

REPORT NUMBER: 214P-CAL-24-014

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

**Vinfast Trading and Production Joint Stock Company
2024 VinFast VF8
5 Door SUV**

NHTSA No: C20244701

**PREPARED BY:
CALSPAN CORPORATION
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October 3, 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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Date: October 3, 2024

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Date: October 3, 2024

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Accepted by

Date: _____

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16. Abstract A 31.00 km/h (19.3 mph), 75° oblique compliance test was conducted on the subject 2024 VinFast VF8 5 Door 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. This test was conducted at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on June 14, 2024. The impact velocity of the vehicle was 30.93 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 190 mm located at level 3. The test vehicle's occupant performance data is as follows: <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th colspan="3">Driver ATD (ES-2re)</th> </tr> <tr> <th>Units</th> <th>IARV</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC36)</td> <td></td> <td>1000</td> <td>287.230</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>44</td> <td>34.566</td> </tr> <tr> <td>Total Abdominal Force</td> <td>N</td> <td>2500</td> <td>1284.200</td> </tr> <tr> <td>Pubic Symphysis Force</td> <td>N</td> <td>6000</td> <td>1921.952</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 (HIC36)		1000	287.230	Maximum Thoracic Rib Deflection	mm	44	34.566	Total Abdominal Force	N	2500	1284.200	Pubic Symphysis Force	N	6000	1921.952
Measurement Description	Driver ATD (ES-2re)																											
	Units	IARV	Result																									
Head Injury Criteria (HIC36)		1000	287.230																									
Maximum Thoracic Rib Deflection	mm	44	34.566																									
Total Abdominal Force	N	2500	1284.200																									
Pubic Symphysis Force	N	6000	1921.952																									
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SECTION 1

PURPOSE AND SUMMARY OF TEST

PURPOSE

This side impact test was conducted as part of the FY 2024 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 2024 VinFast VF8 5 Door 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 2024 VinFast VF8 5 Door SUV. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 30.93 km/h. The test was conducted by Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on June 14, 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 (ES-2re) dummy was placed in the driver 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
Head Injury Criteria (HIC36)		1000	287.230
Upper Rib Deflection	mm	44	34.566
Mid Rib Deflection	mm	44	33.014
Lower Rib Deflection	mm	44	33.966
Abdominal Load (front)	N		366.728
Abdominal Load (mid)	N		418.616
Abdominal Load (rear)	N		501.127
Total Abdominal Force	N	2500	1284.200
Pubic Symphysis Force	N	6000	1921.952

SECTION 2
OCCUPANT AND VEHICLE INFORMATION

This section contains information reporting for the following Data Sheets:

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DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2024 VinFast VF8 5 Door SUV
 Test Facility: Calspan

NHTSA No.: C20244701
 Test Date: 06/14/2024

TEST VEHICLE INFORMATION AND OPTIONS

Make	Vinfast	Anti-Lock Brakes (ABS)	Yes
Model	VF8	All-Wheel Drive (AWD)	Yes
Body Style	5 Door SUV	Traction Control System (TCS)	Yes
VIN	RLLV1AEBXRH006590	Electric Stability Control (ECS)	Yes
Body Color	Brahminy White	Curtain Airbags	Yes
Engine Displacement (L)	Electric Vehicle	Torso Airbags – Front Seats	Yes
Type / No. Cylinders	N/A	Torso Airbags – Rear Seats	Yes
Engine Placement	N/A	Combination/Head Torso Bag	No
Transmission Type	Automatic	Pelvic Airbag – Front Seats	No
Transmission Speeds	Direct Drive	Pelvis Airbag – Rear Seats	No
Overdrive	No	Knee Airbag – Driver	Yes
Final Drive	All Wheel Drive	Knee Airbag – Front Passenger	Yes
Odometer Reading (mi)	147 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	Yes
		Other - Driver Farside Seat Airbag	Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Vinfast Trading and Production Joint Stock Company	GVWR (kg)	2905
Date of Manufacture	09/2023	GVWR Front (kg)	1425
Vehicle Type	MPV	GVWR Rear (kg)	1590

VEHICLE SEATING AND WEIGHT CAPACITY DATA

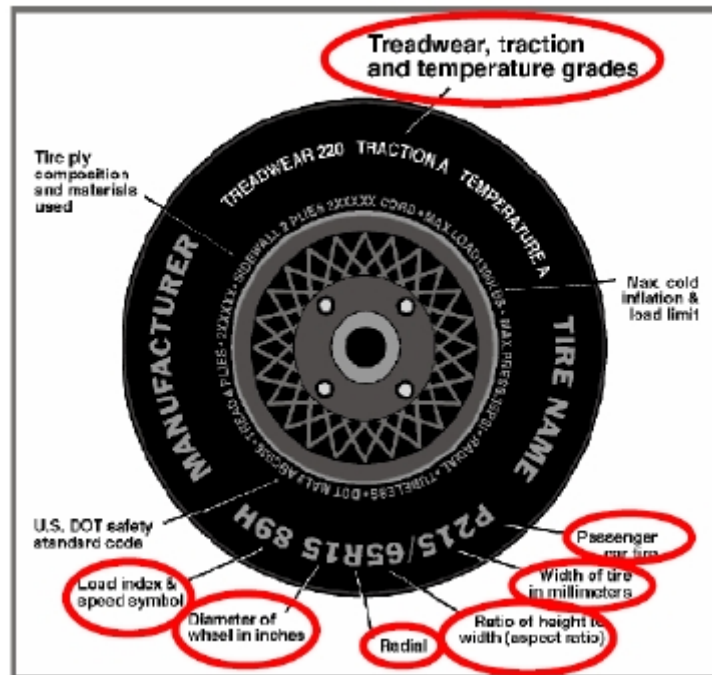
Measured Parameter	Front	Rear	Third	Total
Type of Seats (Bench or Bucket)	Bucket	Split Bench	N/A	
Designated Seating Capacity (DSC)	2	3	N/A	5
Capacity Weight (VCW) (kg)				450
Cargo Weight (RCLW) (kg)				109.8

DATA SHEET NO. 2 VEHICLE TIRE INFORMATION

Test Vehicle: 2024 VinFast VF8 5 Door SUV
Test Facility: Calspan

NHTSA No.: C20244701
Test Date: 06/14/2024

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



VEHICLE TIRE INFORMATION

Tire Placard	Front	Rear
Recommended Cold Pressure (kPa)	260	280
Recommended Tire Size	225/55R19	225/55R19
Tire Sidewall	Front	Rear
Maximum Tire Pressure (kPa)	340	340
Tire Size on Vehicle	225/55R19	225/55R19
Tire Manufacturer Model	Goodyear	Goodyear
Tire Name	Eagle Touring	Eagle Touring
Tire Type	All Season	All Season
Tire Width	225	225
Aspect Ratio	55	55
Radial	Yes	Yes
Wheel Diameter	19"	19"
Load Index / Speed Symbol	103H	103H
Treadwear	400	400
Traction Grade	A	A
Temperature Grades	A	A

DATA SHEET NO. 3
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2024 VinFast VF8 5 Door SUV
Test Facility: Calspan

NHTSA No.: C20244701
Test Date: 06/14/2024

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	251	248	258	261
Tire Placard	kPa	260	260	280	280

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			Fully Loaded			As Tested		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	648	609		676	691		683.5	677.5	
Right	kg	630	627.5		642.5	688.5		641	696	
Ratio	%	50.8	49.2		48.9	51.1		49.1	50.9	
Totals	kg	1278	1236.5	2514.5	1318.5	1379.5	2698	1324.5	1373.5	2698

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	2514.5	(A)
Weight of Test Dummy	kg	81	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	109.8	(C)
Calculated Vehicle Target Weight (TVTW)	kg	2705.3	(A+B+C)

TEST VEHICLE ATTITUDES AND CG

Measurement Description	Units	As Delivered	Fully Loaded	As Tested
Driver Door Sill Angle	Deg	+0.05	+0.10	+0.05
Front Passenger Sill Angle	Deg	-0.10	0.00	-0.10
Front Bumper-Line Angle	Deg	-0.20	+0.20	-0.20
Rear Bumper-Line Angle	Deg	-0.15	0.00	-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	2951
Vertical Impact Reference Line Aft of Front Axle	mm	1464

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Trunk Carpeting	10
Charger	4
Ballast (if any)	93.5

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

Test Vehicle: 2024 VinFast VF8 5 Door SUV
Test Facility: Calspan

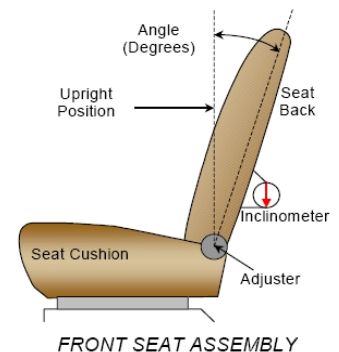
NHTSA No.: C20244701
Test Date: 06/14/2024

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	Degree	23.0
Front Passenger Seat	Degree	23.0

*Measurement taken on seatback



SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	SCR P Height Position	SCR P Height (mm)		
			Rearmost	Mid-Fore / Aft	Forward-Most
Driver Seat	17.7	Max	47	54	58
		Mid	25	31	37
		Min	2	8	15
Front Passenger Seat	16.2	Max	-	-	-
		Mid	-	-	-
		Min	14	20	26

SEAT FORE / AFT POSITION

Seat	Total Fore / Aft Travel		Placed in Position #	
	mm	Detents*	mm	Detents*
Driver Seat	240	Power	120	Power
Front Passenger Seat	239	Power	119.5	Power

SEAT BELT ANCHORAGE ADJUSTMENT

Seat	Total # of Positions	Placed in Position #
Driver Seat	Fixed	Fixed

HEAD RESTRAINT ADJUSTMENT

Seat	Total # of Positions	Placed in Position #
Driver Seat	6 (0-5)	Uppermost

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

Test Vehicle: 2024 VinFast VF8 5 Door SUV
 Test Facility: Calspan

NHTSA No.: C20244701
 Test Date: 06/14/2024

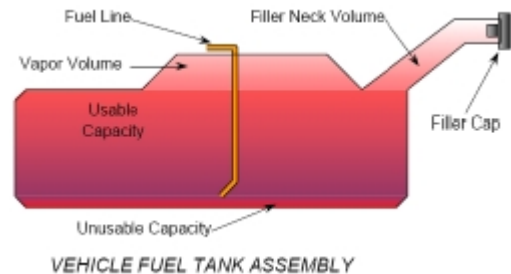
FUEL TANK CAPACITY DATA

Description	Liters
Usable Capacity of (Form No.1)	
Usable Capacity of (Owner's Manual)	
92 - 94% of Usable Capacity	
Actual Amount of Solvent Used in Test	Electric Vehicle

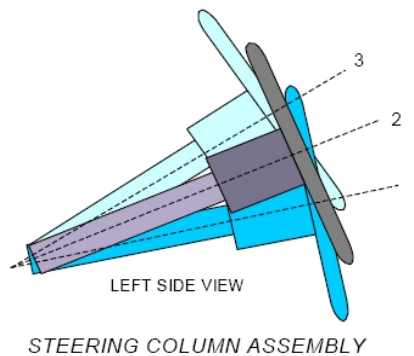
FUEL PUMP

Describe the operation of the fuel pump.

The vehicle is equipped with a charge port location on the left front of the vehicle.



STEERING COLUMN POSITIONS

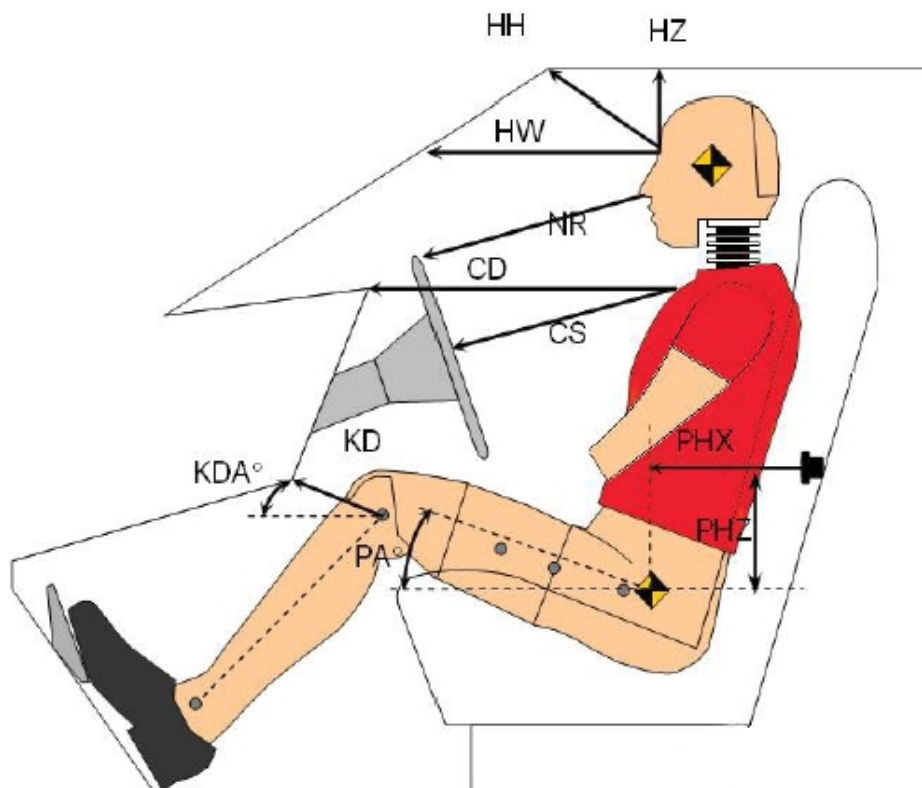


	Degrees	Fore / Aft Position (mm)
Lowermost - Position No. 1	22.5	
Geometric center - Position No. 2	24.4	
Uppermost - Position No. 3	26.2	
Telescoping Steering Wheel Travel		65
Test Position	24.4	32.5

DATA SHEET NO. 6
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2024 VinFast VF8 5 Door SUV
 Test Facility: Calspan

NHTSA No.: C20244701
 Test Date: 06/14/2024



Left Side View

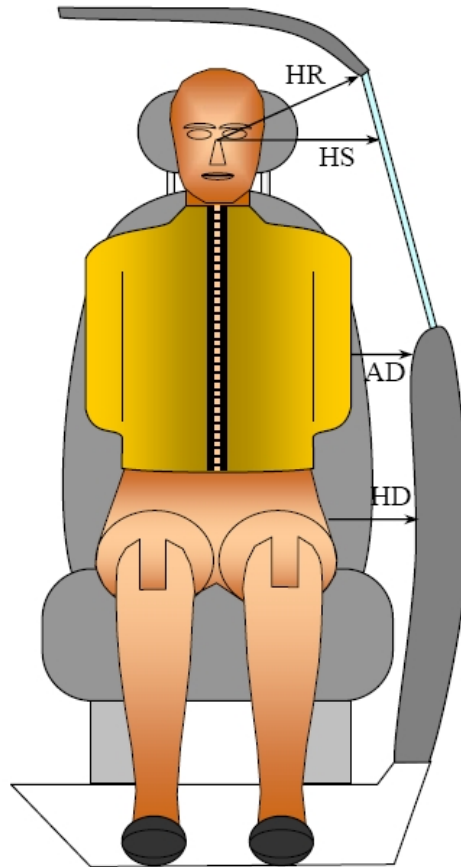
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Description	Driver	
		Length (mm)	Angle (°)
HH	Head to Header	509	
HW	Head to Windshield	798	
HZ	Head to Roof Liner	230	
NR	Nose to Rim	485	
CD	Chest to Dash	700	
CS	Chest to Steering Wheel	408	
KD(L) / KDA(L)°	Left Knee to Dash	204	29.6
KD(R) / KDA(R)°	Right Knee to Dash	192	28.4
PAX°	Pelvic Tilt Angle (X-Axis)		23.9
PAY°	Pelvic Tilt Angle (Y-Axis)		-1.4
PHX	Hip Point to Striker (X-Axis)	141	
PHZ	Hip Point to Striker (Z-Axis)	127	

DATA SHEET NO. 7
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2024 VinFast VF8 5 Door SUV
 Test Facility: Calspan

NHTSA No.: C20244701
 Test Date: 06/14/2024



FRONT VIEW OF DUMMY

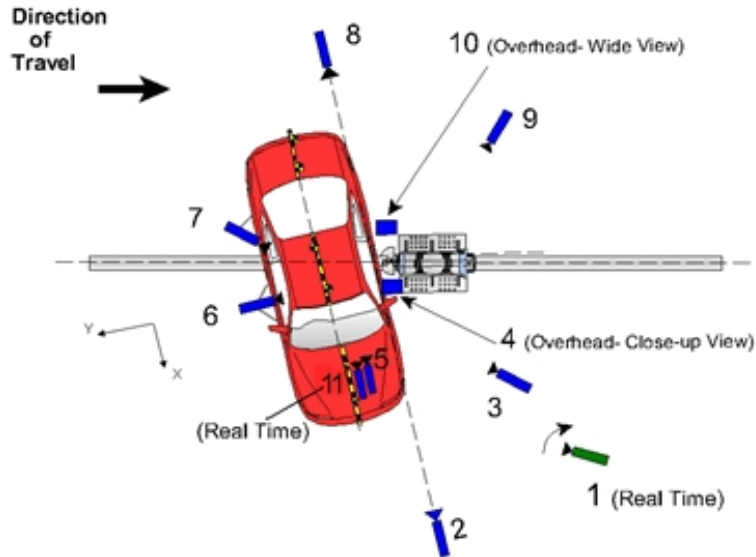
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver
HR	Head to Side Header	mm	258
HS	Head to Side Window	mm	377
AD	Arm to Door	mm	106
HD	H-Point to Door	mm	175

DATA SHEET NO. 8 LOCATION OF CAMERA

Test Vehicle: 2024 VinFast VF8 5 Door SUV
Test Facility: Calspan

NHTSA No.: C20244701
Test Date: 06/14/2024



CAMERA LOCATIONS AND DATA

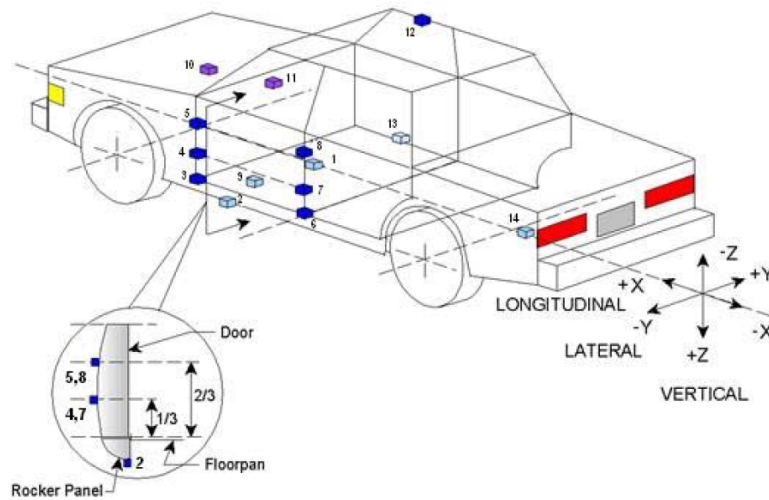
No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Real-time (24 - 30 fps) pan view of impact				Zoom	60
2	Front ground level - impact view	7760	0	-1490	28	1000
3	Impact side 45° - forward pole view	3030	-720	-1423	24	1000
4	Overhead Close-up view of impact	0	0	-9375	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	-8920	0	-1482	28	1000
9	Impact side 45° - rearward pole view	-3924	-4120	-1536	24	1000
10	Overhead wide - view of impact	0	0	-9375	25	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: 2024 VinFast VF8 5 Door SUV
Test Facility: Calspan

NHTSA No.: C20244701
Test Date: 06/14/2024



TEST VEHICLE ACCELEROMETER LOCATIONS

No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2026	-21	491
2	Left Floor Sill	2943	-662	414
3	A-Pillar Sill	3200	-657	422
4	A-Pillar Low	3342	-646	625
5	A-Pillar Mid	3247	-700	1154
6	B-Pillar Sill	2062	-664	418
7	B-Pillar Low	2218	-698	764
8	B-Pillar Mid	2157	-698	1100
9	Seat	2463	-542	451
10	Engine	4063	-34	734
11	Firewall	3683	-2	1006
12	Roof	2002	634	1620
13	Right Floor Sill	2898	663	417
14	Rear Deck	901	-52	573

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: 2024 VinFast VF8 5 Door SUV
Test Facility: Calspan

NHTSA No.: C20244701
Test Date: 06/14/2024

Loc. No	Description	Axes	Units	Positive Direction		Negative Direction	
				Max	Time (ms)	Max	Time (ms)
1	Vehicle CG	X	g	5.12	15.40	-13.80	43.90
	Vehicle CG	Y	g	43.18	16.60	-3.29	21.25
	Vehicle CG	Z	g	41.95	19.85	-37.11	15.60
	Vehicle CG Resultant	N/A	g	54.19	15.95	0.03	-12.55
2	Floor Sill (Left)	Y	g	127.17	16.40	-111.39	21.00
3	A Pillar Sill	Y	g	69.60	16.15	-56.60	20.35
4	A Pillar Low	Y	g	27.38	24.65	-4.53	93.60
5	A Pillar Mid	Y	g	27.48	28.65	-1.29	300.00
6	B Pillar Sill	Y	g	163.70	25.25	-176.20	21.70
7	B Pillar Low	Y	g	296.25	17.85	-170.22	23.05
8	B Pillar Mid	Y	g	75.36	15.75	-33.44	36.20
9	Seat	Y	g	103.15	16.30	-61.13	20.00
10	Engine Top	X	g	3.62	57.45	-11.16	34.95
	Engine Top	Y	g	34.53	40.45	-1.89	74.15
11	Firewall	Y	g	26.96	44.05	-0.84	242.30
12	Roof	Y	g	32.68	44.80	-3.92	17.40
13	Floor Sill (Right)	Y	g	34.66	31.35	-1.90	100.05
14	Rear Deck	X	g	6.78	25.50	-15.64	32.00
	Rear Deck	Y	g	35.61	38.70	-1.38	104.10

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

Test Vehicle: 2024 VinFast VF8 5 Door SUV NHTSA No.: C20244701
Test Facility: Calspan Test Date: 06/14/2024

Dummy Serial No. D037

Description	Axes	Positive Direction		Negative Direction	
		MAX	TIME (ms)	MAX	TIME (ms)
HEAD ACCELERATION (g)					
Longitudinal	X	7.64	103.35	-20.36	68.90
Lateral	Y	53.62	51.95	-33.69	77.40
Vertical	Z	19.21	44.70	-14.03	77.40
Resultant	N/A	55.42	51.65		
HIC36 (t1, t2)	N/A	287.23		t1 = 42.30	t2 = 77.90
THORAX DEFLECTION (mm)					
Upper Rib	Y	34.57	51.55	-7.34	83.40
Middle Rib	Y	33.01	51.65	-7.07	81.35
Lower Rib	Y	33.97	51.05	-4.36	84.00
ABDOMINAL FORCES (N)					
Front	Y	366.73	47.50	-48.78	16.70
Middle	Y	418.62	47.70	-5.32	15.80
Rear	Y	501.13	47.75	-22.50	16.90
SUM	N/A	1284.20	47.65		
PELVIS FORCES (N)					
Pubic Symphysis	Y	139.10	241.20	-1921.95	56.25

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

DATA SHEET NO. 12
POST-TEST OBSERVATIONS

Test Vehicle: 2024 VinFast VF8 5 Door SUV
Test Facility: Calspan

NHTSA No.: C20244701
Test Date: 06/14/2024

IMPACT POINT DATA

Measured Parameter	Units	Value
Vertical Impact Ref Line - Aft of Front Axle, Intended Impact Pt	mm	1464
Actual Impact Point - Aft of Front Axle	mm	1466
Difference	mm	+2

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Driver Seat Dummy (ES2-re)
Head Contact	Curtain Airbag, Head Restraint, and Front Seat Middle Airbag
Upper Torso Contact	Torso/Pelvis Airbag & Seat Back
Lower Torso Contact	Torso/Pelvis Airbag & Seat Back
Left Knee Contact	Driver Door Trim
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
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

POST-TEST STRUCTURAL OBSERVATIONS

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

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

Test Vehicle: 2024 VinFast VF8 5 Door SUV
Test Facility: Calspan

NHTSA No.: C20244701
Test Date: 06/14/2024

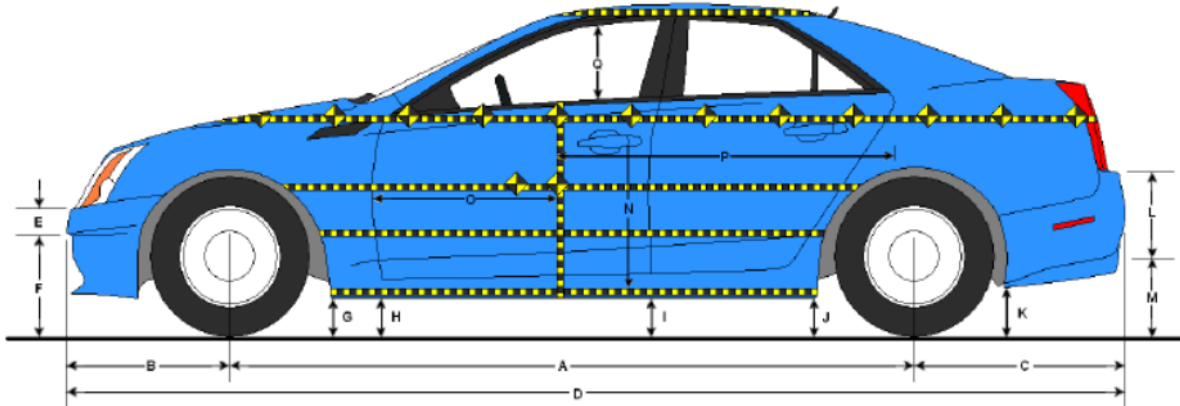
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Front Occupant	
	Mounted	Deployed
Front Airbag	Yes	No
Knee Airbag	Yes	No
Curtain Airbag	Yes	Yes
Side Airbag 2 - Torso/Pelvis Airbag	Yes	Yes
Seat Belt Pretensioner	Yes	Yes
Seat Belt Load Limiter	Yes	Yes
Other - Front Seat Middle Airbag	Yes	Yes

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

Test Vehicle: 2024 VinFast VF8 5 Door SUV
 Test Facility: Calspan

NHTSA No.: C20244701
 Test Date: 06/14/2024



LEFT SIDE VIEW

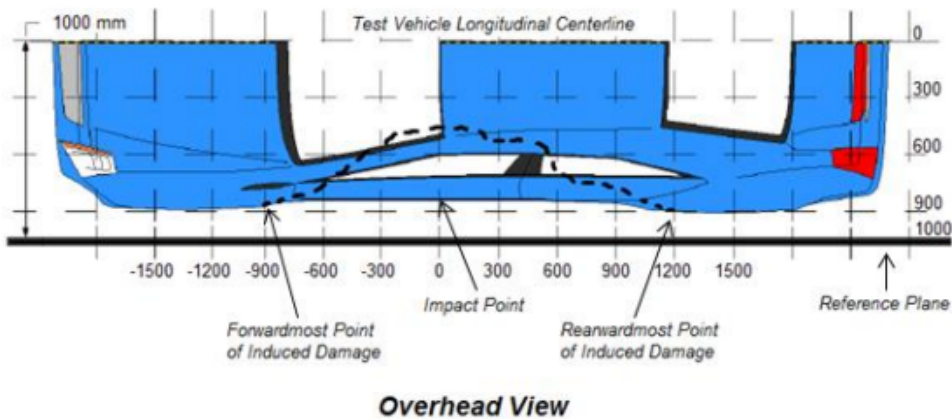
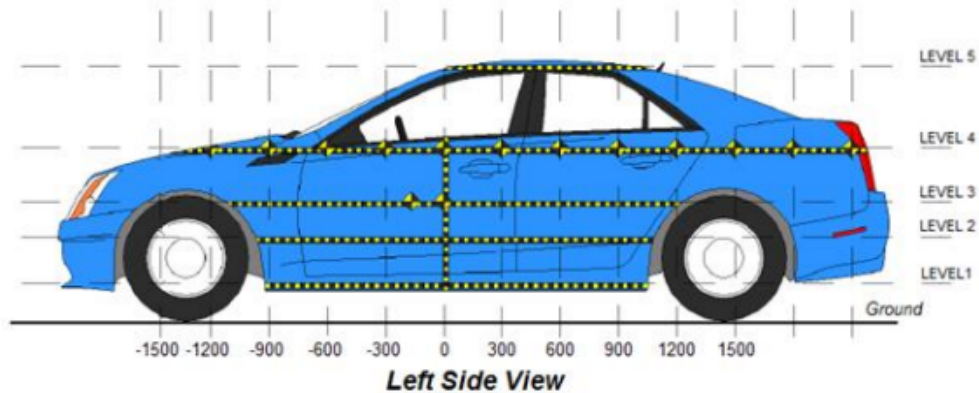
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

No.	Measurement Description	Pre-Test	Post-Test	Difference
A	Vehicle Wheelbase	2951	2932	-19
B	Front Axle to FSOV	855	866	10
C	Rear Axle to RSOV	941	941	-1
D	Total Vehicle Length at Centerline	4747	4738	-9
E	Front Bumper Thickness	115	115	0
F	Front Bumper Bottom to Ground	462	467	5
G	Sill Height at Front Wheel Well	177	176	-1
H	Sill Height at Front Door Leading Edge	172	170	-2
I	Sill Height at B Pillar	174	139	-35
J1	Sill Height at Rear Wheel Well	168	161	-7
J2	Pinch Weld Height at Rear Wheel Well	184	185	1
K	Sill Height Aft of Rear Wheel Well	221	221	0
L	Rear Bumper Thickness	215	215	0
M	Rear Bumper Bottom to Ground	479	466	-13
N	Sill Height to Window Bottom Sill	858	866	7
O	Front Door Leading Edge to Impact CL	878	859	-19
P	Rear Door Trailing Edge to Impact CL	1393	1363	-30
Q	Front Window Opening	370	377	7
R	Right Side Length	4681	4680	-1
S	Left Side Length	4682	4662	-19
T	Vehicle Width at B-Pillars	1873	1826	-47

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

Test Vehicle: 2024 VinFast VF8 5 Door SUV
 Test Facility: Calspan

NHTSA No.: C20244701
 Test Date: 06/14/2024



MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	312	125	0
2	Occupant H-Point	mm	657	184	0
3	Mid-Door	mm	702	190	0
4	Window Sill	mm	1082	156	0
5	Window Top	mm	1571	13	150

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: 2024 VinFast VF8 5 Door SUV
 Test Facility: Calspan

NHTSA No.: C20244701
 Test Date: 06/14/2024

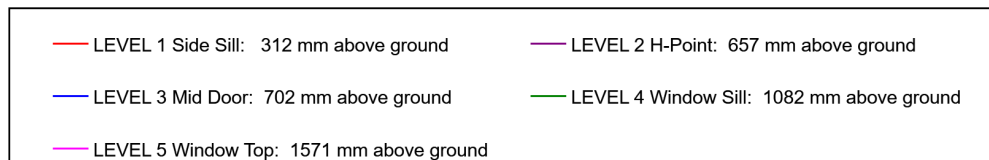
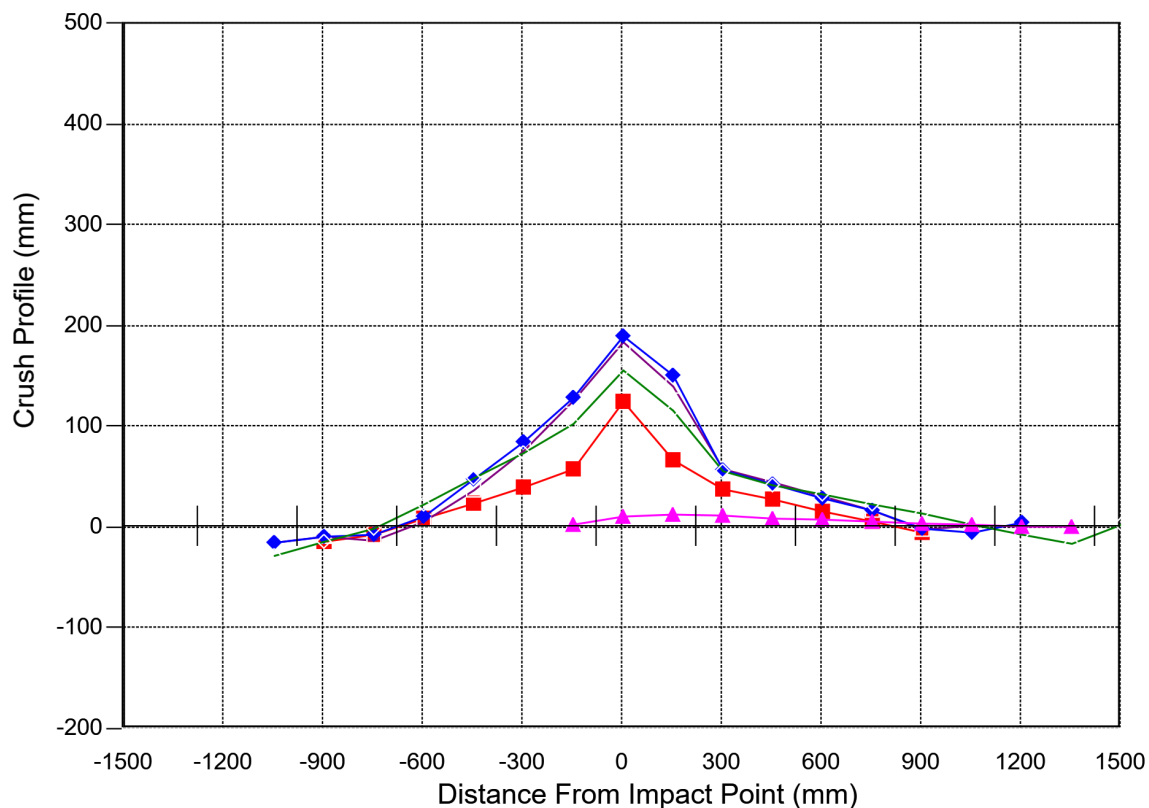
EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1500															
-1350															
-1200															
-1050		942	944	858			957	959	886			-15	-15	-28	
-900	924	939	941	864		938	948	950	878		-14	-9	-9	-14	
-750	919	936	939	865		926	949	946	866		-7	-13	-7	-1	
-600	916	936	939	868		907	930	928	845		9	6	11	23	
-450	913	936	939	875		889	899	891	826		24	37	48	49	
-300	911	936	939	882		871	860	854	808		40	76	85	74	
-150	910	936	938	888	653	852	810	809	785	650	58	126	129	103	3
0	910	935	938	892	668	785	751	748	736	657	125	184	190	156	11
150	912	935	938	895	667	845	795	787	779	654	67	140	151	116	13
300	911	934	937	897	663	873	876	880	841	651	38	58	57	56	12
450	911	935	937	897	659	883	890	894	855	650	28	45	43	42	9
600	911	936	938	900	653	895	905	909	867	645	16	31	29	33	8
750	911	939	941	898	644	905	922	924	875	638	6	17	17	23	6
900	910	943	944	898	632	915	945	945	884	628	-5	-2	-1	14	4
1050		948	949	895	616		946	954	892	613		2	-5	3	3
1200			951	894	591			946	901	590			5	-7	1
1350				891	552				907	551				-16	1
1500				889					886					3	

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

Test Vehicle: 2024 VinFast VF8 5 Door SUV
 Test Facility: Calspan

NHTSA No.: C20244701
 Test Date: 06/14/2024

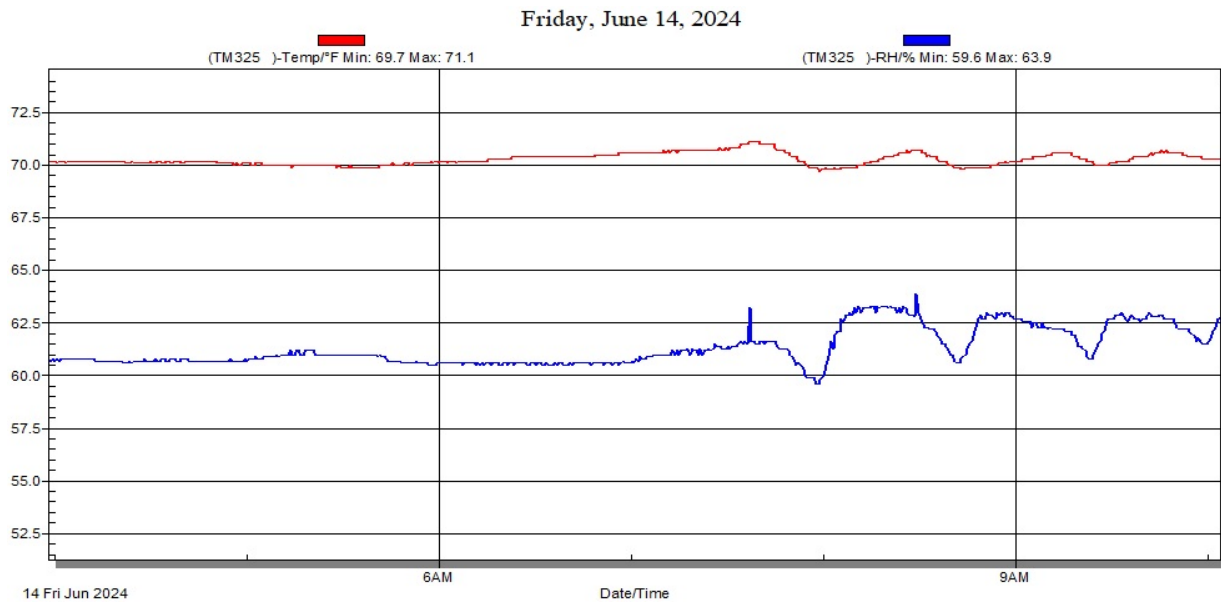


Vehicle Exterior Crush Measurements - Visual Representation

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

Test Vehicle: 2024 VinFast VF8 5 Door SUV
Test Facility: Calspan

NHTSA No.: C20244701
Test Date: 06/14/2024



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

APPENDIX I
PHOTOGRAPHS

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2	Post Test Frontal View of Test Vehicle	I-3
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4	Post-Test Rear View of Test Vehicle	I-4
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26	Close-Up View of Vehicle's Tire Placard Label	I-15



