

**REPORT NUMBER: 214P-CAL-24-001**

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

**GM KOREA COMPANY  
2024 Chevrolet Trax  
5 Door SUV**

**NHTSA No: C20240110**

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



**October 09, 2023**

**FINAL REPORT**

**PREPARED FOR:  
U. S. DEPARTMENT OF TRANSPORTATION  
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION  
ENFORCEMENT  
OFFICE OF VEHICLE SAFETY COMPLIANCE  
1200 NEW JERSEY AVE. S.E.  
WASHINGTON, D.C. 20590**

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, in response to Contract Number 693JJ923D000043.

This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof.

If trade or manufacturers' names or products are mentioned it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared by: Claire Hejaily  
Claire Hejaily, Test Engineer

Date: October 09, 2023

Approved by: Vanessa Hansen  
Vanessa Hansen, Test Engineer

Date: October 09, 2023

**FINAL REPORT ACCEPTANCE BY OVSC:**

\_\_\_\_\_  
Accepted by

Date: \_\_\_\_\_

# **TECHNICAL REPORT DOCUMENTATION PAGE**

| <b>1. Report No.</b><br>214P-CAL-24-001                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                     | <b>2. Government Accession No.</b>                        |          | <b>3. Recipient's Catalog No.</b>                                                                                                                                                                                                                                                            |                  |                         |                     |  |  |       |      |        |                              |  |      |         |                                 |    |    |        |                       |   |      |          |                       |   |      |          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-----------------------------------------------------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------------------|---------------------|--|--|-------|------|--------|------------------------------|--|------|---------|---------------------------------|----|----|--------|-----------------------|---|------|----------|-----------------------|---|------|----------|
| <b>4. Title and Subtitle</b><br>Final Report of 214P Compliance Test<br>Side Impact Protection Testing of a 2024 Chevrolet Trax 5 Door SUV<br>NHTSA No.: C20240110                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                     |                                                           |          | <b>5. Report Date</b><br>October 09, 2023                                                                                                                                                                                                                                                    |                  |                         |                     |  |  |       |      |        |                              |  |      |         |                                 |    |    |        |                       |   |      |          |                       |   |      |          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                     |                                                           |          | <b>6. Performing Organization Code</b><br>CAL                                                                                                                                                                                                                                                |                  |                         |                     |  |  |       |      |        |                              |  |      |         |                                 |    |    |        |                       |   |      |          |                       |   |      |          |
| <b>7. Author(s)</b><br>Claire Hejaily, Test Engineer<br>Vanessa Hansen, Test Engineer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                     |                                                           |          | <b>8. Performing Organization Report No.</b><br>CAL-DOT-2024-001                                                                                                                                                                                                                             |                  |                         |                     |  |  |       |      |        |                              |  |      |         |                                 |    |    |        |                       |   |      |          |                       |   |      |          |
| <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>                                                                                                                                                                                                                                                                     |                  |                         |                     |  |  |       |      |        |                              |  |      |         |                                 |    |    |        |                       |   |      |          |                       |   |      |          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                     |                                                           |          | <b>11. Contract or Grant No.</b><br>693JJ923D000043                                                                                                                                                                                                                                          |                  |                         |                     |  |  |       |      |        |                              |  |      |         |                                 |    |    |        |                       |   |      |          |                       |   |      |          |
| <b>12. Sponsoring Agency Name and Address</b><br>U.S. Department of Transportation<br>National Highway Traffic Safety Administration<br>Office of Vehicle Safety Compliance<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>October 2, 2023 - October 09, 2023                                                                                                                                                                                     |                  |                         |                     |  |  |       |      |        |                              |  |      |         |                                 |    |    |        |                       |   |      |          |                       |   |      |          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                     |                                                           |          | <b>14. Sponsoring Agency Code</b><br>NEF-240                                                                                                                                                                                                                                                 |                  |                         |                     |  |  |       |      |        |                              |  |      |         |                                 |    |    |        |                       |   |      |          |                       |   |      |          |
| <b>15. Supplementary Notes</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                     |                                                           |          |                                                                                                                                                                                                                                                                                              |                  |                         |                     |  |  |       |      |        |                              |  |      |         |                                 |    |    |        |                       |   |      |          |                       |   |      |          |
| <b>16. Abstract</b><br><p>A 31.00 km/h (19.3 mph), 75° oblique compliance test was conducted on the subject 2024 Chevrolet Trax 5 Door SUV in accordance with the specifications of the Office of Vehicle Safety Compliance TP-214P-01 for the determination of FMVSS No.214 Side Impact Protection compliance. This test was conducted at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on October 2, 2023.</p> <p>The impact velocity of the vehicle was 31.04 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 323 mm located at level 3. 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 (ES-2re)</th> </tr> <tr> <th>Units</th> <th>IARV</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC36)</td> <td></td> <td>1000</td> <td>346.664</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>44</td> <td>32.575</td> </tr> <tr> <td>Total Abdominal Force</td> <td>N</td> <td>2500</td> <td>1204.624</td> </tr> <tr> <td>Pubic Symphysis Force</td> <td>N</td> <td>6000</td> <td>1956.662</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 (ES-2re) |  |  | Units | IARV | Result | Head Injury Criteria (HIC36) |  | 1000 | 346.664 | Maximum Thoracic Rib Deflection | mm | 44 | 32.575 | Total Abdominal Force | N | 2500 | 1204.624 | Pubic Symphysis Force | N | 6000 | 1956.662 |
| Measurement Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Driver ATD (ES-2re) |                                                           |          |                                                                                                                                                                                                                                                                                              |                  |                         |                     |  |  |       |      |        |                              |  |      |         |                                 |    |    |        |                       |   |      |          |                       |   |      |          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Units               | IARV                                                      | Result   |                                                                                                                                                                                                                                                                                              |                  |                         |                     |  |  |       |      |        |                              |  |      |         |                                 |    |    |        |                       |   |      |          |                       |   |      |          |
| Head Injury Criteria (HIC36)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     | 1000                                                      | 346.664  |                                                                                                                                                                                                                                                                                              |                  |                         |                     |  |  |       |      |        |                              |  |      |         |                                 |    |    |        |                       |   |      |          |                       |   |      |          |
| Maximum Thoracic Rib Deflection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | mm                  | 44                                                        | 32.575   |                                                                                                                                                                                                                                                                                              |                  |                         |                     |  |  |       |      |        |                              |  |      |         |                                 |    |    |        |                       |   |      |          |                       |   |      |          |
| Total Abdominal Force                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | N                   | 2500                                                      | 1204.624 |                                                                                                                                                                                                                                                                                              |                  |                         |                     |  |  |       |      |        |                              |  |      |         |                                 |    |    |        |                       |   |      |          |                       |   |      |          |
| Pubic Symphysis Force                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | N                   | 6000                                                      | 1956.662 |                                                                                                                                                                                                                                                                                              |                  |                         |                     |  |  |       |      |        |                              |  |      |         |                                 |    |    |        |                       |   |      |          |                       |   |      |          |
| <b>17. Key Words</b><br>Compliance Testing<br>Side Impact Protection<br>Pole Test<br>ES-2re<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 (TIS)<br>Room E12-100 East Bldg.<br>1200 New Jersey Ave.<br>Washington, D.C. 20590<br>Telephone No. (202) 366-2588 |                  |                         |                     |  |  |       |      |        |                              |  |      |         |                                 |    |    |        |                       |   |      |          |                       |   |      |          |
| <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>109                                                                                                                                                                                                                                                               | <b>22. Price</b> |                         |                     |  |  |       |      |        |                              |  |      |         |                                 |    |    |        |                       |   |      |          |                       |   |      |          |

Form DOT F1700.7 (8-72)

## TABLE OF CONTENTS

| <u>Section</u>    |                                                | <u>Page</u> |
|-------------------|------------------------------------------------|-------------|
| 1                 | Test Purpose and Summary of the Test           | 1-1         |
| 2                 | Occupant and Vehicle Information               | 2-1         |
| <br>              |                                                |             |
| <u>Data Sheet</u> |                                                | <u>Page</u> |
| 1                 | Test Vehicle Information and Options           | 2-2         |
| 2                 | Vehicle Tire Information                       | 2-3         |
| 3                 | General Test and Vehicle Parameter Data        | 2-4         |
| 4                 | Seat and Seat Belt Adjustment Data             | 2-5         |
| 5                 | Fuel Systems and Steering Wheel Position Data  | 2-6         |
| 6                 | Dummy Longitudinal Clearance Dimensions        | 2-7         |
| 7                 | Dummy Lateral Clearance Dimensions             | 2-8         |
| 8                 | Location of Cameras                            | 2-9         |
| 9                 | Test Vehicle Accelerometer Location            | 2-10        |
| 10                | Test Vehicle Accelerometer Summary             | 2-11        |
| 11                | Dummy Injury Response Data                     | 2-12        |
| 12                | Post Test Observations                         | 2-13        |
| 13                | Vehicle Pre-test and Post-test Measurements    | 2-15        |
| 14                | Exterior Crush Measurements                    | 2-16        |
| 15                | Vehicle Exterior Crush Profiles                | 2-17        |
| 16                | Temperature and Humidity Trace                 | 2-19        |
| <br>              |                                                |             |
| <u>Appendix</u>   |                                                | <u>Page</u> |
| I                 | Photographs                                    | I-1         |
| II                | Dummy Response Data                            | II-1        |
| III               | Vehicle Accelerometer Response Data Plots      | III-1       |
| IV                | Dummy Performance Calibration Test Data        | IV-1        |
| V                 | Test Equipment and Instrumentation Calibration | V-1         |



## **SECTION 1**

### **PURPOSE AND SUMMARY OF TEST**

#### **PURPOSE**

This side impact test was conducted as part of the FY 2024 FMVSS 214 Side Impact Protection Compliance Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. 693JJ923D000043. The purpose of this test was to evaluate side impact protection in a 2024 Chevrolet Trax 5 Door SUV. The side impact test was conducted in accordance with the Office of Vehicle Safety Compliance's Laboratory Test Procedure, TP-214P-01 dated September 2012.

#### **SUMMARY**

A rigid pole side impact test was conducted on a 2024 Chevrolet Trax 5 Door SUV. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 31.04 km/h. The test was conducted by Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on October 2, 2023. Pre-test and post-test photographs of the test vehicle and side impact dummy (ES2re) are included in Appendix I of this report.

One Part 572U (ES-2re) dummy was placed in the driver designated seating position according to instructions specified in the TP-214P-01 Test Procedure, dated September 2012. The side impact event was documented by nine High Speed Cameras and one real time camera.

The ES2re male dummy was instrumented accordingly:

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

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

Injury readings for the ES2re dummy were recorded as follows:

#### INJURY READINGS

| Measurement Description      | Driver ATD (ES2re) |      |          |
|------------------------------|--------------------|------|----------|
|                              | Units              | IARV | Result   |
| Head Injury Criteria (HIC36) |                    | 1000 | 346.664  |
| Upper Rib Deflection         | mm                 | 44   | 32.575   |
| Mid Rib Deflection           | mm                 | 44   | 23.698   |
| Lower Rib Deflection         | mm                 | 44   | 25.165   |
| Abdominal Load (front)       | N                  |      | 255.896  |
| Abdominal Load (mid)         | N                  |      | 490.933  |
| Abdominal Load (rear)        | N                  |      | 461.206  |
| Total Abdominal Force        | N                  | 2500 | 1204.624 |
| Pubic Symphysis Force        | N                  | 6000 | 1956.662 |

## SECTION 2

### OCCUPANT AND VEHICLE INFORMATION

This section contains information reporting for the following Data Sheets:

| <u>Data Sheet</u>                               | <u>Page</u> |
|-------------------------------------------------|-------------|
| 1 Test Vehicle Information and Options          | 2-2         |
| 2 Vehicle Tire Information                      | 2-3         |
| 3 General Test and Vehicle Parameter Data       | 2-4         |
| 4 Seat and Seat Belt Adjustment Data            | 2-5         |
| 5 Fuel Systems and Steering Wheel Position Data | 2-6         |
| 6 Dummy Longitudinal Clearance Dimensions       | 2-7         |
| 7 Dummy Lateral Clearance Dimensions            | 2-8         |
| 8 Location of Cameras                           | 2-9         |
| 9 Test Vehicle Accelerometer Location           | 2-10        |
| 10 Test Vehicle Accelerometer Summary           | 2-11        |
| 11 Dummy Injury Response Data                   | 2-12        |
| 12 Post Test Observations                       | 2-13        |
| 13 Vehicle Pre-test and Post-test Measurements  | 2-15        |
| 14 Exterior Crush Measurements                  | 2-16        |
| 15 Vehicle Exterior Crush Profiles              | 2-17        |
| 16 Temperature and Humidity Trace               | 2-19        |

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

Test Vehicle: 2024 Chevrolet Trax 5 Door SUV  
 Test Facility: Calspan

NHTSA No.: C20240110  
 Test Date: 10/02/2023

**TEST VEHICLE INFORMATION AND OPTIONS**

|                         |                        |                                        |     |
|-------------------------|------------------------|----------------------------------------|-----|
| Make                    | Chevrolet              | Anti-Lock Brakes (ABS)                 | Yes |
| Model                   | Trax                   | All-Wheel Drive (AWD)                  | No  |
| Body Style              | SUV                    | Traction Control System (TCS)          | Yes |
| VIN                     | KL77LKE25RC039218      | Electric Stability Control (ECS)       | Yes |
| Body Color              | Sterling Gray Metallic | Curtain Airbags                        | Yes |
| Engine Displacement (L) | 1.2                    | Torso Airbags – Front Seats            | Yes |
| Type / No. Cylinders    | I3                     | Torso Airbags – Rear Seats             | No  |
| Engine Placement        | Transverse             | Combination/Head Torso Bag             | No  |
| Transmission Type       | Automatic              | Pelvic Airbag – Front Seats            | No  |
| Transmission Speeds     | 6-Speed                | Pelvis Airbag – Rear Seats             | No  |
| Overdrive               | Yes                    | Knee Airbag – Driver                   | No  |
| Final Drive             | Front Wheel Drive      | Knee Airbag – Front Passenger          | No  |
| Odometer Reading (mi)   | 8 mi                   | Seat Belt Pretensioners – Front Seats  | Yes |
|                         |                        | Seat Belt Pretensioners – Rear Seats   | No  |
|                         |                        | Seat Belt Load Limiter – Front Seats   | Yes |
|                         |                        | Seat Belt Load Limiter – Rear Seats    | No  |
|                         |                        | Tire Pressure Monitoring System (TPMS) | Yes |
|                         |                        | Tilt Steering Wheel                    | Yes |
|                         |                        | Automatic Door Locks (ADL)             | Yes |
|                         |                        | Power Window Auto-reverse              | No  |
|                         |                        | Power Seats                            | Yes |
|                         |                        | Other Safety Restraint                 | N/A |

**DATA FROM CERTIFICATION LABEL**

|                     |                  |                 |      |
|---------------------|------------------|-----------------|------|
| Manufactured By     | GM KOREA COMPANY | GVWR (kg)       | 1880 |
| Date of Manufacture | 04/23            | GVWR Front (kg) | 1060 |
| Vehicle Type        | MPV              | GVWR Rear (kg)  | 1060 |

**VEHICLE SEATING AND WEIGHT CAPACITY DATA**

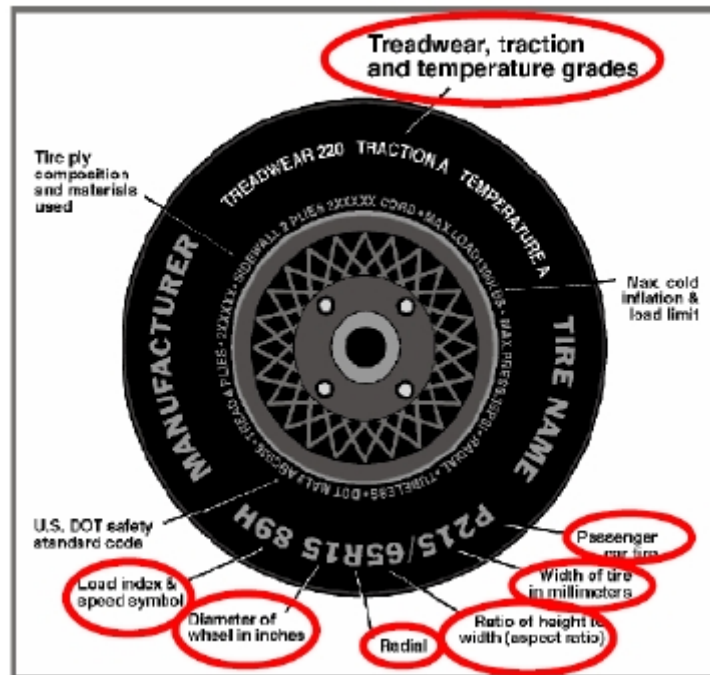
| Measured Parameter                | Front  | Rear        | Third | Total |
|-----------------------------------|--------|-------------|-------|-------|
| Type of Seats (Bench or Bucket)   | Bucket | Split Bench | N/A   |       |
| Designated Seating Capacity (DSC) | 2      | 3           | N/A   | 5     |
| Capacity Weight (VCW) (kg)        |        |             |       | 428   |
| Cargo Weight (RCLW) (kg)          |        |             |       | 87.8  |

## DATA SHEET NO. 2 VEHICLE TIRE INFORMATION

Test Vehicle: 2024 Chevrolet Trax 5 Door SUV  
Test Facility: Calspan

NHTSA No.: C20240110  
Test Date: 10/02/2023

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



## VEHICLE TIRE INFORMATION

| Tire Placard                    | Front      | Rear       |
|---------------------------------|------------|------------|
| Recommended Cold Pressure (kPa) | 240        | 220        |
| Recommended Tire Size           | 225/55R18  | 225/55R18  |
| Tire Sidewall                   | Front      | Rear       |
| Maximum Tire Pressure (kPa)     | 350        | 350        |
| Tire Size on Vehicle            | 225/55R18  | 225/55R18  |
| Tire Manufacturer Model         | Goodyear   | Goodyear   |
| Tire Name                       | Assurance  | Assurance  |
| Tire Type                       | All Season | All Season |
| Tire Width                      | 225        | 225        |
| Aspect Ratio                    | 55         | 55         |
| Radial                          | Yes        | Yes        |
| Wheel Diameter                  | 18"        | 18"        |
| Load Index / Speed Symbol       | 98H        | 98H        |
| Treadwear                       | 540        | 540        |
| Traction Grade                  | A          | A          |
| Temperature Grades              | A          | A          |

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

Test Vehicle: 2024 Chevrolet Trax 5 Door SUV  
Test Facility: Calspan

NHTSA No.: C20240110  
Test Date: 10/02/2023

**TIRE PRESSURES**

|              | Units | LF  | RF  | LR  | RR  |
|--------------|-------|-----|-----|-----|-----|
| As Delivered | kPa   | 243 | 241 | 238 | 236 |
| Tire Placard | kPa   | 240 | 240 | 220 | 220 |

**TEST VEHICLE WEIGHTS**

|        | Units | As Delivered (UVW) |      |       | Fully Loaded |      |       | As Tested |      |       |
|--------|-------|--------------------|------|-------|--------------|------|-------|-----------|------|-------|
|        |       | Front              | Rear | Total | Front        | Rear | Total | Front     | Rear | Total |
| Left   | kg    | 433                | 269  |       | 468          | 338  |       | 459       | 328  |       |
| Right  | kg    | 403                | 263  |       | 412          | 320  |       | 427       | 316  |       |
| Ratio  | %     | 61.1               | 38.9 |       | 57.2         | 42.8 |       | 57.9      | 42.1 |       |
| Totals | kg    | 836                | 532  | 1368  | 880          | 658  | 1538  | 886       | 644  | 1530  |

**TARGET TEST WEIGHT CALCULATION**

| Measured Parameter                      | Units | Value  |         |
|-----------------------------------------|-------|--------|---------|
| Total As Delivered Weight (UVW)         | kg    | 1368   | (A)     |
| Weight of Test Dummy                    | kg    | 81     | (B)     |
| Rated Cargo / Luggage Weight (RCLW)     | kg    | 87.8   | (C)     |
| Calculated Vehicle Target Weight (TVTW) | kg    | 1536.8 | (A+B+C) |

**TEST VEHICLE ATTITUDES AND CG**

| Measurement Description    | Units | As Delivered | Fully Loaded | As Tested |
|----------------------------|-------|--------------|--------------|-----------|
| Driver Door Sill Angle     | Deg   | +0.45        | -0.35        | +0.25     |
| Front Passenger Sill Angle | Deg   | -0.70        | -0.10        | -0.20     |
| Front Bumper-Line Angle    | Deg   | -0.10        | -0.25        | -0.15     |
| Rear Bumper-Line Angle     | Deg   | +0.35        | +0.45        | +0.35     |

ND = Nose Down (-), NU = Nose Up (+), LD = Left Down (-), LU = Left Up (+)

**CALCULATION OF VERTICAL IMPACT REFERENCE LINE**

| Measured Parameter                               | Units | Value |
|--------------------------------------------------|-------|-------|
| Test Vehicle Wheelbase                           | mm    | 2703  |
| Vertical Impact Reference Line Aft of Front Axle | mm    | 1313  |

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

| Component Description | Weight (kg) |
|-----------------------|-------------|
| Trunk Carpeting       | 9           |
| Spare Tire            | 11.5        |
| Jack                  | 4           |
|                       |             |
| Ballast (if any)      | 45          |

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

Test Vehicle: 2024 Chevrolet Trax 5 Door SUV  
Test Facility: Calspan

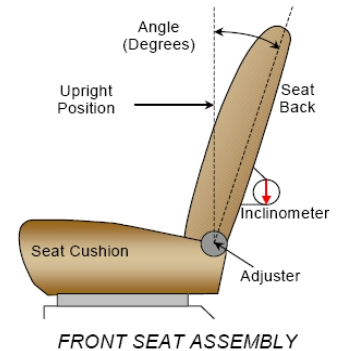
NHTSA No.: C20240110  
Test Date: 10/02/2023

**SEAT BACK ANGLE ADJUSTMENT**

*The driver and passenger seat backs are positioned to the manufacturer's designated angle provided in the Form1.*

|                      | Units   | Seat Back Angle |
|----------------------|---------|-----------------|
| Driver Seat          | Degrees | -21.1           |
| Front Passenger Seat | Degrees | -21.3           |

\*Measurement taken on upper headrest post



**SEAT HEIGHT AND ANGLE**

| Seat                 | As Tested SCRL Angle (Mid) (°) | SCR P Height Position | SCR P Height (mm) |                |              |
|----------------------|--------------------------------|-----------------------|-------------------|----------------|--------------|
|                      |                                |                       | Rearmost          | Mid-Fore / Aft | Forward-Most |
| Driver Seat          | 14.9                           | Max                   | 63                | 66             | 70           |
|                      |                                | Mid                   | 32                | 36             | 39           |
|                      |                                | Min                   | 1                 | 6              | 9            |
| Front Passenger Seat | Fixed                          | Max                   |                   |                |              |
|                      |                                | Mid                   |                   |                |              |
|                      |                                | Min                   |                   |                |              |

**SEAT FORE / AFT POSITION**

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

**SEAT BELT ANCHORAGE ADJUSTMENT**

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

**HEAD RESTRAINT ADJUSTMENT**

| Seat        | Total # of Positions | Placed in Position # |
|-------------|----------------------|----------------------|
| Driver Seat | 9 (0-8)              | Uppermost            |

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

Test Vehicle: 2024 Chevrolet Trax 5 Door SUV  
 Test Facility: Calspan

NHTSA No.: C20240110  
 Test Date: 10/02/2023

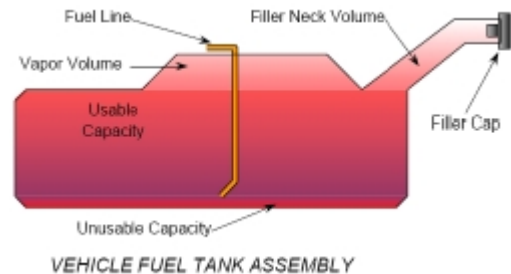
**FUEL TANK CAPACITY DATA**

| Description                           | Liters      |
|---------------------------------------|-------------|
| Usable Capacity of (Form No.1)        | 50          |
| Usable Capacity of (Owner's Manual)   | 50          |
| 92 - 94% of Usable Capacity           | 46.0 - 47.0 |
| Actual Amount of Solvent Used in Test | 46.5        |

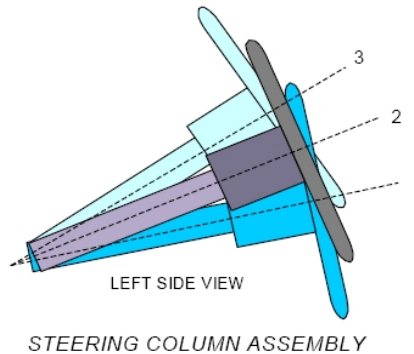
**FUEL PUMP**

*Describe the operation of the fuel pump.*

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



**STEERING COLUMN POSITIONS**



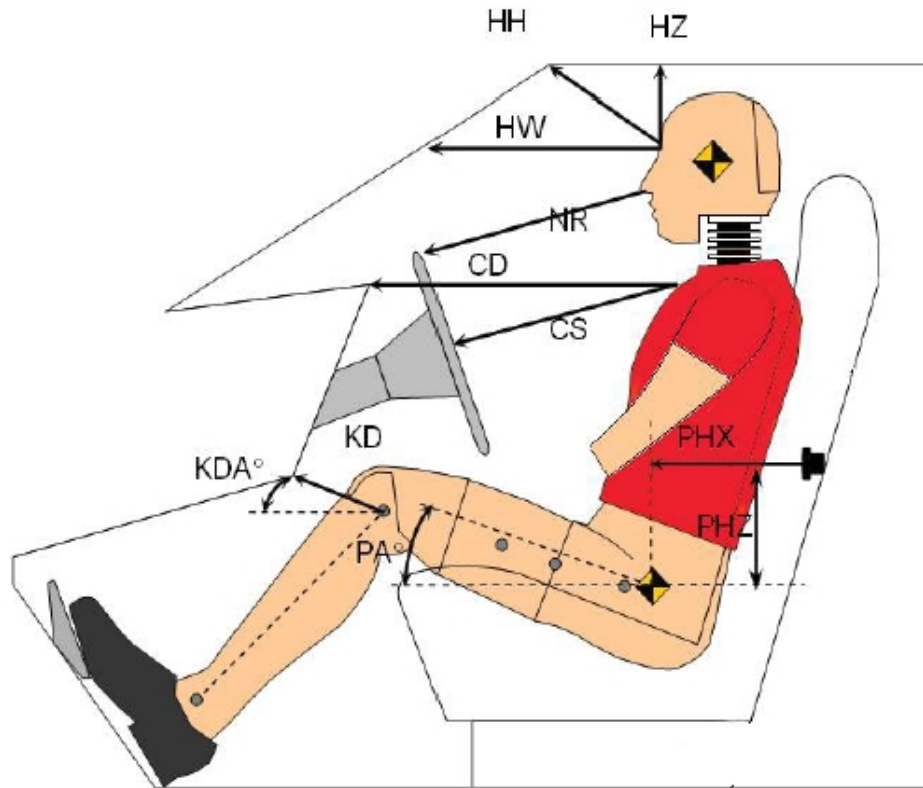
|                                   | Degrees | Fore / Aft Position (mm) |
|-----------------------------------|---------|--------------------------|
| Lowermost - Position No. 1        | 19.4    |                          |
| Geometric center - Position No. 2 | 21.3    |                          |
| Uppermost - Position No. 3        | 23.1    |                          |
| Telescoping Steering Wheel Travel |         | 50                       |
| Test Position                     | 21.3    | 25                       |



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

Test Vehicle: 2024 Chevrolet Trax 5 Door SUV  
 Test Facility: Calspan

NHTSA No.: C20240110  
 Test Date: 10/02/2023



**Left Side View**

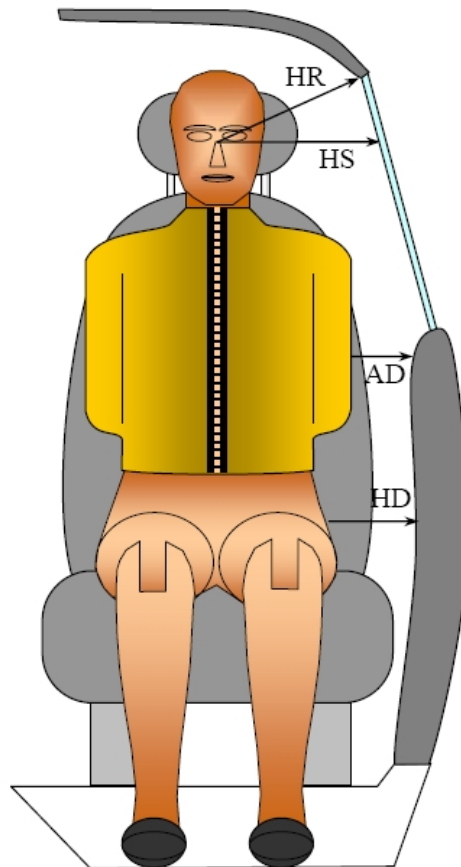
**DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION**

| Driver Code     | Description                   | Driver      |           |
|-----------------|-------------------------------|-------------|-----------|
|                 |                               | Length (mm) | Angle (°) |
| HH              | Head to Header                | 430         |           |
| HW              | Head to Windshield            | 680         |           |
| HZ              | Head to Roof Liner            | 205         |           |
| NR              | Nose to Rim                   | 460         |           |
| CD              | Chest to Dash                 | 605         |           |
| CS              | Chest to Steering Wheel       | 402         |           |
| KD(L) / KDA(L)° | Left Knee to Dash             | 232         | 32.3      |
| KD(R) / KDA(R)° | Right Knee to Dash            | 222         | 33.2      |
| PAX°            | Pelvic Tilt Angle (X-Axis)    |             | 23.6      |
| PAY°            | Pelvic Tilt Angle (Y-Axis)    |             | -1.1      |
| PHX             | Hip Point to Striker (X-Axis) | 129         |           |
| PHZ             | Hip Point to Striker (Z-Axis) | 141         |           |

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

Test Vehicle: 2024 Chevrolet Trax 5 Door SUV  
 Test Facility: Calspan

NHTSA No.: C20240110  
 Test Date: 10/02/2023



*FRONT VIEW OF DUMMY*

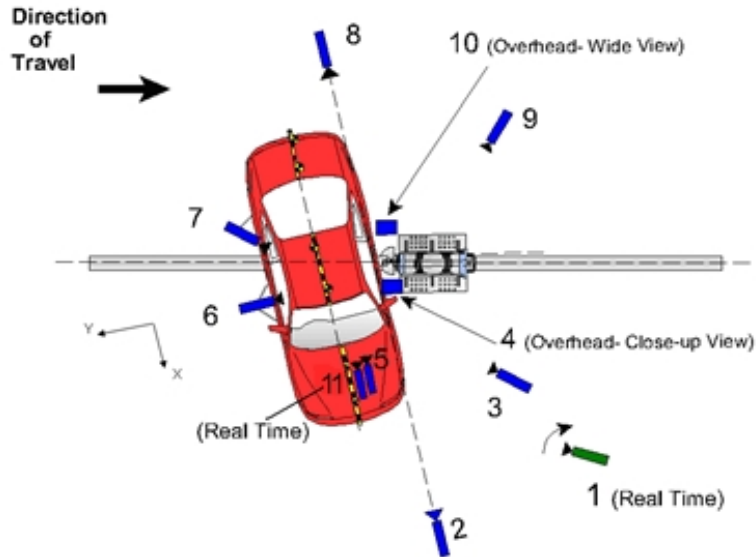
**DUMMY LATERAL CLEARANCE DIMENSION INFORMATION**

| Code | Measurement Description | Units | Driver |
|------|-------------------------|-------|--------|
| HR   | Head to Side Header     | mm    | 209    |
| HS   | Head to Side Window     | mm    | 329    |
| AD   | Arm to Door             | mm    | 109    |
| HD   | H-Point to Door         | mm    | 152    |

## DATA SHEET NO. 8 LOCATION OF CAMERA

Test Vehicle: 2024 Chevrolet Trax 5 Door SUV  
Test Facility: Calspan

NHTSA No.: C20240110  
Test Date: 10/02/2023



**CAMERA LOCATIONS AND DATA**

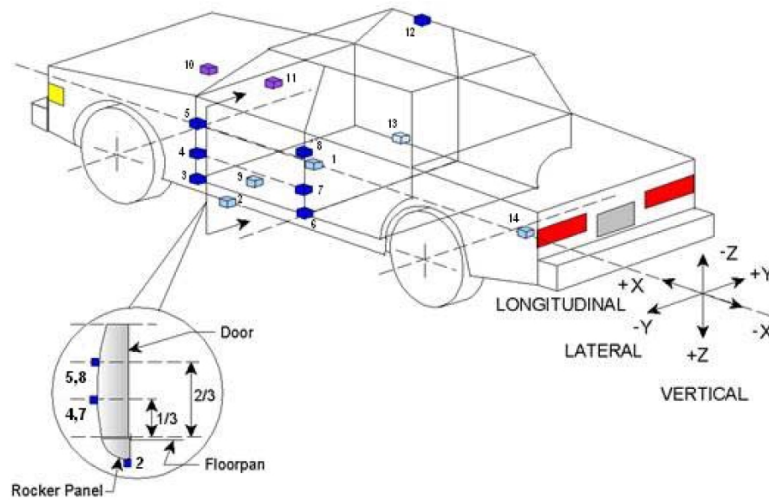
| No. | Camera View                                | Coordinates (mm) |       |       | Lens Length (mm) | Operating Frame Rate (fps) |
|-----|--------------------------------------------|------------------|-------|-------|------------------|----------------------------|
|     |                                            | X                | Y     | Z     |                  |                            |
| 1   | Real-time (24 - 30 fps) pan view of impact |                  |       |       | Zoom             | 60                         |
| 2   | Front ground level - impact view           | 7913             | 0     | -1551 | 28               | 1000                       |
| 3   | Impact side 45° - forward pole view        | 5081             | -911  | -1535 | 24               | 1000                       |
| 4   | Overhead Close-up view of impact           | 0                | 0     | -9375 | 28               | 1000                       |
| 5   | Onboard - dummy front view                 |                  |       |       | 25               | 1000                       |
| 6   | Onboard - dummy side view                  |                  |       |       | 12.5             | 1000                       |
| 7   | Onboard - dummy rear oblique view          |                  |       |       | 12.5             | 1000                       |
| 8   | Rear ground level - impact view            | -7803            | 0     | -1528 | 28               | 1000                       |
| 9   | Impact side 45° - rearward pole view       | -4004            | -3911 | -1429 | 24               | 1000                       |
| 10  | Overhead wide - view of impact             | 0                | 0     | -9375 | 12.5             | 1000                       |

Notes: Reference - From Point of Impact for X and Y; from Ground for Z  
+X = Forward of vehicle, +Y = Right of vehicle, +Z = Down  
\* All measurements accurate to  $\pm 6$  mm. Vehicle is at a 75° angle to the rigid pole.

# **DATA SHEET NO. 9** **TEST VEHICLE ACCELEROMETER LOCATIONS**

Test Vehicle: 2024 Chevrolet Trax 5 Door SUV  
Test Facility: Calspan

NHTSA No.: C20240110  
Test Date: 10/02/2023



## **TEST VEHICLE ACCELEROMETER LOCATIONS**

| No. | Accelerometer Location | Coordinates (mm) |      |      |
|-----|------------------------|------------------|------|------|
|     |                        | X                | Y    | Z    |
| 1   | Vehicle CG             | 2487             | 26   | -173 |
| 2   | Left Floor Sill        | 2714             | -632 | 148  |
| 3   | A-Pillar Sill          | 3111             | -613 | 141  |
| 4   | A-Pillar Low           | 3174             | -603 | -76  |
| 5   | A-Pillar Mid           | 3121             | -613 | -548 |
| 6   | B-Pillar Sill          | 2109             | -649 | 121  |
| 7   | B-Pillar Low           | 2071             | -655 | -253 |
| 8   | B-Pillar Mid           | 2033             | -645 | -516 |
| 9   | Seat                   | 2374             | -524 | 147  |
| 10  | Engine                 | 3834             | 290  | -311 |
| 11  | Firewall               | 3389             | 175  | -279 |
| 12  | Roof                   | 1896             | 557  | -987 |
| 13  | Right Floor Sill       | 2676             | 630  | 169  |
| 14  | Rear Deck              | 1011             | 29   | -6   |

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

**DATA SHEET NO. 10**  
**TEST VEHICLE ACCELEROMETER DATA SUMMARY**

Test Vehicle: 2024 Chevrolet Trax 5 Door SUV  
Test Facility: Calspan

NHTSA No.: C20240110  
Test Date: 10/02/2023

| Loc. No | Description          | Axes | Units | Positive Direction |           | Negative Direction |           |
|---------|----------------------|------|-------|--------------------|-----------|--------------------|-----------|
|         |                      |      |       | Max                | Time (ms) | Max                | Time (ms) |
| 1       | Vehicle CG           | X    | g     | 4.48               | 125.20    | -15.22             | 45.50     |
|         | Vehicle CG           | Y    | g     | 55.08              | 44.20     | -8.88              | 56.25     |
|         | Vehicle CG           | Z    | g     | 15.99              | 36.70     | -14.80             | 42.95     |
|         | Vehicle CG Resultant | N/A  | g     | 58.21              | 44.25     | 0.01               | -34.45    |
| 2       | Floor Sill (Left)    | Y    | g     | 46.86              | 22.45     | -29.36             | 31.10     |
| 3       | A Pillar Sill        | Y    | g     | 42.87              | 57.25     | -22.03             | 47.65     |
| 4       | A Pillar Low         | Y    | g     | 32.50              | 26.35     | -12.21             | 42.05     |
| 5       | A Pillar Mid         | Y    | g     | 29.61              | 29.50     | -21.94             | 40.70     |
| 6       | B Pillar Sill        | Y    | g     | 102.87             | 16.45     | -62.39             | 25.65     |
| 7       | B Pillar Low         | Y    | g     | 392.23             | 18.35     | -187.82            | 14.50     |
| 8       | B Pillar Mid         | Y    | g     | 73.58              | 20.35     | -32.98             | 24.95     |
| 9       | Seat                 | Y    | g     | 47.77              | 26.15     | -14.24             | 45.45     |
| 10      | Engine Top           | X    | g     | 5.32               | 129.30    | -23.85             | 36.60     |
|         | Engine Top           | Y    | g     | 13.11              | 48.70     | -2.34              | 27.20     |
| 11      | Firewall             | Y    | g     | 11.43              | 59.90     | -0.66              | 3.85      |
| 12      | Roof                 | Y    | g     | 20.34              | 38.80     | -1.10              | 292.85    |
| 13      | Floor Sill (Right)   | Y    | g     | 17.85              | 27.65     | -2.06              | 300.00    |
| 14      | Rear Deck            | X    | g     | 3.91               | 102.45    | -5.32              | 56.05     |
|         | Rear Deck            | Y    | g     | 20.23              | 29.70     | -1.96              | 181.95    |

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

Test Vehicle: 2024 Chevrolet Trax 5 Door SUV NHTSA No.: C20240110  
Test Facility: Calspan Test Date: 10/02/2023

**Dummy Serial No. D037**

| Description            | Axes | Positive Direction |           | Negative Direction |            |
|------------------------|------|--------------------|-----------|--------------------|------------|
|                        |      | MAX                | TIME (ms) | MAX                | TIME (ms)  |
| HEAD ACCELERATION (g)  |      |                    |           |                    |            |
| Longitudinal           | X    | 18.13              | 159.45    | -18.77             | 48.15      |
| Lateral                | Y    | 50.78              | 46.30     | -10.85             | 83.55      |
| Vertical               | Z    | 20.99              | 49.00     | -3.98              | 88.00      |
| Resultant              | N/A  | 56.53              | 47.10     |                    |            |
| HIC36 (t1, t2)         | N/A  | 346.66             |           | t1 = 40.20         | t2 = 67.10 |
| THORAX DEFLECTION (mm) |      |                    |           |                    |            |
| Upper Rib              | Y    | 32.58              | 55.65     | -6.48              | 82.75      |
| Middle Rib             | Y    | 23.70              | 57.00     | -8.01              | 80.90      |
| Lower Rib              | Y    | 25.17              | 56.40     | -0.68              | 265.60     |
| ABDOMINAL FORCES (N)   |      |                    |           |                    |            |
| Front                  | Y    | 255.90             | 50.05     | -32.47             | 215.35     |
| Middle                 | Y    | 490.93             | 50.80     | -12.50             | 214.55     |
| Rear                   | Y    | 461.21             | 50.50     | -16.39             | 203.35     |
| SUM                    | N/A  | 1204.62            | 50.60     |                    |            |
| PELVIS FORCES (N)      |      |                    |           |                    |            |
| Pubic Symphysis        | Y    | 68.46              | 228.95    | -1956.66           | 63.00      |

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

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

Test Vehicle: 2024 Chevrolet Trax 5 Door SUV  
Test Facility: Calspan

NHTSA No.: C20240110  
Test Date: 10/02/2023

**IMPACT POINT DATA**

| Measured Parameter                                               | Units | Value |
|------------------------------------------------------------------|-------|-------|
| Vertical Impact Ref Line - Aft of Front Axle, Intended Impact Pt | mm    | 1313  |
| Actual Impact Point - Aft of Front Axle                          | mm    | 1317  |
| Difference                                                       | mm    | 4     |

**TEST DUMMY INFORMATION AND CONTACT POINTS**

| Dummy Body Part     | Driver Seat Dummy (ES2re)              |
|---------------------|----------------------------------------|
| Head Contact        | Side Header, Curtain Airbag & Headrest |
| Upper Torso Contact | Seatback & Torso/Pelvis Airbag         |
| Lower Torso Contact | Seatback                               |
| Left Knee Contact   | Driver Door                            |
| Right Knee Contact  | Left Knee                              |

**POST-TEST DOOR PERFORMANCE**

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

**POST-TEST SEAT PERFORMANCE**

| Description                       | Struck Side |      | Non-Struck Side |      |
|-----------------------------------|-------------|------|-----------------|------|
|                                   | Front       | Rear | Front           | Rear |
| Seat Movement Along Seat Track    | No          | No   | No              | No   |
| Seat Disengagement from Floor Pan | No          | No   | No              | No   |

**POST-TEST STRUCTURAL OBSERVATIONS**

| Critical Areas of Performance | Observations and Conclusions          |
|-------------------------------|---------------------------------------|
| Pillar Performance            | B-Pillar & C-Pillar Buckled           |
| Sill Separation               | None                                  |
| Windshield Damage             | Cracked throughout                    |
| Side Window Damage            | Driver window shattered during impact |
| Other Notable Effects         | None                                  |

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

Test Vehicle: 2024 Chevrolet Trax 5 Door SUV  
 Test Facility: Calspan

NHTSA No.: C20240110  
 Test Date: 10/02/2023

**SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION**

| Restraint Type                      | Struck Side<br>Front Occupant |          |
|-------------------------------------|-------------------------------|----------|
|                                     | Mounted                       | Deployed |
| Front Airbag                        | Yes                           | No       |
| Knee Airbag                         | No                            | N/A      |
| Head Airbag*                        | Yes                           | Yes      |
| Side Airbag 2 - Torso/Pelvis Airbag | Yes                           | Yes      |
| Seat Belt Pretensioner              | Yes                           | Yes      |
| Seat Belt Load Limiter              | Yes                           | Yes      |
| Other                               | N/A                           | N/A      |

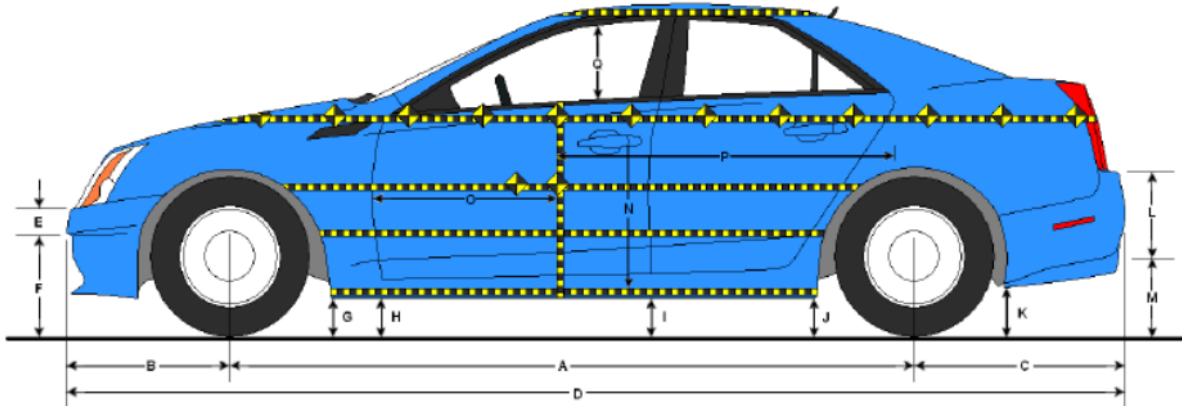
\*Head Airbag was a curtain airbag



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

Test Vehicle: 2024 Chevrolet Trax 5 Door SUV  
 Test Facility: Calspan

NHTSA No.: C20240110  
 Test Date: 10/02/2023



**LEFT SIDE VIEW**

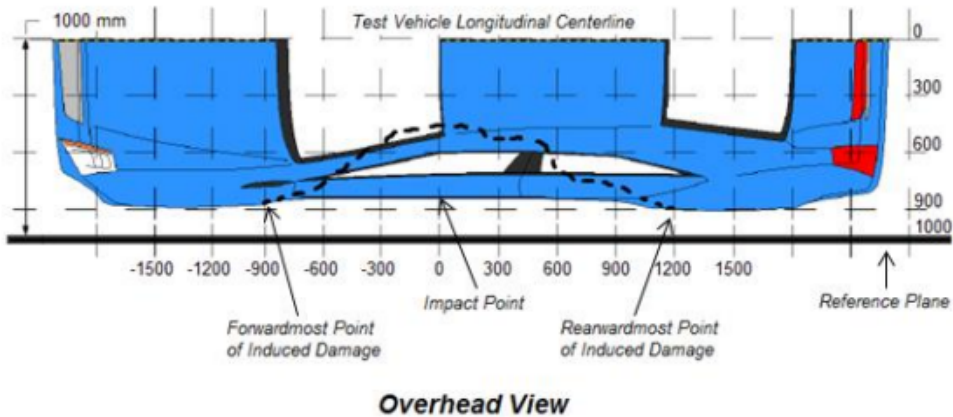
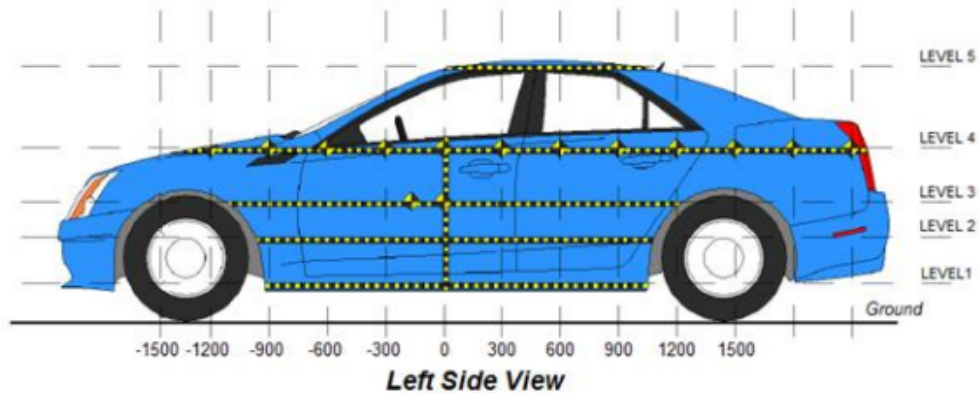
**VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION**

| No. | Measurement Description                | Pre-Test | Post-Test | Difference |
|-----|----------------------------------------|----------|-----------|------------|
| A   | Vehicle Wheelbase                      | 2703     | 2653      | 50         |
| B   | Front Axle to FSOV                     | 929      | 954       | -25        |
| C   | Rear Axle to RSOV                      | 914      | 913       | 1          |
| D   | Total Vehicle Length at Centerline     | 4546     | 4520      | 26         |
| E   | Front Bumper Thickness                 | 68       | 68        | 0          |
| F   | Front Bumper Bottom to Ground          | 435      | 447       | -12        |
| G   | Sill Height at Front Wheel Well        | 246      | 245       | 1          |
| H   | Sill Height at Front Door Leading Edge | 245      | 242       | 3          |
| I   | Sill Height at B Pillar                | 245      | 219       | 26         |
| J1  | Sill Height at Rear Wheel Well         | 245      | 260       | -15        |
| J2  | Pinch Weld Height at Rear Wheel Well   | 228      | 234       | -6         |
| K   | Sill Height Aft of Rear Wheel Well     | 285      | 289       | -4         |
| L   | Rear Bumper Thickness                  | 72       | 72        | 0          |
| M   | Rear Bumper Bottom to Ground           | 535      | 521       | 14         |
| N   | Sill Height to Window Bottom Sill      | 788      | 790       | -1         |
| O   | Front Door Leading Edge to Impact CL   | 823      | 755       | 69         |
| P   | Rear Door Trailing Edge to Impact CL   | 1248     | 1171      | 77         |
| Q   | Front Window Opening                   | 392      | 376       | 16         |
| R   | Right Side Length                      | 4397     | 4388      | 9          |
| S   | Left Side Length                       | 4402     | 4355      | 48         |
| T   | Vehicle Width at B-Pillars             | 1777     | 1631      | 146        |

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

Test Vehicle: 2024 Chevrolet Trax 5 Door SUV  
 Test Facility: Calspan

NHTSA No.: C20240110  
 Test Date: 10/02/2023



**MAXIMUM EXTERIOR CRUSH MEASUREMENTS**

| Level | Measurement Description | Units | Height Above Ground | Maximum Exterior Static Crush | Distance from Impact |
|-------|-------------------------|-------|---------------------|-------------------------------|----------------------|
| 1     | Sill Top                | mm    | 377                 | 265                           | 0                    |
| 2     | Occupant H-Point        | mm    | 612                 | 318                           | 0                    |
| 3     | Mid-Door                | mm    | 712                 | 323                           | 0                    |
| 4     | Window Sill             | mm    | 1038                | 283                           | 0                    |
| 5     | Window Top              | mm    | 1494                | 109                           | 0                    |

