

**RESEARCH FMVSS 214  
RIGID POLE SIDE IMPACT TEST**

**NISSAN MOTOR CO., LTD,  
2020 Nissan Rogue**

**PREPARED BY:  
Transportation Research Center Inc.  
10820 State Route 347  
P. O. Box B-67  
East Liberty, OH 43319**



**Report Date: October 20, 2021**

**FINAL REPORT**

**PREPARED FOR:  
Vehicle Research and Test Center  
P. O. Box 37  
East Liberty, OH 43319**

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#### **TRC TEST NUMBER: 201022**

Project Manager, John Shultz

Report Approved October 20, 2021:

Transportation Research Center Inc.

Final Report Accepted by:

\_\_\_\_\_  
Allison Loudon  
Project Engineer  
Vehicle Research & Test Center

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

## Technical Report Documentation Page

| 1. Report No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2. Government Accession No.                         | 3. Recipient's Catalog No.                                                                                                                                                                                                       |           |                         |                           |  |       |        |                               |     |     |                               |     |      |                     |   |         |                              |    |      |                               |    |      |                       |   |        |                                  |   |        |
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| 4. Title and Subtitle<br>Final Report of Research FMVSS 214 Rigid Pole Side Impact Testing of a 2020 Nissan Rogue                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                     | 5. Report Date<br>October 20, 2021                                                                                                                                                                                               |           |                         |                           |  |       |        |                               |     |     |                               |     |      |                     |   |         |                              |    |      |                               |    |      |                       |   |        |                                  |   |        |
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| 7. Author(s)<br>John Shultz, Project Manager                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                     | 8. Performing Organization Report No.<br>201022                                                                                                                                                                                  |           |                         |                           |  |       |        |                               |     |     |                               |     |      |                     |   |         |                              |    |      |                               |    |      |                       |   |        |                                  |   |        |
| 9. Performing Organization Name And Address<br>Transportation Research Center Inc.<br>10820 State Route 347, East Liberty, OH 43319                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                     | 10. Work Unit No.                                                                                                                                                                                                                |           |                         |                           |  |       |        |                               |     |     |                               |     |      |                     |   |         |                              |    |      |                               |    |      |                       |   |        |                                  |   |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                     | 11. Contract Or Grant No.<br>693JJ918D000019                                                                                                                                                                                     |           |                         |                           |  |       |        |                               |     |     |                               |     |      |                     |   |         |                              |    |      |                               |    |      |                       |   |        |                                  |   |        |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                     | 14. Sponsoring Agency Code<br>NRS-210                                                                                                                                                                                            |           |                         |                           |  |       |        |                               |     |     |                               |     |      |                     |   |         |                              |    |      |                               |    |      |                       |   |        |                                  |   |        |
| 15. Supplemental Notes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                     |                                                                                                                                                                                                                                  |           |                         |                           |  |       |        |                               |     |     |                               |     |      |                     |   |         |                              |    |      |                               |    |      |                       |   |        |                                  |   |        |
| 16. Abstract<br>A 31.00 km/h, 75° Oblique Rigid Pole Research Side Impact Test was conducted on the subject 2020 Nissan Rogue in accordance with the specifications of the Laboratory Test Procedure for the Research Side Impact Rigid Pole Test for the generation of consumer information on vehicle side pole crash protection. This test was conducted by Transportation Research Center Inc. in East Liberty, Ohio, on October 22, 2020.<br><br>The impact velocity was 30.96 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 21.0°C. The test vehicle post-test maximum crush was 356 mm at level 3. The test vehicle's performance was as follows: <table border="1" data-bbox="371 1123 1295 1415"> <thead> <tr> <th rowspan="2">Measurement Description</th><th colspan="2">Driver ATD (WorldSID-50M)</th></tr> <tr> <th>Units</th><th>Result</th></tr> </thead> <tbody> <tr> <td>Head Injury Criterion (HIC15)</td><td>N/A</td><td>318</td></tr> <tr> <td>Brain Injury Criterion (BrIC)</td><td>N/A</td><td>0.94</td></tr> <tr> <td>Peak Shoulder Force</td><td>N</td><td>-1616.2</td></tr> <tr> <td>Peak Thoracic Rib Deflection</td><td>mm</td><td>32.5</td></tr> <tr> <td>Peak Abdominal Rib Deflection</td><td>mm</td><td>20.0</td></tr> <tr> <td>Pubic Symphysis Force</td><td>N</td><td>-828.0</td></tr> <tr> <td>Peak Resultant Sacro-Iliac Force</td><td>N</td><td>2561.0</td></tr> </tbody> </table> |                                                     |                                                                                                                                                                                                                                  |           | Measurement Description | Driver ATD (WorldSID-50M) |  | Units | Result | Head Injury Criterion (HIC15) | N/A | 318 | Brain Injury Criterion (BrIC) | N/A | 0.94 | Peak Shoulder Force | N | -1616.2 | Peak Thoracic Rib Deflection | mm | 32.5 | Peak Abdominal Rib Deflection | mm | 20.0 | Pubic Symphysis Force | N | -828.0 | Peak Resultant Sacro-Iliac Force | N | 2561.0 |
| Measurement Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Driver ATD (WorldSID-50M)                           |                                                                                                                                                                                                                                  |           |                         |                           |  |       |        |                               |     |     |                               |     |      |                     |   |         |                              |    |      |                               |    |      |                       |   |        |                                  |   |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Units                                               | Result                                                                                                                                                                                                                           |           |                         |                           |  |       |        |                               |     |     |                               |     |      |                     |   |         |                              |    |      |                               |    |      |                       |   |        |                                  |   |        |
| Head Injury Criterion (HIC15)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | N/A                                                 | 318                                                                                                                                                                                                                              |           |                         |                           |  |       |        |                               |     |     |                               |     |      |                     |   |         |                              |    |      |                               |    |      |                       |   |        |                                  |   |        |
| Brain Injury Criterion (BrIC)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | N/A                                                 | 0.94                                                                                                                                                                                                                             |           |                         |                           |  |       |        |                               |     |     |                               |     |      |                     |   |         |                              |    |      |                               |    |      |                       |   |        |                                  |   |        |
| Peak Shoulder Force                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | N                                                   | -1616.2                                                                                                                                                                                                                          |           |                         |                           |  |       |        |                               |     |     |                               |     |      |                     |   |         |                              |    |      |                               |    |      |                       |   |        |                                  |   |        |
| Peak Thoracic Rib Deflection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | mm                                                  | 32.5                                                                                                                                                                                                                             |           |                         |                           |  |       |        |                               |     |     |                               |     |      |                     |   |         |                              |    |      |                               |    |      |                       |   |        |                                  |   |        |
| Peak Abdominal Rib Deflection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | mm                                                  | 20.0                                                                                                                                                                                                                             |           |                         |                           |  |       |        |                               |     |     |                               |     |      |                     |   |         |                              |    |      |                               |    |      |                       |   |        |                                  |   |        |
| Pubic Symphysis Force                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | N                                                   | -828.0                                                                                                                                                                                                                           |           |                         |                           |  |       |        |                               |     |     |                               |     |      |                     |   |         |                              |    |      |                               |    |      |                       |   |        |                                  |   |        |
| Peak Resultant Sacro-Iliac Force                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | N                                                   | 2561.0                                                                                                                                                                                                                           |           |                         |                           |  |       |        |                               |     |     |                               |     |      |                     |   |         |                              |    |      |                               |    |      |                       |   |        |                                  |   |        |
| The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                     |                                                                                                                                                                                                                                  |           |                         |                           |  |       |        |                               |     |     |                               |     |      |                     |   |         |                              |    |      |                               |    |      |                       |   |        |                                  |   |        |
| 17. Key Words<br>Side Impact<br>Pole<br>WorldSID-50M                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                     | 18. Distribution Statement<br>Copies of this report are available from:<br>National Highway Traffic Safety Administration<br>Technical Information Services Division, NPO-411<br>1200 New Jersey Ave, SE<br>Washington, DC 20590 |           |                         |                           |  |       |        |                               |     |     |                               |     |      |                     |   |         |                              |    |      |                               |    |      |                       |   |        |                                  |   |        |
| 19. Security Classification of Report<br>Unclassified                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 20. Security Classification of page<br>Unclassified | 21. Number of Pages<br>260                                                                                                                                                                                                       | 22. Price |                         |                           |  |       |        |                               |     |     |                               |     |      |                     |   |         |                              |    |      |                               |    |      |                       |   |        |                                  |   |        |

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## **SECTION 1**

### **PURPOSE AND TEST PROCEDURE**

#### **PURPOSE AND TEST PROCEDURE**

This rigid pole side impact test is a part of the Federal Motor Vehicle Safety Standard 214 Side Impact Protection program. It was conducted for the National Highway Traffic Safety Administration's (NHTSA) under 693JJ918D000019 by Transportation Research Center Inc.. The purpose of this test was to evaluate the repeatability, reproducibility, and durability of the WorldSID 50th percentile male ATD (WorldSID-50M) equipped with RibEye™, to determine whether the dummy is a viable option to replace the EuroSID-2 dummy with rib extension modifiers (ES-2re) in future side impact rigid pole tests conducted by NHTSA. The test was conducted using NHTSA's 'LABORATORY TEST PROCEDURE FOR FMVSS No. 214, DYNAMIC SIDE IMPACT PROTECTION – Rigid Pole Side Impact Test' dated September 2012 as a guideline.

## SECTION 2

### SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2020 Nissan Rogue. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 30.96 km/h. The test was conducted by the Transportation Research Center Inc. in East Liberty, Ohio, on October 22, 2020. Pre-test and post test photographs of the test vehicle and side impact dummy (WorldSID-50M with RibEye) are included in APPENDIX A of this report.

The test setup was conducted following the FMVSS 214 test procedure dated September 2012, including instrumentation and camera placement. One WorldSID-50M with RibEye dummy was placed in the driver designated seating position per NHTSA's "WorldSID 50th Male Dummy Seating Procedure, April 2019 (<https://rosap.nhtl.bts.gov/view/dot/41900>).

The dummy was instrumented in the following manner:

- Head CG tri-axial accelerometer
- Head angular rate sensor
- Upper and lower neck load cells
- Shoulder load cell
- RibEye measurement system in thorax ribs 1-3 and abdominal ribs 1 and 2, with three LEDs per rib
- Upper (T1), middle (T4), and lower spine (T12) tri-axial accelerometers
- Lumbar load cell
- Pelvic tri-axial accelerometers
- Pubic load cell
- Left and right sacroiliac load cells
- Left femur load cell

Appendix B contains the vehicle and dummy response data. Dummy configuration and performance verification data can be found in Appendix C of this report. Appendix D of this report contains the test equipment and instrumentation calibration data. Worksheets and plots found in Appendix E describe dummy positions in detail.

Dummy injury readings were recorded as follows:

| Measurement Description          | Driver ATD (WorldSID-50M) |         |
|----------------------------------|---------------------------|---------|
|                                  | Units                     | Result  |
| Head Injury Criterion (HIC15)    | N/A                       | 318     |
| Brain Injury Criterion (BrIC)    | N/A                       | 0.94    |
| Peak Shoulder Force              | N                         | -1616.2 |
| Peak Thoracic Rib Deflection     | mm                        | 32.5    |
| Peak Abdominal Rib Deflection    | mm                        | 20.0    |
| Pubic Symphysis Force            | N                         | -828.0  |
| Peak Resultant Sacro-Iliac Force | N                         | 2561.0  |

Supplemental restraint information is given below:

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

### GENERAL COMMENTS

All doors remained closed throughout the test. No fuel spillage occurred during the impact and the static rollover test was not performed.

### Data Acquisition Explanations

Vehicle Center of Gravity X-Axis Acceleration; Fell off around 80.0 ms

Vehicle Center of Gravity Y-Axis Acceleration; Fell off around 80.0 ms

Vehicle Center of Gravity Z-Axis Acceleration; Fell off around 80.0 ms

VEHICLE CG ARS X; Fell off around 80.0 ms

VEHICLE CG ARS Y; Fell off around 80.0 ms

VEHICLE CG ARS Z; Fell off around 80.0 ms

Left A-Pillar Sill Y-Axis Acceleration; Open @ 30.0 ms

Left Lower A-Pillar Y-Axis Acceleration; QD after 90.0 ms

Left Front Door Mid Centerline (Y); QD after 20.0 ms

Left Front Door Mid Rear (Y); QD after 20.0 ms

#### Ribeye Error Codes:

- 1 if the top sensor is blocked or sees too much ambient light
- 2 if the bottom sensor is blocked or sees too much ambient light
- 3 if both top and bottom sensors are blocked or see too much ambient light
- 4 if the middle sensor is blocked or sees too much ambient light
- 5 if the middle and top sensors are blocked or see too much ambient light
- 6 if the middle and bottom sensors are blocked or see too much ambient light
- 7 if all three sensors are blocked or see too much ambient light
- 8 if a divide-by-zero condition occurred in the data processing
- 9 if data goes past the end of the calibration curves

*\*error codes may be positive or negative in data and will occur to all x, y, and z channels*

Driver Thorax Rib 1 Front Led Position; Error Code 9 at 48.3-51.8 ms

Driver Thorax Rib 2 Front Led Position; Error Code 7 at 26.8-30.7 ms, Error Code 7 at 44.2-56.9 ms, and Error Code 7 at 92.7-147.6 ms

**SECTION 3**  
**OCCUPANT AND VEHICLE INFORMATION**

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

Test Vehicle: 2020 Nissan Rogue  
 Test Program: Rigid Pole Side Impact

Test Date: 10/22/2020

**TEST VEHICLE INFORMATION AND OPTIONS**

|                          |                   |
|--------------------------|-------------------|
| Model Year               | 2020              |
| Make                     | Nissan            |
| Model                    | Rogue             |
| Body Style               | MPV               |
| VIN                      | 5N1AT2MT0LC798364 |
| Body Color               | Gun Metallic      |
| Odometer Reading (km/mi) | 32 mi.            |
| Engine Displacement (L)  | 2.5               |
| Type/No. Cylinders       | Straight/4        |
| Engine Placement         | Transverse        |
| Transmission Type        | Automatic         |
| Transmission Speeds      | CVT               |
| Overdrive                | N/A               |
| Final Drive              | FWD               |
| Roof Rack                | No                |
| Sunroof/T-Top            | No                |
| Running Boards           | No                |
| Tilt Steering Wheel      | Yes               |
| Power Seats              | No                |
| Anti-Lock Brakes (ABS)   | Yes               |

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

Does owner's manual provide instructions to turn off automatic door locks?

No

**DATA FROM CERTIFICATION LABEL**

|                      |                        |
|----------------------|------------------------|
| Manufactured By      | NISSAN MOTOR CO., LTD, |
| Date of Manufacturer | 06/20                  |
| Vehicle Type         | MPV                    |

|                 |      |
|-----------------|------|
| GVWR (kg)       | 2082 |
| GAWR Front (kg) | 1040 |
| GAWR Rear (kg)  | 1055 |

**VEHICLE SEATING AND WEIGHT CAPACITY DATA**

|                                            | Front | Rear | Third | Total |
|--------------------------------------------|-------|------|-------|-------|
| Designated Seating Capacity (DSC)          | 2     | 3    | N/A   | 5     |
| Vehicle Capacity Weight (VCW) (kg)         |       |      |       | 408.0 |
| DSC X 68.04 kg                             |       |      |       | 340.2 |
| Rated Cargo and Luggage Weight (RCLW) (kg) |       |      |       | 67.8  |

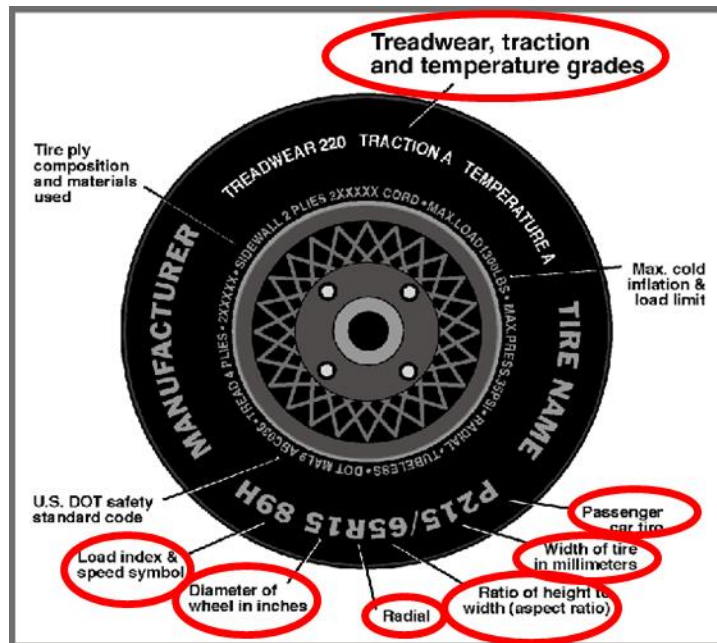
**VEHICLE SEAT TYPE**

| Seating Location        | Type of Seat Pan |       |             |           | Type of Seat Back |            |         |
|-------------------------|------------------|-------|-------------|-----------|-------------------|------------|---------|
|                         | Bucket           | Bench | Split Bench | Contoured | Fixed             | Adjustable |         |
|                         |                  |       |             |           |                   | W/ Lever   | W/ Knob |
| Front Seat              | Yes              | N/A   | N/A         | N/A       | N/A               | Yes        | N/A     |
| Rear or Second Row Seat | N/A              | N/A   | Yes         | Yes       | Yes               | N/A        | N/A     |
| Third row seat          | N/A              | N/A   | N/A         | N/A       | N/A               | N/A        | N/A     |

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

Test Vehicle: 2020 Nissan Rogue  
 Test Program: Rigid Pole Side Impact

Test Date: 10/22/2020



**DATA FROM TIRE PLACARD**

| Measured Parameter          | Front                   | Rear                    |
|-----------------------------|-------------------------|-------------------------|
| Maximum Tire Pressure (kPa) | 275                     | 275                     |
| Cold Pressure (kPa)         | 230                     | 230                     |
| Recommended Tire Size       | 225/65R17 102H          | 225/65R17 102H          |
| Tire Size on Vehicle        | 225/65R17               | 225/65R17               |
| Tire Manufacturer           | Hankook                 | Hankook                 |
| Tire Model                  | Dynapro HT              | Dynapro HT              |
| Treadwear                   | 380                     | 380                     |
| Traction                    | A                       | A                       |
| Temperature Grades          | A                       | A                       |
| Tire Plies Sidewall         | 1                       | 1                       |
| Tire Plies Body             | 5                       | 5                       |
| Load Index/Speed Symbol     | 102H                    | 102H                    |
| Tire Material               | Steel, Polyester, Nylon | Steel, Polyester, Nylon |
| DOT Safety Code Left        | TZH1 HU H 0620          | TZH1 HU H 0620          |
| DOT Safety Code Right       | TZH1 HU H 0620          | TZH1 HU H 0520          |

