

**REPORT NUMBER: SideNCAPMDB-MGA-24-027**

**NEW CAR ASSESSMENT PROGRAM (NCAP)  
Moving Deformable Barrier Side Impact Test**

**GENERAL MOTORS LLC  
2024 Acura ZDX A-Spec 5-Door SUV  
NHTSA No.: O20245302**

**MGA RESEARCH CORPORATION  
5000 Warren Road  
Burlington, WI 53105**



**Test Date: August 28, 2024**

**Final Report Date: January 2, 2025**

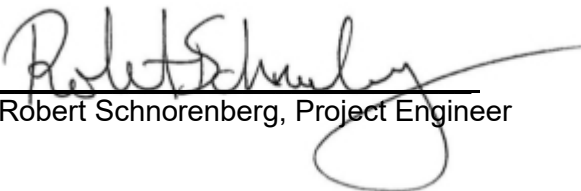
**FINAL REPORT**

**U.S. DEPARTMENT OF TRANSPORTATION  
National Highway Traffic Safety Administration  
Office of Crashworthiness Standards  
Mail Code: NRM-100  
1200 New Jersey Ave, SE  
Washington, DC 20590**

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Approved by:   
Robert Schnorenberg, Project Engineer

Approval Date: January 2, 2025

FINAL REPORT ACCEPTANCE BY OCWS:

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

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

\_\_\_\_\_  
COR, New Car Assessment Program  
NHTSA, Office of Crashworthiness Standards

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

**TECHNICAL REPORT DOCUMENTATION PAGE**

|  |                                    |  |
|--|------------------------------------|--|
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| <b>7. Author(s)</b><br>Ben Fischer, Program Manager  |                                    | <b>6. Performing Organization Code</b><br>MGA  |
| <b>9. Performing Organization Name and Address</b><br>MGA Research Corporation<br>5000 Warren Road<br>Burlington, WI 53105   |                                    | <b>8. Performing Organization Report No.</b><br>SideNCAPMDB-MGA-24-027                                   |
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**15. Supplementary Notes**

**16. Abstract**

A 55/28 km/h 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2024 Acura ZDX A-Spec 5-Door SUV in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP MDB Test Procedure for the generation of consumer information on vehicle side crash protection. The test was conducted at the MGA Research Corporation facility in Burlington, Wisconsin on August 28, 2024.

The impact velocity of the Moving Deformable Barrier (MDB) was 62.06 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 22.1°C. The target vehicle post-test maximum crush was 202 mm at level 3. The test vehicle's performance was as follows:

| Measurement Description                   | Units | Driver ATD (ES-2re) |         |
|---|-------|---------------------|---------|
|   |       | Threshold           | Result  |
| Head Injury Criteria (HIC <sub>36</sub> ) |       | 1000                | 55.125  |
| Maximum Thorax Rib Deflection             | mm    | 44                  | 23.854  |
| Total Abdominal Force                     | N     | 2500                | 731.204 |
| Pubic Symphysis Force                     | N     | 6000                | 724.399 |
| Resultant Lower Spine Acceleration        | g     | 82*                 | 19.765  |

| Measurement Description                                 | Units | Passenger ATD (SID-IIs) |          |
|---|-------|-------------------------|----------|
|   |       | Threshold               | Result   |
| Head Injury Criteria (HIC <sub>36</sub> )               |       | 1000                    | 90.628   |
| Resultant Lower Spine Acceleration                      | g     | 82                      | 34.846   |
| Total Pelvic Force (sum of acetabular and iliac forces) | N     | 5525                    | 1314.449 |
| Maximum Thoracic Rib Deflection                         | mm    | 38*                     | 11.905   |
| Maximum Abdomen Rib Deflection                          | mm    | 45*                     | 11.953   |

\*Proposed IARV

The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite door(s) did not open during the side impact event.

|  |  |
|--|--|
| <b>17. Key Words</b><br>New Car Assessment Program (NCAP)<br>Side Impact<br>MDB<br>ES-2re<br>SID-IIs | <b>18. Distribution Statement</b><br>Copies of this report are available from:<br>National Highway Traffic Safety Administration<br>Technical Information Services Division<br>1200 New Jersey Ave, SE<br>Washington, DC 20590 |
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|  |  |                                |                  |
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## **SECTION 1 PURPOSE AND SUMMARY OF TEST**

### **PURPOSE**

This moving deformable barrier side impact test is part of the MY 2024 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. 693JJ920D000017. The purpose of this test is to generate comparative side impact performance in a 2024 Acura ZDX A-Spec 5-Door SUV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Laboratory Test Procedure dated March 2020.

### **SUMMARY**

A 2024 Acura ZDX A-Spec 5-Door SUV was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 62.06 km/h. The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by MGA Research Corporation in Burlington, Wisconsin on August 28, 2024. Pre-test and post-test photographs of the test vehicle, the MDB, and the dummies (ES-2re and SID-IIs) are included in this report.

Dummies were placed in the driver and left rear designated seating positions according to instructions specified in the OCWS NCAP Side Laboratory Test Procedure dated March 2020. The side impact event was documented by eleven (11) cameras. Camera locations are included in this report.

The dummies were instrumented in the following manner:

#### **DRIVER ATD (ES-2re)**

- Primary and Redundant Head CG Triaxial 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) Triaxial Accelerometers
- Pubic Symphysis Y-Axis Load Cell

#### **PASSENGER ATD (SID-IIs)**

- Primary and Redundant Head CG Triaxial Accelerometers
- Head Triaxial Angular Rate Sensors
- Chest Upper Rib, Middle Rib, and Lower Rib Y-Axis Displacement Potentiometers
- Abdomen Upper Rib and Lower Rib Y-Axis Displacement Potentiometers
- Lower Spine (T12) Triaxial Accelerometers
- Acetabulum and Iliac Wing Y-Axis Load Cells

Appendix B contains the dummy response data. Dummy configuration and performance verification data can be found in Appendix C of this report. Appendix D contains the test equipment and instrumentation calibration data.

Dummy Injury readings were recorded as follows:

### DUMMY INJURY VALUES

| Measurement Description                   | Units | Driver ATD (ES-2re) |         |
|---|-------|---------------------|---------|
|   |       | Threshold           | Result  |
| Head Injury Criteria (HIC <sub>36</sub> ) |       | 1000                | 55.125  |
| Maximum Thorax Rib Deflection             | mm    | 44                  | 23.854  |
| Total Abdominal Force                     | N     | 2500                | 731.204 |
| Pubic Symphysis Force                     | N     | 6000                | 724.399 |
| Resultant Lower Spine Acceleration        | g     | 82*                 | 19.765  |

| Measurement Description                                 | Units | Passenger ATD (SID-IIs) |          |
|---|-------|-------------------------|----------|
|   |       | Threshold               | Result   |
| Head Injury Criteria (HIC <sub>36</sub> )               |       | 1000                    | 90.628   |
| Resultant Lower Spine Acceleration                      | g     | 82                      | 34.846   |
| Total Pelvic Force (sum of acetabular and iliac forces) | N     | 5525                    | 1314.449 |
| Maximum Thoracic Rib Deflection                         | mm    | 38*                     | 11.905   |
| Maximum Abdomen Rib Deflection                          | mm    | 45*                     | 11.953   |

\*Proposed IARV

Supplemental restraint information is given below:

| Restraint Type           | Left Front (Driver)<br>Occupant Location 1 |          | Left Rear (Passenger)<br>Occupant Location 4 |          |
|--------------------------|--|----------|--|----------|
|                          | Mounted                                    | Deployed | Mounted                                      | Deployed |
| Frontal Airbag           | Yes  | No       |  |          |
| Knee Airbag              | Yes  | No       |  |          |
| Side Curtain Airbag      | Yes  | Yes      | Yes  | Yes      |
| Side Torso/Pelvis Airbag | Yes  | Yes      | No   |          |
| Side Airbag (Other)      |  |          |  |          |
| Seat Belt Pretensioner   | Yes  | Yes      | Yes  | Yes      |
| Seat Belt Load Limiter   | Yes  |          | Yes  |          |
| Other:                   | No   |          | No   |          |

The test data can be found on the NHTSA website at [www.nhtsa.gov](http://www.nhtsa.gov)

### GENERAL COMMENTS

None.

MGA does not endorse or certify products. The manufacturer's name appears solely for identification purposes.

**SECTION 2**  
**OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS**

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

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
 Test Date: 8/28/2024

**TEST VEHICLE INFORMATION AND OPTIONS**

|                          |                         |                                   |     |
|--------------------------|-------------------------|-----------------------------------|-----|
| NHTSA No.                | O20245302               | Traction Control System (TCS)     | Yes |
| Model Year               | 2024                    | Auto-Leveling System              | No  |
| Make                     | Acura                   | Automatic Door Locks (ADL)        | Yes |
| Model                    | ZDX A-Spec              | Power Window Auto-Reverse         | Yes |
| Body Style               | 5-Door SUV              | Other Optional Feature            | No  |
| VIN                      | 4W5KHM6R2Z500818        | Driver Front Airbag               | Yes |
| Body Color               | Mercury Silver Metallic | Driver Curtain Airbag             | Yes |
| Odometer Reading (km/mi) | 18 km / 11 mi           | Driver Head/Torso Airbag          | No  |
| Engine Displacement (L)  |                         | Driver Torso Airbag               | No  |
| Type/No. Cylinders       | Electric                | Driver Torso/Pelvis Airbag        | Yes |
| Engine Placement         | Lateral                 | Driver Pelvis Airbag              | No  |
| Transmission Type        | Automatic               | Driver Knee Airbag                | Yes |
| Transmission Speeds      | 1                       | Rear Pass. Curtain Airbag         | Yes |
| Overdrive                | No                      | Rear Pass. Head/Torso Airbag      | No  |
| Final Drive              | RWD                     | Rear Pass. Torso Airbag           | No  |
| Roof Rack                | No                      | Rear Pass. Torso/Pelvis Airbag    | No  |
| Sunroof/T-Top            | Yes                     | Rear Pass. Pelvis Airbag          | No  |
| Running Boards           | No                      | Driver Seat Belt Pretensioner     | Yes |
| Tilt Steering Wheel      | Yes                     | Rear Pass. Seat Belt Pretensioner | Yes |
| Power Seats              | Driver                  | Driver Load Limiter               | Yes |
| Anti-Lock Brakes (ABS)   | Yes                     | Rear Pass. Load Limiter           | Yes |
|                          |                         | Other Safety Restraint            | N/A |

|   |     |
|---|-----|
| Does owner's manual provide instruction to turn off automatic door locks? | Yes |
|---|-----|

**DATA FROM CERTIFICATION LABEL**

|                     |                    |                 |      |
|---------------------|--------------------|-----------------|------|
| Manufactured By     | GENERAL MOTORS LLC | GVWR (kg)       | 3100 |
| Date of Manufacture | 04/24              | GAWR Front (kg) | 1550 |
| Vehicle Type        | MPV                | GAWR Rear (kg)  | 1700 |

**VEHICLE SEATING AND WEIGHT CAPACITY DATA**

| Measured Parameter                         | Front | Rear | Third | Total |       |
|--|-------|------|-------|-------|-------|
| Designated Seating Capacity (DSC)          | 2     | 3    |       | 5     |       |
| Capacity Weight (VCW) (kg)                 |       |      |       | 544   | (A)   |
| DSC x 68 kg                                |       |      |       | 340   | (B)   |
| Rated Cargo and Luggage Weight (RCLW) (kg) |       |      |       | 136   | (A-B) |

\* Rated Cargo and Luggage Weight (RCLW) limited to maximum of 300 lbs (136 kg).

**VEHICLE SEAT TYPE**

| Seating Location   | Type of Seat Pan |       |             |           | Type of Seat Back |            |         |
|--------------------|------------------|-------|-------------|-----------|-------------------|------------|---------|
|                    | Bucket           | Bench | Split Bench | Contoured | Fixed             | Adjustable |         |
|                    |                  |       |             |           |                   | w/ Lever   | w/ Knob |
| Front Seat         | X                |       |             |           |                   | X          |         |
| Rear or Second Row |                  |       |             | X         |                   | X          |         |
| Third Row Seat     |                  |       |             |           |                   |            |         |

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

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
 Test Date: 8/28/2024

**VEHICLE TIRE INFORMATION**



| Measured Parameter       | Front                             | Rear                              |
|--------------------------|-----------------------------------|-----------------------------------|
| Max. Tire Pressure (kPa) | 350                               | 350                               |
| Cold Pressure (kPa)      | 290                               | 290                               |
| Recommended Tire Size    | 265/50R20                         | 265/50R20                         |
| Tire Size on Vehicle     | 265/50R20                         | 265/50R20                         |
| Tire Manufacturer        | Michelin                          | Michelin                          |
| Tire Model               | Primacy A/S                       | Primacy A/S                       |
| Treadwear                | 540                               | 540                               |
| Traction                 | A                                 | A                                 |
| Temperature Grade        | A                                 | A                                 |
| Tire Plies Sidewall      | 2 Polyester                       | 2 Polyester                       |
| Tire Plies Body          | 2 Polyester, 2 Steel, 1 Polyamide | 2 Polyester, 2 Steel, 1 Polyamide |
| Load Index/Speed Symbol  | 107H                              | 107H                              |
| Tire Material            | Rubber                            | Rubber                            |
| DOT Safety Code Left     | 03L UR 01AX 4923                  | 03L UR 01AX 4923                  |
| DOT Safety Code Right    | 03L UR 01AX 4923                  | 03L UR 01AX 4923                  |

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

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
 Test Date: 8/28/2024

**TEST VEHICLE TIRE PRESSURES**

|                | Units | LF  | RF  | LR  | RR  |
|----------------|-------|-----|-----|-----|-----|
| As Delivered   | kPa   | 270 | 270 | 270 | 270 |
| Tire Placard   | kPa   | 290 | 290 | 290 | 290 |
| Owner's Manual | kPa   | 290 | 290 | 290 | 290 |
| As Tested      | kPa   | 290 | 290 | 290 | 290 |

**MDB TIRE SPECIFICATIONS**

|               | Requirement | Units | LF         | RF         | LR         | RR         |
|---------------|-------------|-------|------------|------------|------------|------------|
| Tire Size     | P205/75R15  | N/A   | P205/75R15 | P205/75R15 | P205/75R15 | P205/75R15 |
| Tire Pressure | 200 + 21    | kPa   | 200        | 200        | 200        | 200        |

**TEST VEHICLE AXLE WEIGHTS**

|        | Units | As Delivered (UVW) |        |        | As Tested (ATW) |        |        | Fully Loaded |        |        |
|--------|-------|--------------------|--------|--------|-----------------|--------|--------|--------------|--------|--------|
|        |       | Front              | Rear   | Total  | Front           | Rear   | Total  | Front        | Rear   | Total  |
| Left   | kg    | 622.5              | 641.5  |        | 662.5           | 759.0  |        | 652.5        | 774.0  |        |
| Right  | kg    | 587.5              | 660.5  |        | 595.0           | 753.0  |        | 580.0        | 770.5  |        |
| Ratio  | %     | 48.2%              | 51.8%  |        | 45.4%           | 54.6%  |        | 44.4%        | 55.6%  |        |
| Totals | kg    | 1210.0             | 1302.0 | 2512.0 | 1257.5          | 1512.0 | 2769.5 | 1232.5       | 1544.5 | 2777.0 |

**TARGET TEST WEIGHT CALCULATION**

| Measured Parameter                             | Units | Value  |         |
|--|-------|--------|---------|
| Total Delivered Weight (UVW)                   | kg    | 2512.0 | (A)     |
| Sum of Actual Weight of 2 P572 ATDs Used       | kg    | 129    | (B)     |
| Rated Cargo/Luggage Weight (RCLW)              | kg    | 136    | (C)     |
| Calculated Test Vehicle Target Weight (TVTWTW) | kg    | 2777.0 | (A+B+C) |

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

**TEST VEHICLE ATTITUDES AND CG**

|  | Units | Fully Loaded | As Tested | Meets Requirement* |
|--|-------|--------------|-----------|--------------------|
| Left Front   | mm    | 836          | 829       | Yes                |
| Right Front  | mm    | 840          | 830       | Yes                |
| Right Rear   | mm    | 832          | 841       | Yes                |
| Left Rear  | mm    | 829          | 829       | Yes                |
| Vehicle CG (Aft of Front Axle)                                 | mm    | 1721         | 1689      |                    |
| Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline) | mm    | 23           | 22        |                    |

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

\*\*\* The "As Tested" vehicle attitude measurements must be equal to or within  $\pm 10$  mm of the "Fully Loaded" vehicle attitude measurements at each wheel well.

|   |                |
|---|----------------|
| Test height adjustable suspension setting, if applicable: | Not Applicable |
|---|----------------|

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

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
 Test Date: 8/28/2024

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

| Component Description    | Units | Weight |
|--------------------------|-------|--------|
| Weight of Ballast Added  | kg    | 75     |
| Components Removed: none | kg    |        |

**TEST SURFACE MARKINGS**

|                       | Units | Distance from 63° Impact Angle Line |
|-----------------------|-------|-------------------------------------|
| Fore 25 mm Target     | mm    | 991                                 |
| Aft 25 mm Target      | mm    | 988                                 |
| Pre-Impact Angle Line | mm    | 100                                 |

| Parallel Track Target | Units | X Location | Y Location |
|-----------------------|-------|------------|------------|
| A                     | mm    | 0          | 0          |
| B                     | mm    | 1520       | 3085       |
| C                     | mm    |            |            |
| D                     | mm    | 3500       | 0          |

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

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
 Test Date: 8/28/2024

**SEAT POSITIONING**

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

**SCRL ANGLE RANGE**

| Seat                      | SCRL (°) |       |       |
|---------------------------|----------|-------|-------|
|                           | Max      | Min   | Mid   |
| Driver Seat               | 20.0     | 11.9  | 16.0  |
| Front Passenger Seat      | 19.6     | 11.2  | 15.4  |
| Front Center Seat         |          |       |       |
| Struck Side Rear Seat     | Fixed    | Fixed | Fixed |
| Non-Struck Side Rear Seat | Fixed    | Fixed | Fixed |
| Rear Center Seat          | Fixed    | Fixed | Fixed |

**SEAT HEIGHT AND ANGLE**

| Seat                      | As-Tested SCRL Angle (Mid) (°) | As-Tested SCRP Height (mm) | SCRP Height Position | SCRP Height (mm) |       |              |
|---------------------------|--------------------------------|----------------------------|----------------------|------------------|-------|--------------|
|                           |                                |                            |                      | Rear-Most        | Mid   | Forward-Most |
| Driver Seat               | 16.0                           | 0                          | Max                  | 57               | 57    | 57           |
|                           |                                |                            | Mid                  | 29               | 29    | 29           |
|                           |                                |                            | Min                  | 0                | 0     | 0            |
| Front Passenger Seat      | 15.4                           | 0                          | Max                  | 67               | 67    | 67           |
|                           |                                |                            | Mid                  | 34               | 34    | 34           |
|                           |                                |                            | Min                  | 0                | 0     | 0            |
| Front Center Seat         |                                |                            | Max                  |                  |       |              |
|                           |                                |                            | Mid                  |                  |       |              |
|                           |                                |                            | Min                  |                  |       |              |
| Struck Side Rear Seat     | Fixed                          | Fixed                      | Max                  | Fixed            | Fixed | Fixed        |
|                           |                                |                            | Mid                  | Fixed            | Fixed | Fixed        |
|                           |                                |                            | Min                  | Fixed            | Fixed | Fixed        |
| Non-Struck Side Rear Seat | Fixed                          | Fixed                      | Max                  | Fixed            | Fixed | Fixed        |
|                           |                                |                            | Mid                  | Fixed            | Fixed | Fixed        |
|                           |                                |                            | Min                  | Fixed            | Fixed | Fixed        |
| Rear Center Seat          | Fixed                          | Fixed                      | Max                  | Fixed            | Fixed | Fixed        |
|                           |                                |                            | Mid                  | Fixed            | Fixed | Fixed        |
|                           |                                |                            | Min                  | Fixed            | Fixed | Fixed        |

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

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

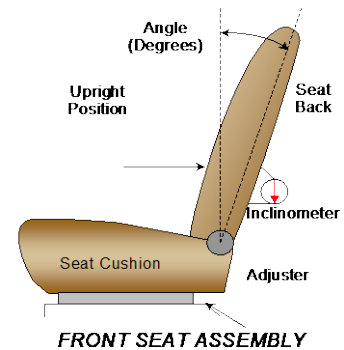
NHTSA No.: O20245302  
 Test Date: 8/28/2024

**SEAT FORE/AFT POSITIONS**

| Seat                      | Total Fore/Aft Travel |                                | Test Position from Forward-Most Position |                               |
|---------------------------|-----------------------|--------------------------------|--|-------------------------------|
|                           | mm                    | Detents (1 <sup>st</sup> as 1) | mm                                       | Detent (1 <sup>st</sup> as 0) |
| Driver Seat               | 260                   |                                | 130                                      |                               |
| Front Passenger Seat      | 260                   |                                | 130                                      |                               |
| Front Center Seat         |                       |                                |  |                               |
| Struck Side Rear Seat     | Fixed                 |                                | Fixed                                    |                               |
| Non-Struck Side Rear Seat | Fixed                 |                                | Fixed                                    |                               |
| Rear Center Seat          | Fixed                 |                                | Fixed                                    |                               |

**SEAT BACK ANGLE ADJUSTMENT**

The driver's seat back is positioned to the manufacturer's designated design angle. The front center and front passenger's seat backs are positioned in a similar manner as the driver's seat back. The struck side rear seat back is positioned such that the dummy's head is level. The rear center and non-struck side rear outboard seat backs are positioned in a similar manner as the struck-side rear seat back.



| Seat                      | Total Seat Back Angle Range |                                | Test Position from Vertical |                               |
|---------------------------|-----------------------------|--------------------------------|-----------------------------|-------------------------------|
|                           | Degrees                     | Detents (1 <sup>st</sup> as 1) | Degrees                     | Detent (1 <sup>st</sup> as 0) |
| Driver Seat               | 55.9                        |                                | -10.7                       |                               |
| Front Passenger Seat      | 55.8                        |                                | -10.8                       |                               |
| Front Center Seat         |                             |                                |                             |                               |
| Struck Side Rear Seat     | 4.2                         | 2                              | 23.9                        | 0                             |
| Non-Struck Side Rear Seat | 4.2                         | 2                              | 24.4                        | 0                             |
| Rear Center Seat          | 4.2                         | 2                              | 23.9                        | 0                             |

Seat back angles measured on outboard headrest post.

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

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
 Test Date: 8/28/2024

**SEAT BELT ANCHORAGE ADJUSTMENT**

Seat belt anchorages are adjusted in accordance with the information provided by the manufacturer on S1 - Vehicle Setup Information.

|             | Total # of Positions | Placed in Position # |
|-------------|----------------------|----------------------|
| Driver Seat | 4                    | 0 (Uppermost as 0)   |
| Rear Seat   | Fixed                |                      |

**HEAD RESTRAINT ADJUSTMENT**

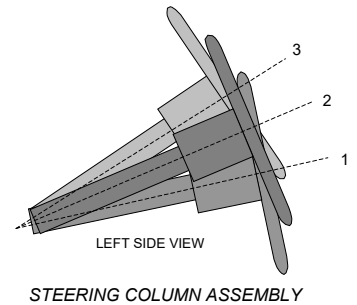
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

|             | Total # of Positions | Placed in Position #             |
|-------------|----------------------|----------------------------------|
| Driver Seat | 4                    | 3 (Lowest as 0) / Fixed Fore-Aft |
| Rear Seat   | 3                    | 0 (Lowest as 0) / Fixed Fore-Aft |

**STEERING COLUMN ADJUSTMENT**

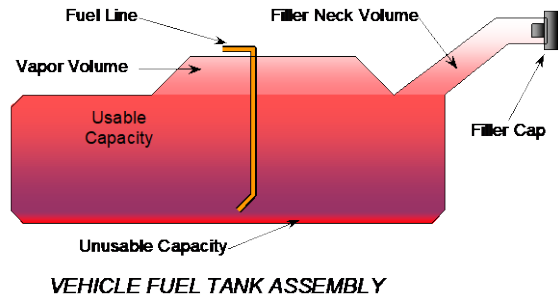
Steering wheel and column adjustments are made so that the steering wheel hub is at the center of its geometric locus it describes when it moves through its full range of motion.

|                                   | Wheel Angle (°) | Fore/Aft Position (mm) |
|-----------------------------------|-----------------|------------------------|
| Lowermost, Position 1             | 72.9            |                        |
| Geometric Center, Position 2      | 70.9            |                        |
| Uppermost, Position 3             | 68.9            |                        |
| Telescoping Steering Wheel Travel |                 | 51                     |
| Test Position                     | 70.9            | 26                     |



**FUEL PUMP**

Electric vehicle.



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

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
 Test Date: 8/28/2024

**FUEL TANK CAPACITY DATA**

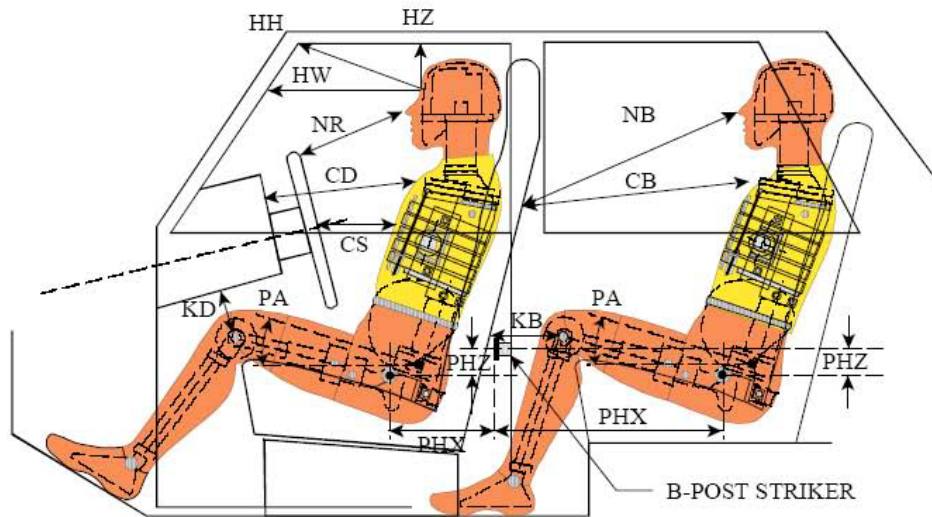
|   | <b>Liters</b> |
|---|---------------|
| Usable Capacity of Standard Tank (see S1 - Vehicle Setup Information) |               |
| Usable Capacity of Optional Tank (see S1 - Vehicle Setup Information) |               |
| Usable Capacity of Standard Tank as Specified in Owner's Manual       |               |
| Usable Capacity of Optional Tank as Specified in Owner's Manual       |               |
| 93% of Usable Capacity  |               |
| Actual Amount of Solvent Used   |               |
| 1/3 of Usable Capacity  |               |

Is the actual amount of solvent used in the test equal to  $93\% \pm 1\%$  of the Usable Capacity stated in S1 - Vehicle Setup Information? **N/A**

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

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
Test Date: 8/28/2024



**LEFT SIDE VIEW**

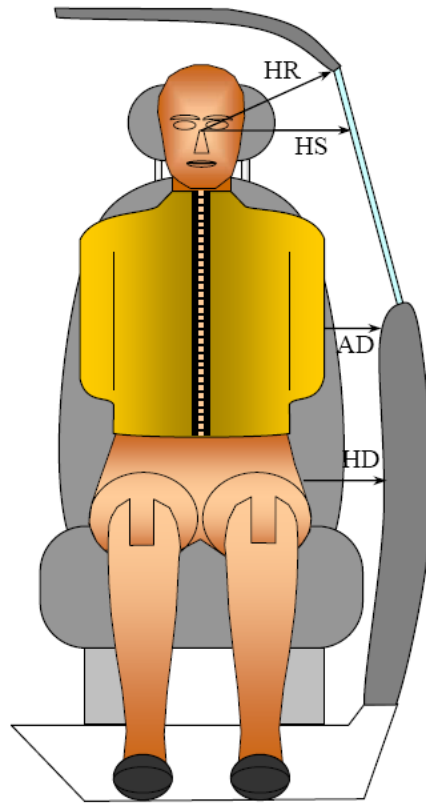
NOTE: 2-DOOR VEHICLE SHOWN.  
REAR DUMMY PHX & PHZ  
MEASUREMENTS FOR A 4-DOOR  
VEHICLE WOULD USE THE C-POST  
STRIKER AS A REFERENCE POINT

| Driver Code | Pass. Code | Measurement Description       | Driver      |           | Passenger   |           |
|-------------|------------|-------------------------------|-------------|-----------|-------------|-----------|
|             |            |                               | Length (mm) | Angle (°) | Length (mm) | Angle (°) |
| HH          |            | Head to Header                | 389         | 20.9      |             |           |
| HW          |            | Head to Windshield            | 706         | 0         |             |           |
| HZ          | HZ         | Head to Roof Liner            | 162         | 90        | 237         | 90        |
| NR          | NB         | Nose to Rim/Seat Back         | 459         | 8.9       | 569         | 12.1      |
| CD          | CB         | Chest to Dashboard/Seat Back  | 576         | 9.5       | 577         | 6.0       |
| CS          |            | Chest to Steering Wheel       | 383         | 7.5       |             |           |
| KDL         | KBL        | Left Knee to Dash/Seat Back   | 218         | 25.7      | 317         | 23.2      |
| KDR         | KBR        | Right Knee to Dash/Seat Back  | 225         | 25.7      | 320         | 32.0      |
| PAX         | PAX        | Pelvic Tilt Angle X           |             | 28.6      |             | 25.4      |
| PAY         | PAY        | Pelvic Tilt Angle Y           |             | -0.3      |             | -1.4      |
| PHX         | PHX        | Hip Point to Striker (X-Axis) | 210         |           | 210         |           |
| PHZ         | PHZ        | Hip Point to Striker (Z-Axis) | 152         |           | 235         |           |

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

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
 Test Date: 8/28/2024

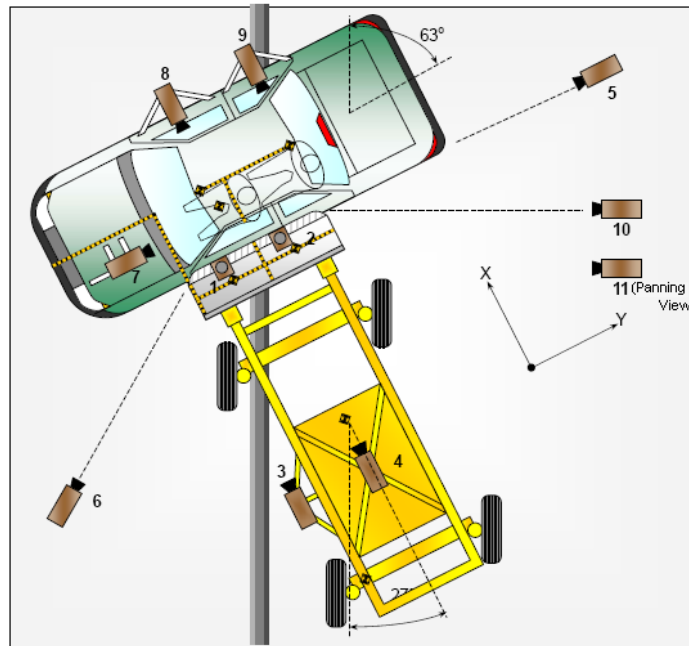


| Code | Measurement Description | Driver      | Passenger |
|------|-------------------------|-------------|-----------|
|      |                         | Length (mm) |           |
| HR   | Head to Side Header     | 256         | 274       |
| HS   | Head to Side Window     | 352         | 380       |
| AD   | Arm to Door             | 110         | 188       |
| HD   | Hip Point to Door       | 161         | 172       |

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

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
 Test Date: 8/28/2024



**CAMERA LOCATIONS AND DATA**

| No. | Camera View             | Coordinates* (mm) |       |       | Lens (mm) | Frame Rate (fps) |
|-----|-------------------------|-------------------|-------|-------|-----------|------------------|
|     |                         | X                 | Y     | Z     |           |                  |
| 1   | Overhead Overall        | 625               | 510   | -4995 | 8.5       | 1000             |
| 2   | Overhead Close-Up       | 0                 | 0     | -4895 | 20        | 1000             |
| 3   | Left Impact Point (MDB) |                   |       |       | 50        | 1000             |
| 4   | Side Overall (MDB)      |                   |       |       | 16        | 1000             |
| 5   | Rear                    | -15               | 7595  | -1500 | 24        | 1000             |
| 6   | Left Front              | -1445             | -4805 | -1490 | 24        | 1000             |
| 7   | Driver Front (OB)       |                   |       |       | 16        | 1000             |
| 8   | Driver Side (OB)        |                   |       |       | 8         | 1000             |
| 9   | Passenger Side (OB)     |                   |       |       | 8         | 1000             |
| 10  | Real Time Left Rear     |                   |       |       |           | 30               |
| 11  | Real Time Inrun         |                   |       |       |           | 30               |

Reference: Impact Point projected to Ground; +X = To Front of MDB, +Y = To Right of MDB, +Z = Down

\*All measurements accurate to ±6 mm

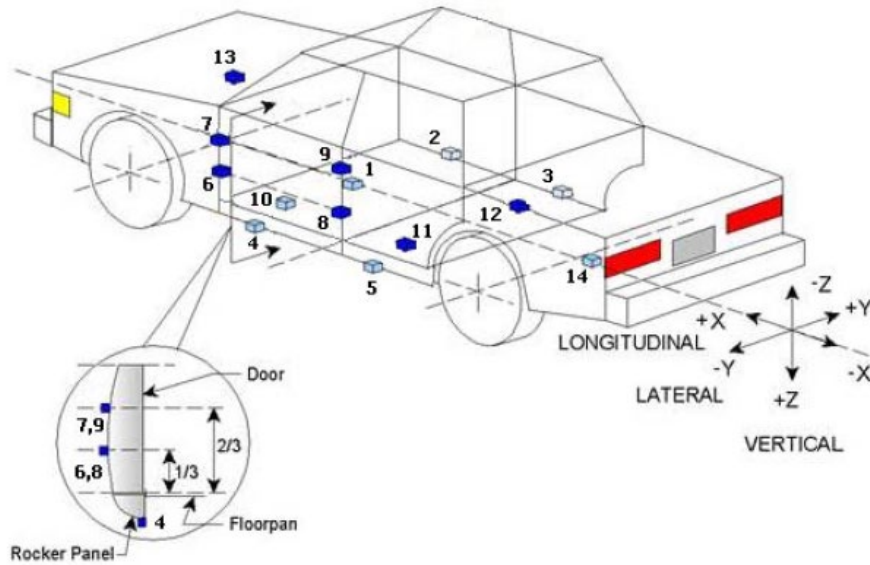
**INSTRUMENTATION**

|                    | Number of Channels |
|--------------------|--------------------|
| Driver Dummy       | 16                 |
| Passenger Dummy    | 19                 |
| Vehicle Structure  | 21                 |
| MDB Accelerometers | 5                  |
| <b>Total</b>       | <b>61</b>          |

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

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
 Test Date: 8/28/2024



**TEST VEHICLE ACCELEROMETER LOCATIONS**

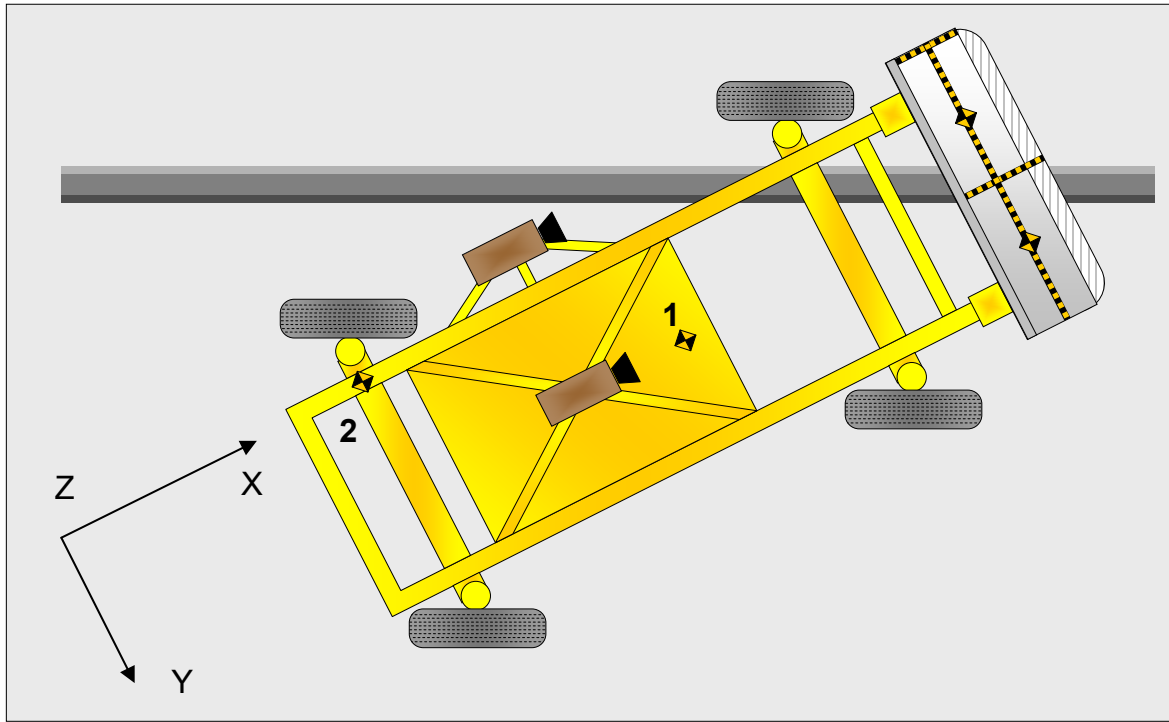
| No. | ID                        | Coordinates (mm) |      |      |
|-----|---------------------------|------------------|------|------|
|     |                           | X                | Y    | Z    |
| 1   | Vehicle CG                | 2433             | -8   | -169 |
| 2   | Right Sill at Front Seat  | 2817             | 788  | -218 |
| 3   | Right Sill at Rear Seat   | 1722             | 797  | -229 |
| 4   | Left Sill at Front Door   | 2816             | -791 | -222 |
| 5   | Left Sill at Rear Door    | 1727             | -791 | -228 |
| 6   | Left Lower A-Post         | 3406             | -904 | -487 |
| 7   | Left Middle A-Post        | 3429             | -889 | -830 |
| 8   | Left Lower B-Post         |                  |      |      |
| 9   | Left Middle B-Post        |                  |      |      |
| 10  | Front Seat Track          | 2412             | -403 | -373 |
| 11  | Rear Seat Structure       | 1850             | -336 | -439 |
| 12  | Rt. Rear Occ. Compartment | 1851             | 338  | -430 |
| 13  | Engine Block              | 4310             | -21  | -615 |
| 14  | Rear Above Axle           | 1113             | -5   | -643 |

Reference: X – Rear Surface of Vehicle (+ forward)  
 Y – Vehicle Centerline (+ to right)  
 Z – Ground Plane (+ down)

**DATA SHEET NO. 7  
MDB ACCELEROMETER LOCATIONS**

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
 Test Date: 8/28/2024



**MDB ACCELEROMETER LOCATIONS**

| No. | Accelerometer Location | Coordinates (mm) |      |      |
|-----|------------------------|------------------|------|------|
|     |                        | X                | Y    | Z    |
| 1   | MDB CG                 | -1105            | 0    | -330 |
| 2   | MDB Rear               | -2580            | -650 | -625 |

Reference: X – MDB Face (+ forward)  
 Y – MDB Centerline (+ to right)  
 Z – Ground Plane (+ down)

|   |    |      |
|---|----|------|
| Width between left and right MDB contact switches | mm | 1399 |
|---|----|------|

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

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
 Test Date: 8/28/2024

**TEST DUMMY INFORMATION AND CONTACT POINTS**

| Description       | Front Seat Dummy (ES-2re)              | Rear Seat Dummy (SID-IIs) |
|-------------------|--|---------------------------|
| Face              | Curtain Airbag                         | None                      |
| Top of Head       | Curtain Airbag, Headliner              | Curtain Airbag            |
| Left Side of Head | Curtain Airbag, Headliner              | Curtain Airbag            |
| Back of Head      | Headrest                               | None                      |
| Left Shoulder     | None                                   | None                      |
| Upper Torso       | Seatback                               | None                      |
| Lower Torso       | Side Torso/Pelvis Airbag, Seatback     | Door Panel                |
| Left Hip          | Side Torso/Pelvis Airbag, Seat Cushion | Door Panel                |
| Left Knee         | Door Panel                             | None                      |

**POST-TEST DOOR PERFORMANCE**

| Description  | Struck Side |      | Non-Struck Side |      | Rear Hatch |
|--|-------------|------|-----------------|------|------------|
|  | 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, Record Width of Opening at Striker (mm) |             |      |                 |      |            |

**POST-TEST SEAT PERFORMANCE**

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

**POST-TEST STRUCTURAL OBSERVATIONS**

| Critical Areas of Performance | Observations and Conclusions |
|-------------------------------|------------------------------|
| Pillar Performance            | No Separation                |
| Sill Separation               | None                         |
| Windshield Damage             | None                         |
| Side Window Damage            | None                         |
| Other Notable Effects         | None                         |

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

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
 Test Date: 8/28/2024

**SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION**

| Restraint Type           | Struck Side<br>Driver |          | Struck Side<br>Left Rear Passenger |          |
|--------------------------|-----------------------|----------|------------------------------------|----------|
|                          | Mounted               | Deployed | Mounted                            | Deployed |
|                          | Frontal Airbag        | Yes      | No                                 |          |
| Knee Airbag              | Yes                   | No       |                                    |          |
| Side Curtain Airbag      | Yes                   | Yes      | Yes                                | Yes      |
| Side Torso/Pelvis Airbag | Yes                   | Yes      | No                                 |          |
| Side Airbag (Other)      |                       |          |                                    |          |
| Seat Belt Pretensioner   | Yes                   | Yes      | Yes                                | Yes      |
| Seat Belt Load Limiter   | Yes                   |          | Yes                                |          |
| Other:                   | No                    |          | No                                 |          |

**IMPACT POINT LOCATION DATA**

| Measured Parameter  | Units | Tolerance                       | Value |
|---|-------|---------------------------------|-------|
| Vehicle Wheelbase   | mm    |                                 | 3094  |
| Vertical Impact Reference Line (Aft of Front Axle)<br>(Intended Impact Point) | mm    |                                 | 508   |
| Actual Impact Point (Aft of Front Axle)                                       | mm    |                                 | 498   |
| Horizontal Offset (+forward / -rearward)                                      | mm    | +/- 50 of intended impact point | 10    |
| Vertical Offset (+down / -up)   | mm    | +/- 20 of intended impact point | -1    |

**DATA SHEET NO. 9  
MDB SUMMARY OF RESULTS**

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
 Test Date: 8/28/2024

**MDB SPECIFICATIONS**

| Measurement Description                 | Length (mm) |
|---|-------------|
| Overall Width of Framework Carriage     | 1250        |
| Overall Length Including Honeycomb Face | 4119        |
| Wheelbase of Framework Carriage         | 2588        |
| CG Location aft of Front Axle           | 1125        |

**MDB WEIGHTS**

|        | Units | Front Axle | Rear Axle | Total  |
|--------|-------|------------|-----------|--------|
| Left   | kg    | 393.4      | 297.1     |        |
| Right  | kg    | 378.0      | 295.8     |        |
| Ratio  | %     | 56.5       | 43.5      |        |
| Totals | kg    | 771.4      | 592.9     | 1364.4 |

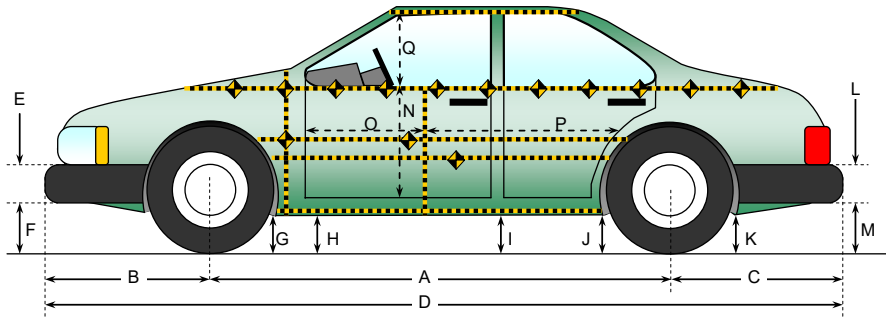
**SPEED AND ANGLE AT IMPACT DATA**

| Measured Parameter                              | Units   | Requirement  | Value |
|---|---------|--------------|-------|
| Trap No. 1 Velocity (Primary)                   | km/h    | 61.1 to 62.7 | 62.06 |
| Trap No. 2 Velocity (Redundant)                 | km/h    | 61.1 to 62.7 | 62.14 |
| MDB CL to Target Vehicle CL                     | degrees | 88.5 to 91.5 | 89.9  |
| MDB Forward Line of Motion to Target Vehicle CL | degrees | 62.5 to 63.5 | 63.0  |
| MDB Crabbed Angle to MDB Forward Line of Motion | degrees | 26 to 28     | 26.7  |

**DATA SHEET NO. 10  
TEST VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
Test Date: 8/28/2024



All measurements in (mm) with tolerance of  $\pm 3$  mm

**LEFT SIDE VIEW**

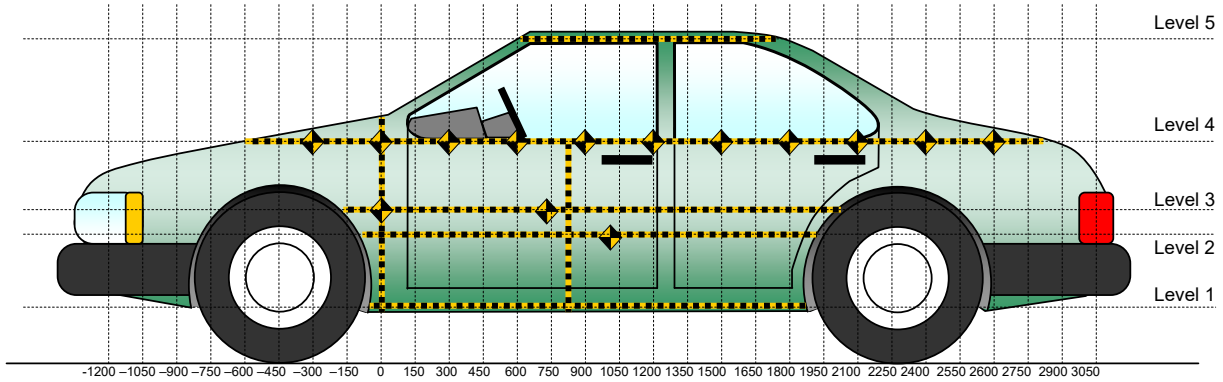
**VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION**

| Code | Measurement Description                | Pre-Test | Post-Test | Change |
|------|--|----------|-----------|--------|
| A    | Wheelbase                              | 3094     | 3091      | -3     |
| B    | Front Axle to FSOV                     | 905      | 905       | 0      |
| C    | Rear Axle to RSOV                      | 1010     | 1013      | 3      |
| D    | Total Length at Centerline             | 5008     | 5009      | 1      |
| E    | Front Bumper Thickness                 | 113      | 114       | 1      |
| F    | Front Bumper Bottom to Ground          | 304      | 310       | 6      |
| G    | Sill Height at Front Wheel Well        | 201      | 213       | 12     |
| H    | Sill Height at Front Door Leading Edge | 191      | 201       | 10     |
| I    | Sill Height at B Pillar                | 211      | 213       | 2      |
| J1   | Sill Height at Rear Wheel Well         | 215      | 220       | 5      |
| J2   | Pinch Weld Height at Rear Wheel Well   | 198      | 206       | 8      |
| K    | Sill Height Aft of Rear Wheel Well     | 274      | 279       | 5      |
| L    | Rear Bumper Thickness                  | 111      | 108       | -3     |
| M    | Rear Bumper Bottom to Ground           | 484      | 489       | 5      |
| N    | Sill Height to Window Bottom Sill      | 689      | 641       | -48    |
| O    | Front Door Leading Edge to Impact CL   | 711      | 697       | -14    |
| P    | Rear Door Trailing Edge to Impact CL   | 1320     | 1281      | -39    |
| Q    | Front Window Opening                   | 347      | 366       | 19     |
| R    | Right Side Length                      | 4547     | 4548      | 1      |
| S    | Left Side Length                       | 4548     | 4548      | 0      |
| T    | Vehicle Width at B Post                | 1939     | 1778      | -161   |
| U    | Front Wheel Track Width                | 1668     |           |        |
| V    | Rear Wheel Track Width                 | 1666     |           |        |

**DATA SHEET NO. 11**  
**TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
 Test Date: 8/28/2024



All Measurements Shown in mm

**LEFT SIDE VIEW**

**MAXIMUM EXTERIOR CRUSH MEASUREMENTS**

| Level | Measurement Description | Height Above Ground | Maximum Exterior Static Crush | Distance from Impact |
|-------|-------------------------|---------------------|-------------------------------|----------------------|
| 1     | Sill Top                | 480                 | 175                           | 1650                 |
| 2     | Occupant H-Point        | 629                 | 172                           | 1650                 |
| 3     | Mid Door                | 677                 | 202                           | 1650                 |
| 4     | Window Sill             | 1096                | 52                            | 1350                 |
| 5     | Window Top              | 1544                | 5                             | 1350                 |

Note: The measurements are taken along the vertical impact reference line. Vehicle measurements forward of the vertical impact reference line are negative.

**DATA SHEET NO. 11 (CONTINUED)**  
**TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
 Test Date: 8/28/2024

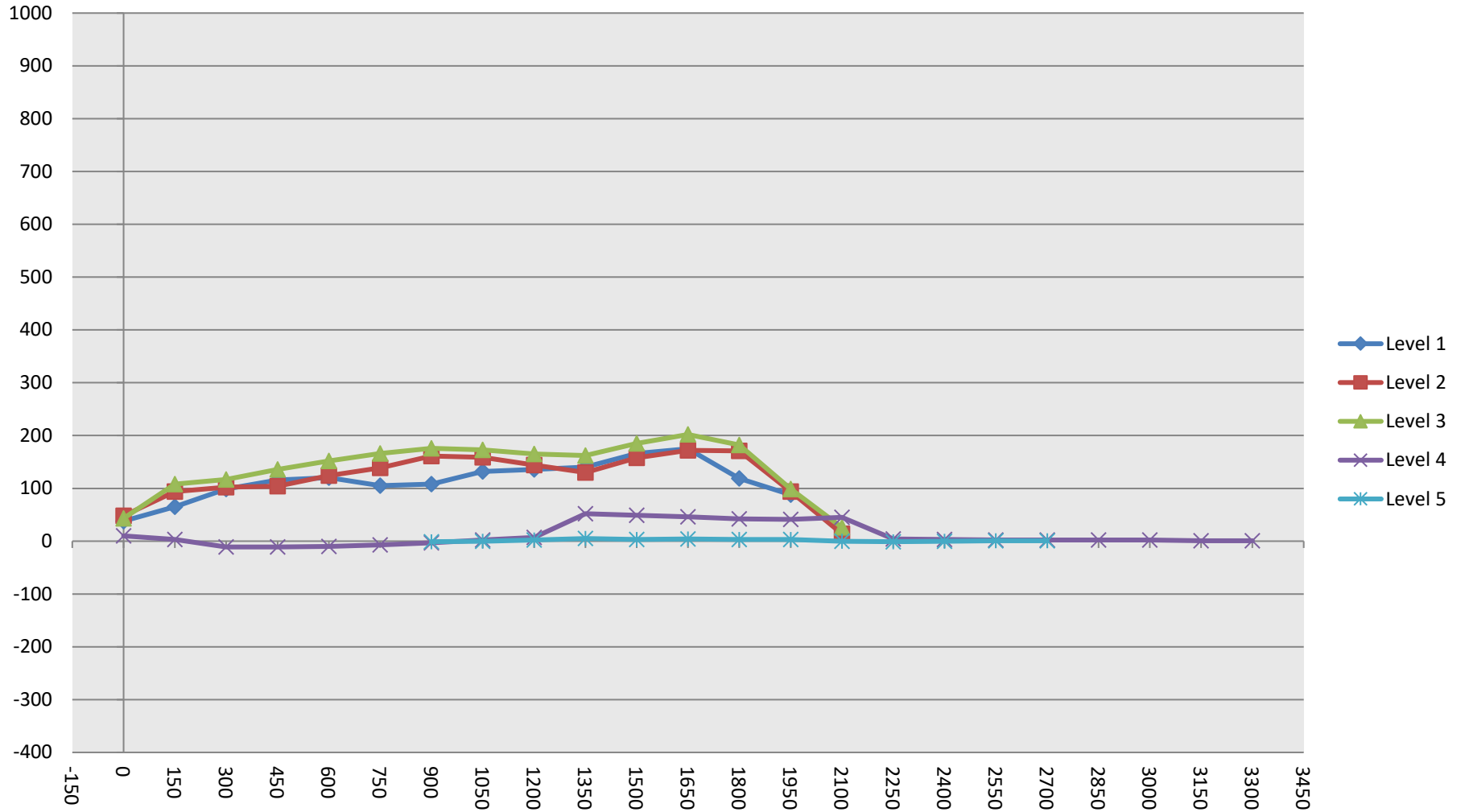
|       | Pre-Test |     |     |     |     | Post-Test |     |     |     |     | Exterior Crush |     |     |     |    |
|-------|----------|-----|-----|-----|-----|-----------|-----|-----|-----|-----|----------------|-----|-----|-----|----|
|       | 1        | 2   | 3   | 4   | 5   | 1         | 2   | 3   | 4   | 5   | 1              | 2   | 3   | 4   | 5  |
| -2100 |          |     |     |     |     |           |     |     |     |     |                |     |     |     |    |
| -1950 |          |     |     |     |     |           |     |     |     |     |                |     |     |     |    |
| -1800 |          |     |     |     |     |           |     |     |     |     |                |     |     |     |    |
| -1650 |          |     |     |     |     |           |     |     |     |     |                |     |     |     |    |
| -1500 |          |     |     |     |     |           |     |     |     |     |                |     |     |     |    |
| -1350 |          |     |     |     |     |           |     |     |     |     |                |     |     |     |    |
| -1200 |          |     |     |     |     |           |     |     |     |     |                |     |     |     |    |
| -1050 |          |     |     |     |     |           |     |     |     |     |                |     |     |     |    |
| -900  |          |     |     |     |     |           |     |     |     |     |                |     |     |     |    |
| -750  |          |     |     |     |     |           |     |     |     |     |                |     |     |     |    |
| -600  |          |     |     |     |     |           |     |     |     |     |                |     |     |     |    |
| -450  |          |     |     |     |     |           |     |     |     |     |                |     |     |     |    |
| -300  |          |     |     |     |     |           |     |     |     |     |                |     |     |     |    |
| -150  |          |     |     |     |     |           |     |     |     |     |                |     |     |     |    |
| 0     | 974      | 982 | 984 | 855 |     | 936       | 934 | 941 | 845 |     | 38             | 48  | 43  | 10  |    |
| 150   | 974      | 978 | 981 | 871 |     | 909       | 884 | 873 | 868 |     | 65             | 94  | 108 | 3   |    |
| 300   | 975      | 974 | 976 | 883 |     | 876       | 872 | 859 | 894 |     | 99             | 102 | 117 | -11 |    |
| 450   | 977      | 967 | 970 | 891 |     | 861       | 863 | 834 | 902 |     | 116            | 104 | 136 | -11 |    |
| 600   | 979      | 962 | 964 | 899 |     | 859       | 838 | 812 | 909 |     | 120            | 124 | 152 | -10 |    |
| 750   | 981      | 960 | 961 | 906 |     | 876       | 821 | 795 | 913 |     | 105            | 139 | 166 | -7  |    |
| 900   | 983      | 960 | 961 | 911 | 637 | 875       | 799 | 785 | 914 | 638 | 108            | 161 | 176 | -3  | -1 |
| 1050  | 984      | 962 | 963 | 916 | 665 | 852       | 803 | 790 | 914 | 665 | 132            | 159 | 173 | 2   | 0  |
| 1200  | 985      | 964 | 965 | 920 | 671 | 849       | 820 | 800 | 913 | 669 | 136            | 144 | 165 | 7   | 2  |
| 1350  | 987      | 969 | 970 | 924 | 671 | 847       | 839 | 808 | 872 | 666 | 140            | 130 | 162 | 52  | 5  |
| 1500  | 986      | 972 | 973 | 928 | 670 | 820       | 814 | 788 | 879 | 667 | 166            | 158 | 185 | 49  | 3  |
| 1650  | 985      | 975 | 977 | 930 | 668 | 810       | 803 | 775 | 884 | 664 | 175            | 172 | 202 | 46  | 4  |
| 1800  | 982      | 978 | 980 | 931 | 663 | 863       | 807 | 798 | 889 | 660 | 119            | 171 | 182 | 42  | 3  |
| 1950  | 978      | 981 | 983 | 933 | 658 | 890       | 887 | 884 | 892 | 655 | 88             | 94  | 99  | 41  | 3  |
| 2100  |          | 982 | 985 | 930 | 649 |           | 968 | 959 | 885 | 649 |                | 14  | 26  | 45  | 0  |
| 2250  |          |     |     | 930 | 634 |           |     |     | 926 | 635 |                |     |     | 4   | -1 |
| 2400  |          |     |     | 925 | 620 |           |     |     | 922 | 620 |                |     |     | 3   | 0  |
| 2550  |          |     |     | 924 | 603 |           |     |     | 922 | 602 |                |     |     | 2   | 1  |
| 2700  |          |     |     | 917 | 579 |           |     |     | 915 | 578 |                |     |     | 2   | 1  |
| 2850  |          |     |     | 906 |     |           |     |     | 904 |     |                |     |     | 2   |    |
| 3000  |          |     |     | 888 |     |           |     |     | 886 |     |                |     |     | 2   |    |
| 3150  |          |     |     | 862 |     |           |     |     | 861 |     |                |     |     | 1   |    |
| 3300  |          |     |     | 817 |     |           |     |     | 816 |     |                |     |     | 1   |    |
| 3450  |          |     |     |     |     |           |     |     |     |     |                |     |     |     |    |
| 3600  |          |     |     |     |     |           |     |     |     |     |                |     |     |     |    |
| 3750  |          |     |     |     |     |           |     |     |     |     |                |     |     |     |    |
| 3900  |          |     |     |     |     |           |     |     |     |     |                |     |     |     |    |

NOTE: Pre-test measurements are taken when the vehicle is in the "As Tested" weight condition. Vehicle measurements forward of the vertical impact reference line are negative. The crush profile grid is established prior to the test based on an estimated impact point.

**DATA SHEET NO. 11 (CONTINUED)**  
**TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

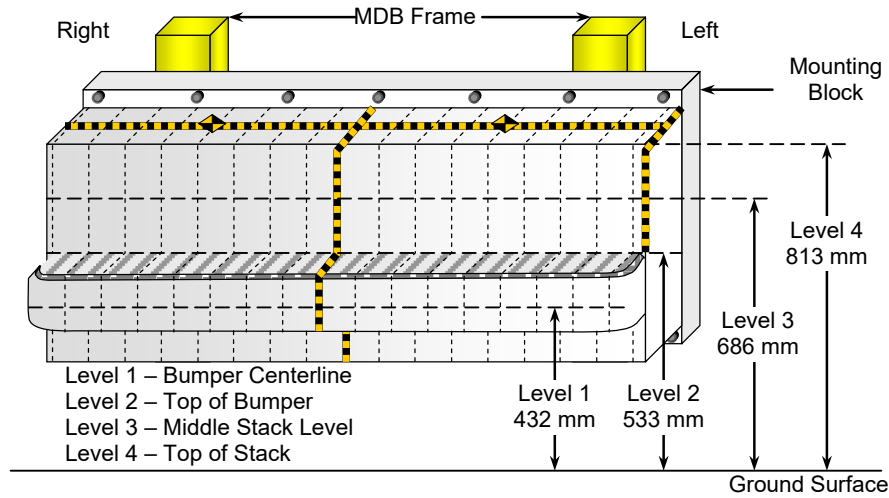
NHTSA No.: O20245302  
 Test Date: 8/28/2024



**DATA SHEET NO. 12**  
**MDB EXTERIOR STATIC CRUSH MEASUREMENTS**

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
 Test Date: 8/28/2024



**FRONT VIEW**

**MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE**

| Row | Vertical Location |             | From Centerline |           | Maximum Crush (mm) |
|-----|-------------------|-------------|-----------------|-----------|--------------------|
|     | Description       | Height (mm) | Distance (mm)   | Direction |                    |
| A   | Center of Bumper  | 432         | 700             | Right     | 313                |
| B   | Top of Bumper     | 533         | 600             | Right     | 223                |
| C   | Mid-Level         | 686         | 800             | Left      | 161                |
| D   | Top of Stack      | 813         | 800             | Left      | 211                |

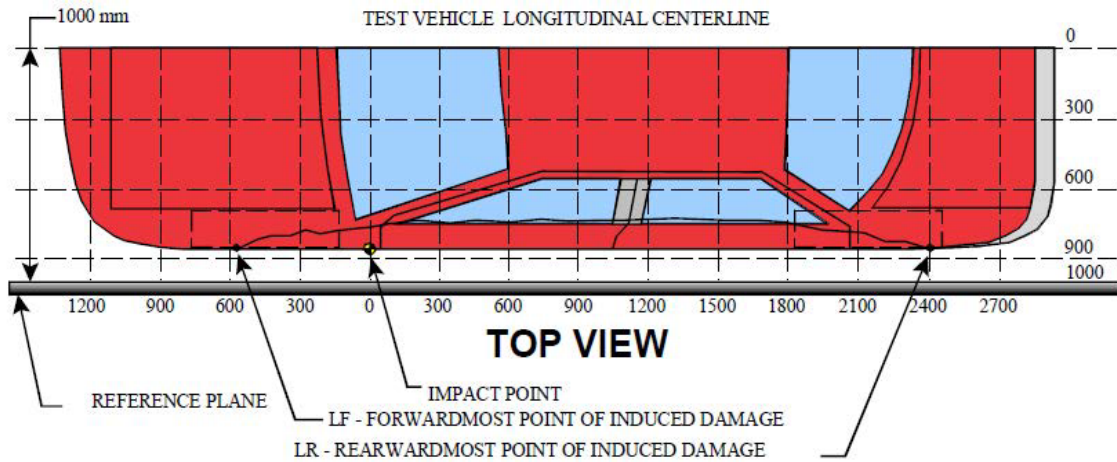
**DEFORMABLE BARRIER STATIC CRUSH**

| Stack Level | Distance Right of Center (mm) |     |     |     |     |     |     |     | C <sub>L</sub> | Distance Left of Center (mm) |     |     |     |     |     |     |     |
|-------------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|----------------|------------------------------|-----|-----|-----|-----|-----|-----|-----|
|             | 800                           | 700 | 600 | 500 | 400 | 300 | 200 | 100 |                | 0                            | 100 | 200 | 300 | 400 | 500 | 600 | 700 |
| 4           | 130                           | 108 | 129 | 151 | 149 | 140 | 119 | 104 | 110            | 116                          | 106 | 117 | 126 | 136 | 158 | 185 | 211 |
| 3           | 132                           | 114 | 124 | 131 | 134 | 139 | 109 | 94  | 87             | 85                           | 86  | 90  | 99  | 112 | 124 | 140 | 161 |
| 2           | 219                           | 220 | 223 | 221 | 222 | 209 | 204 | 209 | 206            | 199                          | 198 | 196 | 195 | 194 | 193 | 195 | 207 |
| 1           | 306                           | 313 | 312 | 311 | 310 | 311 | 304 | 299 | 297            | 294                          | 294 | 292 | 291 | 290 | 289 | 294 | 301 |

**DATA SHEET NO. 13  
VEHICLE AND MDB DAMAGE PROFILE DISTANCES**

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
 Test Date: 8/28/2024



**VEHICLE DAMAGE PROFILE DISTANCES**

| DPD | Distance from Impact Point (mm) | Level | Post-Test (mm) | Pre-Test (mm) | Max. Static Crush (mm) |
|-----|---------------------------------|-------|----------------|---------------|------------------------|
| 1   | 2100                            | 3     | 41             | 15            | 26                     |
| 2   | 1669                            | 3     | 225            | 23            | 202                    |
| 3   | 1259                            | 3     | 175            | 33            | 142                    |
| 4   | 844                             | 3     | 212            | 39            | 173                    |
| 5   | 420                             | 3     | 161            | 29            | 132                    |
| 6   | 0                               | 3     | 59             | 16            | 43                     |

**MDB DAMAGE PROFILE DISTANCES**

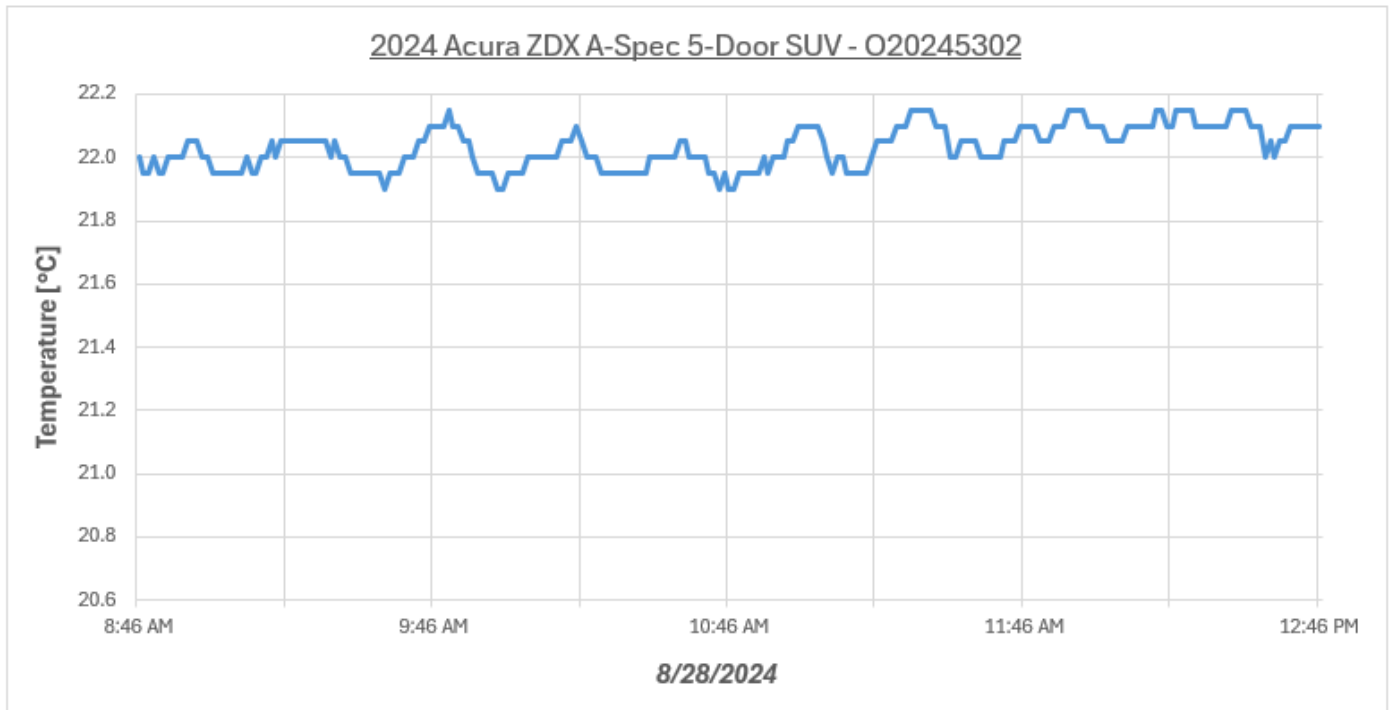
| DPD | Distance from Impact Point (mm) | Level | Post-Test (mm) | Pre-Test (mm) | Max. Static Crush (mm) |
|-----|---------------------------------|-------|----------------|---------------|------------------------|
| 1   | 800 mm right of center          | 1     | 782            | 476           | 306                    |
| 2   | 480 mm right of center          | 1     | 774            | 463           | 311                    |
| 3   | 160 mm right of center          | 1     | 767            | 463           | 304                    |
| 4   | 160 mm left of center           | 1     | 754            | 463           | 291                    |
| 5   | 480 mm left of center           | 1     | 758            | 463           | 295                    |
| 6   | 800 mm left of center           | 1     | 777            | 476           | 301                    |



**DATA SHEET NO. 15**  
**DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA**

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
 Test Date: 8/28/2024



| Serial # | Description                  | Maximum | Average | Minimum | Units |
|----------|------------------------------|---------|---------|---------|-------|
| W2425691 | VSC North Hall - Temp (3016) | 22.15   | 22.03   | 21.90   | °C    |

**DATA SHEET NO. 305-1  
GENERAL TEST AND VEHICLE PARAMETER DATA  
FOR INDICANT FMVSS NO. 305 TESTING**

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
Test Date: 8/28/2024

**ELECTRIC VEHICLE PROPULSION SYSTEM**

|  | Units | Observations and Conclusions  |
|--|-------|---|
| Type of Electric Vehicle                                     |       | Electric  |
| Propulsion Battery Type                                      |       | High Voltage Li-Ion Battery   |
| Nominal Voltage  | V     | 350   |
| Physical Location of Automatic Propulsion Battery Disconnect |       | The high voltage switches (i.e. contactors) are located in the RESS BDU |
| Auxiliary Battery Type                                       |       | AGM – Absorbent Glass Material (12V Battery)                            |

**PROPULSION BATTERY SYSTEM DATA**

|  | Units | Observations and Conclusions                                       |
|--|-------|--|
| Electrolyte Fluid Type   |       | Liquid   |
| Electrolyte Fluid Specific Gravity                                       | g/L   | 1200   |
| Electrolyte Fluid Kinematic Viscosity                                    | cSt   | 3.333  |
| Electrolyte Fluid Color  |       | Colorless / very light yellow                                      |
| Propulsion Battery Coolant Type, Color, Specific Gravity (if applicable) |       | 50/50 Deionized water, Dexcool mix                                 |
| Location of Battery Modules  |       | Inside Passenger Compartment                                       |
|  |       | X Outside Passenger Compartment                                    |
|  |       | The high-voltage battery is located below the occupant compartment |

**PROPULSION BATTERY STATE OF CHARGE**

|   |       |
|---|-------|
| <i>For all battery types:</i>   |       |
| Voltage range corresponding to <b>useable energy</b> of the battery:                |       |
| Minimum State of Charge   | 289   |
| Maximum State of Charge   | 398   |
| 95% of Maximum State of Charge  | 378.1 |
| Test Voltage - No less than 95% of maximum State of Charge                          | 397.7 |
| <i>For batteries that are rechargeable ONLY by an energy source on the vehicle:</i> |       |
| Voltage range corresponding to <b>useable energy</b> of the battery:                |       |
| Minimum State of Charge   |       |
| Maximum State of Charge   |       |
| Test Voltage – Maximum practicable State of Charge within Normal Operating Range    |       |

**DATA SHEET NO. 305-2  
PRE-IMPACT DATA  
FOR INDICANT FMVSS NO. 305 TESTING**

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
 Test Date: 8/28/2024

**VEHICLE CHASSIS GROUND POINT(S) LOCATION(S)**

|  |   |
|--|---|
| Details of Vehicle Chassis Ground Point(s) & Location(s) | Vehicle body at front of high voltage battery |
|--|---|

**PROPULSION BATTERY SYSTEM**

|  |   |
|--|---|
| Details of Electric Energy Storage/Conversion System Test Points | Connected at + and – terminal ends of propulsion system |
| Additional Comments  | None  |

**DATA SHEET NO. 305-3  
PRE-IMPACT ELECTRICAL ISOLATION MEASUREMENTS AND CALCULATIONS  
FOR INDICANT FMVSS NO. 305 TESTING**

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
Test Date: 8/28/2024

**VOLTMETER INFORMATION**

|                          | Units | Observations and Conclusions |
|--------------------------|-------|------------------------------|
| Make                     |       | Fluke                        |
| Model                    |       | 177                          |
| Serial Number            |       | 66160495                     |
| Internal Impedance Value | MΩ    | > 10 MΩ < 100 pF             |
| Resolution               | V     | 0.001                        |
| Last Calibration Date    |       | 2/14/2024                    |

**PROPULSION BATTERY VOLTAGE**

Measurement shall be made with Energy Storage/Conversion System connected to the vehicle propulsion system, and the vehicle in the “ready-to-drive” (propulsion system energized) position.

NOTE: If voltage measurement is not at the voltage or within the normal operating voltage range specified by the manufacturer, the battery must be charged.

|    |   |       |
|----|---|-------|
| Vb | V | 397.7 |
|----|---|-------|

**ELECTRIC ISOLATION MEASUREMENTS  
PROPULSION BATTERY TO VEHICLE CHASSIS**

Vehicle chassis point(s) determined and supplied to contractor by COR.

|    |   |       |
|----|---|-------|
| V1 | V | 192.7 |
| V2 | V | 188.8 |

**PROPULSION BATTERY TO VEHICLE CHASSIS ACROSS RESISTOR**

The known resistance Ro (in ohms) should be approximately 500 times the normal operating voltage of the vehicle (in volts) per SAE J1766.

|    |   |         |
|----|---|---------|
| Ro | Ω | 226,100 |
|----|---|---------|

|                |   |      |
|----------------|---|------|
| V1' Pre-Impact | V | 40.7 |
| V2' Pre-Impact | V | 39.7 |

**DATA SHEET NO. 305-3 (CONTINUED)**  
**PRE-IMPACT ELECTRICAL ISOLATION MEASUREMENTS AND CALCULATIONS**  
**FOR INDICANT FMVSS NO. 305 TESTING**

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
 Test Date: 8/28/2024

**ELECTRICAL ISOLATION CALCULATIONS**

NOTE: If measured voltage is zero and results in a division by zero, record "Zero Volts".  
 This "zero voltage" condition is considered as being compliant.

|  |     |           |
|--|-----|-----------|
| $R_{i1} = R_o (1 + V_2/V_1) [(V_1 - V_1')/V_1']$                                 |     |           |
| Ri1 Pre-Impact   | Ω   | 1,671,716 |
| $R_{i2} = R_o (1 + V_1/V_2) [(V_2 - V_2')/V_2']$                                 |     |           |
| Ri2 Pre-Impact   | Ω   | 1,715,854 |
| Ri = The lesser of Ri1 and Ri2   |     |           |
| Ri Pre-Impact  | Ω   | 1,671,716 |
| $R_i / V_b = \text{Electrical Isolation Value} / \text{Nominal Battery Voltage}$ |     |           |
| Ri / Vb Pre-Impact   | Ω/V | 4,203     |

NOTE: The minimum Electrical Isolation Value is 500 Ω/V.

|   | Yes  | No (Fail) |
|---|------|-----------|
| Is the measured Electrical Isolation Value ≥ 500 Ω/V? | X    |           |
| Additional Comments                                   | None |           |

**DATA SHEET NO. 305-4  
POST-IMPACT DATA  
FOR INDICANT FMVSS NO. 305 TESTING**

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
 Test Date: 8/28/2024

**VOLTMETER INFORMATION**

|                          | Units | Observations and Conclusions |
|--------------------------|-------|------------------------------|
| Make                     |       | Fluke                        |
| Model                    |       | 177                          |
| Serial Number            |       | 66160495                     |
| Internal Impedance Value | MΩ    | > 10 MΩ < 100 pF             |
| Resolution               | V     | 0.001                        |
| Last Calibration Date    |       | 2/14/2024                    |

**ELECTRICAL ISOLATION MEASUREMENTS**

|                 |   |     |             |   |         |    |         |
|-----------------|---|-----|-------------|---|---------|----|---------|
| Vb Post-Impact  | V | 3.8 |             |   |         |    |         |
| V1 Post-Impact  | V | 4.2 | Impact Time | 1 | Minutes | 24 | Seconds |
| V2 Post-Impact  | V | 0.4 |             | 1 | Minutes | 27 | Seconds |
| V1' Post-Impact | V | 0.7 |             | 1 | Minutes | 36 | Seconds |
| V2' Post-Impact | V | 0.1 |             | 1 | Minutes | 31 | Seconds |

**DATA SHEET NO. 305-4 (CONTINUED)**  
**POST-IMPACT DATA**  
**FOR INDICANT FMVSS NO. 305 TESTING**

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
 Test Date: 8/28/2024

**ELECTRICAL ISOLATION CALCULATIONS**

NOTE: If measured voltage is zero and results in a division by zero, record "Zero Volts".  
 This "zero voltage" condition is considered as being compliant.

|  |     |           |             |   |         |    |         |
|--|-----|-----------|-------------|---|---------|----|---------|
| $R_{i1} = R_o (1 + V_2/V_1) [(V_1 - V_1')/V_1']$                                 |     |           |             |   |         |    |         |
| Ri1 Post-Impact  | Ω   | 1,238,167 | Impact Time | 1 | Minutes | 36 | Seconds |
| $R_{i2} = R_o (1 + V_1/V_2) [(V_2 - V_2')/V_2']$                                 |     |           |             |   |         |    |         |
| Ri2 Post-Impact  | Ω   | 7,800,450 | Impact Time | 1 | Minutes | 31 | Seconds |
| Ri = The lesser of Ri1 and Ri2   |     |           |             |   |         |    |         |
| Ri Post-Impact   | Ω   | 1,238,167 | Impact Time | 1 | Minutes | 36 | Seconds |
| $R_i / V_b = \text{Electrical Isolation Value} / \text{Nominal Battery Voltage}$ |     |           |             |   |         |    |         |
| Ri / Vb Post-Impact  | Ω/V | 325,833   | Impact Time | 1 | Minutes | 36 | Seconds |

NOTE: The minimum Electrical Isolation Value is 500 Ω/V.

|   | Yes  | No (Fail) |
|---|------|-----------|
| Is the measured Electrical Isolation Value ≥ 500 Ω/V? | X    |           |
| Additional Comments                                   | None |           |

**DATA SHEET NO. 305-4 (CONTINUED)**  
**POST-IMPACT DATA**  
**FOR INDICANT FMVSS NO. 305 TESTING**

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
 Test Date: 8/28/2024

**PROPULSION BATTERY SYSTEM COMPONENTS**

|  |
|--|
| Describe any Propulsion Battery Module movement within the passenger compartment<br>[Supply photographs as appropriate]: |
| Not Applicable   |

|   | Yes (Fail) | No |
|---|------------|----|
| Has the Propulsion Battery Module moved within the passenger compartment? |            | X  |

|  |
|--|
| Describe intrusion of an outside Propulsion Battery Component into the passenger compartment<br>[Supply photographs as appropriate]: |
| No Intrusion   |

|  | Yes (Fail) | No |
|--|------------|----|
| Has an outside Propulsion Battery Component intruded into the passenger compartment? |            | X  |

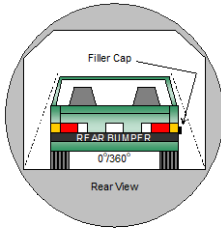
|  | Yes (Fail) | No |
|--|------------|----|
| Is the Propulsion Battery Electrolyte Spillage visible in the passenger compartment? |            | X  |

**DATA SHEET NO. 305-5  
 STATIC ROLLOVER TEST DATA  
 FOR INDICANT FMVSS NO. 305 TESTING**

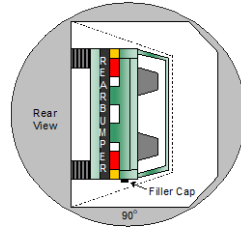
Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
 Test Date: 8/28/2024

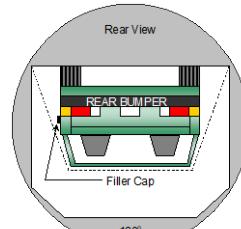
**PROPULSION BATTERY SYSTEM COMPONENTS**



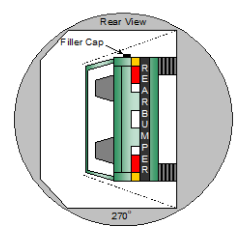
**0°/360°**



**90°**



**180°**



**270°**

**PROPULSION BATTERY ELECTROLYTE COLLECTION TIME PERIOD**

| Test Phase  | Rotation Time (spec. 1-3 min) |     |    |     | FMVSS 301 Hold Time |     | Total Time |     |    |     | Next Whole Minute Interval |     |
|-------------|-------------------------------|-----|----|-----|---------------------|-----|------------|-----|----|-----|----------------------------|-----|
|             | 1                             | min | 56 | sec | 5                   | min | 6          | min | 50 | sec | 7                          | min |
| 0° - 90°    | 1                             | min | 56 | sec | 5                   | min | 6          | min | 50 | sec | 7                          | min |
| 90° - 180°  | 1                             | min | 47 | sec | 5                   | min | 6          | min | 50 | sec | 7                          | min |
| 180° - 270° | 1                             | min | 48 | sec | 5                   | min | 6          | min | 50 | sec | 7                          | min |
| 270° - 360° | 1                             | min | 58 | sec | 5                   | min | 6          | min | 50 | sec | 7                          | min |

**TEST VEHICLE PROPULSION BATTERY ELECTROLYTE SPILLAGE**

NOTE: The maximum allowable Propulsion Battery Electrolyte Spillage is 5.0 Liters.

| Test Phase     | Propulsion Battery Electrolyte Spillage (L) | Spillage Location |
|----------------|---|-------------------|
| 0° to 90°      | 0   | Not Applicable    |
| 90° to 180°    | 0   | Not Applicable    |
| 180° to 270°   | 0   | Not Applicable    |
| 270° to 360°   | 0   | Not Applicable    |
| Total Spillage | 0   |                   |

|  | Yes (Fail) | No |
|--|------------|----|
| Is the total Propulsion Battery Electrolyte Spillage greater than 5.0 Liters?        |            | X  |
| Is the Propulsion Battery Electrolyte Spillage visible in the passenger compartment? |            | X  |

**DATA SHEET NO. 305-5 (CONTINUED)**  
**STATIC ROLLOVER TEST DATA**  
**FOR INDICANT FMVSS NO. 305 TESTING**

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
 Test Date: 8/28/2024

**VOLTMETER INFORMATION**

|                          | Units | Observations and Conclusions |
|--------------------------|-------|------------------------------|
| Make                     |       | Fluke                        |
| Model                    |       | 177                          |
| Serial Number            |       | 66160495                     |
| Internal Impedance Value | MΩ    | > 10 MΩ < 100 pF             |
| Resolution               | V     | 0.001                        |
| Last Calibration Date    |       | 2/14/2024                    |

**ELECTRICAL ISOLATION MEASUREMENTS**

|                |   |     |
|----------------|---|-----|
| Vb Post-Impact | V | 3.1 |
|----------------|---|-----|

Record V1, V2, V1', V2' voltage measurements at the start of each successive increment of 90°, 180°, 270°, and 360° of the static rollover test.

|     | Voltage | Units | Test Phase | Time |     |    |     |
|-----|---------|-------|------------|------|-----|----|-----|
|     |         |       |            |      |     |    |     |
| V1  | 3.8     | V     | 0°         |      | min |    | sec |
|     | 1.2     |       | 90°        | 3    |     | 13 |     |
|     | 0.0     |       | 180°       | 2    |     | 40 |     |
|     | 0.0     |       | 270°       | 2    |     | 48 |     |
|     | 0.0     |       | 360°       | 2    |     | 51 |     |
| V2  | 0.8     | V     | 0°         |      | min |    | sec |
|     | 1.2     |       | 90°        | 3    |     | 17 |     |
|     | 0.0     |       | 180°       | 2    |     | 43 |     |
|     | 0.0     |       | 270°       | 2    |     | 52 |     |
|     | 0.0     |       | 360°       | 2    |     | 55 |     |
| V1' | 0.5     | V     | 0°         |      | min |    | sec |
|     | 0.2     |       | 90°        | 3    |     | 26 |     |
|     | 0.0     |       | 180°       | 2    |     | 53 |     |
|     | 0.0     |       | 270°       | 3    |     | 2  |     |
|     | 0.0     |       | 360°       | 3    |     | 5  |     |
| V2' | 0.1     | V     | 0°         |      | min |    | sec |
|     | 0.2     |       | 90°        | 3    |     | 21 |     |
|     | 0.0     |       | 180°       | 2    |     | 47 |     |
|     | 0.0     |       | 270°       | 2    |     | 56 |     |
|     | 0.0     |       | 360°       | 2    |     | 59 |     |

**DATA SHEET NO. 305-5 (CONTINUED)**  
**STATIC ROLLOVER TEST DATA**  
**FOR INDICANT FMVSS NO. 305 TESTING**

Test Vehicle: 2024 Acura ZDX A-Spec 5-Door SUV  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20245302  
 Test Date: 8/28/2024

**ELECTRICAL ISOLATION CALCULATIONS**

NOTE: If measured voltage is zero and results in a division by zero, record "Zero Volts".  
 This "zero voltage" condition is considered as being compliant.

|  | Voltage    | Units | Test Phase | Time |     |    |
|--|------------|-------|------------|------|-----|----|
| $Ri1 = Ro (1 + V2/V1) [(V1-V1')/V1']$  |            |       |            |      |     |    |
| Ri1  | 1,806,420  | Ω     | 0°         |      | min |    |
|  | 2,261,000  |       | 90°        | 3    |     | 26 |
|  | Zero Volts |       | 180°       | 2    |     | 53 |
|  | Zero Volts |       | 270°       | 3    |     | 2  |
|  | Zero Volts |       | 360°       | 3    |     | 5  |
| $Ri2 = Ro (1 + V1/V2) [(V2-V2')/V2']$  |            |       |            |      |     |    |
| Ri2  | 9,100,525  | Ω     | 0°         |      | min |    |
|  | 2,261,000  |       | 90°        | 3    |     | 21 |
|  | Zero Volts |       | 180°       | 2    |     | 47 |
|  | Zero Volts |       | 270°       | 2    |     | 56 |
|  | Zero Volts |       | 360°       | 2    |     | 59 |
| $Ri = \text{The lesser of } Ri1 \text{ and } Ri2$                              |            |       |            |      |     |    |
| Ri   | 1,806,420  | Ω     | 0°         |      | min |    |
|  | 2,261,000  |       | 90°        | 3    |     | 21 |
|  | Zero Volts |       | 180°       | 2    |     | 47 |
|  | Zero Volts |       | 270°       | 2    |     | 56 |
|  | Zero Volts |       | 360°       | 2    |     | 59 |
| $Ri / Vb = \text{Electrical Isolation Value} / \text{Nominal Battery Voltage}$ |            |       |            |      |     |    |
| Ri / Vb  | 582,716    | Ω/V   | 0°         |      | min |    |
|  | Zero Volts |       | 90°        | 3    |     | 21 |
|  | Zero Volts |       | 180°       | 2    |     | 47 |
|  | Zero Volts |       | 270°       | 2    |     | 56 |
|  | Zero Volts |       | 360°       | 2    |     | 59 |

NOTE: The minimum Electrical Isolation Value is 500 Ω/V.

|   | Yes  | No (Fail) |
|---|------|-----------|
| Is the measured Electrical Isolation Value ≥ 500 Ω/V? | X    |           |
| Additional Comments                                   | None |           |

**APPENDIX A  
PHOTOGRAPHS**

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Photo No. 001 - As Delivered Right Front Three-Quarter View of Test Vehicle



Photo No. 002 - As Delivered Left Rear Three-Quarter View of Test Vehicle



Photo No. 003 - Pre-Test Frontal View of Test Vehicle



Photo No. 004 - Post-Test Frontal View of Test Vehicle



Photo No. 005 - Pre-Test Left Front Three-Quarter View of Test Vehicle



Photo No. 006 - Post-Test Left Front Three-Quarter View of Test Vehicle



Photo No. 007 - Pre-Test Left Side View of Test Vehicle



Photo No. 008 - Post-Test Left Side View of Test Vehicle



Photo No. 009 - Pre-Test Left Three-Quarter Rear View of Test Vehicle



Photo No. 010 - Post-Test Left Three-Quarter Rear View of Test Vehicle



Photo No. 011 - Pre-Test Rear View of Test Vehicle



Photo No. 012 - Post-Test Rear View of Test Vehicle



Photo No. 013 - Pre-Test Right Side View of Test Vehicle



Photo No. 014 - Post-Test Right Side View of Test Vehicle

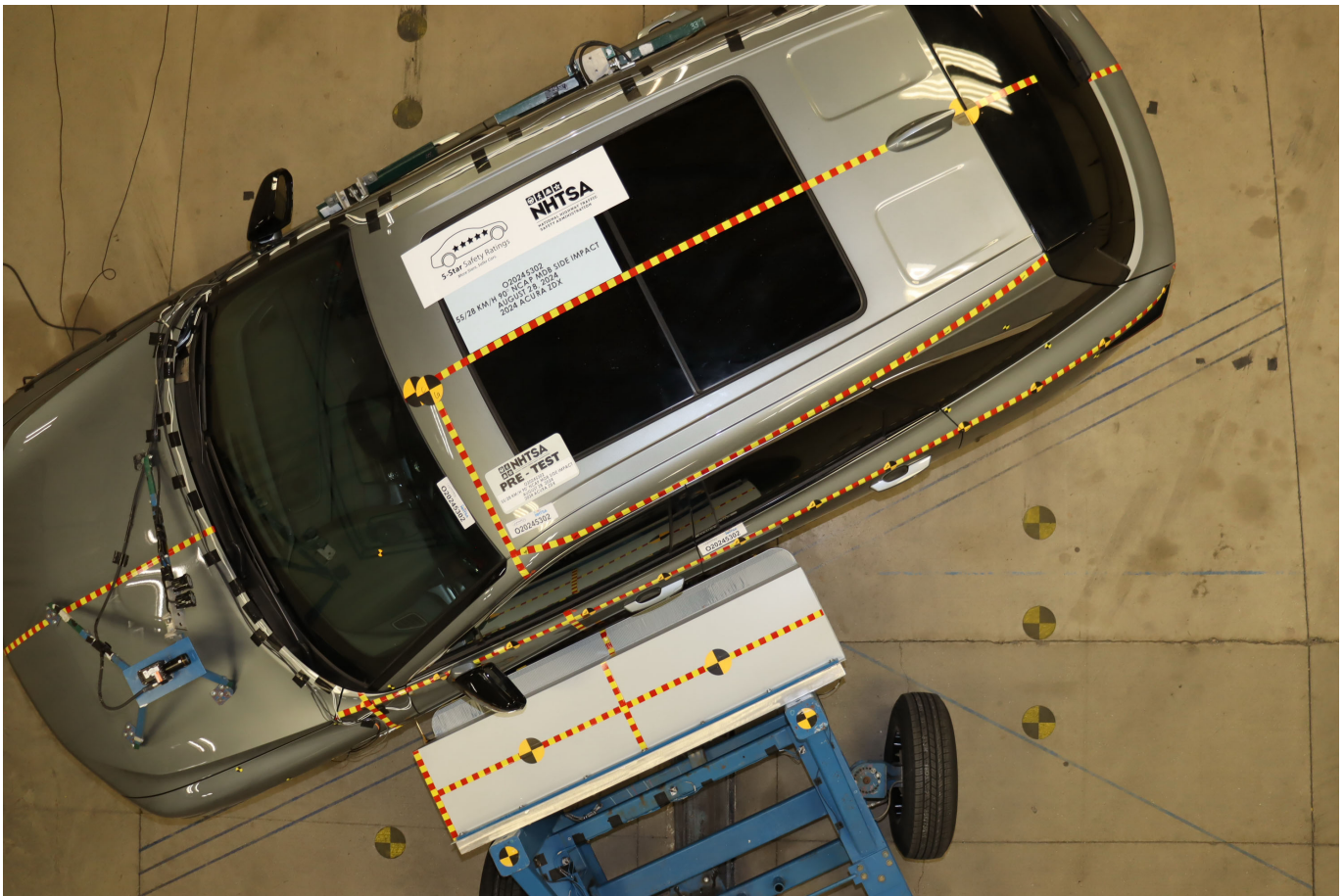


Photo No. 015 - Pre-Test Overhead View of Test Area



Photo No. 016 - Post-Test Overhead View of Test Area



Photo No. 017 - Pre-Test Left Side View of MDB Positioned Against Side of Test Vehicle



Photo No. 018 - Pre-Test Right Side View of MDB Positioned Against Side of Test Vehicle



Photo No. 019 - Pre-Test Close-Up View of Impact Point Target



Photo No. 020 - Post-Test Close-Up View of Impact Point Target



Photo No. 021 - Pre-Test Left Front Door Latch Close-Up



Photo No. 022 - Post-Test Left Front Door Latch Close-Up



Photo No. 023 - Pre-Test Left Rear Door Latch Close-Up



Photo No. 024 - Post-Test Left Rear Door Latch Close-Up



Photo No. 025 - Pre-Test Front Close-Up View of Driver Dummy



Photo No. 026 - Post-Test Front Close-Up View of Driver Dummy



Photo No. 027 - Pre-Test Left Side View of Driver Dummy Showing Belt and Chalking



Photo No. 028 - Pre-Test Left Side View of Driver Dummy Shoulder and Door Top View



Photo No. 029 - Post-Test Left Side View of Driver Dummy Shoulder and Door Top View



Photo No. 030 - Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning



Photo No. 031 - Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint



Photo No. 032 - Pre-Test Frontal View of Driver Seat Pan Prior to Dummy Positioning



