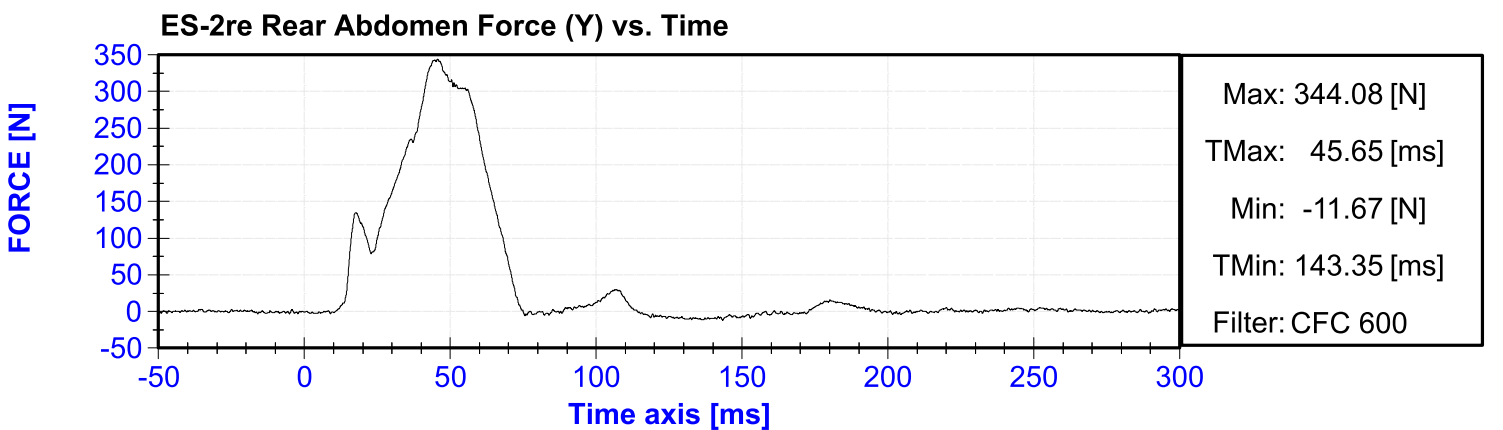
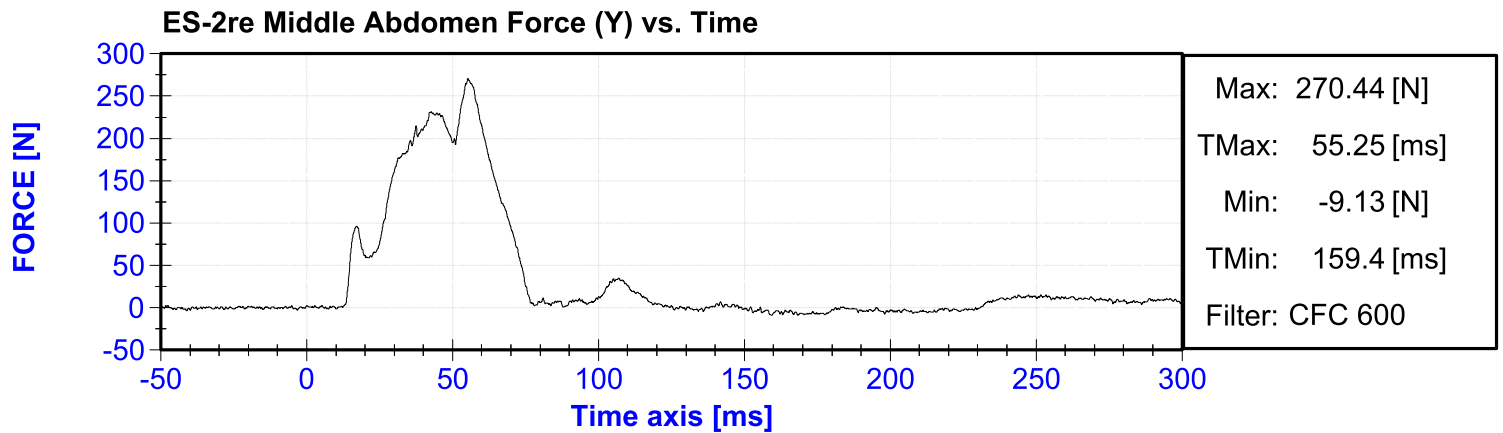
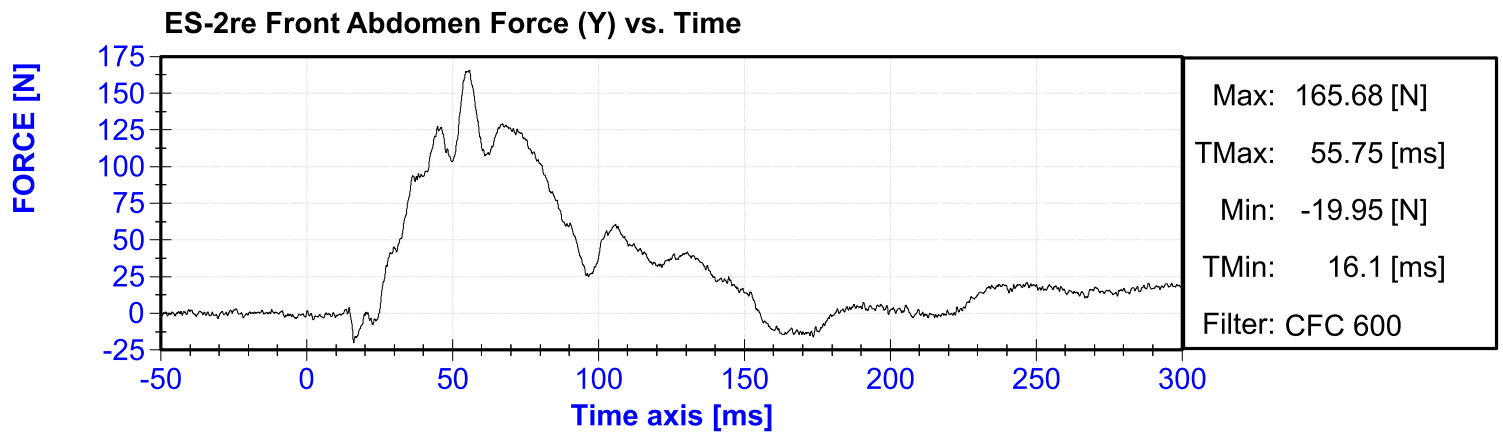
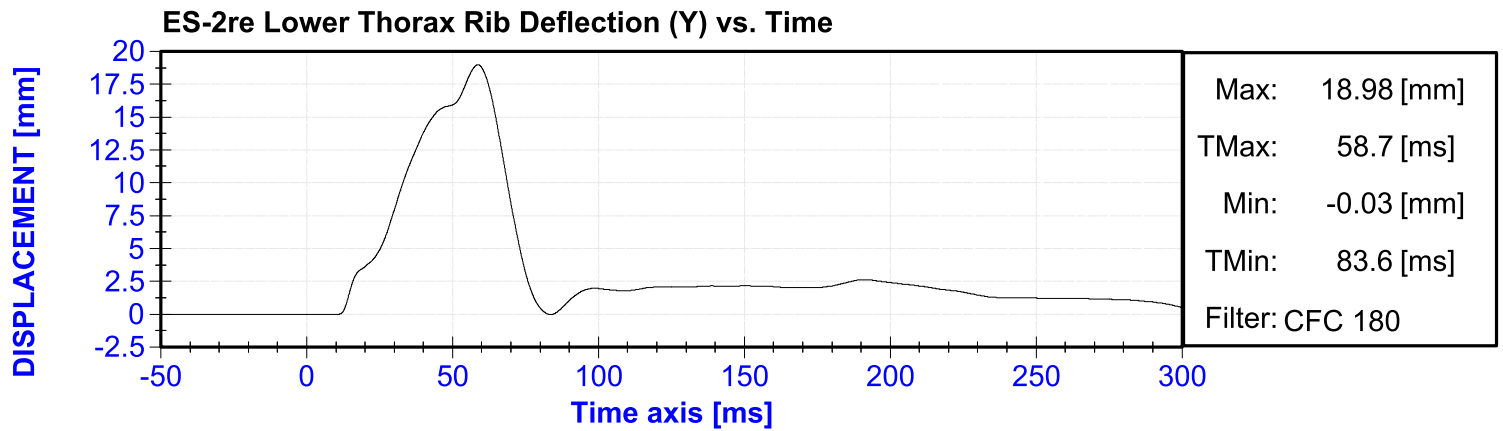
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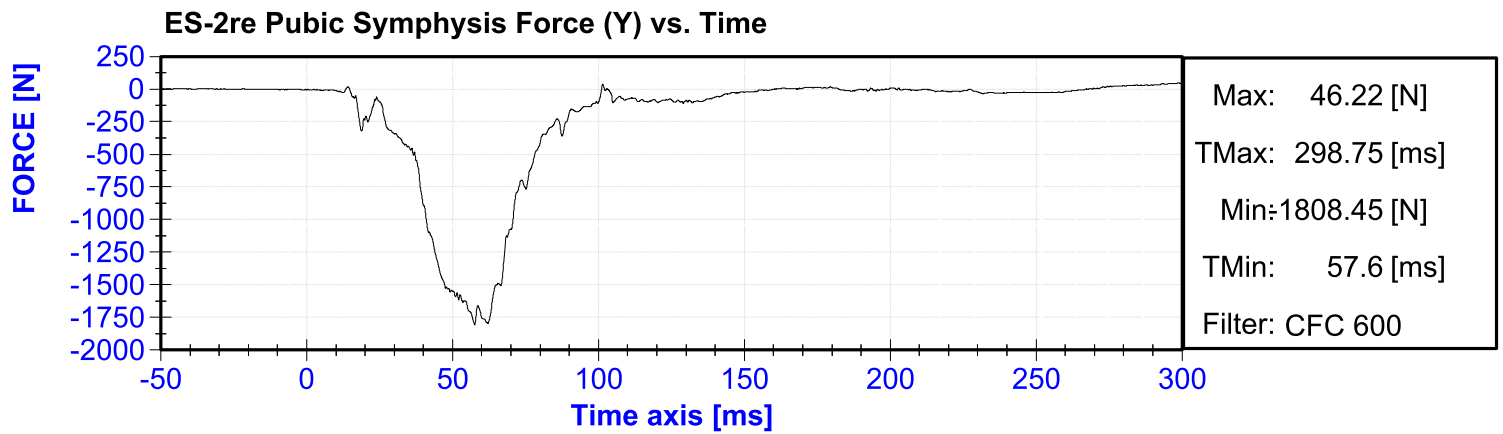
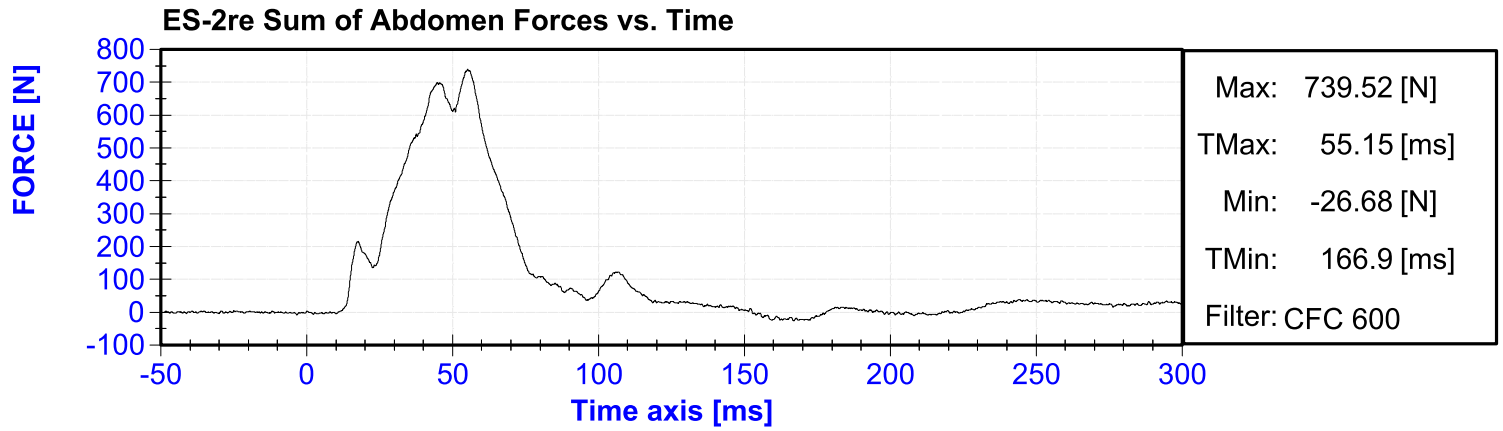
ES-2re Head Resultant Acceleration vs. Time









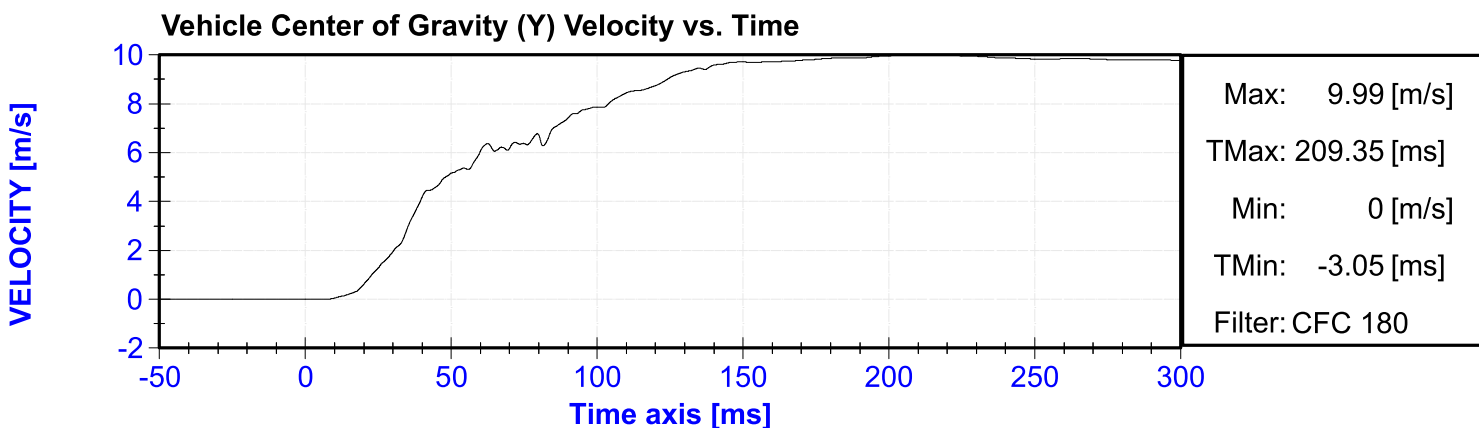
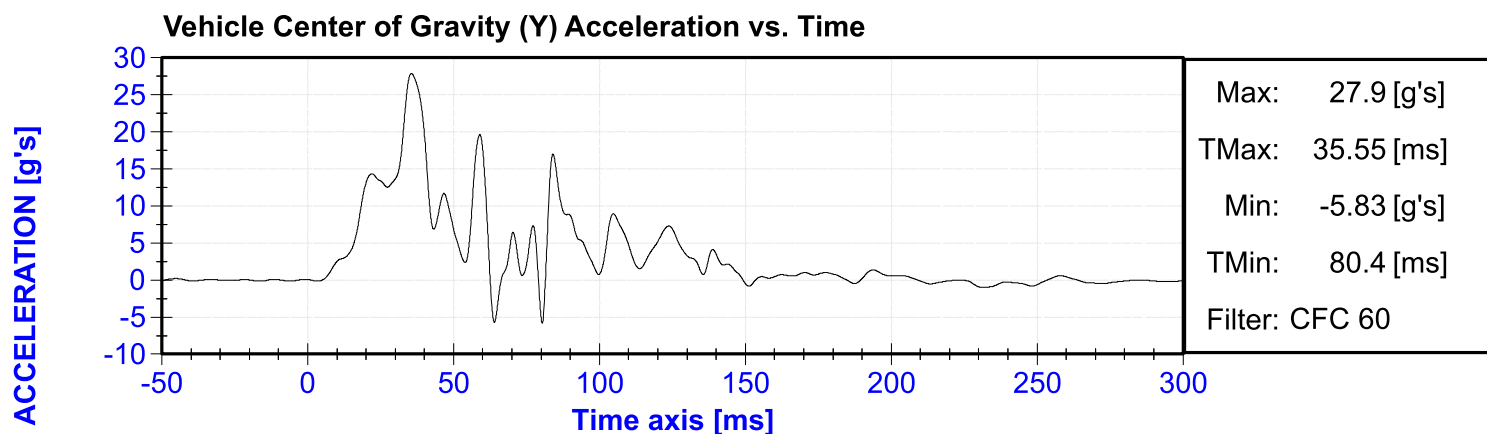
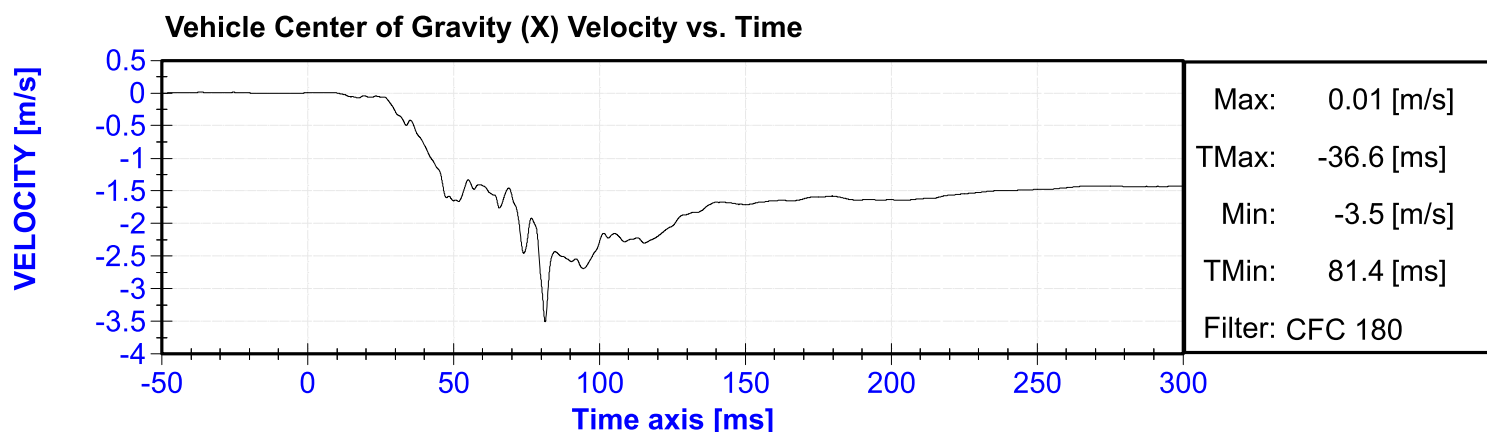
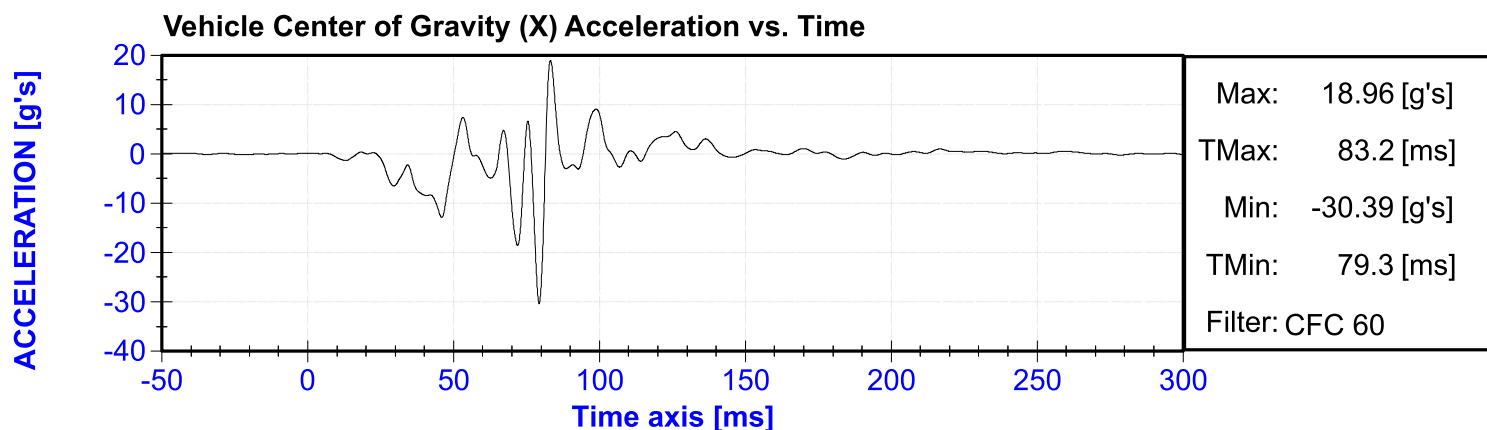


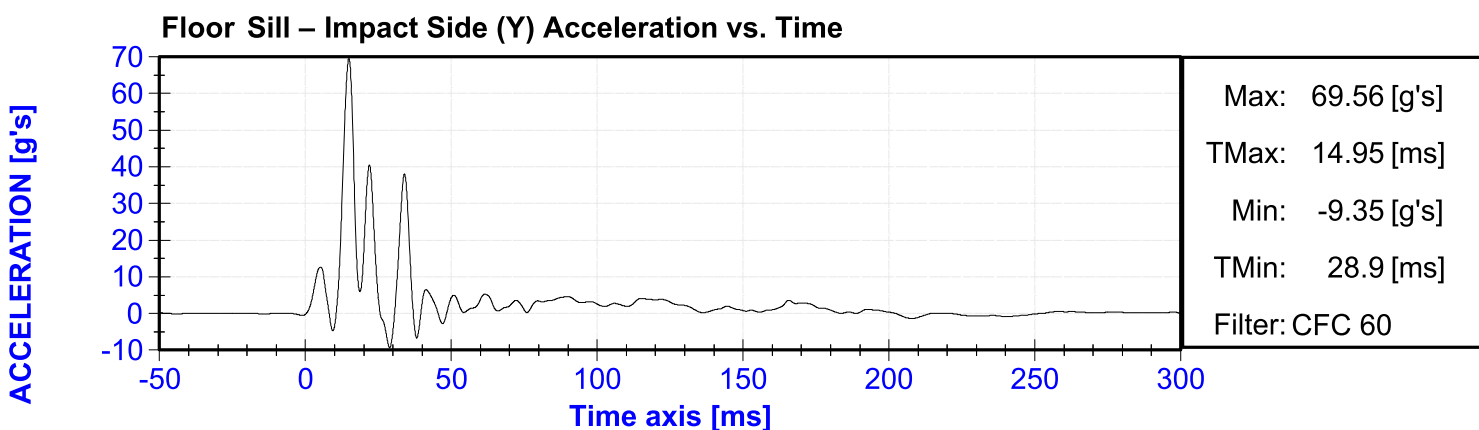
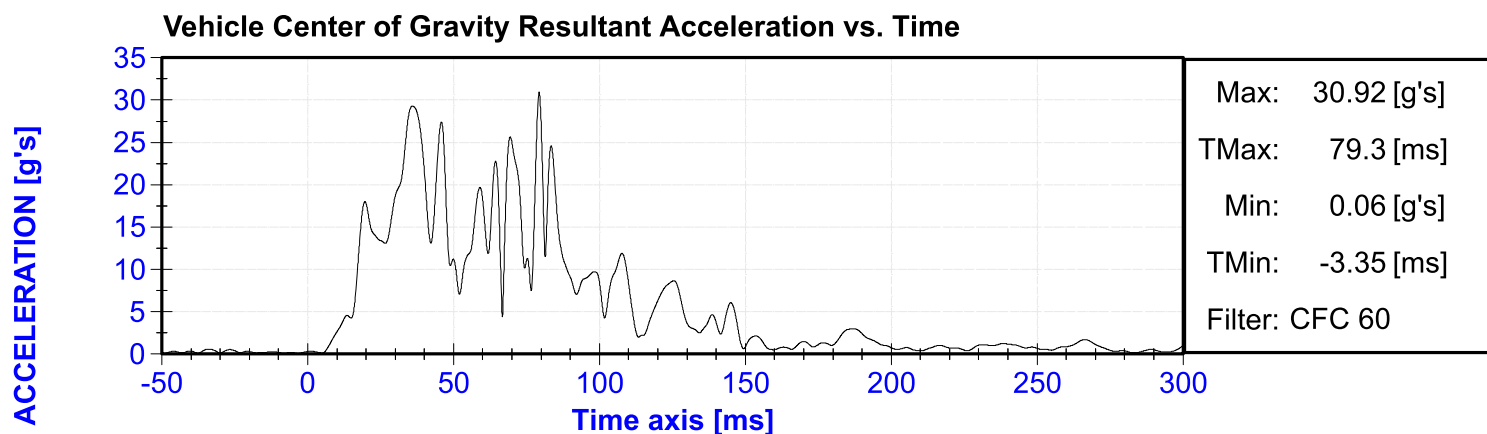
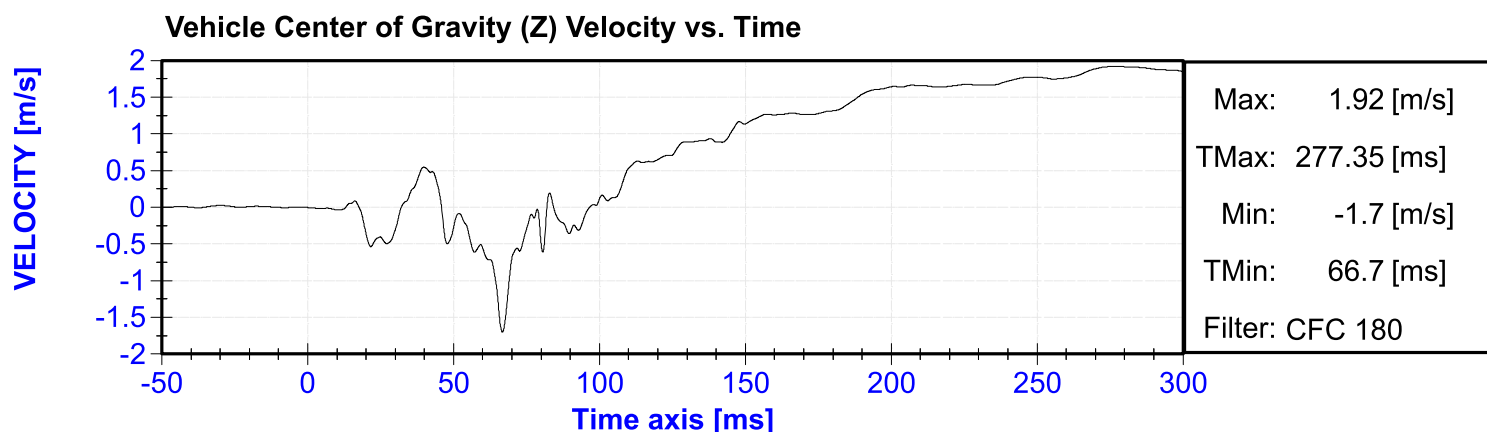
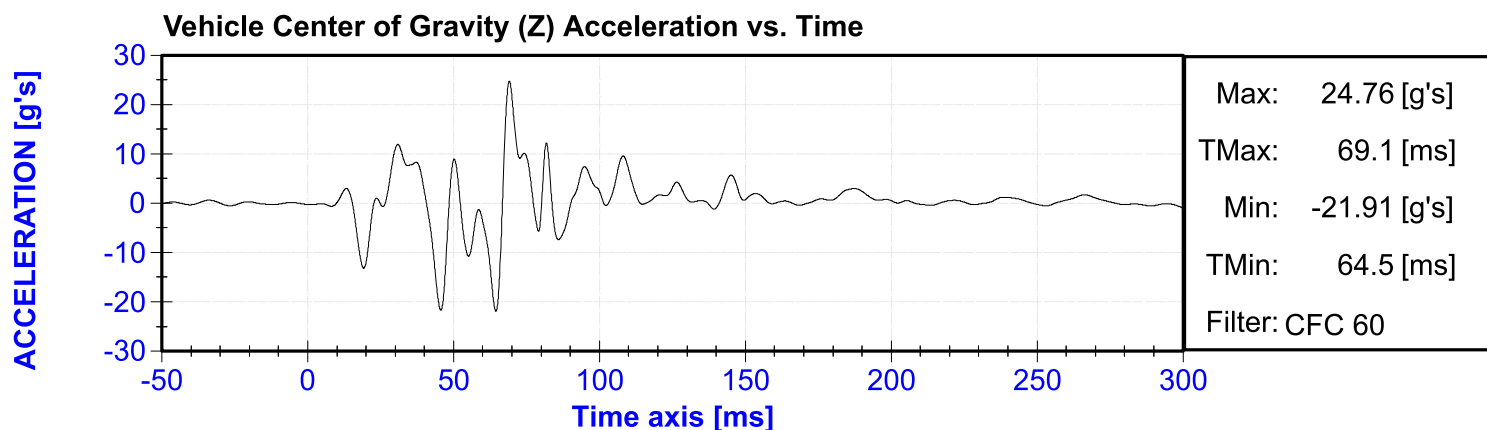
APPENDIX III

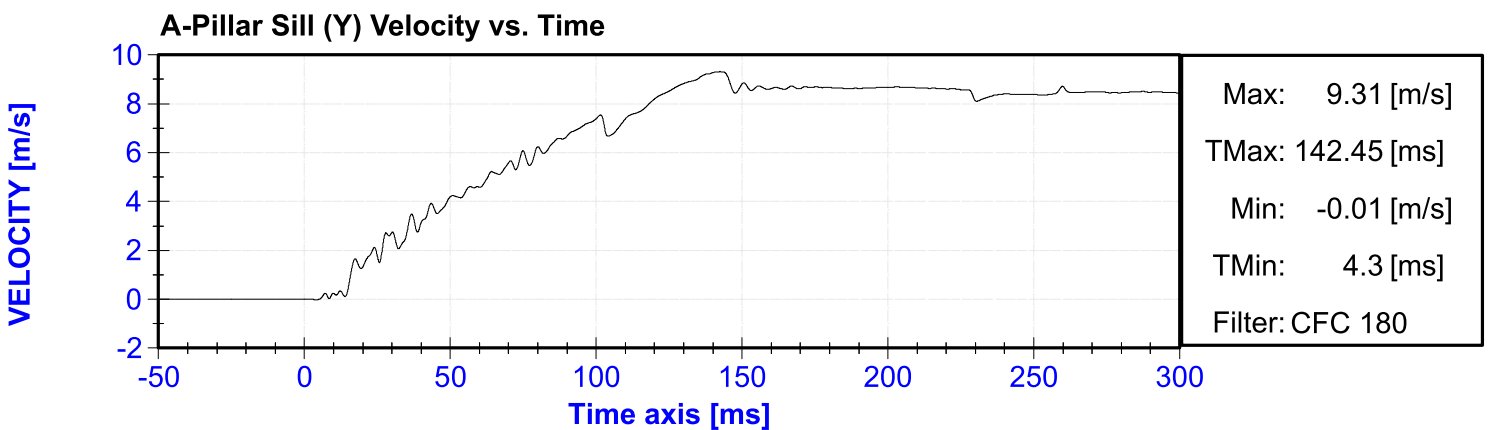
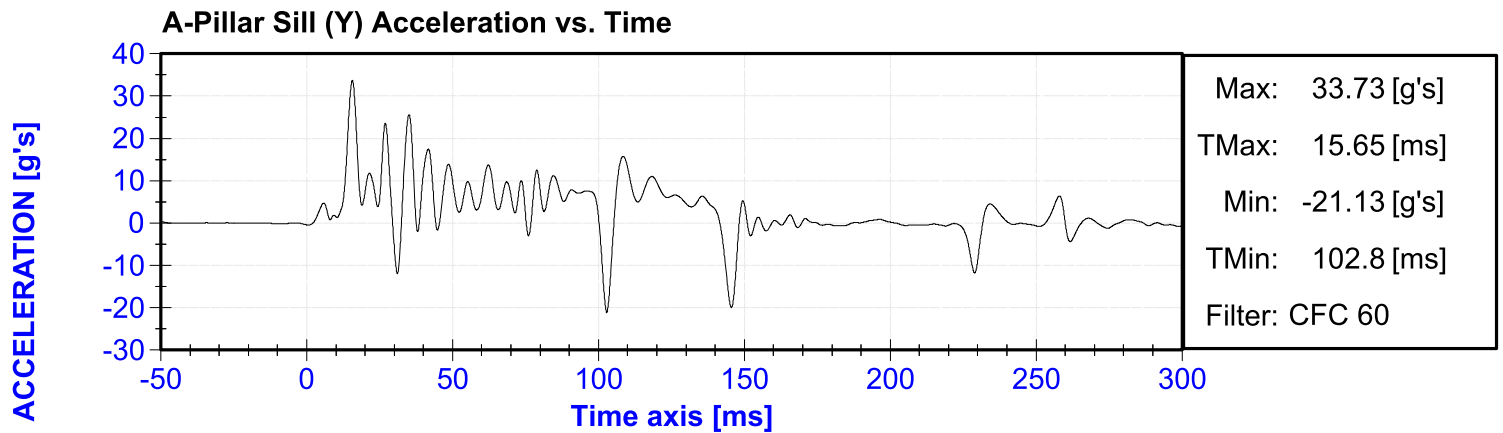
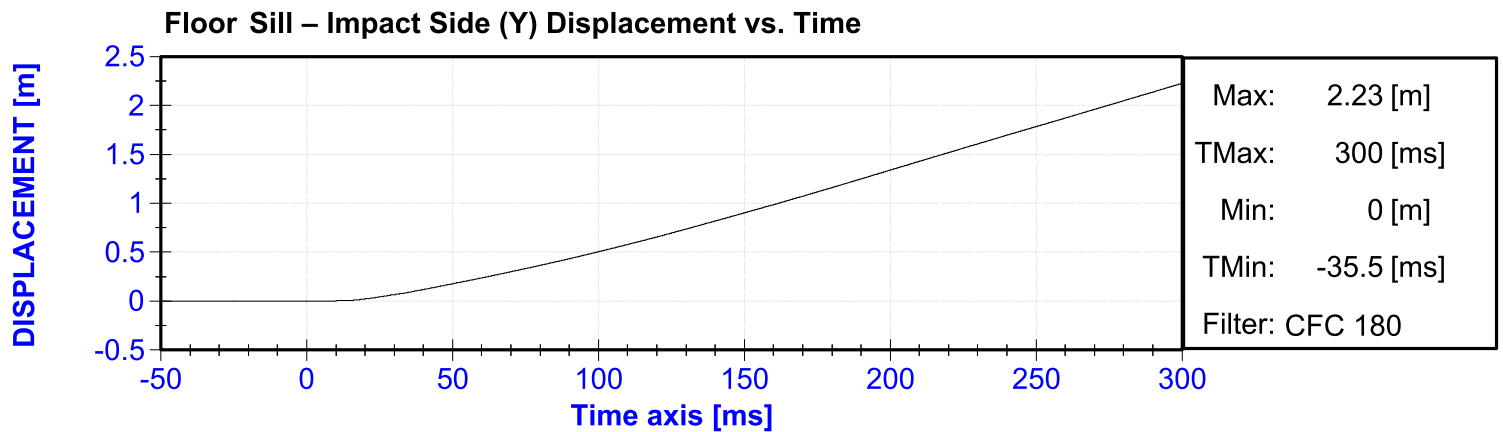
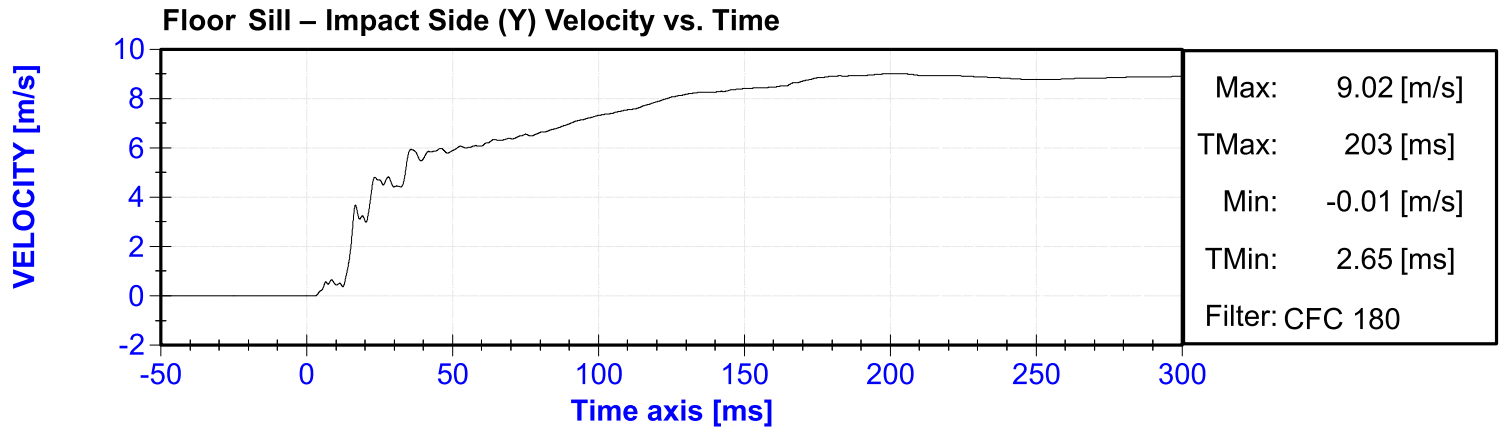
VEHICLE ACCELEROMETER RESPONSE DATA

