

REPORT NUMBER: 214P-CAL-25-003

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

**KIA Mexico, S.A DE C.V.
2025 KIA K4
4 Door Sedan**

NHTSA No: C20254205

**PREPARED BY:
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February 5, 2025

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**

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Date: February 5, 2025

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Date: February 5, 2025

FINAL REPORT ACCEPTANCE BY OVSC:

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16. Abstract A 31.00 km/h (19.3 mph), 75° oblique compliance test was conducted on the subject 2025 KIA K4 4 Door Sedan 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 January 10, 2025. The impact velocity of the vehicle was 30.97 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 251 mm located at level 3. The test vehicle's occupant performance data is as follows: <table border="1" data-bbox="194 1138 1443 1348"> <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>283.110</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>44</td> <td>24.868</td> </tr> <tr> <td>Total Abdominal Force</td> <td>N</td> <td>2500</td> <td>1163.361</td> </tr> <tr> <td>Pubic Symphysis Force</td> <td>N</td> <td>6000</td> <td>2217.696</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	283.110	Maximum Thoracic Rib Deflection	mm	44	24.868	Total Abdominal Force	N	2500	1163.361	Pubic Symphysis Force	N	6000	2217.696
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Pubic Symphysis Force	N	6000	2217.696																									
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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 KIA K4 4 Door Sedan. 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 KIA K4 4 Door Sedan. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 30.97 km/h. The test was conducted by Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on January 10, 2025. 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
- Pubic 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	283.110
Upper Rib Deflection	mm	44	21.543
Mid Rib Deflection	mm	44	21.306
Lower Rib Deflection	mm	44	24.868
Abdominal Load (front)	N		313.183
Abdominal Load (mid)	N		391.819
Abdominal Load (rear)	N		496.893
Total Abdominal Force	N	2500	1163.361
Pubic Symphysis Force	N	6000	2217.696

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: 2025 KIA K4 4 Door Sedan

NHTSA No.: C20254205

Test Facility: Calspan

Test Date: 01/10/2025

TEST VEHICLE INFORMATION AND OPTIONS

Make	KIA	Anti-Lock Brakes (ABS)	Yes
Model	K4	All-Wheel Drive (AWD)	No
Body Style	Sedan	Traction Control System (TCS)	Yes
VIN	3KPFT4DE1SE014403	Electric Stability Control (ECS)	Yes
Body Color	Snow White Pearl	Curtain Airbags	Yes
Engine Displacement (L)	2.0	Torso Airbags – Front Seats	Yes
Type / No. Cylinders	I4	Torso Airbags – Rear Seats	Yes
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	No
Final Drive	Front Wheel Drive	Knee Airbag – Front Passenger	No
Odometer Reading (mi)	43 miles	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	No
		Power Seats	No
		Other Safety Restraint	N/A

DATA FROM CERTIFICATION LABEL

Manufactured By	KIA MEXICO, S.A. DE C.V.	GVWR (kg)	1780
Date of Manufacture	08/24	GAWR Front (kg)	1071
Vehicle Type	Passenger Car	GAWR Rear (kg)	898

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)				340.2
Cargo Weight (RCLW) (kg)				44.8

DATA SHEET NO. 2 VEHICLE TIRE INFORMATION

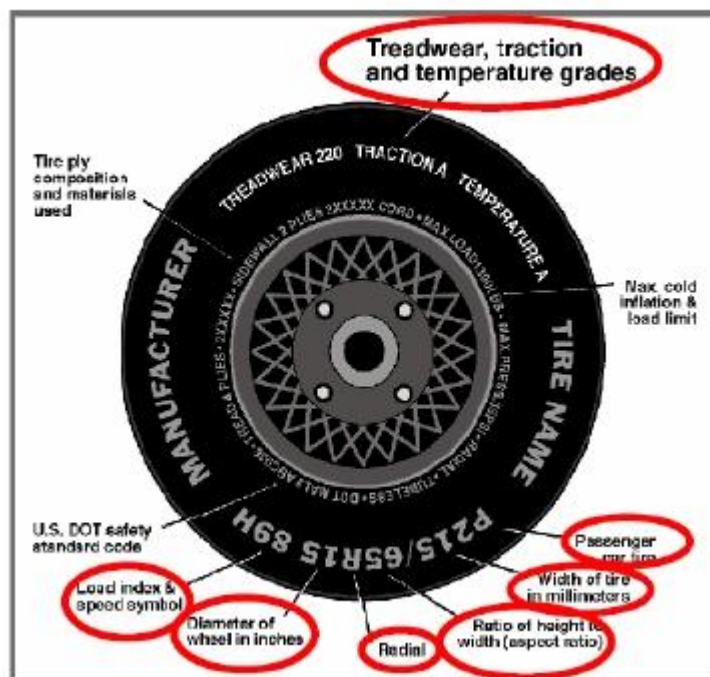
Test Vehicle: 2025 KIA K4 4 Door Sedan

NHTSA No.: C20254205

Test Facility: Calspan

Test Date: 01/10/2025

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)	250	230
Recommended Tire Size	205/55R16	205/55R16
Tire Sidewall	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Tire Size on Vehicle	205/55R16	205/55R16
Tire Manufacturer Model	Kumho	Kumho
Tire Name	Solus TA51	Solus TA51
Tire Type	All Season	All Season
Tire Width	205	205
Aspect Ratio	55	55
Radial	Yes	Yes
Wheel Diameter	16"	16"
Load Index / Speed Symbol	91H	91H
Treadwear	500	500
Traction Grade	A	A
Temperature Grades	A	A

DATA SHEET NO. 3
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2025 KIA K4 4 Door Sedan
Test Facility: Calspan

NHTSA No.: C20254205
Test Date: 01/10/2025

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	240	240	222	224
Tire Placard	kPa	250	250	230	230

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			Fully Loaded			As Tested		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	408	270		437	325		436	308	
Right	kg	415	255		424	287		437	286	
Ratio	%	61.1	38.9		58.5	41.5		59.5	40.5	
Totals	kg	823	525	1348	861	612	1473	873	594	1467

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1348	(A)
Weight of Test Dummy	kg	81	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	44.8	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1473.8	(A+B+C)

TEST VEHICLE ATTITUDES AND CG

Measurement Description	Units	As Delivered	Fully Loaded	As Tested
Driver Door Sill Angle	Deg	-0.65	-0.45	-0.50
Front Passenger Sill Angle	Deg	-0.55	-0.50	-0.50
Front Bumper-Line Angle	Deg	+0.15	-0.20	-0.10
Rear Bumper-Line Angle	Deg	+0.15	-0.05	+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	2720
Vertical Impact Reference Line Aft of Front Axle	mm	1309

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Trunk Carpeting	4
Spare Tire	10
Jack	3
Passenger Rear Window	3
Ballast (if any)	5

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

Test Vehicle: 2025 KIA K4 4 Door Sedan
Test Facility: Calspan

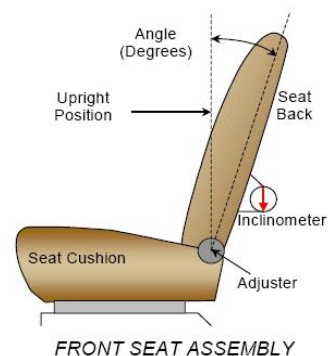
NHTSA No.: C20254205
Test Date: 01/10/2025

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	Degrees	-3.0
Front Passenger Seat	Degrees	-3.0

*Seatback measurement was taken on headrest post.



SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	SCRP Height Position	SCRP Height (mm)		
			Rearmost	Mid-Fore / Aft	Forward-Most
Driver Seat	14.4	Max	-	-	-
		Mid	-	-	-
		Min	10	21	30
Front Passenger Seat	14.8	Max	-	-	-
		Mid	-	-	-
		Min	12	22	31

SEAT FORE / AFT POSITION

Seat	Total Fore / Aft Travel		Placed in Position #	
	mm	Detents*	mm	Detents*
Driver Seat	260	41 (0-40)	130	20
Front Passenger Seat	260	41 (0-40)	130	20

SEAT BELT ANCHORAGE ADJUSTMENT

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

HEAD RESTRAINT ADJUSTMENT

Seat	Total # of Positions	Placed in Position #
Driver Seat	5 (0-4)	Uppermost

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

Test Vehicle: 2025 KIA K4 4 Door Sedan
 Test Facility: Calspan

NHTSA No.: C20254205
 Test Date: 01/10/2025

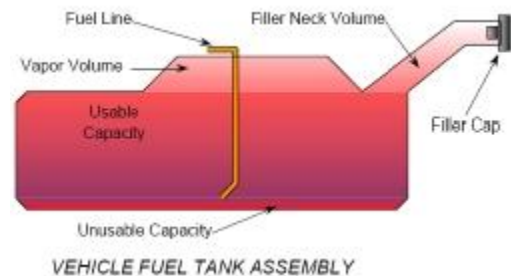
FUEL TANK CAPACITY DATA

Description	Liters
Usable Capacity of (Form No.1)	47.0
Usable Capacity of (Owner's Manual)	47.0
92 - 94% of Usable Capacity	43.24 - 44.18
Actual Amount of Solvent Used in Test	43.7

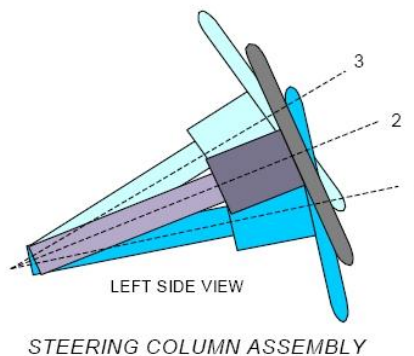
FUEL PUMP

Describe the operation of the fuel pump.

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



STEERING COLUMN POSITIONS

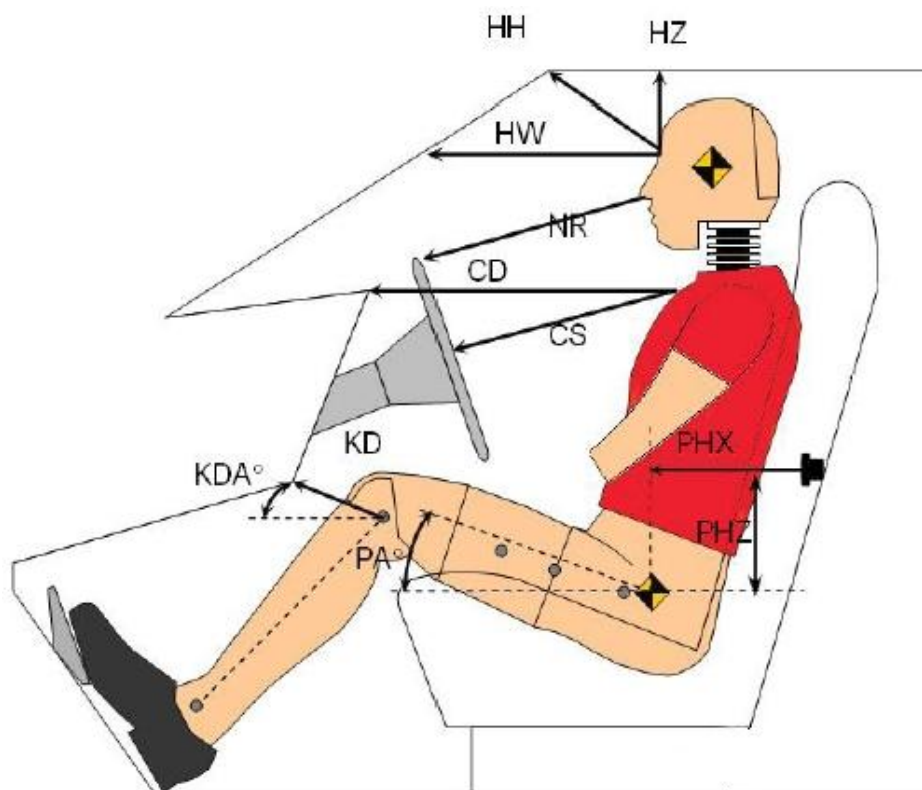


	Degrees	Fore / Aft Position (mm)
Lowermost - Position No. 1	17.6	
Geometric center - Position No. 2	20.4	
Uppermost - Position No. 3	23.1	
Telescoping Steering Wheel Travel		50
Test Position	20.4	25

DATA SHEET NO. 6
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2025 KIA K4 4 Door Sedan
 Test Facility: Calspan

NHTSA No.: C20254205
 Test Date: 01/10/2025



Left Side View

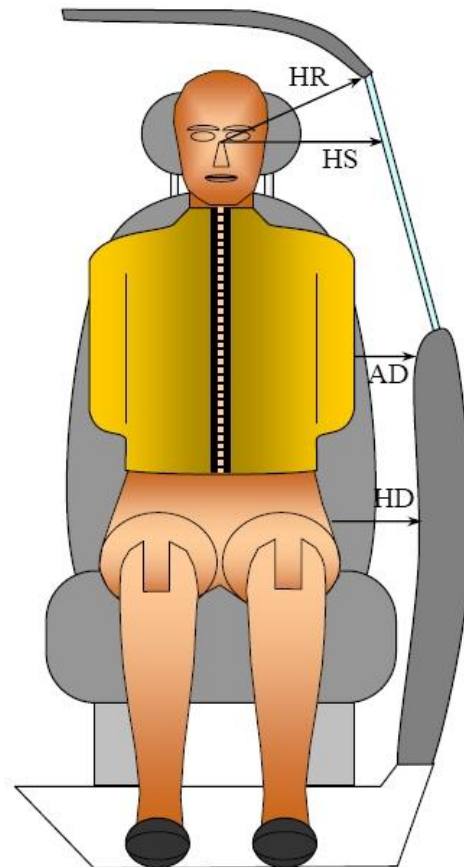
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Description	Driver	
		Length (mm)	Angle (°)
HH	Head to Header	375	
HW	Head to Windshield	621	
HZ	Head to Roof Liner	160	
NR	Nose to Rim	469	
CD	Chest to Dash	633	
CS	Chest to Steering Wheel	388	
KD(L) / KDA(L)°	Left Knee to Dash	211	38.8
KD(R) / KDA(R)°	Right Knee to Dash	203	23.1
PAX°	Pelvic Tilt Angle (X-Axis)		24.2
PAY°	Pelvic Tilt Angle (Y-Axis)		-1.8
PHX	Hip Point to Striker (X-Axis)	167	
PHZ	Hip Point to Striker (Z-Axis)	243	

DATA SHEET NO. 7
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2025 KIA K4 4 Door Sedan
Test Facility: Calspan

NHTSA No.: C20254205
Test Date: 01/10/2025



FRONT VIEW OF DUMMY

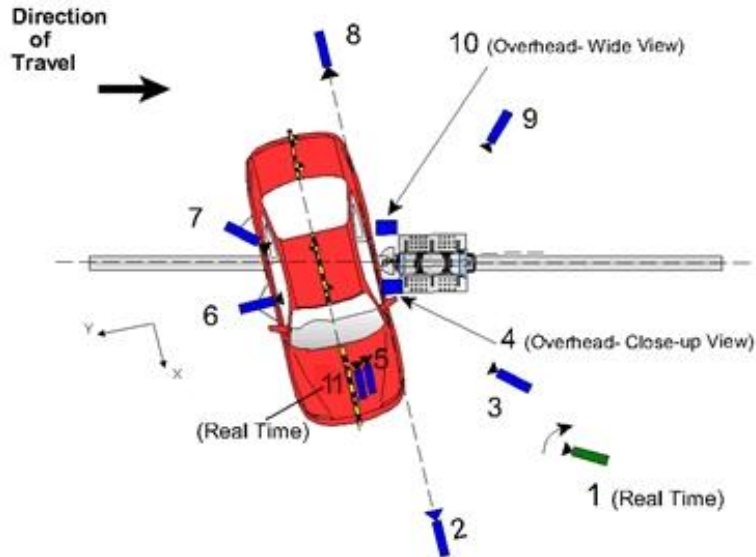
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver
HR	Head to Side Header	mm	203
HS	Head to Side Window	mm	338
AD	Arm to Door	mm	110
HD	H-Point to Door	mm	146

DATA SHEET NO. 8 LOCATION OF CAMERA

Test Vehicle: 2025 KIA K4 4 Door Sedan
Test Facility: Calspan

NHTSA No.: C20254205
Test Date: 01/10/2025



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	0	6700	-1550	28	1000
3	Impact side 45° - forward pole view	1050	4629	-1580	24	1000
4	Overhead Close-up view of impact	0	0	-9200	24	1000
5	Onboard - dummy front view				25	1000
6	Onboard - dummy side view				12.5	1000
7	Onboard - dummy rear oblique view				12.5	1000
8	Rear ground level - impact view	0	-7800	-1500	28	1000
9	Impact side 45° - rearward pole view	3865	-4060	-1500	24	1000
10	Overhead wide - view of impact	0	0	-9200	16	1000

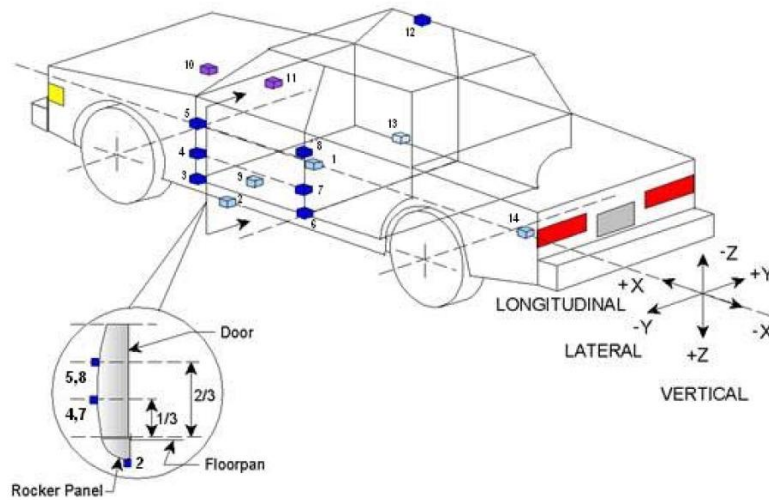
Notes: Reference - From Point of Impact for X and Y; from Ground for Z
+X = Forward of vehicle, +Y = Right of vehicle, +Z = Down

* 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 KIA K4 4 Door Sedan
 Test Facility: Calspan

NHTSA No.: C20254205
 Test Date: 01/10/2025



TEST VEHICLE ACCELEROMETER LOCATIONS

No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2752	-7	34
2	Left Floor Sill	2899	-669	308
3	A-Pillar Sill	3306	-633	319
4	A-Pillar Low	3390	-629	118
5	A-Pillar Mid	3180	-667	-345
6	B-Pillar Sill	2000	-671	296
7	B-Pillar Low	2232	-675	72
8	B-Pillar Mid	2215	-660	-343
9	Seat	2516	-554	343
10	Engine	4019	182	-201
11	Firewall	3727	21	-228
12	Roof	2528	642	-730
13	Right Floor Sill	2886	666	308
14	Rear Deck	1212	2	105

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 KIA K4
Test Facility: Calspan

NHTSA No.: C20254205
Test Date: 01/10/2025

Loc. No	Description	Axes	Units	Positive Direction		Negative Direction	
				Max	Time (ms)	Max	Time (ms)
1	Vehicle CG	X	g	4.83	23.20	-12.73	31.65
	Vehicle CG	Y	g	32.23	51.65	-2.38	150.15
	Vehicle CG	Z	g	18.02	34.50	-18.58	25.30
	Vehicle CG Resultant	N/A	g	33.32	51.50	0.05	273.85
2	Floor Sill (Left)	Y	g	102.29	17.05	-56.10	30.80
3	A Pillar Sill	Y	g	77.76	39.80	-52.52	34.40
4	A Pillar Low	Y	g	36.55	17.90	-13.75	32.60
5	A Pillar Mid	Y	g	34.34	23.25	-8.46	28.25
6	B Pillar Sill	Y	g	117.87	29.95	-119.87	33.30
7	B Pillar Low	Y	g	75.86	18.90	-46.07	26.80
8	B Pillar Mid	Y	g	52.90	44.00	-49.49	15.55
9	Seat	Y	g	61.35	33.55	-26.22	20.20
10	Engine Top	X	g	12.00	87.05	-15.55	36.20
	Engine Top	Y	g	16.19	36.05	-7.21	173.85
11	Firewall	Y	g	17.45	44.50	-1.41	33.00
12	Roof	Y	g	36.63	42.00	-3.71	60.80
13	Floor Sill (Right)	Y	g	27.99	48.15	-1.97	147.40
14	Rear Deck	X	g	5.18	31.85	-9.30	36.70
	Rear Deck	Y	g	25.81	50.00	-1.56	130.20

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

Test Vehicle: 2025 KIA K4

NHTSA No.: C20254205

Test Facility: Calspan

Test Date: 01/10/2025

Dummy Serial No. D037

Description	Axes	Positive Direction		Negative Direction	
		MAX	TIME (ms)	MAX	TIME (ms)
HEAD ACCELERATION (g)					
Longitudinal	X	6.99	97.05	-21.44	61.20
Lateral	Y	48.78	51.80	-12.92	89.95
Vertical	Z	8.72	39.10	-7.82	69.65
Resultant	N/A	51.20	51.80		
HIC36 (t1, t2)	N/A	283.11		t1 = 43.25	t2 = 68.55
THORAX DEFLECTION (mm)					
Upper Rib	Y	21.54	53.50	-6.03	86.65
Middle Rib	Y	21.31	52.55	-4.19	87.40
Lower Rib	Y	24.87	54.90	-0.51	18.80
ABDOMINAL FORCES (N)					
Front	Y	313.18	53.85	-27.18	16.90
Middle	Y	391.82	52.60	-10.95	112.15
Rear	Y	496.89	43.70	-8.47	115.70
SUM	N/A	1163.36	52.70		
PELVIS FORCES (N)					
Pubic Symphysis	Y	113.91	123.10	-2217.70	53.55

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

DATA SHEET NO. 12
POST-TEST OBSERVATIONS

Test Vehicle: 2025 KIA K4 4 Door Sedan
Test Facility: Calspan

NHTSA No.: C20254205
Test Date: 01/10/2025

IMPACT POINT DATA

Measured Parameter	Units	Value
Vertical Impact Ref Line - Aft of Front Axle, Intended Impact Pt	mm	1309
Actual Impact Point - Aft of Front Axle	mm	1317
Difference	mm	8

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Driver Seat Dummy (ES2-re)
Head Contact	Curtain Airbag, Side Header & Head Restraint
Upper Torso Contact	Torso/Pelvis Airbag & Seat Back
Lower Torso Contact	Torso/Pelvis Airbag & Seat Back
Left Knee Contact	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	Separation near impact zone
Windshield Damage	Cracked throughout
Side Window Damage	Driver window shattered
Other Notable Effects	None

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

Test Vehicle: 2025 KIA K4 4 Door Sedan
 Test Facility: Calspan

NHTSA No.: C20254205
 Test Date: 01/10/2025

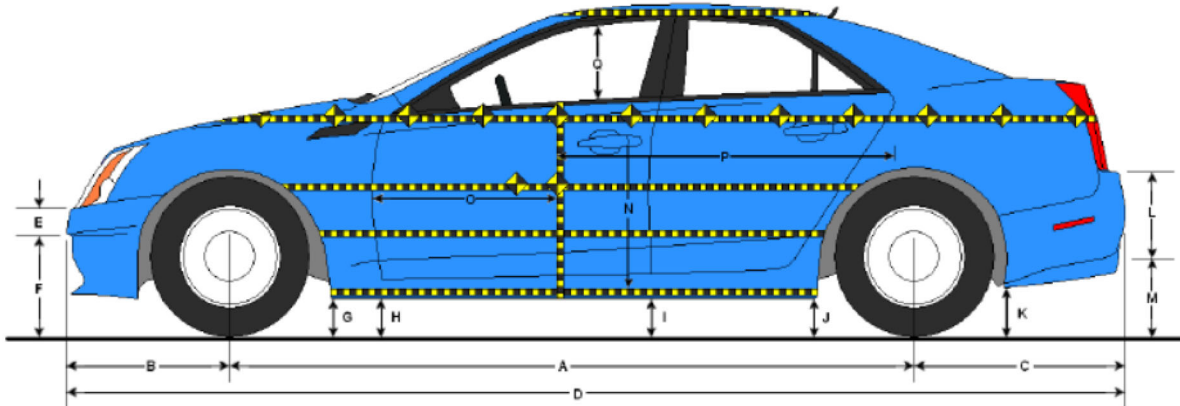
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

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

Test Vehicle: 2025 KIA K4 4 Door Sedan
 Test Facility: Calspan

NHTSA No.: C20254205
 Test Date: 01/10/2025



LEFT SIDE VIEW

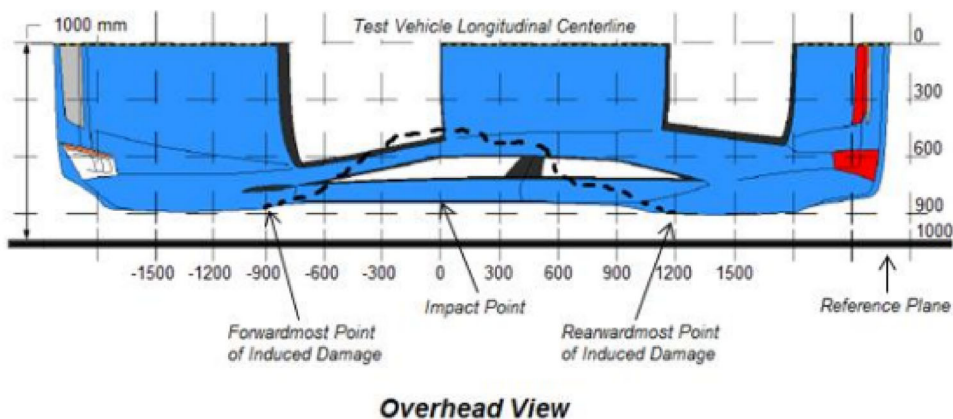
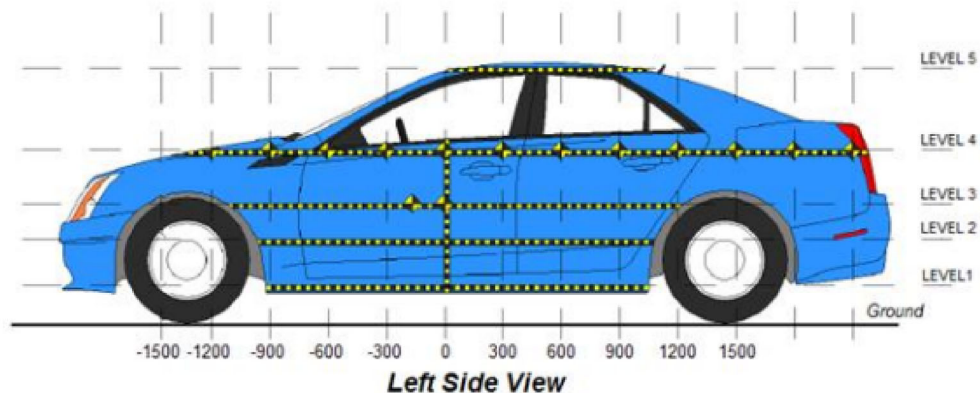
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

No.	Measurement Description	Pre-Test	Post-Test	Difference
A	Vehicle Wheelbase	2720	2708	-12
B	Front Axle to FSOV	900	915	15
C	Rear Axle to RSOV	1093	1084	-9
D	Total Vehicle Length at Centerline	4713	4707	-6
E	Front Bumper Thickness	95	95	0
F	Front Bumper Bottom to Ground	454	474	20
G	Sill Height at Front Wheel Well	157	155	-2
H	Sill Height at Front Door Leading Edge	163	157	-6
I	Sill Height at B Pillar	168	145	-23
J1	Sill Height at Rear Wheel Well	177	193	16
J2	Pinch Weld Height at Rear Wheel Well	156	164	8
K	Sill Height Aft of Rear Wheel Well	212	230	18
L	Rear Bumper Thickness	165	165	0
M	Rear Bumper Bottom to Ground	397	407	10
N	Sill Height to Window Bottom Sill	691	693	2
O	Front Door Leading Edge to Impact CL	841	809	-32
P	Rear Door Trailing Edge to Impact CL	1358	1320	-38
Q	Front Window Opening	378	369	-9
R	Right Side Length	4646	4646	1
S	Left Side Length	4647	4633	-14
T	Vehicle Width at B-Pillars	1812	1731	-81

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

Test Vehicle: 2025 KIA K4 4 Door Sedan
 Test Facility: Calspan

NHTSA No.: C20254205
 Test Date: 01/10/2025



MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	313	213	0
2	Occupant H-Point	mm	487	235	0
3	Mid-Door	mm	610	251	0
4	Window Sill	mm	898	210	0
5	Window Top	mm	1350	36	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 KIA K4 4 Door Sedan

NHTSA No.: C20254205

Test Facility: Calspan

Test Date: 01/10/2025

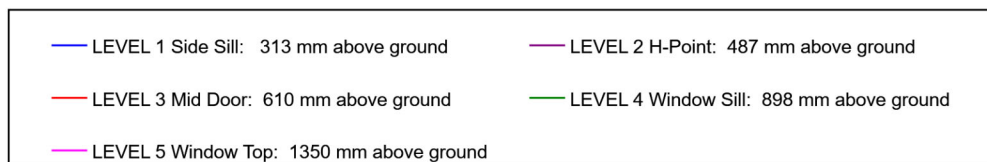
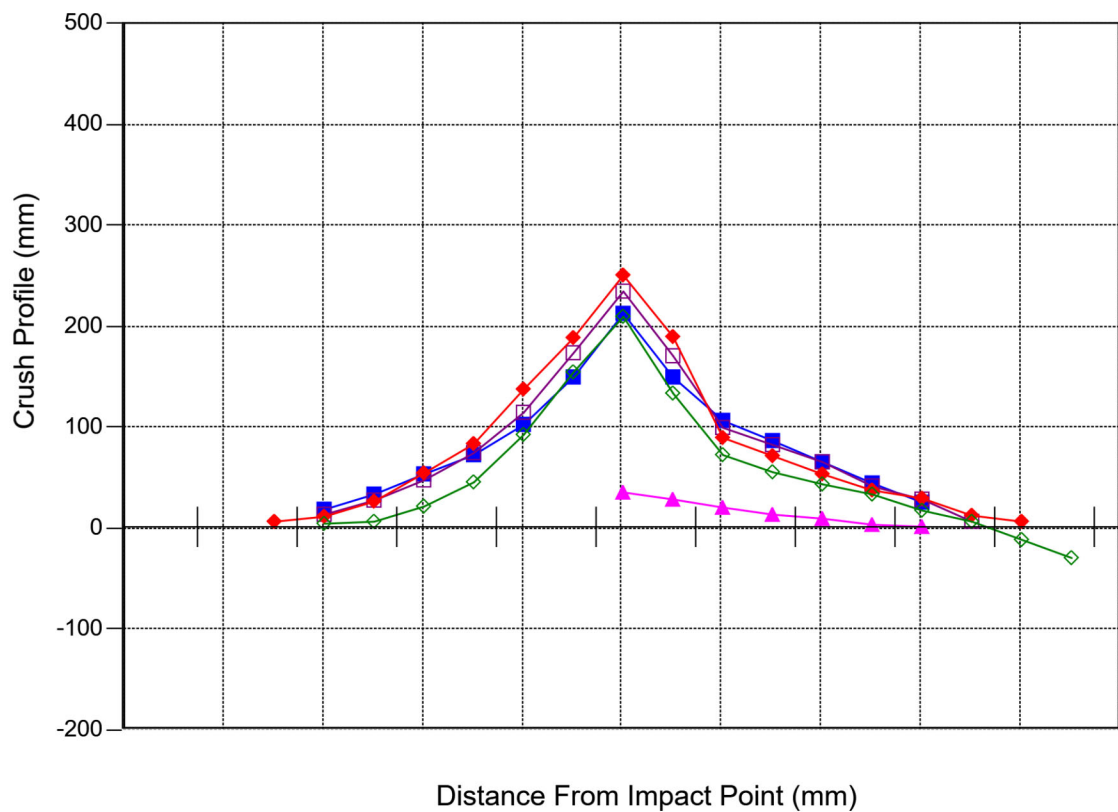
EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1500															
-1350															
-1200															
-1050			907					900					7		
-900	890	905	910	818		871	891	898	813		19	14	12	5	
-750	884	900	906	827		850	872	879	820		34	28	27	7	
-600	871	894	905	835		817	846	850	813		54	48	55	22	
-450	873	894	907	843		800	819	823	797		73	75	84	46	
-300	876	895	908	849		773	780	770	756		103	115	138	93	
-150	878	895	908	853		728	721	719	698		150	174	189	155	
0	879	895	907	856	618	666	660	656	646	582	213	235	251	210	36
150	879	893	906	857	621	729	722	716	723	592	150	171	190	134	29
300	877	890	903	857	620	770	790	813	784	599	107	100	90	73	21
450	876	886	898	854	614	789	803	826	798	600	87	83	72	56	14
600	872	882	893	850	605	806	816	839	806	595	66	66	54	44	10
750	871	881	890	848	586	826	839	852	814	582	45	42	38	34	4
900	879	894	898	854	564	853	865	868	836	562	26	29	30	18	2
1050		909	909	864			902	896	857			7	13	7	
1200			909	872				902	883				7	-11	
1350				876					905					-29	
1500															

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

Test Vehicle: 2025 KIA K4 4 Door Sedan
 Test Facility: Calspan

NHTSA No.: C20254205
 Test Date: 01/10/2025

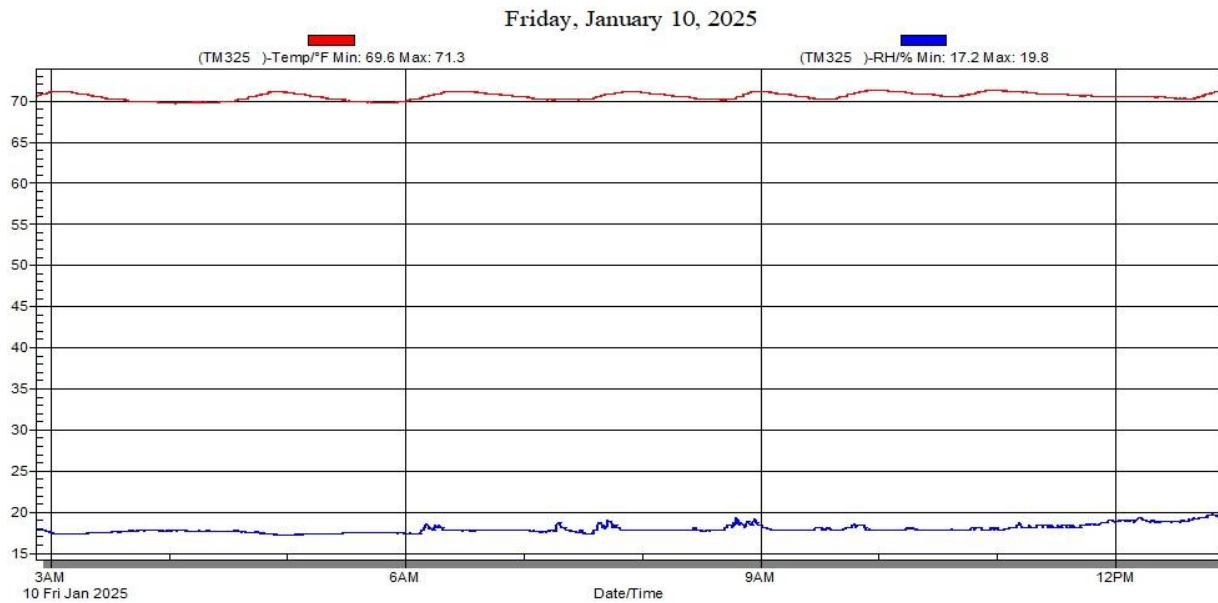


Vehicle Exterior Crush Measurements - Visual Representation

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

Test Vehicle: 2025 KIA K4 4 Door Sedan
Test Facility: Calspan

NHTSA No.: C20254205
Test Date: 01/10/2025



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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15	Pre-Test Dummy with Door Open	I-10
16	Pre-Test Dummy Shoulder and Door Top View	I-10
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21	Post-Test Impact Zone Close-Up View	I-13
22	Post-Test $\frac{3}{4}$ Front View of Impact Zone	I-13
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24	Post-Test Close-Up View of Impact Point Target	I-14
25	Close-Up View of Vehicle's Certification Label	I-15
26	Close-Up View of Vehicle's Tire Placard Label	I-15

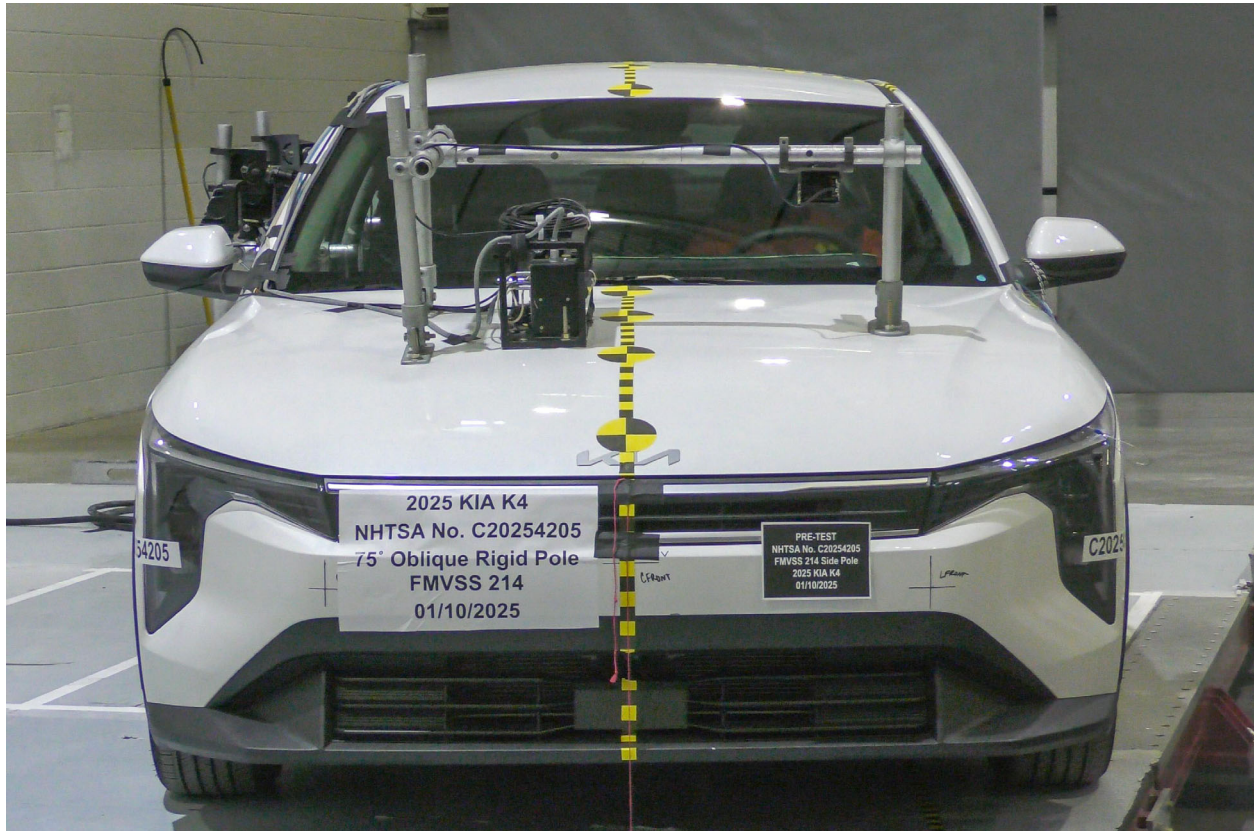


Figure A-1: Pre-Test Frontal View of Test Vehicle

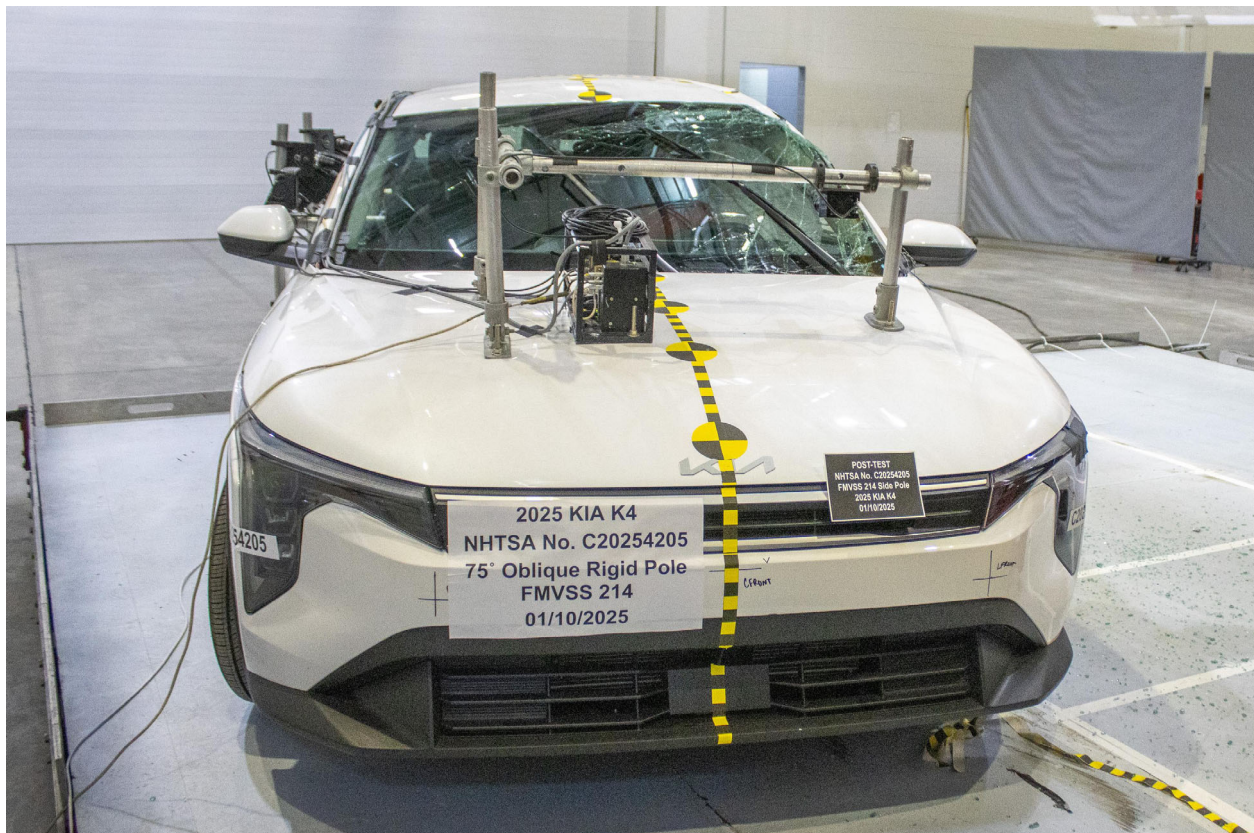


Figure A-2: Post Test Frontal View of Test Vehicle



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

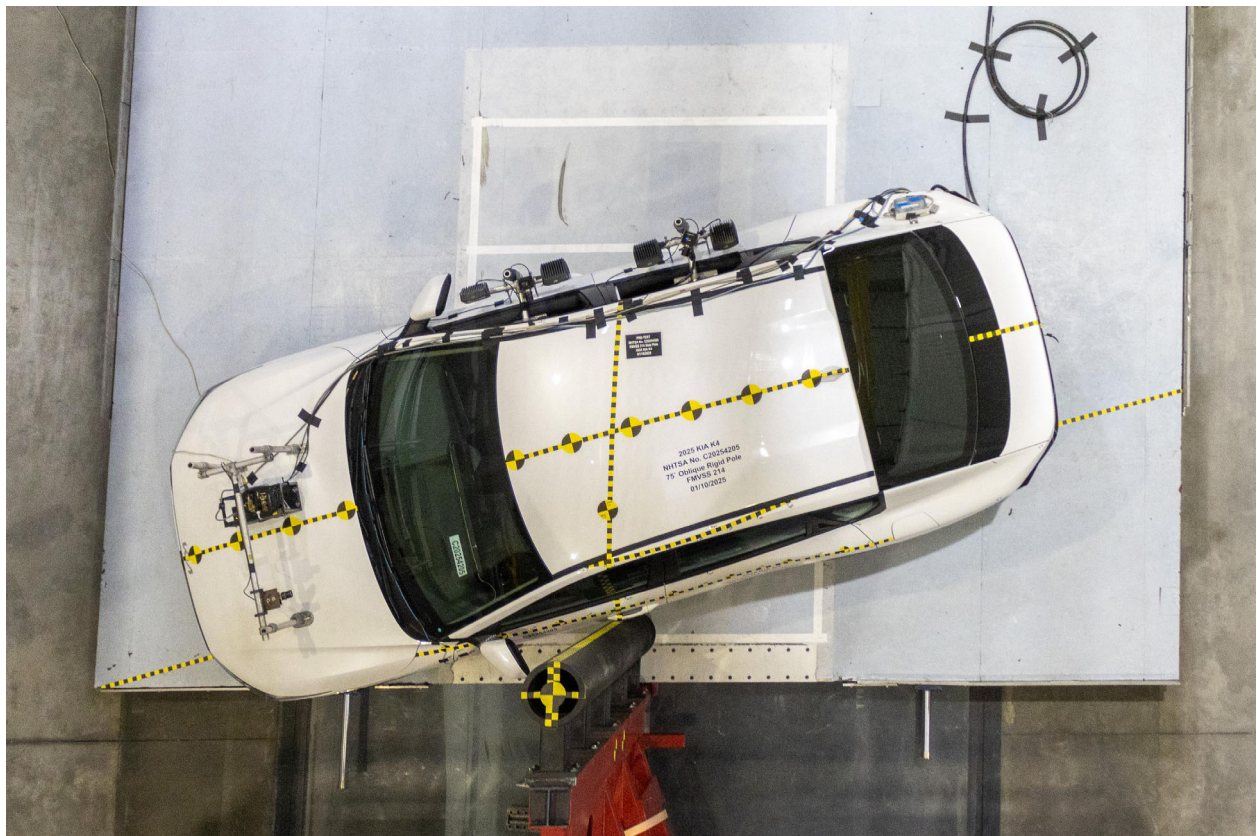


Figure A-9: Pre-Test Overhead View of Test Vehicle

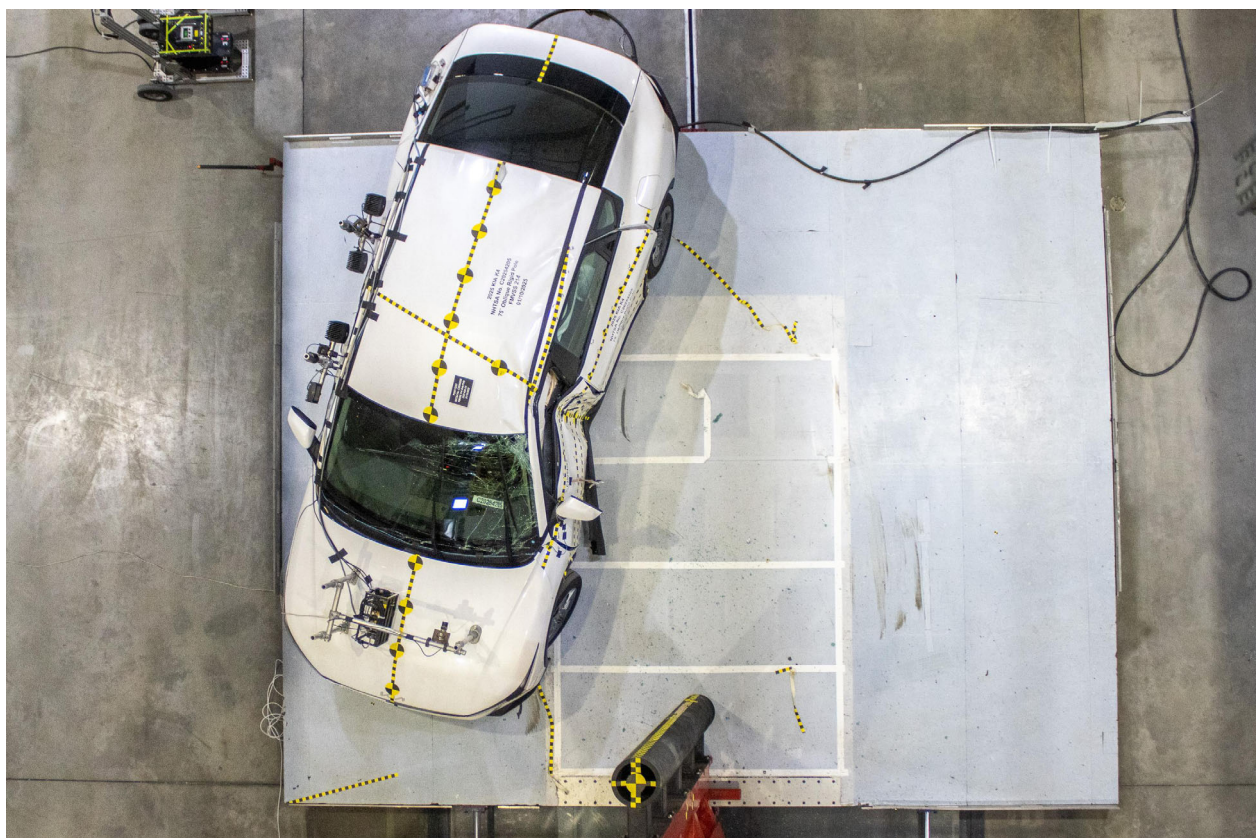


Figure A-10: Post-Test Overhead View of Test Vehicle



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 $\frac{3}{4}$ 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