Photo No. 033 - Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan



Photo No. 034 - Pre-Test Placement of Driver Dummy's Feet



Photo No. 035 - Pre-Test View of Belt Anchorage for Driver Dummy



Photo No. 036 - Pre-Test Left Side View of Steering Wheel



Photo No. 037 - Pre-Test View of Disengaged Parking Brake



Photo No. 038 - Pre-Test View of Parking Brake



Photo No. 039 - Pre-Test Close-Up Left Side View of Driver Seat Track



Photo No. 040 - Pre-Test Close-Up Left Side View of Driver Seat Back



Photo No. 041 - Pre-Test Close-Up View of Driver Seat Back or Head Restraint



Photo No. 042 - Pre-Test Driver Dummy and Door Clearance View



Photo No. 043 - Post-Test Driver Dummy and Door Clearance View



Photo No. 044 - Pre-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment



Photo No. 045 - Post-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment



Photo No. 046 - Pre-Test Driver Inner Door Panel View



Photo No. 047 - Post-Test Driver Inner Door Panel View



Photo No. 048 - Post-Test Driver Dummy Close-Up Head Contact with Vehicle Interior View



Photo No. 049 - Post-Test Driver Dummy Close-Up Head Contact with Side Airbag View



Photo No. 050 - Post-Test Driver Dummy Close-Up Torso Contact with Vehicle Interior View



Photo No. 051 - Post-Test Driver Dummy Close-Up Torso Contact with Side Airbag View



Photo No. 052 - Post-Test Driver Dummy Close-Up Pelvis Contact with Vehicle Interior View



Photo No. 053 - Post-Test Driver Dummy Close-Up Pelvis Contact with Side Airbag View



Photo No. 054 - Post-Test Driver Dummy Close-Up Knee Contact View



Photo No. 055 - Pre-Test Left Side View of Rear Passenger Dummy Showing Belt and Chalking



Photo No. 056 - Pre-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View



Photo No. 057 - Post-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View



Photo No. 058 - Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning



Photo No. 059 - Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint



Photo No. 060 - Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning



Photo No. 061 - Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan



Photo No. 062 - Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket



Photo No. 063 - Pre-Test View of Rear Passenger Dummy's Head Showing Dummy's Head is Level



Photo No. 064 - Pre-Test Placement of Rear Passenger Dummy's Feet



Photo No. 065 - Pre-Test View of Belt Anchorage for Rear Passenger Dummy



Photo No. 066 - Pre-Test Close-Up Left Side View of Rear Passenger Seat Track



Photo No. 067 - Pre-Test Close-Up Left Side View of Rear Passenger Seat Back



Photo No. 068 - Pre-Test Close-Up View of Rear Passenger Seat Back or Head Restraint



Photo No. 069 - Pre-Test Rear Passenger Dummy and Door Clearance View



Photo No. 070 - Post-Test Rear Passenger Dummy and Door Clearance View



Photo No. 071 - Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



Photo No. 072 - Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



Photo No. 073 - Pre-Test Rear Passenger Inner Door Panel View



Photo No. 074 - Post-Test Rear Passenger Inner Door Panel View

# PHOTOGRAPH NOT APPLICABLE

Photo No. 075 - Post-Test Rear Passenger Dummy Close-Up Head Contact with Vehicle Interior View



Photo No. 076 - Post-Test Rear Passenger Dummy Close-Up Head Contact with Side Airbag View



Photo No. 077 - Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Interior View

**PHOTOGRAPH NOT APPLICABLE**

Photo No. 078 - Post-Test Rear Passenger Dummy Close-Up Torso Contact with Side Airbag View



Photo No. 079 - Post-Test Rear Passenger Dummy Close-Up Pelvis Contact with Vehicle Interior View

**PHOTOGRAPH NOT APPLICABLE**

Photo No. 080 - Post-Test Rear Passenger Dummy Close-Up Pelvis Contact with Side Airbag View

**PHOTOGRAPH NOT APPLICABLE**

Photo No. 081 - Post-Test Rear Passenger Dummy Close-Up Knee Contact View

**PHOTOGRAPH NOT APPLICABLE**

Photo No. 082 - Pre-Test View of Fuel Filler Cap or Fuel Filler Neck

# PHOTOGRAPH NOT APPLICABLE

Photo No. 083 - Post-Test View of Fuel Filler Cap or Fuel Filler Neck



Photo No. 084 - Pre-Test Front View of MDB Impactor Face

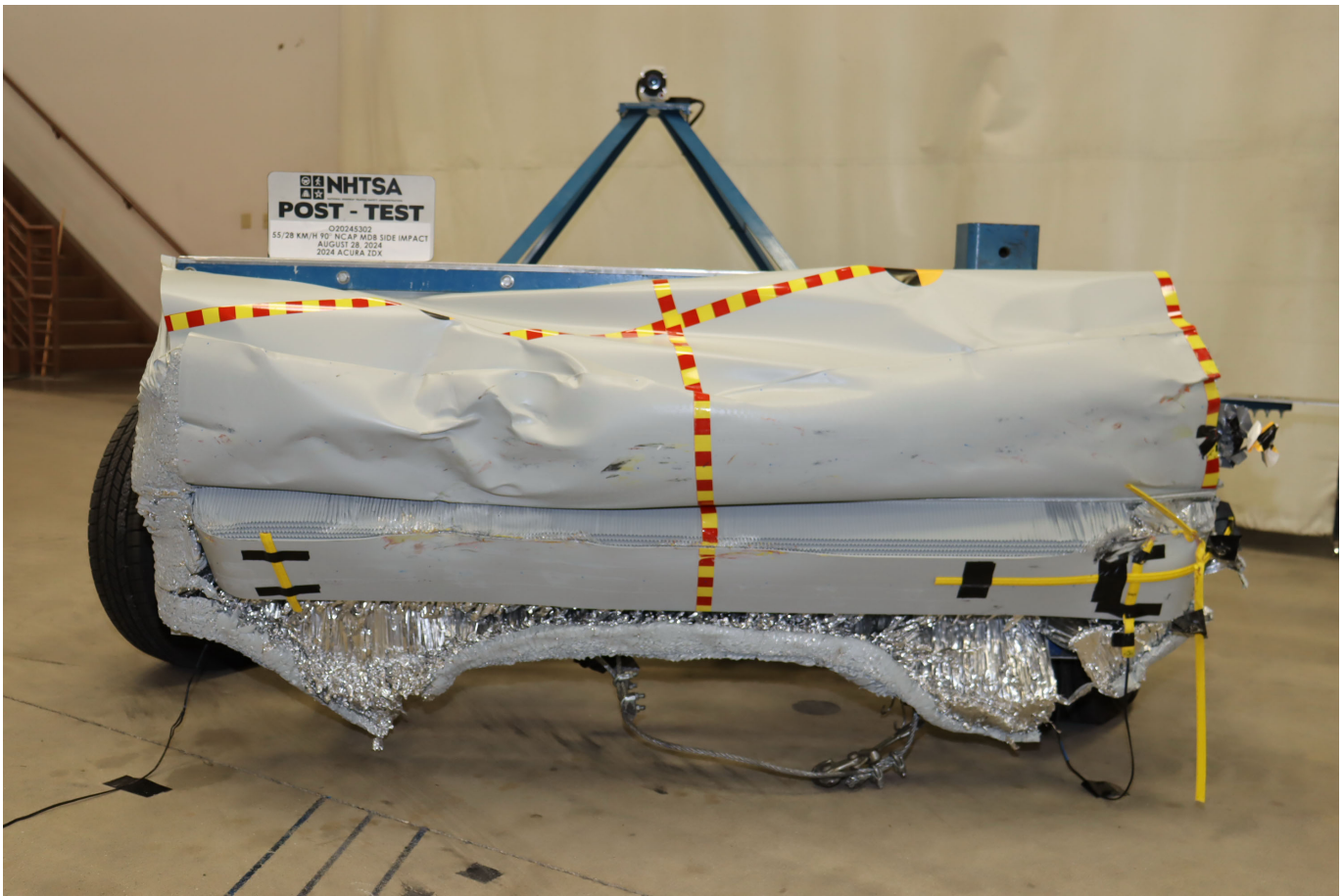


Photo No. 085 - Post-Test Front View of MDB Impactor Face



Photo No. 086 - Pre-Test Top View of MDB Impactor Face

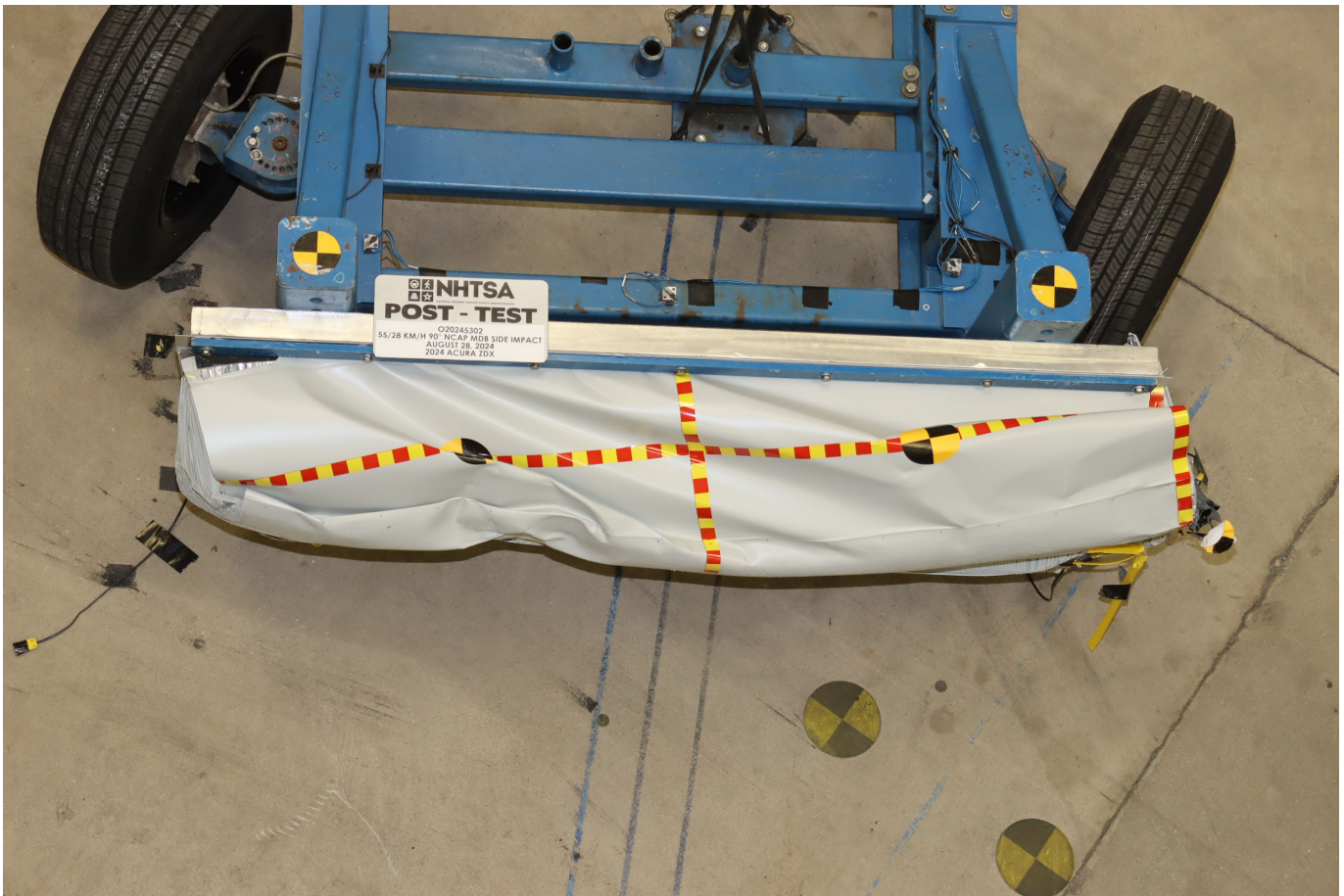


Photo No. 087 - Post-Test Top View of MDB Impactor Face



Photo No. 088 - Pre-Test Left Side View of MDB Impactor Face



Photo No. 089 - Post-Test Left Side View of MDB Impactor Face



Photo No. 090 - Pre-Test Right Side View of MDB Impactor Face



Photo No. 091 - Post-Test Right Side View of MDB Impactor Face



Photo No. 092 - Close-Up View of Vehicle's Certification Label



Photo No. 093 - Close-Up View of Vehicle's Tire Information Placard or Label

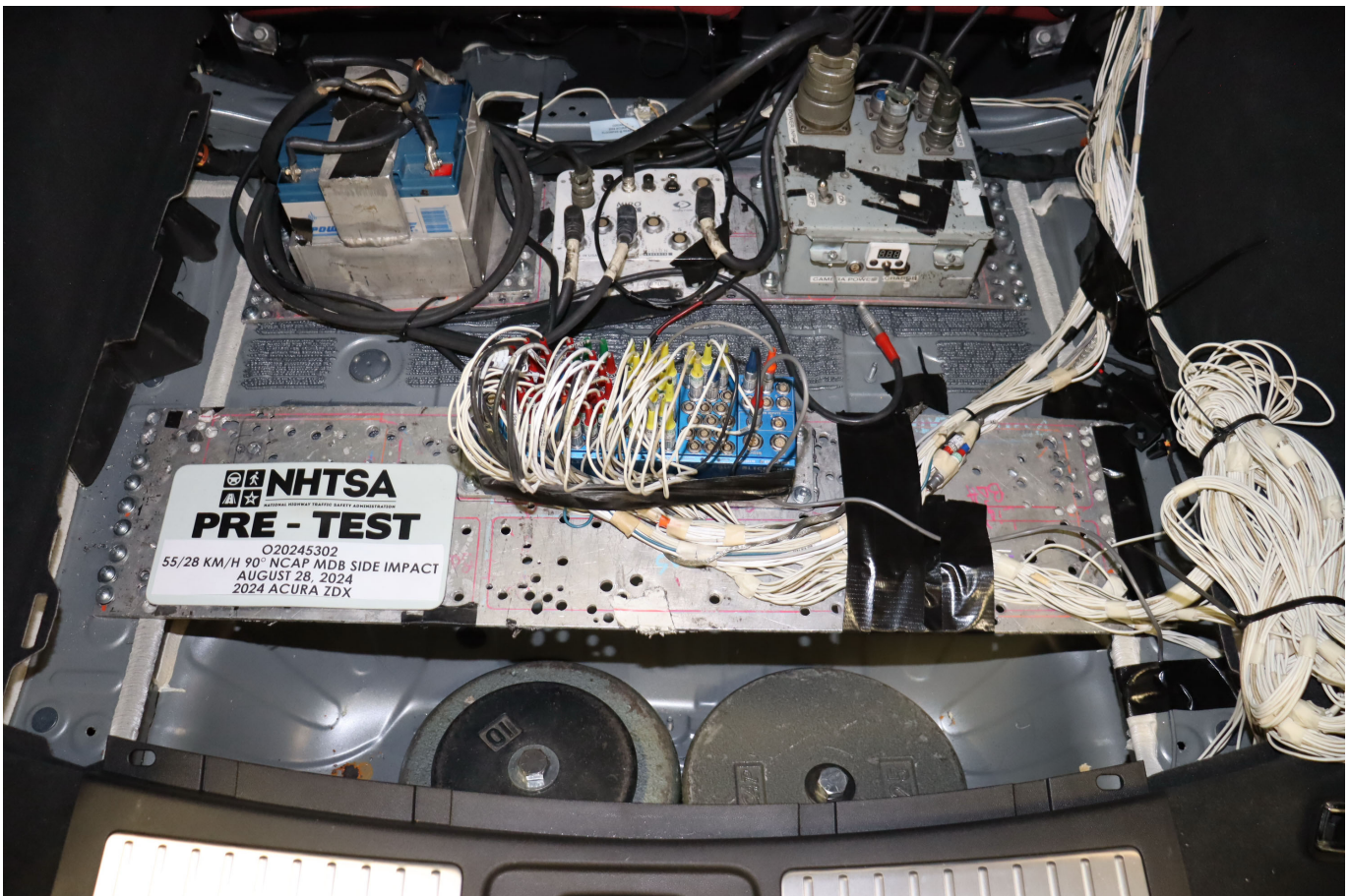


Photo No. 094 - Pre-Test Ballast View



Photo No. 095 - Post-Test Primary and Redundant Speed Trap Read-Out

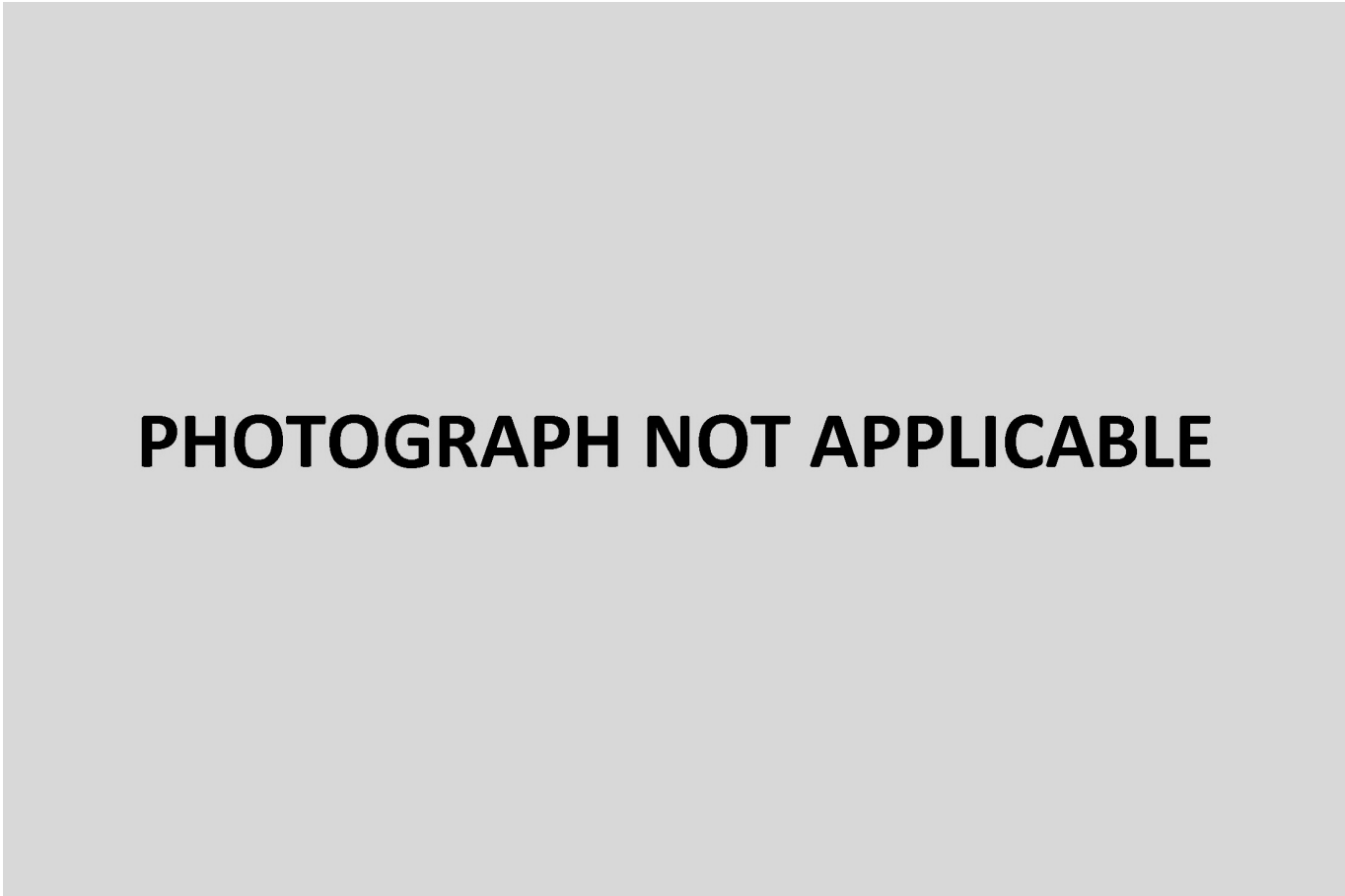


Photo No. 096 - FMVSS Photo No. 301 Static Rollover 0 Degrees

**PHOTOGRAPH NOT APPLICABLE**

Photo No. 097 - FMVSS Photo No. 301 Static Rollover 90 Degrees

**PHOTOGRAPH NOT APPLICABLE**

Photo No. 098 - FMVSS Photo No. 301 Static Rollover 180 Degrees

**PHOTOGRAPH NOT APPLICABLE**

Photo No. 099 - FMVSS Photo No. 301 Static Rollover 270 Degrees

**PHOTOGRAPH NOT APPLICABLE**

Photo No. 100 - FMVSS Photo No. 301 Static Rollover 360 Degrees



Photo No. 101 - Impact Event

**2024 ZDX A-SPEC**  
EXT: MERCURY SILVER M MOTOR NUMBER: X0D-000000  
INT: RED

**EPA DOT Fuel Economy and Environment** Electric Vehicle

**Fuel Economy**

**90** MPGe  
combined city/hwy

Driving Range: 313 miles  
When fully charged, vehicle can travel about:

Charge Time: 11 hours (240V)

**You Save \$5,500**  
in fuel costs over 5 years compared to the average new vehicle.

**Annual fuel cost \$850**

**Fuel Economy & Greenhouse Gas Rating** (tailpipe only) **Smog Rating** (tailpipe only)

This vehicle emits 0 grams CO<sub>2</sub> per mile. The best emits 0 grams per mile (tailpipe only). Does not include emissions from generating electricity. Learn more at [fuelconomy.gov](http://fuelconomy.gov)

**GOVERNMENT 5-STAR SAFETY RATING**

**Overall Vehicle Score Not Rated**  
Based on the combined ratings of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight.

|                      |            |           |
|----------------------|------------|-----------|
| <b>Frontal Crash</b> | Driver     | Not Rated |
|                      | Passenger  | Not Rated |
| <b>Side Crash</b>    | Front seat | Not Rated |
|                      | Rear seat  | Not Rated |
| <b>Rollover</b>      |            | Not Rated |

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

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**STANDARD EQUIPMENT AT NO EXTRA COST**

- \* TECHNICAL FEATURES \***
  - Single Electric Motor Rear Wheel Drive
  - 102 kWh Battery Rated Energy
  - 190 kW DC Fast Charging Capability (requires compatible charging station)
  - 11.5 kW AC Onboard Charger
  - Regenerative Braking & One Pedal Driving
  - Drive Mode Selector (Normal, Sport, Snow, Individual)
  - Multi-Link Suspension
- \* SAFETY & ASSIST FEATURES \***
  - Driver's and Front Passenger's Airbags
  - Side Curtain Airbags
  - Driver's and Front Passenger's Side Airbags
  - Driver's and Front Passenger's Knee Airbags
  - Anti-Lock Braking System (ABS)
  - Electronic Brake Distribution (EBD)
  - Electronic Stability Control (ESC)
  - Tire Pressure Monitoring System
  - LED Day Time Running Lights
  - LATCH System for Child Seats
  - Automatic Emergency Braking
  - Forward Collision Alert
  - Front Pedestrian Braking
  - Adaptive Cruise Control (ACC)
  - Lane Keep Assist
  - Lane Change Alert
  - Side Blind Zone Alert
  - Blind Zone Steering Assist
  - Rear Cross Traffic Alert
  - Rear Cross Traffic Braking
  - Reverse Automatic Braking
- \* INTERIOR FEATURES \***
  - 11.3-Inch Color Touchscreen Display
  - 11-inch Digital Instrument Cluster
  - Google built-in with 36 Months of Connectivity to support Services
  - OnStar Services Equipped
  - 36 Months Remote Services;
  - 36 Months Safety & Security;
  - 96 Months EV & Connected Access;
  - See [onstar.com/zdx](http://onstar.com/zdx)
  - Universal Home Remote System
  - Bang & Olufsen Premium Audio System with 18 Speakers
  - SiriusXM Satellite Radio

Manufacturer's Suggested Retail Price **\$64,500.00**

MSRP Includes:
 

- 4YR/50K Mile Ltd Vehicle Warranty
- Choice of Complimentary Charging Pkg. See website and dealer for details.
- SiriusXM: 3 Months Trial Subscription Included (excl. AK & HI)

Destination and Handling 1,350.00

**TOTAL VEHICLE PRICE**  
(includes Pre-Delivery Service) **\$65,850.00**

License and title fees, state and local taxes and dealer options and accessories are not included in the manufacturer's suggested retail price.

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VANDERGRIF ACURA  
1100 W. I-20  
ARLINGTON, TX 76017

PORT OF ENTRY: SPRINGHILL  
DELIVERY POINT: HOUSTON  
SHIP#:   
ROW/SPACE: 305-006  
TRANS.METHOD: L32 NASHVILLE SOUTH  
J10 ALLIANCE

ORIG. DLR: 251470  
REF. NO: 41399  
HN CODE: AL-2462  
EMISSION: 50 STATE  
CONTROL NO: 563977  
DEALER: 251470

**FOR THIS VEHICLE**  
Final Assembly Point:  
**SPRING HILL, TENNESSEE USA**  
Country of Origin: Motor:  
**MEXICO**  
Transmission:  
**CHINA**

Photo No. 102 - Monroney Label

**Head Restraints**

**Front Seats**

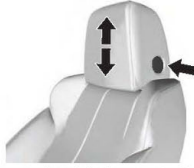
**Warning**

With head restraints that are not installed and adjusted properly, there is a greater chance that occupants will suffer a neck/spinal injury in a crash. Do not drive until the head restraints for all occupants are installed and adjusted properly.

The vehicle's front seats have adjustable head restraints in the outboard seating positions.



Adjust the head restraint so that the top of the restraint is at the same height as the top of the occupant's head. This position reduces the chance of a neck injury in a crash. The height of the head restraint can be adjusted.



To raise or lower the head restraint, press the button located on the side of the head restraint, and pull up or push the head restraint down, and release the button. Pull and push on the head restraint after the button is released to make sure that it is locked in place.

The front seat outboard head restraints are not removable.

**Rear Seats**

**Adjusting the Rear Head Restraint**

The vehicle's rear seats have adjustable head restraints in all the seating positions.

The height of the head restraint can be adjusted. Pull the head restraint up to raise it. Try to move the head restraint to make sure that it is locked in place.

When you use the head restraint in the rear center seating position, pull up the head restraint to its highest position. Do not use it in any lower position.



To lower the head restraint, press the button, located on the top of the seatback, and push the head restraint down. Try to move the head restraint after the button is released to make sure that it is locked in place.

Always adjust the head restraint so that the top of the restraint is at the same height as the top of the occupant's head.

Rear head restraints are not removable.

If you are installing a child restraint in the rear seat, see "Securing a Child Restraint Designed for the LATCH System" under Lower Anchors and Tethers for Children (LATCH System) 66.

**Front Seats**

**Power Seat Adjustment**

**Warning**

Do not adjust driver seat while the vehicle is moving. Doing so could result in a crash causing death or serious injury. Only adjust driver seat when vehicle is not moving.

You can lose control of the vehicle and be seriously hurt or killed if you try to adjust the driver's seat while the vehicle is moving. Adjust the driver seat only when the vehicle is not moving.

**Warning**

The power seats will work with the vehicle off. Children could operate the power seats and be injured or killed. Never leave children alone in the vehicle.



To adjust the seat:

- Move the seat forward or rearward by sliding the control forward or rearward.
  - Raise or lower the front part of the seat cushion by moving the front of the control up or down.
  - Raise or lower the entire seat by moving the rear of the control up or down.
- To adjust the seatback, see Reclining Seatbacks 35.
- To adjust the lumbar support, see Lumbar Adjustment 35.

Photo No. 103 - Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

**Head Restraints**

**Front Seats**

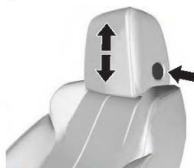
**Warning**

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Rear head restraints are not removable.

If you are installing a child restraint in the rear seat, see "Securing a Child Restraint Designed for the LATCH System" under Lower Anchors and Tethers for Children (LATCH System) 66.

**Front Seats**

**Power Seat Adjustment**

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  - Raise or lower the front part of the seat cushion by moving the front of the control up or down.
  - Raise or lower the entire seat by moving the rear of the control up or down.
- To adjust the seatback, see Reclining Seatbacks 35.
- To adjust the lumbar support, see Lumbar Adjustment 35.

Photo No. 104 - Left Rear Passenger Head Restraint Use and Adjustment Information from Vehicle Owner's Manual



Photo No. 305-01 - Auxiliary Power Module Warning Label

**PHOTOGRAPH NOT APPLICABLE**

Photo No. 305-02 - Power Inverter Warning Label



Photo No. 305-03 - First Responder Warning Label

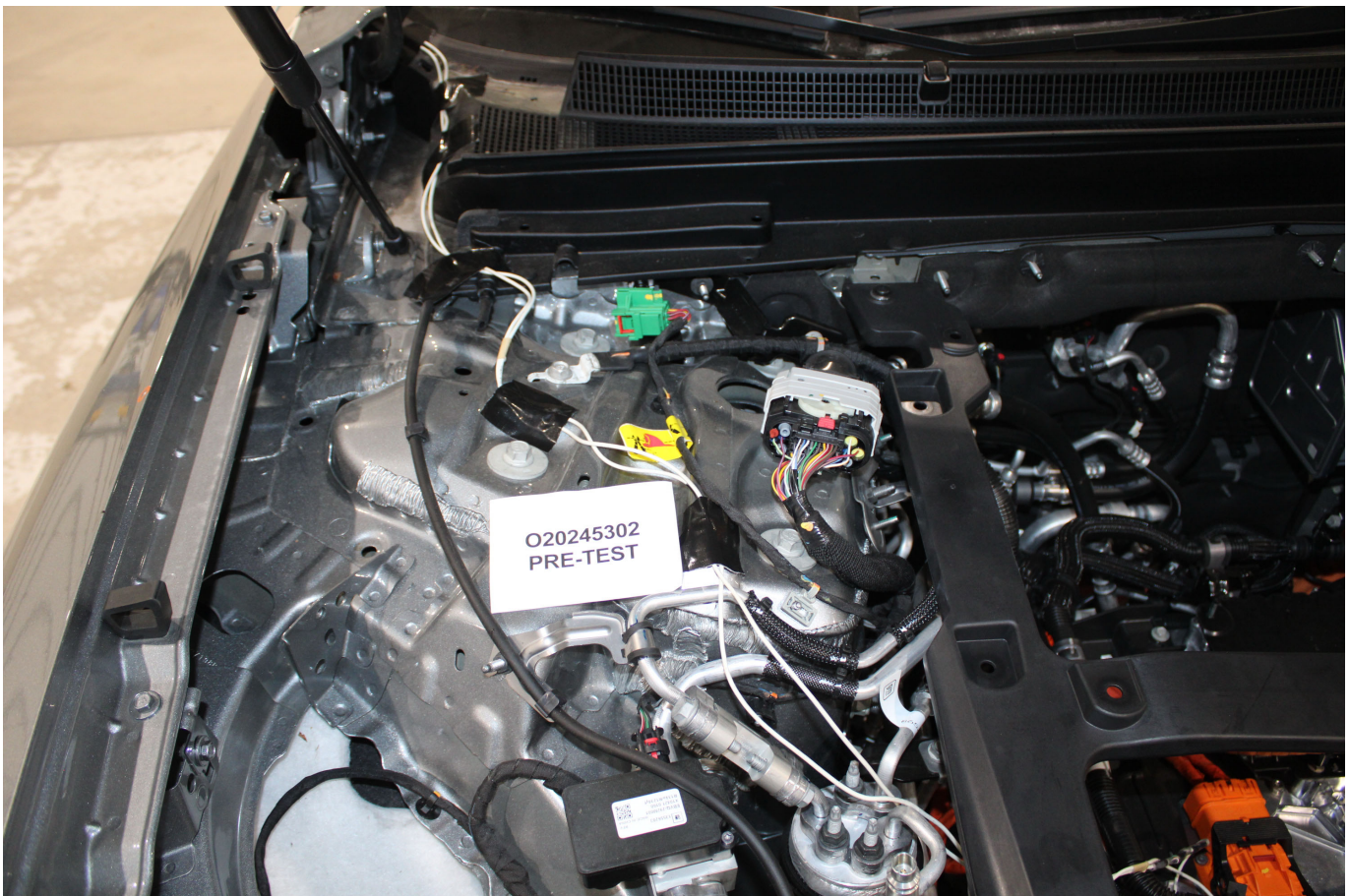


Photo No. 305-04 - First Responder Warning Location

# PHOTOGRAPH NOT APPLICABLE

Photo No. 305-05 - Other Vehicle Label(s) Related to Electrical Propulsion System



Photo No. 305-06 - Manual High Voltage Service Disconnect in Place



Photo No. 305-07 - Manual High Voltage Service Disconnect Removed



Photo No. 305-08 - Manual High Voltage Service Disconnect Removed



Photo No. 305-09 - Pre-Impact View of Propulsion Battery

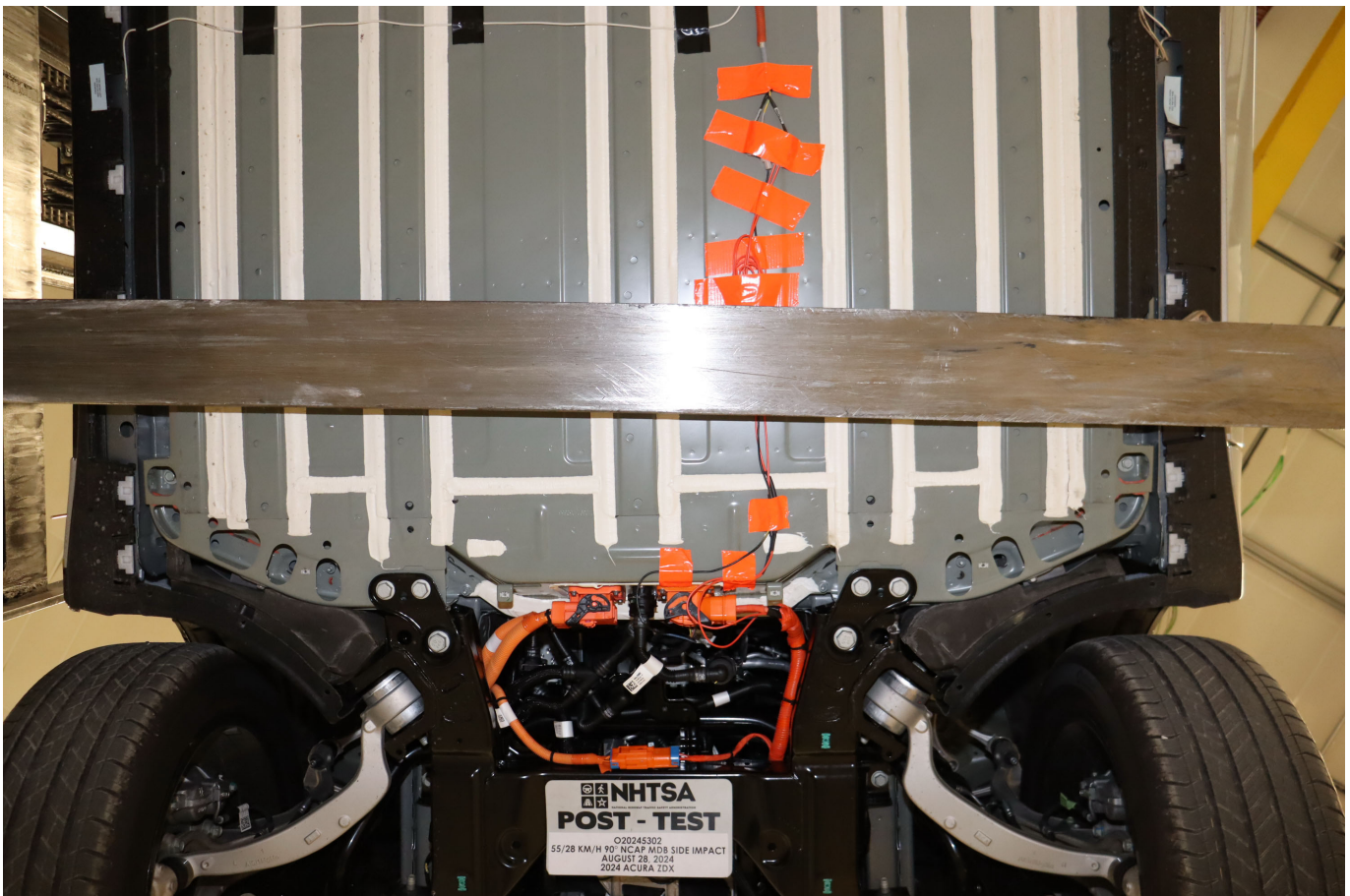


Photo No. 305-10 - Post-Impact Front View of Propulsion Battery

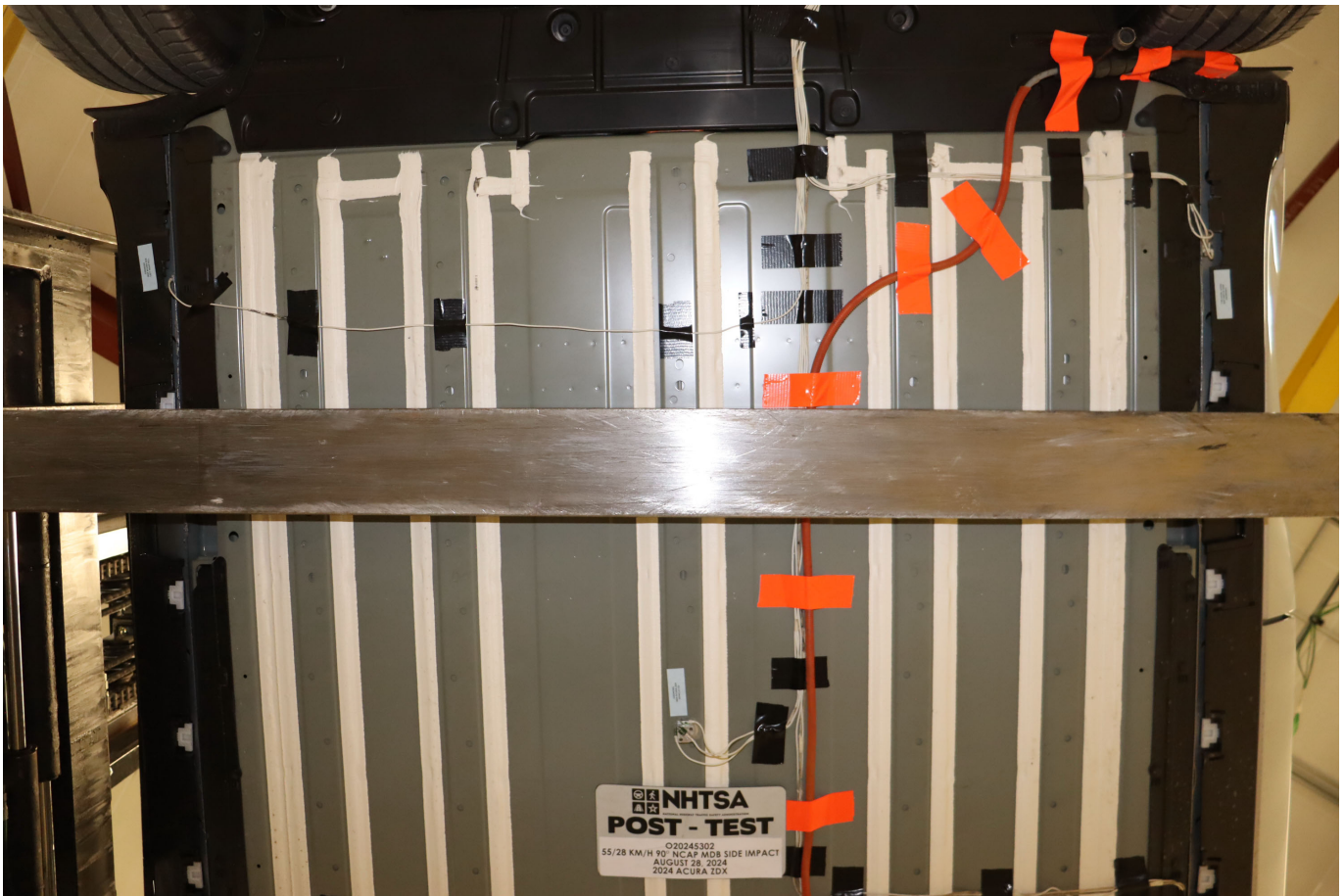


Photo No. 305-11 - Post-Impact Rear View of Propulsion Battery

**PHOTOGRAPH NOT AVAILABLE**

Photo No. 305-12 - Pre-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules

**PHOTOGRAPH NOT AVAILABLE**

Photo No. 305-13 - Post-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules

**PHOTOGRAPH NOT AVAILABLE**

Photo No. 305-14 - Pre-Impact View of Propulsion Battery Module(s)

**PHOTOGRAPH NOT AVAILABLE**

Photo No. 305-15 - Post-Impact View of Propulsion Battery Module(s)

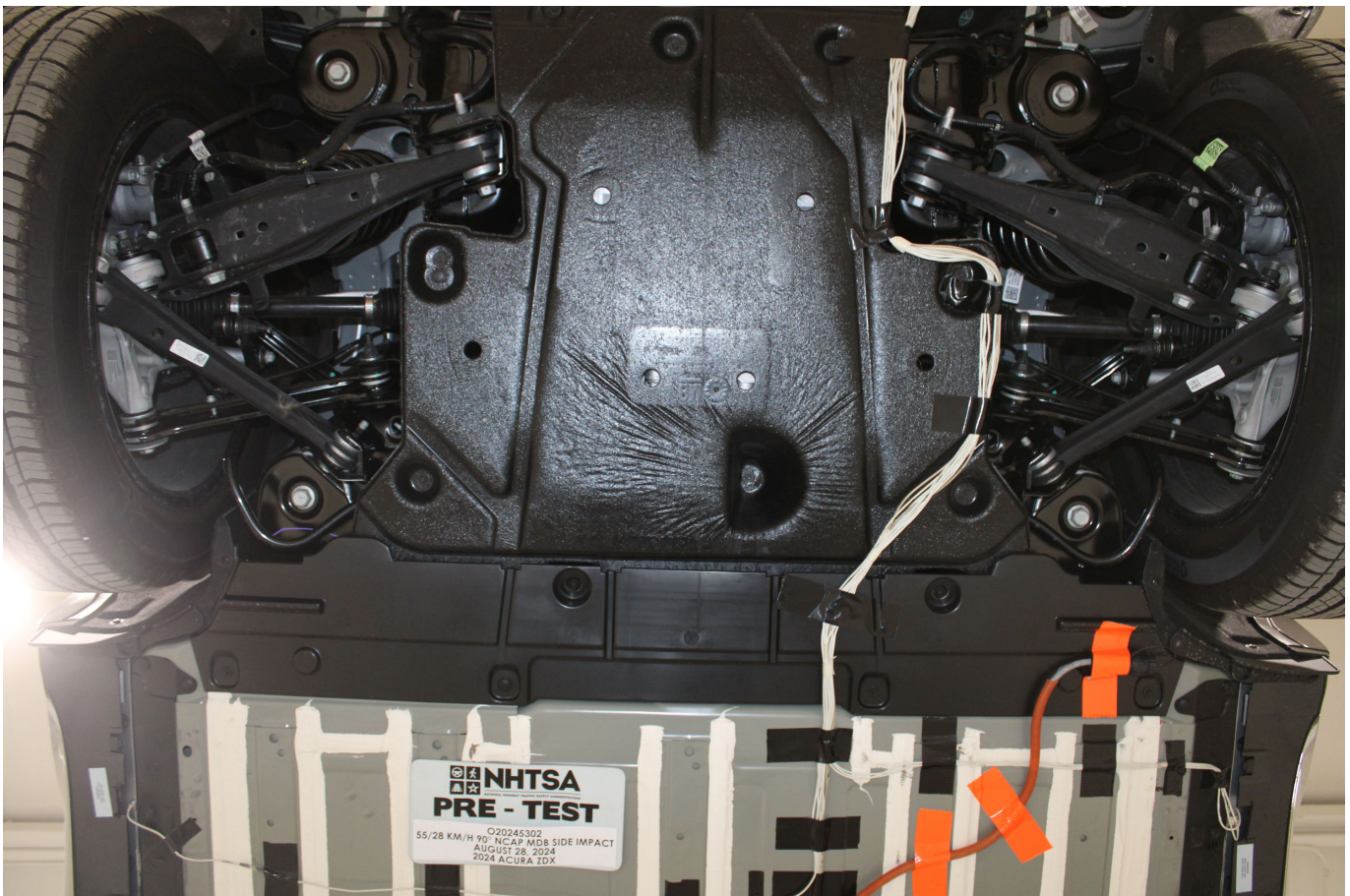


Photo No. 305-16 - Pre-Impact View of Electric Propulsion Drive

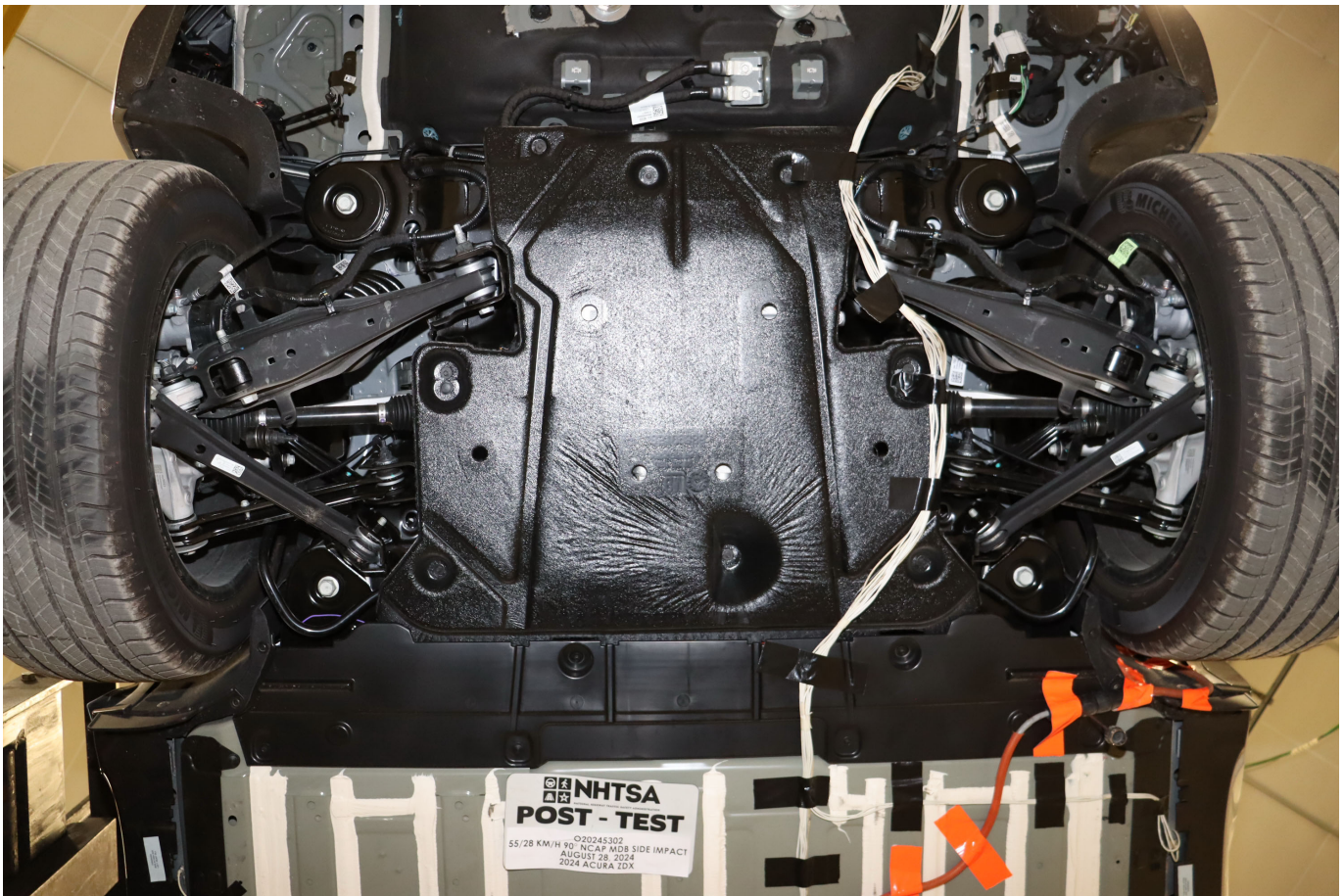


Photo No. 305-17 - Post-Impact View of Electric Propulsion Drive



Photo No. 305-18 - Pre-Impact View of High Voltage Interconnect(s)

**PHOTOGRAPH NOT APPLICABLE**

Photo No. 305-19 - Pre-Impact View Propulsion Battery Venting System(s)

**PHOTOGRAPH NOT APPLICABLE**

Photo No. 305-20 - Pre-Impact View of Other Visible Electric Propulsion Components



Photo No. 305-21 - Pre-Impact View of Ground Lead Attached

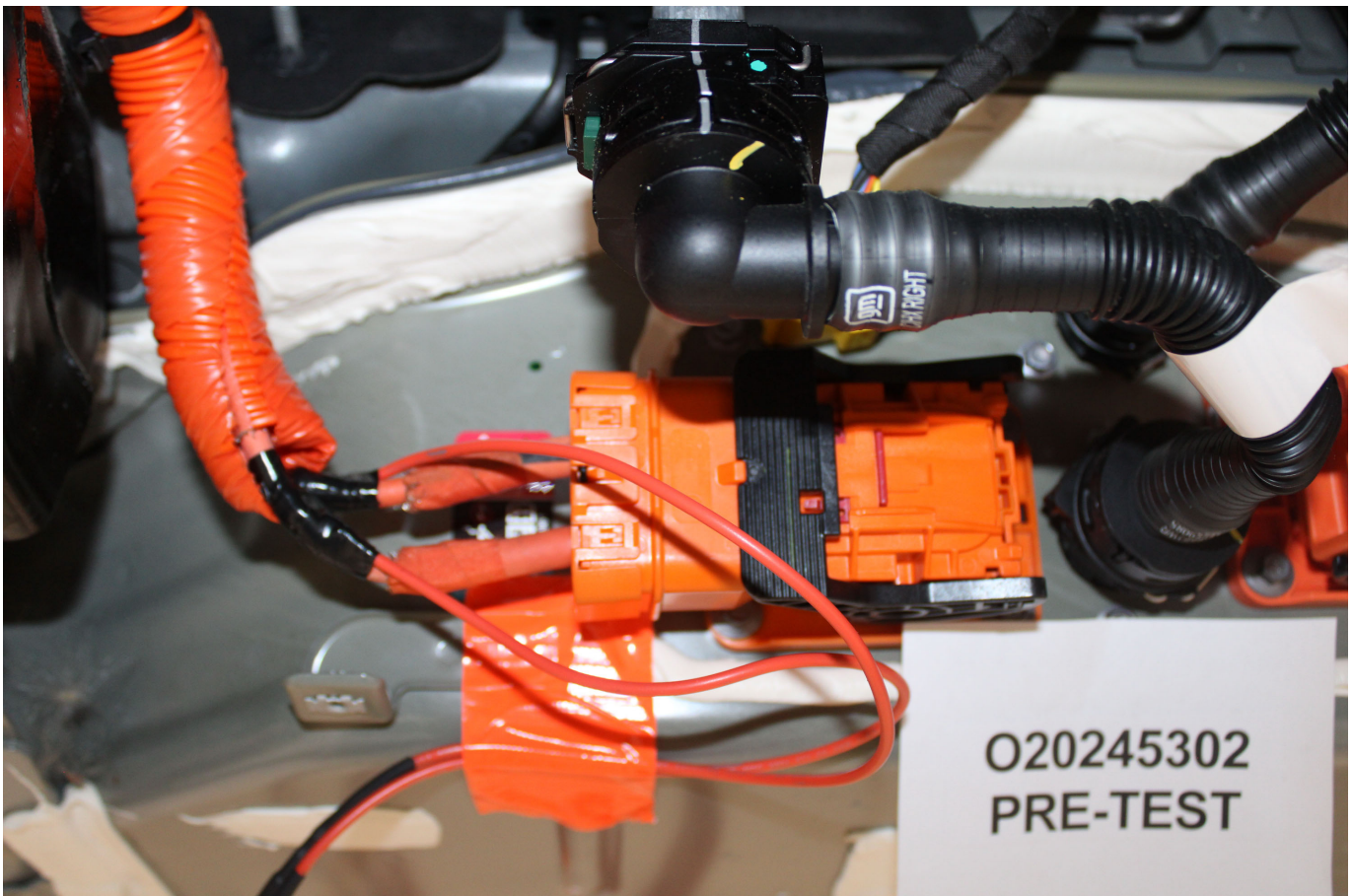


Photo No. 305-22 - Pre-Impact View of High Voltage Leads Attached



Photo No. 305-23 - Pre-Impact Close-Up View of High Voltage Leads Attached



Photo No. 305-24 - Pre-Impact View of Installed Test Interface Port



Photo No. 305-25 - Post-Impact View of Installed Test Interface Port



Photo No. 305-26 - Pre-Impact View of Other Test Devices



Photo No. 305-27 - Post-Impact View of Other Test Devices



Photo No. 305-28 - FMVSS No. 305 Static Rollover at 90 Degrees



Photo No. 305-29 - FMVSS No. 305 Static Rollover at 180 Degrees



Photo No. 305-30 - FMVSS No. 305 Static Rollover at 270 Degrees



Photo No. 305-31 - FMVSS No. 305 Static Rollover at 360 Degrees

**PHOTOGRAPH NOT APPLICABLE**

Photo No. 305-32 - Pre-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery

**PHOTOGRAPH NOT APPLICABLE**

Photo No. 305-33 - Post-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery

**PHOTOGRAPH NOT APPLICABLE**

Photo No. 305-34 - Post-Impact Propulsion Battery System Mounting and-or Intrusion Failure(s)

**PHOTOGRAPH NOT APPLICABLE**

Photo No. 305-35 - Post-Impact View of Battery Component Intrusion

**PHOTOGRAPH NOT APPLICABLE**

Photo No. 305-36 - Post-Impact View of Battery Module Movement or Retention Loss

**PHOTOGRAPH NOT APPLICABLE**

Photo No. 305-37 - Post-Impact View of Propulsion Battery Electrolyte Spillage Location

**PHOTOGRAPH NOT APPLICABLE**

Photo No. 305-38 - Post-Test View of Propulsion Battery Electrolyte Spillage Location

**APPENDIX B**  
**DUMMY RESPONSE DATA PLOTS**

**TABLE OF DATA PLOTS**  
**Driver Dummy Instrumentation Plots**

| <b><u>No.</u></b> | <b><u>Description</u></b>                                 | <b><u>Page No.</u></b> |
|-------------------|---|------------------------|
| Figure No. 1.     | Driver Head Acceleration (X) Primary vs. Time             | B-1                    |
| Figure No. 2.     | Driver Head Acceleration (Y) Primary vs. Time             | B-1                    |
| Figure No. 3.     | Driver Head Acceleration (Z) Primary vs. Time             | B-1                    |
| Figure No. 4.     | Driver Head Resultant Acceleration Primary vs. Time       | B-1                    |
| Figure No. 5.     | Driver Upper Thorax Rib Deflection (Y) vs. Time           | B-2                    |
| Figure No. 6.     | Driver Middle Thorax Rib Deflection (Y) vs. Time          | B-2                    |
| Figure No. 7.     | Driver Lower Thorax Rib Deflection (Y) vs. Time           | B-2                    |
| Figure No. 8.     | Driver Thorax Rib Deflection Maximum vs. Time             | B-2                    |
| Figure No. 9.     | Driver Anterior Abdomen Force (Y) vs. Time                | B-3                    |
| Figure No. 10.    | Driver Middle Abdomen Force (Y) vs. Time                  | B-3                    |
| Figure No. 11.    | Driver Posterior Abdomen Force (Y) vs. Time               | B-3                    |
| Figure No. 12.    | Driver Total Abdominal Force (Y) vs. Time                 | B-3                    |
| Figure No. 13.    | Driver Pubic Symphysis Force (Y) vs. Time                 | B-4                    |
| Figure No. 14.    | Passenger Head Acceleration (X) Primary vs. Time          | B-5                    |
| Figure No. 15.    | Passenger Head Acceleration (Y) Primary vs. Time          | B-5                    |
| Figure No. 16.    | Passenger Head Acceleration (Z) Primary vs. Time          | B-5                    |
| Figure No. 17.    | Passenger Head Resultant Acceleration Primary vs. Time    | B-5                    |
| Figure No. 18.    | Passenger Lower Spine T12 Acceleration (X) vs. Time       | B-6                    |
| Figure No. 19.    | Passenger Lower Spine T12 Acceleration (Y) vs. Time       | B-6                    |
| Figure No. 20.    | Passenger Lower Spine T12 Acceleration (Z) vs. Time       | B-6                    |
| Figure No. 21.    | Passenger Lower Spine T12 Resultant Acceleration vs. Time | B-6                    |
| Figure No. 22.    | Passenger Iliac Force on Impact Side (Y) vs. Time         | B-7                    |
| Figure No. 23.    | Passenger Acetabulum Force on Impact Side (Y) vs. Time    | B-7                    |
| Figure No. 24.    | Passenger Total Pelvic Force on Impact Side (Y) vs. Time  | B-7                    |

The following additional data for this test can be obtained from the Research and Development section of the NHTSA website. The website can be found at [www.nhtsa.gov](http://www.nhtsa.gov)

**Additional Driver & Passenger Dummy Instrumentation Data**

Passenger Head Angular Velocity (X)  
Passenger Head Angular Velocity (Y)  
Passenger Head Angular Velocity (Z)  
Driver Lower Spine T12 Acceleration (X)  
Driver Lower Spine T12 Acceleration (Y)  
Driver Lower Spine T12 Acceleration (Z)  
Passenger Upper Thorax Rib Deflection (Y)  
Passenger Middle Thorax Rib Deflection (Y)  
Passenger Lower Thorax Rib Deflection (Y)  
Passenger Upper Abdomen Rib Deflection (Y)  
Passenger Lower Abdomen Rib Deflection (Y)  
Driver Head Acceleration Redundant (X)  
Driver Head Acceleration Redundant (Y)  
Driver Head Acceleration Redundant (Z)  
Passenger Head Acceleration Redundant (X)  
Passenger Head Acceleration Redundant (Y)  
Passenger Head Acceleration Redundant (Z)

### **Vehicle Instrumentation Data**

Vehicle Center of Gravity Acceleration (X)  
Vehicle Center of Gravity Acceleration (Y)  
Vehicle Center of Gravity Acceleration (Z)  
Right Side Sill at Front Seat Acceleration (X)  
Right Side Sill at Front Seat Acceleration (Y)  
Right Side Sill at Front Seat Acceleration (Z)  
Right Side Sill at Rear Seat Acceleration (X)  
Right Side Sill at Rear Seat Acceleration (Y)  
Right Side Sill at Rear Seat Acceleration (Z)  
Left Side Sill at Front Seat Acceleration (Y)  
Left Side Sill at Rear Seat Acceleration (Y)  
Lower A-Post Acceleration (Y)  
Middle A-Post Acceleration (Y)  
Lower B-Post Acceleration (Y)  
Middle B-Post Acceleration (Y)  
Front Seat Track Acceleration (Y)  
Rear Seat Track Acceleration (Y)  
Right Rear Occupant Compartment Acceleration (Y)  
Engine Block (X)  
Engine Block (Y)  
Rear Floorpan Above Axle Acceleration (X)  
Rear Floorpan Above Axle Acceleration (Y)  
Rear Floorpan Above Axle Acceleration (Z)

### **MDB Instrumentation Data**

MDB Center of Gravity Acceleration (X)

MDB Center of Gravity Acceleration (Y)

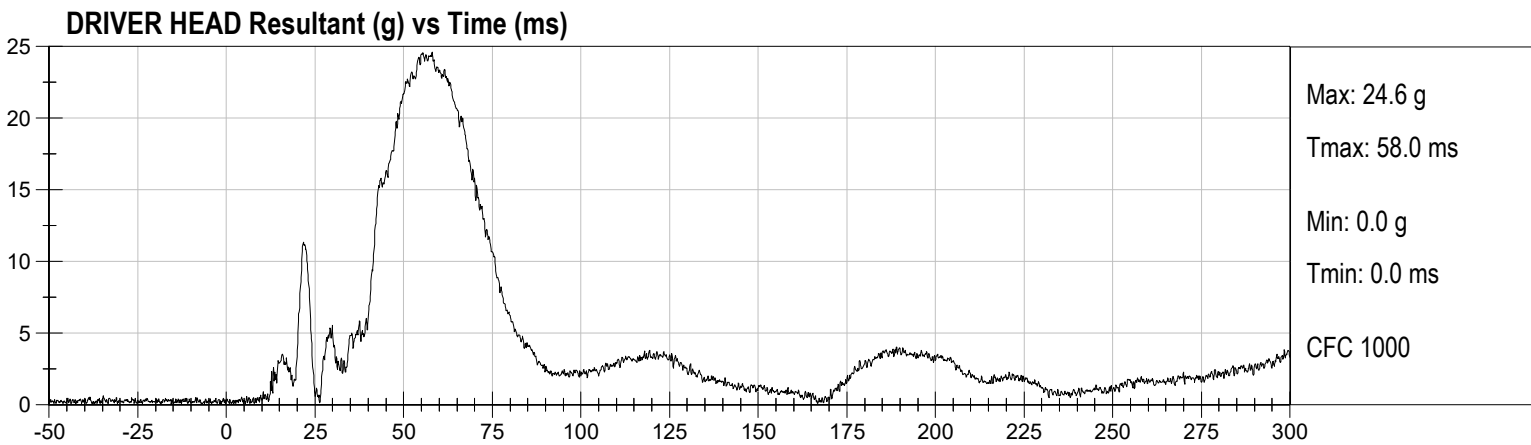
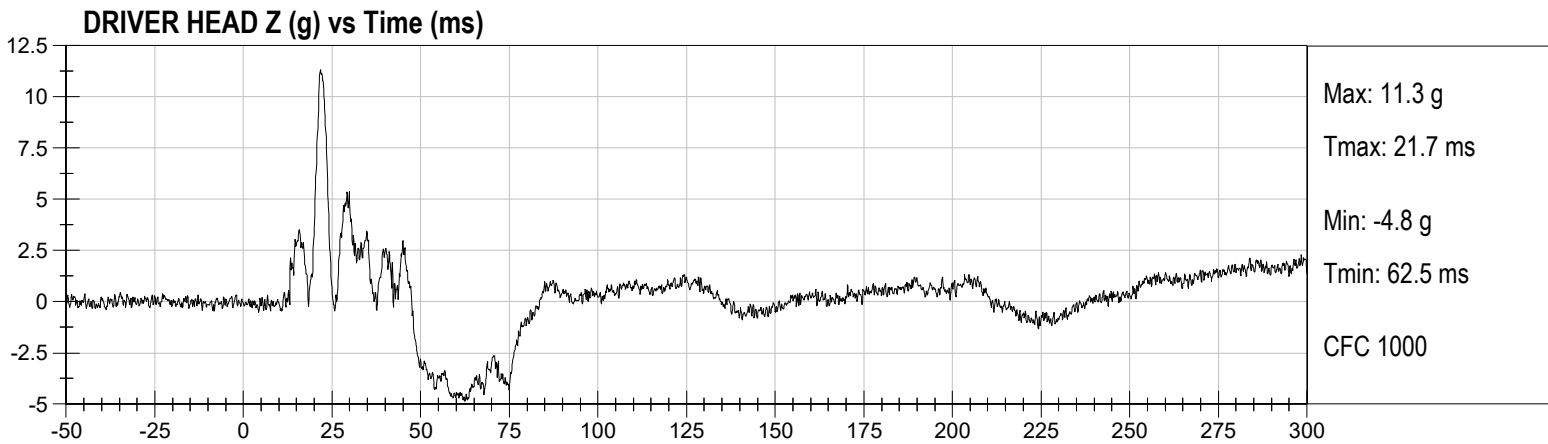
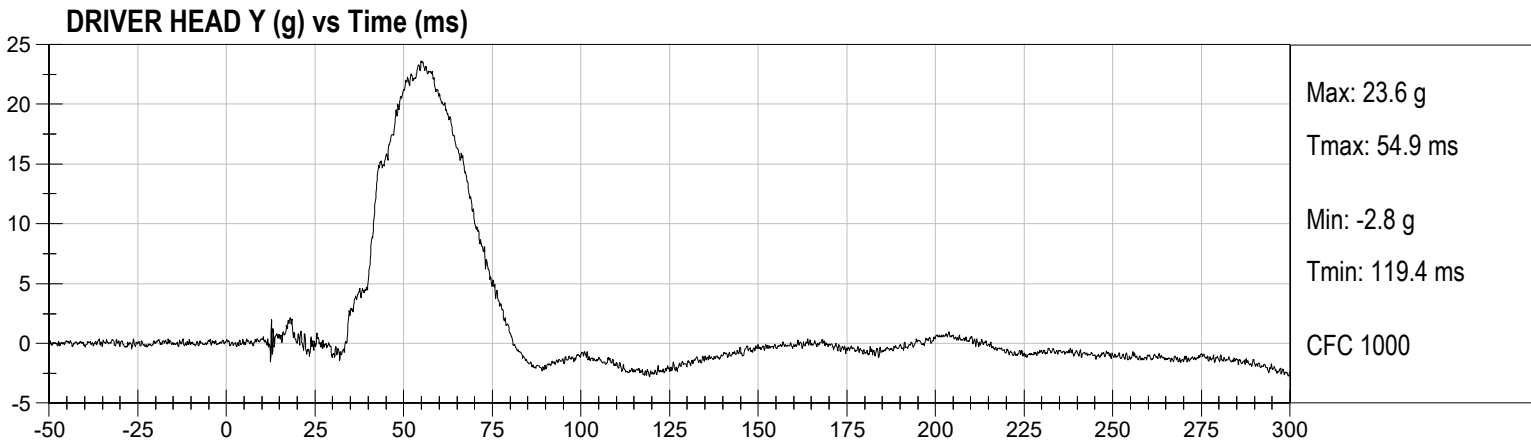
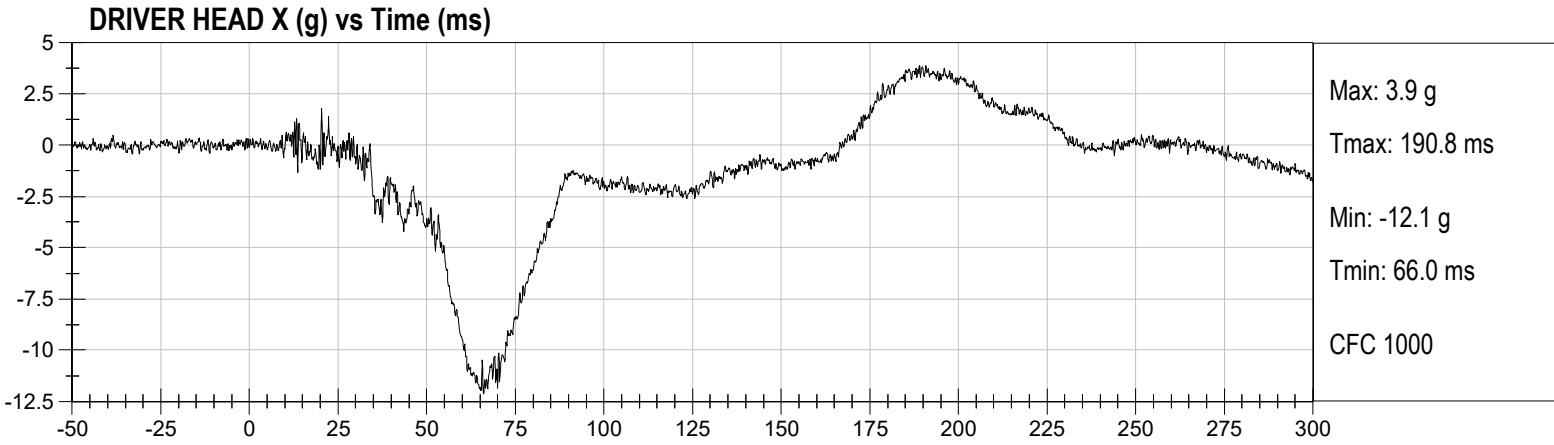
MDB Center of Gravity Acceleration (Z)

MDB Rear Acceleration (X)

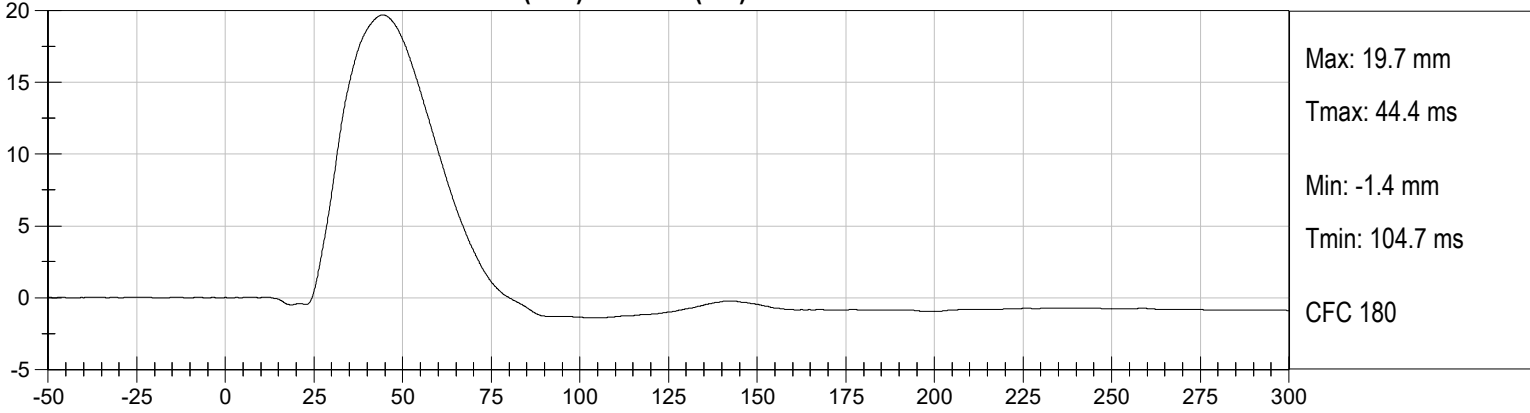
MDB Rear Acceleration (Y)

Left MDB Contact Switch

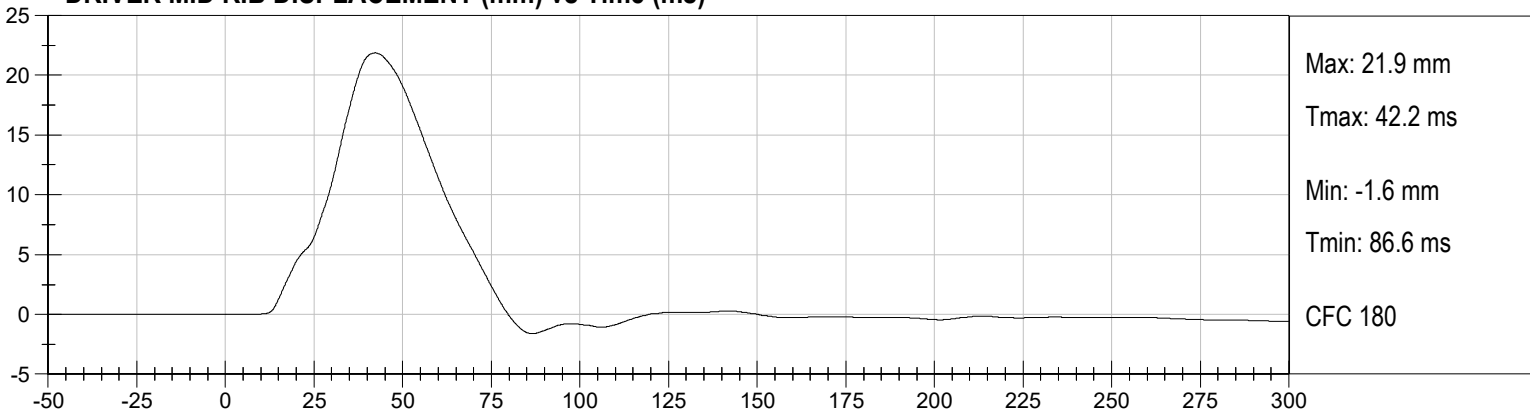
Right MDB Contact Switch



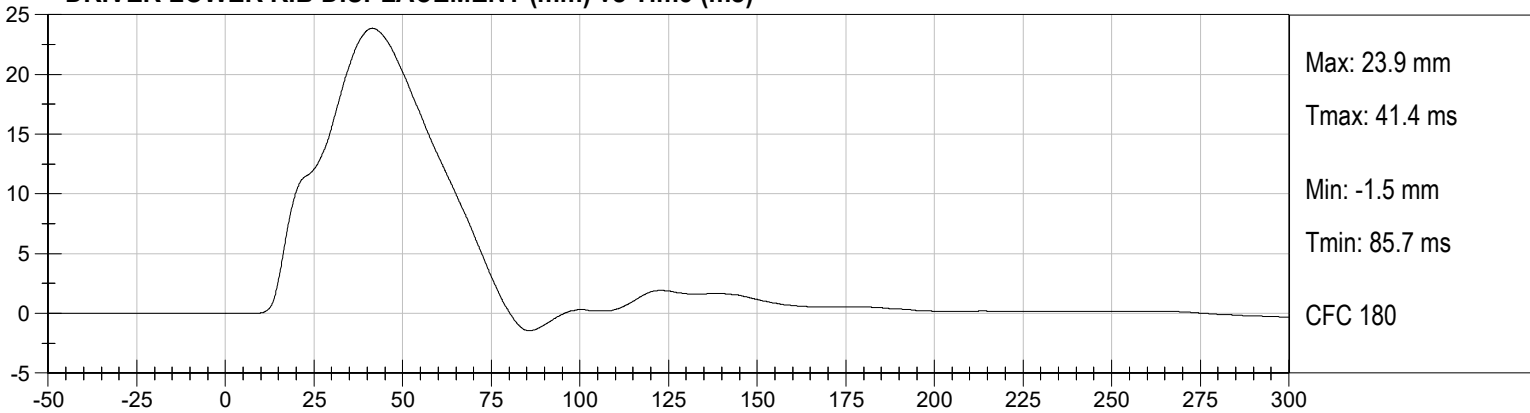
**DRIVER UPPER RIB DISPLACEMENT (mm) vs Time (ms)**



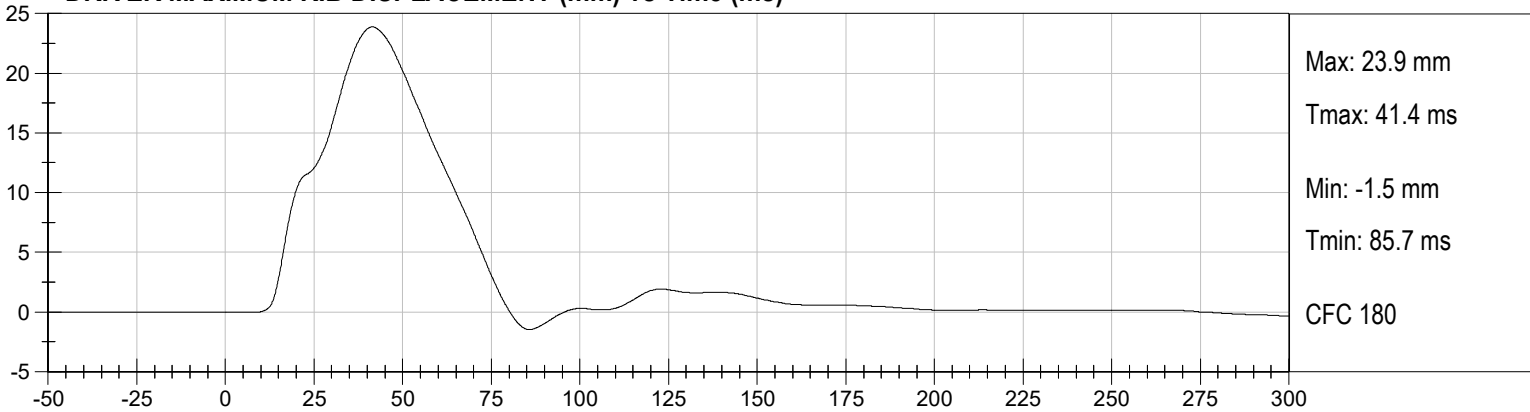
**DRIVER MID RIB DISPLACEMENT (mm) vs Time (ms)**

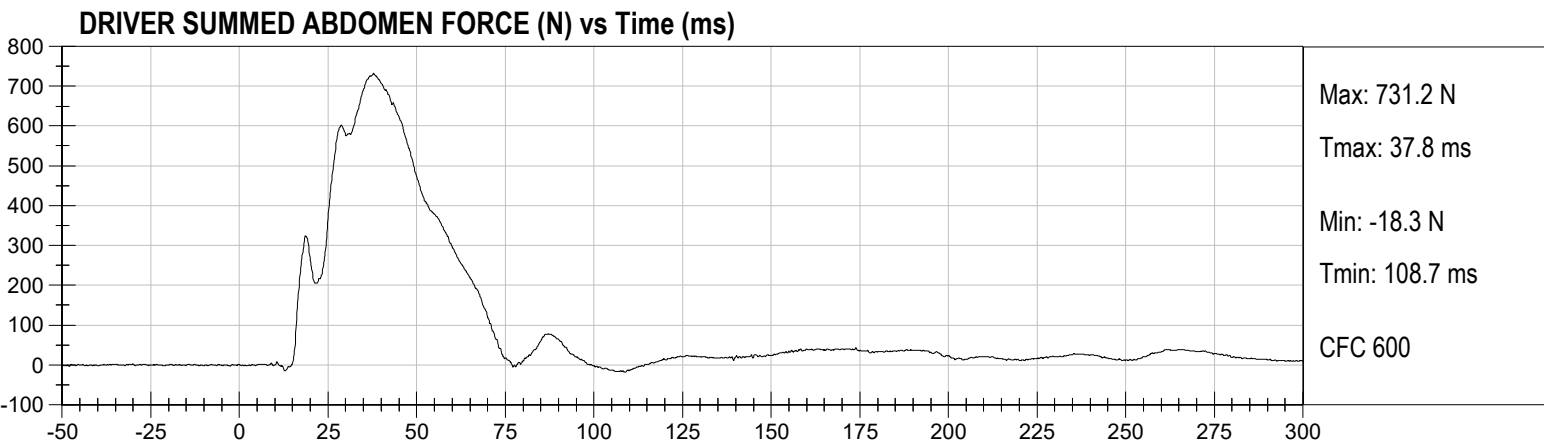
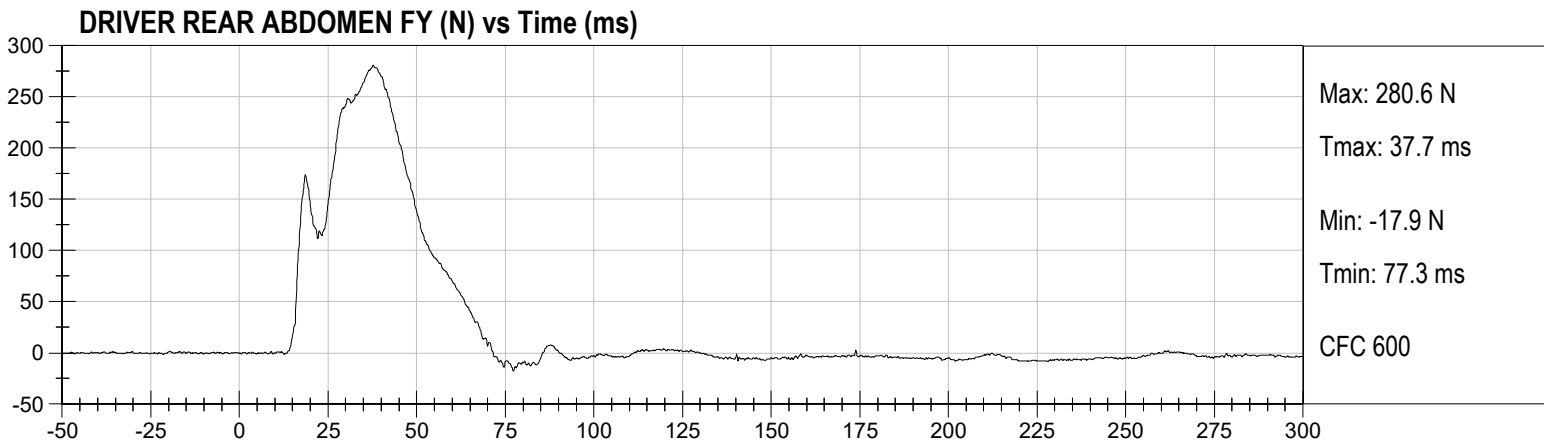
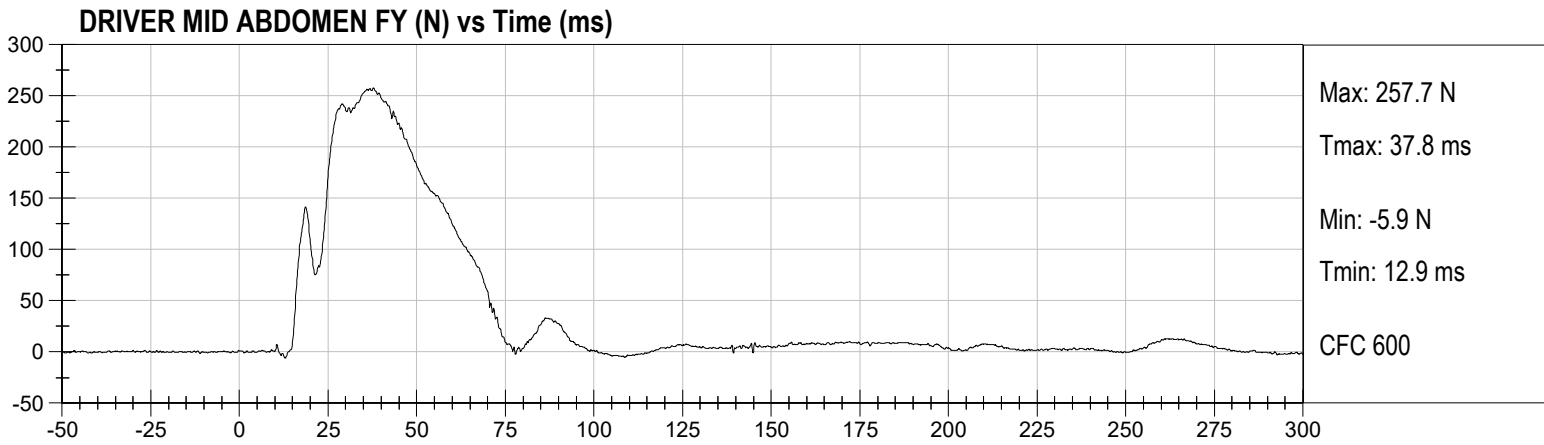
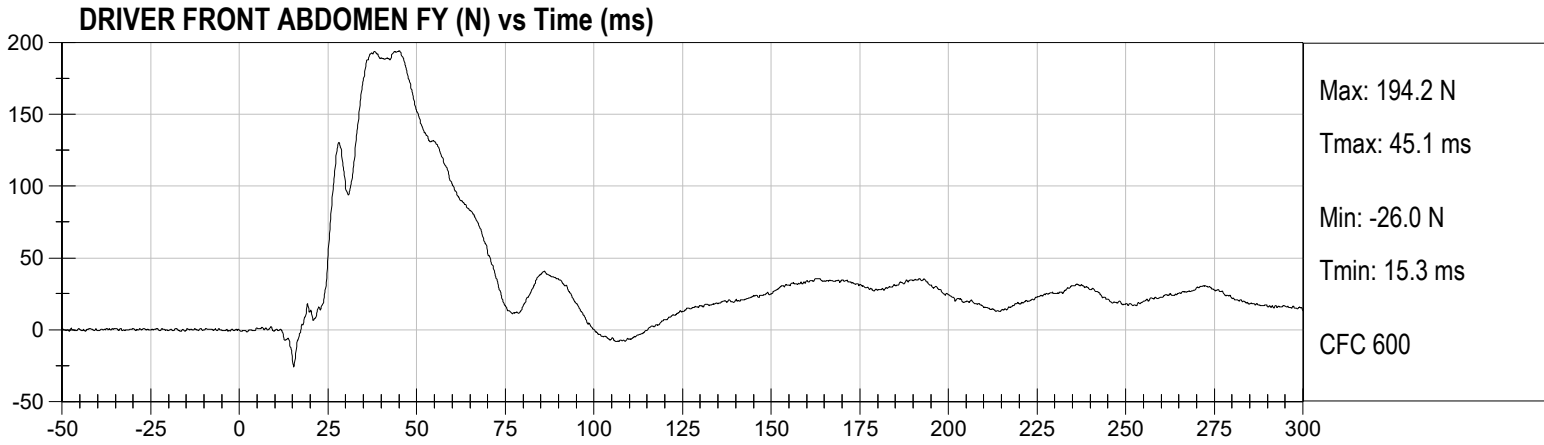


**DRIVER LOWER RIB DISPLACEMENT (mm) vs Time (ms)**

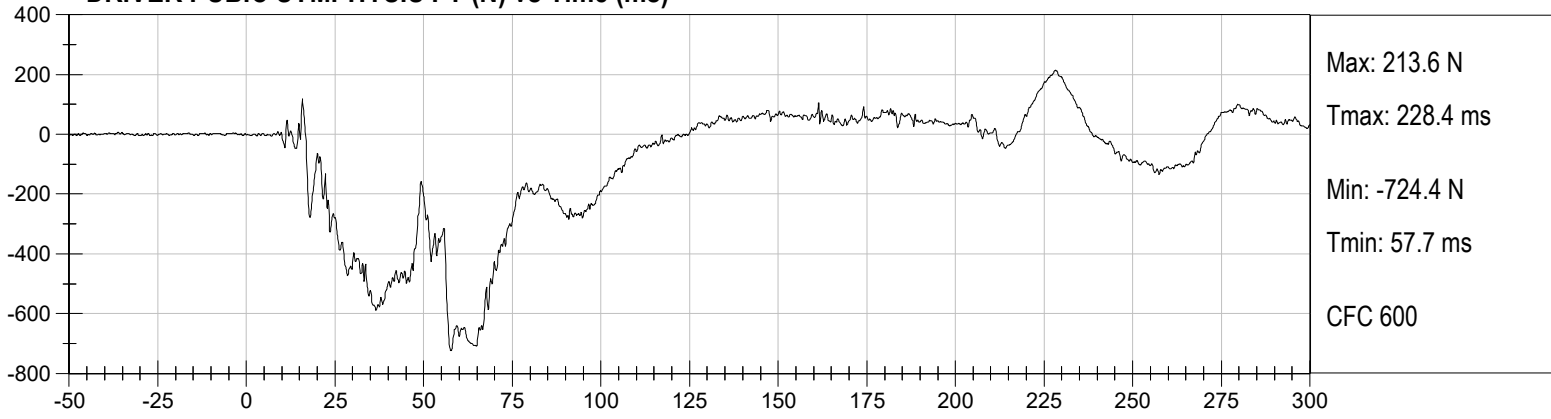


**DRIVER MAXIMUM RIB DISPLACEMENT (mm) vs Time (ms)**

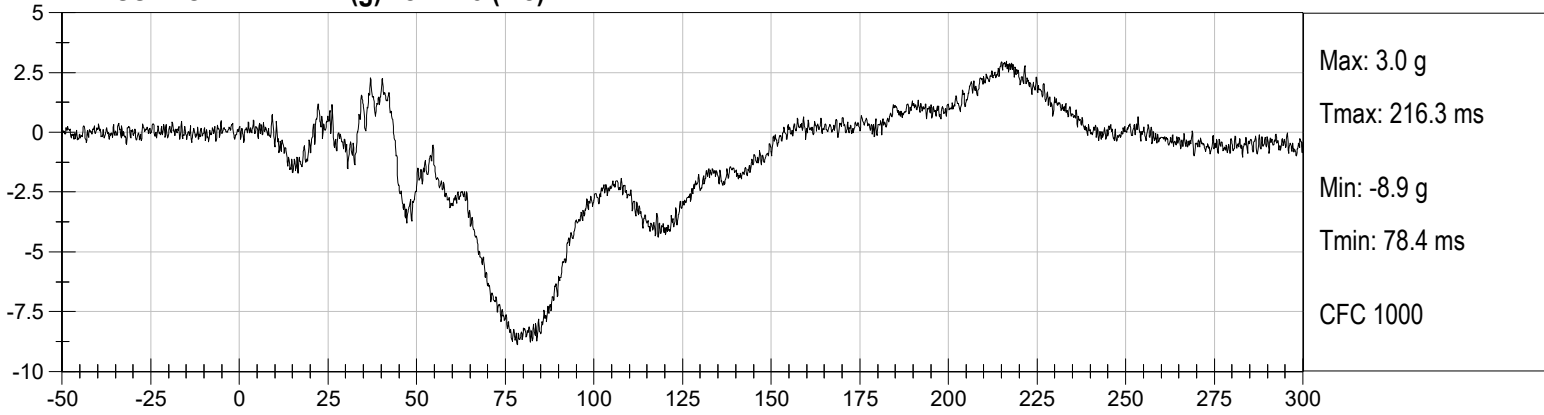




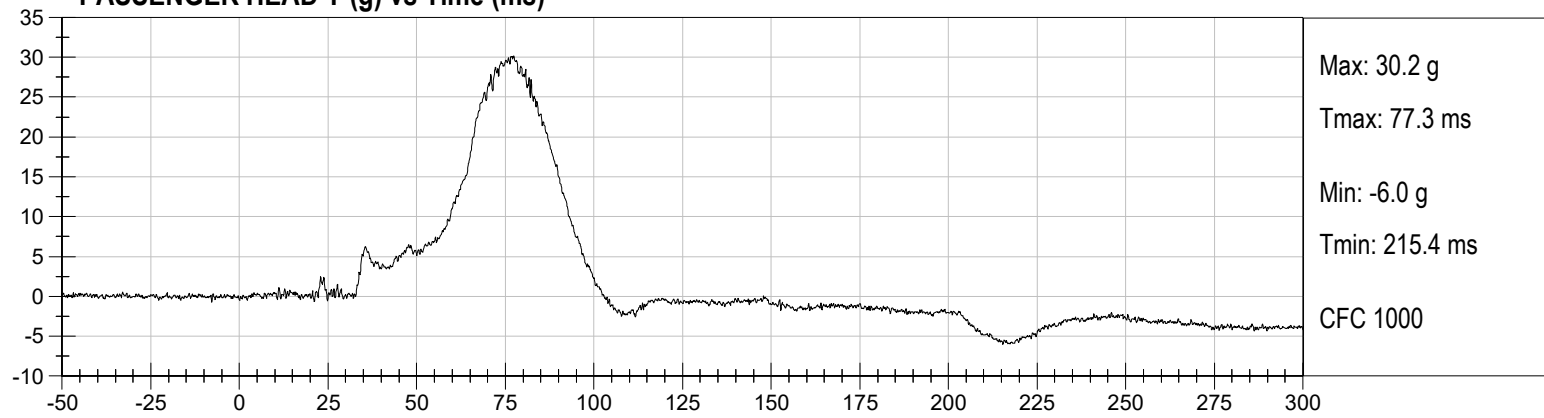
DRIVER PUBIC SYMPHYSIS FY (N) vs Time (ms)



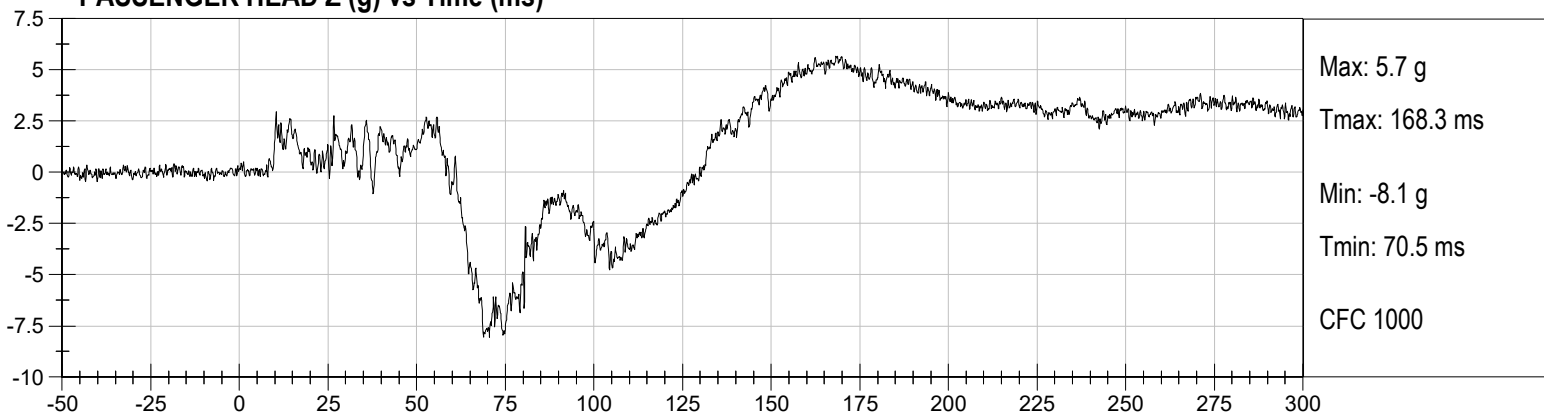
PASSENGER HEAD X (g) vs Time (ms)



