

REPORT NUMBER: SPNCAP-CAL-25-001

**NEW CAR ASSESSMENT PROGRAM (NCAP)
SIDE IMPACT POLE TEST**

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

NHTSA No: M20254201

**PREPARED BY:
CALSPAN CORPORATION
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February 27, 2025

FINAL REPORT

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

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

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FINAL REPORT ACCEPTANCE BY OCWS:

Division Chief, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

COTR, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

TECHNICAL REPORT DOCUMENTATION PAGE

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15. Supplementary Notes					
16. Abstract A 32.20 km/h (20 mph), 75° oblique impact Side NCAP Test was conducted on the subject 2025 KIA K4 4 Door Sedan in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP Pole Laboratory Test Procedure for the generation of consumer information on vehicle side pole crash protection. This test was conducted at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on January 9, 2025. The impact velocity of the vehicle was 32.07 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle was 21°C. The target vehicle's maximum post-test static crush was 270 mm located at level 3. The test vehicle's occupant performance data is as follows:					
Measurement Description			Driver ATD (SID-IIs) (Serial No.DG8012)		
			Units	Threshold	Result
Head Injury Criteria (HIC36)				1000	177.793
Resultant Lower Spine Acceleration			G	82	41.797
Total Pelvic Force (sum of acetabular and iliac forces)			N	5525	3082.330
Maximum Thoracic Rib Deflection			mm	38	21.971
Maximum Abdominal Rib Deflection			mm	45*	25.055
The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.					
17. Key Words New Car Assessment Program (NCAP) Side Impact Pole Part 572V SID-IIs				18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division 1200 New Jersey Ave. Washington, D.C. 20590	
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SECTION 1

TEST PURPOSE AND PROCEDURE

This side impact test was conducted as part of the MY 2025 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. 693JJ920D000016. The purpose of this test is to generate comparative side impact performance in a 2025 KIA K4 4 Door Sedan. The side impact test was conducted in accordance with the Office of Crashworthiness Standards Side NCAP Pole Laboratory Test Procedure, dated March 2020.

SECTION 2
SUMMARY OF TEST RESULTS

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 32.07 km/h. The test was conducted by Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on January 9, 2025. Pre-test and post-test photographs of the test vehicle and side impact dummy (SID-IIs) are included in Appendix A of this report.

One Part 572U (SID-IIs) dummy was placed in the driver designated seating position according to instructions specified in the OCWS Side NCAP Pole Laboratory Test Procedure, dated March 2020. The side impact event was documented by 11 cameras. Camera locations and other pertinent camera information are included on page 3-11 in this report.

The Part 572U (SID-IIs) dummy was instrumented accordingly:

- Head CG tri-axial accelerometers
- Thorax upper, middle, and lower rib displacement potentiometers
- Abdomen upper and lower rib displacement potentiometers
- Lower spine tri-axial accelerometers
- Iliac load cell
- Acetabulum load cell

Appendix B contains the dummy response data. Dummy configuration and performance verification data can be found in Appendix C of this report. Appendix D 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 SID-IIs dummy were recorded as follows:

INJURY READINGS

Measurement Description	Driver ATD (SID-IIs)		
	Units	IARV	Result
Head Injury Criteria (HIC36)		1000	177.793
Resultant Lower Spine Acceleration	G	82	41.797
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3082.330
Maximum Thoracic Rib Deflection	mm	38	21.971
Maximum Abdominal Rib Deflection	mm	45*	25.055

*Proposed IARV

Supplemental restraint information was recorded as follows:

SUPPLEMENTAL RESTRAINT INFORMATION

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Front Airbag	Yes	No		
Knee Airbag	No	N/A		
Side Airbag 1 - Curtain	Yes	Yes	Yes	Yes
Side Airbag 2 - Torso/Pelvis Airbag	Yes	Yes	No	N/A
Side Airbag 3 - Torso Airbag	No	N/A	Yes	Yes
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Other				

GENERAL COMMENTS:

1. P1 serial number - DG8012

Data Anomalies:

- Left Middle A-Pillar Y Acceleration, Exceeded calibration range at 51.2 ms
- Left Middle B-Pillar Y Acceleration, Exceeded calibration range at 12 ms
- Left Middle A-Pillar Y Acceleration, Exceeded calibration range at 51.2 ms
- Left Middle B-Pillar Y Acceleration, Exceeded calibration range at 12 ms

SECTION 3

OCCUPANT AND VEHICLE INFORMATION

This section contains information reporting for the following Data Sheets:

Data Sheet No. 1 - General Test and Vehicle Parameter Data

Data Sheet No. 2 - Seat, Seat Belt, Steering Wheel Adjustment and Fuel Systems Data

Data Sheet No. 3 - Dummy Longitudinal Clearance Dimensions

Data Sheet No. 4 - Dummy Lateral Clearance Dimensions

Data Sheet No. 5 - Camera and Instrumentation Data

Data Sheet No. 6 - Vehicle Accelerometer Data

Data Sheet No. 7- Rigid Pole Load Cell Data

Data Sheet No. 8 - Post-Test Observations

Data Sheet No. 9 - Test Vehicle Profile Measurements

Data Sheet No. 10 - Test Vehicle Exterior Crush Measurements

Data Sheet No. 11 - Vehicle Damage Profile Distances

Data Sheet No. 12 - FMVSS No. 301 Static Rollover Results

Data Sheet No. 13 - Dummy / Vehicle Temperature and Humidity Stabilization Data

**DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2025 KIA K4 4 Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20254201
 Test Date: 01/09/2025

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20254201
Model Year	2025
Make	KIA
Model	K4
Body Style	Four Door Sedan
VIN	3KPFT4DEXSE006512
Body Color	Currant Red
Odometer Reading (km/mi)	27 mi
Engine Displacement (L)	2.0
Type / No. Cylinders	I4
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	CVT
Overdrive	Yes
Final Drive	Front Wheel Drive
Roof Rack	No
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes

Traction Control System (TCS)	Yes
Auto-Leveling System	No
Automatic Door Locks (ADL)	Yes
Power Window Auto-Reverse	No
Other Optional Feature	N/A
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso / Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	No
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head / Torso Airbag	No
Rear Pass. Torso Airbag	Yes
Rear Pass. Torso / Pelvis Airbag	No
Rear Pass. Pelvis Airbag	No
Driver Seat Belt Pretensioner	Yes
Rear Pass. Seat Belt Pretensioner	Yes
Driver Load Limiter	Yes
Rear Pass. Load Limiter	Yes
Other Safety Restraint	N/A

Does owner's manual provide instructions to turn off automatic door locks? No

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	
Designated Seating Capacity (DSC)	2	3	N/A	5	
Vehicle Capacity Weight (VCW) (kg)				385	(A)
DSC x 68.0 kg				340	(B)
Cargo Weight (RCLW) (kg)				45	(A-B)

VEHICLE SEAT TYPE

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

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

Test Vehicle: 2025 KIA K4 4 Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20254201
 Test Date: 01/09/2025

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	235	235	215	215
Tire Placard	kPa	235	235	215	215
Owner's Manual	kPa	235	235	215	215
As Tested	kPa	235	235	215	215

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Rear	Total	Total	Front	Rear	Total
Left	kg	404	275		423	307		422	316	
Right	kg	416	253		425	281		421	287	
Ratio	%	60.8	39.2		59.0	41.0		58.3	41.7	
Totals	kg	820	528	1348	848	588	1436	843	603	1446

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1348	(A)
Actual Weight of 1 P572V (SID-IIs) ATD Used	kg	50	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	45	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1443	(A+B+C)

Does the measured As Test Vehicle Weight lie within the required weight range (i.e. Calculated Test Vehicle Target Weight – 4.5 kg to – 9 kg)?

Yes No

TEST VEHICLE ATTITUDES AND CG

Measurement Description	Units	As Delivered	As Tested	Fully Loaded	Meets Rqmt***
Driver Door Sill Angle (front-to-rear)*	Deg	-0.8	-0.3	-0.2	Yes
Front Passenger Sill Angle (front-to-rear)*	Deg	-0.9	-0.9	-0.9	Yes
Front Bumper-Line Angle (left-to-right)**	Deg	-0.6	-0.6	-0.6	Yes
Rear Bumper-Line Angle (left-to-right)**	Deg	+0.25	-0.1	-0.35	Yes
Vehicle CG (Aft of Front Axle)	mm	1066	1114	1135	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	7	15	18	

* ND = Nose Down (-), NU = Nose Up (+)

** LD = Left Down (-), LU = Left Up (+)

*** The "As Tested" vehicle attitude measurements must be equal to or between the "As Delivered" and "Fully Loaded" vehicle attitude measurements. Indicate "Yes" or "No" for Meets Requirement"

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

Test Vehicle: 2025 KIA K4 4 Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20254201
 Test Date: 01/09/2025

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Trunk Carpeting	4
Spare Tire	10
Jack	3
Passenger Window	3
Ballast / Equipment Added	0

Test Height – Adjustable Suspension Setting, if Applicable	N/A
--	-----

TEST SURFACE MARKING

	Distance from 75° Impact Location Line (mm)
Fore 25 mm target	505
Aft 25 mm target	505

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

Test Vehicle: 2025 KIA K4 4 Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20254201
 Test Date: 01/09/2025

SEAT POSITIONING

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

SCRL ANGLE RANGE

Seat	SCRL(°)		
	Max	Min	Mid
Driver Seat	15.7	12.8	14.3
Front Passenger Seat	15.9	12.8	14.4
Front Center Seat			
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid-Fore / Aft	Forward-Most
Driver Seat	14.3	29	Max	-	-	-
			Mid	9	19	29
			Min	-	-	-
Front Passenger Seat	14.4	31	Max	-	-	-
			Mid	11	22	31
			Min	-	-	-
Front Center Seat*			Max			
			Mid			
			Min			
Struck Side Rear Seat	Fixed	Fixed	Max			
			Mid			
			Min			
Non-Struck Side Rear Seat	Fixed	Fixed	Max			
			Mid			
			Min			
Rear Center Seat*	Fixed	Fixed	Max			
			Mid			
			Min			

**If applicable*

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

Test Vehicle: 2025 KIA K4 4 Door Sedan
 Test Program: NCAP Side Pole Impact Test

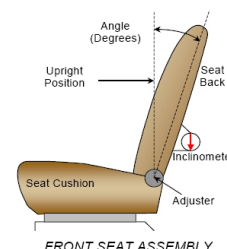
NHTSA No.: M20254201
 Test Date: 01/09/2025

SEAT FORE / AFT POSITION

Seat	Total Fore / Aft Travel		Test Position from Forward most Position	
	mm	Detents*	mm	Detents*
Driver Seat	260	41 (0-40)	0	0
Front Passenger Seat	260	41 (0-40)	0	0
Front Center Seat				
Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed	Fixed

SEAT BACK ANGLE ADJUSTMENT

The driver's seat back is positioned such that the dummy's head is level. The front center and front passenger's seat backs are positioned in a similar manner as the driver's seat back. The struck-side rear passenger seat back is positioned in accordance with the information provided by the manufacturer on Form No. 1 for the 5th percentile female dummy in a Side NCAP MDB test. The rear center and non-struck side rear passenger's seat back are set to match the struck-side rear seat back.



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detents*
Driver Seat w/Seated Dummy	60.1	30 (0-29)	-10.75	4
Front Passenger Seat	60	30 (0-29)	-10.75	4
Front Center Seat				
Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed	Fixed

SEAT BELT ANCHORAGE ADJUSTMENT

Seat belt anchorages are adjusted in accordance with the information provided by the manufacturer on Form No. 1. Zero is defined as the uppermost detent

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

HEAD RESTRAINT ADJUSTMENT

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

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

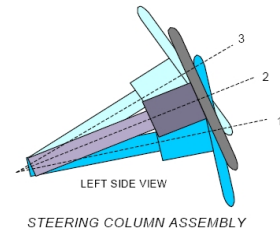
DATA SHEET NO. 2 ... (CONTINUED)
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle: 2025 KIA K4 4 Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20254201
 Test Date: 01/09/2025

STEERING COLUMN POSITIONS

Steering wheel and column adjustments are made so that the steering wheel hub is at the center of its geometric locus it describes when it moves through its full range of motion.

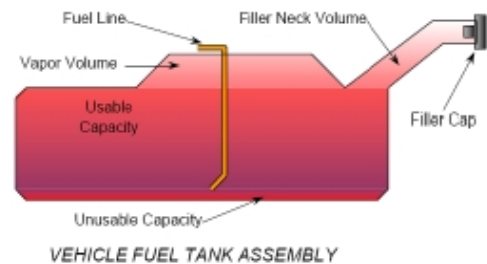


	Degrees	Fore / Aft Position (mm)
Lowermost - Position No. 1	18.6	
Geometric center - Position No. 2	21.2	
Uppermost - Position No. 3	23.7	
Telescoping Steering Wheel Travel		52
Test Position	21.2	26

FUEL PUMP

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

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



FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank" - see Form No. 1	47
Usable Capacity of "Optional Tank" - see Form No. 1	N/A
Usable Capacity of "Standard Tank" - see Owner's Manual	47
Usable Capacity of "Optional Tank" - see Owner's Manual	N/A
93% of Usable Capacity	43.7
Actual Amount of Solvent Used in Test	43.7
1/3 of Usable Capacity	15.6

Is the Actual Amount of Solvent Used in the test equal to 93% ±1% of the Usable

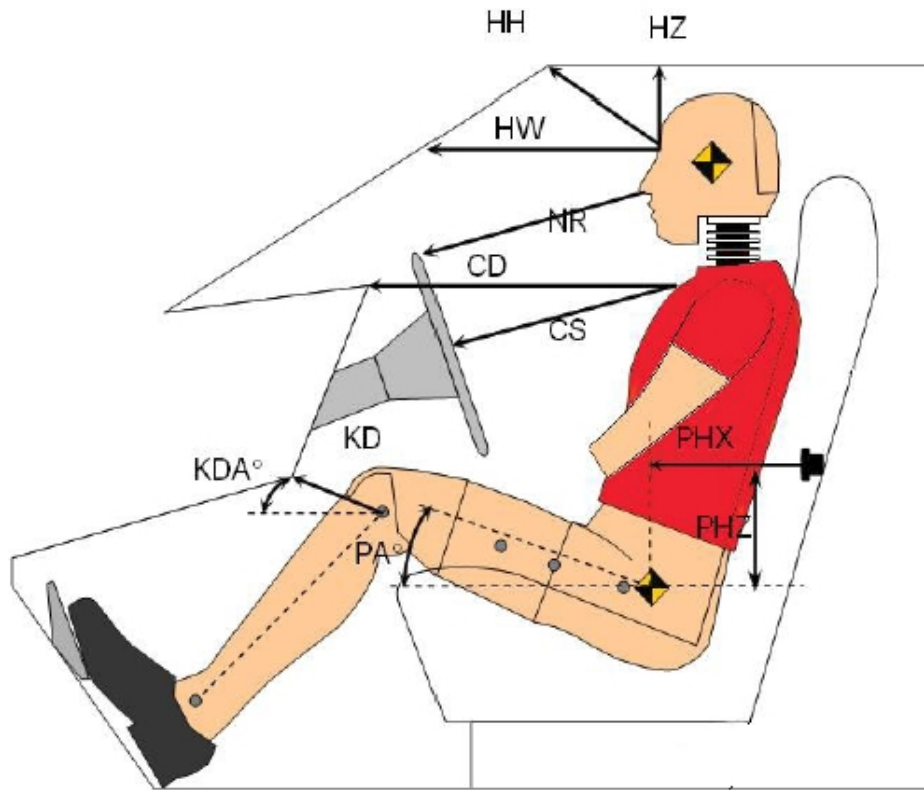
Capacity stated in Form No. 1?

Yes No

**DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS**

Test Vehicle: 2025 KIA K4 4 Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20254201
 Test Date: 01/09/2025



Left Side View

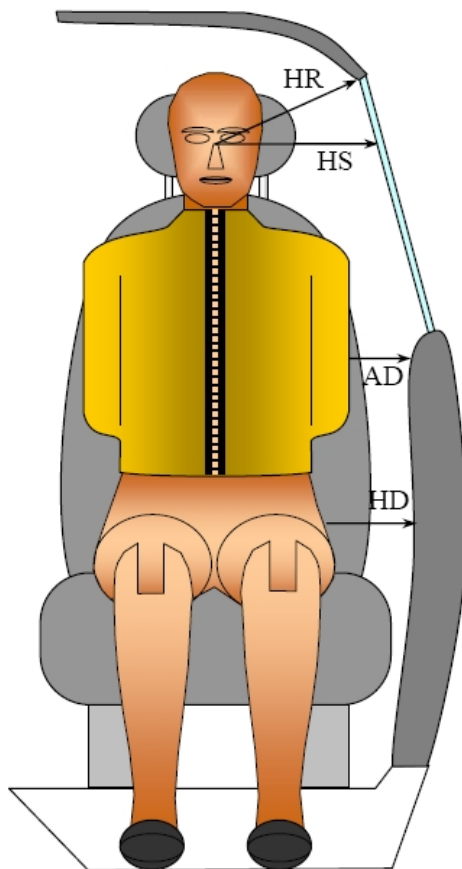
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Description	Driver (Serial No. DG8012)	
		Length (mm)	Angle (°)
HH	Head to Header	275	
HW	Head to Windshield	612	
HZ	Head to Roof Liner	196	
NR	Nose to Rim	254	
CD	Chest to Dash	475	
CS	Chest to Steering Wheel	212	
KD(L) / KDA(L)°	Left Knee to Dash	160	36.0
KD(R) / KDA(R)°	Right Knee to Dash	155	38.1
PAX°	Pelvic Tilt Angle (X-Axis)		20.5
PAY°	Pelvic Tilt Angle (Y-Axis)		0.2
PHX	Hip Point to Striker (X-Axis)	322	
PHZ	Hip Point to Striker (Z-Axis)	244	

**DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS**

Test Vehicle: 2025 KIA K4 4 Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20254201
 Test Date: 01/09/2025



FRONT VIEW OF DUMMY

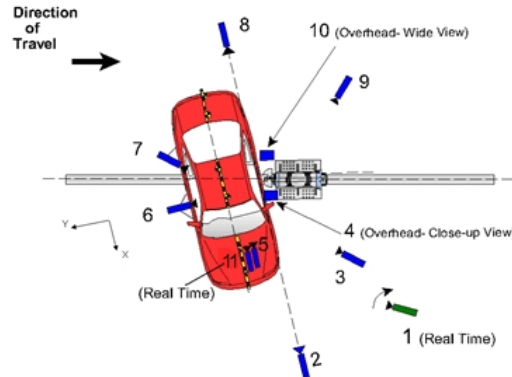
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver – Length (Serial No. DG8012)
HR	Head to Side Header	mm	248
HS	Head to Side Window	mm	377
AD	Arm to Door	mm	183
HD	H-Point to Door	mm	166

**DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA**

Test Vehicle: 2025 KIA K4 4 Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20254201
 Test Date: 01/09/2025



CAMERA LOCATIONS AND DATA

No.	Camera View	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-time (24 - 30 fps) pan view of impact				Zoom	30
2	Front ground level - impact view	7762	0	-1498	28	1000
3	Impact side 45° - forward pole view	5042	-734	-1413	24	1000
4	Overhead Close-up view of impact	0	0	-9375	28	1000
5	Onboard - dummy front view				25	1000
6	Onboard - dummy side view				12.5	1000
7	Onboard - dummy rear oblique view				12.5	1000
8	Rear ground level - impact view	-8901	0	-1482	28	1000
9	Impact side 45° - rearward pole view	-3921	-4100	-1536	24	1000
10	Overhead wide - view of impact	0	0	-9375	12.5	1000
11	Real-time (24 - 30 fps) - dummy front view				Zoom	30

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.

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

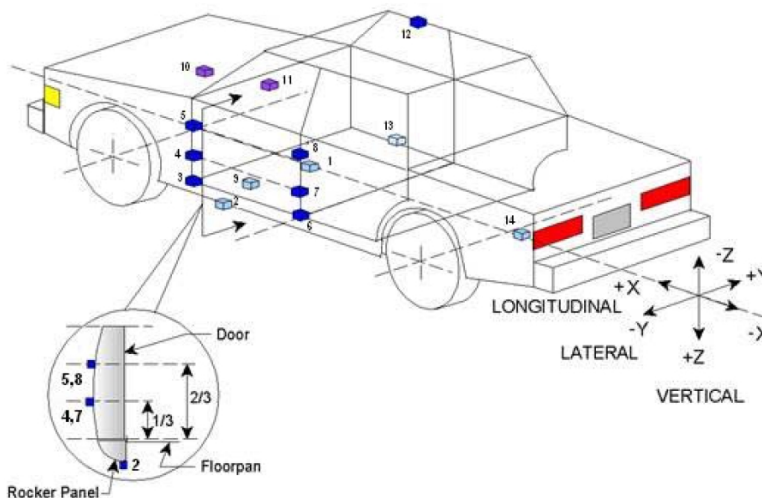
INSTRUMENTATION

Description	Number of Channels
Driver Dummy Channels	16
Vehicle Structure Accelerometers	18
Pole Load Cells	8
Total	42

**DATA SHEET NO. 6
TEST VEHICLE ACCELEROMETER LOCATIONS**

Test Vehicle: 2025 KIA K4 4 Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20254201
 Test Date: 01/09/2025



TEST VEHICLE ACCELEROMETER LOCATIONS

No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2750	-23	37
2	Left Floor Sill	2991	-667	313
3	A-Pillar Sill	3319	-631	309
4	A-Pillar Low	3401	-629	140
5	A-Pillar Mid	3207	-665	-352
6	B-Pillar Sill	2276	-675	261
7	B-Pillar Low	2271	-675	59
8	B-Pillar Mid	2213	-658	-342
9	Driver Seat Track	2408	-551	349
10	Engine Top	4022	193	-193
11	Firewall	3589	-37	-99
12	Right Roof	2174	590	-778
13	Right Floor Sill	2936	669	304
14	Rear Floor Pan	326	-47	321

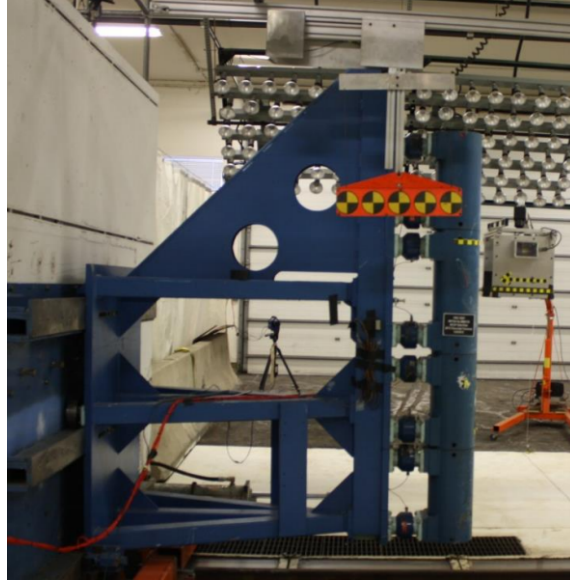
Reference: X – Rear surface of vehicle (+ forward)
 Y – Vehicle centerline (+ to right)
 Z – Ground plane (+ down)

**DATA SHEET NO. 7
RIGID POLE LOAD CELL DATA**

Test Vehicle: 2025 KIA K4 4 Door Sedan
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20254201
Test Date: 01/09/2025

POLE BARRIER



RIGID POLE LOAD CELL LOCATION

ID	Units	Height From Ground
1	mm	200
2	mm	590
3	mm	750
4	mm	1075
5	mm	1260
6	mm	1740
7	mm	1920
8	mm	2300

**DATA SHEET NO. 8
POST-TEST OBSERVATIONS**

Test Vehicle: 2025 KIA K4 4 Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20254201
 Test Date: 01/09/2025

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Driver Seat Dummy (SID-IIs)
Face	Torso/Pelvis Airbag
Top of Head	Curtain Airbag
Left Side of Head	Curtain Airbag & Torso/Pelvis Airbag
Back of Head	Curtain Airbag & Head Restraint
Left Shoulder	Seatback & Torso/Pelvis Airbag
Upper Torso	Seatback & Torso/Pelvis Airbag
Lower Torso	Seatback & Torso/Pelvis Airbag
Left Hip	Seat pan & Torso/Pelvis Airbag
Left Knee	Door Panel

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	N/A	No	N/A
Seat Disengagement from Floor Pan	No	No	No	No
Seat Back Movement from Initial Position	No	No	No	No
Seat Back Collapse	No	No	No	No

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

Test Vehicle: 2025 KIA K4 4 Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20254201
 Test Date: 01/09/2025

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	A-Pillar & B-Pillar Buckled
Sill Separation	260 mm Rear of Impact Line
Windshield Damage	Cracked throughout, delaminated 3/4 along bottom and all of left A-Pillar
Side Window Damage	Driver window shattered
Other Notable Effects	Trunk opened upon impact

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Driver		Struck Side Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Front Airbag	Yes	No		
Knee Airbag	No	N/A		
Side Airbag 1 - Curtain	Yes	Yes	Yes	Yes
Side Airbag 2 - Torso/Pelvis Airbag	Yes	Yes	No	N/A
Side Airbag 3 - Torso Airbag	No	N/A	Yes	Yes
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Other				

VEHICLE SPEED, VEHICLE ANGLE AT IMPACT AND IMPACT POINT LOCATION DATA

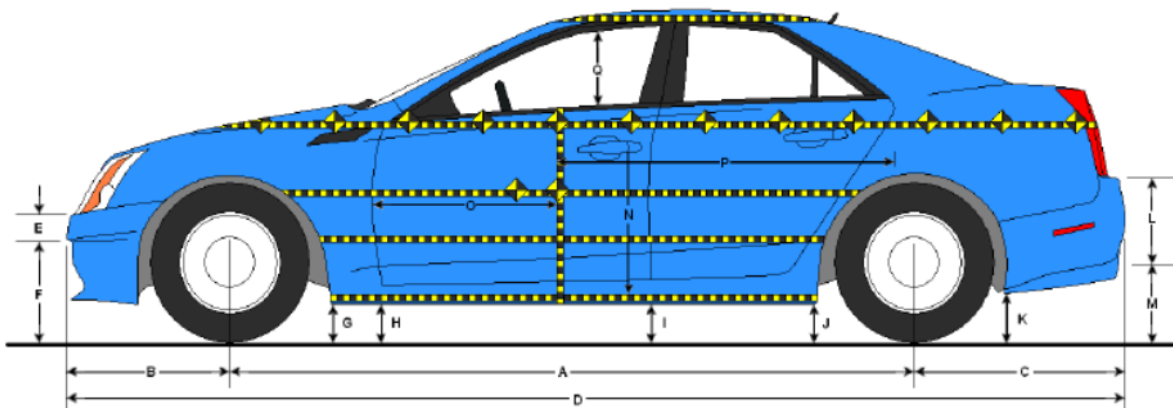
Measured Parameter	Units	Tolerance	Value
Vertical Impact Ref Line - Aft of Front Axle, Intended Impact Pt	mm		1111
Actual Impact Point - Aft of Front Axle	mm		1115
Horizontal Offset (+ forward / - rearward)	mm	+/- 38*	-4
Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion	deg	75 +/- 3	75
Trap No. 1 Velocity - Primary	kph	31.4 to 33.0	32.07
Trap No. 2 Velocity - Redundant	kph	31.4 to 33.0	32.05

*Of Intended Impact Point

DATA SHEET NO. 9
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2025 KIA K4 4 Door Sedan
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20254201
Test Date: 01/09/2025



LEFT SIDE VIEW

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

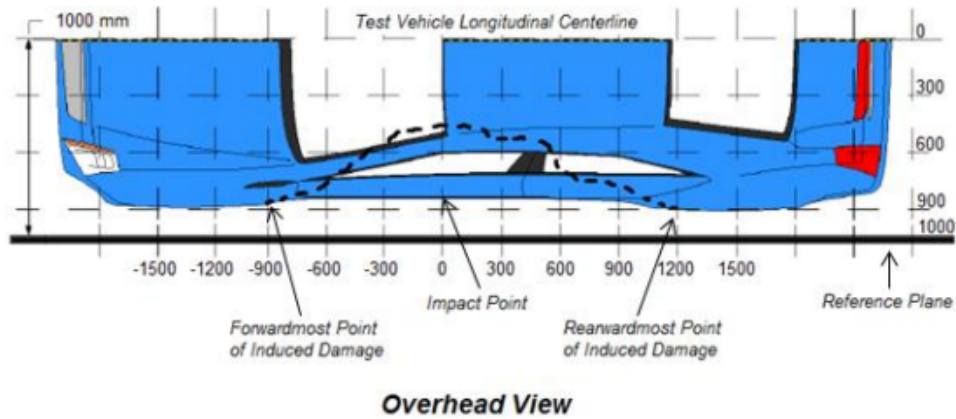
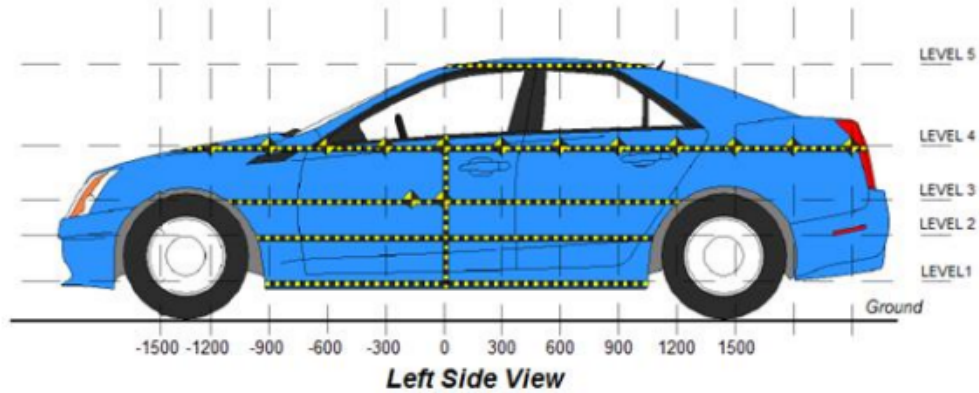
No.	Measurement Description	Pre-Test	Post-Test	Change
A	Vehicle Wheelbase	2722	2694	-28
B	Front Axle to FSOV	899	914	15
C	Rear Axle to RSOV	1093	1096	3
D	Total Length at Centerline	4713	4704	-9
E	Front Bumper Thickness	100	100	0
F	Front Bumper Bottom to Ground	394	397	3
G	Sill Height at Front Wheel Well	160	148	-12
H	Sill Height at Front Door Leading Edge	161	146	-15
I	Sill Height at B Pillar	175	161	-14
J1	Sill Height at Rear Wheel Well	186	207	21
J2	Pinch Weld Height at Rear Wheel Well	159	185	26
K	Sill Height Aft of Rear Wheel Well	213	223	10
L	Rear Bumper Thickness	210	210	0
M	Rear Bumper Bottom to Ground	395	401	6
N	Sill Height to Bottom of Front Window Sill	777	788	11
O	Front Door Leading Edge to Impact CL	639	585	-54
P	Rear Door Trailing Edge to Impact CL	1558	1519	-39
Q	Front Window Opening	308	308	0
R	Right Side Length	4646	4647	1
S	Left Side Length	4646	4617	-29
T	Vehicle Width at B-Pillars	1814	1750	-64
U	Front Wheel Track width	1585	1592	7
V	Rear Wheel Track Width	1590	1593	3

* All measurements in mm with tolerance of ± 3 mm

**DATA SHEET NO.10
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2025 KIA K4 4 Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20254201
 Test Date: 01/09/2025



MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	316	228	0
2	Driver H-Point	mm	492	252	0
3	Mid-Door	mm	612	270	0
4	Window Sill	mm	897	225	0
5	Window Top	mm	1347	50	150

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

**DATA SHEET NO.10 ... (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2025 KIA K4 4 Door Sedan
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20254201
Test Date: 01/09/2025

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

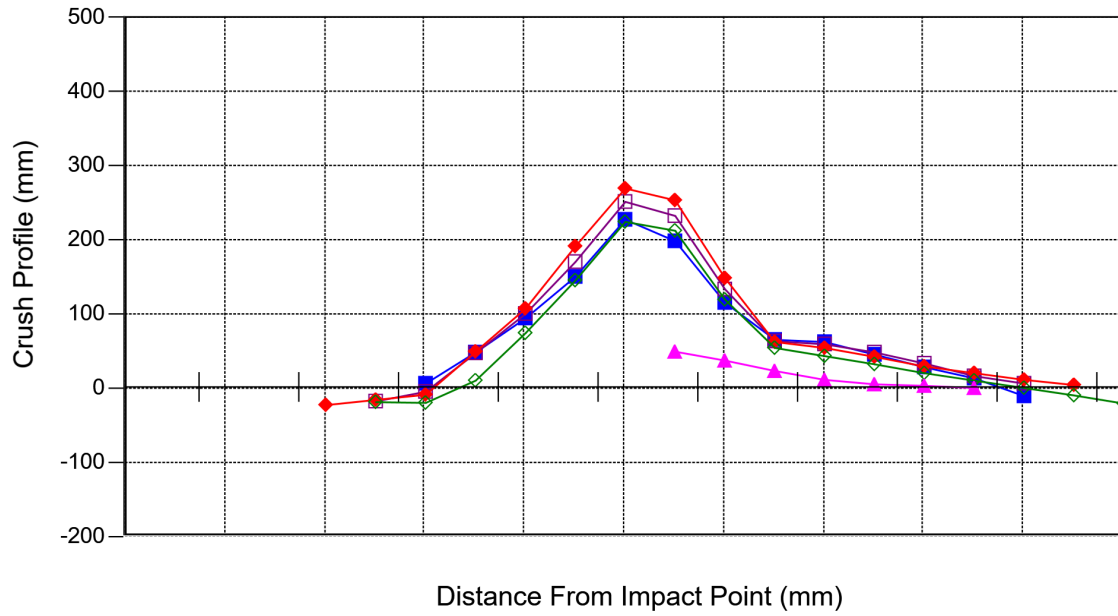
	Pre-Test					Post-Test					Crush				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1500															
-1350															
-1200															
-1050															
-900			910					932					-22		
-750		900	909	805			917	924	823			-17	-15	-18	
-600	889	901	906	822		882	905	914	841		7	-4	-8	-19	
-450	869	895	904	830		820	847	854	819		49	48	50	11	
-300	869	894	905	840		774	793	797	765		95	101	108	75	
-150	872	895	908	846		721	724	716	700		151	171	192	146	
0	875	896	909	851		647	644	639	626		228	252	270	225	
150	877	896	908	855	605	678	663	654	642	555	199	233	254	213	50
300	877	895	907	859	623	761	761	758	739	585	116	134	149	120	38
450	877	893	906	859	624	811	829	843	804	600	66	64	63	55	24
600	875	887	900	857	620	812	827	845	813	608	63	60	55	44	12
750	872	883	895	854	614	826	834	852	821	608	46	49	43	33	6
900	868	880	890	849	601	839	846	860	828	597	29	34	30	21	4
1050	873	888	894	851	563	859	871	873	840	562	14	17	21	11	1
1200	886	902	905	860		896	895	893	859		-10	7	12	1	
1350			917	872				912	881				5	-9	
1500				876					896					-20	

NOTE: Pre-test measurements are taken when the vehicle is in the "As Tested" weight condition. Vehicle measurements forward of the vertical impact reference line are negative. The crush profile grid is established prior to the test based on an estimated impact point. The final distance from impact is determined after the final dummy positioning and the pole is aligned with the center of gravity of the dummy's head.

DATA SHEET NO.10 ... (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2025 KIA K4 4 Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20254201
 Test Date: 01/09/2025



— LEVEL 1 Side Sill: 316 mm above ground	— LEVEL 2 H-Point: 492 mm above ground	— LEVEL 3 Mid Door: 612 mm above ground	— LEVEL 4 Window Sill: 897 mm above ground
— LEVEL 5 Window Top: 1347 mm above ground			

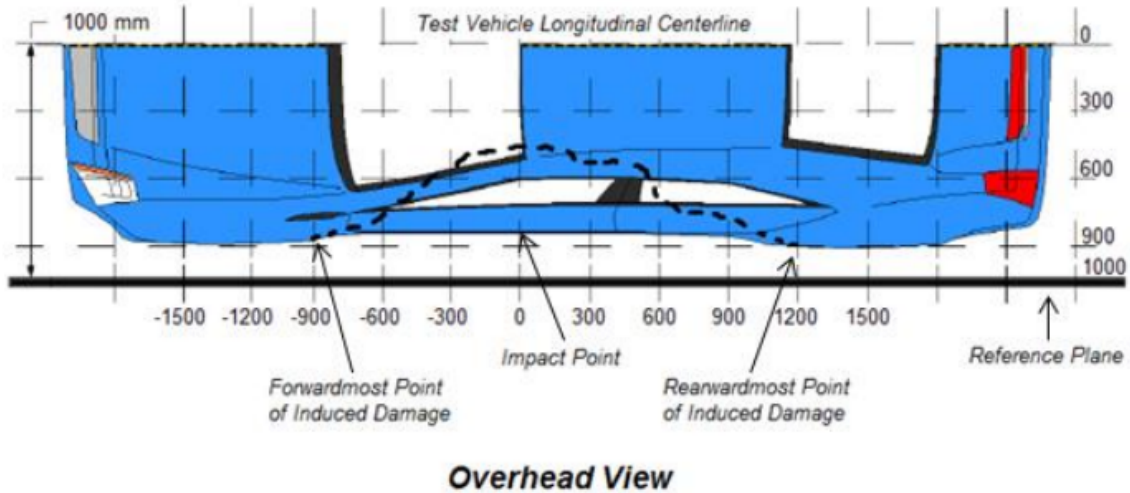
Vehicle Exterior Crush Measurements - Visual Representation

**DATA SHEET NO.11
VEHICLE DAMAGE PROFILE DISTANCE**

Test Vehicle: 2025 KIA K4 4 Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20254201
 Test Date: 01/09/2025

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



VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	-900	3	68	90	-22
2	-450	3	146	96	50
3	0	3	361	91	270
4	450	3	157	94	63
5	900	3	140	110	30
6	1350	3	88	83	5

**DATA SHEET NO.12
FMVSS NO.301 STATIC ROLLOVER RESULTS**

Test Vehicle: 2025 KIA K4 4 Door Sedan
 Test Program: NCAP Side Pole Impact Test

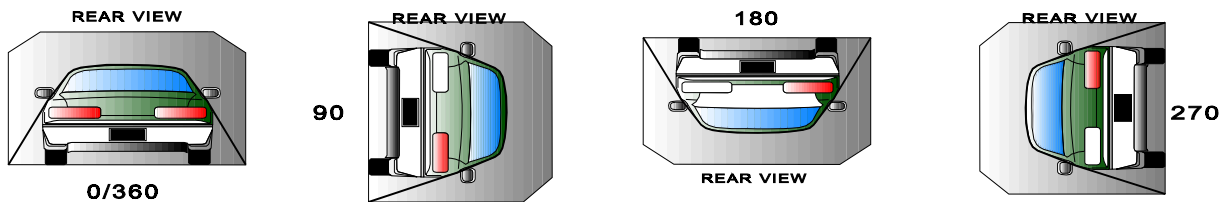
NHTSA No.: M20254201
 Test Date: 01/09/2025

Test Time: 10:19 AM

Temperature: 21 °C

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

D. Spillage Detail: No Spillage Occured



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	73	300	373
90° to 180°	66	300	366
180° to 270°	63	300	363
270° to 360°	70	300	370

FMVSS 301 SPILLAGE TABLE

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

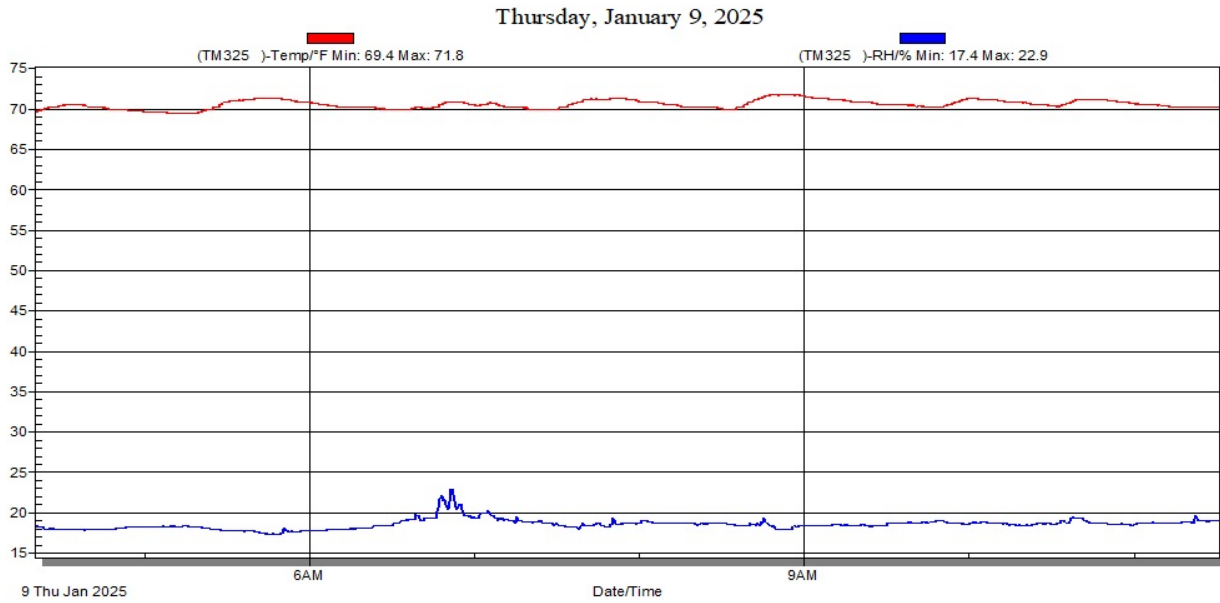
SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 13
DUMMY / VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle: 2025 KIA K4 4 Door Sedan
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20254201
Test Date: 01/09/2025



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

APPENDIX A
PHOTOGRAPHS

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50	Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View	A-28
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M20254201