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

Test Vehicle: 2020 Nissan Rogue  
 Test Program: Rigid Pole Side Impact

Test Date: 10/22/2020

**TIRE PRESSURES**

|                | Units | LF  | RF  | LR  | RR  |
|----------------|-------|-----|-----|-----|-----|
| As Delivered   | kPa   | 290 | 303 | 290 | 290 |
| Tire Placard   | kPa   | 230 | 230 | 230 | 230 |
| Owner's Manual | kPa   | 230 | 230 | 230 | 230 |
| As Tested      | kPa   | 230 | 230 | 230 | 230 |

**TEST VEHICLE AXLE WEIGHTS**

|        | Units | As Delivered (UVW) |           |        | As Tested (ATW) |           |        | Fully Loaded |           |        |
|--------|-------|--------------------|-----------|--------|-----------------|-----------|--------|--------------|-----------|--------|
|        |       | Front Axle         | Rear Axle | Total  | Front Axle      | Rear Axle | Total  | Front Axle   | Rear Axle | Total  |
| Left   | kg    | 457.2              | 335.2     |        | 484.2           | 387.4     |        | 496.2        | 395.6     |        |
| Right  | kg    | 457.8              | 311.8     |        | 460.6           | 364.6     |        | 460.0        | 353.0     |        |
| Ratio  | %     | 58.6               | 41.4      |        | 55.7            | 44.3      |        | 56.1         | 43.9      |        |
| Totals | kg    | 915.0              | 647.0     | 1562.0 | 944.8           | 752.0     | 1696.8 | 956.2        | 748.6     | 1704.8 |

**TARGET TEST WEIGHT CALCULATION**

| Measured Parameter                                     | Units | Value  |         |
|--------------------------------------------------------|-------|--------|---------|
| Total As Delivered Weight (UVW)                        | kg    | 1562.0 | (A)     |
| Actual Weight of 1 WorldSID-50M with RibEye Dummy Used | kg    | 75.0   | (B)     |
| Rated Cargo/Luggage Weight (RCLW)                      | kg    | 67.8   | (C)     |
| Calculated Vehicle Target Weight (TVTW)                | kg    | 1704.8 | (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      ☐ NO

**TEST VEHICLE ATTITUDES AND CG**

|                                                                | Units | As Delivered | As Tested | Fully Loaded | Meets Requirement*** |
|----------------------------------------------------------------|-------|--------------|-----------|--------------|----------------------|
| Driver Door Sill Angle (front-to-rear)*                        | Deg.  | -1.1         | +0.2      | +0.8         | Yes                  |
| Front Passenger Sill Angle (front-to-rear)*                    | Deg.  | -0.8         | +0.2      | +0.6         | Yes                  |
| Front Bumper-Line Angle (left-to-right)**                      | Deg.  | 0.0          | -0.2      | -0.2         | Yes                  |
| Rear Bumper-Line Angle (left-to-right)**                       | Deg.  | 0.0          | -0.2      | -0.3         | Yes                  |
| Vehicle CG (Aft of Front Axle)                                 | mm    | 1120         | 1199      | 1188         |                      |
| Vehicle CG (Left (+) / Right (-) from longitudinal Centerline) | mm    | +12          | +22       | +37          |                      |

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

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

Test height adjustable suspension setting, if applicable:

N/A



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

Test Vehicle: 2020 Nissan Rogue  
Test Program: Rigid Pole Side Impact

Test Date: 10/22/2020

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

| <b>Component Description</b> | <b>Weight (kg)</b> |
|------------------------------|--------------------|
| Ballast: None                | 0.0                |
| Components removed: None     | 0.0                |

## DATA SHEET NO. 2

### SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle: 2020 Nissan Rogue  
 Test Program: Rigid Pole Side Impact

Test Date: 10/22/2020

#### 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 nonstruck 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               | 16.1    | 13.2 | 14.7 |
| Front Passenger Seat      | N/A     | N/A  | 14.4 |
| Front Center Seat*        | N/A     | N/A  | N/A  |
| Struck Side Rear Seat     | N/A     | N/A  | 10.3 |
| Non-Struck Side Rear Seat | N/A     | N/A  | 9.4  |
| Rear Center Seat*         | N/A     | N/A  | 11.7 |

\* If applicable.

#### SEAT HEIGHT AND ANGLE

| Seat                      | As Tested SCRL Angle (Mid) (°) | As Tested SCRP Height (mm) | SCRP Height Position | SCRP Height (mm) |              |              |
|---------------------------|--------------------------------|----------------------------|----------------------|------------------|--------------|--------------|
|                           |                                |                            |                      | Rearmost         | Mid Fore/Aft | Forward-Most |
| Driver Seat               | 14.7                           | 207                        | Max                  | 221              | 225          | 228          |
|                           |                                |                            | Mid                  | 198              | 207          | 216          |
|                           |                                |                            | Min                  | 180              | 192          | 203          |
| Front Passenger Seat      | 14.4                           | 209                        | Max                  | N/A              | N/A          | N/A          |
|                           |                                |                            | Mid                  | 202              | 209          | 216          |
|                           |                                |                            | Min                  | N/A              | N/A          | N/A          |
| Front Center Seat*        | N/A                            | N/A                        | Max                  | N/A              | N/A          | N/A          |
|                           |                                |                            | Mid                  | N/A              | N/A          | N/A          |
|                           |                                |                            | Min                  | N/A              | N/A          | N/A          |
| Struck Side Rear Seat     | 10.3                           | 242                        | Max                  | N/A              | N/A          | N/A          |
|                           |                                |                            | Mid                  | N/A              | 242          | N/A          |
|                           |                                |                            | Min                  | N/A              | N/A          | N/A          |
| Non-Struck Side Rear Seat | 9.4                            | 238                        | Max                  | N/A              | N/A          | N/A          |
|                           |                                |                            | Mid                  | N/A              | 238          | N/A          |
|                           |                                |                            | Min                  | N/A              | N/A          | N/A          |
| Rear Center Seat*         | 11.7                           | Fixed                      | Max                  | N/A              | N/A          | N/A          |
|                           |                                |                            | Mid                  | N/A              | Fixed        | N/A          |
|                           |                                |                            | Min                  | N/A              | N/A          | N/A          |

\* If applicable.

## DATA SHEET NO. 2 (CONTINUED)

### SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle: 2020 Nissan Rogue

Test Program: Rigid Pole Side Impact

Test Date: 10/22/2020

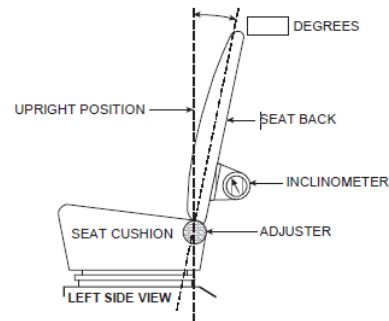
#### SEAT FORE/AFT POSITION

| Seat                      | Total Fore/Aft Travel |          | Test Position from Forwardmost Position |         |
|---------------------------|-----------------------|----------|-----------------------------------------|---------|
|                           | mm                    | Detents* | mm                                      | Detent* |
| Driver Seat               | 240                   | 25       | 130                                     | 13      |
| Front Passenger Seat      | 240                   | 25       | 130                                     | 13      |
| Front Center Seat*        | N/A                   | N/A      | N/A                                     | N/A     |
| Struck Side Rear Seat     | Fixed                 | N/A      | Fixed                                   | N/A     |
| Non-Struck Side Rear Seat | Fixed                 | N/A      | Fixed                                   | N/A     |
| Rear Center Seat*         | Fixed                 | N/A      | Fixed                                   | N/A     |

\* If applicable.

#### SEAT BACK ANGLE ADJUSTMENT

The driver's seat back was positioned according to the manufacturer's information as provided on Form 1; resulting in a head rest post angle of 2.9° at the head rest post. The front passenger seat was set to match the driver seat.



FRONT SEAT ASSEMBLY

| Seat                        | Total Seat Back Angle Range |          | Test Position from Most Upright |         |
|-----------------------------|-----------------------------|----------|---------------------------------|---------|
|                             | Degrees                     | Detents* | Degrees                         | Detent* |
| Driver Seat w/ Seated Dummy | 68.2                        | 44       | 2.9                             | 11      |
| Front Passenger Seat        | 68.4                        | 46       | 2.7                             | 11      |
| Front Center Seat*          | N/A                         | N/A      | N/A                             | N/A     |
| Struck Side Rear Seat       | N/A                         | Fixed    | N/A                             | Fixed   |
| Non-Struck Side Rear Seat   | N/A                         | Fixed    | N/A                             | Fixed   |
| Rear Center Seat*           | N/A                         | Fixed    | N/A                             | Fixed   |

\* If applicable.

**DATA SHEET NO. 2 (CONTINUED)**

**SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA**

Test Vehicle: 2020 Nissan Rogue

Test Program: Rigid Pole Side Impact

Test Date: 10/22/2020

**SEAT BELT ANCHORAGE ADJUSTMENT**

Seat belt anchorages are adjusted with the information provided by the manufacturer on Form No. 1

|             | Total # of Positions | Placed in Position # |
|-------------|----------------------|----------------------|
| Driver Seat | 4                    | 4, Uppermost         |

**HEAD RESTRAINT ADJUSTMENT**

Head restraints are adjusted to the lowest and most full rearward in-use position.

|             | Total # of Positions | Placed in Position # |
|-------------|----------------------|----------------------|
| Driver Seat | 3                    | 3, Uppermost         |

## DATA SHEET NO. 2 (CONTINUED)

### SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

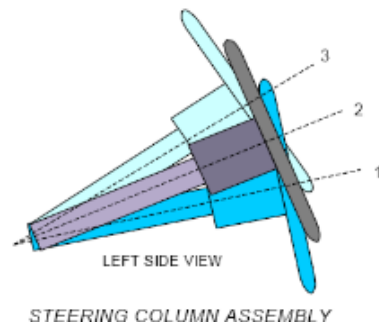
Test Vehicle: 2020 Nissan Rogue  
 Test Program: Rigid Pole Side Impact

Test Date: 10/22/2020

#### STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel geometric locus it describes when moved through its full range of motion.

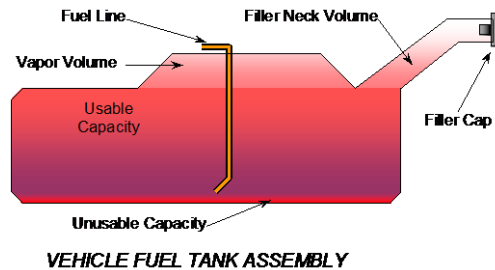
|                                   | Degrees | Fore/Aft Position, mm |
|-----------------------------------|---------|-----------------------|
| Lowermost, Position No. 1         | 24.9    | 0                     |
| Geometric Center, Position No. 2  | 26.4    | 21                    |
| Uppermost, Position No. 3         | 28.5    | 42                    |
| Telescoping Steering Wheel Travel |         | 42                    |
| Test Position                     | 26.4    | 21                    |



#### FUEL PUMP

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

When engine is running



#### FUEL TANK CAPACITY

|                                                       | Liters |
|-------------------------------------------------------|--------|
| Usable Capacity of "Standard Tank" (see Form No. 1)   | 54.9   |
| Usable Capacity of "Optional" Tank (see Form No. 1)   | N/A    |
| Usable Capacity of Standard Tank (see Owner's Manual) | 54.9   |
| Usable Capacity of Optional Tank (see Owner's Manual) | N/A    |
| 93% of Usable Capacity                                | 51.0   |
| Actual Amount of Solvent Used in Test                 | 51.0   |
| 1/3 of Usable Capacity                                | 18.3   |

Is the Actual Amount of Solvent Used in the test equal to 93% +/- 1% of the Usable Capacity stated on Form No. 1? ☒ YES ☐ NO

**TABLE 1 WORLDSID-50M INSTRUMENTATION DATA**Test Vehicle: 2020 Nissan RogueTest Program: Rigid Pole Side ImpactTest Date: 10/22/2020

Driver Dummy Serial Number: EB8888

| Location                             |   | Positive Direction |           | Negative Direction |           |
|--------------------------------------|---|--------------------|-----------|--------------------|-----------|
|                                      |   | Max.               | Time (ms) | Max.               | Time (ms) |
| Head Acceleration (g)                | X | 3.00               | 29.65     | -13.15             | 252.80    |
|                                      | Y | 56.18              | 49.15     | -13.66             | 151.05    |
|                                      | Z | 2.15               | 28.45     | -16.69             | 48.00     |
|                                      | R | 59.01              | 49.00     |                    |           |
| Head Angular Rate (deg/sec)          | X | 1462.99            | 66.85     | -1321.32           | 186.55    |
|                                      | Y | 282.42             | 279.85    | -849.80            | 237.70    |
|                                      | Z | 949.37             | 257.40    | -1998.02           | 213.15    |
| Upper Neck Force (N)                 | X | 65.63              | 138.70    | -300.85            | 67.90     |
|                                      | Y | 111.54             | 232.10    | -537.13            | 154.00    |
|                                      | Z | 1155.76            | 47.20     | -10.14             | 81.45     |
| Upper Neck Moment (Nm)               | X | 16.73              | 53.05     | -31.51             | 153.95    |
|                                      | Y | 16.86              | 82.95     | -19.39             | 56.15     |
|                                      | Z | 32.29              | 232.05    | -17.76             | 85.30     |
| Lower Neck Force (N)                 | X | 159.64             | 153.15    | -510.80            | 53.50     |
|                                      | Y | 477.93             | 39.85     | -555.10            | 135.25    |
|                                      | Z | 1352.38            | 47.75     | -407.61            | 154.90    |
| Lower Neck Moment (Nm)               | X | 33.50              | 257.25    | -113.36            | 143.65    |
|                                      | Y | 42.36              | 68.45     | -38.75             | 136.90    |
|                                      | Z | 33.92              | 232.10    | -17.27             | 114.85    |
| Driver Shoulder Force (N)            | X | 48.75              | 237.10    | -554.43            | 49.75     |
|                                      | Y | 53.45              | 111.70    | -1616.24           | 49.20     |
|                                      | Z | 461.20             | 34.30     | -111.24            | 112.15    |
| Shoulder Rear Ribeye Position (mm)   | X | -44.44             | 84.25     | -65.87             | 254.60    |
|                                      | Y | -58.30             | 51.75     | -85.30             | 21.15     |
|                                      | Z | -42.44             | 117.80    | -66.58             | 37.60     |
| Length of Change (mm)                |   | 24.03              | 51.85     | -5.41              | 270.50    |
| Shoulder Middle Ribeye Position (mm) | X | -9.30              | 81.30     | -33.39             | 247.70    |
|                                      | Y | -53.67             | 52.15     | -96.46             | 180.60    |
|                                      | Z | -39.58             | 117.75    | -69.29             | 37.80     |
| Length of Change (mm)                |   | 39.92              | 52.20     | -2.37              | 180.55    |
| Shoulder Front Ribeye Position (mm)  | X | 32.03              | 48.80     | 3.54               | 252.30    |
|                                      | Y | -33.17             | 52.45     | -83.63             | 174.10    |
|                                      | Z | -45.60             | 116.10    | -72.66             | 38.05     |
| Length of Change (mm)                |   | 28.11              | 56.45     | -1.91              | 20.45     |

**TABLE 1 WORLDSID-50M INSTRUMENTATION DATA (CONTINUED)**Test Vehicle: 2020 Nissan RogueTest Program: Rigid Pole Side ImpactTest Date: 10/22/2020

Driver Dummy Serial Number: EB8888

| Location                                             |   | Positive Direction |           | Negative Direction |           |
|------------------------------------------------------|---|--------------------|-----------|--------------------|-----------|
|                                                      |   | Max.               | Time (ms) | Max.               | Time (ms) |
| Thorax Rib 1 Rear Ribeye Position (mm)               | X | -7.71              | 50.70     | -42.94             | 138.60    |
|                                                      | Y | -71.87             | 51.10     | -99.80             | 265.70    |
|                                                      | Z | 1.98               | 111.45    | -15.85             | 39.75     |
| Length of Change (mm)                                |   | 32.48              | 51.00     | -1.72              | 265.65    |
| Thorax Rib 1 Middle Ribeye Position (mm)             | X | 35.51              | 50.45     | -6.78              | 140.00    |
|                                                      | Y | -66.89             | 50.10     | -109.00            | 288.95    |
|                                                      | Z | 2.75               | 111.40    | -17.61             | 40.25     |
| Length of Change (mm)                                |   | 31.56              | 50.90     | -1.57              | 288.95    |
| Thorax Rib 1 Front Ribeye Position (mm) <sup>1</sup> | X | 81.02              | 51.95     | 2.41               | 48.35     |
|                                                      | Y | 15.11              | 48.35     | -99.18             | 270.00    |
|                                                      | Z | 11.01              | 48.35     | -18.37             | 38.30     |
| Length of Change (mm) <sup>1</sup>                   |   | 15.07              | 48.15     | -1.29              | 270.00    |
| Thorax Rib 2 Rear Ribeye Position (mm)               | X | 0.38               | 47.40     | -31.53             | 138.15    |
|                                                      | Y | -72.70             | 47.60     | -98.91             | 291.10    |
|                                                      | Z | 42.74              | 105.00    | 33.81              | 39.50     |
| Length of Change (mm)                                |   | 30.35              | 47.35     | -0.83              | 291.05    |
| Thorax Rib 2 Middle Ribeye Position (mm)             | X | 44.02              | 47.35     | 2.99               | 139.10    |
|                                                      | Y | -74.49             | 46.80     | -110.12            | 274.70    |
|                                                      | Z | 44.08              | 104.90    | 33.51              | 40.10     |
| Length of Change (mm)                                |   | 24.12              | 46.85     | -1.69              | 234.40    |
| Thorax Rib 2 Front Ribeye Position (mm) <sup>1</sup> | X | 87.98              | 44.05     | -2.34              | 147.55    |
|                                                      | Y | 17.61              | 92.75     | -109.50            | 147.75    |
|                                                      | Z | 52.37              | 147.75    | -3.00              | 147.55    |
| Length of Change (mm) <sup>1</sup>                   |   | 9.15               | 44.05     | -5.54              | 224.00    |
| Thorax Rib 3 Rear Ribeye Position (mm)               | X | -27.97             | 47.30     | -49.31             | 128.50    |
|                                                      | Y | -75.79             | 47.25     | -94.55             | 267.80    |
|                                                      | Z | -34.09             | 98.55     | -43.83             | 40.50     |
| Length of Change (mm)                                |   | 20.73              | 47.30     | -0.88              | 267.70    |
| Thorax Rib 3 Middle Ribeye Position (mm)             | X | 10.54              | 47.10     | -18.83             | 128.30    |
|                                                      | Y | -78.79             | 47.00     | -101.91            | 133.50    |
|                                                      | Z | -32.27             | 101.60    | -43.25             | 40.75     |
| Length of Change (mm)                                |   | 15.96              | 47.10     | -1.07              | 133.40    |

<sup>1</sup>See data acquisition explanation

**TABLE 1 WORLDSID-50M INSTRUMENTATION DATA (CONTINUED)**Test Vehicle: 2020 Nissan RogueTest Program: Rigid Pole Side ImpactTest Date: 10/22/2020