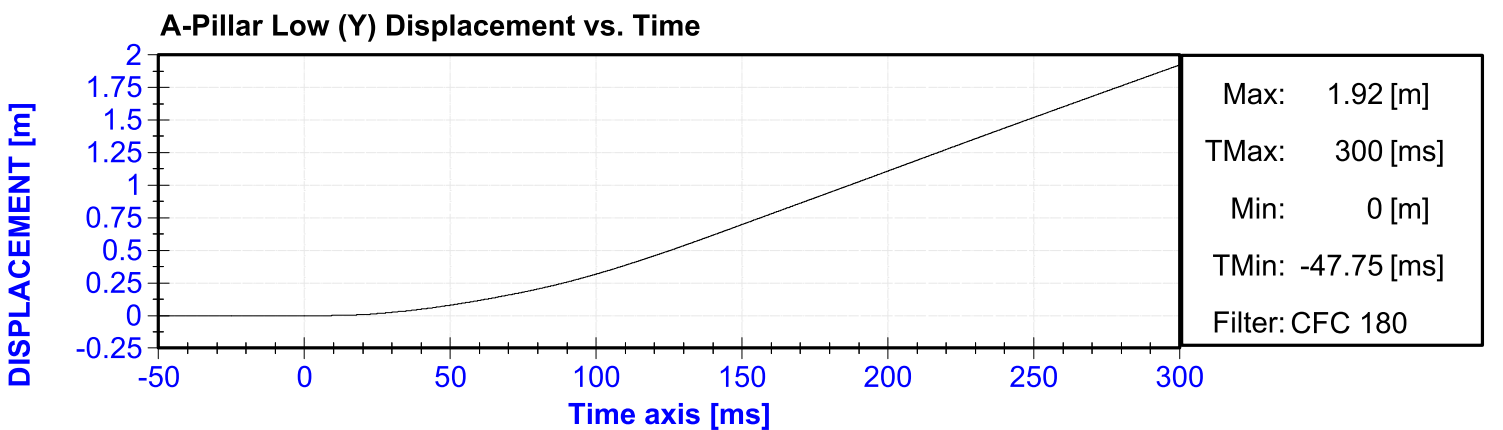
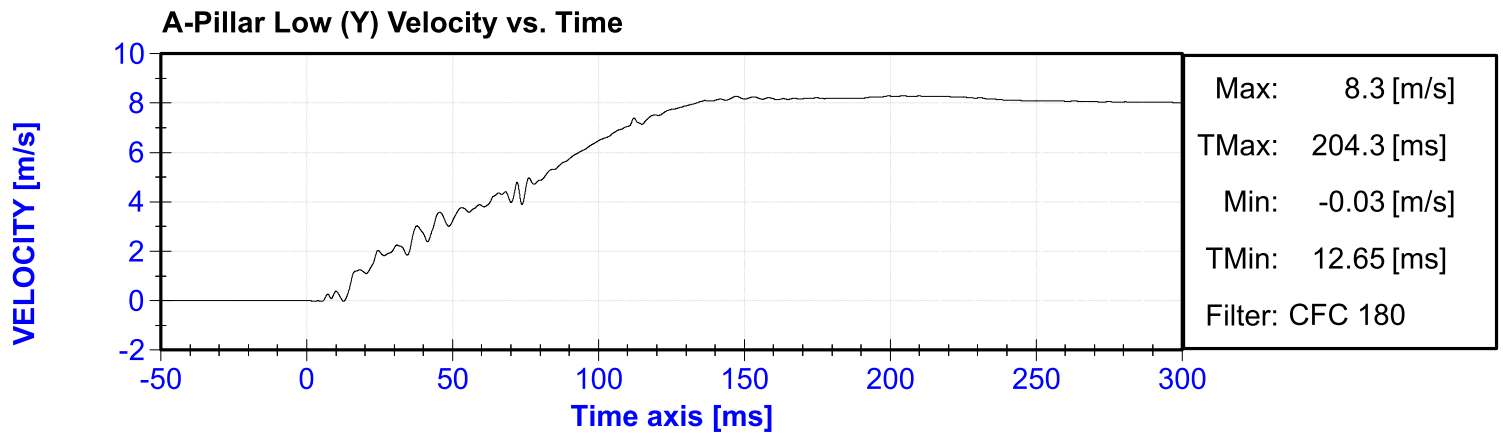
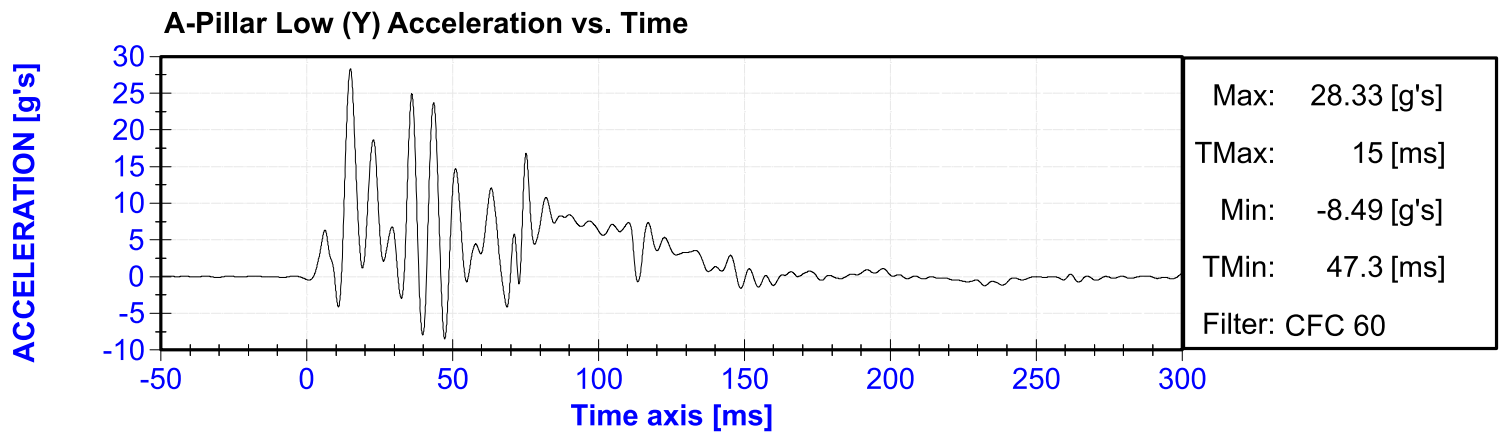
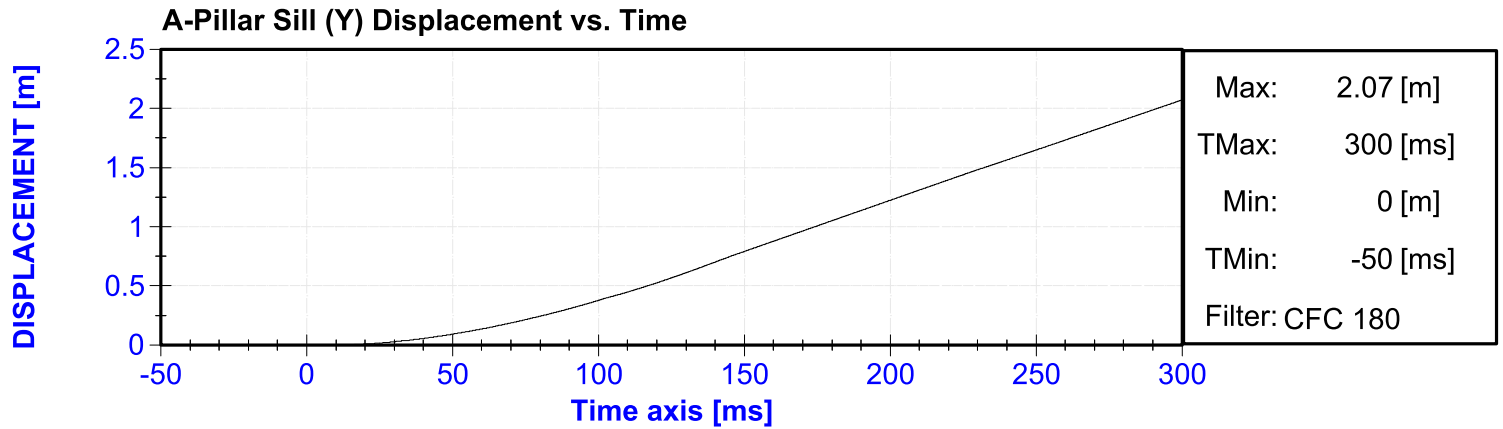
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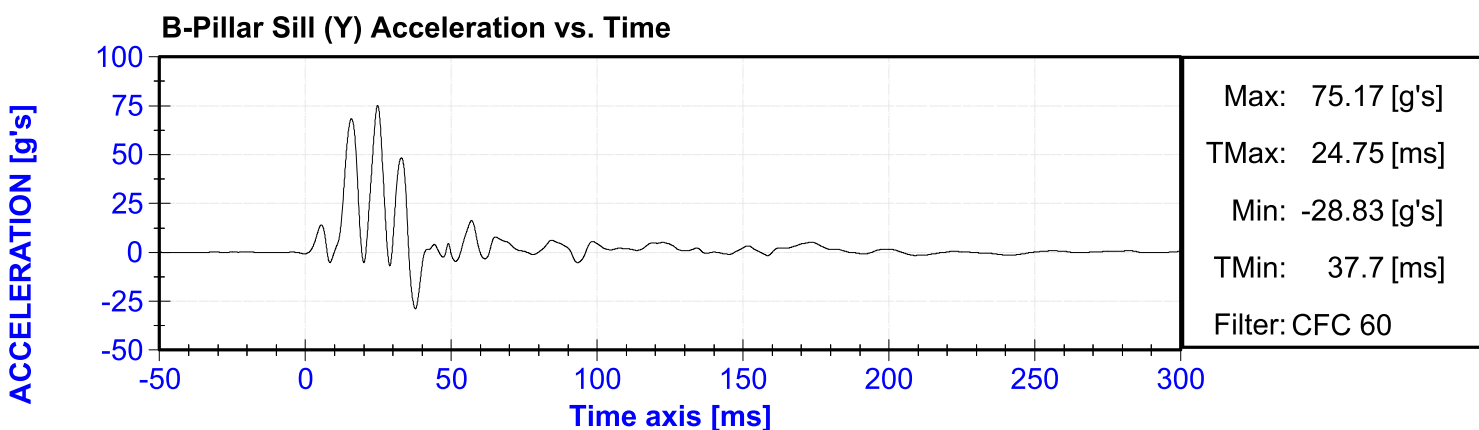
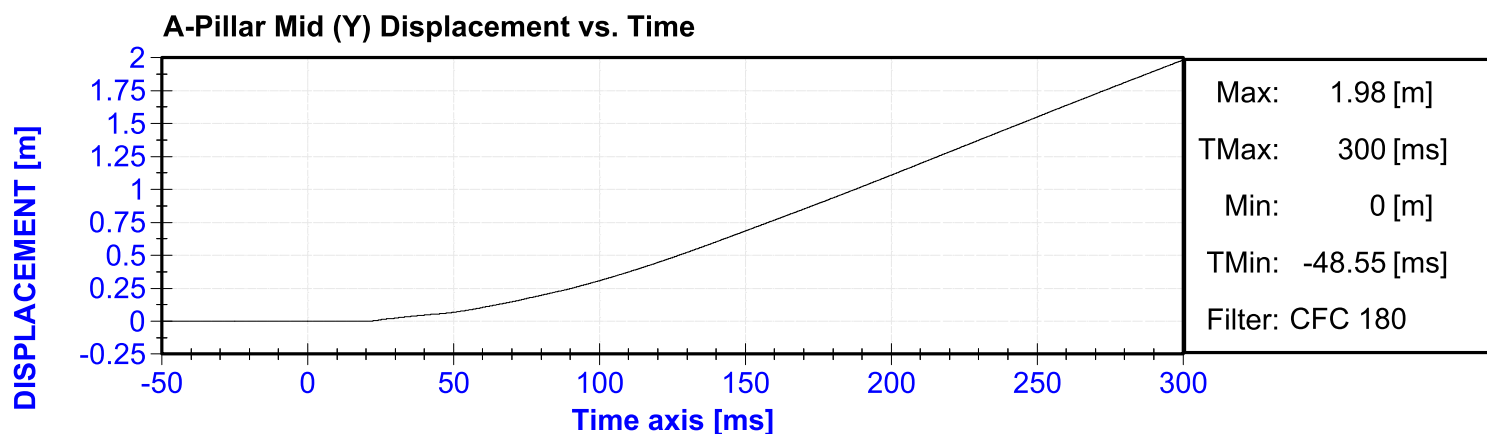
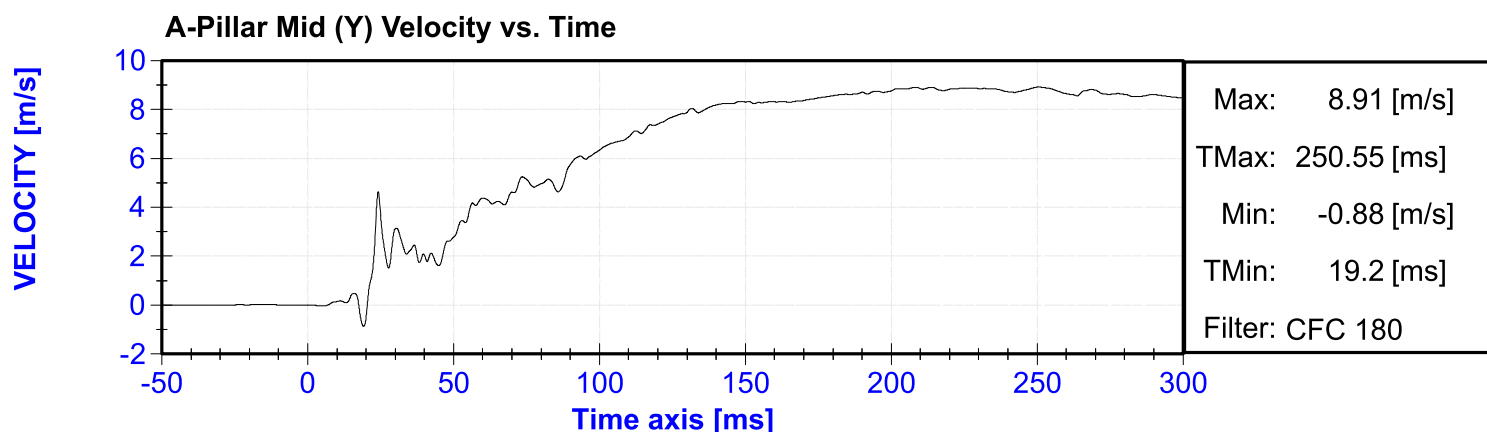
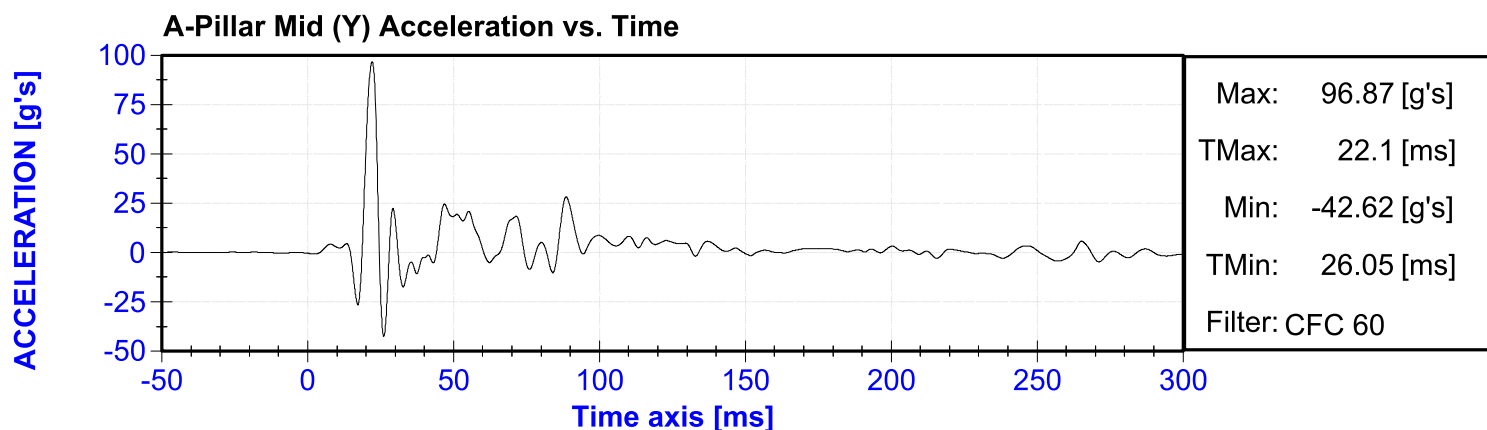
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2	Vehicle Center of Gravity (X) Velocity vs. Time	III-3
3	Vehicle Center of Gravity (Y) Acceleration vs. Time	III-3
4	Vehicle Center of Gravity (Y) Velocity vs. Time	III-3
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43	Rear Deck (X) Velocity vs. Time	III-13
44	Rear Deck (Y) Acceleration vs. Time	III-13
45	Rear Deck (Y) Velocity vs. Time	III-14

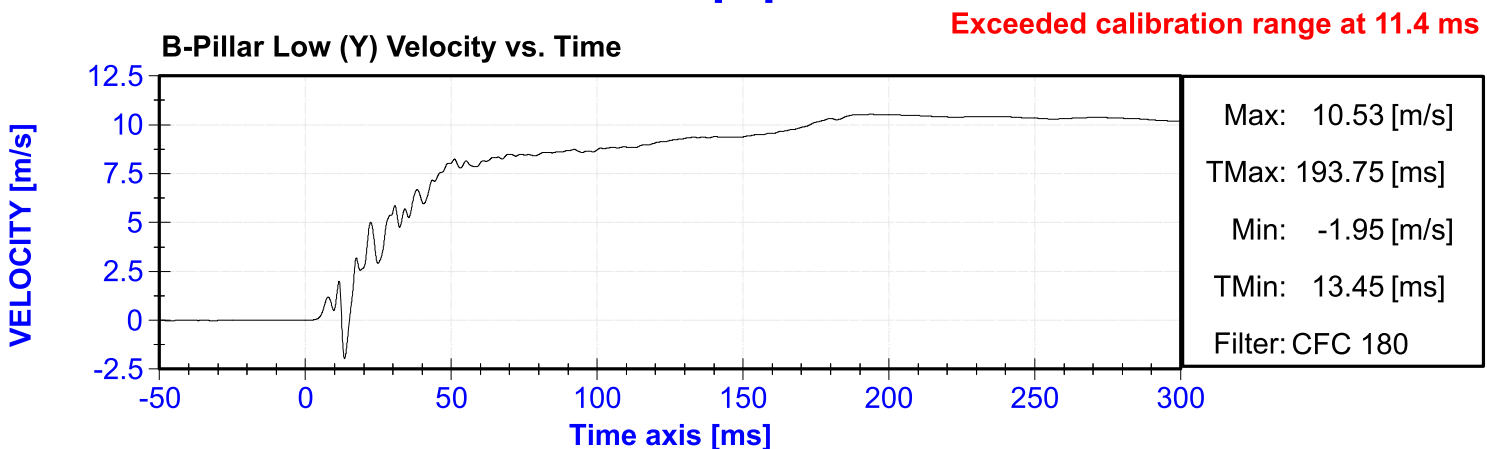
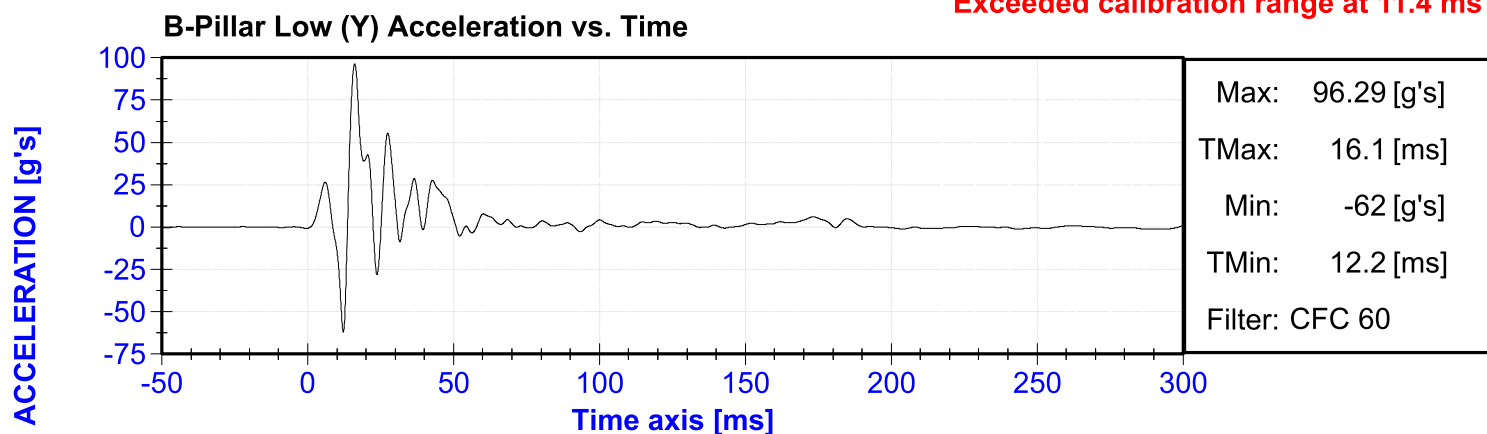
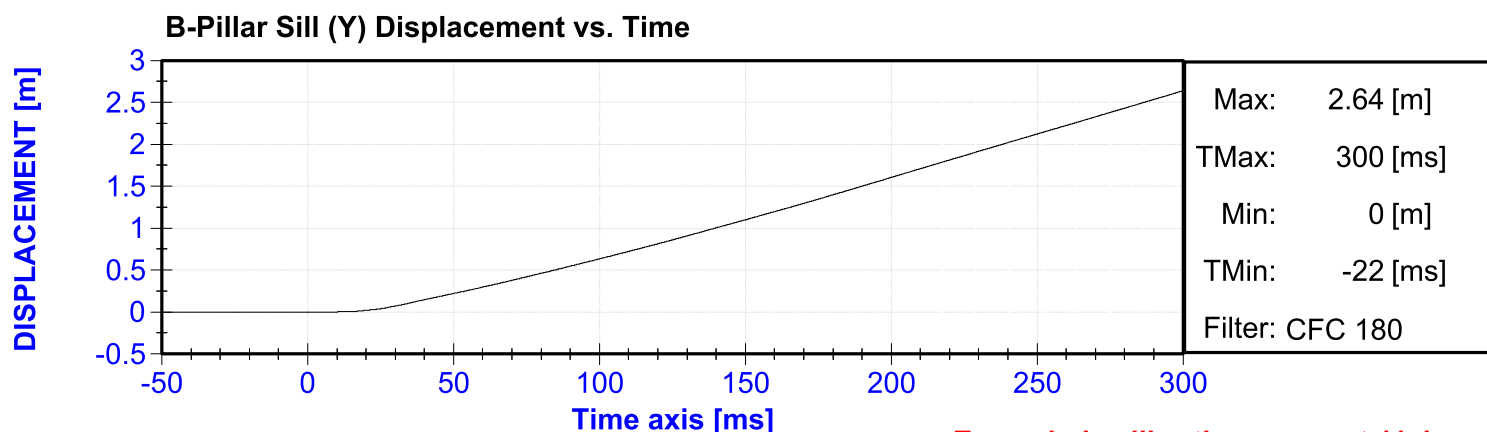
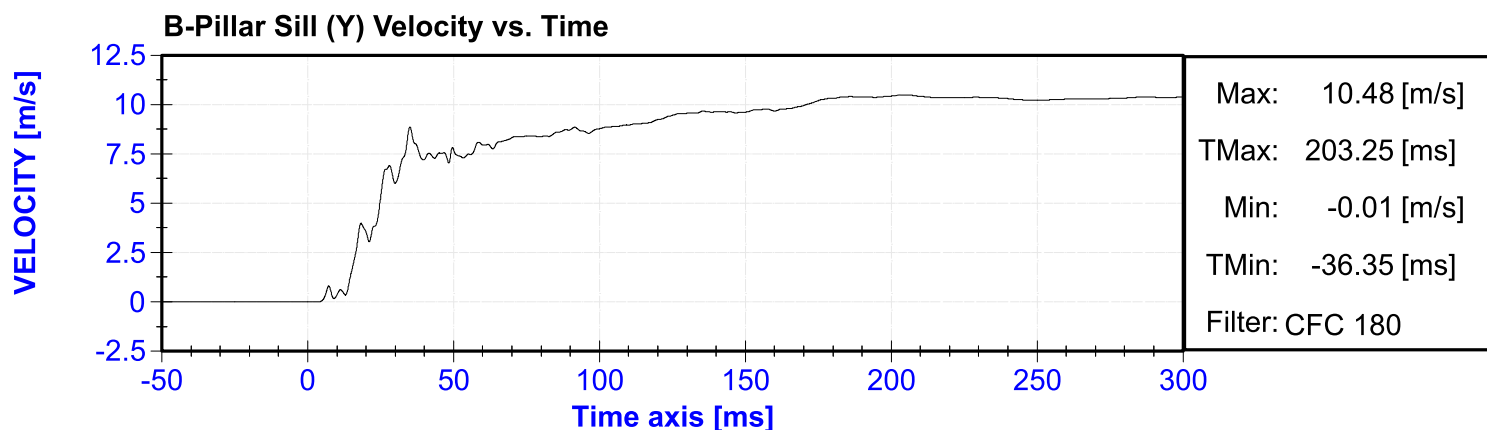


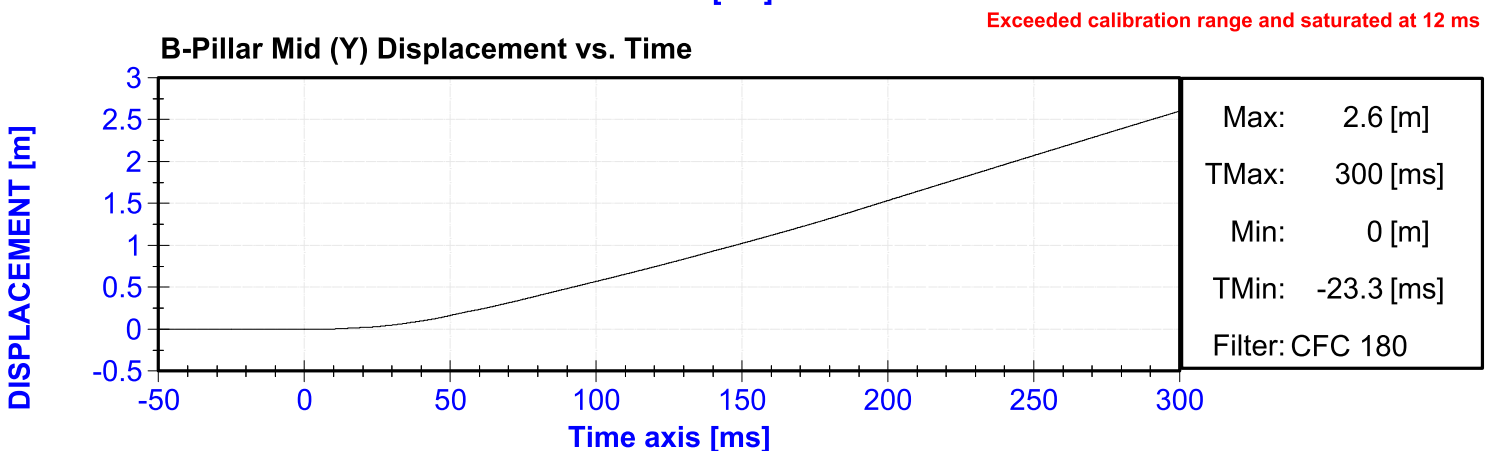
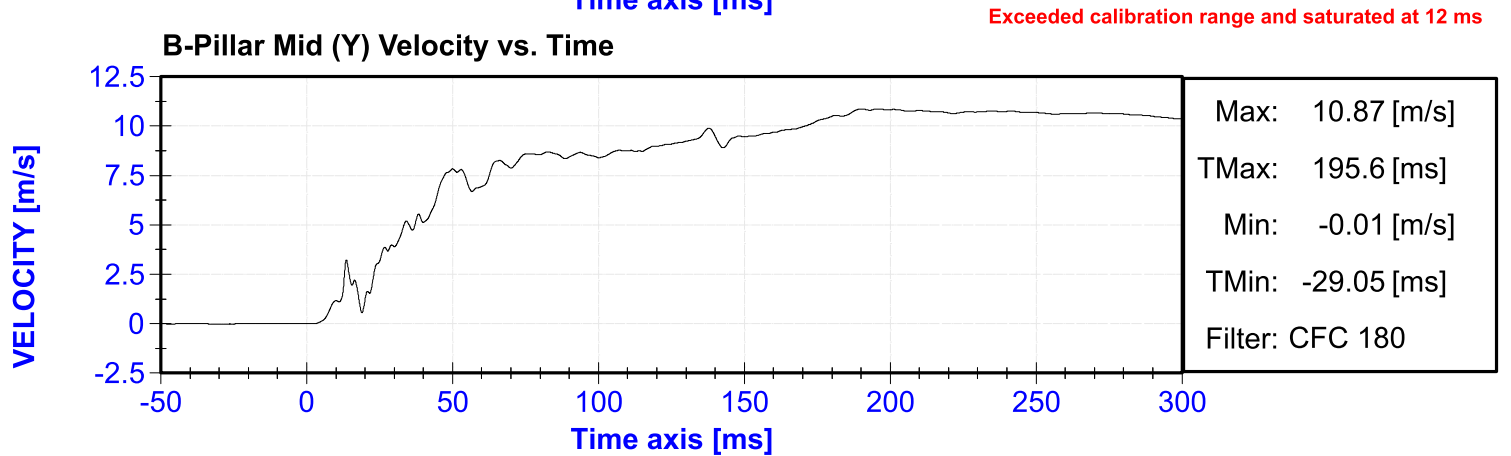
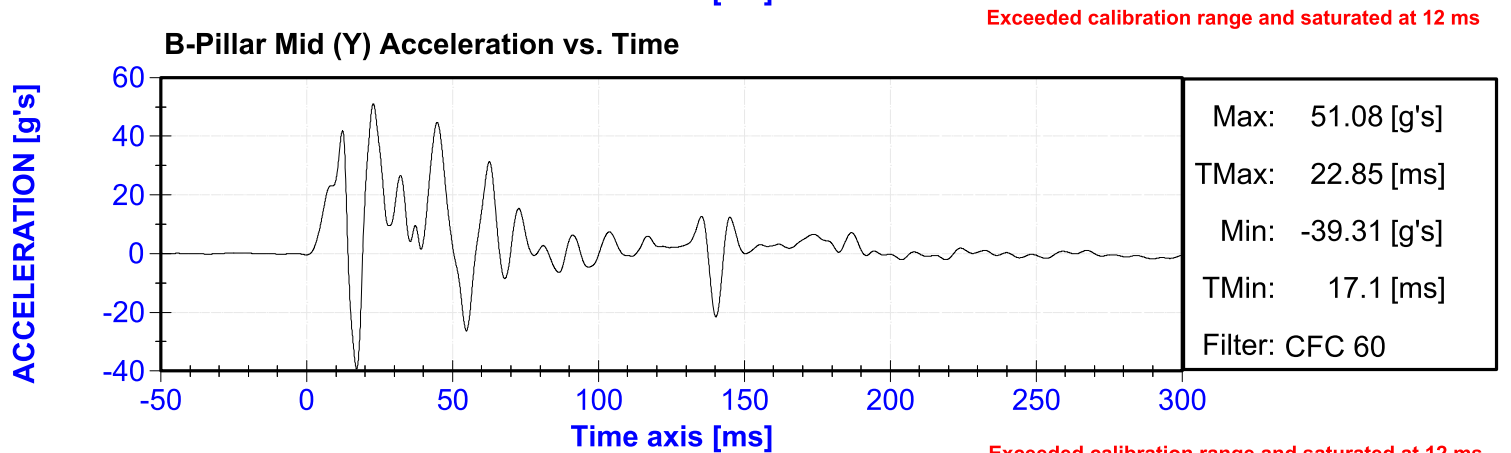
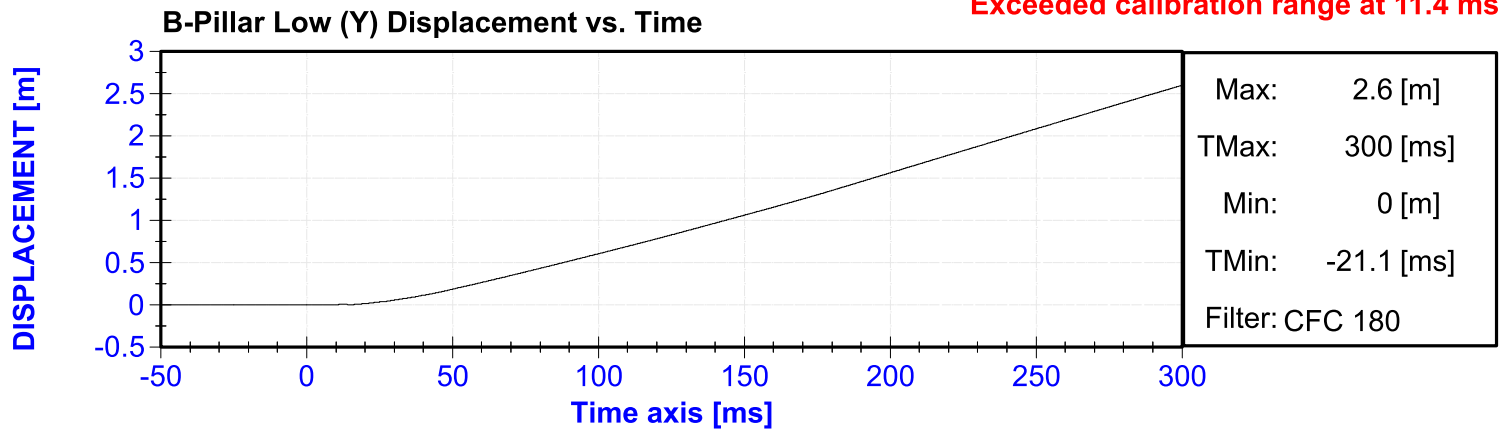


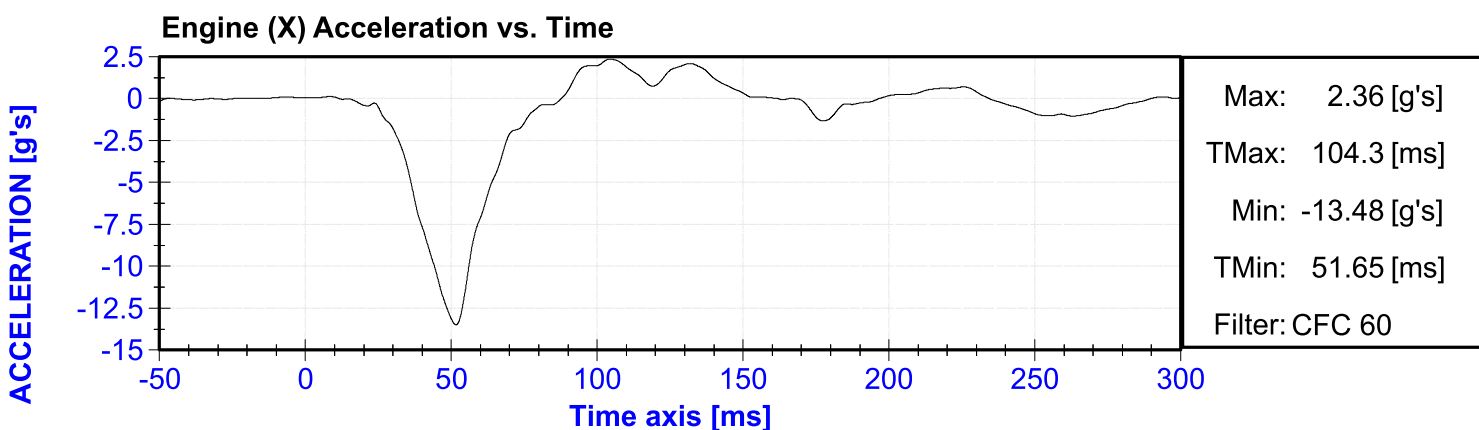
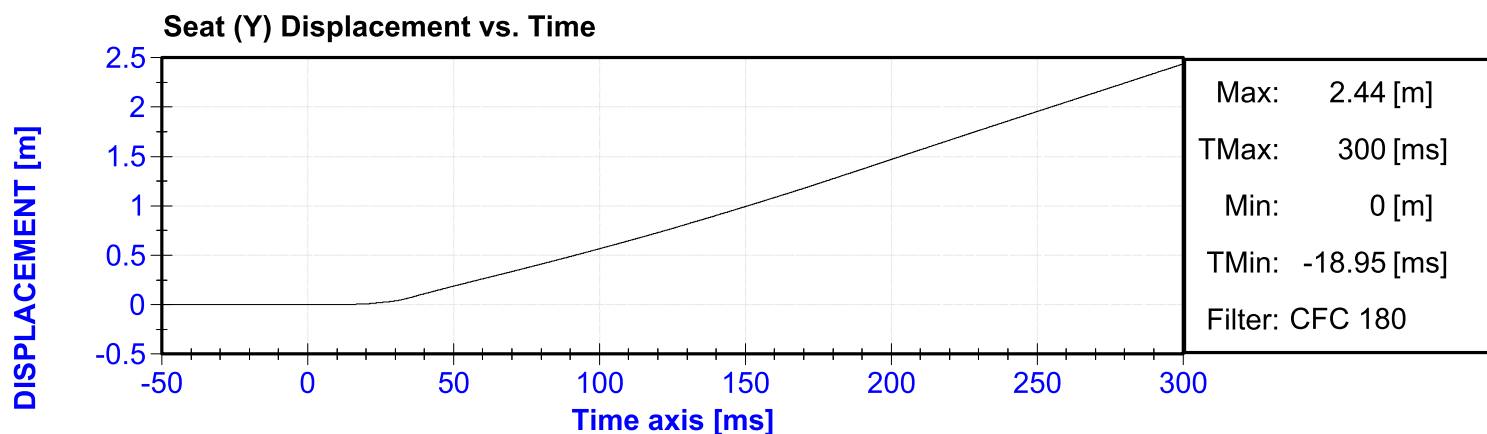
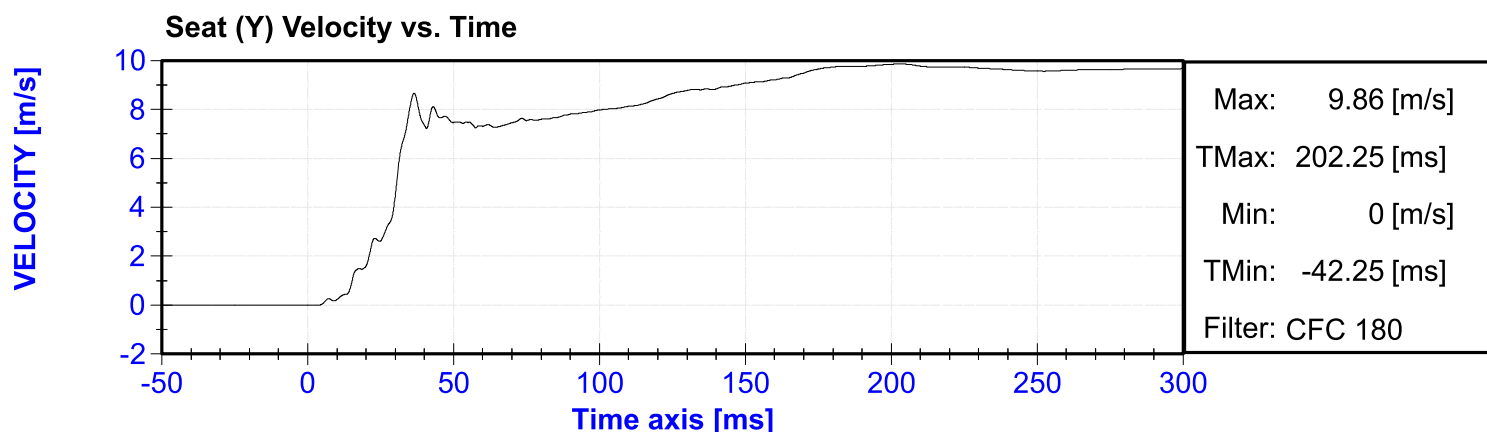
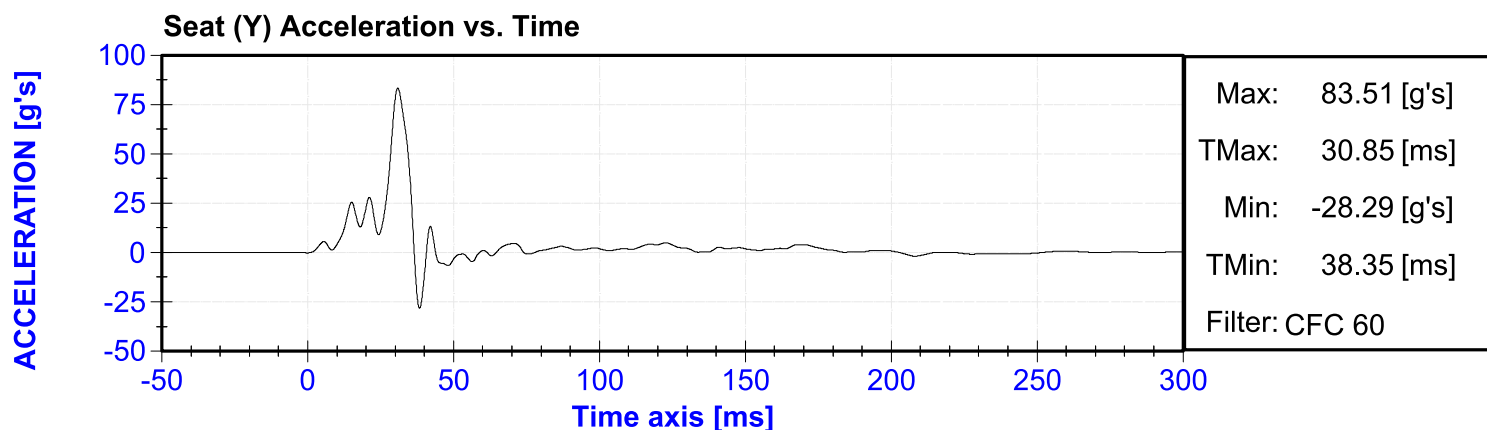


