

REPORT NUMBER: 214P-CAL-23-001

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

**Nissan Motor CO., LTD
2023 Nissan Rogue
4 Door SUV**

NHTSA No: C20235202

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



November 7, 2022

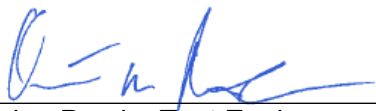
FINAL REPORT

**PREPARED FOR:
U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF SAFETY COMPLIANCE
1200 NEW JERSEY AVE. S.E.
WEST Bldg. (NVS-220)
WASHINGTON, D.C. 20590**

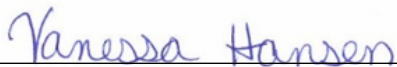
This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Administration, in response to Contract Number DTNH22-17-D-00078.

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Prepared by: 
Quinn Porzio, Test Engineer

Date: November 17, 2022

Approved by: 
Vanessa Hansen, Operations Manager

Date: November 17, 2022

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted by _____

Date: _____

TECHNICAL REPORT DOCUMENTATION PAGE

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16. Abstract A 31.00 km/h (19.3 mph), 285° oblique compliance test was conducted on the subject 2023 Nissan Rogue 4 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 November 3, 2022. The impact velocity of the vehicle was 31.00 km/h, and the ambient temperature at the struck (passenger's) side of the target vehicle was 21°C. The target vehicle's maximum post-test static crush was 333 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">Front Passenger 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>220.154</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>44</td> <td>32.692</td> </tr> <tr> <td>Total Abdominal Force</td> <td>N</td> <td>2500</td> <td>1035.808</td> </tr> <tr> <td>Pubic Symphysis Force</td> <td>N</td> <td>6000</td> <td>-1985.555</td> </tr> </tbody> </table>						Measurement Description	Front Passenger ATD (ES-2re)			Units	IARV	Result	Head Injury Criteria (HIC36)		1000	220.154	Maximum Thoracic Rib Deflection	mm	44	32.692	Total Abdominal Force	N	2500	1035.808	Pubic Symphysis Force	N	6000	-1985.555
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Pubic Symphysis Force	N	6000	-1985.555																									
No test failures were reported.																												
17. Key Words Compliance Testing Side Impact Protection Pole Test ES-2re SID-IIs				18. Distribution Statement <u>Copies of this report are available from:</u> National Highway Traffic Safety Administration Technical Information Services (TIS) Room E12-100 East Bldg. 1200 New Jersey Ave. Washington, D.C. 20590 Telephone No. (202) 366-2588																								
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Form DOT F1700.7 (8-72)

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SECTION 1

PURPOSE AND SUMMARY OF TEST

PURPOSE

This side impact test was conducted as part of the FY 2023 FMVSS 214 Side Impact Protection Compliance Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-17-D-00078. The purpose of this test was to evaluate side impact protection in a 2023 Nissan Rogue 4 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 2023 Nissan Rogue 4 Door SUV. The subject vehicle was towed into the rigid pole at an angle of 285° and a velocity of 31.00 km/h. The test was conducted by Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on November 3, 2022. Pre-test and post-test photographs of the test vehicle and side impact dummy (ES2re) are included in Appendix I of this report.

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

The ES2re male dummy was instrumented accordingly:

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

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

Injury readings for the ES2re dummy were recorded as follows:

INJURY READINGS

Measurement Description	Front Passenger ATD (ES2re)		
	Units	IARV	Result
Head Injury Criteria (HIC36)		1000	220.154
Upper Rib Deflection	mm	44	31.225
Mid Rib Deflection	mm	44	30.787
Lower Rib Deflection	mm	44	32.692
Abdominal Load (front)	N		291.911
Abdominal Load (mid)	N		287.722
Abdominal Load (rear)	N		459.209
Total Abdominal Force	N	2500	1035.808
Pubic Symphysis Force	N	6000	-1985.555

SECTION 2

OCCUPANT AND VEHICLE INFORMATION

This section contains information reporting for the following Data Sheets:

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**DATA SHEET NO. 1
TEST VEHICLE INFORMATION AND OPTIONS**

Test Vehicle: 2023 Nissan Rogue 4 Door SUV
 Test Facility: Calspan

NHTSA No.: C20235202
 Test Date: 11/03/2022

TEST VEHICLE INFORMATION AND OPTIONS

Make	Nissan	Anti-Lock Brakes (ABS)	Yes
Model	Rogue	All-Wheel Drive (AWD)	Yes
Body Style	SUV	Traction Control System (TCS)	Yes
VIN	5N1BT3AB8PC673544	Electric Stability Control (ECS)	Yes
Body Color	Black	Curtain Airbags	Yes
Engine Displacement (L)	1.5	Torso Airbags – Front Seats	Yes
Type / No. Cylinders	Inline 3	Torso Airbags – Rear Seats	Yes
Engine Placement	Transverse	Combination/Head Torso Bag	No
Transmission Type	Automatic	Pelvic Airbag – Front Seats	No
Transmission Speeds	Variable	Pelvis Airbag – Rear Seats	No
Overdrive	Yes	Knee Airbag – Driver	Yes
Final Drive	AWD	Knee Airbag – Front Passenger	Yes
Odometer Reading (mi)	12	Seat Belt Pretensioners – Front Seats	Yes
		Seat Belt Pretensioners – Rear Seats	Yes
		Seat Belt Load Limiter – Front Seats	Yes
		Seat Belt Load Limiter – Rear Seats	Yes
		Tire Pressure Monitoring System (TPMS)	Yes
		Tilt Steering Wheel	Yes
		Automatic Door Locks (ADL)	Yes
		Power Window Auto-reverse	Yes
		Power Seats	No
		Other Safety Restraint	

DATA FROM CERTIFICATION LABEL

Manufactured By	Nissan Motor CO., LTD	GVWR (kg)	2125
Date of Manufacture	08/22	GVWR Front (kg)	1115
Vehicle Type	MPV	GVWR Rear (kg)	1065

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)				408
Cargo Weight (RCLW) (kg)				67.8

**DATA SHEET NO. 3
GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2023 Nissan Rogue 4 Door SUV
 Test Facility: Calspan

NHTSA No.: C20235202
 Test Date: 11/03/2022

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	270	275	256	251
Tire Placard	kPa	250	250	230	230

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			Fully Loaded			As Tested		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	482	342		493	384		506	385	
Right	kg	479	325		514	388		509	371	
Ratio	%	59	41		56.6	43.4		57	43	
Totals	kg	961	667	1628	1007	772	1779	1015	756	1771

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1628	(A)
Weight of Test Dummy	kg	81	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	67.8	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1776.8	(A+B+C)

TEST VEHICLE ATTITUDES AND CG

Measurement Description	Units	As Delivered	Fully Loaded	As Tested
Driver Door Sill Angle	Deg	-1.0	-0.9	-1.0
Front Passenger Sill Angle	Deg	-1.0	-1.15	-1.0
Front Bumper-Line Angle	Deg	0.1	0.15	0.1
Rear Bumper-Line Angle	Deg	0.25	0.3	0.25

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	2705
Vertical Impact Reference Line Aft of Front Axle	mm	1238

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Trunk Carpeting	11
Spare Tire	15.5
Jack	2.5
Left Rear Window	4.5
Ballast (if any)	36.3

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

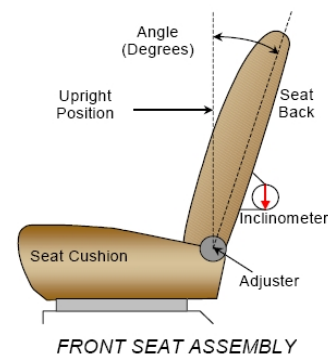
Test Vehicle: 2023 Nissan Rogue 4 Door SUV
 Test Facility: Calspan

NHTSA No.: C20235202
 Test Date: 11/03/2022

SEAT BACK ANGLE ADJUSTMENT

The driver and passenger seat backs are positioned to the manufacturer's designated angle provided in the Form 1.

	Units	
Driver Seat	Deg	1.7
Front Passenger Seat	Deg	6.0



*Measurement taken on seatback

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	SCRIP Height Position	SCRIP Height (mm)		
			Rearmost	Mid-Fore / Aft	Forward-Most
Driver Seat	15.8	Max			
		Mid			
		Min	25	34	43
Front Passenger Seat	Fixed	Max			
		Mid			
		Min	0	7	14

SEAT FORE / AFT POSITION

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

SEAT BELT ANCHORAGE ADJUSTMENT

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

HEAD RESTRAINT ADJUSTMENT

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

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

Test Vehicle: 2023 Nissan Rogue 4 Door SUV
 Test Facility: Calspan

NHTSA No.: C20235202
 Test Date: 11/03/2022

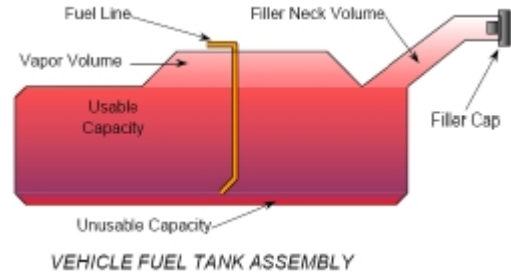
FUEL TANK CAPACITY

Description	Liters
Usable Capacity of (Form No.1)	58.3
Usable Capacity of (Owner's Manual)	58.3
92 - 94% of Usable Capacity	53.6 - 54.8
Actual Amount of Solvent Used in Test	54.1

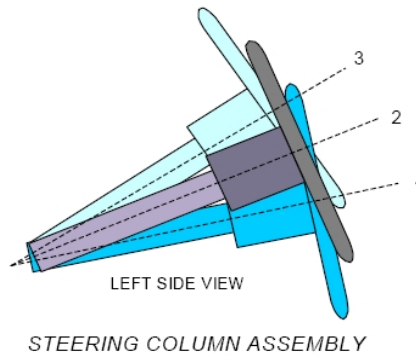
FUEL PUMP

Describe the operation of the fuel pump.

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



STEERING COLUMN POSITIONS

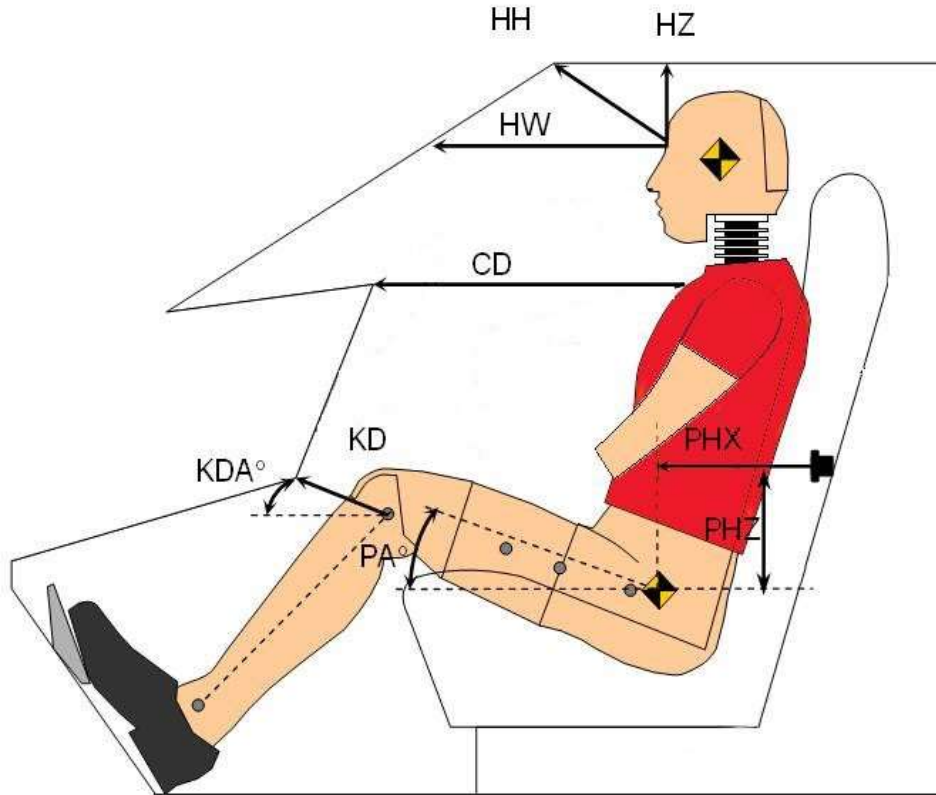


	Degrees	Fore / Aft Position (mm)
Lowermost - Position No. 1	23.0	
Geometric center - Position No. 2	25.6	
Uppermost - Position No. 3	28.2	
Telescoping Steering Wheel Travel		58
Test Position	25.6	29

**DATA SHEET NO. 6
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS**

Test Vehicle: 2023 Nissan Rogue 4 Door SUV
 Test Facility: Calspan

NHTSA No.: C20235202
 Test Date: 11/03/2022



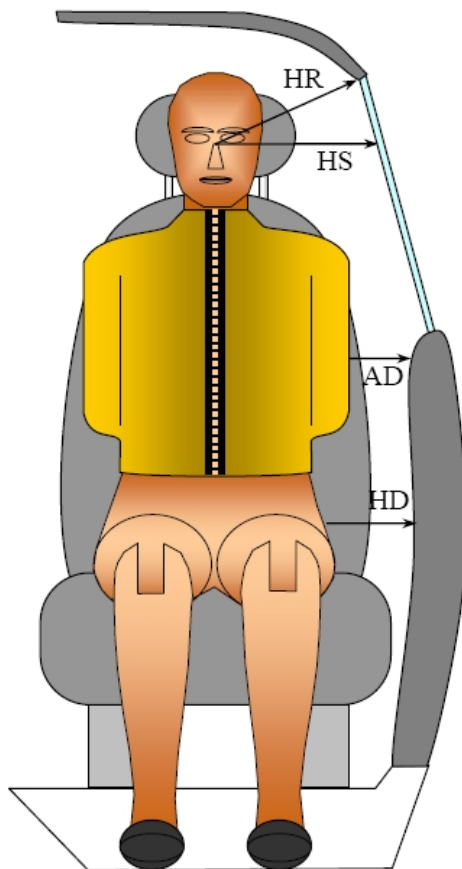
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Description	Front Passenger	
		Length (mm)	Angle (°)
HH	Head to Header	365	
HW	Head to Windshield	584	
HZ	Head to Roof Liner	156	
CD	Chest to Dash	535	
KD(L) / KDA(L)°	Left Knee to Dash	120	25.7
KD(R) / KDA(R)°	Right Knee to Dash	135	28.6
PAX°	Pelvic Tilt Angle (X-Axis)		0.7
PAY°	Pelvic Tilt Angle (Y-Axis)		20.7
PHX	Hip Point to Striker (X-Axis)	237	
PHZ	Hip Point to Striker (Z-Axis)	105	

**DATA SHEET NO. 7
DUMMY LATERAL CLEARANCE DIMENSIONS**

Test Vehicle: 2023 Nissan Rogue 4 Door SUV
 Test Facility: Calspan

NHTSA No.: C20235202
 Test Date: 11/03/2022



FRONT VIEW OF DUMMY

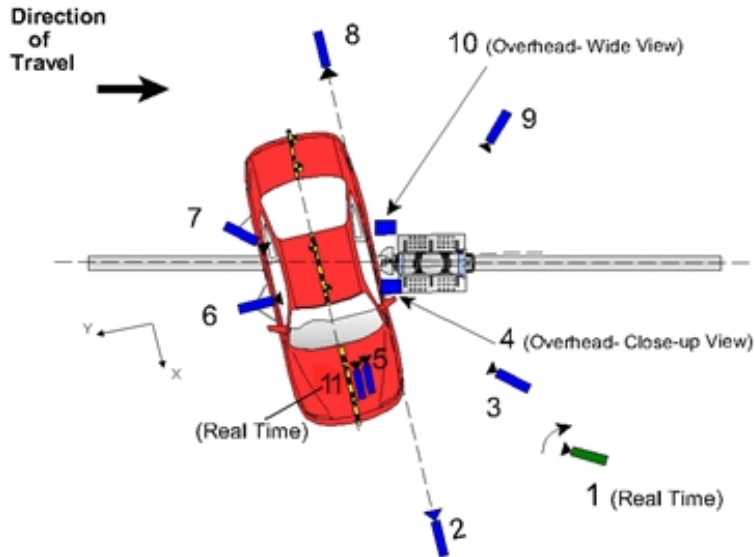
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Front Passenger
HR	Head to Side Header	mm	209
HS	Head to Side Window	mm	330
AD	Arm to Door	mm	92
HD	H-Point to Door	mm	143

**DATA SHEET NO. 8
LOCATION OF CAMERAS**

Test Vehicle: 2023 Nissan Rogue 4 Door SUV
 Test Facility: Calspan

NHTSA No.: C20235202
 Test Date: 11/03/2022



CAMERA LOCATIONS AND DATA

CAMERA LOCATIONS AND DATA

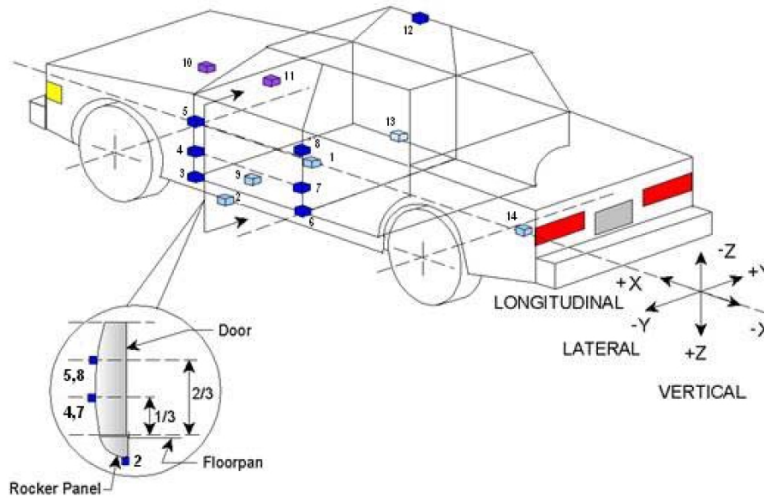
No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Real-time (24 - 30 fps) pan view of impact				Zoom	60
2	Front ground level - impact view	7614	0	-1488	24	1000
3	Impact side 45° - forward pole view	4868	-1156	-1531	28	1000
4	Overhead Close-up view of impact	0	0	-9375	24	1000
5	Onboard - dummy front view				25	1000
6	Onboard - dummy side view				12.5	1000
7	Onboard - dummy rear oblique view				12.5	1000
8	Rear ground level - impact view	-7825	0	-1421	24	1000
9	Impact side 45° - rearward pole view	-4329	-2955	-1538	28	1000
10	Overhead wide - view of impact	0	0	-9375	12.5	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: 2023 Nissan Rogue 4 Door SUV
Test Facility: Calspan

NHTSA No.: C20235202
Test Date: 11/03/2022



TEST VEHICLE ACCELEROMETER LOCATIONS

No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2689	-15	-248
2	Left Floor Sill	2884	638	181
3	A-Pillar Sill	3155	627	199
4	A-Pillar Low	3297	595	23
5	A-Pillar Mid	3189	641	-562
6	B-Pillar Sill	2139	673	131
7	B-Pillar Low	2145	671	-203
8	B-Pillar Mid	2101	653	-531
9	Seat	2510	546	128
10	Engine	3824	206	-271
11	Firewall	3481	285	-250
12	Roof	2038	-577	-1072
13	Right Floor Sill	2885	-635	189
14	Rear Deck	684	1	134

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: C20235202 – 2023 Nissan Rogue - FMVSS 214 Right
 Test Facility: Calspan

NHTSA No.: C20235202
 Test Date: 11/3/2022

Loc. No	Description	Axes	Units	Positive Direction		Negative Direction	
				Max	Time (ms)	Max	Time (ms)
1	Vehicle CG	X	g	7.03	39.85	-12.49	46.40
	Vehicle CG	Y	g	19.21	44.90	-48.78	35.90
	Vehicle CG	Z	g	41.66	27.00	-29.83	46.90
	Vehicle CG Resultant	N/A	g	49.65	35.65	0.03	-13.85
2	Floor Sill (Left)	Y	g	13.38	24.20	-30.30	19.55
3	A Pillar Sill	Y	g	3.34	35.50	-29.36	20.35
4	A Pillar Low	Y	g	2.51	54.25	-31.77	21.10
5	A Pillar Mid	Y	g	85.81	62.00	-57.35	80.90
6	B Pillar Sill	Y	g	20.00	32.70	-89.76	15.35
7	B Pillar Low	Y	g	129.51	35.80	-146.68	30.95
8	B Pillar Mid	Y	g	57.49	35.70	-123.95	21.50
9	Seat	Y	g	24.52	59.45	-54.00	14.35
10	Engine Top	X	g	4.11	104.40	-13.04	34.50
	Engine Top	Y	g	5.58	211.15	-21.05	36.25
11	Firewall	Y	g	6.09	35.20	-20.18	41.20
12	Roof	Y	g	2.44	300.00	-35.44	38.50
13	Floor Sill (Right)	Y	g	5.77	28.35	-37.85	15.05
14	Rear Deck	X	g	3.79	23.20	-5.51	62.10
	Rear Deck	Y	g	2.47	184.45	-14.21	47.10

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

Test Vehicle: C20235202 – 2023 Nissan Rogue - FMVSS 214 Side Pole
 Test Facility: Calspan

NHTSA No.: C20235202
 Test Date: 11/3/2022

Dummy Serial No. D037

Description	Axes	Positive Direction		Negative Direction	
		MAX	TIME (ms)	MAX	TIME (ms)
HEAD ACCELERATION (g)					
Longitudinal	X	6.89	118.65	-12.46	49.60
Lateral	Y	10.92	106.95	-46.28	48.70
Vertical	Z	11.37	20.70	-3.24	82.40
Resultant	N/A	47.71	48.70		
HIC36 (t1, t2)	N/A	220.15		t1 = 38.25	t2 = 72.95
THORAX DEFLECTION (mm)					
Upper Rib	Y	31.23	54.90	-6.93	25.15
Middle Rib	Y	30.79	54.55	-6.21	80.30
Lower Rib	Y	32.69	53.80	-2.92	80.70
ABDOMINAL FORCES (N)					
Front	Y	291.91	47.60	-18.47	129.75
Middle	Y	287.72	49.20	-12.04	130.80
Rear	Y	459.21	48.65	-9.10	120.90
SUM	N/A	1035.81	47.75		
PELVIS FORCES (N)					
Pubic Symphysis	Y	4.04	-41.70	-1985.56	57.35

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

**DATA SHEET NO. 12
POST-TEST OBSERVATIONS**

Test Vehicle: 2023 Nissan Rogue 4 Door SUV
 Test Facility: Calspan

NHTSA No.: C20235202
 Test Date: 11/03/2022

IMPACT POINT DATA

Measured Parameter	Units	Value
Vertical Impact Ref Line - Aft of Front Axle, Intended Impact Pt	mm	1238
Actual Impact Point - Aft of Front Axle	mm	1228
Difference	mm	10

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Front Passenger Seat Dummy (ES2re)
Head Contact	Side Curtain Airbag & Headrest
Upper Torso Contact	Torso/Pelvis Airbag
Lower Torso Contact	Torso/Pelvis Airbag
Left Knee Contact	Passenger Door Trim
Right Knee Contact	Torso/Pelvis Airbag

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)	No	No	No	No	No

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	A-Pillar Buckled
Sill Separation	front of impact location, and at middle of rear impact side door
Windshield Damage	Cracked throughout and separated along the top of the windshield
Side Window Damage	Passenger window shattered during impact event
Other Notable Effects	Muffler detached from vehicle body & separation along rear toepan

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

Test Vehicle: 2023 Nissan Rogue 4 Door SUV
 Test Facility: Calspan

NHTSA No.: C20235202
 Test Date: 11/03/2022

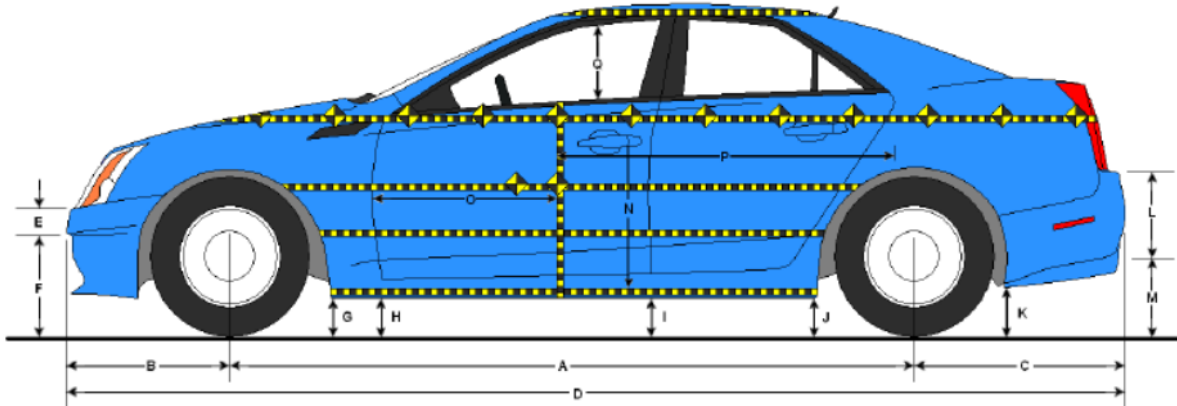
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Front Occupant	
	Mounted	Deployed
Front Airbag	Yes	No
Knee Airbag	Yes	No
Side Airbag 1 - 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: 2023 Nissan Rogue 4 Door SUV
Test Facility: Calspan

NHTSA No.: C20235202
Test Date: 11/03/2022



LEFT SIDE VIEW

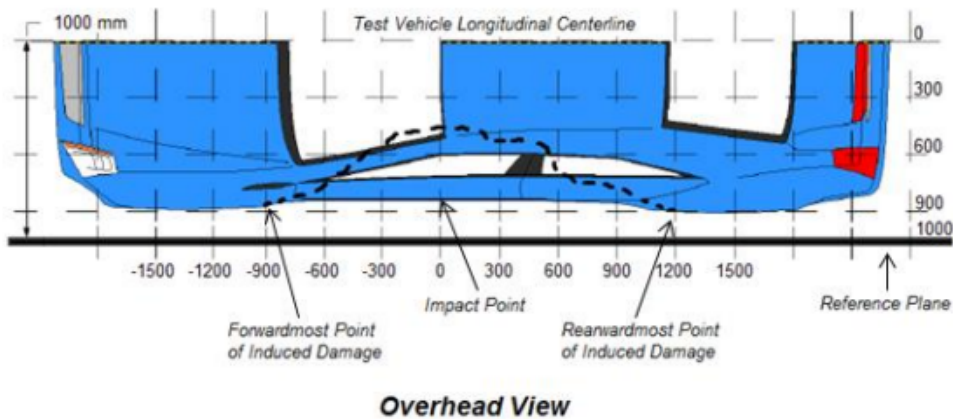
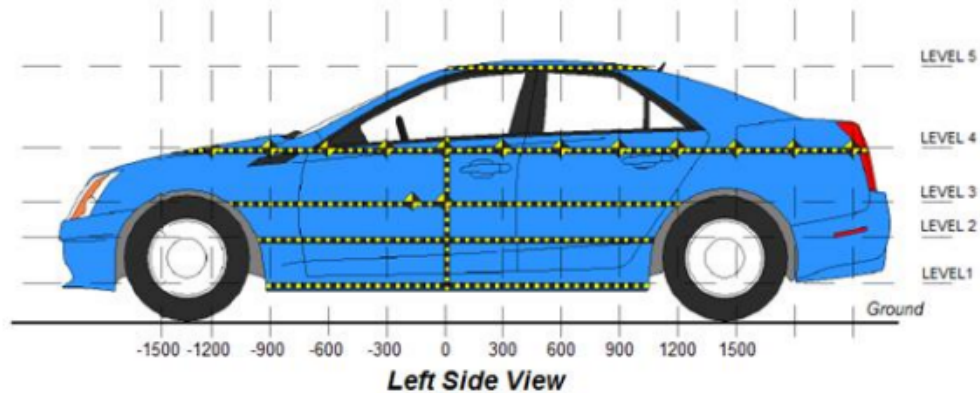
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

No.	Measurement Description	Pre-Test	Post-Test	Difference
A	Vehicle Wheelbase	2704	2709	-5
B	Front Axle to FSOV	944	911	34
C	Rear Axle to RSOV	1006	1008	-2
D2	Total Vehicle Length at Centerline	4655	4628	27
E	Front Bumper Thickness	104	104	0
F	Front Bumper Bottom to Ground	485	501	-16
G	Sill Height at Front Wheel Well	293	306	-13
H	Sill Height at Front Door Leading Edge	294	305	-11
I	Sill Height at B Pillar	313	330	-17
J1	Sill Height at Rear Wheel Well	325	308	17
J2	Pinch Weld Height at Rear Wheel Well	289	346	-57
K	Sill Height Aft of Rear Wheel Well	308	320	-12
L	Rear Bumper Thickness	149	149	0
M	Rear Bumper Bottom to Ground	456	449	7
N	Sill Height to Window Bottom Sill	840	846	-5
O	Front Door Leading Edge to Impact CL	775	845	-70
P	Rear Door Trailing Edge to Impact CL	1398	1175	223
Q	Front Window Opening	404	400	4
R	Right Side Length	4567	4519	49
S	Left Side Length	4566	4564	1
T	Vehicle Width at B-Pillars	1829	1704	125

DATA SHEET NO. 14
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2023 Nissan Rogue 4 Door SUV
Test Facility: Calspan

NHTSA No.: C20235202
Test Date: 11/03/2022



MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	344	290	0
2	Occupant H-Point	mm	715	333	0
3	Mid-Door	mm	771	333	0
4	Window Sill	mm	1102	266	0
5	Window Top	mm	1608	89	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 SHE17ET NO. 14
VEHICLE EXTERIOR CRUSH MEASUREMENTS (CONTINUED)

Test Vehicle: 2023 Nissan Rogue 4 Door SUV
 Test Facility: Calspan

NHTSA No.: C20235202
 Test Date: 11/03/2022

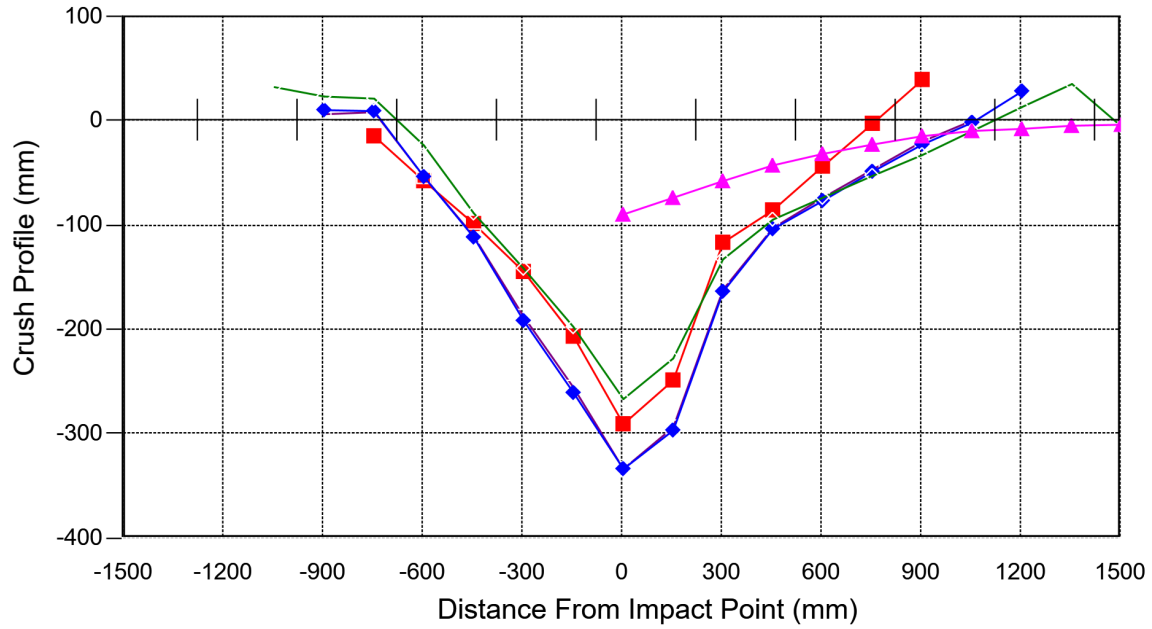
EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1500															
-1350															
-1200															
-1050				-804					-837					33	
-900		-921	-911	-817			-928	-922	-841			7	11	24	
-750	-905	-915	-914	-817		-891	-924	-924	-839		-14	9	10	22	
-600	-907	-912	-913	-811		-850	-859	-860	-788		-57	-53	-53	-23	
-450	-905	-909	-912	-817		-807	-799	-801	-729		-98	-110	-111	-88	
-300	-903	-909	-911	-825		-759	-722	-720	-684		-144	-187	-191	-141	
-150	-901	-909	-911	-832		-695	-654	-651	-635		-206	-255	-260	-197	
0	-899	-908	-909	-837	-616	-609	-575	-576	-571	-527	-290	-333	-333	-266	-89
150	-897	-906	-907	-842	-626	-649	-613	-611	-615	-553	-248	-293	-296	-227	-73
300	-894	-903	-904	-845	-626	-778	-742	-741	-713	-569	-116	-161	-163	-132	-57
450	-890	-898	-900	-845	-627	-805	-796	-797	-751	-585	-85	-102	-103	-94	-42
600	-883	-894	-896	-845	-627	-840	-821	-820	-772	-596	-43	-73	-76	-73	-31
750	-881	-896	-896	-845	-626	-879	-850	-848	-793	-604	-2	-46	-48	-52	-22
900	-880	-908	-907	-853	-623	-920	-889	-885	-821	-609	40	-19	-22	-32	-14
1050		-912	-912	-867	-619		-913	-911	-858	-610		1	-1	-9	-9
1200			-922	-871	-615			-951	-885	-608			29	14	-7
1350				-884	-607				-920	-603				36	-4
1500				-884	-596				-879	-593				-5	-3

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

Test Vehicle: 2023 Nissan Rogue 4 Door SUV
 Test Facility: Calspan

NHTSA No.: C20235202
 Test Date: 11/03/2022



LEVEL 1 Side Sill: -251 mm above ground LEVEL 3 Mid Door: 176 mm above ground LEVEL 5 Window Top: 1013 mm above ground	LEVEL 2 H-Point: 119 mm above ground LEVEL 4 Window Sill: 507 mm above ground
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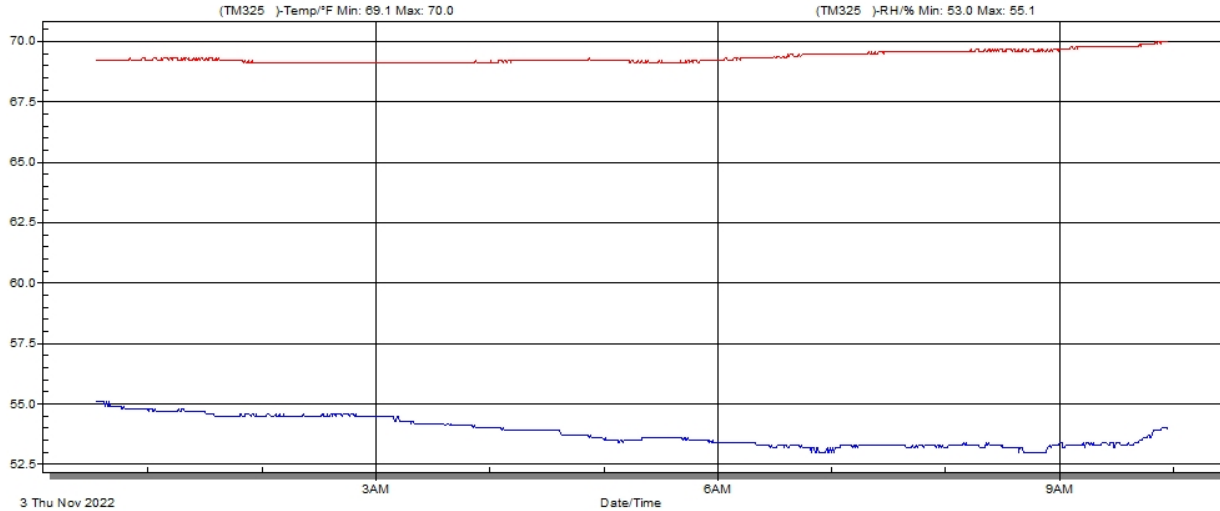
Vehicle Exterior Crush Measurements - Visual Representation

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

Test Vehicle: 2023 Nissan Rogue 4 Door SUV
Test Facility: Calspan

NHTSA No.: C20235202
Test Date: 11/03/2022

Downloaded Data - Thursday, November 3, 2022



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

APPENDIX I
PHOTOGRAPHS

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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

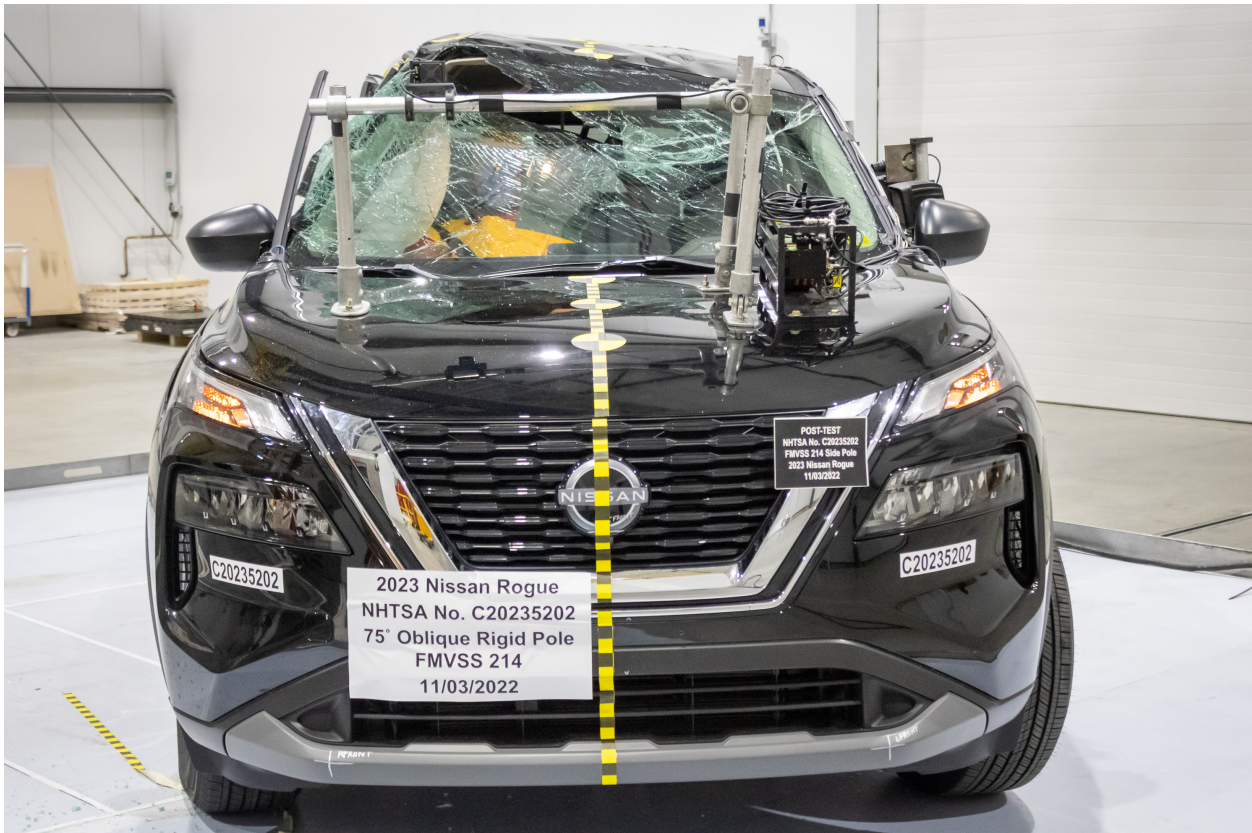


Figure A-2: Post Test Frontal View of Test Vehicle

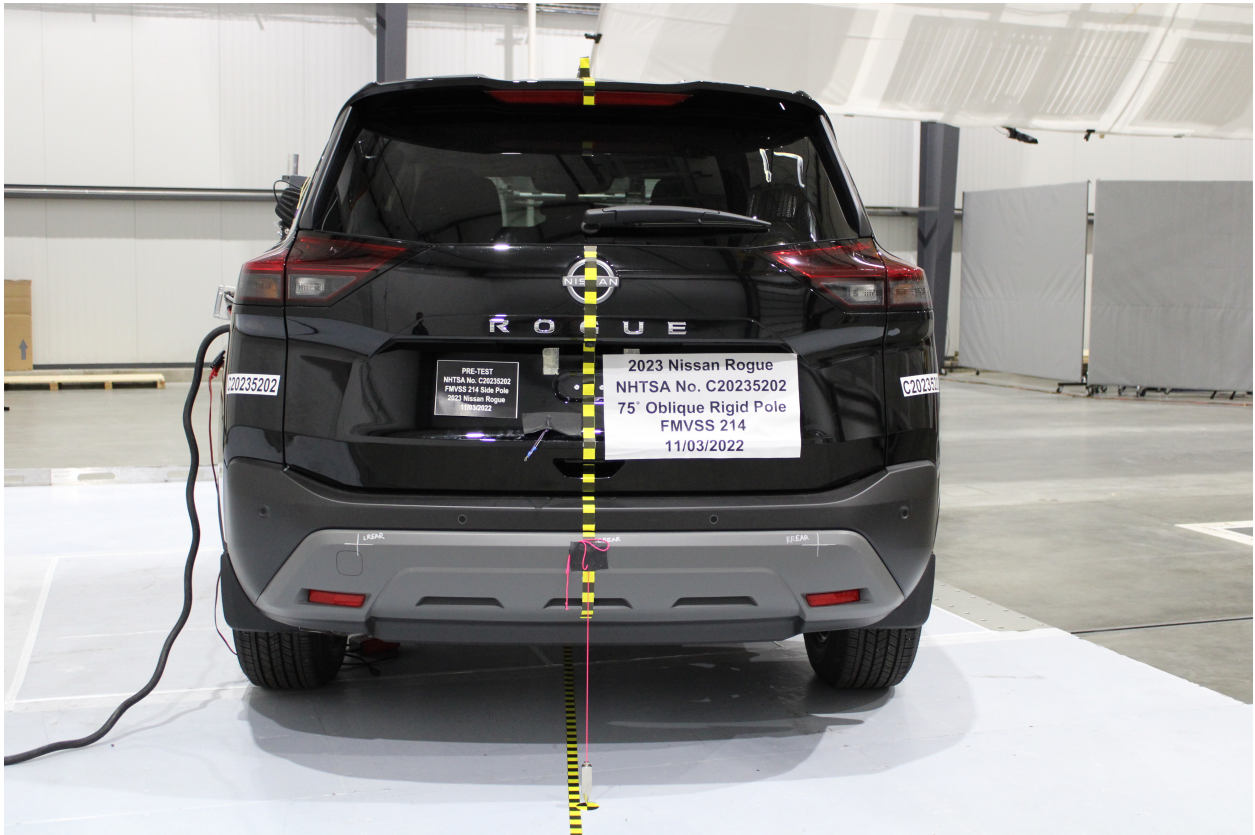


Figure A-3: Pre-Test Rear View of Test Vehicle



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 Right $\frac{3}{4}$ Front View of Vehicle and Pole



Figure A-8: Pre-Test Right $\frac{3}{4}$ 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



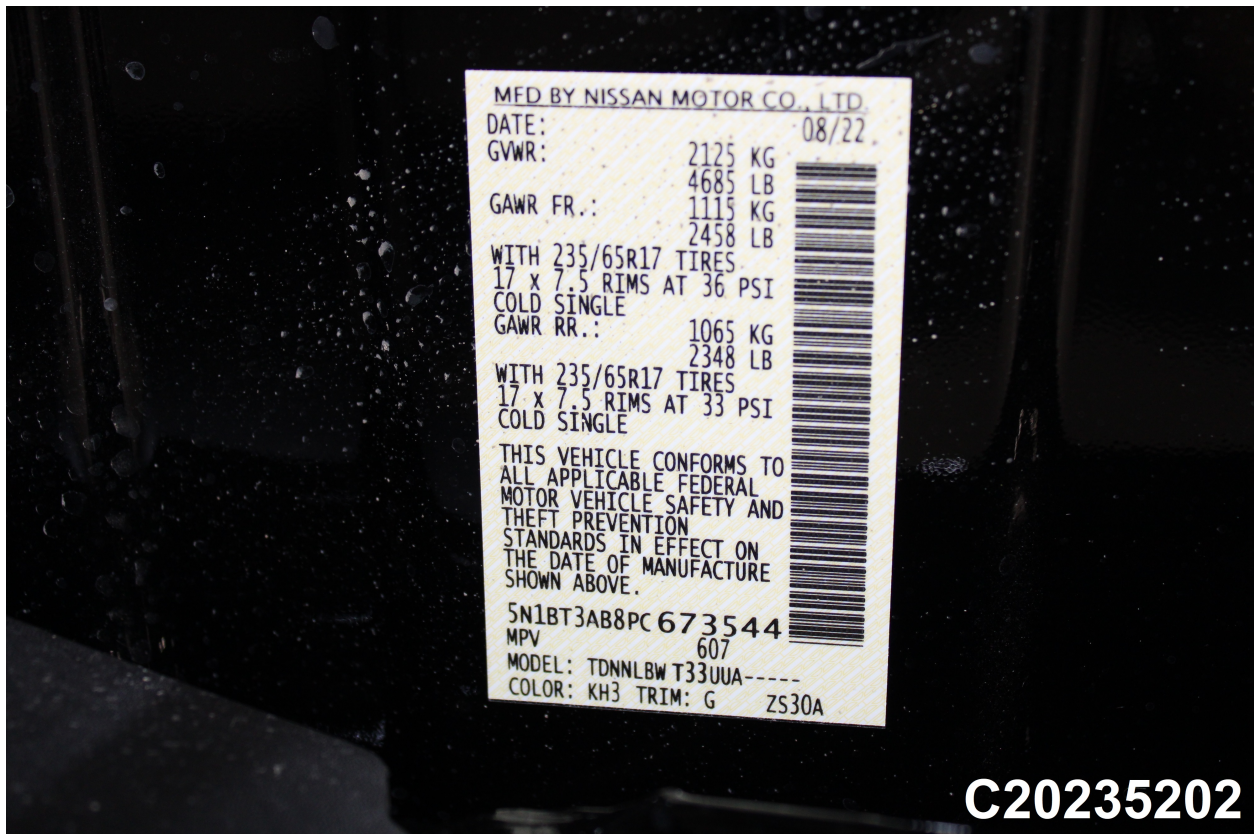
Figure A-22: Post-Test ¾ Front View of Impact Zone