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

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

Test Vehicle: 2024 Chevrolet Trax 5 Door SUV  
 Test Facility: Calspan

NHTSA No.: C20240110  
 Test Date: 10/02/2023

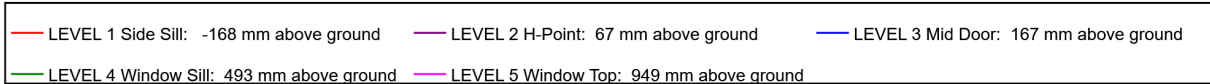
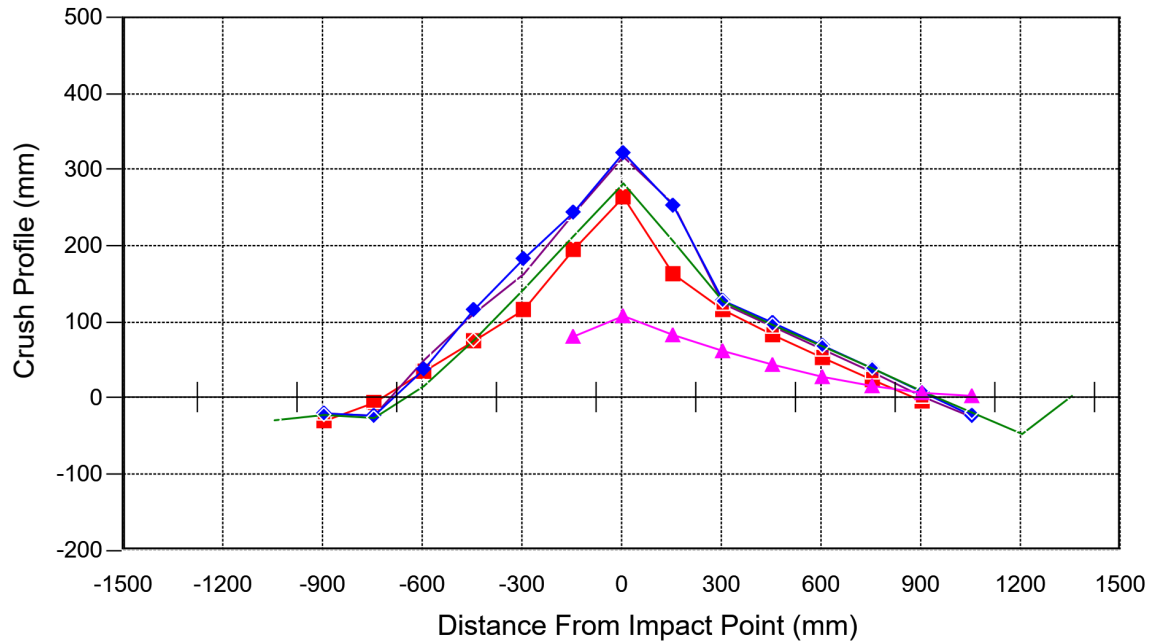
**EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL**

|       | Pre-Test |     |     |     |     | Post-Test |     |     |     |     | Difference |     |     |     |     |
|-------|----------|-----|-----|-----|-----|-----------|-----|-----|-----|-----|------------|-----|-----|-----|-----|
|       | 1        | 2   | 3   | 4   | 5   | 1         | 2   | 3   | 4   | 5   | 1          | 2   | 3   | 4   | 5   |
| -1500 |          |     |     |     |     |           |     |     |     |     |            |     |     |     |     |
| -1350 |          |     |     |     |     |           |     |     |     |     |            |     |     |     |     |
| -1200 |          |     |     |     |     |           |     |     |     |     |            |     |     |     |     |
| -1050 |          |     |     | 784 |     |           |     |     | 812 |     |            |     |     | -28 |     |
| -900  | 881      | 898 | 900 | 790 |     | 910       | 917 | 919 | 811 |     | -29        | -19 | -19 | -21 |     |
| -750  | 878      | 887 | 890 | 789 |     | 883       | 909 | 912 | 814 |     | -5         | -22 | -22 | -25 |     |
| -600  | 878      | 880 | 884 | 793 |     | 842       | 829 | 845 | 776 |     | 36         | 51  | 39  | 17  |     |
| -450  | 877      | 877 | 882 | 799 |     | 801       | 765 | 765 | 722 |     | 76         | 112 | 117 | 77  |     |
| -300  | 876      | 877 | 882 | 808 |     | 759       | 713 | 698 | 664 |     | 117        | 164 | 184 | 144 |     |
| -150  | 875      | 880 | 882 | 813 | 573 | 679       | 637 | 637 | 599 | 491 | 196        | 243 | 245 | 214 | 82  |
| 0     | 873      | 883 | 882 | 819 | 589 | 608       | 565 | 559 | 536 | 480 | 265        | 318 | 323 | 283 | 109 |
| 150   | 872      | 887 | 883 | 824 | 593 | 708       | 631 | 629 | 617 | 509 | 164        | 256 | 254 | 207 | 84  |
| 300   | 870      | 889 | 883 | 829 | 593 | 753       | 764 | 754 | 701 | 530 | 117        | 125 | 129 | 128 | 63  |
| 450   | 868      | 891 | 885 | 831 | 591 | 784       | 796 | 785 | 734 | 546 | 84         | 95  | 100 | 97  | 45  |
| 600   | 868      | 892 | 888 | 840 | 586 | 814       | 827 | 818 | 771 | 557 | 54         | 65  | 70  | 69  | 29  |
| 750   | 867      | 894 | 893 | 841 | 579 | 842       | 859 | 853 | 801 | 562 | 25         | 35  | 40  | 40  | 17  |
| 900   | 868      | 897 | 900 | 845 | 567 | 871       | 894 | 891 | 835 | 559 | -3         | 3   | 9   | 10  | 8   |
| 1050  |          | 902 | 906 | 839 | 547 |           | 926 | 928 | 857 | 543 |            | -24 | -22 | -18 | 4   |
| 1200  |          |     |     | 856 |     |           |     |     | 902 |     |            |     |     | -46 |     |
| 1350  |          |     |     | 857 |     |           |     |     | 853 |     |            |     |     | 4   |     |
| 1500  |          |     |     |     |     |           |     |     |     |     |            |     |     |     |     |

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

Test Vehicle: 2024 Chevrolet Trax 5 Door SUV  
Test Facility: Calspan

NHTSA No.: C20240110  
Test Date: 10/02/2023

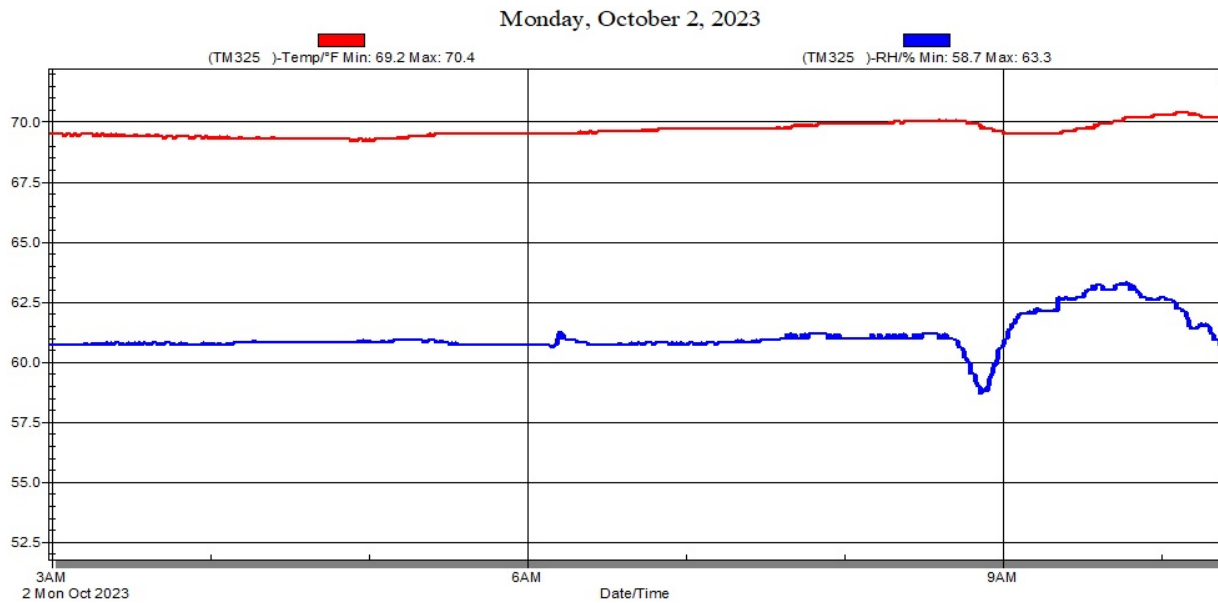


***Vehicle Exterior Crush Measurements - Visual Representation***

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

Test Vehicle: 2024 Chevrolet Trax 5 Door SUV  
Test Facility: Calspan

NHTSA No.: C20240110  
Test Date: 10/02/2023



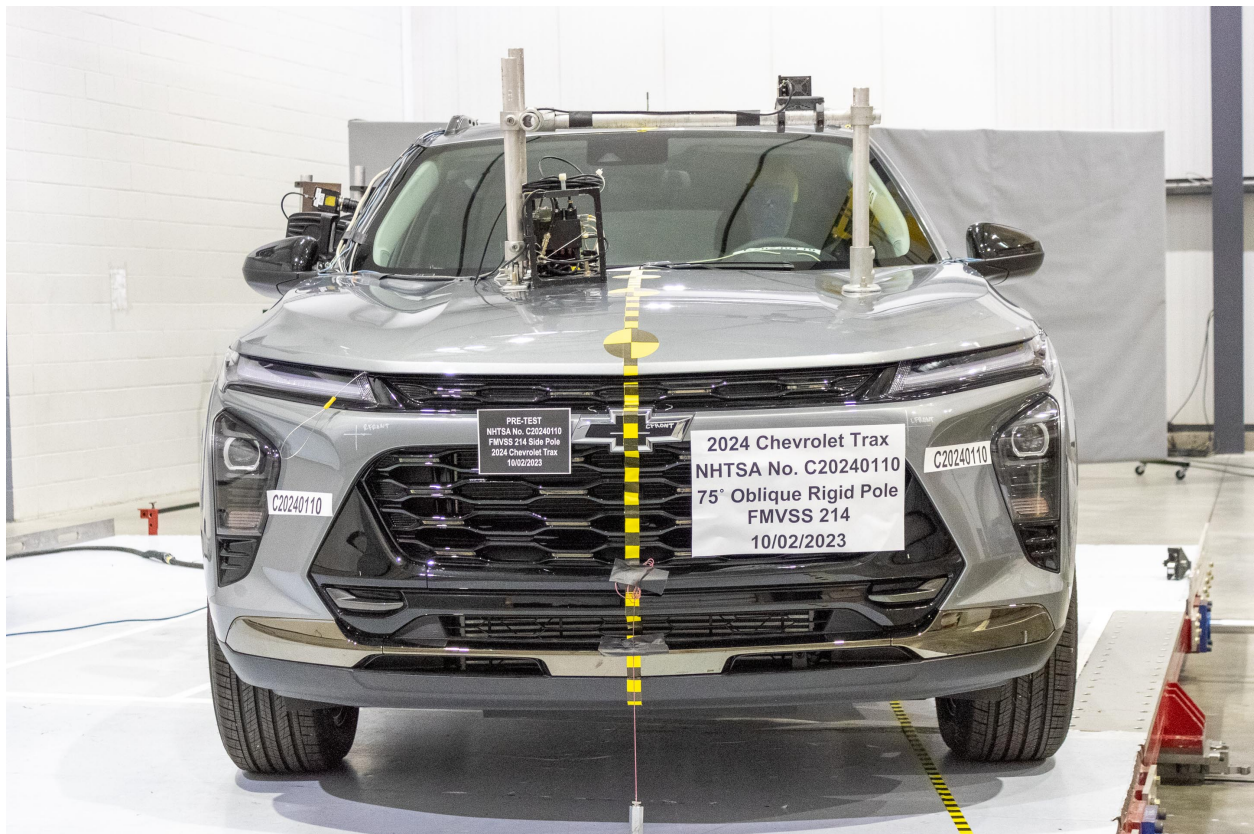
***Temperature and Humidity Stabilization Chart/Data for Dummies and Test Vehicle***

**APPENDIX I**  
**PHOTOGRAPHS**

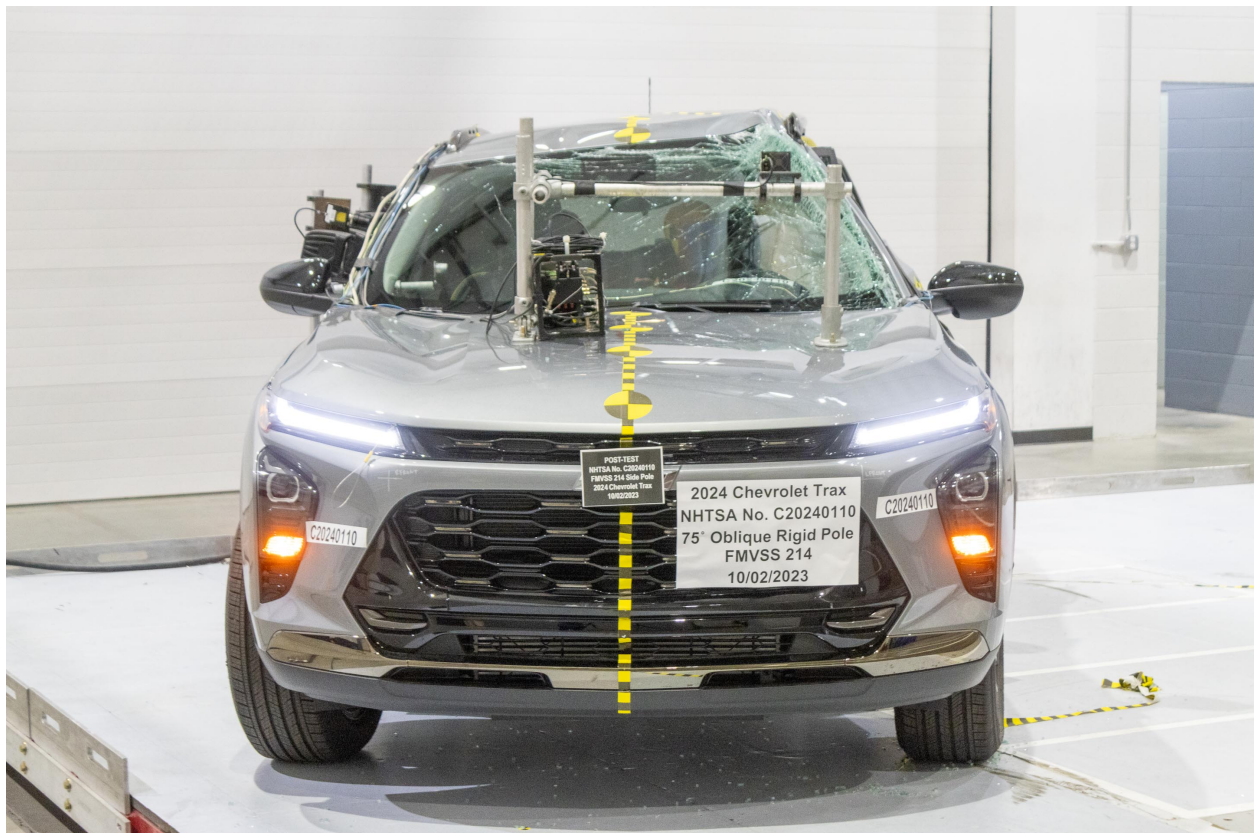
## TABLE OF PHOTOGRAPHS

| Fig. | Description                                                      | Page |
|------|------------------------------------------------------------------|------|
| 1    | Pre-Test Frontal View of Test Vehicle                            | I-3  |
| 2    | Post Test Frontal View of Test Vehicle                           | I-3  |
| 3    | Pre-Test Rear View of Test Vehicle                               | I-4  |
| 4    | Post-Test Rear View of Test Vehicle                              | I-4  |
| 5    | Pre-Test Impacted Side View of Test Vehicle                      | I-5  |
| 6    | Post-Test Impacted Side View of Test Vehicle                     | I-5  |
| 7    | Pre-Test Left $\frac{3}{4}$ Front View of Vehicle and Pole       | I-6  |
| 8    | Pre-Test Left $\frac{3}{4}$ Rear View of Vehicle and Pole        | I-6  |
| 9    | Pre-Test Overhead View of Test Vehicle                           | I-7  |
| 10   | Post-Test Overhead View of Test Vehicle                          | I-7  |
| 11   | Pre-Test Dummy Through Opposite Window                           | I-8  |
| 12   | Post-Test Dummy Through Opposite Window                          | I-8  |
| 13   | Pre-Test Close-Up of Dummy with Door Closed (Impact Side)        | I-9  |
| 14   | Post-Test Close-Up of Dummy with Door Closed (Impact Side)       | I-9  |
| 15   | Pre-Test Dummy with Door Open                                    | I-10 |
| 16   | Pre-Test Dummy Shoulder and Door Top View                        | I-10 |
| 17   | Post-Test Dummy Shoulder and Door Top View                       | I-11 |
| 18   | Pre-Test Interior of Front Door Closed (through opposite window) | I-11 |
| 19   | Post-Test Interior of Front Door Showing Dummy Impact Locations  | I-12 |
| 20   | Impact Event                                                     | I-12 |
| 21   | Post-Test Impact Zone Close-Up View                              | I-13 |
| 22   | Post-Test $\frac{3}{4}$ Front View of Impact Zone                | I-13 |
| 23   | Post-Test $\frac{3}{4}$ Rear View of Impact Zone                 | I-14 |
| 24   | Post-Test Close-Up View of Impact Point Target                   | I-14 |
| 25   | Close-Up View of Vehicle's Certification Label                   | I-15 |
| 26   | Close-Up View of Vehicle's Tire Placard Label                    | I-15 |



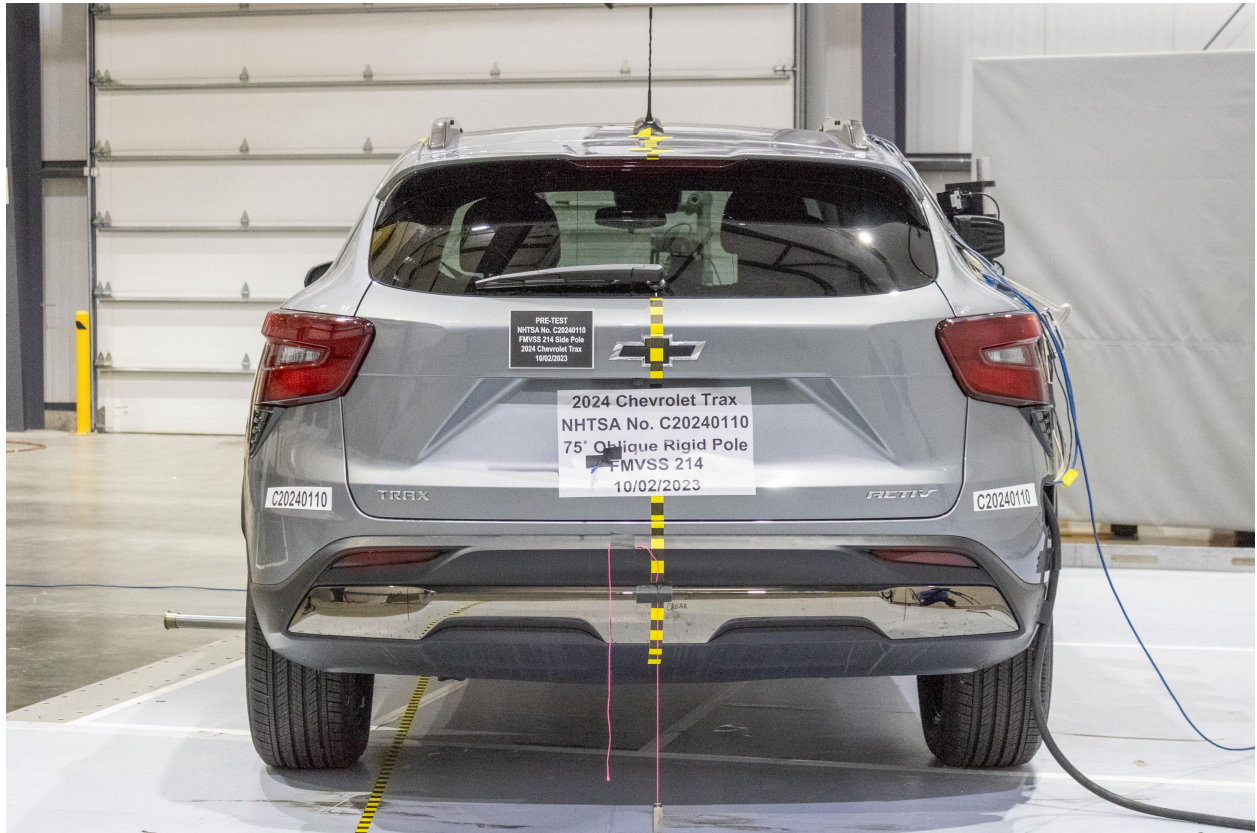


**Figure A-1: Pre-Test Frontal View of Test Vehicle**



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





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



**Figure A-4: Post-Test Rear View of Test Vehicle**





**Figure A-5: Pre-Test Impacted Side View of Test Vehicle**



**Figure A-6: Post-Test Impacted Side View of Test Vehicle**





**Figure A-7: Pre-Test Left  $\frac{3}{4}$  Front View of Vehicle and Pole**

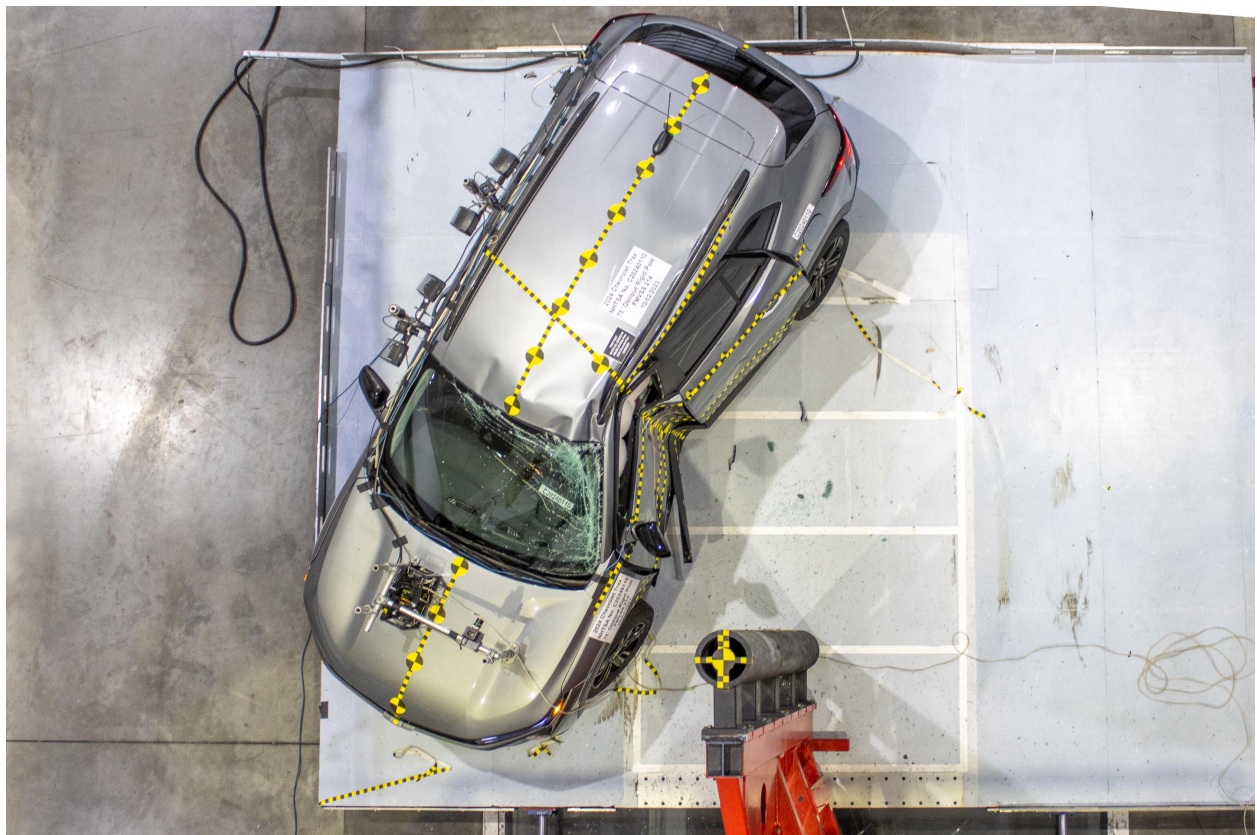


**Figure A-8: Pre-Test Left  $\frac{3}{4}$  Rear View of Vehicle and Pole**





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



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





**Figure A-11: Pre-Test Dummy Through Opposite Window**



**Figure A-12: Post-Test Dummy Through Opposite Window**





**Figure A-13: Pre-Test Close-Up of Dummy with Door Closed (Impact Side)**



**Figure A-14: Post-Test Close-Up of Dummy with Door Closed (Impact Side)**





**Figure A-15: Pre-Test Dummy with Door Open**



**Figure A-16: Pre-Test Dummy Shoulder and Door Top View**





**Figure A-17: Post-Test Dummy Shoulder and Door Top View**



**Figure A-18: Pre-Test Interior of Front Door Closed (through opposite window)**





**Figure A-19: Post-Test Interior of Front Door Showing Dummy Impact Locations**



**Figure A-20: Impact Event**





**Figure A-21: Post-Test Impact Zone Close-Up View**



**Figure A-22: Post-Test  $\frac{3}{4}$  Front View of Impact Zone**





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



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





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



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



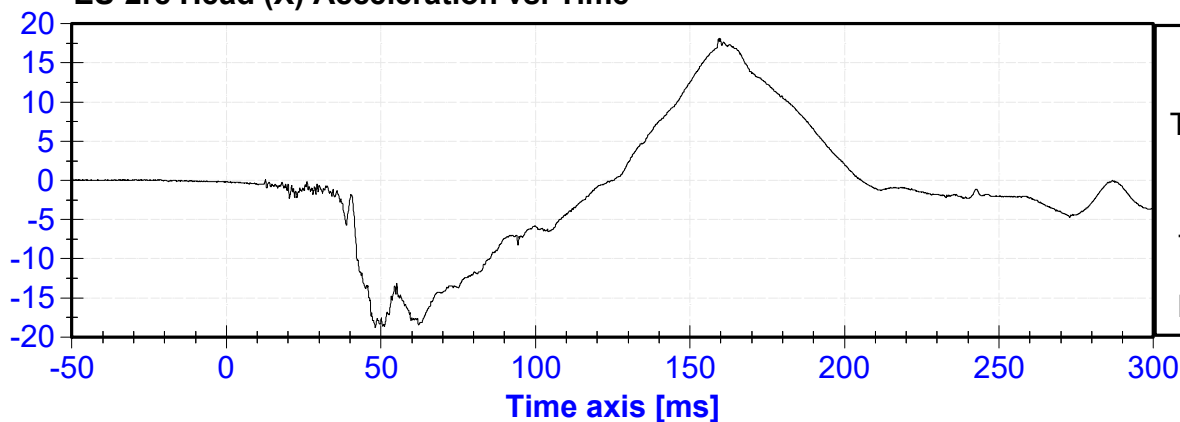
# **APPENDIX II**

## **ES-2re DUMMY RESPONSE DATA TRACES**

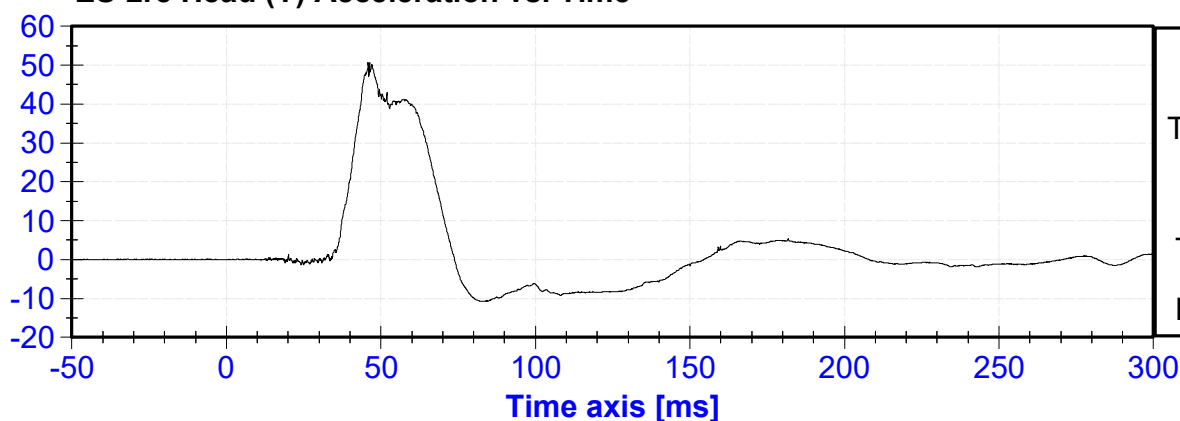
## Table of Data Plots

| No. | Description                                       | Page |
|-----|---------------------------------------------------|------|
| 1   | ES-2re Head (X) Acceleration vs. Time             | II-3 |
| 2   | ES-2re Head (Y) Acceleration vs. Time             | II-3 |
| 3   | ES-2re Head (Z) Acceleration vs. Time             | II-3 |
| 4   | ES-2re Head Resultant Acceleration vs. Time       | II-3 |
| 5   | ES-2re Head (X) Velocity vs. Time                 | II-4 |
| 6   | ES-2re Head (Y) Velocity vs. Time                 | II-4 |
| 7   | ES-2re Head (Z) Velocity vs. Time                 | II-4 |
| 8   | ES-2re Upper Thorax Rib Deflection Rate vs. Time  | II-4 |
| 9   | ES-2re Upper Thorax Rib Deflection (Y) vs. Time   | II-5 |
| 10  | ES-2re Middle Thorax Rib Deflection Rate vs. Time | II-5 |
| 11  | ES-2re Middle Thorax Rib Deflection (Y) vs. Time  | II-5 |
| 12  | ES-2re Lower Thorax Rib Deflection Rate vs. Time  | II-5 |
| 13  | ES-2re Lower Thorax Rib Deflection (Y) vs. Time   | II-6 |
| 14  | ES-2re Front Abdomen Force (Y) vs. Time           | II-6 |
| 15  | ES-2re Middle Abdomen Force (Y) vs. Time          | II-6 |
| 16  | ES-2re Rear Abdomen Force (Y) vs. Time            | II-6 |
| 17  | ES-2re Sum of Abdomen Forces vs. Time             | II-7 |
| 18  | ES-2re Pubic Symphysis Force (Y) vs. Time         | II-7 |

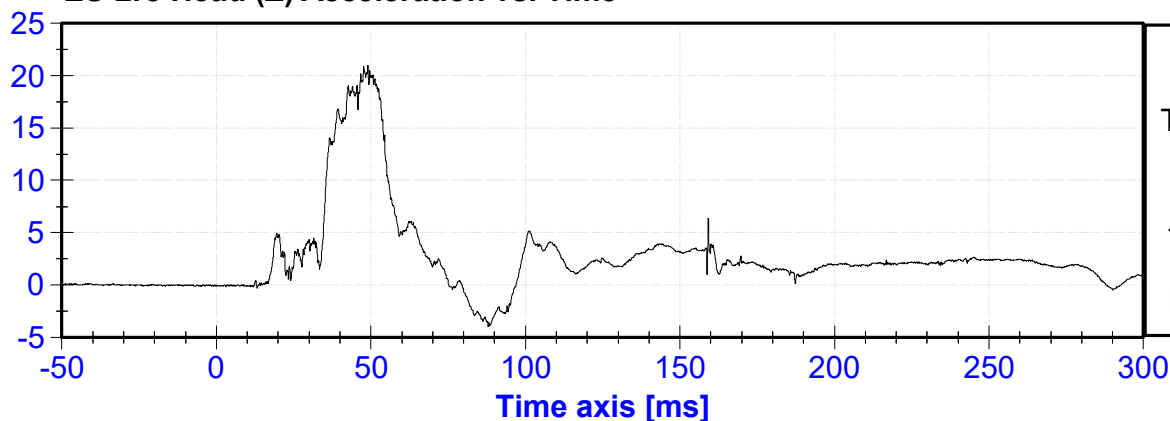
ES-2re Head (X) Acceleration vs. Time



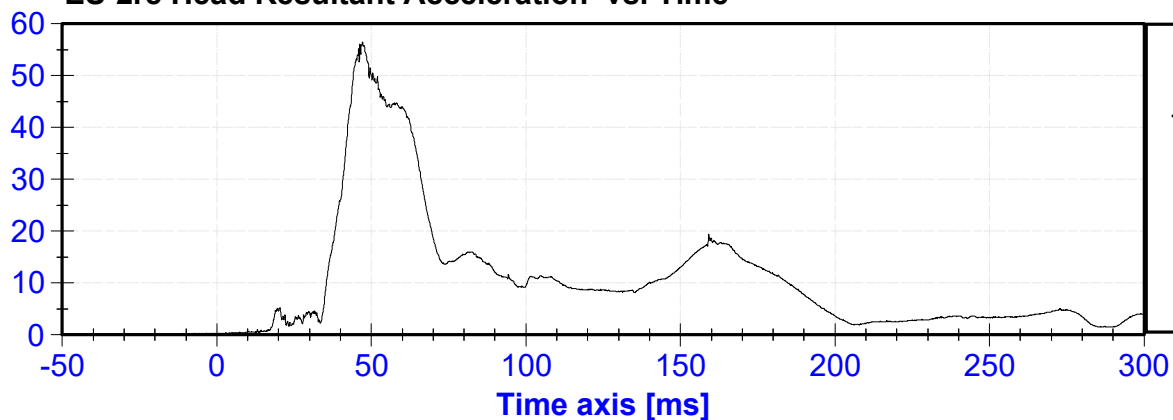
ES-2re Head (Y) Acceleration vs. Time



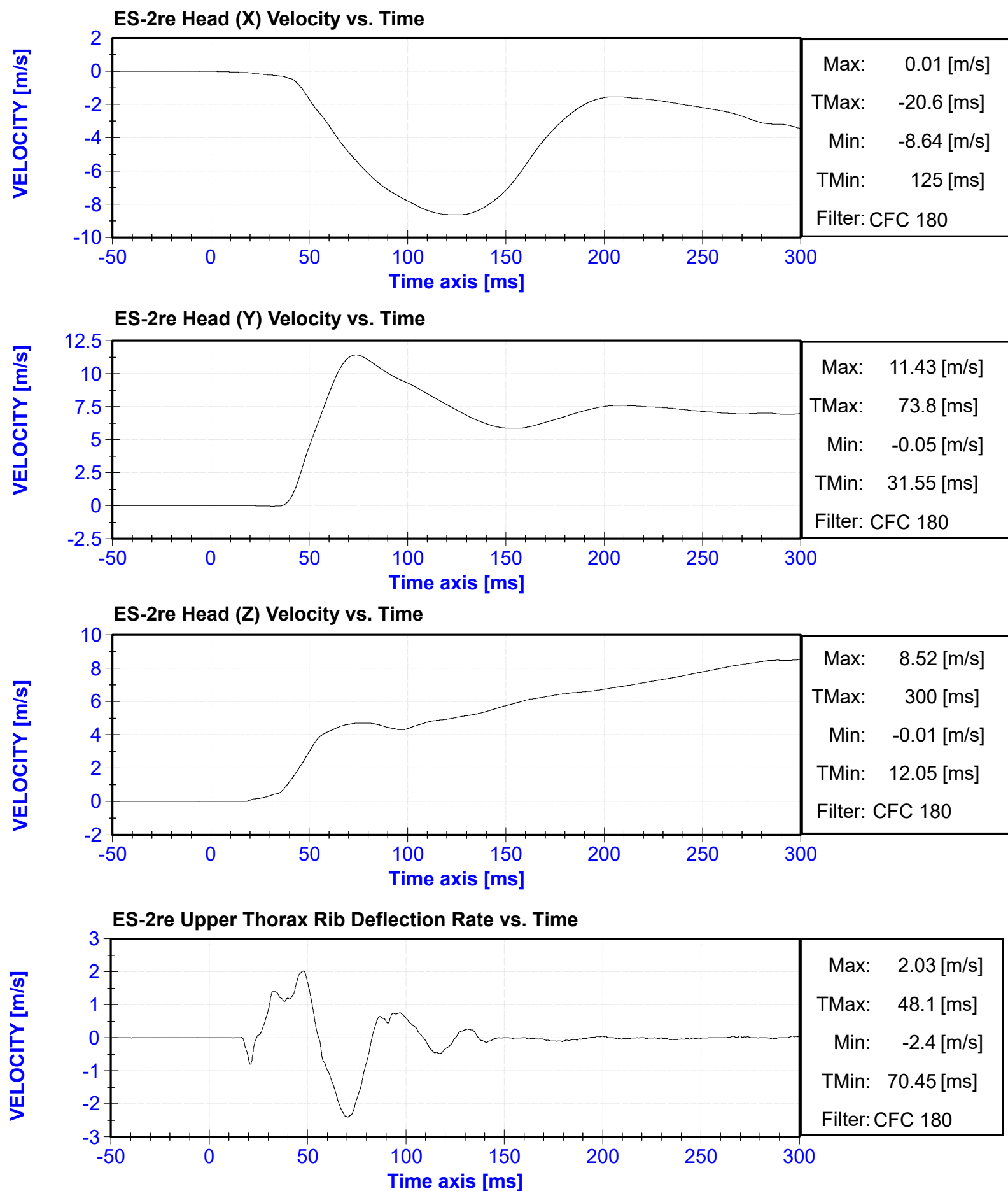
ES-2re Head (Z) Acceleration vs. Time



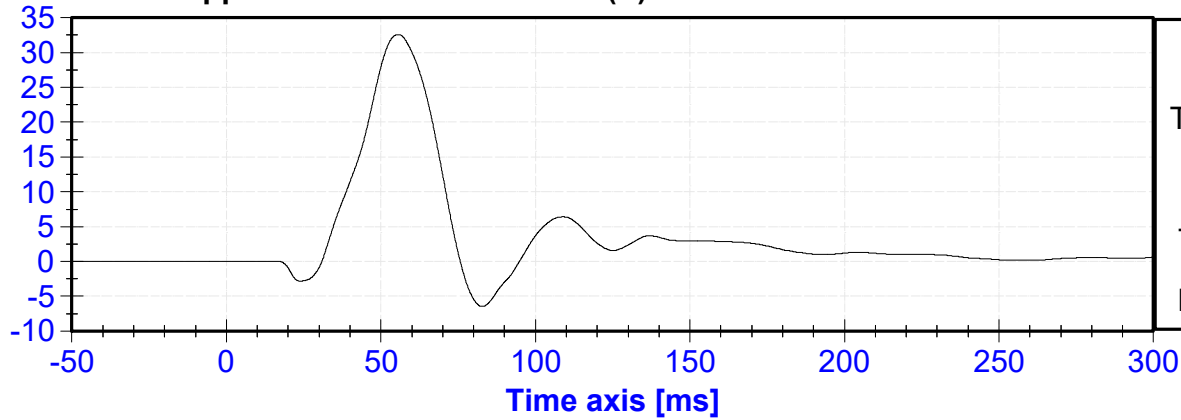
ES-2re Head Resultant Acceleration vs. Time



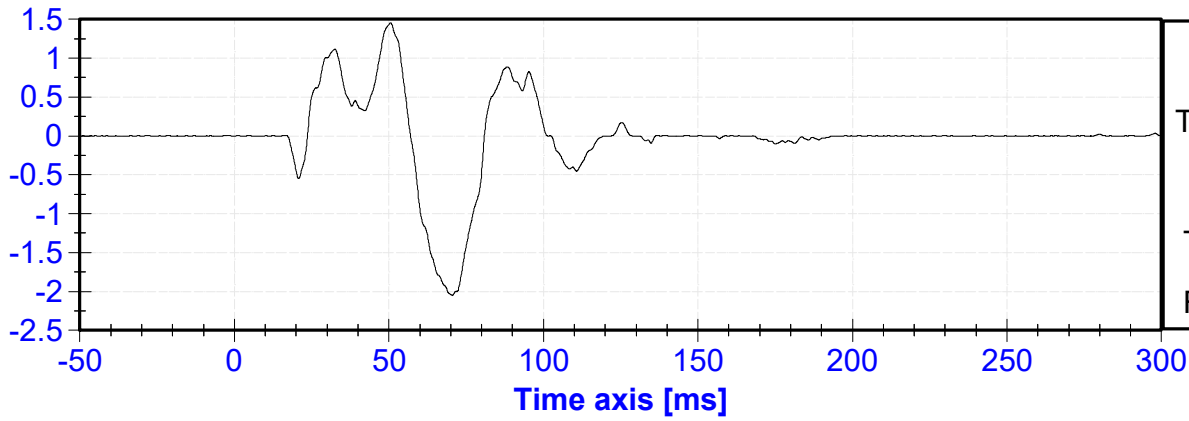




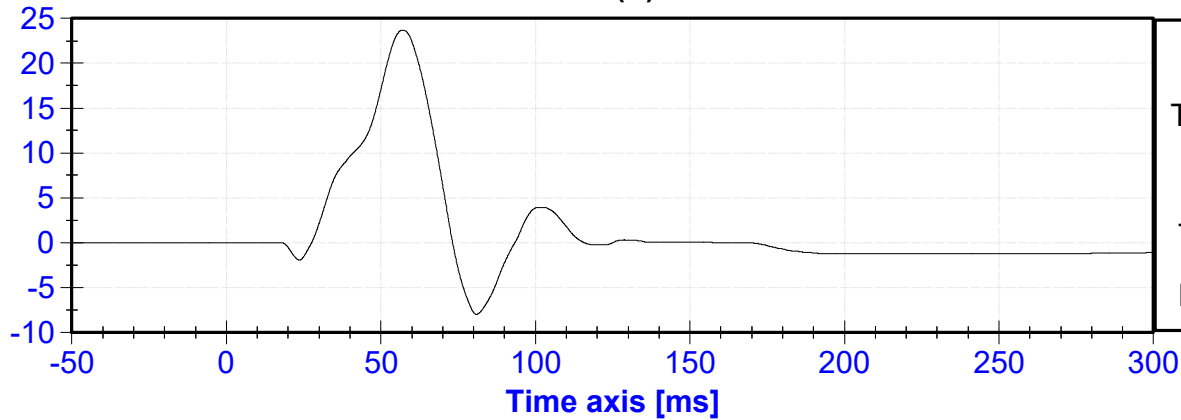
ES-2re Upper Thorax Rib Deflection (Y) vs. Time



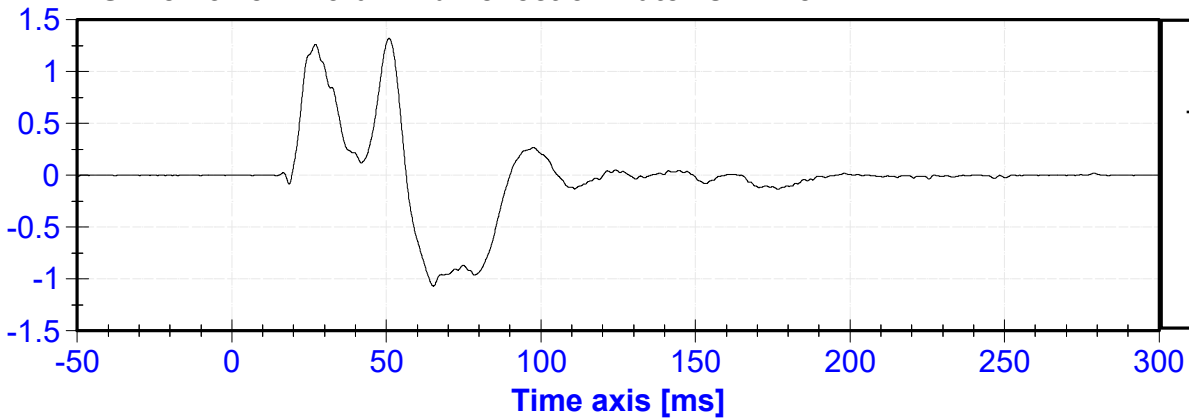
ES-2re Middle Thorax Rib Deflection Rate vs. Time



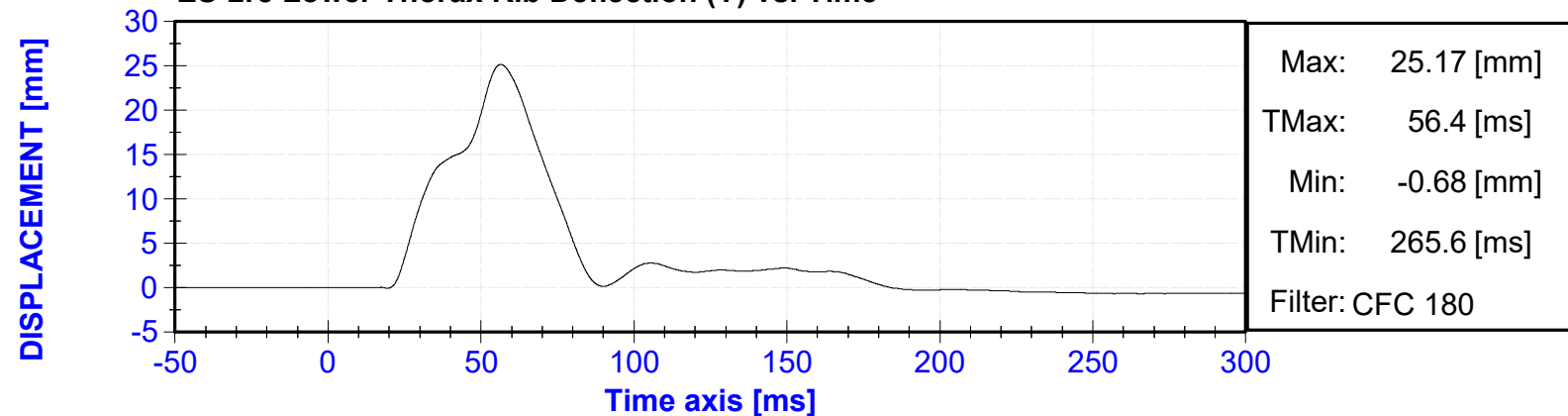
ES-2re Middle Thorax Rib Deflection (Y) vs. Time



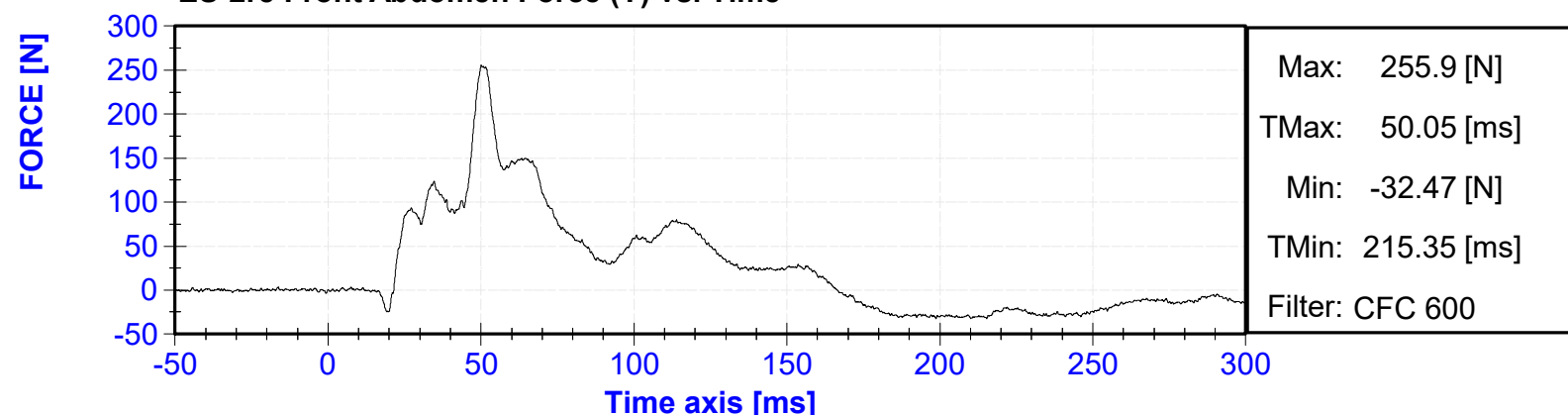
ES-2re Lower Thorax Rib Deflection Rate vs. Time



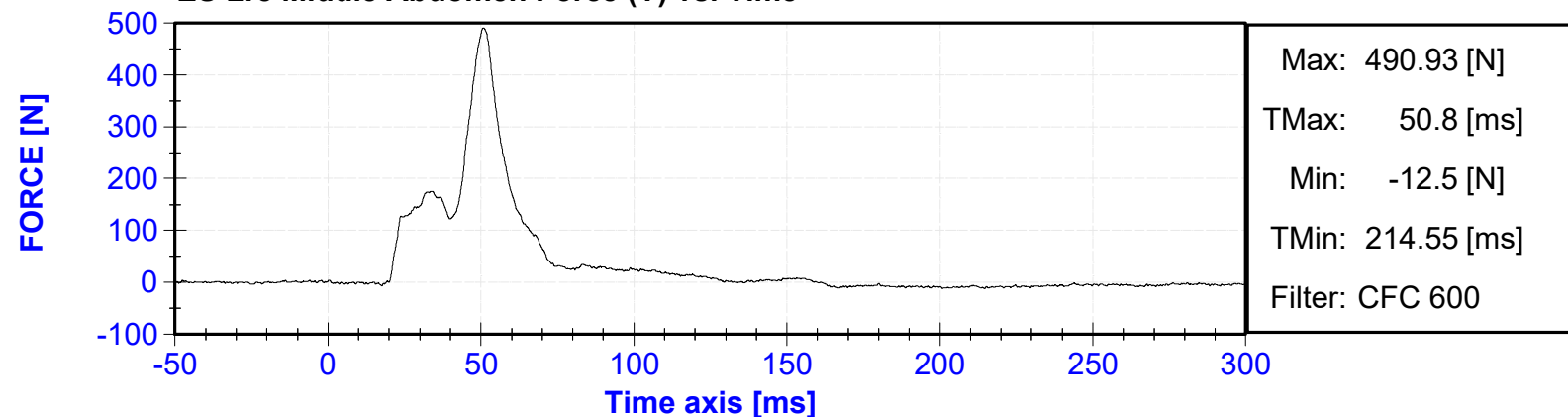
ES-2re Lower Thorax Rib Deflection (Y) vs. Time