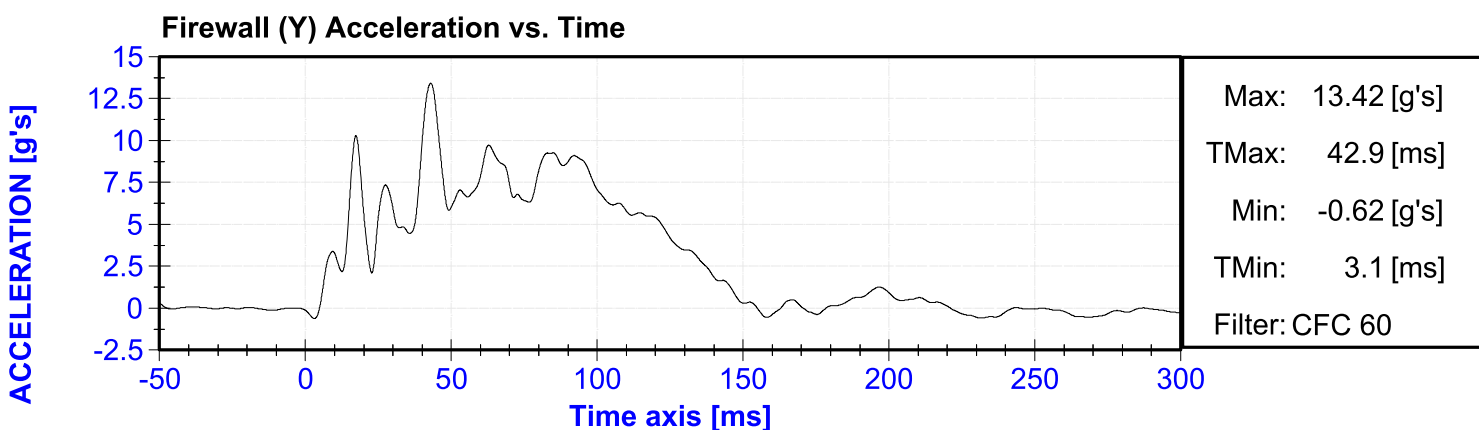
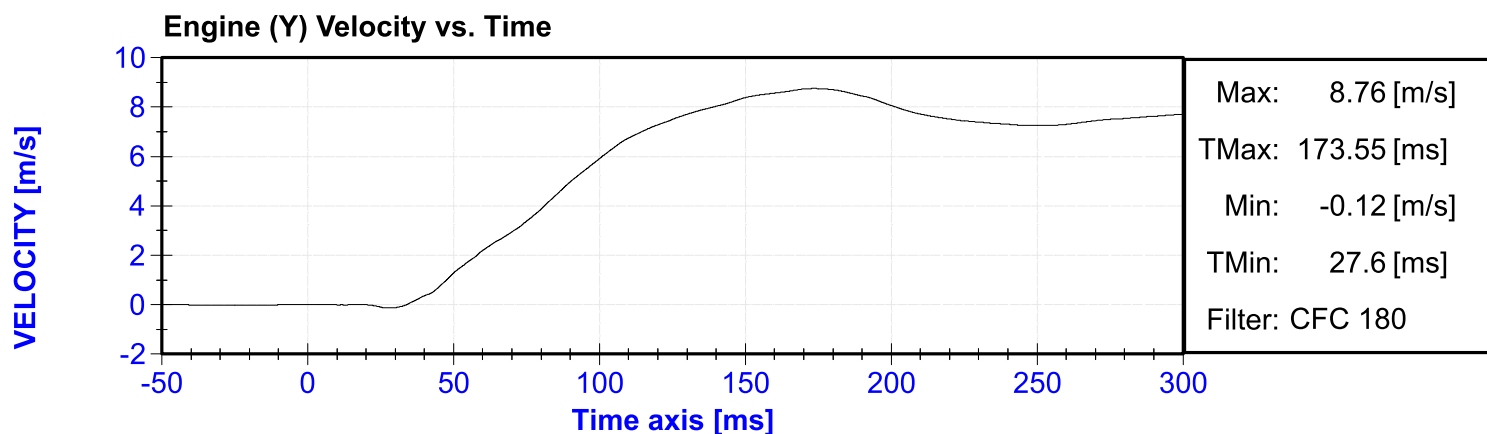
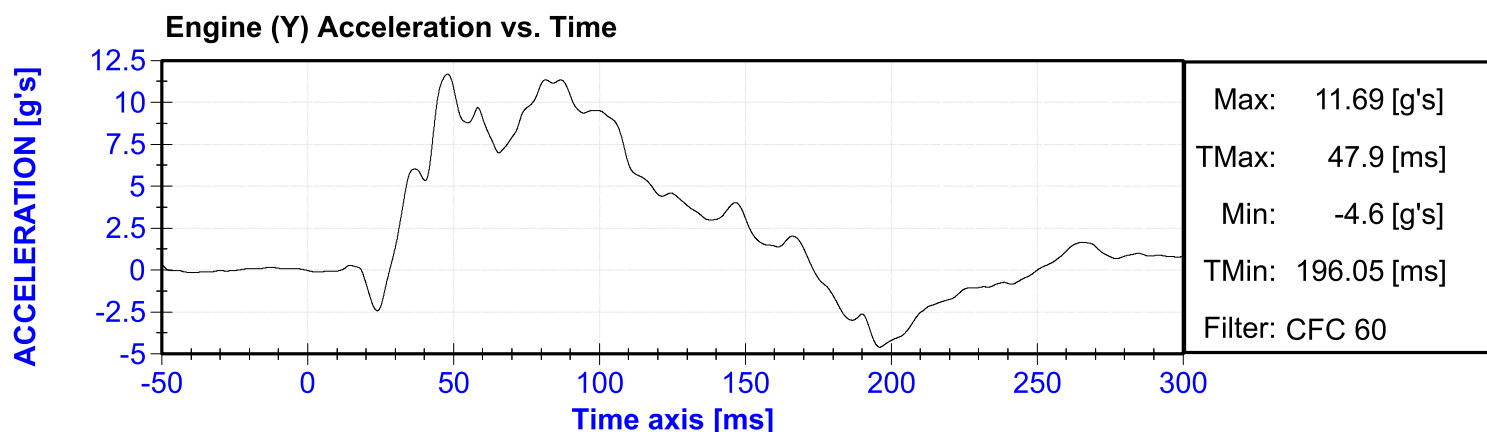
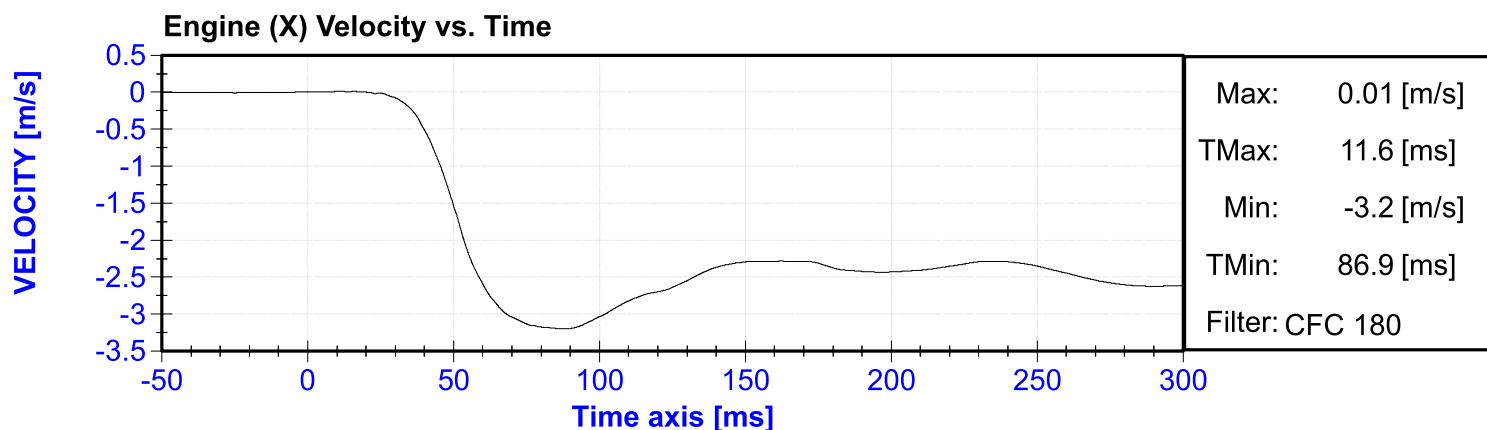


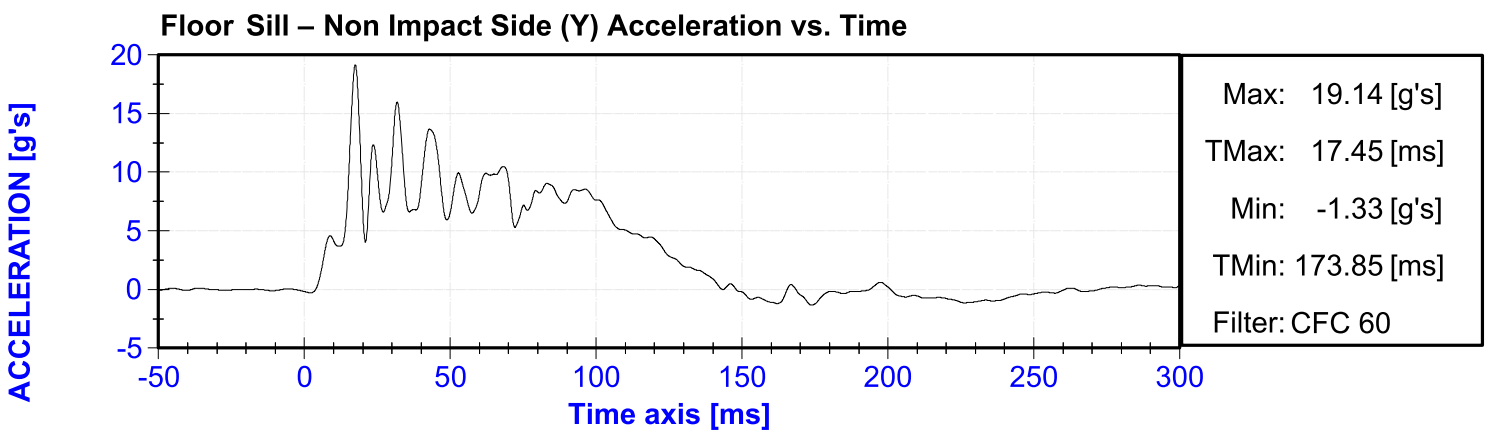
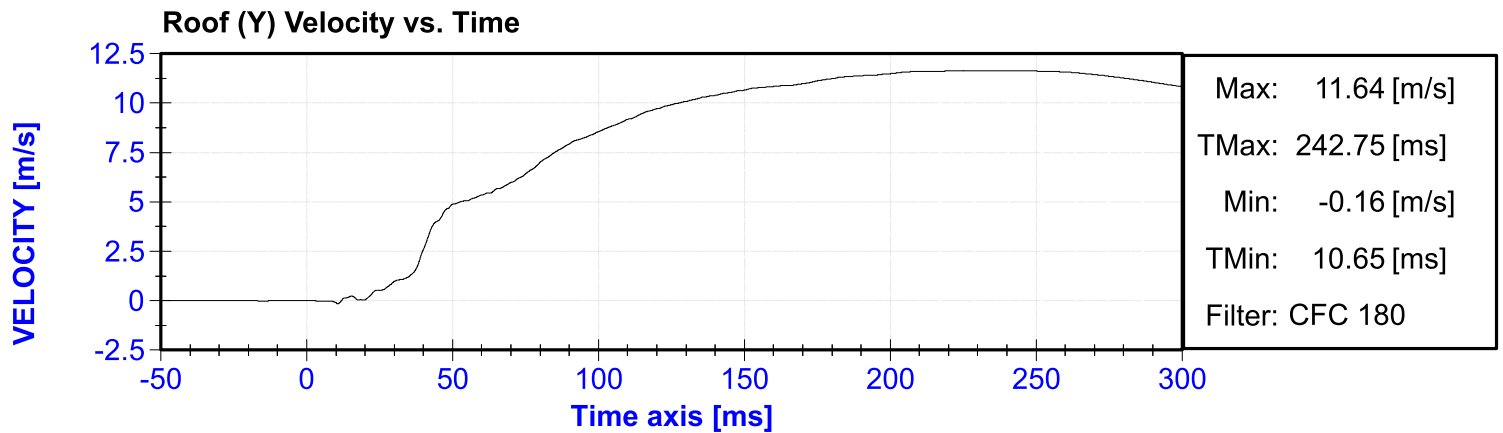
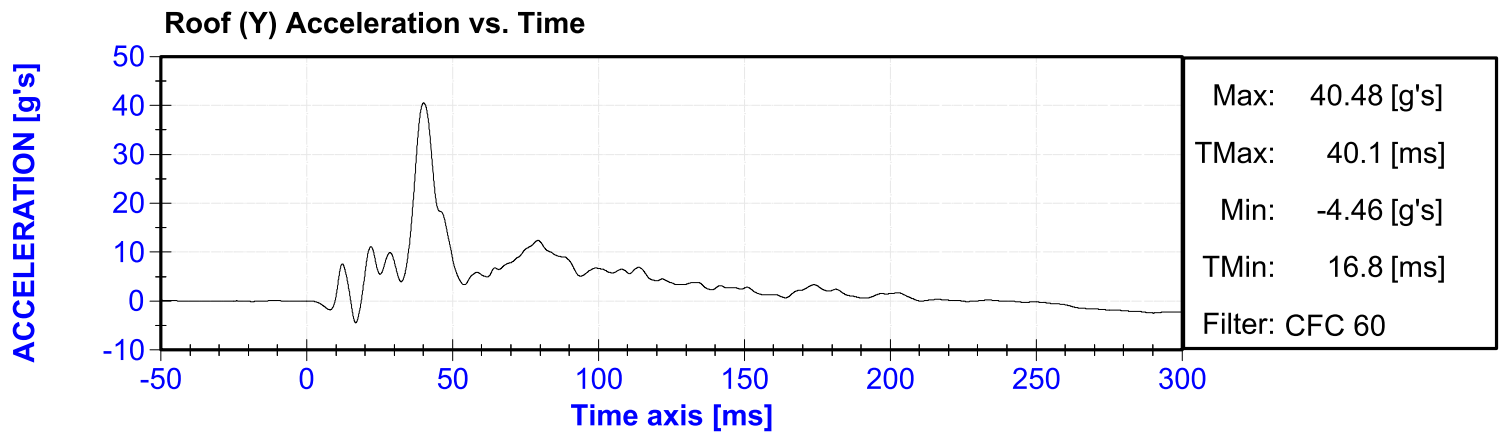
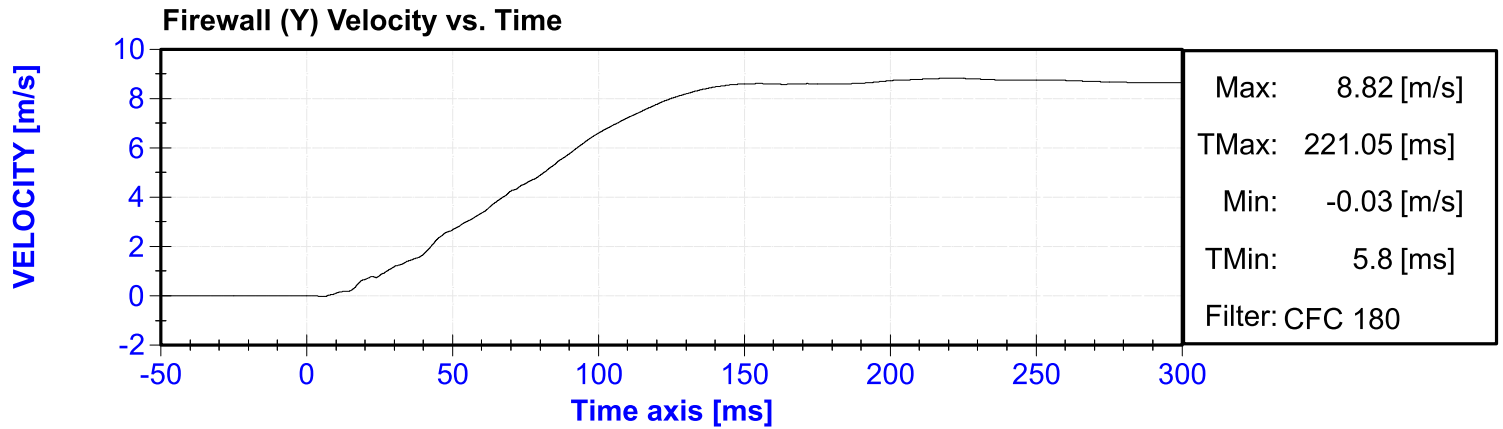


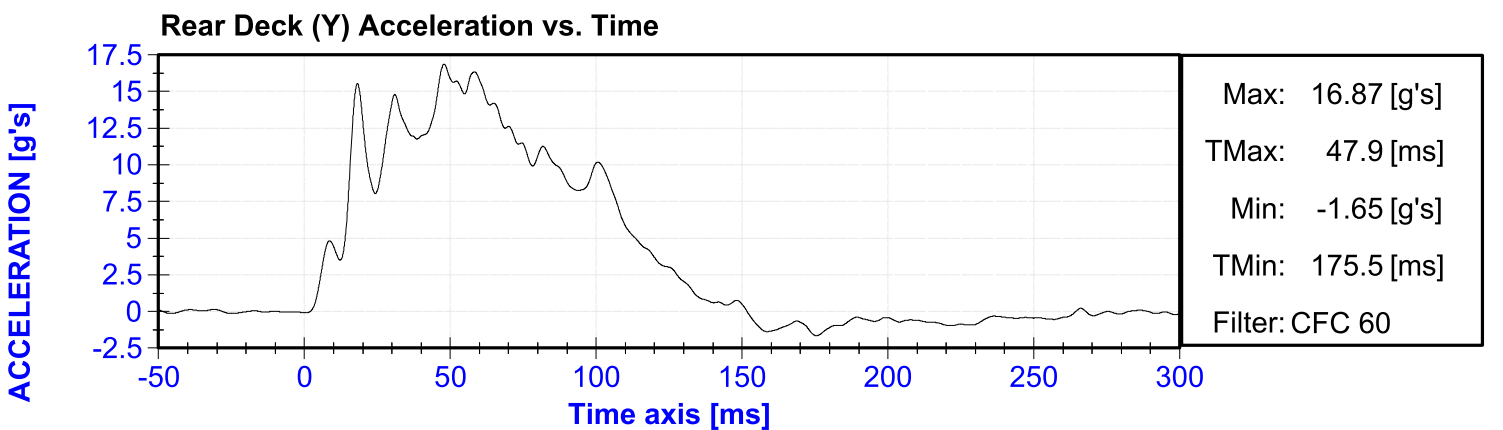
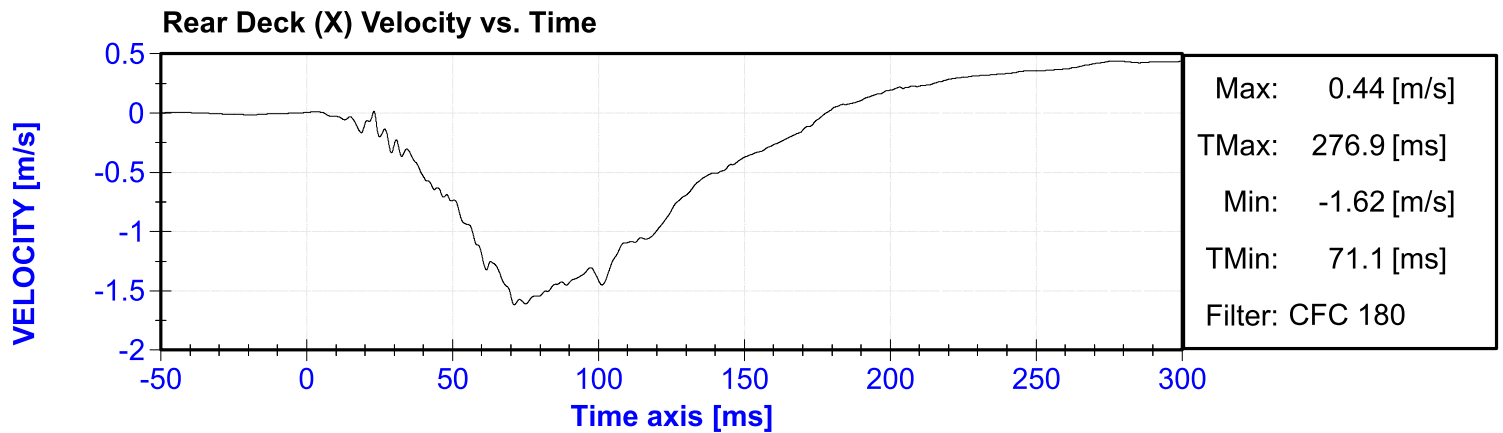
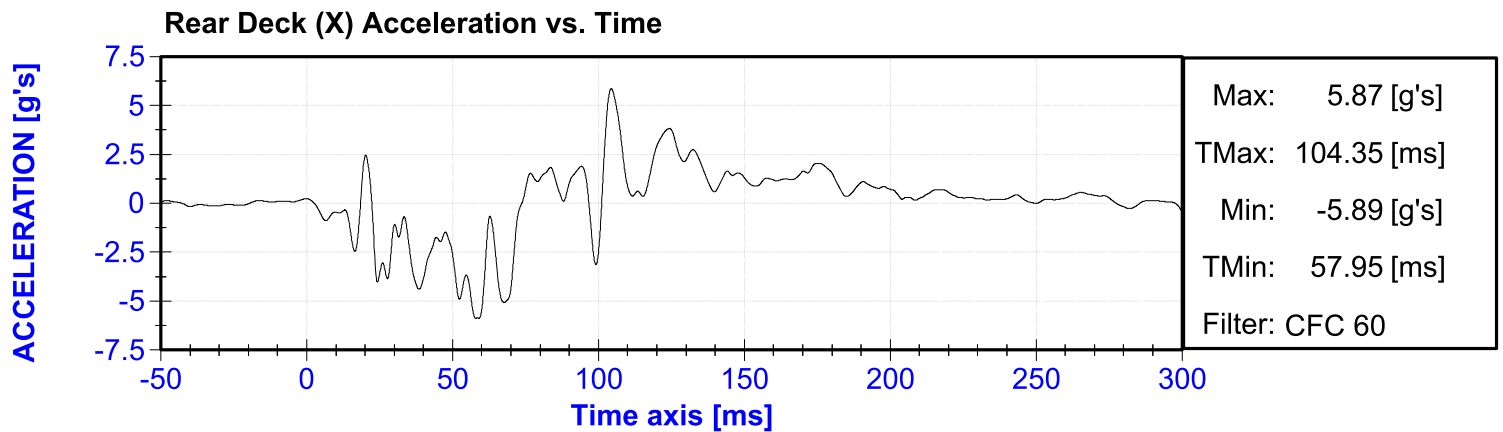
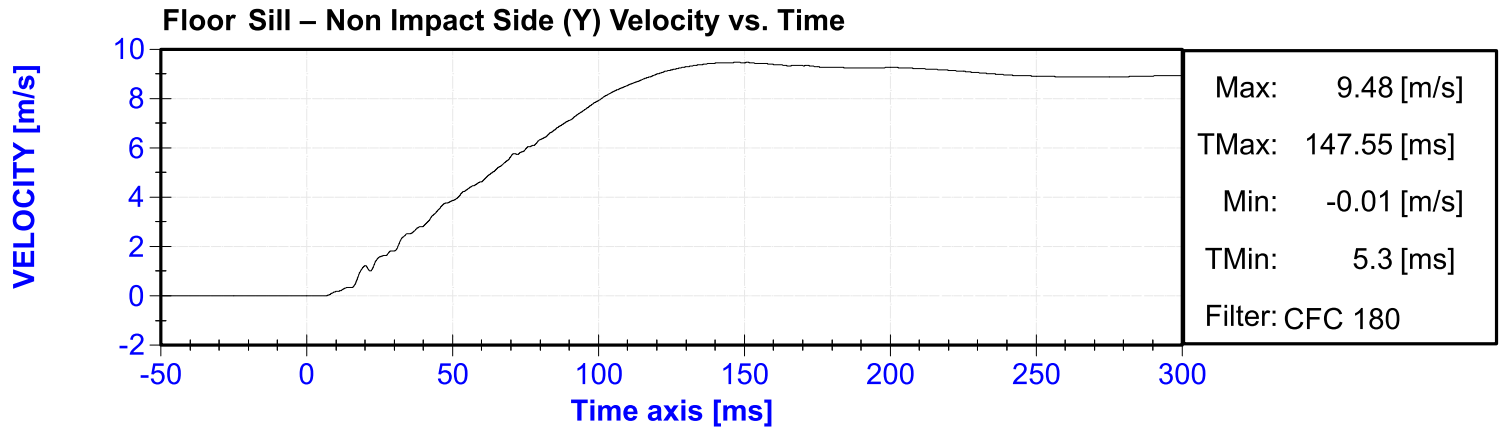


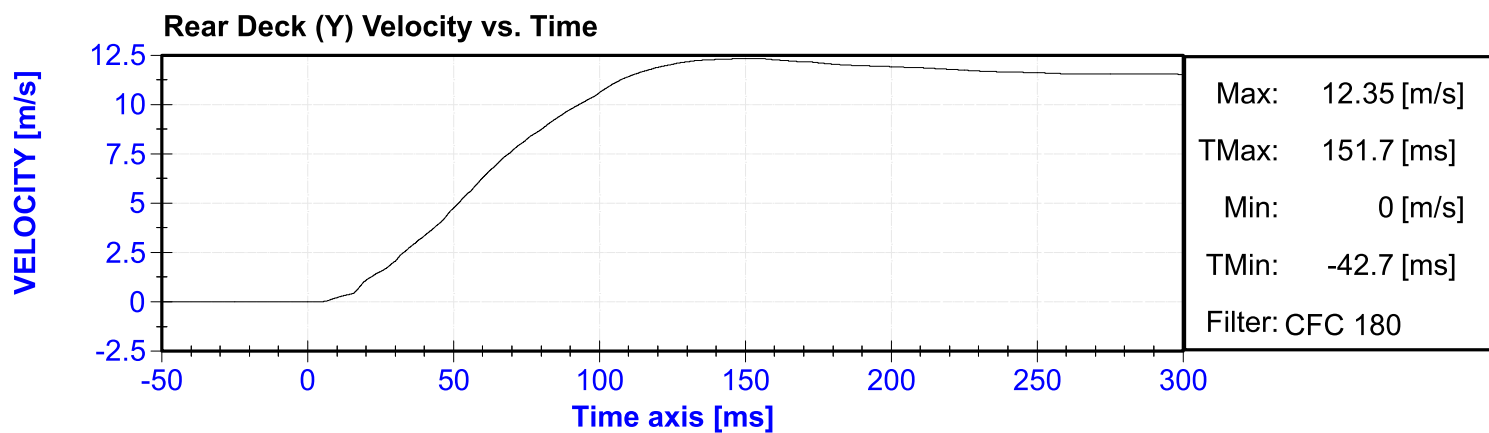












APPENDIX IV

PRE-TEST DUMMY PERFORMANCE CALIBRATION TEST DATA

(Subpart U, ES-2re)

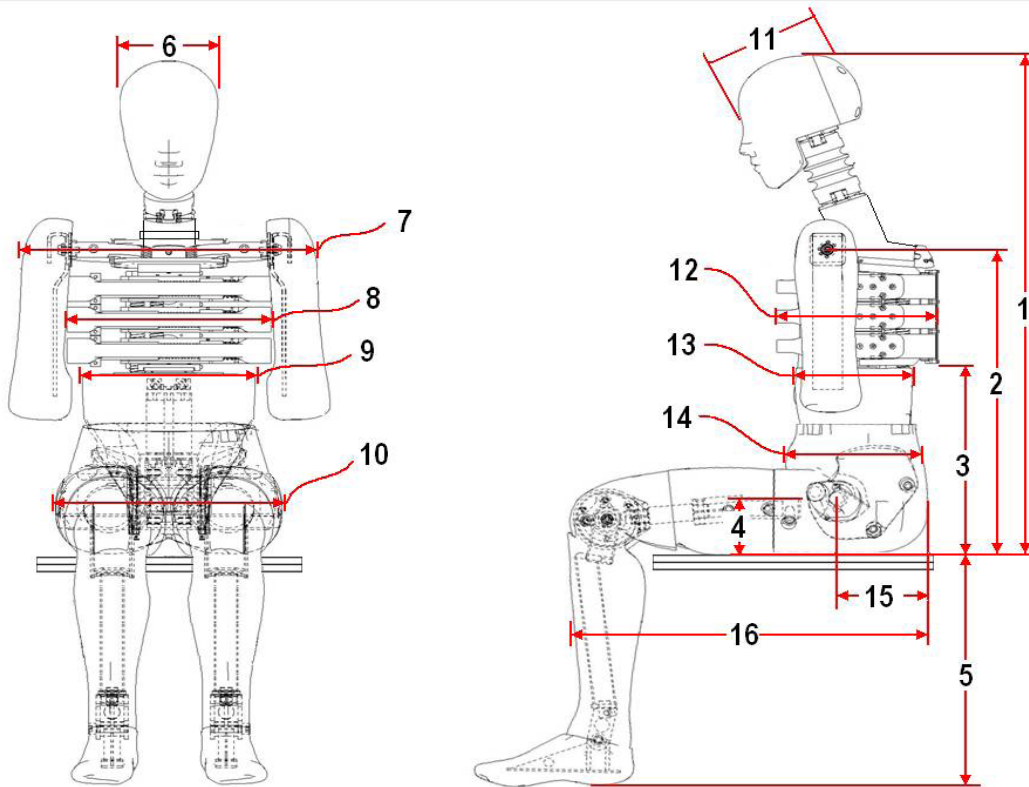


External Measurements - EuroSID-2re

Technician: J. Rios

Date: 10/22/2024

Dummy Serial Number: D037



FRONT VIEW

SIDE VIEW

Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	910	Pass
2	Seat to Shoulder Joint	558	572	562	Pass
3	Seat to Lower Face of Thoracic Spine Box	346	356	349	Pass
4	Seat to Hip Joint (center of bolt)	97	103	101	Pass
5	Sole to Seat, Sitting	333	451	420	Pass
6	Head Width	152	158	153	Pass
7	Shoulder/Arm Width	461	479	474	Pass
8	Thorax Width	322	332	330	Pass
9	Abdomen Width	273	287	277	Pass
10	Pelvis Lap Width	359	373	372	Pass
11	Head Depth	196	206	200	Pass
12	Thorax Depth	262	272	265	Pass
13	Abdomen Depth	194	204	195	Pass
14	Pelvis Depth	235	245	238	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150	160	154	Pass
16	Back of Buttocks to Front Knee	597	615	599	Pass

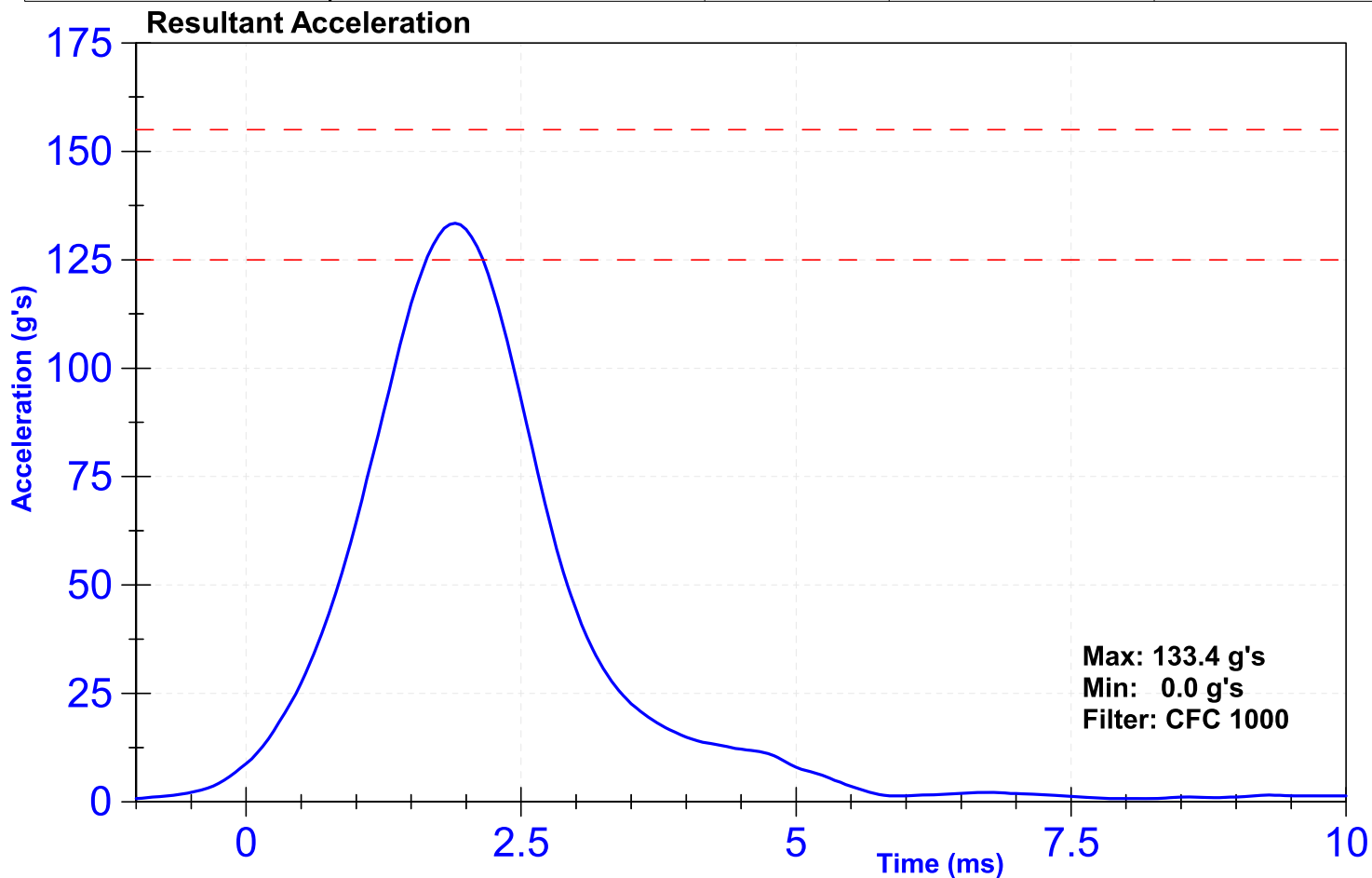
ATD Manufacturer	Denton	Test Technician	J. Kinderman
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

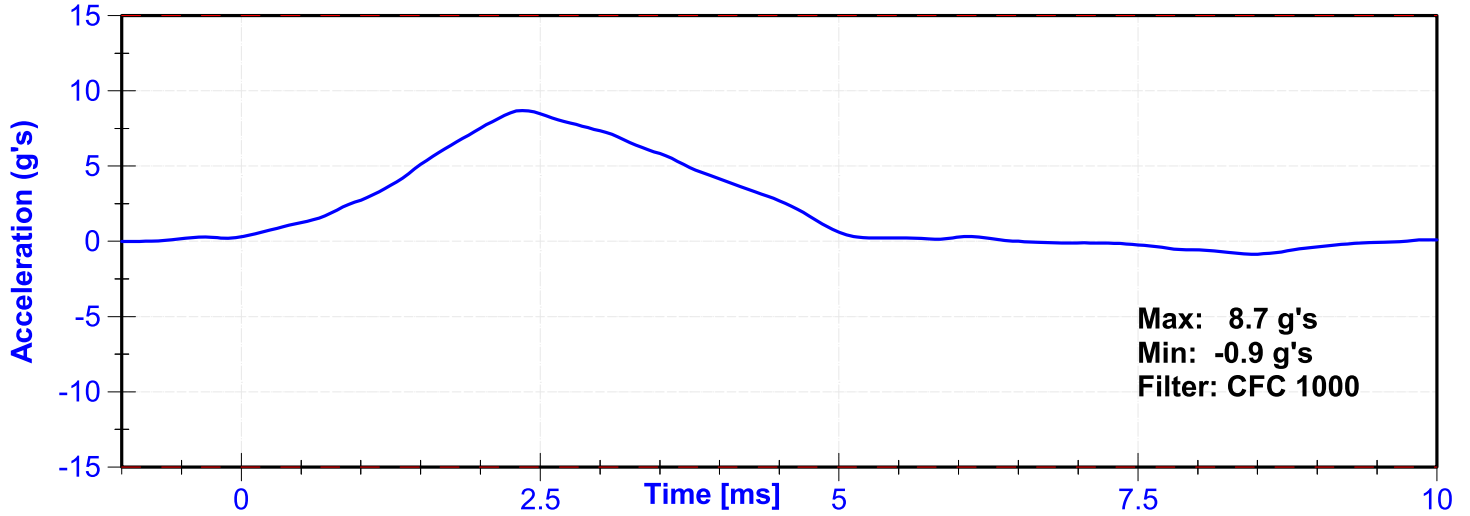
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	41	Pass
Resultant Acceleration	125	155	g's	133.4	Pass
Oscillation	0	15	%	1.63	Pass
Fore-Aft Acceleration	-15	15	g's	8.7	Pass