Driver Dummy Serial Number: EB8888

| Location                                  |   | Positive Direction |           | Negative Direction |           |
|-------------------------------------------|---|--------------------|-----------|--------------------|-----------|
|                                           |   | Max.               | Time (ms) | Max.               | Time (ms) |
| Thorax Rib 3 Front Ribeye Position (mm)   | X | 44.23              | 47.00     | 11.83              | 125.70    |
|                                           | Y | -67.80             | 46.40     | -93.19             | 259.90    |
|                                           | Z | -33.71             | 125.35    | -44.06             | 40.15     |
| Length of Change (mm)                     |   | 4.35               | 47.75     | -1.59              | 259.85    |
| Abdomen Rib 1 Rear Ribeye Position (mm)   | X | -14.32             | 47.00     | -33.37             | 90.30     |
|                                           | Y | -80.97             | 46.20     | -96.09             | 297.50    |
|                                           | Z | -0.46              | 141.70    | -10.47             | 61.50     |
| Length of Change (mm)                     |   | 17.89              | 46.30     | -0.22              | 297.50    |
| Abdomen Rib 1 Middle Ribeye Position (mm) | X | 25.88              | 47.05     | 0.36               | 94.00     |
|                                           | Y | -84.99             | 45.40     | -105.39            | 110.50    |
|                                           | Z | 0.15               | 143.50    | -11.14             | 61.50     |
| Length of Change (mm)                     |   | 15.09              | 43.90     | -0.61              | 111.70    |
| Abdomen Rib 1 Front Ribeye Position (mm)  | X | 59.72              | 47.05     | 33.10              | 91.95     |
|                                           | Y | -75.35             | 46.20     | -96.34             | 100.00    |
|                                           | Z | -1.58              | 136.50    | -12.22             | 60.70     |
| Length of Change (mm)                     |   | 6.65               | 39.40     | -1.61              | 136.80    |
| Abdomen Rib 2 Rear Ribeye Position (mm)   | X | -0.90              | 52.70     | -21.62             | 102.45    |
|                                           | Y | -74.95             | 47.00     | -93.38             | -33.80    |
|                                           | Z | 37.08              | 148.60    | 23.53              | 62.55     |
| Length of Change (mm)                     |   | 19.64              | 47.40     | -2.61              | 108.50    |
| Abdomen Rib 2 Middle Ribeye Position (mm) | X | 37.76              | 50.70     | 8.49               | 103.55    |
|                                           | Y | -80.99             | 47.00     | -103.93            | -31.90    |
|                                           | Z | 36.59              | 147.35    | 20.14              | 62.10     |
| Length of Change (mm)                     |   | 20.02              | 47.10     | -0.95              | 108.50    |
| Abdomen Rib 2 Front Ribeye Position (mm)  | X | 71.49              | 48.45     | 40.28              | 103.60    |
|                                           | Y | -73.63             | 46.40     | -96.58             | 104.85    |
|                                           | Z | 38.43              | 149.00    | 22.55              | 61.85     |
| Length of Change (mm)                     |   | 10.52              | 39.30     | -0.52              | 14.65     |
| T1 Acceleration (g)                       | X | 3.20               | 71.65     | -11.83             | 17.90     |
|                                           | Y | 32.31              | 30.25     | -11.25             | 19.20     |
|                                           | Z | 8.51               | 52.10     | -5.45              | 105.05    |
|                                           | R | 33.07              | 50.70     |                    |           |



**TABLE 1 WORLDSID-50M INSTRUMENTATION DATA (CONTINUED)**Test Vehicle: 2020 Nissan RogueTest Program: Rigid Pole Side ImpactTest Date: 10/22/2020

Driver Dummy Serial Number: EB8888

| Location                      |   | Positive Direction |           | Negative Direction |           |
|-------------------------------|---|--------------------|-----------|--------------------|-----------|
|                               |   | Max.               | Time (ms) | Max.               | Time (ms) |
| T4 Acceleration (g)           | X | 3.60               | 68.40     | -8.60              | 17.60     |
|                               | Y | 36.20              | 32.20     | -10.88             | 19.05     |
|                               | Z | 9.27               | 51.95     | -6.74              | 106.45    |
|                               | R | 36.70              | 32.20     |                    |           |
| T12 Acceleration (g)          | X | 5.29               | 63.20     | -8.66              | 28.75     |
|                               | Y | 41.75              | 39.65     | -6.97              | 23.70     |
|                               | Z | 7.57               | 50.00     | -6.49              | 105.80    |
|                               | R | 42.03              | 39.65     |                    |           |
| Pubic Symphysis (N)           | Y | 6.05               | -8.25     | -828.00            | 42.20     |
| Left Sacro-Iliac Force (N)    | X | 89.54              | 103.95    | -497.19            | 55.25     |
|                               | Y | 8.53               | -46.80    | -2510.07           | 44.00     |
|                               | Z | 220.03             | 114.80    | -338.68            | 46.10     |
| Left Sacro-Iliac Moment (Nm)  | X | 15.52              | 74.40     | -42.61             | 38.35     |
|                               | Y | 23.19              | 61.60     | -2.77              | 26.05     |
|                               | Z | 34.58              | 43.40     | -17.35             | 66.60     |
| Right Sacro-Iliac Force (N)   | X | 169.59             | 73.40     | -328.21            | 47.30     |
|                               | Y | 44.30              | 183.20    | -1364.48           | 44.75     |
|                               | Z | 263.10             | 74.45     | -257.93            | 107.40    |
| Right Sacro-Iliac Moment (Nm) | X | 28.49              | 73.20     | -40.36             | 107.00    |
|                               | Y | 11.91              | 102.75    | -5.15              | 73.85     |
|                               | Z | 26.59              | 41.00     | -17.28             | 66.65     |
| Lumbar Force (N)              | X | 383.72             | 61.70     | -140.69            | 19.75     |
|                               | Y | 578.16             | 43.50     | -136.55            | 103.35    |
|                               | Z | 816.27             | 61.70     | -425.82            | 107.35    |
| Lumbar Moment (Nm)            | X | 31.13              | 141.00    | -10.10             | 24.75     |
|                               | Y | 17.10              | 106.50    | -17.06             | 71.45     |
|                               | Z | 10.90              | 46.35     | -15.49             | 101.00    |
| Pelvis Acceleration (g)       | X | 4.21               | 61.00     | -9.00              | 19.35     |
|                               | Y | 48.14              | 43.30     | -13.69             | 92.45     |
|                               | Z | 10.84              | 43.35     | -9.67              | 61.00     |
|                               | R | 49.41              | 43.30     |                    |           |

<sup>1</sup>See data acquisition explanation

**TABLE 1 WORLD SID-50M INSTRUMENTATION DATA (CONTINUED)**

Test Vehicle: 2020 Nissan Rogue

Test Program: Rigid Pole Side Impact

Test Date: 10/22/2020

Driver Dummy Serial Number: EB8888

| Location                    |   | Positive Direction |           | Negative Direction |           |
|-----------------------------|---|--------------------|-----------|--------------------|-----------|
|                             |   | Max.               | Time (ms) | Max.               | Time (ms) |
| Left Femur Force (N)        | X | 12.33              | 11.30     | -218.50            | 38.30     |
|                             | Y | 150.72             | 32.10     | -76.49             | 57.55     |
|                             | Z | 317.41             | 53.20     | -159.19            | 0.20      |
| Left Femur Moment (Nm)      | X | 124.98             | 46.60     | -4.49              | 188.45    |
|                             | Y | 59.29              | 36.90     | -14.31             | 107.15    |
|                             | Z | 25.77              | 45.45     | -12.88             | 85.00     |
| Left Femoral Neck Force (N) | X | 425.53             | 44.25     | -129.13            | 84.05     |
|                             | Y | 49.58              | 259.65    | -1208.68           | 44.15     |
|                             | Z | 36.92              | 186.60    | -1021.26           | 44.90     |
| Left Outer Knee Force (N)   | Y | 83.21              | 72.15     | -134.22            | 34.75     |
| Left Inner Knee Force (N)   | Y | 15.95              | -49.15    | -509.03            | 70.75     |

<sup>1</sup>See data acquisition explanation

Positive Direction

Longitudinal    Forward  
Lateral            Rightward  
Vertical           Downward

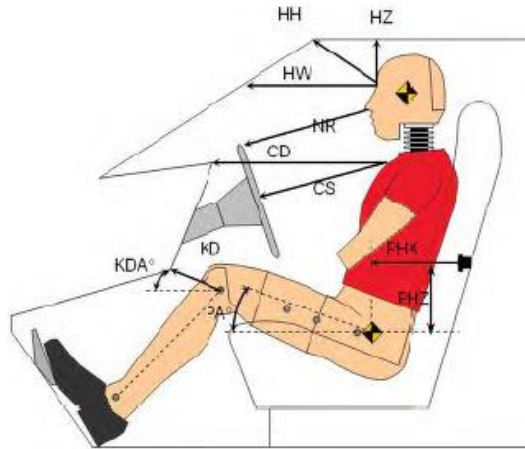
Negative Direction

Longitudinal    Rearward  
Lateral           Leftward  
Vertical           Upward

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

Test Vehicle: 2020 Nissan Rogue  
 Test Program: Rigid Pole Side Impact

Test Date: 10/22/2020



| Code              | Measurement Description       | Driver WorldSID-50M<br>SN # EB8888 |       |
|-------------------|-------------------------------|------------------------------------|-------|
|                   |                               | Length (mm)                        | Angle |
| HH                | Header to Header              | 381                                |       |
| HW                | Header to Windshield          | 742                                |       |
| HZ                | Head to Roof Liner            | 204                                |       |
| NR                | Nose to Rim/Seat Back         | 493                                |       |
| CD                | Chest to Dash/Seat Back       | 621                                |       |
| CS                | Chest to Steering Wheel       | 355                                |       |
| KD(L)/KDA(L)°     | Left Knee to Dash/Seat Back   | 107                                | 21.1  |
| KD(R)/KDA(R)°     | Right Knee to Dash/Seat Back  | 70                                 | 32.1  |
| PAX°              | Pelvic Tilt Angle X           |                                    | -0.5  |
| PAY°              | Pelvic Tilt Angle Y           |                                    | -2.1  |
| PHX               | Hip Point to Striker (X-Axis) | 283                                |       |
| PHZ               | Hip Point to Striker (Z-Axis) | 84                                 |       |
| HAX°              | Head Tilt Angle X             |                                    | -0.4  |
| HAY <sup>1o</sup> | Head Tilt Angle Y             |                                    | -1.5  |
| TAX°              | Thorax Tilt Angle X           |                                    | 0.4   |
| TAY°              | Thorax Tilt Angle Y           |                                    | 0.1   |
|                   | Head Rest Angle               |                                    | 2.9   |
|                   | H-Point Tool Angle            |                                    | 43.2  |
|                   | Torso Angle                   |                                    | 15.4  |
|                   | Windshield Angle              |                                    | 60.2  |

Note: All measurements are in millimeters. 2-door vehicle shown. Rear dummy HX, HZ, PHX and PHZ measurements for 4-door vehicle would use the C-post striker as a reference point.

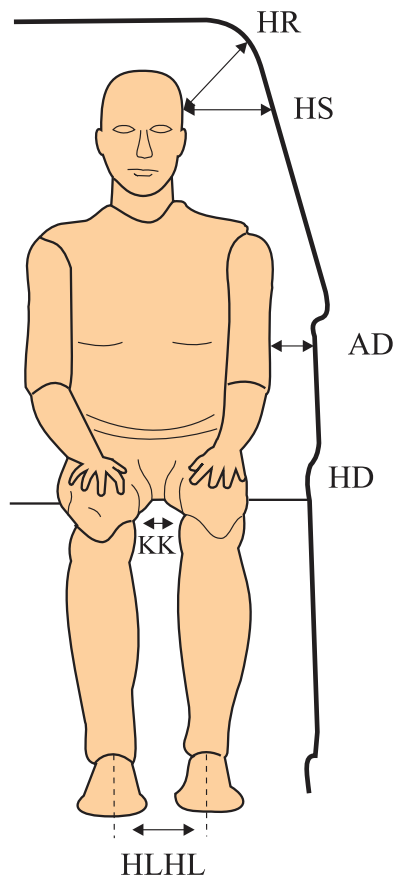
All tilt sensor angles are recorded digitally

WorldSID-50M neck was adjusted 0 notches

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

Test Vehicle: 2020 Nissan Rogue  
 Test Program: Rigid Pole Side Impact

Test Date: 10/22/2020



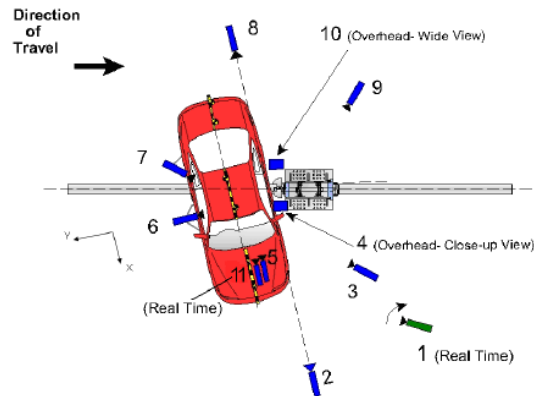
| Code | Measurement Description | Driver WorldSID-50M<br>SN # EB8888 |
|------|-------------------------|------------------------------------|
| HR   | Head to Side Header     | 216                                |
| HS   | Head to Side Window     | 330                                |
| AD   | Arm to Door             | 116                                |
| HD   | Hip Point to Door       | 109                                |
| KK   | Knee to Knee            | 440                                |
| HLHL | Heel to Heel            | 338                                |

Note: All measurements are in millimeters.

## DATA SHEET NO. 5 CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2020 Nissan Rogue  
Test Program: Rigid Pole Side Impact

Test Date: 10/22/2020



REFERENCE (from Point of Impact for X and Y; from Ground for Z):  
+ X = Forward of vehicle, + Y = Right of vehicle, + Z = Down

### CAMERA LOCATIONS AND DATA

| Camera No. | View                                     | Coordinates (mm) |       |       | Lens Length (mm) | Operating Frame Rate (fps) |
|------------|------------------------------------------|------------------|-------|-------|------------------|----------------------------|
|            |                                          | X                | Y     | Z     |                  |                            |
| 1          | Real time (24-30 fps) pan view of impact |                  |       |       | Zoom             | 30                         |
| 2          | Front ground level – impact view         | 4826             | 0     | -1843 | 20               | 1000                       |
| 3          | Impact side 45° – forward pole view      | 3926             | -1186 | -1704 | 20               | 1000                       |
| 4          | Overhead Close-up view of impact         | 0                | 0     | -5252 | 28               | 1000                       |
| 5          | Onboard – dummy front view               |                  |       |       | 25               | 1000                       |
| 6          | Onboard – dummy side view                |                  |       |       | 12.5             | 1000                       |
| 7          | Onboard – dummy rear oblique view        |                  |       |       | 12.5             | 1000                       |
| 8          | Rear ground level – impact view          | -4937            | 0     | -1608 | 20               | 1000                       |
| 9          | Impact side 45° – rearward pole view     | -3947            | 1793  | -1620 | 20               | 1000                       |
| 10         | Overhead wide – view of impact           | 383              | 252   | -5261 | 18.5             | 1000                       |
| 11         | Real time (24-30 fps) – dummy front view |                  |       |       | Zoom             | 30                         |

\* All measurements accurate to  $\pm 6$  mm.

NOTE: Vehicle is at a 75° angle to the rigid pole.

If applicable, explain why camera(s) did not operate as intended: Camera 11 failed

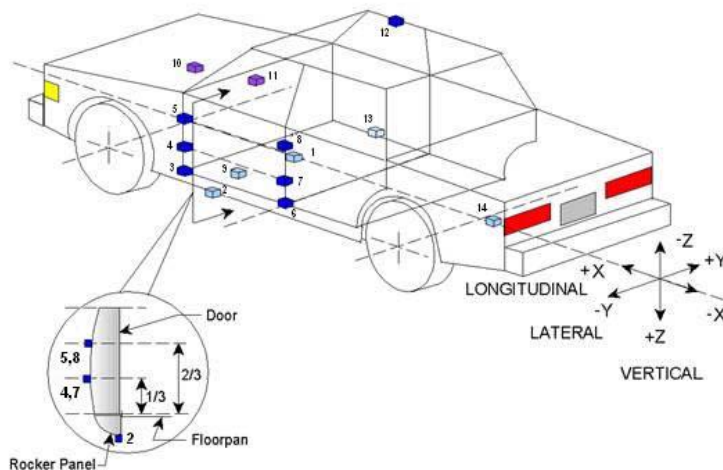
### INSTRUMENTATION

|                   |            |
|-------------------|------------|
| Driver Dummy      | 135        |
| Vehicle Structure | 32         |
| Pole Load Cells   | 8          |
| Contact Channels  | 4          |
| <b>TOTAL</b>      | <b>179</b> |

# **DATA SHEET NO. 6** **VEHICLE ACCELEROMETER DATA**

Test Vehicle: 2020 Nissan Rogue  
Test Program: Rigid Pole Side Impact

Test Date: 10/22/2020



| Location |                                  | Coordinates (mm) |      |      | Positive Direction |                  | Negative Direction |                  |
|----------|----------------------------------|------------------|------|------|--------------------|------------------|--------------------|------------------|
|          |                                  | X                | Y    | Z    | Max                | Time (ms)        | Max                | Time (ms)        |
| 1        | Vehicle CG                       | 2602             | -7   | -62  |                    |                  |                    |                  |
|          | Longitudinal (g)                 |                  |      |      | --- <sup>1</sup>   | --- <sup>1</sup> | --- <sup>1</sup>   | --- <sup>1</sup> |
|          | Lateral (g)                      |                  |      |      | --- <sup>1</sup>   | --- <sup>1</sup> | --- <sup>1</sup>   | --- <sup>1</sup> |
|          | Vertical (g)                     |                  |      |      | --- <sup>1</sup>   | --- <sup>1</sup> | --- <sup>1</sup>   | --- <sup>1</sup> |
|          | Resultant (g)                    |                  |      |      | --- <sup>1</sup>   | --- <sup>1</sup> |                    |                  |
| 2        | Vehicle CG ARS                   | 2601             | 16   | -62  |                    |                  |                    |                  |
|          | Longitudinal (deg/s)             |                  |      |      | --- <sup>1</sup>   | --- <sup>1</sup> | --- <sup>1</sup>   | --- <sup>1</sup> |
|          | Lateral (deg/s)                  |                  |      |      | --- <sup>1</sup>   | --- <sup>1</sup> | --- <sup>1</sup>   | --- <sup>1</sup> |
|          | Vertical (deg/s)                 |                  |      |      | --- <sup>1</sup>   | --- <sup>1</sup> | --- <sup>1</sup>   | --- <sup>1</sup> |
| 3        | Left Floor Sill Acceleration     | 2812             | -706 | -145 |                    |                  |                    |                  |
|          | Lateral (g)                      |                  |      |      | 60.43              | 14.85            | -15.60             | 30.15            |
| 4        | Left A-Pillar Sill Acceleration  | 3132             | -688 | -160 |                    |                  |                    |                  |
|          | Lateral (g)                      |                  |      |      | --- <sup>1</sup>   | --- <sup>1</sup> | --- <sup>1</sup>   | --- <sup>1</sup> |
| 5        | Left Lower A-Pillar Acceleration | 3244             | -802 | -198 |                    |                  |                    |                  |
|          | Lateral (g)                      |                  |      |      | --- <sup>1</sup>   | --- <sup>1</sup> | --- <sup>1</sup>   | --- <sup>1</sup> |
| 6        | Left Mid A-Pillar Acceleration   | 3231             | -792 | -378 |                    |                  |                    |                  |
|          | Lateral (g)                      |                  |      |      | 11.68              | 13.00            | -1.56              | 1.95             |
| 7        | Left B-Pillar Sill Acceleration  | 2063             | -719 | -86  |                    |                  |                    |                  |
|          | Lateral (g)                      |                  |      |      | 66.44              | 15.45            | -6.92              | 25.85            |
| 8        | Left Lower B-Pillar Acceleration | 2117             | -805 | -115 |                    |                  |                    |                  |
|          | Lateral (g)                      |                  |      |      | 57.87              | 15.70            | -19.28             | 22.80            |
| 9        | Left Mid B-Pillar Acceleration   | 2090             | -790 | -468 |                    |                  |                    |                  |
|          | Lateral (g)                      |                  |      |      | 44.84              | 16.60            | -47.31             | 68.40            |

