

**REPORT NUMBER: SPNCAP-CAL-24-008**

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

**Hyundai Motor Manufacturing Alabama, LLC  
2024 Hyundai Santa Cruz  
4 Door Truck**

**NHTSA No: M20244206**

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



**December 18, 2024**

**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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Matthew Pronko, Test Engineer

Date: December 18, 2024

Approved by: Vanessa Hansen  
Vanessa Hansen, Operations Manager

Date: December 18, 2024

#### 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**

| <b>1. Report No.</b><br>SPNCAP-CAL-24-008                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                             | <b>2. Government Accession No.</b>                        |          | <b>3. Recipient's Catalog No.</b>                                                                                                                                                                                                    |                  |                         |                                             |  |  |       |           |        |                              |  |      |         |                                    |   |    |        |                                                         |   |      |          |                                 |    |    |        |                                  |    |     |        |
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| <b>4. Title and Subtitle</b><br>Final Report of New Car Assessment Program<br>Side Impact Pole Testing of a 2024 Hyundai Santa Cruz 4 Door Truck<br>NHTSA No.: M20244206                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                             |                                                           |          | <b>5. Report Date</b><br>December 18, 2024                                                                                                                                                                                           |                  |                         |                                             |  |  |       |           |        |                              |  |      |         |                                    |   |    |        |                                                         |   |      |          |                                 |    |    |        |                                  |    |     |        |
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| <b>7. Author(s)</b><br>Matthew Pronko, Test Engineer<br>Vanessa Hansen, Operations Manager                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                             |                                                           |          | <b>8. Performing Organization Report No.</b><br>CAL-DOT-2024-008                                                                                                                                                                     |                  |                         |                                             |  |  |       |           |        |                              |  |      |         |                                    |   |    |        |                                                         |   |      |          |                                 |    |    |        |                                  |    |     |        |
| <b>9. Performing Organization Name and Address</b><br>Calspan Corporation<br>Transportation Test Operations<br>P.O. Box 400<br>Buffalo, New York 14225                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                             |                                                           |          | <b>10. Work Unit No.</b>                                                                                                                                                                                                             |                  |                         |                                             |  |  |       |           |        |                              |  |      |         |                                    |   |    |        |                                                         |   |      |          |                                 |    |    |        |                                  |    |     |        |
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| <b>12. Sponsoring Agency Name and Address</b><br>U.S. Department of Transportation<br>National Highway Traffic Safety Administration<br>Office of Crashworthiness Standards<br>1200 New Jersey Ave., SE<br>Washington, D.C. 20590                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                             |                                                           |          | <b>13. Type of Report and Period Covered:</b><br>Final Test Report<br>July 16, 2024 - December 18, 2024                                                                                                                              |                  |                         |                                             |  |  |       |           |        |                              |  |      |         |                                    |   |    |        |                                                         |   |      |          |                                 |    |    |        |                                  |    |     |        |
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| <b>15. Supplementary Notes</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                             |                                                           |          |                                                                                                                                                                                                                                      |                  |                         |                                             |  |  |       |           |        |                              |  |      |         |                                    |   |    |        |                                                         |   |      |          |                                 |    |    |        |                                  |    |     |        |
| <b>16. Abstract</b><br><p>A 32.20 km/h (20 mph), 75° oblique impact Side NCAP Test was conducted on the subject 2024 Hyundai Santa Cruz 4 Door Truck 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 July 16, 2024.</p> <p>The impact velocity of the vehicle was 32.19 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 403 mm located at level 2. The test vehicle's occupant performance data is as follows:</p> <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th colspan="3">Driver ATD (SID-IIs)<br/>(Serial No.DG8012 )</th> </tr> <tr> <th>Units</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC36)</td> <td></td> <td>1000</td> <td>274.509</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td>G</td> <td>82</td> <td>40.408</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td>N</td> <td>5525</td> <td>2876.829</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38</td> <td>23.002</td> </tr> <tr> <td>Maximum Abdominal Rib Deflection</td> <td>mm</td> <td>45*</td> <td>21.939</td> </tr> </tbody> </table> <p>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.</p> |                                             |                                                           |          |                                                                                                                                                                                                                                      |                  | Measurement Description | Driver ATD (SID-IIs)<br>(Serial No.DG8012 ) |  |  | Units | Threshold | Result | Head Injury Criteria (HIC36) |  | 1000 | 274.509 | Resultant Lower Spine Acceleration | G | 82 | 40.408 | Total Pelvic Force (sum of acetabular and iliac forces) | N | 5525 | 2876.829 | Maximum Thoracic Rib Deflection | mm | 38 | 23.002 | Maximum Abdominal Rib Deflection | mm | 45* | 21.939 |
| Measurement Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Driver ATD (SID-IIs)<br>(Serial No.DG8012 ) |                                                           |          |                                                                                                                                                                                                                                      |                  |                         |                                             |  |  |       |           |        |                              |  |      |         |                                    |   |    |        |                                                         |   |      |          |                                 |    |    |        |                                  |    |     |        |
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| Head Injury Criteria (HIC36)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                             | 1000                                                      | 274.509  |                                                                                                                                                                                                                                      |                  |                         |                                             |  |  |       |           |        |                              |  |      |         |                                    |   |    |        |                                                         |   |      |          |                                 |    |    |        |                                  |    |     |        |
| Resultant Lower Spine Acceleration                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | G                                           | 82                                                        | 40.408   |                                                                                                                                                                                                                                      |                  |                         |                                             |  |  |       |           |        |                              |  |      |         |                                    |   |    |        |                                                         |   |      |          |                                 |    |    |        |                                  |    |     |        |
| Total Pelvic Force (sum of acetabular and iliac forces)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | N                                           | 5525                                                      | 2876.829 |                                                                                                                                                                                                                                      |                  |                         |                                             |  |  |       |           |        |                              |  |      |         |                                    |   |    |        |                                                         |   |      |          |                                 |    |    |        |                                  |    |     |        |
| Maximum Thoracic Rib Deflection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | mm                                          | 38                                                        | 23.002   |                                                                                                                                                                                                                                      |                  |                         |                                             |  |  |       |           |        |                              |  |      |         |                                    |   |    |        |                                                         |   |      |          |                                 |    |    |        |                                  |    |     |        |
| Maximum Abdominal Rib Deflection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | mm                                          | 45*                                                       | 21.939   |                                                                                                                                                                                                                                      |                  |                         |                                             |  |  |       |           |        |                              |  |      |         |                                    |   |    |        |                                                         |   |      |          |                                 |    |    |        |                                  |    |     |        |
| <b>17. Key Words</b><br>New Car Assessment Program (NCAP)<br>Side Impact<br>Pole<br>Part 572V<br>SID-IIs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                             |                                                           |          | <b>18. Distribution Statement</b><br><u>Copies of this report are available from:</u><br>National Highway Traffic Safety Administration<br>Technical Information Services Division<br>1200 New Jersey Ave.<br>Washington, D.C. 20590 |                  |                         |                                             |  |  |       |           |        |                              |  |      |         |                                    |   |    |        |                                                         |   |      |          |                                 |    |    |        |                                  |    |     |        |
| <b>19. Security Class. (of this report)</b><br>UNCLASSIFIED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                             | <b>20. Security Class. (of this page)</b><br>UNCLASSIFIED |          | <b>21. No. of Pages</b><br>126                                                                                                                                                                                                       | <b>22. Price</b> |                         |                                             |  |  |       |           |        |                              |  |      |         |                                    |   |    |        |                                                         |   |      |          |                                 |    |    |        |                                  |    |     |        |

Form DOT F1700.7 (8-72)

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## **SECTION 1**

### **TEST PURPOSE AND PROCEDURE**

This side impact test was conducted as part of the MY 2024 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 2024 Hyundai Santa Cruz 4 Door Truck. 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 2024 Hyundai Santa Cruz 4 Door Truck. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.19 km/h. The test was conducted by Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on July 16, 2024. 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 | 274.509  |
| Resultant Lower Spine Acceleration                      | G                    | 82   | 40.408   |
| Total Pelvic Force (sum of acetabular and iliac forces) | N                    | 5525 | 2876.829 |
| Maximum Thoracic Rib Deflection                         | mm                   | 38   | 23.002   |
| Maximum Abdominal Rib Deflection                        | mm                   | 45*  | 21.939   |

\*Proposed IARV

Supplemental restraint information was recorded as follows:

#### SUPPLEMENTAL RESTRAINT INFORMATION

| Restraint Type                      | Left Front (Driver)<br>Occupant Location 1 |          | Left Rear (Passenger)<br>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      | 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 Sill B-Pillar Y Acceleration, Exceeded calibration range at 29.8 ms
- Left Middle B-Pillar Y Acceleration, Exceeded calibration range at 11.6 ms 17.8 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: 2024 Hyundai Santa Cruz 4 Door Truck  
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20244206  
Test Date: 07/16/2024

**TEST VEHICLE INFORMATION AND OPTIONS**

|                          |                   |                                   |     |
|--------------------------|-------------------|-----------------------------------|-----|
| NHTSA No.                | M20244206         | Traction Control System (TCS)     | Yes |
| Model Year               | 2024              | Auto-Leveling System              | No  |
| Make                     | Hyundai           | Automatic Door Locks (ADL)        | Yes |
| Model                    | Santa Cruz        | Power Window Auto-Reverse         | No  |
| Body Style               | Truck             | Other Optional Feature            | N/A |
| VIN                      | 5NTJB4DE8RH120755 | Driver Front Airbag               | Yes |
| Body Color               | Hampton Gray      | Driver Curtain Airbag             | Yes |
| Odometer Reading (km/mi) | 12 mi             | Driver Head/Torso Airbag          | No  |
| Engine Displacement (L)  | 2.5               | Driver Torso Airbag               | No  |
| Type / No. Cylinders     | I4                | Driver Torso / Pelvis Airbag      | Yes |
| Engine Placement         | Transverse        | Driver Pelvis Airbag              | No  |
| Transmission Type        | Automatic         | Driver Knee Airbag                | No  |
| Transmission Speeds      | 8-Speed           | Rear Pass. Curtain Airbag         | Yes |
| Overdrive                | Yes               | Rear Pass. Head / Torso Airbag    | No  |
| Final Drive              | Front Wheel Drive | Rear Pass. Torso Airbag           | No  |
| Roof Rack                | No                | Rear Pass. Torso / Pelvis Airbag  | Yes |
| Sunroof / T-Top          | No                | Rear Pass. Pelvis Airbag          | No  |
| Running Boards           | No                | Driver Seat Belt Pretensioner     | Yes |
| Tilt Steering Wheel      | Yes               | Rear Pass. Seat Belt Pretensioner | Yes |
| Power Seats              | Yes               | Driver Load Limiter               | Yes |
| Anti-Lock Brakes (ABS)   | 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     | Hyundai Motor Manufacturing Alabama, LLC | GVWR (KG)       | 2475 |
| Date of Manufacture | May/07/24                                | GVWR Front (KG) | 1200 |
| Vehicle Type        | Truck                                    | GVWR Rear (KG)  | 1450 |

**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) |       |      |       | 640   | (A)   |
| DSC x 68.0 kg                      |       |      |       | 340   | (B)   |
| Cargo Weight (RCLW) (kg)           |       |      |       | 136   | (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     |

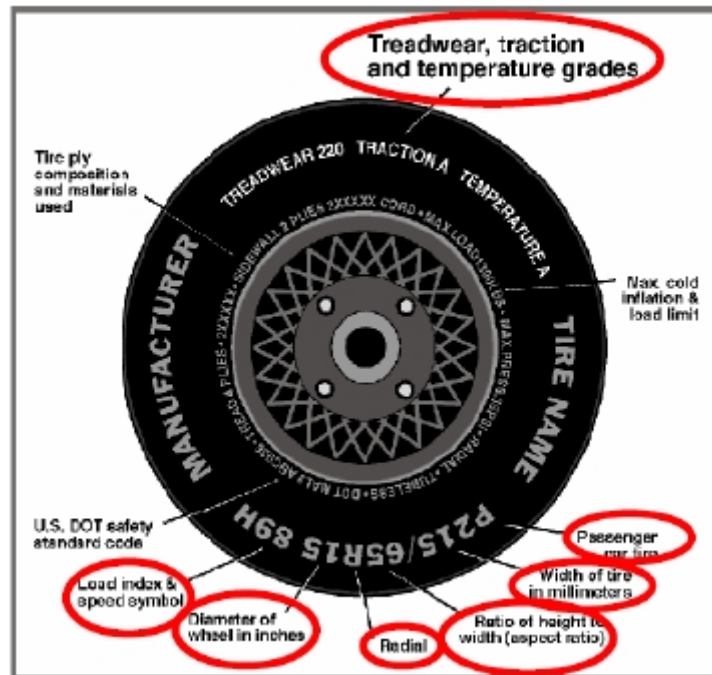


**DATA SHEET NO. 1 ... (CONTINUED)**  
**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2024 Hyundai Santa Cruz 4 Door Truck  
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20244206  
 Test Date: 07/16/2024

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



**VEHICLE TIRE INFORMATION**

| Measured Parameter          | Front                                | Rear                                 |
|-----------------------------|--------------------------------------|--------------------------------------|
| Maximum Tire Pressure (kPa) | 350                                  | 350                                  |
| Cold Pressure (kPa)         | 240                                  | 240                                  |
| Recommended Tire Size       | 245/60R18                            | 245/60R18                            |
| Tire Size on Vehicle        | 245/60R18                            | 245/60R18                            |
| Tire Manufacturer           | Kumho                                | Kumho                                |
| Tire Model                  | Crugen                               | Crugen                               |
| Treadwear                   | 540                                  | 540                                  |
| Traction                    | A                                    | A                                    |
| Temperature Grades          | A                                    | A                                    |
| Tire Plies Sidewall         | 2 Polyester                          | 2 Polyester                          |
| Tire Plies Body             | 2 Steel, 2 Polyester,<br>1 Polyamide | 2 Steel, 2 Polyester,<br>1 Polyamide |
| Load Index / Speed Symbol   | 105H                                 | 105H                                 |
| Tire Material               | Rubber                               | Rubber                               |
| DOT Safety Code Left        | 000J8YA8E1824                        | 000J8YA8E1824                        |
| DOT Safety Code Right       | 000J8YA8E1824                        | 000J8YA8E1824                        |

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

Test Vehicle: 2024 Hyundai Santa Cruz 4 Door Truck  
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20244206  
 Test Date: 07/16/2024

**TIRE PRESSURES**

|                | Units | LF  | RF  | LR  | RR  |
|----------------|-------|-----|-----|-----|-----|
| As Delivered   | kPa   | 217 | 218 | 217 | 216 |
| Tire Placard   | kPa   | 240 | 240 | 240 | 240 |
| Owner's Manual | kPa   | 240 | 240 | 240 | 240 |
| As Tested      | kPa   | 240 | 240 | 240 | 240 |

**TEST VEHICLE WEIGHTS**

|        | Units | As Delivered (UVW) |      |       | As Tested (ATW) |       |       | Fully Loaded |      |       |
|--------|-------|--------------------|------|-------|-----------------|-------|-------|--------------|------|-------|
|        |       | Front              | Rear | Total | Rear            | Total | Total | Front        | Rear | Total |
| Left   | kg    | 502                | 370  |       | 502             | 463   |       | 521          | 468  |       |
| Right  | kg    | 481                | 367  |       | 504             | 430   |       | 482          | 444  |       |
| Ratio  | %     | 57.2               | 42.8 |       | 53.0            | 47.0  |       | 52.4         | 47.6 |       |
| Totals | kg    | 983                | 737  | 1720  | 1006            | 893   | 1899  | 1003         | 912  | 1915  |

**TARGET TEST WEIGHT CALCULATION**

| Measured Parameter                          | Units | Value |         |
|---------------------------------------------|-------|-------|---------|
| Total As Delivered Weight (UVW)             | kg    | 1720  | (A)     |
| Actual Weight of 1 P572V (SID-IIs) ATD Used | kg    | 50    | (B)     |
| Rated Cargo / Luggage Weight (RCLW)         | kg    | 136   | (C)     |
| Calculated Vehicle Target Weight (TVTW)     | kg    | 1906  | (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   | -0.45        | -0.30     | -0.25        | Yes           |
| Front Passenger Sill Angle (front-to-rear)*                    | Deg   | -0.55        | -0.50     | -0.50        | Yes           |
| Front Bumper-Line Angle (left-to-right)**                      | Deg   | -0.55        | -0.25     | -0.25        | Yes           |
| Rear Bumper-Line Angle (left-to-right)**                       | Deg   | -0.50        | -0.15     | -0.15        | Yes           |
| Vehicle CG (Aft of Front Axle)                                 | mm    | 1290         | 1415      | 1433         |               |
| Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline) | mm    | +12          | +14       | +27          |               |

\* 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: 2024 Hyundai Santa Cruz 4 Door Truck | NHTSA No.: M20244206  |
| Test Program: NCAP Side Pole Impact Test           | Test Date: 07/16/2024 |

**WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW**

| Component Description                                      | Weight (kg) |
|------------------------------------------------------------|-------------|
| Hood Plastic                                               | 1           |
|                                                            |             |
| 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 | 551                                         |
| Aft 25 mm target  | 553                                         |

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

Test Vehicle: 2024 Hyundai Santa Cruz 4 Door Truck  
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20244206  
 Test Date: 07/16/2024

**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               | 21.6    | 13.1  | 17.4  |
| Front Passenger Seat      | Fixed   | Fixed | Fixed |
| 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               | 17.4                           | 52                         | Max                  | 71               | 77             | 84           |
|                           |                                |                            | Mid                  | 38               | 46             | 52           |
|                           |                                |                            | Min                  | 6                | 13             | 19           |
| Front Passenger Seat      | Fixed                          | Fixed                      | Max                  |                  |                |              |
|                           |                                |                            | Mid                  |                  |                |              |
|                           |                                |                            | 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: 2024 Hyundai Santa Cruz 4 Door Truck  
 Test Program: NCAP Side Pole Impact Test

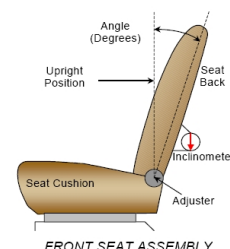
NHTSA No.: M20244206  
 Test Date: 07/16/2024

**SEAT FORE / AFT POSITION**

| Seat                      | Total Fore / Aft Travel |           | Test Position from Forward most Position |          |
|---------------------------|-------------------------|-----------|------------------------------------------|----------|
|                           | mm                      | Detents*  | mm                                       | Detents* |
| Driver Seat               | 240                     | Power     | 0                                        | Power    |
| Front Passenger Seat      | 239                     | 38 (0-37) | 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 | 64.4                        | Power     | 5.05                            | Power    |
| Front Passenger Seat       | 59.9                        | 31 (0-30) | 4.95                            | 5        |
| 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 | 4 (0-3)              | 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 | 6 (0-5)              | Lowest               |

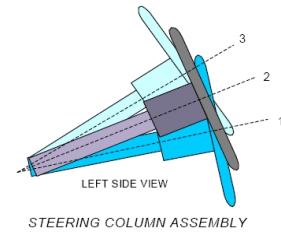
**DATA SHEET NO. 2 ... (CONTINUED)**  
**SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA**

Test Vehicle: 2024 Hyundai Santa Cruz 4 Door Truck  
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20244206  
 Test Date: 07/16/2024

**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.*

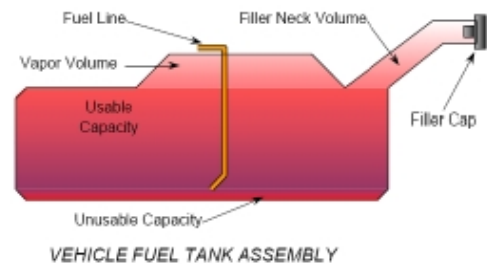


|                                   | Degrees | Fore / Aft Position (mm) |
|-----------------------------------|---------|--------------------------|
| Lowermost - Position No. 1        | 23.0    |                          |
| Geometric center - Position No. 2 | 25.4    |                          |
| Uppermost - Position No. 3        | 27.8    |                          |
| Telescoping Steering Wheel Travel |         | 56                       |
| Test Position                     | 25.4    | 28                       |

**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     | 67.0   |
| Usable Capacity of "Optional Tank" - see Form No. 1     | N/A    |
| Usable Capacity of "Standard Tank" - see Owner's Manual | 67.0   |
| Usable Capacity of "Optional Tank" - see Owner's Manual | N/A    |
| 93% of Usable Capacity                                  | 62.3   |
| Actual Amount of Solvent Used in Test                   | 62.3   |
| 1/3 of Usable Capacity                                  | 22.3   |

Is the Actual Amount of Solvent Used in the test equal to 93%  $\pm$ 1% of the Usable

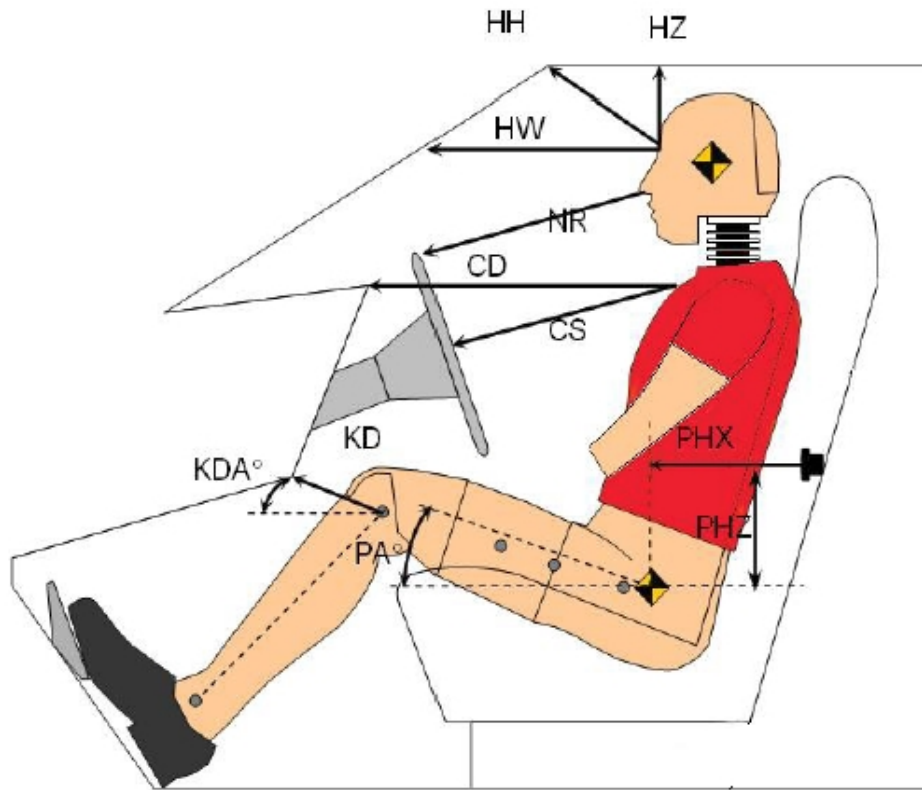
Capacity stated in Form No. 1?

☒ Yes ☐ No

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

Test Vehicle: 2024 Hyundai Santa Cruz 4 Door Truck  
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20244206  
 Test Date: 07/16/2024



**Left Side View**

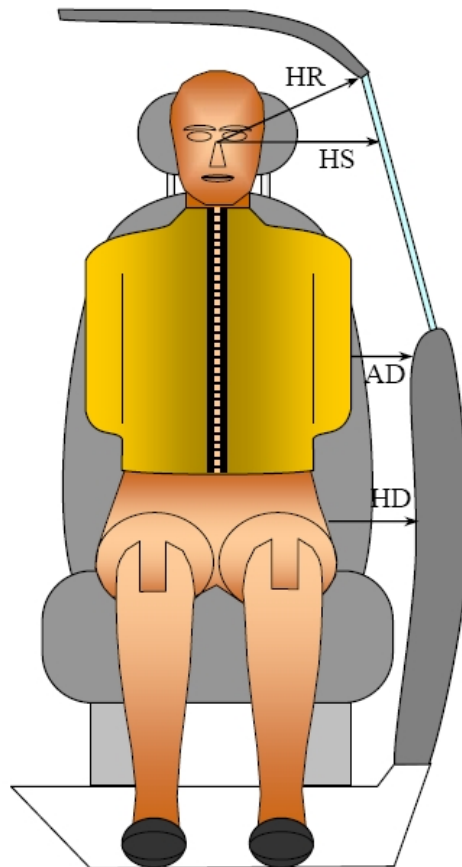
**DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION**

| Driver Code     | Description                   | Driver<br>(Serial No. DG8012) |           |
|-----------------|-------------------------------|-------------------------------|-----------|
|                 |                               | Length (mm)                   | Angle (°) |
| HH              | Head to Header                | 286                           |           |
| HW              | Head to Windshield            | 590                           |           |
| HZ              | Head to Roof Liner            | 205                           |           |
| NR              | Nose to Rim                   | 263                           |           |
| CD              | Chest to Dash                 | 424                           |           |
| CS              | Chest to Steering Wheel       | 186                           |           |
| KD(L) / KDA(L)° | Left Knee to Dash             | 125                           | 27.3      |
| KD(R) / KDA(R)° | Right Knee to Dash            | 98                            | 24.0      |
| PAX°            | Pelvic Tilt Angle (X-Axis)    |                               | 20.45     |
| PAY°            | Pelvic Tilt Angle (Y-Axis)    |                               | 0.2       |
| PHX             | Hip Point to Striker (X-Axis) | 323                           |           |
| PHZ             | Hip Point to Striker (Z-Axis) | 161                           |           |

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

Test Vehicle: 2024 Hyundai Santa Cruz 4 Door Truck  
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20244206  
Test Date: 07/16/2024



*FRONT VIEW OF DUMMY*

**DUMMY LATERAL CLEARANCE DIMENSION INFORMATION**

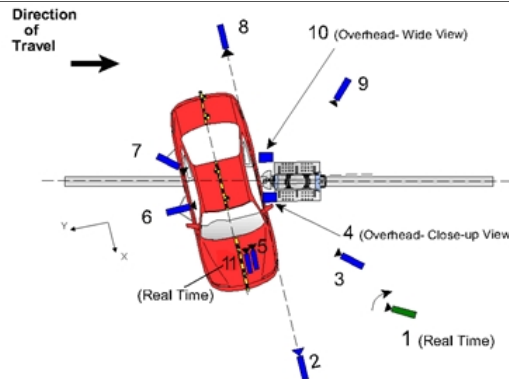
| Code | Measurement Description | Units | Driver – Length<br>(Serial No. DG8012) |
|------|-------------------------|-------|----------------------------------------|
| HR   | Head to Side Header     | mm    | 249                                    |
| HS   | Head to Side Window     | mm    | 362                                    |
| AD   | Arm to Door             | mm    | 156                                    |
| HD   | H-Point to Door         | mm    | 200                                    |



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

Test Vehicle: 2024 Hyundai Santa Cruz 4 Door Truck  
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20244206  
 Test Date: 07/16/2024



## **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           | 0             | 7780  | -1535 | 28        | 1000        |
| 3   | Impact side 45° - forward pole view        | 425           | 5040  | -1535 | 24        | 1000        |
| 4   | Overhead Close-up view of impact           | 0             | 0     | -9200 | 24        | 1000        |
| 5   | Onboard - dummy front view                 |               |       |       | 25        | 1000        |
| 6   | Onboard - dummy side view                  |               |       |       | 12.5      | 1000        |
| 7   | Onboard - dummy rear oblique view          |               |       |       | 12.5      | 1000        |
| 8   | Rear ground level - impact view            | 0             | -9200 | -1550 | 28        | 1000        |
| 9   | Impact side 45° - rearward pole view       | 4190          | -4165 | -1430 | 24        | 1000        |
| 10  | Overhead wide - view of impact             | 0             | 0     | -9200 | 16        | 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.

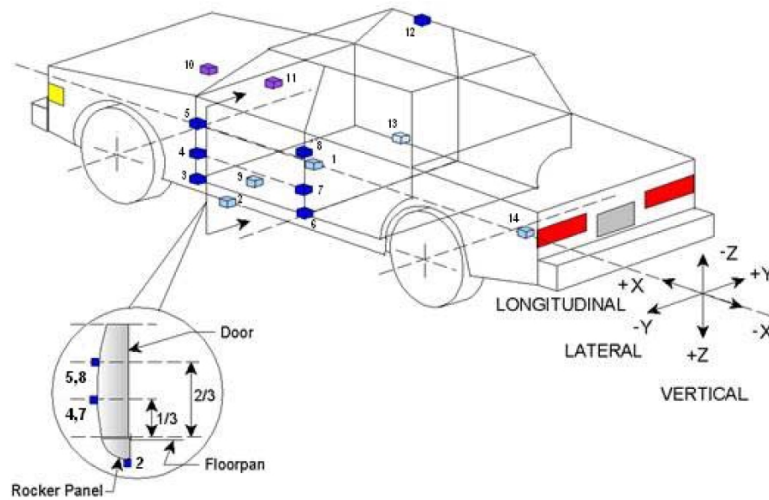
## **INSTRUMENTATION**

| 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: 2024 Hyundai Santa Cruz 4 Door Truck  
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20244206  
Test Date: 07/16/2024



## **TEST VEHICLE ACCELEROMETER LOCATIONS**

| No. | Accelerometer Location | Coordinates (mm) |      |       |
|-----|------------------------|------------------|------|-------|
|     |                        | X                | Y    | Z     |
| 1   | Vehicle CG             | 2446             | 10   | -12   |
| 2   | Left Floor Sill        | 3202             | -667 | -24   |
| 3   | A-Pillar Sill          | 3544             | -665 | -59   |
| 4   | A-Pillar Low           | 3636             | -647 | -203  |
| 5   | A-Pillar Mid           | 3503             | -654 | -771  |
| 6   | B-Pillar Sill          | 2496             | -656 | -42   |
| 7   | B-Pillar Low           | 2548             | -689 | -303  |
| 8   | B-Pillar Mid           | 2473             | -661 | -739  |
| 9   | Driver Seat Track      | 2716             | -570 | -59   |
| 10  | Engine Top             | 4286             | 252  | -514  |
| 11  | Firewall               | 3844             | 206  | -430  |
| 12  | Right Roof             | 2564             | 594  | -1229 |
| 13  | Right Floor Sill       | 3193             | 670  | -36   |
| 14  | Rear Floor Pan         | 934              | -1   | -357  |

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: 2024 Hyundai Santa Cruz 4 Door Truck  
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20244206  
Test Date: 07/16/2024

**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: 2024 Hyundai Santa Cruz 4 Door Truck  
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20244206  
Test Date: 07/16/2024

**TEST DUMMY INFORMATION AND CONTACT POINTS**

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

**POST-TEST DOOR PERFORMANCE**

| Description                                                 | Struck Side |      | Non-Struck Side |      | Rear Hatch/Other |
|-------------------------------------------------------------|-------------|------|-----------------|------|------------------|
|                                                             | Front       | Rear | Front           | Rear |                  |
| Remained Closed and Operational                             | No          | No   | Yes             | Yes  | Yes              |
| Total Separation from Vehicle at Hinges or Latches          | No          | No   | No              | No   | No               |
| Latch or Hinge Systems Pulled Out of Their Anchorages       | No          | No   | No              | No   | No               |
| Disengaged from Latched Position                            | No          | No   | No              | No   | No               |
| Latch Separated from Striker                                | No          | No   | No              | No   | No               |
| Jammed Shut                                                 | Yes         | Yes  | No              | No   | No               |
| If Door Opened at Striker, Width of Opening at Striker (mm) | 0           | 0    | 0               | 0    | 0                |

**POST-TEST SEAT PERFORMANCE**

| Description                              | Struck Side |      | Non-Struck Side |      |
|------------------------------------------|-------------|------|-----------------|------|
|                                          | Front       | Rear | Front           | Rear |
| Seat Movement Along Seat Track           | No          | No   | No              | No   |
| Seat Disengagement from Floor Pan        | No          | No   | No              | No   |
| 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: 2024 Hyundai Santa Cruz 4 Door Truck  
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20244206  
Test Date: 07/16/2024

**POST-TEST STRUCTURAL OBSERVATIONS**

| Critical Areas of Performance | Observations and Conclusions                                        |
|-------------------------------|---------------------------------------------------------------------|
| Pillar Performance            | A-Pillar, B-Pillar & C-Pillar Buckled                               |
| Sill Separation               | 180mm front of impact location & 130 mm rearward of impact location |
| Windshield Damage             | Cracks throughout with separation along Driver A-Pillar             |
| Side Window Damage            | Driver window shattered during impact                               |
| Other Notable Effects         | None                                                                |

**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      | 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**

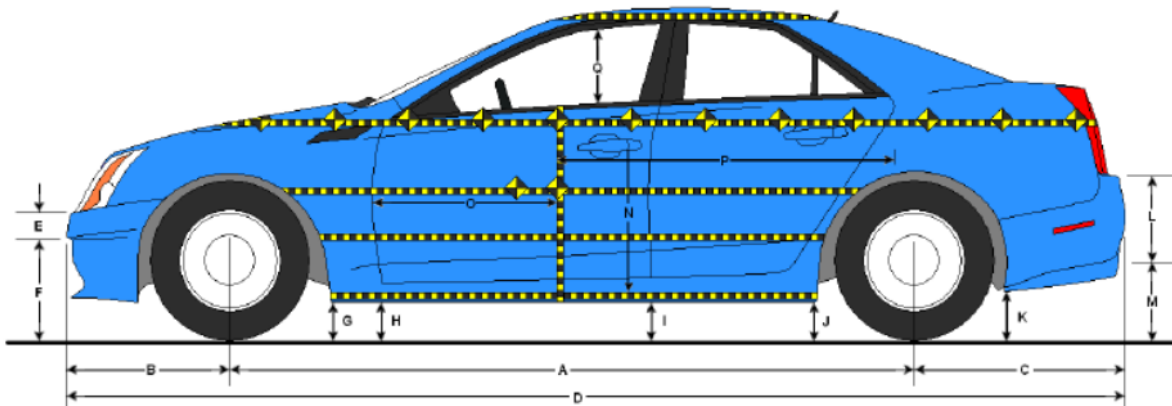
| Measured Parameter                                                         | Units | Tolerance    | Value |
|----------------------------------------------------------------------------|-------|--------------|-------|
| Vertical Impact Ref Line - Aft of Front Axle, Intended Impact Pt           | mm    |              | 1127  |
| Actual Impact Point - Aft of Front Axle                                    | mm    |              | 1130  |
| Horizontal Offset (+ forward / - rearward)                                 | mm    | +/- 38*      | -3    |
| 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 | 32.19 |
| Trap No. 2 Velocity - Redundant                                            | kph   | 31.4 to 33.0 | 32.26 |

\*Of Intended Impact Point

**DATA SHEET NO. 9**  
**TEST VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2024 Hyundai Santa Cruz 4 Door Truck  
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20244206  
Test Date: 07/16/2024



**LEFT SIDE VIEW**

**VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION**

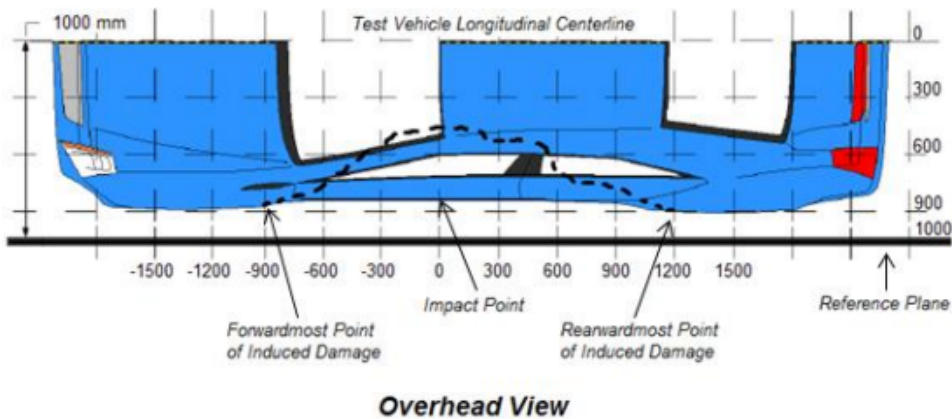
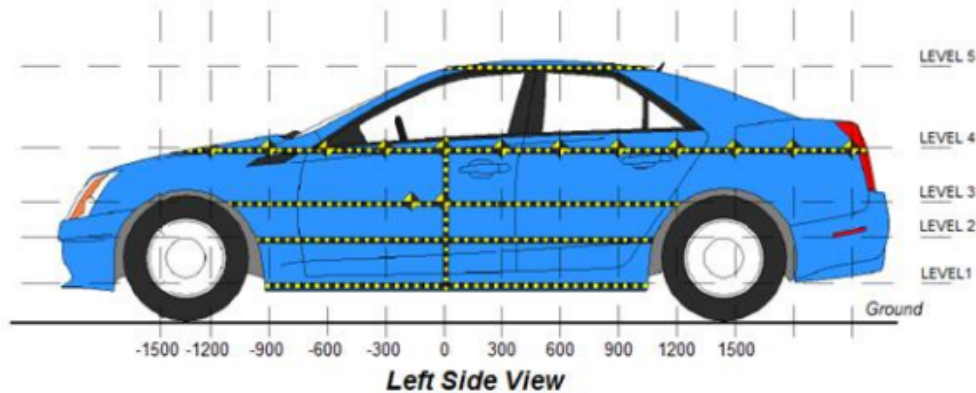
| No. | Measurement Description                    | Pre-Test | Post-Test | Change |
|-----|--------------------------------------------|----------|-----------|--------|
| A   | Vehicle Wheelbase                          | 3010     | 2942      | -68    |
| B   | Front Axle to FSOV                         | 887      | 902       | 15     |
| C   | Rear Axle to RSOV                          | 1076     | 1083      | 8      |
| D   | Total Length at Centerline                 | 4972     | 4927      | -45    |
| E   | Front Bumper Thickness                     | 108      | 108       | 0      |
| F   | Front Bumper Bottom to Ground              | 500      | 544       | 44     |
| G   | Sill Height at Front Wheel Well            | 280      | 258       | -22    |
| H   | Sill Height at Front Door Leading Edge     | 283      | 270       | -13    |
| I   | Sill Height at B Pillar                    | 283      | 301       | 18     |
| J1  | Sill Height at Rear Wheel Well             | 283      | 319       | 36     |
| J2  | Pinch Weld Height at Rear Wheel Well       | 272      | 308       | 36     |
| K   | Sill Height Aft of Rear Wheel Well         | 335      | 362       | 27     |
| L   | Rear Bumper Thickness                      | 210      | 210       | 0      |
| M   | Rear Bumper Bottom to Ground               | 395      | 396       | 1      |
| N   | Sill Height to Bottom of Front Window Sill | 904      | 911       | 7      |
| O   | Front Door Leading Edge to Impact CL       | 621      | 504       | -117   |
| P   | Rear Door Trailing Edge to Impact CL       | 1433     | 1324      | -109   |
| Q   | Front Window Opening                       | 419      | 407       | -12    |
| R   | Right Side Length                          | 4886     | 4868      | -18    |
| S   | Left Side Length                           | 4887     | 4799      | -88    |
| T   | Vehicle Width at B-Pillars                 | 1837     | 1699      | -138   |
| U   | Front Wheel Track width                    | 1636     | 1642      | 6      |
| V   | Rear Wheel Track Width                     | 1658     | 1658      | 0      |

\* All measurements in mm with tolerance of  $\pm 3$ mm

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

Test Vehicle: 2024 Hyundai Santa Cruz 4 Door Truck  
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20244206  
 Test Date: 07/16/2024



## **MAXIMUM EXTERIOR CRUSH MEASUREMENTS**

| Level | Measurement Description | Units | Height Above Ground | Maximum Exterior Static Crush | Distance from Impact |
|-------|-------------------------|-------|---------------------|-------------------------------|----------------------|
| 1     | Sill Top                | mm    | 436                 | 396                           | 0                    |
| 2     | Driver H-Point          | mm    | 742                 | 403                           | 0                    |
| 3     | Mid-Door                | mm    | 794                 | 403                           | 0                    |
| 4     | Window Sill             | mm    | 1111                | 331                           | 150                  |
| 5     | Window Top              | mm    | 1616                | 103                           | 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: 2024 Hyundai Santa Cruz 4 Door Truck  
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20244206  
 Test Date: 07/16/2024

**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  |          |     | 943 |     |     |           |     | 949 |     |     |       |     | -6  |     |     |
| -750  |          | 952 | 949 | 824 |     |           | 941 | 940 | 840 |     |       | 11  | 9   | -16 |     |
| -600  | 924      | 940 | 936 | 832 |     | 880       | 900 | 905 | 843 |     | 44    | 40  | 31  | -11 |     |
| -450  | 924      | 930 | 928 | 840 |     | 758       | 809 | 816 | 797 |     | 166   | 121 | 112 | 43  |     |
| -300  | 922      | 923 | 923 | 835 |     | 689       | 706 | 712 | 699 |     | 233   | 217 | 211 | 136 |     |
| -150  | 911      | 919 | 920 | 838 |     | 605       | 620 | 624 | 612 |     | 306   | 299 | 296 | 226 |     |
| 0     | 904      | 917 | 919 | 845 |     | 508       | 514 | 516 | 521 |     | 396   | 403 | 403 | 324 |     |
| 150   | 903      | 916 | 919 | 851 | 606 | 525       | 520 | 518 | 520 | 503 | 378   | 396 | 401 | 331 | 103 |
| 300   | 902      | 916 | 919 | 858 | 621 | 636       | 631 | 629 | 634 | 545 | 266   | 285 | 290 | 224 | 76  |
| 450   | 902      | 916 | 919 | 863 | 622 | 749       | 774 | 779 | 745 | 570 | 153   | 142 | 140 | 118 | 52  |
| 600   | 901      | 916 | 918 | 865 | 620 | 782       | 803 | 809 | 774 | 591 | 119   | 113 | 109 | 91  | 29  |
| 750   | 901      | 915 | 918 | 869 | 617 | 814       | 833 | 837 | 799 | 600 | 87    | 82  | 81  | 70  | 17  |
| 900   | 902      | 914 | 916 | 872 | 611 | 846       | 860 | 864 | 822 | 601 | 56    | 54  | 52  | 50  | 10  |
| 1050  | 903      | 913 | 915 | 874 | 601 | 877       | 888 | 892 | 847 | 595 | 26    | 25  | 23  | 27  | 6   |
| 1200  | 909      | 919 | 916 | 875 | 585 | 908       | 921 | 922 | 871 | 585 | 1     | -2  | -6  | 4   | 0   |
| 1350  |          | 938 | 933 | 875 | 565 |           | 961 | 958 | 892 | 568 |       | -23 | -25 | -17 | -3  |
| 1500  |          |     | 946 | 871 |     |           |     | 944 | 870 |     |       |     | 2   | 1   |     |

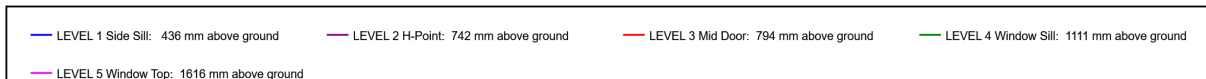
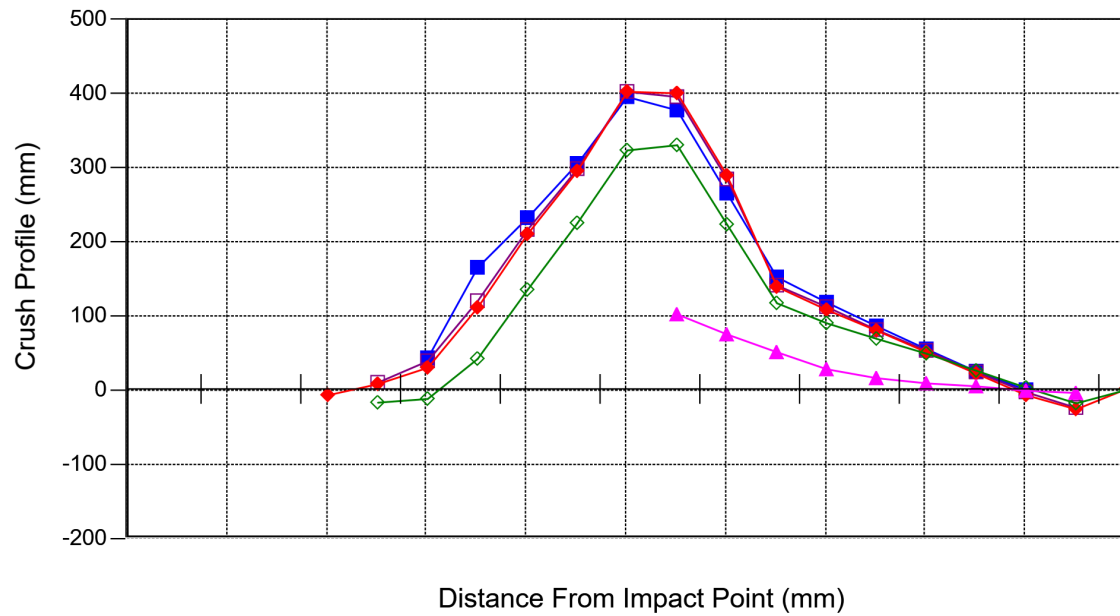
**NOTE:** Pre-test measurements are taken when the vehicle is in the "As Tested" weight condition. Vehicle measurements forward of the vertical impact reference line are negative. The crush profile grid is established prior to the test based on an estimated impact point. The final distance from impact 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: 2024 Hyundai Santa Cruz 4 Door Truck  
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20244206  
Test Date: 07/16/2024



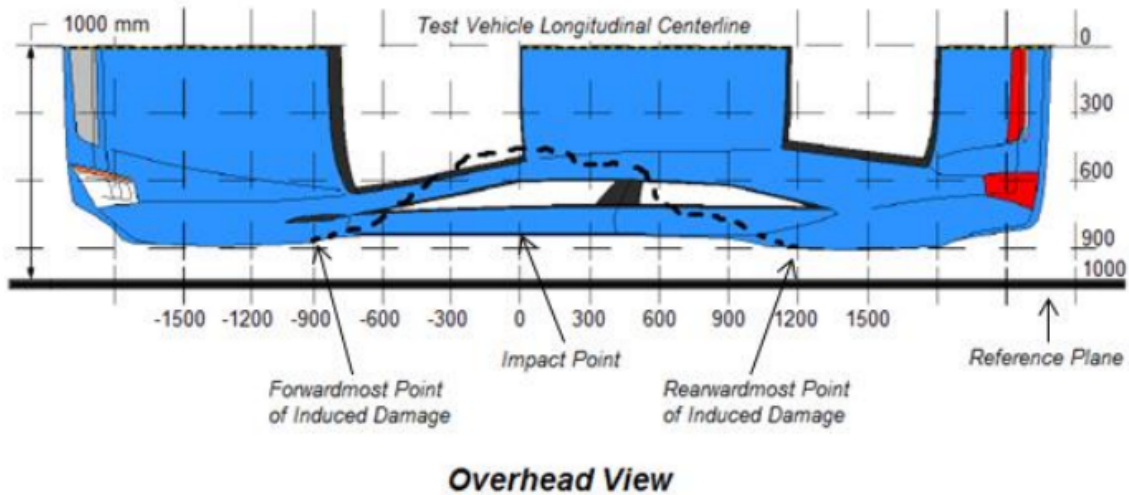
**Vehicle Exterior Crush Measurements - Visual Representation**