Transducer Calibrations

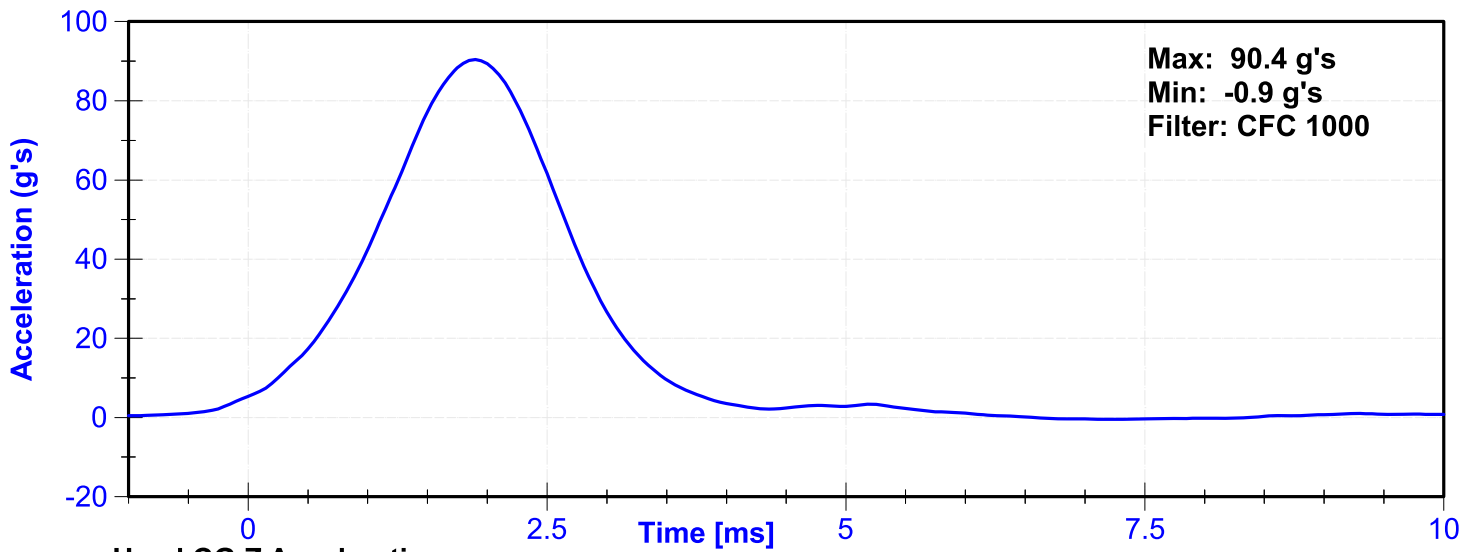
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	T21724	10/8/2024	4/6/2025
Y Accelerometer	Endevco	T22281	10/8/2024	4/6/2025
Z Accelerometer	Endevco	T26050	10/8/2024	4/6/2025



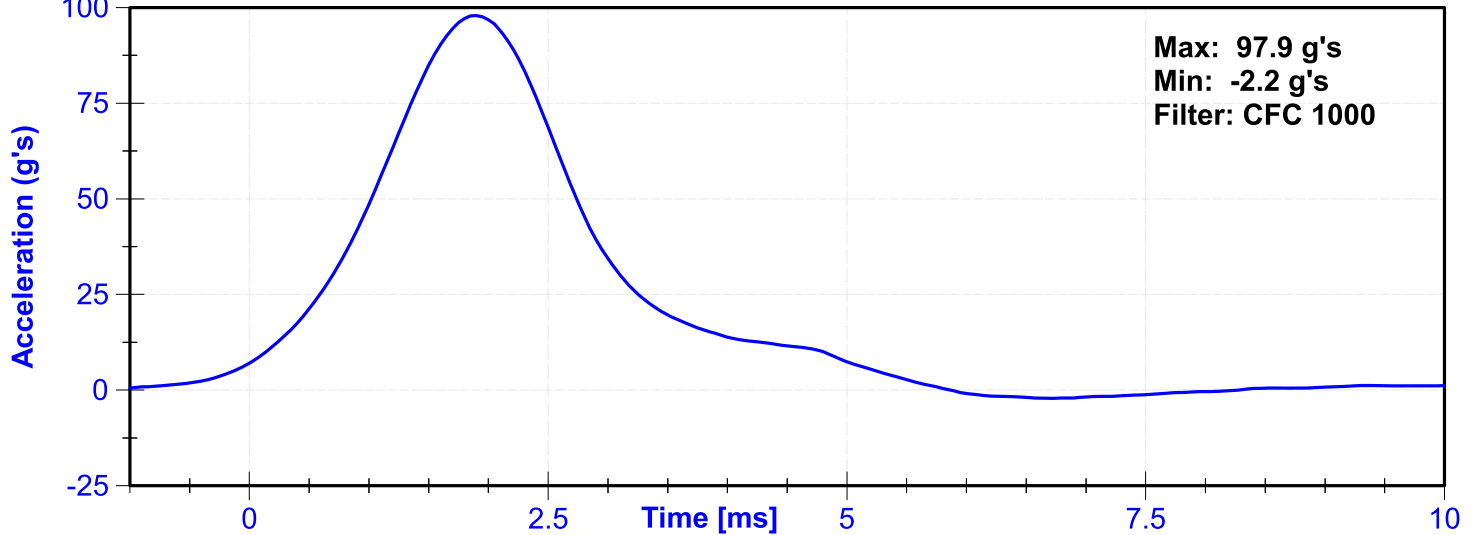
Head CG X Acceleration



Head CG Y Acceleration



Head CG Z Acceleration



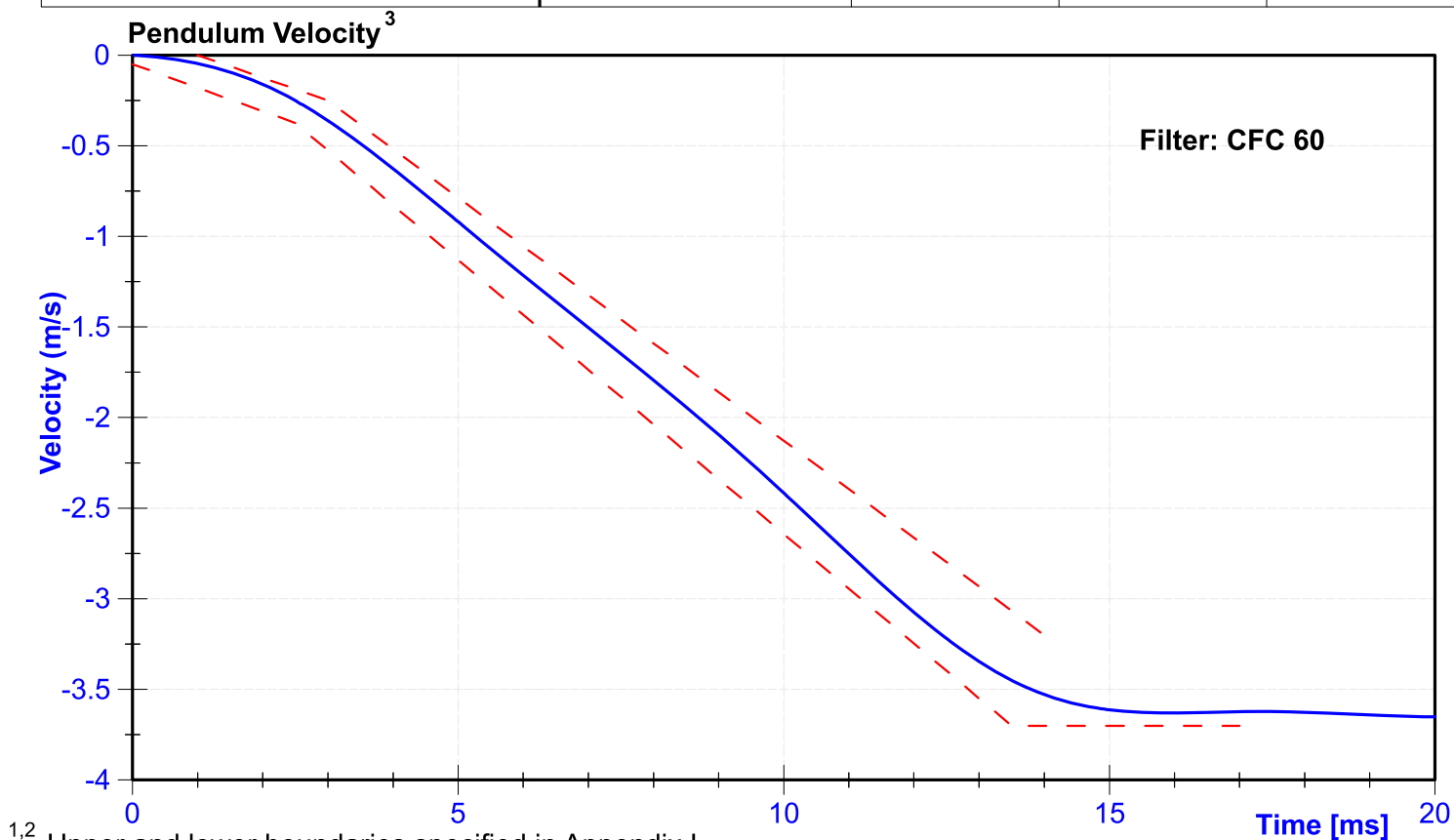
ATD Manufacturer	Denton	Test Technician	J. Kinderman
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

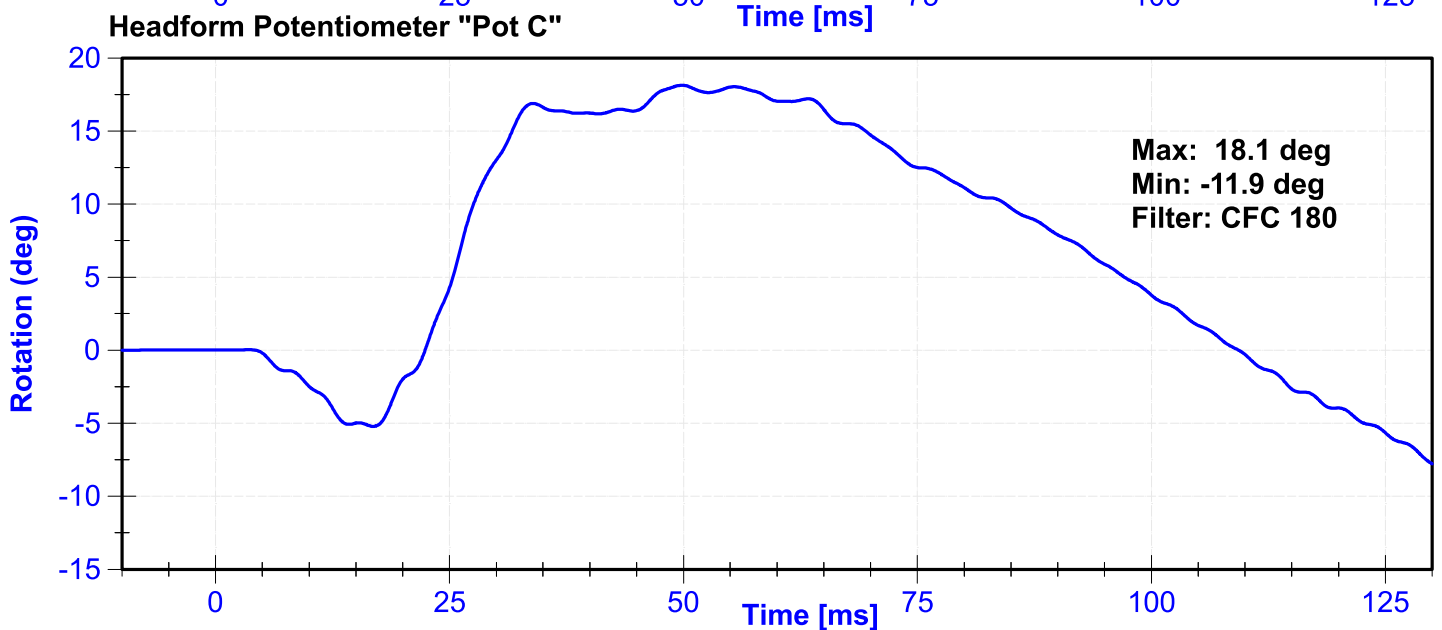
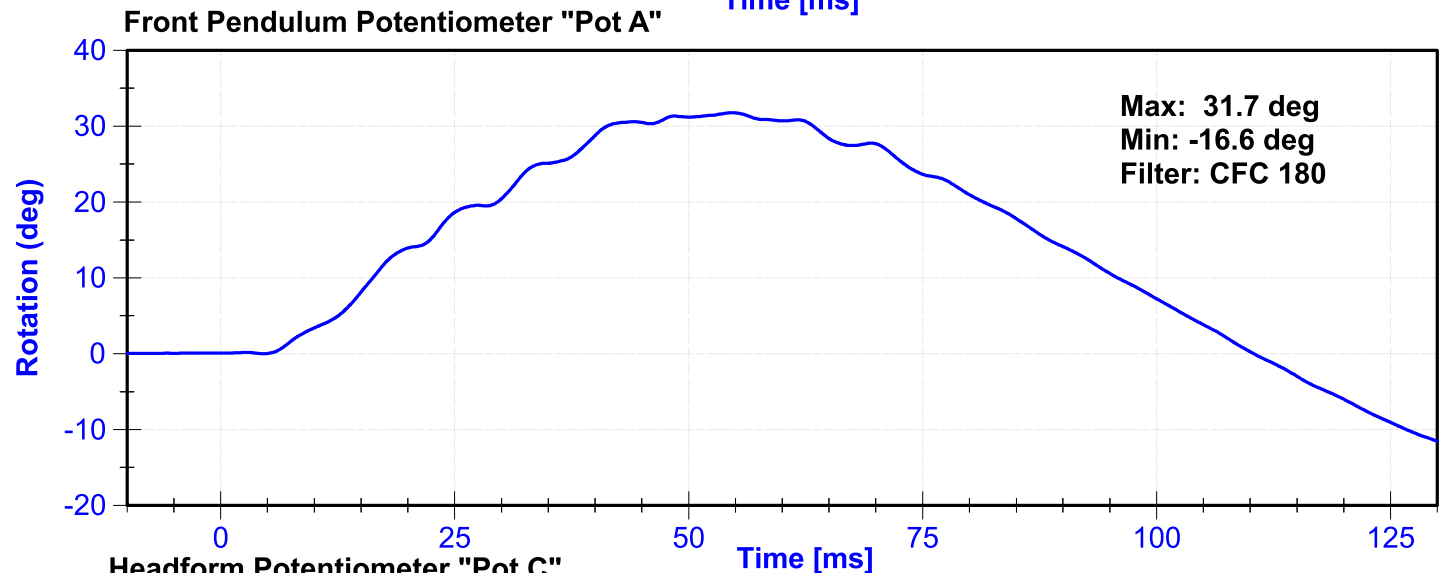
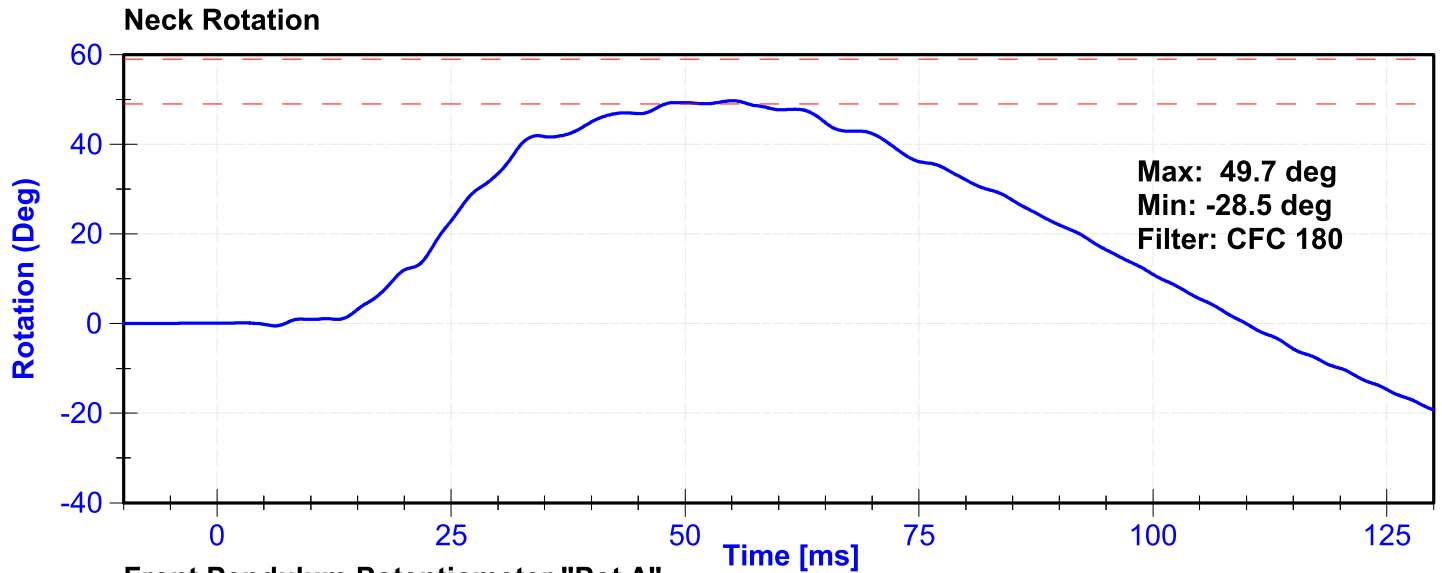
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	40	Pass
Velocity	3.3	3.5	m/s	3.45	Pass
Lateral Neck Rotation	49	59	deg	49.7	Pass
Time at Maximum Rotation	54	66	ms	55.1	Pass
Time of Rotation Decay from Maximum	53	88	ms	54.9	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	C16503	4/29/2024	10/26/2024
Front Pendulum Potentiometer	Sfernice	2247	9/13/2024	9/13/2025
Headform Potentiometer	Sfernice	095	9/13/2024	9/13/2025





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

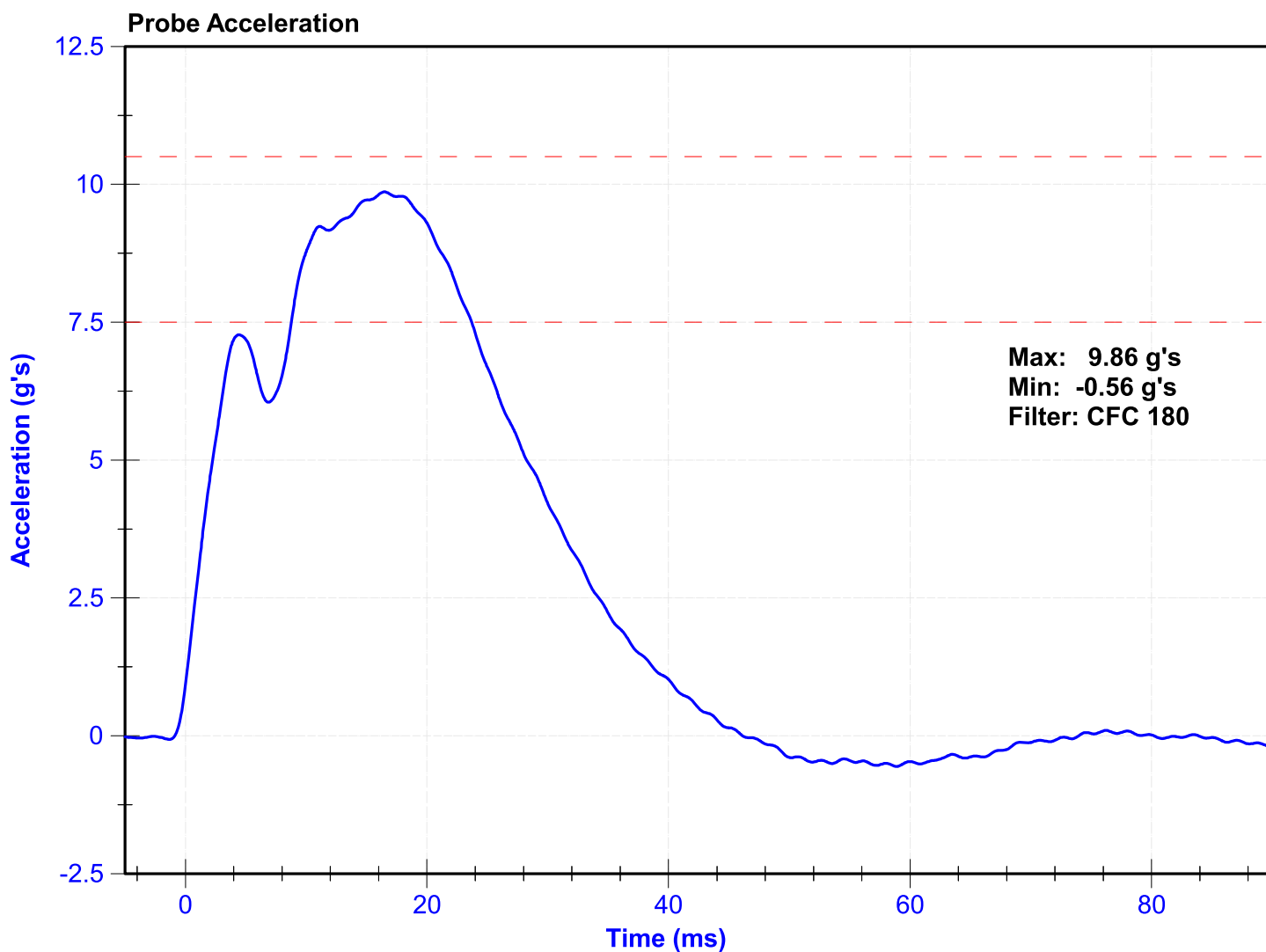
ATD Manufacturer	Denton	Test Technician	J. Kinderman
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	40	Pass
Velocity	4.2	4.4	m/s	4.28	Pass
Probe Acceleration	7.5	10.5	g's	9.86	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	18599	9/13/2024	3/12/2025



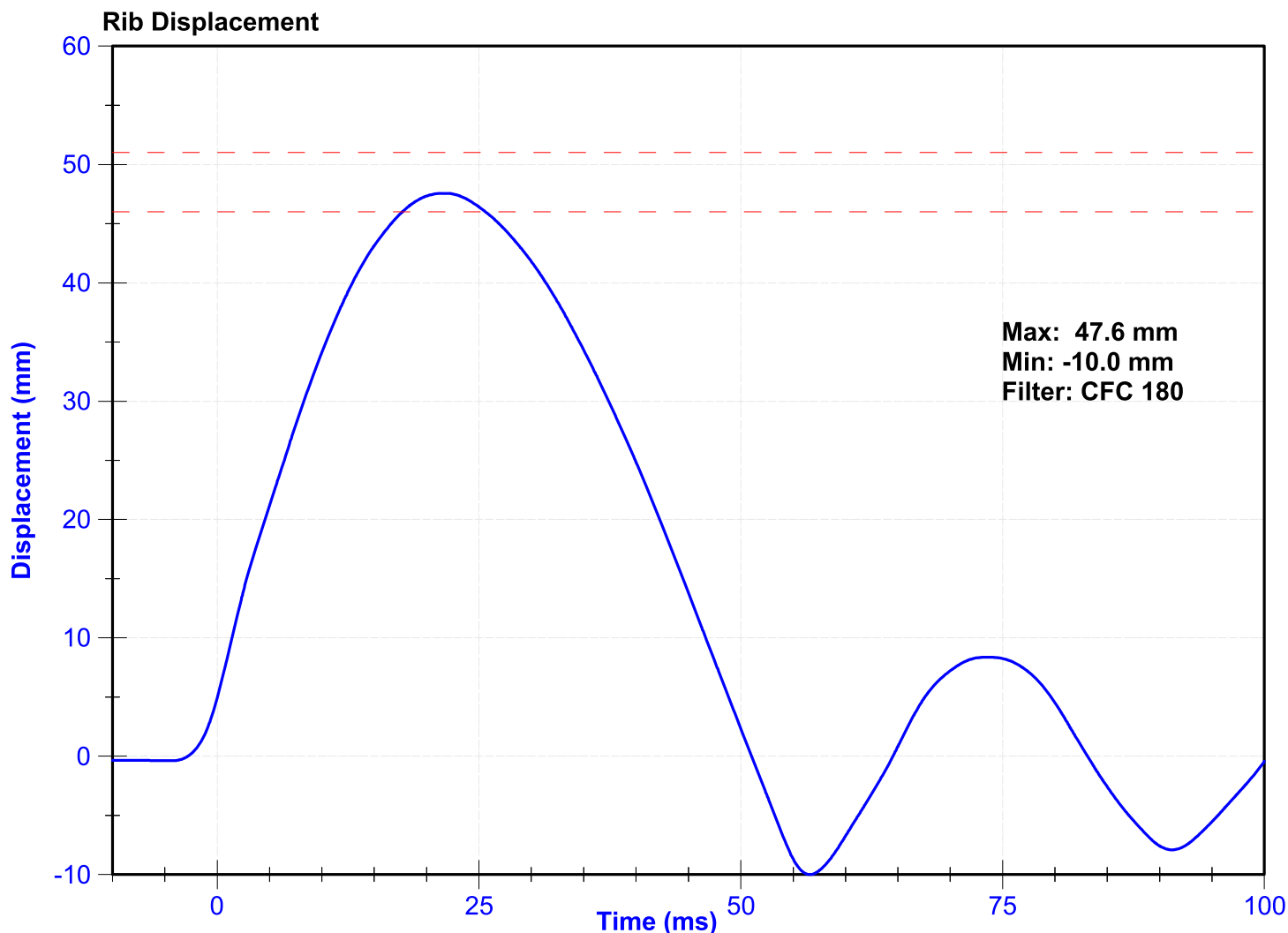
ATD Manufacturer	Denton	Test Technician	J.Kinderman
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	40	Pass
Rib Displacement	46	51	mm	47.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	0552-01	10/8/2024	4/8/2025



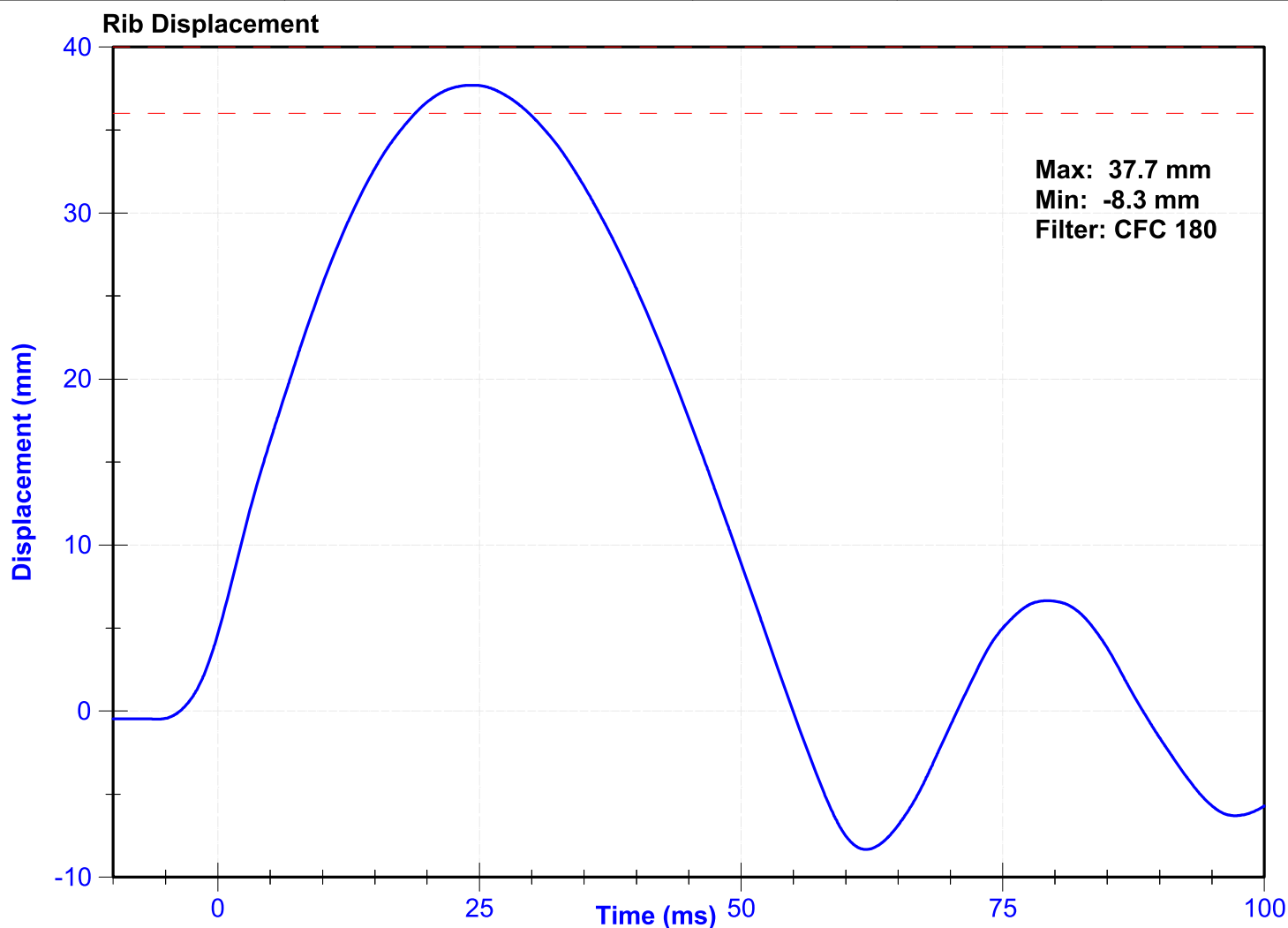
ATD Manufacturer	Denton	Test Technician	J.Kinderman
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	40	Pass
Rib Displacement	36	40	mm	37.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	0552-01	10/8/2024	4/8/2025



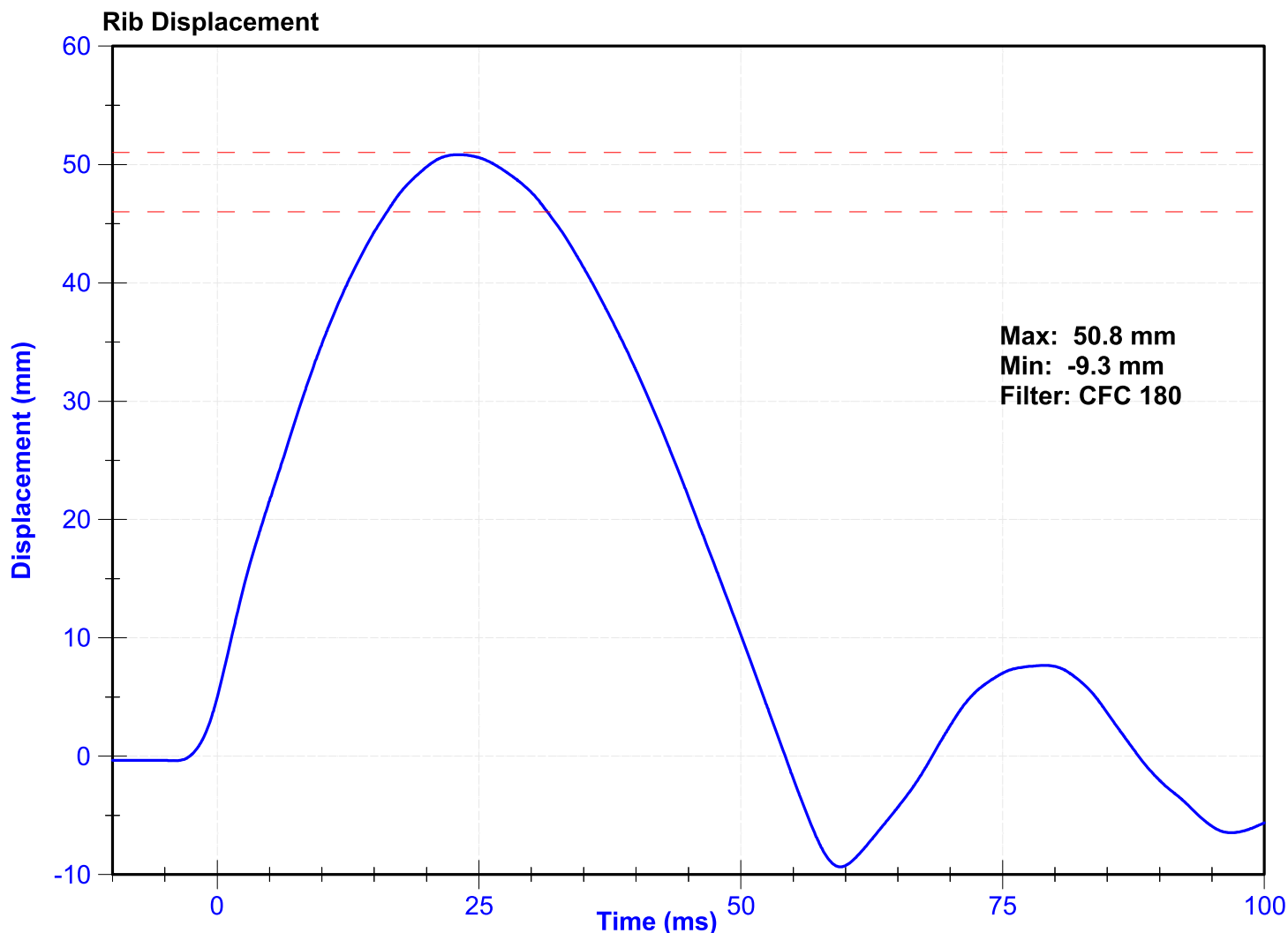
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ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	40	Pass
Rib Displacement	46	51	mm	50.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	807	10/8/2024	4/8/2025



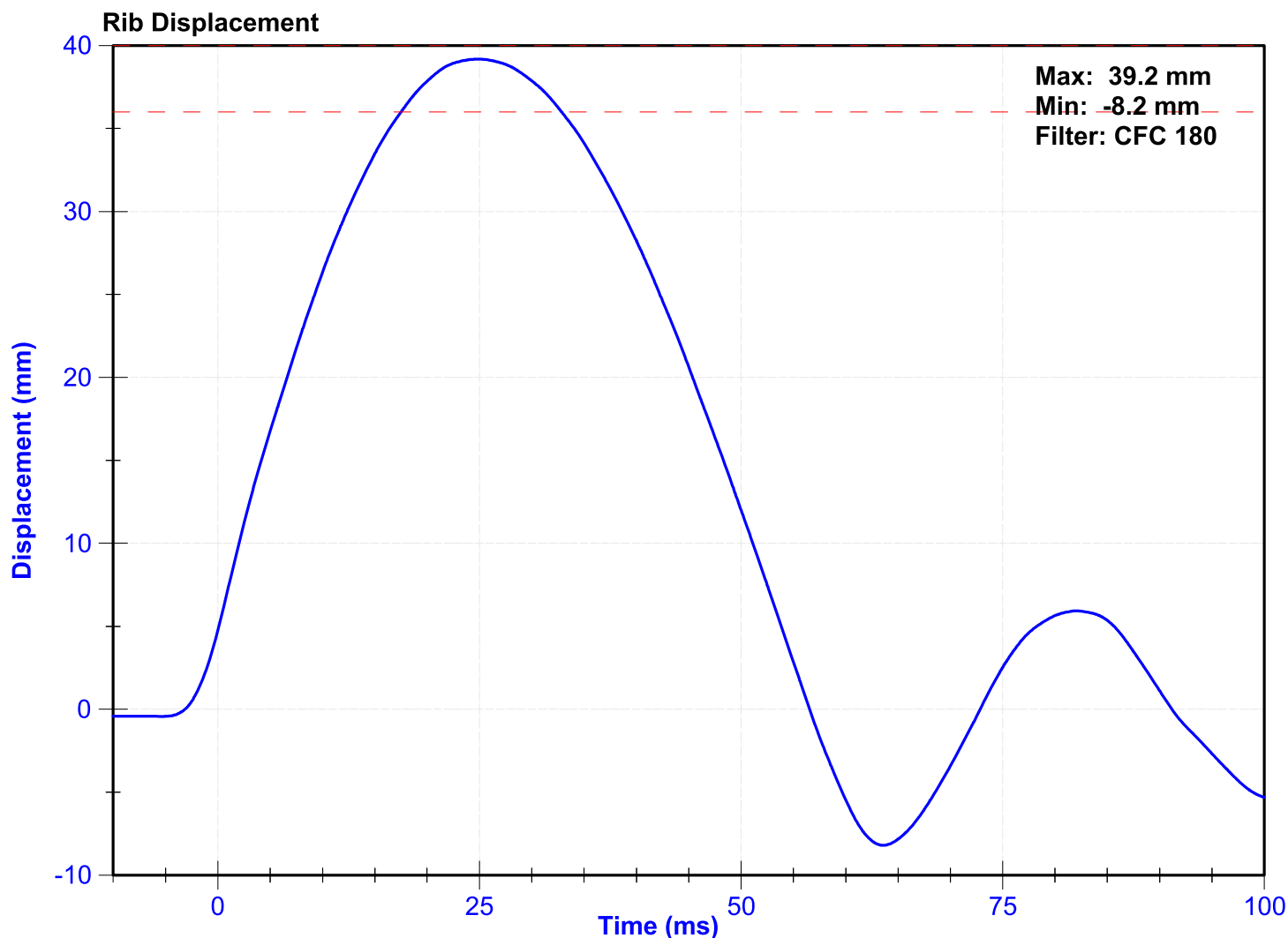
ATD Manufacturer	Denton	Test Technician	J.Kinderman
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	40	Pass
Rib Displacement	36	40	mm	39.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	807	10/8/2024	4/8/2025