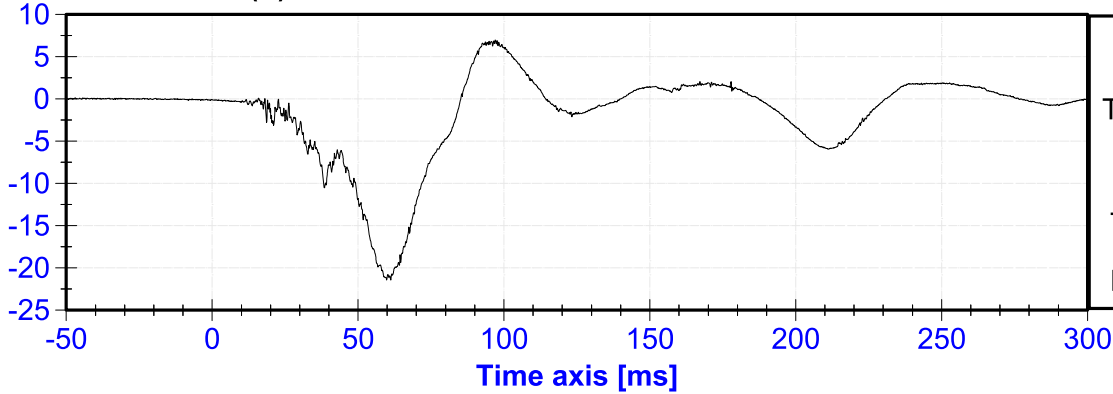
ES-2re DUMMY RESPONSE DATA TRACES

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1	ES-2re Head (X) Acceleration vs. Time	II-3
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4	ES-2re Head Resultant Acceleration vs. Time	II-3
5	ES-2re Head (X) Velocity vs. Time	II-4
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7	ES-2re Head (Z) Velocity vs. Time	II-4
8	ES-2re Upper Thorax Rib Deflection Rate vs. Time	II-4
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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

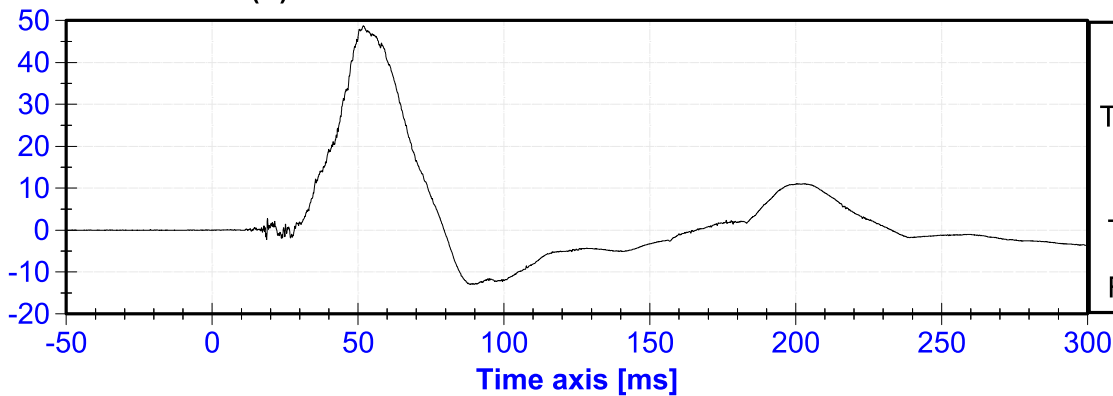
ACCELERATION [g's]

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



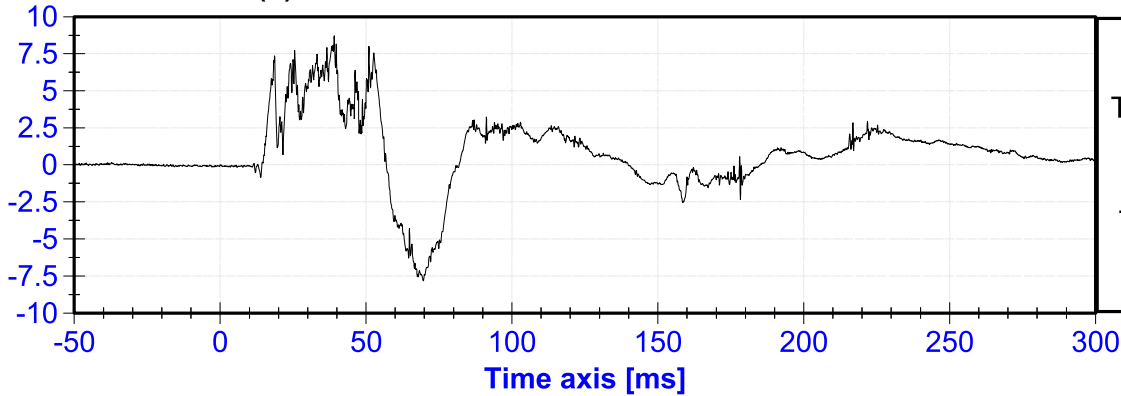
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ES-2re Head (Y) Acceleration vs. Time



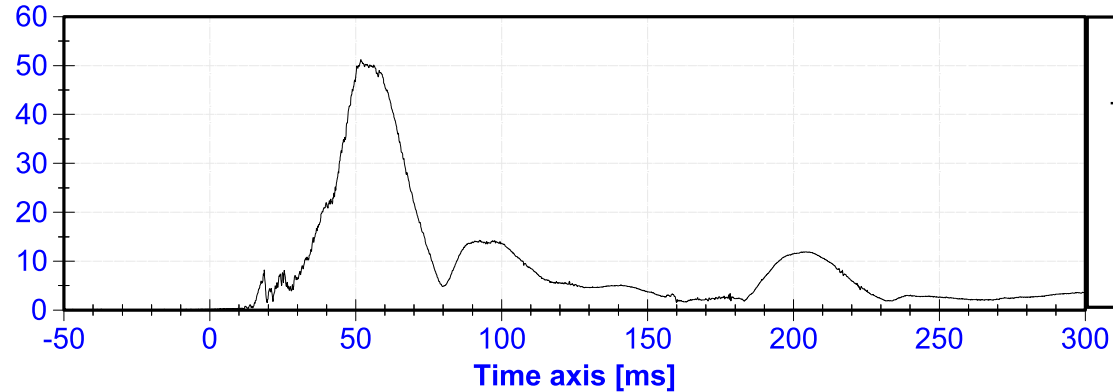
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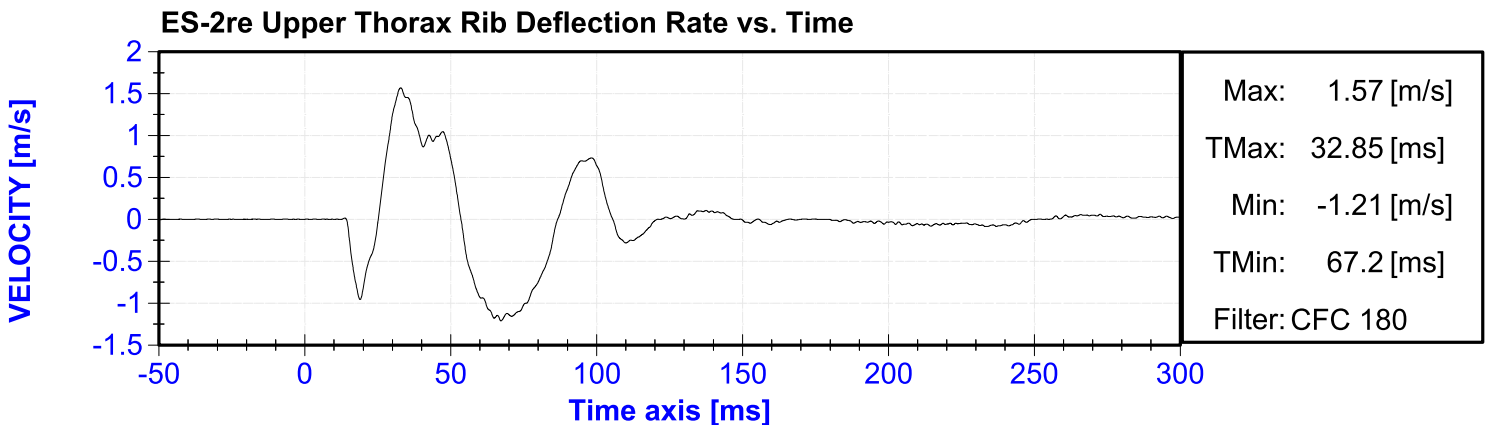
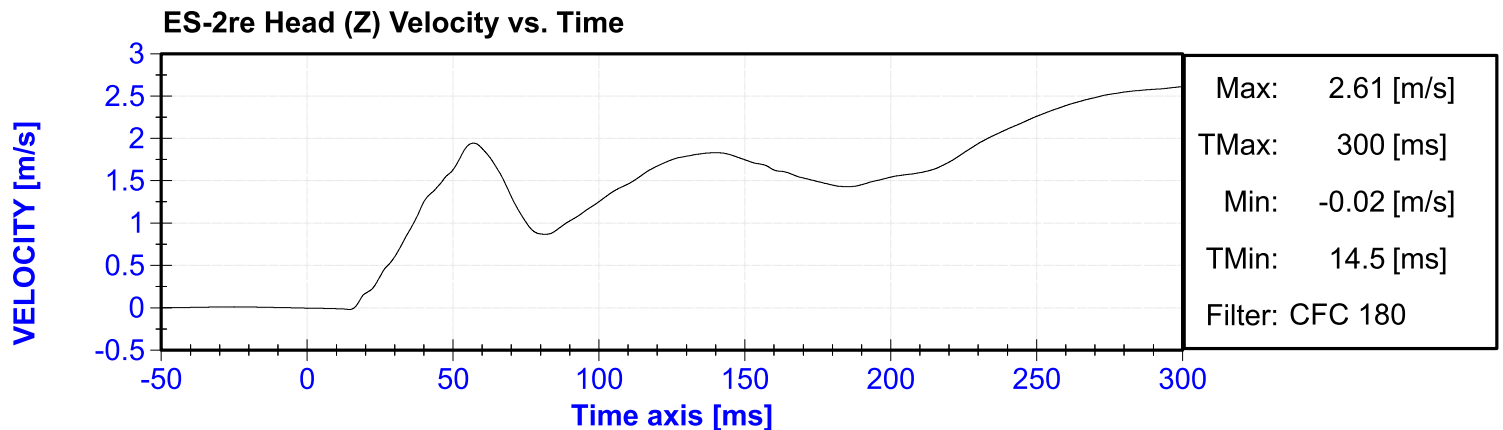
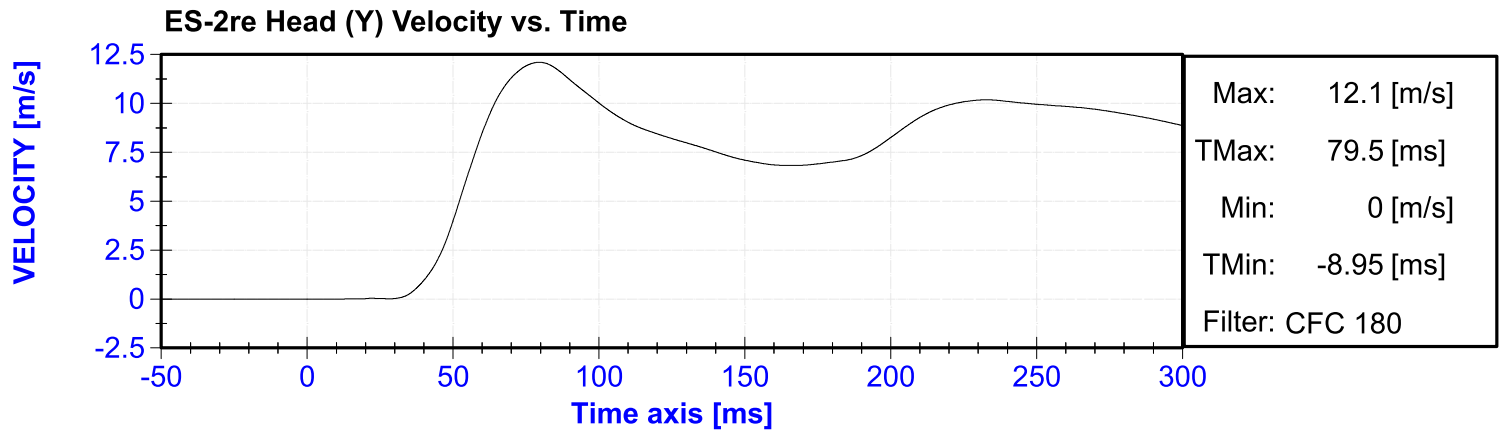
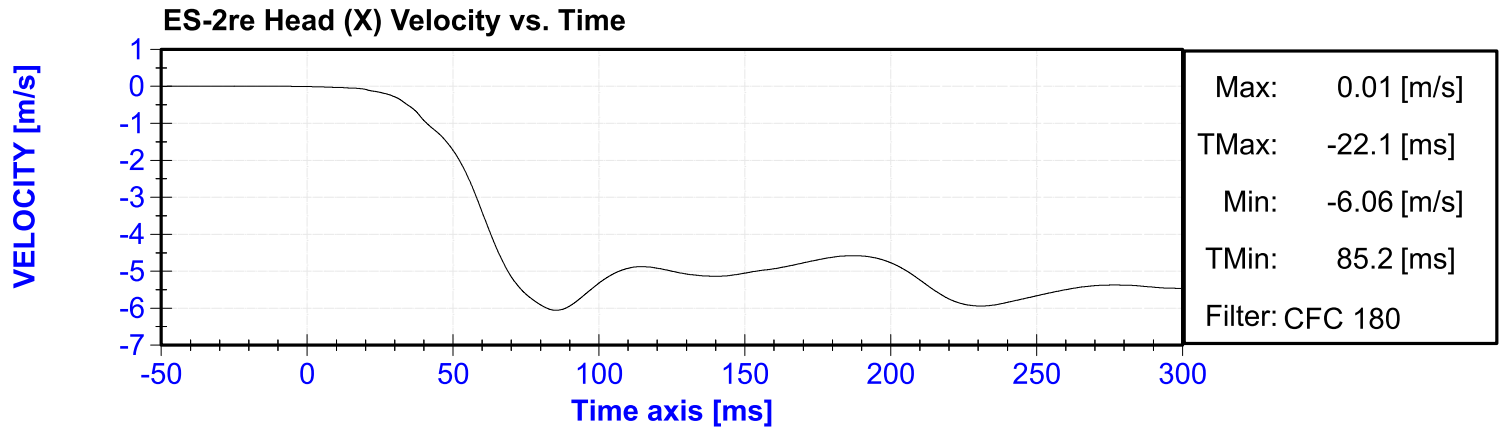
ES-2re Head (Z) Acceleration vs. Time

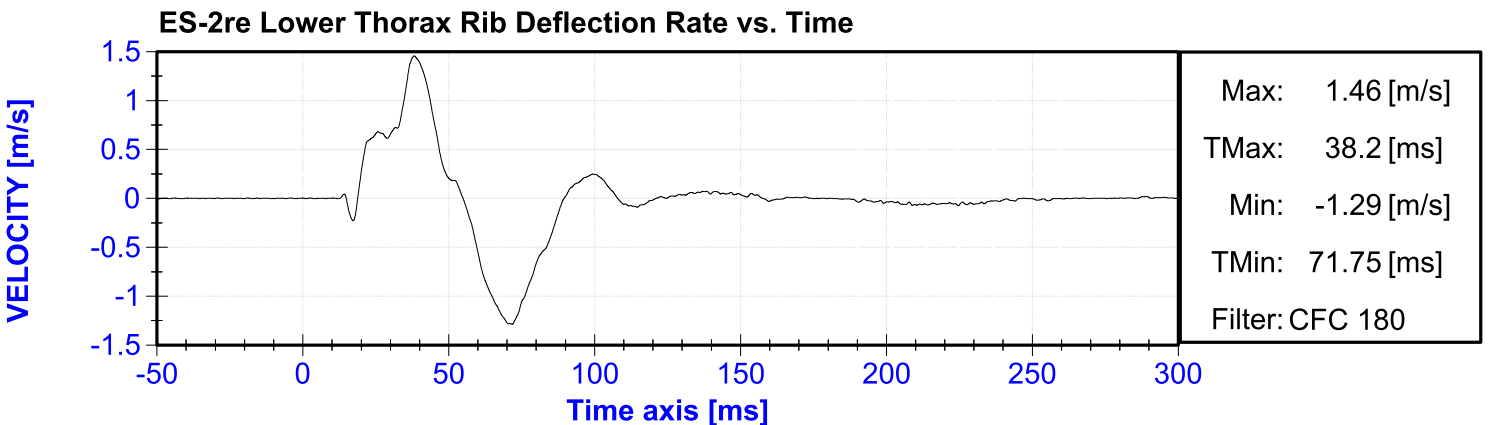
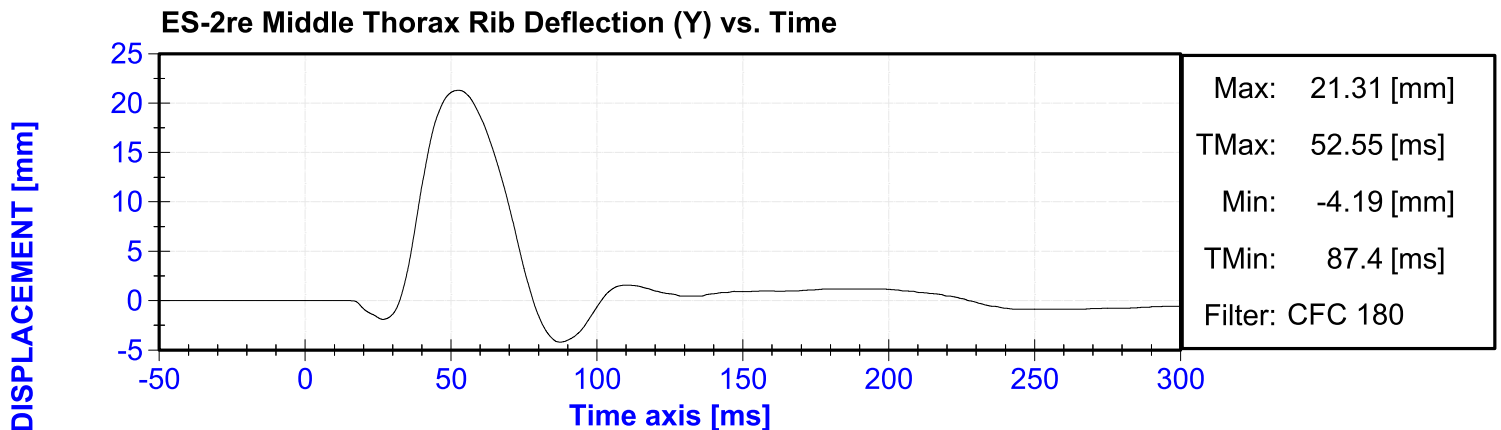
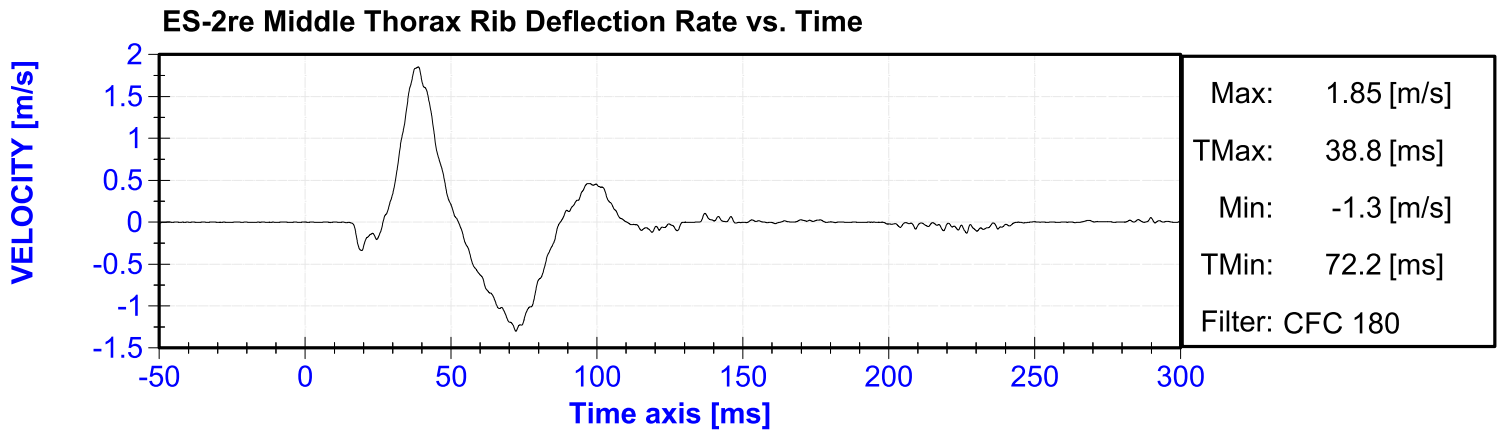
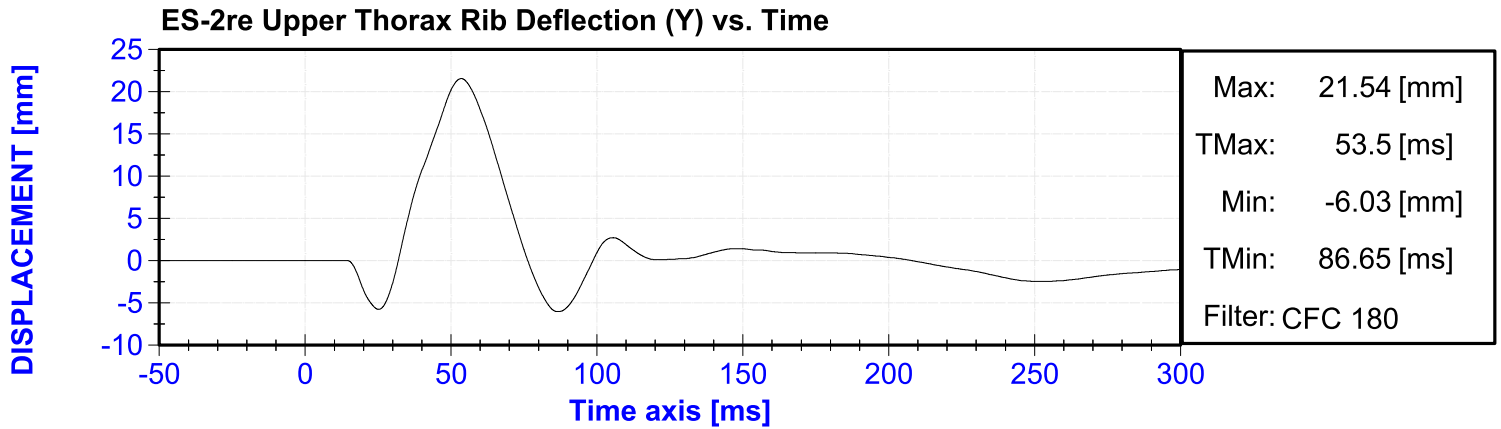


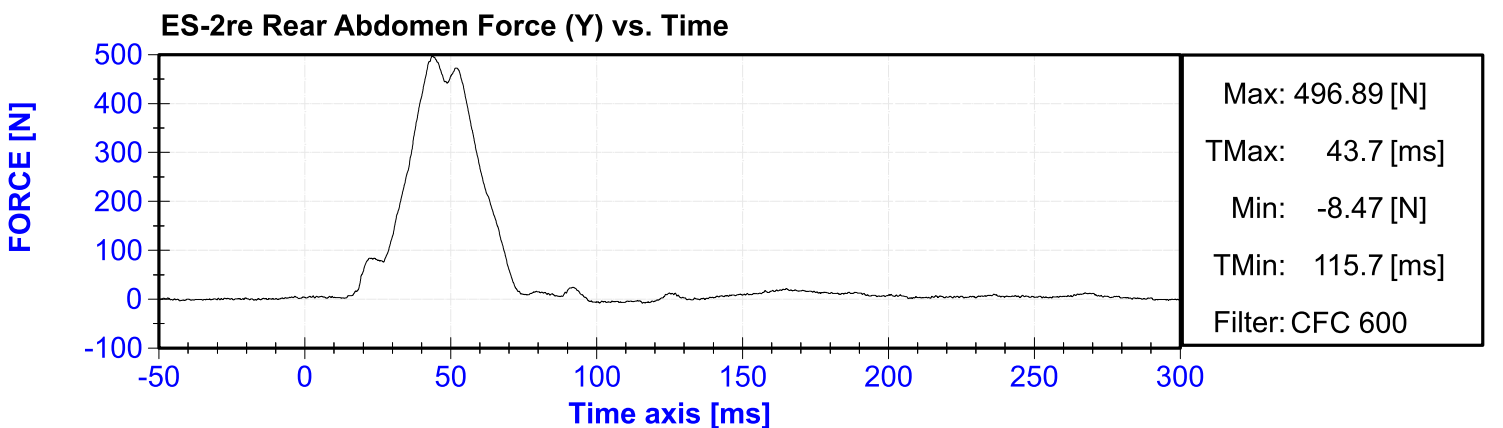
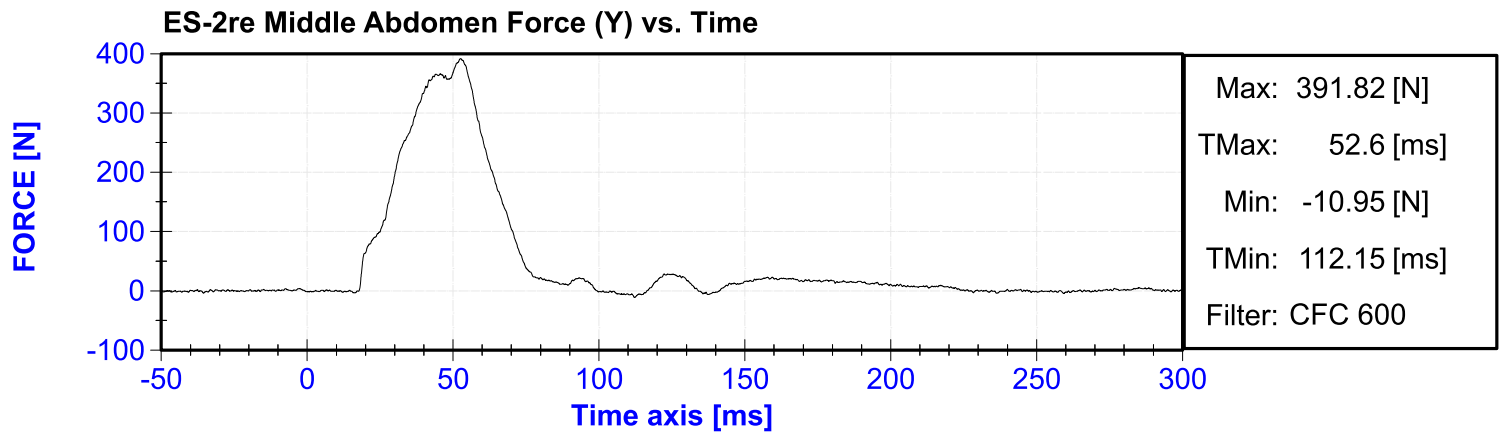
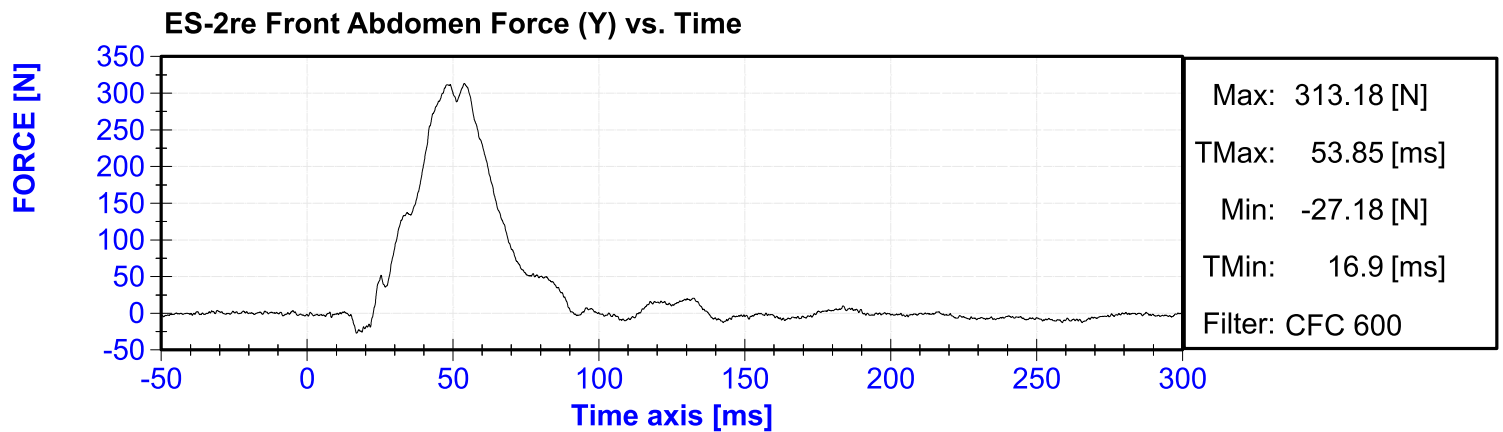
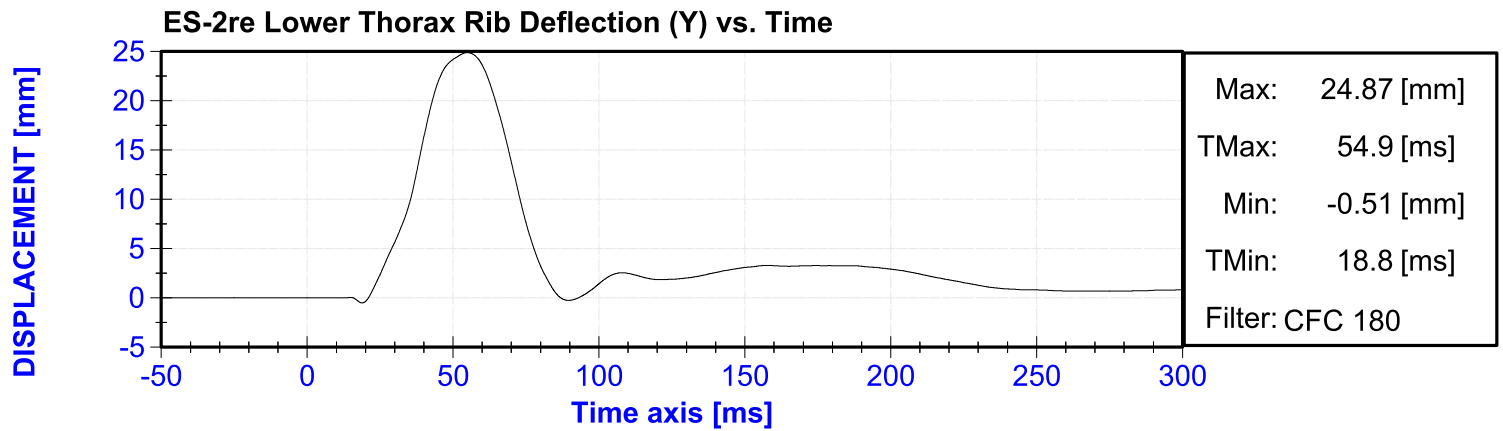
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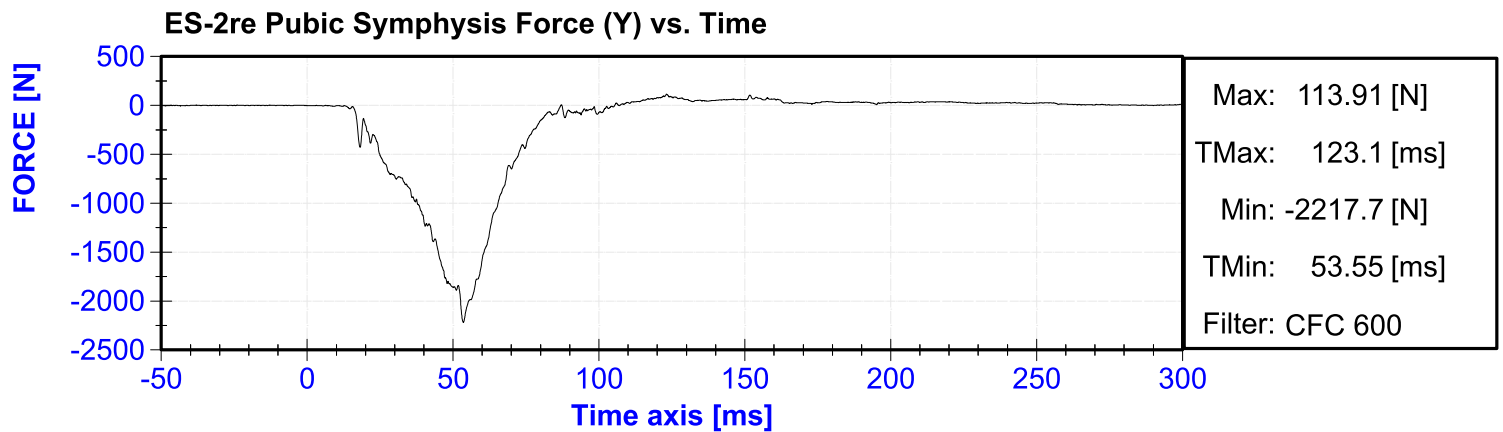
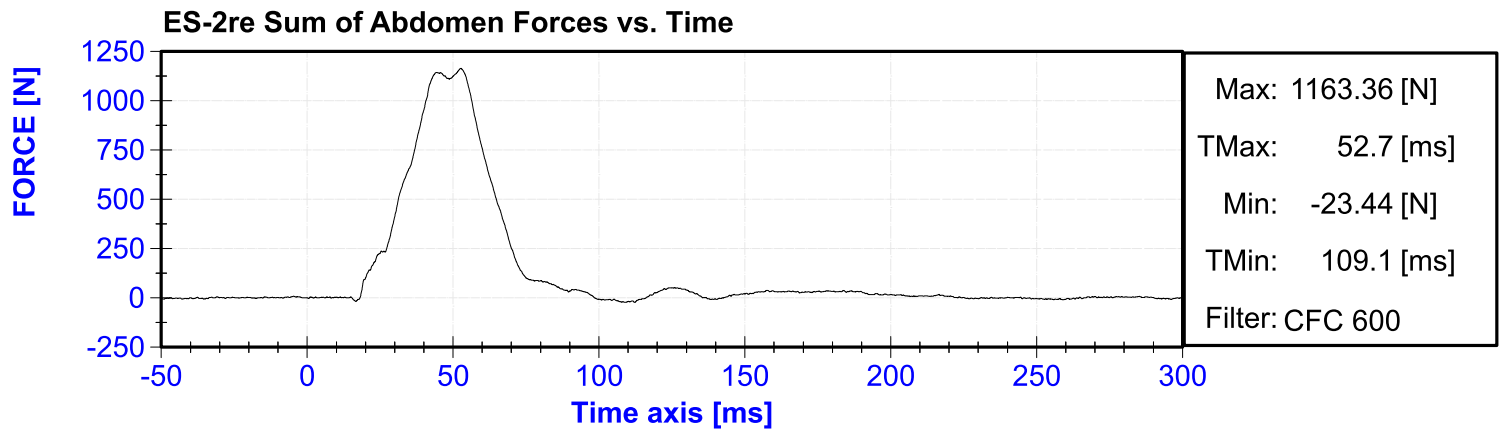
ES-2re Head Resultant Acceleration vs. Time









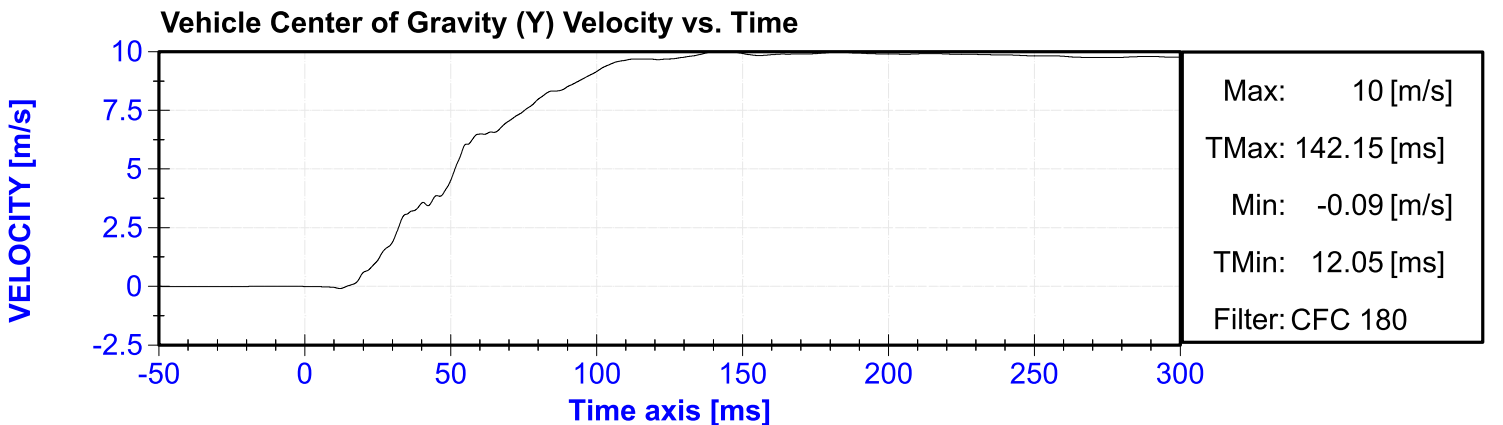
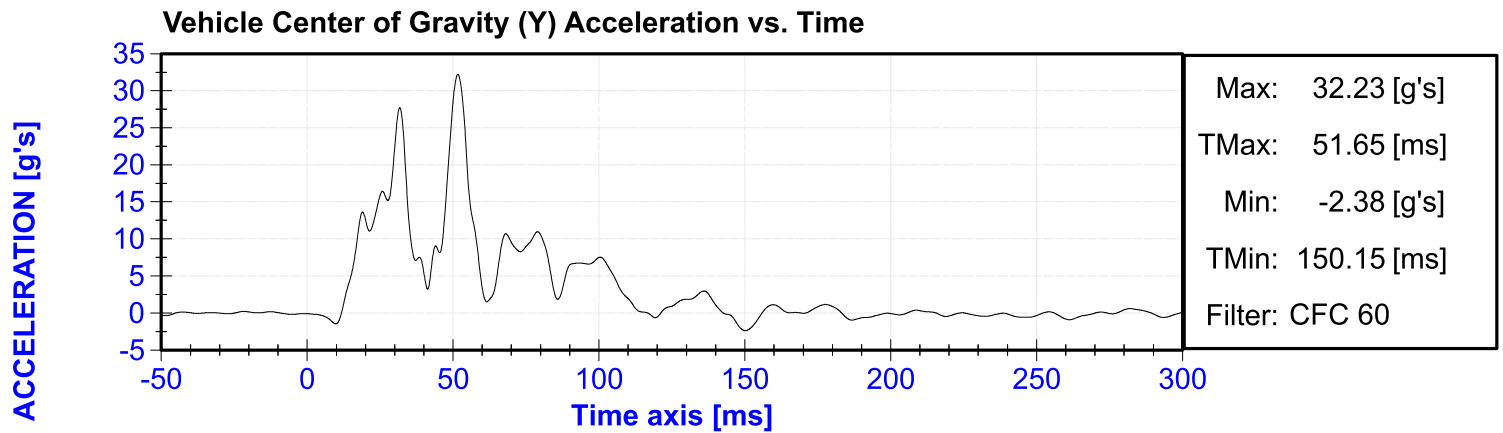
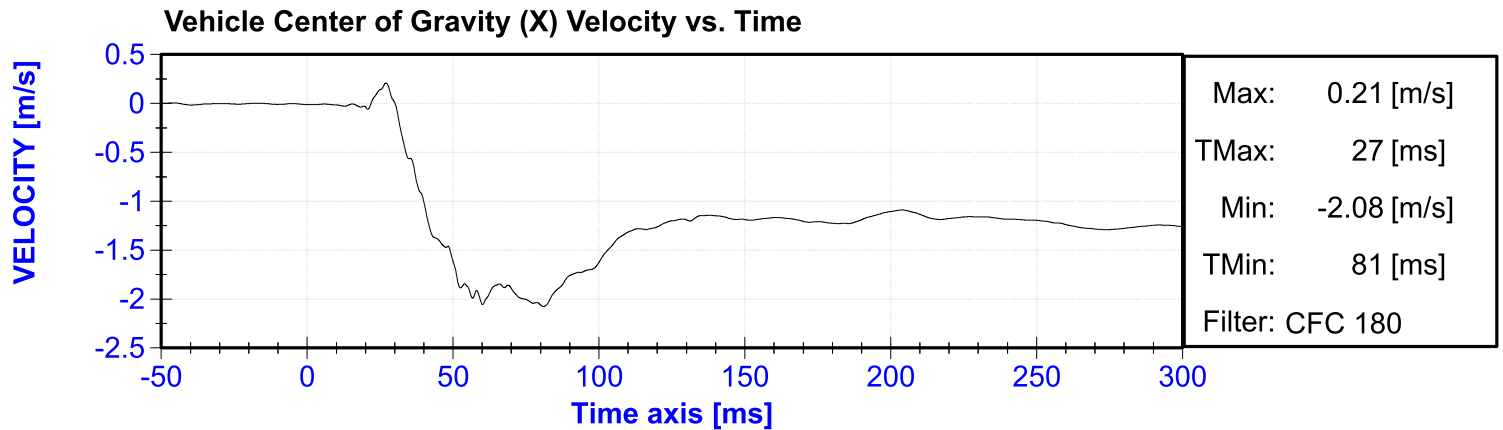
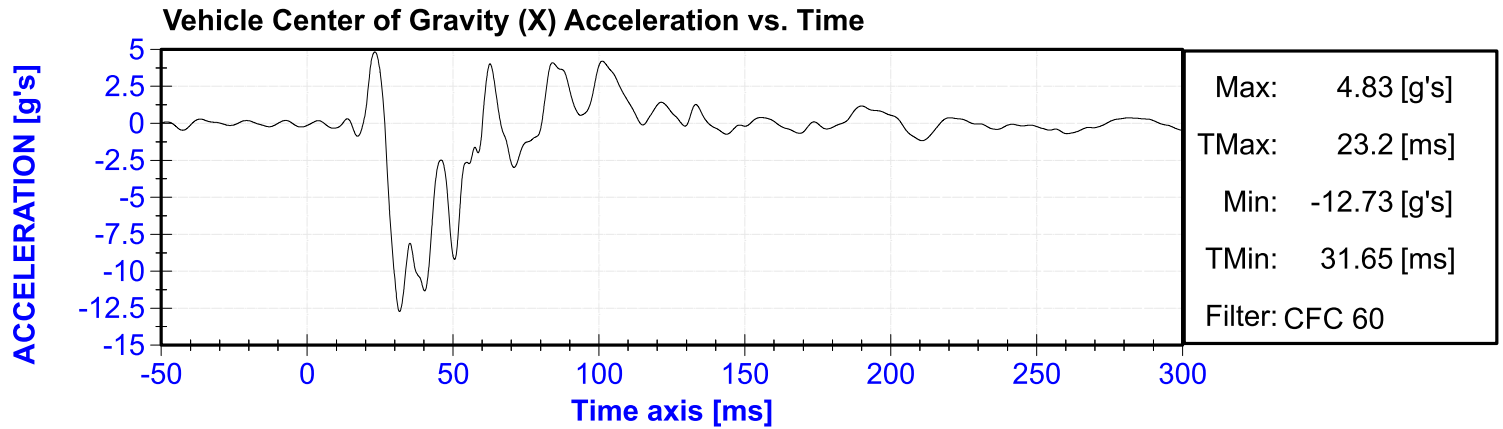