Figure A-1: As Delivered Right Front $\frac{3}{4}$ View of Test Vehicle



M20254201

Figure A-2: As Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle



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

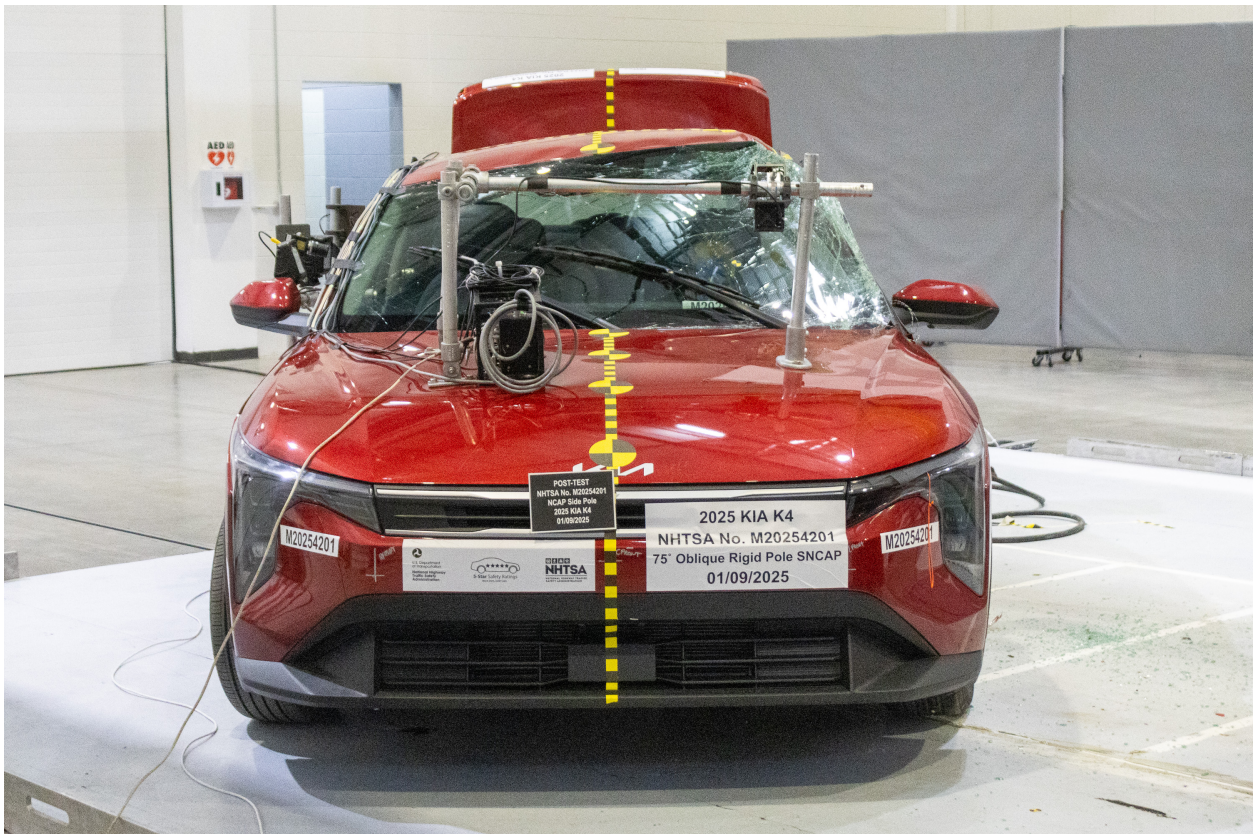


Figure A-4: Post-Test Frontal View of Test Vehicle



Figure A-5: Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle



Figure A-6: Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle



Figure A-7: Pre-Test Left Side View of Test Vehicle



Figure A-8: Post-Test Left Side View of Test Vehicle



Figure A-9: Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



Figure A-10: Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



Figure A-11: Pre-Test Rear View of Test Vehicle

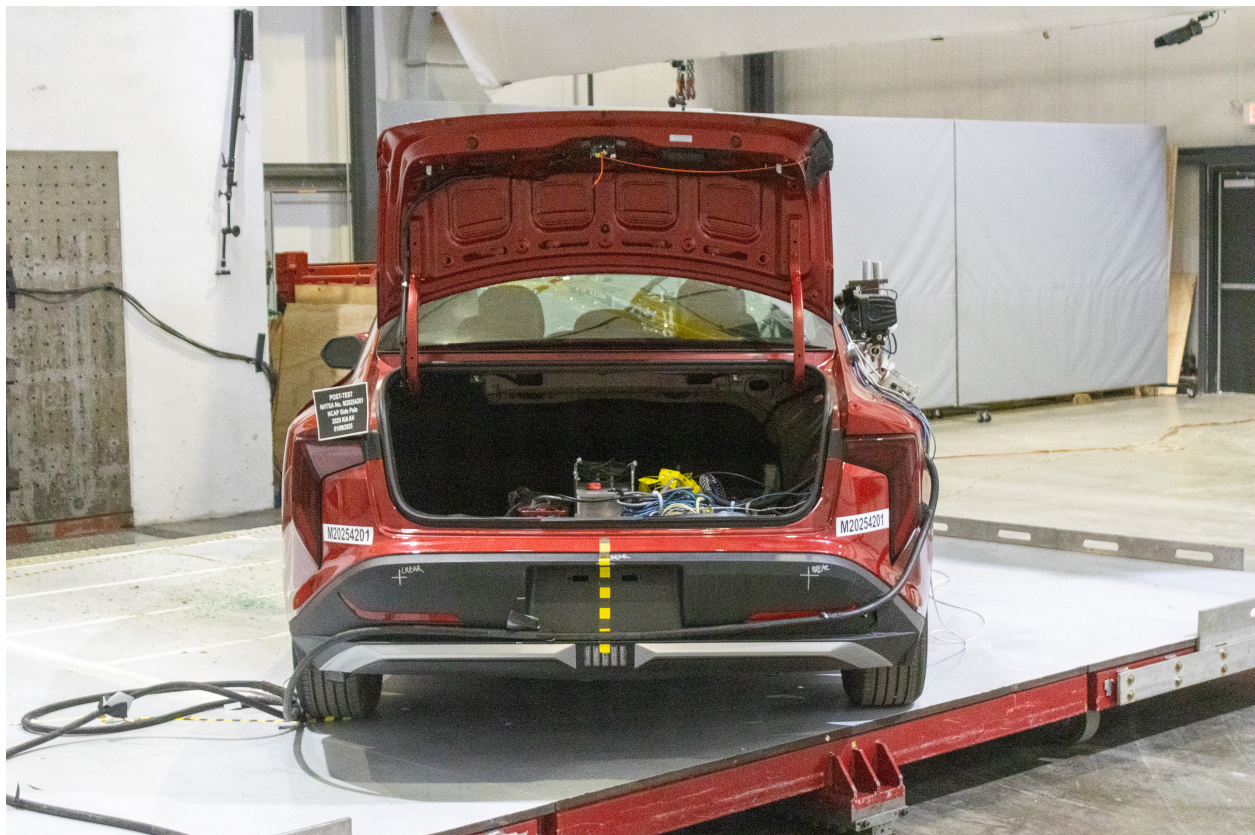


Figure A-12: Post-Test Rear View of Test Vehicle



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



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

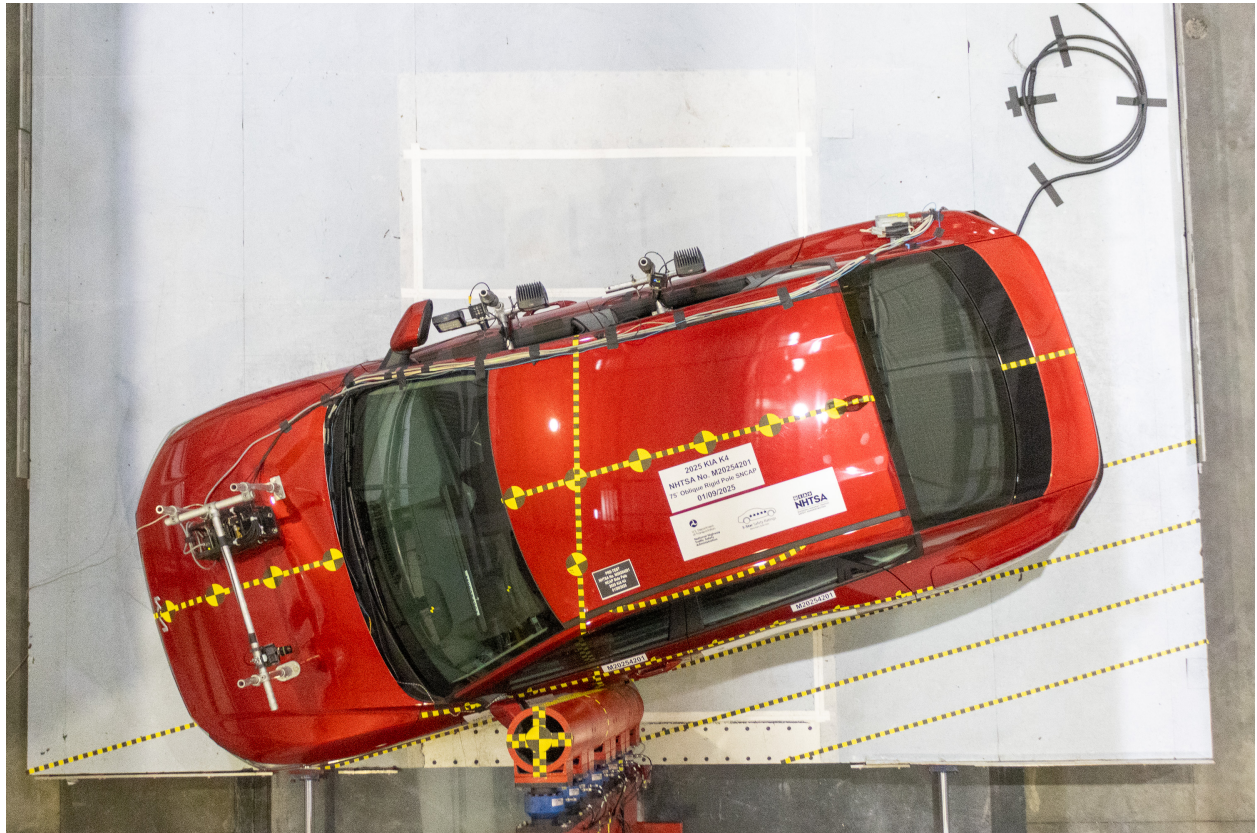


Figure A-15: Pre-Test Overhead View of Test Area

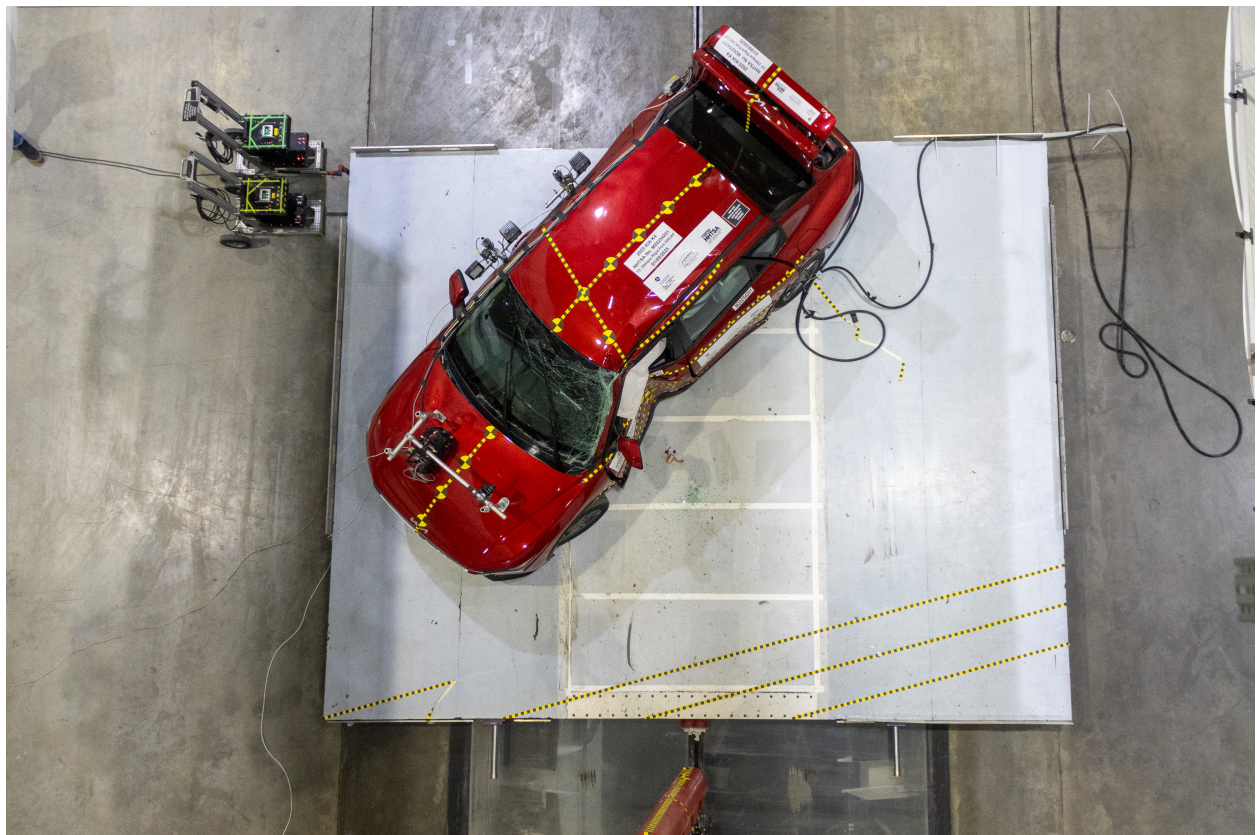


Figure A-16: Post-Test Overhead View of Test Area



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



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



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



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



Figure A-21: Pre-Test Front Close-Up View of Dummy Head and Chest



Figure A-22: Post-Test Front Close-Up View of Dummy



Figure A-23: Pre-Test Left Side View of Dummy Showing Belt and Chalking



Figure A-24: Pre-Test Left Side View of Dummy Shoulder and Door Top View



Figure A-25: Post-Test Left Side View of Dummy Shoulder and Door Top View



Figure A-26: Pre-Test Frontal View of Seat Back Prior to Dummy Positioning



Figure A-27: Pre-Test Frontal Close-Up View of Dummy Head / Shoulders in Relation to Head Restraint



Figure A-28: Pre-Test Frontal View of Seat Pan Prior to Dummy Positioning



Figure A-29: Pre-Test Overhead View of Dummy Thighs on Seat Pan



Figure A-30: Pre-Test Left Side View of Dummy's Neck Showing Position of Adjustable Neck Bracket



Figure A-31: Pre-Test Left Side View of Dummy's Head Showing Dummy's Head is Level



Figure A-32: Pre-Test Placement of Dummy's Feet

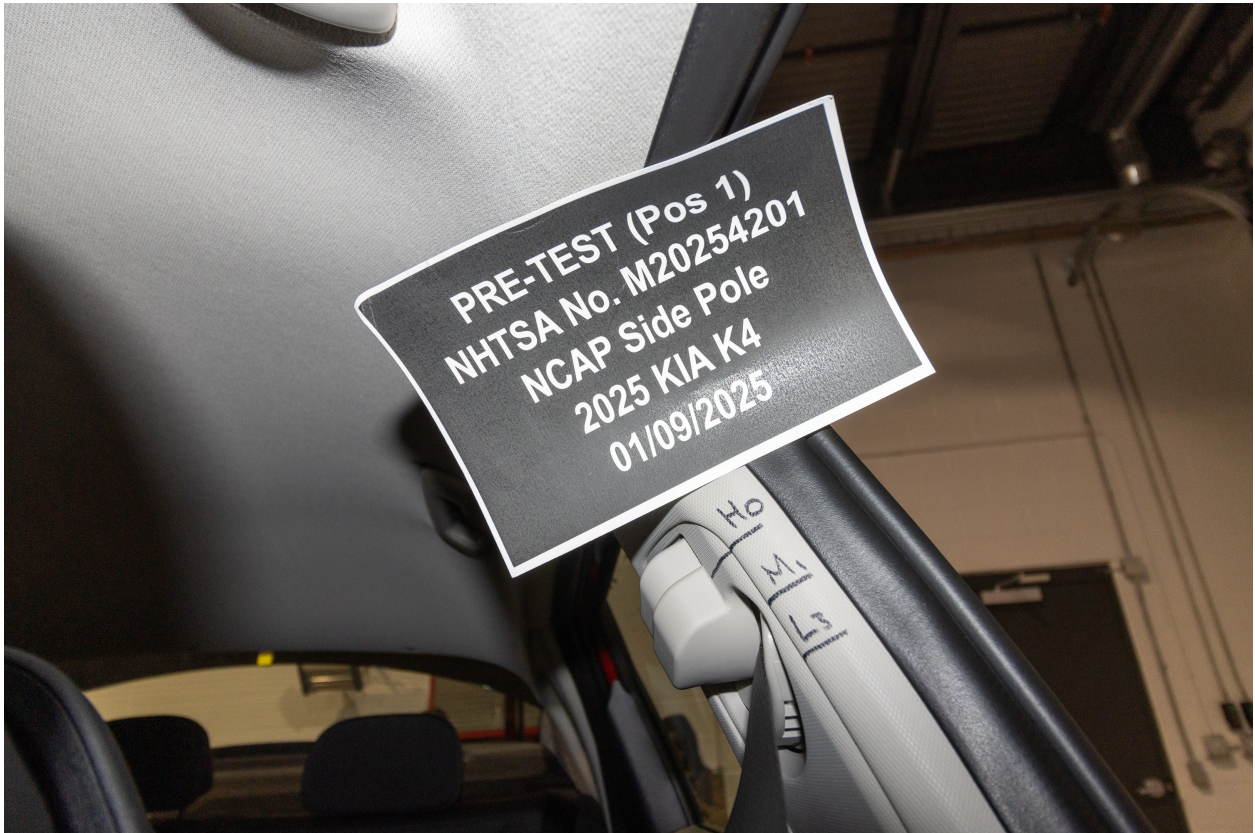


Figure A-33: Pre-Test View of Belt Anchorage for Dummy



Figure A-34: Pre-Test Left Side View of Steering Wheel



Figure A-35: Pre-Test View of Disengaged Parking Brake



Figure A-36: Pre-Test View of Parking Brake



Figure A-37: Pre-Test Close-Up Left Side View of Driver Seat Track



Figure A-38: Pre-Test Close-Up Left Side View of Driver Seat Back



Figure A-39: Pre-Test Close-Up View of Driver Seat Back or Head Restraint



Figure A-40: Pre-Test Dummy and Door Clearance View



Figure A-41: Post-Test Dummy and Door Clearance View



Figure A-42: Pre-Test Right Side View of Dummy and Front Seat of Occupant Compartment



Figure A-43: Post-Test Right Side View of Dummy and Front Seat of Occupant Compartment



Figure A-44: Pre-Test Inner Door Panel View



Figure A-45: Post-Test Inner Door Panel View Showing Dummy Contact Location



Figure A-46: Post-Test Dummy Close-Up Head Contact with Vehicle Interior View



Figure A-47: Post-Test Dummy Close-Up Head Contact with Side Airbag View



Figure A-48: Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View



Figure A-49: Post-Test Dummy Close-Up Torso Contact with Side Airbag View



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



Figure A-51: Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View



Figure A-52: Post-Test Dummy Close-Up Knee Contact with Vehicle Interior View



Figure A-53: Pre-Test Right Side View of Dummy and Rear Seat of Occupant Compartment



Figure A-54: Post-Test Inner Rear Passenger Torso Air Bag Deployment View



Figure A-55: Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



Figure A-56: Post-Test View of Fuel Filler Cap or Fuel Filler Neck



Figure A-57: Close-Up View of Vehicle's Certification Label



Figure A-58: Close-Up View of Vehicle's Tire Information Placard or Label



Figure A-59: Pre-Test Pole Barrier Front View



Figure A-60: Post-Test Pole Barrier Front View

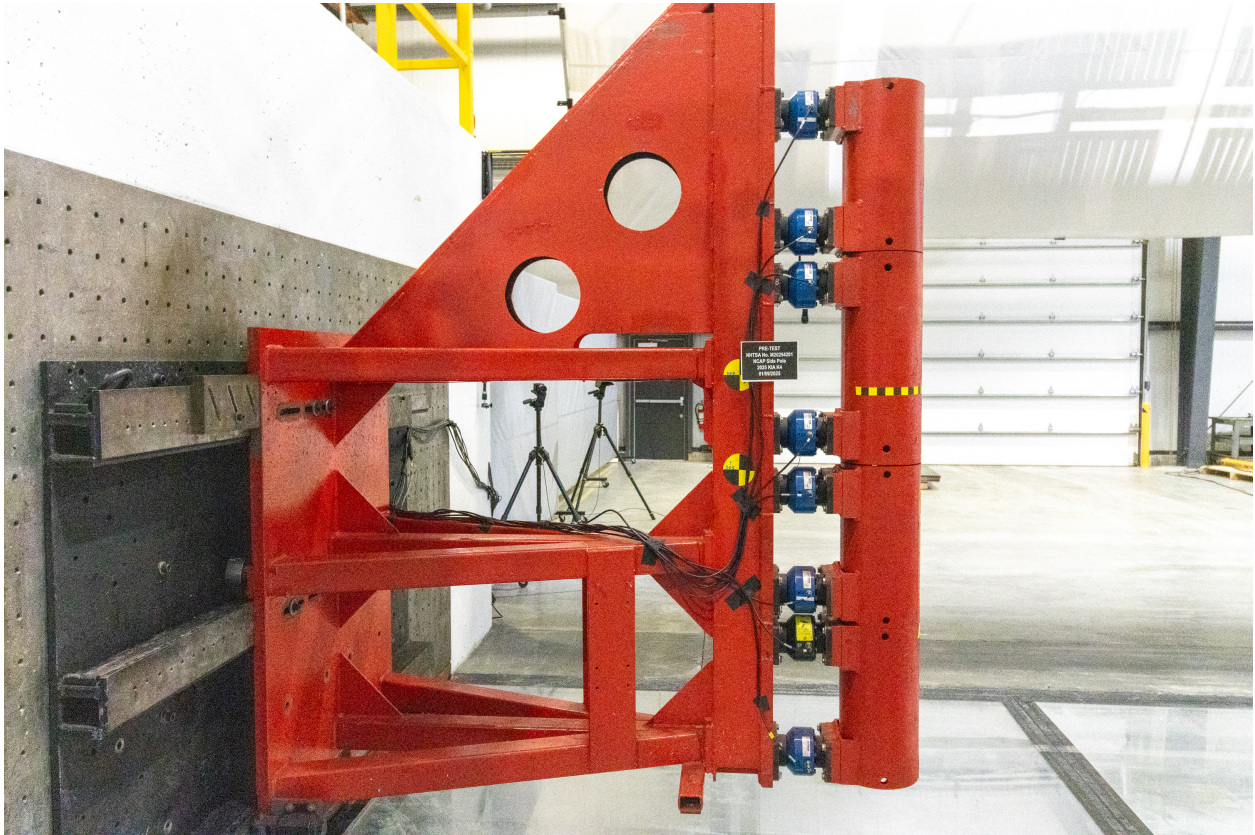


Figure A-61: Pre-Test Pole Barrier Side View

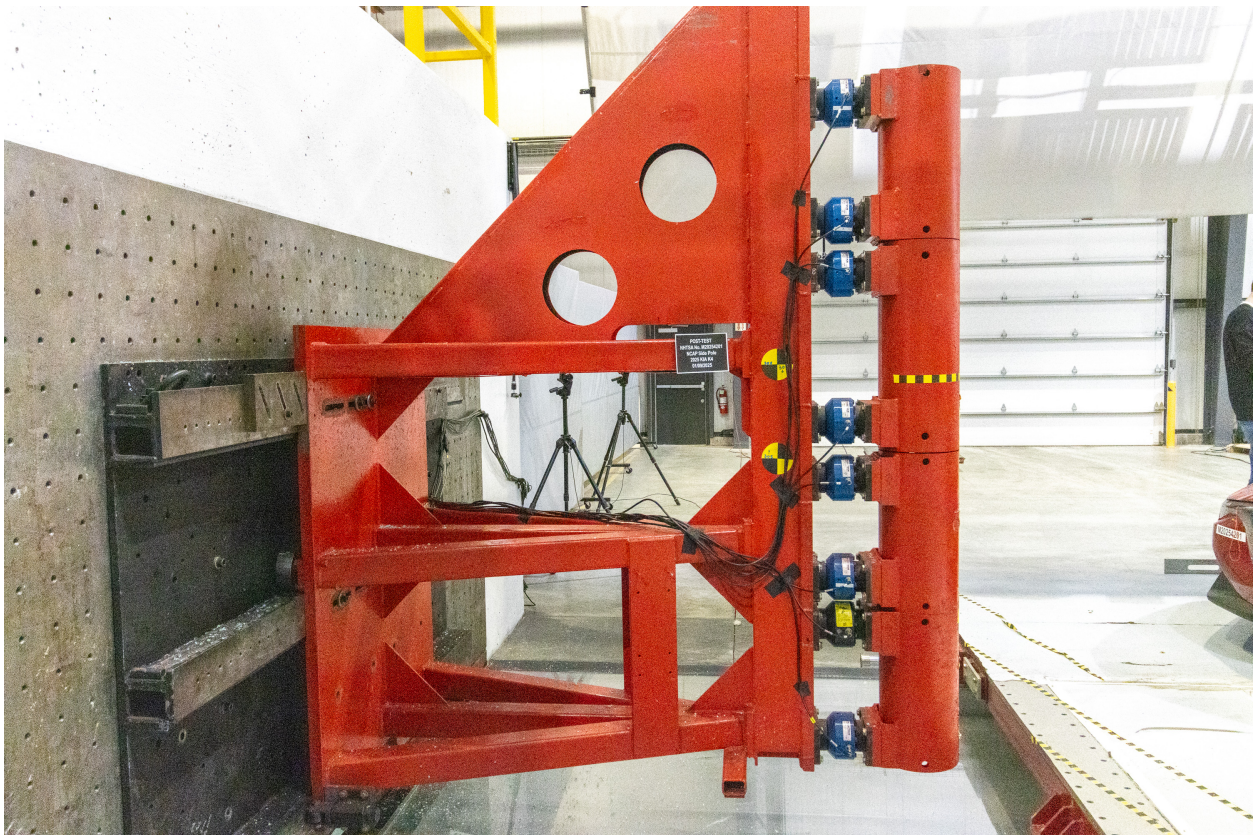


Figure A-62: Post-Test Pole Barrier Side View



Figure A-63: Pre-Test Ballast View



Figure A-64: Post-Test Primary and Redundant Speed Trap Read-Out



Figure A-65: FMVSS No. 301 Static Rollover 0 Degrees

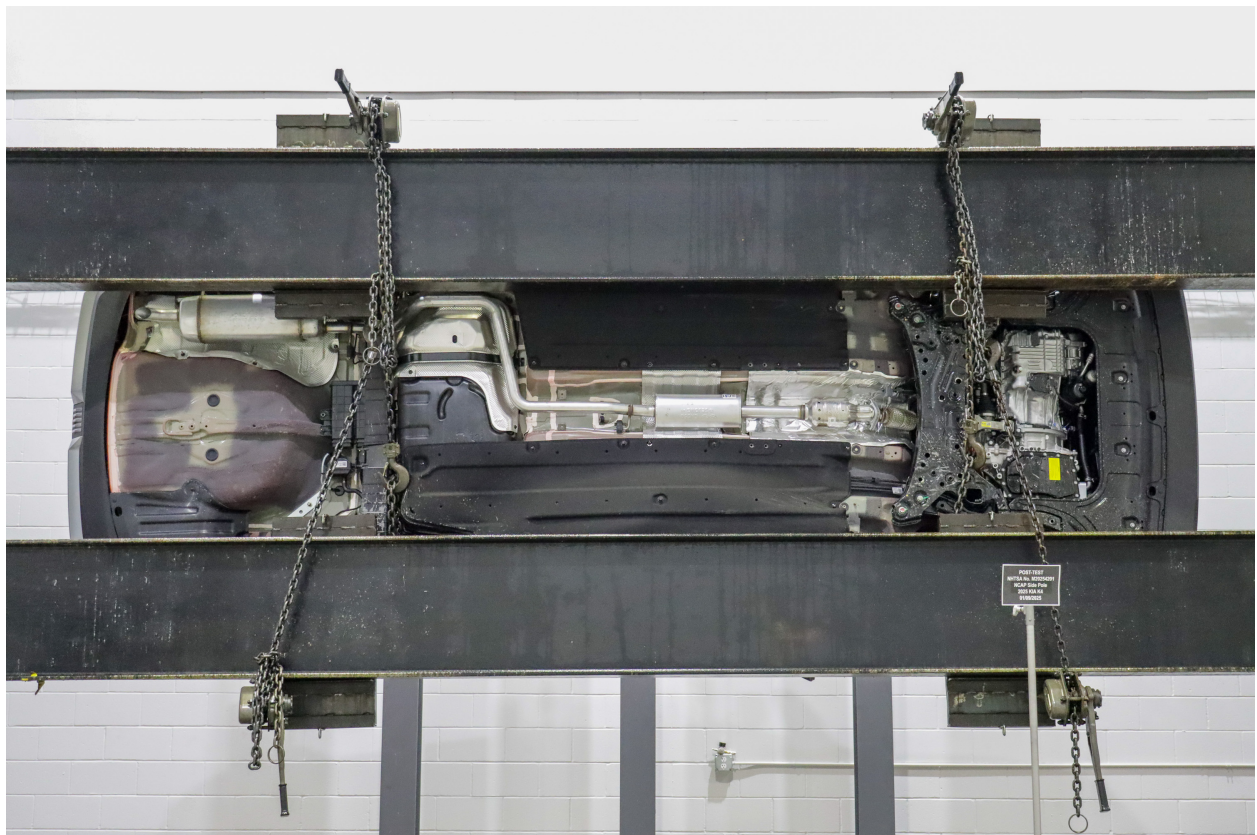


Figure A-66: FMVSS No. 301 Static Rollover 90 Degrees



Figure A-67: FMVSS No. 301 Static Rollover 180 Degrees



Figure A-68: FMVSS No. 301 Static Rollover 270 Degrees



Figure A-69: FMVSS No. 301 Static Rollover 360 Degrees



Figure A-70: Impact Event





2025 K4 LX5 MODEL/OPT CODE: 23422 / 010 EXTERIOR COLOR: CURRANT RED INTERIOR COLOR: MEDIUM GRAY VEHICLE ID NUMBER: 3KPF4DEXE006512 PORT OF ENTRY: PHILADELPHIA		Sold To: NY073 Mathews Kia 3013 OLD VESTAL ROAD VESTAL NY 13850 Ship To: NY073																											
STANDARD FEATURES STANDARD LX FEATURES MECHANICAL 2.0L Multi-Point Fuel Injection (MPI) 4-Cyl Engine Intelligent Variable Automatic Transmission Electronic Parking Brake w/ Auto Hold ADVANCED DRIVER-ASSISTANCE SYSTEMS Forward Collision-Avoidance Assist - Cyclist/Just Turning Lane Keeping Assist & Lane Following Assist Driver Attention Warning & High Beam Assist Smart Cruise Control w/ Stop & Go SAFETY Dual Front Advanced Airbags Front and Rear Seat-Mounted Side Airbags Front and Rear Side Curtain Airbags Electronic Stability Control & Hill-Start Assist Control INTERIOR, COMFORT & CONVENIENCE 12.3" Touchscreen w/Wireless Android Auto & Apple CarPlay Kia Connect w/Comp 3-Yr Ultimate** Where Available** SIRIUSXM® w/Free 3-Mo. Subscription* Rear View Camera with Dynamic Guidelines 4.0" Instrument Display Smart Key w/ Push Button & Remote Start Smart Trunk (Open) USB Multimedia Port, Front & Rear USB Charge Ports Multi-Adjustable Manual Front Seats Tilt & Telescopic Steering Column Rear Occupant Alert EXTERIOR 16" Steel Wheels with Wheel Covers LED Reflector Headlights w/Auto-On/Off & Amber LED DRLs LED Tail Lights Power Adjustable Heated Outside Mirrors Compact Spare Tire WARRANTY 10 Year/100,000 Mile Limited Powertrain Warranty 5 Year/60,000 Mile Limited Basic Warranty 5 Year/60,000 Mile Roadside Assistance		MANUFACTURER'S SUGGESTED RETAIL PRICE ▶ \$22,990.00 COMPARE LX5 FEATURES Added to/in place of standard LX features - 16" Alloy Wheels - Drive Mode Select - Blind-Spot Collision-Avoidance Assist - Rear Cross-Traffic Collision-Avoidance Assist - Safe Exit Warning - 60/40 Split-Folding Rear Seats ADDITIONAL INSTALLED EQUIPMENT: (In addition to or in place of standard features) Current Red Paint Carpeted Floor Mats Included Included Included Included Included Included \$395.00 \$175.00		EPA DOT Fuel Economy and Environment Gasoline Vehicle Fuel Economy  33 MPG combined city/hwy 29 MPG City 39 MPG highway 3.0 gallons per 100 miles MDSIZE CARS range from 15 to 140 MPG. The best vehicle rates 140 MPG. You Save \$1,500 in fuel costs over 5 years compared to the average new vehicle. Annual fuel Cost \$1,600 Fuel Economy & Greenhouse Gas Rating (tailpipe only) Smog Rating (tailpipe only)  Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 28 MPG and costs \$3,500 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$3.29 per gallon. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog. fuelconomy.gov Calculate personalized estimates and compare vehicles GOVERNMENT 5-STAR SAFETY RATINGS Overall Vehicle Score Not Rated Based on the combined rating of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight. <table border="1"> <tr> <td>Frontal</td> <td>Driver</td> <td>Not Rated</td> </tr> <tr> <td>Crash</td> <td>Passenger</td> <td>Not Rated</td> </tr> <tr> <td colspan="3">Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.</td> </tr> <tr> <td>Side</td> <td>Front seat</td> <td>Not Rated</td> </tr> <tr> <td>Crash</td> <td>Rear seat</td> <td>Not Rated</td> </tr> <tr> <td colspan="3">Star ratings based on the risk of injury in a side impact.</td> </tr> <tr> <td>Rollover</td> <td></td> <td>Not Rated</td> </tr> <tr> <td colspan="3">Star ratings based on the risk of rollover in a single-vehicle crash.</td> </tr> </table> Star ratings range from 1 to 5 stars (★★★★★) with 5 being the highest. Source: National Highway Traffic Safety Administration (NHTSA). www.safercar.gov or 1-888-327-4236 PARTS CONTENT INFORMATION FOR VEHICLES IN THIS CAR LINE U.S./CANADIAN PARTS CONTENT: 20 % MAJOR SOURCES OF FOREIGN PARTS: KOREA: 40% MEXICO: 35% NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS. FOR THIS VEHICLE FINAL ASSEMBLY POINT: PESQUERIA, NL, MEXICO COUNTRY OF ORIGIN ENGINE (MOTOR): USA TRANSMISSION: MEXICO		Frontal	Driver	Not Rated	Crash	Passenger	Not Rated	Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.			Side	Front seat	Not Rated	Crash	Rear seat	Not Rated	Star ratings based on the risk of injury in a side impact.			Rollover		Not Rated	Star ratings based on the risk of rollover in a single-vehicle crash.		
Frontal	Driver	Not Rated																											
Crash	Passenger	Not Rated																											
Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.																													
Side	Front seat	Not Rated																											
Crash	Rear seat	Not Rated																											
Star ratings based on the risk of injury in a side impact.																													
Rollover		Not Rated																											
Star ratings based on the risk of rollover in a single-vehicle crash.																													
MSRP INCLUDING OPTIONS \$23,560.00 INLAND FREIGHT AND HANDLING \$1,155.00 TOTAL MANUFACTURER'S SUGGESTED RETAIL PRICE ▶ \$24,715.00		MSRP INCLUDING OPTIONS \$23,560.00 INLAND FREIGHT AND HANDLING \$1,155.00 TOTAL MANUFACTURER'S SUGGESTED RETAIL PRICE ▶ \$24,715.00		TOTAL ADDITIONAL WEIGHT: 11.4 																									
<small>*Additional terms and conditions apply. **Kia Connect may be currently unavailable for some Model Year 2022 and newer vehicles sold or purchased in Massachusetts; please see www.kia.com for more information. NOTE: When you purchase this vehicle, Kia America, Inc. collects personal information you provide to the dealership. For information on our collection and use of personal information and your rights, please see our Privacy Policy on www.kia.com.</small>																													

Figure A-71: Monroney Label

Safety features of your Kia

Headrest for front seat
 The driver's and front passenger's seats are equipped with a headrest for safety and comfort.



The headrest not only provides comfort for the driver and front passenger, but also helps protect the head and neck in the event of a rear collision. For maximum effectiveness in case of an accident, the headrest should be adjusted so the middle of the headrest is as high as the center of gravity of an occupant's head. Generally, the center of gravity of most people's head is the top of their eyes.

Adjust the headrest as close to your head as possible. The use of a cushion that holds the body away from the seat-back is not recommended.

WARNING
Headrest removal/adjustment

- Do not operate the vehicle with the headrests removed. Headrests can provide critical neck and head support in a crash.
- Do not adjust the headrest height while the vehicle is in motion. Driver may lose control of the vehicle.

Seats

CAUTION
 Excessive pulling or pushing may damage the headrest.

Forward and rearward adjustment (if equipped)



The headrest may be adjusted forward to 3 different positions by pulling the headrest forward to the desired detent. To adjust the headrest to its furthest rearwards position, pull it fully forward to the farthest position and release it.

Adjusting the height up and down



To raise the headrest:
 1. Pull it up to the desired position (1).
 2. To lower the headrest, push and hold the release button (2) on the headrest support.
 3. Lower the headrest to the desired position (3).

Figure A-72: Head Restraint Use and Adjustment Information from Vehicle Owner's Manual



Figure A-73: Post-Test View of Shattered Vehicle Inner Door Panel

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA TRACES

Table of Data Plots Driver Dummy Instrumentation Plots

Fig.	Description	Page
Plot 1	Driver Head Acceleration (X) Primary vs. Time	B-4
Plot 2	Driver Head Acceleration (Y) Primary vs. Time	B-4
Plot 3	Driver Head Acceleration (Z) Primary vs. Time	B-4
Plot 4	Driver Head Resultant Primary vs. Time	B-4
Plot 5	Driver Lower Spine T12 Acceleration (X) vs. Time	B-5
Plot 6	Driver Lower Spine T12 Acceleration (Y) vs. Time	B-5
Plot 7	Driver Lower Spine T12 Acceleration (Z) vs. Time	B-5
Plot 8	Driver Lower Spine T12 Resultant Acceleration vs. Time	B-5
Plot 9	Driver Iliac Wing Force on Impact Side (Y) vs. Time	B-6
Plot 10	Driver Acetabulum Force on Impact Side (Y) vs. Time	B-6
Plot 11	Driver Total Pelvis Force on Impact Side (Y) vs. Time	B-6

The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at www.NHTSA.gov

Additional Driver Dummy Instrumentation Data

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

Vehicle Instrumentation Data

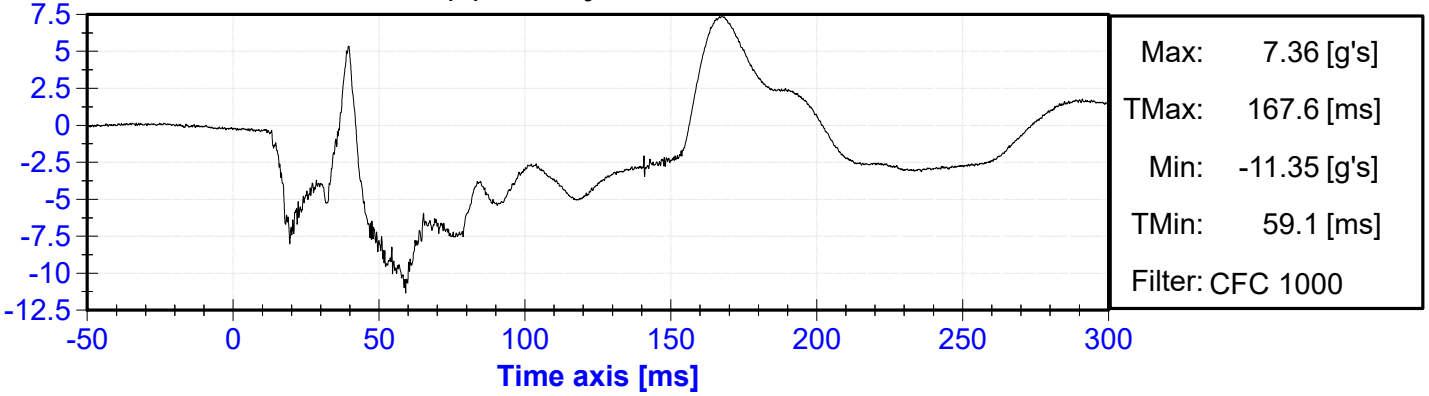
Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Left Floor Sill Acceleration (Y)
Left A-Pillar Sill Acceleration (Y)
Left Lower A-Pillar Acceleration (Y)
Left Mid A-Pillar Acceleration (Y)
Left B-Pillar Sill Acceleration (Y)
Left Lower B-Pillar Acceleration (Y)
Left Mid B-Pillar Acceleration (Y)
Driver Seat Track at Dummy Hip Point Acceleration (Y)
Engine Top Acceleration (X)
Engine Top Acceleration (Y)
Firewall Center Acceleration (Y)
Right Roof at Vertical Impact Reference Line Acceleration (Y)
Right Sill at Vertical Impact Reference Line Acceleration (Y)
Rear Floorpan Behind Rear Axle at Centerline Acceleration (X)
Rear Floorpan Behind Rear Axle at Centerline Acceleration (Y)

Pole Instrumentation Data

Load Cell Pole Barrier #1 Force (Y)
Load Cell Pole Barrier #2 Force (Y)
Load Cell Pole Barrier #3 Force (Y)
Load Cell Pole Barrier #4 Force (Y)
Load Cell Pole Barrier #5 Force (Y)
Load Cell Pole Barrier #6 Force (Y)
Load Cell Pole Barrier #7 Force (Y)
Load Cell Pole Barrier #8 Force (Y)

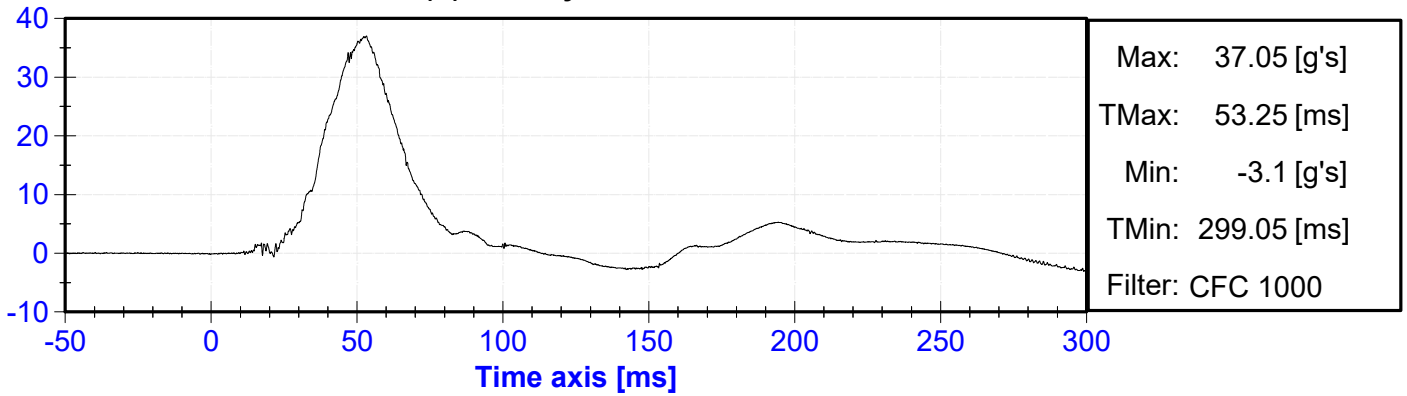
ACCELERATION [g's]

Driver Head Acceleration (X) Primary vs. Time



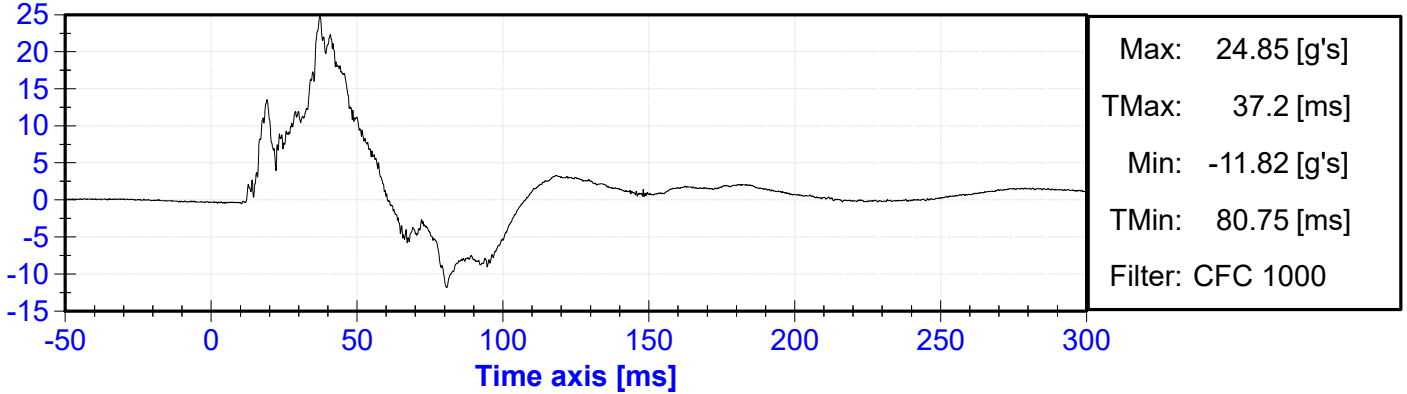
ACCELERATION [g's]