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

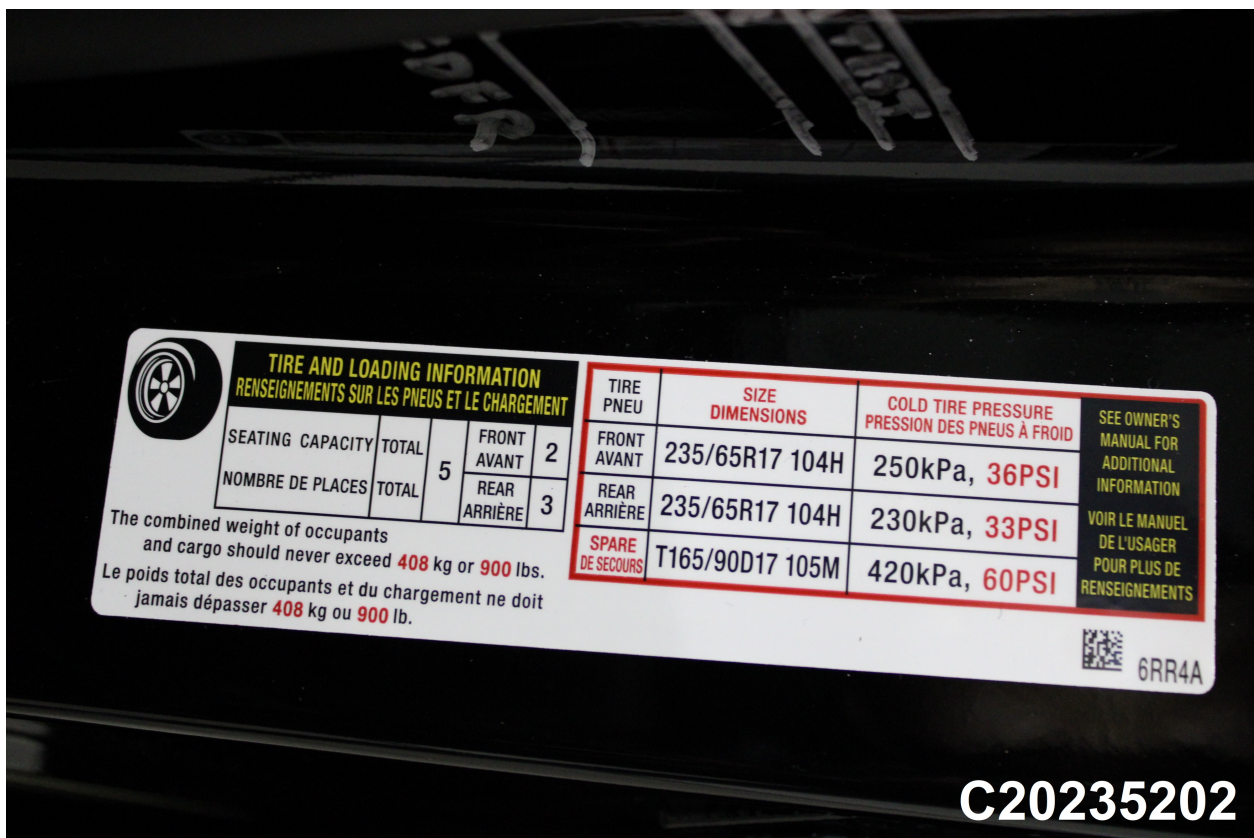


Figure A-24: Post-Test Close-Up View of Impact Point Target



C20235202

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



C20235202

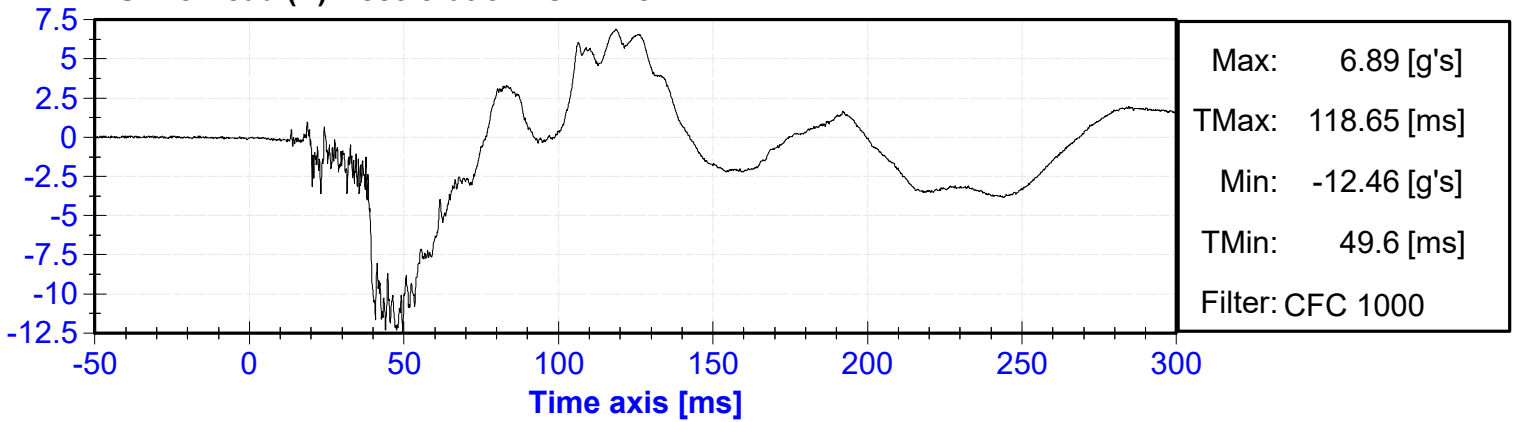
Figure A-26: Close-Up View of Vehicle's Tire Placard Label

Data Traces
VEHICLE & DUMMY RESPONSE DATA TRACES

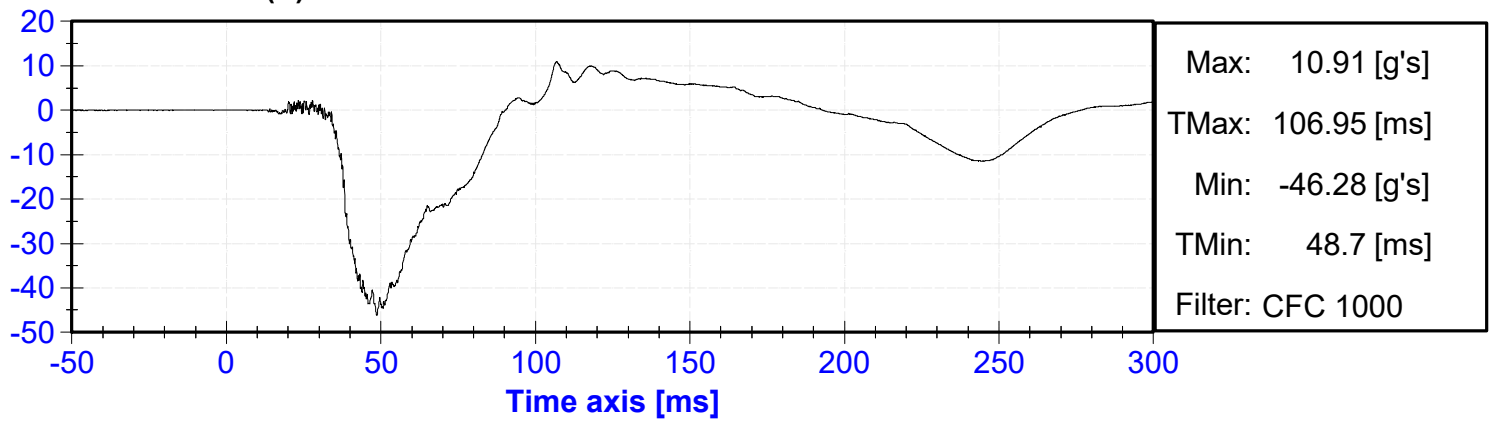
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18	ES-2re Pubic Symphysis Force (Y) vs. Time	B-7

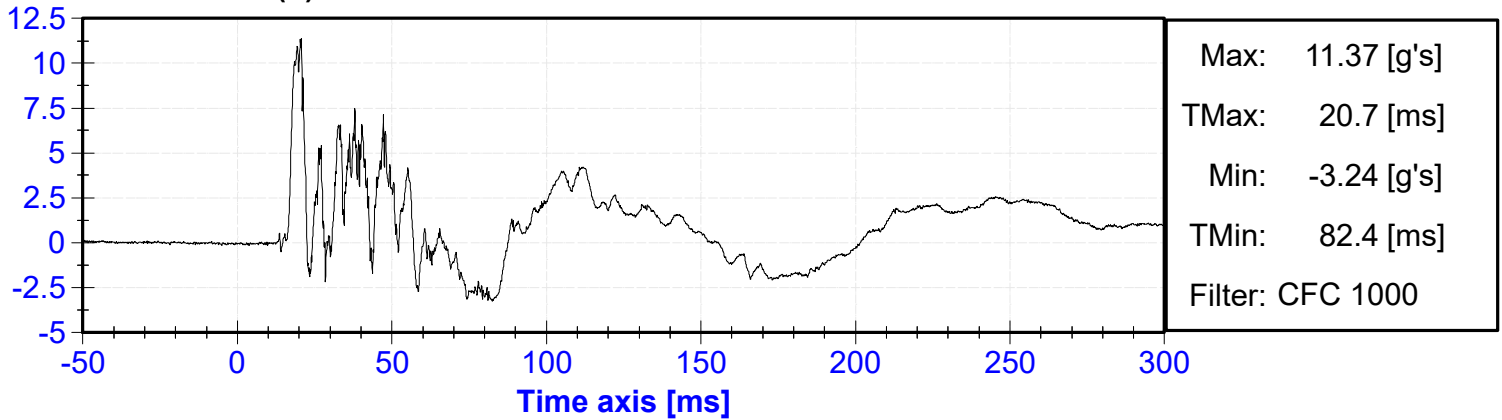
ES-2re Head (X) Acceleration vs. Time



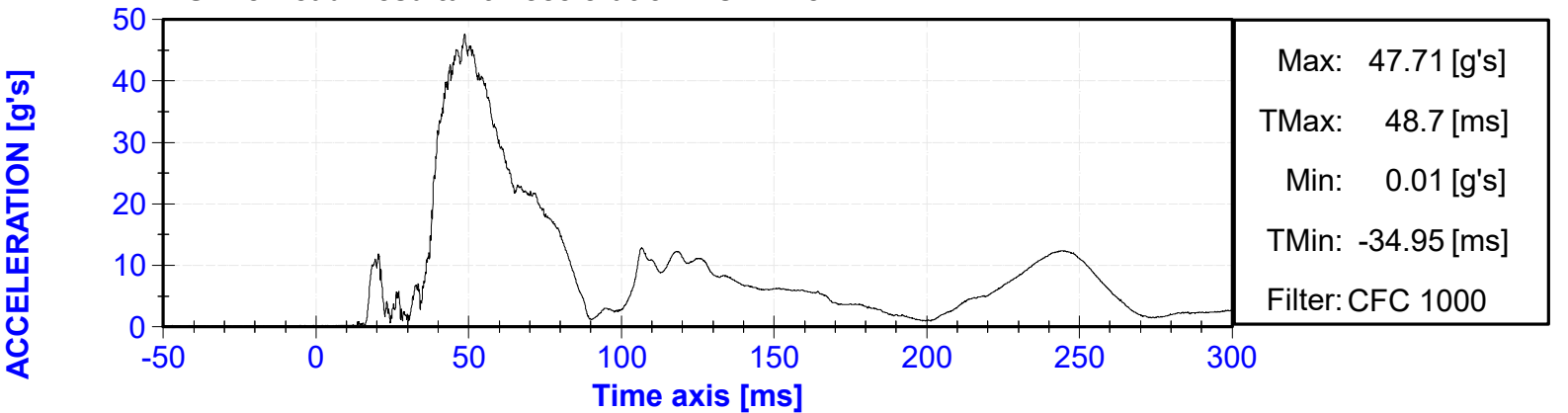
ES-2re Head (Y) Acceleration vs. Time



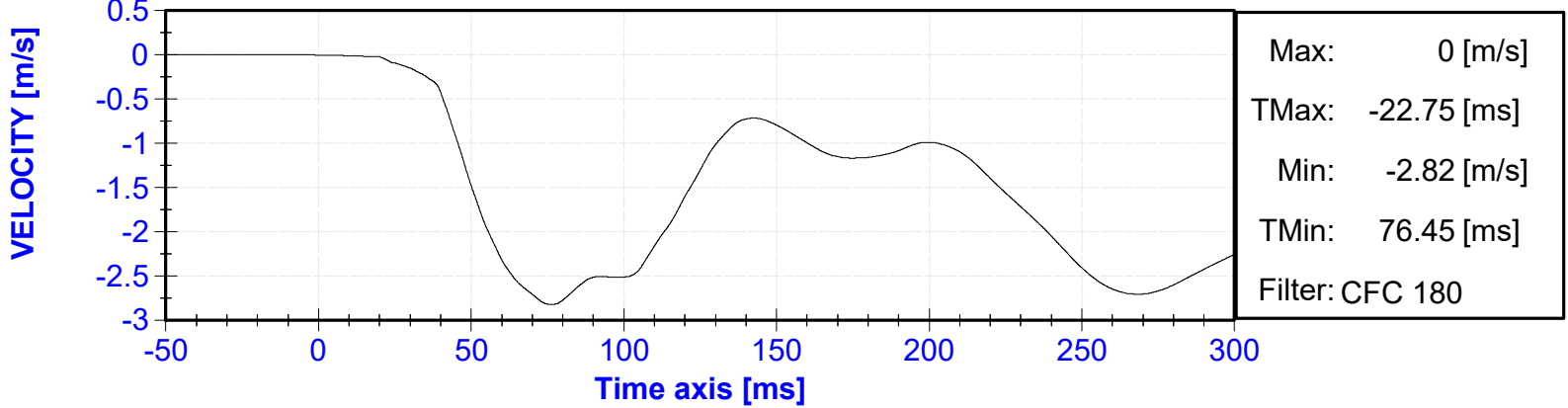
ES-2re Head (Z) Acceleration vs. Time



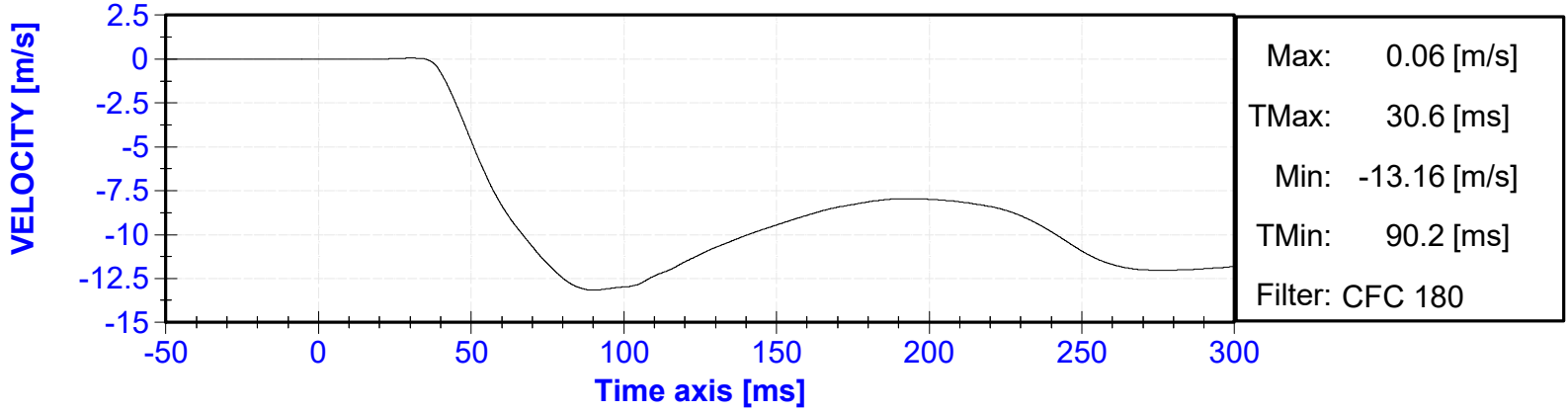
ES-2re Head Resultant Acceleration vs. Time



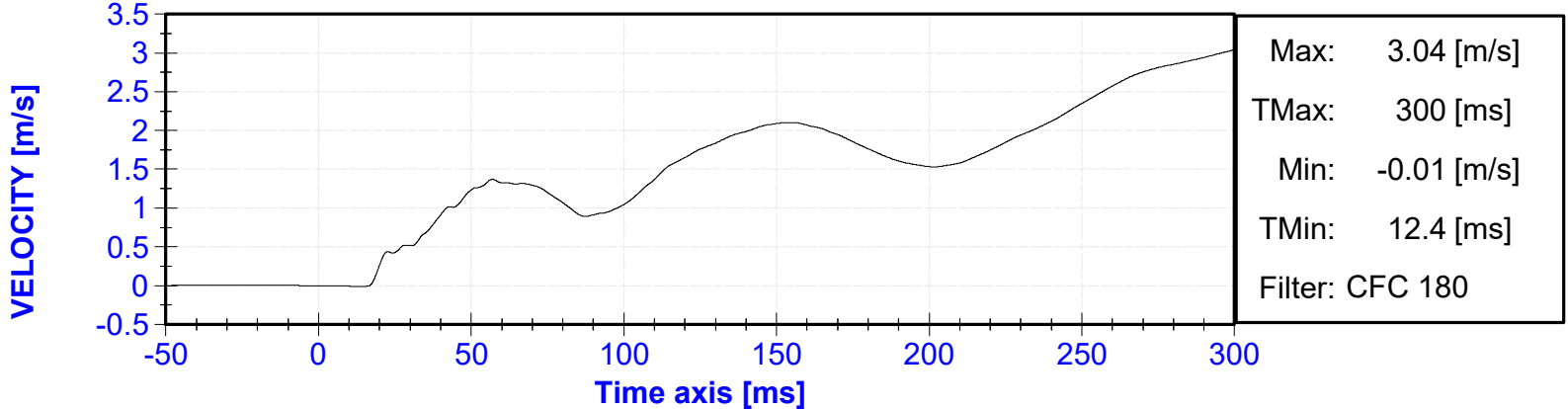
ES-2re Head (X) Velocity vs. Time



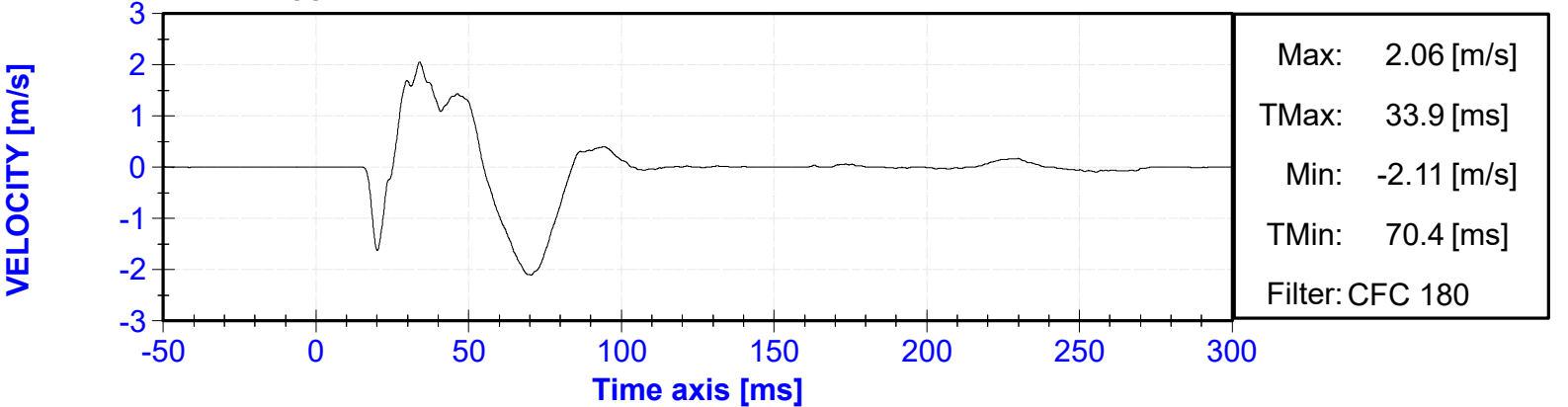
ES-2re Head (Y) Velocity vs. Time



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

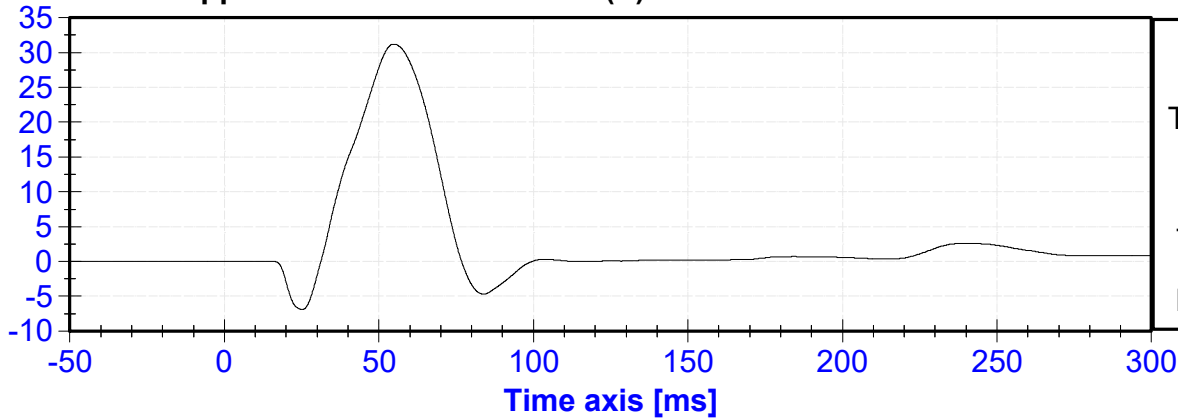


ES-2re Upper Thorax Rib Deflection Rate vs. Time



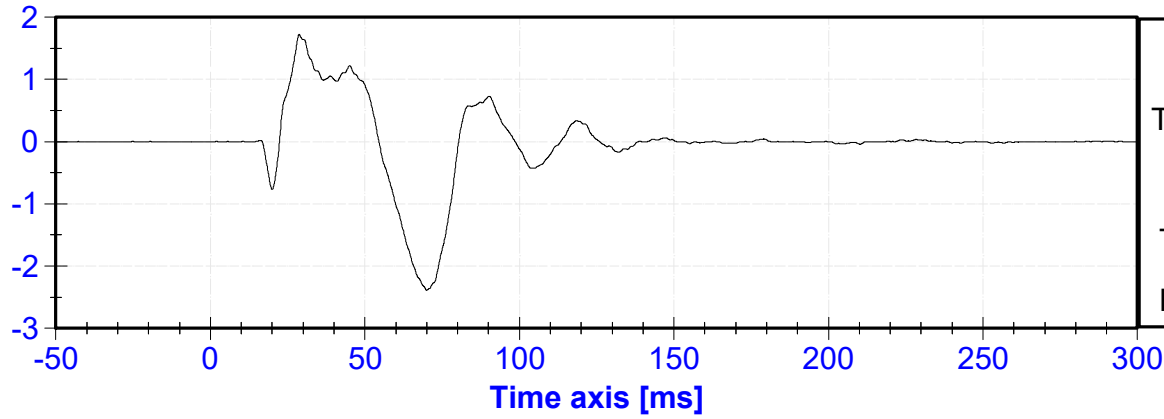
ES-2re Upper Thorax Rib Deflection (Y) vs. Time

DISPLACEMENT [mm]



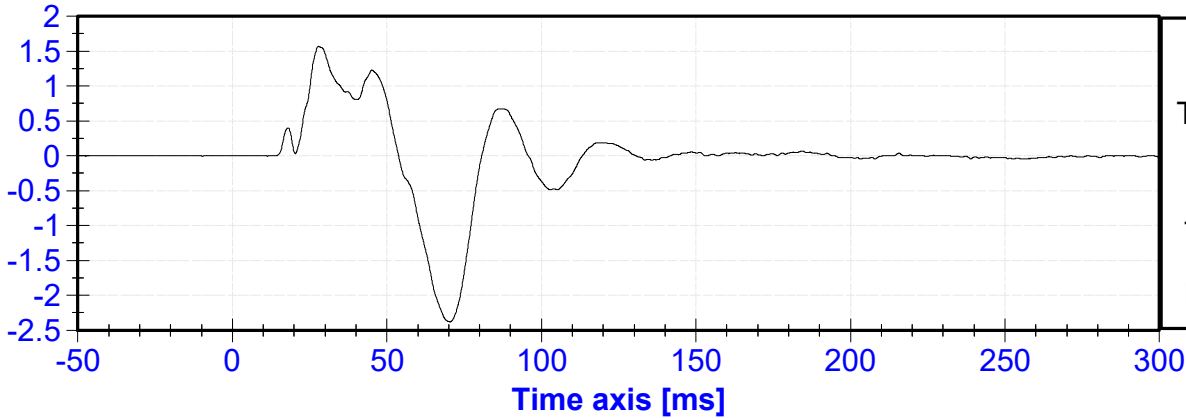
ES-2re Middle Thorax Rib Deflection Rate vs. Time

VELOCITY [m/s]



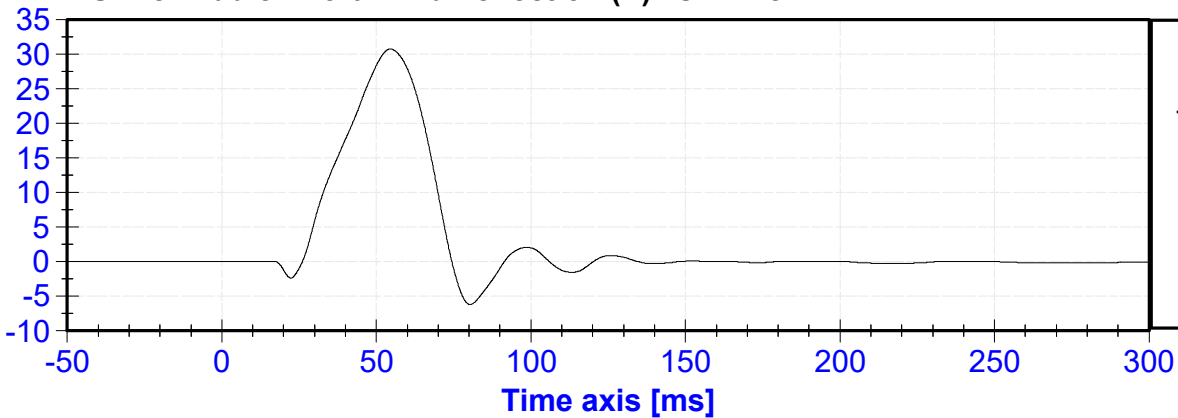
ES-2re Lower Thorax Rib Deflection Rate vs. Time

VELOCITY [m/s]

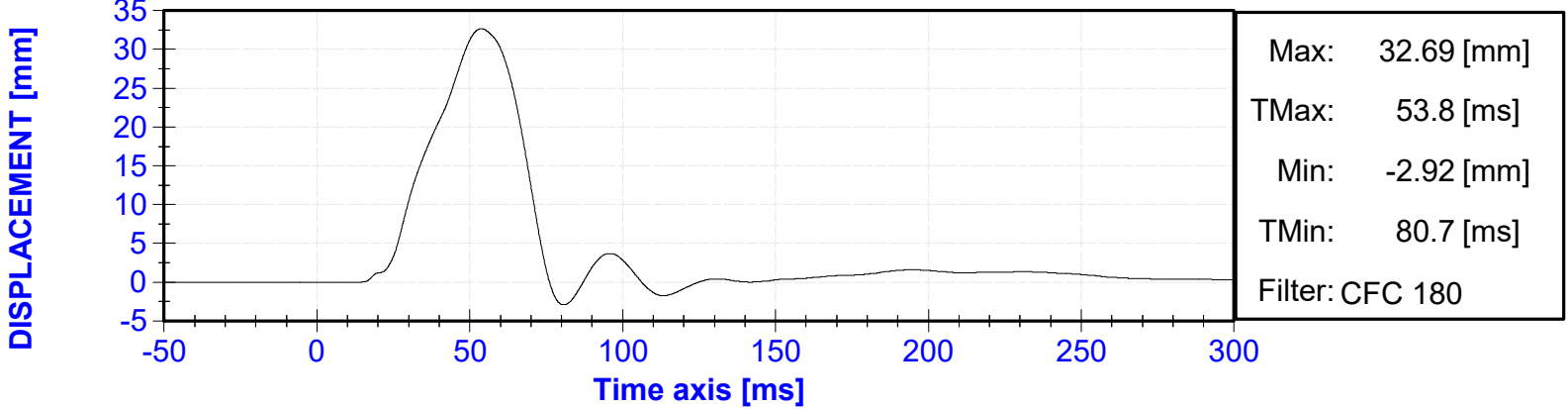


ES-2re Middle Thorax Rib Deflection (Y) vs. Time

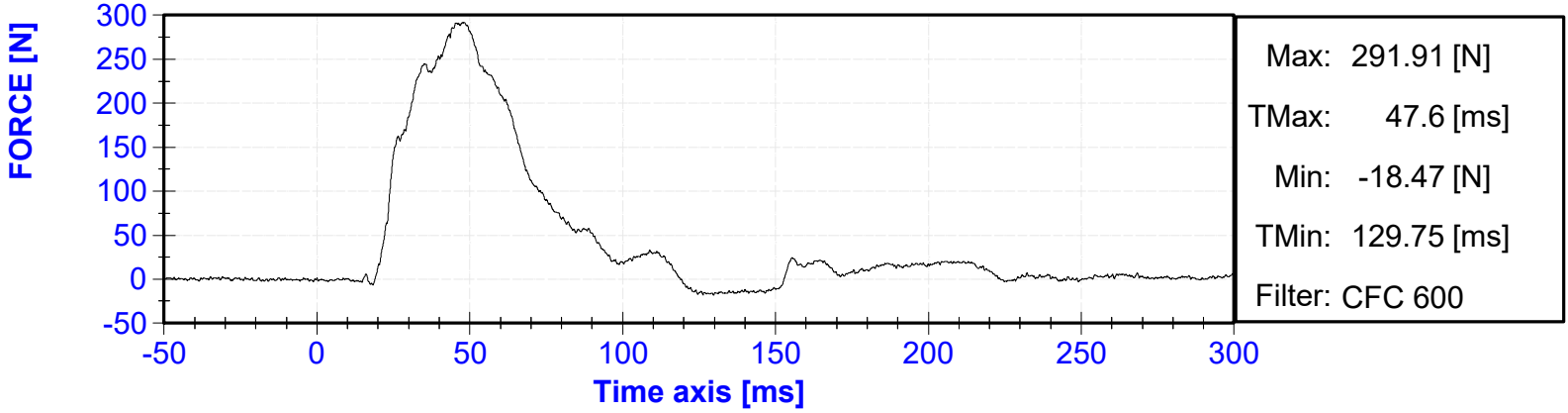
DISPLACEMENT [mm]



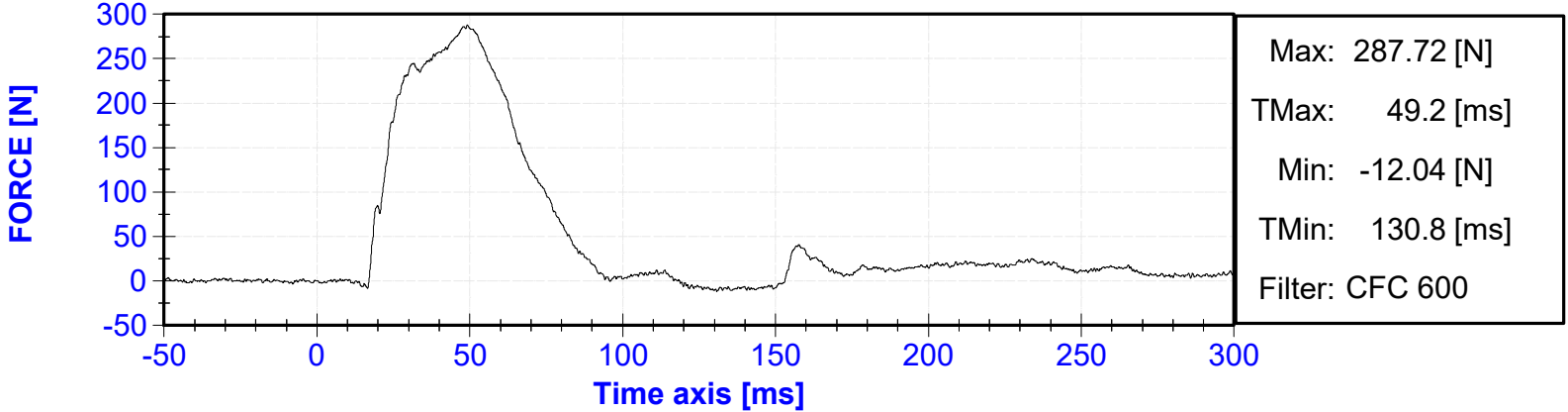
ES-2re Lower Thorax Rib Deflection (Y) vs. Time



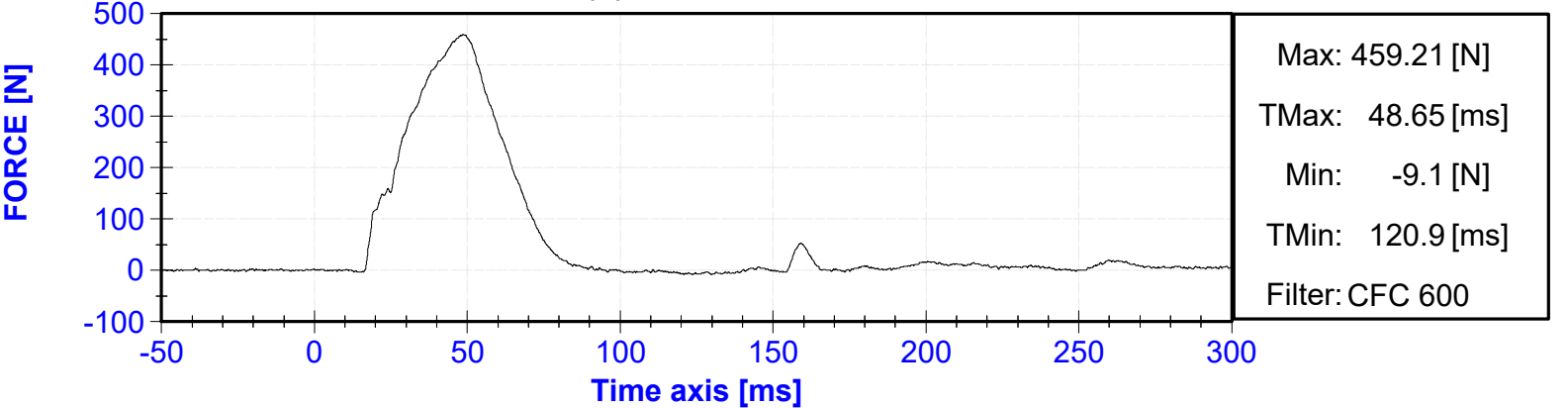
ES-2re Front Abdomen Force (Y) vs. Time



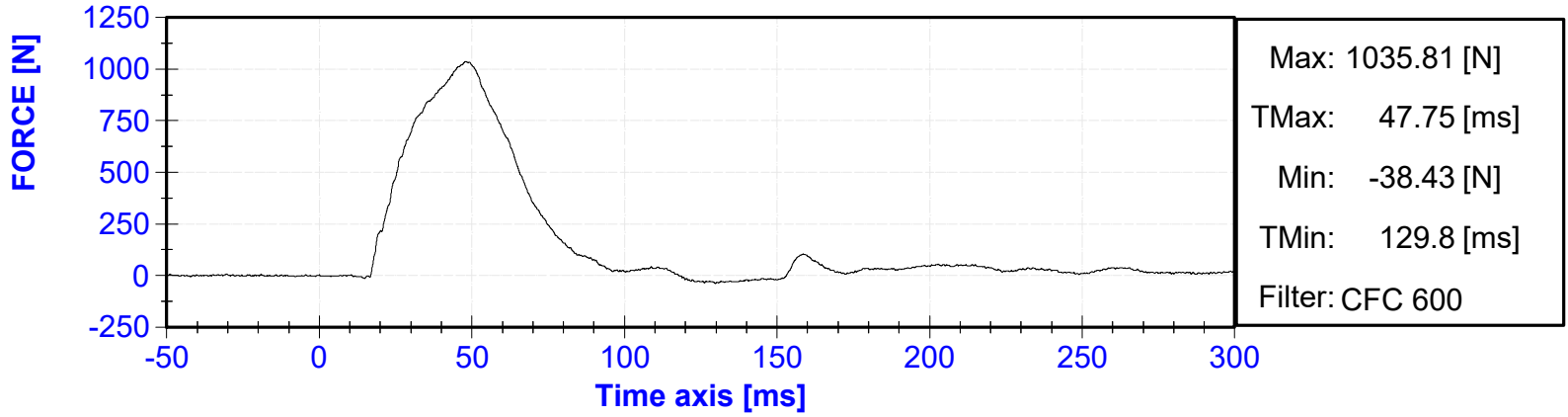
ES-2re Middle Abdomen Force (Y) vs. Time



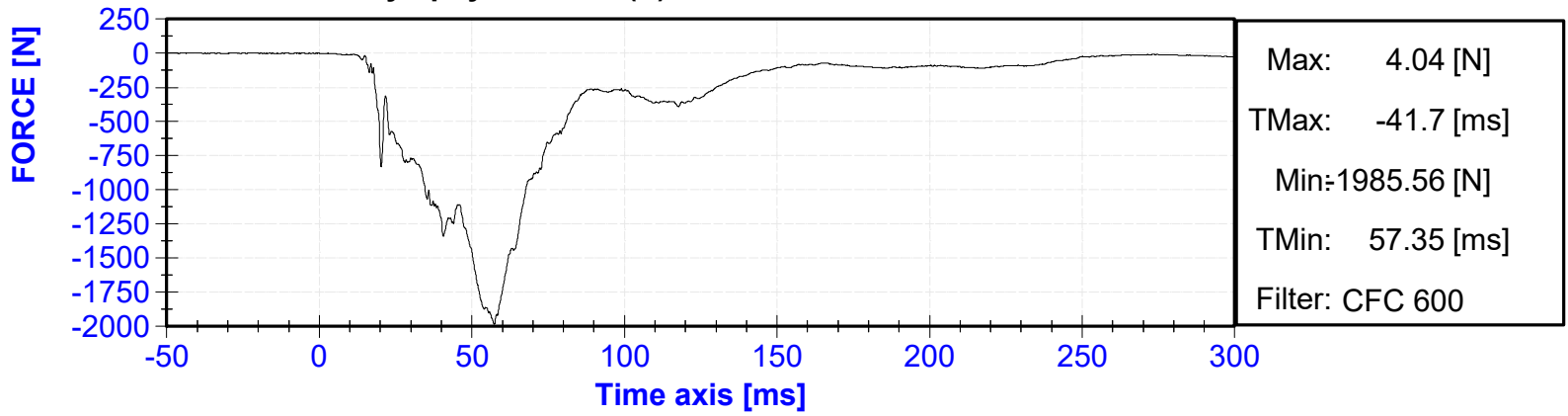
ES-2re Rear Abdomen Force (Y) vs. Time



ES-2re Sum of Abdomen Forces vs. Time



ES-2re Pubic Symphysis Force (Y) vs. Time

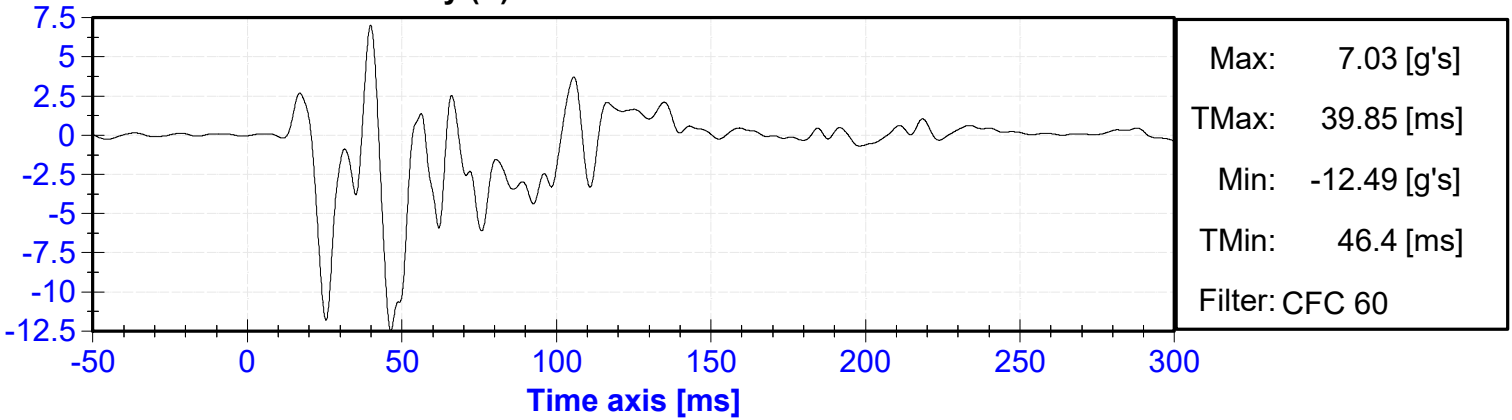


Data Traces
VEHICLE & DUMMY RESPONSE DATA TRACES

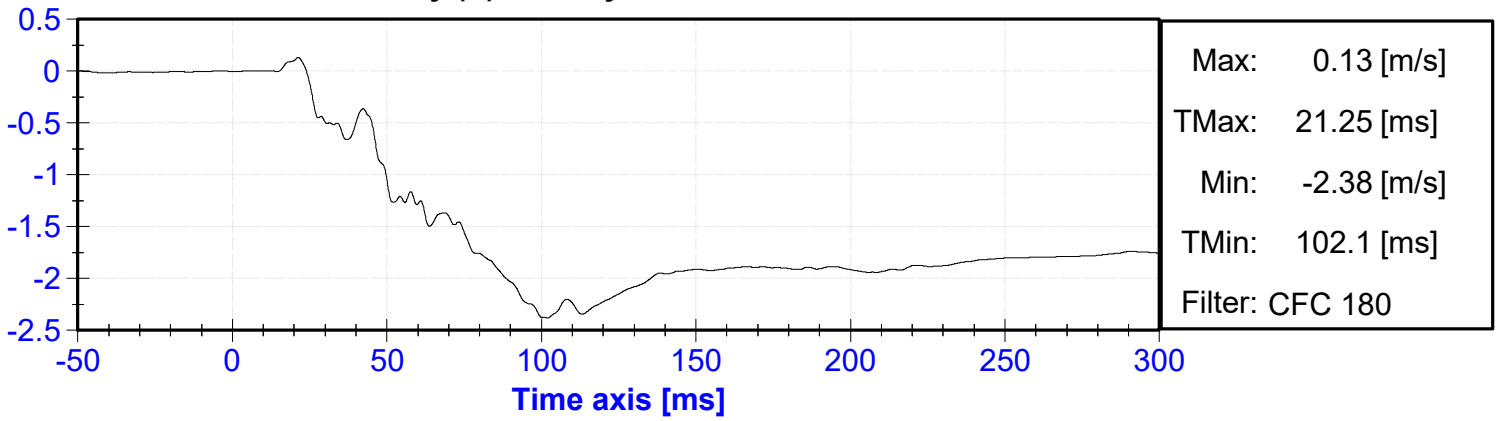
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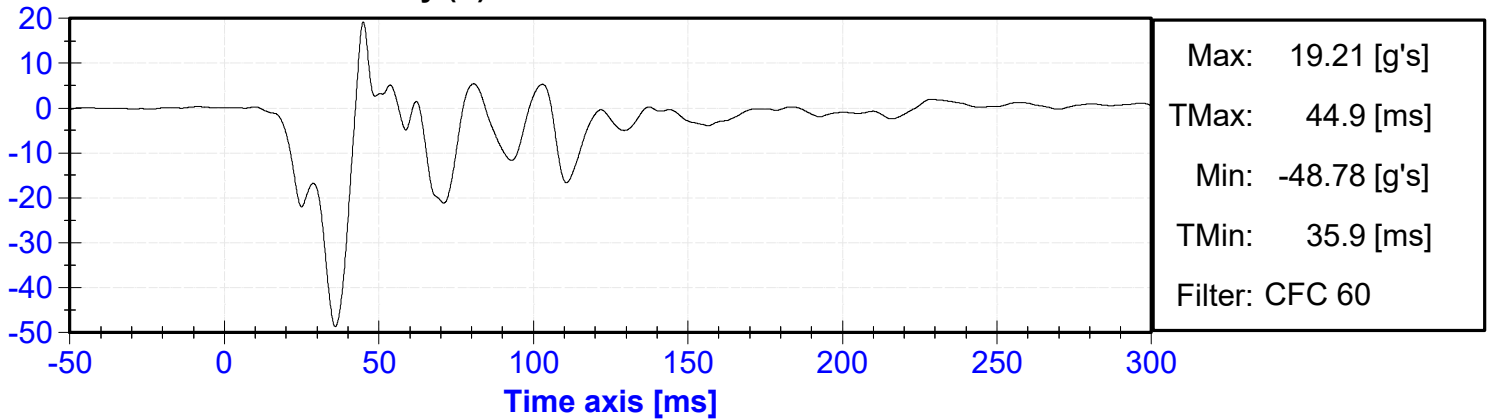
Vehicle Center of Gravity (X) Acceleration vs. Time



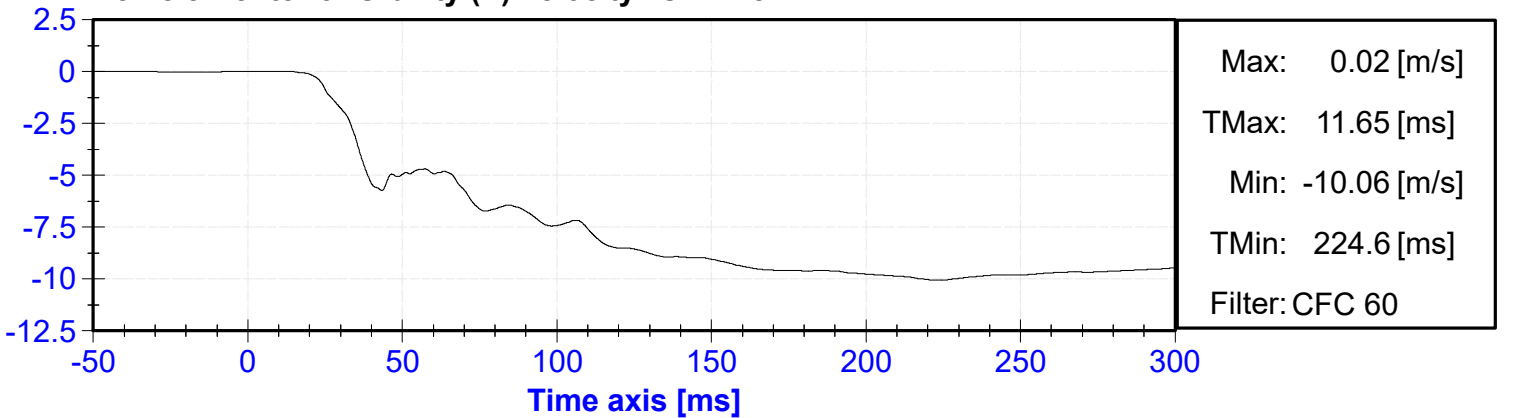
Vehicle Center of Gravity (X) Velocity vs. Time



Vehicle Center of Gravity (Y) Acceleration vs. Time

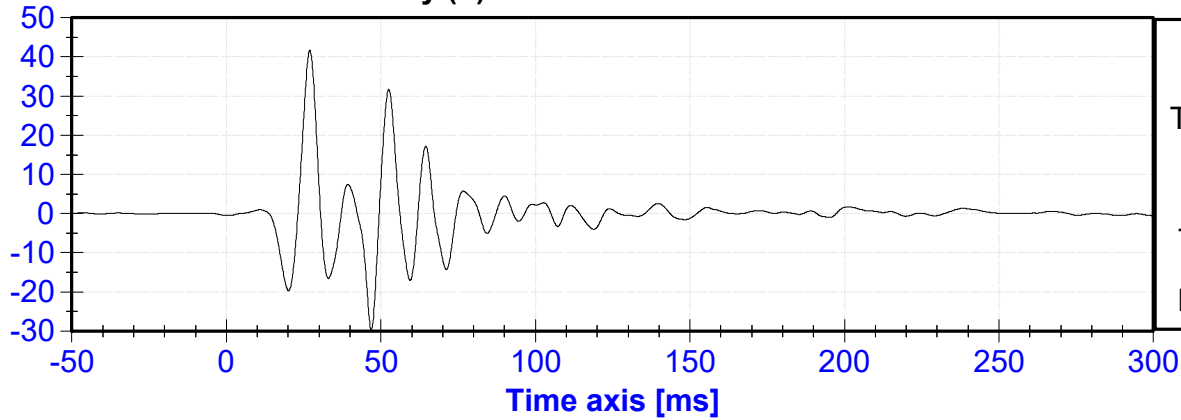


Vehicle Center of Gravity (Y) Velocity vs. Time



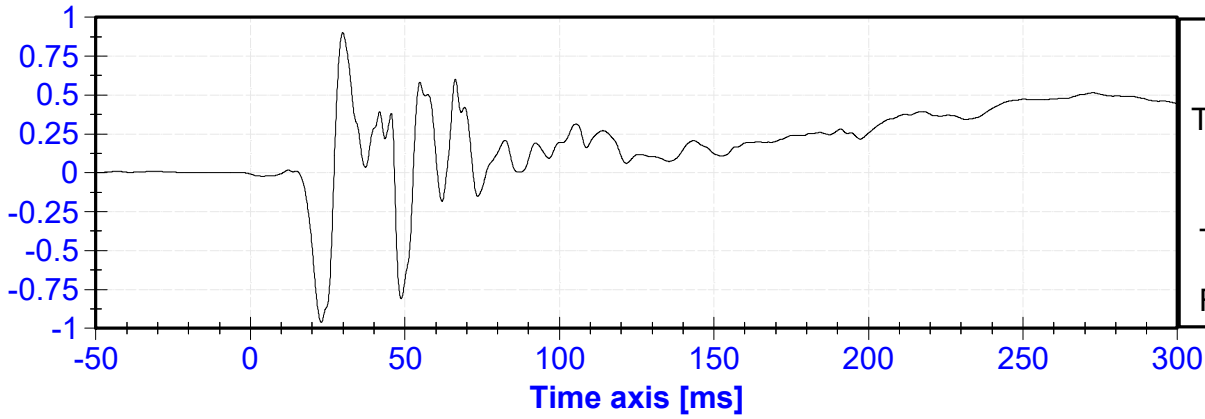
Vehicle Center of Gravity (Z) Acceleration vs. Time

ACCELERATION [g's]



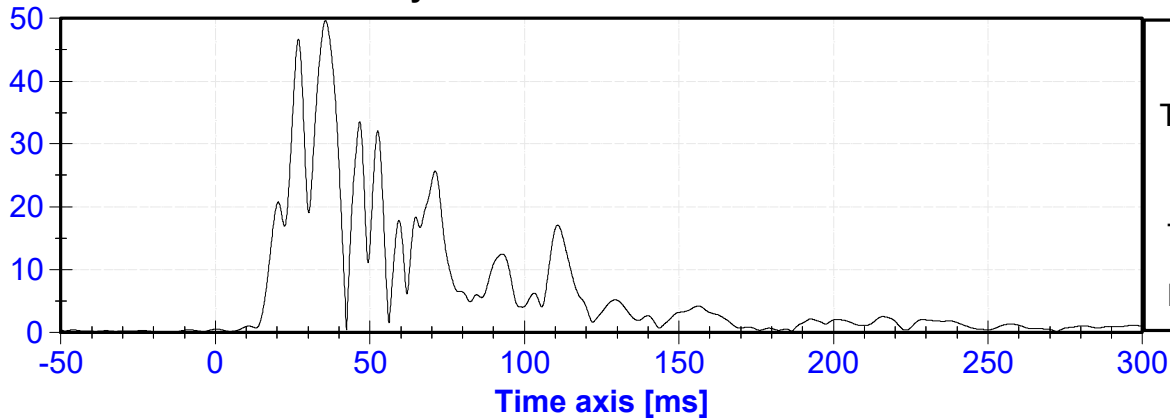
Vehicle Center of Gravity (Z) Velocity vs. Time