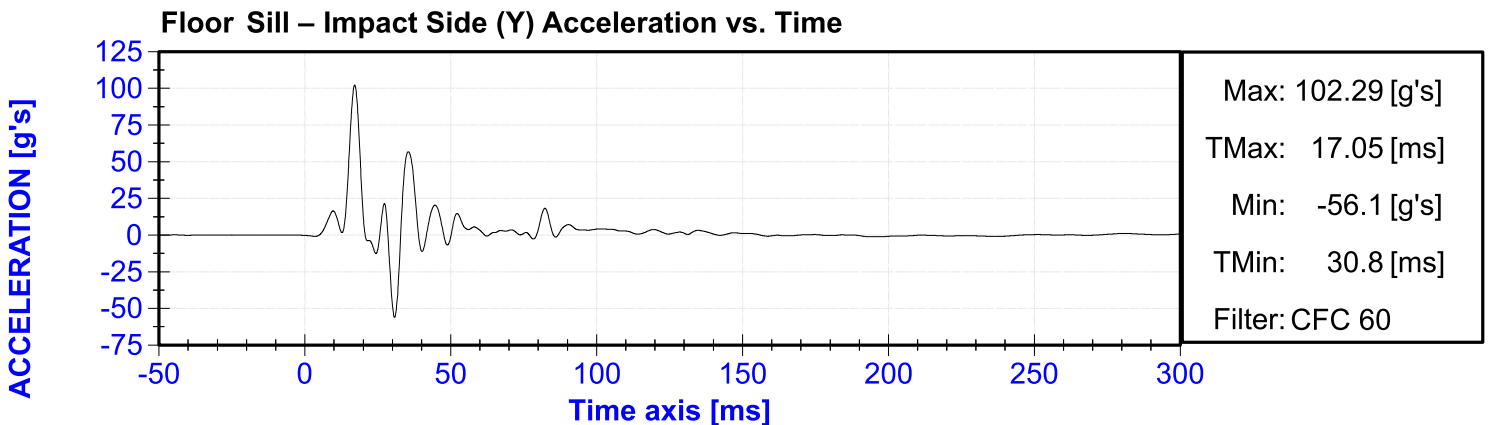
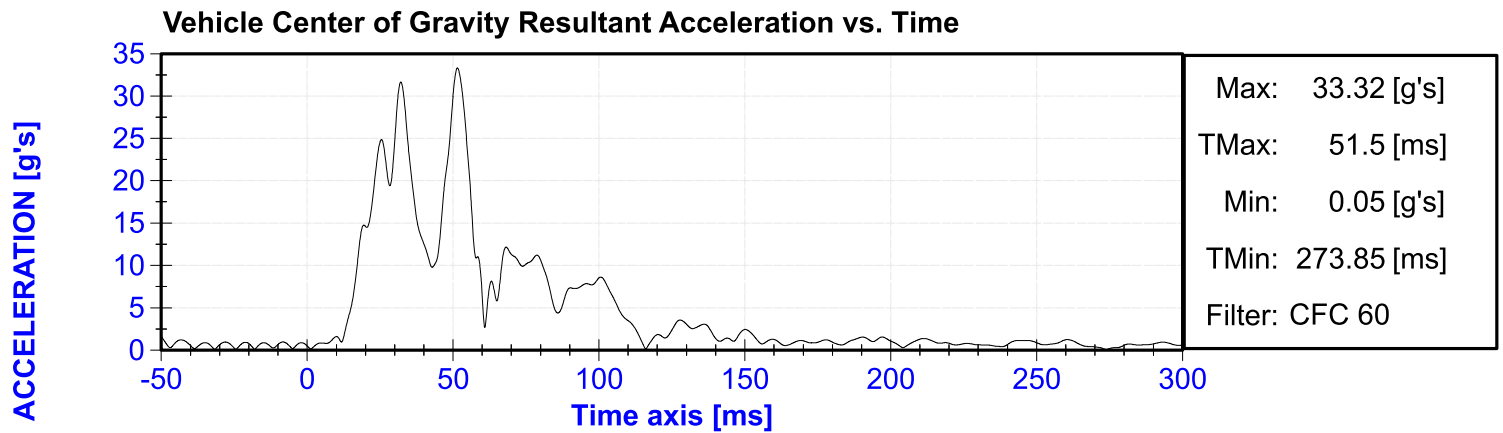
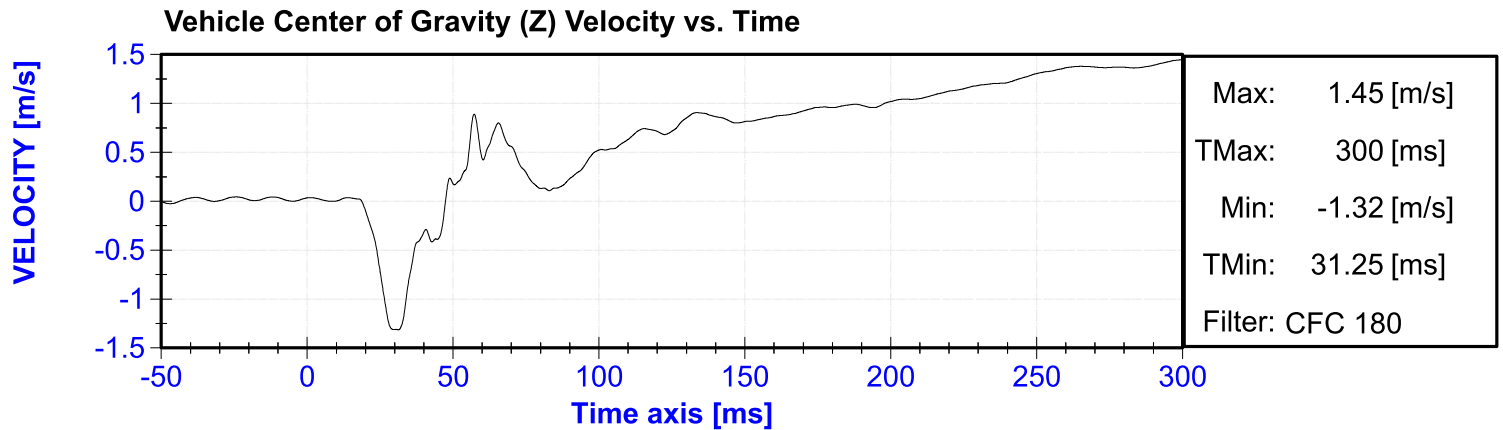
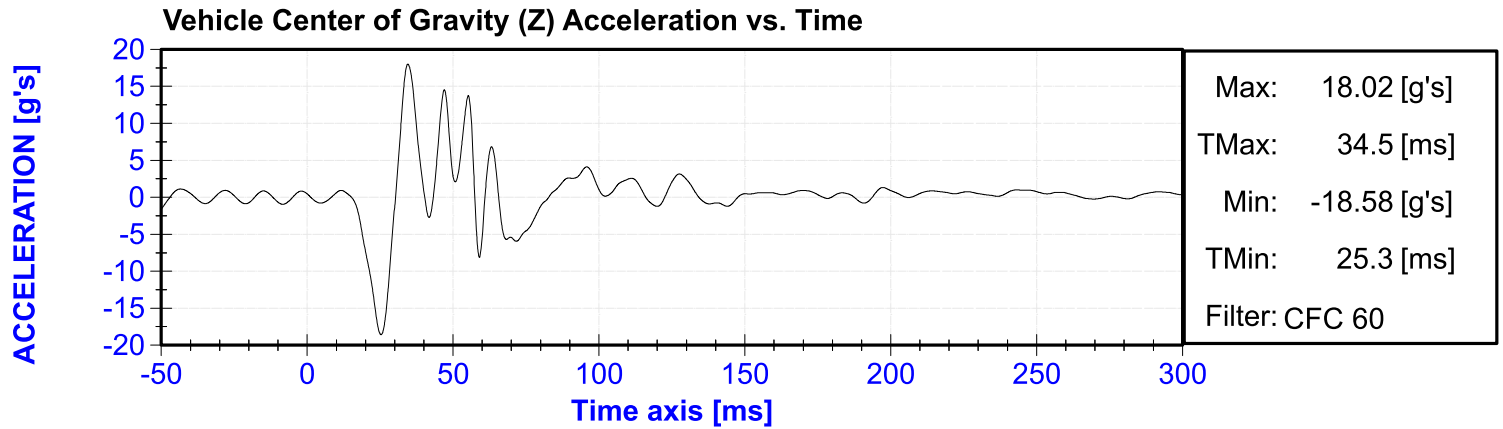
APPENDIX III

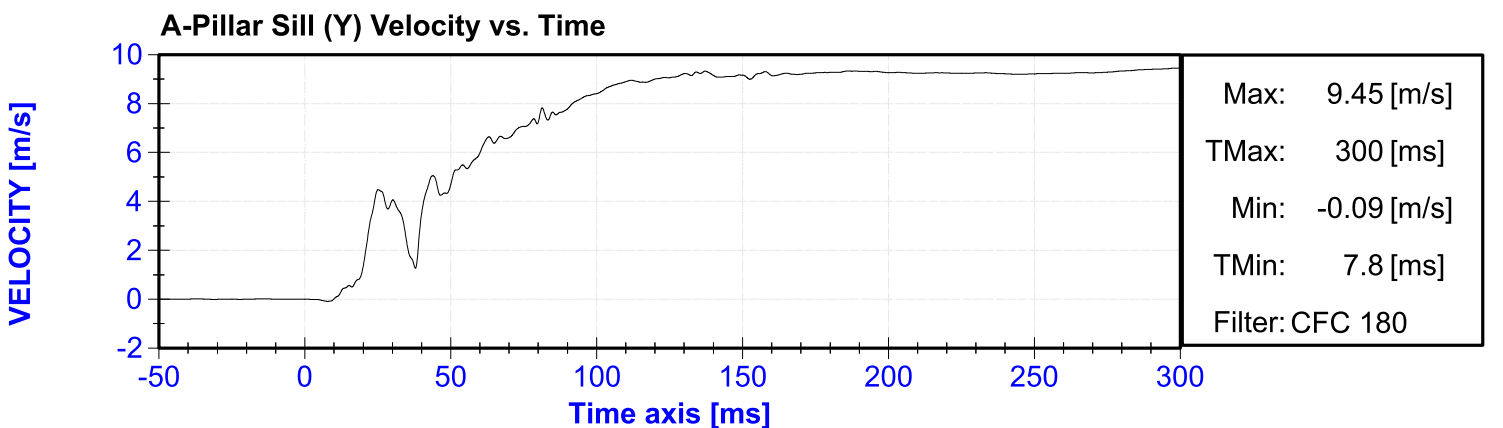
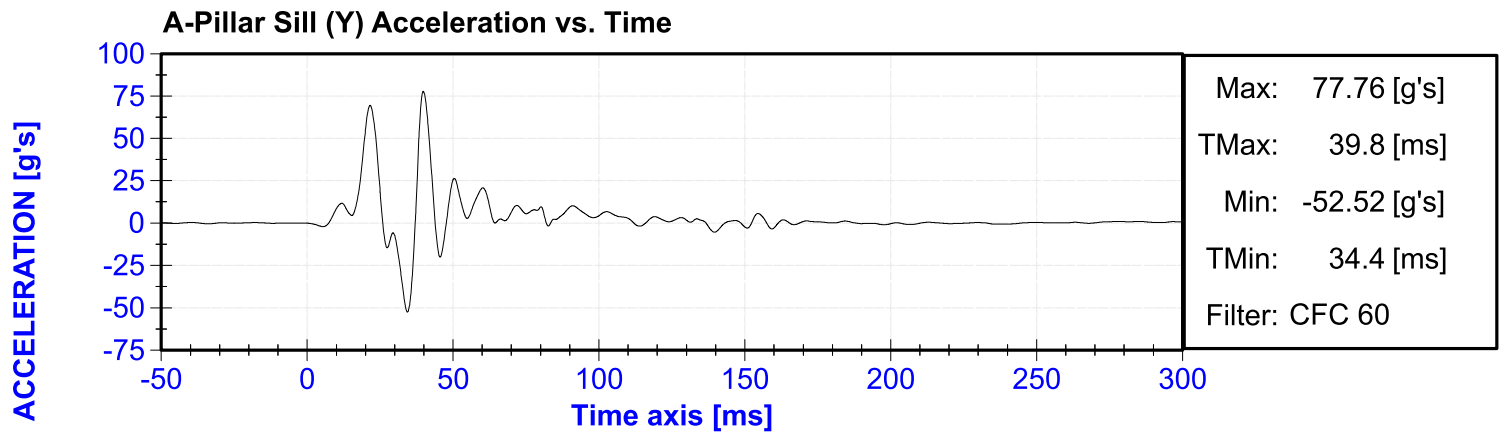
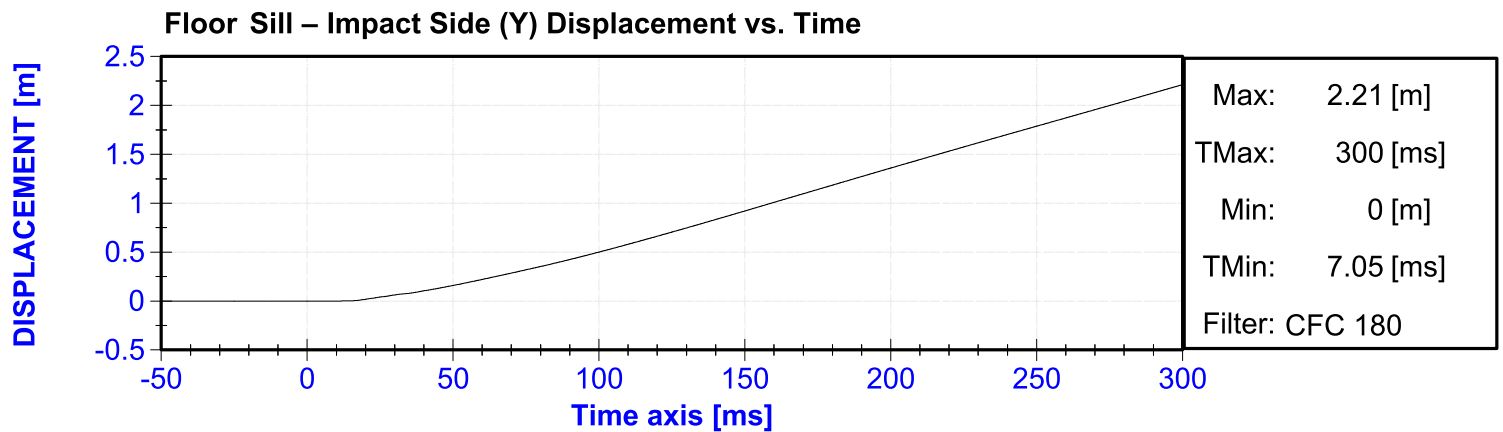
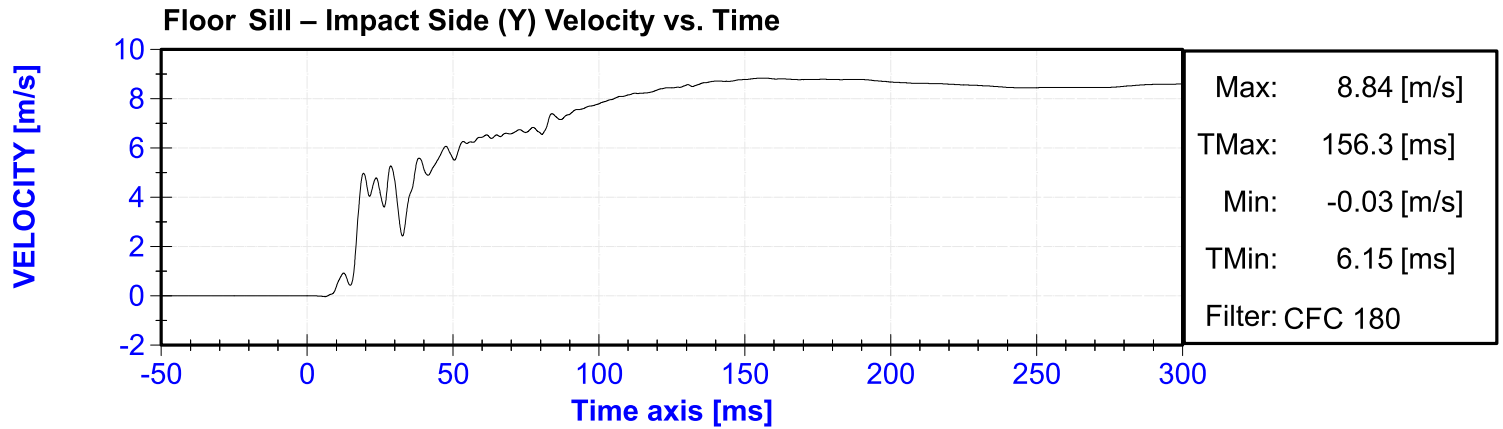
VEHICLE ACCELEROMETER RESPONSE DATA

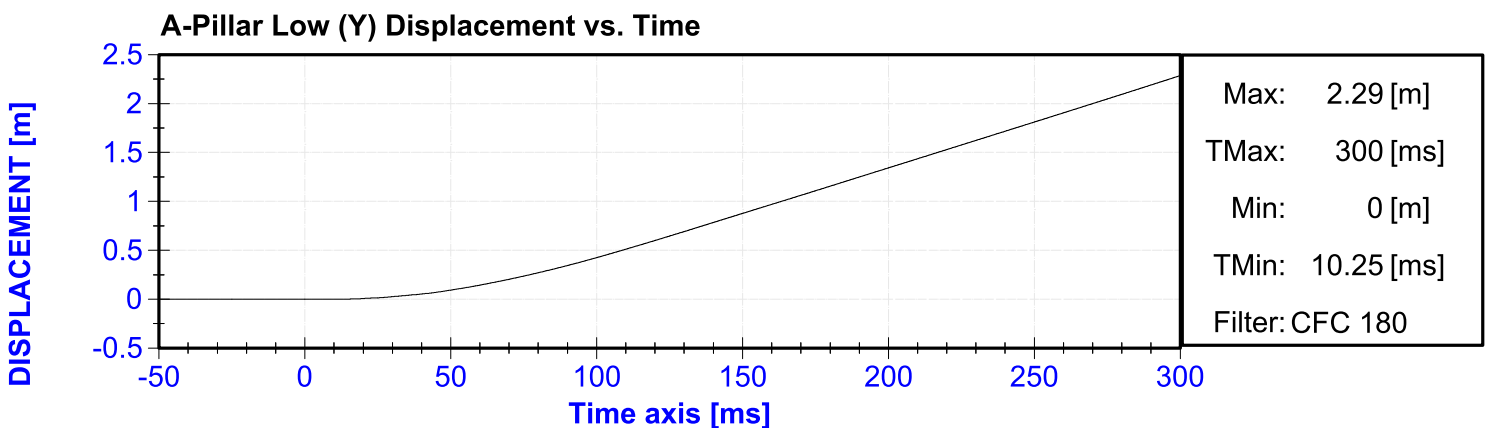
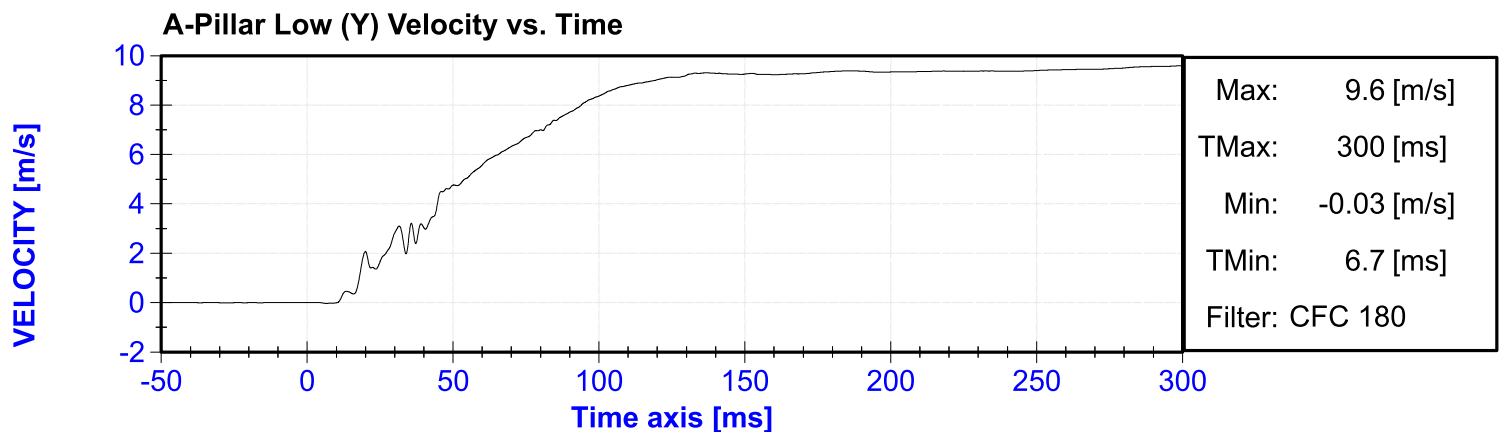
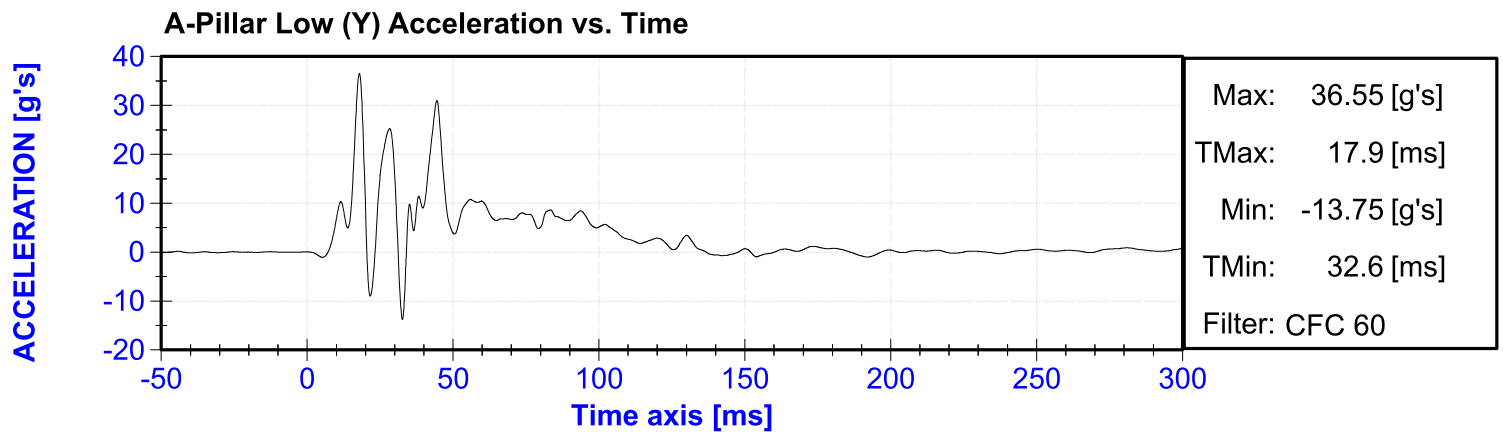
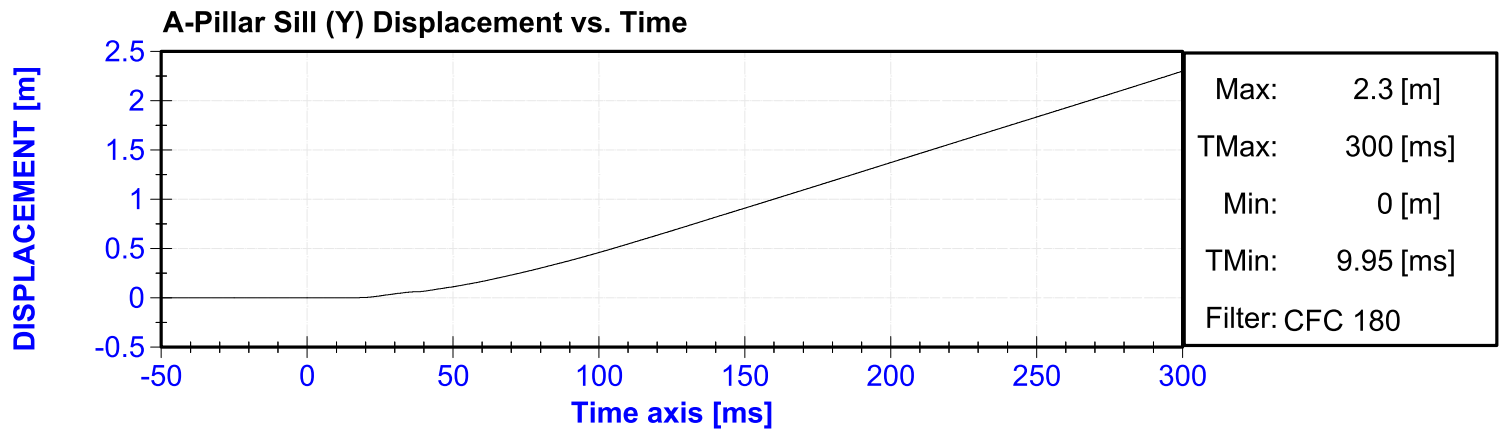
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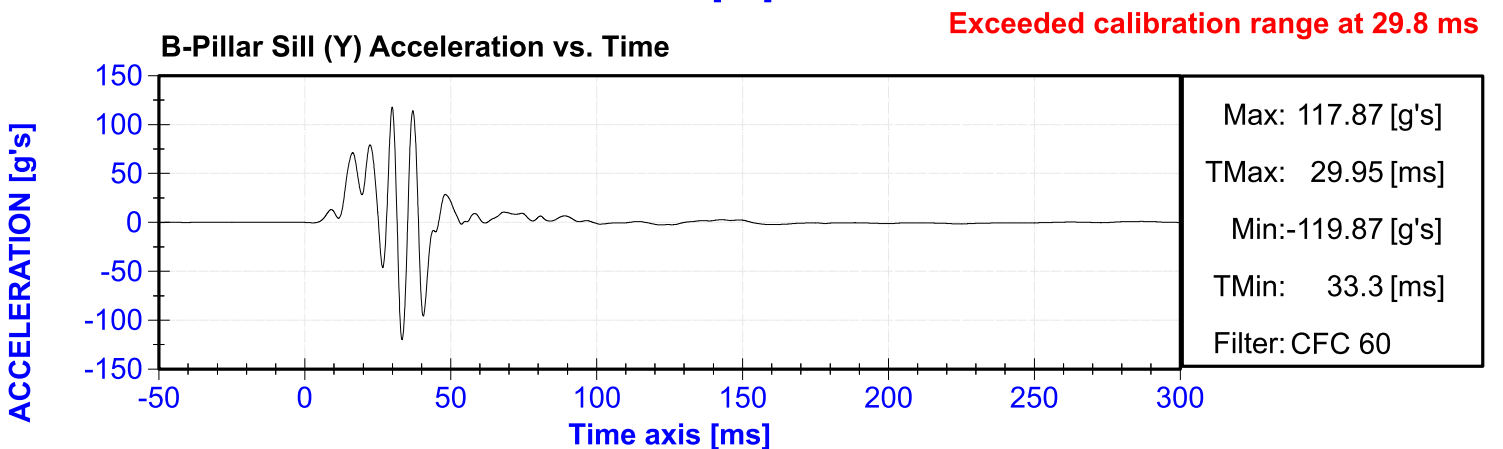
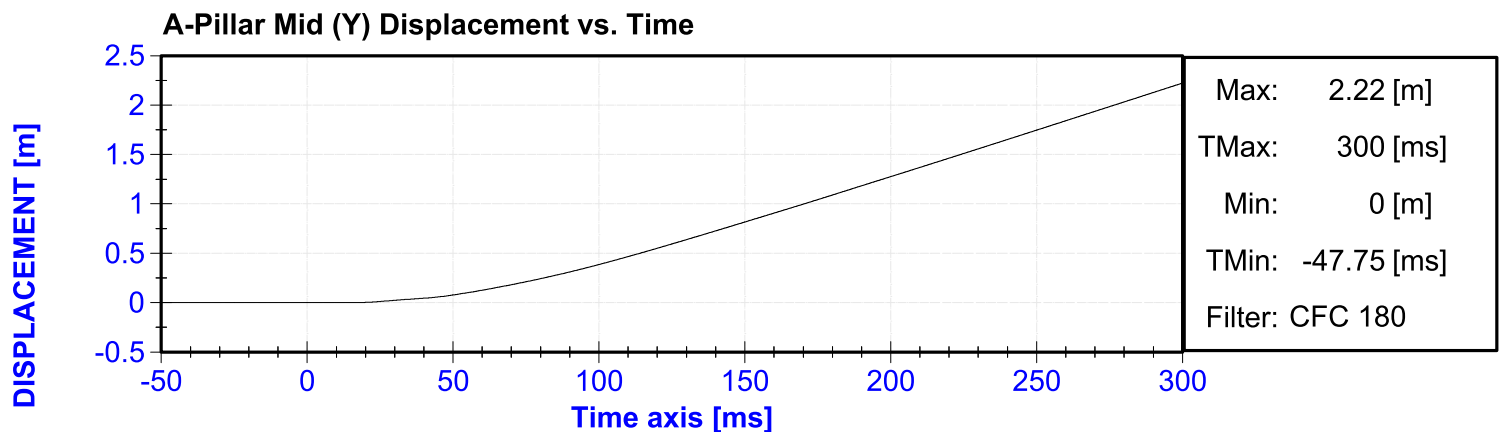
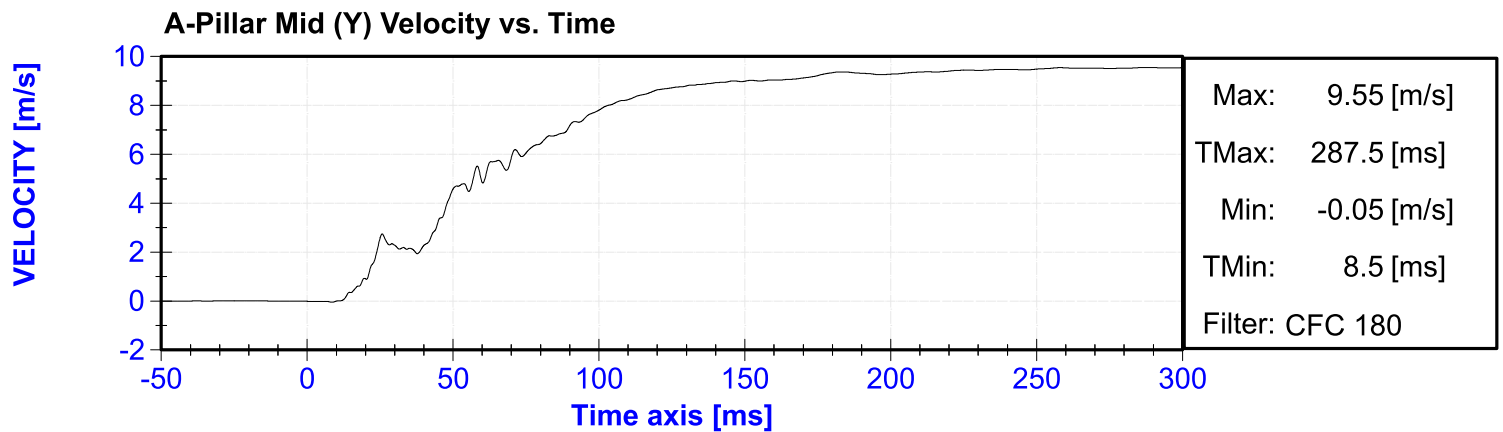
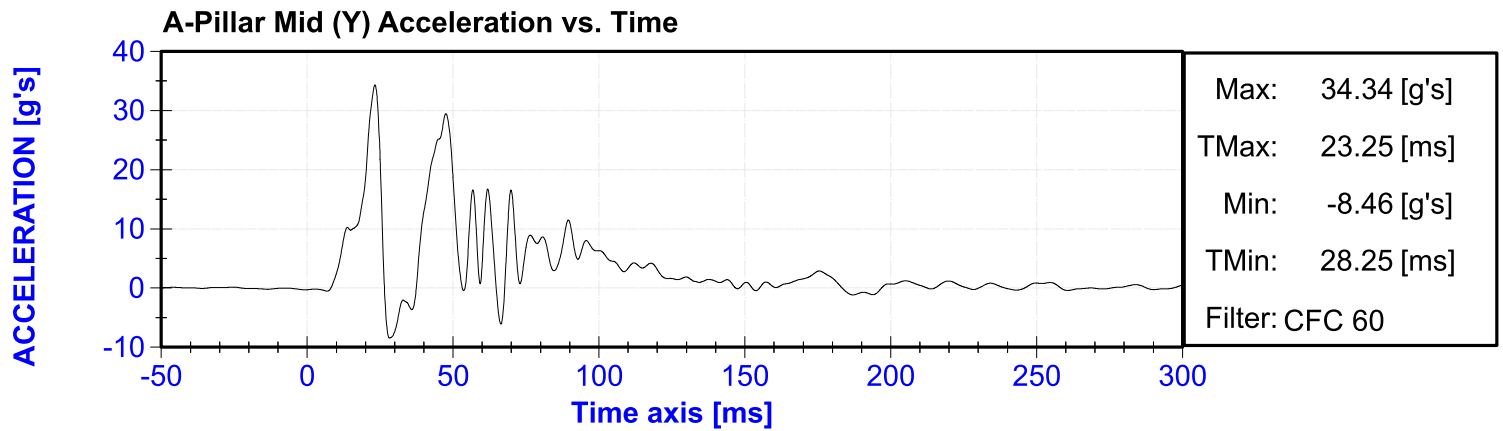
No.	Description	Page
1	Vehicle Center of Gravity (X) Acceleration vs. Time	III-3
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3	Vehicle Center of Gravity (Y) Acceleration vs. Time	III-3
4	Vehicle Center of Gravity (Y) Velocity vs. Time	III-3
5	Vehicle Center of Gravity (Z) Acceleration vs. Time	III-4
6	Vehicle Center of Gravity (Z) Velocity vs. Time	III-4
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9	Floor Sill – Impact Side (Y) Velocity vs. Time	III-5
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17	A-Pillar Mid (Y) Acceleration vs. Time	III-7
18	A-Pillar Mid (Y) Velocity vs. Time	III-7
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20	B-Pillar Sill (Y) Acceleration vs. Time	III-7
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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

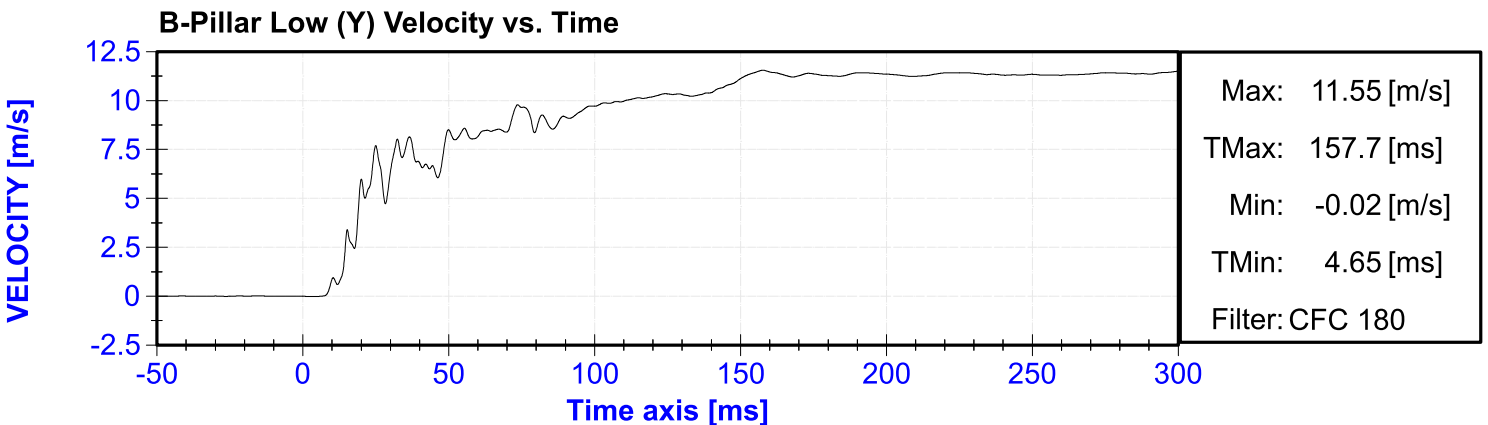
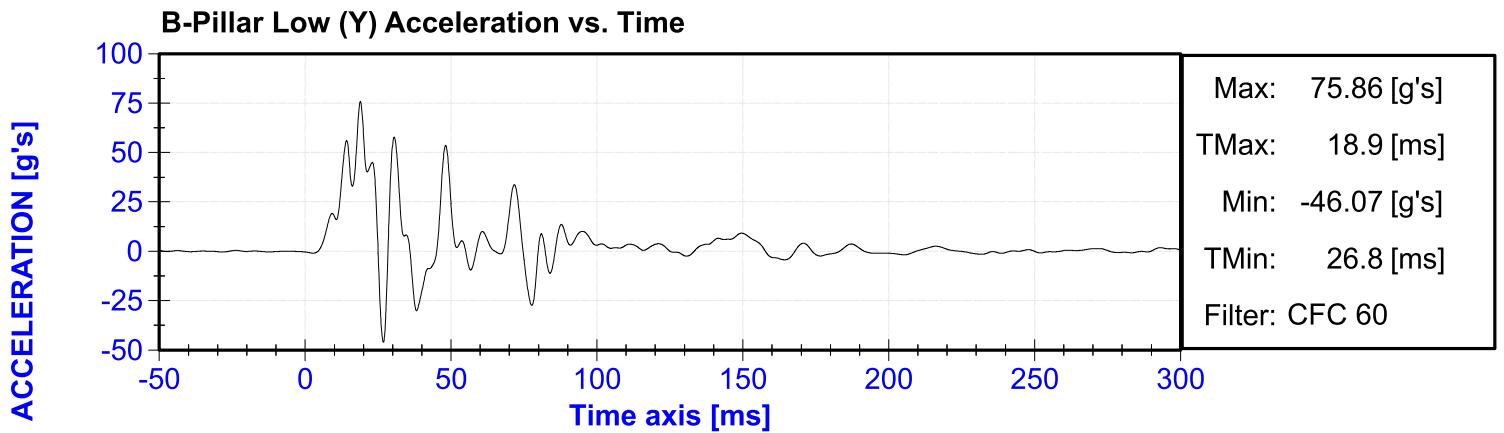
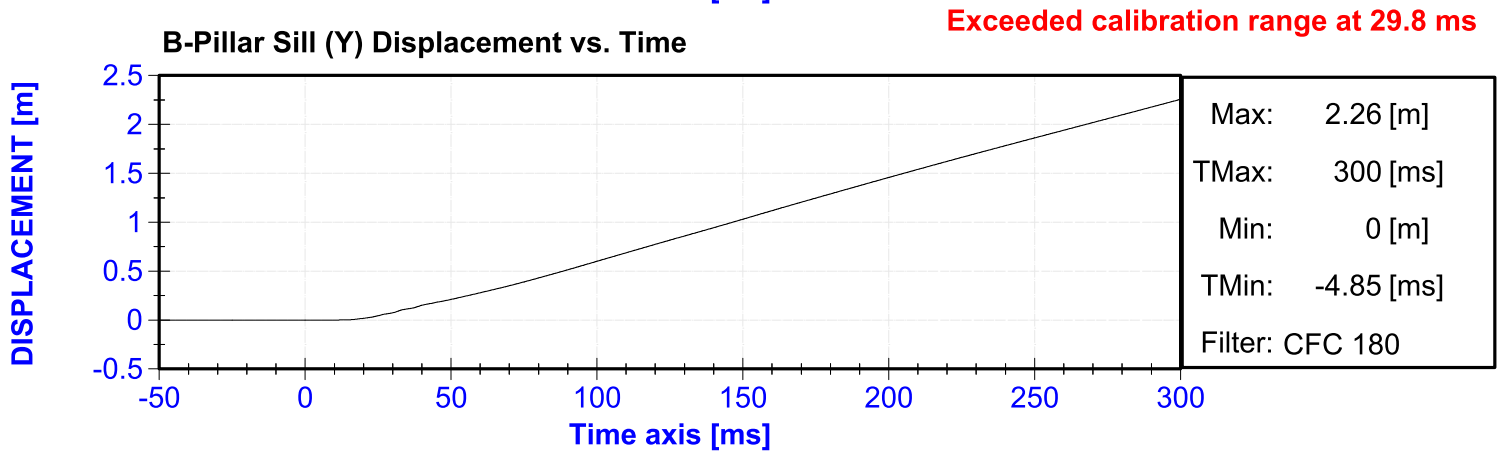
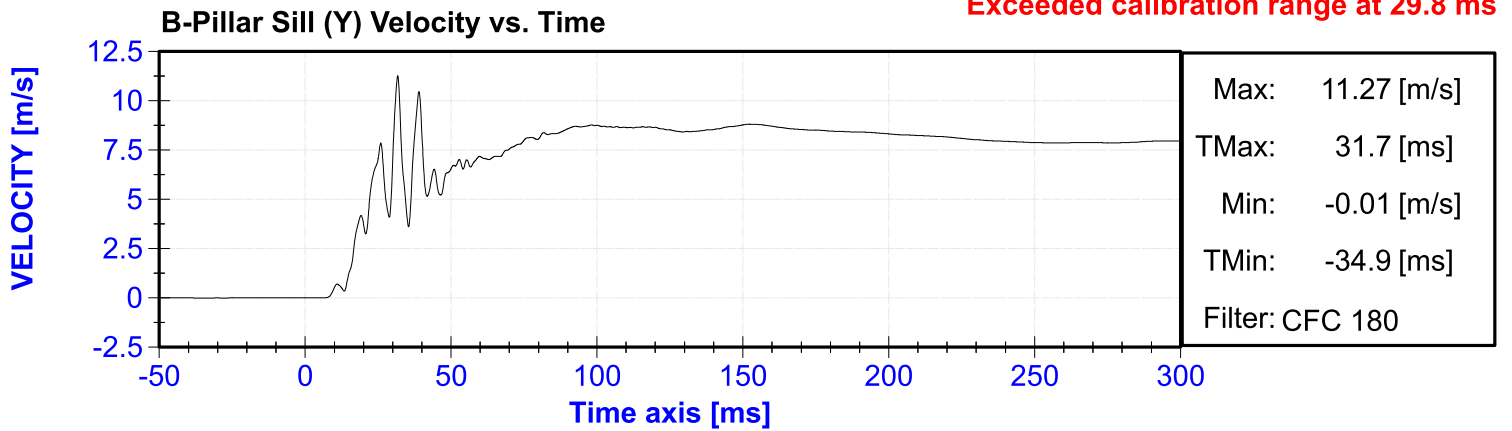


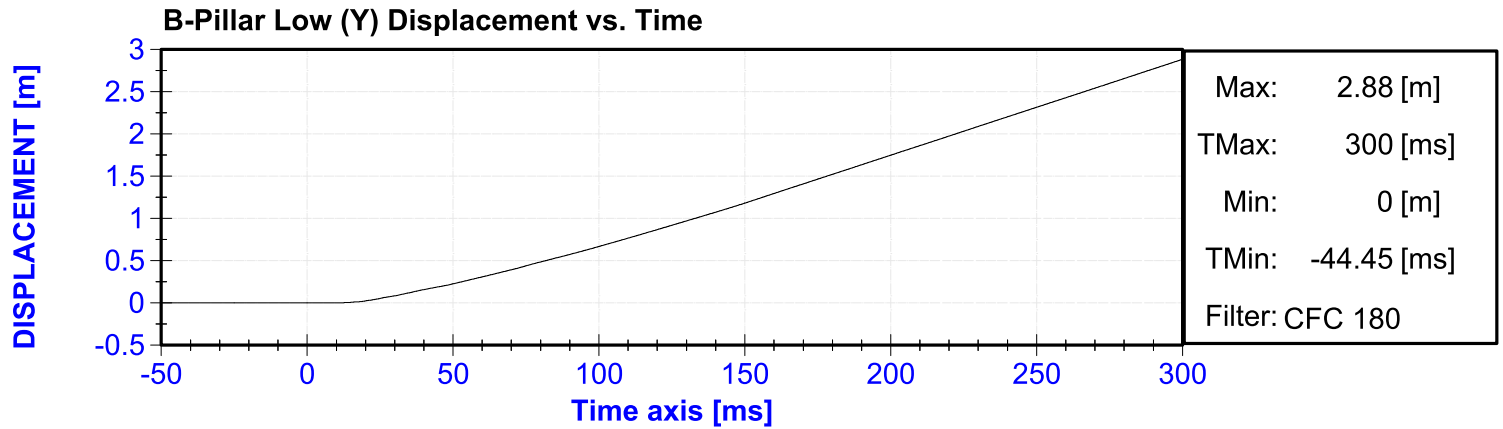




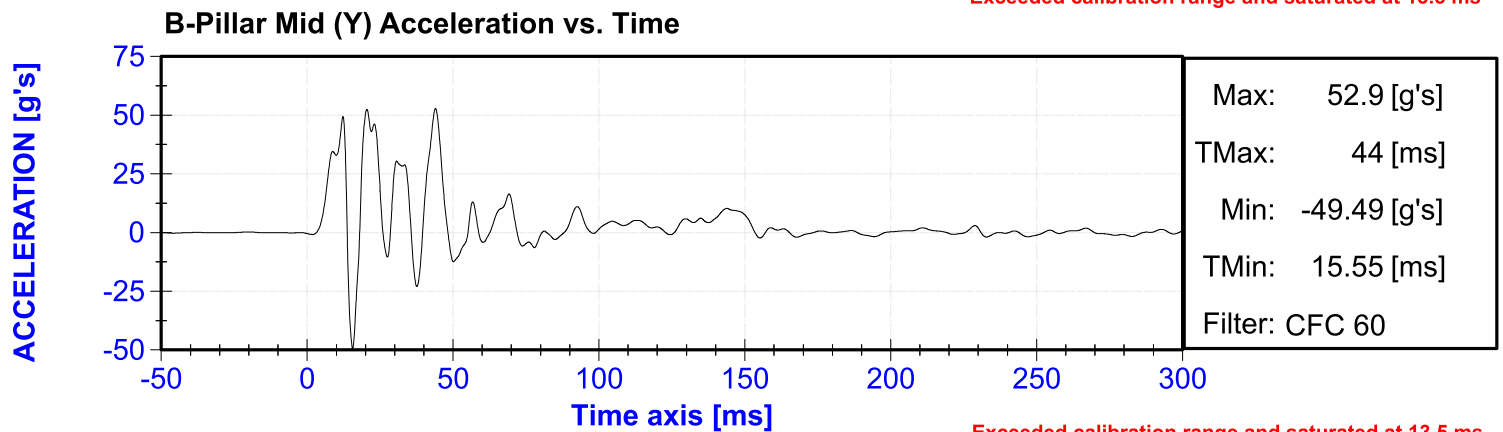




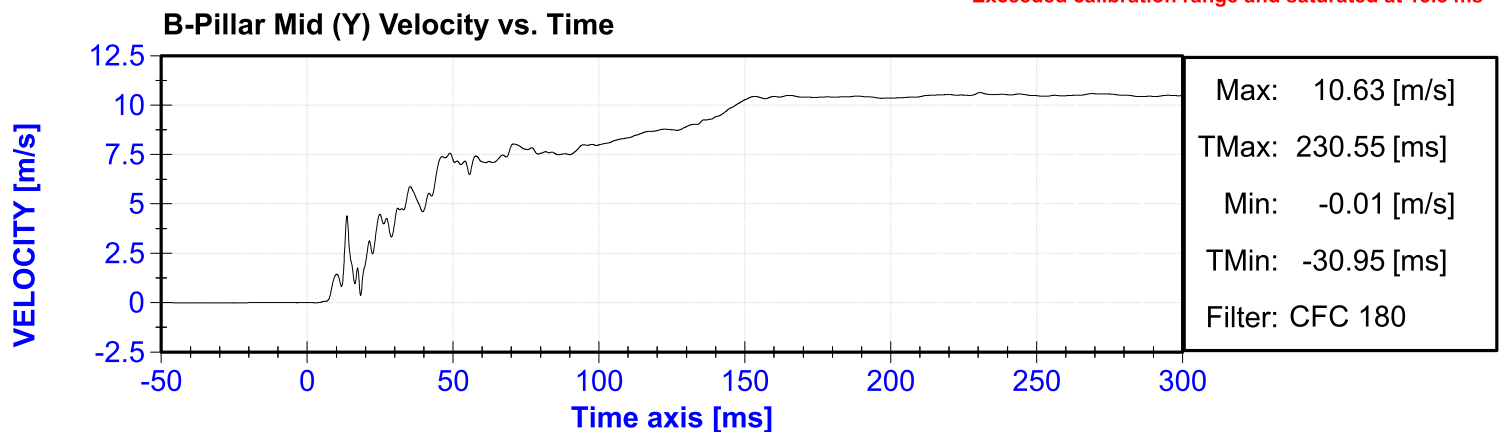




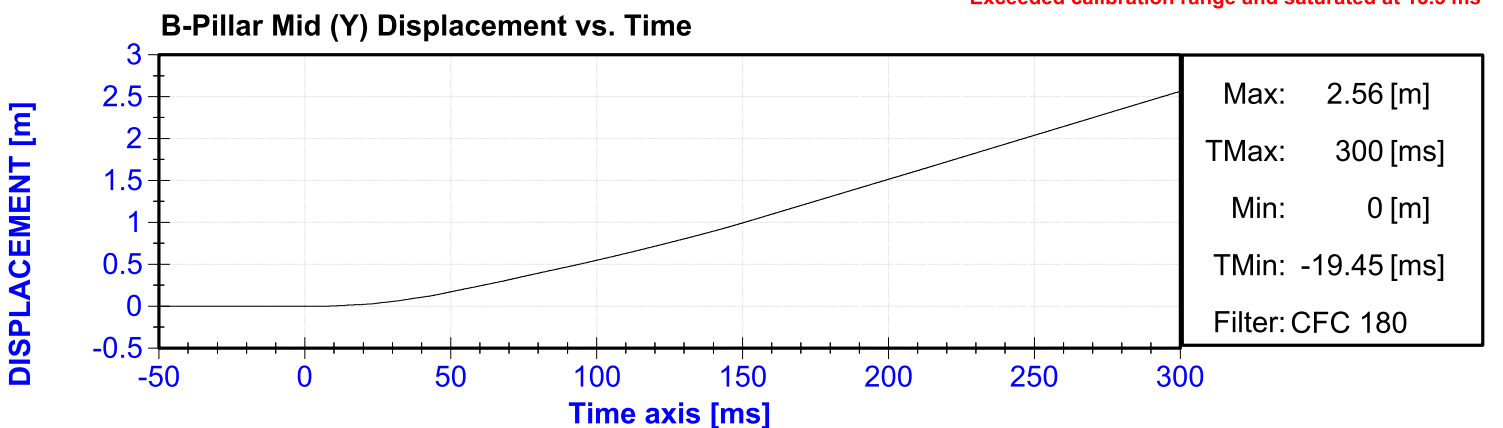
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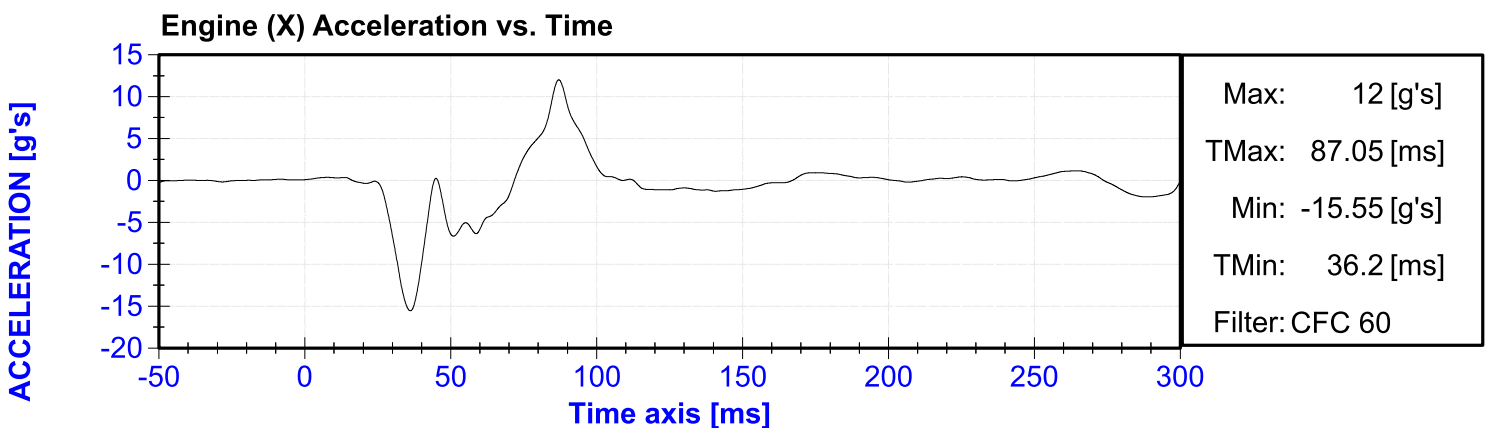
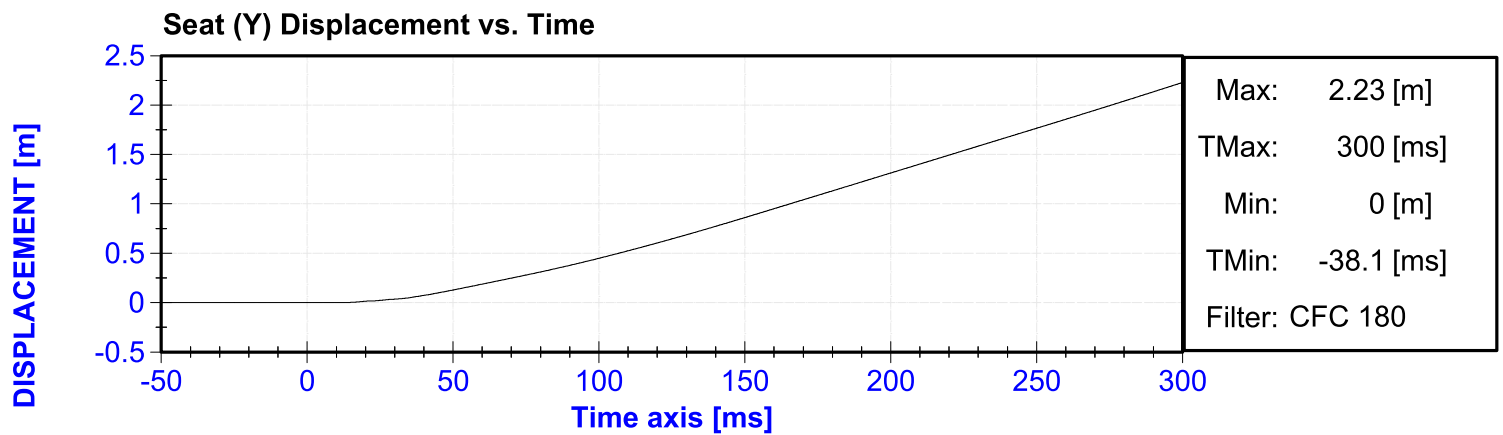
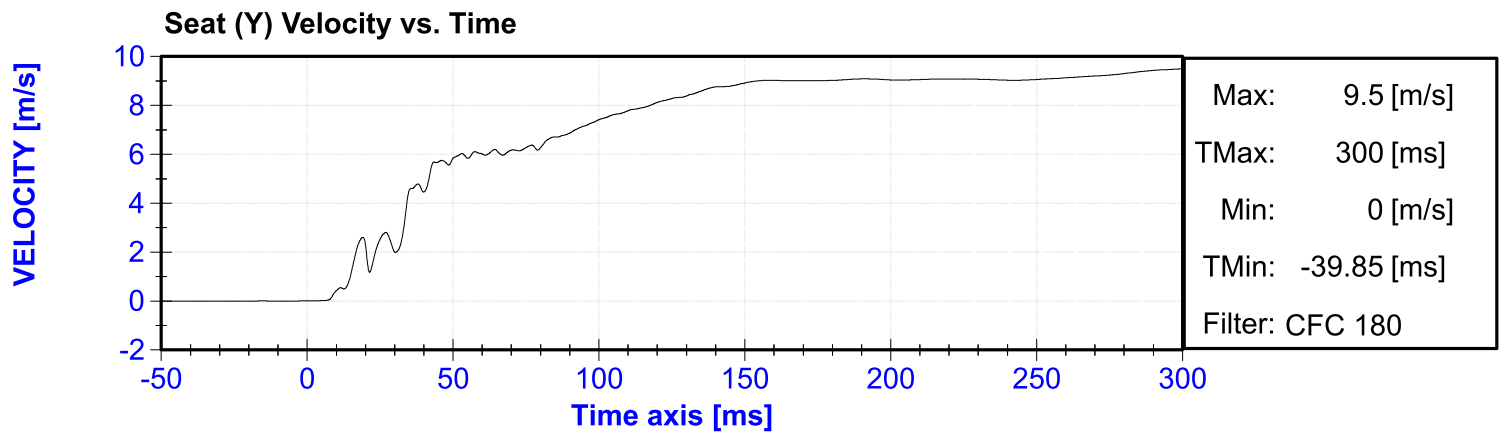
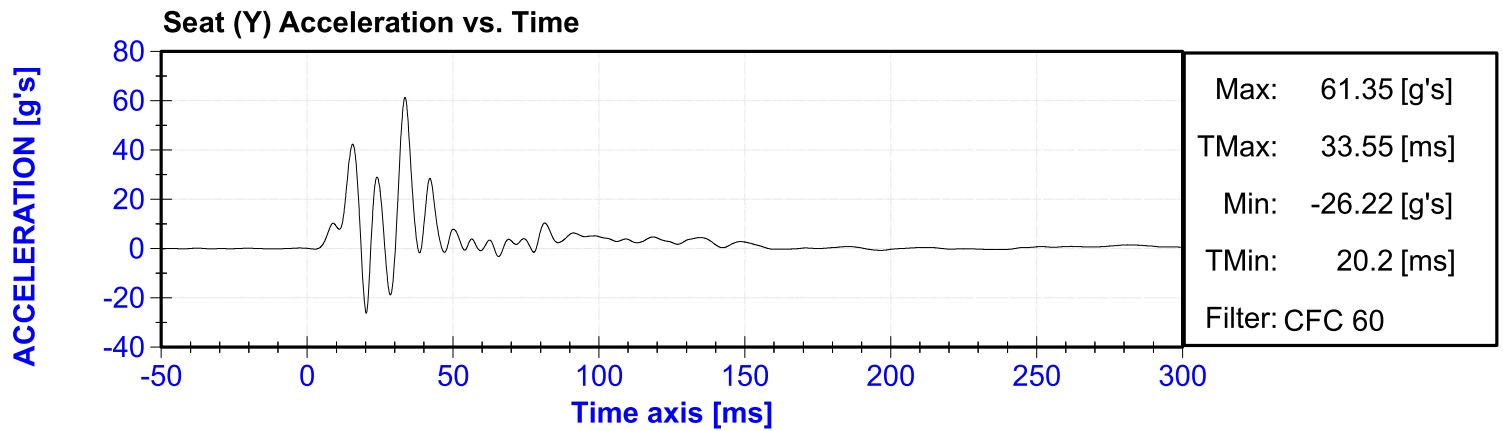