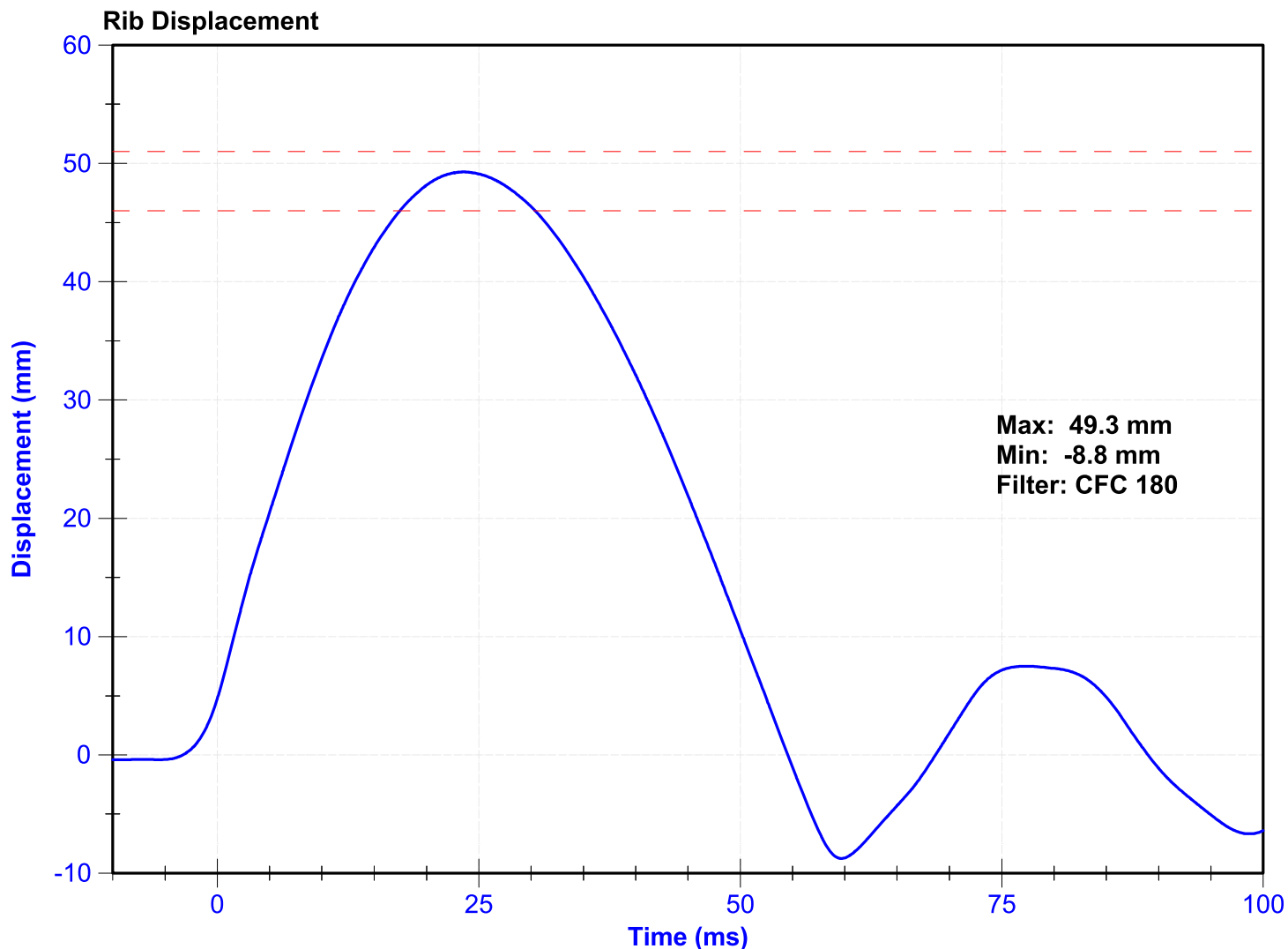
ATD Manufacturer	Denton	Test Technician	J.Kinderman
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	40	Pass
Rib Displacement	46	51	mm	49.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	0552-03	10/8/2024	4/8/2025



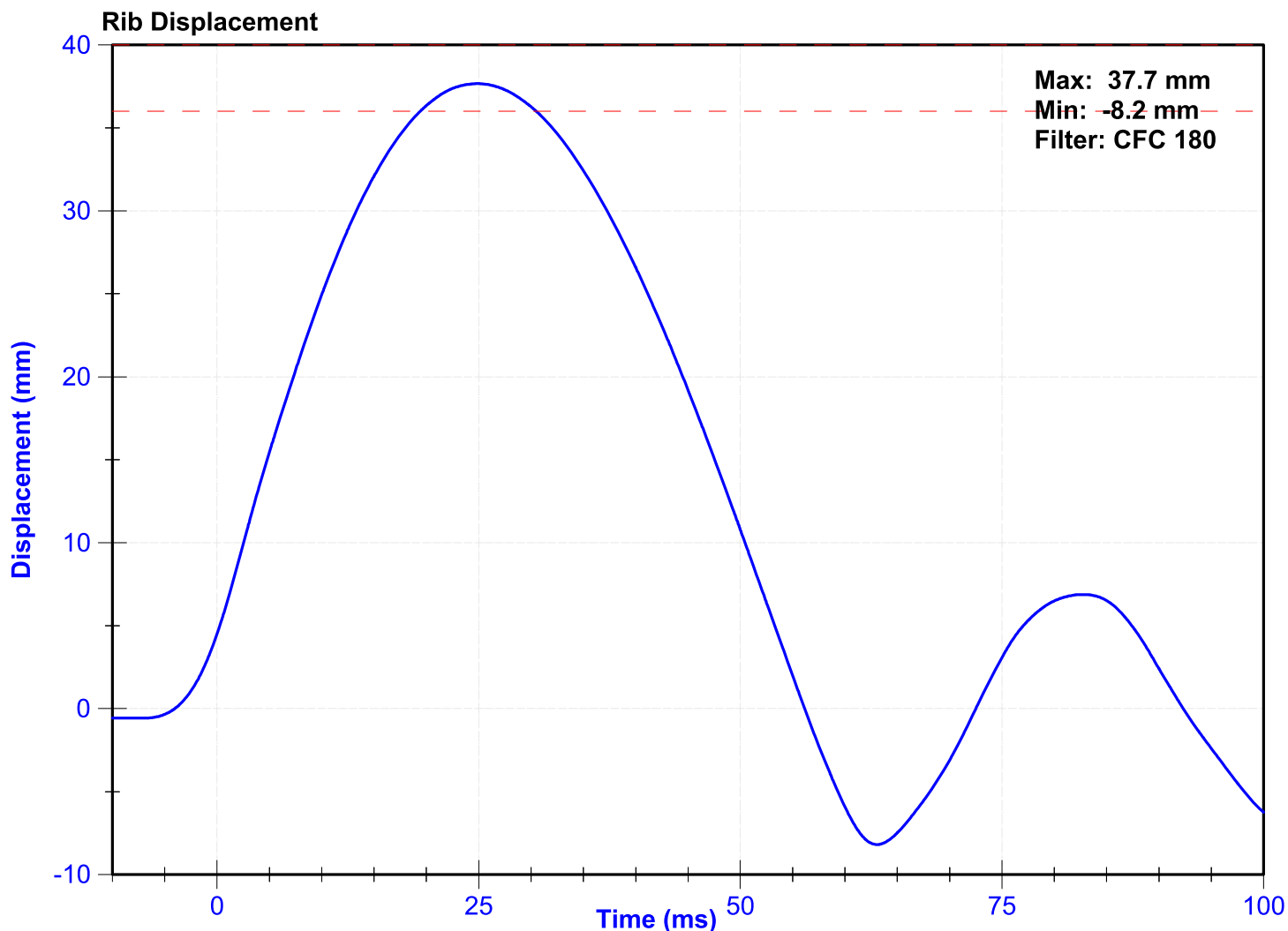
ATD Manufacturer	Denton	Test Technician	J.Kinderman
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	40	Pass
Rib Displacement	36	40	mm	37.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	0552-03	10/8/2024	4/8/2025



ATD Manufacturer	Denton	Test Technician	J. Kinderman
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

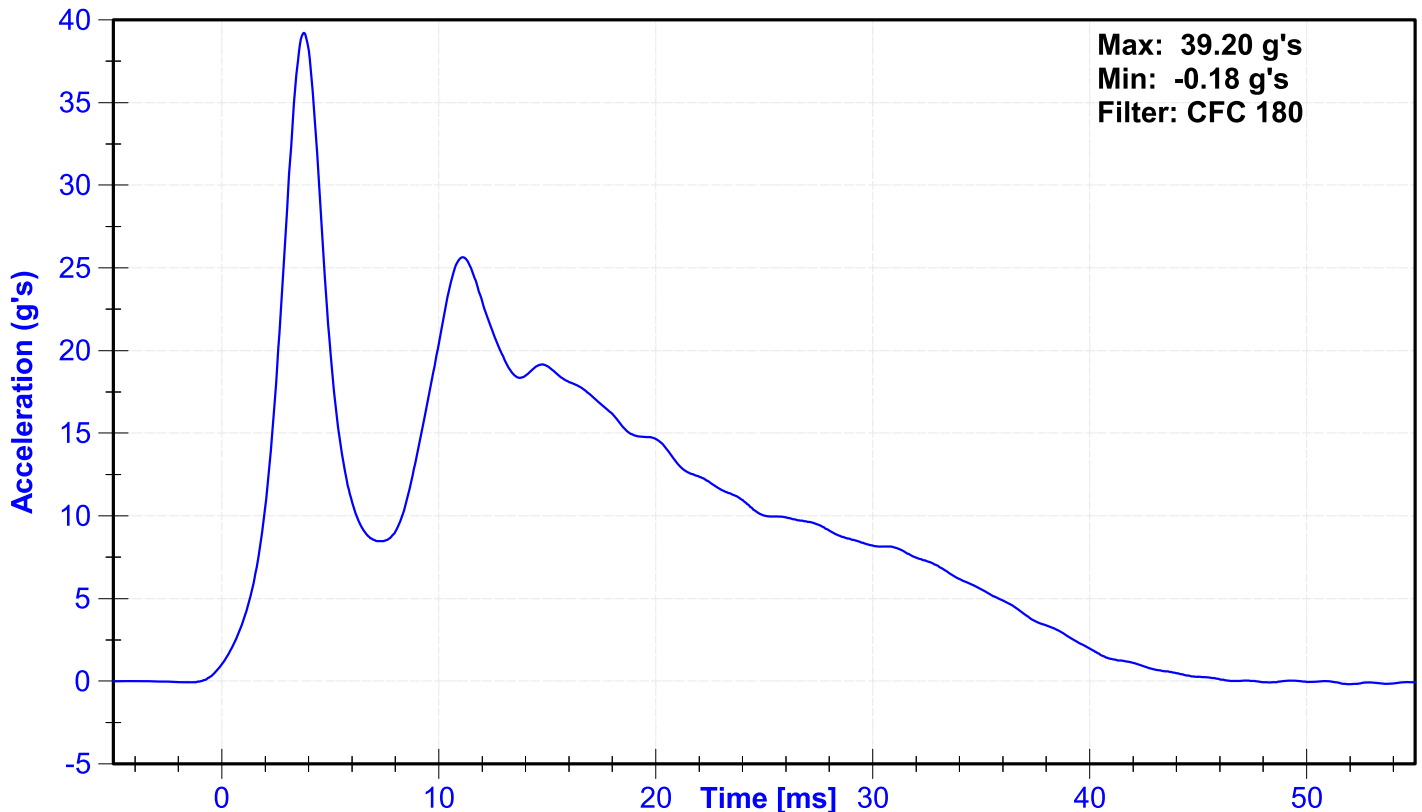
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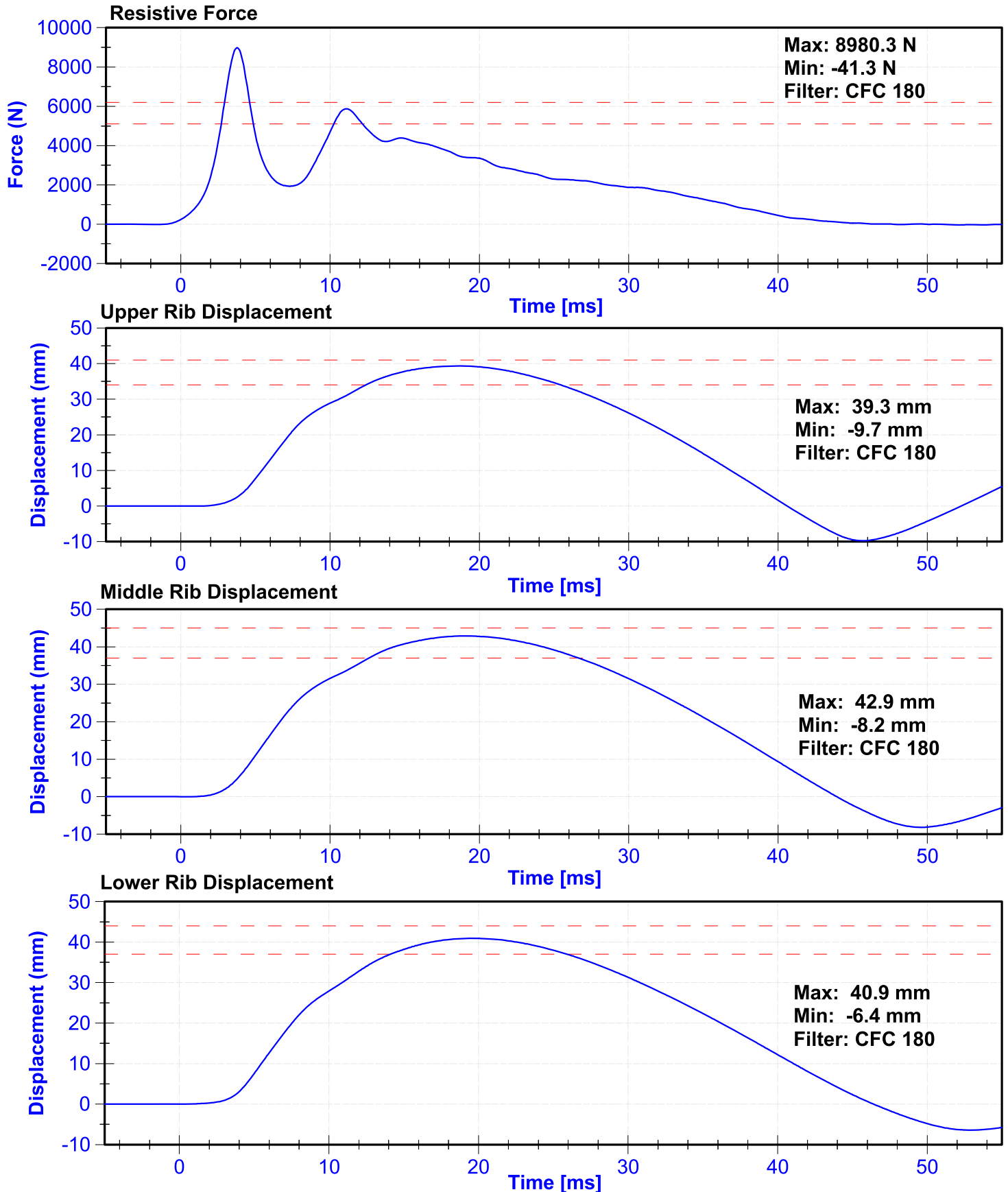
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Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	40	Pass
Velocity	5.4	5.6	m/s	5.53	Pass
Resistive Force after 6ms	5100	6200	N	5874.4	Pass
Upper Thorax Rib Deflection	34	41	mm	39.3	Pass
Mid Thorax Rib Deflection	37	45	mm	42.9	Pass
Lower Thorax Rib Deflection	37	44	mm	40.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	18599	9/13/2024	3/12/2025
Upper Thorax Rib Potentiometer	Honeywell	0552-01	10/8/2024	4/8/2025
Middle Thorax Rib Potentiometer	Honeywell	807	10/8/2024	4/8/2025
Lower Thorax Rib Potentiometer	Honeywell	0552-03	10/8/2024	4/8/2025

Probe Acceleration





ATD Manufacturer	Denton	Test Technician	J. Kinderman
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

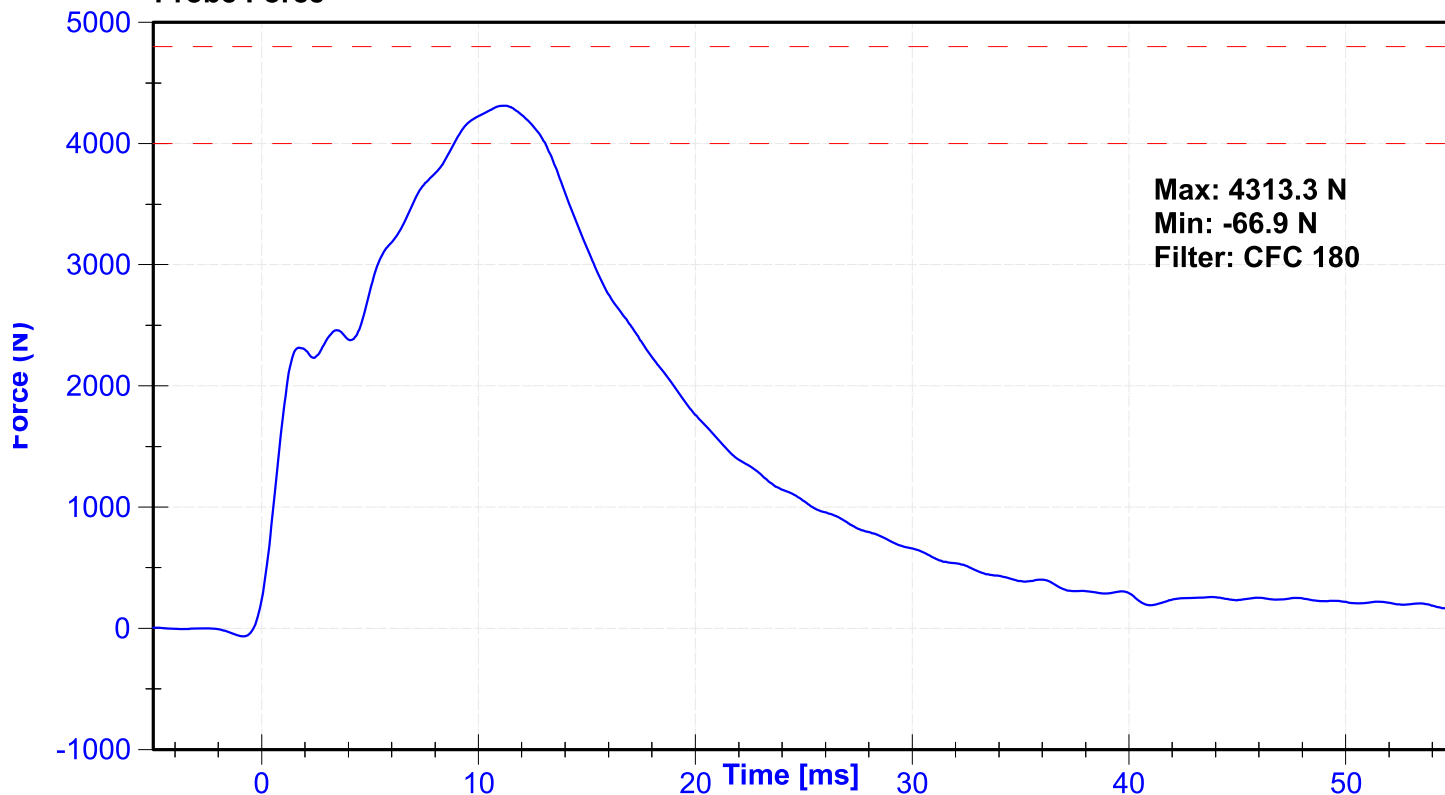
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	40	Pass
Velocity	3.9	4.1	m/s	4.02	Pass
Combined Abdomen Force	2200	2700	N	2358.8	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	10.95	Pass
Resistive Probe Force	4000	4800	N	4313.3	Pass
Time at Peak Resistive Force	10.6	13.0	ms	11.15	Pass

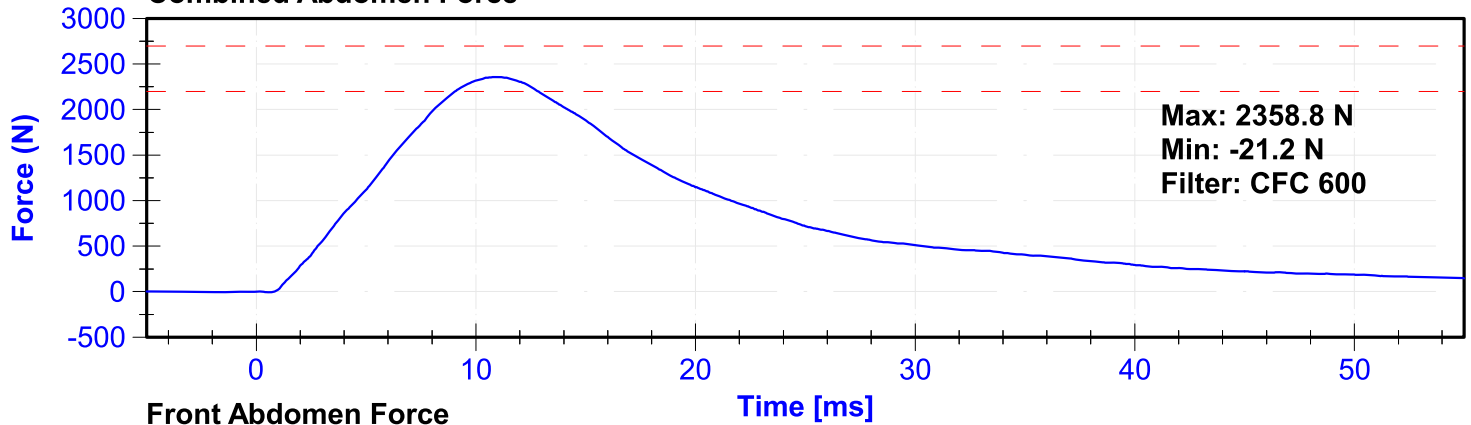
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18599	9/13/2024	3/12/2025
Front Abdomen Load Cell	Denton	1512	9/16/2024	9/16/2025
Middle Abdomen Load Cell	Denton	1526	9/16/2024	9/16/2025
Rear Abdomen Load Cell	Denton	1516	9/16/2024	9/16/2025

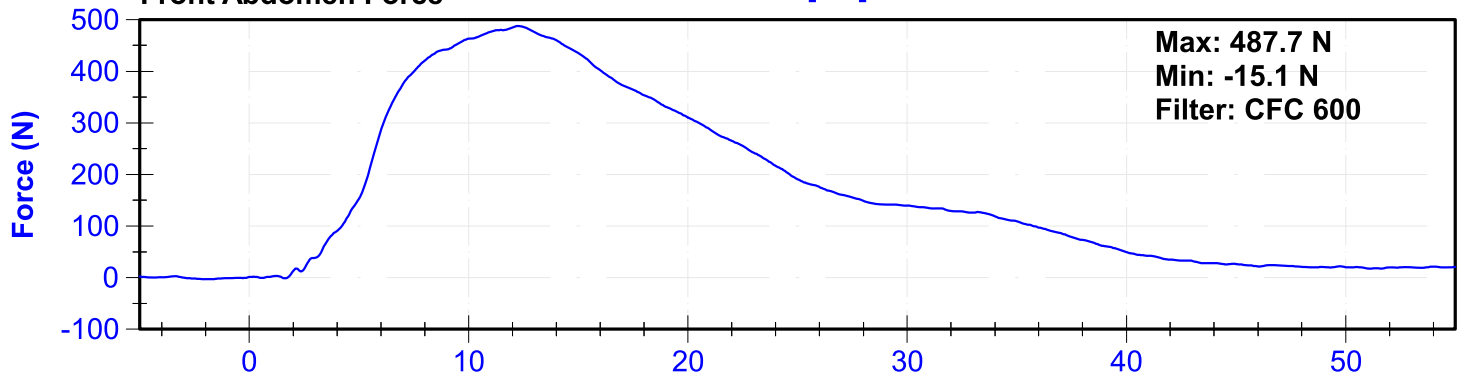
Probe Force



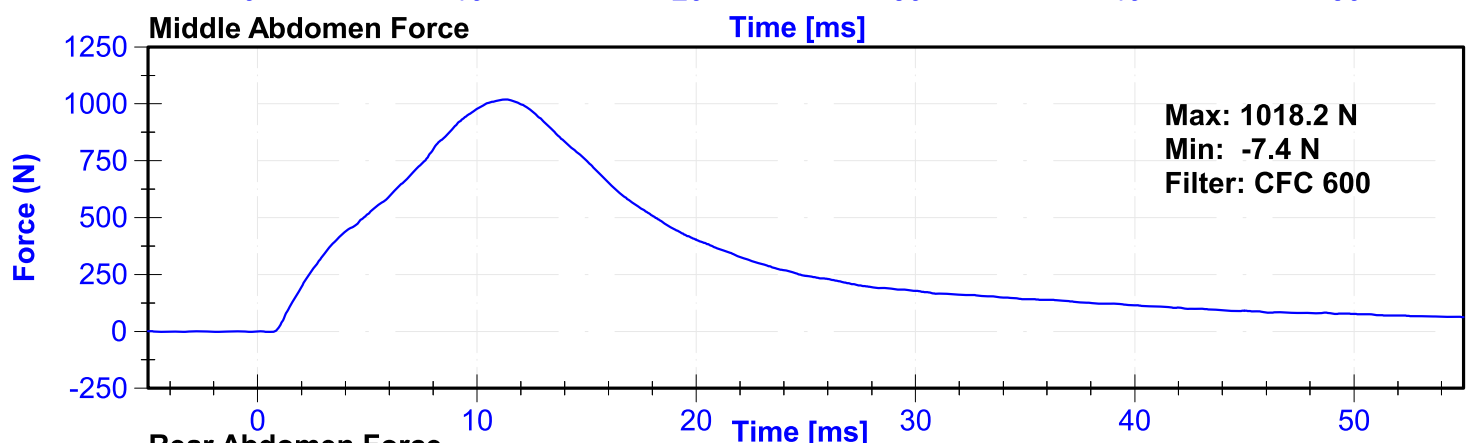
Combined Abdomen Force



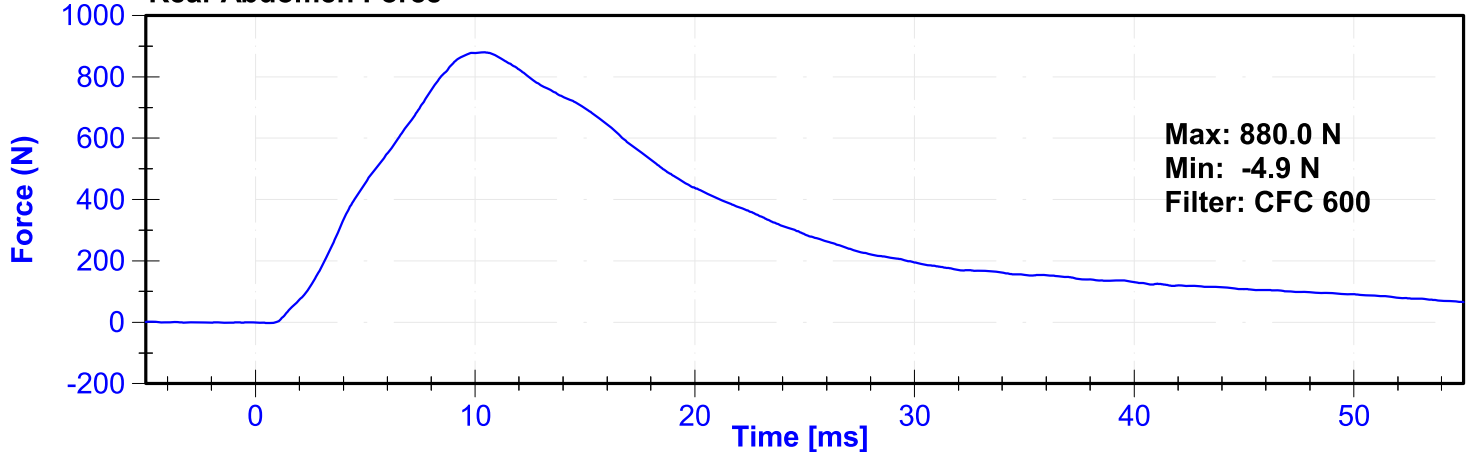
Front Abdomen Force



Middle Abdomen Force



Rear Abdomen Force





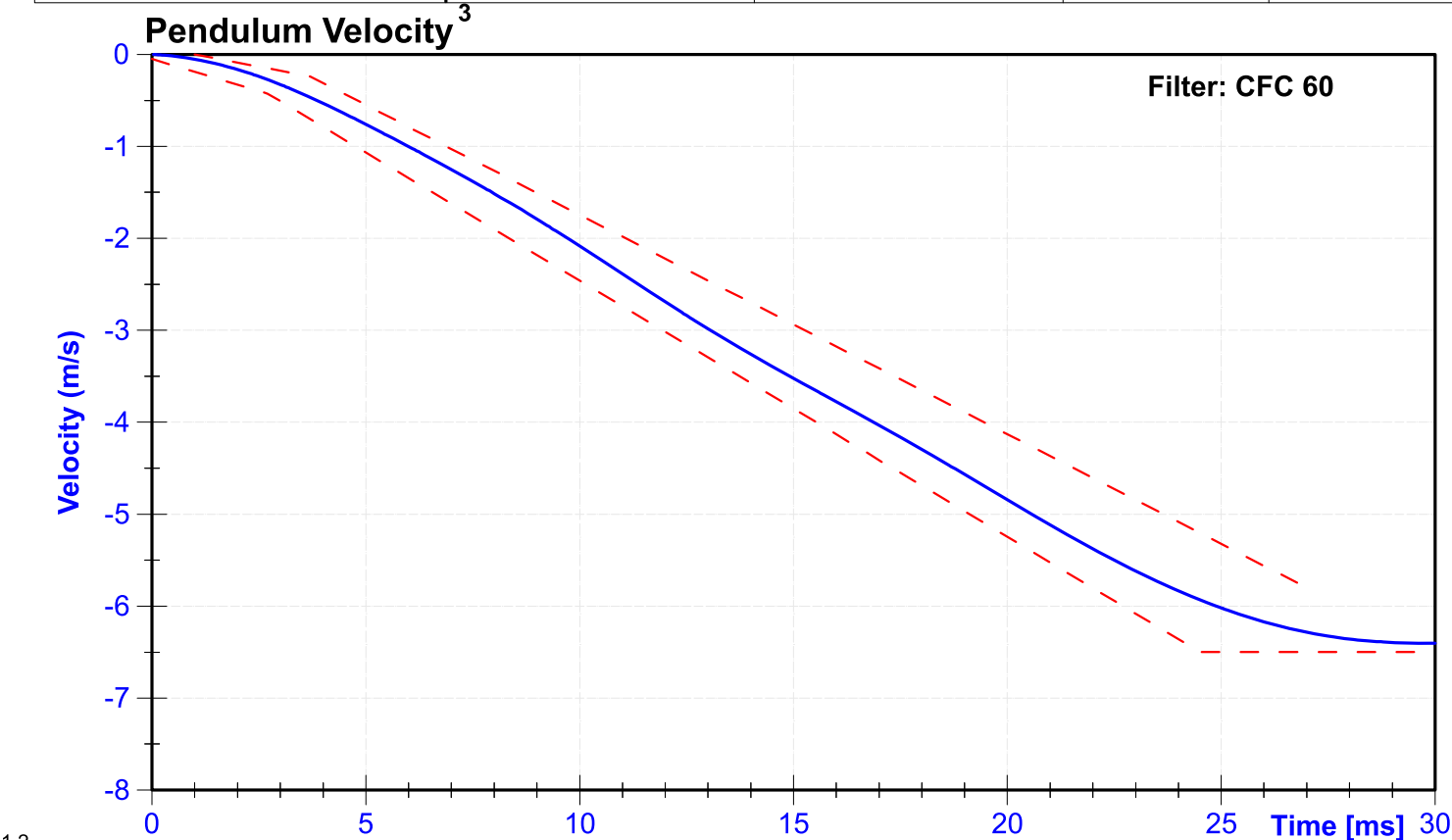
ATD Manufacturer	Denton	Test Technician	J. Kinderman
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

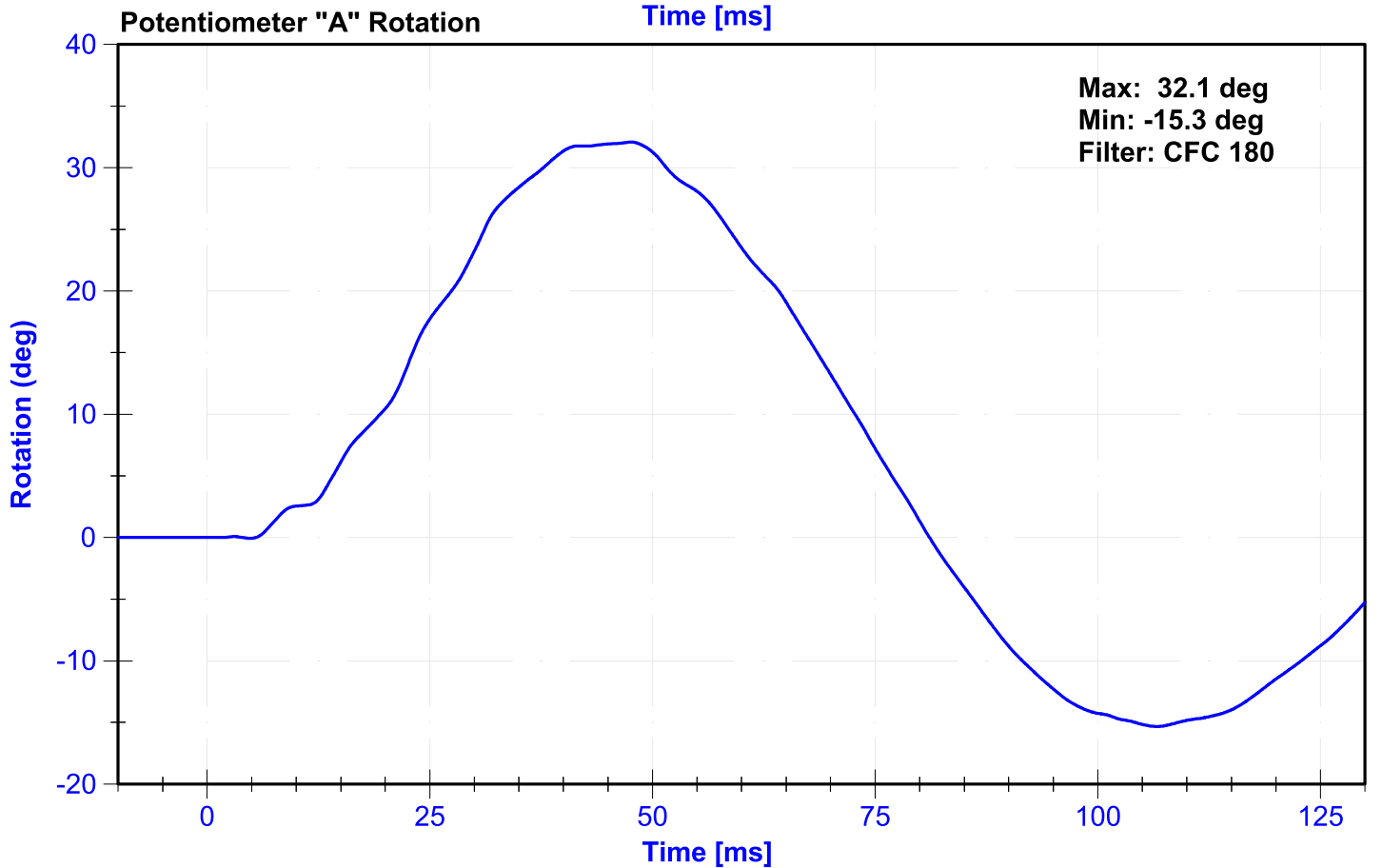
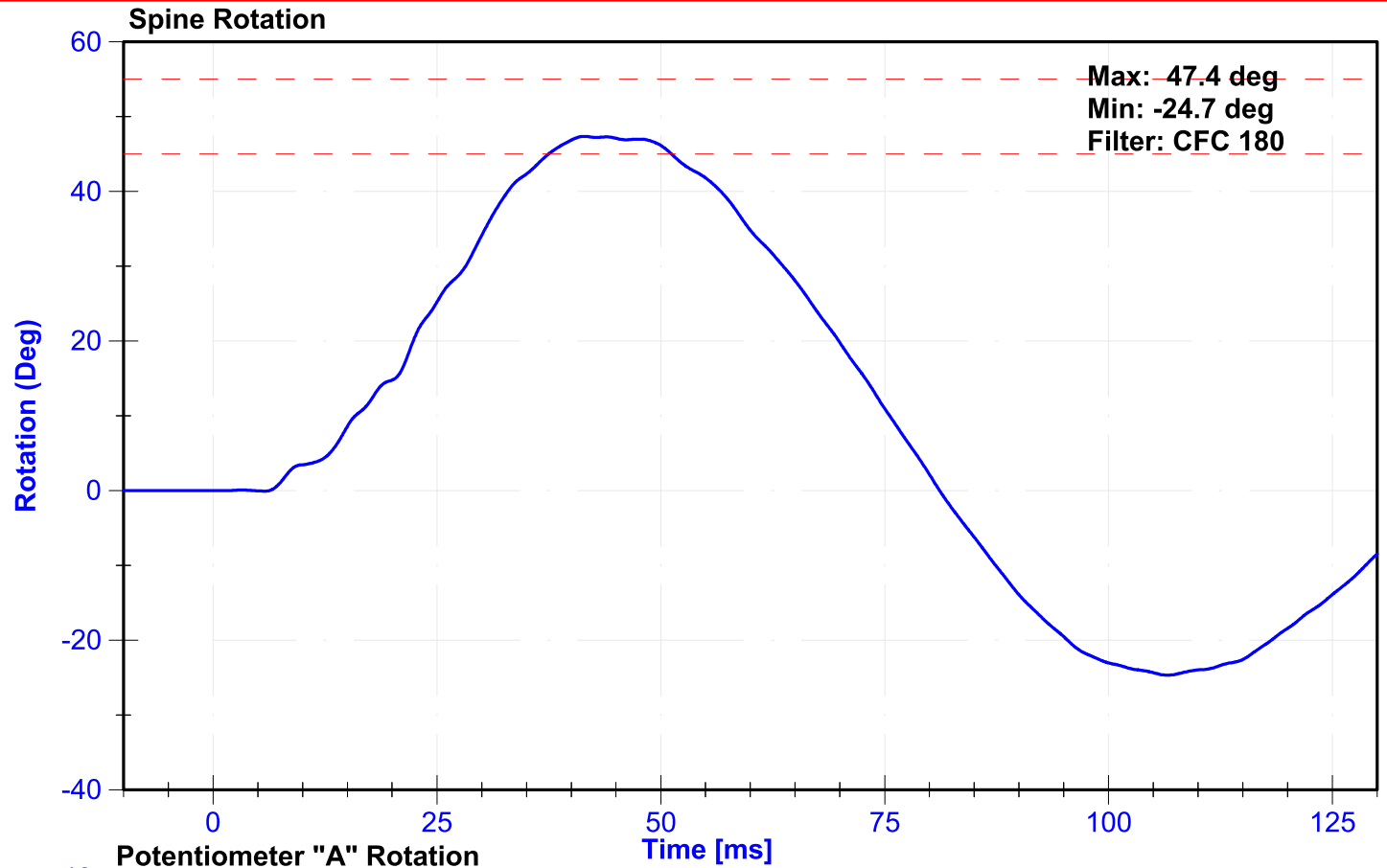
Results