Driver Head Acceleration (Y) Primary vs. Time



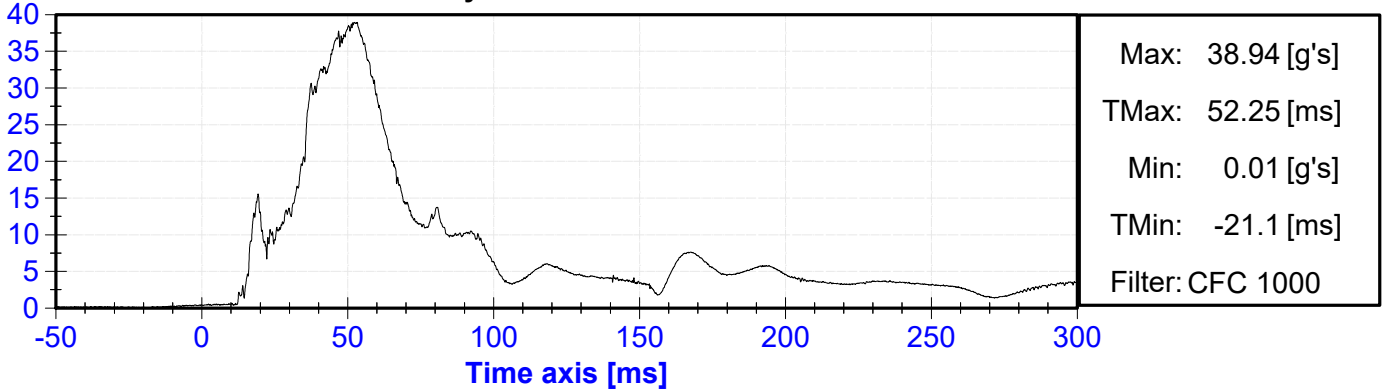
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Driver Head Acceleration (Z) Primary vs. Time



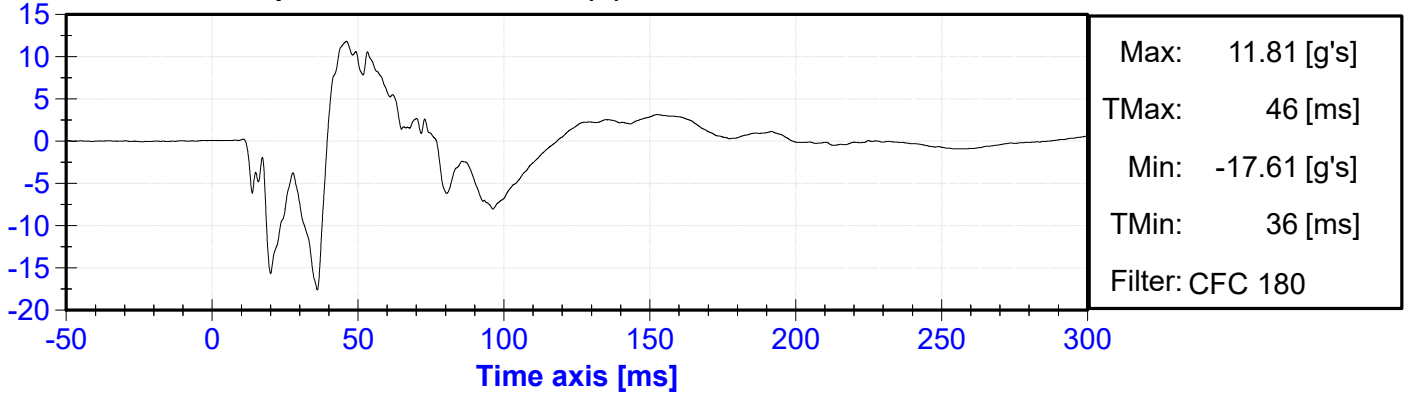
ACCELERATION [g's]

Driver Head Resultant Primary vs. Time



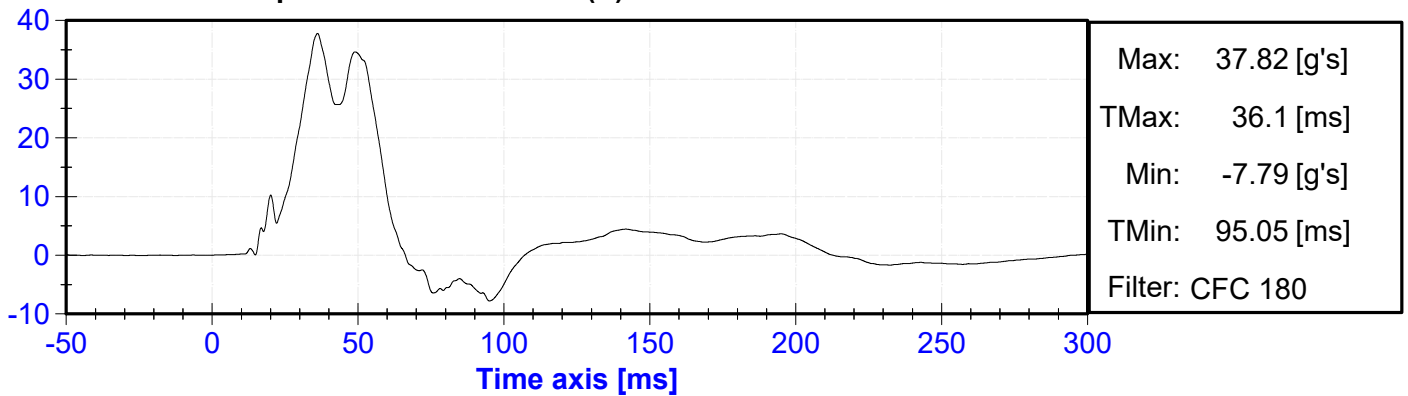
ACCELERATION [g's]

Driver Lower Spine T12 Acceleration (X) vs. Time



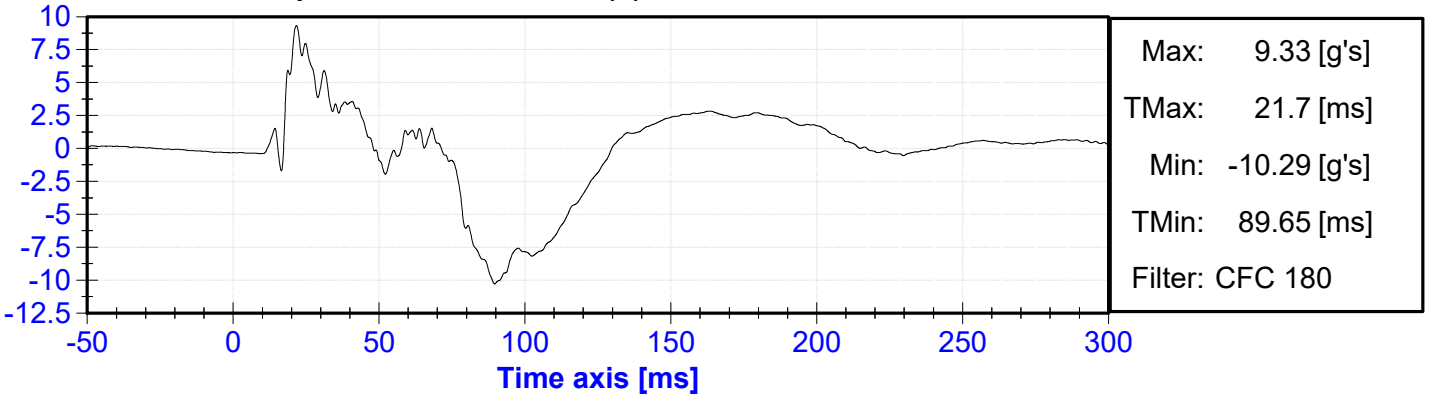
ACCELERATION [g's]

Driver Lower Spine T12 Acceleration (Y) vs. Time



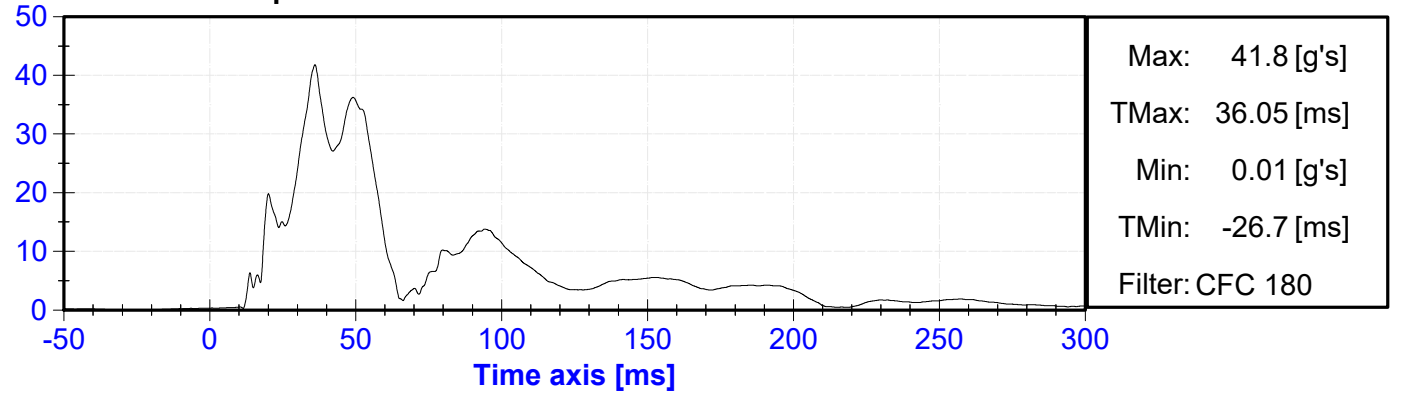
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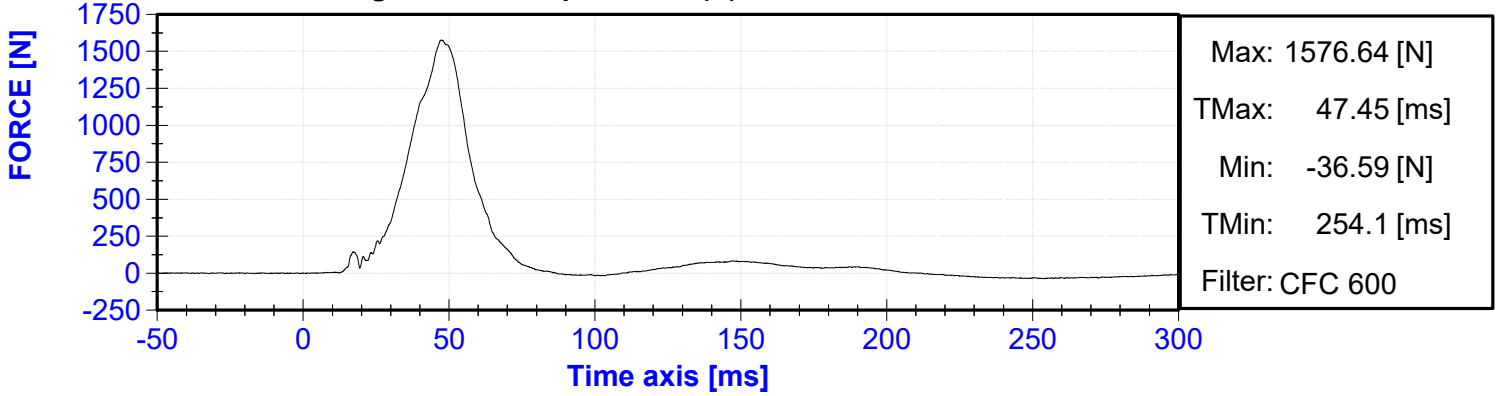


ACCELERATION [g's]

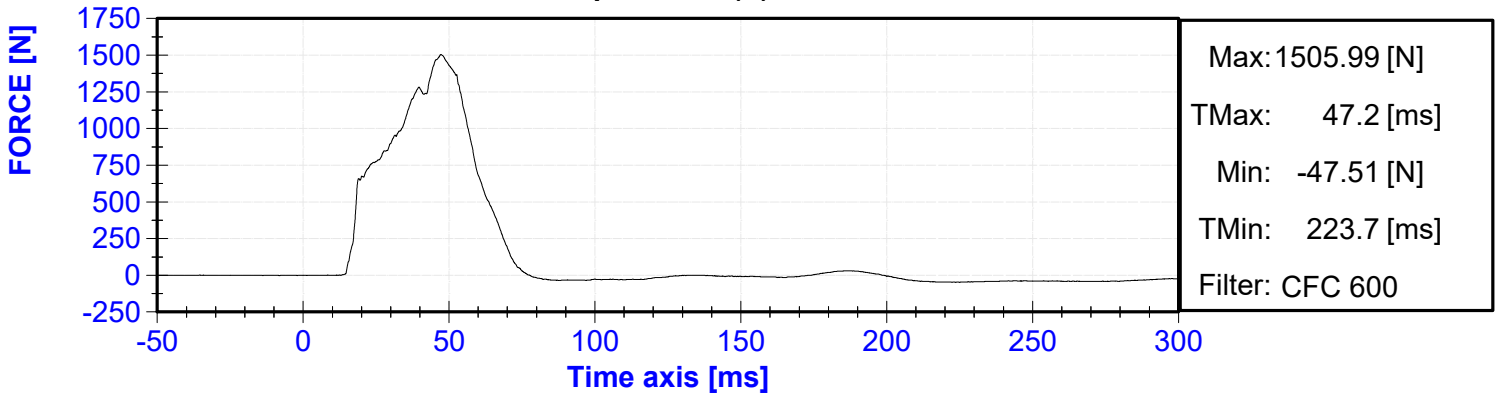
Driver Lower Spine T12 Resultant Acceleration vs. Time



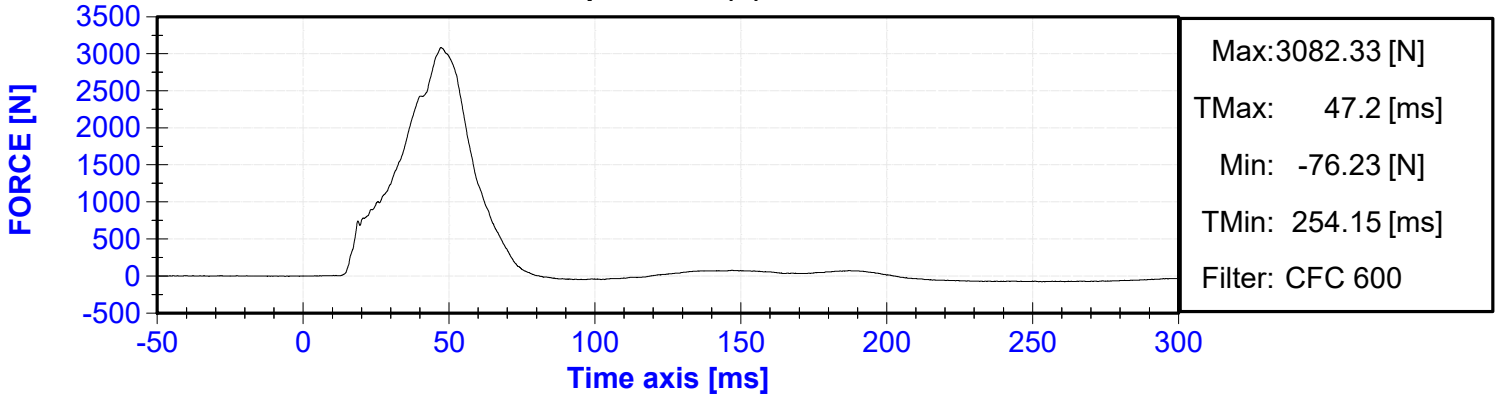
Driver Iliac Wing Force on Impact Side (Y) vs. Time



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



Driver Total Pelvis Force on Impact Side (Y) vs. Time



APPENDIX C

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

SID-IIS 5TH PERCENTILE FEMALE - DRIVER ATD

SERIAL NO:DG8012

(CONFIGURED FOR LEFT SIDE IMPACT)

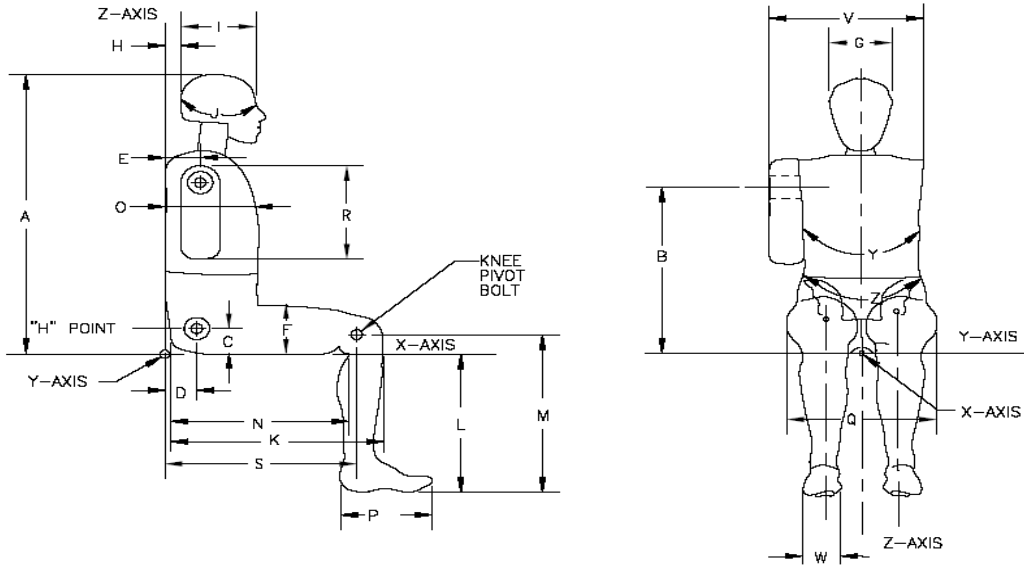


External Measurements - SID-IIs

Technician: J. Rios

Date: 11/22/2024

Dummy Serial Number: DG8012



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	781	Pass
B	Shoulder Pivot Height	437	453	444	Pass
C	H-point Height	79	89	85	Pass
D	H-point from seatback	141	151	147	Pass
E	Shoulder Pivot from Backline	97	107	102	Pass
F	Thigh Clearance	119	135	125	Pass
G	Head Breadth	140	148	142	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	183	Pass
J	Head Circumference	541	551	550	Pass
K	Buttock to Knee Length	514	540	522	Pass
L	Popliteal Height	343	369	352	Pass
M	Knee Pivot to floor height	392	409	402	Pass
N	Buttock Popliteal Length	416	442	431	Pass
O	Chest Depth w/o jacket	195	211	204	Pass
P	Foot Length	216	232	226	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	319	Pass
R	Arm Length	249	259	256	Pass
S	Knee Joint to seatback	477	493	483	Pass
V	Shoulder Width	341	357	352	Pass
W	Foot Width	78	94	85	Pass
Y	Chest Circumference w/jacket	851	881	873	Pass
Z	Waist Circumference	761	791	783	Pass

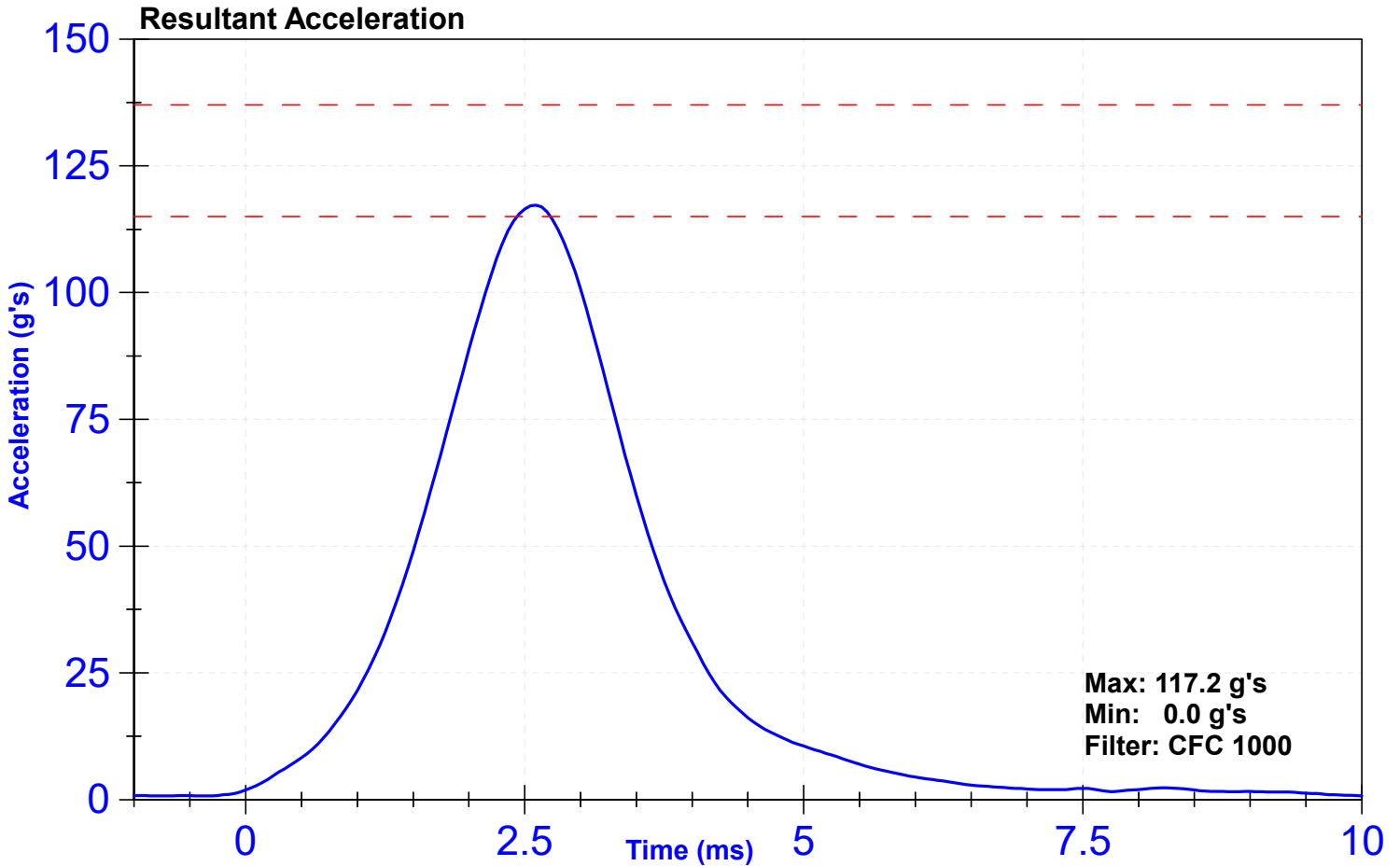
ATD Manufacturer	FTSS	Test Technician	J. Rios
ATD Serial Number	DG8012	Laboratory Supervisor	J. Kinderman

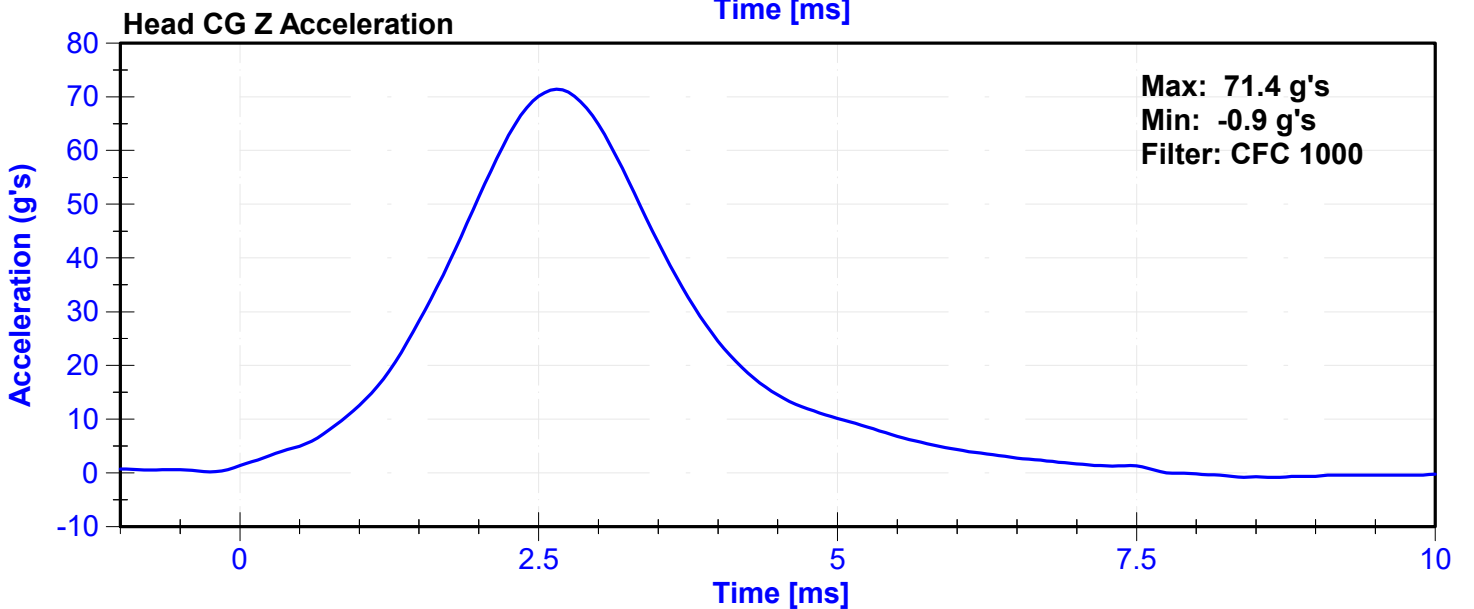
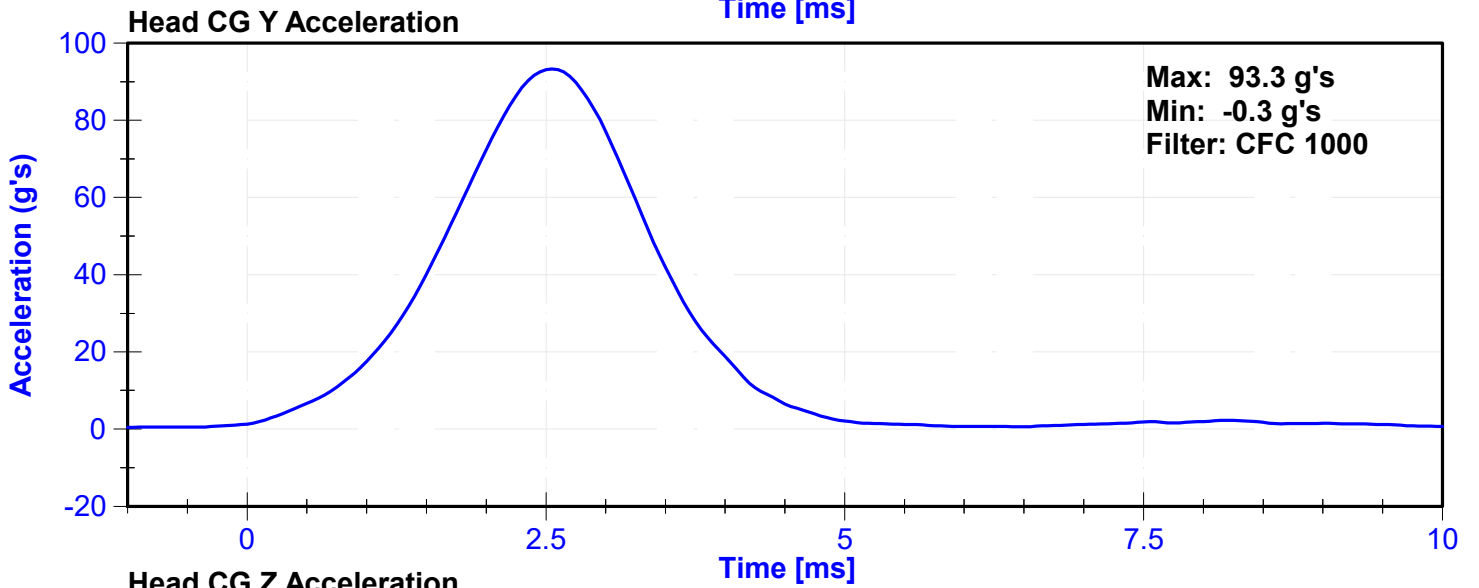
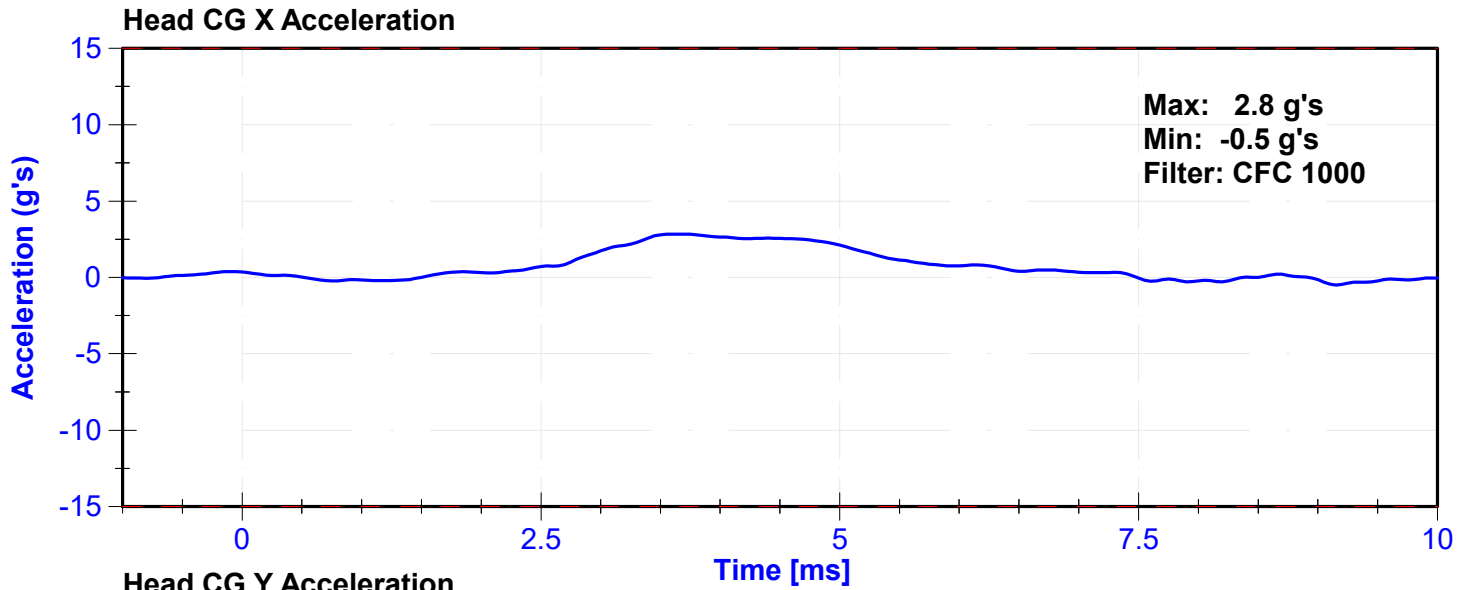
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	31	Pass
Resultant Acceleration	115	137	g's	117.2	Pass
Oscillation	0	15	%	1.9	Pass
Fore-Aft Acceleration	-15	15	g's	2.8	Pass

Transducer Calibrations

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





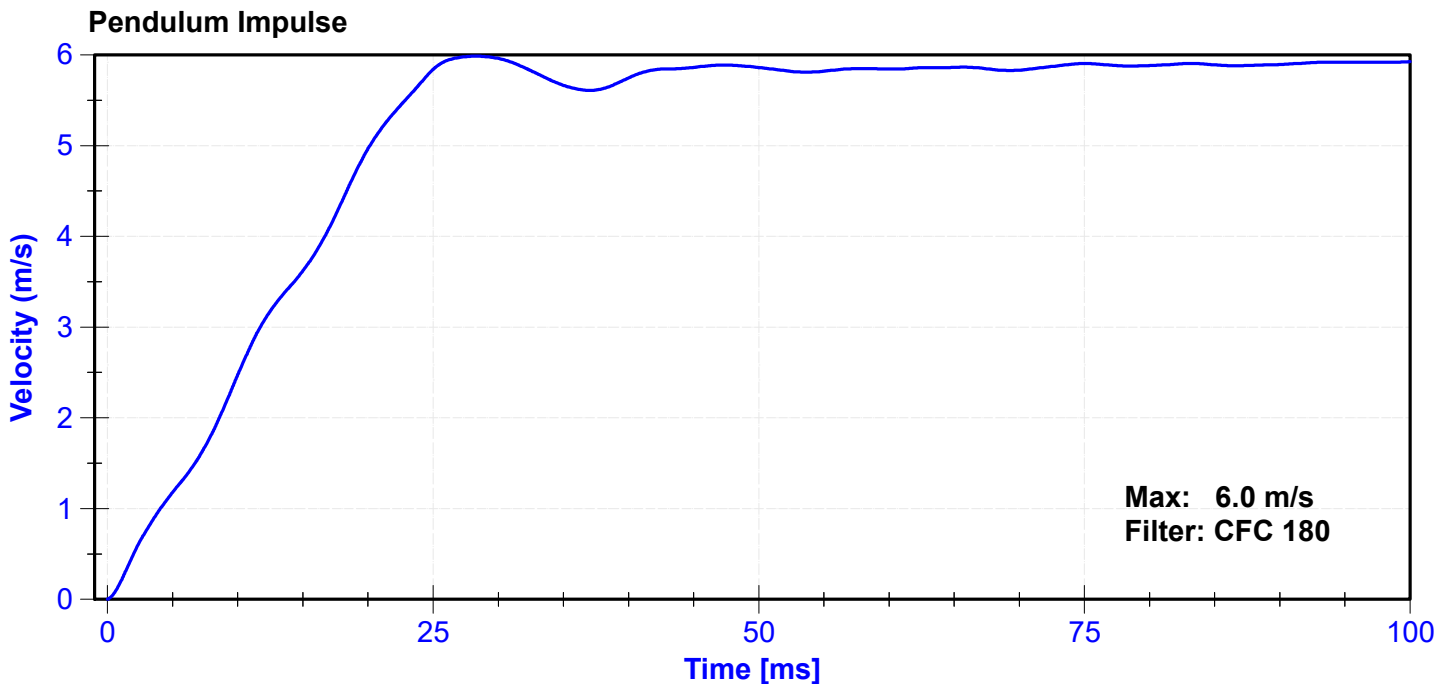
ATD Manufacturer	FTSS	Test Technician	J. Rios
ATD Serial Number	DG8012	Laboratory Supervisor	J. Kinderman

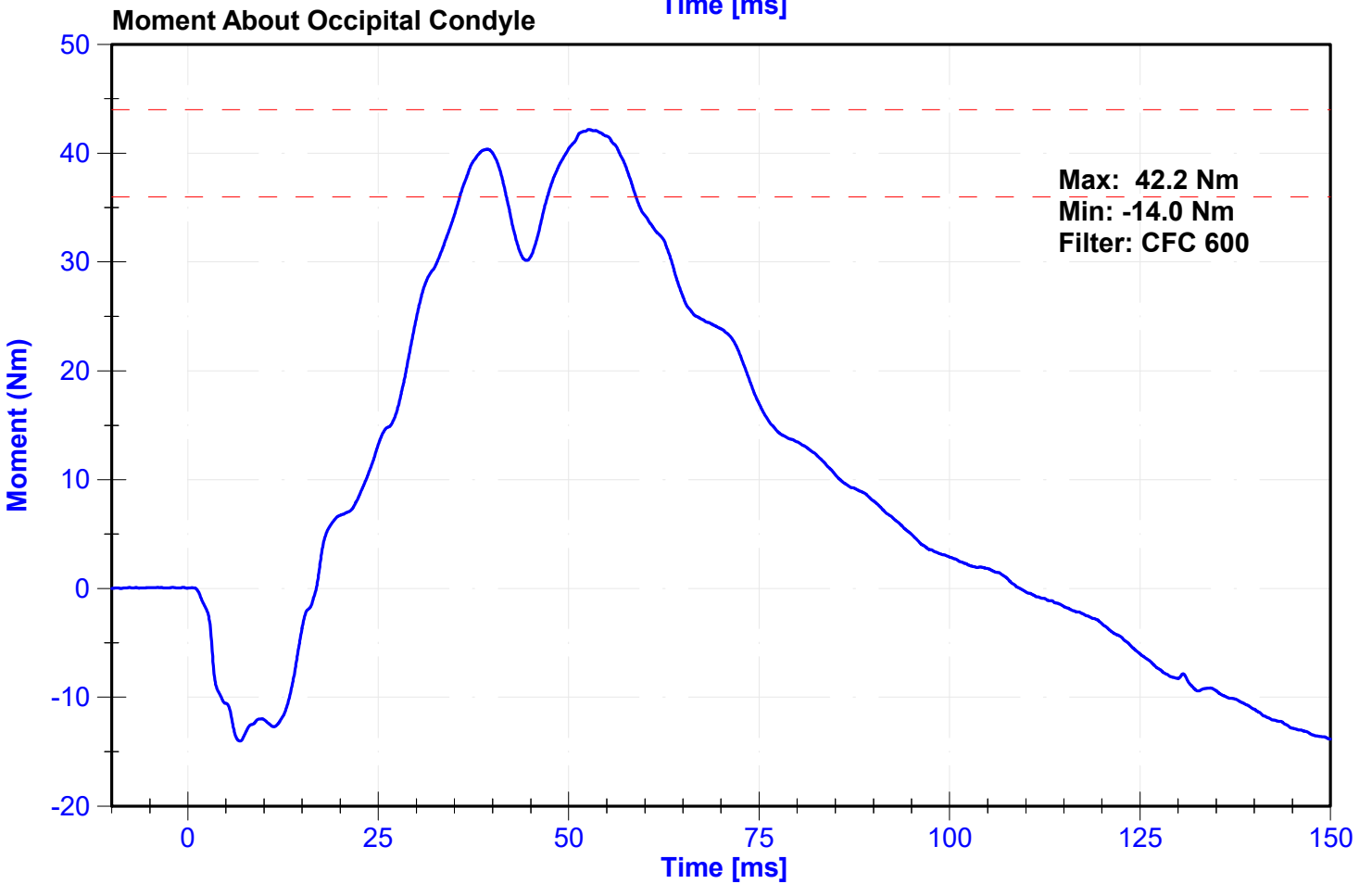
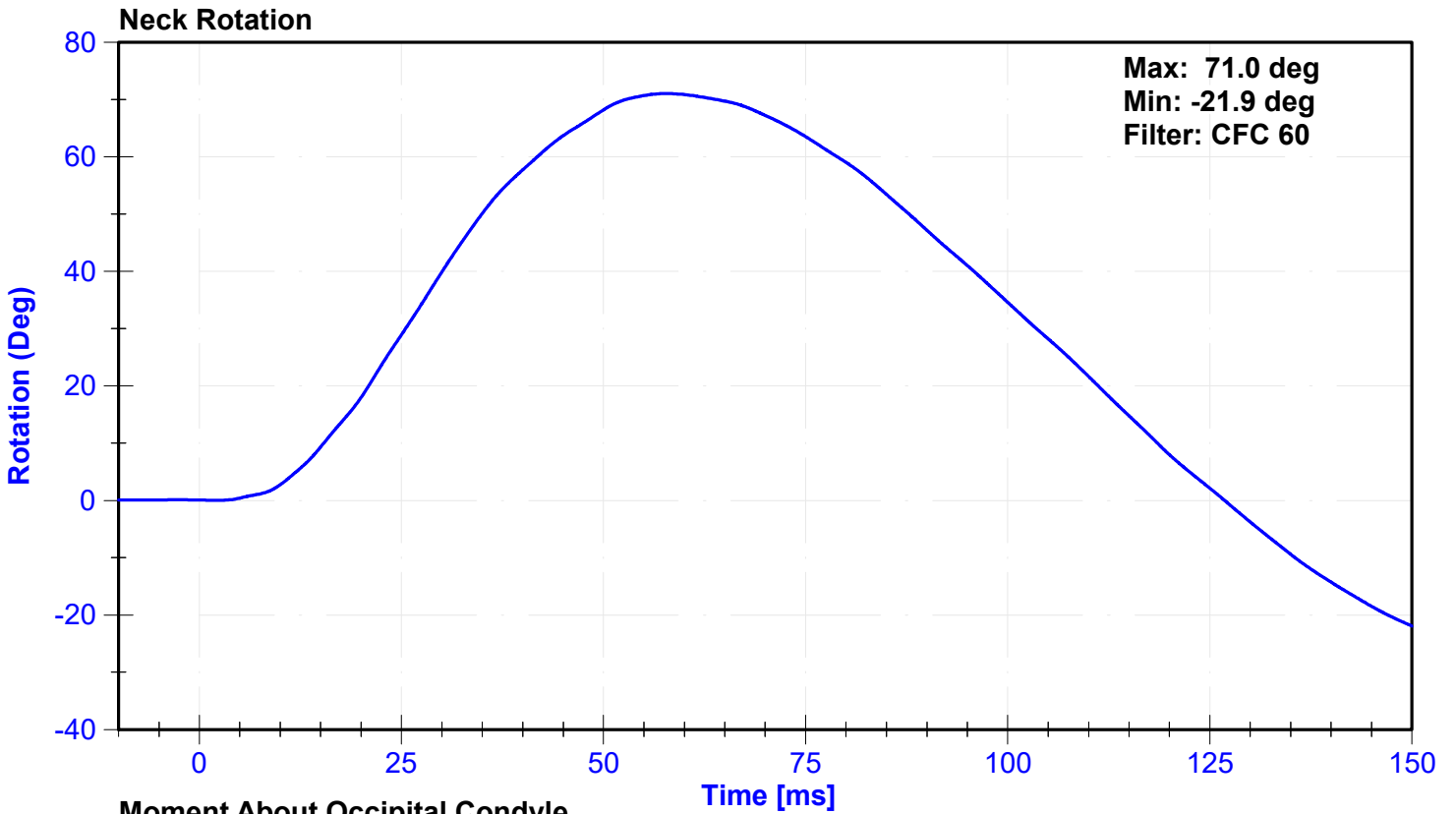
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	35	Pass
Velocity	5.51	5.63	m/s	5.580	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.48	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.62	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.97	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.84	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.98	Pass
Neck Rotation	71	81	deg	71.0	Pass
Time at Maximum Rotation	50	70	ms	57.7	Pass
Moment about the OC	36	44	Nm	42.2	Pass
Moment Decay to 0 Nm	102	126	ms	109.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	7231C-750	11/1/2024	11/1/2025
Pendulum Potentiometer	Servo	4961	9/23/2024	9/23/2025
Condyle Potentiometer	Servo	DS185	9/23/2024	9/23/2025
Upper Neck Load Cell	Denton	1716A_2187-FY	12/5/2023	12/4/2024