VELOCITY [m/s]



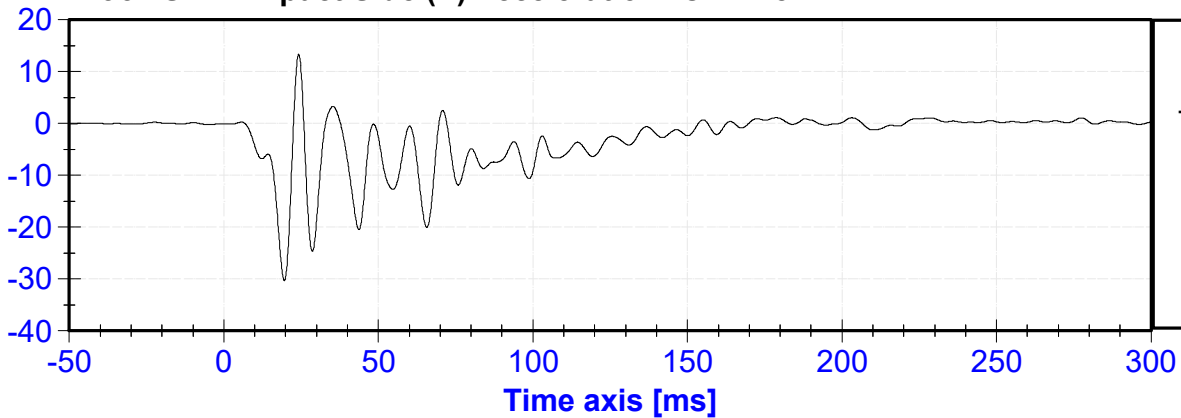
Vehicle Center of Gravity Resultant Acceleration vs. Time

ACCELERATION [g's]



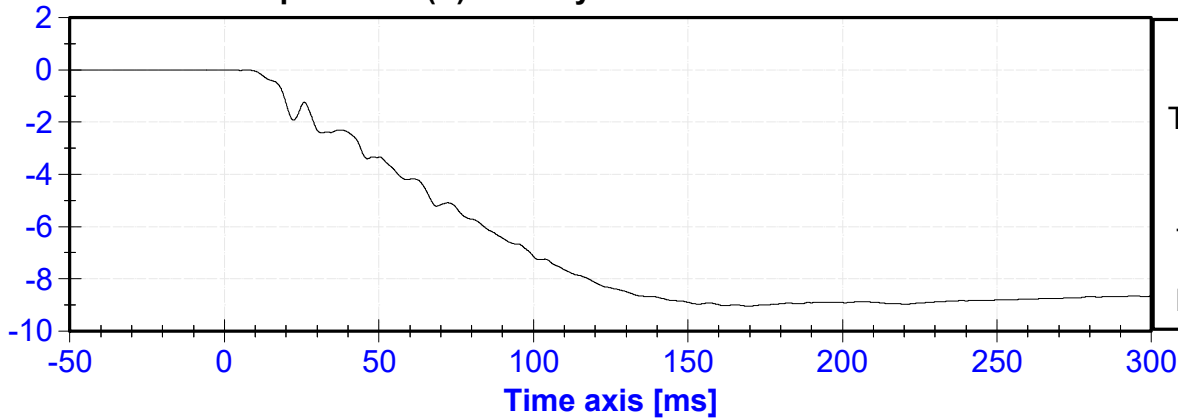
Floor Sill – Impact Side (Y) Acceleration vs. Time

ACCELERATION [g's]



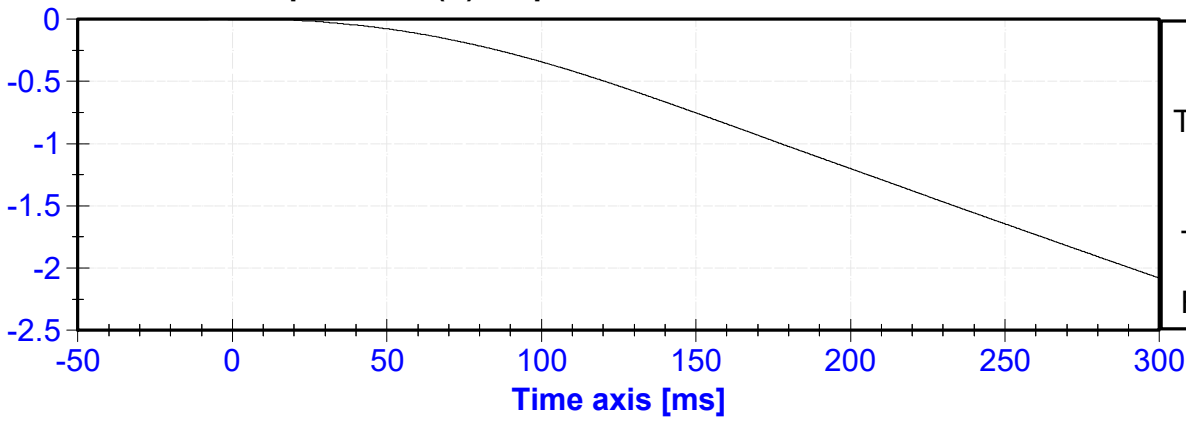
Floor Sill – Impact Side (Y) Velocity vs. Time

VELOCITY [m/s]



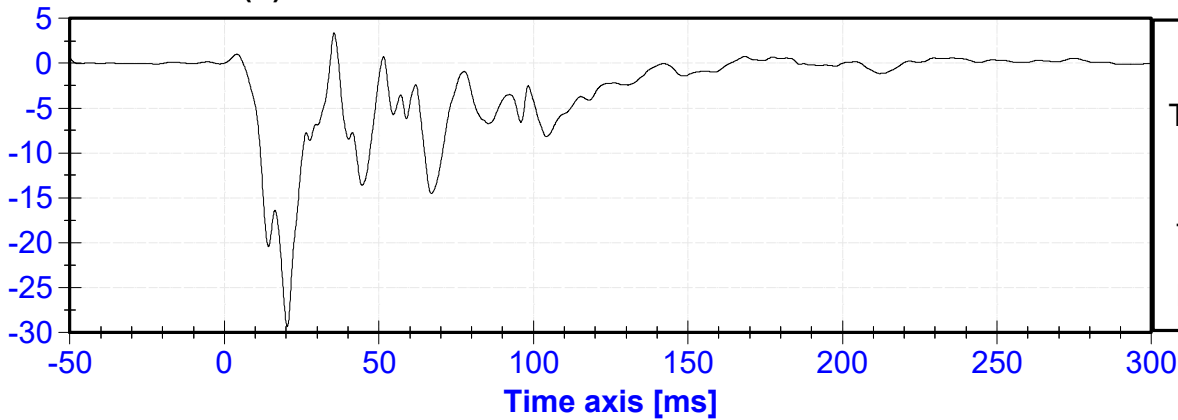
Floor Sill – Impact Side (Y) Displacement vs. Time

DISPLACEMENT [m]



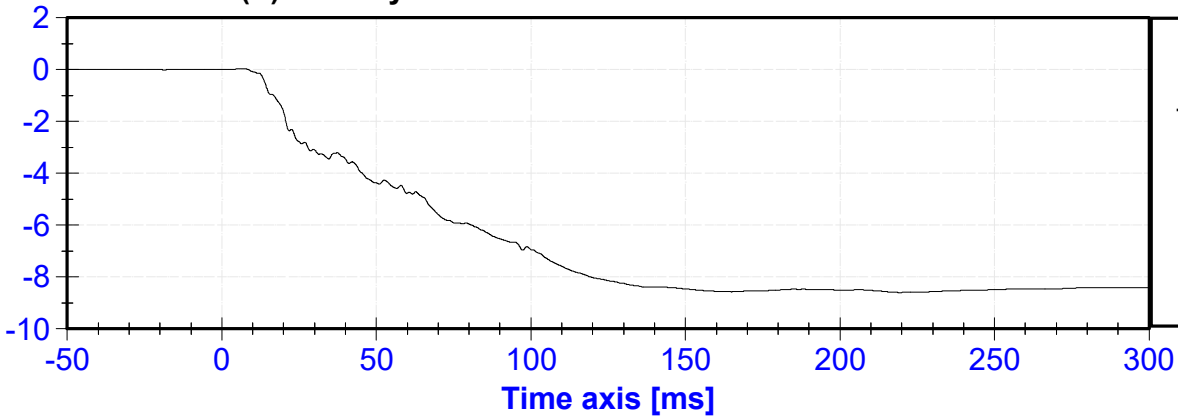
A-Pillar Sill (Y) Acceleration vs. Time

ACCELERATION [g's]

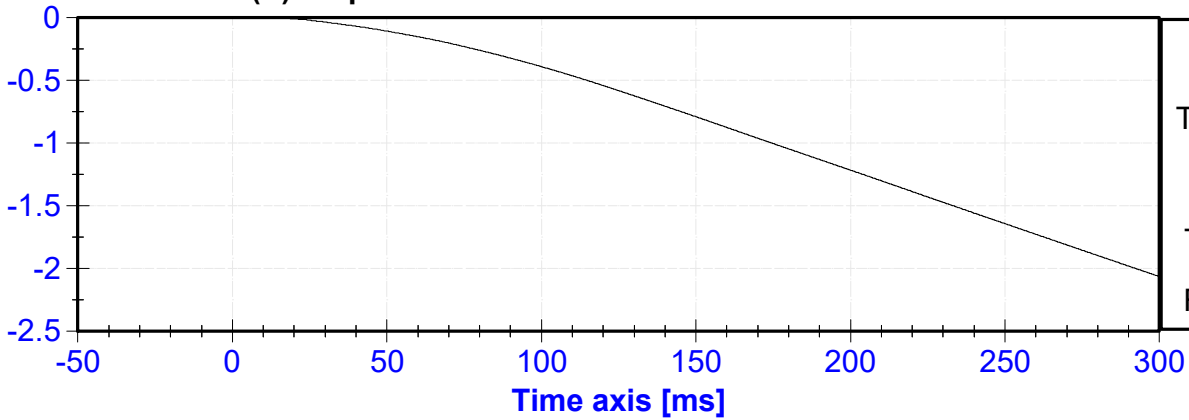


A-Pillar Sill (Y) Velocity vs. Time

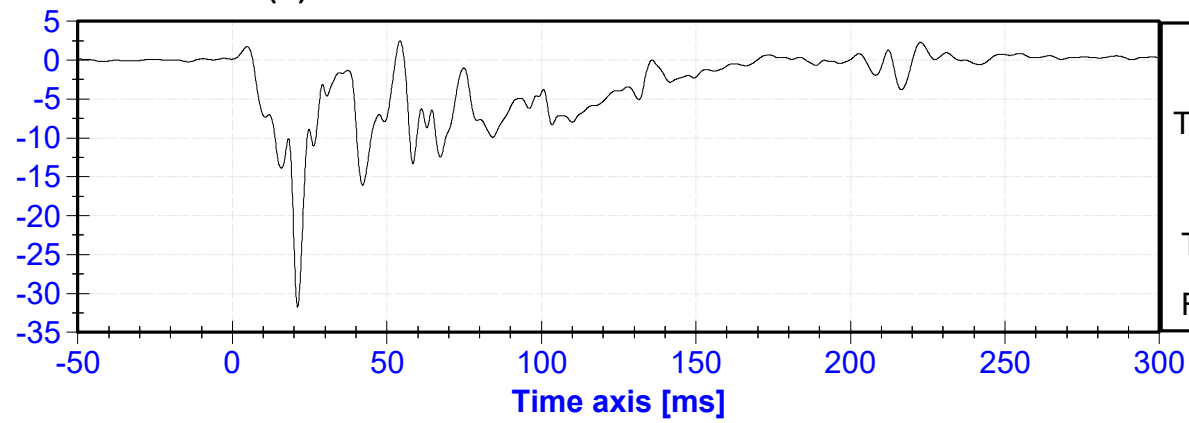
VELOCITY [m/s]



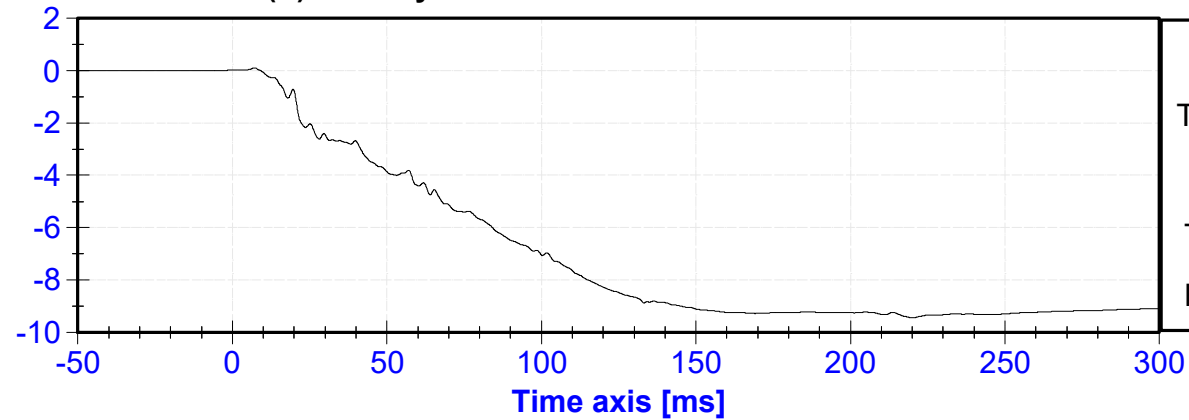
A-Pillar Sill (Y) Displacement vs. Time



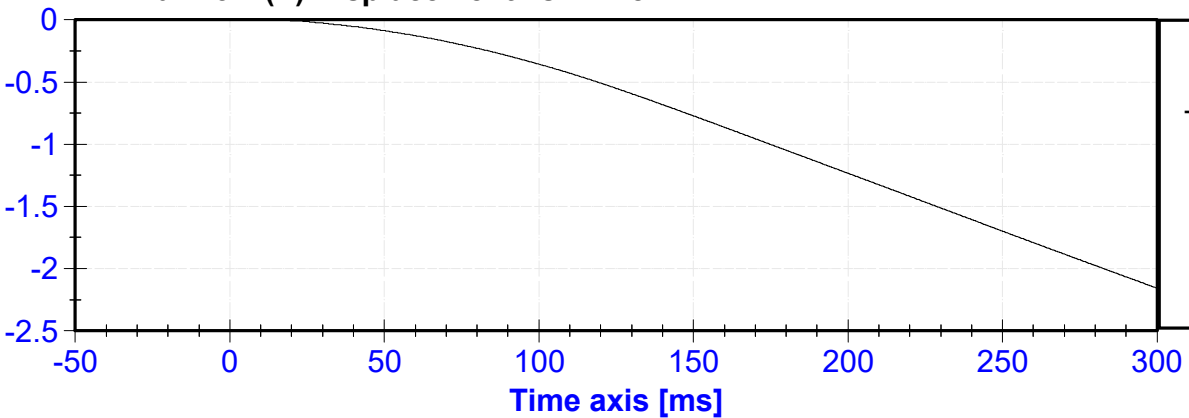
A-Pillar Low (Y) Acceleration vs. Time



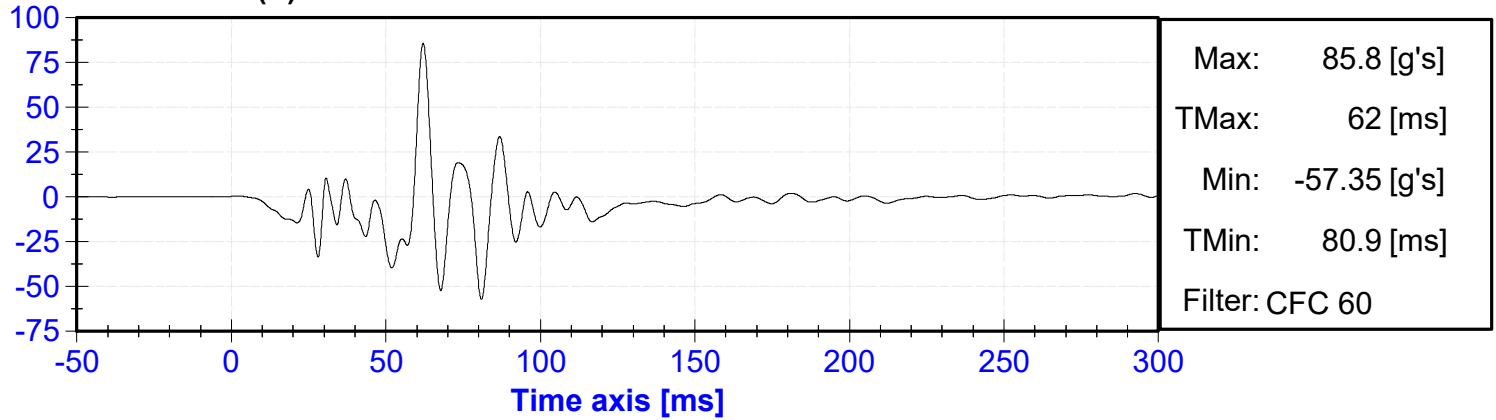
A-Pillar Low (Y) Velocity vs. Time



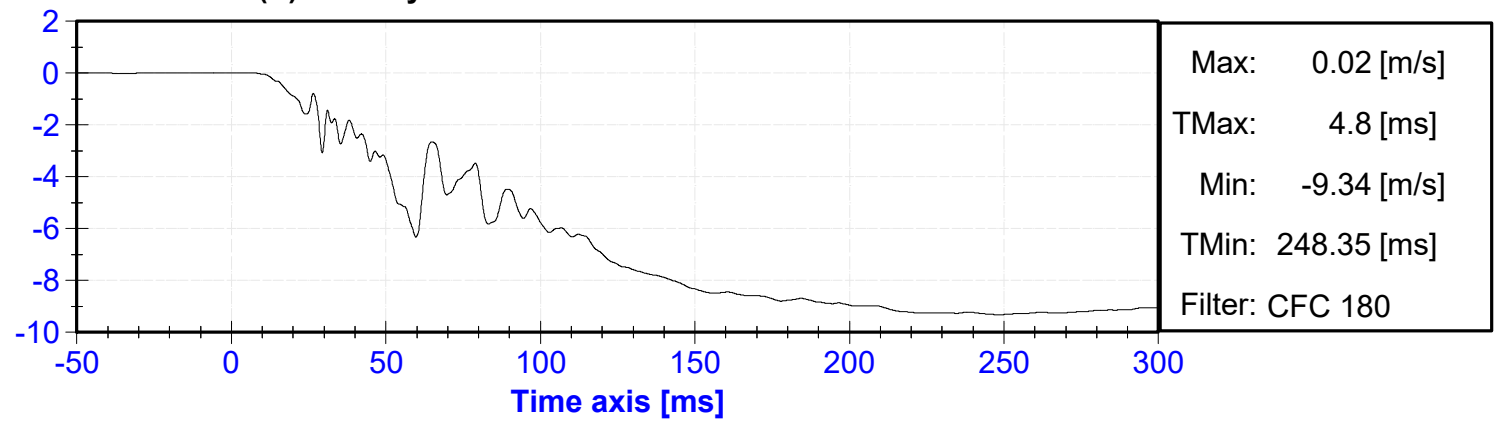
A-Pillar Low (Y) Displacement vs. Time



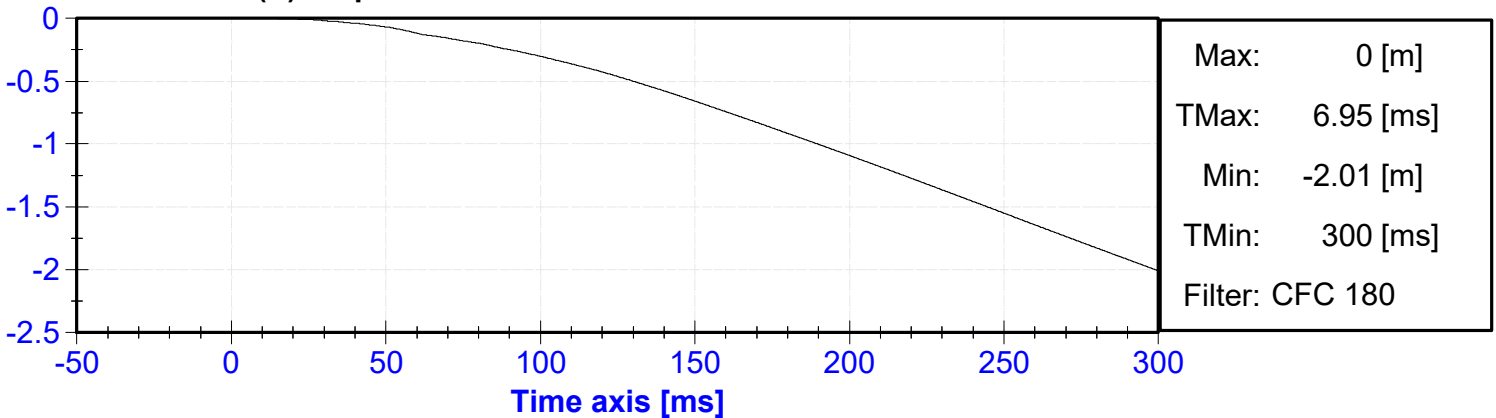
A-Pillar Mid (Y) Acceleration vs. Time



A-Pillar Mid (Y) Velocity vs. Time

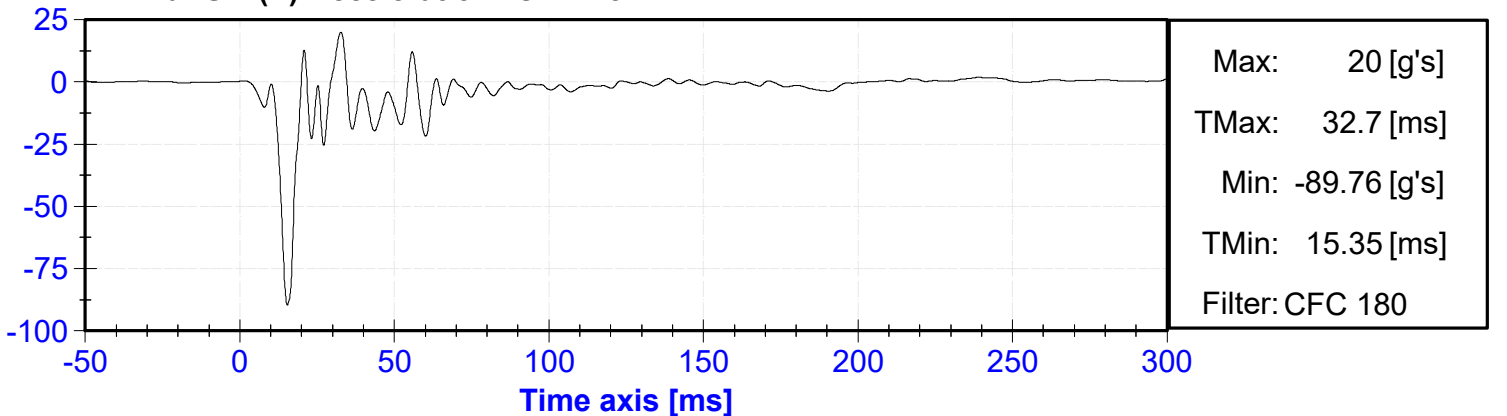


A-Pillar Mid (Y) Displacement vs. Time



Exceeded calibration range and saturated at 15.7 ms

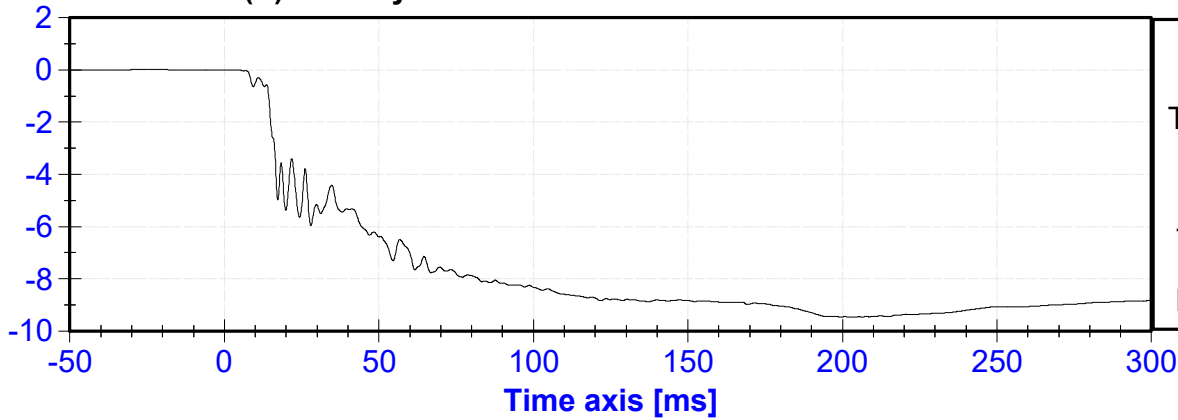
B-Pillar Sill (Y) Acceleration vs. Time



Exceeded calibration range and saturated at 15.7 ms

B-Pillar Sill (Y) Velocity vs. Time

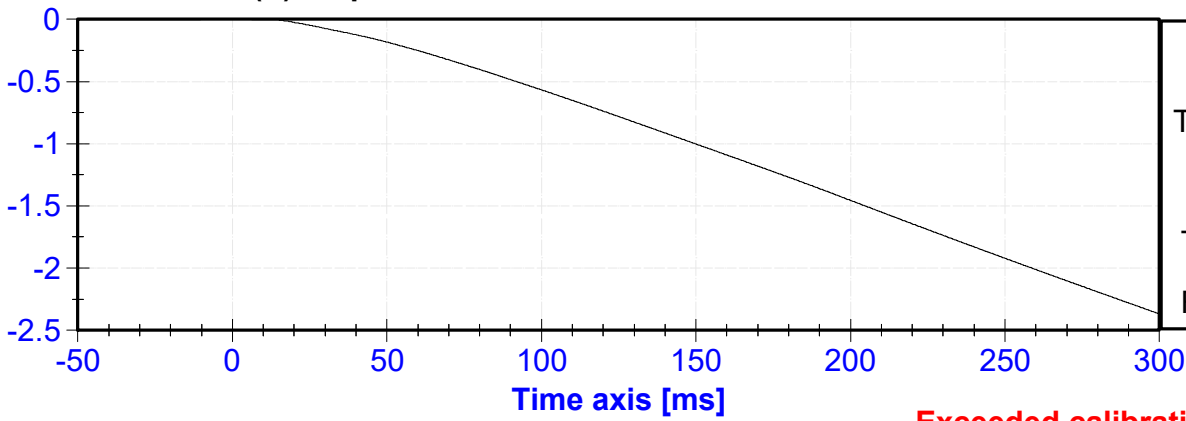
VELOCITY [m/s]



Exceeded calibration range and saturated at 15.7 ms

B-Pillar Sill (Y) Displacement vs. Time

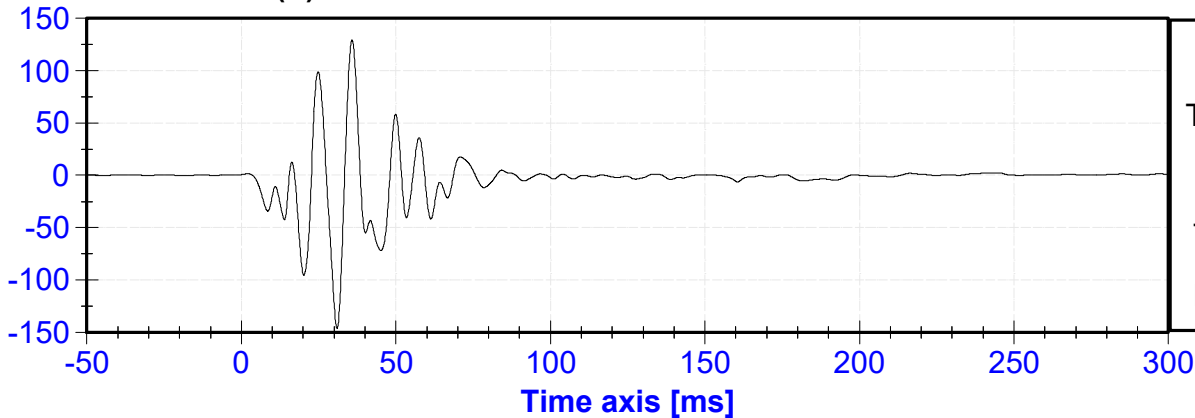
DISPLACEMENT [m]



Exceeded calibration range at 23.1 ms

B-Pillar Low (Y) Acceleration vs. Time

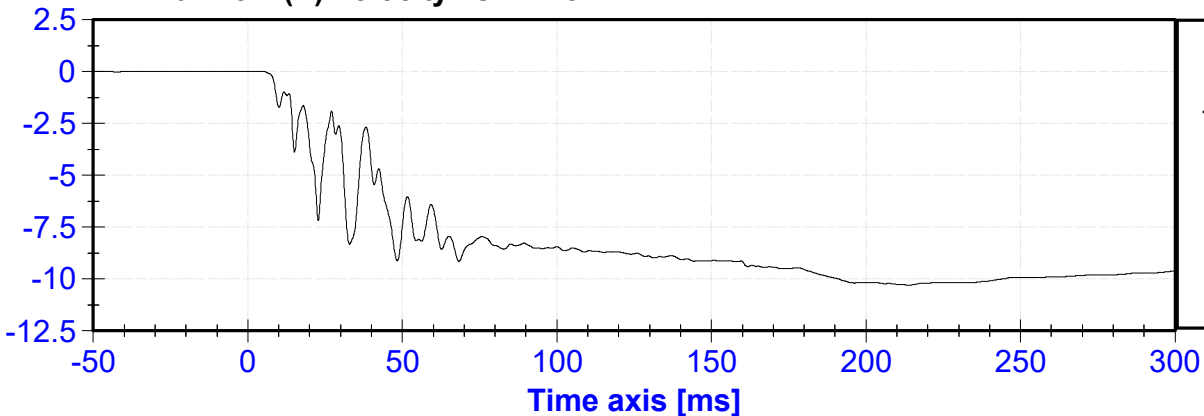
ACCELERATION [g's]



Exceeded calibration range at 23.1 ms

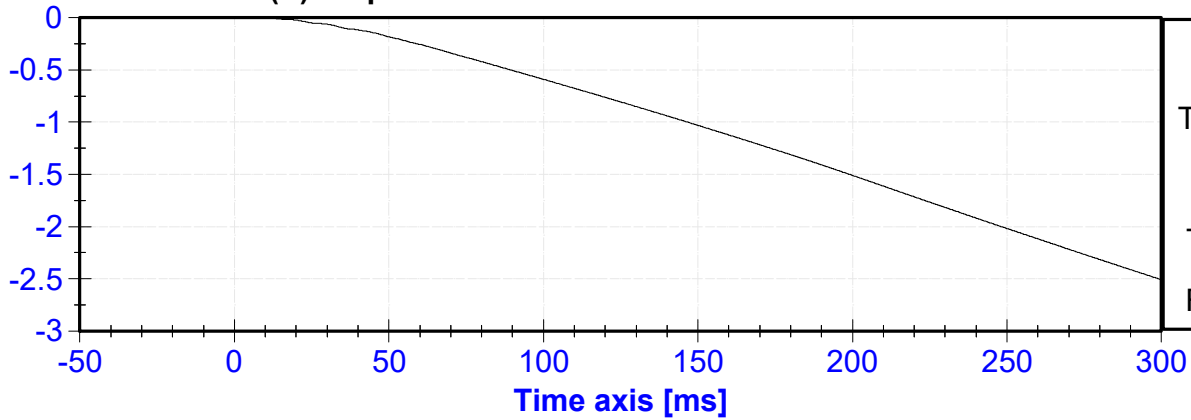
B-Pillar Low (Y) Velocity vs. Time

VELOCITY [m/s]

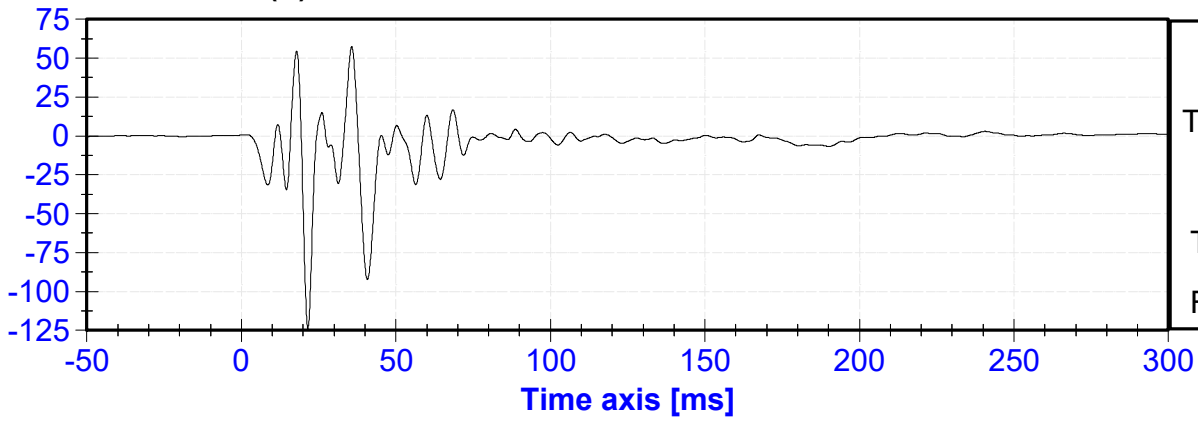


Exceeded calibration range at 23.1 ms

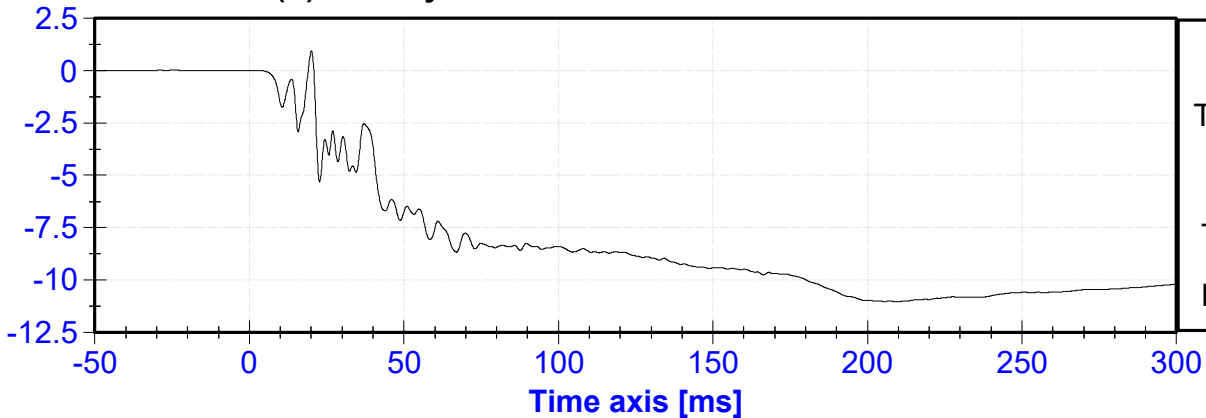
B-Pillar Low (Y) Displacement vs. Time



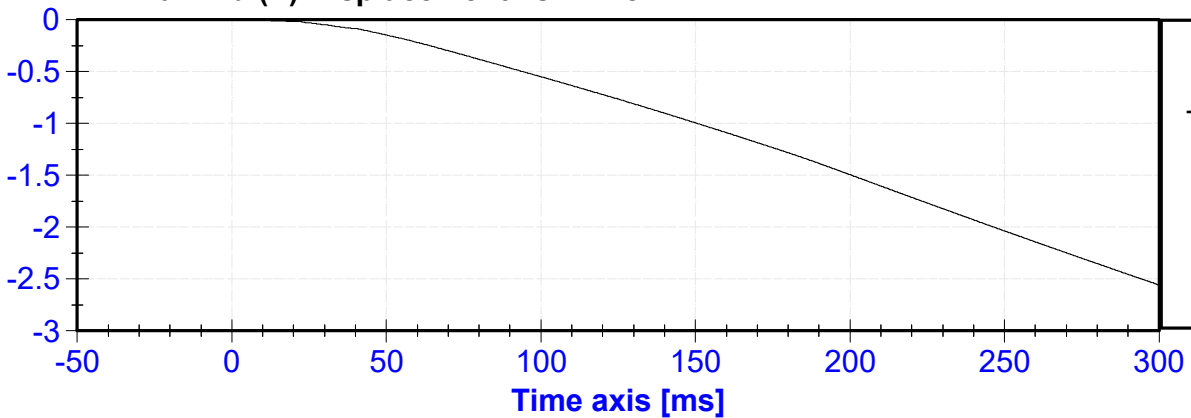
B-Pillar Mid (Y) Acceleration vs. Time



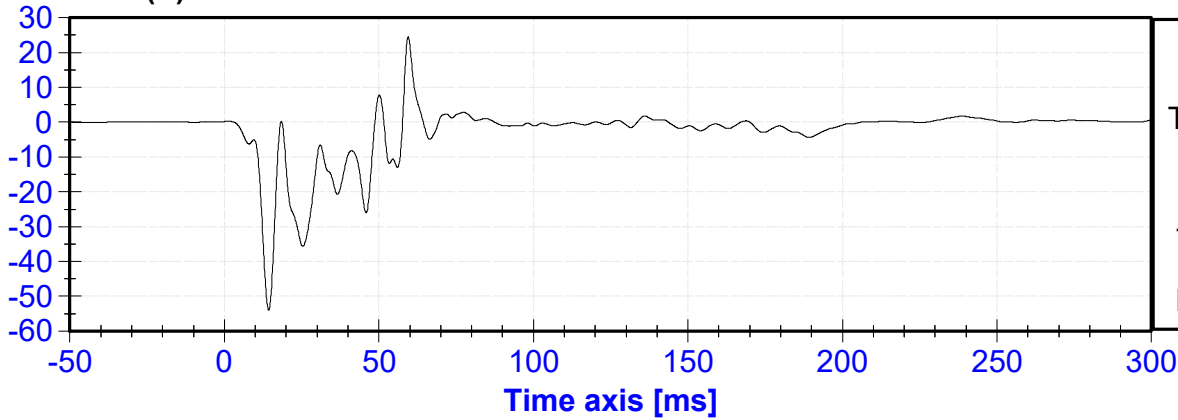
B-Pillar Mid (Y) Velocity vs. Time



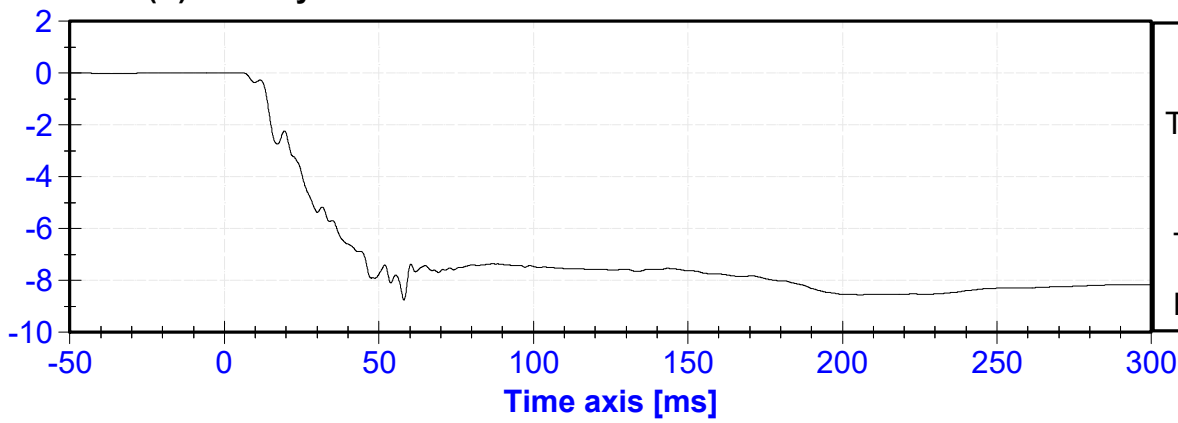
B-Pillar Mid (Y) Displacement vs. Time



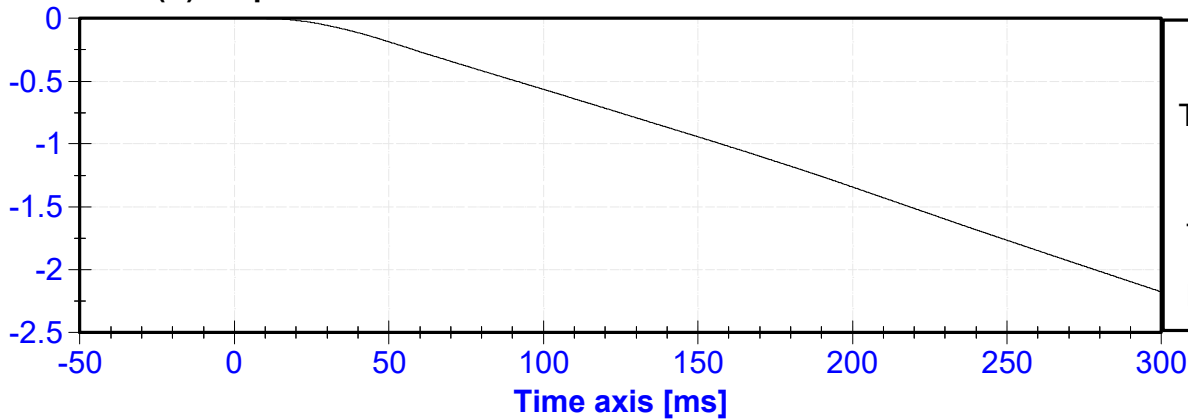
Seat (Y) Acceleration vs. Time



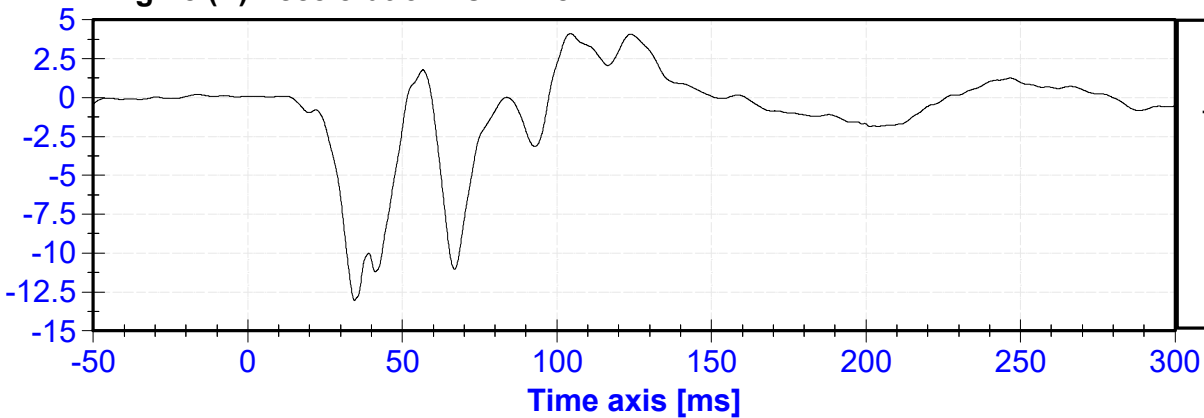
Seat (Y) Velocity vs. Time

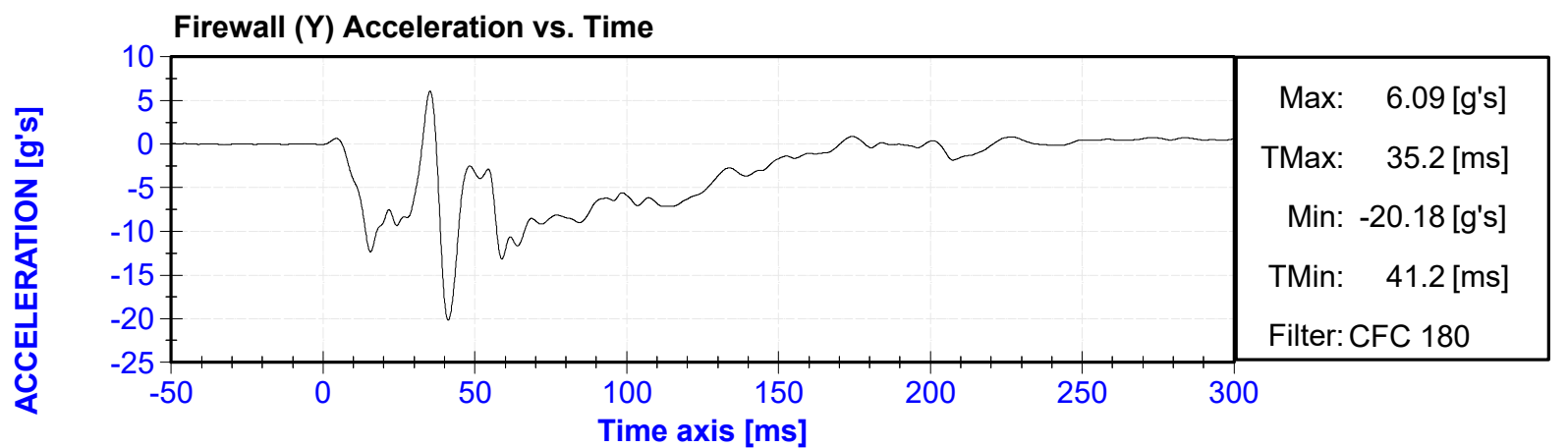
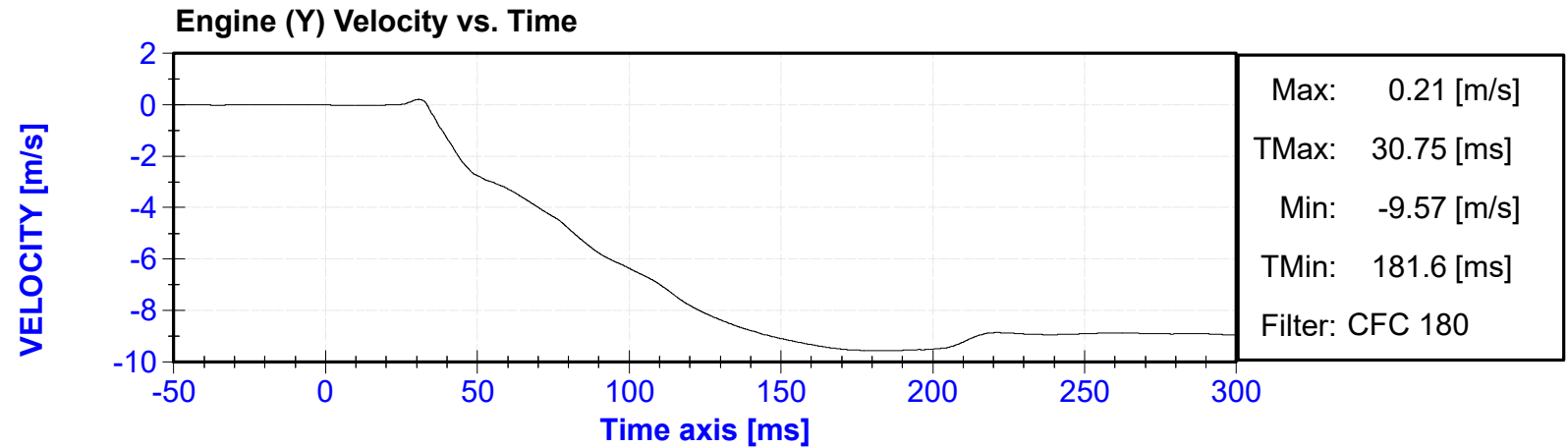
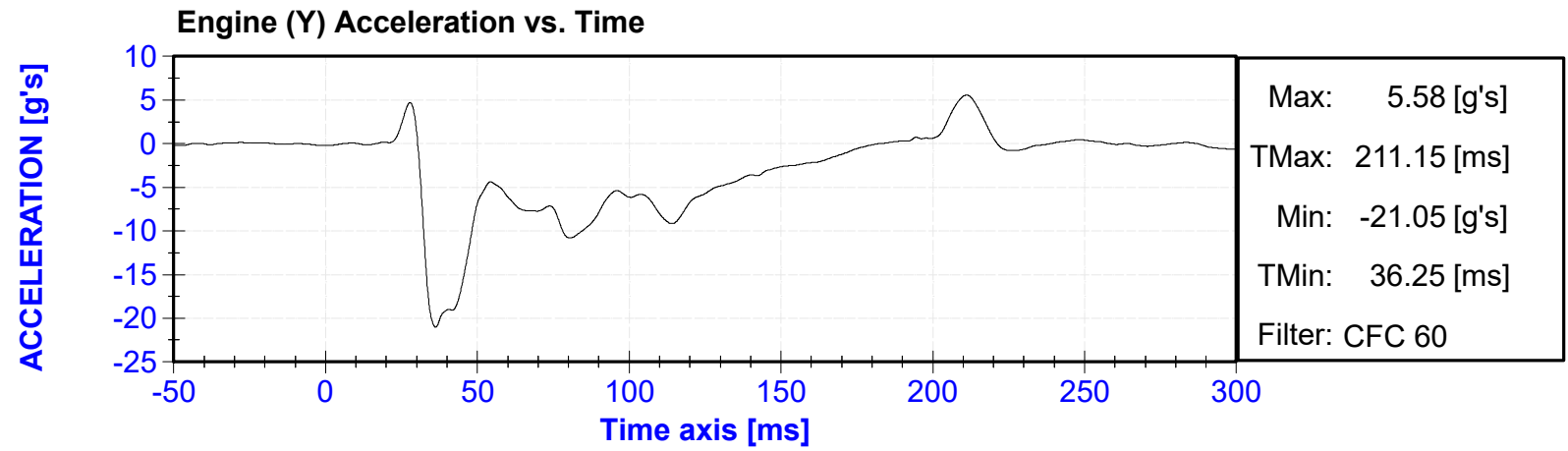
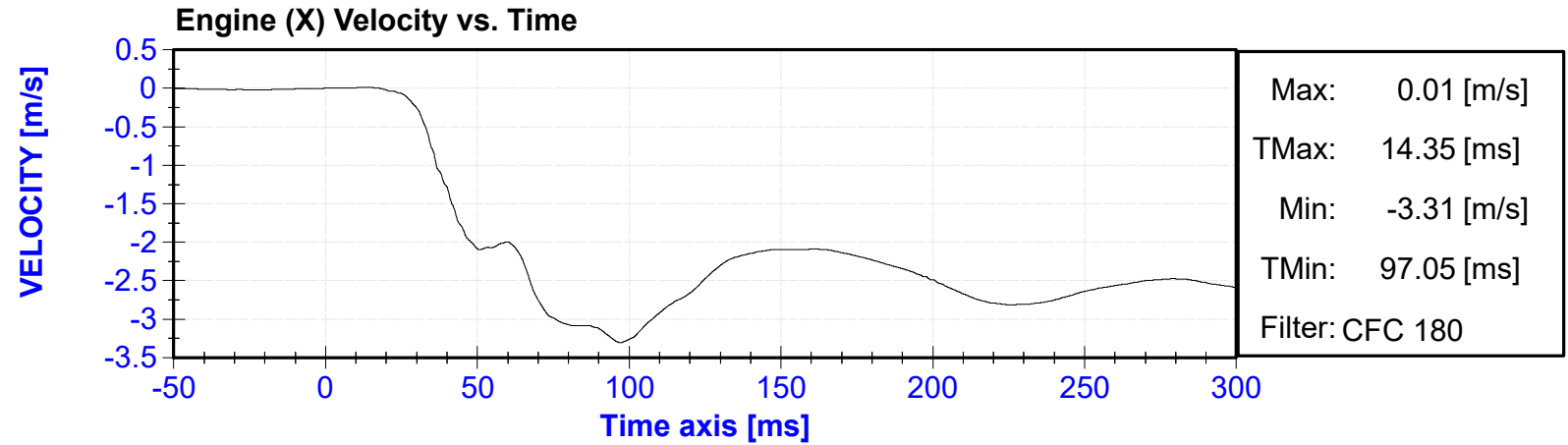