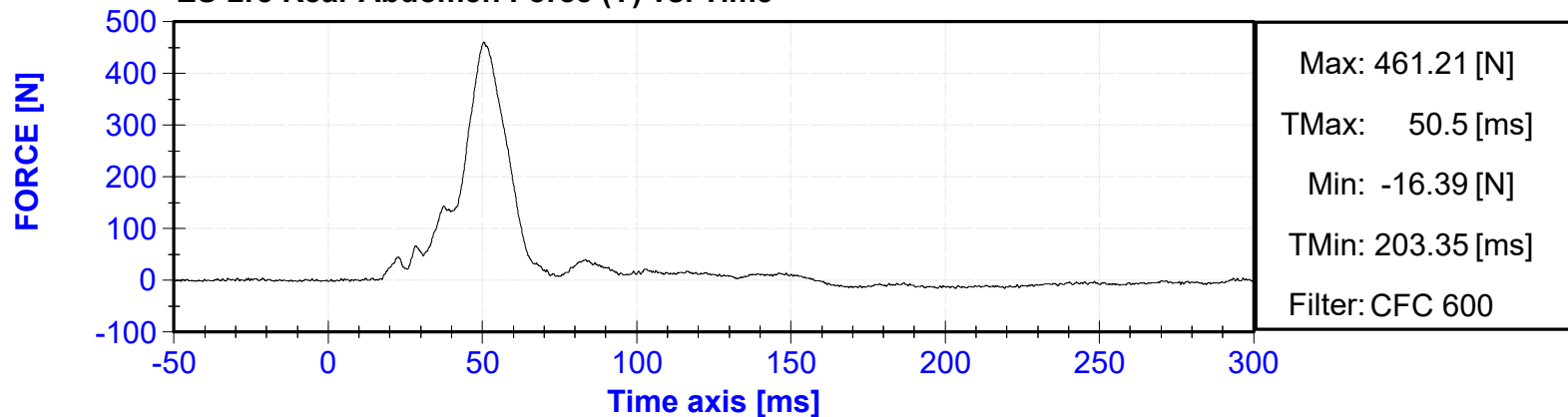
ES-2re Front Abdomen Force (Y) vs. Time



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

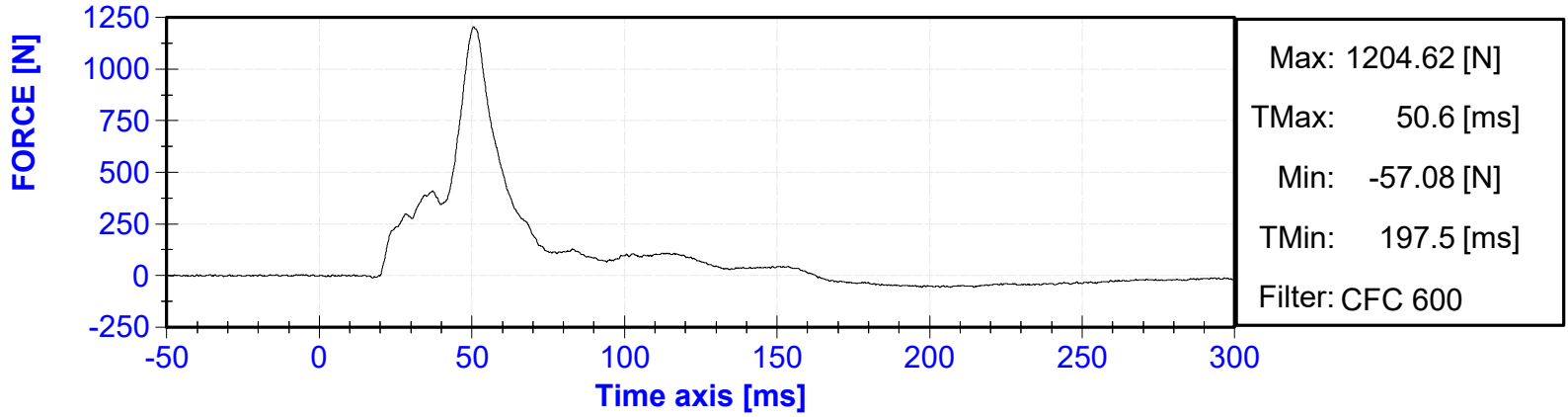


ES-2re Rear Abdomen Force (Y) vs. Time

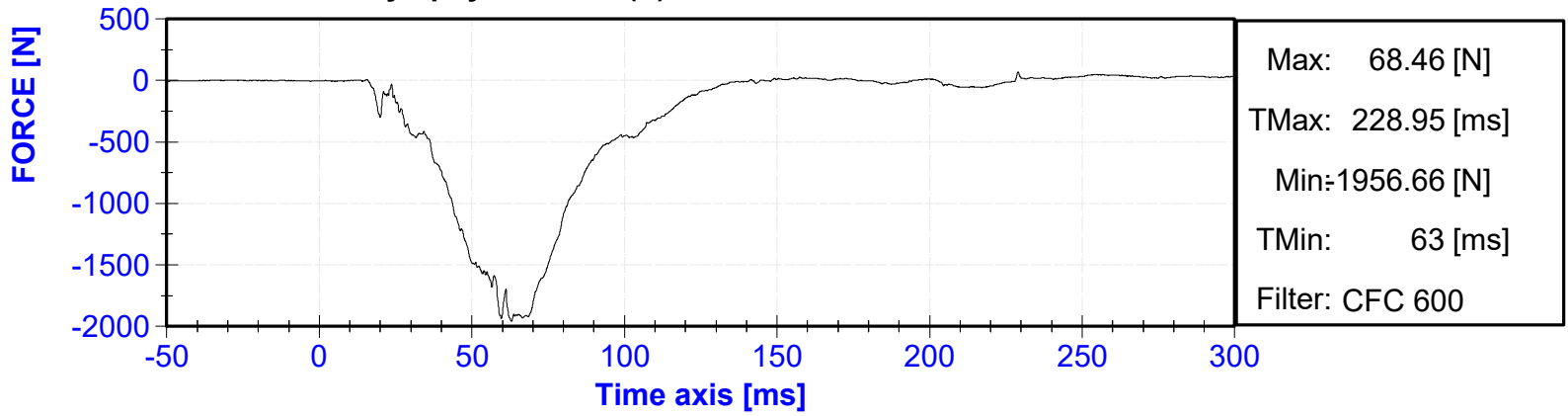




ES-2re Sum of Abdomen Forces vs. Time



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



# **APPENDIX III**

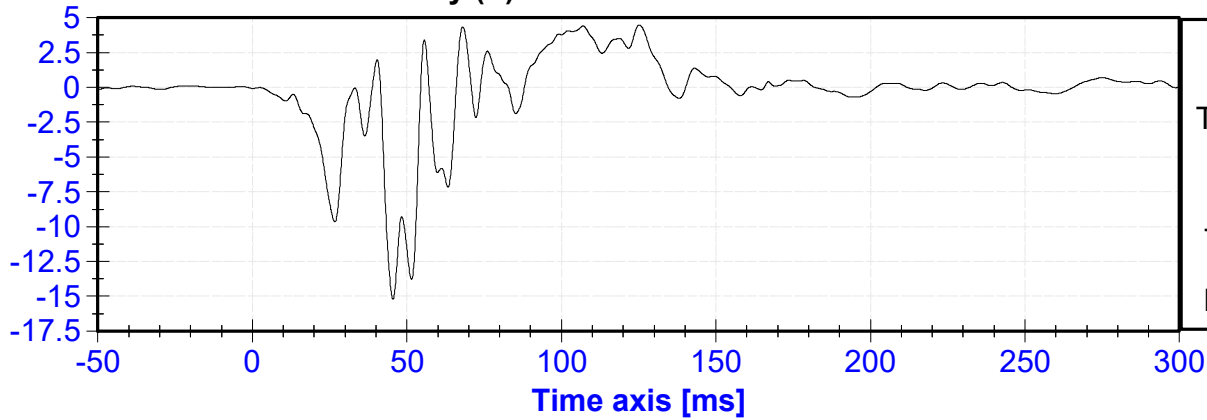
## **VEHICLE ACCELEROMETER RESPONSE DATA**

## Table of Data Plots

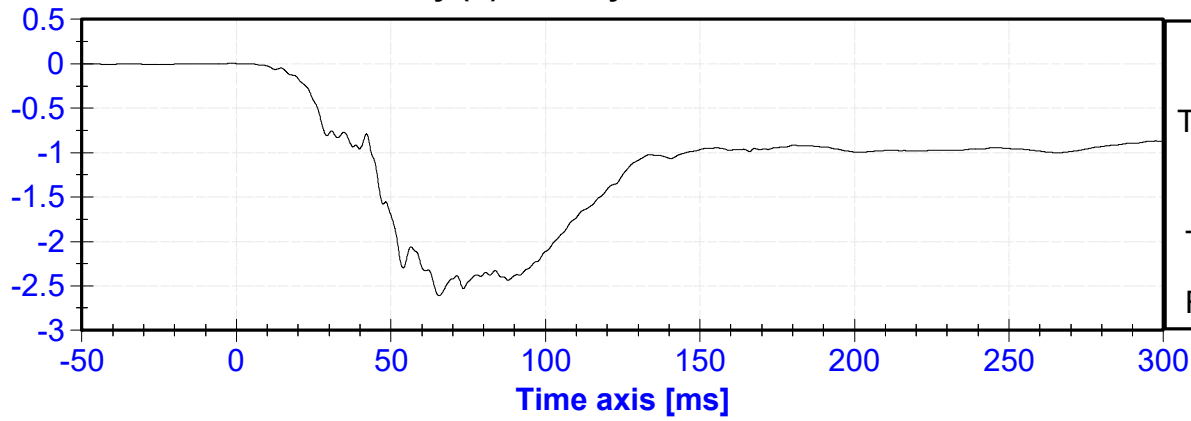
| No. | Description                                               | Page   |
|-----|-----------------------------------------------------------|--------|
| 1   | Vehicle Center of Gravity (X) Acceleration vs. Time       | III-3  |
| 2   | Vehicle Center of Gravity (X) Velocity vs. Time           | III-3  |
| 3   | Vehicle Center of Gravity (Y) Acceleration vs. Time       | III-3  |
| 4   | Vehicle Center of Gravity (Y) Velocity vs. Time           | III-3  |
| 5   | Vehicle Center of Gravity (Z) Acceleration vs. Time       | III-4  |
| 6   | Vehicle Center of Gravity (Z) Velocity vs. Time           | III-4  |
| 7   | Vehicle Center of Gravity Resultant Acceleration vs. Time | III-4  |
| 8   | Floor Sill – Impact Side (Y) Acceleration vs. Time        | III-4  |
| 9   | Floor Sill – Impact Side (Y) Velocity vs. Time            | III-5  |
| 10  | Floor Sill – Impact Side (Y) Displacement vs. Time        | III-5  |
| 11  | A-Pillar Sill (Y) Acceleration vs. Time                   | III-5  |
| 12  | A-Pillar Sill (Y) Velocity vs. Time                       | III-5  |
| 13  | A-Pillar Sill (Y) Displacement vs. Time                   | III-6  |
| 14  | A-Pillar Low (Y) Acceleration vs. Time                    | III-6  |
| 15  | A-Pillar Low (Y) Velocity vs. Time                        | III-6  |
| 16  | A-Pillar Low (Y) Displacement vs. Time                    | III-6  |
| 17  | A-Pillar Mid (Y) Acceleration vs. Time                    | III-7  |
| 18  | A-Pillar Mid (Y) Velocity vs. Time                        | III-7  |
| 19  | A-Pillar Mid (Y) Displacement vs. Time                    | III-7  |
| 20  | B-Pillar Sill (Y) Acceleration vs. Time                   | III-7  |
| 21  | B-Pillar Sill (Y) Velocity vs. Time                       | III-8  |
| 22  | B-Pillar Sill (Y) Displacement vs. Time                   | III-8  |
| 23  | B-Pillar Low (Y) Acceleration vs. Time                    | III-8  |
| 24  | B-Pillar Low (Y) Velocity vs. Time                        | III-8  |
| 25  | B-Pillar Low (Y) Displacement vs. Time                    | III-9  |
| 26  | B-Pillar Mid (Y) Acceleration vs. Time                    | III-9  |
| 27  | B-Pillar Mid (Y) Velocity vs. Time                        | III-9  |
| 28  | B-Pillar Mid (Y) Displacement vs. Time                    | III-9  |
| 29  | Seat (Y) Acceleration vs. Time                            | III-10 |
| 30  | Seat (Y) Velocity vs. Time                                | III-10 |
| 31  | Seat (Y) Displacement vs. Time                            | III-10 |
| 32  | Engine (X) Acceleration vs. Time                          | III-10 |
| 33  | Engine (X) Velocity vs. Time                              | III-11 |
| 34  | Engine (Y) Acceleration vs. Time                          | III-11 |
| 35  | Engine (Y) Velocity vs. Time                              | III-11 |
| 36  | Firewall (Y) Acceleration vs. Time                        | III-11 |
| 37  | Firewall (Y) Velocity vs. Time                            | III-12 |
| 38  | Roof (Y) Acceleration vs. Time                            | III-12 |
| 39  | Roof (Y) Velocity vs. Time                                | III-12 |
| 40  | Floor Sill – Non Impact Side (Y) Acceleration vs. Time    | III-12 |
| 41  | Floor Sill – Non Impact Side (Y) Velocity vs. Time        | III-13 |
| 42  | Rear Deck (X) Acceleration vs. Time                       | III-13 |
| 43  | Rear Deck (X) Velocity vs. Time                           | III-13 |
| 44  | Rear Deck (Y) Acceleration vs. Time                       | III-13 |
| 45  | Rear Deck (Y) Velocity vs. Time                           | III-14 |



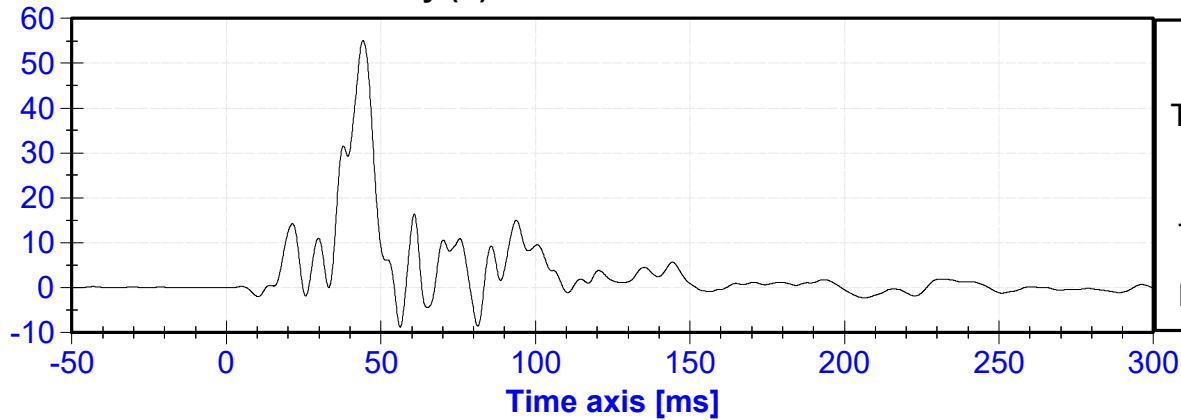
Vehicle Center of Gravity (X) Acceleration vs. Time



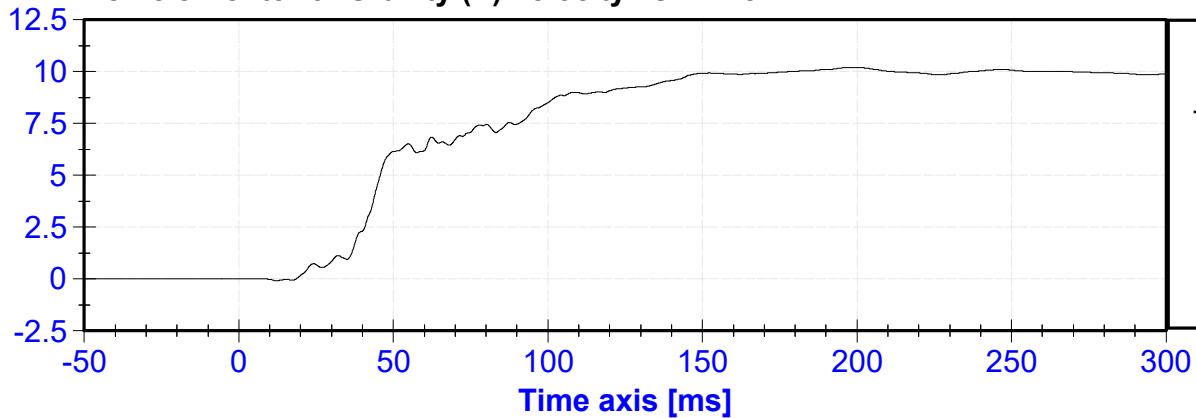
Vehicle Center of Gravity (X) Velocity vs. Time



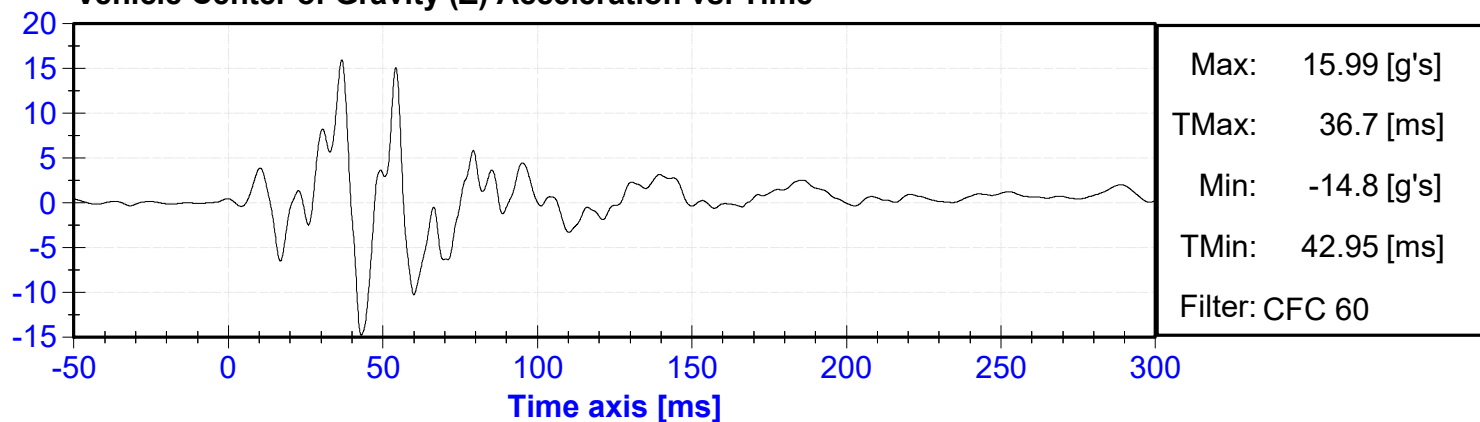
Vehicle Center of Gravity (Y) Acceleration vs. Time



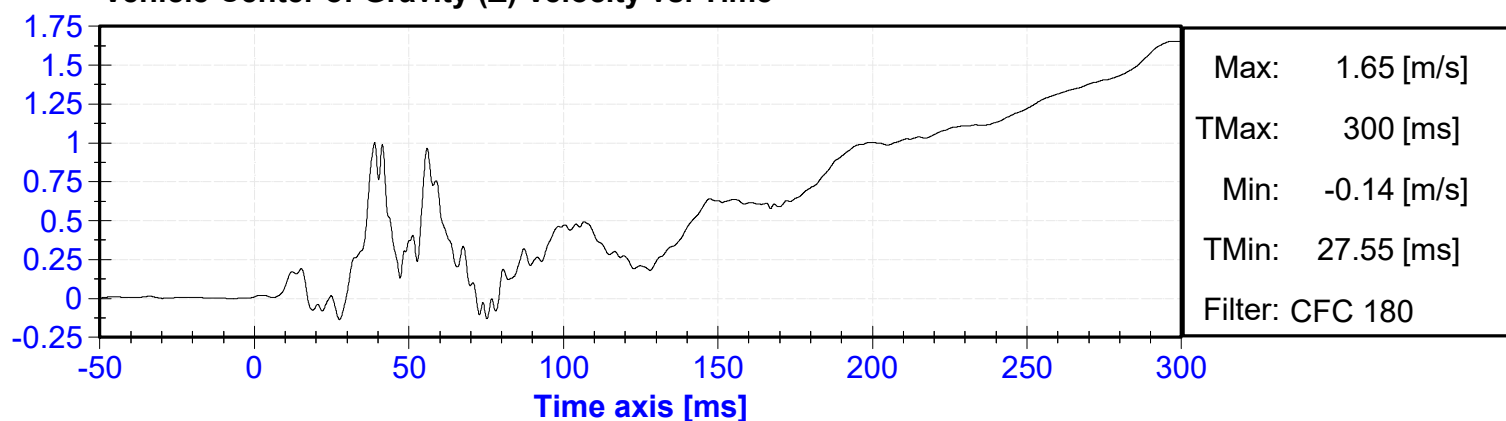
Vehicle Center of Gravity (Y) Velocity vs. Time



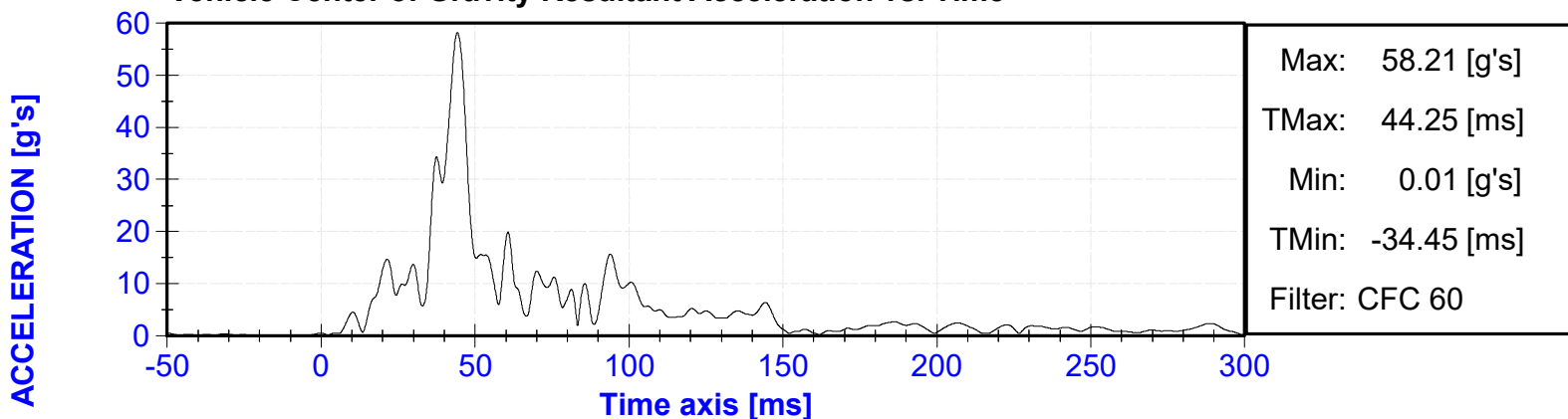
Vehicle Center of Gravity (Z) Acceleration vs. Time



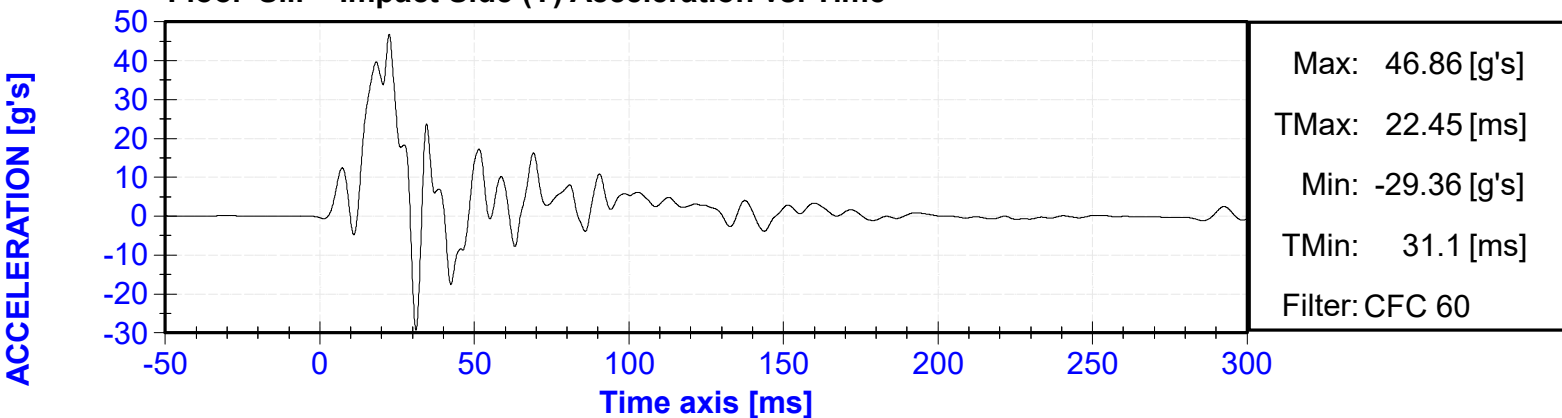
Vehicle Center of Gravity (Z) Velocity vs. Time



Vehicle Center of Gravity Resultant Acceleration vs. Time

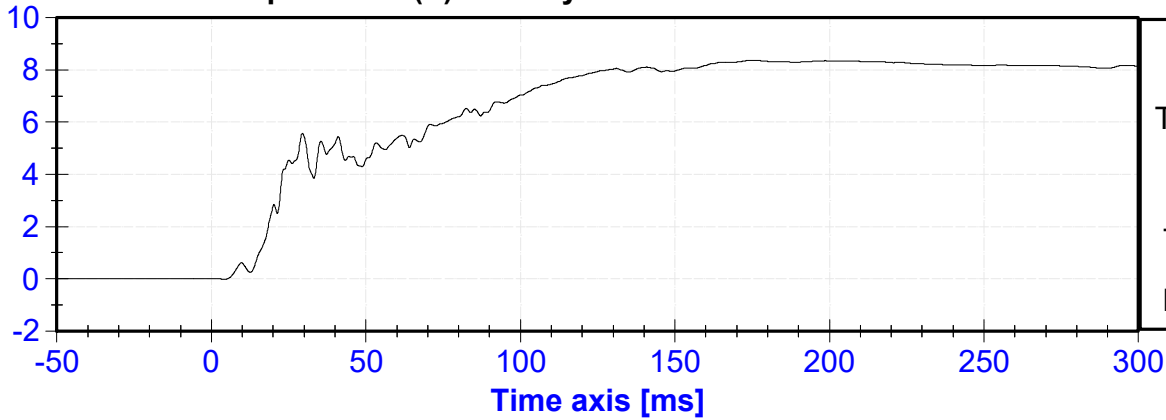


Floor Sill – Impact Side (Y) Acceleration vs. Time



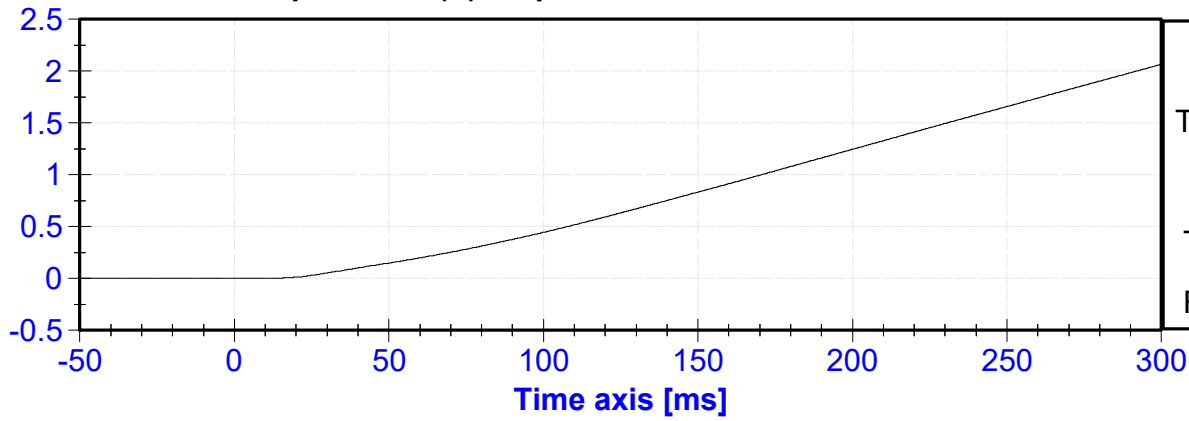
Floor Sill – Impact Side (Y) Velocity vs. Time

VELOCITY [m/s]



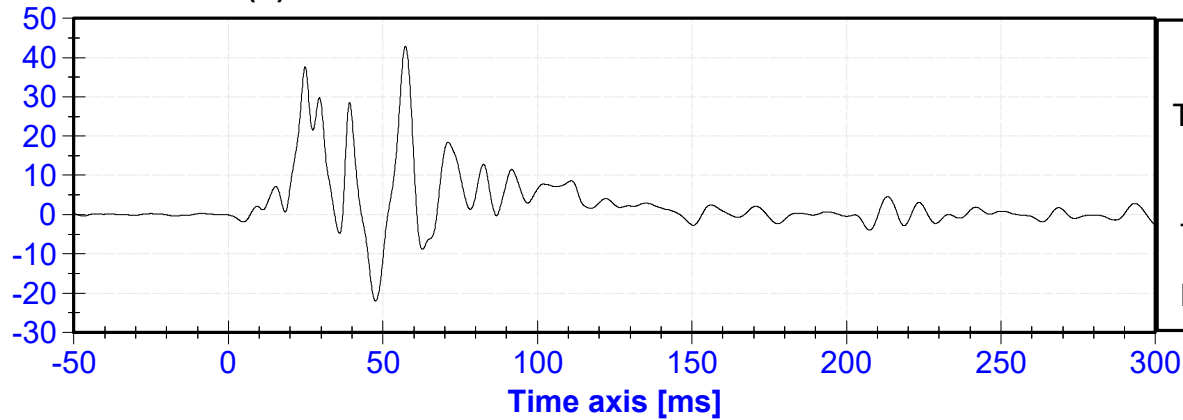
Floor Sill – Impact Side (Y) Displacement vs. Time

DISPLACEMENT [m]



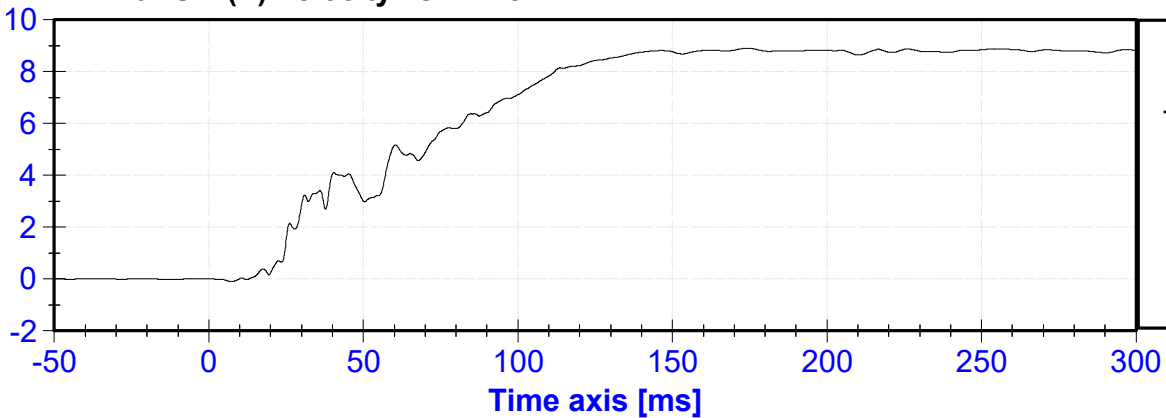
A-Pillar Sill (Y) Acceleration vs. Time

ACCELERATION [g's]



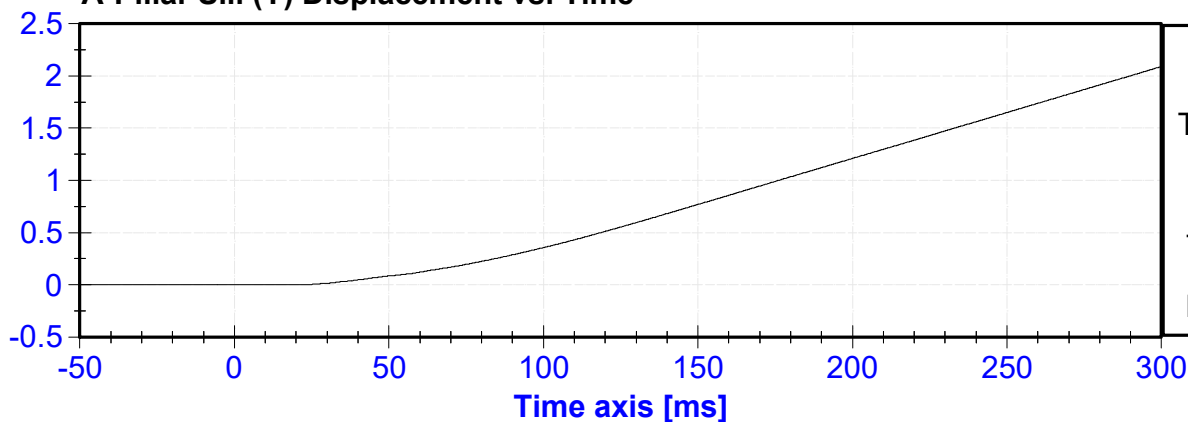
A-Pillar Sill (Y) Velocity vs. Time

VELOCITY [m/s]



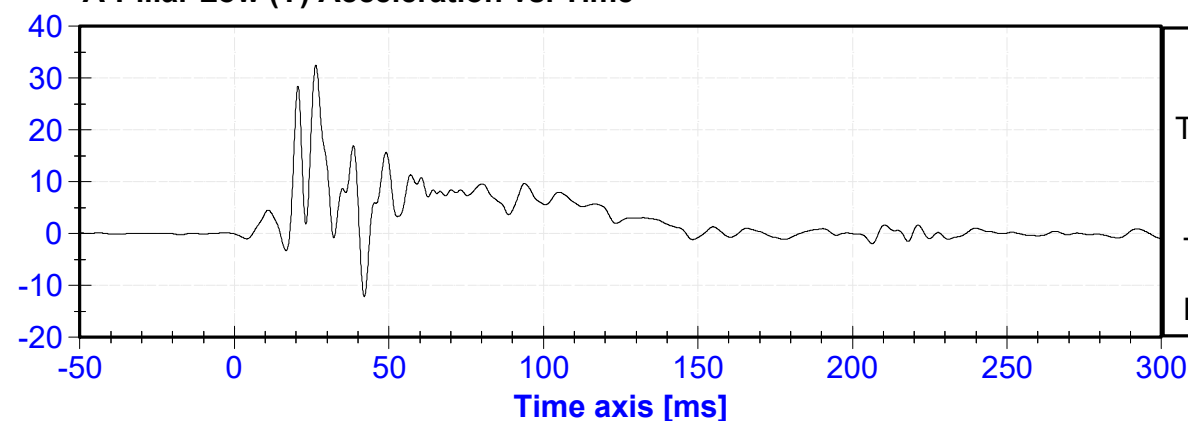
DISPLACEMENT [m]

A-Pillar Sill (Y) Displacement vs. Time



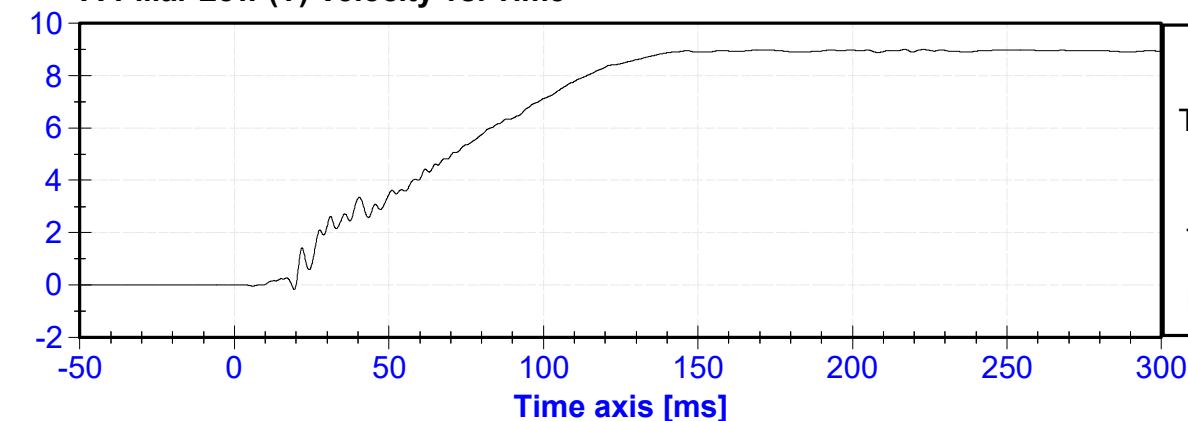
ACCELERATION [g's]

A-Pillar Low (Y) Acceleration vs. Time



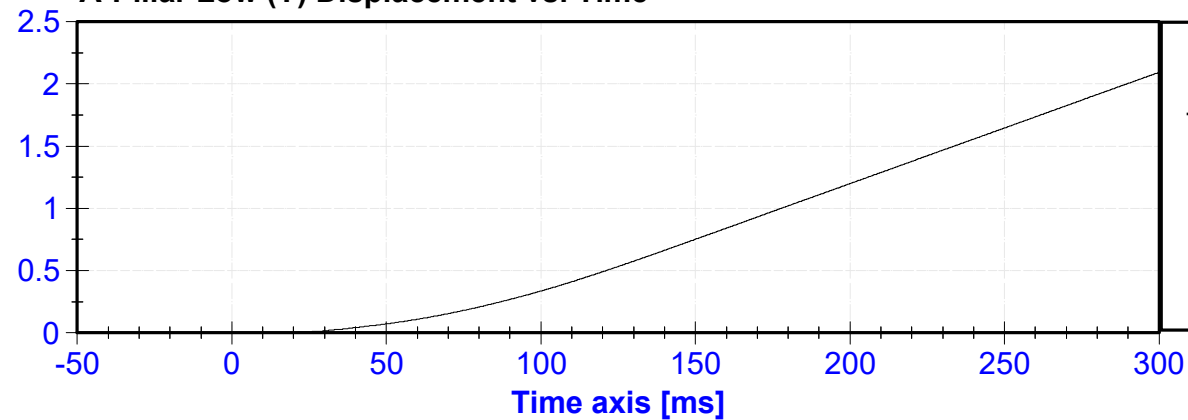
VELOCITY [m/s]

A-Pillar Low (Y) Velocity vs. Time



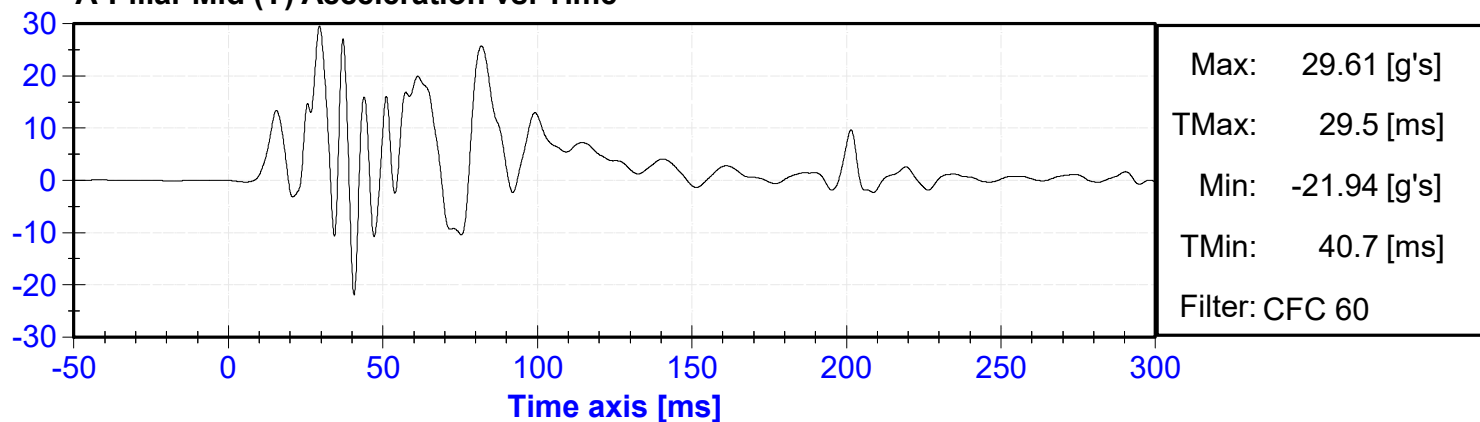
DISPLACEMENT [m]

A-Pillar Low (Y) Displacement vs. Time

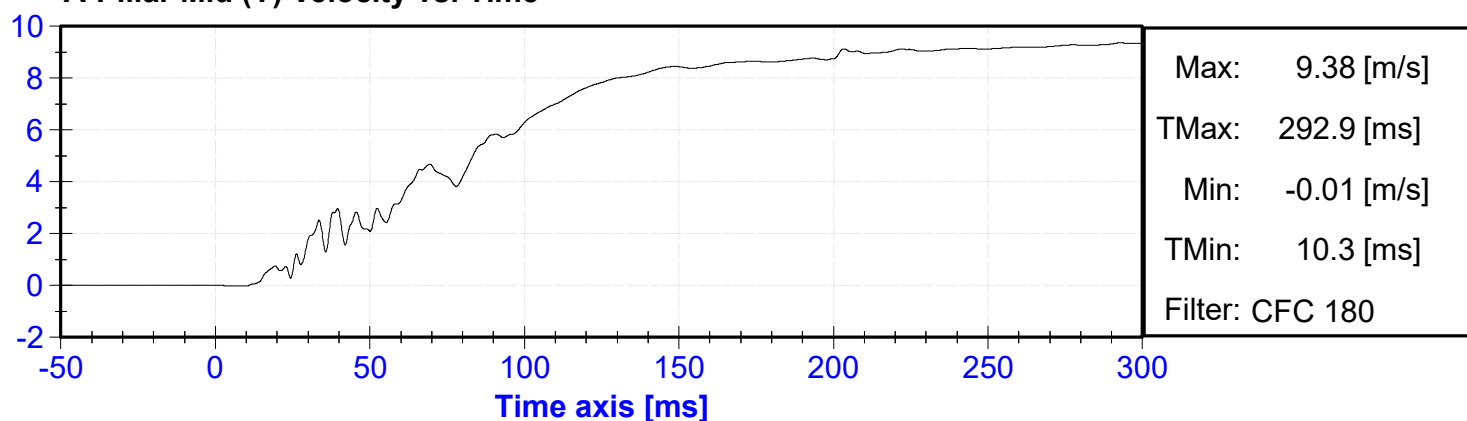




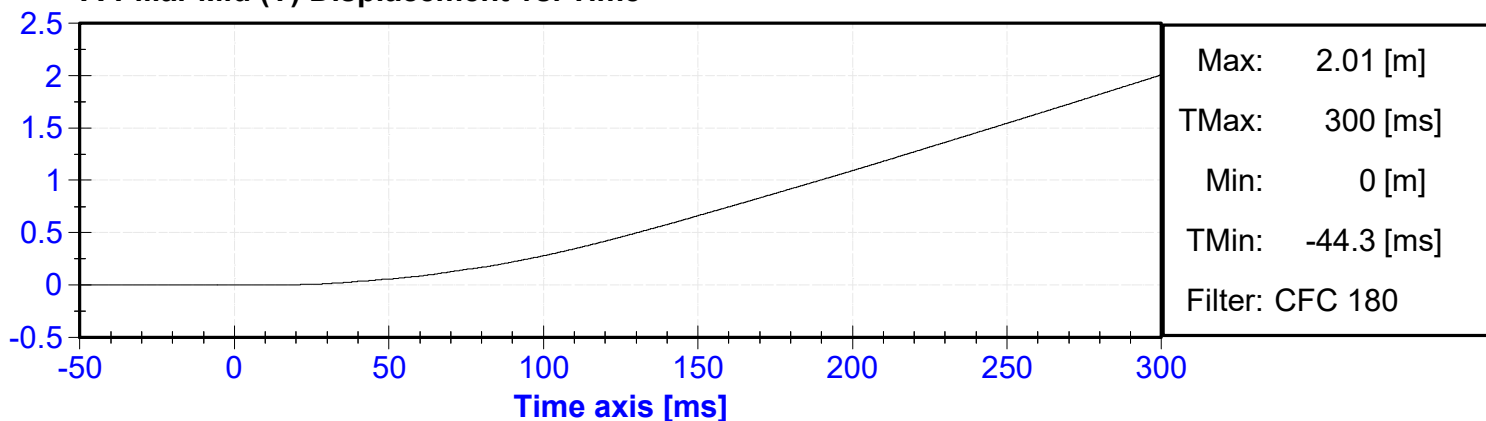
**A-Pillar Mid (Y) Acceleration vs. Time**



**A-Pillar Mid (Y) Velocity vs. Time**

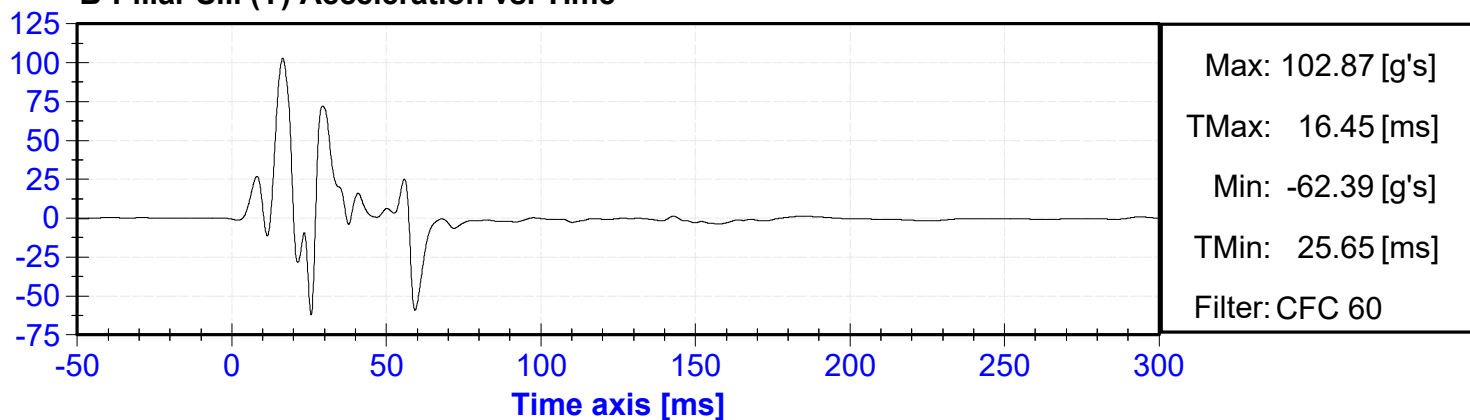


**A-Pillar Mid (Y) Displacement vs. Time**



Exceeded calibration range and saturated at 57.7 ms

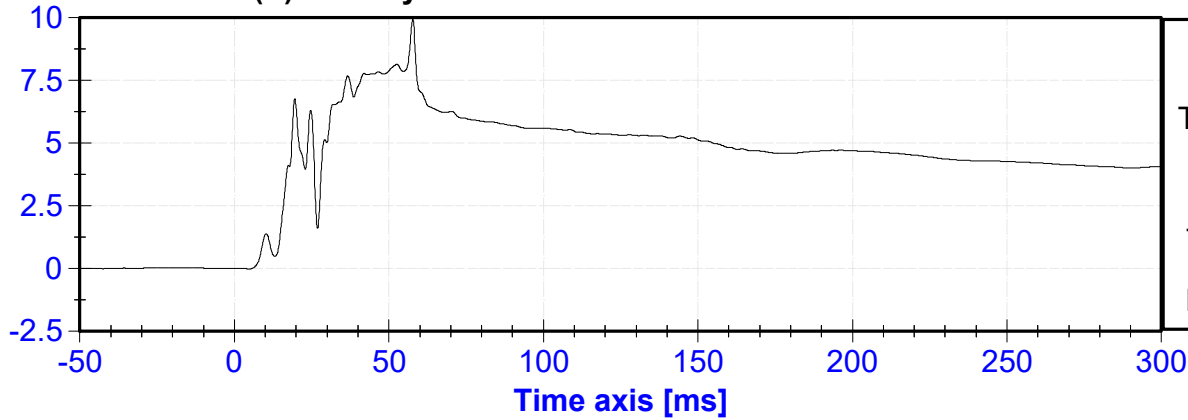
**B-Pillar Sill (Y) Acceleration vs. Time**



Exceeded calibration range and saturated at 57.7 ms

B-Pillar Sill (Y) Velocity vs. Time

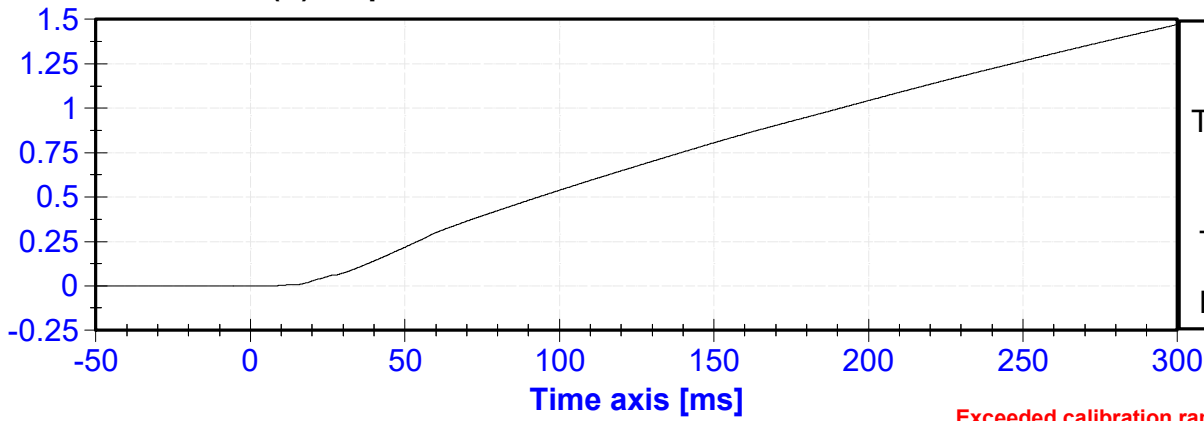
VELOCITY [m/s]



Exceeded calibration range and saturated at 57.7 ms

B-Pillar Sill (Y) Displacement vs. Time

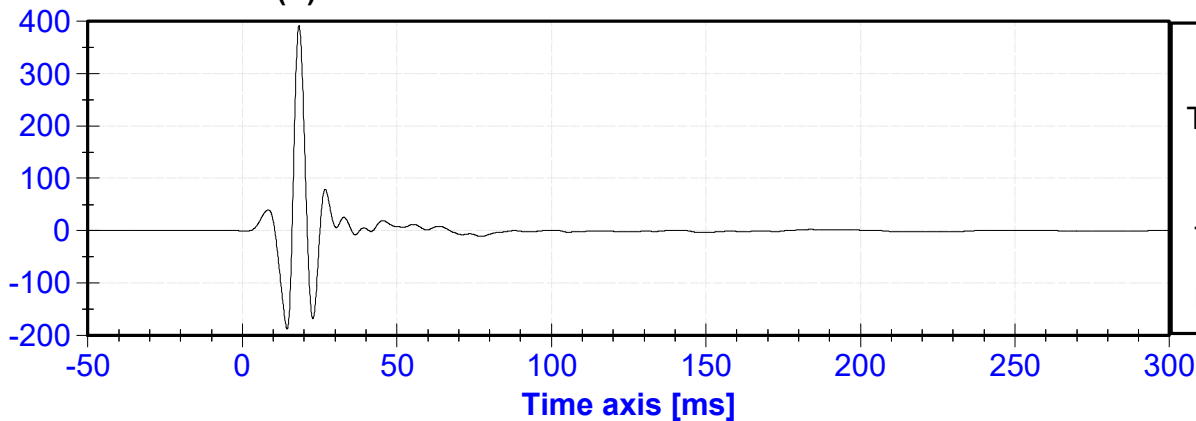
DISPLACEMENT [m]



Exceeded calibration range and saturated at 15.8 ms

B-Pillar Low (Y) Acceleration vs. Time

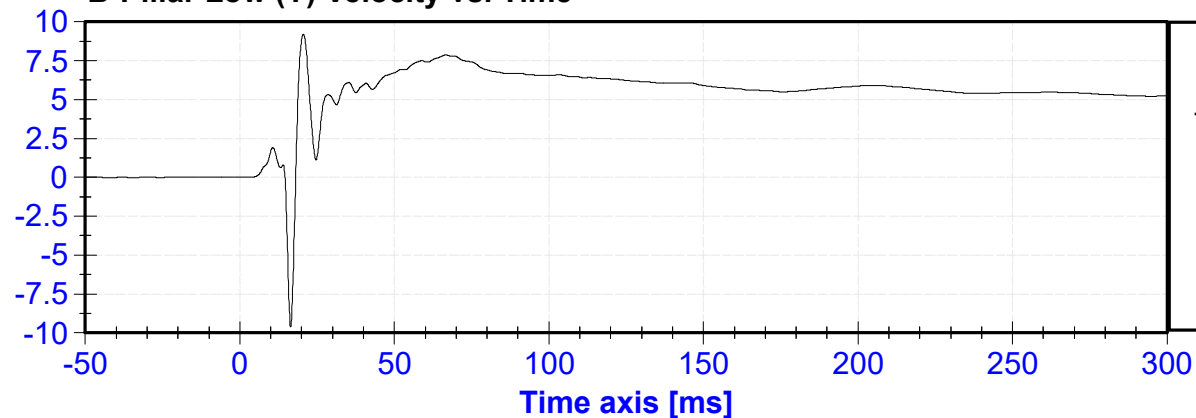
ACCELERATION [g's]