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

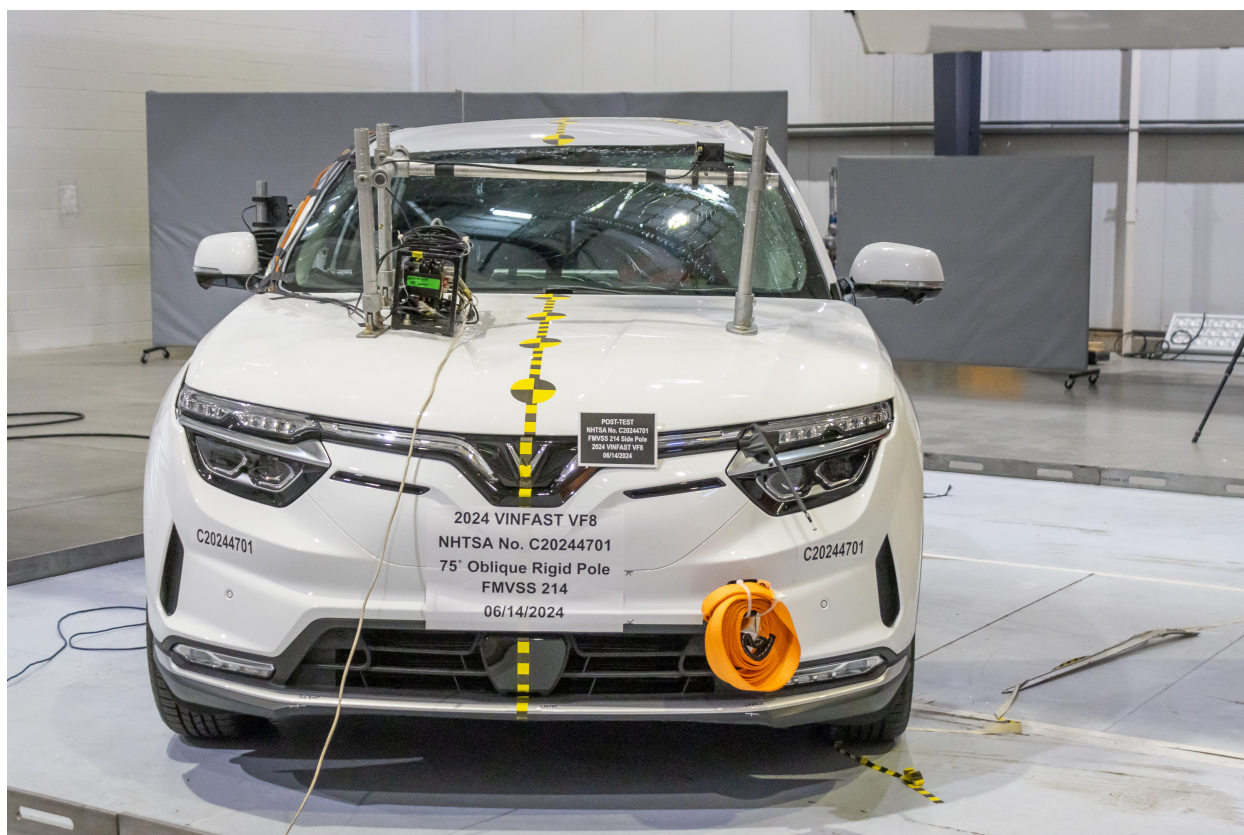


Figure A-2: Post Test Frontal View of Test Vehicle

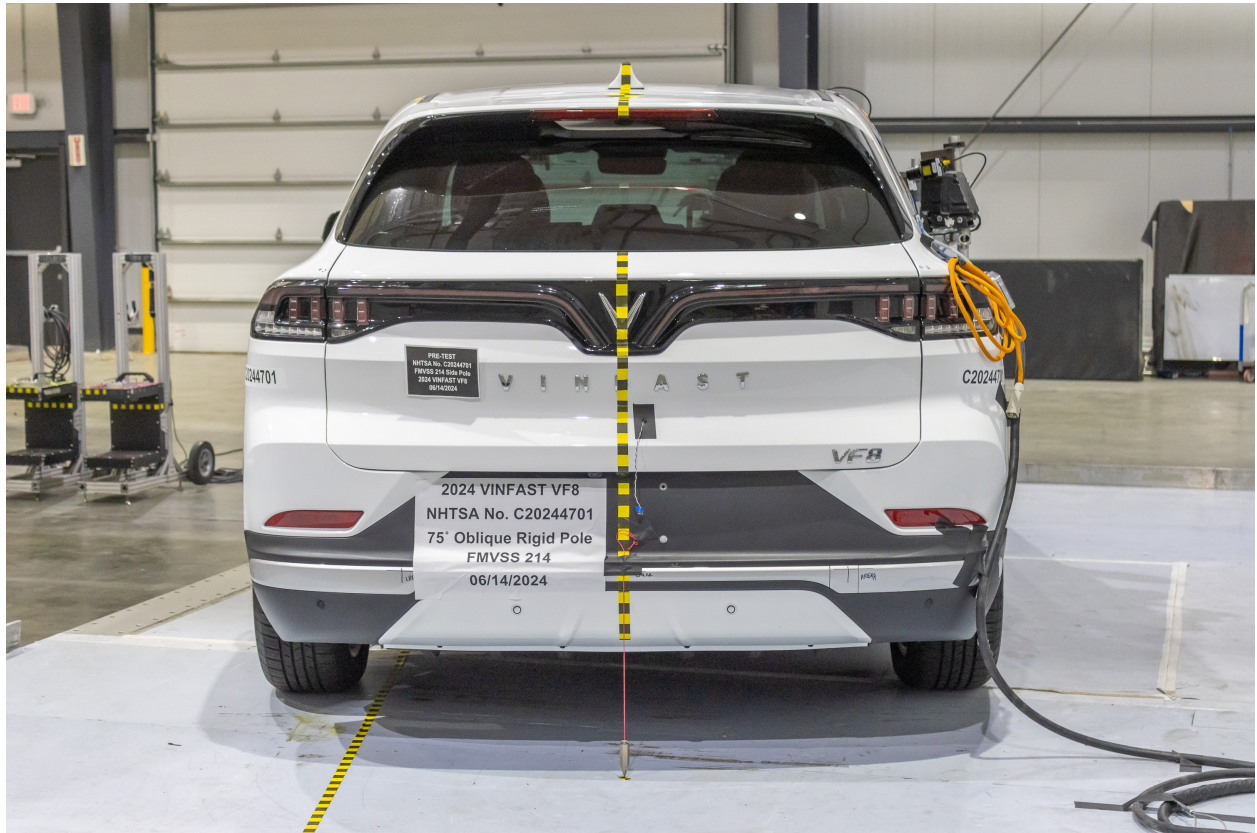


Figure A-3: Pre-Test Rear View of Test Vehicle



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

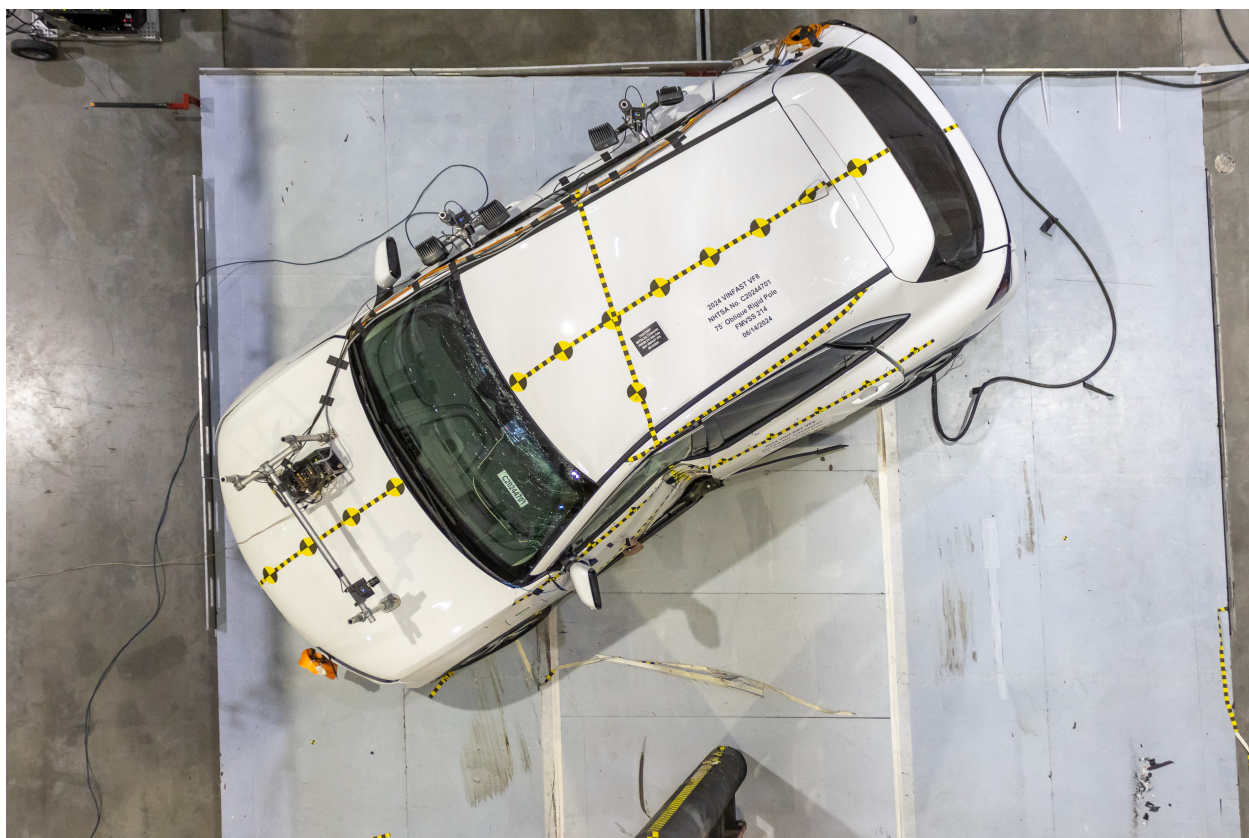


Figure A-10: Post-Test Overhead View of Test Vehicle



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

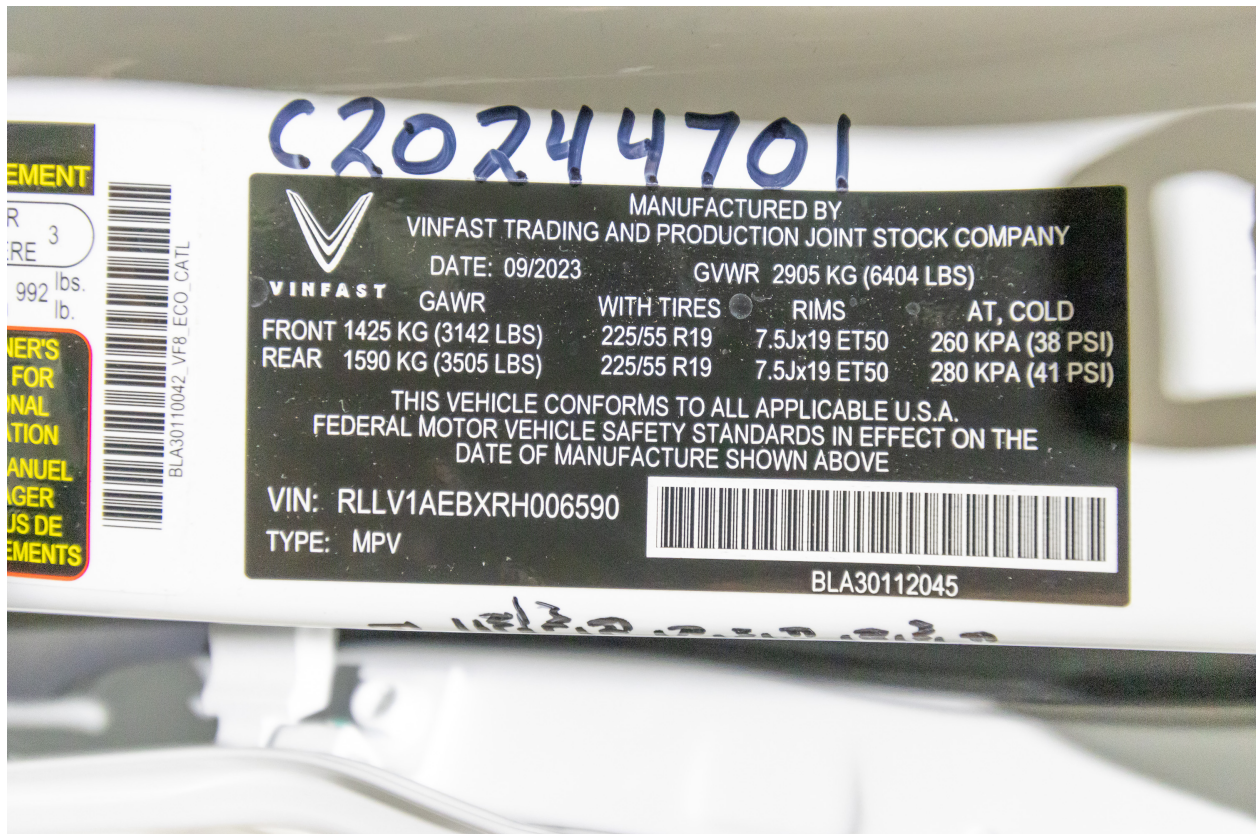


Figure A-25: Close-Up View of Vehicle's Certification Label

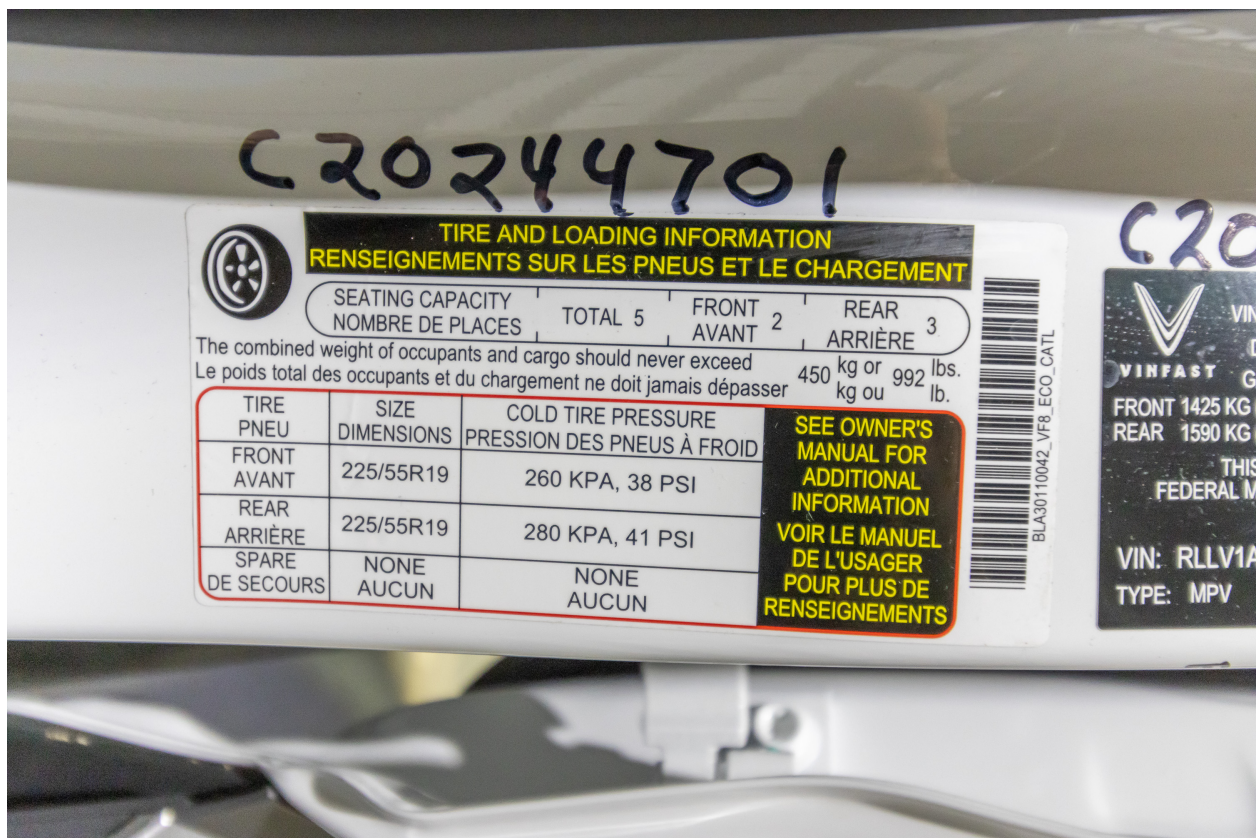


Figure A-26: Close-Up View of Vehicle's Tire Placard Label

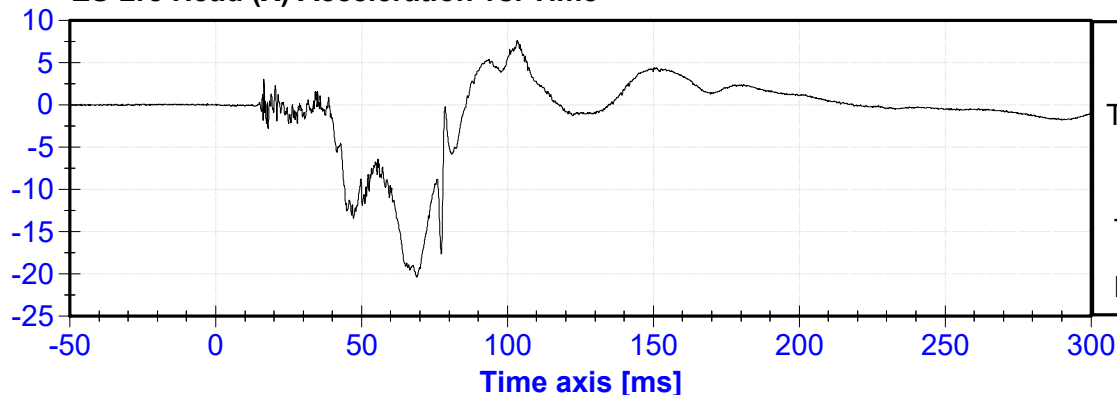
APPENDIX II
ES-2re DUMMY RESPONSE DATA TRACES

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

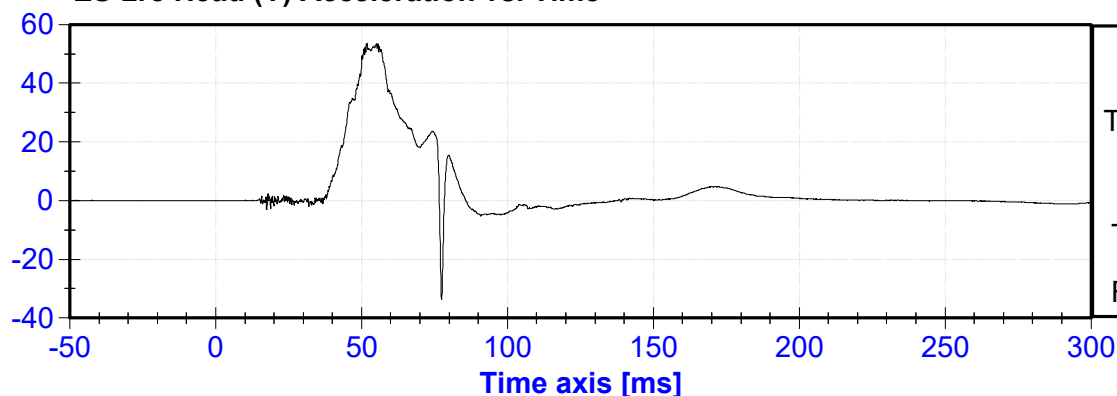
ACCELERATION [g's]

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



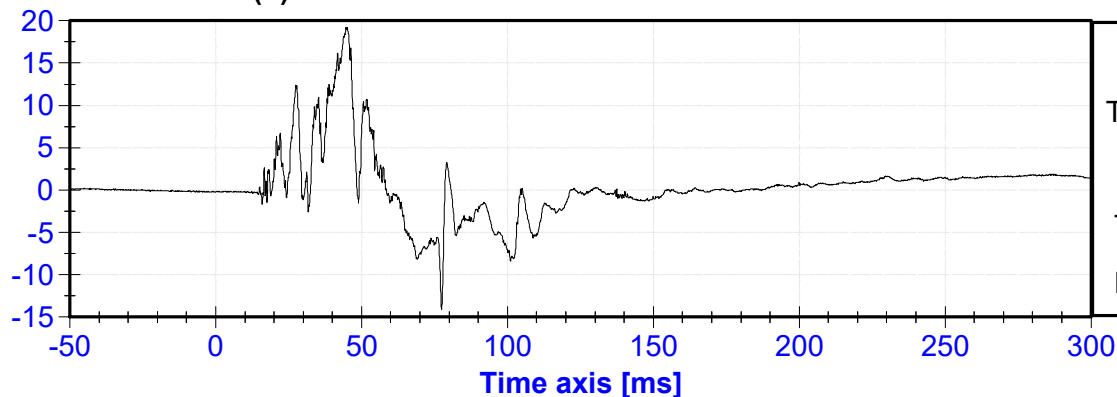
ACCELERATION [g's]

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



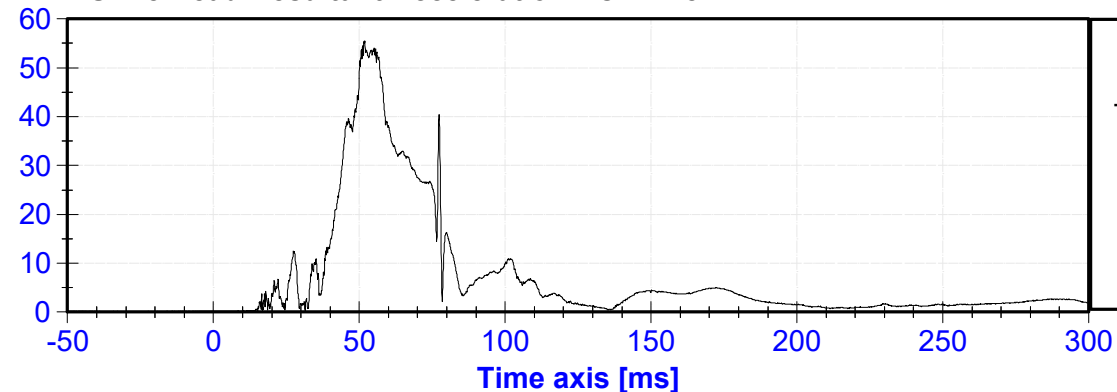
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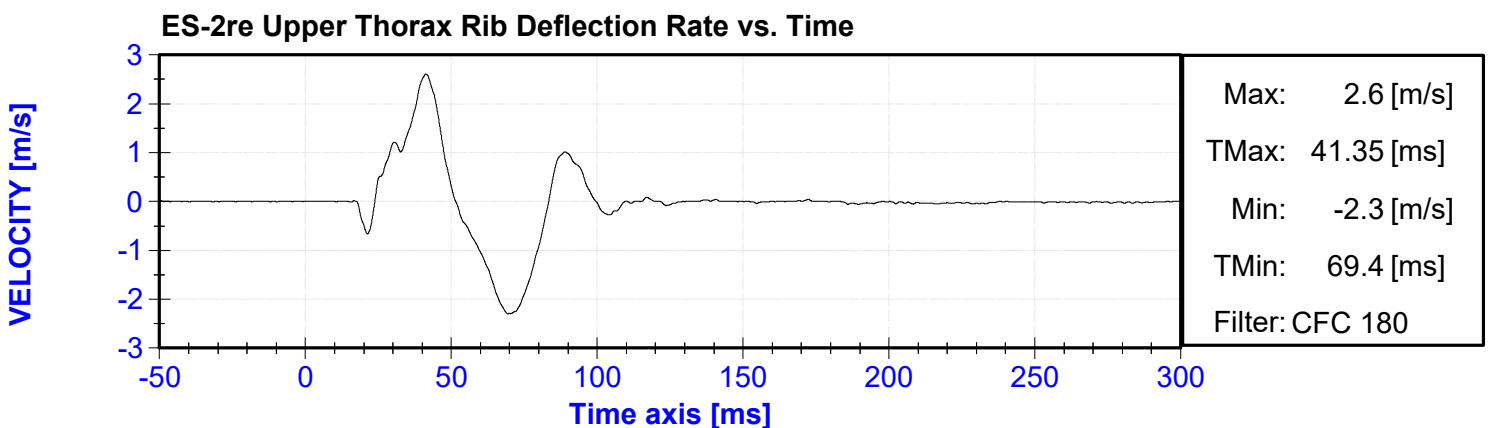
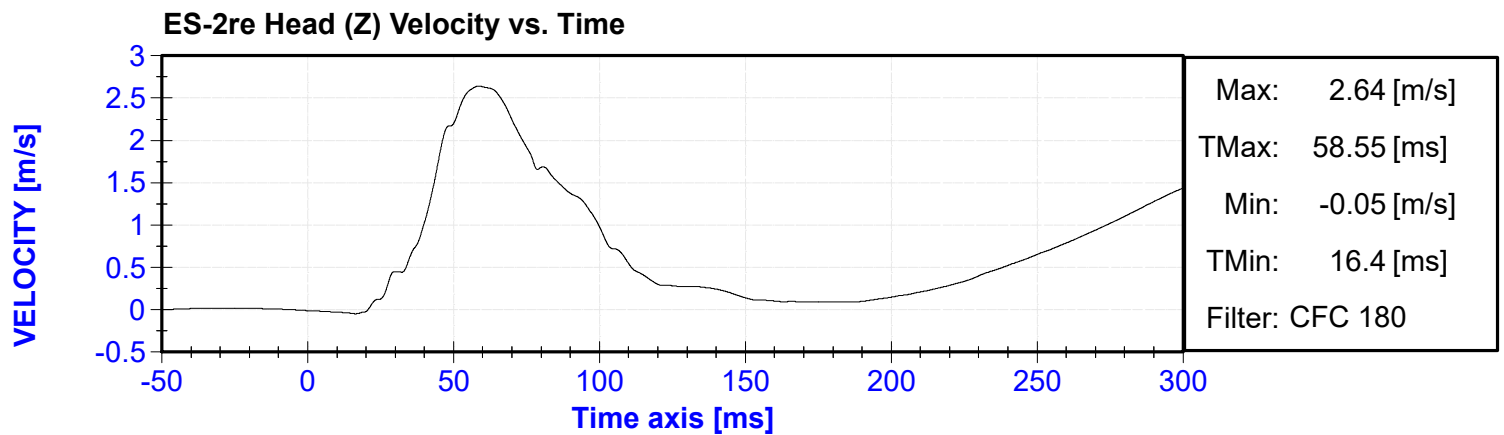
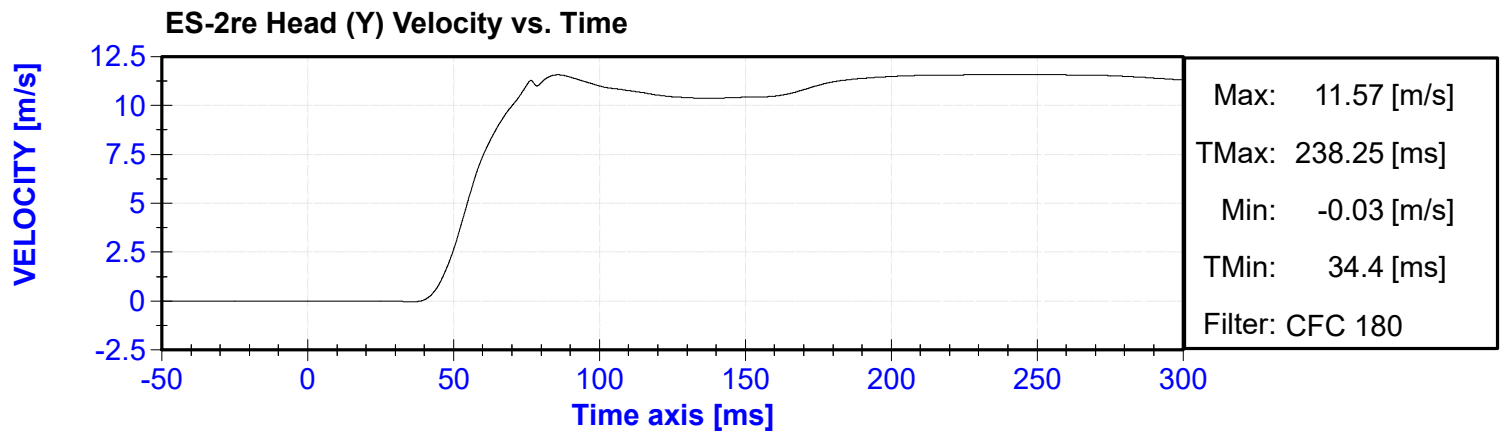
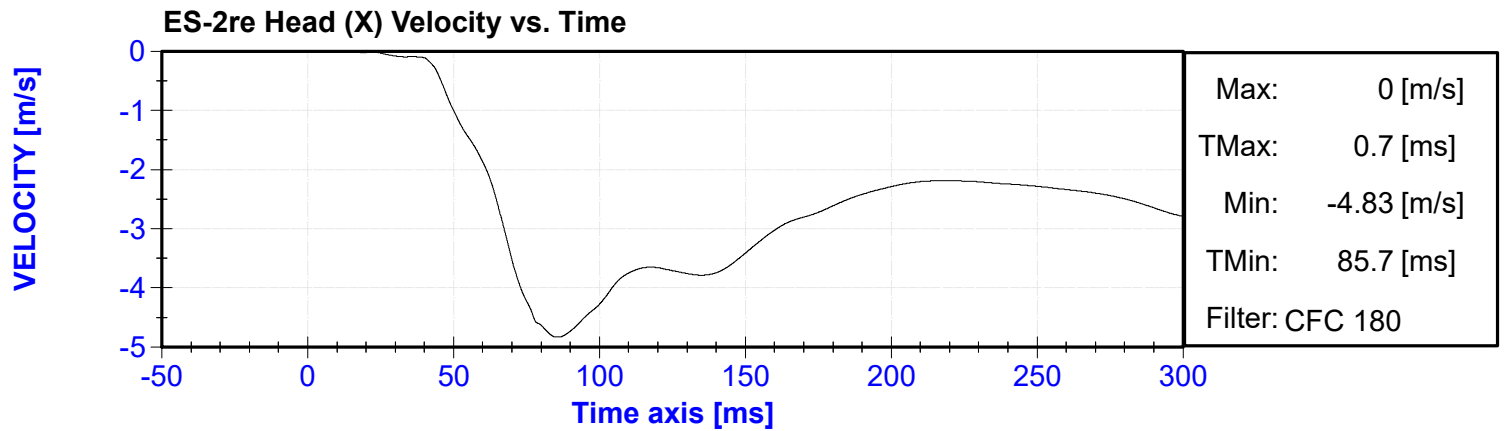
ES-2re Head (Z) Acceleration vs. Time

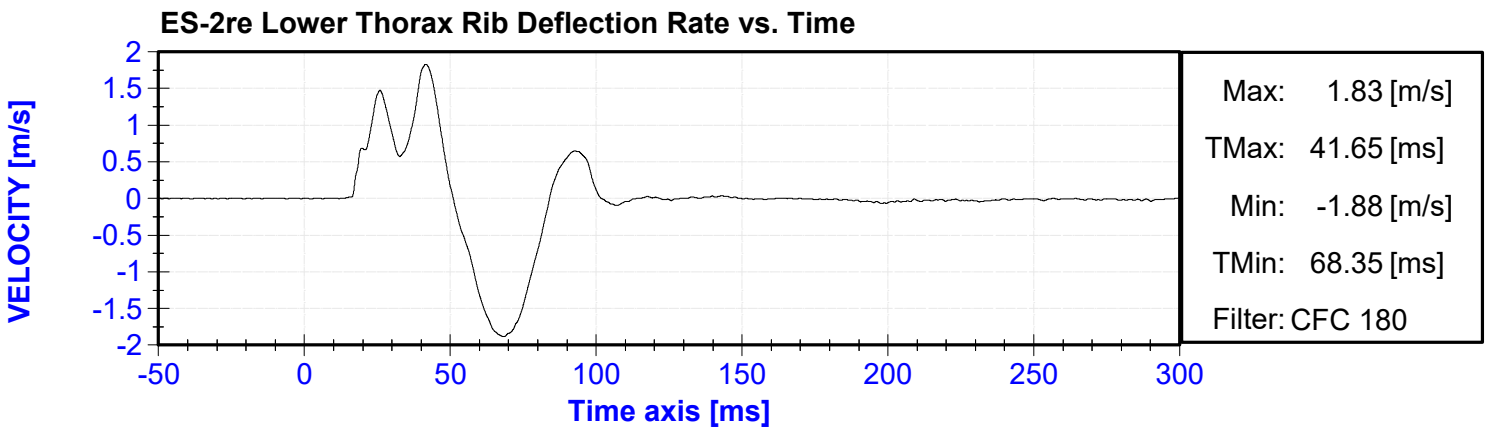
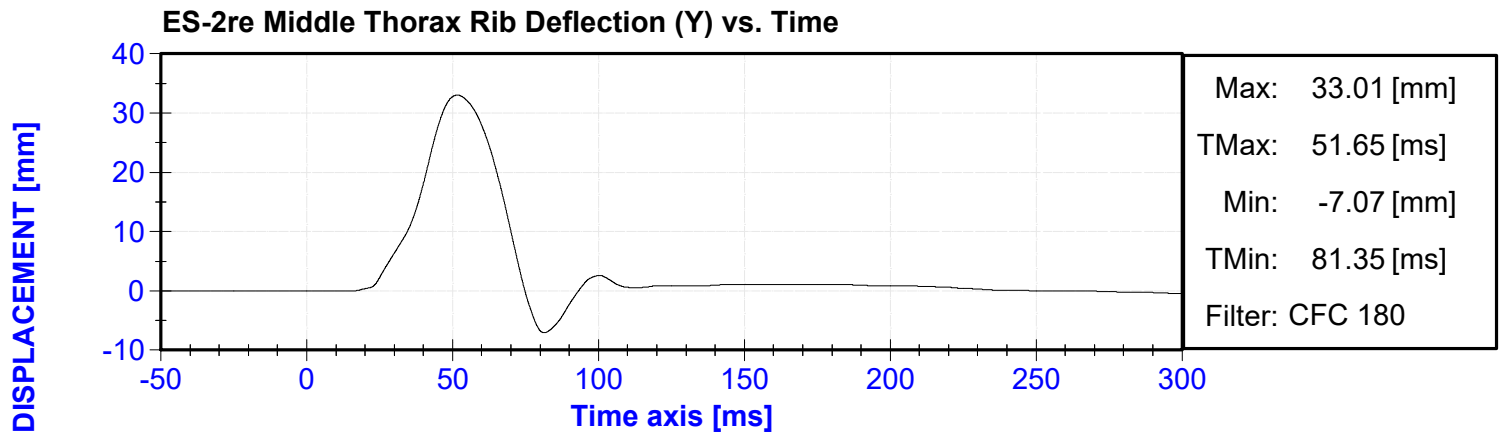
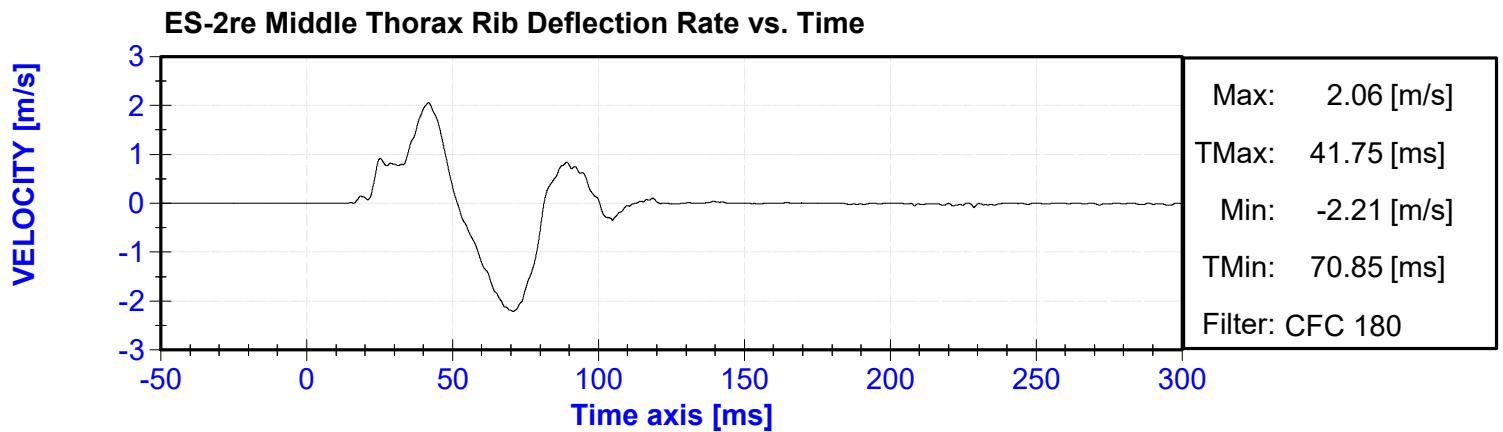
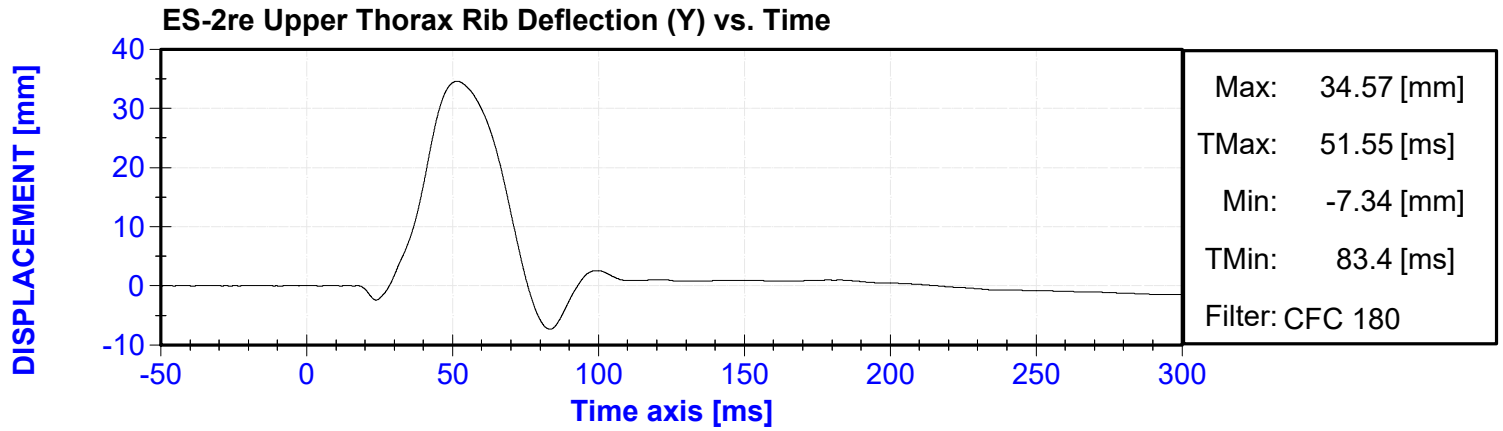


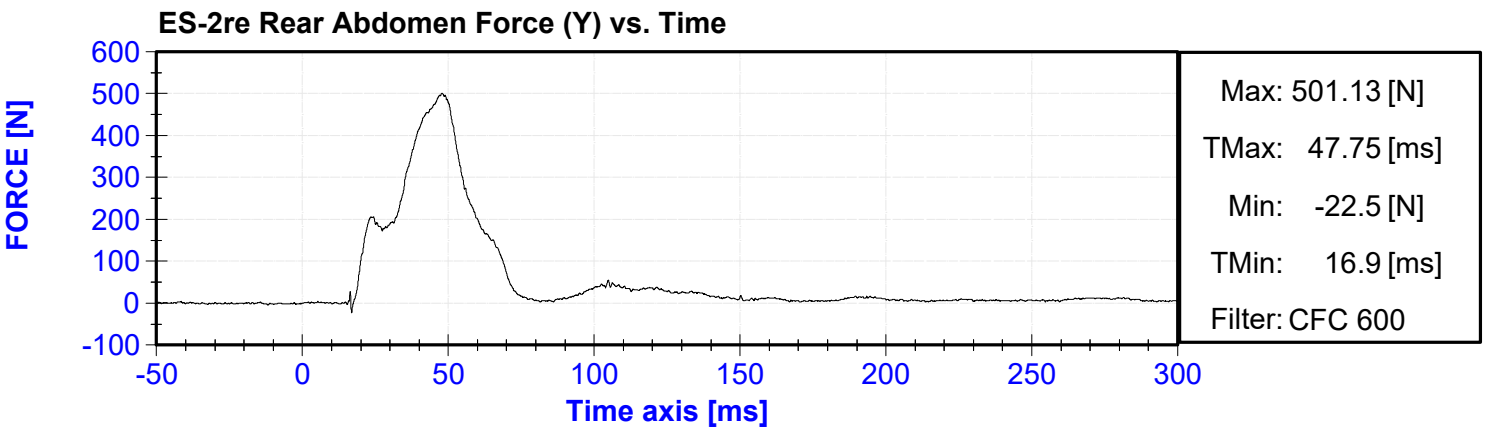
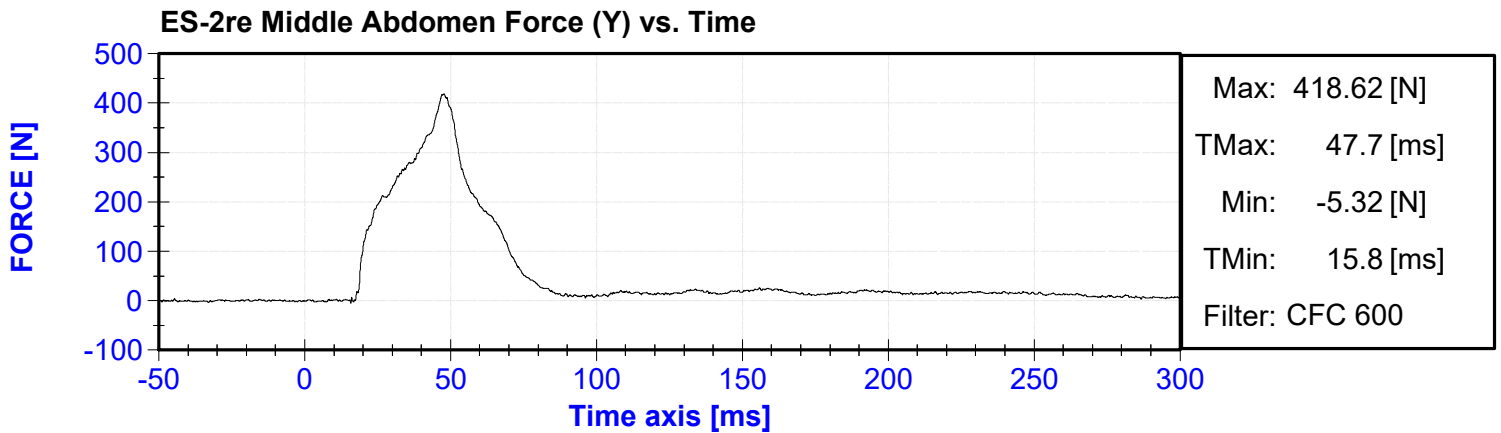
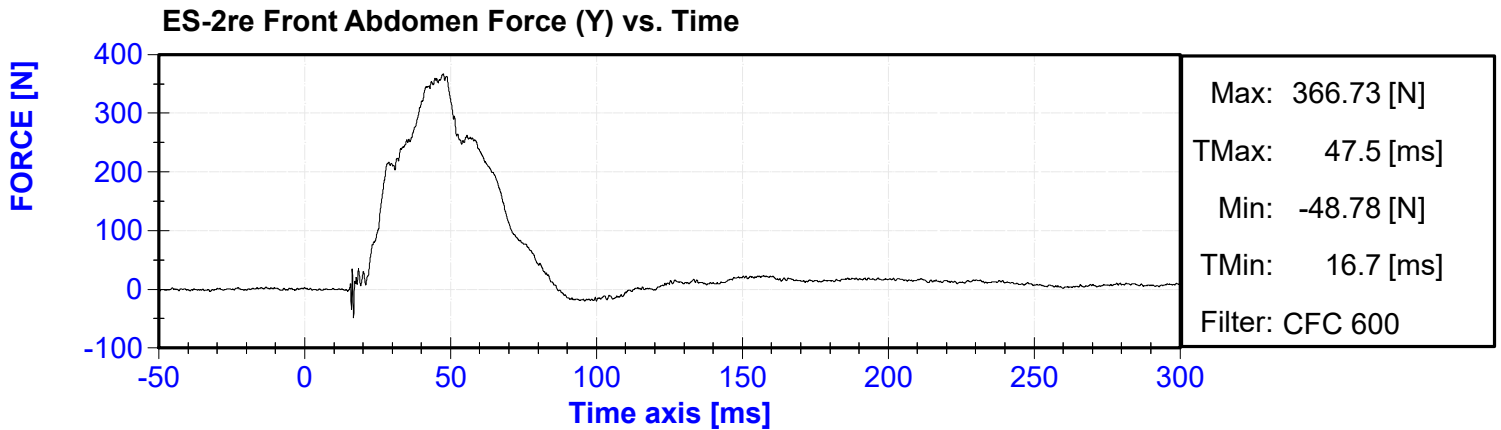
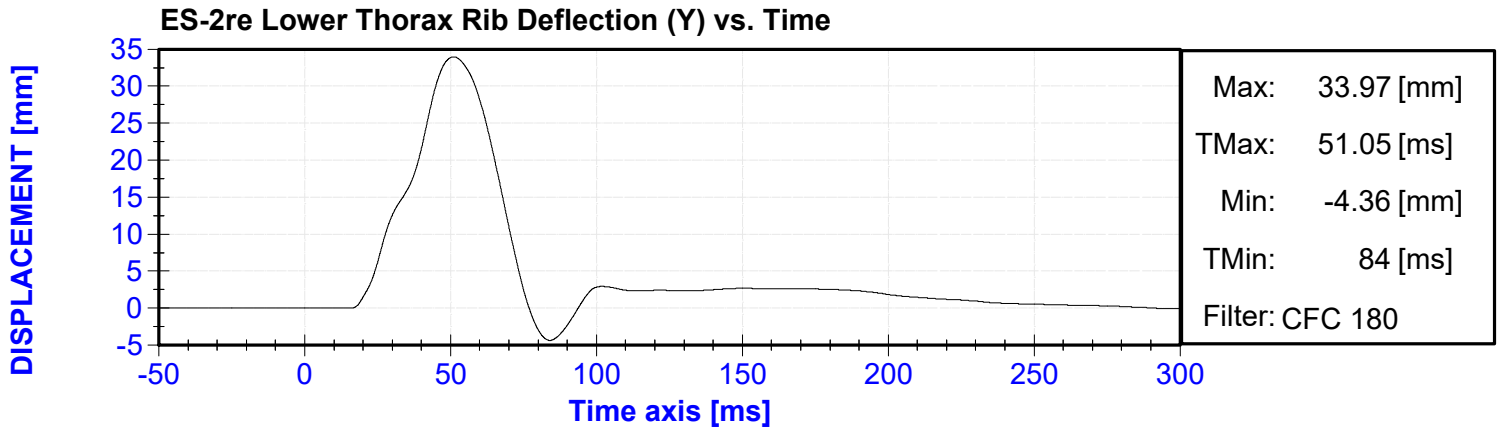
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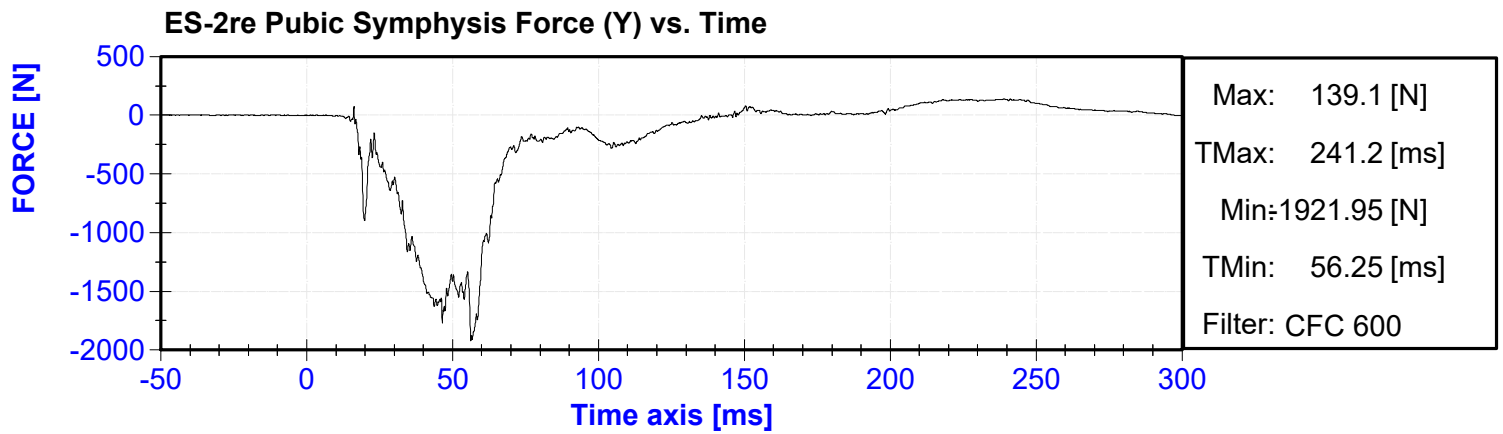
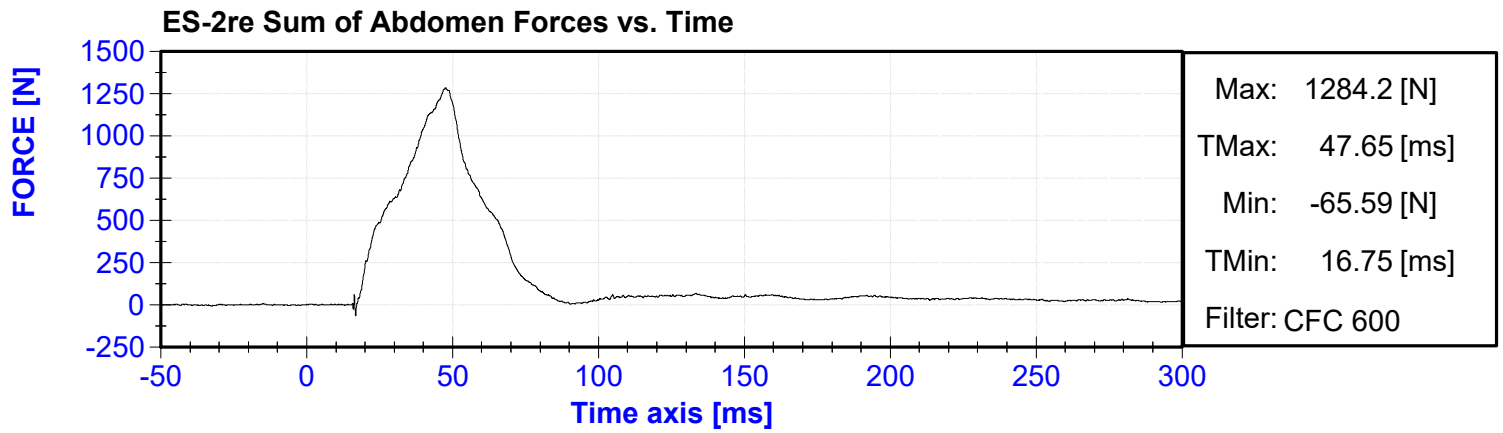
ES-2re Head Resultant Acceleration vs. Time









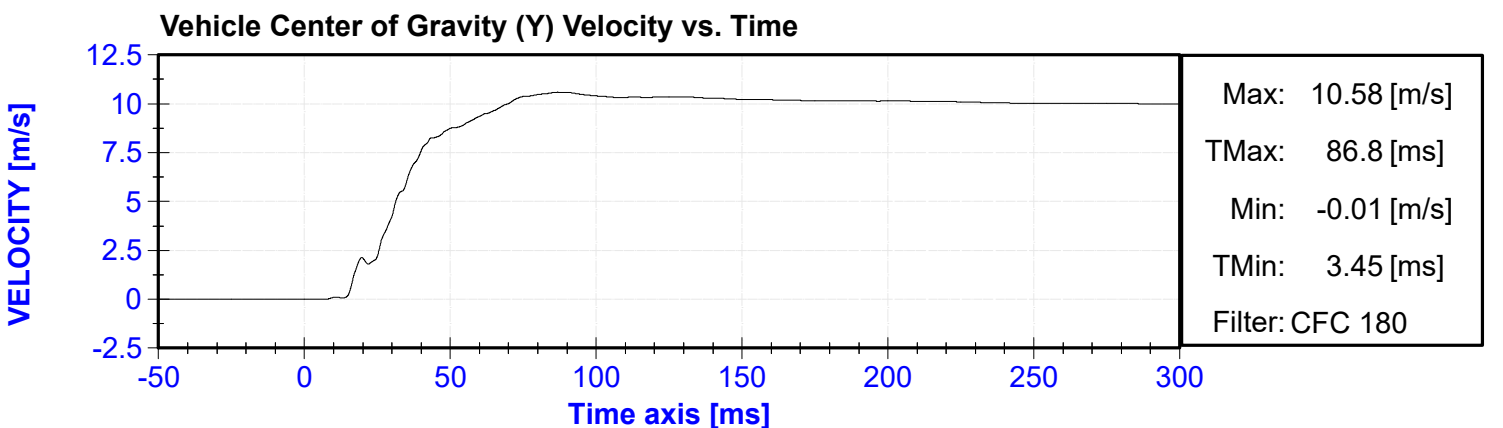
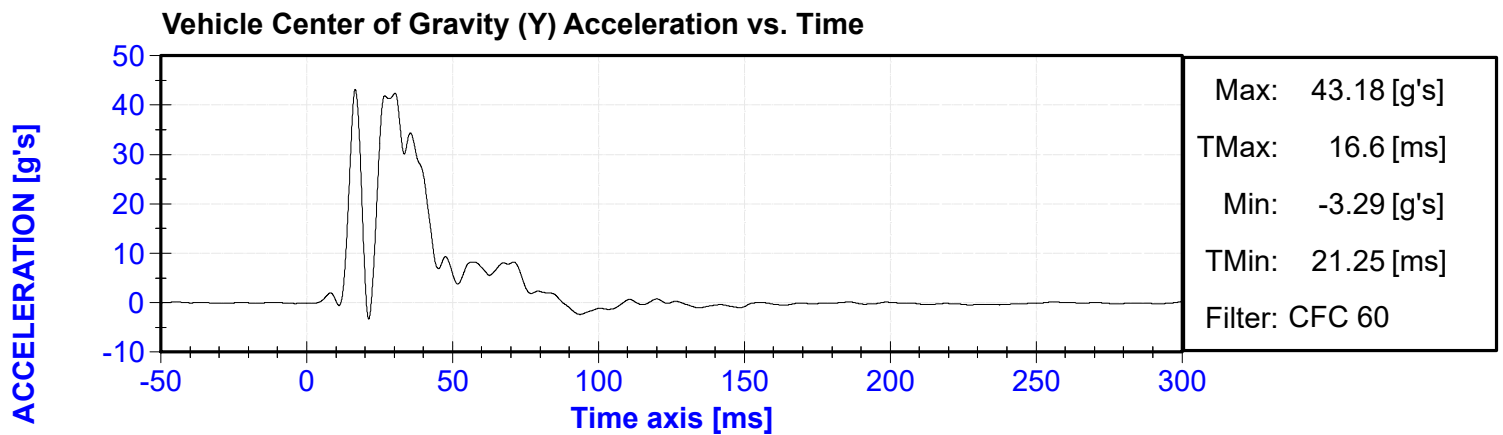
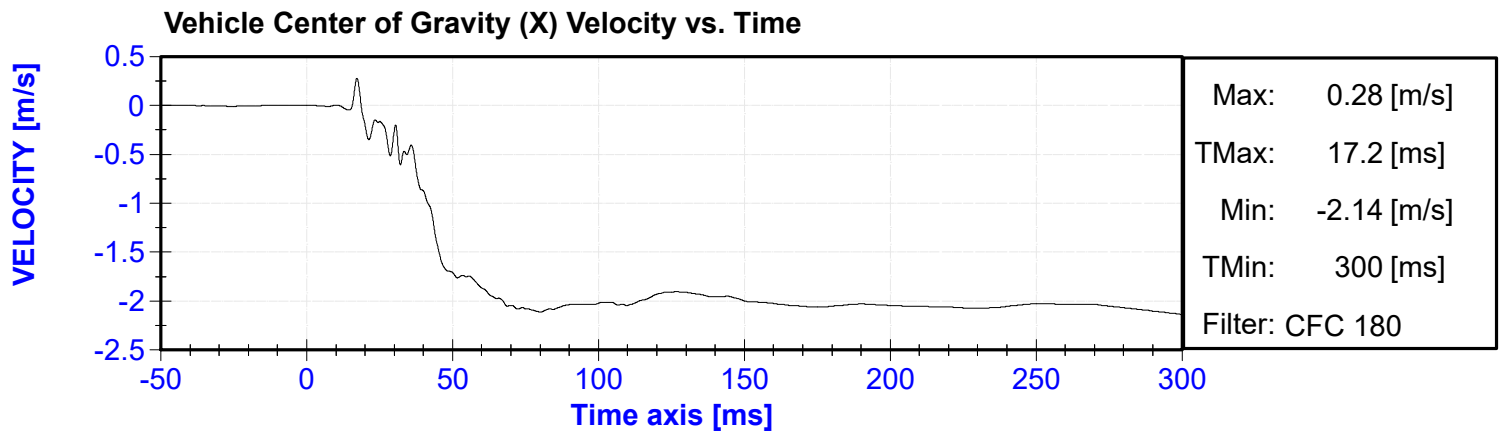
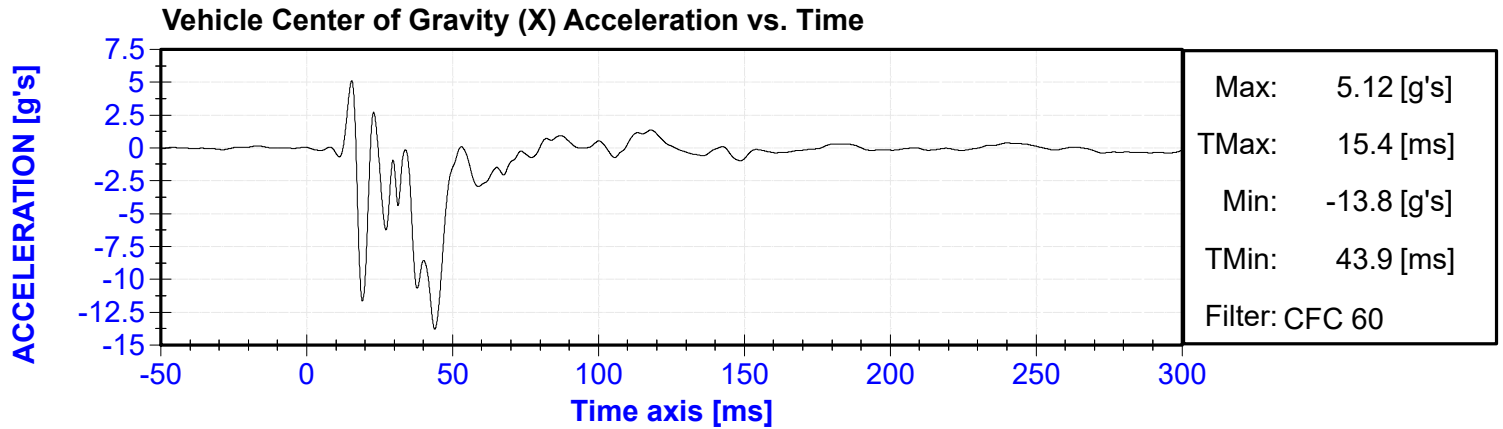