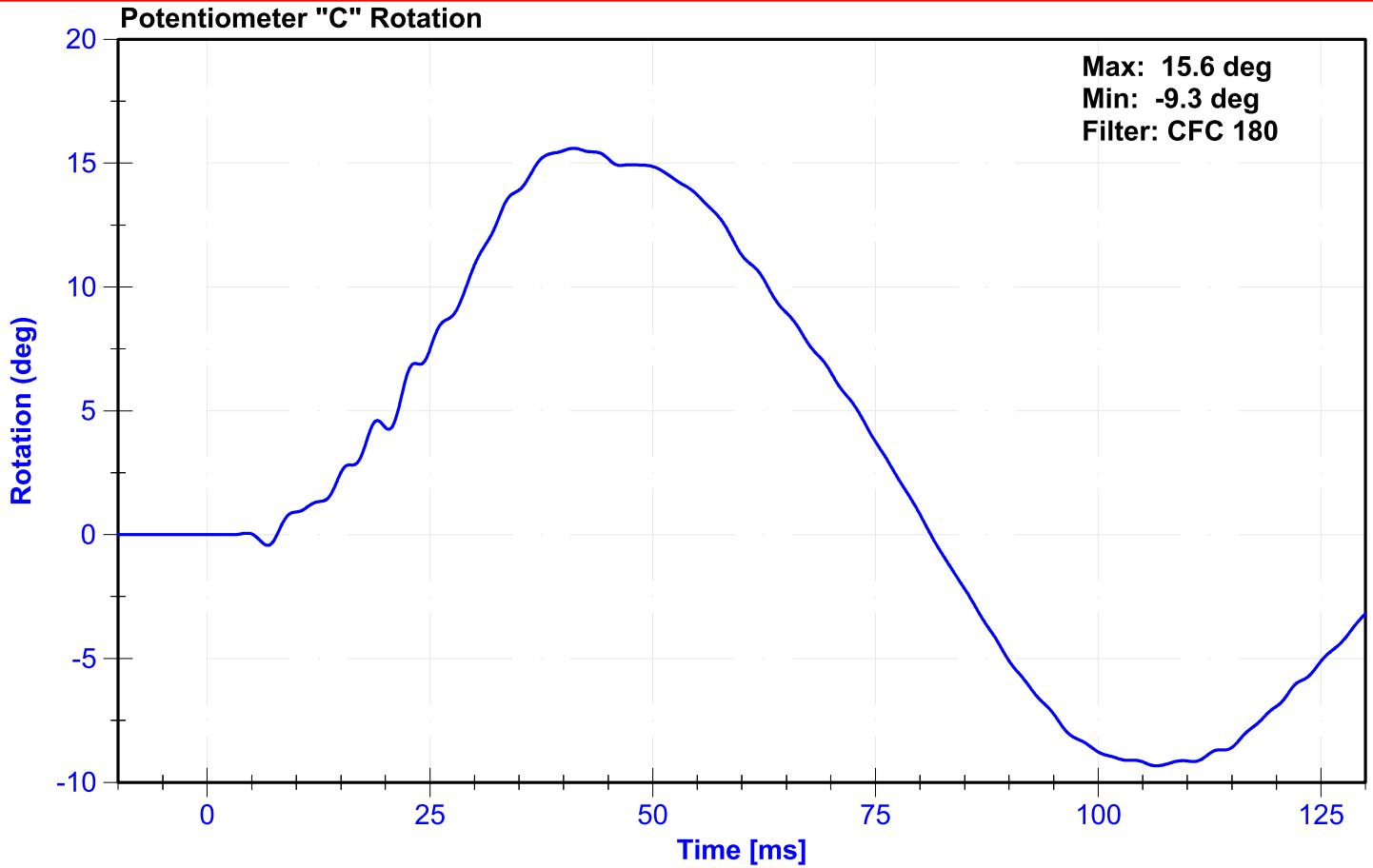
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	40	Pass
Velocity	5.95	6.15	m/s	6.122	Pass
Lateral Spine Rotation	45	55	deg	47.4	Pass
Time at Maximum Rotation	39	53	ms	41.4	Pass
Time of Decay to Zero Degrees	37	57	ms	39.7	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	C16503	4/29/2024	10/26/2024
Pendulum "A" Potentiometer	Sfernice	2247	9/13/2024	9/13/2025
Condyle "B" Potentiometer	Sfernice	095	9/13/2024	9/13/2025







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

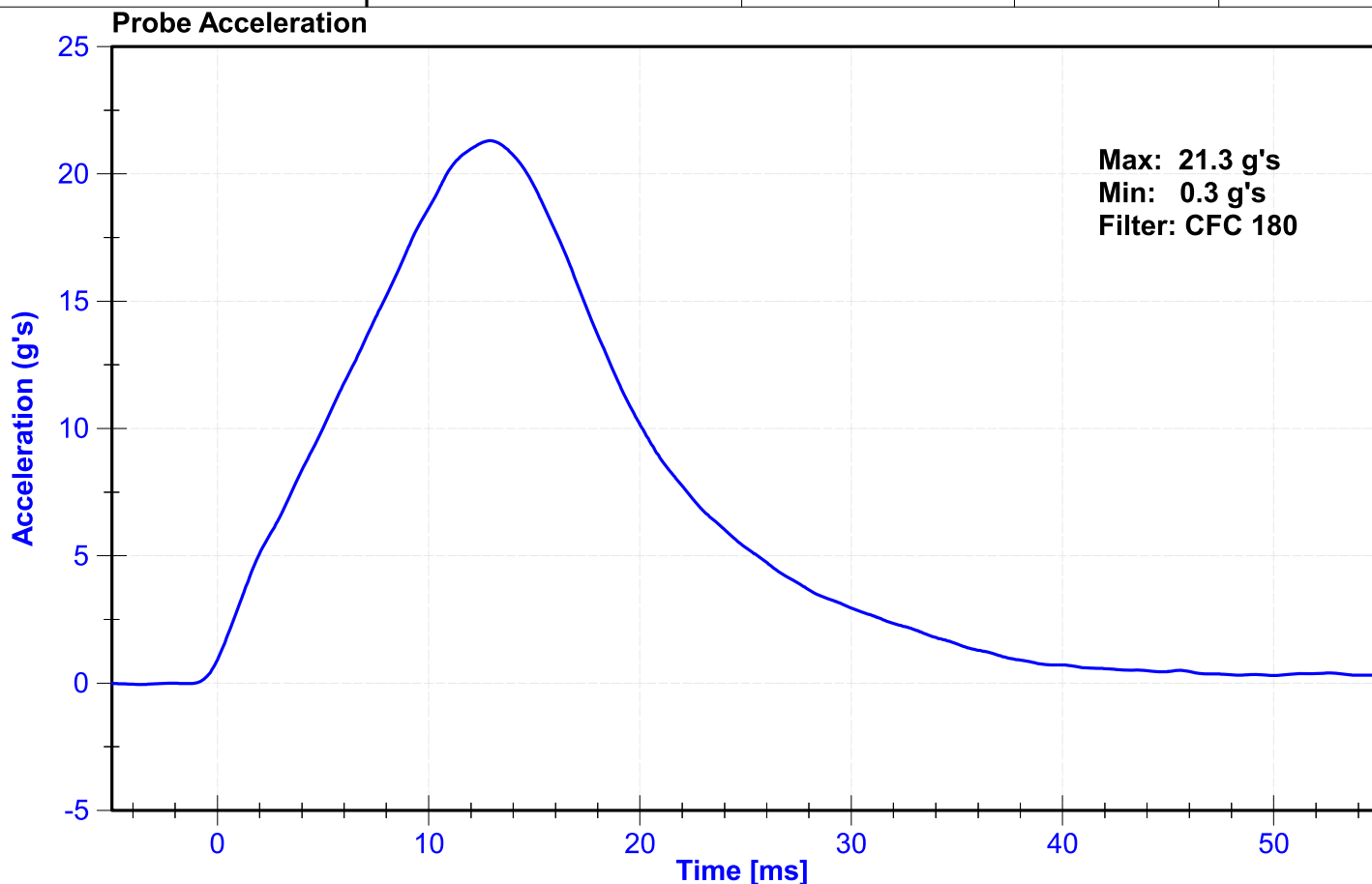
ATD Manufacturer	Denton	Test Technician	J. Kinderman
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

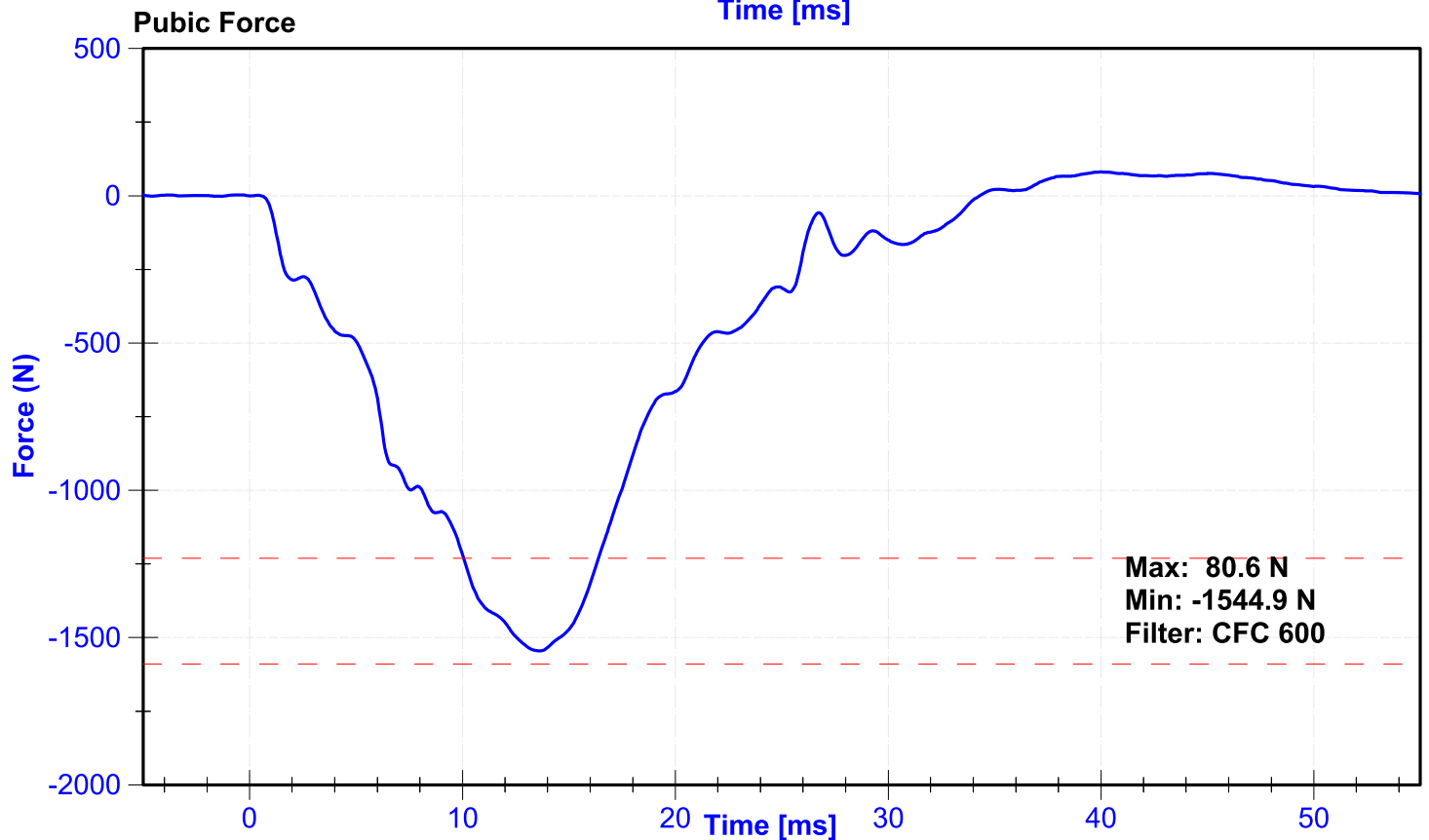
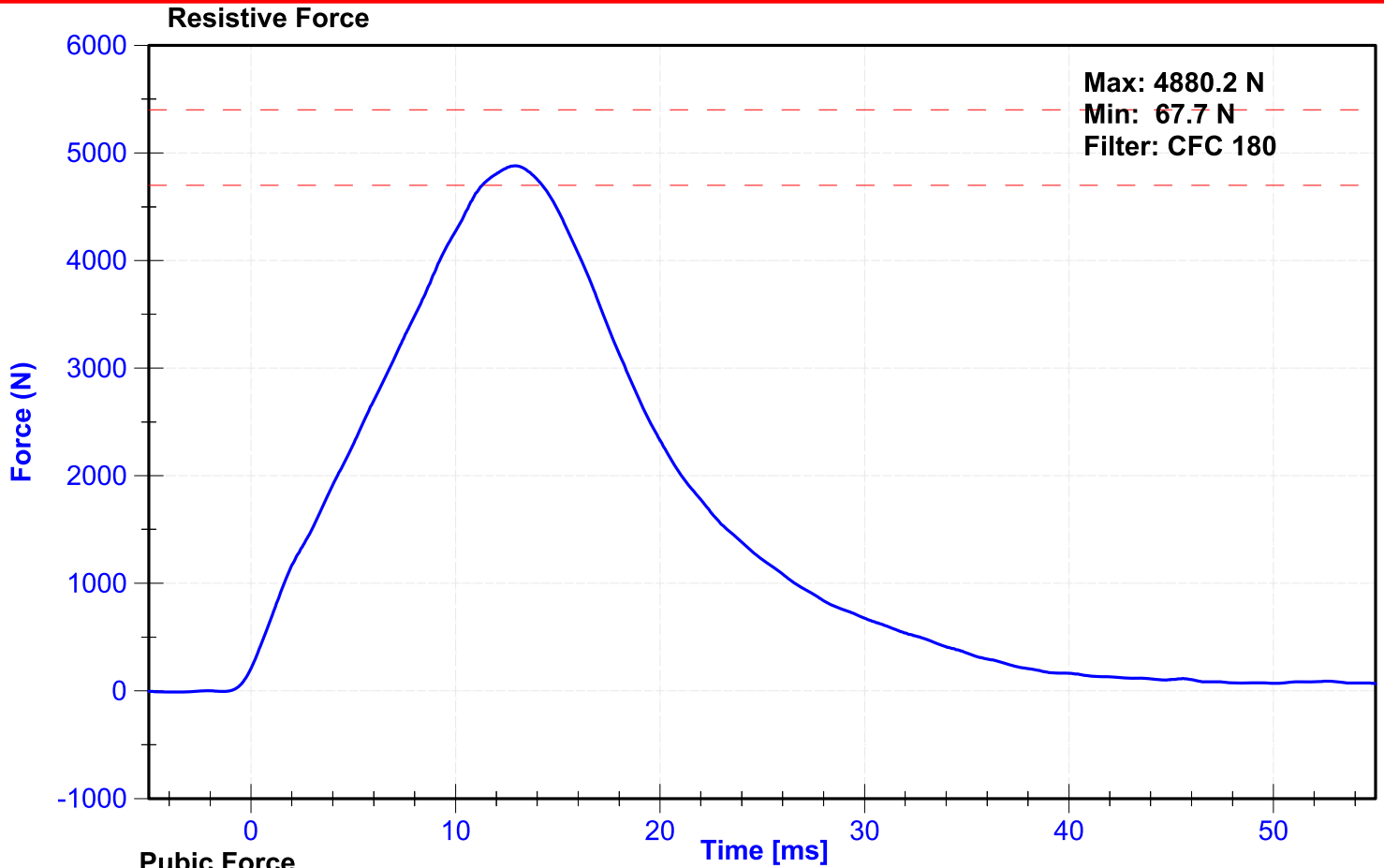
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	40	Pass
Velocity	4.2	4.4	m/s	4.28	Pass
Resistive Force	4700	5400	N	4880.2	Pass
Time at Peak Resistive Force	11.8	16.1	ms	12.90	Pass
Pubic Force	-1590	-1230	N	-1544.9	Pass
Time at Peak Pubic Force	12.2	17.0	ms	13.60	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18599	9/13/2024	3/12/2025
Pubic Load Cell	Denton	464-FY	9/16/2024	9/16/2025





POST-TEST DUMMY PERFORMANCE CALIBRATION TEST DATA
(Subpart U, ES-2re)

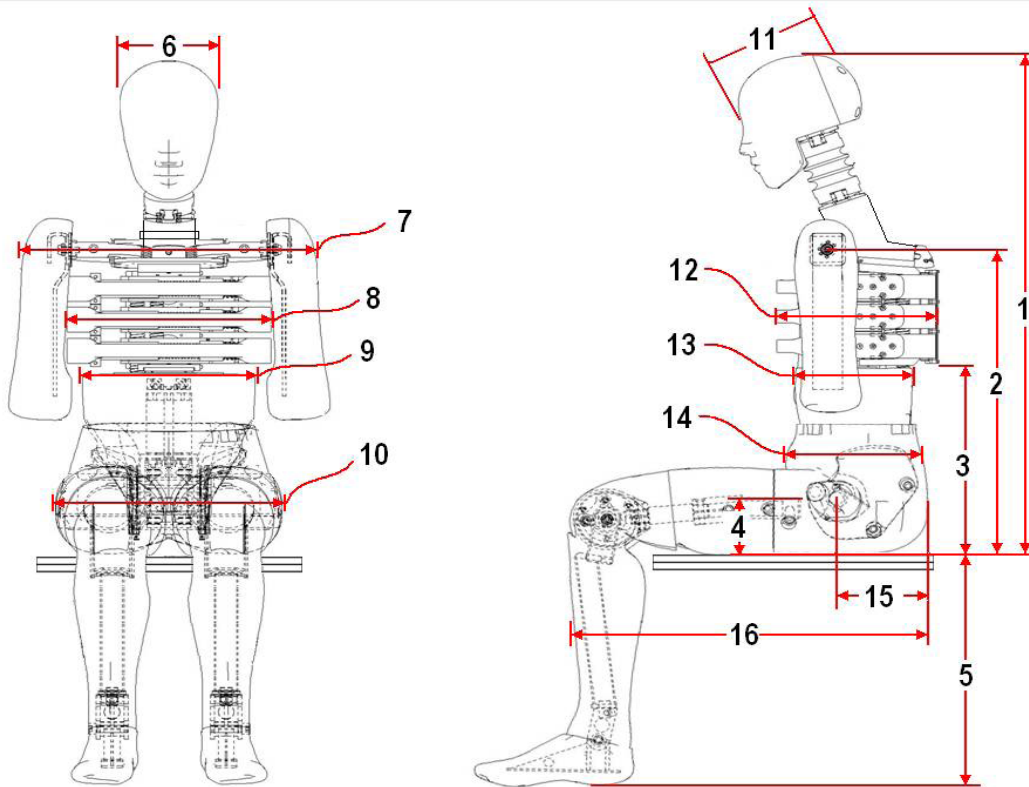


External Measurements - EuroSID-2re

Technician: J. Rios

Date: 10/31/2024

Dummy Serial Number: D037



FRONT VIEW

SIDE VIEW

Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	903	Pass
2	Seat to Shoulder Joint	558	572	559	Pass
3	Seat to Lower Face of Thoracic Spine Box	346	356	354	Pass
4	Seat to Hip Joint (center of bolt)	97	103	98	Pass
5	Sole to Seat, Sitting	333	451	427	Pass
6	Head Width	152	158	153	Pass
7	Shoulder/Arm Width	461	479	470	Pass
8	Thorax Width	322	332	330	Pass
9	Abdomen Width	273	287	285	Pass
10	Pelvis Lap Width	359	373	362	Pass
11	Head Depth	196	206	198	Pass
12	Thorax Depth	262	272	265	Pass
13	Abdomen Depth	194	204	196	Pass
14	Pelvis Depth	235	245	238	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

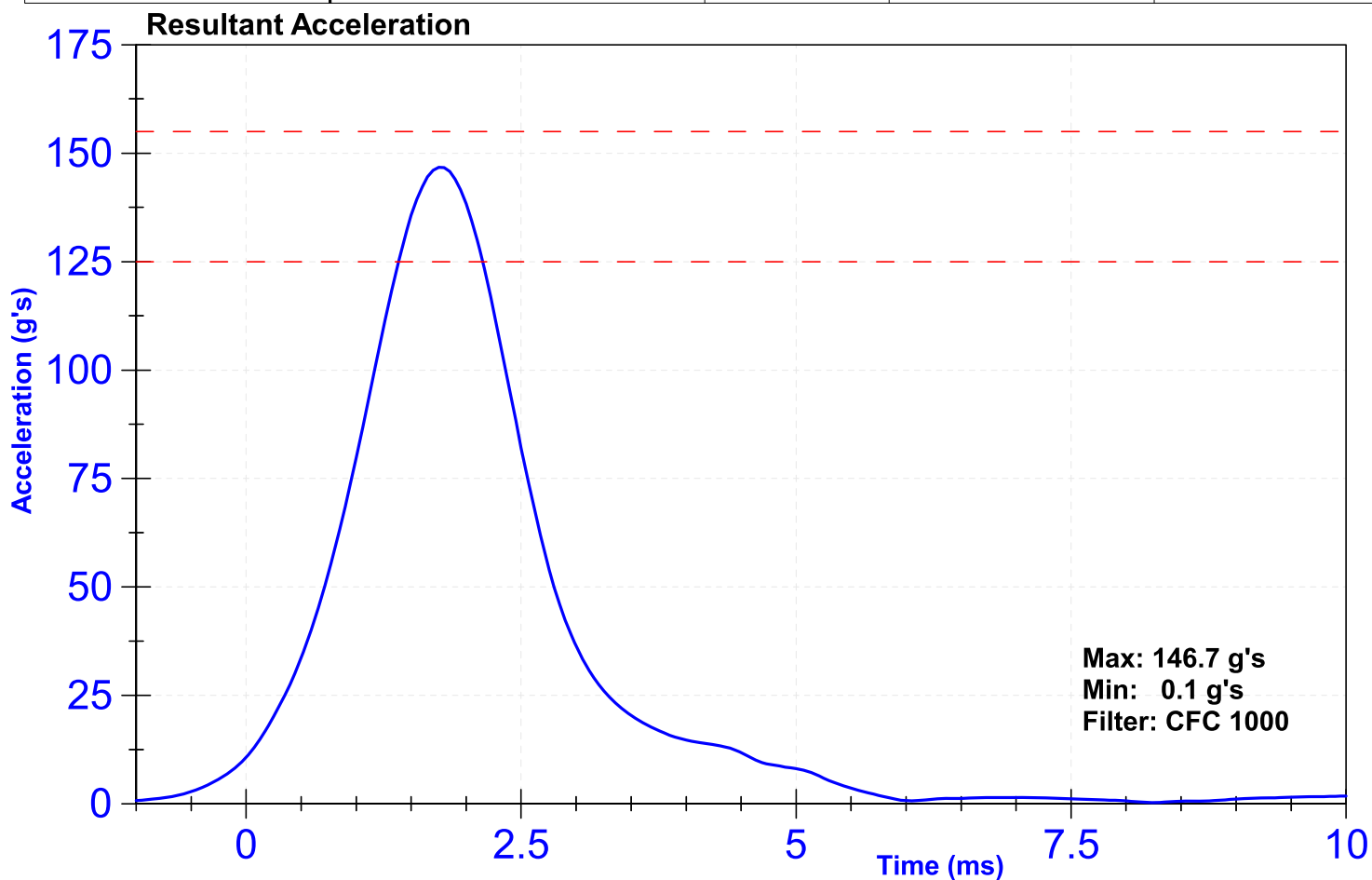
ATD Manufacturer	Denton	Test Technician	J. Kinderman
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

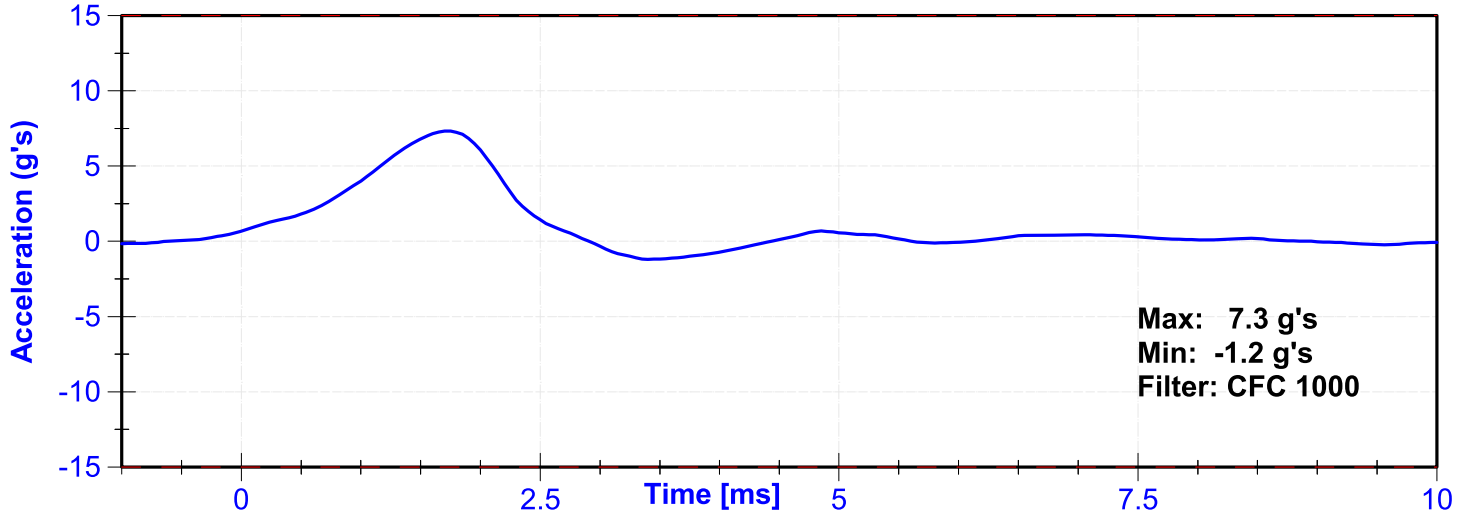
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	41	Pass
Resultant Acceleration	125	155	g's	146.7	Pass
Oscillation	0	15	%	1.20	Pass
Fore-Aft Acceleration	-15	15	g's	7.3	Pass

Transducer Calibrations

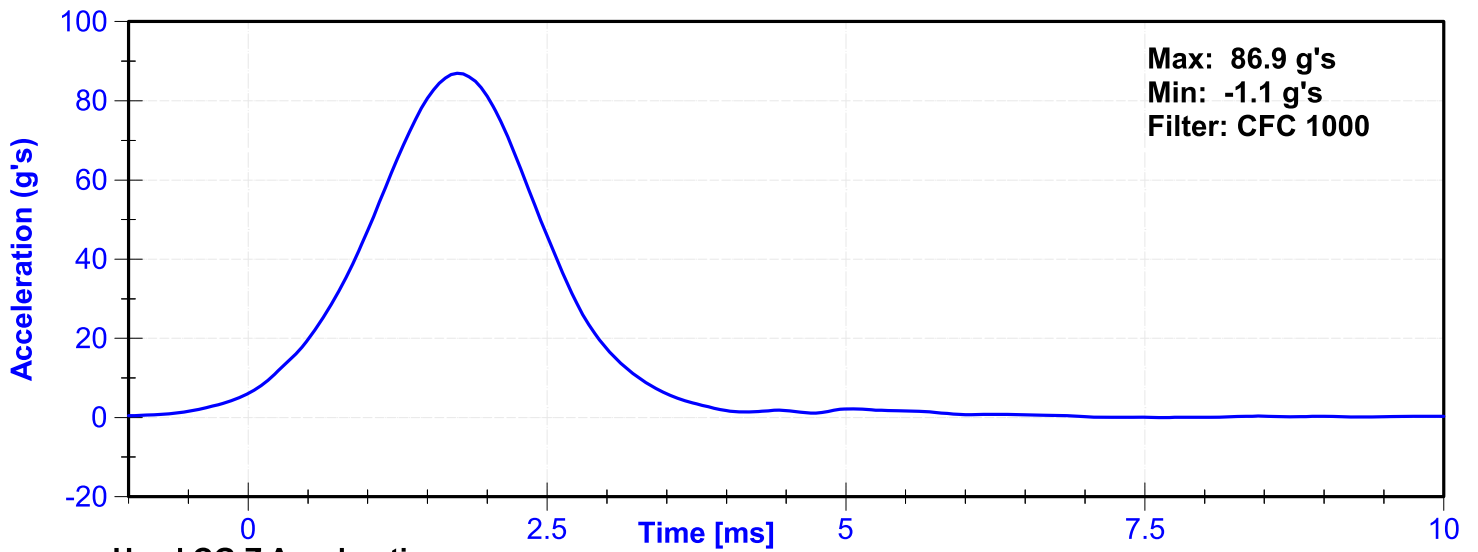
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	T21724	10/8/2024	4/6/2025
Y Accelerometer	Endevco	T22281	10/8/2024	4/6/2025
Z Accelerometer	Endevco	T26050	10/8/2024	4/6/2025



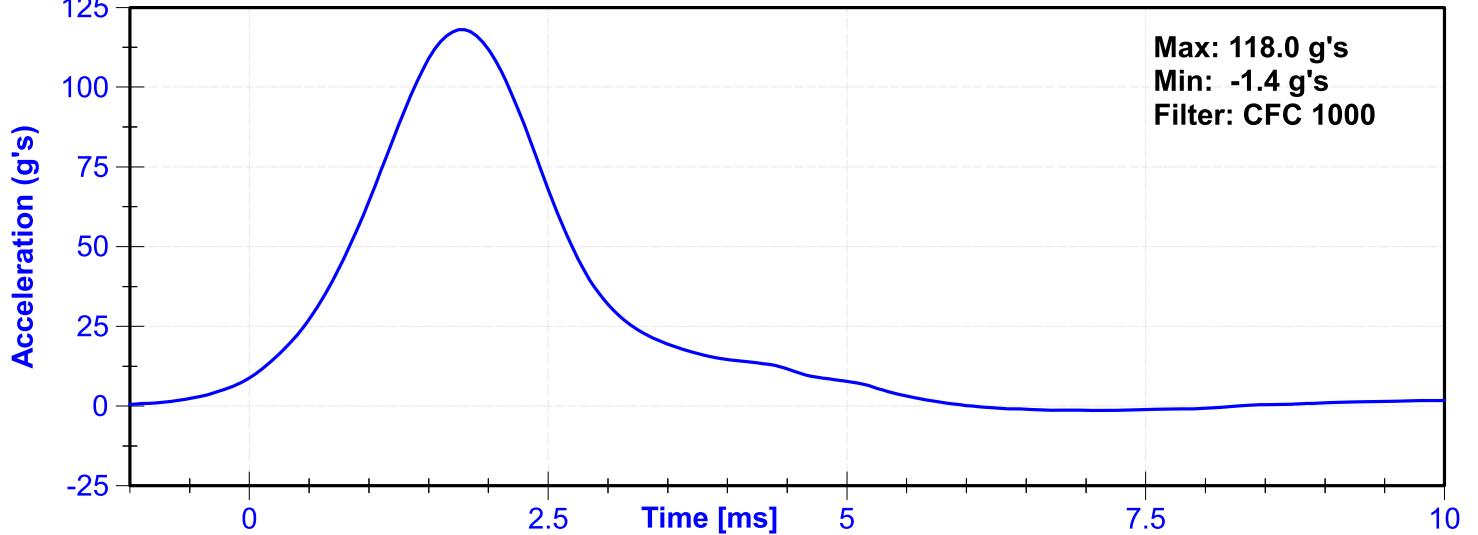
Head CG X Acceleration



Head CG Y Acceleration



Head CG Z Acceleration



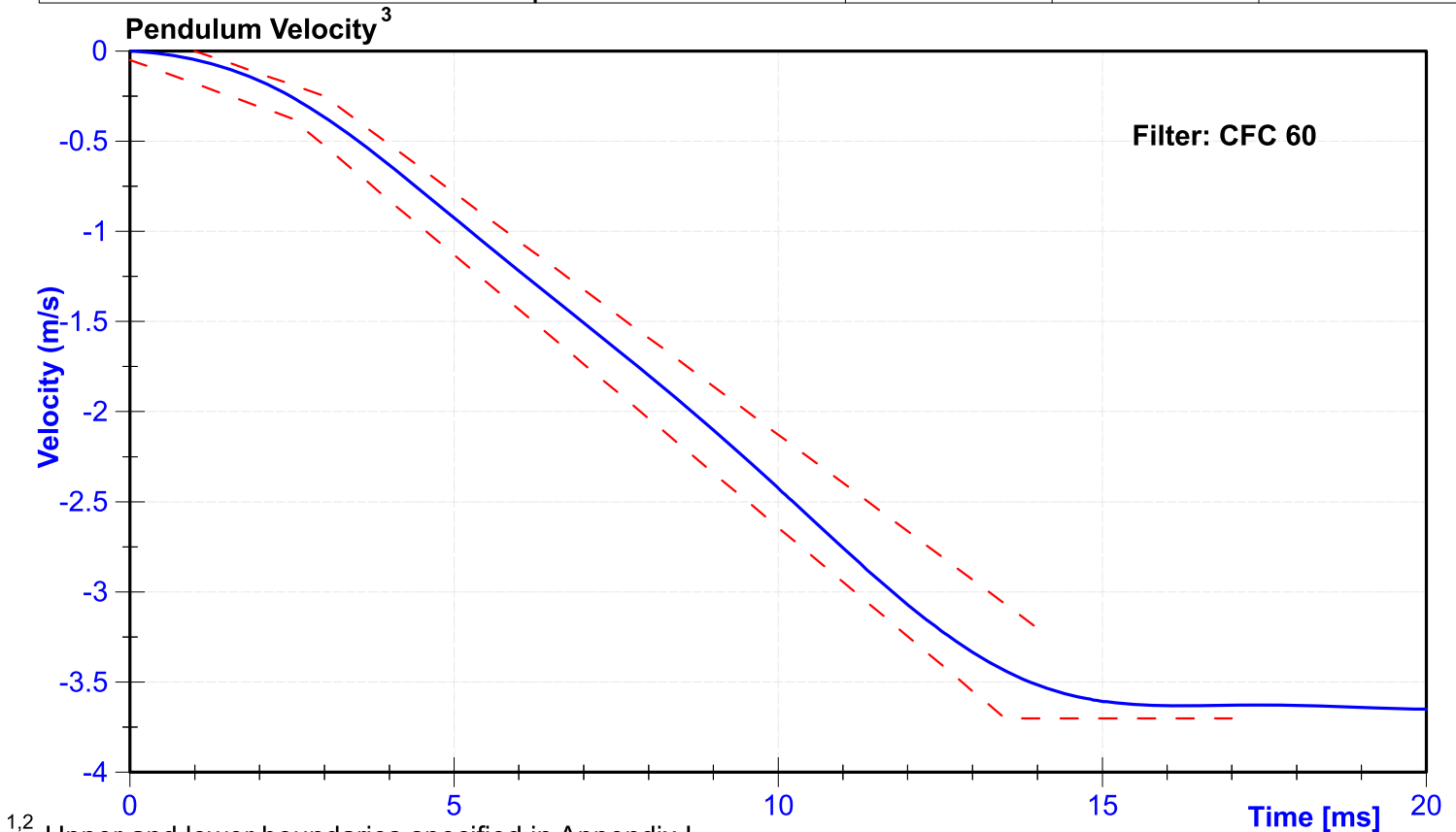
ATD Manufacturer	Denton	Test Technician	J. Kinderman
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

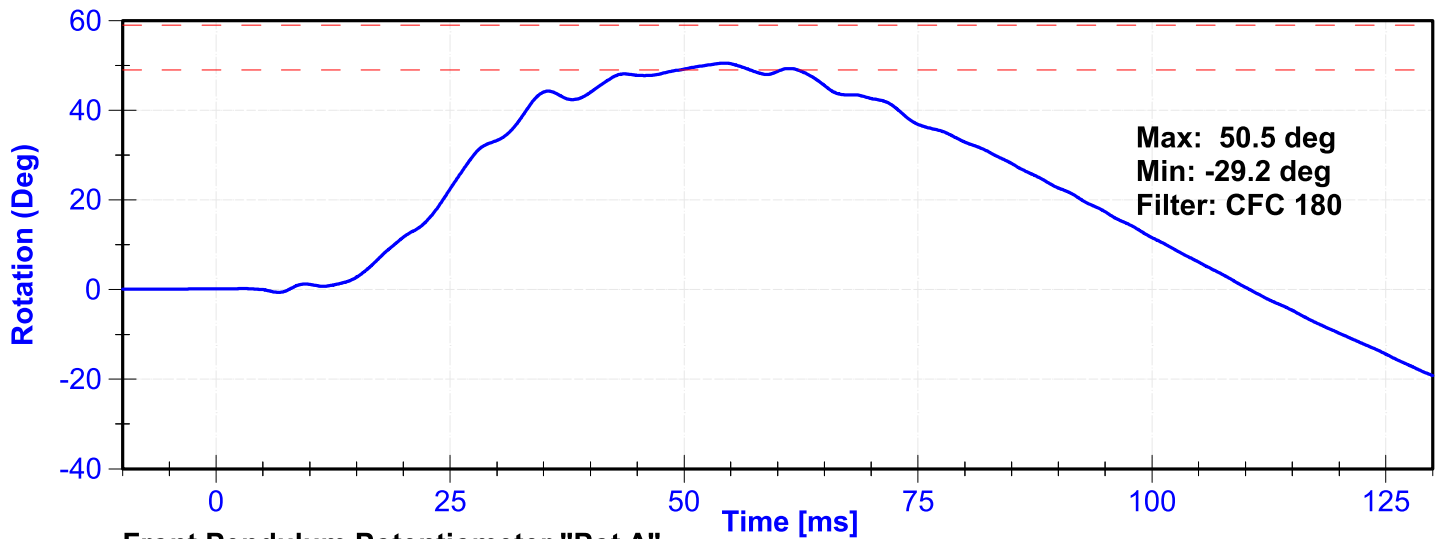
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	40	Pass
Velocity	3.3	3.5	m/s	3.45	Pass
Lateral Neck Rotation	49	59	deg	50.5	Pass
Time at Maximum Rotation	54	66	ms	54.4	Pass
Time of Rotation Decay from Maximum	53	88	ms	56.0	Pass
Pendulum Velocity Overall Corridor	Lower Boundary ¹	Upper Boundary ²	m/s	See Plot ³	Pass