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

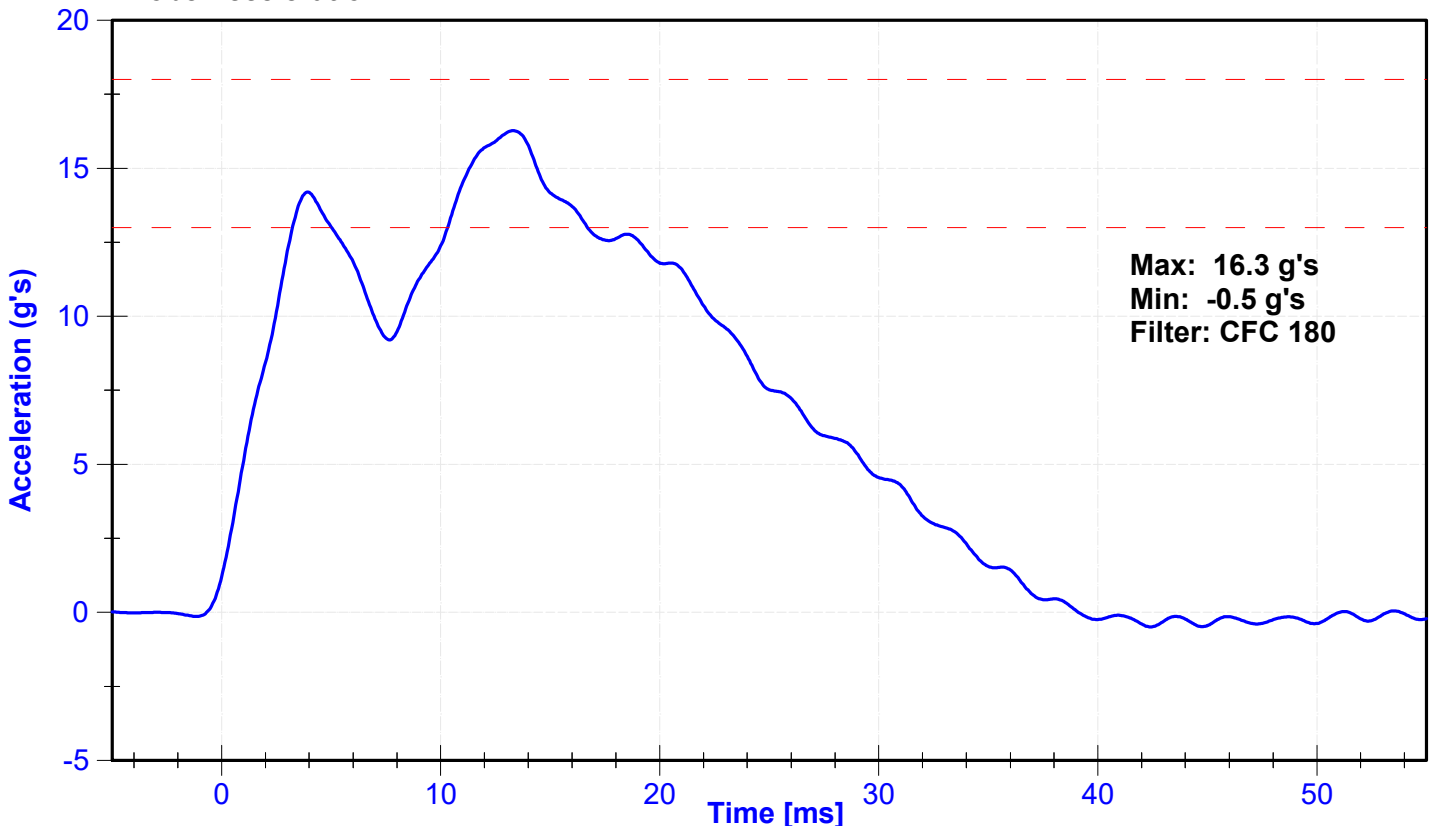
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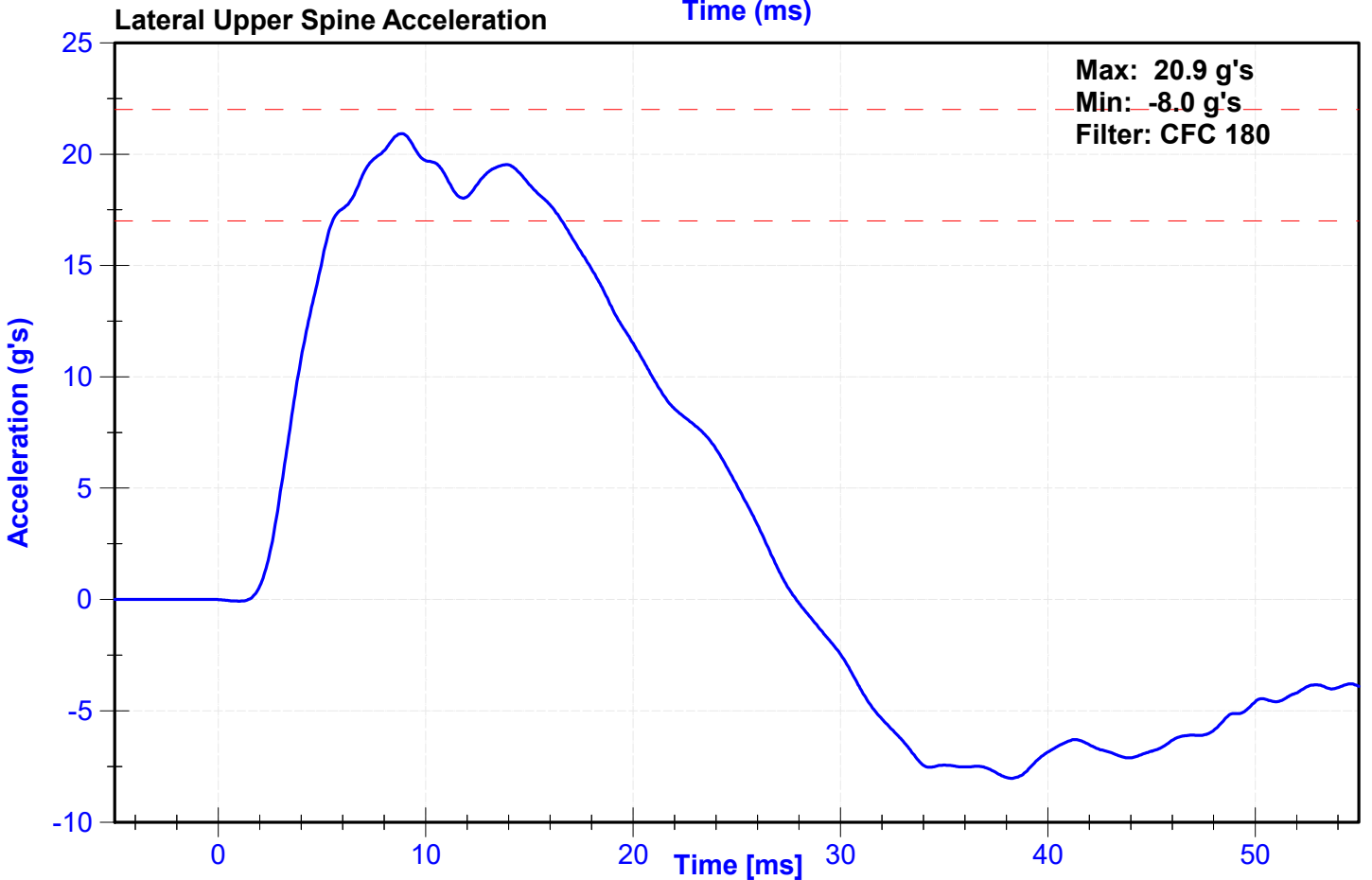
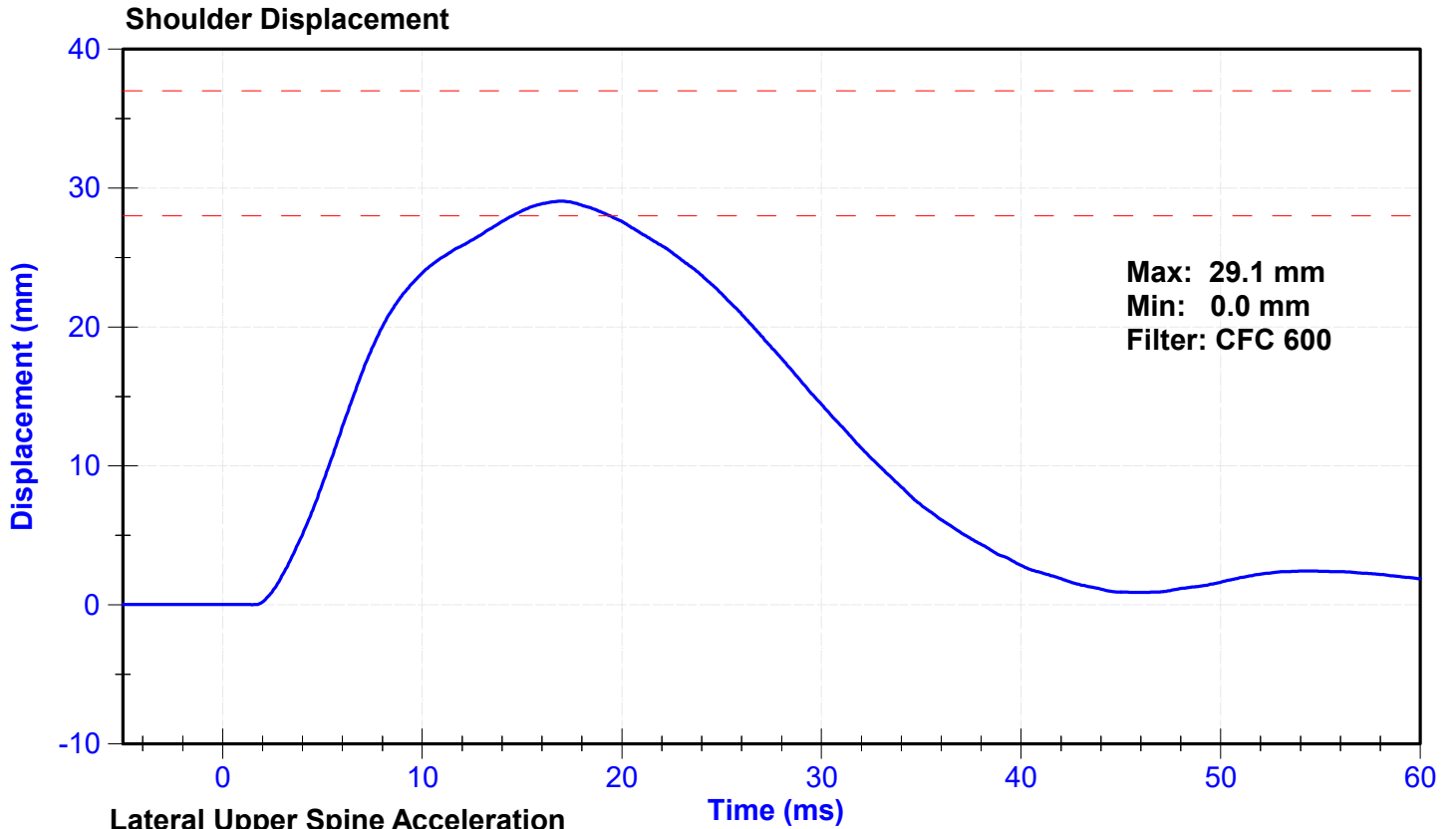
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	33	Pass
Velocity	4.2	4.4	m/s	4.29	Pass
Probe Acceleration	13	18	g's	16.3	Pass
Shoulder Deflection	28	37	mm	29.1	Pass
Lateral Upper Spine Acceleration	17	22	g's	20.9	Pass

Transducer Calibrations

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

Probe Acceleration





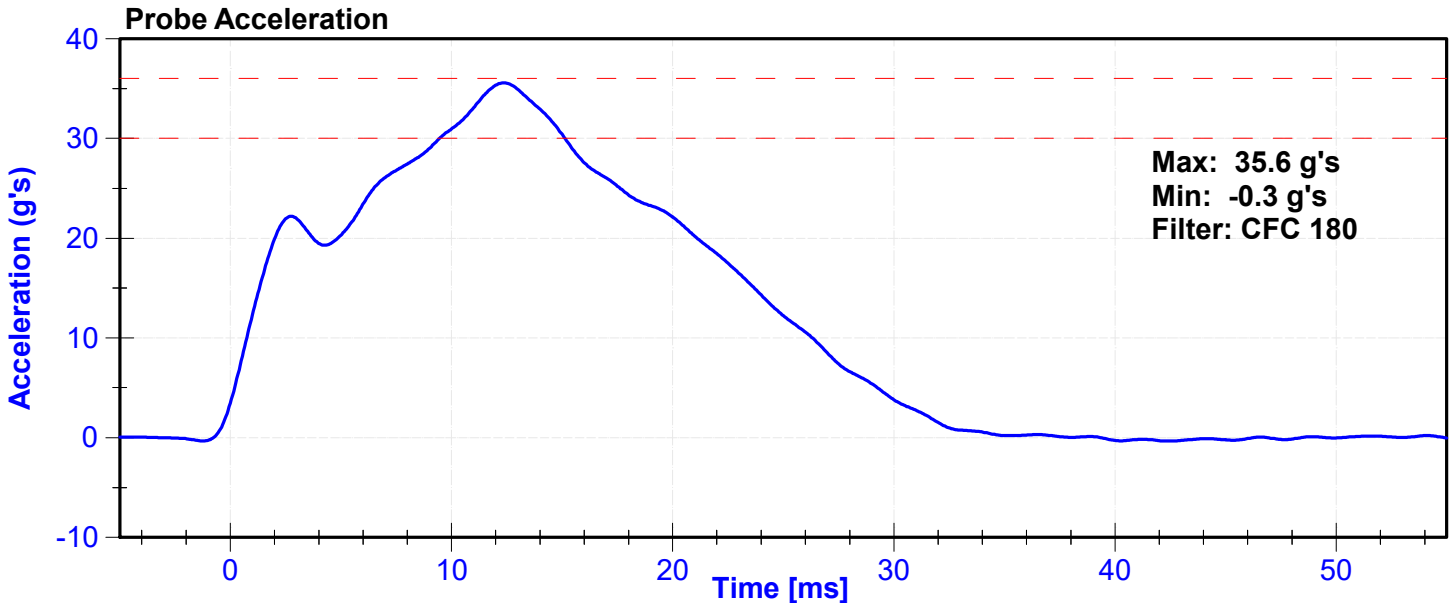
ATD Manufacturer	FTSS	Test Technician	J. Rios
ATD Serial Number	DG8012	Laboratory Supervisor	J. Kinderman

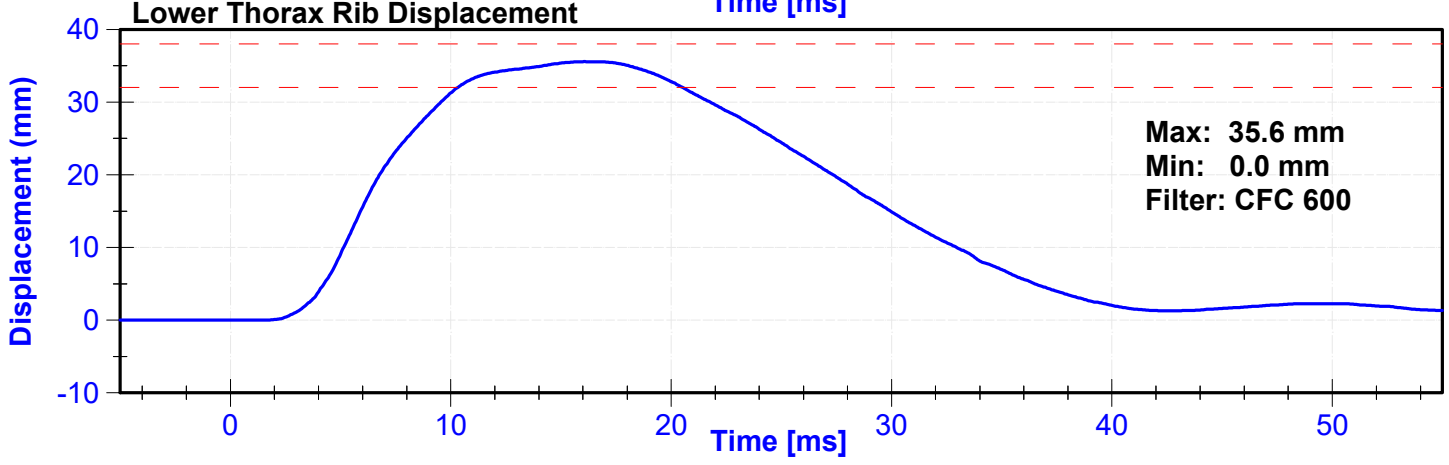
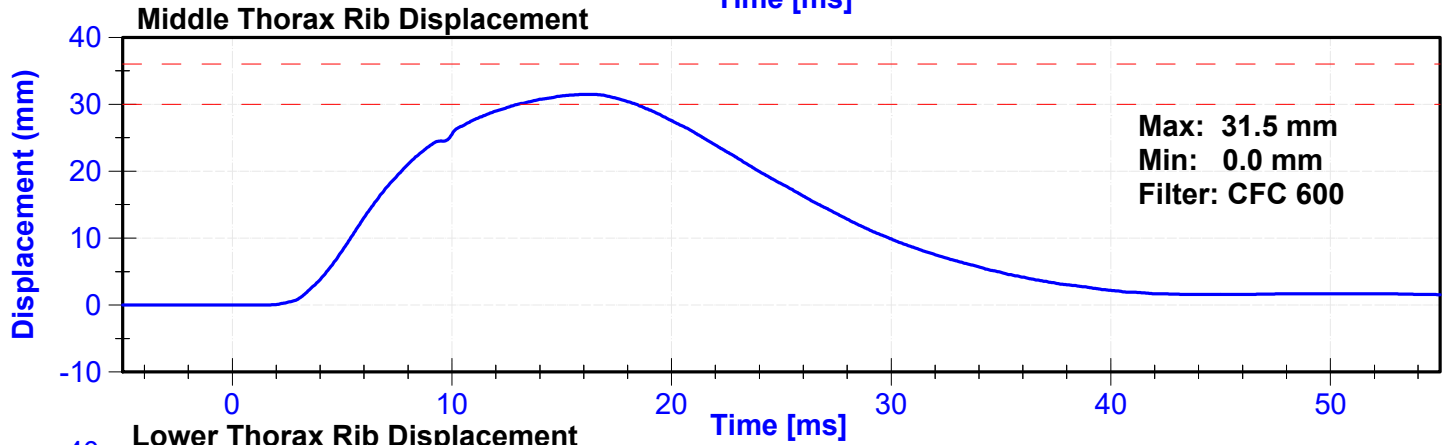
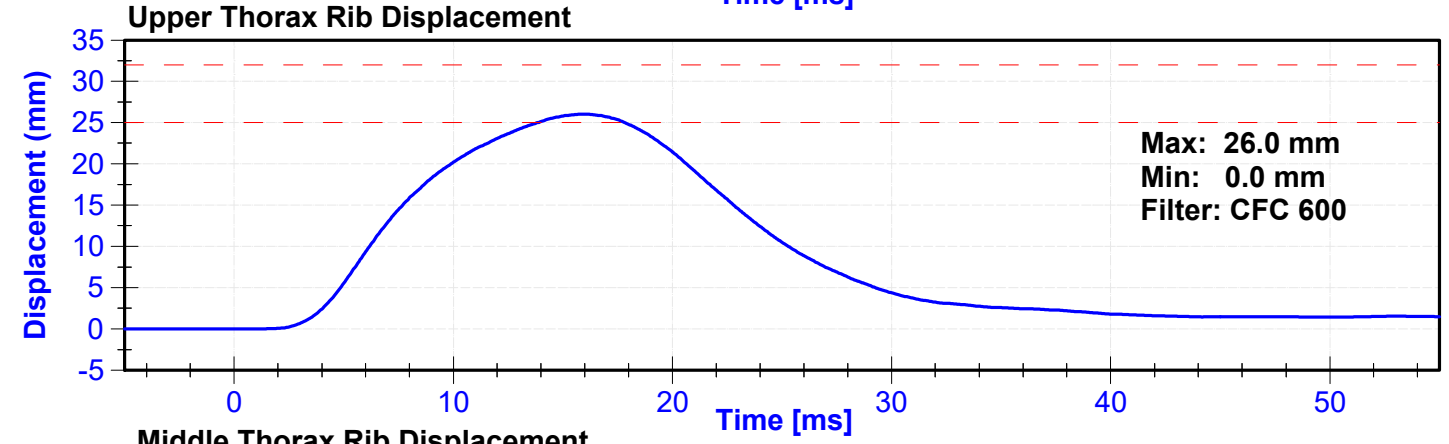
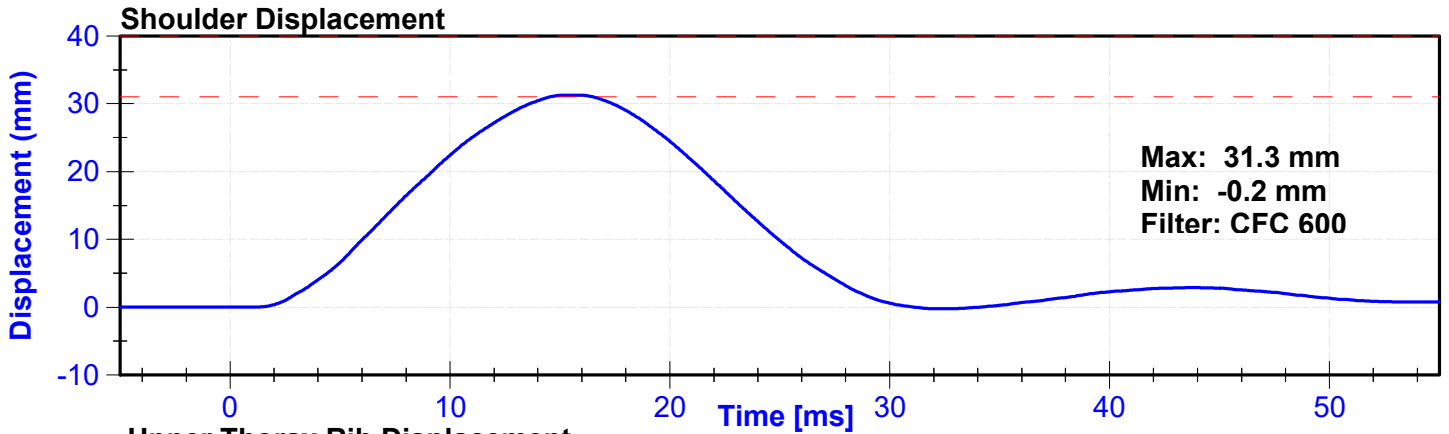
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	33	Pass
Velocity	6.6	6.8	m/s	6.67	Pass
Probe Acceleration after 5 ms	30	36	g's	35.6	Pass
Lateral Upper Spine Acceleration	34	43	g's	38.9	Pass
Lateral Lower Spine Acceleration	29	37	g's	32.9	Pass
Shoulder Deflection	31	40	mm	31.3	Pass
Upper Thorax Rib Deflection	25	32	mm	26.0	Pass
Mid Thorax Rib Deflection	30	36	mm	31.5	Pass
Lower Thorax Rib Deflection	32	38	mm	35.6	Pass

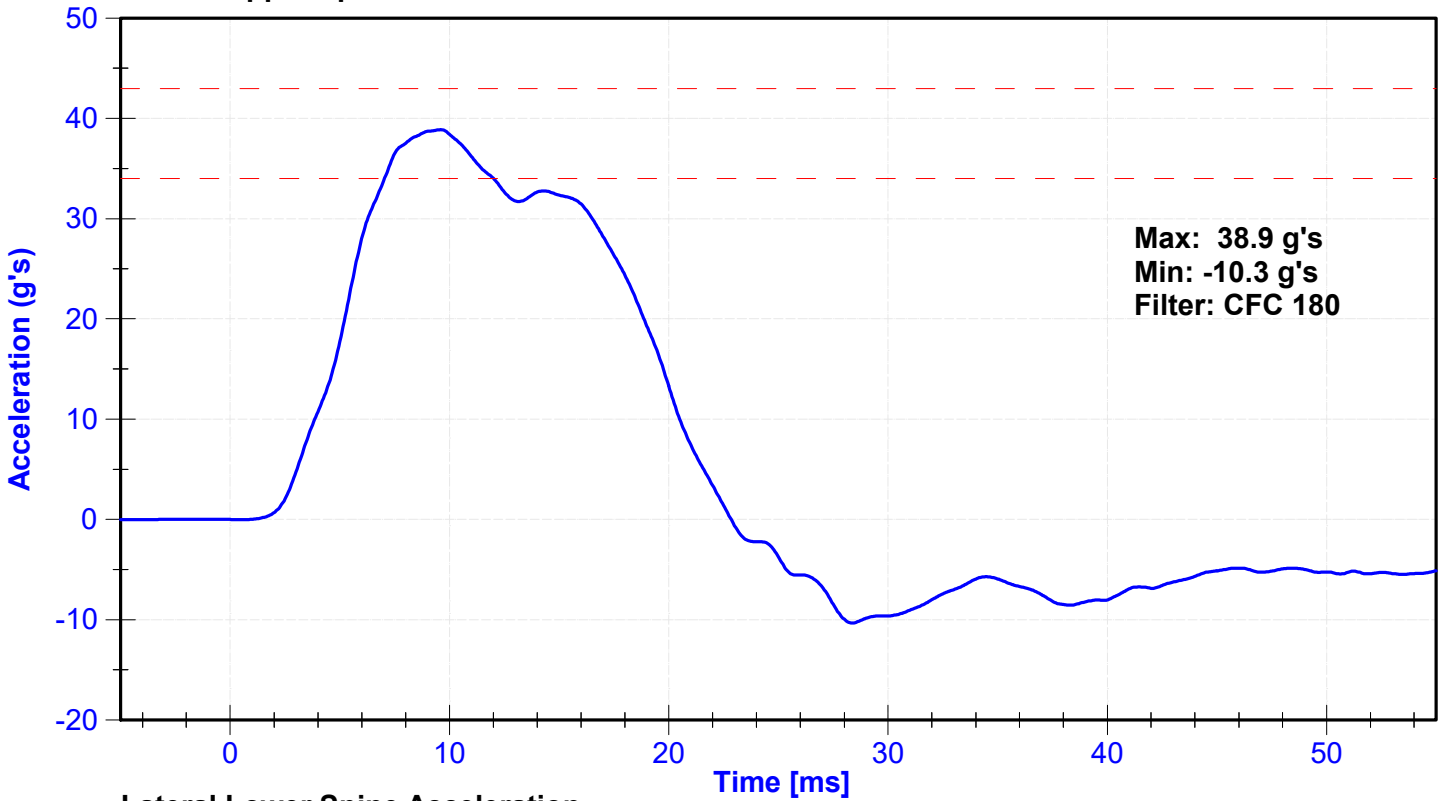
Transducer Calibrations

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Upper Spine T1 Y Accelerometer	Endevco	P64148	10/17/2024	4/15/2025
Upper Spine T12 Y Accelerometer	Endevco	P51327	10/17/2024	4/15/2025
Shoulder Potentiometer	Servo	1274GFE	10/16/2024	4/16/2025
Upper Thorax Rib Potentiometer	Servo	1199GFE	10/16/2024	4/16/2025
Middle Thorax Rib Potentiometer	Servo	1246GFE	10/16/2024	4/16/2025
Lower Thorax Rib Potentiometer	Servo	011GFE	10/16/2024	4/16/2025

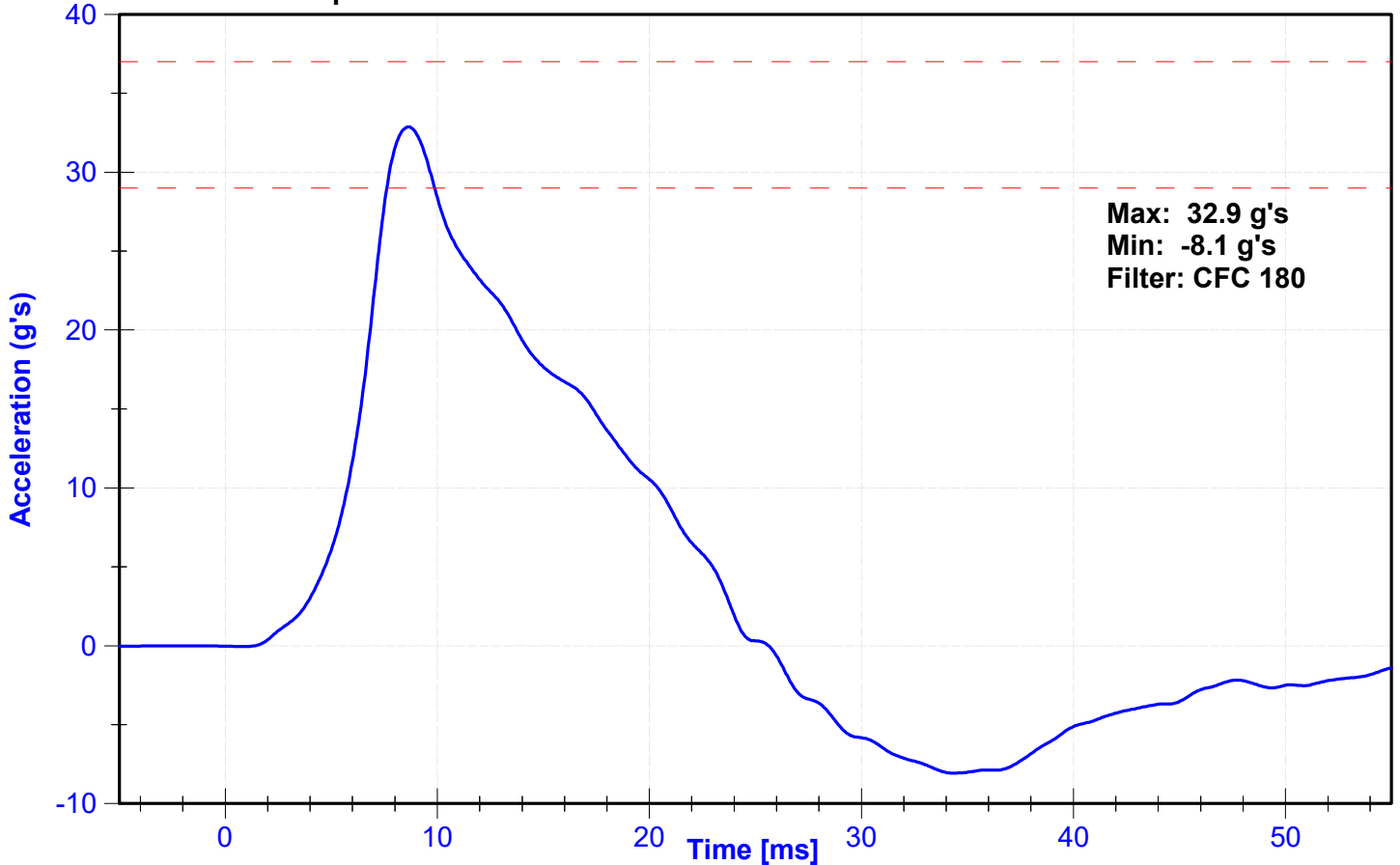




Lateral Upper Spine Acceleration



Lateral Lower Spine Acceleration



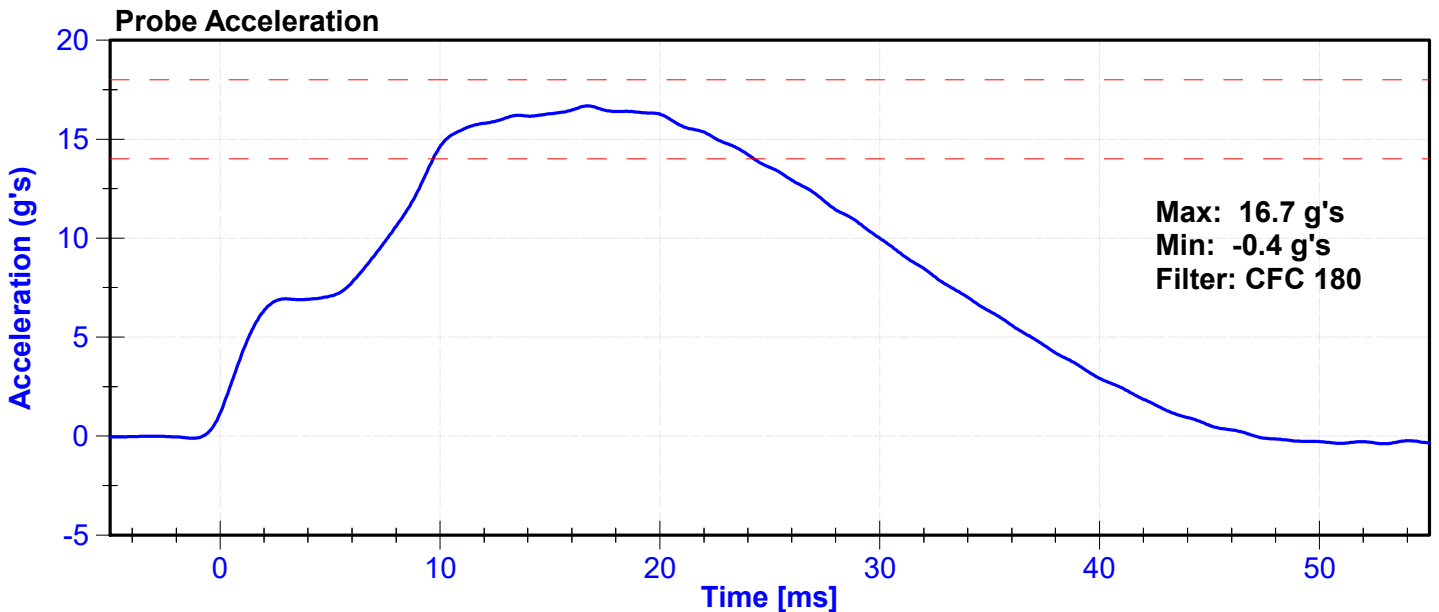
ATD Manufacturer	FTSS	Test Technician	J. Rios
ATD Serial Number	DG8012	Laboratory Supervisor	J. Kinderman

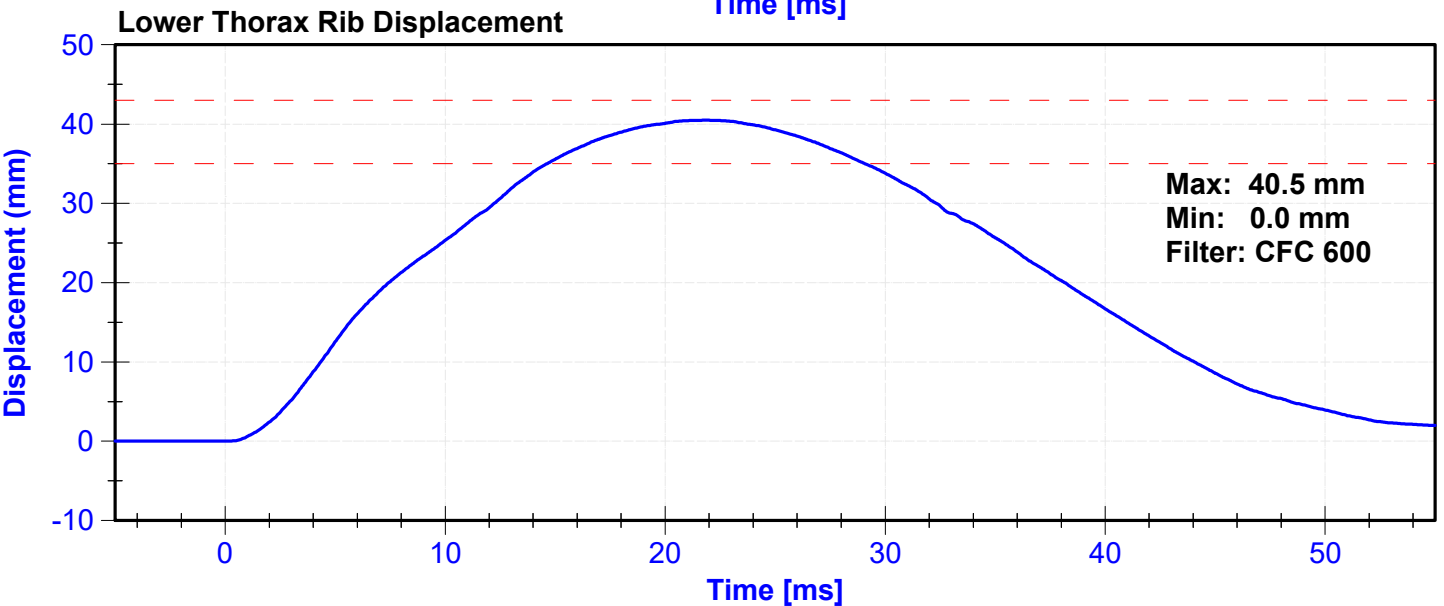
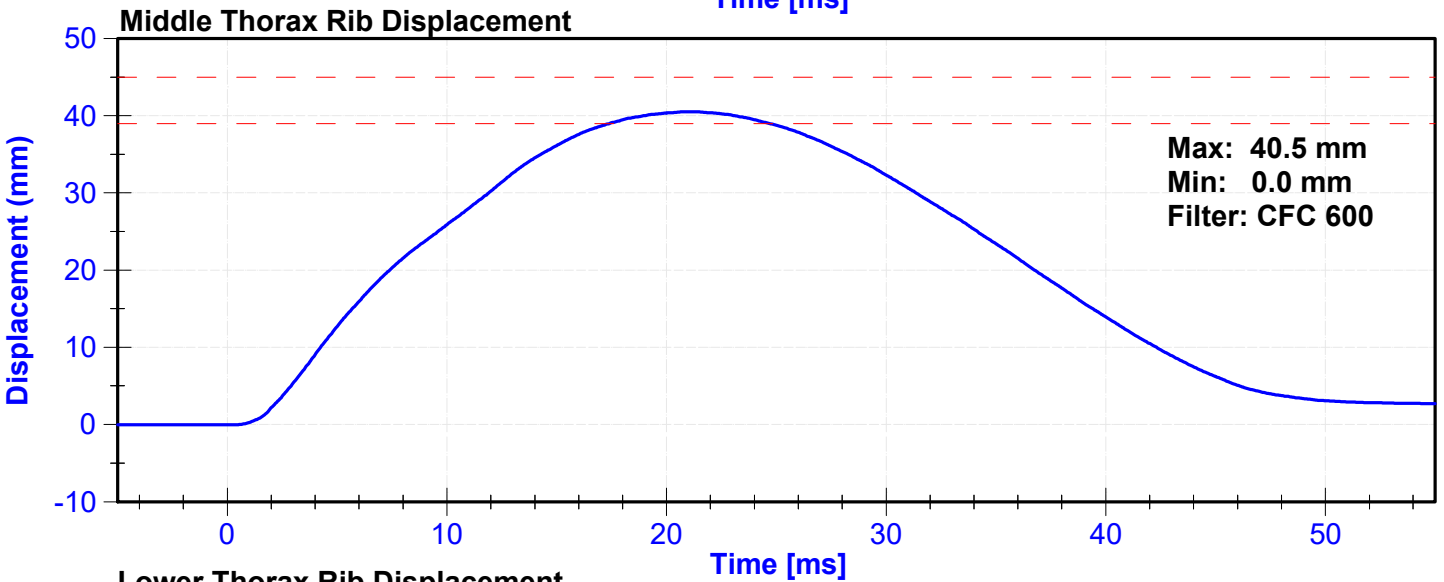
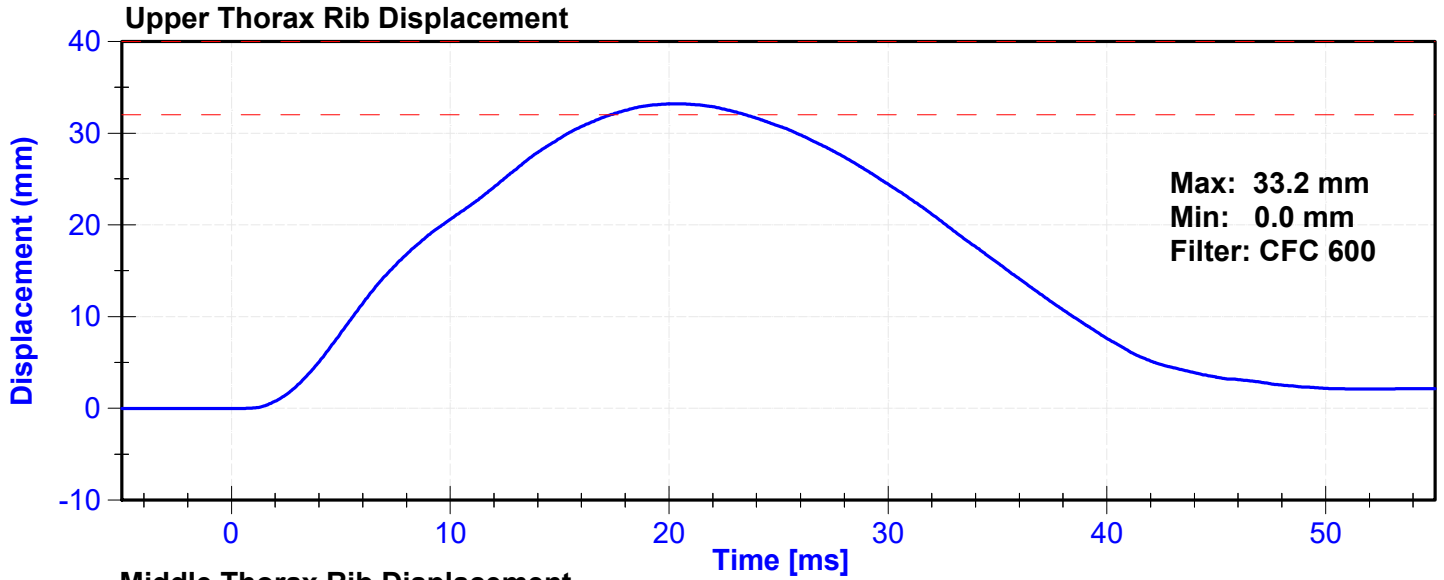
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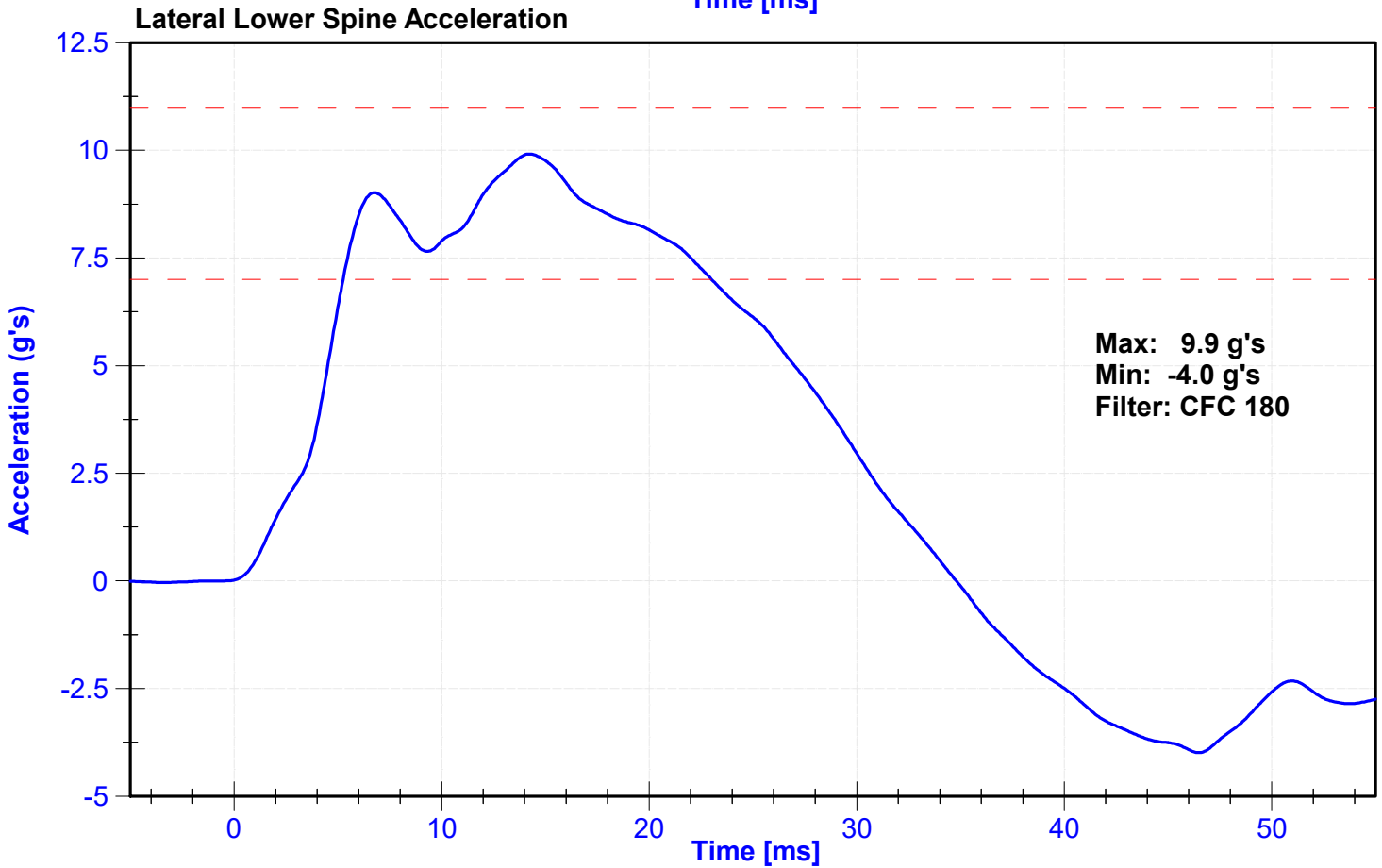
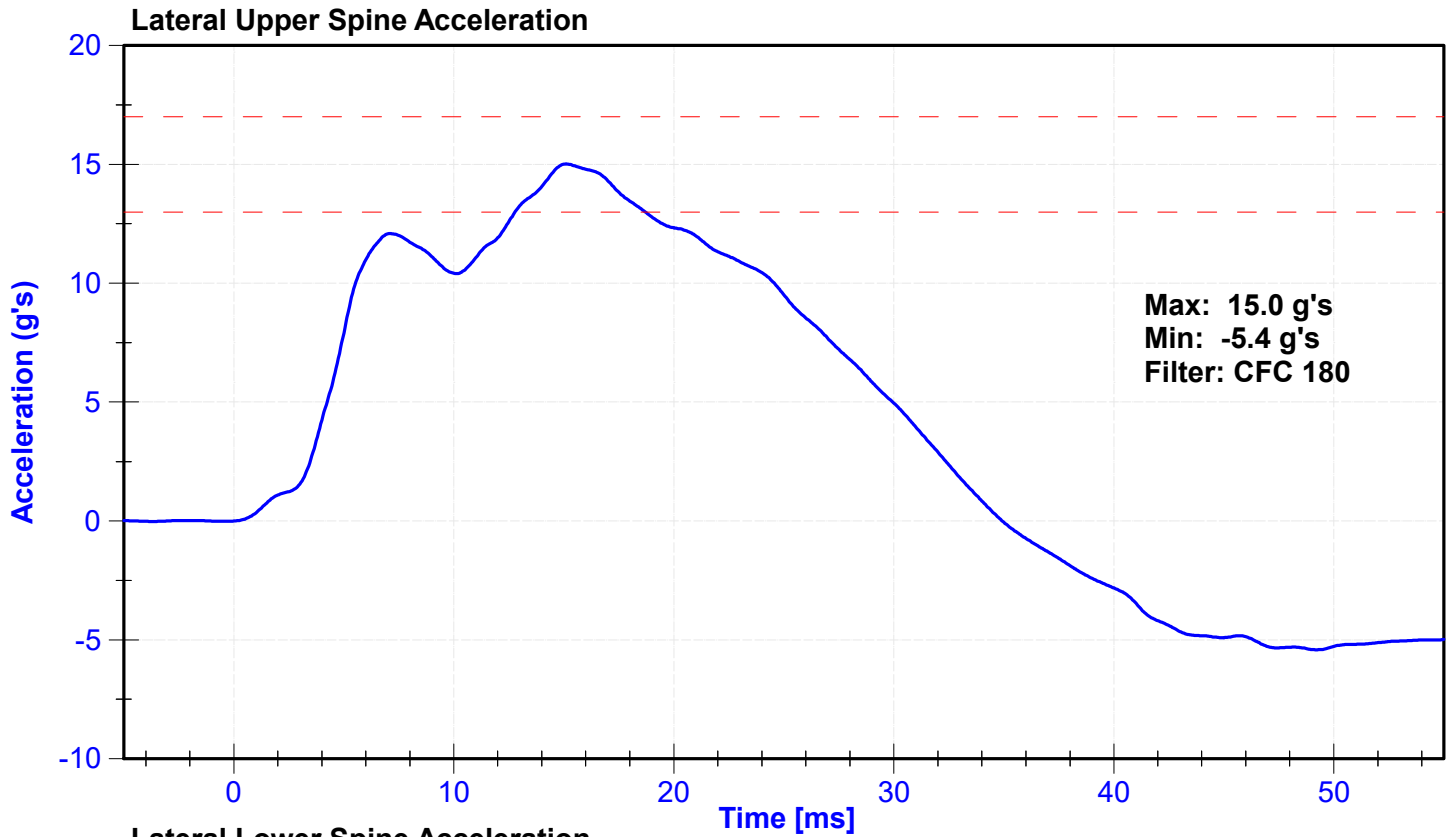
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	33	Pass
Velocity	4.2	4.4	m/s	4.30	Pass
Probe Acceleration	14	18	g's	16.7	Pass
Lateral Upper Spine Acceleration	13	17	g's	15.0	Pass
Lateral Lower Spine Acceleration	7	11	g's	9.9	Pass
Upper Thorax Rib Deflection	32	40	mm	33.2	Pass
Middle Thorax Rib Deflection	39	45	mm	40.5	Pass
Lower Thorax Rib Deflection	35	43	mm	40.5	Pass