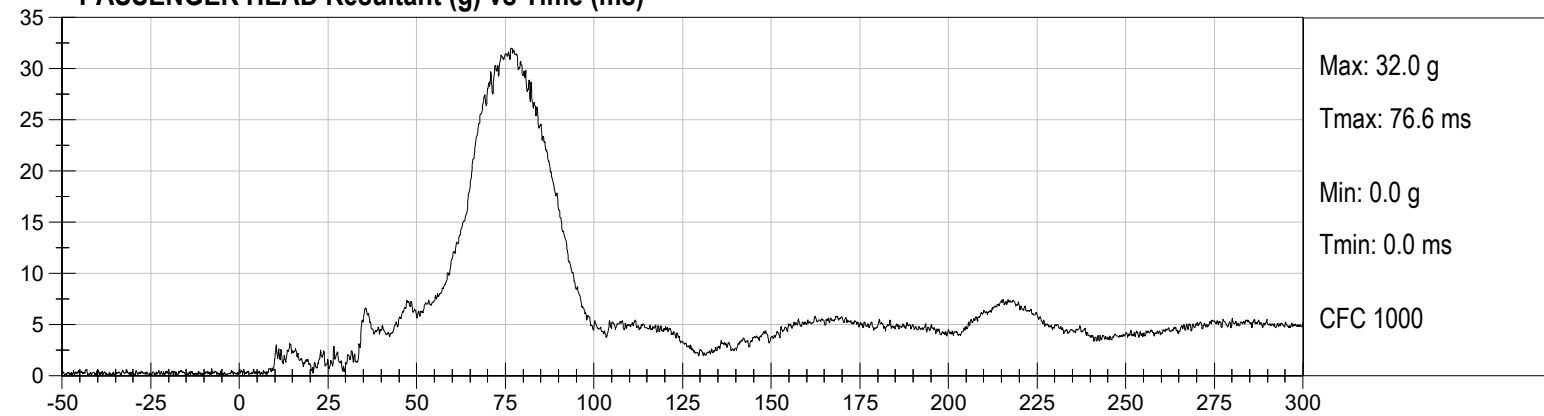
PASSENGER HEAD Y (g) vs Time (ms)



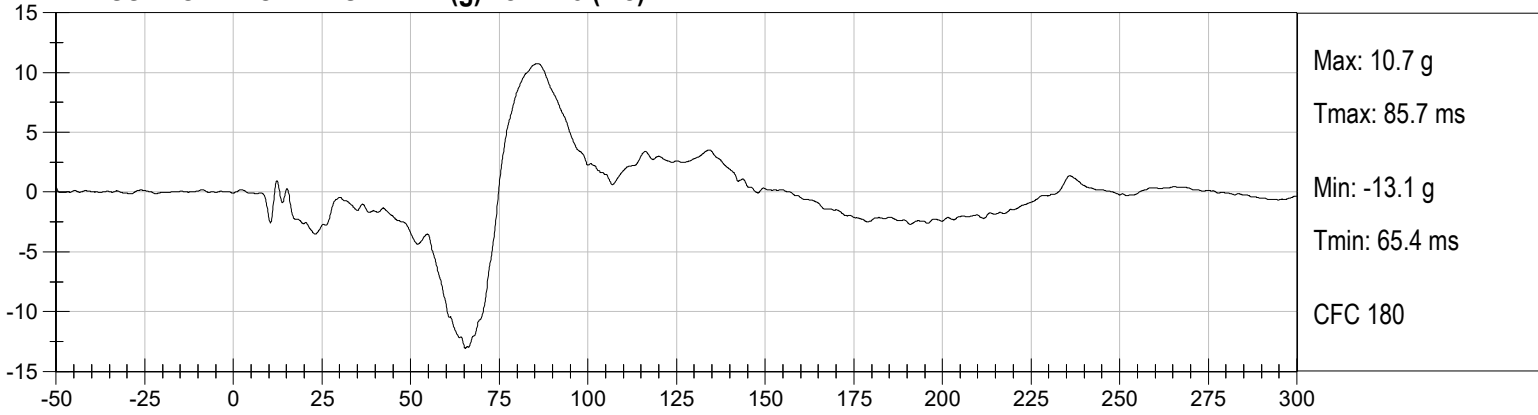
PASSENGER HEAD Z (g) vs Time (ms)



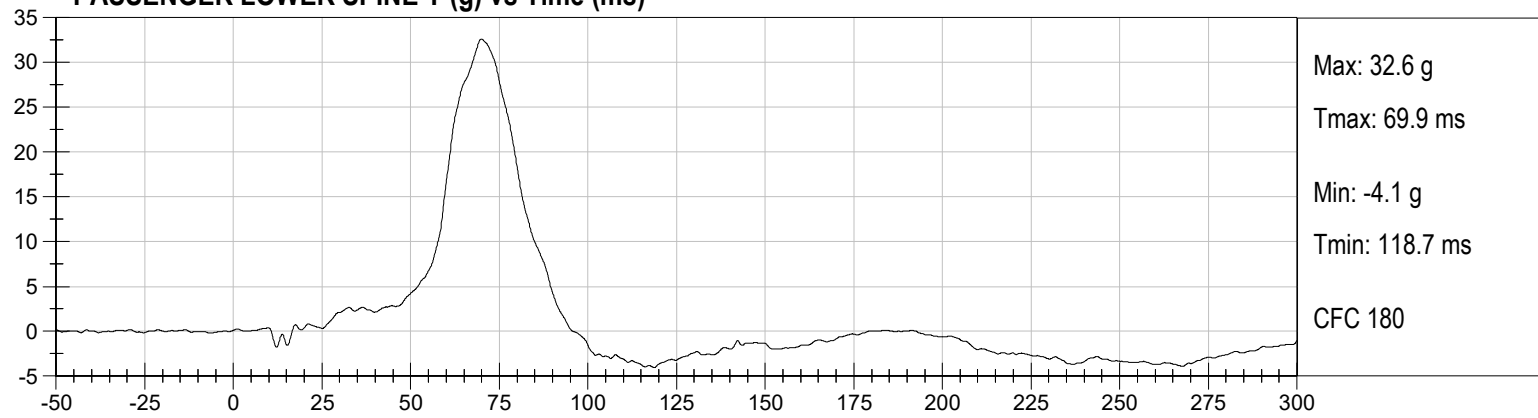
PASSENGER HEAD Resultant (g) vs Time (ms)



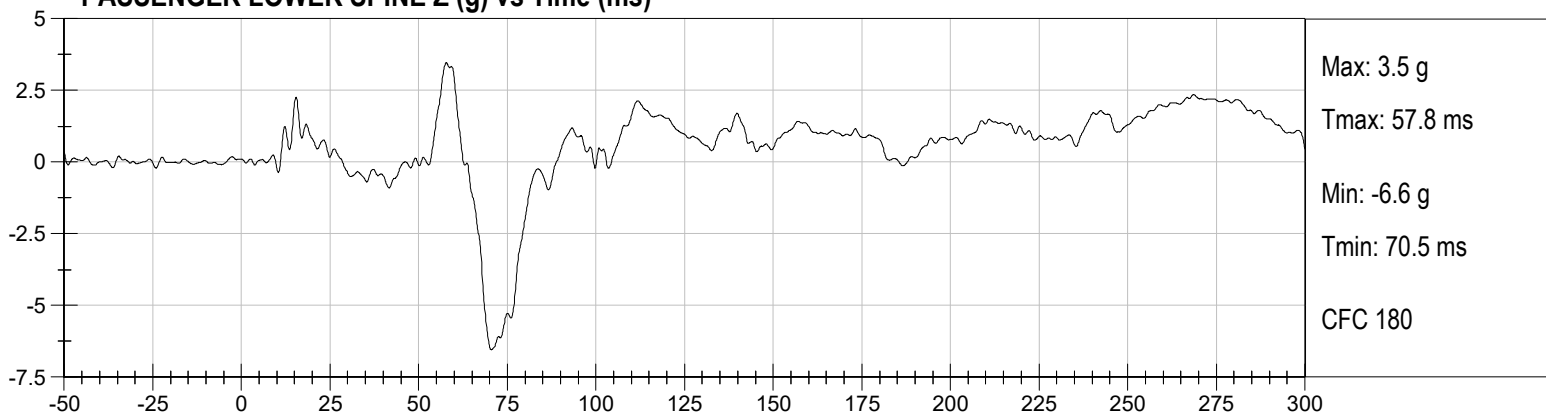
PASSENGER LOWER SPINE X (g) vs Time (ms)



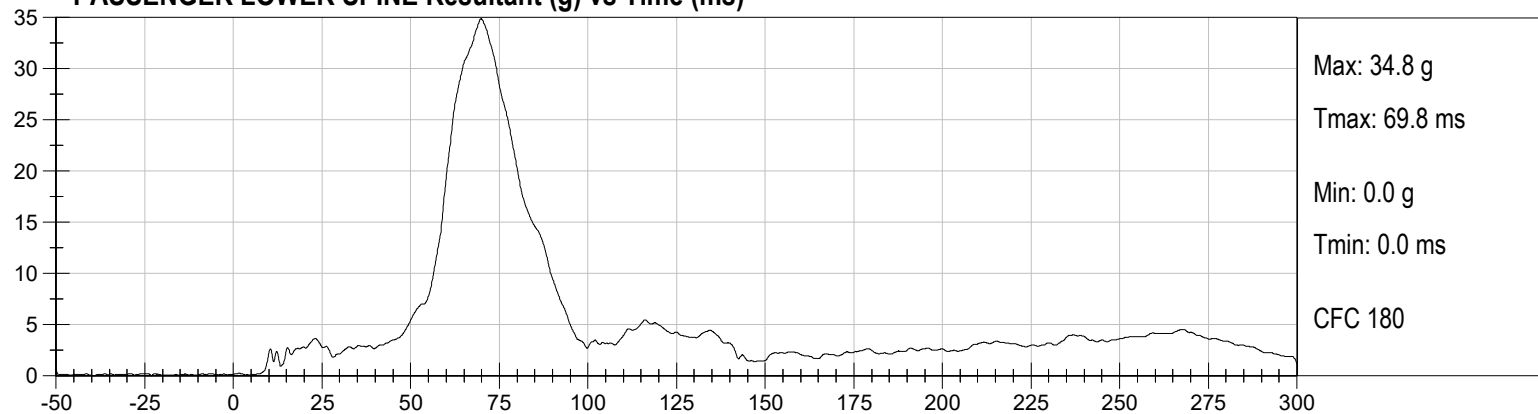
PASSENGER LOWER SPINE Y (g) vs Time (ms)



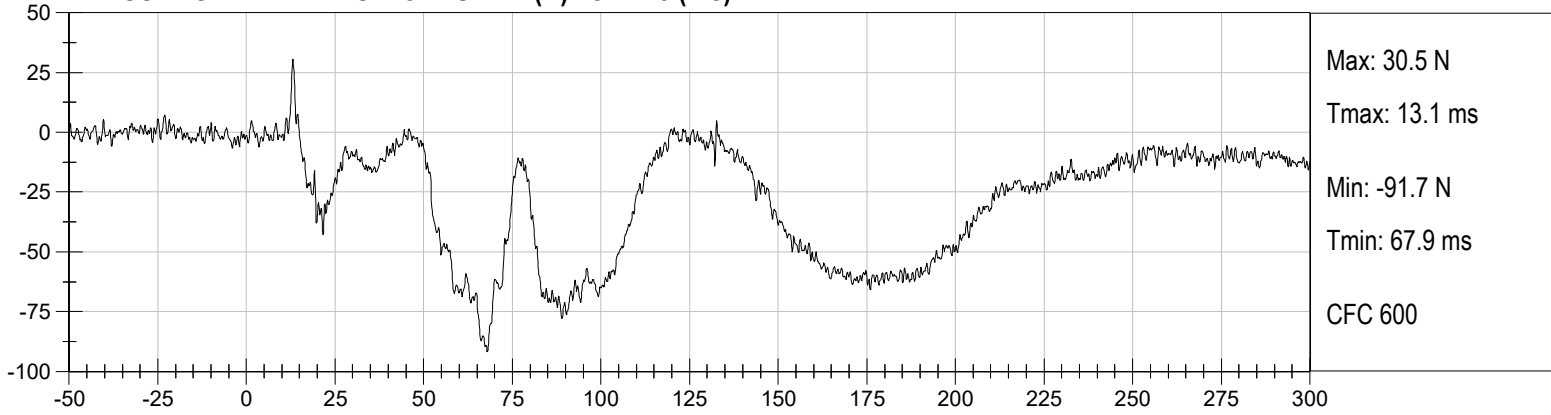
PASSENGER LOWER SPINE Z (g) vs Time (ms)



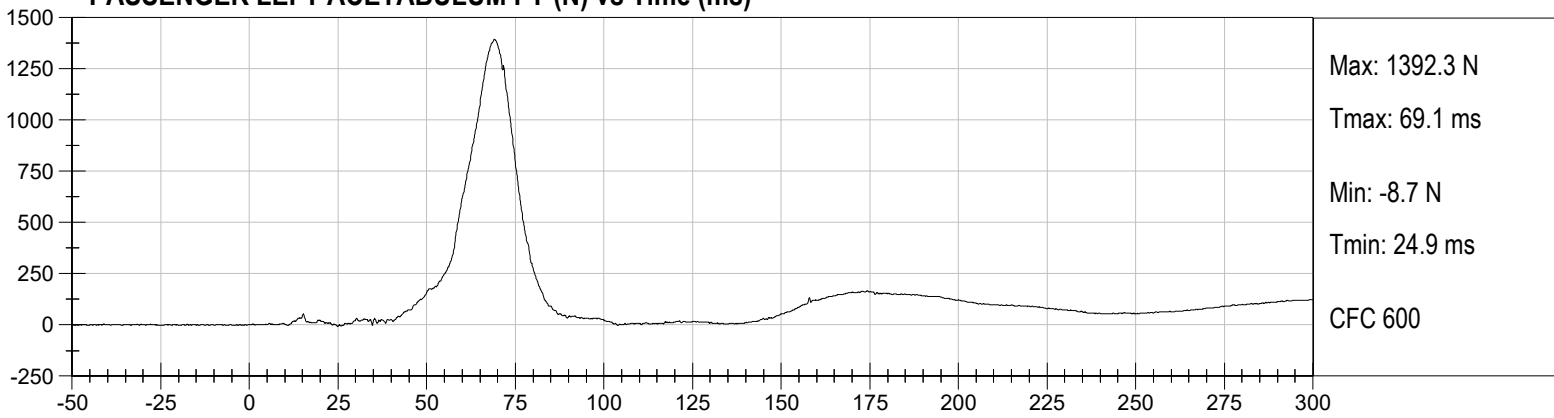
PASSENGER LOWER SPINE Resultant (g) vs Time (ms)



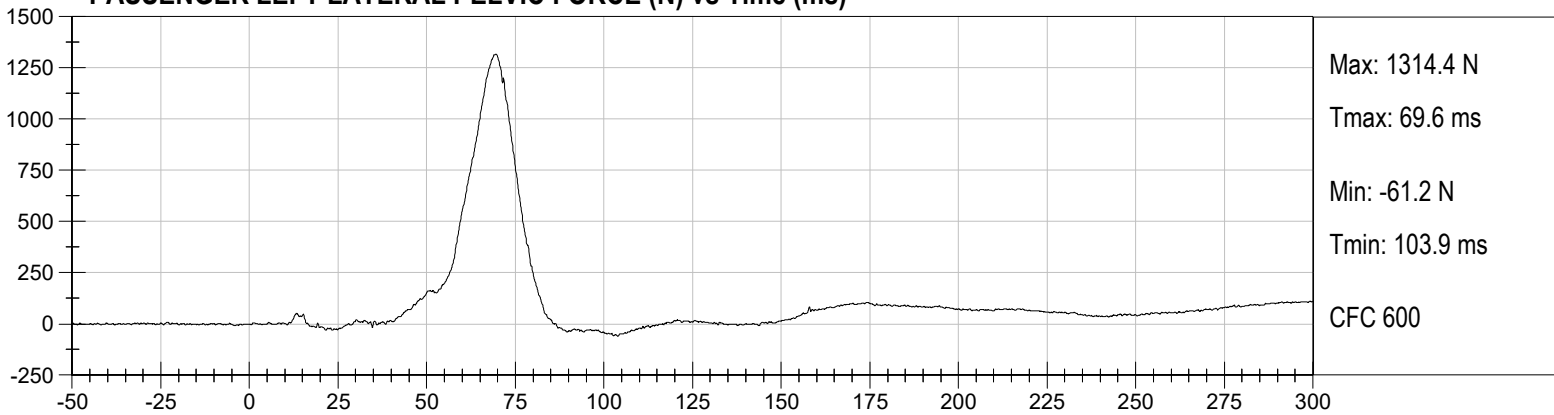
**PASSENGER LEFT ILIUM CREST FY (N) vs Time (ms)**



**PASSENGER LEFT ACETABULUM FY (N) vs Time (ms)**



**PASSENGER LEFT LATERAL PELVIC FORCE (N) vs Time (ms)**



**APPENDIX C**  
**DUMMY QUALIFICATION AND PERFORMANCE VERIFICATION**

**QUALIFICATION TEST RESULTS**

**PRE-TEST**

**EUROSID 2 (ES-2RE) MALE – DRIVER ATD**

**ES-2re External Measurements  
SN: F032**

| <b>No.</b> | <b>Name</b>                                    | <b>Spec. (mm)</b> | <b>Result</b> | <b>Pass/Fail</b> |
|------------|--|-------------------|---------------|------------------|
| 1          | Sitting Height                                 | 900 - 918         | 915           | Pass             |
| 2          | Seat to Shoulder Joint                         | 558 - 572         | 568           | Pass             |
| 3          | Seat to Lower Face of Thoracic Spine Box       | 346 - 356         | 355           | Pass             |
| 4          | Seat to Hip Joint (center of bolt)             | 97 - 103          | 98            | Pass             |
| 5          | Sole to Seat, Sitting                          | 333 - 451         | 440           | Pass             |
| 6          | Head Width                                     | 152 - 158         | 157           | Pass             |
| 7          | Shoulder/Arm Width                             | 461 - 479         | 464           | Pass             |
| 8          | Thorax Width                                   | 322 - 332         | 323           | Pass             |
| 9          | Abdomen Width                                  | 273 - 287         | 281           | Pass             |
| 10         | Pelvis Lap Width                               | 359 - 373         | 370           | Pass             |
| 11         | Head Depth                                     | 196 - 206         | 203           | Pass             |
| 12         | Thorax Depth                                   | 262 - 272         | 264           | Pass             |
| 13         | Abdomen Depth                                  | 194 - 204         | 196           | Pass             |
| 14         | Pelvis Depth                                   | 235 - 245         | 236           | Pass             |
| 15         | Back of Buttocks to Hip Joint (center of bolt) | 150 - 160         | 151           | Pass             |
| 16         | Back of Buttocks to Front Knee                 | 597 - 615         | 607           | Pass             |

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HEAD DROP TEST

ES-2re DUMMY

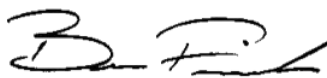
ATD Serial No:       F032      

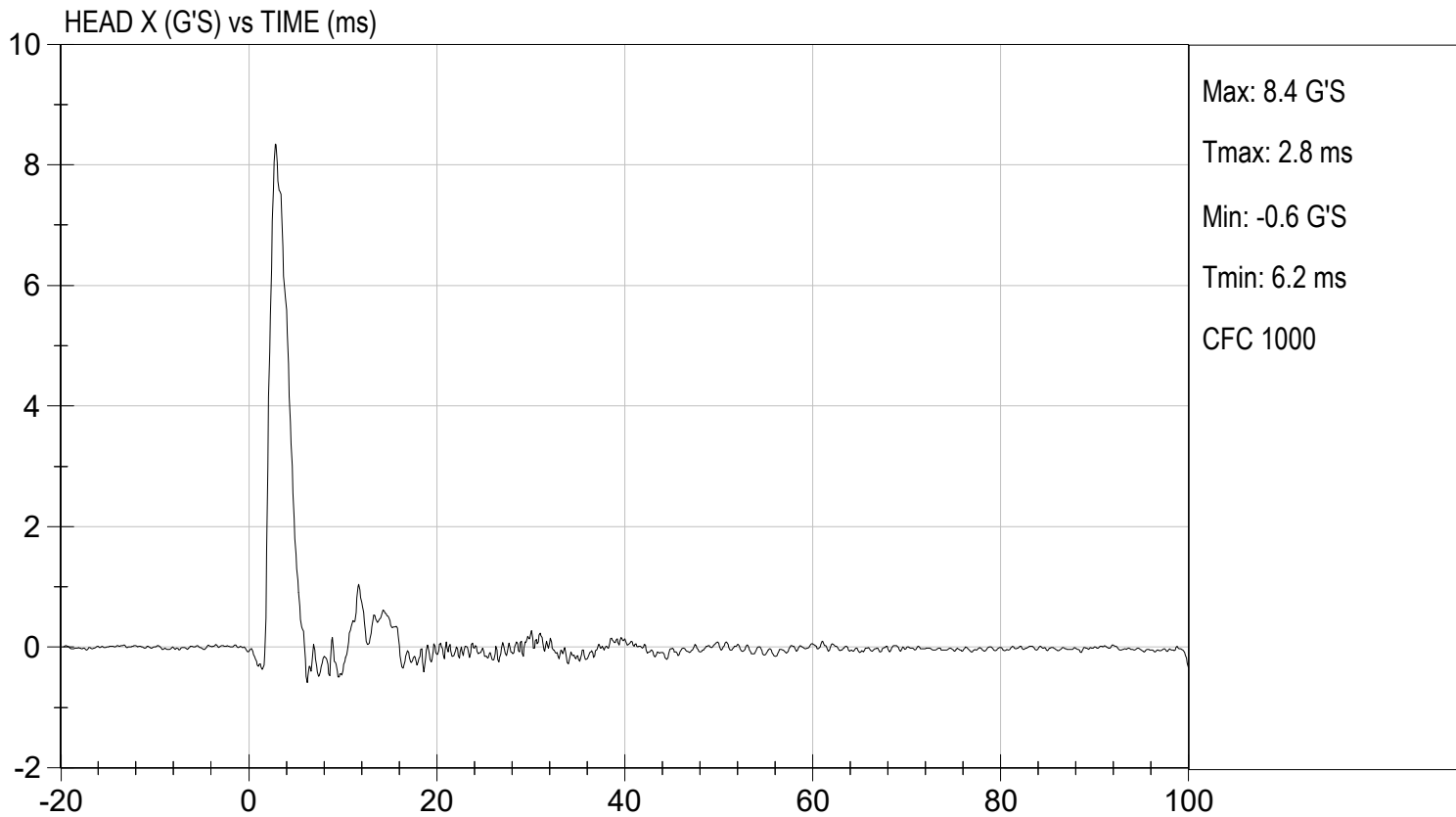
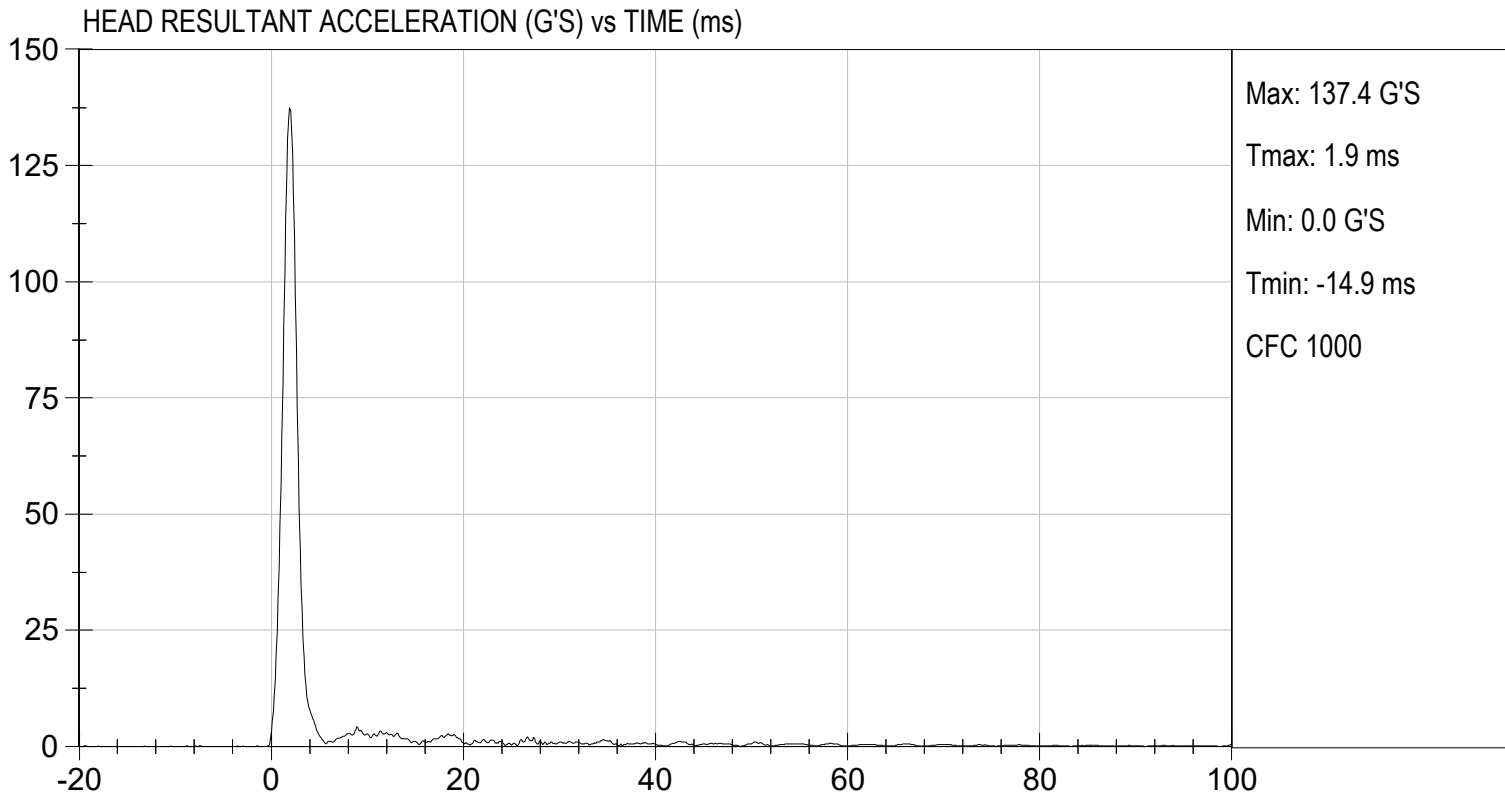
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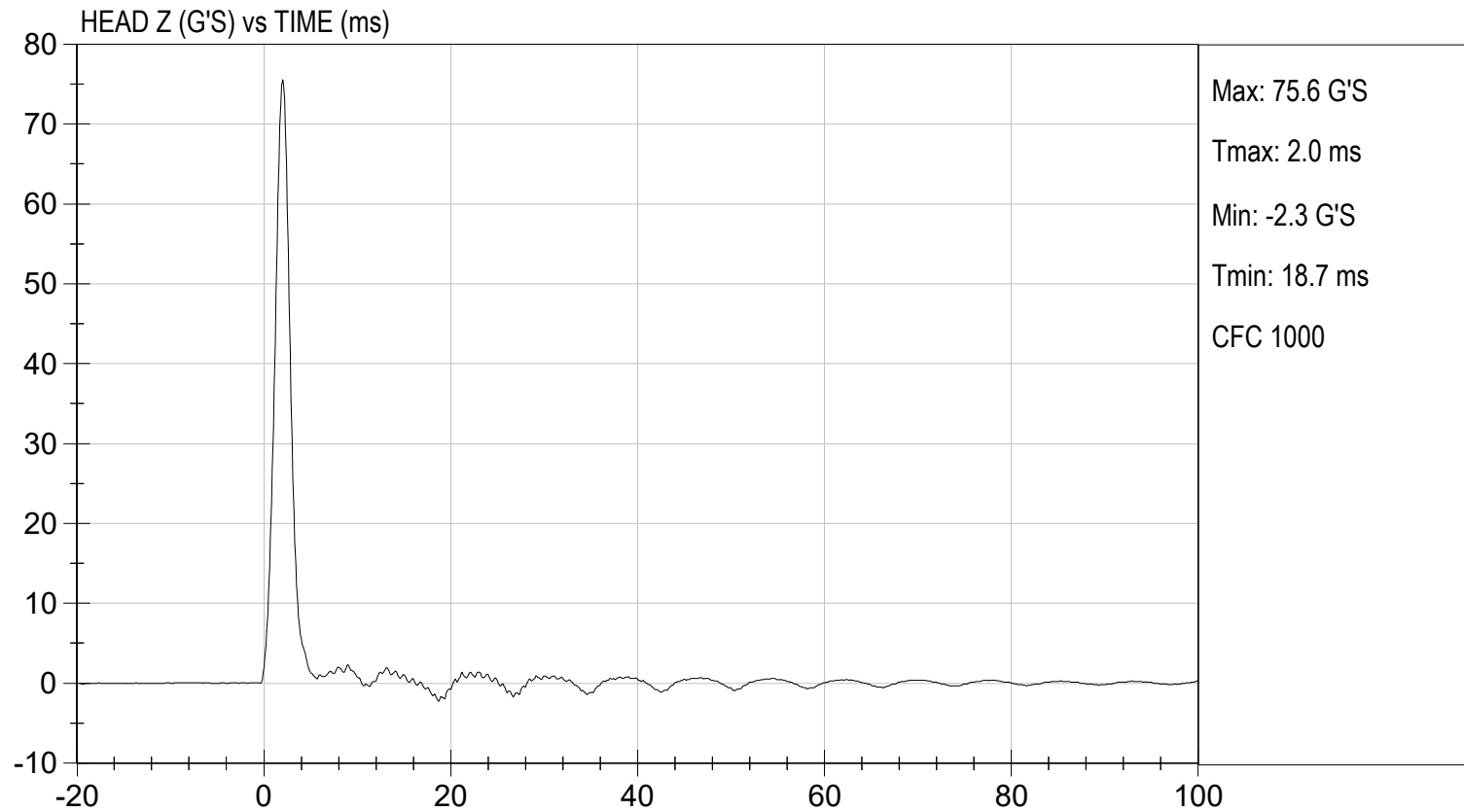
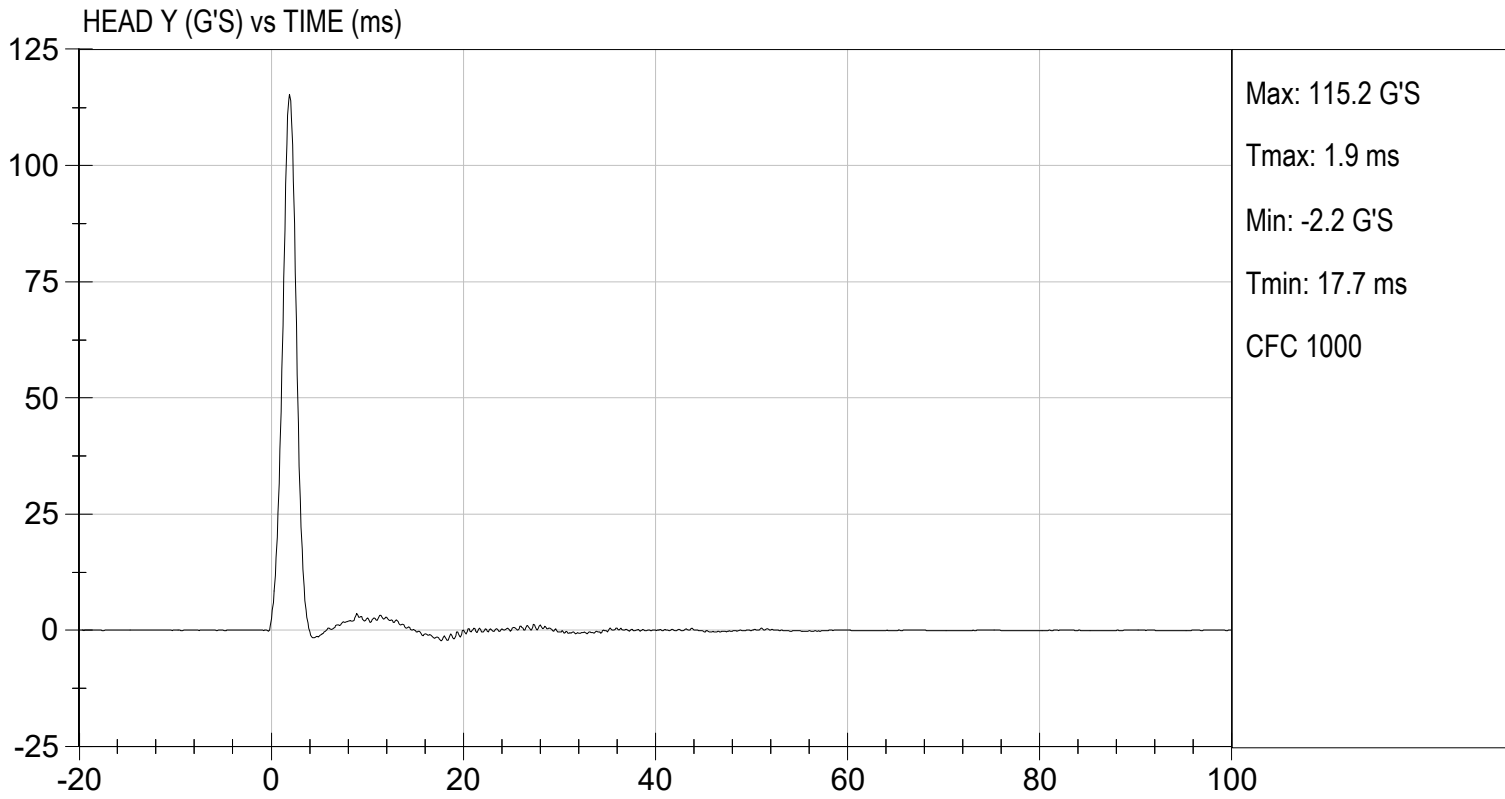
| Tested Parameter               | Units | Specification      | Result | Pass/Fail |
|--------------------------------|-------|--------------------|--------|-----------|
| Laboratory Temperature         | deg C | 18.9 to 25.6       | 21.2   | Pass      |
| Laboratory Relative Humidity   | %     | 10 to 70           | 48     | Pass      |
| Peak Resultant Acceleration    | G's   | 125 to 155         | 137    | Pass      |
| Peak Longitudinal Acceleration | G's   | <= +/- 15.0        | 8.4    | Pass      |
| Unimodal                       | N/A   | Yes                | Yes    | Pass      |
| Oscillations                   | N/A   | within 15% of peak | Yes    | Pass      |
| Overall Test Results           |       |                    |        | Pass      |

  
\_\_\_\_\_  
Laboratory Technician

08/15/2024  
Test Date

  
\_\_\_\_\_  
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**NECK PENDULUM TEST**  
**ES-2re DUMMY**

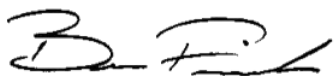
ATD Serial No:           F032          

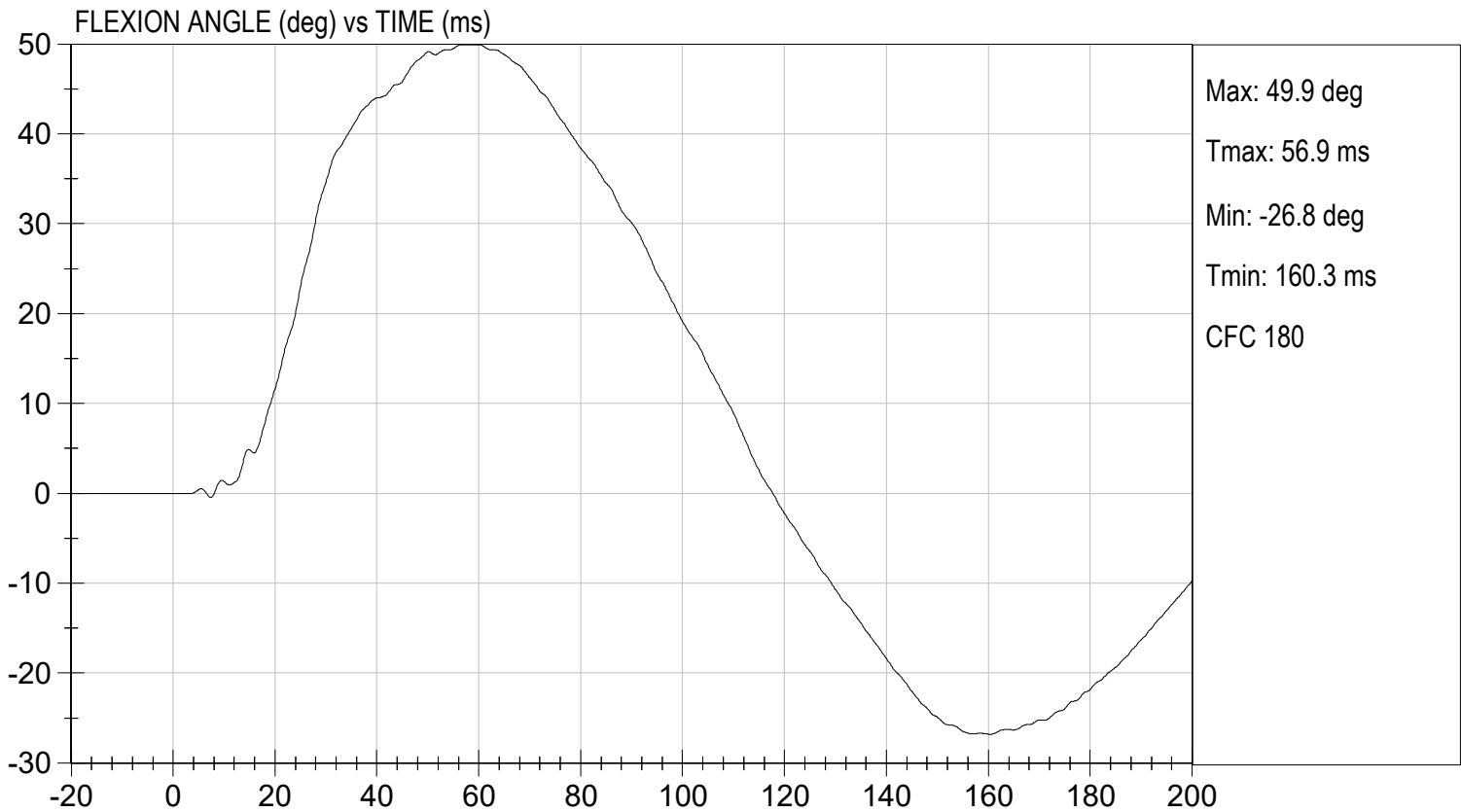
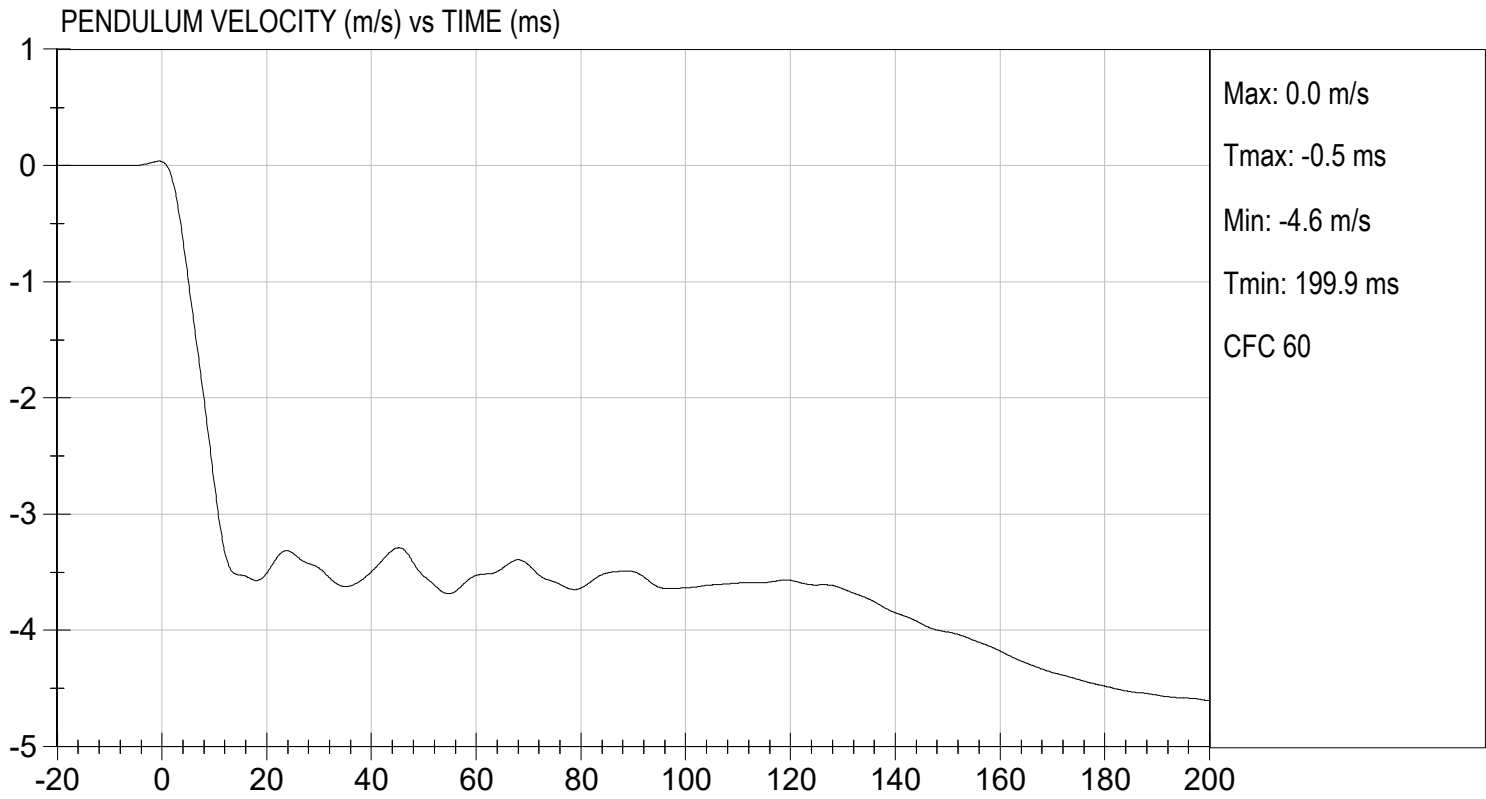
Test I.D.:           D242082          

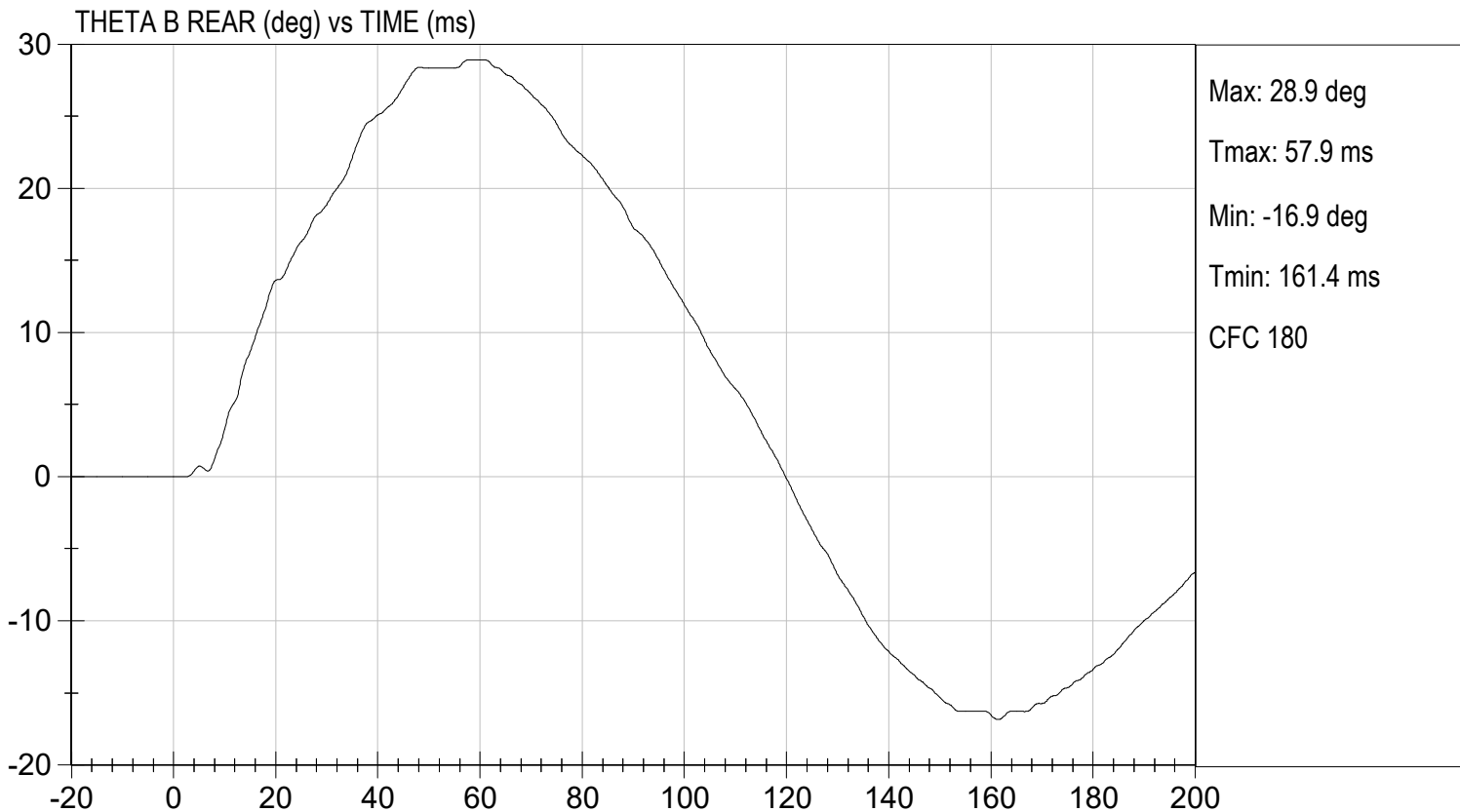
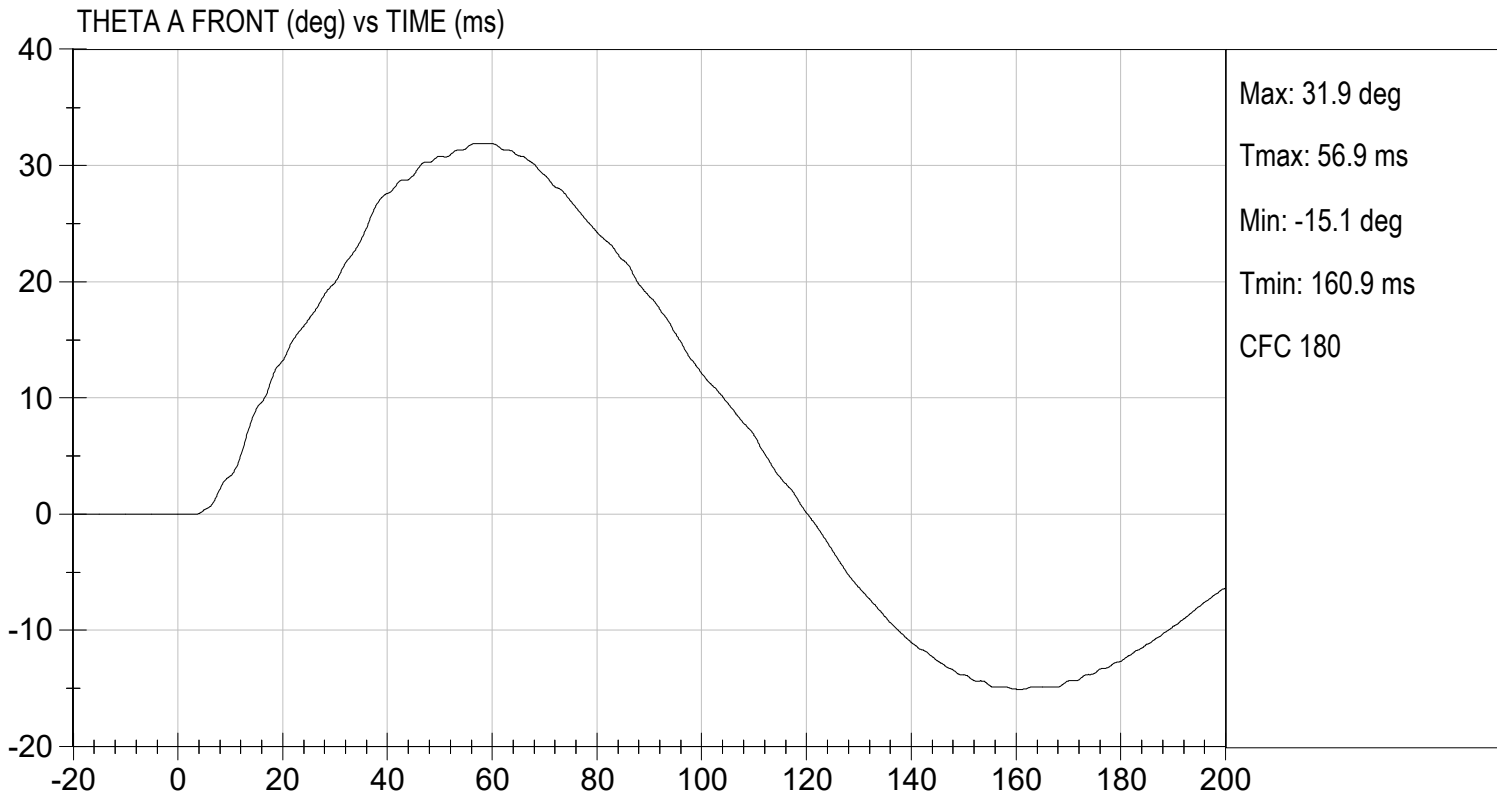
| Tested Parameter                     |       | Units | Specification   | Result | Pass/Fail |
|--------------------------------------|-------|-------|-----------------|--------|-----------|
| Laboratory Temperature               |       | deg C | 20.6 to 22.2    | 21.3   | Pass      |
| Laboratory Relative Humidity         |       | %     | 10 to 70        | 47     | Pass      |
| Pendulum Speed                       |       | m/s   | 3.30 to 3.50    | 3.43   | Pass      |
| Pendulum Velocity                    | 1 ms  | m/s   | -0.05 to 0.00   | -0.01  | Pass      |
|                                      | 3 ms  | m/s   | -0.25 to -0.375 | -0.34  | Pass      |
|                                      | 14 ms | m/s   | -3.20 to -3.70  | -3.52  | Pass      |
|                                      | 17 ms | m/s   | >= -3.70        | -3.56  | Pass      |
| Maximum Flexion Angle                |       | deg   | 49.0 to 59.0    | 49.9   | Pass      |
| Time of Maximum Flexion Angle        |       | ms    | 54.0 to 66.0    | 56.9   | Pass      |
| Head Rotation Decay Time to 0 Degree |       | ms    | 53.0 to 88.0    | 60.9   | Pass      |
| Overall Results                      |       |       |                 |        | Pass      |

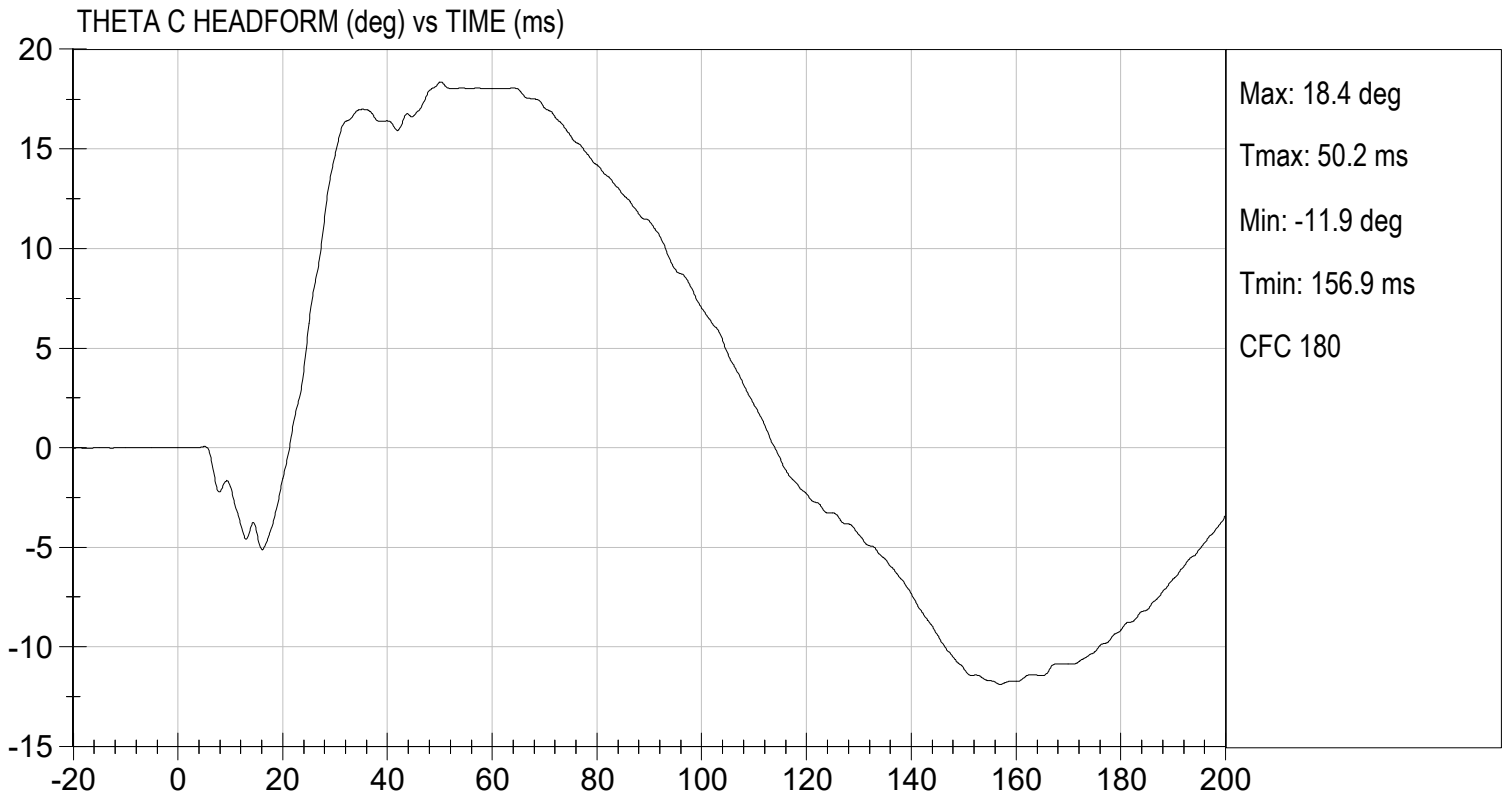
  
 Laboratory Technician

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 Test Date

  
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SHOULDER IMPACT TEST  
ES-2re DUMMY

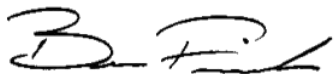
ATD Serial No: F032

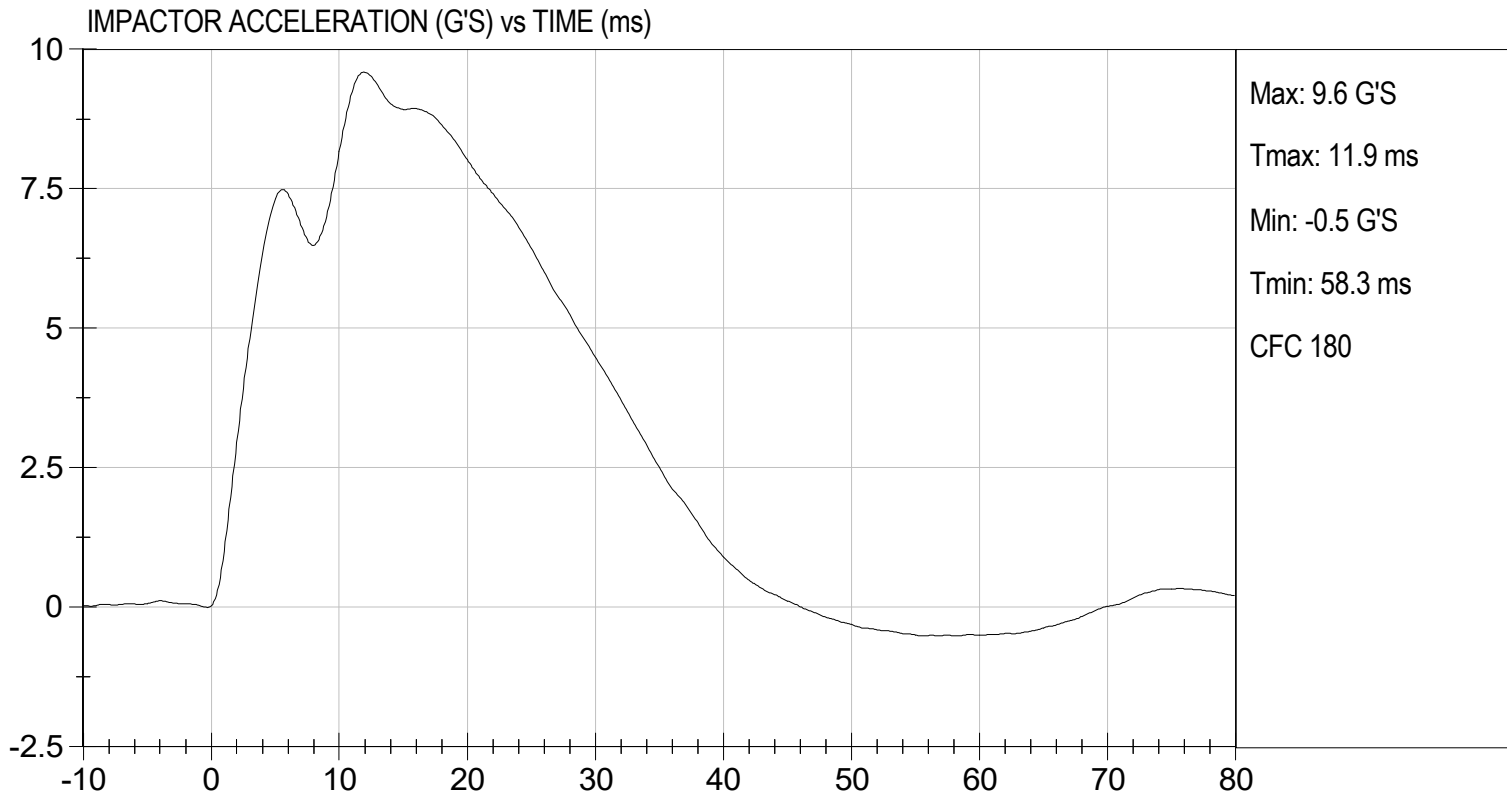
Test I.D: D242083

| Tested Parameter             | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature       | deg C | 20.6 to 22.2  | 21.2   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 48     | Pass      |
| Pendulum Speed               | m/s   | 4.20 to 4.40  | 4.23   | Pass      |
| Peak Impactor Acceleration   | G's   | 7.5 to 10.5   | 9.6    | Pass      |
| Overall Test Results         |       |               |        | Pass      |

  
Laboratory Technician

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UPPER RIB TEST

ES-2re DUMMY

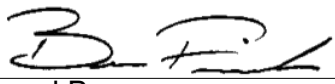
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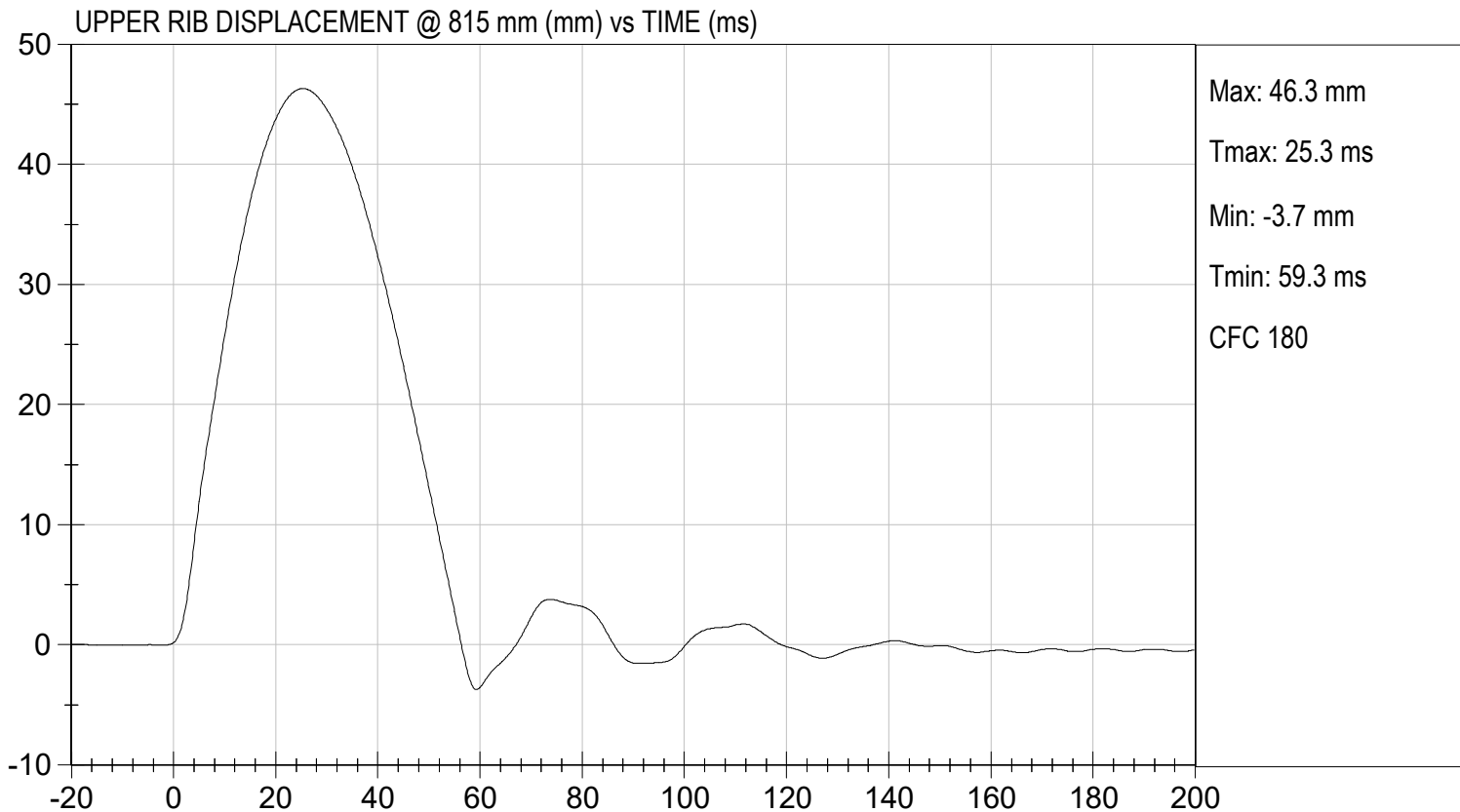
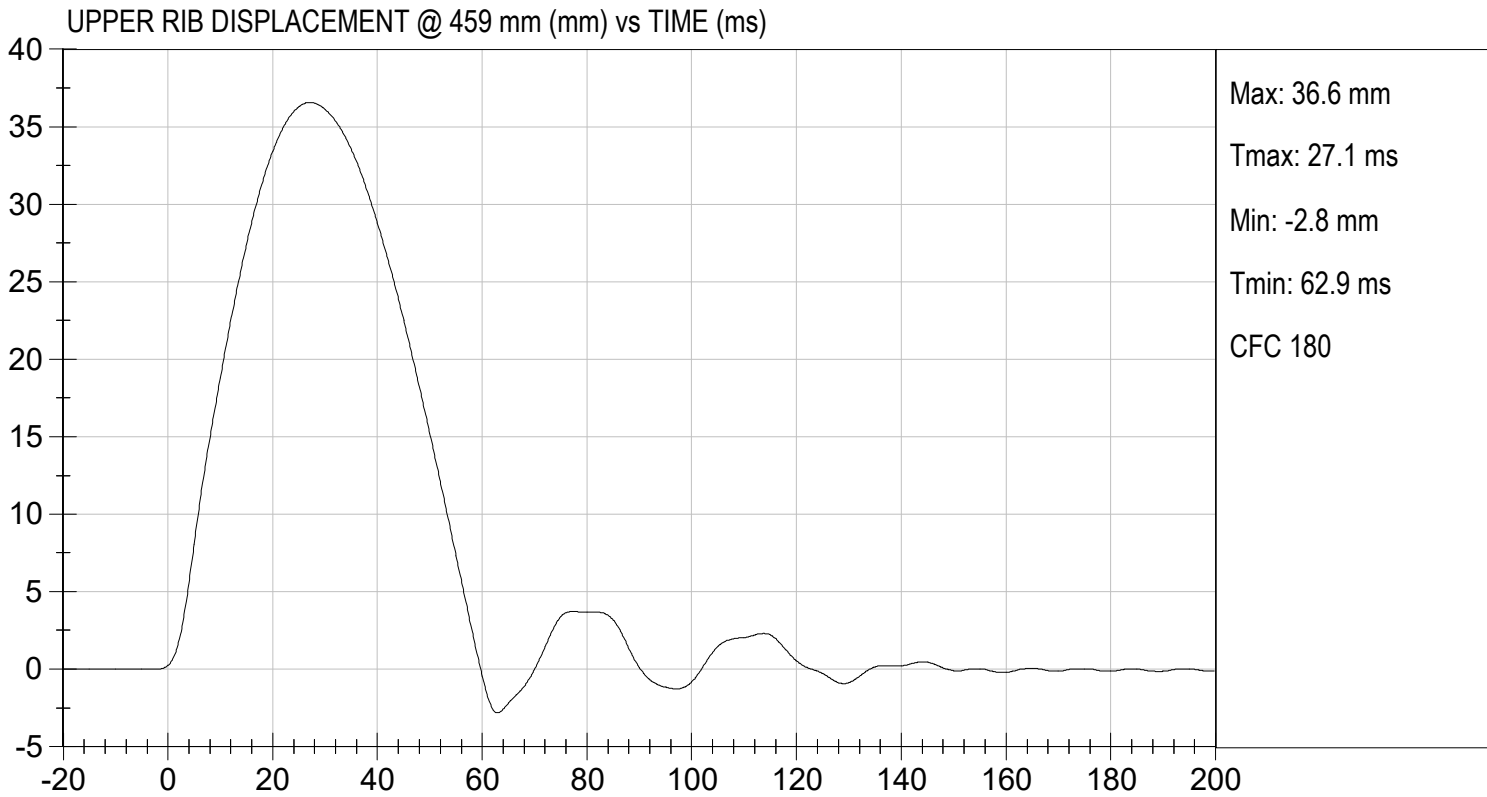
Test I.D: D242084

| Tested Parameter             | Units | Specification | Result               | Pass/Fail |
|------------------------------|-------|---------------|----------------------|-----------|
| Laboratory Temperature       | deg C | 20.6 to 22.2  | 21.2                 | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 48                   | Pass      |
| Displacement at 459 mm       | mm    | 36.0 to 40.0  | 36.6                 | Pass      |
| Displacement at 815 mm       | mm    | 46.0 to 51.0  | 46.3                 | Pass      |
|                              |       |               | Overall Test Results | Pass      |

  
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MID RIB TEST

ES-2re DUMMY

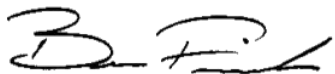
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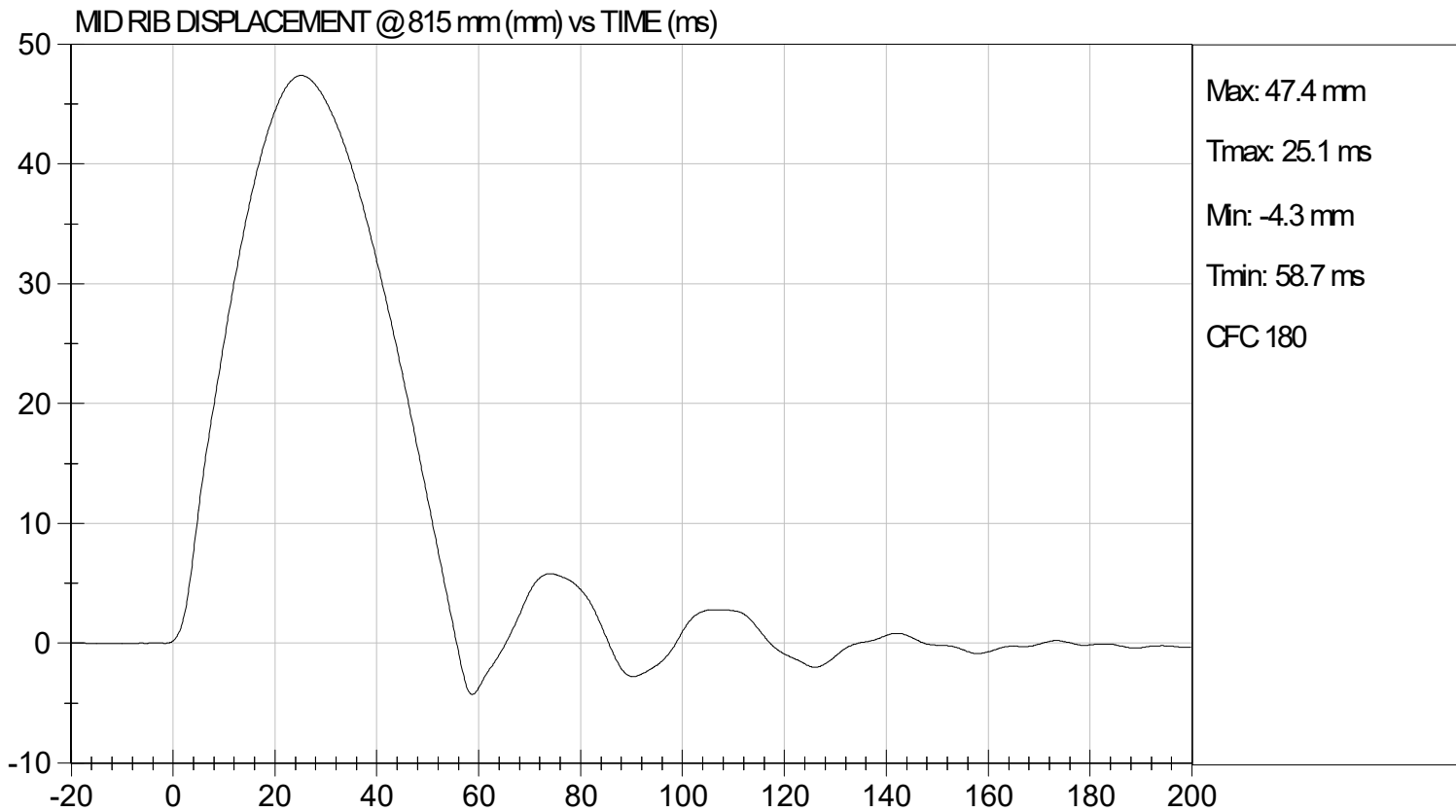
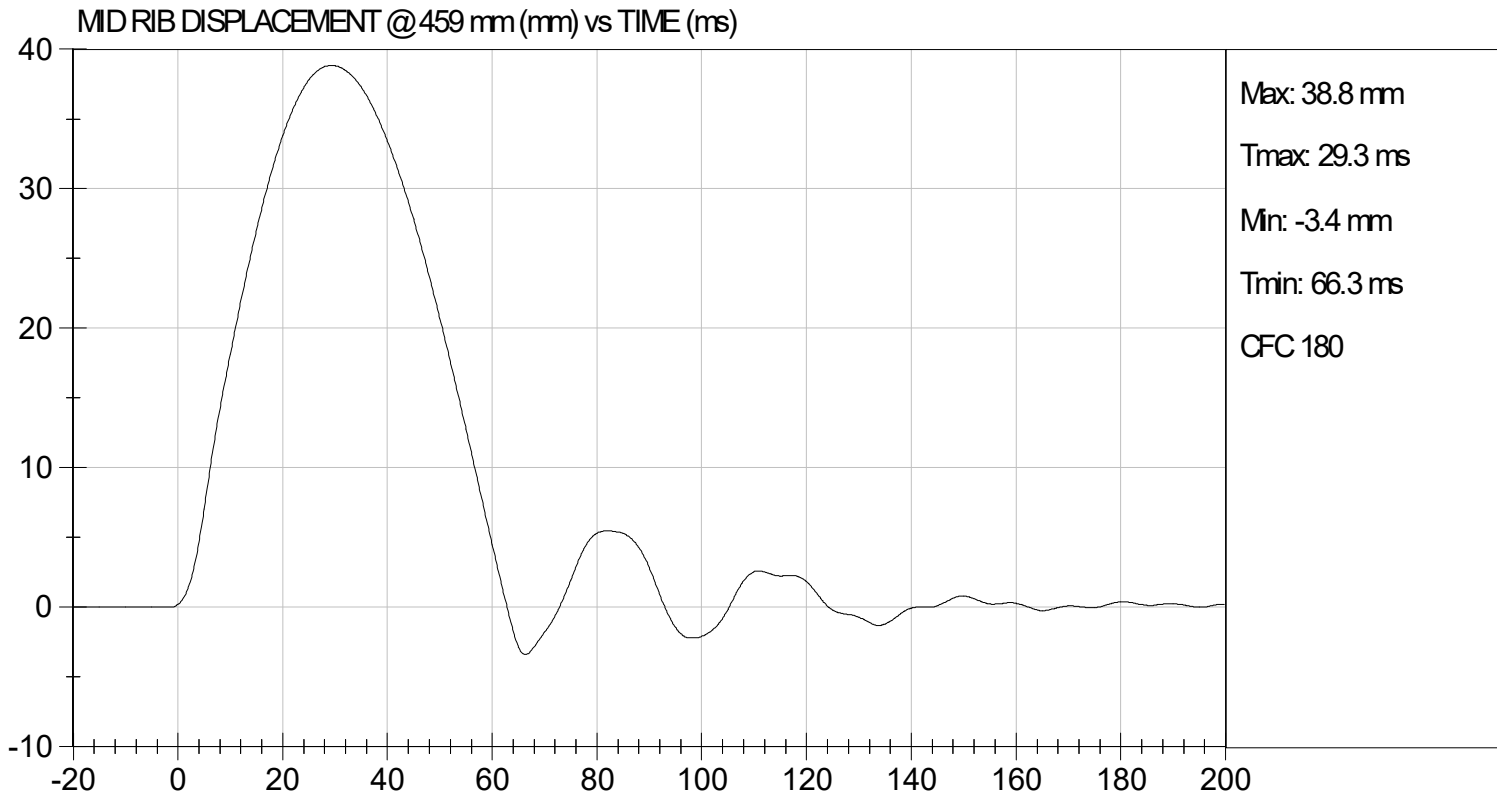
Test I.D: D242085

| Tested Parameter             | Units | Specification | Result               | Pass/Fail |
|------------------------------|-------|---------------|----------------------|-----------|
| Laboratory Temperature       | deg C | 20.6 to 22.2  | 21.2                 | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 48                   | Pass      |
| Displacement at 459 mm       | mm    | 36.0 to 40.0  | 38.8                 | Pass      |
| Displacement at 815 mm       | mm    | 46.0 to 51.0  | 47.4                 | Pass      |
|                              |       |               | Overall Test Results | Pass      |

  
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LOWER RIB TEST

ES-2re DUMMY

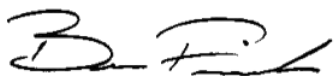
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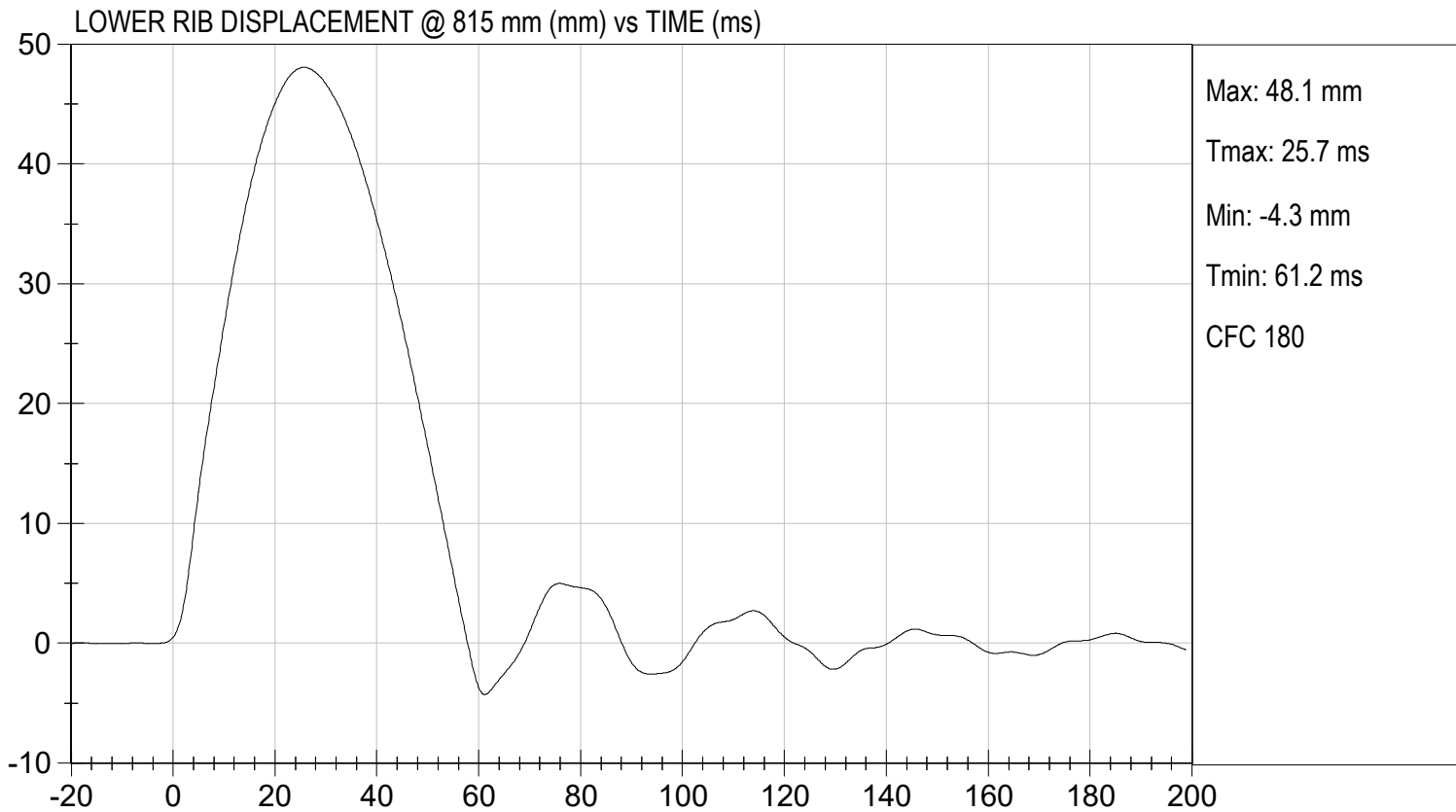
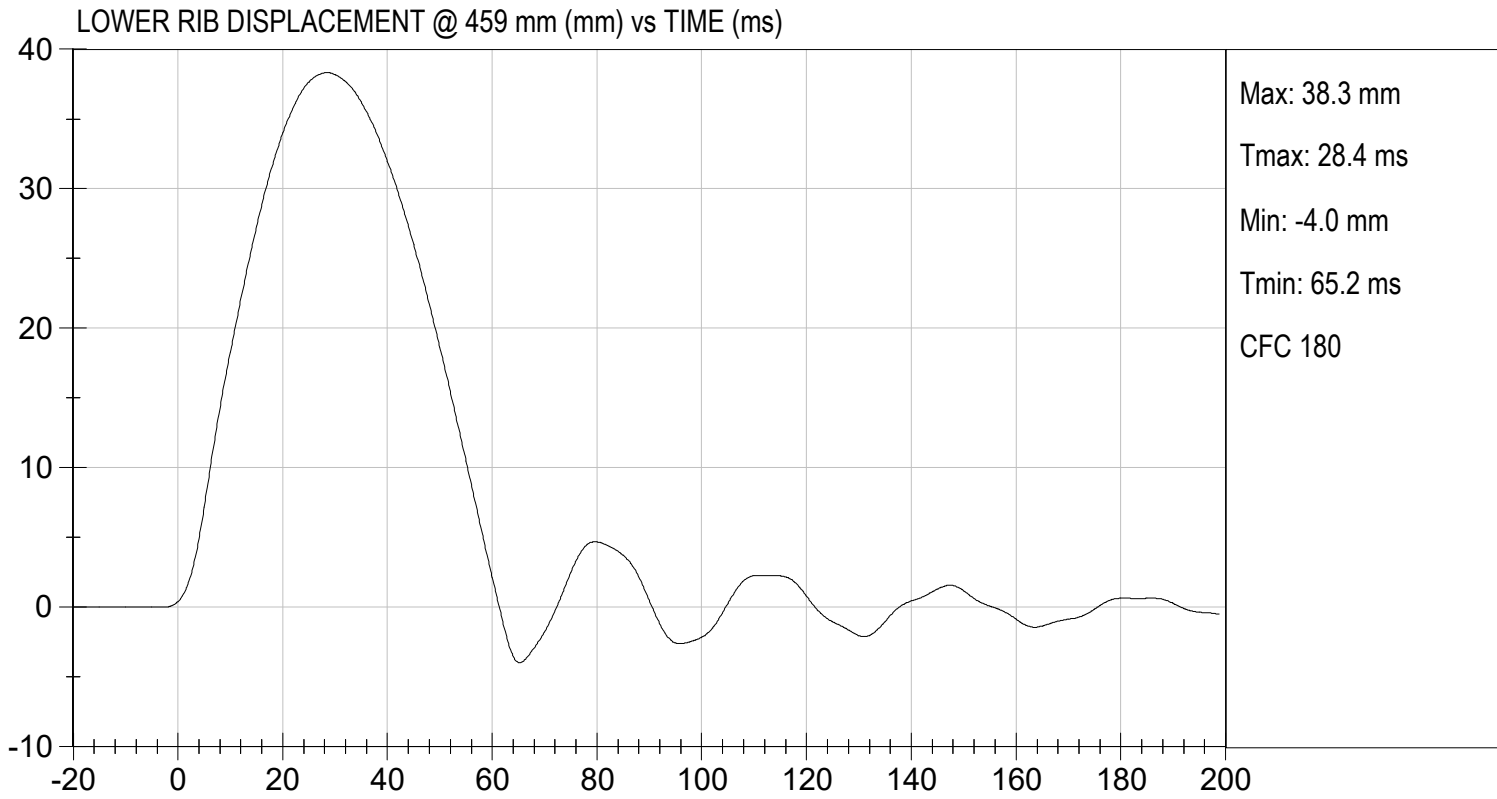
Test I.D: D242086

| Tested Parameter             | Units | Specification | Result               | Pass/Fail |
|------------------------------|-------|---------------|----------------------|-----------|
| Laboratory Temperature       | deg C | 20.6 to 22.2  | 21.2                 | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 48                   | Pass      |
| Displacement at 459 mm       | mm    | 36.0 to 40.0  | 38.3                 | Pass      |
| Displacement at 815 mm       | mm    | 46.0 to 51.0  | 48.1                 | Pass      |
|                              |       |               | Overall Test Results | Pass      |

  
Laboratory Technician

08/15/2024  
Test Date

  
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ABDOMEN TEST

ES-2re DUMMY

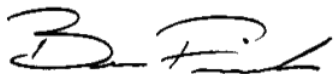
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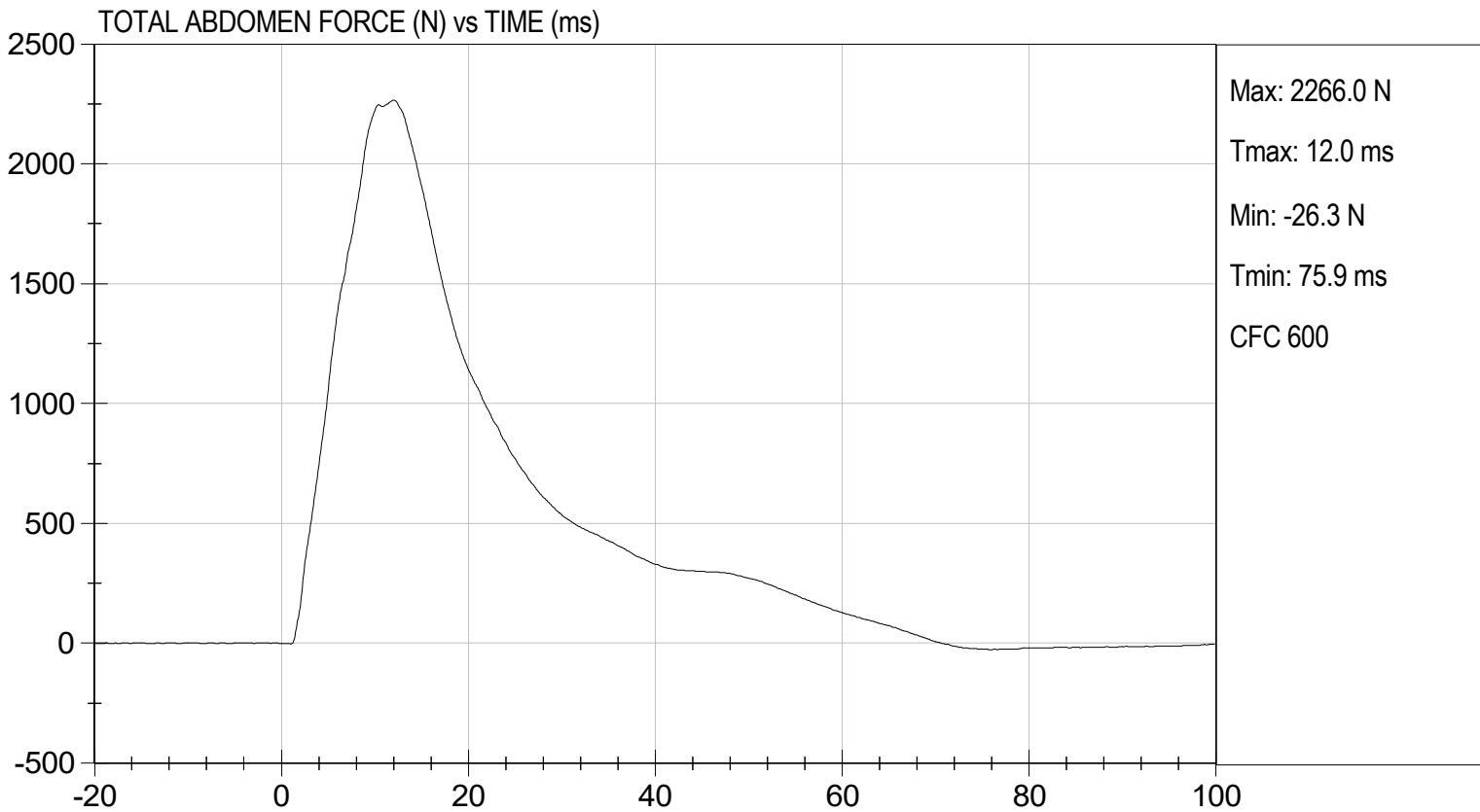
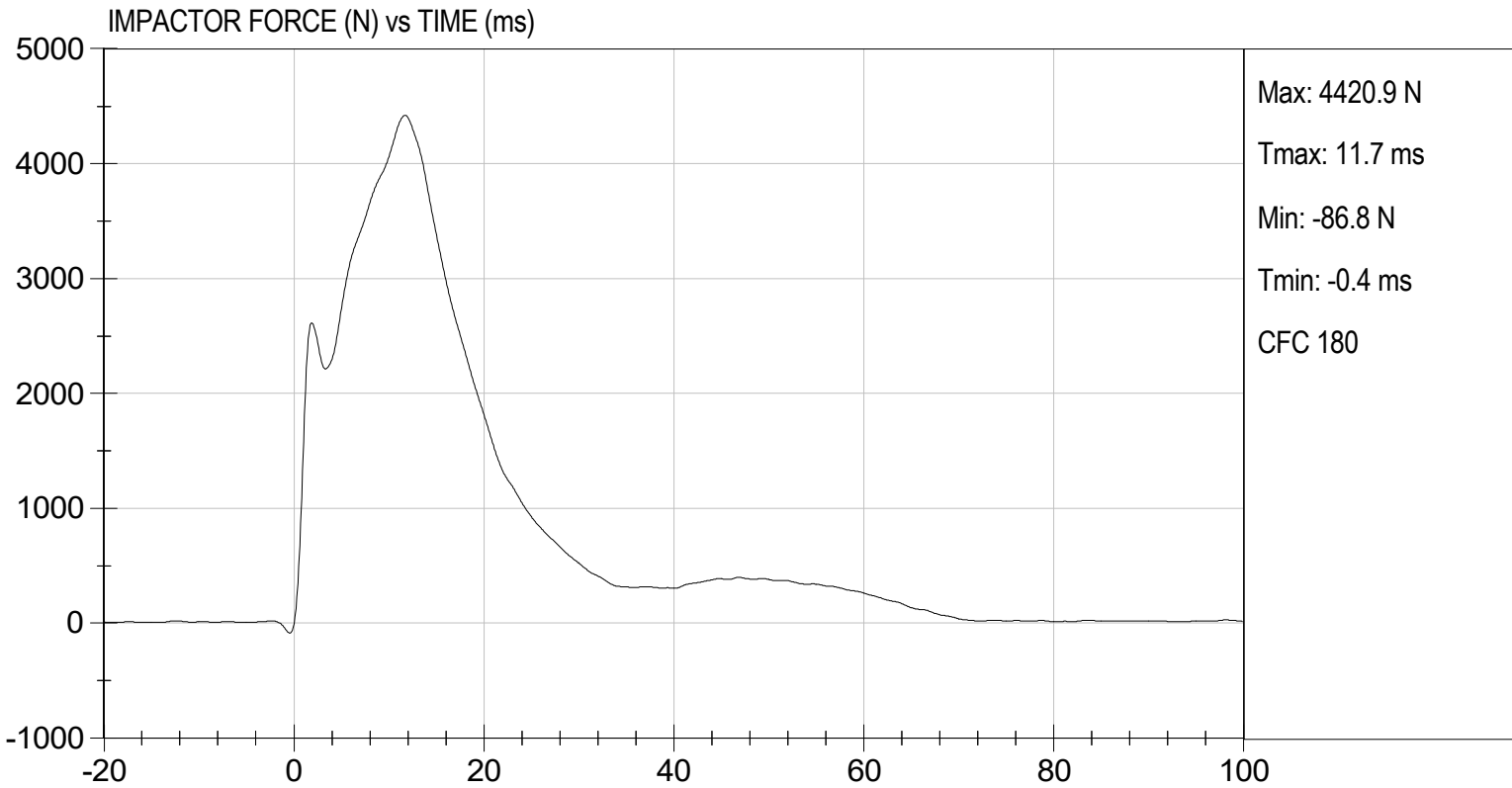
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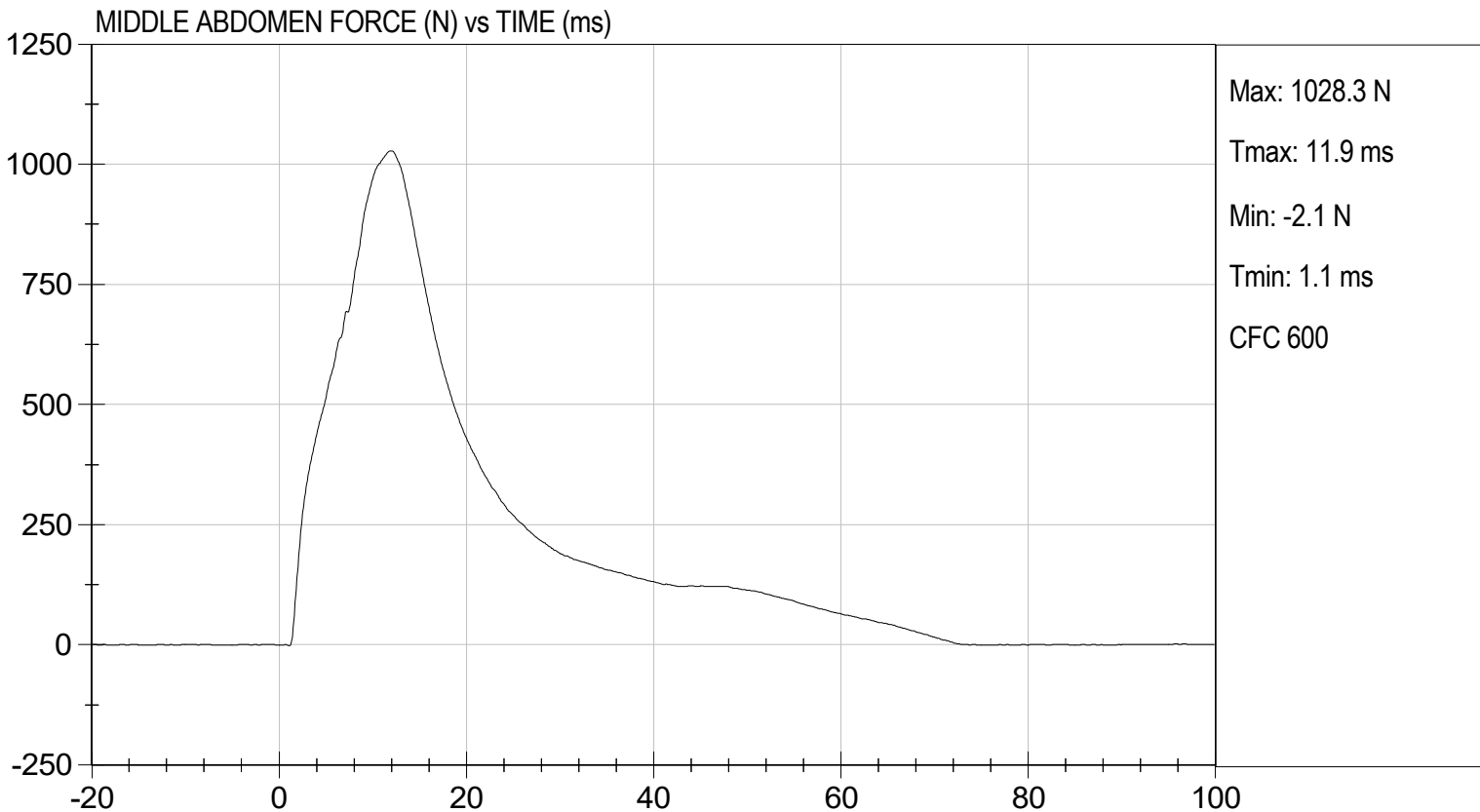
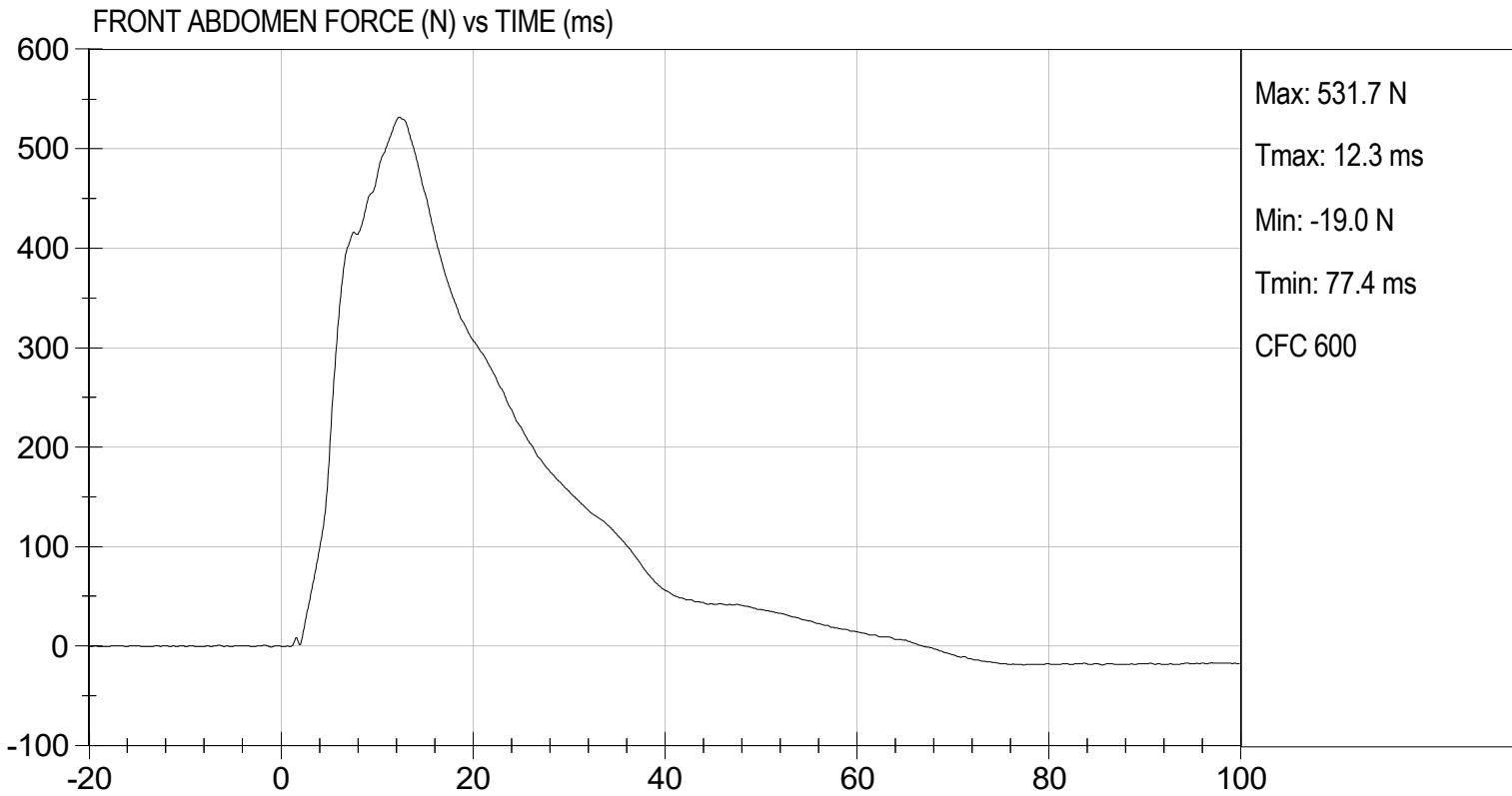
| Tested Parameter               | Units | Specification | Result | Pass/Fail |
|--------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature         | deg C | 20.6 to 22.2  | 21.2   | Pass      |
| Laboratory Relative Humidity   | %     | 10 to 70      | 48     | Pass      |
| Probe Speed                    | m/s   | 3.90 to 4.10  | 3.94   | Pass      |
| Maximum Impactor Force         | N     | 4000 to 4800  | 4421   | Pass      |
| Time of Maximum Impactor Force | ms    | 10.6 to 13.0  | 11.7   | Pass      |
| Maximum Total Abdomen Force    | N     | 2200 to 2700  | 2266   | Pass      |
| Time of Maximum Abdomen Force  | ms    | 10.0 to 12.3  | 12.0   | Pass      |
| Overall Test Results           |       |               |        | Pass      |