Seat (Y) Displacement vs. Time



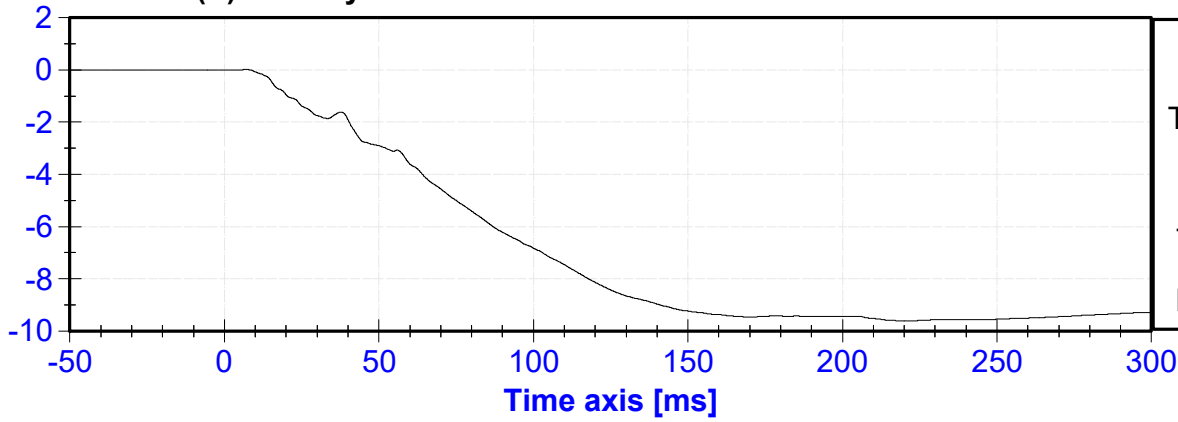
Engine (X) Acceleration vs. Time





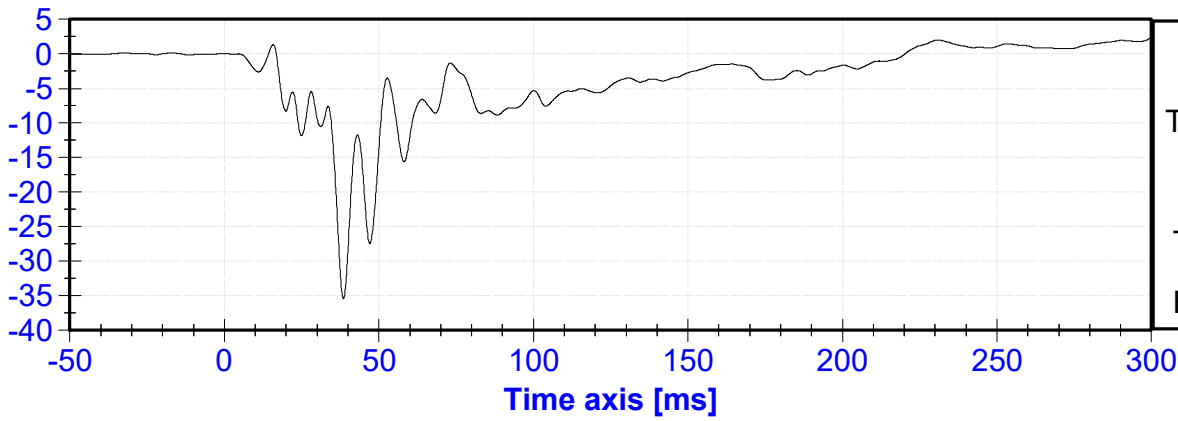
VELOCITY [m/s]

Firewall (Y) Velocity vs. Time



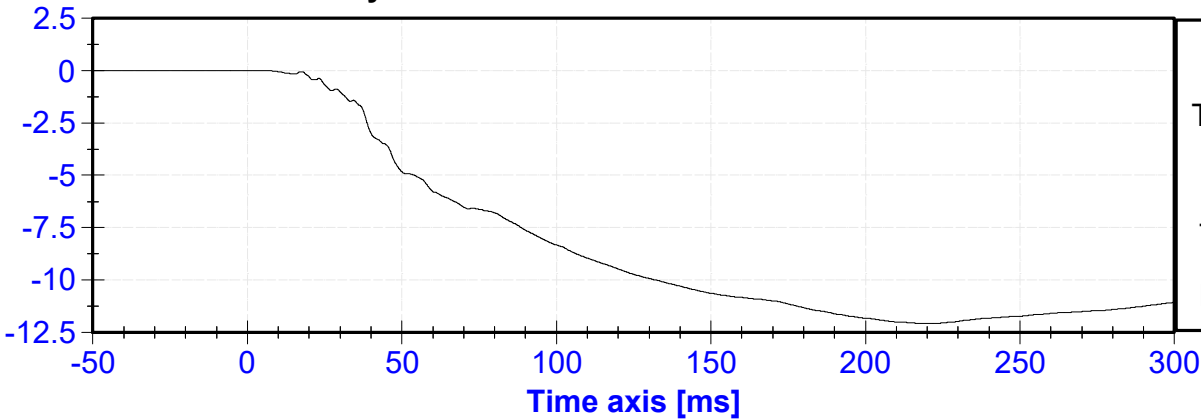
ACCELERATION [g's]

Left Roof Y Acceleration



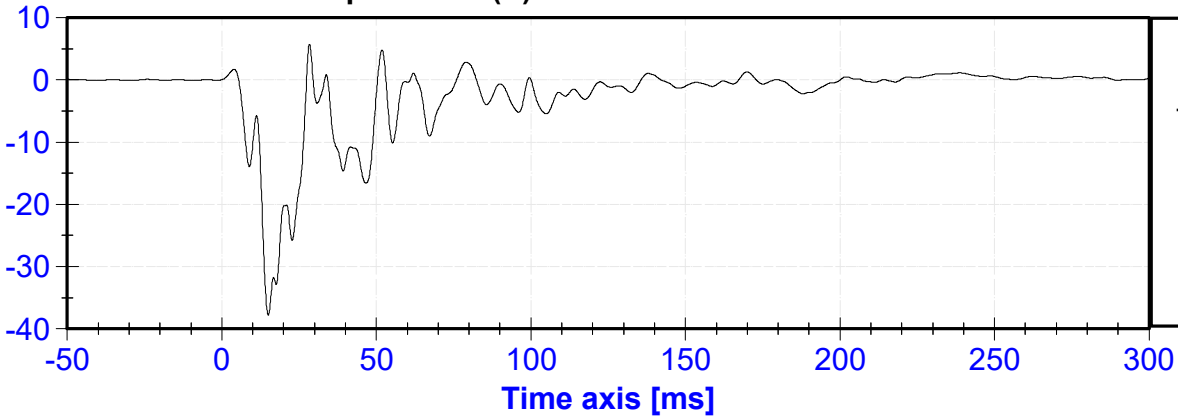
VELOCITY [m/s]

Left Roof Y Velocity



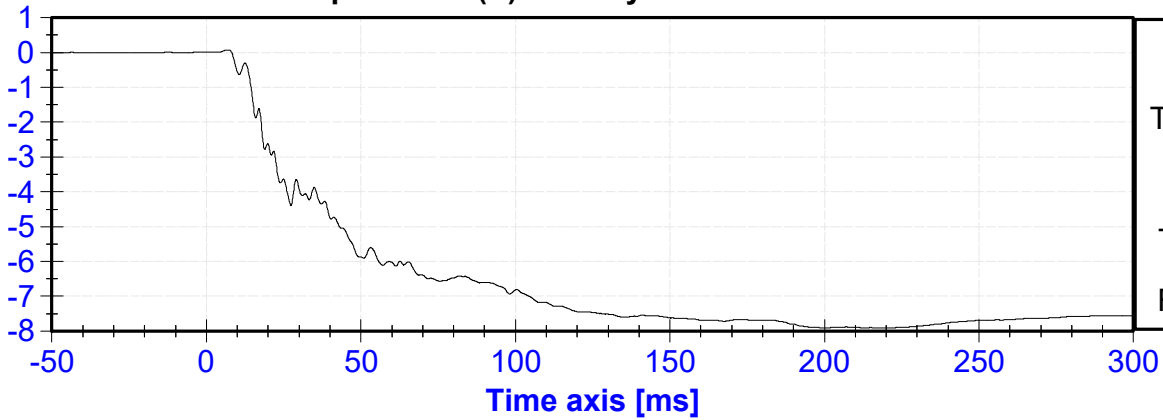
ACCELERATION [g's]

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



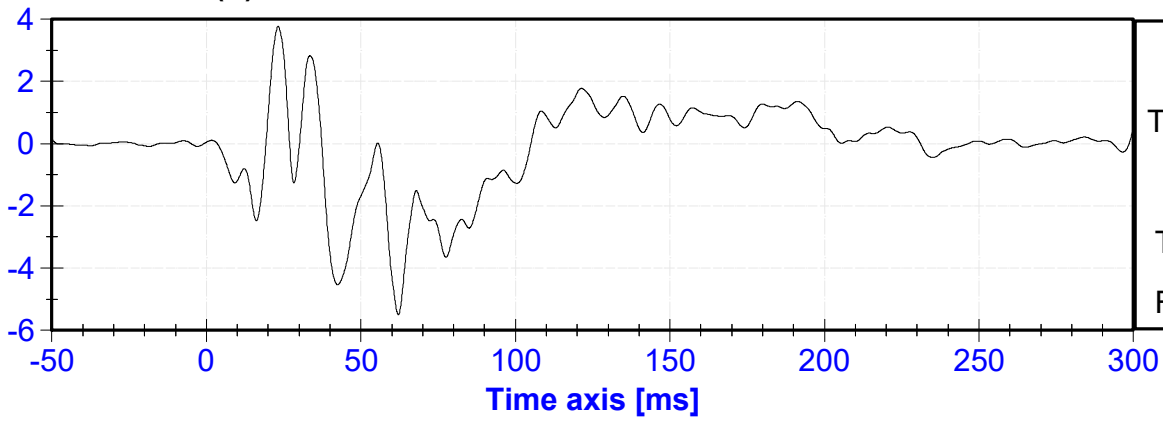
Floor Sill – Non Impact Side (Y) Velocity vs. Time

VELOCITY [m/s]



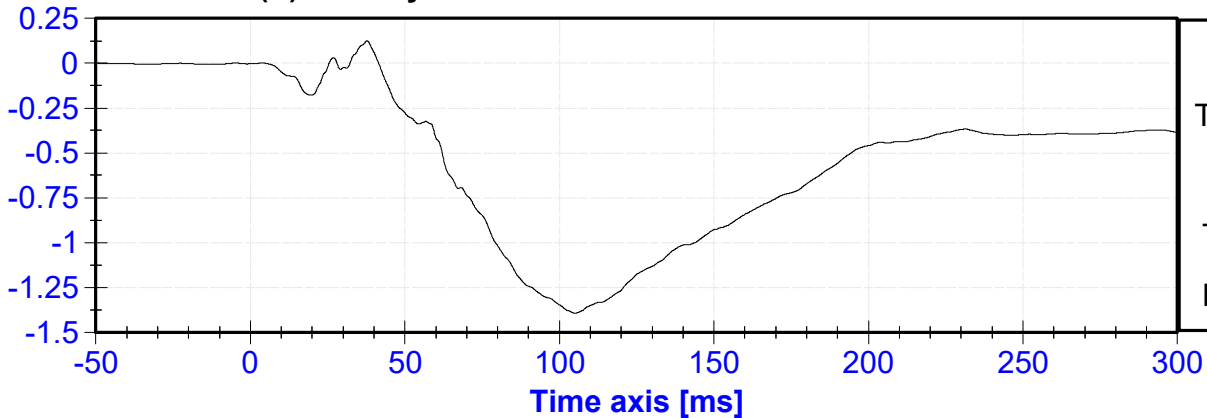
Rear Deck (X) Acceleration vs. Time

ACCELERATION [g's]



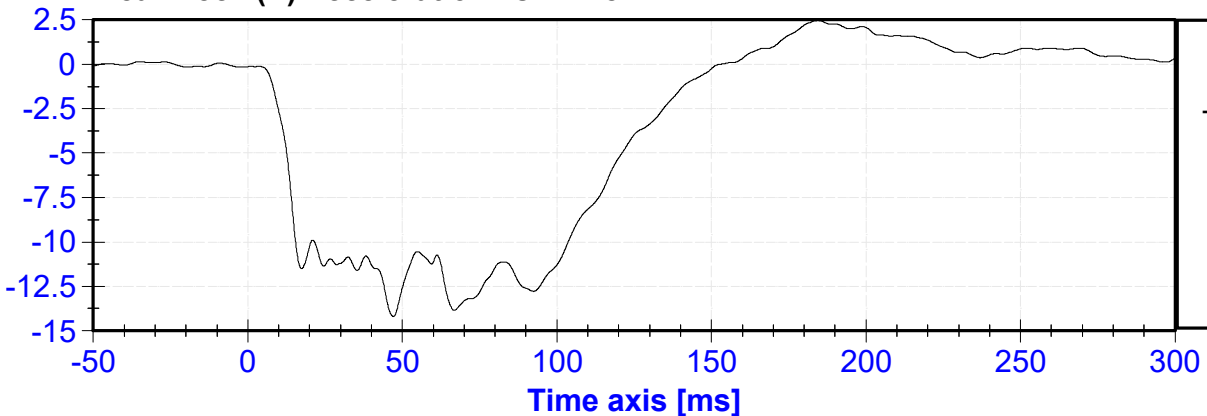
Rear Deck (X) Velocity vs. Time

VELOCITY [m/s]

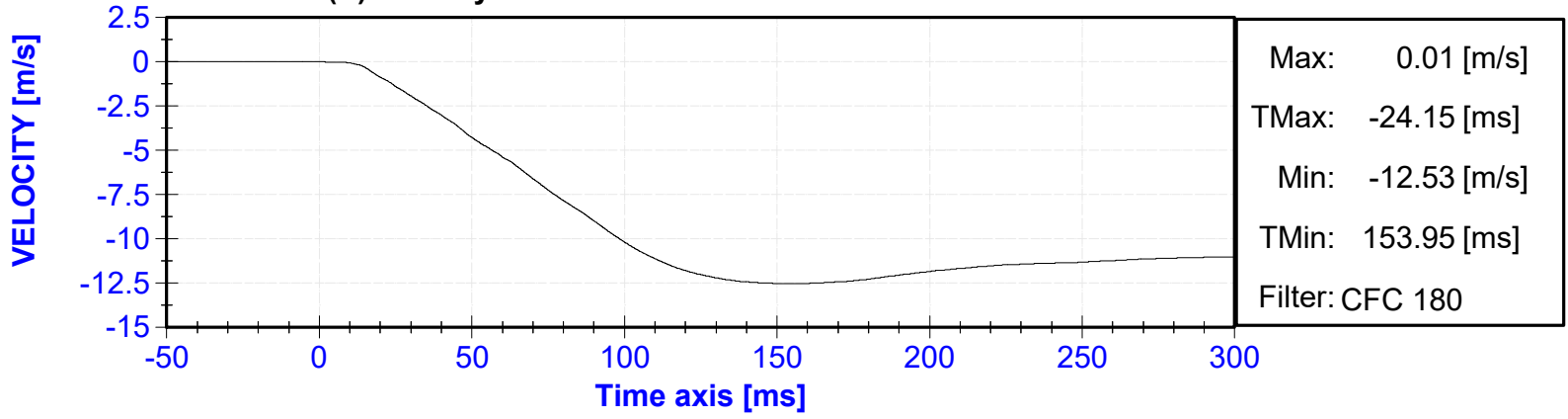


Rear Deck (Y) Acceleration vs. Time

ACCELERATION [g's]



Rear Deck (Y) Velocity vs. Time



APPENDIX IV

PRE-TEST DUMMY PERFORMANCE CALIBRATION TEST DATA

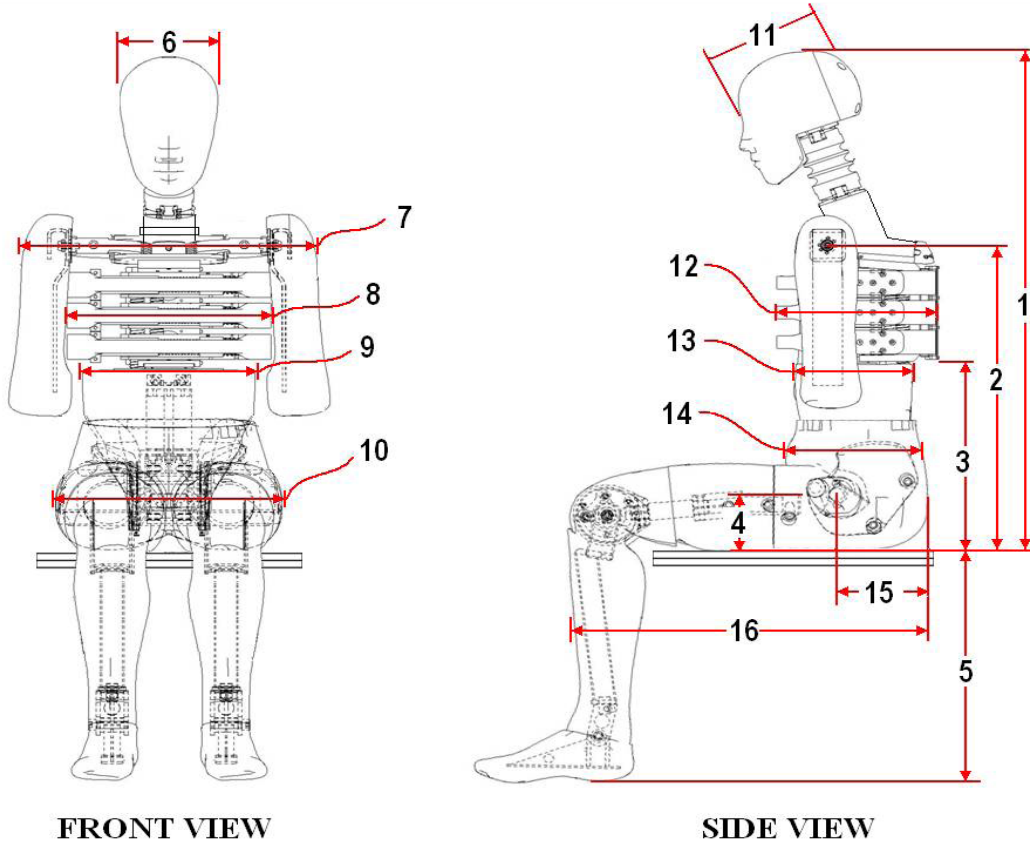
(Subpart U, ES-2re)

External Measurements - EuroSID-2re

Technician: K. Brogan

Date: 10/26/2022

Dummy Serial Number: D037



Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	913	Pass
2	Seat to Shoulder Joint	558	572	564	Pass
3	Seat to Lower Face of Thoracic Spine Box	346	356	353	Pass
4	Seat to Hip Joint (center of bolt)	97	103	101	Pass
5	Sole to Seat, Sitting	333	451	415	Pass
6	Head Width	152	158	155	Pass
7	Shoulder/Arm Width	461	479	471	Pass
8	Thorax Width	322	332	330	Pass
9	Abdomen Width	273	287	280	Pass
10	Pelvis Lap Width	359	373	365	Pass
11	Head Depth	196	206	197	Pass
12	Thorax Depth	262	272	266	Pass
13	Abdomen Depth	194	204	201	Pass
14	Pelvis Depth	235	245	240	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150	160	155	Pass
16	Back of Buttocks to Front Knee	597	615	611	Pass

ATD Manufacturer	Denton	Test Technician	T. Roseman
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

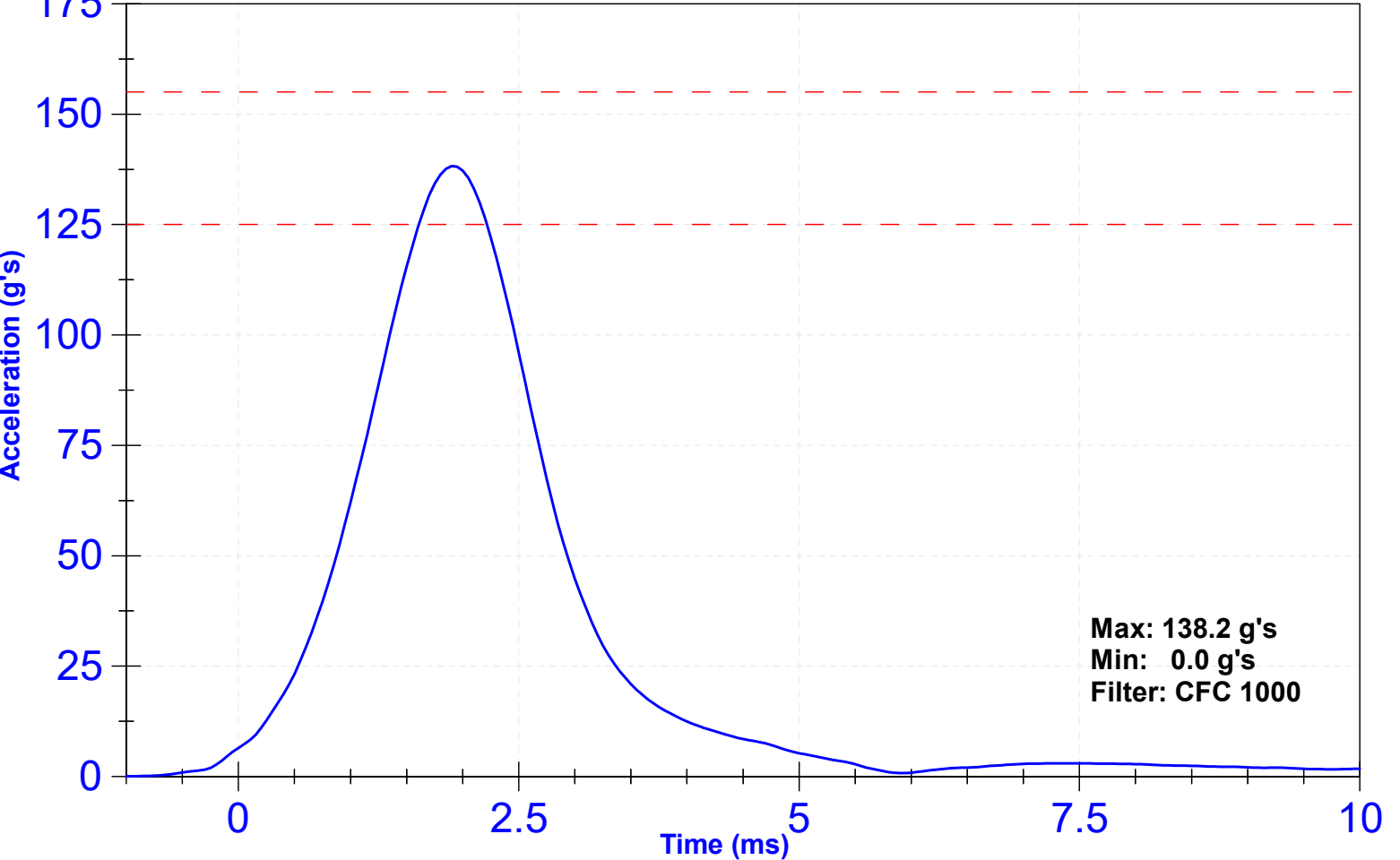
Results

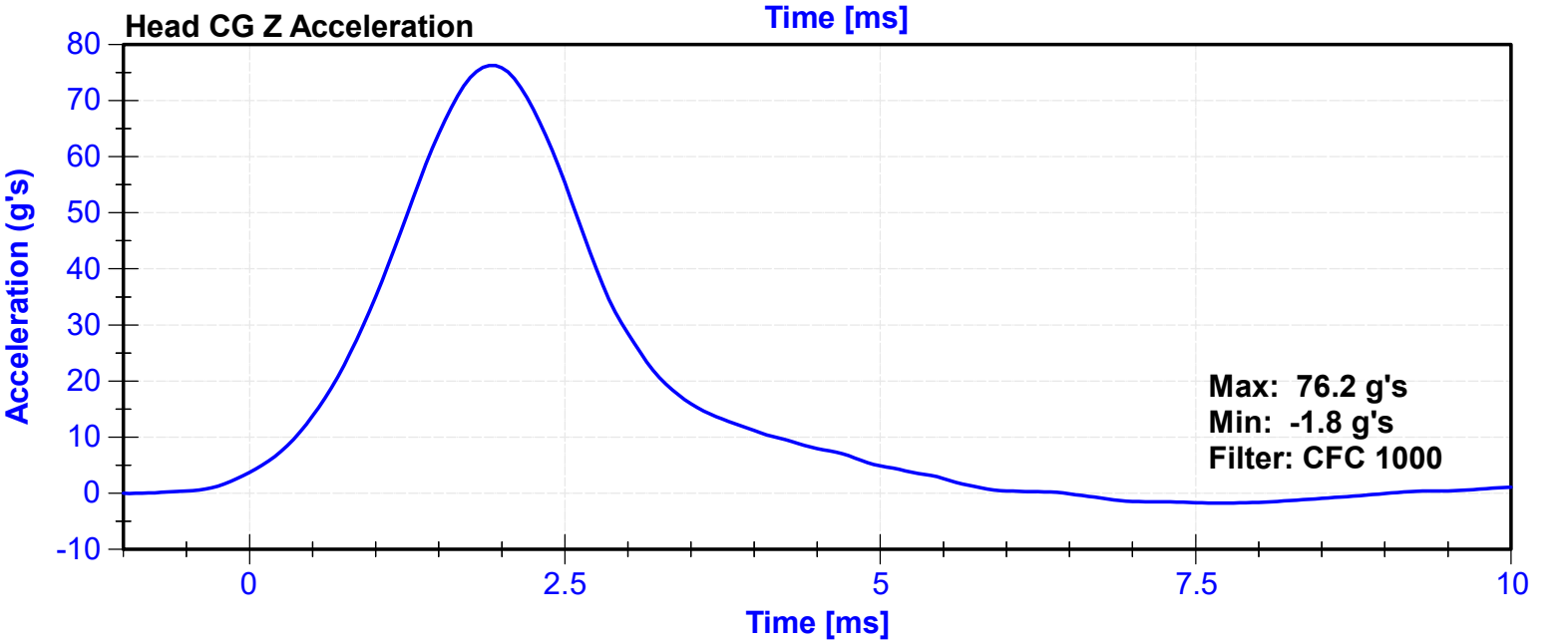
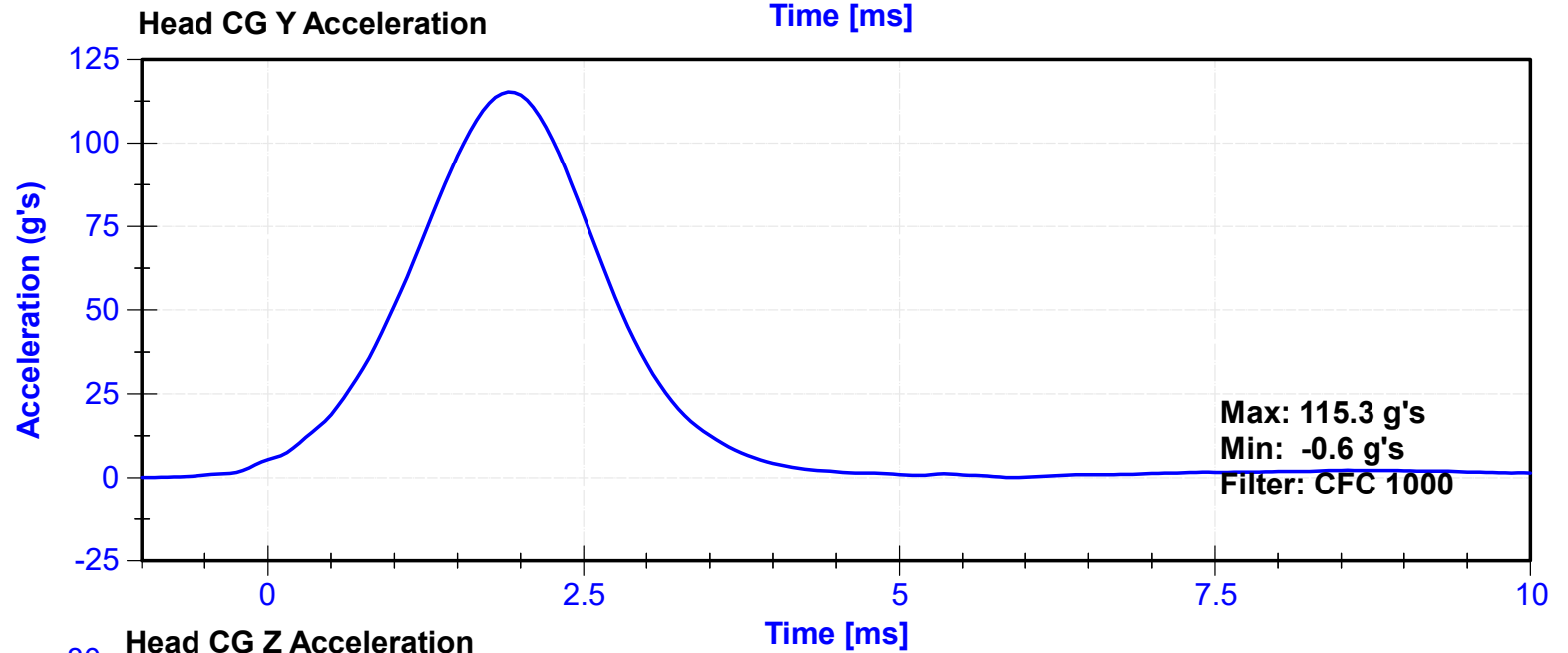
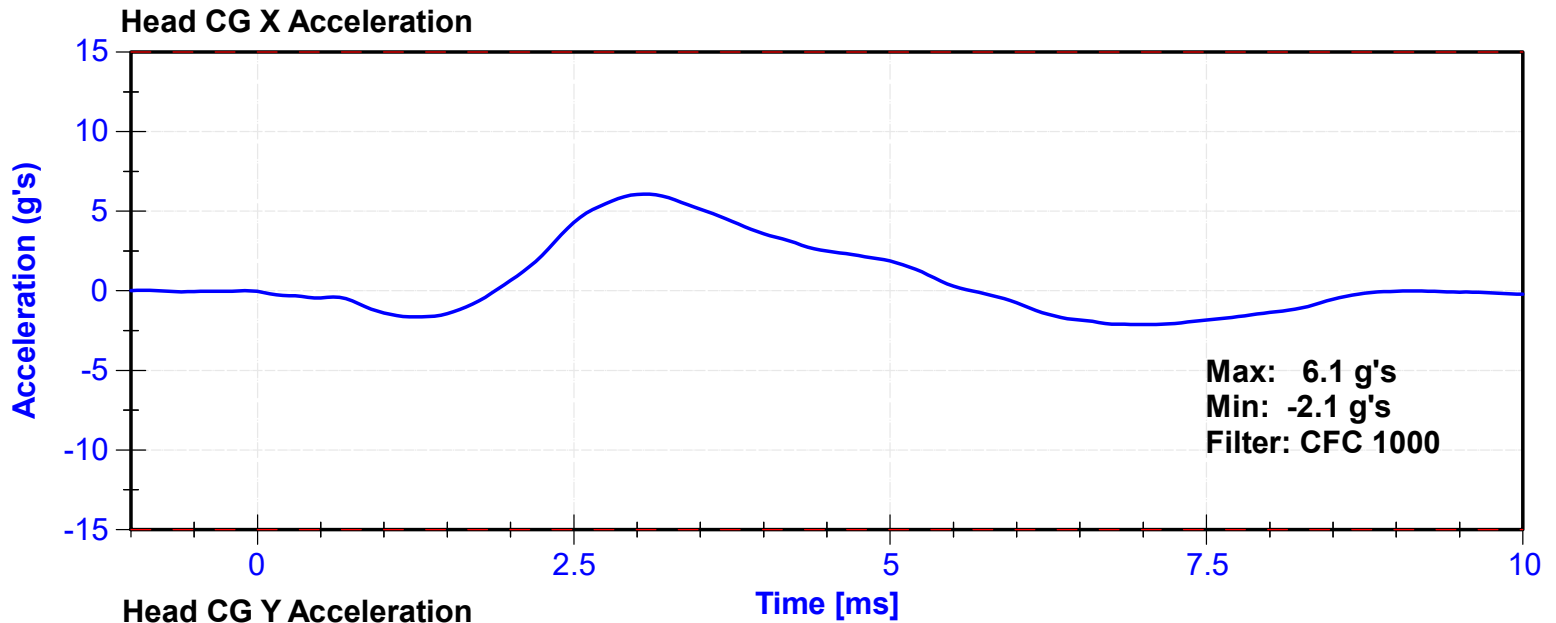
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	30.0	Pass
Resultant Acceleration	125	155	g's	138.2	Pass
Oscillation	0	15	%	2.16	Pass
Fore-Aft Acceleration	-15	15	g's	6.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	T21724	9/6/2022	3/5/2023
Y Accelerometer	Endevco	T22281	9/6/2022	3/5/2023
Z Accelerometer	Endevco	T26050	9/9/2022	3/8/2023

Resultant Acceleration





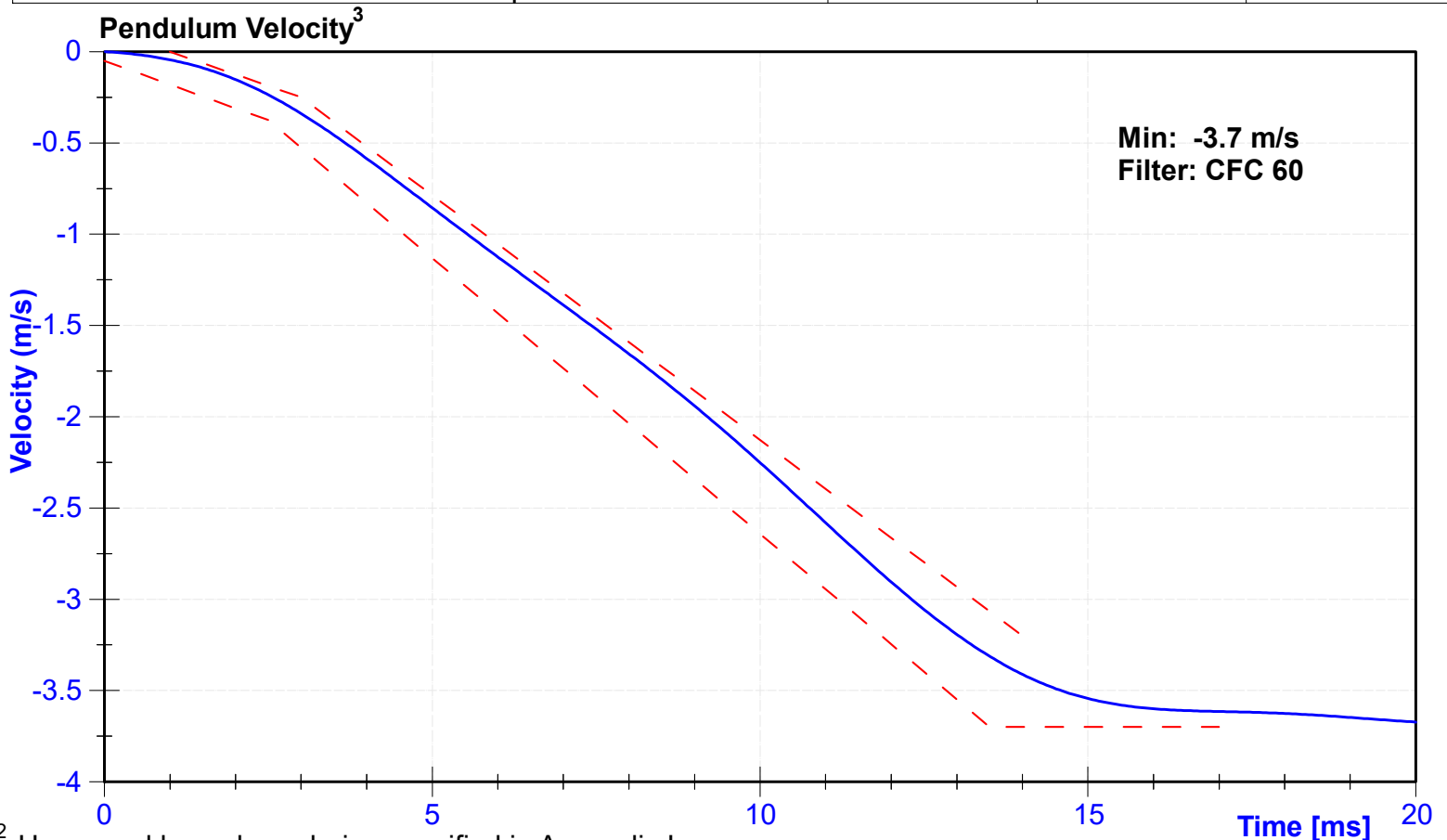
ATD Manufacturer	Denton	Test Technician	D. Sakona
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	26.4	Pass
Velocity	3.3	3.5	m/s	3.40	Pass
Lateral Neck Rotation	49	59	deg	53.9	Pass
Time at Maximum Rotation	54	66	ms	60.6	Pass
Time of Rotation Decay from Maximum	53	88	ms	55.1	Pass
Pendulum Velocity Overall Corridor	Lower Boundary ¹	Upper Boundary ²	m/s	See Plot ³	Pass

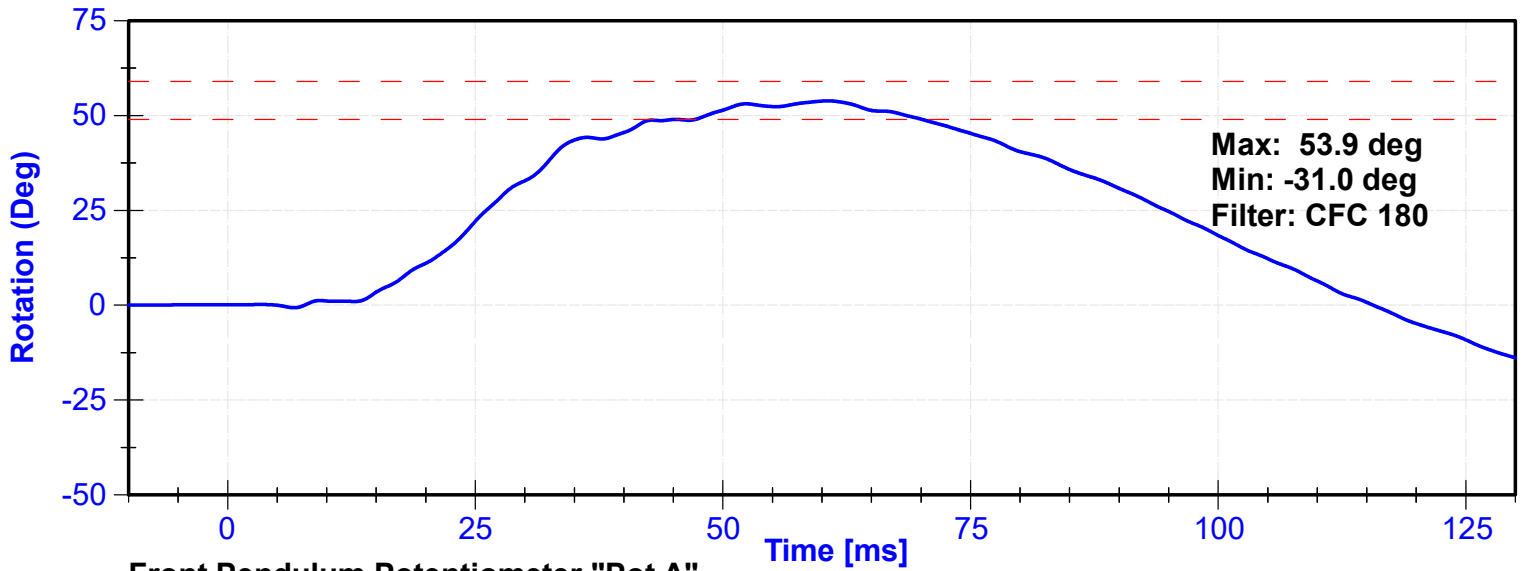
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16503	10/28/2021	10/28/2022
Front Pendulum Potentiometer	Sfernice	094	10/5/2022	10/5/2023
Headform Potentiometer	Sfernice	095	10/5/2022	10/5/2023

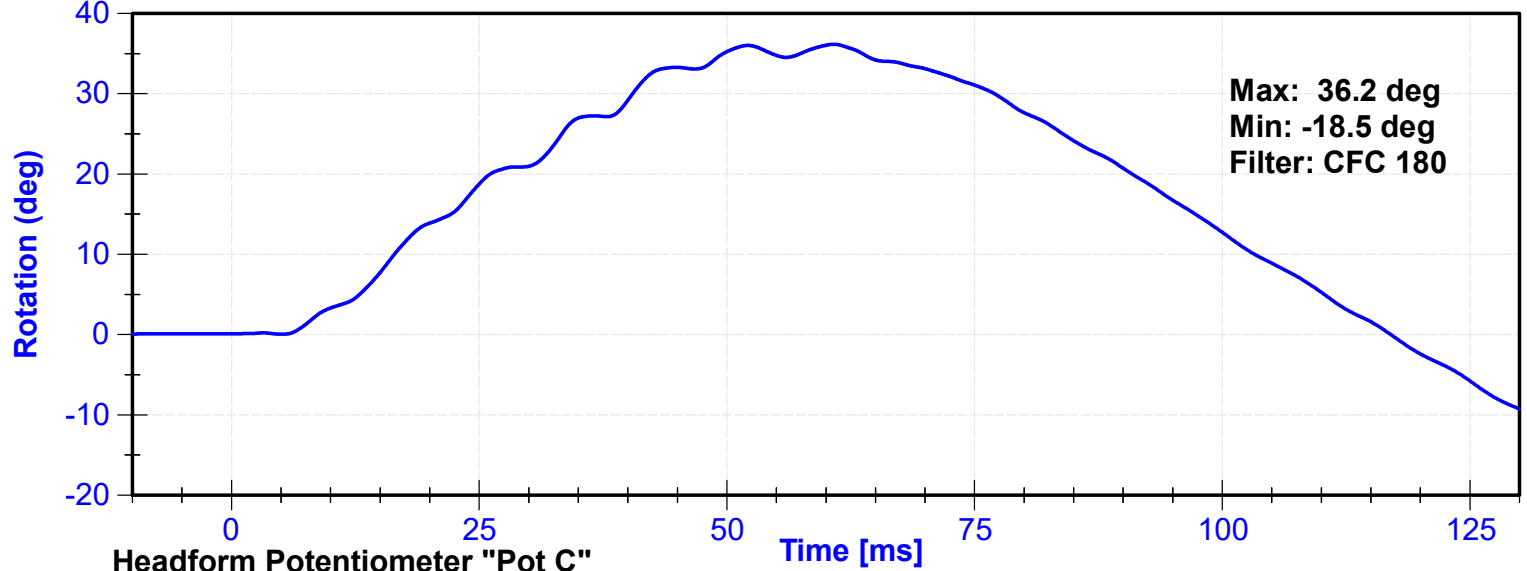


^{1,2} Upper and lower boundaries specified in Appendix I

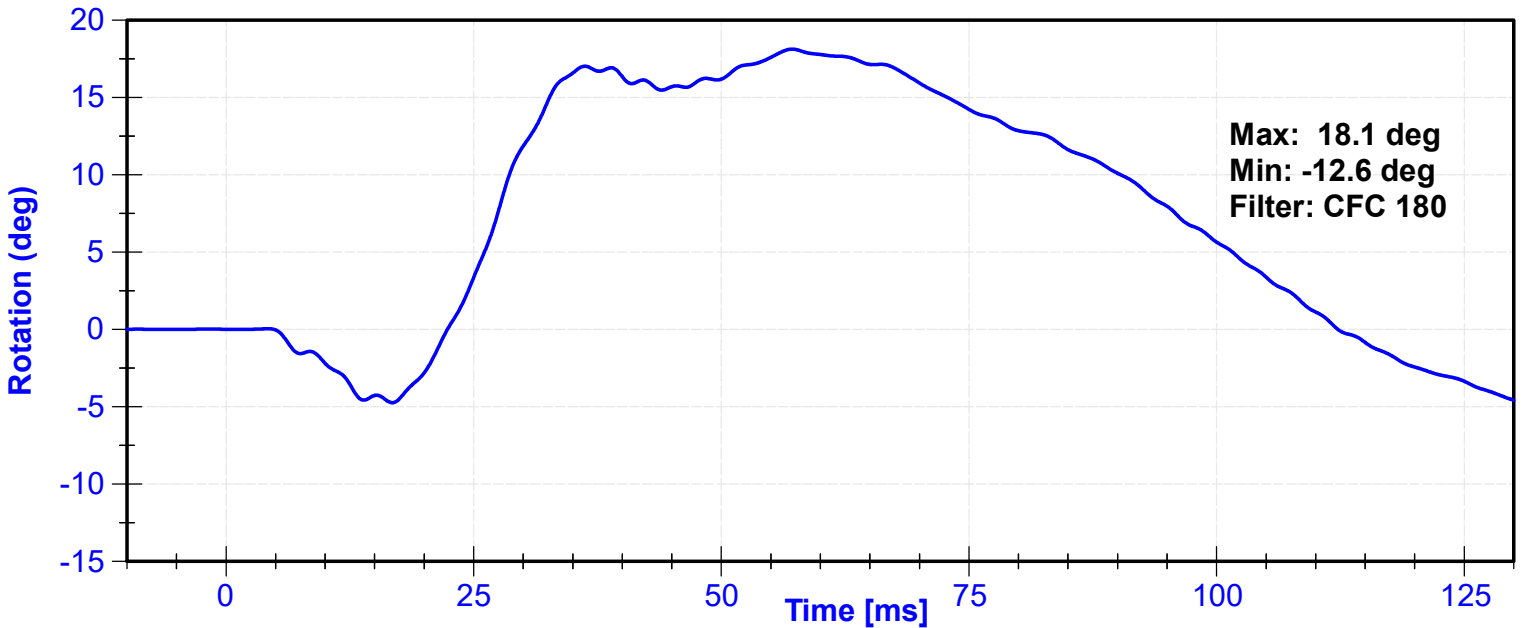
Neck Rotation



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	B. Kirchner
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