Exceeded calibration range and saturated at 15.8 ms

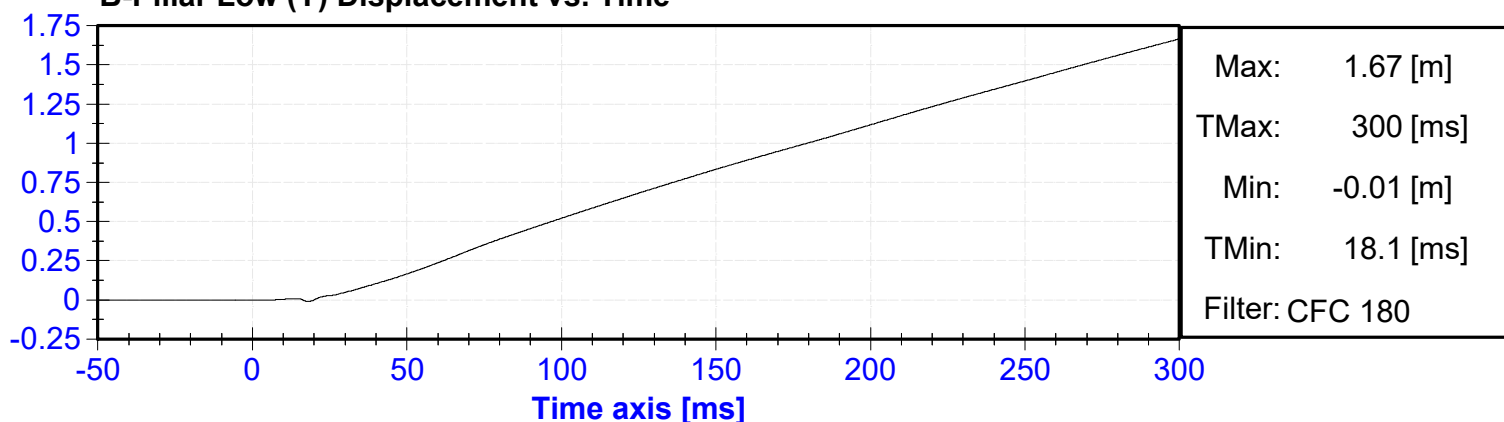
B-Pillar Low (Y) Velocity vs. Time

VELOCITY [m/s]



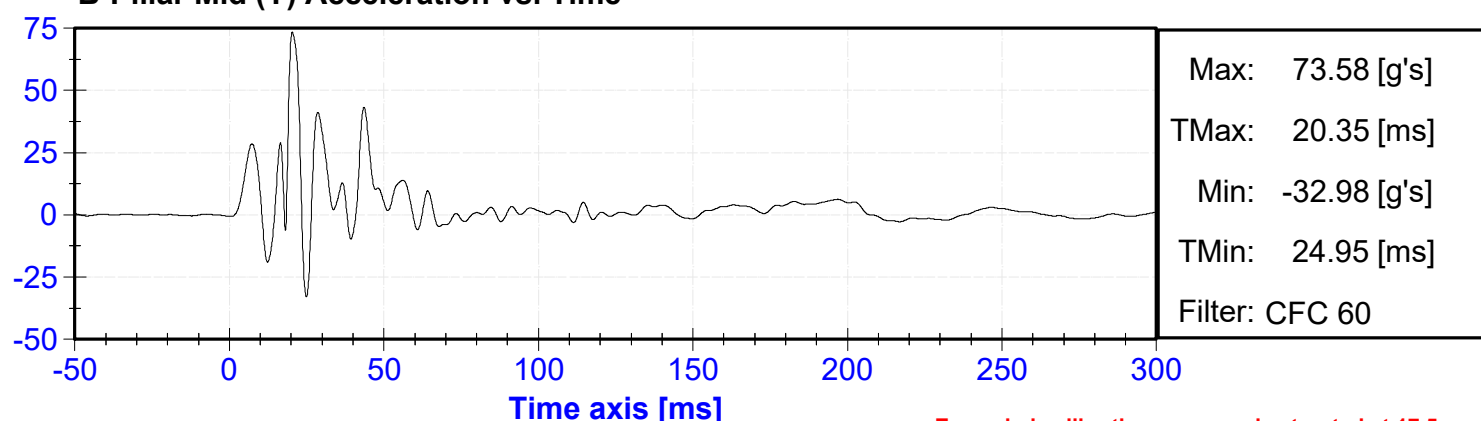
Exceeded calibration range and saturated at 15.8 ms

B-Pillar Low (Y) Displacement vs. Time



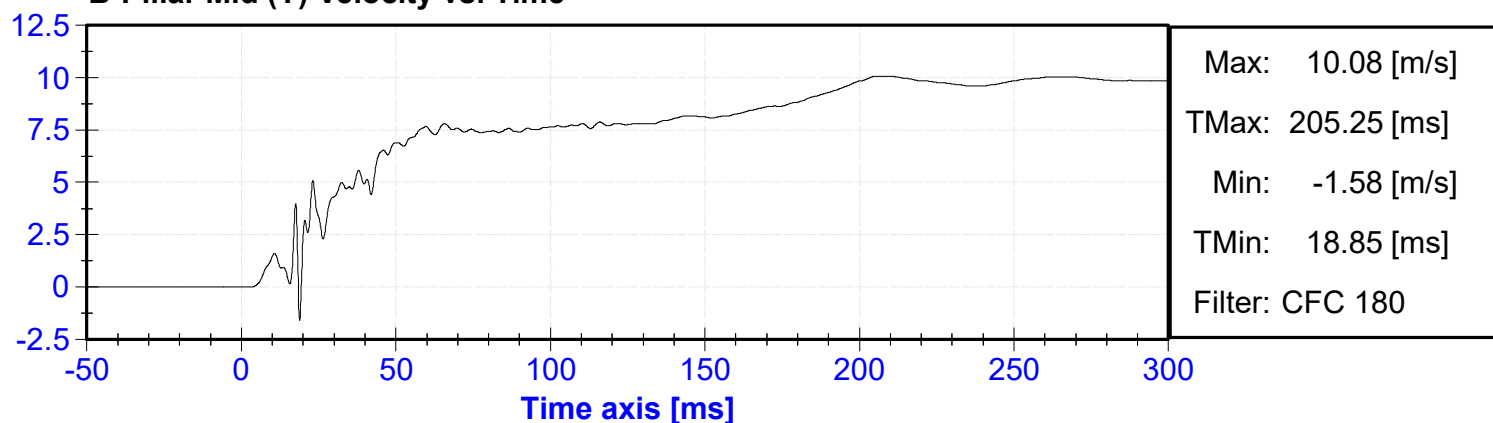
Exceeded calibration range and saturated at 17.5 ms

B-Pillar Mid (Y) Acceleration vs. Time



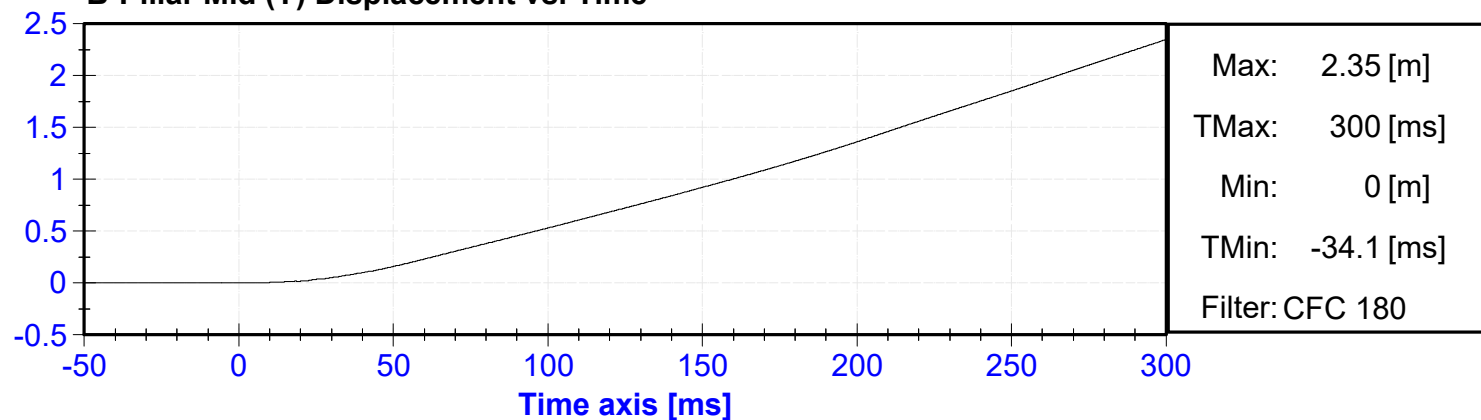
Exceeded calibration range and saturated at 17.5 ms

B-Pillar Mid (Y) Velocity vs. Time

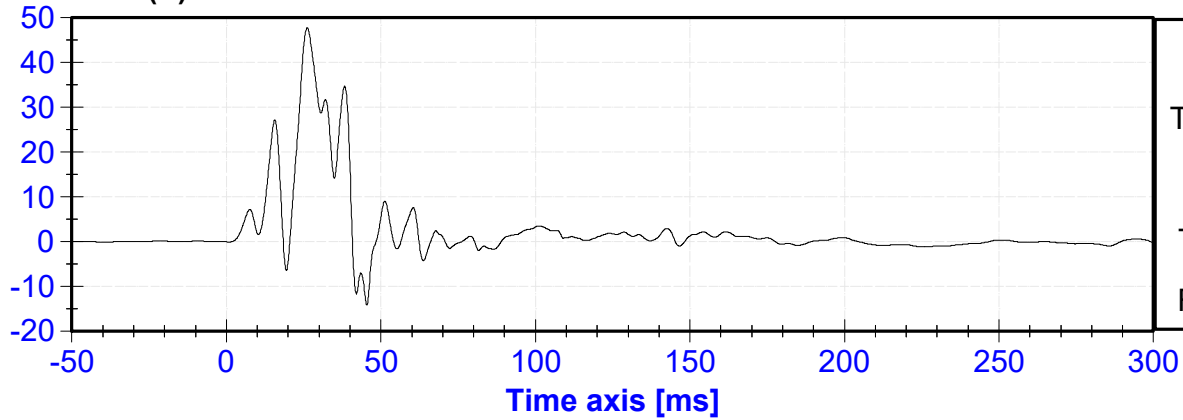


Exceeded calibration range and saturated at 17.5 ms

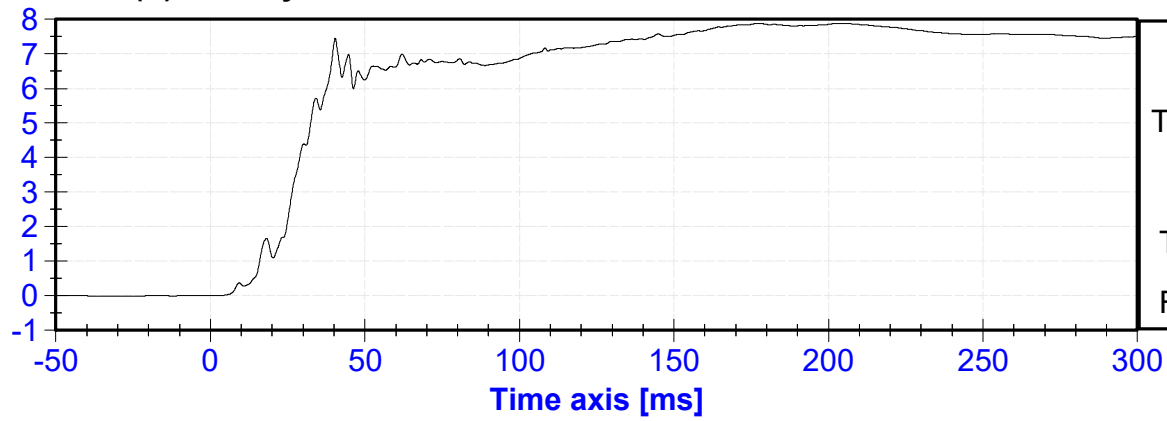
B-Pillar Mid (Y) Displacement vs. Time



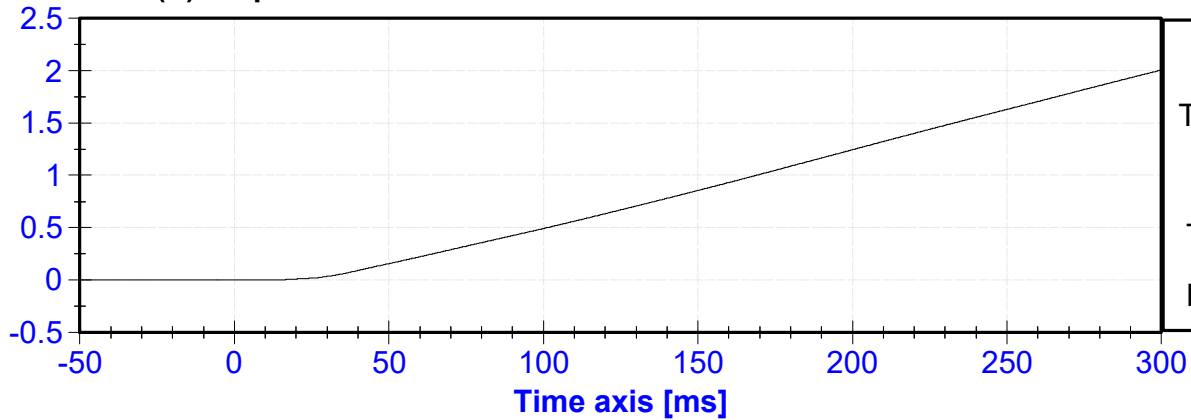
Seat (Y) Acceleration vs. Time



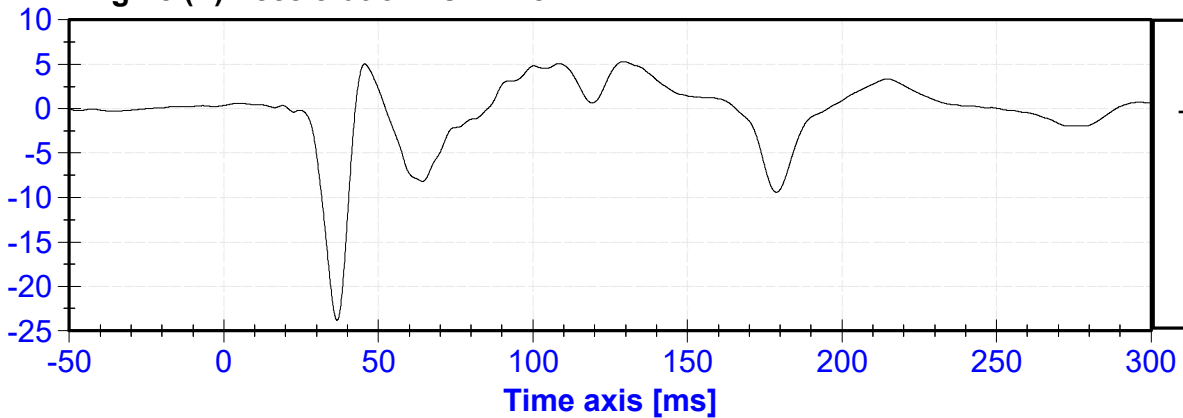
Seat (Y) Velocity vs. Time



Seat (Y) Displacement vs. Time



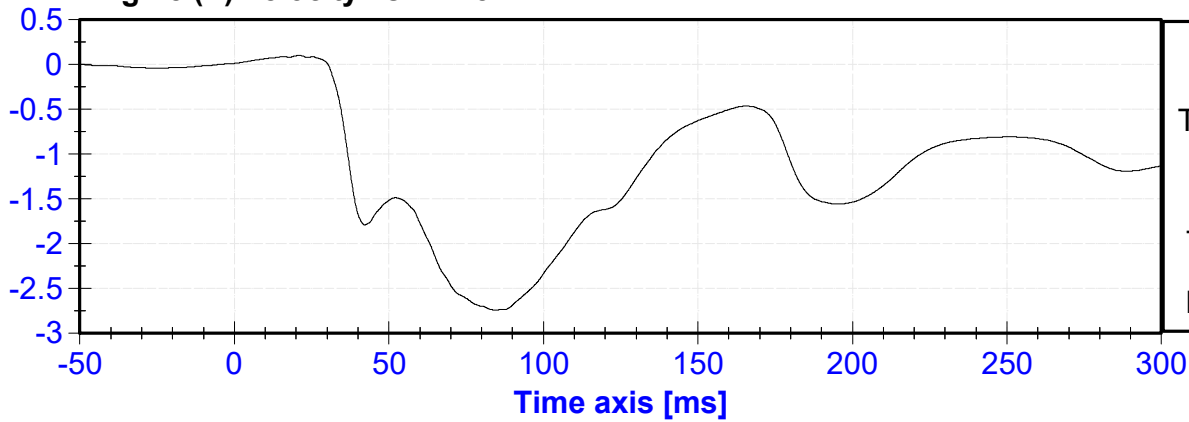
Engine (X) Acceleration vs. Time





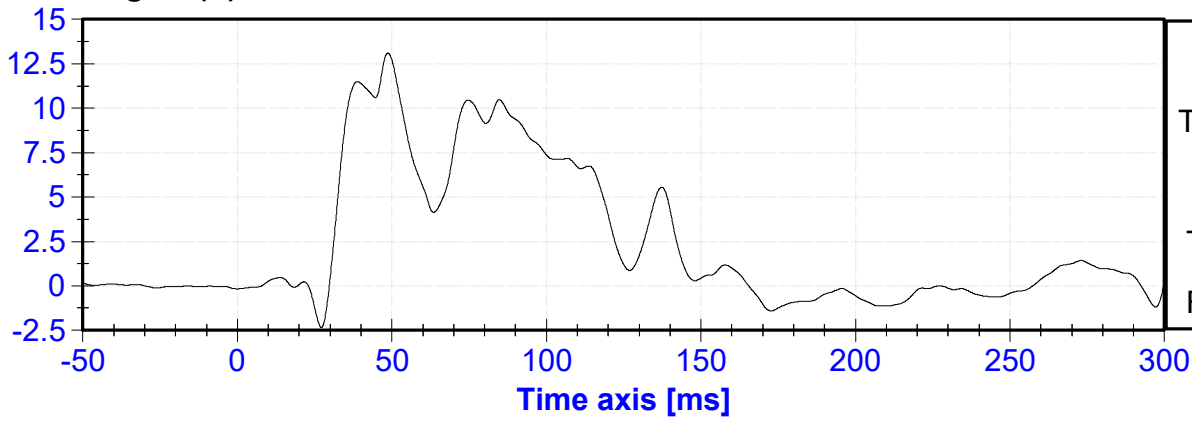
Engine (X) Velocity vs. Time

VELOCITY [m/s]



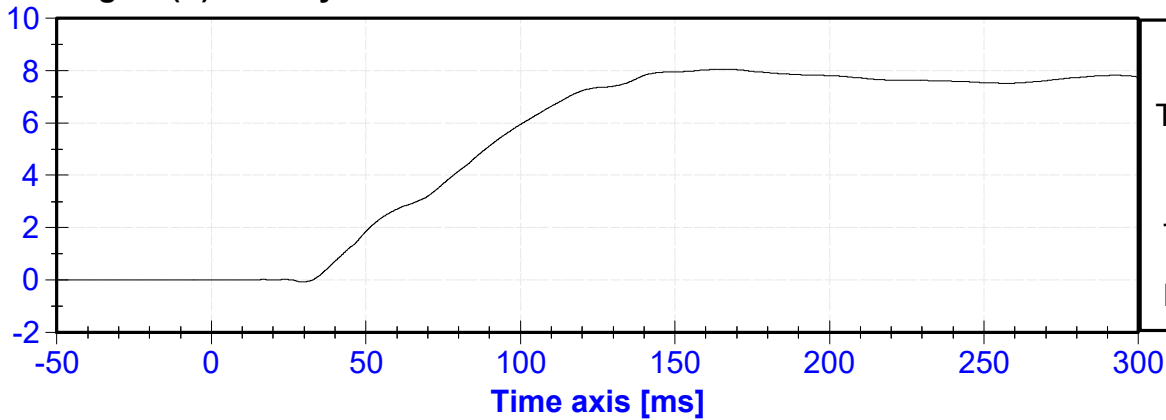
Engine (Y) Acceleration vs. Time

ACCELERATION [g's]



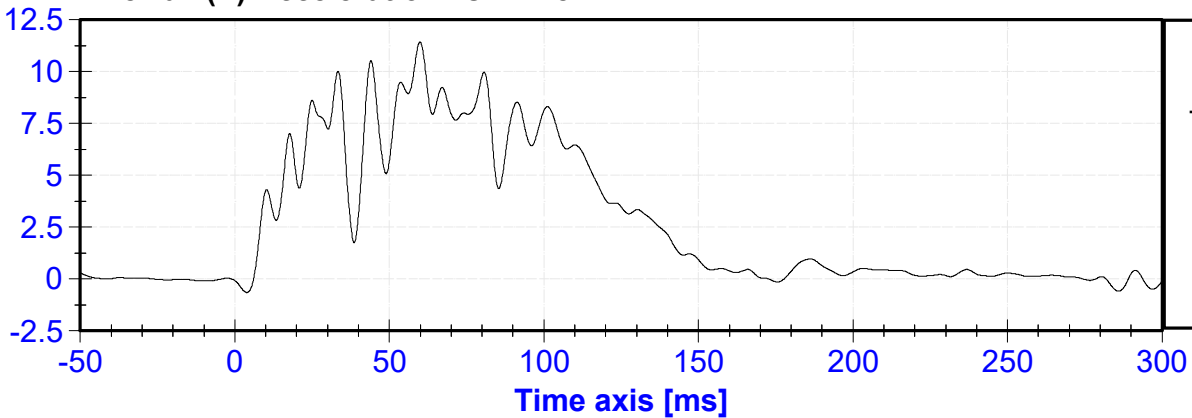
Engine (Y) Velocity vs. Time

VELOCITY [m/s]



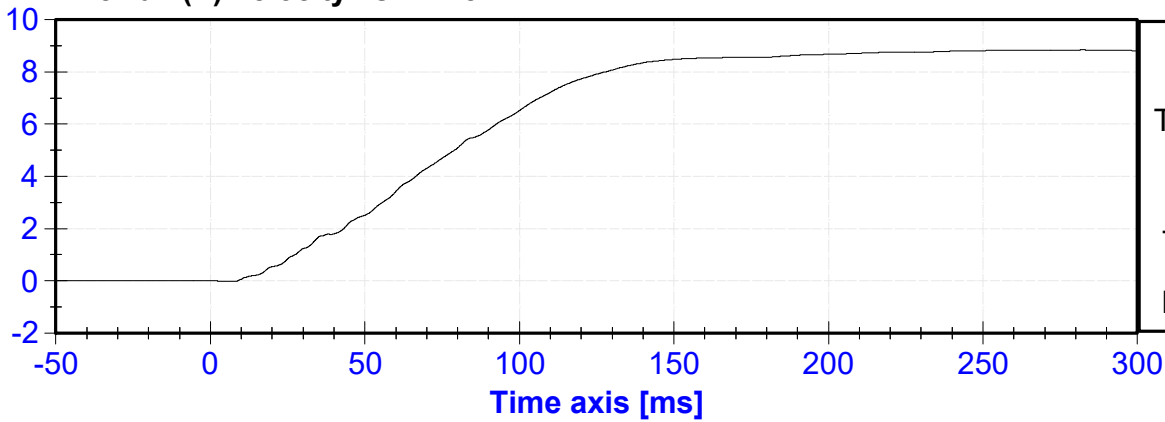
Firewall (Y) Acceleration vs. Time

ACCELERATION [g's]



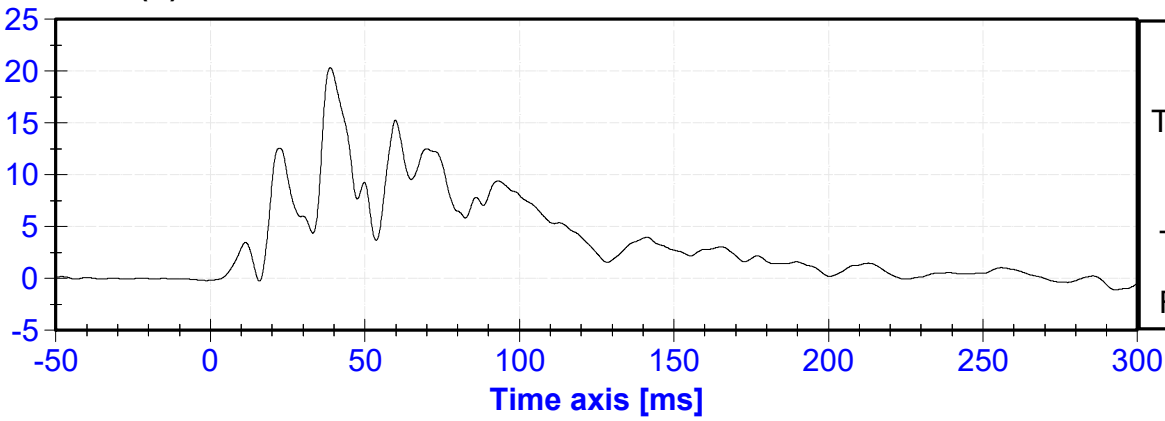
Firewall (Y) Velocity vs. Time

VELOCITY [m/s]



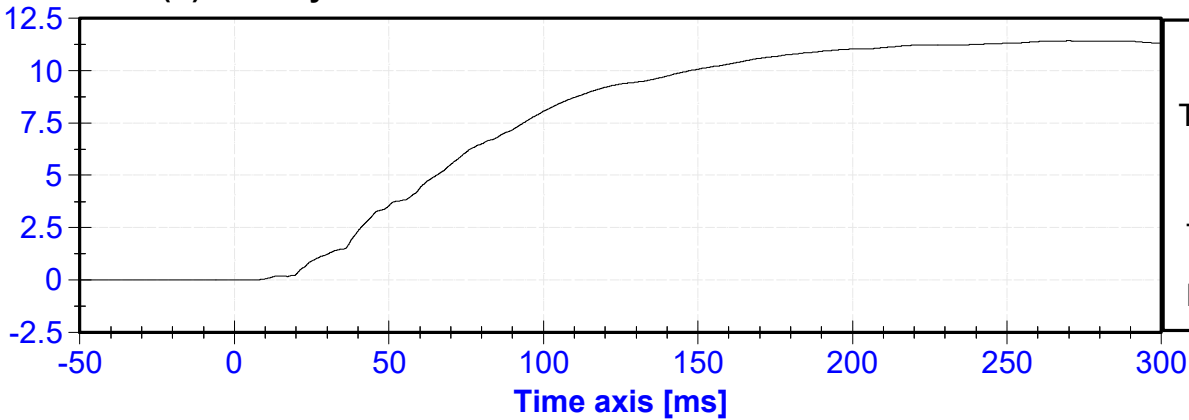
Roof (Y) Acceleration vs. Time

ACCELERATION [g's]



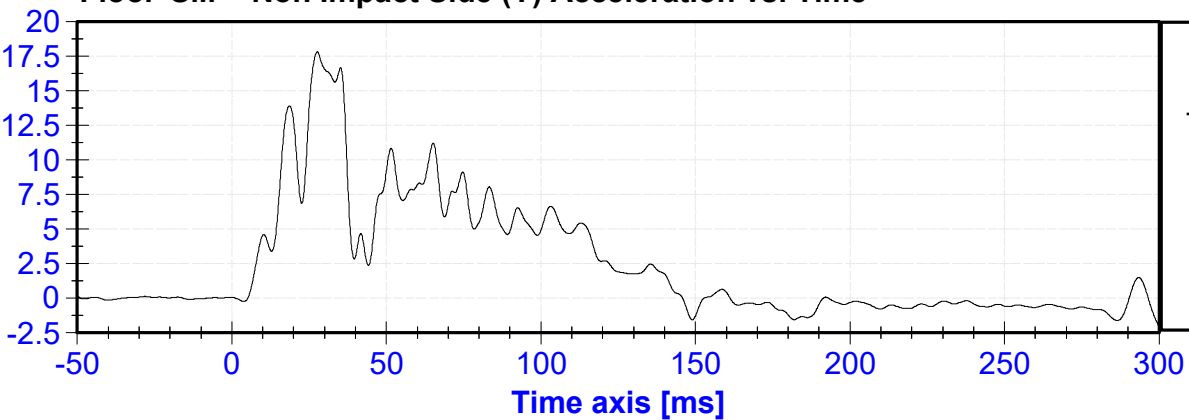
Roof (Y) Velocity vs. Time

VELOCITY [m/s]



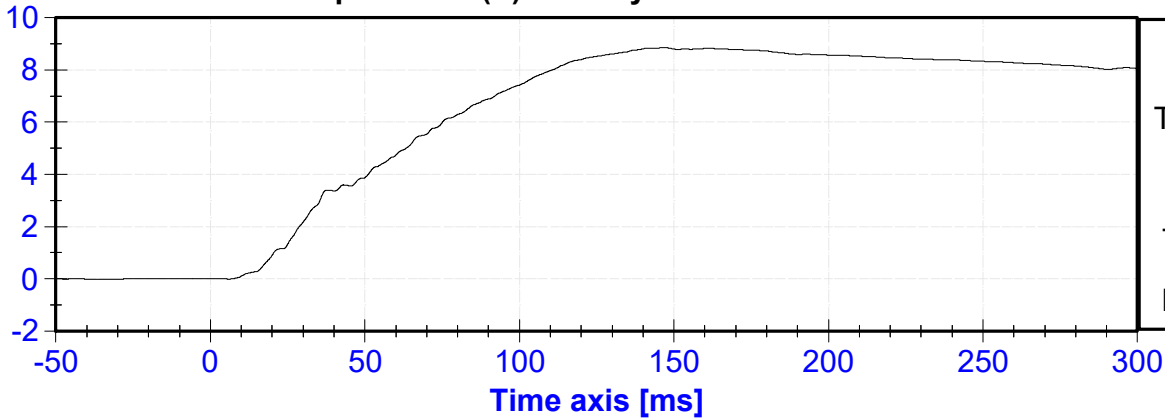
Floor Sill – Non Impact Side (Y) Acceleration vs. Time

ACCELERATION [g's]



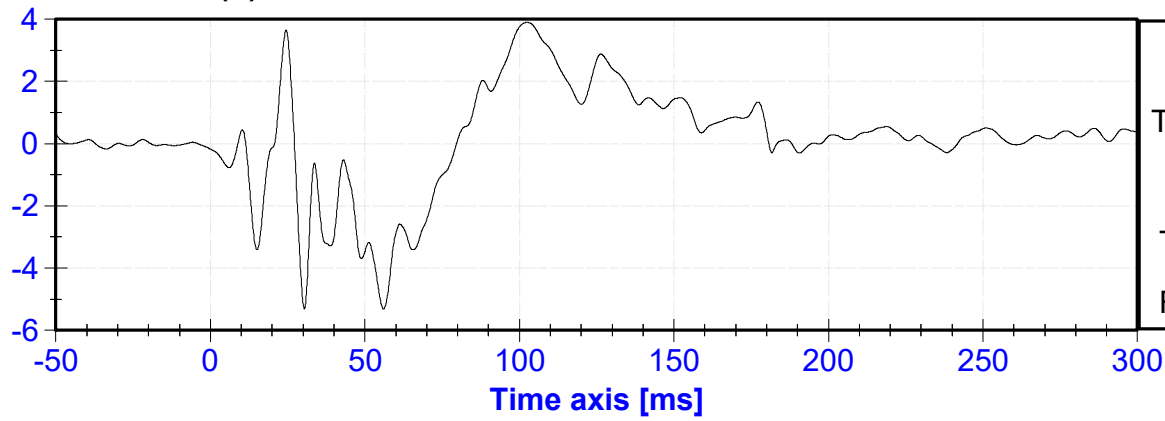
Floor Sill – Non Impact Side (Y) Velocity vs. Time

VELOCITY [m/s]



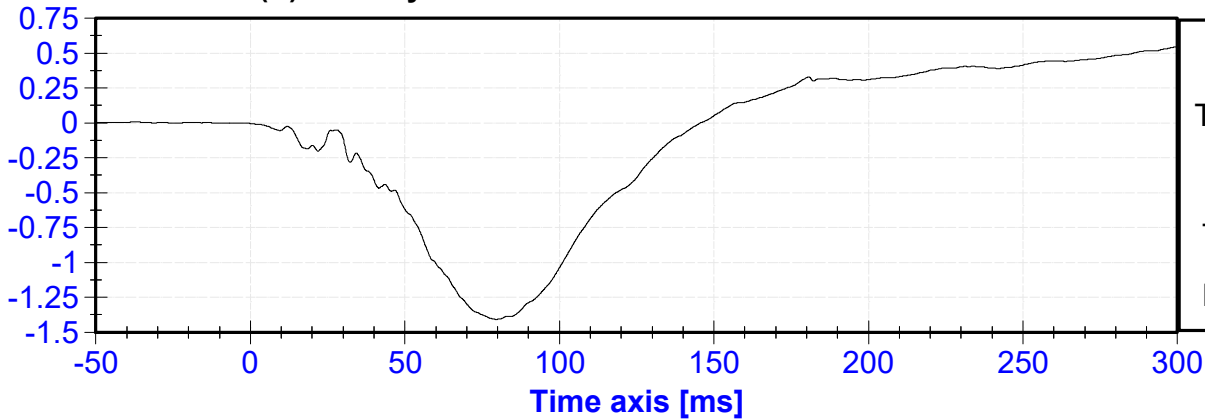
Rear Deck (X) Acceleration vs. Time

ACCELERATION [g's]



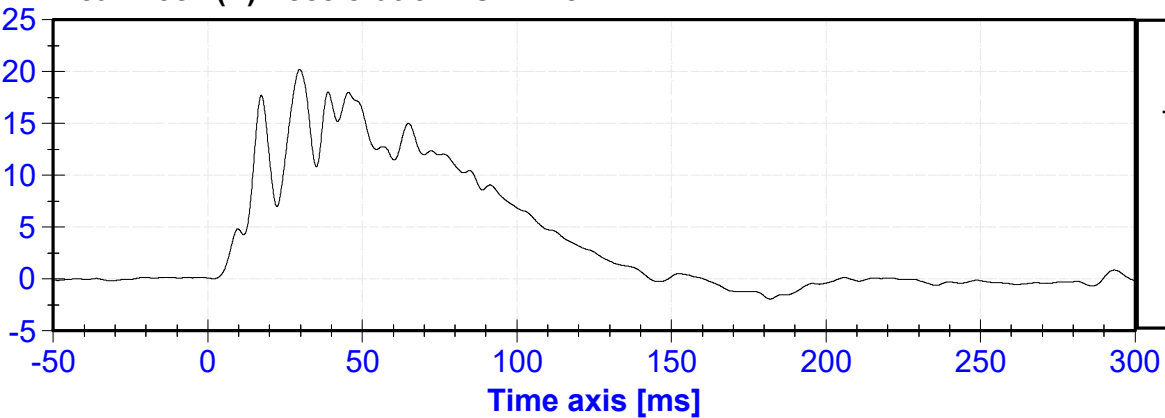
Rear Deck (X) Velocity vs. Time

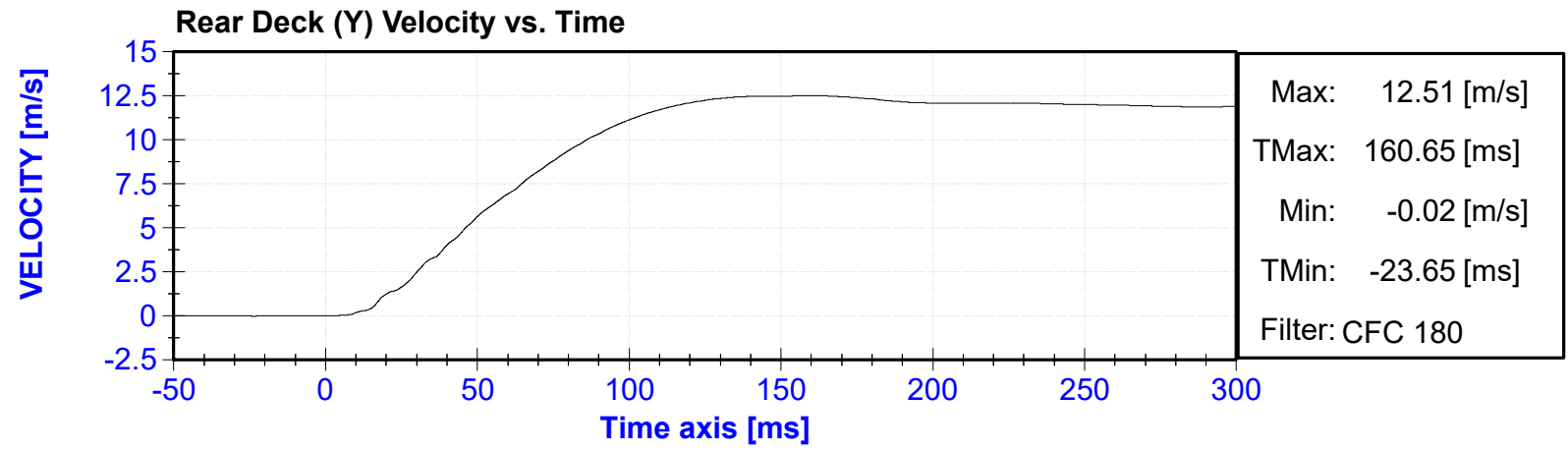
VELOCITY [m/s]



Rear Deck (Y) Acceleration vs. Time

ACCELERATION [g's]







## **APPENDIX IV**

### **PRE-TEST DUMMY PERFORMANCE CALIBRATION TEST DATA**

**(Subpart U, ES-2re)**

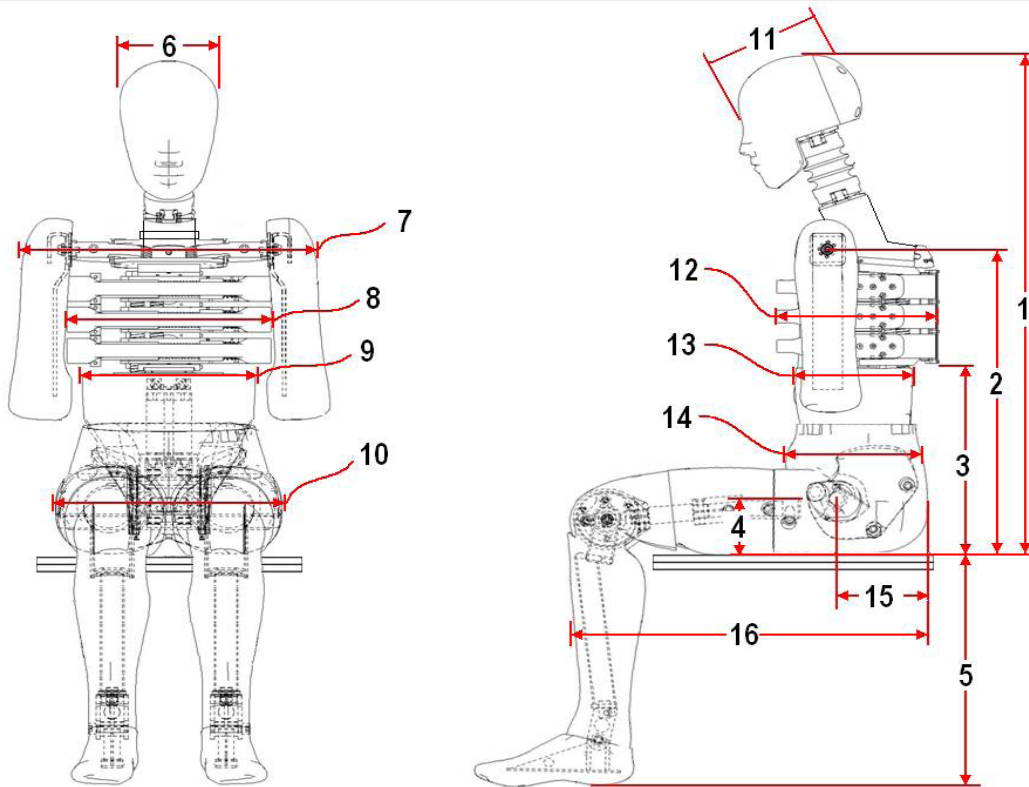


## External Measurements - EuroSID-2re

Technician: K. Brogan

Date: 09/19/2023

Dummy Serial Number: D037



**FRONT VIEW**

**SIDE VIEW**

| Dim. No. | Description                                    | Specification (mm) |     | Result (mm) | Pass/Fail |
|----------|------------------------------------------------|--------------------|-----|-------------|-----------|
| 1        | Sitting Height                                 | 900                | 918 | 911         | Pass      |
| 2        | Seat to Shoulder Joint                         | 558                | 572 | 564         | Pass      |
| 3        | Seat to Lower Face of Thoracic Spine Box       | 346                | 356 | 354         | Pass      |
| 4        | Seat to Hip Joint (center of bolt)             | 97                 | 103 | 101         | Pass      |
| 5        | Sole to Seat, Sitting                          | 333                | 451 | 422         | Pass      |
| 6        | Head Width                                     | 152                | 158 | 155         | Pass      |
| 7        | Shoulder/Arm Width                             | 461                | 479 | 471         | Pass      |
| 8        | Thorax Width                                   | 322                | 332 | 329         | Pass      |
| 9        | Abdomen Width                                  | 273                | 287 | 281         | Pass      |
| 10       | Pelvis Lap Width                               | 359                | 373 | 364         | Pass      |
| 11       | Head Depth                                     | 196                | 206 | 201         | Pass      |
| 12       | Thorax Depth                                   | 262                | 272 | 266         | Pass      |
| 13       | Abdomen Depth                                  | 194                | 204 | 198         | Pass      |
| 14       | Pelvis Depth                                   | 235                | 245 | 241         | Pass      |
| 15       | Back of Buttocks to Hip Joint (center of bolt) | 150                | 160 | 154         | Pass      |
| 16       | Back of Buttocks to Front Knee                 | 597                | 615 | 605         | Pass      |

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

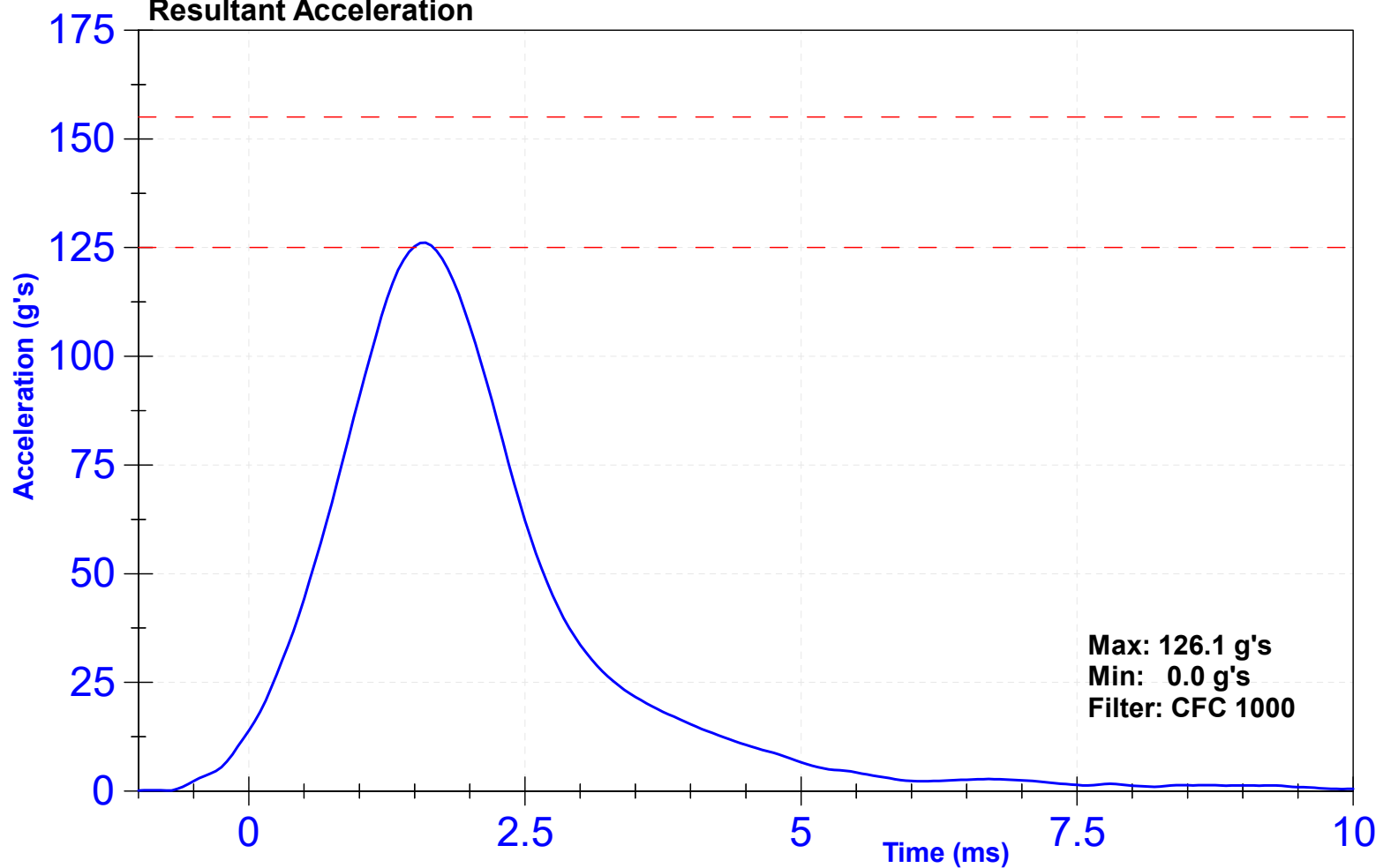
### Results

| Test Parameter         | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|------------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature            | 20.6                  | 22.2                  | °C   | 21.8   | Pass      |
| Humidity               | 10                    | 70                    | %    | 53     | Pass      |
| Resultant Acceleration | 125                   | 155                   | g's  | 126.1  | Pass      |
| Oscillation            | 0                     | 15                    | %    | 2.18   | Pass      |
| Fore-Aft Acceleration  | -15                   | 15                    | g's  | 6.5    | Pass      |

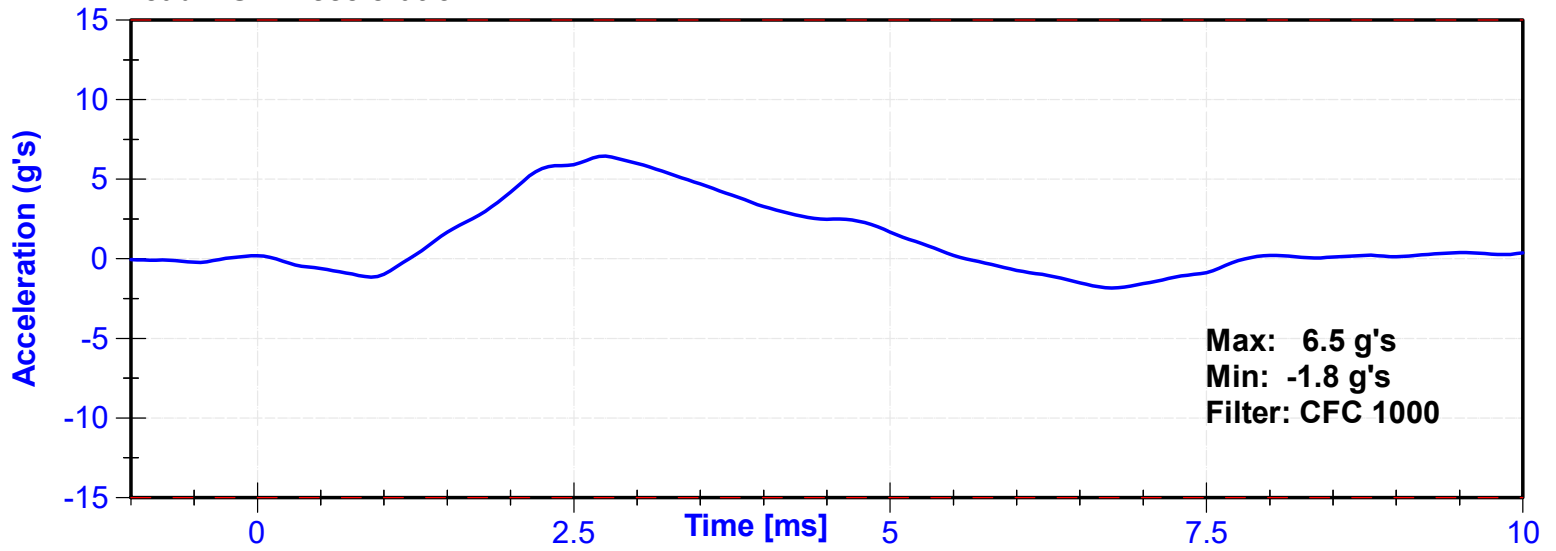
### Transducer Calibrations

| Channel         | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|--------------|---------------|------------------|----------------------|
| X Accelerometer | Endevco      | T21724        | 8/8/2023         | 2/4/2024             |
| Y Accelerometer | Endevco      | T22281        | 8/8/2023         | 2/4/2024             |
| Z Accelerometer | Endevco      | T26050        | 8/8/2023         | 2/4/2024             |