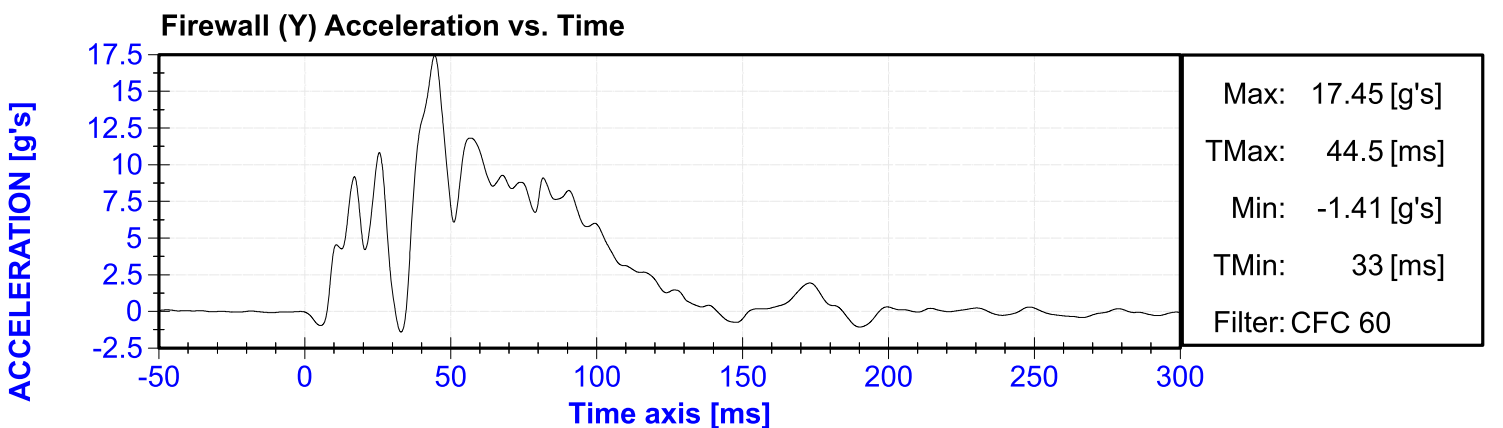
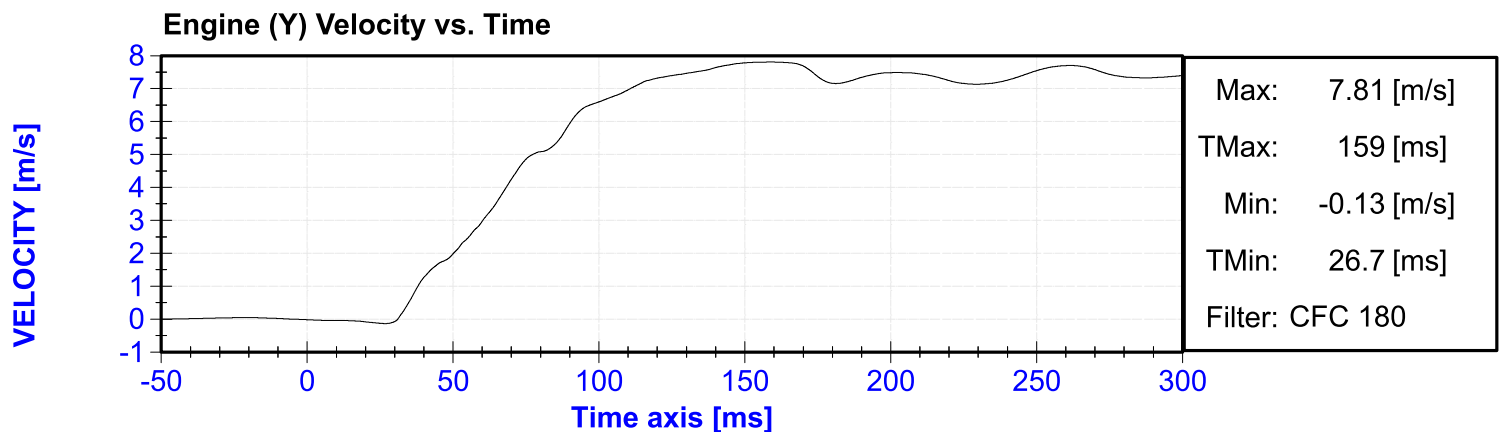
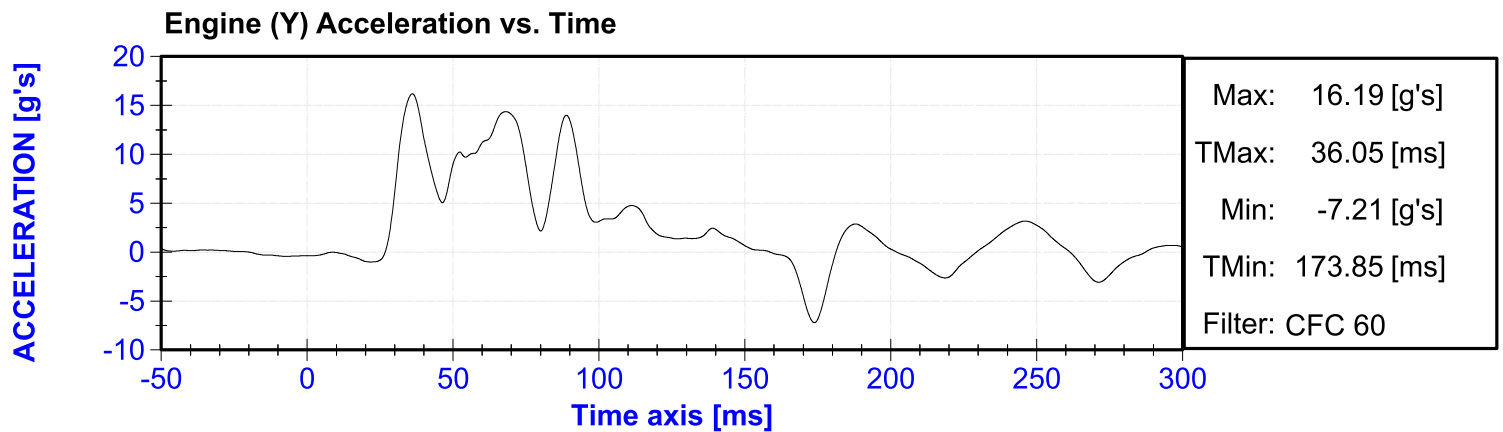
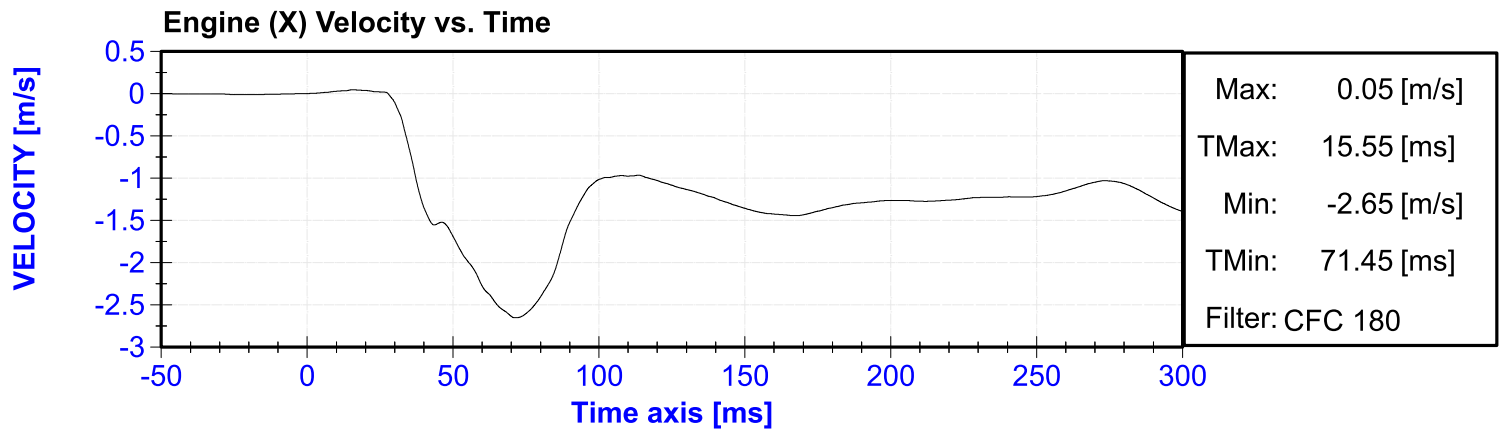
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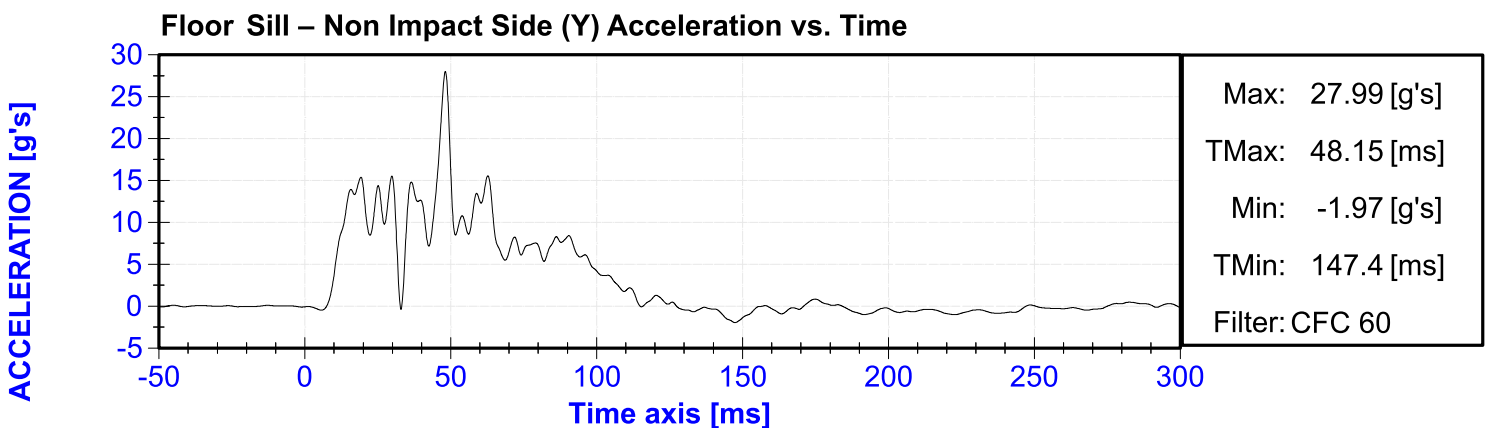
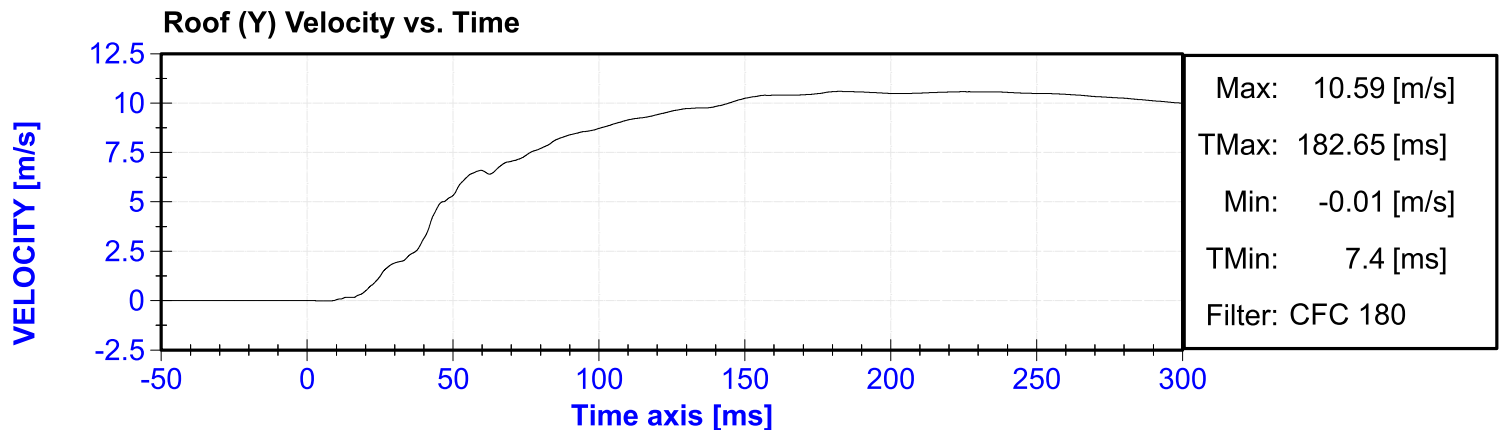
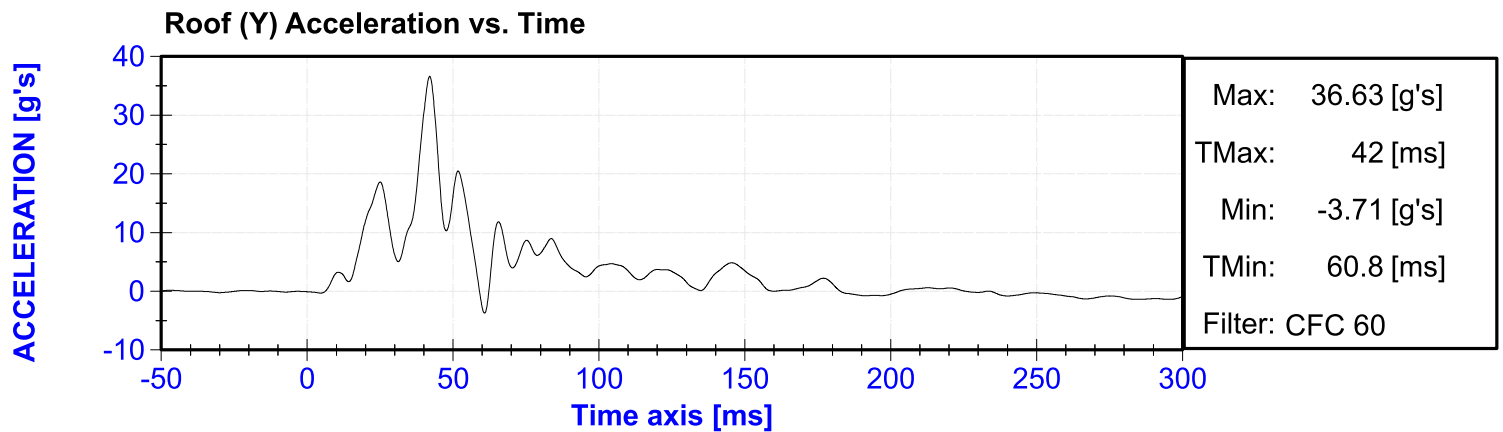
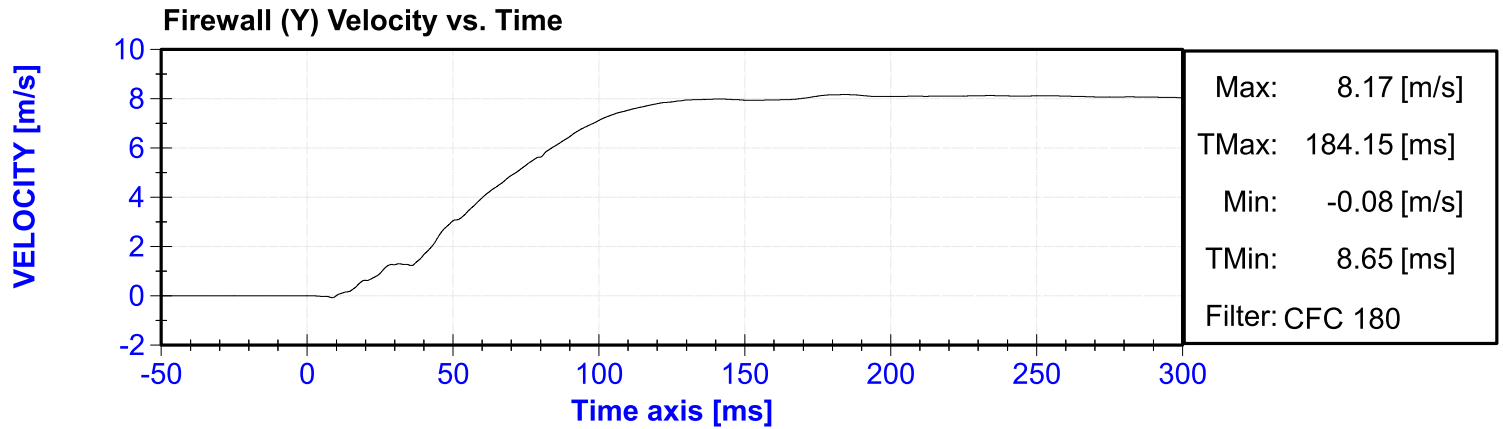


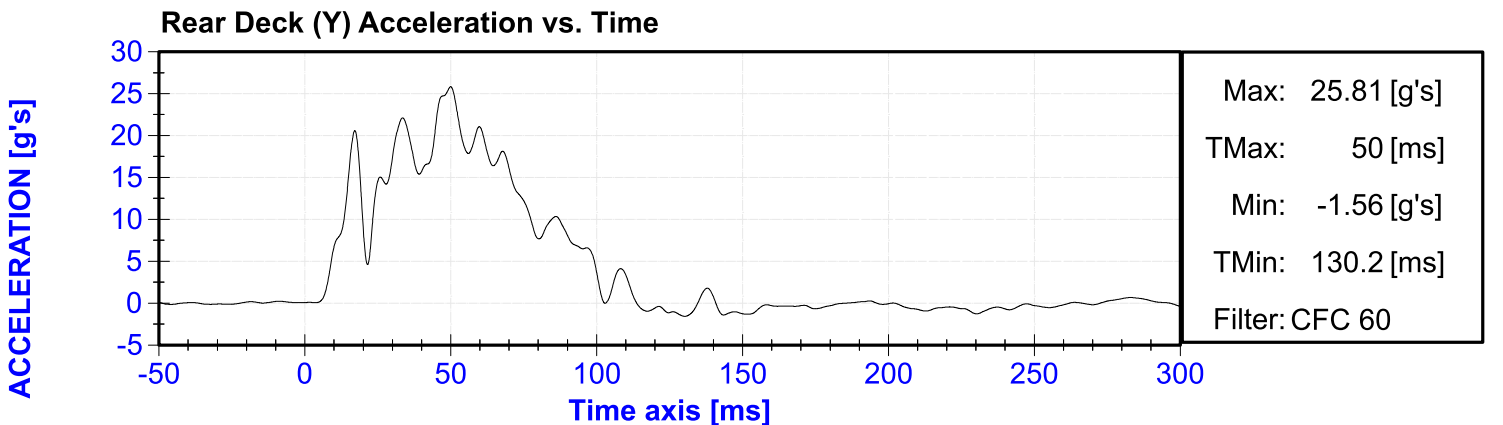
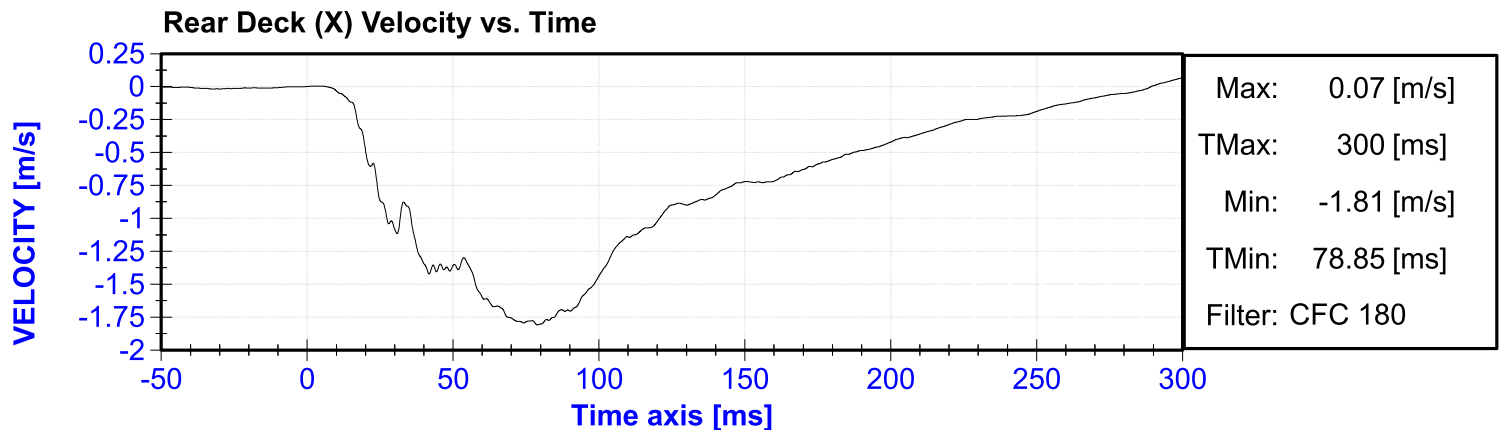
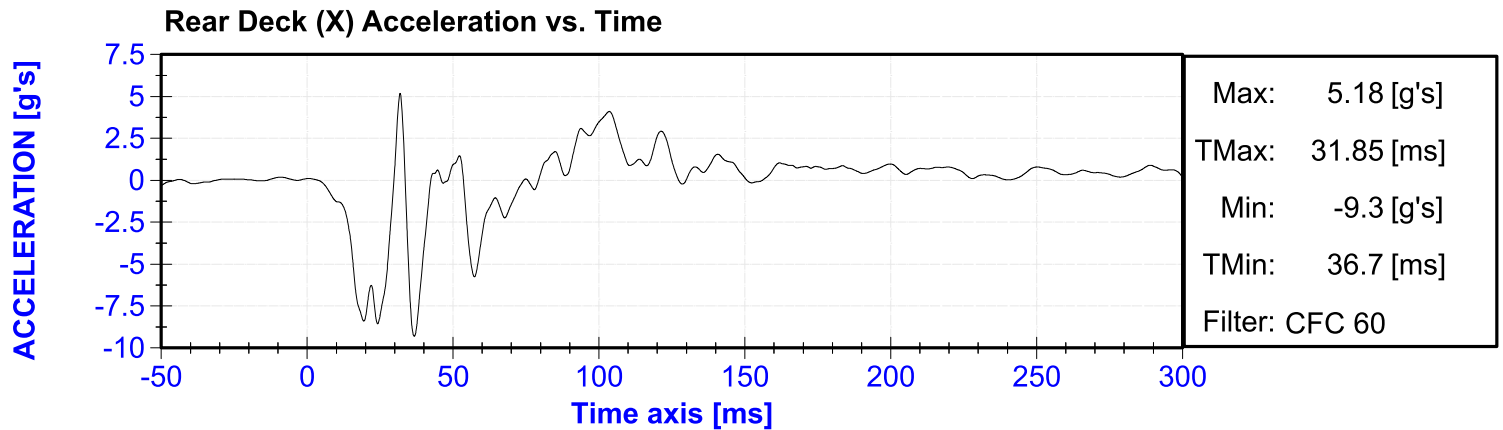
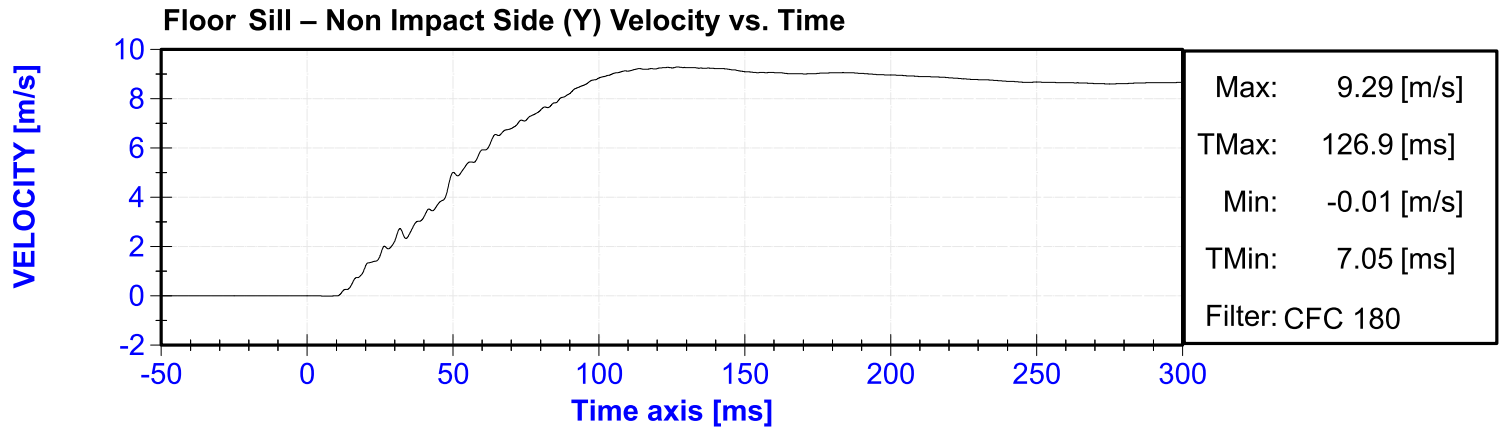
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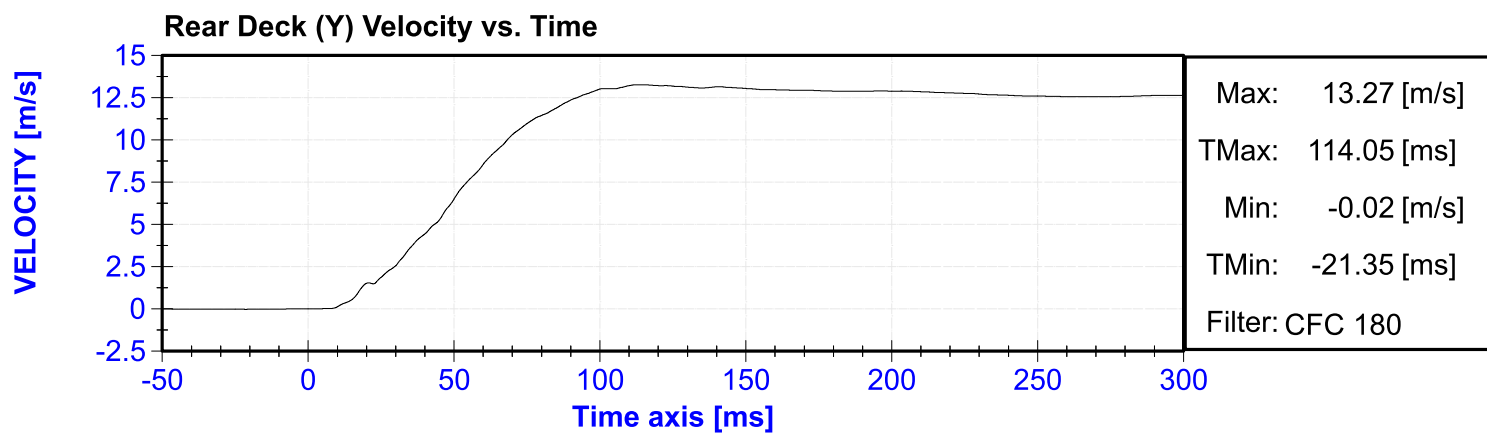












APPENDIX IV

PRE-TEST DUMMY PERFORMANCE CALIBRATION TEST DATA

(Subpart U, ES-2re)

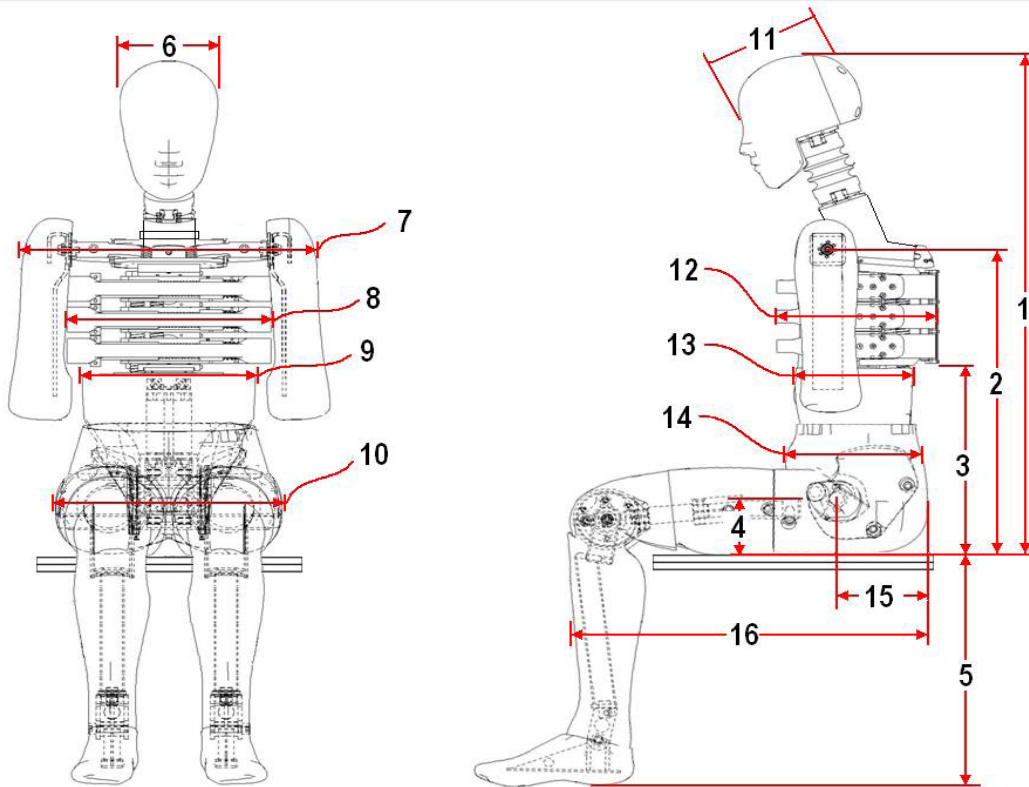


External Measurements - EuroSID-2re

Technician: J. Rios

Date: 12/17/2024

Dummy Serial Number: D037



FRONT VIEW

SIDE VIEW

Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	902	Pass
2	Seat to Shoulder Joint	558	572	569	Pass
3	Seat to Lower Face of Thoracic Spine Box	346	356	348	Pass
4	Seat to Hip Joint (center of bolt)	97	103	103	Pass
5	Sole to Seat, Sitting	333	451	398	Pass
6	Head Width	152	158	154	Pass
7	Shoulder/Arm Width	461	479	472	Pass
8	Thorax Width	322	332	328	Pass
9	Abdomen Width	273	287	281	Pass
10	Pelvis Lap Width	359	373	364	Pass
11	Head Depth	196	206	202	Pass
12	Thorax Depth	262	272	266	Pass
13	Abdomen Depth	194	204	197	Pass
14	Pelvis Depth	235	245	239	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150	160	155	Pass
16	Back of Buttocks to Front Knee	597	615	601	Pass

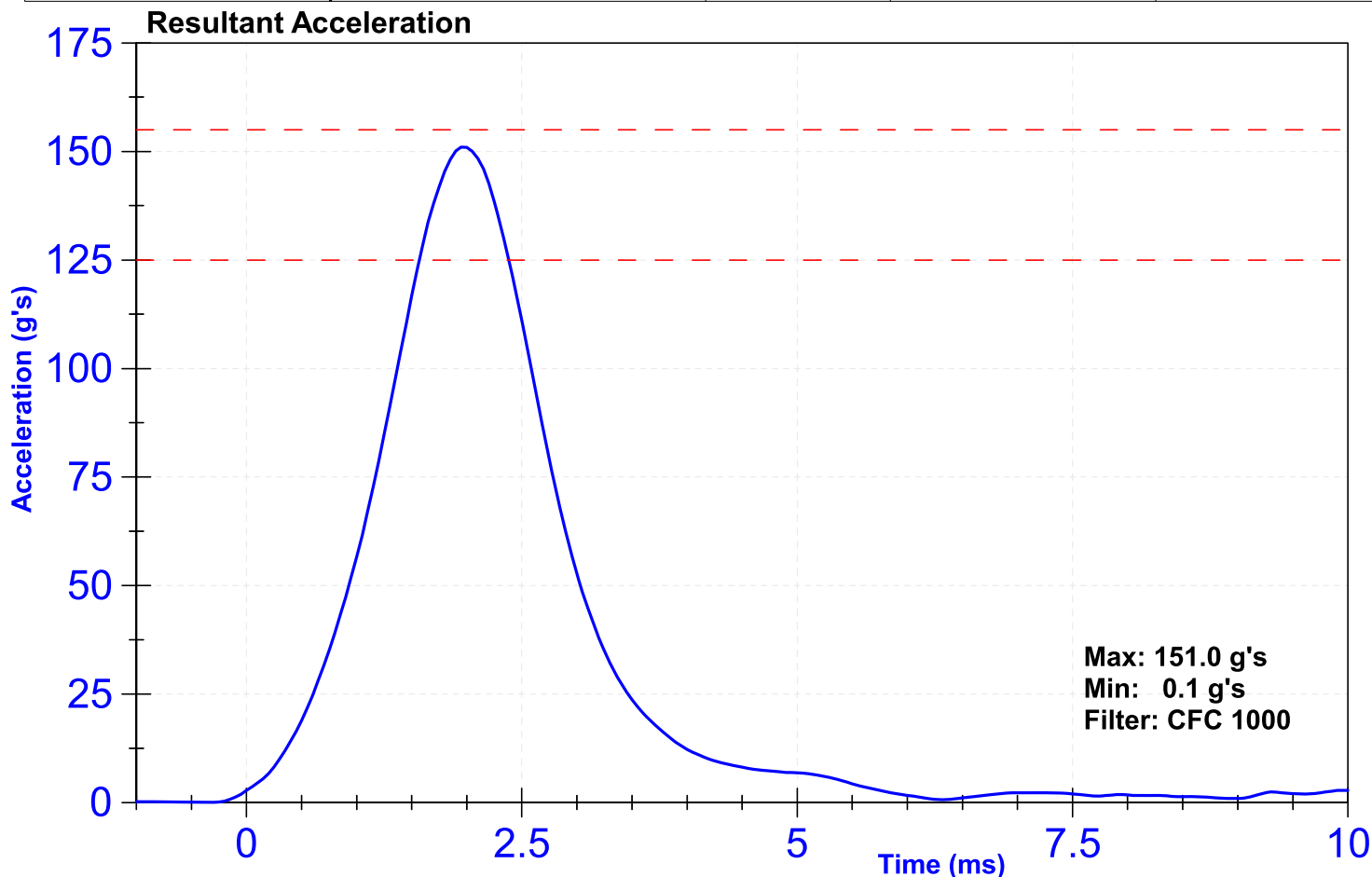
ATD Manufacturer	Humanetics	Test Technician	E. Andruczyk
ATD Serial Number	d037	Laboratory Supervisor	J. Kinderman

Results

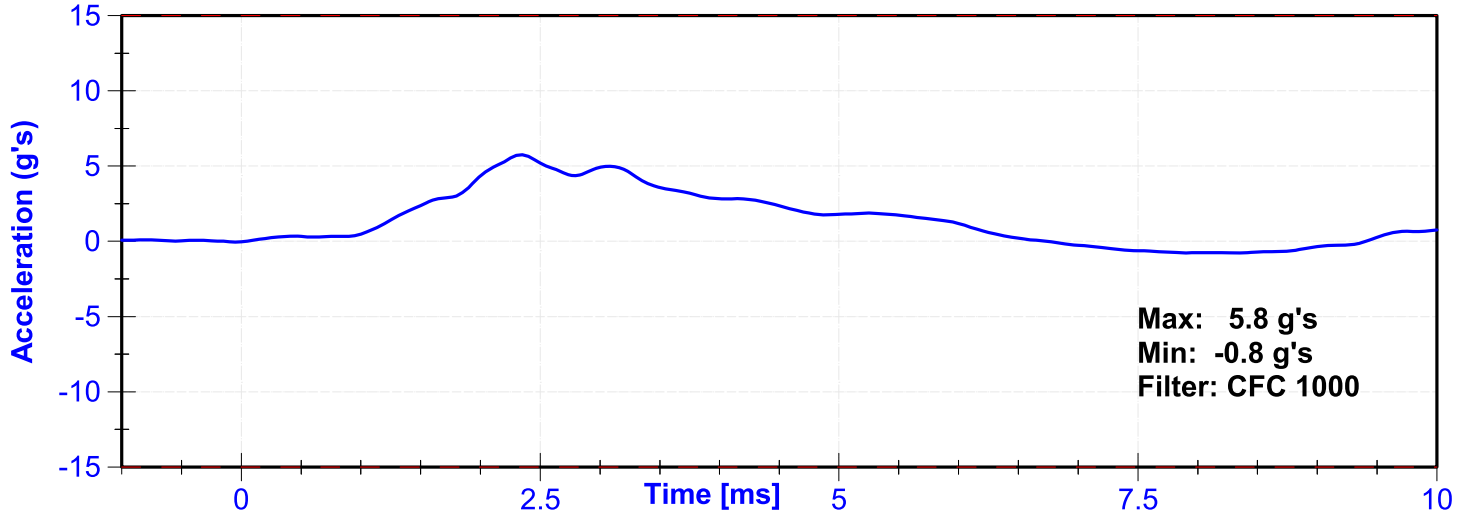
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	28	Pass
Resultant Acceleration	125	155	g's	151.0	Pass
Oscillation	0	15	%	2.00	Pass
Fore-Aft Acceleration	-15	15	g's	5.8	Pass

Transducer Calibrations

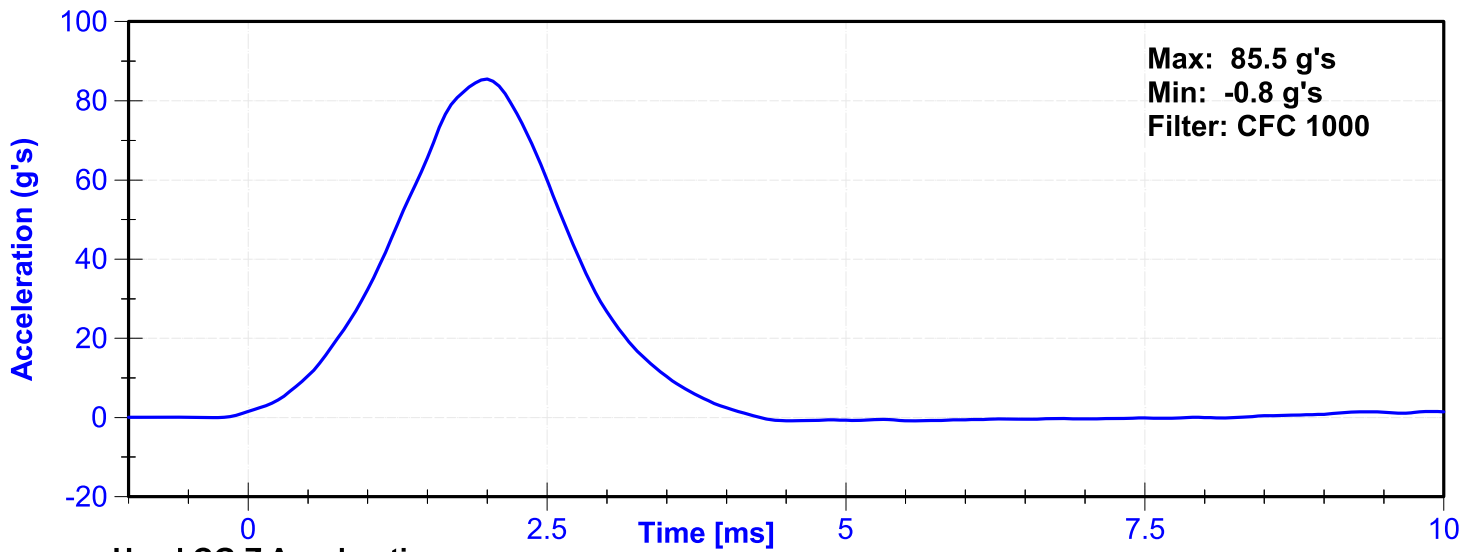
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	T21724	10/8/2024	4/6/2025
Y Accelerometer	Endevco	T22281	10/8/2024	4/6/2025
Z Accelerometer	Endevco	T26050	10/8/2024	4/6/2025