Transducer Calibrations

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







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

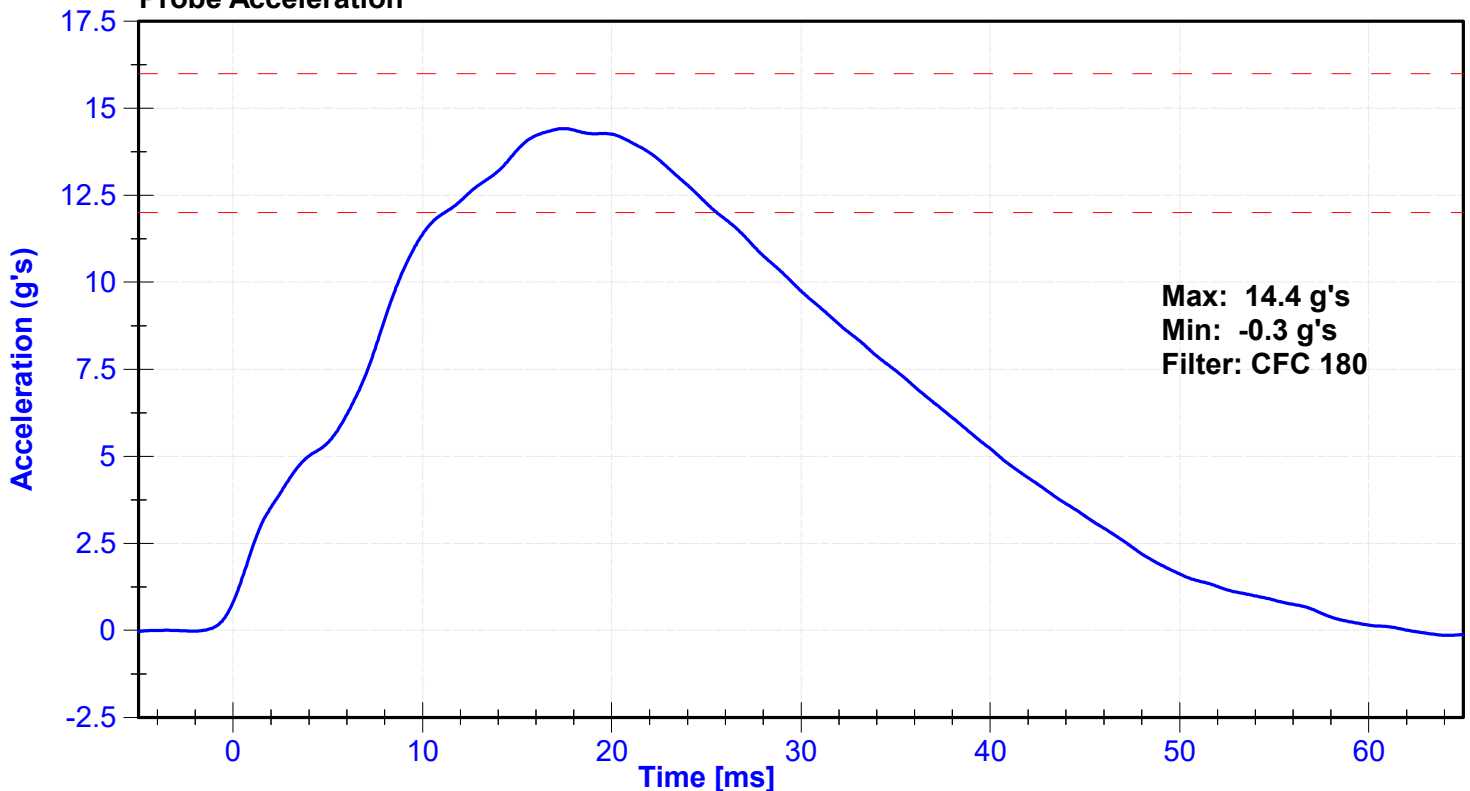
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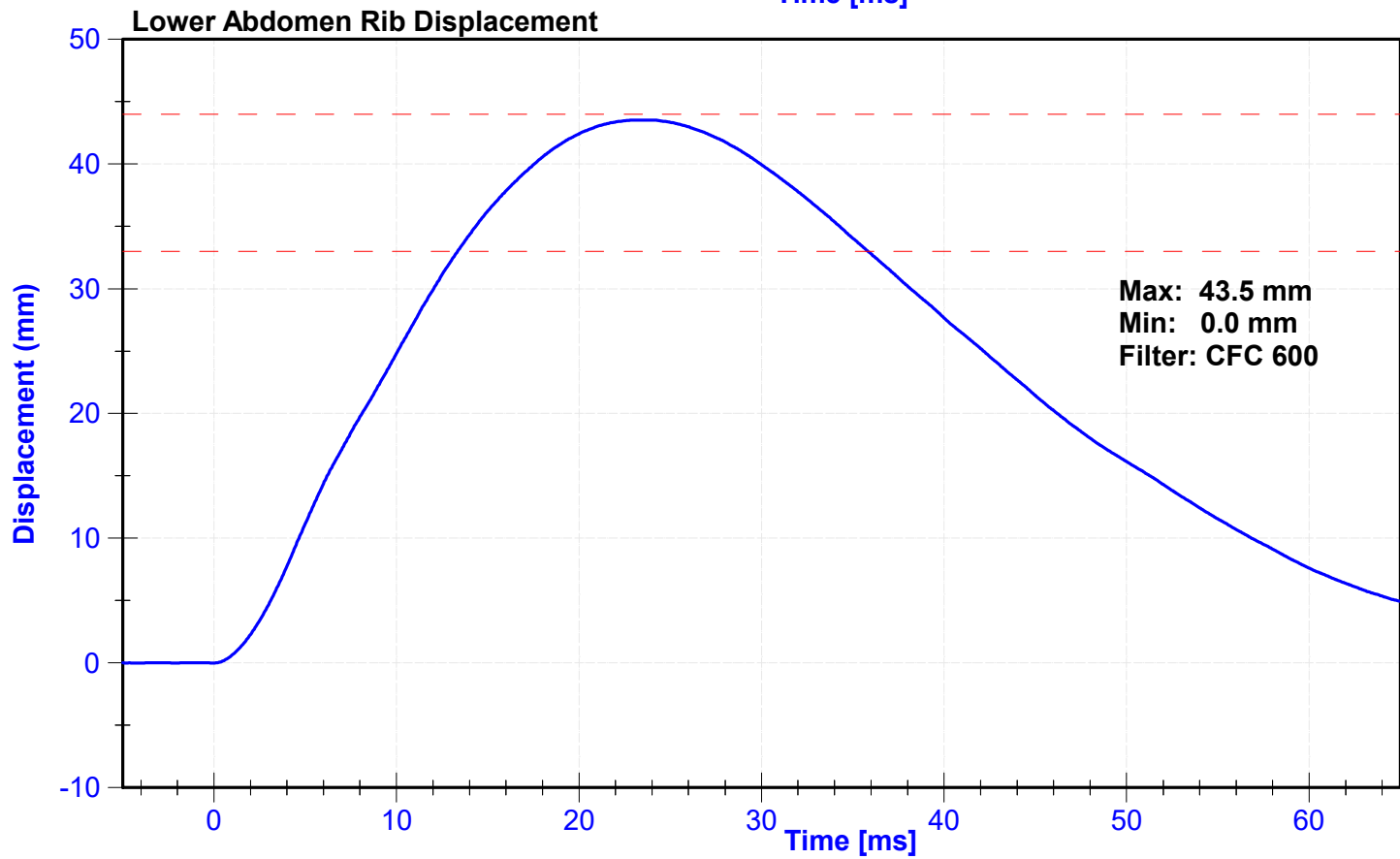
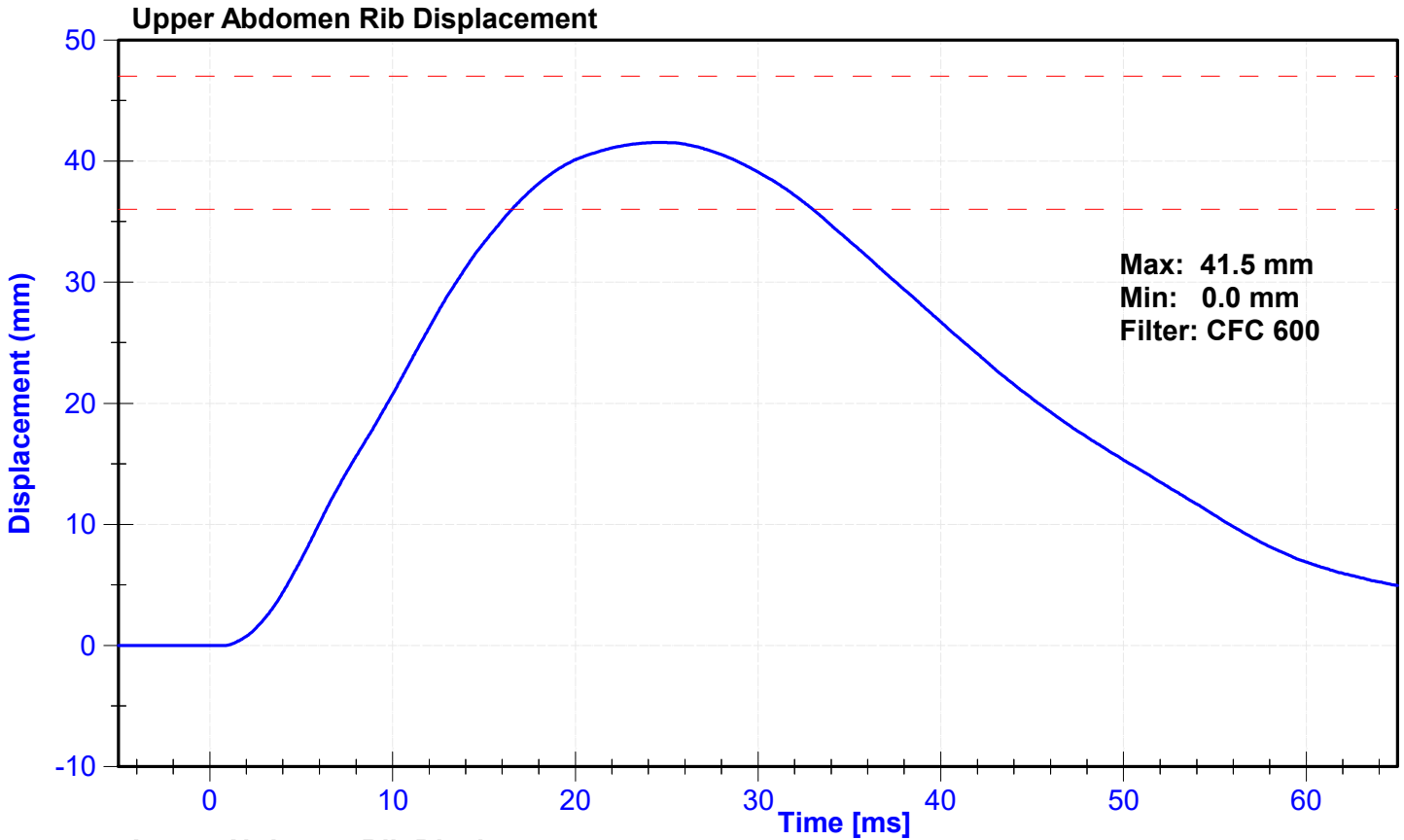
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	33	Pass
Velocity	4.2	4.4	m/s	4.30	Pass
Probe Acceleration	12	16	g's	14.4	Pass
Lateral Lower Spine Acceleration	9	14	g's	10.2	Pass
Upper Abdomen Rib Deflection	36	47	mm	41.5	Pass
Lower Abdomen Rib Deflection	33	44	mm	43.5	Pass

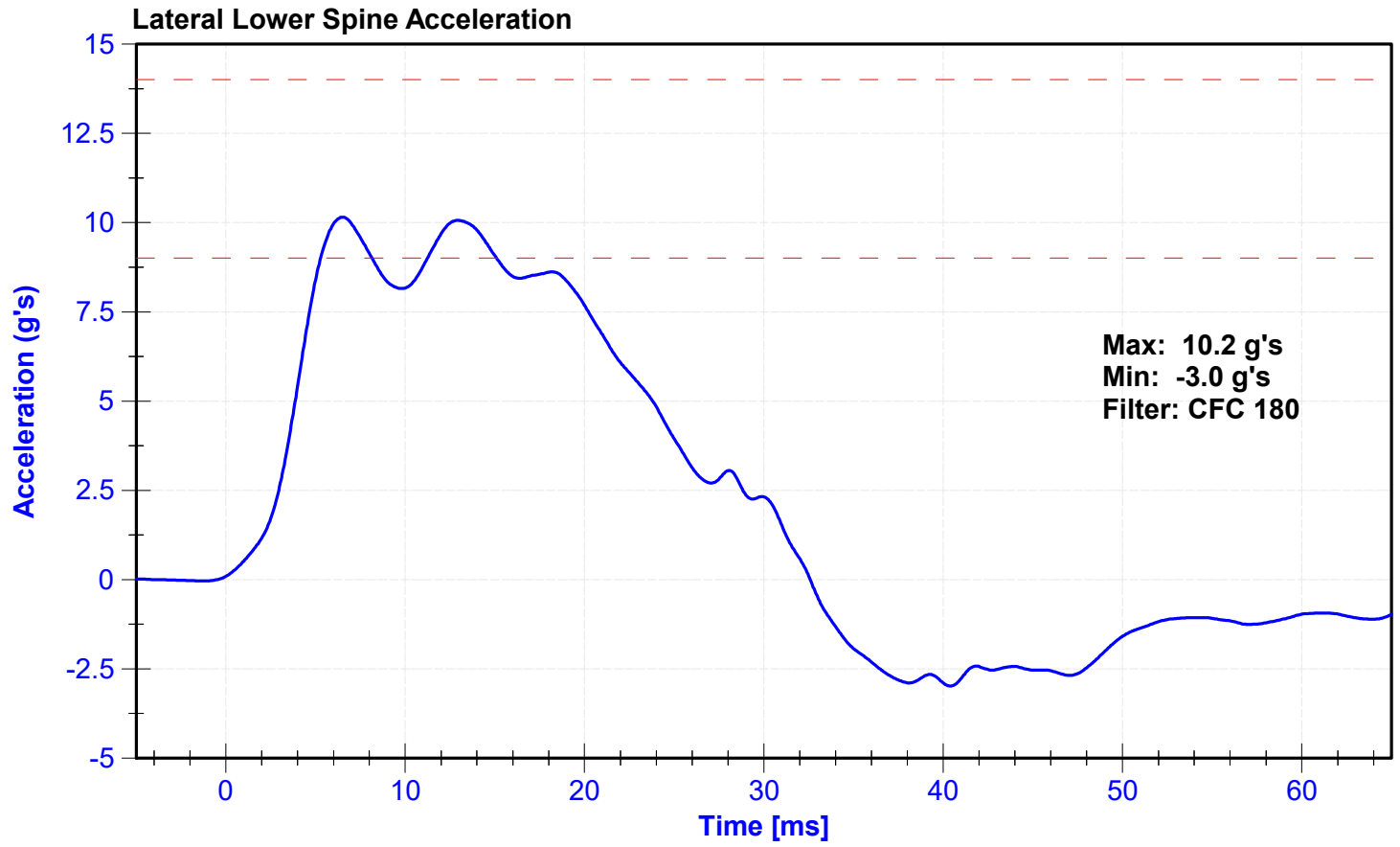
Transducer Calibrations

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

Probe Acceleration







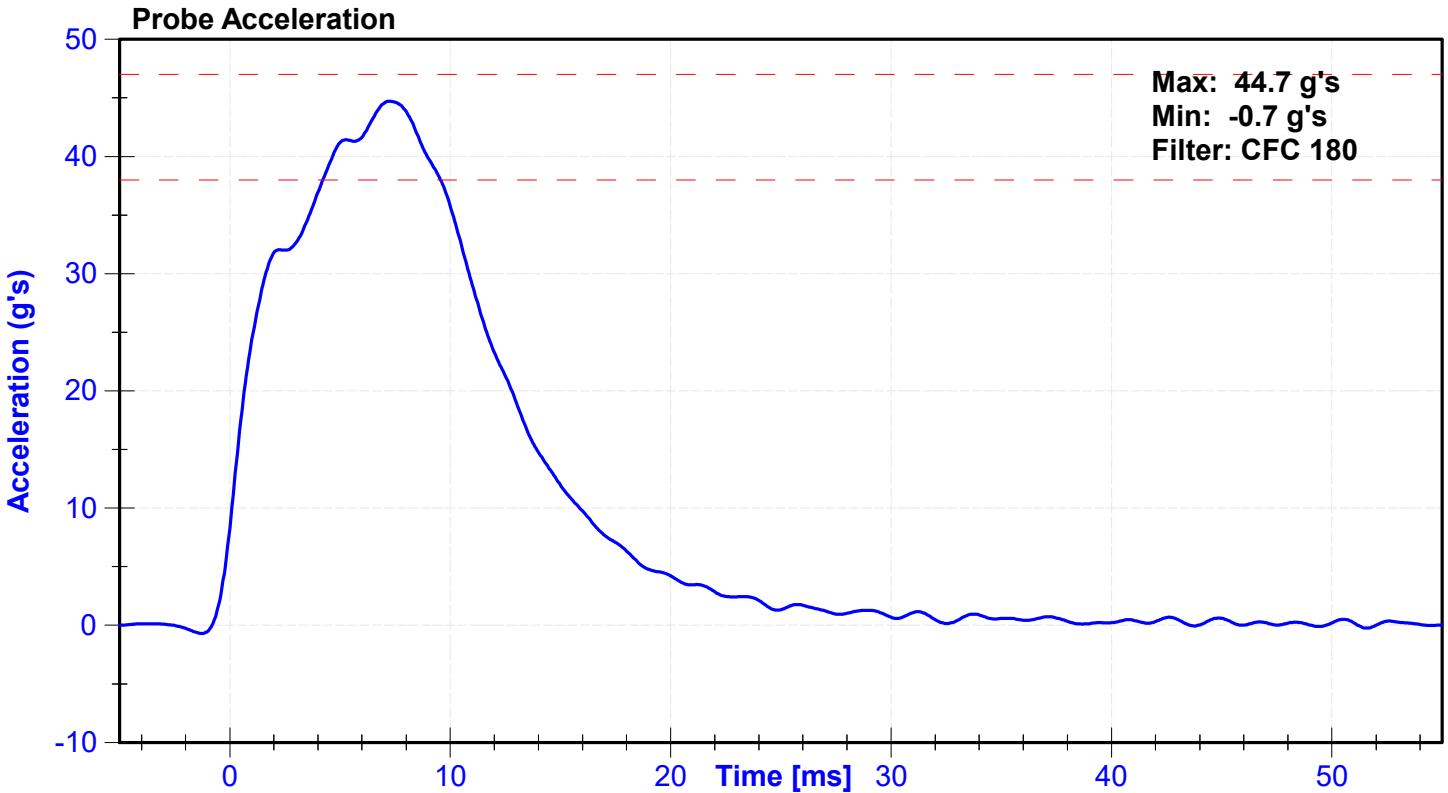
ATD Manufacturer	FTSS	Test Technician	J. Rios
ATD Serial Number	DG8012	Laboratory Supervisor	J. Kinderman

Results

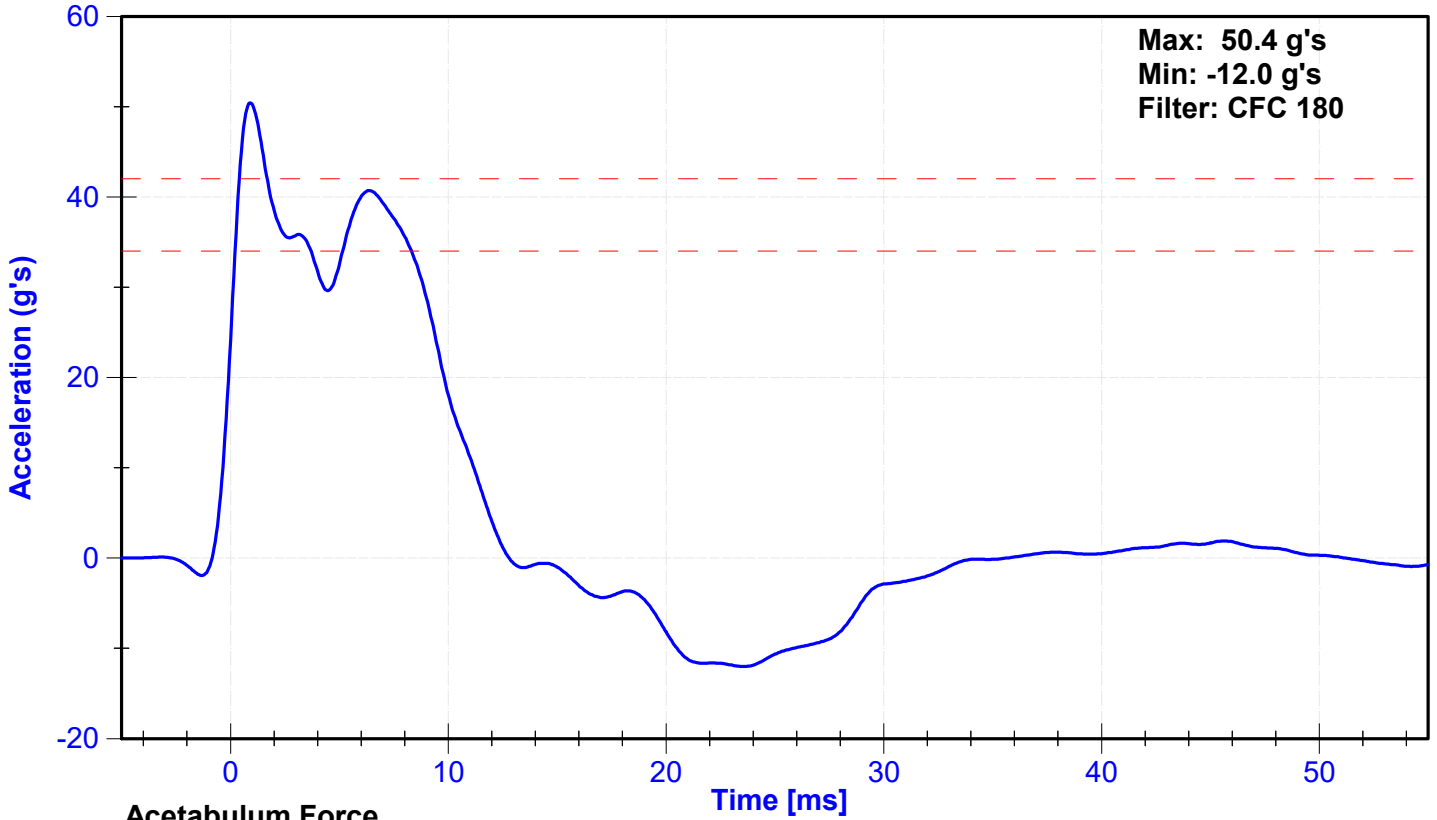
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	33	Pass
Velocity	6.6	6.8	m/s	6.67	Pass
Probe Acceleration	38	47	g's	44.7	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	40.7	Pass
Acetabulum Force	3600	4300	N	3898.2	Pass

Transducer Calibrations

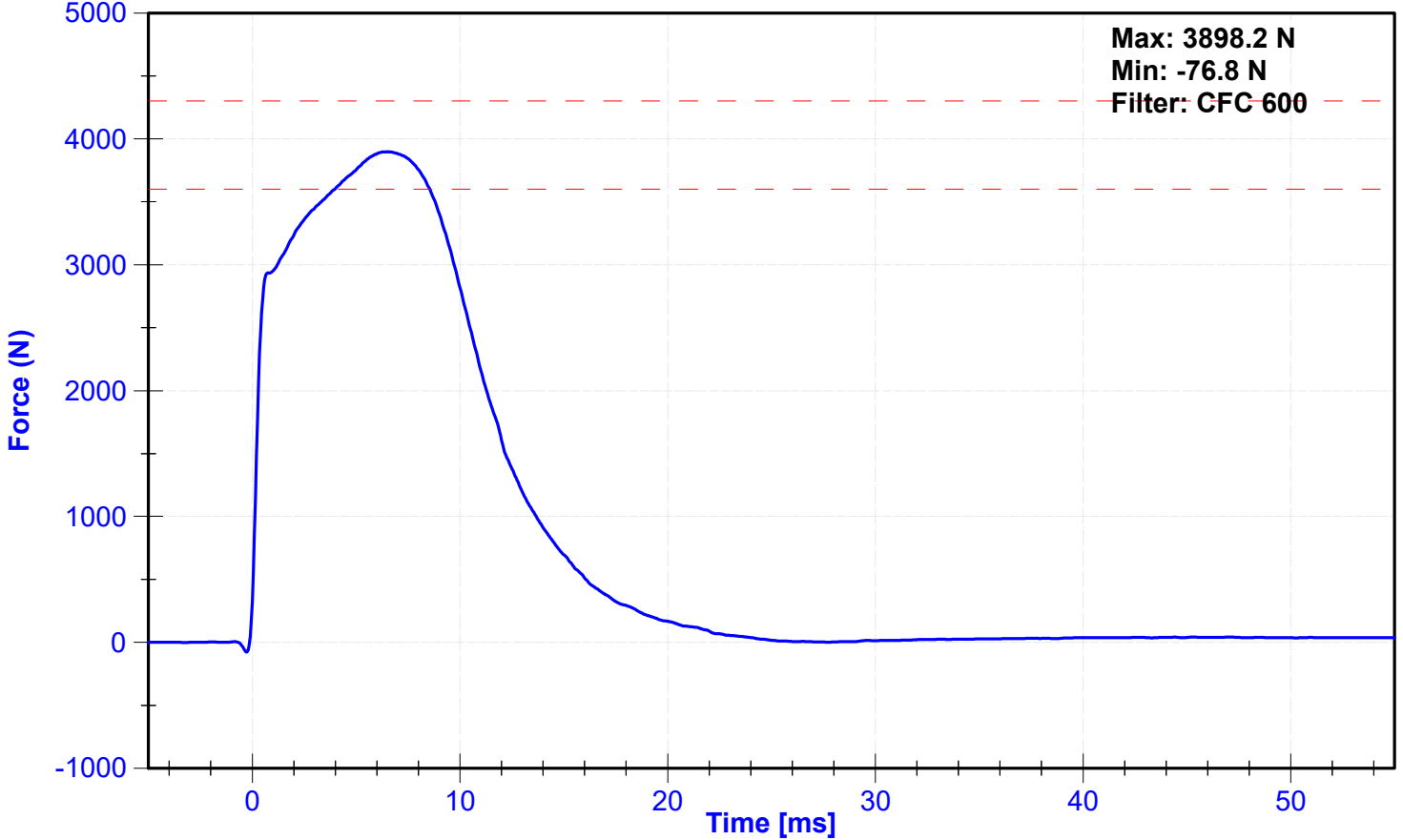
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18527	8/2/2024	1/29/2025
Pelvis Y Accelerometer	Endevco	T20860	10/17/2024	4/15/2025
Acetabulum Load Cell	Denton	270-FY	9/16/2024	9/16/2025
Certification Plug	SACO			N/A
Crash Test Plug	SACO			N/A



Lateral Pelvis Acceleration



Acetabulum Force





SID-ILS Pelvis Plug Certification Test

Plug S/N 16732

Test Number 23532

Report Number 23589

Test Date 7/22/2022 12:49:50 PM

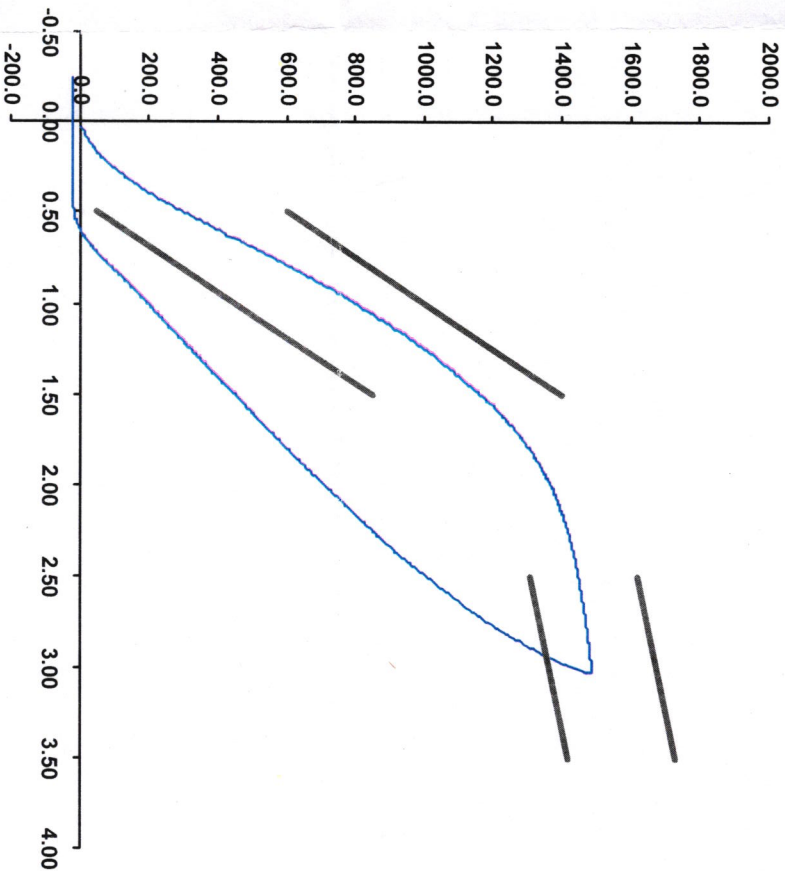
Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	50	600
Force @ 1.5 mm (N)	850	1,400
Force @ 2.5 mm (N)	1,306	1,618
Force @ 3.0 mm (N)	1,361	1,673

Testing Machine STM-20 5965542
 Load Cell S/N (FI360947), Units (LBS) 1000

Crosshead Speed (mm / min) or Rate 12.7
 Extension or Position Measured by XHD_100 (XHD100)

Notes: *Cart Plug 11.21.21 Dg8012*

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107 22-Jul-22
 SACO Research

By: *DC* Date: *7/22/22*

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



SID-IIS Pelvis Plug Certification Test

Plug S/N 16759

Test Number 23562

Report Number 23619

Test Date 7/22/2022 1:51:22 PM

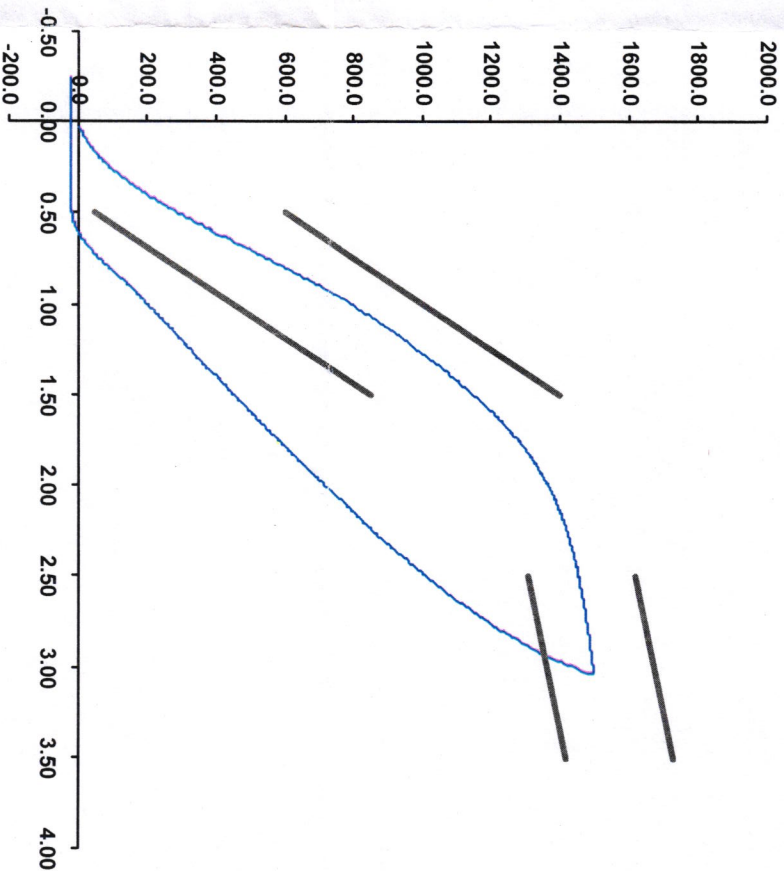
Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	50	600
Force @ 1.5 mm (N)	850	1,400
Force @ 2.5 mm (N)	1,306	1,618
Force @ 3.0 mm (N)	1,361	1,673

Testing Machine STM-20 5965542
Load Cell S/N (F1360947), Units (LBS) 1000

Crosshead Speed (mm / min) or Rate 12.7
Extension or Position Measured by XHD_100 (XHD100)

Notes: ADW - IMPACT 11-21-24 D48012

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107 22-Jul-22

SACO Research

By: DC

Date: 7/22/22

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



SID-ILIS Pelvis Plug Certification Test

Plug S/N 16692

Test Number 23492

Report Number 23549

Test Date 7/22/2022 10:57:41 AM

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

Testing Machine STM-20 5965542
 Load Cell S/N (F1360947), Units (LBS) 1000

Crosshead Speed (mm / min) or Rate 12.7
 Extension or Position Measured by XHD_100 (XHD100)

Notes: **FRACKT** 11-21-24 **D68012**

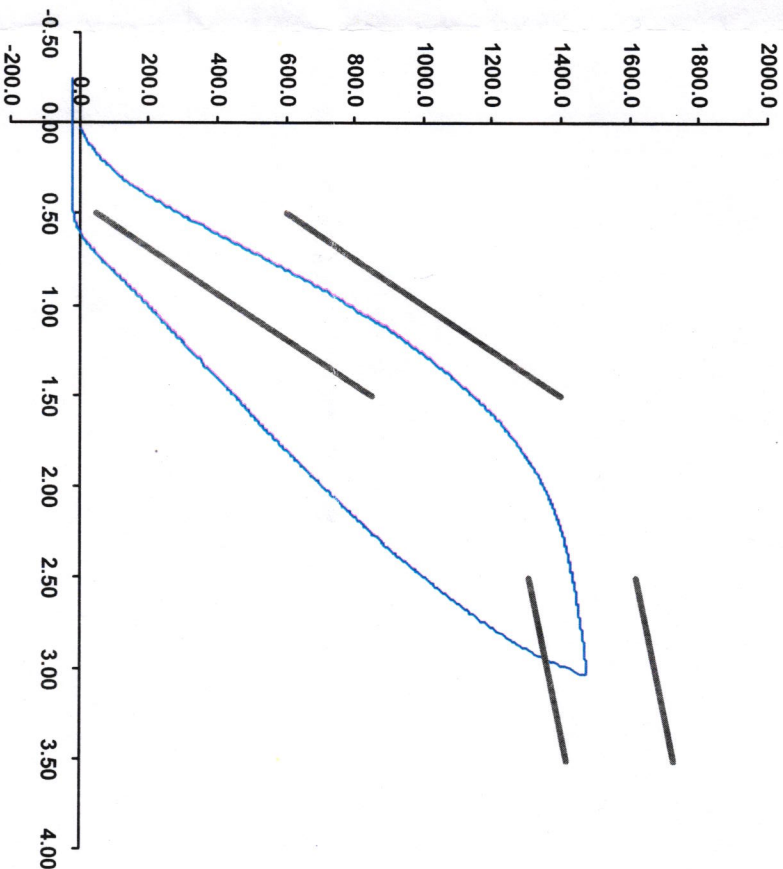
Operator

Part Number 180-4450

Template No 107 22-Jul-22

SACO Research

Force (-N) vs Extension (-mm)