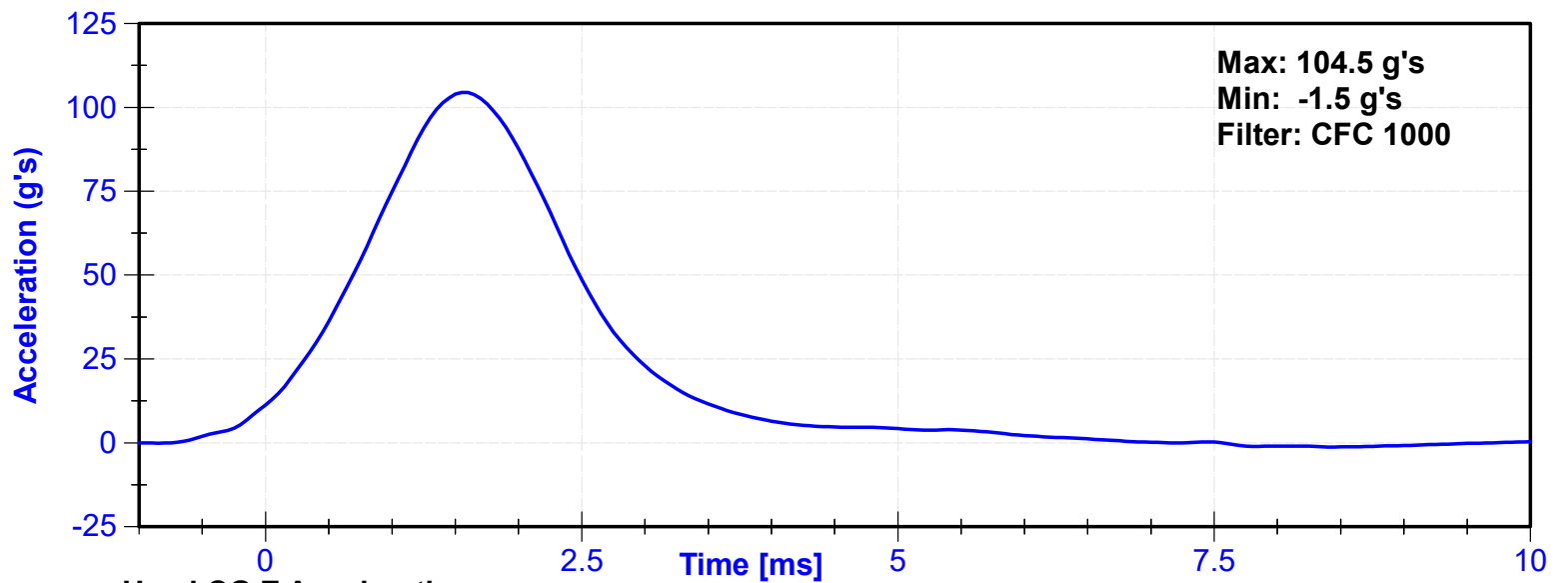
### Resultant Acceleration



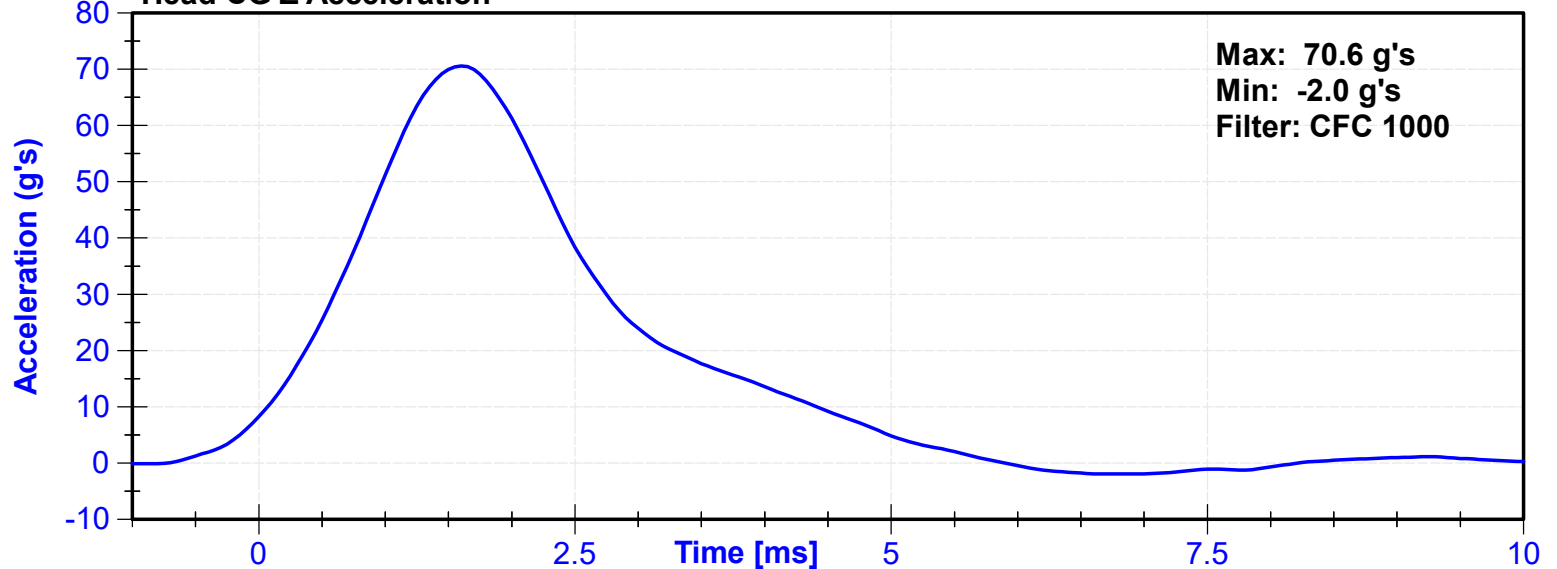
Head CG X Acceleration



Head CG Y Acceleration



Head CG Z Acceleration





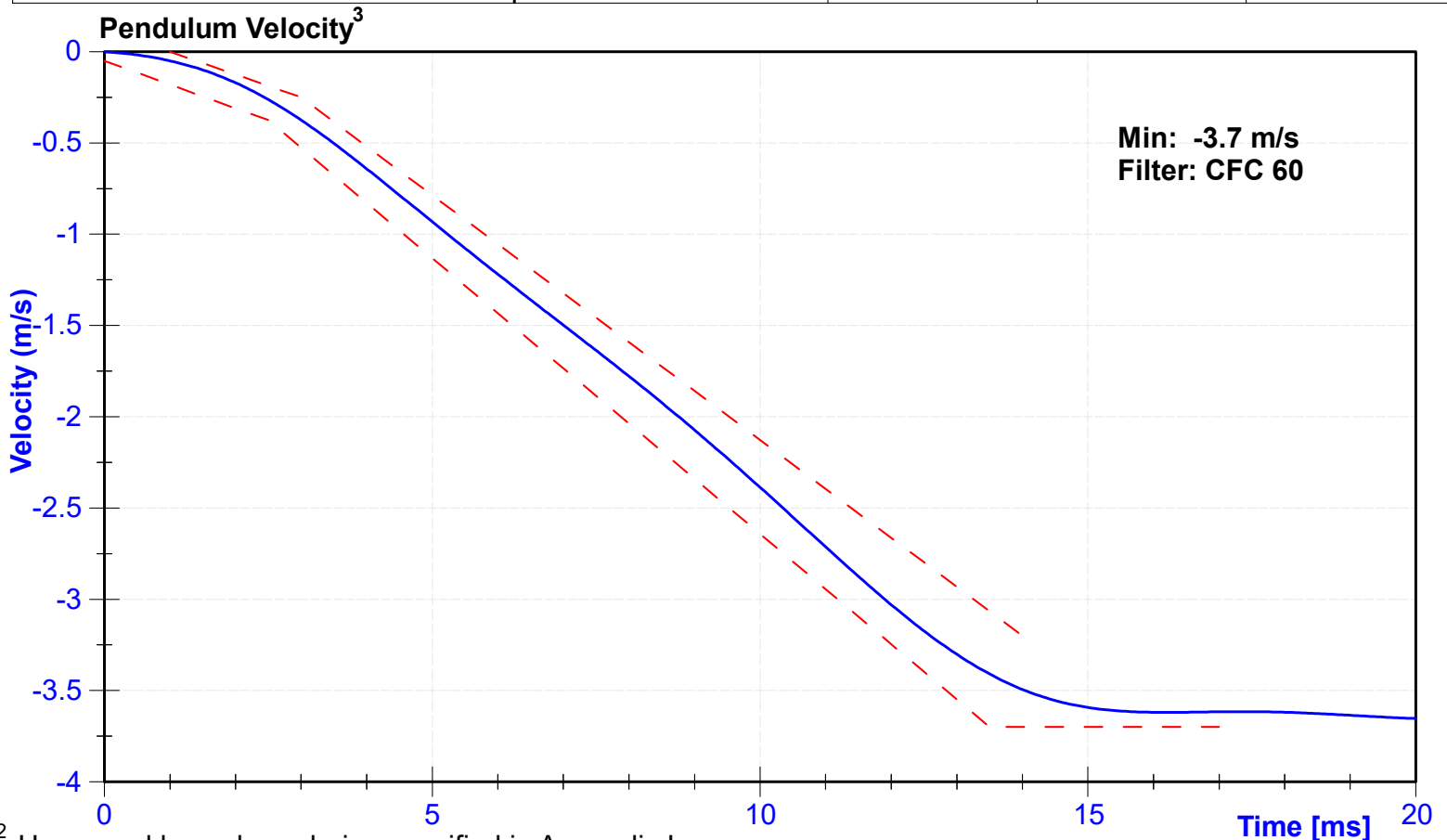
|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | Denton | Test Technician       | D. Sakona  |
| ATD Serial Number | D037   | Laboratory Supervisor | C. Mantell |

### Results

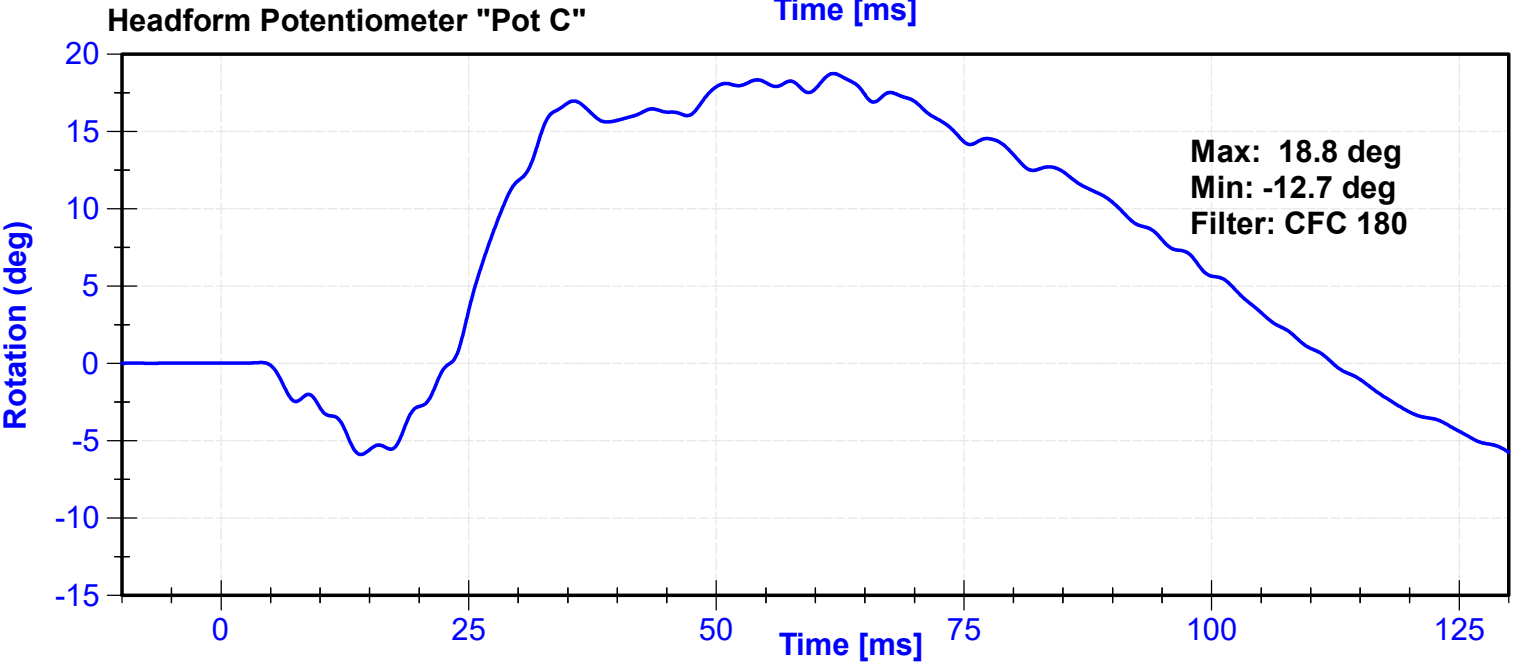
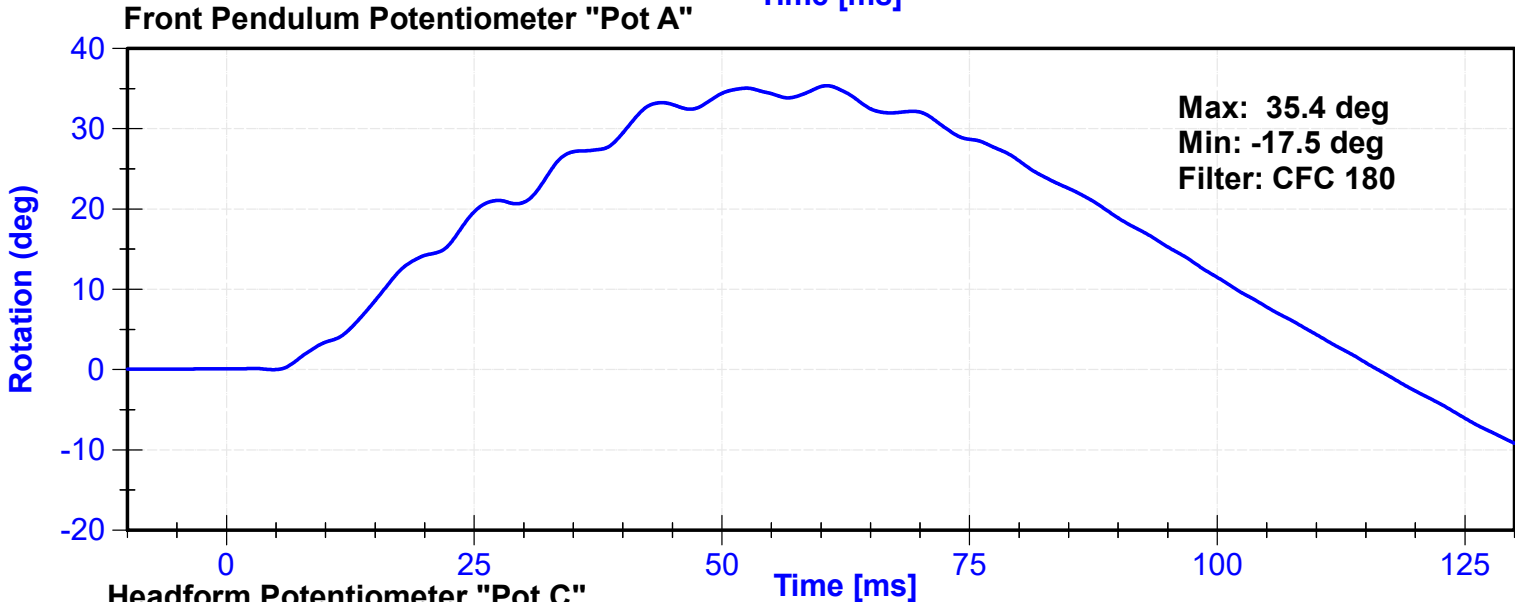
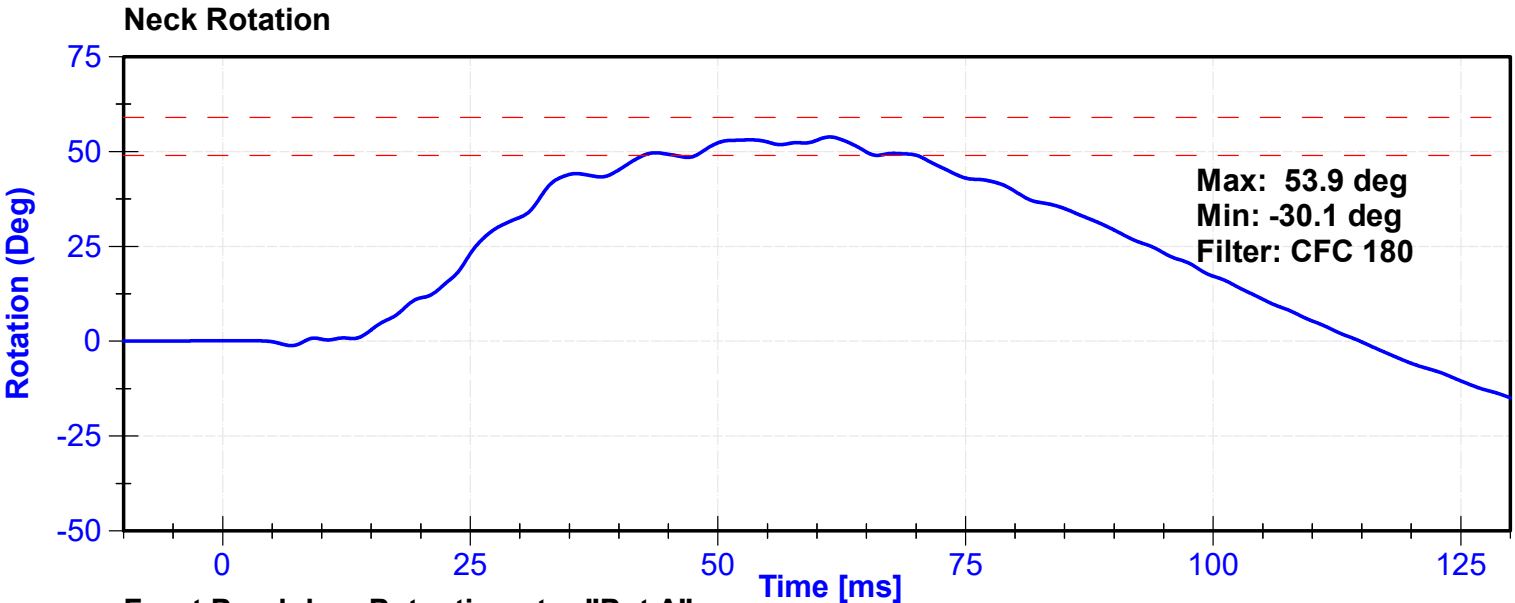
| Test Parameter                      | Minimum Specification       | Maximum Specification       | Unit | Result                | Pass/Fail |
|-------------------------------------|-----------------------------|-----------------------------|------|-----------------------|-----------|
| Temperature                         | 20.6                        | 22.2                        | °C   | 21.8                  | Pass      |
| Humidity                            | 10                          | 70                          | %    | 53                    | Pass      |
| Velocity                            | 3.3                         | 3.5                         | m/s  | 3.43                  | Pass      |
| Lateral Neck Rotation               | 49                          | 59                          | deg  | 53.9                  | Pass      |
| Time at Maximum Rotation            | 54                          | 66                          | ms   | 61.3                  | Pass      |
| Time of Rotation Decay from Maximum | 53                          | 88                          | ms   | 53.6                  | Pass      |
| Pendulum Velocity Overall Corridor  | Lower Boundary <sup>1</sup> | Upper Boundary <sup>2</sup> | m/s  | See Plot <sup>3</sup> | Pass      |

### Transducer Calibrations

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



<sup>1,2</sup> Upper and lower boundaries specified in Appendix I



Appendix I

| <sup>2</sup> Upper Boundary Corridor |                | <sup>1</sup> Lower Boundary Corridor |                |
|--------------------------------------|----------------|--------------------------------------|----------------|
| Time (ms)                            | Velocity (m/s) | Time (ms)                            | Velocity (m/s) |
| 1.0                                  | 0.00           | 0.0                                  | -0.05          |
| 3.0                                  | -0.25          | 2.5                                  | -0.375         |
| 14.0                                 | -3.20          | 13.5                                 | -3.7           |
|                                      |                | 17.0                                 | -3.7           |

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

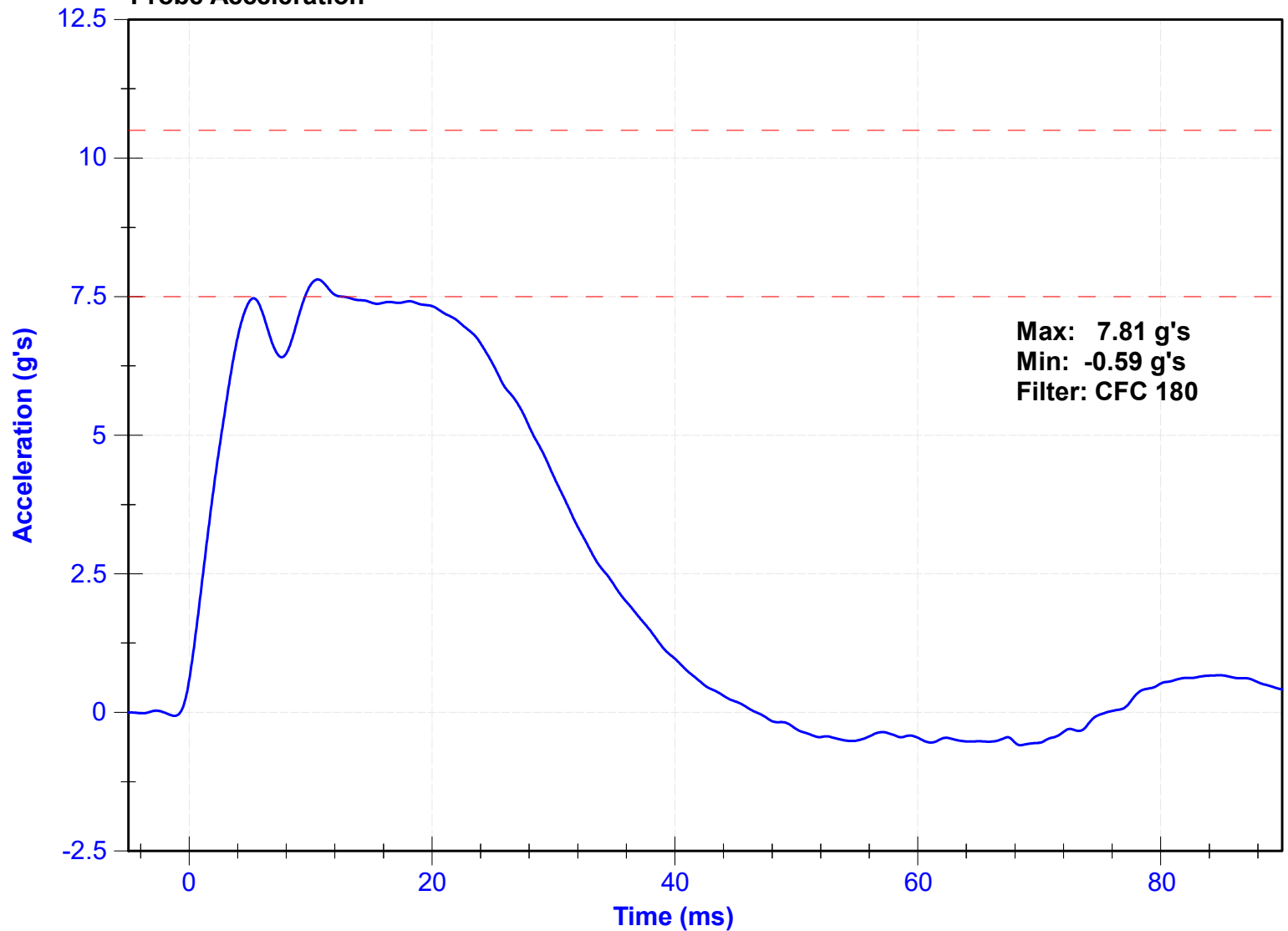
### Results

| Test Parameter     | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|--------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature        | 20.6                  | 22.2                  | °C   | 21.5   | Pass      |
| Humidity           | 10                    | 70                    | %    | 47     | Pass      |
| Velocity           | 4.2                   | 4.4                   | m/s  | 4.34   | Pass      |
| Probe Acceleration | 7.5                   | 10.5                  | g's  | 7.81   | Pass      |

### Transducer Calibrations

| Channel             | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|---------------------|--------------|---------------|------------------|----------------------|
| Probe Accelerometer | Endevco      | 18546         | 11/19/2022       | 11/18/2023           |

Probe Acceleration





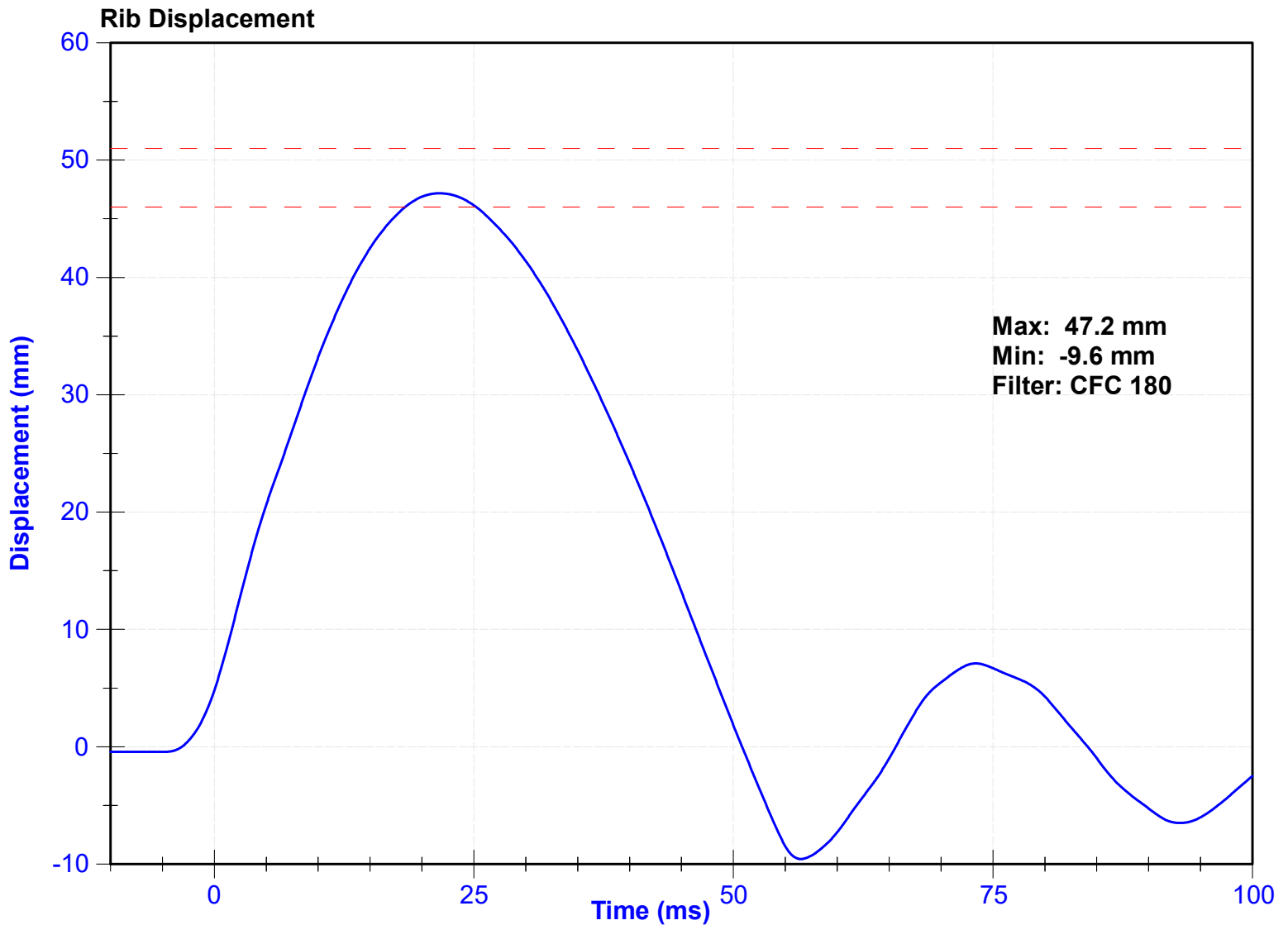
|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | Denton | Test Technician       | D. Sakona  |
| ATD Serial Number | D037   | Laboratory Supervisor | C. Mantell |

### Results

| Test Parameter   | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature      | 20.6                  | 22.2                  | °C   | 21.8   | Pass      |
| Humidity         | 10                    | 70                    | %    | 53     | Pass      |
| Rib Displacement | 46                    | 51                    | mm   | 47.2   | Pass      |

### Transducer Calibrations

| Channel           | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|-------------------|--------------|---------------|------------------|----------------------|
| Rib Potentiometer | Honeywell    | 0552-01       | 8/7/2023         | 2/5/2024             |



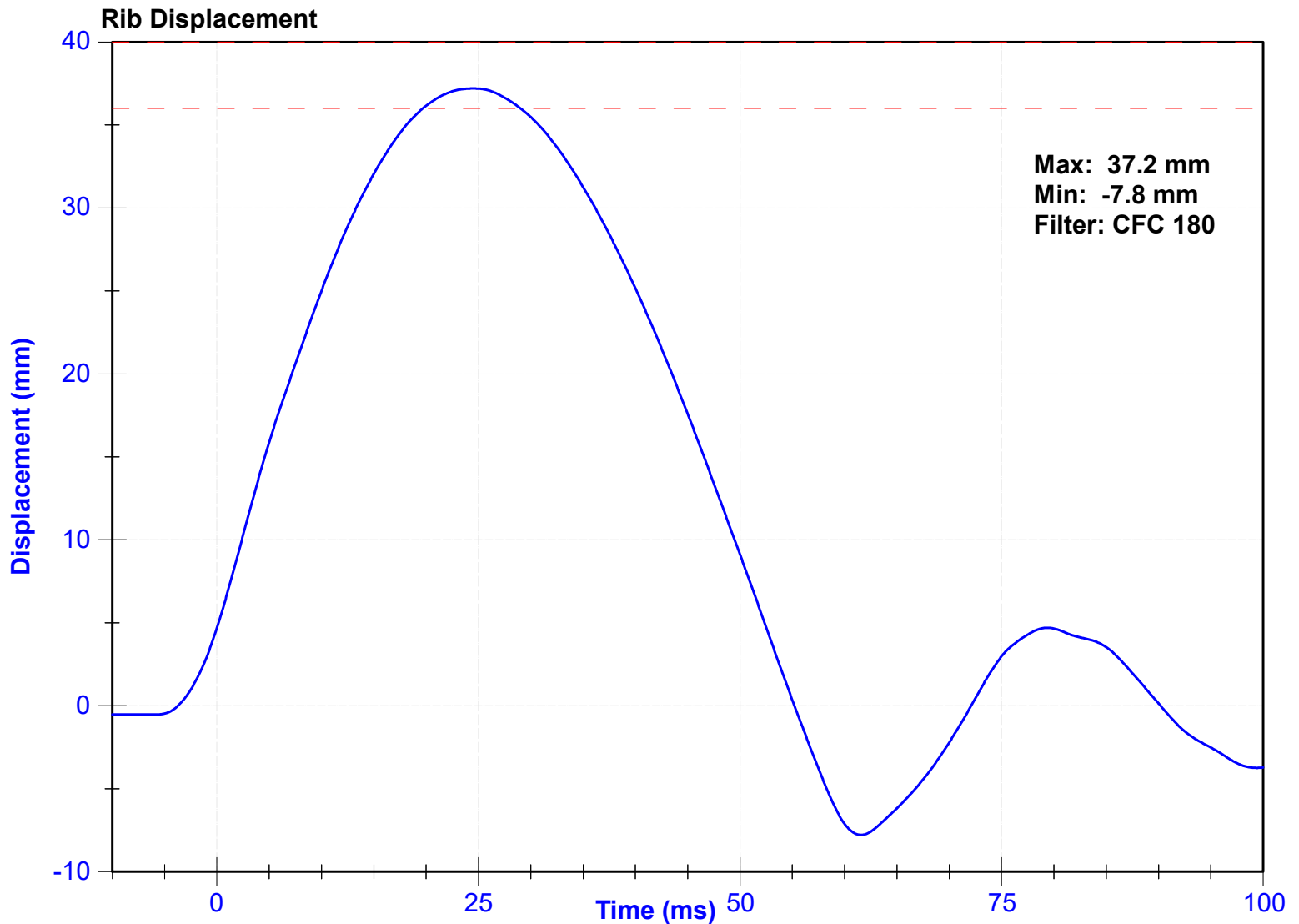
|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | Denton | Test Technician       | D. Sakona  |
| ATD Serial Number | D037   | Laboratory Supervisor | C. Mantell |

### Results

| Test Parameter   | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature      | 20.6                  | 22.2                  | °C   | 21.8   | Pass      |
| Humidity         | 10                    | 70                    | %    | 53     | Pass      |
| Rib Displacement | 36                    | 40                    | mm   | 37.2   | Pass      |

### Transducer Calibrations

| Channel           | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|-------------------|--------------|---------------|------------------|----------------------|
| Rib Potentiometer | Honeywell    | 0552-01       | 8/7/2023         | 2/5/2024             |



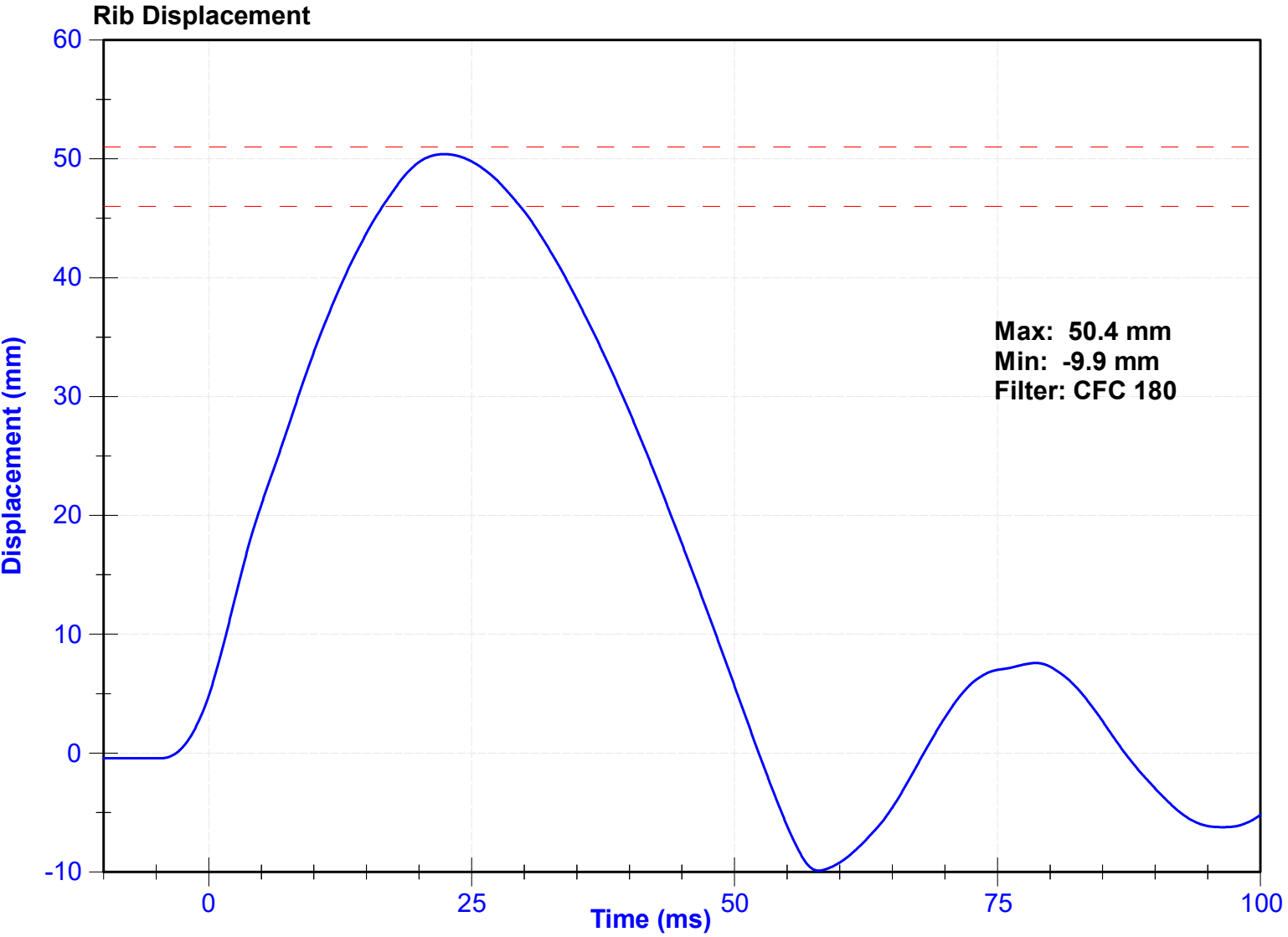
|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | Denton | Test Technician       | D. Sakona  |
| ATD Serial Number | D037   | Laboratory Supervisor | C. Mantell |

Results

| Test Parameter   | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature      | 20.6                  | 22.2                  | °C   | 21.8   | Pass      |
| Humidity         | 10                    | 70                    | %    | 53     | Pass      |
| Rib Displacement | 46                    | 51                    | mm   | 50.4   | Pass      |

Transducer Calibrations

| Channel           | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|-------------------|--------------|---------------|------------------|----------------------|
| Rib Potentiometer | Honeywell    | 807           | 8/7/2023         | 2/5/2024             |



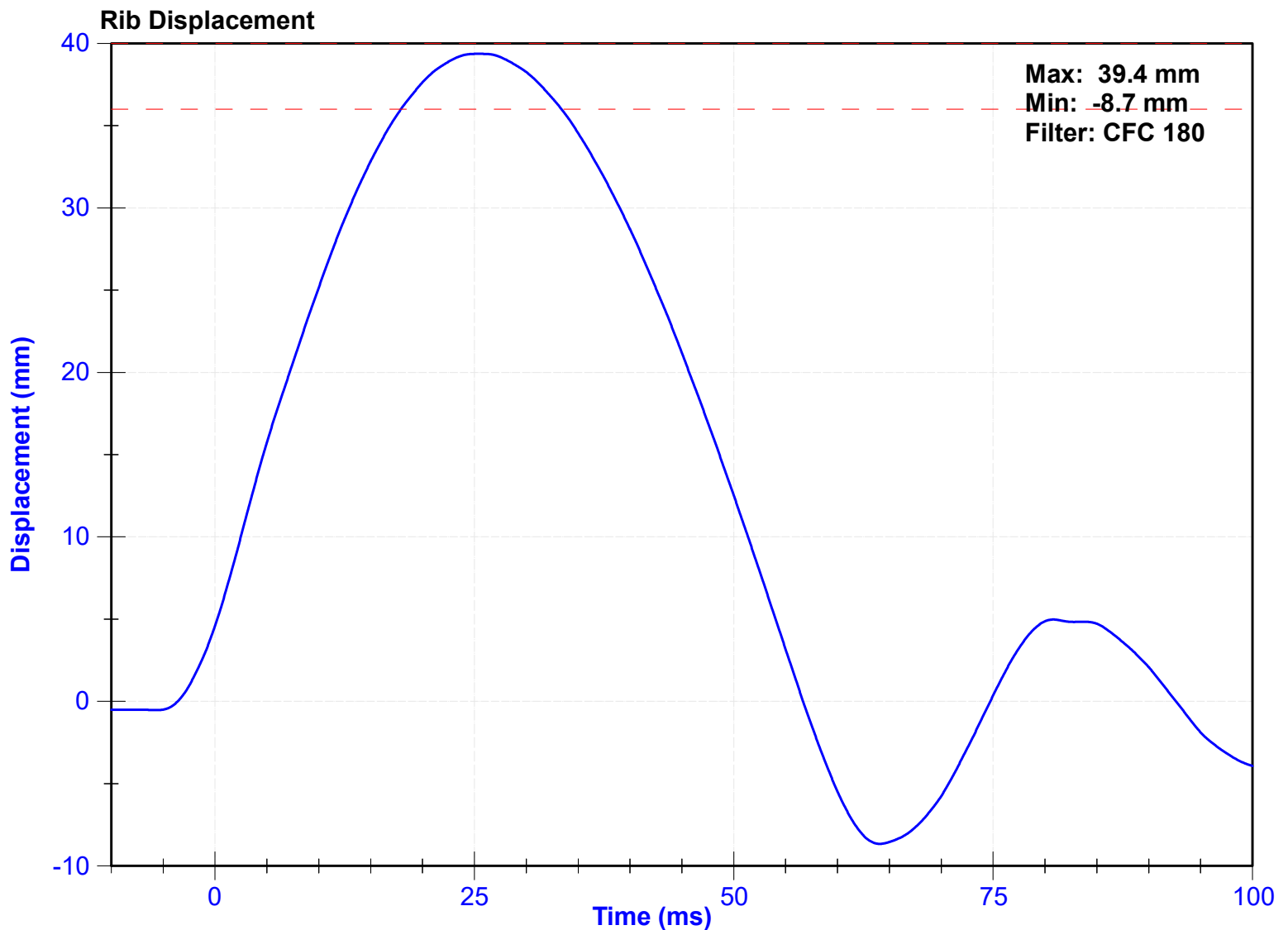
|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | Denton | Test Technician       | D. Sakona  |
| ATD Serial Number | D037   | Laboratory Supervisor | C. Mantell |

### Results

| Test Parameter   | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature      | 20.6                  | 22.2                  | °C   | 21.8   | Pass      |
| Humidity         | 10                    | 70                    | %    | 53     | Pass      |
| Rib Displacement | 36                    | 40                    | mm   | 39.4   | Pass      |

### Transducer Calibrations

| Channel           | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|-------------------|--------------|---------------|------------------|----------------------|
| Rib Potentiometer | Honeywell    | 807           | 8/7/2023         | 2/5/2024             |





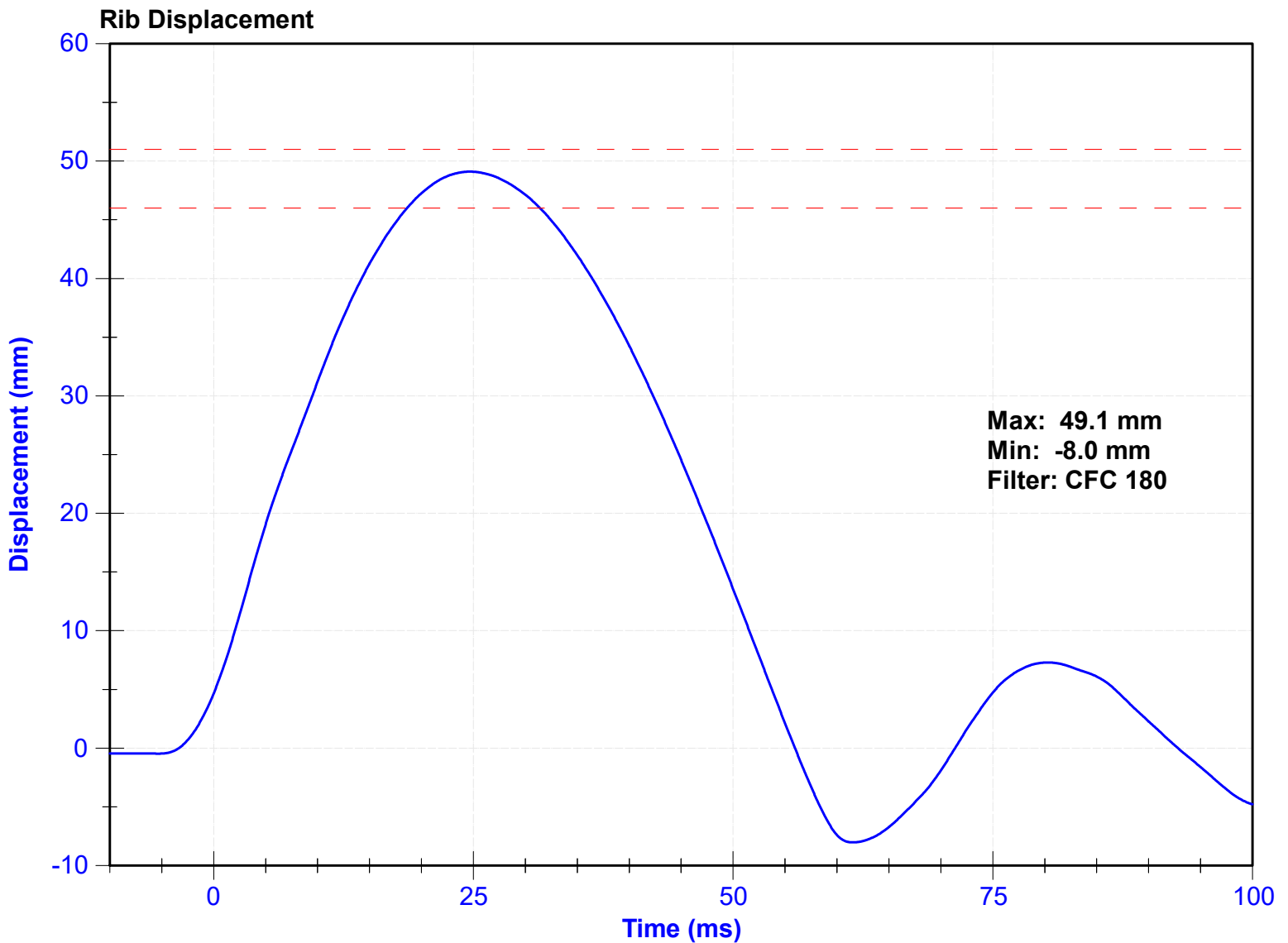
|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | Denton | Test Technician       | D. Sakona  |
| ATD Serial Number | D037   | Laboratory Supervisor | C. Mantell |

### Results

| Test Parameter   | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature      | 20.6                  | 22.2                  | °C   | 21.8   | Pass      |
| Humidity         | 10                    | 70                    | %    | 53     | Pass      |
| Rib Displacement | 46                    | 51                    | mm   | 49.1   | Pass      |

### Transducer Calibrations

| Channel           | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|-------------------|--------------|---------------|------------------|----------------------|
| Rib Potentiometer | Honeywell    | 0552-03       | 8/7/2023         | 2/5/2024             |



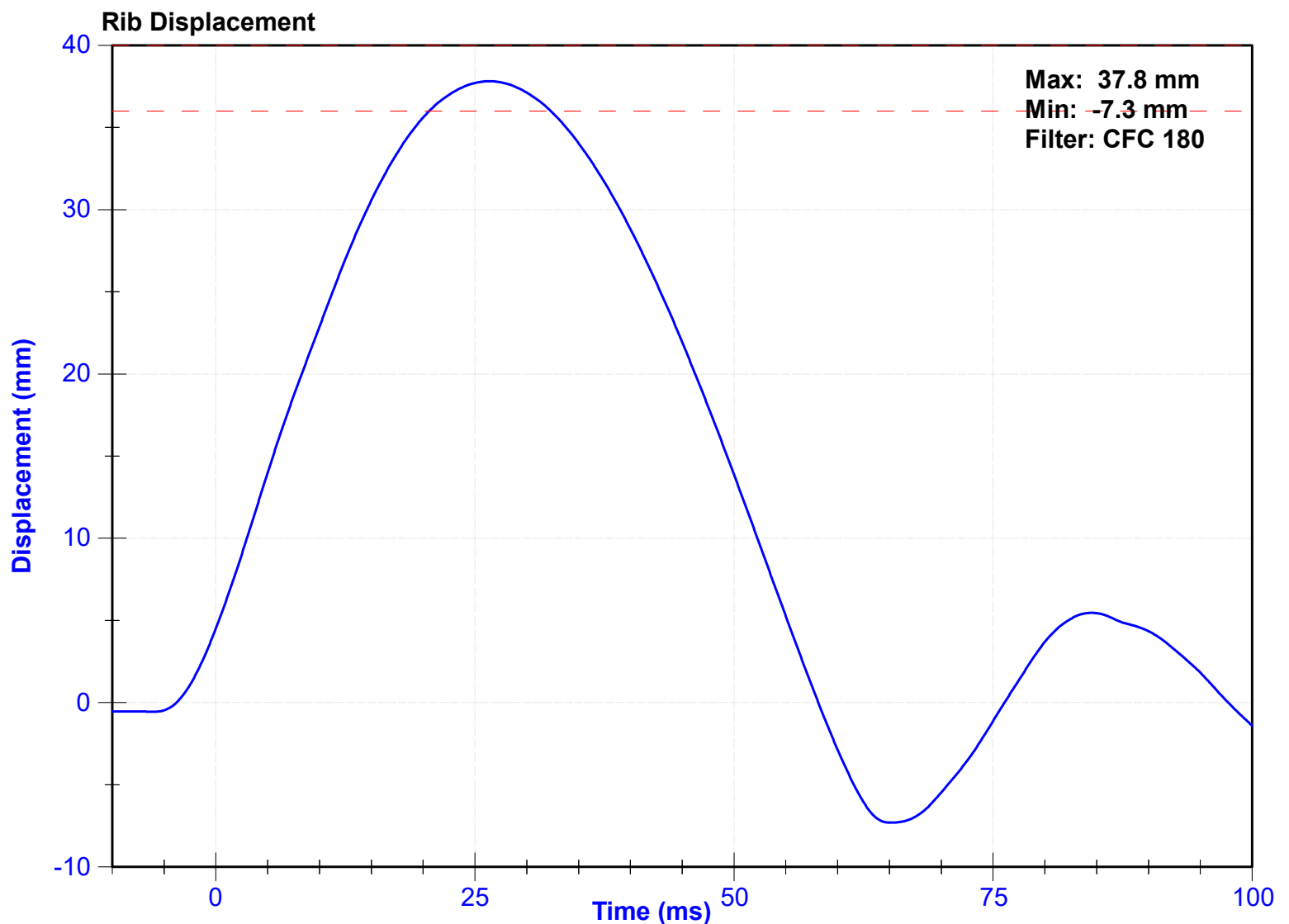
|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | Denton | Test Technician       | D. Sakona  |
| ATD Serial Number | D037   | Laboratory Supervisor | C. Mantell |

### Results

| Test Parameter   | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature      | 20.6                  | 22.2                  | °C   | 21.8   | Pass      |
| Humidity         | 10                    | 70                    | %    | 53     | Pass      |
| Rib Displacement | 36                    | 40                    | mm   | 37.8   | Pass      |

### Transducer Calibrations

| Channel           | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|-------------------|--------------|---------------|------------------|----------------------|
| Rib Potentiometer | Honeywell    | 0552-03       | 8/7/2023         | 2/5/2024             |