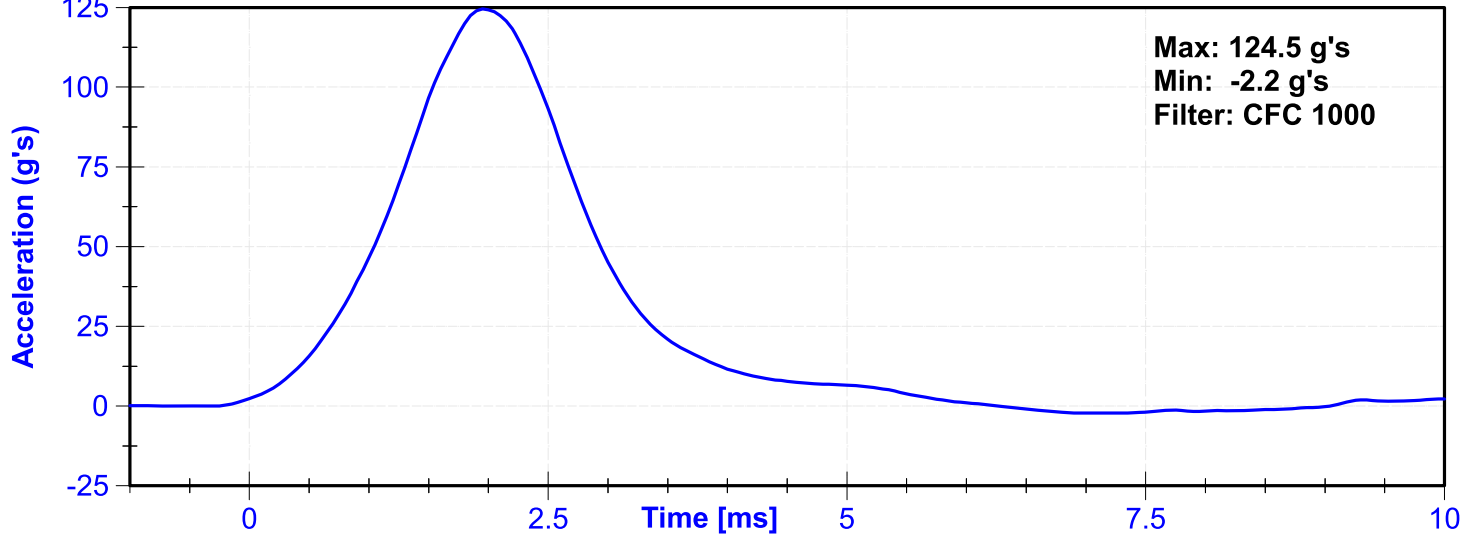
Head CG X Acceleration



Head CG Y Acceleration



Head CG Z Acceleration



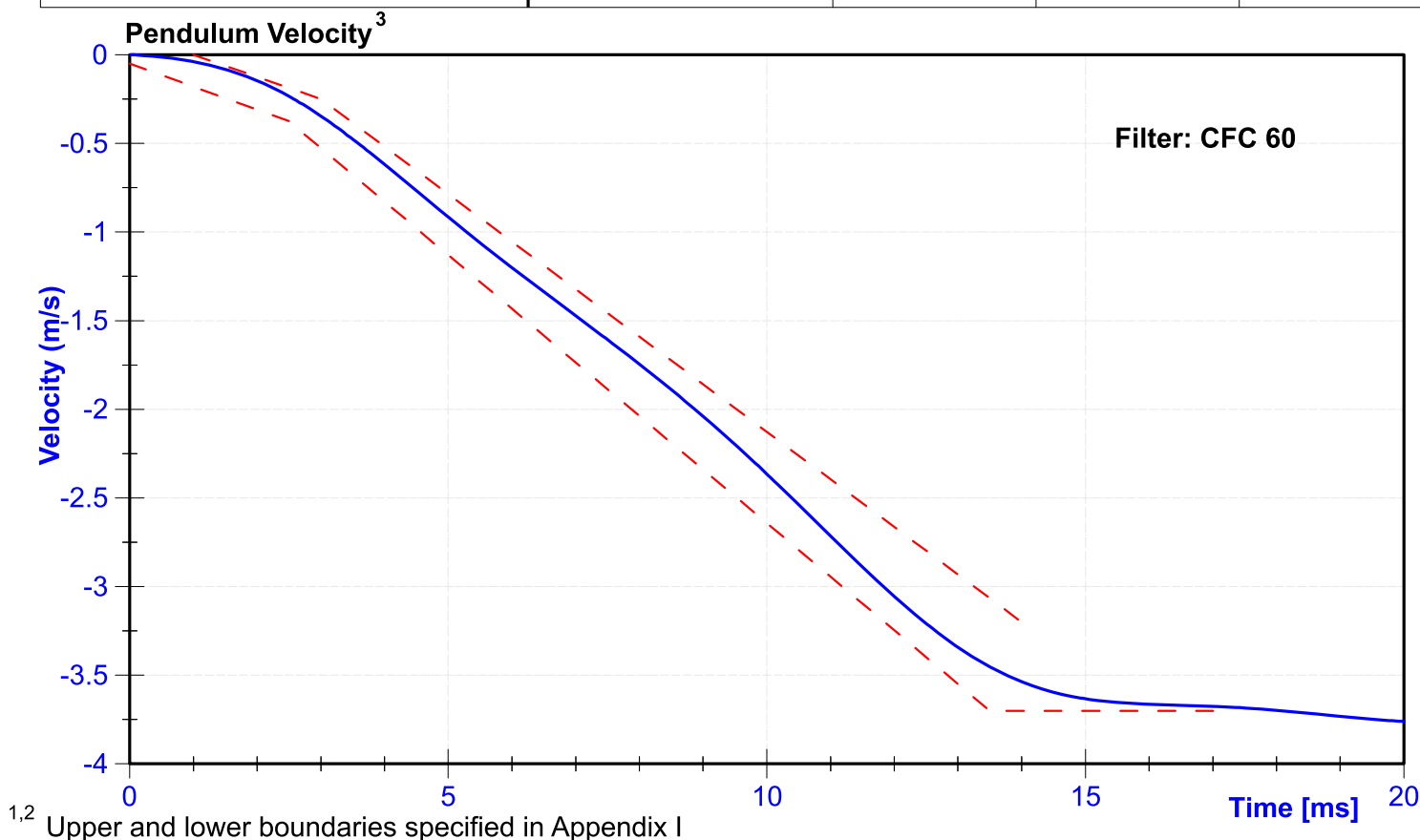
ATD Manufacturer	denton	Test Technician	E. Andruczyk
ATD Serial Number	d037	Laboratory Supervisor	J. Kinderman

Results

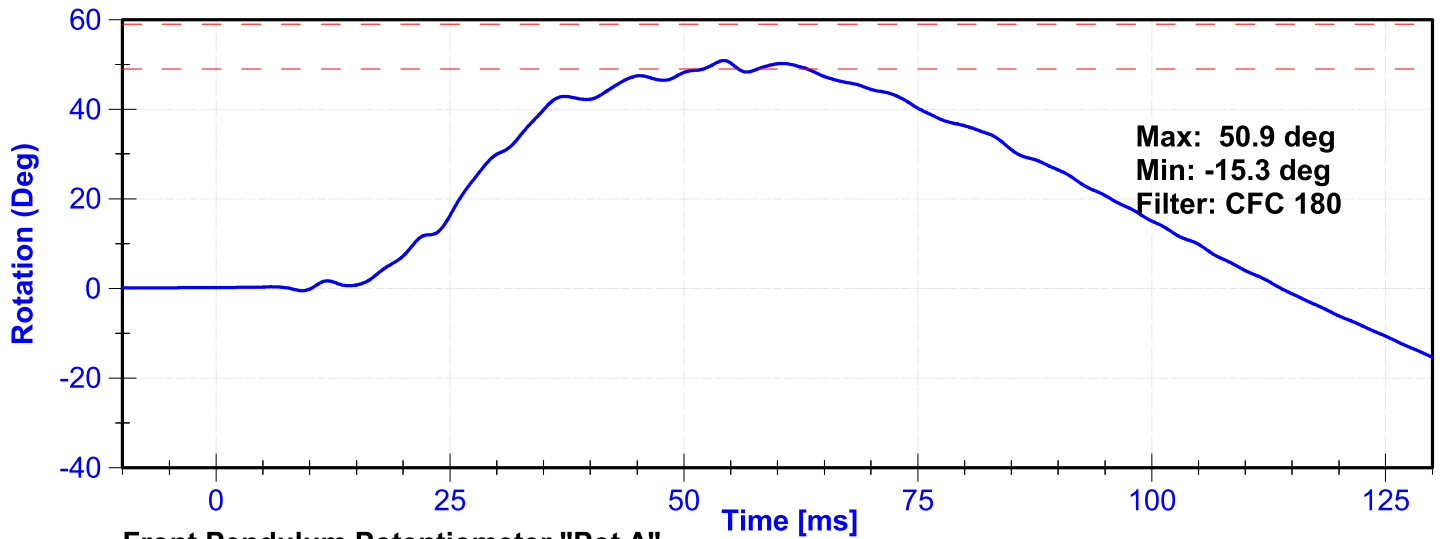
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	28	Pass
Velocity	3.3	3.5	m/s	3.48	Pass
Lateral Neck Rotation	49	59	deg	50.9	Pass
Time at Maximum Rotation	54	66	ms	54.2	Pass
Time of Rotation Decay from Maximum	53	88	ms	59.6	Pass
Pendulum Velocity Overall Corridor	Lower Boundary ¹	Upper Boundary ²	m/s	See Plot ³	Pass

Transducer Calibrations

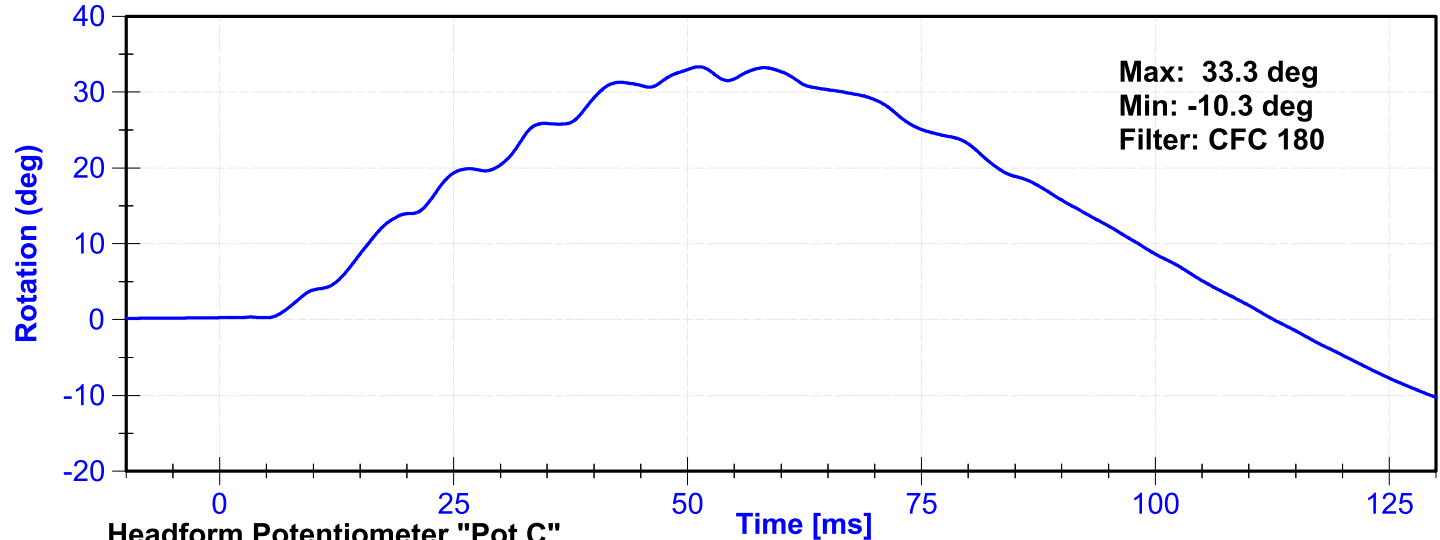
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16650	11/1/2024	11/1/2025
Front Pendulum Potentiometer	Sfernice	2247	9/13/2024	9/13/2025
Headform Potentiometer	Sfernice	095	9/13/2024	9/13/2025



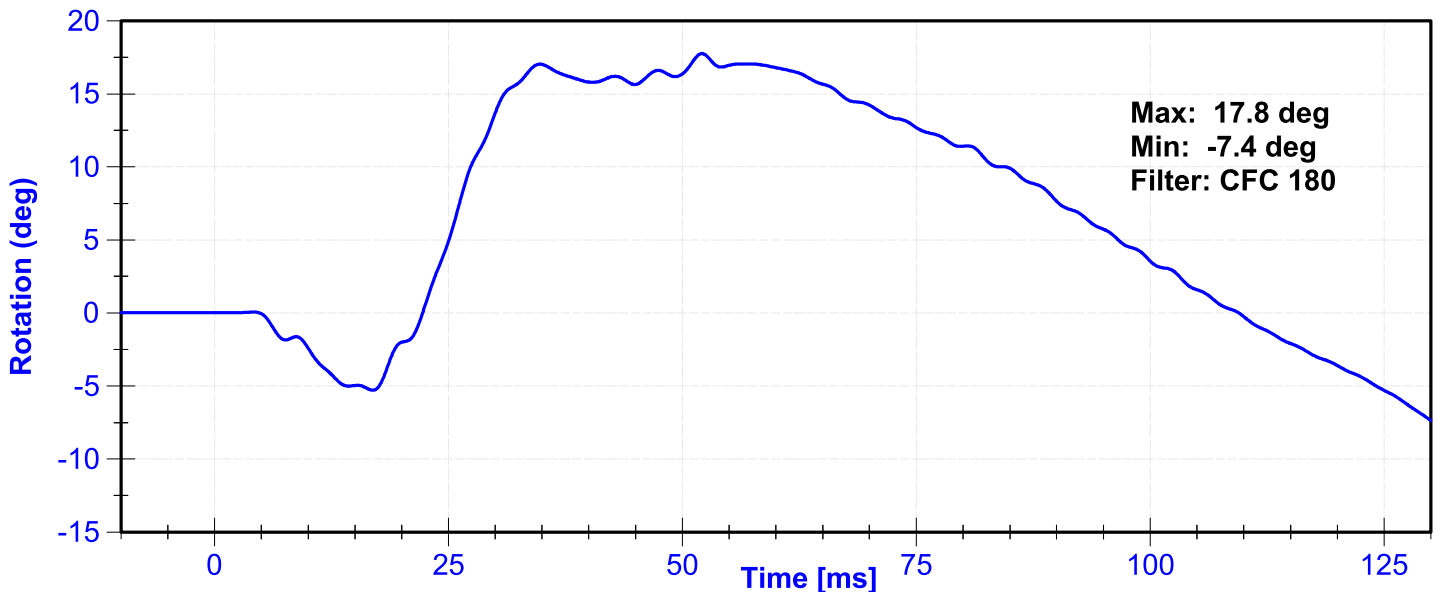
Neck Rotation



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

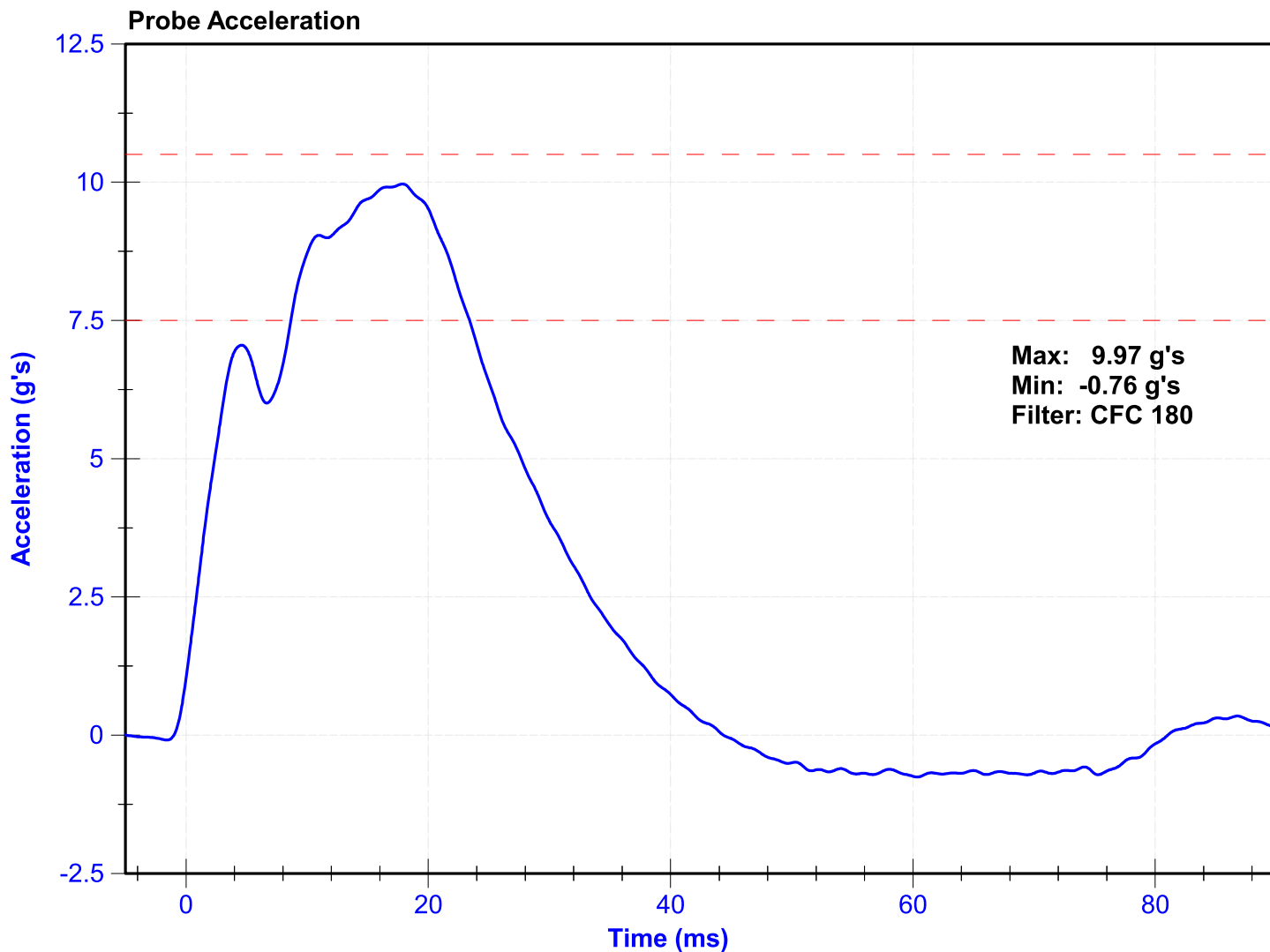
ATD Manufacturer	Humanetics	Test Technician	E. Andruczyk
ATD Serial Number	d037	Laboratory Supervisor	J.Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	35	Pass
Velocity	4.2	4.4	m/s	4.24	Pass
Probe Acceleration	7.5	10.5	g's	9.97	Pass

Transducer Calibrations

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



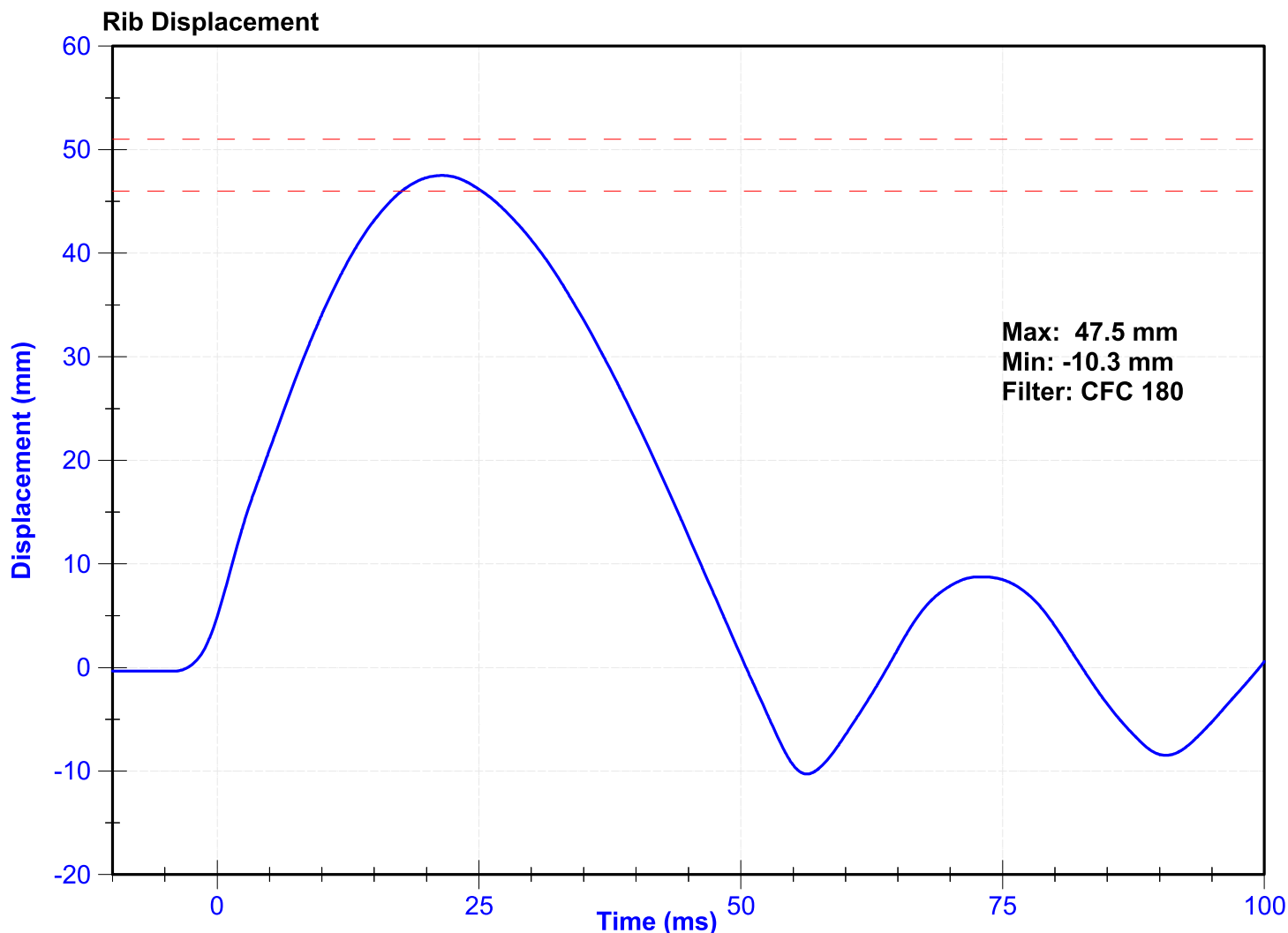
ATD Manufacturer	denton	Test Technician	E. Andruczyk
ATD Serial Number	do37	Laboratory Supervisor	J.Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	28	Pass
Rib Displacement	46	51	mm	47.5	Pass

Transducer Calibrations

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



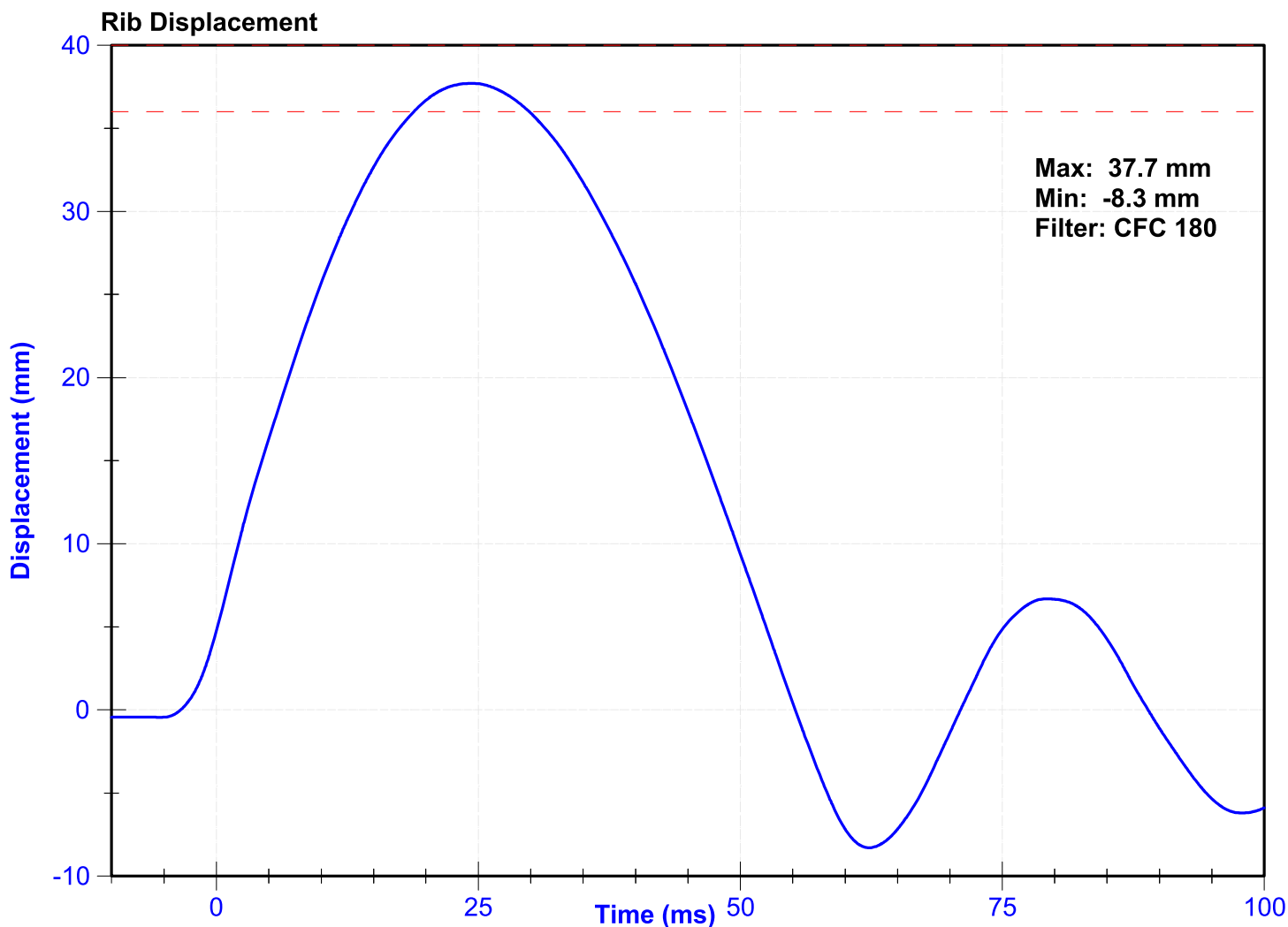
ATD Manufacturer	denton	Test Technician	E. Andruczyk
ATD Serial Number	do37	Laboratory Supervisor	J.Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	28	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



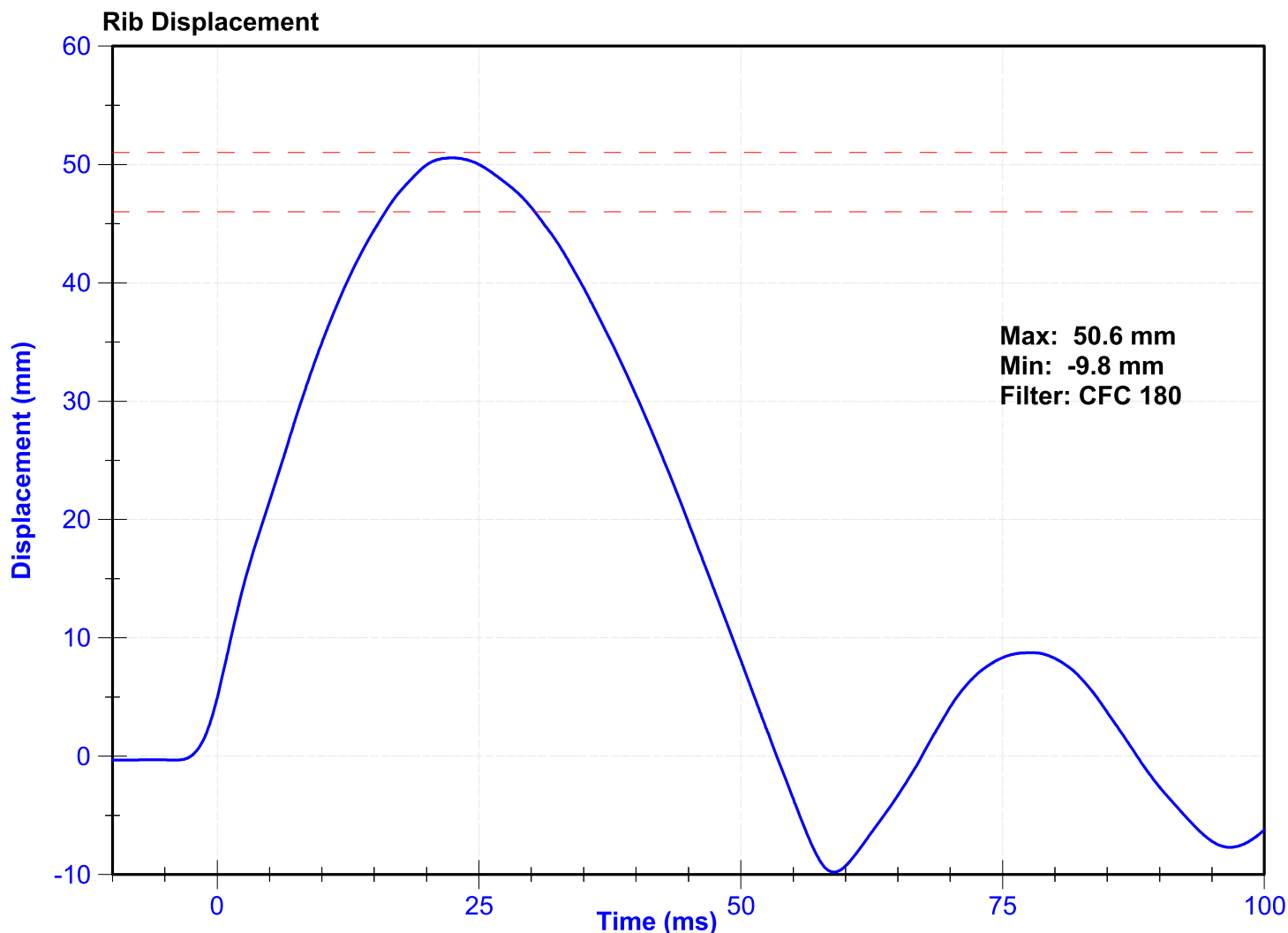
ATD Manufacturer	denton	Test Technician	E. Andruczyk
ATD Serial Number	do37	Laboratory Supervisor	J.Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	28	Pass
Rib Displacement	46	51	mm	50.6	Pass

Transducer Calibrations

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



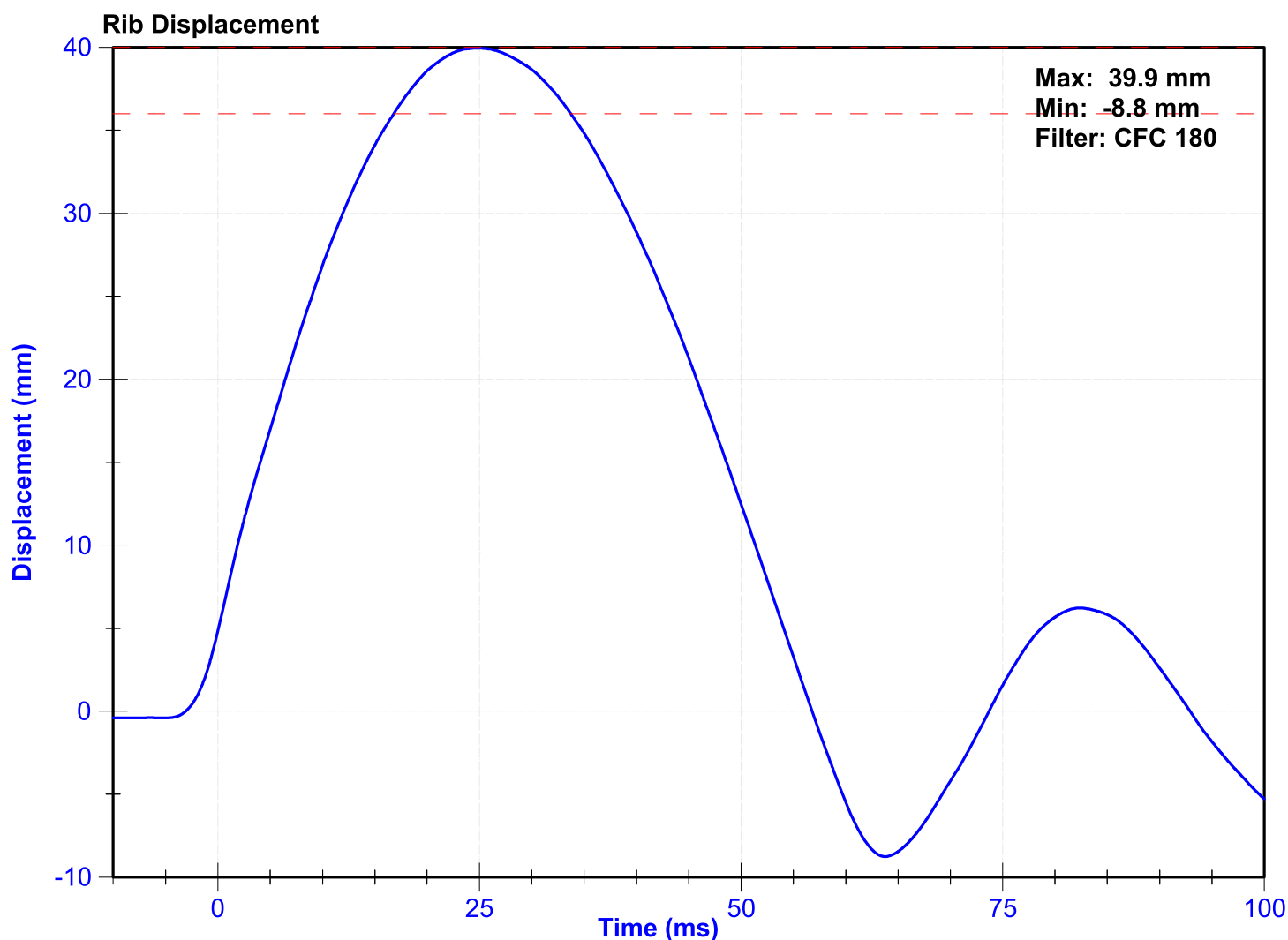
ATD Manufacturer	denton	Test Technician	E. Andruczyk
ATD Serial Number	do37	Laboratory Supervisor	J.Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	28	Pass
Rib Displacement	36	40	mm	39.9	Pass

Transducer Calibrations

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



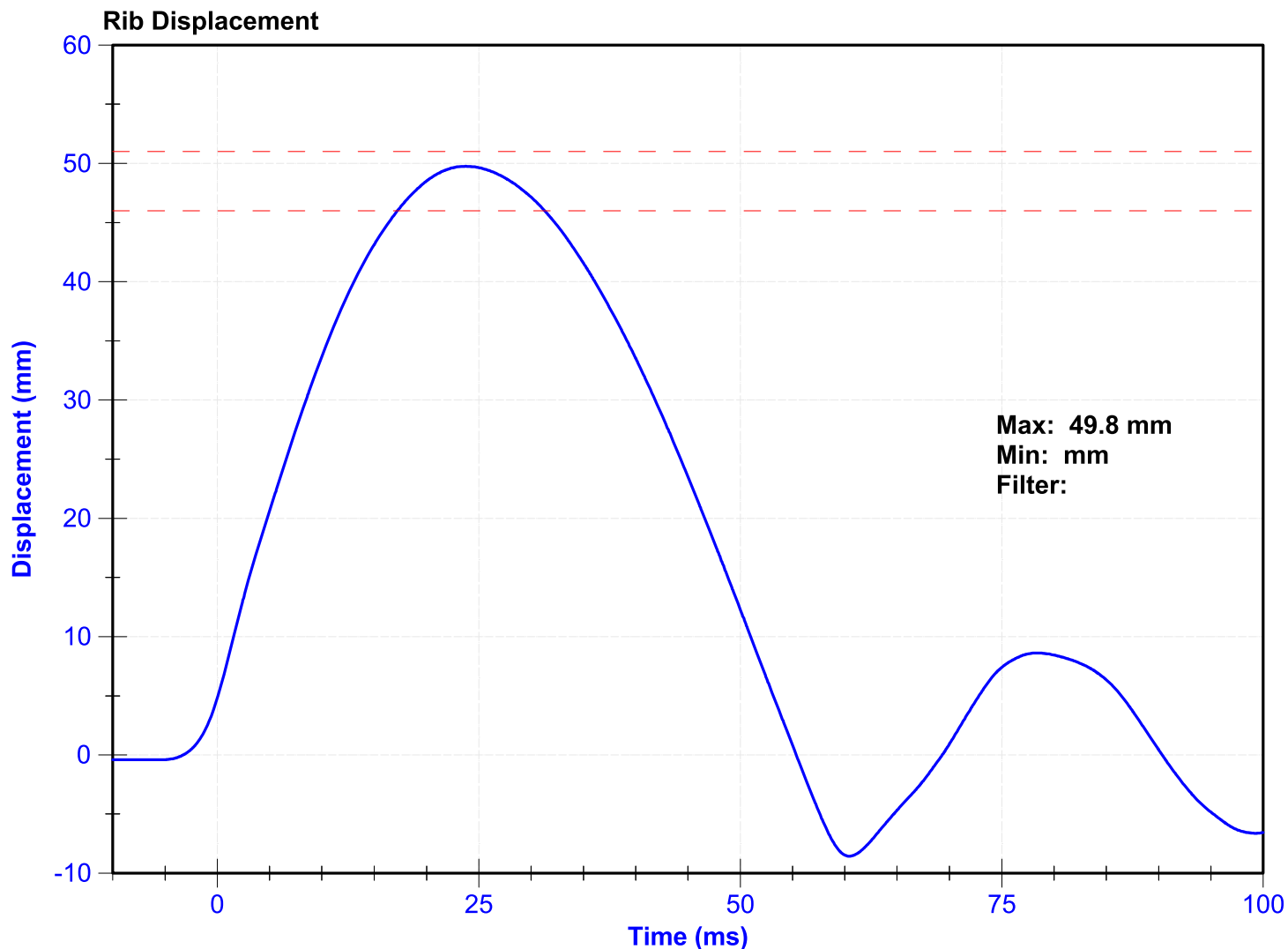
ATD Manufacturer	denton	Test Technician	E. Andruczyk
ATD Serial Number	do37	Laboratory Supervisor	J.Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	28	Pass
Rib Displacement	46	51	mm	49.8	Pass

Transducer Calibrations

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



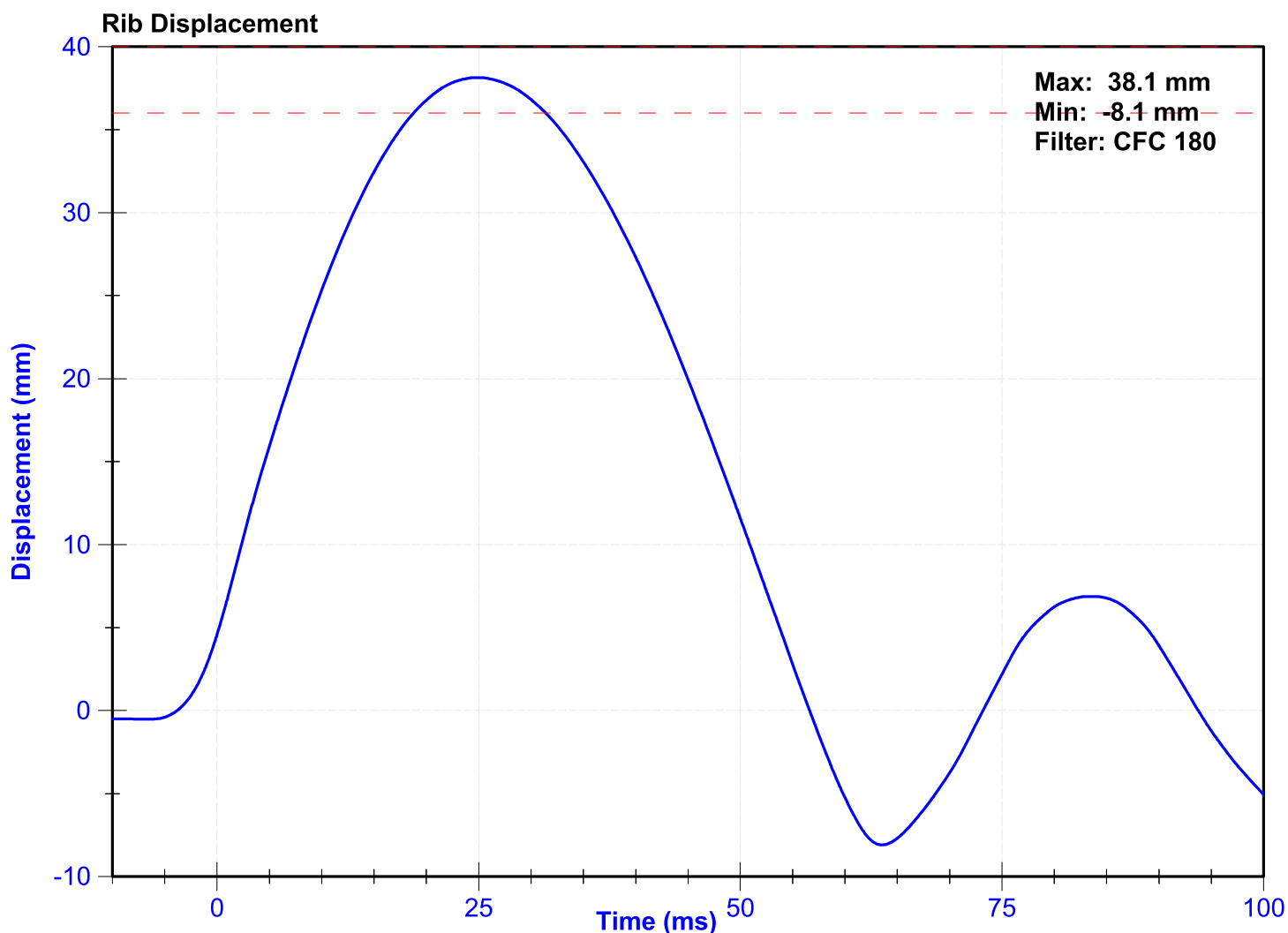
ATD Manufacturer	denton	Test Technician	E. Andruczyk
ATD Serial Number	do37	Laboratory Supervisor	J.Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	28	Pass
Rib Displacement	36	40	mm	38.1	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	Humanetics	Test Technician	E. Andruczyk
ATD Serial Number	d037	Laboratory Supervisor	J.Kinderman

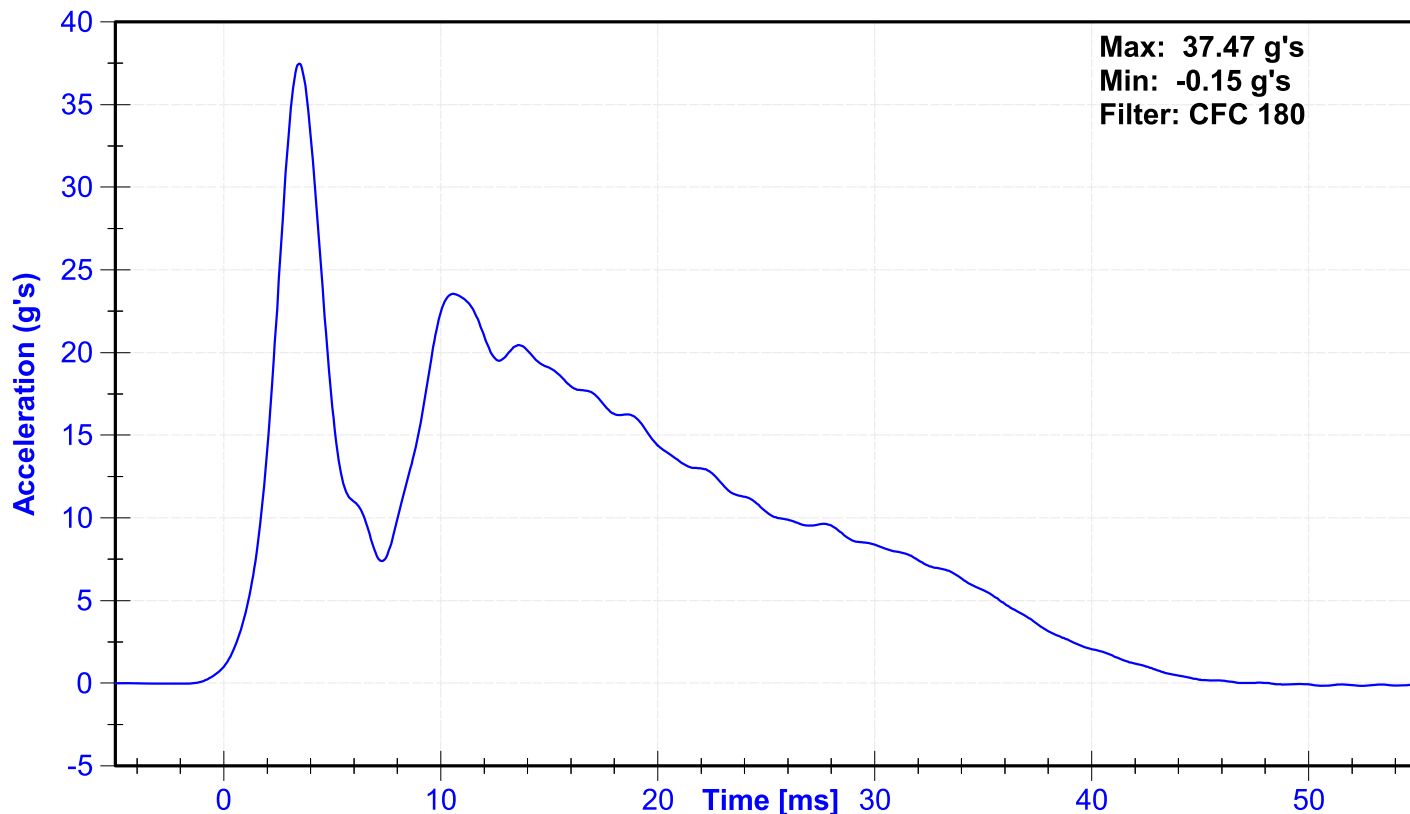
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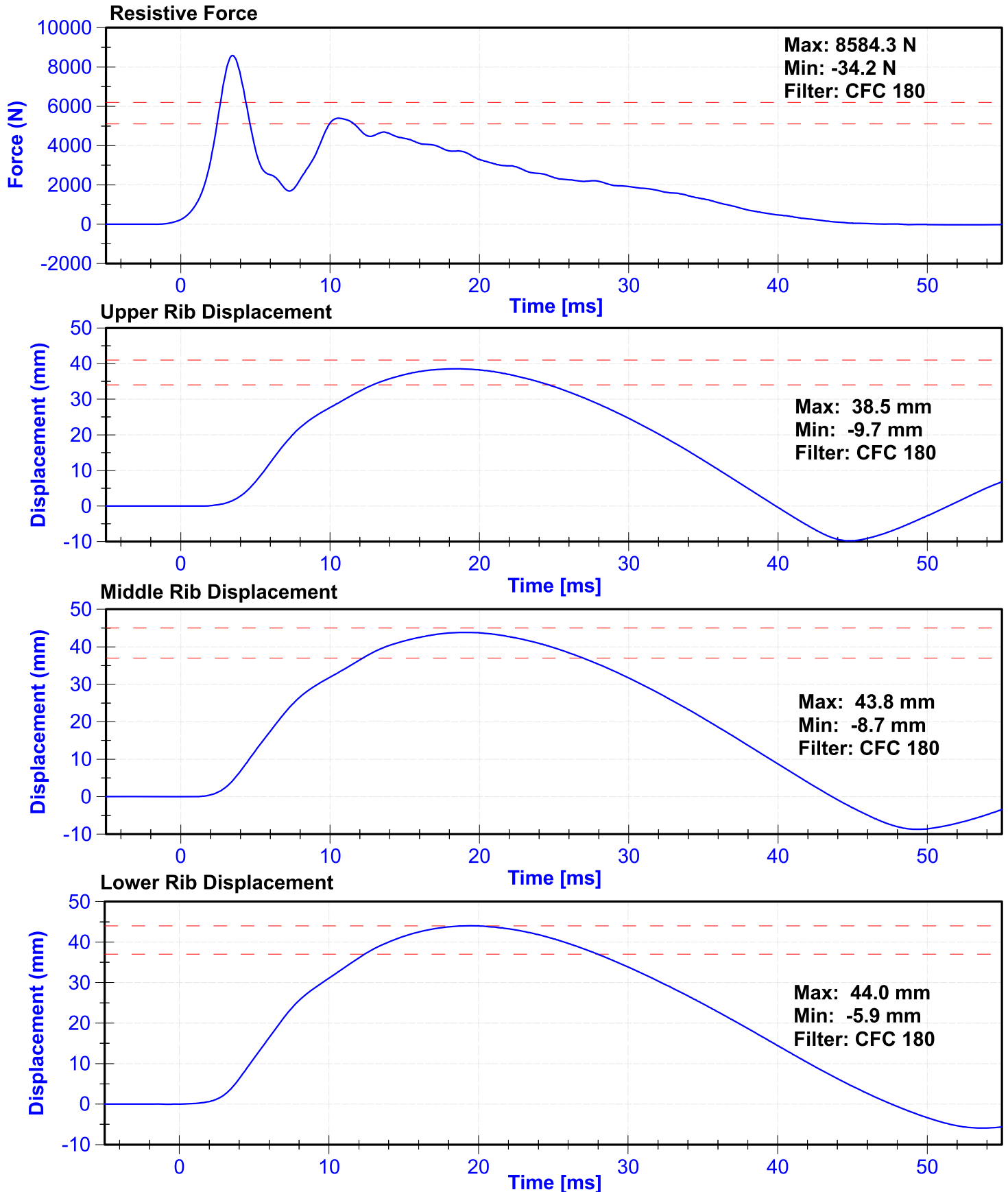
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	35	Pass
Velocity	5.4	5.6	m/s	5.54	Pass
Resistive Force after 6ms	5100	6200	N	5391.3	Pass
Upper Thorax Rib Deflection	34	41	mm	38.5	Pass
Mid Thorax Rib Deflection	37	45	mm	43.8	Pass
Lower Thorax Rib Deflection	37	44	mm	44.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	18566	11/26/2024	5/25/2025
Upper Thorax Rib Potentiometer	Honeywell	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	Humanetics	Test Technician	E. Andruczyk
ATD Serial Number	d037	Laboratory Supervisor	J.Kinderman