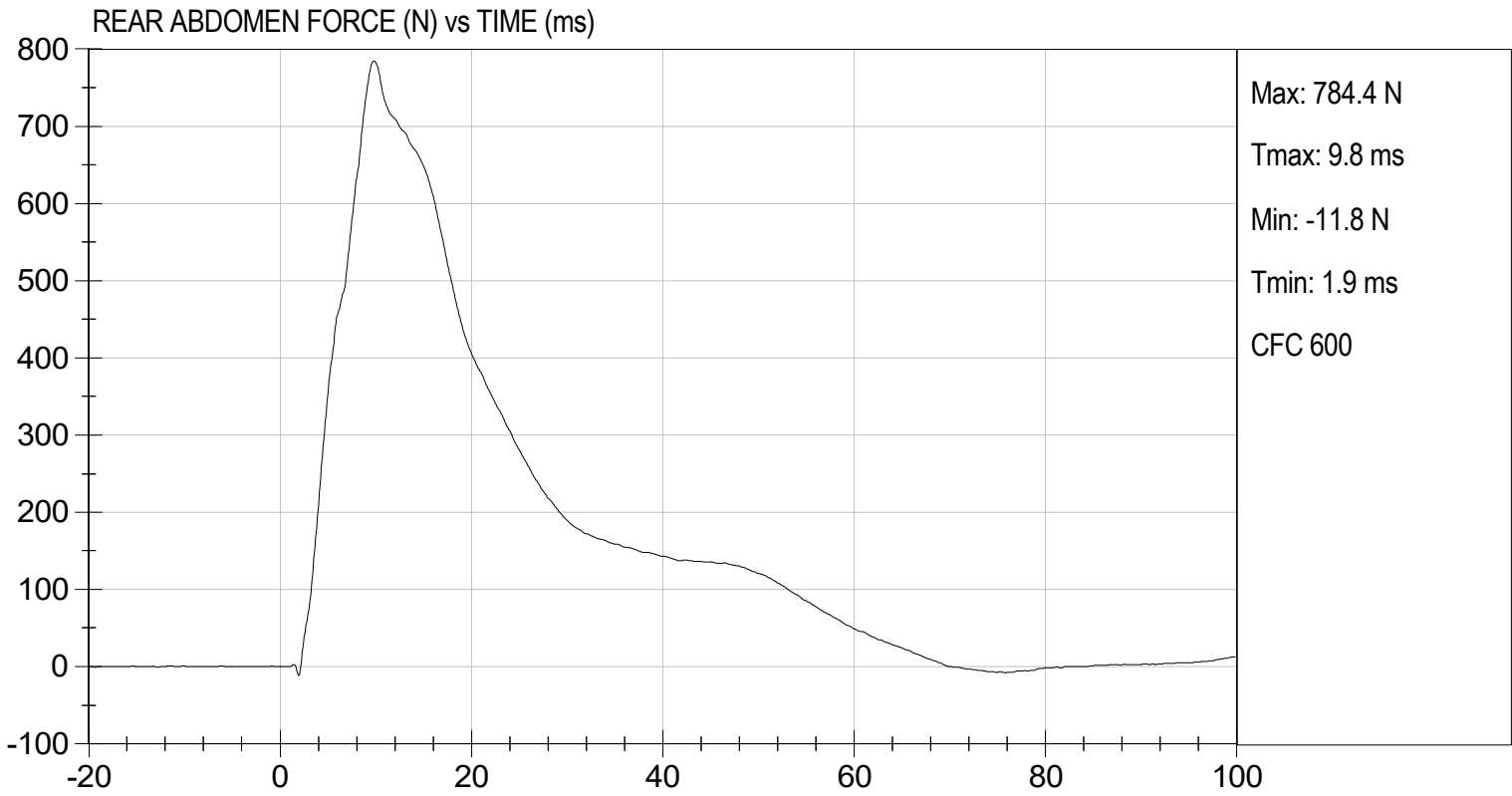
  
\_\_\_\_\_  
Laboratory Technician

08/15/2024  
Test Date

  
\_\_\_\_\_  
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**LUMBAR SPINE TEST**

**ES-2re DUMMY**

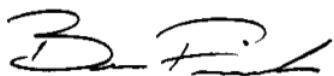
**ATD Serial No:**           F032          

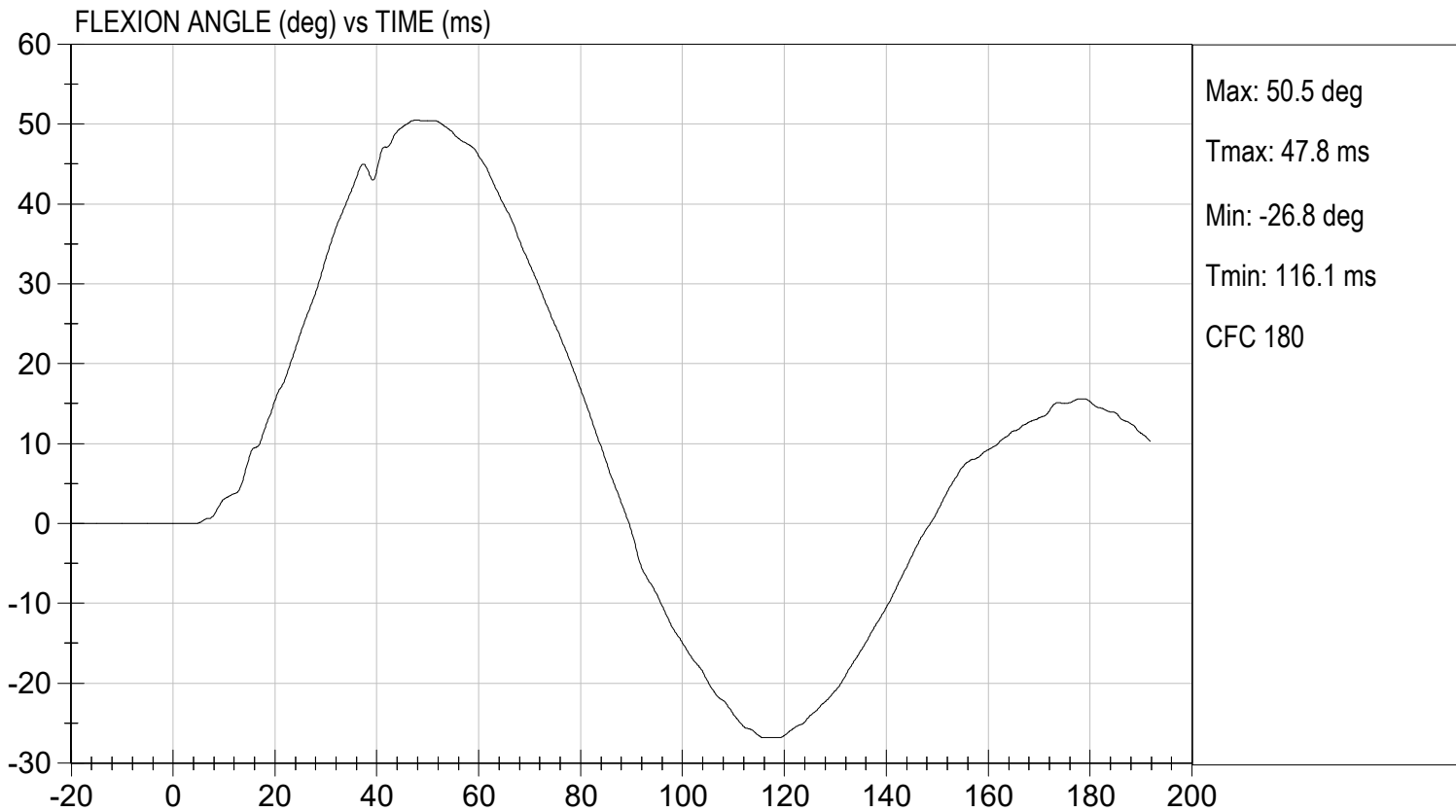
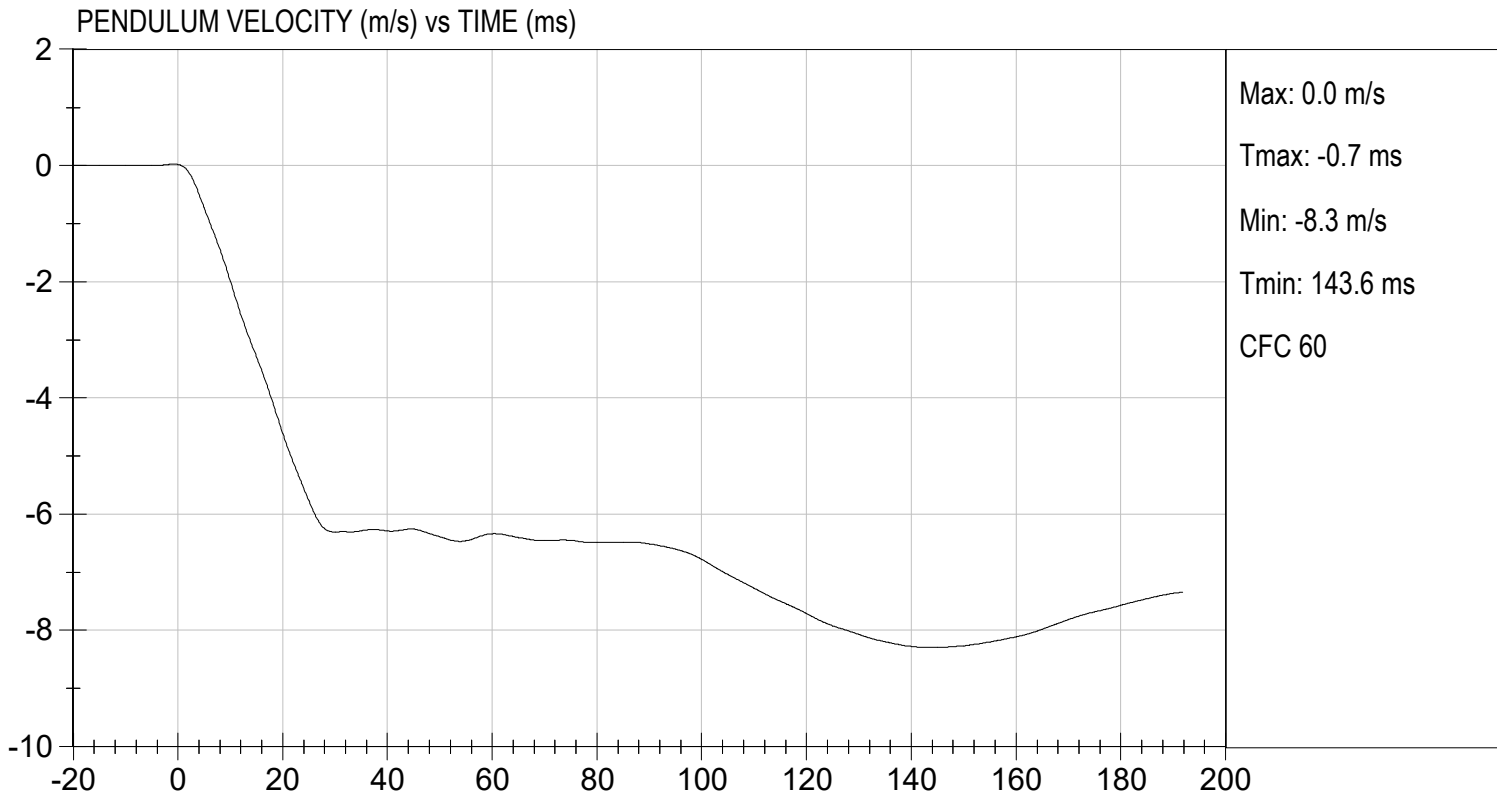
**Test I.D.:**           D242088          

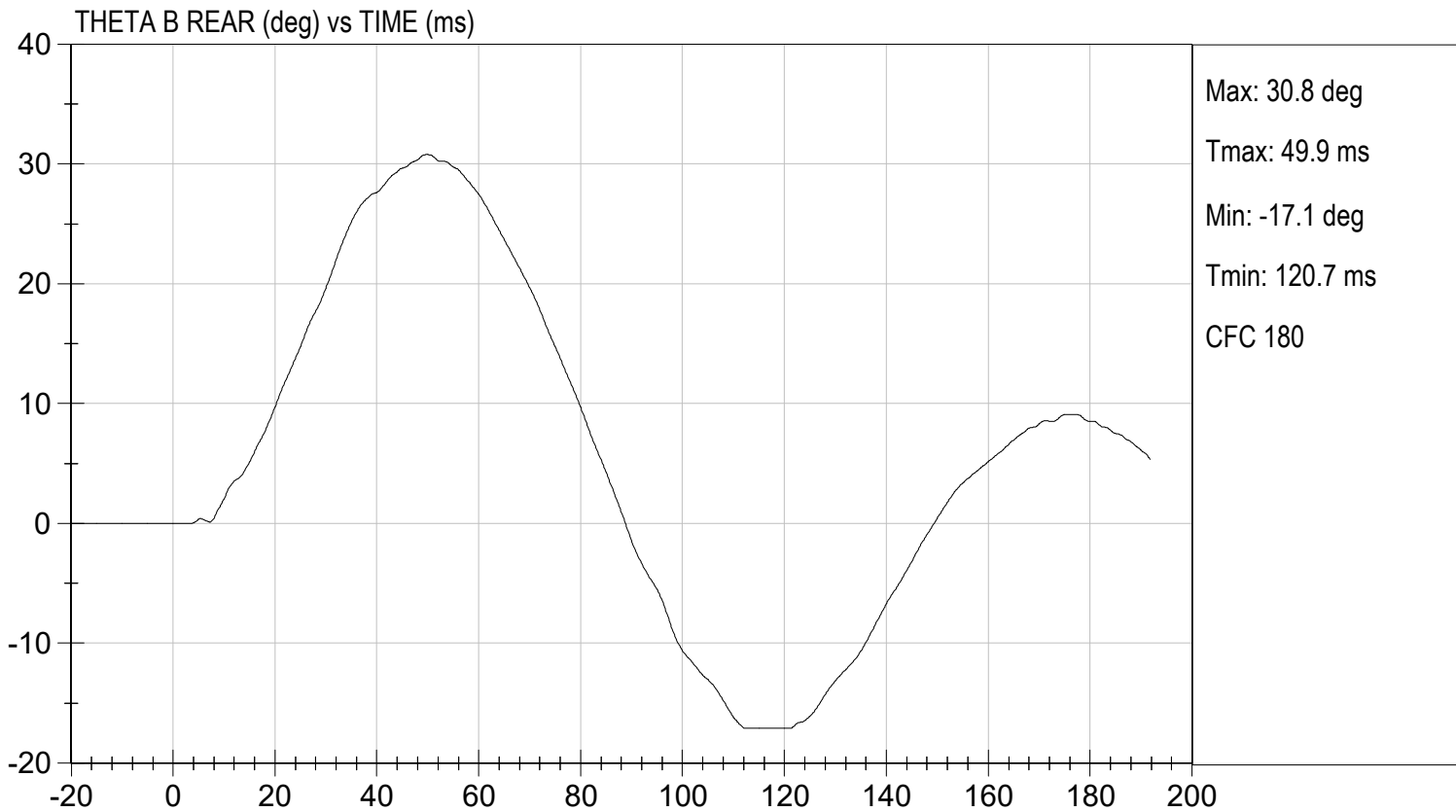
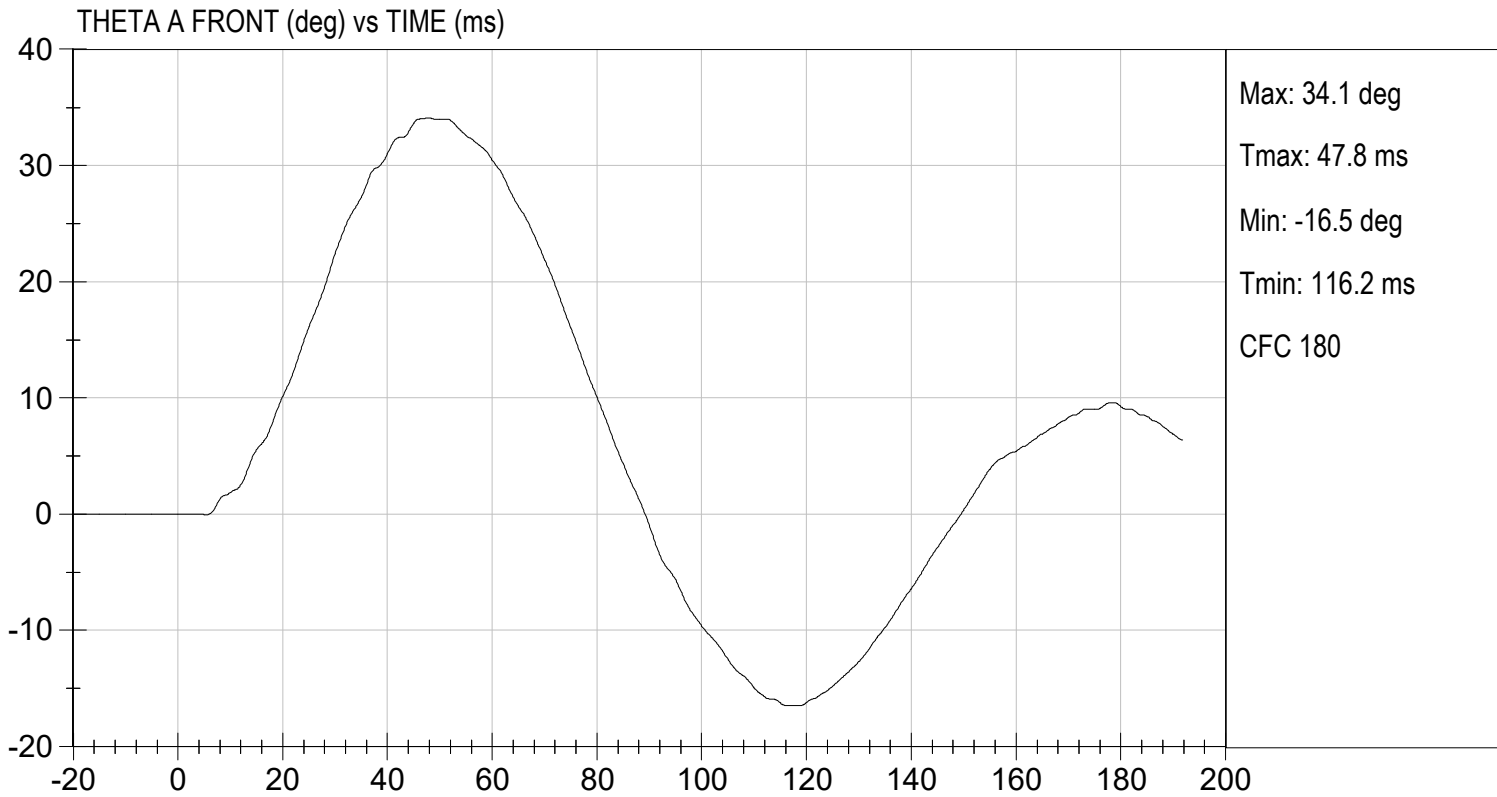
| Tested Parameter                            | Units  | Specification | Result          | Pass/Fail   |      |
|---|--------|---------------|-----------------|-------------|------|
| Laboratory Temperature                      | deg C  | 20.6 to 22.2  | 21.3            | Pass        |      |
| Laboratory Relative Humidity                | %      | 10 to 70      | 47              | Pass        |      |
| Pendulum Speed                              | m/s    | 5.95 to 6.15  | 6.12            | Pass        |      |
| Pendulum Velocity                           | 1 ms   | m/s           | -0.05 to 0.00   | -0.02       | Pass |
|   | 3.7 ms | m/s           | -0.425 to -0.24 | -0.421      | Pass |
|   | 27 ms  | m/s           | -6.50 to -5.80  | -6.15       | Pass |
|   | 30 ms  | m/s           | >= -6.50        | -6.31       | Pass |
| Maximum Flexion Angle                       | deg    | 45.0 to 55.0  | 50.5            | Pass        |      |
| Time of Maximum Flexion Angle               | ms     | 39.0 to 53.0  | 47.8            | Pass        |      |
| Headform Rotation Decay to Initial Position | ms     | 37 to 57      | 42              | Pass        |      |
| <b>Overall Results</b>                      |        |               |                 | <b>Pass</b> |      |

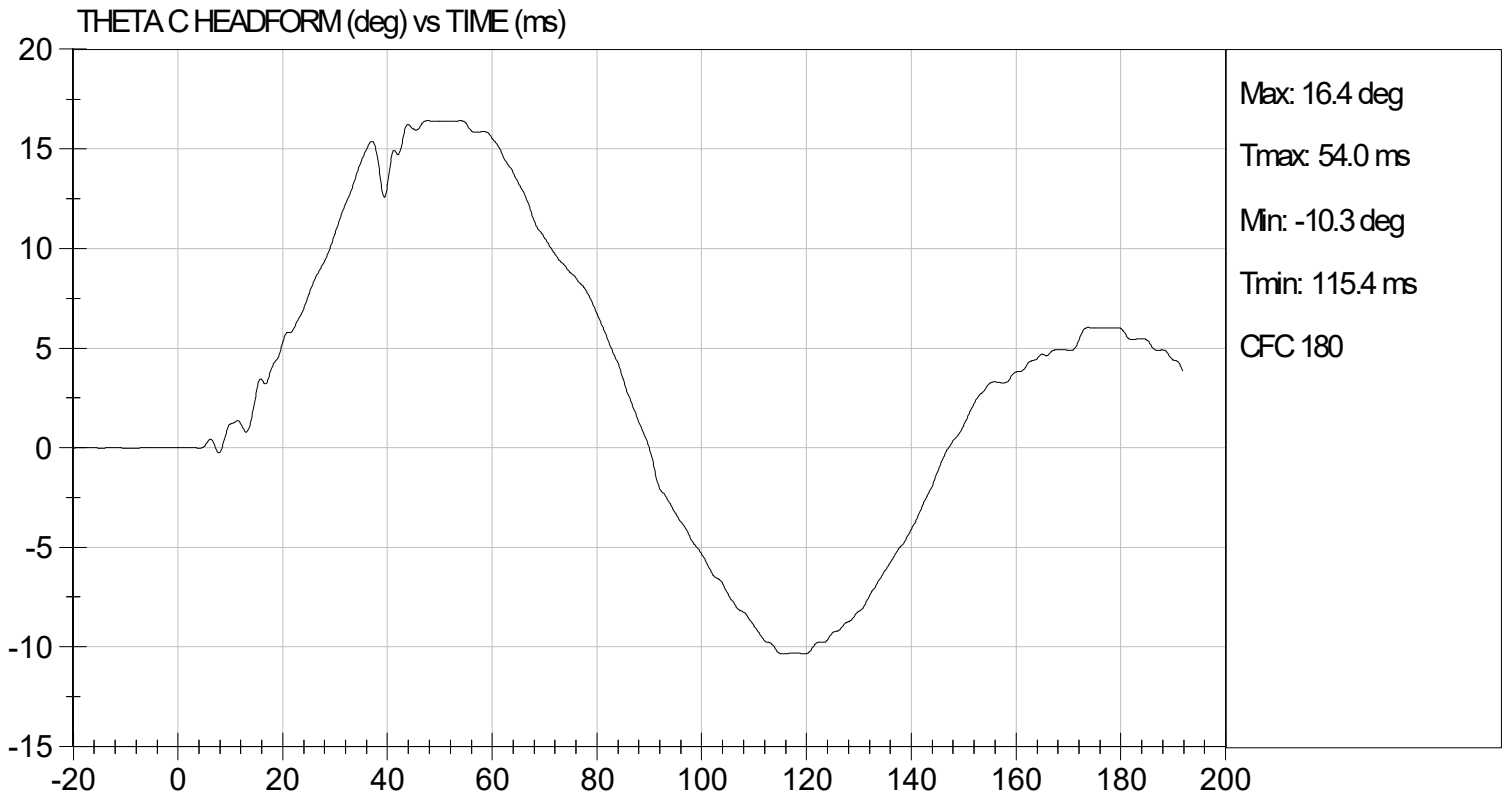
  
 Laboratory Technician

          08/15/2024            
 Test Date

  
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PELVIS TEST

ES-2re DUMMY

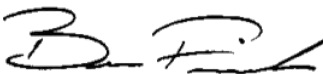
ATD Serial No:           F032          

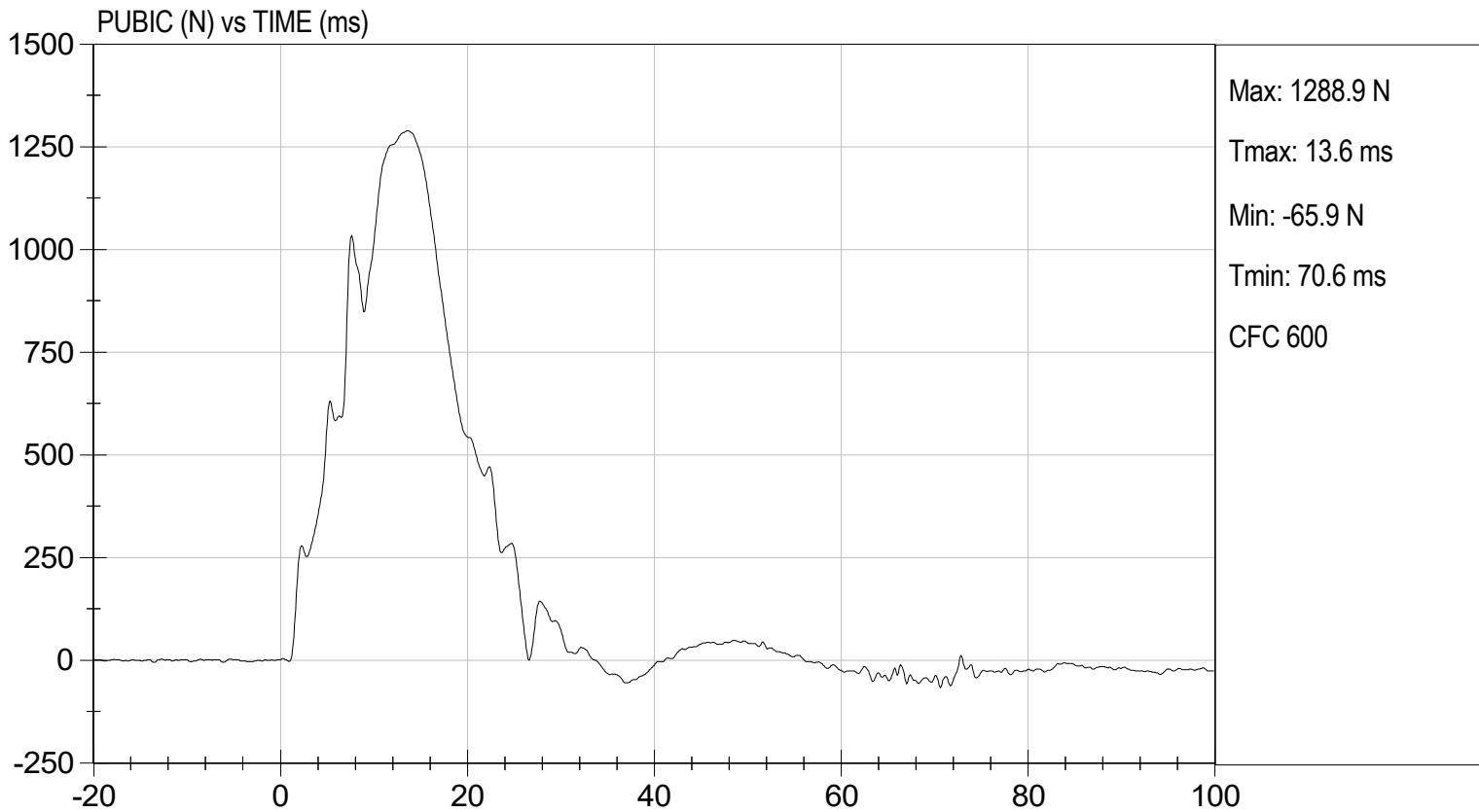
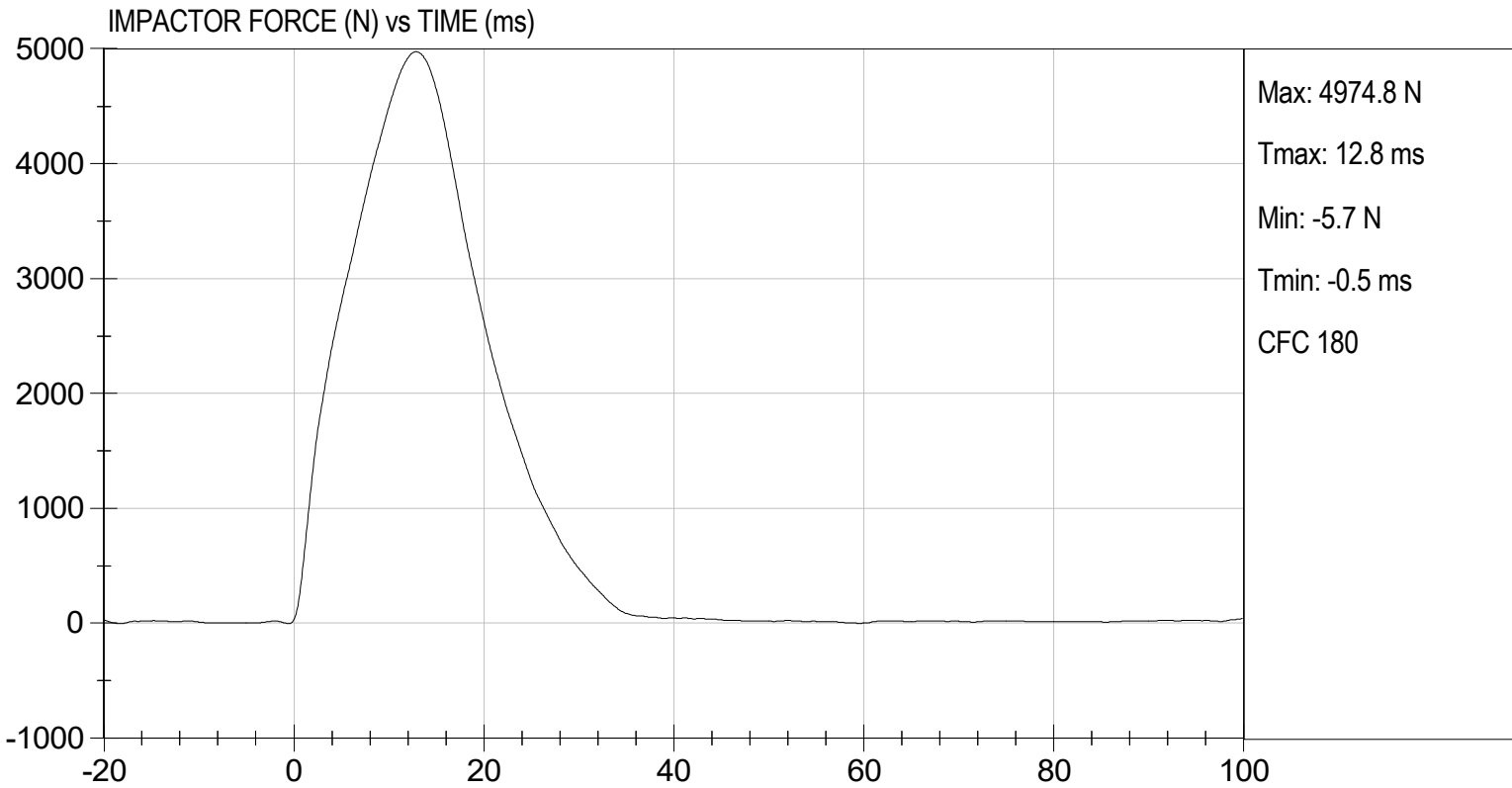
Test I.D:           D242089          

| Tested Parameter               | Units | Specification | Result | Pass/Fail |
|--------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature         | deg C | 20.6 to 22.2  | 21.2   | Pass      |
| Laboratory Relative Humidity   | %     | 10 to 70      | 48     | Pass      |
| Probe Speed                    | m/s   | 4.20 to 4.40  | 4.30   | Pass      |
| Maximum Impactor Force         | N     | 4700 to 5400  | 4975   | Pass      |
| Time of Maximum Impactor Force | ms    | 11.8 to 16.1  | 12.8   | Pass      |
| Maximum Pubic Force            | N     | 1230 to 1590  | 1289   | Pass      |
| Time of Maximum Pubic Force    | ms    | 12.2 to 17.0  | 13.6   | Pass      |
| Overall Test Results           |       |               |        | Pass      |

  
Laboratory Technician

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Test Date

  
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THORAX IMPACT TEST

ES-2re DUMMY

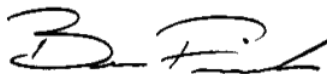
ATD Serial No:           F032          

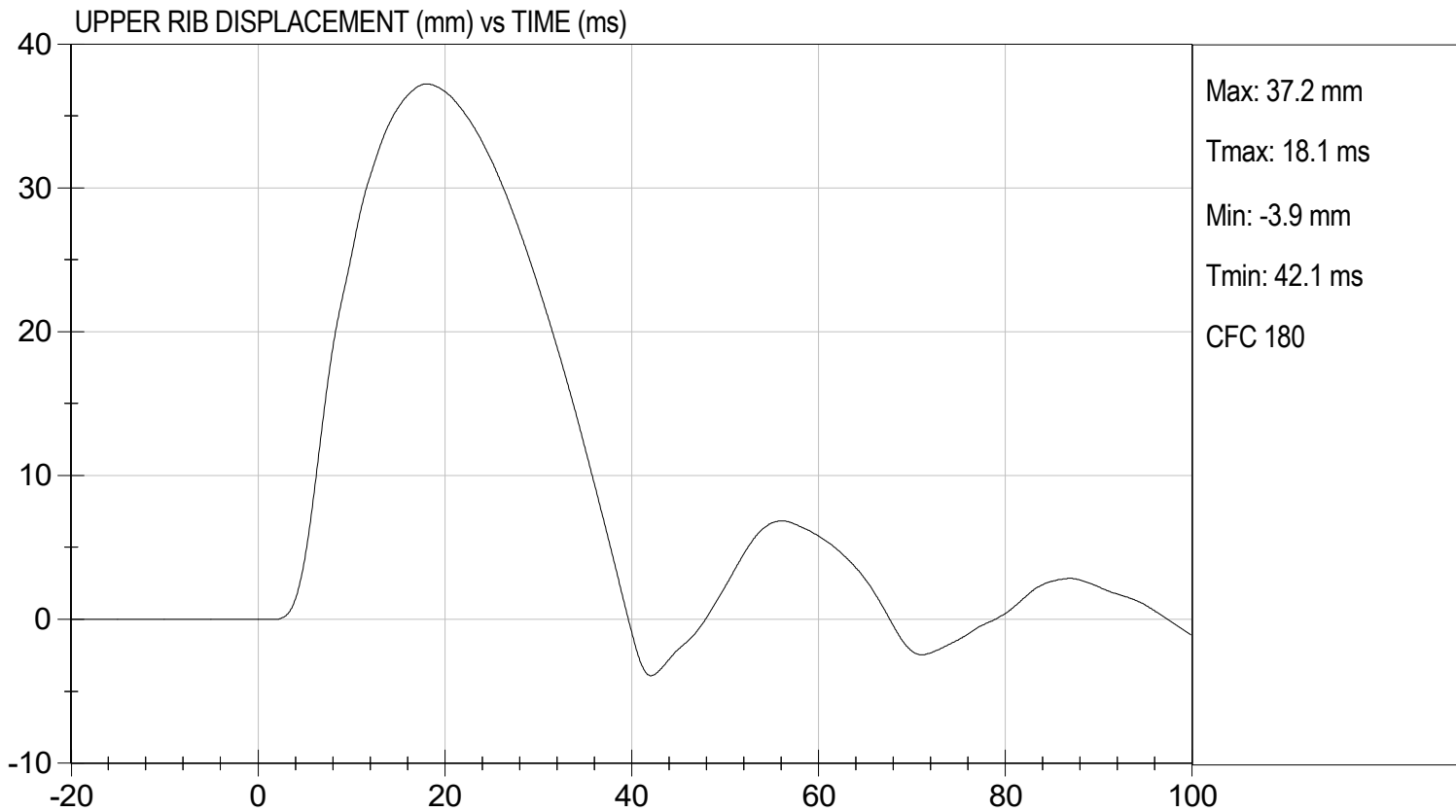
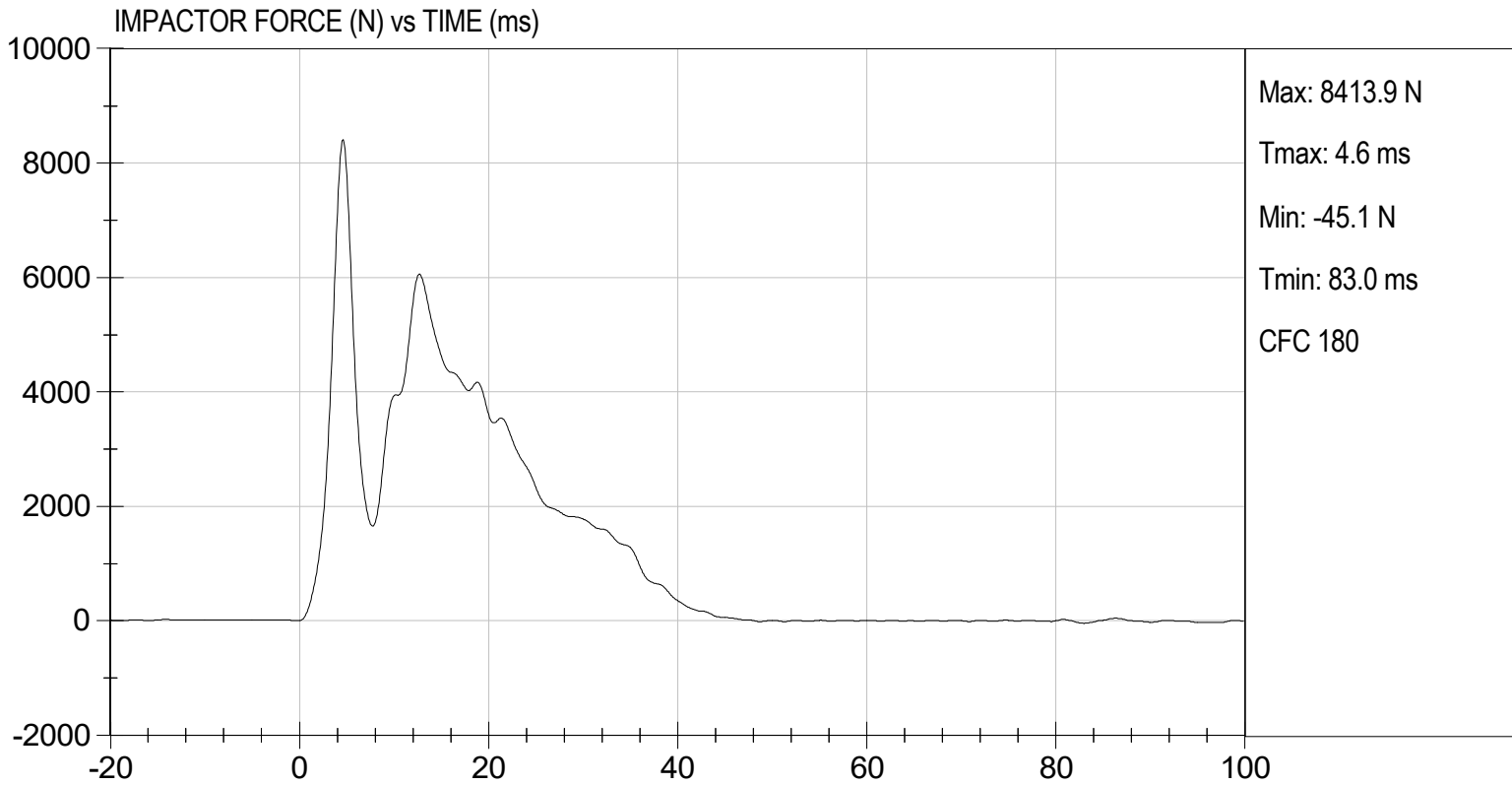
Test I.D:           D242080          

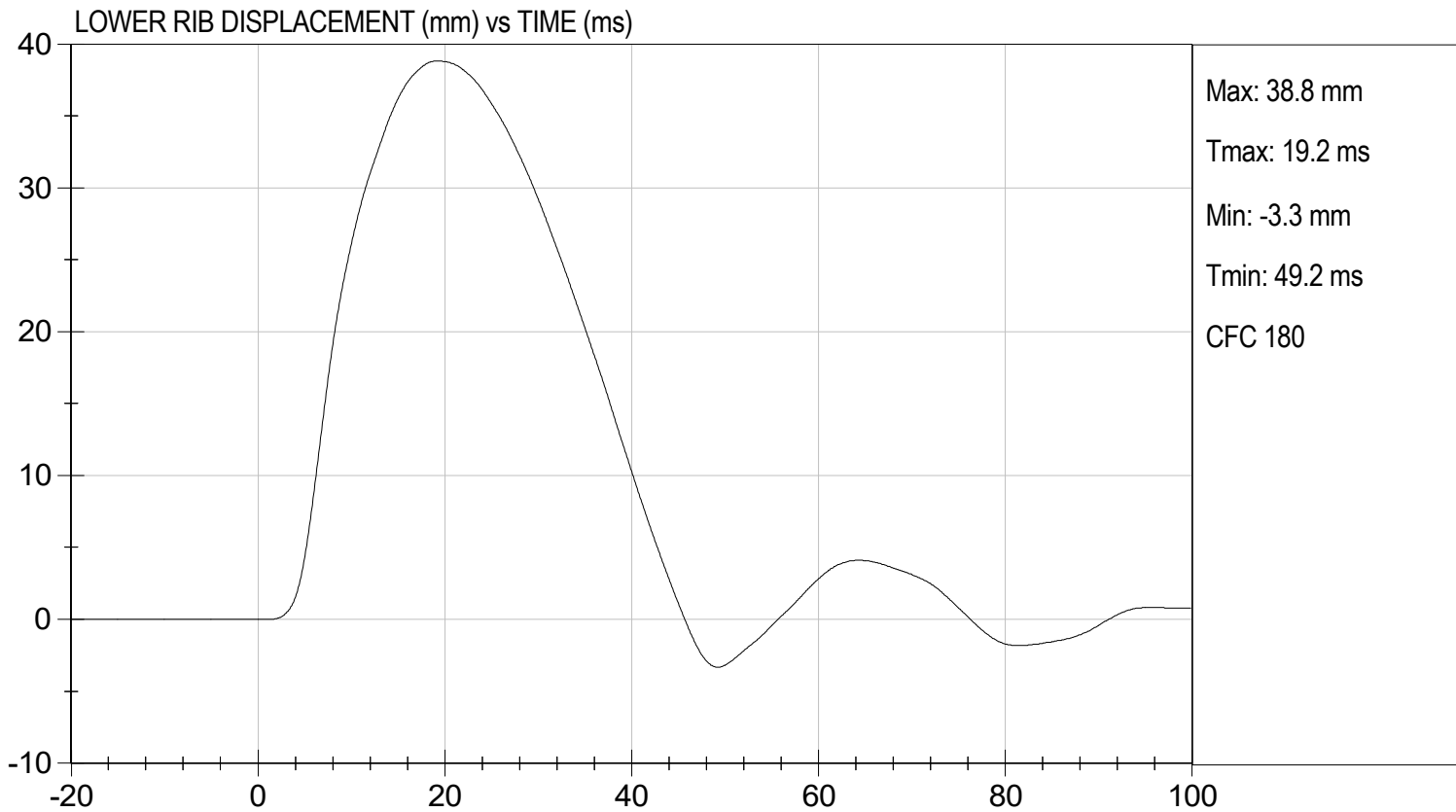
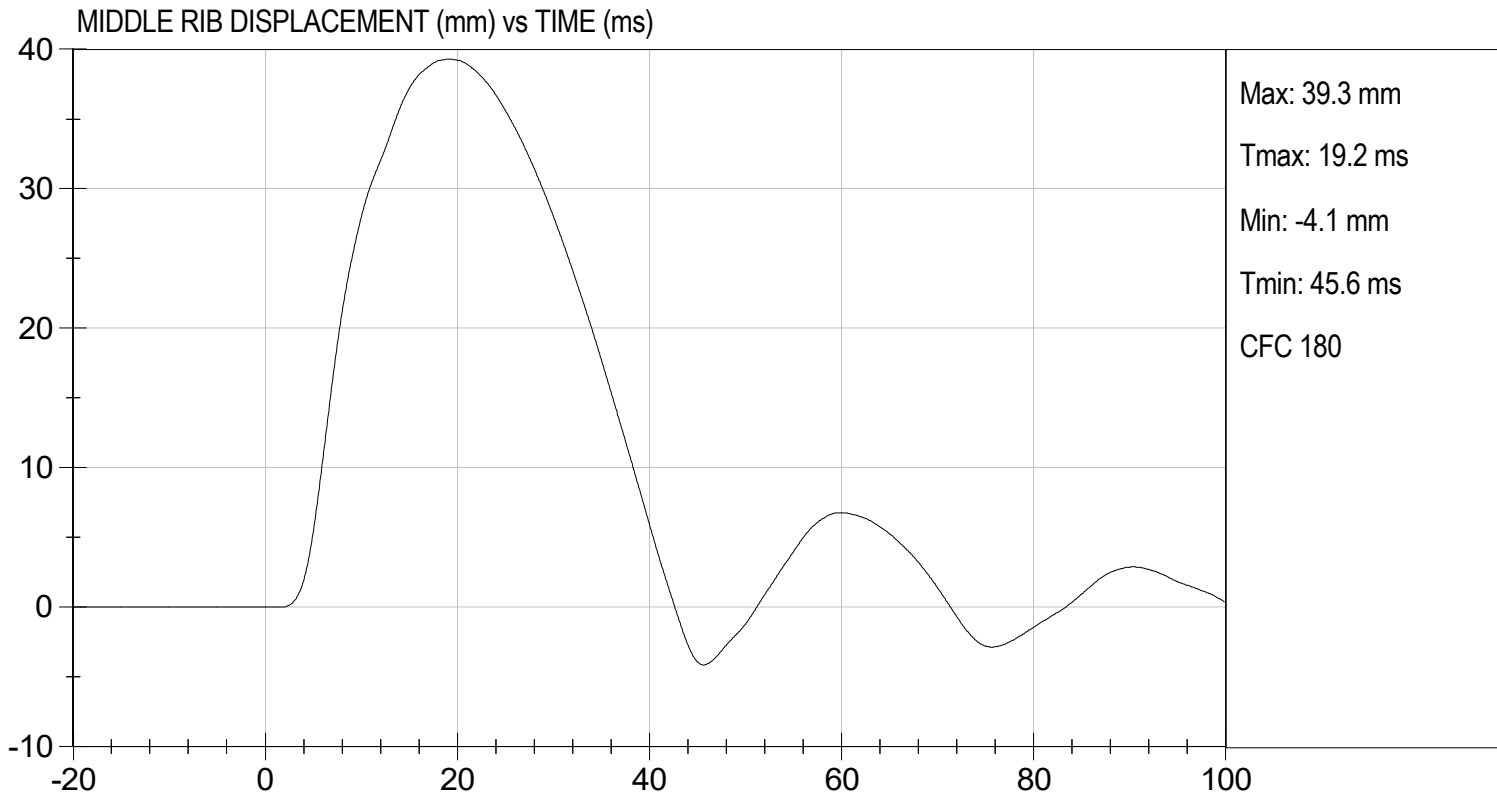
| Tested Parameter                    | Units | Specification | Result | Pass/Fail |
|-------------------------------------|-------|---------------|--------|-----------|
| Temperature                         | deg C | 20.6 to 22.2  | 21.2   | Pass      |
| Humidity                            | %     | 10 to 70      | 48     | Pass      |
| Probe Speed                         | m/s   | 5.40 to 5.60  | 5.40   | Pass      |
| Maximum Impactor Force (after 6 ms) | N     | 5100 to 6200  | 6058   | Pass      |
| Upper Rib Displacement              | mm    | 34.0 to 41.0  | 37.2   | Pass      |
| Middle Rib Displacement             | mm    | 37.0 to 45.0  | 39.3   | Pass      |
| Lower Rib Displacement              | mm    | 37.0 to 44.0  | 38.8   | Pass      |
| Overall Test Results                |       |               |        | Pass      |

  
Laboratory Technician

          08/15/2024            
Test Date

  
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**QUALIFICATION TEST RESULTS**

**POST-TEST**

**EUROSID 2 (ES-2RE) MALE – DRIVER ATD**

**ES-2re External Measurements  
SN: F032**

| <b>No.</b> | <b>Name</b>                                    | <b>Spec. (mm)</b> | <b>Result</b> | <b>Pass/Fail</b> |
|------------|--|-------------------|---------------|------------------|
| 1          | Sitting Height                                 | 900 - 918         | 915           | Pass             |
| 2          | Seat to Shoulder Joint                         | 558 - 572         | 568           | Pass             |
| 3          | Seat to Lower Face of Thoracic Spine Box       | 346 - 356         | 355           | Pass             |
| 4          | Seat to Hip Joint (center of bolt)             | 97 - 103          | 98            | Pass             |
| 5          | Sole to Seat, Sitting                          | 333 - 451         | 440           | Pass             |
| 6          | Head Width                                     | 152 - 158         | 157           | Pass             |
| 7          | Shoulder/Arm Width                             | 461 - 479         | 464           | Pass             |
| 8          | Thorax Width                                   | 322 - 332         | 323           | Pass             |
| 9          | Abdomen Width                                  | 273 - 287         | 281           | Pass             |
| 10         | Pelvis Lap Width                               | 359 - 373         | 370           | Pass             |
| 11         | Head Depth                                     | 196 - 206         | 203           | Pass             |
| 12         | Thorax Depth                                   | 262 - 272         | 264           | Pass             |
| 13         | Abdomen Depth                                  | 194 - 204         | 196           | Pass             |
| 14         | Pelvis Depth                                   | 235 - 245         | 236           | Pass             |
| 15         | Back of Buttocks to Hip Joint (center of bolt) | 150 - 160         | 151           | Pass             |
| 16         | Back of Buttocks to Front Knee                 | 597 - 615         | 607           | Pass             |

**MGA RESEARCH CORPORATION**

**HEAD DROP TEST**

**ES-2re DUMMY**

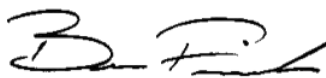
**ATD Serial No:**           F032          

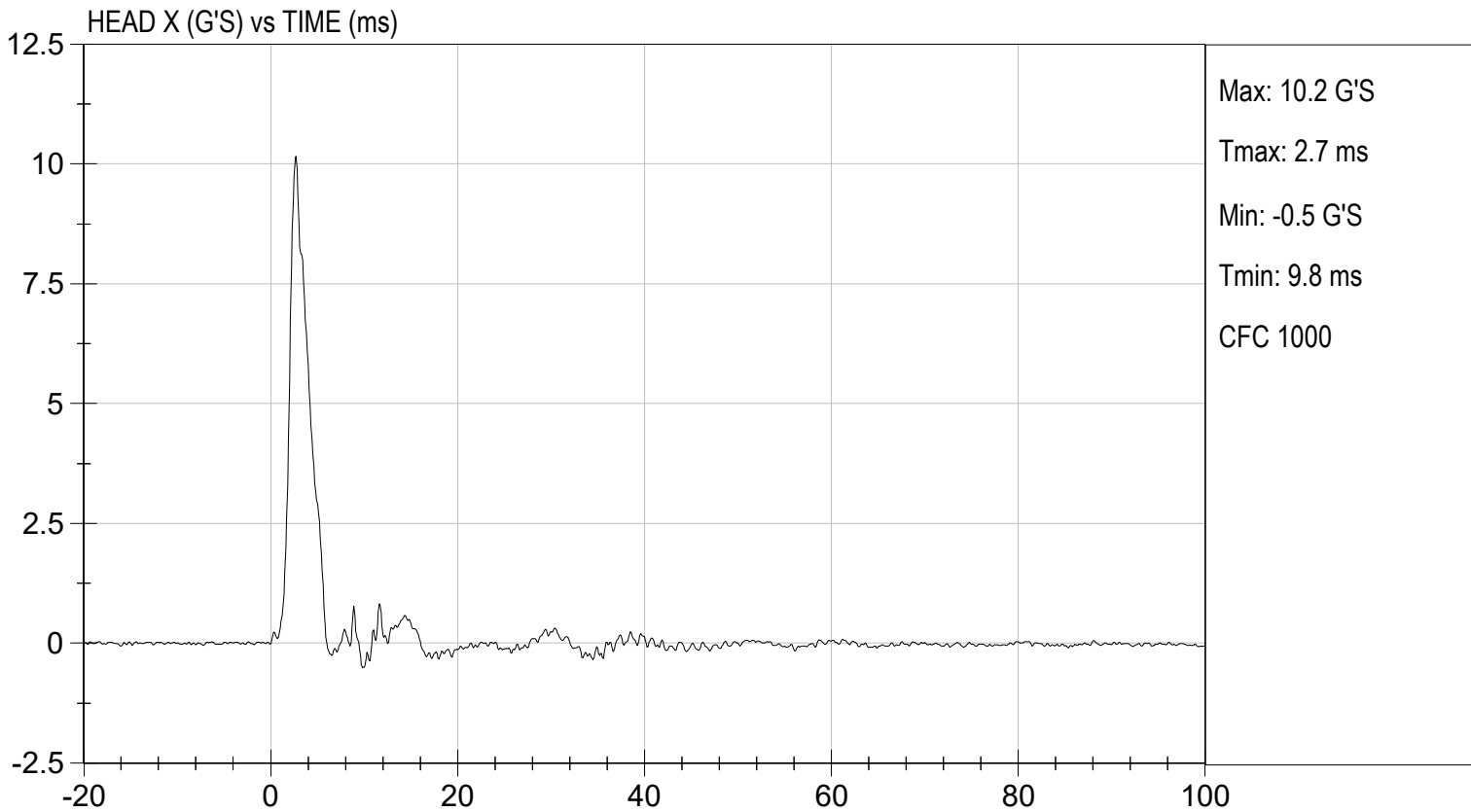
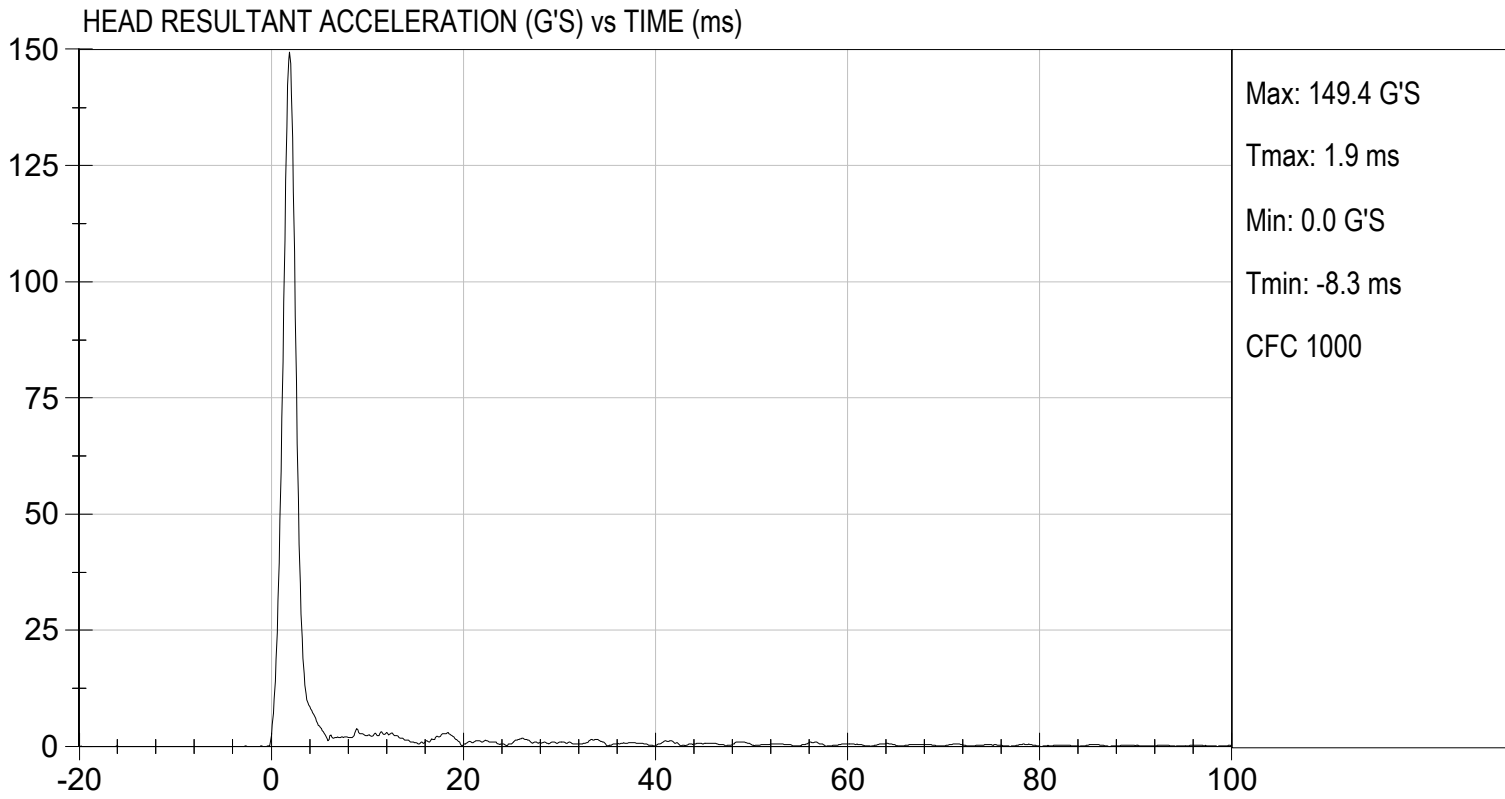
**Test ID:**           D242211          

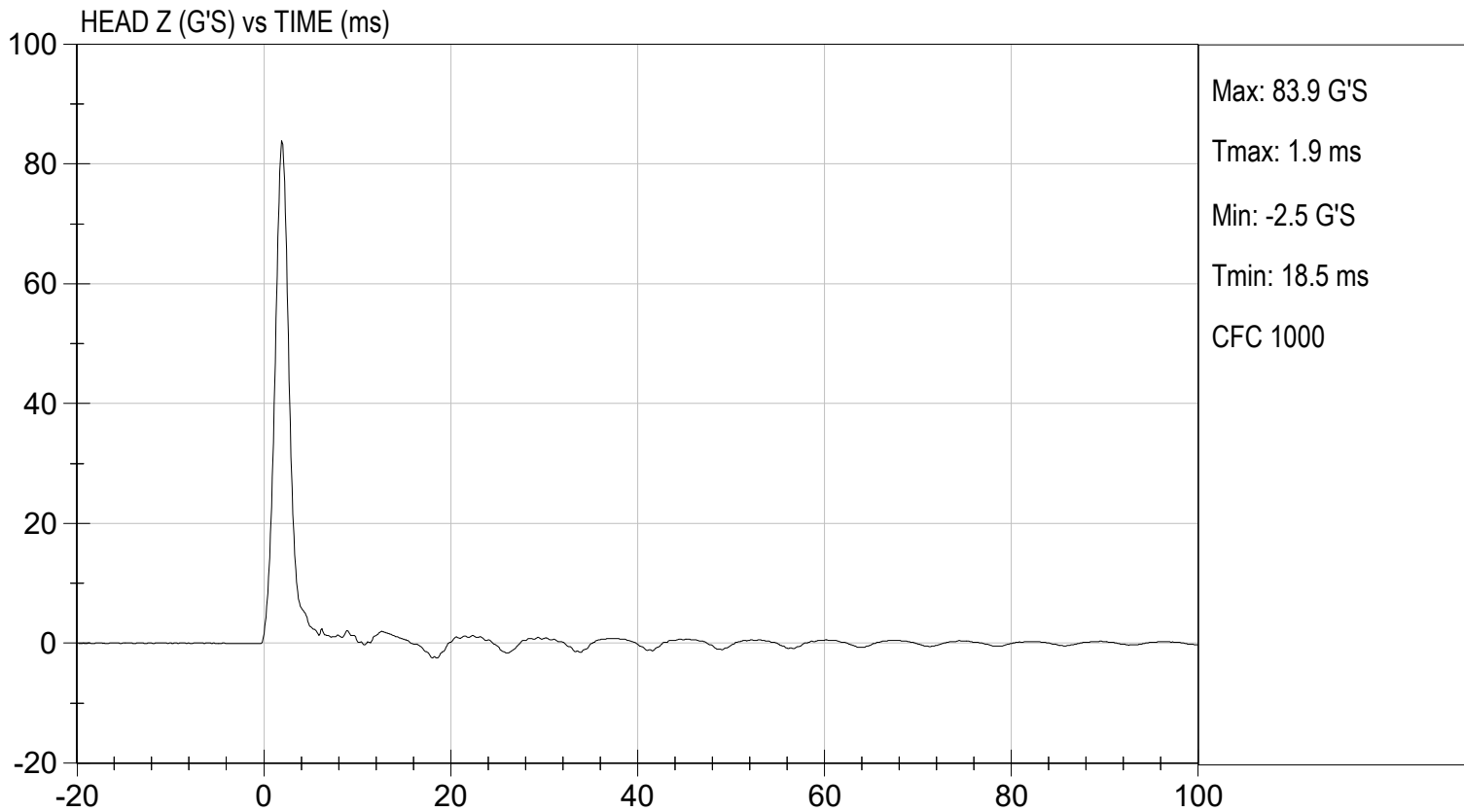
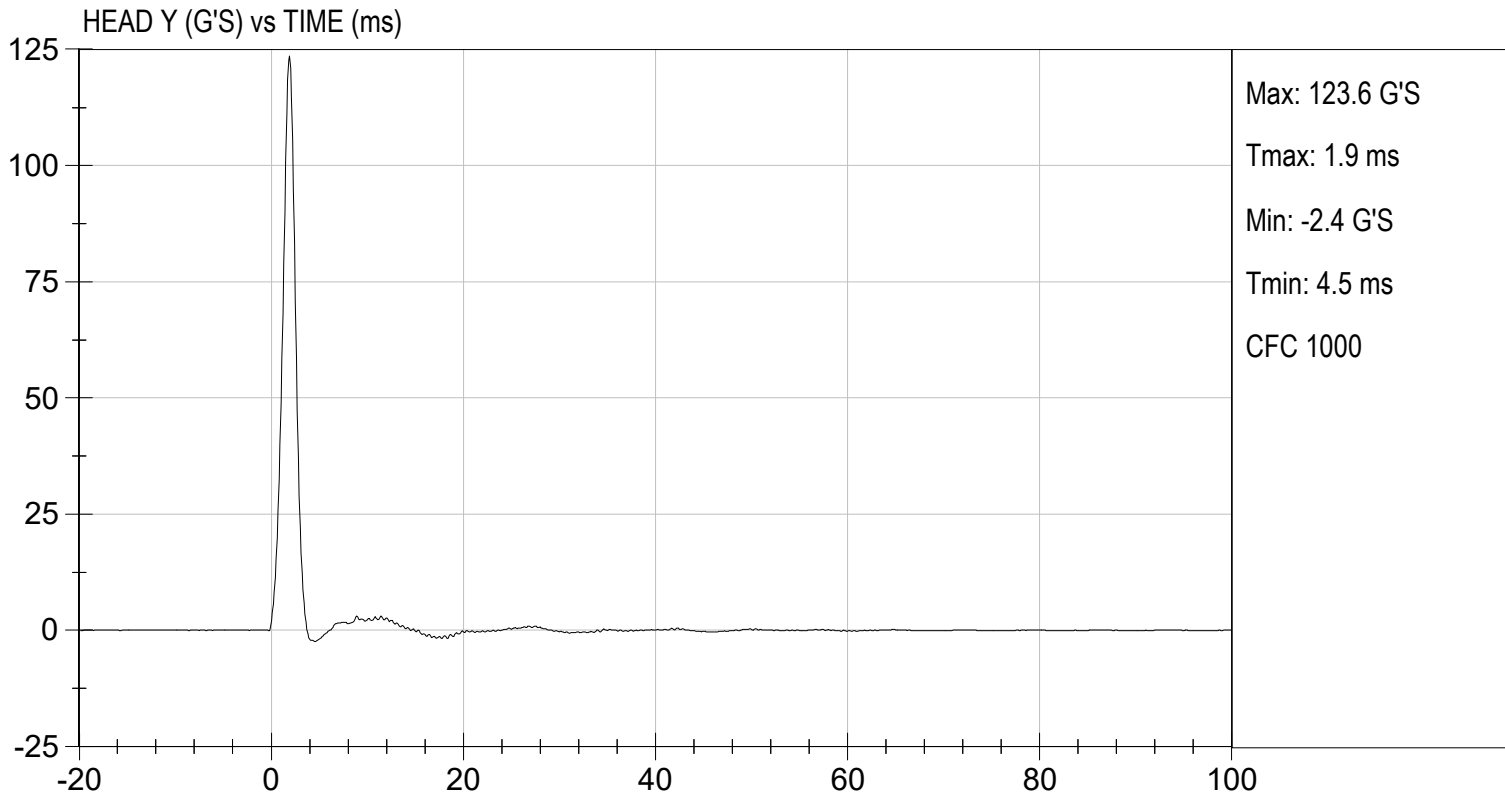
| Tested Parameter               | Units | Specification      | Result | Pass/Fail   |
|--------------------------------|-------|--------------------|--------|-------------|
| Laboratory Temperature         | deg C | 18.9 to 25.6       | 21.3   | Pass        |
| Laboratory Relative Humidity   | %     | 10 to 70           | 49     | Pass        |
| Peak Resultant Acceleration    | G's   | 125 to 155         | 149    | Pass        |
| Peak Longitudinal Acceleration | G's   | <= +/- 15.0        | 10.2   | Pass        |
| Unimodal                       | N/A   | Yes                | Yes    | Pass        |
| Oscillations                   | N/A   | within 15% of peak | Yes    | Pass        |
| <b>Overall Test Results</b>    |       |                    |        | <b>Pass</b> |

  
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**NECK PENDULUM TEST**  
**ES-2re DUMMY**

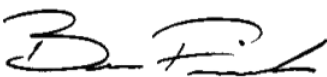
**ATD Serial No:**           F032          

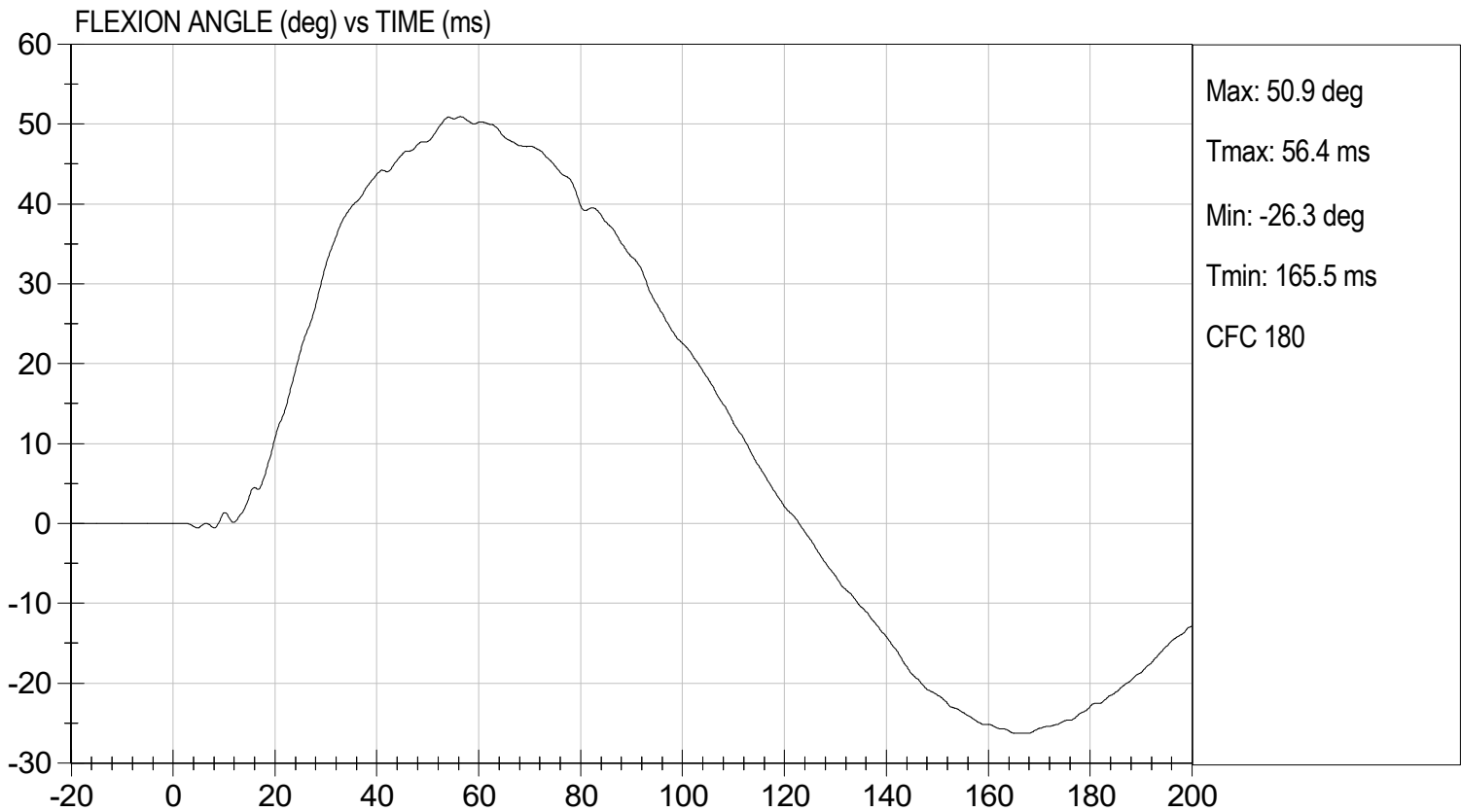
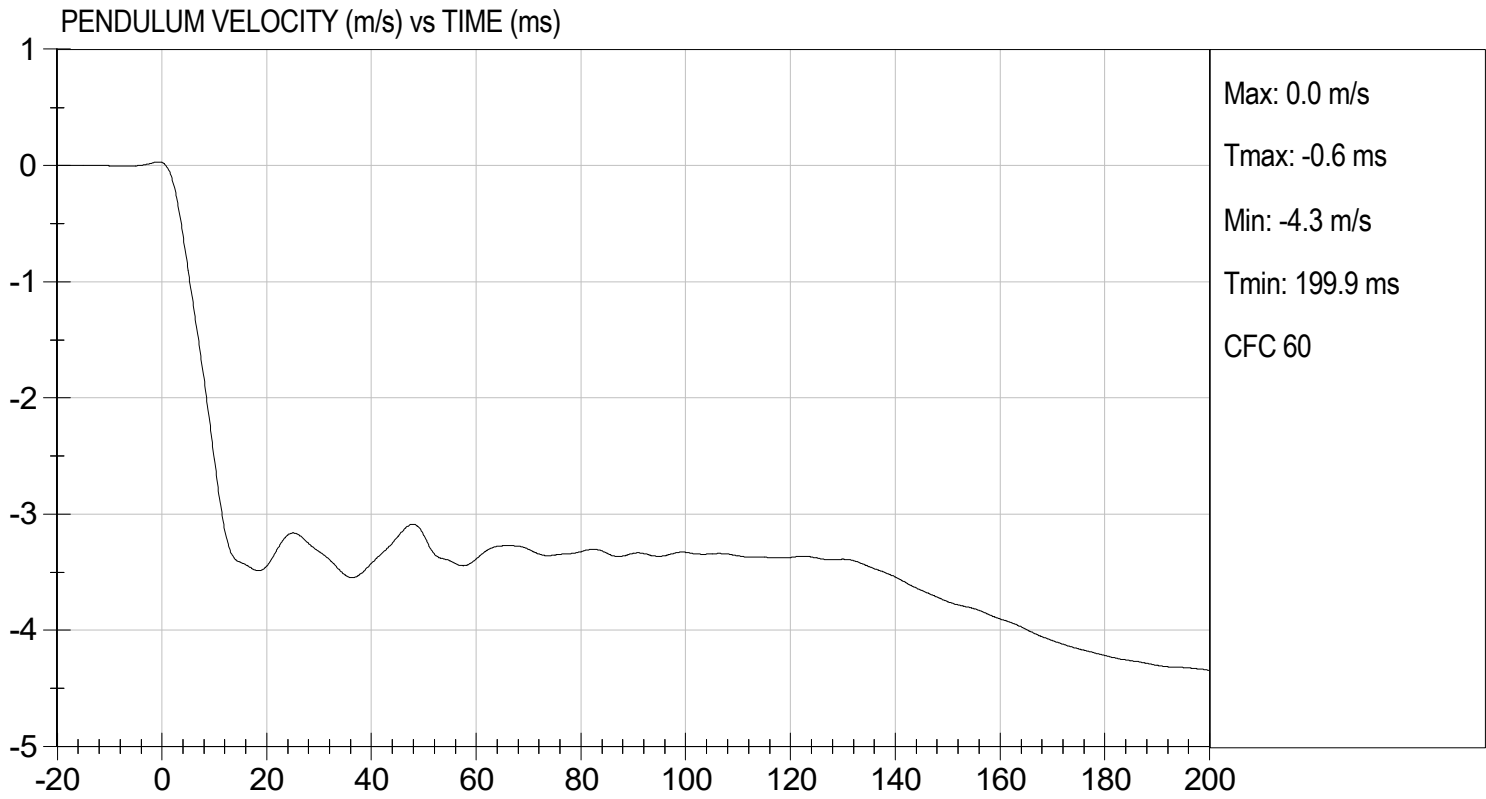
**Test I.D.:**           D242212          

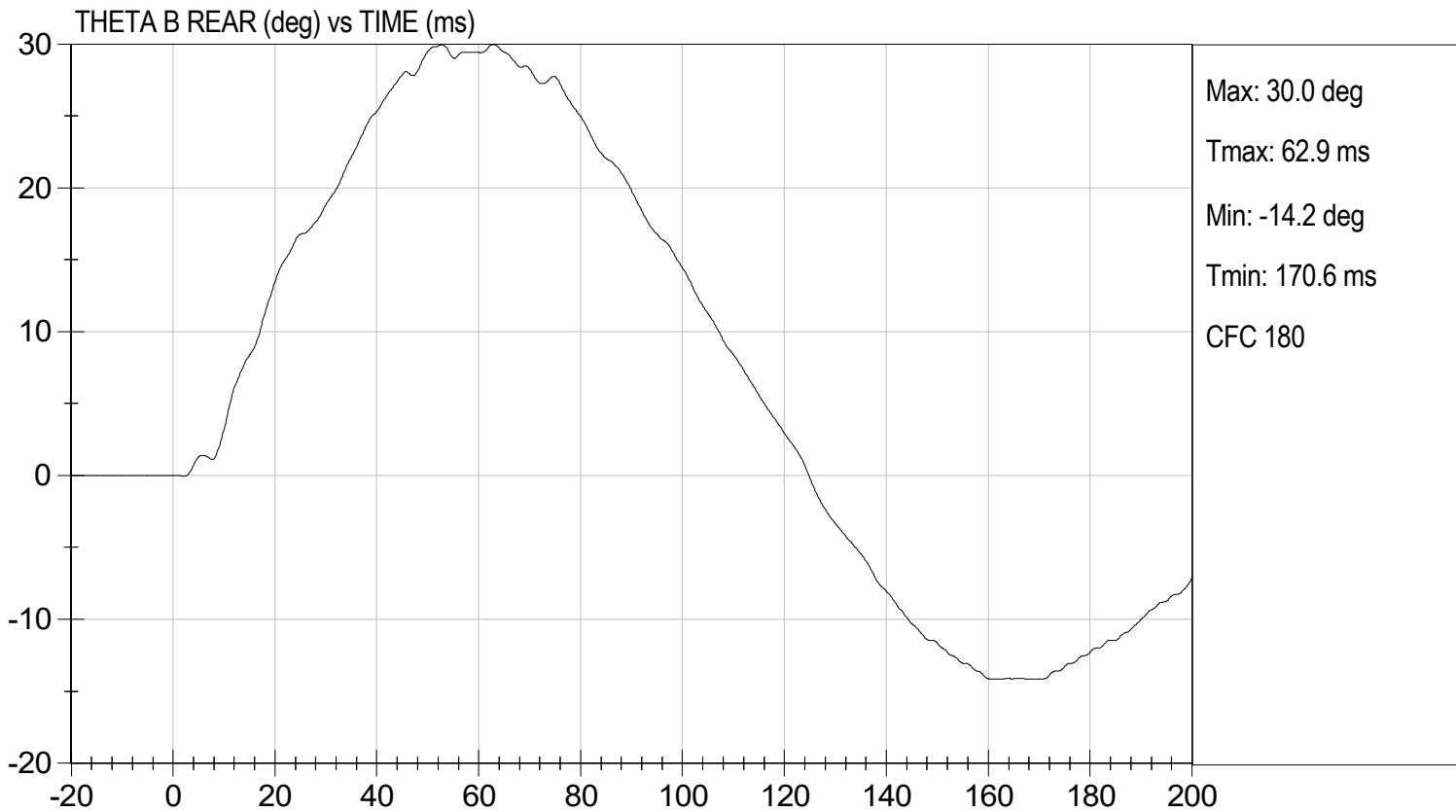
| Tested Parameter                     |       | Units | Specification   | Result | Pass/Fail   |
|--------------------------------------|-------|-------|-----------------|--------|-------------|
| Laboratory Temperature               |       | deg C | 20.6 to 22.2    | 21.2   | Pass        |
| Laboratory Relative Humidity         |       | %     | 10 to 70        | 49     | Pass        |
| Pendulum Speed                       |       | m/s   | 3.30 to 3.50    | 3.43   | Pass        |
| Pendulum Velocity                    | 1 ms  | m/s   | -0.05 to 0.00   | -0.02  | Pass        |
|                                      | 3 ms  | m/s   | -0.25 to -0.375 | -0.32  | Pass        |
|                                      | 14 ms | m/s   | -3.20 to -3.70  | -3.39  | Pass        |
|                                      | 17 ms | m/s   | >= -3.70        | -3.46  | Pass        |
| Maximum Flexion Angle                |       | deg   | 49.0 to 59.0    | 50.9   | Pass        |
| Time of Maximum Flexion Angle        |       | ms    | 54.0 to 66.0    | 56.4   | Pass        |
| Head Rotation Decay Time to 0 Degree |       | ms    | 53.0 to 88.0    | 66.5   | Pass        |
| <b>Overall Results</b>               |       |       |                 |        | <b>Pass</b> |

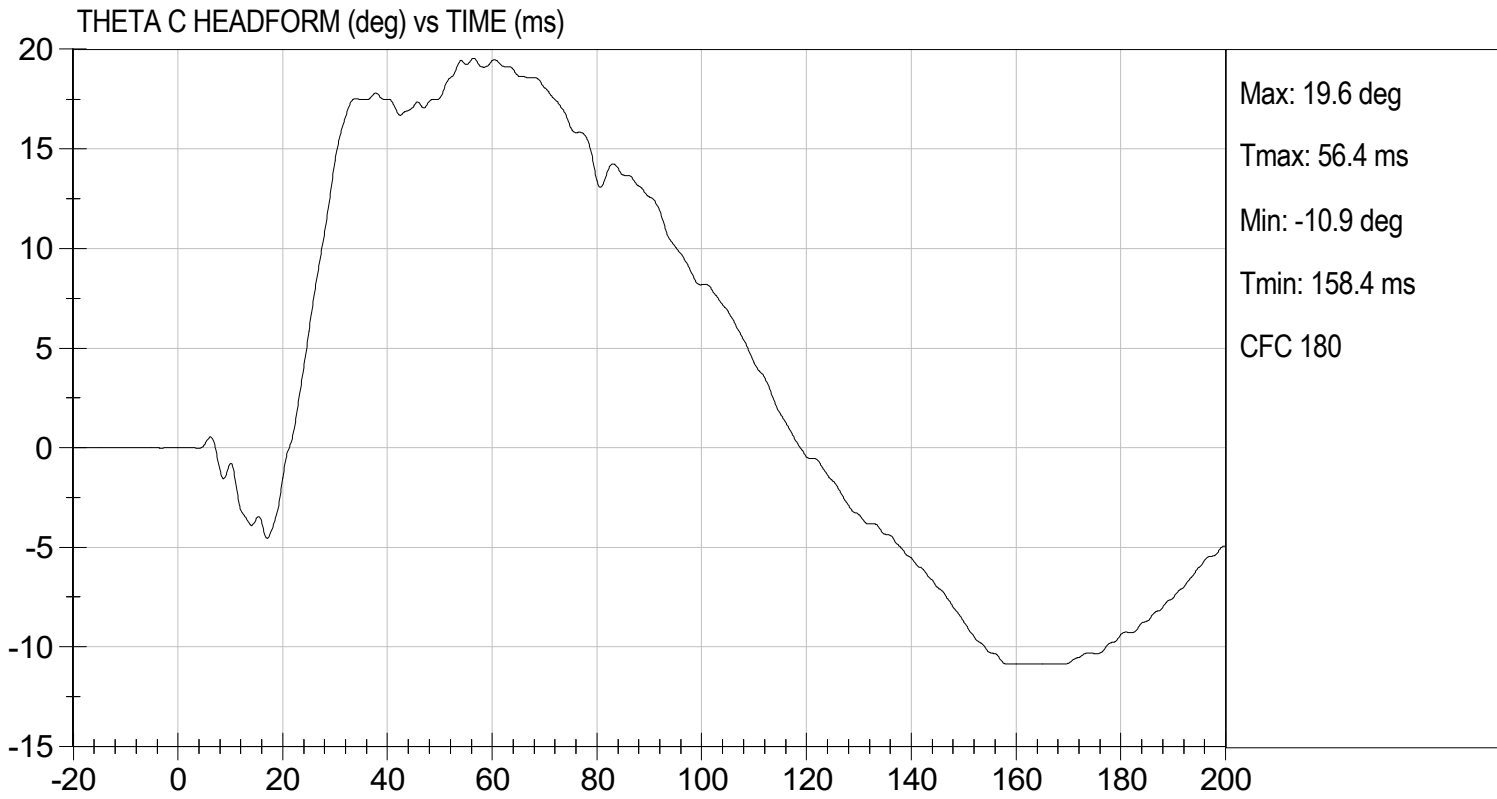
  
 Laboratory Technician

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SHOULDER IMPACT TEST  
ES-2re DUMMY

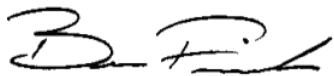
ATD Serial No:       F032      

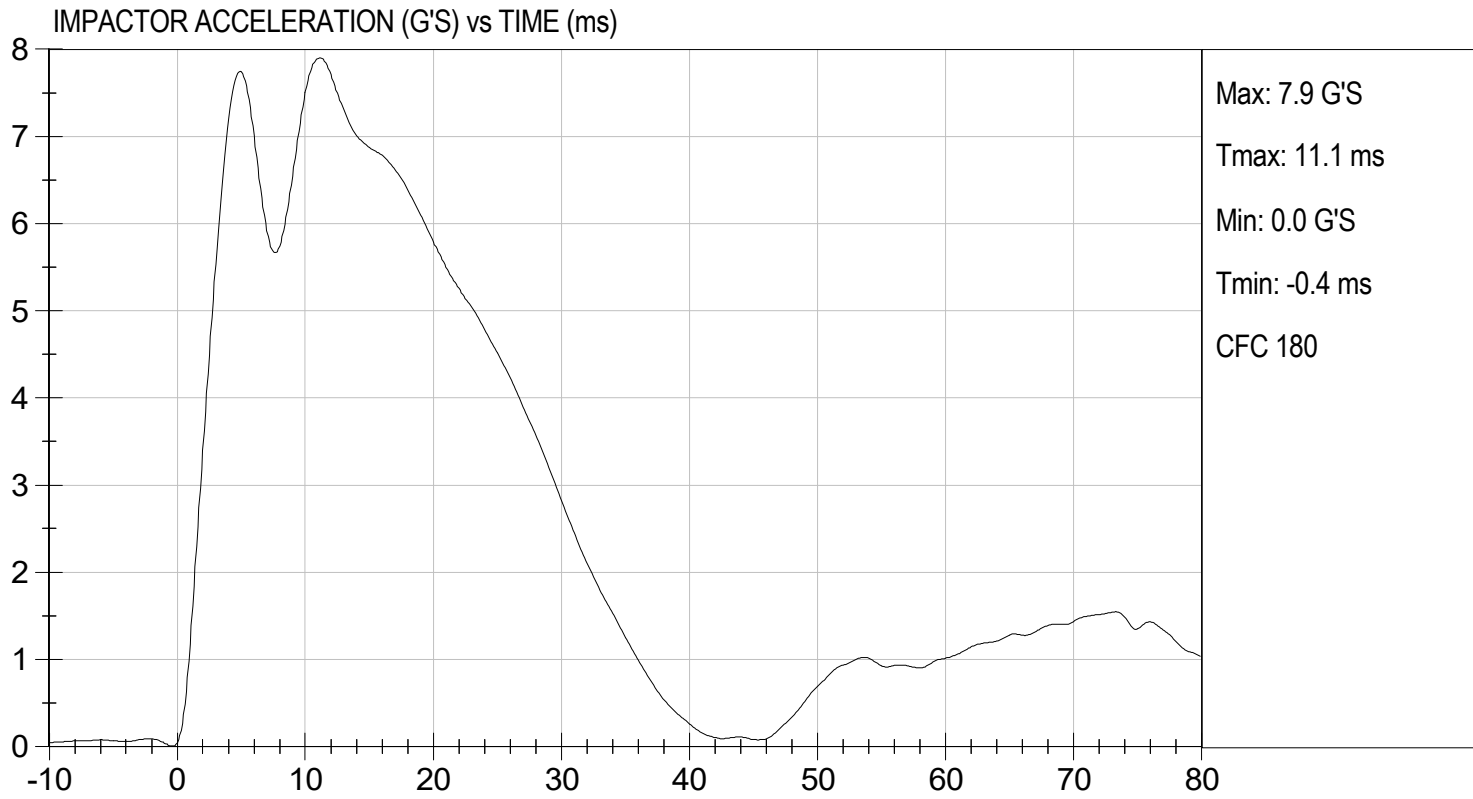
Test I.D:       D242213      

| Tested Parameter             | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature       | deg C | 20.6 to 22.2  | 21.3   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 51     | Pass      |
| Pendulum Speed               | m/s   | 4.20 to 4.40  | 4.23   | Pass      |
| Peak Impactor Acceleration   | G's   | 7.5 to 10.5   | 7.9    | Pass      |
| Overall Test Results         |       |               |        | Pass      |