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

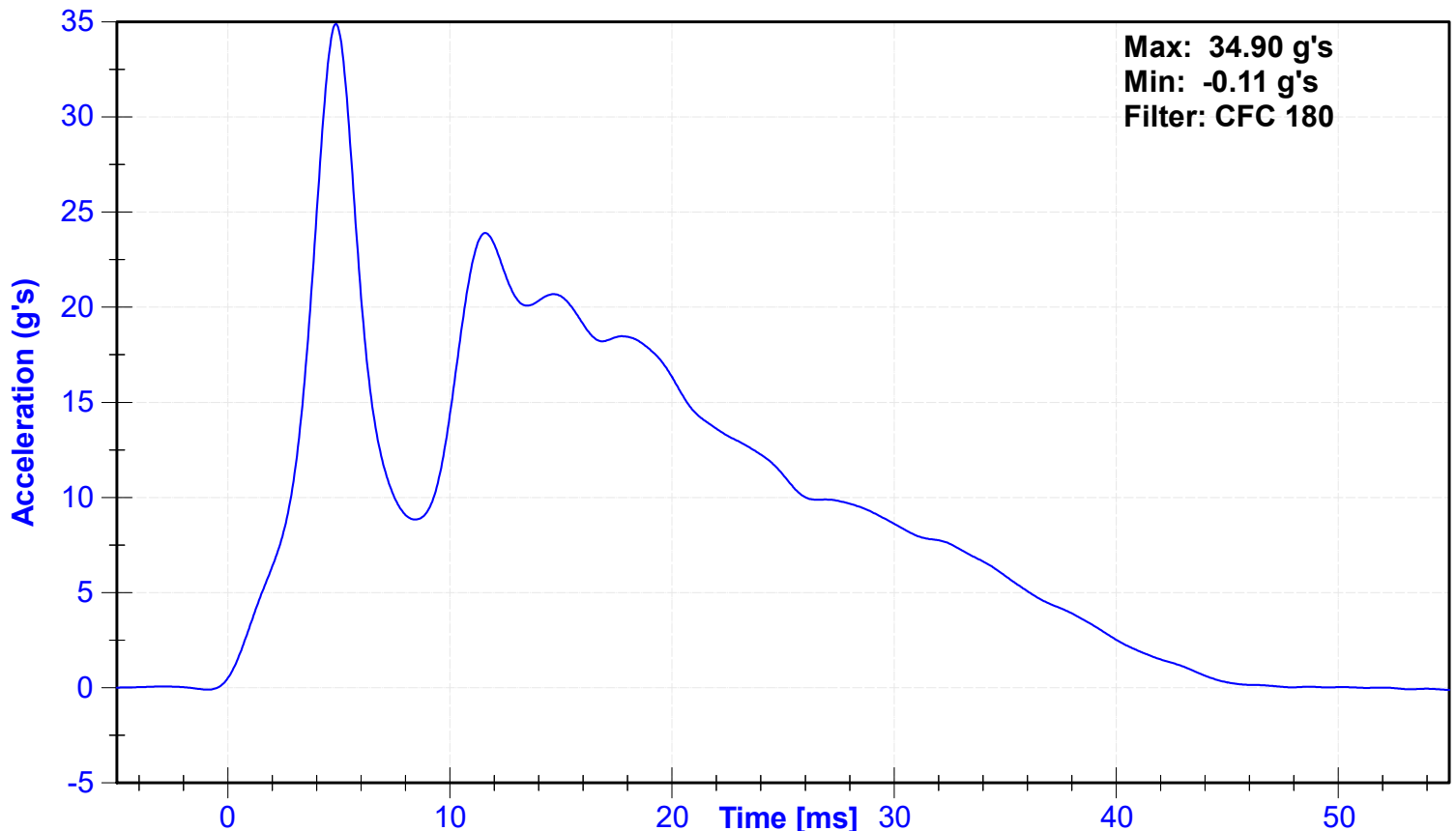
### Results

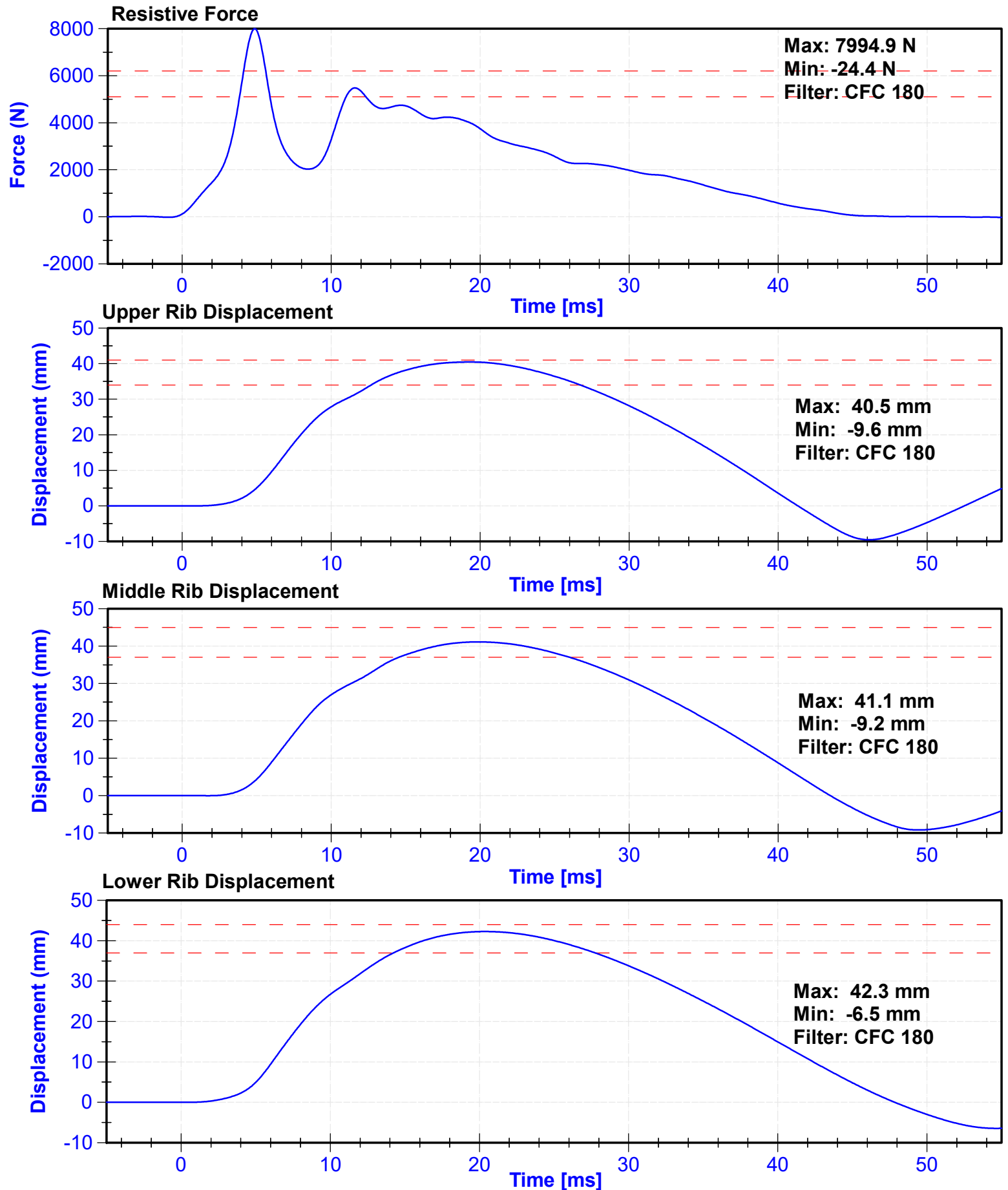
| Test Parameter              | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|-----------------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature                 | 20.6                  | 22.2                  | °C   | 21.5   | Pass      |
| Humidity                    | 10                    | 70                    | %    | 47     | Pass      |
| Velocity                    | 5.4                   | 5.6                   | m/s  | 5.51   | Pass      |
| Resistive Force after 6ms   | 5100                  | 6200                  | N    | 5476.4 | Pass      |
| Upper Thorax Rib Deflection | 34                    | 41                    | mm   | 40.5   | Pass      |
| Mid Thorax Rib Deflection   | 37                    | 45                    | mm   | 41.1   | Pass      |
| Lower Thorax Rib Deflection | 37                    | 44                    | mm   | 42.3   | Pass      |

### Transducer Calibrations

| Channel                         | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|---------------------------------|--------------|---------------|------------------|----------------------|
| Probe Accelerometer             | Endevco      | 18546         | 11/19/2022       | 11/18/2023           |
| Upper Thorax Rib Potentiometer  | Honeywell    | 0552-01       | 8/7/2023         | 2/5/2024             |
| Middle Thorax Rib Potentiometer | Honeywell    | 807           | 8/7/2023         | 2/5/2024             |
| Lower Thorax Rib Potentiometer  | Honeywell    | 0552-03       | 8/7/2023         | 2/5/2024             |

### Probe Acceleration





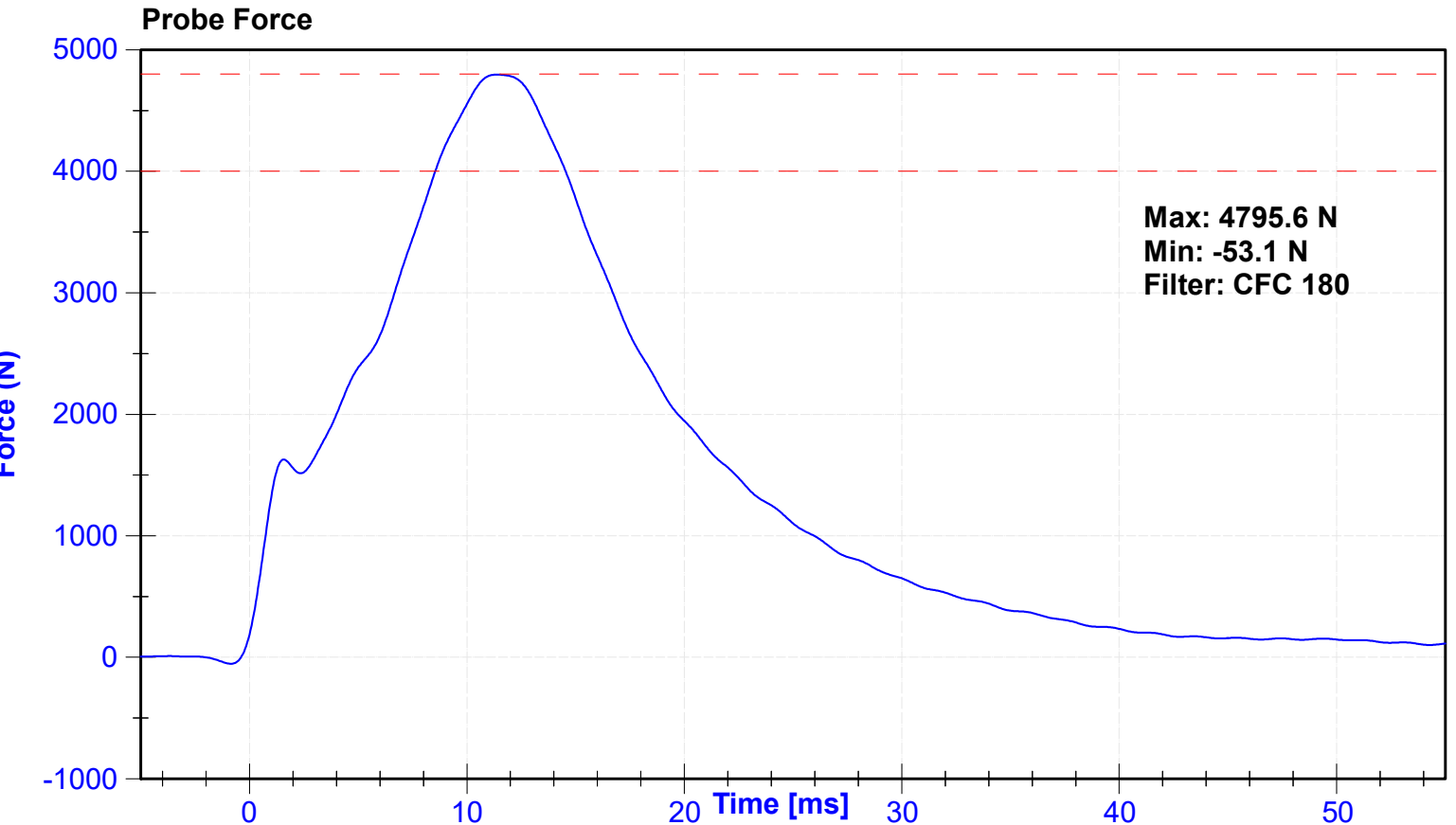
|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | Denton | Test Technician       | D. Sakona  |
| ATD Serial Number | D037   | Laboratory Supervisor | C. Mantell |

Results

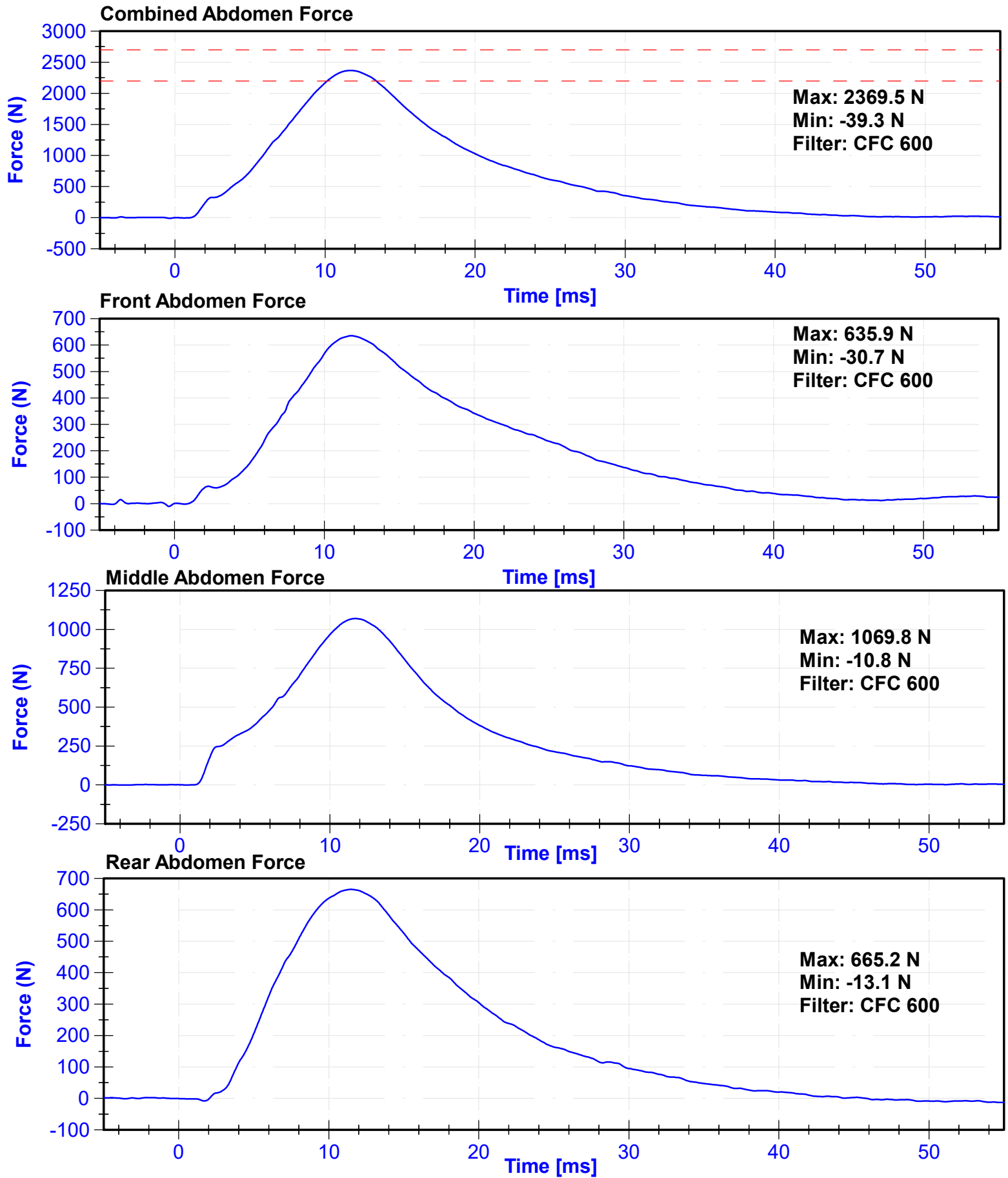
| Test Parameter               | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|------------------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature                  | 20.6                  | 22.2                  | °C   | 21.5   | Pass      |
| Humidity                     | 10                    | 70                    | %    | 47     | Pass      |
| Velocity                     | 3.9                   | 4.1                   | m/s  | 3.92   | Pass      |
| Combined Abdomen Force       | 2200                  | 2700                  | N    | 2369.5 | Pass      |
| Time at Peak Abdomen Force   | 10.0                  | 12.3                  | ms   | 11.70  | Pass      |
| Resistive Probe Force        | 4000                  | 4800                  | N    | 4795.6 | Pass      |
| Time at Peak Resistive Force | 10.6                  | 13.0                  | ms   | 11.35  | Pass      |

Transducer Calibrations

| Channel                  | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|--------------------------|--------------|---------------|------------------|----------------------|
| Pendulum Accelerometer   | Endevco      | 18546         | 11/19/2022       | 11/18/2023           |
| Front Abdomen Load Cell  | Denton       | 1440          | 8/8/2023         | 8/7/2024             |
| Middle Abdomen Load Cell | Denton       | 1525          | 8/8/2023         | 8/7/2024             |
| Rear Abdomen Load Cell   | Denton       | 1528          | 8/8/2023         | 8/7/2024             |







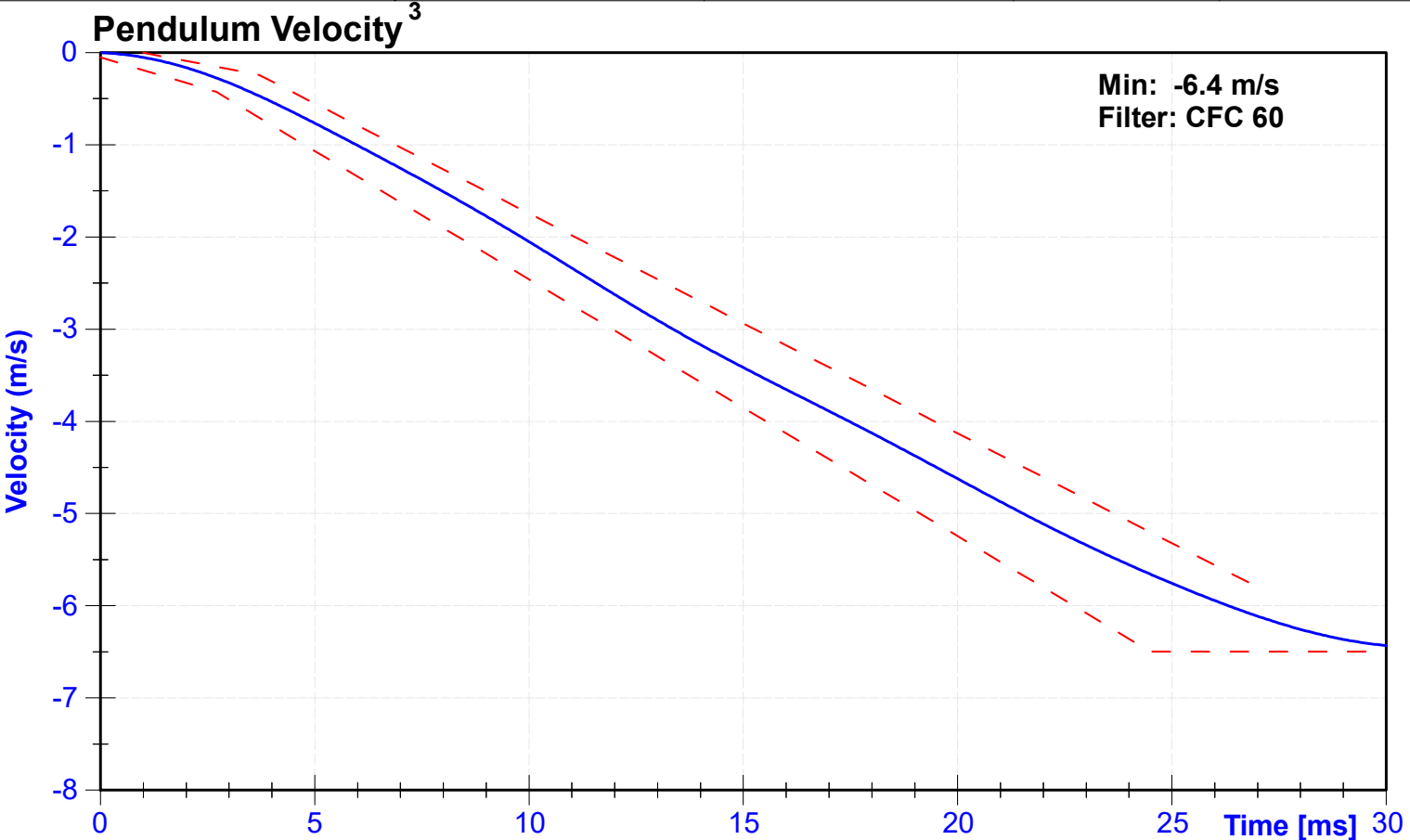
|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | Denton | Test Technician       | D. Sakona  |
| ATD Serial Number | D037   | Laboratory Supervisor | C. Mantell |

**Results**

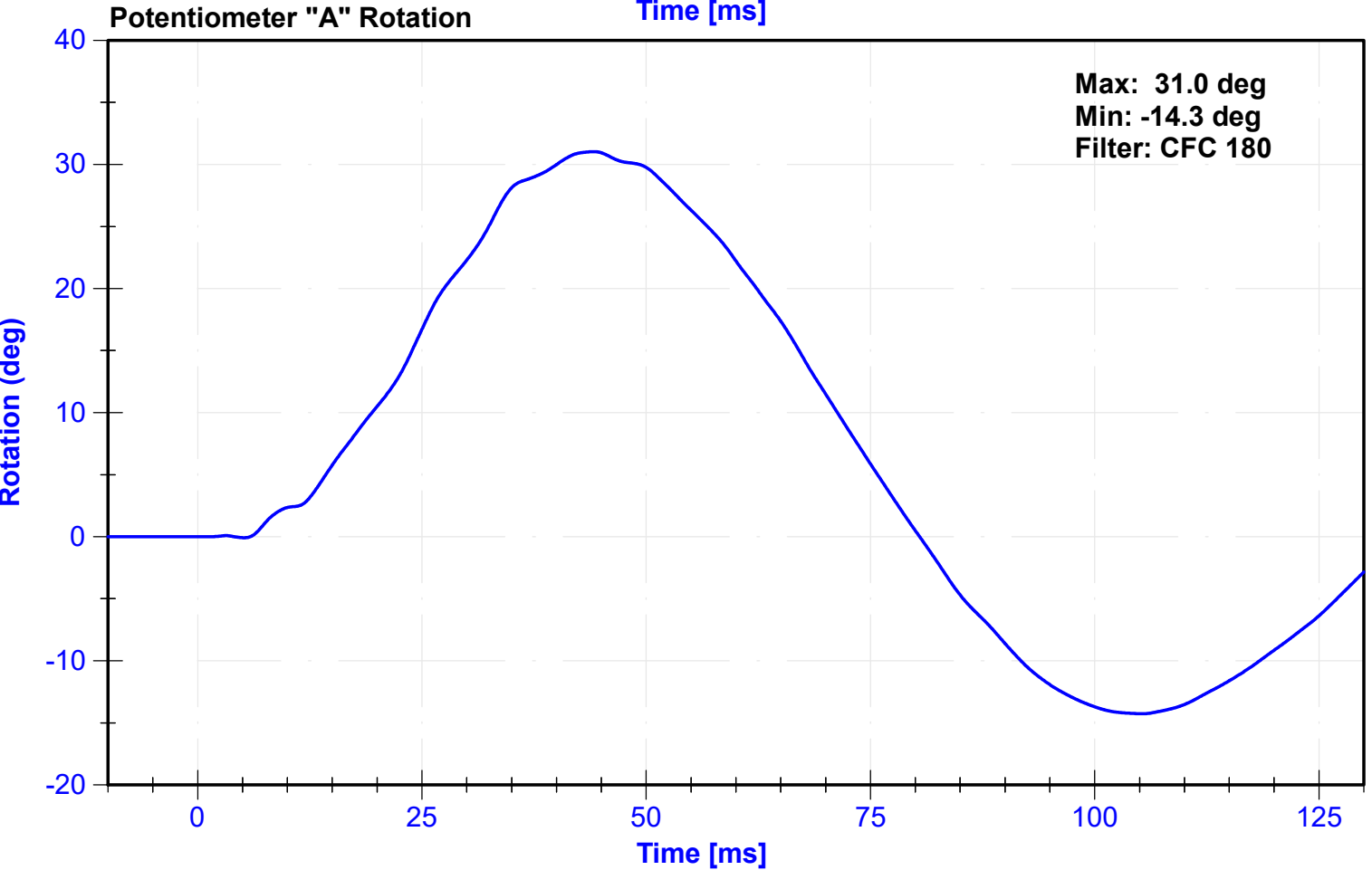
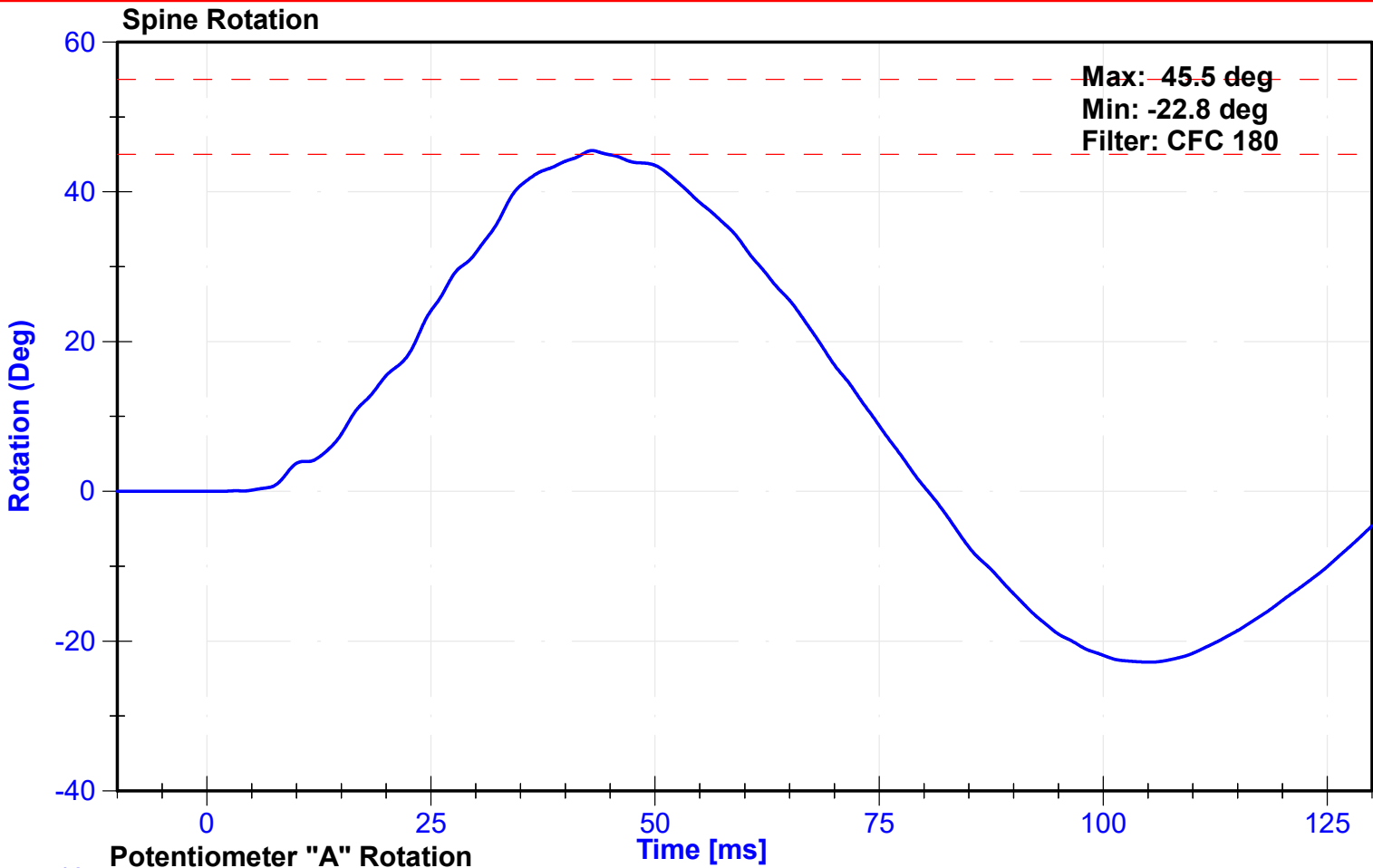
| Test Parameter                     | Minimum Specification       | Maximum Specification       | Unit | Result                | Pass/Fail |
|------------------------------------|-----------------------------|-----------------------------|------|-----------------------|-----------|
| Temperature                        | 20.6                        | 22.2                        | °C   | 21.8                  | Pass      |
| Humidity                           | 10                          | 70                          | %    | 53                    | Pass      |
| Velocity                           | 5.95                        | 6.15                        | m/s  | 6.044                 | Pass      |
| Lateral Spine Rotation             | 45                          | 55                          | deg  | 45.5                  | Pass      |
| Time at Maximum Rotation           | 39                          | 53                          | ms   | 43.0                  | Pass      |
| Time of Decay to Zero Degrees      | 37                          | 57                          | ms   | 37.5                  | Pass      |
| Pendulum Velocity Overall Corridor | Lower Boundary <sup>1</sup> | Upper Boundary <sup>2</sup> | m/s  | See Plot <sup>3</sup> | Pass      |

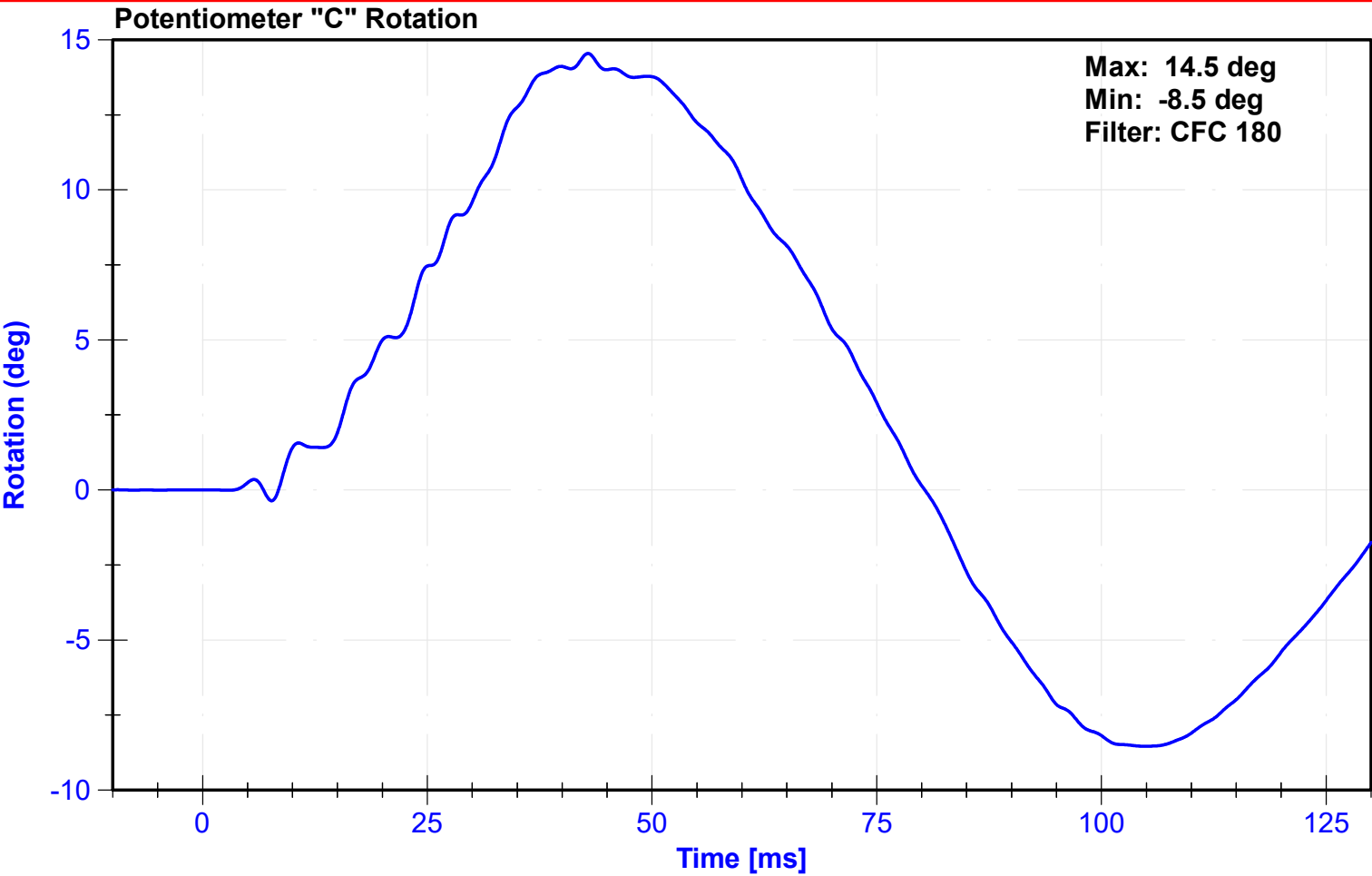
**Transducer Calibrations**

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



<sup>1,2</sup> Upper and lower boundaries specified in Appendix I IV-19





Appendix I

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

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

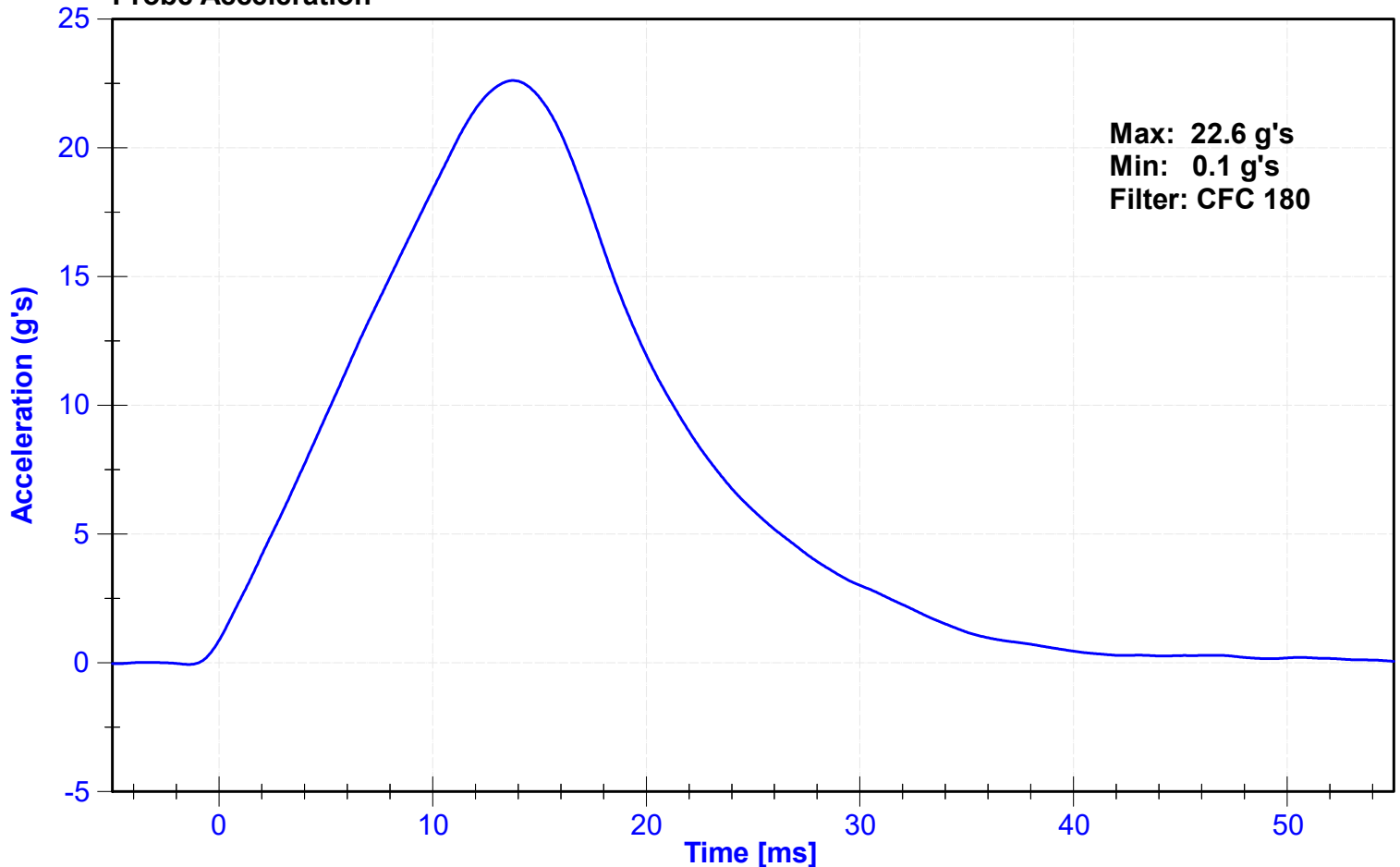
### Results

| Test Parameter               | Minimum Specification | Maximum Specification | Unit | Result  | Pass/Fail |
|------------------------------|-----------------------|-----------------------|------|---------|-----------|
| Temperature                  | 20.6                  | 22.2                  | °C   | 21.5    | Pass      |
| Humidity                     | 10                    | 70                    | %    | 47      | Pass      |
| Velocity                     | 4.2                   | 4.4                   | m/s  | 4.27    | Pass      |
| Resistive Force              | 4700                  | 5400                  | N    | 5179.3  | Pass      |
| Time at Peak Resistive Force | 11.8                  | 16.1                  | ms   | 13.75   | Pass      |
| Pubic Force                  | -1590                 | -1230                 | N    | -1558.6 | Pass      |
| Time at Peak Pubic Force     | 12.2                  | 17.0                  | ms   | 14.40   | Pass      |

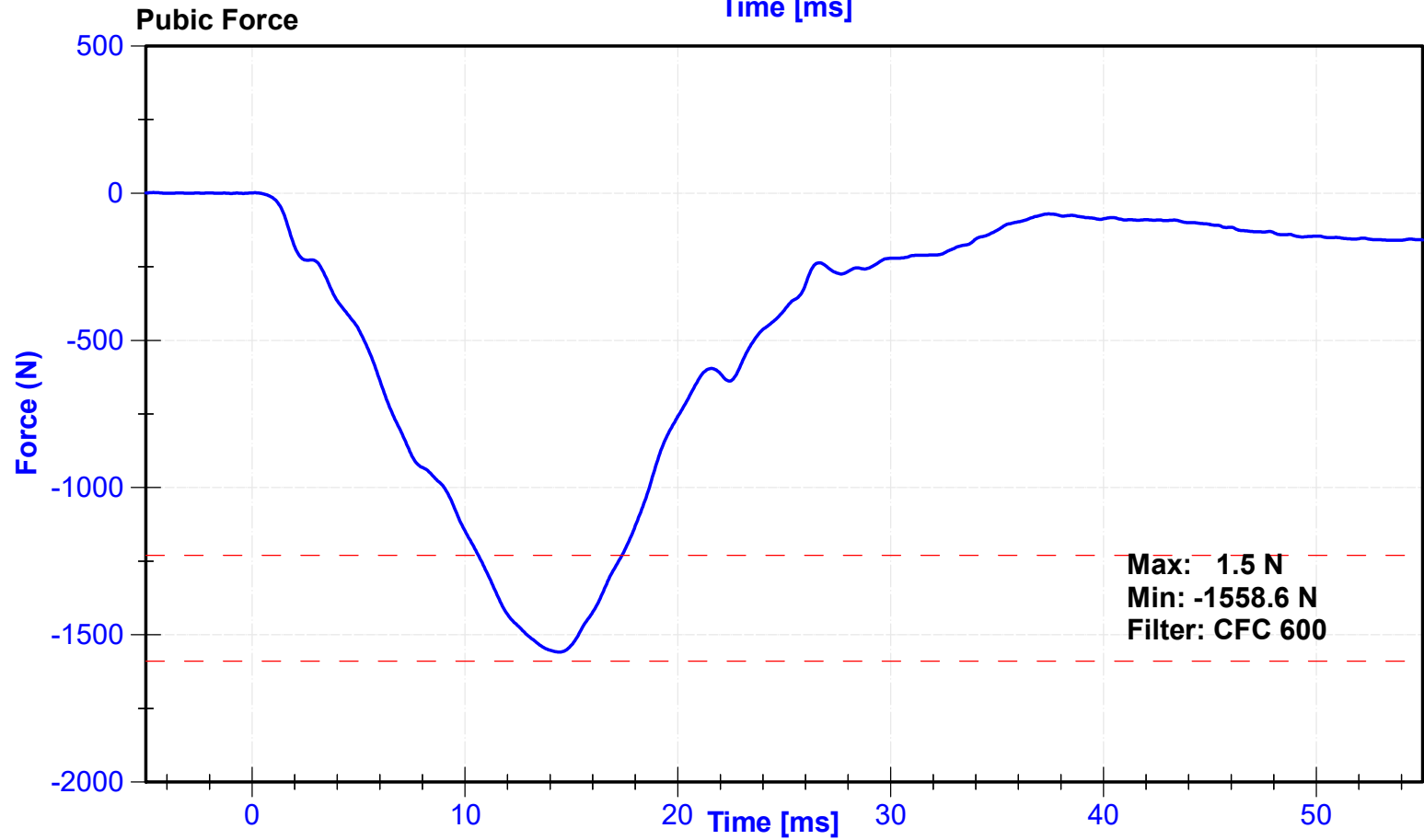
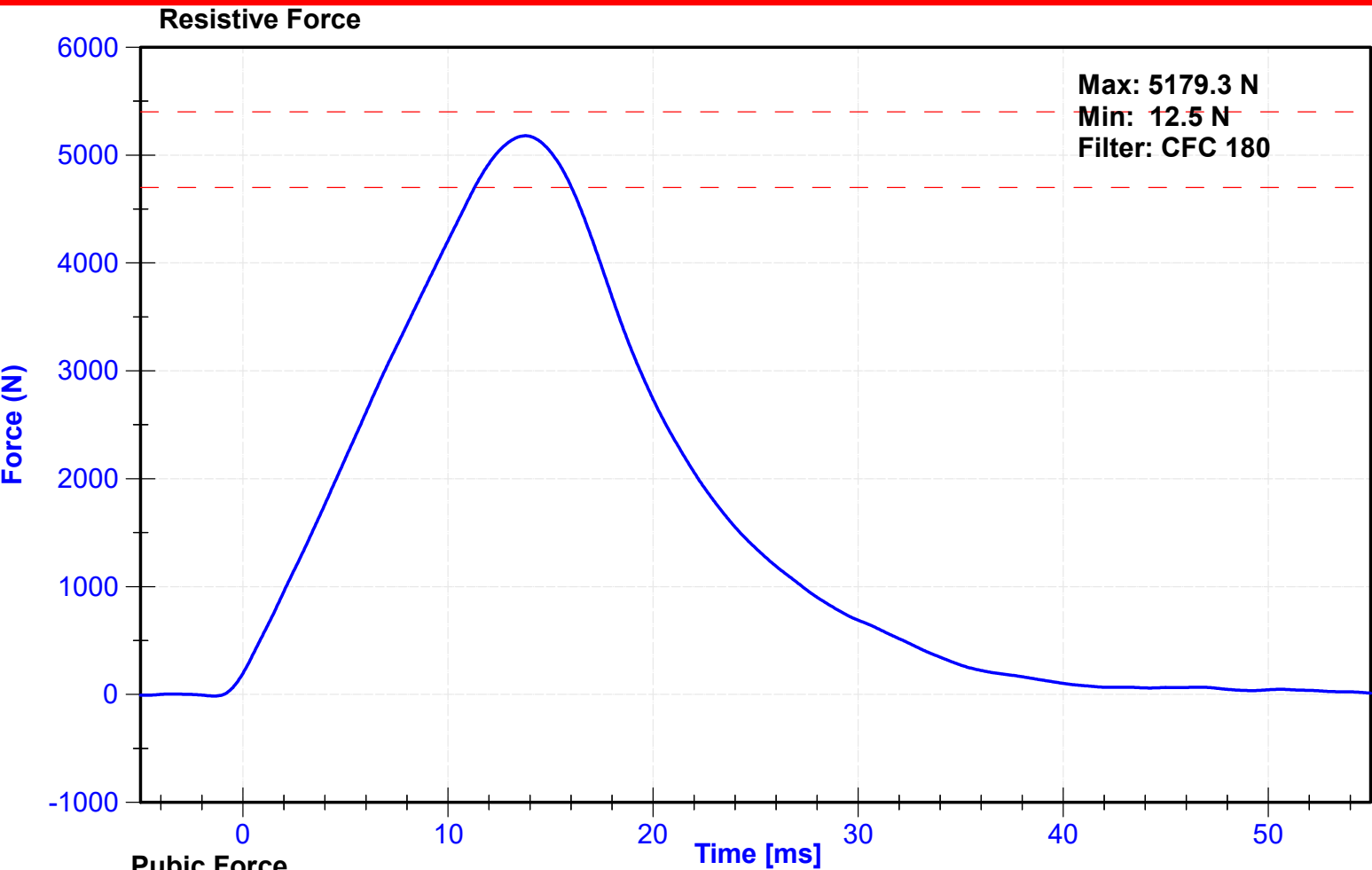
### Transducer Calibrations

| Channel                | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|------------------------|--------------|---------------|------------------|----------------------|
| Pendulum Accelerometer | Endevco      | 18546         | 11/19/2022       | 11/18/2023           |
| Pubic Load Cell        | Denton       | 456-FY        | 8/8/2023         | 8/7/2024             |

Probe Acceleration







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

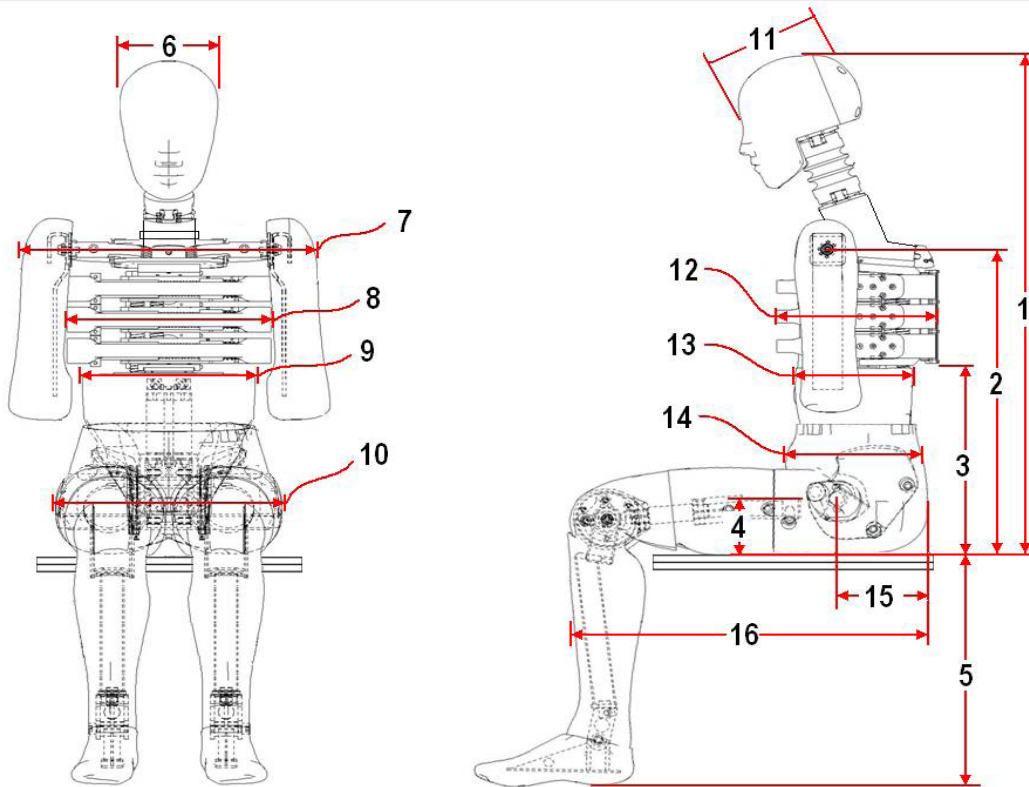


## External Measurements - EuroSID-2re

Technician: K. Brogan

Date: 10/02/2023

Dummy Serial Number: D037



**FRONT VIEW**

**SIDE VIEW**

| Dim. No. | Description                                    | Specification (mm) |     | Result (mm) | Pass/Fail |
|----------|------------------------------------------------|--------------------|-----|-------------|-----------|
| 1        | Sitting Height                                 | 900                | 918 | 909         | Pass      |
| 2        | Seat to Shoulder Joint                         | 558                | 572 | 564         | Pass      |
| 3        | Seat to Lower Face of Thoracic Spine Box       | 346                | 356 | 353         | Pass      |
| 4        | Seat to Hip Joint (center of bolt)             | 97                 | 103 | 101         | Pass      |
| 5        | Sole to Seat, Sitting                          | 333                | 451 | 423         | Pass      |
| 6        | Head Width                                     | 152                | 158 | 154         | Pass      |
| 7        | Shoulder/Arm Width                             | 461                | 479 | 471         | Pass      |
| 8        | Thorax Width                                   | 322                | 332 | 330         | Pass      |
| 9        | Abdomen Width                                  | 273                | 287 | 282         | Pass      |
| 10       | Pelvis Lap Width                               | 359                | 373 | 364         | Pass      |
| 11       | Head Depth                                     | 196                | 206 | 200         | Pass      |
| 12       | Thorax Depth                                   | 262                | 272 | 266         | Pass      |
| 13       | Abdomen Depth                                  | 194                | 204 | 199         | Pass      |
| 14       | Pelvis Depth                                   | 235                | 245 | 241         | Pass      |
| 15       | Back of Buttocks to Hip Joint (center of bolt) | 150                | 160 | 154         | Pass      |
| 16       | Back of Buttocks to Front Knee                 | 597                | 615 | 604         | Pass      |

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

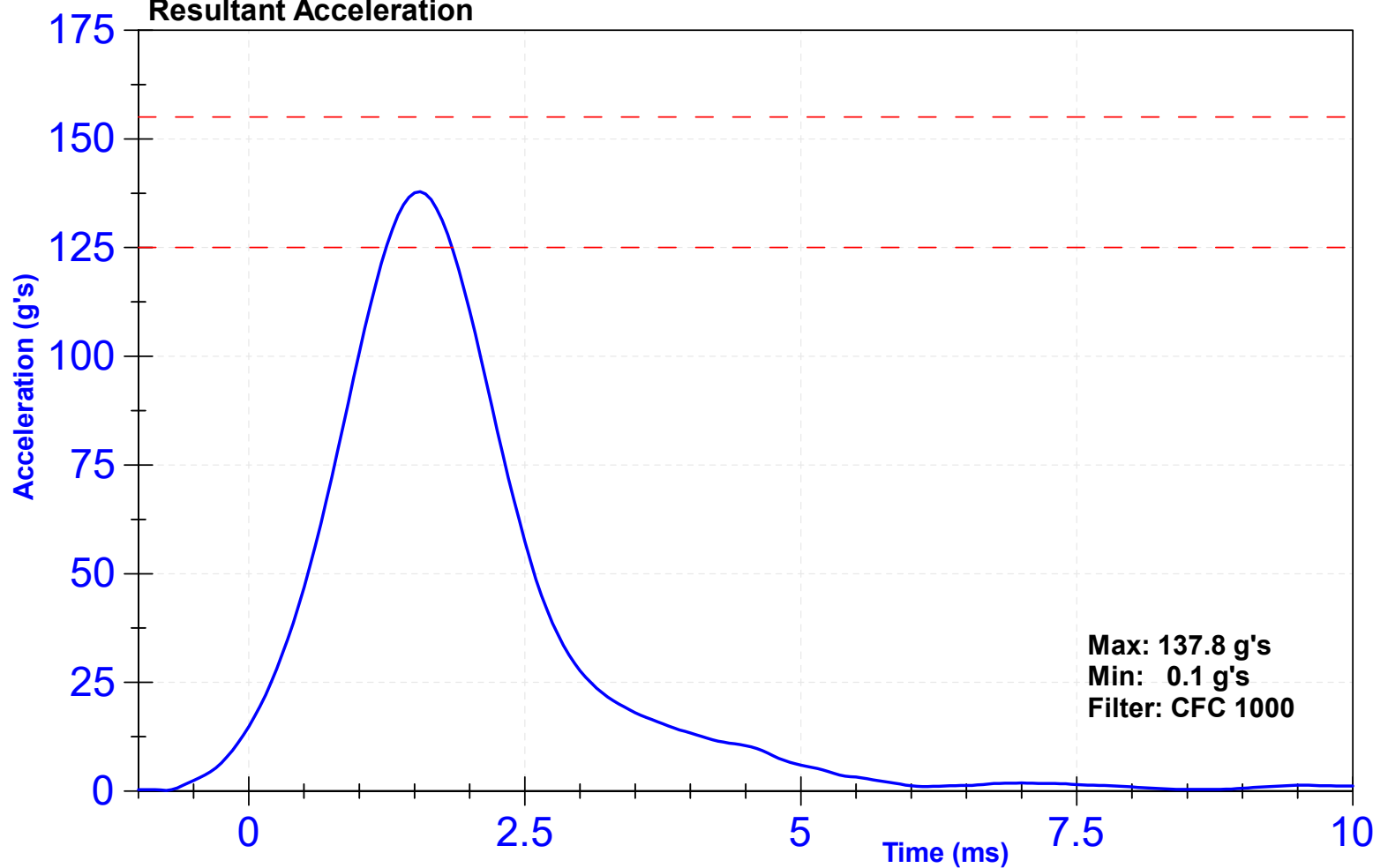
### Results

| Test Parameter         | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|------------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature            | 20.6                  | 22.2                  | °C   | 21.5   | Pass      |
| Humidity               | 10                    | 70                    | %    | 62.1   | Pass      |
| Resultant Acceleration | 125                   | 155                   | g's  | 137.8  | Pass      |
| Oscillation            | 0                     | 15                    | %    | 1.34   | Pass      |
| Fore-Aft Acceleration  | -15                   | 15                    | g's  | 6.1    | Pass      |