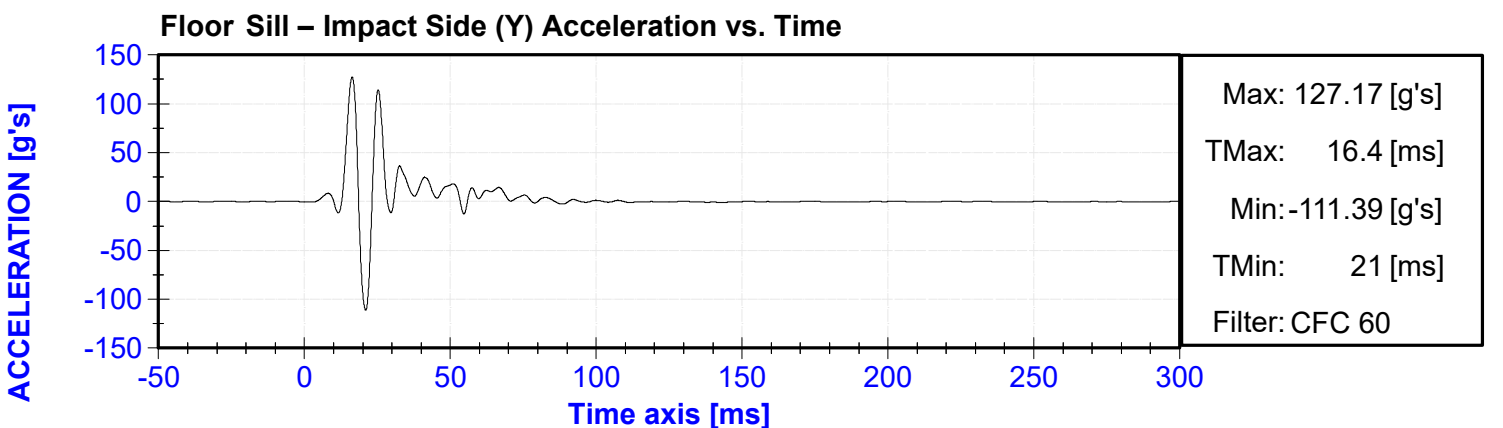
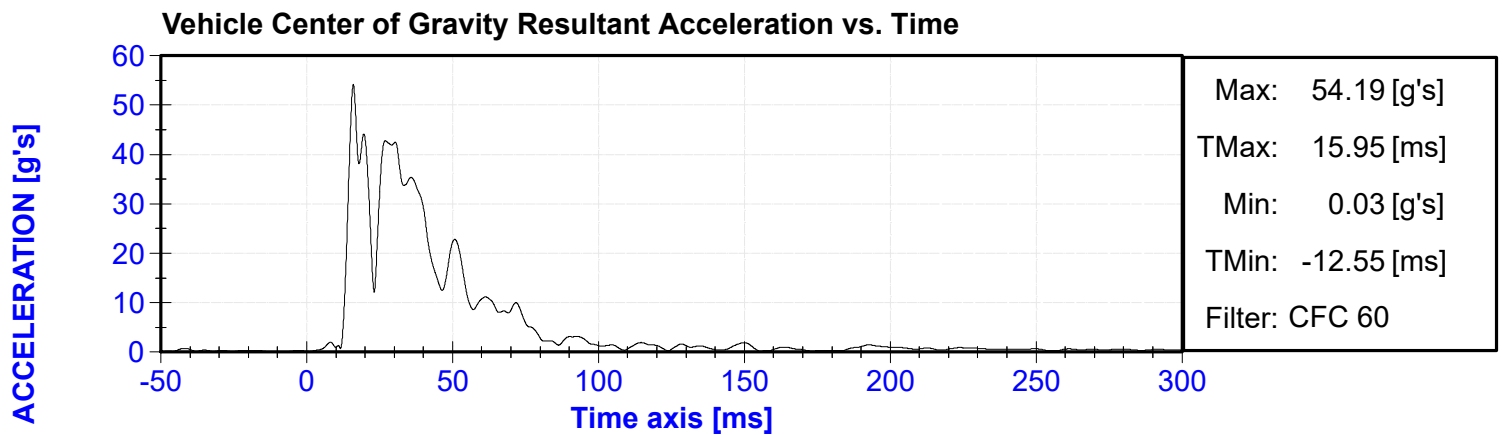
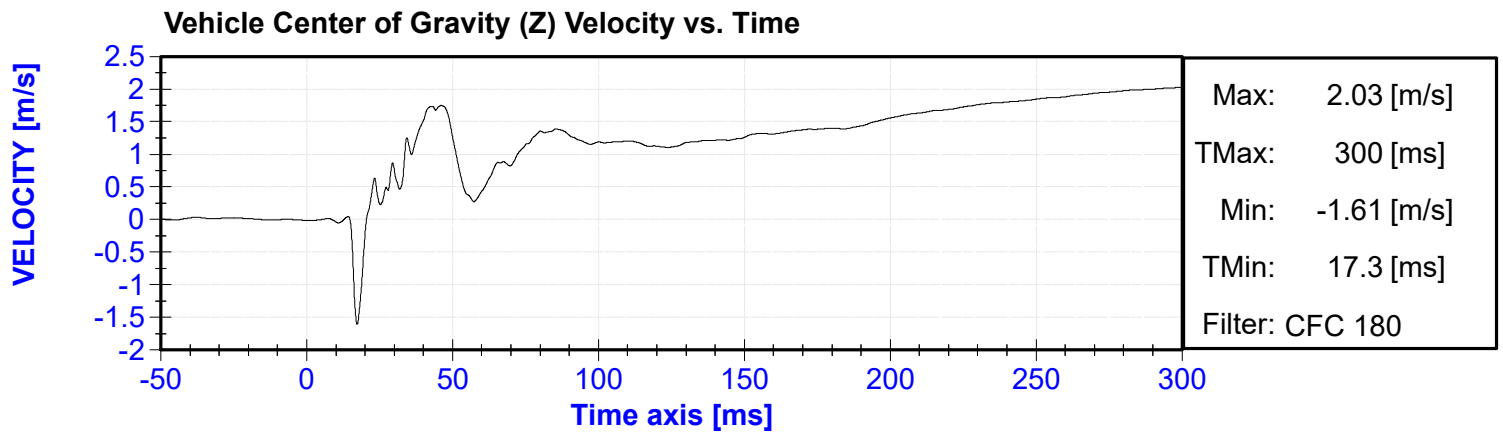
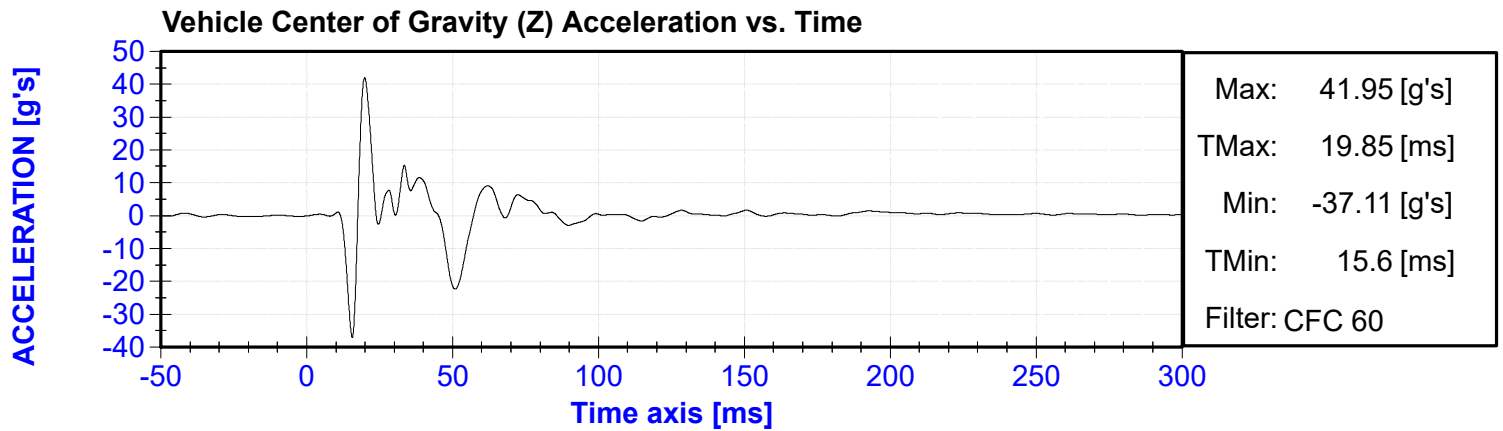
APPENDIX III

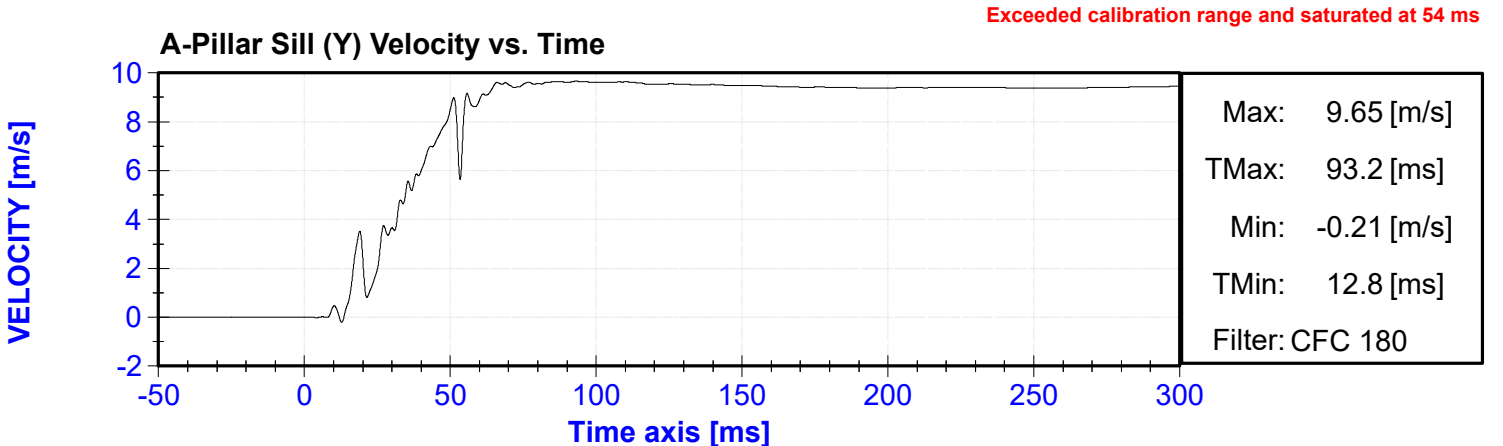
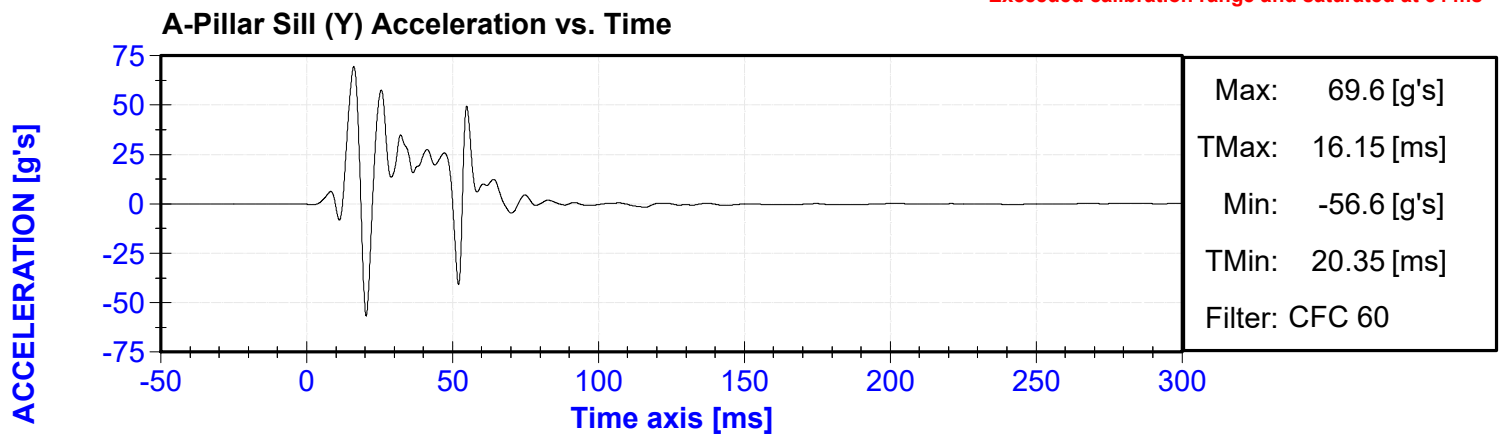
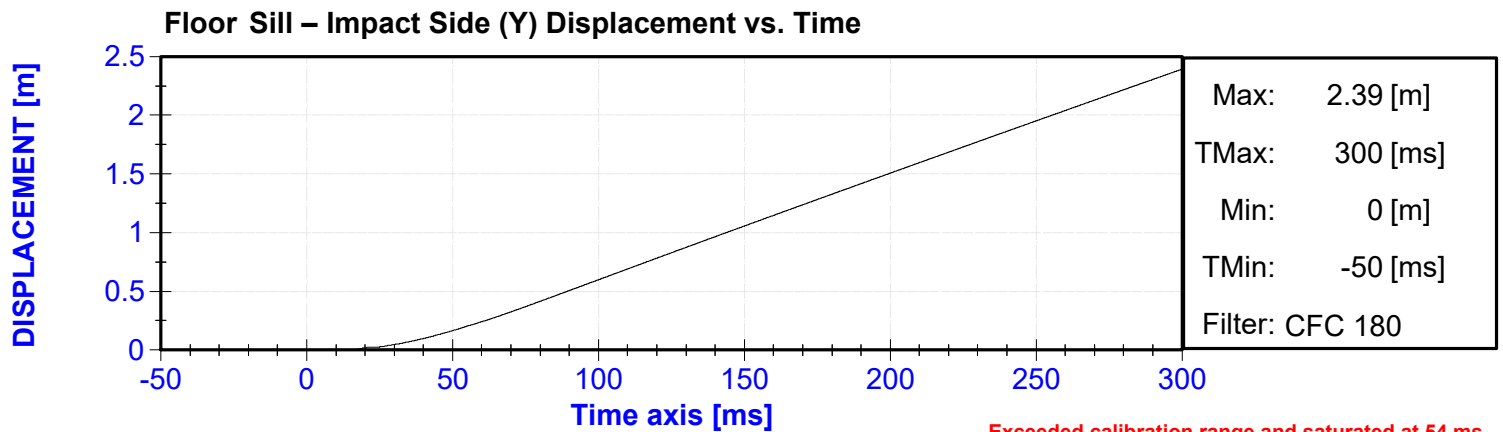
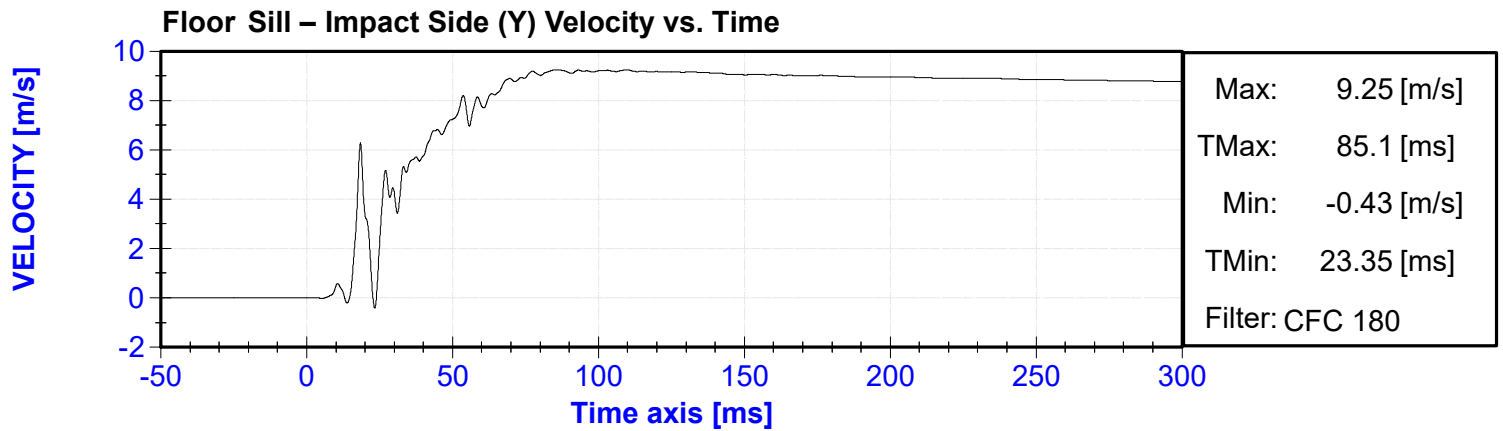
VEHICLE ACCELEROMETER RESPONSE DATA

Table of Data Plots

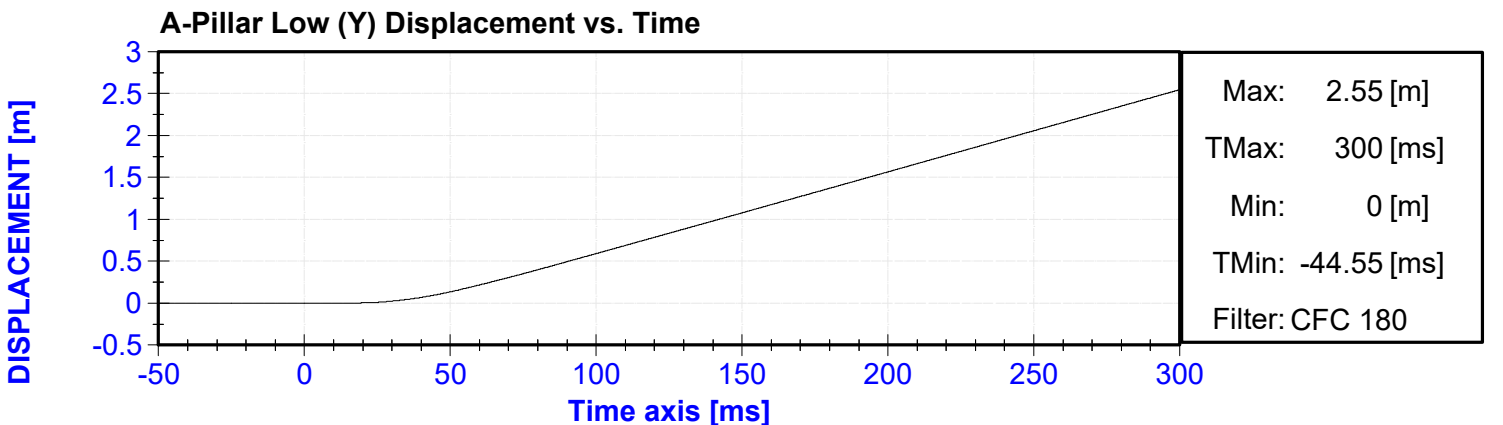
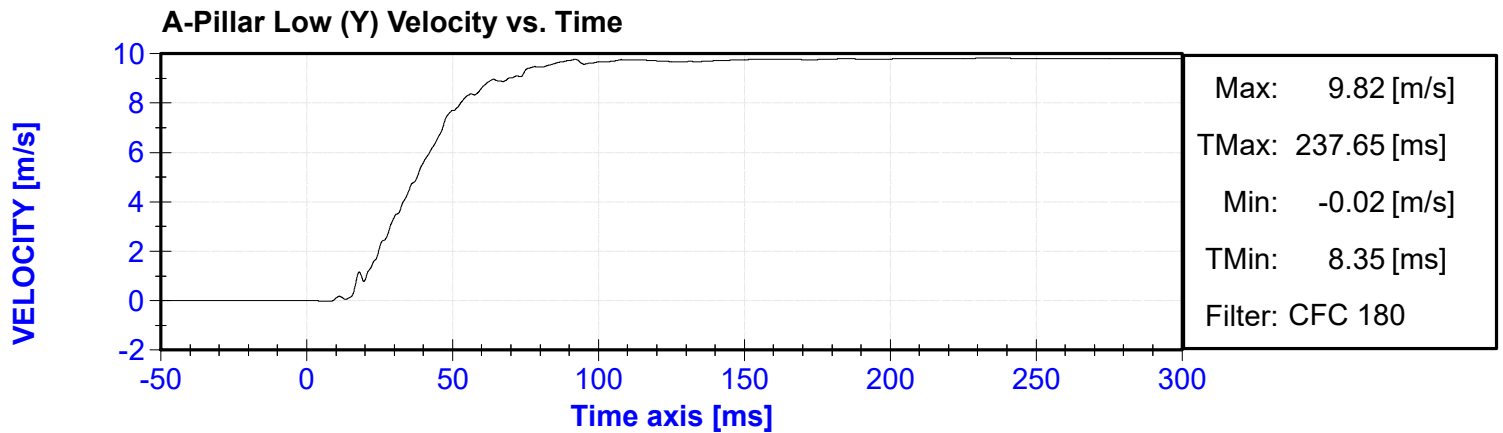
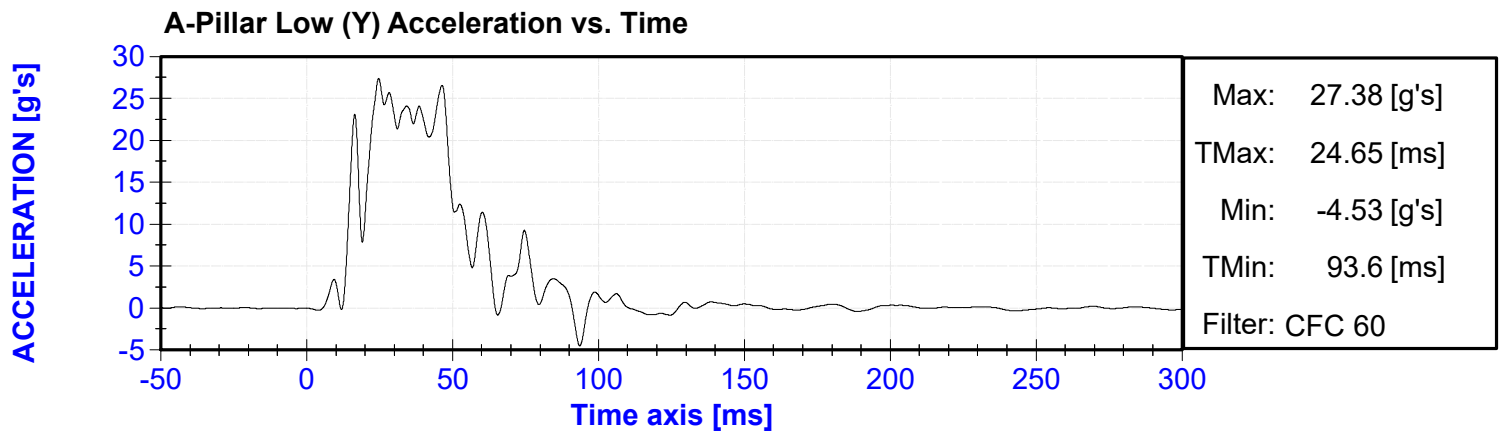
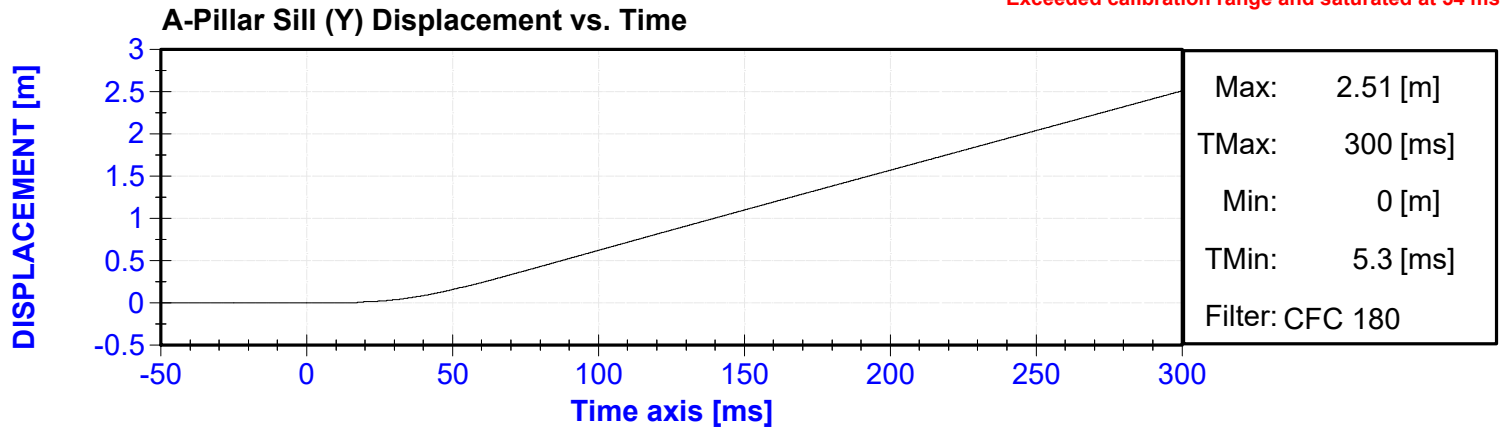
No.	Description	Page
1	Vehicle Center of Gravity (X) Acceleration vs. Time	III-3
2	Vehicle Center of Gravity (X) Velocity vs. Time	III-3
3	Vehicle Center of Gravity (Y) Acceleration vs. Time	III-3
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9	Floor Sill – Impact Side (Y) Velocity vs. Time	III-5
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11	A-Pillar Sill (Y) Acceleration vs. Time	III-5
12	A-Pillar Sill (Y) Velocity vs. Time	III-5
13	A-Pillar Sill (Y) Displacement vs. Time	III-6
14	A-Pillar Low (Y) Acceleration vs. Time	III-6
15	A-Pillar Low (Y) Velocity vs. Time	III-6
16	A-Pillar Low (Y) Displacement vs. Time	III-6
17	A-Pillar Mid (Y) Acceleration vs. Time	III-7
18	A-Pillar Mid (Y) Velocity vs. Time	III-7
19	A-Pillar Mid (Y) Displacement vs. Time	III-7
20	B-Pillar Sill (Y) Acceleration vs. Time	III-7
21	B-Pillar Sill (Y) Velocity vs. Time	III-8
22	B-Pillar Sill (Y) Displacement vs. Time	III-8
23	B-Pillar Low (Y) Acceleration vs. Time	III-8
24	B-Pillar Low (Y) Velocity vs. Time	III-8
25	B-Pillar Low (Y) Displacement vs. Time	III-9
26	B-Pillar Mid (Y) Acceleration vs. Time	III-9
27	B-Pillar Mid (Y) Velocity vs. Time	III-9
28	B-Pillar Mid (Y) Displacement vs. Time	III-9
29	Seat (Y) Acceleration vs. Time	III-10
30	Seat (Y) Velocity vs. Time	III-10
31	Seat (Y) Displacement vs. Time	III-10
32	Engine (X) Acceleration vs. Time	III-10
33	Engine (X) Velocity vs. Time	III-11
34	Engine (Y) Acceleration vs. Time	III-11
35	Engine (Y) Velocity vs. Time	III-11
36	Firewall (Y) Acceleration vs. Time	III-11
37	Firewall (Y) Velocity vs. Time	III-12
38	Roof (Y) Acceleration vs. Time	III-12
39	Roof (Y) Velocity vs. Time	III-12
40	Floor Sill – Non Impact Side (Y) Acceleration vs. Time	III-12
41	Floor Sill – Non Impact Side (Y) Velocity vs. Time	III-13
42	Rear Deck (X) Acceleration vs. Time	III-13
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

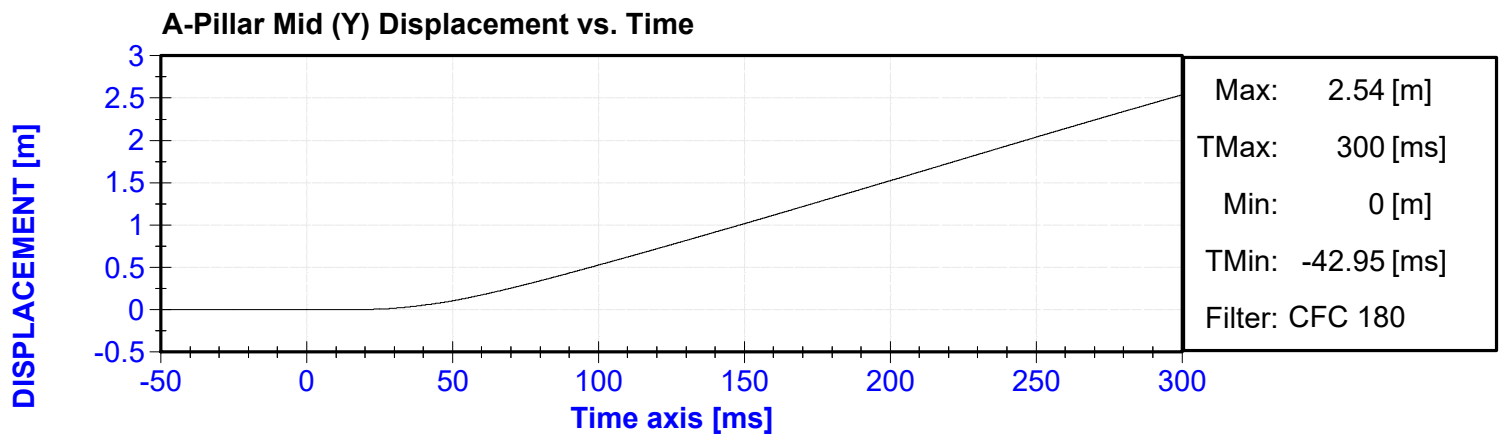
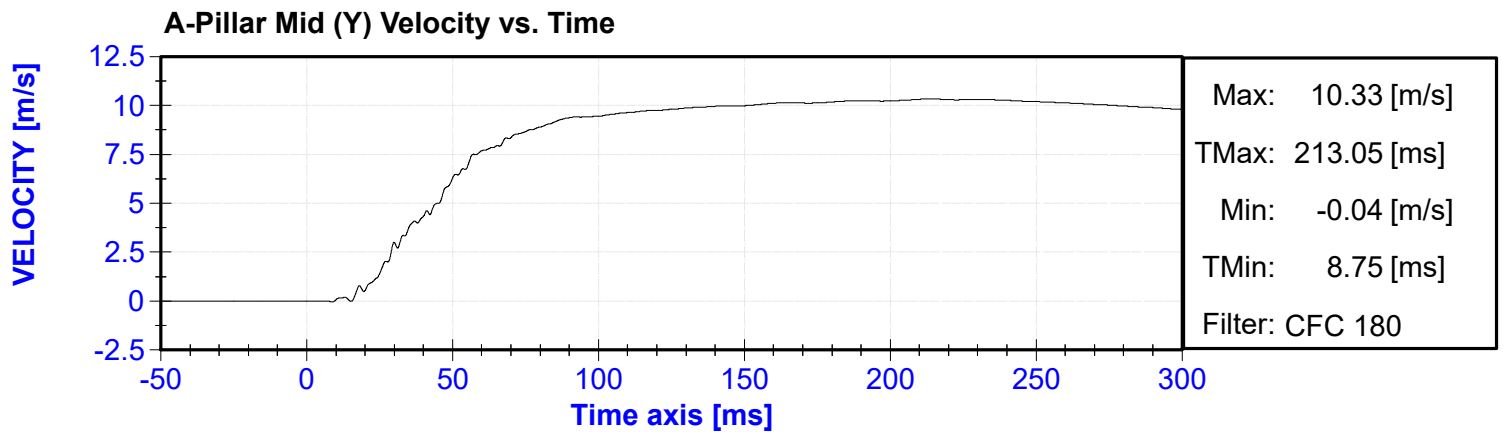
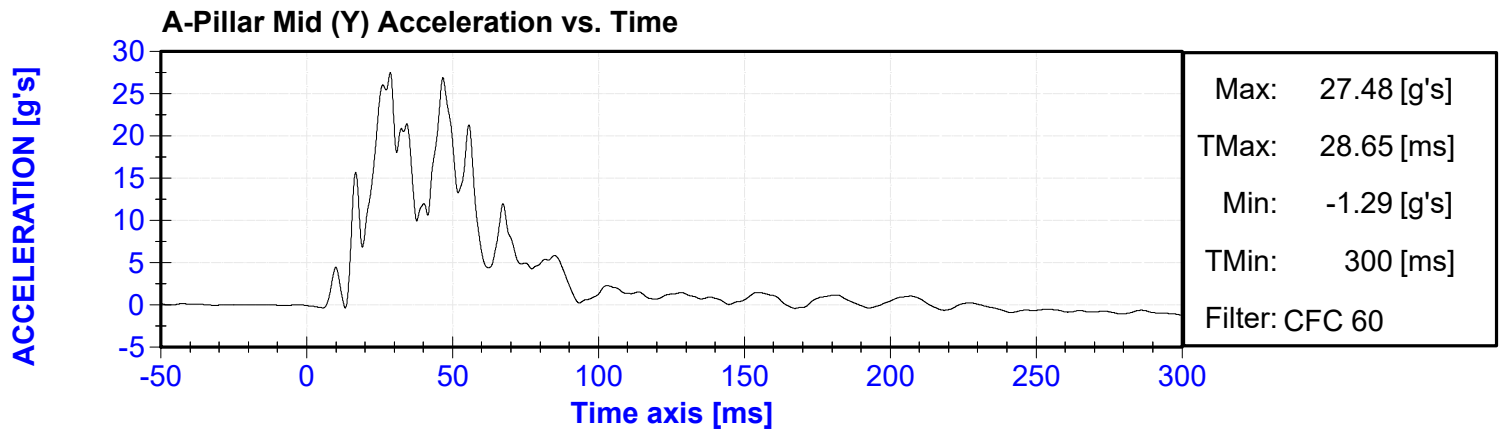




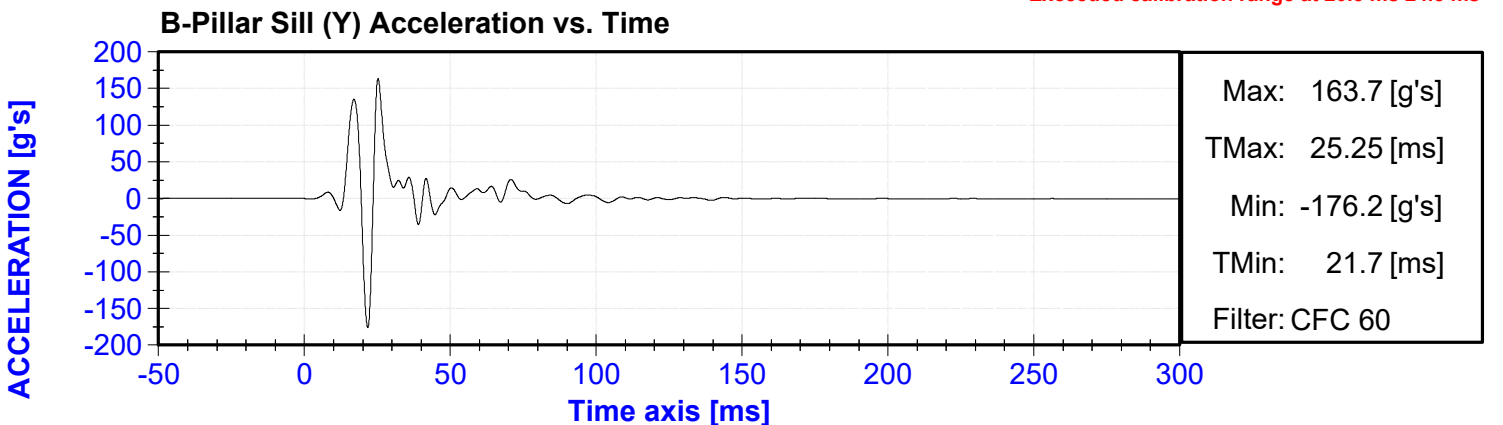


Exceeded calibration range and saturated at 54 ms

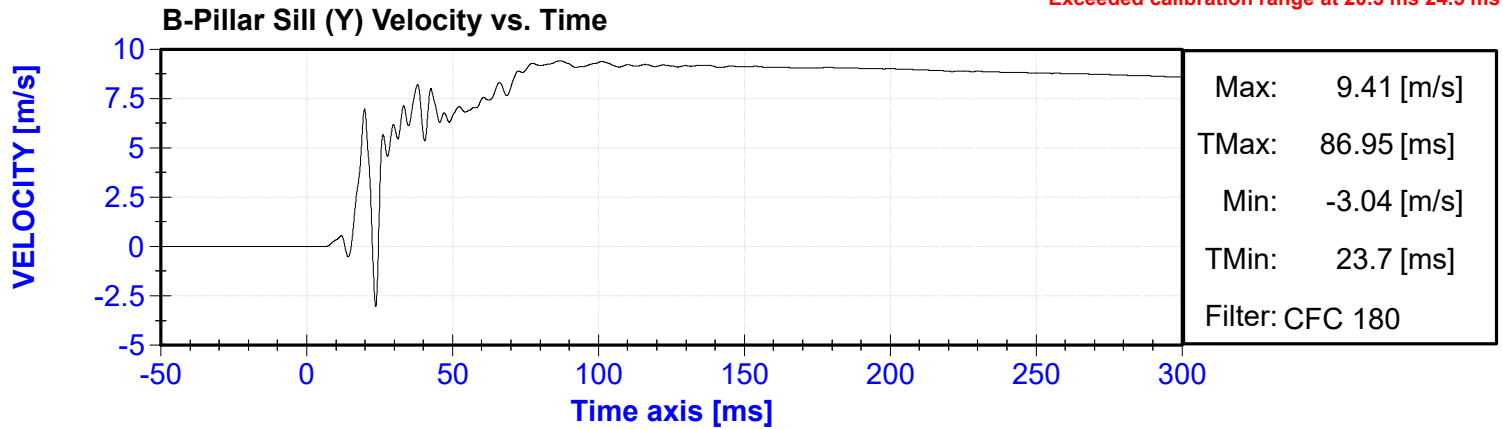




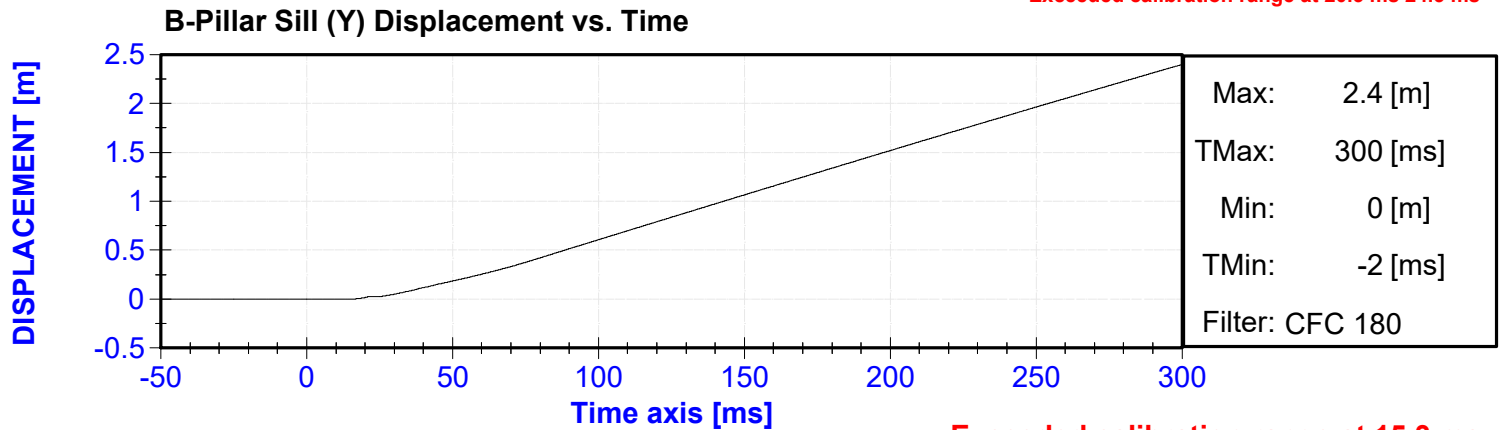
Exceeded calibration range at 20.3 ms 24.5 ms



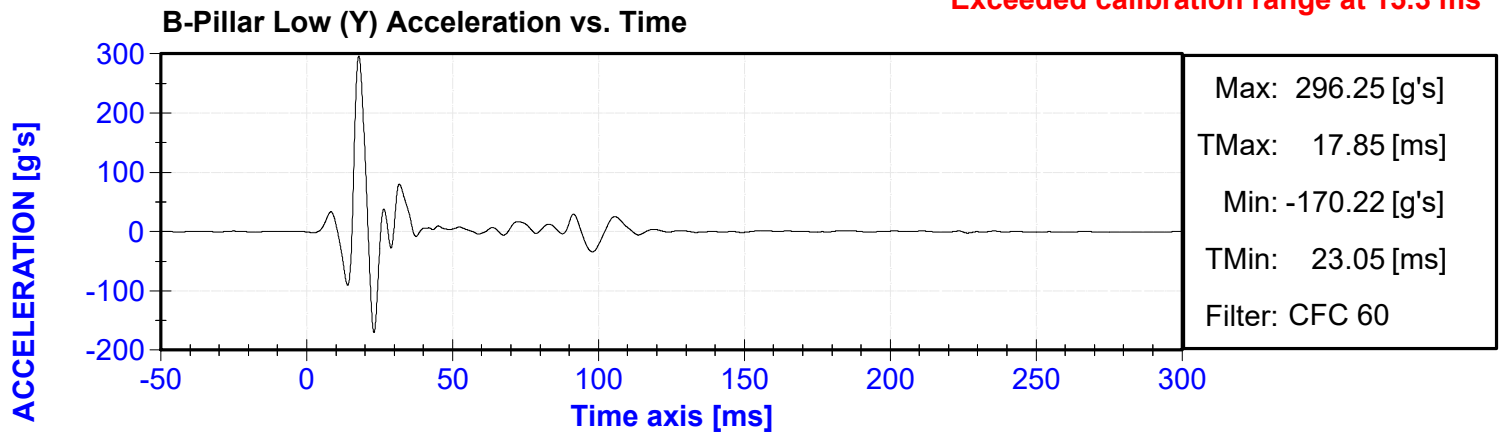
Exceeded calibration range at 20.3 ms 24.5 ms



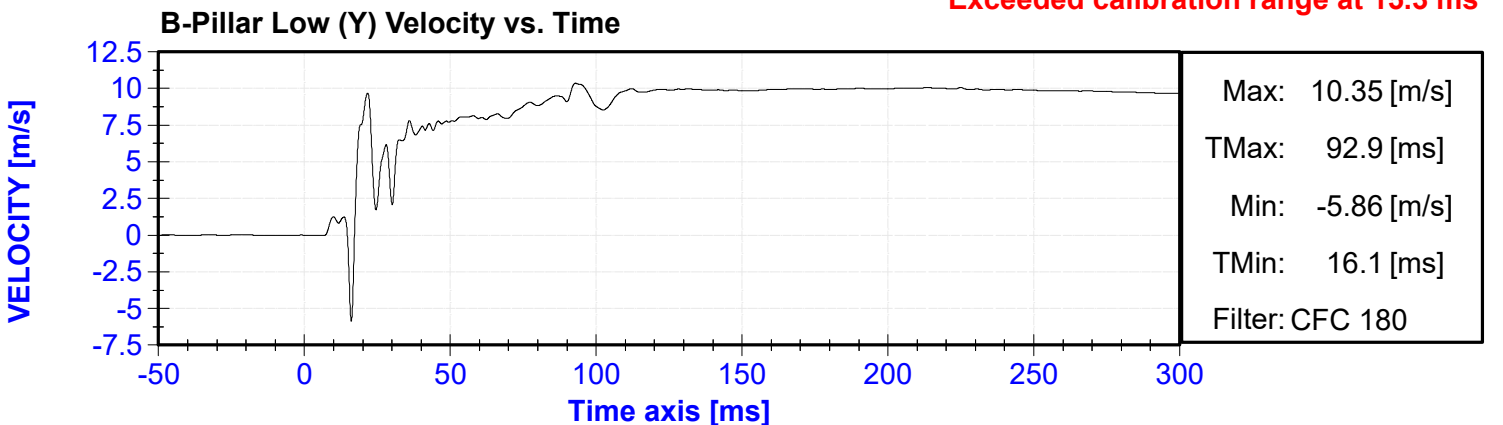
Exceeded calibration range at 20.3 ms 24.5 ms



Exceeded calibration range at 15.3 ms



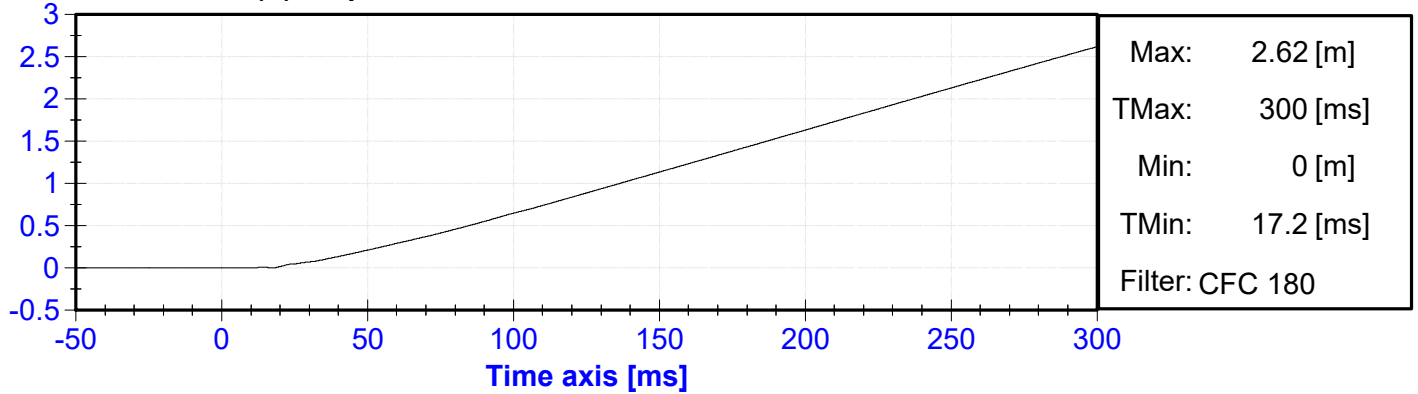
Exceeded calibration range at 15.3 ms



DISPLACEMENT [m]