  
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UPPER RIB TEST

ES-2re DUMMY

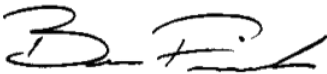
ATD Serial No: F032

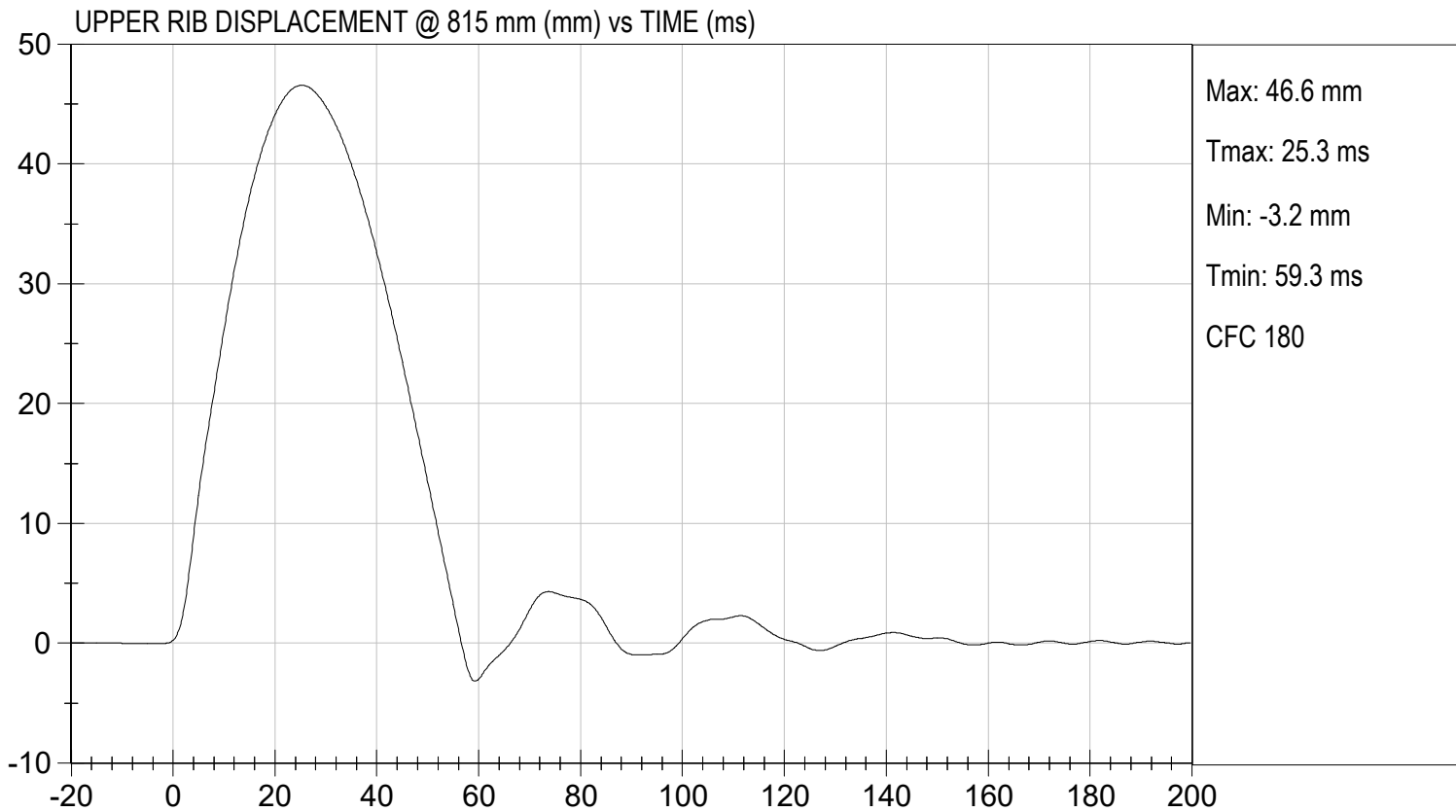
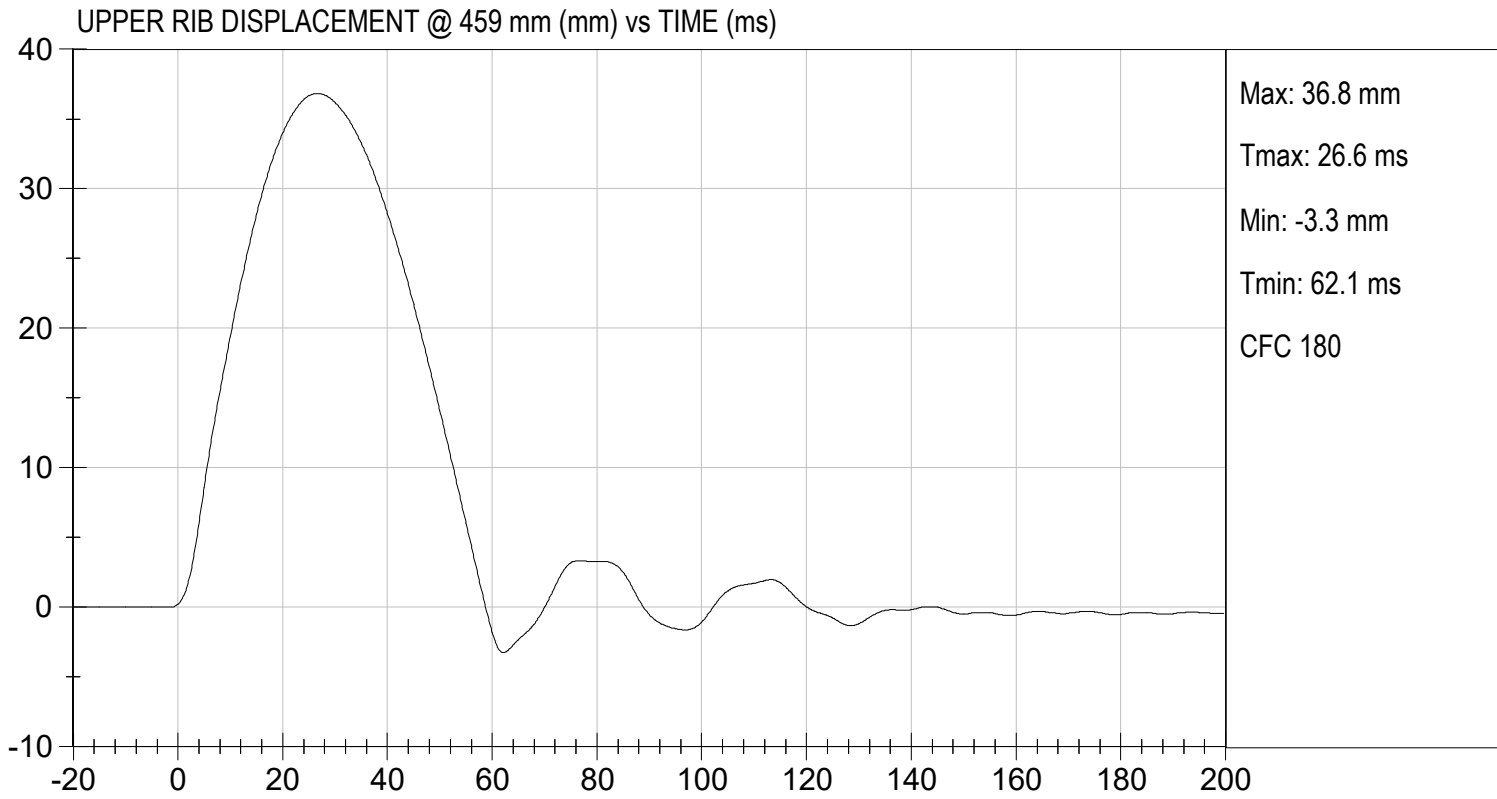
Test I.D: D242214

| Tested Parameter             | Units | Specification | Result               | Pass/Fail |
|------------------------------|-------|---------------|----------------------|-----------|
| Laboratory Temperature       | deg C | 20.6 to 22.2  | 21.3                 | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 49                   | Pass      |
| Displacement at 459 mm       | mm    | 36.0 to 40.0  | 36.8                 | Pass      |
| Displacement at 815 mm       | mm    | 46.0 to 51.0  | 46.6                 | Pass      |
|                              |       |               | Overall Test Results | Pass      |

  
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MID RIB TEST

ES-2re DUMMY


ATD Serial No: F032

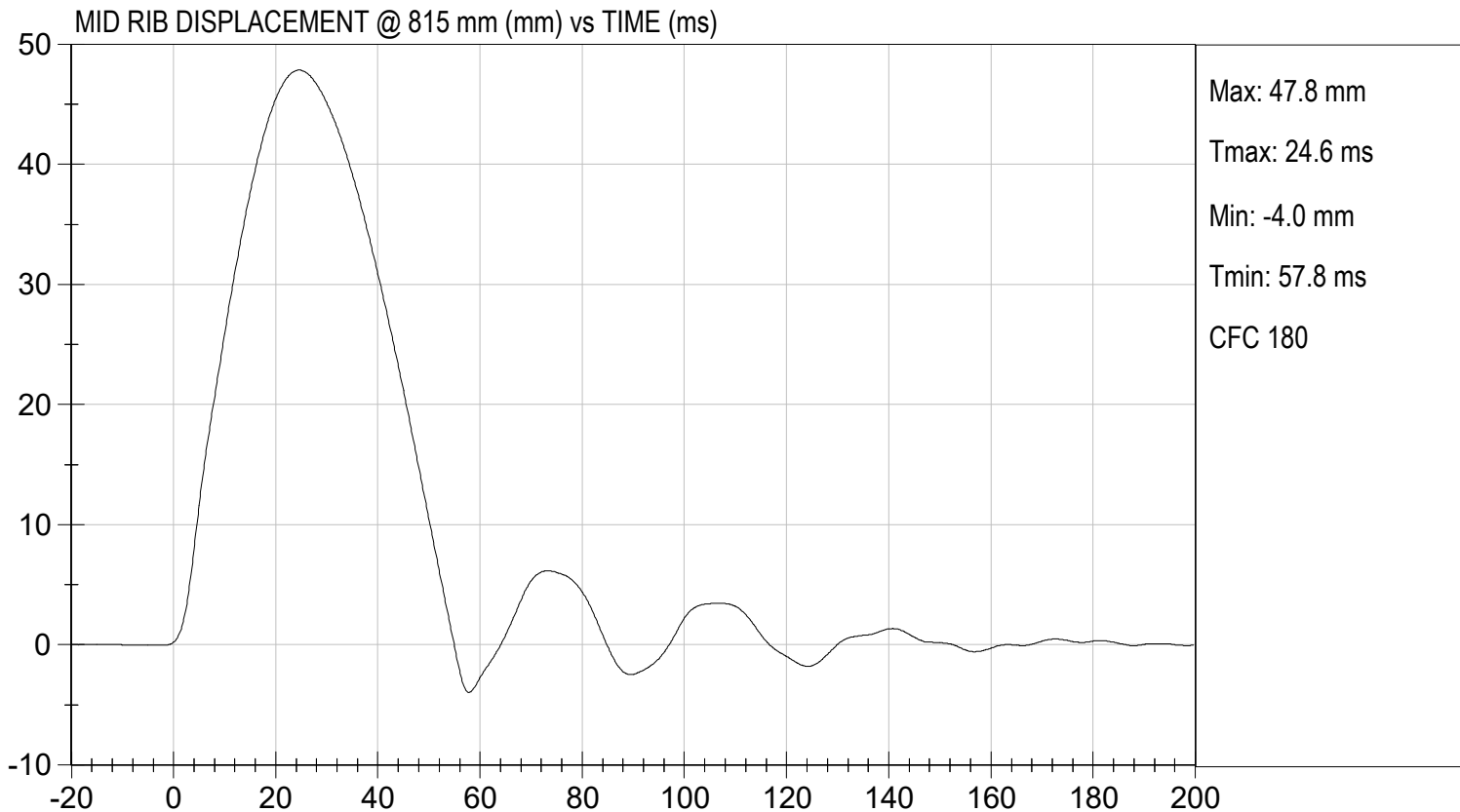
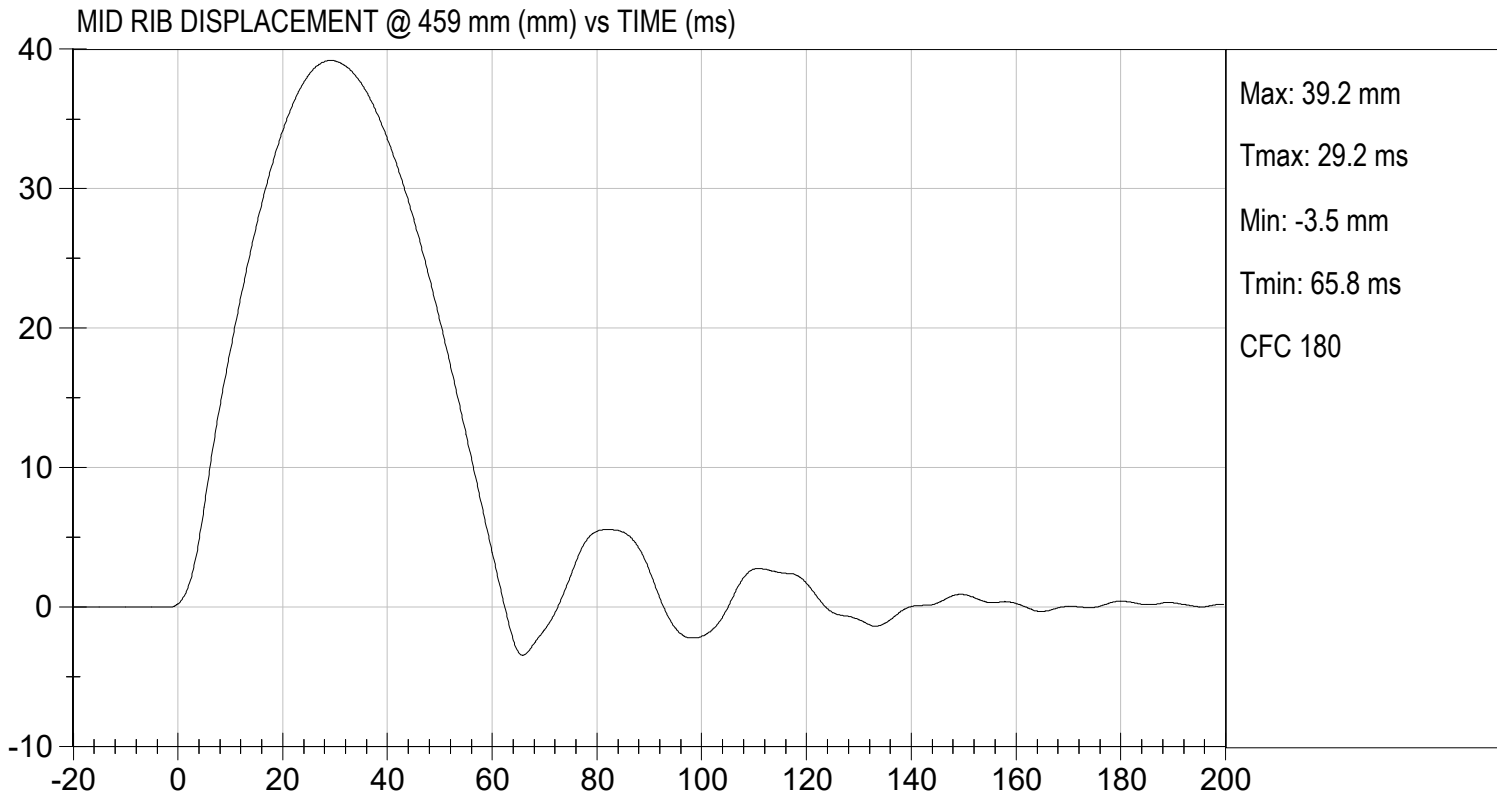
Test I.D: D242215

| Tested Parameter             | Units | Specification | Result               | Pass/Fail |
|------------------------------|-------|---------------|----------------------|-----------|
| Laboratory Temperature       | deg C | 20.6 to 22.2  | 21.3                 | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 49                   | Pass      |
| Displacement at 459 mm       | mm    | 36.0 to 40.0  | 39.2                 | Pass      |
| Displacement at 815 mm       | mm    | 46.0 to 51.0  | 47.9                 | Pass      |
|                              |       |               | Overall Test Results | Pass      |

  
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LOWER RIB TEST

ES-2re DUMMY

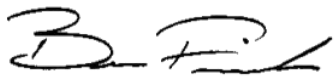
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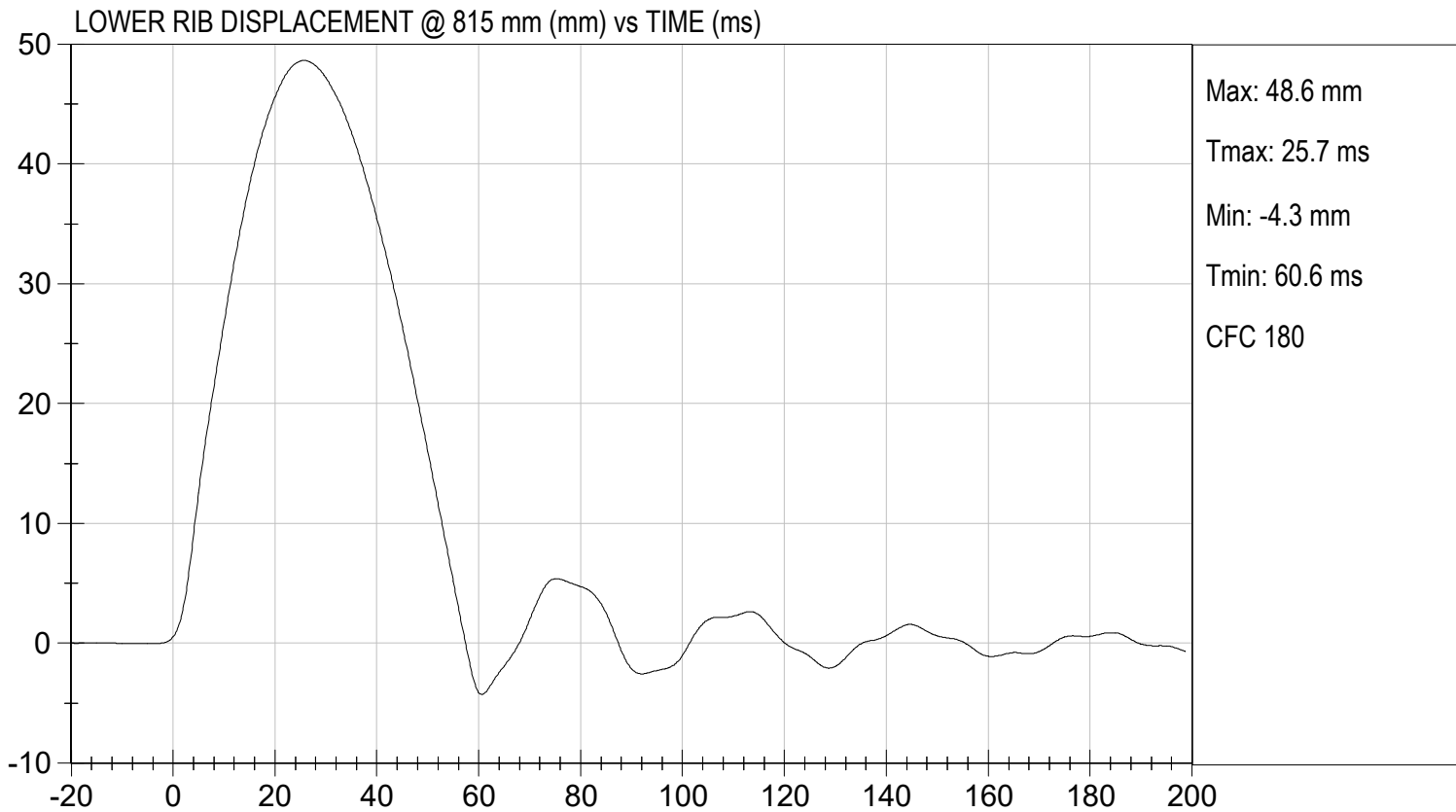
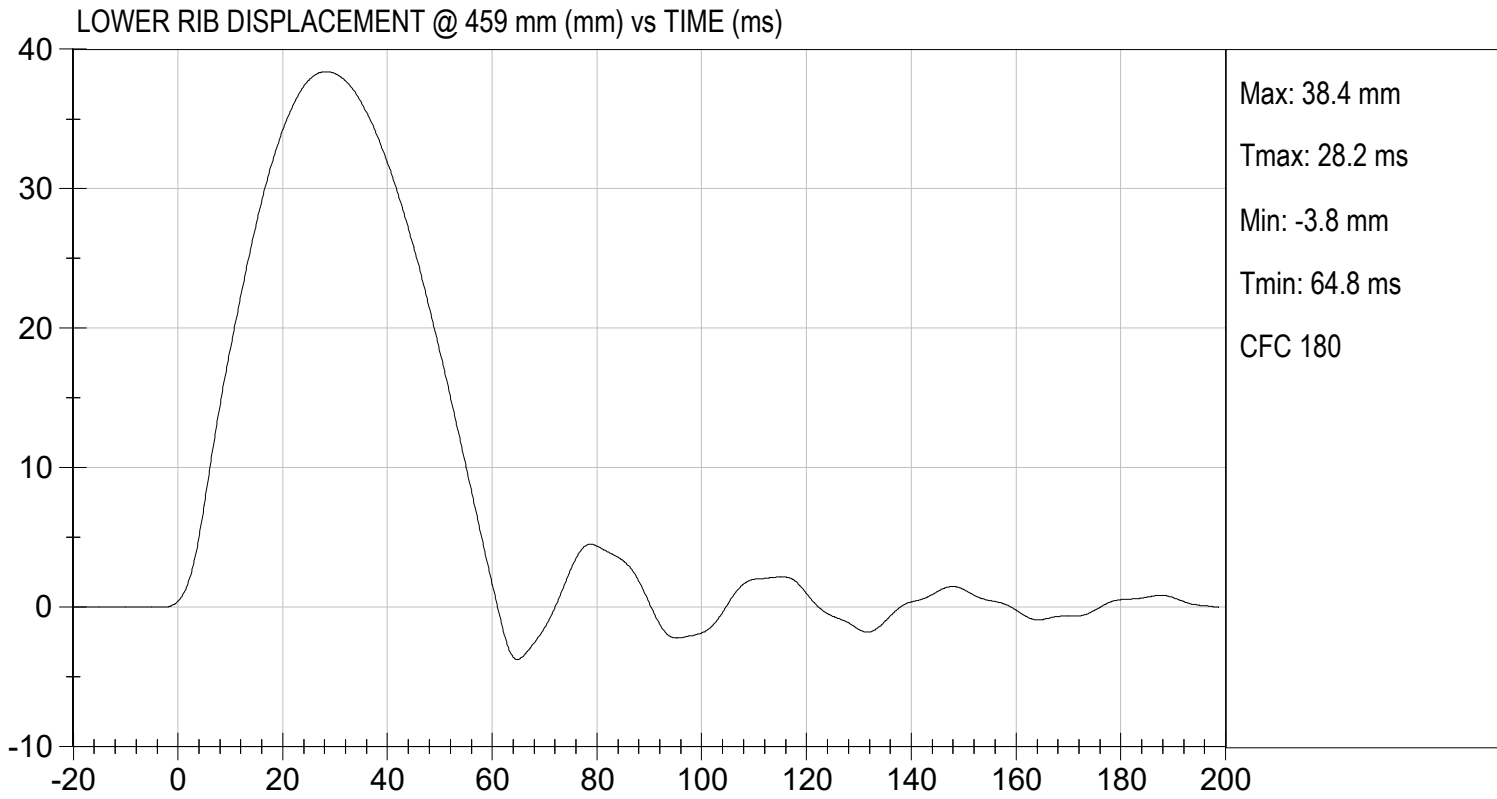
Test I.D: D242216

| Tested Parameter             | Units | Specification | Result               | Pass/Fail |
|------------------------------|-------|---------------|----------------------|-----------|
| Laboratory Temperature       | deg C | 20.6 to 22.2  | 21.3                 | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 49                   | Pass      |
| Displacement at 459 mm       | mm    | 36.0 to 40.0  | 38.4                 | Pass      |
| Displacement at 815 mm       | mm    | 46.0 to 51.0  | 48.6                 | Pass      |
|                              |       |               | Overall Test Results | Pass      |

  
Laboratory Technician

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Test Date

  
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ABDOMEN TEST

ES-2re DUMMY

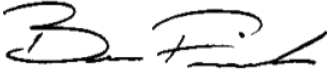
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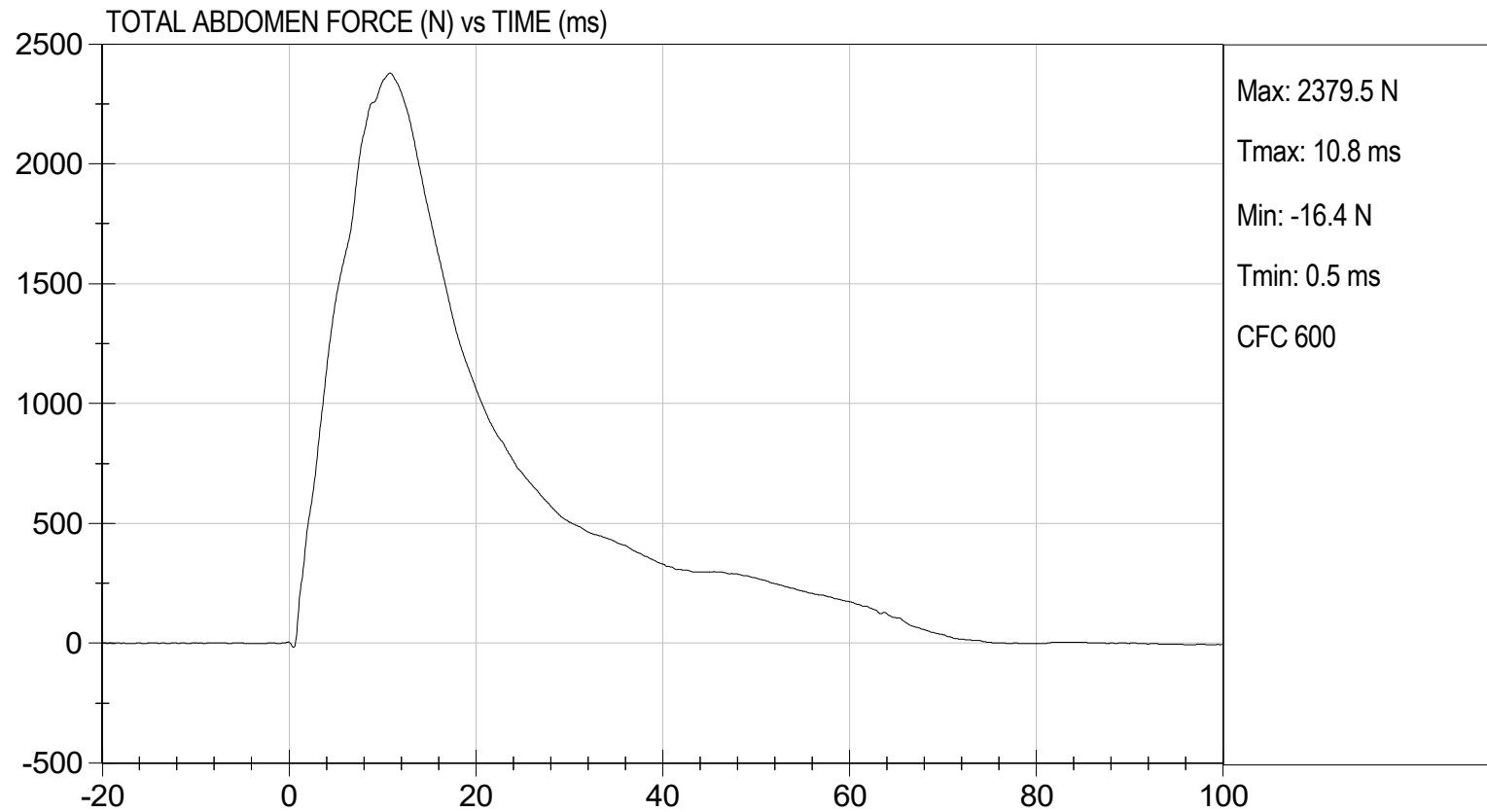
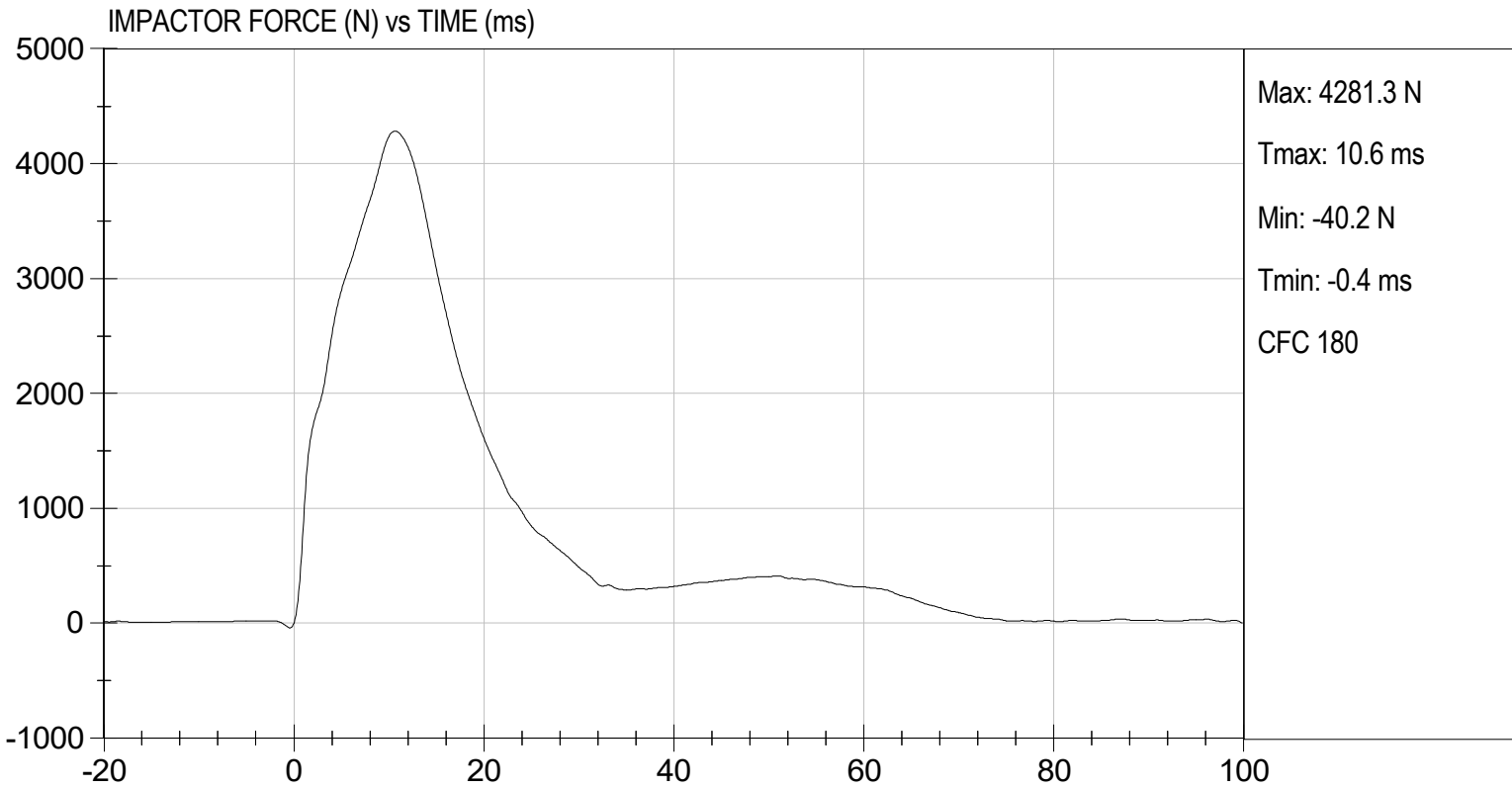
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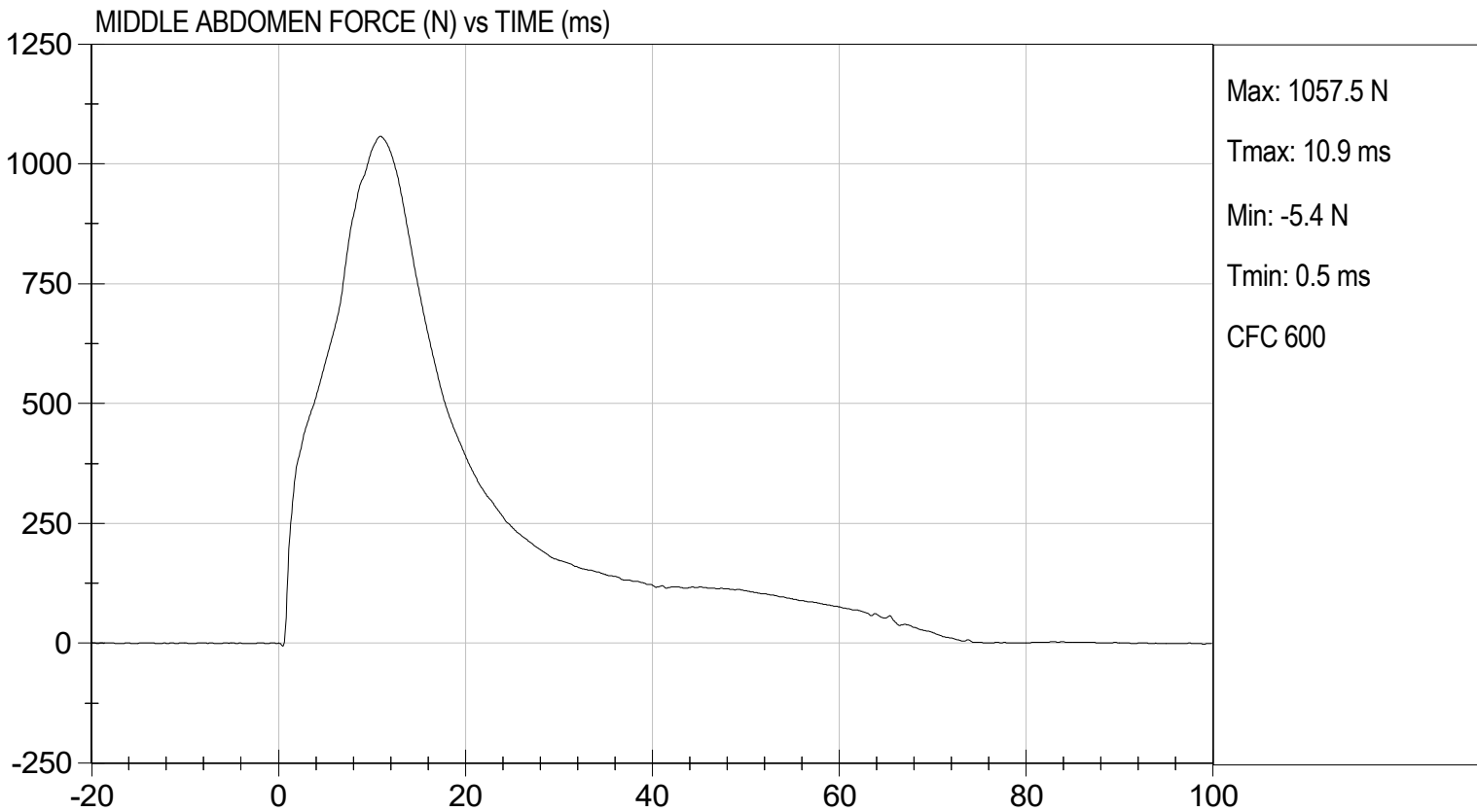
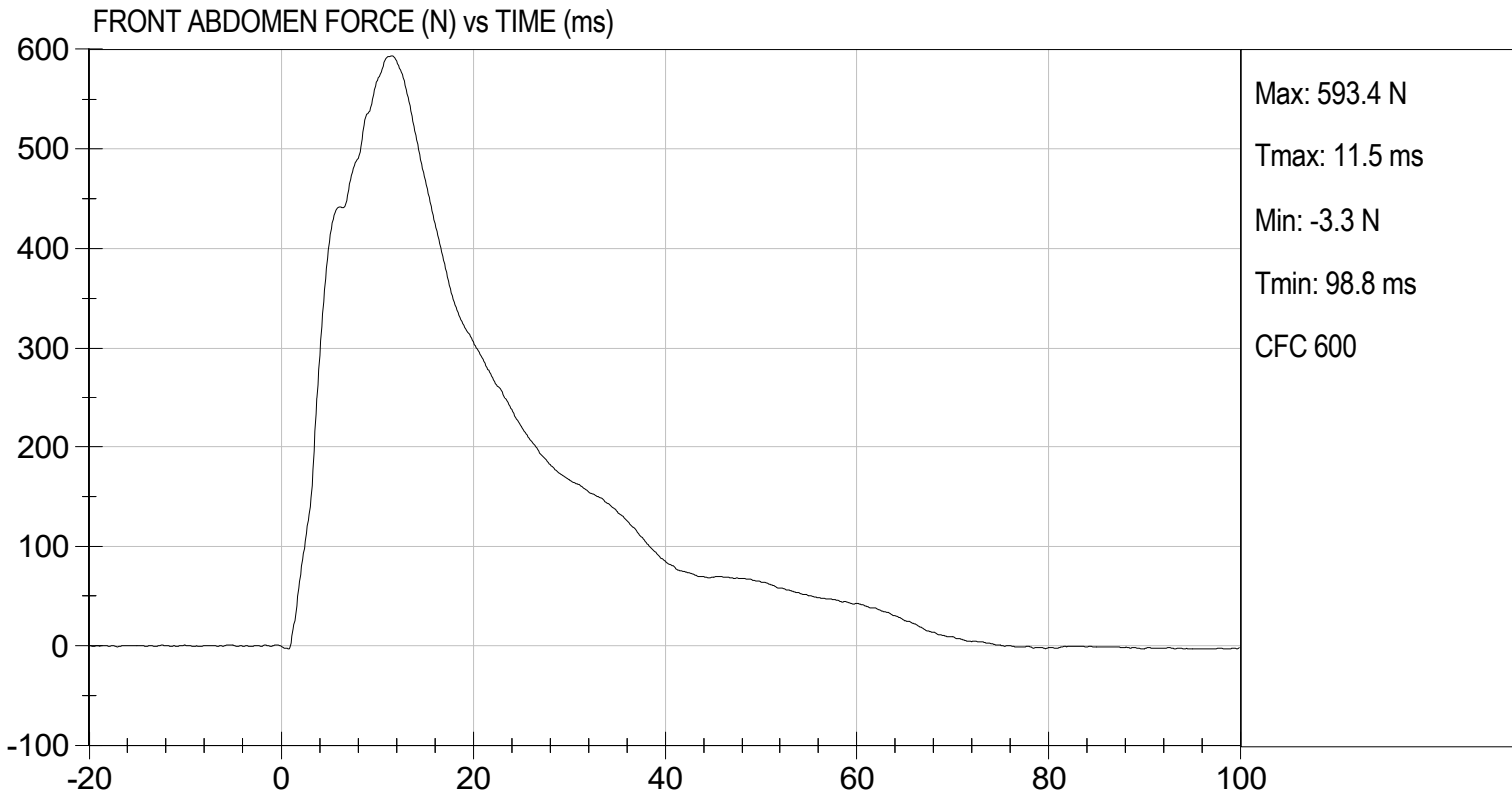
| Tested Parameter               | Units | Specification | Result | Pass/Fail |
|--------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature         | deg C | 20.6 to 22.2  | 21.3   | Pass      |
| Laboratory Relative Humidity   | %     | 10 to 70      | 51     | Pass      |
| Probe Speed                    | m/s   | 3.90 to 4.10  | 3.98   | Pass      |
| Maximum Impactor Force         | N     | 4000 to 4800  | 4281   | Pass      |
| Time of Maximum Impactor Force | ms    | 10.6 to 13.0  | 10.6   | Pass      |
| Maximum Total Abdomen Force    | N     | 2200 to 2700  | 2380   | Pass      |
| Time of Maximum Abdomen Force  | ms    | 10.0 to 12.3  | 10.8   | Pass      |
| Overall Test Results           |       |               |        | Pass      |

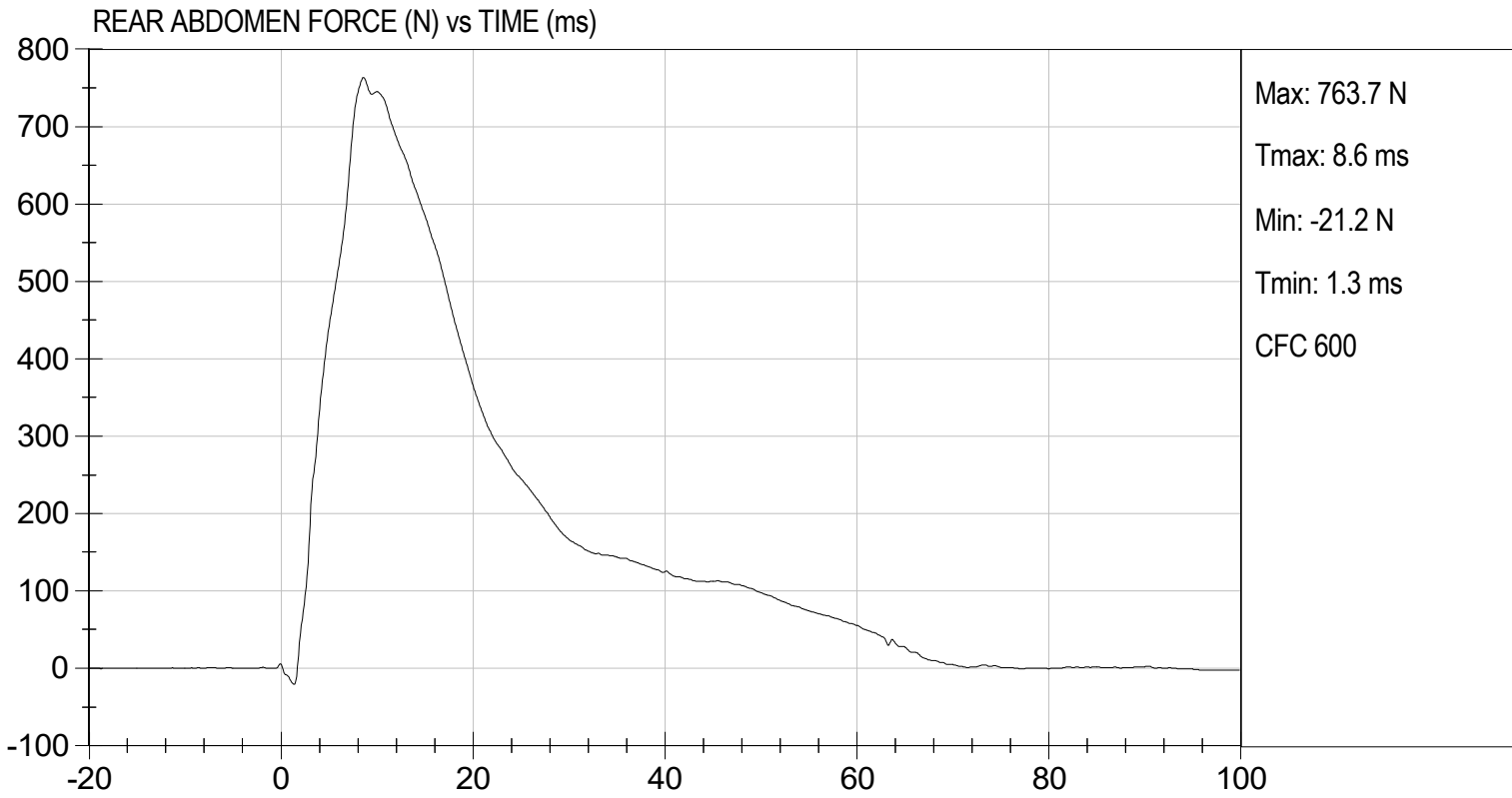
  
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**MGA RESEARCH CORPORATION**

**LUMBAR SPINE TEST**

**ES-2re DUMMY**

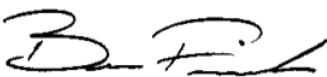
**ATD Serial No:**           F032          

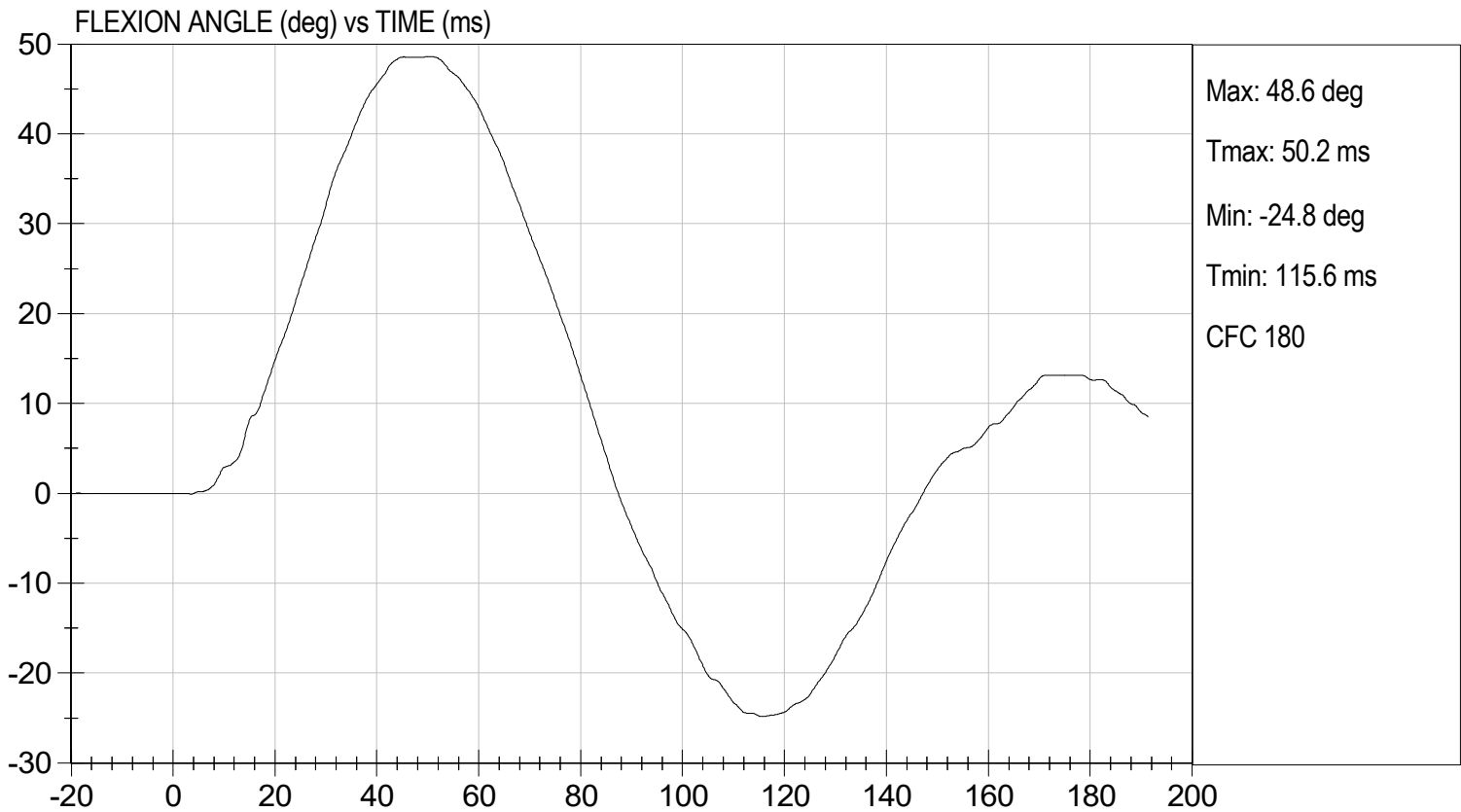
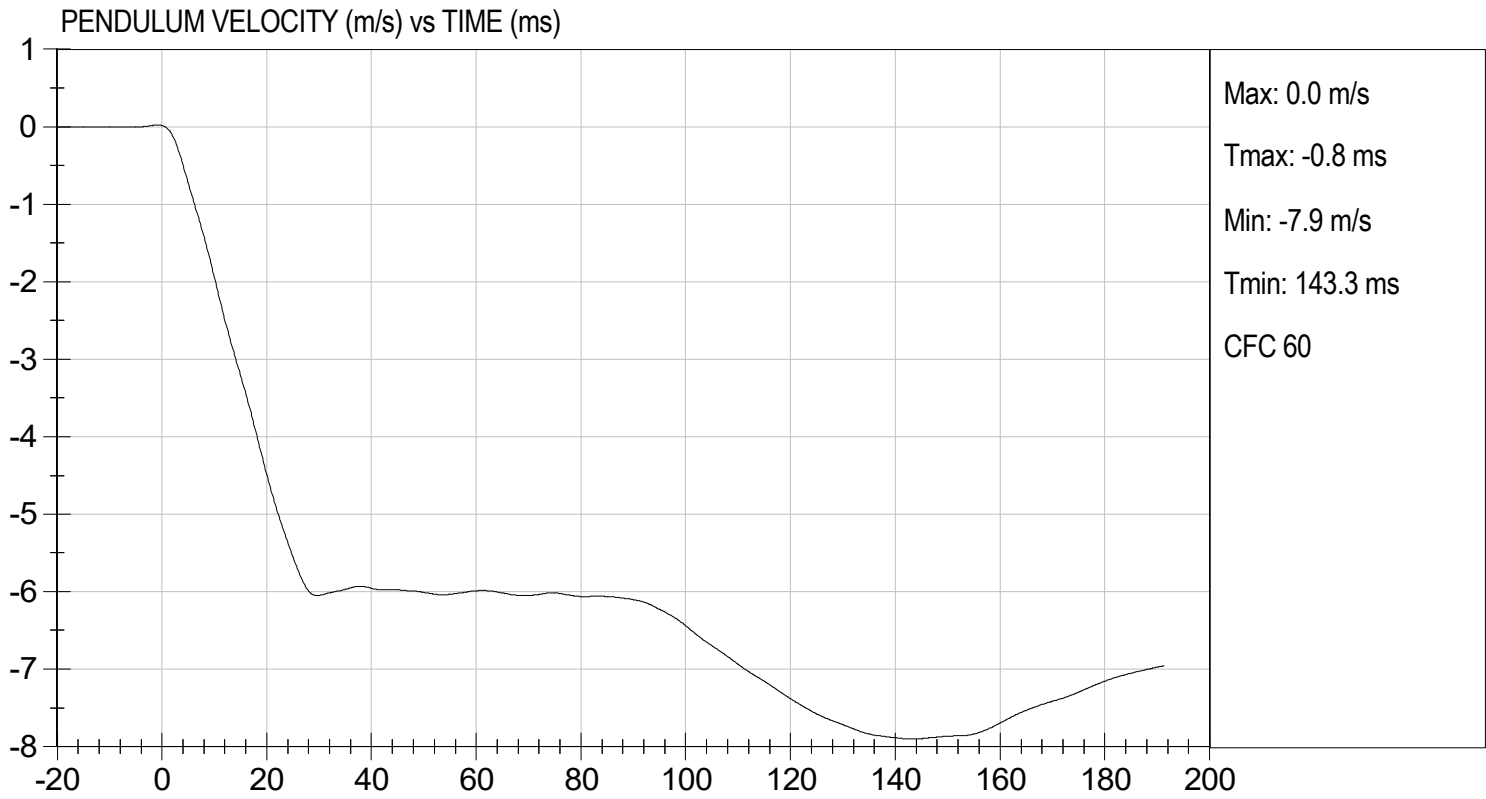
**Test I.D.:**           D242218          

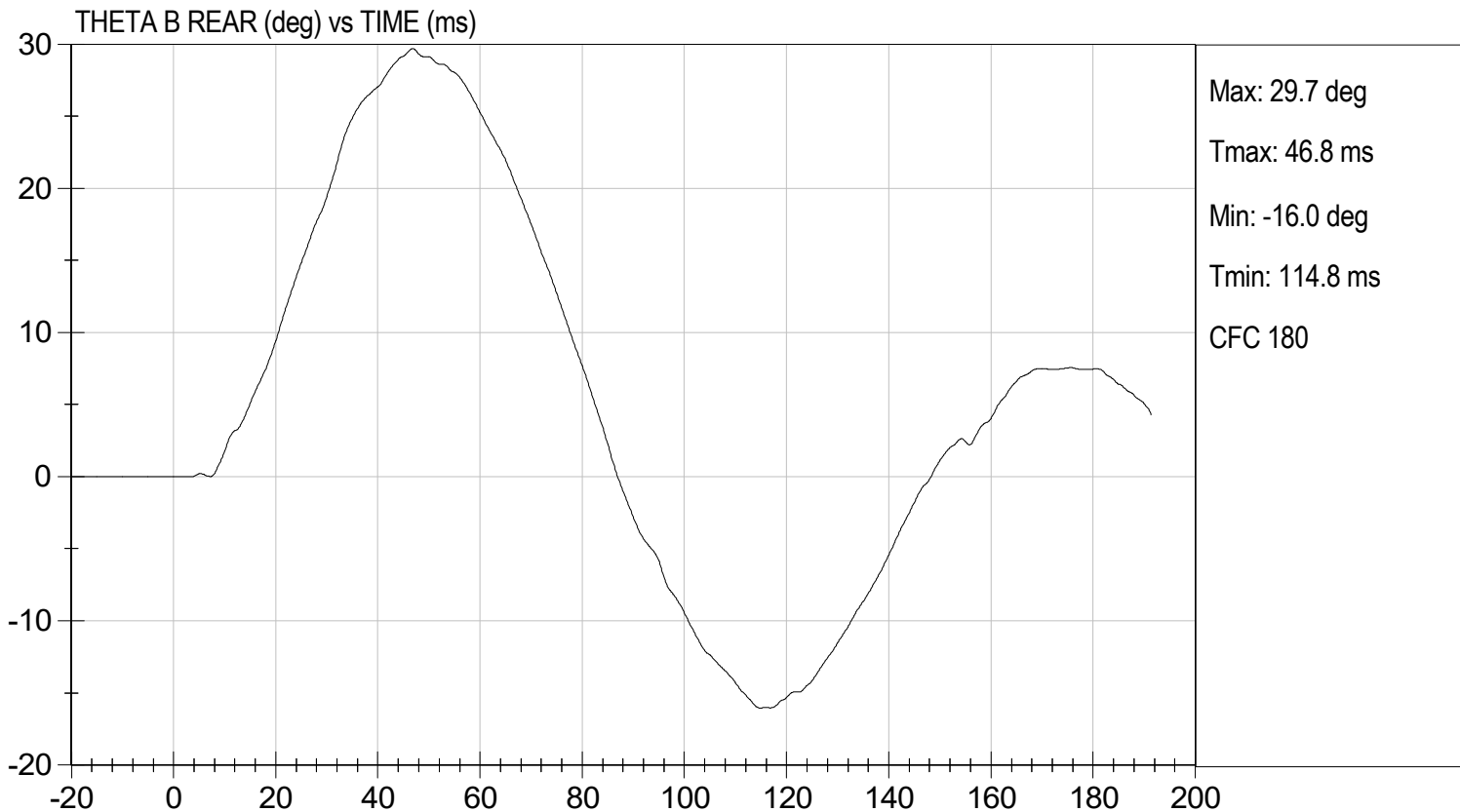
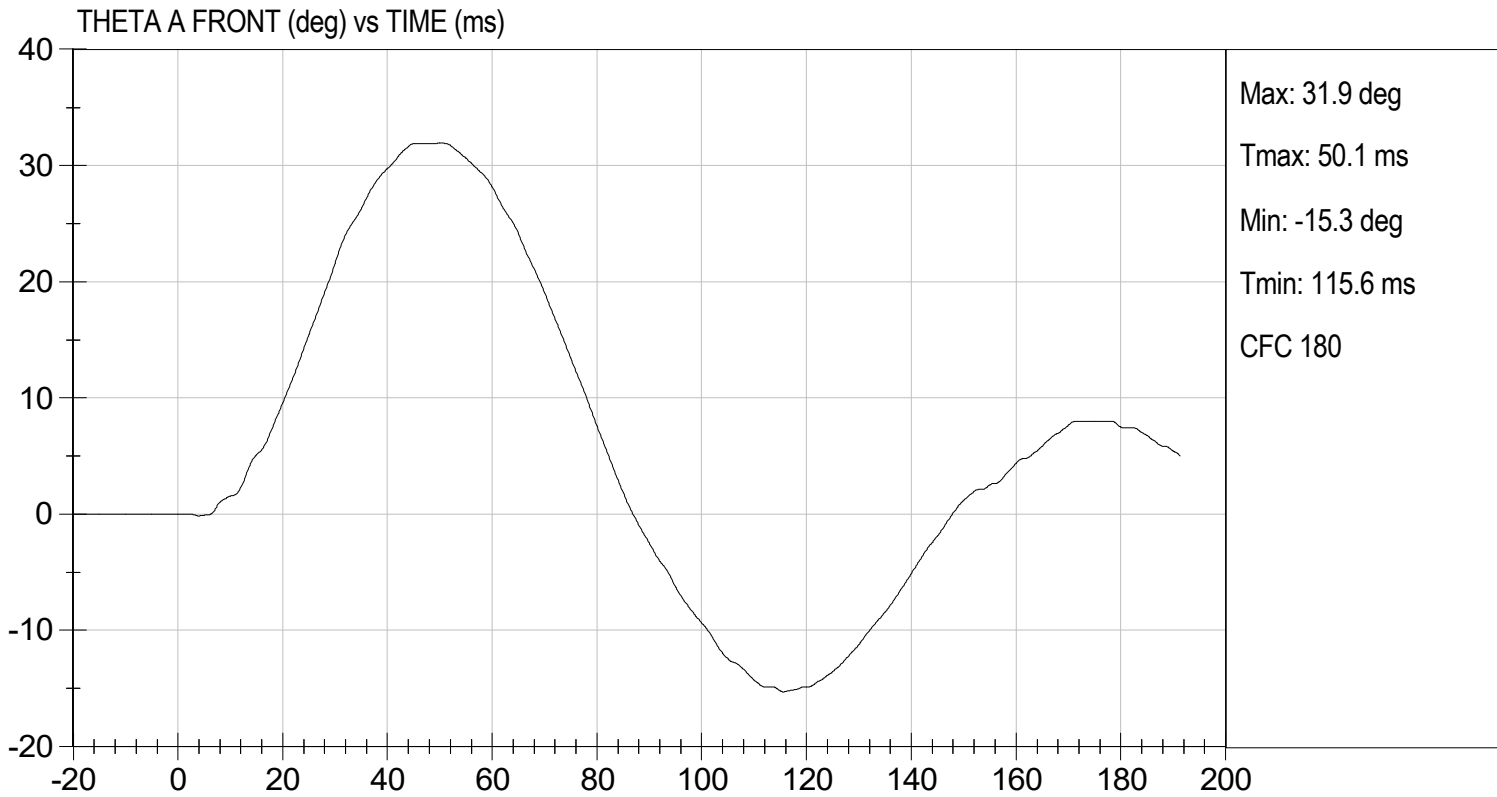
| Tested Parameter                            | Units  | Specification | Result          | Pass/Fail   |      |
|---|--------|---------------|-----------------|-------------|------|
| Laboratory Temperature                      | deg C  | 20.6 to 22.2  | 21.2            | Pass        |      |
| Laboratory Relative Humidity                | %      | 10 to 70      | 49              | Pass        |      |
| Pendulum Speed                              | m/s    | 5.95 to 6.15  | 6.10            | Pass        |      |
| Pendulum Velocity                           | 1 ms   | m/s           | -0.05 to 0.00   | -0.02       | Pass |
|   | 3.7 ms | m/s           | -0.425 to -0.24 | -0.422      | Pass |
|   | 27 ms  | m/s           | -6.50 to -5.80  | -5.88       | Pass |
|   | 30 ms  | m/s           | >= -6.50        | -6.05       | Pass |
| Maximum Flexion Angle                       | deg    | 45.0 to 55.0  | 48.6            | Pass        |      |
| Time of Maximum Flexion Angle               | ms     | 39.0 to 53.0  | 50.2            | Pass        |      |
| Headform Rotation Decay to Initial Position | ms     | 37 to 57      | 37              | Pass        |      |
| <b>Overall Results</b>                      |        |               |                 | <b>Pass</b> |      |

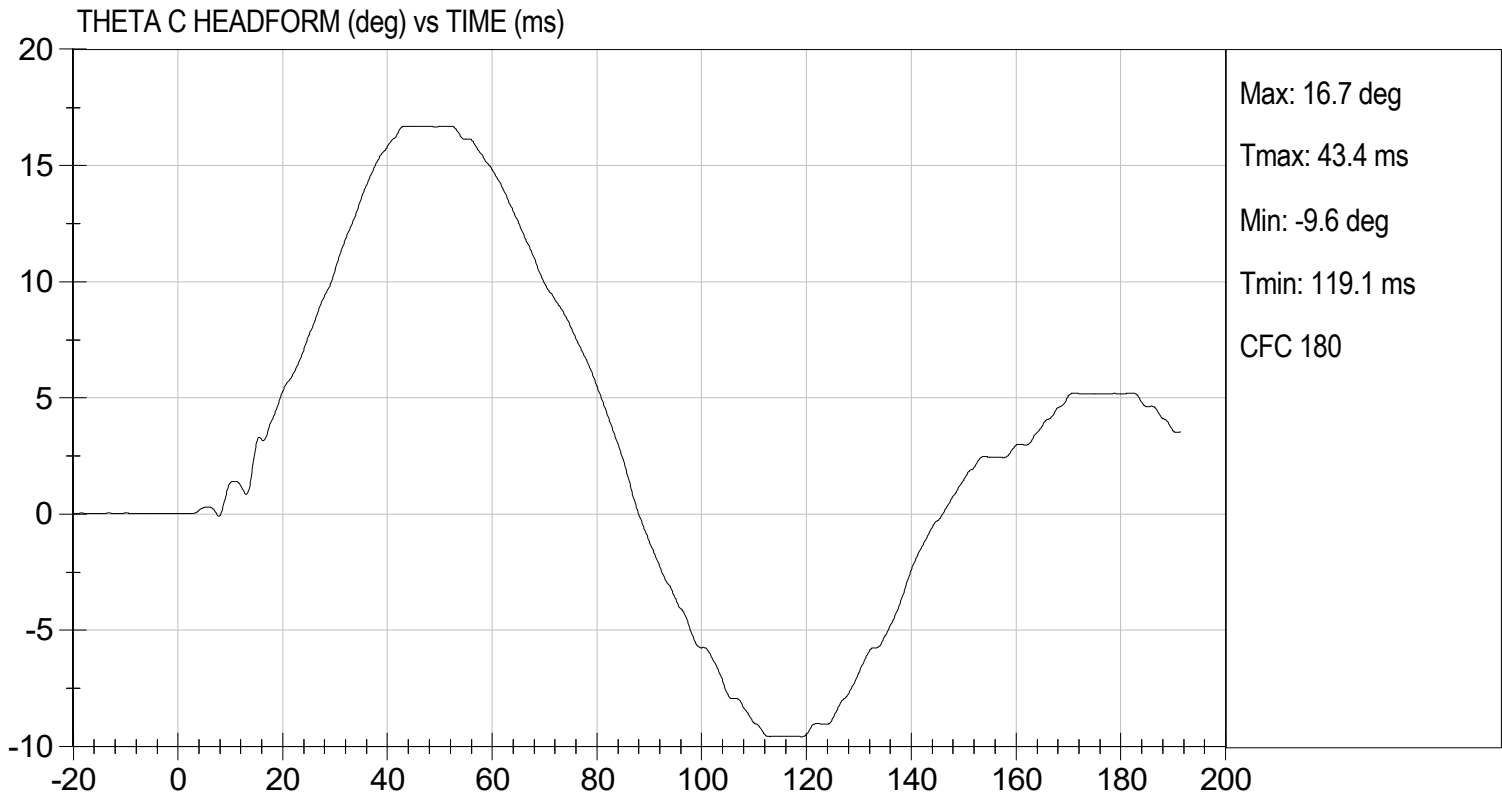
  
 \_\_\_\_\_  
 Laboratory Technician

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PELVIS TEST

ES-2re DUMMY

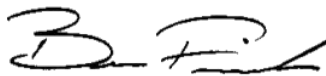
ATD Serial No: F032

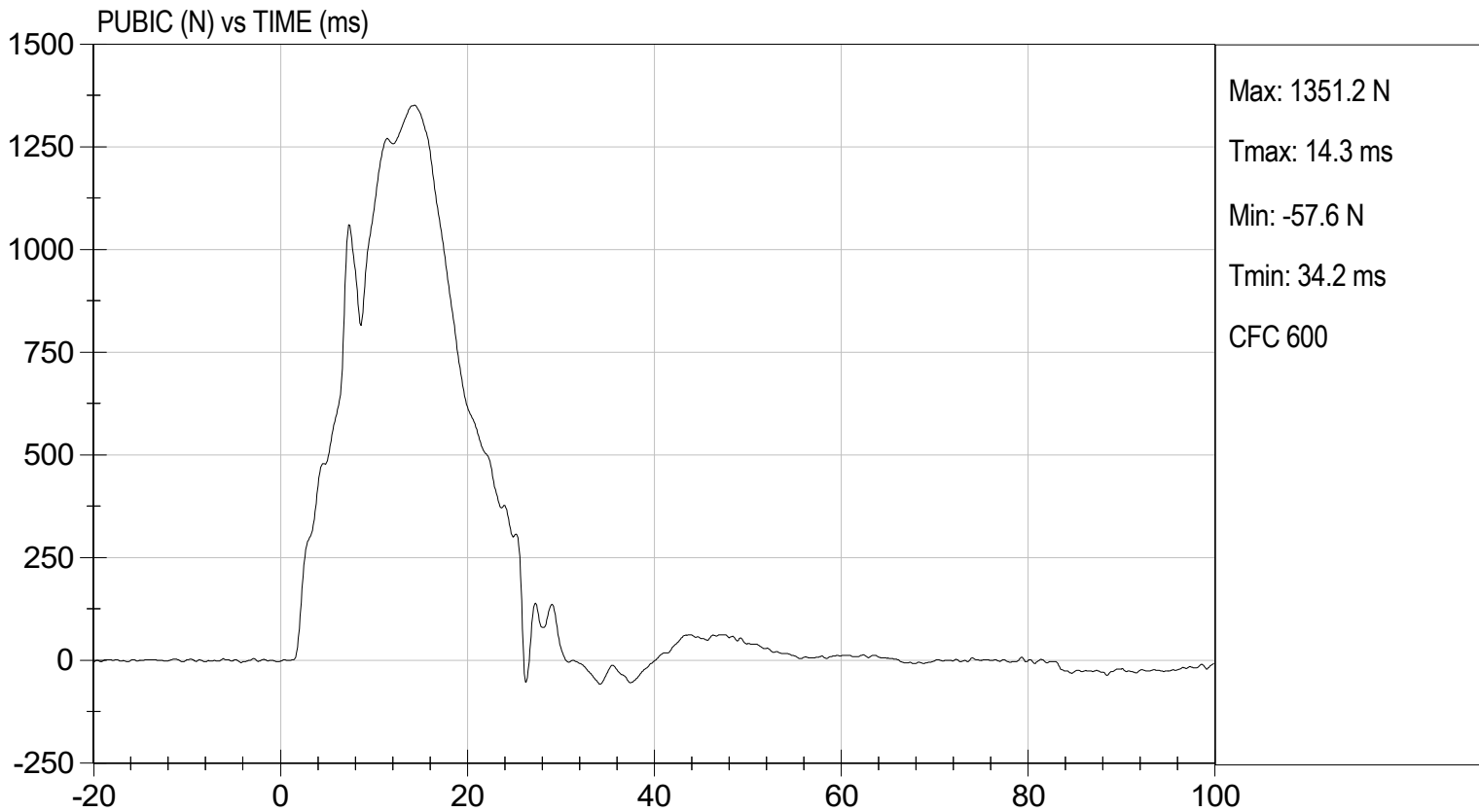
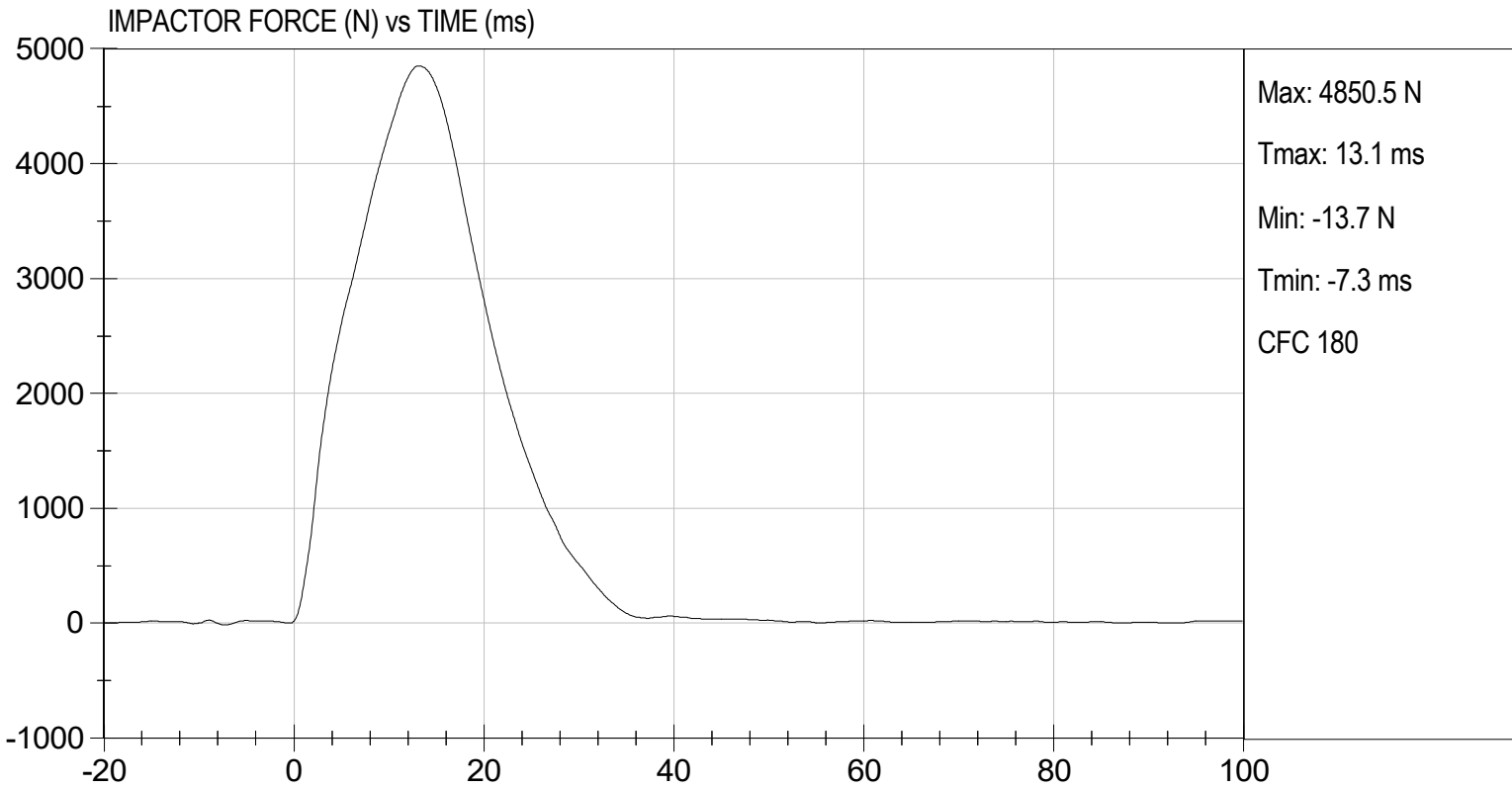
Test I.D: D242219

| Tested Parameter               | Units | Specification | Result | Pass/Fail |
|--------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature         | deg C | 20.6 to 22.2  | 21.3   | Pass      |
| Laboratory Relative Humidity   | %     | 10 to 70      | 51     | Pass      |
| Probe Speed                    | m/s   | 4.20 to 4.40  | 4.26   | Pass      |
| Maximum Impactor Force         | N     | 4700 to 5400  | 4850   | Pass      |
| Time of Maximum Impactor Force | ms    | 11.8 to 16.1  | 13.1   | Pass      |
| Maximum Pubic Force            | N     | 1230 to 1590  | 1351   | Pass      |
| Time of Maximum Pubic Force    | ms    | 12.2 to 17.0  | 14.3   | Pass      |
| Overall Test Results           |       |               |        | Pass      |

  
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Test Date

  
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THORAX IMPACT TEST

ES-2re DUMMY

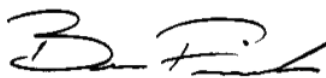
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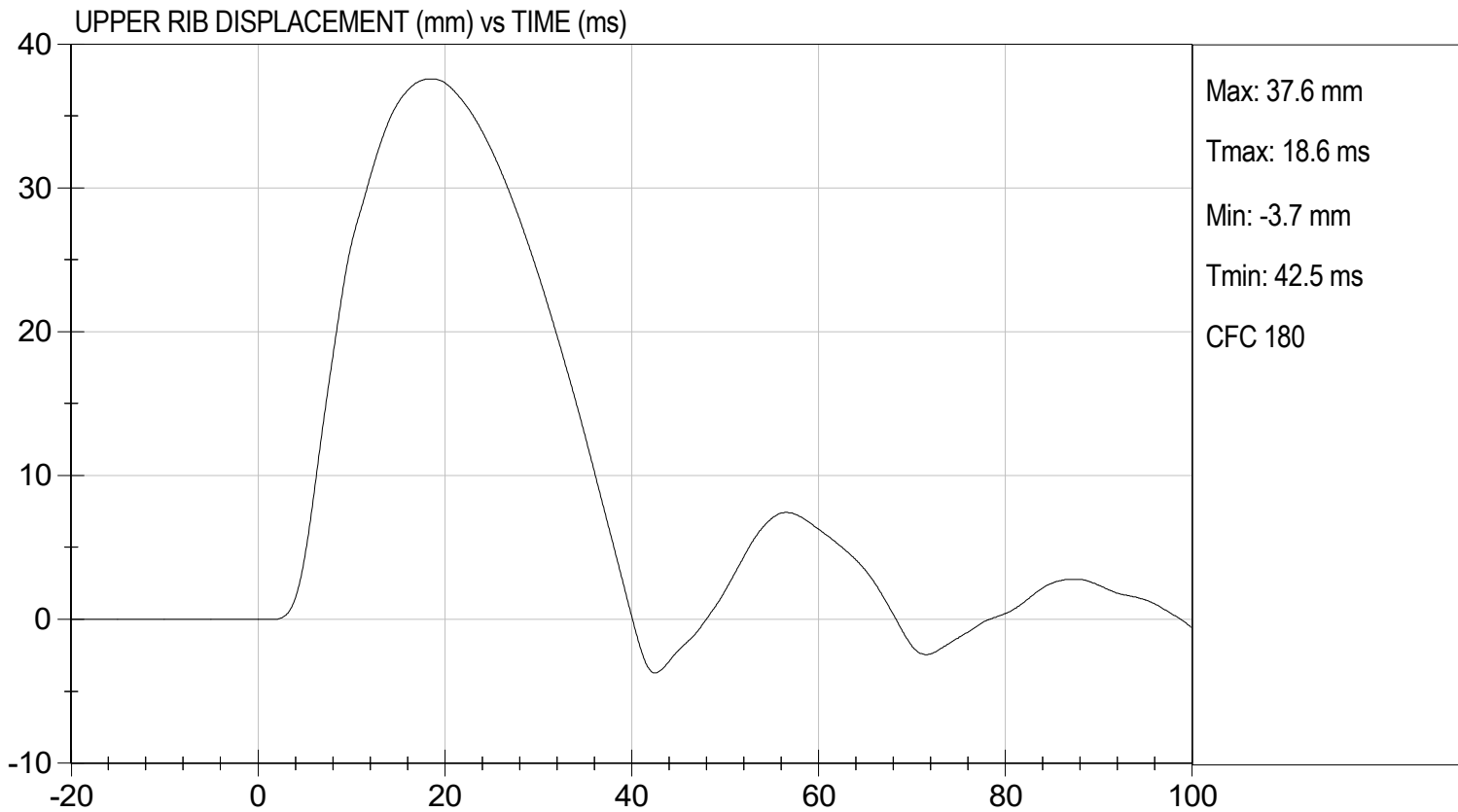
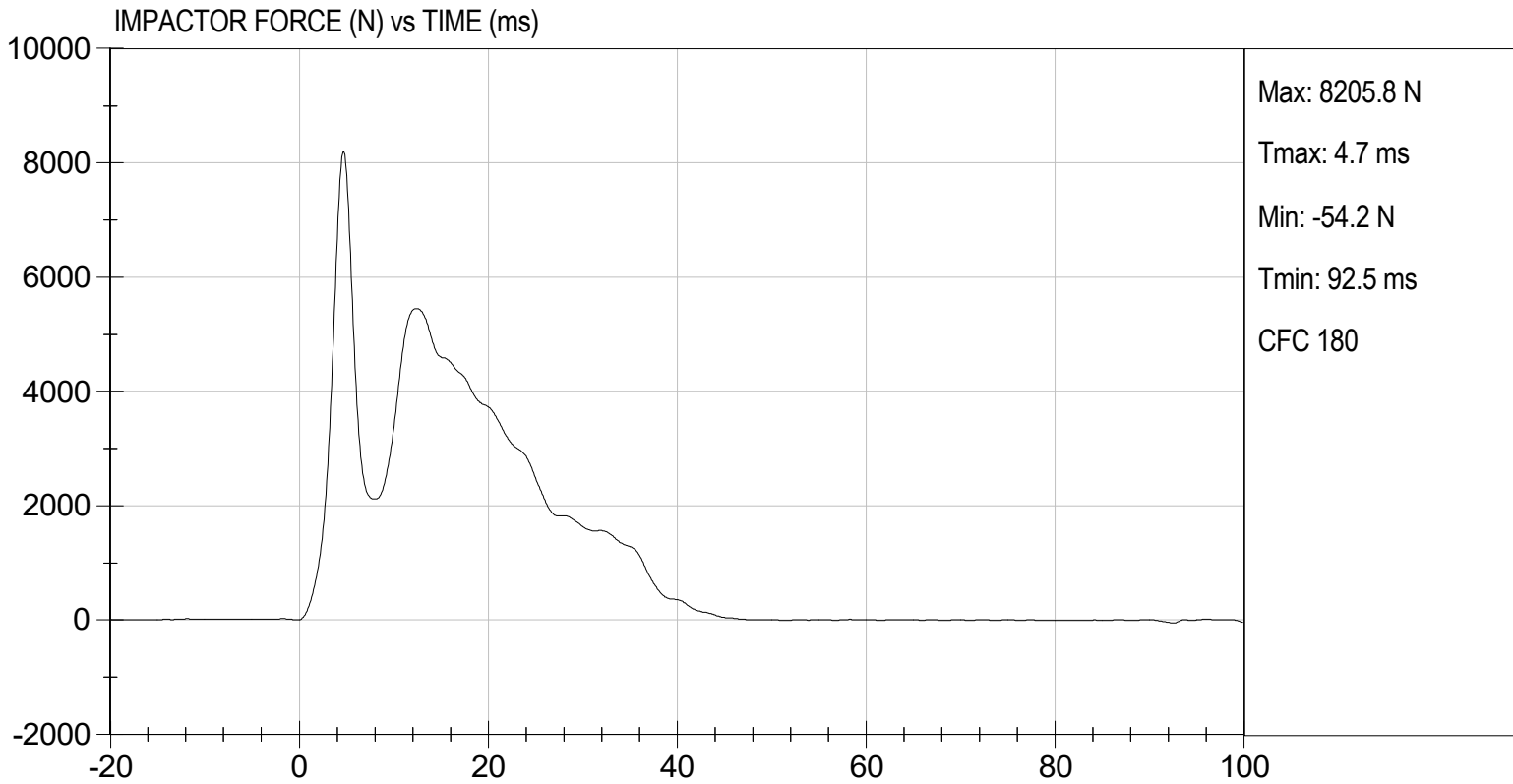
Test I.D: D242210

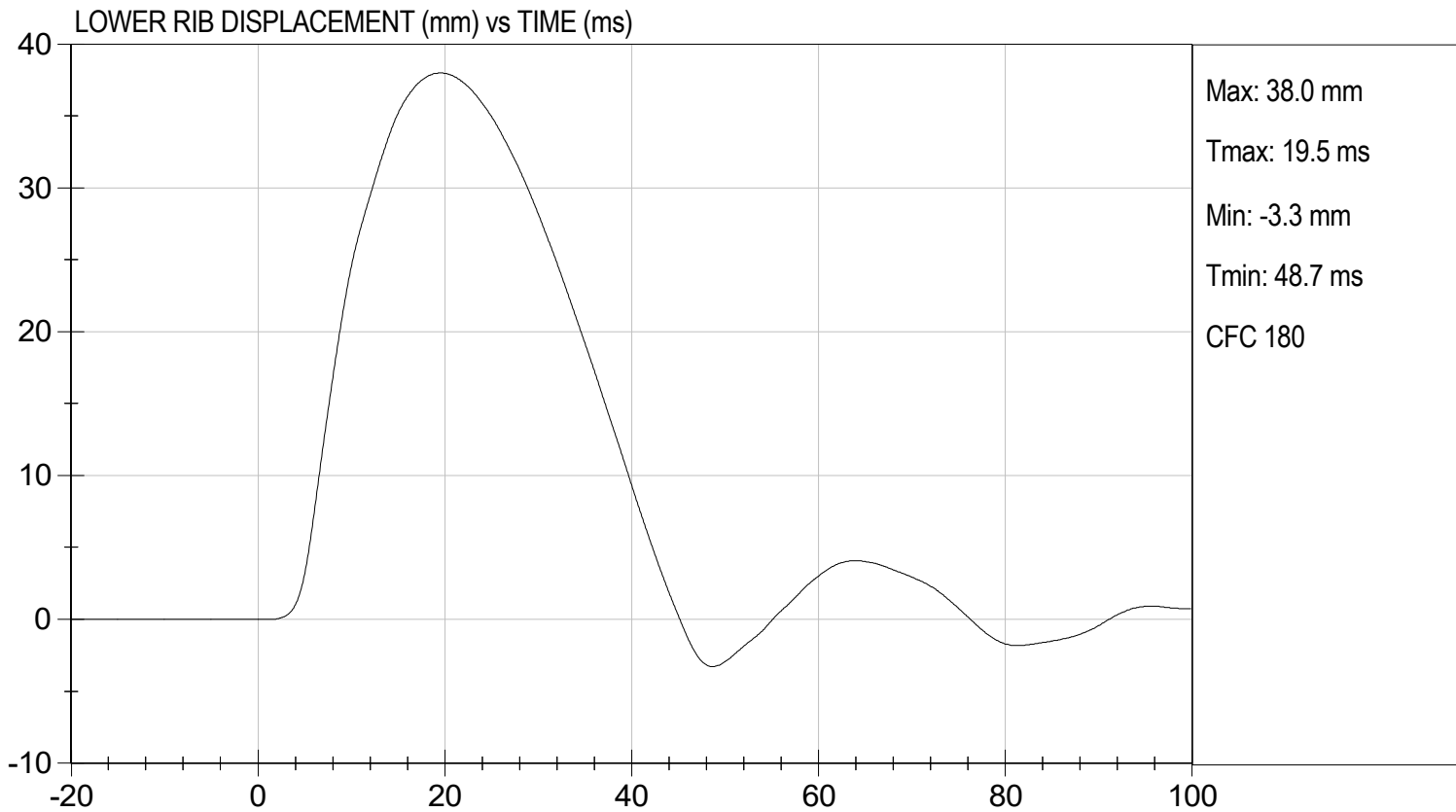
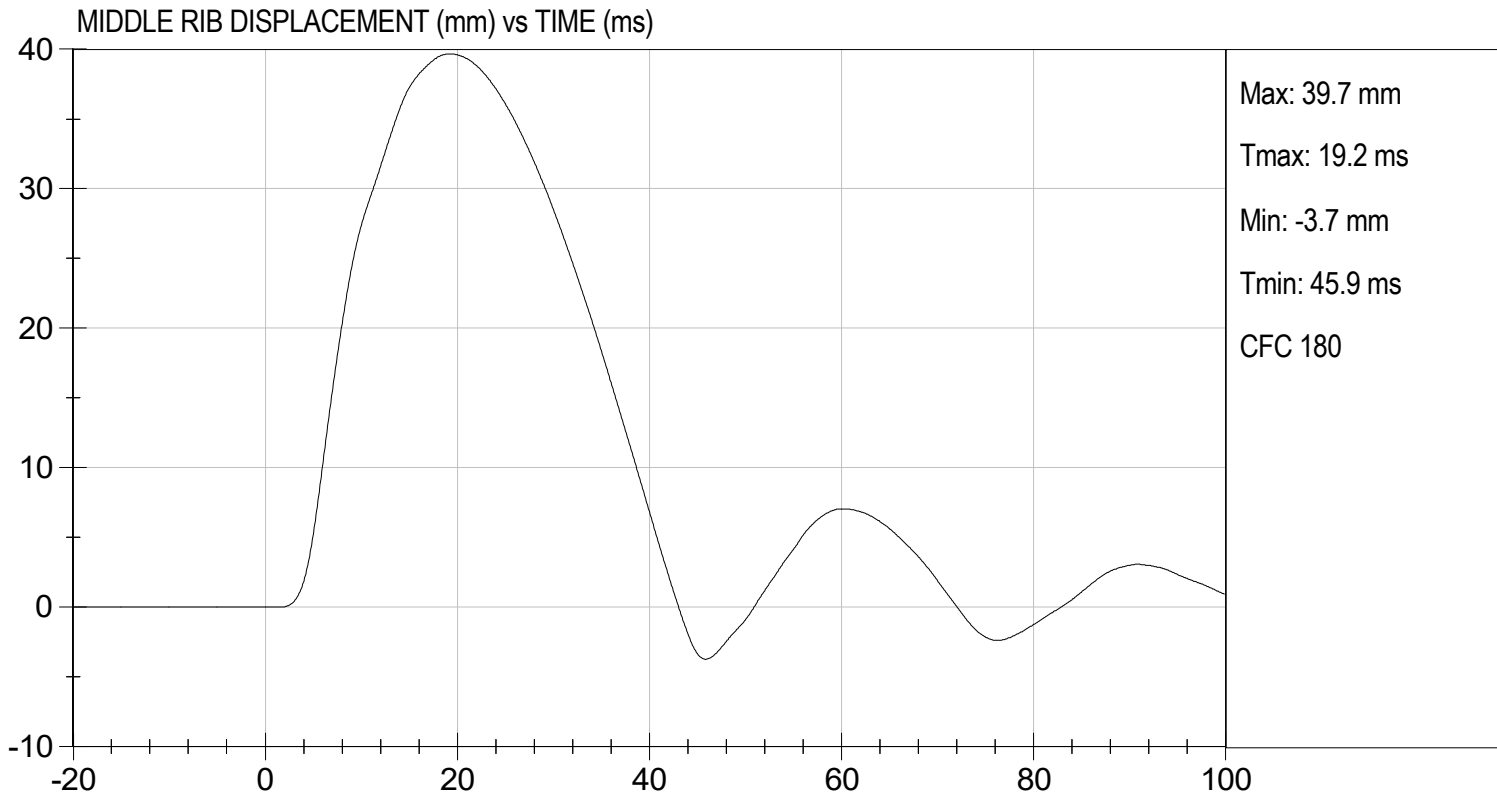
| Tested Parameter                    | Units | Specification | Result | Pass/Fail |
|-------------------------------------|-------|---------------|--------|-----------|
| Temperature                         | deg C | 20.6 to 22.2  | 21.3   | Pass      |
| Humidity                            | %     | 10 to 70      | 50     | Pass      |
| Probe Speed                         | m/s   | 5.40 to 5.60  | 5.49   | Pass      |
| Maximum Impactor Force (after 6 ms) | N     | 5100 to 6200  | 5449   | Pass      |
| Upper Rib Displacement              | mm    | 34.0 to 41.0  | 37.6   | Pass      |
| Middle Rib Displacement             | mm    | 37.0 to 45.0  | 39.7   | Pass      |
| Lower Rib Displacement              | mm    | 37.0 to 44.0  | 38.0   | Pass      |
| Overall Test Results                |       |               |        | Pass      |

  
Laboratory Technician

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Test Date

  
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**QUALIFICATION TEST RESULTS**

**PRE-TEST**

**SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD**

**SID-IIsD External Measurements**  
**SN: 296**

| <b>No.</b> | <b>Name</b>                   | <b>Spec. (mm)</b> | <b>Result</b> | <b>Pass/Fail</b> |
|------------|-------------------------------|-------------------|---------------|------------------|
| <b>A</b>   | Sitting Height                | 772 - 788         | 784           | Pass             |
| <b>B</b>   | Shoulder Pivot Height         | 437 - 453         | 442           | Pass             |
| <b>C</b>   | H-point Height                | 79 - 89           | 83            | Pass             |
| <b>D</b>   | H-point from Seatback         | 141 - 151         | 145           | Pass             |
| <b>E</b>   | Shoulder Pivot from Backline  | 97 - 107          | 99            | Pass             |
| <b>F</b>   | Thigh Clearance               | 119 - 135         | 121           | Pass             |
| <b>G</b>   | Head Breadth                  | 140 - 148         | 142           | Pass             |
| <b>H</b>   | Head Back from Backline       | 40 - 46           | 45            | Pass             |
| <b>I</b>   | Head Depth                    | 178 - 188         | 180           | Pass             |
| <b>J</b>   | Head Circumference            | 541 - 551         | 548           | Pass             |
| <b>K</b>   | Buttock to Knee Length        | 514 - 540         | 535           | Pass             |
| <b>L</b>   | Popliteal Height              | 343 - 369         | 358           | Pass             |
| <b>M</b>   | Knee Pivot to Floor Height    | 392 - 409         | 404           | Pass             |
| <b>N</b>   | Buttock Popliteal Length      | 416 - 442         | 435           | Pass             |
| <b>O</b>   | Chest Depth w/o Jacket        | 195 - 211         | 206           | Pass             |
| <b>P</b>   | Foot Length                   | 216 - 232         | 219           | Pass             |
| <b>Q</b>   | Hip Breadth (w/ pelvic plugs) | 313 - 323         | 316           | Pass             |
| <b>R</b>   | Arm Length                    | 249 - 259         | 250           | Pass             |
| <b>S</b>   | Knee Joint to Seatback        | 477 - 493         | 481           | Pass             |
| <b>V</b>   | Shoulder Width                | 341 - 357         | 346           | Pass             |
| <b>W</b>   | Foot Width                    | 78 - 94           | 85            | Pass             |
| <b>Y</b>   | Chest Circumference w/ jacket | 851 - 881         | 870           | Pass             |
| <b>Z</b>   | Waist Circumference           | 761 - 791         | 772           | Pass             |