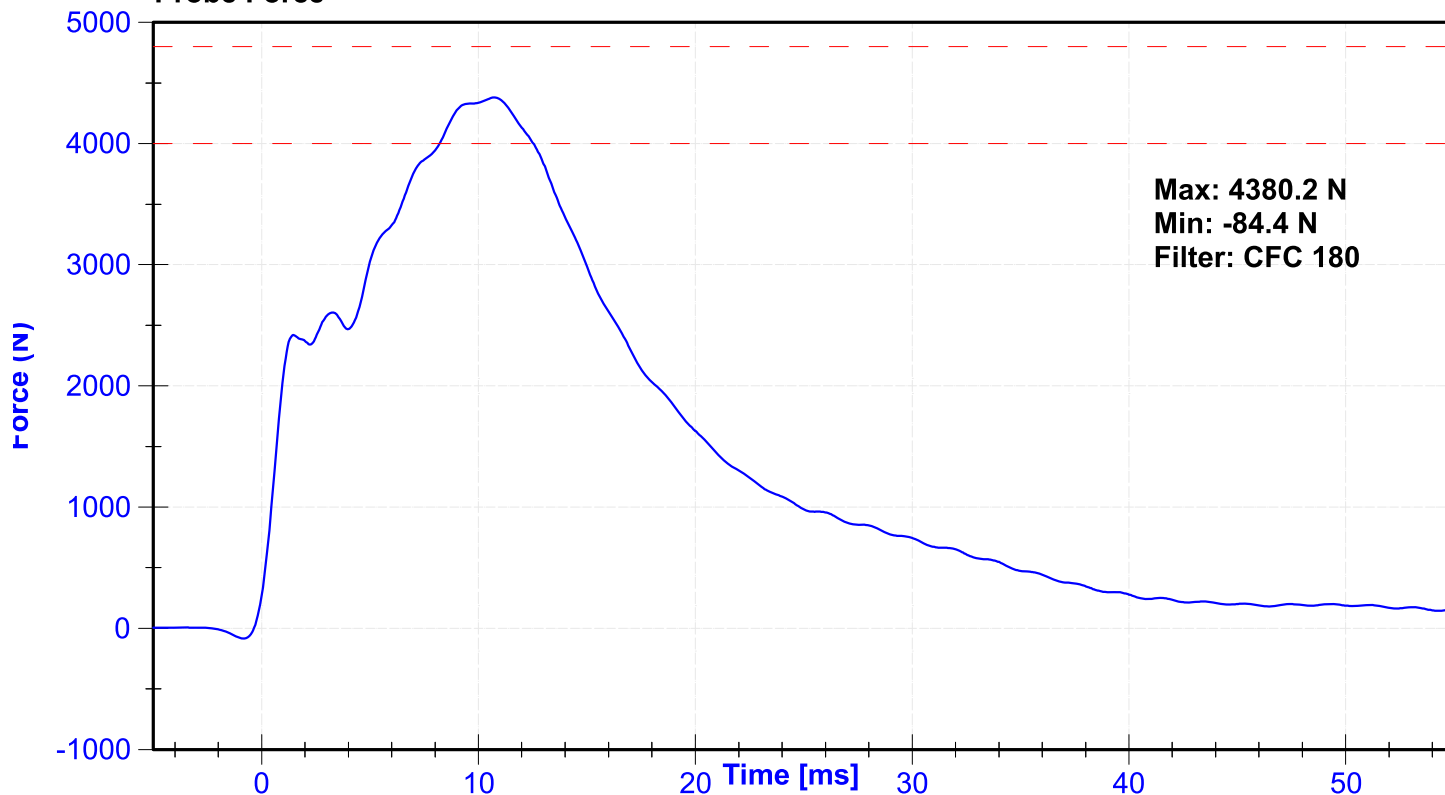
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	35	Pass
Velocity	3.9	4.1	m/s	4.02	Pass
Combined Abdomen Force	2200	2700	N	2349.1	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	10.65	Pass
Resistive Probe Force	4000	4800	N	4380.2	Pass
Time at Peak Resistive Force	10.6	13.0	ms	10.75	Pass

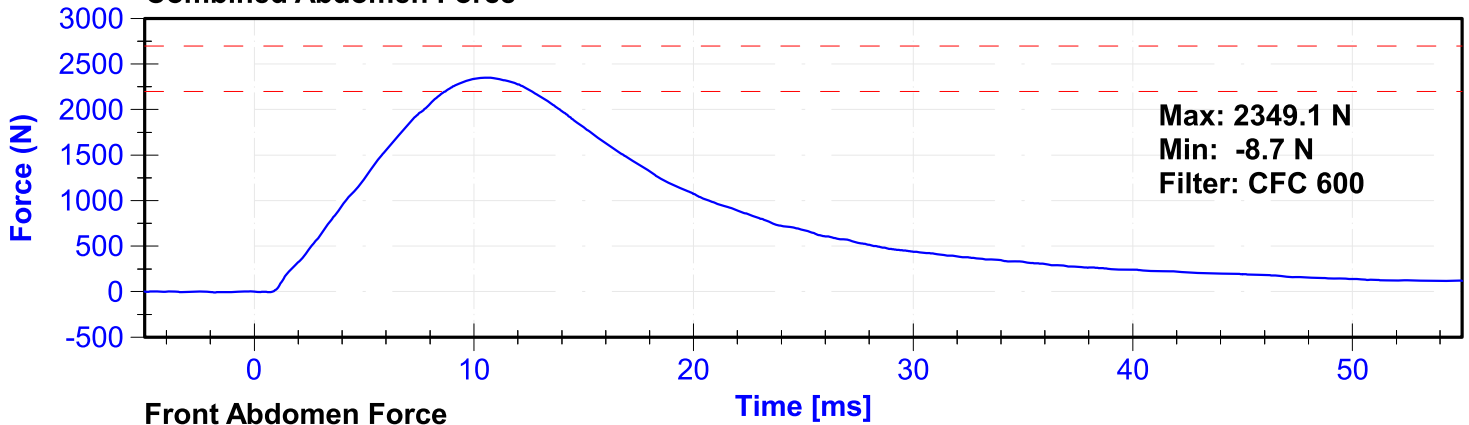
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18566	11/26/2024	5/25/2025
Front Abdomen Load Cell	Denton	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

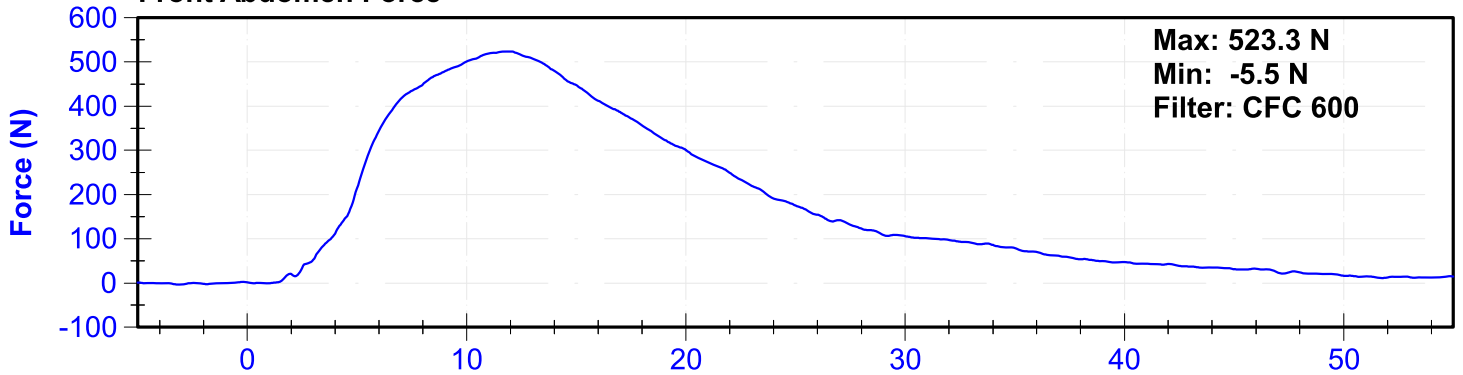
Probe Force



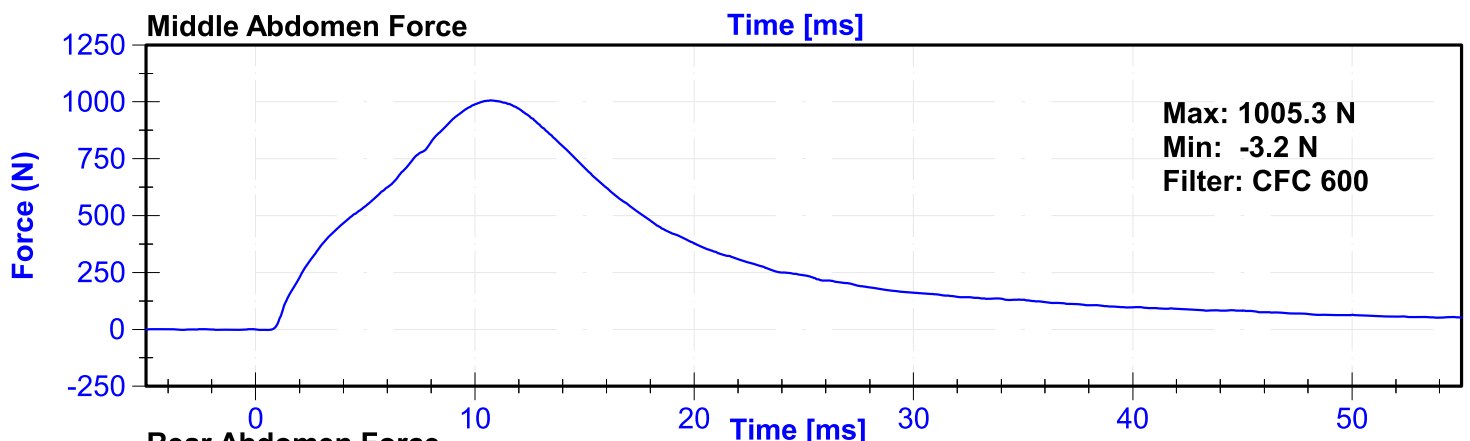
Combined Abdomen Force



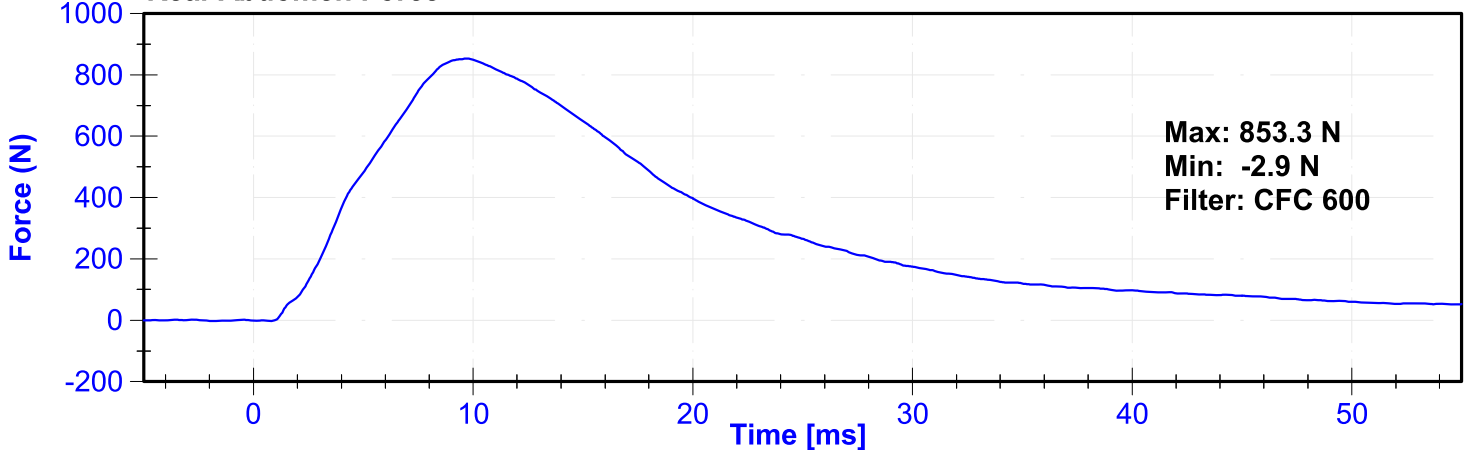
Front Abdomen Force



Middle Abdomen Force



Rear Abdomen Force



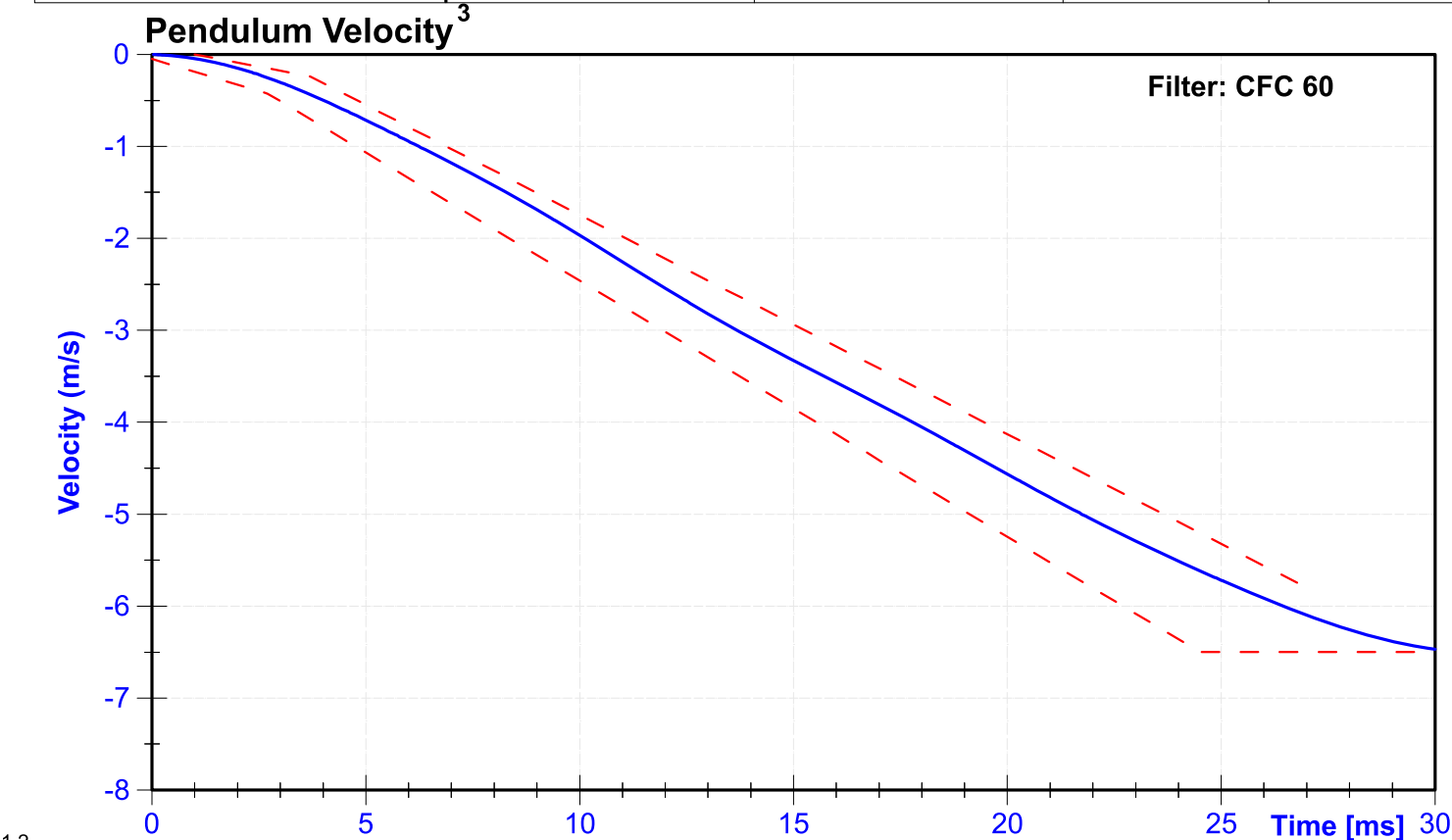
ATD Manufacturer	denton	Test Technician	E. Andruczyk
ATD Serial Number	d037	Laboratory Supervisor	J. Kinderman

Results

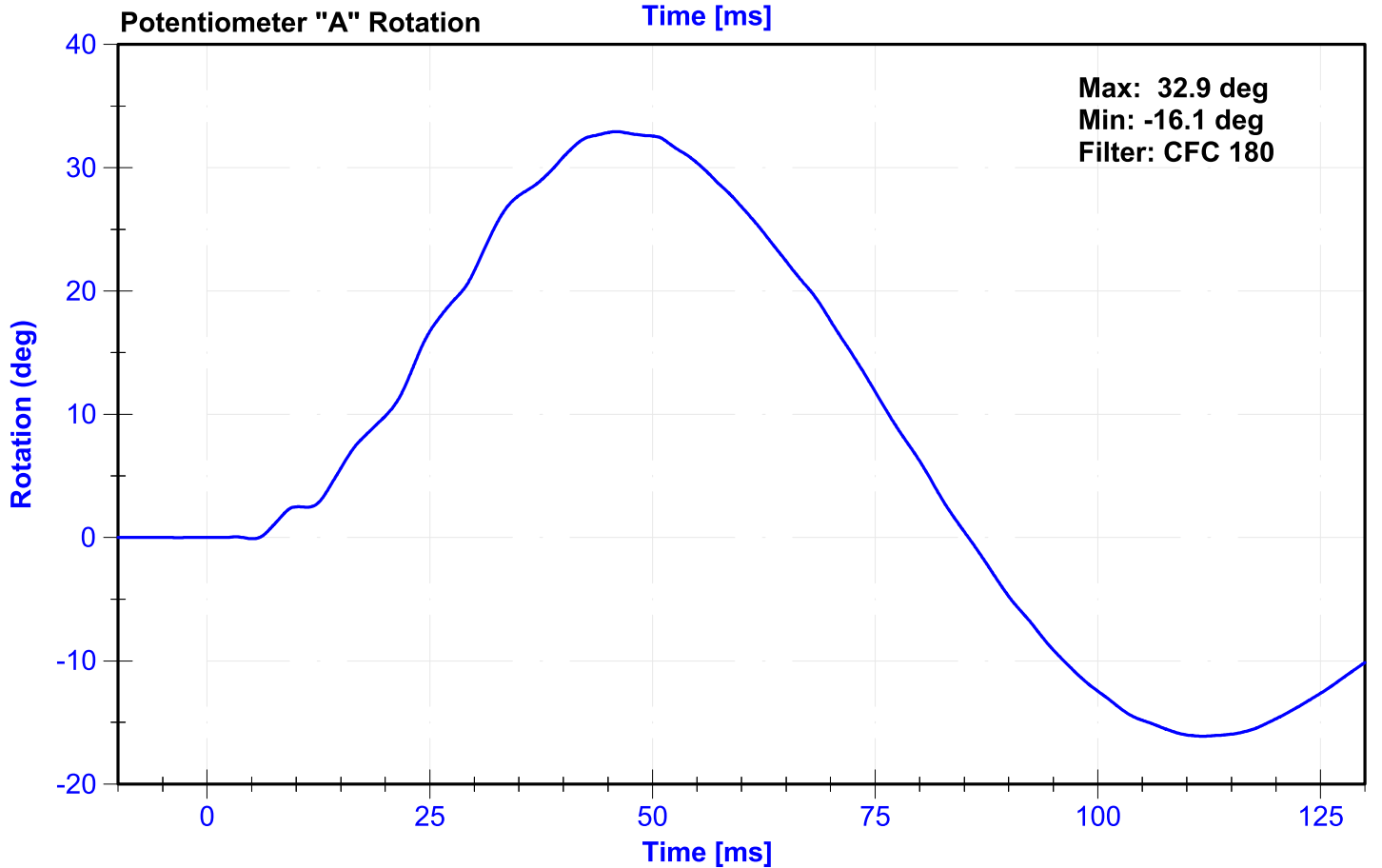
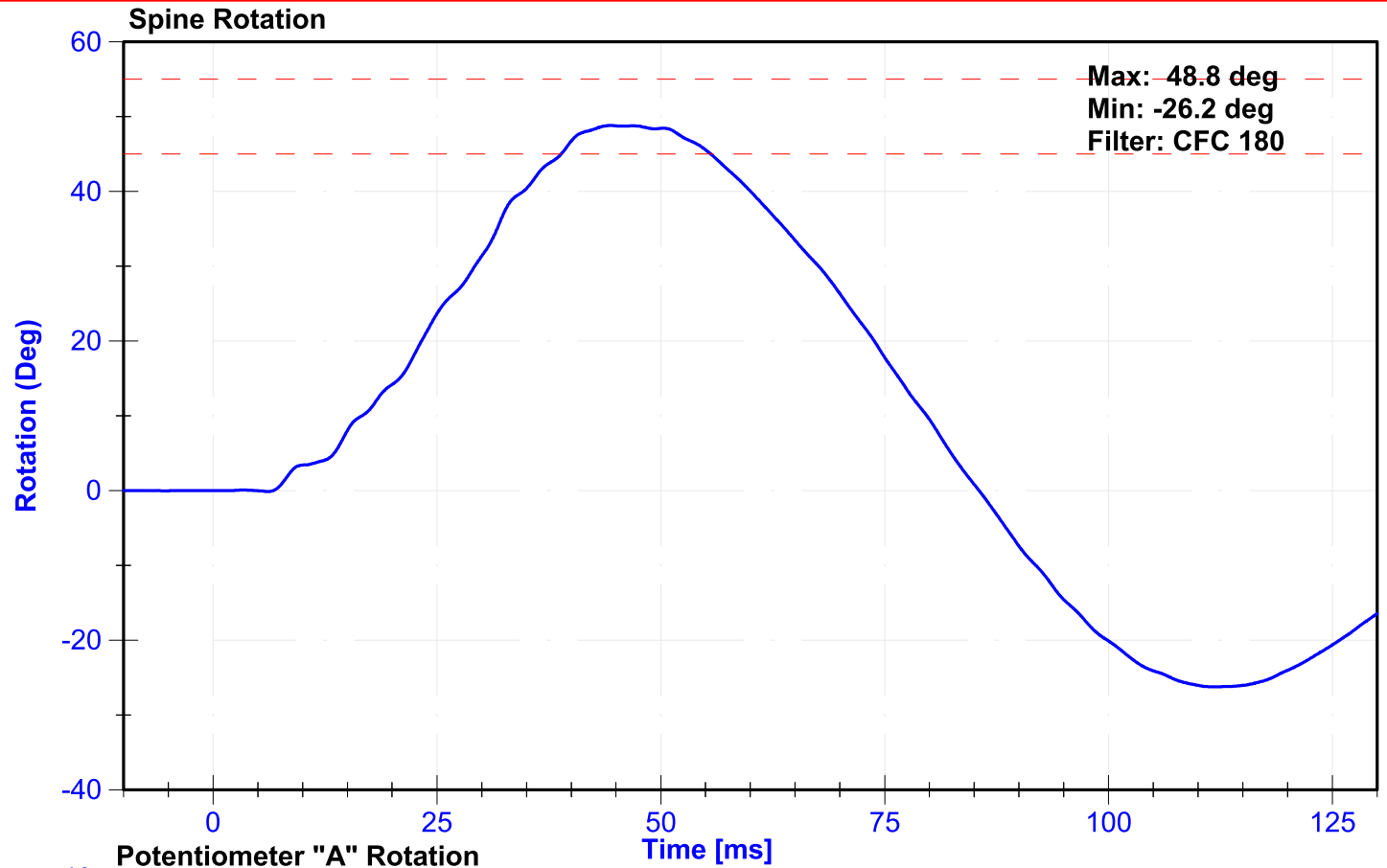
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	32	Pass
Velocity	5.95	6.15	m/s	6.116	Pass
Lateral Spine Rotation	45	55	deg	48.8	Pass
Time at Maximum Rotation	39	53	ms	44.4	Pass
Time of Decay to Zero Degrees	37	57	ms	41.2	Pass
Pendulum Velocity Overall Corridor	Lower Boundary ¹	Upper Boundary ²	m/s	See Plot ³	Pass

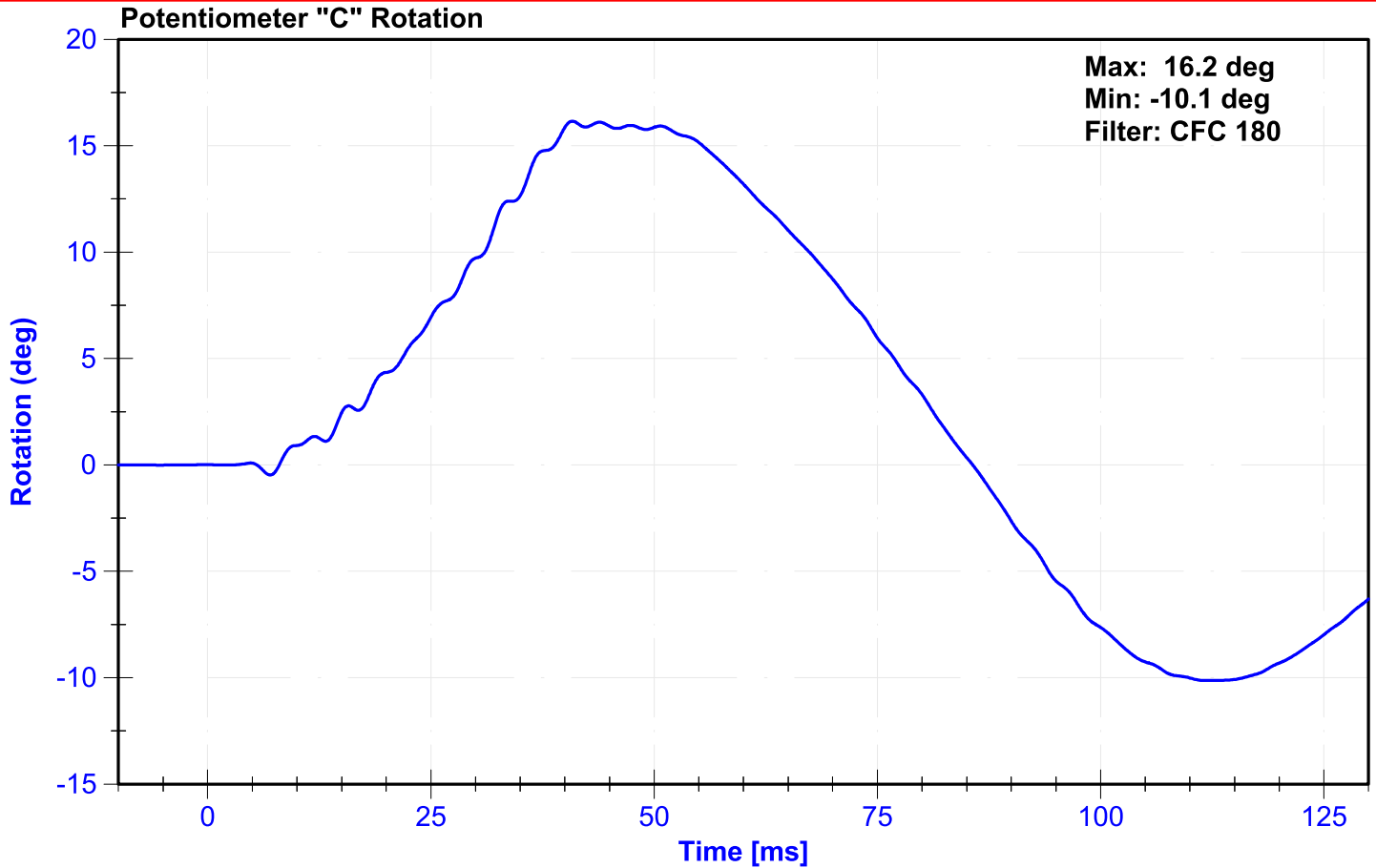
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16650	11/1/2024	11/1/2025
Pendulum "A" Potentiometer	Sfernice	2247	9/13/2024	9/13/2025
Condyle "B" Potentiometer	Sfernice	095	9/13/2024	9/13/2025



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





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

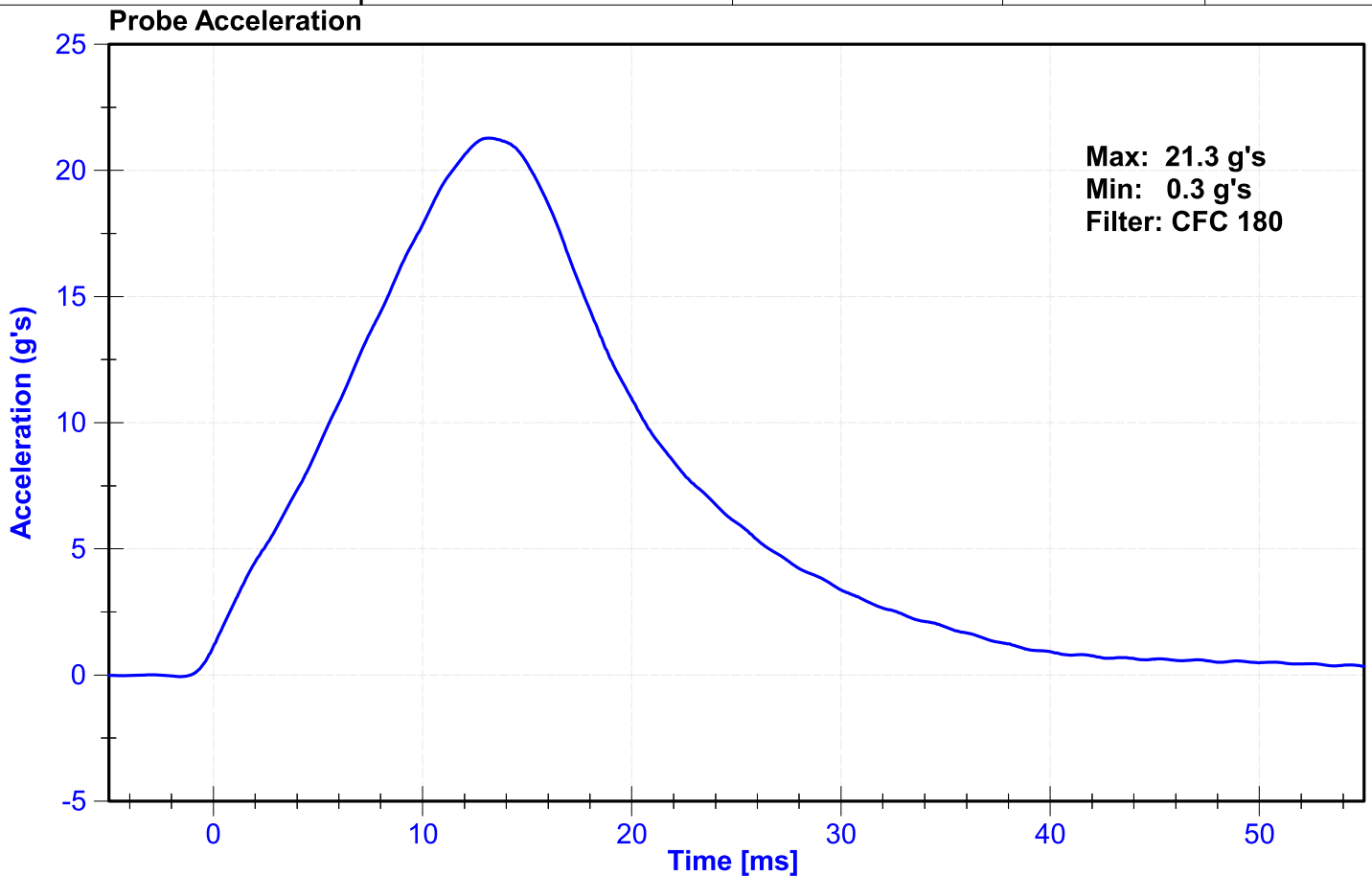
ATD Manufacturer	Humanetics	Test Technician	E. Andruczyk
ATD Serial Number	d037	Laboratory Supervisor	J.Kinderman

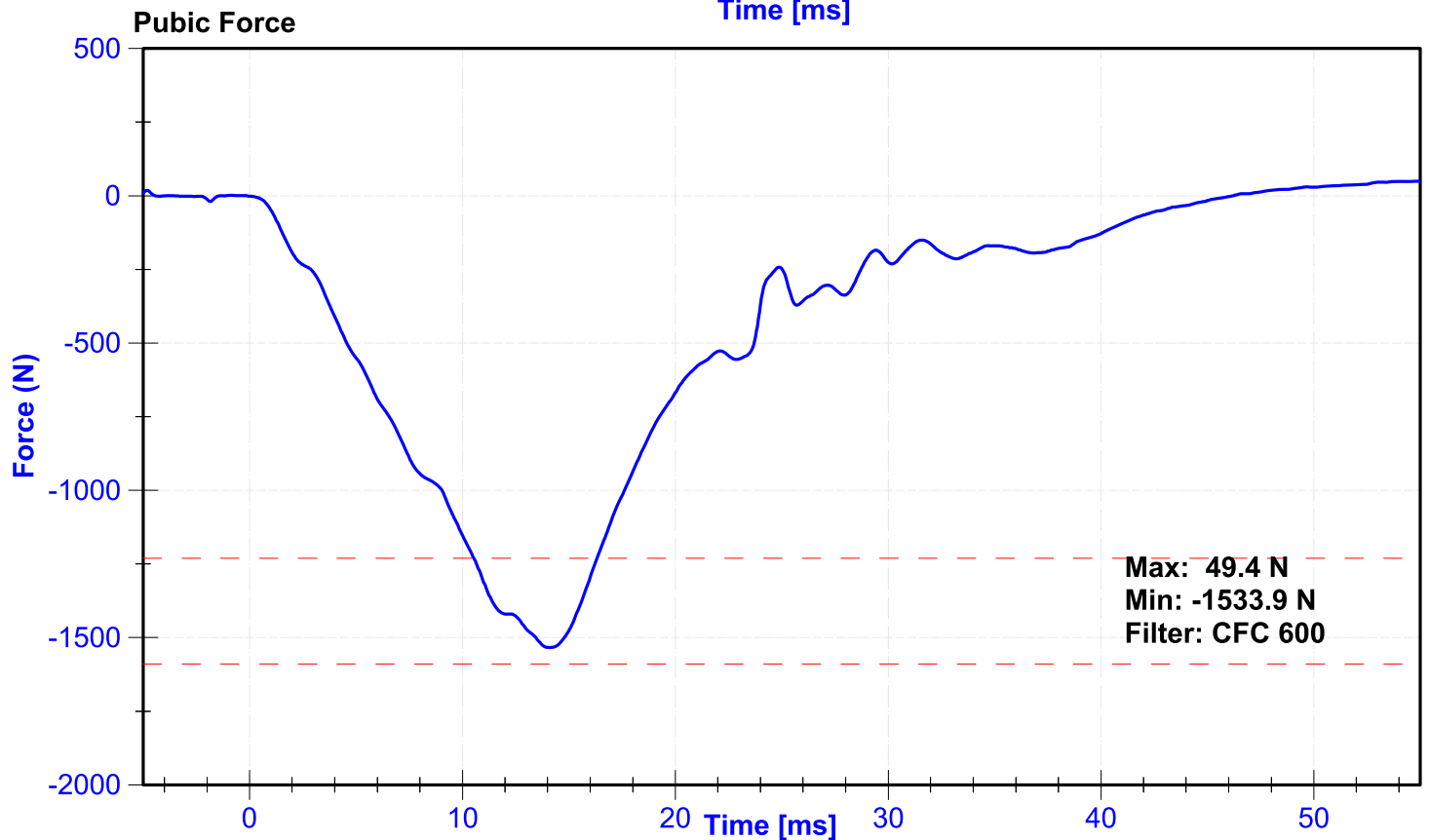
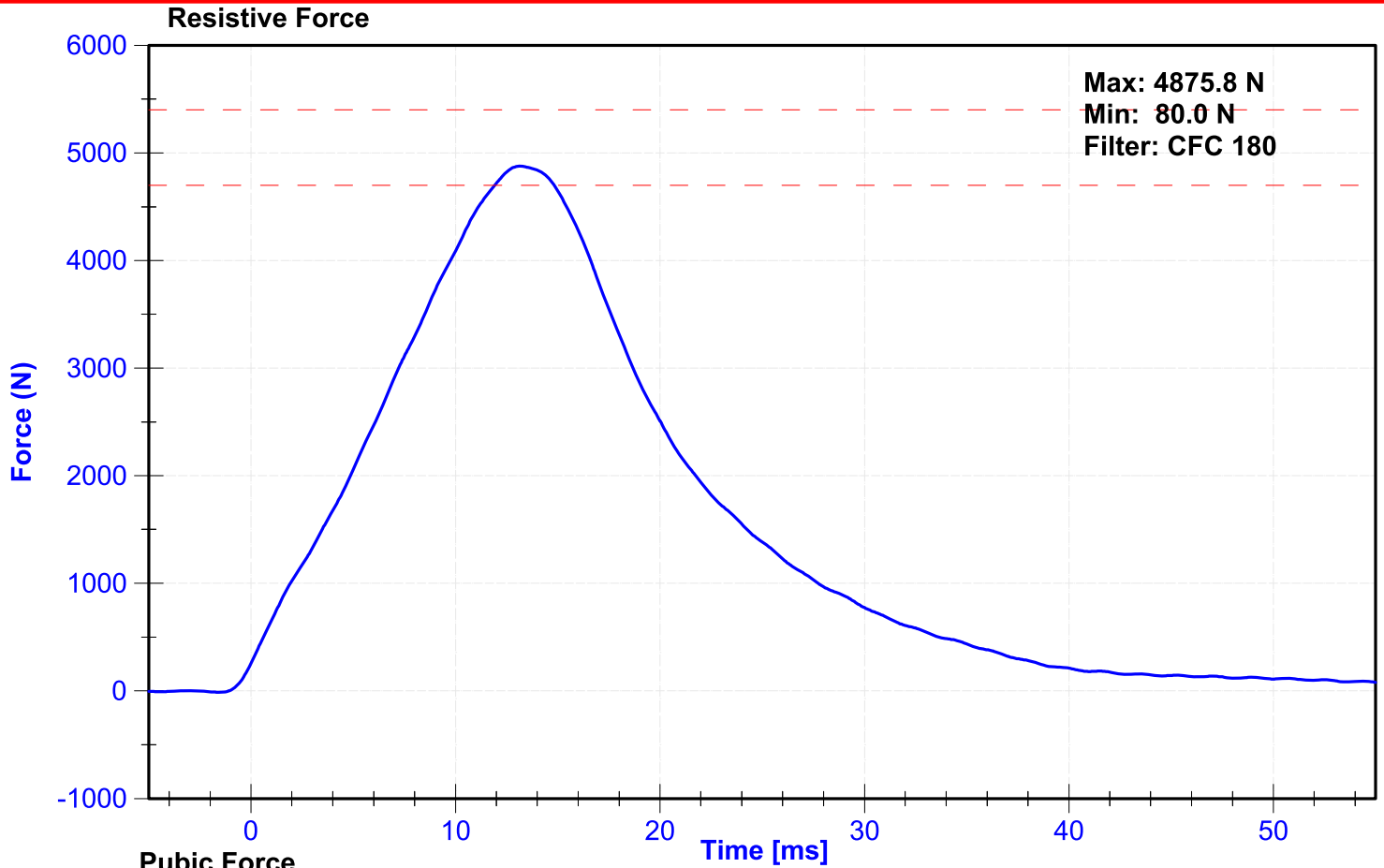
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	35	Pass
Velocity	4.2	4.4	m/s	4.28	Pass
Resistive Force	4700	5400	N	4875.8	Pass
Time at Peak Resistive Force	11.8	16.1	ms	13.15	Pass
Pubic Force	-1590	-1230	N	-1533.9	Pass
Time at Peak Pubic Force	12.2	17.0	ms	14.05	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18566	11/26/2024	5/25/2025
Pubic Load Cell	Denton	464-FY	9/16/2024	9/16/2025





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

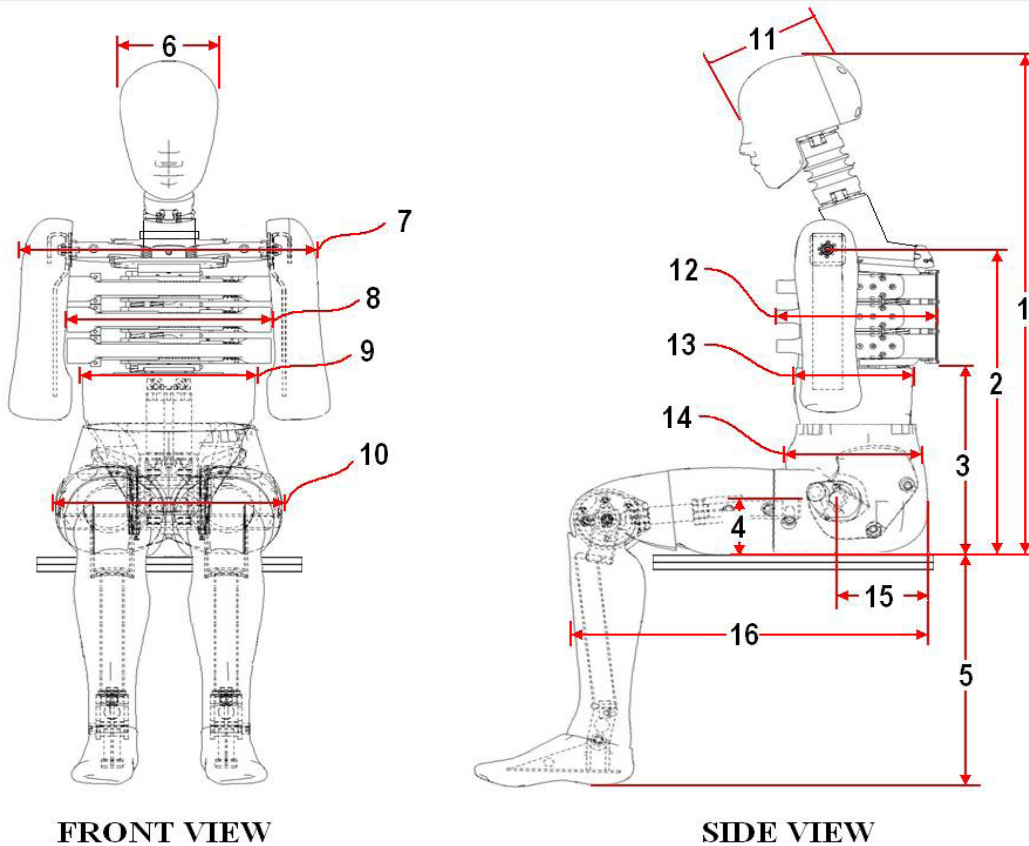


External Measurements - EuroSID-2re

Technician: J. Rios

Date: 1/17/2025

Dummy Serial Number: D037



FRONT VIEW

SIDE VIEW

Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	912	Pass
2	Seat to Shoulder Joint	558	572	566	Pass
3	Seat to Lower Face of Thoracic Spine Box	346	356	352	Pass
4	Seat to Hip Joint (center of bolt)	97	103	101	Pass
5	Sole to Seat, Sitting	333	451	397	Pass
6	Head Width	152	158	154	Pass
7	Shoulder/Arm Width	461	479	472	Pass
8	Thorax Width	322	332	328	Pass
9	Abdomen Width	273	287	281	Pass
10	Pelvis Lap Width	359	373	364	Pass
11	Head Depth	196	206	200	Pass
12	Thorax Depth	262	272	268	Pass
13	Abdomen Depth	194	204	197	Pass
14	Pelvis Depth	235	245	239	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150	160	153	Pass
16	Back of Buttocks to Front Knee	597	615	601	Pass

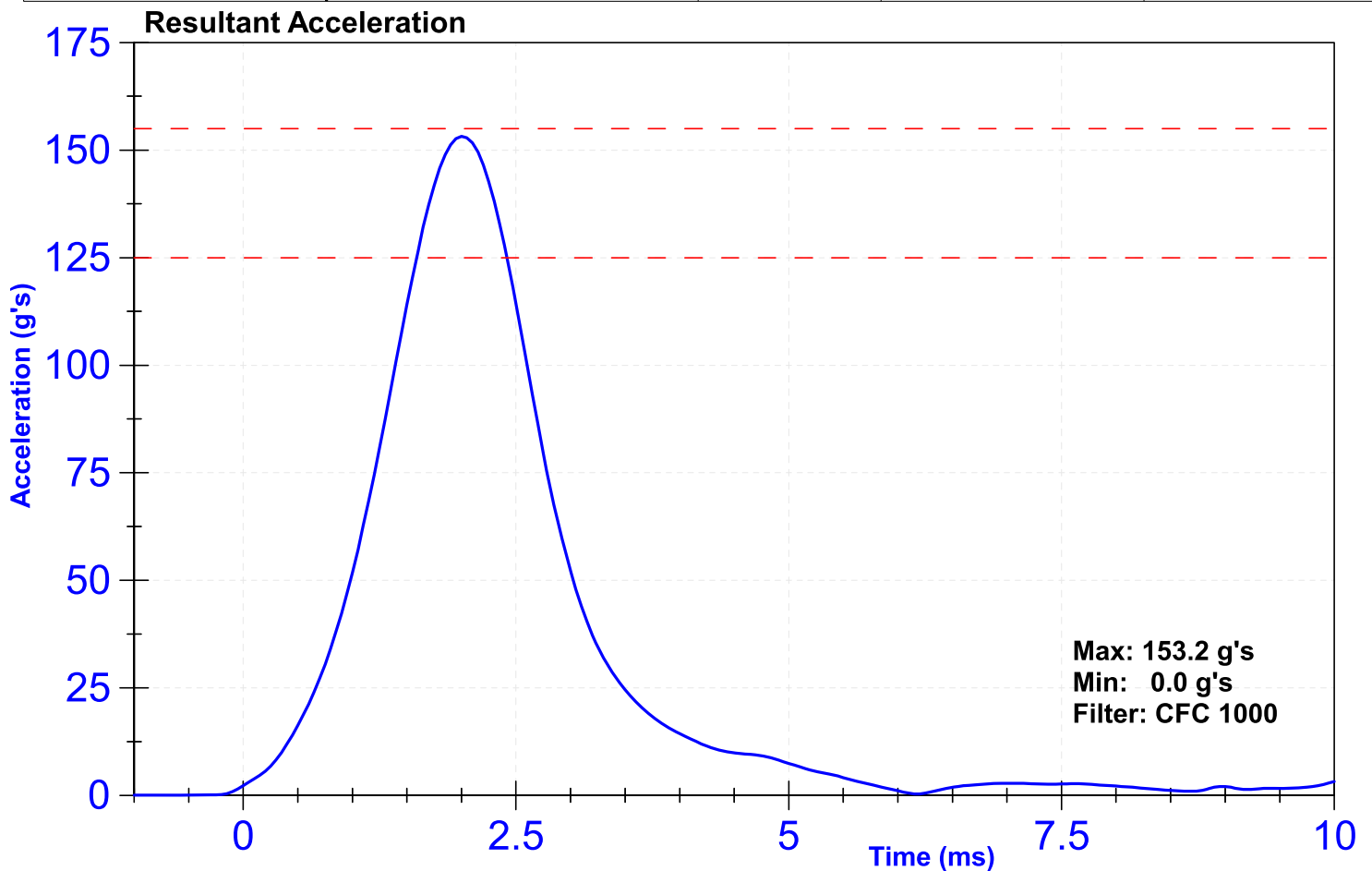
ATD Manufacturer	Humanetics	Test Technician	E. Andruczyk
ATD Serial Number	D037	Laboratory Supervisor	J. Kinderman