B-Pillar Low (Y) Displacement vs. Time

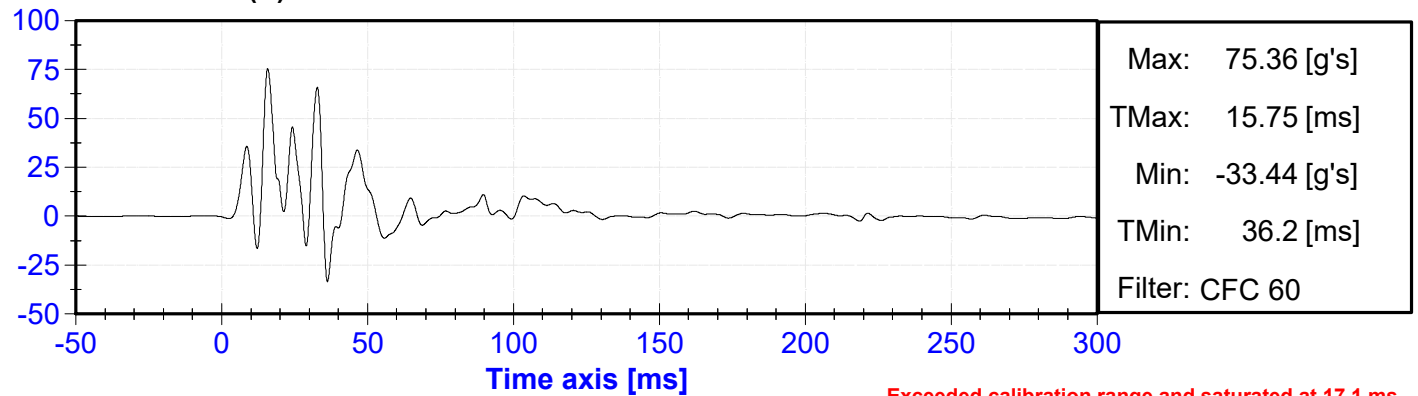
Exceeded calibration range at 15.3 ms



ACCELERATION [g's]

B-Pillar Mid (Y) Acceleration vs. Time

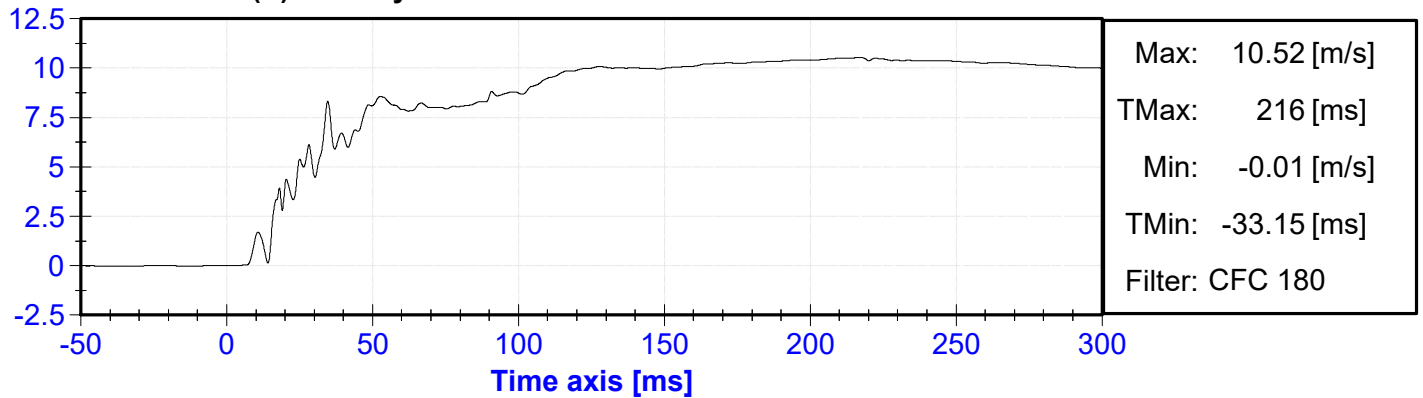
Exceeded calibration range and saturated at 17.1 ms



VELOCITY [m/s]

B-Pillar Mid (Y) Velocity vs. Time

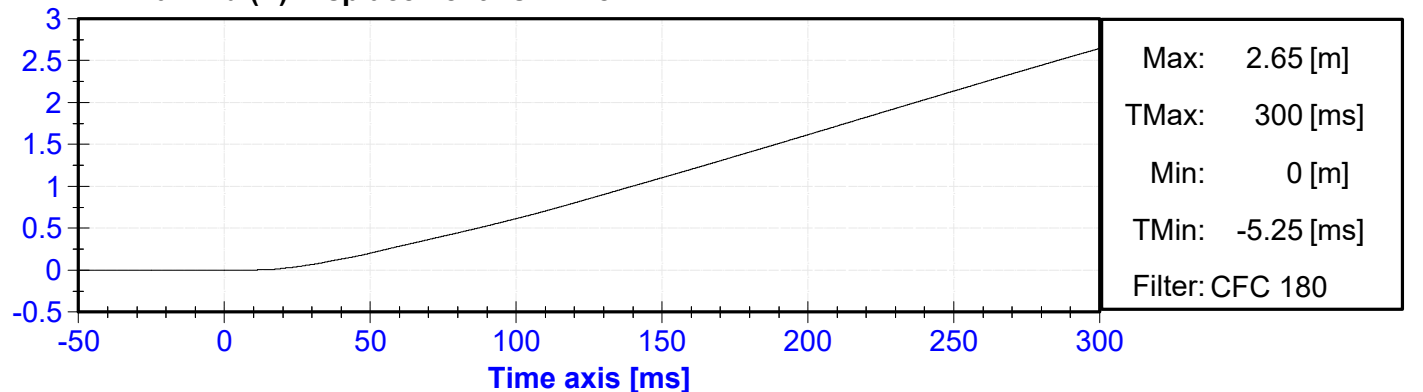
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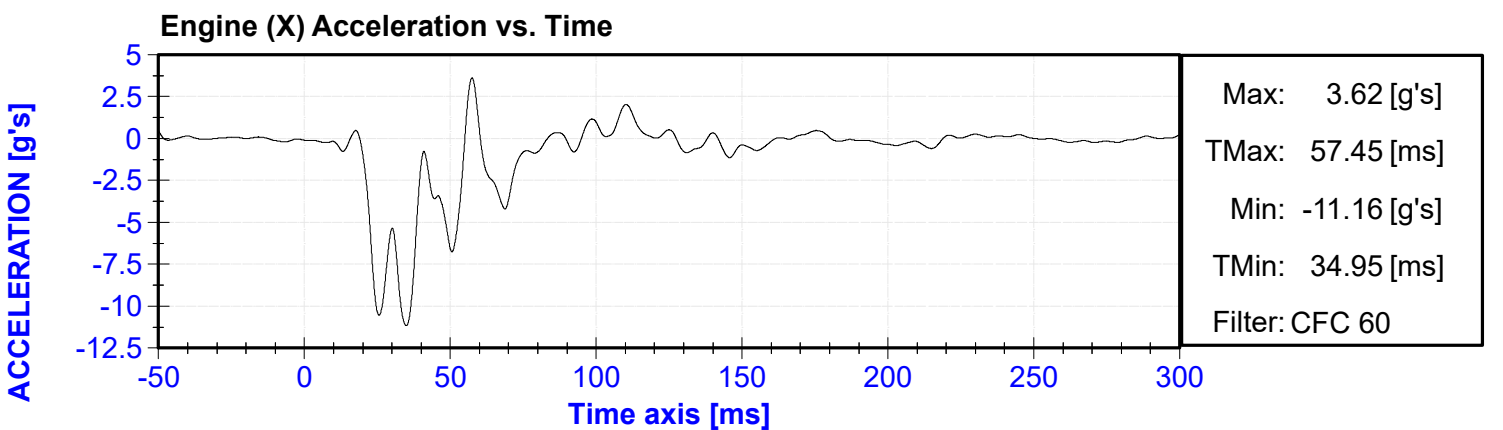
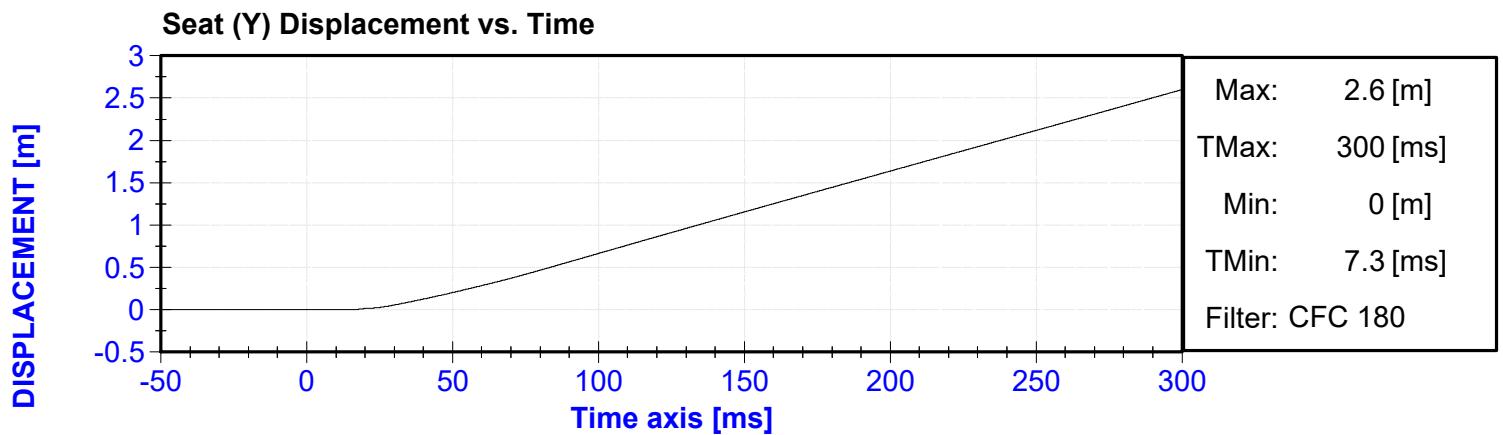
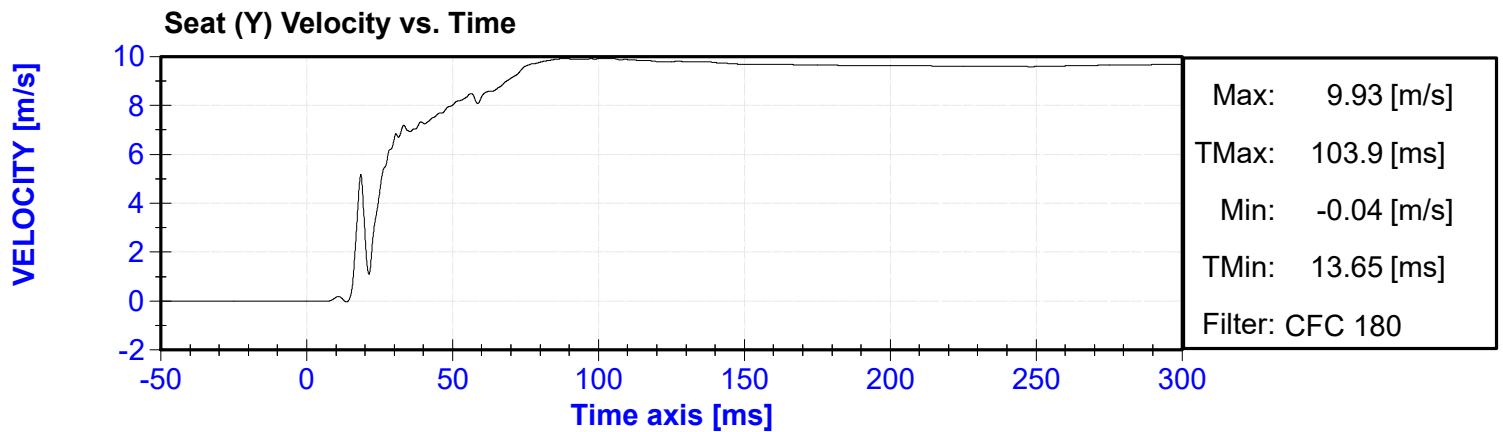
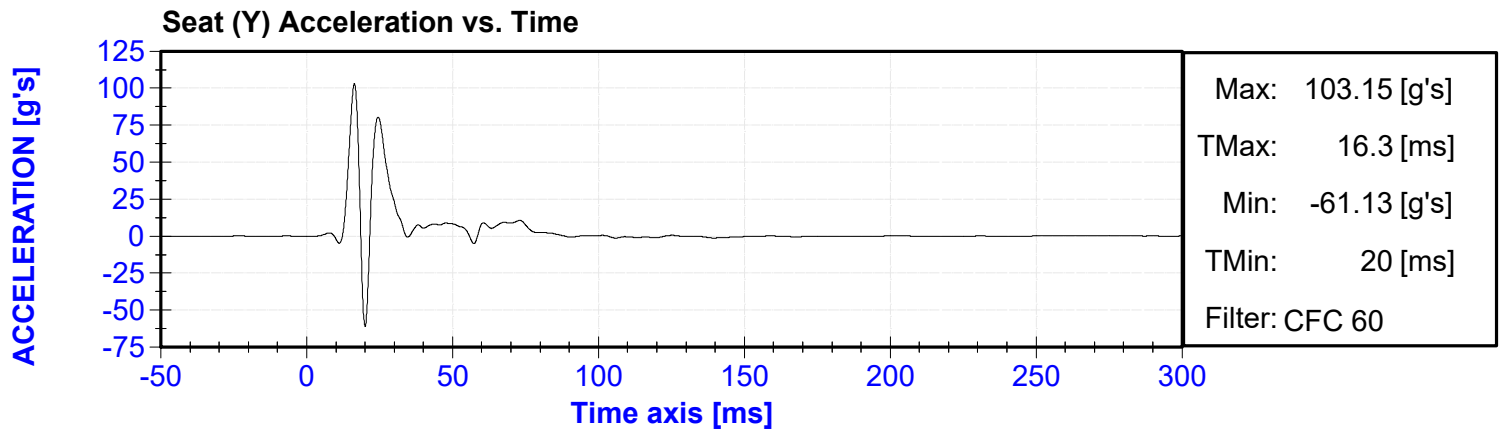


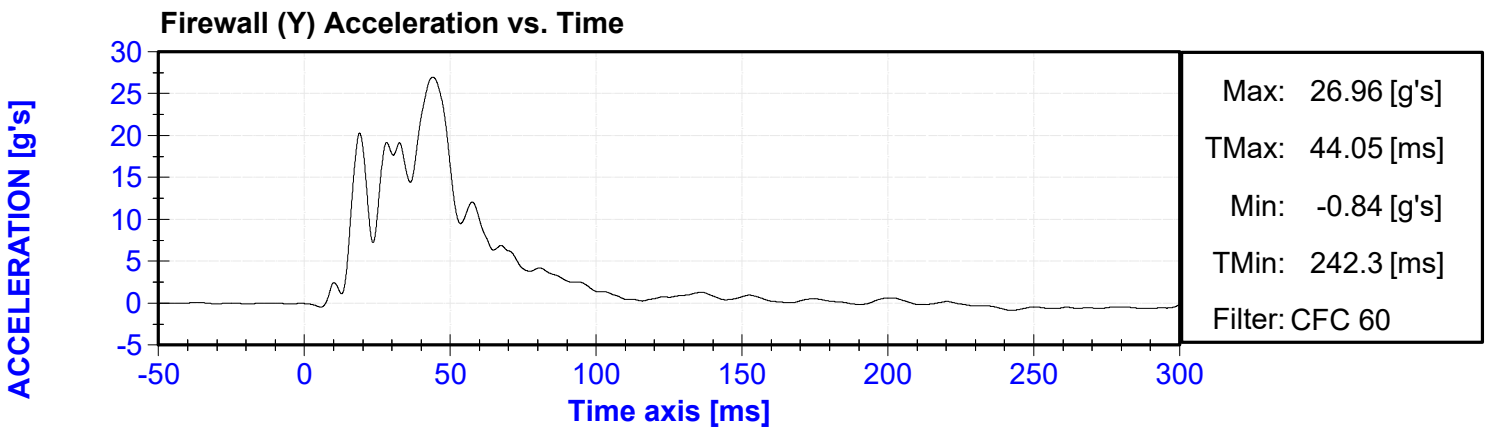
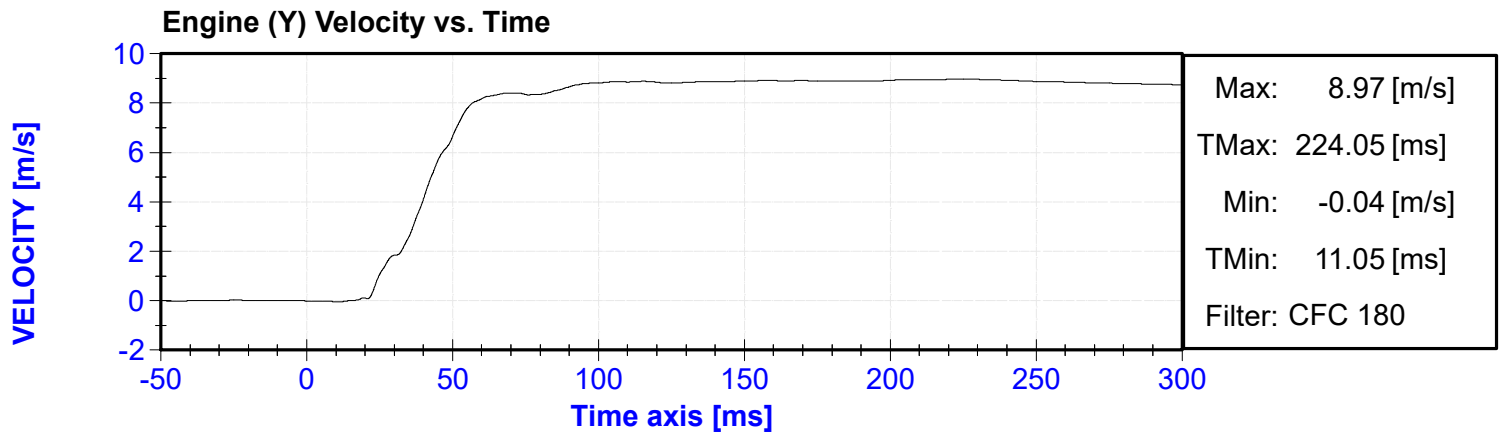
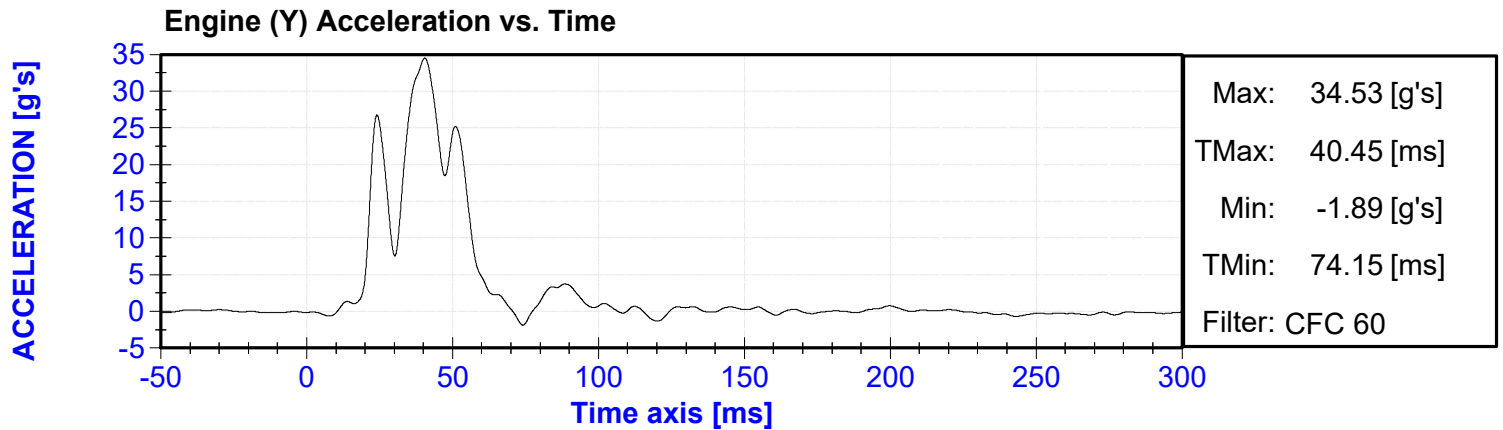
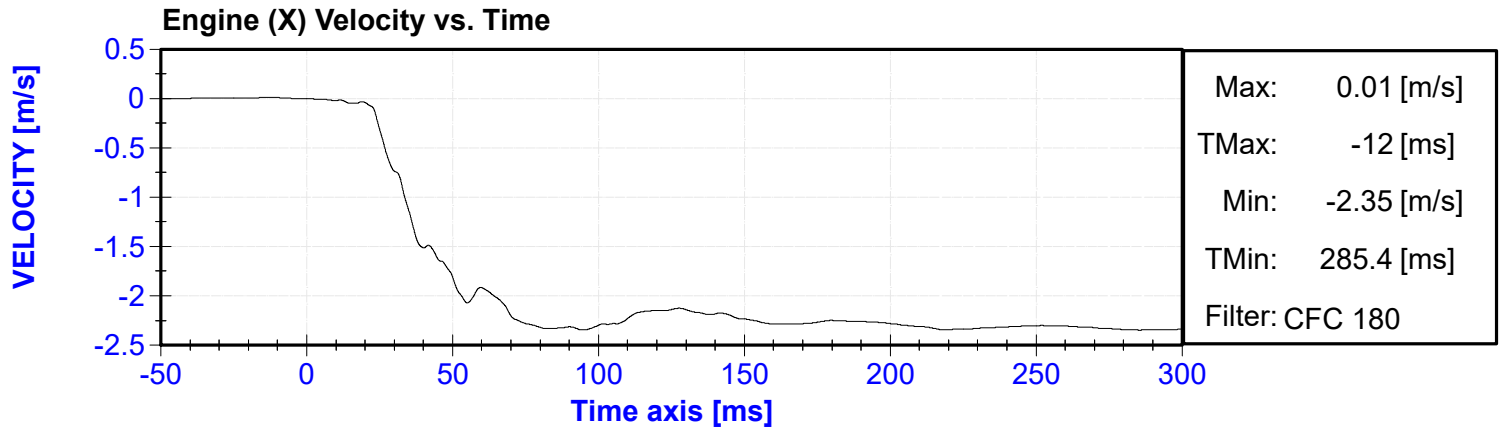
DISPLACEMENT [m]

B-Pillar Mid (Y) Displacement vs. Time

Exceeded calibration range and saturated at 17.1 ms

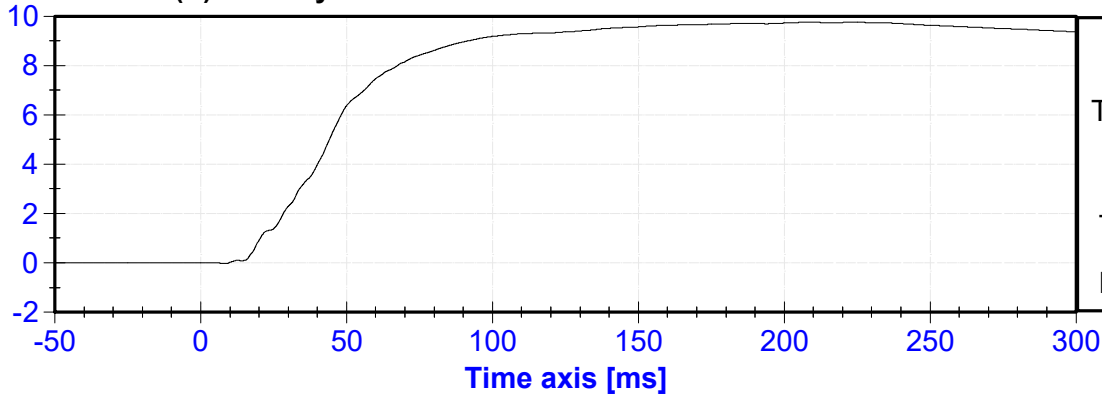






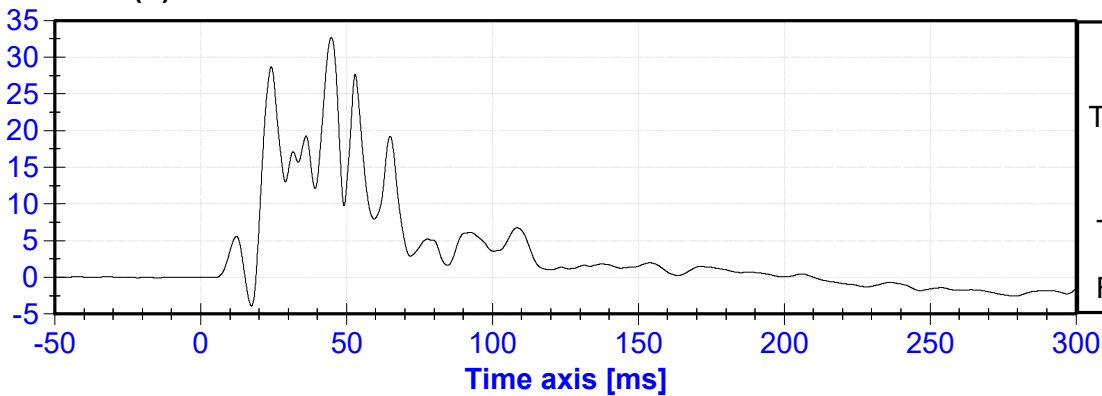
VELOCITY [m/s]

Firewall (Y) Velocity vs. Time



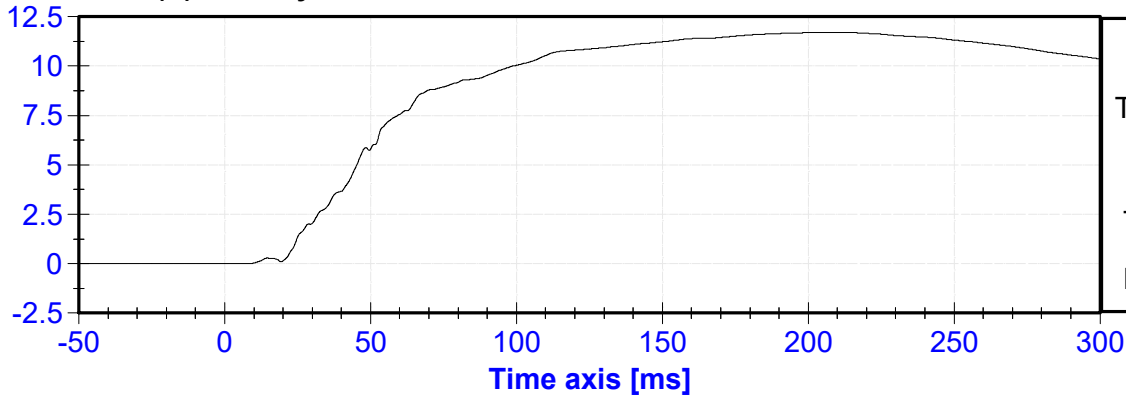
ACCELERATION [g's]

Roof (Y) Acceleration vs. Time



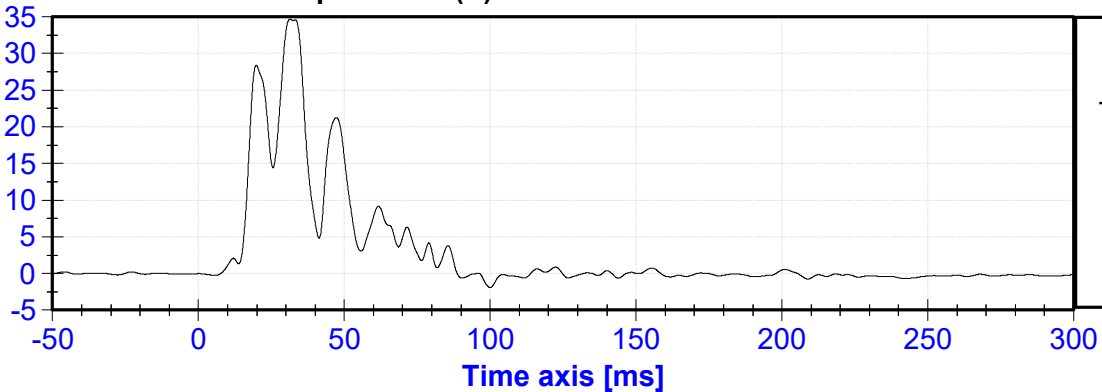
VELOCITY [m/s]

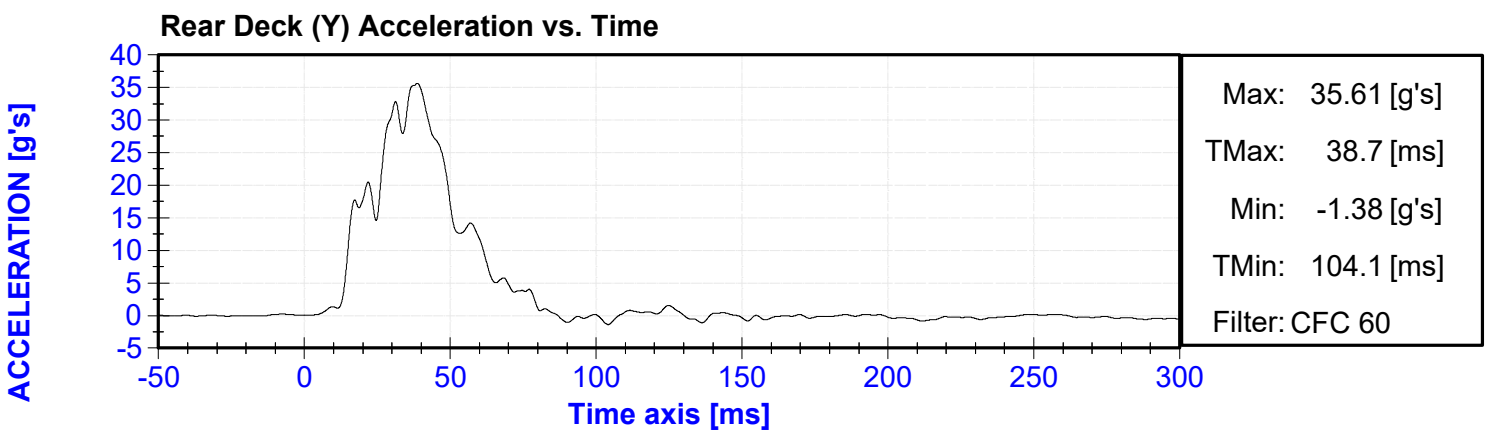
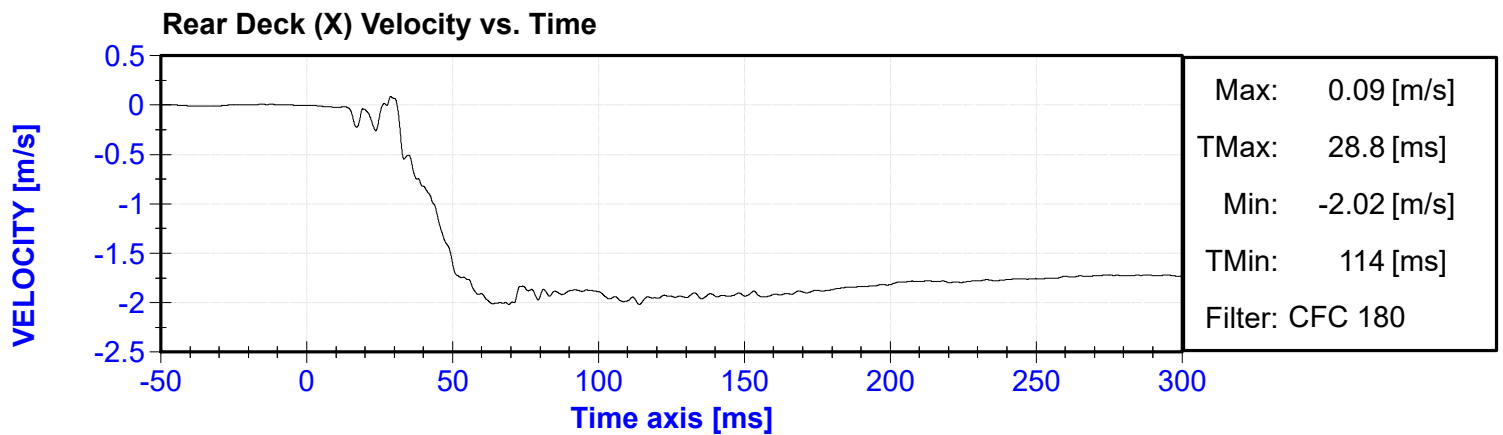
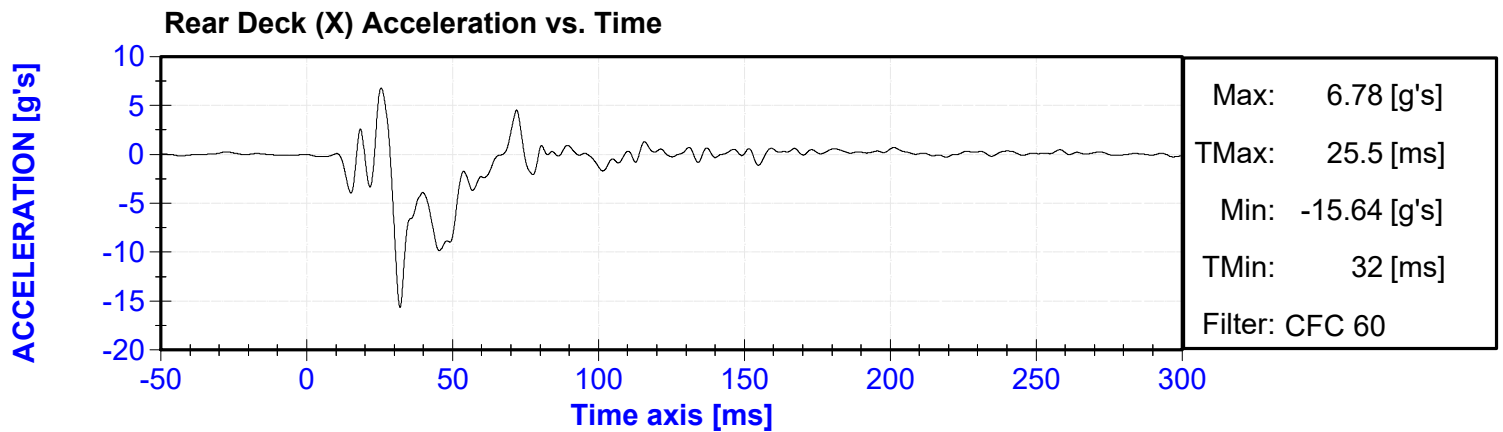
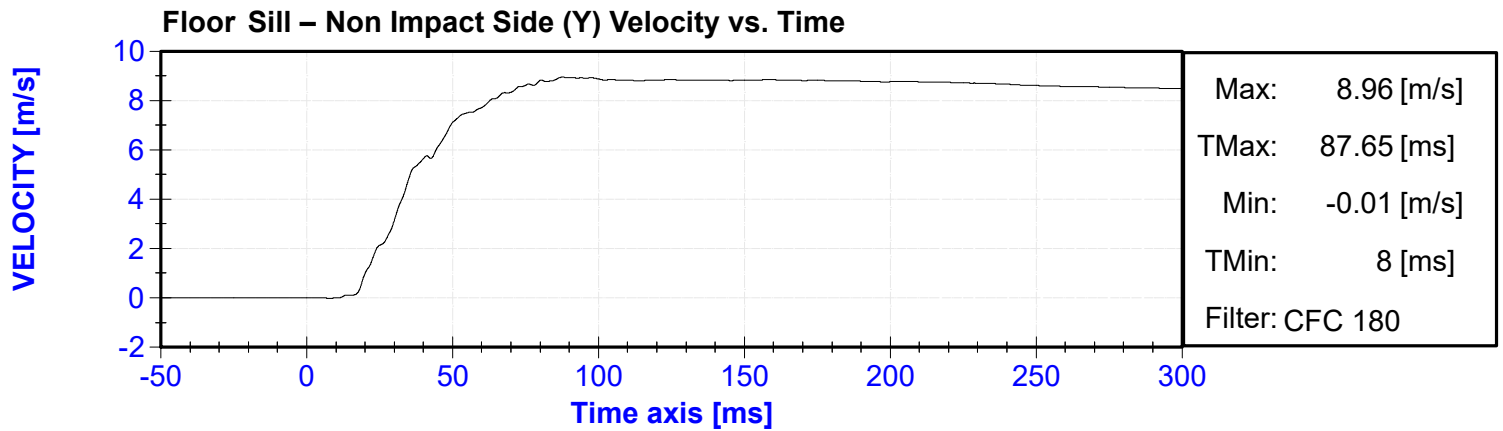
Roof (Y) Velocity vs. Time

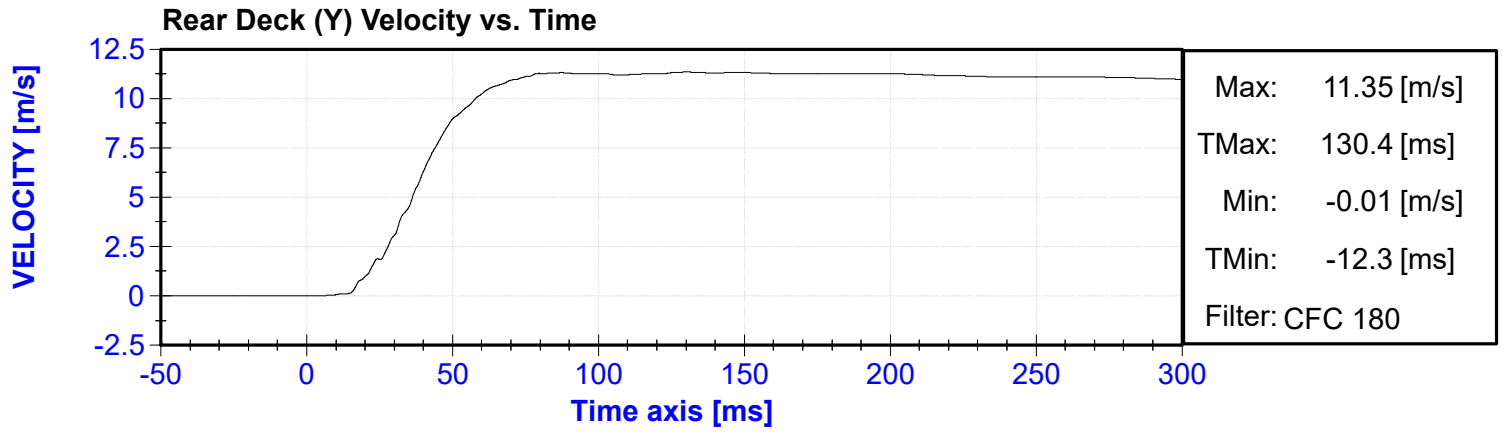


ACCELERATION [g's]

Floor Sill – Non Impact Side (Y) Acceleration vs. Time







APPENDIX IV

PRE-TEST DUMMY PERFORMANCE CALIBRATION TEST DATA

(Subpart U, ES-2re)

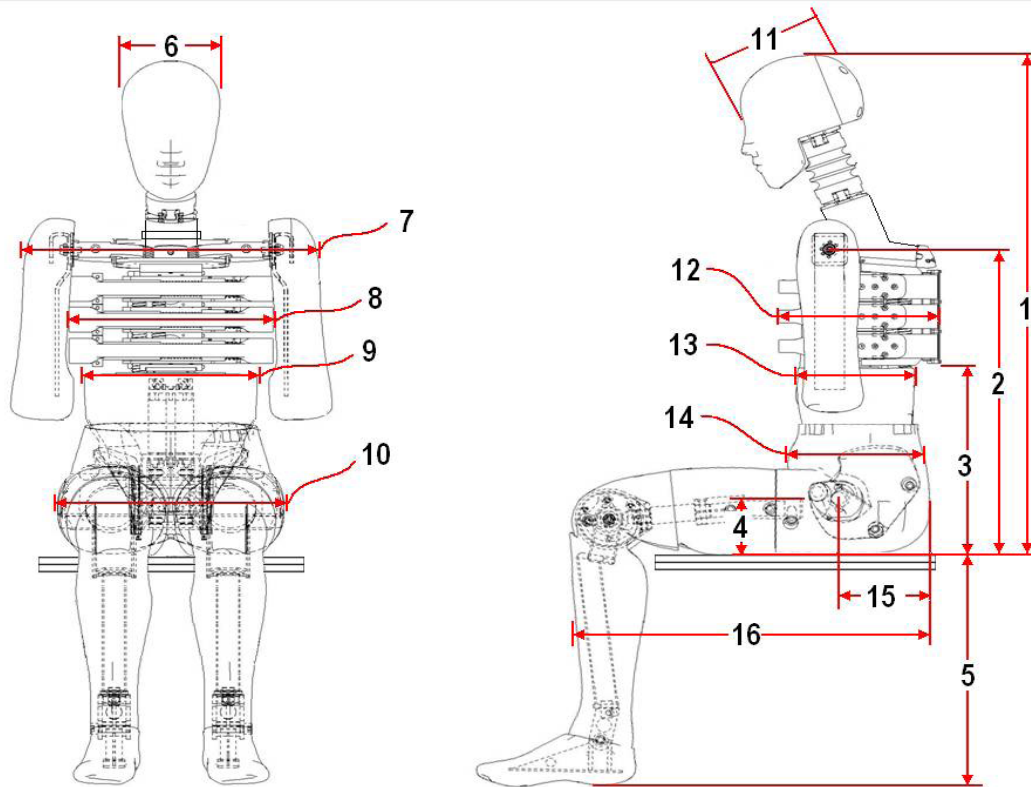


External Measurements - EuroSID-2re

Technician: T. Roseman

Date: 3/1/2024

Dummy Serial Number: D037



FRONT VIEW

SIDE VIEW

Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	909	Pass
2	Seat to Shoulder Joint	558	572	562	Pass
3	Seat to Lower Face of Thoracic Spine Box	346	356	354	Pass
4	Seat to Hip Joint (center of bolt)	97	103	101	Pass
5	Sole to Seat, Sitting	333	451	421	Pass
6	Head Width	152	158	153	Pass
7	Shoulder/Arm Width	461	479	472	Pass
8	Thorax Width	322	332	330	Pass
9	Abdomen Width	273	287	281	Pass
10	Pelvis Lap Width	359	373	362	Pass
11	Head Depth	196	206	199	Pass
12	Thorax Depth	262	272	265	Pass
13	Abdomen Depth	194	204	197	Pass
14	Pelvis Depth	235	245	238	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150	160	155	Pass
16	Back of Buttocks to Front Knee	597	615	602	Pass

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

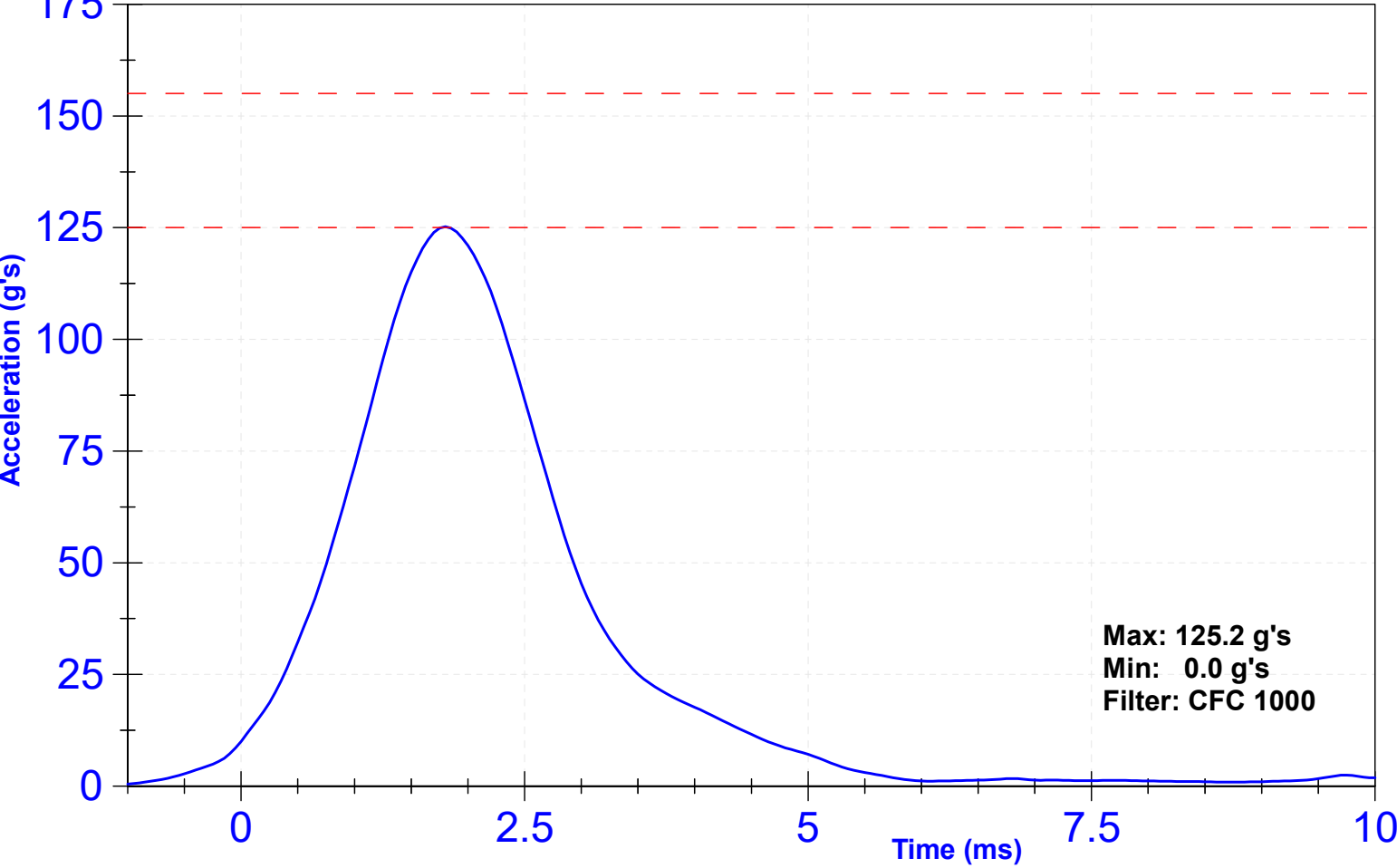
Results

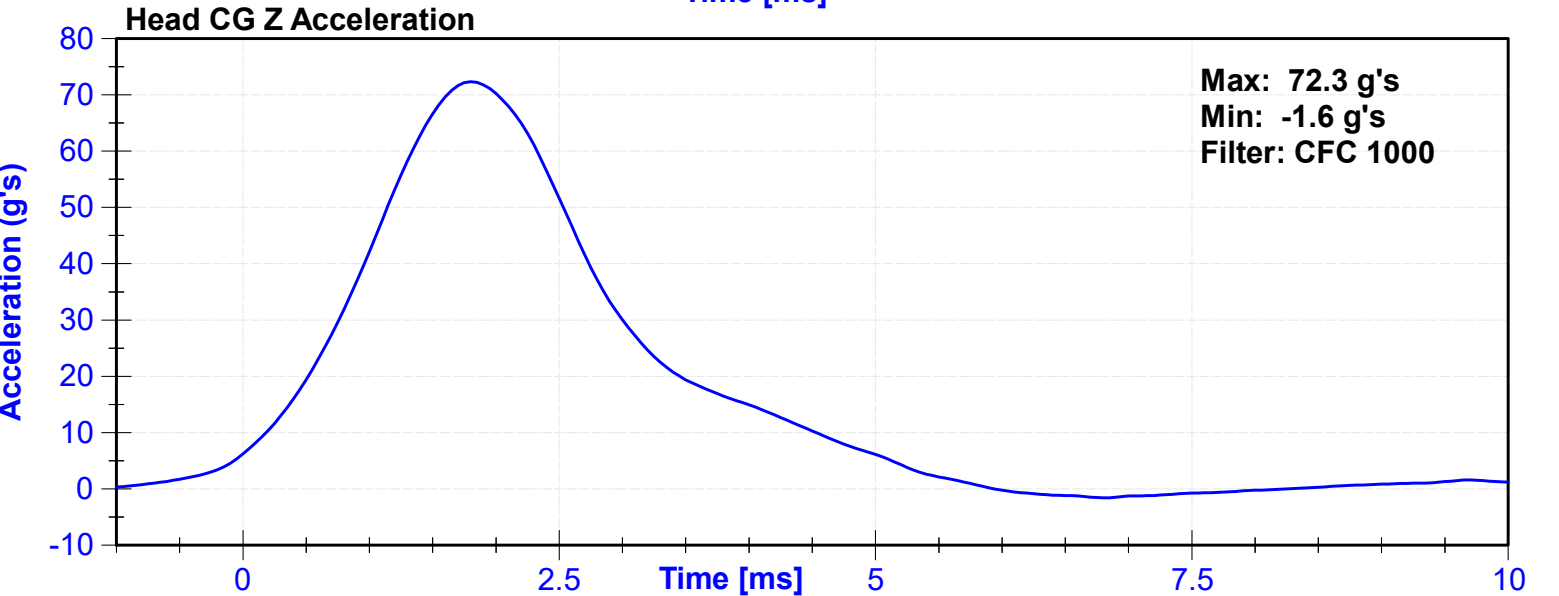
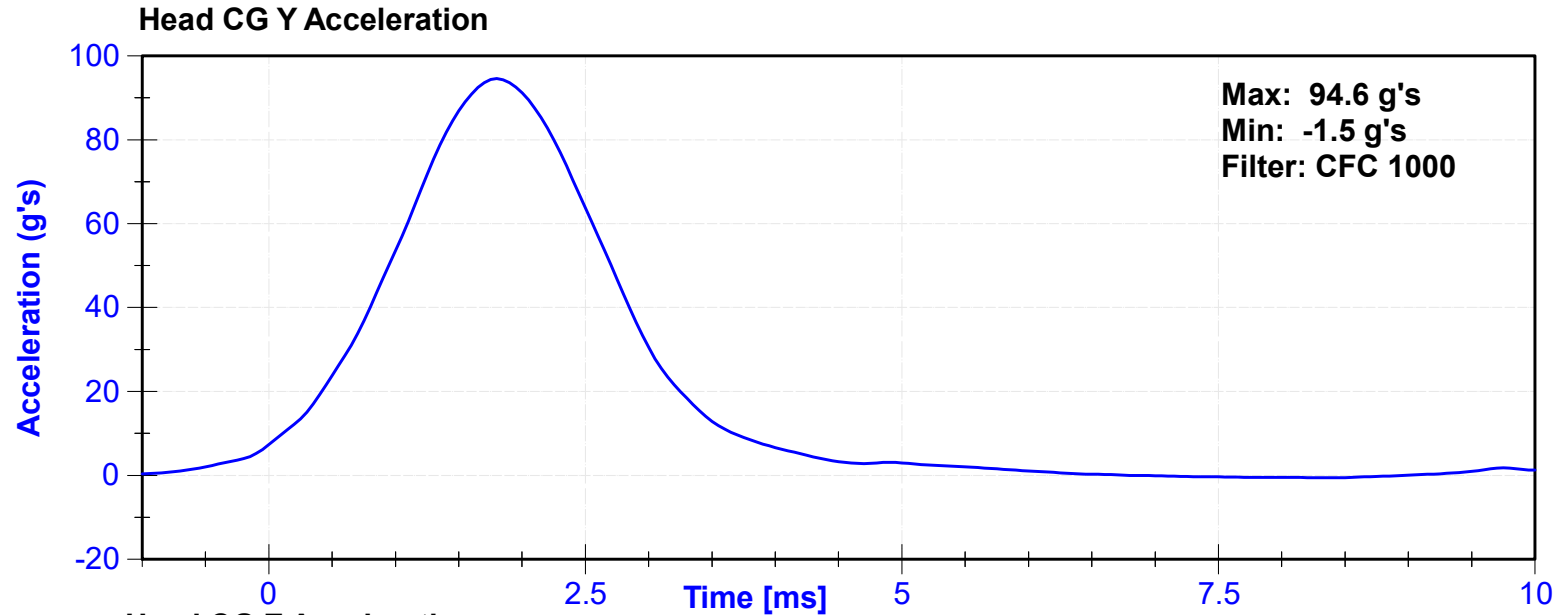
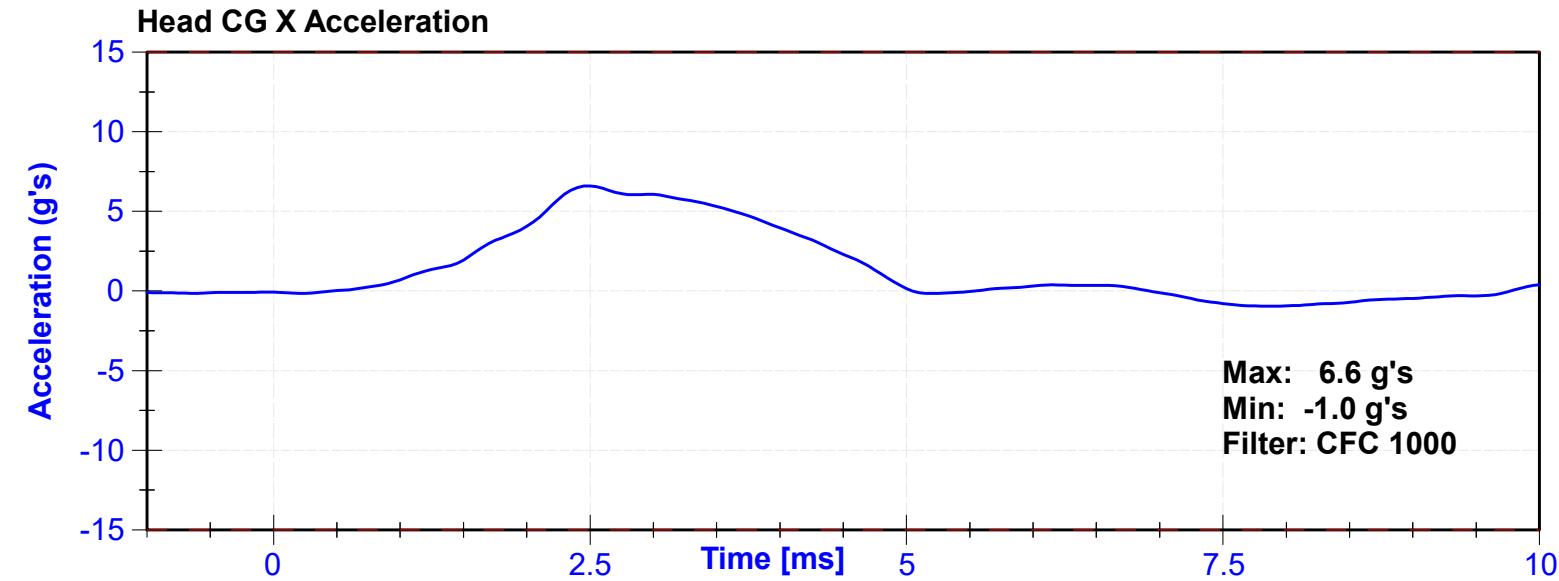
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	47	Pass
Resultant Acceleration	125	155	g's	125.2	Pass
Oscillation	0	15	%	2.02	Pass
Fore-Aft Acceleration	-15	15	g's	6.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	T21724	2/1/2024	7/30/2024
Y Accelerometer	Endevco	T22281	2/1/2024	7/30/2024
Z Accelerometer	Endevco	T26050	2/1/2024	7/30/2024