**MGA RESEARCH CORPORATION**  
**HEAD DROP TEST**  
**SID-IIs BUILD LEVEL D DUMMY**

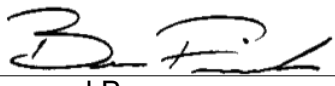
ATD Serial No: 296

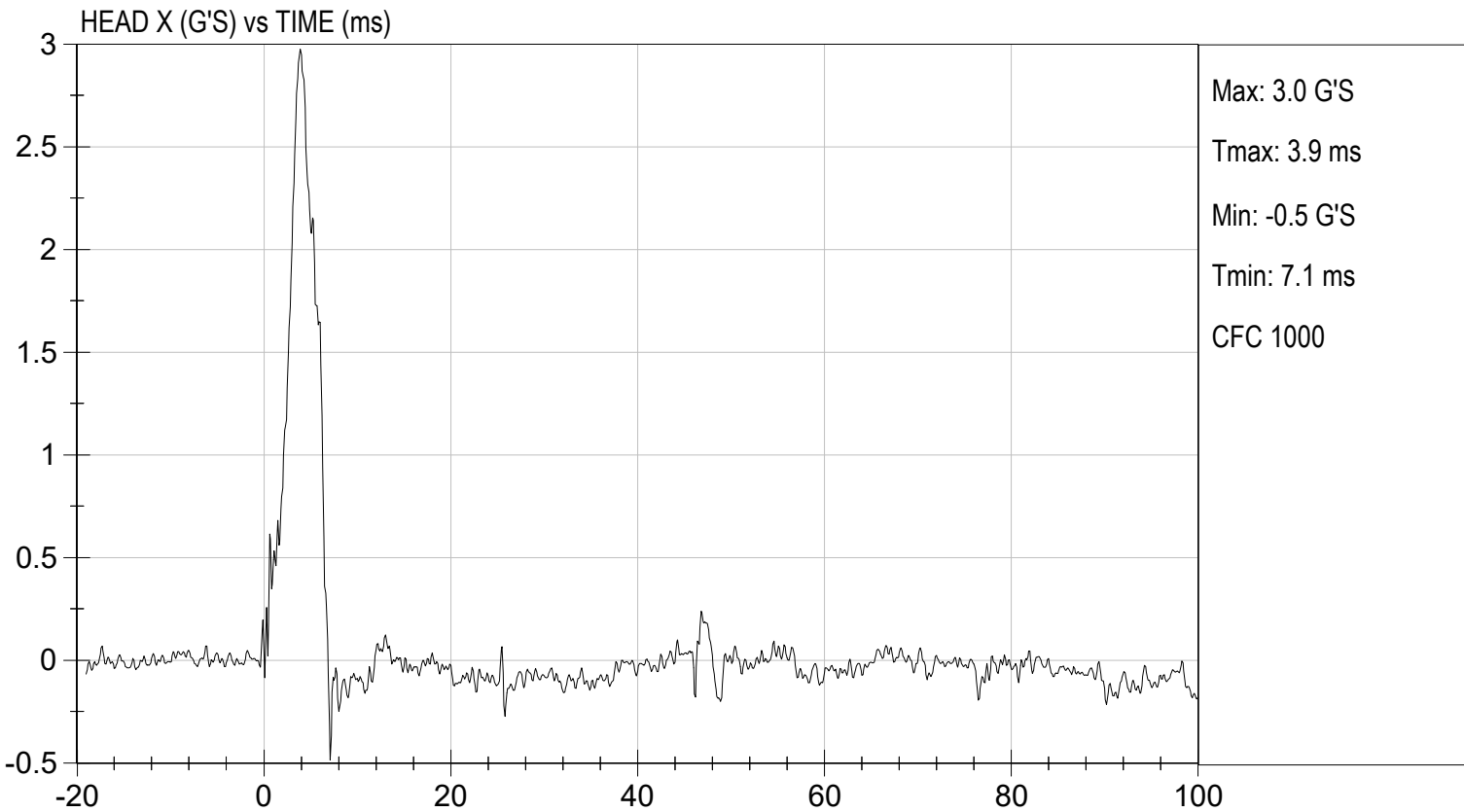
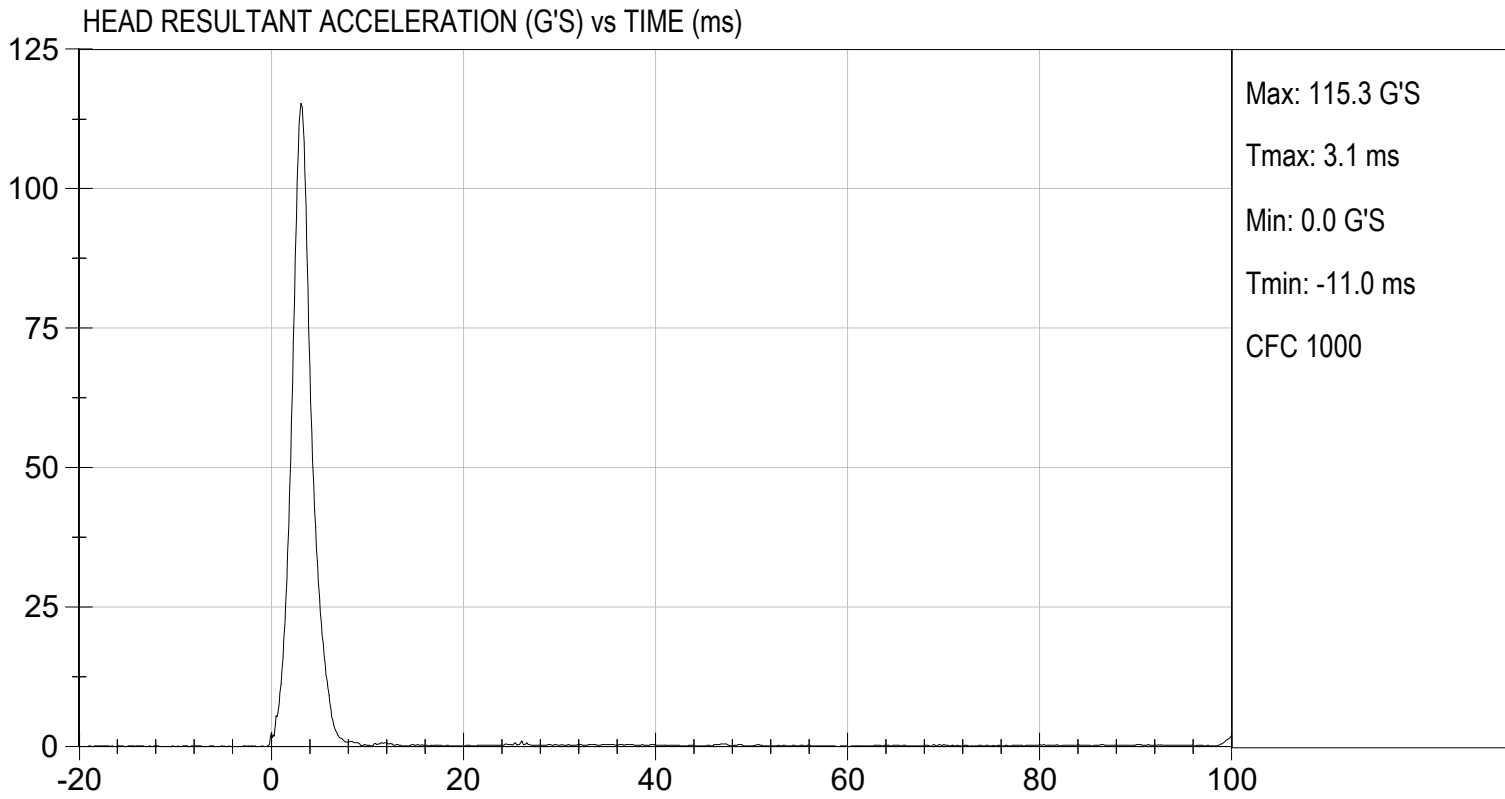
Test ID: D242091

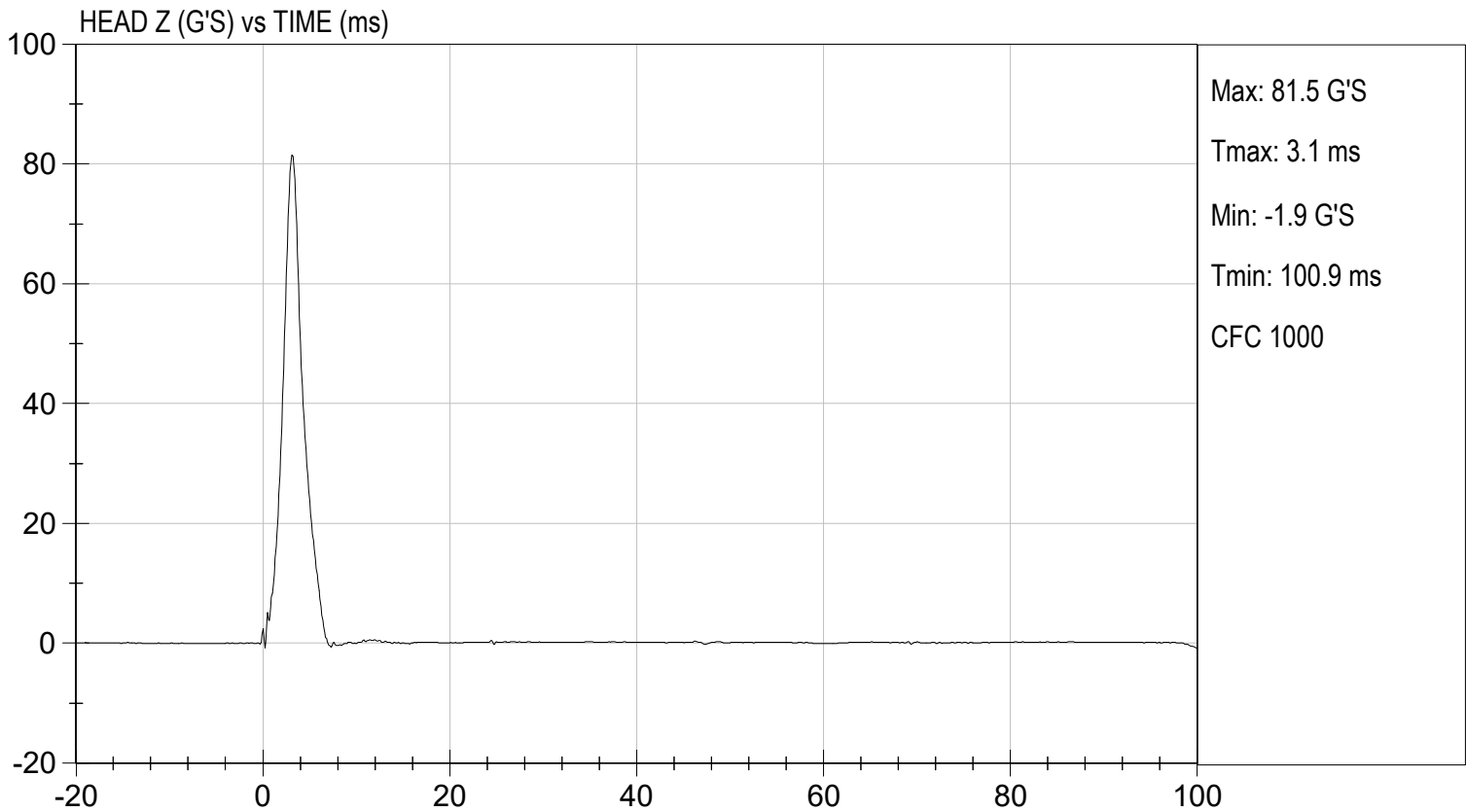
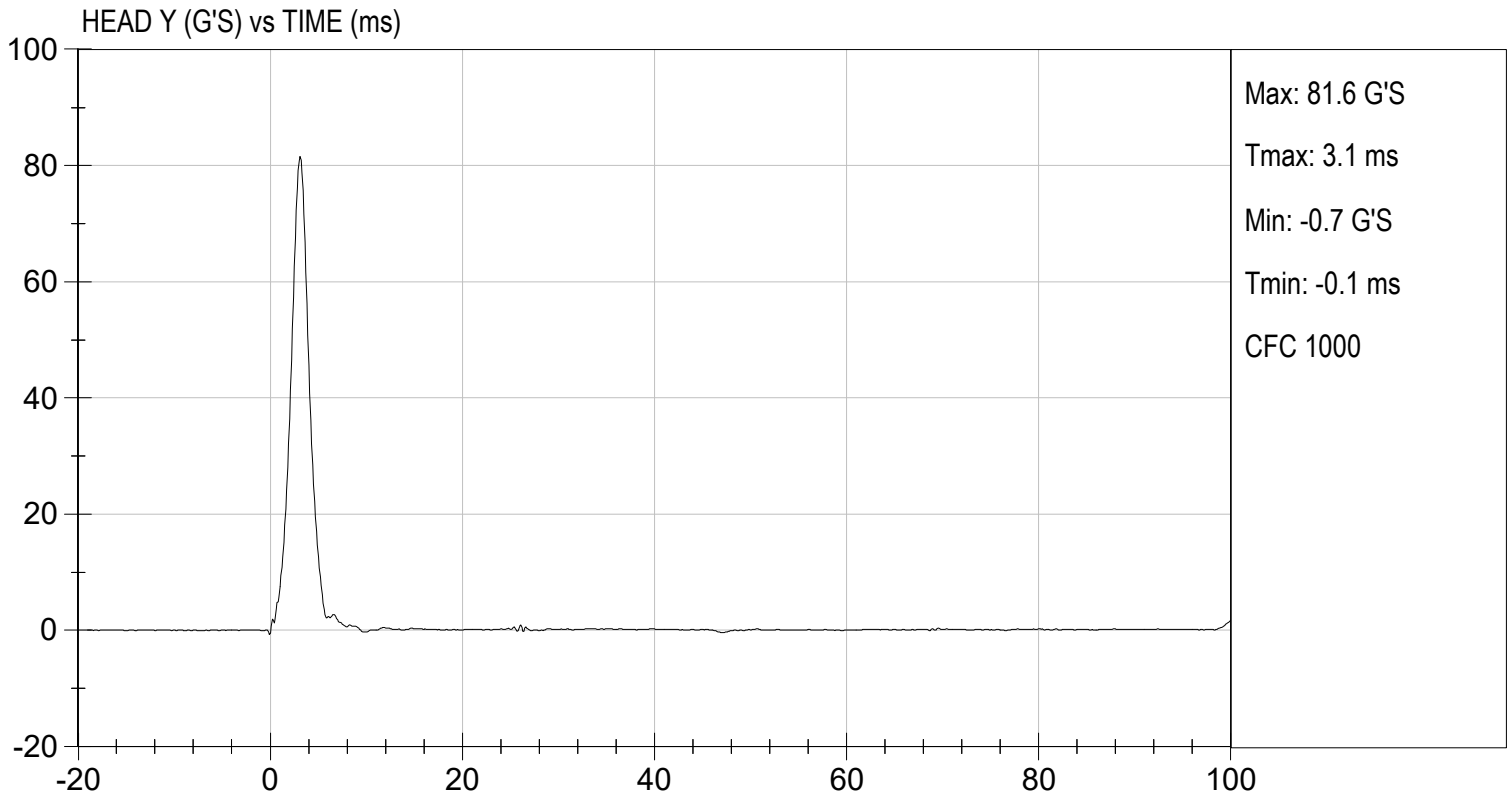
| Tested Parameter               | Units | Specification | Result | Pass/Fail |
|--------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature         | deg C | 20.6 to 22.2  | 21.2   | Pass      |
| Laboratory Relative Humidity   | %     | 10 to 70      | 48     | Pass      |
| Peak Resultant Acceleration    | G's   | 115 to 137    | 115    | Pass      |
| Peak Longitudinal Acceleration | G's   | +/- 15        | 3.0    | Pass      |
| Unimodal                       | N/A   | Yes           | Yes    | Pass      |
| Oscillations                   | N/A   | <15%          | Yes    | Pass      |
| Overall Test Results           |       |               |        | Pass      |

  
 Laboratory Technician

08/15/2024  
 Test Date

  
 Approved By





**MGA RESEARCH CORPORATION**  
**LATERAL NECK PENDULUM TEST**  
**SID-Its BUILD LEVEL D DUMMY**

ATD Serial No: 296


Test I.D: D242092

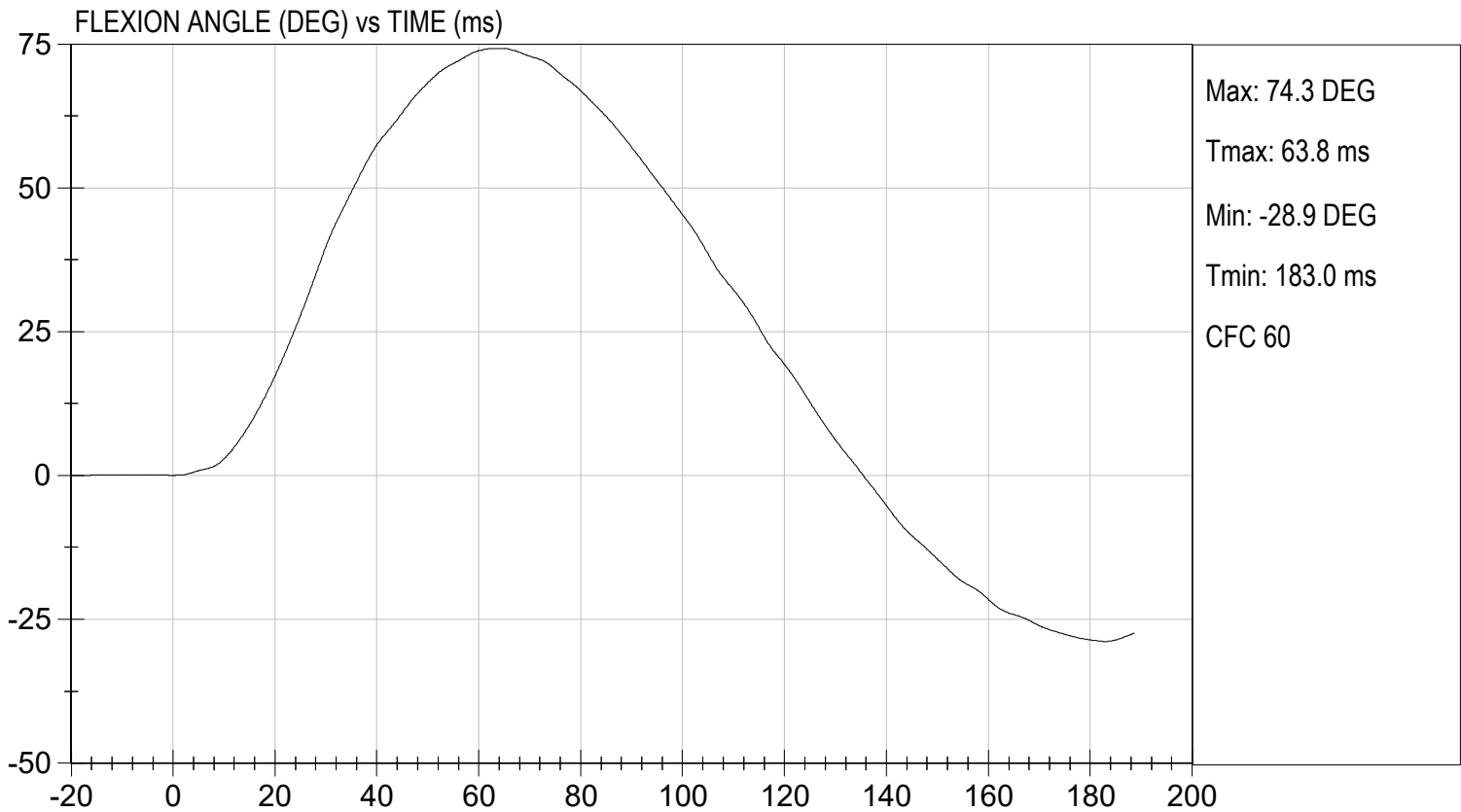
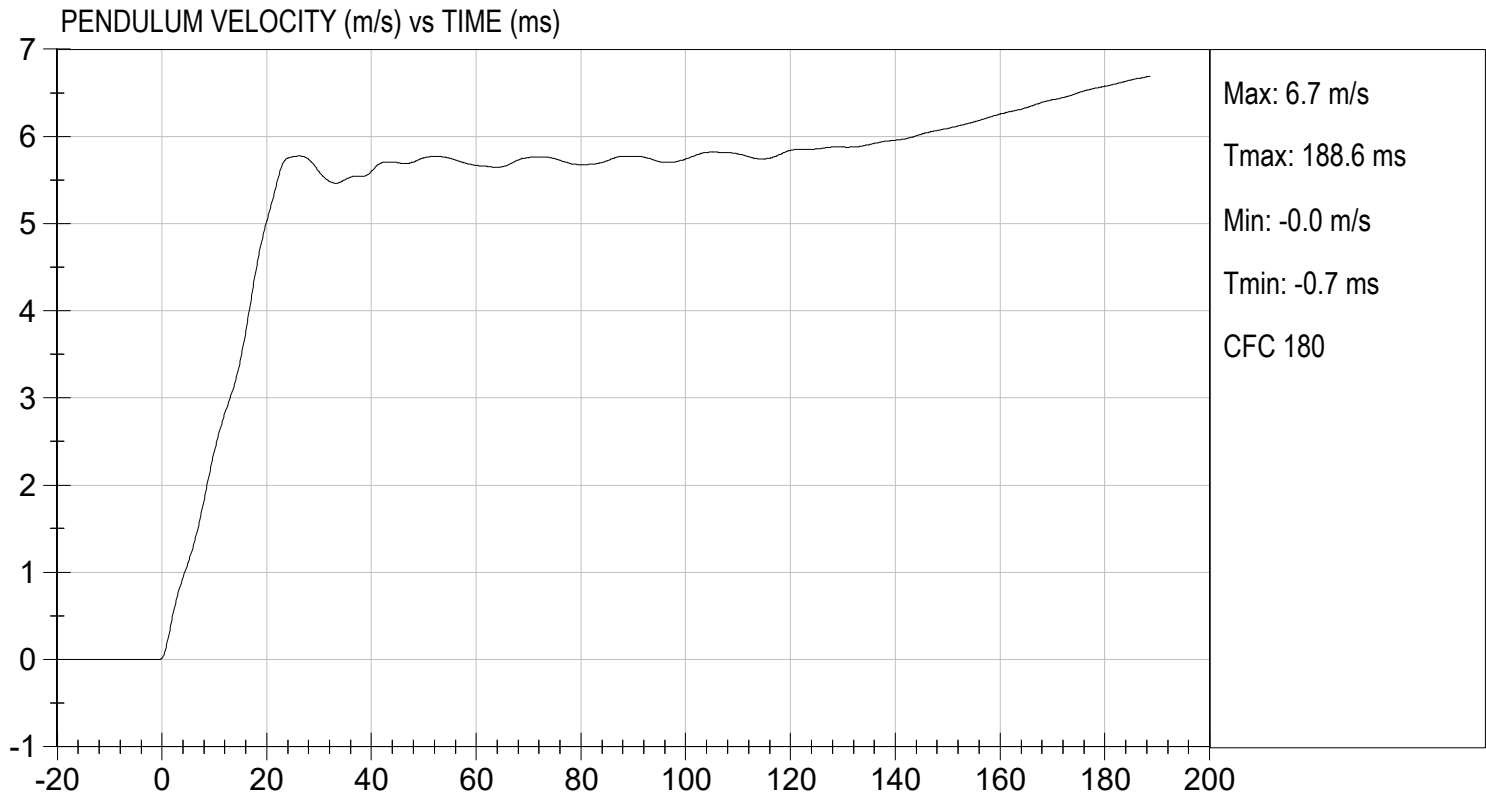
| Tested Parameter                 | Units     | Specification | Result       | Pass/Fail |      |
|----------------------------------|-----------|---------------|--------------|-----------|------|
| Temperature                      | deg C     | 20.6 to 22.2  | 21.3         | Pass      |      |
| Humidity                         | %         | 10 to 70      | 47           | Pass      |      |
| Impact Velocity                  | m/s       | 5.51 to 5.63  | 5.53         | Pass      |      |
| Pendulum Velocity                | 10 ms     | m/s           | 2.20 to 2.80 | 2.39      | Pass |
|                                  | 15 ms     | m/s           | 3.30 to 4.10 | 3.45      | Pass |
|                                  | 20 ms     | m/s           | 4.40 to 5.40 | 5.03      | Pass |
|                                  | 25 ms     | m/s           | 5.40 to 6.10 | 5.77      | Pass |
|                                  | 25-100 ms | m/s           | 5.50 to 6.20 | 5.78      | Pass |
| Maximum D-Plane Rotation         | deg       | 71 to 81      | 74           | Pass      |      |
| Time of Maximum D-Plane Rotation | ms        | 50 to 70      | 64           | Pass      |      |
| Maximum Occipital Condyle Moment | Nm        | -44 to -36    | -37          | Pass      |      |
| Time of Moment Decay to 0 Nm     | ms        | 102 to 126    | 119          | Pass      |      |
| Overall Test Results             |           |               |              | Pass      |      |

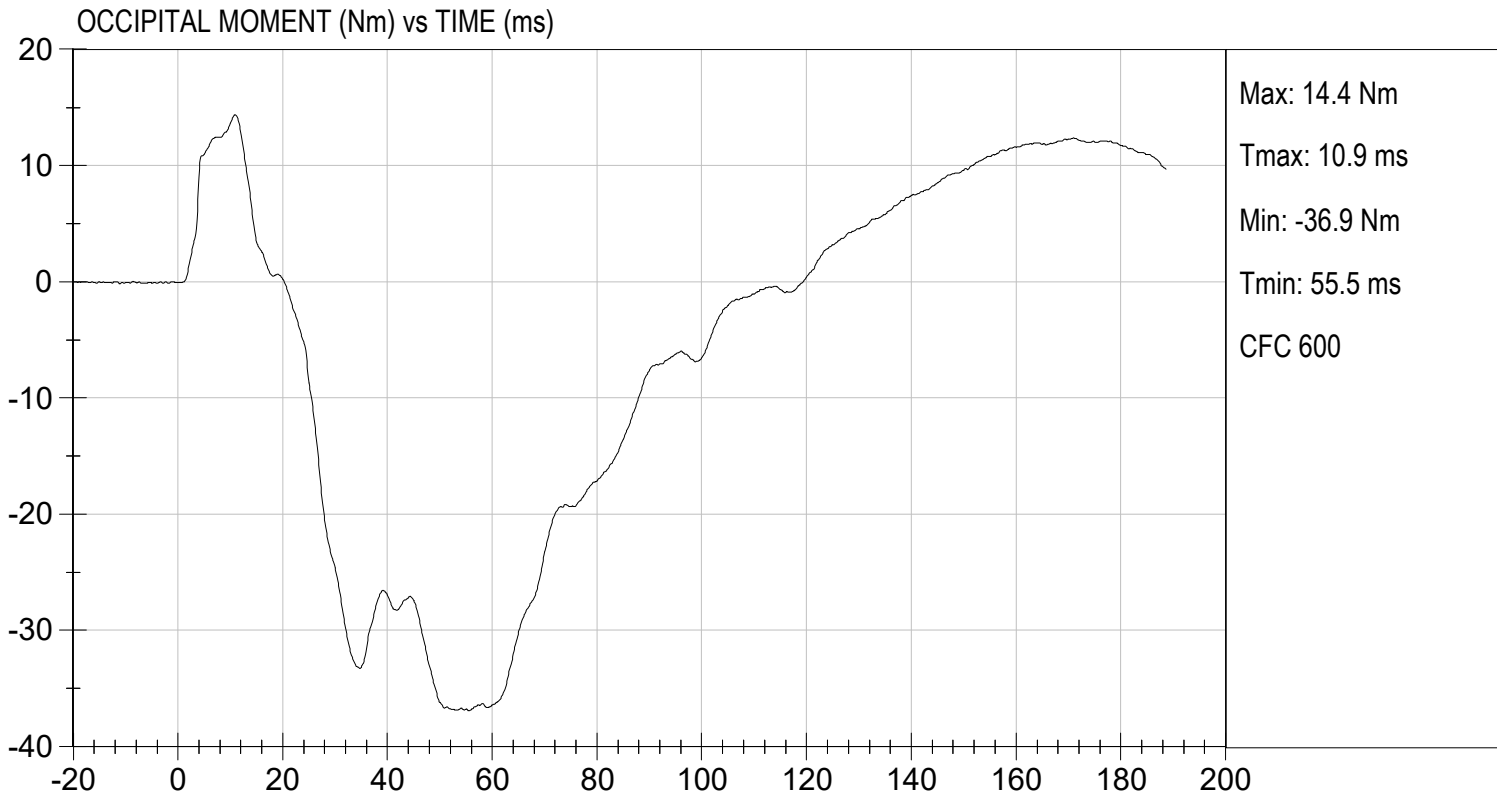
  
 Laboratory Technician

08/15/2024

Test Date

  
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**MGA RESEARCH CORPORATION**  
**SHOULDER IMPACT TEST**  
**SID-IIs BUILD LEVEL D DUMMY**

ATD Serial No: 296

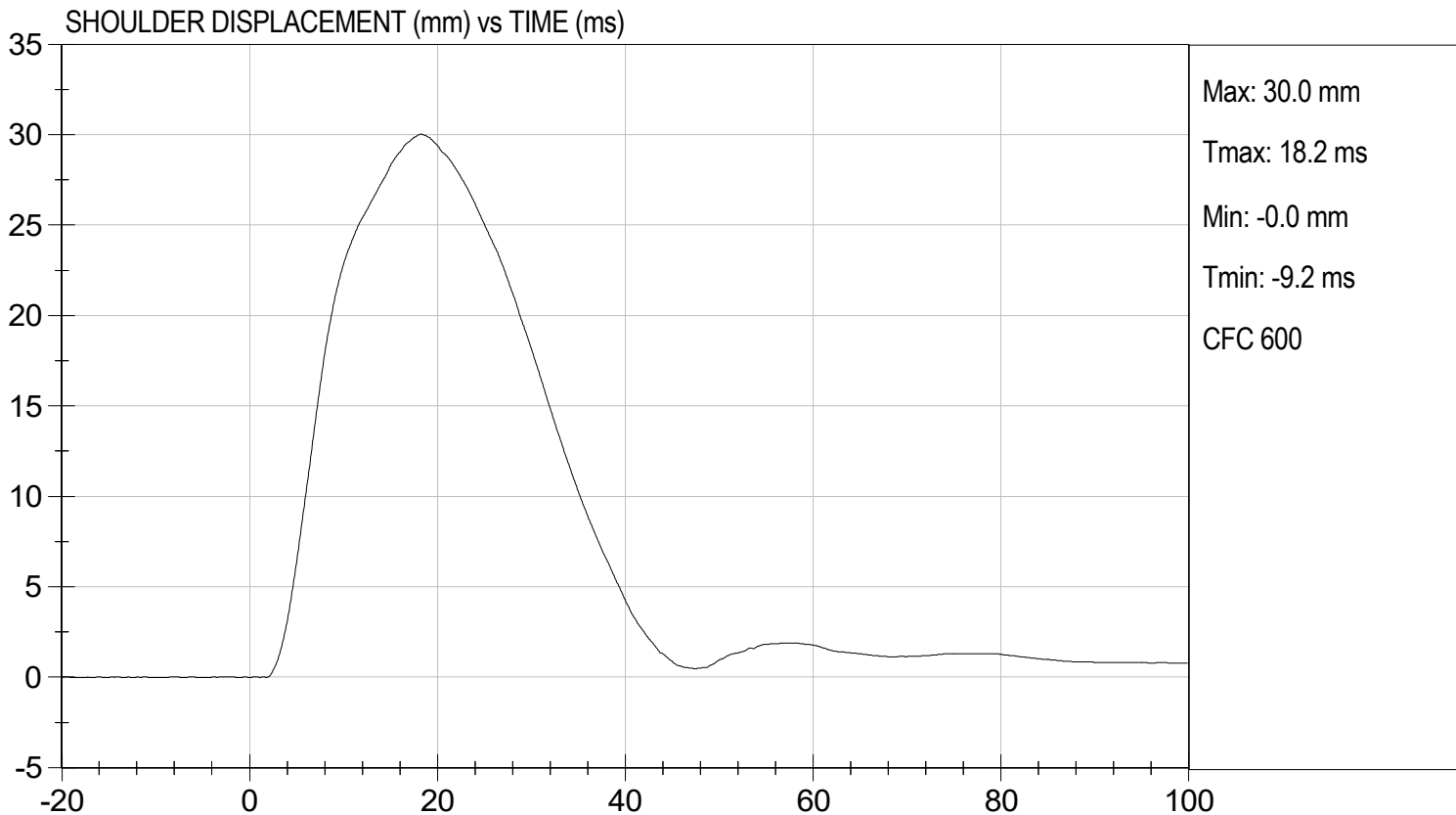
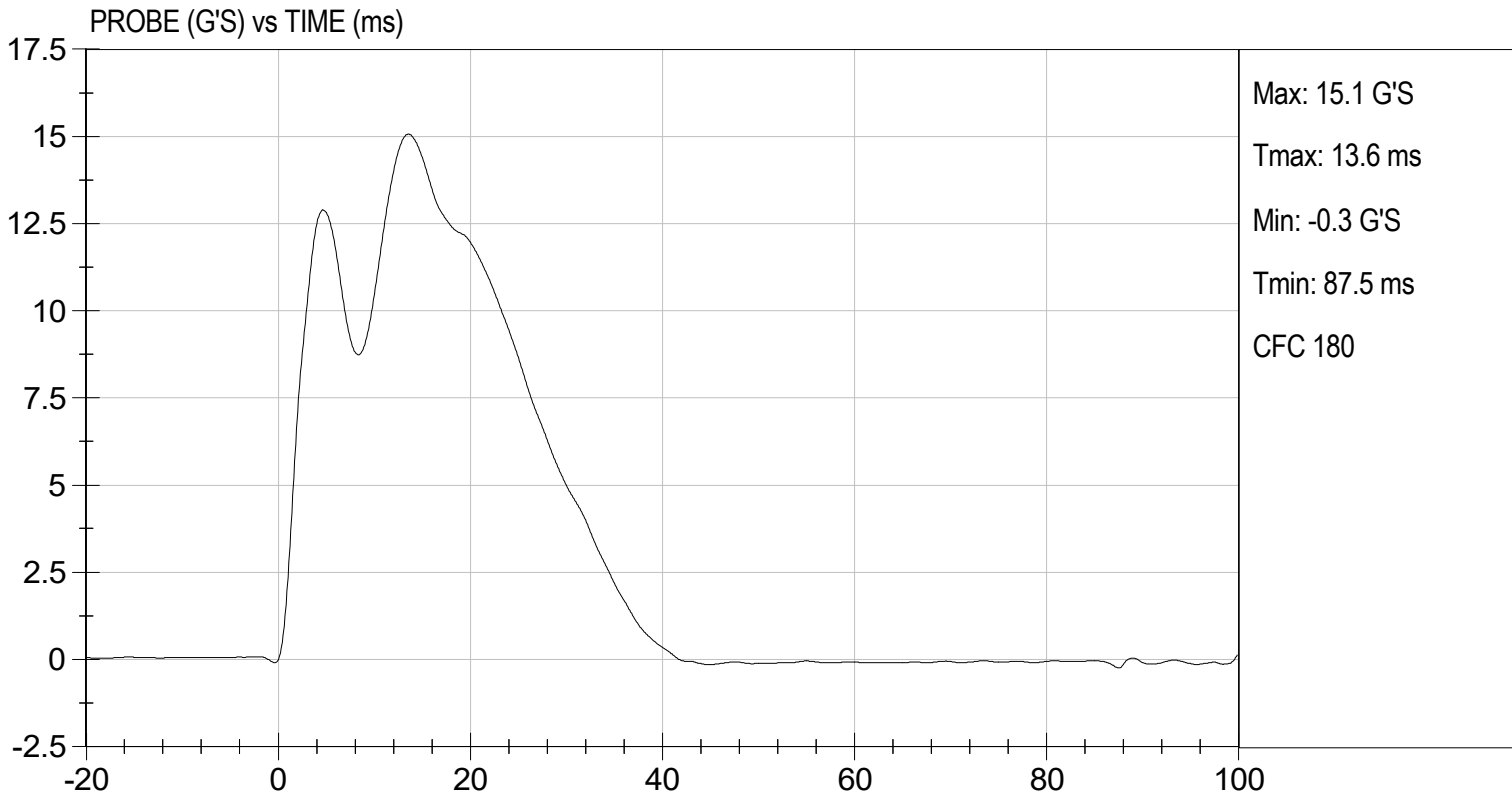
Test ID: D242093

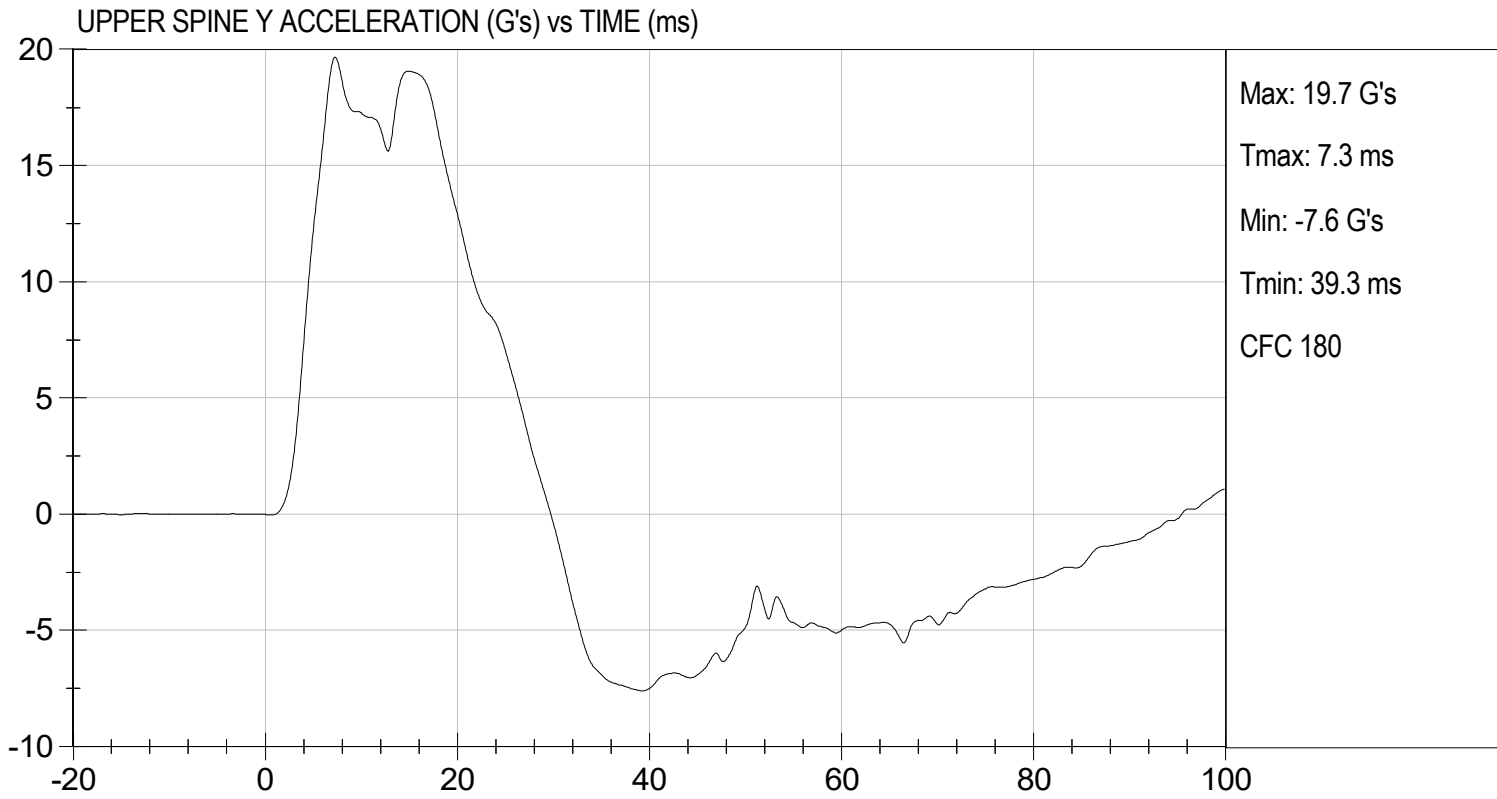
| Tested Parameter                | Units | Specification | Result | Pass/Fail |
|---------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature          | deg C | 20.6 to 22.2  | 21.3   | Pass      |
| Laboratory Relative Humidity    | %     | 10 to 70      | 49     | Pass      |
| Impact Velocity                 | m/s   | 4.20 to 4.40  | 4.30   | Pass      |
| Maximum Probe Acceleration      | G's   | 13 to 18      | 15     | Pass      |
| Shoulder Displacement           | mm    | 28 to 37      | 30     | Pass      |
| Upper Spine (T1) Y Acceleration | G's   | 17 to 22      | 20     | Pass      |
| Overall Test Results            |       |               |        | Pass      |

  
 Laboratory Technician

08/15/2024  
 Test Date

  
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**MGA RESEARCH CORPORATION  
THORAX (WITH ARM) IMPACT TEST  
SID-IIs BUILD LEVEL D DUMMY**

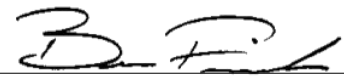
ATD Serial No: 296

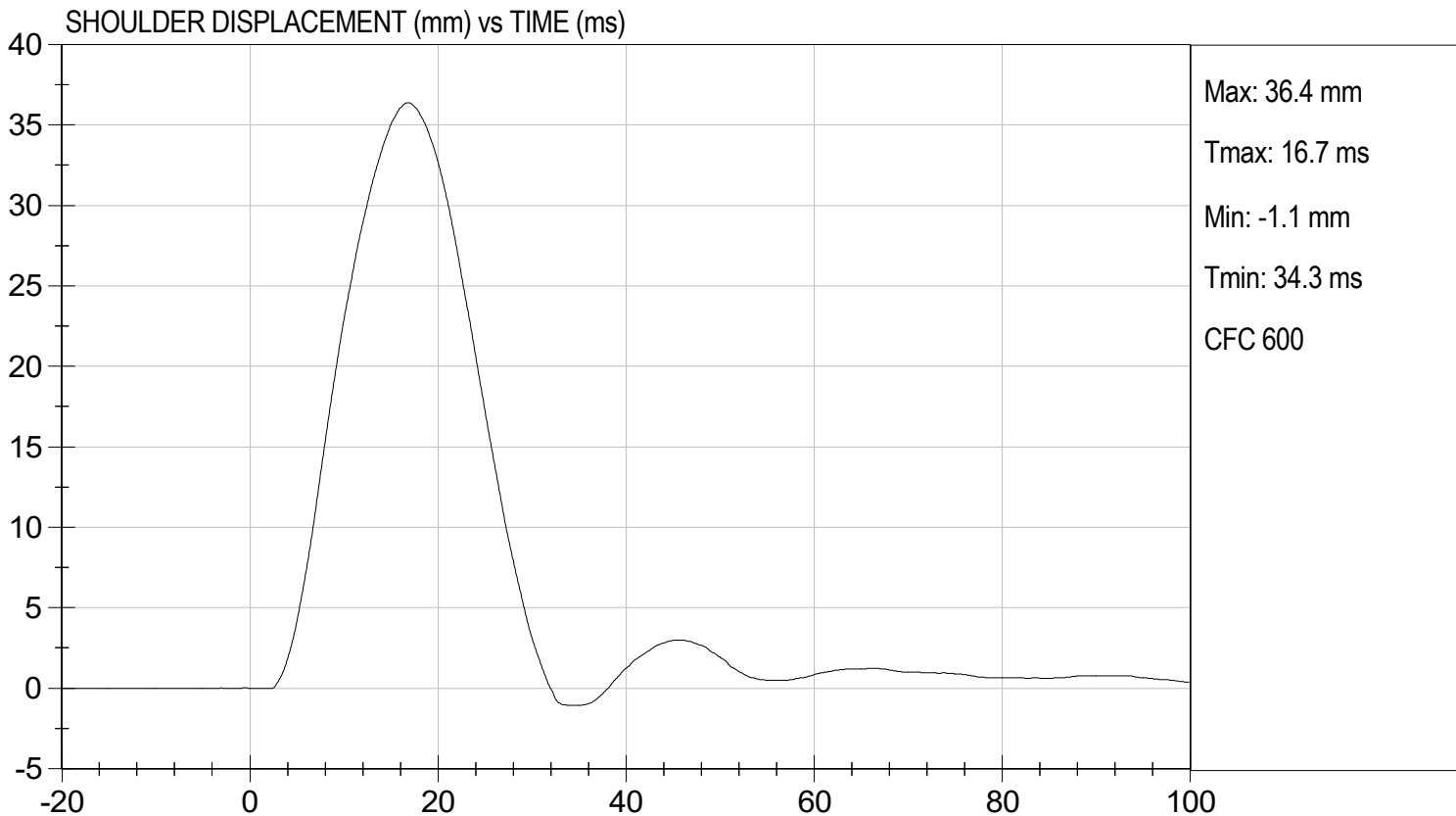
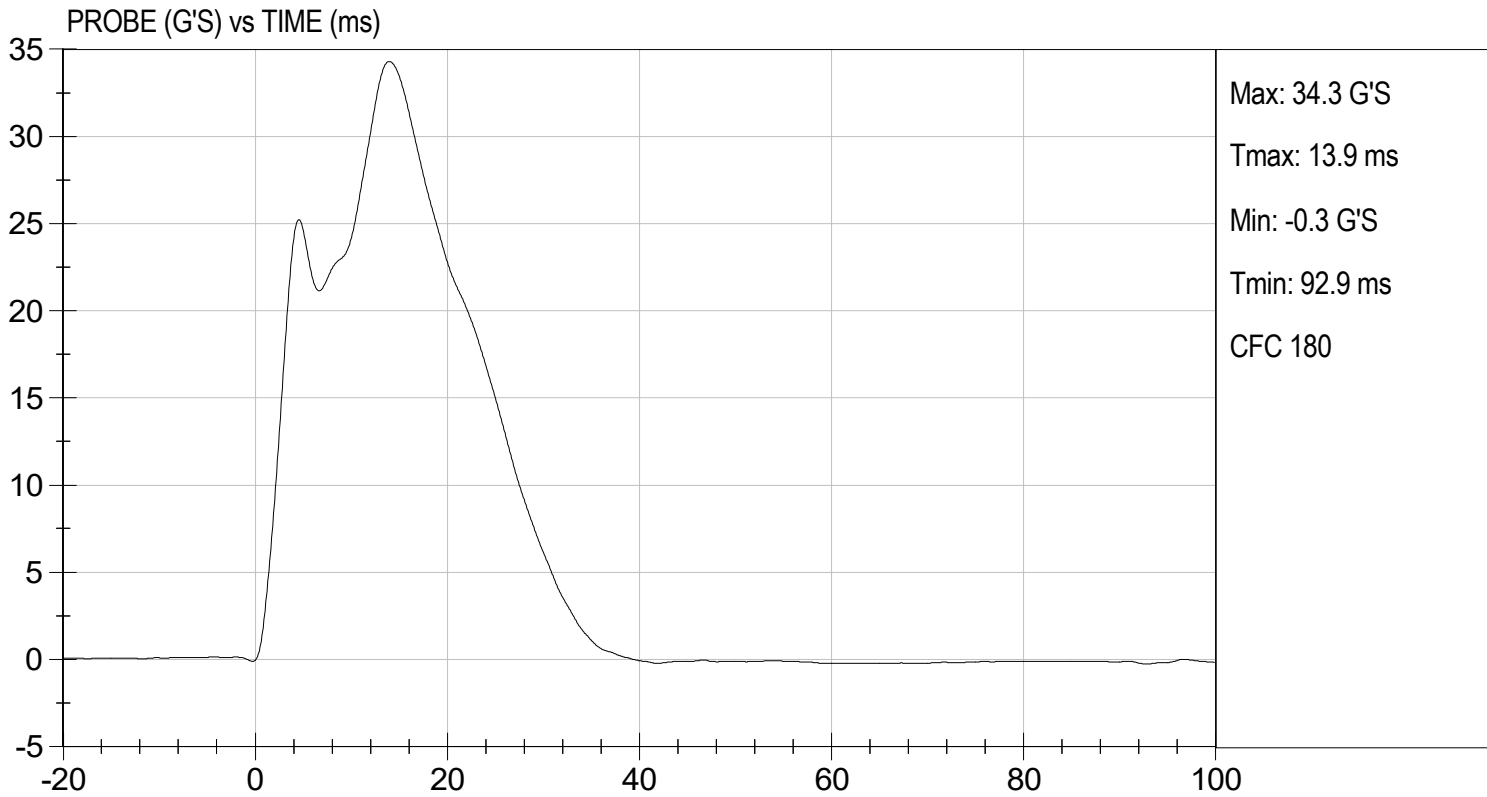
Test I.D: D242094

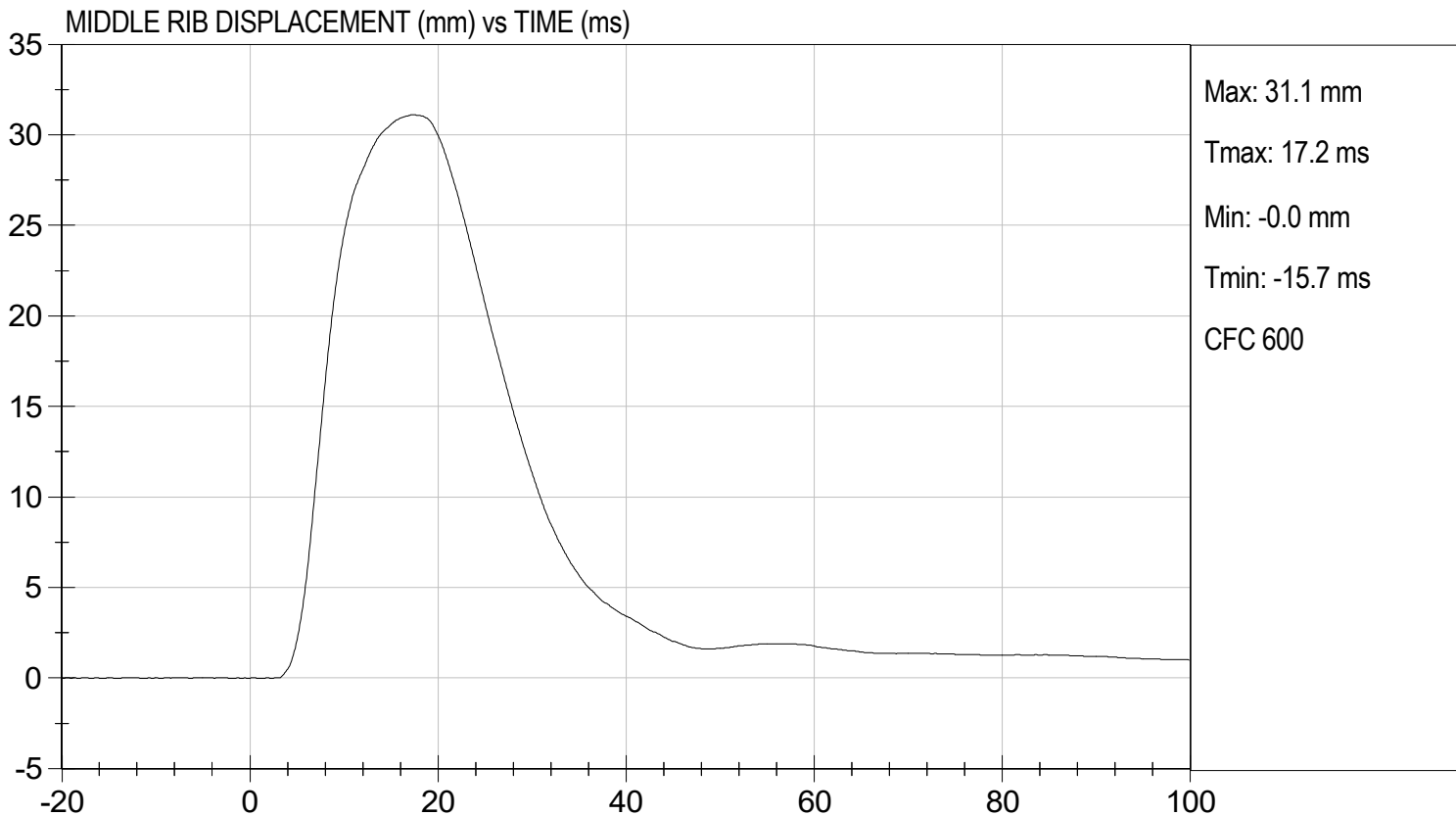
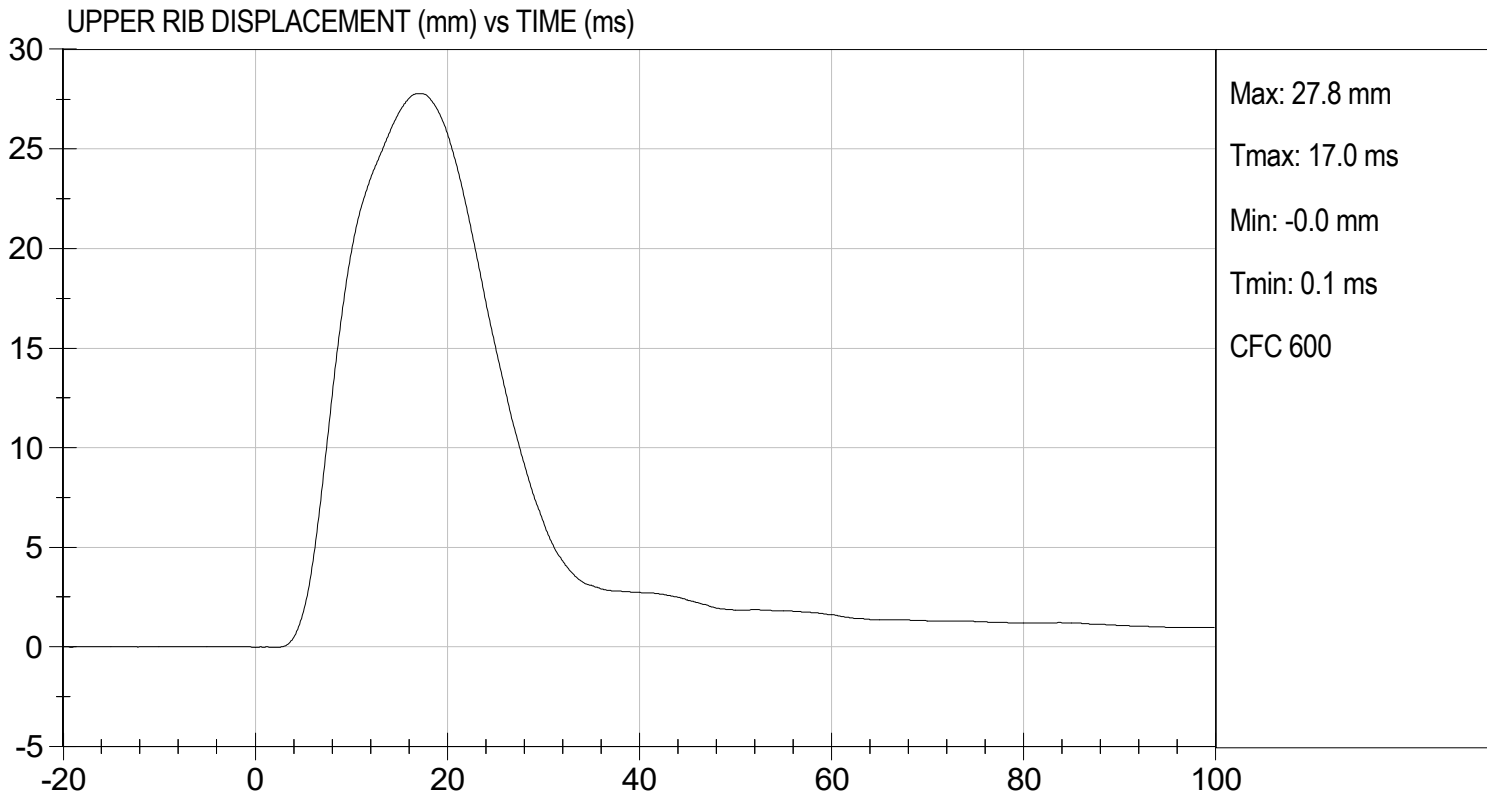
| Tested Parameter                 | Units | Specification | Result | Pass/Fail |
|----------------------------------|-------|---------------|--------|-----------|
| Temperature                      | deg C | 20.6 to 22.2  | 21.3   | Pass      |
| Humidity                         | %     | 10 to 70      | 52     | Pass      |
| Impact Velocity                  | m/s   | 6.60 to 6.80  | 6.77   | Pass      |
| Maximum Probe Acceleration       | G's   | 30 to 36      | 34     | Pass      |
| Shoulder Displacement            | mm    | 31 to 40      | 36     | Pass      |
| Upper Rib Displacement           | mm    | 25 to 32      | 28     | Pass      |
| Middle Rib Displacement          | mm    | 30 to 36      | 31     | Pass      |
| Lower Rib Displacement           | mm    | 32 to 38      | 33     | Pass      |
| Upper Spine (T1) Y Acceleration  | G's   | 34 to 43      | 38     | Pass      |
| Lower Spine (T12) Y Acceleration | G's   | 29 to 37      | 35     | Pass      |
| Overall Test Results             |       |               |        | Pass      |

  
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08/15/2024  
Test Date

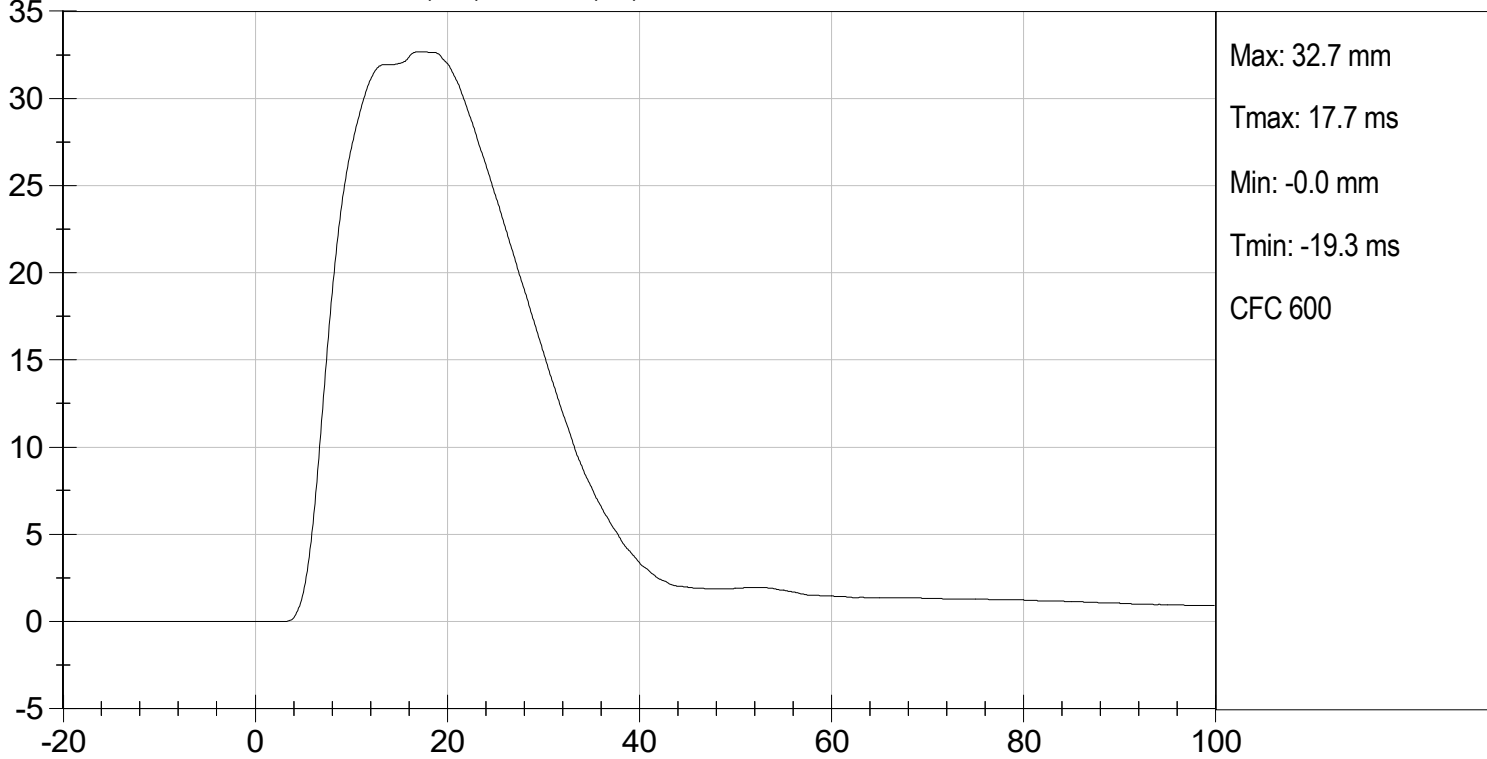
  
Approved By



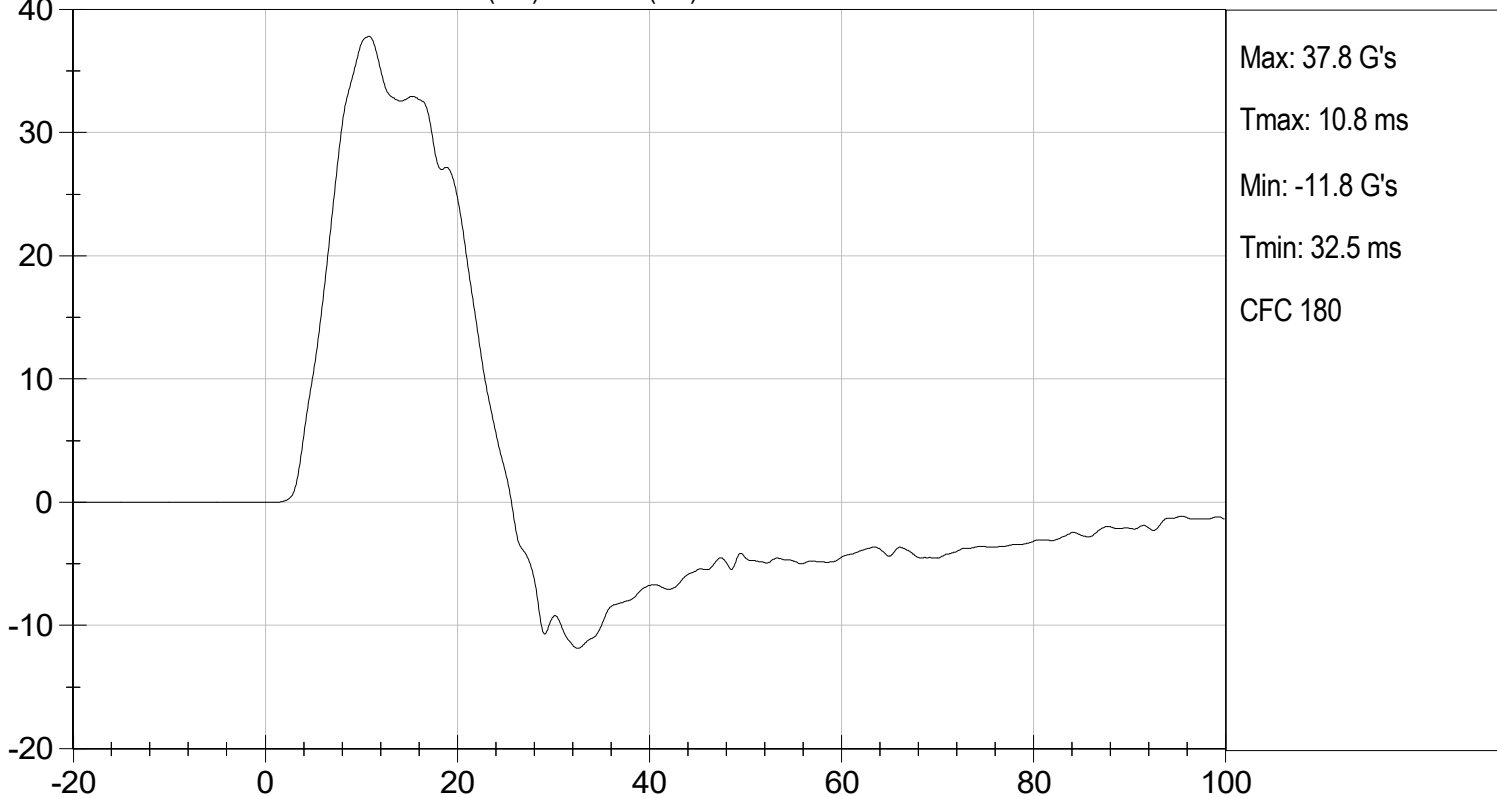


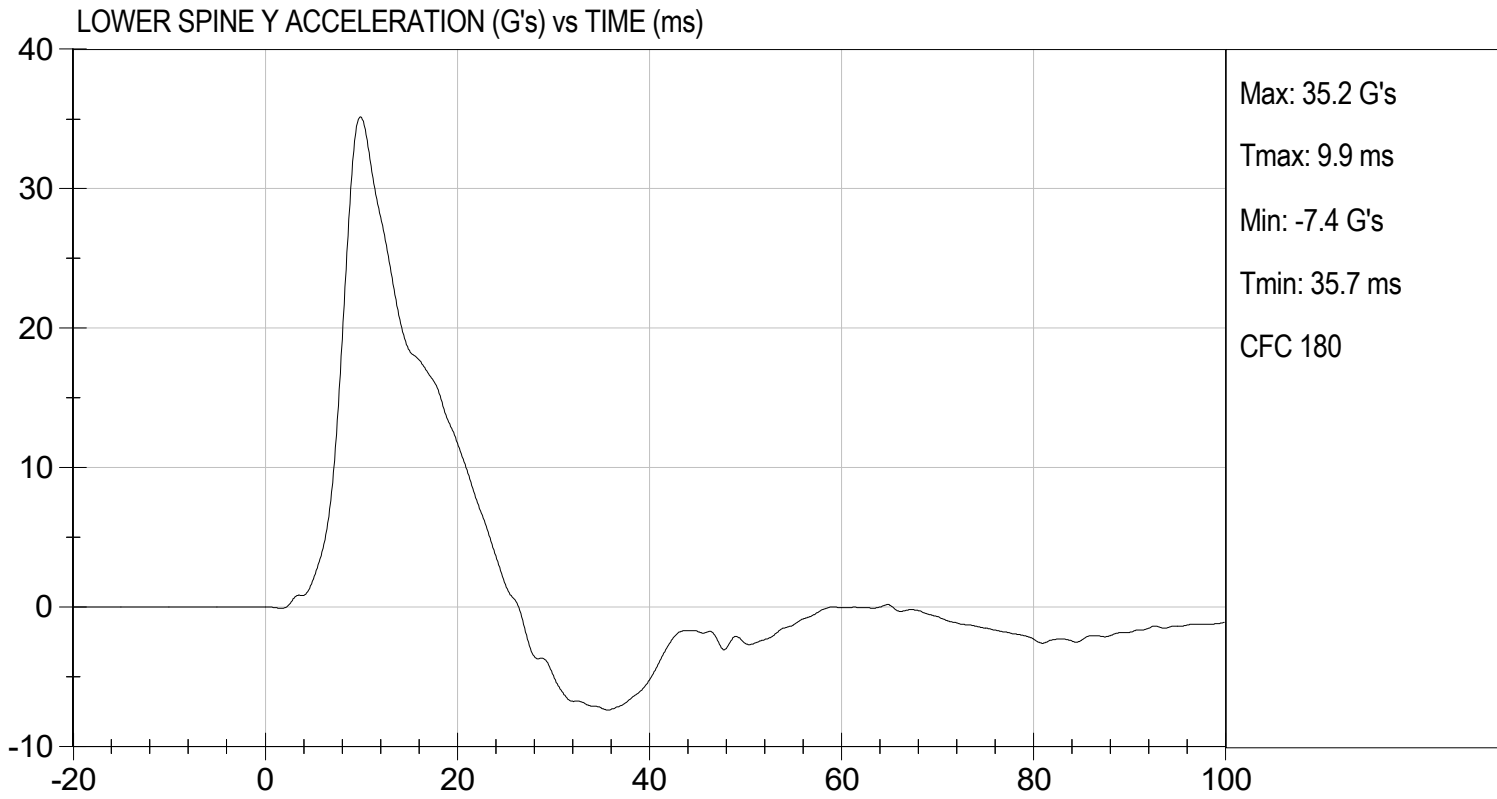


LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



UPPER SPINE Y ACCELERATION (G's) vs TIME (ms)





**MGA RESEARCH CORPORATION**  
**THORAX (WITHOUT ARM) IMPACT TEST**  
**SID-Its BUILD LEVEL D DUMMY**

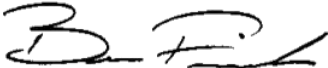
ATD Serial No: 296

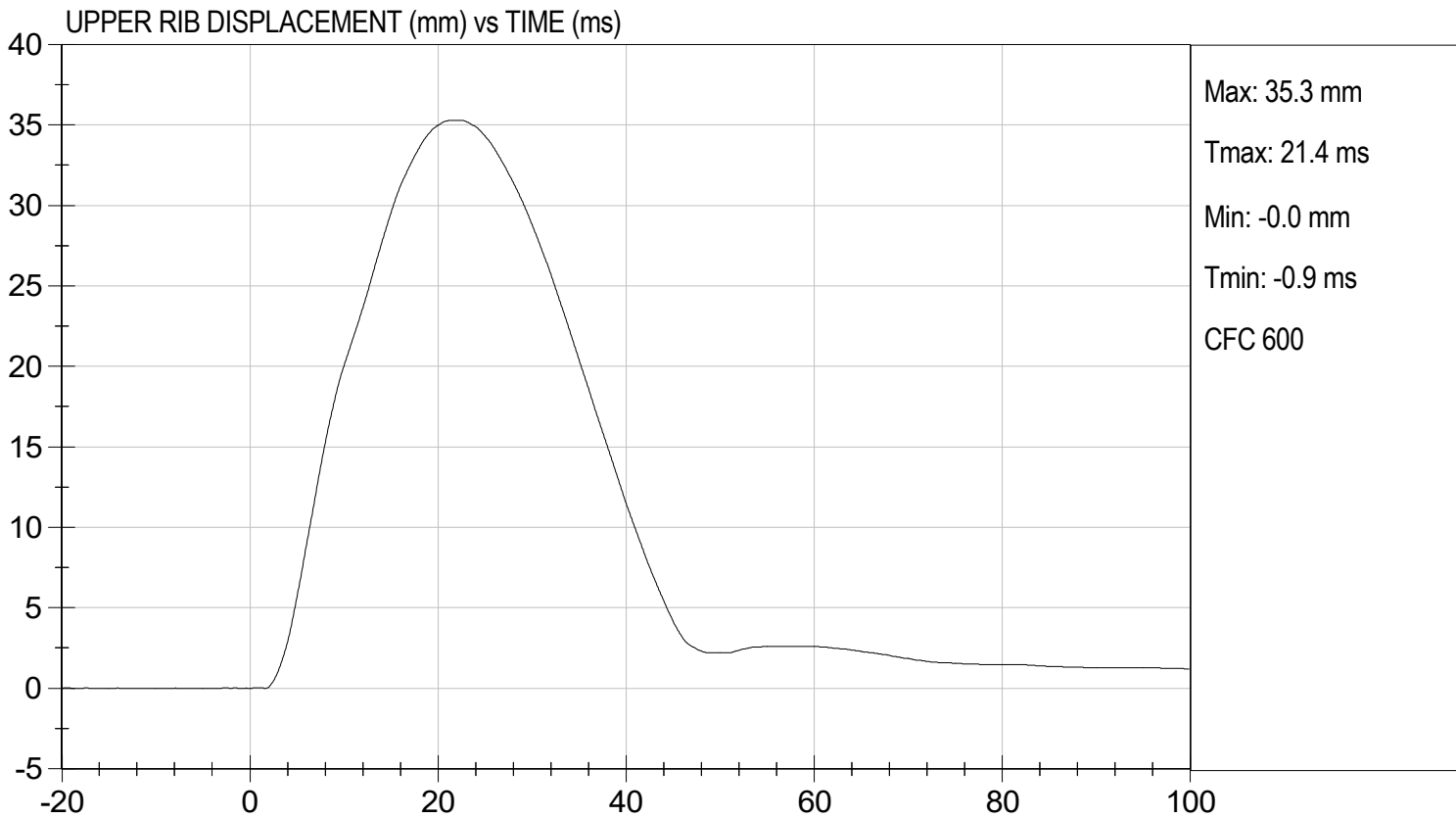
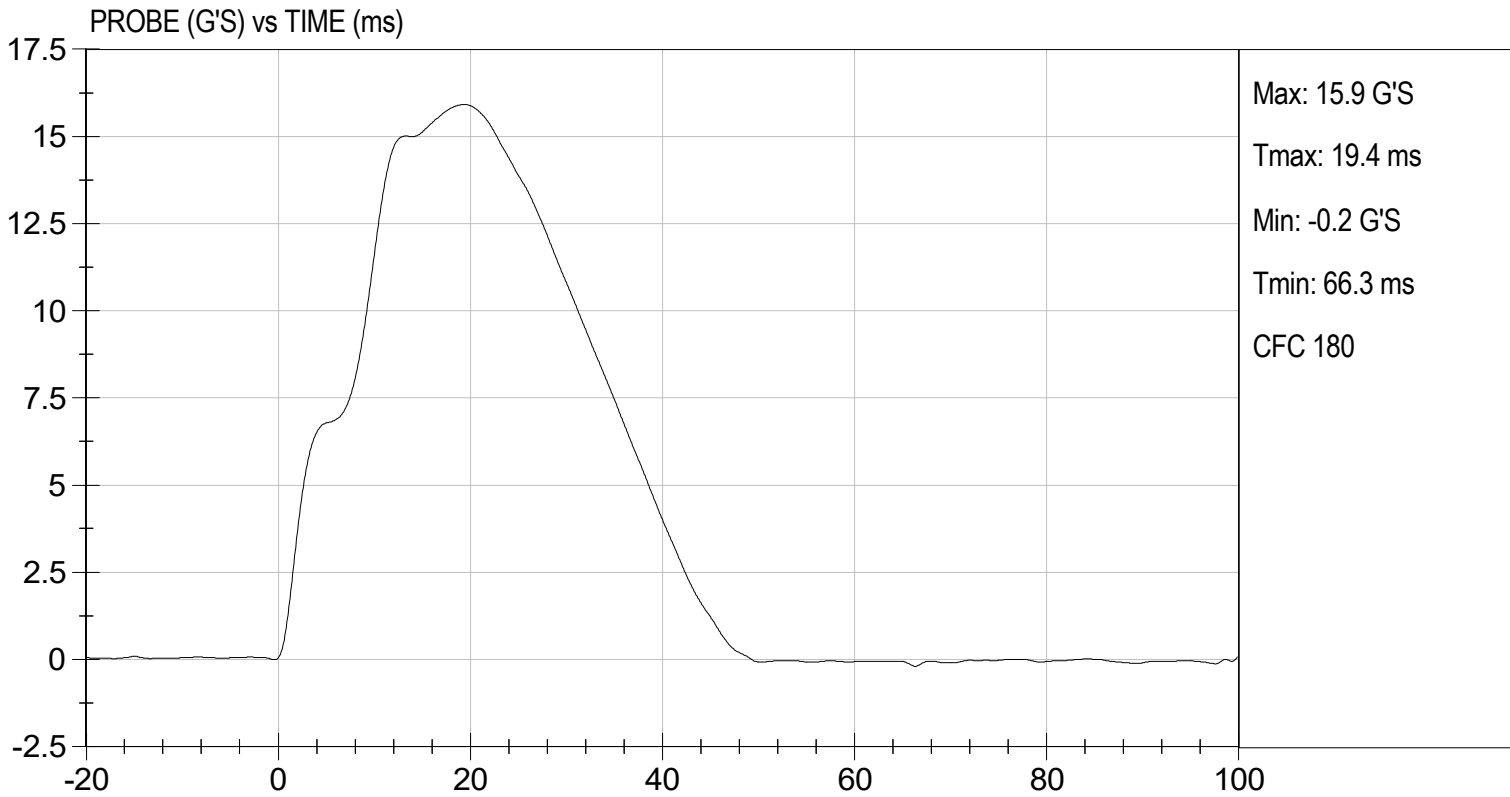
Test I.D: D242095

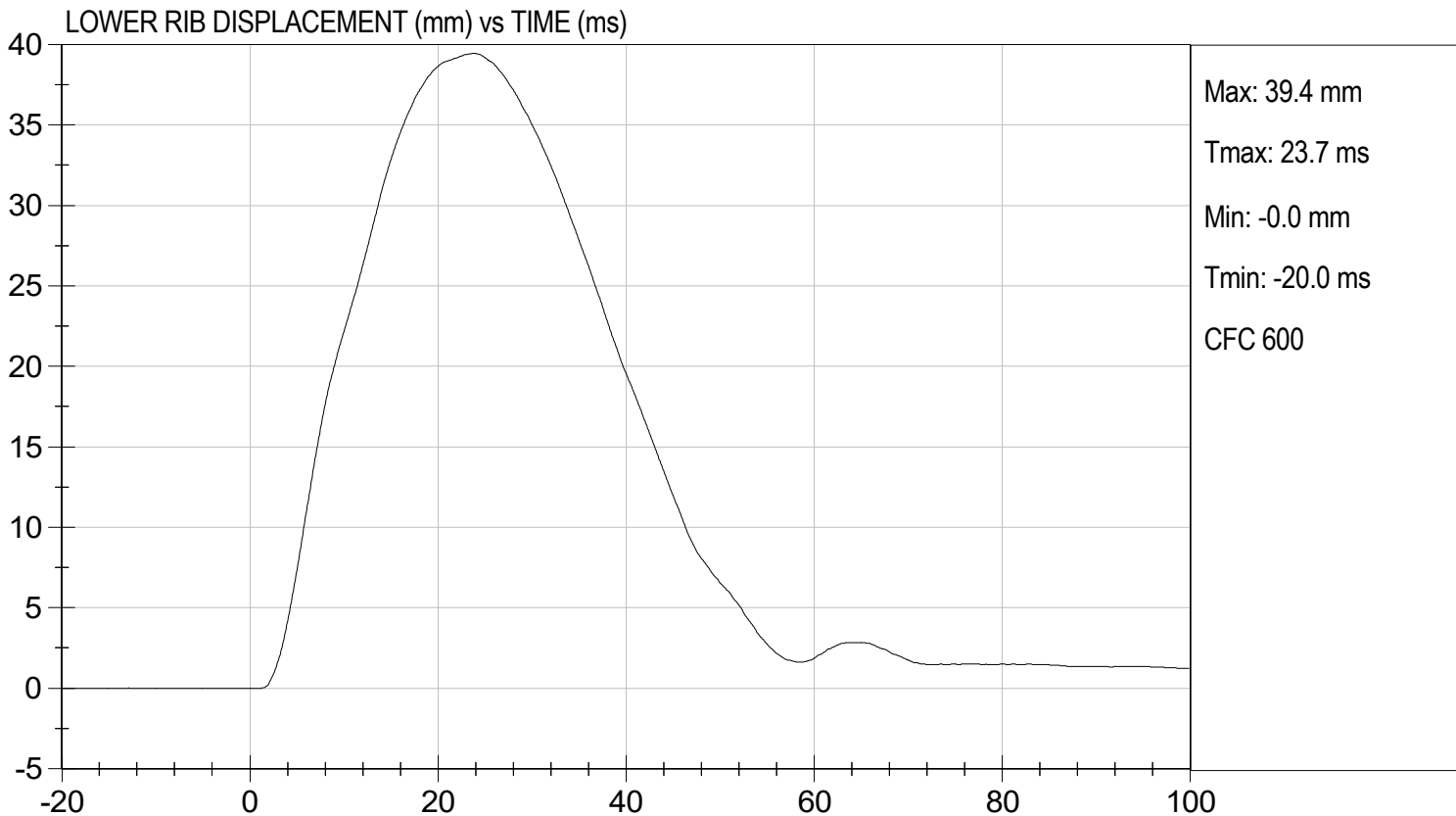
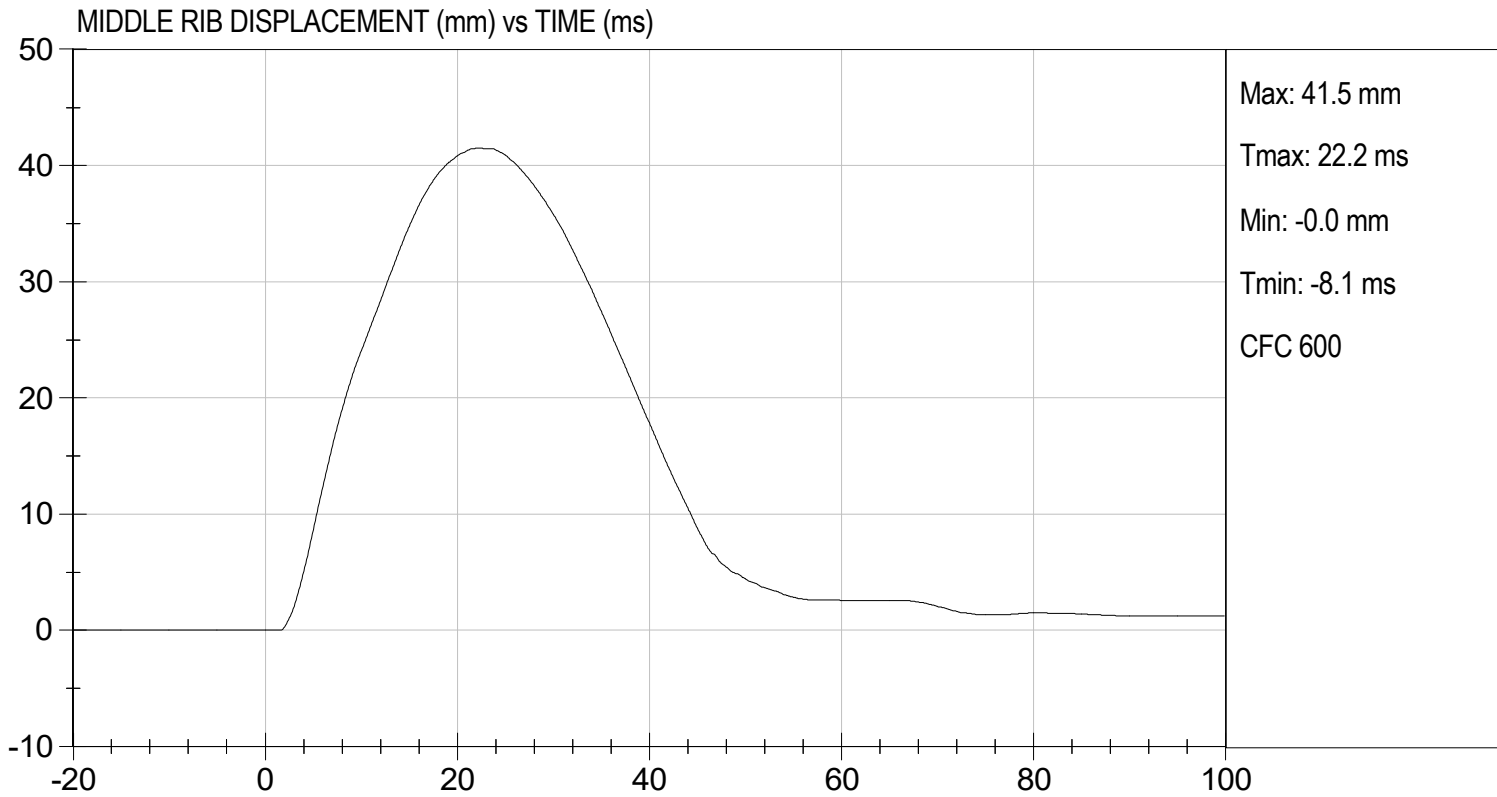
| Tested Parameter                 | Units | Specification | Result | Pass/Fail   |
|----------------------------------|-------|---------------|--------|-------------|
| Temperature                      | deg C | 20.6 to 22.2  | 21.2   | Pass        |
| Humidity                         | %     | 10 to 70      | 51     | Pass        |
| Impact Velocity                  | m/s   | 4.20 to 4.40  | 4.30   | Pass        |
| Maximum Probe Acceleration       | G's   | 14 to 18      | 16     | Pass        |
| Upper Rib Displacement           | mm    | 32 to 40      | 35     | Pass        |
| Middle Rib Displacement          | mm    | 39 to 45      | 41     | Pass        |
| Lower Rib Displacement           | mm    | 35 to 43      | 39     | Pass        |
| Upper Spine (T1) Y Acceleration  | G's   | 13 to 17      | 15     | Pass        |
| Lower Spine (T12) Y Acceleration | G's   | 7 to 11       | 10     | Pass        |
| <b>Overall Test Results</b>      |       |               |        | <b>Pass</b> |

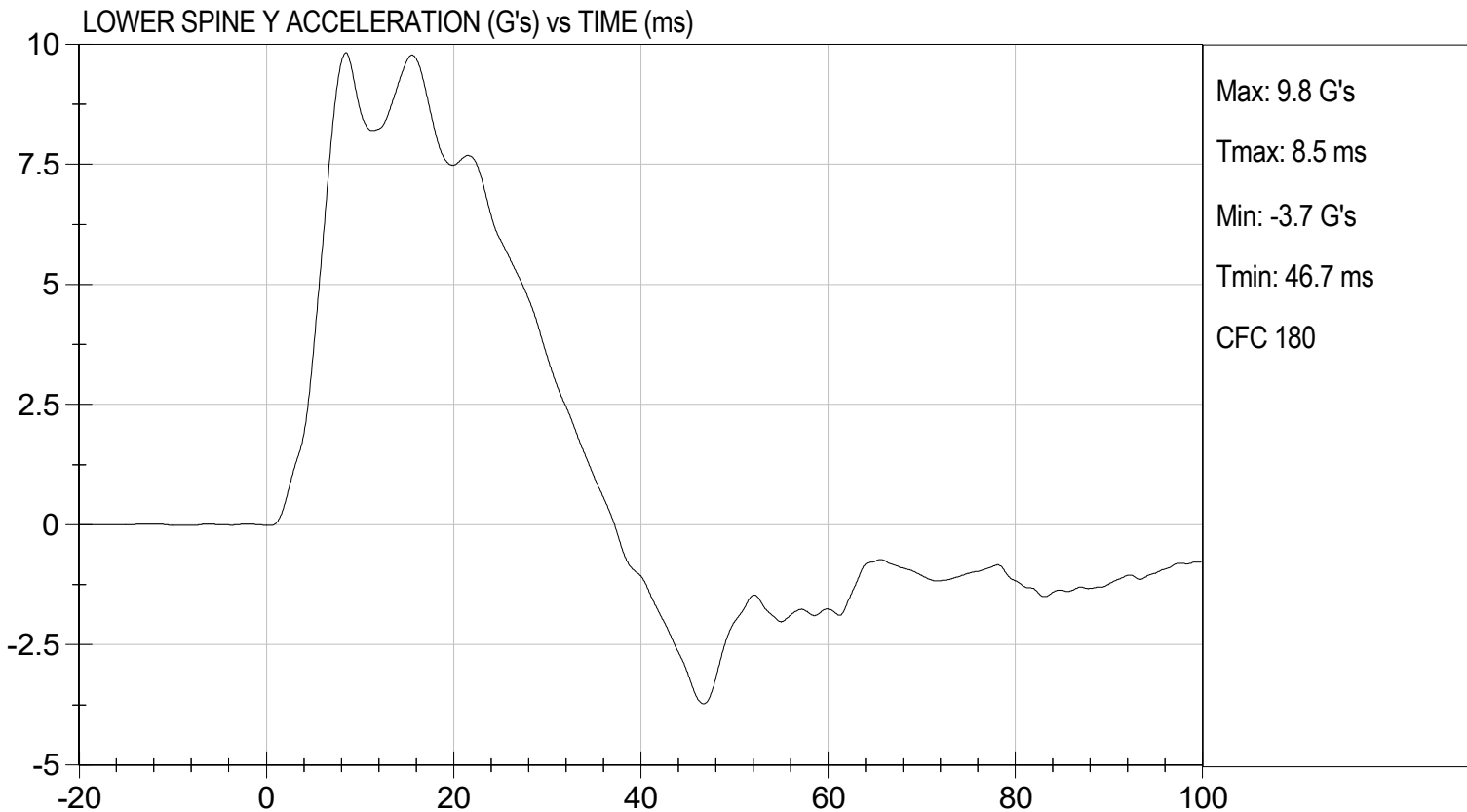
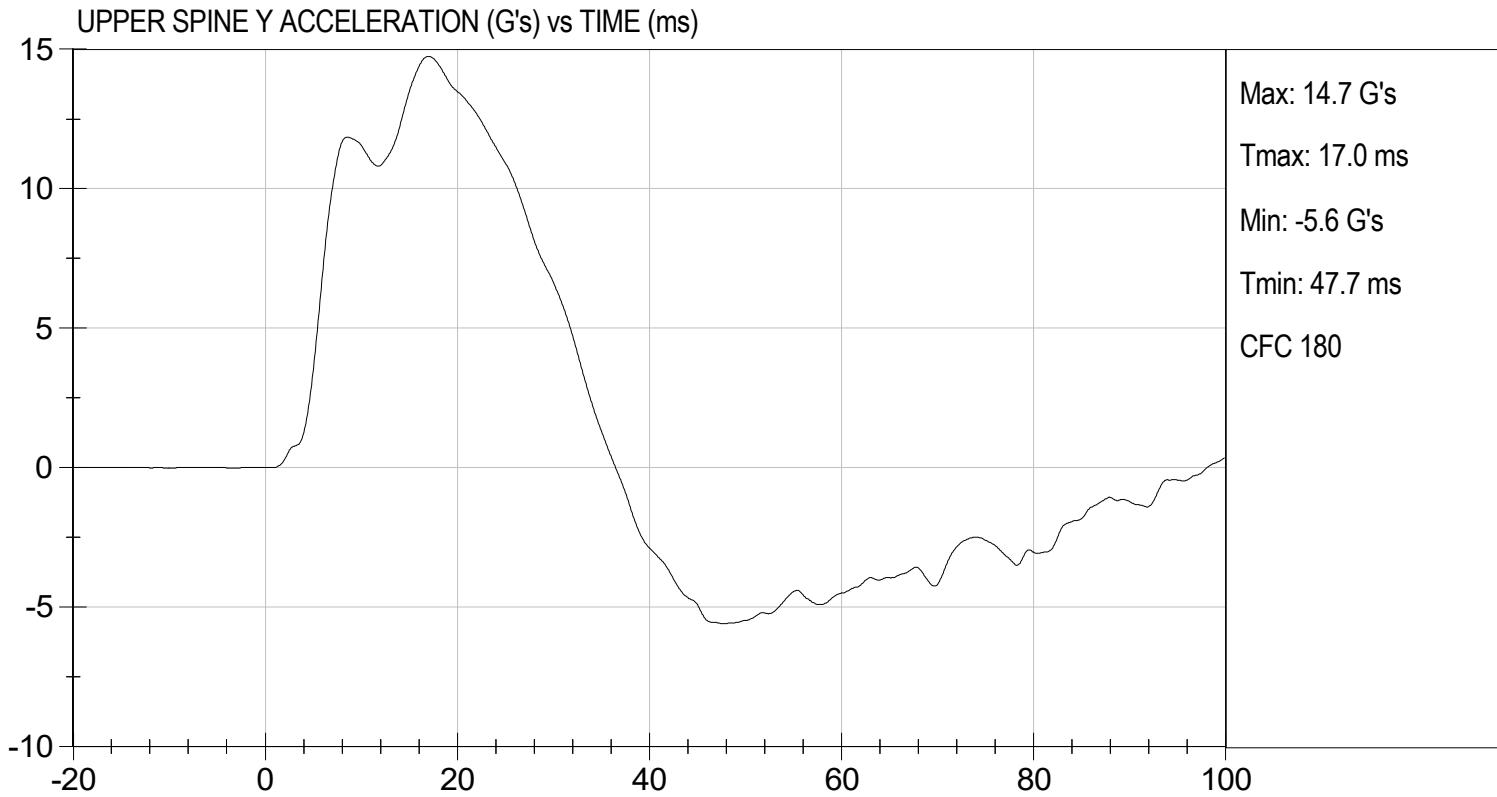
  