By: *DC* Date: *7/22/22*

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

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

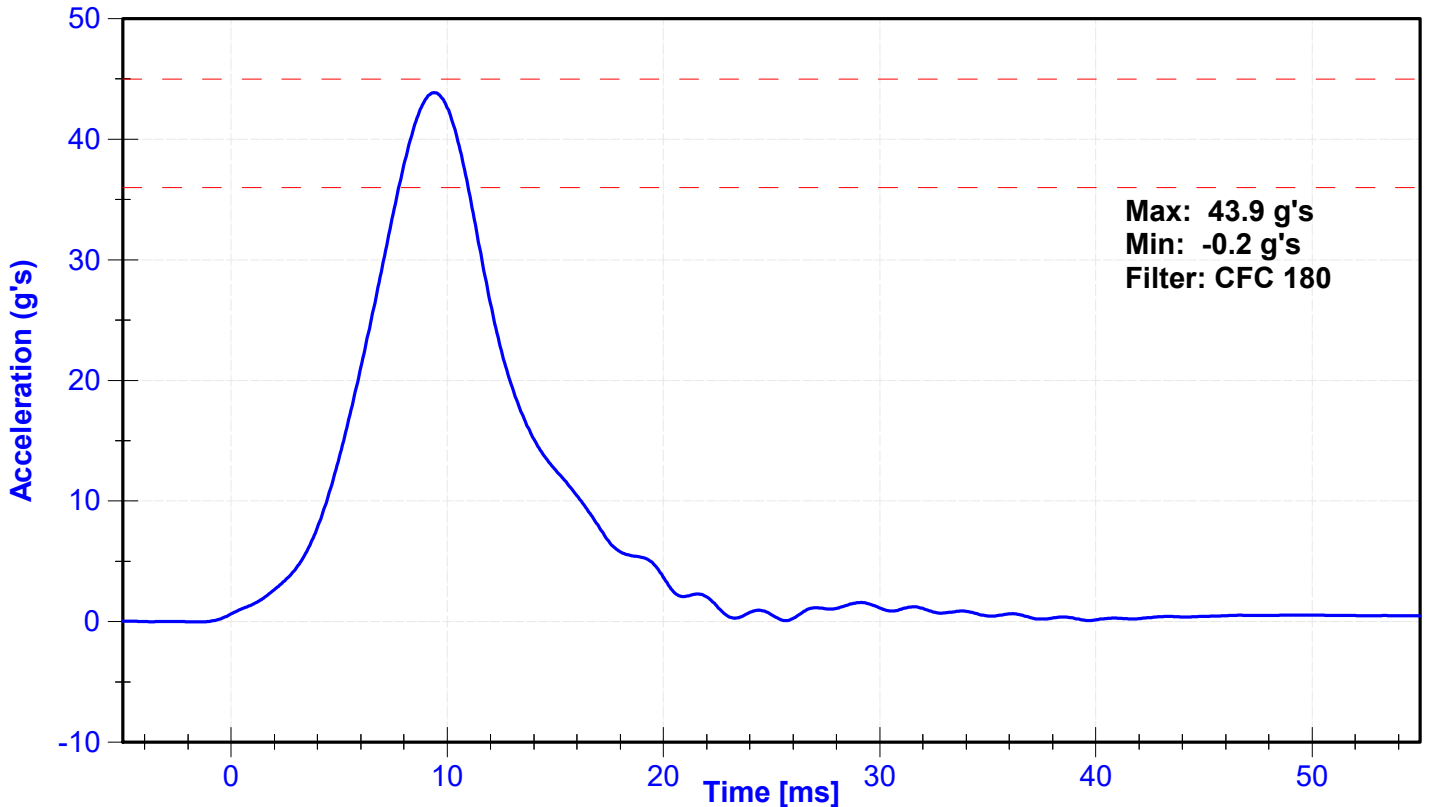
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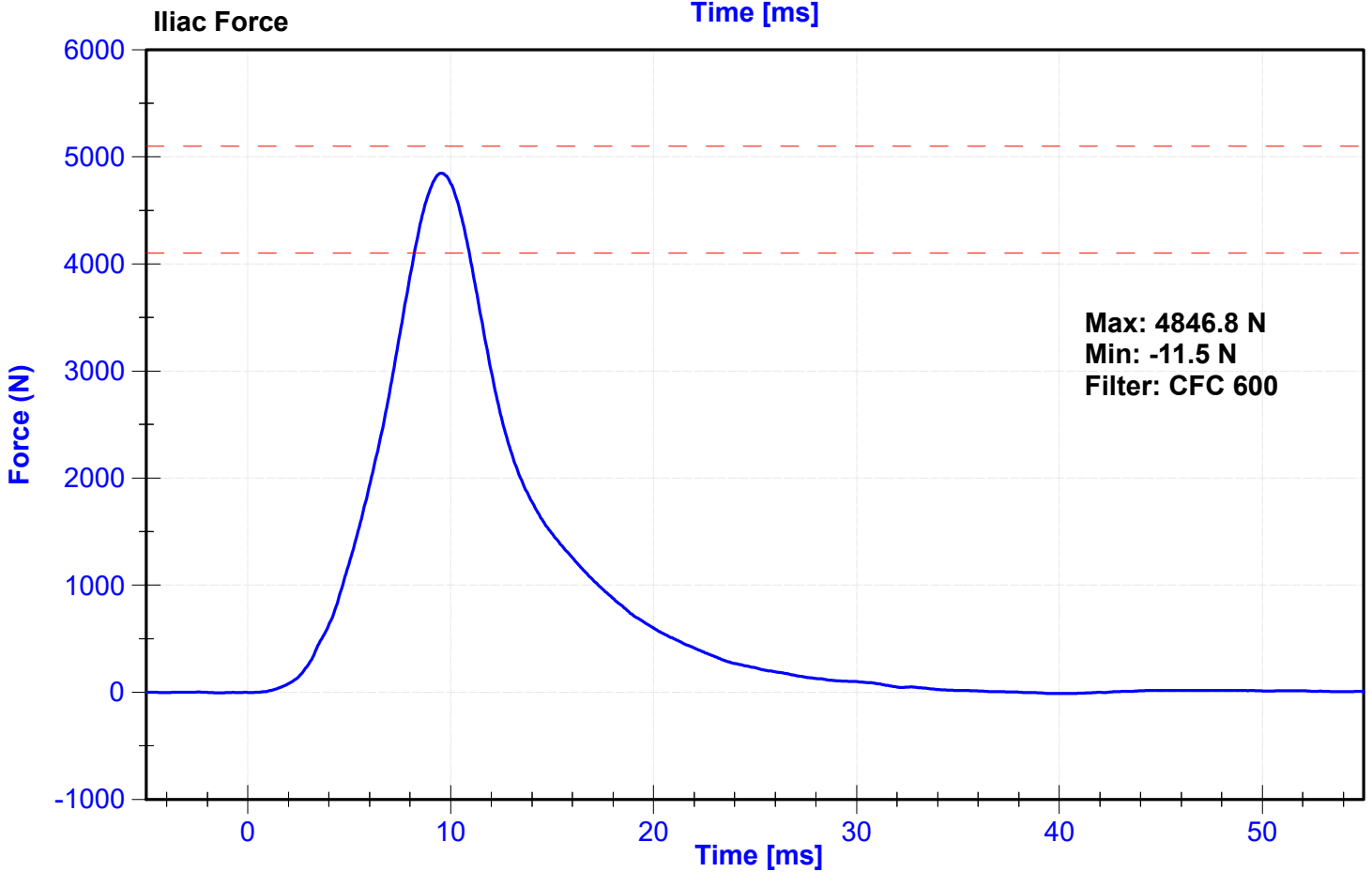
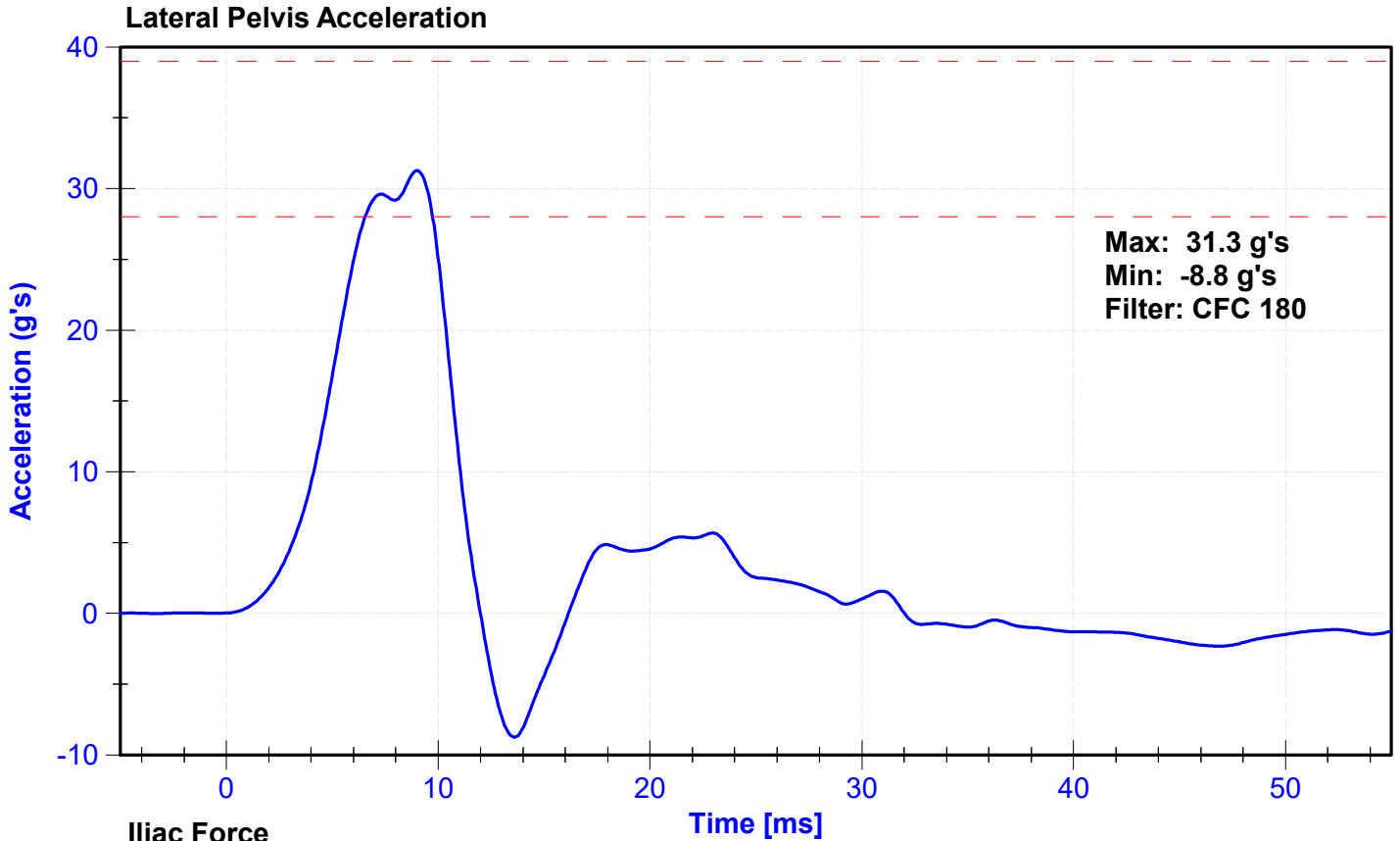
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	33	Pass
Velocity	4.2	4.4	m/s	4.29	Pass
Probe Acceleration	36	45	g's	43.9	Pass
Lateral Pelvis Acceleration	28	39	g's	31.3	Pass
Iliac Force	4100	5100	N	4846.8	Pass

Transducer Calibrations

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

Probe Acceleration





CALIBRATION TEST RESULTS

POST-TEST

SID-IIS 5TH PERCENTILE FEMALE - DRIVER ATD

SERIAL NO:DG8012

(CONFIGURED FOR LEFT SIDE IMPACT)

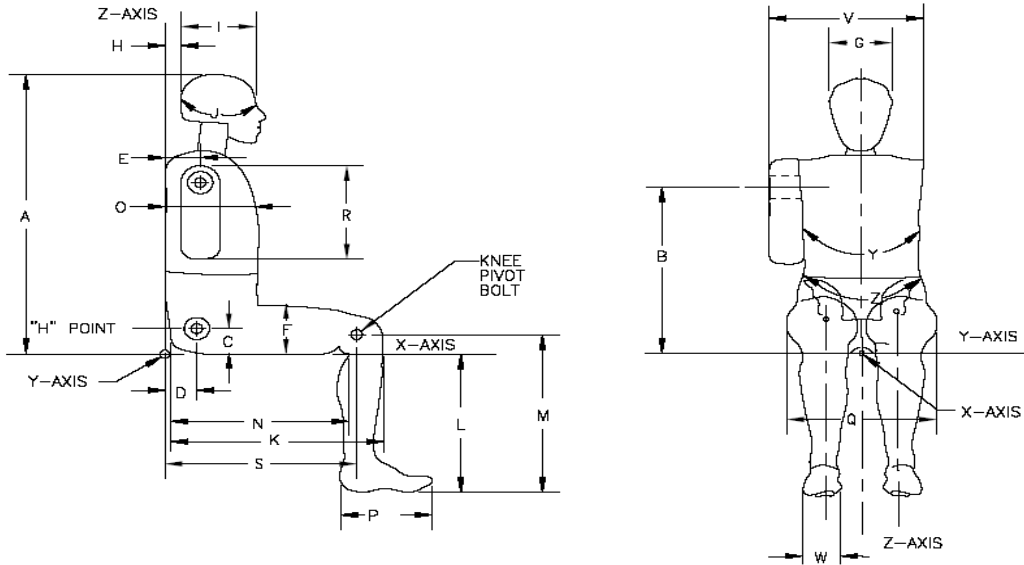


External Measurements - SID-IIs

Technician: J. Rios

Date: 1/15/2025

Dummy Serial Number: DG8012



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

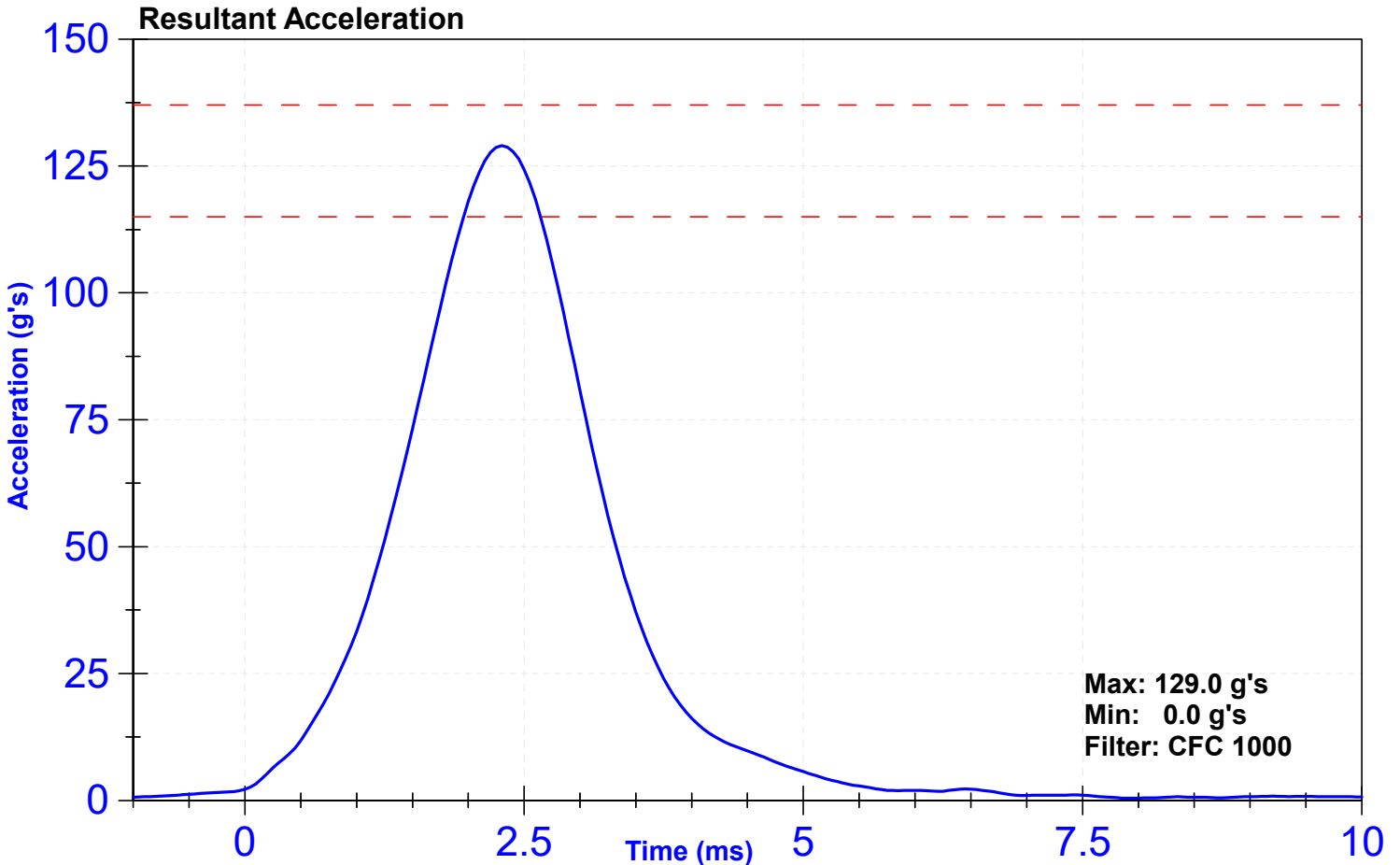
ATD Manufacturer	FTSS	Test Technician	E. Andruczyk
ATD Serial Number	DG8012	Laboratory Supervisor	J. Kinderman

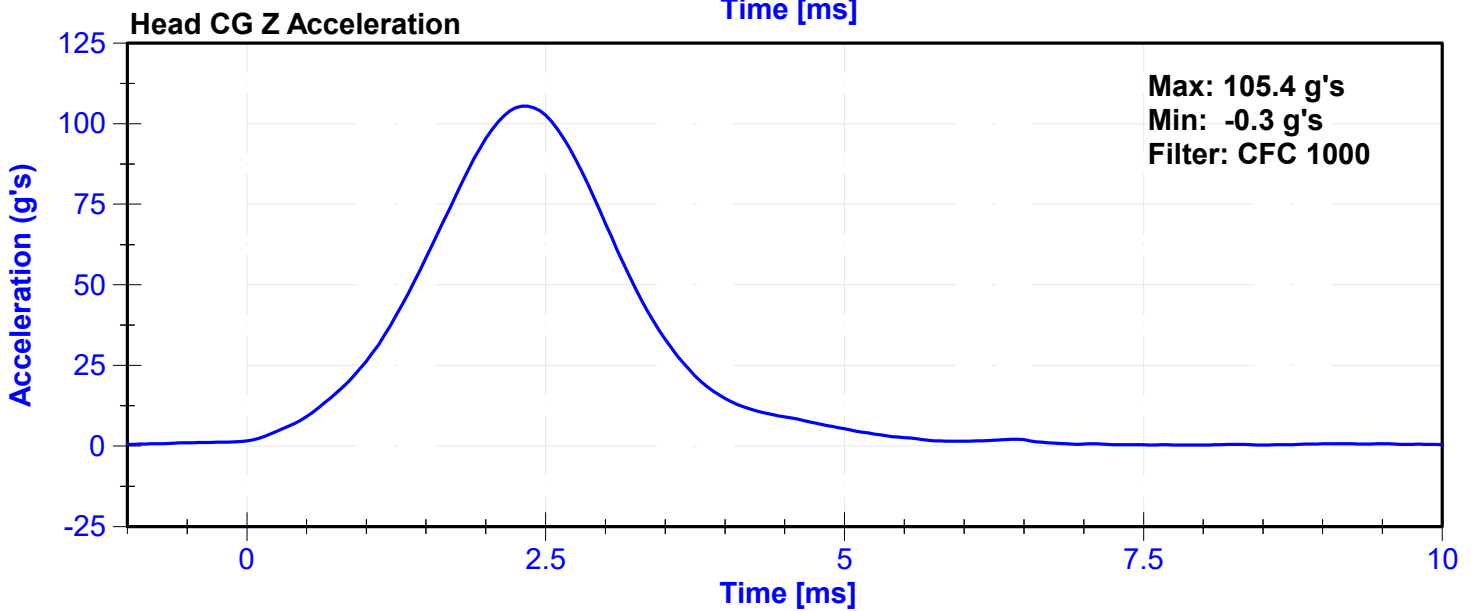
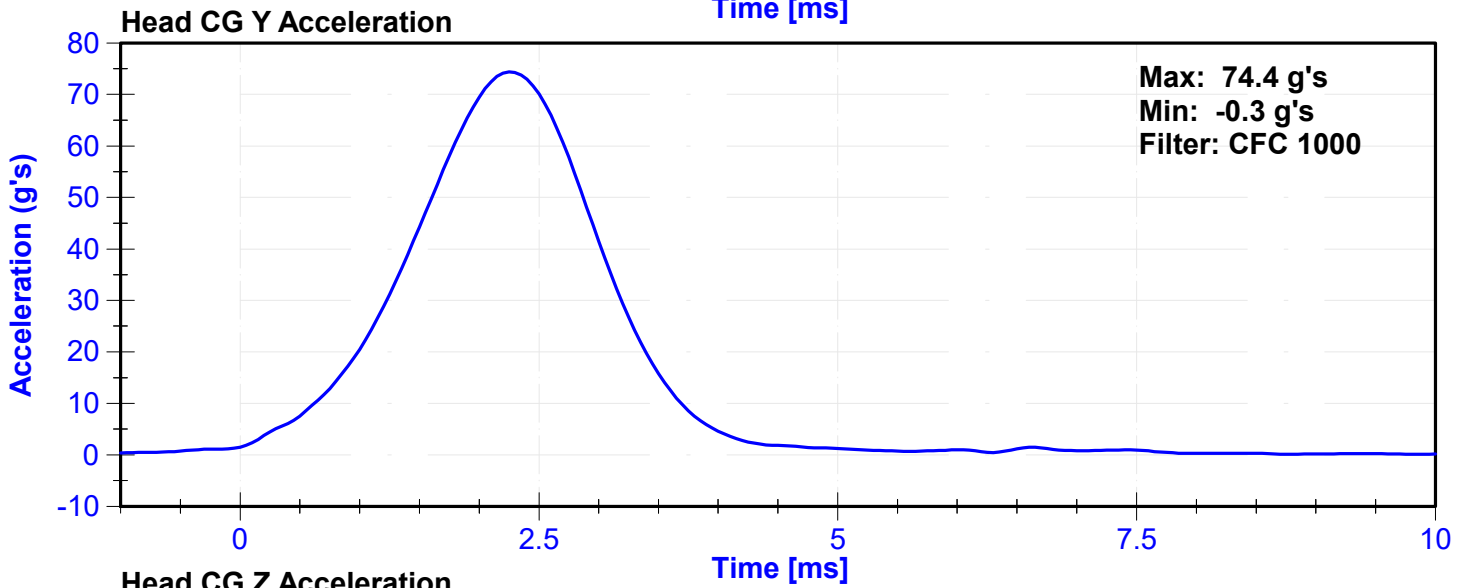
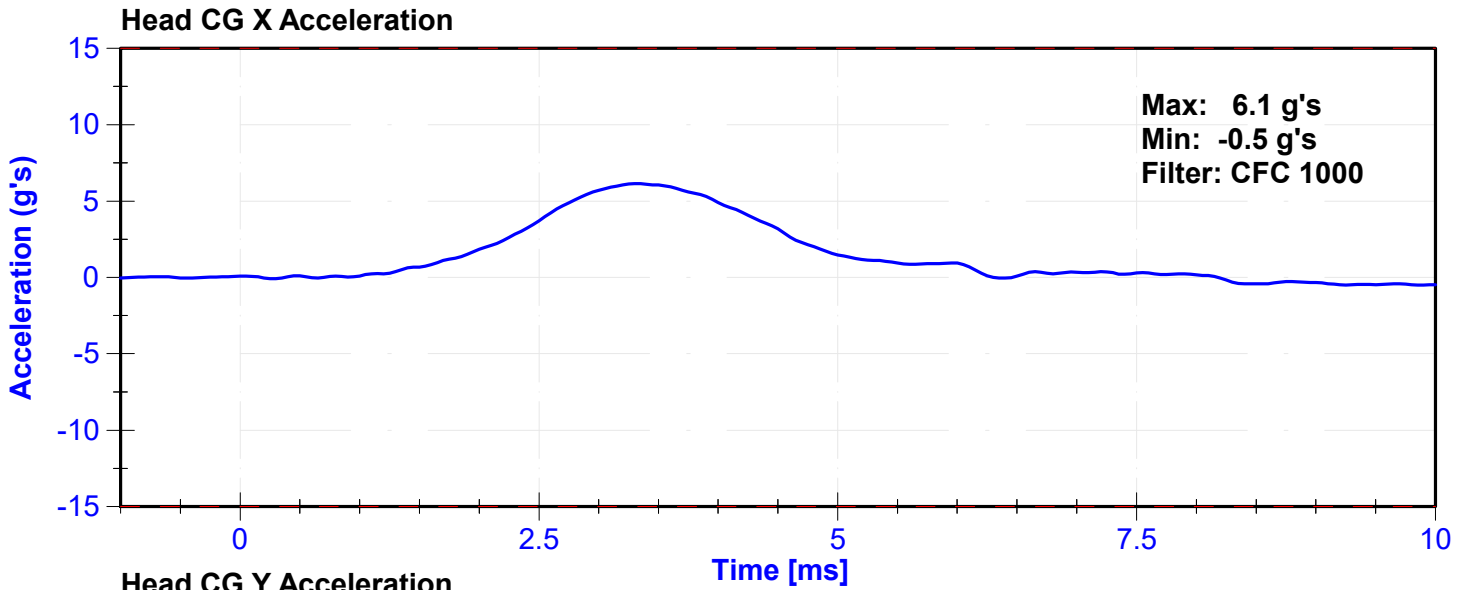
Results

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

Transducer Calibrations

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





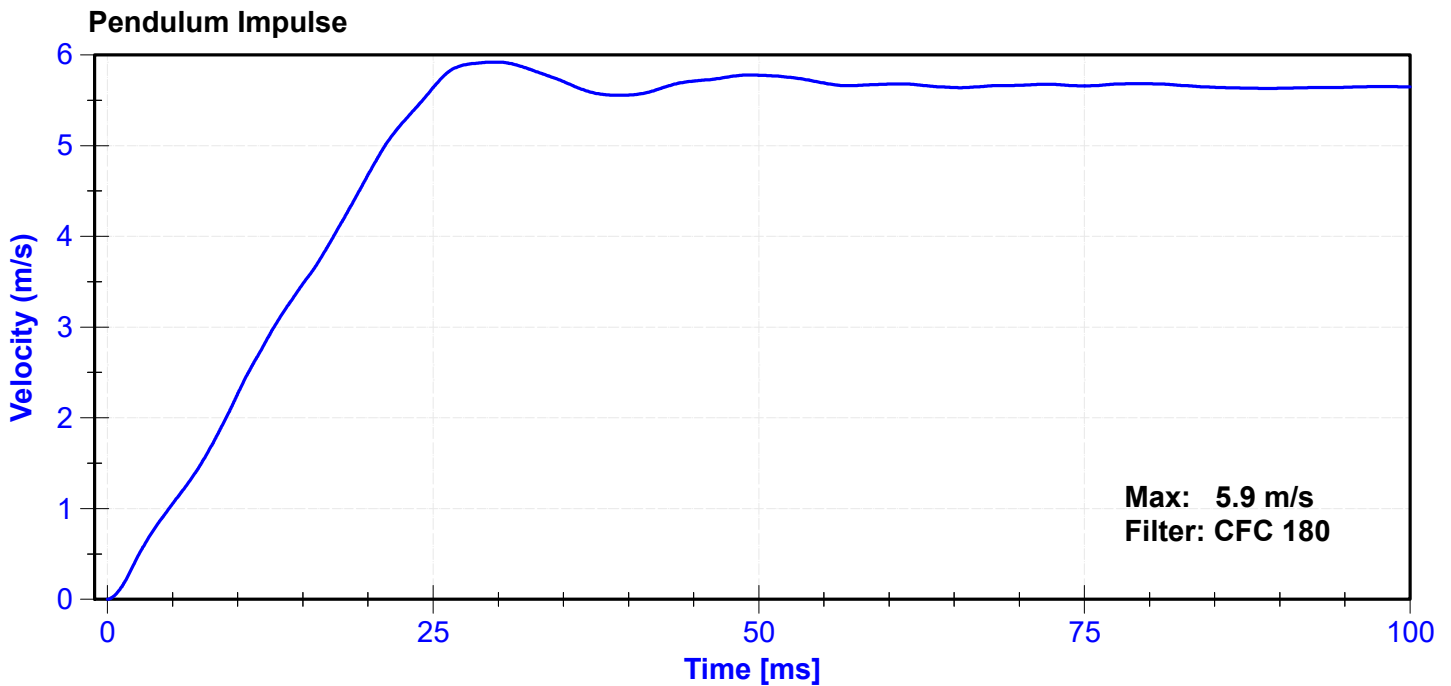
ATD Manufacturer	Humanetics	Test Technician	J. Rios
ATD Serial Number	DG8012	Laboratory Supervisor	J. Kinderman

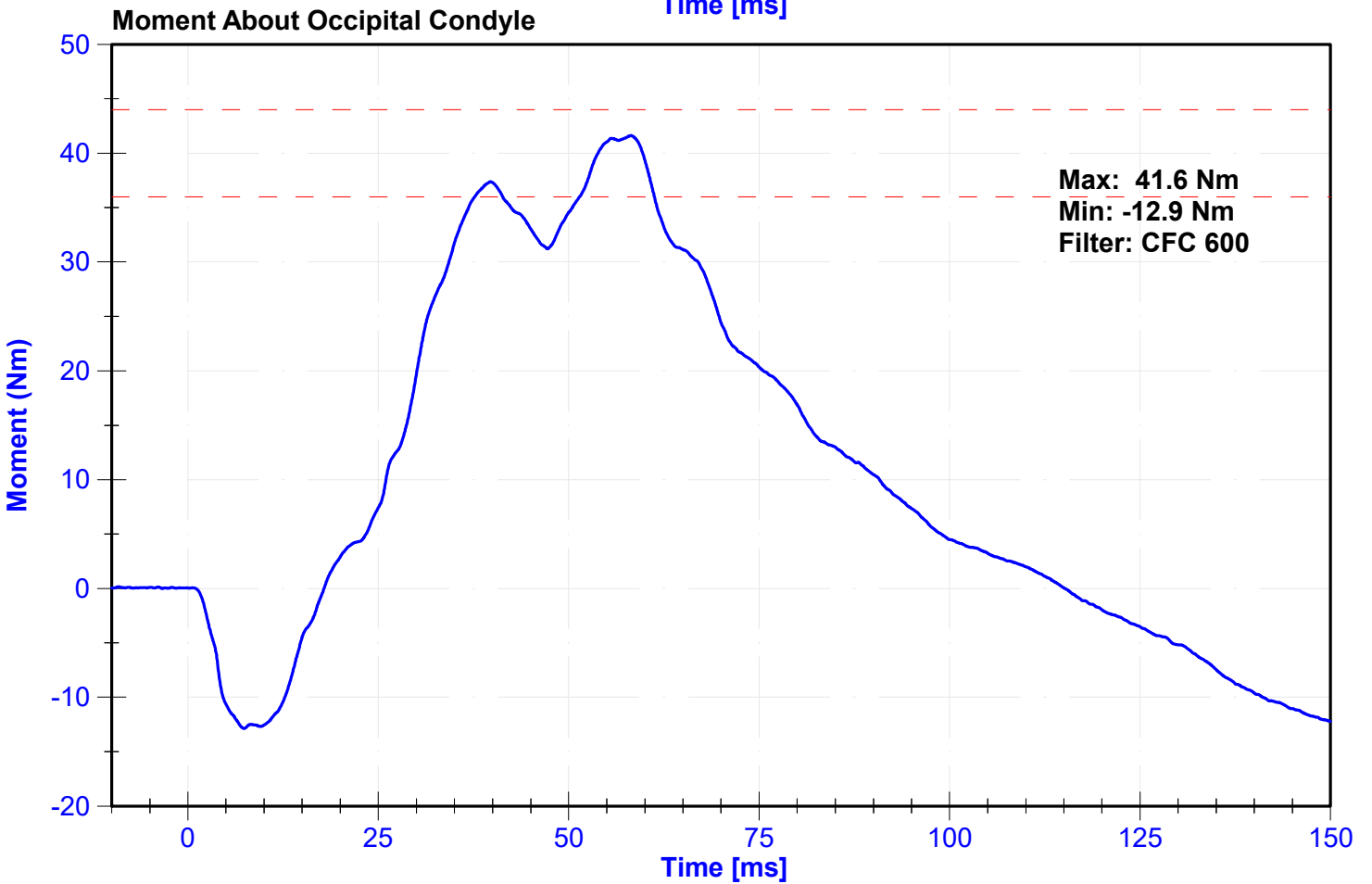
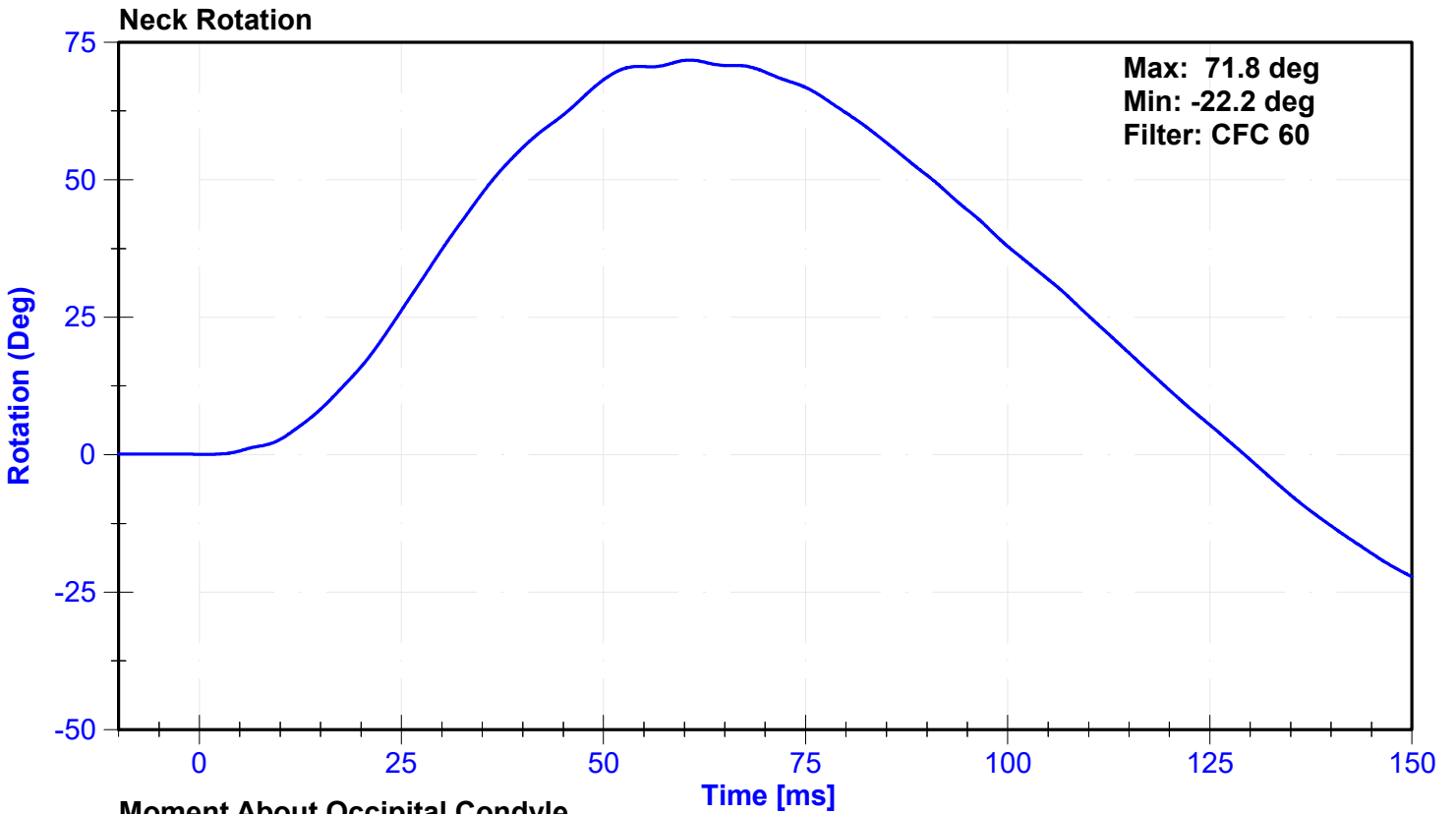
Results

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

Transducer Calibrations

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





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

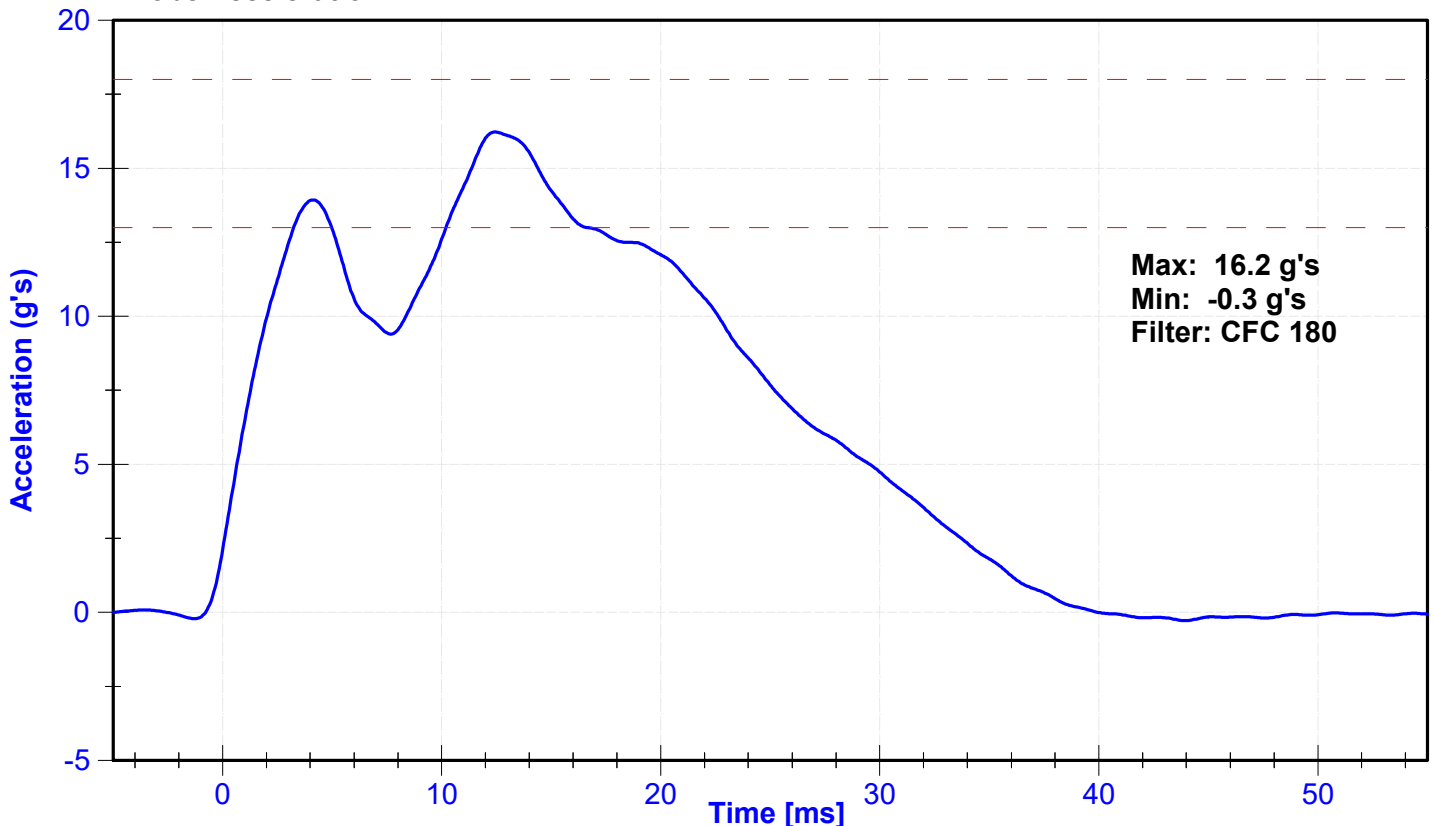
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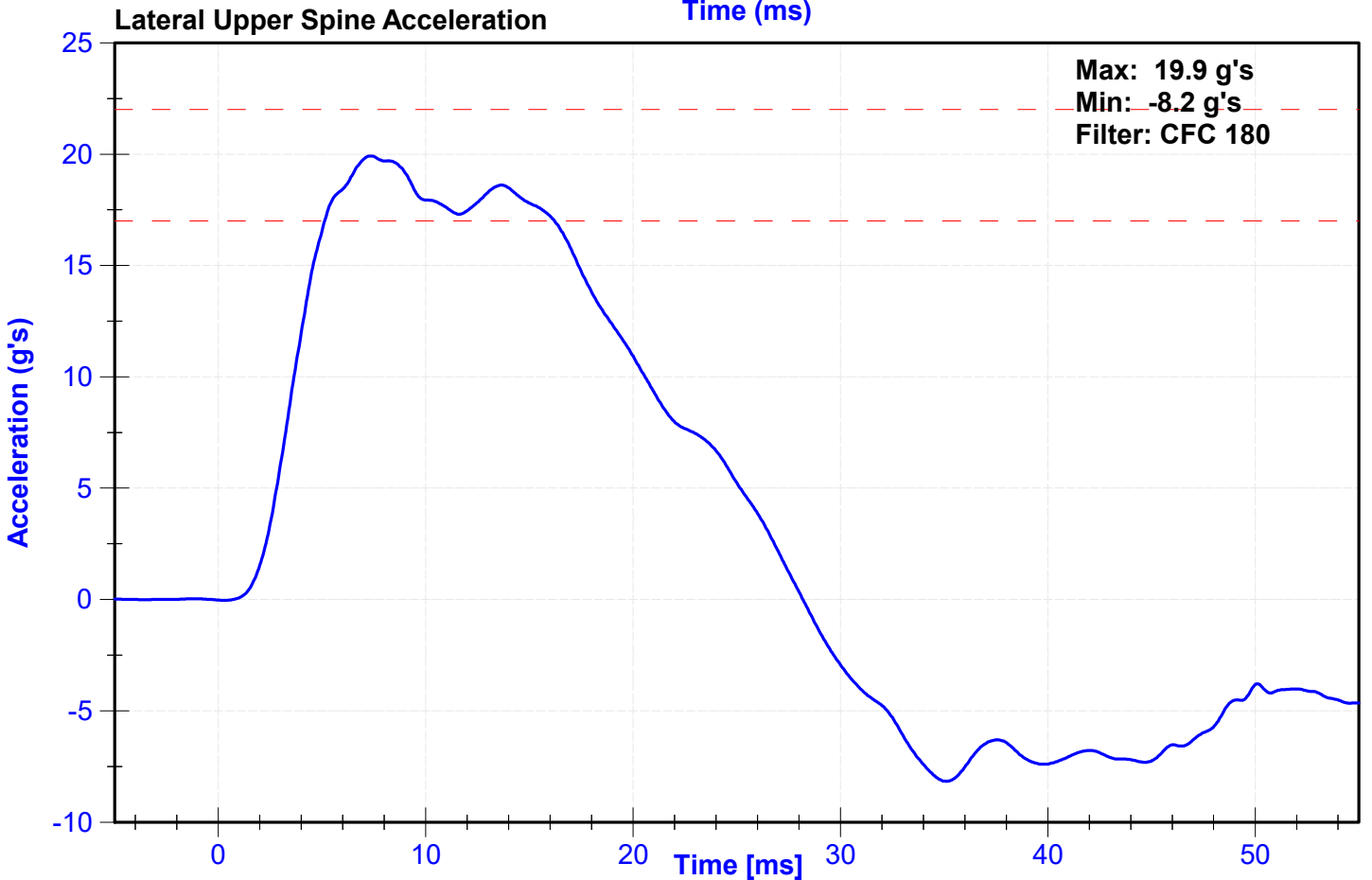
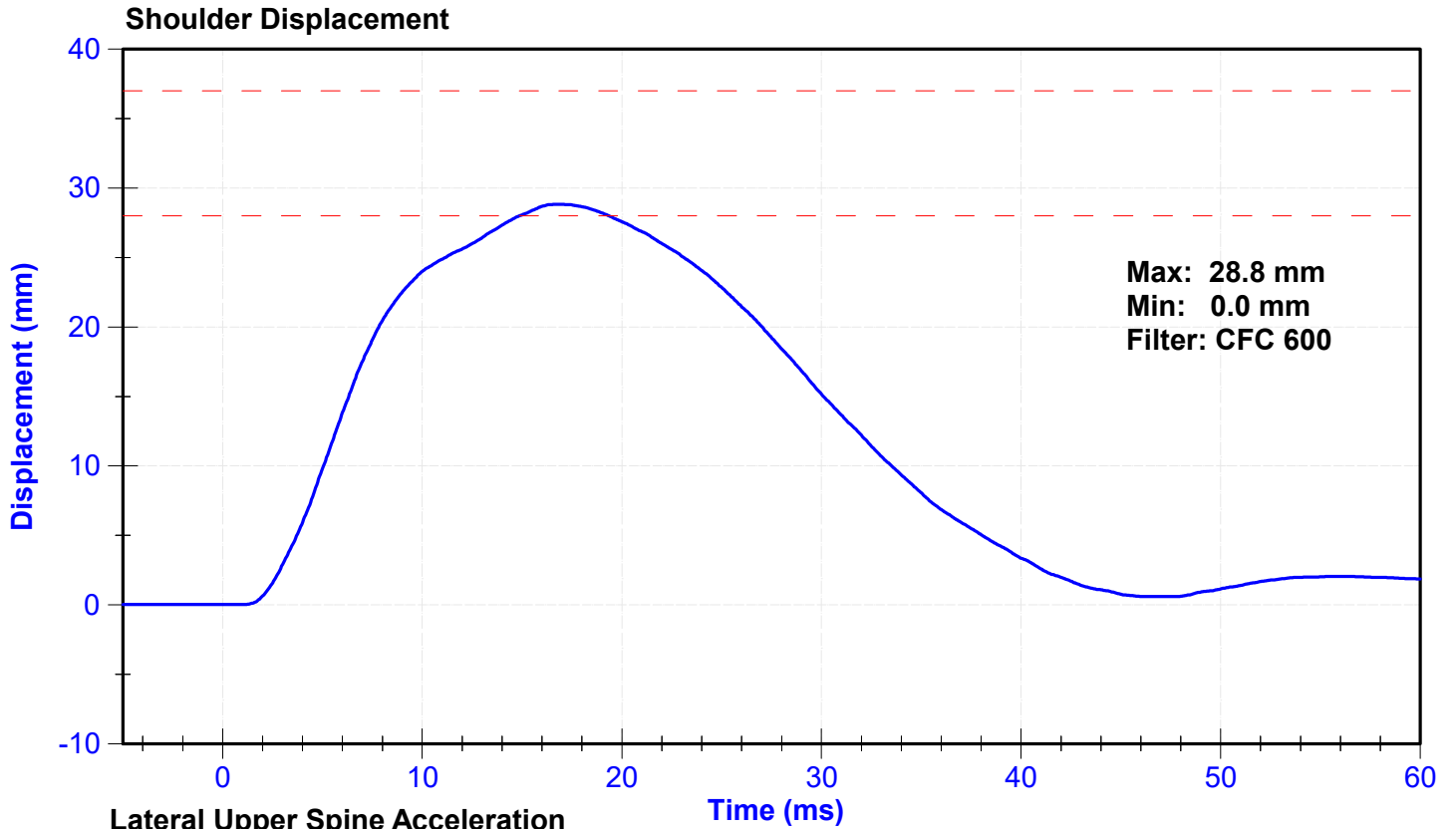
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	20	Pass
Velocity	4.2	4.4	m/s	4.28	Pass
Probe Acceleration	13	18	g's	16.2	Pass
Shoulder Deflection	28	37	mm	28.8	Pass
Lateral Upper Spine Acceleration	17	22	g's	19.9	Pass