Resultant Acceleration





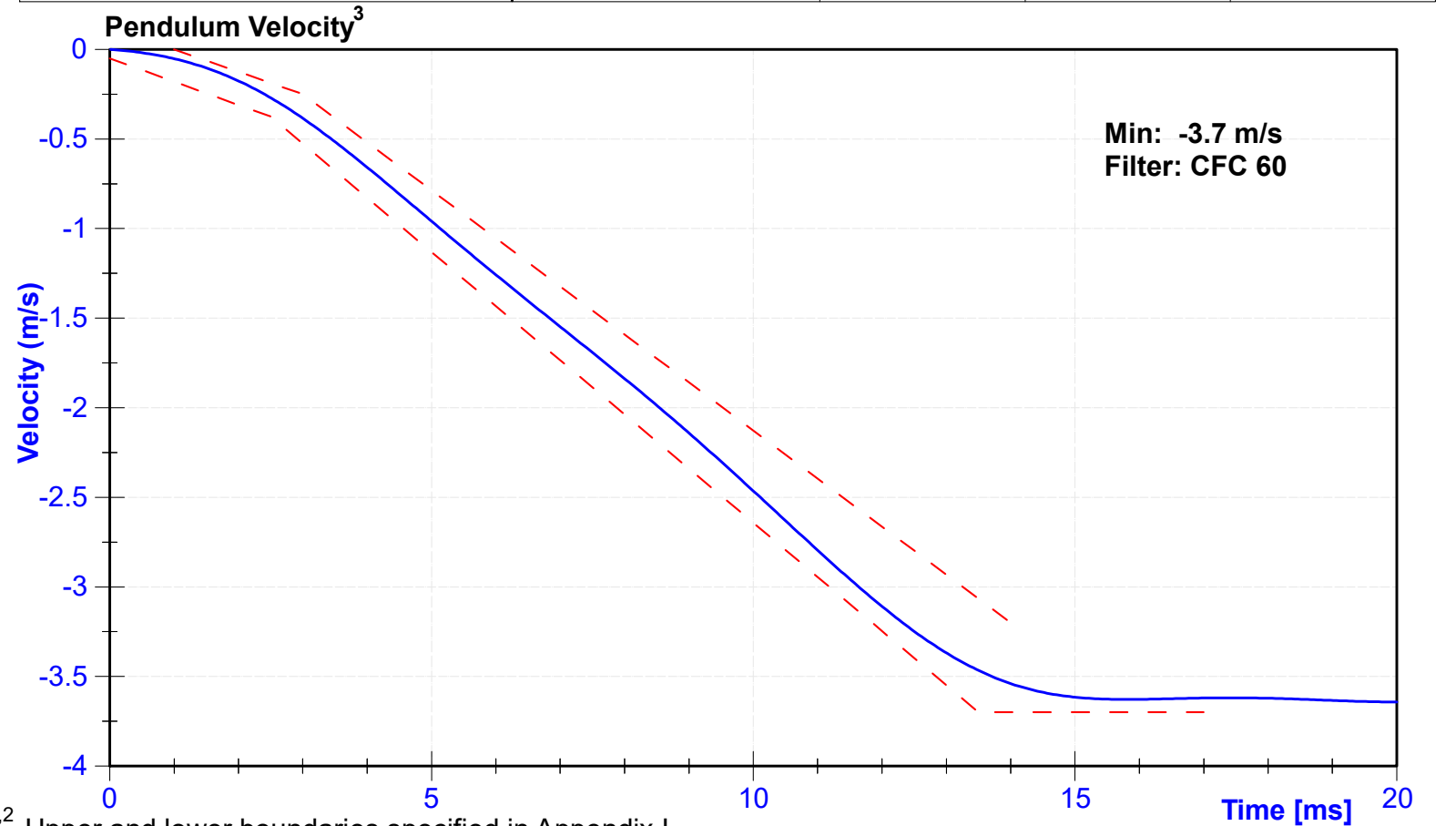
ATD Manufacturer	Denton	Test Technician	J. Rios
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

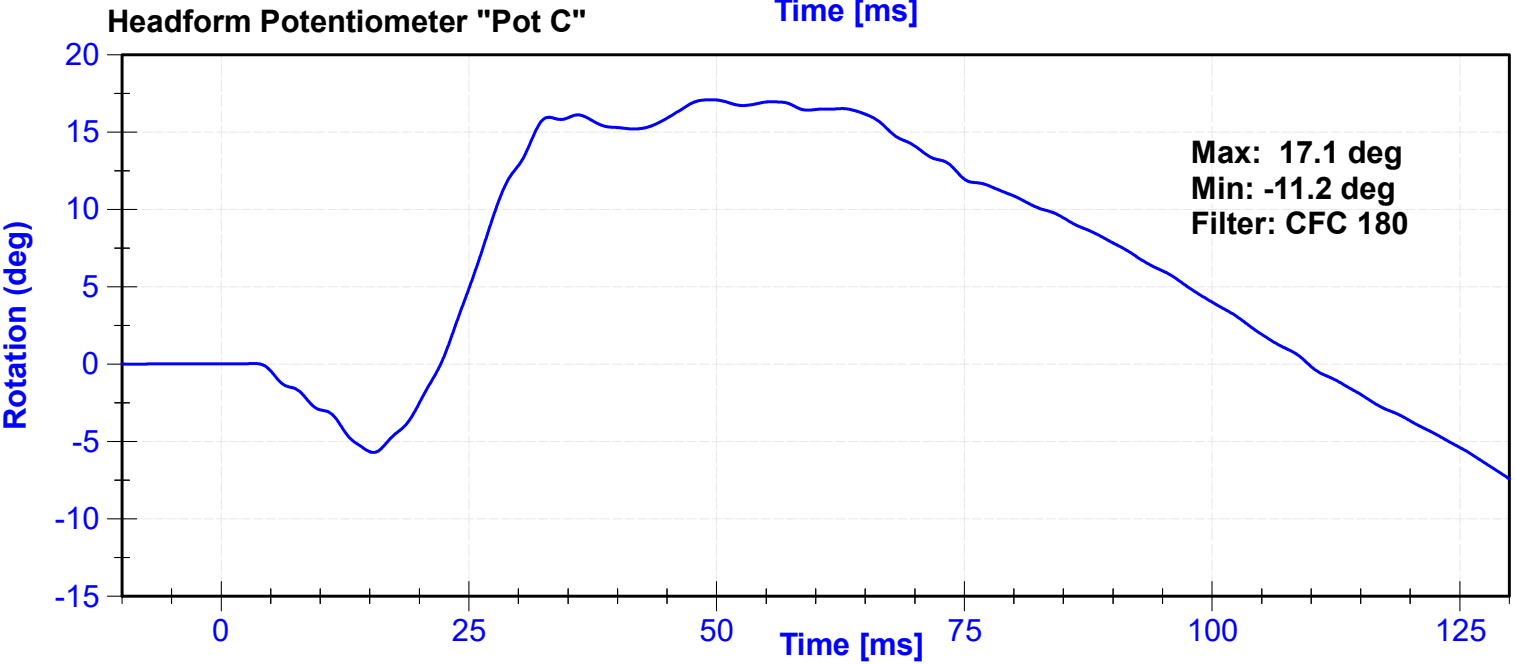
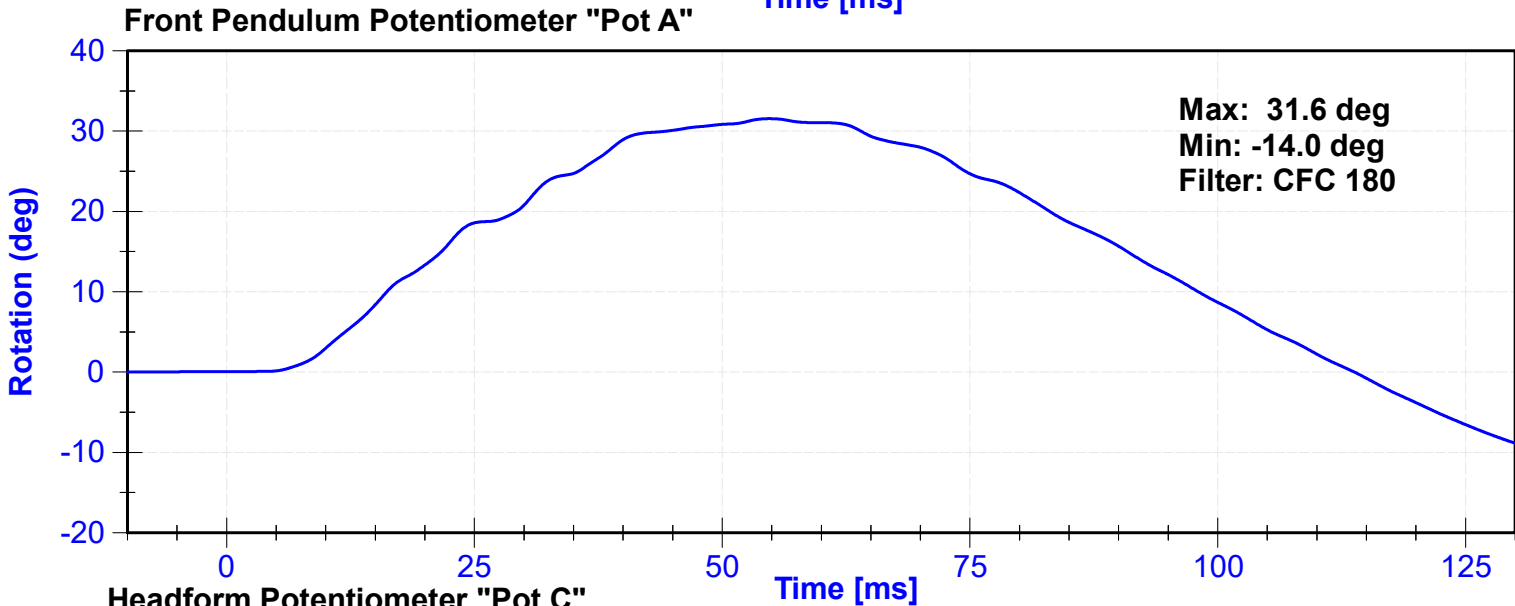
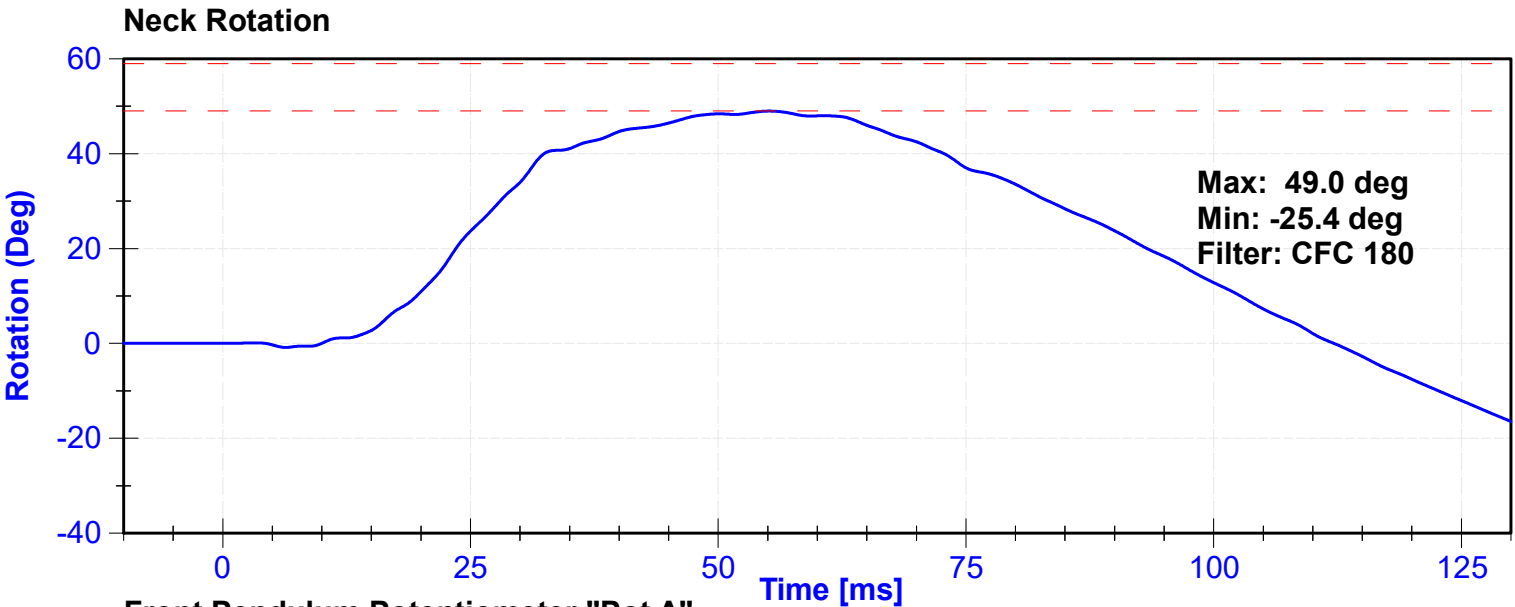
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	49	Pass
Velocity	3.3	3.5	m/s	3.43	Pass
Lateral Neck Rotation	49	59	deg	49.0	Pass
Time at Maximum Rotation	54	66	ms	55.2	Pass
Time of Rotation Decay from Maximum	53	88	ms	57.0	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	4/29/2024	10/26/2024
Front Pendulum Potentiometer	Sfernice	2247	12/5/2023	12/4/2024
Headform Potentiometer	Sfernice	095	9/29/2023	9/28/2024





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. Rios
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

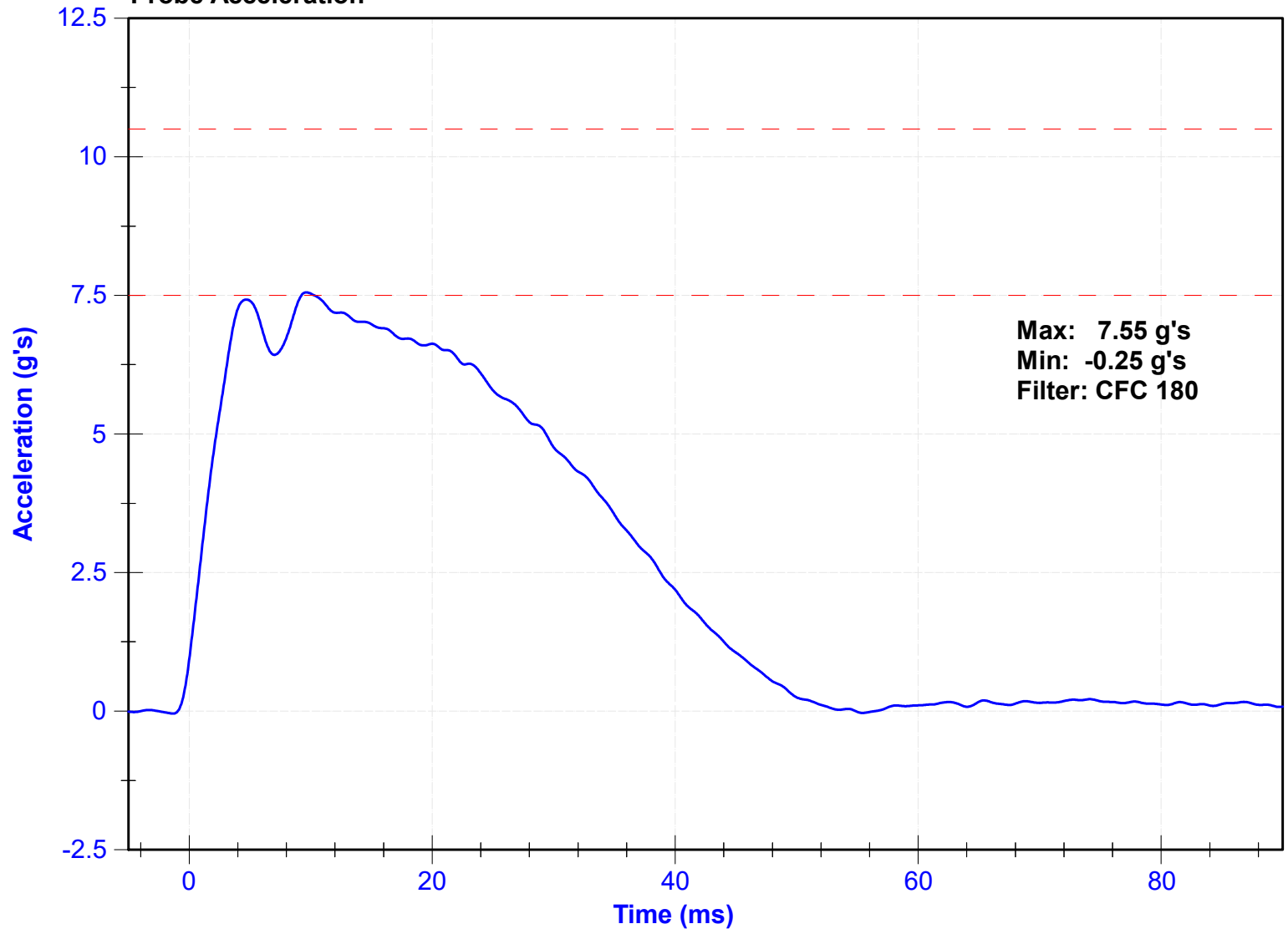
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	46	Pass
Velocity	4.2	4.4	m/s	4.27	Pass
Probe Acceleration	7.5	10.5	g's	7.55	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	18587	11/20/2023	11/19/2024

Probe Acceleration



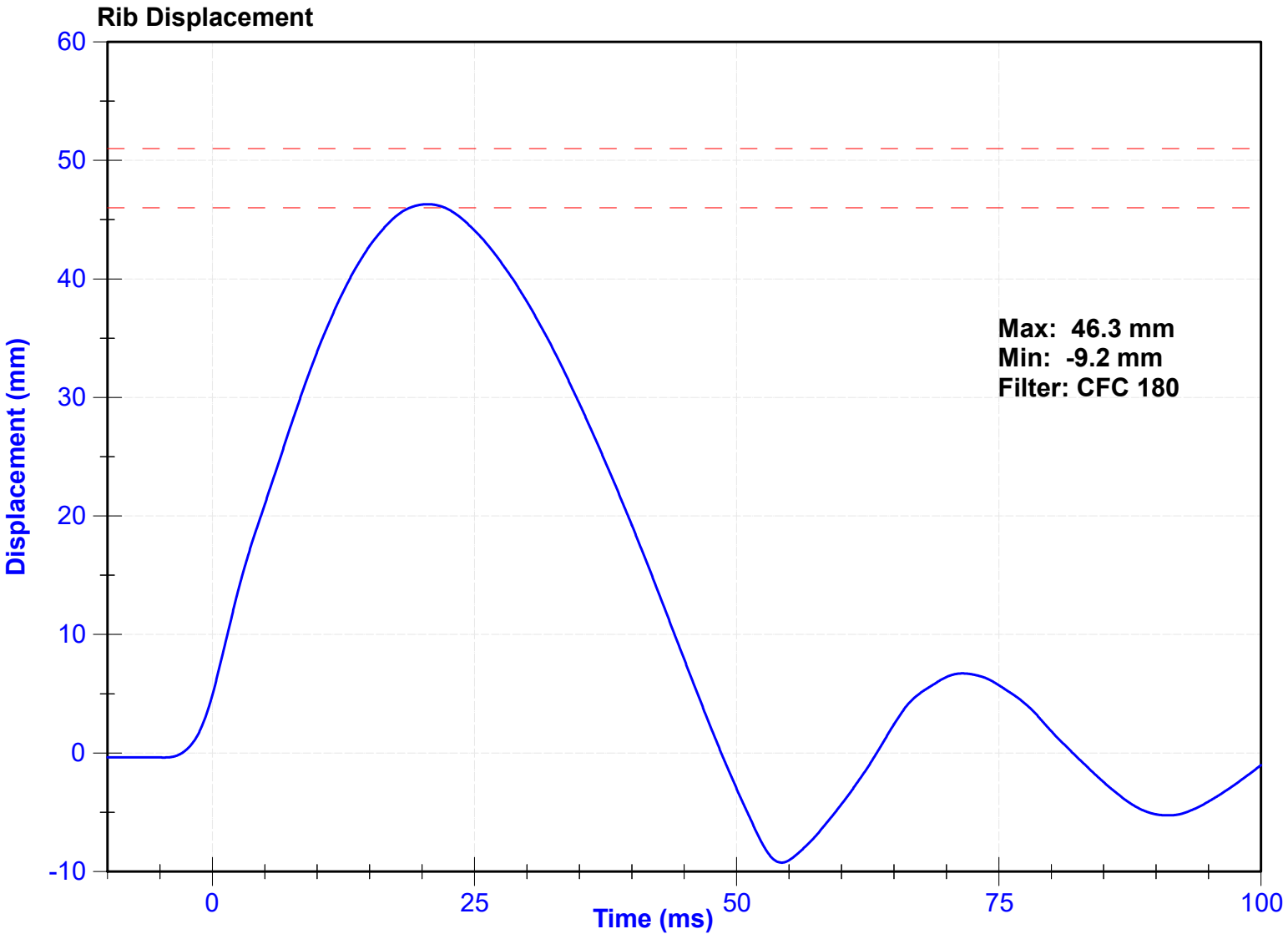
ATD Manufacturer	Denton	Test Technician	J. Rios
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	47	Pass
Rib Displacement	46	51	mm	46.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	0552-01	1/31/2024	7/31/2024



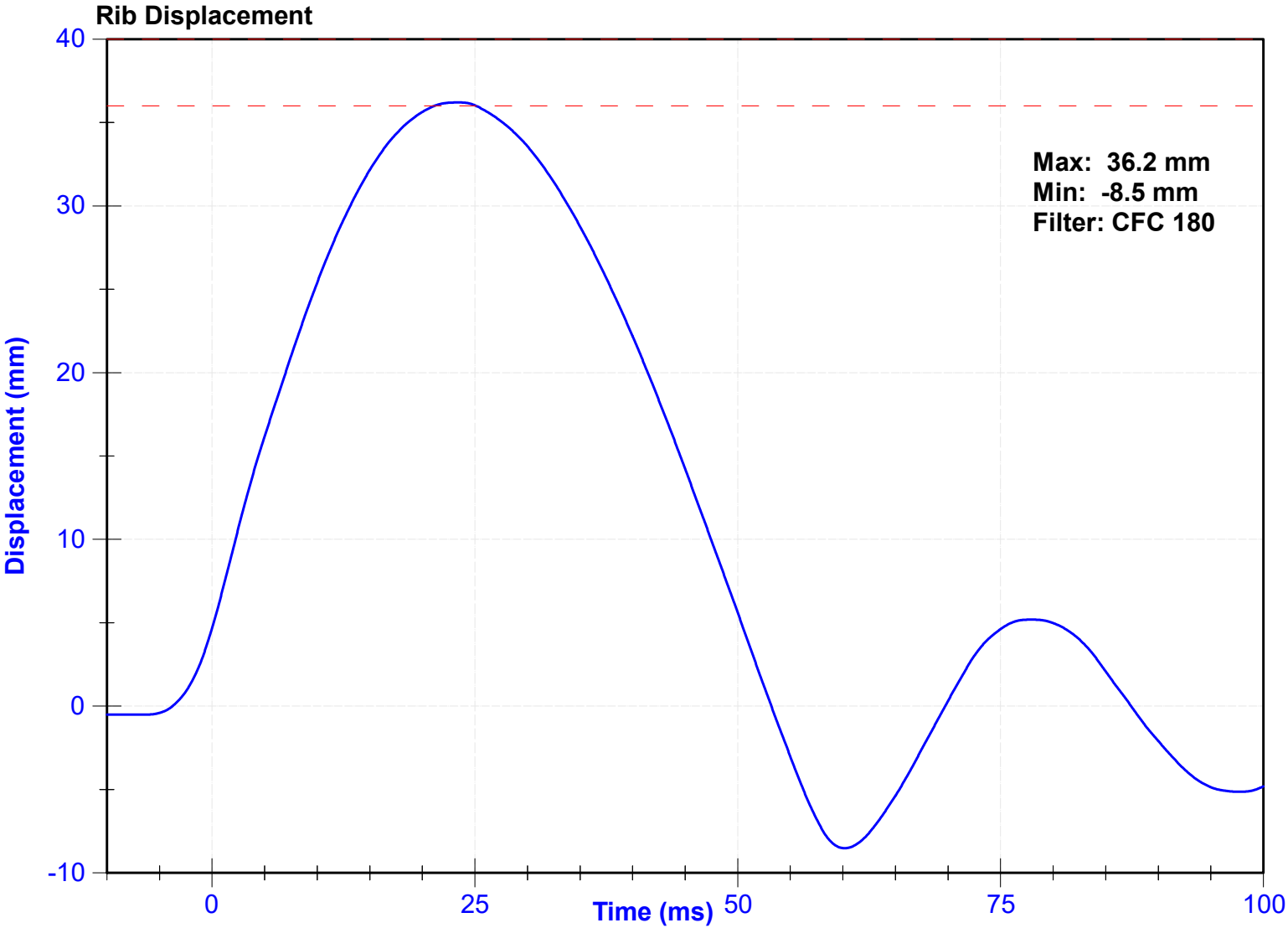
ATD Manufacturer	Denton	Test Technician	J. Rios
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	47	Pass
Rib Displacement	36	40	mm	36.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	0552-01	1/31/2024	7/31/2024



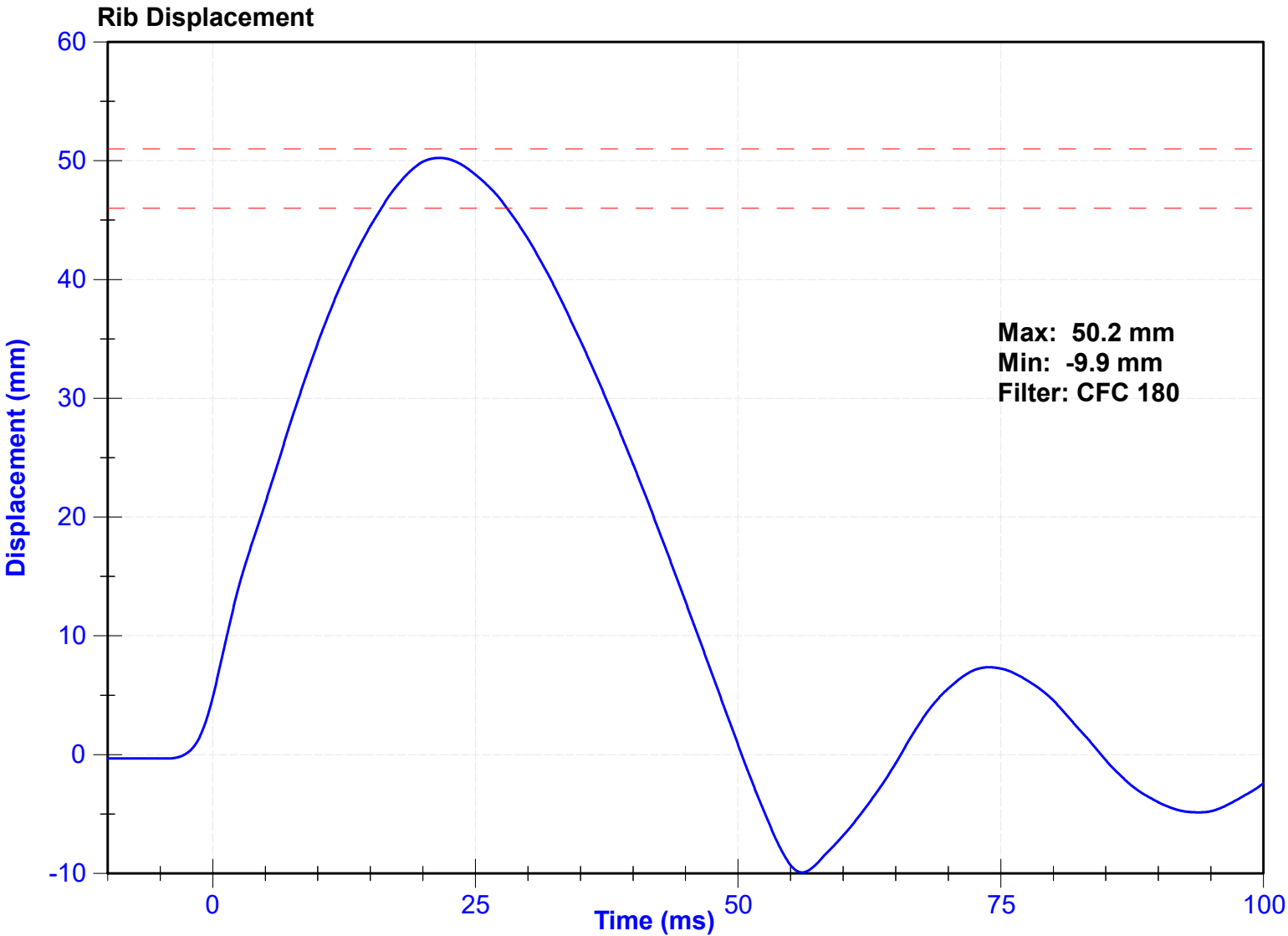
ATD Manufacturer	Denton	Test Technician	J. Rios
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	47	Pass
Rib Displacement	46	51	mm	50.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	807	1/31/2024	7/31/2024



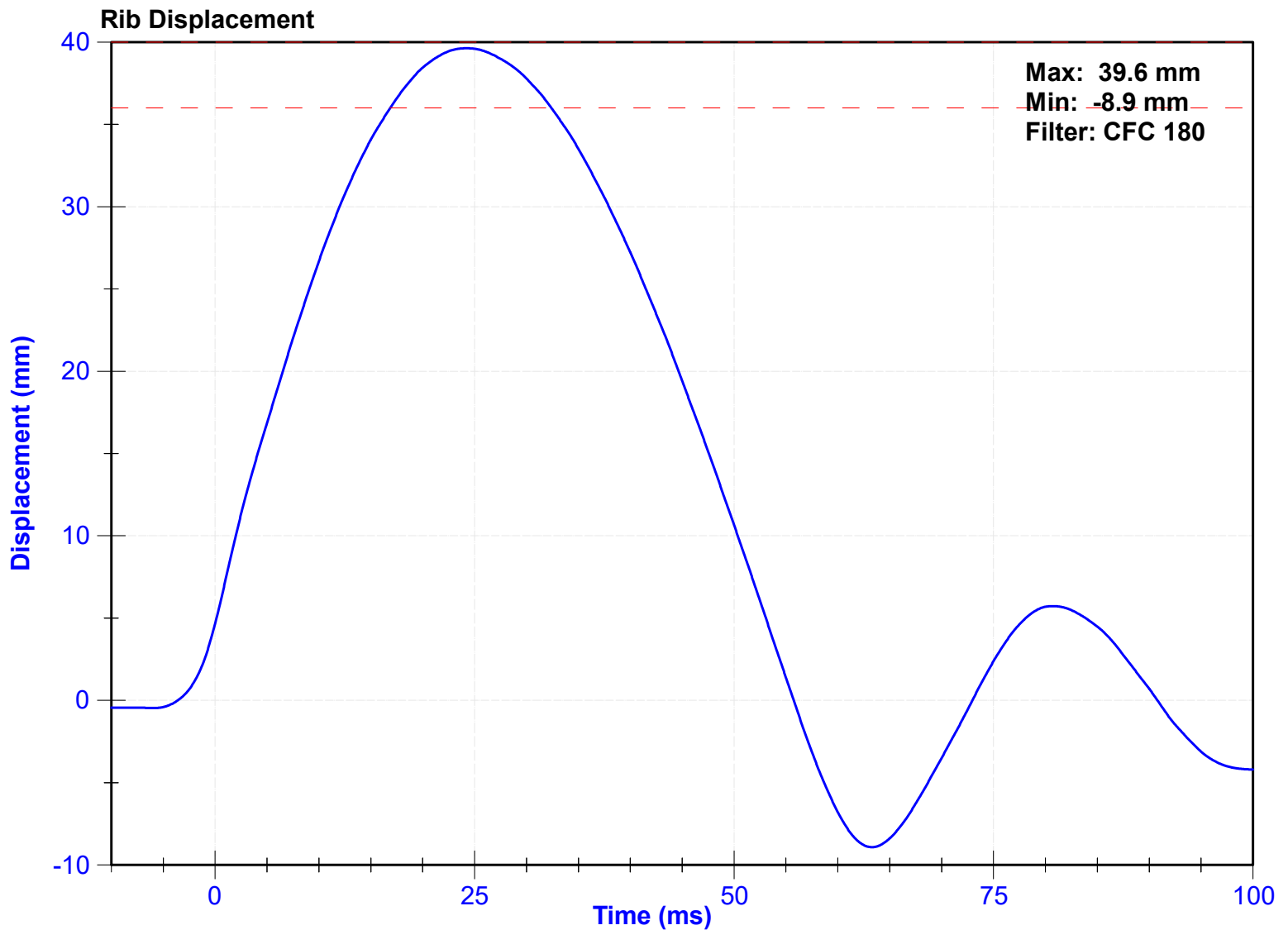
ATD Manufacturer	Denton	Test Technician	J. Rios
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	47	Pass
Rib Displacement	36	40	mm	39.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	807	1/31/2024	7/31/2024



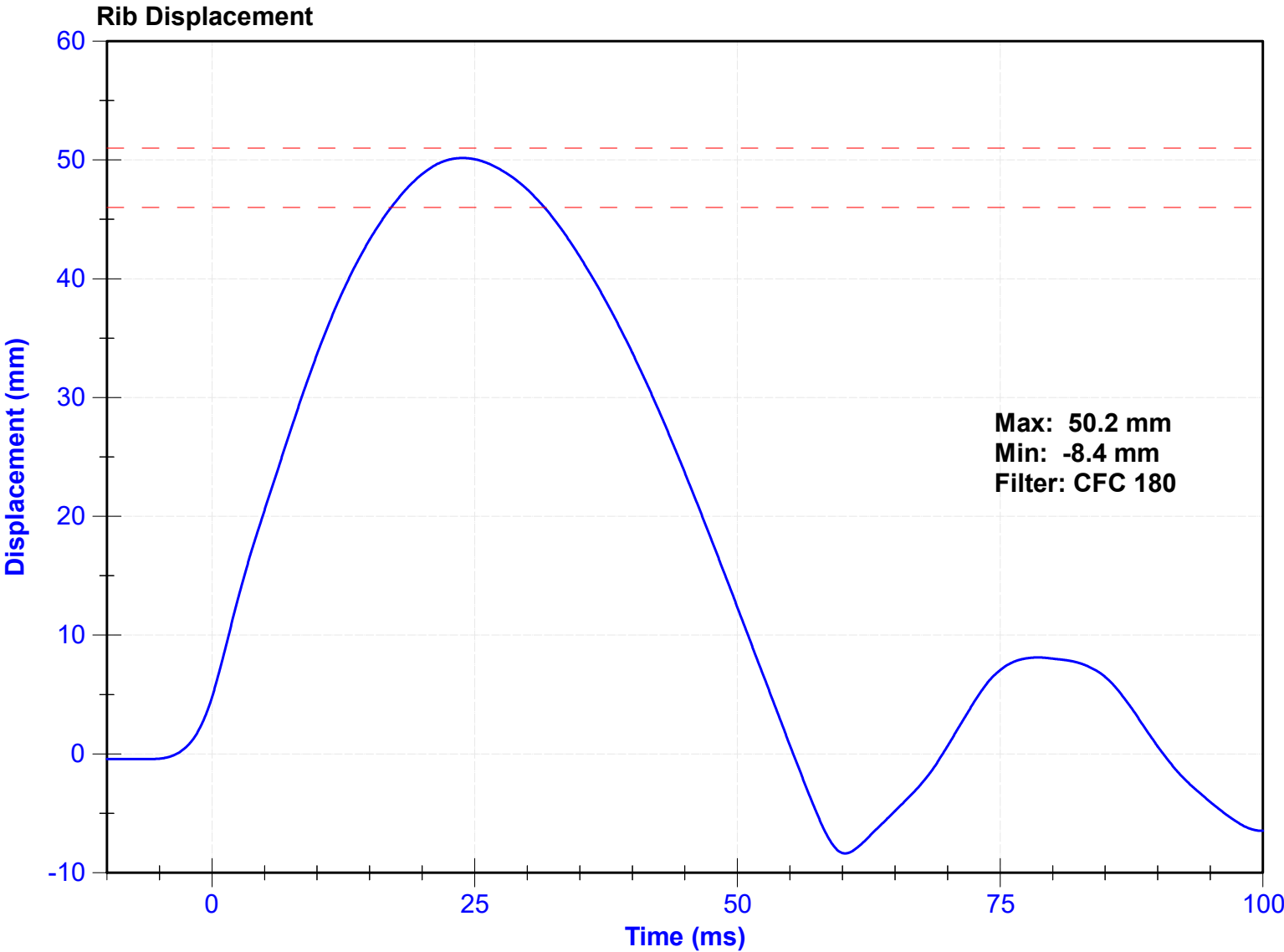
ATD Manufacturer	Denton	Test Technician	J. Rios
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	47	Pass
Rib Displacement	46	51	mm	50.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	0552-03	1/31/2024	7/31/2024



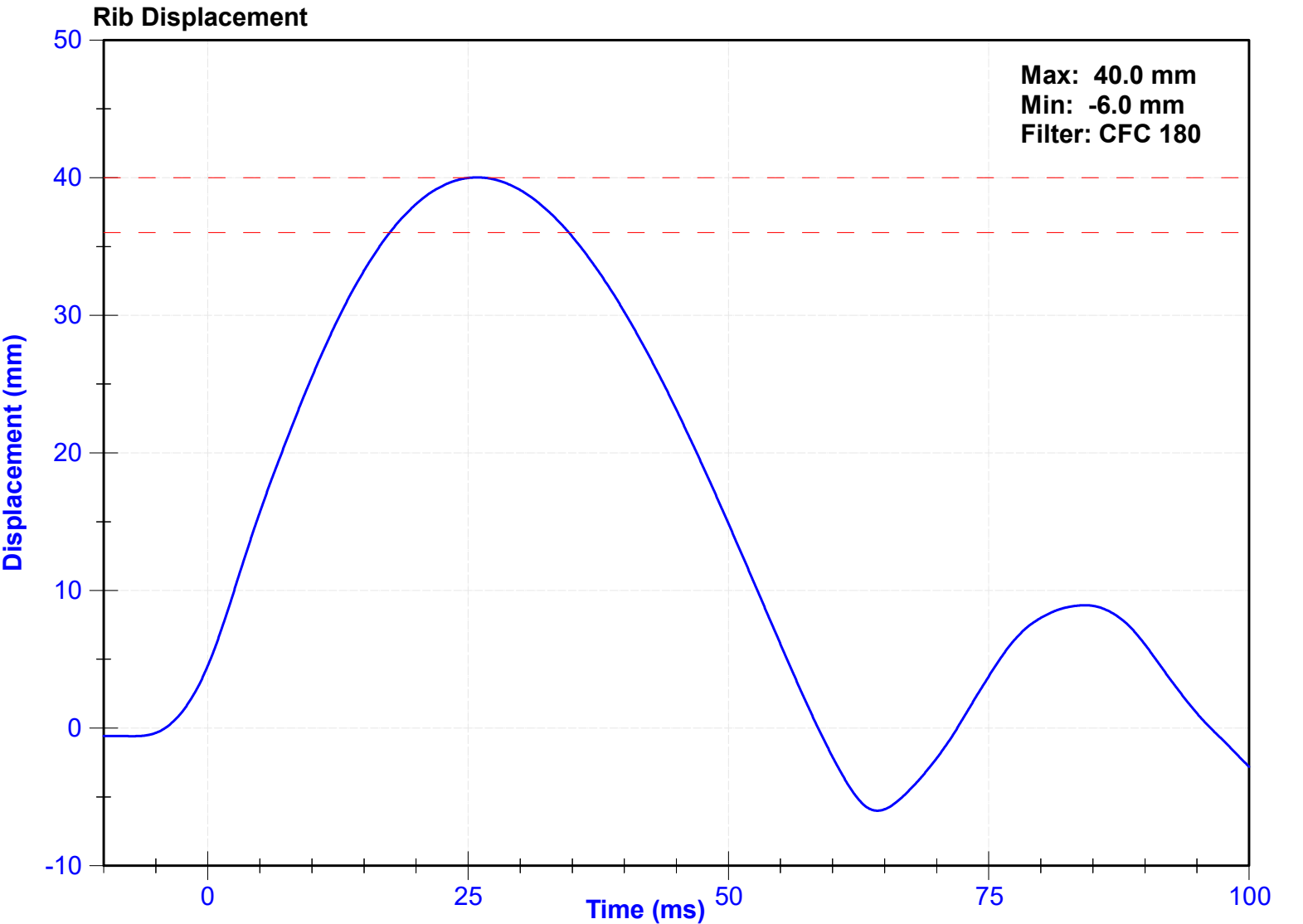
ATD Manufacturer	Denton	Test Technician	J. Rios
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	47	Pass
Rib Displacement	36	40	mm	40.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	0552-03	1/31/2024	7/31/2024