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 Test Date

  
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MGA RESEARCH CORPORATION

ABDOMINAL IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

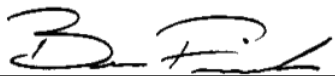
ATD Serial No: 296

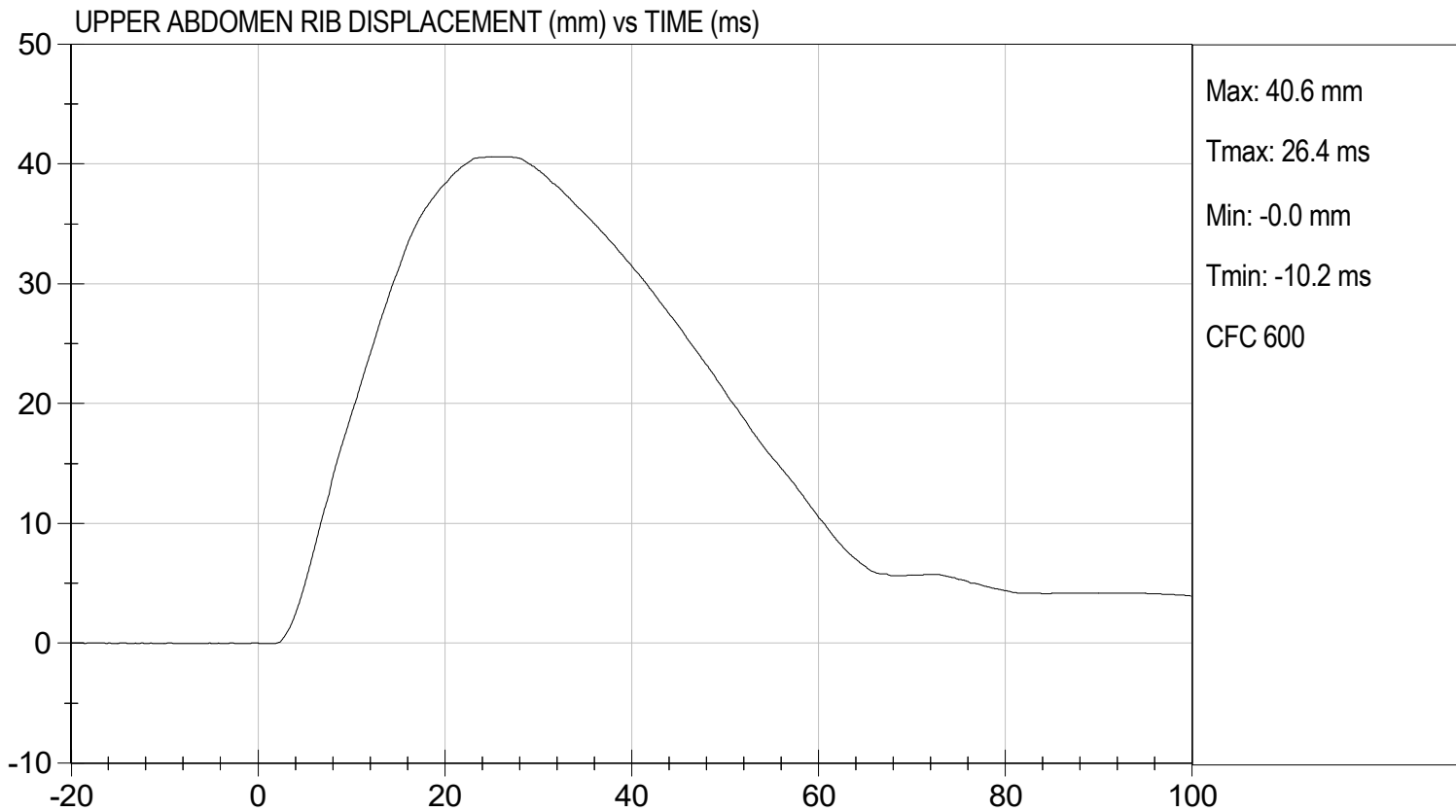
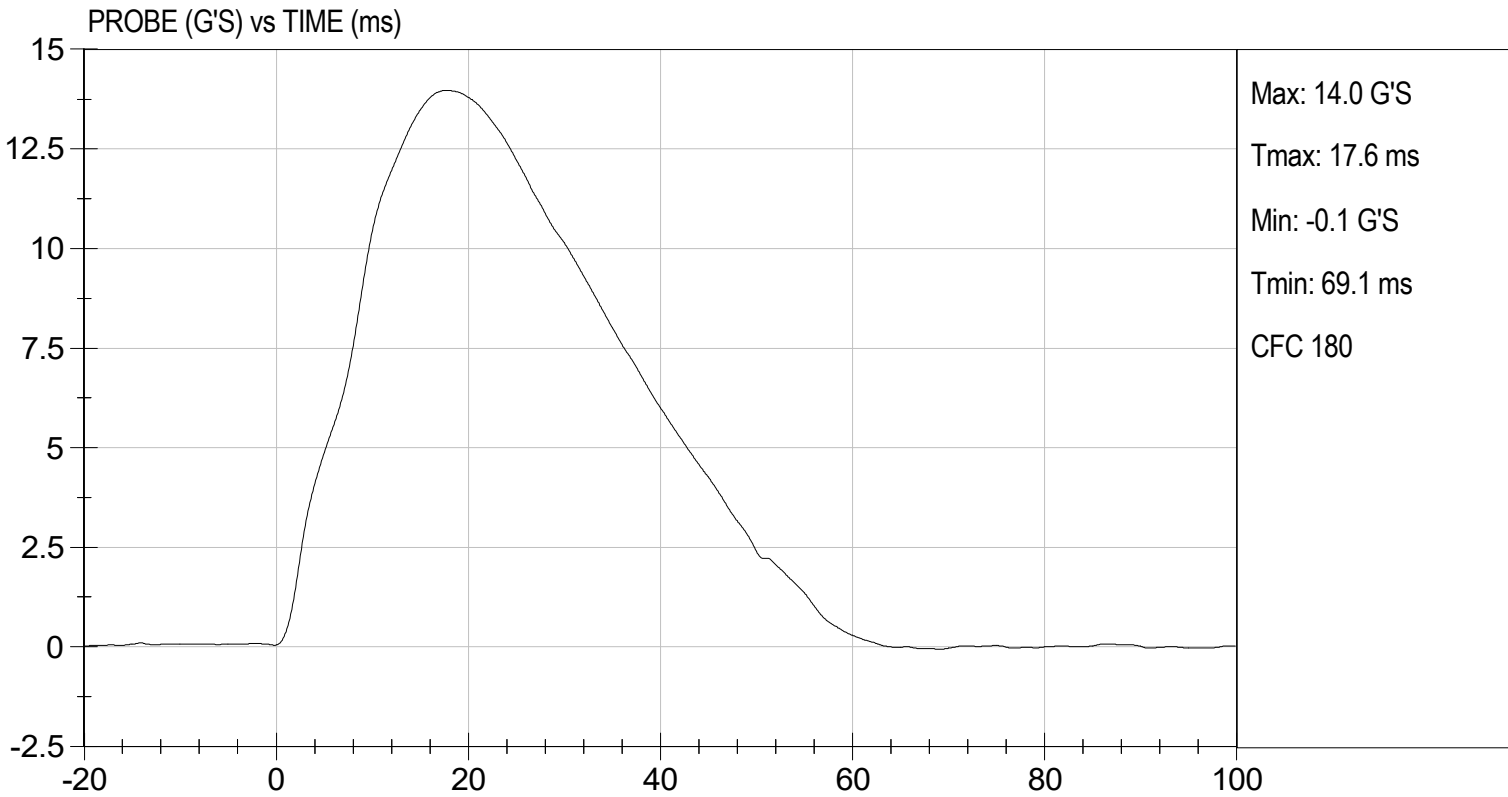
Test I.D: D242096

| Tested Parameter                 | Units | Specification | Result | Pass/Fail |
|----------------------------------|-------|---------------|--------|-----------|
| Temperature                      | deg C | 20.6 to 22.2  | 21.2   | Pass      |
| Humidity                         | %     | 10 to 70      | 51     | Pass      |
| Impact Velocity                  | m/s   | 4.20 to 4.40  | 4.34   | Pass      |
| Maximum Probe Acceleration       | G's   | 12 to 16      | 14     | Pass      |
| Upper Abdomen Rib Displacement   | mm    | 36 to 47      | 41     | Pass      |
| Lower Abdomen Rib Displacement   | mm    | 33 to 44      | 37     | Pass      |
| Lower Spine (T12) Y Acceleration | G's   | 9 to 14       | 11     | Pass      |
| Overall Test Results             |       |               |        | Pass      |

  
Laboratory Technician

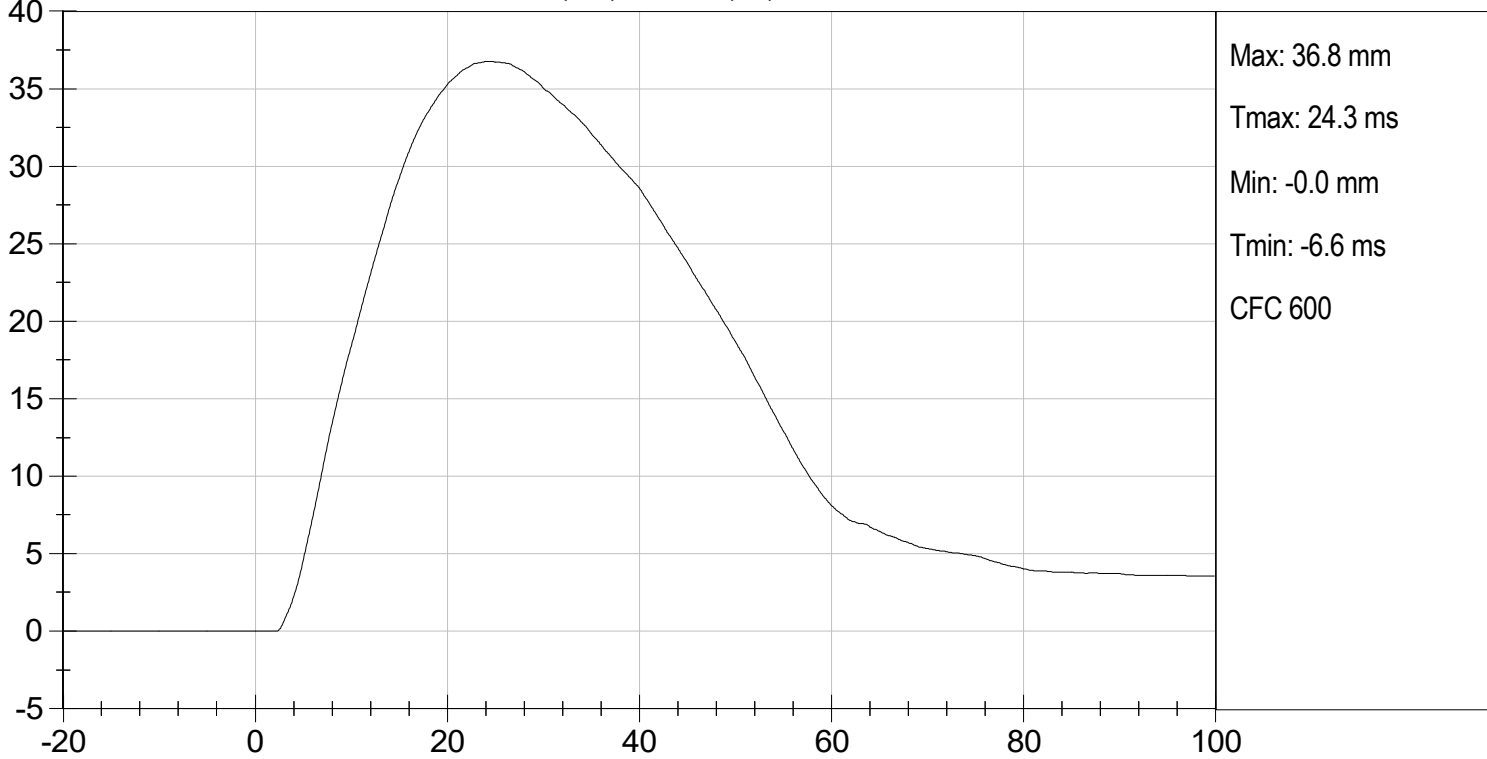
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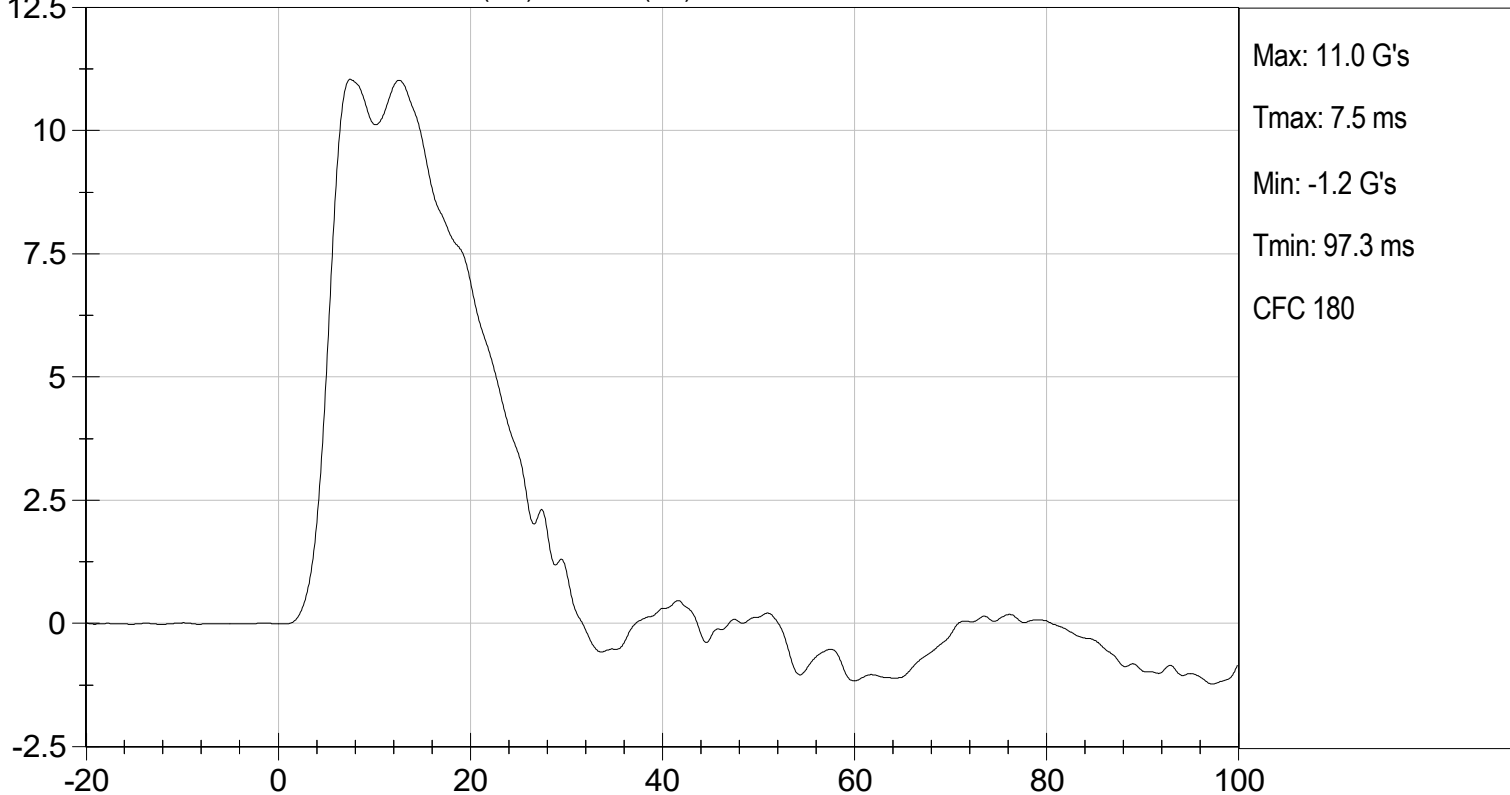




LOWER ABDOMEN RIB DISPLACEMENT (mm) vs TIME (ms)



LOWER SPINE ACCELERATION (G's) vs TIME (ms)



**MGA RESEARCH CORPORATION**  
**PELVIS IMPACT TEST**  
**SID-Its BUILD LEVEL D DUMMY**

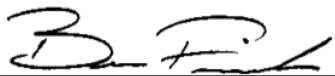
ATD Serial No: 296

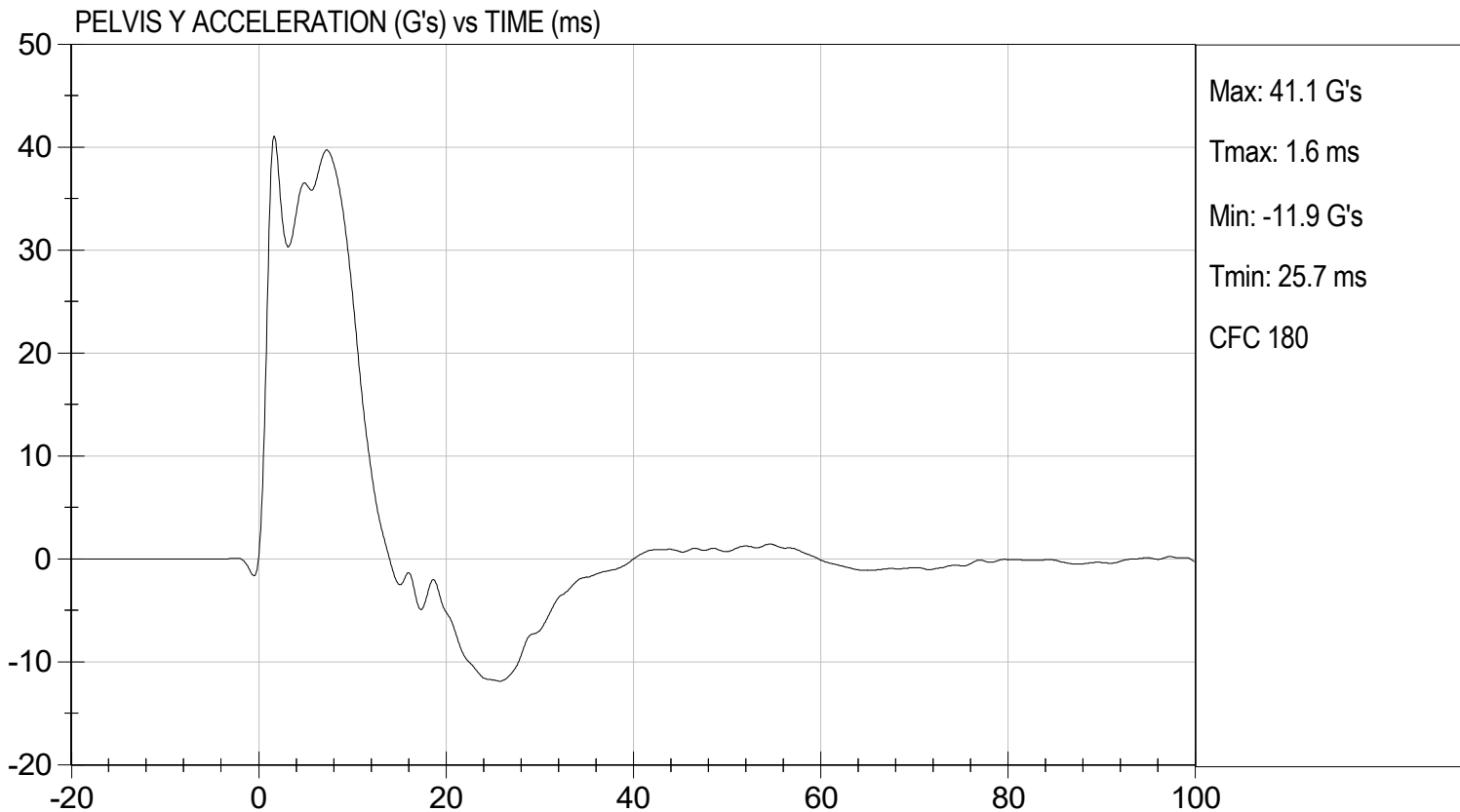
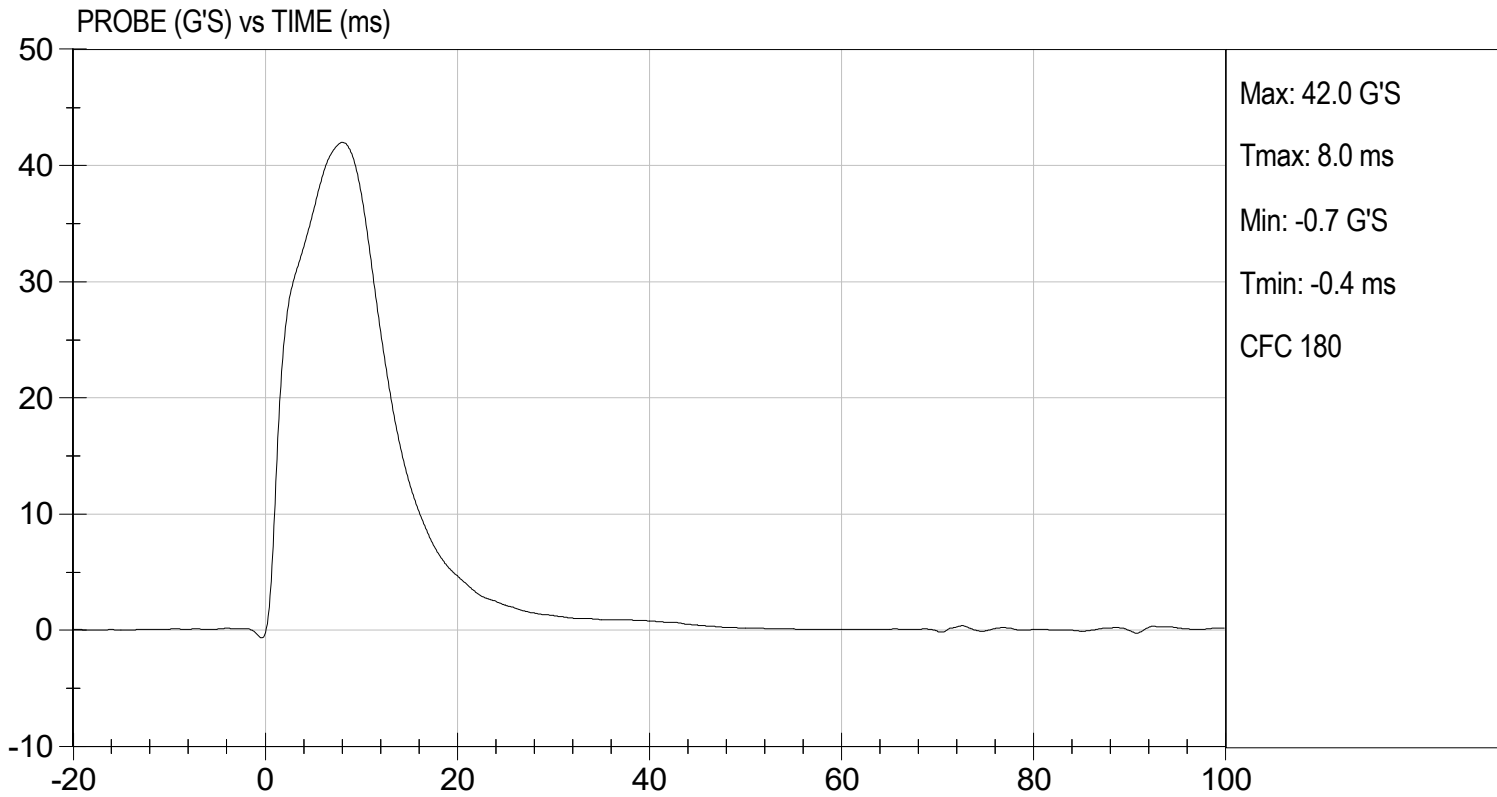
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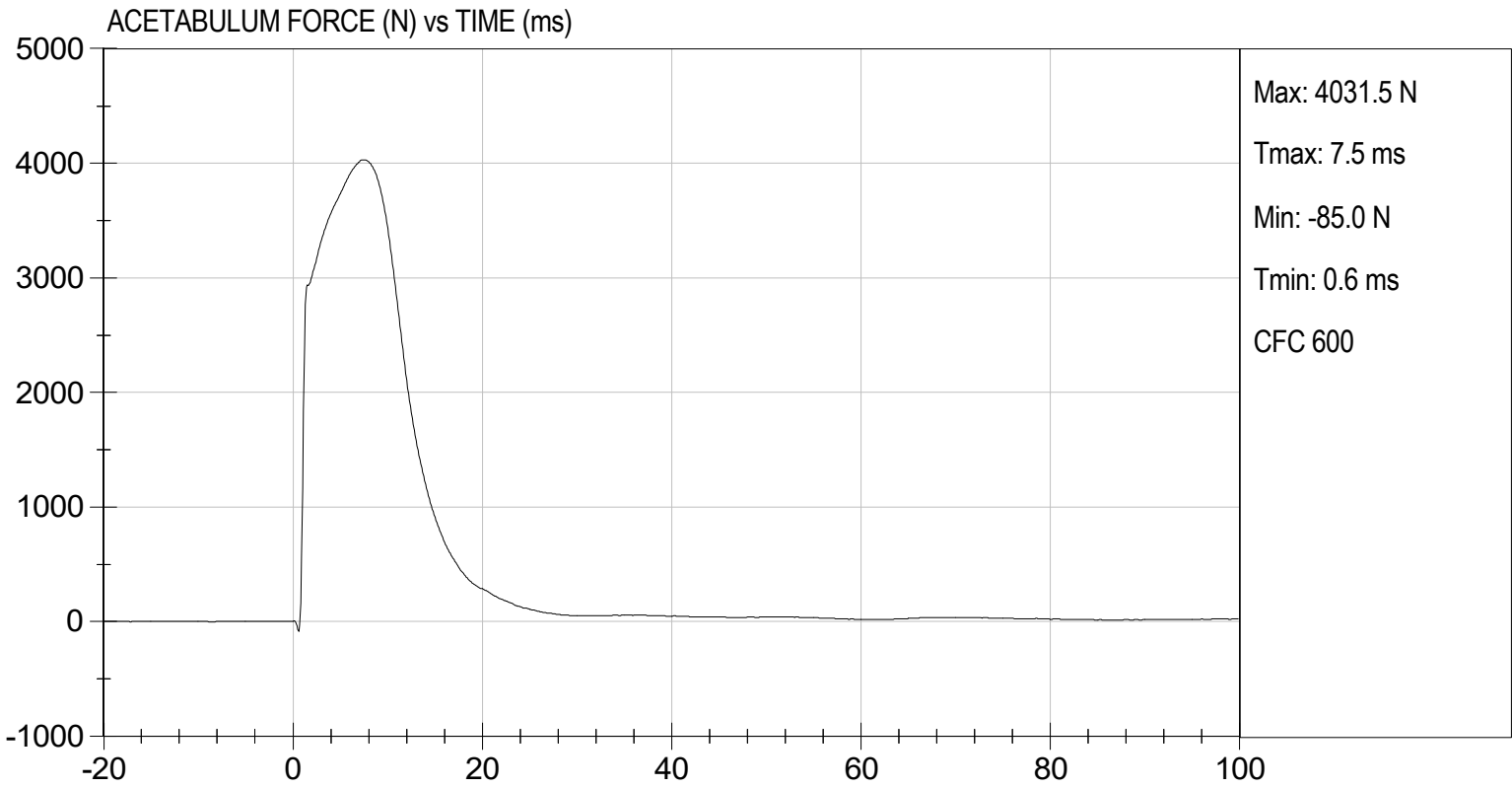
| Tested Parameter                 | Units | Specification | Result | Pass/Fail |
|----------------------------------|-------|---------------|--------|-----------|
| Temperature                      | deg C | 20.6 to 22.2  | 21.2   | Pass      |
| Humidity                         | %     | 10 to 70      | 49     | Pass      |
| Impact Velocity                  | m/s   | 6.60 to 6.80  | 6.68   | Pass      |
| Maximum Probe Acceleration       | G's   | 38 to 47      | 42     | Pass      |
| Pelvis Y Acceleration After 6 ms | G's   | 34 to 42      | 39.7   | Pass      |
| Peak Acetabulum Force            | N     | 3600 to 4300  | 4,032  | Pass      |
| Overall Test Results             |       |               |        | Pass      |

  
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 Test Date

  
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**MGA RESEARCH CORPORATION**  
**ILIAC IMPACT TEST**  
**SID-ILs BUILD LEVEL D DUMMY**

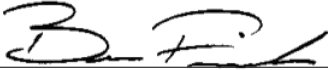
ATD Serial No: 296

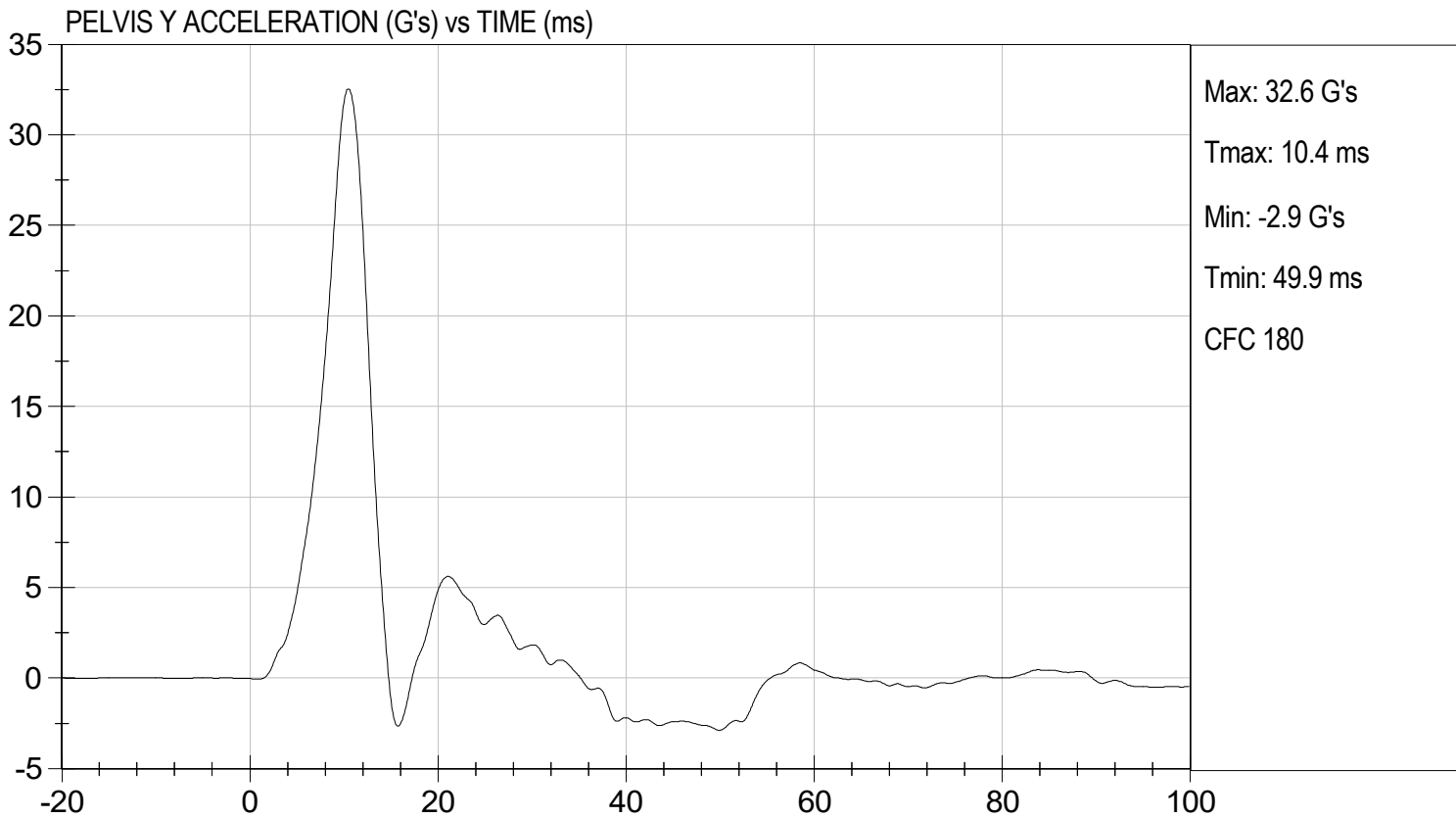
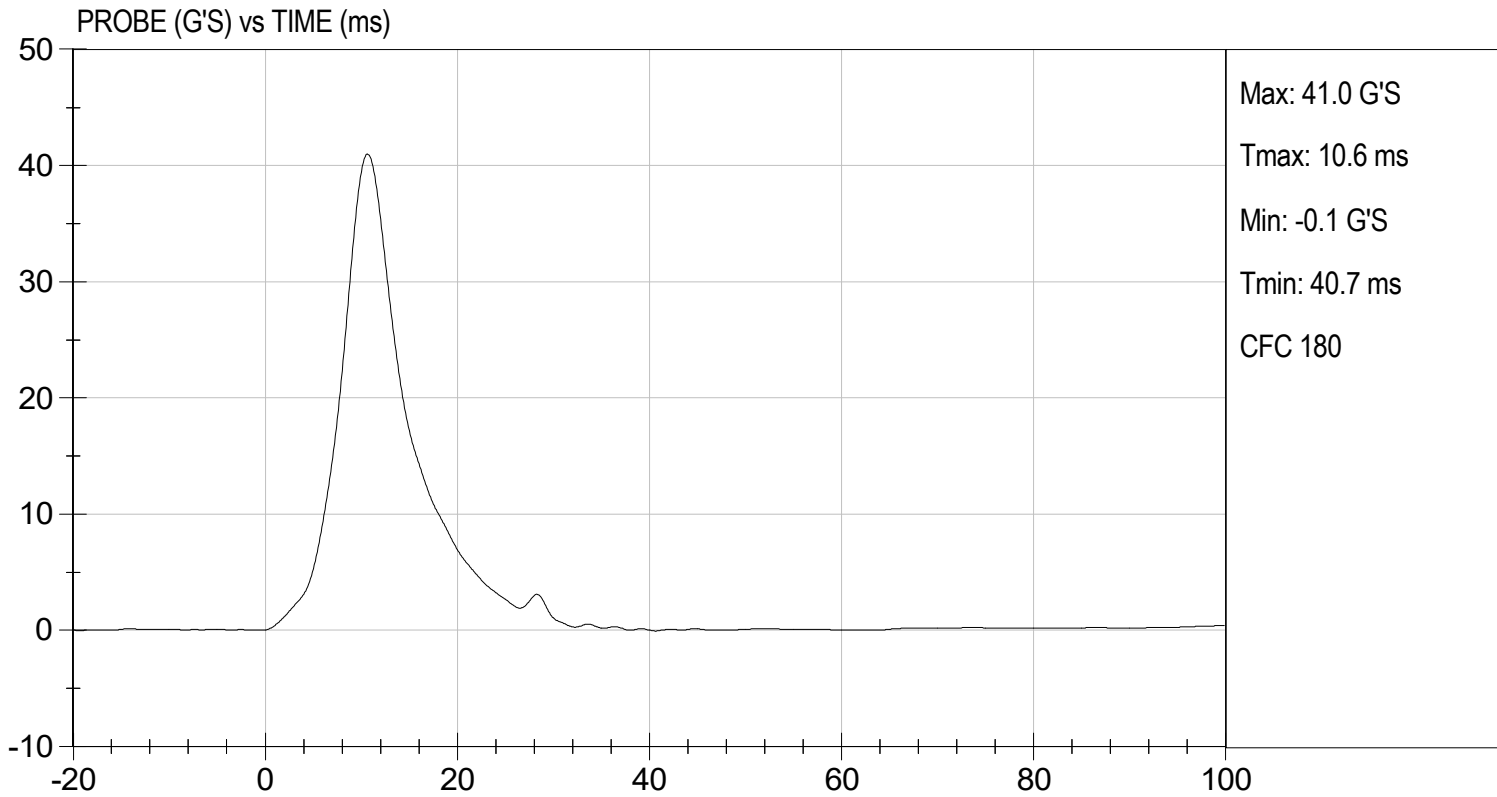
Test I.D: D242098

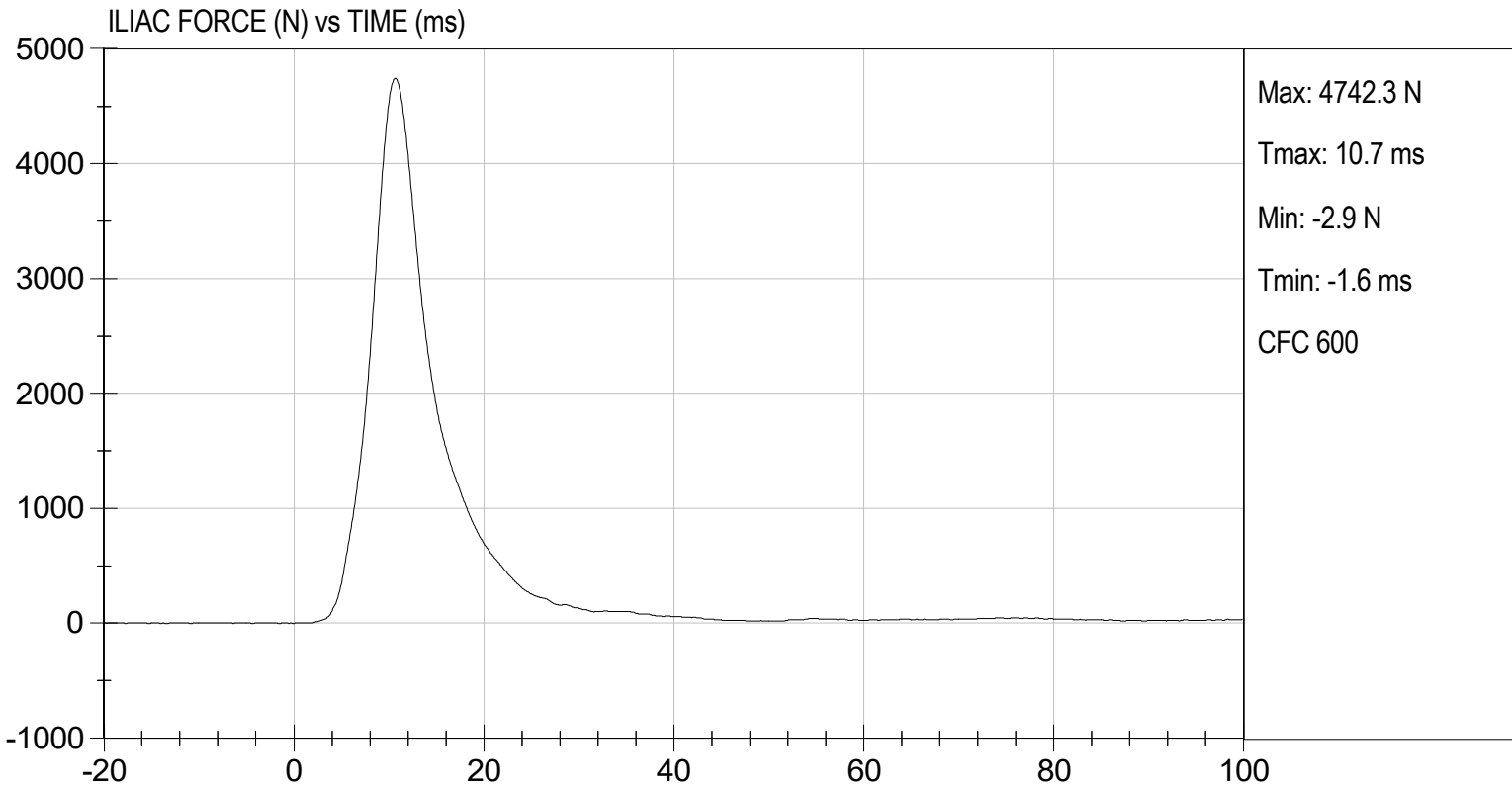
| Tested Parameter           | Units | Specification | Result | Pass/Fail |
|----------------------------|-------|---------------|--------|-----------|
| Temperature                | deg C | 20.6 to 22.2  | 21.3   | Pass      |
| Humidity                   | %     | 10 to 70      | 48     | Pass      |
| Impact Velocity            | m/s   | 4.20 to 4.40  | 4.34   | Pass      |
| Maximum Probe Acceleration | G's   | 36 to 45      | 41     | Pass      |
| Pelvis Y Acceleration      | G's   | 28 to 39      | 33     | Pass      |
| Peak Pelvis Iliac Force    | N     | 4100 to 5100  | 4,742  | Pass      |
| Overall Test Results       |       |               |        | Pass      |

  
 Laboratory Technician

08/15/2024  
 Test Date

  
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**QUALIFICATION TEST RESULTS**

**POST-TEST**

**SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD**

**SID-IIsD External Measurements**  
**SN: 296**

| <b>No.</b> | <b>Name</b>                   | <b>Spec. (mm)</b> | <b>Result</b> | <b>Pass/Fail</b> |
|------------|-------------------------------|-------------------|---------------|------------------|
| <b>A</b>   | Sitting Height                | 772 - 788         | 784           | Pass             |
| <b>B</b>   | Shoulder Pivot Height         | 437 - 453         | 442           | Pass             |
| <b>C</b>   | H-point Height                | 79 - 89           | 83            | Pass             |
| <b>D</b>   | H-point from Seatback         | 141 - 151         | 145           | Pass             |
| <b>E</b>   | Shoulder Pivot from Backline  | 97 - 107          | 99            | Pass             |
| <b>F</b>   | Thigh Clearance               | 119 - 135         | 121           | Pass             |
| <b>G</b>   | Head Breadth                  | 140 - 148         | 142           | Pass             |
| <b>H</b>   | Head Back from Backline       | 40 - 46           | 45            | Pass             |
| <b>I</b>   | Head Depth                    | 178 - 188         | 180           | Pass             |
| <b>J</b>   | Head Circumference            | 541 - 551         | 548           | Pass             |
| <b>K</b>   | Buttock to Knee Length        | 514 - 540         | 535           | Pass             |
| <b>L</b>   | Popliteal Height              | 343 - 369         | 358           | Pass             |
| <b>M</b>   | Knee Pivot to Floor Height    | 392 - 409         | 404           | Pass             |
| <b>N</b>   | Buttock Popliteal Length      | 416 - 442         | 435           | Pass             |
| <b>O</b>   | Chest Depth w/o Jacket        | 195 - 211         | 206           | Pass             |
| <b>P</b>   | Foot Length                   | 216 - 232         | 219           | Pass             |
| <b>Q</b>   | Hip Breadth (w/ pelvic plugs) | 313 - 323         | 316           | Pass             |
| <b>R</b>   | Arm Length                    | 249 - 259         | 250           | Pass             |
| <b>S</b>   | Knee Joint to Seatback        | 477 - 493         | 481           | Pass             |
| <b>V</b>   | Shoulder Width                | 341 - 357         | 346           | Pass             |
| <b>W</b>   | Foot Width                    | 78 - 94           | 85            | Pass             |
| <b>Y</b>   | Chest Circumference w/ jacket | 851 - 881         | 870           | Pass             |
| <b>Z</b>   | Waist Circumference           | 761 - 791         | 772           | Pass             |

**MGA RESEARCH CORPORATION**  
**HEAD DROP TEST**  
**SID-IIs BUILD LEVEL D DUMMY**

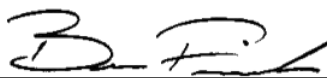
ATD Serial No: 296

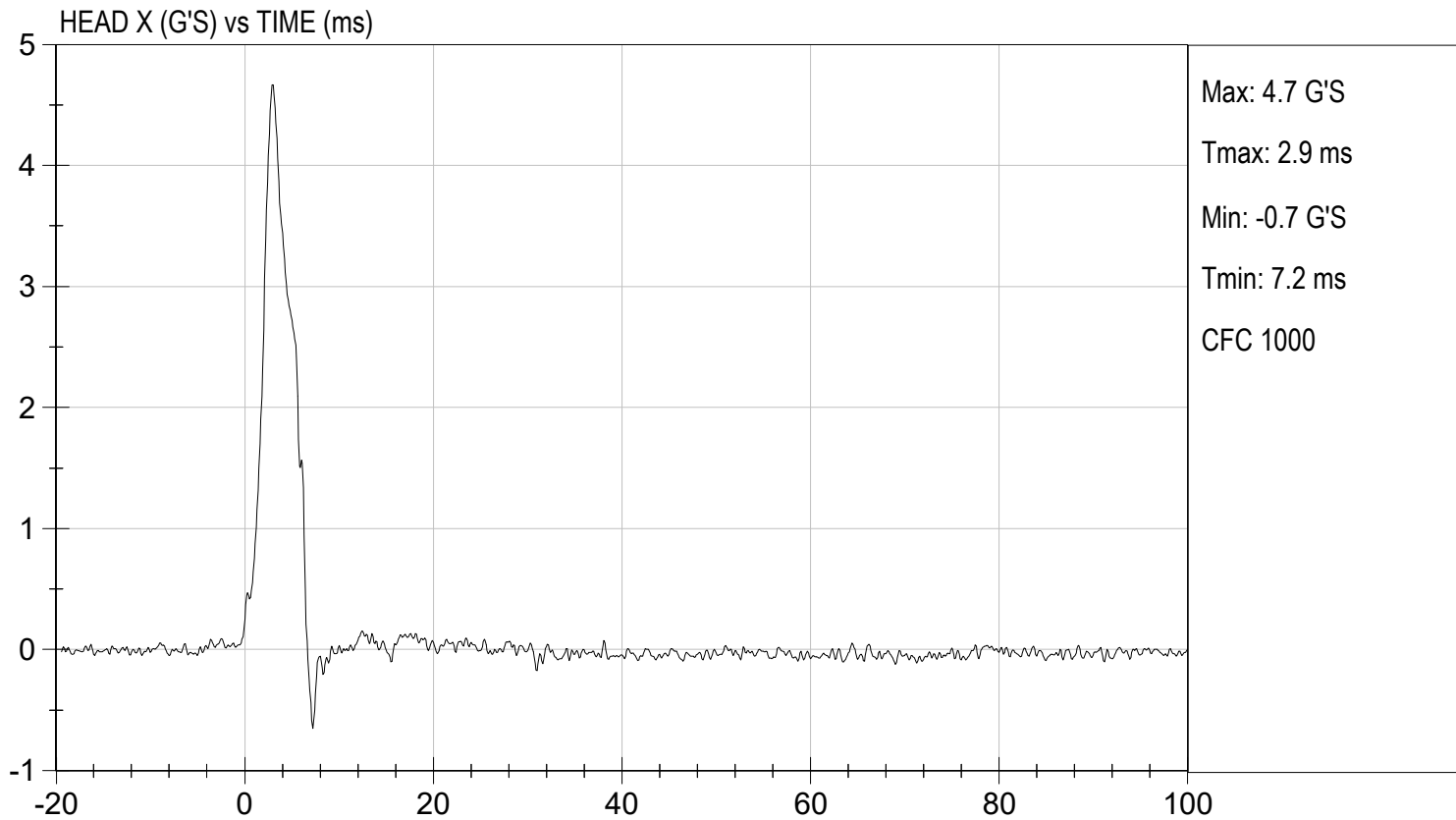
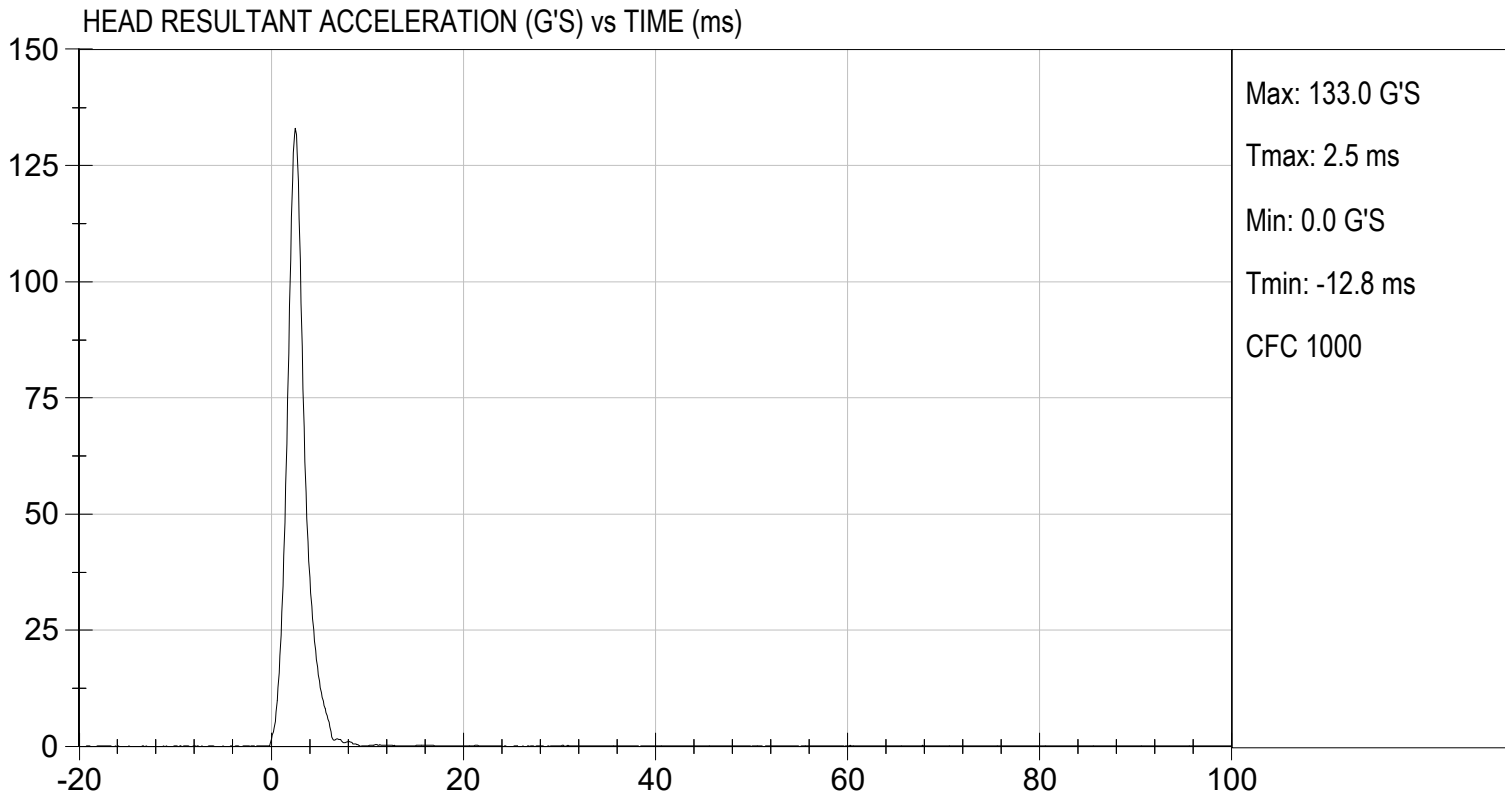
Test ID: D242221

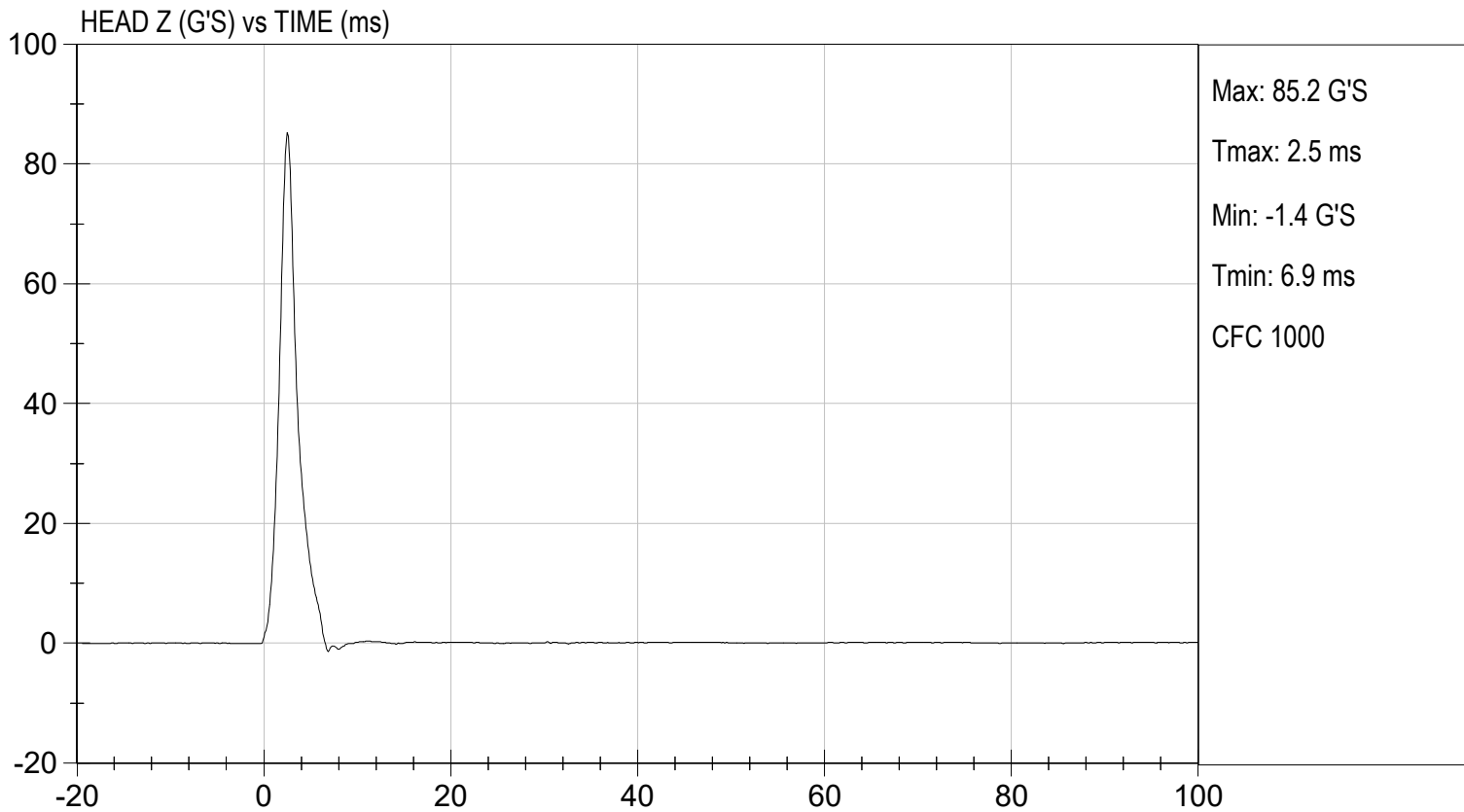
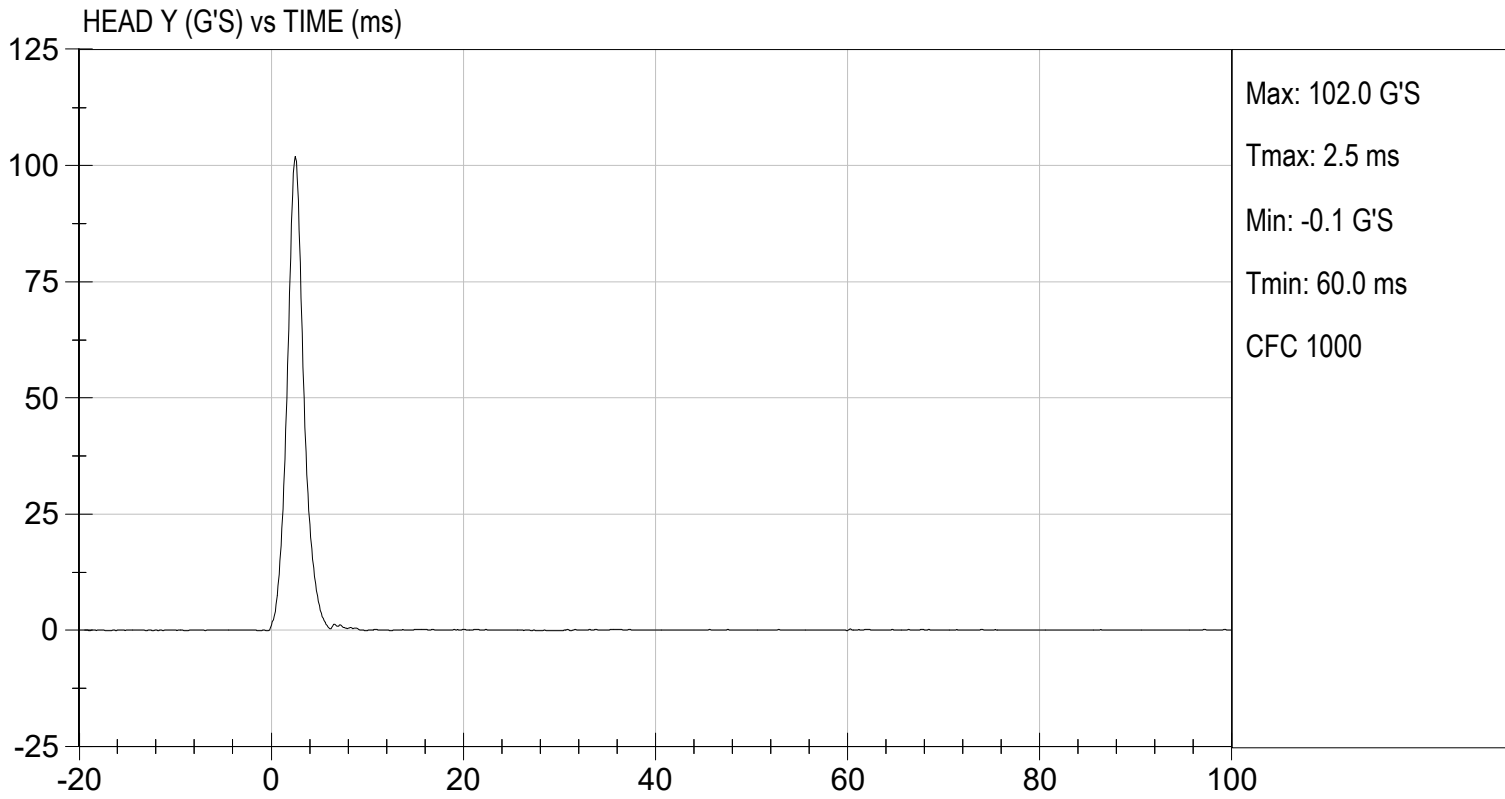
| Tested Parameter               | Units | Specification | Result | Pass/Fail |
|--------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature         | deg C | 20.6 to 22.2  | 21.3   | Pass      |
| Laboratory Relative Humidity   | %     | 10 to 70      | 49     | Pass      |
| Peak Resultant Acceleration    | G's   | 115 to 137    | 133    | Pass      |
| Peak Longitudinal Acceleration | G's   | +/- 15        | 4.7    | Pass      |
| Unimodal                       | N/A   | Yes           | Yes    | Pass      |
| Oscillations                   | N/A   | <15%          | Yes    | Pass      |
| Overall Test Results           |       |               |        | Pass      |

  
 Laboratory Technician

08/29/2024  
 Test Date

  
 Approved By





**MGA RESEARCH CORPORATION**  
**LATERAL NECK PENDULUM TEST**  
**SID-Its BUILD LEVEL D DUMMY**

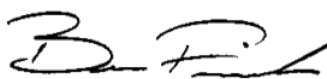
ATD Serial No: 296

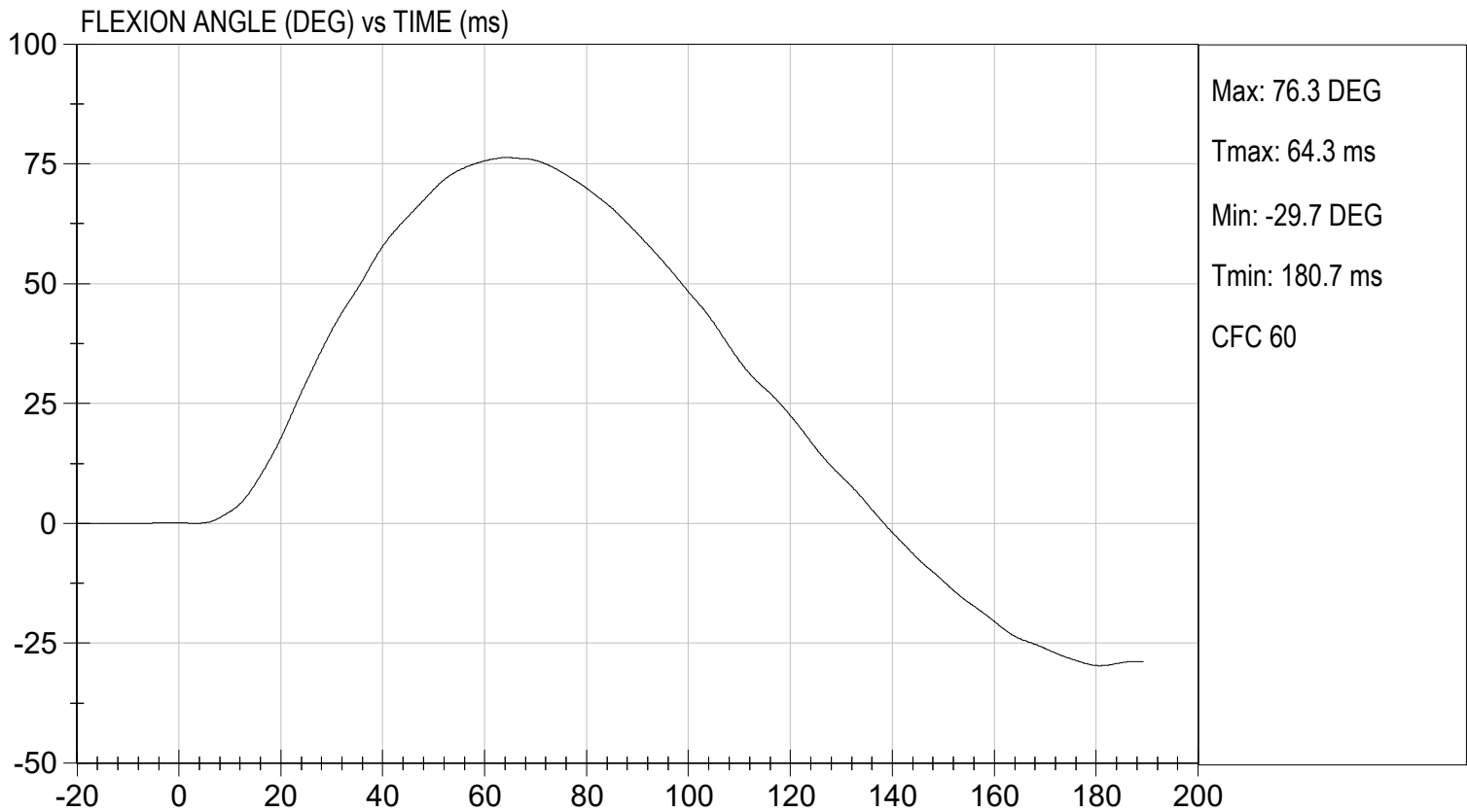
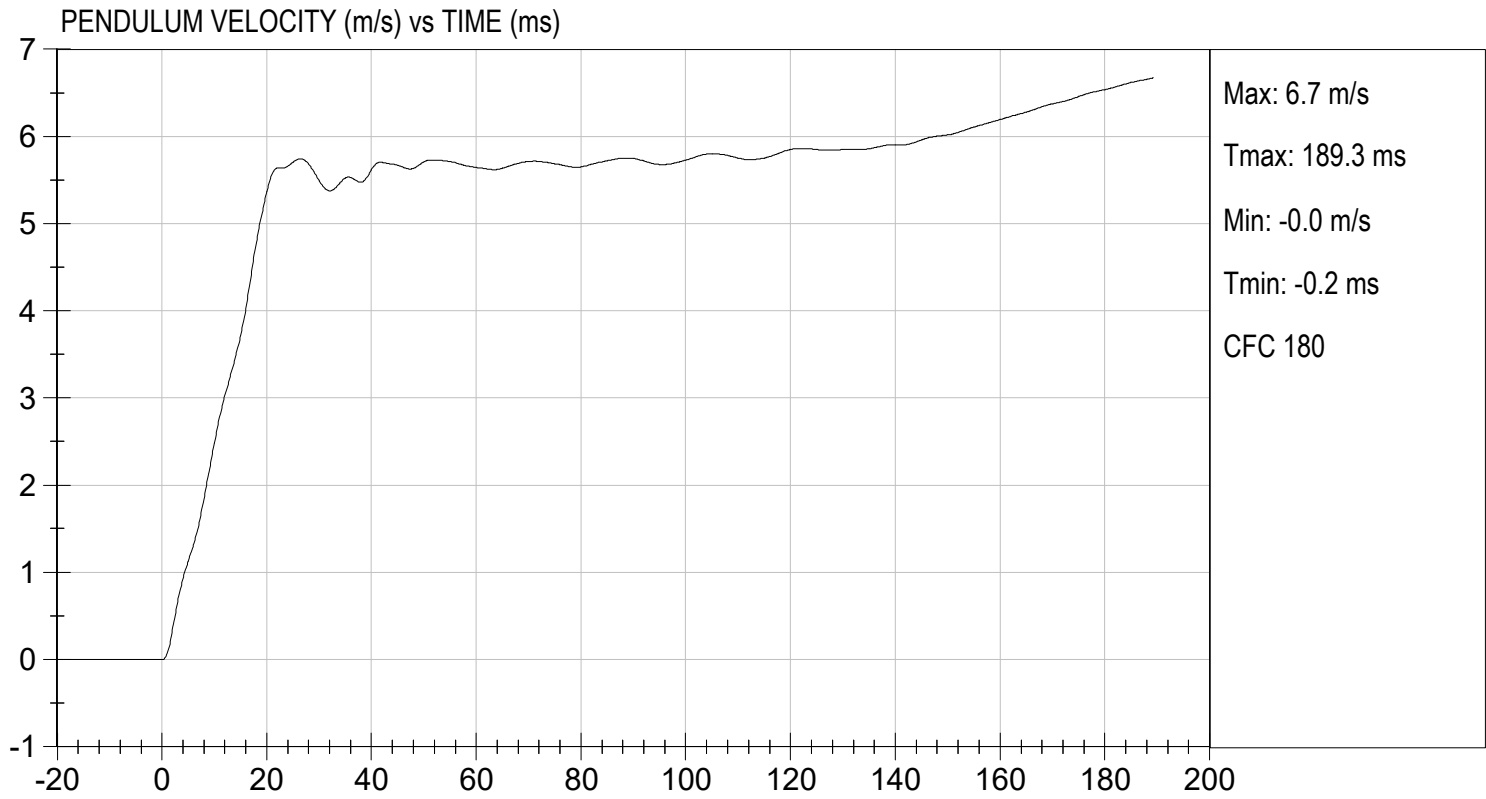
Test I.D: D242222

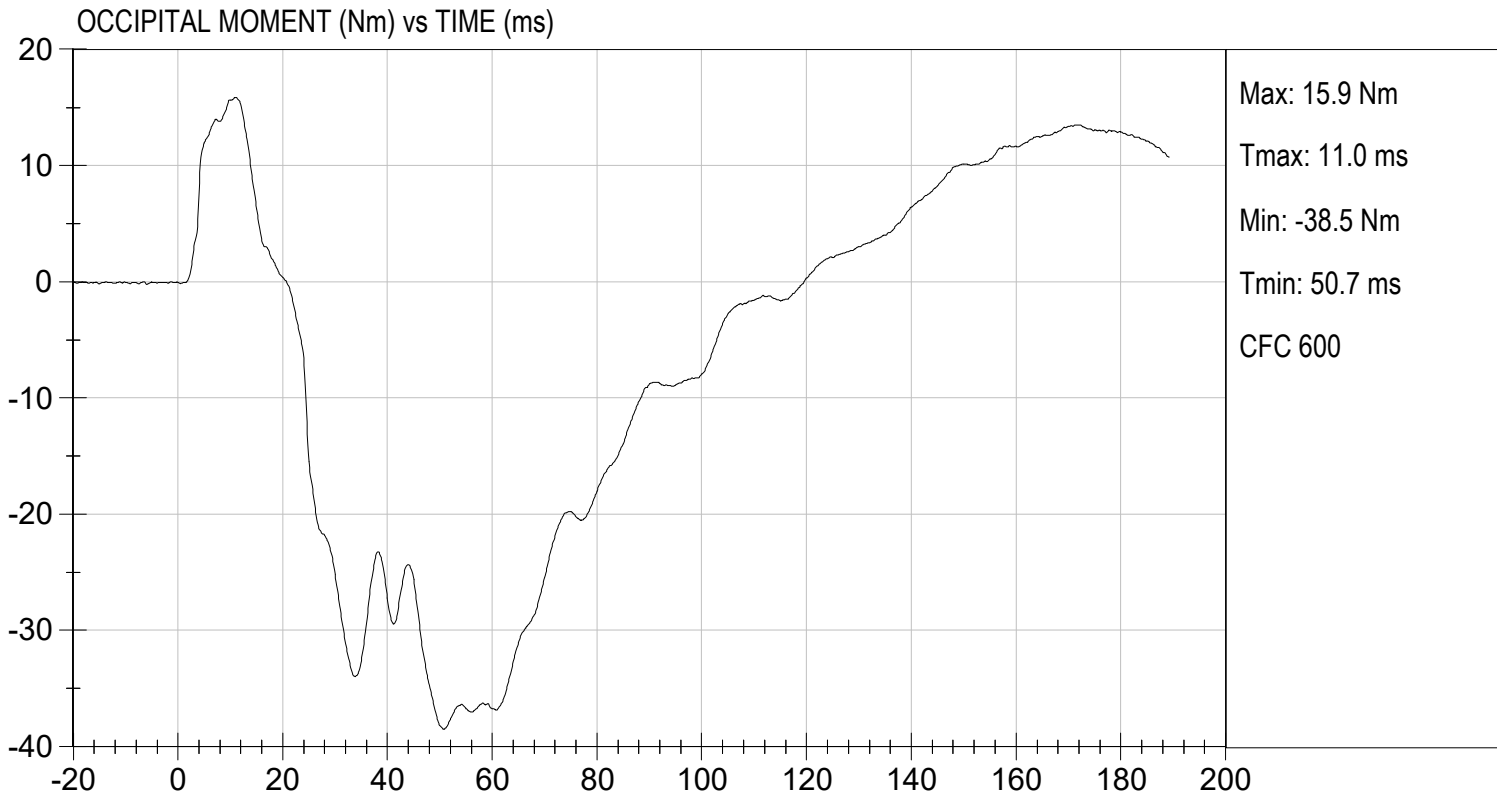
| Tested Parameter                 |           | Units | Specification | Result | Pass/Fail |
|----------------------------------|-----------|-------|---------------|--------|-----------|
| Temperature                      |           | deg C | 20.6 to 22.2  | 21.3   | Pass      |
| Humidity                         |           | %     | 10 to 70      | 50     | Pass      |
| Impact Velocity                  |           | m/s   | 5.51 to 5.63  | 5.52   | Pass      |
| Pendulum Velocity                | 10 ms     | m/s   | 2.20 to 2.80  | 2.48   | Pass      |
|                                  | 15 ms     | m/s   | 3.30 to 4.10  | 3.72   | Pass      |
|                                  | 20 ms     | m/s   | 4.40 to 5.40  | 5.36   | Pass      |
|                                  | 25 ms     | m/s   | 5.40 to 6.10  | 5.70   | Pass      |
|                                  | 25-100 ms | m/s   | 5.50 to 6.20  | 5.75   | Pass      |
| Maximum D-Plane Rotation         |           | deg   | 71 to 81      | 76     | Pass      |
| Time of Maximum D-Plane Rotation |           | ms    | 50 to 70      | 64     | Pass      |
| Maximum Occipital Condyle Moment |           | Nm    | -44 to -36    | -39    | Pass      |
| Time of Moment Decay to 0 Nm     |           | ms    | 102 to 126    | 120    | Pass      |
| Overall Test Results             |           |       |               |        | Pass      |

  
 Laboratory Technician

08/29/2024  
 Test Date

  
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**MGA RESEARCH CORPORATION**  
**SHOULDER IMPACT TEST**  
**SID-IIs BUILD LEVEL D DUMMY**

ATD Serial No: 296

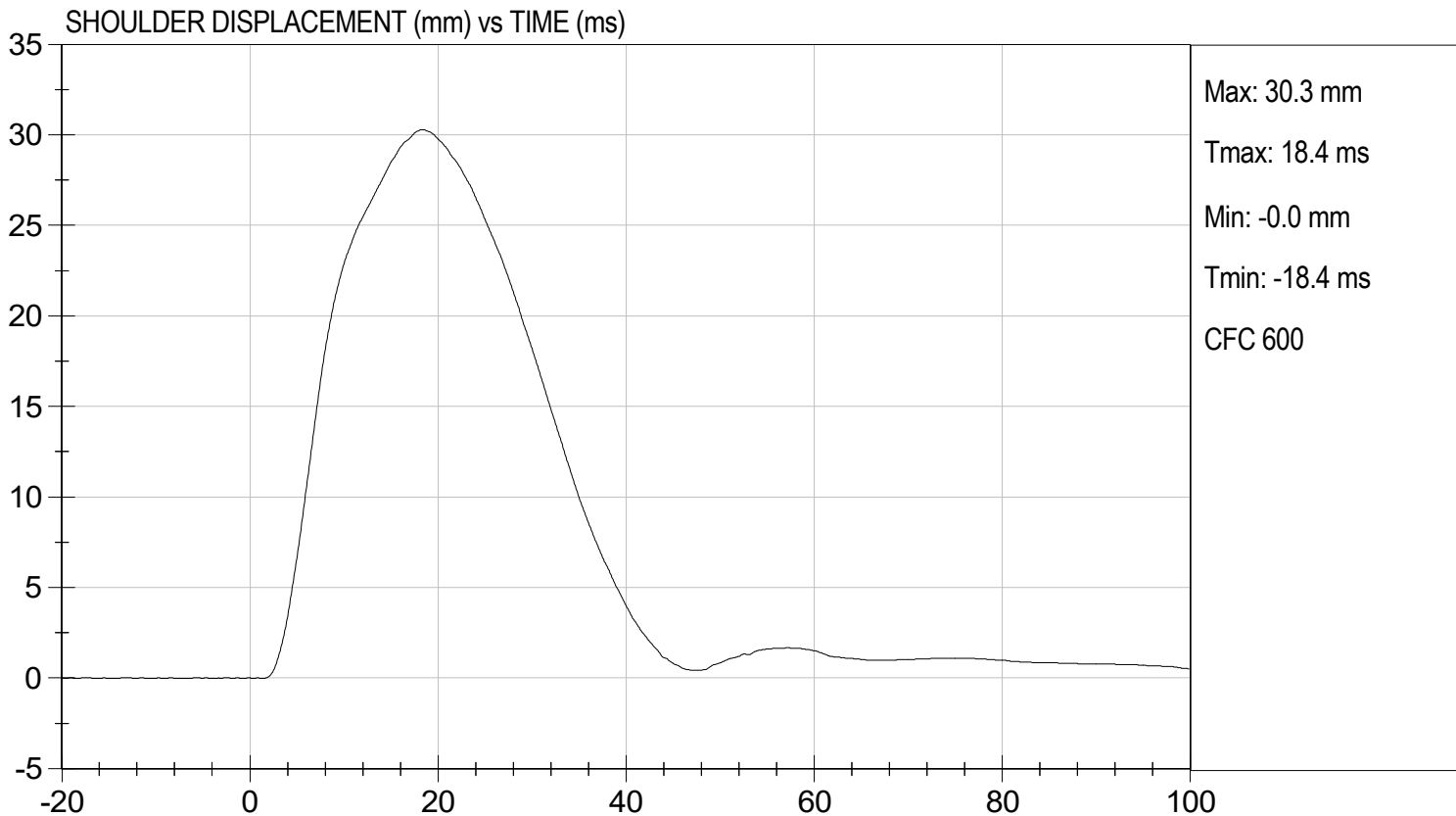
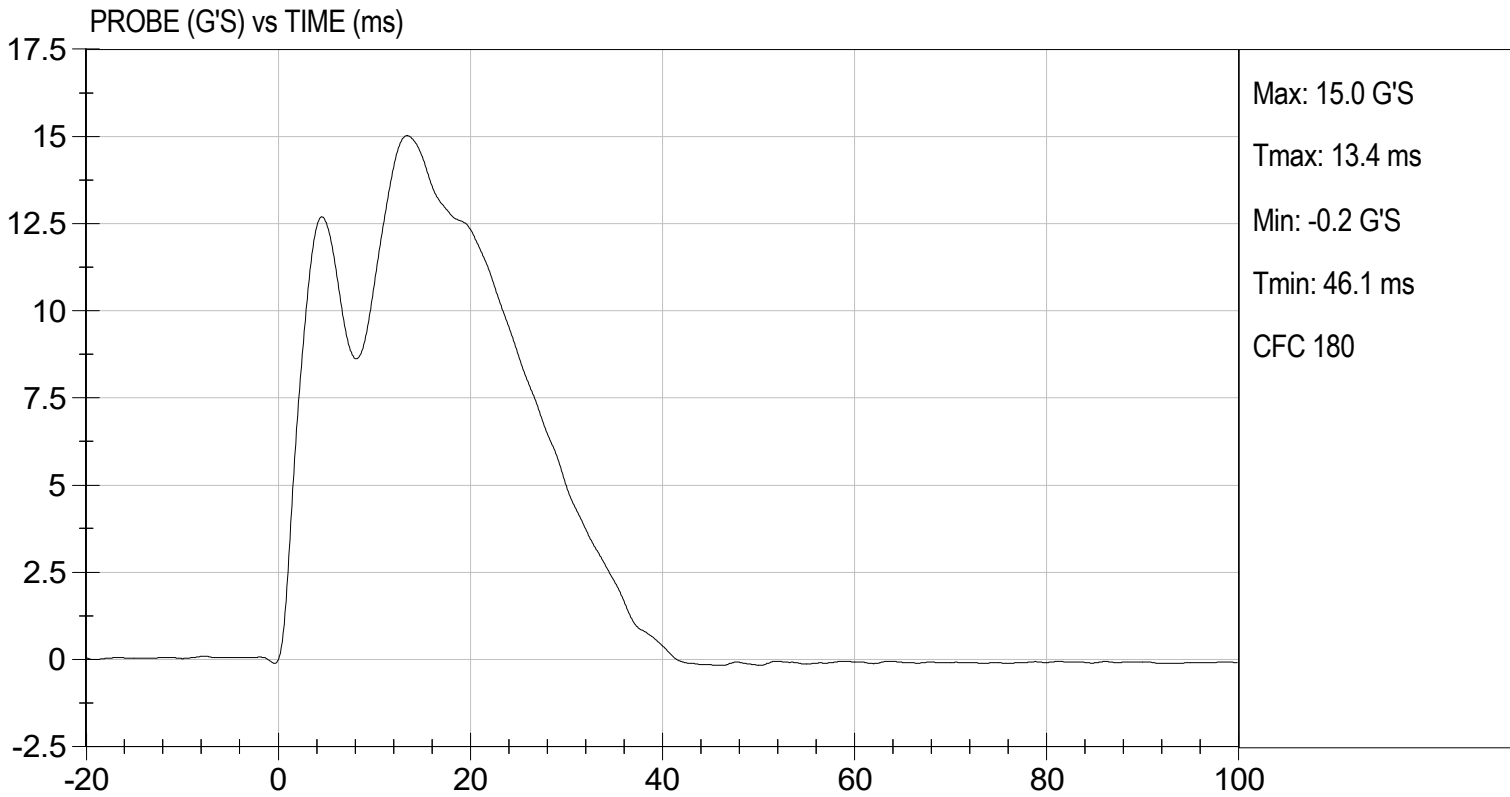
Test ID: D242223

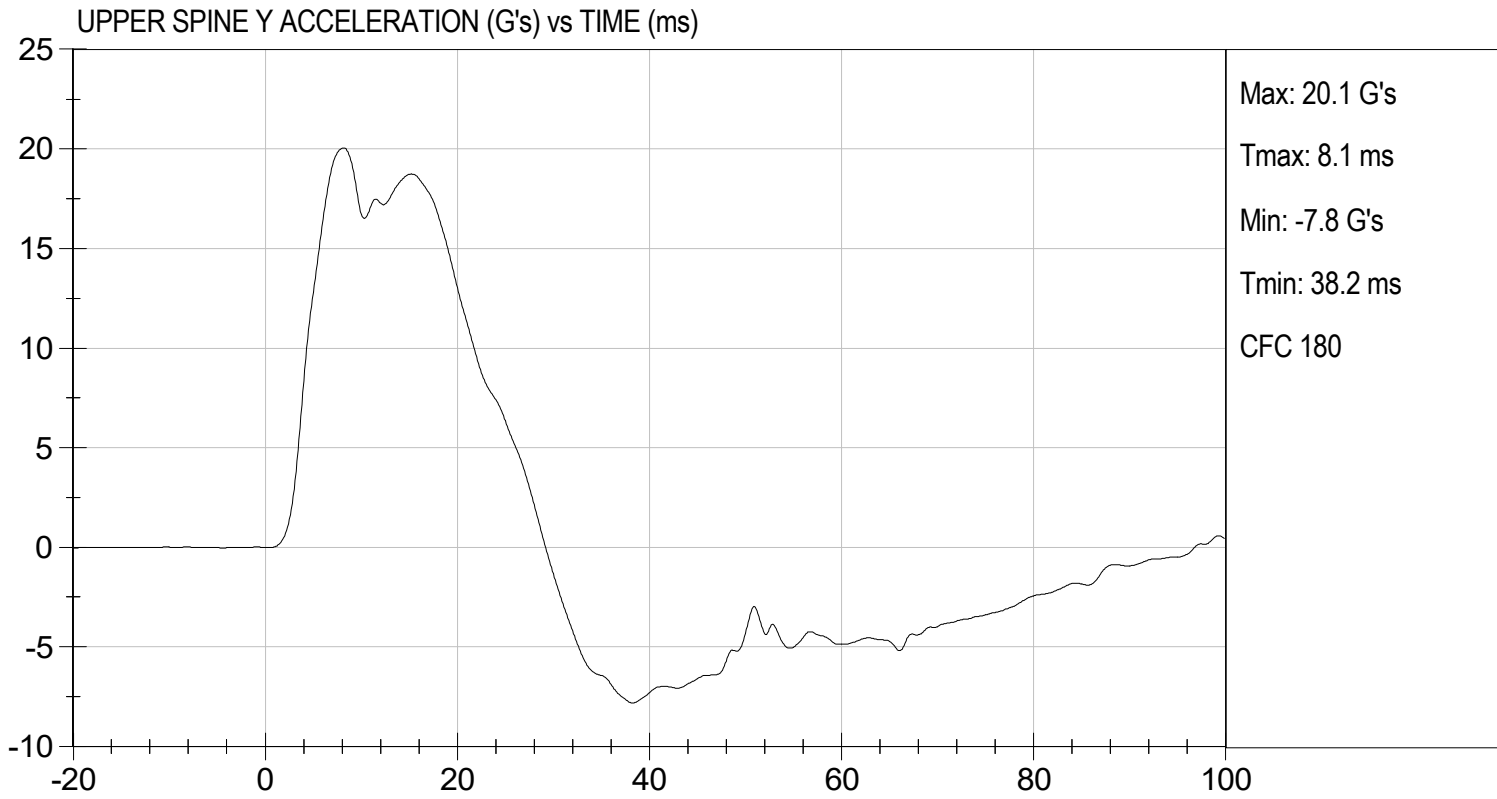
| Tested Parameter                | Units | Specification | Result | Pass/Fail |
|---------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature          | deg C | 20.6 to 22.2  | 21.3   | Pass      |
| Laboratory Relative Humidity    | %     | 10 to 70      | 47     | Pass      |
| Impact Velocity                 | m/s   | 4.20 to 4.40  | 4.27   | Pass      |
| Maximum Probe Acceleration      | G's   | 13 to 18      | 15     | Pass      |
| Shoulder Displacement           | mm    | 28 to 37      | 30     | Pass      |
| Upper Spine (T1) Y Acceleration | G's   | 17 to 22      | 20     | Pass      |
| Overall Test Results            |       |               |        | Pass      |

  
 Laboratory Technician

08/29/2024  
 Test Date

  
 Approved By





**MGA RESEARCH CORPORATION  
THORAX (WITH ARM) IMPACT TEST  
SID-Its BUILD LEVEL D DUMMY**

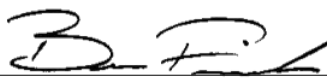
ATD Serial No: 296

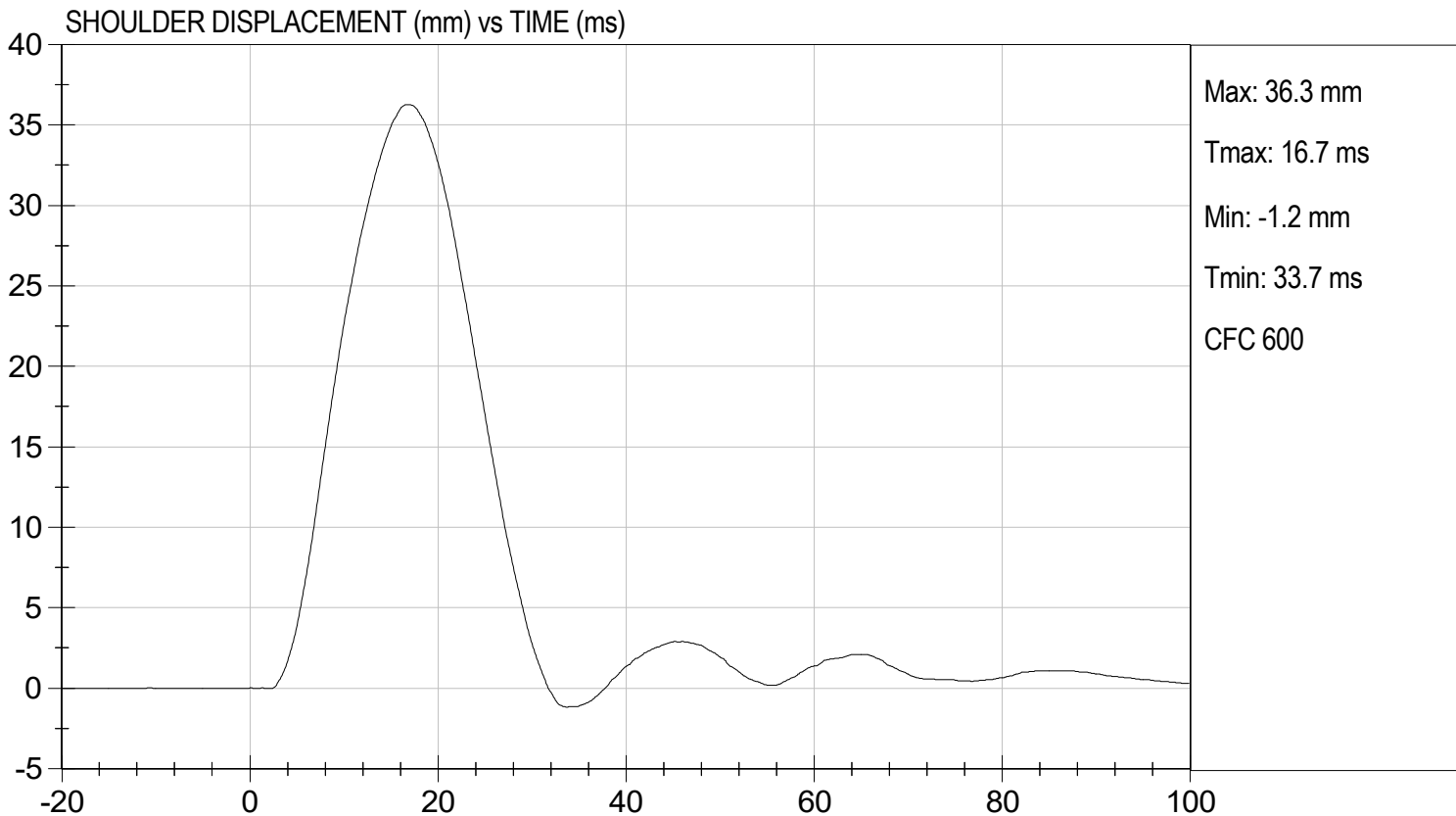
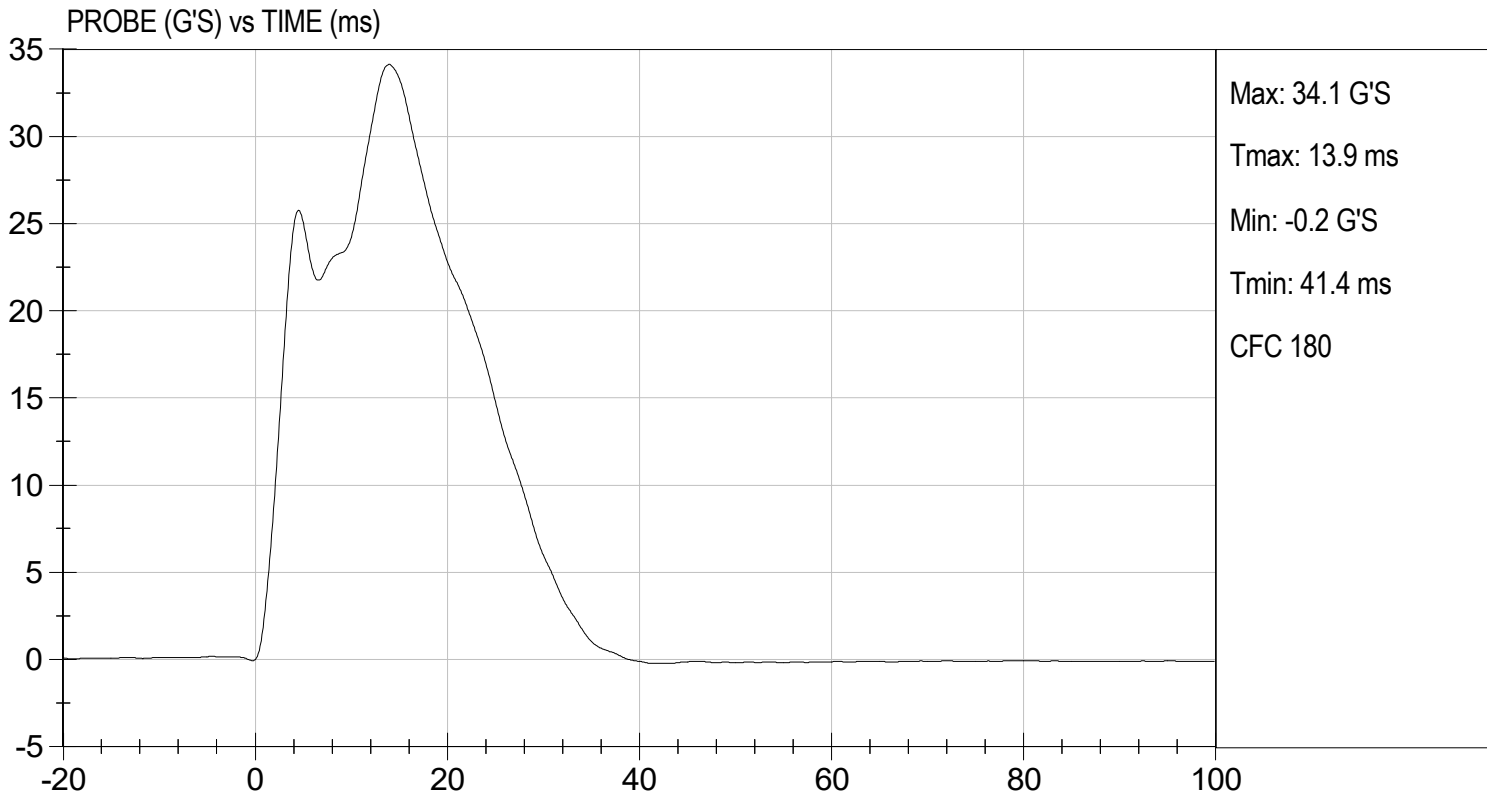
Test I.D: D242224