Transducer Calibrations

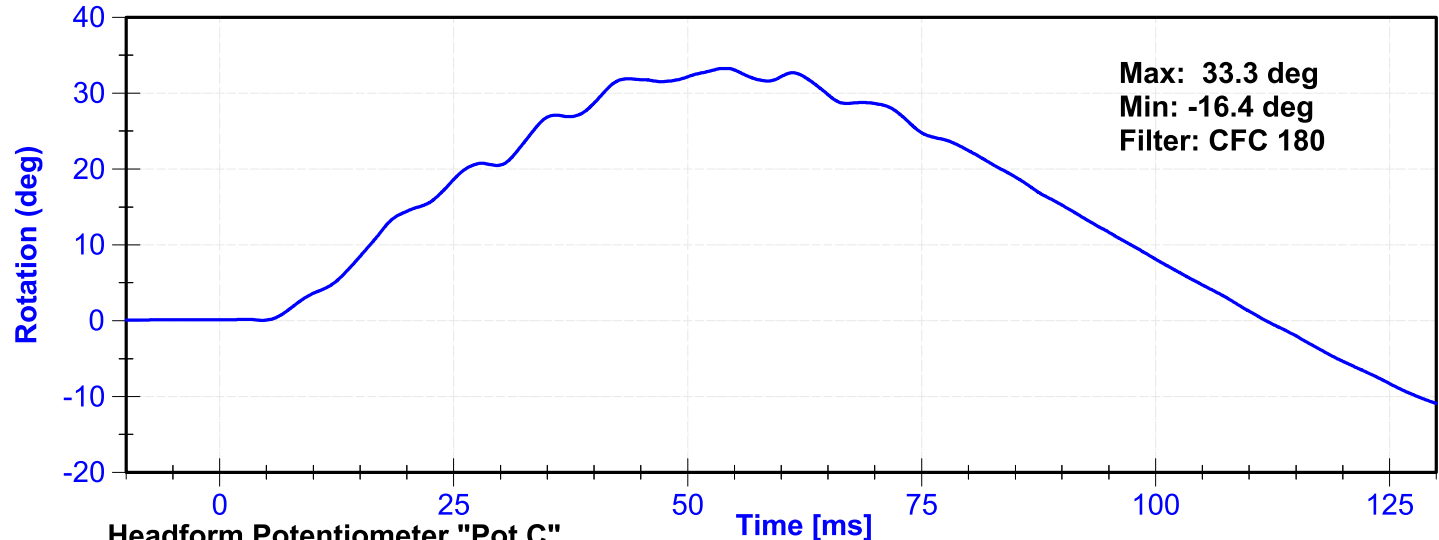
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16503	10/30/2024	4/28/2025
Front Pendulum Potentiometer	Sfernice	2247	9/13/2024	9/13/2025
Headform Potentiometer	Sfernice	095	9/13/2024	9/13/2025



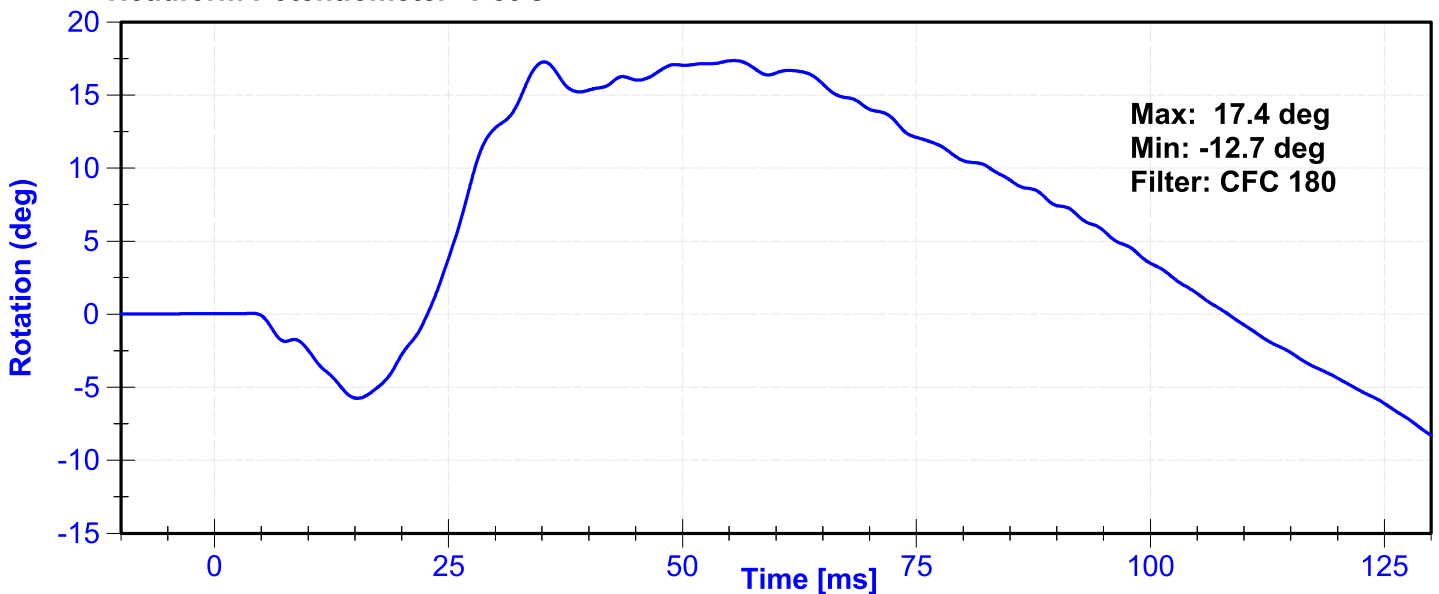
Neck Rotation



Front Pendulum Potentiometer "Pot A"



Headform Potentiometer "Pot C"



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

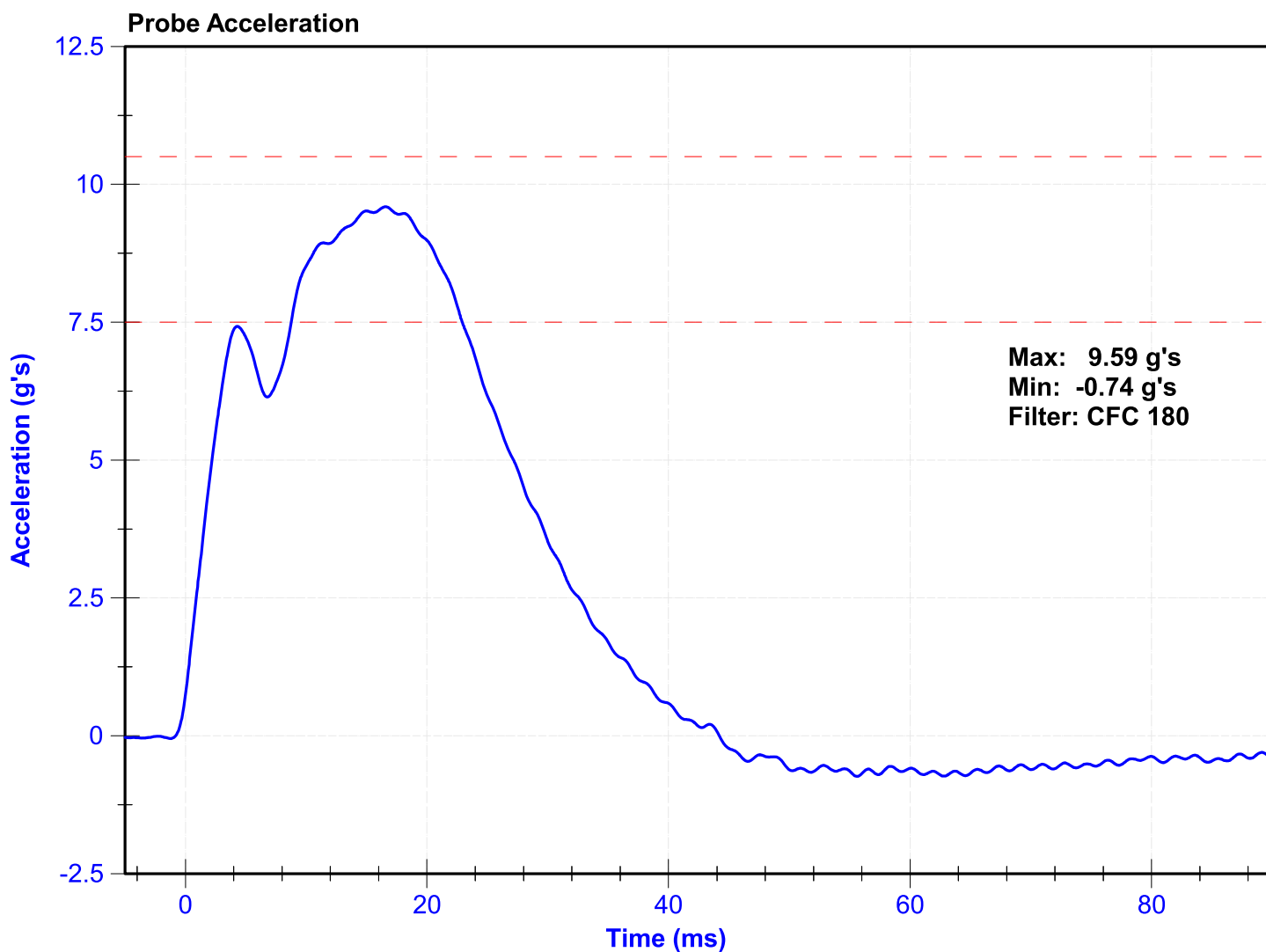
ATD Manufacturer	Denton	Test Technician	J. Kinderman
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	40	Pass
Velocity	4.2	4.4	m/s	4.28	Pass
Probe Acceleration	7.5	10.5	g's	9.59	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	18599	9/13/2024	3/12/2025



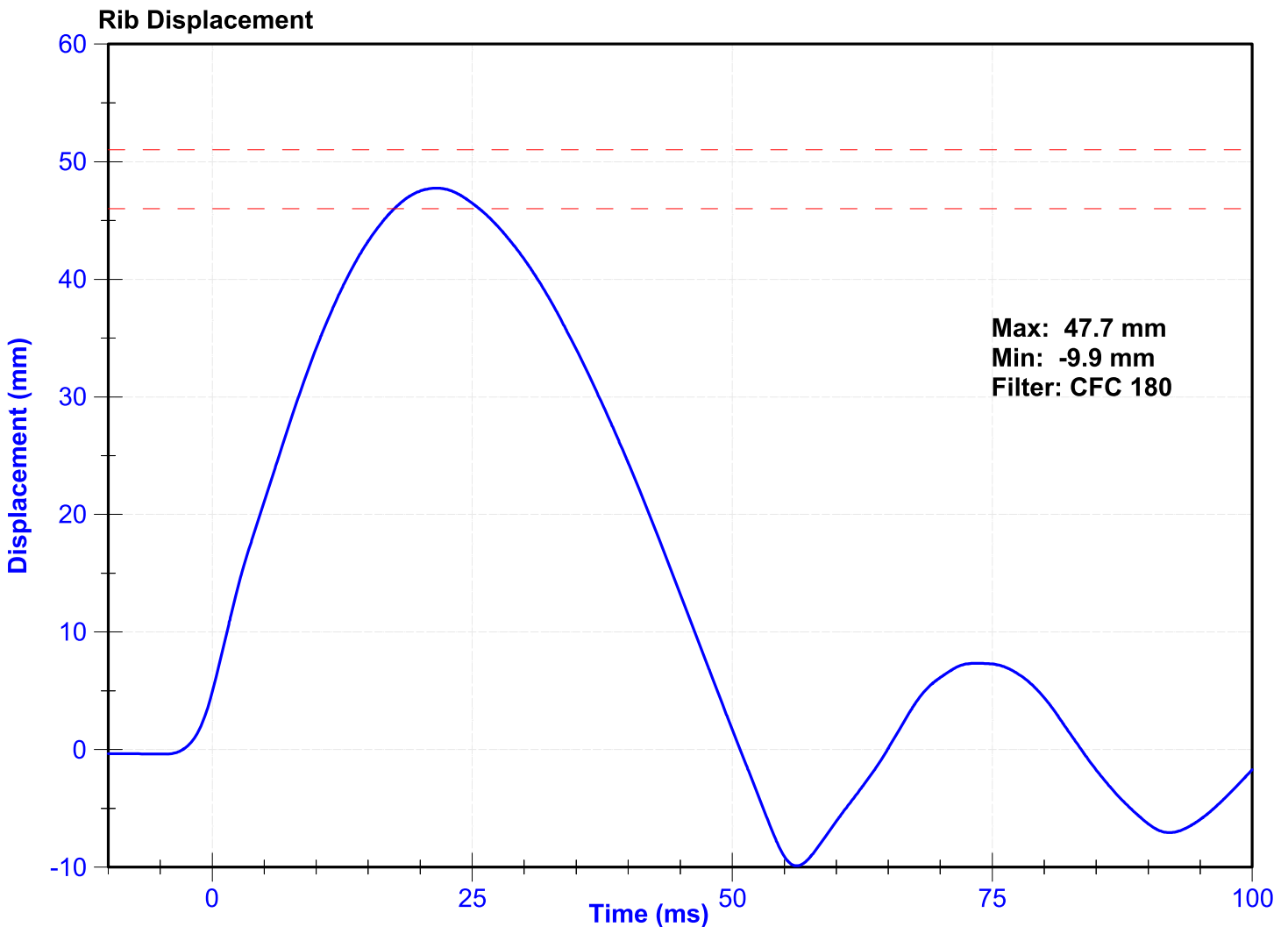
ATD Manufacturer	Denton	Test Technician	J.Kinderman
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	40	Pass
Rib Displacement	46	51	mm	47.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	0552-01	10/8/2024	4/8/2025



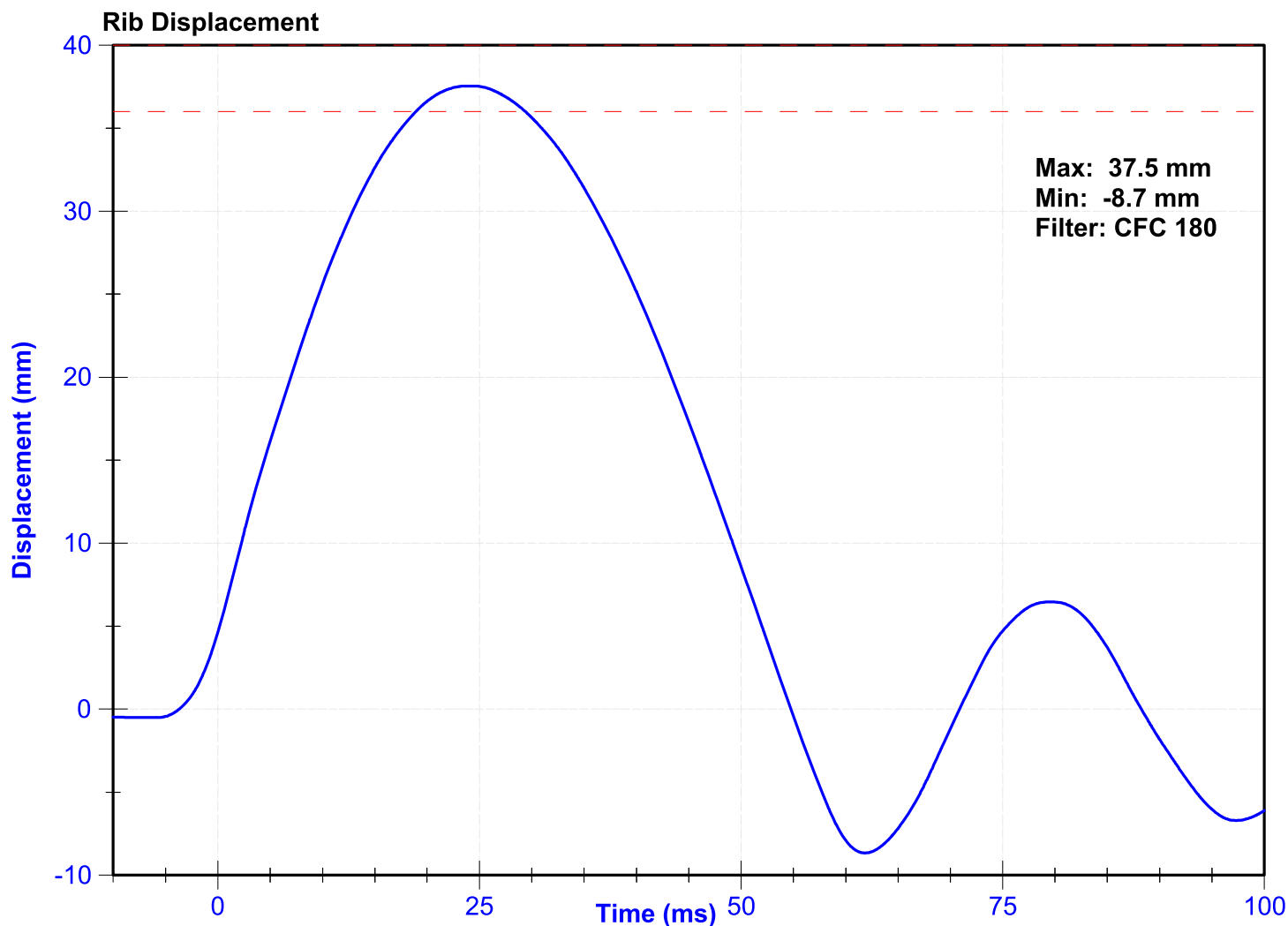
ATD Manufacturer	Denton	Test Technician	J.Kinderman
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	40	Pass
Rib Displacement	36	40	mm	37.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	0552-01	10/8/2024	4/8/2025



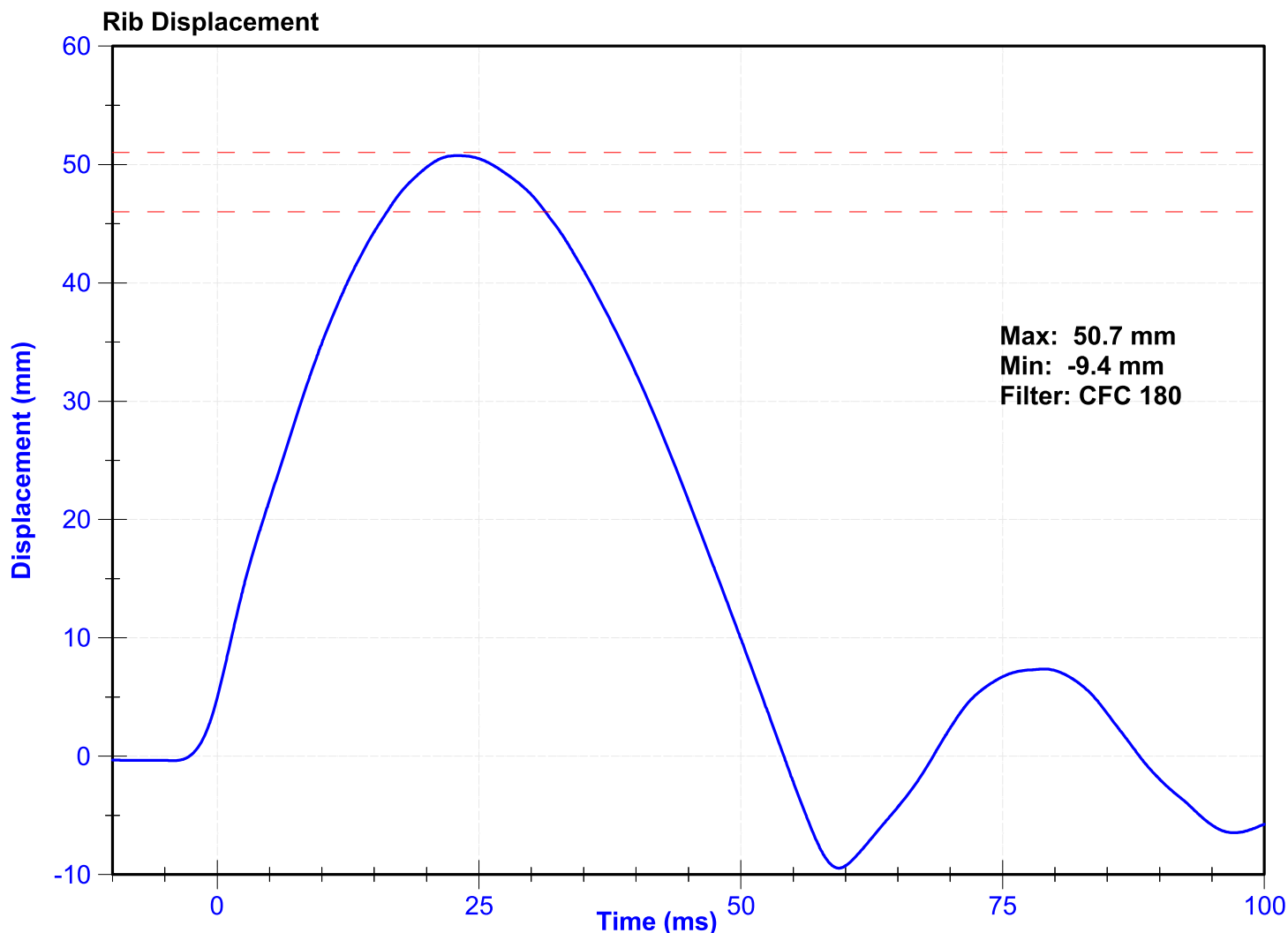
ATD Manufacturer	Denton	Test Technician	J.Kinderman
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	40	Pass
Rib Displacement	46	51	mm	50.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	807	10/8/2024	4/8/2025



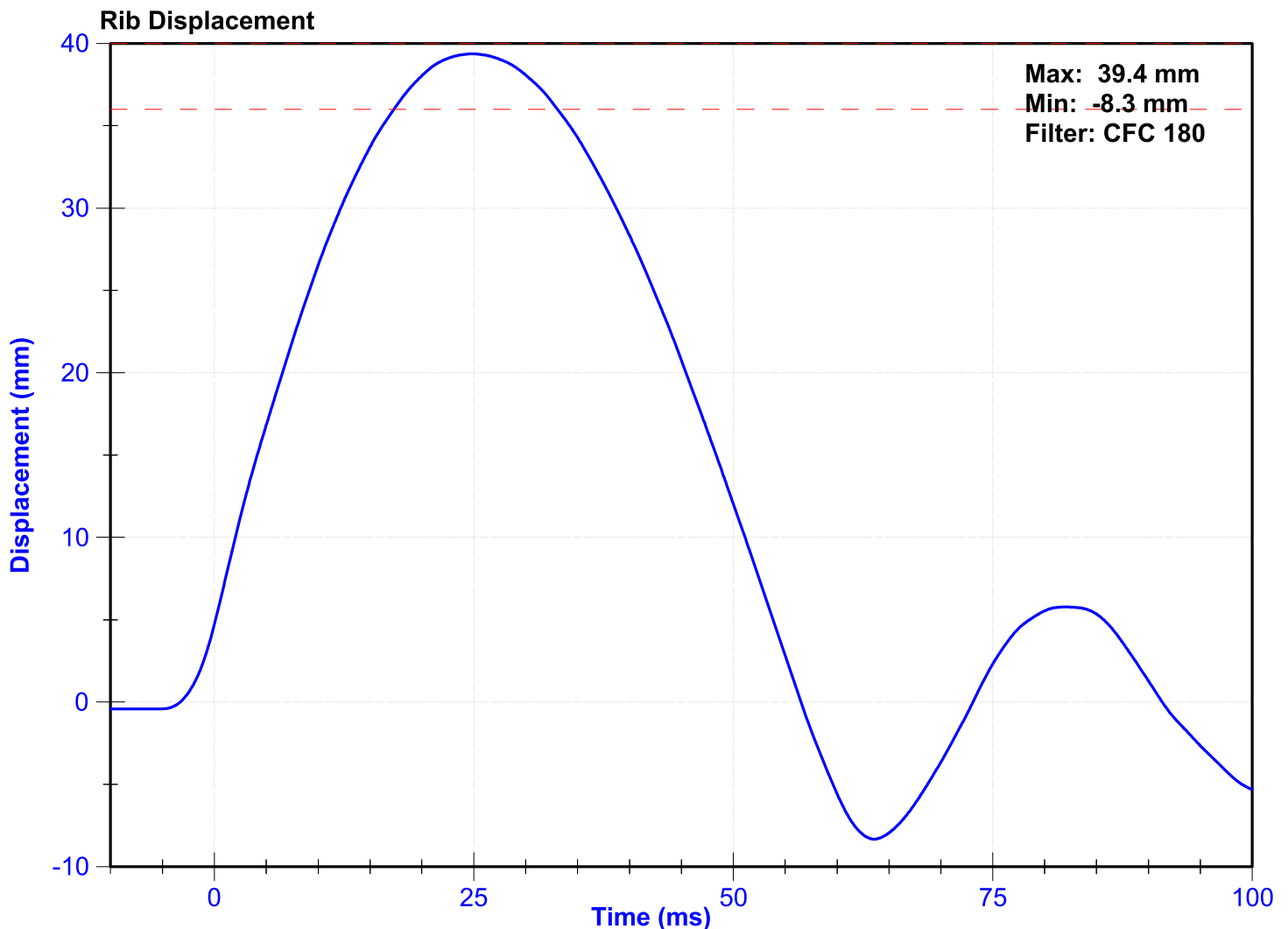
ATD Manufacturer	Denton	Test Technician	J.Kinderman
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	40	Pass
Rib Displacement	36	40	mm	39.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	807	10/8/2024	4/8/2025



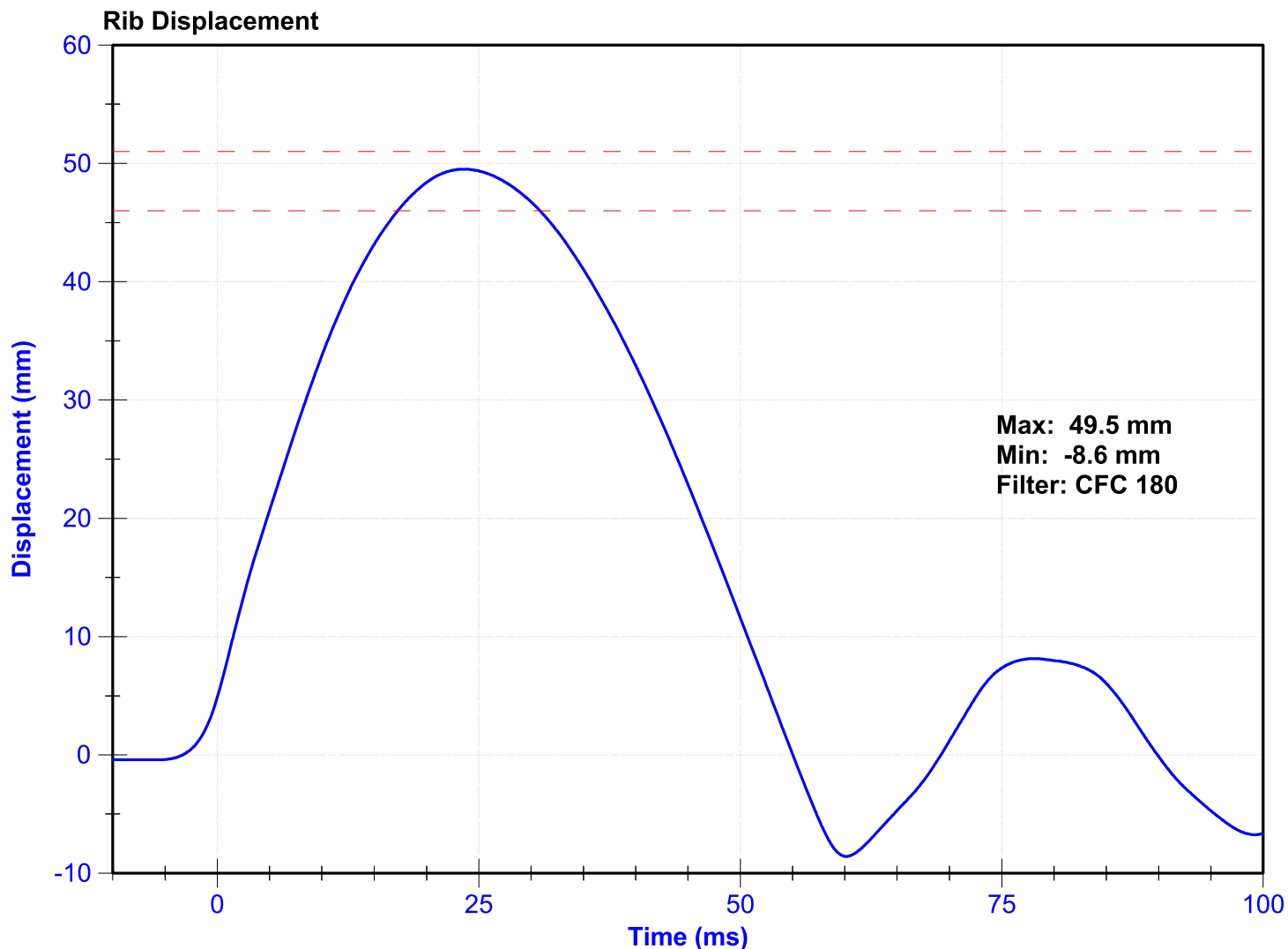
ATD Manufacturer	Denton	Test Technician	J.Kinderman
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	40	Pass
Rib Displacement	46	51	mm	49.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	0552-03	10/8/2024	4/8/2025



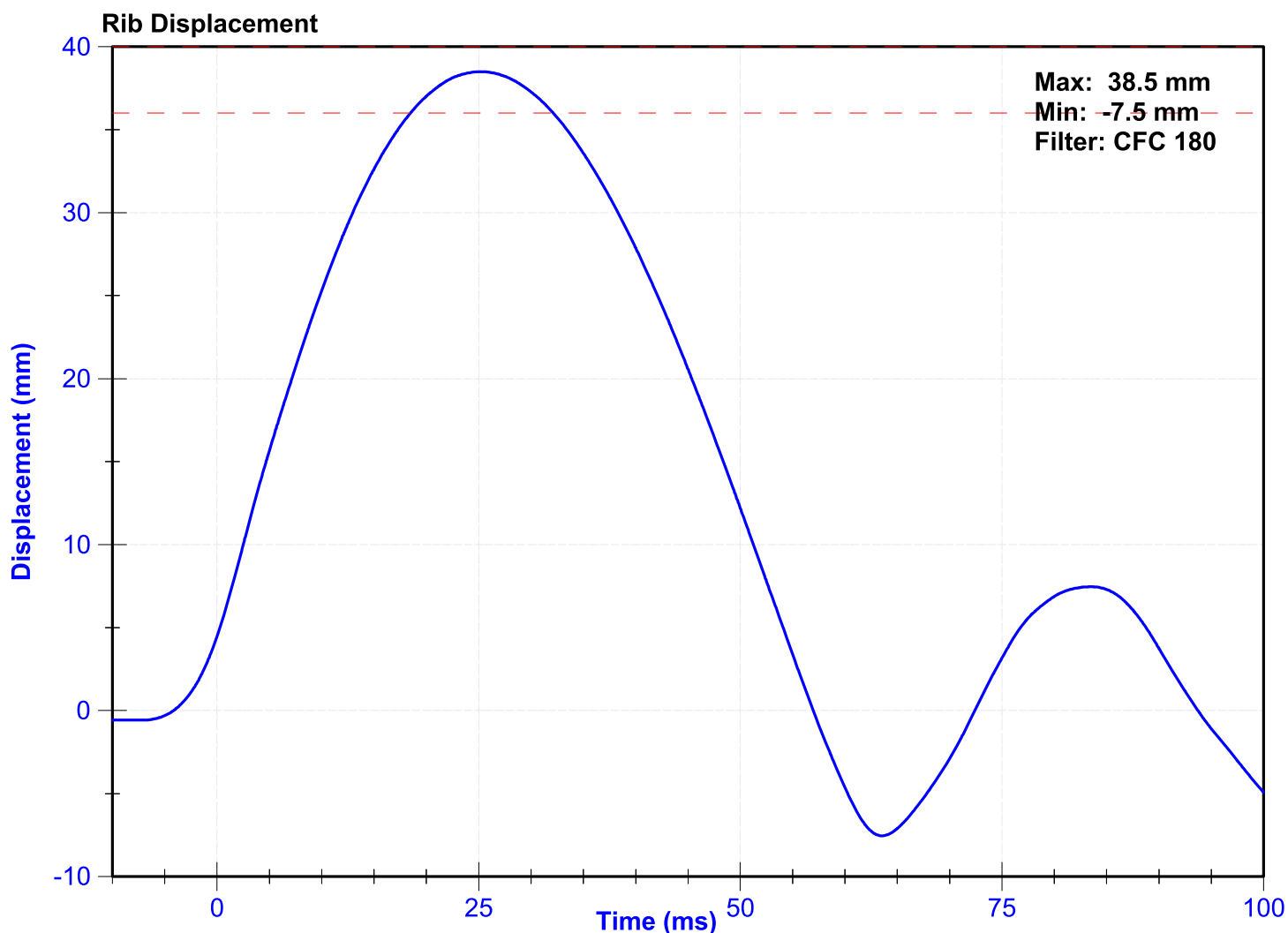
ATD Manufacturer	Denton	Test Technician	J.Kinderman
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	40	Pass
Rib Displacement	36	40	mm	38.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	0552-03	10/8/2024	4/8/2025



ATD Manufacturer	Denton	Test Technician	J. Kinderman
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

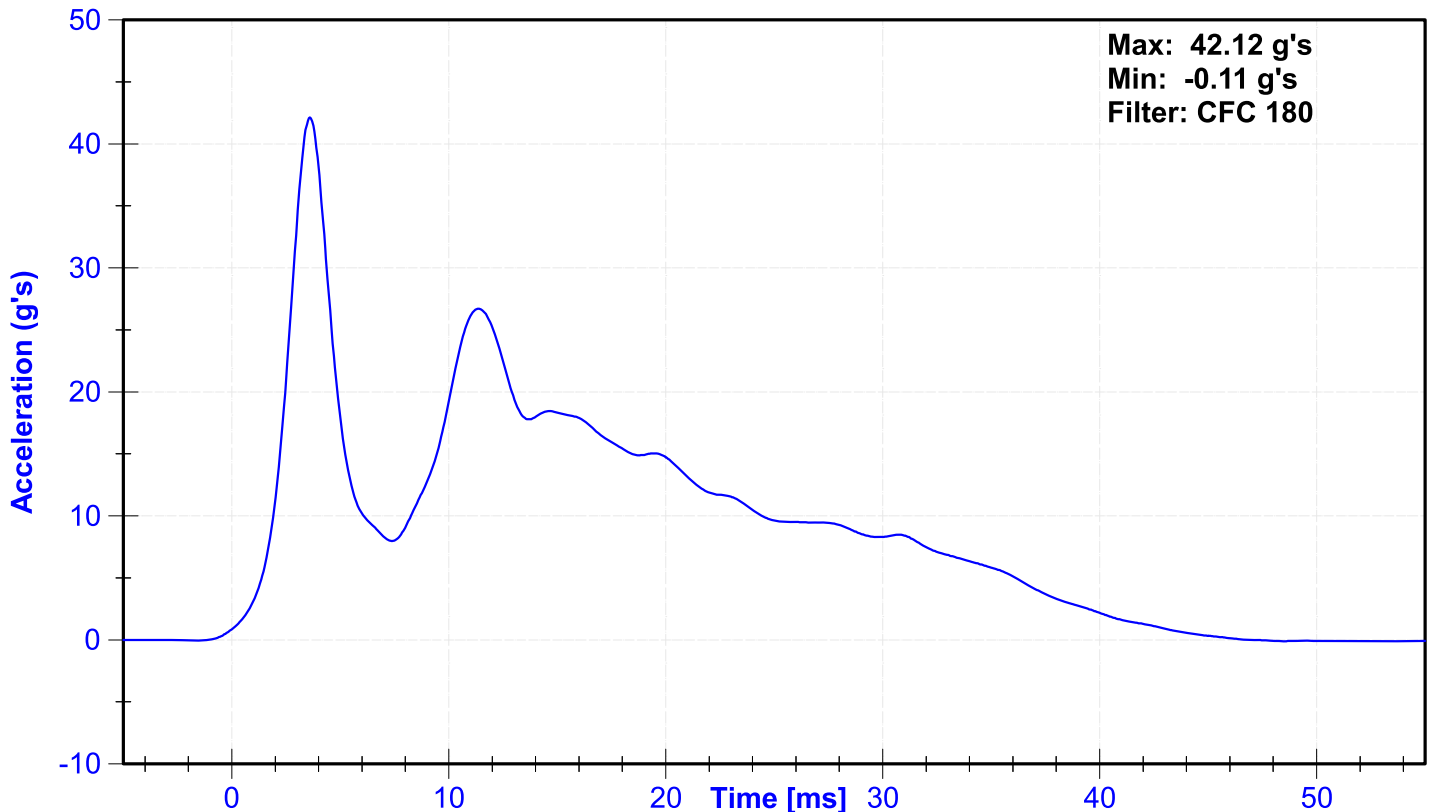
Results

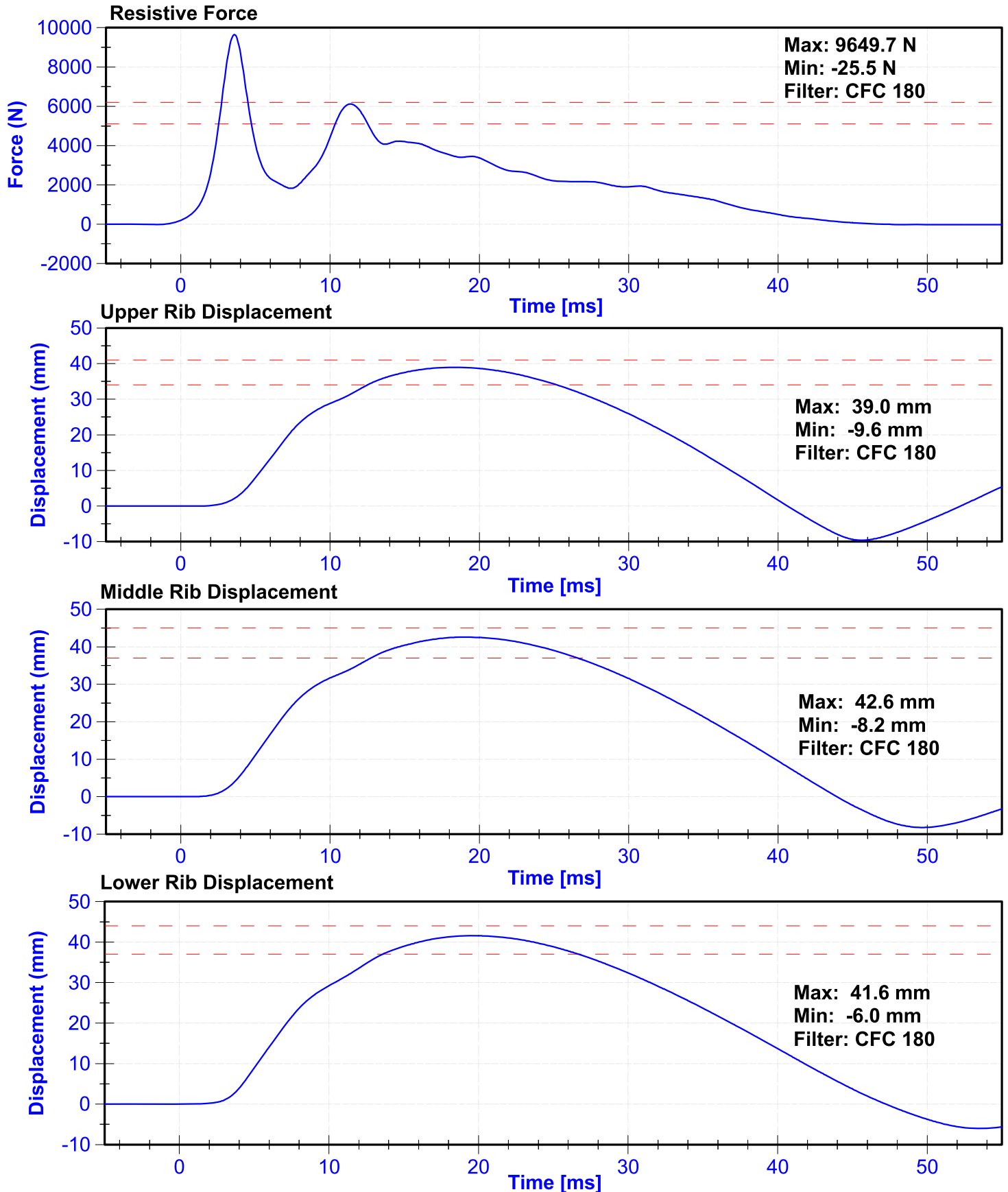
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	40	Pass
Velocity	5.4	5.6	m/s	5.53	Pass
Resistive Force after 6ms	5100	6200	N	6117.1	Pass
Upper Thorax Rib Deflection	34	41	mm	39.0	Pass
Mid Thorax Rib Deflection	37	45	mm	42.6	Pass
Lower Thorax Rib Deflection	37	44	mm	41.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	18599	9/13/2024	3/12/2025
Upper Thorax Rib Potentiometer	Honeywell	0552-01	10/8/2024	4/8/2025
Middle Thorax Rib Potentiometer	Honeywell	807	10/8/2024	4/8/2025
Lower Thorax Rib Potentiometer	Honeywell	0552-03	10/8/2024	4/8/2025