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

Test Vehicle: 2024 Hyundai Santa Cruz 4 Door Truck  
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20244206  
 Test Date: 07/16/2024

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     | 51             | 57            | -6         |
| 2   | -420                            | 3     | 205            | 73            | 132        |
| 3   | 60                              | 3     | 483            | 81            | 402        |
| 4   | 540                             | 3     | 203            | 82            | 121        |
| 5   | 1020                            | 3     | 114            | 85            | 29         |
| 6   | 1500                            | 3     | 56             | 54            | 2          |

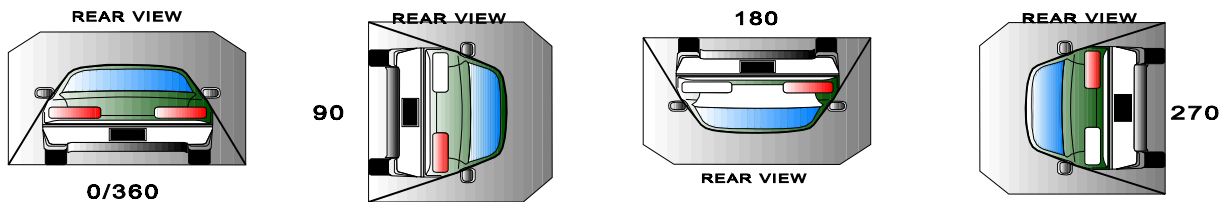
**DATA SHEET NO.12**  
**FMVSS NO.301 STATIC ROLLOVER RESULTS**

Test Vehicle: 2024 Hyundai Santa Cruz 4 Door Truck NHTSA No.: M20244206  
 Test Program: NCAP Side Pole Impact Test Test Date: 07/16/2024

Test Time: 10:40 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



**ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS**

| Test Phase   | Rotation Time | Hold Time | Total Time |
|--------------|---------------|-----------|------------|
| 0° to 90°    | 62            | 300       | 362        |
| 90° to 180°  | 73            | 300       | 373        |
| 180° to 270° | 63            | 300       | 363        |
| 270° to 360° | 66            | 300       | 366        |

**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**

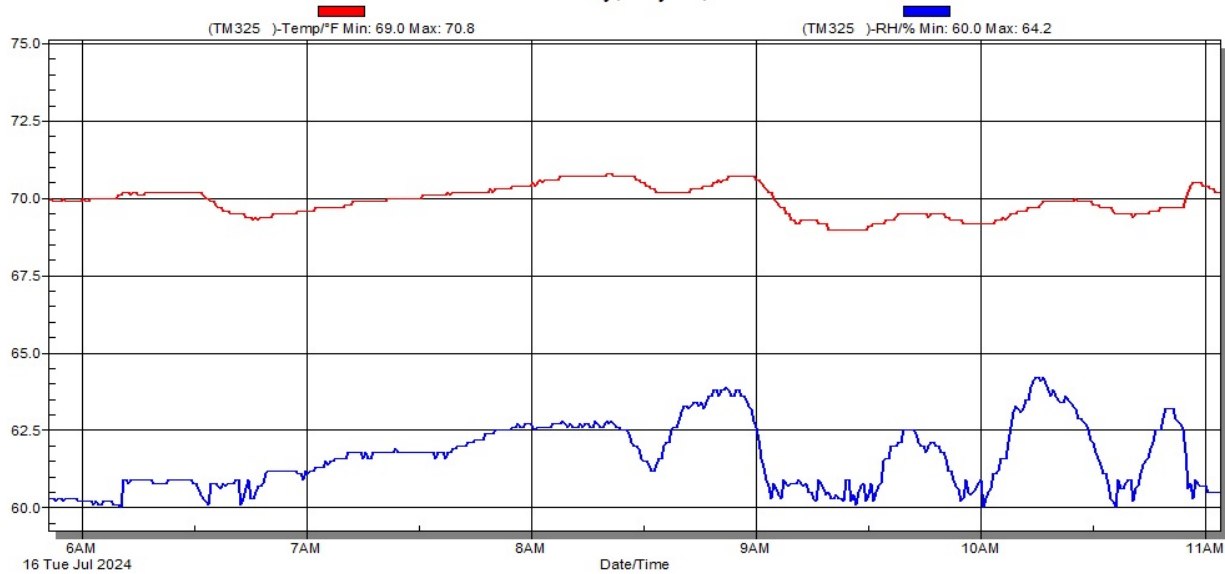
| Test Phase   | Spillage Location |
|--------------|-------------------|
| 0° to 90°    | None              |
| 90° to 180°  | None              |
| 180° to 270° | None              |
| 270° to 360° | None              |

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

Test Vehicle: 2024 Hyundai Santa Cruz 4 Door Truck  
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20244206  
Test Date: 07/16/2024

Wednesday, July 17, 2024



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

**APPENDIX A**  
**PHOTOGRAPHS**

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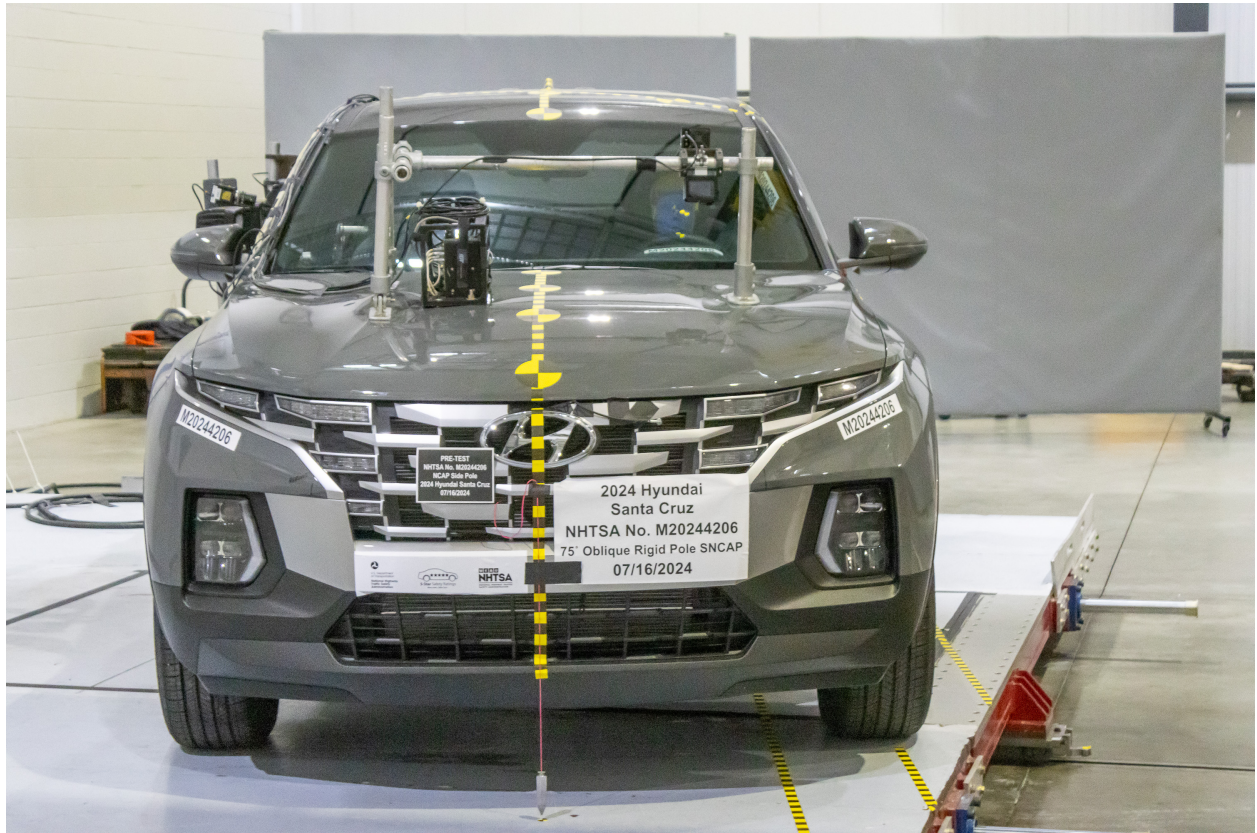


**Figure A-1: As Delivered Right Front  $\frac{3}{4}$  View of Test Vehicle**



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



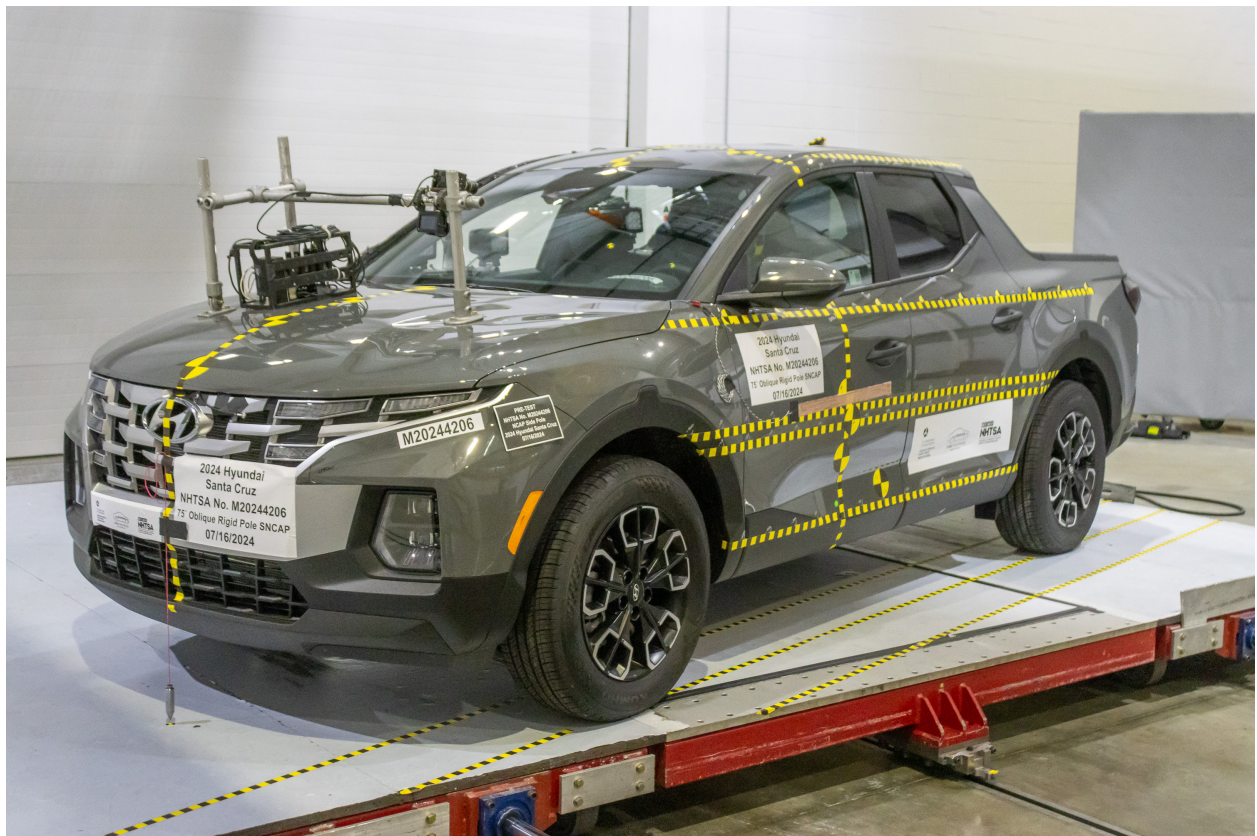


**Figure A-3: Pre-Test Frontal View of Test Vehicle**



**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**

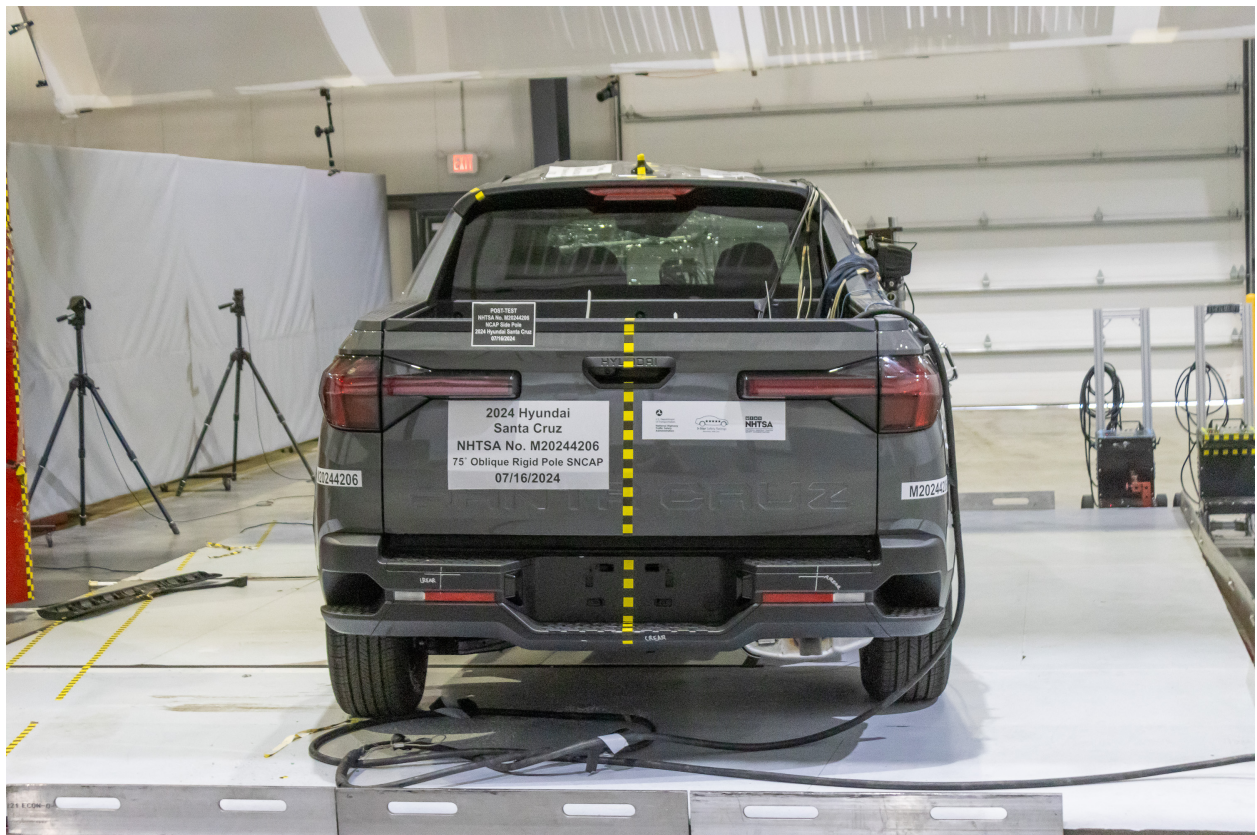


**Figure A-10: Post-Test Left Rear  $\frac{3}{4}$  View of Test Vehicle**





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



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



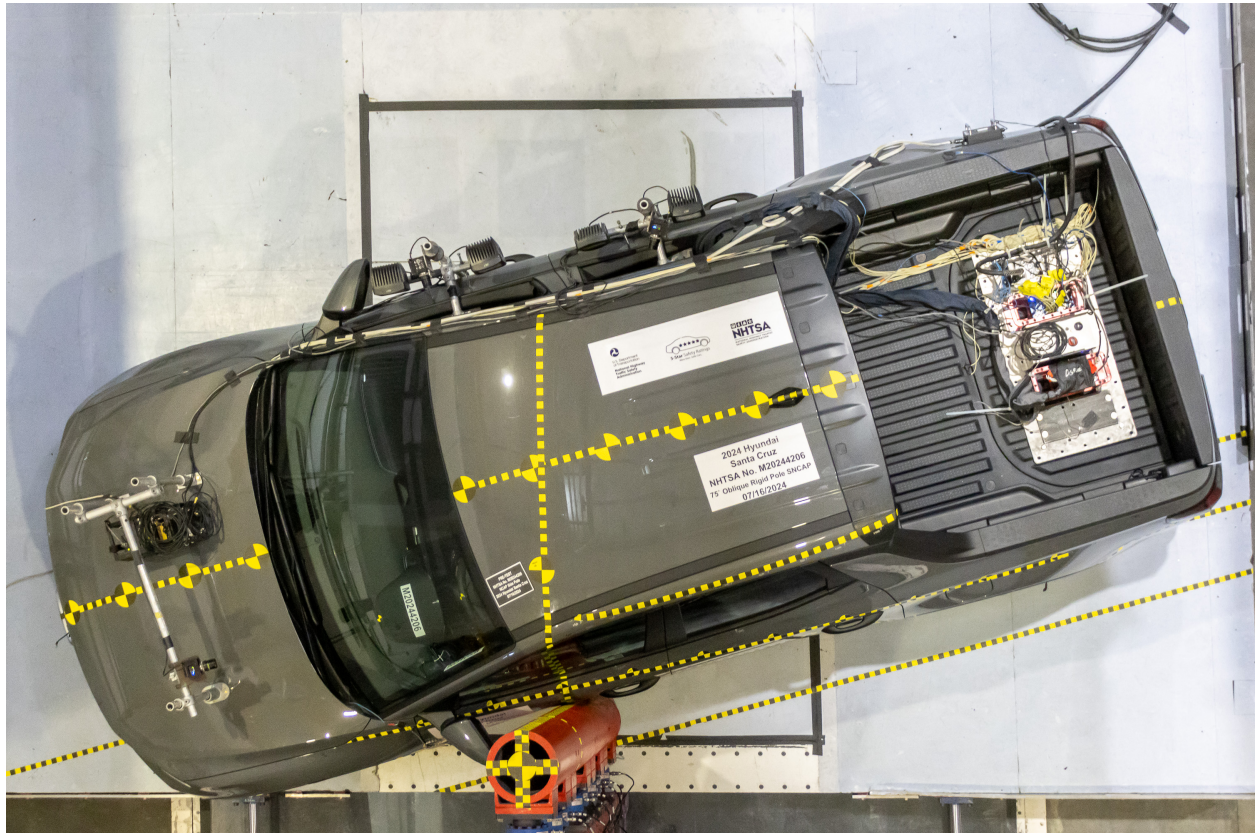


**Figure A-13: Pre-Test Right Side View of Test Vehicle**

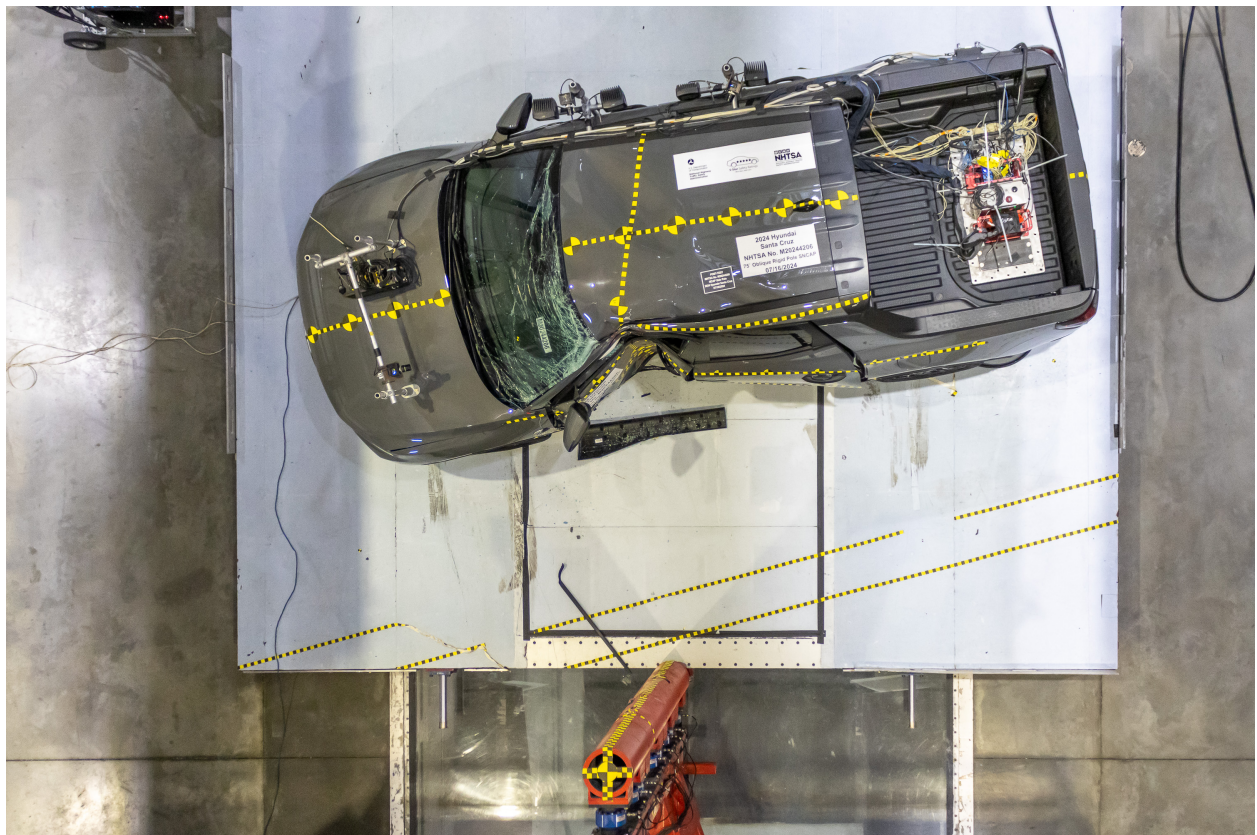


**Figure A-14: Post-Test Right Side View of Test Vehicle**





**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**

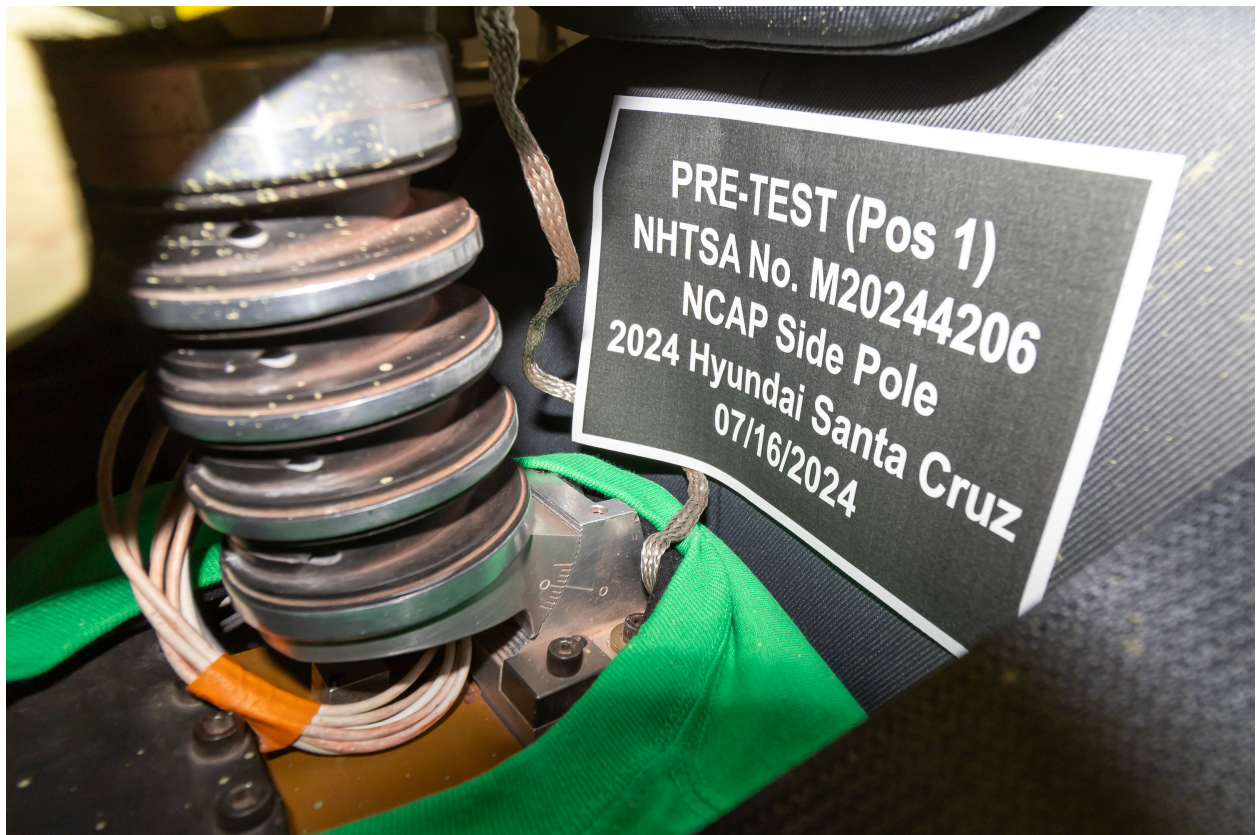


**Figure A-28: Pre-Test Frontal View of Seat Pan Prior to Dummy Positioning**





**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**

# Photo Not Applicable

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

# Photo Not Applicable

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**



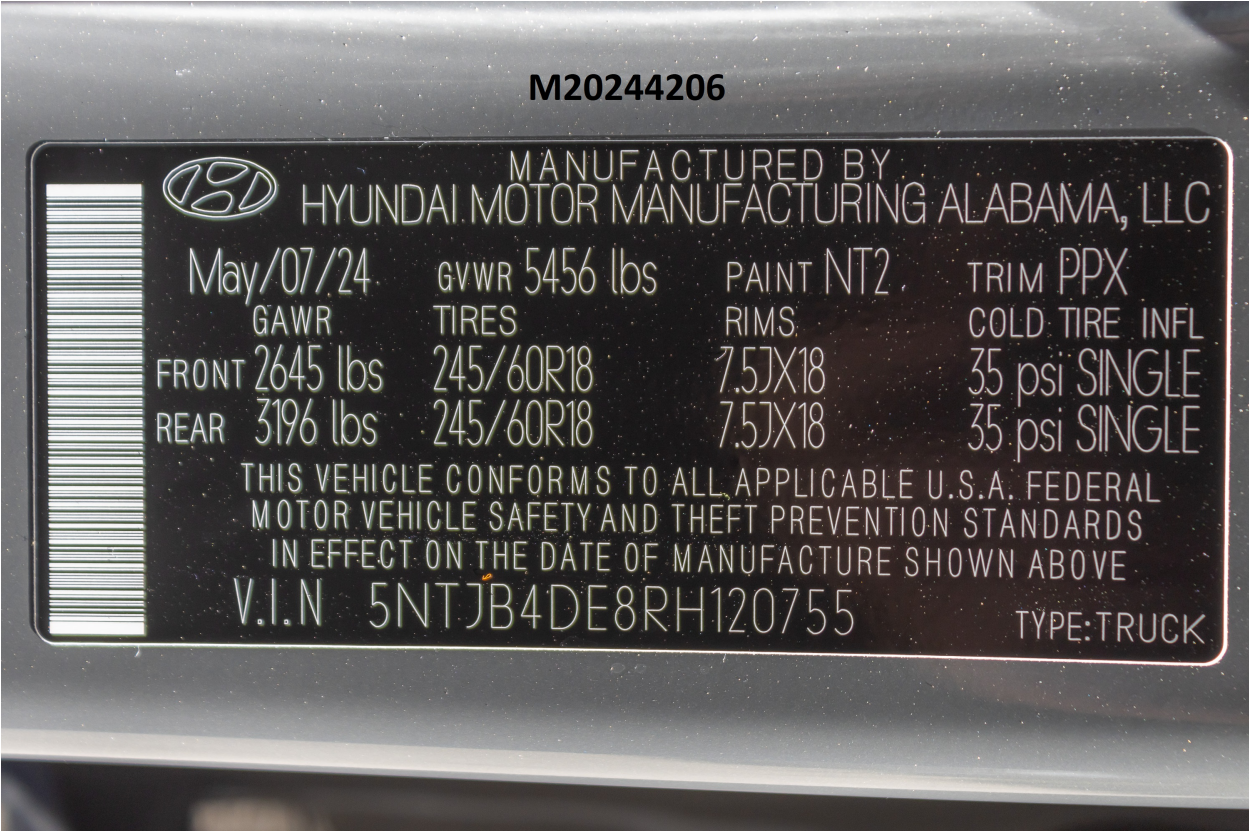


Figure A-57: Close-Up View of Vehicle's Certification Label

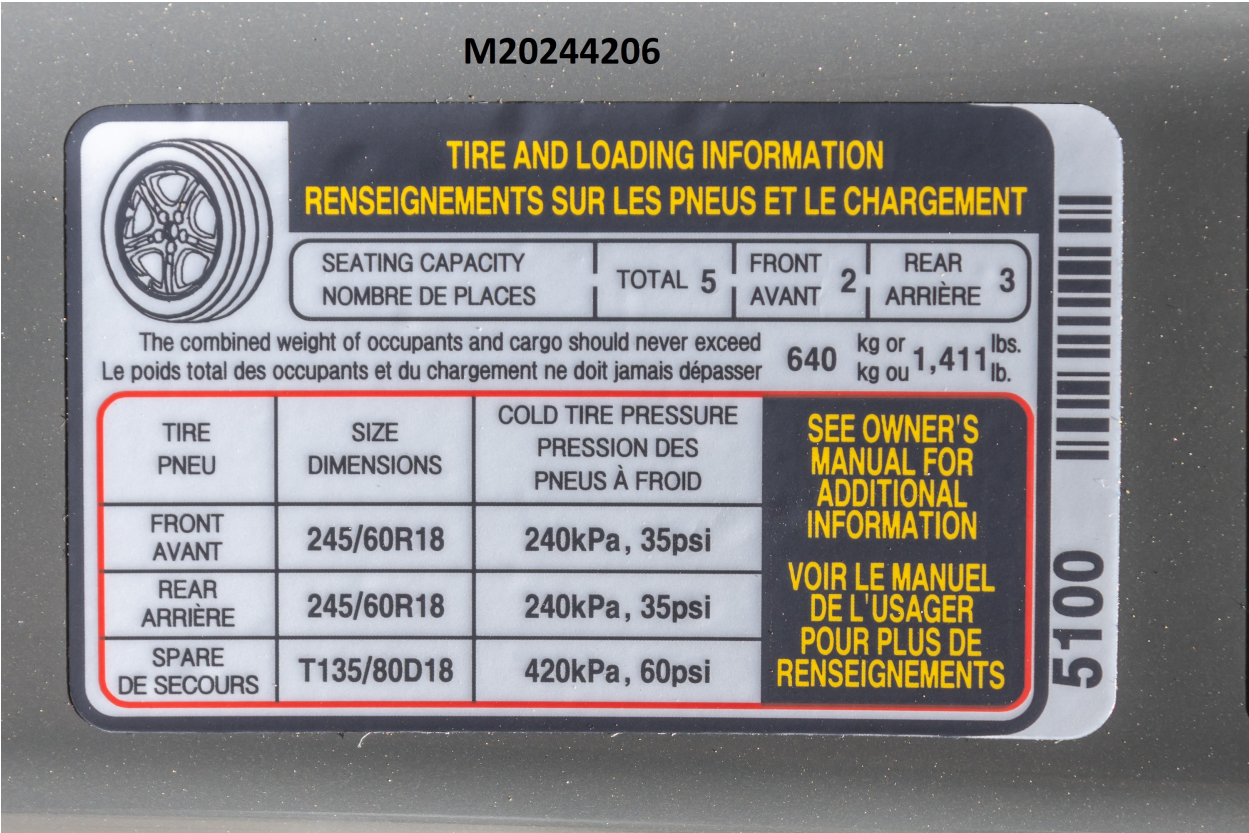


Figure A-58: Close-Up View of Vehicle's Tire Information Placard or Label



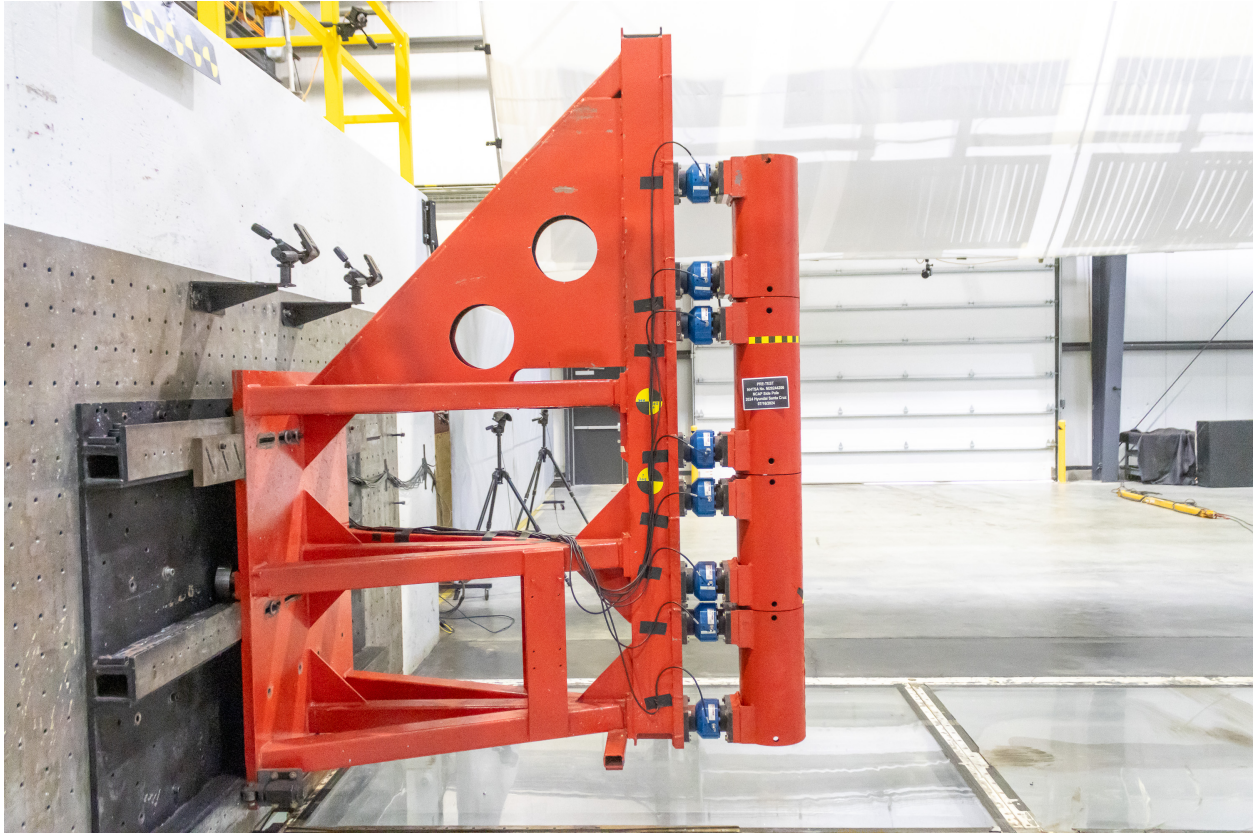


**Figure A-59: Pre-Test Pole Barrier Front View**

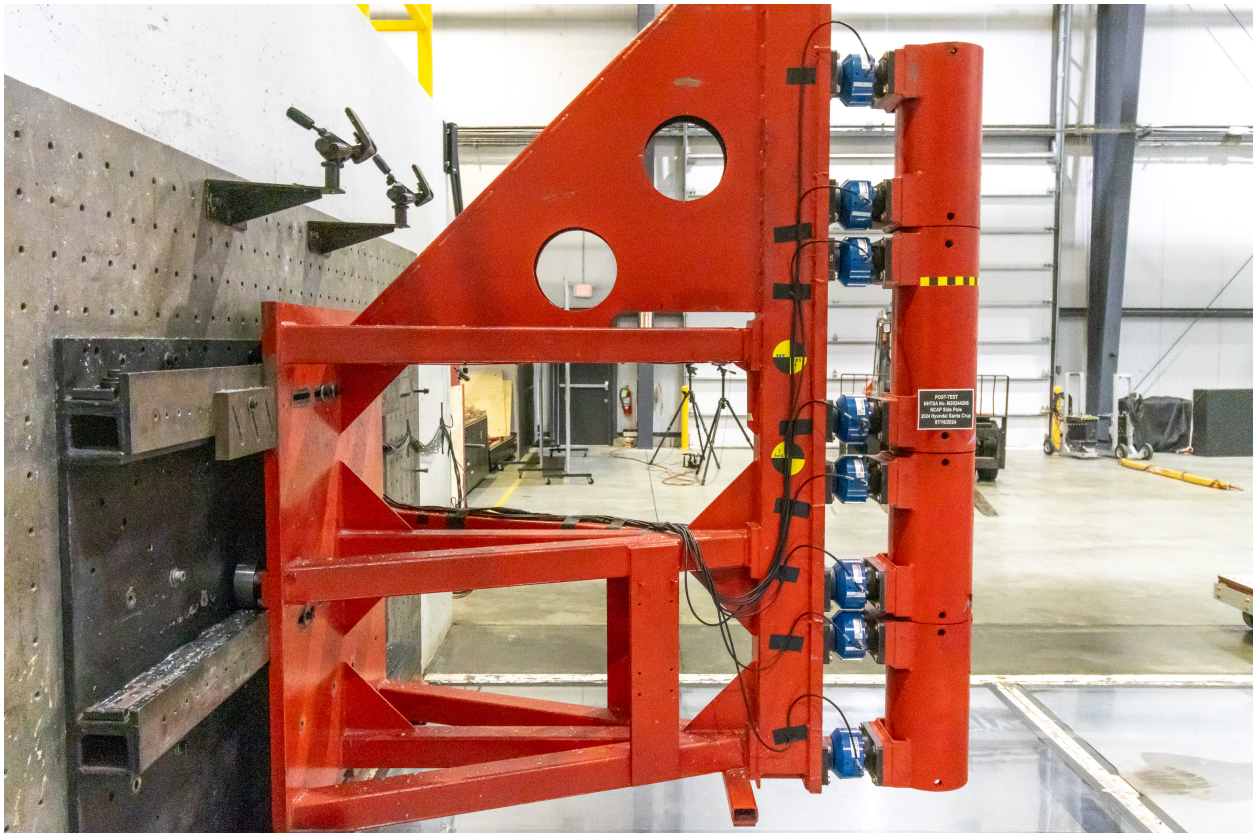


**Figure A-60: Post-Test Pole Barrier Front View**





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



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



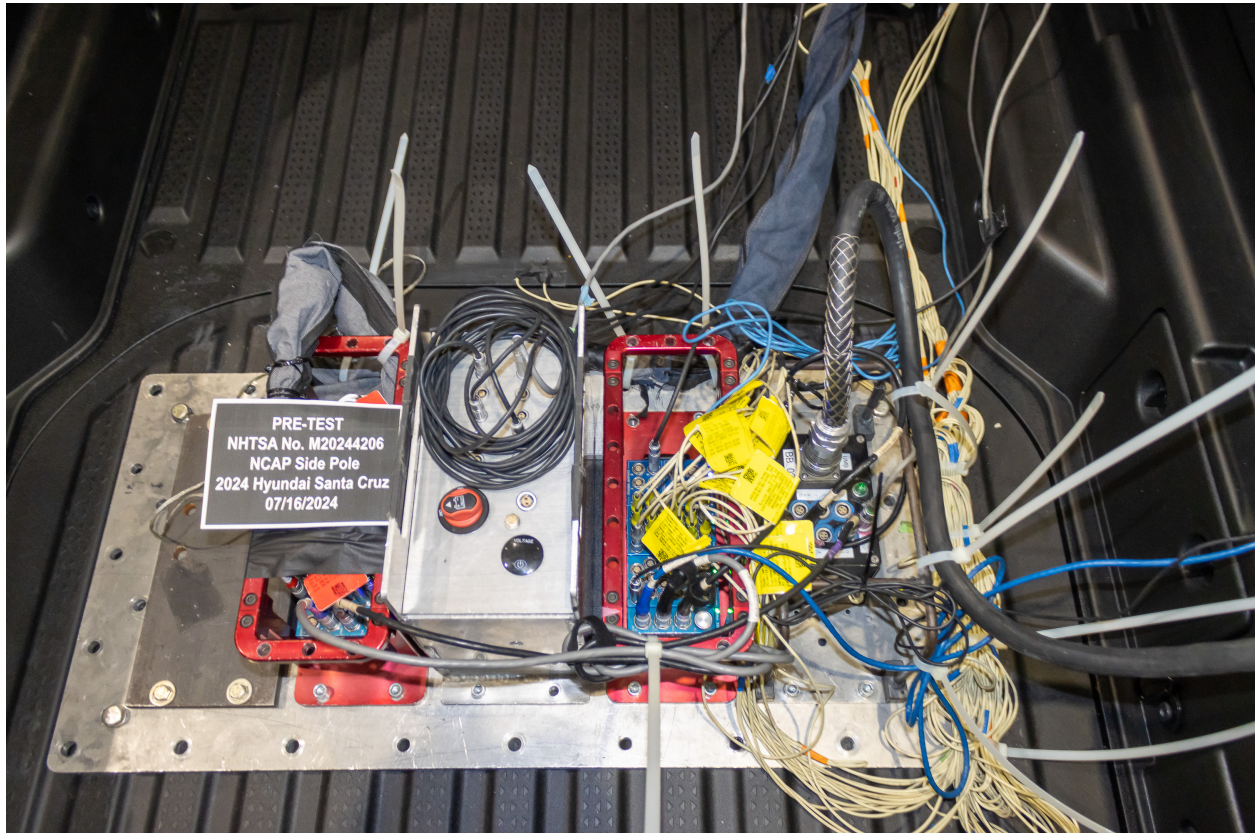


Figure A-63: Pre-Test Ballast View

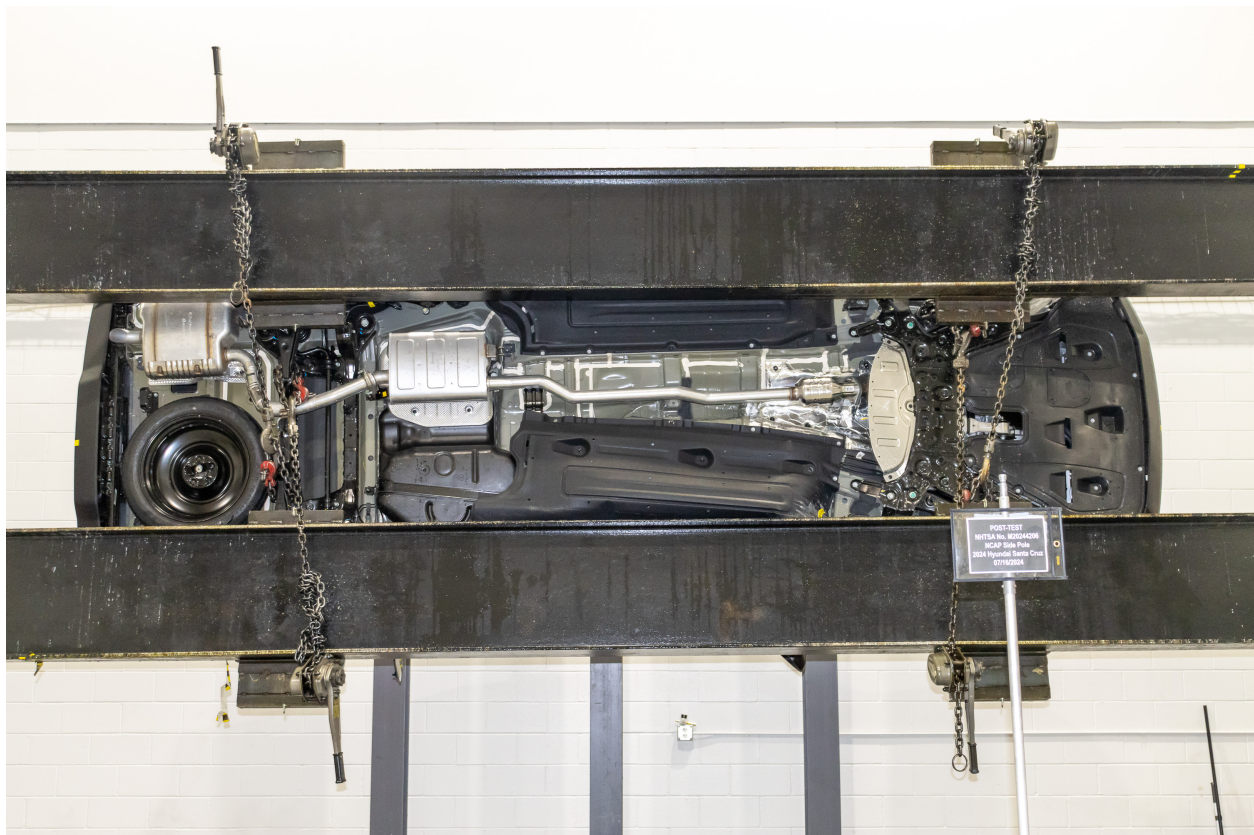


Figure A-64: Post-Test Primary and Redundant Speed Trap Read-Out





**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**





## 2024 SANTA CRUZ SEL FWD

SOLD TO: NY123  
MAGUIRE HYUNDAI  
320 ELMIRA ROAD  
ITHACA NY 14850

SHIPPED TO: NY123

VIN: 5NTJBADE8RH120755  
MODEL: 90432F45  
ENGINE: G4KNRK130328  
PORT OF ENTRY: MA  
EXTERIOR COLOR: HAMPTON GRAY  
INTERIOR/SEAT COLOR: GRAY/GRAY  
TRANSPORT: TRUCK  
ACCESSORY WEIGHT: 15 lbs / 7 kgs.  
EMISSIONS: This vehicle is certified to meet emission requirements in all 50 states

### GOVERNMENT 5-STAR SAFETY RATINGS

| Overall Vehicle Score                                                                                                                |            | Not Rated |           |
|--------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|-----------|
| Based on the combined rating of frontal, side and rollover.<br>Should ONLY be compared to other vehicles of similar size and weight. |            |           |           |
| Frontal                                                                                                                              | Driver     | ★★★★★     |           |
| Crash                                                                                                                                | Passenger  | ★★★★★     |           |
| Based on the risk of injury in a frontal impact<br>Should ONLY be compared to other vehicles of similar size and weight.             |            |           |           |
| Side                                                                                                                                 | Front seat |           | Not Rated |
| Crash                                                                                                                                | Rear seat  |           | Not Rated |
| Based on the risk of injury in a side impact.                                                                                        |            |           |           |
| Rollover                                                                                                                             |            | ★★★★★     |           |
| Based on the risk of rollover in a single-vehicle crash.                                                                             |            |           |           |

Star ratings range from 1 to 5 stars (★★★★★) with 5 being the highest.  
Source: National Highway Traffic Safety Administration (NHTSA).  
[www.safercar.gov](http://www.safercar.gov) or 1-888-327-4236

#### STANDARD FEATURES:

AMERICA'S BEST WARRANTY  
5-year/60,000-mile New Vehicle Warranty\*  
10-year/100,000-mile Powertrain Warranty\*  
7-year/100,000-mile Anti-rust/perforation Warranty\*  
3-year/50,000-mile Complimentary Maintenance\*  
5-year/100,000-mile Roadside Assistance

\*Limited warranties, see dealer for details

#### ADVANCED SAFETY TECHNOLOGIES

Front, Front Side, & Side-Curtain Airbags w/ Rollover Sensors  
Forward Collision-Avoidance Assist  
Lane Keeping Assist, Lane Following Assist  
Driver Attention Warning  
Blind-Spot Collision-Avoidance Assist  
Rear Cross-Traffic Collision-Avoidance Assist  
Rearview Camera  
Safe Exit Warning  
Immobilizer

#### POWERTRAIN TECHNOLOGY

Smartstream 2.5L 4-cylinder Engine w/ GDI & MPI  
8-speed Automatic Transmission w/ SHIFTRONIC®  
Self-levelling Rear Suspension  
Drive Mode Select

#### EXTERIOR

18" Alloy Wheels  
Automatic LED Headlights  
LED Daytime Running Lights  
LED Taillights  
Shelf Model Composite Bed  
Under Bed & Side Wall Storage Compartments  
Rear Bumper Corner Steps

#### COMFORT & CONVENIENCE

Downhill Brake Control  
Hillstart Assist Control  
Dual Automatic Temperature Control  
Proximity Key w/ Push Button Start  
Remote Engine Start  
Power Driver's Seat w/ Lumbar Support  
Heated Front Seats  
60/40 Flip-up Rear Seats w/ Storage Bin  
4.2" Digital Cluster + Analog Gauges  
Front USB Ports  
Temporary Compact Spare Tire

#### MULTIMEDIA & CONNECTIVITY

8.0" Display Audio w/ AM/FM/DAB Radio(TM)  
SiriusXM Radio w/ 90-day trial subscription;  
Not Available in AK & HI  
Android Auto(TM) & Apple CarPlay(R)  
Bluetooth® All-inclusive Connected Services (enrollment required)  
Full Tank of Fuel

Manufacturer's Suggested Retail Price:

\$29,650.00

#### ADDED FEATURES:

\*Carpeted Floor Mats \$210.00  
\*Roadside Assistance Kit \$70.00  
\*First Aid Kit \$30.00  
\*Cargo Net, Bed \$80.00  
\*Tailgate Cover \$195.00

Inland Freight & Handling: \$1,375.00  
Total Price: \$31,610.00

Break out of the ordinary. With our one-of-a-kind Sport Adventure Vehicle, go time is all the time.