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

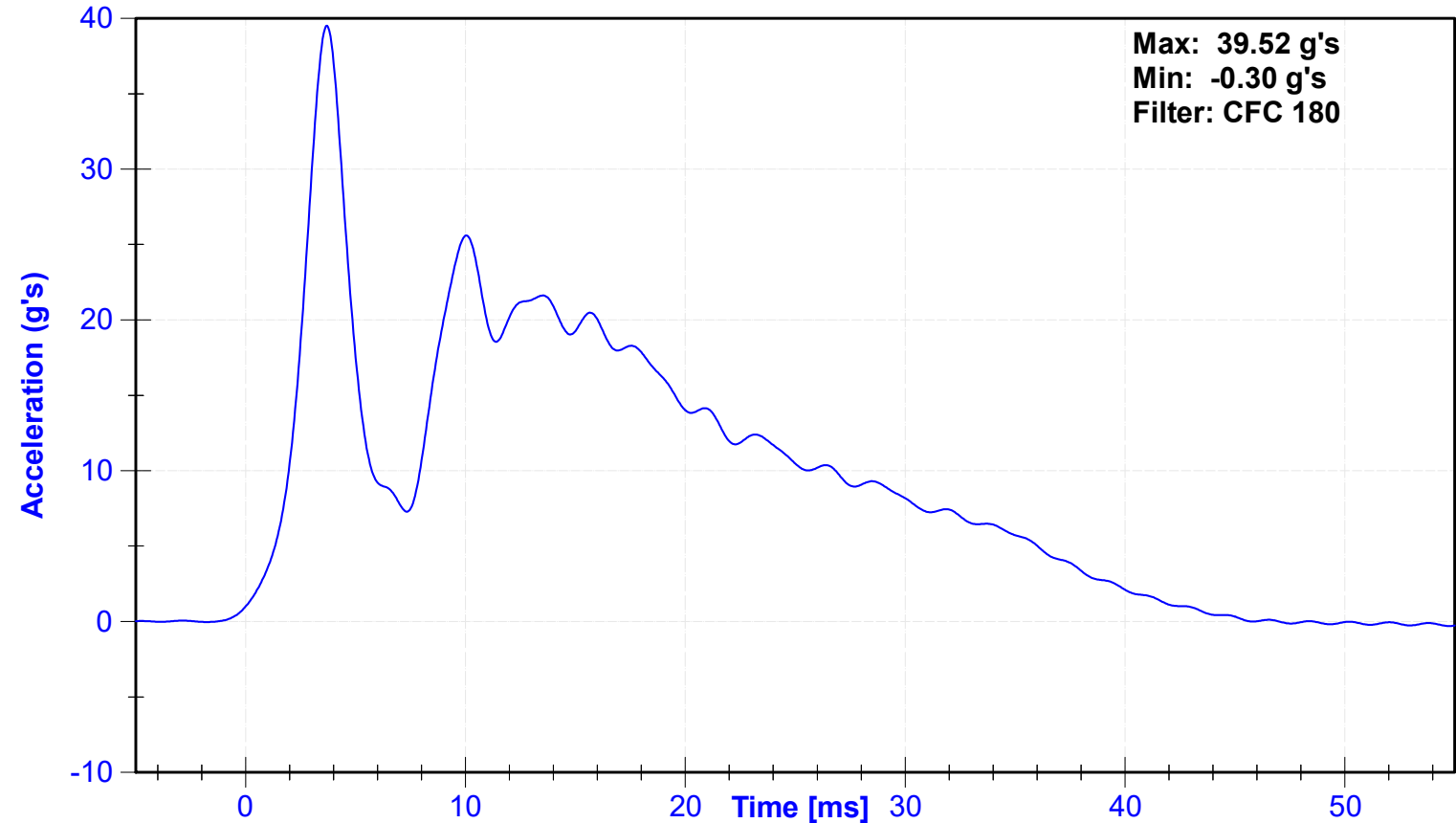
Results

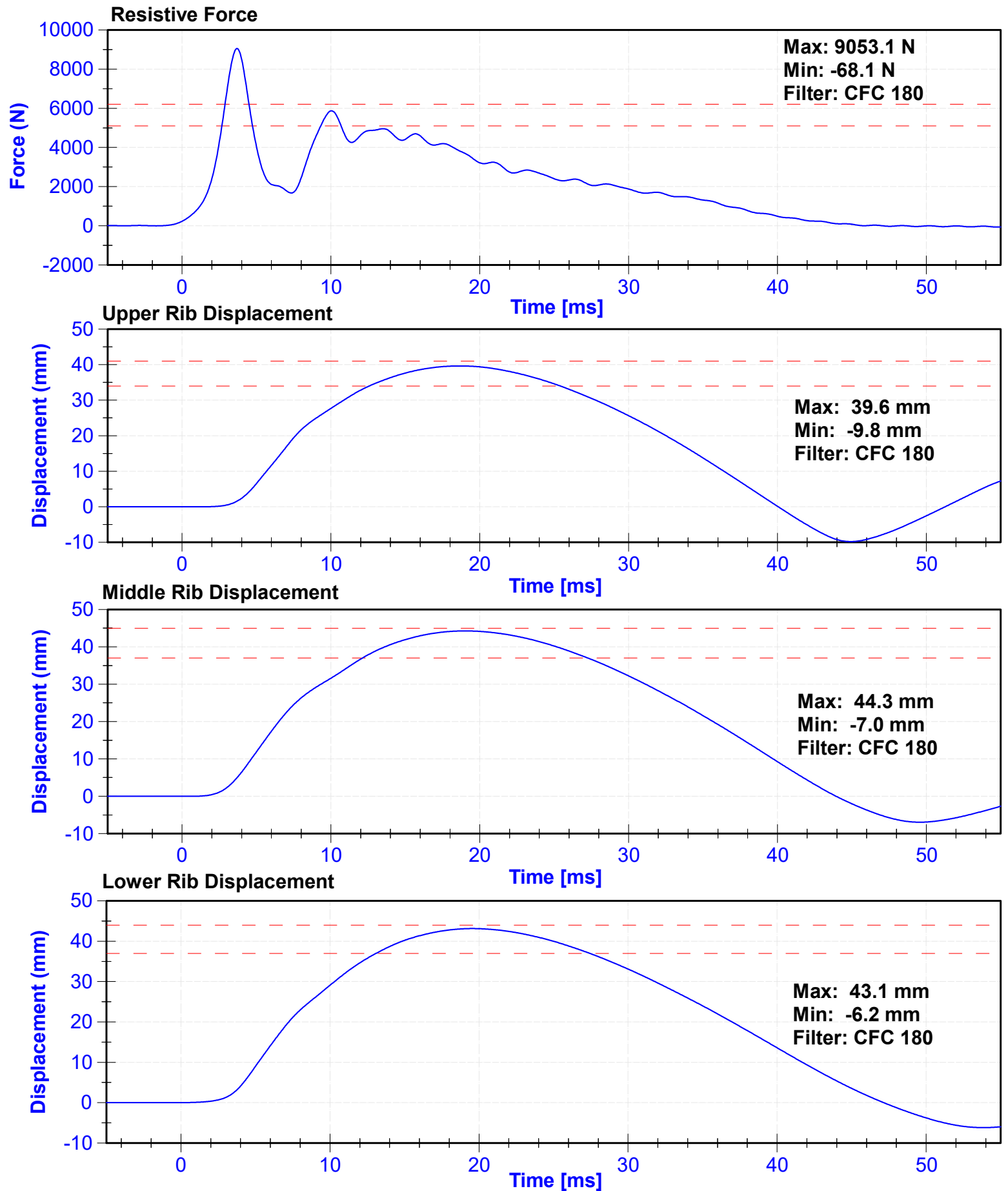
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	46	Pass
Velocity	5.4	5.6	m/s	5.48	Pass
Resistive Force after 6ms	5100	6200	N	5867.3	Pass
Upper Thorax Rib Deflection	34	41	mm	39.6	Pass
Mid Thorax Rib Deflection	37	45	mm	44.3	Pass
Lower Thorax Rib Deflection	37	44	mm	43.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	18587	11/20/2023	11/19/2024
Upper Thorax Rib Potentiometer	Honeywell	0552-01	1/31/2024	7/31/2024
Middle Thorax Rib Potentiometer	Honeywell	807	1/31/2024	7/31/2024
Lower Thorax Rib Potentiometer	Honeywell	0552-03	1/31/2024	7/31/2024

Probe Acceleration





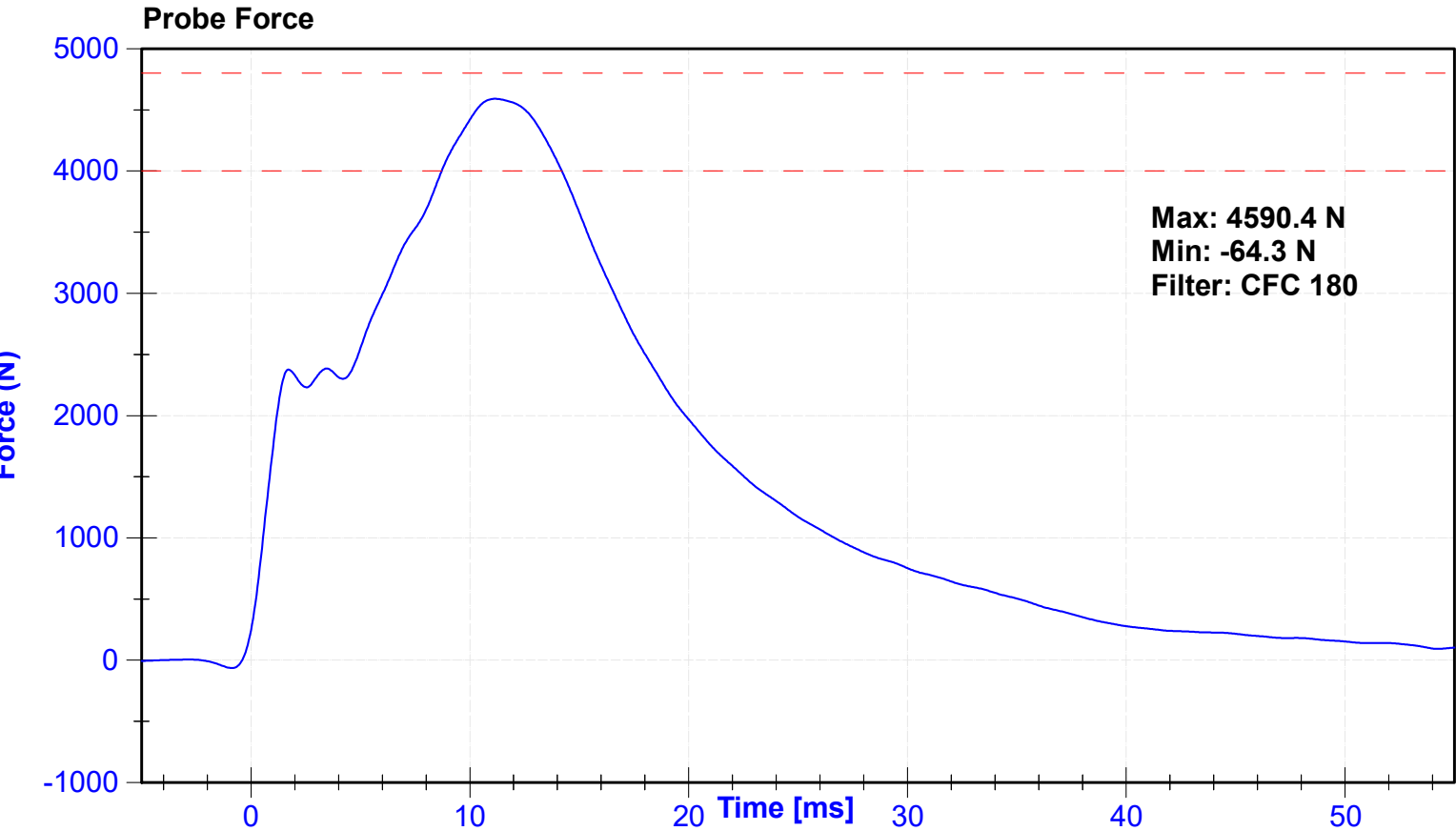
ATD Manufacturer	Denton	Test Technician	J. Rios
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

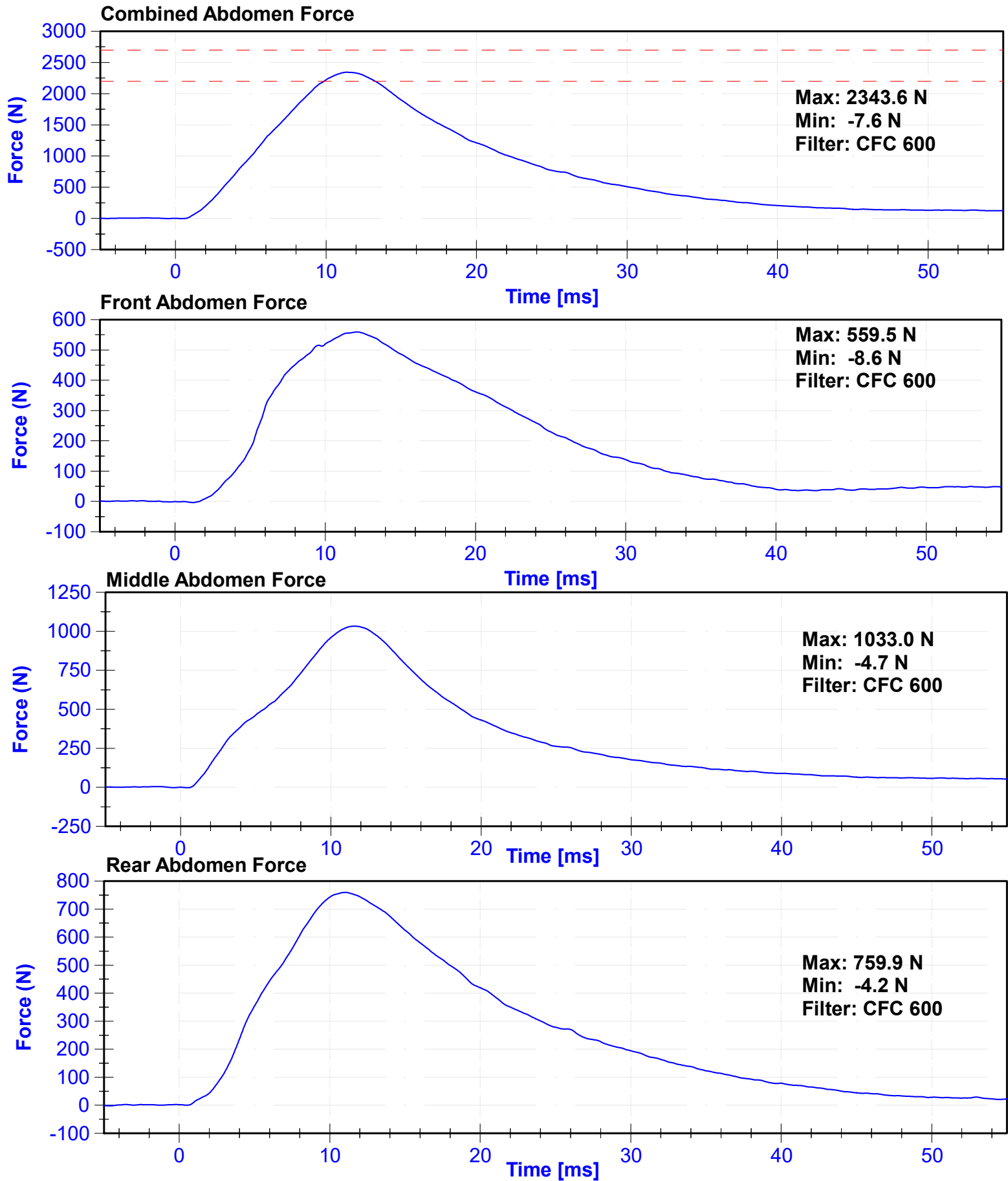
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	46	Pass
Velocity	3.9	4.1	m/s	4.01	Pass
Combined Abdomen Force	2200	2700	N	2343.6	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	11.40	Pass
Resistive Probe Force	4000	4800	N	4590.4	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	18587	11/20/2023	11/19/2024
Front Abdomen Load Cell	Denton	1440	8/8/2023	8/7/2024
Middle Abdomen Load Cell	Denton	1525	8/8/2023	8/7/2024
Rear Abdomen Load Cell	Denton	1528	8/8/2023	8/7/2024





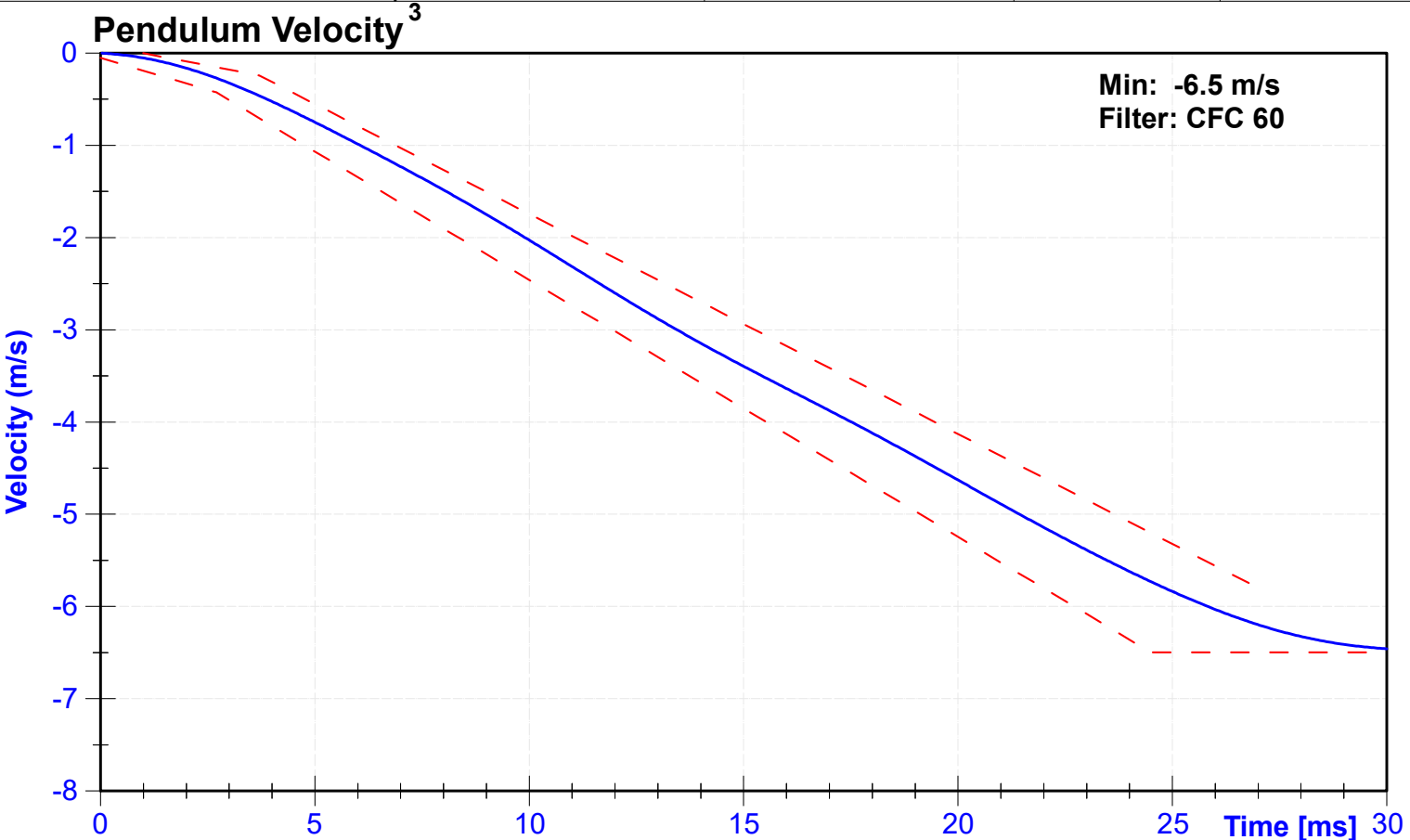
ATD Manufacturer	Denton	Test Technician	J. Rios
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

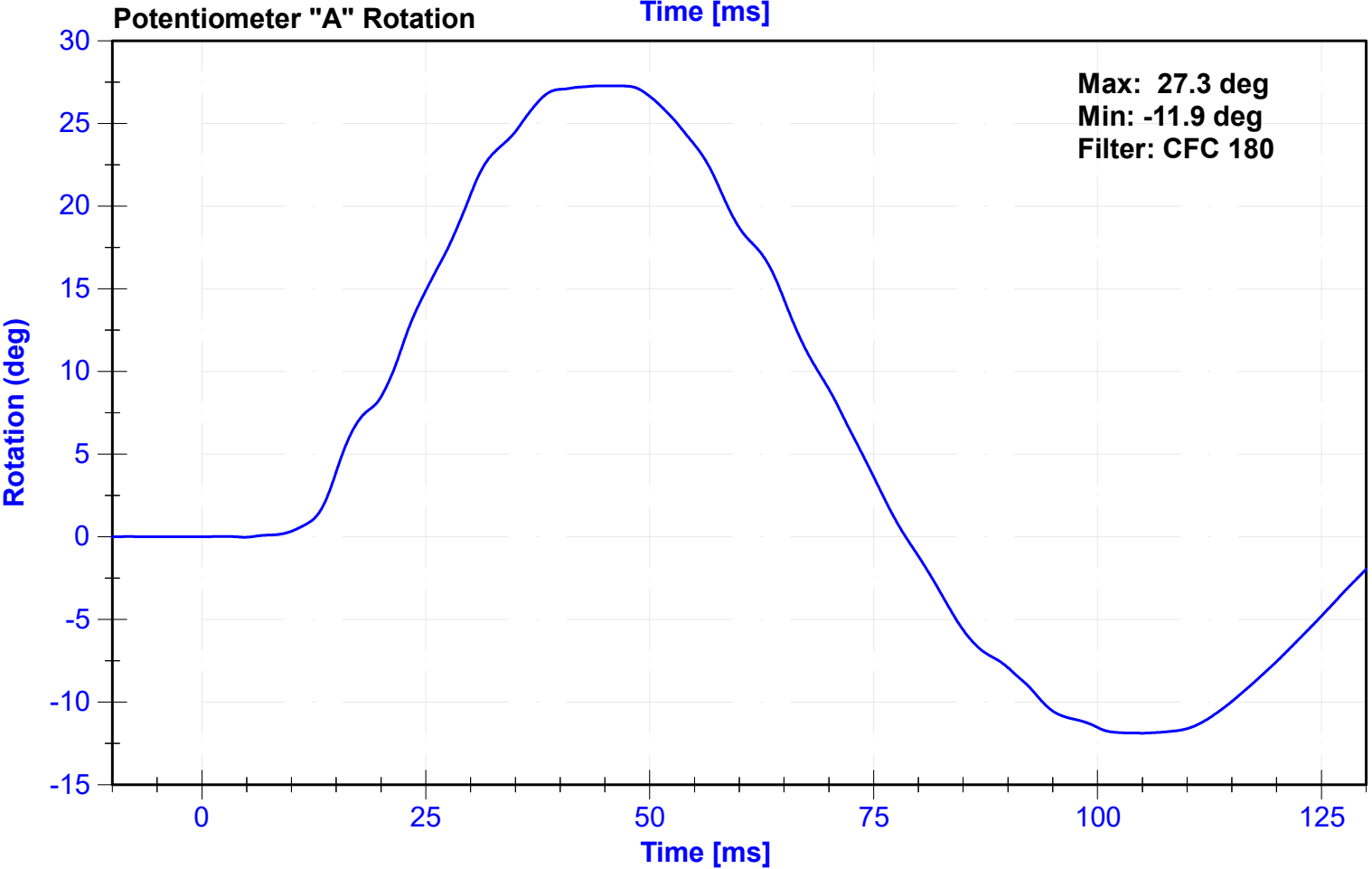
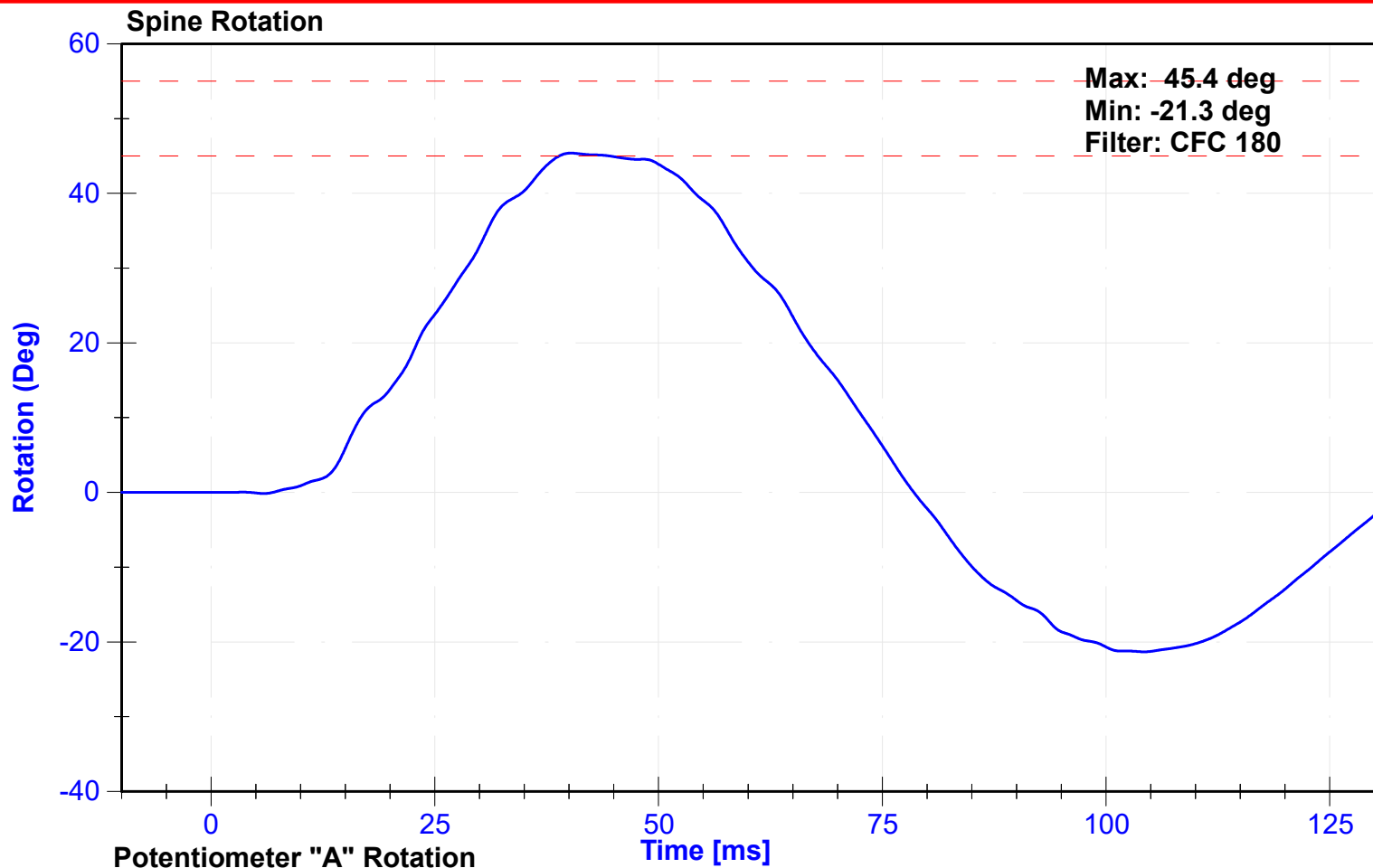
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	49	Pass
Velocity	5.95	6.15	m/s	6.105	Pass
Lateral Spine Rotation	45	55	deg	45.4	Pass
Time at Maximum Rotation	39	53	ms	40.2	Pass
Time of Decay to Zero Degrees	37	57	ms	38.3	Pass
Pendulum Velocity Overall Corridor	Lower Boundary ¹	Upper Boundary ²	m/s	See Plot ³	Pass

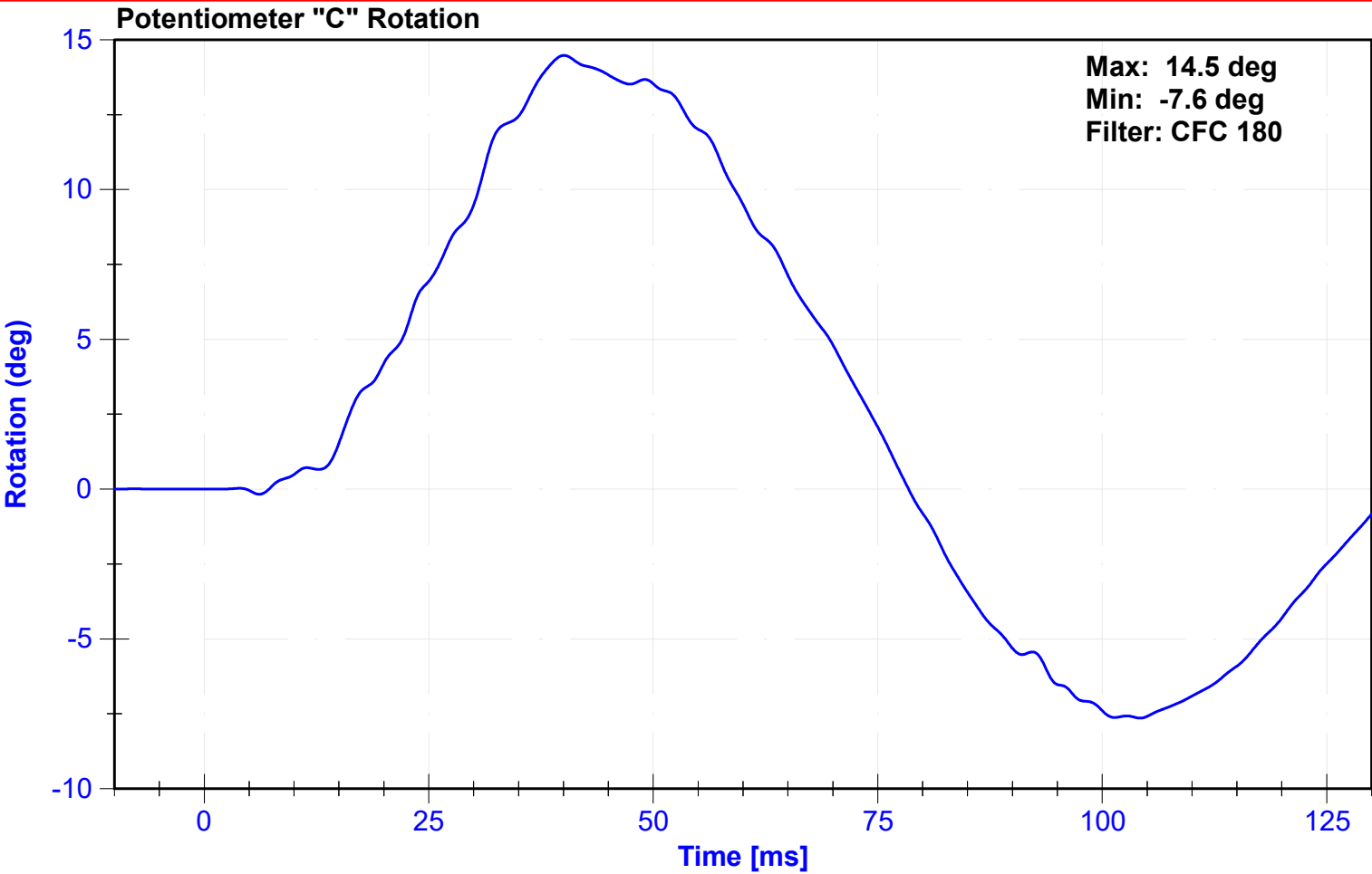
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16503	4/29/2024	10/26/2024
Pendulum "A" Potentiometer	Sfernice	2247	12/5/2023	12/4/2024
Condyle "B" Potentiometer	Sfernice	095	9/29/2023	9/28/2024



^{1,2} Upper and lower boundaries specified in Appendix I IV-19





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. Rios
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

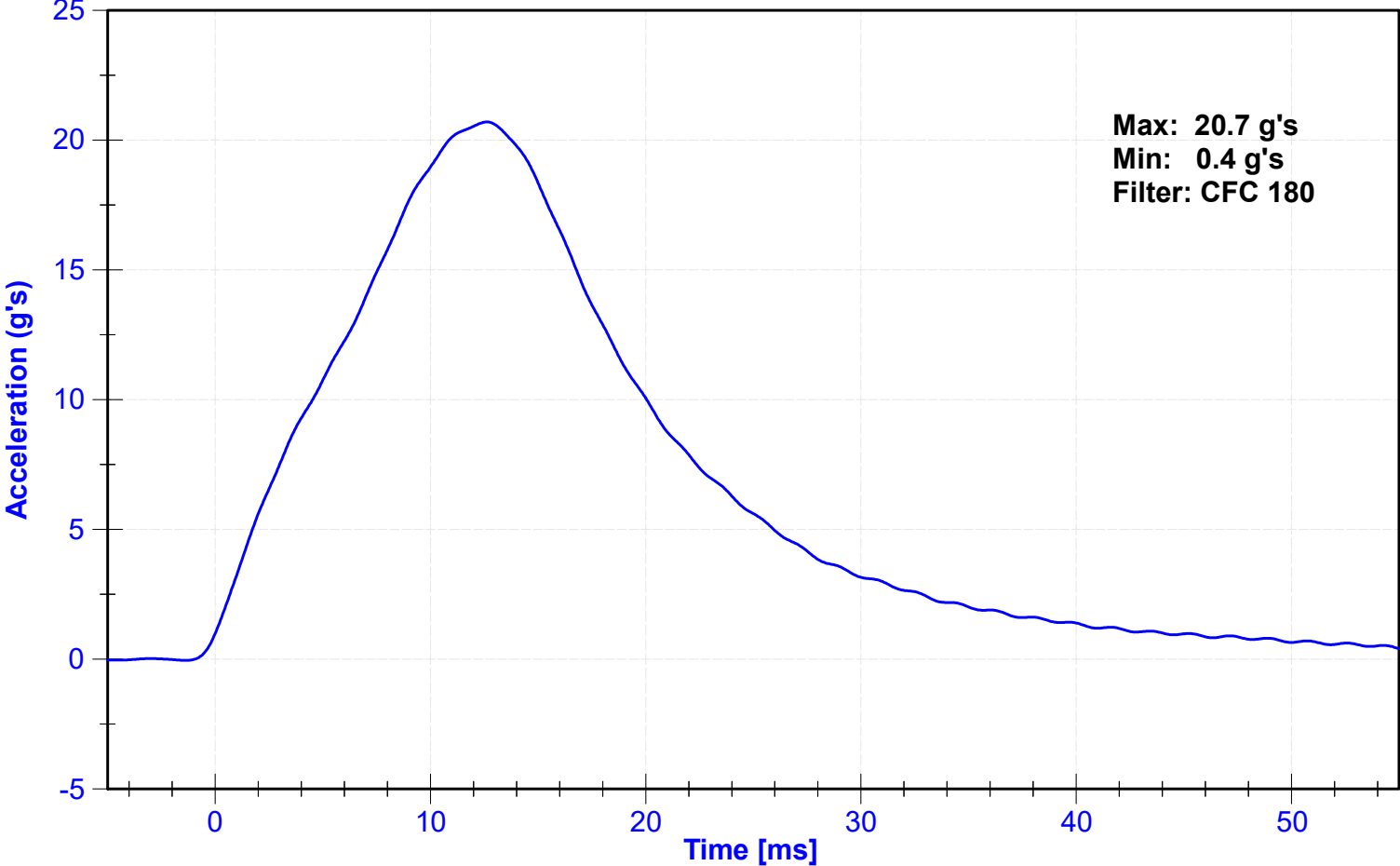
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	46	Pass
Velocity	4.2	4.4	m/s	4.27	Pass
Resistive Force	4700	5400	N	4741.6	Pass
Time at Peak Resistive Force	11.8	16.1	ms	12.60	Pass
Pubic Force	-1590	-1230	N	-1398.6	Pass
Time at Peak Pubic Force	12.2	17.0	ms	12.60	Pass

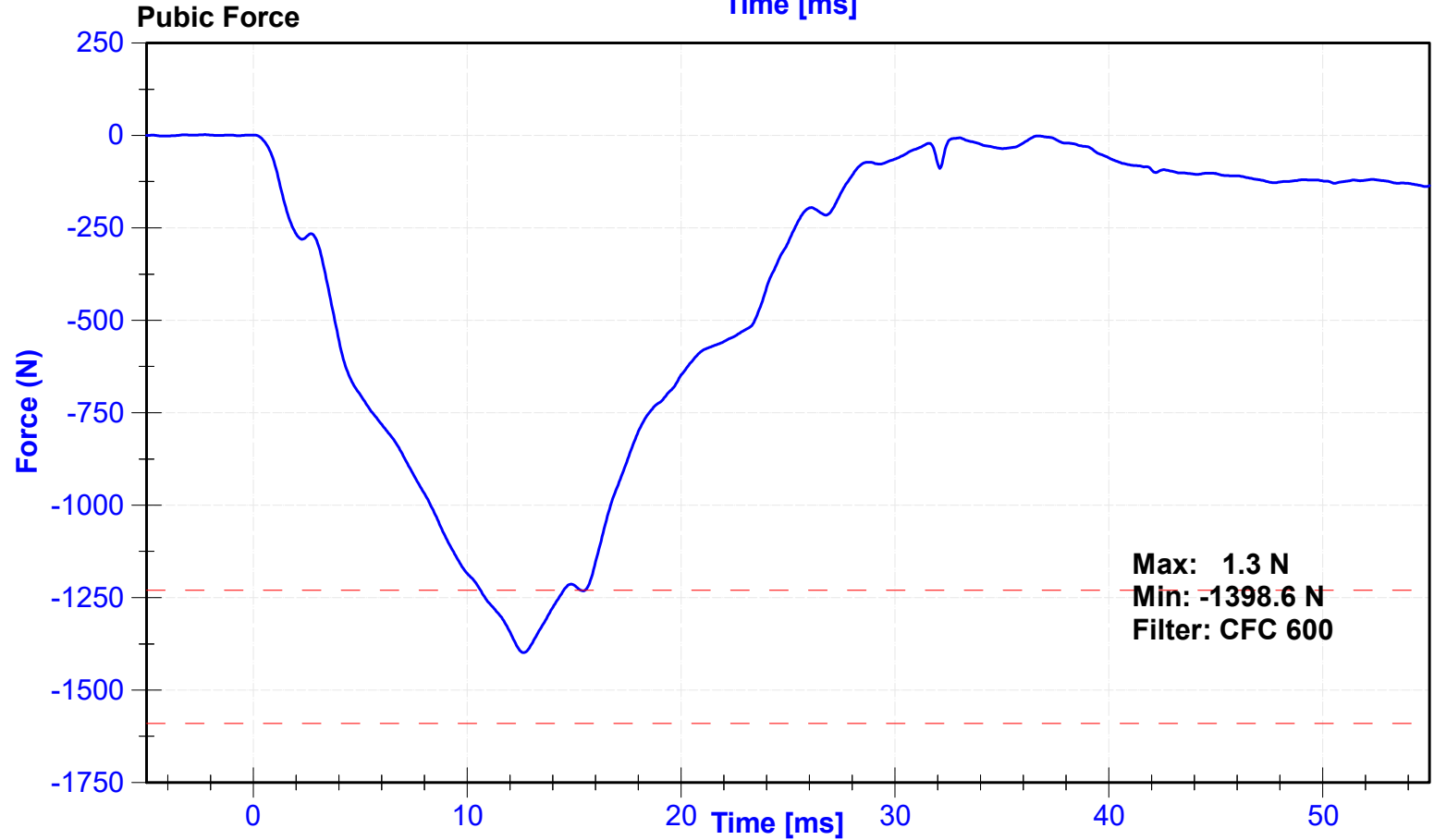
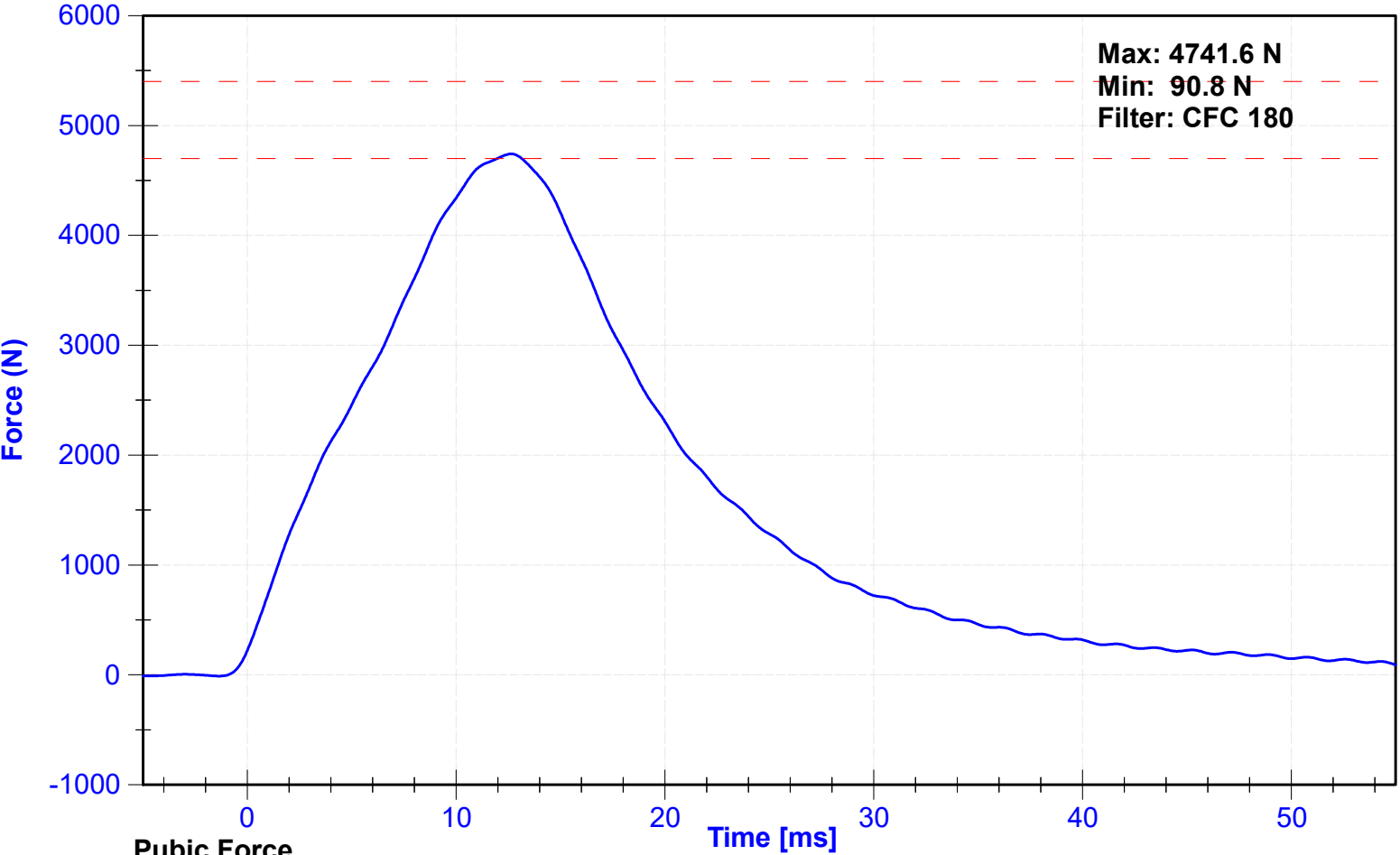
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18587	11/20/2023	11/19/2024
Pubic Load Cell	Denton	456-FY	8/8/2023	8/7/2024

Probe Acceleration



Resistive Force



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

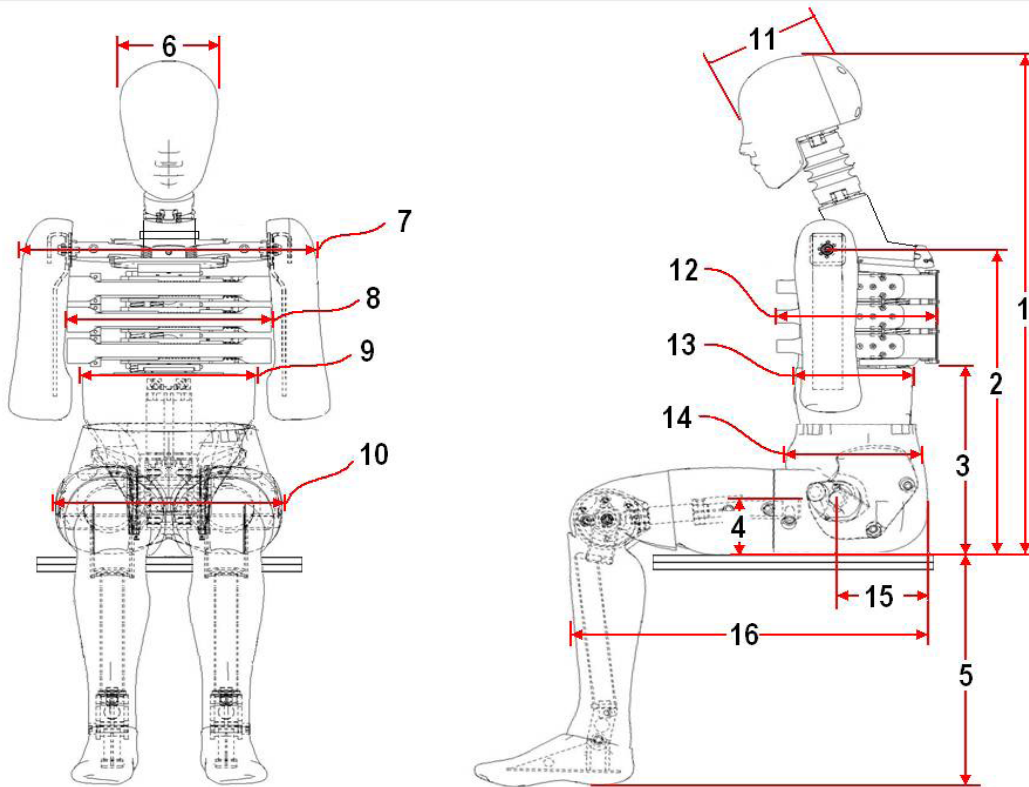


External Measurements - EuroSID-2re

Technician: T. Roseman

Date: 6/18/2024

Dummy Serial Number: D037



FRONT VIEW

SIDE VIEW

Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	909	Pass
2	Seat to Shoulder Joint	558	572	562	Pass
3	Seat to Lower Face of Thoracic Spine Box	346	356	354	Pass
4	Seat to Hip Joint (center of bolt)	97	103	101	Pass
5	Sole to Seat, Sitting	333	451	421	Pass
6	Head Width	152	158	153	Pass
7	Shoulder/Arm Width	461	479	472	Pass
8	Thorax Width	322	332	330	Pass
9	Abdomen Width	273	287	281	Pass
10	Pelvis Lap Width	359	373	362	Pass
11	Head Depth	196	206	199	Pass
12	Thorax Depth	262	272	265	Pass
13	Abdomen Depth	194	204	197	Pass
14	Pelvis Depth	235	245	238	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150	160	155	Pass
16	Back of Buttocks to Front Knee	597	615	602	Pass