<sup>1</sup>See data acquisition explanation

**DATA SHEET NO. 6 (CONTINUED)**  
**VEHICLE ACCELEROMETER DATA**

Test Vehicle: 2020 Nissan Rogue  
 Test Program: Rigid Pole Side Impact

Test Date: 10/22/2020

| Location |                                                           | Coordinates (mm) |       |       | Positive Direction |                  | Negative Direction |                  |
|----------|-----------------------------------------------------------|------------------|-------|-------|--------------------|------------------|--------------------|------------------|
|          |                                                           | X                | Y     | Z     | Max                | Time (ms)        | Max                | Time (ms)        |
| 10       | Driver Seat Track at Dummy H-Point Acceleration           | 2501             | -545  | -144  |                    |                  |                    |                  |
|          | Lateral (g)                                               |                  |       |       | 115.69             | 35.45            | -36.00             | 41.15            |
| 11       | Engine Top Acceleration                                   | 3888             | 81    | -292  |                    |                  |                    |                  |
|          | Longitudinal (g)                                          |                  |       |       | 6.53               | 157.10           | -9.37              | 42.55            |
|          | Lateral (g)                                               |                  |       |       | 11.16              | 79.00            | -2.37              | 215.35           |
| 12       | Firewall Center Acceleration                              | 3678             | 13    | -404  |                    |                  |                    |                  |
|          | Lateral (g)                                               |                  |       |       | 15.72              | 43.80            | -1.28              | 37.15            |
| 13       | Right Roof at Vertical Impact Reference Line Acceleration | 2258             | 578   | -1073 |                    |                  |                    |                  |
|          | Lateral (g)                                               |                  |       |       | 2.14               | 132.35           | -4.38              | 63.85            |
| 14       | Right Sill at Vertical Impact Reference Line Acceleration | 2843             | 714   | -145  |                    |                  |                    |                  |
|          | Longitudinal (g)                                          |                  |       |       | 29.72              | 38.70            | -1.01              | 300.00           |
|          | Lateral (g)                                               |                  |       |       | 4.84               | 50.00            | -4.89              | 32.75            |
|          | Vertical (g)                                              |                  |       |       | 18.65              | 18.20            | -1.00              | 38.00            |
|          | Resultant (g)                                             |                  |       |       | 29.73              | 38.70            |                    |                  |
| 15       | Right Sill at Rear Seat Acceleration                      | 1908             | 716   | -120  |                    |                  |                    |                  |
|          | Longitudinal (g)                                          |                  |       |       | 5.27               | 42.85            | -6.42              | 33.70            |
|          | Lateral (g)                                               |                  |       |       | 2.22               | 132.55           | -4.31              | 63.55            |
|          | Vertical (g)                                              |                  |       |       | 15.89              | 16.95            | -0.79              | 256.45           |
|          | Resultant (g)                                             |                  |       |       | 16.30              | 17.00            |                    |                  |
| 16       | Rear Floorpan Behind Rear Axle at Centerline Acceleration | 281              | 7     | -39   |                    |                  |                    |                  |
|          | Longitudinal (g)                                          |                  |       |       | 3.19               | 126.15           | -6.45              | 86.05            |
|          | Lateral (g)                                               |                  |       |       | 17.74              | 77.25            | -2.01              | 184.30           |
| 17       | Left Front Door Mid Centerline Acceleration               | 2632             | -747  | -222  |                    |                  |                    |                  |
|          | Lateral (g)                                               |                  |       |       | --- <sup>1</sup>   | --- <sup>1</sup> | --- <sup>1</sup>   | --- <sup>1</sup> |
| 18       | Left Front Door Mid Rear Acceleration                     | 2927             | -1357 | -480  |                    |                  |                    |                  |
|          | Lateral (g)                                               |                  |       |       | --- <sup>1</sup>   | --- <sup>1</sup> | --- <sup>1</sup>   | --- <sup>1</sup> |
| 19       | Left Front Door Upper Centerline Acceleration             | 2787             | -1645 | -218  |                    |                  |                    |                  |
|          | Lateral (g)                                               |                  |       |       | 64.32              | 14.45            | -16.48             | 35.60            |

<sup>1</sup>See data acquisition explanation

**DATA SHEET NO. 6 (CONTINUED)**  
**VEHICLE ACCELEROMETER DATA**

Test Vehicle: 2020 Nissan Rogue  
 Test Program: Rigid Pole Side Impact

Test Date: 10/22/2020

| Location |                                              | Coordinates (mm) |       |      | Positive Direction |           | Negative Direction |           |
|----------|----------------------------------------------|------------------|-------|------|--------------------|-----------|--------------------|-----------|
|          |                                              | X                | Y     | Z    | Max                | Time (ms) | Max                | Time (ms) |
| 20       | Left Rear Door Mid Rear Acceleration         | 1767             | -1162 | -556 |                    |           |                    |           |
|          | Lateral (g)                                  |                  |       |      | 26.90              | 26.50     | -3.61              | 21.70     |
| 21       | Left Rear Door Upper Centerline Acceleration | 1647             | -1353 | -261 |                    |           |                    |           |
|          | Lateral (g)                                  |                  |       |      | 38.77              | 47.70     | -6.73              | 38.95     |
| 22       | Rear Deck Acceleration                       | 412              | 527   | -55  |                    |           |                    |           |
|          | Longitudinal (g)                             |                  |       |      | 2.94               | 132.65    | -4.39              | 62.10     |
|          | Lateral (g)                                  |                  |       |      | 16.55              | 77.25     | -1.90              | 204.40    |
|          | Vertical (g)                                 |                  |       |      | 5.21               | 54.20     | -3.24              | 45.15     |
|          | Resultant (g)                                |                  |       |      | 16.62              | 77.35     |                    |           |
| 23       | Rear Deck ARS                                | 388              | 527   | -55  |                    |           |                    |           |
|          | Longitudinal (deg/s)                         |                  |       |      | 66.06              | 39.65     | -55.66             | 276.45    |
|          | Lateral (deg/s)                              |                  |       |      | 38.84              | 20.20     | -34.13             | 51.80     |
|          | Vertical (deg/s)                             |                  |       |      | 103.54             | 124.35    | -33.97             | 27.95     |

\*0,0,0 located at rear bumper

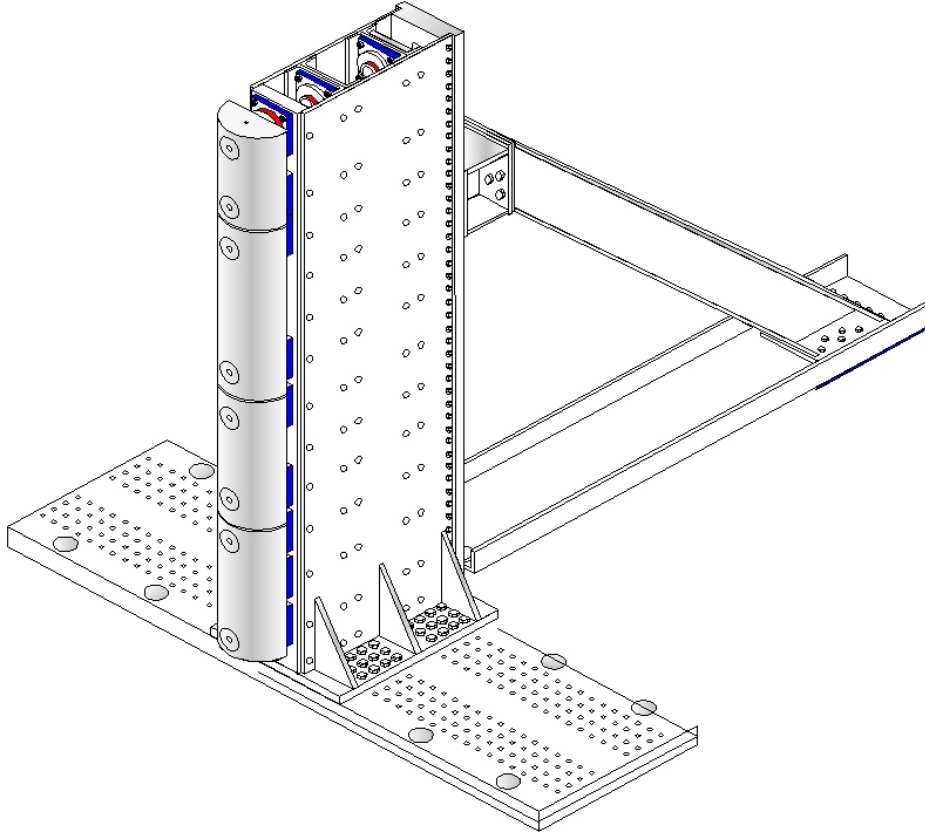


**DATA SHEET NO. 7**  
**RIGID POLE LOAD CELL DATA**

Test Vehicle: 2020 Nissan Rogue  
Test Program: Rigid Pole Side Impact

Test Date: 10/22/2020

**FOIL 300K RIGID POLE**



| Load Cell Locations |                                 |
|---------------------|---------------------------------|
| ID                  | Height From Top of Carrier (mm) |
| 1                   | 87                              |
| 2                   | 468                             |
| 3                   | 648                             |
| 4                   | 978                             |
| 5                   | 1168                            |
| 6                   | 1651                            |
| 7                   | 1816                            |
| 8                   | 2057                            |

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

Test Vehicle: 2020 Nissan Rogue

Test Program: Rigid Pole Side Impact

Test Date: 10/22/2020

**TEST DUMMY INFORMATION AND CONTACT POINTS**

| Dummy Body Part   | Driver WorldSID-50M Dummy |
|-------------------|---------------------------|
| Face              | SCAB                      |
| Top of Head       | SCAB                      |
| Left Side of Head | SCAB, Headrest            |
| Back of head      | Headrest                  |
| Left Shoulder     | SCAB, SAB                 |
| Upper Torso       | Seatback bolster, SAB     |
| Lower Torso       | Seatback bolster, SAB     |
| Left Hip          | SAB, Door panel           |
| Left Knee         | Door panel                |

**POST-TEST DOOR PERFORMANCE**

| Description                                                        | Struck Side |      | Non-Struck Side |      | Rear Hatch/<br>Other Door |
|--------------------------------------------------------------------|-------------|------|-----------------|------|---------------------------|
|                                                                    | 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) | N/A         | N/A  | N/A             | N/A  | N/A                       |

\* Indicate "Yes", "No", or "NA".

**POST-TEST SEAT PERFORMANCE**

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

**POST-TEST STRUCTURAL OBSERVATIONS**

| Critical Areas of Performance | Observations and Conclusions       |
|-------------------------------|------------------------------------|
| Pillar Performance            | Good                               |
| Sill Separation               | None                               |
| Windshield Damage             | Along left A pillar and across top |
| Side Window Damage            | Driver window broken out           |
| Other Notable Effects         | None                               |

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

Test Vehicle: 2020 Nissan Rogue

Test Program: Rigid Pole Side Impact

Test Date: 10/22/2020

**SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION**

| Restraint Type           | Struck Side (Driver) |          | Struck Side (Rear Passenger) |          |
|--------------------------|----------------------|----------|------------------------------|----------|
|                          | Mounted              | Deployed | Mounted                      | Deployed |
| Front Airbag             | Yes                  | No       |                              |          |
| Knee Airbag              | No                   | N/A      |                              |          |
| Side Curtain Airbag      | Yes                  | Yes      | Yes                          | Yes      |
| Side Torso/Pelvis Airbag | Yes                  | Yes      | No                           | Yes      |
| Side Torso Airbag        | No                   | N/A      | No                           | No       |
| Seat Belt Pretensioner   | Yes                  | Yes      | No                           | Yes      |
| Seat Belt Load Limiter   | Yes                  | Unknown  | No                           | Yes      |
| Other                    | No                   | N/A      | No                           | No       |

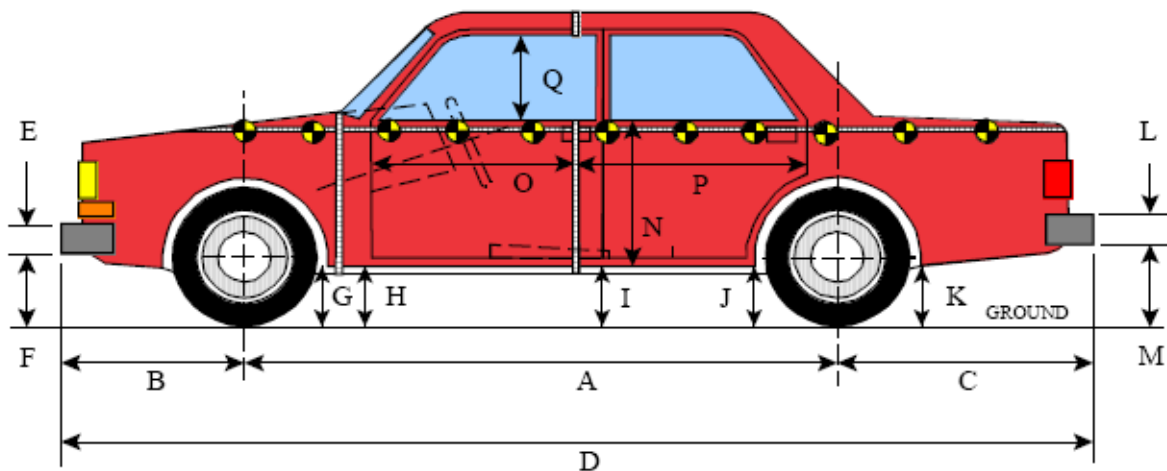
**VEHICLE SPEED, VEHICLE ANGLE AT IMPACT, AND IMPACT POINT LOCATION DATA**

| Measured Parameter                                                         | Units   | Tolerance                       | Value |
|----------------------------------------------------------------------------|---------|---------------------------------|-------|
| Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point) | mm      |                                 | 1272  |
| Actual Impact Point (Aft of Front Axle)                                    | mm      |                                 | 1288  |
| Horizontal Offset (+ forward / - rearward)                                 | mm      | +/- 38 of Intended Impact Point | 16    |
| Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion | Degrees | 75 +/- 3                        | 75    |
| Trap No. 1 Velocity (Primary)                                              | km/h    | 30.1 to 31.9                    | 30.96 |
| Trap No. 2 Velocity (Redundant)                                            | km/h    | 30.1 to 31.9                    | 30.96 |

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

Test Vehicle: 2020 Nissan Rogue  
 Test Program: Rigid Pole Side Impact

Test Date: 10/22/2020



**LEFT SIDE VIEW**

All MEASUREMENTS IN (mm) WITH TOLERANCE OF  $\pm 3$ mm

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

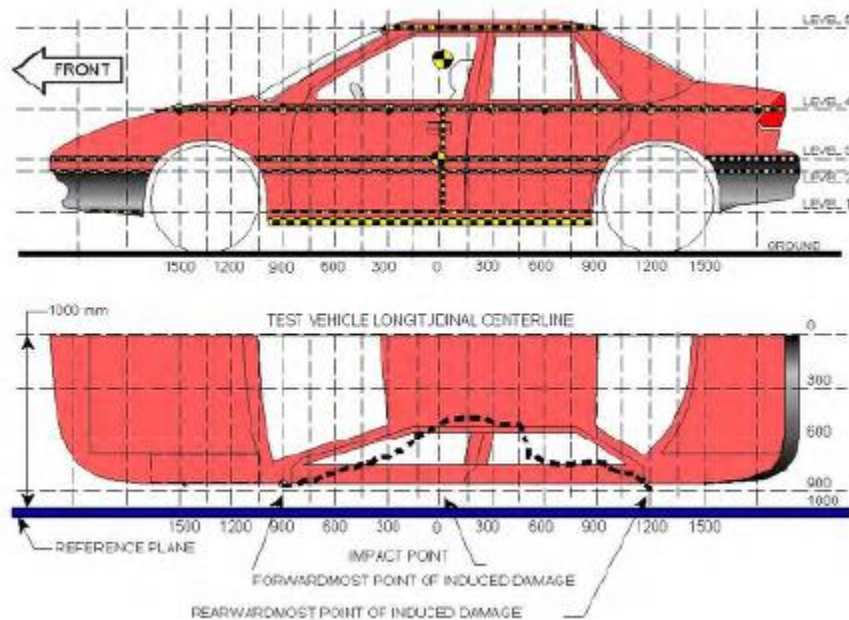
| Code | Measurement Description                    | Pre-Test | Post-Test | Difference |
|------|--------------------------------------------|----------|-----------|------------|
| A    | Wheelbase                                  | 2705     | 2655      | 50         |
| B    | Front Axle to FSOV                         | 970      | 970       | 0          |
| C    | Rear Axle to RSOV                          | 1010     | 1010      | 0          |
| D    | Total Length at Centerline                 | 4685     | 4650      | 35         |
| E    | Front Bumper Thickness                     | 65       | 65        | 0          |
| F    | Front Bumper Bottom to Ground              | 478      | 495       | -17        |
| G    | Sill Height at Front Wheel Well            | 382      | 383       | -1         |
| H    | Sill Height at Front Door Leading Edge     | 382      | 390       | -8         |
| I    | Sill Height at B Pillar                    | 410      | 430       | -20        |
| J1   | Sill Height at Rear Wheel Well             | 413      | 468       | -55        |
| J2   | Pinch Weld Height at Rear Wheel Well       | 265      | 298       | -33        |
| K    | Sill Height Aft of Rear Wheel Well         | 456      | 495       | -39        |
| L    | Rear Bumper Thickness                      | 60       | 60        | 0          |
| M    | Rear Bumper Bottom to Ground               | 566      | 560       | 6          |
| N    | Sill Height to Bottom of Front Window Sill | 792      | 800       | -8         |
| O    | Front Door Leading Edge to Impact CL       | 815      | 670       | 145        |
| P    | Rear Door Trailing Edge to Impact CL       | 1364     | 1290      | 74         |
| Q    | Front Window Opening                       | 420      | 400       | 20         |
| R    | Right Side Length                          | 4460     | 4455      | 5          |
| S    | Left Side Length                           | 4460     | 4380      | 80         |
| T    | Maximum Vehicle Width at B-Pillars         | 1783     | 1870      | -87        |
| U    | Maximum Vehicle Width                      | 1823     | 1870      | -47        |