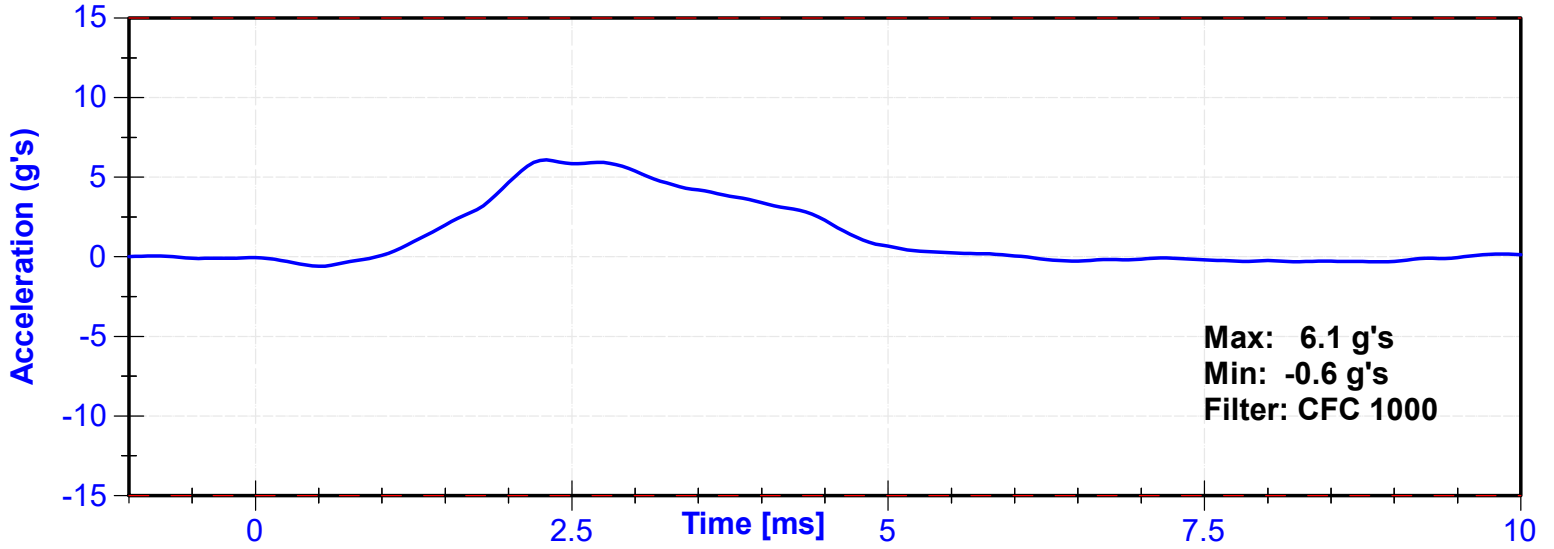
### Transducer Calibrations

| Channel         | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|--------------|---------------|------------------|----------------------|
| X Accelerometer | Endevco      | T21724        | 8/8/2023         | 2/4/2024             |
| Y Accelerometer | Endevco      | T22281        | 8/8/2023         | 2/4/2024             |
| Z Accelerometer | Endevco      | T26050        | 8/8/2023         | 2/4/2024             |

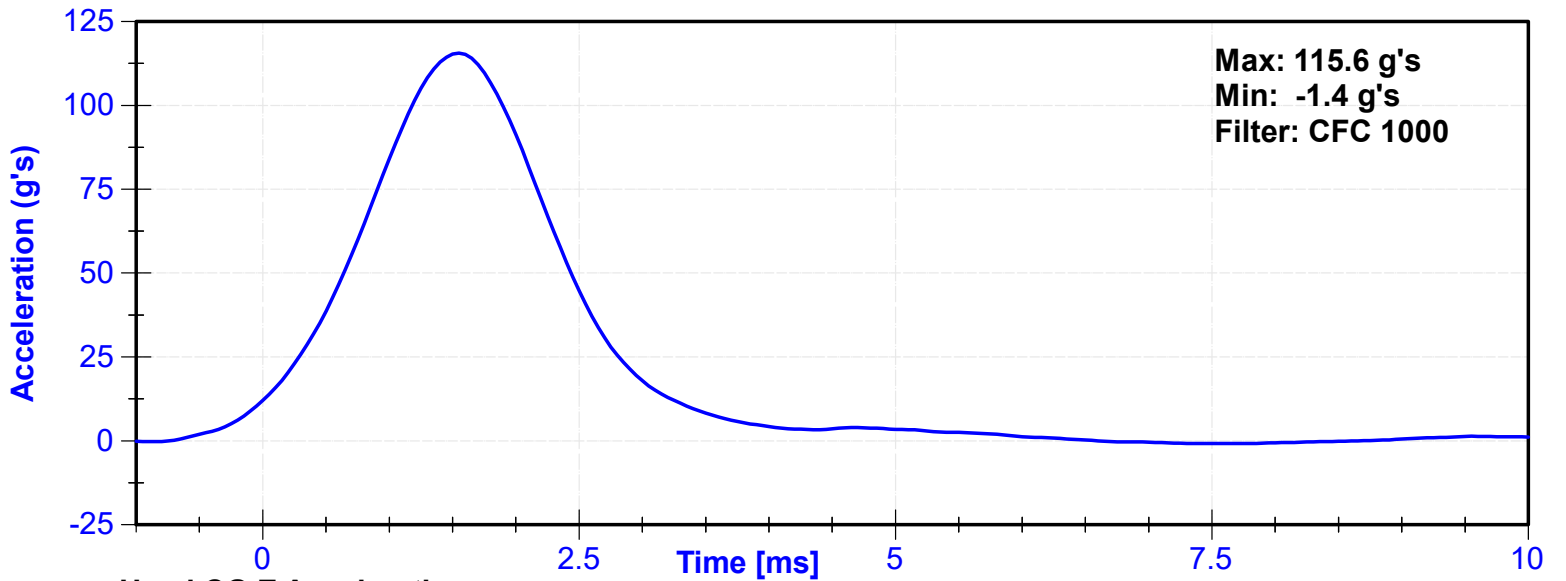
### Resultant Acceleration



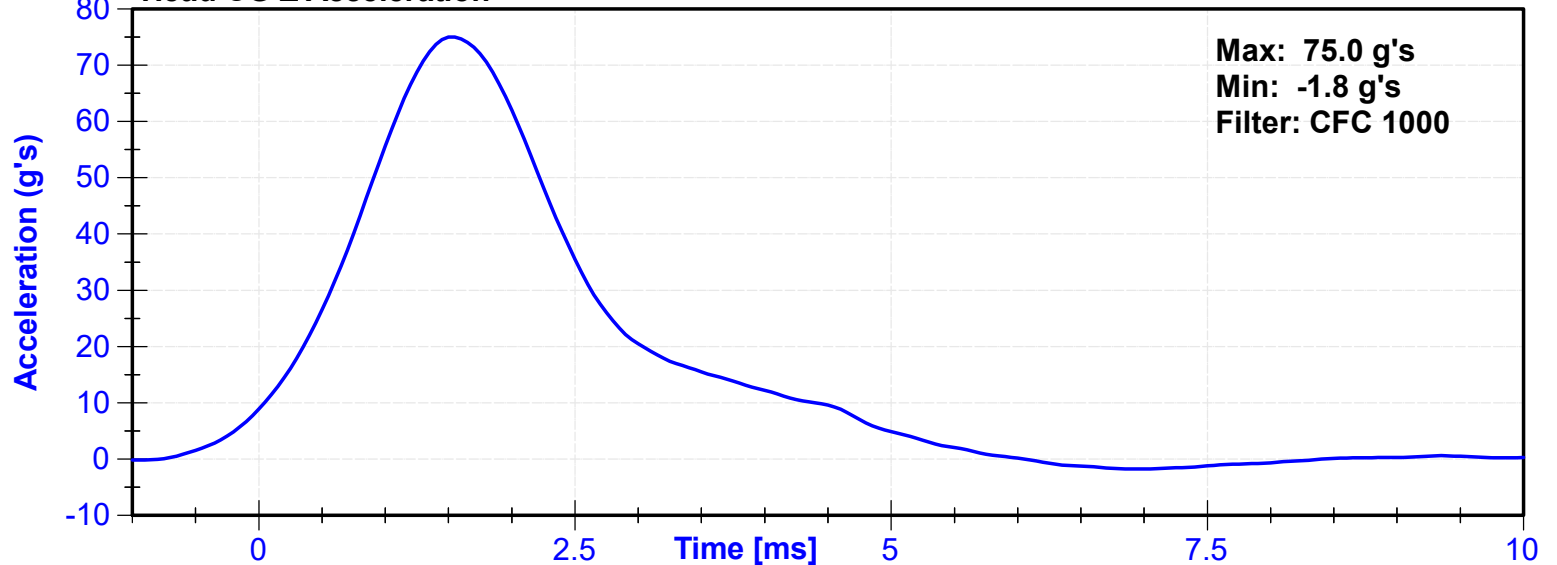
Head CG X Acceleration



Head CG Y Acceleration



Head CG Z Acceleration





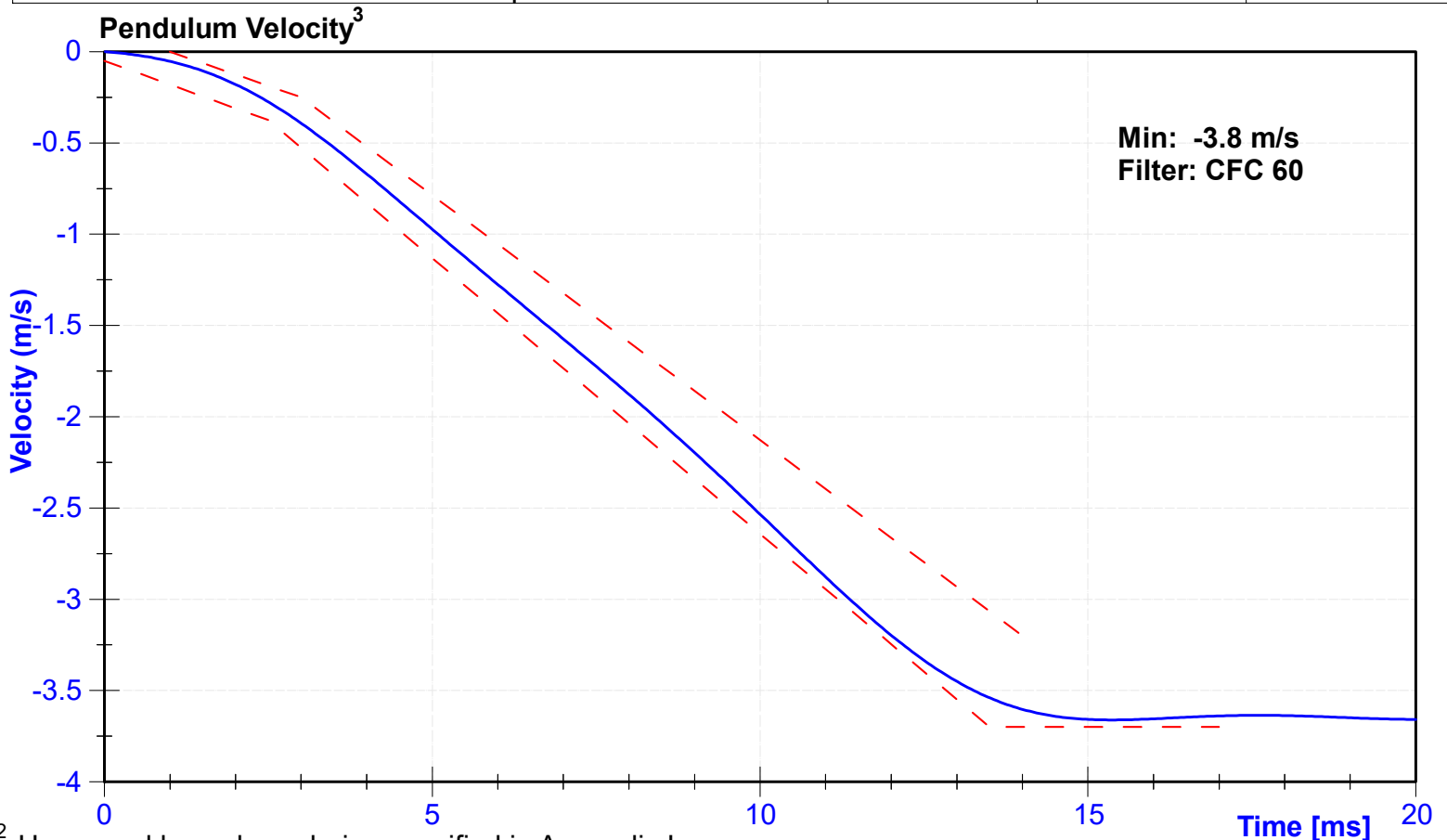
|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | Denton | Test Technician       | J. Miller  |
| ATD Serial Number | D037   | Laboratory Supervisor | C. Mantell |

### Results

| Test Parameter                      | Minimum Specification       | Maximum Specification       | Unit | Result                | Pass/Fail |
|-------------------------------------|-----------------------------|-----------------------------|------|-----------------------|-----------|
| Temperature                         | 20.6                        | 22.2                        | °C   | 21.6                  | Pass      |
| Humidity                            | 10                          | 70                          | %    | 62.1                  | Pass      |
| Velocity                            | 3.3                         | 3.5                         | m/s  | 3.44                  | Pass      |
| Lateral Neck Rotation               | 49                          | 59                          | deg  | 51.7                  | Pass      |
| Time at Maximum Rotation            | 54                          | 66                          | ms   | 56.2                  | Pass      |
| Time of Rotation Decay from Maximum | 53                          | 88                          | ms   | 58.0                  | Pass      |
| Pendulum Velocity Overall Corridor  | Lower Boundary <sup>1</sup> | Upper Boundary <sup>2</sup> | m/s  | See Plot <sup>3</sup> | Pass      |

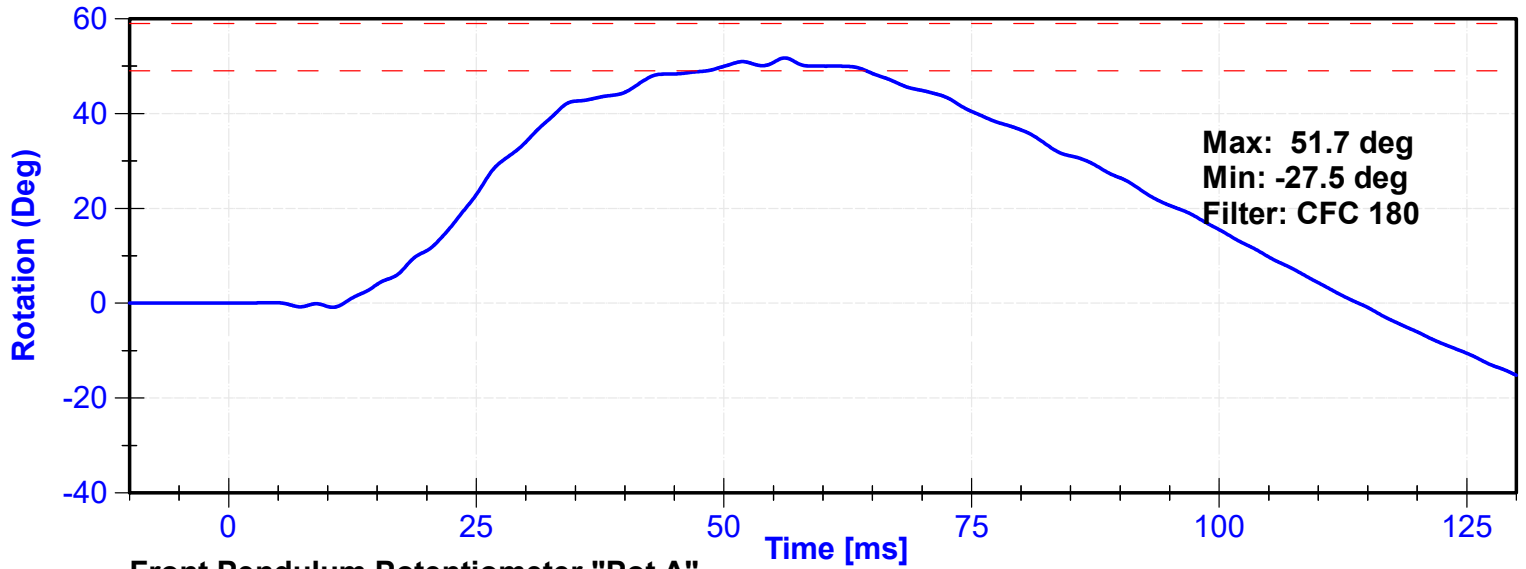
### Transducer Calibrations

| Channel                      | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|------------------------------|--------------|---------------|------------------|----------------------|
| Pendulum Accelerometer       | Endevco      | C16503        | 10/26/2022       | 10/26/2023           |
| Front Pendulum Potentiometer | Sfernice     | 094           | 9/29/2023        | 9/28/2024            |
| Headform Potentiometer       | Sfernice     | 095           | 9/29/2023        | 9/28/2024            |

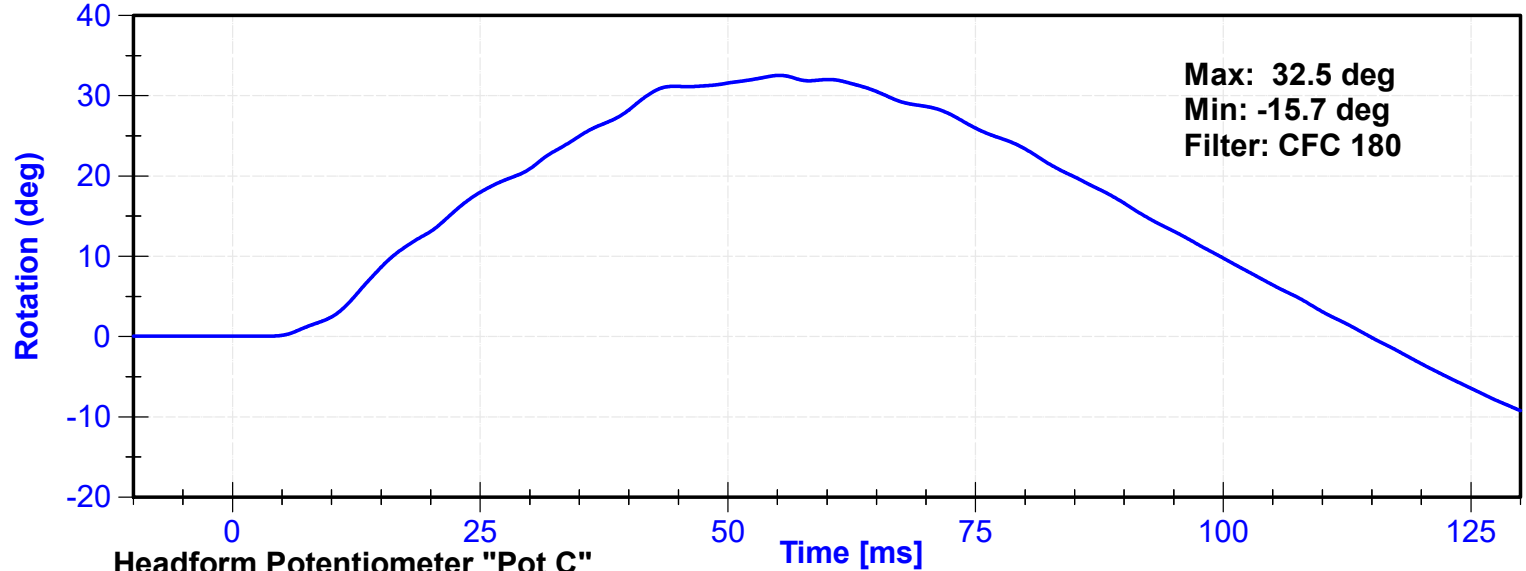


<sup>1,2</sup> Upper and lower boundaries specified in Appendix I

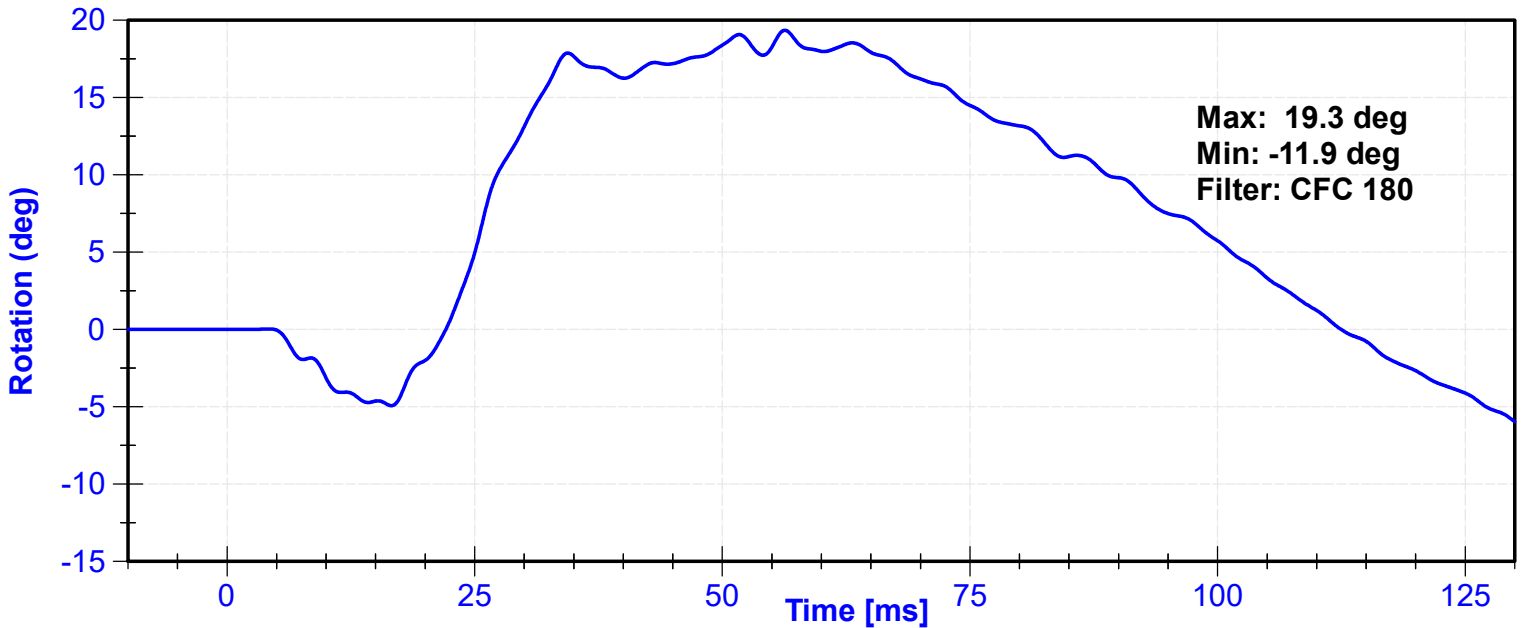
### Neck Rotation



### Front Pendulum Potentiometer "Pot A"



### Headform Potentiometer "Pot C"



Appendix I

| <sup>2</sup> Upper Boundary Corridor |                | <sup>1</sup> Lower Boundary Corridor |                |
|--------------------------------------|----------------|--------------------------------------|----------------|
| Time (ms)                            | Velocity (m/s) | Time (ms)                            | Velocity (m/s) |
| 1.0                                  | 0.00           | 0.0                                  | -0.05          |
| 3.0                                  | -0.25          | 2.5                                  | -0.375         |
| 14.0                                 | -3.20          | 13.5                                 | -3.7           |
|                                      |                | 17.0                                 | -3.7           |

|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | Denton | Test Technician       | J. Miller  |
| ATD Serial Number | D037   | Laboratory Supervisor | C. Mantell |

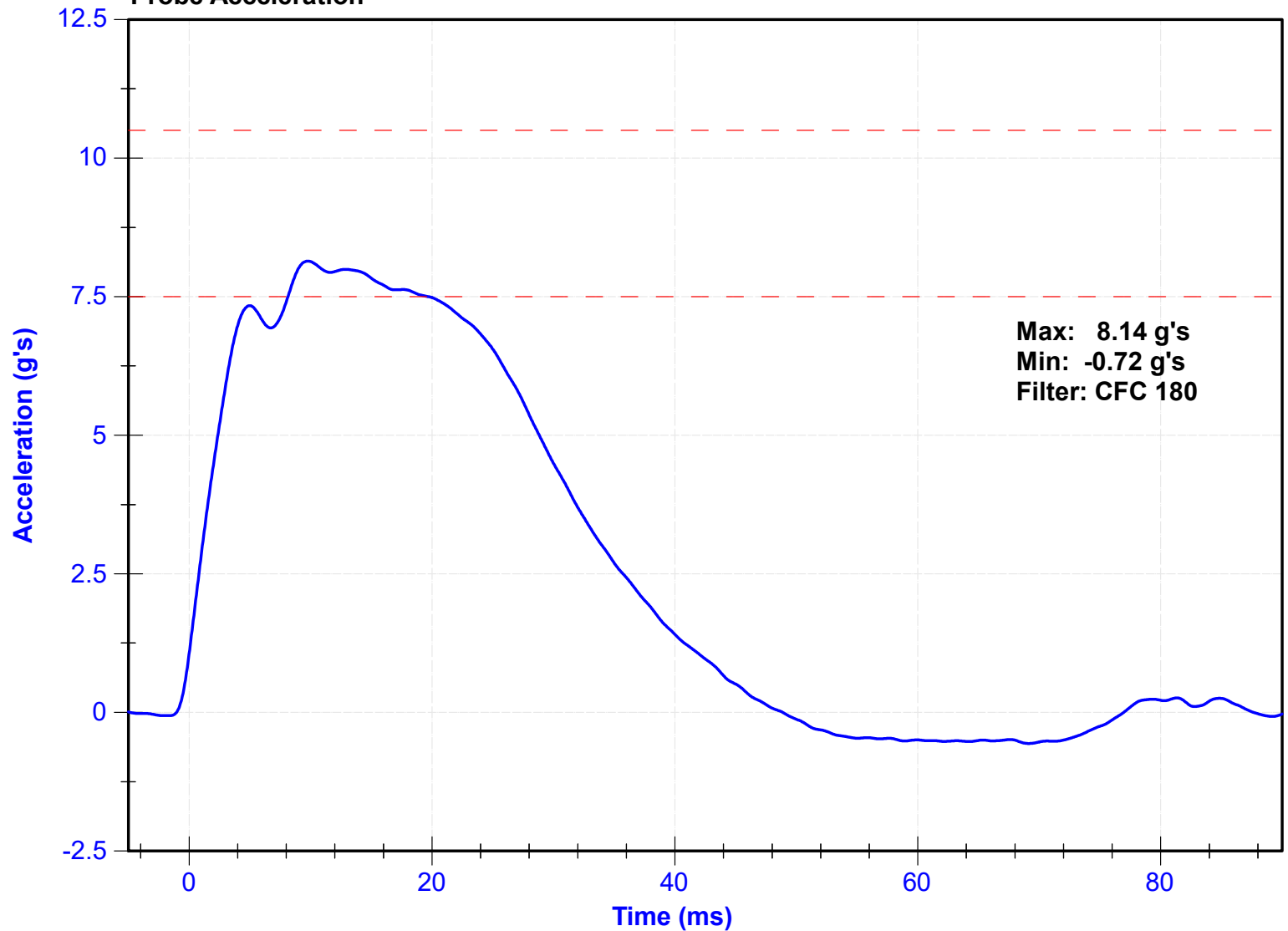
### Results

| Test Parameter     | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|--------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature        | 20.6                  | 22.2                  | °C   | 21.8   | Pass      |
| Humidity           | 10                    | 70                    | %    | 59.1   | Pass      |
| Velocity           | 4.2                   | 4.4                   | m/s  | 4.35   | Pass      |
| Probe Acceleration | 7.5                   | 10.5                  | g's  | 8.14   | Pass      |

### Transducer Calibrations

| Channel             | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|---------------------|--------------|---------------|------------------|----------------------|
| Probe Accelerometer | Endevco      | 18546         | 11/19/2022       | 11/18/2023           |

Probe Acceleration



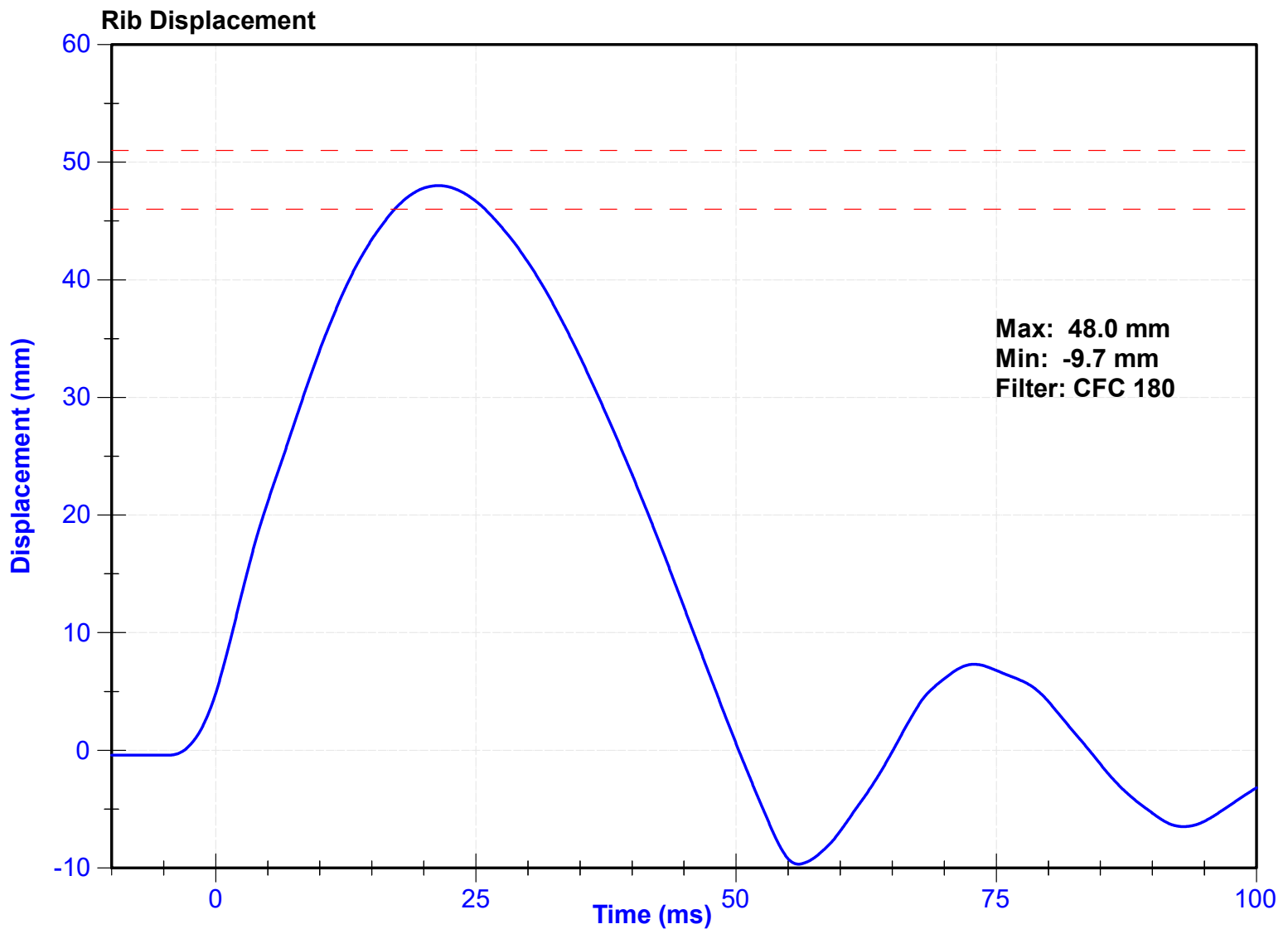
|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | Denton | Test Technician       | D. Sakona  |
| ATD Serial Number | D037   | Laboratory Supervisor | C. Mantell |

### Results

| Test Parameter   | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature      | 20.6                  | 22.2                  | °C   | 21.5   | Pass      |
| Humidity         | 10                    | 70                    | %    | 62.1   | Pass      |
| Rib Displacement | 46                    | 51                    | mm   | 48.0   | Pass      |

### Transducer Calibrations

| Channel           | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|-------------------|--------------|---------------|------------------|----------------------|
| Rib Potentiometer | Honeywell    | 0552-01       | 8/7/2023         | 2/5/2024             |





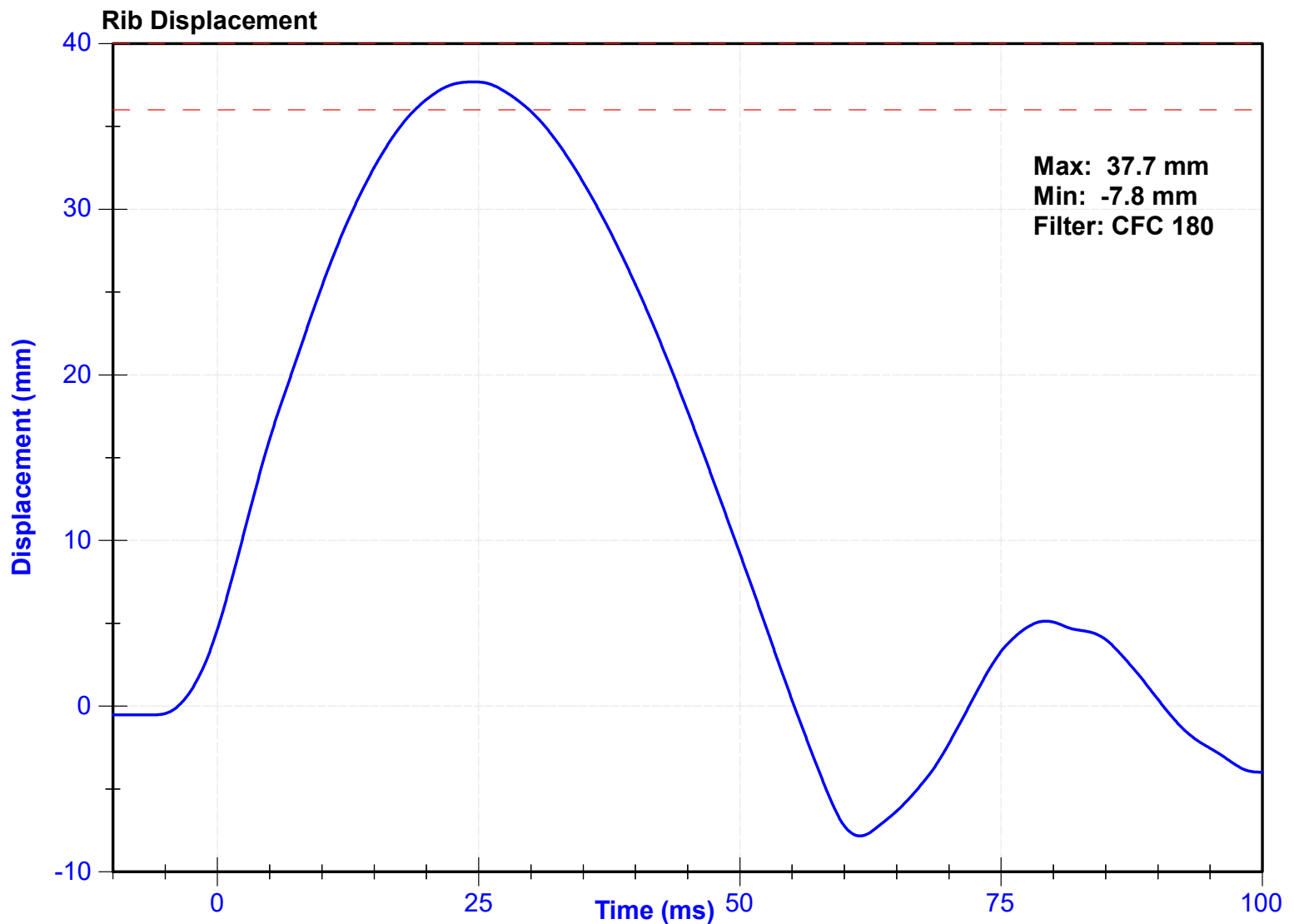
|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | Denton | Test Technician       | D. Sakona  |
| ATD Serial Number | D037   | Laboratory Supervisor | C. Mantell |

### Results

| Test Parameter   | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature      | 20.6                  | 22.2                  | °C   | 21.5   | Pass      |
| Humidity         | 10                    | 70                    | %    | 62.1   | Pass      |
| Rib Displacement | 36                    | 40                    | mm   | 37.7   | Pass      |

### Transducer Calibrations

| Channel           | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|-------------------|--------------|---------------|------------------|----------------------|
| Rib Potentiometer | Honeywell    | 0552-01       | 8/7/2023         | 2/5/2024             |



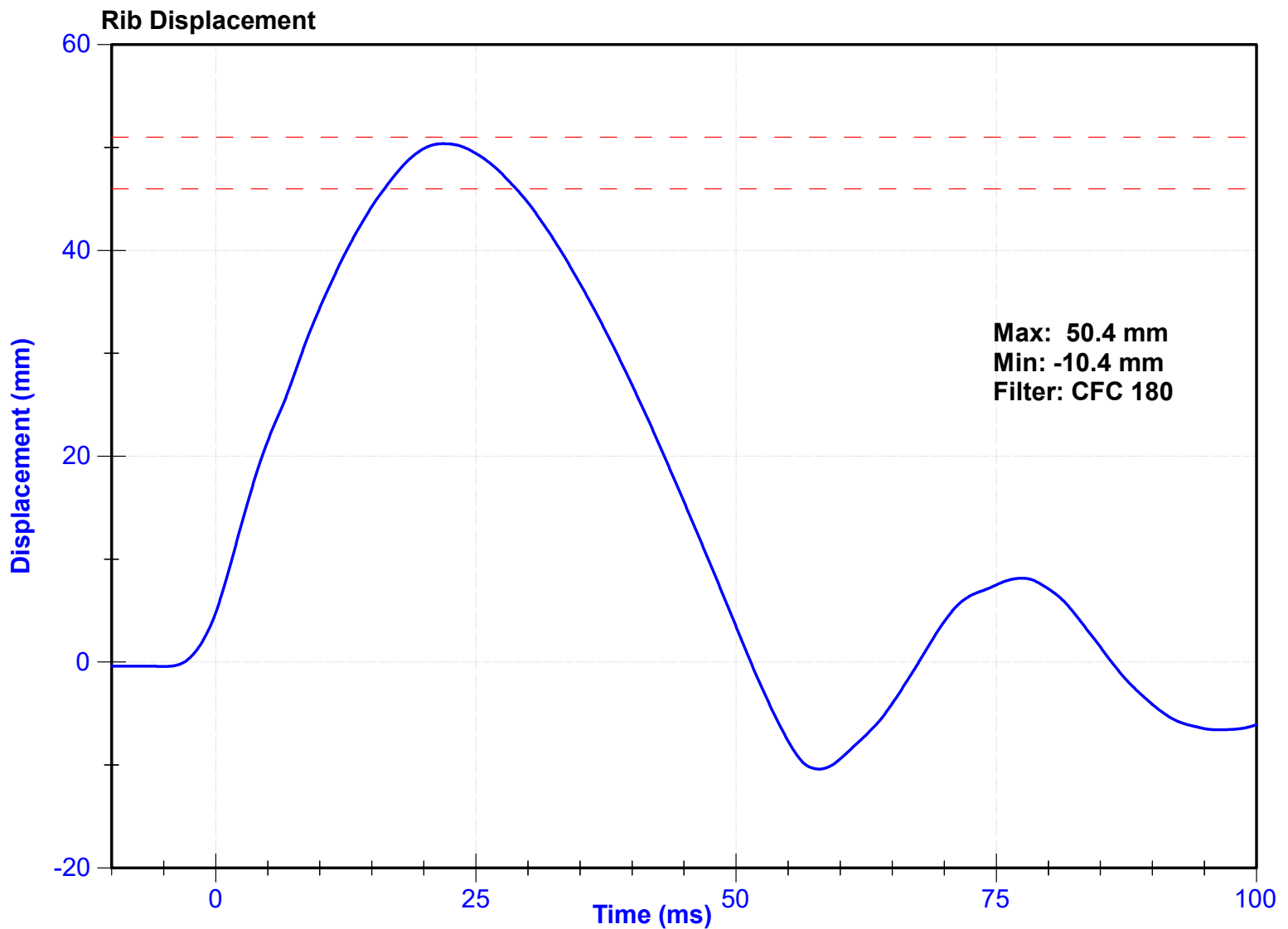
|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | Denton | Test Technician       | D. Sakona  |
| ATD Serial Number | D037   | Laboratory Supervisor | C. Mantell |

### Results

| Test Parameter   | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature      | 20.6                  | 22.2                  | °C   | 21.5   | Pass      |
| Humidity         | 10                    | 70                    | %    | 62.1   | Pass      |
| Rib Displacement | 46                    | 51                    | mm   | 50.4   | Pass      |

### Transducer Calibrations

| Channel           | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|-------------------|--------------|---------------|------------------|----------------------|
| Rib Potentiometer | Honeywell    | 807           | 8/7/2023         | 2/5/2024             |



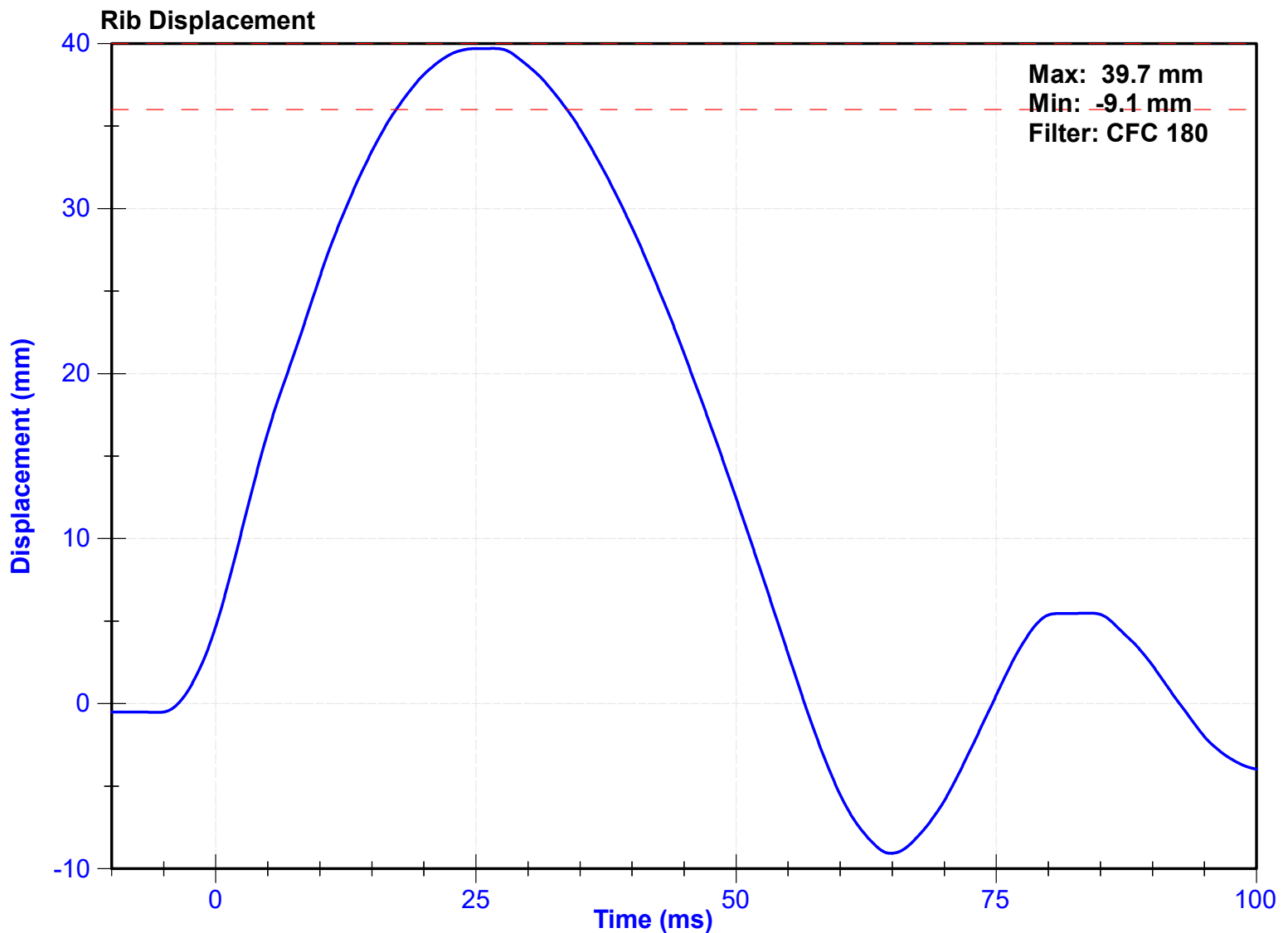
|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | Denton | Test Technician       | D. Sakona  |
| ATD Serial Number | D037   | Laboratory Supervisor | C. Mantell |

### Results

| Test Parameter   | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature      | 20.6                  | 22.2                  | °C   | 21.5   | Pass      |
| Humidity         | 10                    | 70                    | %    | 62.1   | Pass      |
| Rib Displacement | 36                    | 40                    | mm   | 39.7   | Pass      |

### Transducer Calibrations

| Channel           | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|-------------------|--------------|---------------|------------------|----------------------|
| Rib Potentiometer | Honeywell    | 807           | 8/7/2023         | 2/5/2024             |



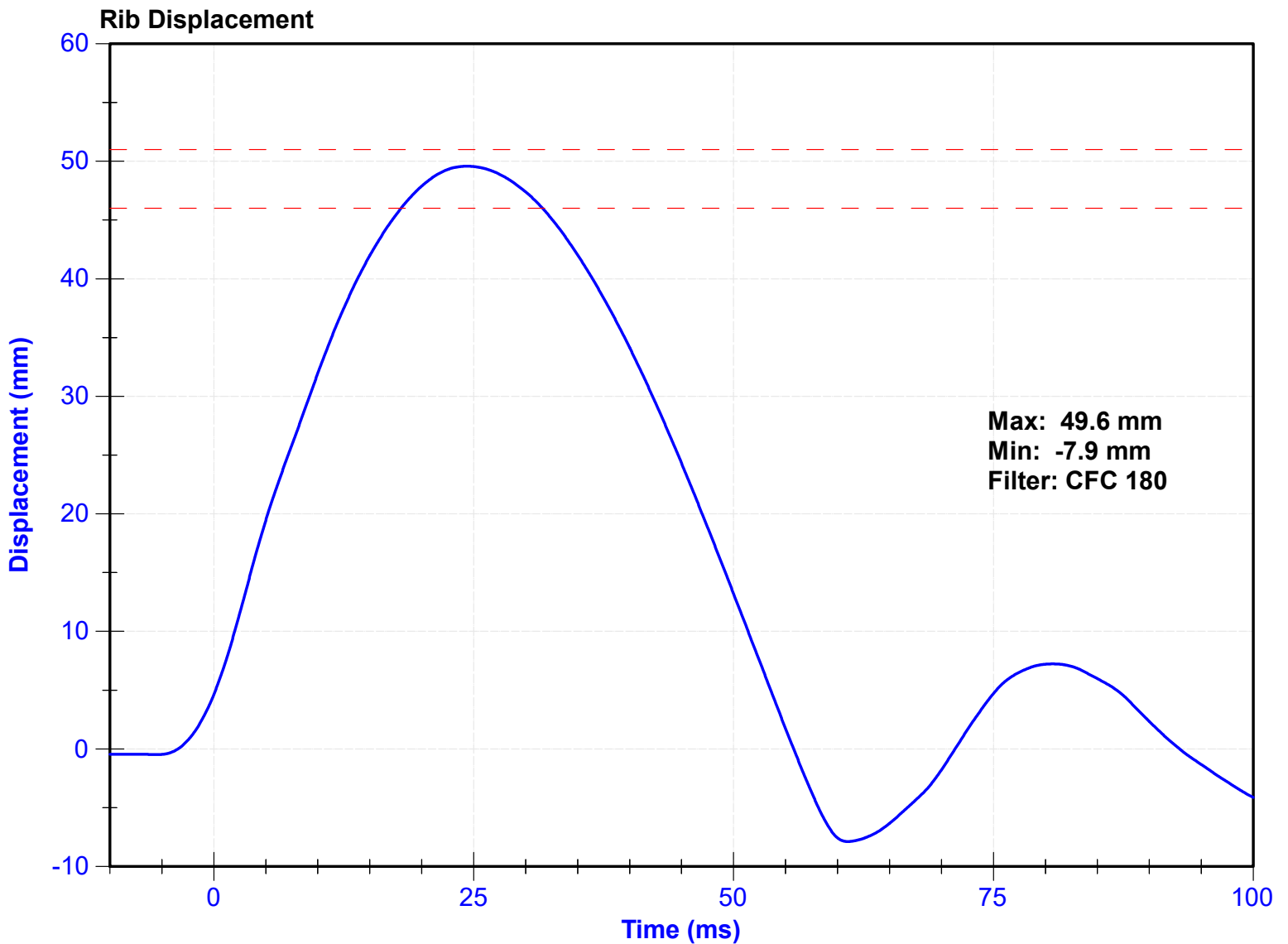
|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | Denton | Test Technician       | D. Sakona  |
| ATD Serial Number | D037   | Laboratory Supervisor | C. Mantell |

### Results

| Test Parameter   | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature      | 20.6                  | 22.2                  | °C   | 21.5   | Pass      |
| Humidity         | 10                    | 70                    | %    | 62.1   | Pass      |
| Rib Displacement | 46                    | 51                    | mm   | 49.6   | Pass      |

### Transducer Calibrations

| Channel           | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|-------------------|--------------|---------------|------------------|----------------------|
| Rib Potentiometer | Honeywell    | 0552-03       | 8/7/2023         | 2/5/2024             |



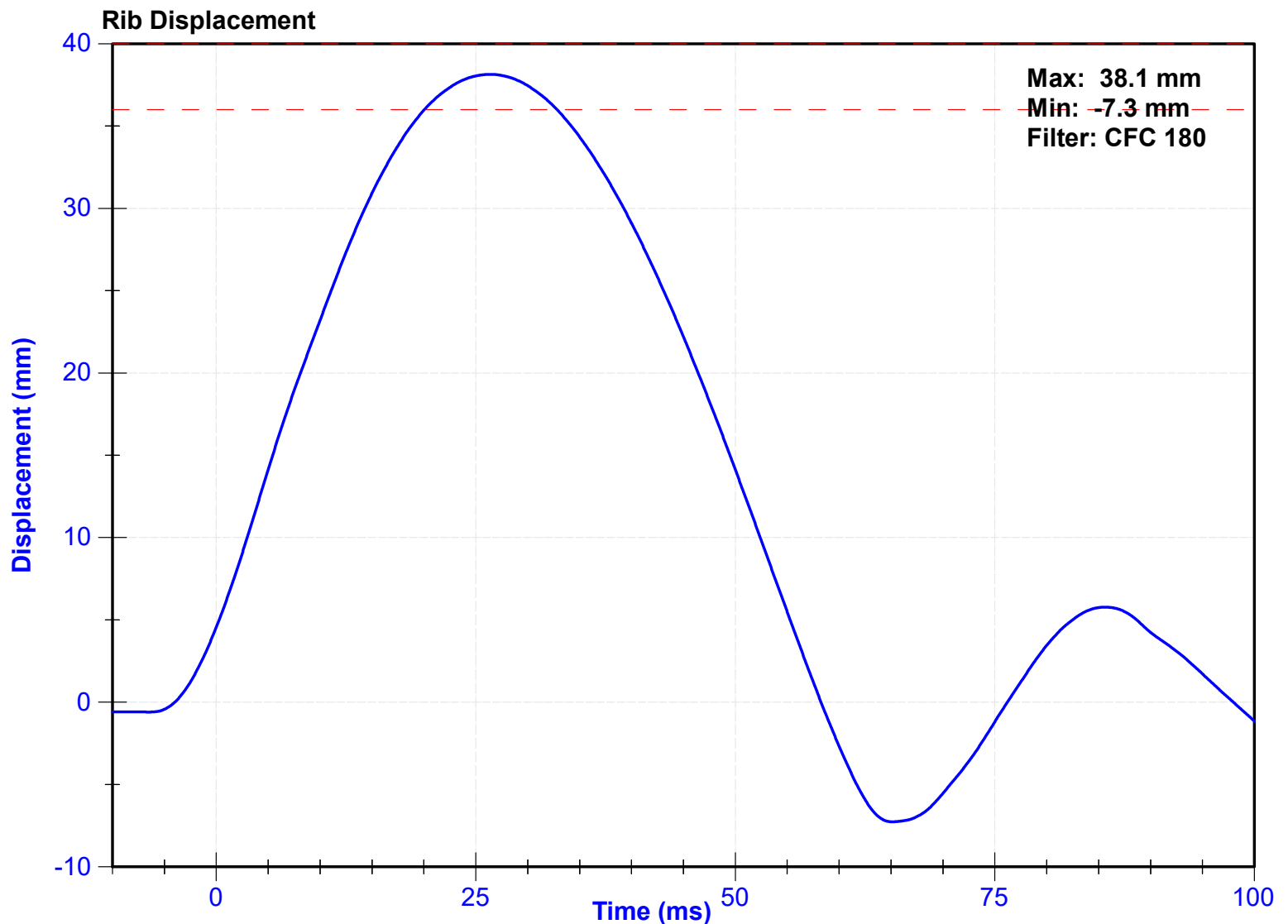
|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | Denton | Test Technician       | D. Sakona  |
| ATD Serial Number | D037   | Laboratory Supervisor | C. Mantell |