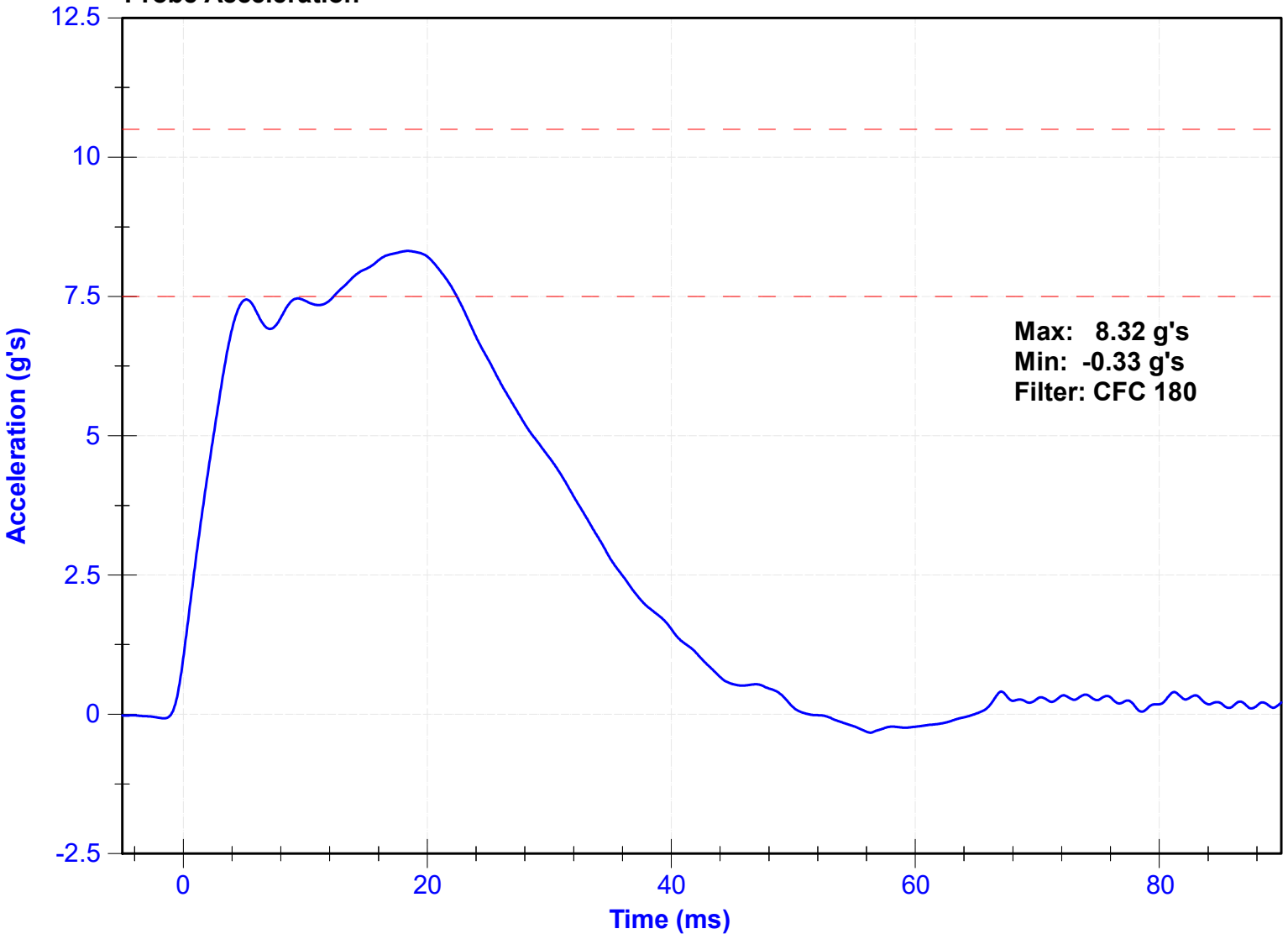
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	46.2	Pass
Velocity	4.2	4.4	m/s	4.37	Pass
Probe Acceleration	7.5	10.5	g's	8.32	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	T25885	10/24/2022	10/24/2023

Probe Acceleration



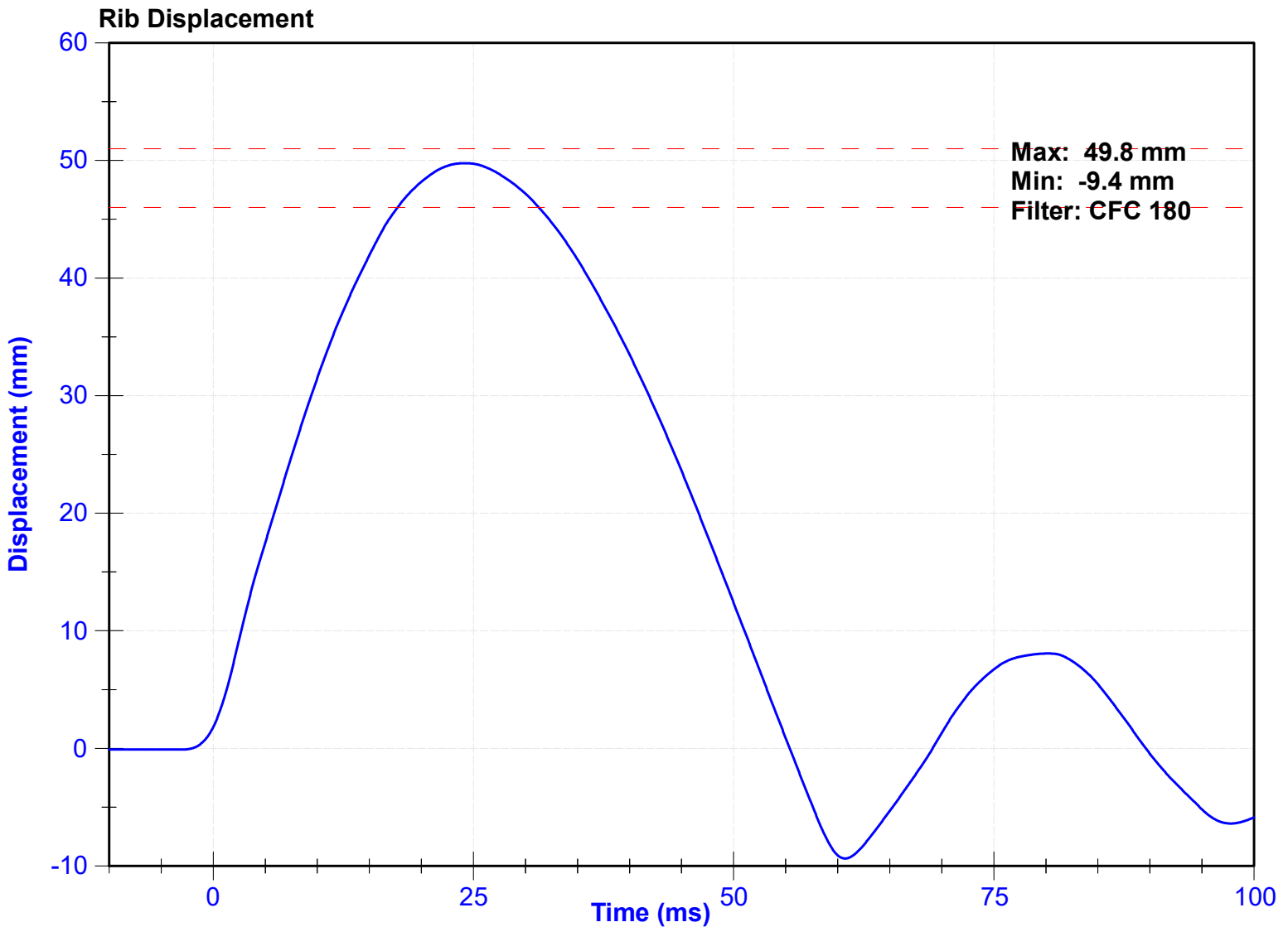
ATD Manufacturer	Denton	Test Technician	B. Kirchner
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	42.1	Pass
Rib Displacement	46	51	mm	49.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	DS-0552-01	9/7/2022	3/8/2023



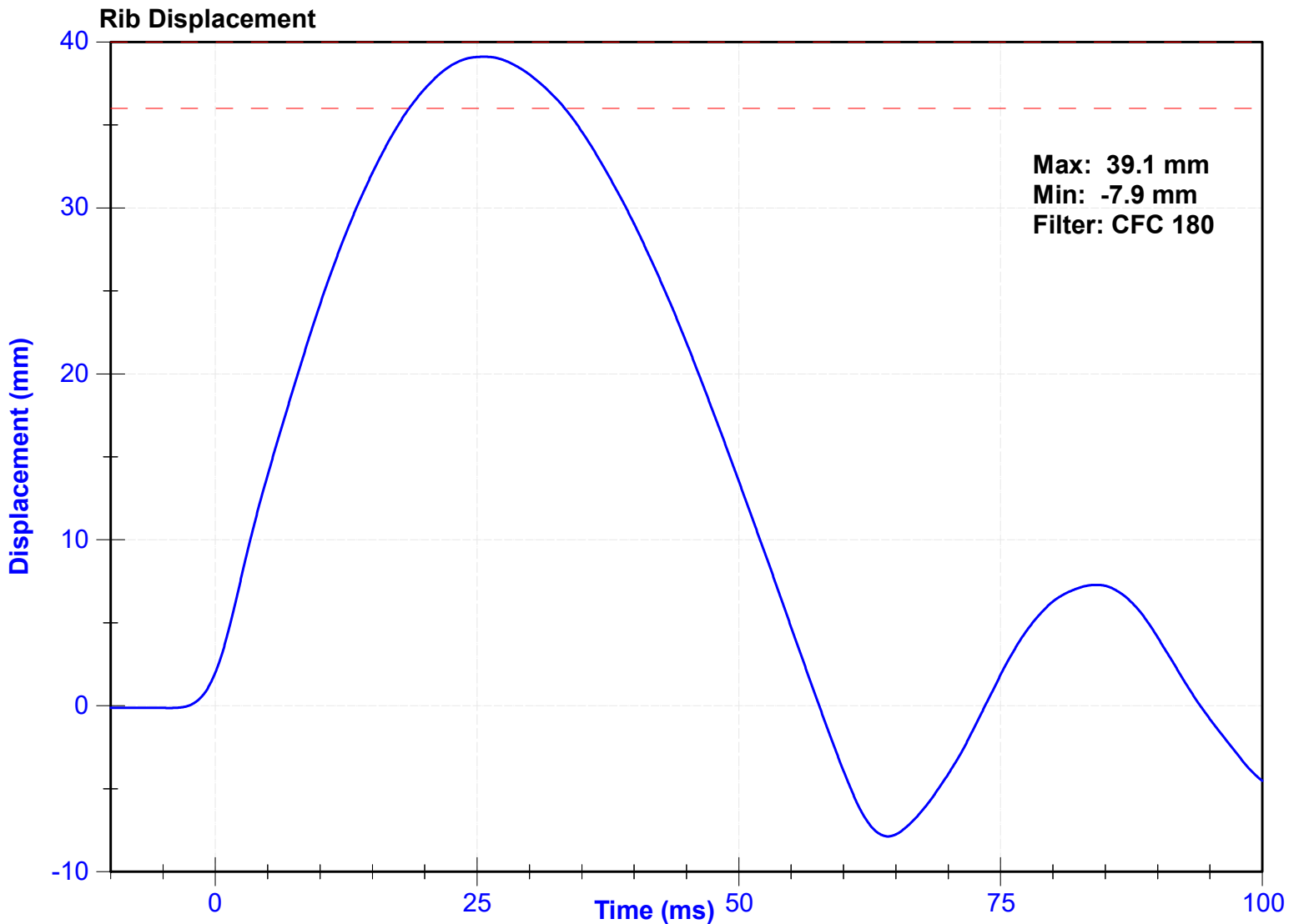
ATD Manufacturer	Denton	Test Technician	B. Kirchner
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	42.1	Pass
Rib Displacement	36	40	mm	39.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	DS-0552-01	9/7/2022	3/8/2023



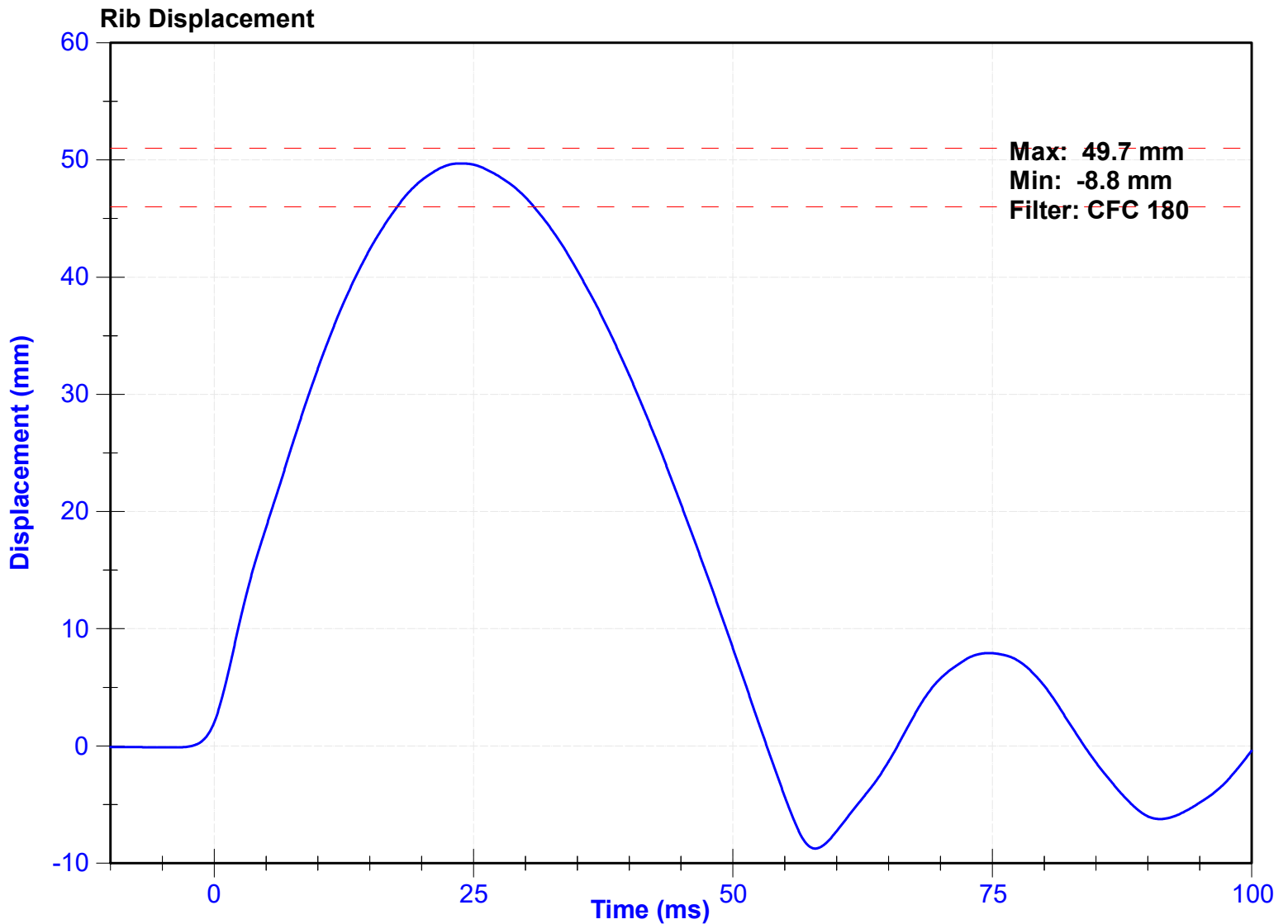
ATD Manufacturer	Denton	Test Technician	B. Kirchner
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	42.1	Pass
Rib Displacement	46	51	mm	49.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	DS-807	9/7/2022	3/8/2023



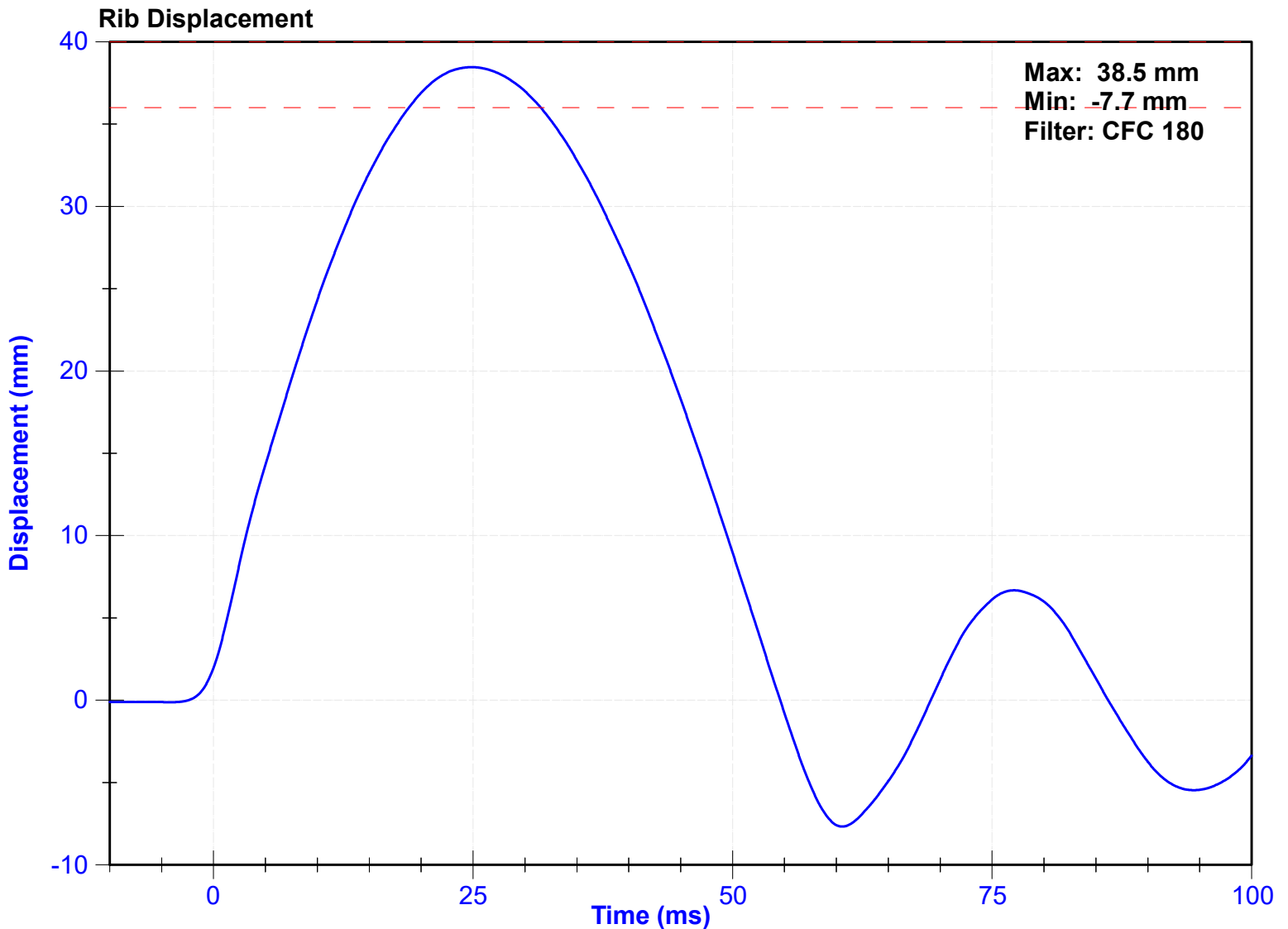
ATD Manufacturer	Denton	Test Technician	B. Kirchner
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	42.1	Pass
Rib Displacement	36	40	mm	38.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	DS-807	9/7/2022	3/8/2023



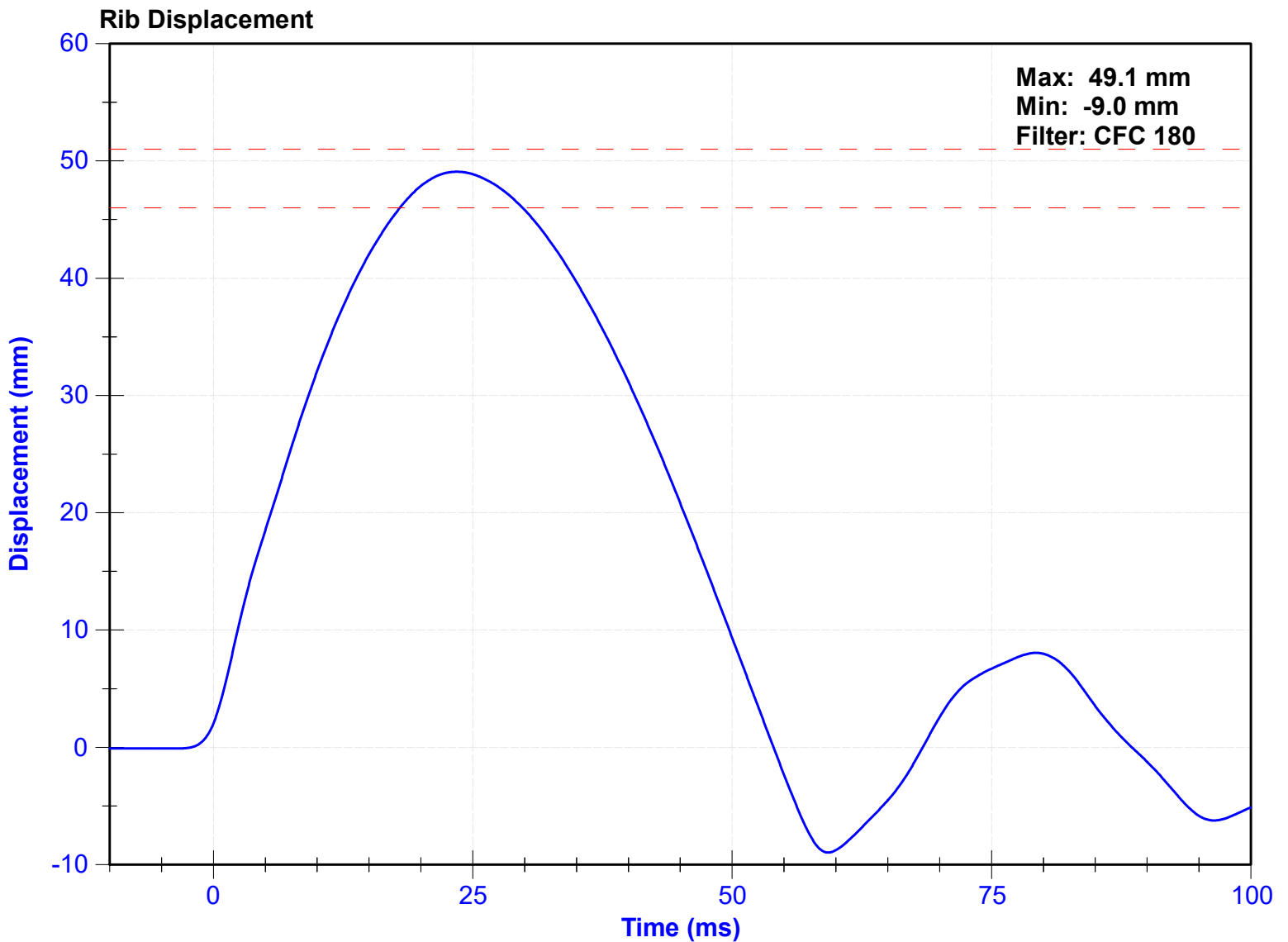
ATD Manufacturer	Denton	Test Technician	B. Kirchner
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	42.1	Pass
Rib Displacement	46	51	mm	49.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	DS-0552-03	9/7/2022	3/8/2023



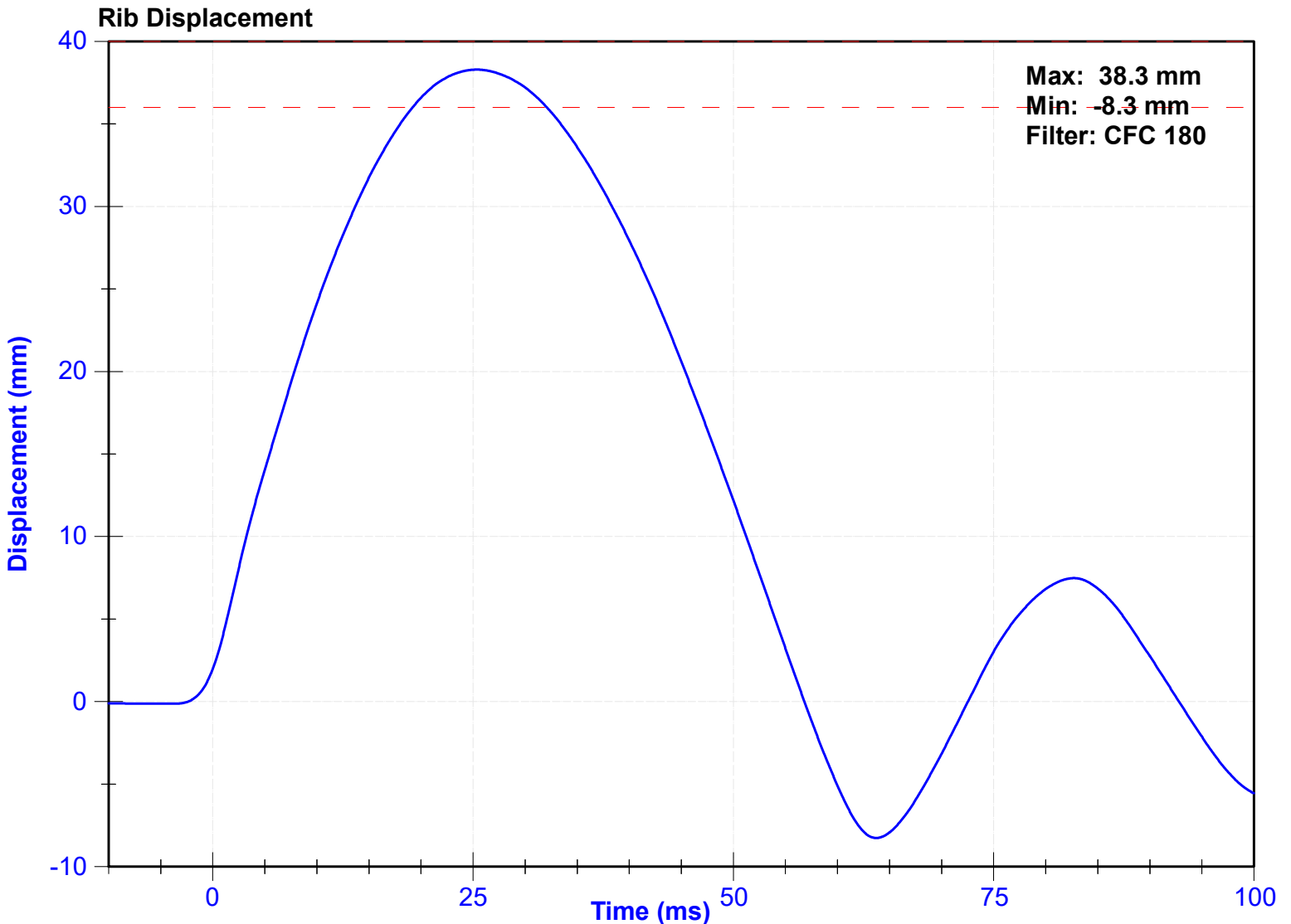
ATD Manufacturer	Denton	Test Technician	B. Kirchner
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	42.1	Pass
Rib Displacement	36	40	mm	38.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	DS-0552-03	9/7/2022	3/8/2023



ATD Manufacturer	Denton	Test Technician	B. Kirchner
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

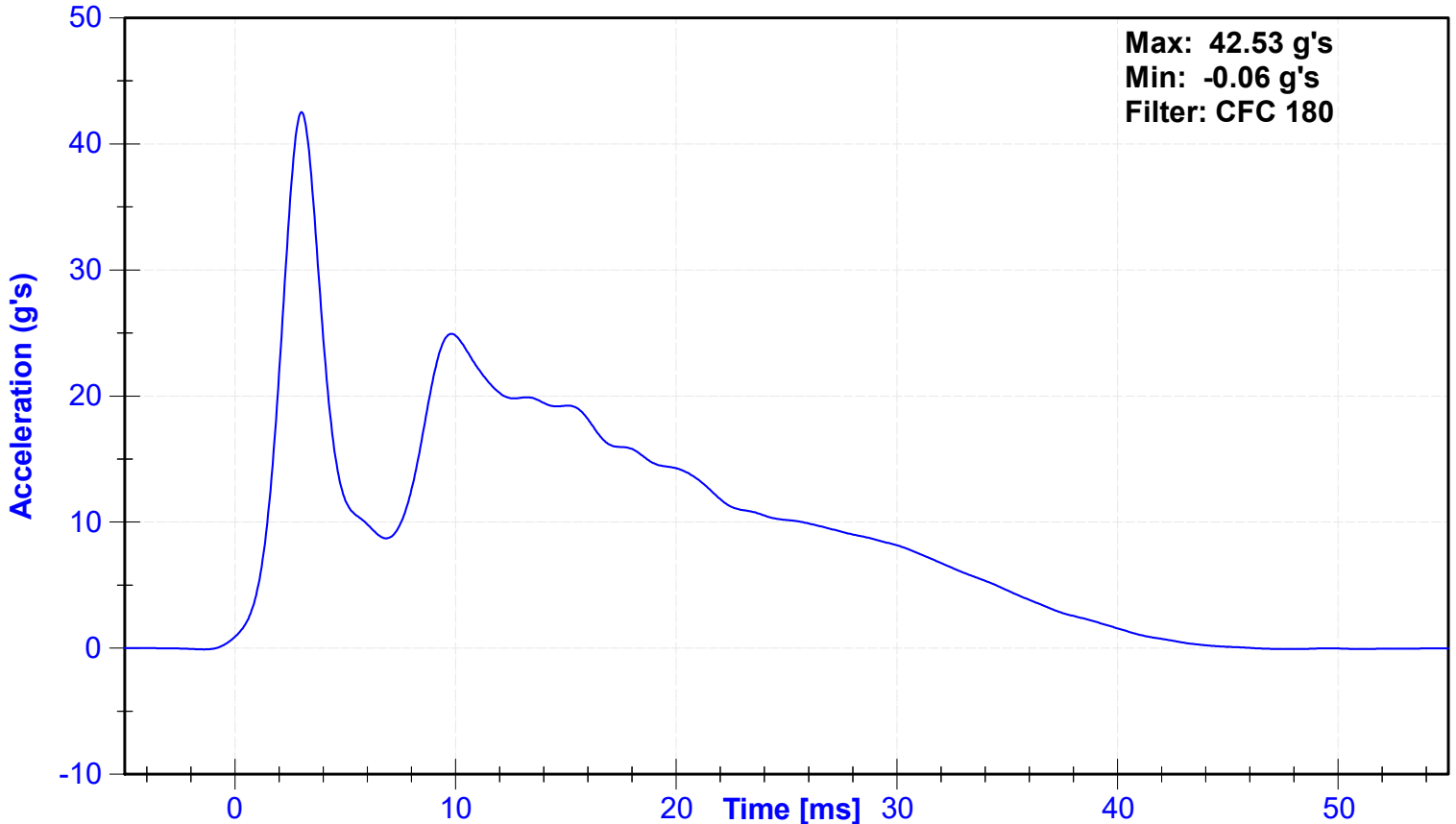
Results

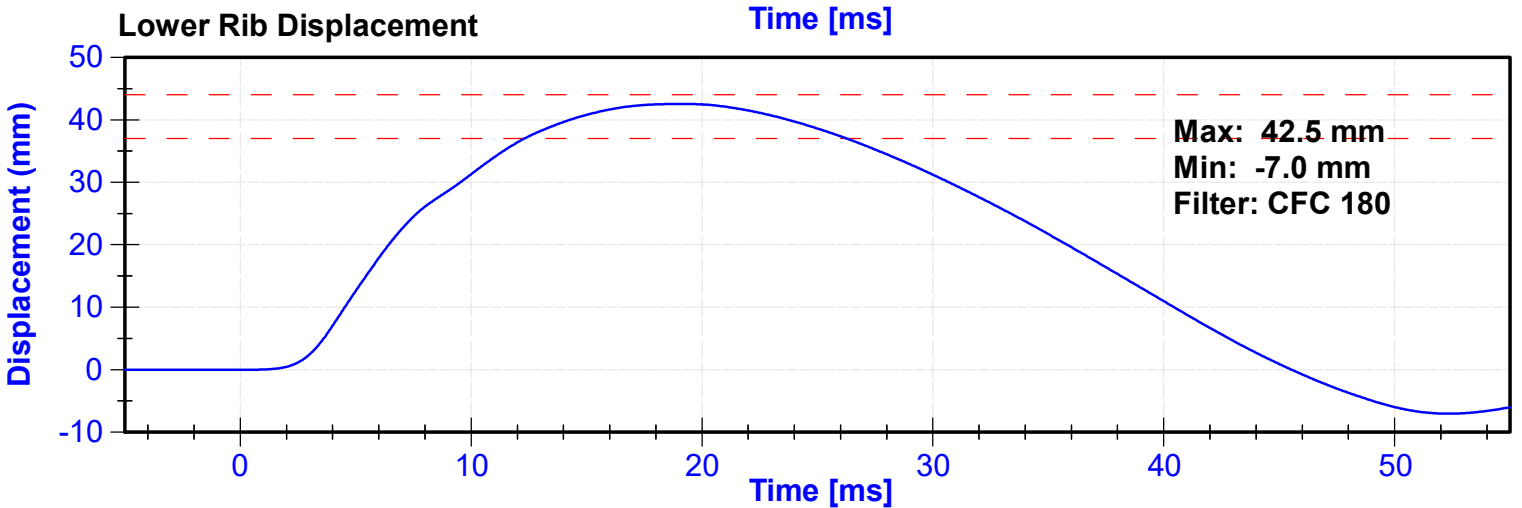
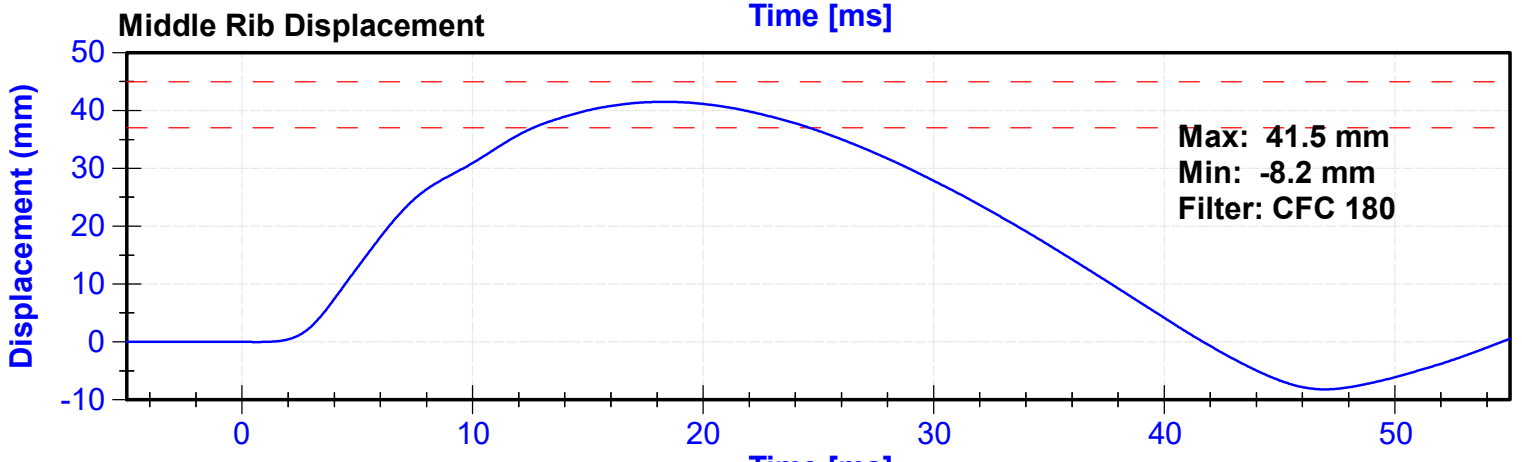
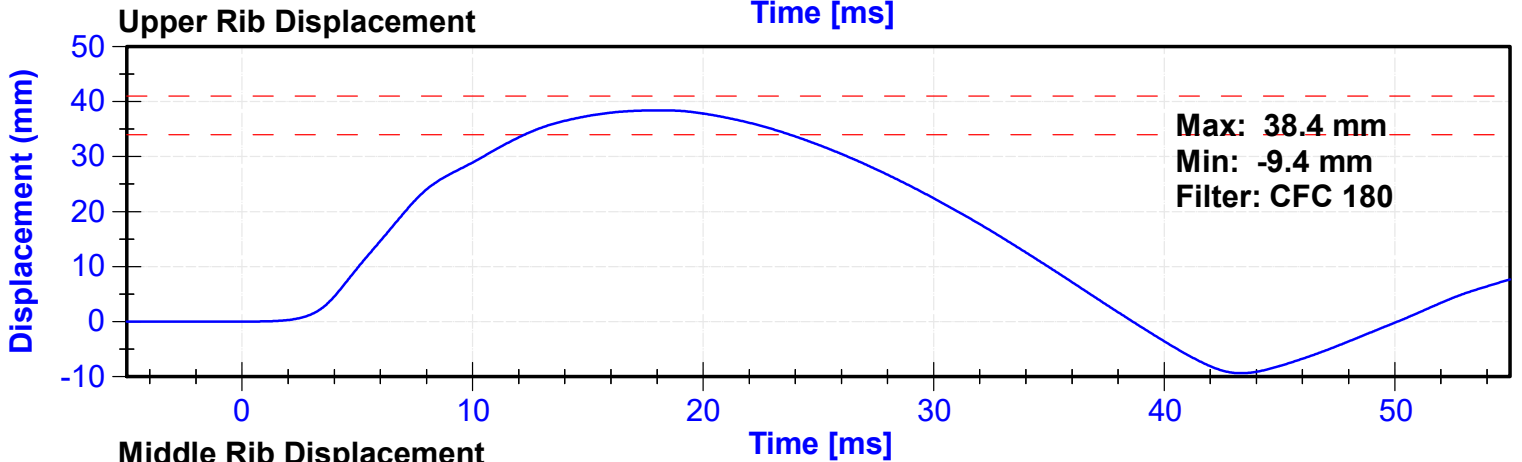
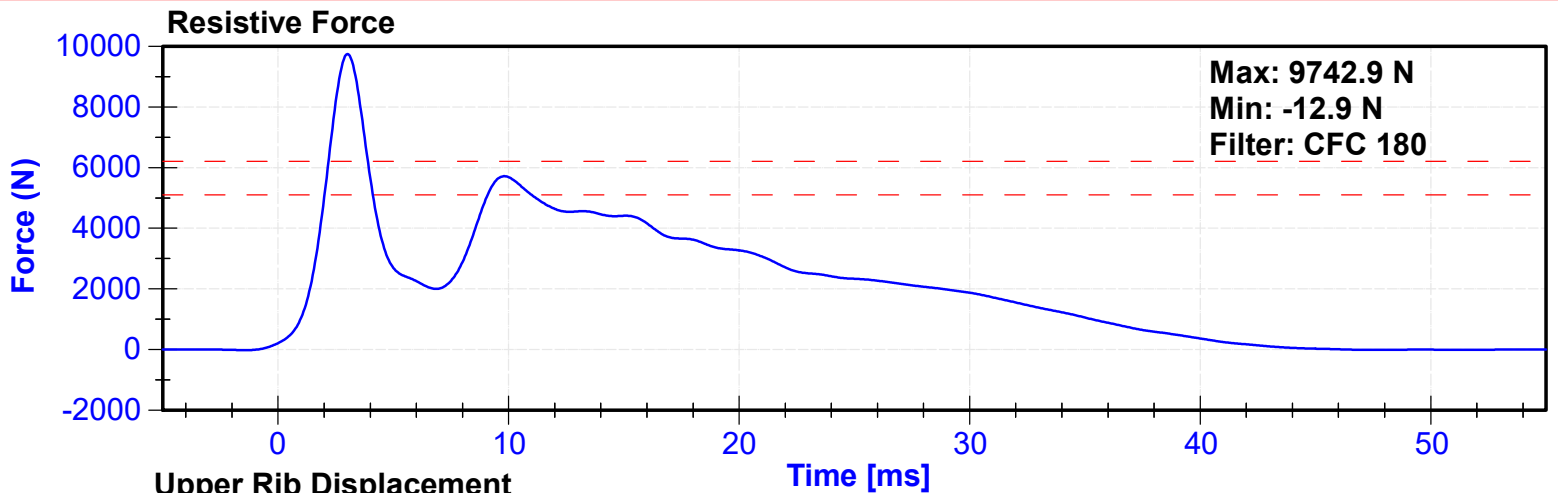
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	46.2	Pass
Velocity	5.4	5.6	m/s	5.55	Pass
Resistive Force after 6ms	5100	6200	N	5714.7	Pass
Upper Thorax Rib Deflection	34	41	mm	38.4	Pass
Mid Thorax Rib Deflection	37	45	mm	41.5	Pass
Lower Thorax Rib Deflection	37	44	mm	42.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	T25885	10/24/2022	10/24/2023
Upper Thorax Rib Potentiometer	Honeywell	DS-0552-01	9/7/2022	3/8/2023
Middle Thorax Rib Potentiometer	Honeywell	DS-807	9/7/2022	3/8/2023
Lower Thorax Rib Potentiometer	Honeywell	DS-0552-03	9/7/2022	3/8/2023

Probe Acceleration





ATD Manufacturer	Denton	Test Technician	B. Kirchner
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

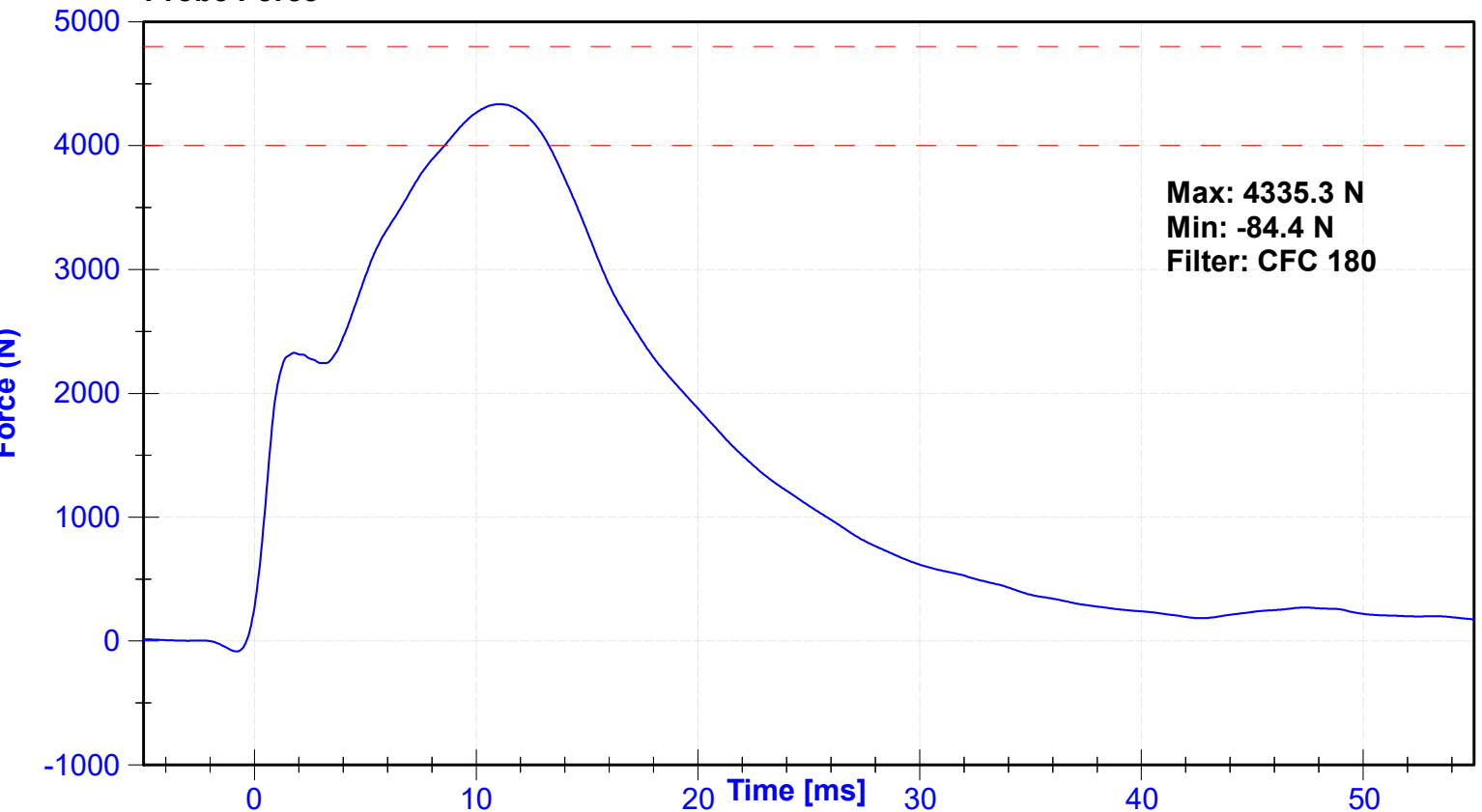
Results

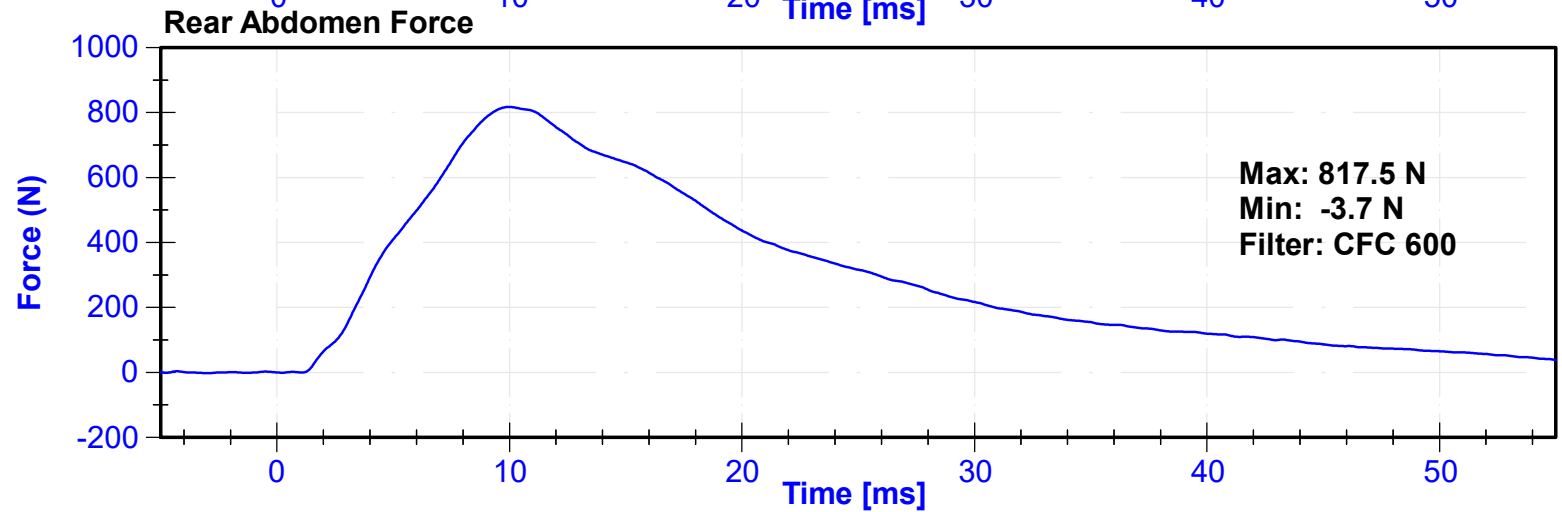
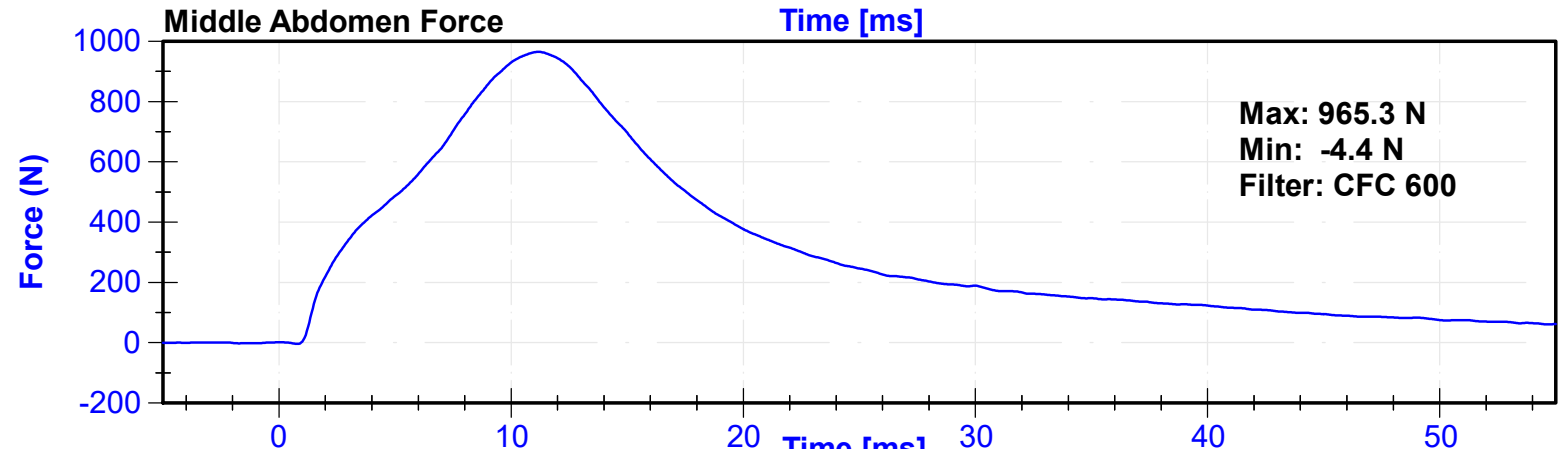
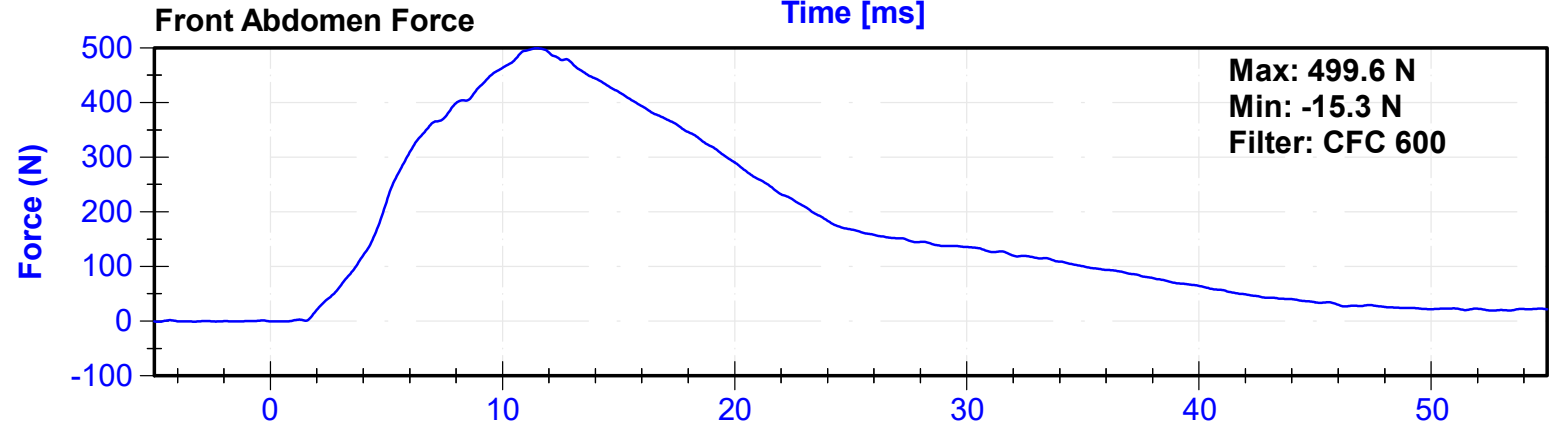
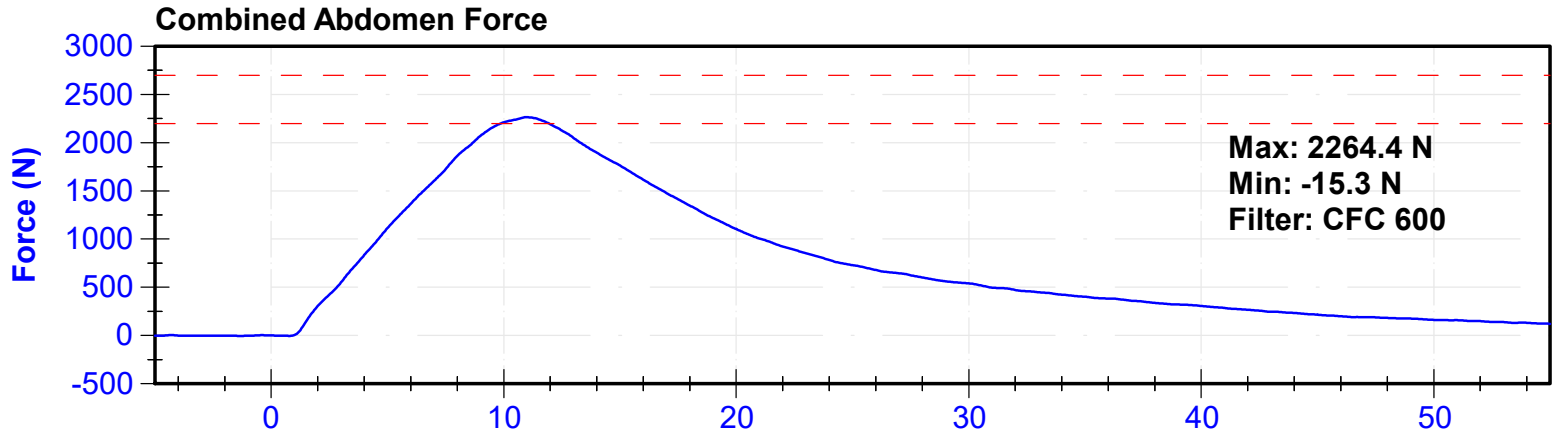
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	46.2	Pass
Velocity	3.9	4.1	m/s	4.02	Pass
Combined Abdomen Force	2200	2700	N	2264.4	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	11.00	Pass
Resistive Probe Force	4000	4800	N	4335.3	Pass
Time at Peak Resistive Force	10.6	13.0	ms	11.05	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25885	10/24/2022	10/24/2023
Front Abdomen Load Cell	Denton	1440	8/12/2022	8/12/2023
Middle Abdomen Load Cell	Denton	1525	8/12/2022	8/12/2023
Rear Abdomen Load Cell	Denton	1528	8/12/2022	8/12/2023