Results

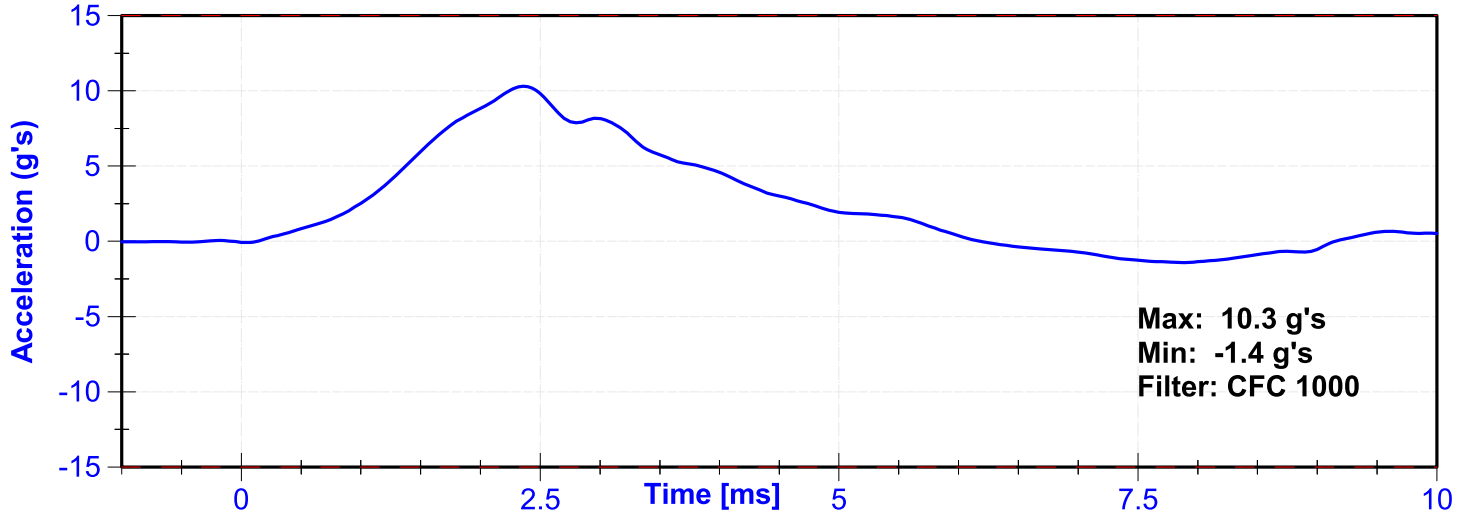
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	20	Pass
Resultant Acceleration	125	155	g's	153.2	Pass
Oscillation	0	15	%	2.40	Pass
Fore-Aft Acceleration	-15	15	g's	10.3	Pass

Transducer Calibrations

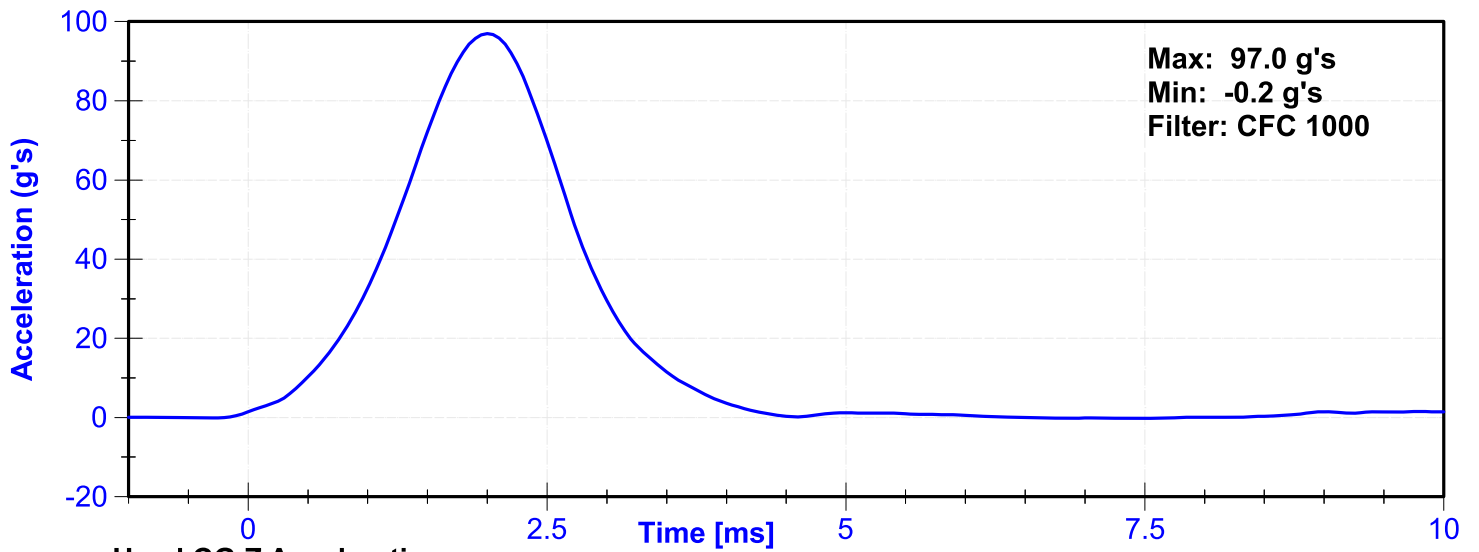
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	T21724	10/8/2024	4/6/2025
Y Accelerometer	Endevco	T22281	10/8/2024	4/6/2025
Z Accelerometer	Endevco	T26050	10/8/2024	4/6/2025



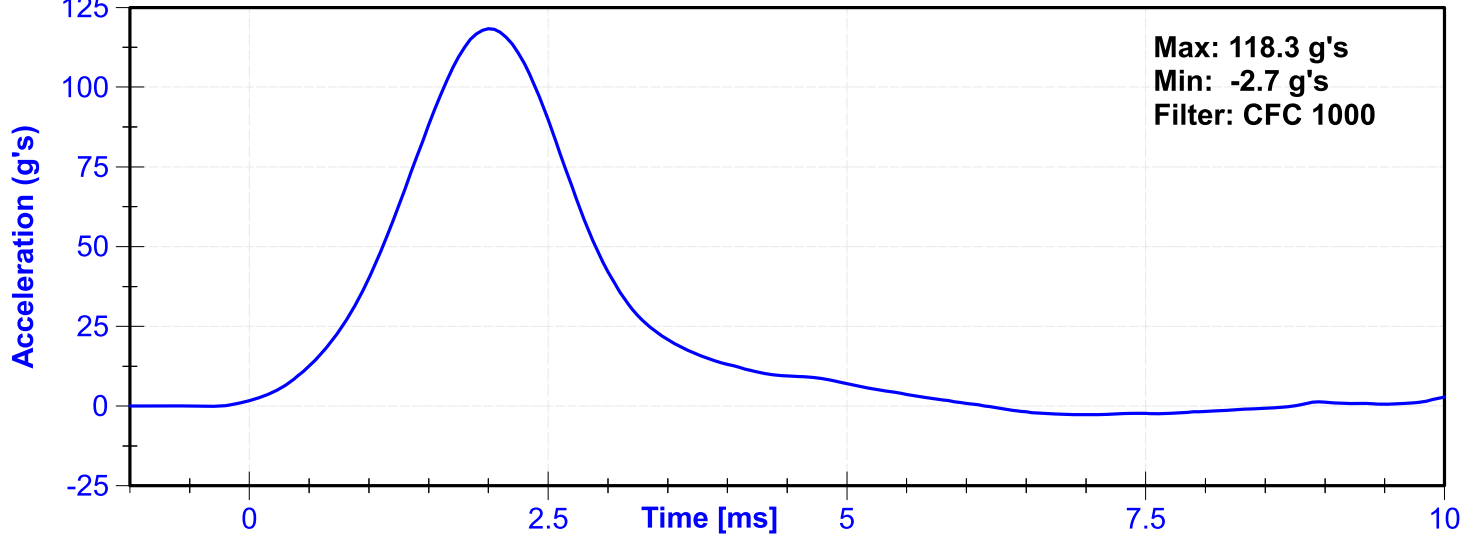
Head CG X Acceleration



Head CG Y Acceleration



Head CG Z Acceleration



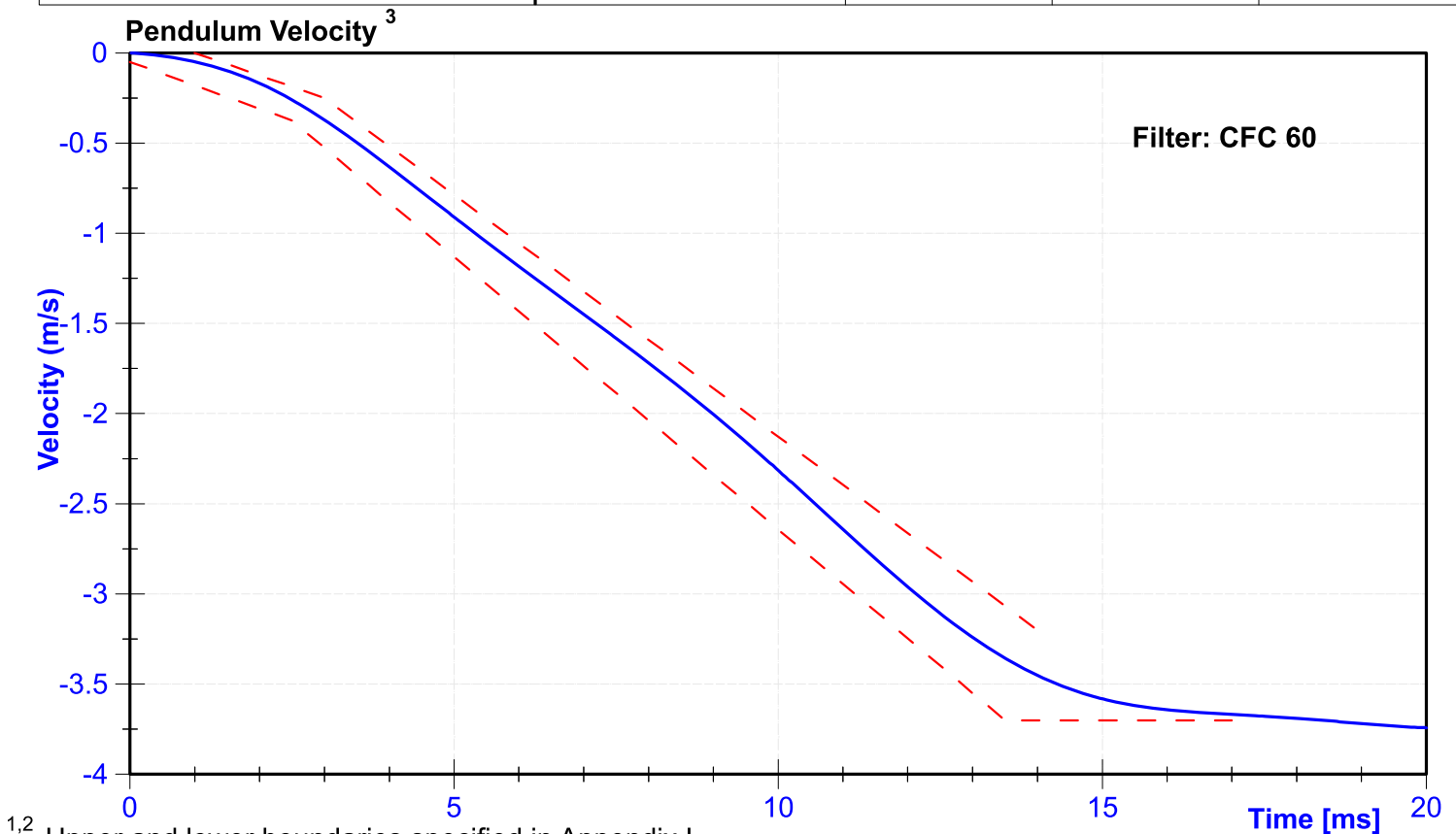
ATD Manufacturer	Denton	Test Technician	E. Andruczyk
ATD Serial Number	D037	Laboratory Supervisor	J. Kinderman

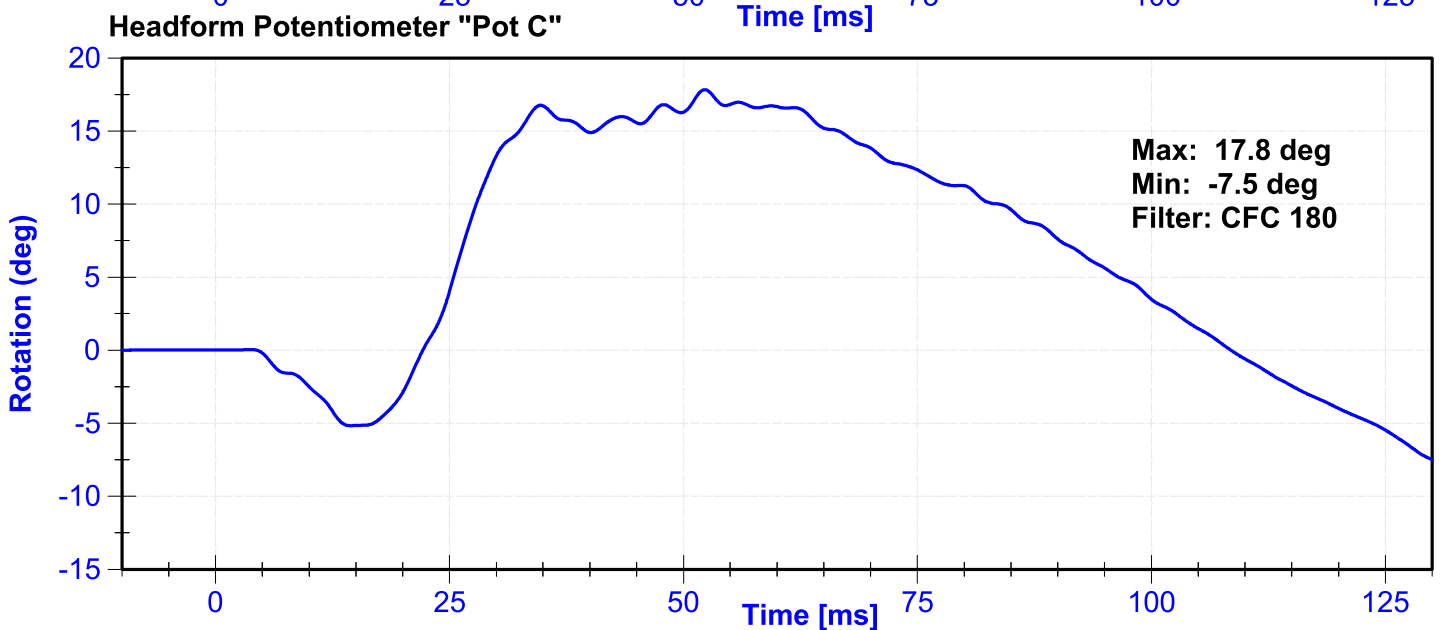
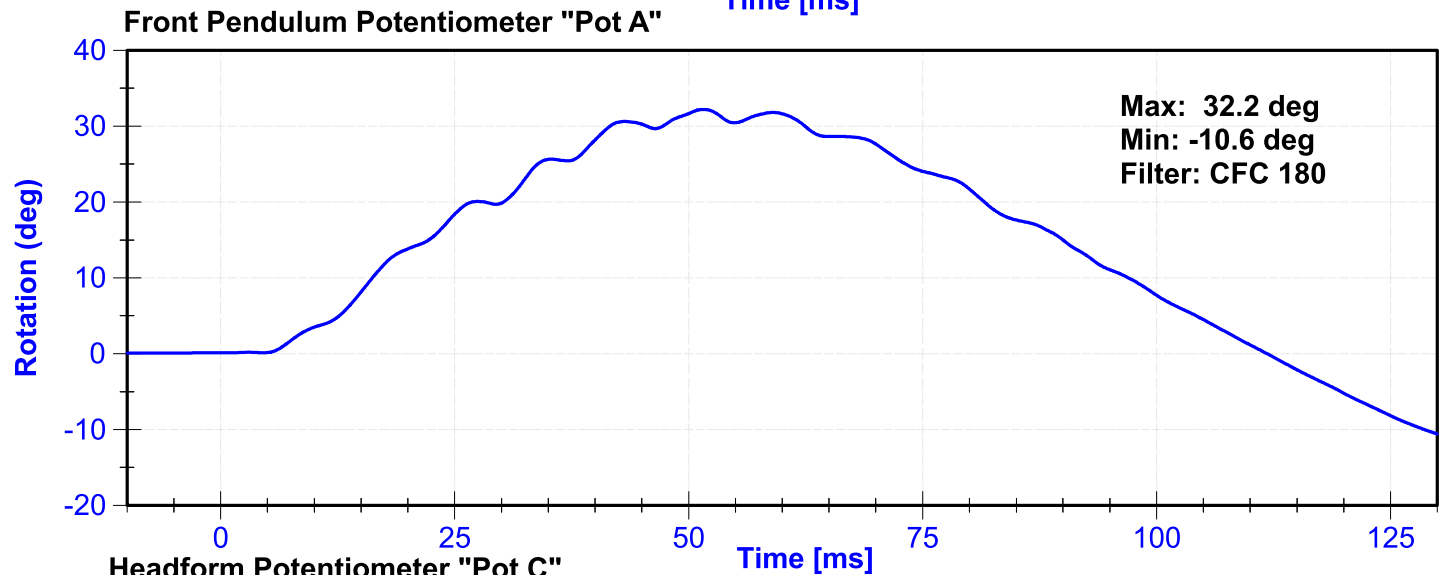
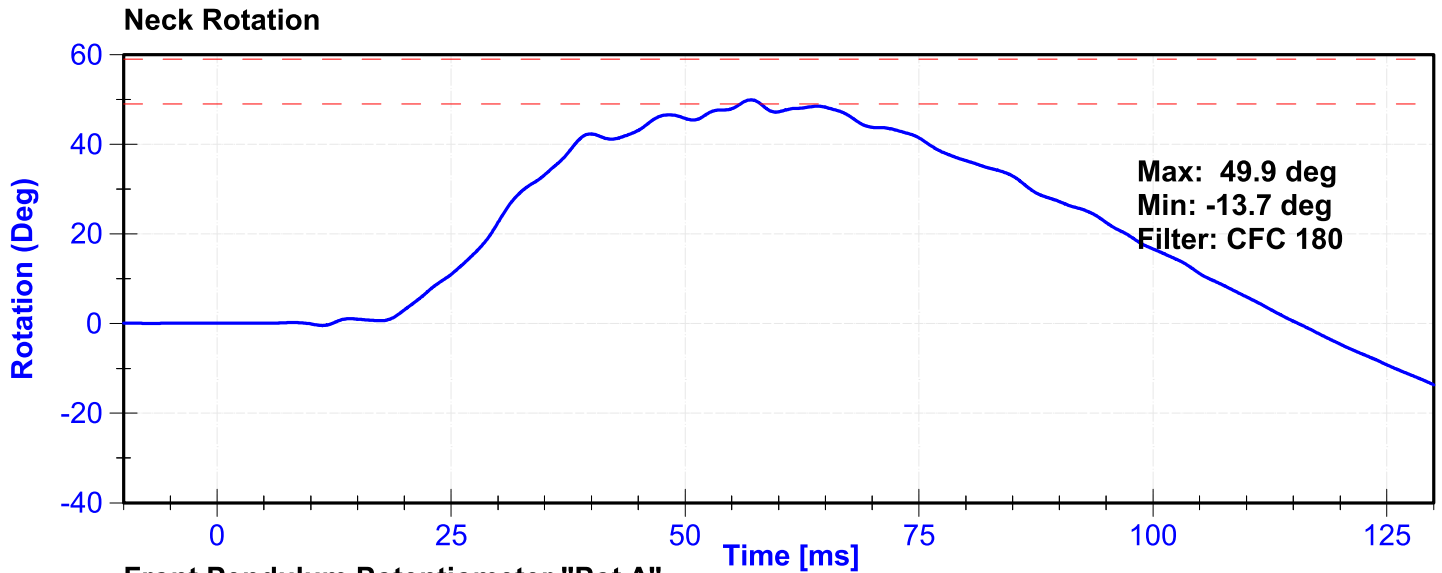
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	20	Pass
Velocity	3.3	3.5	m/s	3.46	Pass
Lateral Neck Rotation	49	59	deg	49.9	Pass
Time at Maximum Rotation	54	66	ms	57.0	Pass
Time of Rotation Decay from Maximum	53	88	ms	58.5	Pass
Pendulum Velocity Overall Corridor	Lower Boundary ¹	Upper Boundary ²	m/s	See Plot ³	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16650	11/1/2024	11/1/2025
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

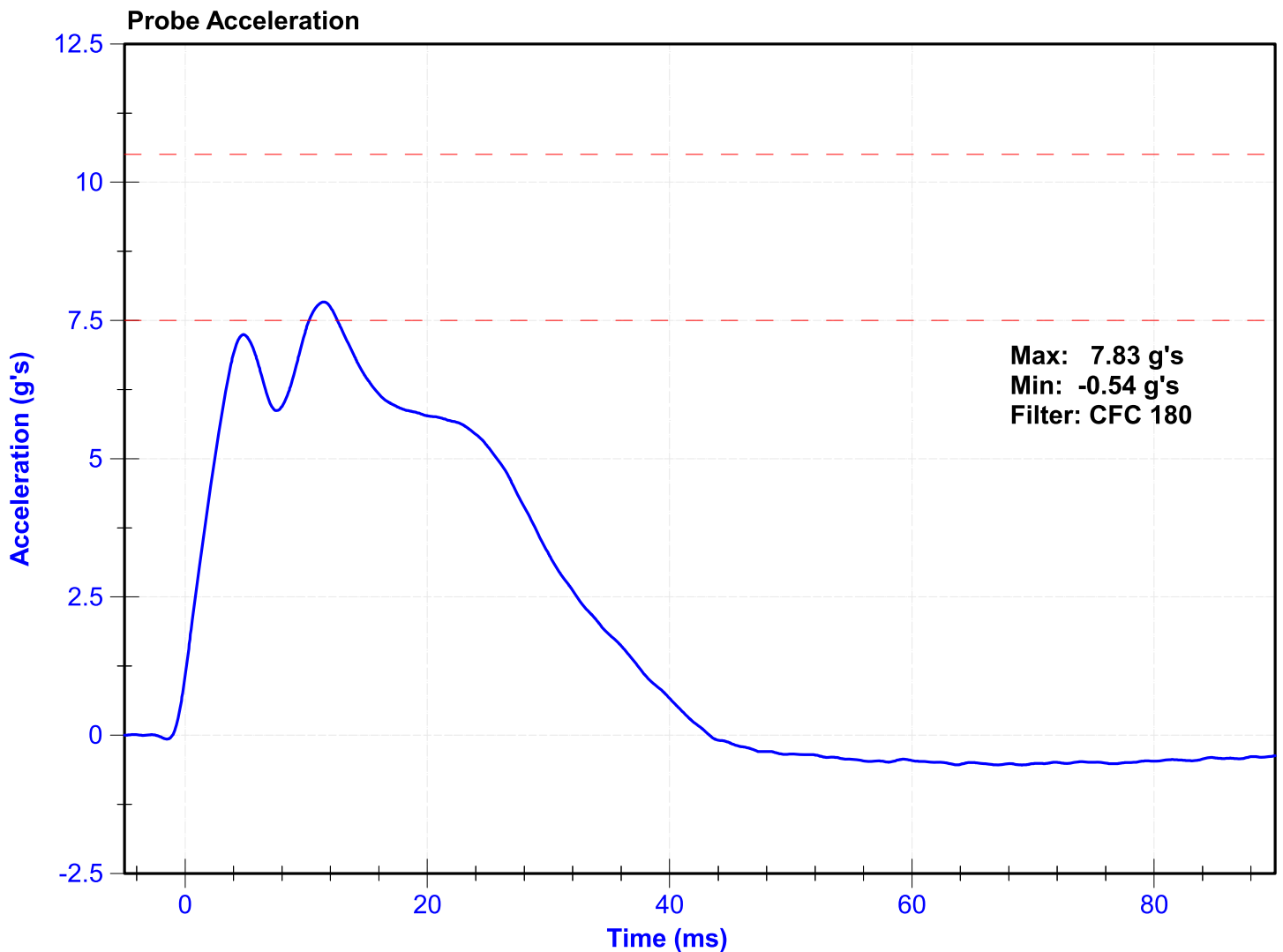
ATD Manufacturer	FTSS	Test Technician	E. Andruczyk
ATD Serial Number	D037	Laboratory Supervisor	J. Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	20	Pass
Velocity	4.2	4.4	m/s	4.27	Pass
Probe Acceleration	7.5	10.5	g's	7.83	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	T25863	1/17/2025	7/16/2025



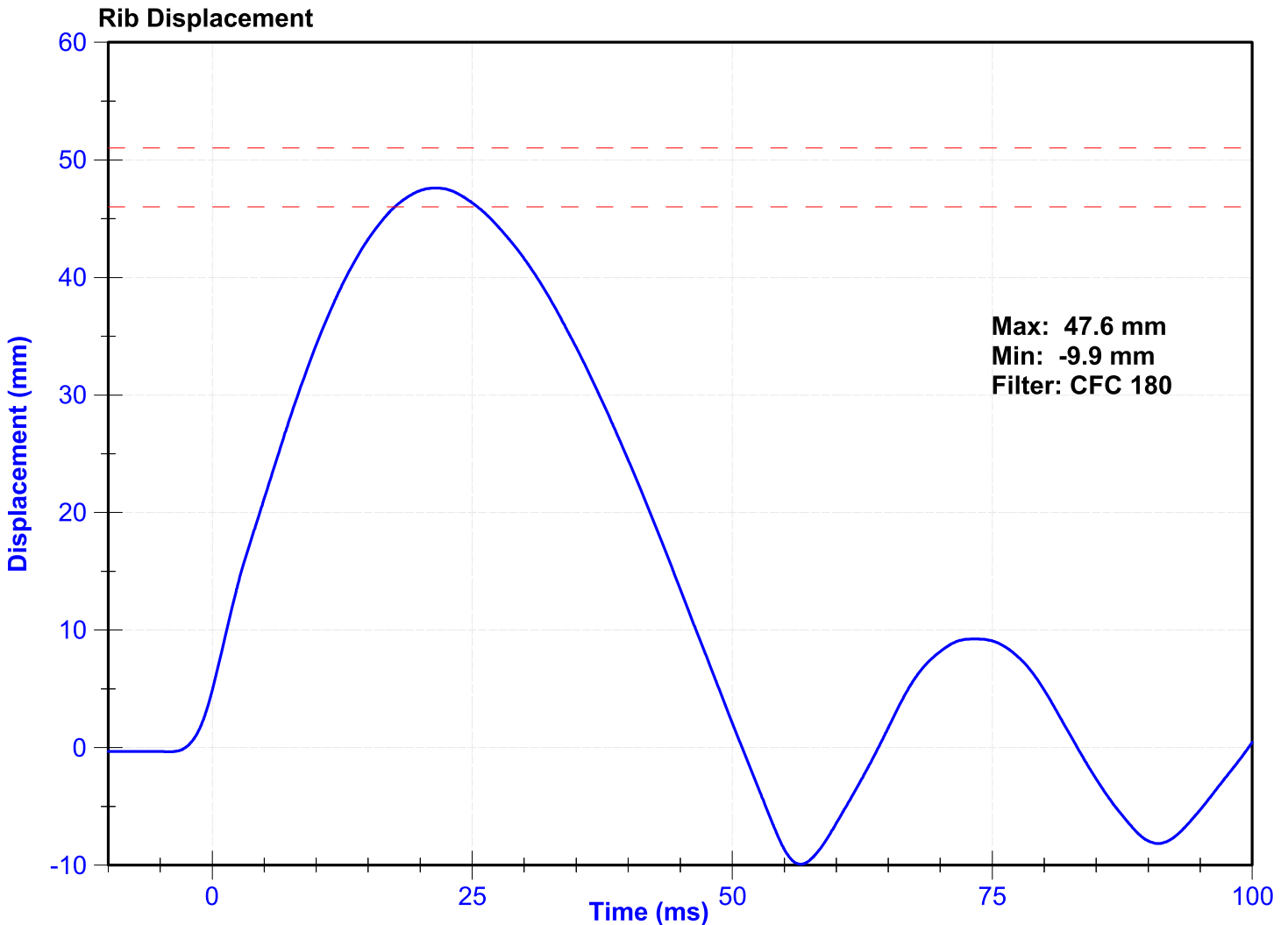
ATD Manufacturer	Humanetics	Test Technician	E. Andruczyk
ATD Serial Number	D037	Laboratory Supervisor	J. Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	20	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



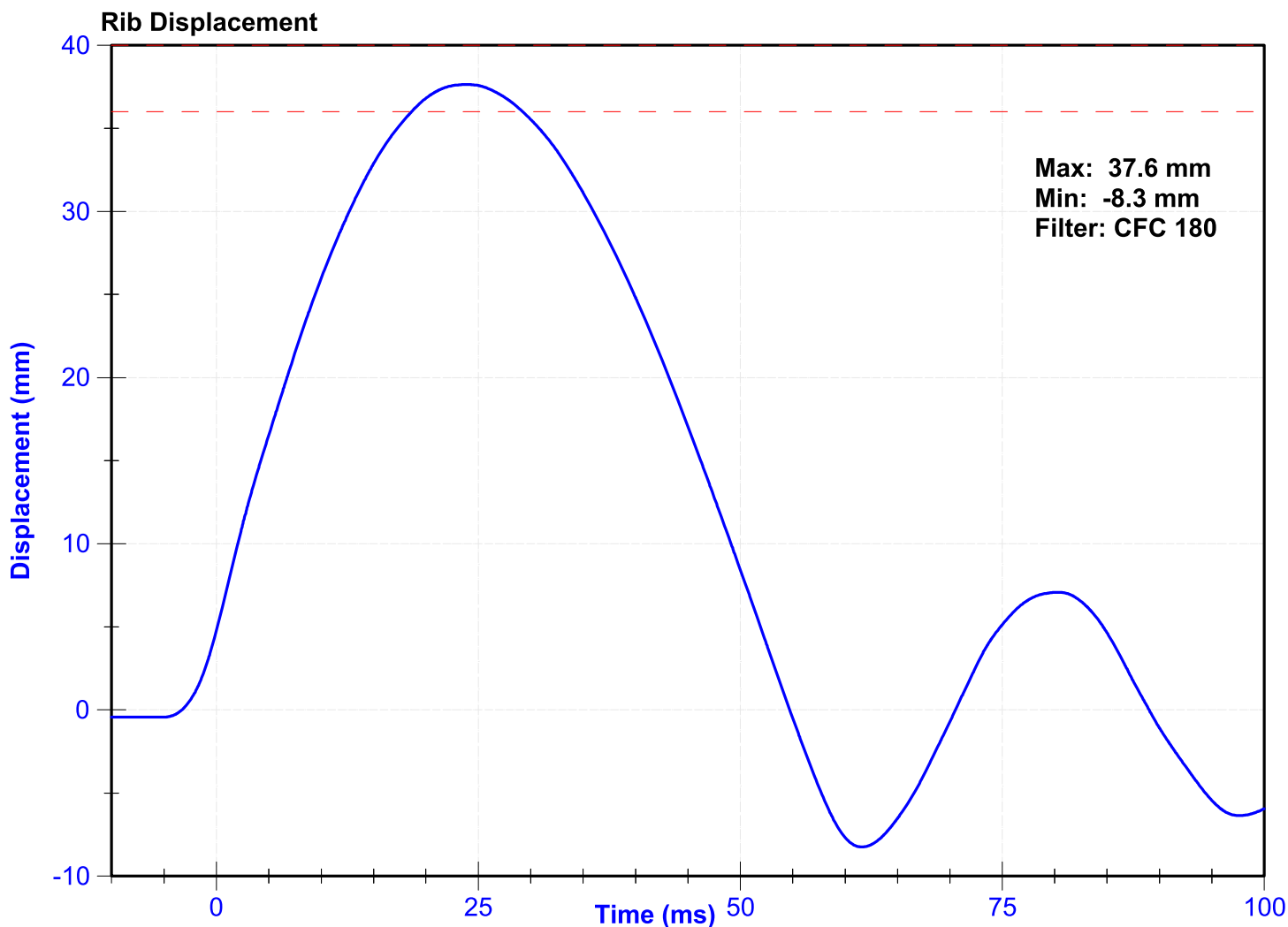
ATD Manufacturer	Humanetics	Test Technician	E. Andruczyk
ATD Serial Number	D037	Laboratory Supervisor	J. Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	20	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	10/8/2024	4/8/2025



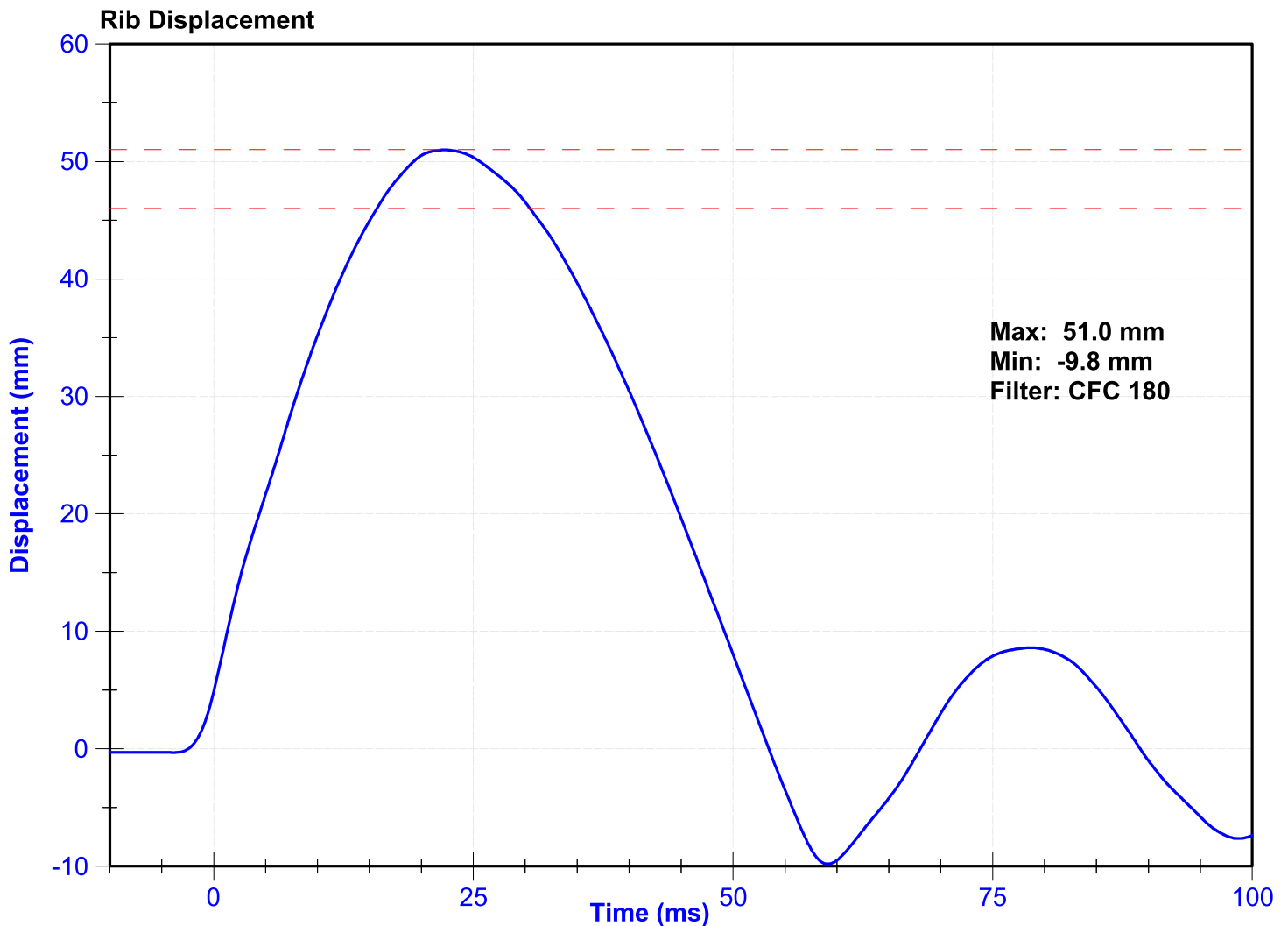
ATD Manufacturer	Humanetics	Test Technician	E. Andruczyk
ATD Serial Number	D037	Laboratory Supervisor	J. Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	20	Pass
Rib Displacement	46	51	mm	51.0	Pass

Transducer Calibrations

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



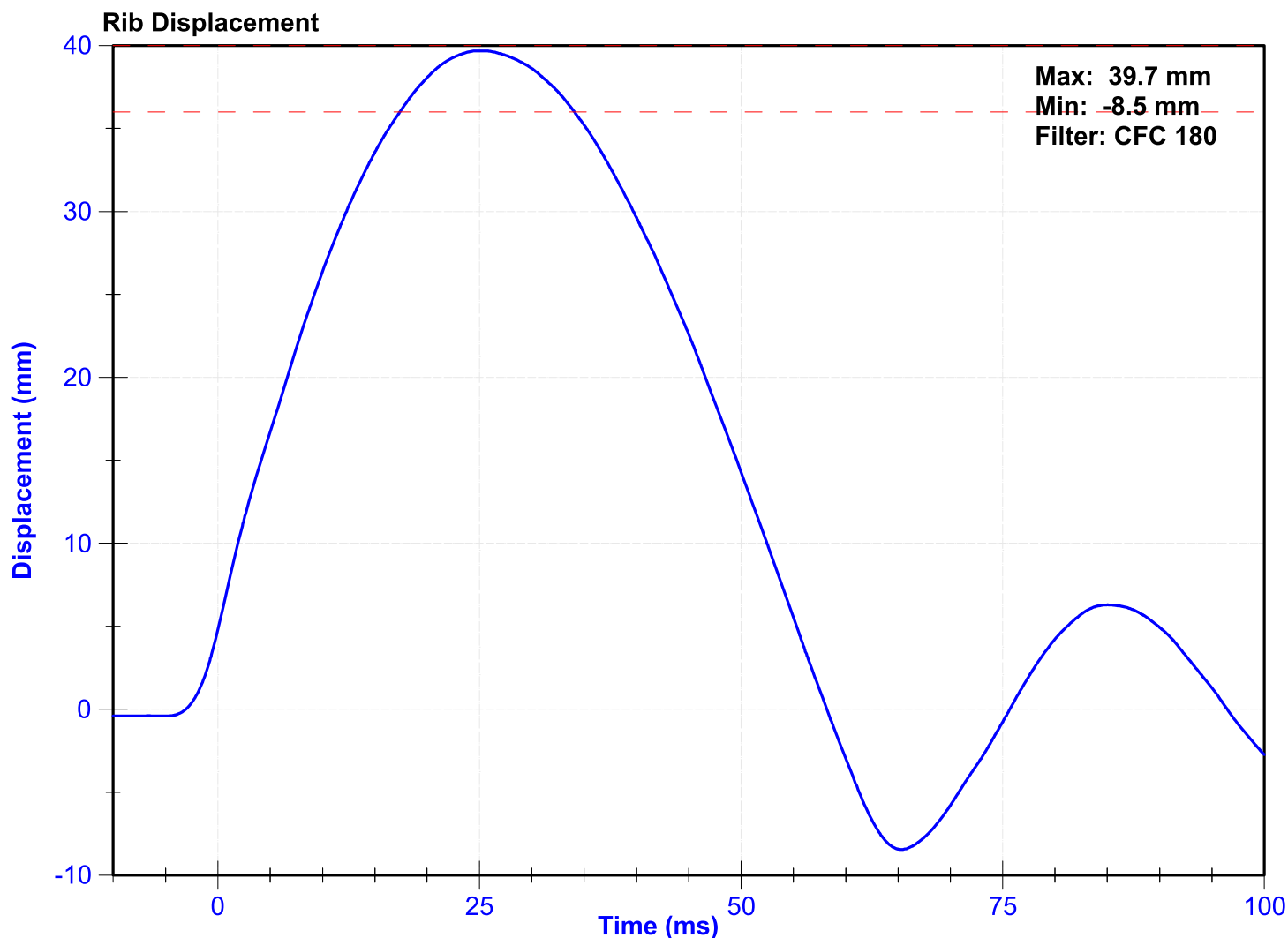
ATD Manufacturer	Humanetics	Test Technician	E. Andruczyk
ATD Serial Number	D037	Laboratory Supervisor	J. Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	20	Pass
Rib Displacement	36	40	mm	39.7	Pass

Transducer Calibrations

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



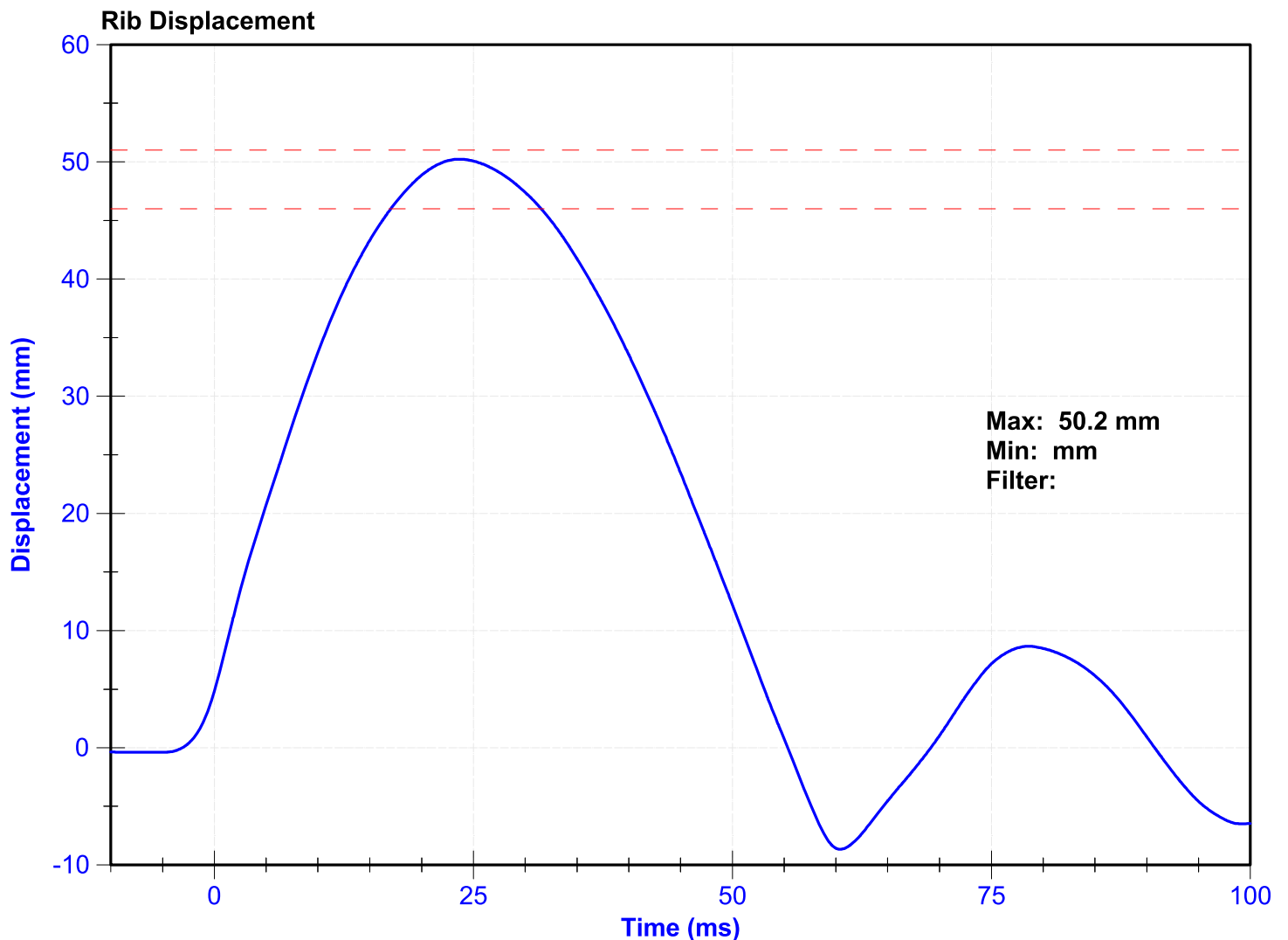
ATD Manufacturer	Humanetics	Test Technician	E. Andruczyk
ATD Serial Number	D037	Laboratory Supervisor	J. Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	20	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	10/8/2024	4/8/2025



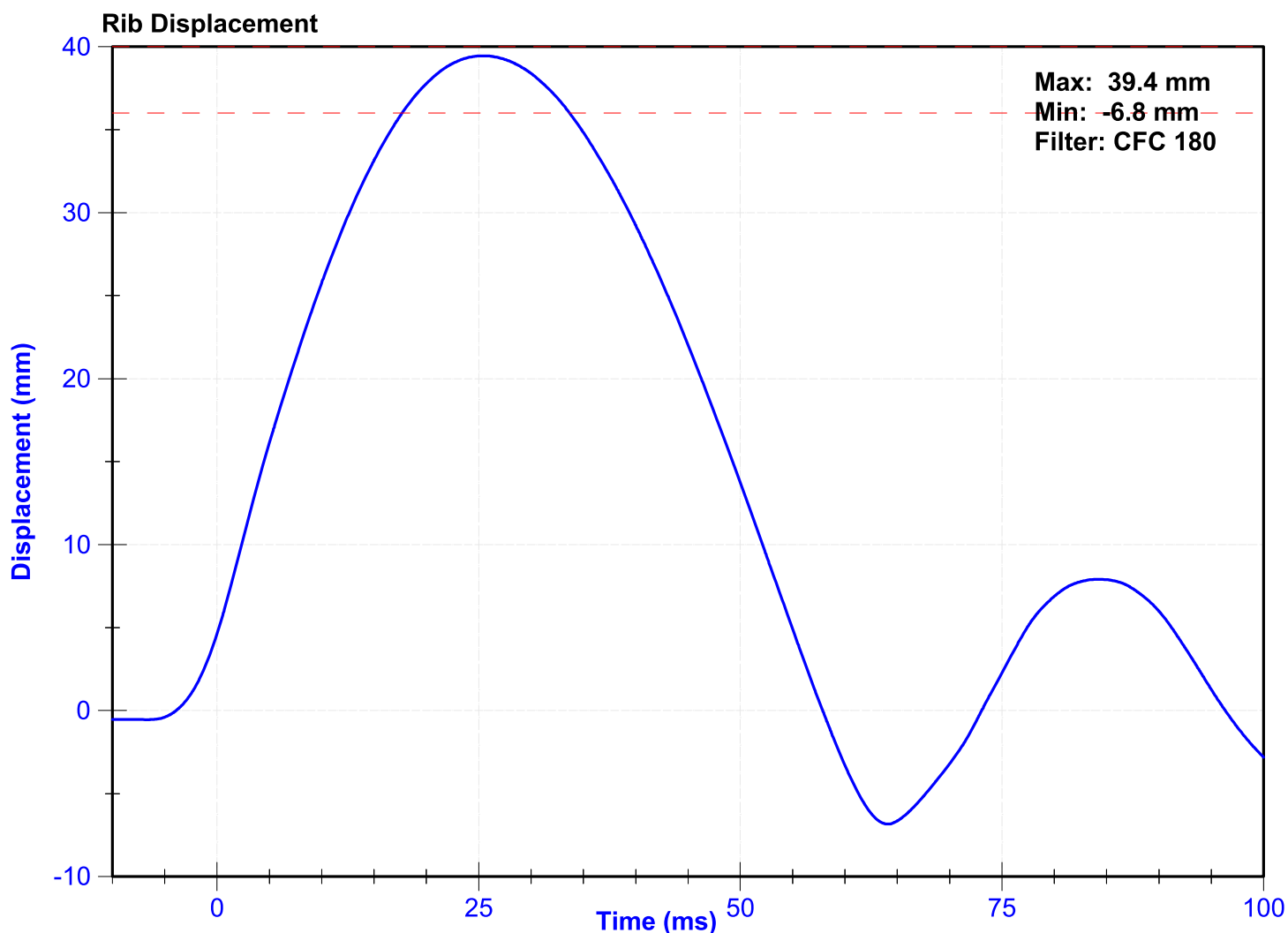
ATD Manufacturer	Humanetics	Test Technician	E. Andruczyk
ATD Serial Number	D037	Laboratory Supervisor	J. Kinderman

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	20	Pass
Rib Displacement	36	40	mm	39.4	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	FTSS	Test Technician	E. Andruczyk
ATD Serial Number	D037	Laboratory Supervisor	J. Kinderman