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

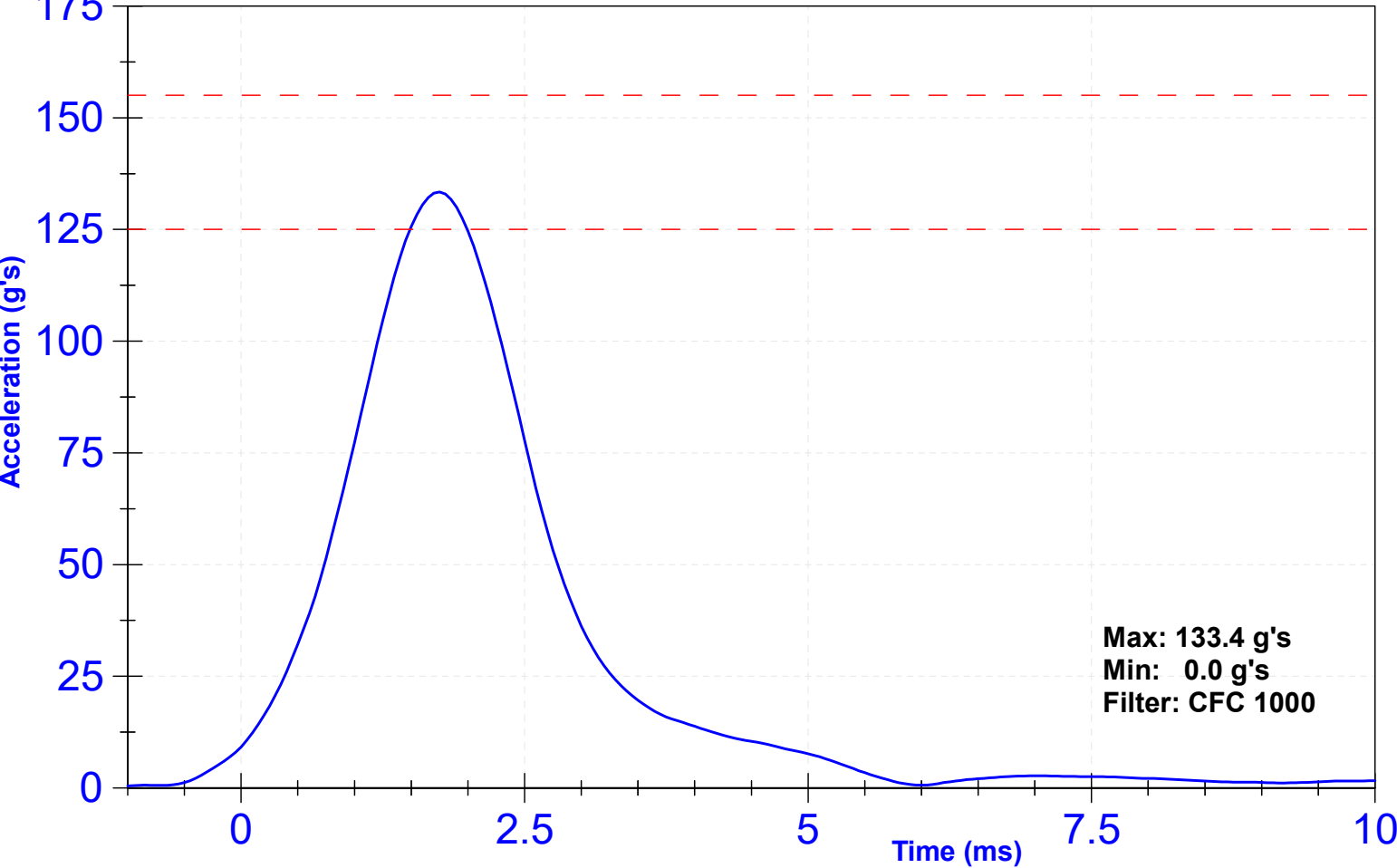
Results

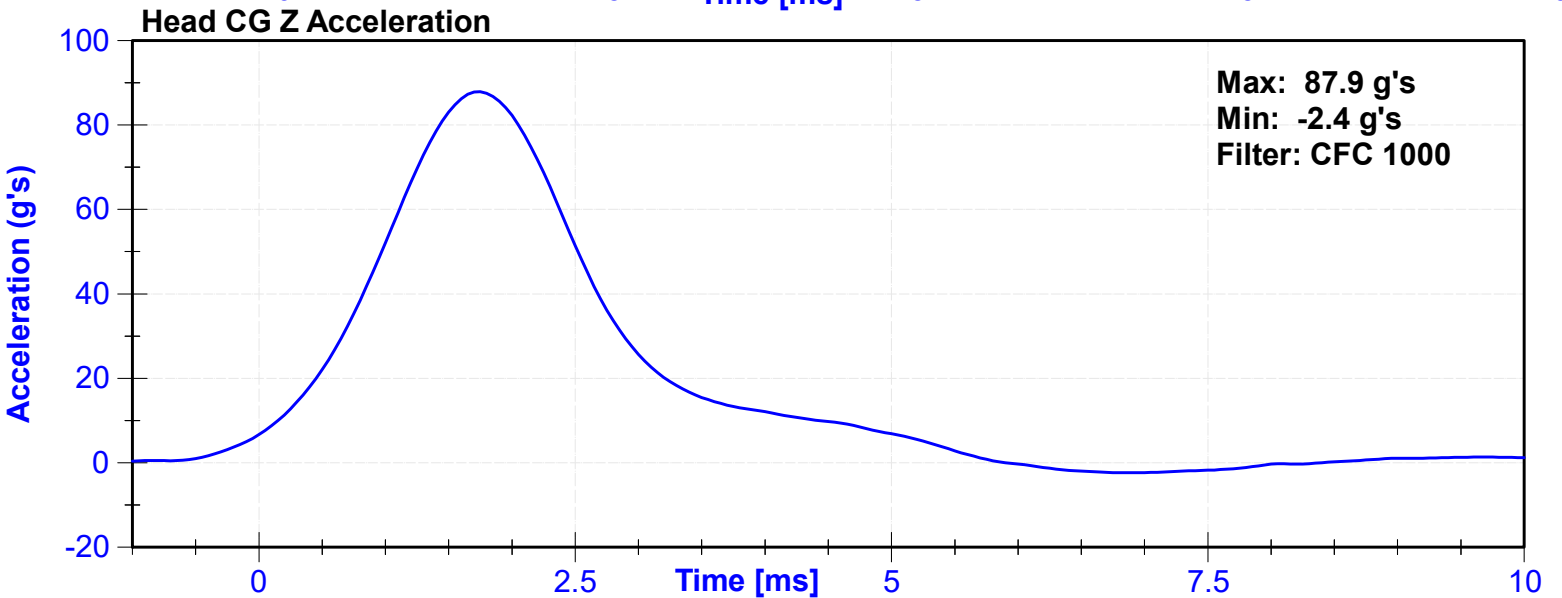
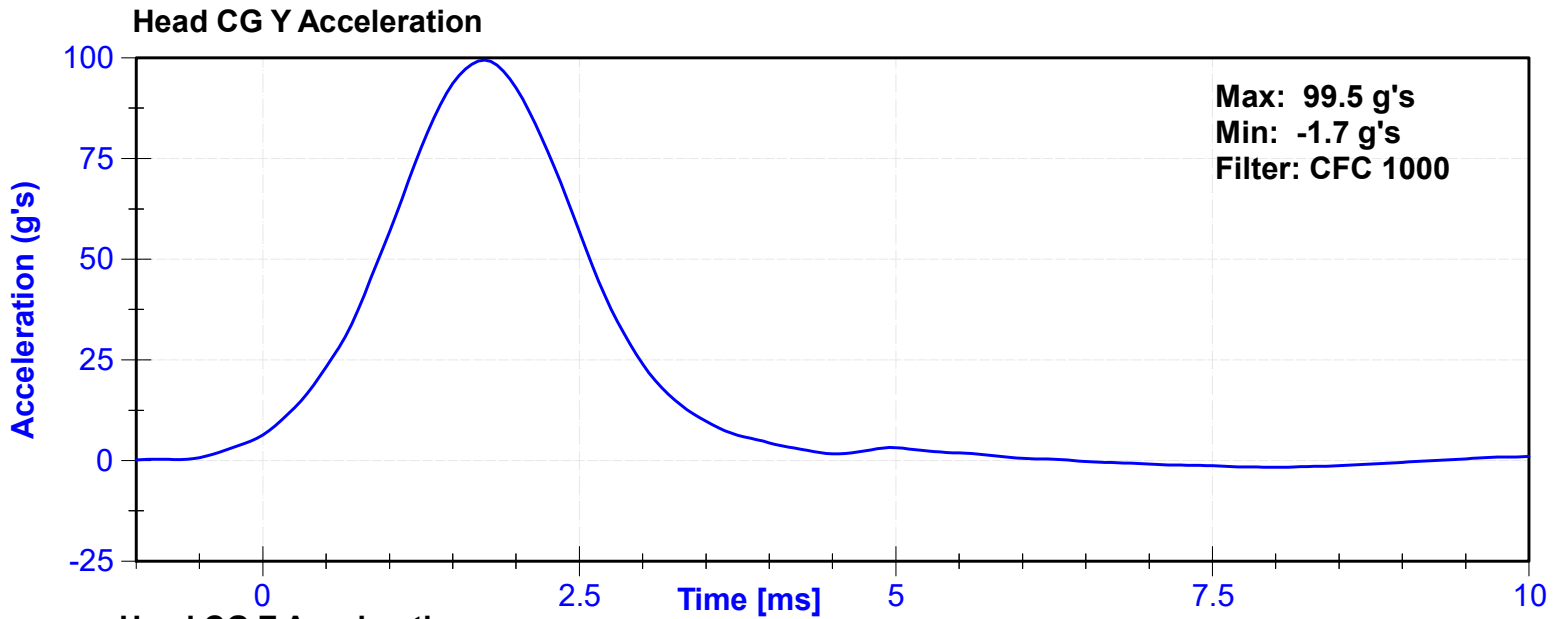
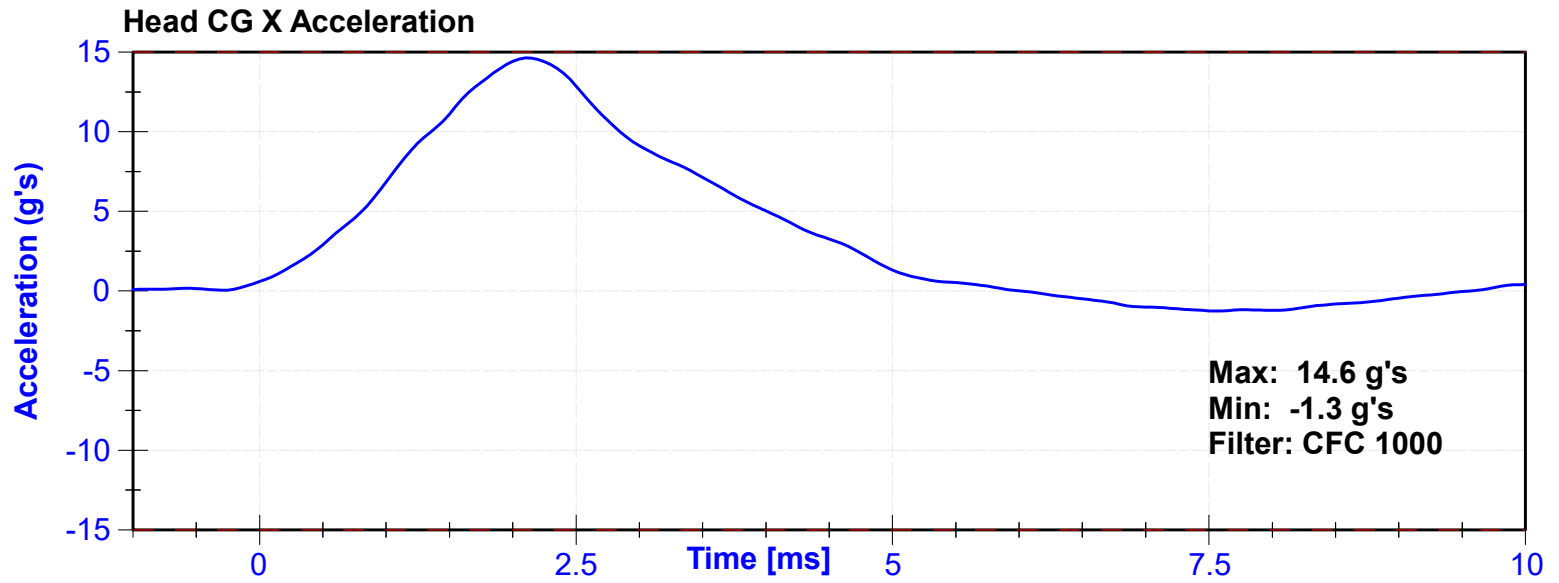
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	47	Pass
Resultant Acceleration	125	155	g's	133.4	Pass
Oscillation	0	15	%	2.03	Pass
Fore-Aft Acceleration	-15	15	g's	14.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	T21724	2/1/2024	7/30/2024
Y Accelerometer	Endevco	T22281	2/1/2024	7/30/2024
Z Accelerometer	Endevco	T26050	2/1/2024	7/30/2024

Resultant Acceleration





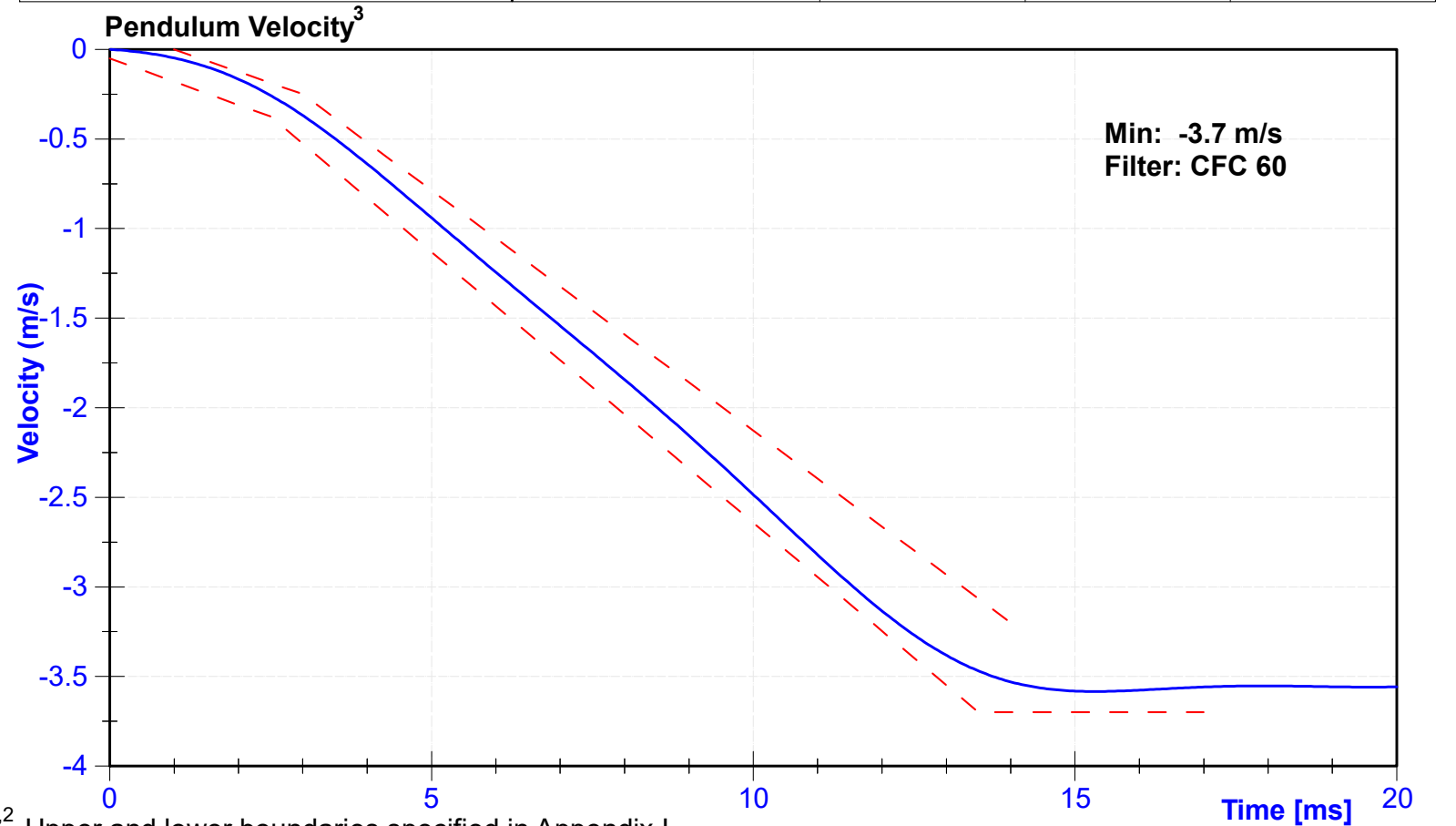
ATD Manufacturer	Denton	Test Technician	J. Rios
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

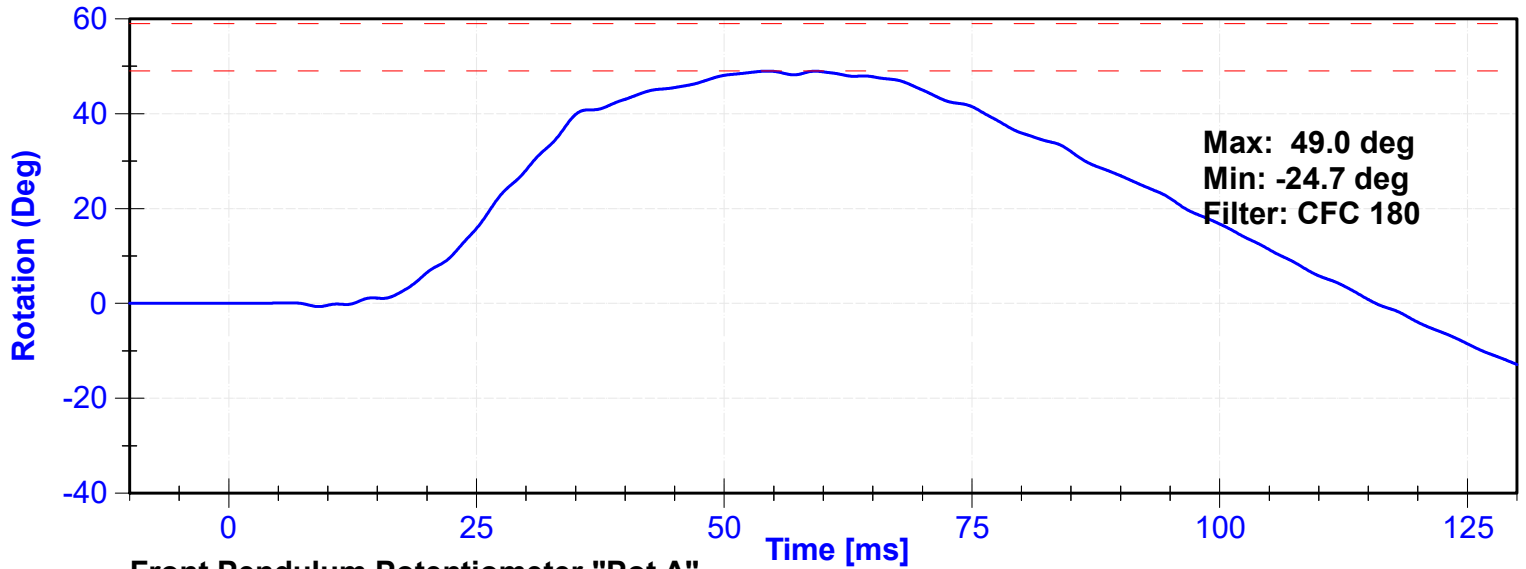
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	49	Pass
Velocity	3.3	3.5	m/s	3.38	Pass
Lateral Neck Rotation	49	59	deg	49.0	Pass
Time at Maximum Rotation	54	66	ms	54.4	Pass
Time of Rotation Decay from Maximum	53	88	ms	61.4	Pass
Pendulum Velocity Overall Corridor	Lower Boundary ¹	Upper Boundary ²	m/s	See Plot ³	Pass

Transducer Calibrations

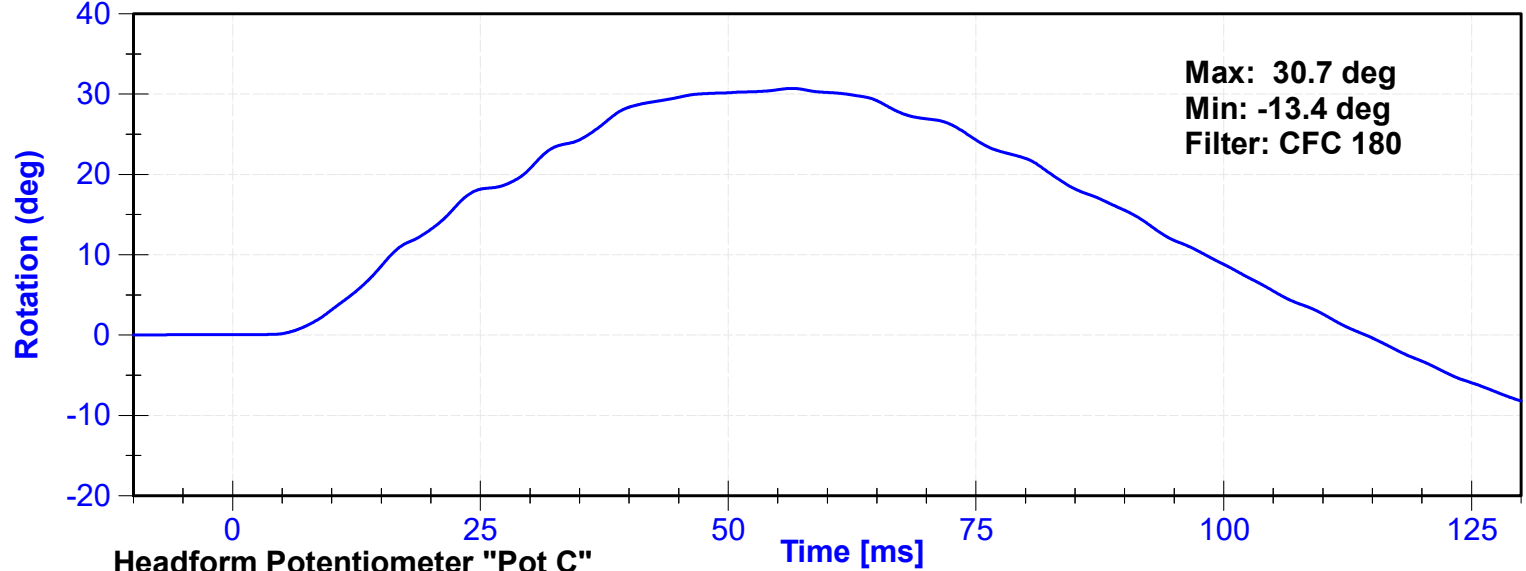
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16503	4/29/2024	10/26/2024
Front Pendulum Potentiometer	Sfernice	2247	12/5/2023	12/4/2024
Headform Potentiometer	Sfernice	095	9/29/2023	9/28/2024



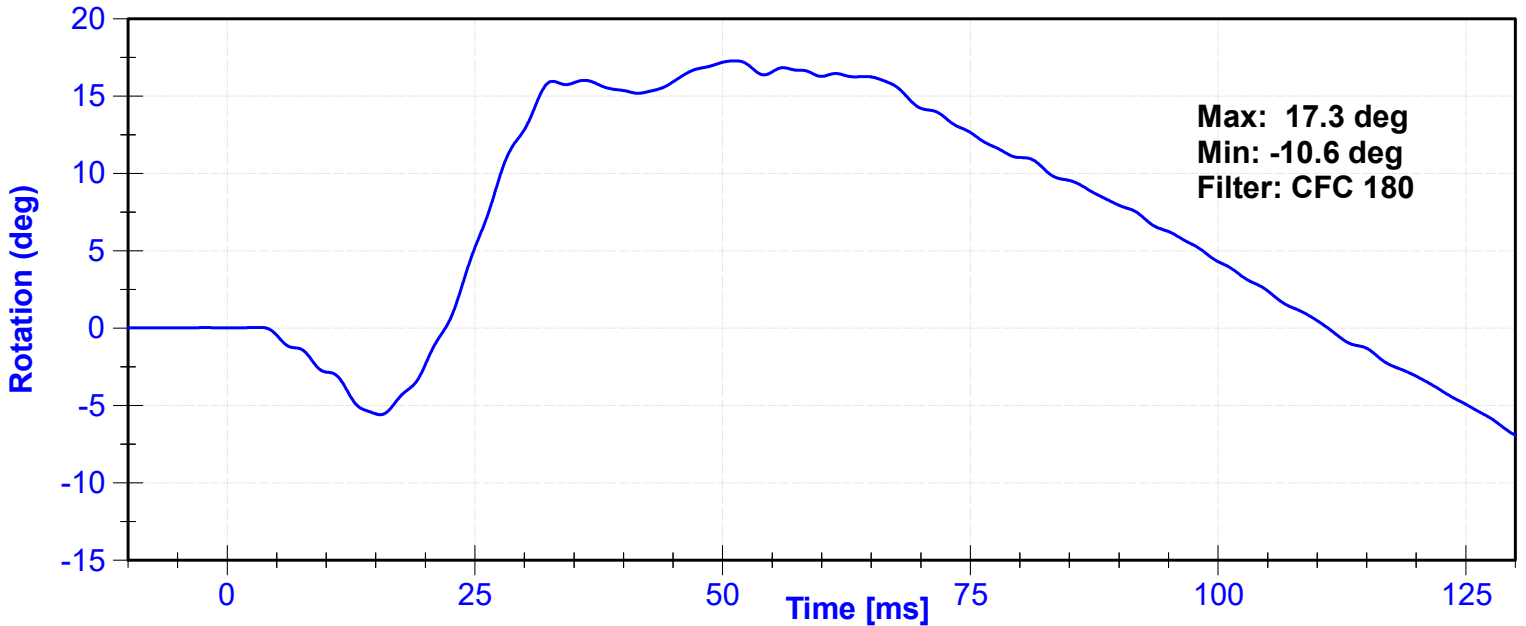
Neck Rotation



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. Rios
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

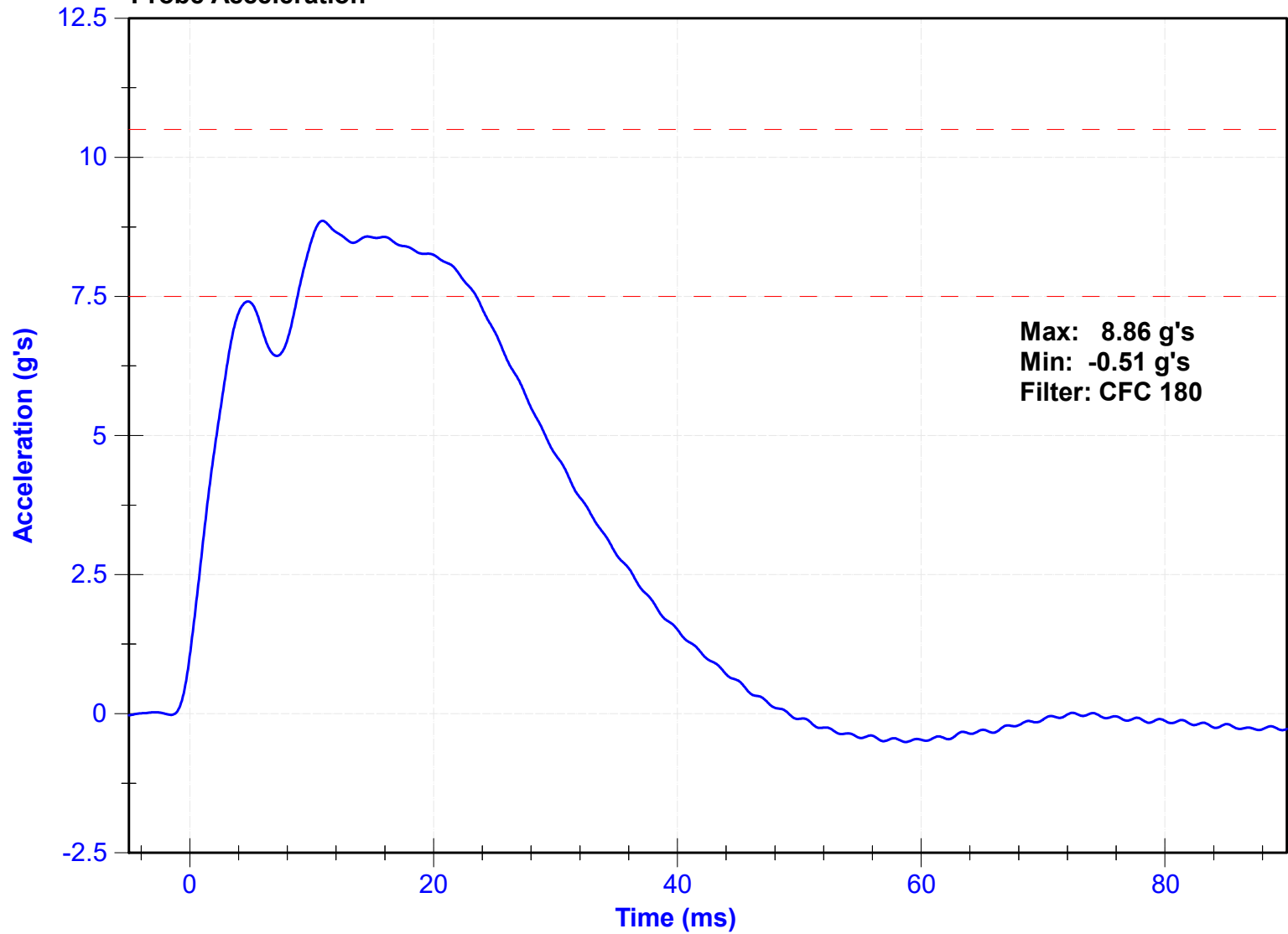
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	49	Pass
Velocity	4.2	4.4	m/s	4.28	Pass
Probe Acceleration	7.5	10.5	g's	8.86	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	18587	11/20/2023	11/19/2024

Probe Acceleration



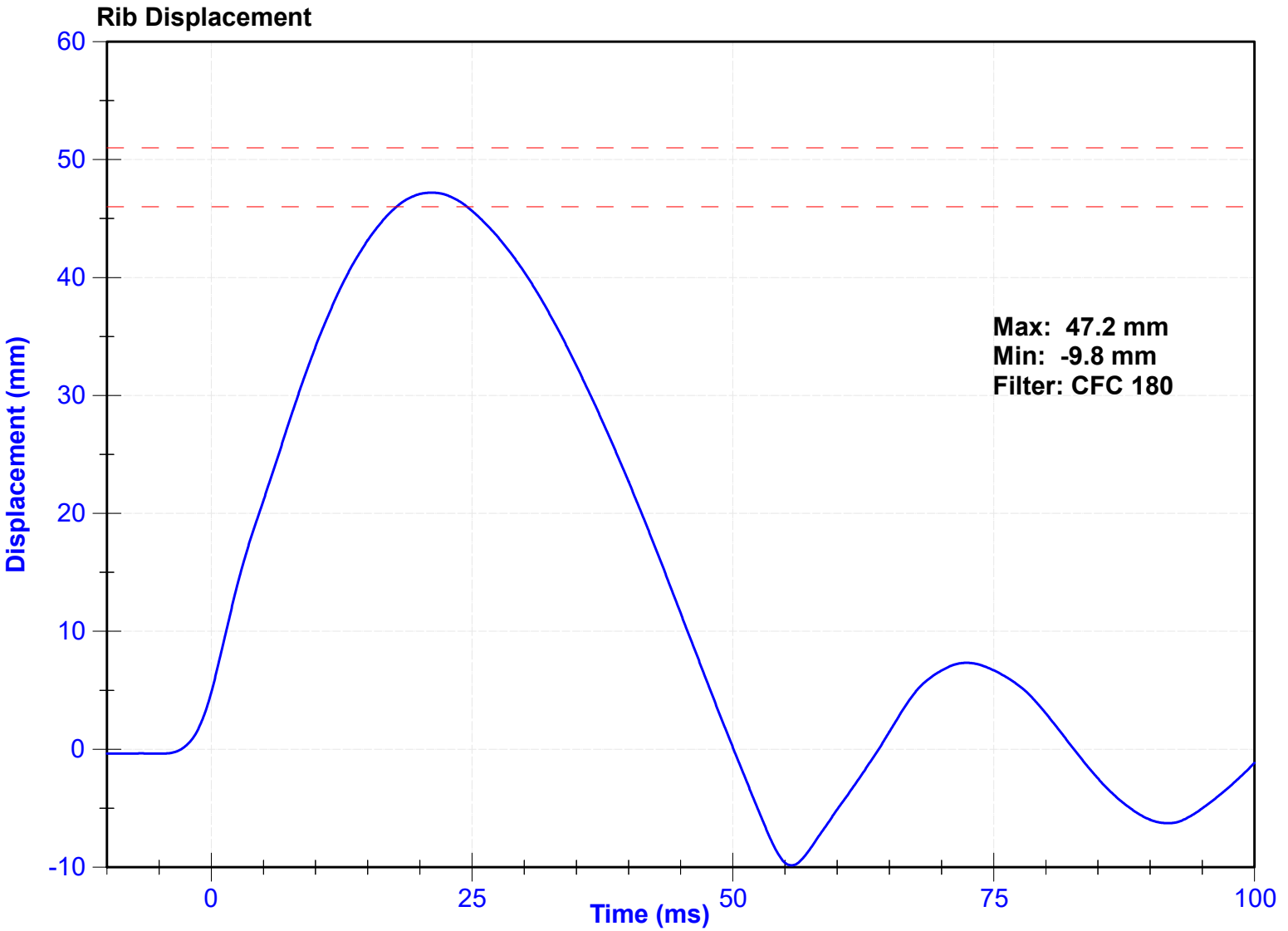
ATD Manufacturer	Denton	Test Technician	J.Rios
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	44	Pass
Rib Displacement	46	51	mm	47.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	0552-01	1/31/2024	7/31/2024



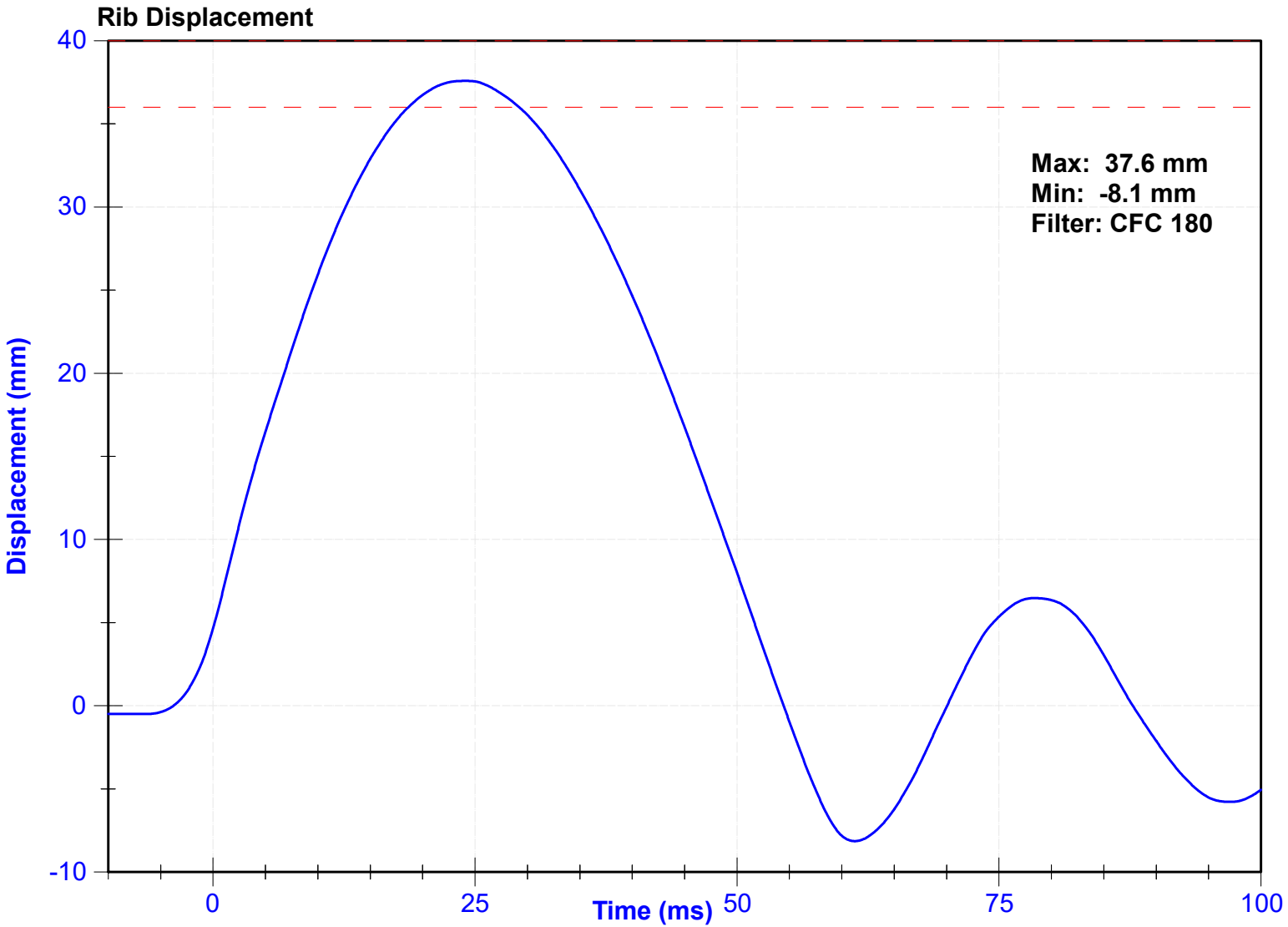
ATD Manufacturer	Denton	Test Technician	J.Rios
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	44	Pass
Rib Displacement	36	40	mm	37.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	0552-01	1/31/2024	7/31/2024



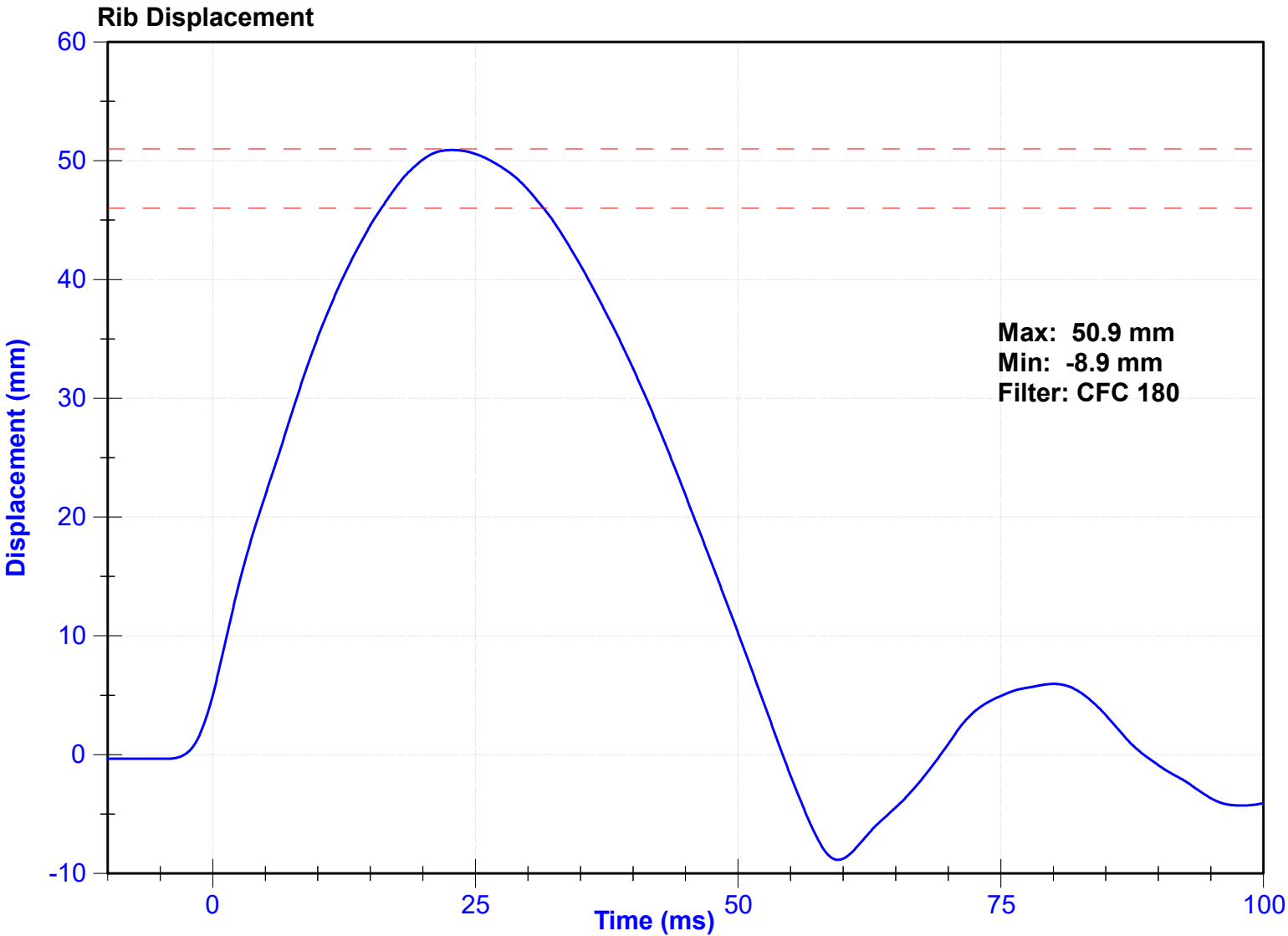
ATD Manufacturer	Denton	Test Technician	J.Rios
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	44	Pass
Rib Displacement	46	51	mm	50.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	807	1/31/2024	7/31/2024



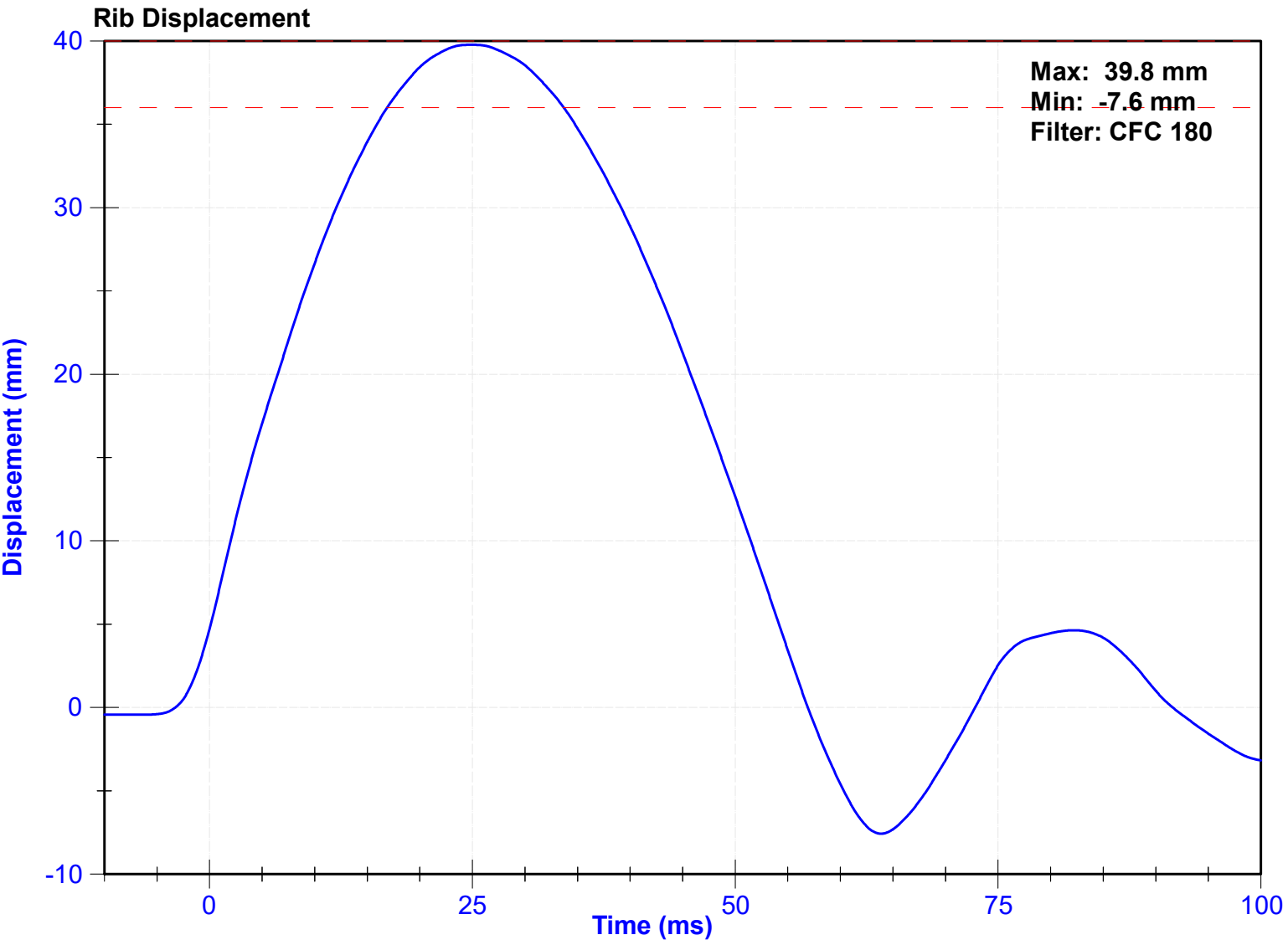
ATD Manufacturer	Denton	Test Technician	J.Rios
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	44	Pass
Rib Displacement	36	40	mm	39.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	807	1/31/2024	7/31/2024



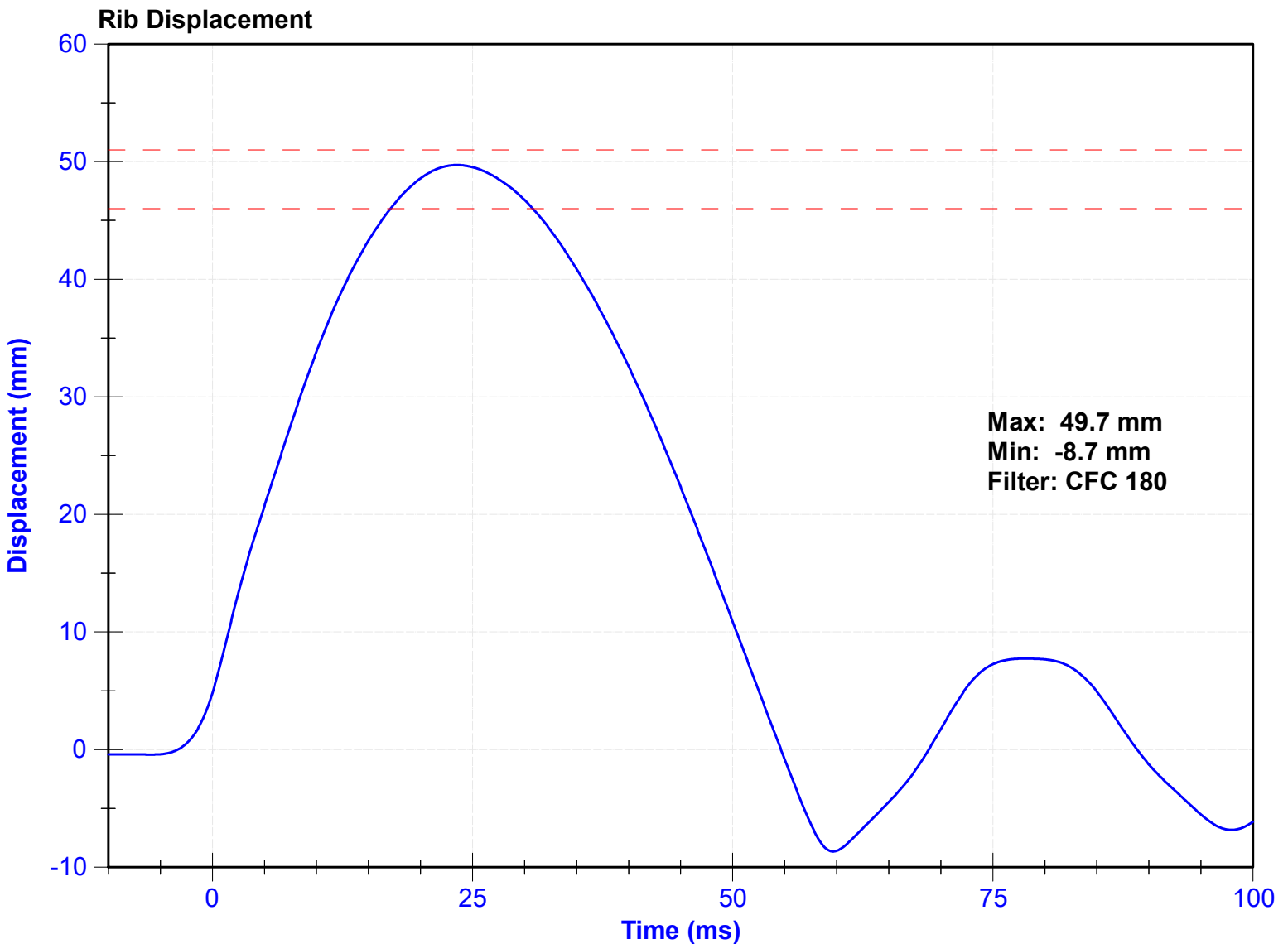
ATD Manufacturer	Denton	Test Technician	J.Rios
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	44	Pass
Rib Displacement	46	51	mm	49.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	0552-03	1/31/2024	7/31/2024