### Results

| Test Parameter   | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature      | 20.6                  | 22.2                  | °C   | 21.5   | Pass      |
| Humidity         | 10                    | 70                    | %    | 62.1   | Pass      |
| Rib Displacement | 36                    | 40                    | mm   | 38.1   | Pass      |

### Transducer Calibrations

| Channel           | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|-------------------|--------------|---------------|------------------|----------------------|
| Rib Potentiometer | Honeywell    | 0552-03       | 8/7/2023         | 2/5/2024             |





|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | Denton | Test Technician       | J. Miller  |
| ATD Serial Number | D037   | Laboratory Supervisor | C. Mantell |

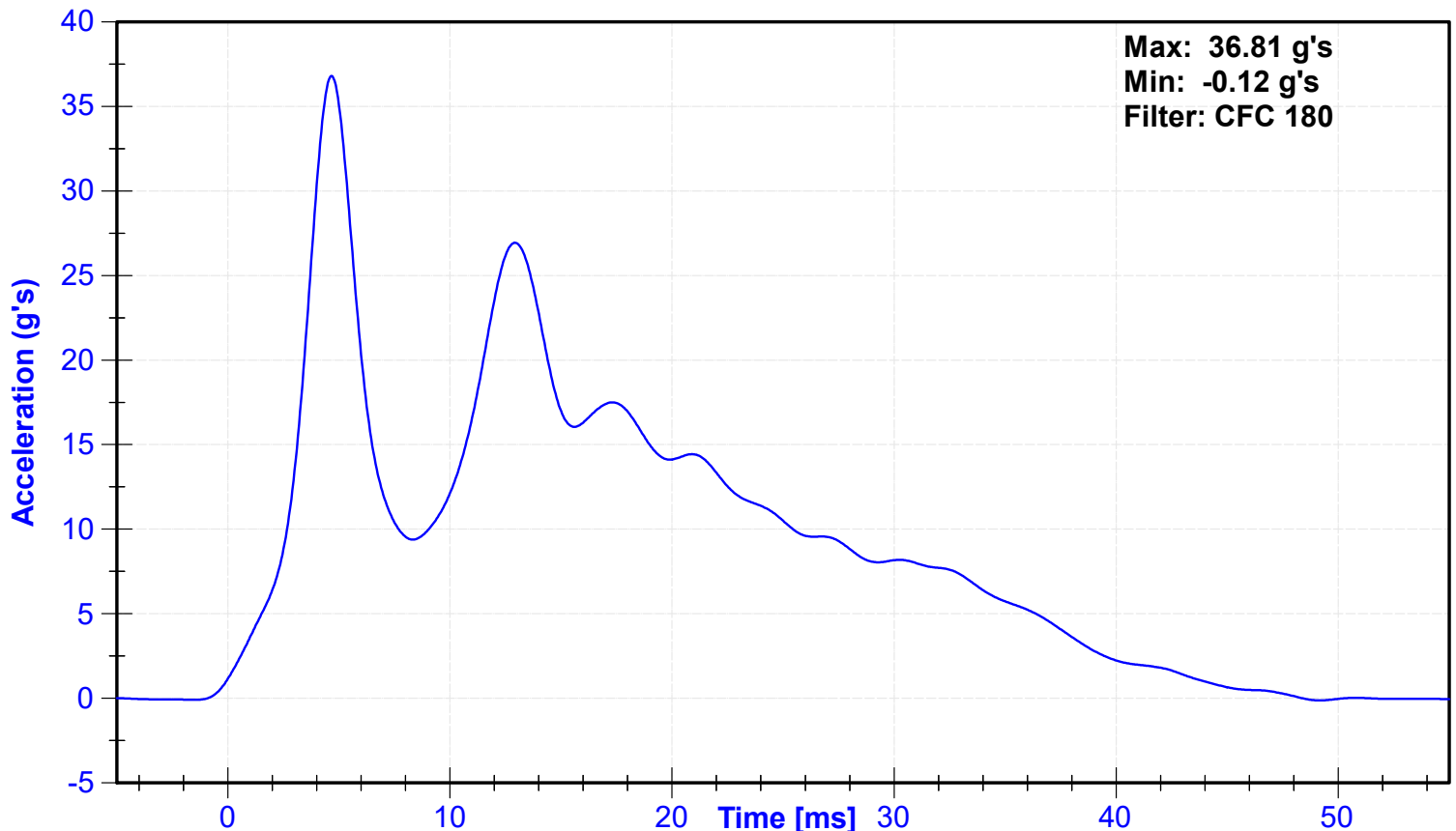
### Results

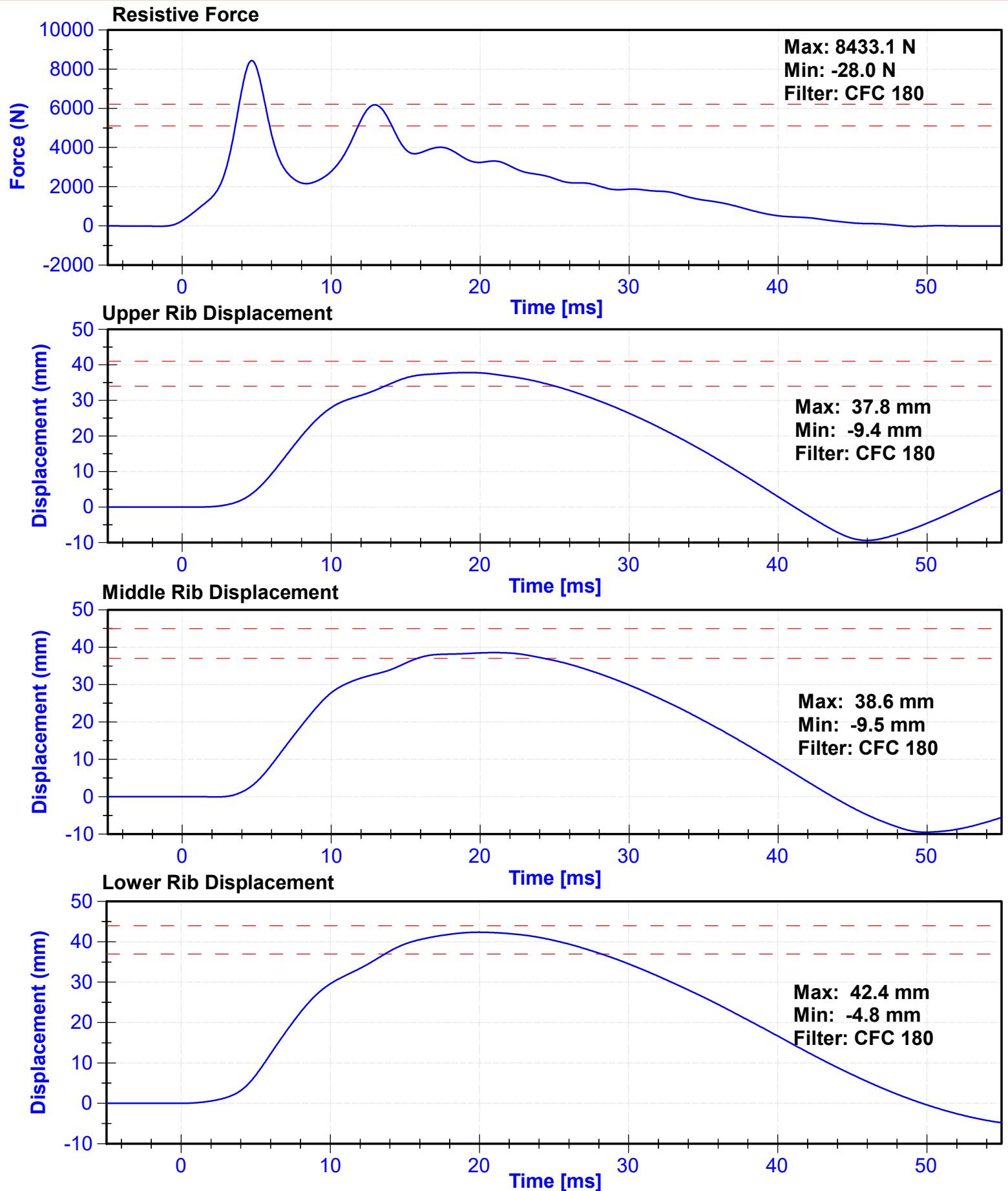
| Test Parameter              | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|-----------------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature                 | 20.6                  | 22.2                  | °C   | 21.8   | Pass      |
| Humidity                    | 10                    | 70                    | %    | 59.1   | Pass      |
| Velocity                    | 5.4                   | 5.6                   | m/s  | 5.53   | Pass      |
| Resistive Force after 6ms   | 5100                  | 6200                  | N    | 6173.0 | Pass      |
| Upper Thorax Rib Deflection | 34                    | 41                    | mm   | 37.8   | Pass      |
| Mid Thorax Rib Deflection   | 37                    | 45                    | mm   | 38.6   | Pass      |
| Lower Thorax Rib Deflection | 37                    | 44                    | mm   | 42.4   | Pass      |

### Transducer Calibrations

| Channel                         | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|---------------------------------|--------------|---------------|------------------|----------------------|
| Probe Accelerometer             | Endevco      | 18546         | 11/19/2022       | 11/18/2023           |
| Upper Thorax Rib Potentiometer  | Honeywell    | 0552-01       | 8/7/2023         | 2/5/2024             |
| Middle Thorax Rib Potentiometer | Honeywell    | 807           | 8/7/2023         | 2/5/2024             |
| Lower Thorax Rib Potentiometer  | Honeywell    | 0552-03       | 8/7/2023         | 2/5/2024             |

### Probe Acceleration





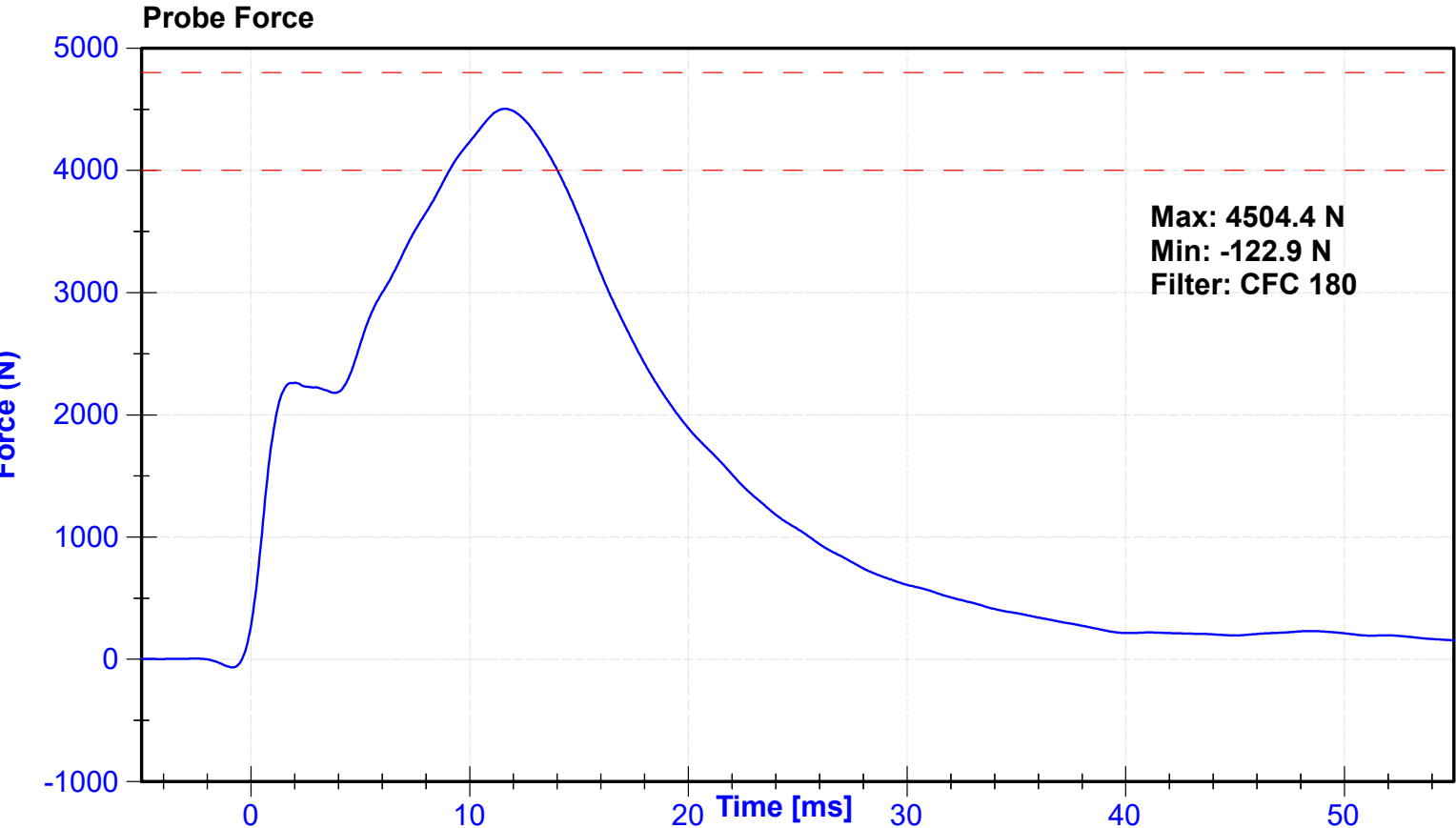
|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | Denton | Test Technician       | J. Miller  |
| ATD Serial Number | D037   | Laboratory Supervisor | C. Mantell |

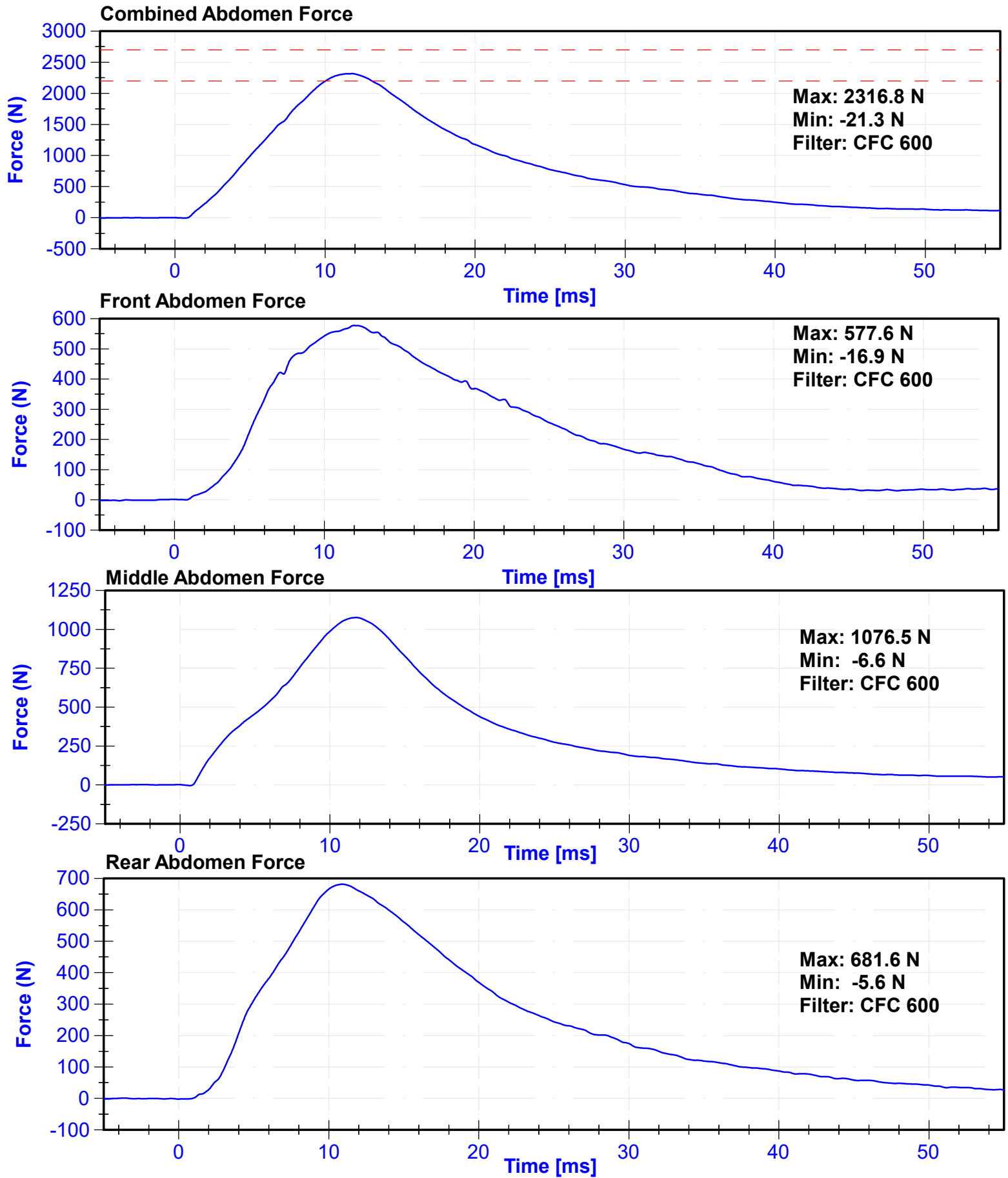
Results

| Test Parameter               | Minimum Specification | Maximum Specification | Unit | Result | Pass/Fail |
|------------------------------|-----------------------|-----------------------|------|--------|-----------|
| Temperature                  | 20.6                  | 22.2                  | °C   | 21.5   | Pass      |
| Humidity                     | 10                    | 70                    | %    | 59.1   | Pass      |
| Velocity                     | 3.9                   | 4.1                   | m/s  | 4.03   | Pass      |
| Combined Abdomen Force       | 2200                  | 2700                  | N    | 2316.8 | Pass      |
| Time at Peak Abdomen Force   | 10.0                  | 12.3                  | ms   | 11.80  | Pass      |
| Resistive Probe Force        | 4000                  | 4800                  | N    | 4504.4 | Pass      |
| Time at Peak Resistive Force | 10.6                  | 13.0                  | ms   | 11.60  | Pass      |

Transducer Calibrations

| Channel                  | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|--------------------------|--------------|---------------|------------------|----------------------|
| Pendulum Accelerometer   | Endevco      | 18546         | 11/19/2022       | 11/18/2023           |
| Front Abdomen Load Cell  | Denton       | 1440          | 8/8/2023         | 8/7/2024             |
| Middle Abdomen Load Cell | Denton       | 1525          | 8/8/2023         | 8/7/2024             |
| Rear Abdomen Load Cell   | Denton       | 1528          | 8/8/2023         | 8/7/2024             |





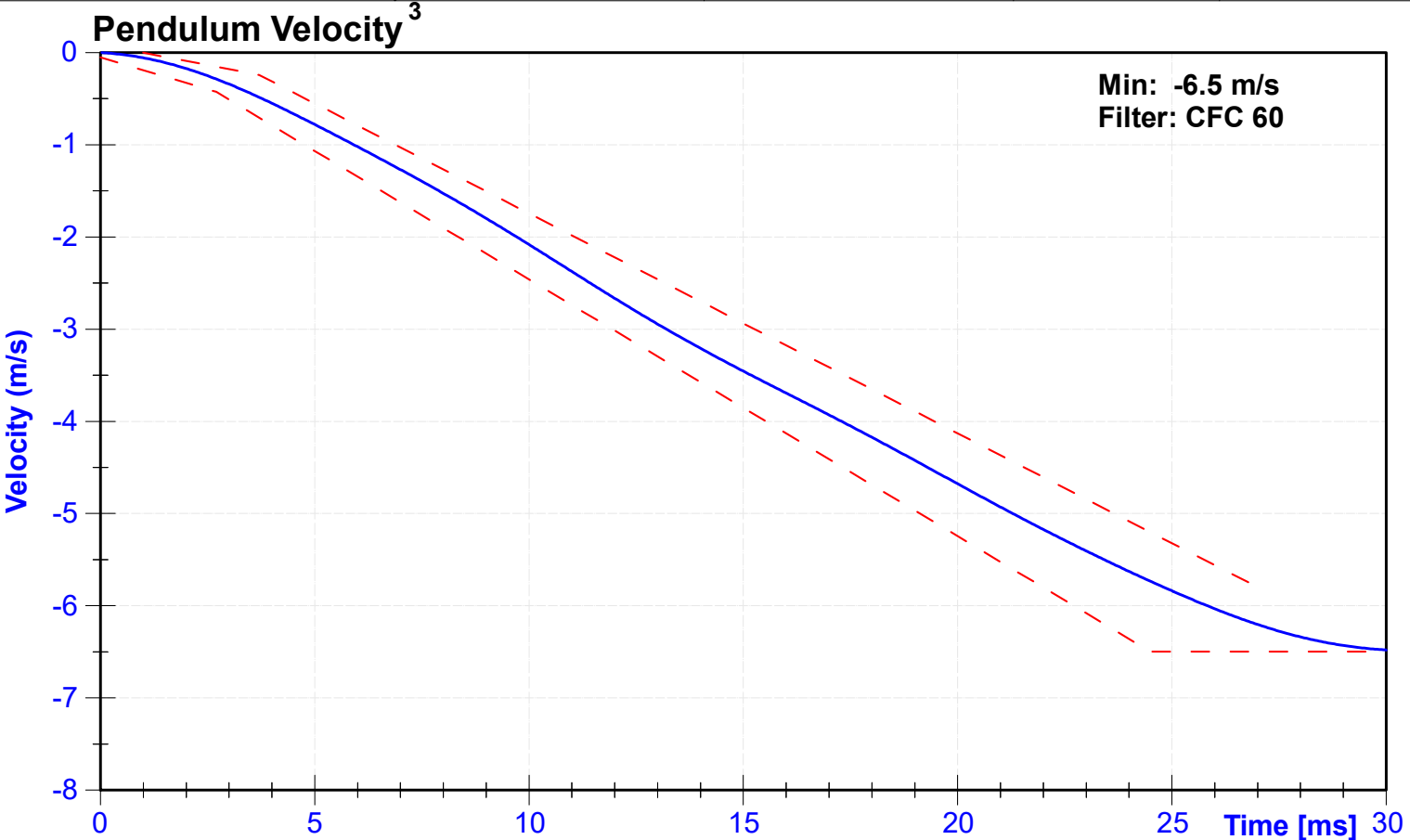
|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | Denton | Test Technician       | J. Miller  |
| ATD Serial Number | D037   | Laboratory Supervisor | C. Mantell |

Results

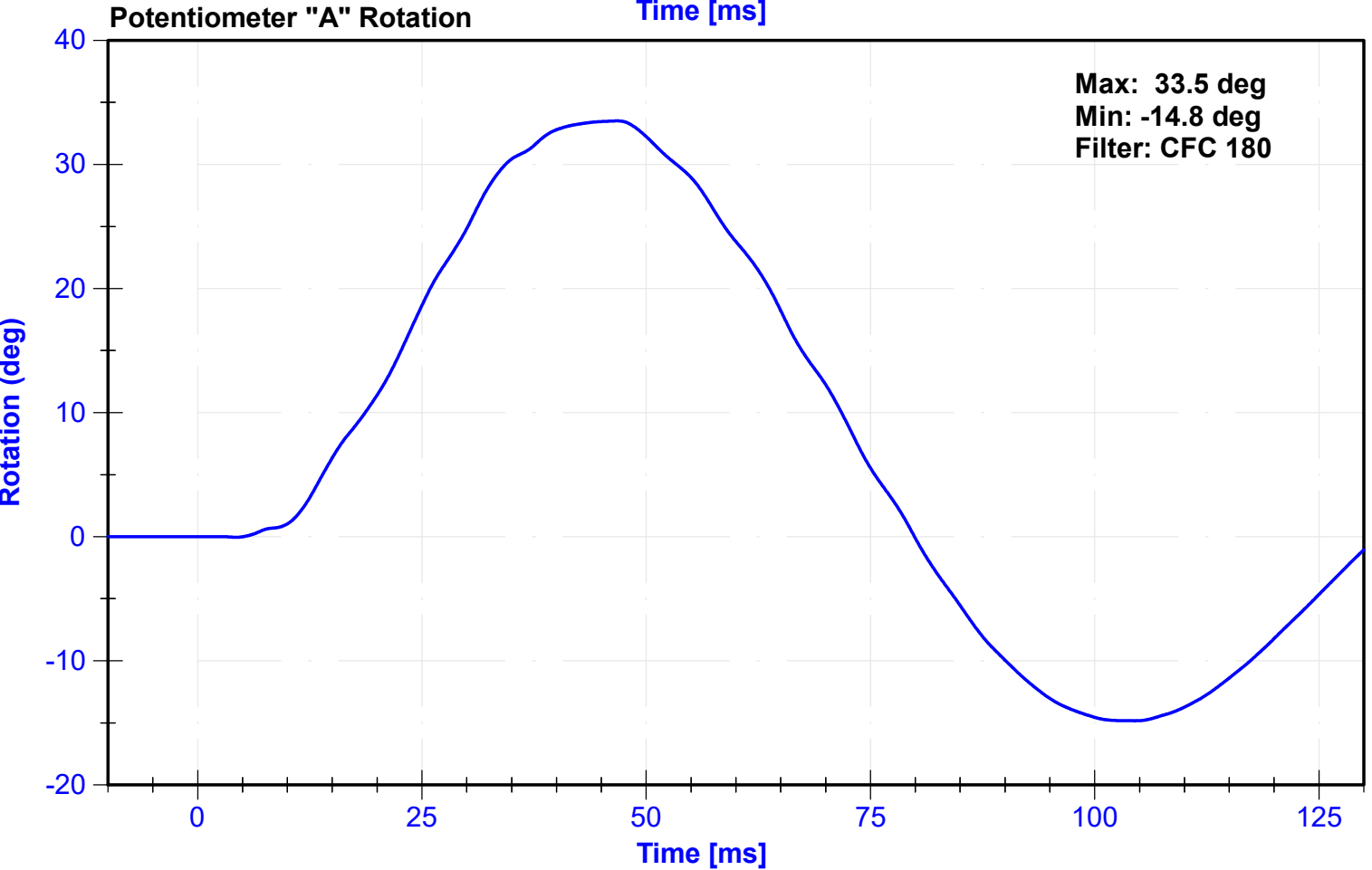
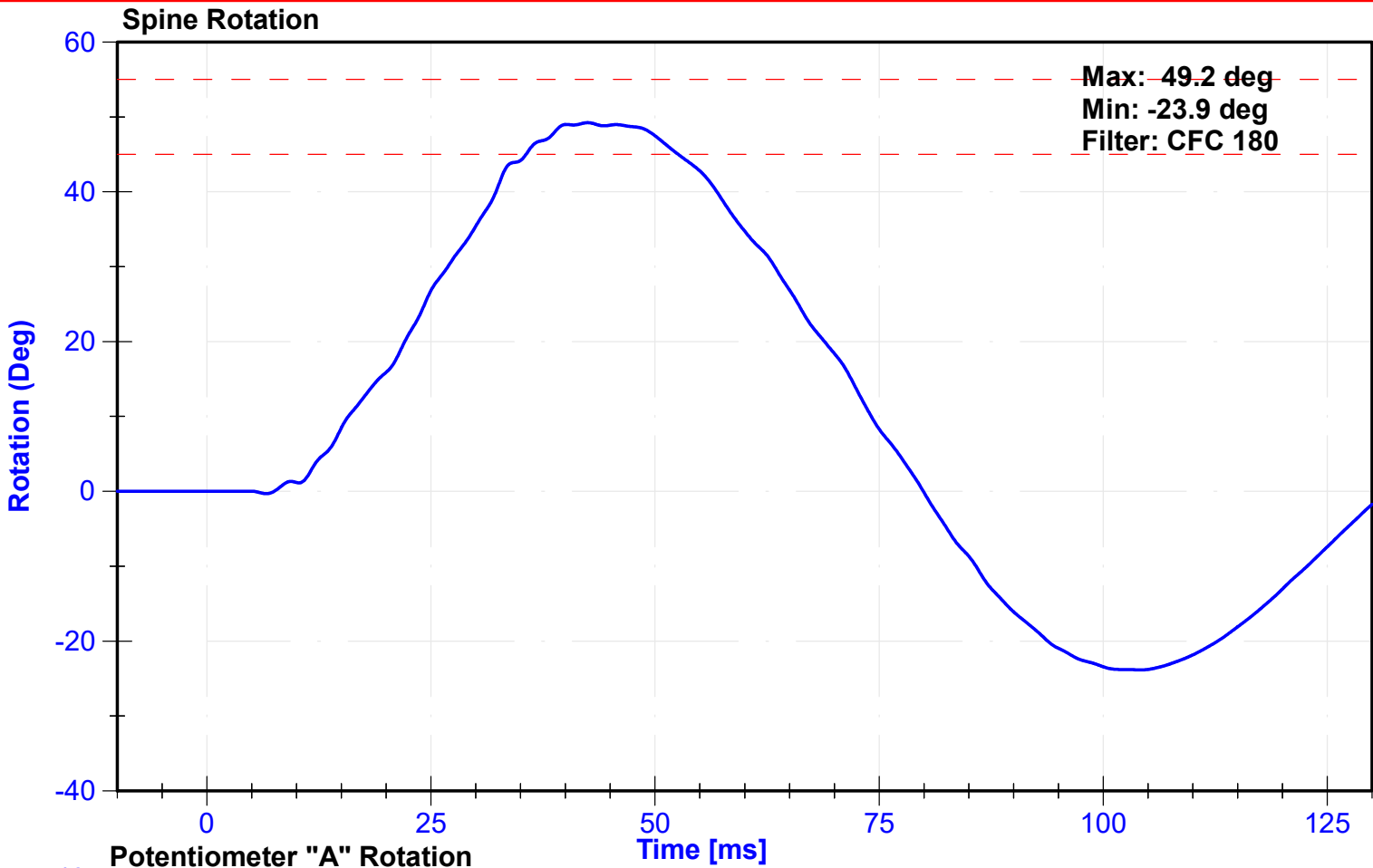
| Test Parameter                     | Minimum Specification       | Maximum Specification       | Unit | Result                | Pass/Fail |
|------------------------------------|-----------------------------|-----------------------------|------|-----------------------|-----------|
| Temperature                        | 20.6                        | 22.2                        | °C   | 21.6                  | Pass      |
| Humidity                           | 10                          | 70                          | %    | 62.1                  | Pass      |
| Velocity                           | 5.95                        | 6.15                        | m/s  | 6.061                 | Pass      |
| Lateral Spine Rotation             | 45                          | 55                          | deg  | 49.2                  | Pass      |
| Time at Maximum Rotation           | 39                          | 53                          | ms   | 42.5                  | Pass      |
| Time of Decay to Zero Degrees      | 37                          | 57                          | ms   | 37.5                  | Pass      |
| Pendulum Velocity Overall Corridor | Lower Boundary <sup>1</sup> | Upper Boundary <sup>2</sup> | m/s  | See Plot <sup>3</sup> | Pass      |

Transducer Calibrations

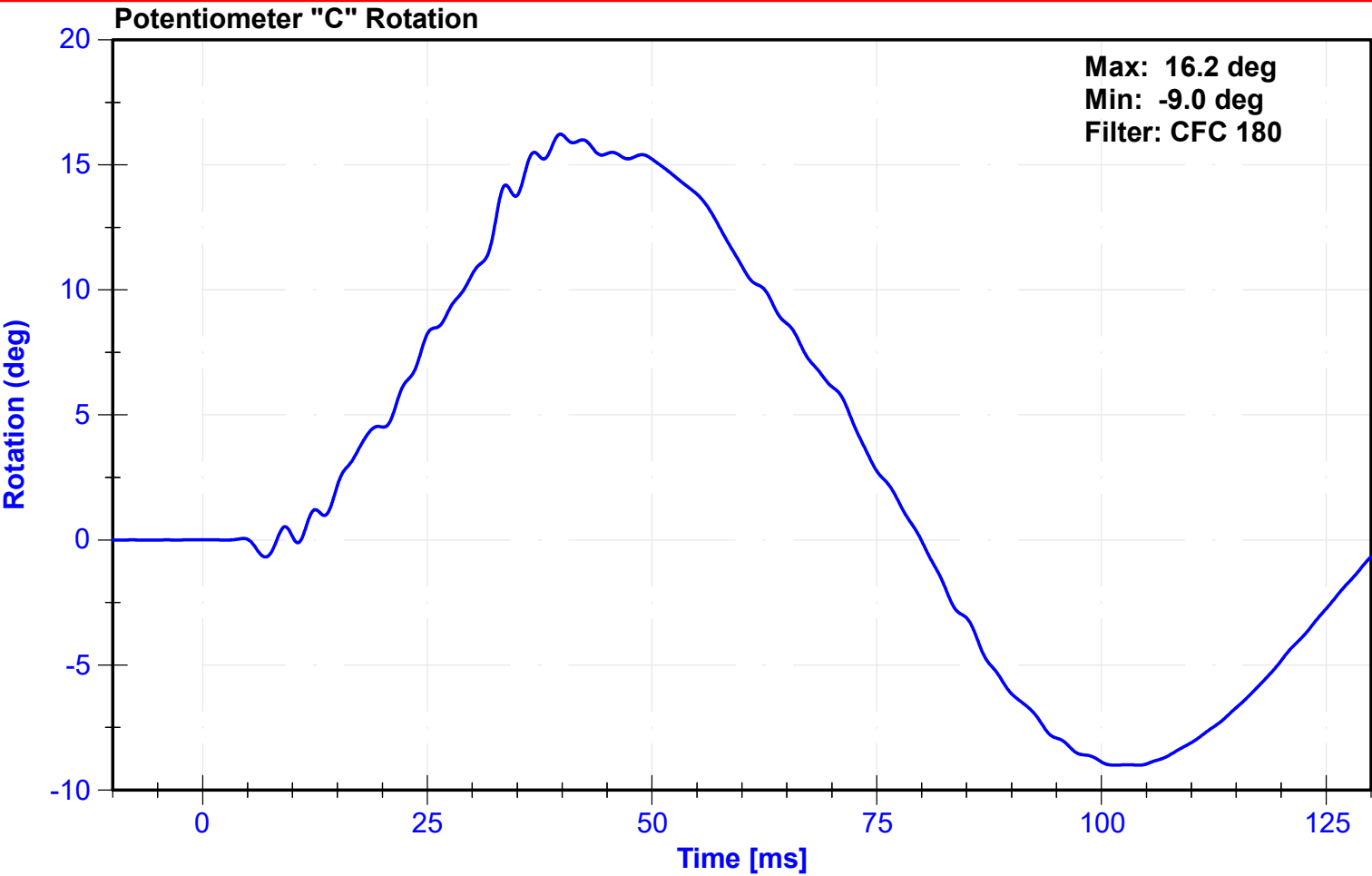
| Channel                    | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|----------------------------|--------------|---------------|------------------|----------------------|
| Pendulum Accelerometer     | Endevco      | C16503        | 10/26/2022       | 10/26/2023           |
| Pendulum "A" Potentiometer | Sfernice     | 094           | 9/29/2023        | 9/28/2024            |
| Condyle "B" Potentiometer  | Sfernice     | 095           | 9/29/2023        | 9/28/2024            |



<sup>1,2</sup> Upper and lower boundaries specified in Appendix I  
IV-42







Appendix I

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

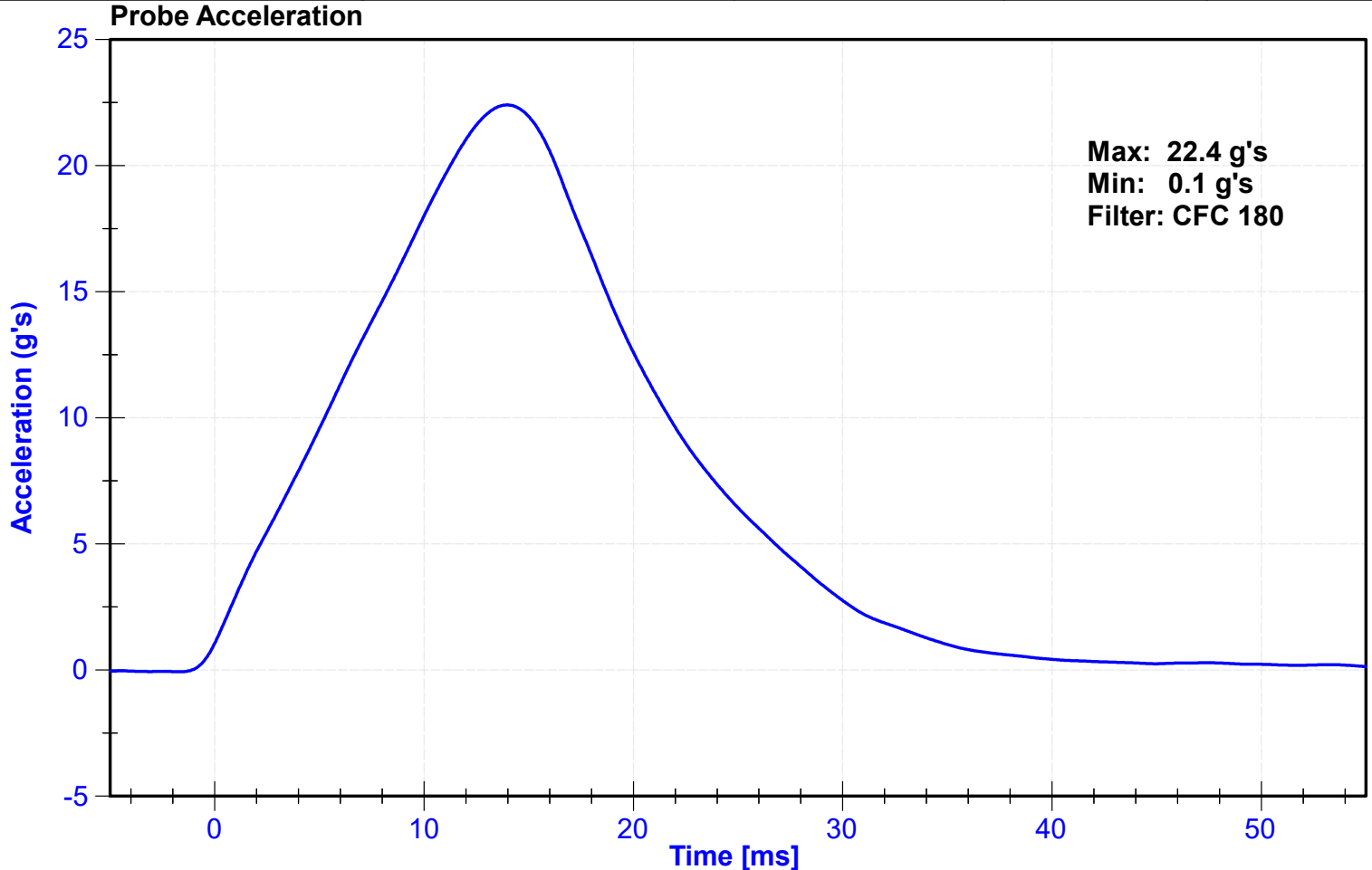
|                   |        |                       |            |
|-------------------|--------|-----------------------|------------|
| ATD Manufacturer  | Denton | Test Technician       | J. Miller  |
| ATD Serial Number | D037   | Laboratory Supervisor | C. Mantell |

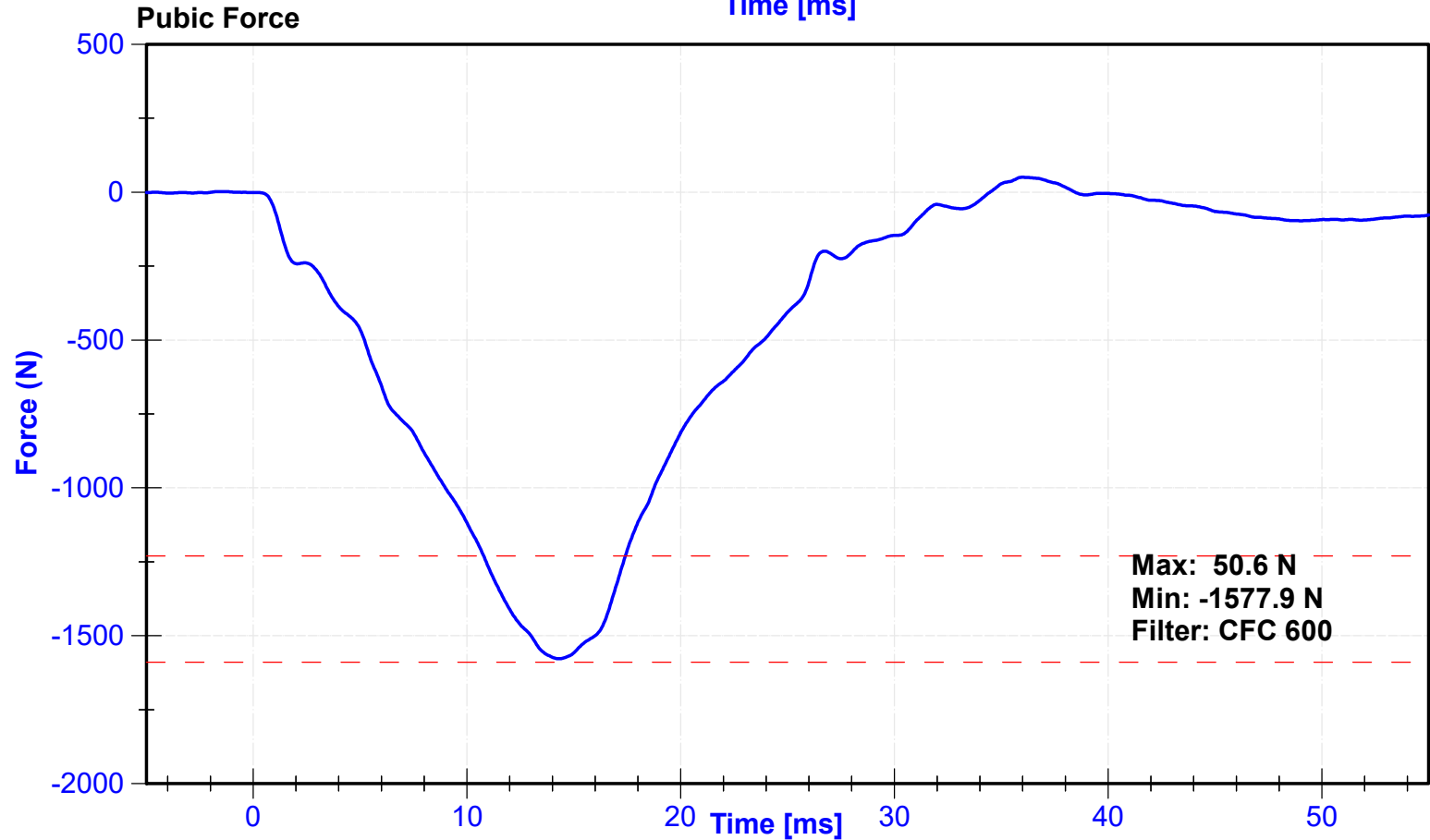
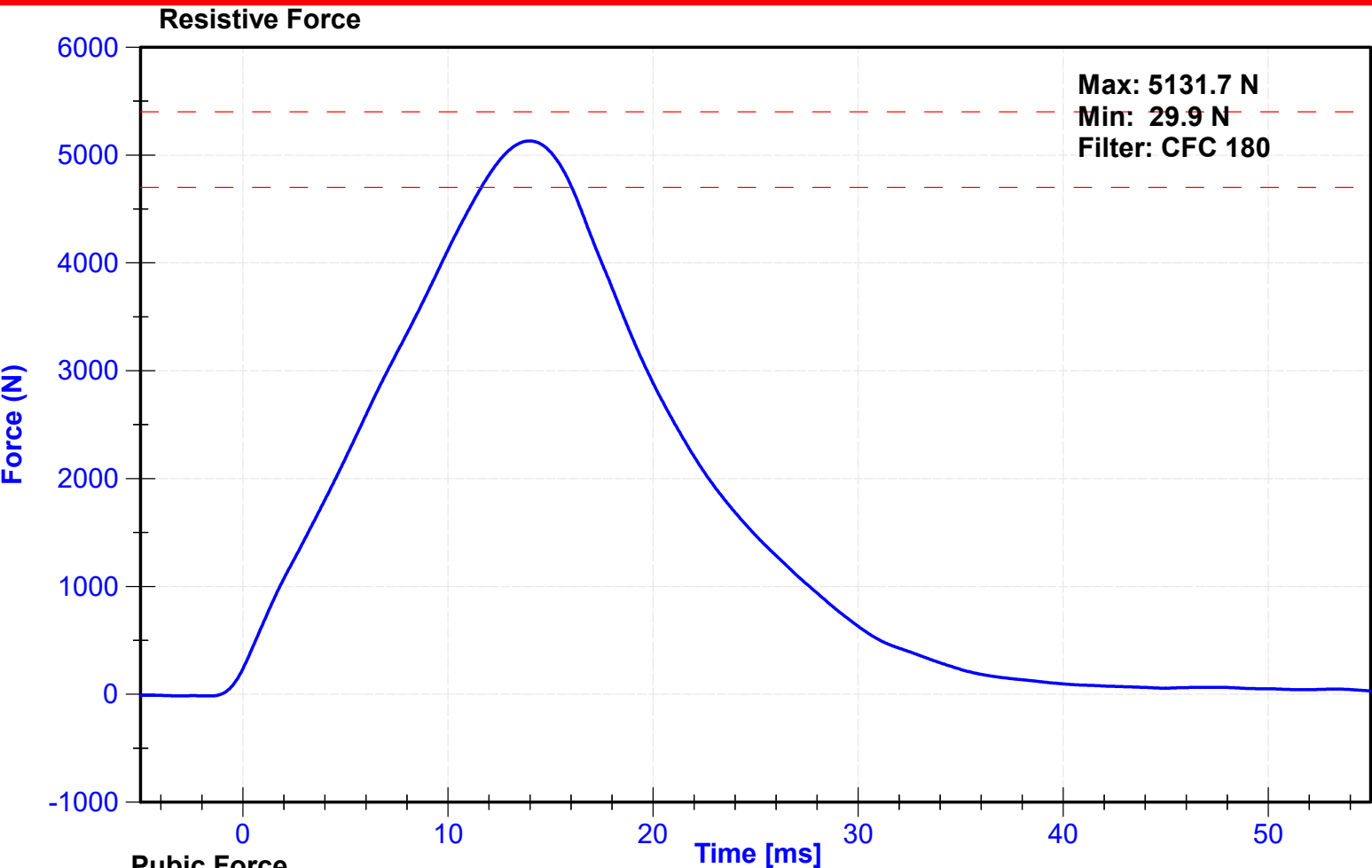
### Results

| Test Parameter               | Minimum Specification | Maximum Specification | Unit | Result  | Pass/Fail |
|------------------------------|-----------------------|-----------------------|------|---------|-----------|
| Temperature                  | 20.6                  | 22.2                  | °C   | 21.5    | Pass      |
| Humidity                     | 10                    | 70                    | %    | 61.1    | Pass      |
| Velocity                     | 4.2                   | 4.4                   | m/s  | 4.23    | Pass      |
| Resistive Force              | 4700                  | 5400                  | N    | 5131.7  | Pass      |
| Time at Peak Resistive Force | 11.8                  | 16.1                  | ms   | 13.95   | Pass      |
| Pubic Force                  | -1590                 | -1230                 | N    | -1577.9 | Pass      |
| Time at Peak Pubic Force     | 12.2                  | 17.0                  | ms   | 14.30   | Pass      |

### Transducer Calibrations

| Channel                | Manufacturer | Serial Number | Calibration Date | Calibration Due Date |
|------------------------|--------------|---------------|------------------|----------------------|
| Pendulum Accelerometer | Endevco      | 18546         | 11/19/2022       | 11/18/2023           |
| Pubic Load Cell        | Denton       | 456-FY        | 8/8/2023         | 8/7/2024             |





## **APPENDIX V**

### **TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA**

**Table 1 – Dummy Instrumentation (ES-2re)**

|                                        |           |   | ES-2re S/N _D037 |              |                  |
|----------------------------------------|-----------|---|------------------|--------------|------------------|
|                                        |           |   | Serial Number    | Manufacturer | Calibration Date |
| Head Accelerometers                    | Primary   | X | T21724           | Endevco      | 08/08/2023       |
|                                        |           | Y | T22281           | Endevco      | 08/08/2023       |
|                                        |           | Z | T26050           | Endevco      | 08/08/2023       |
|                                        | Redundant | X | T21682           | Endevco      | 08/08/2023       |
|                                        |           | Y | T25989           | Endevco      | 08/08/2023       |
|                                        |           | Z | T25864           | Endevco      | 08/08/2023       |
| Thorax Rib Displacement Potentiometers | Upper     | Y | 0552-01          | Honeywell    | 08/07/2023       |
|                                        | Middle    | Y | 807              | Honeywell    | 08/07/2023       |
|                                        | Lower     | Y | 0552-03          | Honeywell    | 08/07/2023       |
| Abdomen Load Cells                     | Forward   | Y | 1440             | Denton       | 08/08/2023       |
|                                        | Middle    | Y | 1525             | Denton       | 08/08/2023       |
|                                        | Rear      | Y | 1528             | Denton       | 08/08/2023       |
| Lower Spine Accelerometers (T12)       |           | X | P71278           | Endevco      | 08/08/2023       |
|                                        |           | Y | P49226           | Endevco      | 08/30/2023       |
|                                        |           | Z | P50078           | Endevco      | 08/30/2023       |
| Pubic Symphysis Load Cell              |           | Y | 456-FY           | Denton       | 08/08/2023       |

**Table 2 – Vehicle Instrumentation**

| Vehicle Instrumentation   |   | Serial Number | Manufacturer            | Calibration Date |
|---------------------------|---|---------------|-------------------------|------------------|
| Vehicle Center of Gravity | X | G23693        | Endevco                 | 06/13/2023       |
| Vehicle Center of Gravity | Y | G23695        | Endevco                 | 06/14/2023       |
| Vehicle Center of Gravity | Z | G23699        | Endevco                 | 06/13/2023       |
| Left Floor Sill           | Y | G22699        | Endevco                 | 06/26/2023       |
| A-Pillar Sill             | Y | G23453        | Endevco                 | 09/15/2023       |
| A-Pillar Low              | Y | A431198       | Measurement Specialties | 08/29/2023       |
| A-Pillar Mid              | Y | G23680        | Endevco                 | 06/14/2023       |
| B-Pillar Sill             | Y | A399943       | Measurement Specialties | 06/01/2023       |
| B-Pillar Low              | Y | G22700        | Endevco                 | 09/15/2023       |
| B-Pillar Mid              | Y | G22408        | Endevco                 | 09/15/2023       |
| Driver Seat               | Y | A335496       | Measurement Specialties | 09/15/2023       |
| Engine Top                | X | A282659       | Measurement Specialties | 09/19/2023       |
| Engine Top                | Y | A315990       | Measurement Specialties | 09/19/2023       |
| Firewall                  | Y | G23411        | Endevco                 | 09/08/2023       |
| Right Roof                | Y | A282760       | Measurement Specialties | 06/01/2023       |
| Right Floor Sill          | Y | A398322       | Measurement Specialties | 08/08/2023       |
| Rear Floorpan             | X | A370964       | Measurement Specialties | 05/22/2023       |
| Rear Floorpan             | Y | A396636       | Measurement Specialties | 05/22/2023       |