Probe Force





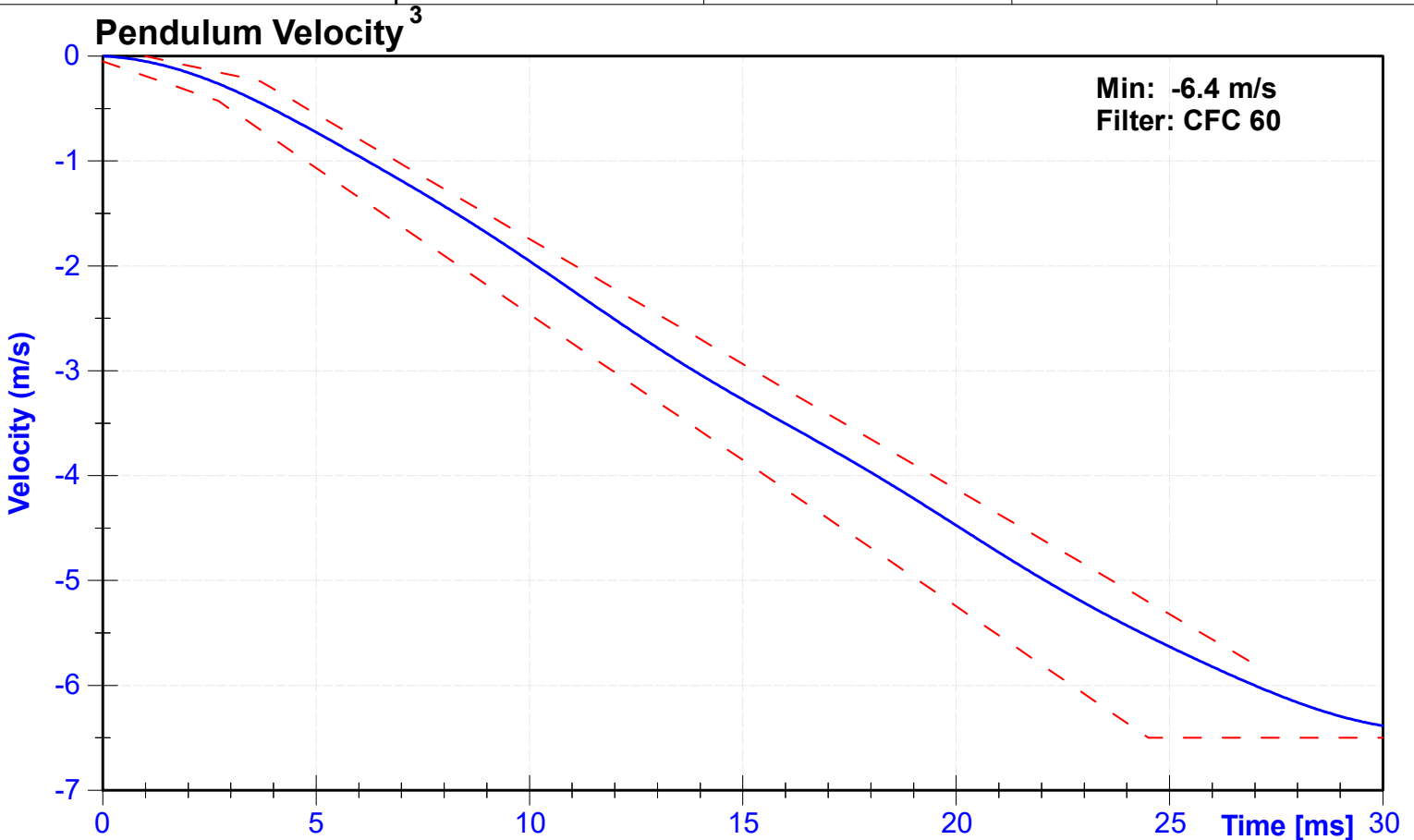
ATD Manufacturer	Denton	Test Technician	D. Sakona
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

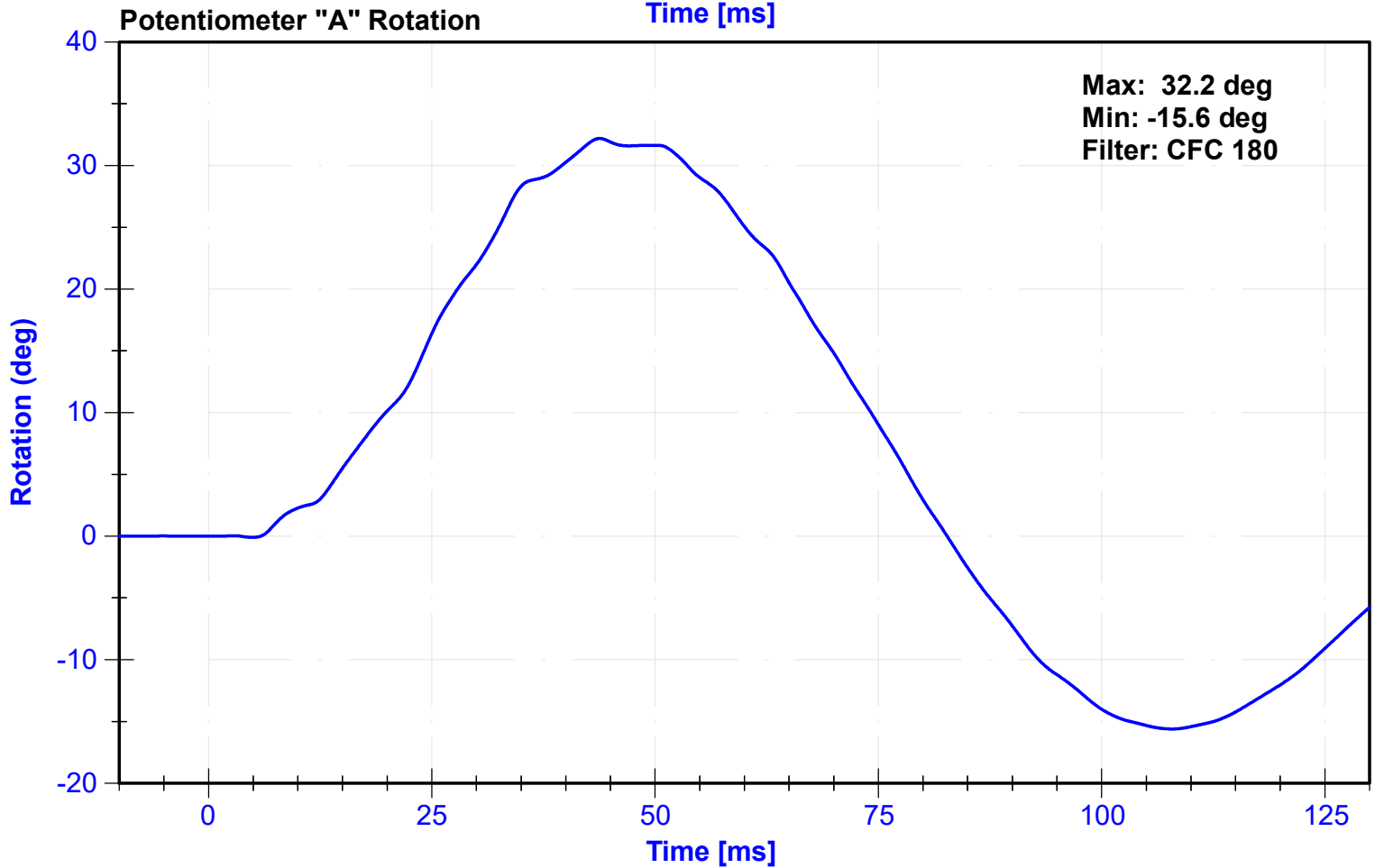
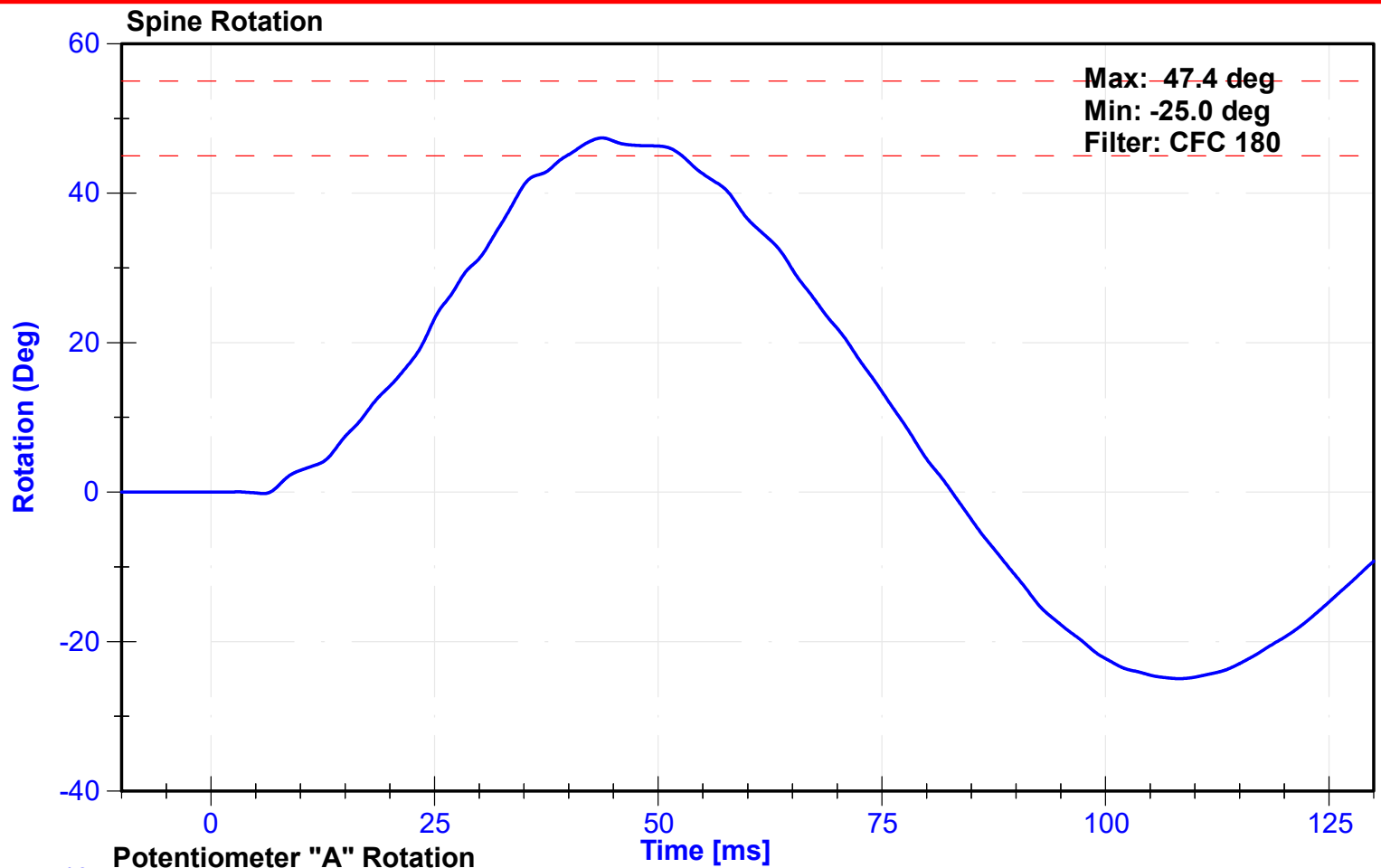
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	26.4	Pass
Velocity	5.95	6.15	m/s	6.044	Pass
Lateral Spine Rotation	45	55	deg	47.4	Pass
Time at Maximum Rotation	39	53	ms	43.7	Pass
Time of Decay to Zero Degrees	37	57	ms	39.1	Pass
Pendulum Velocity Overall Corridor	Lower Boundary ¹	Upper Boundary ²	m/s	See Plot ³	Pass

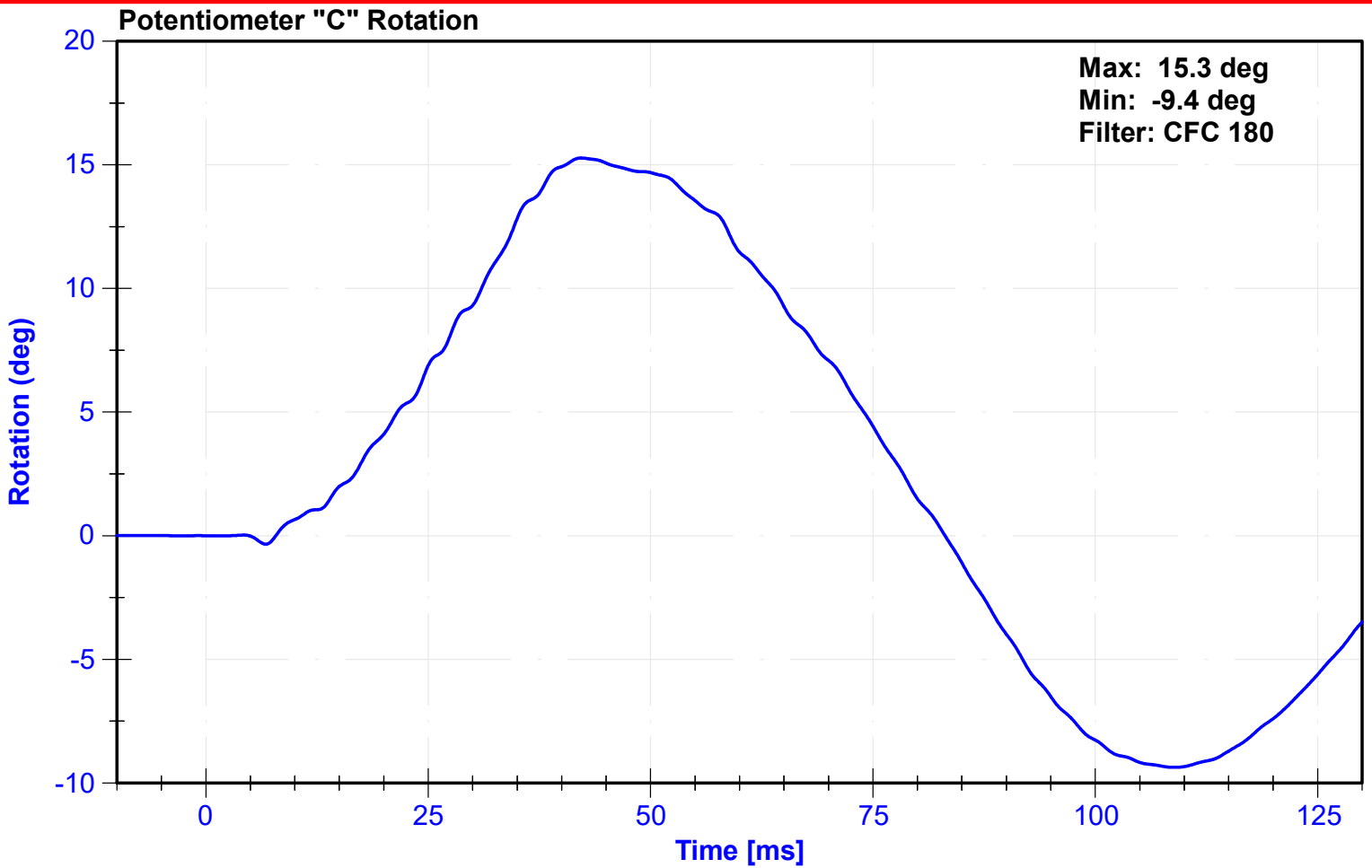
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16503	10/28/2021	10/28/2022
Pendulum "A" Potentiometer	Sfernice	094	10/5/2022	10/5/2023
Condyle "B" Potentiometer	Sfernice	095	10/5/2022	10/5/2023



^{1,2} Upper and lower boundaries specified in Appendix I IV-43





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	B. Kirchner
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

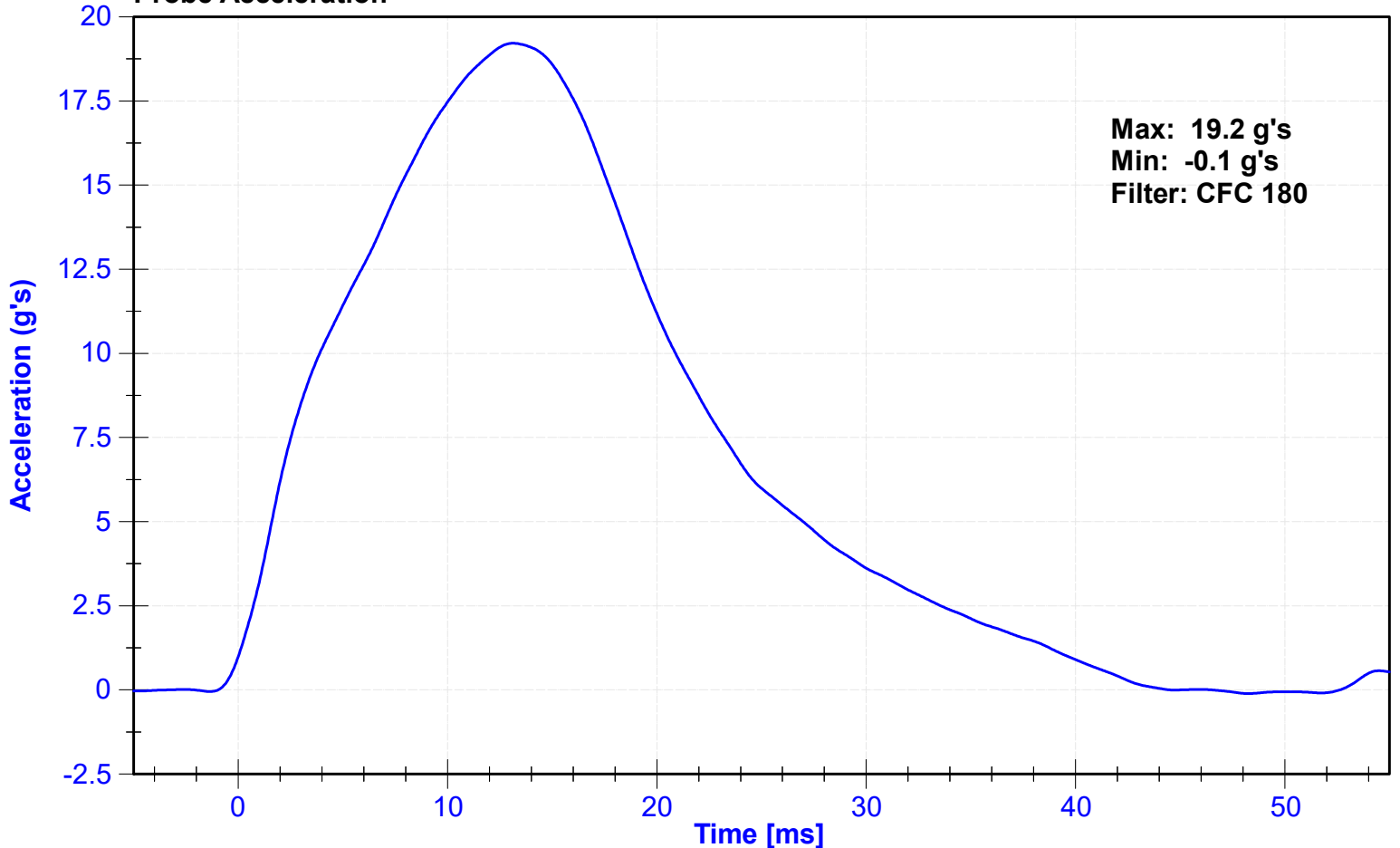
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	46.2	Pass
Velocity	4.2	4.4	m/s	4.28	Pass
Resistive Force	4700	5400	N	4709.9	Pass
Time at Peak Resistive Force	11.8	16.1	ms	13.10	Pass
Pubic Force	-1590	-1230	N	-1344.7	Pass
Time at Peak Pubic Force	12.2	17.0	ms	13.90	Pass

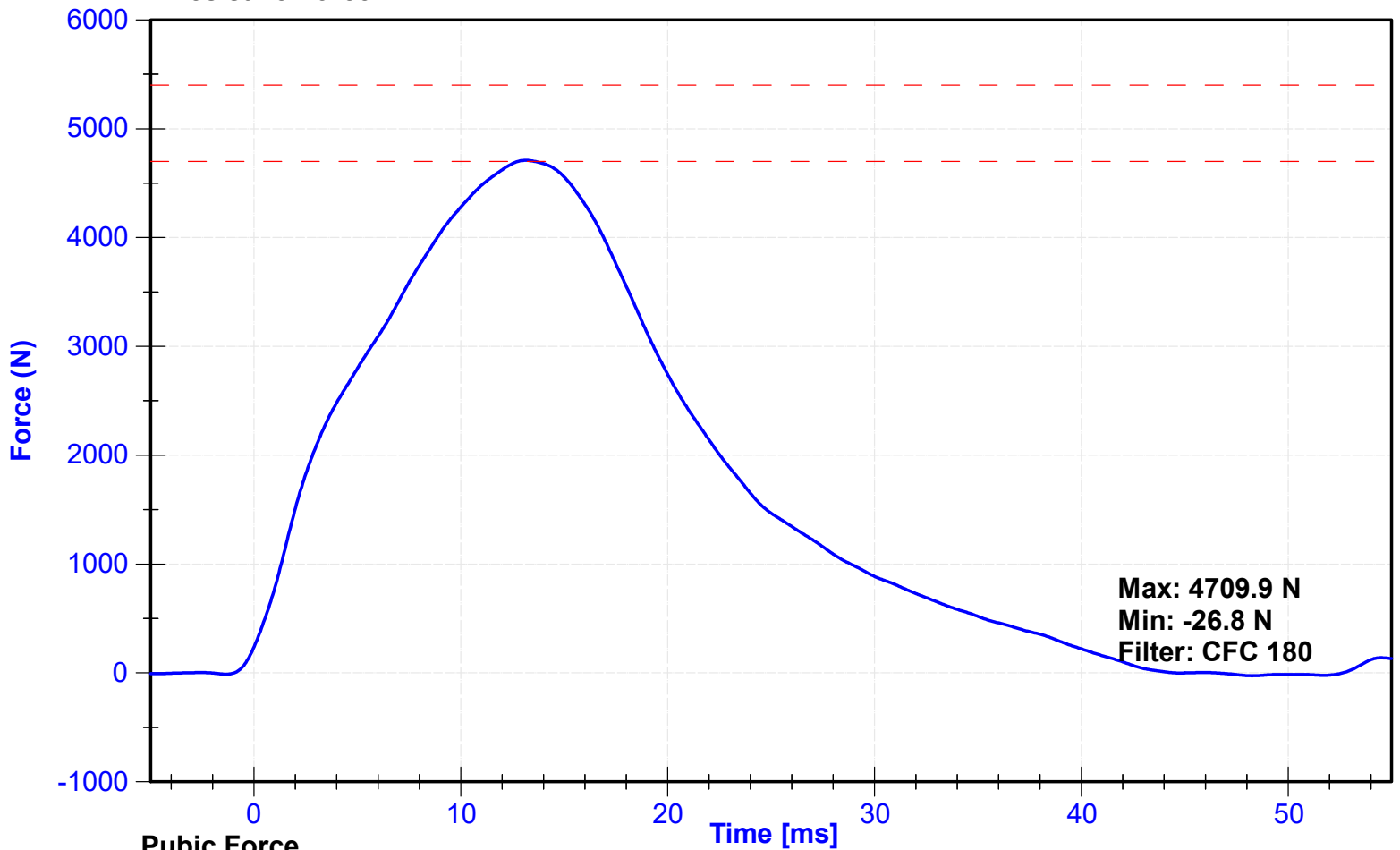
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25885	10/24/2022	10/24/2023
Pubic Load Cell	Denton		8/12/2022	8/12/2023

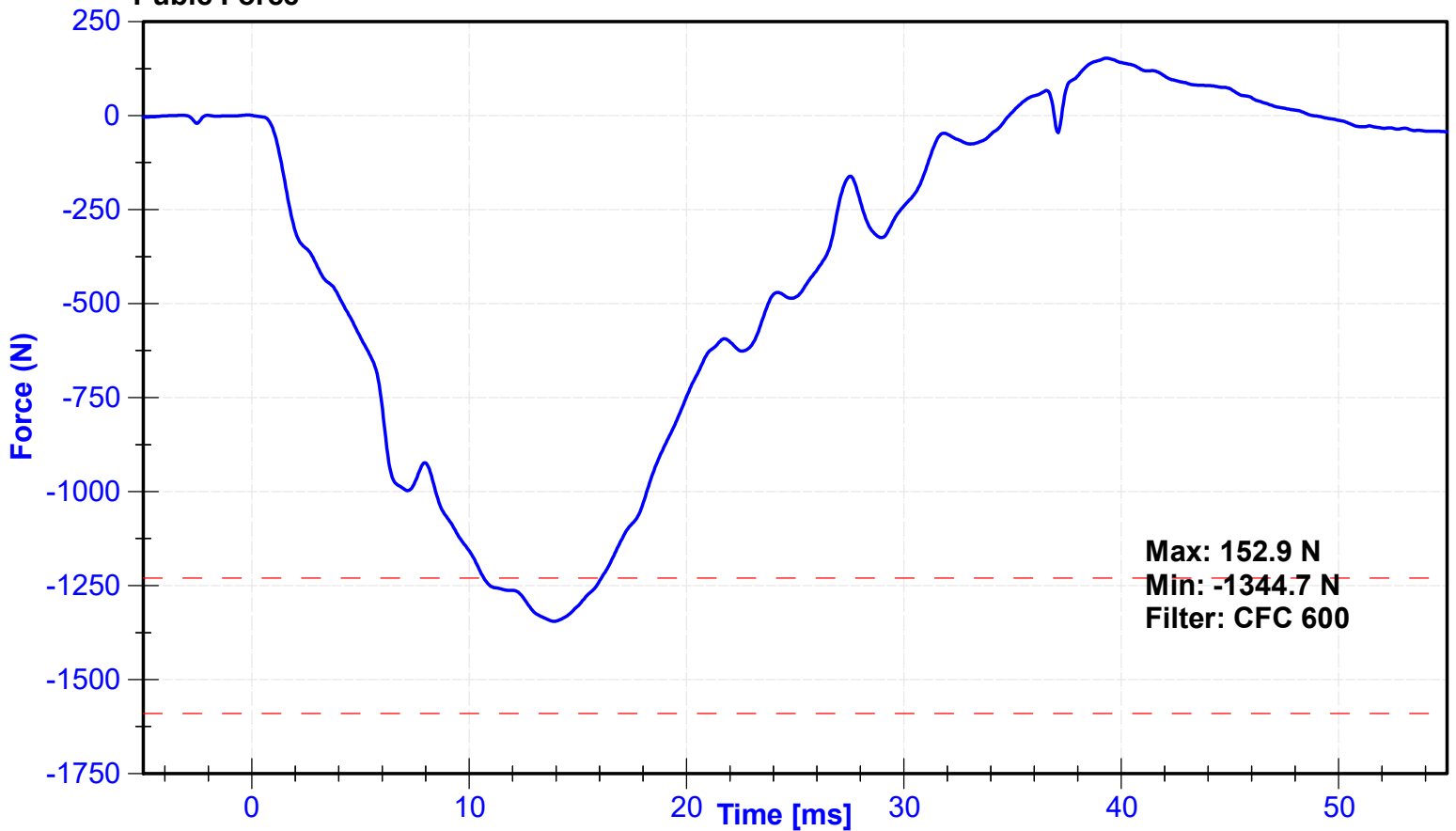
Probe Acceleration



Resistive Force



Pubic Force



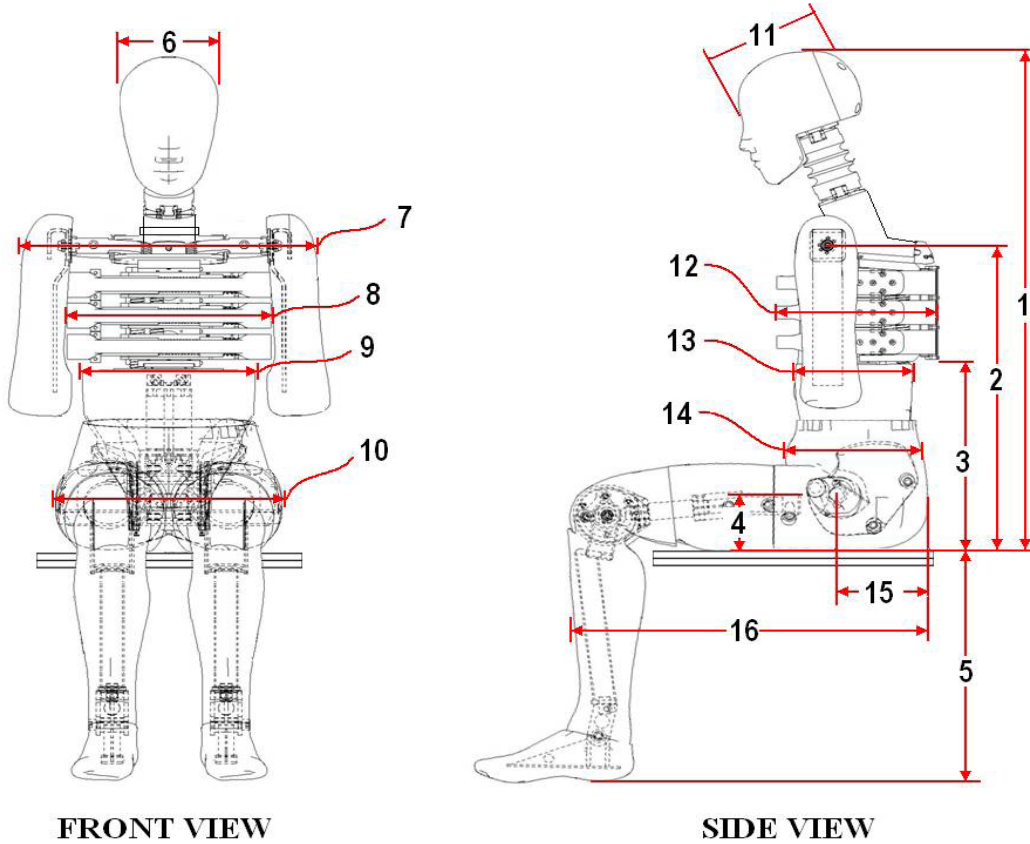
POST-TEST DUMMY PERFORMANCE CALIBRATION TEST DATA
(Subpart U, ES-2re)

External Measurements - EuroSID-2re

Technician: K. Brogan

Date: 11/4/2022

Dummy Serial Number: D037



Dim. No.	Description	Specification (mm)		Result (mm)	Pass/Fail
1	Sitting Height	900	918	915	Pass
2	Seat to Shoulder Joint	558	572	564	Pass
3	Seat to Lower Face of Thoracic Spine Box	346	356	353	Pass
4	Seat to Hip Joint (center of bolt)	97	103	101	Pass
5	Sole to Seat, Sitting	333	451	417	Pass
6	Head Width	152	158	155	Pass
7	Shoulder/Arm Width	461	479	471	Pass
8	Thorax Width	322	332	330	Pass
9	Abdomen Width	273	287	283	Pass
10	Pelvis Lap Width	359	373	365	Pass
11	Head Depth	196	206	197	Pass
12	Thorax Depth	262	272	268	Pass
13	Abdomen Depth	194	204	201	Pass
14	Pelvis Depth	235	245	242	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150	160	155	Pass
16	Back of Buttocks to Front Knee	597	615	608	Pass

ATD Manufacturer	Denton	Test Technician	B. Kirchner
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

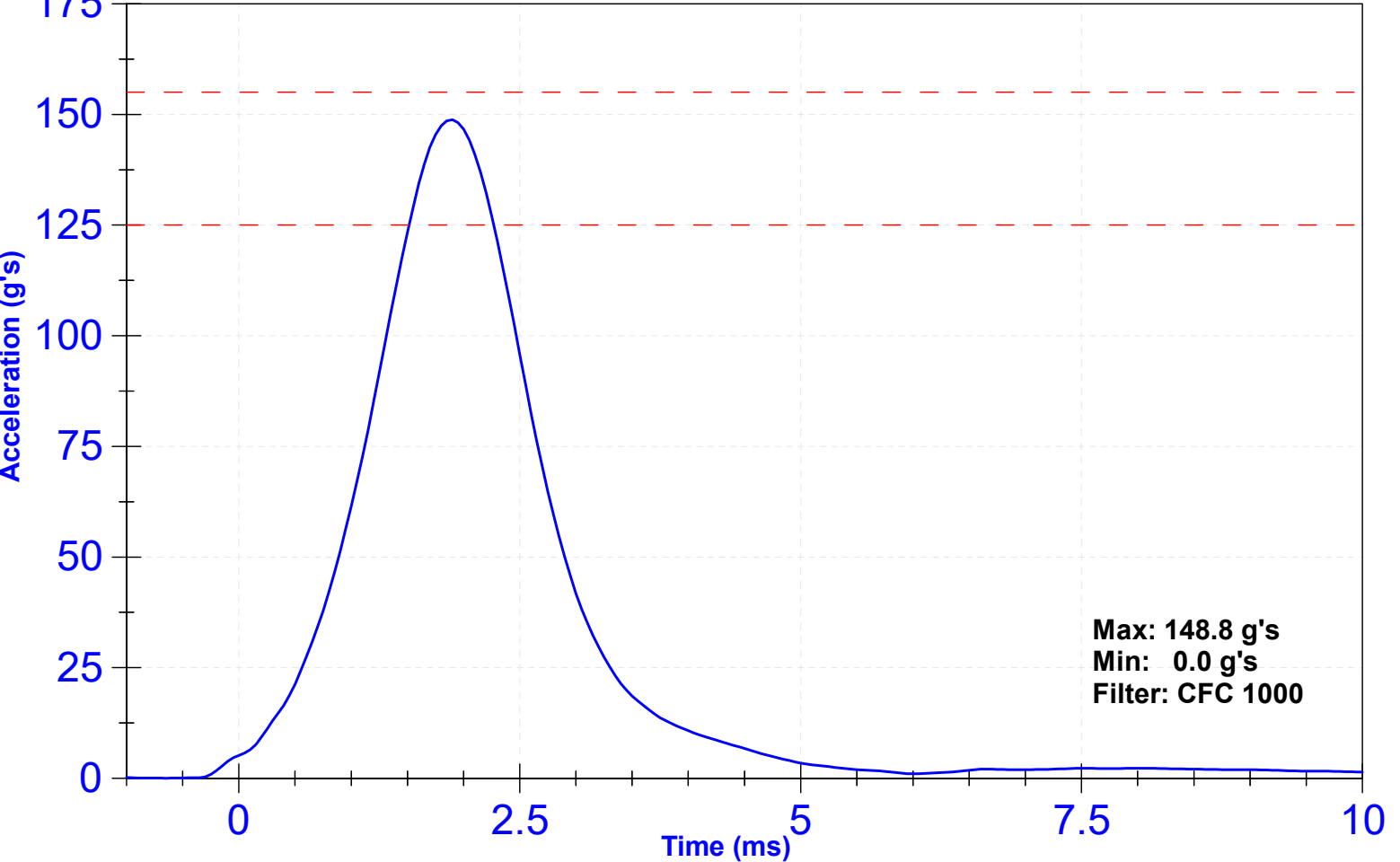
Results

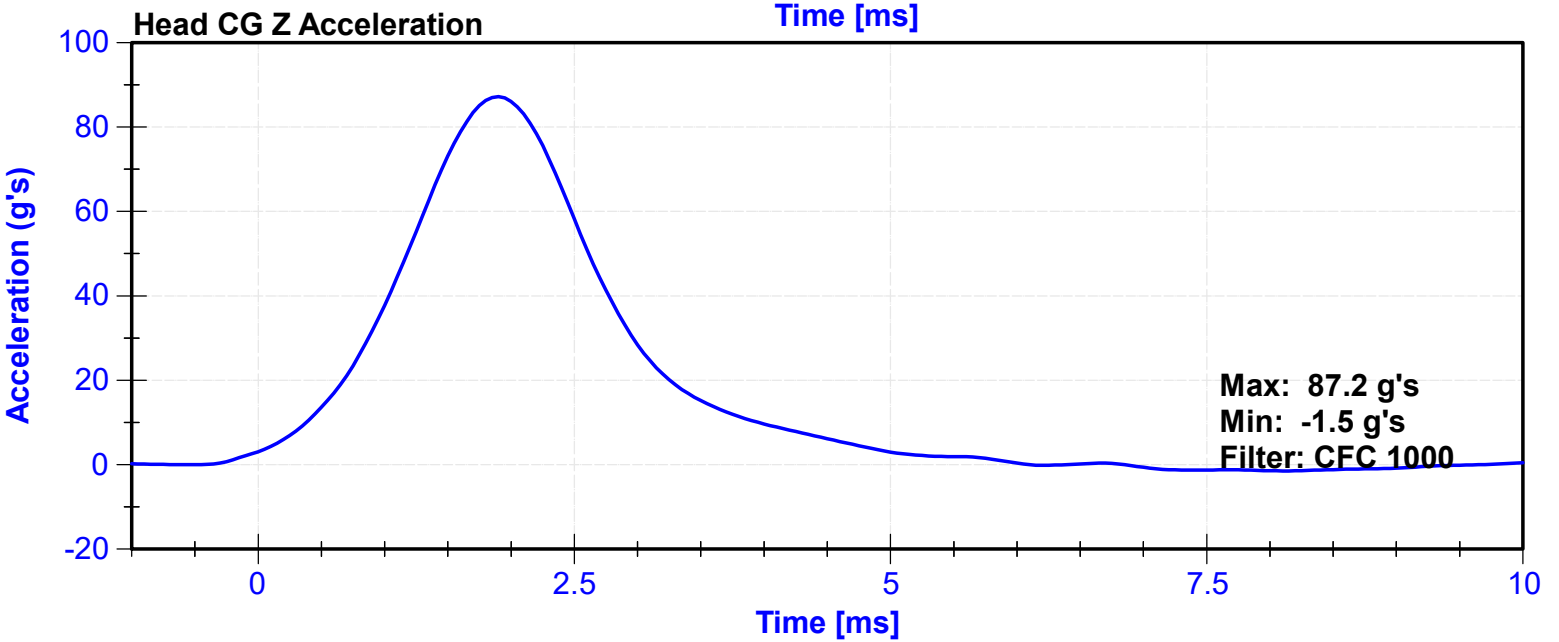
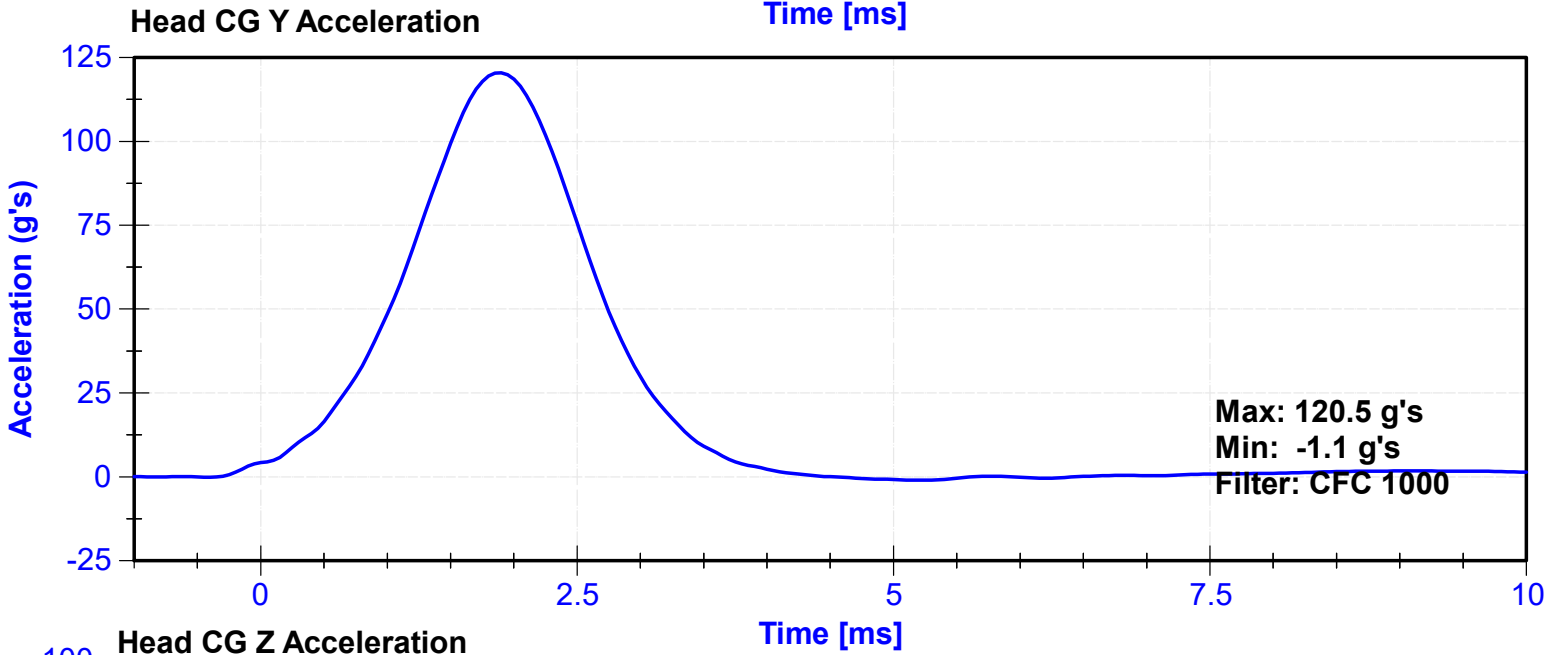
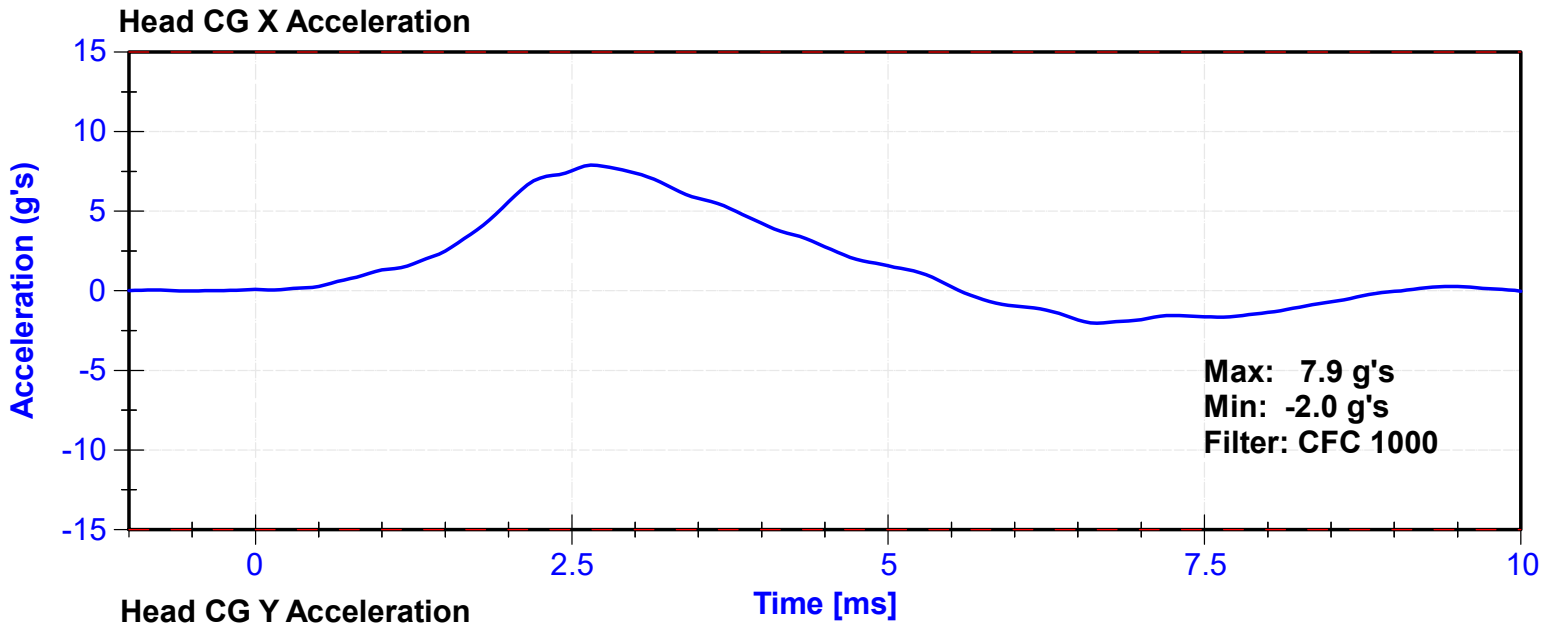
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	42.1	Pass
Resultant Acceleration	125	155	g's	148.8	Pass
Oscillation	0	15	%	1.52	Pass
Fore-Aft Acceleration	-15	15	g's	7.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco	T21724	9/6/2022	3/5/2023
Y Accelerometer	Endevco	T22281	9/6/2022	3/5/2023
Z Accelerometer	Endevco	T26050	9/9/2022	3/8/2023