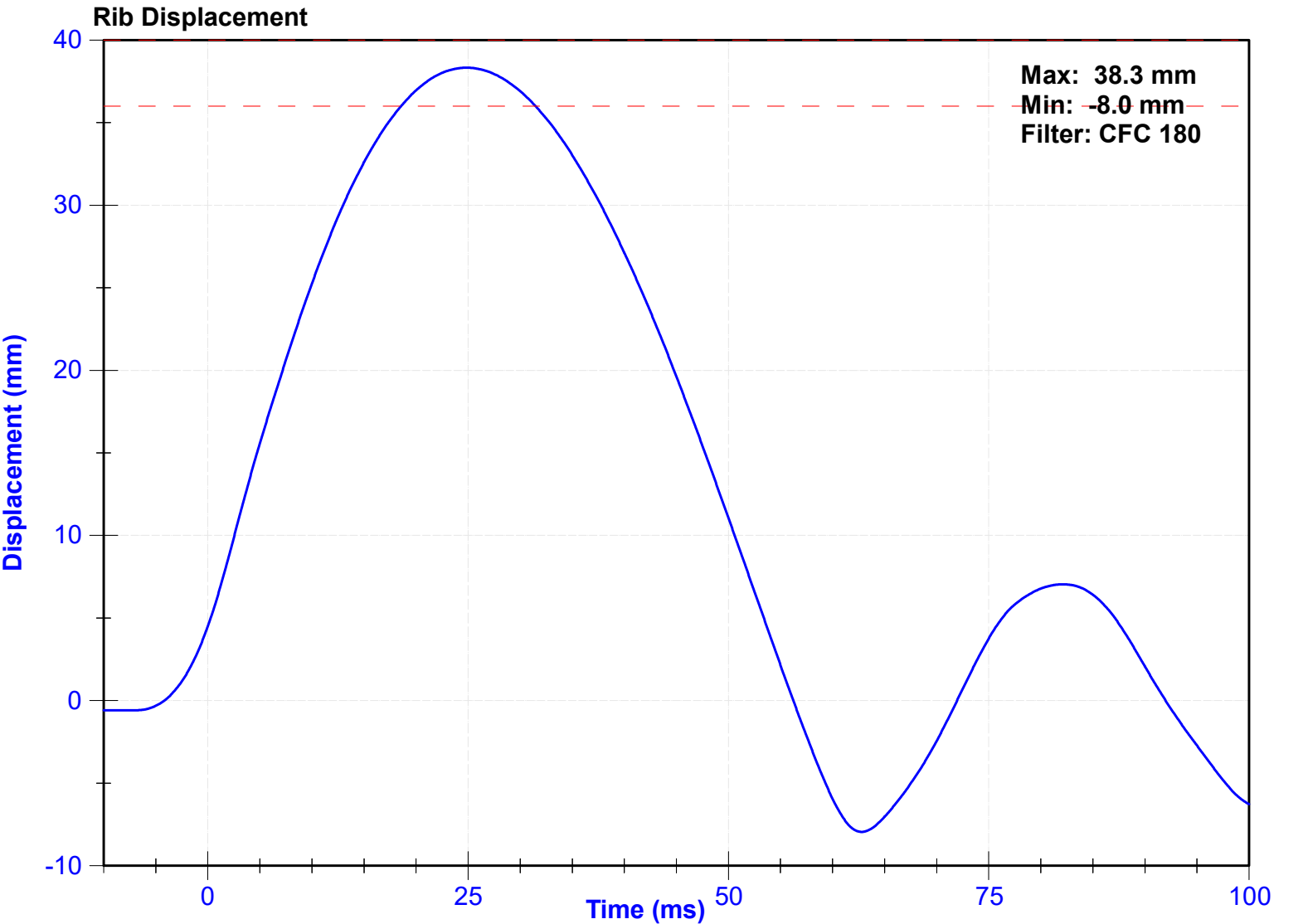
ATD Manufacturer	Denton	Test Technician	J.Rios
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	44	Pass
Rib Displacement	36	40	mm	38.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	0552-03	1/31/2024	7/31/2024



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

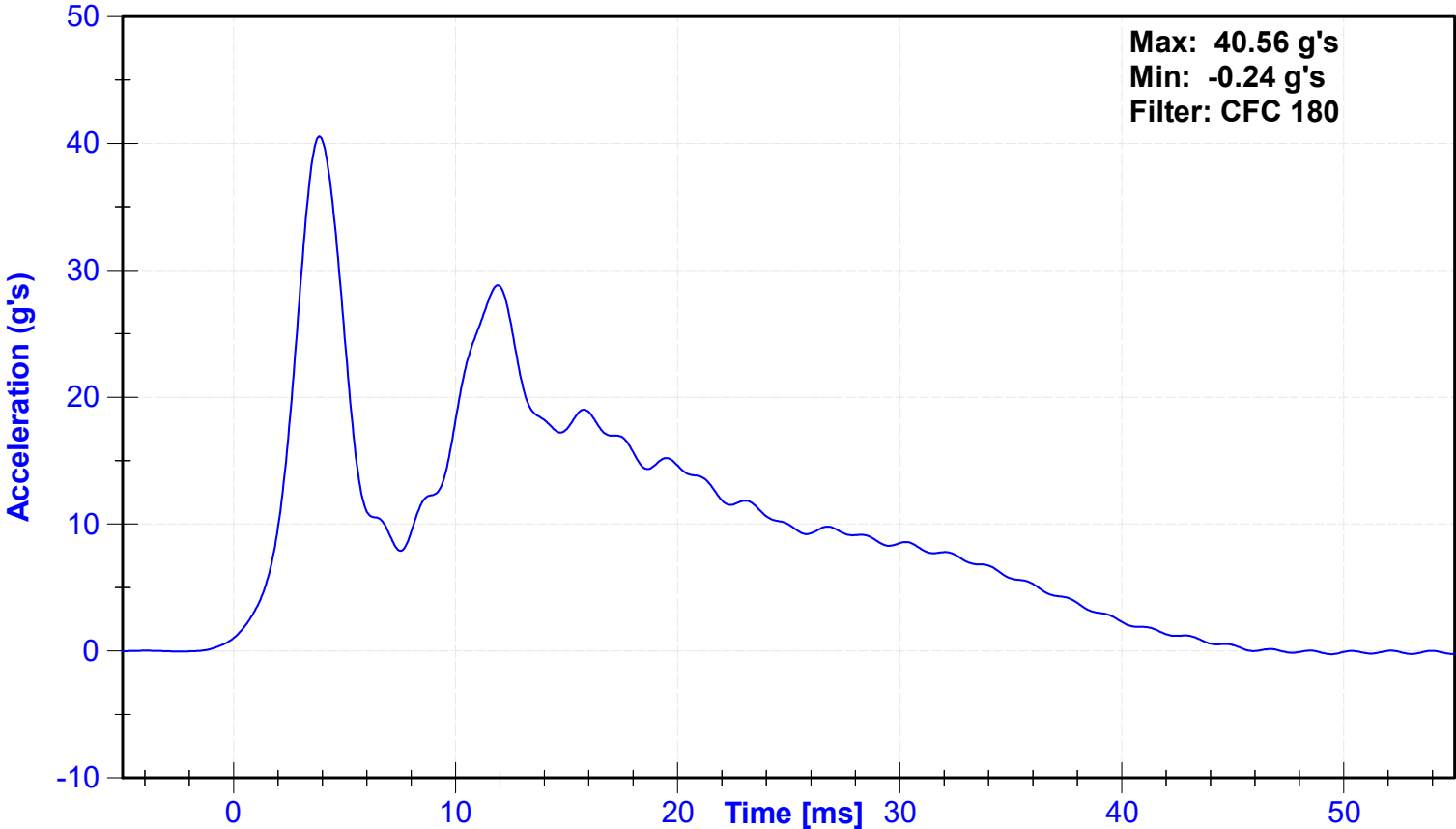
Results

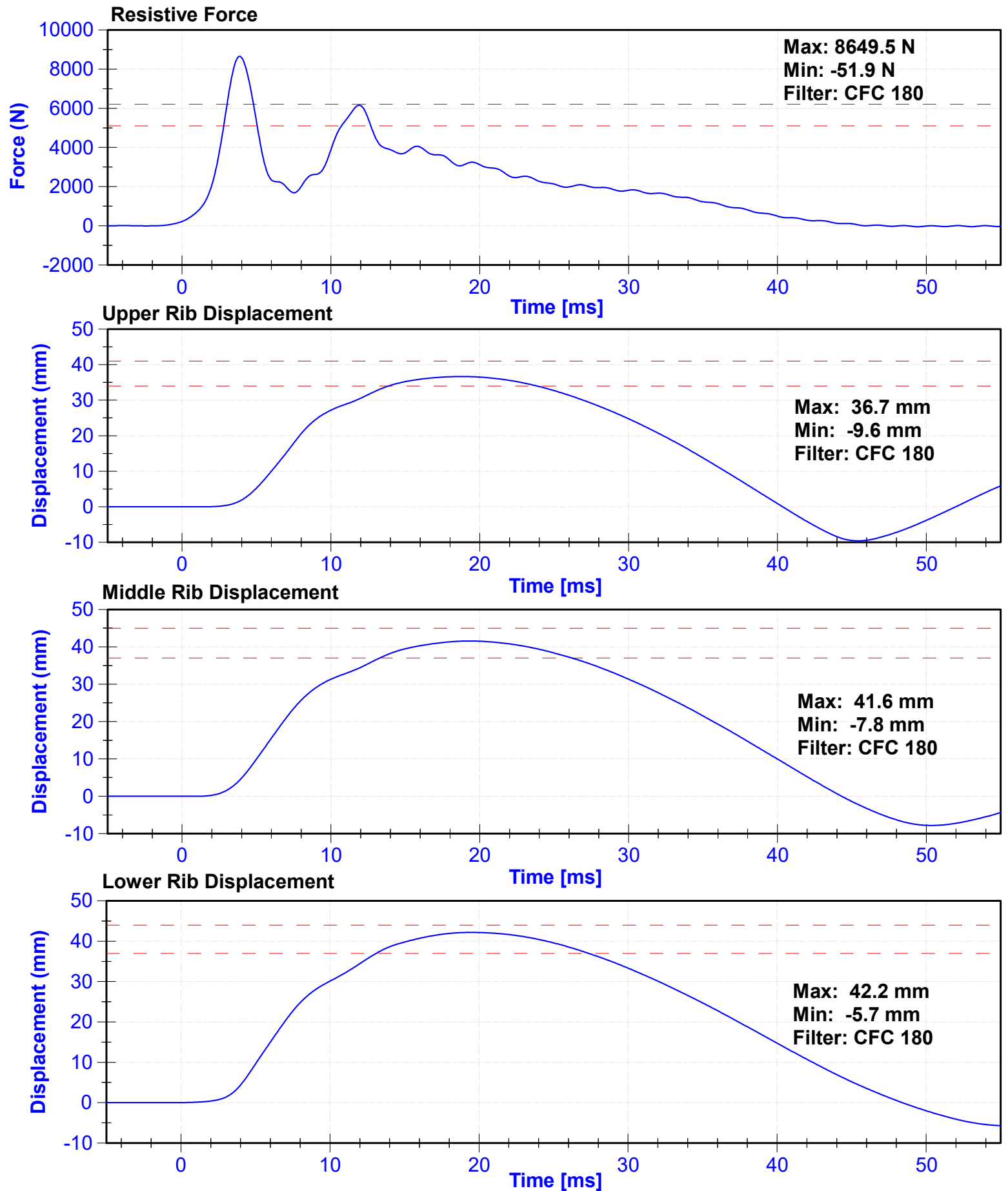
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	49	Pass
Velocity	5.4	5.6	m/s	5.53	Pass
Resistive Force after 6ms	5100	6200	N	6151.3	Pass
Upper Thorax Rib Deflection	34	41	mm	36.7	Pass
Mid Thorax Rib Deflection	37	45	mm	41.6	Pass
Lower Thorax Rib Deflection	37	44	mm	42.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	18587	11/20/2023	11/19/2024
Upper Thorax Rib Potentiometer	Honeywell	0552-01	1/31/2024	7/31/2024
Middle Thorax Rib Potentiometer	Honeywell	807	1/31/2024	7/31/2024
Lower Thorax Rib Potentiometer	Honeywell	0552-03	1/31/2024	7/31/2024

Probe Acceleration





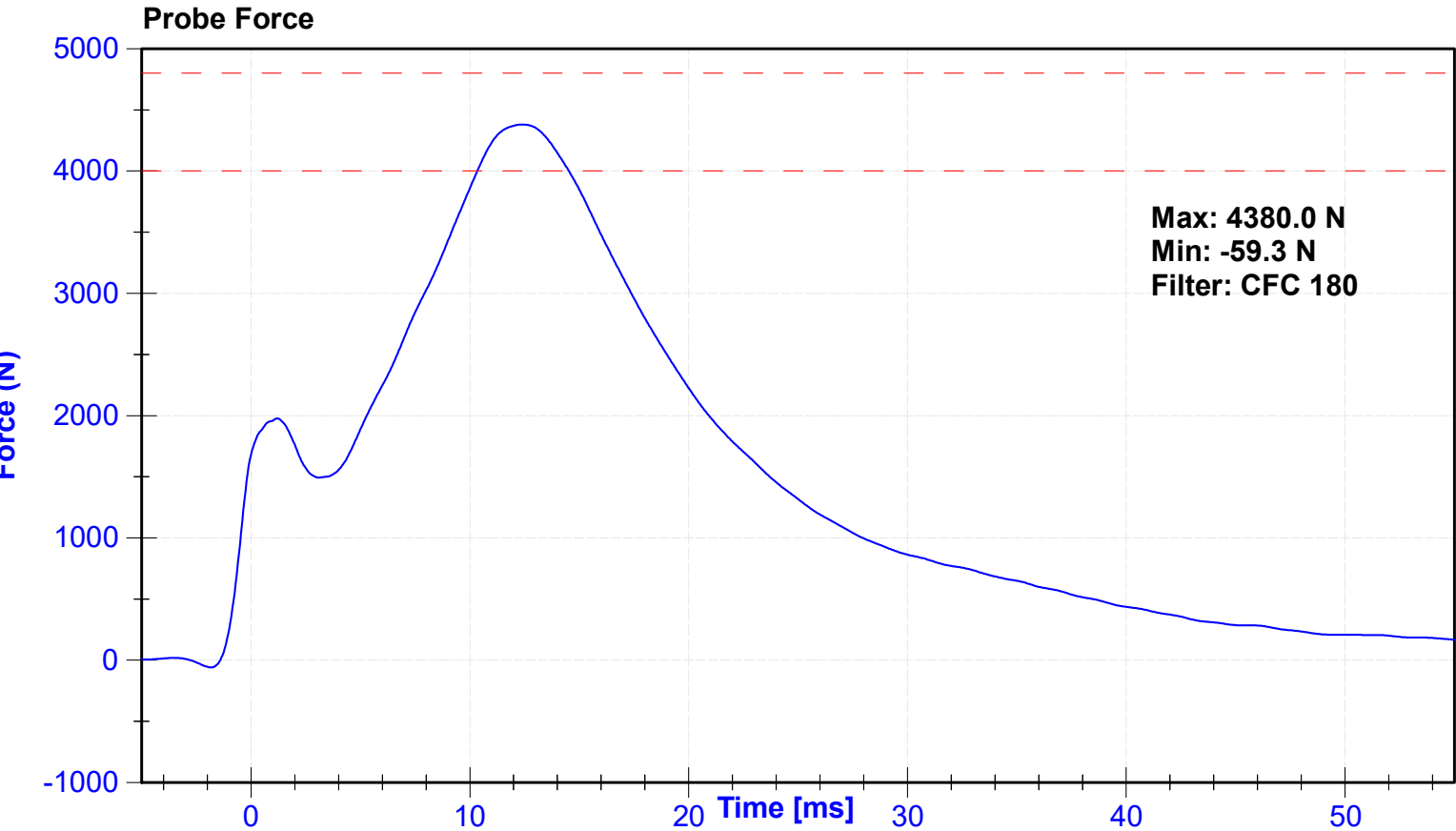
ATD Manufacturer	Denton	Test Technician	J. Rios
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

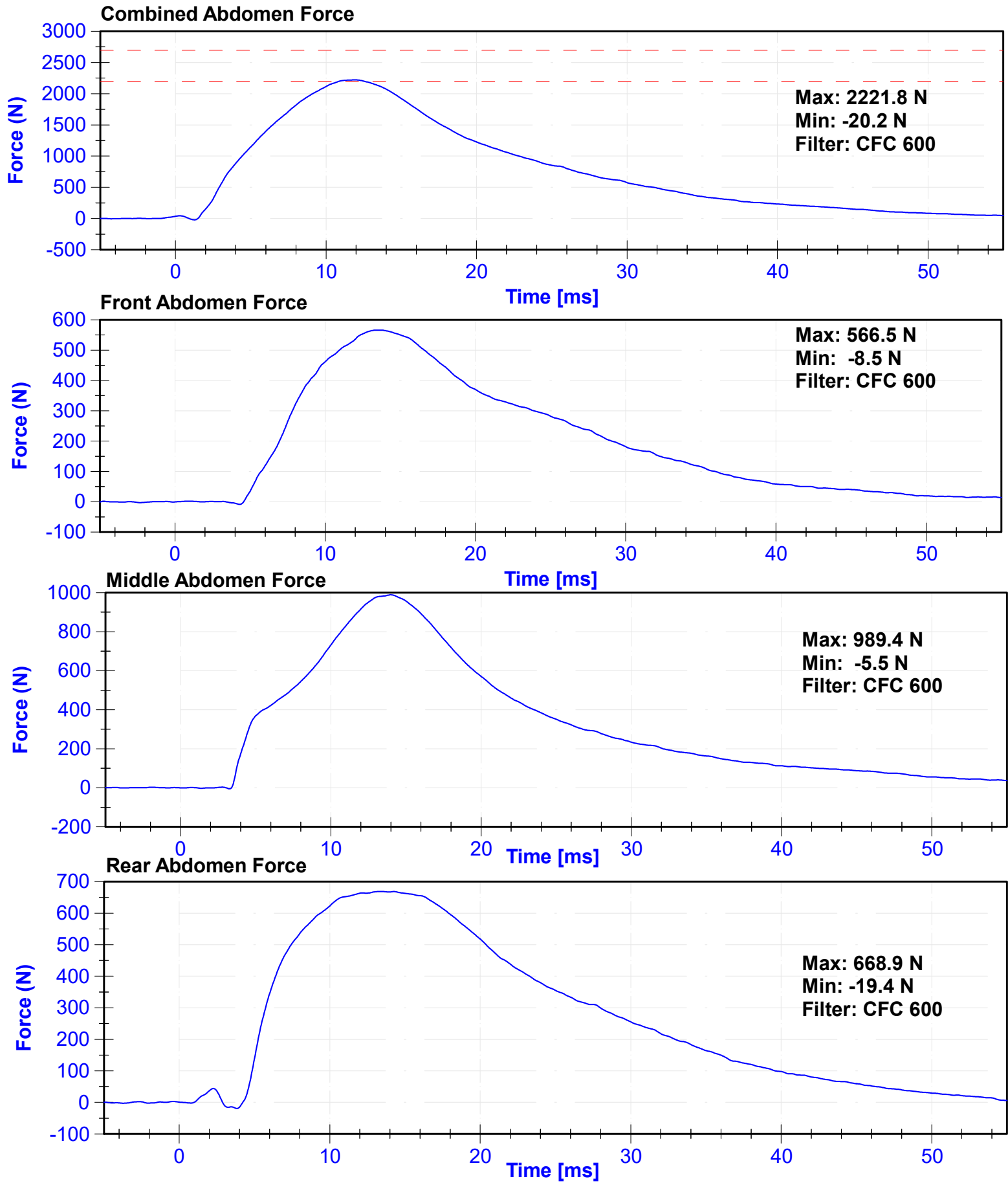
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	49	Pass
Velocity	3.9	4.1	m/s	4.01	Pass
Combined Abdomen Force	2200	2700	N	2221.8	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	11.95	Pass
Resistive Probe Force	4000	4800	N	4380.0	Pass
Time at Peak Resistive Force	10.6	13.0	ms	12.45	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18587	11/20/2023	11/19/2024
Front Abdomen Load Cell	Denton	1440	8/8/2023	8/7/2024
Middle Abdomen Load Cell	Denton	1525	8/8/2023	8/7/2024
Rear Abdomen Load Cell	Denton	1528	8/8/2023	8/7/2024





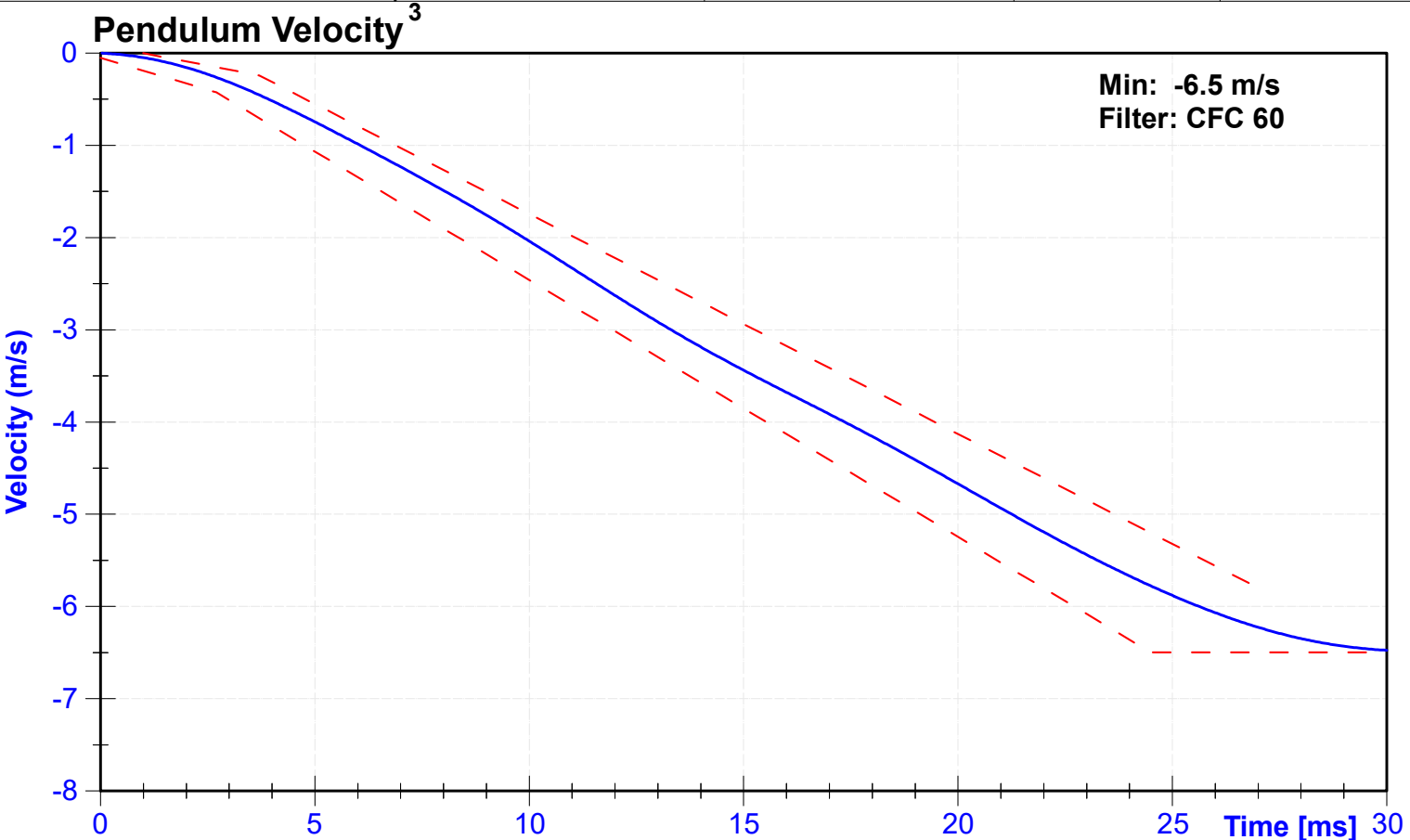
ATD Manufacturer	Denton	Test Technician	J. Rios
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

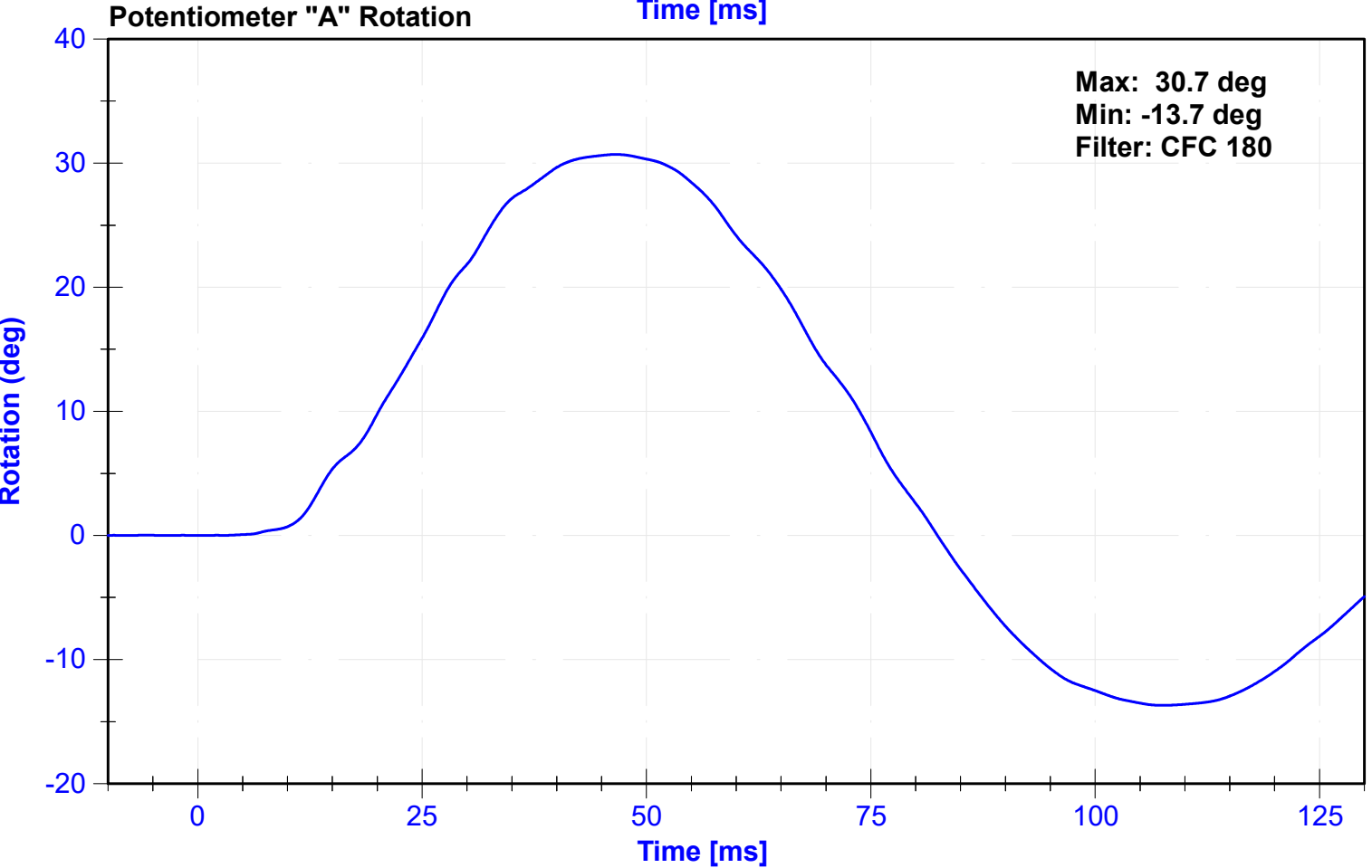
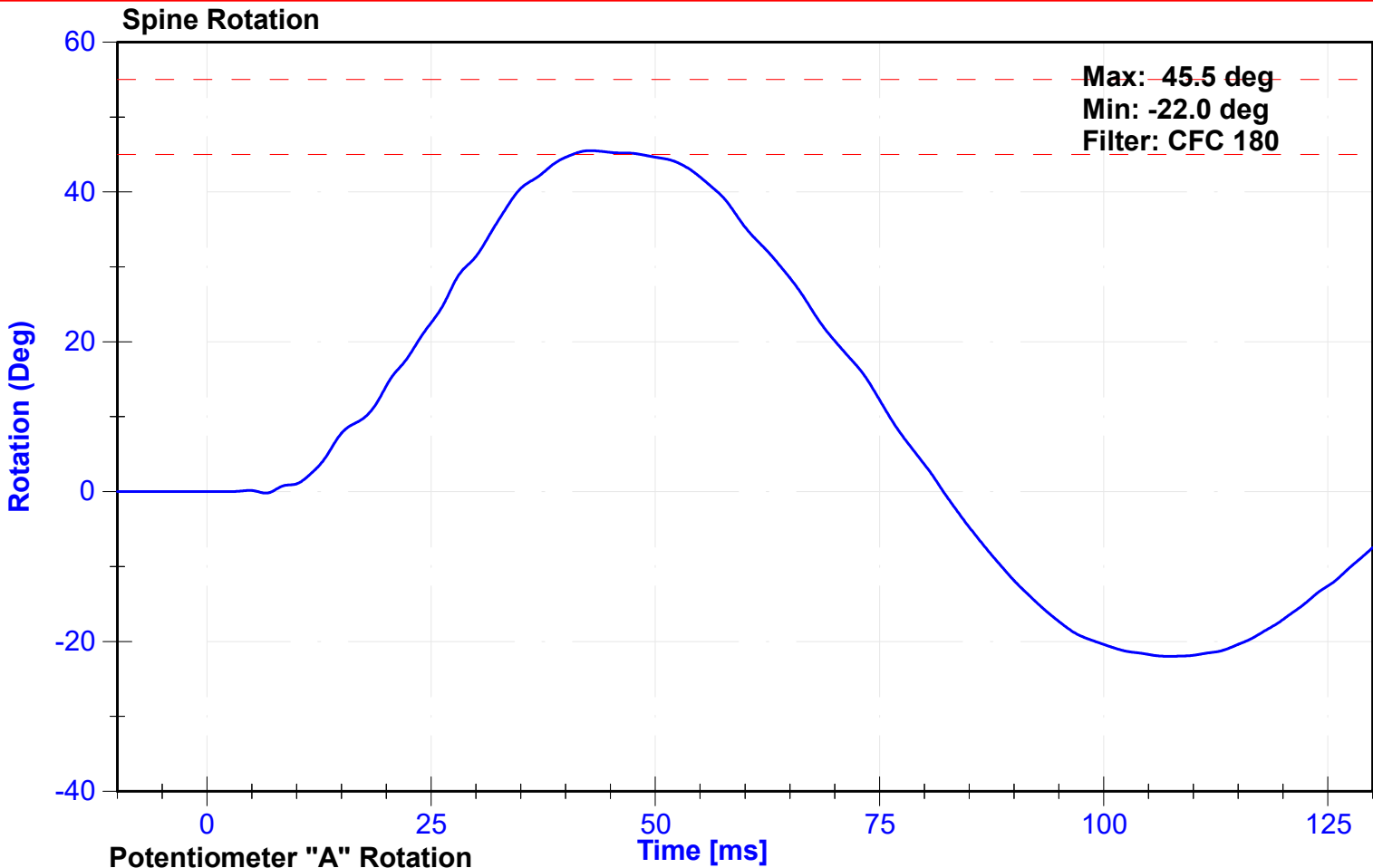
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	49	Pass
Velocity	5.95	6.15	m/s	6.035	Pass
Lateral Spine Rotation	45	55	deg	45.5	Pass
Time at Maximum Rotation	39	53	ms	42.7	Pass
Time of Decay to Zero Degrees	37	57	ms	39.4	Pass
Pendulum Velocity Overall Corridor	Lower Boundary ¹	Upper Boundary ²	m/s	See Plot ³	Pass

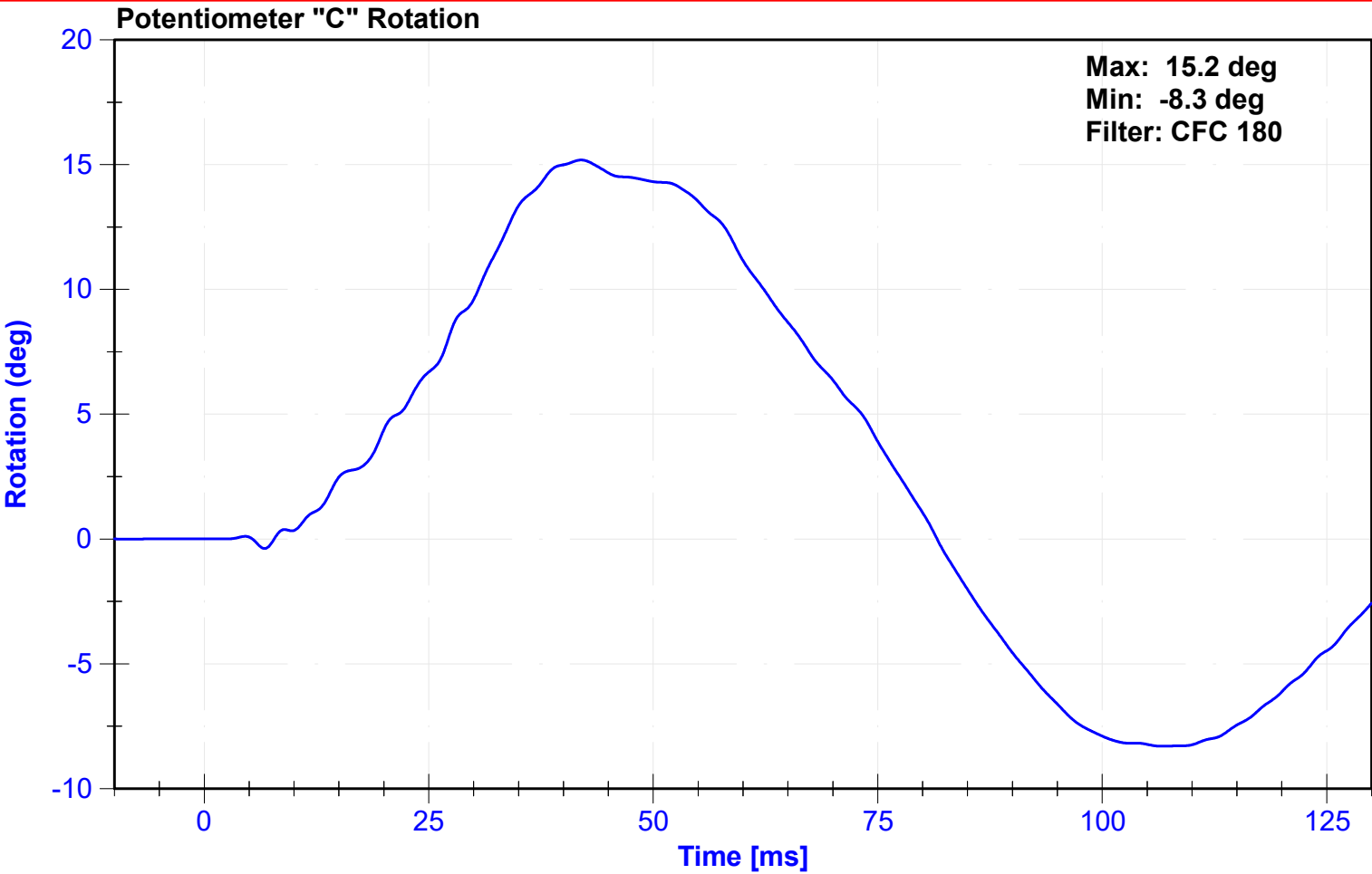
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16503	4/29/2024	10/26/2024
Pendulum "A" Potentiometer	Sfernice	2247	12/5/2023	12/4/2024
Condyle "B" Potentiometer	Sfernice	095	9/29/2023	9/28/2024



^{1,2} Upper and lower boundaries specified in Appendix I
IV-42





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. Rios
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

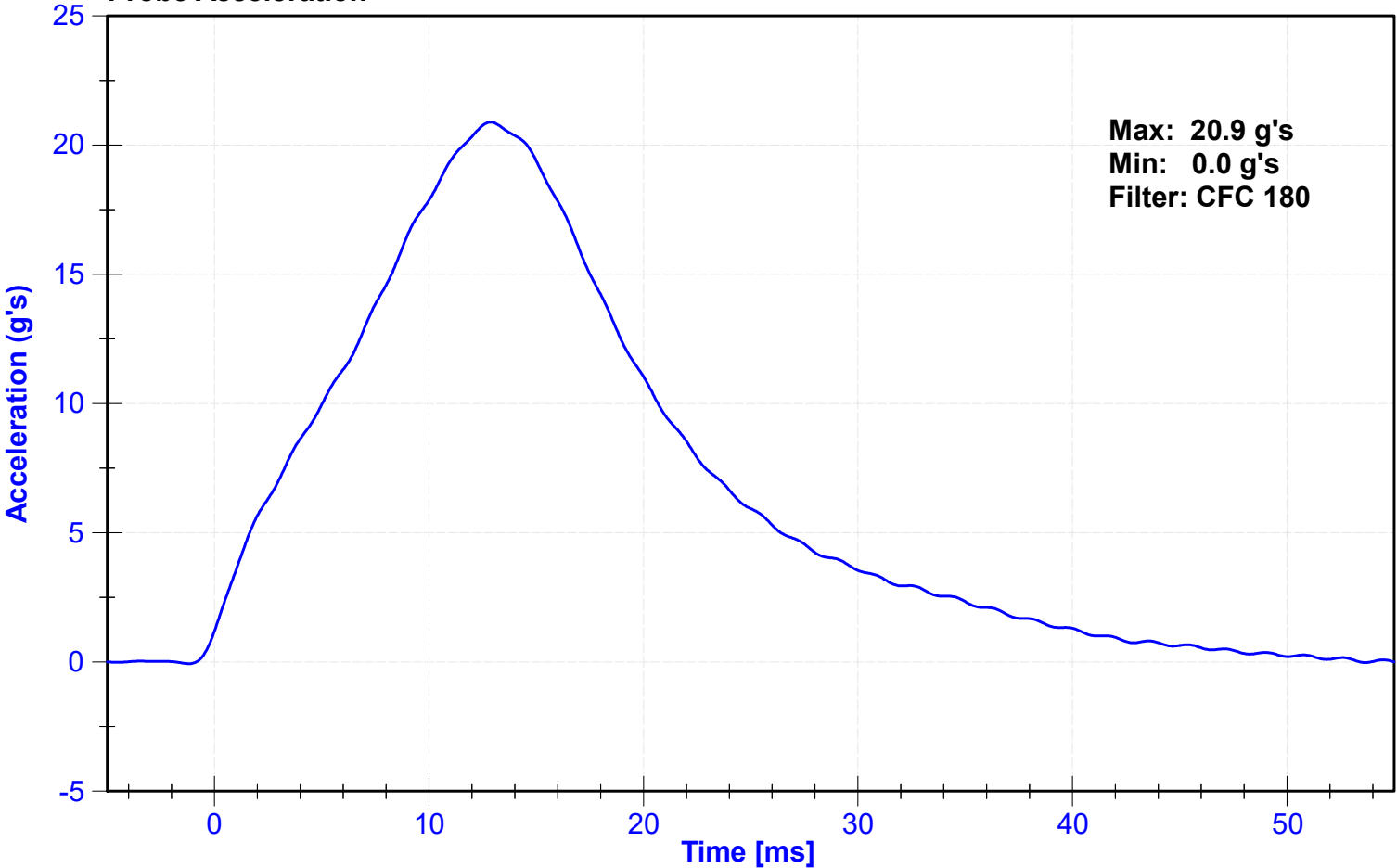
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	49	Pass
Velocity	4.2	4.4	m/s	4.26	Pass
Resistive Force	4700	5400	N	4784.2	Pass
Time at Peak Resistive Force	11.8	16.1	ms	12.85	Pass
Pubic Force	-1590	-1230	N	-1526.6	Pass
Time at Peak Pubic Force	12.2	17.0	ms	13.70	Pass

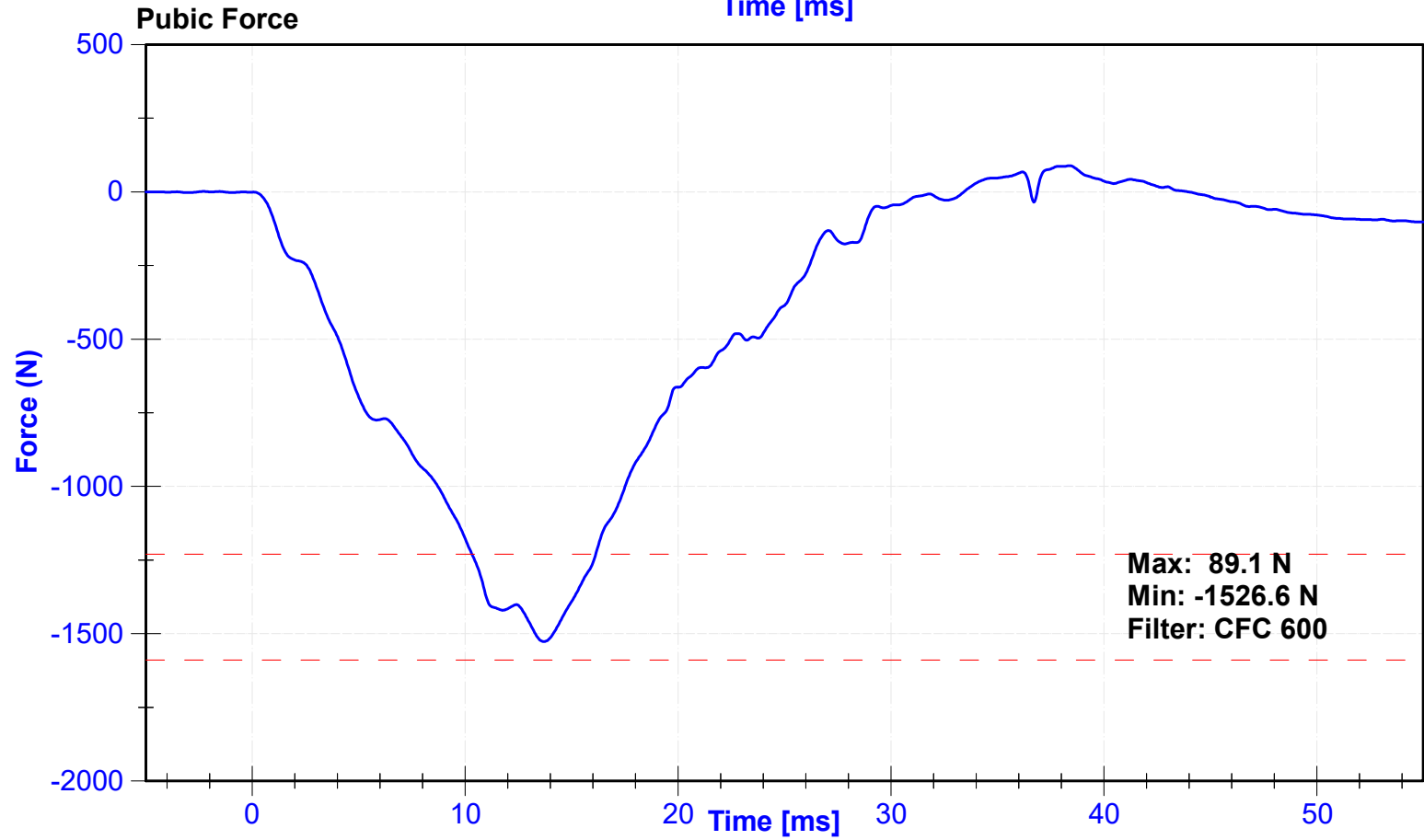
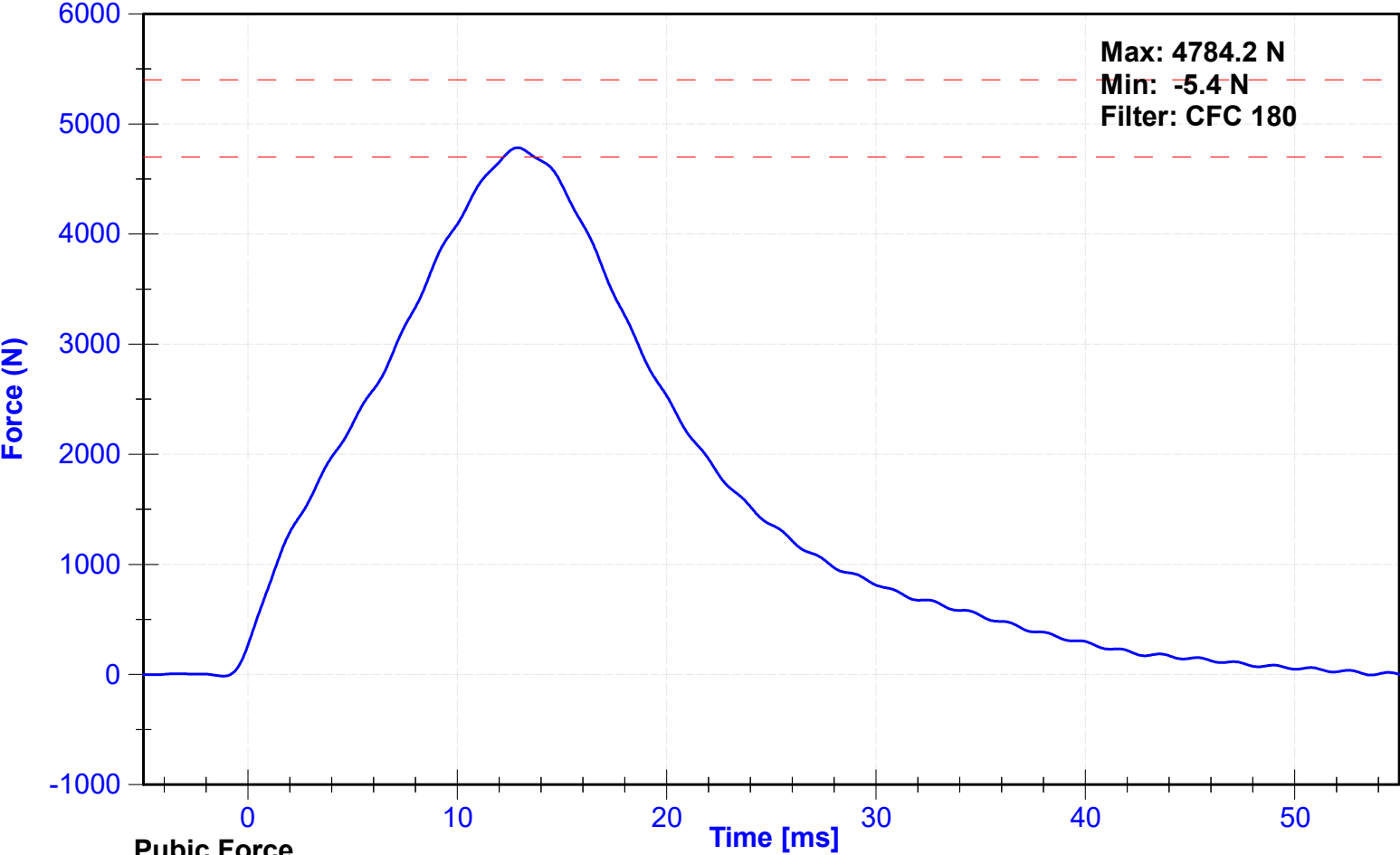
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18587	11/20/2023	11/19/2024
Pubic Load Cell	Denton	456-FY	8/8/2023	8/7/2024

Probe Acceleration



Resistive Force



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	02/01/2024
		Y	T22281	Endevco	02/01/2024
		Z	T26050	Endevco	02/01/2024
	Redundant	X	T21682	Endevco	02/01/2024
		Y	T25989	Endevco	02/01/2024
		Z	T25864	Endevco	02/01/2024
Thorax Rib Displacement Potentiometers	Upper	Y	0552-01	Honeywell	01/31/2024
	Middle	Y	807	Honeywell	01/31/2024
	Lower	Y	0552-03	Honeywell	01/31/2024
Abdomen Load Cells	Forward	Y	1440	Denton	08/08/2023
	Middle	Y	1525	Denton	08/08/2023
	Rear	Y	1528	Denton	08/08/2023
Lower Spine Accelerometers (T12)		X	P71278	Endevco	02/01/2024
		Y	18595	Endevco	04/04/2024
		Z	18509	Endevco	04/04/2024
Pubic Symphysis Load Cell		Y	456-FY	Denton	08/08/2023

Table 2 – Vehicle Instrumentation

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	A280366	Measurement Specialties	02/13/2024
Vehicle Center of Gravity	Y	A315922	Measurement Specialties	02/13/2024
Vehicle Center of Gravity	Z	A350985	Measurement Specialties	02/13/2024
Left Floor Sill	Y	G24592	Endevco	05/15/2024
A-Pillar Sill	Y	G23450	Endevco	04/04/2024
A-Pillar Low	Y	G24025	Endevco	02/19/2024
A-Pillar Mid	Y	G25033	Endevco	01/29/2024
B-Pillar Sill	Y	G22398	Endevco	02/19/2024
B-Pillar Low	Y	G25001	Endevco	01/29/2024
B-Pillar Mid	Y	G24629	Endevco	04/25/2024
Driver Seat	Y	G24992	Endevco	01/29/2024
Engine Top	X	A315020	Measurement Specialties	04/25/2024
Engine Top	Y	A315780	Measurement Specialties	04/25/2024
Firewall	Y	G22699	Endevco	04/09/2024
Right Roof	Y	G24321	Endevco	04/22/2024
Right Floor Sill	Y	G22836	Endevco	02/15/2024
Rear Floorpan	X	A370901	Measurement Specialties	02/14/2024
Rear Floorpan	Y	A370963	Measurement Specialties	02/16/2024