\*\*All Dimensions in mm

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

Test Vehicle: 2020 Nissan Rogue  
 Test Program: Rigid Pole Side Impact

Test Date: 10/22/2020



**MAXIMUM EXTERIOR CRUSH MEASUREMENTS**

| Level | Measurement Description | Height Above Ground | Maximum Exterior Static Crush | Distance from Impact |
|-------|-------------------------|---------------------|-------------------------------|----------------------|
| 1     | Sill Top                | 408                 | 280                           | 0                    |
| 2     | Occupant H-Point        | 694                 | 339                           | 0                    |
| 3     | Mid-Door                | 765                 | 356                           | 0                    |
| 4     | Window Sill             | 1064                | 313                           | 0                    |
| 5     | Window Top              | 1598                | 120                           | 0                    |

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

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

Test Vehicle: 2020 Nissan Rogue  
 Test Program: Rigid Pole Side Impact

Test Date: 10/22/2020

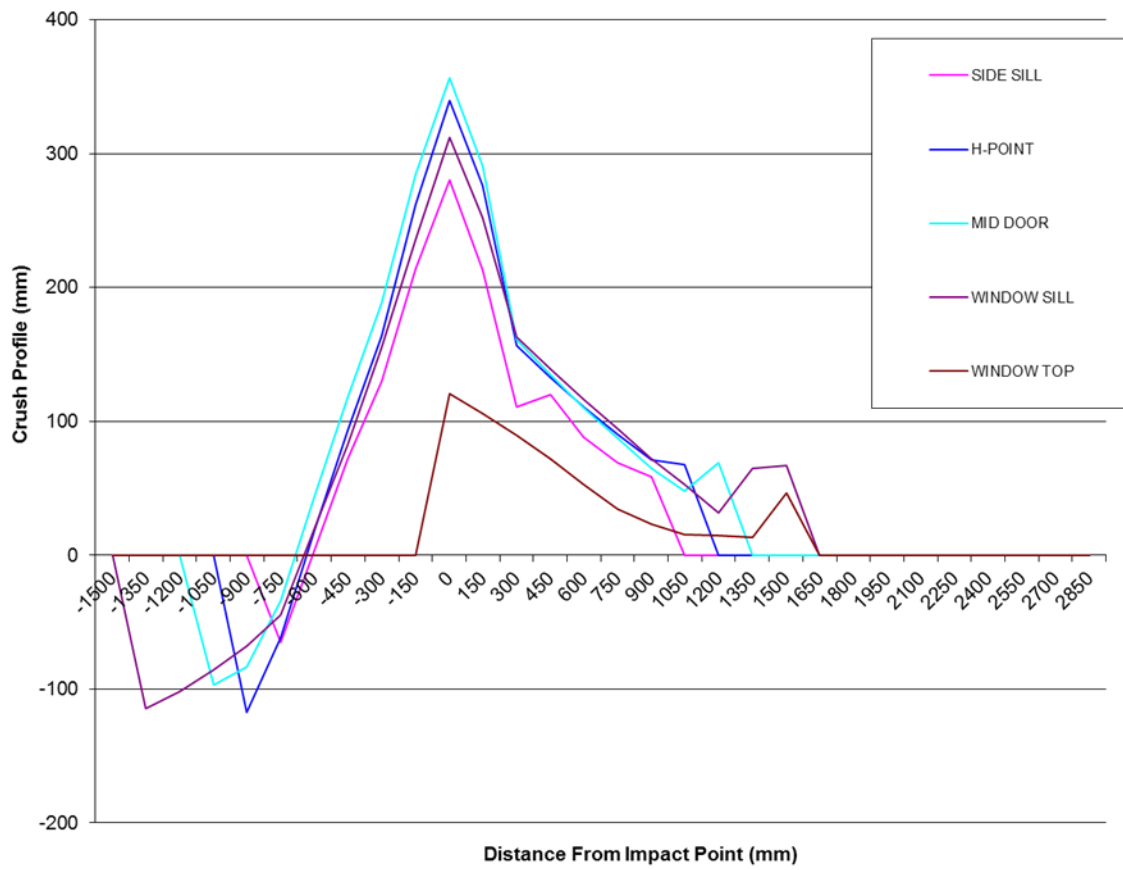
|       | Pre-Test |     |     |     |     | Post-Test |     |     |     |     | Difference |      |     |      |     |
|-------|----------|-----|-----|-----|-----|-----------|-----|-----|-----|-----|------------|------|-----|------|-----|
|       | 1        | 2   | 3   | 4   | 5   | 1         | 2   | 3   | 4   | 5   | 1          | 2    | 3   | 4    | 5   |
| -1350 |          |     |     | 770 |     |           |     |     | 884 |     |            |      |     | -114 |     |
| -1200 |          |     |     | 799 |     |           |     |     | 901 |     |            |      |     | -102 |     |
| -1050 |          |     | 878 | 814 |     |           |     | 975 | 899 |     |            |      | -97 | -85  |     |
| -900  |          | 881 | 883 | 819 |     |           | 998 | 967 | 887 |     |            | -117 | -84 | -68  |     |
| -750  | 852      | 880 | 883 | 807 |     | 917       | 942 | 917 | 852 |     | -65        | -62  | -34 | -45  |     |
| -600  | 854      | 881 | 885 | 799 |     | 850       | 862 | 841 | 779 |     | 4          | 19   | 44  | 20   |     |
| -450  | 854      | 884 | 889 | 807 |     | 783       | 791 | 771 | 725 |     | 71         | 93   | 118 | 82   |     |
| -300  | 858      | 887 | 892 | 821 |     | 729       | 724 | 703 | 665 |     | 129        | 163  | 189 | 156  |     |
| -150  | 866      | 891 | 895 | 833 |     | 653       | 629 | 610 | 598 |     | 213        | 262  | 285 | 235  |     |
| 0     | 870      | 894 | 898 | 844 | 564 | 590       | 555 | 542 | 531 | 444 | 280        | 339  | 356 | 313  | 120 |
| 150   | 873      | 898 | 901 | 852 | 581 | 660       | 622 | 610 | 600 | 475 | 213        | 276  | 291 | 252  | 106 |
| 300   | 869      | 900 | 903 | 858 | 590 | 758       | 744 | 742 | 695 | 500 | 111        | 156  | 161 | 163  | 90  |
| 450   | 880      | 902 | 903 | 862 | 594 | 760       | 769 | 769 | 723 | 522 | 120        | 133  | 134 | 139  | 72  |
| 600   | 883      | 906 | 907 | 866 | 598 | 795       | 795 | 797 | 750 | 545 | 88         | 111  | 110 | 116  | 53  |
| 750   | 891      | 914 | 915 | 870 | 599 | 822       | 824 | 828 | 775 | 564 | 69         | 90   | 87  | 95   | 35  |
| 900   | 899      | 923 | 924 | 874 | 599 | 840       | 852 | 859 | 802 | 576 | 59         | 71   | 65  | 72   | 23  |
| 1050  |          | 927 | 928 | 870 | 597 |           | 859 | 880 | 817 | 581 |            | 68   | 48  | 53   | 16  |
| 1200  |          |     | 936 | 894 | 594 |           |     | 867 | 862 | 579 |            |      | 69  | 32   | 15  |
| 1350  |          |     |     | 884 | 588 |           |     |     | 819 | 575 |            |      |     | 65   | 13  |
| 1500  |          |     |     | 885 | 580 |           |     |     | 819 | 533 |            |      |     | 66   | 47  |

**NOTE:** Pre-test measurements are taken when the vehicle is in the "As Tested" weight condition. Vehicle measurements forward of the vertical impact reference line are negative. The crush profile grid is established prior to the test based on an estimated impact point. The vertical impact reference line was set at (0, 0, 0).

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

Test Vehicle: 2020 Nissan Rogue  
Test Program: Rigid Pole Side Impact

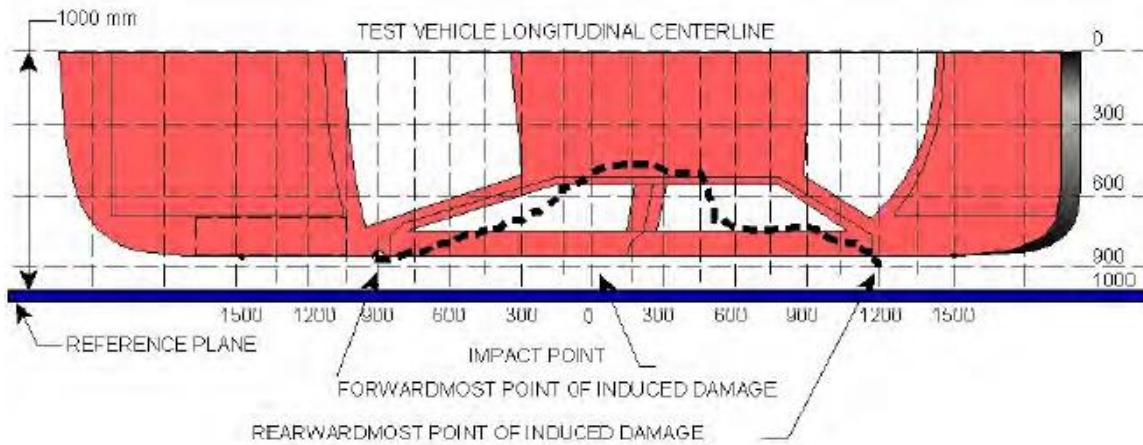
Test Date: 10/22/2020



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

Test Vehicle: 2020 Nissan Rogue  
 Test Program: Rigid Pole Side Impact

Test Date: 10/22/2020



**VEHICLE DAMAGE PROFILE DISTANCES**

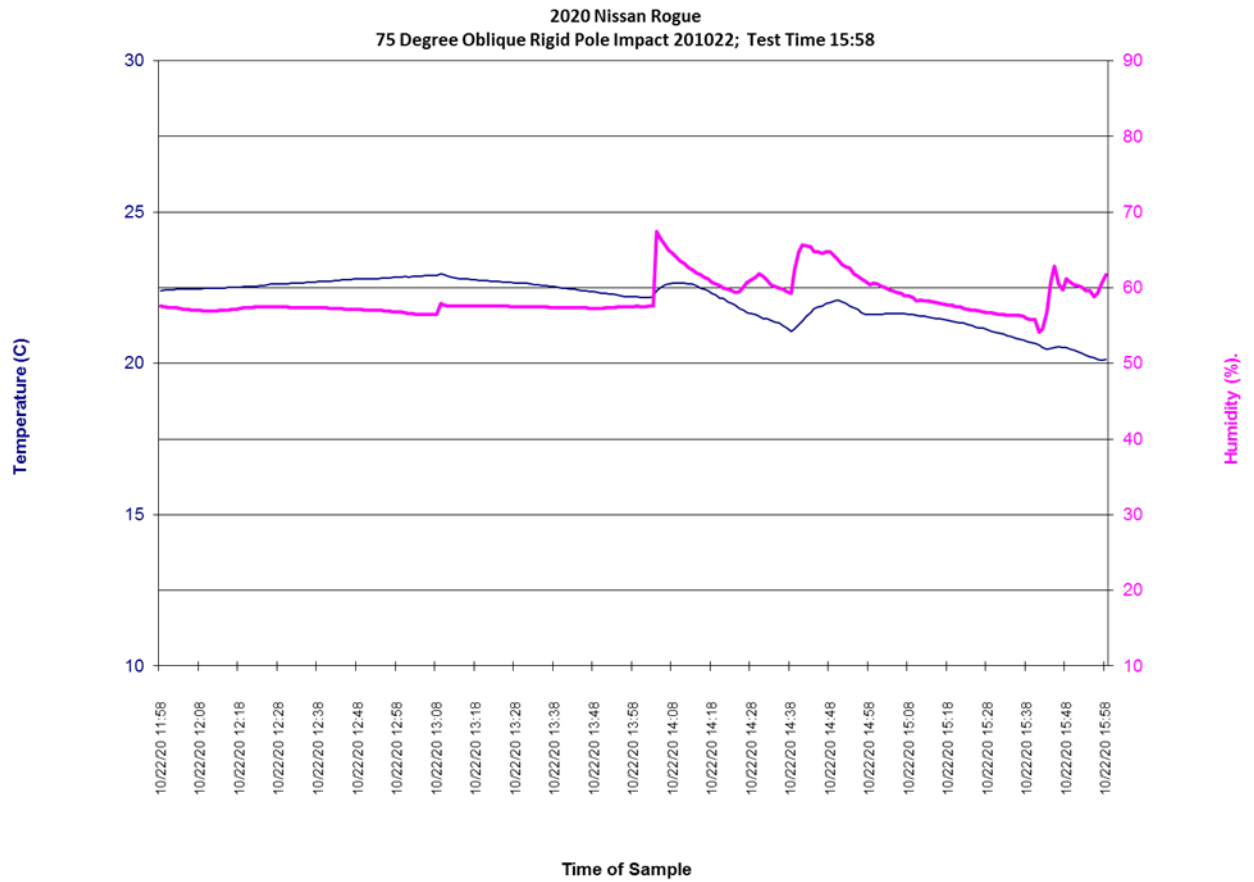
| DPD            | Distance From Impact Point (mm) | Level | Post-Test (mm) | Pre-Test (mm) | Crush (mm) |
|----------------|---------------------------------|-------|----------------|---------------|------------|
| 1              | 1500                            | 4     | 819            | 885           | 66         |
| 2              | 1050                            | 2     | 589            | 927           | 68         |
| 3              | 600                             | 4     | 750            | 866           | 116        |
| 4              | 300                             | 4     | 695            | 858           | 163        |
| 5              | -150                            | 3     | 610            | 895           | 285        |
| 6 <sup>1</sup> | -600                            | 3     | 841            | 885           | 0          |

<sup>1</sup> DPD 6 is defined as zero crush since the crush does not extend to the end of the vehicle.



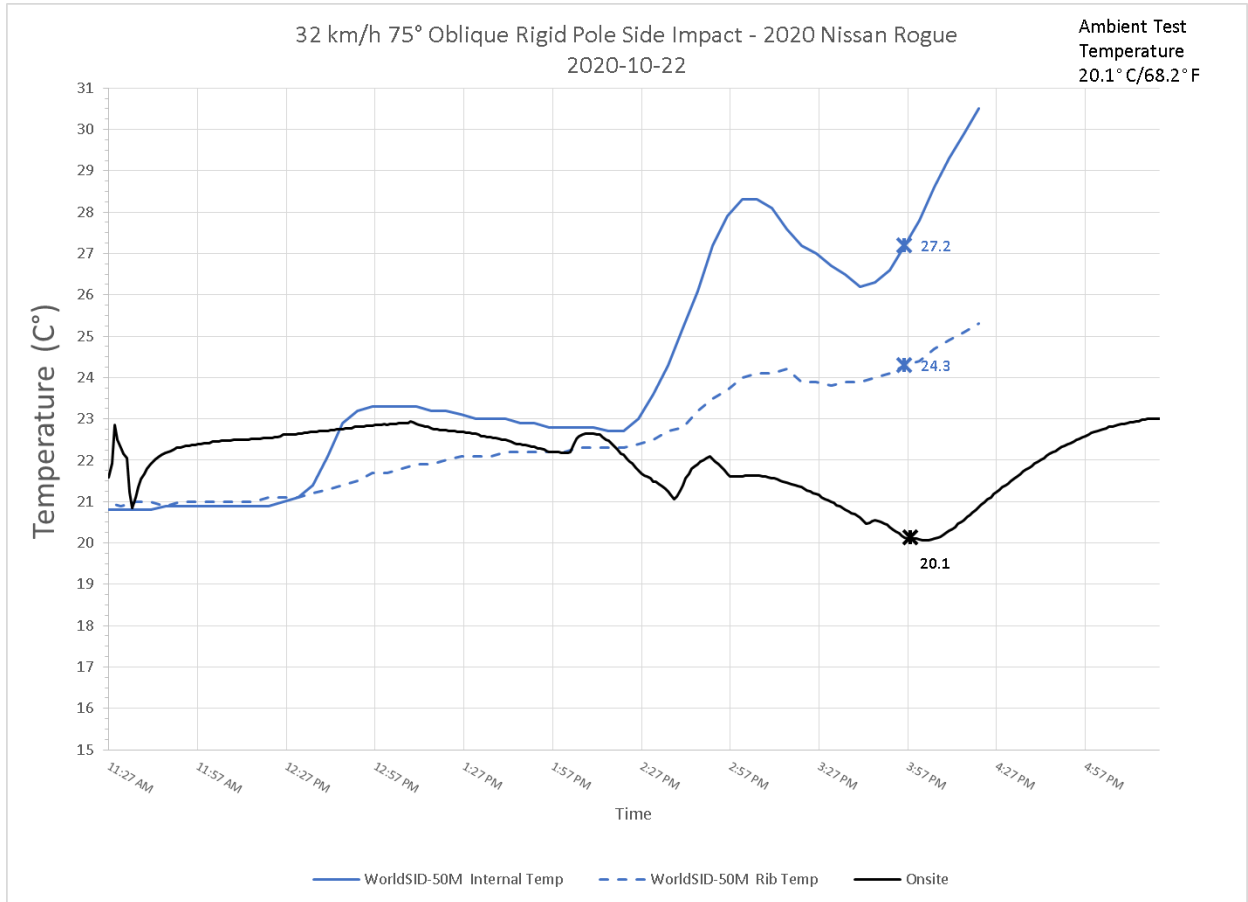
**DATA SHEET NO. 12**  
**DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA**

Test Vehicle: 2020 Nissan Rogue  
 Test Program: Rigid Pole Side Impact Test Date: 10/22/2020



**DATA SHEET NO. 12, CONTINUED**  
**DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA**

Test Vehicle: 2020 Nissan Rogue  
 Test Program: Rigid Pole Side Impact Test Date: 10/22/2020



**APPENDIX A**  
**PHOTOGRAPHS**

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**No. 001 As Delivered Right Front  $\frac{3}{4}$  View of Test Vehicle**