### Fuel Economy and Environment



#### Fuel Economy

**23** MPG  
combined city/hwy  
4.3 gallons per 100 miles

Small SUVs range from 14 to 118 MPG.  
The best vehicle rates 140 MPG.  
22 city 26 highway

**You spend \$2,000**  
more in fuel costs  
over 5 years  
compared to the  
average new vehicle.

Annual fuel Cost  
**\$2,350**

#### Fuel Economy & Greenhouse Gas Rating (tailpipe only)

1 5 10 Best  
This vehicle emits 383 grams CO<sub>2</sub> per mile. The best emits 81 grams per mile (tailpipe only). Producing and distributing fuel also create emissions; learn more at [fuelconomy.gov](http://fuelconomy.gov)

#### Smog Rating (tailpipe only)

1 5 10 Best  
This vehicle emits 383 grams CO<sub>2</sub> per mile. The best emits 81 grams per mile (tailpipe only). Producing and distributing fuel also create emissions; learn more at [fuelconomy.gov](http://fuelconomy.gov)

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 24 MPG and costs \$9,720 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$3.60 per gallon. MPG 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

Manufacturer's suggested retail price includes manufacturer's recommended pre-delivery service. Gasoline license and title fees, state and local taxes and dealer installed options and accessories are not included in the manufacturer's suggested retail price. This label has been affixed to this vehicle by Hyundai Motor America, pursuant to the requirements of 15 U.S.C. 1231 et seq. which prohibits its removal or alteration prior to delivery to the ultimate purchaser.

#### PARTS CONTENT INFORMATION

FOR VEHICLE IN THIS CARLINE:

U.S./CANADIAN PARTS CONTENT: 55 %

MAJOR SOURCES OF FOREIGN PARTS CONTENT: KOREA: 35 %

Note: Parts content does not include final assembly, distribution, or other non-parts costs.

#### FOR THIS VEHICLE:

FINAL ASSEMBLY POINT: MONTGOMERY, ALABAMA U.S.A.

COUNTRY OF ORIGIN:

ENGINE: U.S.A.

TRANSMISSION: U.S.A./KOREA

138

A

1



Figure A-71: Monroney Label

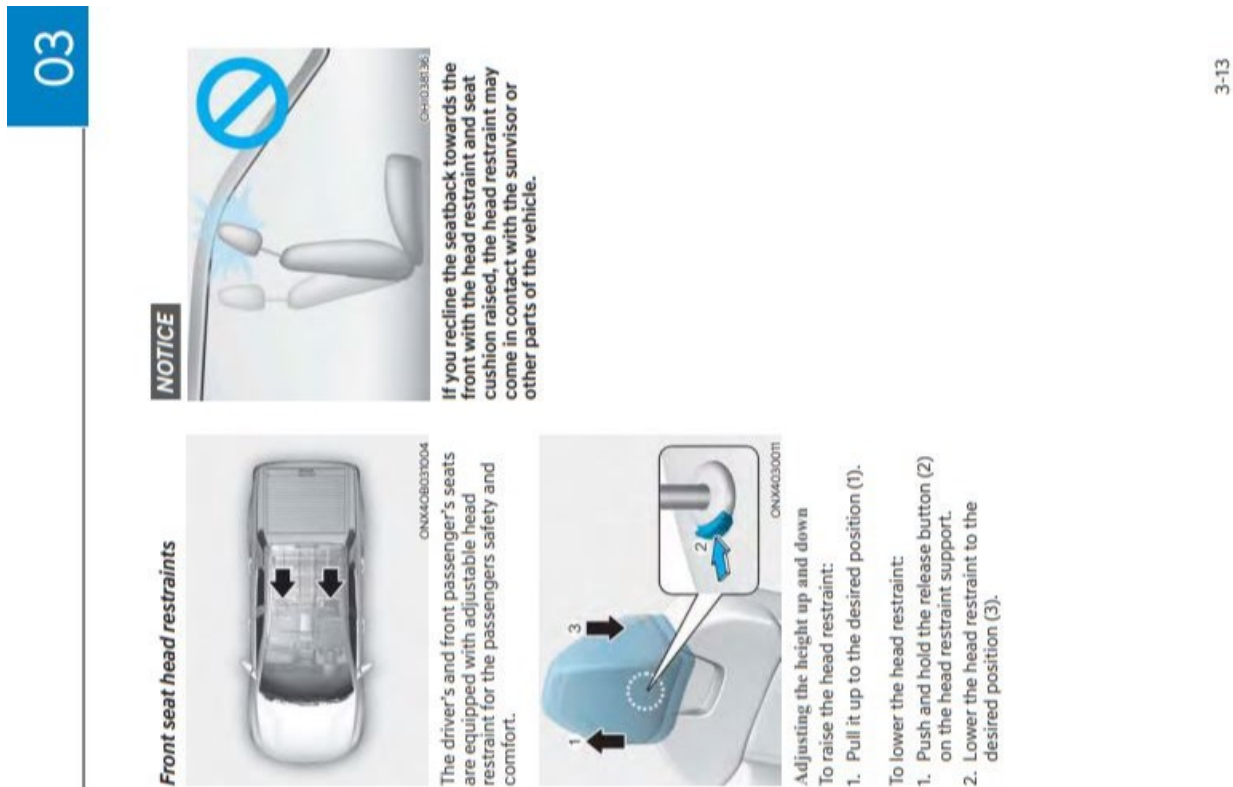


Figure A-72: Head Restraint Use and Adjustment Information from Vehicle Owner's Manual



**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

| <b>Fig.</b> | <b>Description</b>                                     | <b>Page</b> |
|-------------|--------------------------------------------------------|-------------|
| 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](http://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**

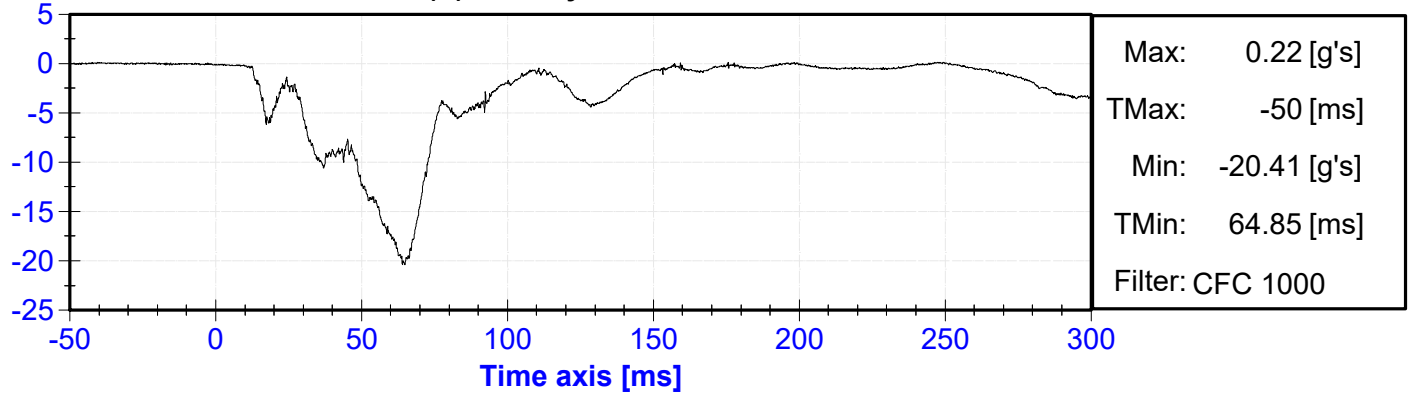
Vehicle Center of Gravity Acceleration (X)  
Vehicle Center of Gravity Acceleration (Y)  
Vehicle Center of Gravity Acceleration (Z)  
Left Floor Sill Acceleration (Y)  
Left A-Pillar Sill Acceleration (Y)  
Left Lower A-Pillar Acceleration (Y)  
Left Mid A-Pillar Acceleration (Y)  
Left B-Pillar Sill 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)

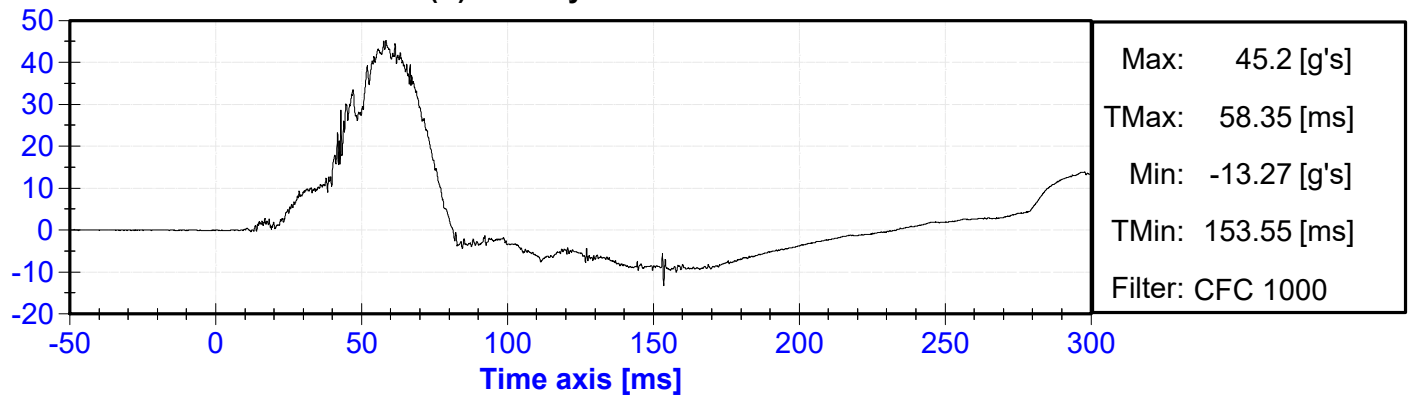
ACCELERATION [g's]

Driver Head Acceleration (X) Primary vs. Time



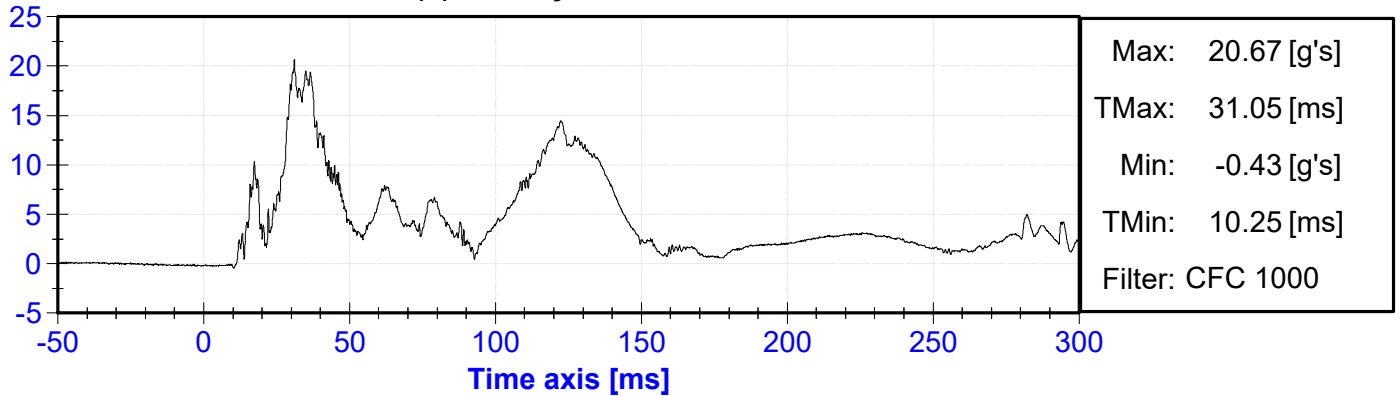
ACCELERATION [g's]

Driver Head Acceleration (Y) Primary vs. Time



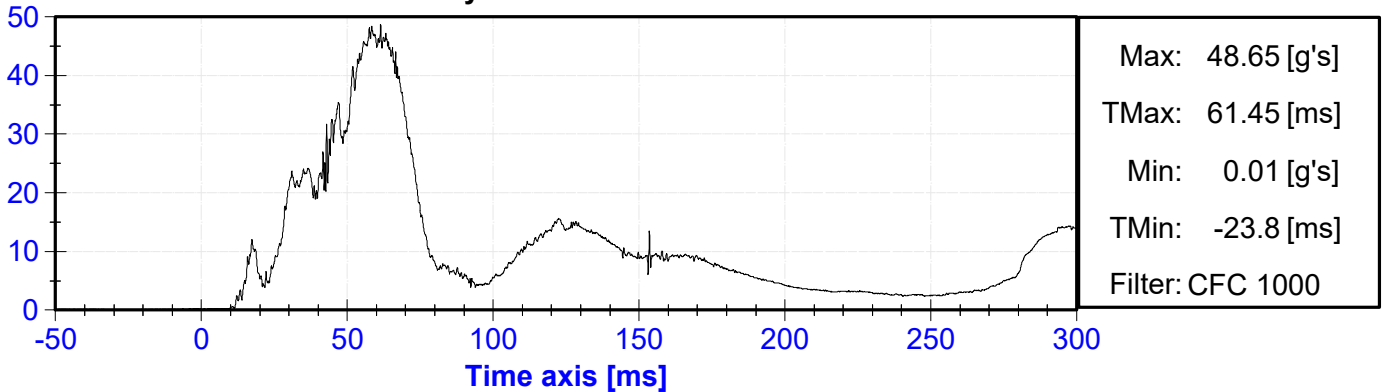
ACCELERATION [g's]

Driver Head Acceleration (Z) Primary vs. Time



ACCELERATION [g's]

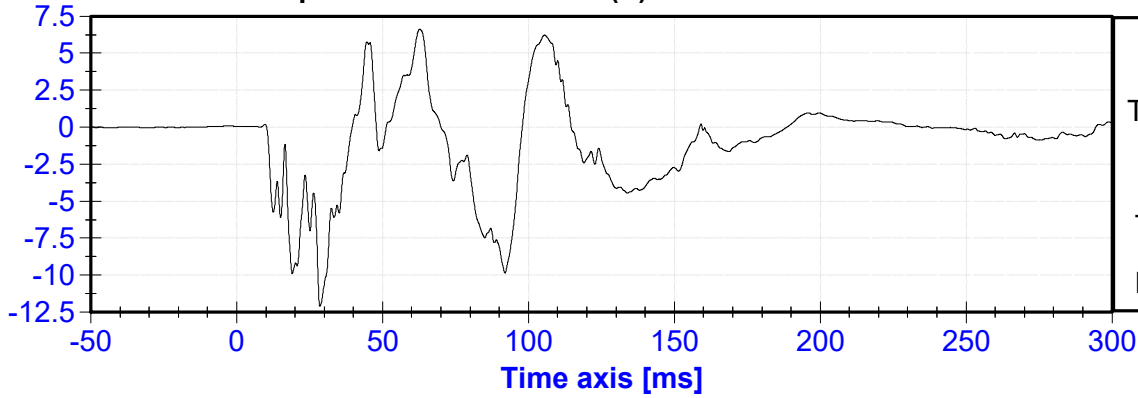
Driver Head Resultant Primary vs. Time





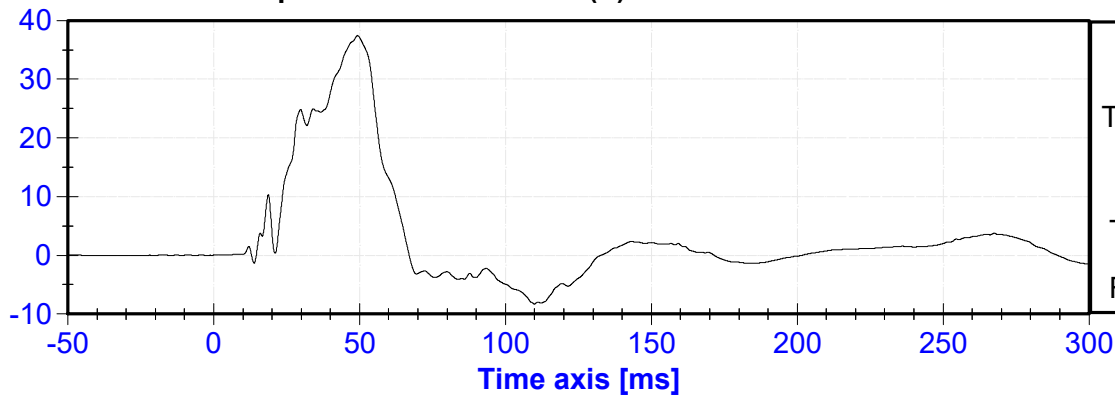
ACCELERATION [g's]

Driver Lower Spine T12 Acceleration (X) vs. Time



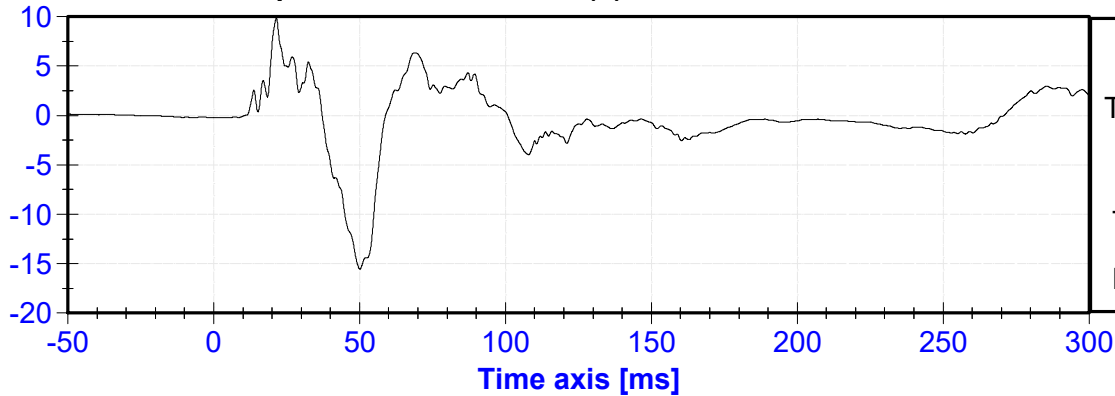
ACCELERATION [g's]

Driver Lower Spine T12 Acceleration (Y) vs. Time



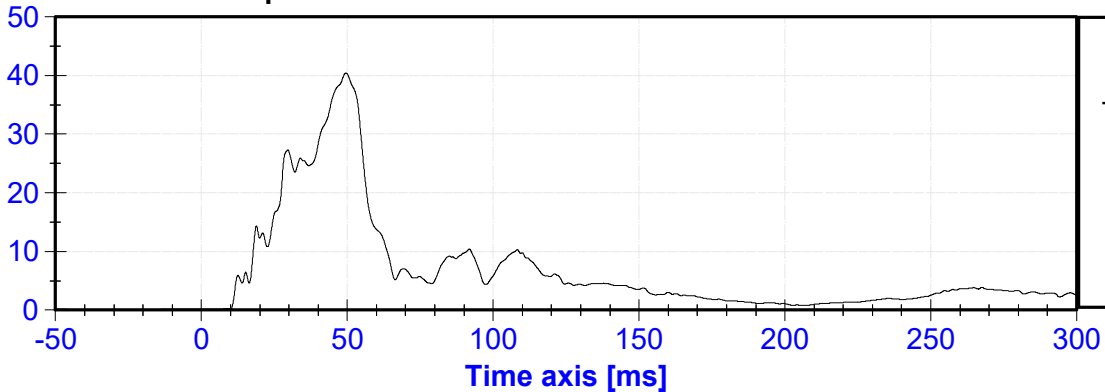
ACCELERATION [g's]

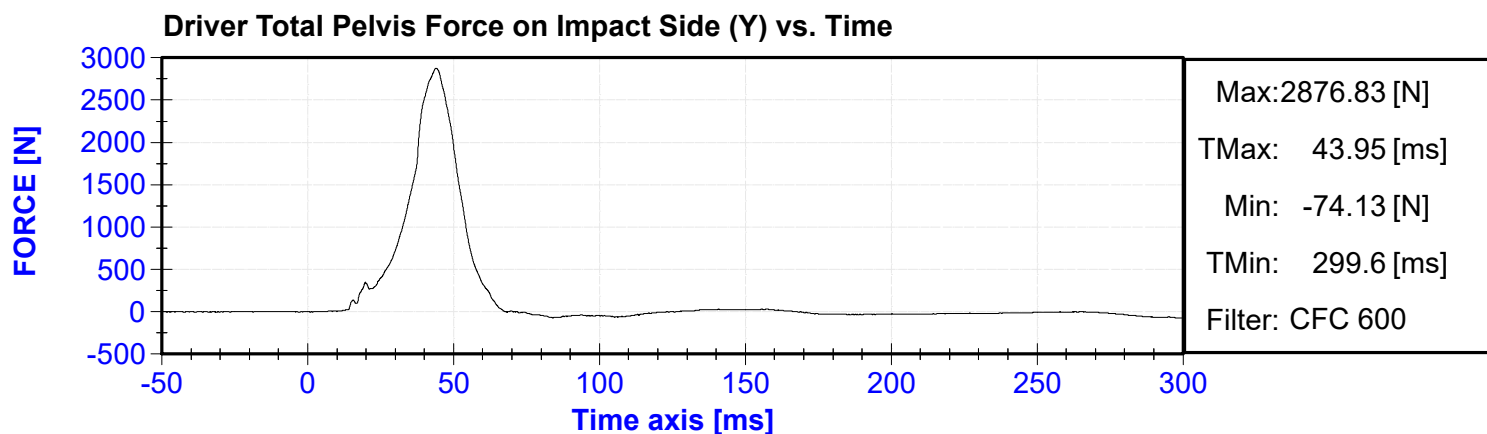
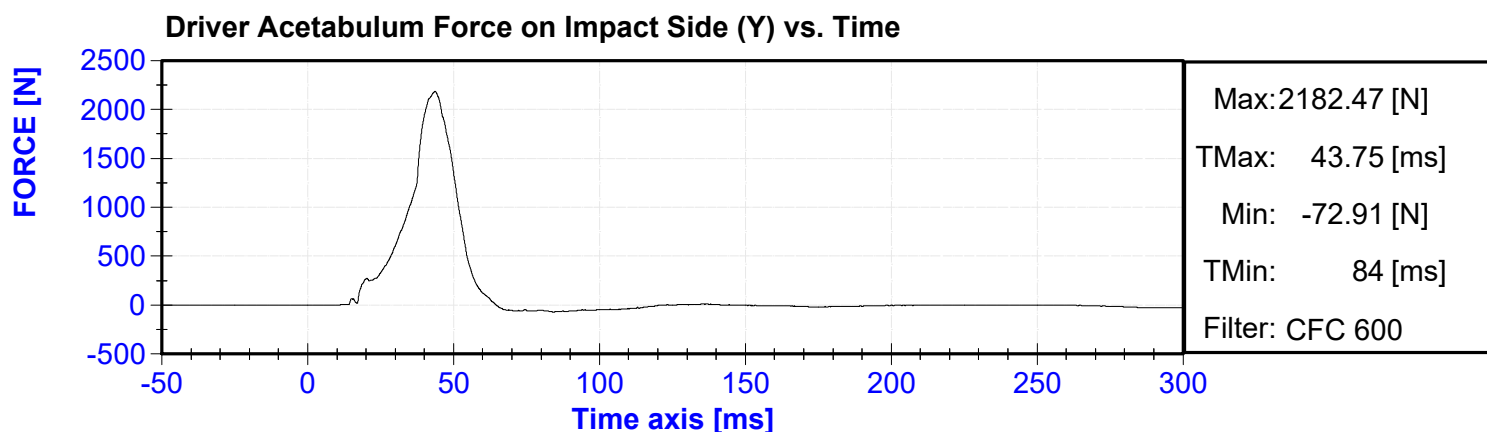
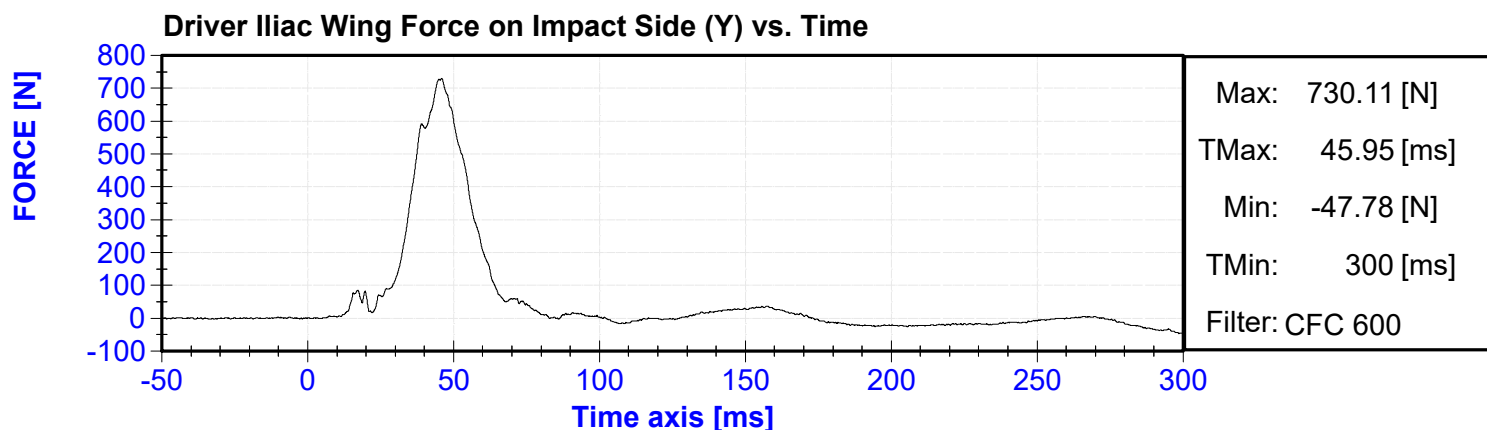
Driver Lower Spine T12 Acceleration (Z) vs. Time



ACCELERATION [g's]

Driver Lower Spine T12 Resultant Acceleration vs. Time







**APPENDIX C**

**DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA**

**CALIBRATION TEST RESULTS**

**PRE-TEST**

**SID-IIS 5<sup>TH</sup> PERCENTILE FEMALE - DRIVER ATD**

**SERIAL NO:DG8012**

**(CONFIGURED FOR LEFT SIDE IMPACT)**

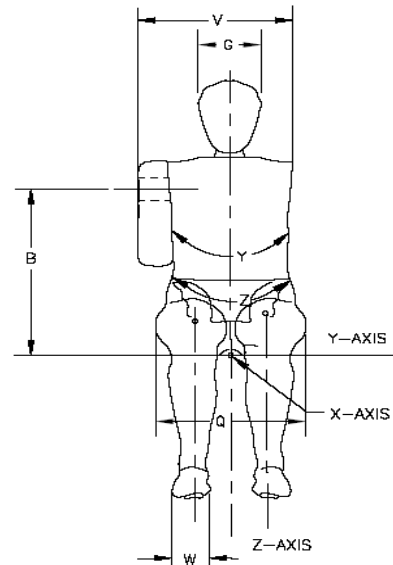
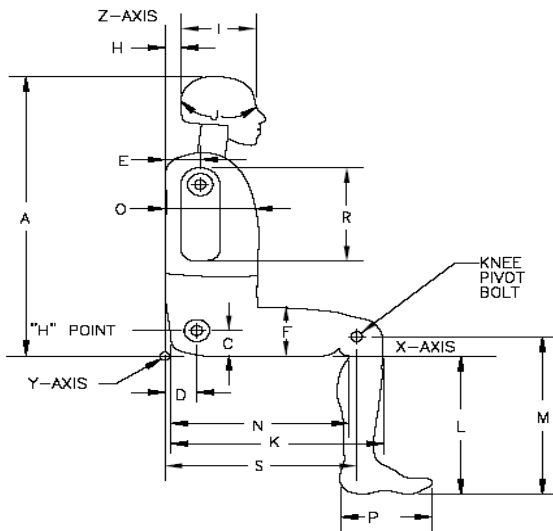


## External Measurements - SID-IIs

Technician: **K. Brogan**

Date: **05/28/2024**

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 | 446         | Pass      |
| C      | H-point Height               | 79                 | 89  | 84          | Pass      |
| D      | H-point from seatback        | 141                | 151 | 146         | Pass      |
| E      | Shoulder Pivot from Backline | 97                 | 107 | 105         | Pass      |
| F      | Thigh Clearance              | 119                | 135 | 128         | Pass      |
| G      | Head Breadth                 | 140                | 148 | 144         | Pass      |
| H      | Head Back from Backline      | 40                 | 46  | 44          | Pass      |
| I      | Head Depth                   | 178                | 188 | 183         | Pass      |
| J      | Head Circumference           | 541                | 551 | 546         | Pass      |
| K      | Buttock to Knee Length       | 514                | 540 | 530         | Pass      |
| L      | Popliteal Height             | 343                | 369 | 360         | Pass      |
| M      | Knee Pivot to floor height   | 392                | 409 | 400         | Pass      |
| N      | Buttock Popliteal Length     | 416                | 442 | 438         | Pass      |
| O      | Chest Depth w/o jacket       | 195                | 211 | 204         | Pass      |
| P      | Foot Length                  | 216                | 232 | 220         | Pass      |
| Q      | Hip Breadth (w/pelvic plugs) | 313                | 323 | 317         | Pass      |
| R      | Arm Length                   | 249                | 259 | 254         | Pass      |
| S      | Knee Joint to seatback       | 477                | 493 | 485         | Pass      |
| V      | Shoulder Width               | 341                | 357 | 354         | Pass      |
| W      | Foot Width                   | 78                 | 94  | 85          | Pass      |
| Y      | Chest Circumference w/jacket | 851                | 881 | 868         | Pass      |
| Z      | Waist Circumference          | 761                | 791 | 781         | Pass      |



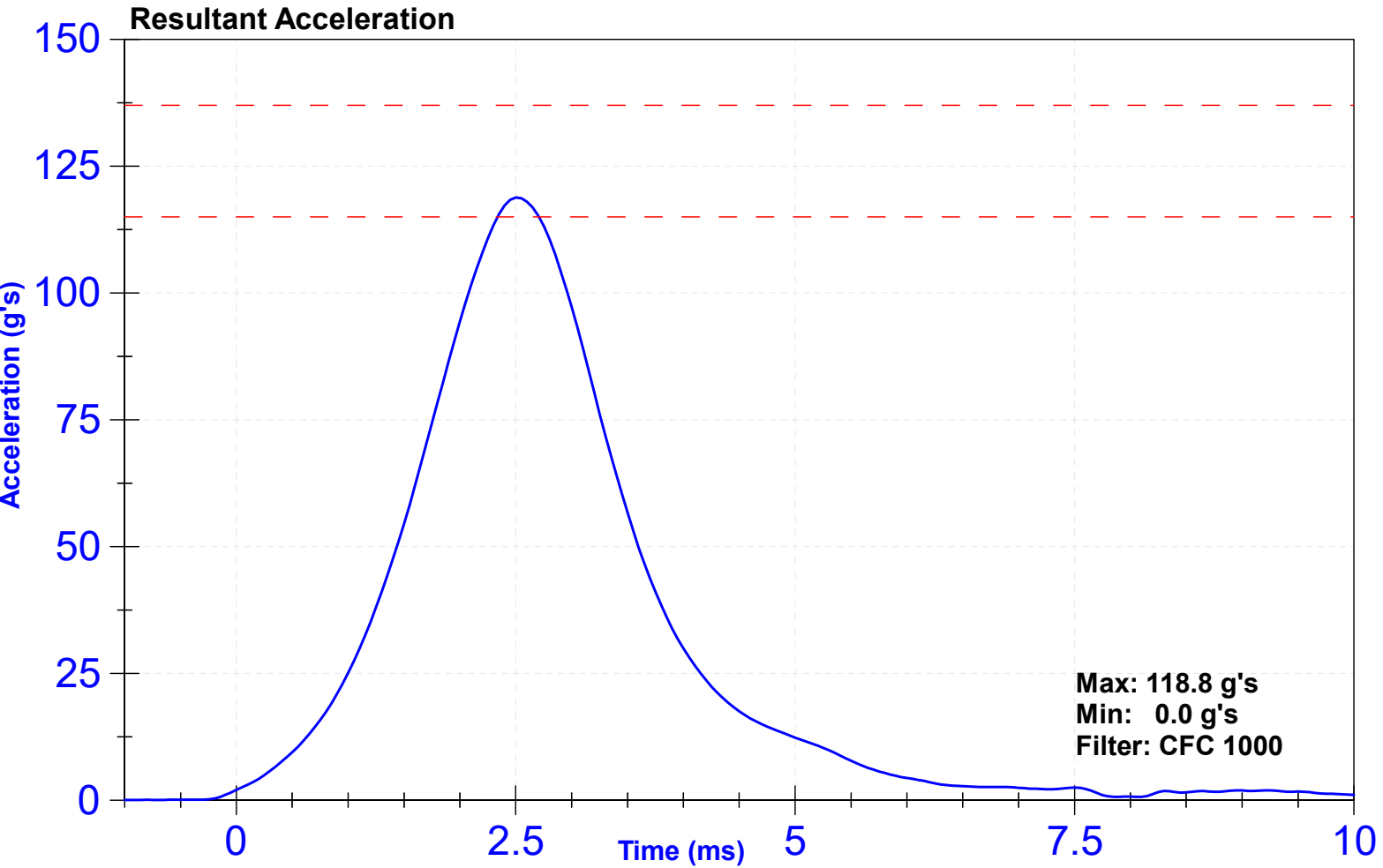
|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | FTSS   | Test Technician       | J. Rios    |
| ATD Serial Number | DG8012 | Laboratory Supervisor | C. Mantell |

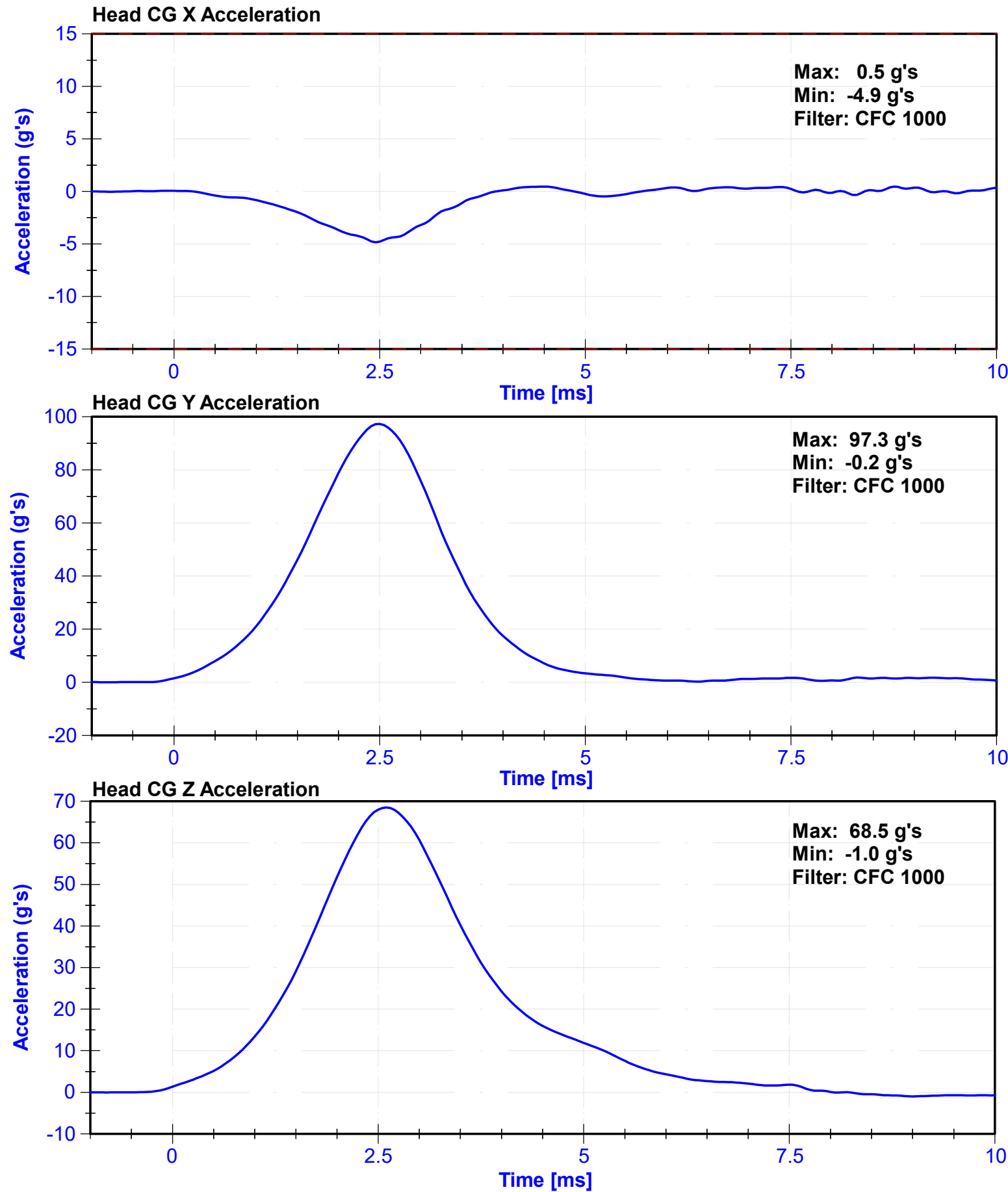
Results

| Test Parameter         | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|------------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature            | 20.6                  | 22.2                  | °C   | 21     | Pass      |
| Humidity               | 10                    | 70                    | %    | 46     | Pass      |
| Resultant Acceleration | 115                   | 137                   | g's  | 118.8  | Pass      |
| Oscillation            | 0                     | 15                    | %    | 2.2    | Pass      |
| Fore-Aft Acceleration  | -15                   | 15                    | g's  | -4.9   | Pass      |

Transducer Calibrations

| Channel         | Manufacturer | Serial Number | Calibratio Date | Calibratio Due Date |
|-----------------|--------------|---------------|-----------------|---------------------|
| X Accelerometer | Endevco      | T21184        | 5/6/2024        | 11/2/2024           |
| Y Accelerometer | Endevco      | P51668        | 5/6/2024        | 11/2/2024           |
| Z Accelerometer | Endevco      | P83319        | 5/6/2024        | 11/2/2024           |







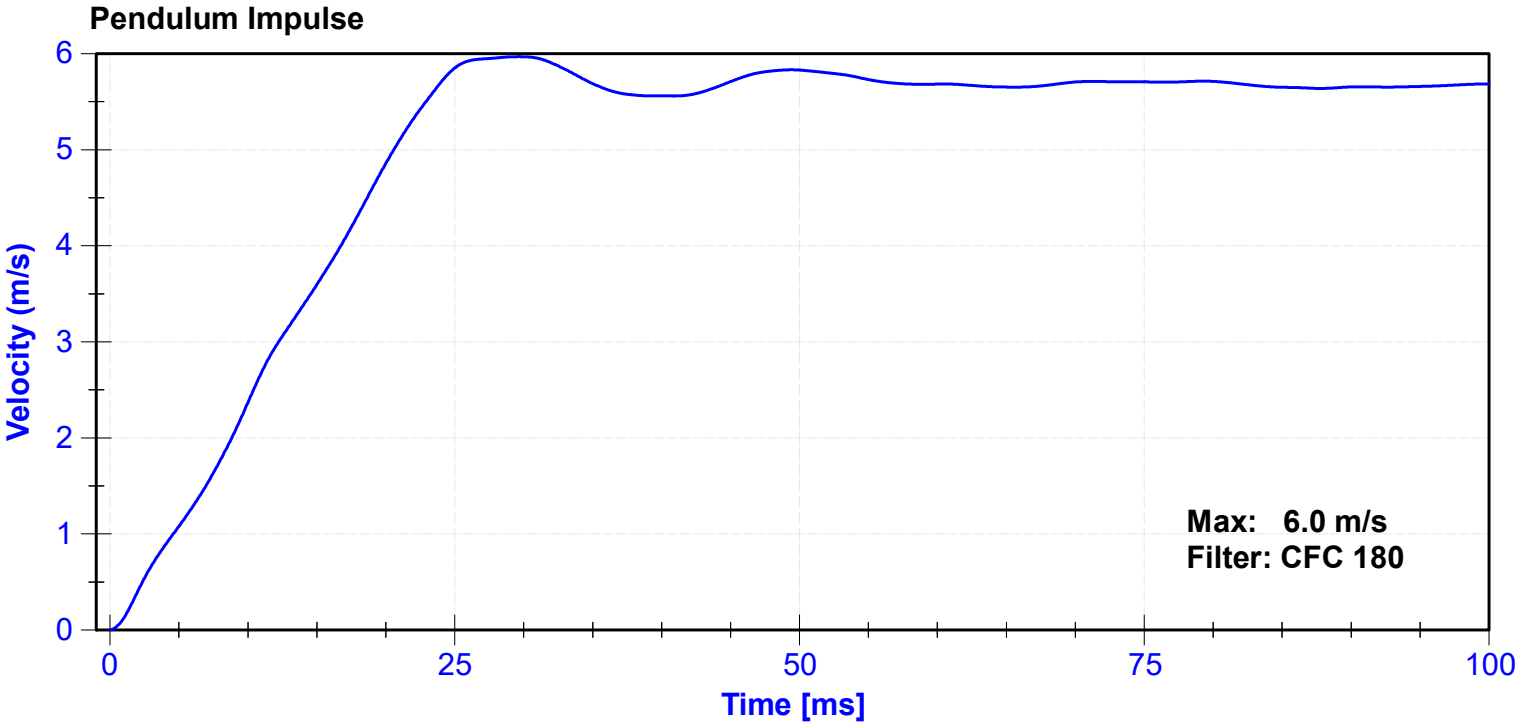
|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | FTSS   | Test Technician       | J. Rios    |
| ATD Serial Number | DG8012 | Laboratory Supervisor | C. Mantell |