Resultant Acceleration





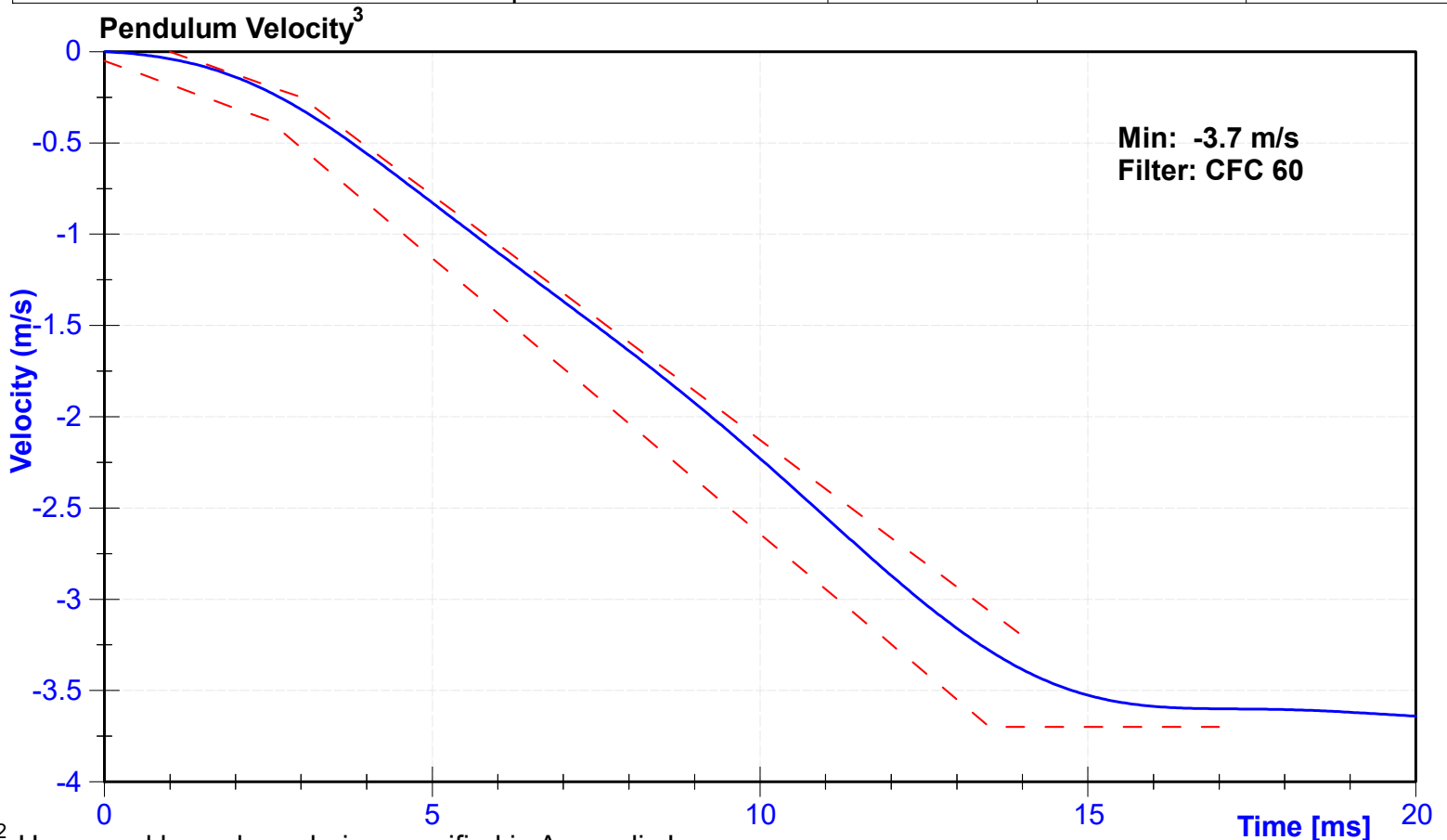
ATD Manufacturer	Denton	Test Technician	C. Mantell
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	26.8	Pass
Velocity	3.3	3.5	m/s	3.41	Pass
Lateral Neck Rotation	49	59	deg	54.7	Pass
Time at Maximum Rotation	54	66	ms	56.5	Pass
Time of Rotation Decay from Maximum	53	88	ms	60.1	Pass
Pendulum Velocity Overall Corridor	Lower Boundary ¹	Upper Boundary ²	m/s	See Plot ³	Pass

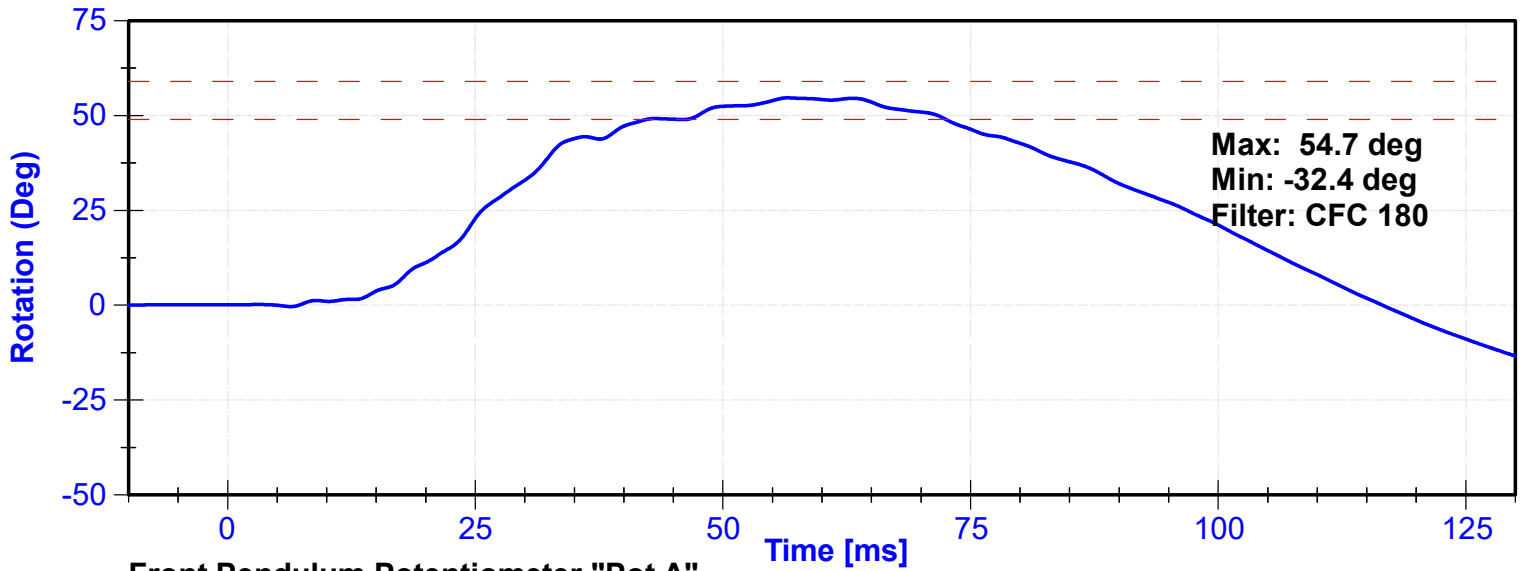
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16503	10/26/2022	10/26/2023
Front Pendulum Potentiometer	Sfernice	094	10/5/2022	10/5/2023
Headform Potentiometer	Sfernice	095	10/5/2022	10/5/2023

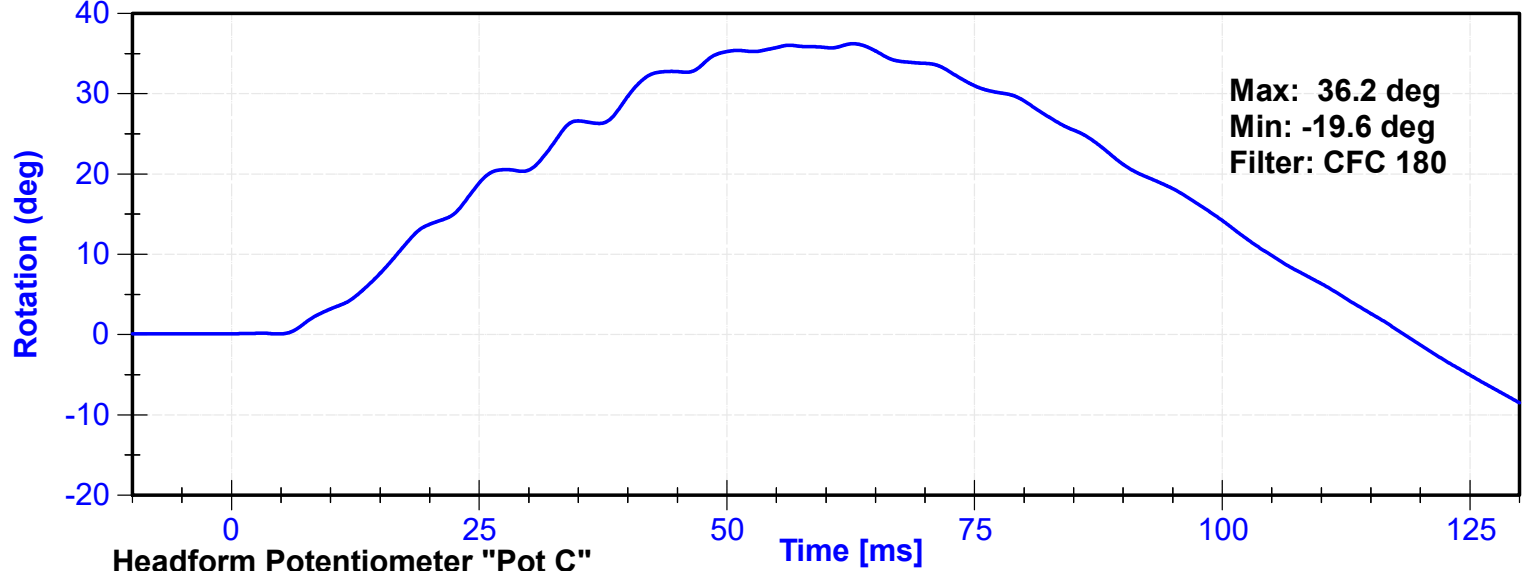


^{1,2} Upper and lower boundaries specified in Appendix I

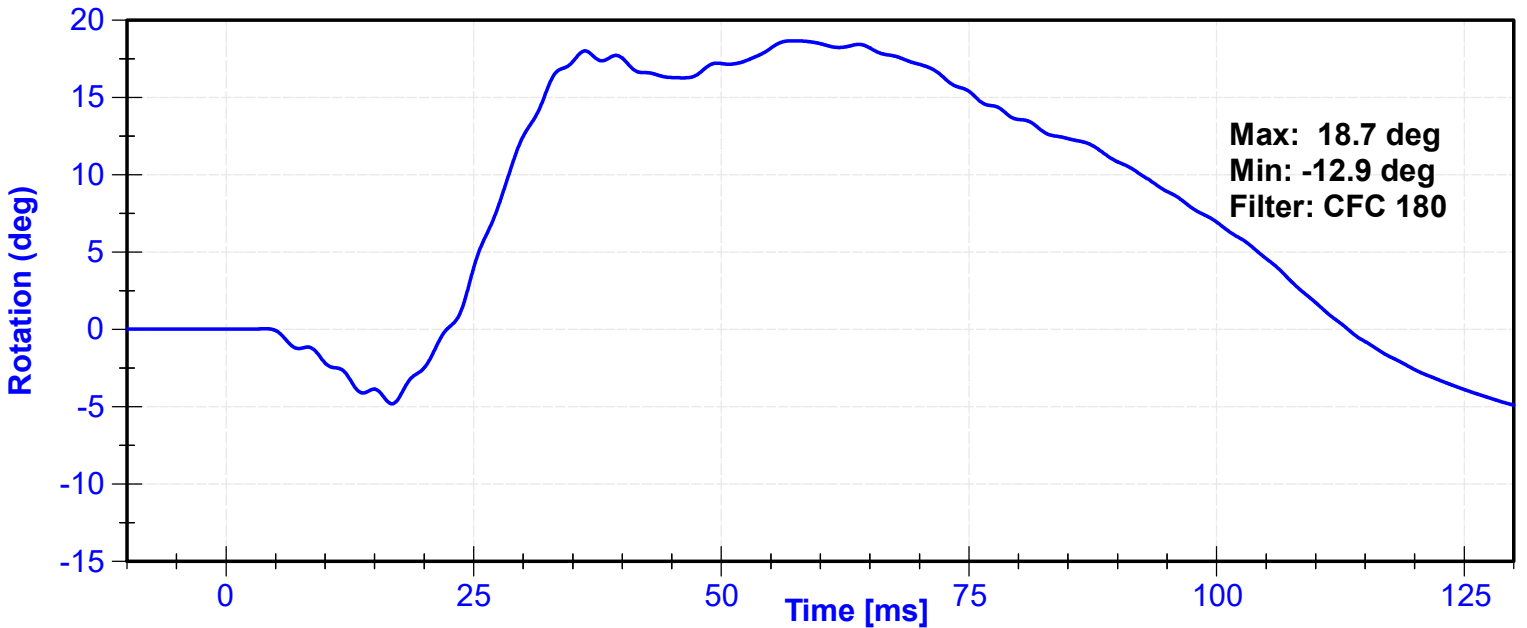
Neck Rotation



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	T. Roseman
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

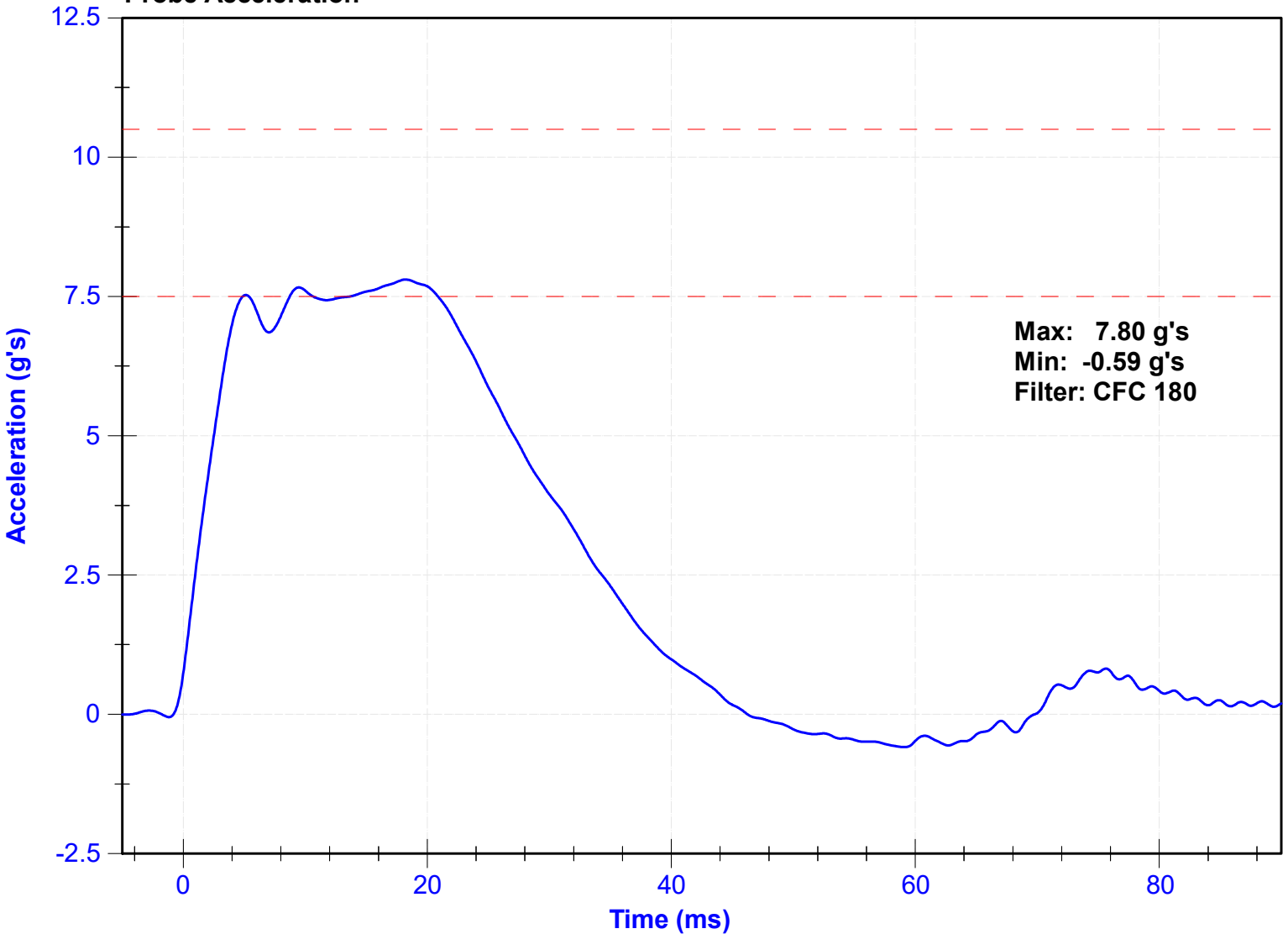
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	41.3	Pass
Velocity	4.2	4.4	m/s	4.35	Pass
Probe Acceleration	7.5	10.5	g's	7.80	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	T25885	10/24/2022	10/24/2023

Probe Acceleration



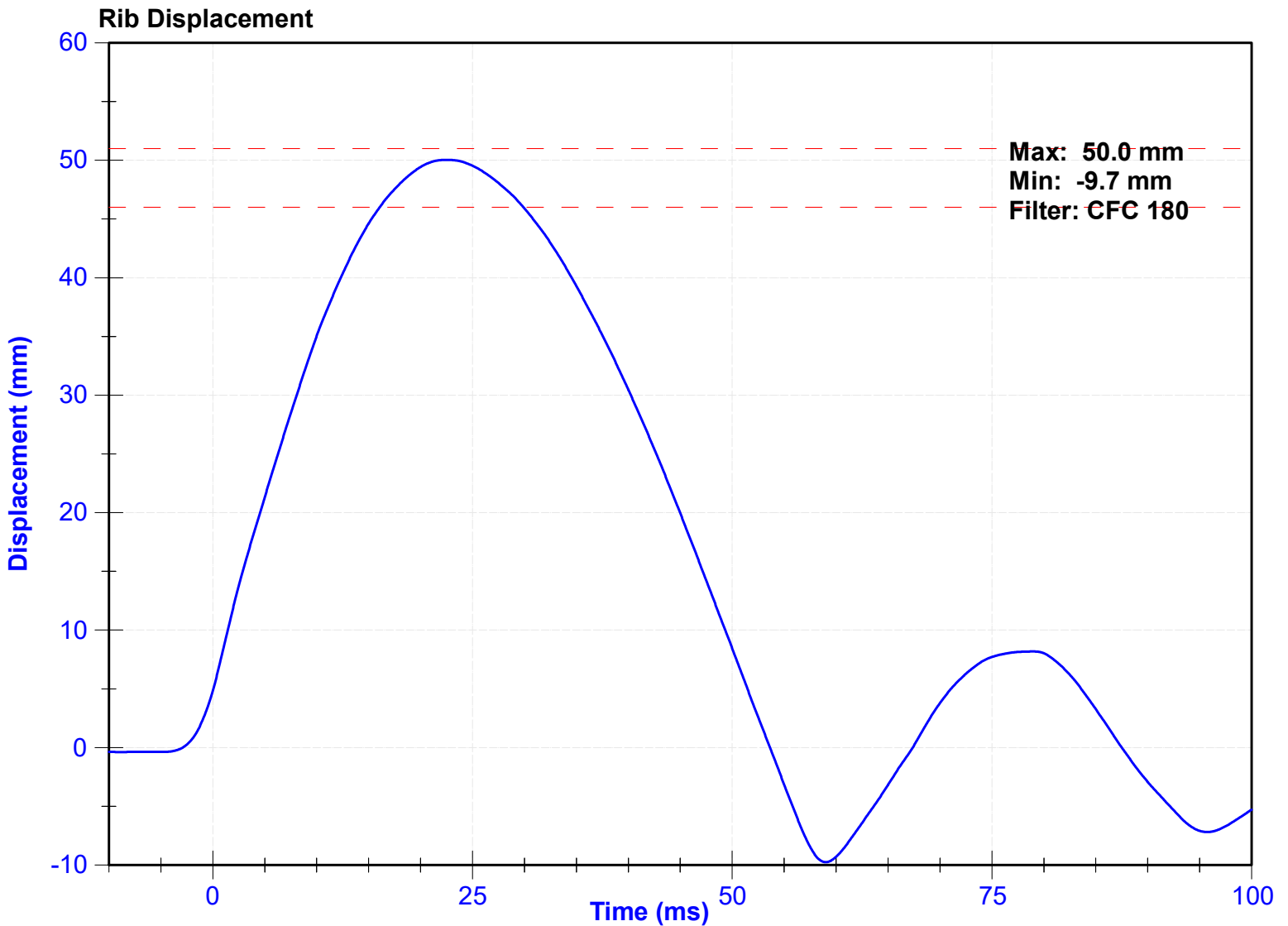
ATD Manufacturer	Denton	Test Technician	B. Kirchner
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	41.8	Pass
Rib Displacement	46	51	mm	50.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	DS-0552-01	9/7/2022	3/8/2023



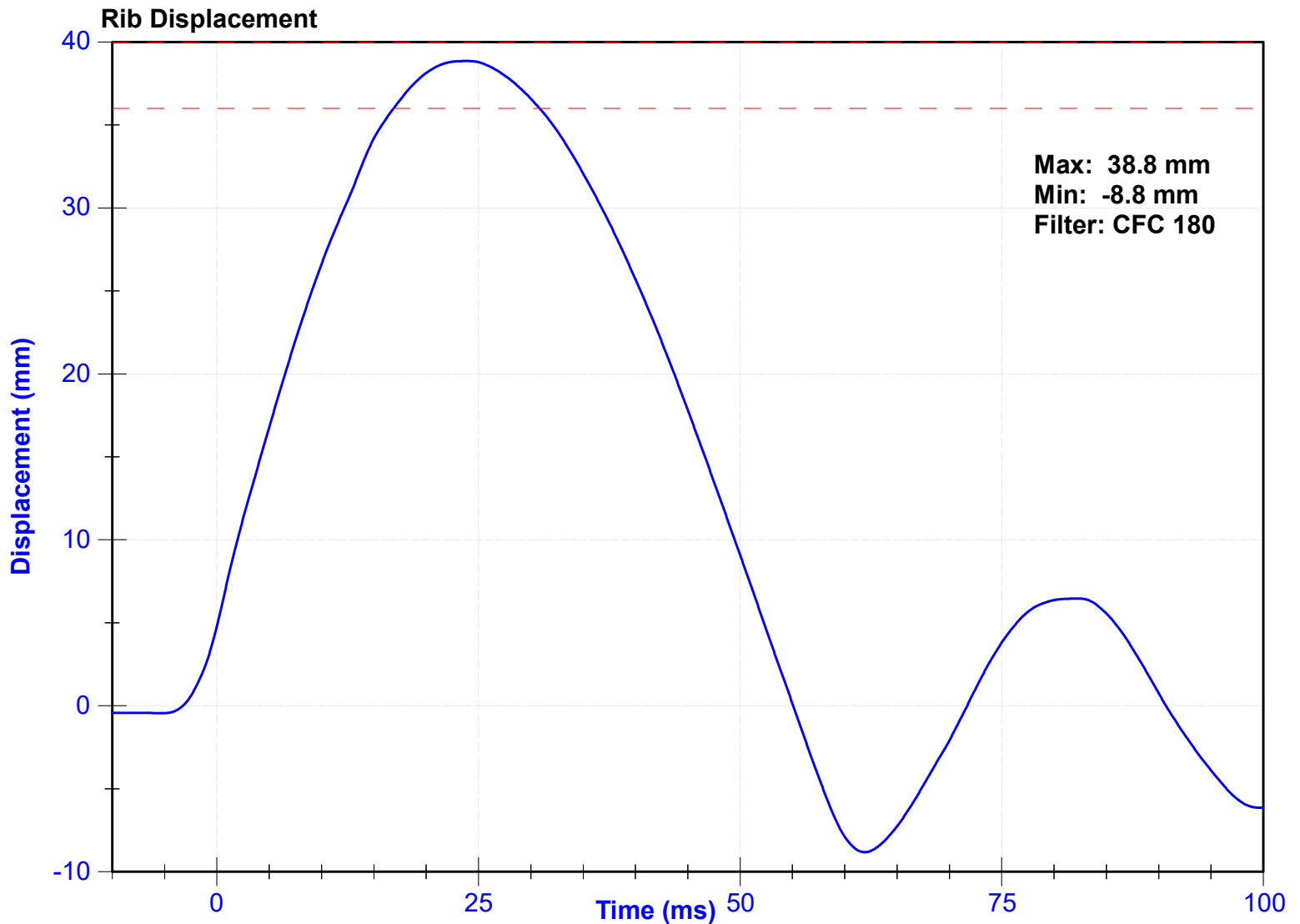
ATD Manufacturer	Denton	Test Technician	B. Kirchner
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	41.8	Pass
Rib Displacement	36	40	mm	38.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	DS-0552-01	9/7/2022	3/8/2023



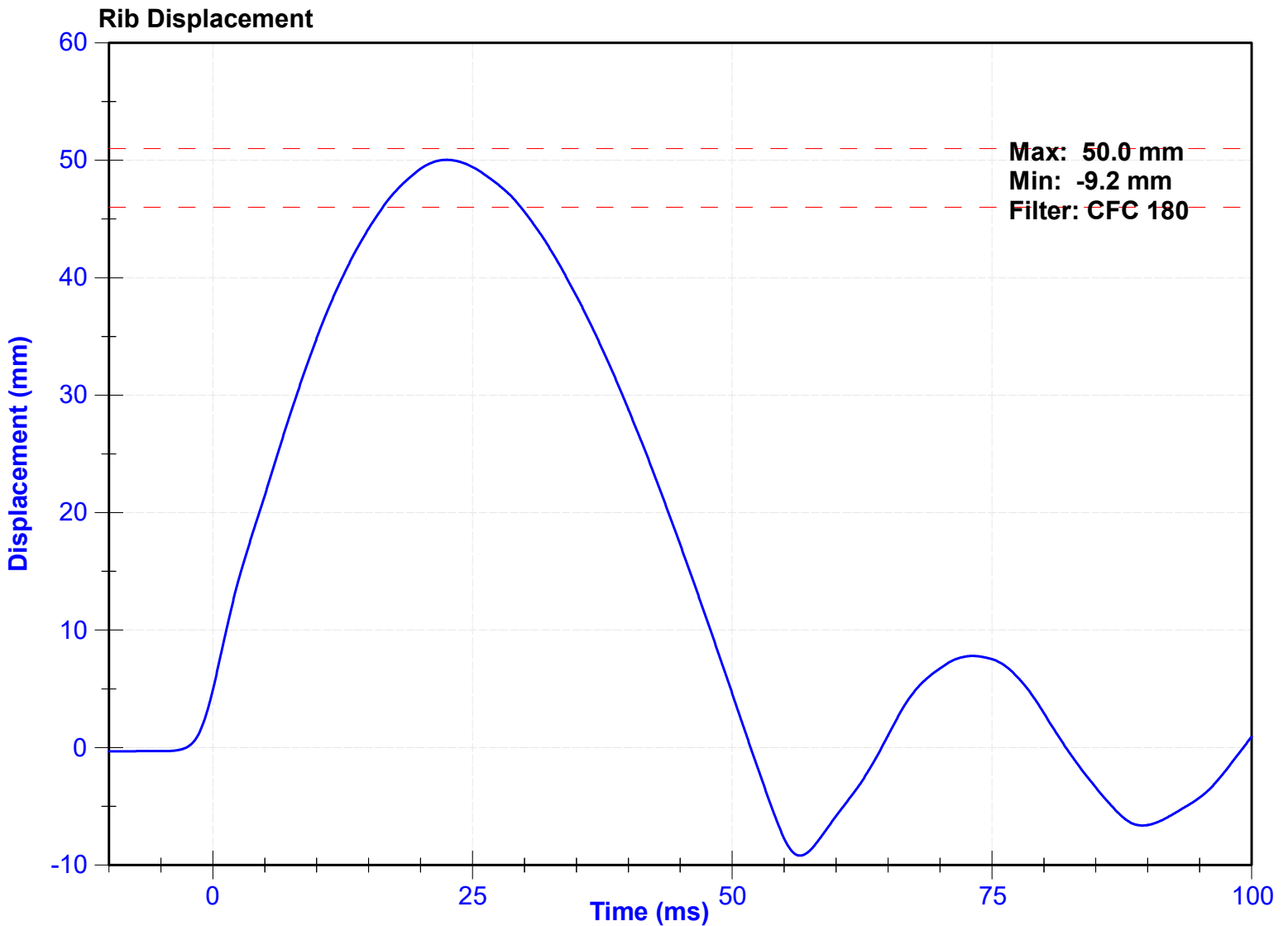
ATD Manufacturer	Denton	Test Technician	B. Kirchner
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	41.8	Pass
Rib Displacement	46	51	mm	50.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	DS-807	9/7/2022	3/8/2023



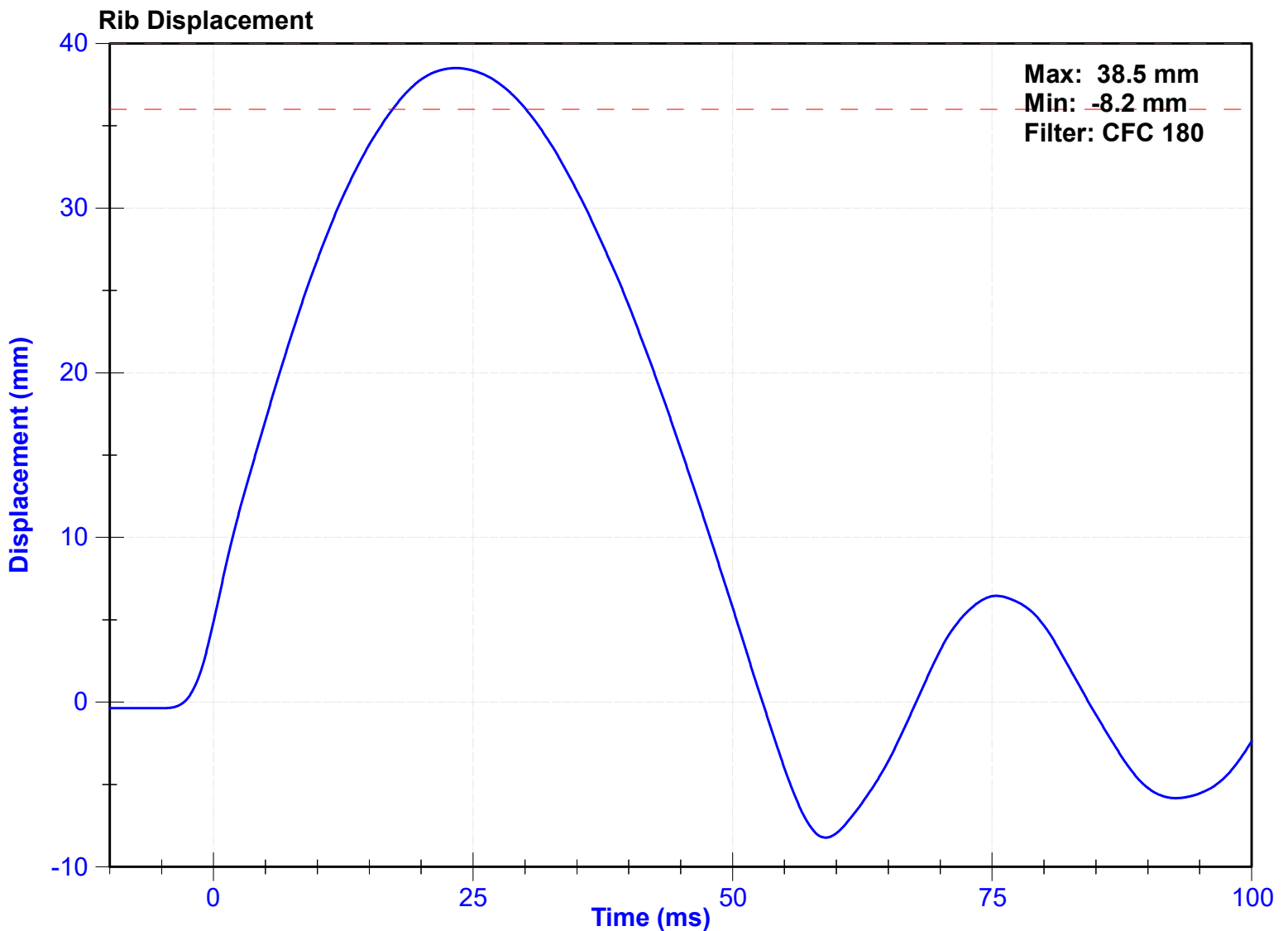
ATD Manufacturer	Denton	Test Technician	B. Kirchner
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	41.8	Pass
Rib Displacement	36	40	mm	38.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	DS-807	9/7/2022	3/8/2023



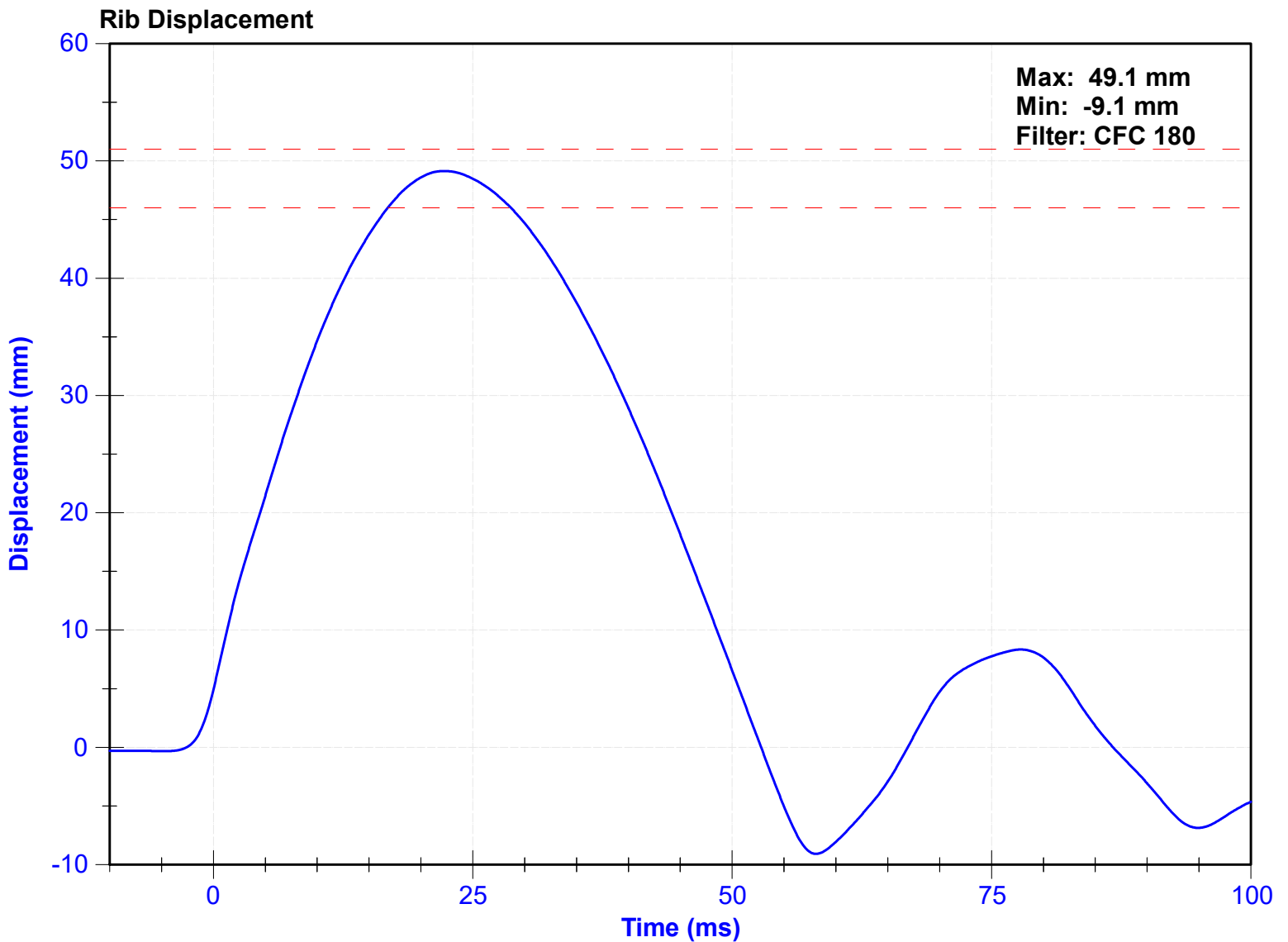
ATD Manufacturer	Denton	Test Technician	B. Kirchner
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	41.8	Pass
Rib Displacement	46	51	mm	49.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	DS-0552-03	9/7/2022	3/8/2023



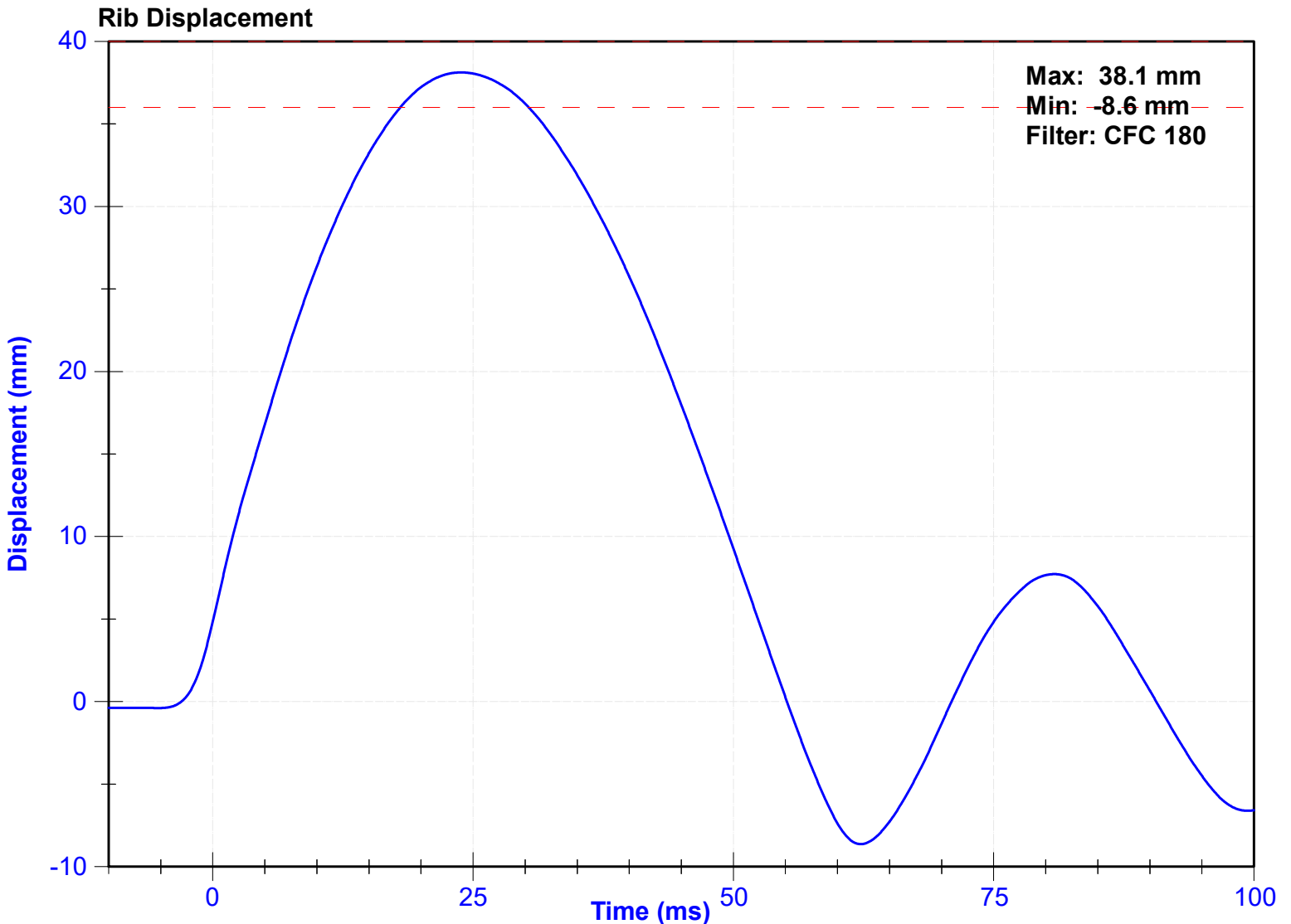
ATD Manufacturer	Denton	Test Technician	B. Kirchner
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	41.8	Pass
Rib Displacement	36	40	mm	38.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Rib Potentiometer	Honeywell	DS-0552-03	9/7/2022	3/8/2023



ATD Manufacturer	Denton	Test Technician	T.Roseman
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

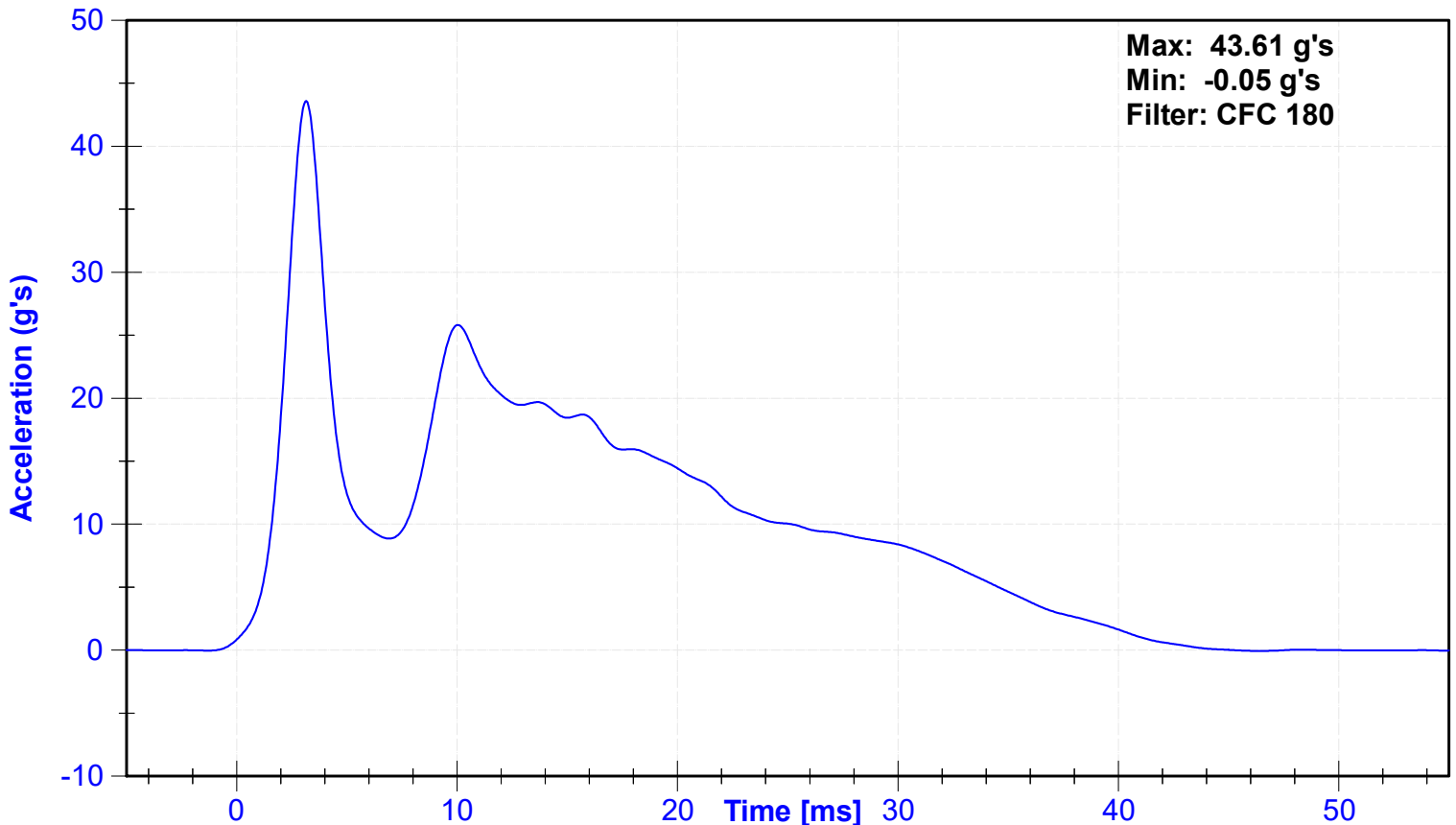
Results

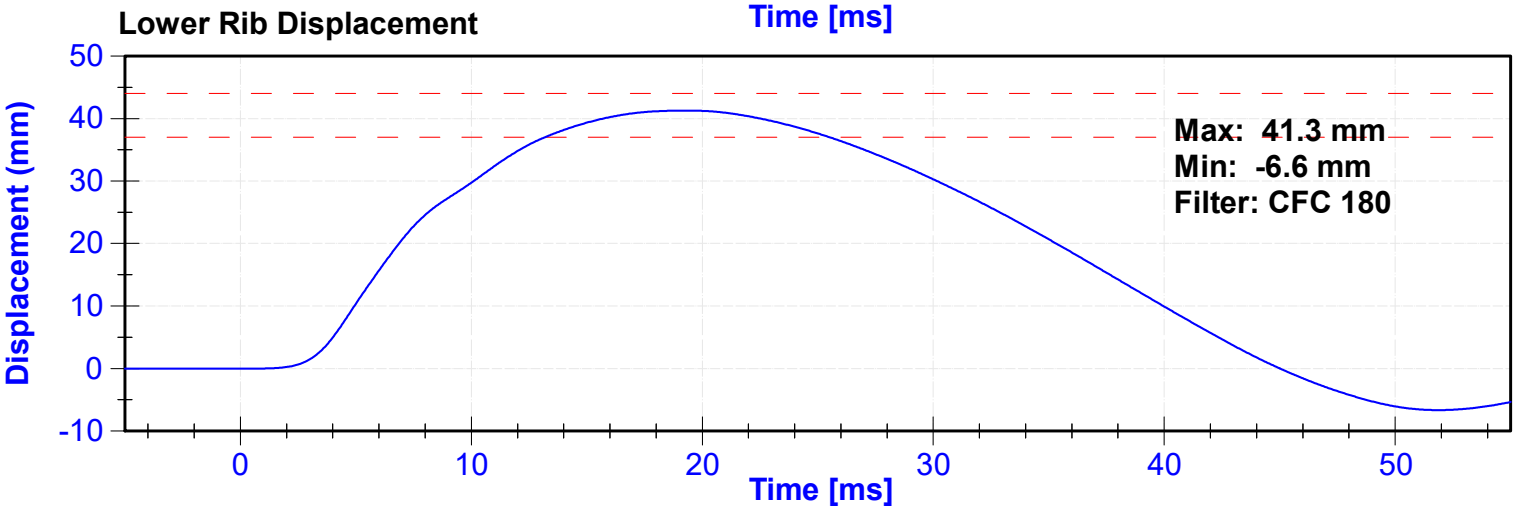
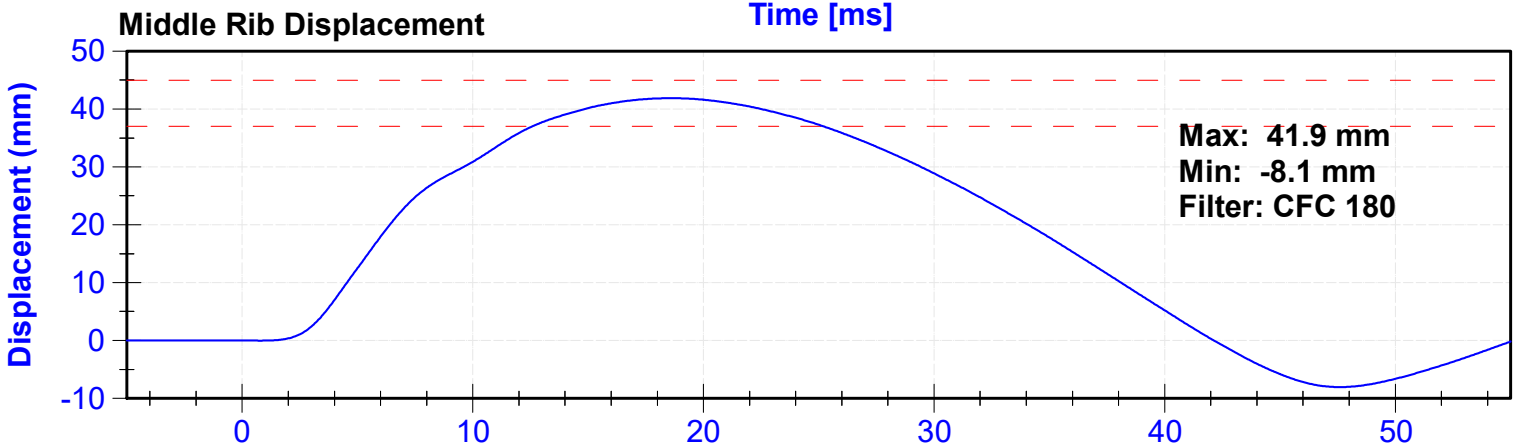
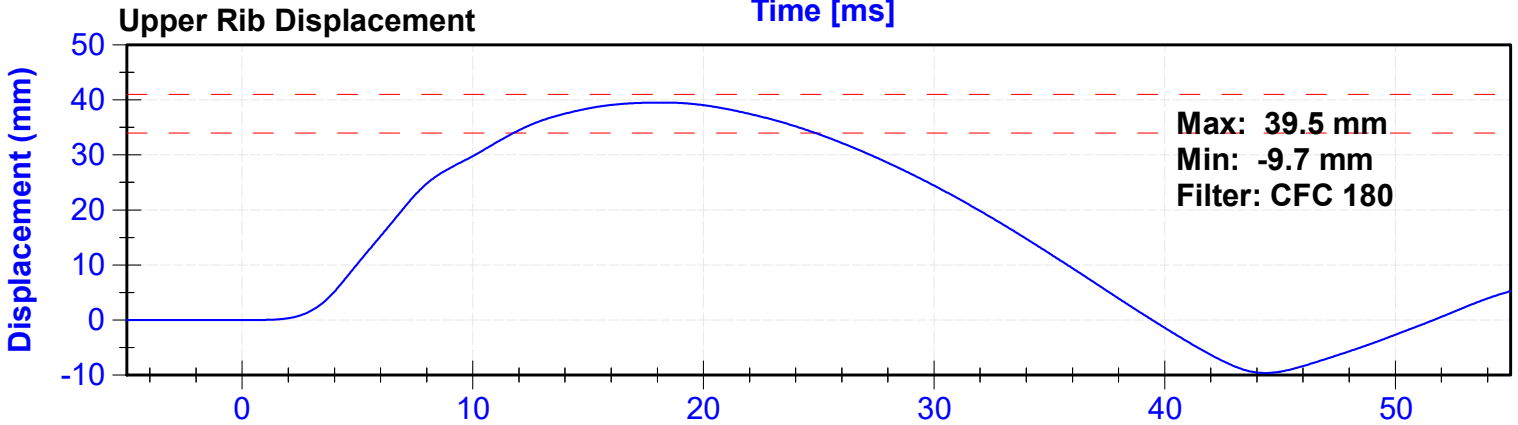
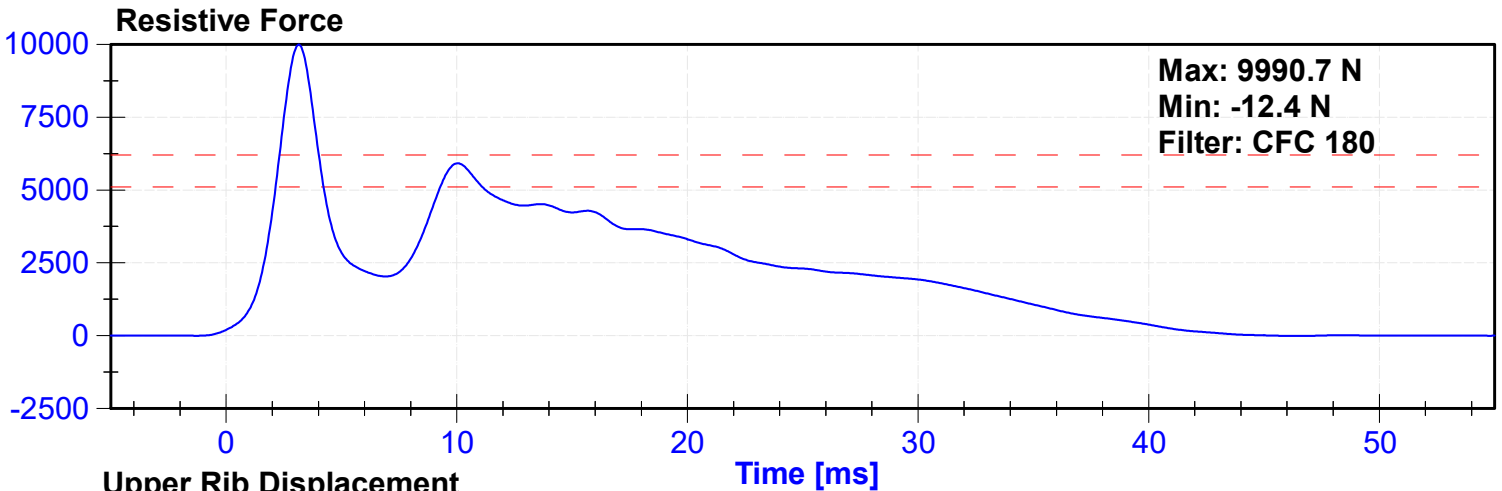
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	41.3	Pass
Velocity	5.4	5.6	m/s	5.56	Pass
Resistive Force after 6ms	5100	6200	N	5915.3	Pass
Upper Thorax Rib Deflection	34	41	mm	39.5	Pass
Mid Thorax Rib Deflection	37	45	mm	41.9	Pass
Lower Thorax Rib Deflection	37	44	mm	41.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco	T25885	10/24/2022	10/24/2023
Upper Thorax Rib Potentiometer	Honeywell	DS-0552-01	9/7/2022	3/8/2023
Middle Thorax Rib Potentiometer	Honeywell	DS-807	9/7/2022	3/8/2023
Lower Thorax Rib Potentiometer	Honeywell	DS-0552-03	9/7/2022	3/8/2023