**No. 002 As Delivered Left Rear  $\frac{3}{4}$  View of Test Vehicle**





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



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



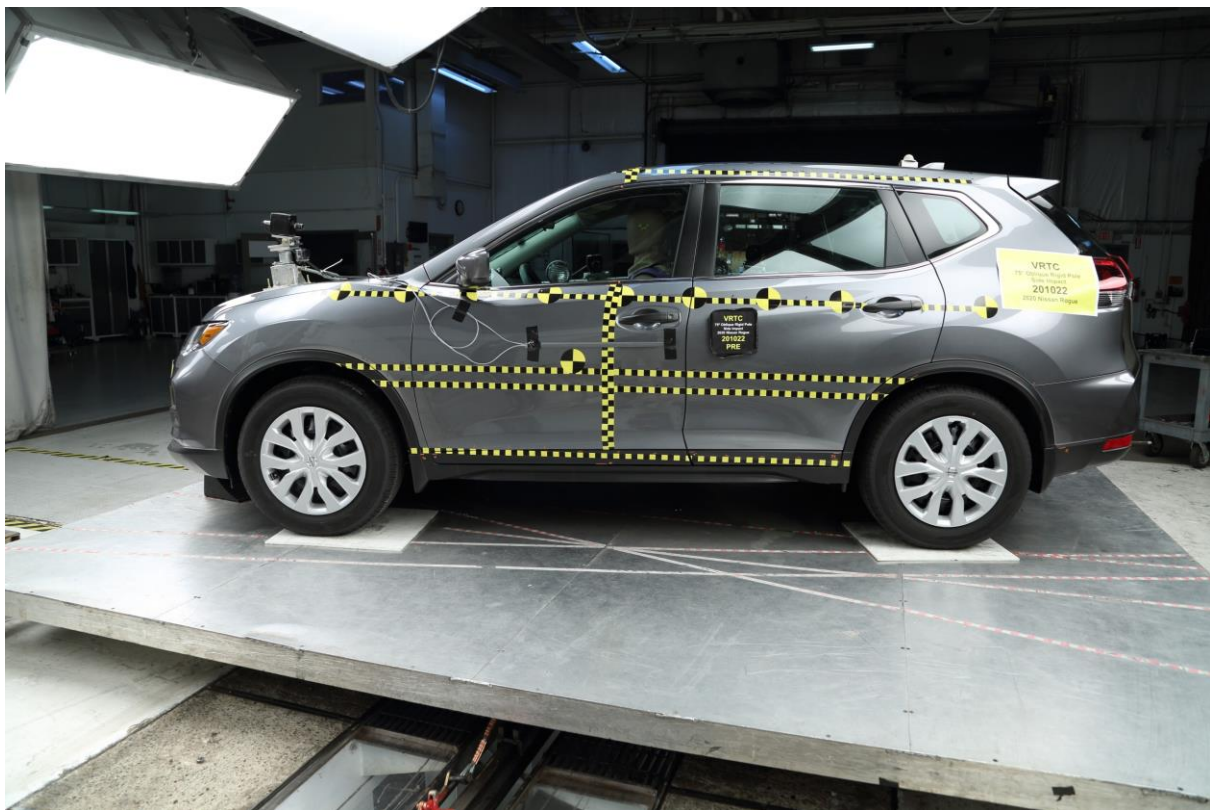


**No. 005 Pre-Test Left Front  $\frac{3}{4}$  View of Test Vehicle**



**No. 006 Post-Test Left Front  $\frac{3}{4}$  View of Test Vehicle**





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

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



hicle





**No. 009 Pre-Test Left Rear  $\frac{3}{4}$  View of Test Vehicle**



**No. 010 Post-Test Left Rear  $\frac{3}{4}$  View of Test Vehicle**



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



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





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



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





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



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





**No. 017 Pre-Test Left Side View of Pole Positioned Against Side of Vehicle**



**No. 018 Pre-Test Right Side View of Pole Positioned Against Side of Vehicle**



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



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





**No. 021 Pre-Test Front Close-Up View of Dummy Head and Chest**



**No. 022 Post-Test Front Close-Up View of Dummy**





**No. 023 Pre-Test Left Side View of Dummy Showing Belt and Chalking**

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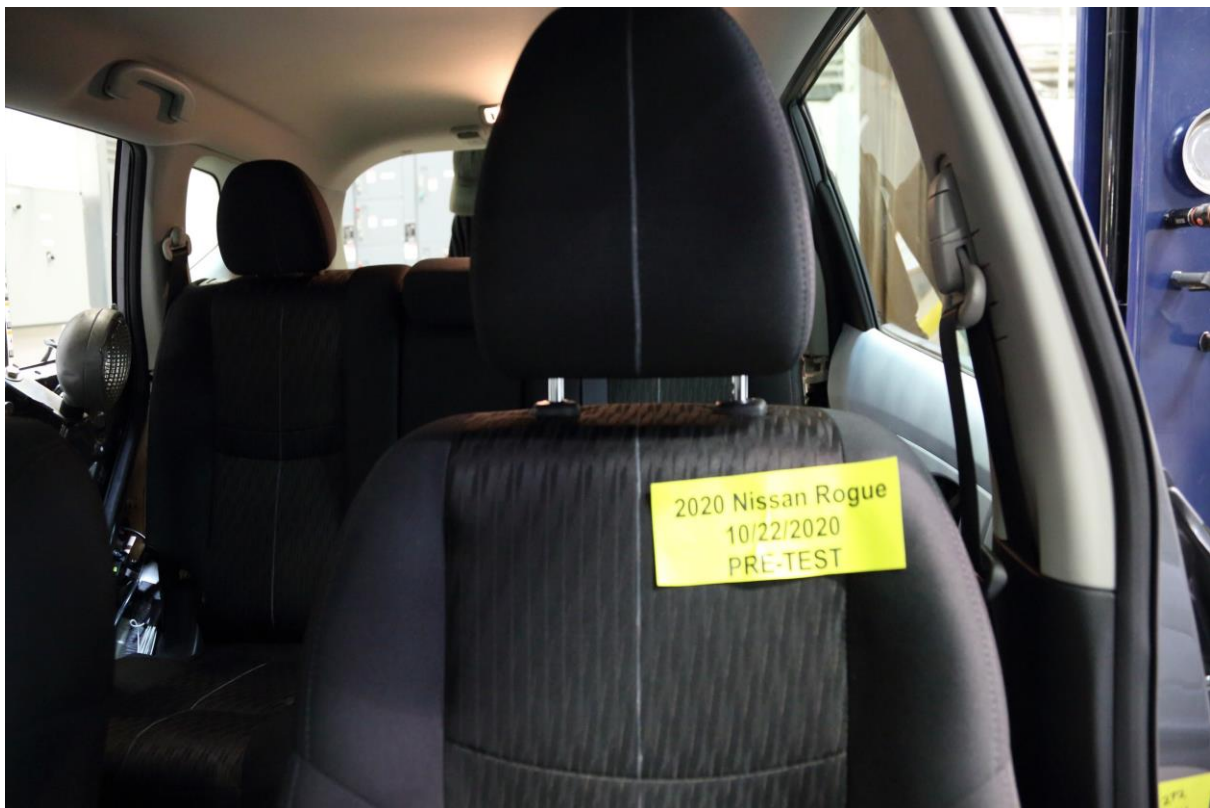


No. 024 Pre-Test Left Side View of Dummy Shoulder and Door Top View



No. 025 Post-Test Left Side View of Dummy Shoulder and Door Top View





**No. 026 Pre-Test Front View of Seat Back Prior to Dummy Positioning**



**No. 027 Pre-Test Front Close-Up View of Dummy Head and Shoulders in Relation to Head Restraint**

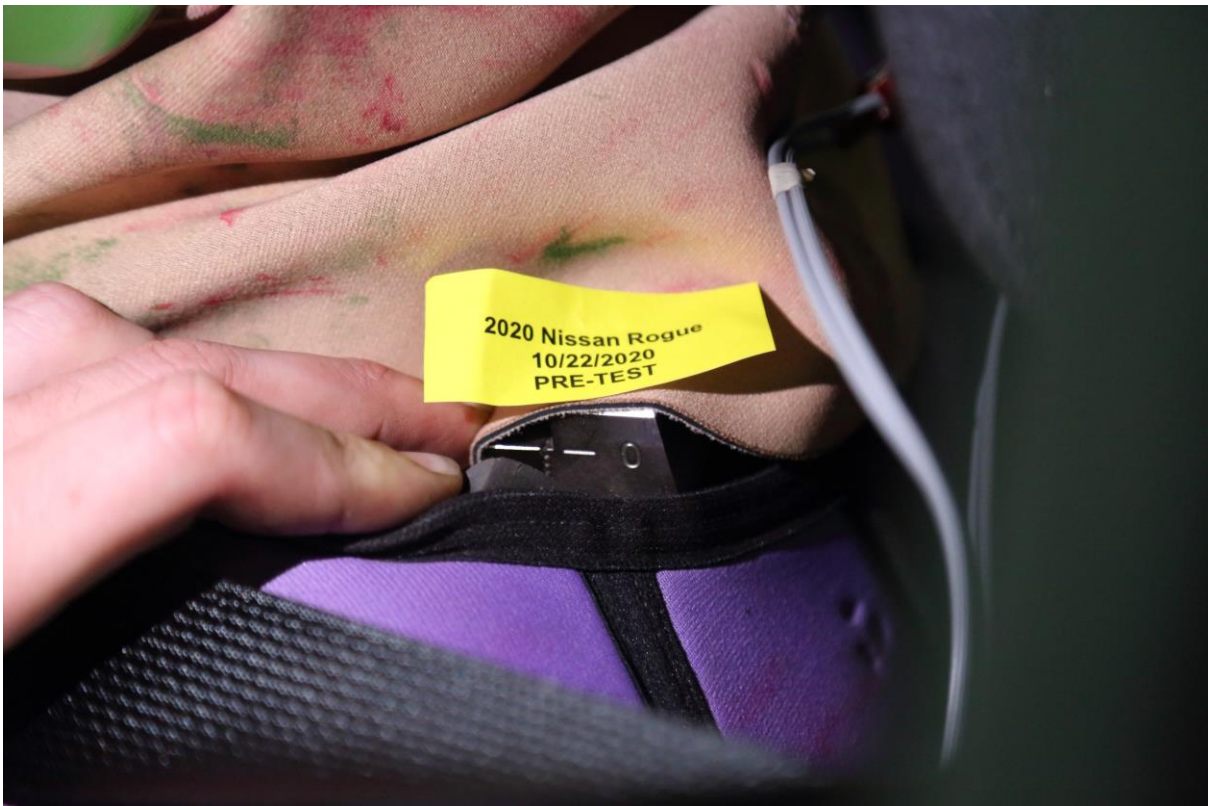


**No. 028 Pre-Test Front View of Seat Pan Prior to Dummy Positioning**

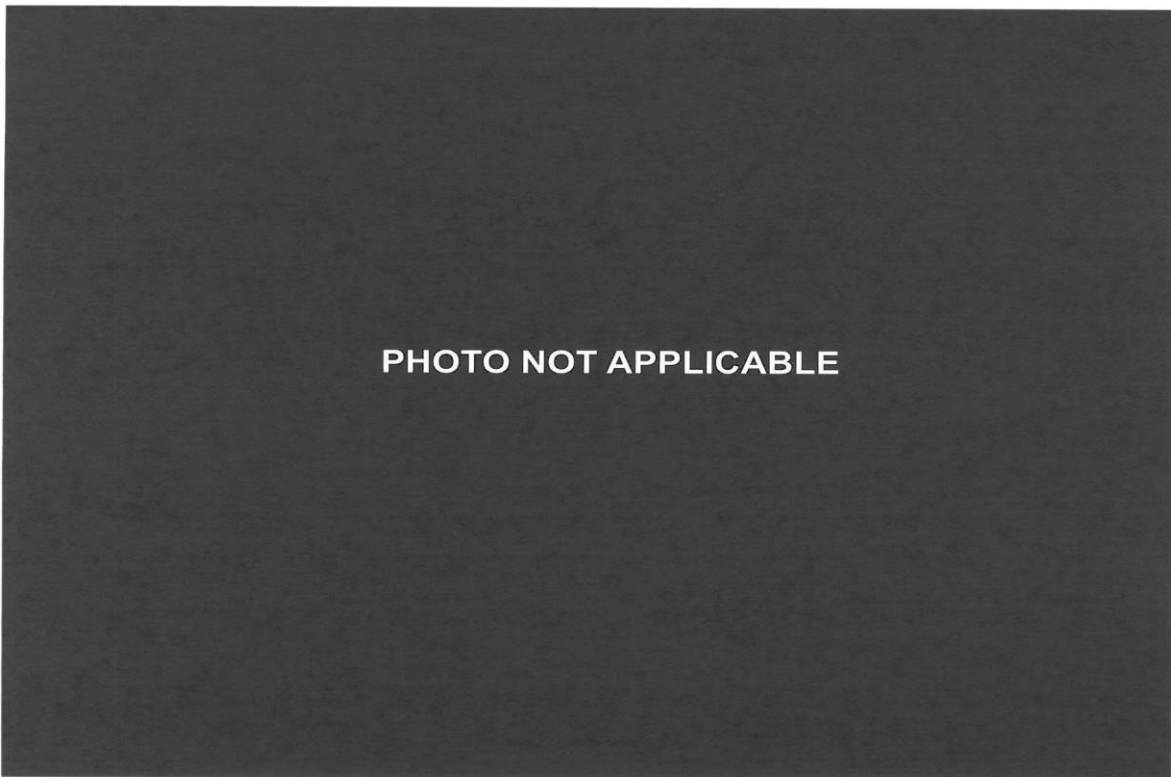


**No. 029 Pre-Test Overhead View of Dummy Thighs on Seat Pan**





**No. 030 Pre-Test Left Side View of Dummy Neck Showing Position of Adjustable Neck Bracket**

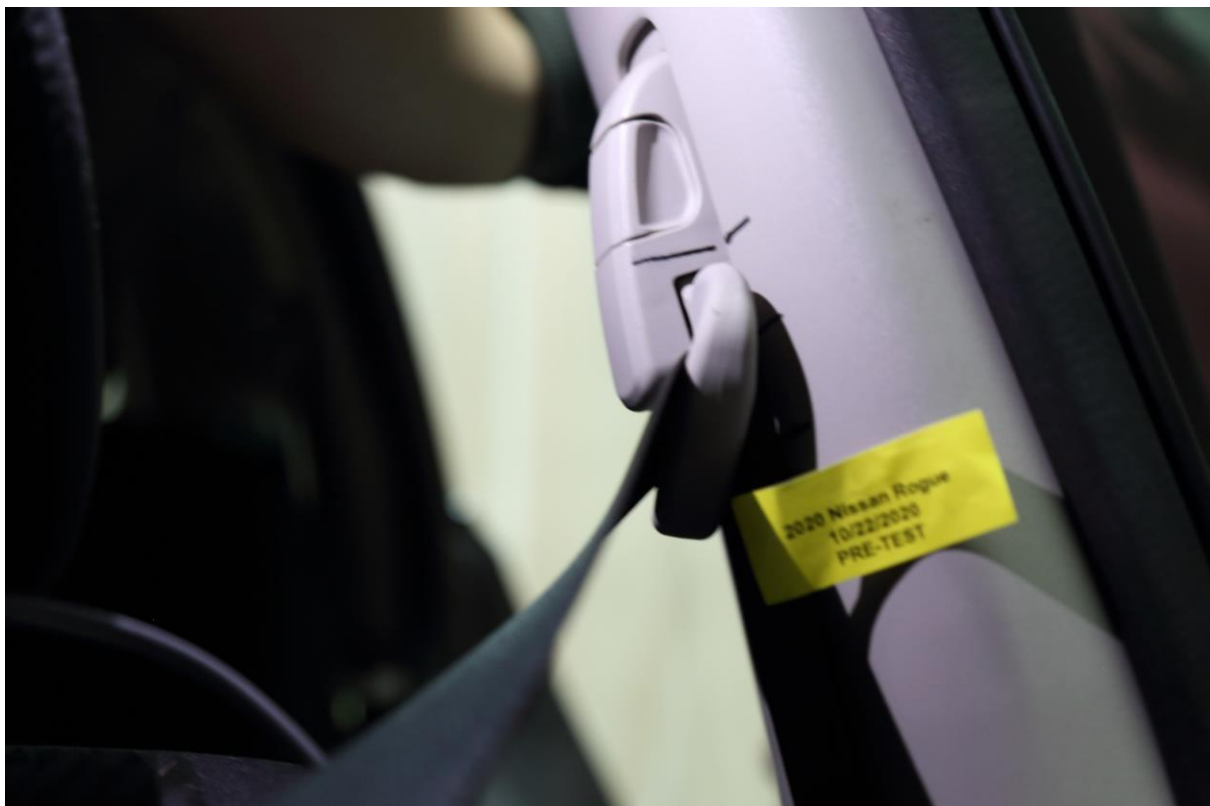


**No. 031 Pre-Test Left Side View of Dummy Head Showing Dummy Head is Level**





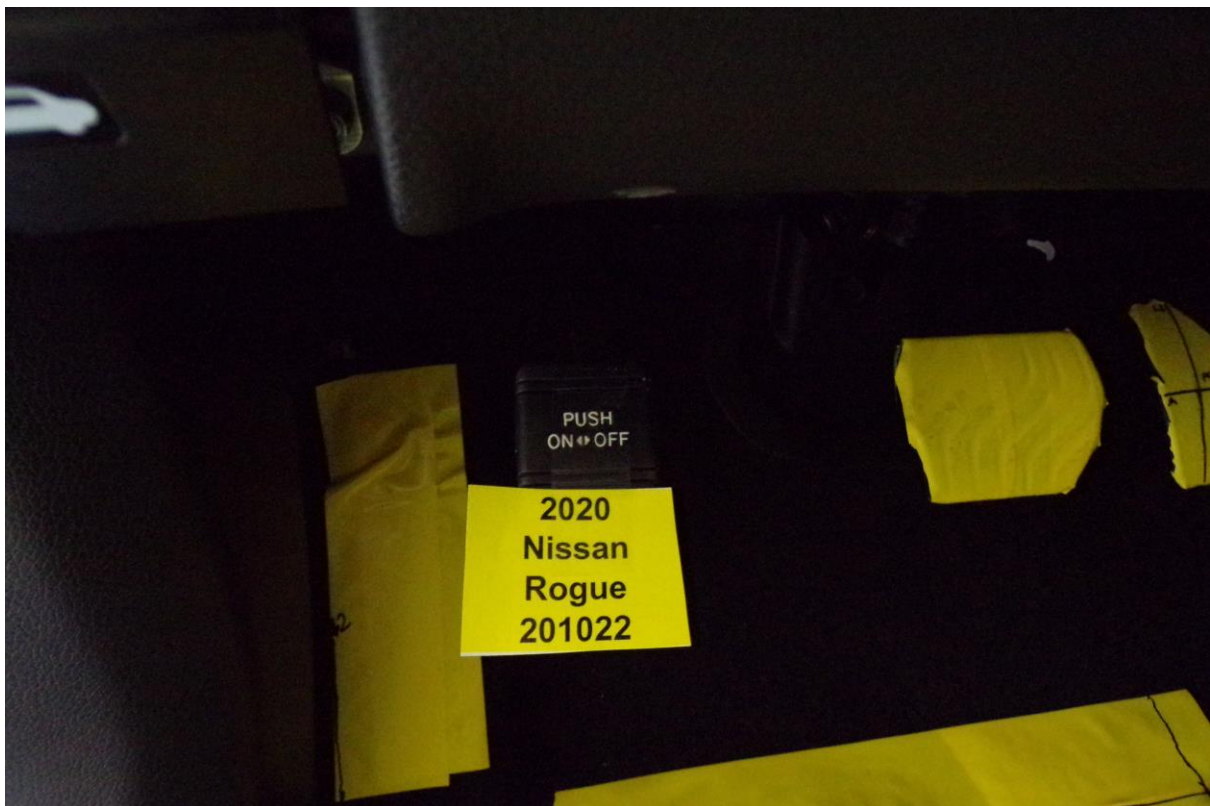
No. 032 Pre-Test Placement of Dummy Feet