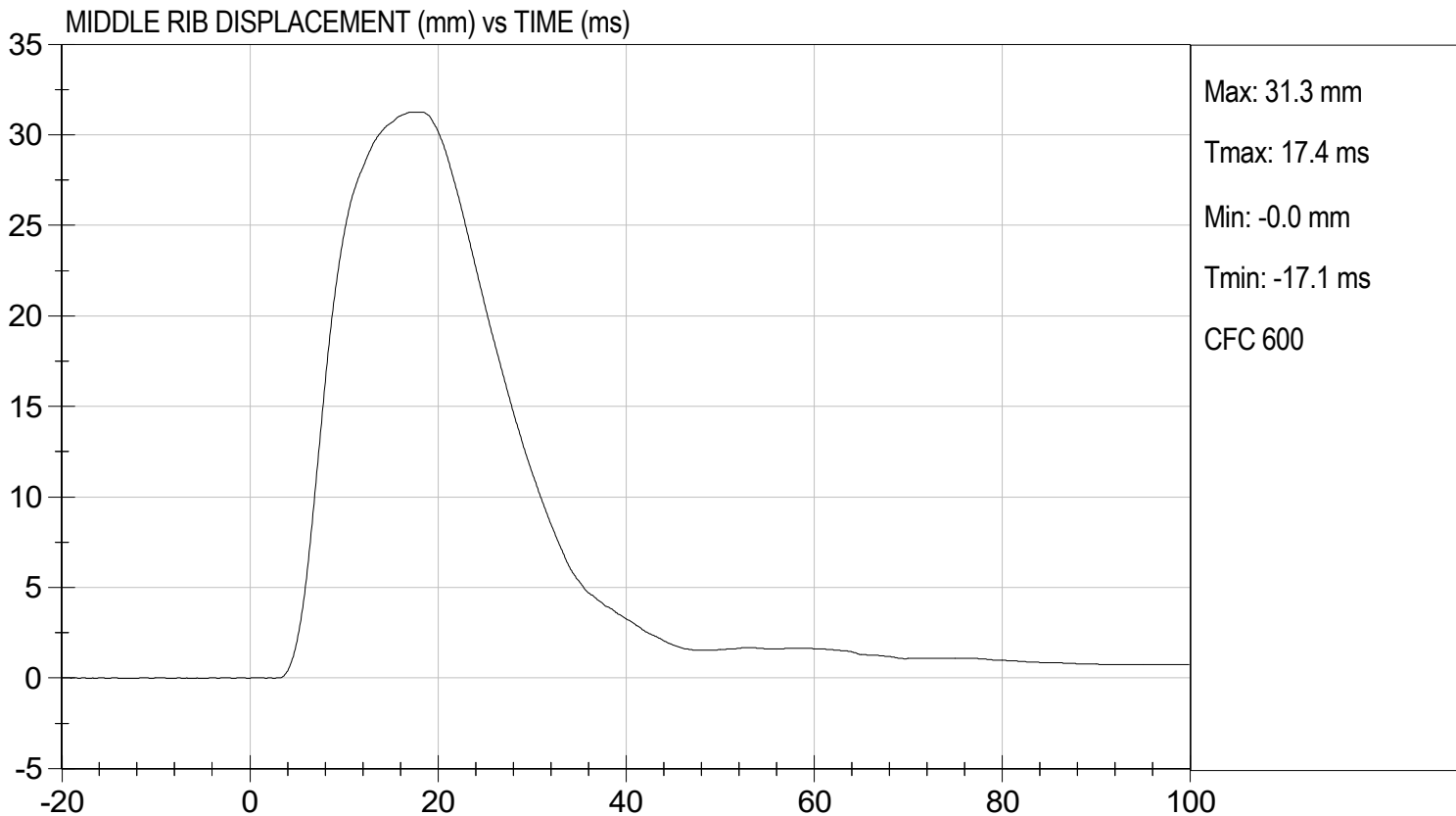
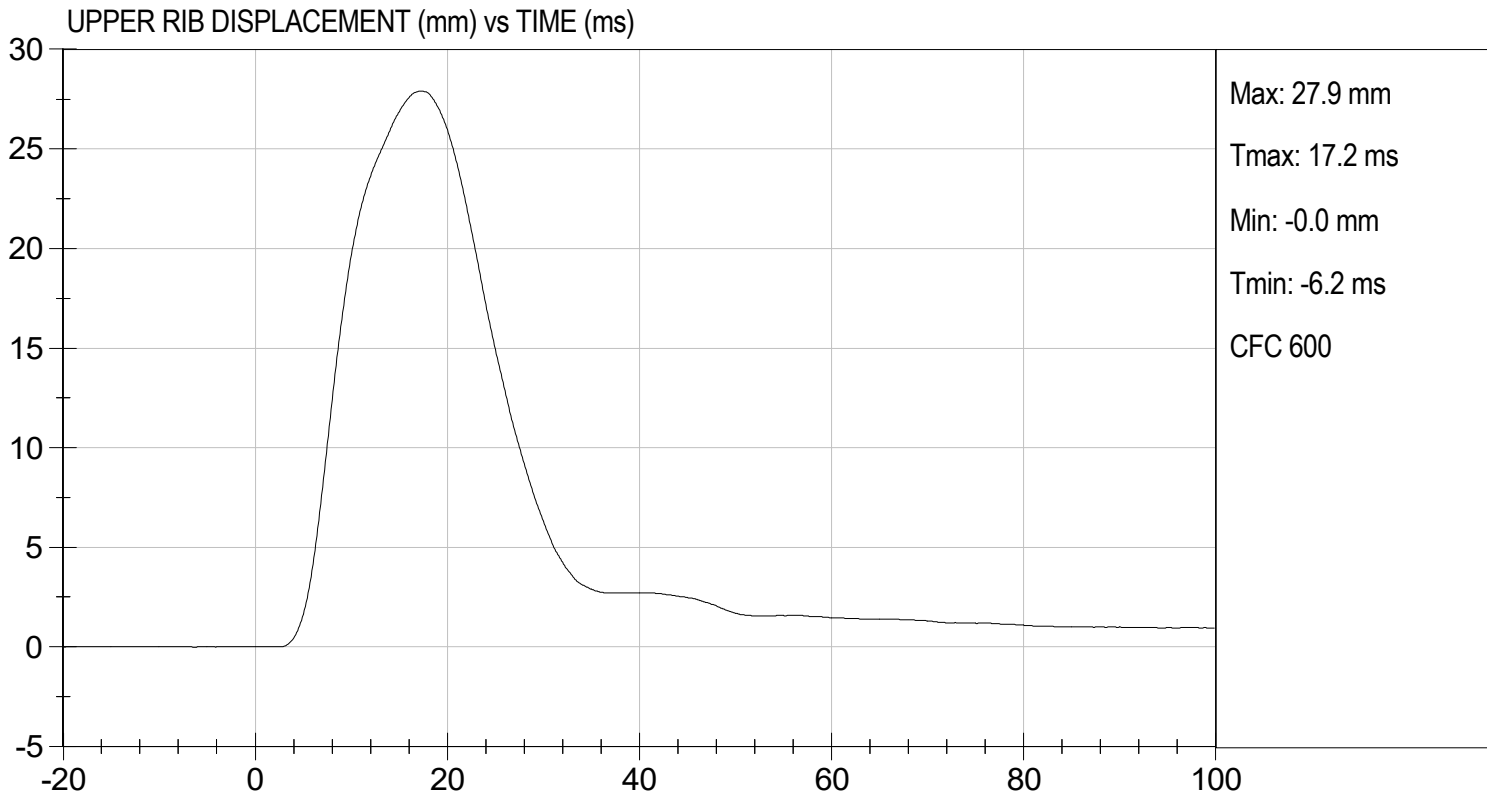
| Tested Parameter                 | Units | Specification | Result | Pass/Fail |
|----------------------------------|-------|---------------|--------|-----------|
| Temperature                      | deg C | 20.6 to 22.2  | 21.2   | Pass      |
| Humidity                         | %     | 10 to 70      | 47     | Pass      |
| Impact Velocity                  | m/s   | 6.60 to 6.80  | 6.77   | Pass      |
| Maximum Probe Acceleration       | G's   | 30 to 36      | 34     | Pass      |
| Shoulder Displacement            | mm    | 31 to 40      | 36     | Pass      |
| Upper Rib Displacement           | mm    | 25 to 32      | 28     | Pass      |
| Middle Rib Displacement          | mm    | 30 to 36      | 31     | Pass      |
| Lower Rib Displacement           | mm    | 32 to 38      | 33     | Pass      |
| Upper Spine (T1) Y Acceleration  | G's   | 34 to 43      | 39     | Pass      |
| Lower Spine (T12) Y Acceleration | G's   | 29 to 37      | 36     | Pass      |
| Overall Test Results             |       |               |        | Pass      |

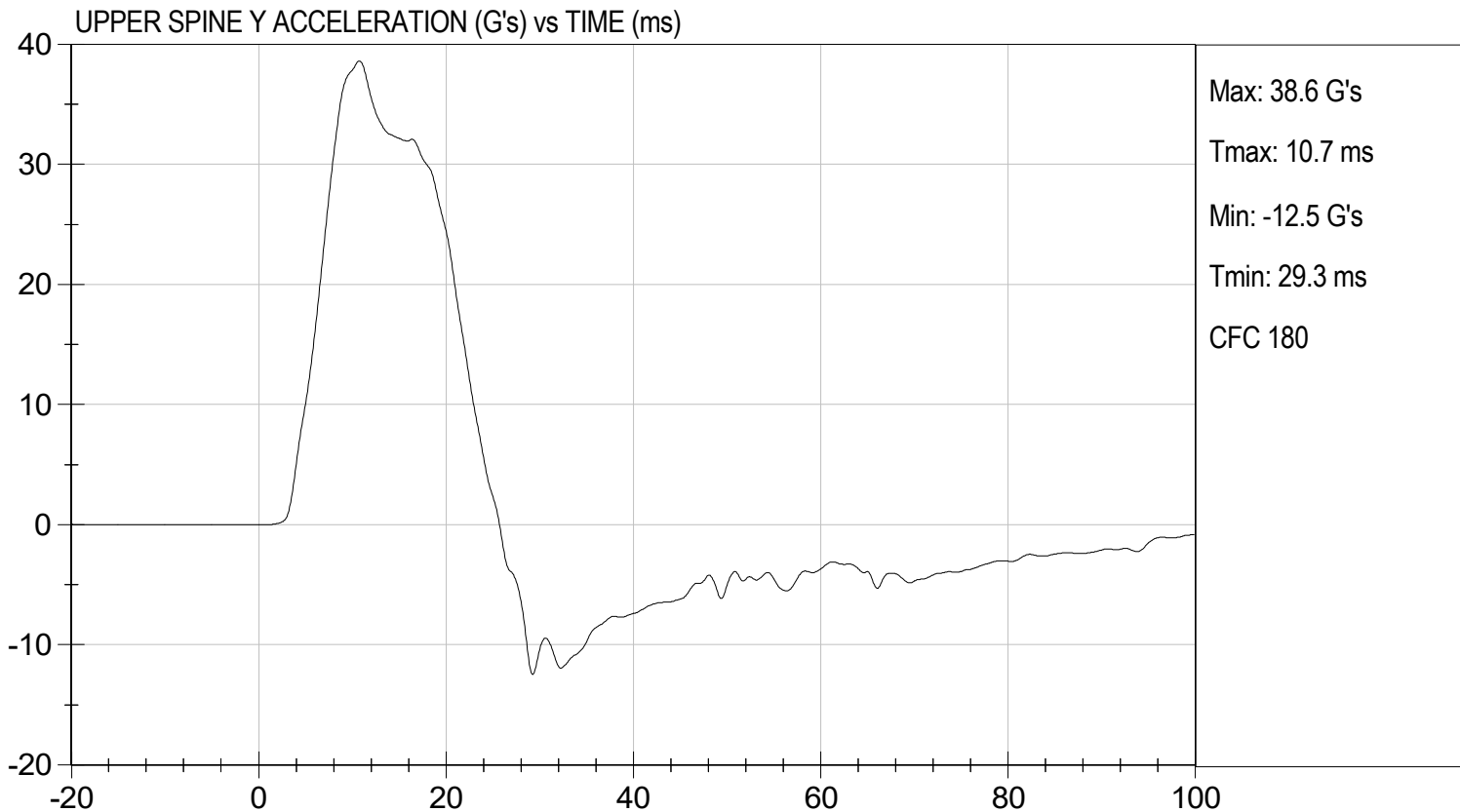
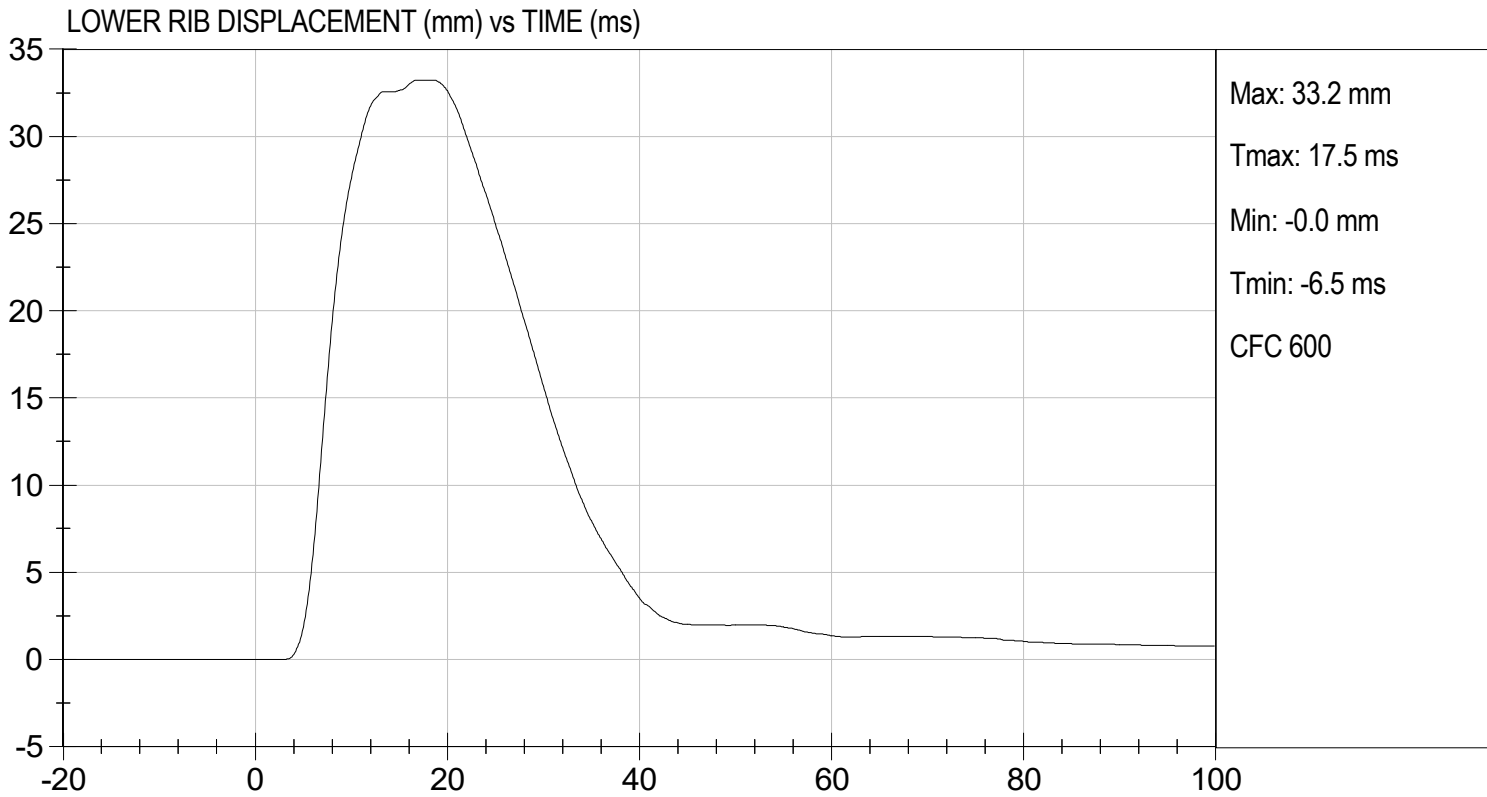
  
Laboratory Technician

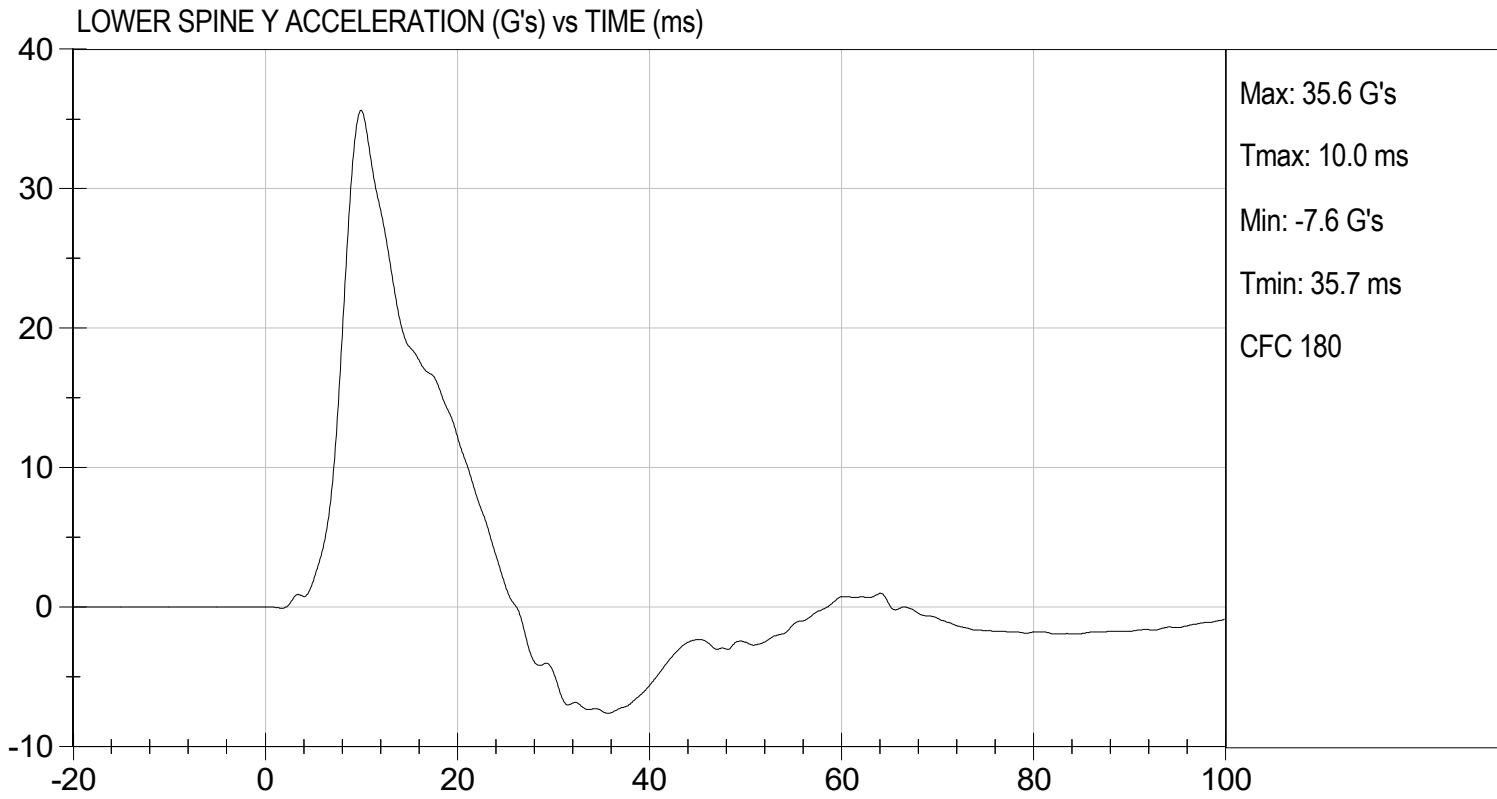
08/29/2024  
Test Date

  
Approved By









**MGA RESEARCH CORPORATION**  
**THORAX (WITHOUT ARM) IMPACT TEST**  
**SID-Its BUILD LEVEL D DUMMY**

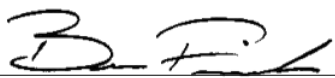
ATD Serial No: 296

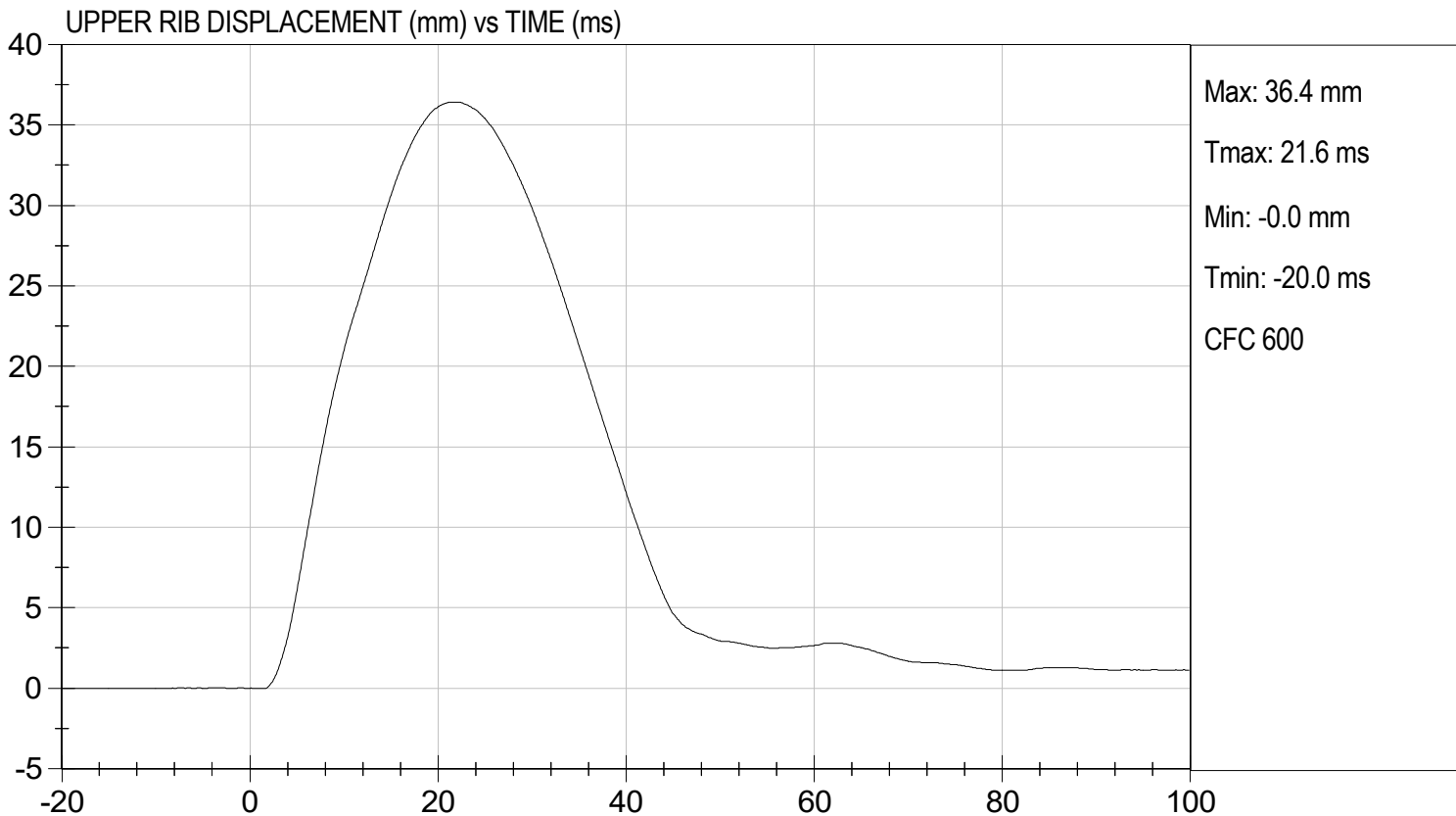
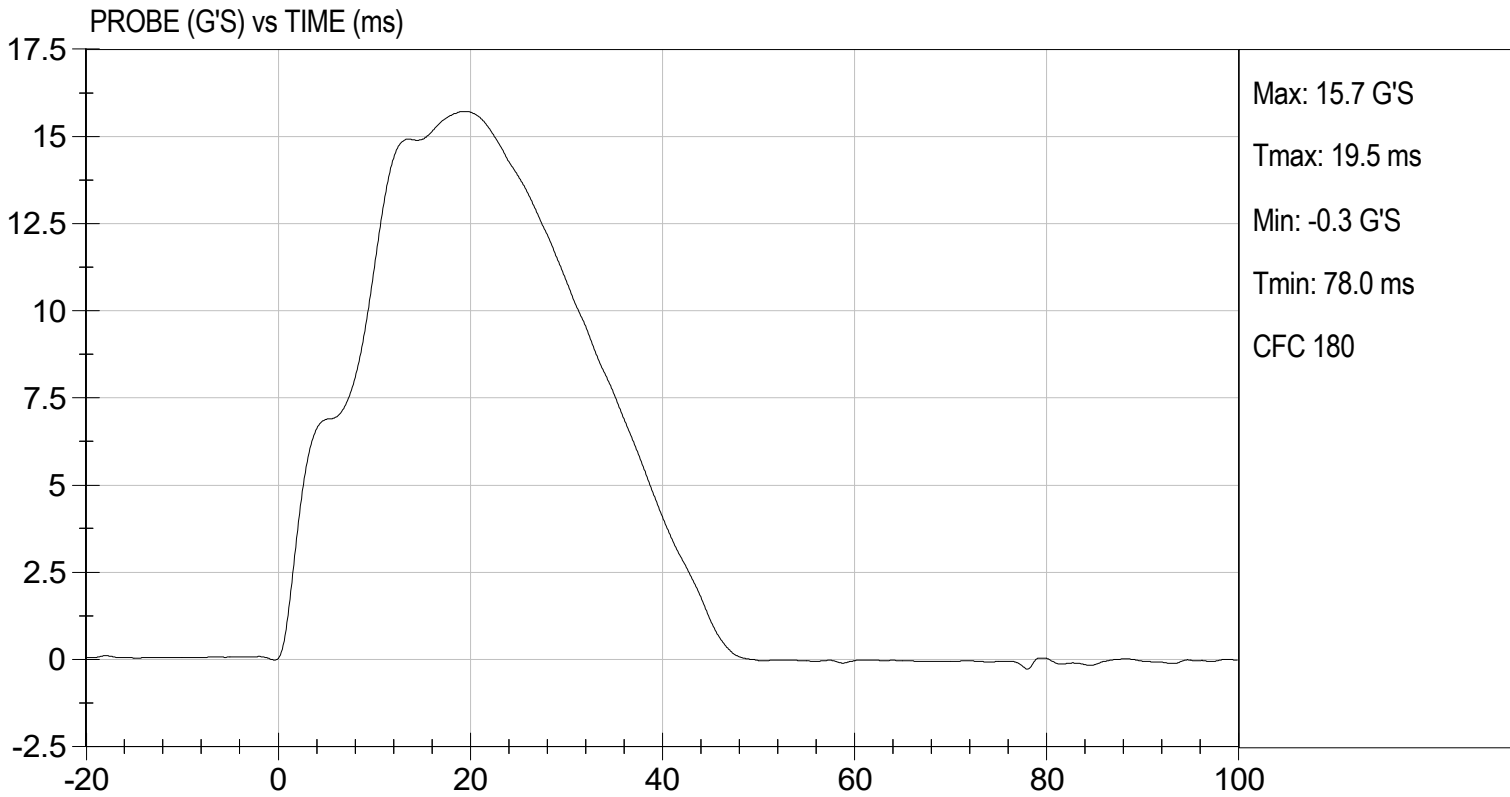
Test I.D: D242225

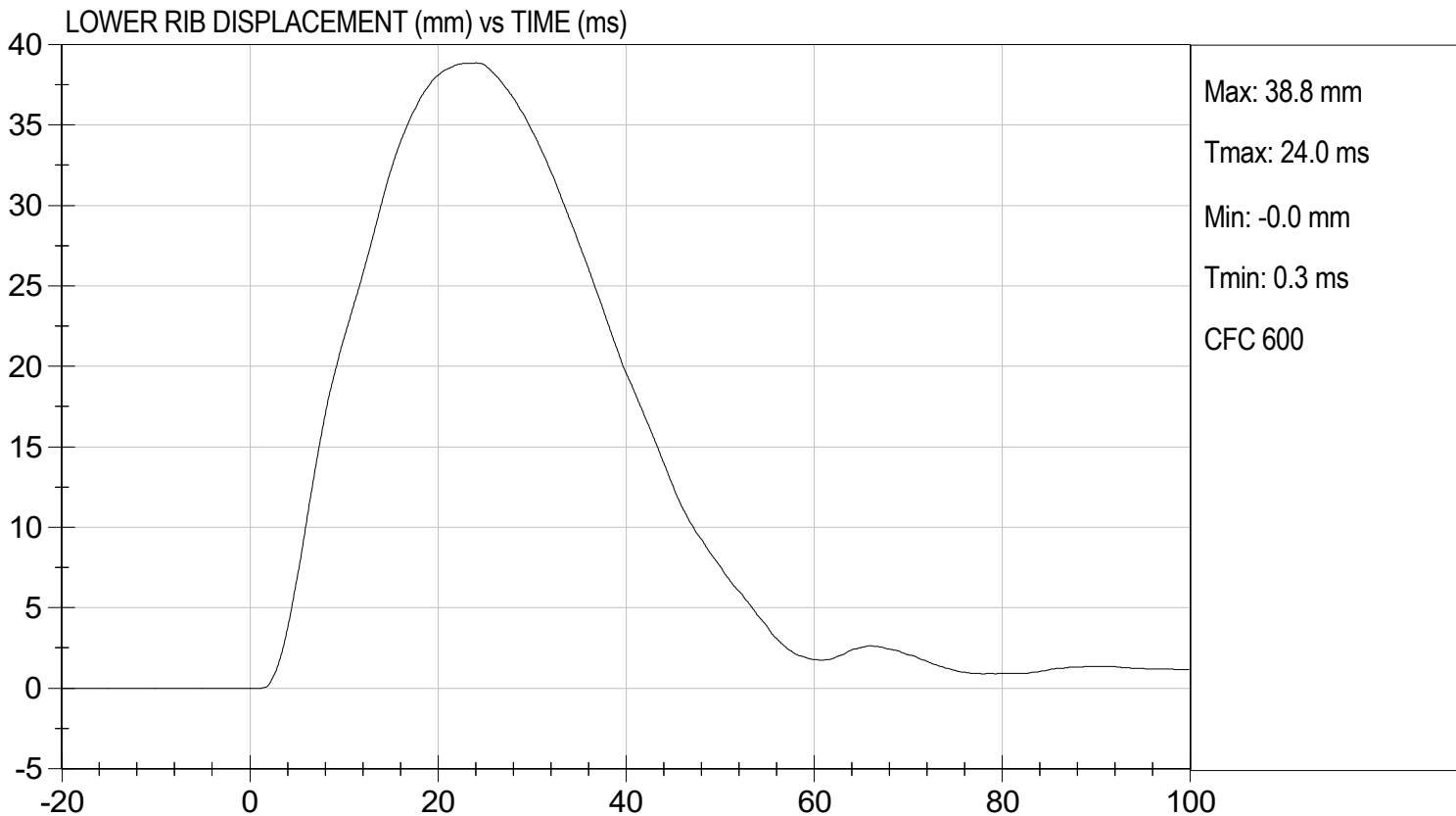
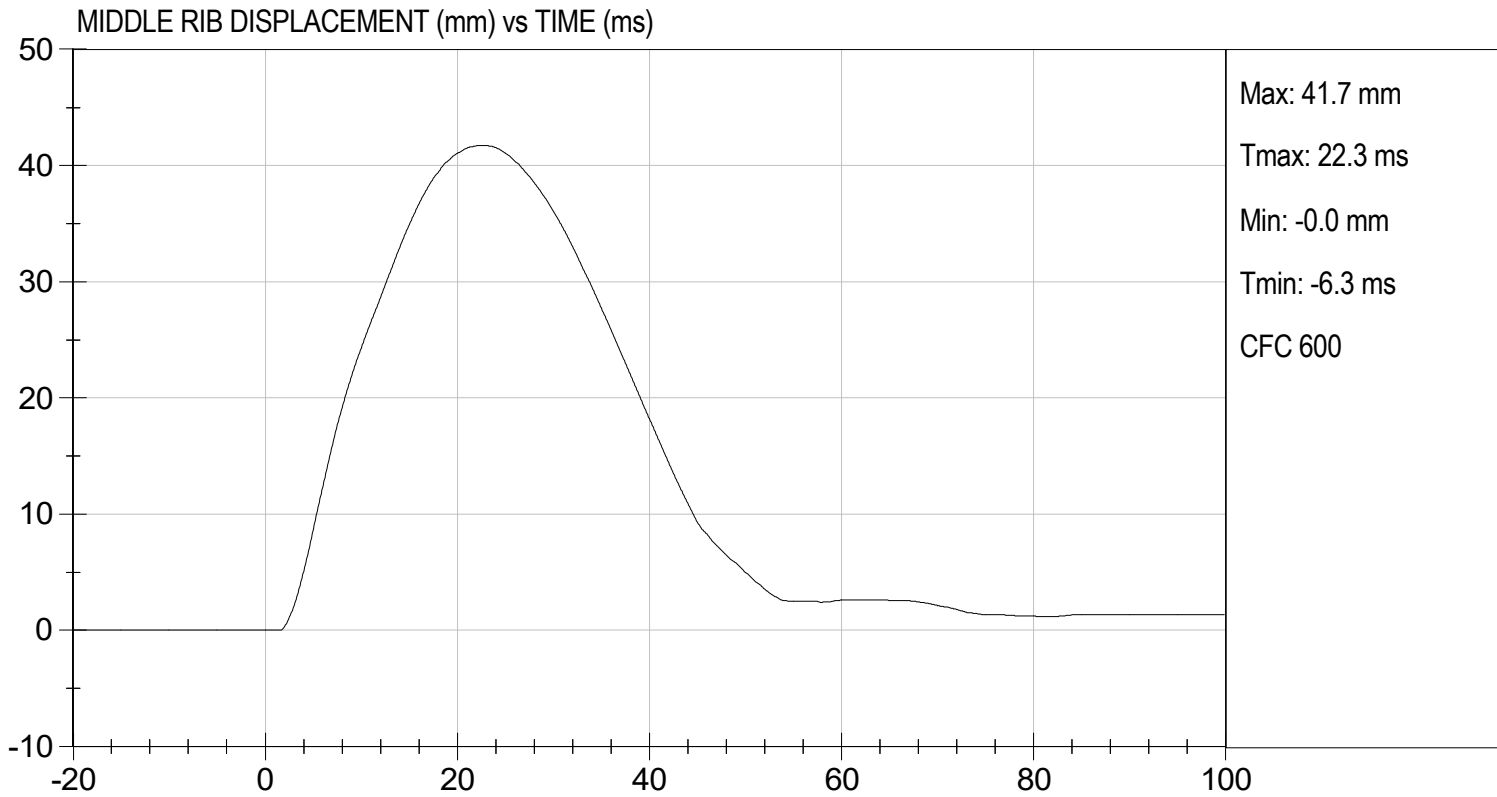
| Tested Parameter                 | Units | Specification | Result | Pass/Fail   |
|----------------------------------|-------|---------------|--------|-------------|
| Temperature                      | deg C | 20.6 to 22.2  | 21.2   | Pass        |
| Humidity                         | %     | 10 to 70      | 47     | Pass        |
| Impact Velocity                  | m/s   | 4.20 to 4.40  | 4.30   | Pass        |
| Maximum Probe Acceleration       | G's   | 14 to 18      | 16     | Pass        |
| Upper Rib Displacement           | mm    | 32 to 40      | 36     | Pass        |
| Middle Rib Displacement          | mm    | 39 to 45      | 42     | Pass        |
| Lower Rib Displacement           | mm    | 35 to 43      | 39     | Pass        |
| Upper Spine (T1) Y Acceleration  | G's   | 13 to 17      | 15     | Pass        |
| Lower Spine (T12) Y Acceleration | G's   | 7 to 11       | 10     | Pass        |
| <b>Overall Test Results</b>      |       |               |        | <b>Pass</b> |

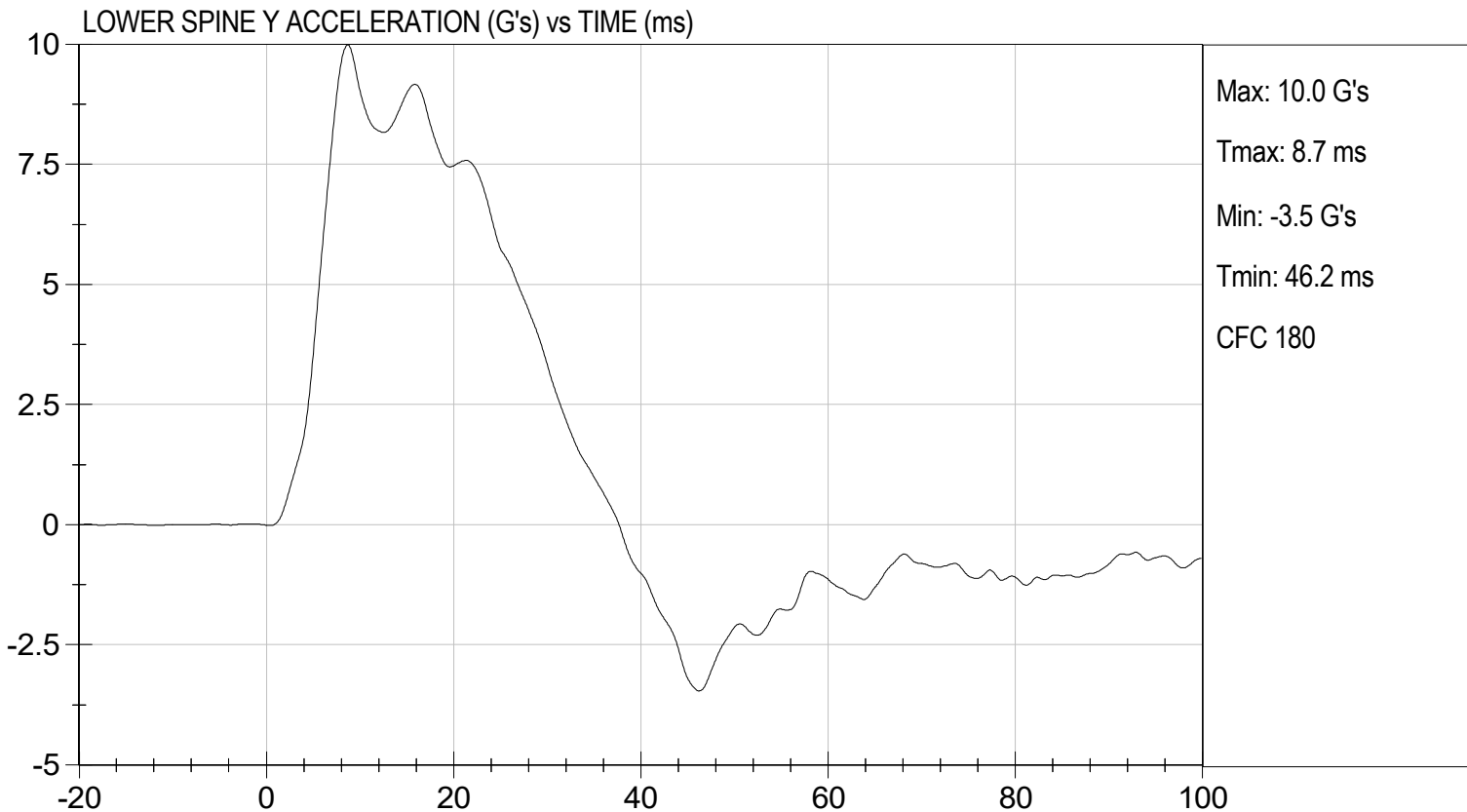
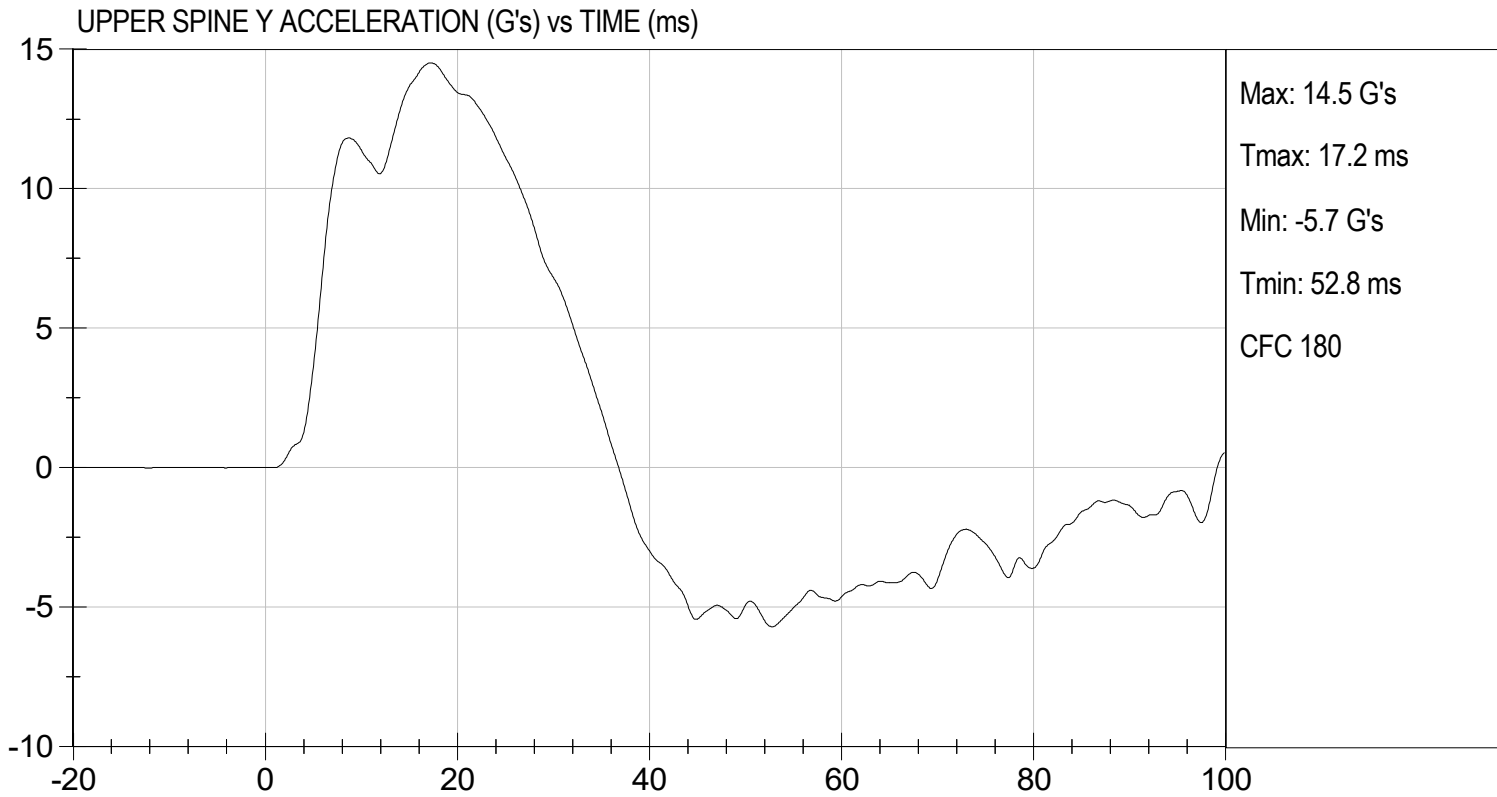
  
 Laboratory Technician

08/29/2024  
 Test Date

  
 Approved By







MGA RESEARCH CORPORATION

ABDOMINAL IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

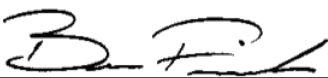
ATD Serial No: 296

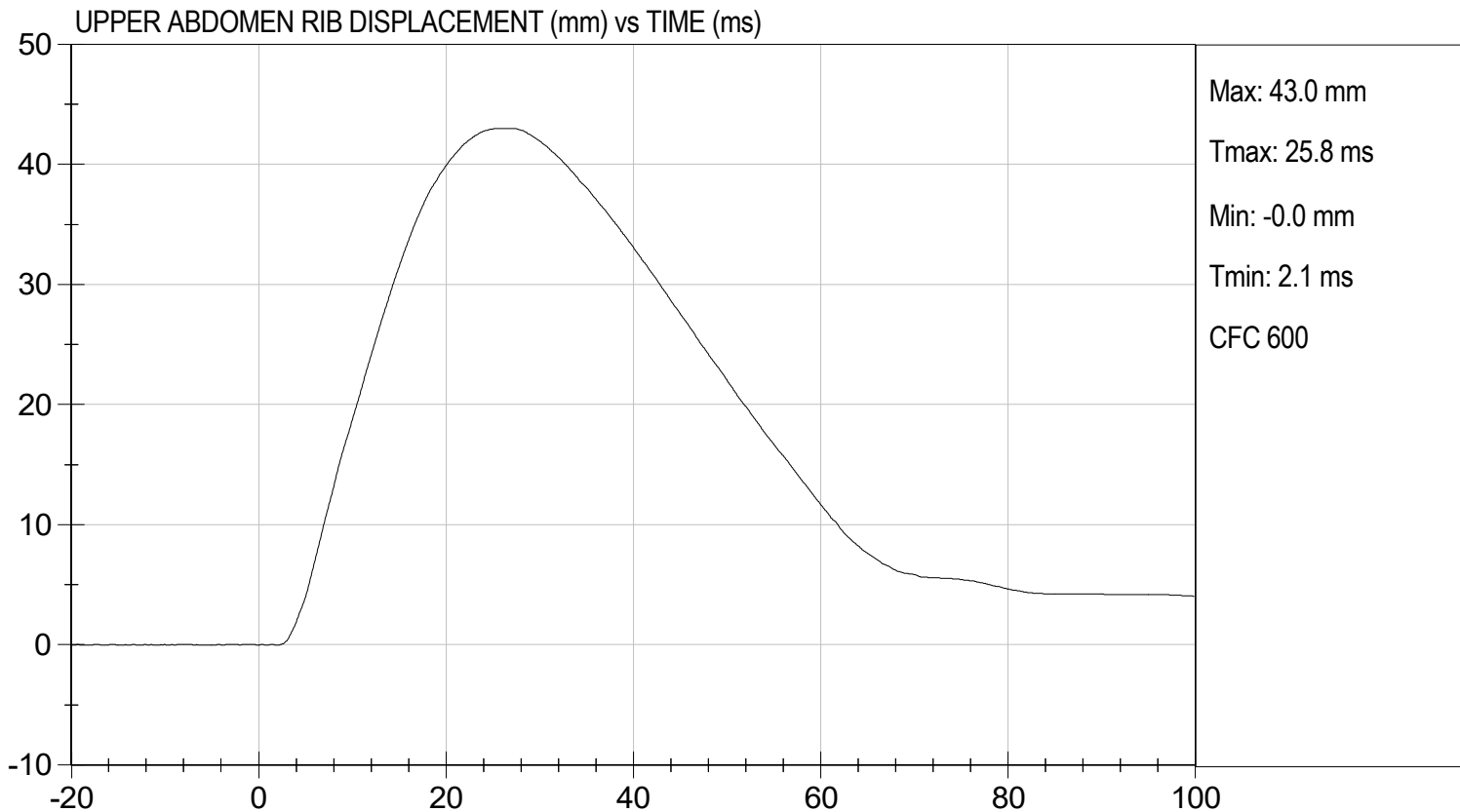
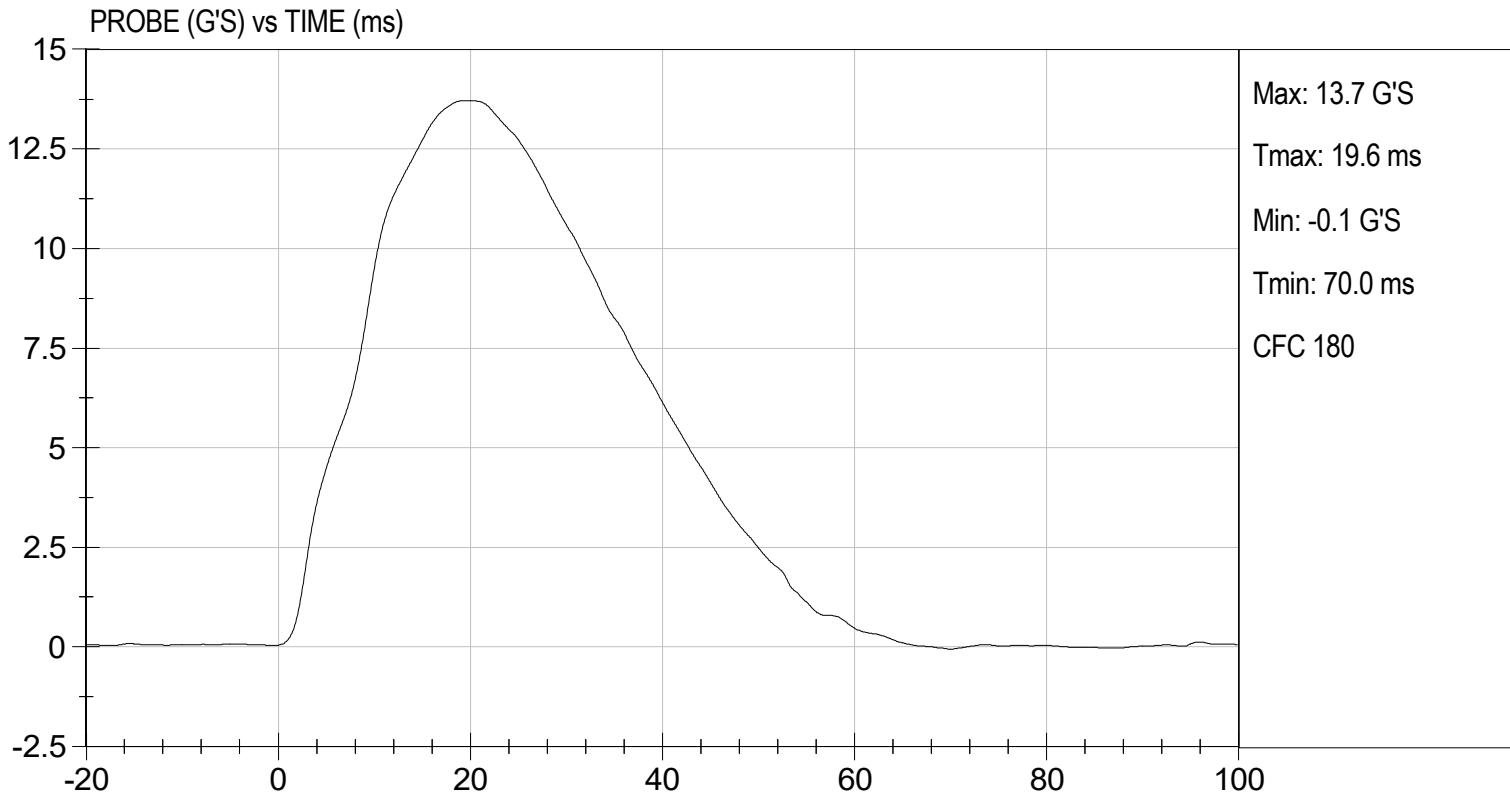
Test I.D: D242226

| Tested Parameter                 | Units | Specification | Result | Pass/Fail |
|----------------------------------|-------|---------------|--------|-----------|
| Temperature                      | deg C | 20.6 to 22.2  | 21.3   | Pass      |
| Humidity                         | %     | 10 to 70      | 48     | Pass      |
| Impact Velocity                  | m/s   | 4.20 to 4.40  | 4.34   | Pass      |
| Maximum Probe Acceleration       | G's   | 12 to 16      | 14     | Pass      |
| Upper Abdomen Rib Displacement   | mm    | 36 to 47      | 43     | Pass      |
| Lower Abdomen Rib Displacement   | mm    | 33 to 44      | 36     | Pass      |
| Lower Spine (T12) Y Acceleration | G's   | 9 to 14       | 11     | Pass      |
| Overall Test Results             |       |               |        | Pass      |

  
Laboratory Technician

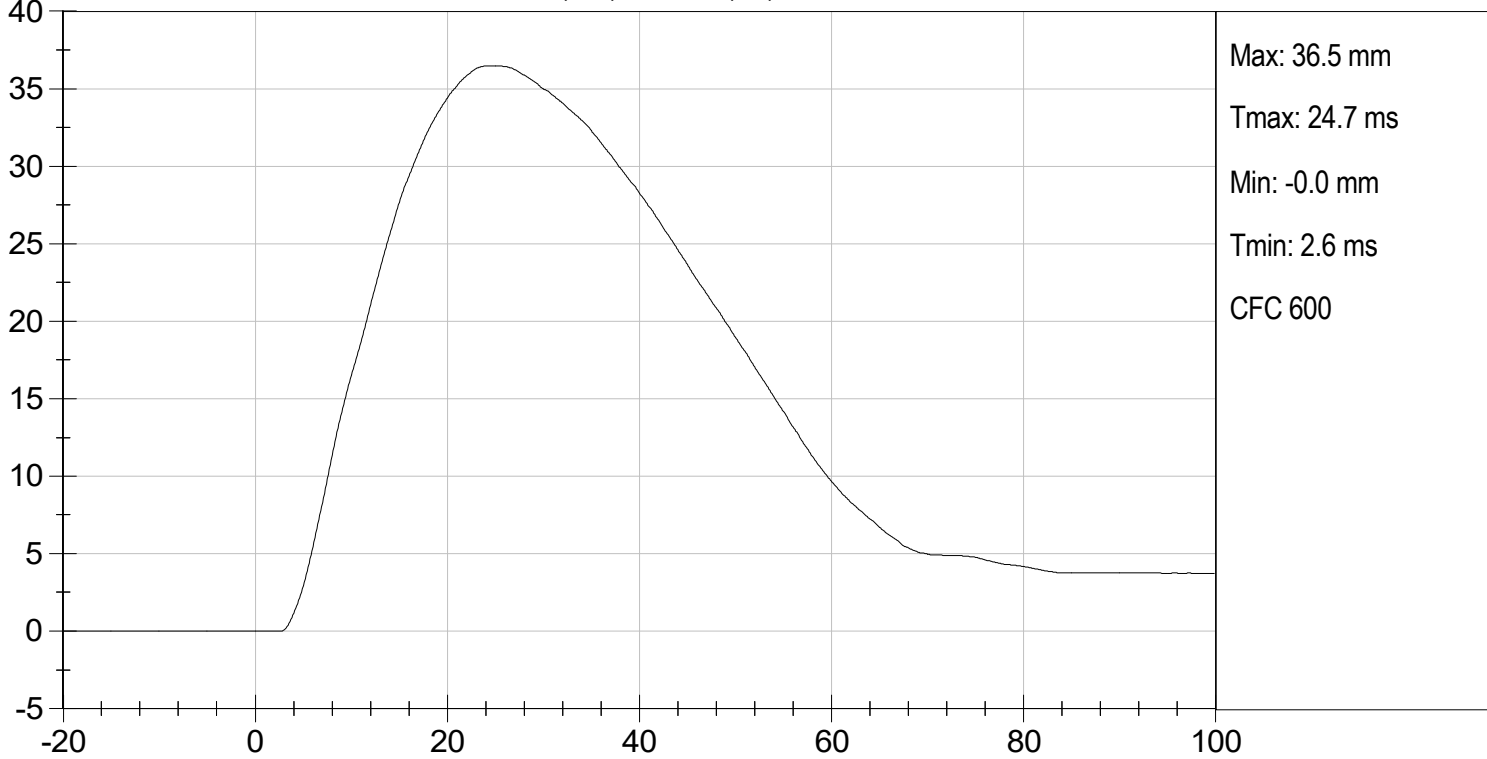
08/29/2024  
Test Date

  
Approved By

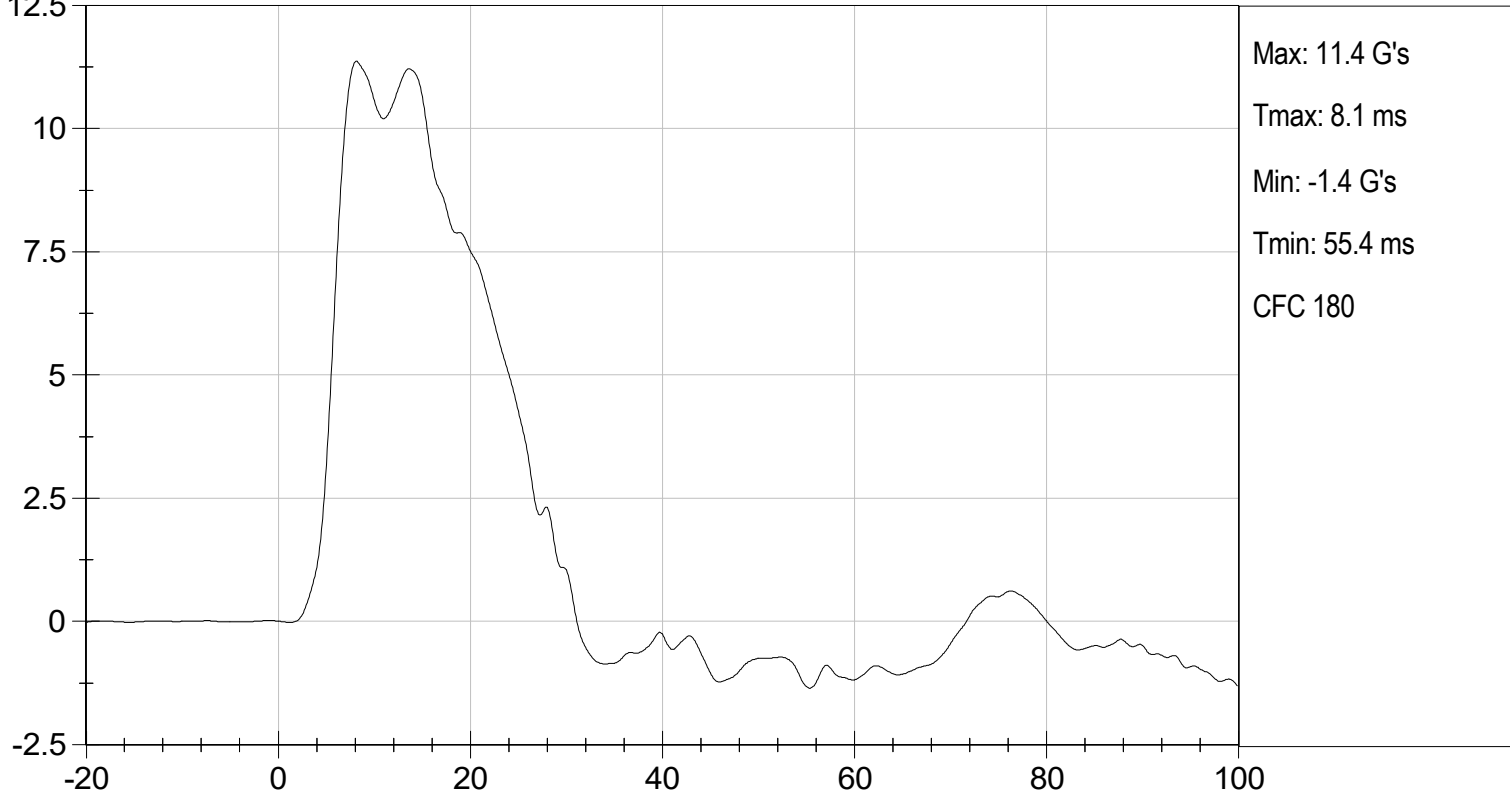




LOWER ABDOMEN RIB DISPLACEMENT (mm) vs TIME (ms)



LOWER SPINE ACCELERATION (G's) vs TIME (ms)



**MGA RESEARCH CORPORATION**  
**PELVIS IMPACT TEST**  
**SID-Its BUILD LEVEL D DUMMY**

ATD Serial No: 296

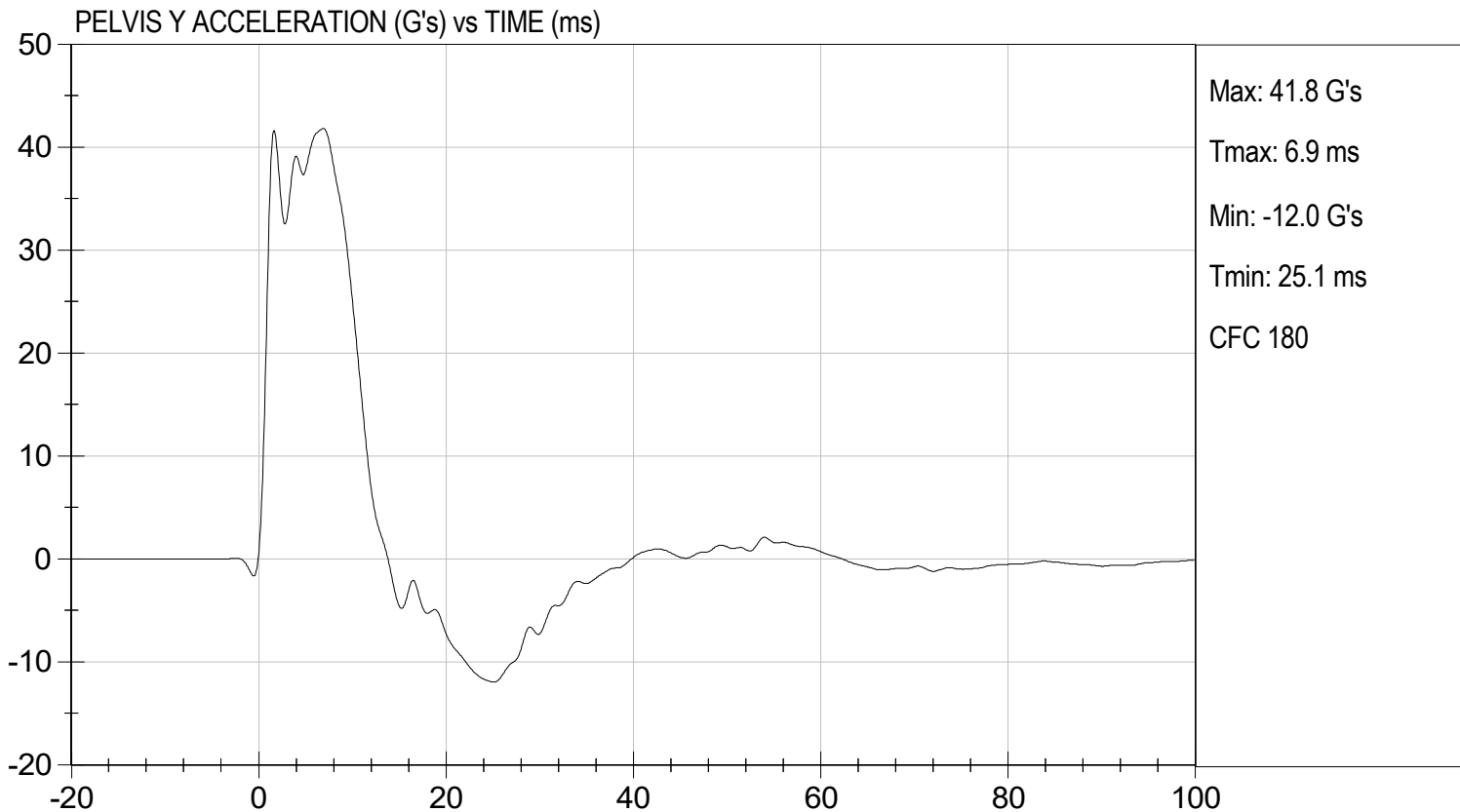
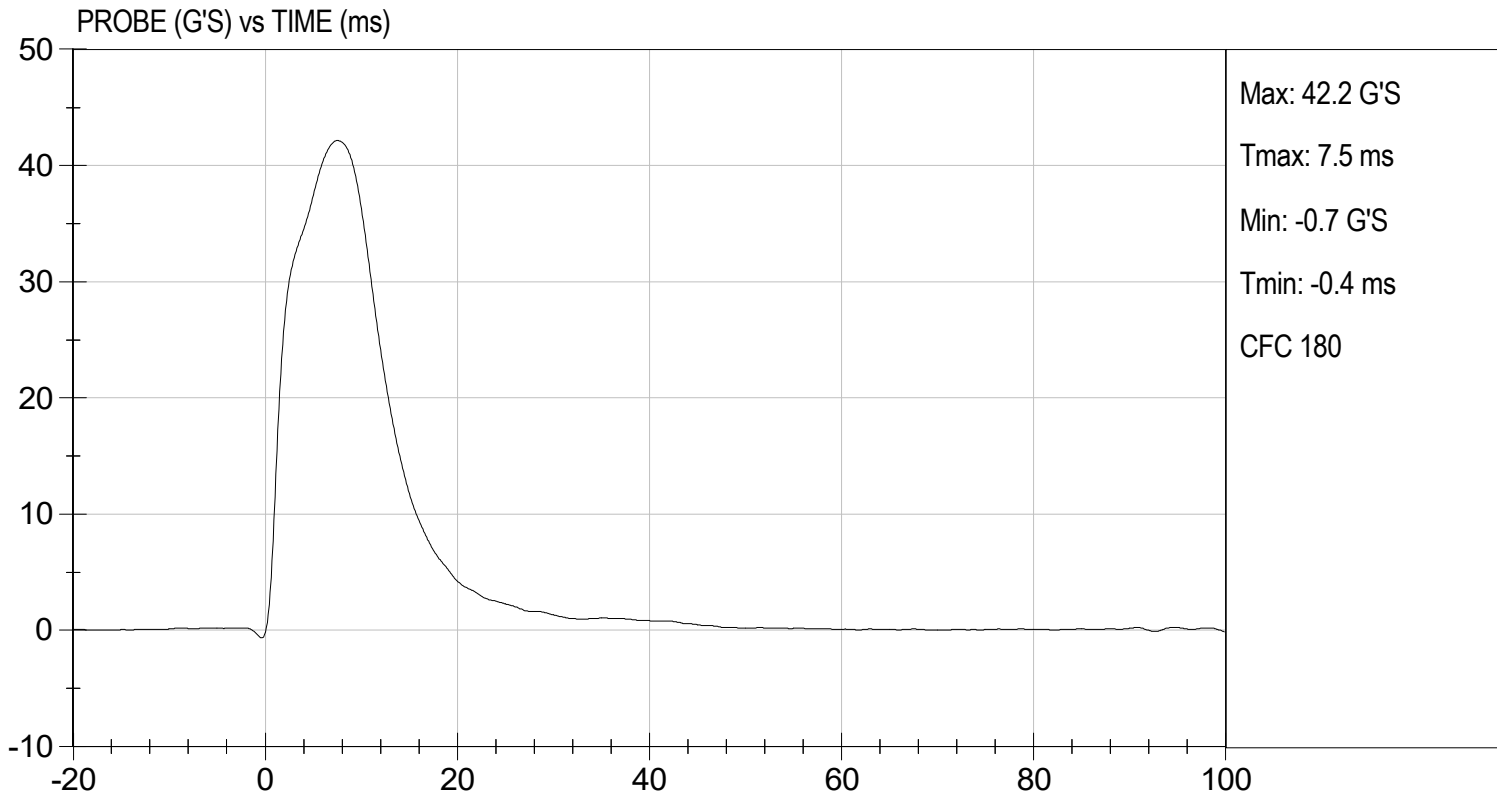
Test I.D: D242227

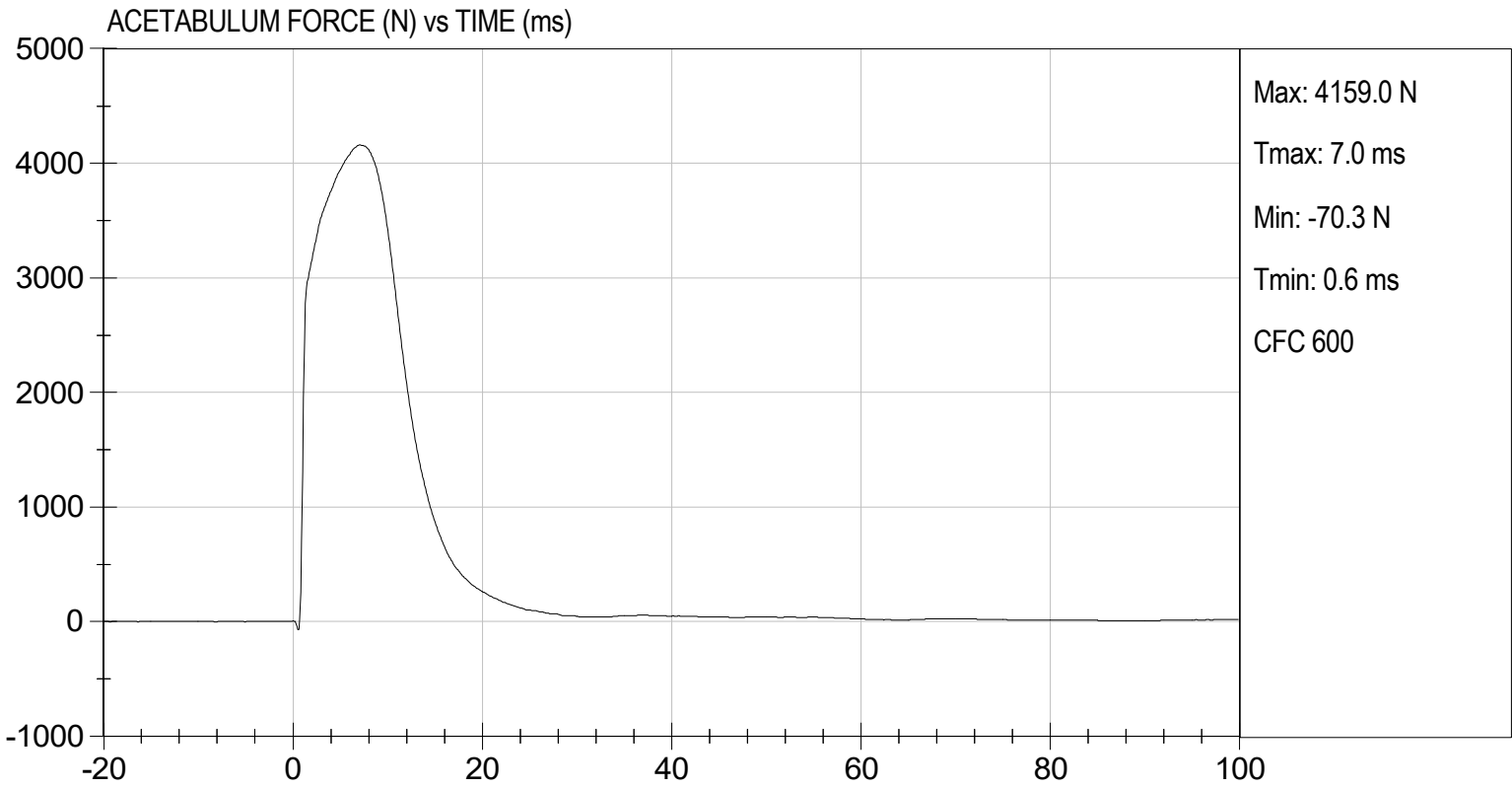
| Tested Parameter                 | Units | Specification | Result | Pass/Fail |
|----------------------------------|-------|---------------|--------|-----------|
| Temperature                      | deg C | 20.6 to 22.2  | 21.3   | Pass      |
| Humidity                         | %     | 10 to 70      | 47     | Pass      |
| Impact Velocity                  | m/s   | 6.60 to 6.80  | 6.68   | Pass      |
| Maximum Probe Acceleration       | G's   | 38 to 47      | 42     | Pass      |
| Pelvis Y Acceleration After 6 ms | G's   | 34 to 42      | 41.8   | Pass      |
| Peak Acetabulum Force            | N     | 3600 to 4300  | 4,159  | Pass      |
| Overall Test Results             |       |               |        | Pass      |

  
 Laboratory Technician

08/29/2024  
 Test Date

  
 Approved By





**MGA RESEARCH CORPORATION**  
**ILIAC IMPACT TEST**  
**SID-ILs BUILD LEVEL D DUMMY**

ATD Serial No: 296

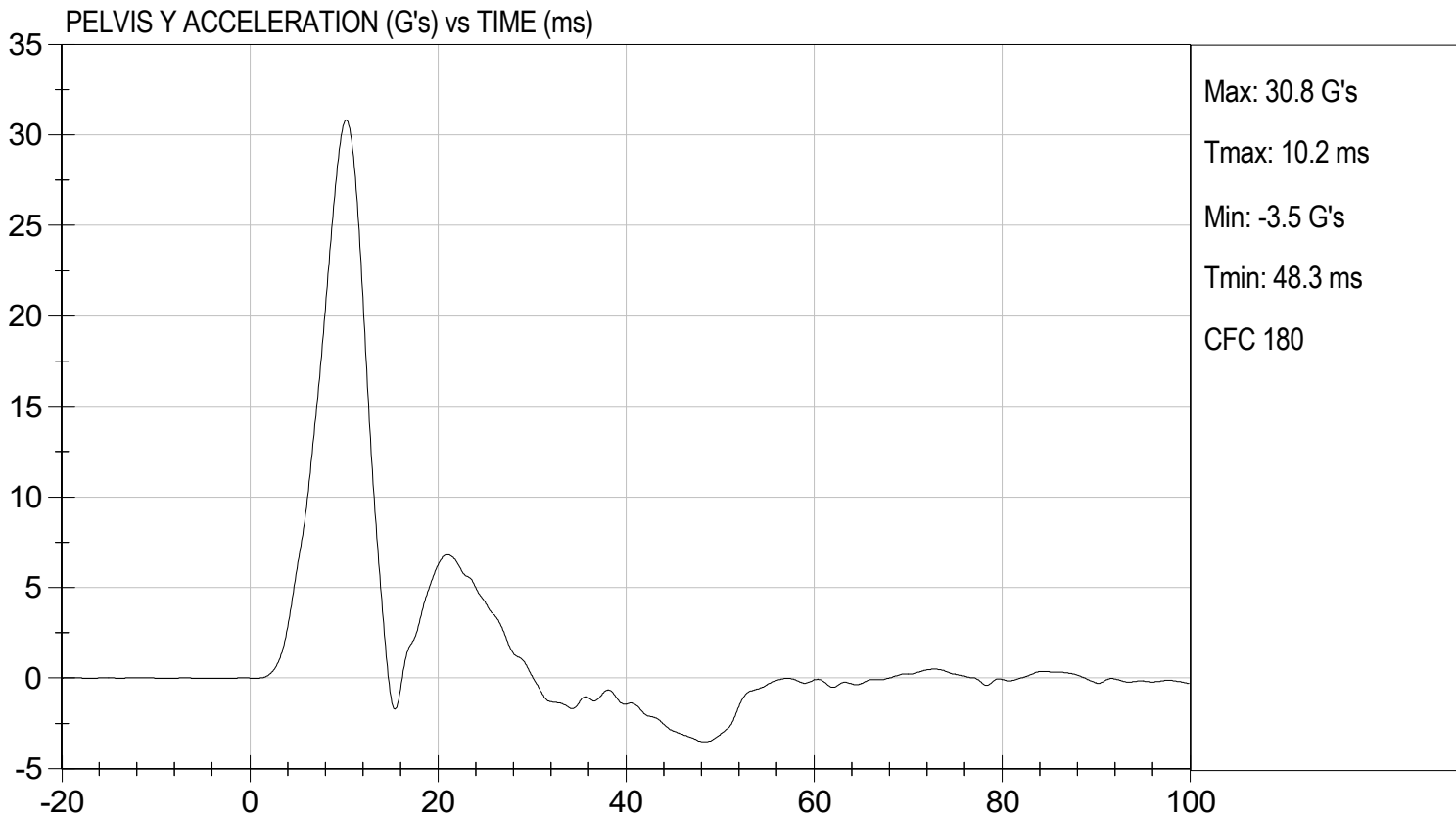
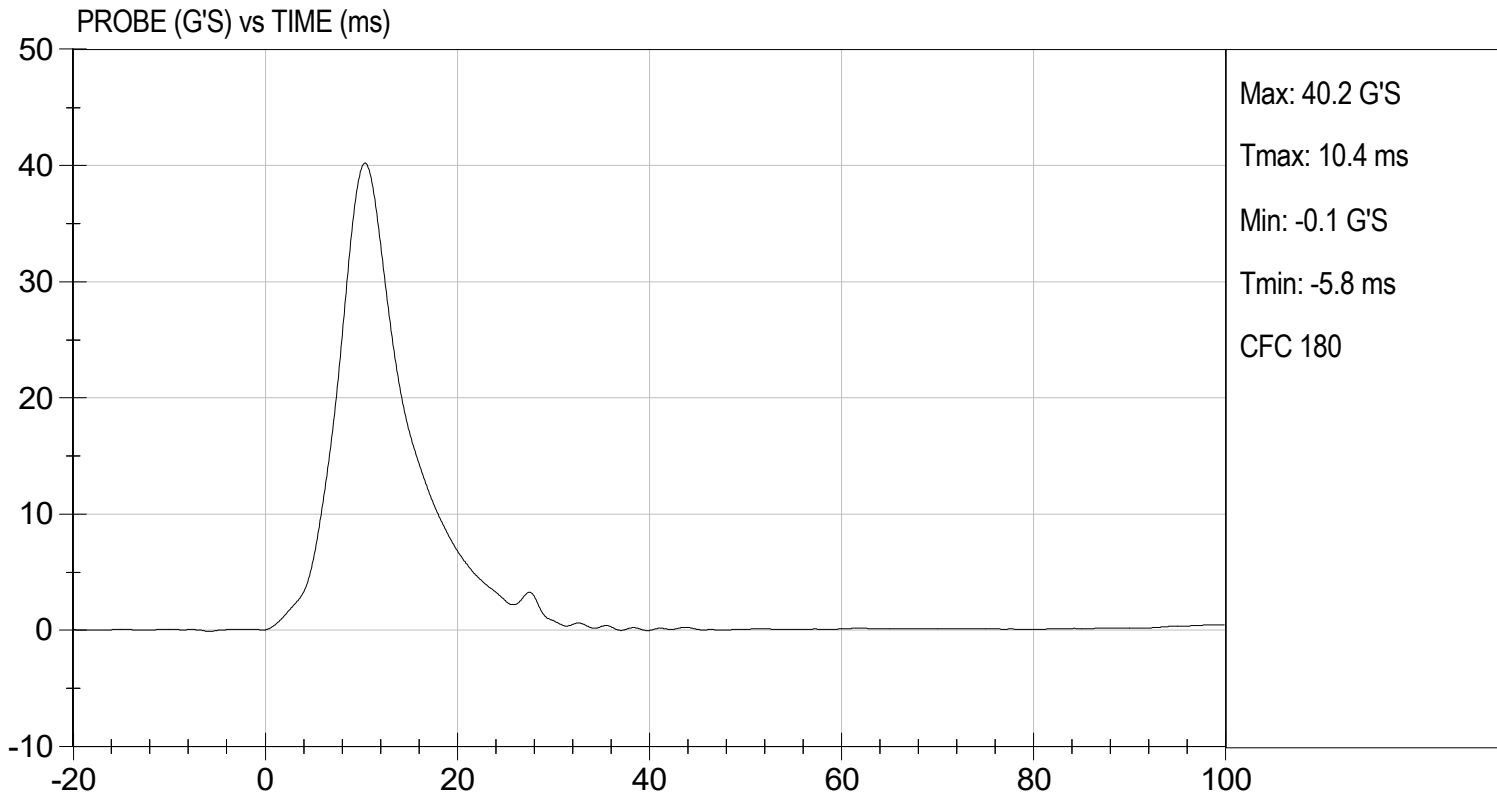
Test I.D: D242228

| Tested Parameter           | Units | Specification | Result | Pass/Fail |
|----------------------------|-------|---------------|--------|-----------|
| Temperature                | deg C | 20.6 to 22.2  | 21.3   | Pass      |
| Humidity                   | %     | 10 to 70      | 49     | Pass      |
| Impact Velocity            | m/s   | 4.20 to 4.40  | 4.38   | Pass      |
| Maximum Probe Acceleration | G's   | 36 to 45      | 40     | Pass      |
| Pelvis Y Acceleration      | G's   | 28 to 39      | 31     | Pass      |
| Peak Pelvis Iliac Force    | N     | 4100 to 5100  | 4,644  | Pass      |
| Overall Test Results       |       |               |        | Pass      |

  
 Laboratory Technician

08/29/2024  
 Test Date

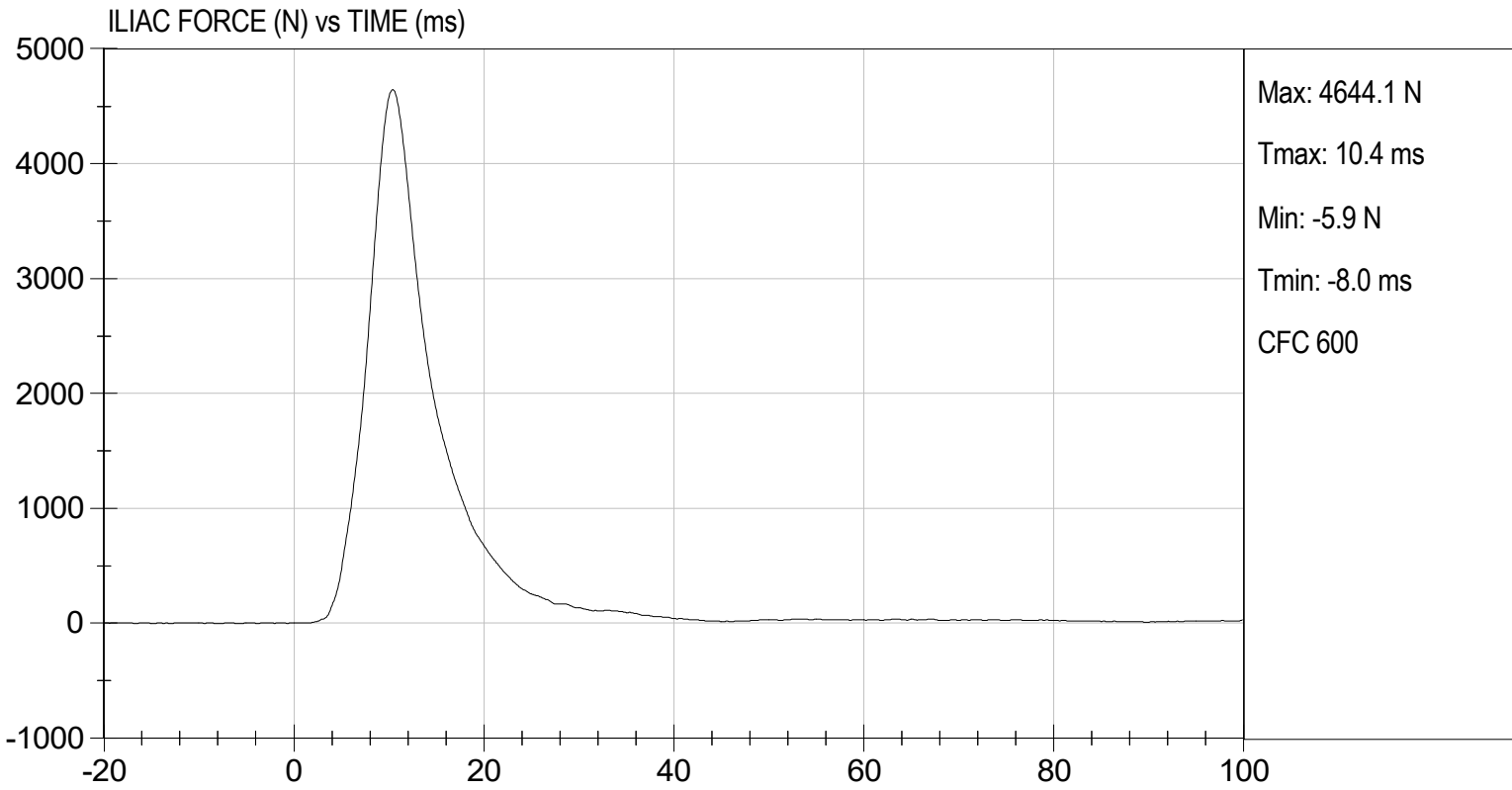
  
 Approved By





TEST DESC: ILLIAC  
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 08/29/2024  
TEST #: D242228





**SID-IIs Pelvis Plug Certification Test**

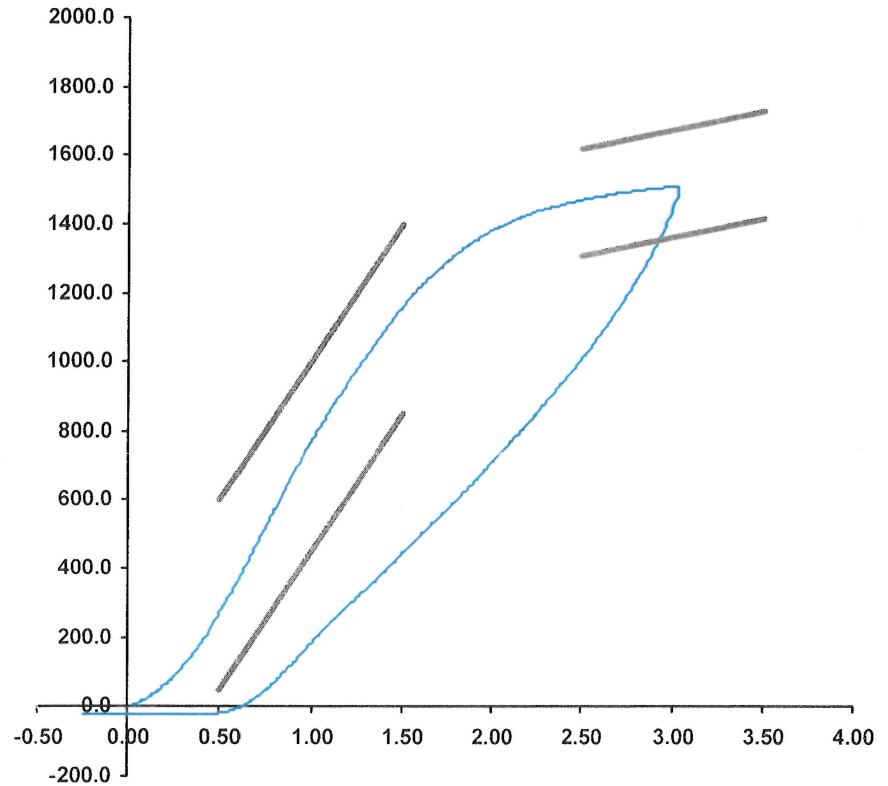
Plug S/N 17068  
 Test Number 23966  
 Report Number 24023  
 Test Date 8/21/2022 10:21:04 AM

|                    | Test Results | Spec Min | Spec Max |
|--------------------|--------------|----------|----------|
| Force @ 0.5 mm (N) | 278          | 50       | 600      |
| Force @ 1.5 mm (N) | 1,159        | 850      | 1,400    |
| Force @ 2.5 mm (N) | 1,472        | 1,306    | 1,618    |
| Force @ 3.0 mm (N) | 1,509        | 1,361    | 1,673    |

Testing Machine STM-20 5965542  
 Load Cell S/N (FI360947), Units (LBS ) 1000  
 Crosshead Speed ( mm / min ) or Rate 12.7  
 Extension or Position Measured by XHD\_100 ( XHD100 )

Notes:

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107 21-Aug-22  
 SACO Research

By: DC Date: 8/21/22



### SID-IIs Pelvis Plug Certification Test

Plug S/N 17055

Test Number 23953

Report Number 24010

Test Date 8/21/2022 9:48:52 AM

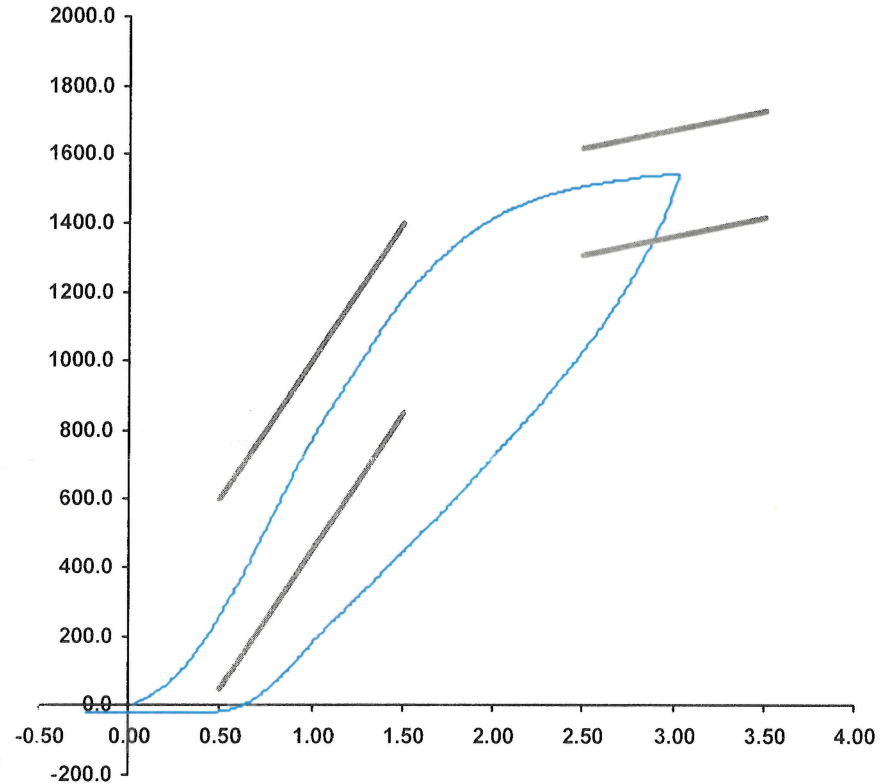
|                    | Test Results | Spec Min | Spec Max |
|--------------------|--------------|----------|----------|
| Force @ 0.5 mm (N) | 268          | 50       | 600      |
| Force @ 1.5 mm (N) | 1,180        | 850      | 1,400    |
| Force @ 2.5 mm (N) | 1,508        | 1,306    | 1,618    |
| Force @ 3.0 mm (N) | 1,546        | 1,361    | 1,673    |

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

Crosshead Speed ( mm / min ) or Rate 12.7  
Extension or Position Measured by XHD\_100 ( XHD100 )

Notes:

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107 21-Aug-22

SACO Research

By : DG Date : 8/21/22

**APPENDIX D**  
**TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION**

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

|  |         | ES-2re S/N F032 |              |                  |            |
|--|---------|-----------------|--------------|------------------|------------|
|  |         | Serial Number   | Manufacturer | Calibration Date |            |
| Head CG Accelerometers                 |         | X               | P79568       | Endevco          | 05/28/2024 |
|  |         | Y               | P79569       | Endevco          | 05/28/2024 |
|  |         | Z               | T30941       | Endevco          | 05/28/2024 |
|  |         | Xr              | P86797       | Endevco          | 05/28/2024 |
|  |         | Yr              | P94957       | Endevco          | 05/28/2024 |
|  |         | Zr              | P97381       | Endevco          | 05/28/2024 |
| Thorax Rib Displacement Potentiometers | Upper   | Y               | G236         | Honeywell        | 05/28/2024 |
|  | Middle  | Y               | G368         | Honeywell        | 05/28/2024 |
|  | Lower   | Y               | G164         | Honeywell        | 05/28/2024 |
| Abdomen Load Cells                     | Forward | Y               | ABG1513      | Denton           | 02/22/2024 |
|  | Middle  | Y               | ABG1531      | Denton           | 02/22/2024 |
|  | Rear    | Y               | ABG1536      | Denton           | 02/22/2024 |
| Lower Spine Accelerometers (T12)       |         | X               | P79574       | Endevco          | 05/28/2024 |
|  |         | Y               | T14094       | Endevco          | 05/28/2024 |
|  |         | Z               | P82603       | Endevco          | 05/28/2024 |
| Public Symphysis Load Cell             |         | Y               | PG462        | Denton           | 02/22/2024 |

**Table 2 – Dummy Instrumentation (SID-IIs)**

|                                  |               |        | SID-IIs S/N 296 |              |                  |            |
|----------------------------------|---------------|--------|-----------------|--------------|------------------|------------|
|                                  |               |        | Serial Number   | Manufacturer | Calibration Date |            |
| Head CG Accelerometers           |               |        | X               | P82109       | Endevco          | 06/11/2024 |
|                                  |               |        | Y               | P94783       | Endevco          | 06/11/2024 |
|                                  |               |        | Z               | P94786       | Endevco          | 06/11/2024 |
|                                  |               |        | Xr              | P94938       | Endevco          | 06/11/2024 |
|                                  |               |        | Yr              | P96854       | Endevco          | 06/11/2024 |
|                                  |               |        | Zr              | P97386       | Endevco          | 06/11/2024 |
| Head Angular Rate Sensors        |               |        | X               | ARS7391      | DTS              | 11/17/2023 |
|                                  |               |        | Y               | ARS7402      | DTS              | 11/17/2023 |
|                                  |               |        | Z               | ARS7416      | DTS              | 11/17/2023 |
| Displacement Potentiometers      | Thoracic Rib  | Upper  | Y               | G012         | Servo            | 06/10/2024 |
|                                  |               | Middle | Y               | G1163        | FTSS             | 06/10/2024 |
|                                  |               | Lower  | Y               | G1158        | FTSS             | 06/10/2024 |
|                                  | Abdominal Rib | Upper  | Y               | G1146        | FTSS             | 06/10/2024 |
|                                  |               | Lower  | Y               | G1126        | FTSS             | 06/10/2024 |
| Lower Spine Accelerometers (T12) |               |        | X               | P79614       | Endevco          | 06/11/2024 |
|                                  |               |        | Y               | P79439       | Endevco          | 06/11/2024 |
|                                  |               |        | Z               | P79418       | Endevco          | 06/11/2024 |
| Acetabulum Load Cell             |               |        | Y               | ACG111       | FTSS             | 02/22/2024 |
| Iliac Wing Load Cell             |               |        | Y               | IWG226       | FTSS             | 02/22/2024 |
| Pelvis Plug (struck side)        |               |        |                 | 17068        | SACO             | 08/21/2022 |
| Pelvis Plug (non-struck side)    |               |        |                 | 17055        | SACO             | 08/21/2022 |

**Table 3 – Vehicle Instrumentation**

|    |                              |   | Serial Number | Manufacturer | Calibration Date |
|----|------------------------------|---|---------------|--------------|------------------|
| 1  | Vehicle Center of Gravity    | X | T35284        | Endevco      | 06/25/2024       |
|    | Vehicle Center of Gravity    | Y | T41772        | Endevco      | 06/14/2024       |
|    | Vehicle Center of Gravity    | Z | T41762        | Endevco      | 06/14/2024       |
| 2  | Right Sill at Front Seat     | X | A390874       | MSI          | 03/14/2024       |
|    | Right Sill at Front Seat     | Y | A383426       | MSI          | 03/04/2024       |
|    | Right Sill at Front Seat     | Z | T39055        | Endevco      | 05/06/2024       |
| 3  | Right Sill at Rear Seat      | X | T39129        | Endevco      | 06/24/2024       |
|    | Right Sill at Rear Seat      | Y | T39281        | Endevco      | 06/24/2024       |
|    | Right Sill at Rear Seat      | Z | T39064        | Endevco      | 06/24/2024       |
| 4  | Left Sill at Front Door      | Y | T42826        | Endevco      | 06/14/2024       |
| 5  | Left Sill at Rear Door       | Y | T39093        | Endevco      | 07/01/2024       |
| 6  | Left A-Post Lower            | Y | T39025        | Endevco      | 07/19/2024       |
| 7  | Left A-Post Middle           | Y | T40107        | Endevco      | 03/22/2024       |
| 8  | Left B-Post Lower            | Y |               |              |                  |
| 9  | Left B-Post Middle           | Y |               |              |                  |
| 10 | Front Seat Track             | Y | T39233        | Endevco      | 07/19/2024       |
| 11 | Rear Seat Track or Structure | Y | T42825        | Endevco      | 07/30/2024       |
| 12 | Right Rear Occ. Compartment  | Y | T32334        | Endevco      | 04/26/2024       |
| 13 | Engine Block                 | X | T42843        | Endevco      | 06/26/2024       |
|    | Engine Block                 | Y | T37949        | Endevco      | 07/01/2024       |
| 14 | Rear Floorpan Above Axle     | X | T29894        | Endevco      | 06/04/2024       |
|    | Rear Floorpan Above Axle     | Y | T33128        | Endevco      | 07/19/2024       |
|    | Rear Floorpan Above Axle     | Z | A337194       | MSI          | 07/19/2024       |

**Table 4 – MDB Instrumentation**

|                                    |   | Serial Number | Manufacturer | Calibration Date |
|------------------------------------|---|---------------|--------------|------------------|
| MDB Center of Gravity              | X | PCB1183D      | PCB          | 03/15/2024       |
| MDB Center of Gravity              | Y | PCB1822D      | PCB          | 03/15/2024       |
| MDB Center of Gravity              | Z | PCB1753D      | PCB          | 03/15/2024       |
| Left Frame at Rear Axle Centerline | X | PCB1438D      | PCB          | 03/08/2024       |
| Left Frame at Rear Axle Centerline | Y | PCB1653D      | PCB          | 03/08/2024       |