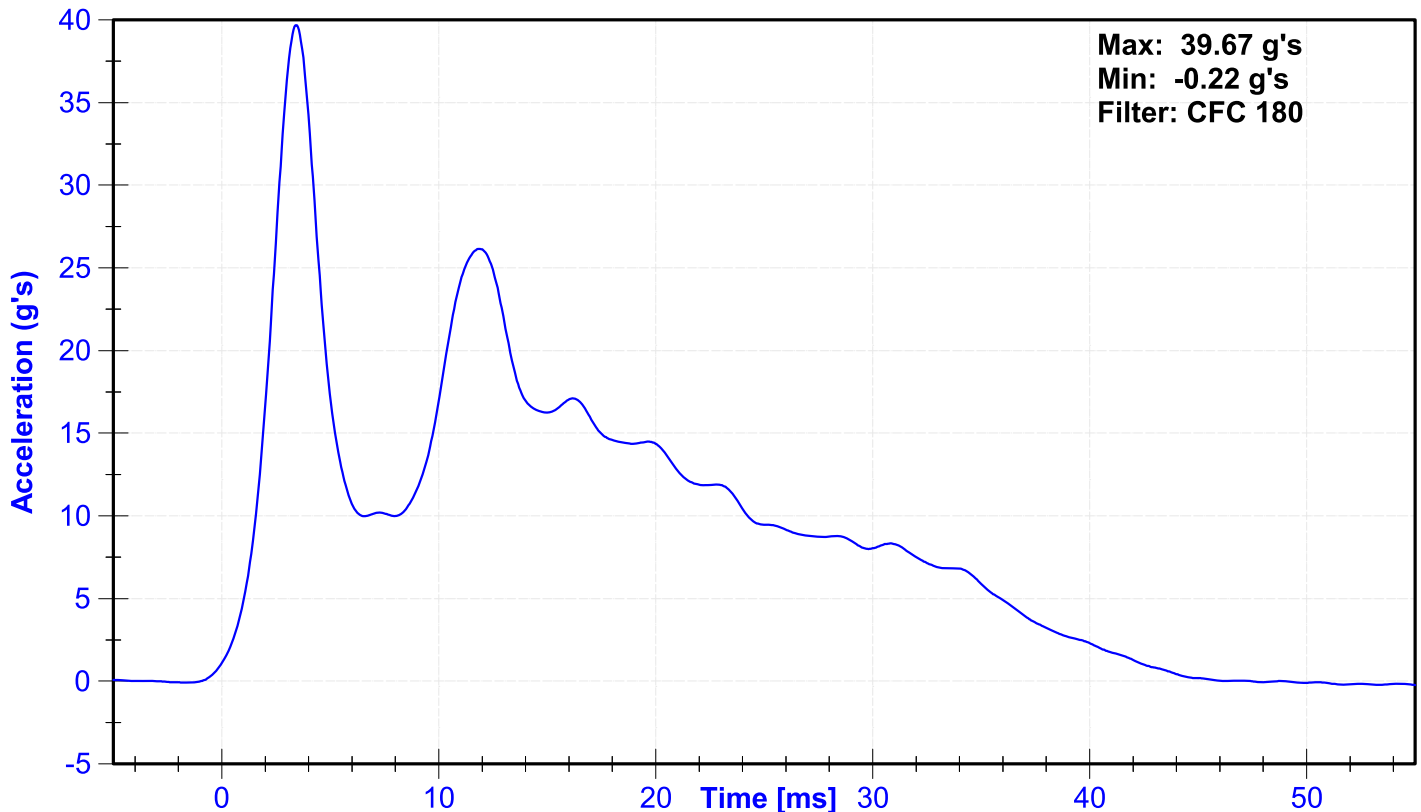
Results

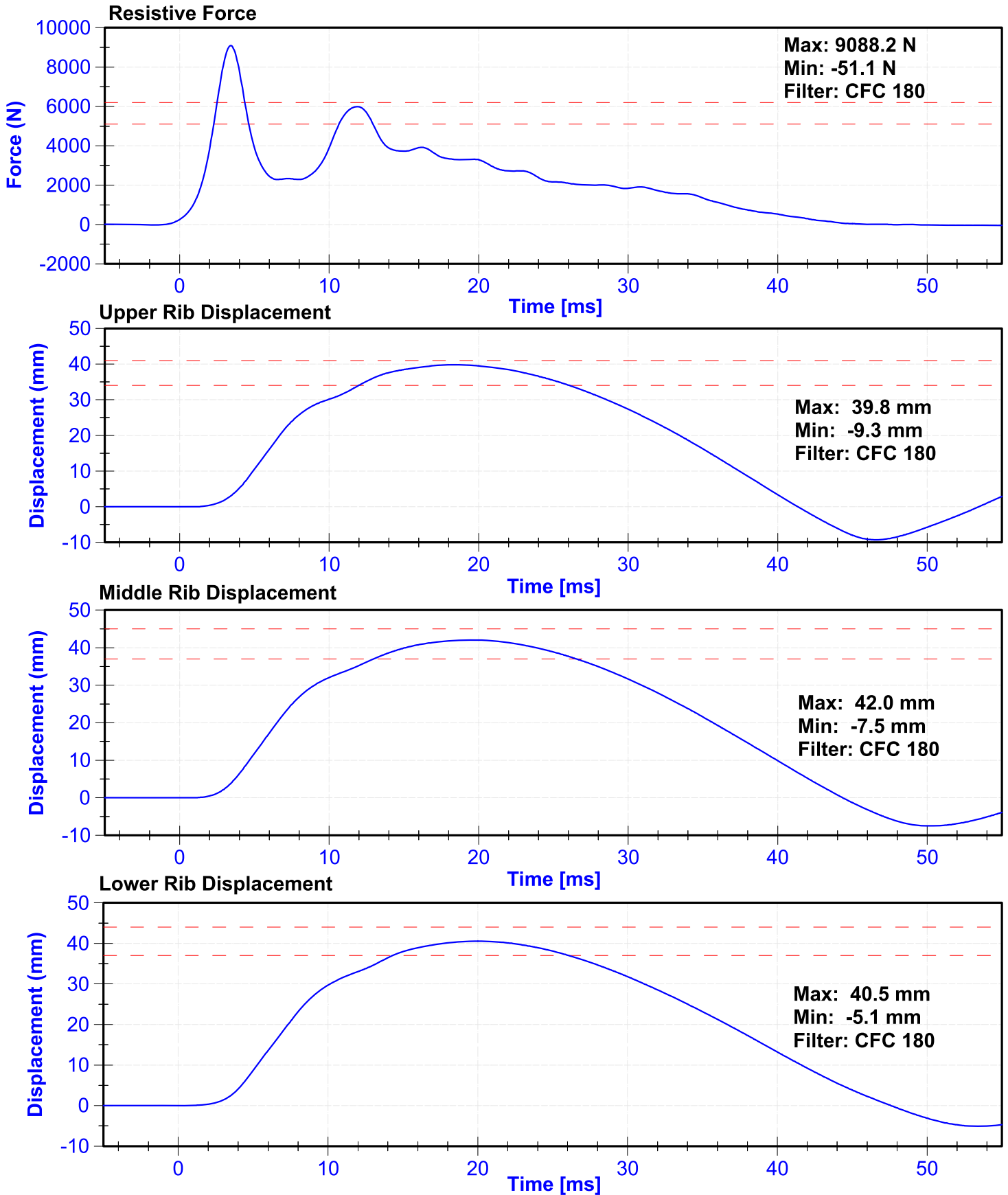
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	20	Pass
Velocity	5.4	5.6	m/s	5.49	Pass
Resistive Force after 6ms	5100	6200	N	5990.7	Pass
Upper Thorax Rib Deflection	34	41	mm	39.8	Pass
Mid Thorax Rib Deflection	37	45	mm	42.0	Pass
Lower Thorax Rib Deflection	37	44	mm	40.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	T25863	1/17/2025	7/16/2025
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	FTSS	Test Technician	E. Andruczyk
ATD Serial Number	D037	Laboratory Supervisor	J. Kinderman

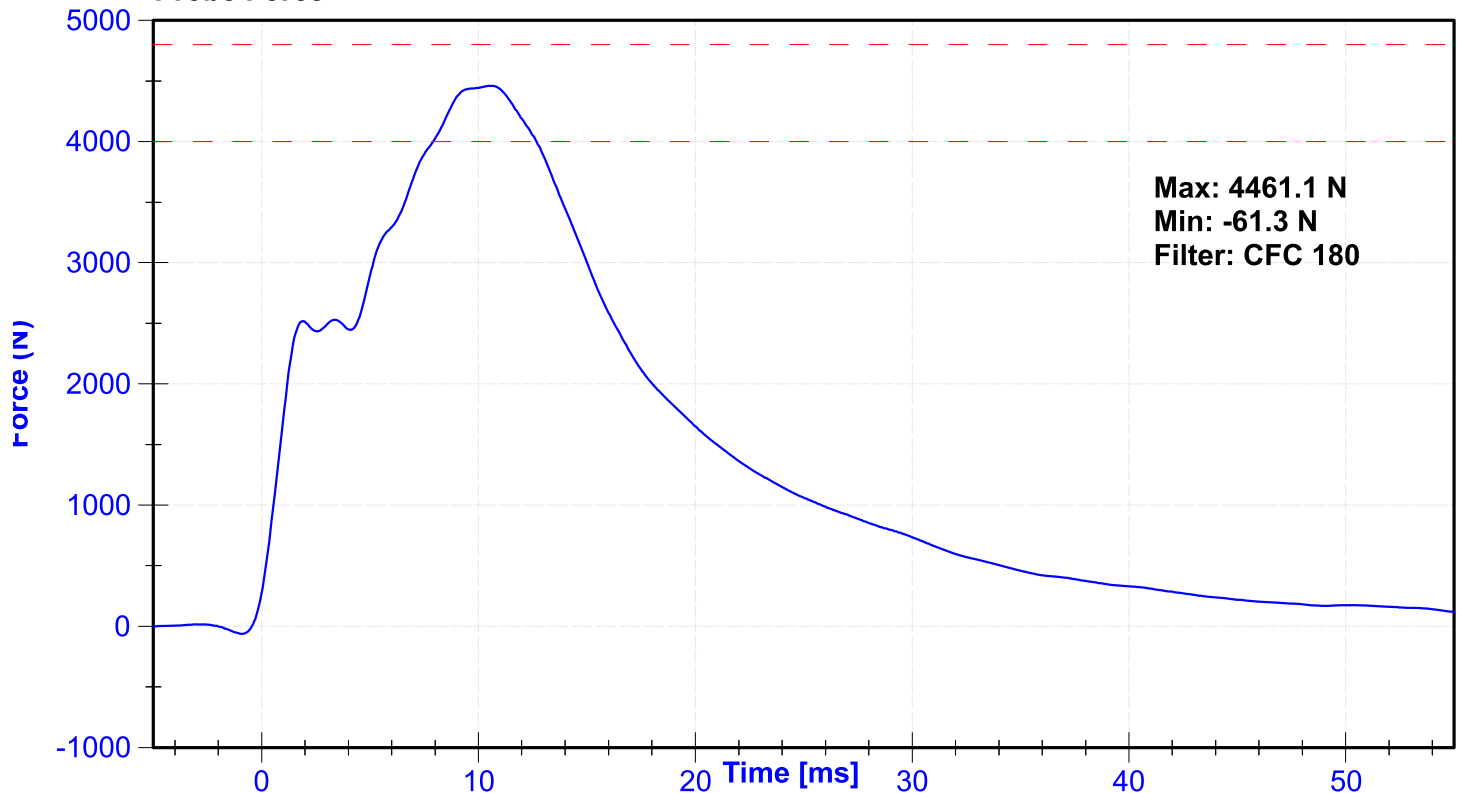
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	20	Pass
Velocity	3.9	4.1	m/s	4.03	Pass
Combined Abdomen Force	2200	2700	N	2444.9	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	10.45	Pass
Resistive Probe Force	4000	4800	N	4461.1	Pass
Time at Peak Resistive Force	10.6	13.0	ms	10.60	Pass

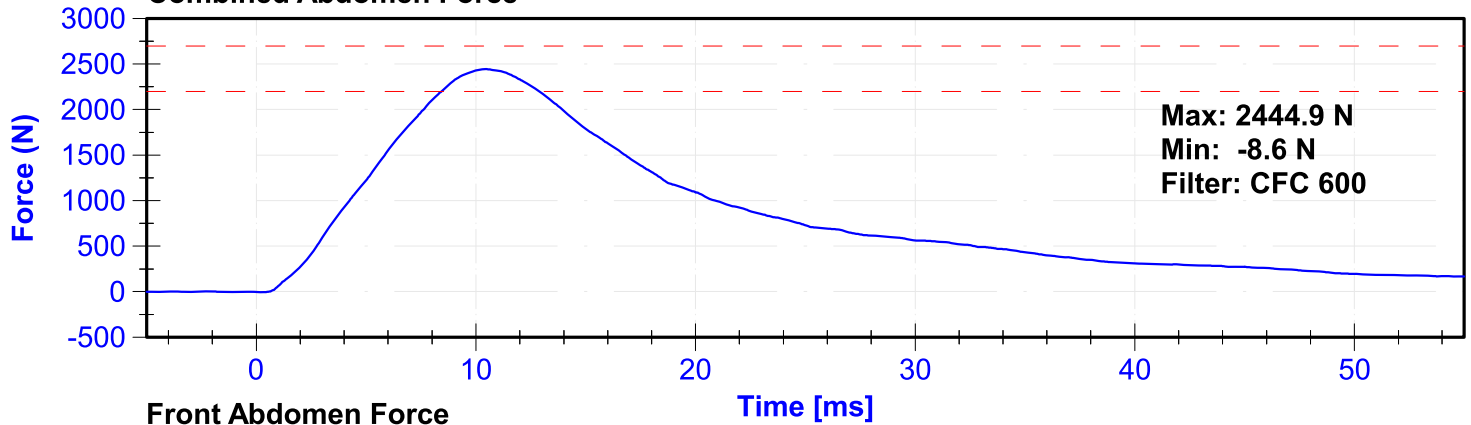
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25863	1/17/2025	7/16/2025
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

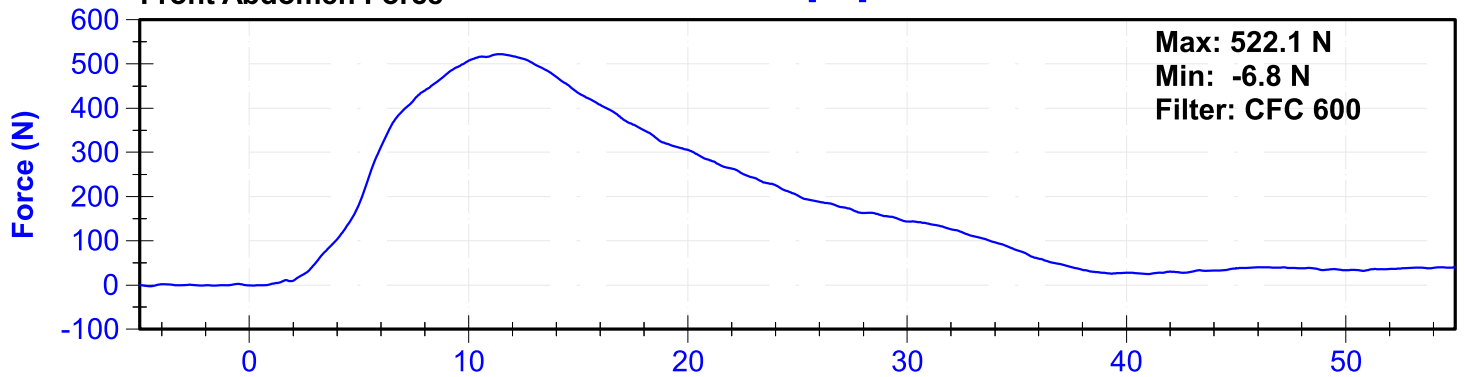
Probe Force



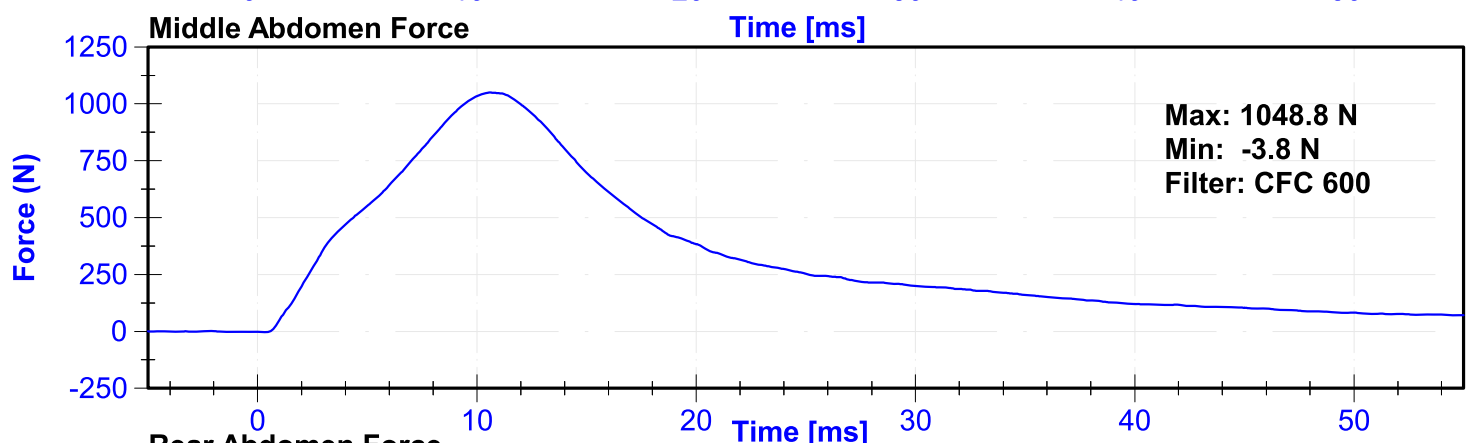
Combined Abdomen Force



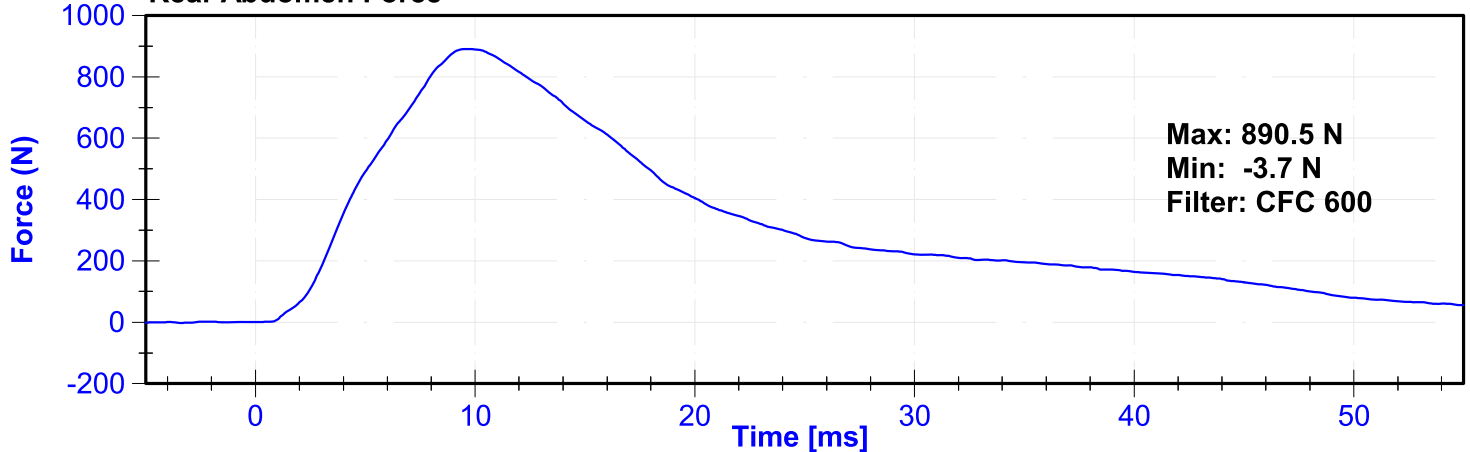
Front Abdomen Force



Middle Abdomen Force



Rear Abdomen Force



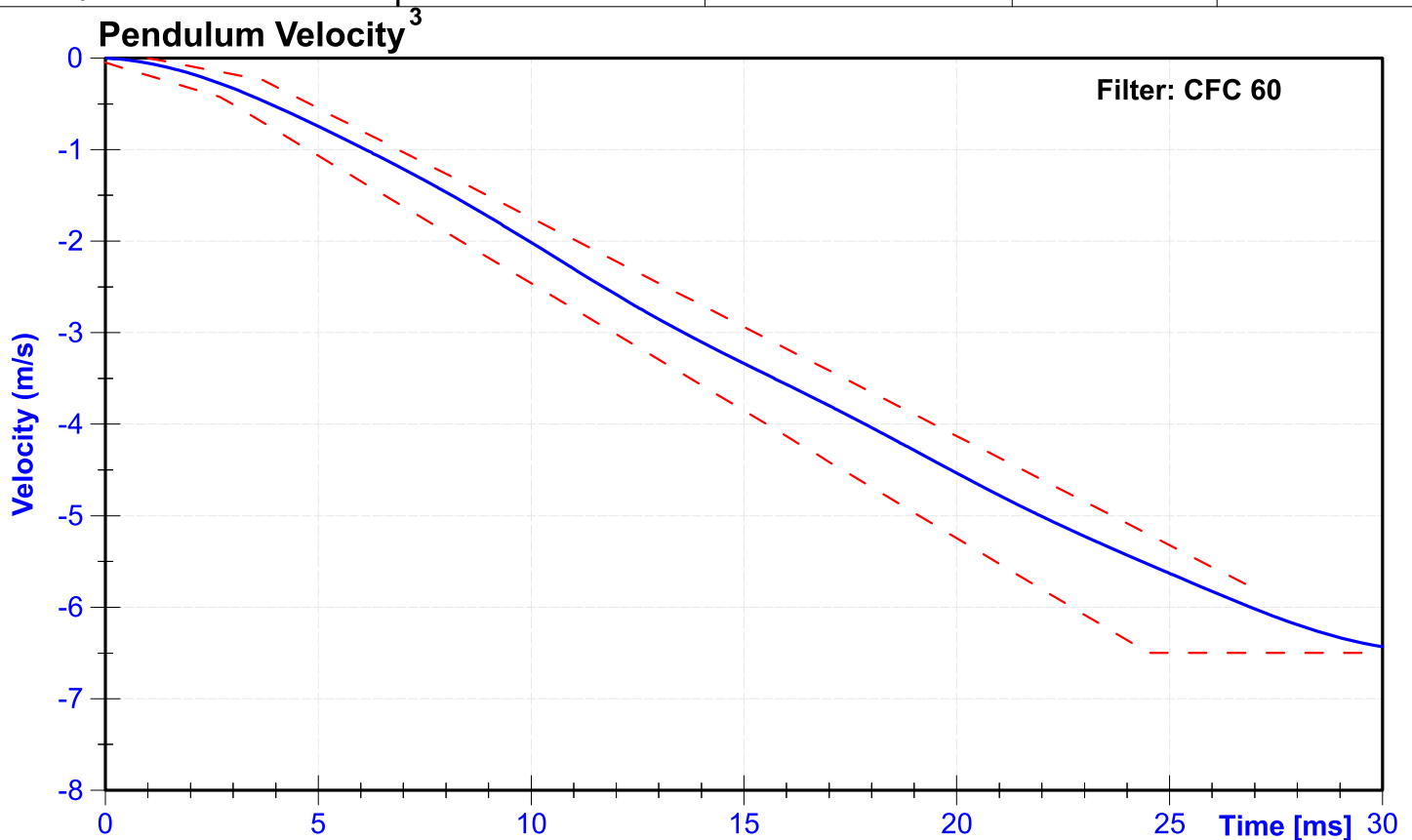
ATD Manufacturer	Denton	Test Technician	E. Andruczyk
ATD Serial Number	D037	Laboratory Supervisor	J. Kinderman

Results

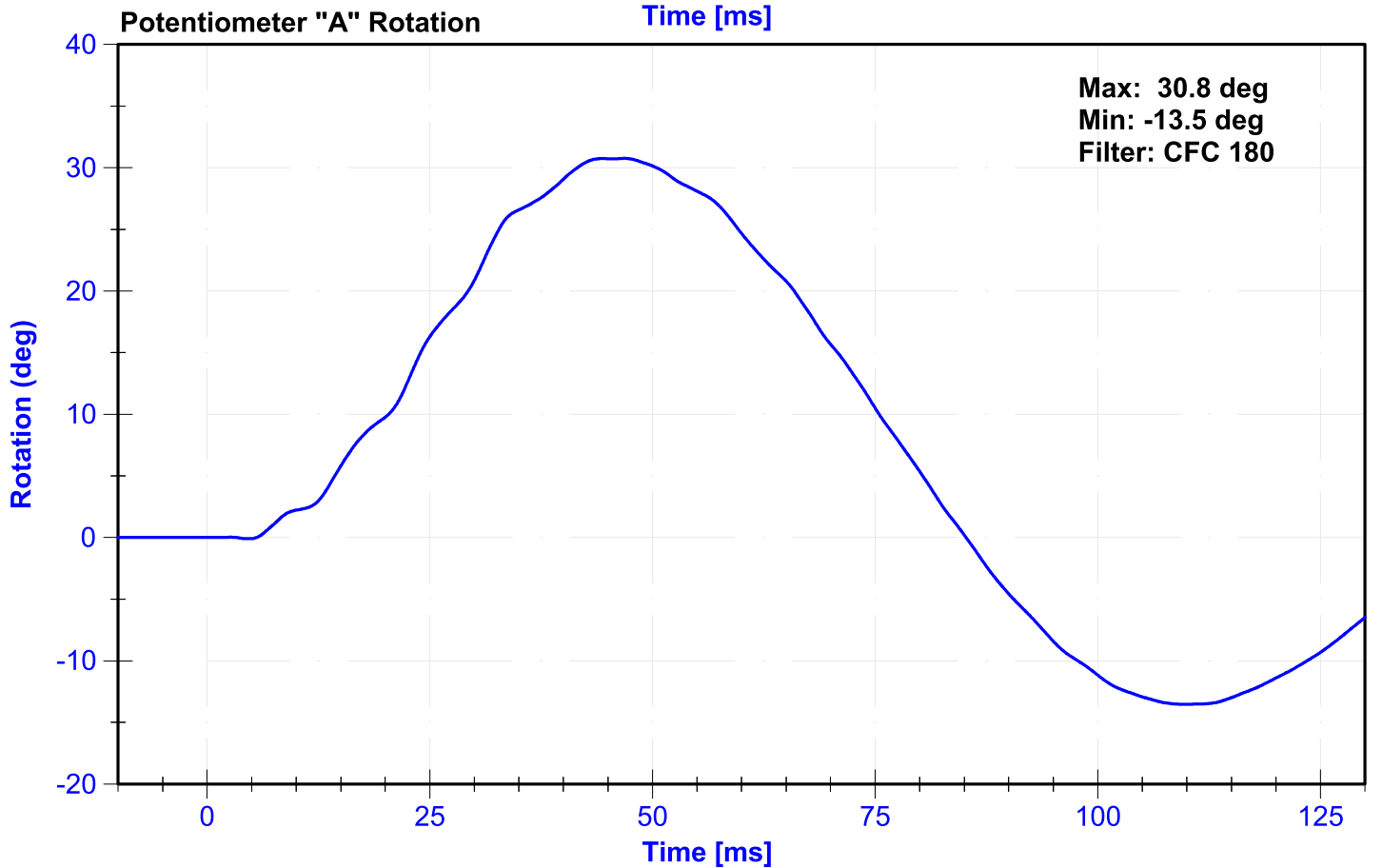
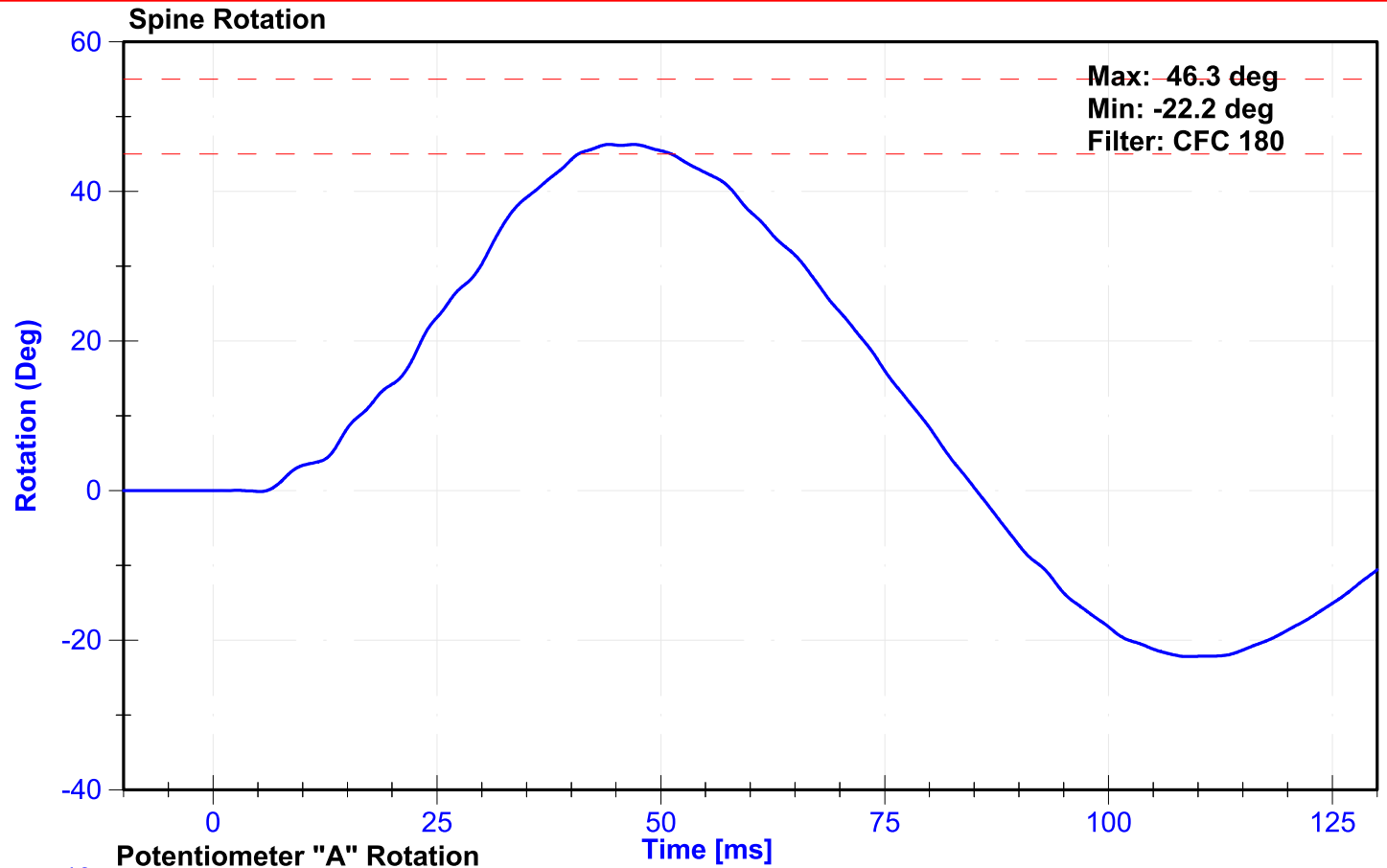
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	20	Pass
Velocity	5.95	6.15	m/s	6.147	Pass
Lateral Spine Rotation	45	55	deg	46.3	Pass
Time at Maximum Rotation	39	53	ms	44.2	Pass
Time of Decay to Zero Degrees	37	57	ms	41.1	Pass
Pendulum Velocity Overall Corridor	Lower Boundary ¹	Upper Boundary ²	m/s	See Plot ³	Pass

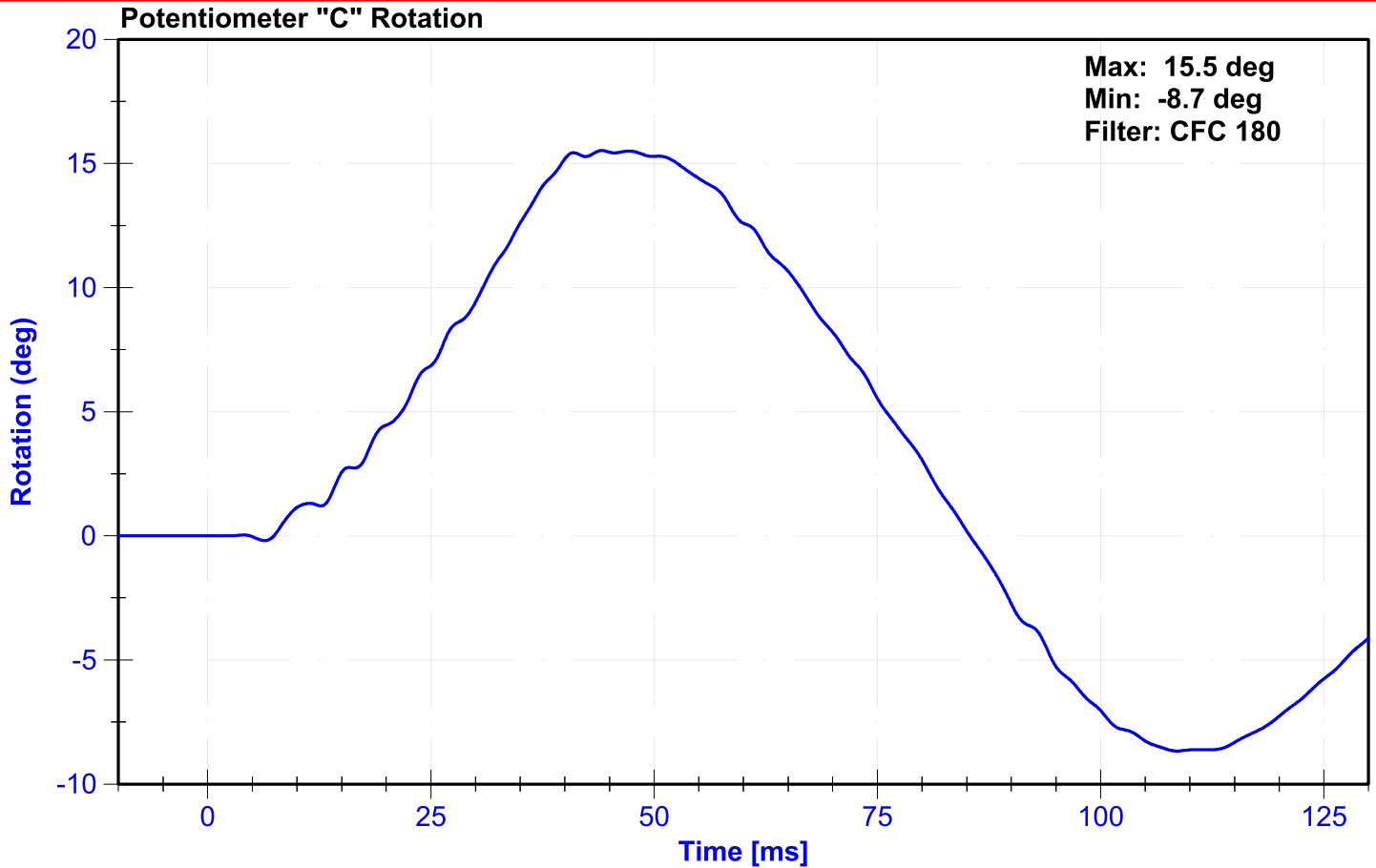
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16650	11/1/2024	11/1/2025
Pendulum "A" Potentiometer	Sfernice	2247	9/13/2024	9/13/2025
Condyle "B" Potentiometer	Sfernice	095	9/13/2024	9/13/2025



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





Appendix I

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

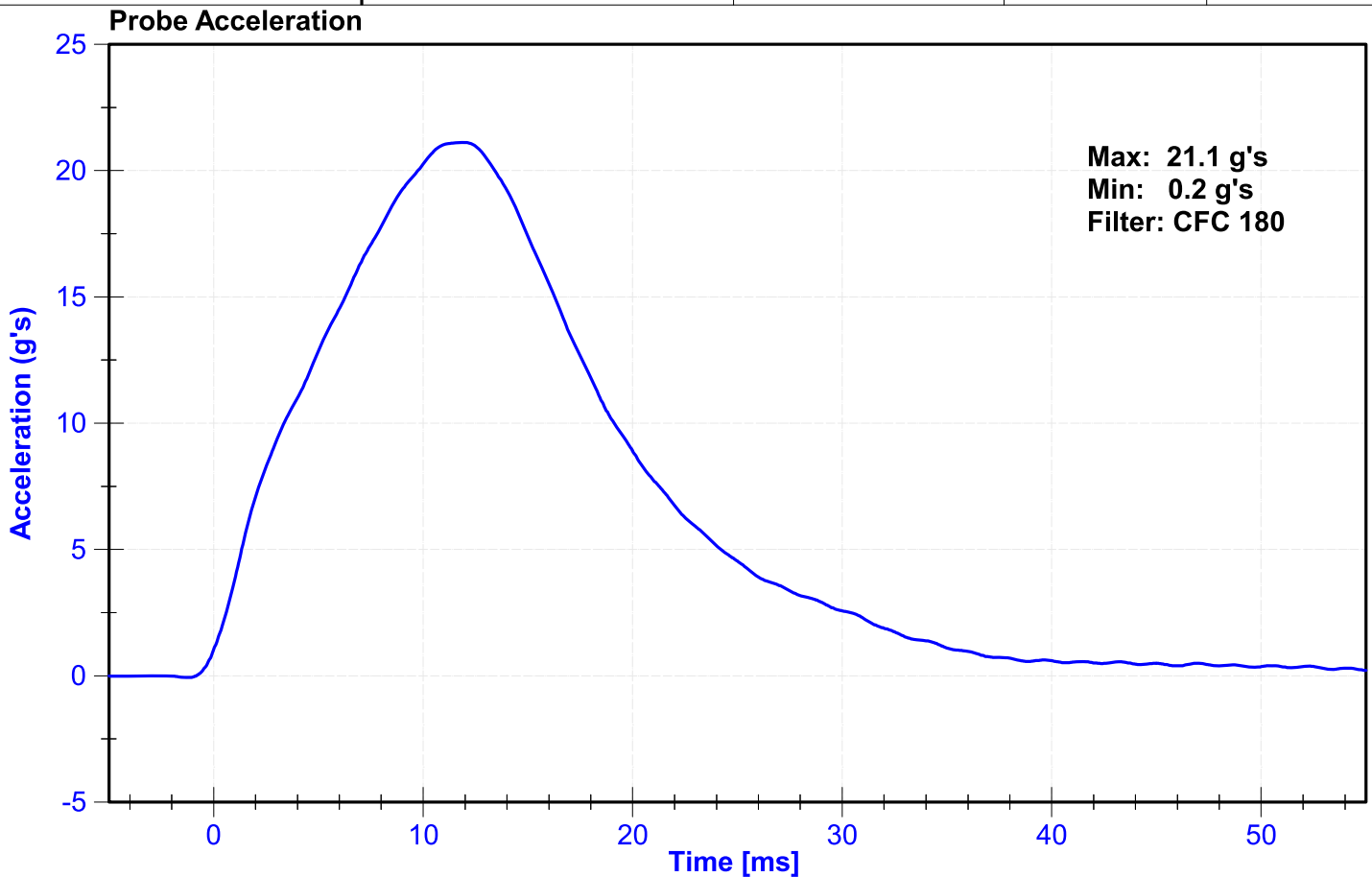
ATD Manufacturer	FTSS	Test Technician	E. Andruczyk
ATD Serial Number	D037	Laboratory Supervisor	J. Kinderman

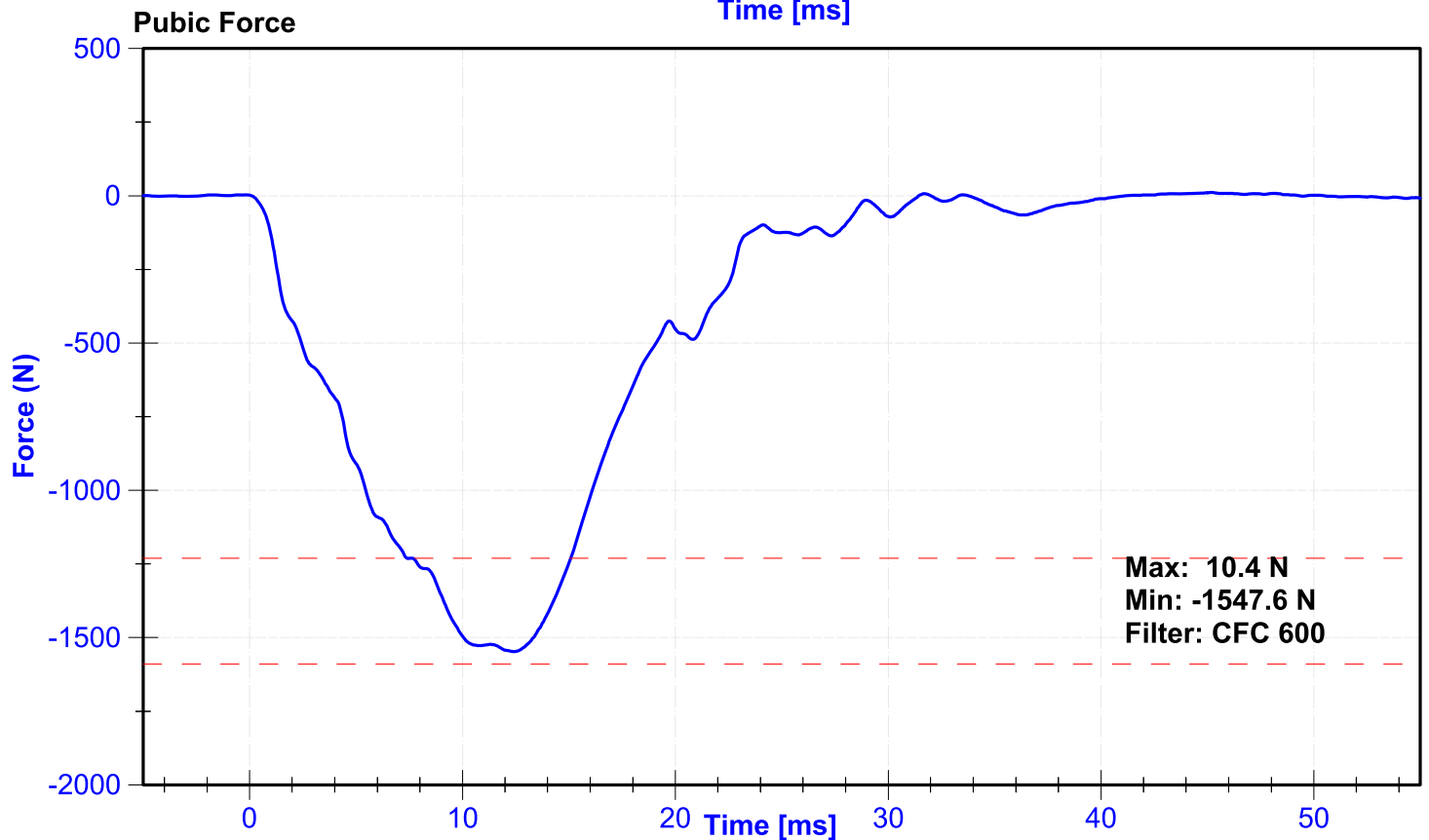
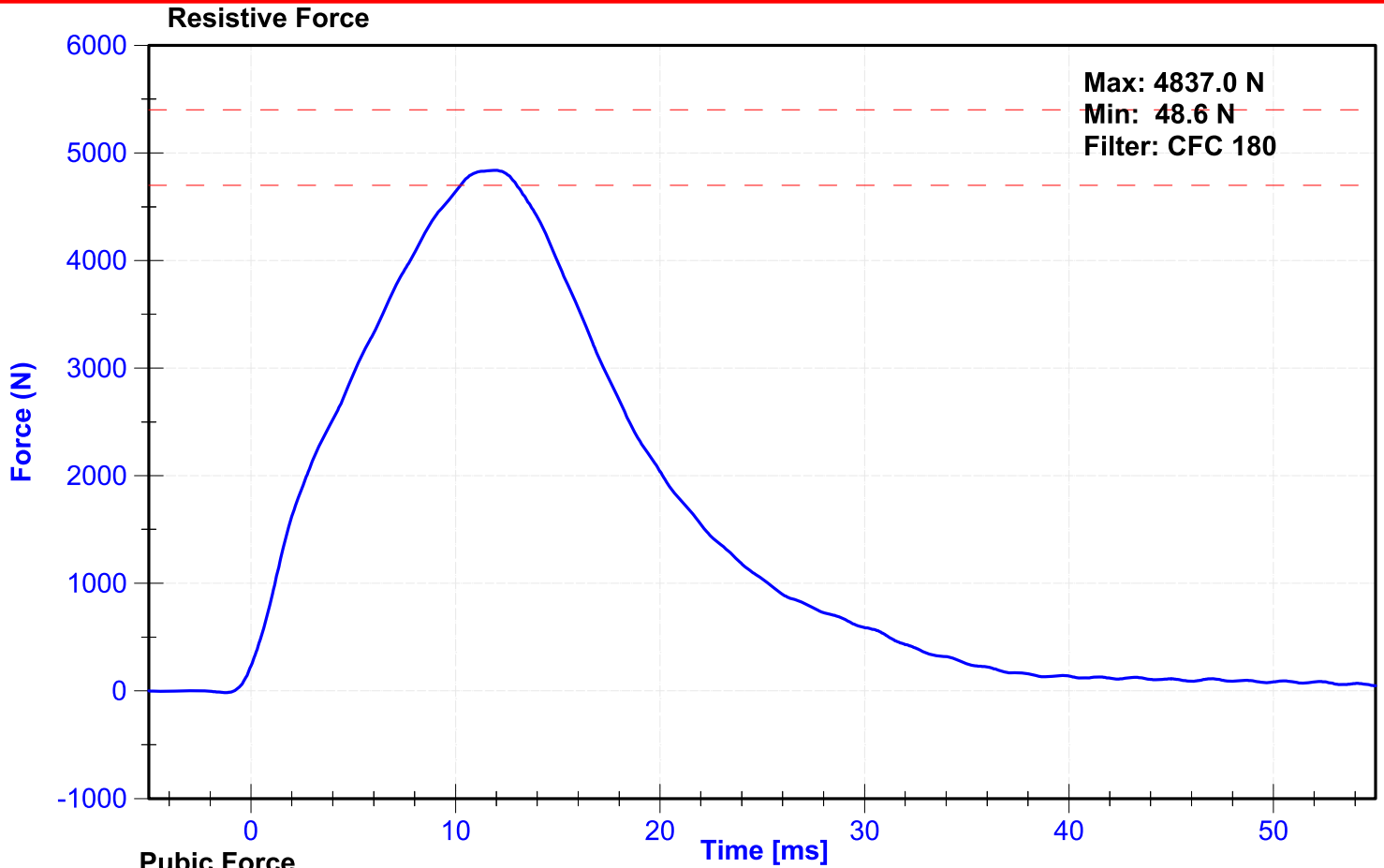
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	20	Pass
Velocity	4.2	4.4	m/s	4.29	Pass
Resistive Force	4700	5400	N	4837.0	Pass
Time at Peak Resistive Force	11.8	16.1	ms	11.95	Pass
Pubic Force	-1590	-1230	N	-1547.6	Pass
Time at Peak Pubic Force	12.2	17.0	ms	12.45	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25863	1/17/2025	7/16/2025
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	A431363	Measurement Specialties	09/19/2024
Vehicle Center of Gravity	Y	A399940	Measurement Specialties	09/19/2024
Vehicle Center of Gravity	Z	A399946	Measurement Specialties	09/19/2024
Left Floor Sill	Y	G22222	Endevco	09/10/2024
A-Pillar Sill	Y	A315916	Measurement Specialties	08/21/2024
A-Pillar Low	Y	A414760	Measurement Specialties	08/01/2024
A-Pillar Mid	Y	A374265	Measurement Specialties	08/21/2024
B-Pillar Sill	Y	G22684	Endevco	10/16/2024
B-Pillar Low	Y	A281011	Measurement Specialties	09/18/2024
B-Pillar Mid	Y	A282636	Measurement Specialties	08/21/2024
Driver Seat	Y	A274245	Measurement Specialties	09/17/2024
Engine Top	X	A413588	Measurement Specialties	11/16/2024
Engine Top	Y	A431210	Measurement Specialties	11/16/2024
Firewall	Y	G21387	Endevco	09/09/2024
Right Roof	Y	A413571	Measurement Specialties	10/11/2024
Right Floor Sill	Y	G24318	Endevco	09/10/2024
Rear Floorpan	X	A281029	Measurement Specialties	09/27/2024
Rear Floorpan	Y	A315955	Measurement Specialties	09/27/2024