Transducer Calibrations

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

Probe Acceleration





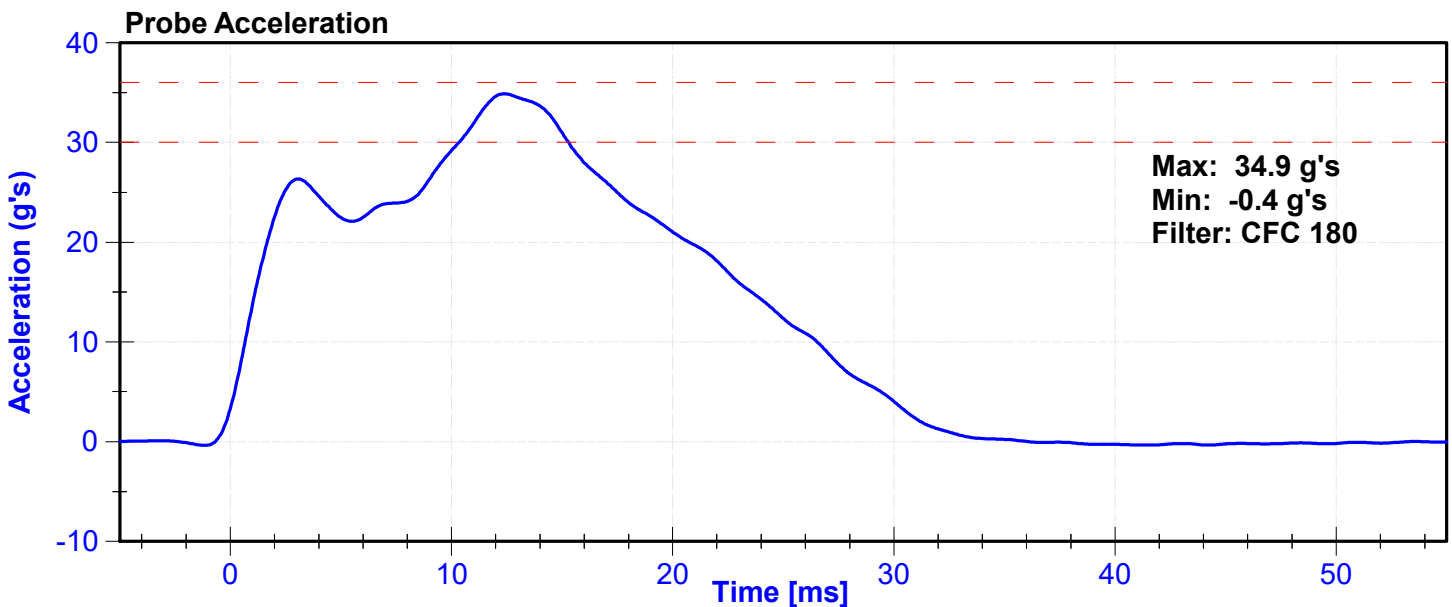
ATD Manufacturer	FTSS	Test Technician	E. Andruczyk
ATD Serial Number	DG8012	Laboratory Supervisor	J. Kinderman

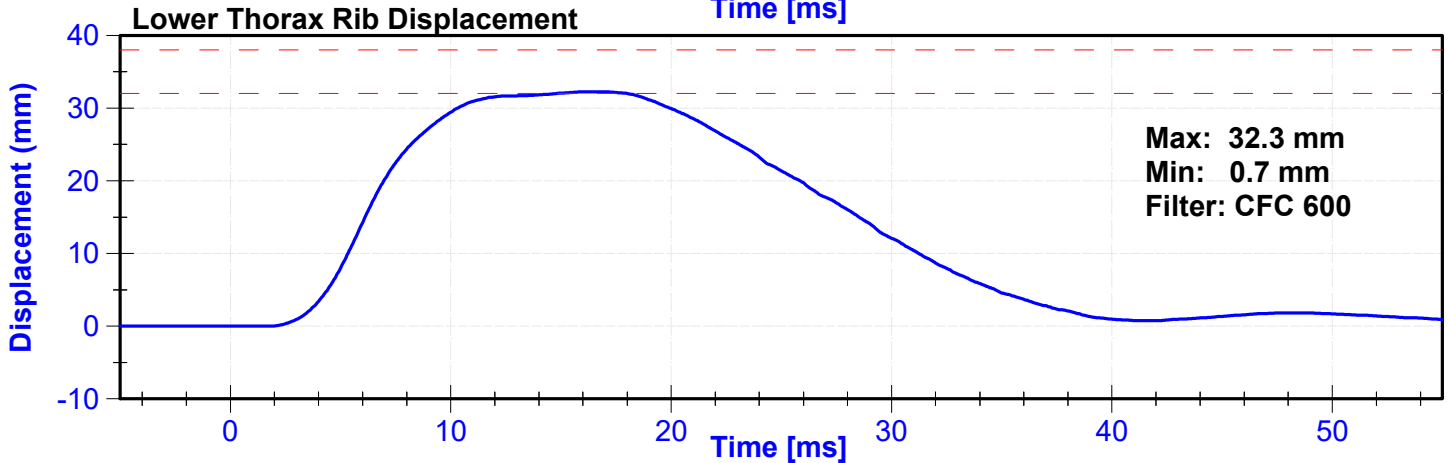
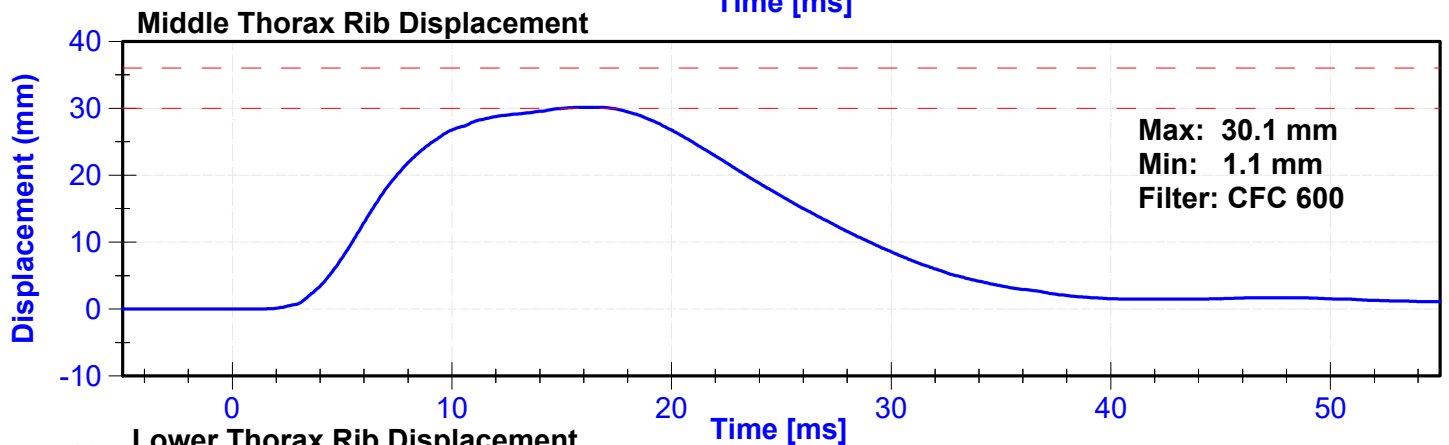
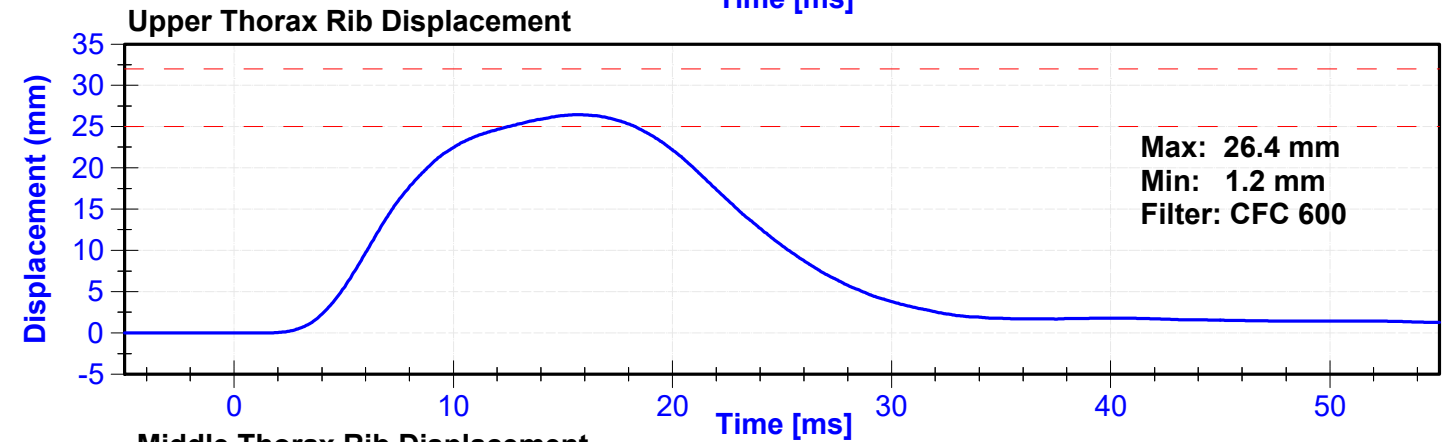
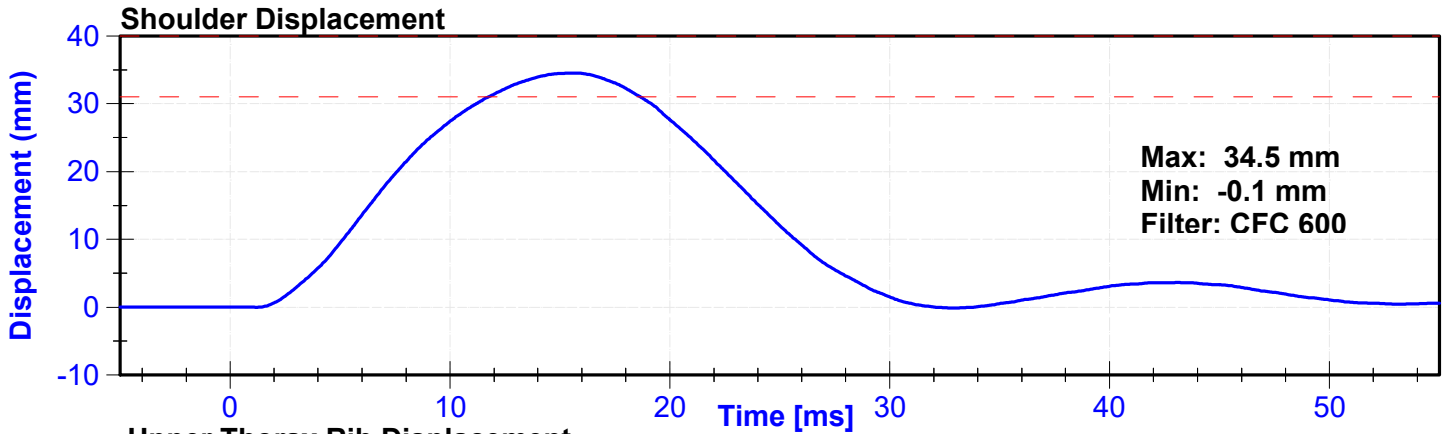
Results

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

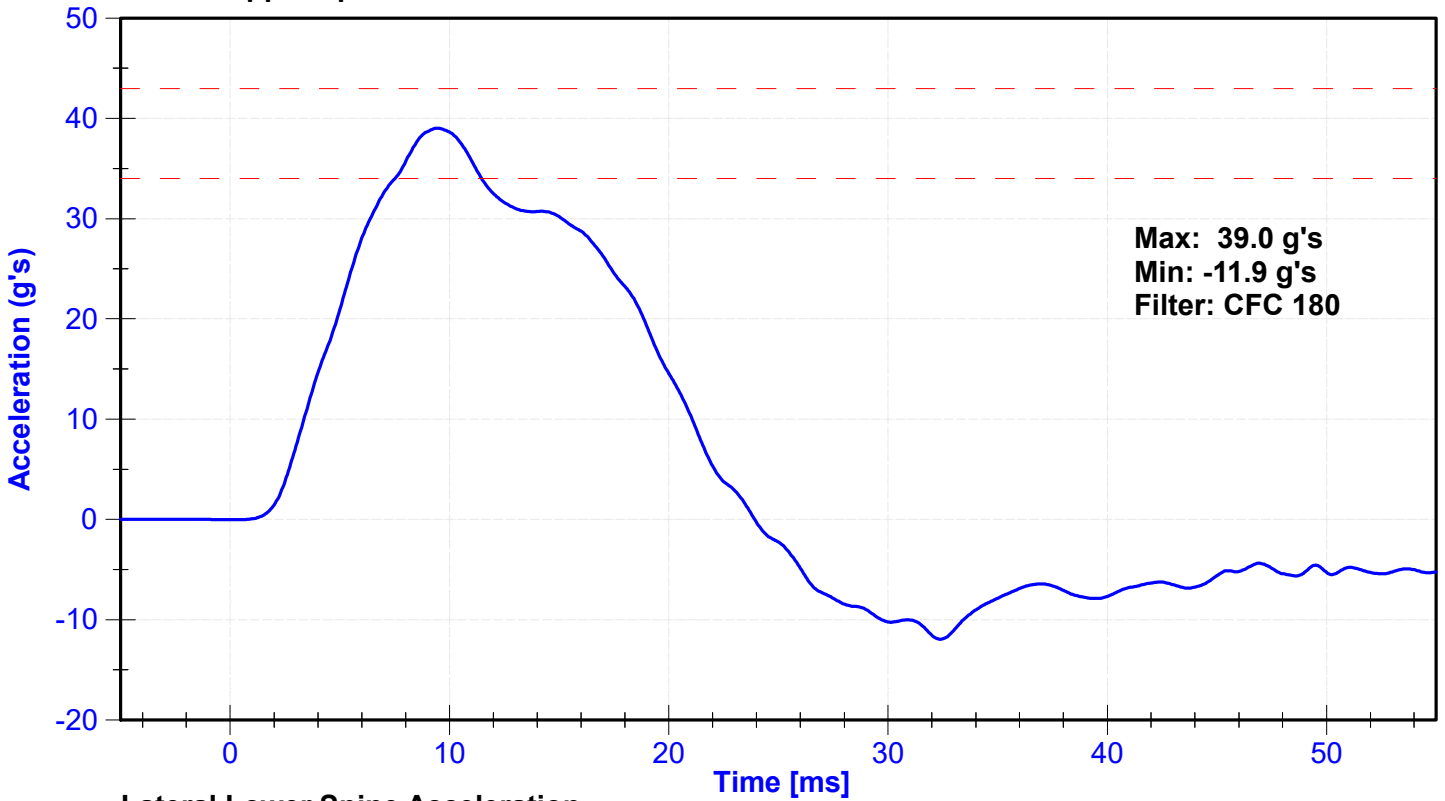
Transducer Calibrations

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

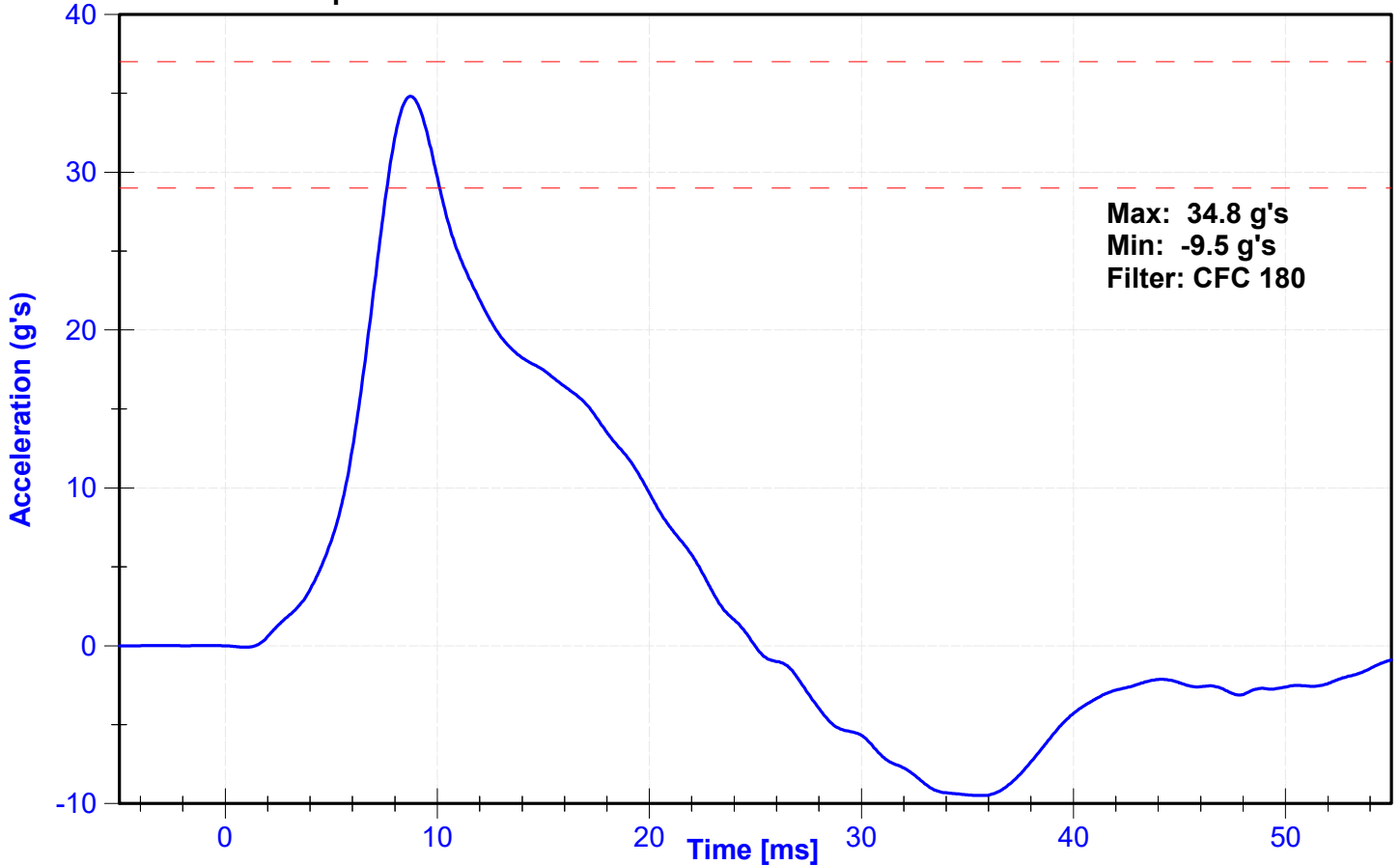




Lateral Upper Spine Acceleration



Lateral Lower Spine Acceleration



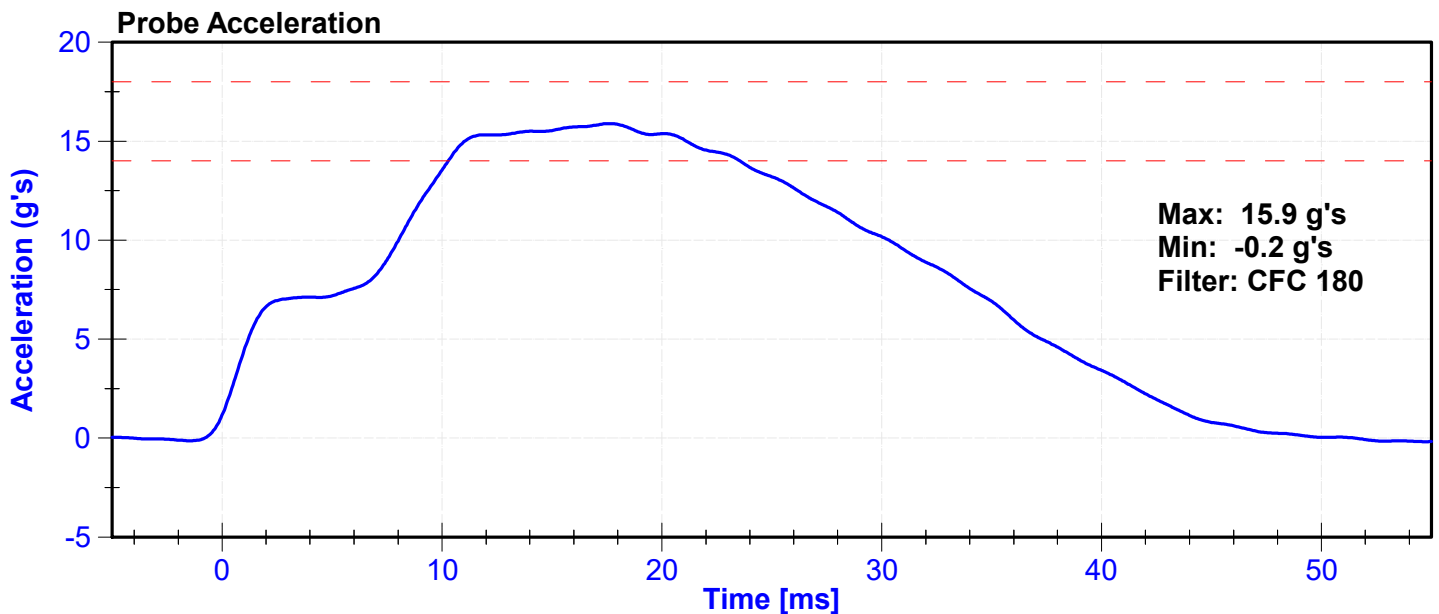
ATD Manufacturer	FTSS	Test Technician	E. Andruczyk
ATD Serial Number	DG8012	Laboratory Supervisor	J. Kinderman

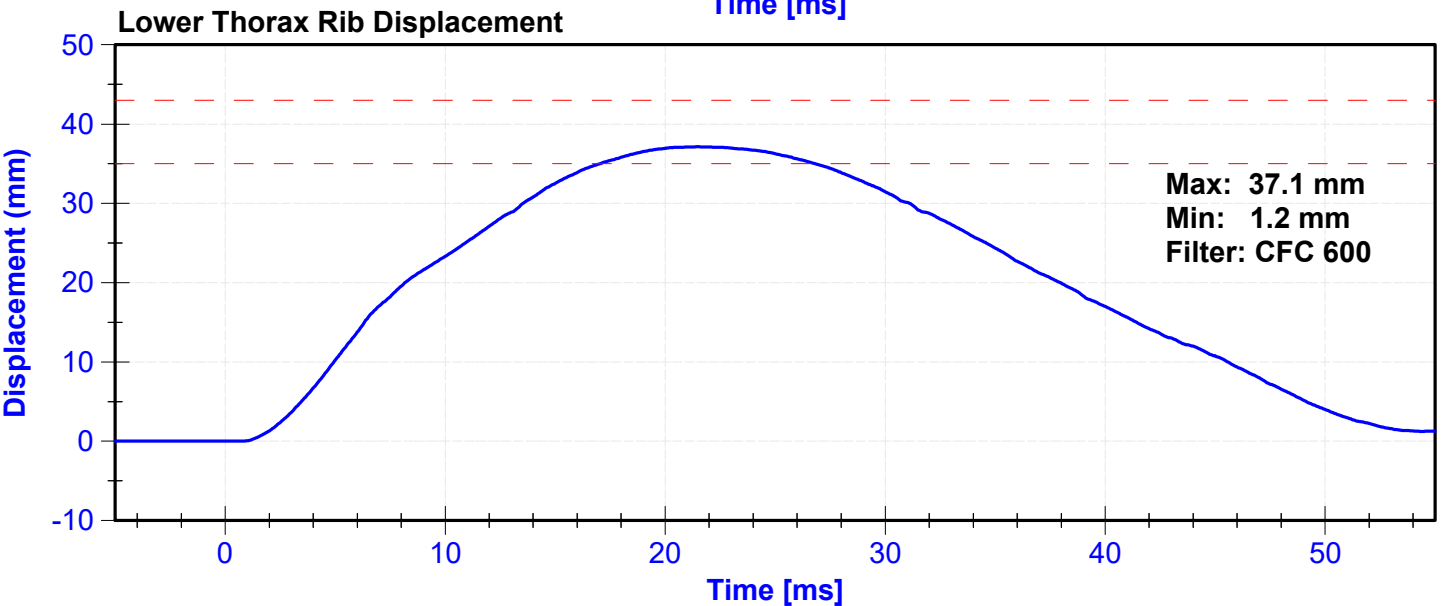
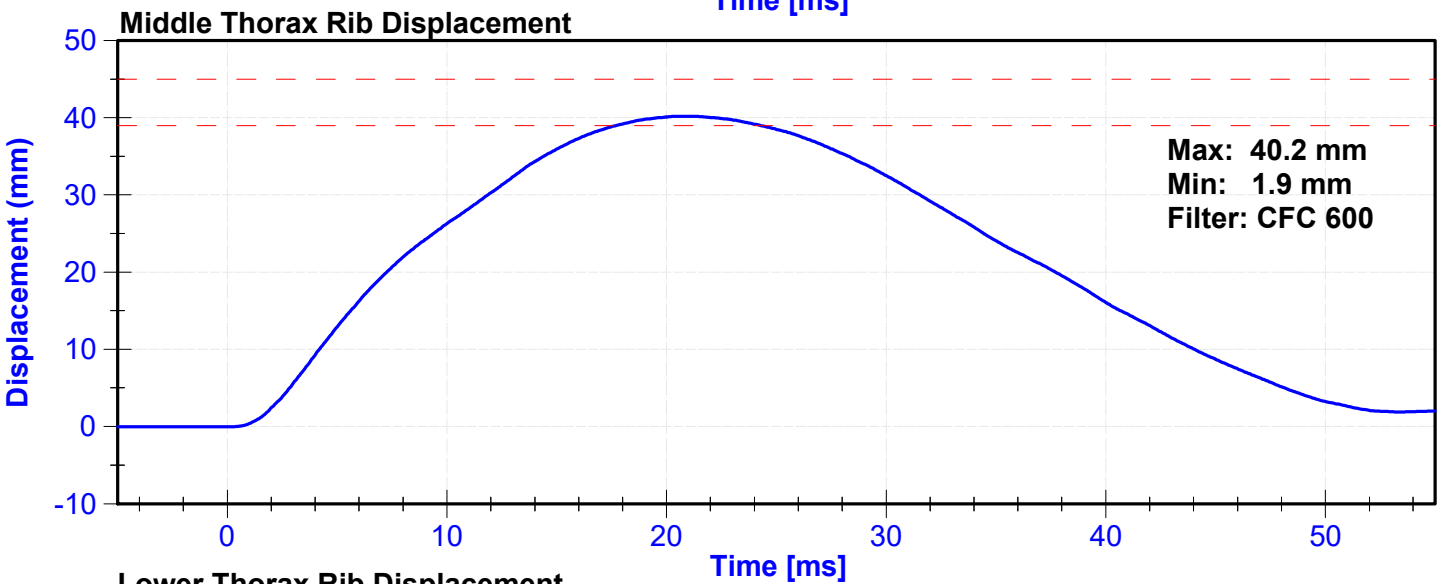
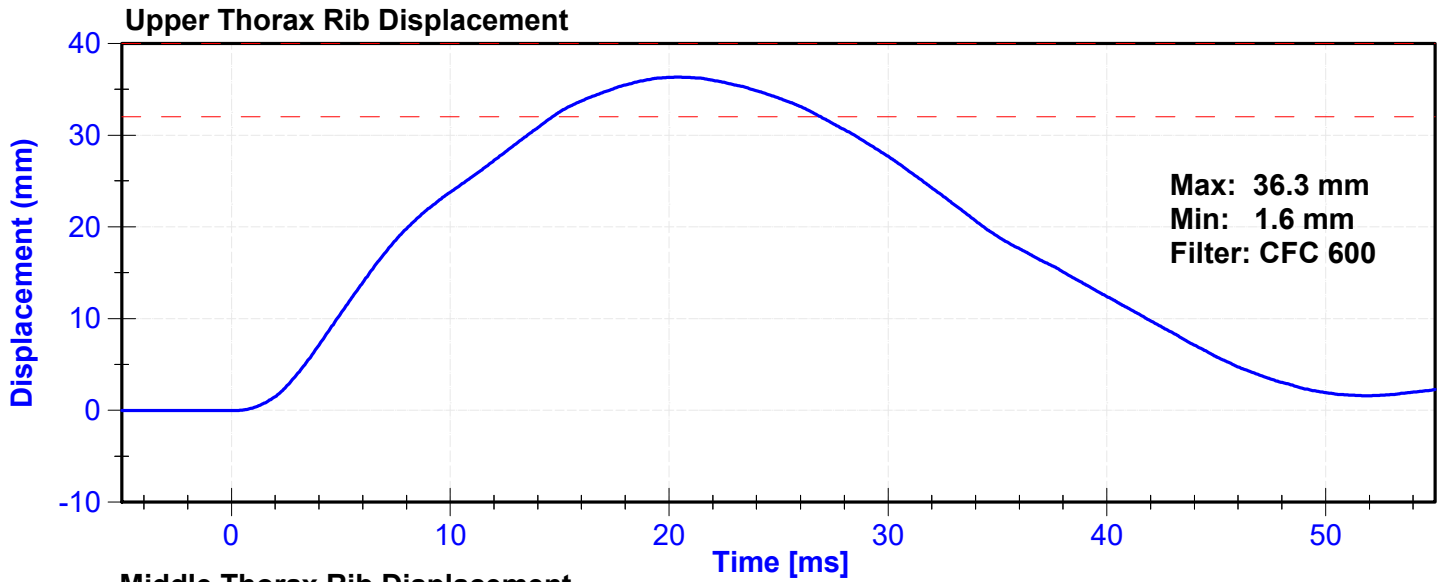
Results

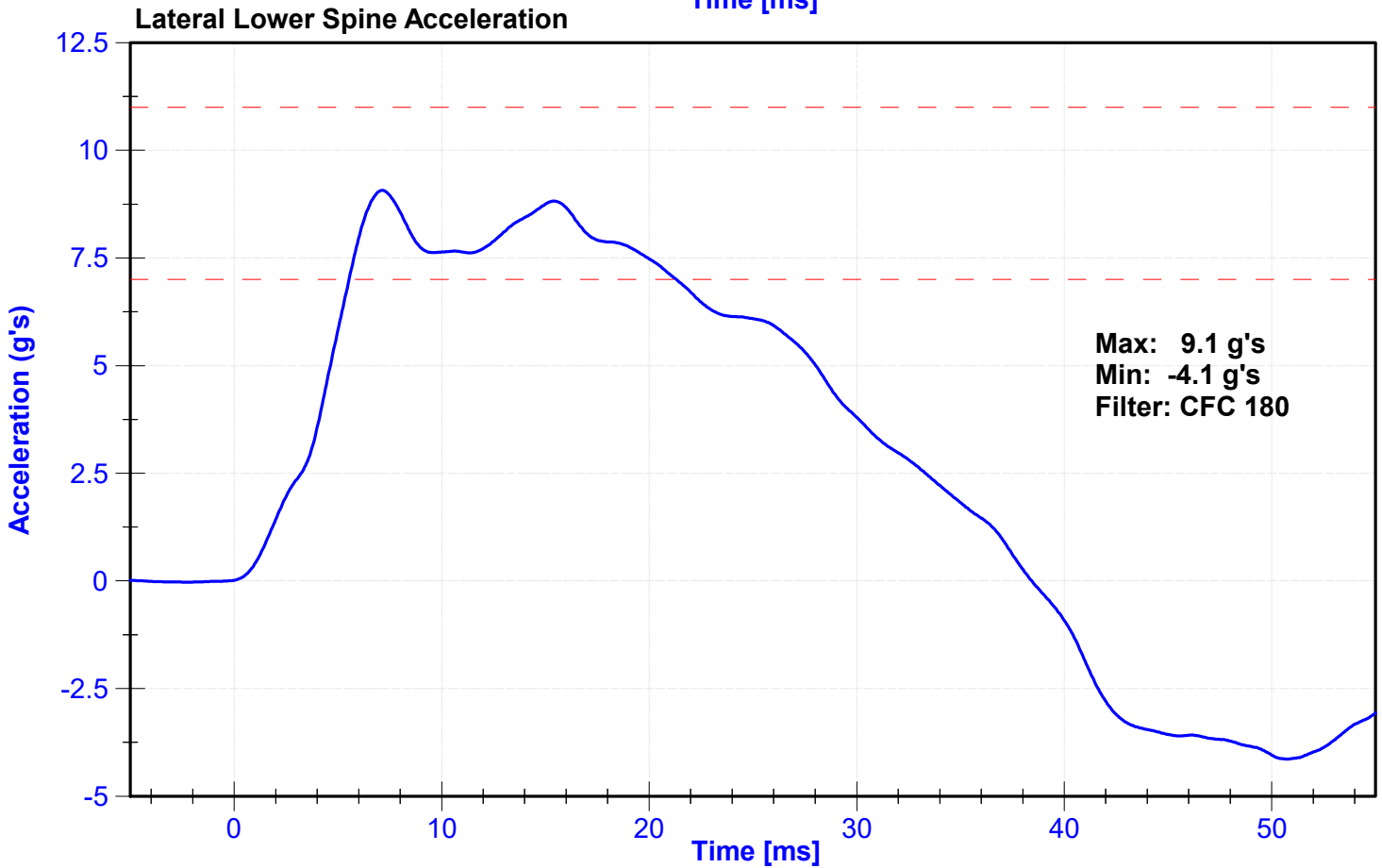
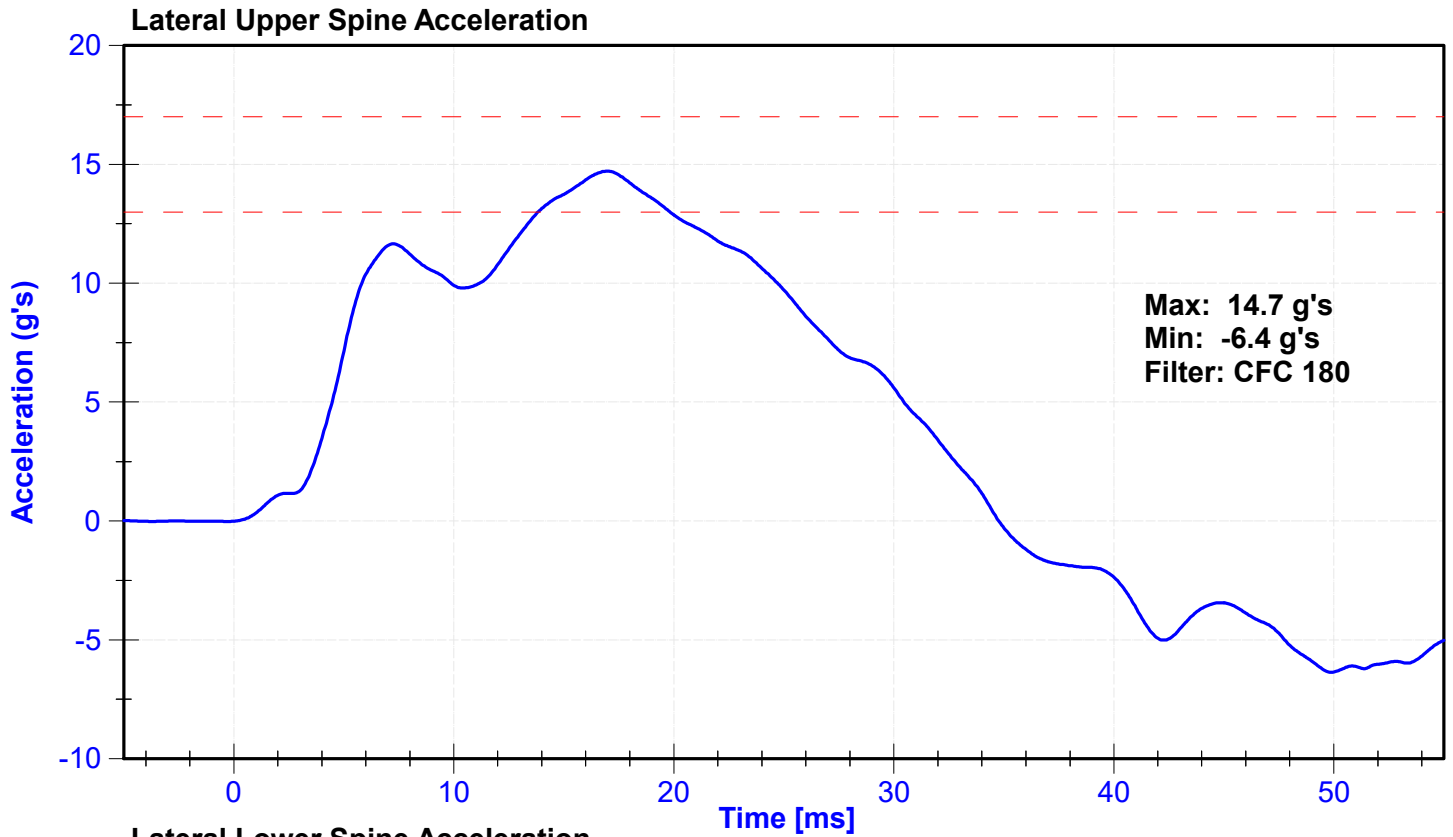
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	20	Pass
Velocity	4.2	4.4	m/s	4.29	Pass
Probe Acceleration	14	18	g's	15.9	Pass
Lateral Upper Spine Acceleration	13	17	g's	14.7	Pass
Lateral Lower Spine Acceleration	7	11	g's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

Transducer Calibrations

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







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

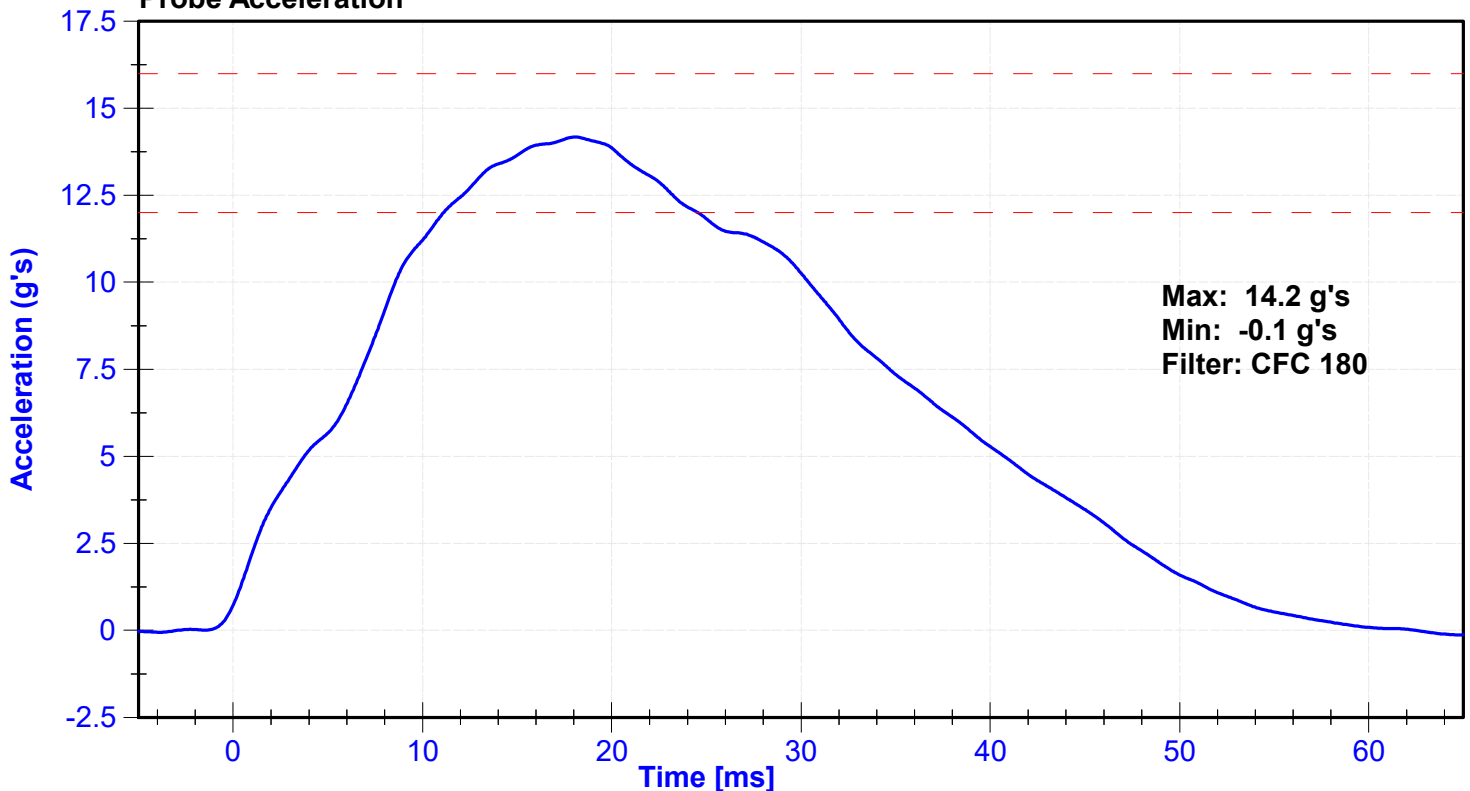
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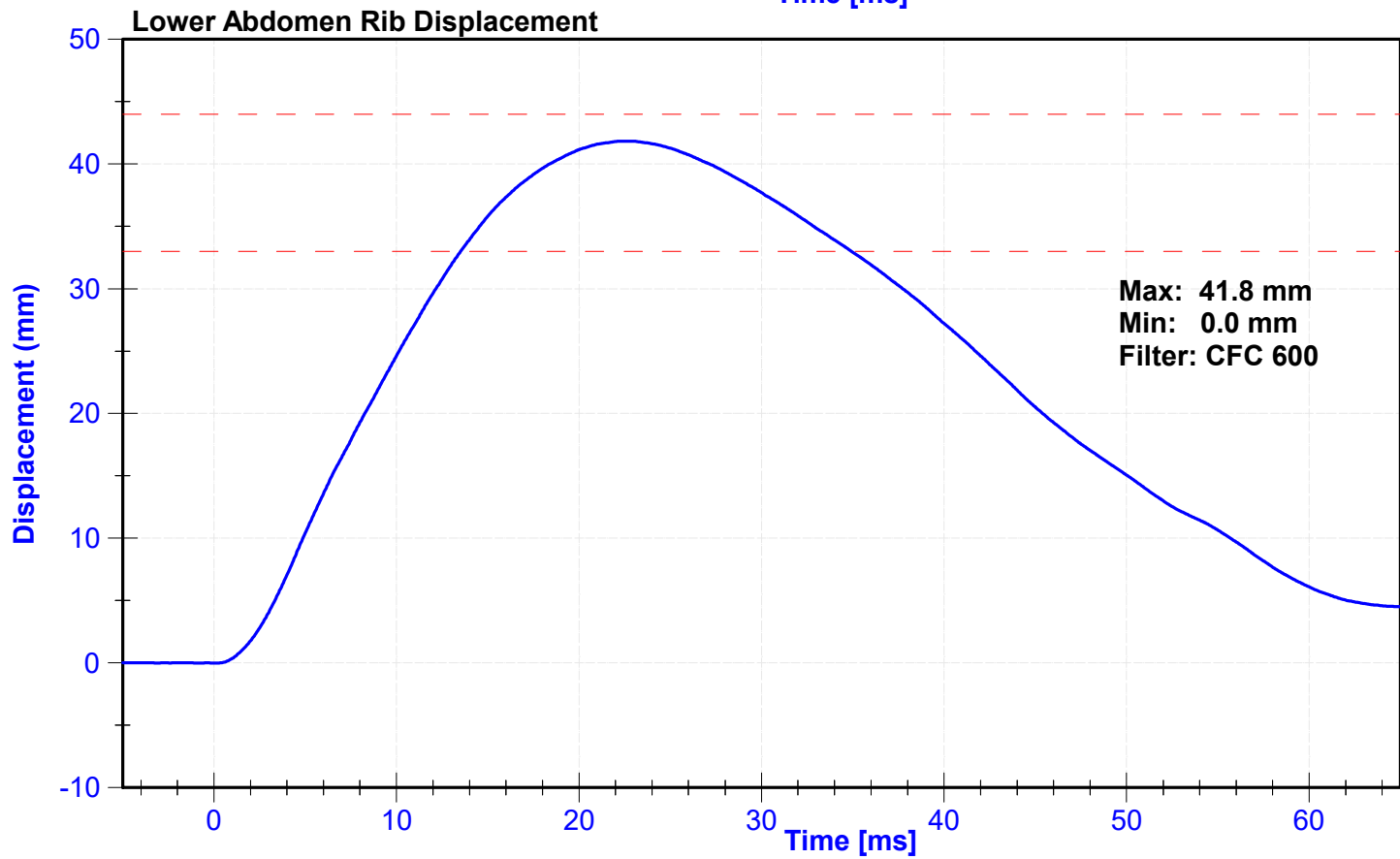
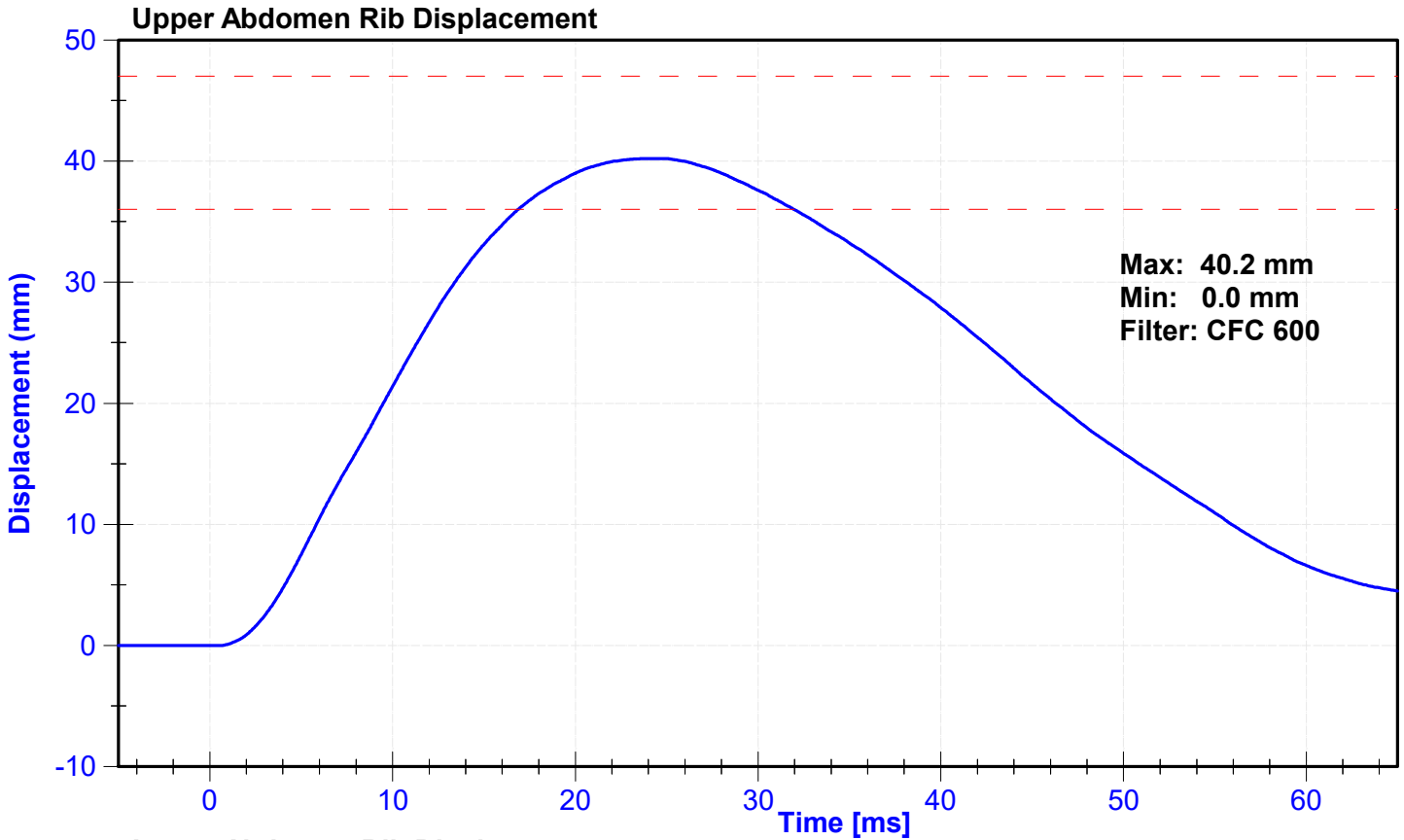
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	20	Pass
Velocity	4.2	4.4	m/s	4.28	Pass
Probe Acceleration	12	16	g's	14.2	Pass
Lateral Lower Spine Acceleration	9	14	g's	10.2	Pass
Upper Abdomen Rib Deflection	36	47	mm	40.2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