Probe Acceleration





ATD Manufacturer	Denton	Test Technician	J. Kinderman
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

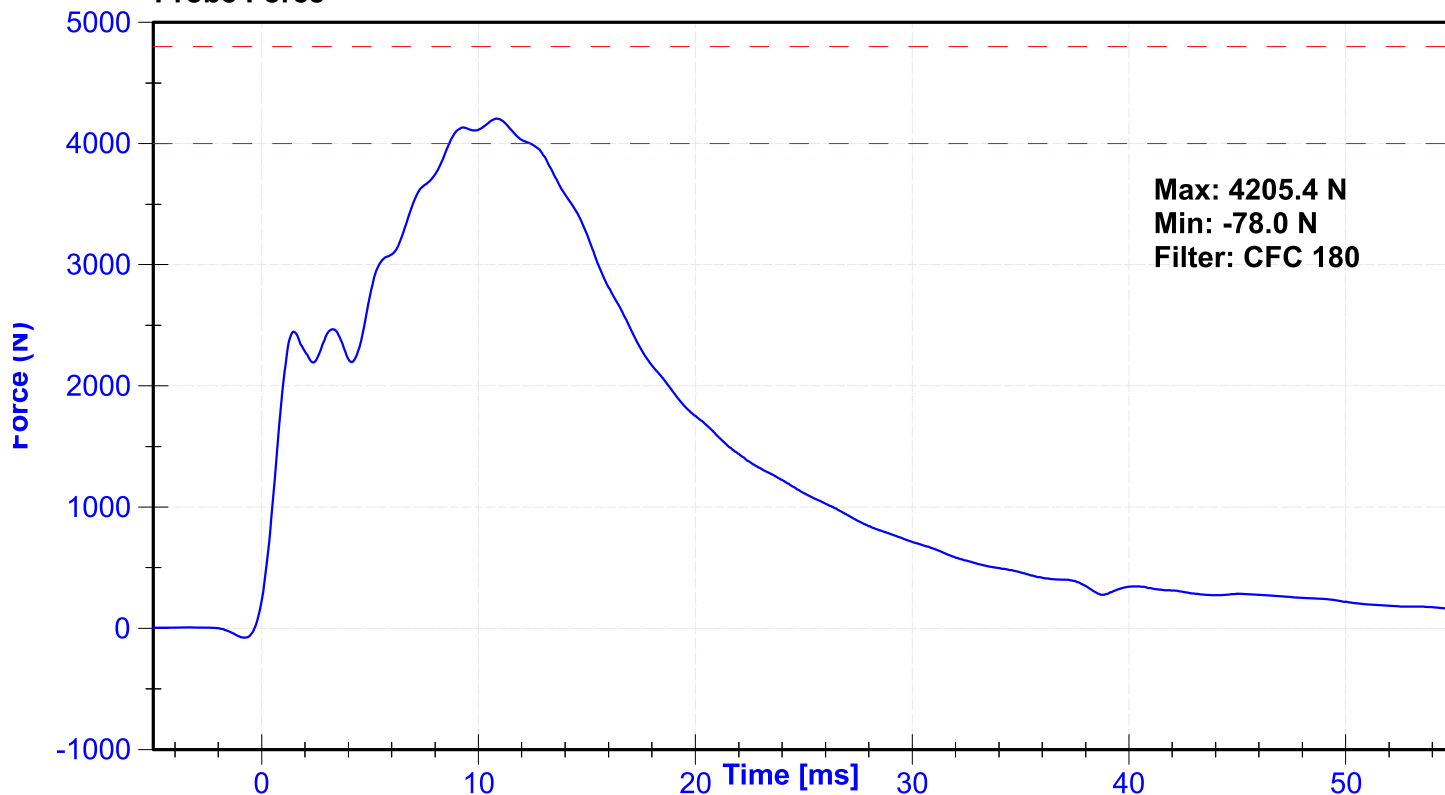
Results

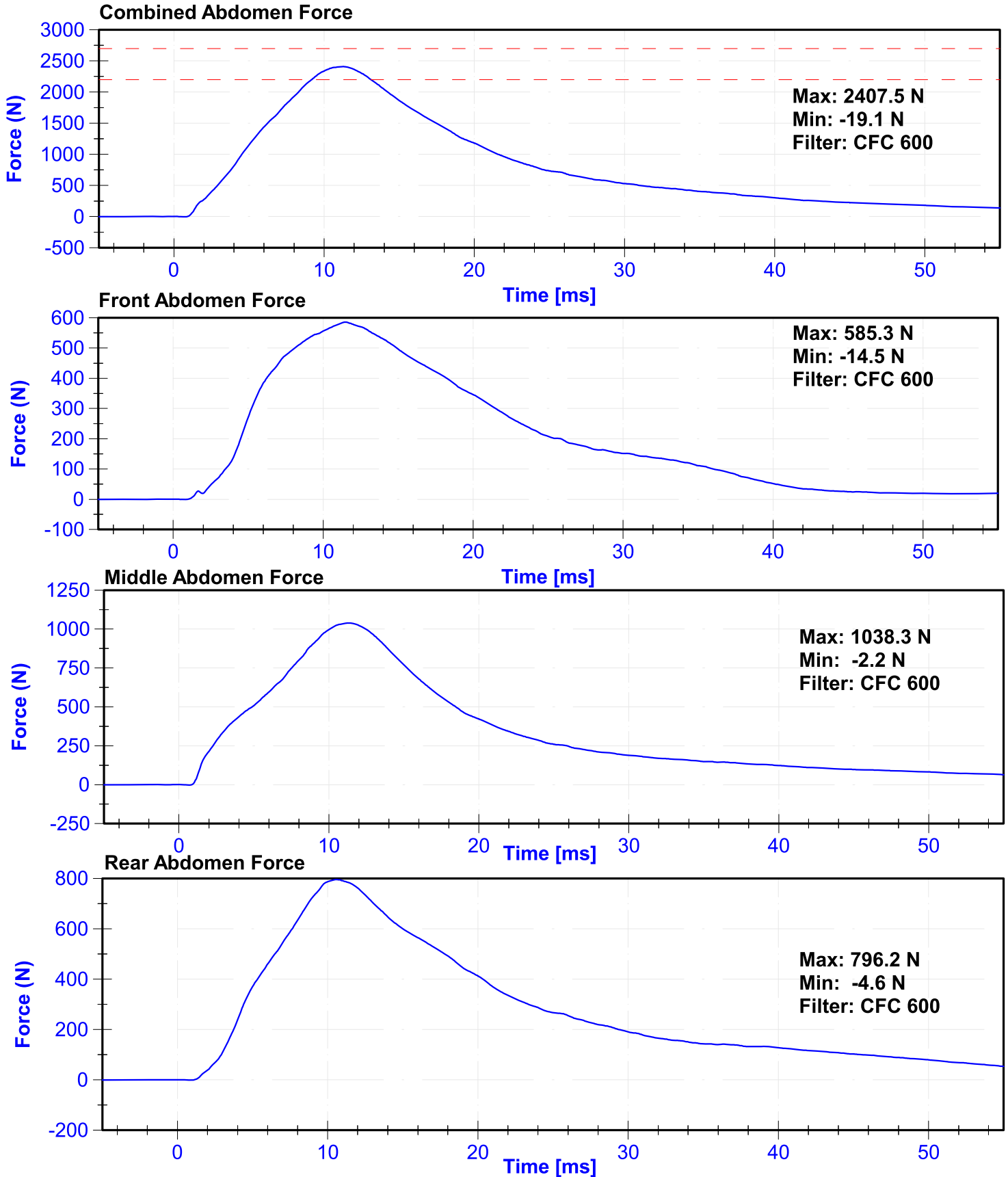
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	40	Pass
Velocity	3.9	4.1	m/s	4.02	Pass
Combined Abdomen Force	2200	2700	N	2407.5	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	11.30	Pass
Resistive Probe Force	4000	4800	N	4205.4	Pass
Time at Peak Resistive Force	10.6	13.0	ms	10.85	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18599	9/13/2024	3/12/2025
Front Abdomen Load Cell	Denton	1512	9/16/2024	9/16/2025
Middle Abdomen Load Cell	Denton	1526	9/16/2024	9/16/2025
Rear Abdomen Load Cell	Denton	1516	9/16/2024	9/16/2025

Probe Force







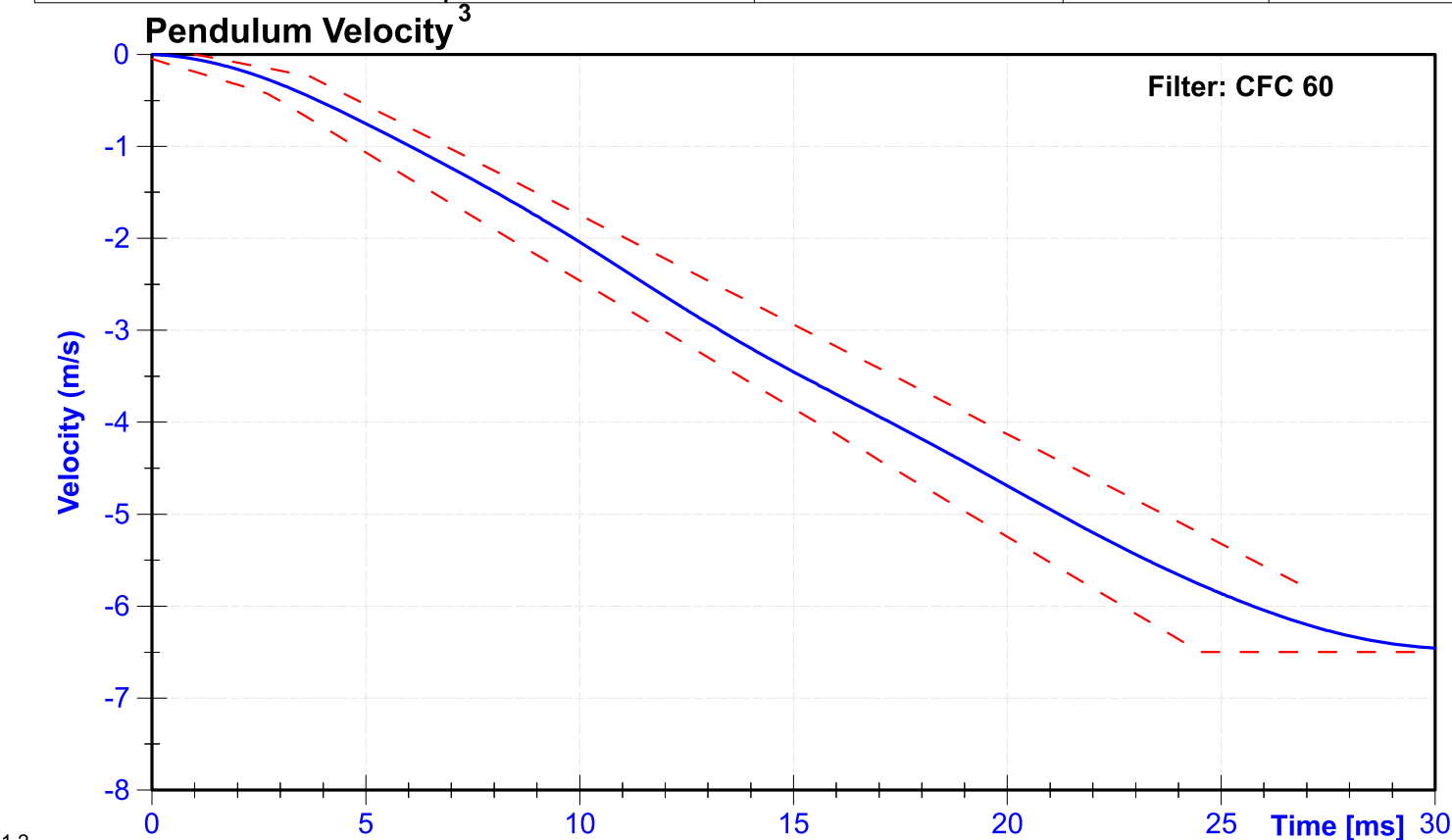
ATD Manufacturer	Denton	Test Technician	J. Kinderman
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

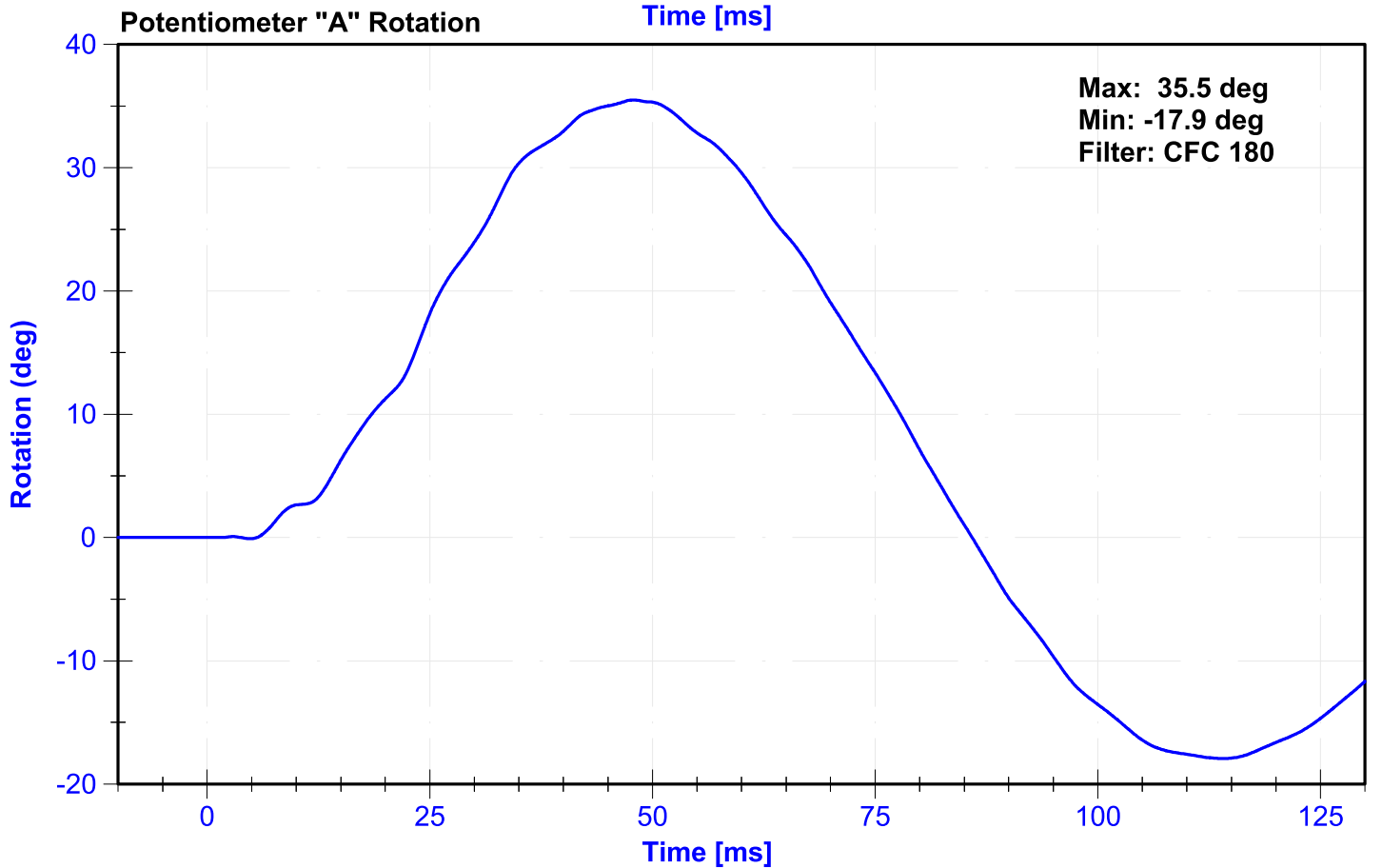
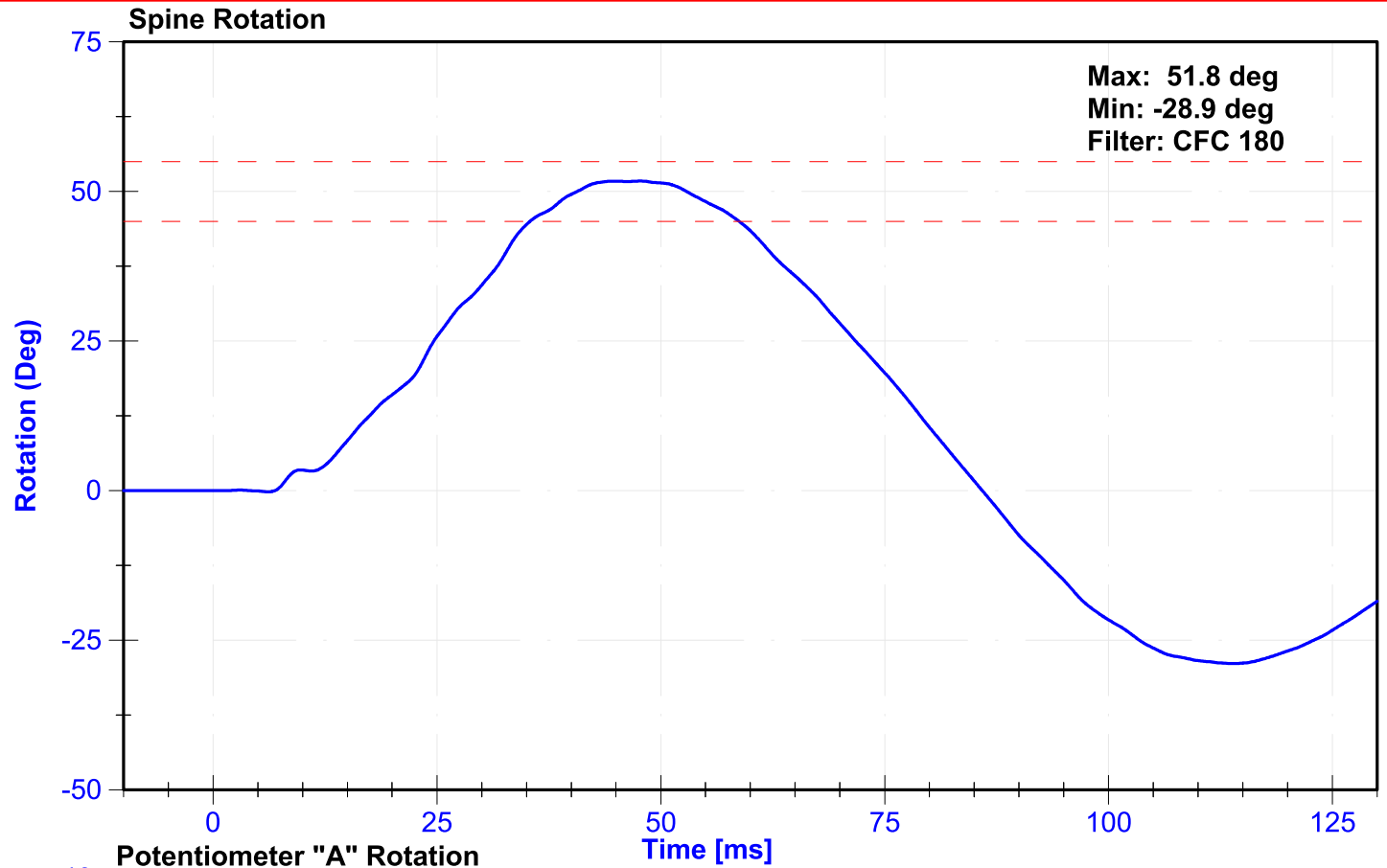
Results

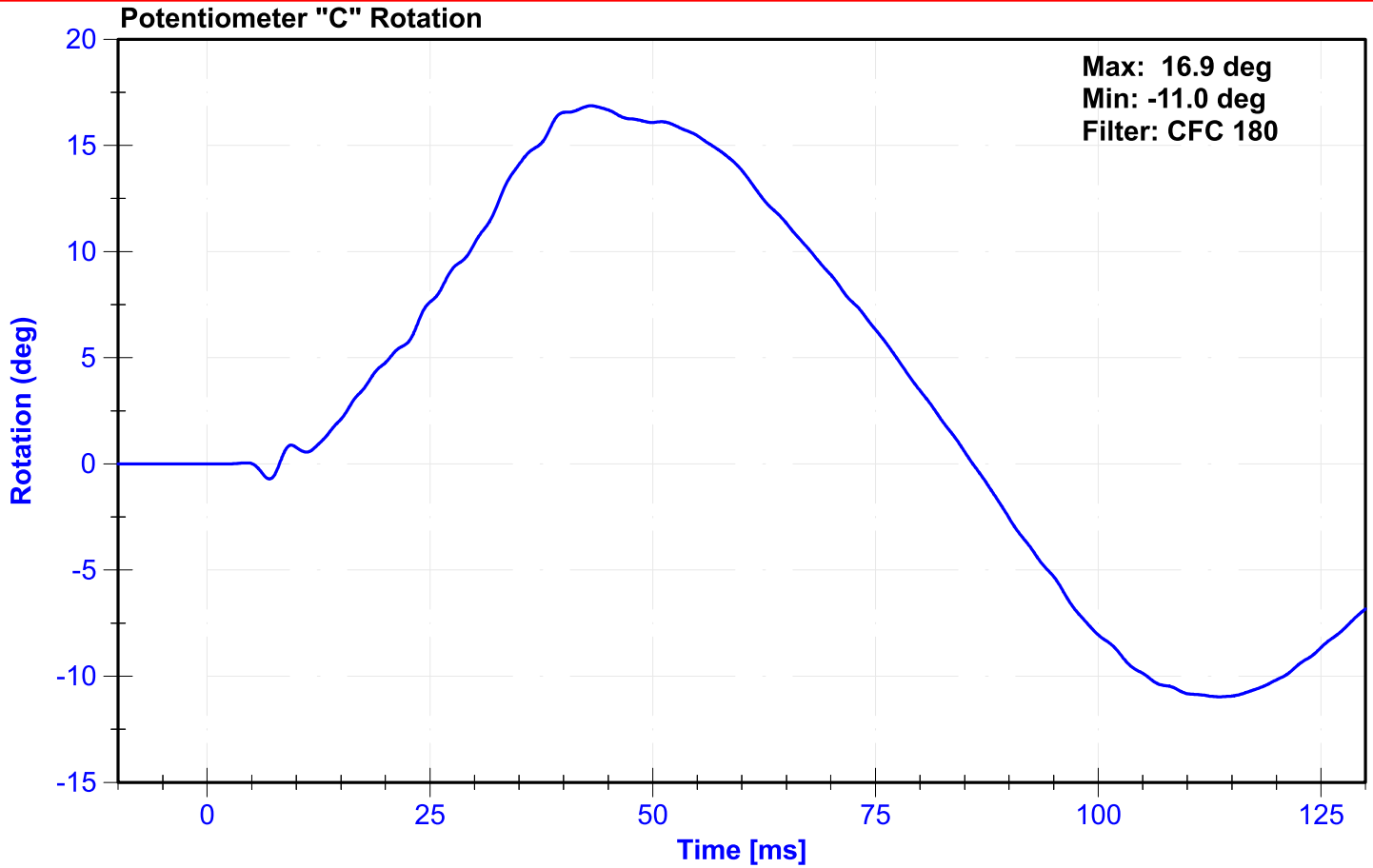
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	40	Pass
Velocity	5.95	6.15	m/s	6.122	Pass
Lateral Spine Rotation	45	55	deg	51.8	Pass
Time at Maximum Rotation	39	53	ms	47.7	Pass
Time of Decay to Zero Degrees	37	57	ms	38.2	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	C16503	10/30/2024	4/28/2025
Pendulum "A" Potentiometer	Sfernice	2247	9/13/2024	9/13/2025
Condyle "B" Potentiometer	Sfernice	095	9/13/2024	9/13/2025







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

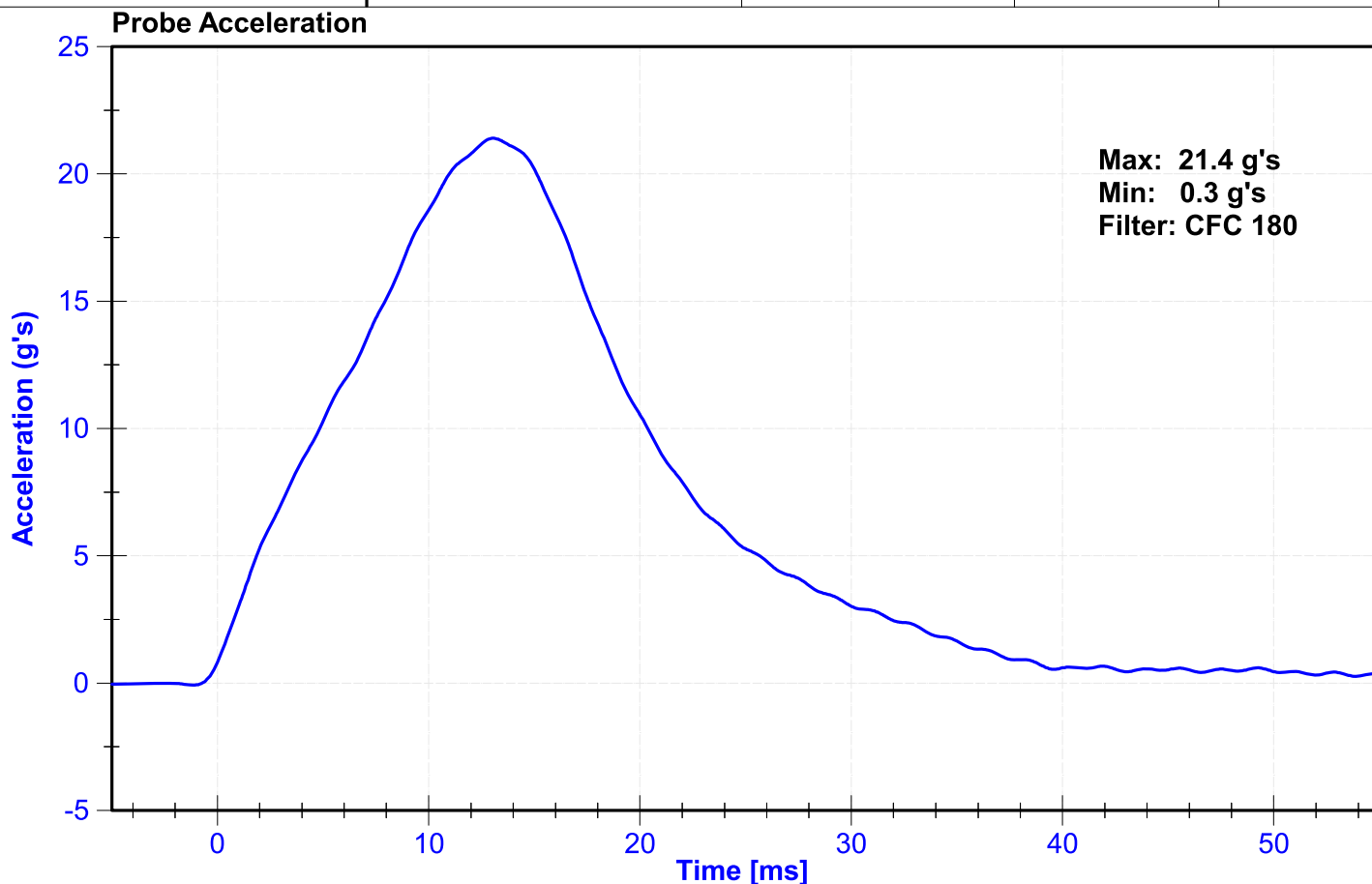
ATD Manufacturer	Denton	Test Technician	J. Kinderman
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

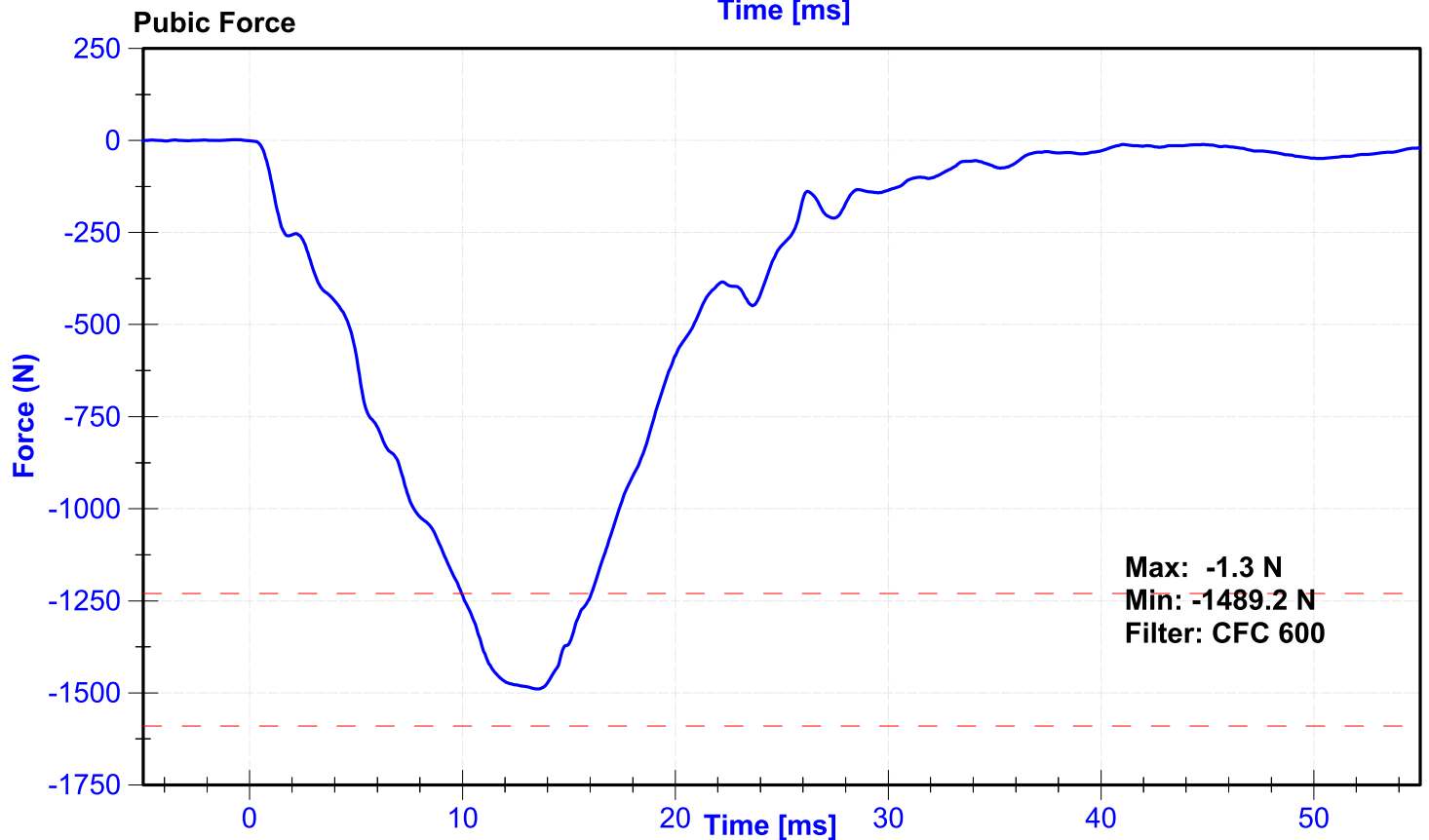
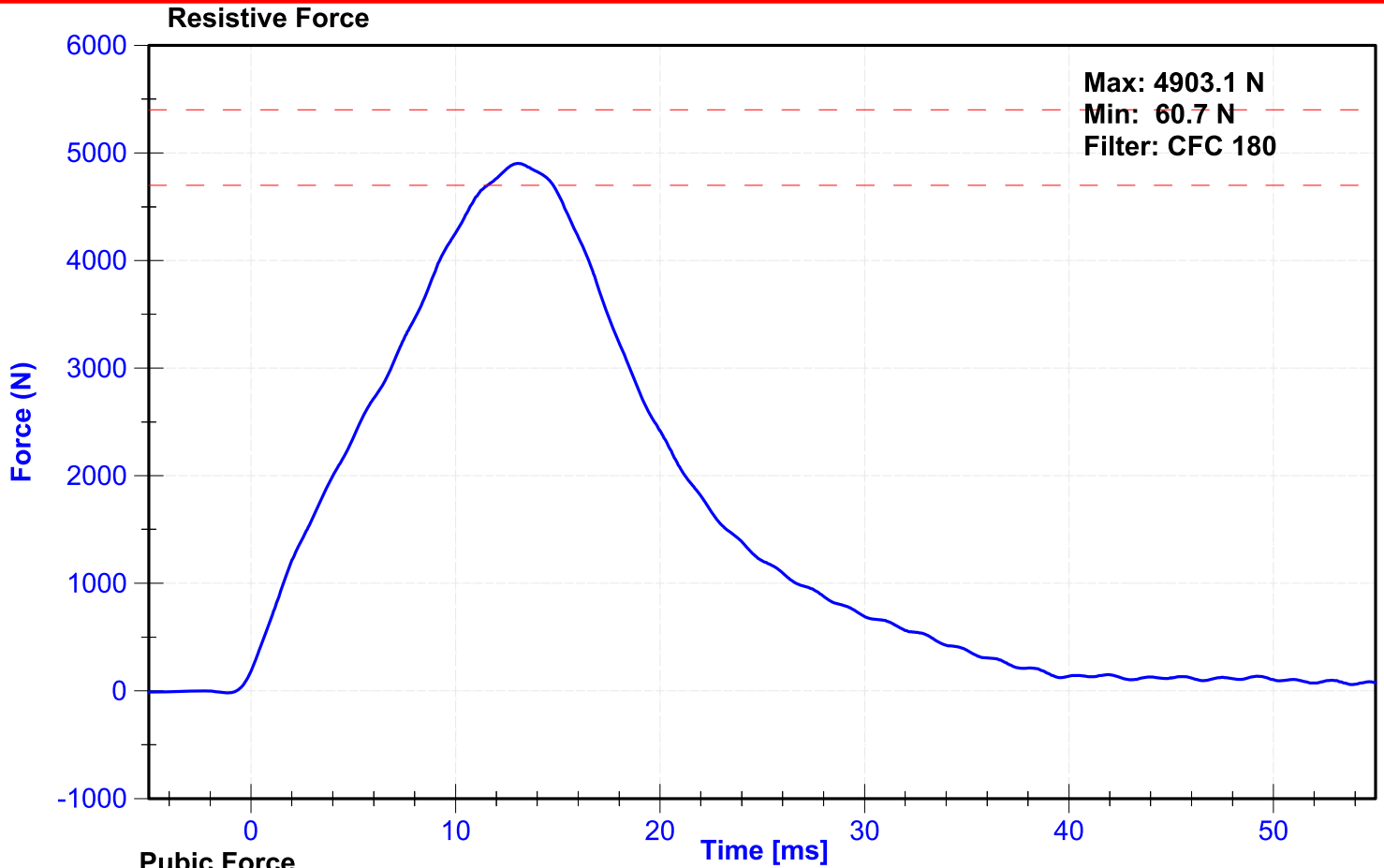
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	40	Pass
Velocity	4.2	4.4	m/s	4.28	Pass
Resistive Force	4700	5400	N	4903.1	Pass
Time at Peak Resistive Force	11.8	16.1	ms	13.05	Pass
Pubic Force	-1590	-1230	N	-1489.2	Pass
Time at Peak Pubic Force	12.2	17.0	ms	13.50	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18599	9/13/2024	3/12/2025
Pubic Load Cell	Denton	464-FY	9/16/2024	9/16/2025





APPENDIX V

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation (ES-2re)

			ES-2re S/N _D037		
			Serial Number	Manufacturer	Calibration Date
Head Accelerometers	Primary	X	T21724	Endevco	10/08/2024
		Y	T22281	Endevco	10/08/2024
		Z	T26050	Endevco	10/08/2024
	Redundant	X	T21682	Endevco	10/08/2024
		Y	T25989	Endevco	10/08/2024
		Z	T25864	Endevco	10/08/2024
Thorax Rib Displacement Potentiometers	Upper	Y	0552-01	Honeywell	10/08/2024
	Middle	Y	807	Honeywell	10/08/2024
	Lower	Y	0552-03	Honeywell	10/08/2024
Abdomen Load Cells	Forward	Y	1512	Denton	09/16/2024
	Middle	Y	1526	Denton	09/16/2024
	Rear	Y	1516	Denton	09/16/2024
Lower Spine Accelerometers (T12)		X	P71278	Endevco	10/08/2024
		Y	18595	Endevco	10/08/2024
		Z	18509	Endevco	10/08/2024
Pubic Symphysis Load Cell		Y	464-FY	Denton	09/16/2024

Table 2 – Vehicle Instrumentation

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	G25354	Endevco	09/25/2024
Vehicle Center of Gravity	Y	G25360	Endevco	09/25/2024
Vehicle Center of Gravity	Z	G25376	Endevco	09/25/2024
Left Floor Sill	Y	G25269	Endevco	10/15/2024
A-Pillar Sill	Y	G24979	Endevco	10/15/2024
A-Pillar Low	Y	G25039	Endevco	10/15/2024
A-Pillar Mid	Y	G23853	Endevco	10/15/2024
B-Pillar Sill	Y	G25022	Endevco	10/14/2024
B-Pillar Low	Y	G25243	Endevco	10/14/2024
B-Pillar Mid	Y	G25349	Endevco	10/14/2024
Driver Seat	Y	G24241	Endevco	10/14/2024
Engine Top	X	G22681	Endevco	10/21/2024
Engine Top	Y	A398319	Measurement Specialties	10/21/2024
Firewall	Y	G25237	Endevco	10/14/2024
Right Roof	Y	G22834	Endevco	10/11/2024
Right Floor Sill	Y	G22671	Endevco	10/10/2024
Rear Floorpan	X	A280354	Measurement Specialties	09/17/2024
Rear Floorpan	Y	A280858	Measurement Specialties	09/17/2024