No. 033 Pre-Test View of Belt Anchorage for Dummy



No. 034 Pre-Test Left Side View of Steering Wheel



No. 035 Pre-Test View of Disengaged Parking Brake

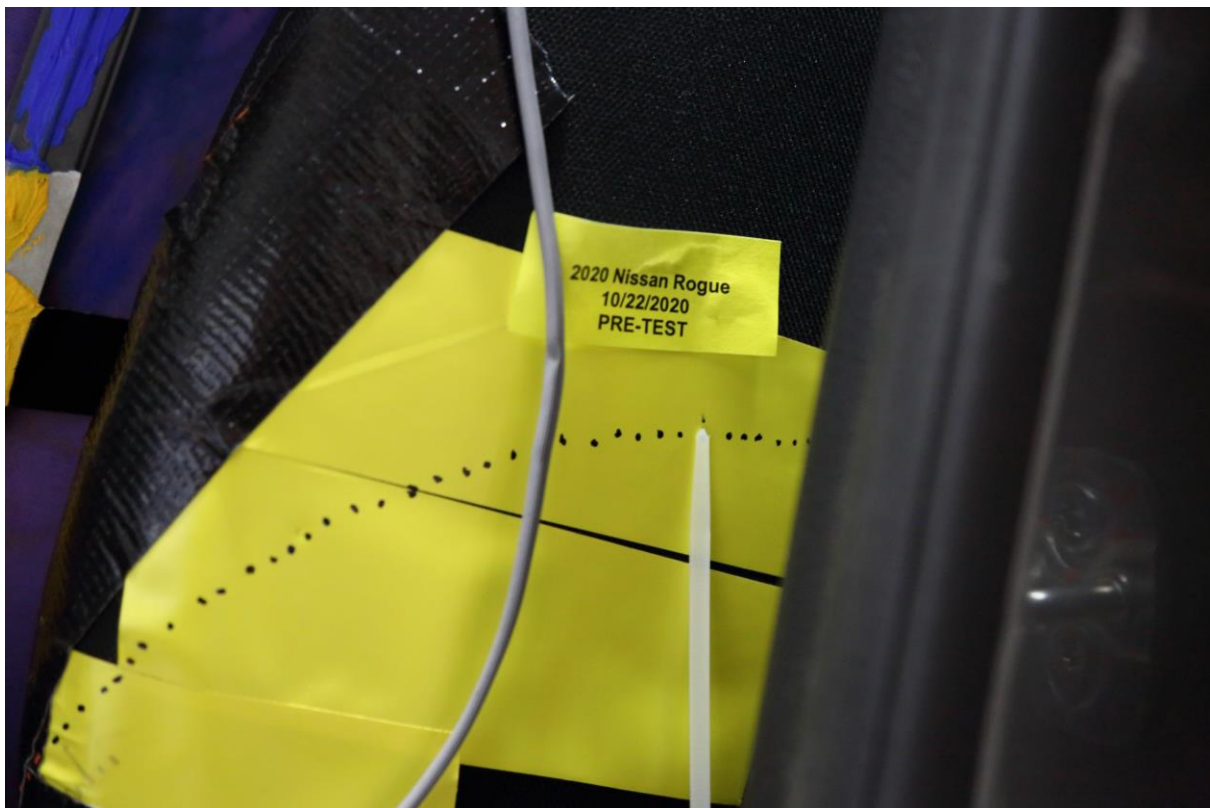


No. 036 Pre-Test View of Parking Brake



No. 037 Pre-Test Close-Up Left Side View of Driver Seat Track





No. 038 Pre-Test Close-Up Left Side View of Driver Seat Back



No. 039 Pre-Test Close-Up View of Driver Seat Back or Head Restraint



**No. 040 Pre-Test Dummy and Door Clearance View**



**No. 041 Post-Test Dummy and Door Clearance View**





**No. 042 Pre-Test Right Side View of Dummy and Front Seat of Occupant Compartment**



**No. 043 Post-Test Right Side View of Dummy and Front Seat of Occupant Compartment**



**No. 044 Pre-Test Inner Door Panel View**



**No. 045 Post-Test Inner Door Panel View Showing Dummy Contact Location**

**PHOTO NOT APPLICABLE**

**No. 046 Post-Test Dummy Close-Up Head Contact with Vehicle Interior View**

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**No. 047 Post-Test Dummy Close-Up Head Contact with Side Airbag View**



**No. 048 Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View**





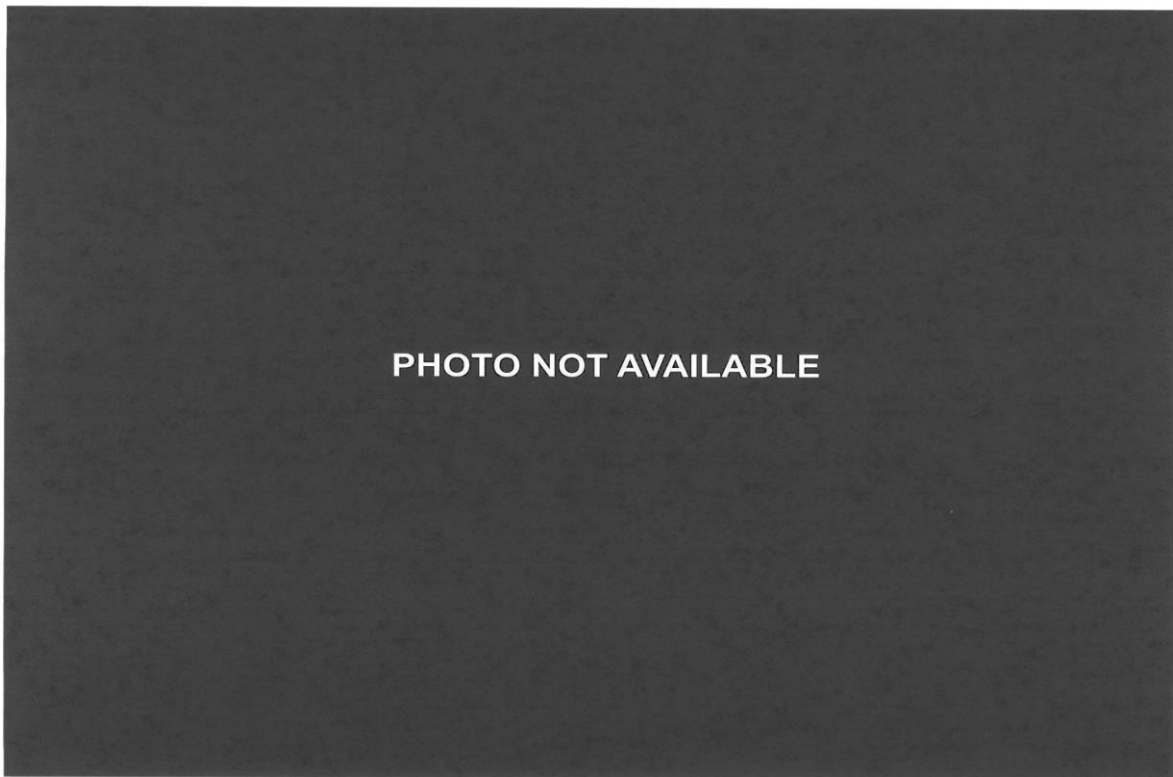
**No. 049 Post-Test Dummy Close-Up Torso Contact with Side Airbag View**



**No. 050 Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View**



**No. 051 Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View**



**No. 052 Post-Test Dummy Close-Up Knee Contact with Vehicle Interior View**

**PHOTO NOT AVAILABLE**

**No. 053 Post-Test Right Side View of Dummy and Rear Seat of Occupant Compartment**

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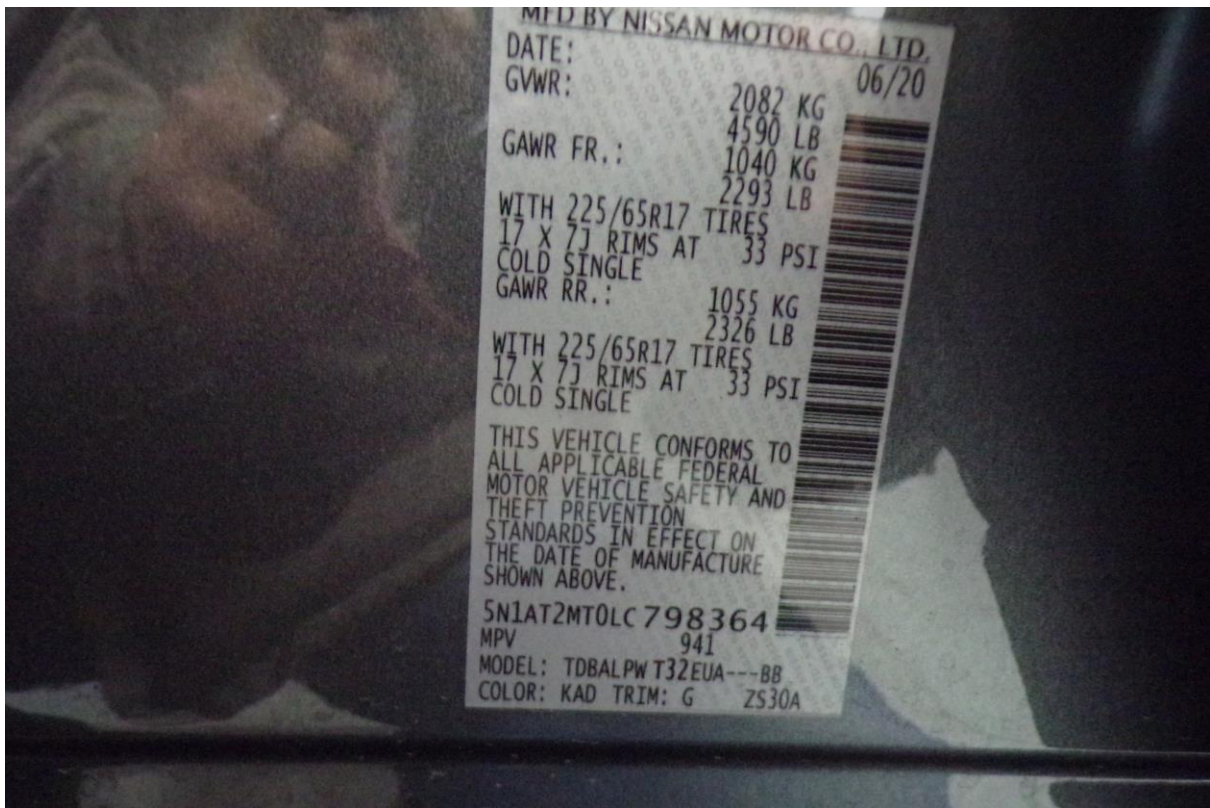