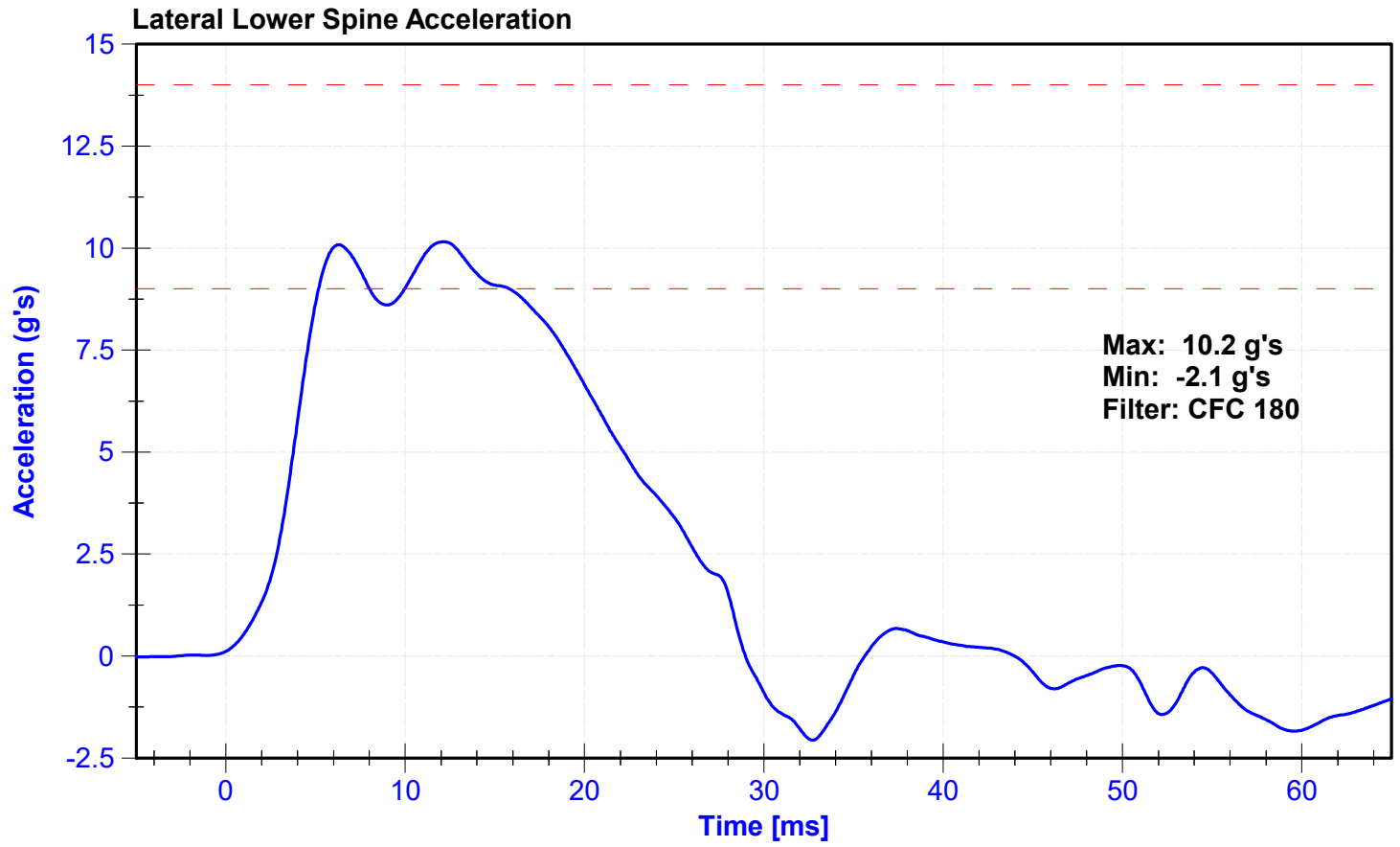
Transducer Calibrations

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

Probe Acceleration







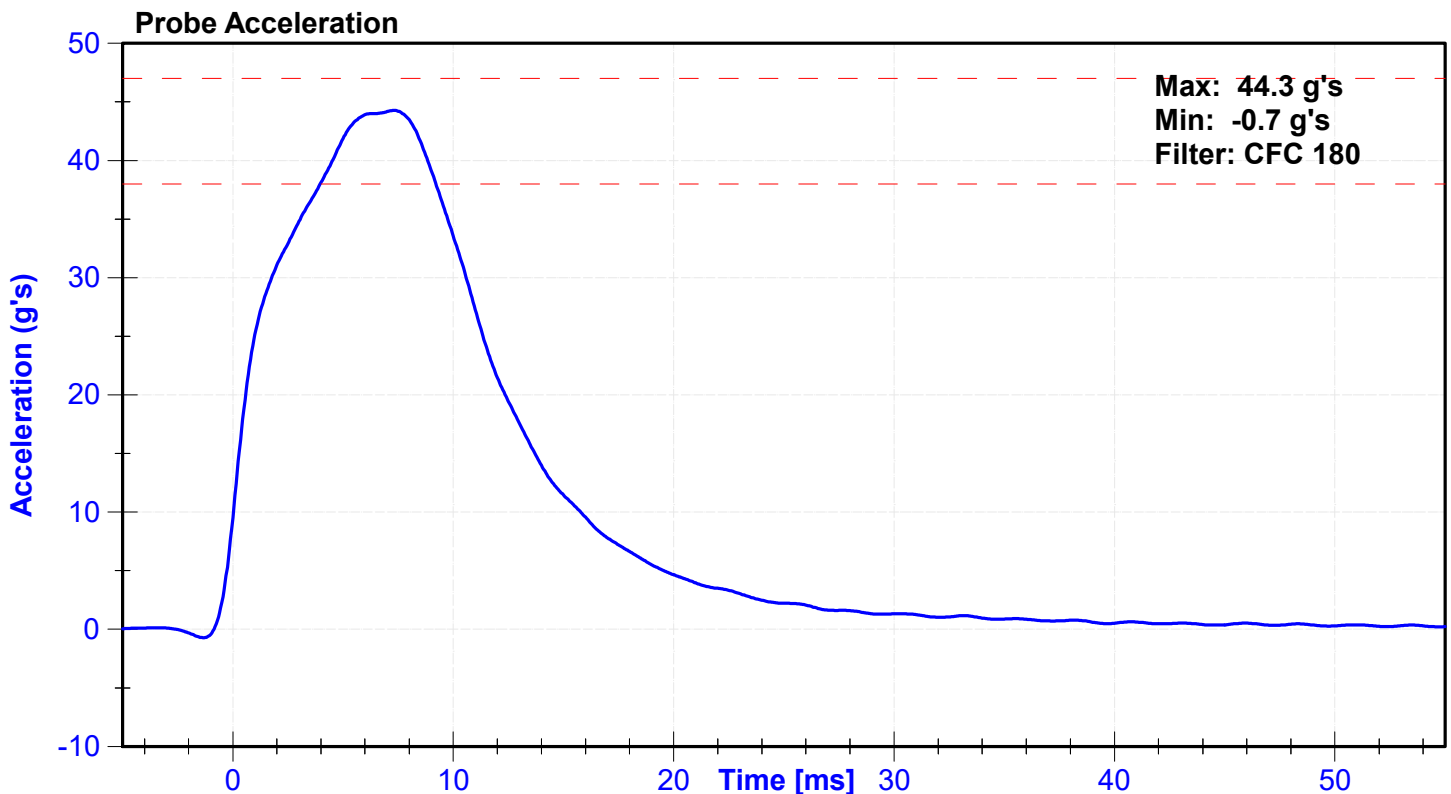
ATD Manufacturer	FTSS	Test Technician	E. Andruczyk
ATD Serial Number	DG8012	Laboratory Supervisor	J. Kinderman

Results

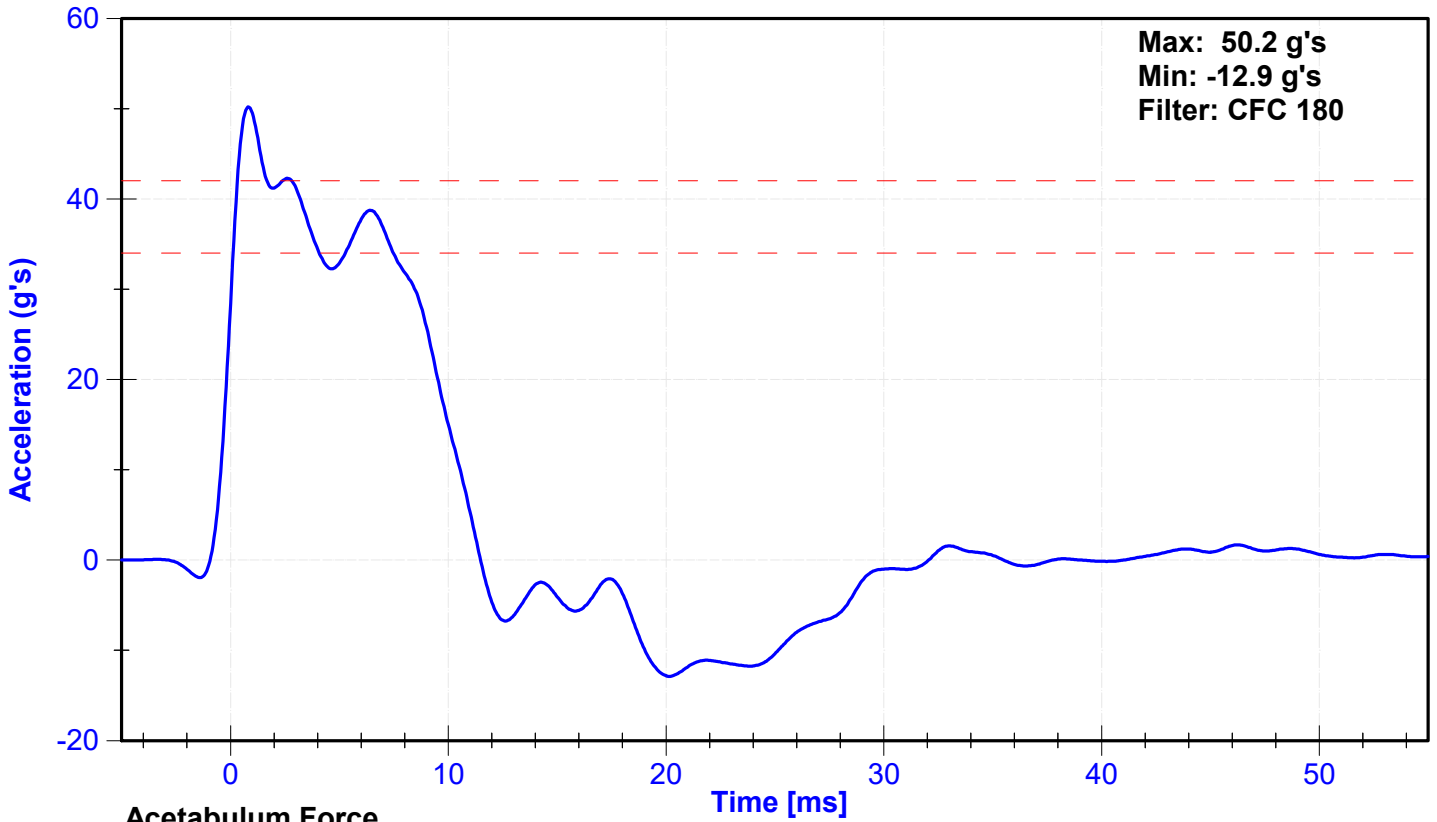
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	20	Pass
Velocity	6.6	6.8	m/s	6.62	Pass
Probe Acceleration	38	47	g's	44.3	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	38.7	Pass
Acetabulum Force	3600	4300	N	4073.7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

Transducer Calibrations

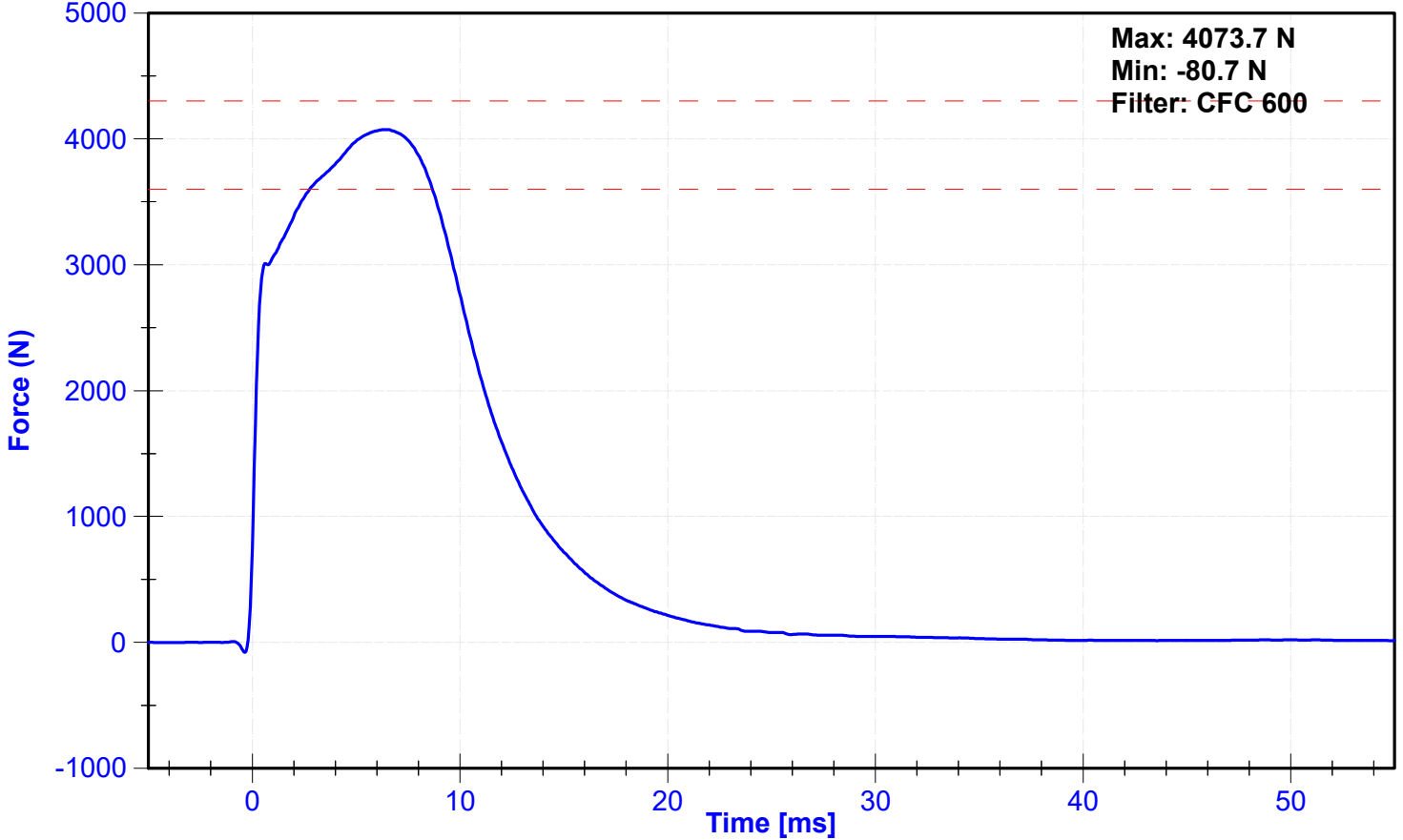
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco	18527	8/2/2024	1/29/2025
Pelvis Y Accelerometer	Endevco	T20860	10/17/2024	4/15/2025
Acetabulum Load Cell	Denton	270-FY	9/16/2024	9/16/2025
Certification Plug	SACO			N/A
Crash Test Plug	SACO			N/A



Lateral Pelvis Acceleration



Acetabulum Force





SID-IIs Pelvis Plug Certification Test

Plug S/N 16753

Test Number 23556

Report Number 23613

Test Date 7/22/2022 1:40:32 PM

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

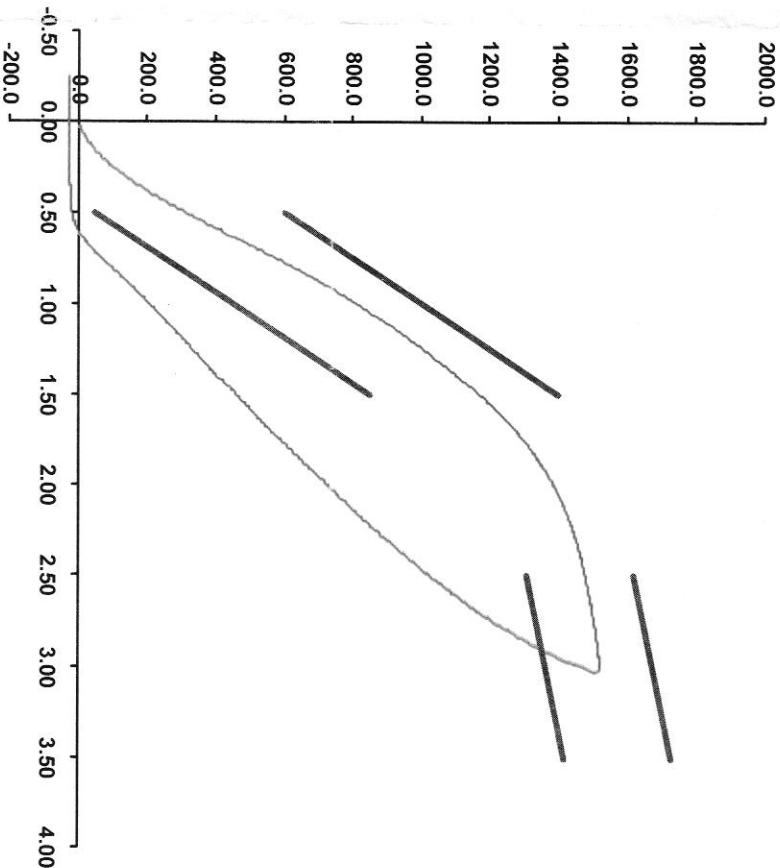
Testing Machine STM-20 5965542
 Load Cell S/N (F1360947), Units (LBS) 1000

Crosshead Speed (mm / min) or Rate 12.7
 Extension or Position Measured by XHD_100 (XHD100)

Notes:

*Cert
 062012
 1-15-2025*

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107

22-Jul-22

SACO Research

By:

DC

Date:

7/22/22

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



*Impact +
Debris
L-15-2025*

SID-IIs Pelvis Plug Certification Test

Plug S/N 16721

Test Number 23521

Report Number 23578

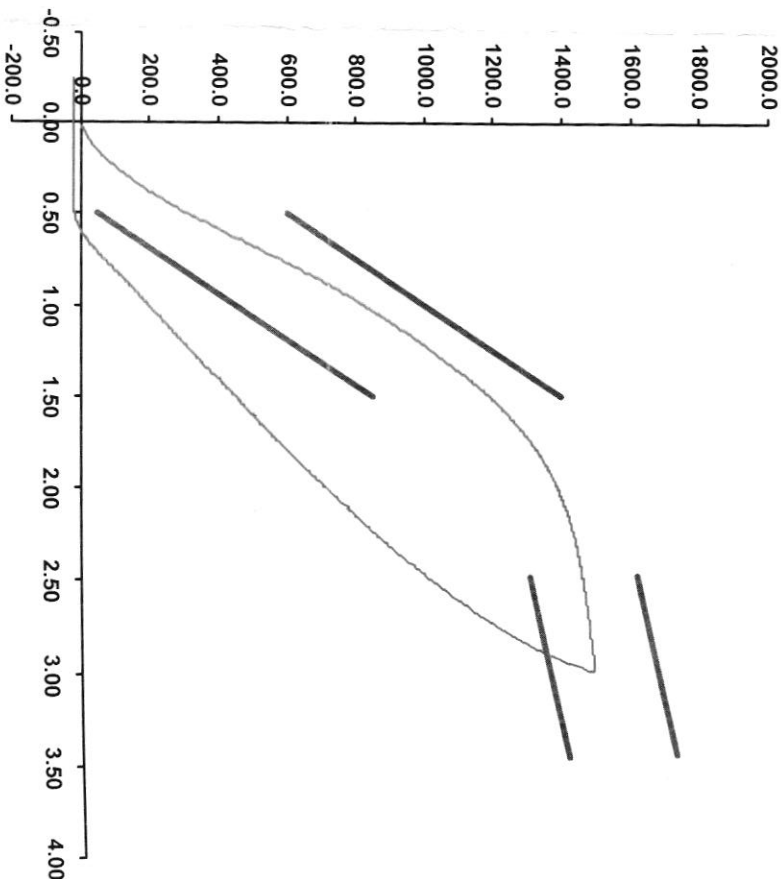
Test Date 7/22/2022 12:24:32 PM

Force (-N) vs Extension (-mm)

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

Testing Machine STM-20 5965542
 Load Cell S/N (F1360947), Units (LBS) 1000
 Crosshead Speed (mm / min) or Rate 12.7
 Extension or Position Measured by XHD_100 (XHD100)

Notes:



Operator

Part Number 180-4450

Template No 107 22-Jul-22
SACO Research

By: *[Signature]* Date: *7/22/22*
SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 FAX



SID-IIS Pelvis Plug Certification Test

Plug S/N 16695

Test Number 23495

Report Number 23552

Test Date 7/22/2022 11:05:39 AM

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

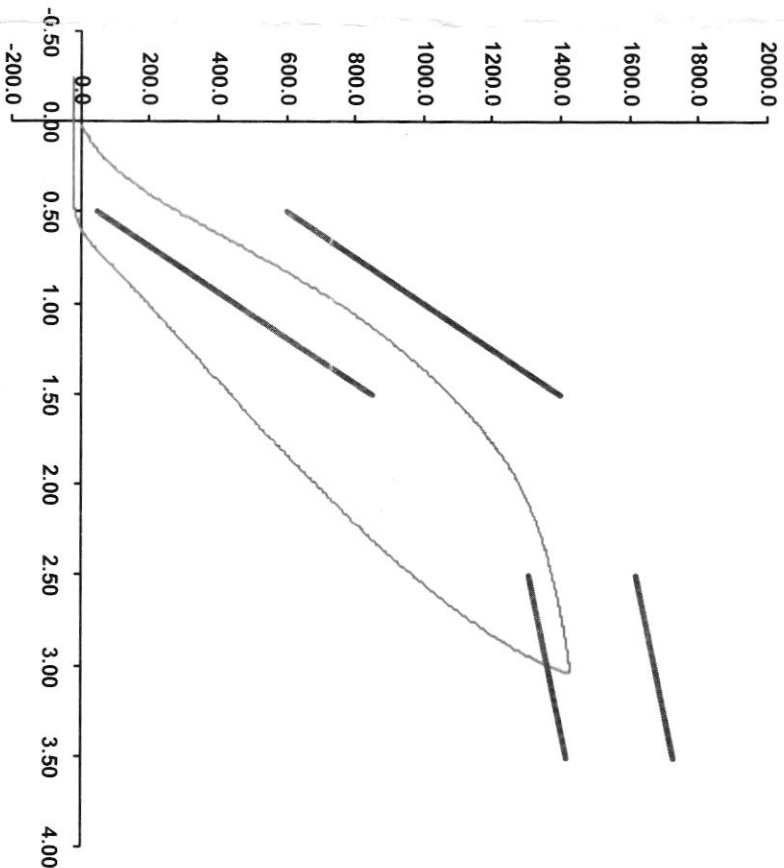
Testing Machine STM-20 5965542
Load Cell S/N (F1360947), Units (LBS) 1000

Crosshead Speed (mm / min) or Rate 12.7
Extension or Position Measured by XHD_100 (XHD100)

Notes:

*NOV Impact
068012
1-15-2025*

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107 22-Jul-22
SACO Research

By: *[Signature]* Date: *7/22/22*

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

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

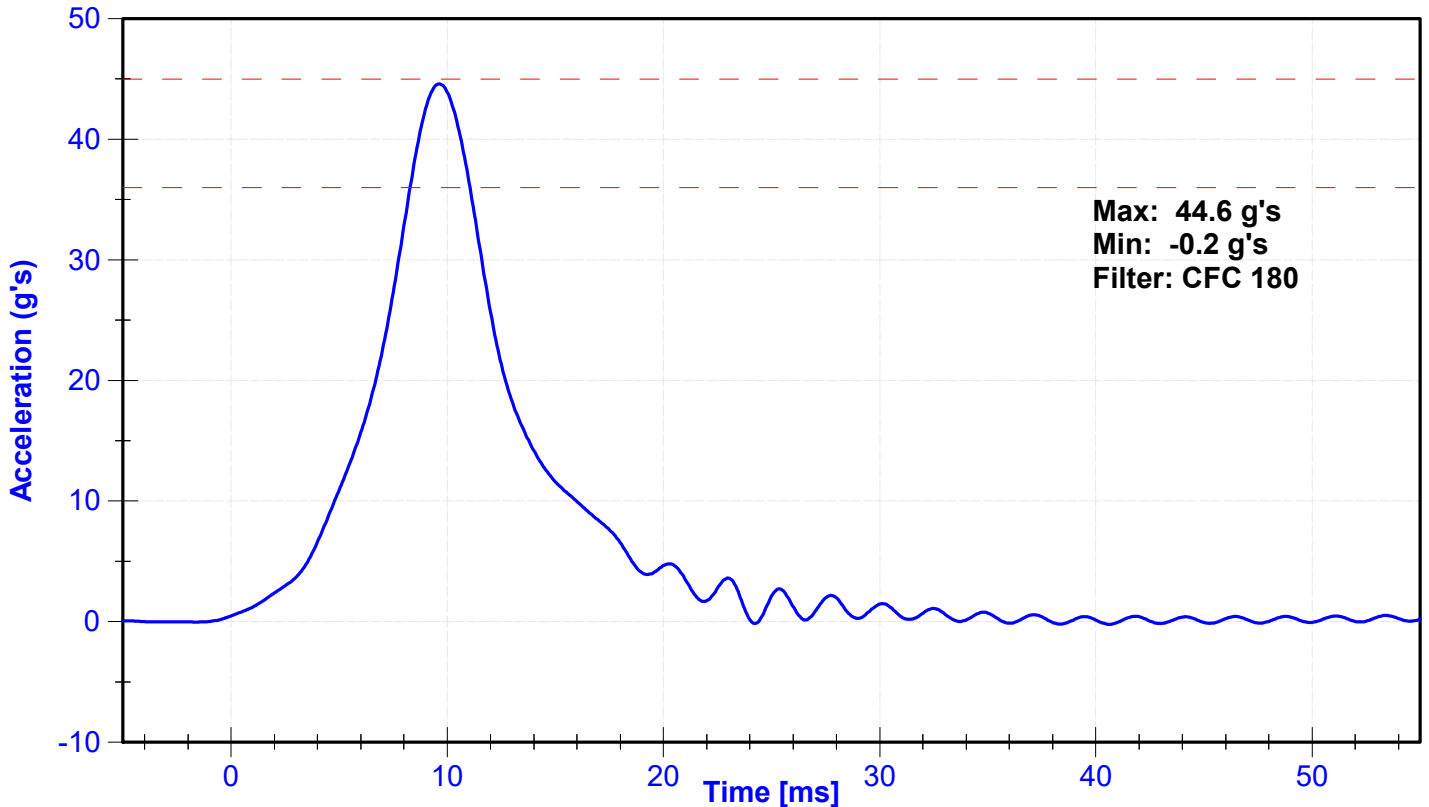
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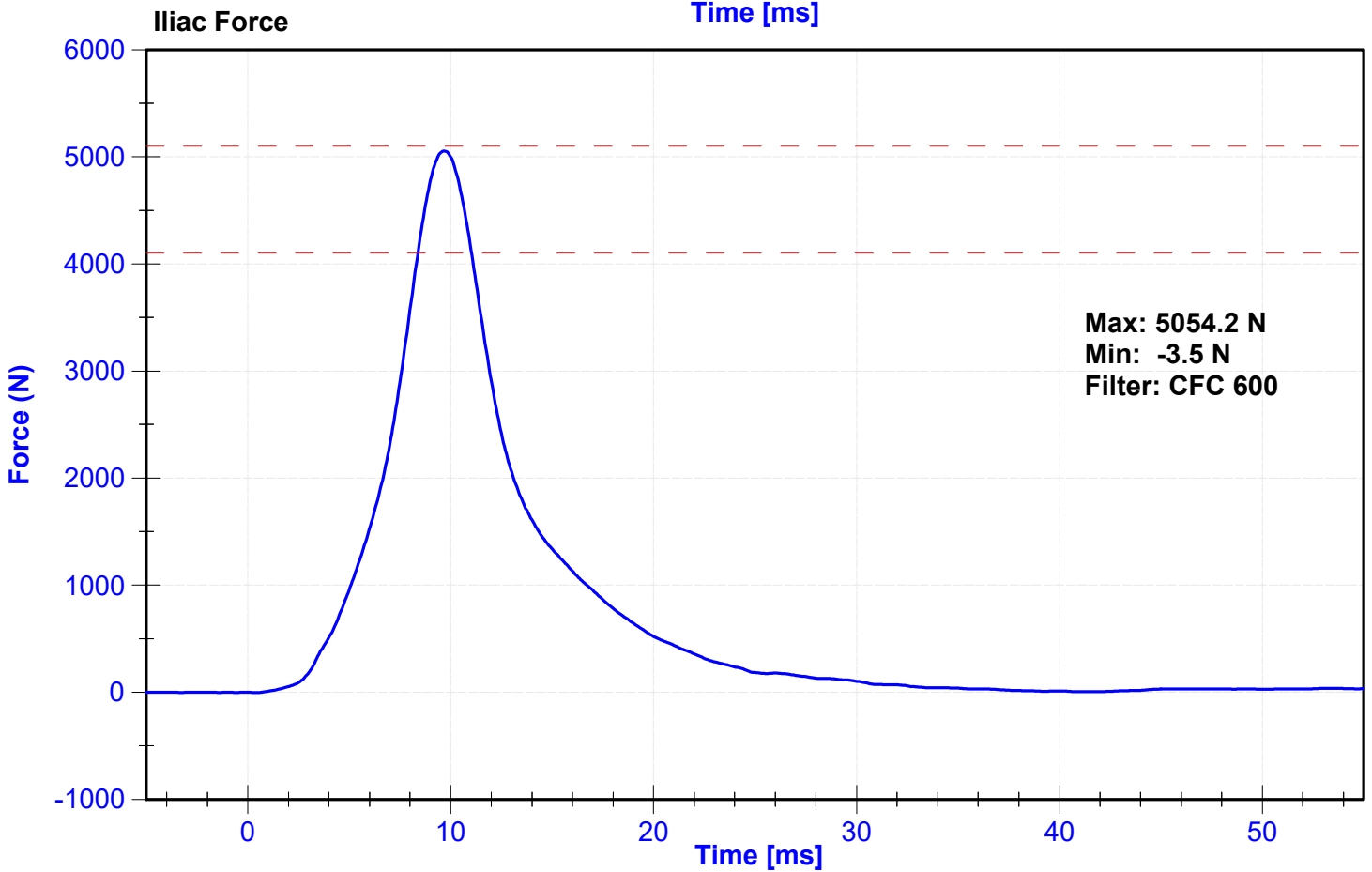
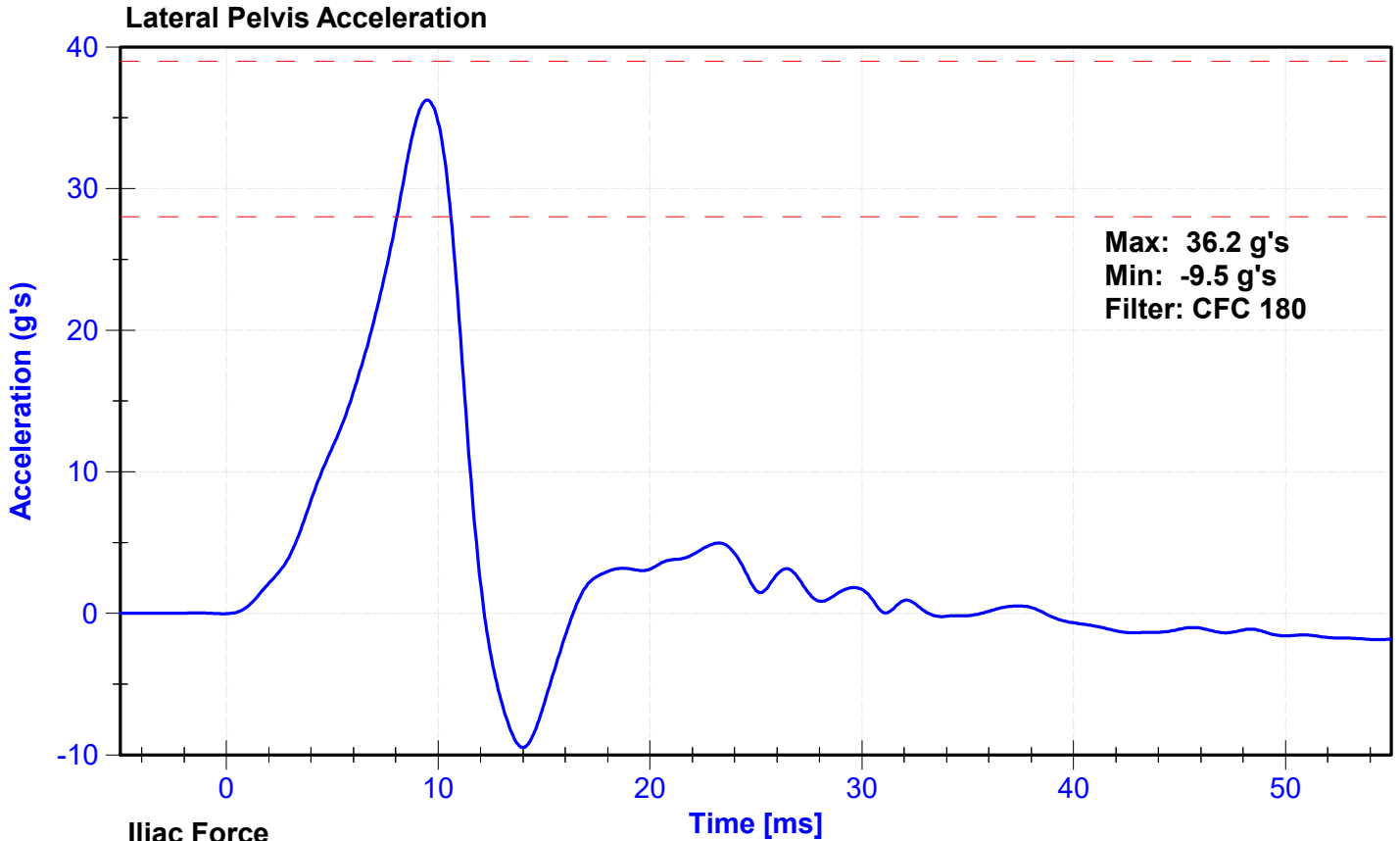
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	20	Pass
Velocity	4.2	4.4	m/s	4.21	Pass
Probe Acceleration	36	45	g's	44.6	Pass
Lateral Pelvis Acceleration	28	39	g's	36.2	Pass
Iliac Force	4100	5100	N	5054.2	Pass

Transducer Calibrations

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

Probe Acceleration





APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation (SID-IIs)

			SID-IIs S/N: DG8012			
			Serial Number	Manufacturer	Calibration Date	
Head Accelerometers	X		T21184	Endevco	10/17/2024	
	Y		T31030	Endevco	10/17/2024	
	Z		P83319	Endevco	10/17/2024	
Head Accelerometers - Redundant	X		T21354	Endevco	10/17/2024	
	Y		P52155	Endevco	10/17/2024	
	Z		P83322	Endevco	10/17/2024	
Displacement Potentiometer	Shoulder		Y			
	Thoracic Rib	Upper	Y	1199GFE	Servo	10/16/2024
		Middle	Y	1246GFE	Servo	10/16/2024
		Lower	Y	011GFE	Servo	10/16/2024
	Abdominal Rib	Upper	Y	008GFE	Servo	10/16/2024
		Lower	Y	046GFE	Servo	10/16/2024
Lower Spine Accelerometers (T12)	X		P71272	Endevco	10/17/2024	
	Y		P51327	Endevco	10/17/2024	
	Z		P52067	Endevco	10/17/2024	
Acetabulum Load Cell		Y	270-FY	Denton	09/16/2024	
Lilac Wing Load Cell		Y	321	Denton	09/16/2024	
Pelvis Plug (Struck Side)			16692	SACO	07/22/2022	
Pelvis Plug (Non-Struck Side)			16759	SACO	07/22/2022	

Table 2 – Vehicle Instrumentation

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	G26003	Endevco	12/14/2024
Vehicle Center of Gravity	Y	G26007	Endevco	12/14/2024
Vehicle Center of Gravity	Z	G26008	Endevco	12/14/2024
Left Floor Sill	Y	A399991	Measurement Specialties	11/01/2024
A-Pillar Sill	Y	A396614	Measurement Specialties	11/01/2024
A-Pillar Low	Y	A431213	Measurement Specialties	10/31/2024
A-Pillar Mid	Y	A398325	Measurement Specialties	11/01/2024
B-Pillar Sill	Y	A315026	Measurement Specialties	09/27/2024
B-Pillar Low	Y	A280896	Measurement Specialties	10/11/2024
B-Pillar Mid	Y	A315756	Measurement Specialties	11/20/2024
Driver Seat	Y	A315890	Measurement Specialties	08/21/2024
Engine Top	X	G25564	Endevco	11/22/2024
Engine Top	Y	G24599	Endevco	11/22/2024
Firewall	Y	A315874	Measurement Specialties	10/18/2024
Right Roof	Y	A284324	Measurement Specialties	11/13/2024
Right Floor Sill	Y	A280380	Measurement Specialties	11/04/2024
Rear Floorpan	X	G25261	Endevco	11/22/2024
Rear Floorpan	Y	A274260	Measurement Specialties	11/21/2024

Table 3 – Pole Instrumentation

Pole Instrumentation	Serial Number	Manufacturer	Calibration Date
Load Cell 1	1220AF-1277329-F0	Interface	06/21/2024
Load Cell 2	1220AF-BLACKLC	Interface	06/21/2024
Load Cell 3	1220AF-1117025-F0	Interface	06/21/2024
Load Cell 4	1220AF-1130989-F0	Interface	06/21/2024
Load Cell 5	1220AF-1281288-F0	Interface	06/21/2024
Load Cell 6	1220AF-1281285-F0	Interface	06/21/2024
Load Cell 7	1220AF-1117035-F0	Interface	06/21/2024
Load Cell 8	1220AF-1117011-F0	Interface	06/21/2024