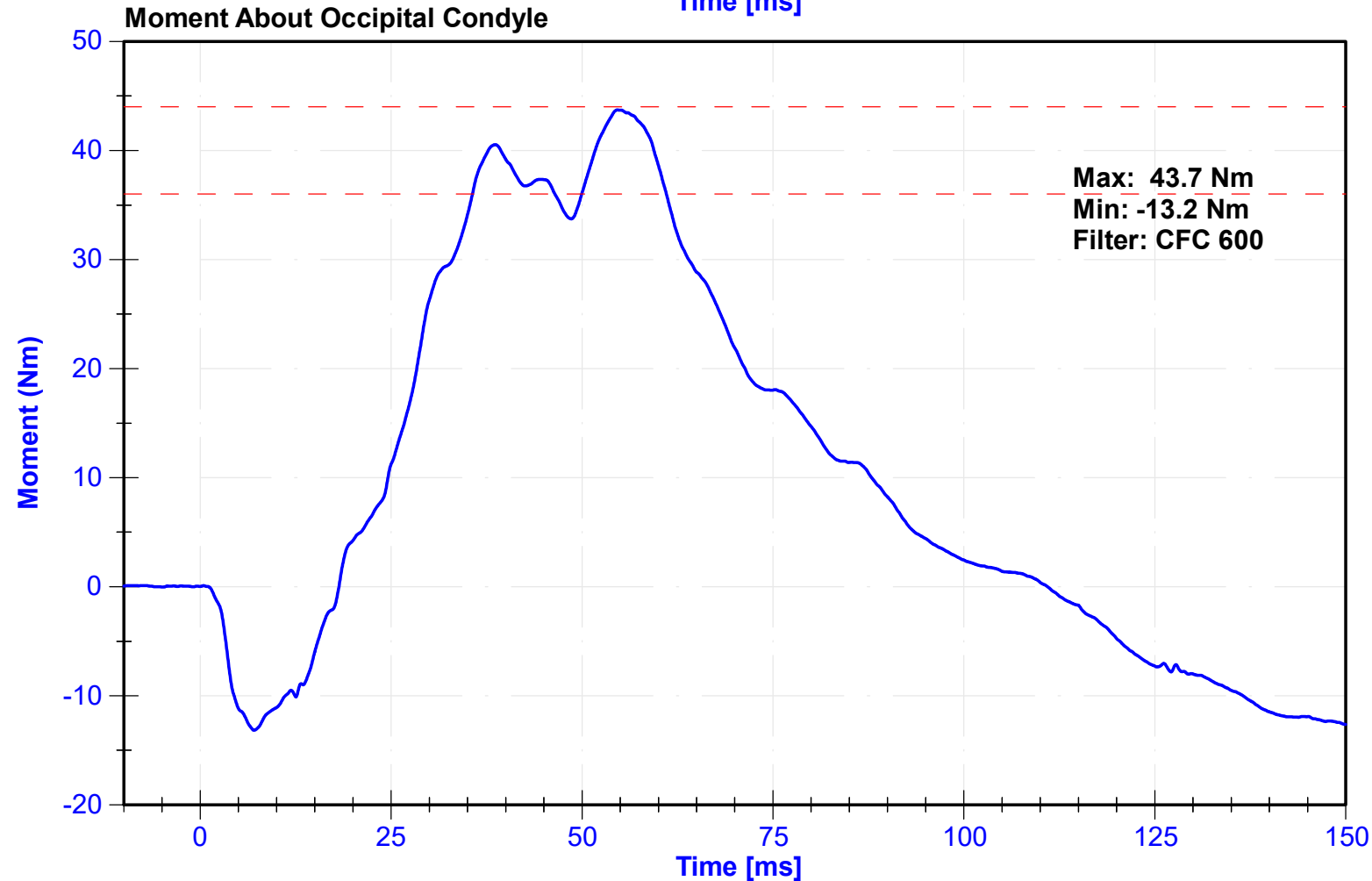
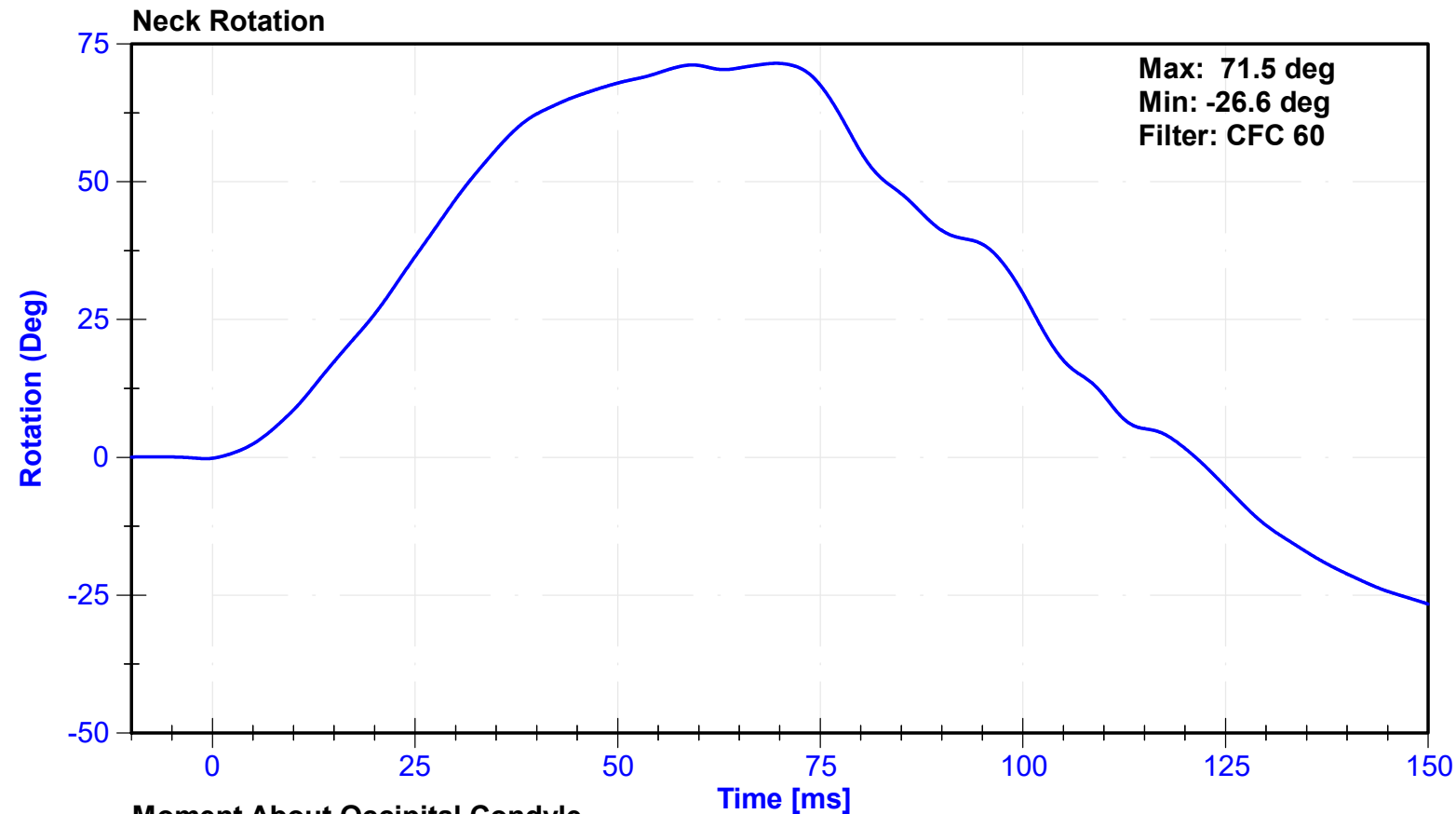
Results

| Test Parameter                    | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|-----------------------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature                       | 20.6                  | 22.2                  | °C   | 20.8   | Pass      |
| Humidity                          | 10                    | 70                    | %    | 48     | Pass      |
| Velocity                          | 5.51                  | 5.63                  | m/s  | 5.550  | Pass      |
| Pendulum Impulse at 10ms          | 2.2                   | 2.8                   | m/s  | 2.37   | Pass      |
| Pendulum Impulse at 15ms          | 3.3                   | 4.1                   | m/s  | 3.60   | Pass      |
| Pendulum Impulse at 20ms          | 4.4                   | 5.4                   | m/s  | 4.86   | Pass      |
| Pendulum Impulse at 25ms          | 5.4                   | 6.1                   | m/s  | 5.85   | Pass      |
| Pendulum Impulse from 25 to 100ms | 5.5                   | 6.2                   | m/s  | 5.97   | Pass      |
| Neck Rotation                     | 71                    | 81                    | deg  | 71.5   | Pass      |
| Time at Maximum Rotation          | 50                    | 70                    | ms   | 69.6   | Pass      |
| Moment about the OC               | 36                    | 44                    | Nm   | 43.7   | Pass      |
| Moment Decay to 0 Nm              | 102                   | 126                   | ms   | 110.9  | Pass      |

Transducer Calibrations

| Channel                | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|------------------------|--------------|---------------|------------------|----------------------|
| Pendulum Accelerometer | Endevco      | 7231C-750     | 4/29/2024        | 10/26/2024           |
| Pendulum Potentiometer | Servo        | 4961          | 10/2/2023        | 10/1/2024            |
| Condyle Potentiometer  | Servo        | DS185         | 10/2/2023        | 10/1/2024            |
| 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 | C. Mantell |

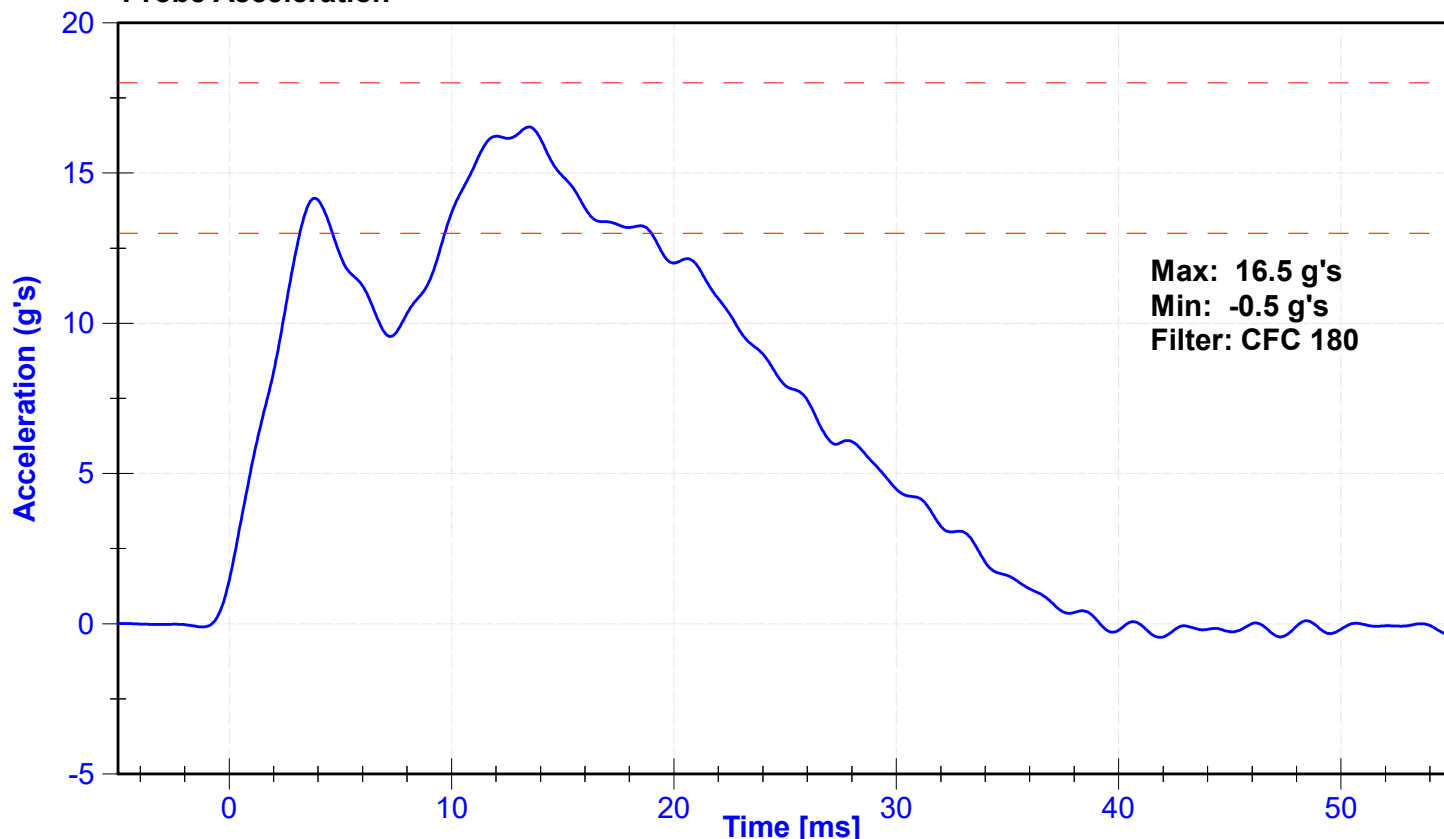
### Results

| Test Parameter                   | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|----------------------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature                      | 20.6                  | 22.2                  | °C   | 20.9   | Pass      |
| Humidity                         | 10                    | 70                    | %    | 49     | Pass      |
| Velocity                         | 4.2                   | 4.4                   | m/s  | 4.25   | Pass      |
| Probe Acceleration               | 13                    | 18                    | g's  | 16.5   | Pass      |
| Shoulder Deflection              | 28                    | 37                    | mm   | 29.0   | Pass      |
| Lateral Upper Spine Acceleration | 17                    | 22                    | g's  | 19.9   | Pass      |

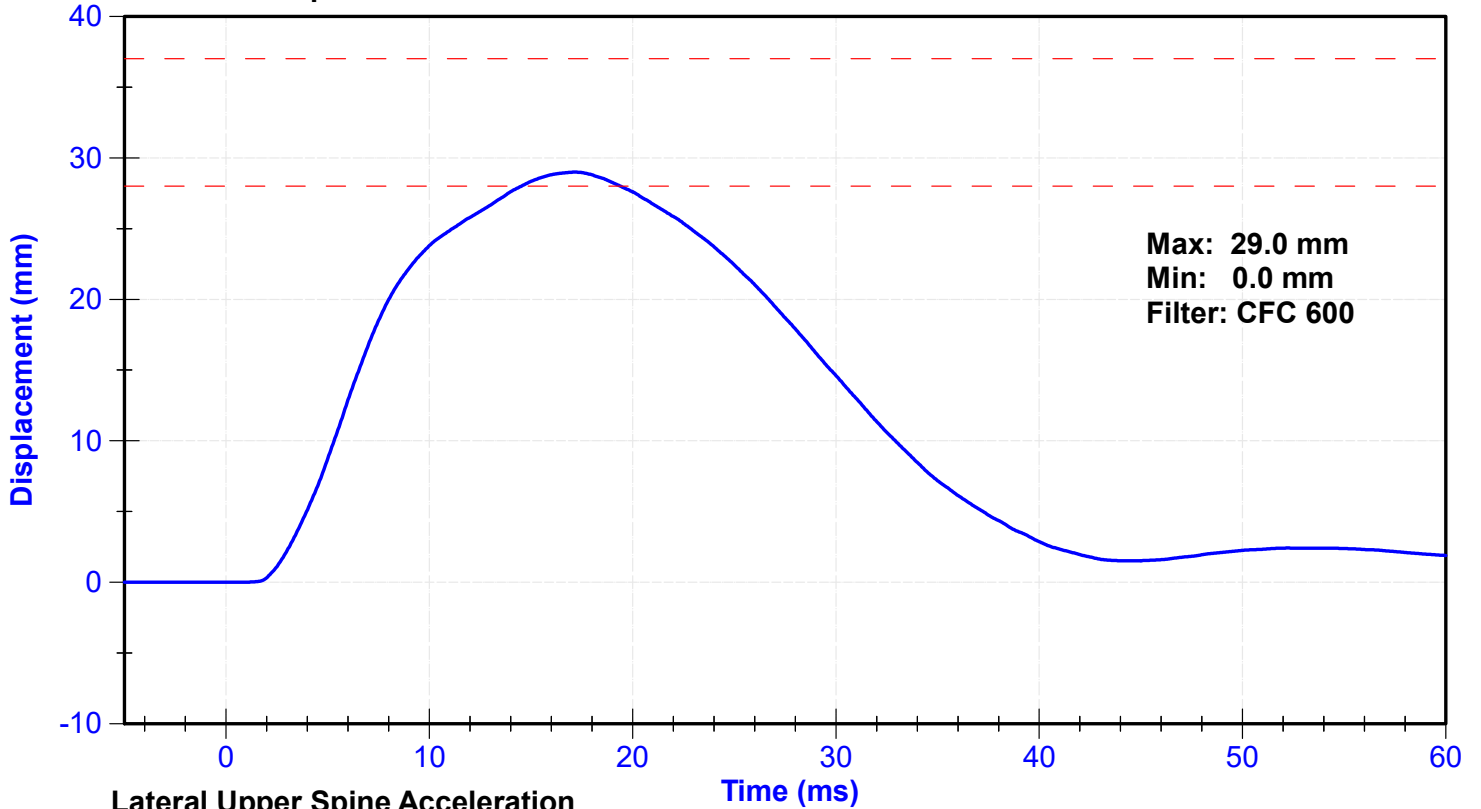
### Transducer Calibrations

| Channel                     | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|-----------------------------|--------------|---------------|------------------|----------------------|
| Pendulum Accelerometer      | Endevco      | 18587         | 11/20/2023       | 11/19/2024           |
| Shoulder Potentiometer      | Servo        | 1274GFE       | 5/6/2024         | 11/4/2024            |
| Upper Spine Y Accelerometer | Endevco      | P64148        | 5/6/2024         | 11/2/2024            |

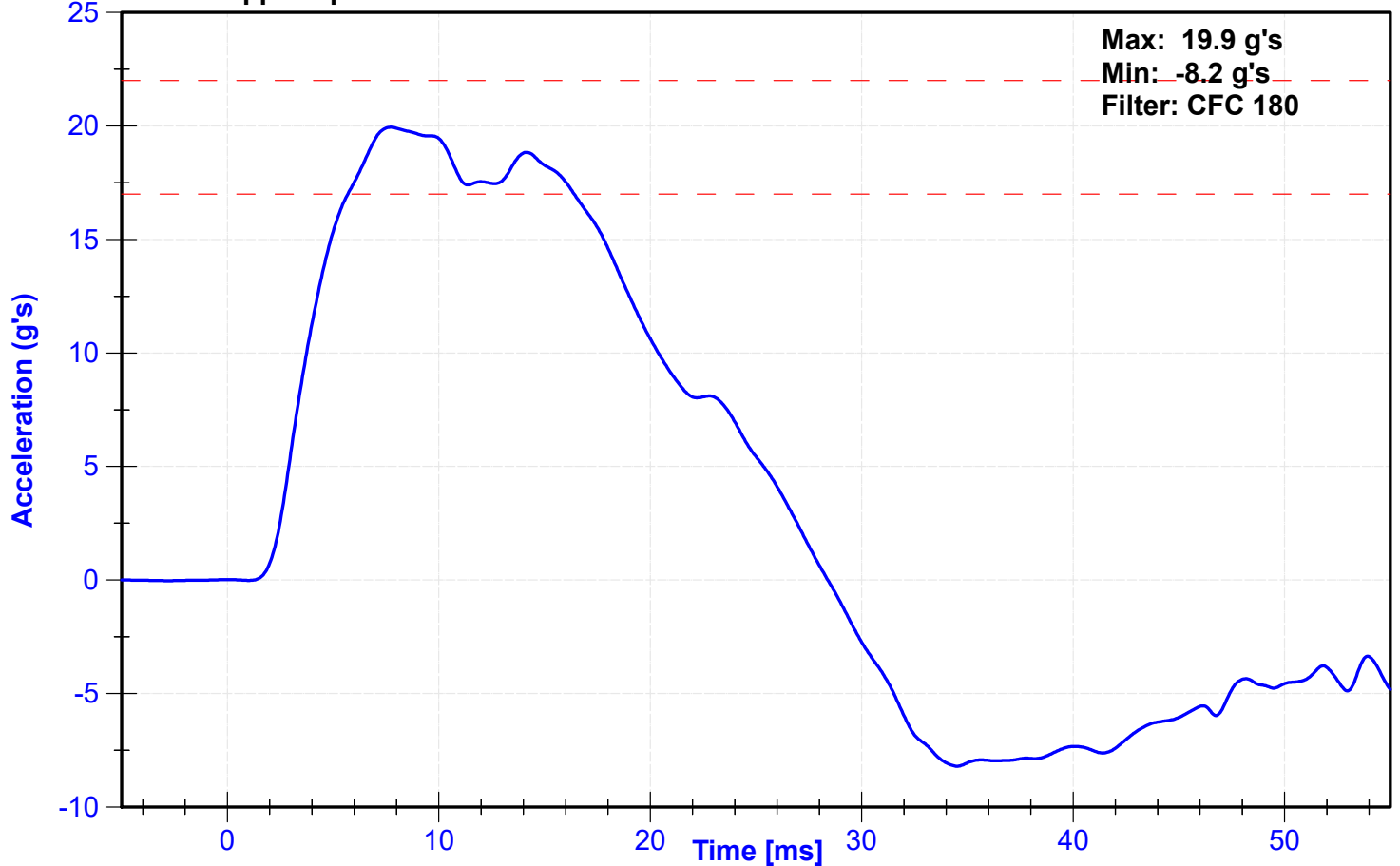
### Probe Acceleration



### Shoulder Displacement



### Lateral Upper Spine Acceleration





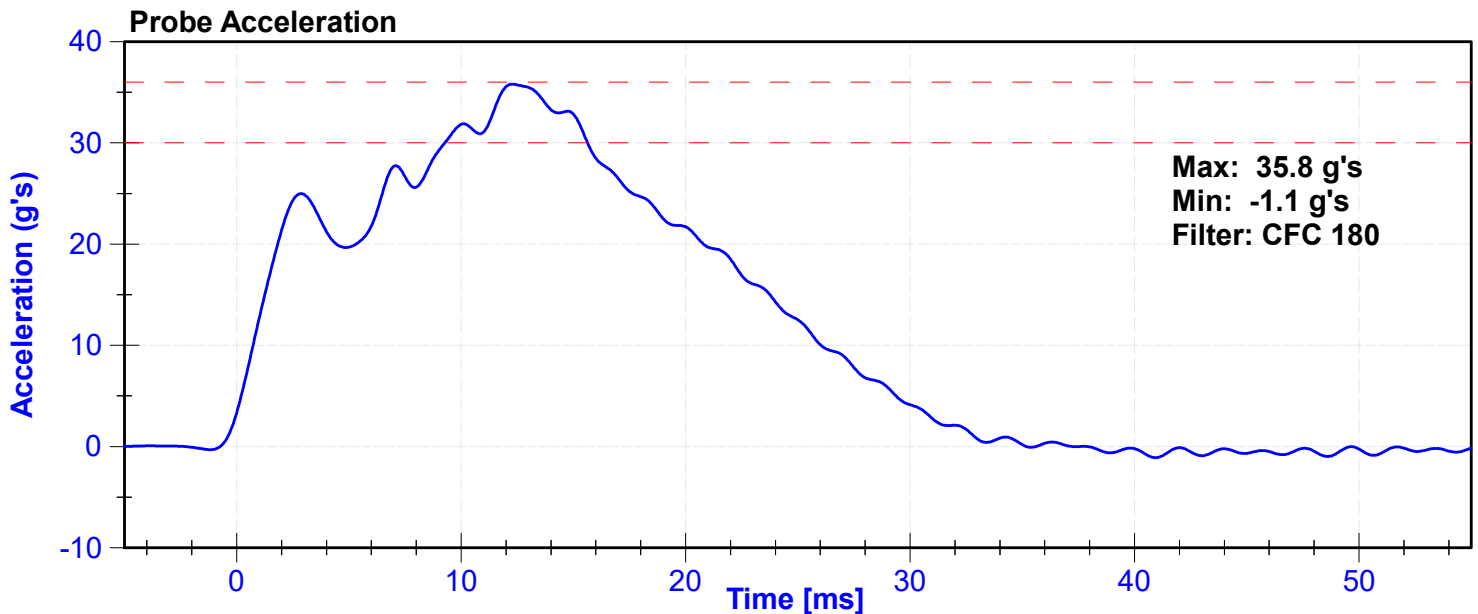
|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | FTSS   | Test Technician       | J. Rios    |
| ATD Serial Number | DG8012 | Laboratory Supervisor | C. Mantell |

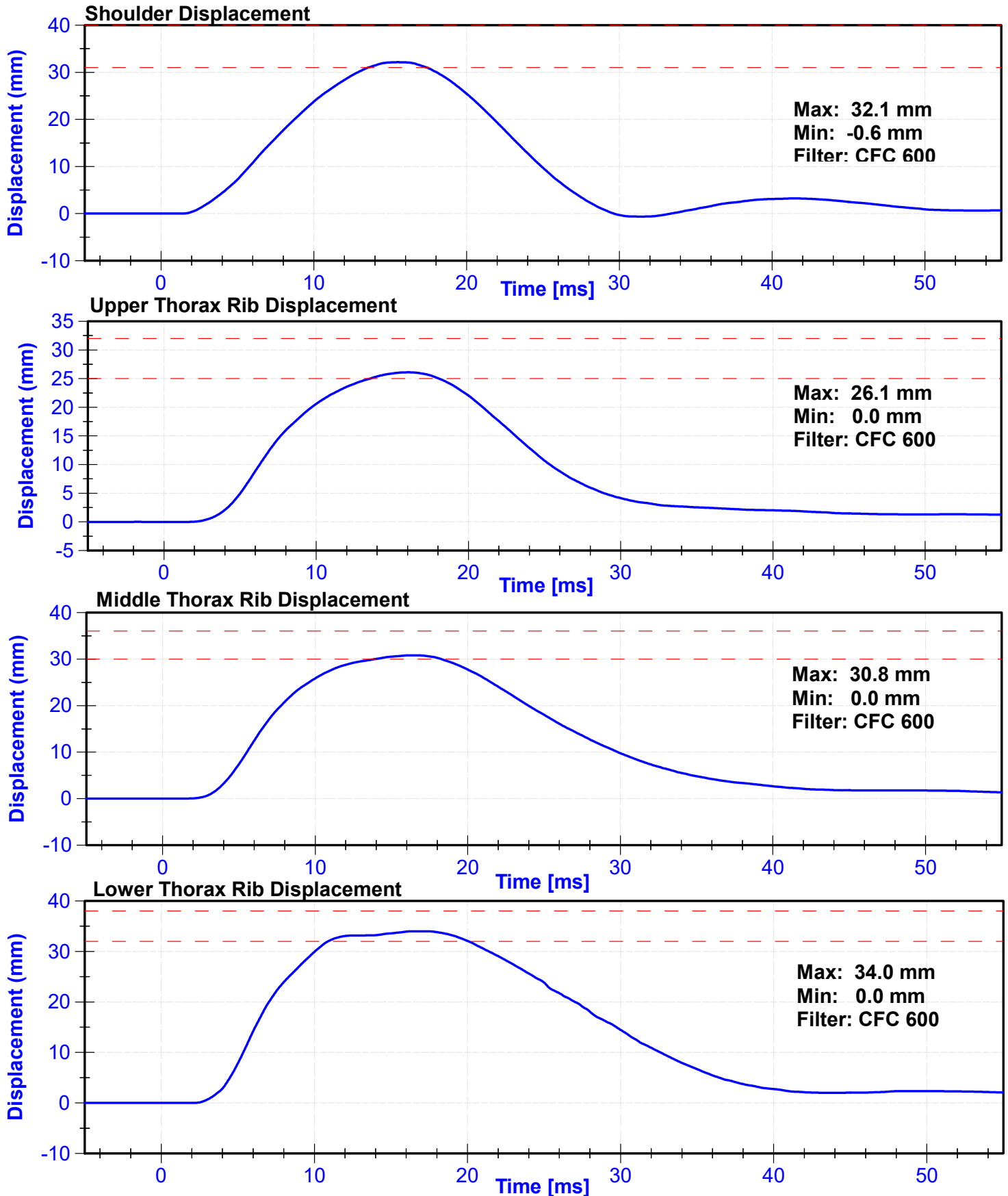
### Results

| Test Parameter                   | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|----------------------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature                      | 20.6                  | 22.2                  | °C   | 20.9   | Pass      |
| Humidity                         | 10                    | 70                    | %    | 49     | Pass      |
| Velocity                         | 6.6                   | 6.8                   | m/s  | 6.68   | Pass      |
| Probe Acceleration after 5 ms    | 30                    | 36                    | g's  | 35.8   | Pass      |
| Lateral Upper Spine Acceleration | 34                    | 43                    | g's  | 38.9   | Pass      |
| Lateral Lower Spine Acceleration | 29                    | 37                    | g's  | 32.5   | Pass      |
| Shoulder Deflection              | 31                    | 40                    | mm   | 32.1   | Pass      |
| Upper Thorax Rib Deflection      | 25                    | 32                    | mm   | 26.1   | Pass      |
| Mid Thorax Rib Deflection        | 30                    | 36                    | mm   | 30.8   | Pass      |
| Lower Thorax Rib Deflection      | 32                    | 38                    | mm   | 34.0   | Pass      |

### Transducer Calibrations

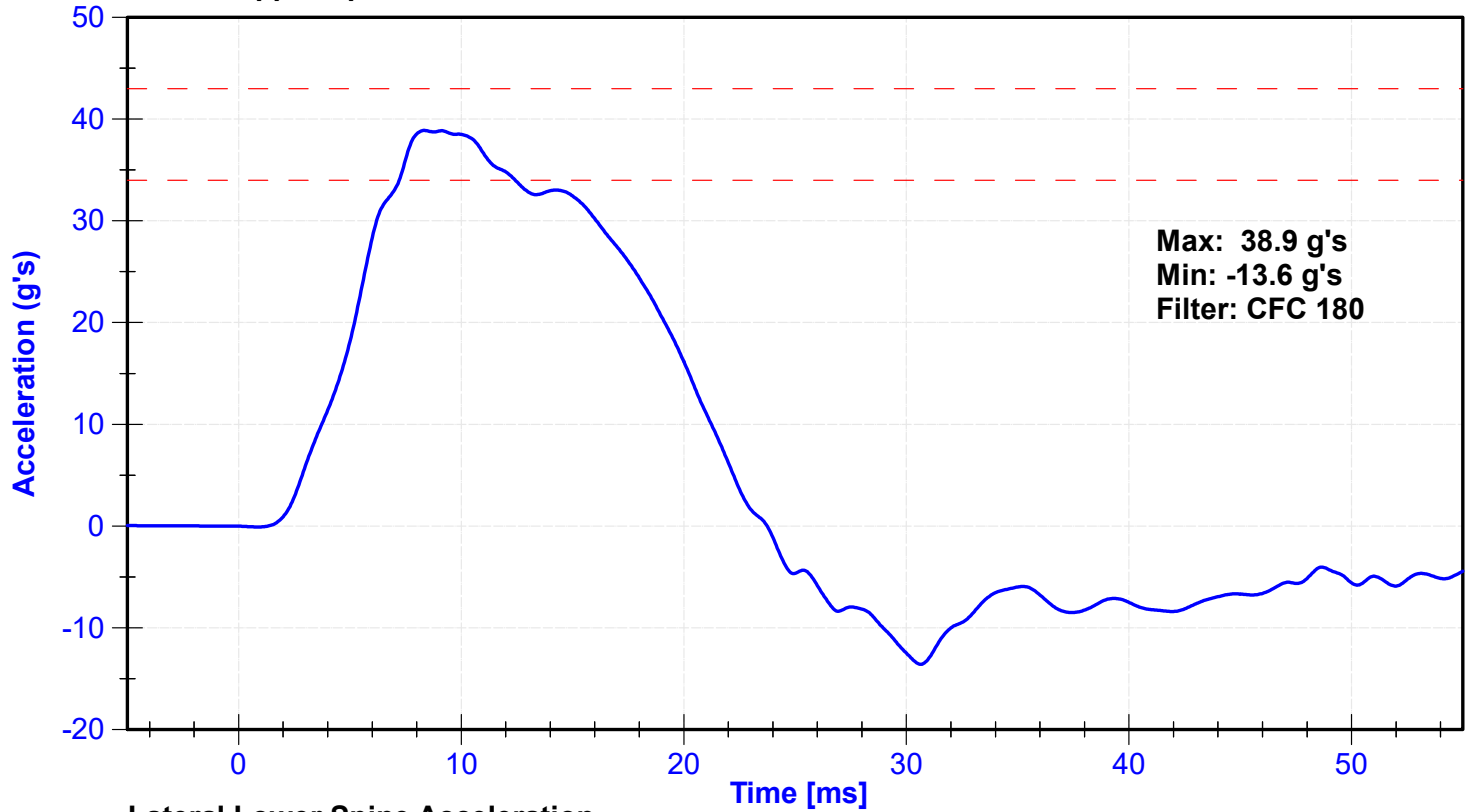
| Channel                         | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|---------------------------------|--------------|---------------|------------------|----------------------|
| Pendulum Accelerometer          | Endevco      | 18587         | 11/20/2023       | 11/19/2024           |
| Upper Spine T1 Y Accelerometer  | Endevco      | P64148        | 5/6/2024         | 11/2/2024            |
| Upper Spine T12 Y Accelerometer | Endevco      | P51327        | 5/6/2024         | 11/2/2024            |
| Shoulder Potentiometer          | Servo        | 1274GFE       | 5/6/2024         | 11/4/2024            |
| Upper Thorax Rib Potentiometer  | Servo        | 1199GFE       | 5/6/2024         | 11/4/2024            |
| Middle Thorax Rib Potentiometer | Servo        | 1246GFE       | 5/6/2024         | 11/4/2024            |
| Lower Thorax Rib Potentiometer  | Servo        | 011GFE        | 5/6/2024         | 11/4/2024            |



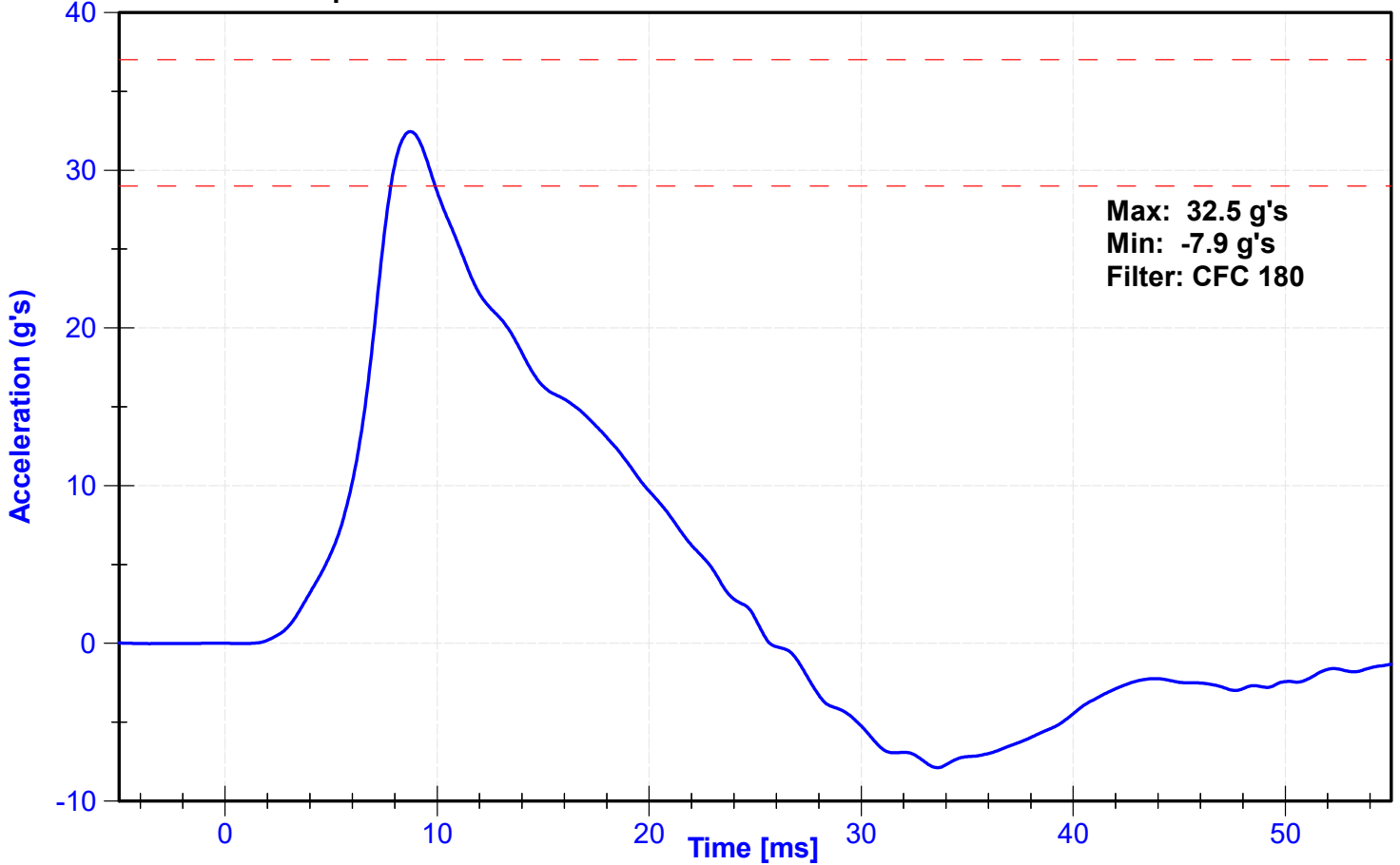




### Lateral Upper Spine Acceleration



### Lateral Lower Spine Acceleration



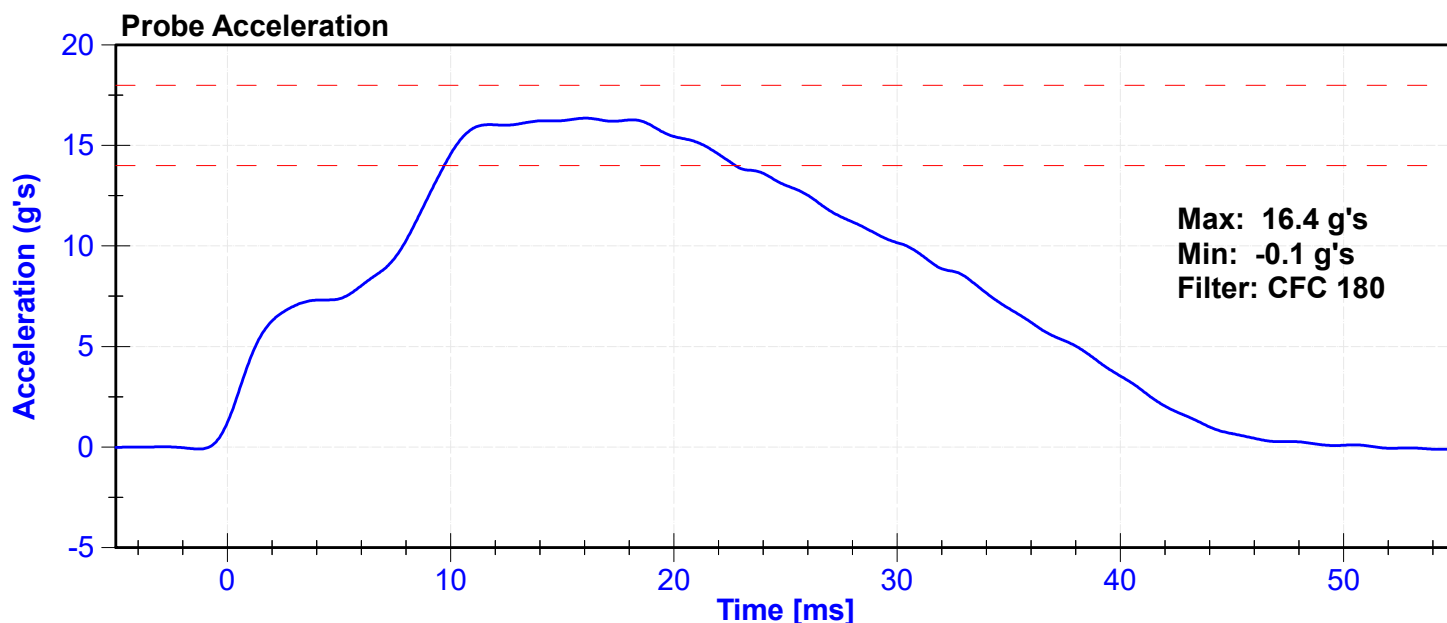
|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | FTSS   | Test Technician       | J. Rios    |
| ATD Serial Number | DG8012 | Laboratory Supervisor | C. Mantell |

### Results

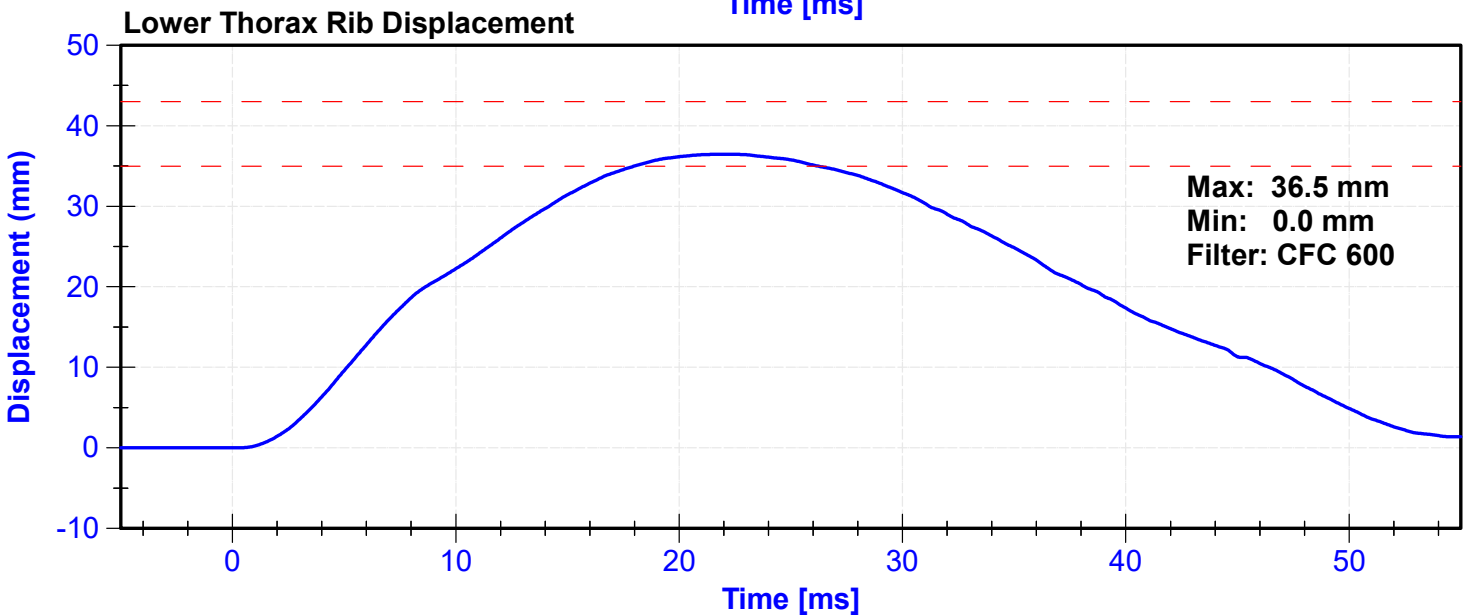
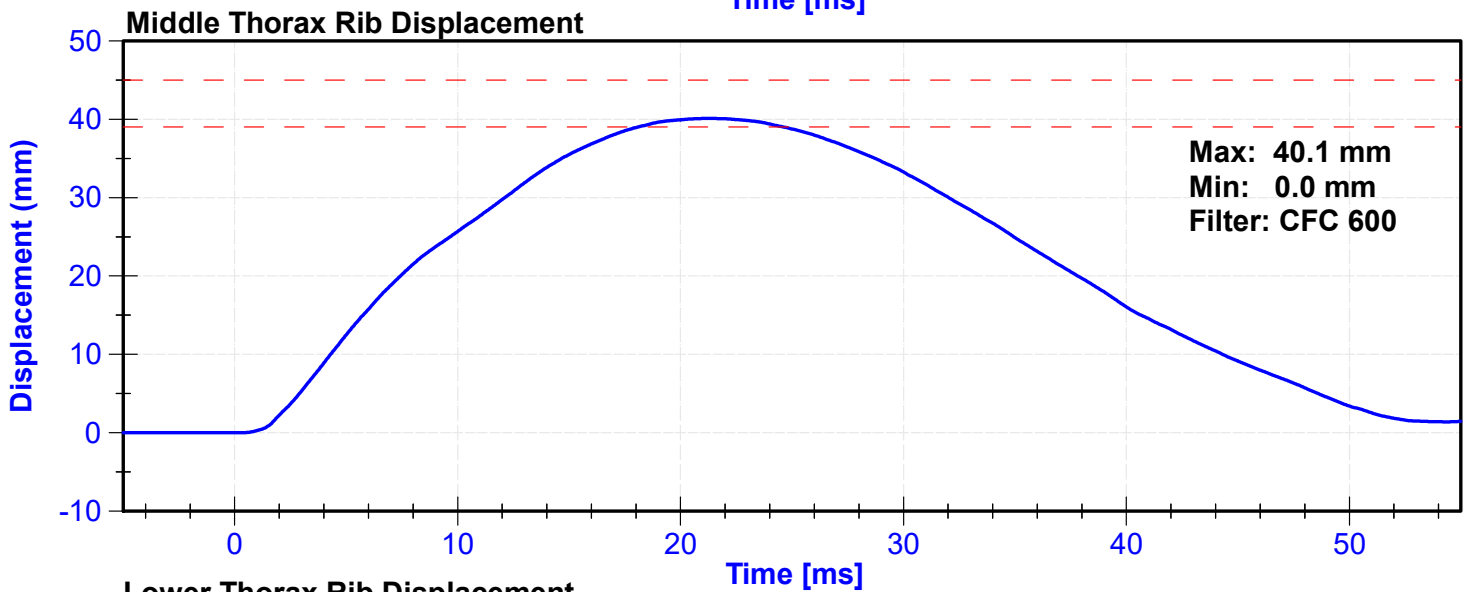
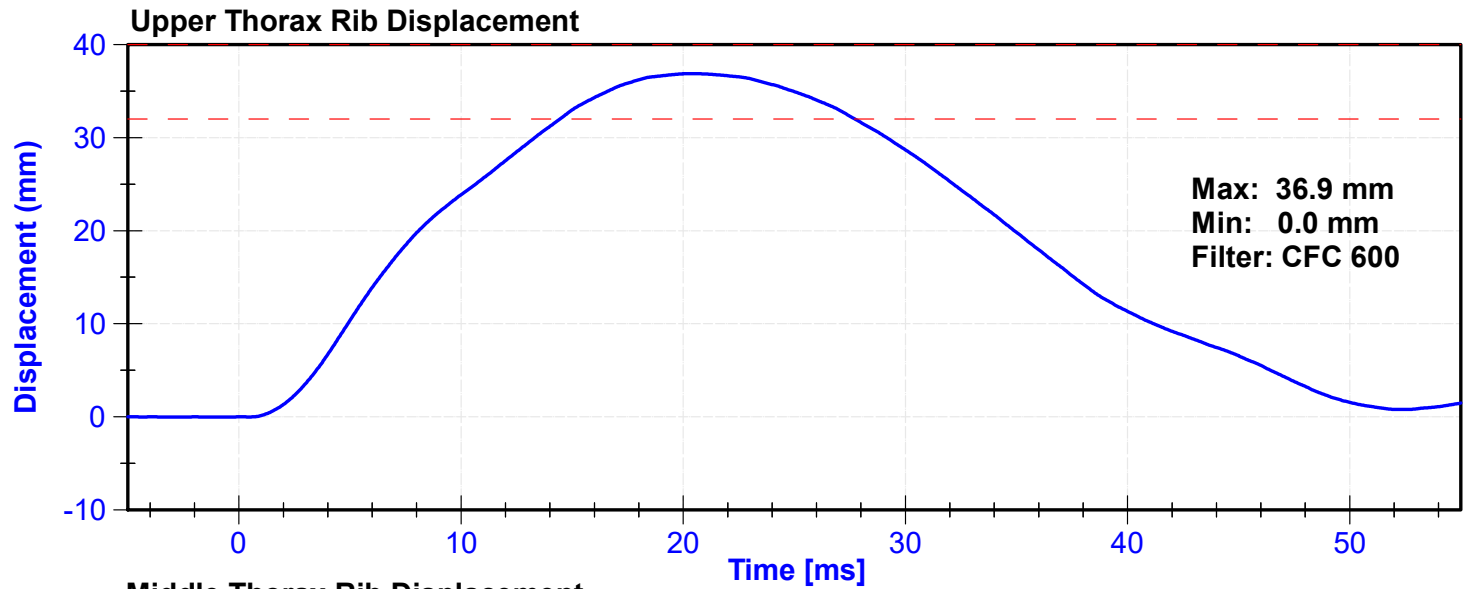
| Test Parameter                   | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|----------------------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature                      | 20.6                  | 22.2                  | °C   | 20.9   | Pass      |
| Humidity                         | 10                    | 70                    | %    | 49     | Pass      |
| Velocity                         | 4.2                   | 4.4                   | m/s  | 4.28   | Pass      |
| Probe Acceleration               | 14                    | 18                    | g's  | 16.4   | Pass      |
| Lateral Upper Spine Acceleration | 13                    | 17                    | g's  | 15.0   | Pass      |
| Lateral Lower Spine Acceleration | 7                     | 11                    | g's  | 8.5    | Pass      |
| Upper Thorax Rib Deflection      | 32                    | 40                    | mm   | 36.9   | Pass      |
| Middle Thorax Rib Deflection     | 39                    | 45                    | mm   | 40.1   | Pass      |
| Lower Thorax Rib Deflection      | 35                    | 43                    | mm   | 36.5   | Pass      |