Probe Acceleration





ATD Manufacturer	Denton	Test Technician	T. Roseman
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

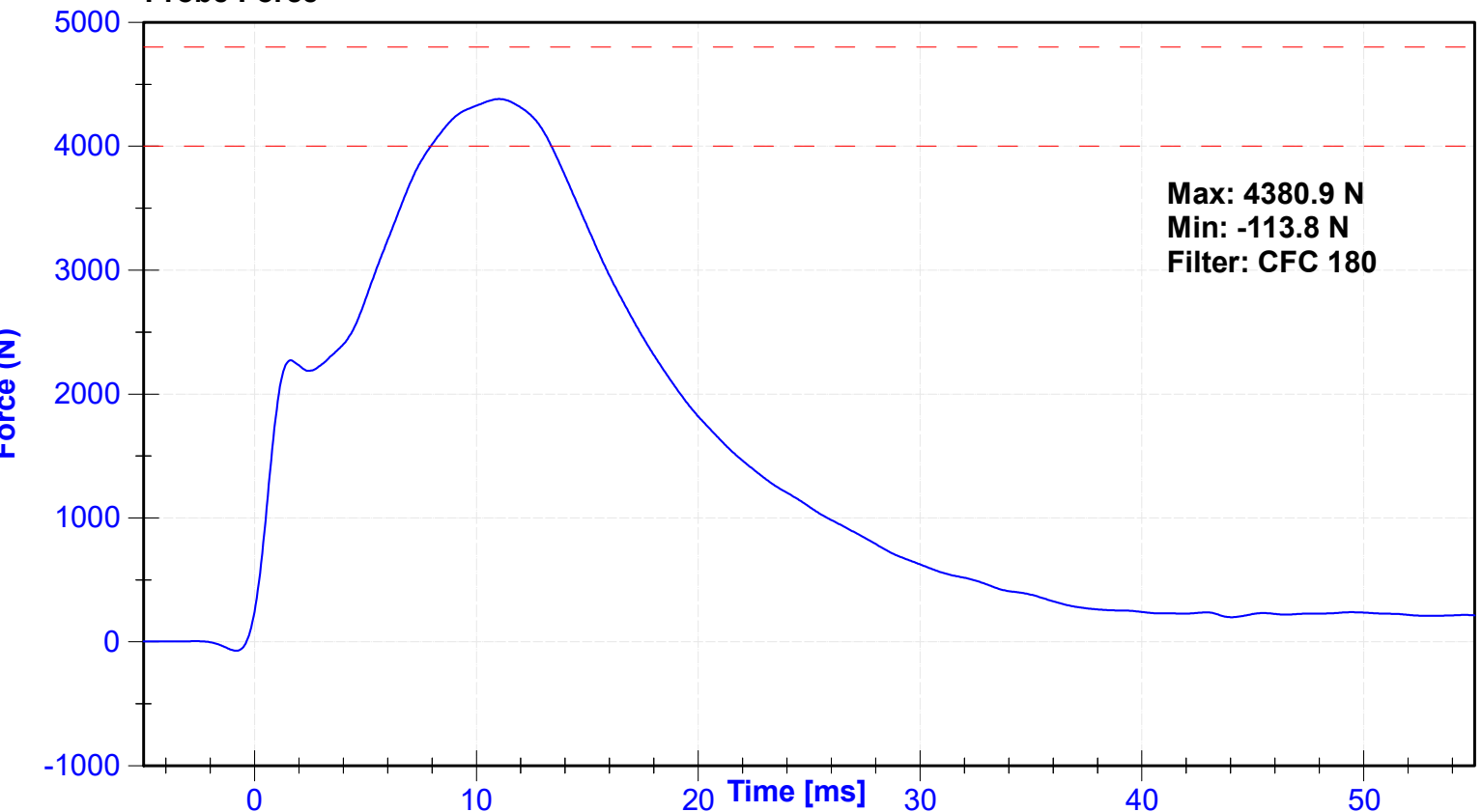
Results

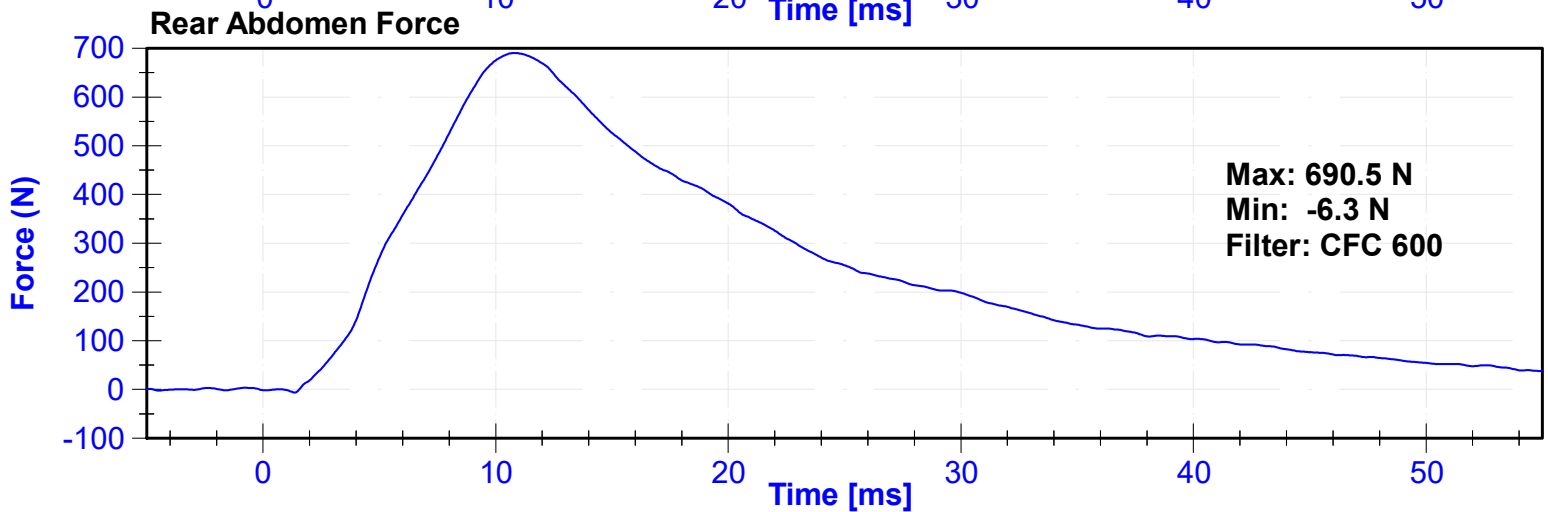
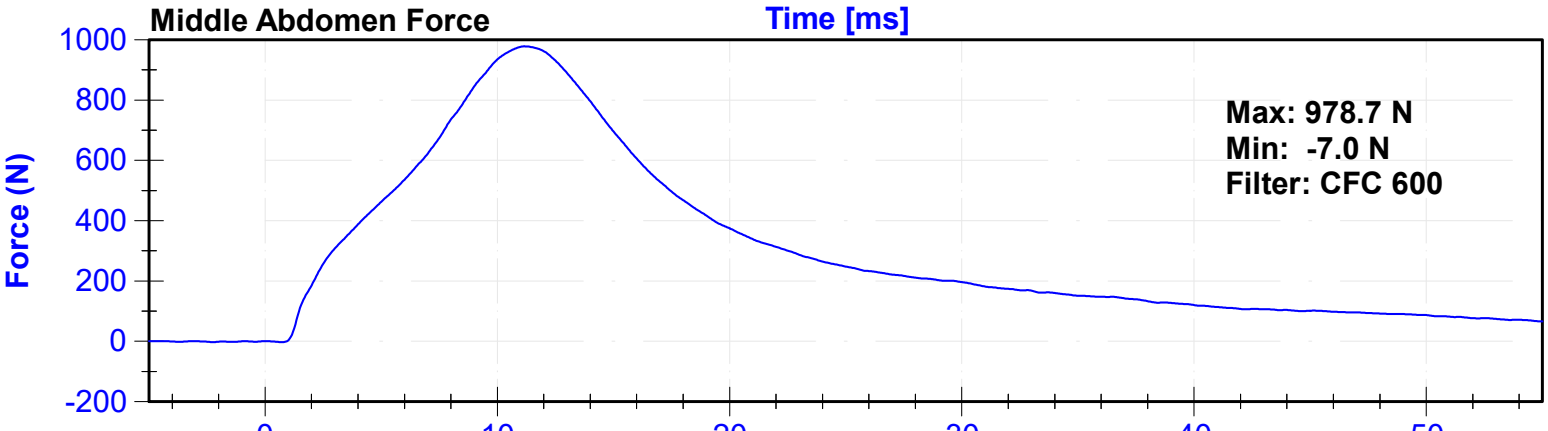
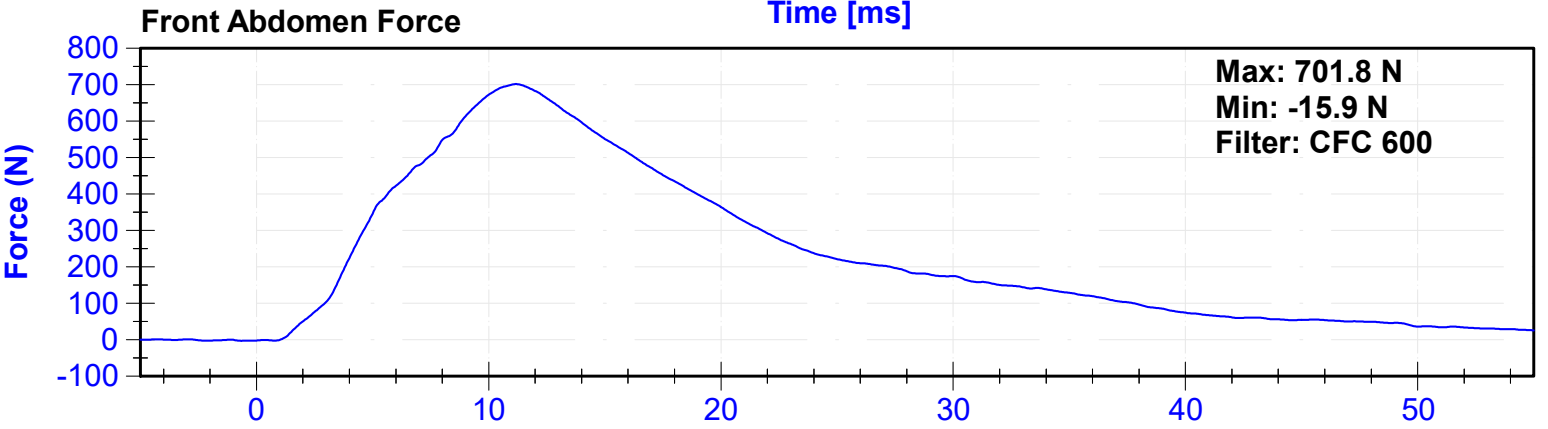
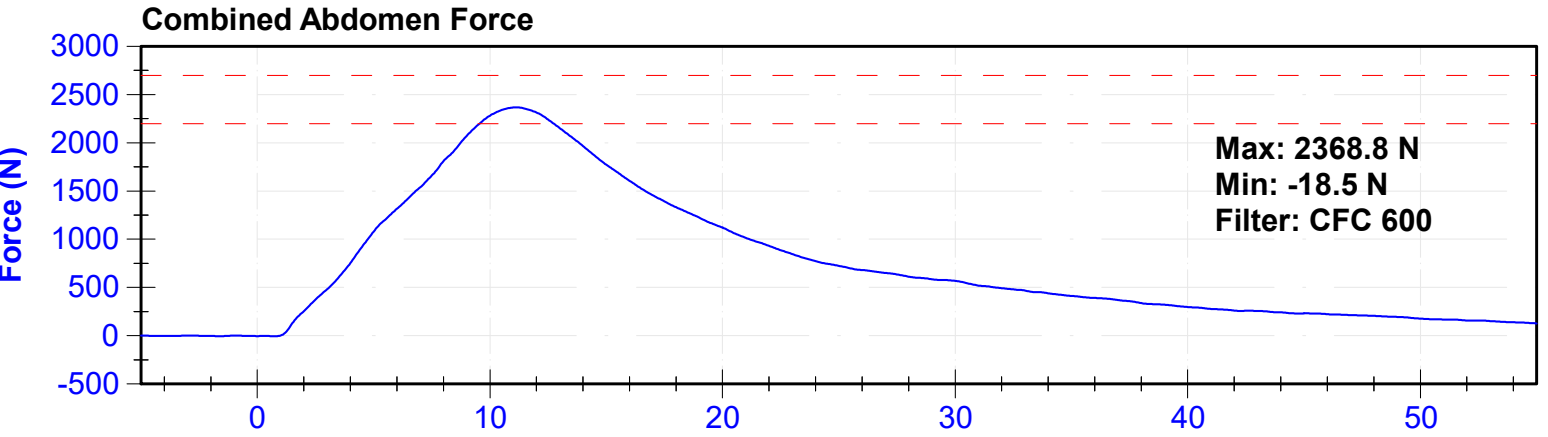
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	41.3	Pass
Velocity	3.9	4.1	m/s	4.04	Pass
Combined Abdomen Force	2200	2700	N	2368.8	Pass
Time at Peak Abdomen Force	10.0	12.3	ms	11.10	Pass
Resistive Probe Force	4000	4800	N	4380.9	Pass
Time at Peak Resistive Force	10.6	13.0	ms	11.05	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25885	10/24/2022	10/24/2023
Front Abdomen Load Cell	Denton	1440	8/12/2022	8/12/2023
Middle Abdomen Load Cell	Denton	1525	8/12/2022	8/12/2023
Rear Abdomen Load Cell	Denton	1528	8/12/2022	8/12/2023

Probe Force





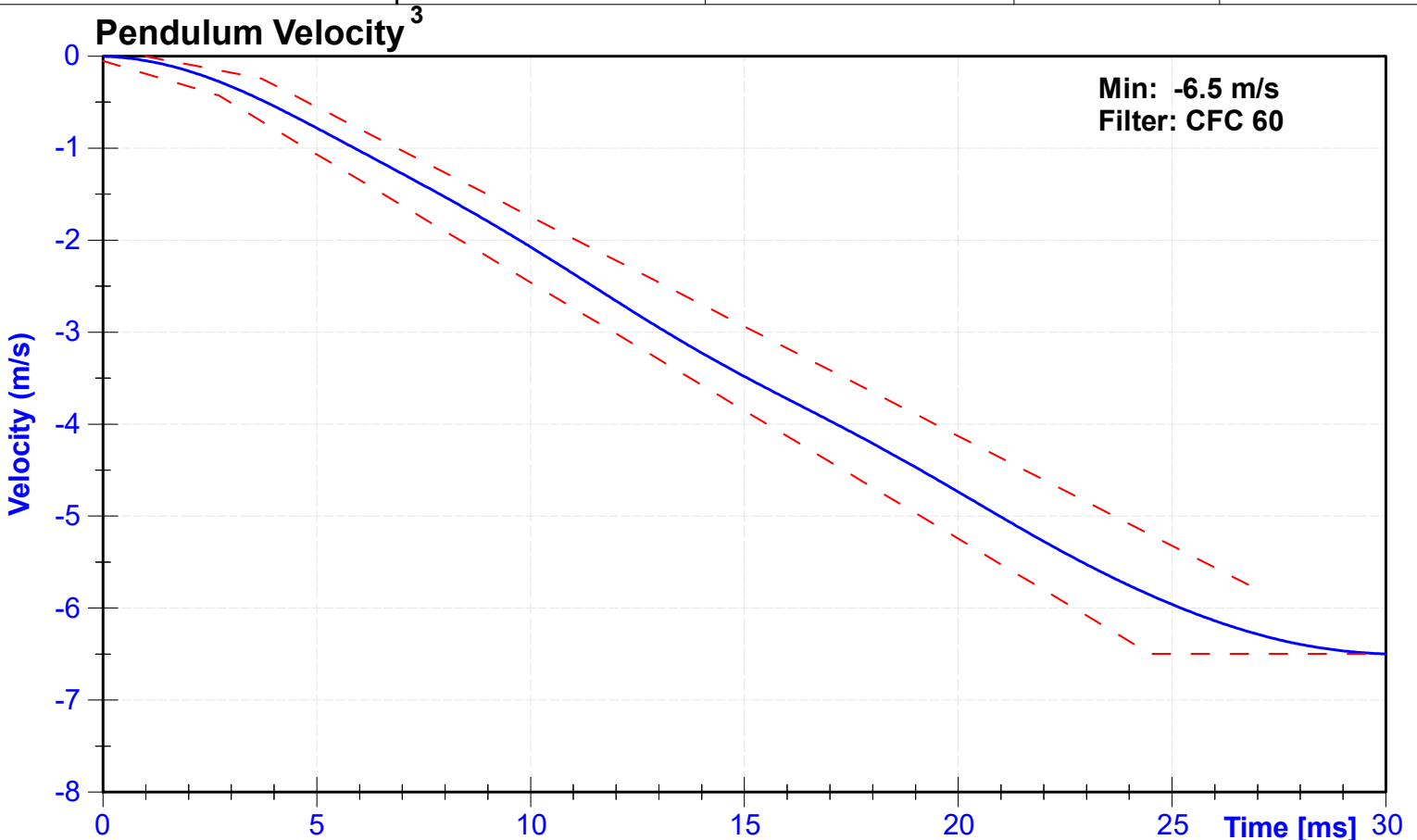
ATD Manufacturer	Denton	Test Technician	C. Mantell
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

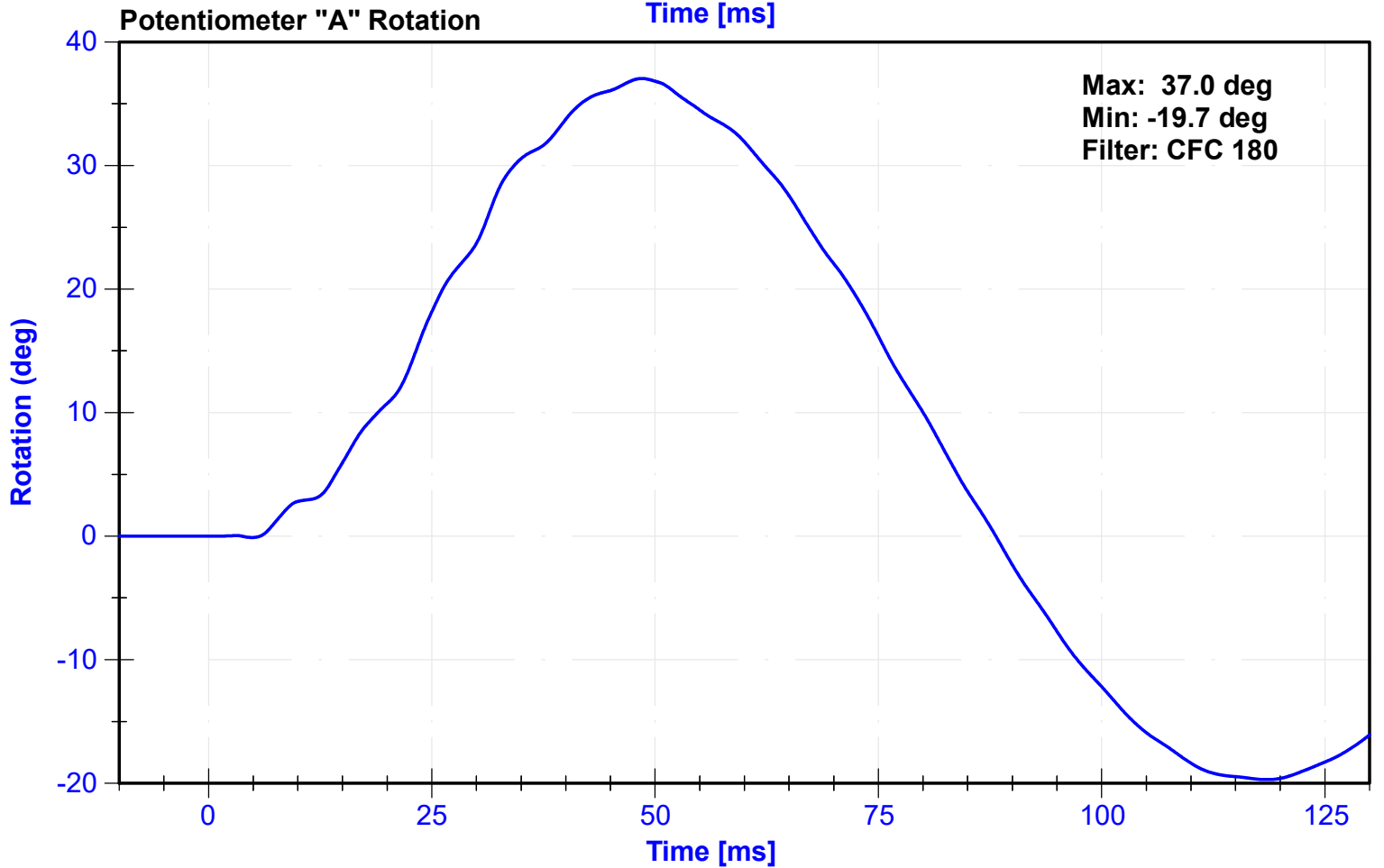
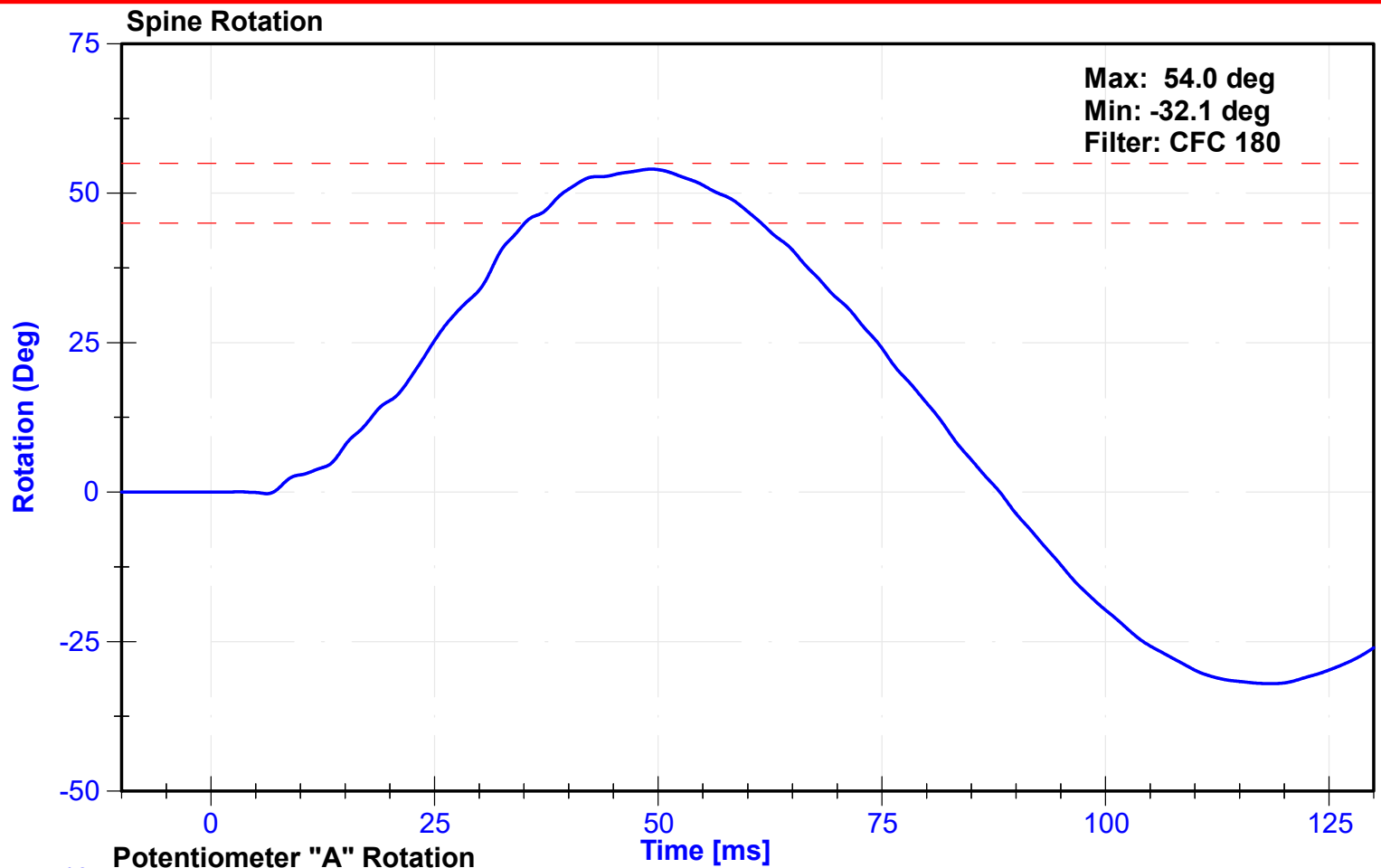
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	26.8	Pass
Velocity	5.95	6.15	m/s	6.028	Pass
Lateral Spine Rotation	45	55	deg	54.0	Pass
Time at Maximum Rotation	39	53	ms	49.2	Pass
Time of Decay to Zero Degrees	37	57	ms	39.0	Pass
Pendulum Velocity Overall Corridor	Lower Boundary ¹	Upper Boundary ²	m/s	See Plot ³	Pass

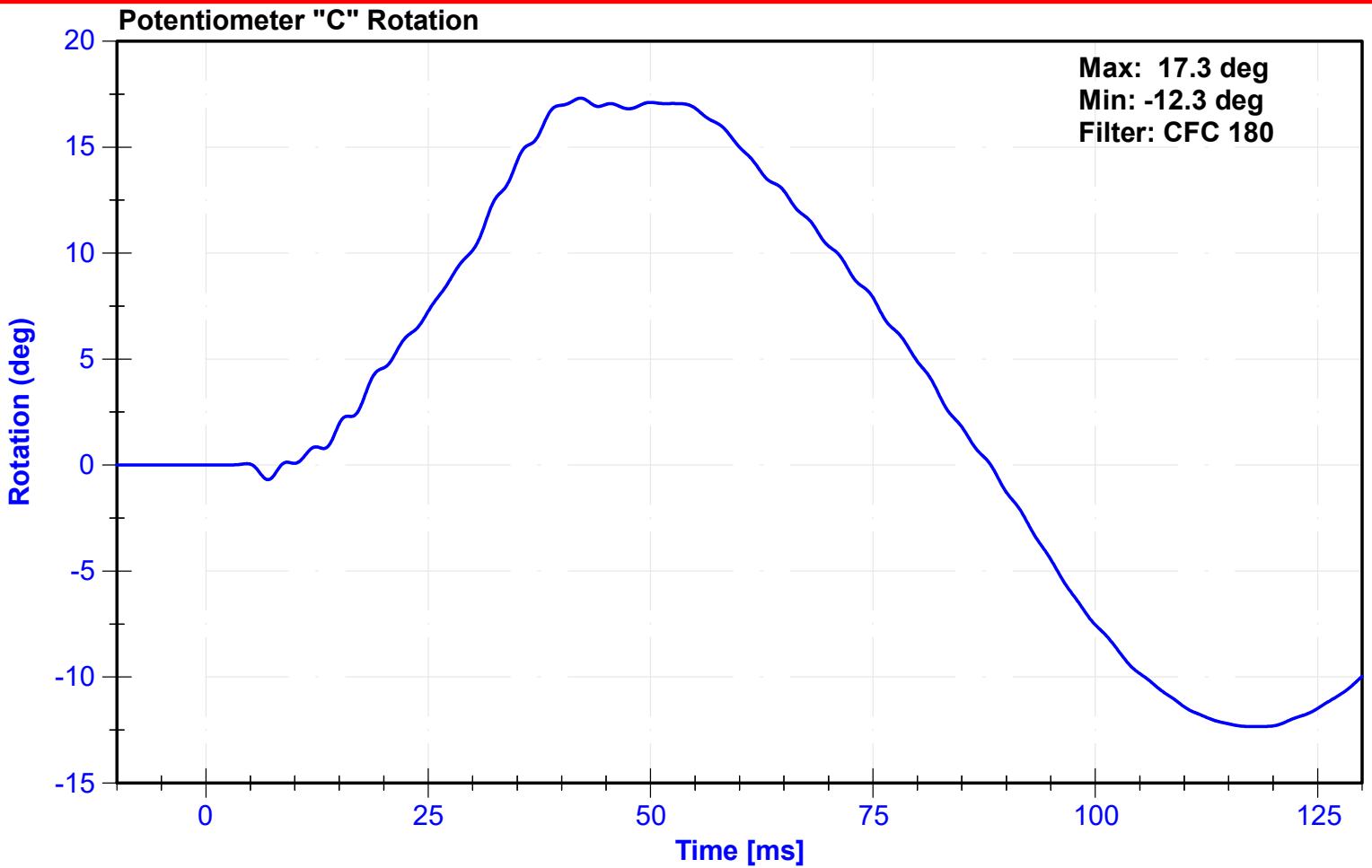
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	C16503	10/26/2022	10/26/2023
Pendulum "A" Potentiometer	Sfernice	094	10/5/2022	10/5/2023
Condyle "B" Potentiometer	Sfernice	095	10/5/2022	10/5/2023



^{1,2} Upper and lower boundaries specified in Appendix I IV-41





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

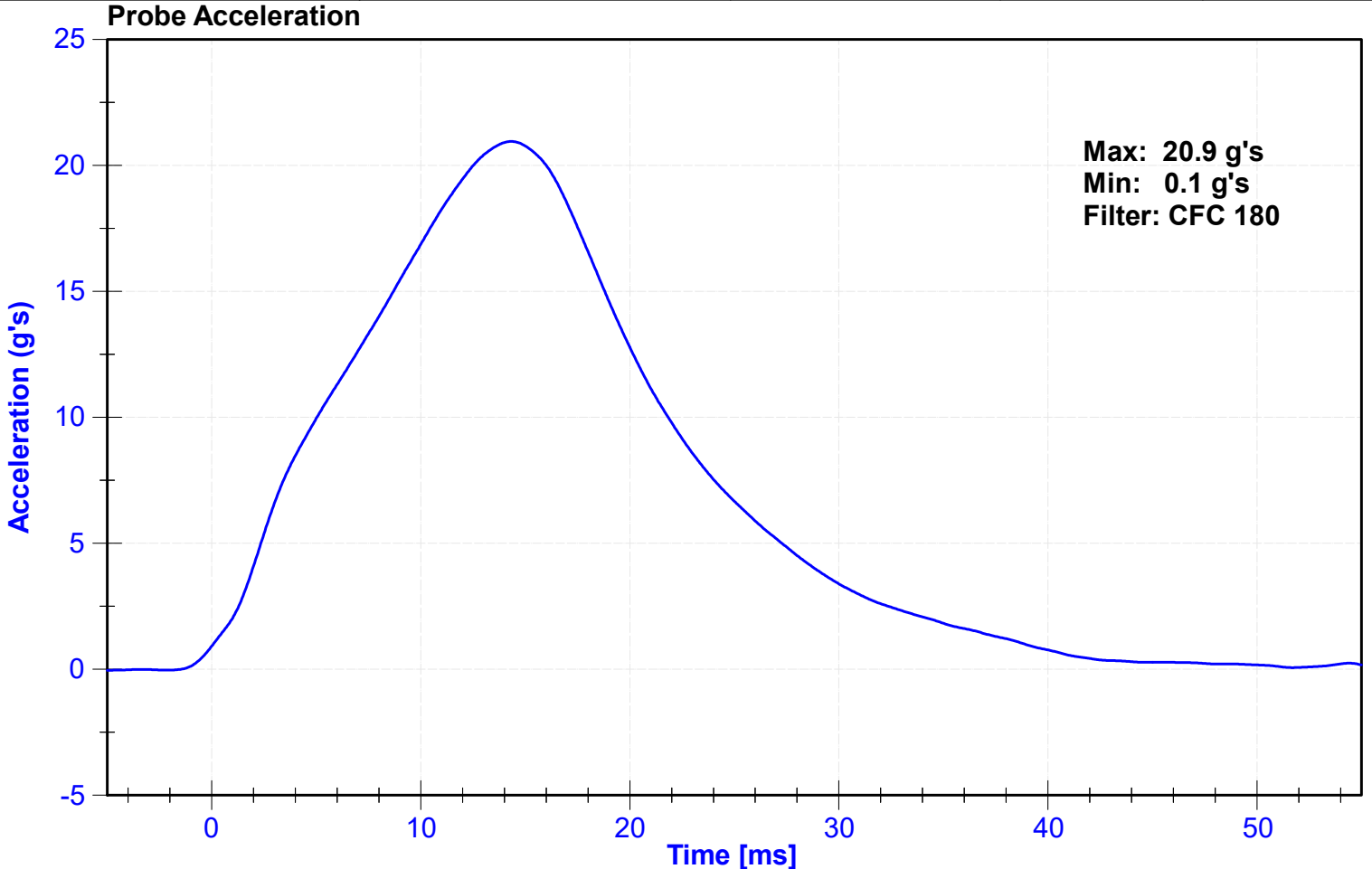
ATD Manufacturer	Denton	Test Technician	T.Roseman
ATD Serial Number	D037	Laboratory Supervisor	C. Mantell

Results

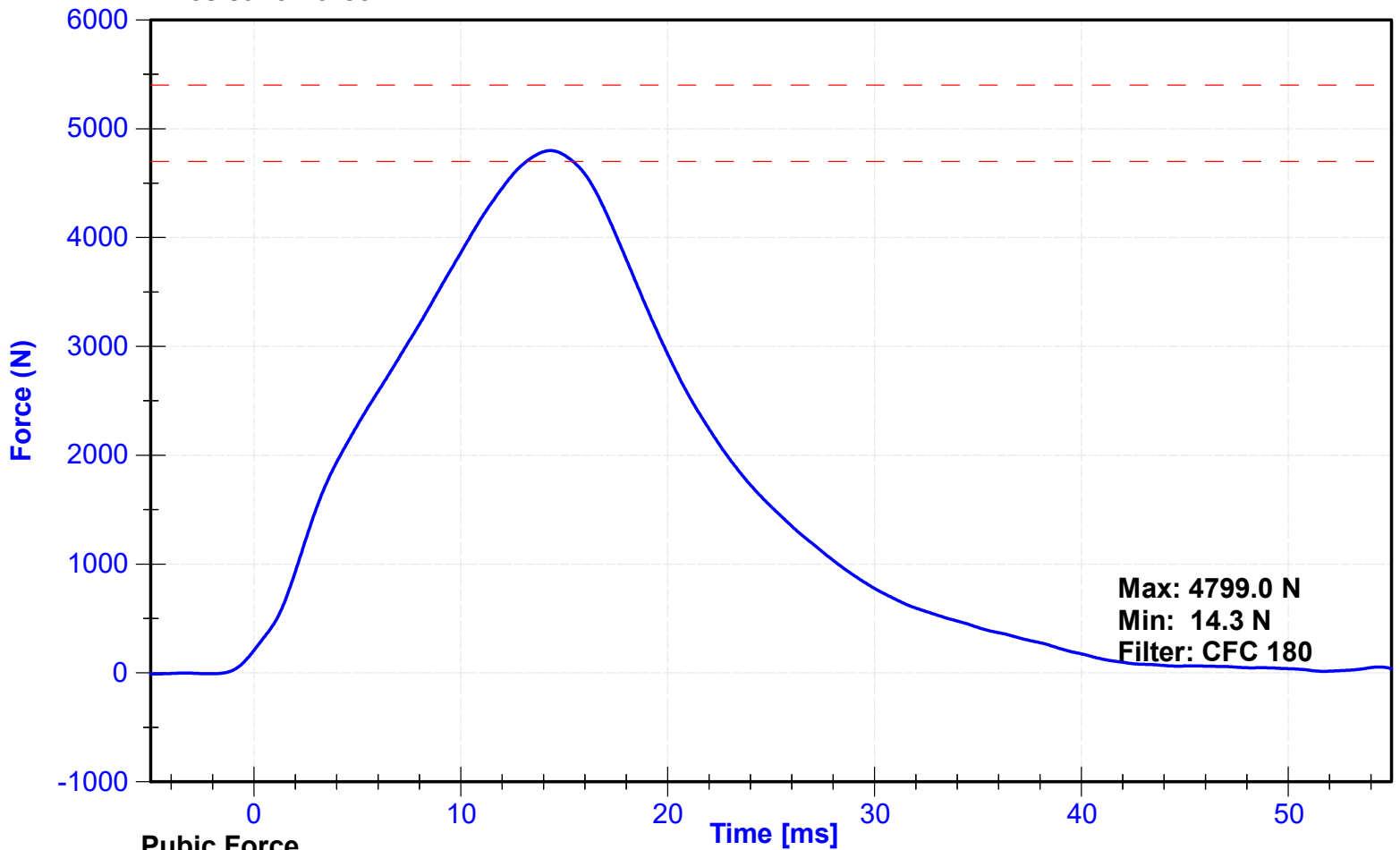
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	41.3	Pass
Velocity	4.2	4.4	m/s	4.36	Pass
Resistive Force	4700	5400	N	4799.0	Pass
Time at Peak Resistive Force	11.8	16.1	ms	14.35	Pass
Pubic Force	-1590	-1230	N	-1473.4	Pass
Time at Peak Pubic Force	12.2	17.0	ms	14.90	Pass

Transducer Calibrations

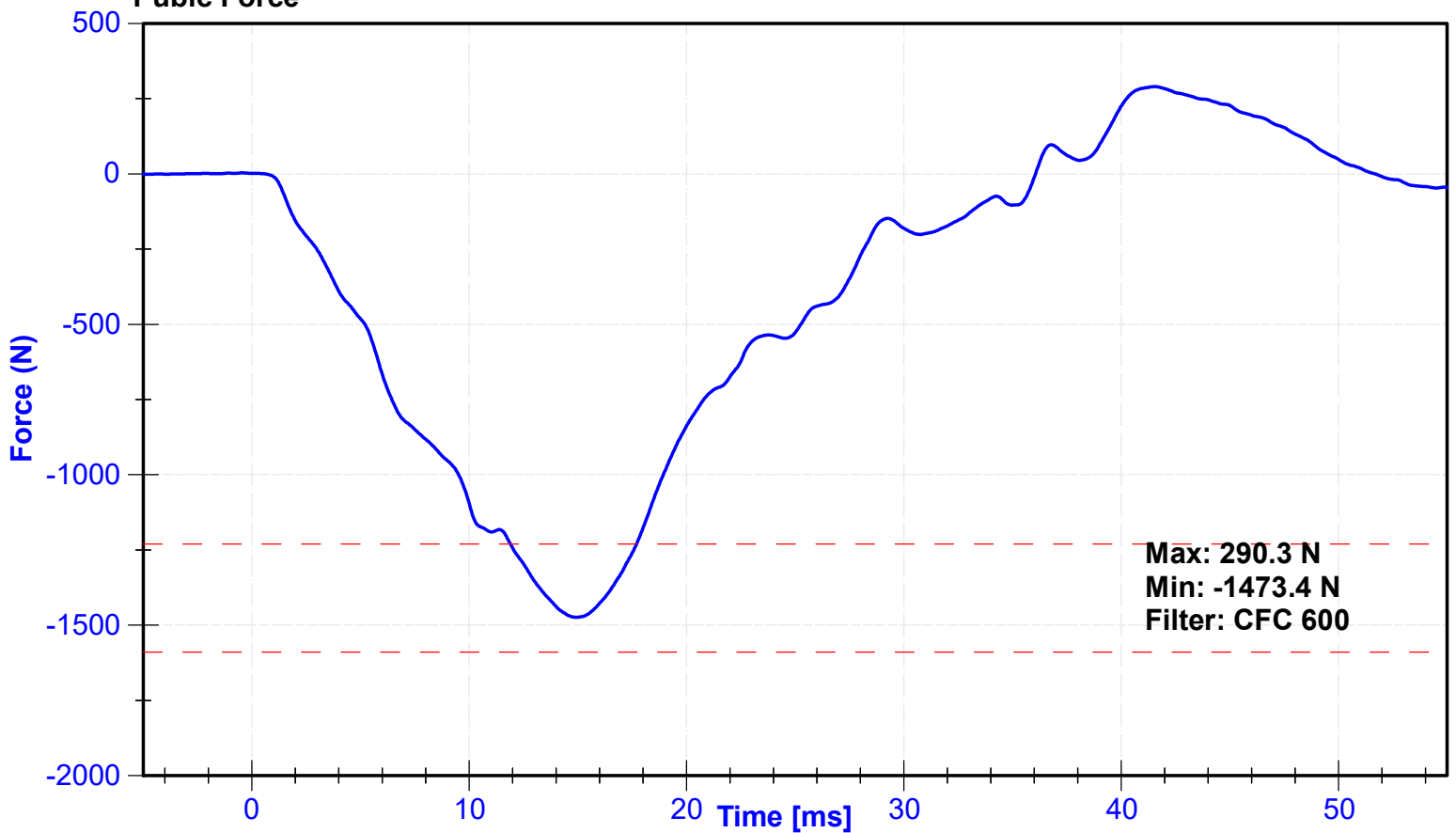
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	T25885	10/24/2022	10/24/2023
Pubic Load Cell	Denton	3096JFL-456-FY	8/12/2022	8/12/2023



Resistive Force



Pubic 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	9/6/2022
		Y	T22281	Endevco	9/6/2022
		Z	T26050	Endevco	9/9/2022
	Redundant	X	T21682	Endevco	9/6/2022
		Y	T25989	Endevco	9/9/2022
		Z	T25864	Endevco	9/6/2022
Thorax Rib Displacement Potentiometers	Upper	Y	DS-0552-01	Honeywell	9/7/2022
	Middle	Y	DS-807	Honeywell	9/7/2022
	Lower	Y	DS-0552-03	Honeywell	9/7/2022
Abdomen Load Cells	Forward	Y	1440	Denton	8/12/2022
	Middle	Y	1525	Denton	8/12/2022
	Rear	Y	1528	Denton	8/12/2022
Lower Spine Accelerometers (T12)		X	P71278	Endevco	9/6/2022
		Y	P71276	Endevco	9/6/2022
		Z	T23573	Endevco	9/6/2022
Pubic Symphysis Load Cell		Y	3096JFL-456-FY	Denton	8/12/2022

Table 2 – Vehicle Instrumentation

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	A399961	Measurement Specialties	7/12/2022
Vehicle Center of Gravity	Y	A399962	Measurement Specialties	7/12/2022
Vehicle Center of Gravity	Z	A400008	Measurement Specialties	7/12/2022
Left Floor Sill	Y	A405585	Measurement Specialties	9/20/2022
A-Pillar Sill	Y	A399946	Measurement Specialties	10/10/2022
A-Pillar Low	Y	A399972	Measurement Specialties	9/2/2022
A-Pillar Mid	Y	A398658	Measurement Specialties	10/10/2022
B-Pillar Sill	Y	A399940	Measurement Specialties	9/15/2022
B-Pillar Low	Y	A398292	Measurement Specialties	6/15/2022
B-Pillar Mid	Y	A400780	Measurement Specialties	7/19/2022
Driver Seat	Y	G22200	Endevco	9/19/2022
Engine Top	X	A374261	Measurement Specialties	7/26/2022
Engine Top	Y	A374319	Measurement Specialties	7/26/2022
Firewall	Y	G22233	Endevco	9/21/2022
Left Roof	Y	A431363	Measurement Specialties	9/14/2022
Right Floor Sill	Y	A400017	Measurement Specialties	9/16/2022
Rear Floorpan	X	A373225	Measurement Specialties	8/23/2022
Rear Floorpan	Y	A374227	Measurement Specialties	8/23/2022