### Transducer Calibrations

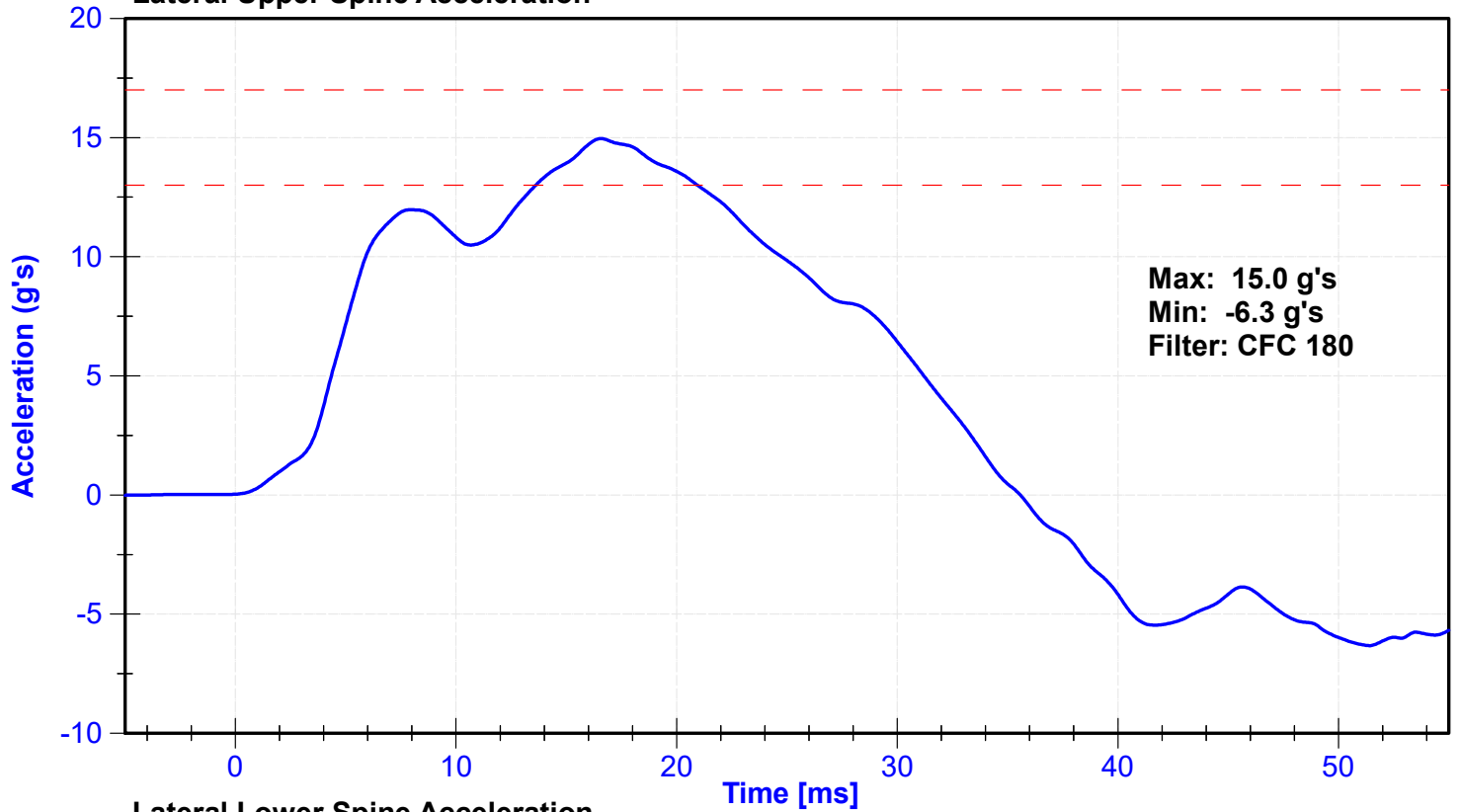
| Channel                         | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|---------------------------------|--------------|---------------|------------------|----------------------|
| Pendulum Accelerometer          | Endevco      | 18587         | 11/20/2023       | 11/19/2024           |
| Upper Spine Y Accelerometer     | Endevco      | P64148        | 5/6/2024         | 11/2/2024            |
| Lower Spine Y Accelerometer     | Endevco      | P51327        | 5/6/2024         | 11/2/2024            |
| Upper Thorax Rib Potentiometer  | Servo        | 1199GFE       | 5/6/2024         | 11/4/2024            |
| Middle Thorax Rib Potentiometer | Servo        | 1246GFE       | 5/6/2024         | 11/4/2024            |
| Lower Thorax Rib Potentiometer  | Servo        | 011GFE        | 5/6/2024         | 11/4/2024            |



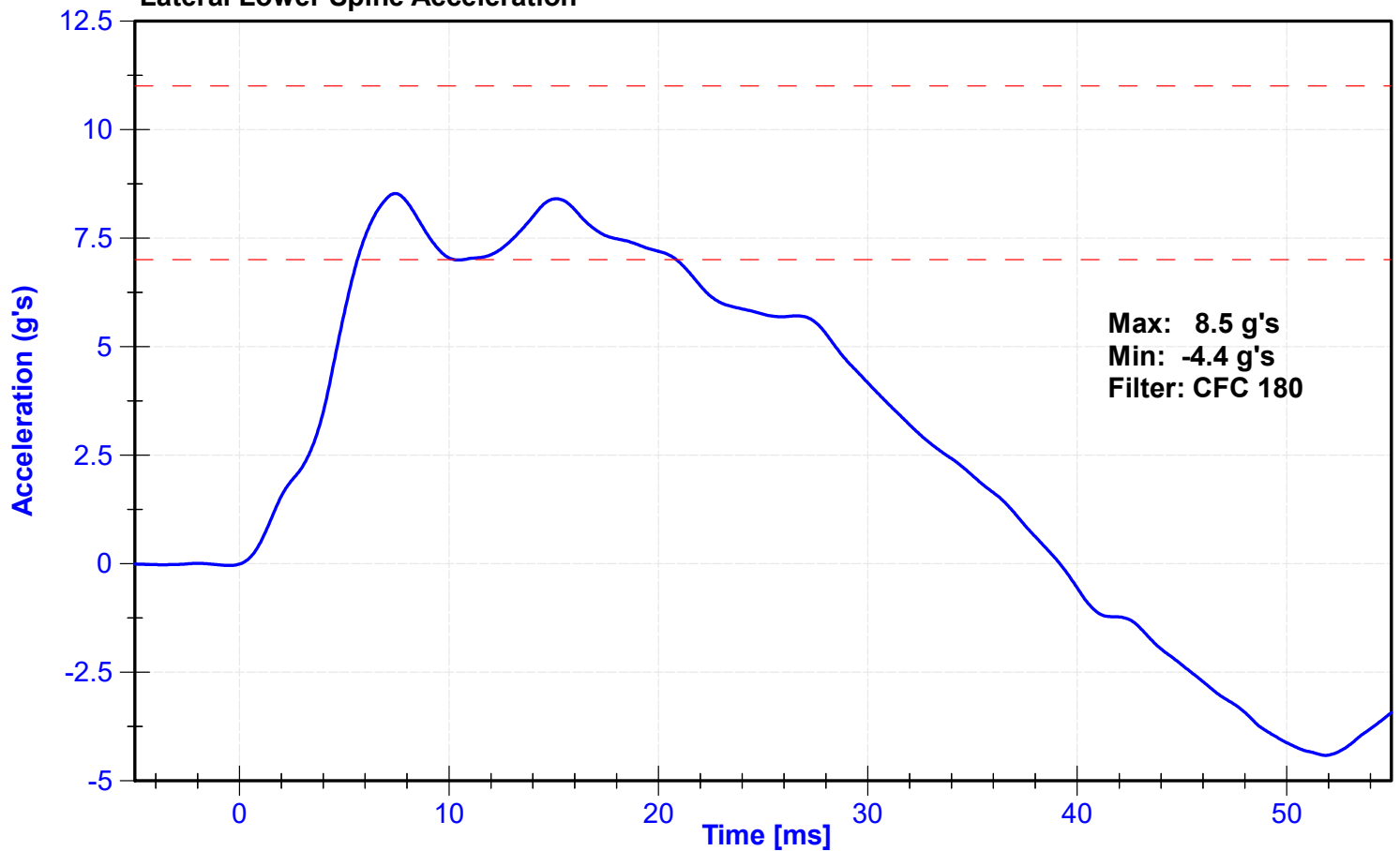




### Lateral Upper Spine Acceleration



### Lateral Lower Spine Acceleration





|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | FTSS   | Test Technician       | J. Rios    |
| ATD Serial Number | DG8012 | Laboratory Supervisor | C. Mantell |

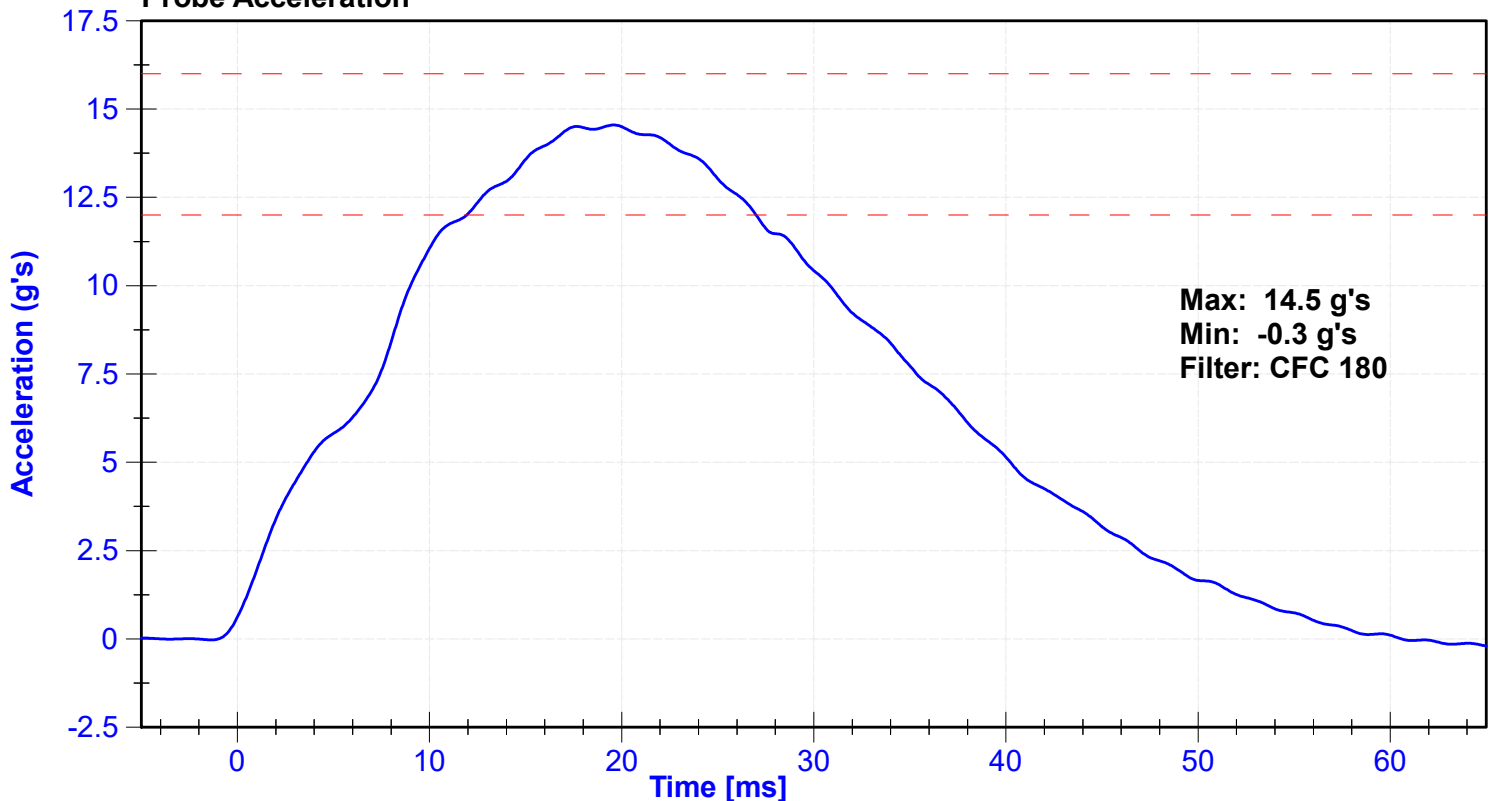
**Results**

| Test Parameter                   | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|----------------------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature                      | 20.6                  | 22.2                  | °C   | 20.9   | Pass      |
| Humidity                         | 10                    | 70                    | %    | 49     | Pass      |
| Velocity                         | 4.2                   | 4.4                   | m/s  | 4.28   | Pass      |
| Probe Acceleration               | 12                    | 16                    | g's  | 14.5   | Pass      |
| Lateral Lower Spine Acceleration | 9                     | 14                    | g's  | 11.2   | Pass      |
| Upper Abdomen Rib Deflection     | 36                    | 47                    | mm   | 44.6   | Pass      |
| Lower Abdomen Rib Deflection     | 33                    | 44                    | mm   | 41.3   | Pass      |

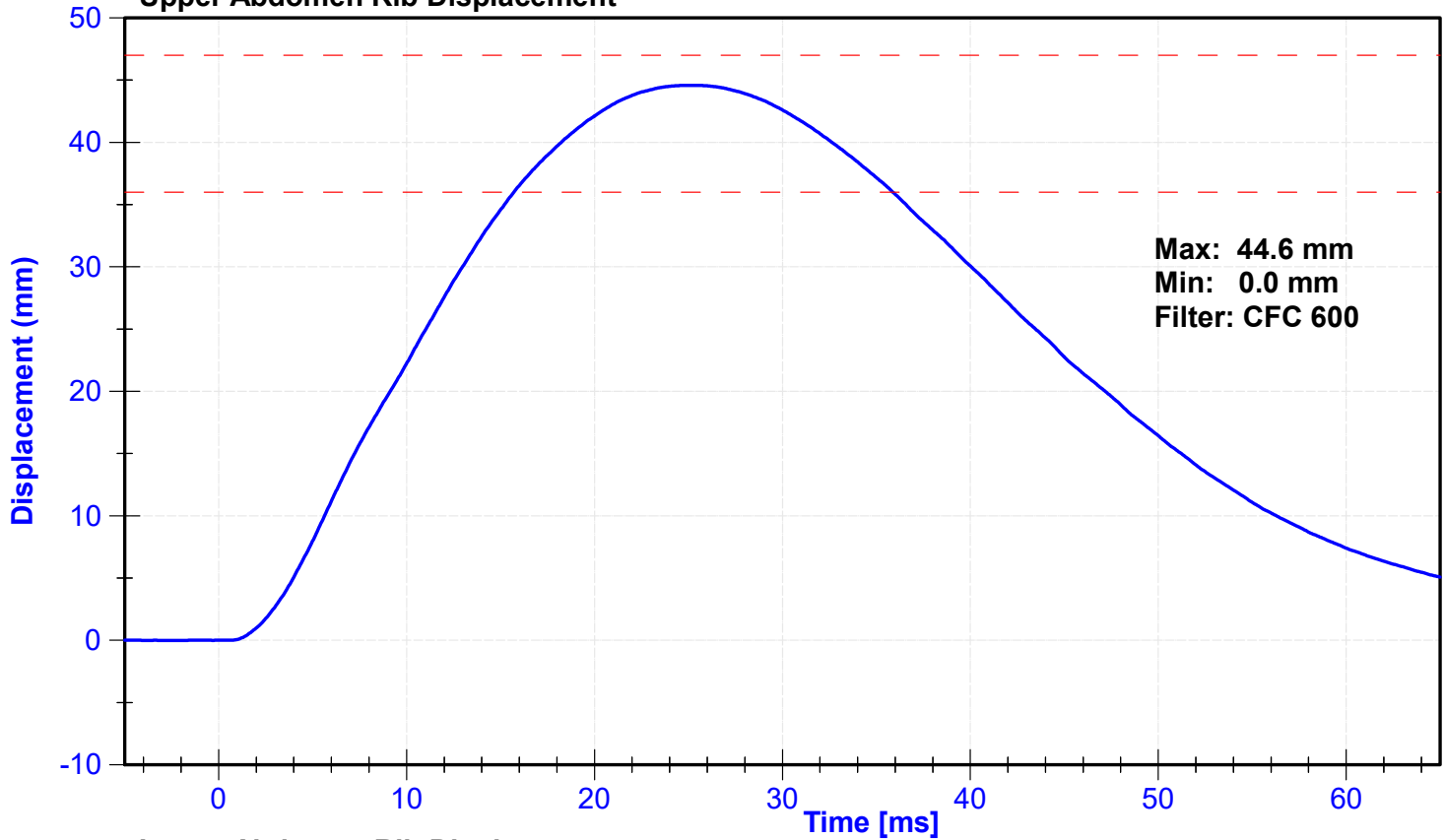
**Transducer Calibrations**

| Channel                         | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|---------------------------------|--------------|---------------|------------------|----------------------|
| Probe Accelerometer             | Endevco      | 18587         | 11/20/2023       | 11/19/2024           |
| Lower Spine Y Accelerometer     | Endevco      | P51327        | 5/6/2024         | 11/2/2024            |
| Upper Abdomen Rib Potentiometer | Servo        | 008GFE        | 5/6/2024         | 11/4/2024            |
| Lower Abdomen Rib Potentiometer | Servo        | 046GFE        | 5/6/2024         | 11/4/2024            |

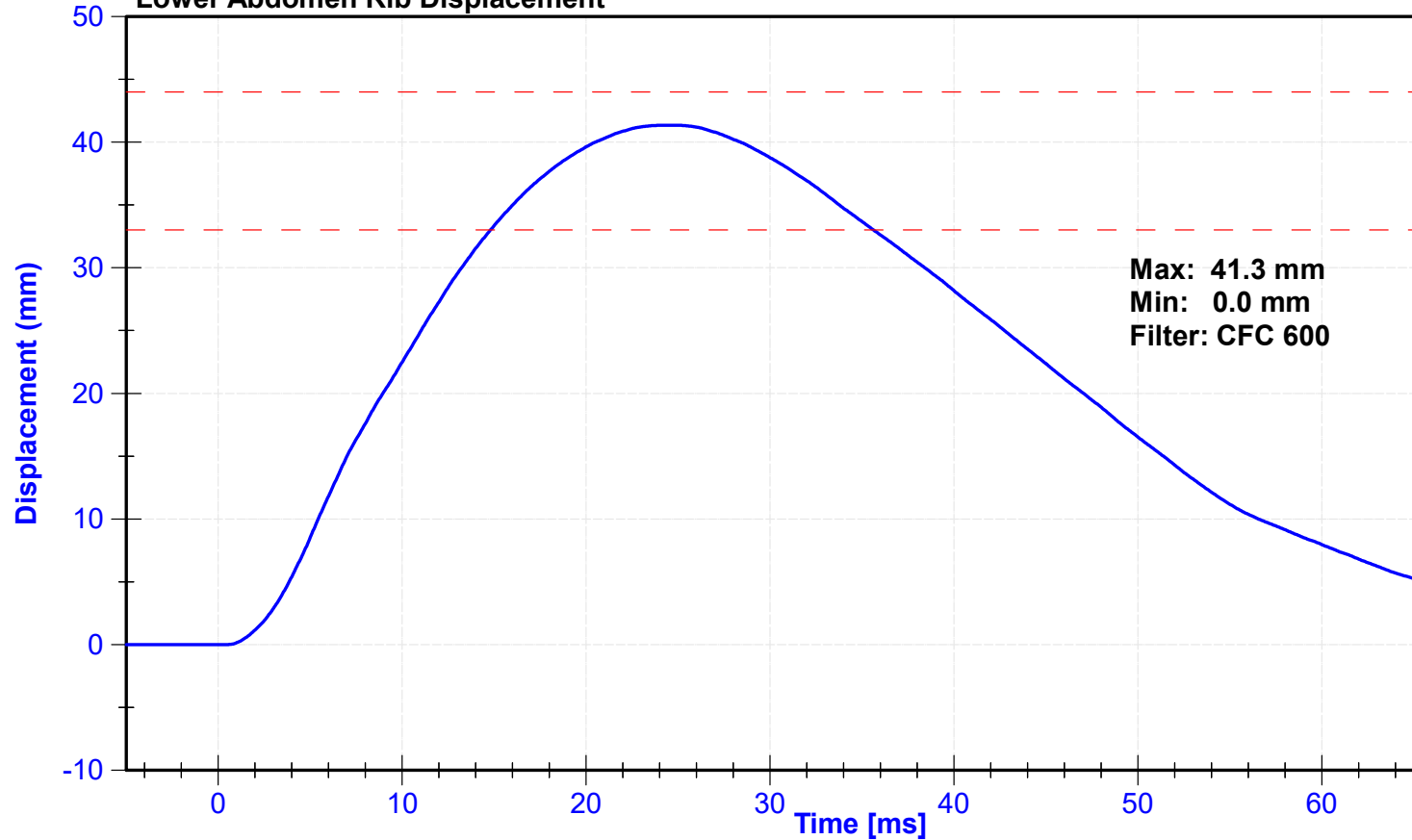
**Probe Acceleration**



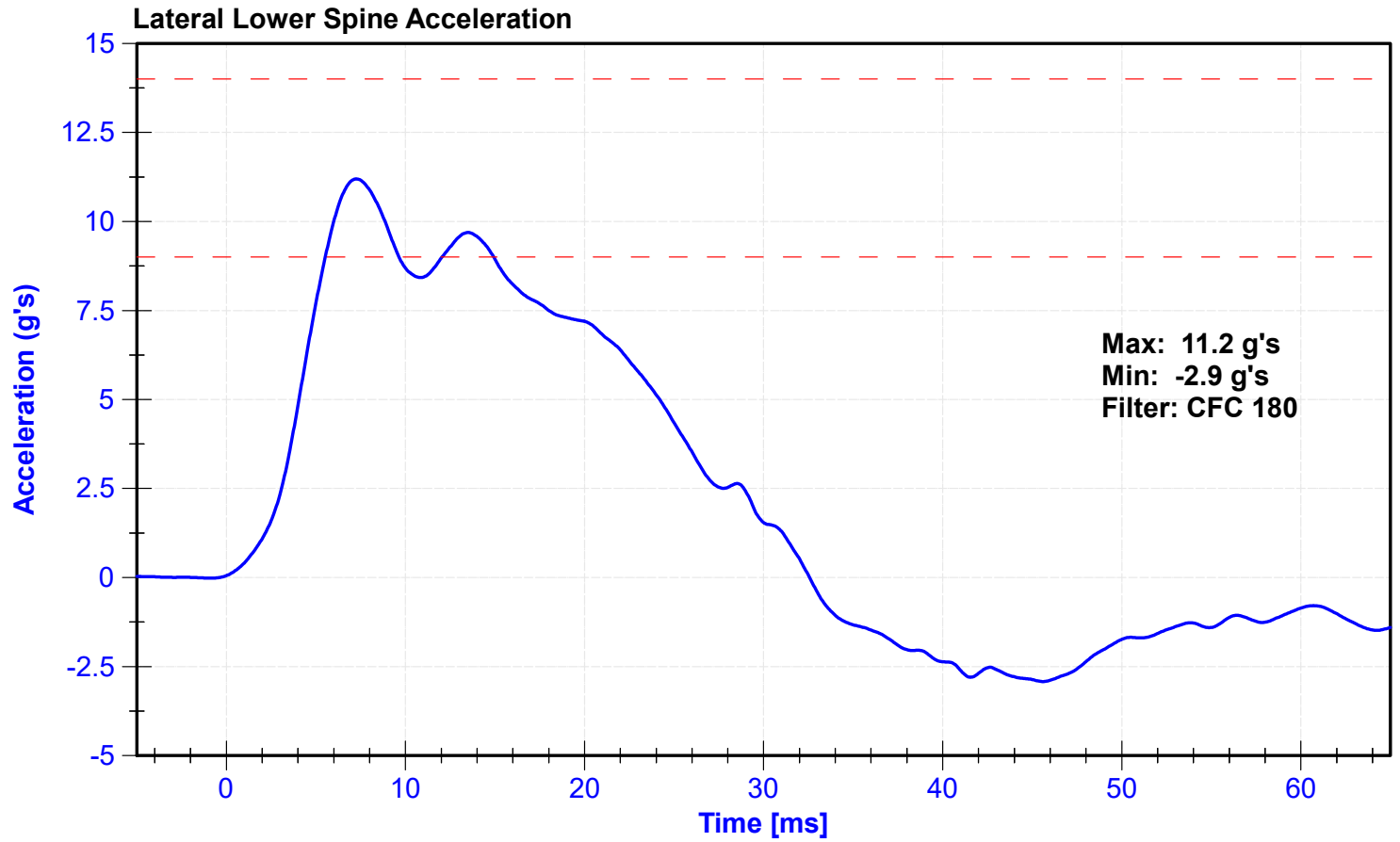
Upper Abdomen Rib Displacement



Lower Abdomen Rib Displacement







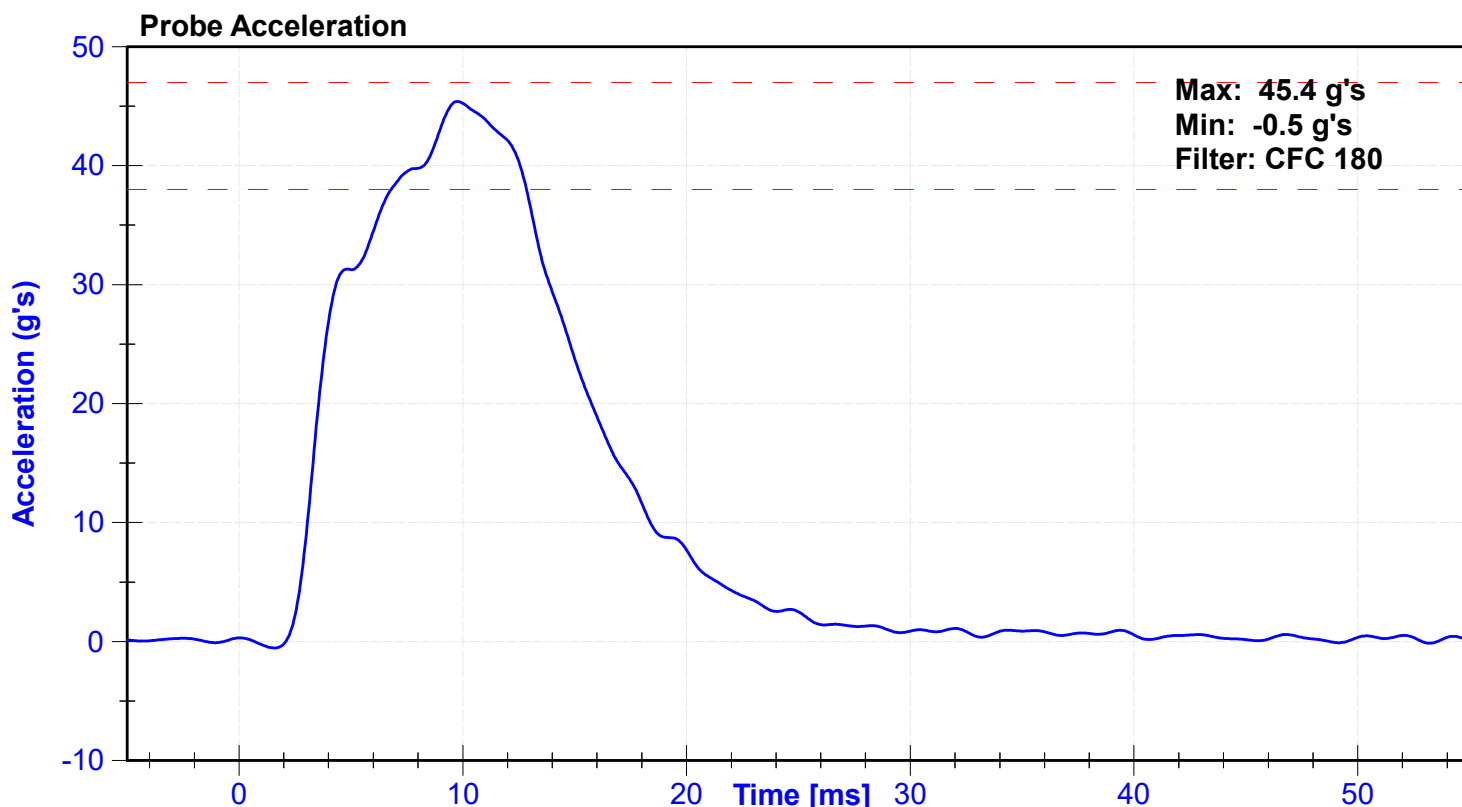
|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | FTSS   | Test Technician       | J. Rios    |
| ATD Serial Number | DG8012 | Laboratory Supervisor | C. Mantell |

### Results

| Test Parameter                        | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|---------------------------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature                           | 20.6                  | 22.2                  | °C   | 20.9   | Pass      |
| Humidity                              | 10                    | 70                    | %    | 49     | Pass      |
| Velocity                              | 6.6                   | 6.8                   | m/s  | 6.64   | Pass      |
| Probe Acceleration                    | 38                    | 47                    | g's  | 45.4   | Pass      |
| Lateral Pelvis Acceleration after 6ms | 34                    | 42                    | g's  | 39.0   | Pass      |
| Acetabulum Force                      | 3600                  | 4300                  | N    | 4119.0 | Pass      |

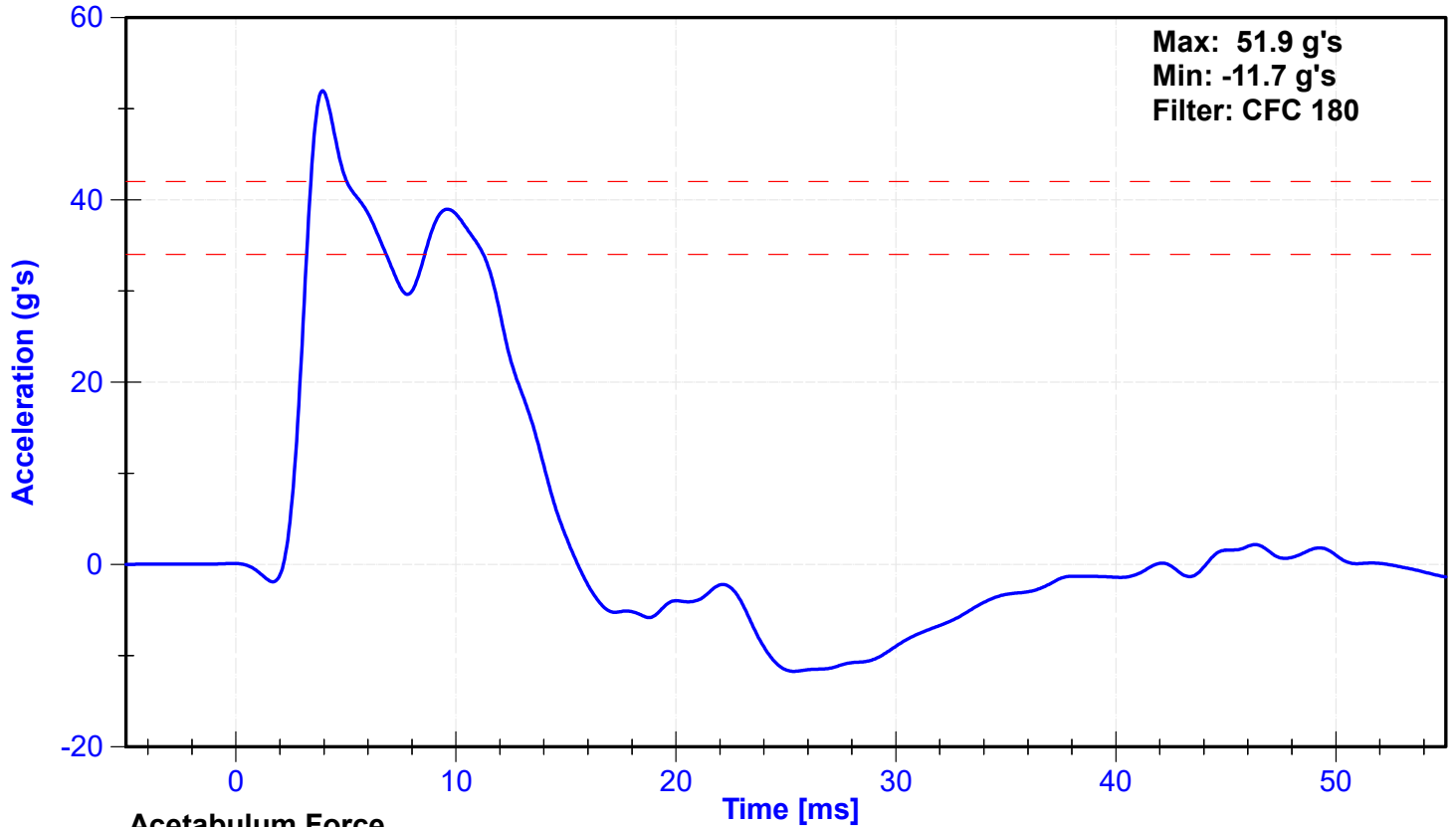
### Transducer Calibrations

| Channel                | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|------------------------|--------------|---------------|------------------|----------------------|
| Pendulum Accelerometer | Endevco      | 18587         | 11/20/2023       | 11/19/2024           |
| Pelvis Y Accelerometer | Endevco      | P50078        | 5/6/2024         | 11/2/2024            |
| Acetabulum Load Cell   | Denton       | 270-FY        | 9/11/2023        | 9/10/2024            |
| Certification Plug     | SACO         |               |                  | N/A                  |
| Crash Test Plug        | SACO         |               |                  | N/A                  |

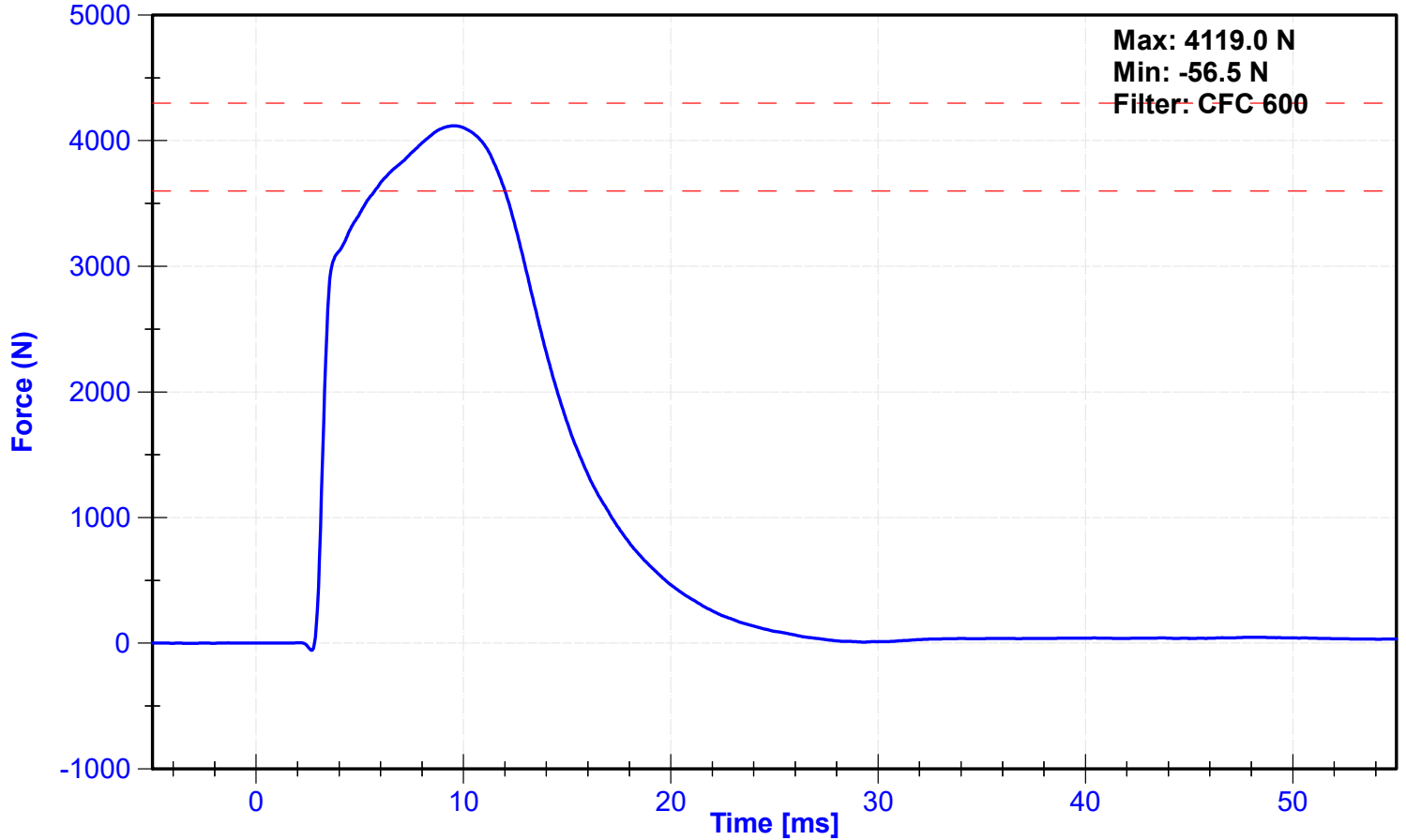




### Lateral Pelvis Acceleration



### Acetabulum Force





SID-ILs Pelvis Plug Certification Test

Plug S/N 16558

Test Number 23342

Report Number 23399

Test Date 7/15/2022 9:45:23 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

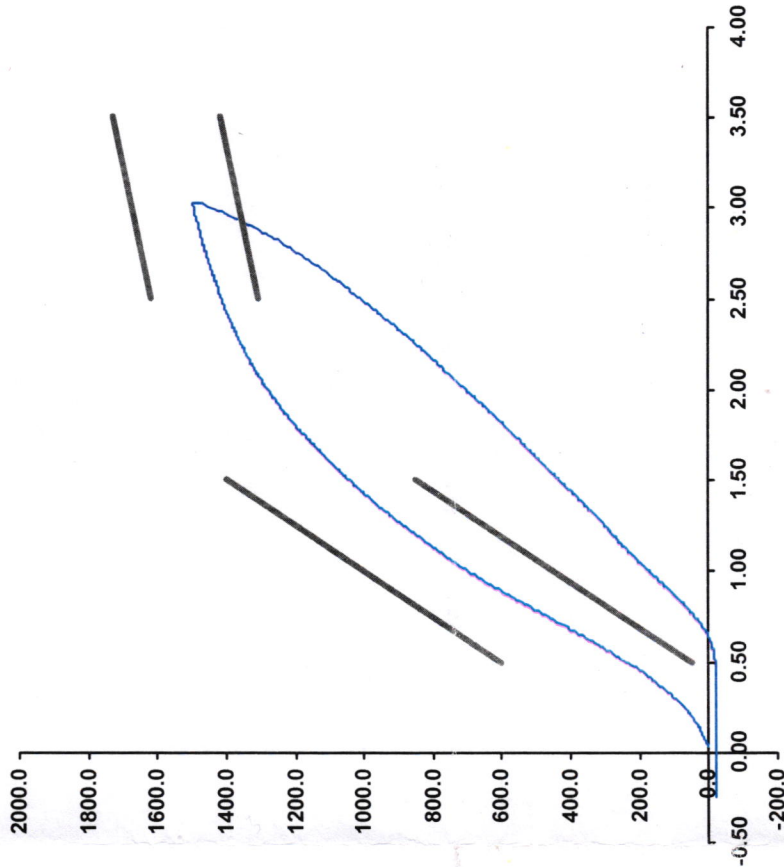
Load Cell S/N (F1360947), Units (LBS ) 1000

Crosshead Speed ( mm / min ) or Rate 12.7

Extension or Position Measured by XHD\_100 ( XHD100 )

Notes: Cert Plug 05-28-2024

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107 15-Jul-22

SACO Research

By: *DC*

Date: 7/15/22

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





SID-IIs Pelvis Plug Certification Test

Plug S/N 16313

Test Number 22879

Report Number 22936

Test Date 5/20/2022 10:58:25 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

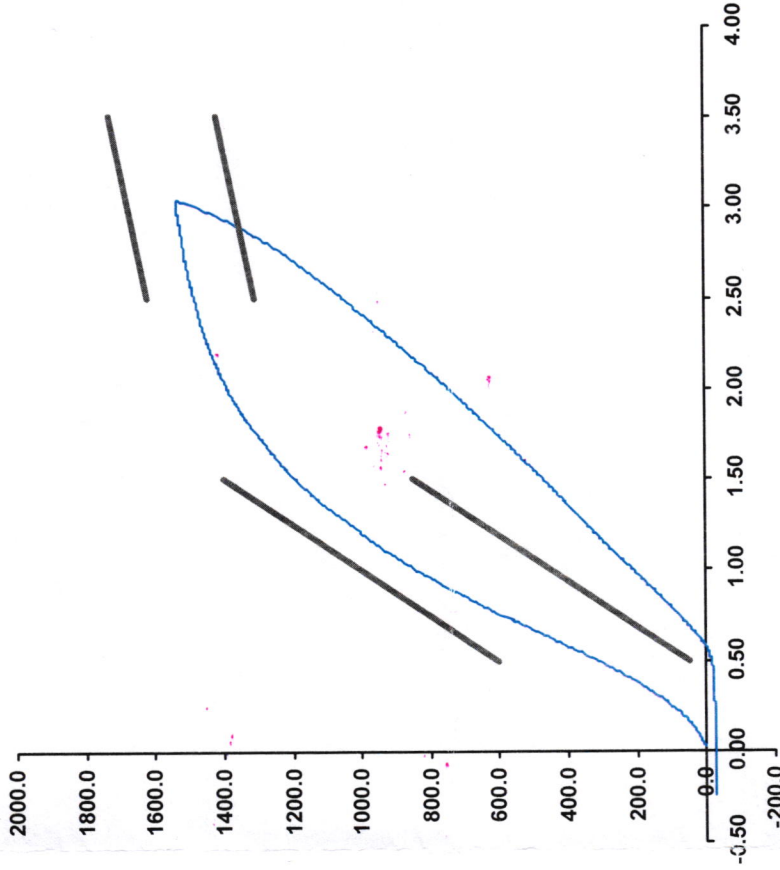
Load Cell S/N (FI360947), Units (LBS ) 1000

Crosshead Speed ( mm / min ) or Rate 12.7

Extension or Position Measured by XHD\_100 ( XHD100 )

Notes: *Crash Plug 5/28/24 DG802*

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107

20-May-22

SACO Research

By: *DC* Date: *5/20/2022*

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



SID-ILs Pelvis Plug Certification Test

Plug S/N 16337

Test Number 22904

Report Number 22961

Test Date 5/20/2022 11:54:16 AM

| Test Results       | Spec Min | Spec Max |
|--------------------|----------|----------|
| Force @ 0.5 mm (N) | 305      | 600      |
| Force @ 1.5 mm (N) | 1,174    | 1,400    |
| Force @ 2.5 mm (N) | 1,456    | 1,618    |
| Force @ 3.0 mm (N) | 1,510    | 1,673    |

Testing Machine STM-20 5965542

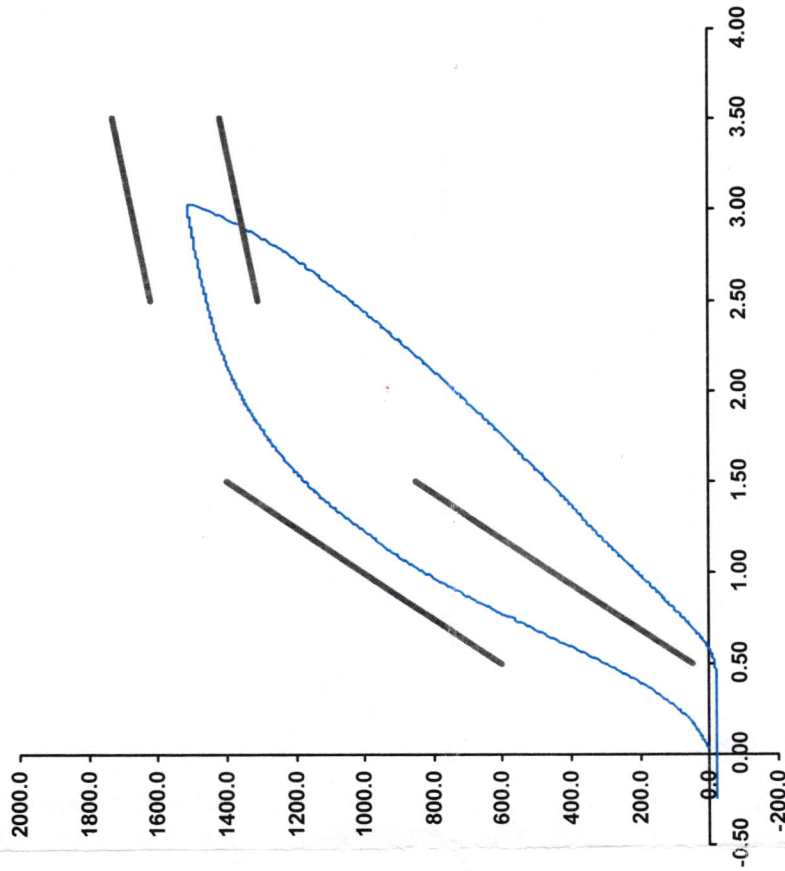
Load Cell S/N (FI360947), Units (LBS ) 1000

Crosshead Speed ( mm / min ) or Rate 12.7

Extension or Position Measured by XHD\_100 ( XHD100 )

Notes: *Now IMPACT 5/28/24 D68012*

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107 20-May-22

SACO Research

By: *DC* Date: *5/20/2022*

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 | C. Mantell |

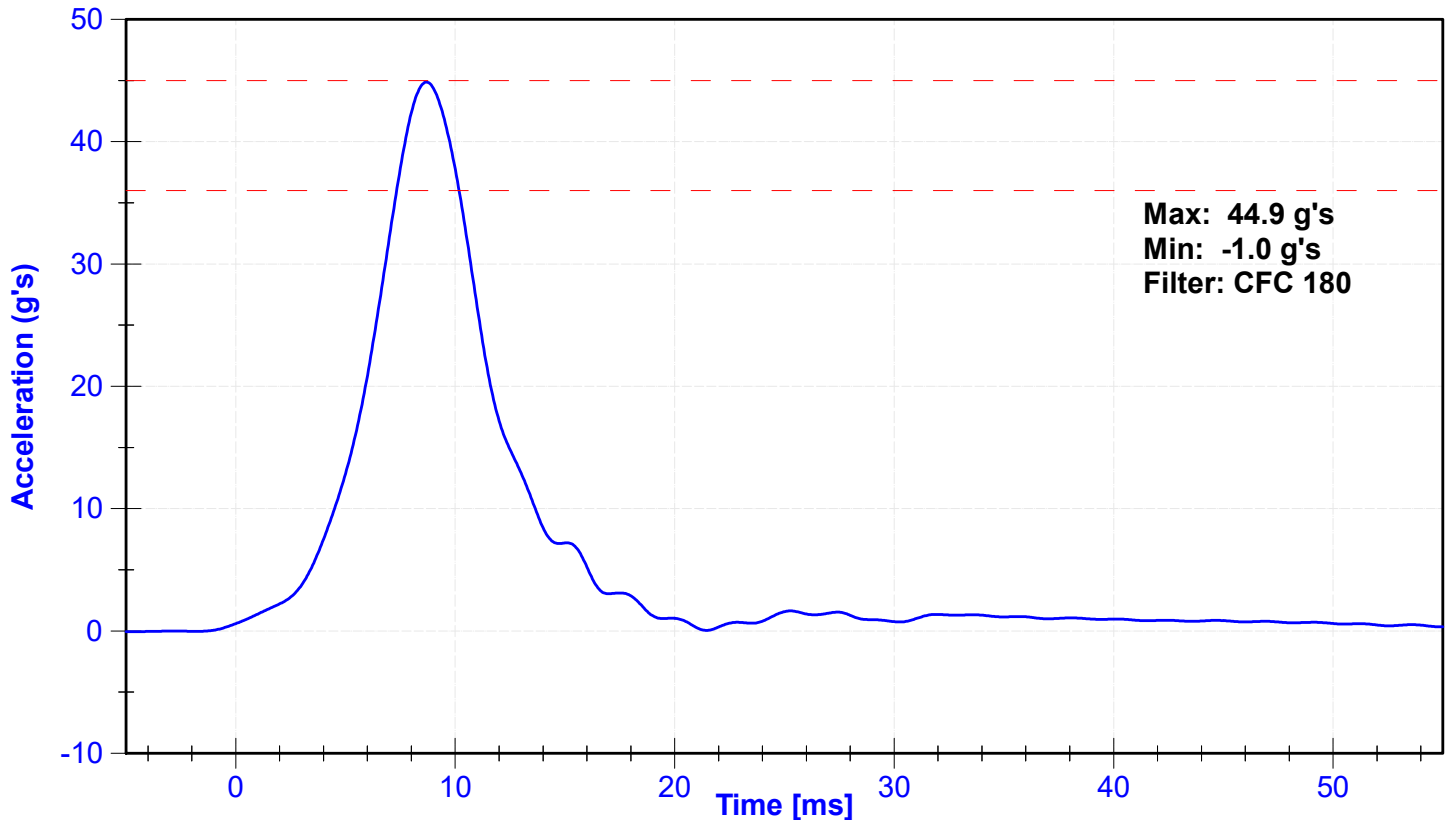
### Results

| Test Parameter              | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|-----------------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature                 | 20.6                  | 22.2                  | °C   | 20.9   | Pass      |
| Humidity                    | 10                    | 70                    | %    | 49     | Pass      |
| Velocity                    | 4.2                   | 4.4                   | m/s  | 4.27   | Pass      |
| Probe Acceleration          | 36                    | 45                    | g's  | 44.9   | Pass      |
| Lateral Pelvis Acceleration | 28                    | 39                    | g's  | 38.9   | Pass      |
| Iliac Force                 | 4100                  | 5100                  | N    | 5089.7 | Pass      |

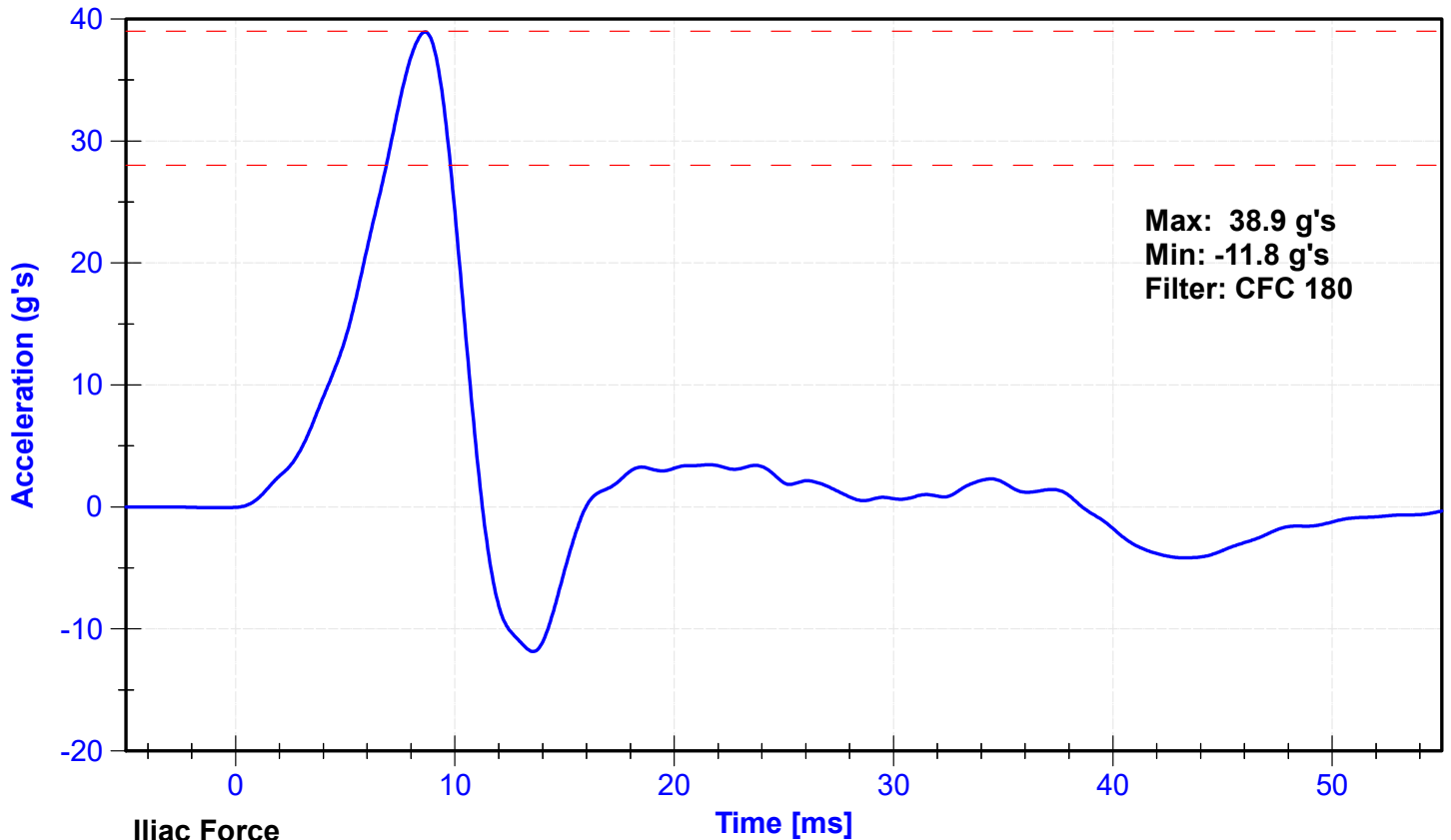
### Transducer Calibrations

| Channel                | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|------------------------|--------------|---------------|------------------|----------------------|
| Pendulum Accelerometer | Endevco      | 18587         | 11/20/2023       | 11/19/2024           |
| Pelvis Y Accelerometer | Endevco      | P50078        | 5/6/2024         | 11/2/2024            |
| Iliac Load Cell        | Denton       | 280-FY        | 9/11/2023        | 9/10/2024            |

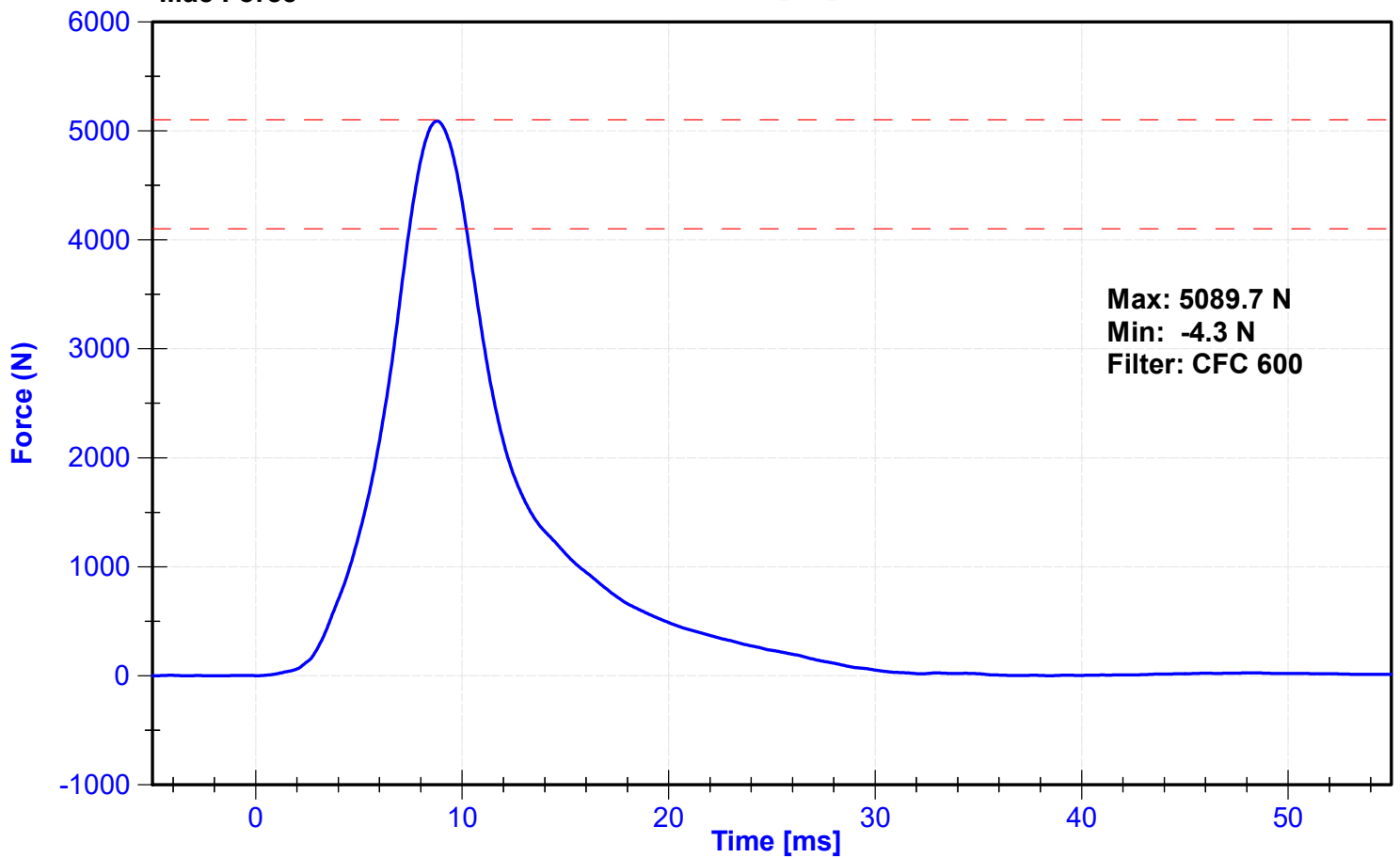
### Probe Acceleration



### Lateral Pelvis Acceleration



### Iliac Force





**CALIBRATION TEST RESULTS**

**POST-TEST**

**SID-IIS 5<sup>TH</sup> PERCENTILE FEMALE - DRIVER ATD**

**SERIAL NO:DG8012**

**(CONFIGURED FOR LEFT SIDE IMPACT)**

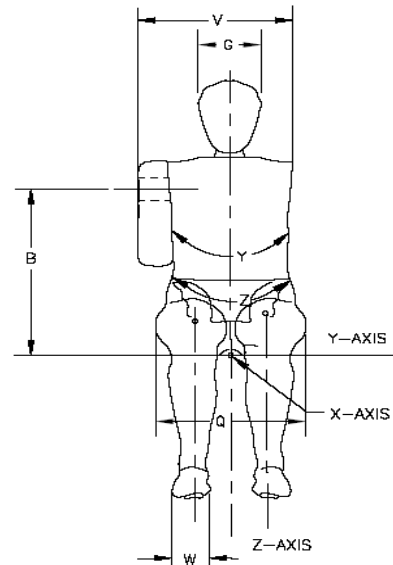
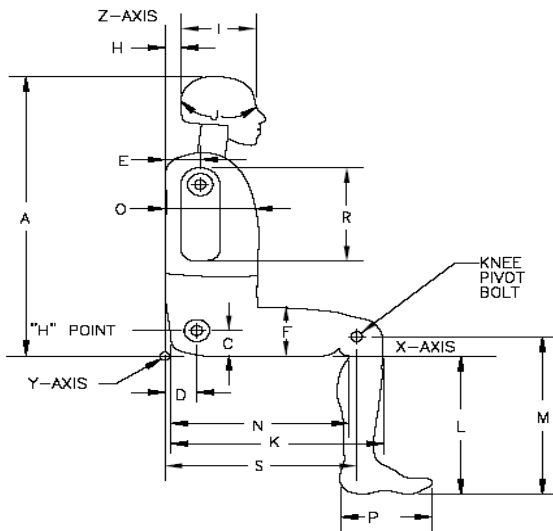


## External Measurements - SID-IIs

Technician: **T. Roseman**

Date: **07/18/2024**

Dummy Serial Number: **DG8012**



| Symbol | Description                  | Specification (mm) |     | Result (mm) | Pass/Fail |
|--------|------------------------------|--------------------|-----|-------------|-----------|
| A      | Sitting Height               | 772                | 788 | 780         | Pass      |
| B      | Shoulder Pivot Height        | 437                | 453 | 447         | Pass      |
| C      | H-point Height               | 79                 | 89  | 87          | Pass      |
| D      | H-point from seatback        | 141                | 151 | 146         | Pass      |
| E      | Shoulder Pivot from Backline | 97                 | 107 | 105         | Pass      |
| F      | Thigh Clearance              | 119                | 135 | 129         | Pass      |
| G      | Head Breadth                 | 140                | 148 | 145         | Pass      |
| H      | Head Back from Backline      | 40                 | 46  | 44          | Pass      |
| I      | Head Depth                   | 178                | 188 | 183         | Pass      |
| J      | Head Circumference           | 541                | 551 | 545         | Pass      |
| K      | Buttock to Knee Length       | 514                | 540 | 530         | Pass      |
| L      | Popliteal Height             | 343                | 369 | 364         | Pass      |
| M      | Knee Pivot to floor height   | 392                | 409 | 400         | Pass      |
| N      | Buttock Popliteal Length     | 416                | 442 | 438         | Pass      |
| O      | Chest Depth w/o jacket       | 195                | 211 | 205         | Pass      |
| P      | Foot Length                  | 216                | 232 | 220         | Pass      |
| Q      | Hip Breadth (w/pelvic plugs) | 313                | 323 | 319         | Pass      |
| R      | Arm Length                   | 249                | 259 | 255         | Pass      |
| S      | Knee Joint to seatback       | 477                | 493 | 485         | Pass      |
| V      | Shoulder Width               | 341                | 357 | 354         | Pass      |
| W      | Foot Width                   | 78                 | 94  | 86          | Pass      |
| Y      | Chest Circumference w/jacket | 851                | 881 | 869         | Pass      |
| Z      | Waist Circumference          | 761                | 791 | 782         | Pass      |



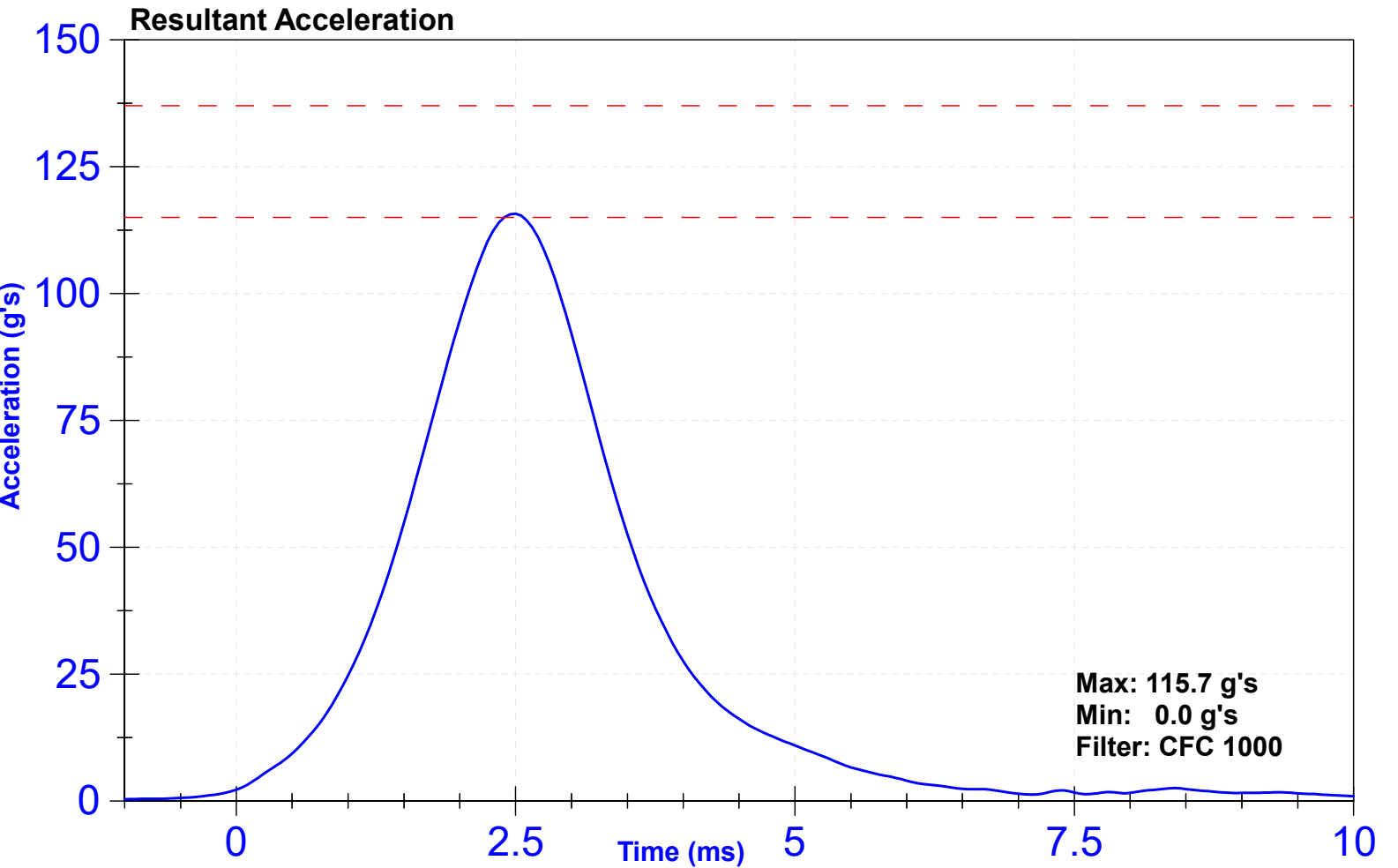
|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | FTSS   | Test Technician       | J. Rios    |
| ATD Serial Number | DG8012 | Laboratory Supervisor | C. Mantell |

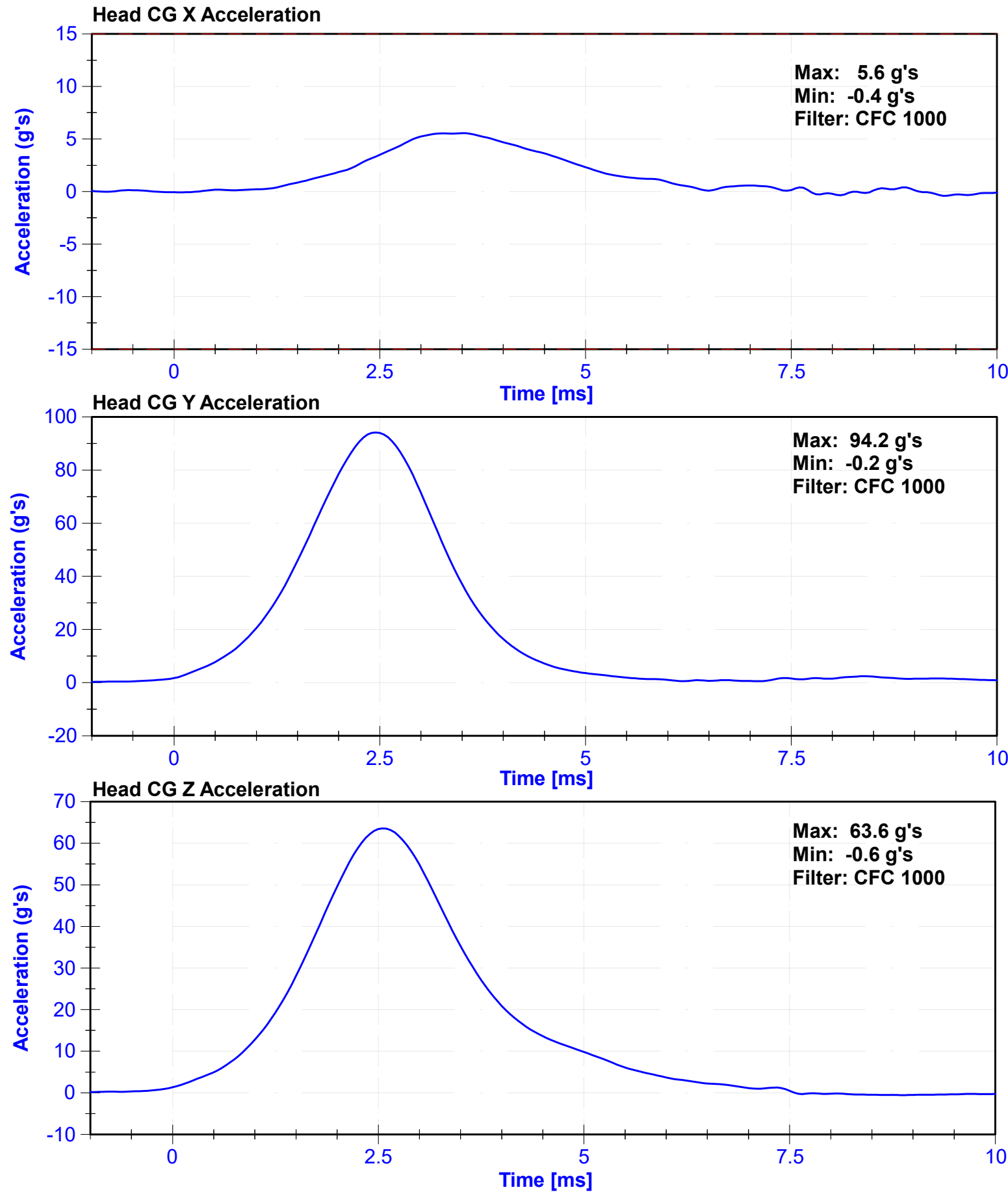
Results

| Test Parameter         | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|------------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature            | 20.6                  | 22.2                  | °C   | 21.2   | Pass      |
| Humidity               | 10                    | 70                    | %    | 61     | Pass      |
| Resultant Acceleration | 115                   | 137                   | g's  | 115.7  | Pass      |
| Oscillation            | 0                     | 15                    | %    | 2.1    | Pass      |
| Fore-Aft Acceleration  | -15                   | 15                    | g's  | 5.6    | Pass      |

Transducer Calibrations

| Channel         | Manufacturer | Serial Number | Calibratio Date | Calibratio Due Date |
|-----------------|--------------|---------------|-----------------|---------------------|
| X Accelerometer | Endevco      | T21184        | 5/6/2024        | 11/2/2024           |
| Y Accelerometer | Endevco      | P51668        | 5/6/2024        | 11/2/2024           |
| Z Accelerometer | Endevco      | P83319        | 5/6/2024        | 11/2/2024           |





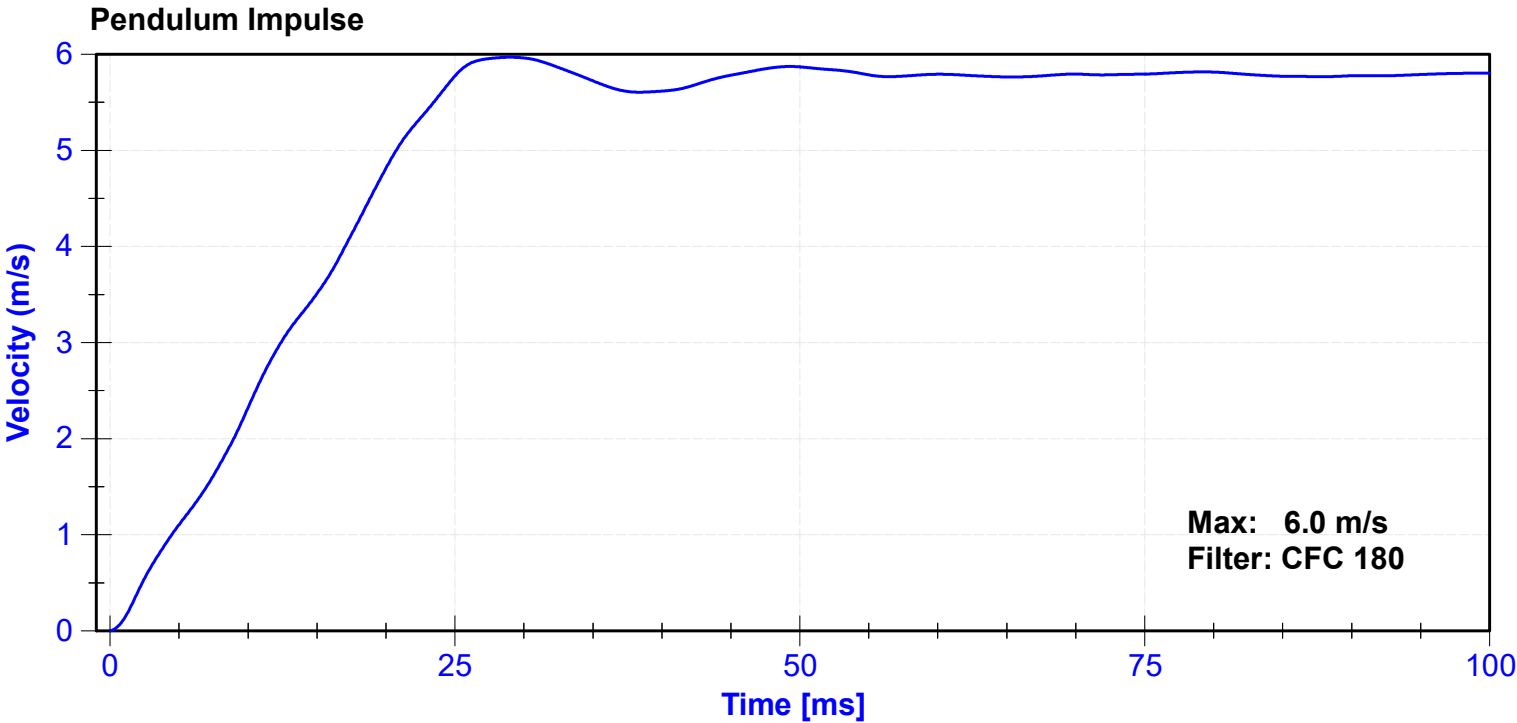
|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | FTSS   | Test Technician       | J. Rios    |
| ATD Serial Number | DG8012 | Laboratory Supervisor | C. Mantell |

### Results

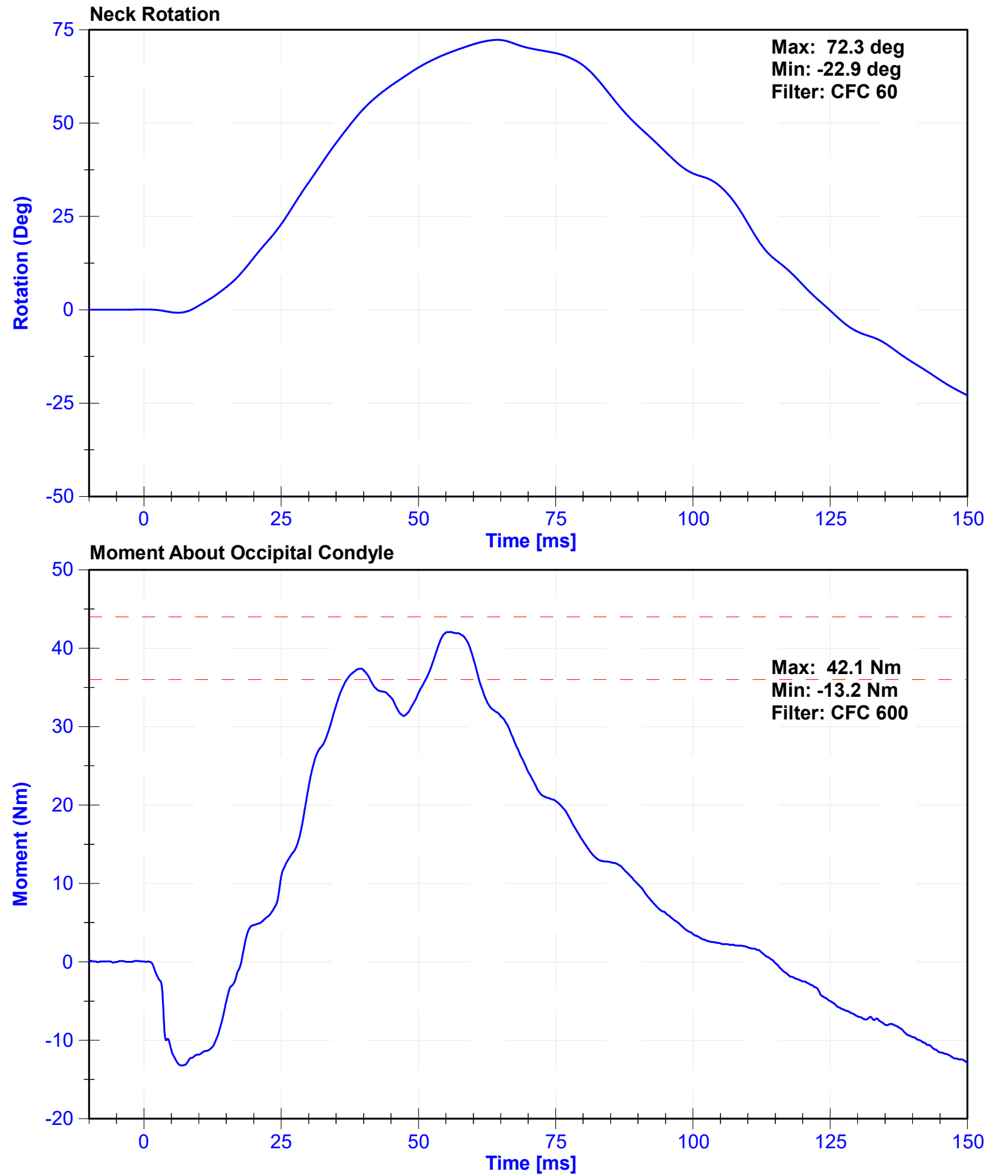
| Test Parameter                    | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|-----------------------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature                       | 20.6                  | 22.2                  | °C   | 21.2   | Pass      |
| Humidity                          | 10                    | 70                    | %    | 62     | Pass      |
| Velocity                          | 5.51                  | 5.63                  | m/s  | 5.548  | Pass      |
| Pendulum Impulse at 10ms          | 2.2                   | 2.8                   | m/s  | 2.32   | Pass      |
| Pendulum Impulse at 15ms          | 3.3                   | 4.1                   | m/s  | 3.51   | Pass      |
| Pendulum Impulse at 20ms          | 4.4                   | 5.4                   | m/s  | 4.81   | Pass      |
| Pendulum Impulse at 25ms          | 5.4                   | 6.1                   | m/s  | 5.77   | Pass      |
| Pendulum Impulse from 25 to 100ms | 5.5                   | 6.2                   | m/s  | 5.97   | Pass      |
| Neck Rotation                     | 71                    | 81                    | deg  | 72.3   | Pass      |
| Time at Maximum Rotation          | 50                    | 70                    | ms   | 64.4   | Pass      |
| Moment about the OC               | 36                    | 44                    | Nm   | 42.1   | Pass      |
| Moment Decay to 0 Nm              | 102                   | 126                   | ms   | 114.8  | Pass      |

### Transducer Calibrations

| Channel                | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|------------------------|--------------|---------------|------------------|----------------------|
| Pendulum Accelerometer | Endevco      | 7231C-750     | 4/29/2024        | 10/26/2024           |
| Pendulum Potentiometer | Servo        | 4961          | 10/2/2023        | 10/1/2024            |
| Condyle Potentiometer  | Servo        | DS185         | 10/2/2023        | 10/1/2024            |
| Upper Neck Load Cell   | Denton       | 1716A_2187-FY | 12/5/2023        | 12/4/2024            |







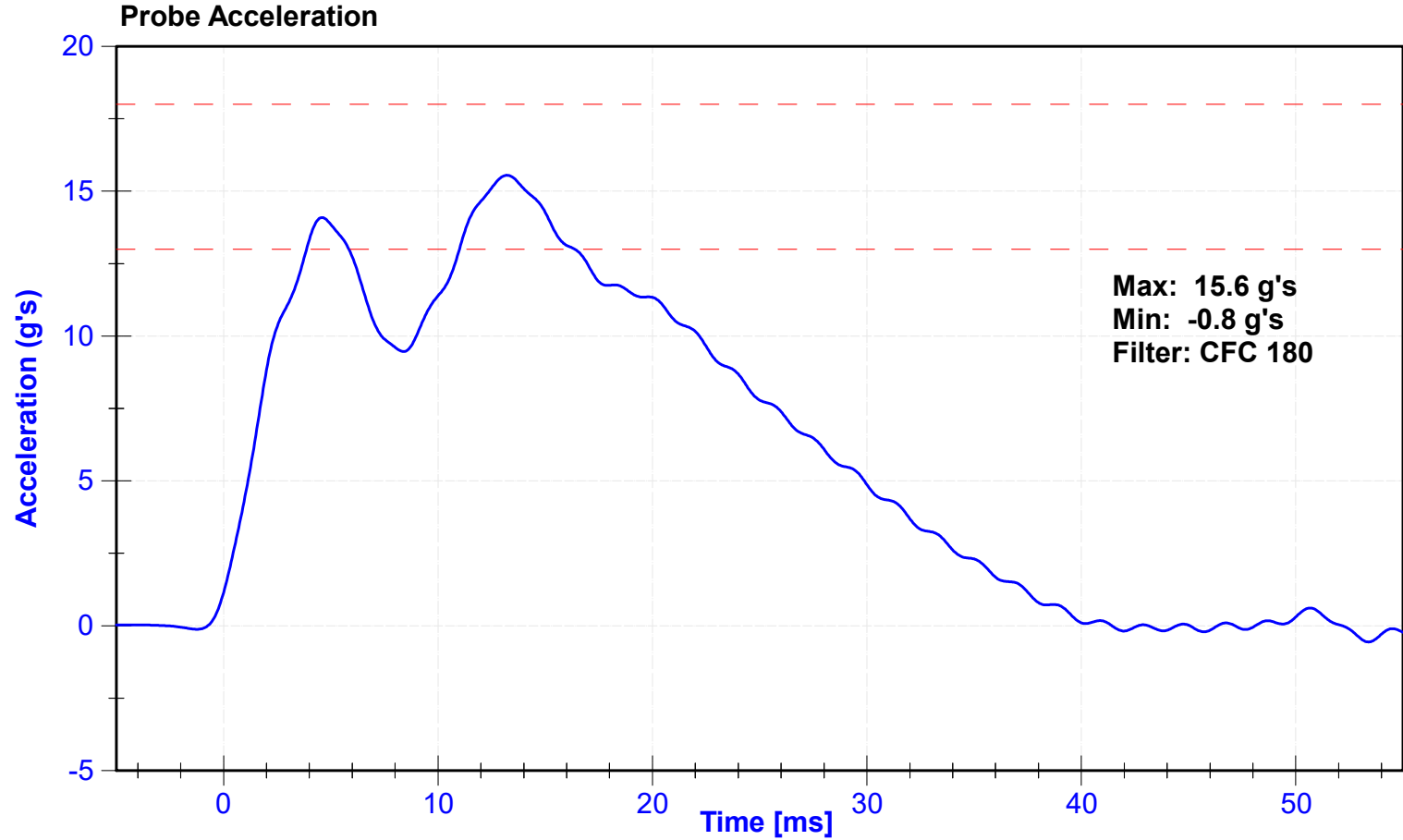
|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | FTSS   | Test Technician       | J. Rios    |
| ATD Serial Number | DG8012 | Laboratory Supervisor | C. Mantell |

Results

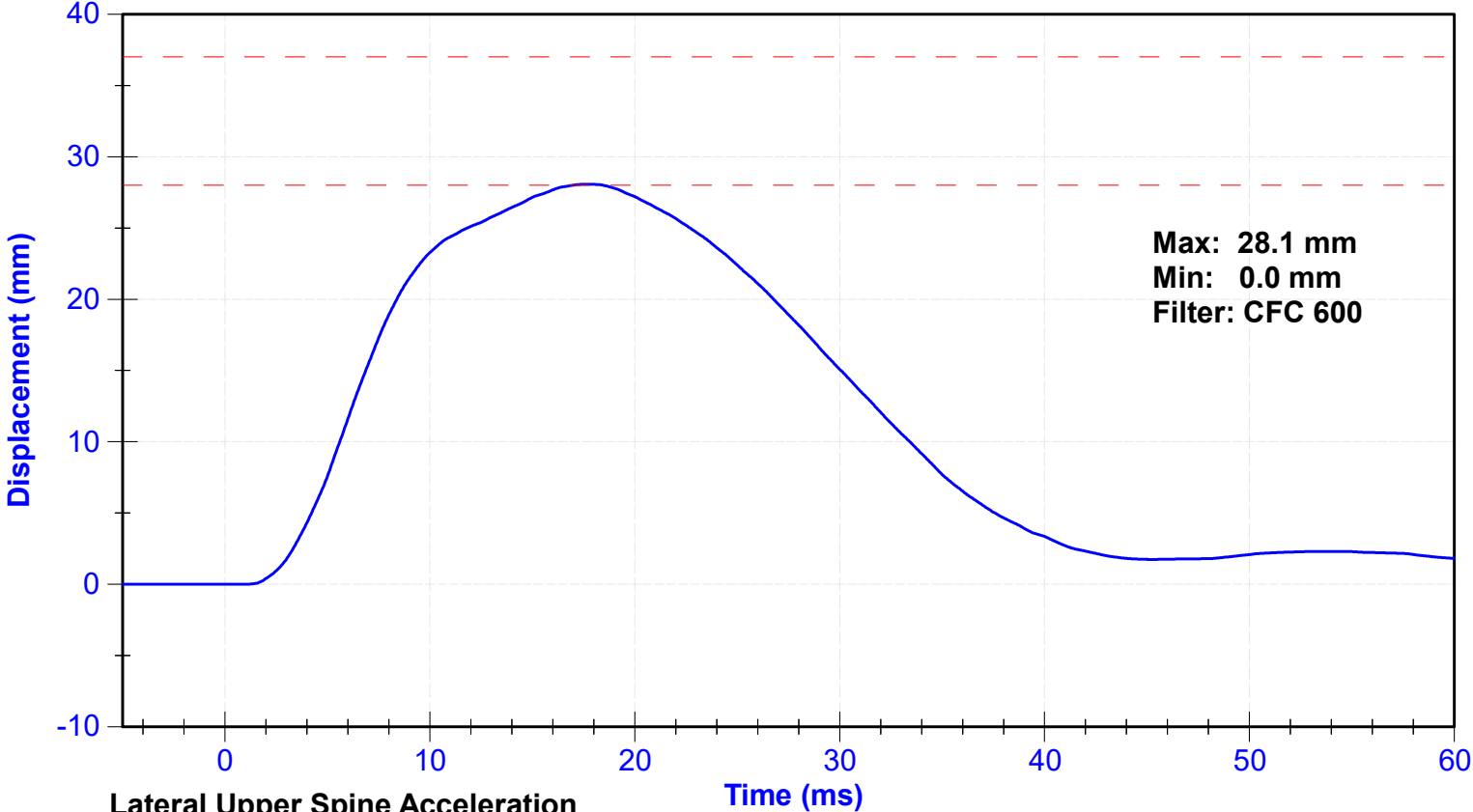
| Test Parameter                   | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|----------------------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature                      | 20.6                  | 22.2                  | °C   | 21.2   | Pass      |
| Humidity                         | 10                    | 70                    | %    | 63     | Pass      |
| Velocity                         | 4.2                   | 4.4                   | m/s  | 4.24   | Pass      |
| Probe Acceleration               | 13                    | 18                    | g's  | 15.6   | Pass      |
| Shoulder Deflection              | 28                    | 37                    | mm   | 28.1   | Pass      |
| Lateral Upper Spine Acceleration | 17                    | 22                    | g's  | 19.0   | Pass      |

Transducer Calibrations

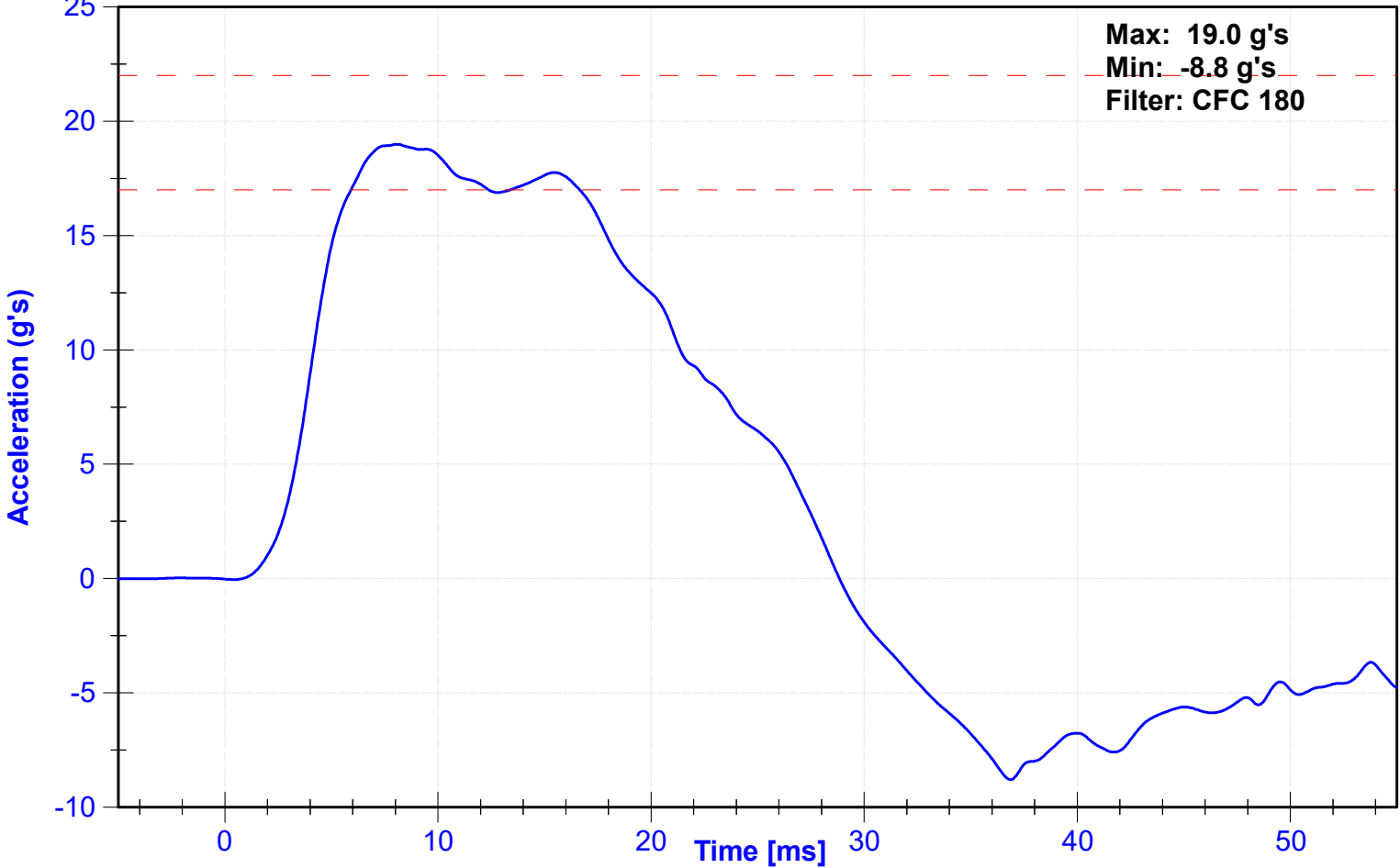
| Channel                     | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|-----------------------------|--------------|---------------|------------------|----------------------|
| Pendulum Accelerometer      | Endevco      | 18619         | 3/29/2024        | 9/25/2024            |
| Shoulder Potentiometer      | Servo        | 1274GFE       | 5/6/2024         | 11/4/2024            |
| Upper Spine Y Accelerometer | Endevco      | P64148        | 5/6/2024         | 11/2/2024            |



Shoulder Displacement



Lateral Upper Spine Acceleration





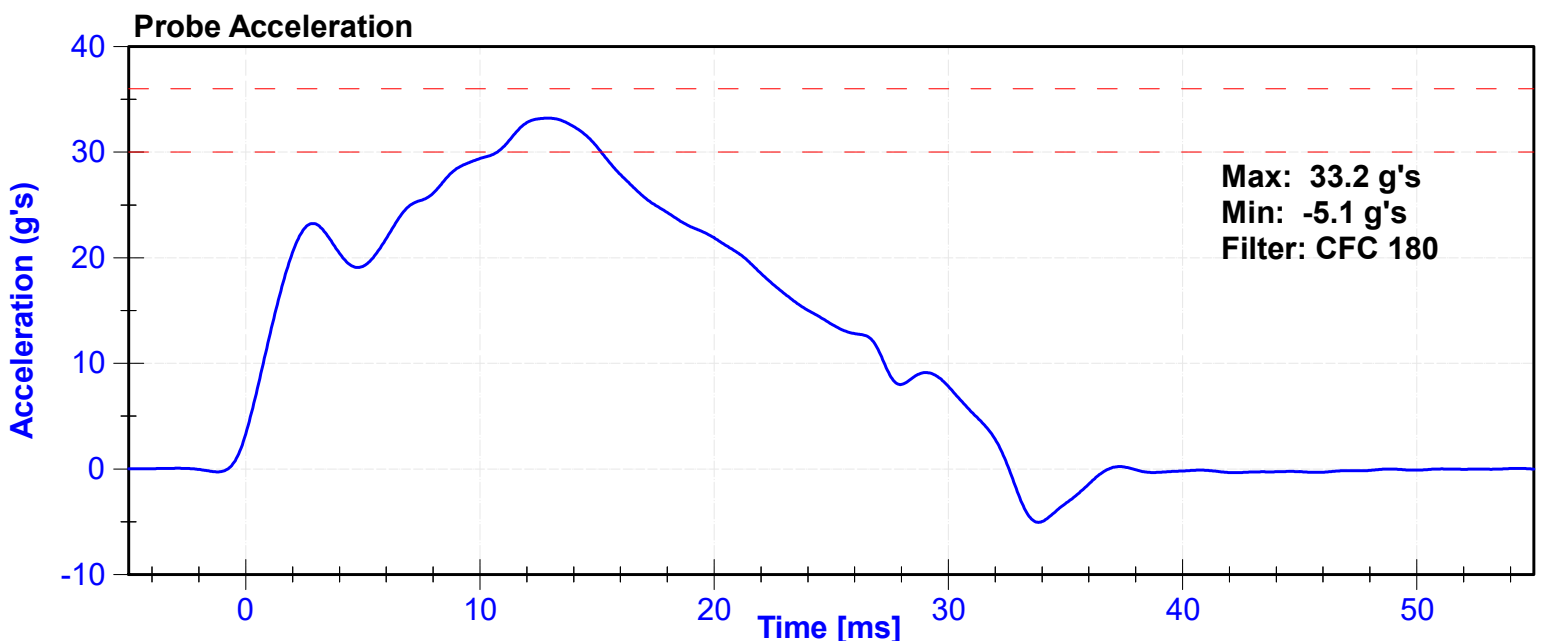
|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | FTSS   | Test Technician       | J. Rios    |
| ATD Serial Number | DG8012 | Laboratory Supervisor | C. Mantell |

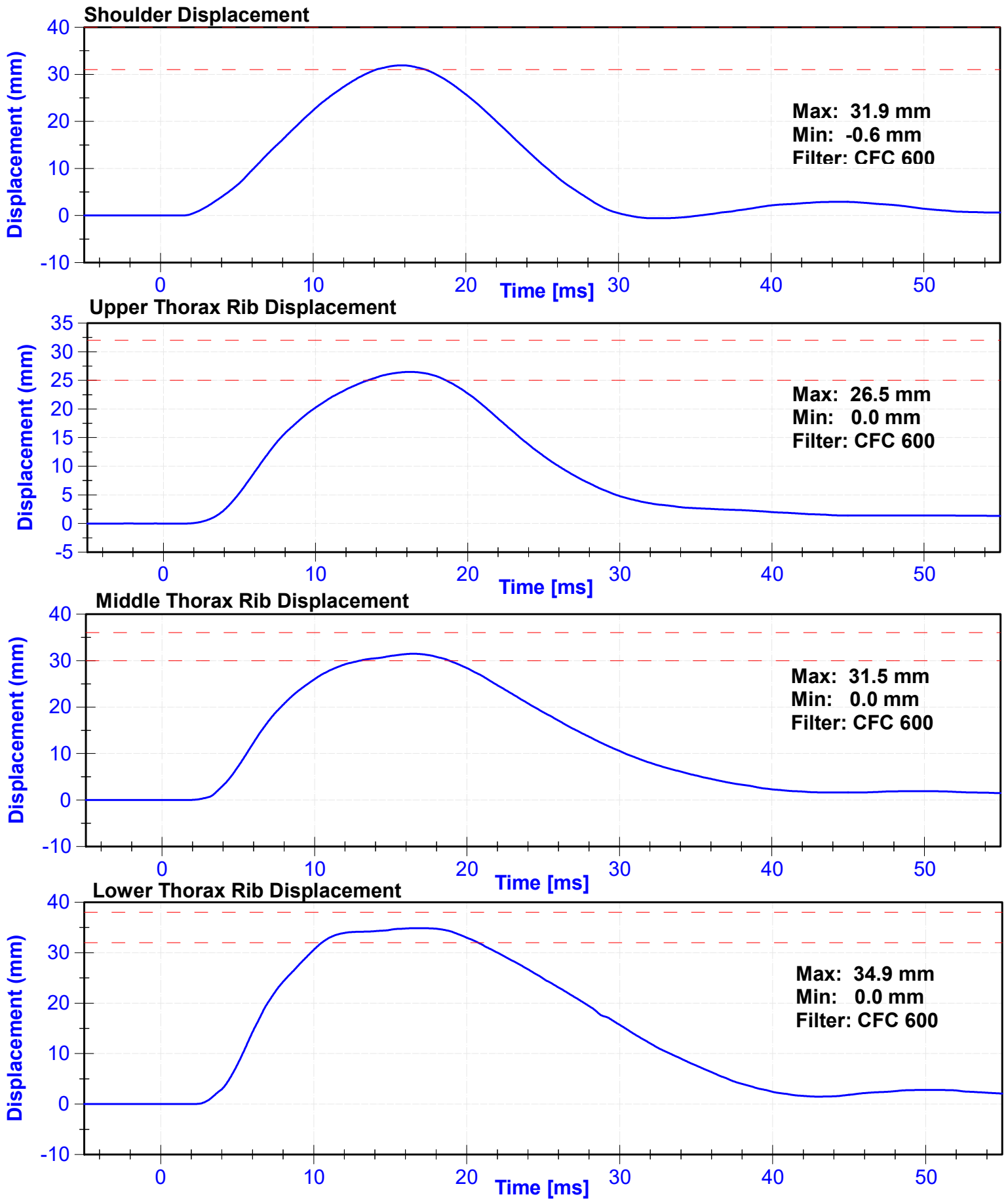
### Results

| Test Parameter                   | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|----------------------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature                      | 20.6                  | 22.2                  | °C   | 21.2   | Pass      |
| Humidity                         | 10                    | 70                    | %    | 63     | Pass      |
| Velocity                         | 6.6                   | 6.8                   | m/s  | 6.64   | Pass      |
| Probe Acceleration after 5 ms    | 30                    | 36                    | g's  | 33.2   | Pass      |
| Lateral Upper Spine Acceleration | 34                    | 43                    | g's  | 38.1   | Pass      |
| Lateral Lower Spine Acceleration | 29                    | 37                    | g's  | 33.0   | Pass      |
| Shoulder Deflection              | 31                    | 40                    | mm   | 31.9   | Pass      |
| Upper Thorax Rib Deflection      | 25                    | 32                    | mm   | 26.5   | Pass      |
| Mid Thorax Rib Deflection        | 30                    | 36                    | mm   | 31.5   | Pass      |
| Lower Thorax Rib Deflection      | 32                    | 38                    | mm   | 34.9   | Pass      |

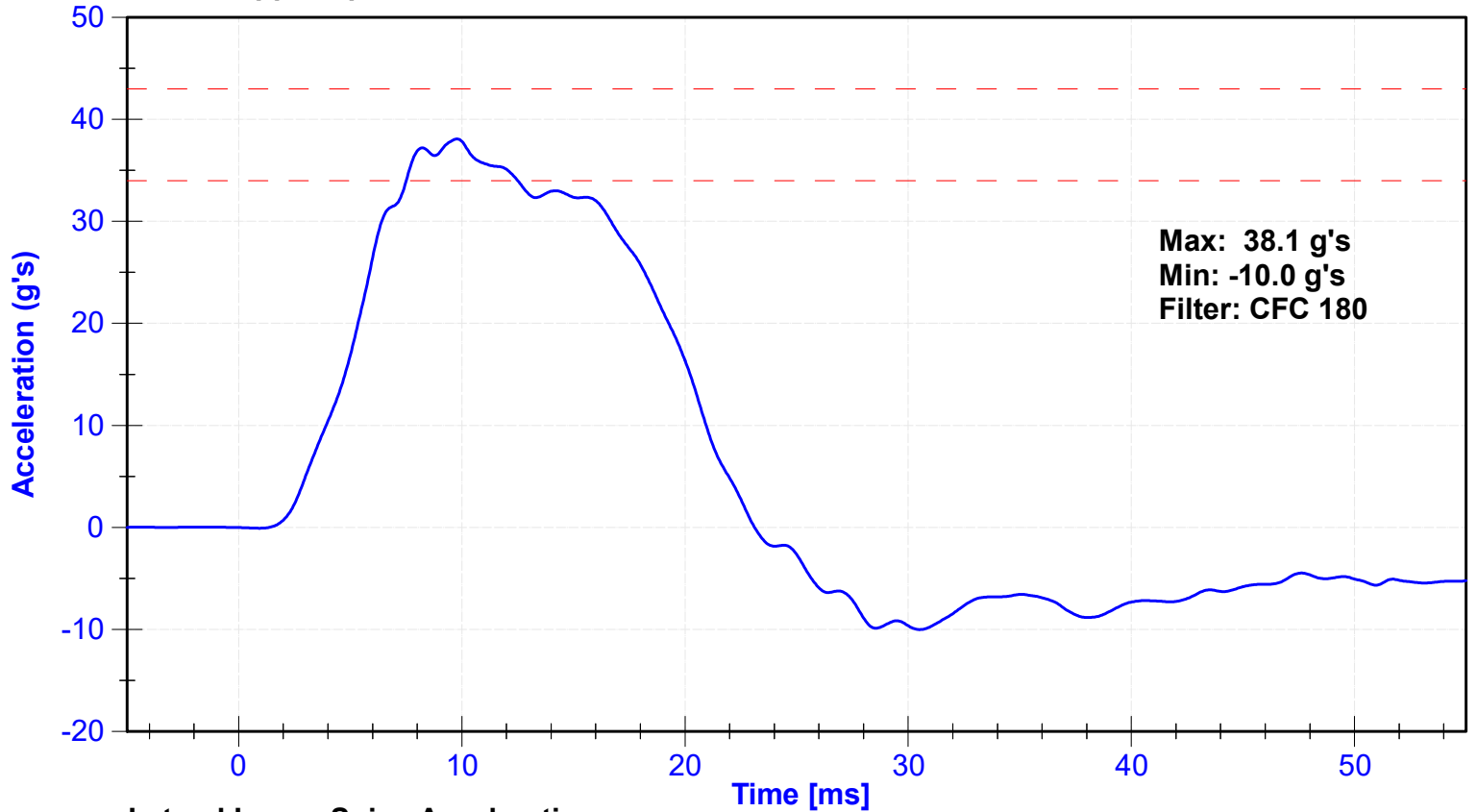
### Transducer Calibrations

| Channel                         | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|---------------------------------|--------------|---------------|------------------|----------------------|
| Pendulum Accelerometer          | Endevco      | 18619         | 3/29/2024        | 9/25/2024            |
| Upper Spine T1 Y Accelerometer  | Endevco      | P64148        | 5/6/2024         | 11/2/2024            |
| Upper Spine T12 Y Accelerometer | Endevco      | P51327        | 5/6/2024         | 11/2/2024            |
| Shoulder Potentiometer          | Servo        | 1274GFE       | 5/6/2024         | 11/4/2024            |
| Upper Thorax Rib Potentiometer  | Servo        | 1199GFE       | 5/6/2024         | 11/4/2024            |
| Middle Thorax Rib Potentiometer | Servo        | 1246GFE       | 5/6/2024         | 11/4/2024            |
| Lower Thorax Rib Potentiometer  | Servo        | 011GFE        | 5/6/2024         | 11/4/2024            |

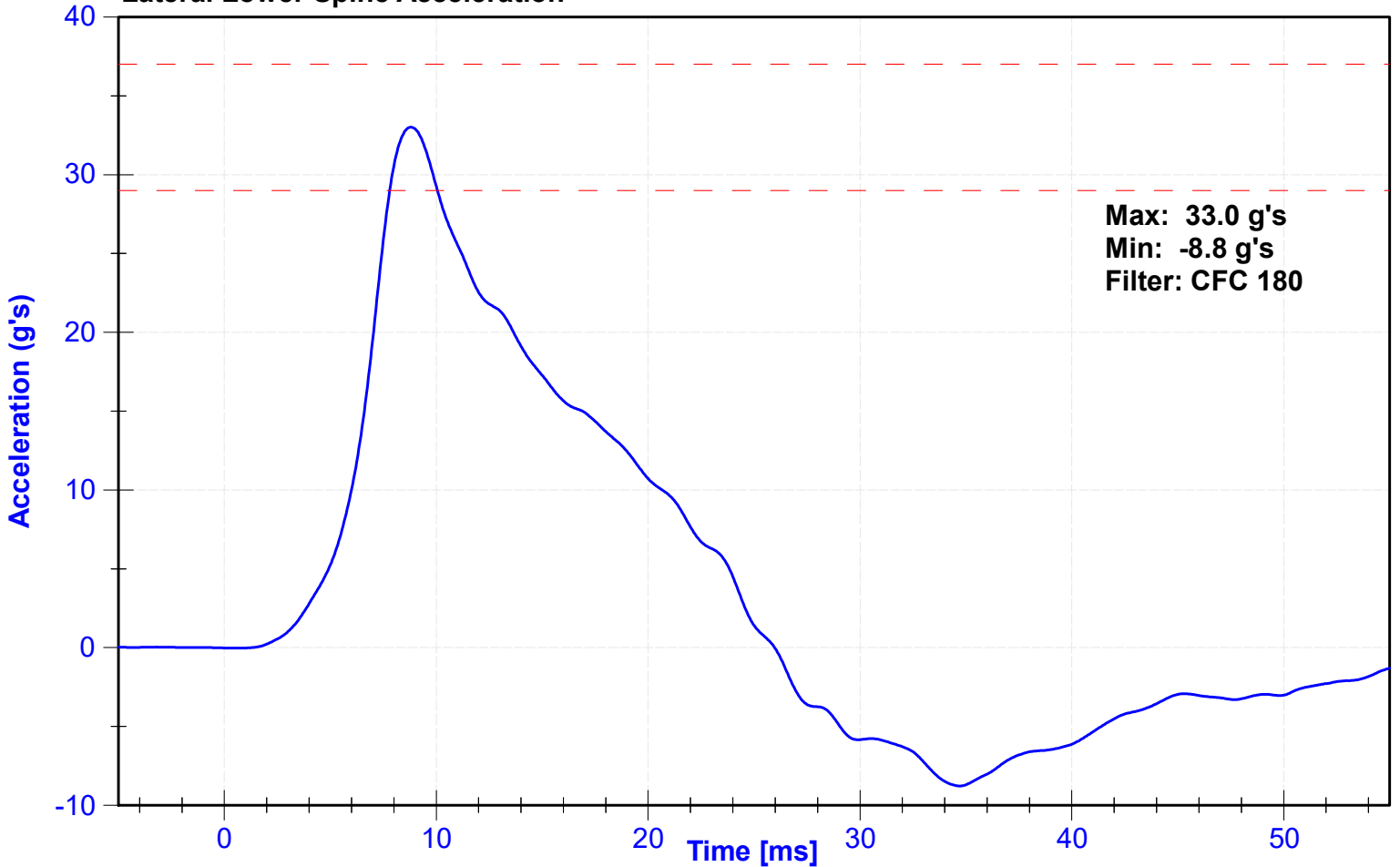




**Lateral Upper Spine Acceleration**



**Lateral Lower Spine Acceleration**





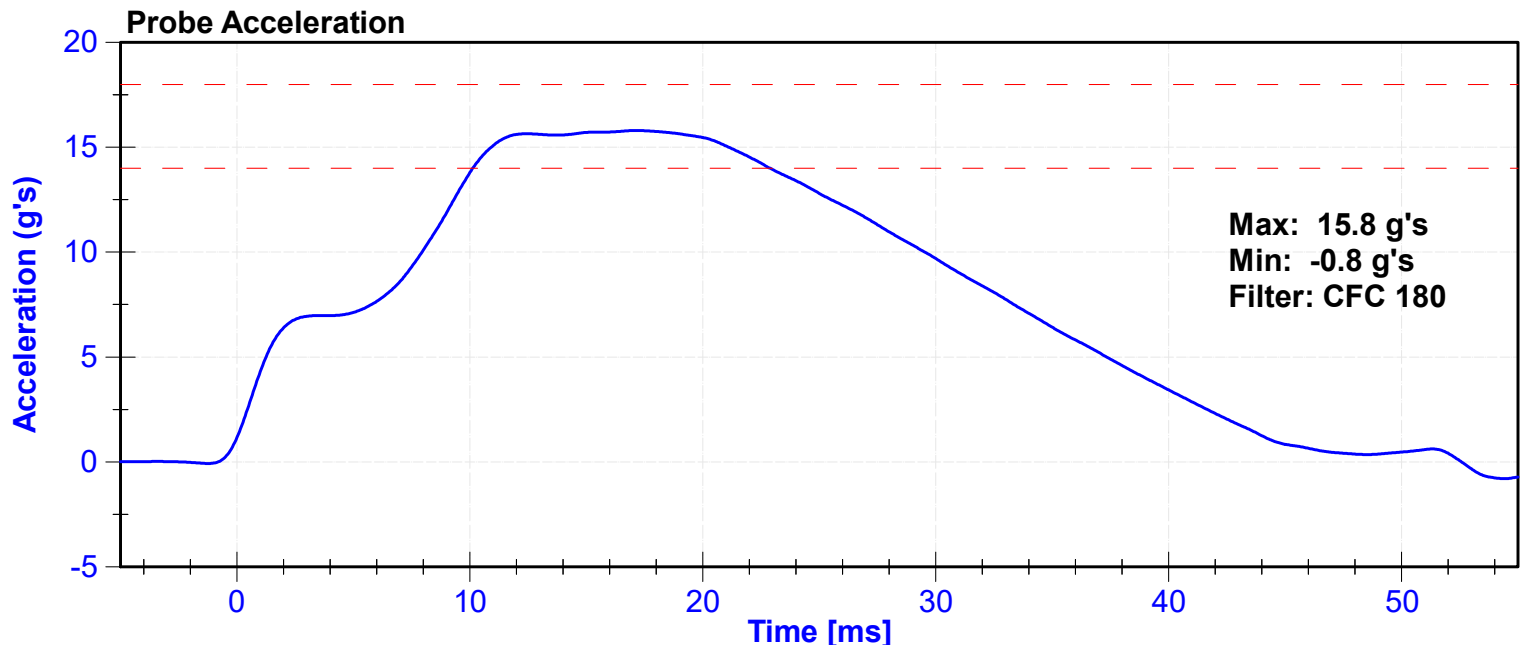
|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | FTSS   | Test Technician       | J. Rios    |
| ATD Serial Number | DG8012 | Laboratory Supervisor | C. Mantell |

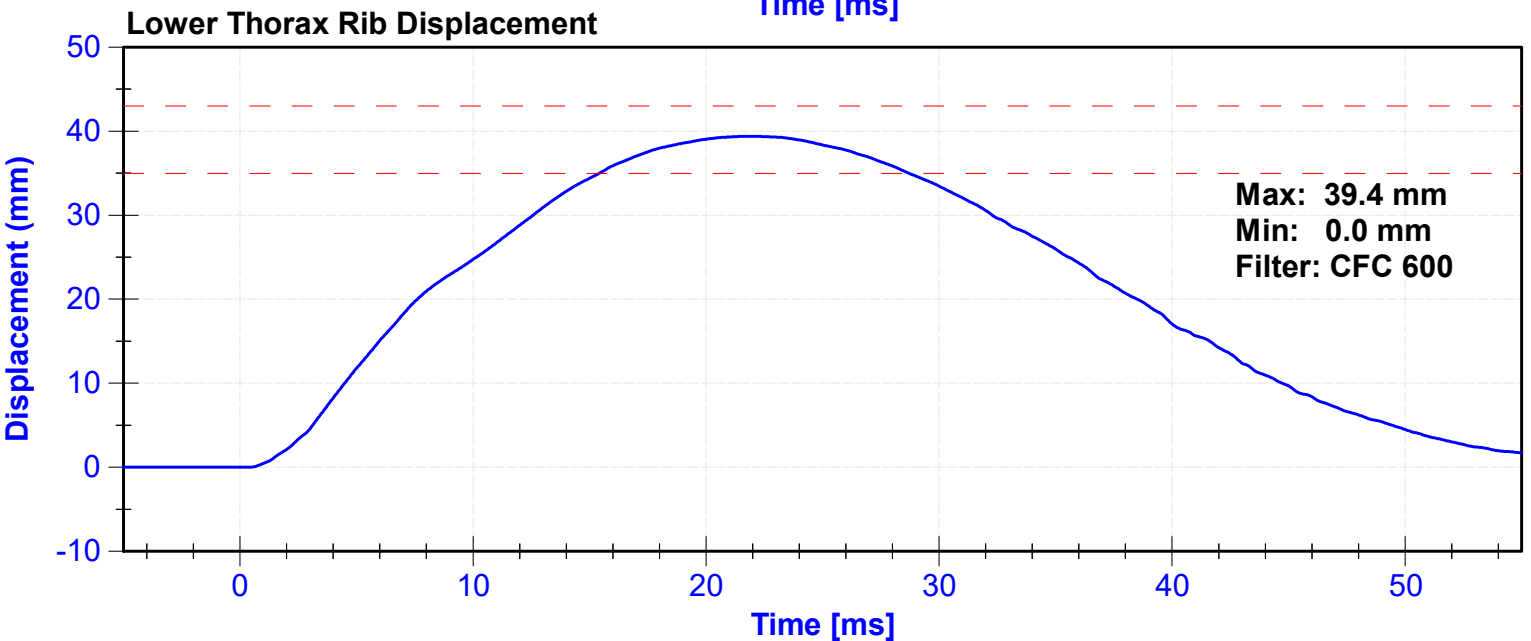
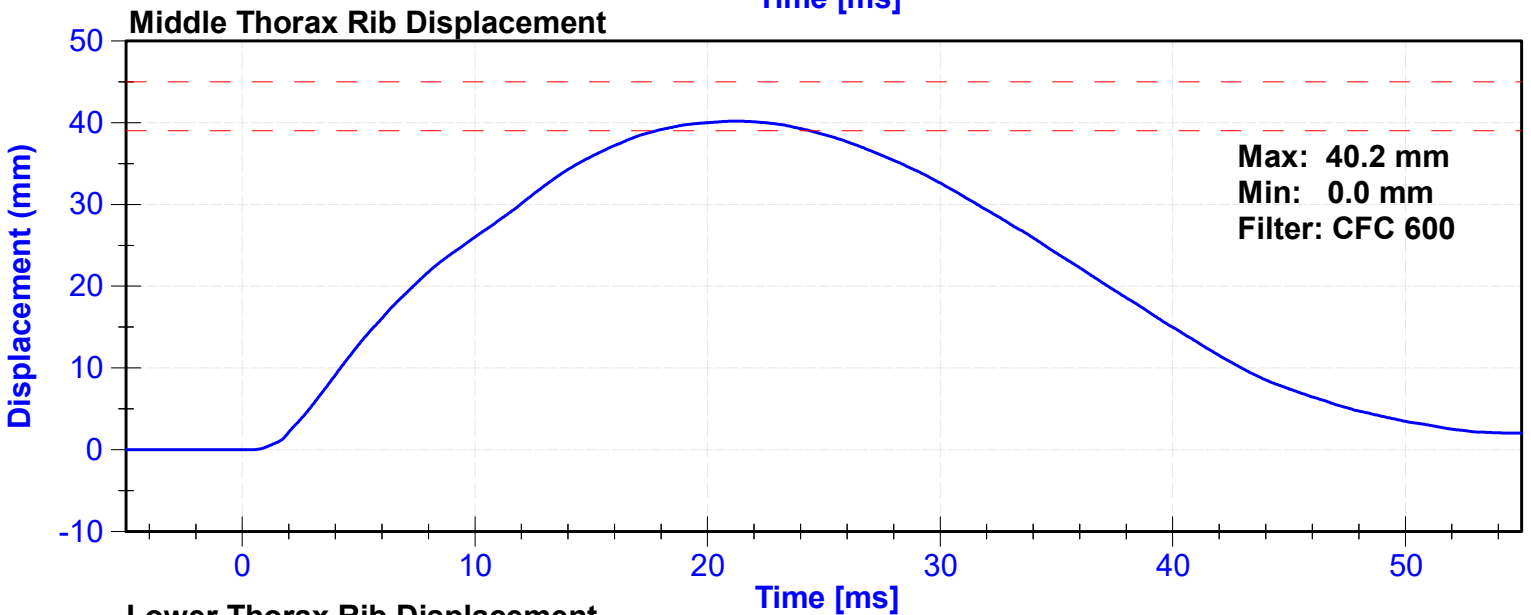
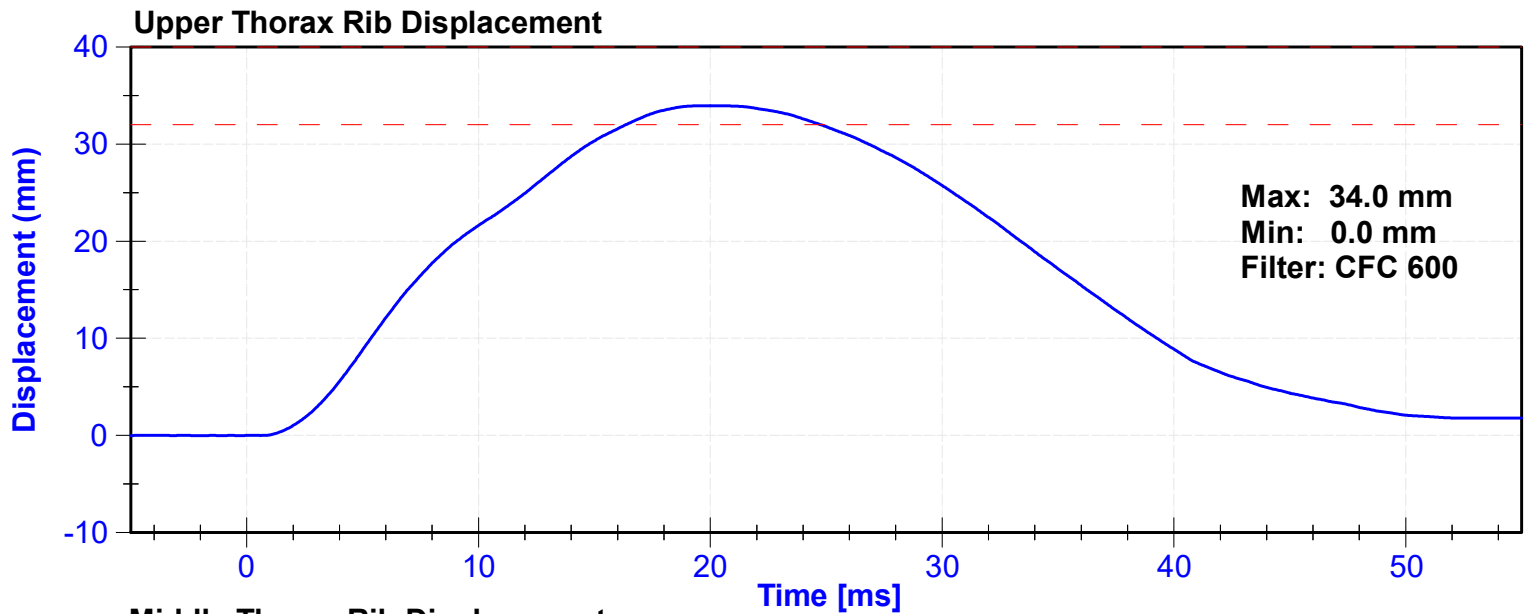
### Results

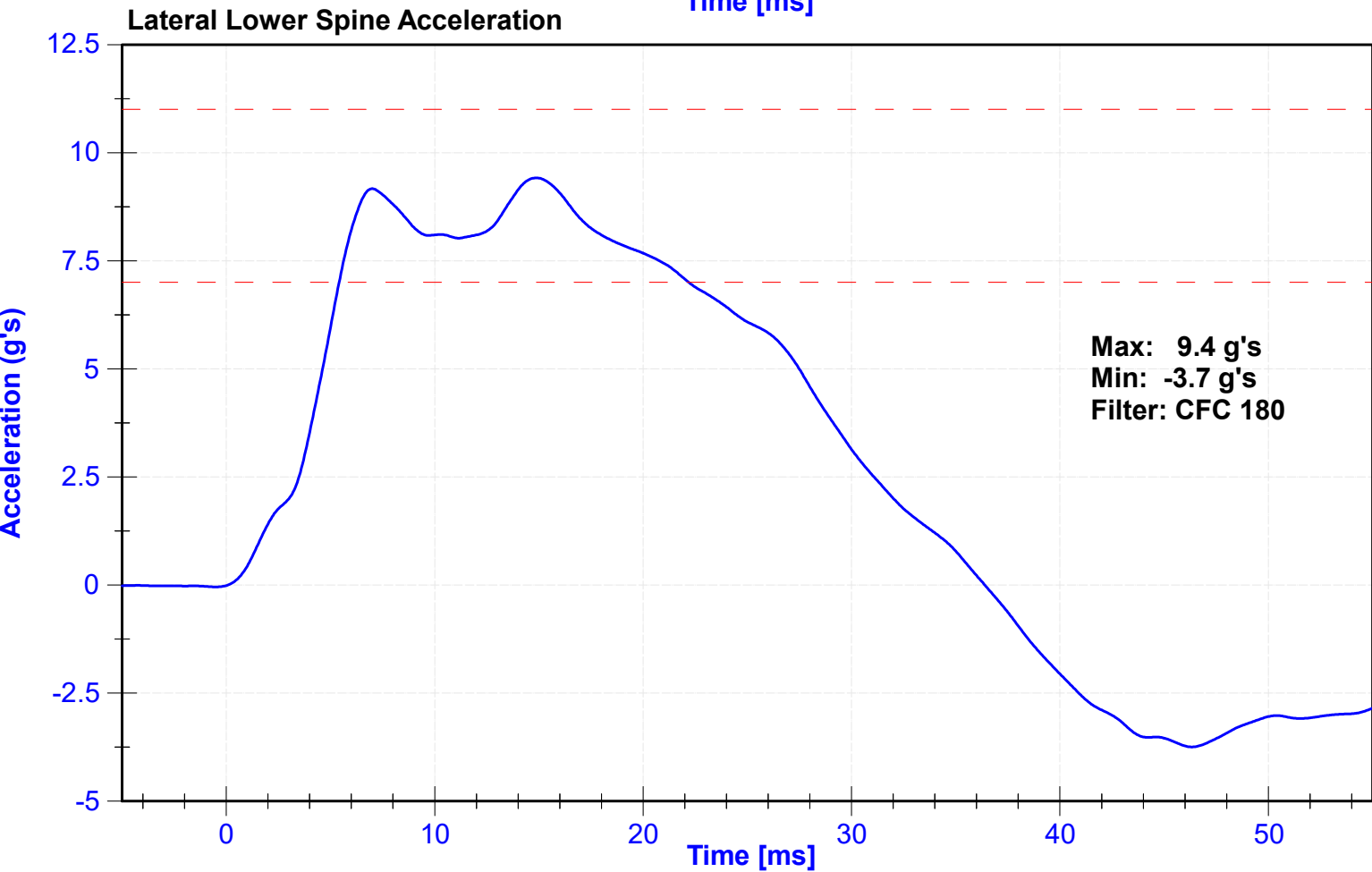
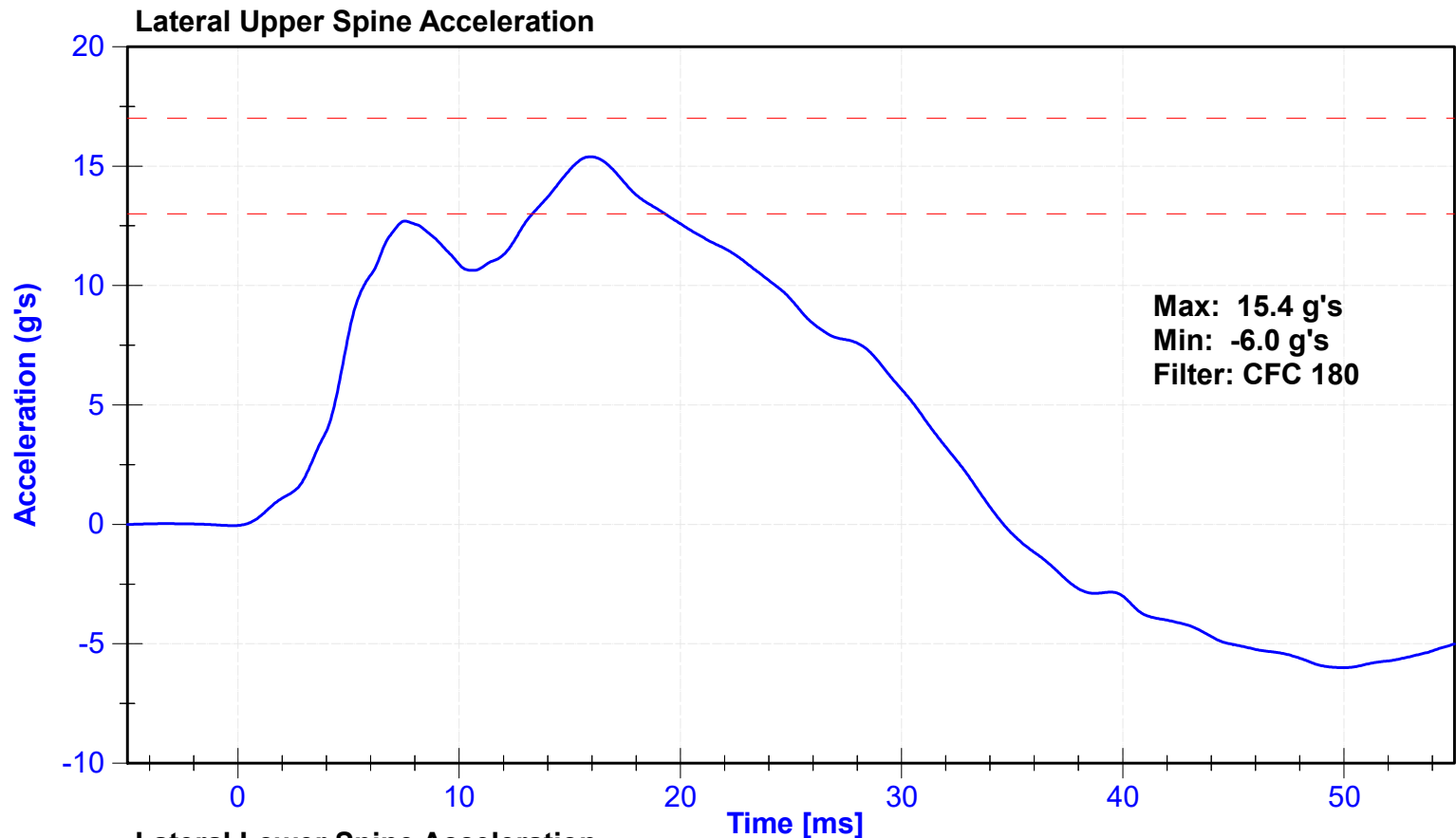
| Test Parameter                   | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|----------------------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature                      | 20.6                  | 22.2                  | °C   | 21.2   | Pass      |
| Humidity                         | 10                    | 70                    | %    | 63     | Pass      |
| Velocity                         | 4.2                   | 4.4                   | m/s  | 4.28   | Pass      |
| Probe Acceleration               | 14                    | 18                    | g's  | 15.8   | Pass      |
| Lateral Upper Spine Acceleration | 13                    | 17                    | g's  | 15.4   | Pass      |
| Lateral Lower Spine Acceleration | 7                     | 11                    | g's  | 9.4    | Pass      |
| Upper Thorax Rib Deflection      | 32                    | 40                    | mm   | 34.0   | Pass      |
| Middle Thorax Rib Deflection     | 39                    | 45                    | mm   | 40.2   | Pass      |
| Lower Thorax Rib Deflection      | 35                    | 43                    | mm   | 39.4   | Pass      |

### Transducer Calibrations

| Channel                         | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|---------------------------------|--------------|---------------|------------------|----------------------|
| Pendulum Accelerometer          | Endevco      | 18619         | 3/29/2024        | 9/25/2024            |
| Upper Spine Y Accelerometer     | Endevco      | P64148        | 5/6/2024         | 11/2/2024            |
| Lower Spine Y Accelerometer     | Endevco      | P51327        | 5/6/2024         | 11/2/2024            |
| Upper Thorax Rib Potentiometer  | Servo        | 1199GFE       | 5/6/2024         | 11/4/2024            |
| Middle Thorax Rib Potentiometer | Servo        | 1246GFE       | 5/6/2024         | 11/4/2024            |
| Lower Thorax Rib Potentiometer  | Servo        | 011GFE        | 5/6/2024         | 11/4/2024            |









|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | FTSS   | Test Technician       | J. Rios    |
| ATD Serial Number | DG8012 | Laboratory Supervisor | C. Mantell |

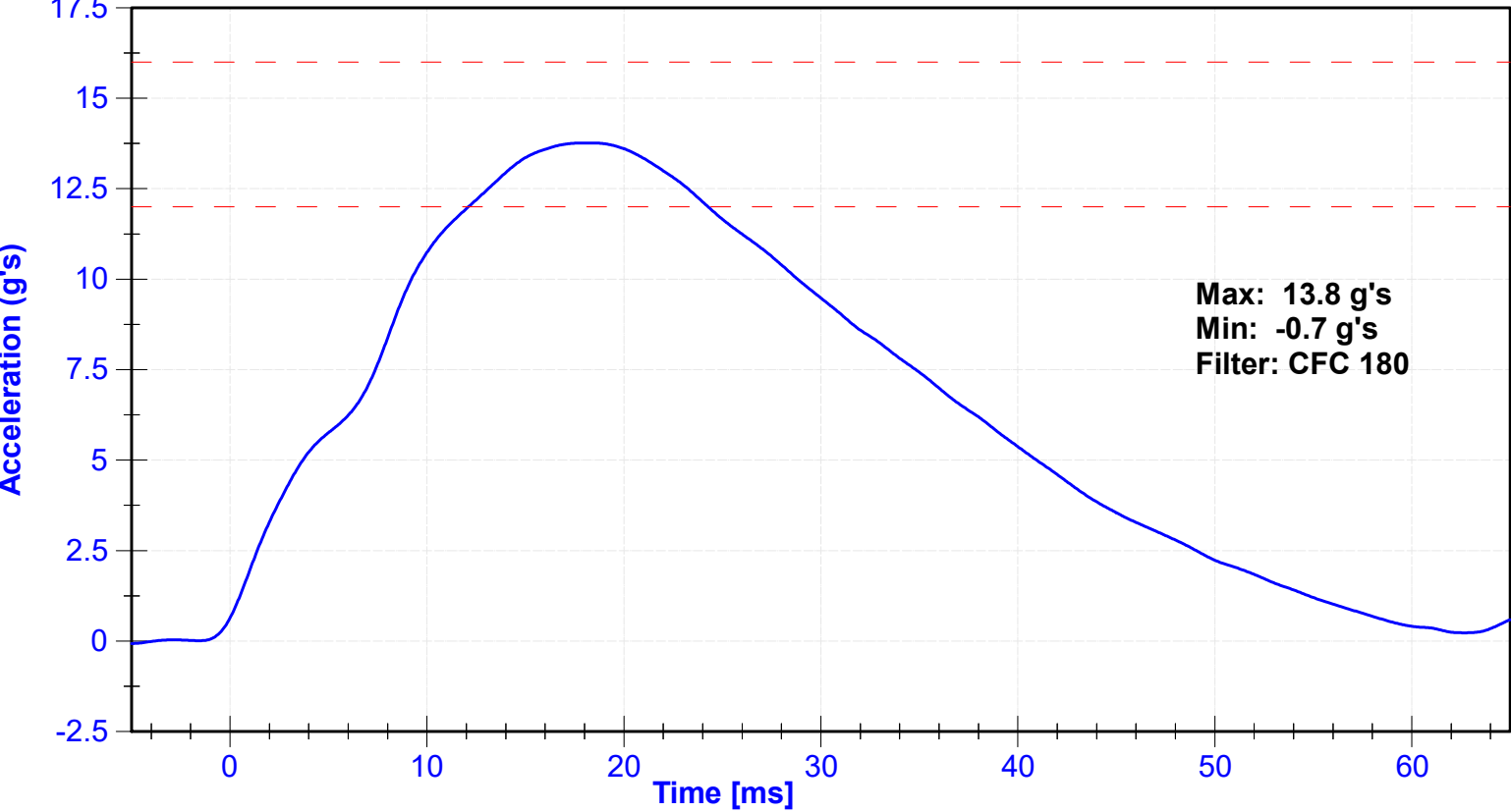
Results

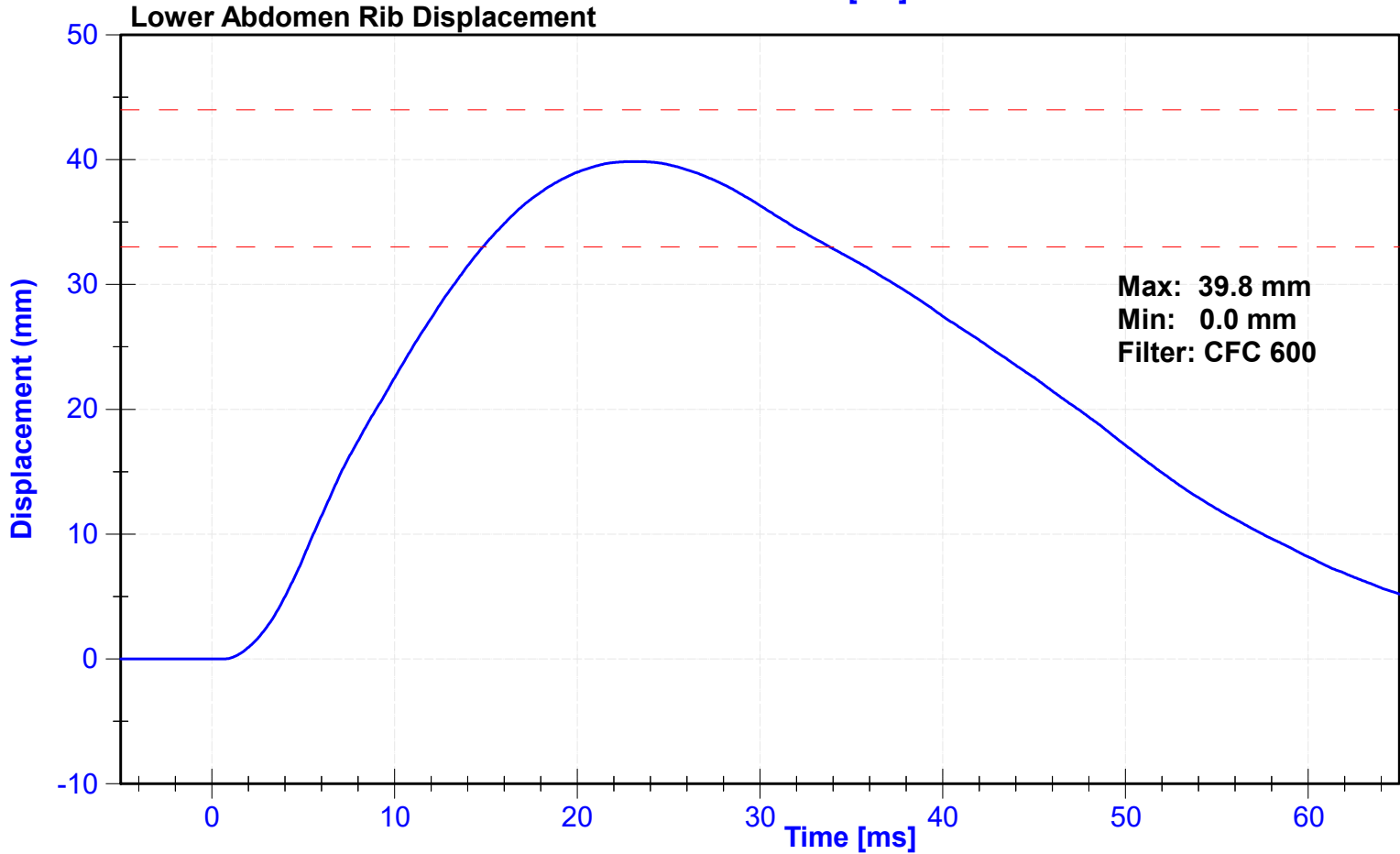
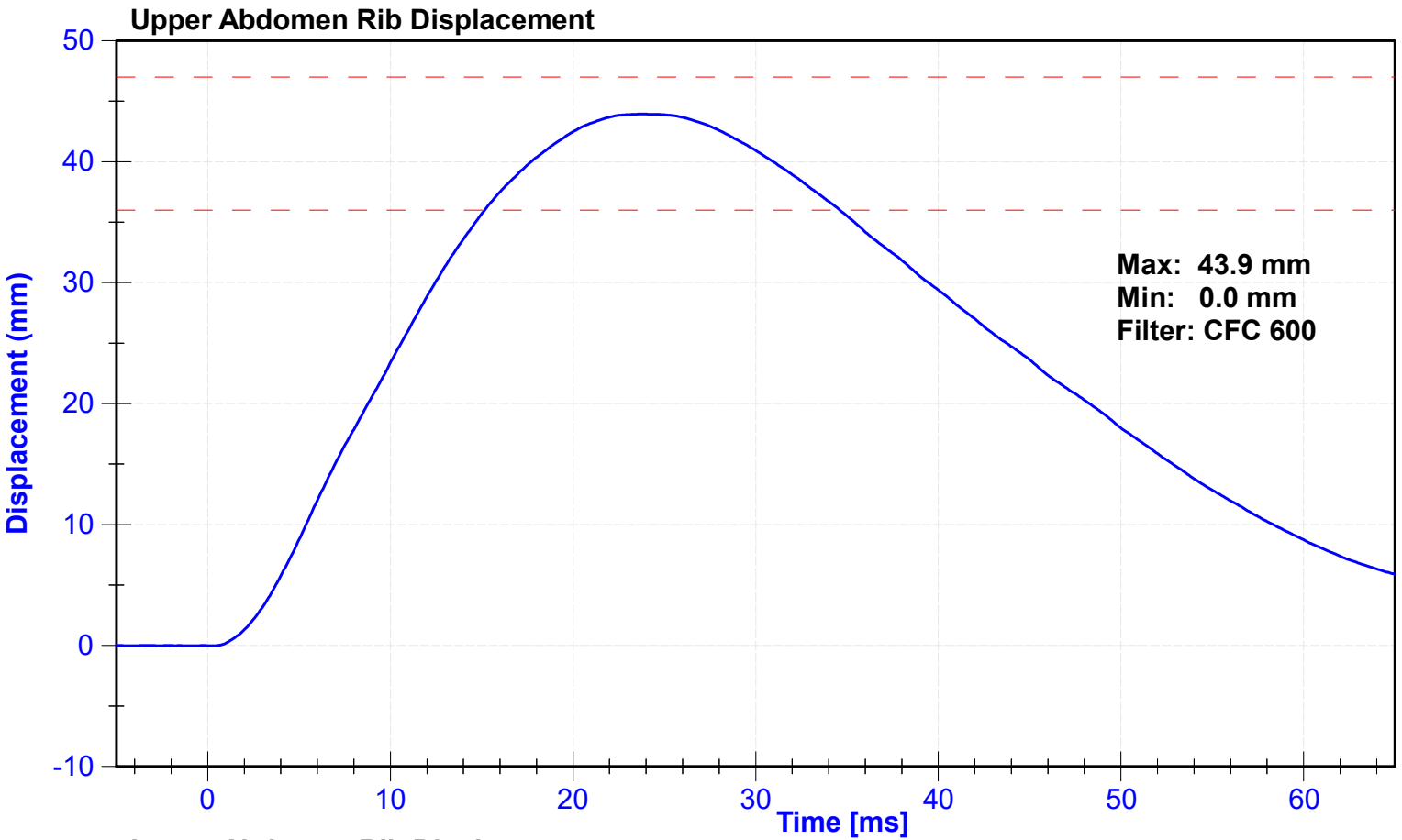
| Test Parameter                   | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|----------------------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature                      | 20.6                  | 22.2                  | °C   | 21.2   | Pass      |
| Humidity                         | 10                    | 70                    | %    | 63     | Pass      |
| Velocity                         | 4.2                   | 4.4                   | m/s  | 4.29   | Pass      |
| Probe Acceleration               | 12                    | 16                    | g's  | 13.8   | Pass      |
| Lateral Lower Spine Acceleration | 9                     | 14                    | g's  | 10.3   | Pass      |
| Upper Abdomen Rib Deflection     | 36                    | 47                    | mm   | 43.9   | Pass      |
| Lower Abdomen Rib Deflection     | 33                    | 44                    | mm   | 39.8   | Pass      |

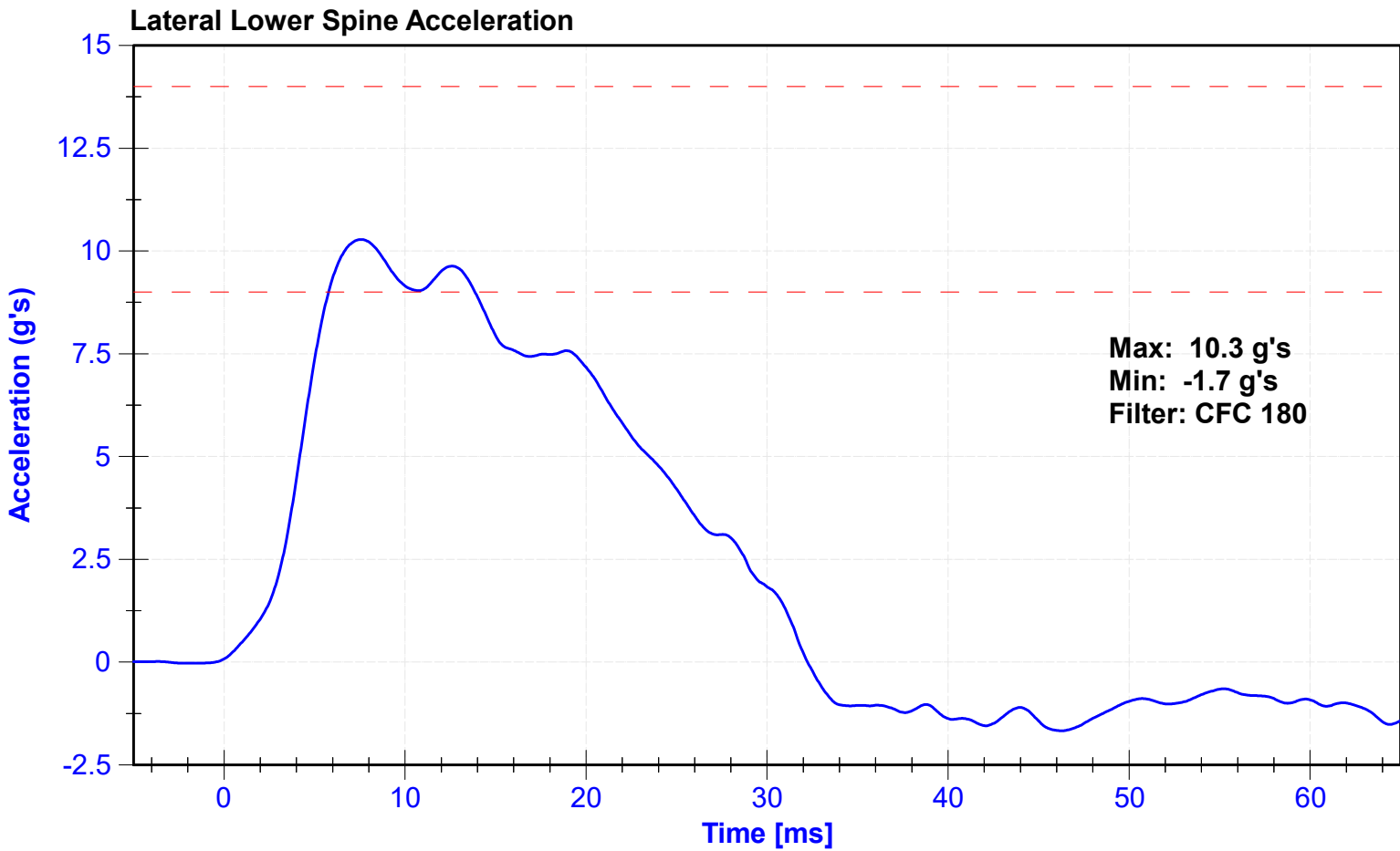
Transducer Calibrations

| Channel                         | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|---------------------------------|--------------|---------------|------------------|----------------------|
| Probe Accelerometer             | Endevco      | 18619         | 3/29/2024        | 9/25/2024            |
| Lower Spine Y Accelerometer     | Endevco      | P51327        | 5/6/2024         | 11/2/2024            |
| Upper Abdomen Rib Potentiometer | Servo        | 008GFE        | 5/6/2024         | 11/4/2024            |
| Lower Abdomen Rib Potentiometer | Servo        | 046GFE        | 5/6/2024         | 11/4/2024            |

Probe Acceleration









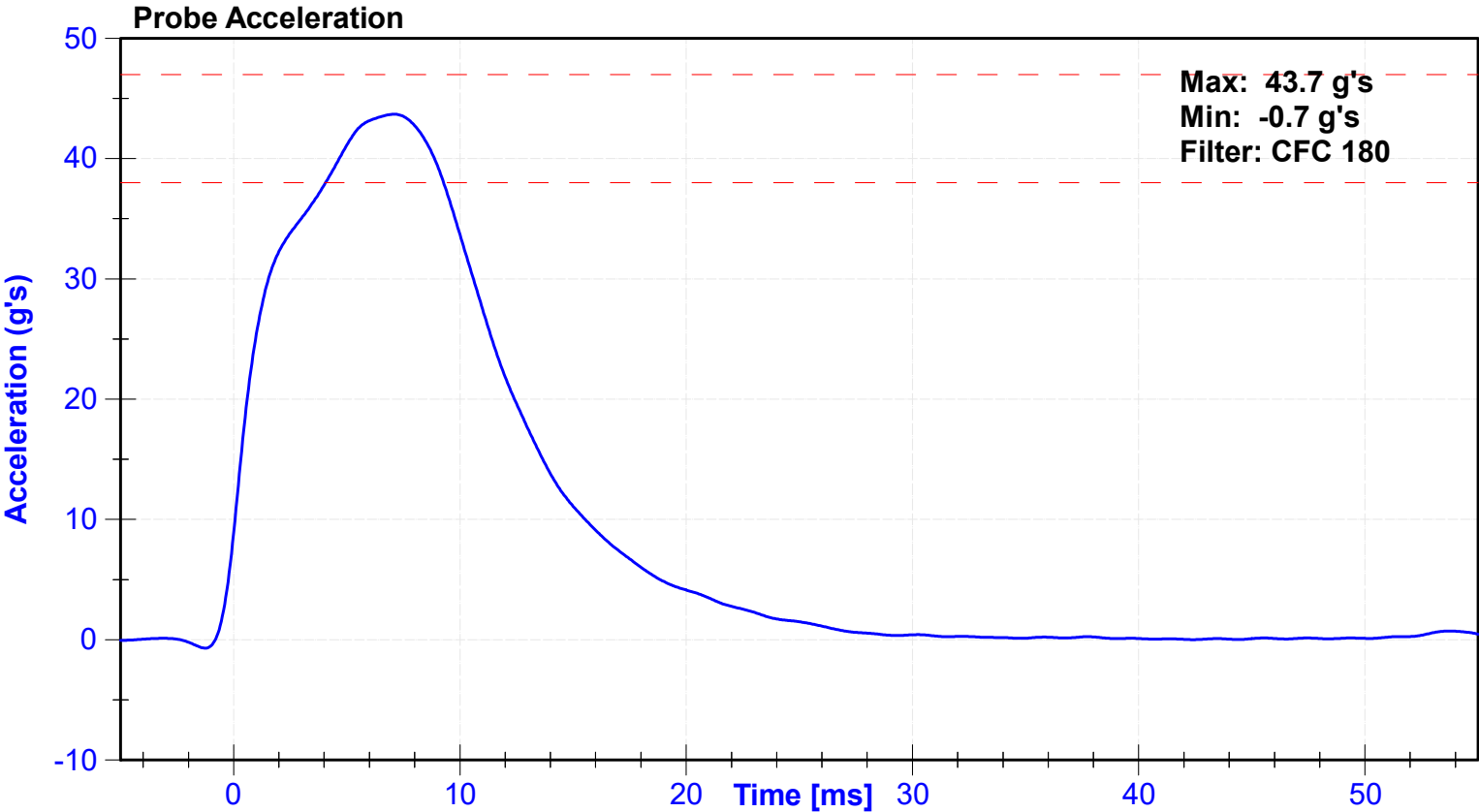
|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | FTSS   | Test Technician       | J. Rios    |
| ATD Serial Number | DG8012 | Laboratory Supervisor | C. Mantell |

Results

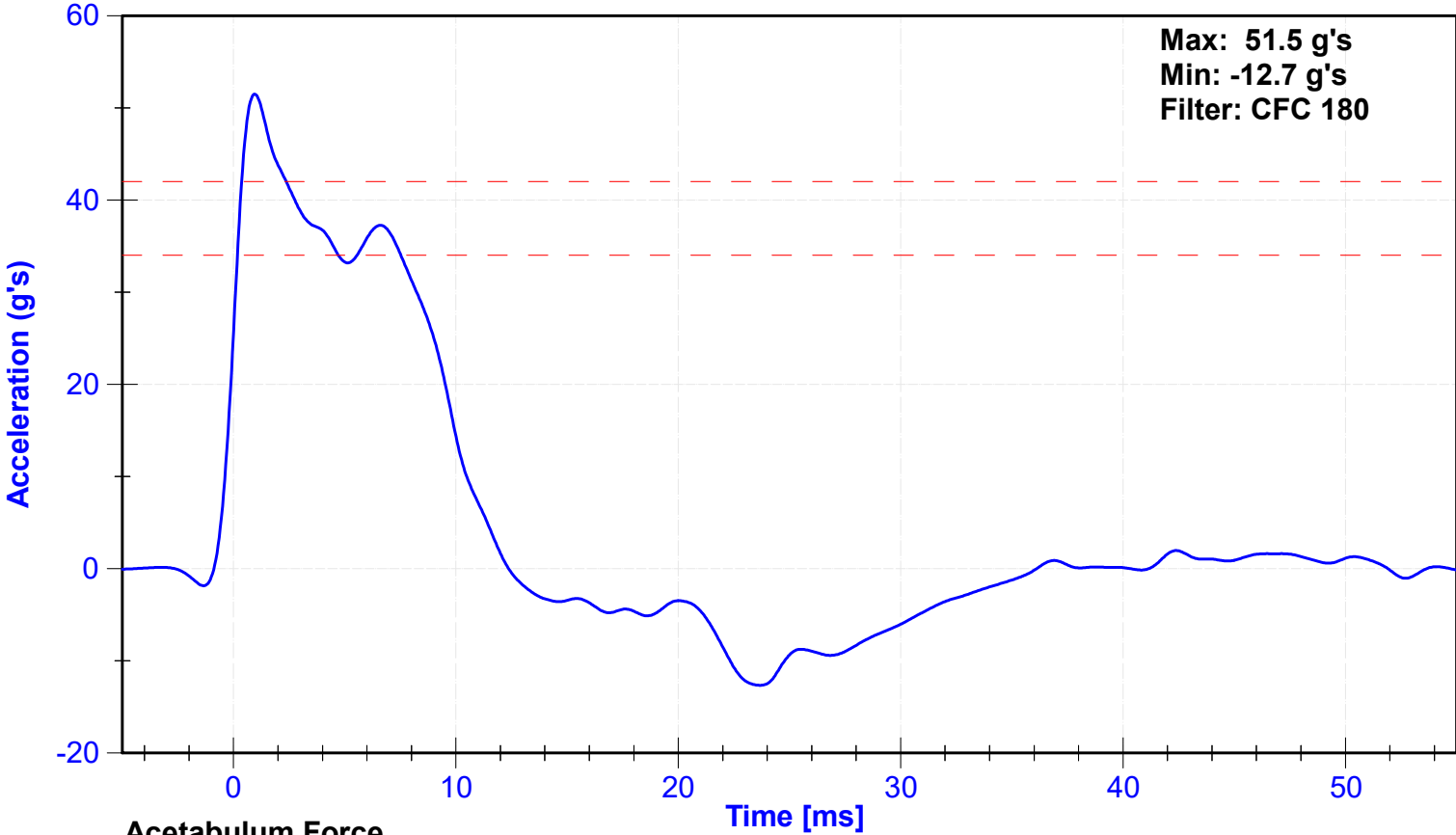
| Test Parameter                        | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|---------------------------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature                           | 20.6                  | 22.2                  | °C   | 21.2   | Pass      |
| Humidity                              | 10                    | 70                    | %    | 63     | Pass      |
| Velocity                              | 6.6                   | 6.8                   | m/s  | 6.66   | Pass      |
| Probe Acceleration                    | 38                    | 47                    | g's  | 43.7   | Pass      |
| Lateral Pelvis Acceleration after 6ms | 34                    | 42                    | g's  | 37.3   | Pass      |
| Acetabulum Force                      | 3600                  | 4300                  | N    | 4173.4 | Pass      |

Transducer Calibrations

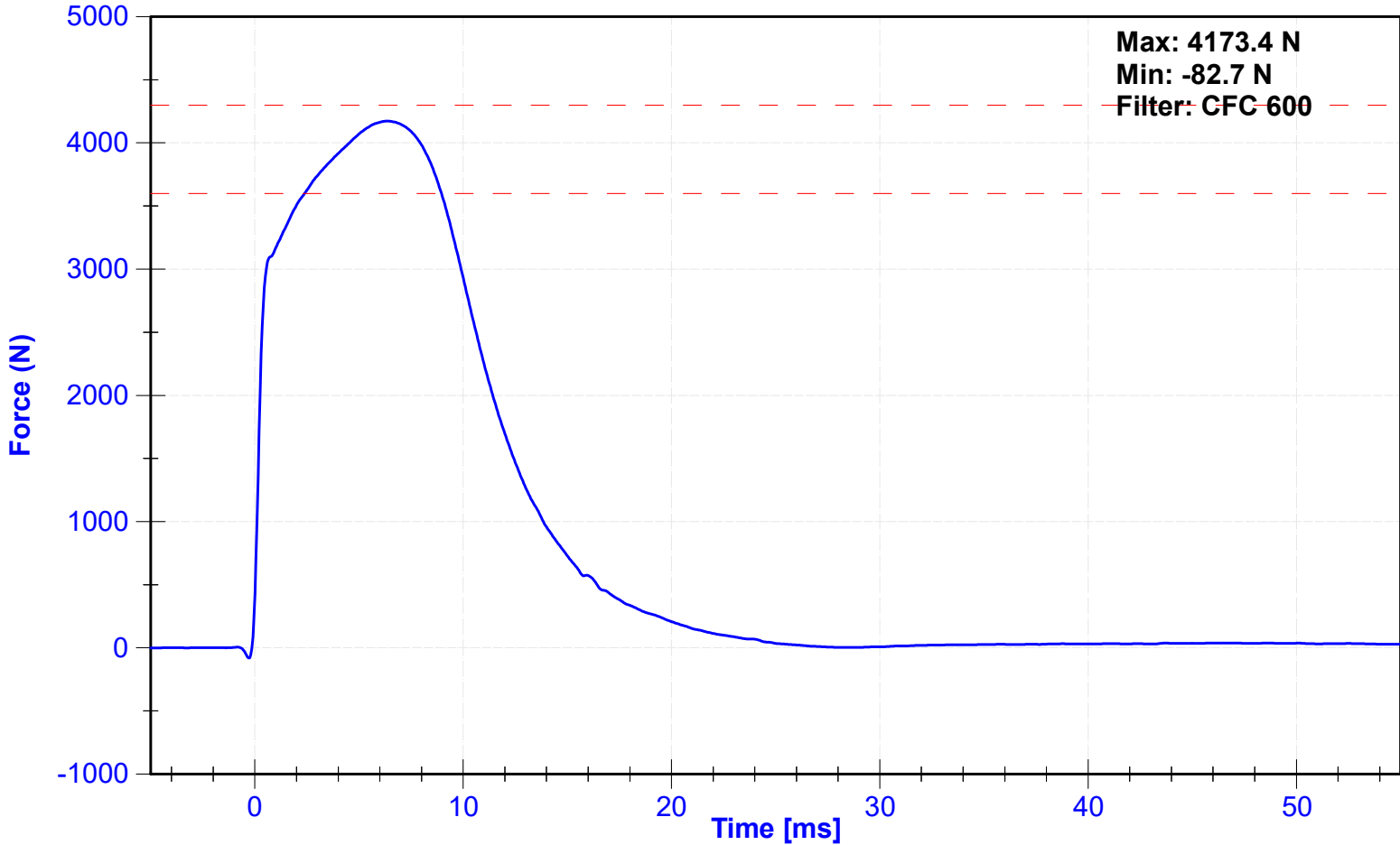
| Channel                | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|------------------------|--------------|---------------|------------------|----------------------|
| Pendulum Accelerometer | Endevco      | 18619         | 3/29/2024        | 9/25/2024            |
| Pelvis Y Accelerometer | Endevco      | P50078        | 5/6/2024         | 11/2/2024            |
| Acetabulum Load Cell   | Denton       | 270-FY        | 9/11/2023        | 9/10/2024            |
| 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 15784

Test Number 20684

Report Number 20738

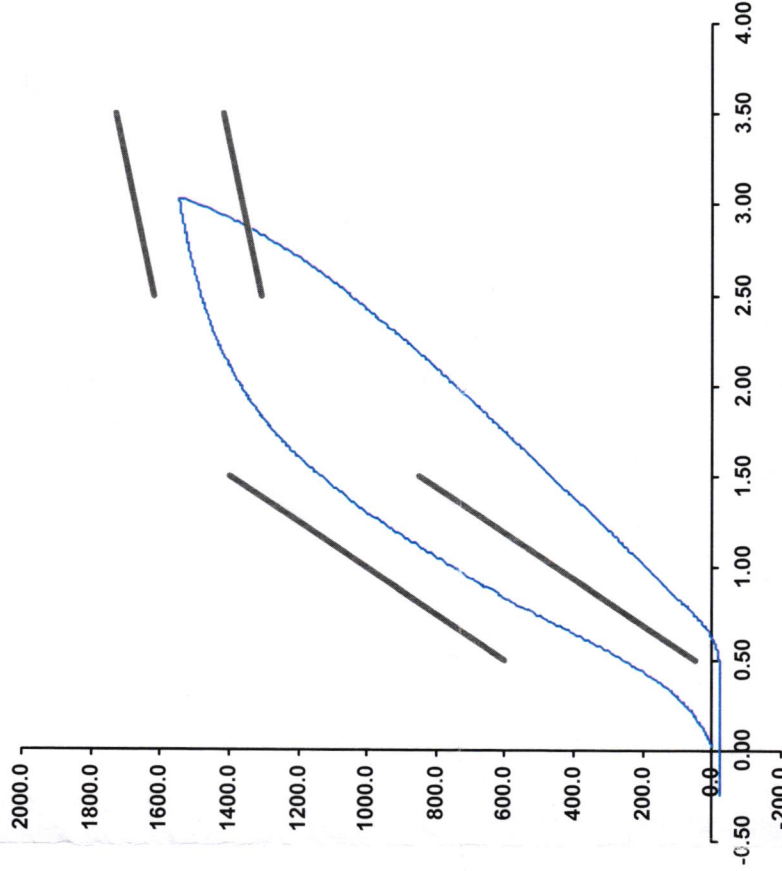
Test Date 10/15/2021 8:23:47 AM

| 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: Cert Plug 07/18/24 D88012

Force (-N) vs Extension (-mm)



Operator  
 Part Number 180-4450

Template No 107 15-Oct-21  
 SACO Research

By: DC Date: 10/15/21  
 SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 FAX





SID-ILs Pelvis Plug Certification Test

Plug S/N 16382

Test Number 22949

Report Number 23006

Test Date 5/20/2022 2:33:40 PM

| Test Results       | Spec Min | Spec Max |
|--------------------|----------|----------|
| Force @ 0.5 mm (N) | 310      | 600      |
| Force @ 1.5 mm (N) | 1,182    | 1,400    |
| Force @ 2.5 mm (N) | 1,477    | 1,618    |
| Force @ 3.0 mm (N) | 1,528    | 1,673    |

Testing Machine STM-20 5965542

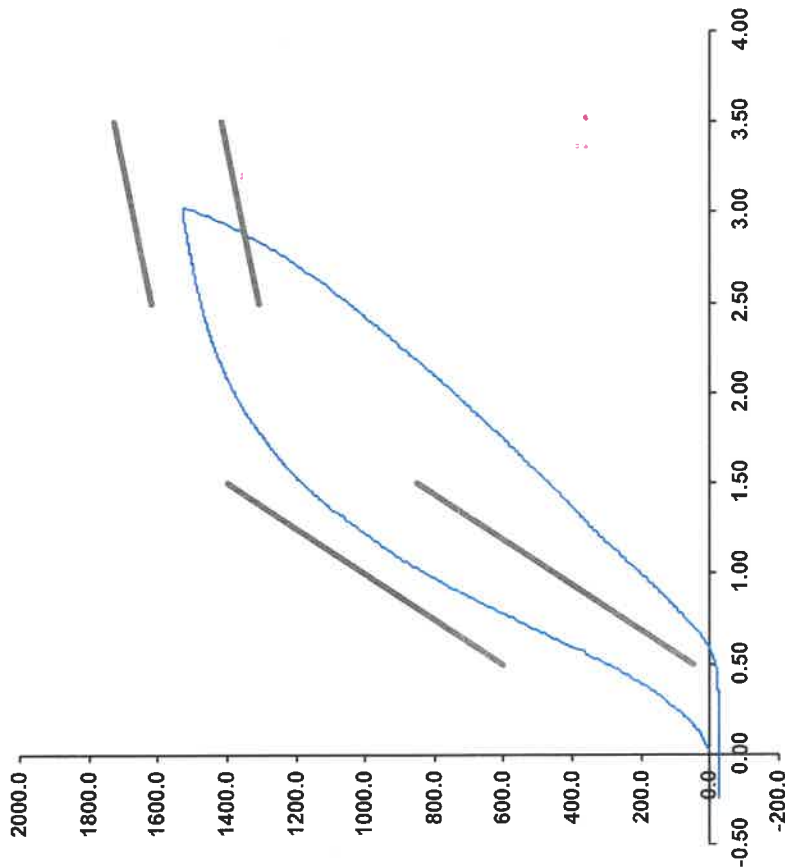
Load Cell S/N (F1360947), Units (LBS ) 1000

Crosshead Speed ( mm / min ) or Rate 12.7

Extension or Position Measured by XHD\_100 ( XHD100 )

Notes: CLASH D680RZ 7/19/24

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107 20-May-22

SACO Research

By : DC Date : 5/24/2022

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



SID-IIs Pelvis Plug Certification Test

Plug S/N 14233

Test Number 14373

Report Number 14417

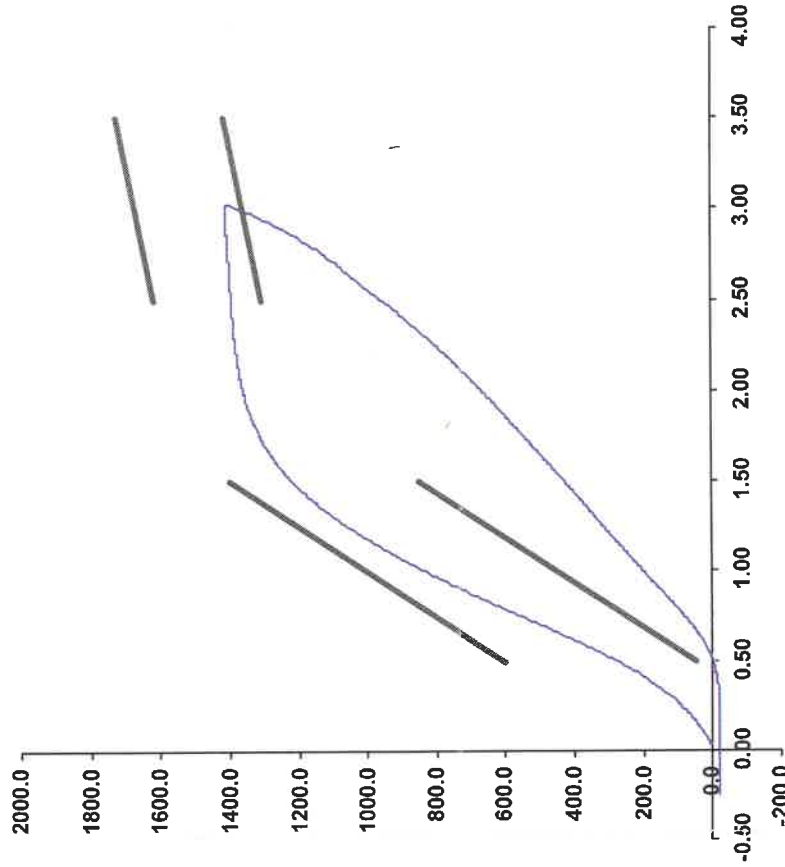
Test Date 7/3/2020 9:26:13 AM

| Test Results       | Spec Min | Spec Max |
|--------------------|----------|----------|
| Force @ 0.5 mm (N) | 50.00    | 600.00   |
| Force @ 1.5 mm (N) | 850.00   | 1,400.00 |
| Force @ 2.5 mm (N) | 1,306.00 | 1,618.00 |
| Force @ 3.0 mm (N) | 1,361.00 | 1,673.00 |

Testing Machine STM-20 5965541  
Load Cell S/N (FI360947), Units (LBS 1000  
Crosshead Speed ( mm / min ) or Rat 12.7  
Extension or Position Measured by XHD\_100 ( XHD100 )

Notes: *Non-Impact D68012*

Force (-N) vs Extension (-mm)



Operator  
Part Number 180-4450

Template No 107 03-Jul-20  
SACO Research

By : *DC* Date : *7/3/2020*  
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 | C. Mantell |

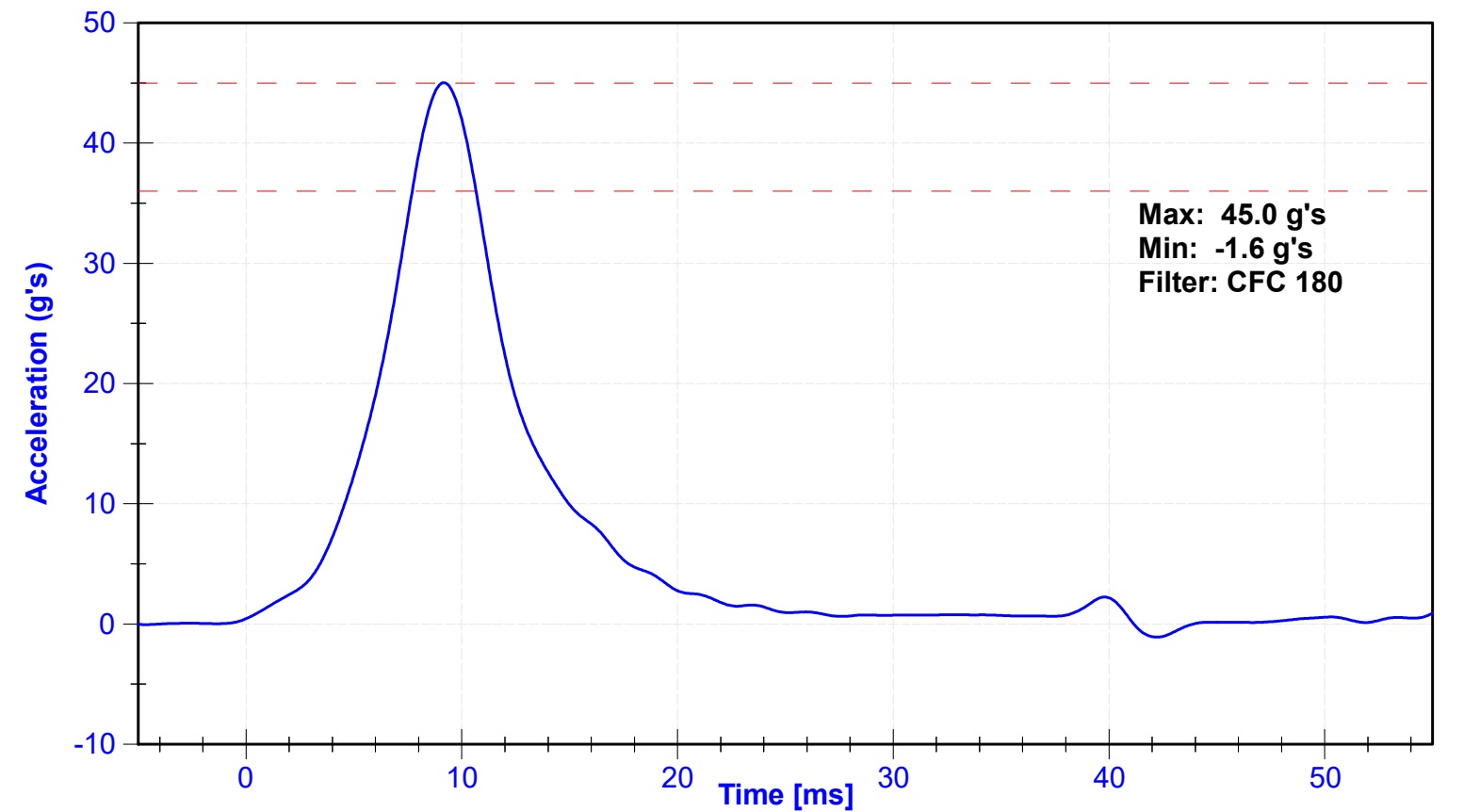
Results

| Test Parameter              | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|-----------------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature                 | 20.6                  | 22.2                  | °C   | 21.2   | Pass      |
| Humidity                    | 10                    | 70                    | %    | 63     | Pass      |
| Velocity                    | 4.2                   | 4.4                   | m/s  | 4.28   | Pass      |
| Probe Acceleration          | 36                    | 45                    | g's  | 45.0   | Pass      |
| Lateral Pelvis Acceleration | 28                    | 39                    | g's  | 36.9   | Pass      |
| Iliac Force                 | 4100                  | 5100                  | N    | 5081.0 | Pass      |

Transducer Calibrations

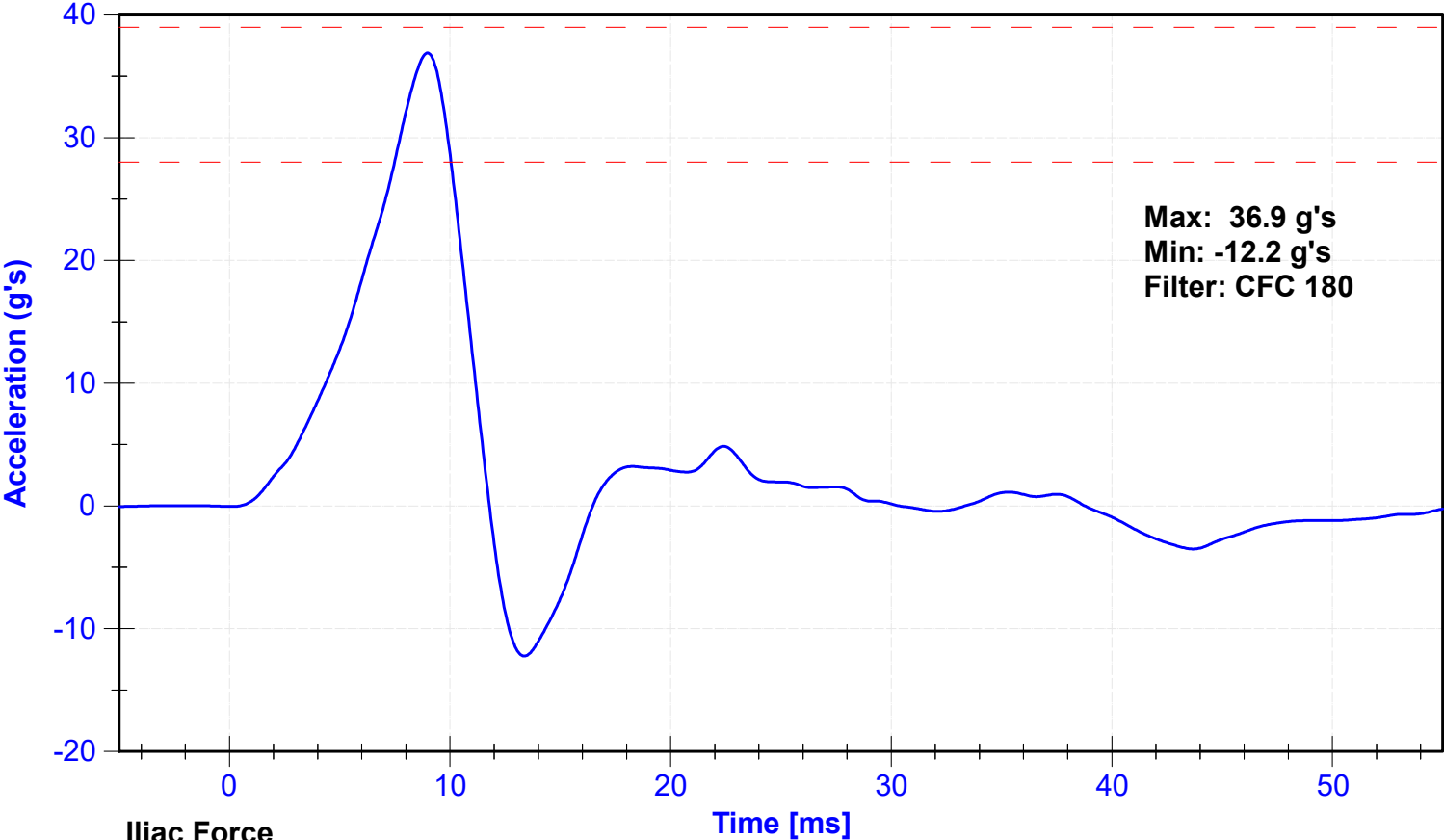
| Channel                | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|------------------------|--------------|---------------|------------------|----------------------|
| Pendulum Accelerometer | Endevco      | 18619         | 3/29/2024        | 9/25/2024            |
| Pelvis Y Accelerometer | Endevco      | P50078        | 5/6/2024         | 11/2/2024            |
| Iliac Load Cell        | Denton       | 280-FY        | 9/11/2023        | 9/10/2024            |

Probe Acceleration

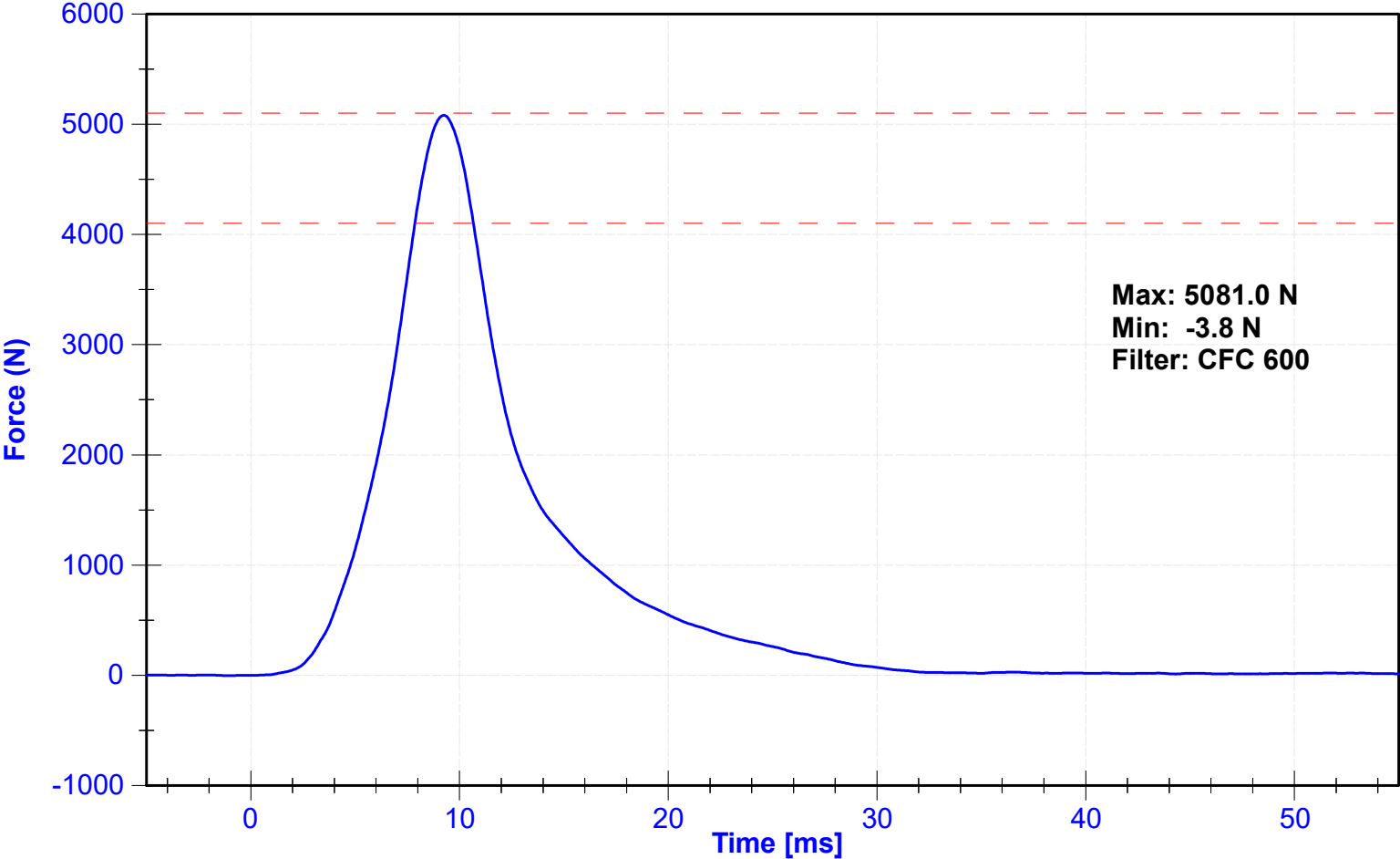




Lateral Pelvis Acceleration



Iliac Force



## **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          | 05/06/2024 |
|                                  |               |        | Y                   | P51668       | Endevco          | 05/06/2024 |
|                                  |               |        | Z                   | P83319       | Endevco          | 05/06/2024 |
| Head Accelerometers - Redundant  |               |        | X                   | T21354       | Endevco          | 05/06/2024 |
|                                  |               |        | Y                   | P52155       | Endevco          | 05/06/2024 |
|                                  |               |        | Z                   | P83322       | Endevco          | 05/06/2024 |
| Displacement Potentiometer       | Shoulder      |        | Y                   |              |                  |            |
|                                  | Thoracic Rib  | Upper  | Y                   | 1199GFE      | Servo            | 05/06/2024 |
|                                  |               | Middle | Y                   | 1246GFE      | Servo            | 05/06/2024 |
|                                  |               | Lower  | Y                   | 011GFE       | Servo            | 05/06/2024 |
|                                  | Abdominal Rib | Upper  | Y                   | 008GFE       | Servo            | 05/06/2024 |
|                                  |               | Lower  | Y                   | 046GFE       | Servo            | 05/06/2024 |
| Lower Spine Accelerometers (T12) |               |        | X                   | P71272       | Endevco          | 05/06/2024 |
|                                  |               |        | Y                   | P51327       | Endevco          | 05/06/2024 |
|                                  |               |        | Z                   | P52067       | Endevco          | 05/06/2024 |
| Acetabulum Load Cell             |               |        | Y                   | 270-FY       | Denton           | 09/11/2023 |
| Lilac Wing Load Cell             |               |        | Y                   | 280-FY       | Denton           | 09/11/2023 |
| Pelvis Plug (Struck Side)        |               |        |                     | 16313        | SACO             | 05/20/2022 |
| Pelvis Plug (Non-Struck Side)    |               |        |                     | 16337        | SACO             | 05/20/2022 |



**Table 2 – Vehicle Instrumentation**

| Vehicle Instrumentation   |   | Serial Number | Manufacturer            | Calibration Date |
|---------------------------|---|---------------|-------------------------|------------------|
| Vehicle Center of Gravity | X | G24217        | Endevco                 | 03/05/2024       |
| Vehicle Center of Gravity | Y | G24220        | Endevco                 | 03/05/2024       |
| Vehicle Center of Gravity | Z | G24228        | Endevco                 | 03/05/2024       |
| Left Floor Sill           | Y | G25260        | Endevco                 | 03/02/2024       |
| A-Pillar Sill             | Y | G22391        | Endevco                 | 06/05/2024       |
| A-Pillar Low              | Y | G24214        | Endevco                 | 05/03/2024       |
| A-Pillar Mid              | Y | G25269        | Endevco                 | 03/02/2024       |
| B-Pillar Sill             | Y | G25378        | Endevco                 | 04/01/2024       |
| B-Pillar Low              | Y | A405598       | Measurement Specialties | 06/18/2024       |
| B-Pillar Mid              | Y | A405559       | Measurement Specialties | 06/18/2024       |
| Driver Seat               | Y | G22408        | Endevco                 | 04/15/2024       |
| Engine Top                | X | G24989        | Endevco                 | 05/31/2024       |
| Engine Top                | Y | A282767       | Measurement Specialties | 05/31/2024       |
| Firewall                  | Y | G24326        | Endevco                 | 06/13/2024       |
| Right Roof                | Y | A280993       | Measurement Specialties | 06/13/2024       |
| Right Floor Sill          | Y | A315095       | Measurement Specialties | 06/13/2024       |
| Rear Floorpan             | X | G24319        | Endevco                 | 04/25/2024       |
| Rear Floorpan             | Y | G24623        | Endevco                 | 04/25/2024       |

**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-1117017-F0 | 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       |