No. 054 Pre-Test View of Fuel Filler Cap or Fuel Filler Neck

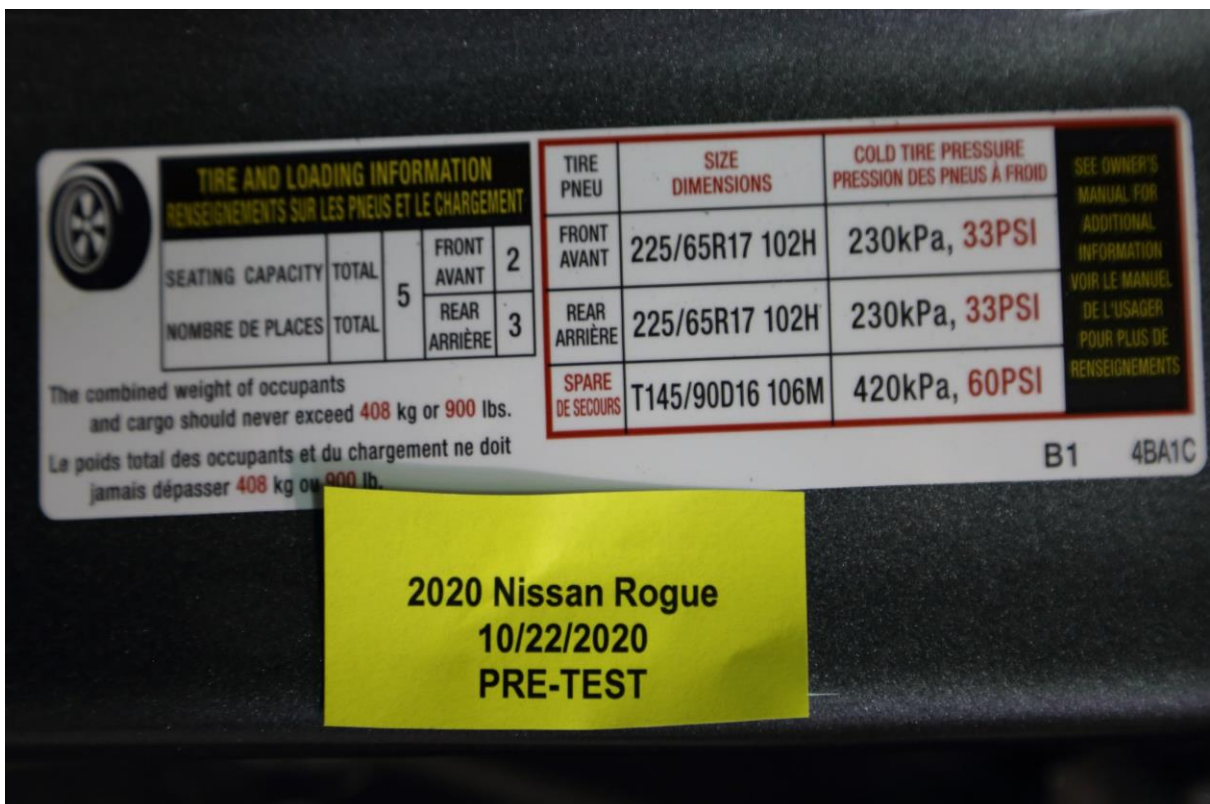


No. 055 Post-Test View of Fuel Filler Cap or Fuel Filler Neck

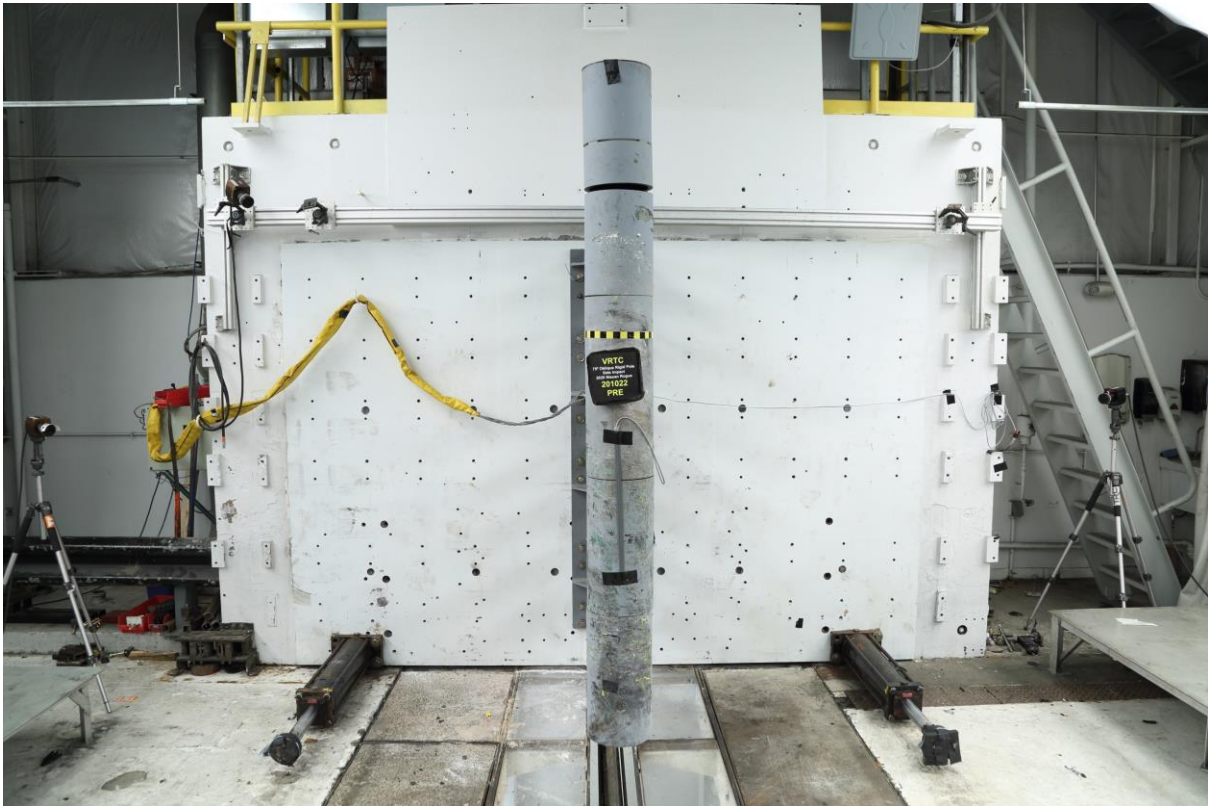




No. 056 Close-Up View of Vehicle Certification Label



No. 057 Close-Up View of Vehicle Tire Information Placard or Label



**No. 058 Pre-Test Pole Barrier Front View**

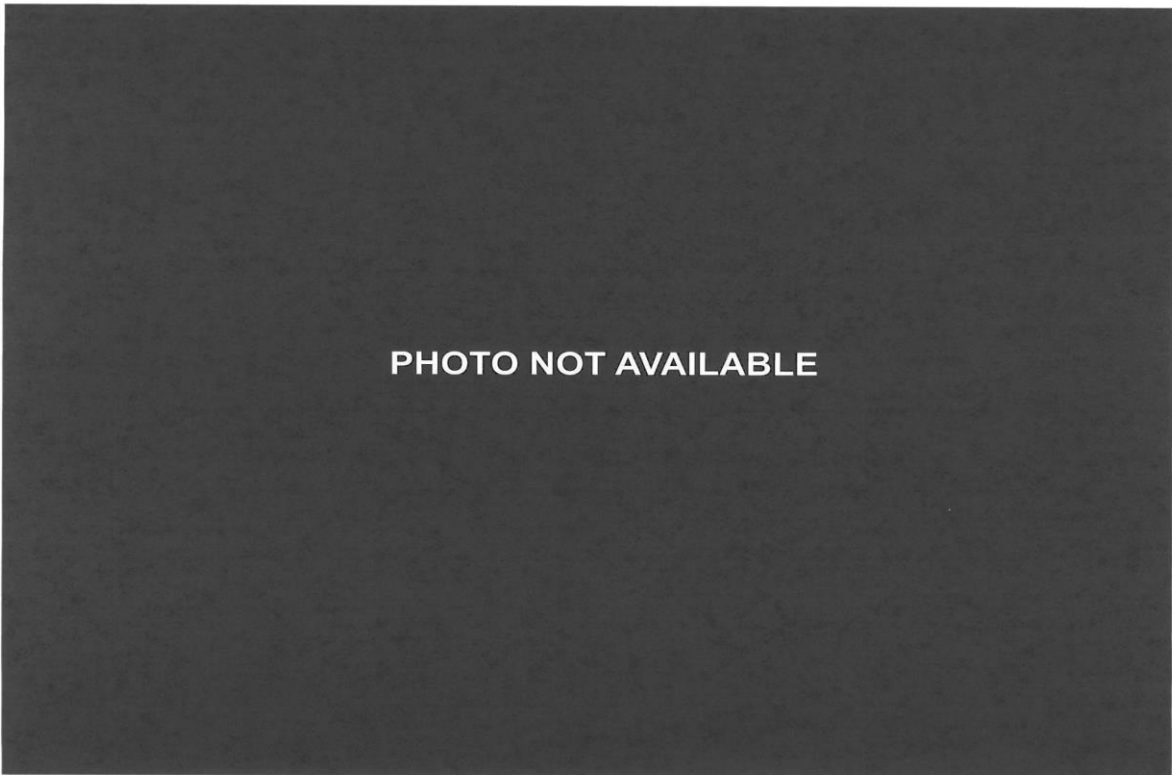


**No. 059 Post-Test Pole Barrier Front View**

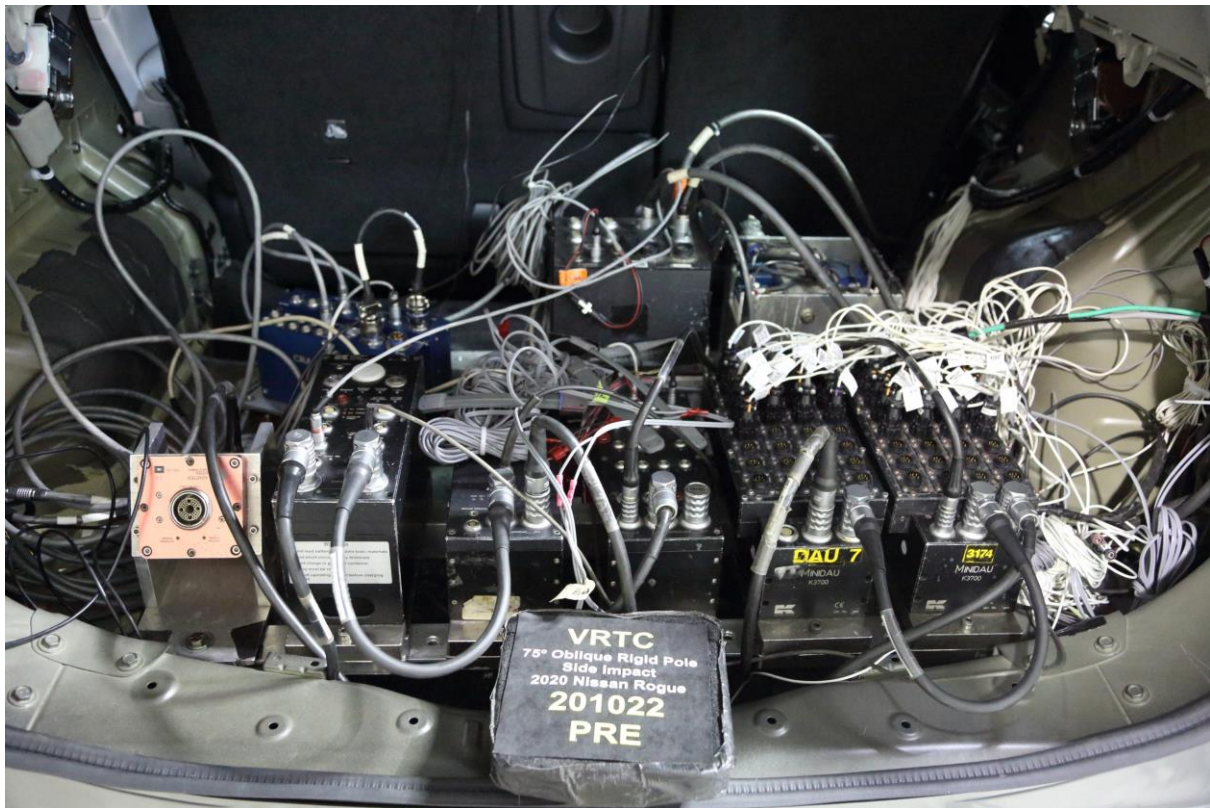




**No. 060 Pre-Test Pole Barrier Side View**



**No. 061 Post-Test Pole Barrier Side View**

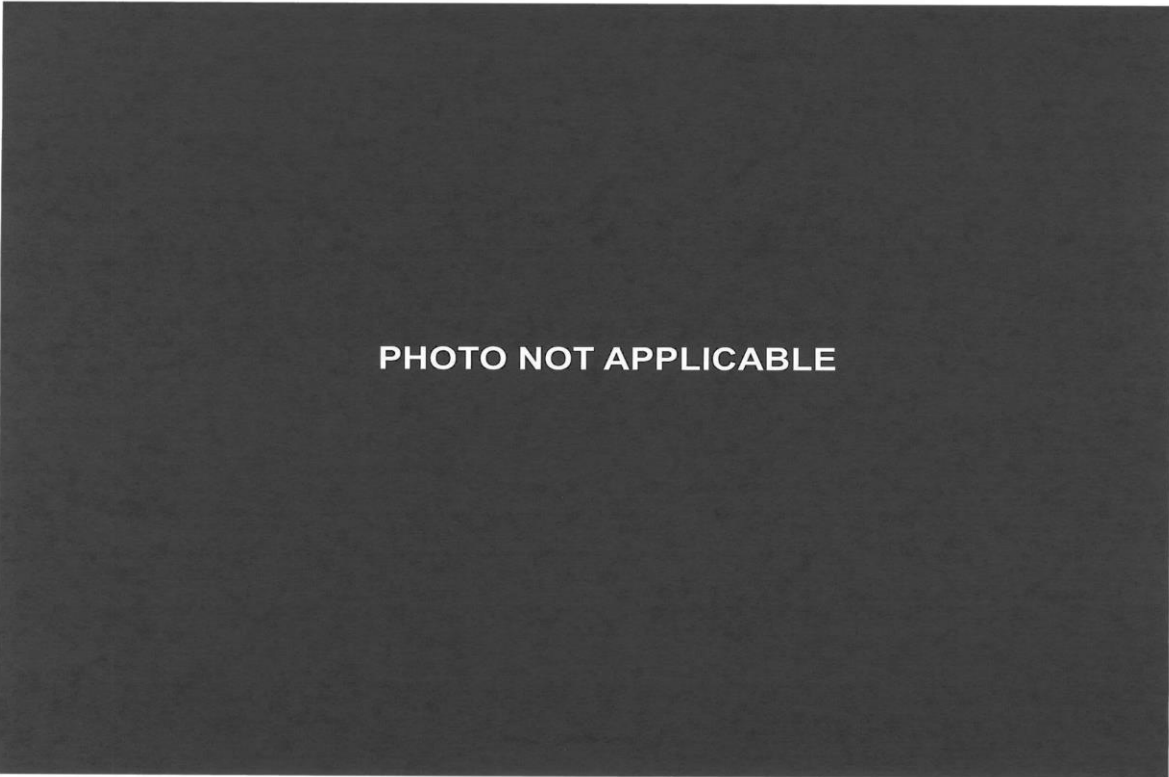


No. 062 Pre-Test Ballast View



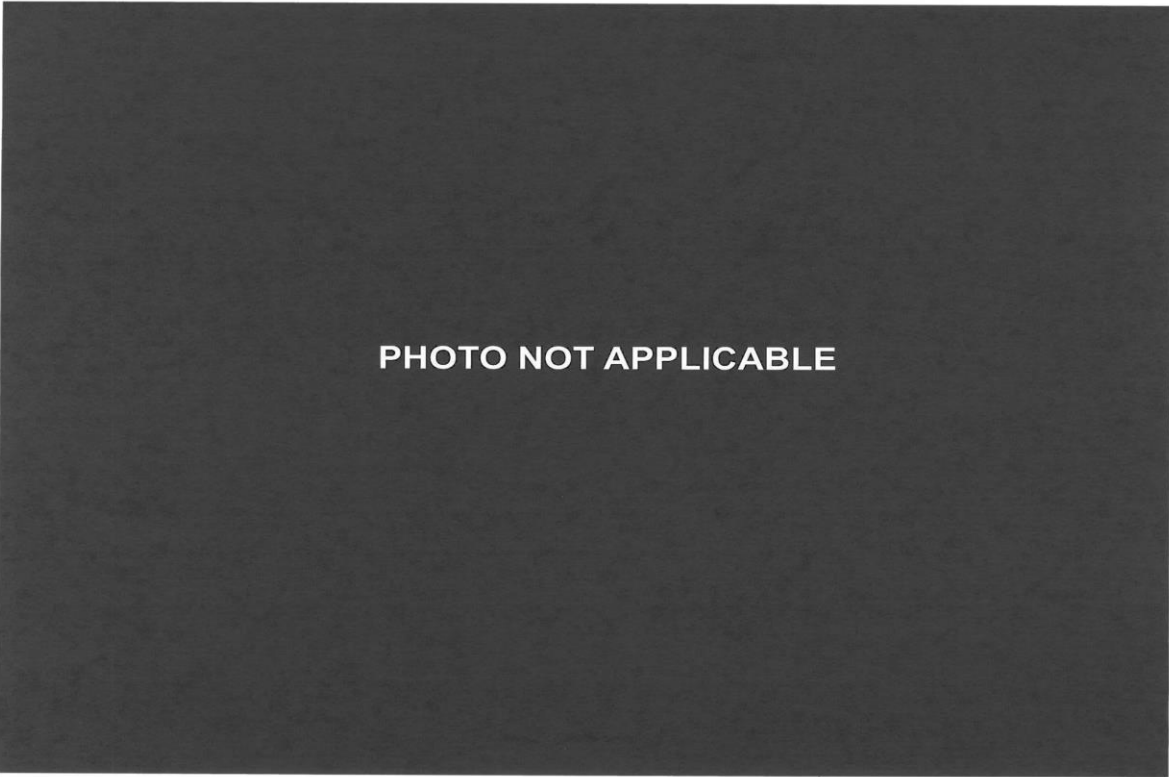
No. 063 Post-Test Primary and Redundant Speed Trap Read Out





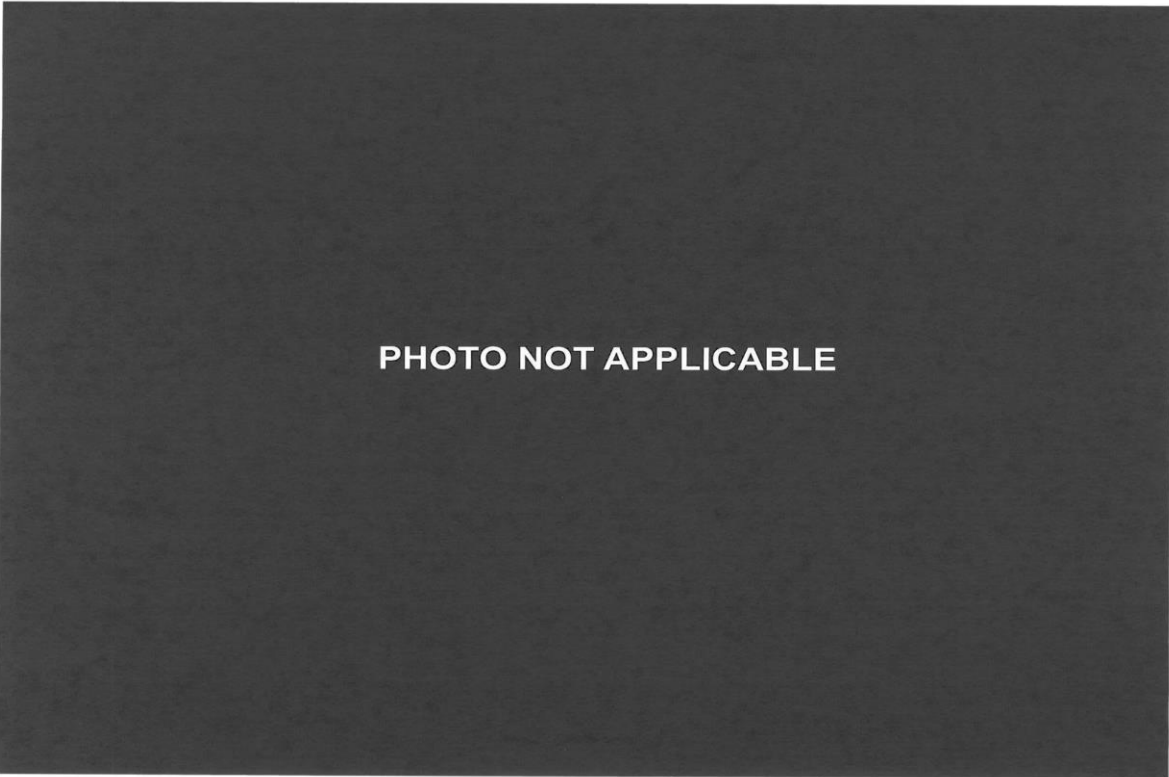
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**No. 064 FMVSS No. 301 Static Rollover 0 Degrees**



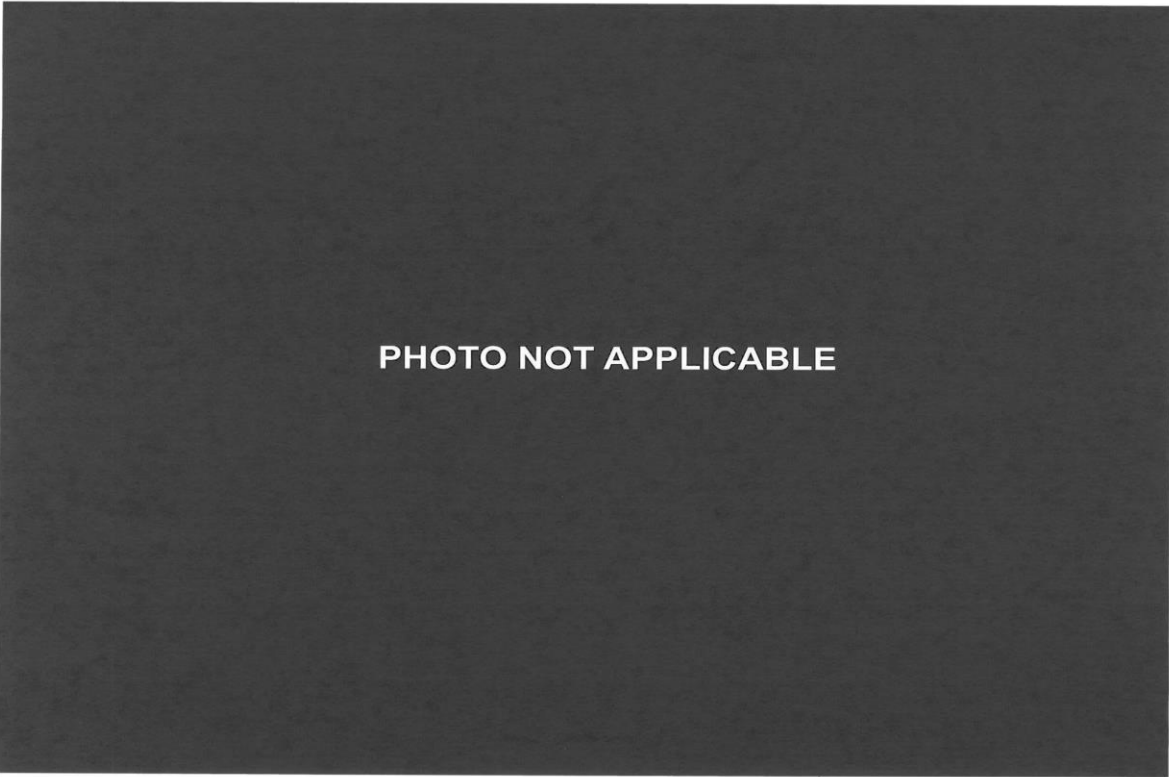
**PHOTO NOT APPLICABLE**

**No. 065 FMVSS No. 301 Static Rollover 90 Degrees**



**PHOTO NOT APPLICABLE**

**No. 066 FMVSS No. 301 Static Rollover 180 Degrees**



**PHOTO NOT APPLICABLE**

**No. 067 FMVSS No. 301 Static Rollover 270 Degrees**

PHOTO NOT APPLICABLE

**No. 068 FMVSS No. 301 Static Rollover 360 Degrees**



**No. 069 Impact Event**



## 2020 NISSAN ROGUE S FWD



Scan QR code for general model information and options

### Standard Equipment Included at No Extra Charge

#### MECHANICAL & PERFORMANCE

170-hp 2.5-liter DOHC 16-valve I-4  
175 lb-ft @ 4400 rpm of Torque  
XTRONIC CVT® w/ Sport Mode Switch  
Eco Mode  
4-Wheel Front and Rear Disc Brakes  
17" Steel Wheels w/ Full Wheel Covers  
Temporary Spare Tire  
Front Independent Suspension  
Rear Multi-link Suspension

#### SAFETY & SECURITY

Driver and Front Passenger  
Side Impact, Curtain Air Bags  
Lower Anchors and Tethers for  
Children (LATCH)  
4-Wheel Anti-Lock Braking System (ABS)  
Vehicle Dynamic Control (VDC)  
Traction Control System (TCS)  
Electronic Brake Force Distribution (EBD)  
Brake Assist (BA)  
Tire Pressure Monitoring System (TPMS)  
with Easy-Fill Tire Alert  
RearView Monitor  
Automatic Emergency Braking with  
Pedestrian Detection (P-AEB)  
Blind Spot Warning (BSW)  
Rear Cross Traffic Alert (RCTA)  
Lane Departure Warning (LDW)  
Intelligent Lane Intervention (ILLI)  
High Beam Assist (HBA)

#### COMFORT & CONVENIENCE

6-Way Manual Driver Seat  
40/20/40 Split Folding Rear Seat  
Cruise Control  
NissanConnect®  
Apple CarPlay®  
Android Auto™  
7" Color Display with Multi-touch Control  
SiriusXM® Radio  
Bluetooth® Hands-free Phone System  
Streaming Audio via Bluetooth®  
Hands-free Text Messaging Assistant  
Siding/Rearview 2nd Row Seats  
Hill Start Assist  
Intelligent Engine Brake (IEB)  
Intelligent Trace Control (ITC)  
Active Ride Control (ARC)  
Sport Mode Shifter w/ Manual Mode  
Divide-N-Hide®  
Power Windows with Driver Auto-up/down

### COMFORT & CONVENIENCE CONT.

2nd Row Seat Air Vents  
Adjustable Tilt and Telescoping Steering  
Column  
Rear Door Alert

#### EXTERIOR

Intelligent Auto Headlights (I-AH)  
LED Daytime Running Lights (DRL)  
LED Tail Lamps  
Rear Spoiler with Center High-mounted  
Stoplight

\*For more information, see dealer,  
owner's manual, or [www.NissanUSA.com](http://www.NissanUSA.com)/  
connect/important-information.  
+Optional Equipment Replaces  
Standard Where Applicable

Manufacturer's Suggested  
Retail Base Price: \$25,300.00

Options Included by Manufacturer  
Splash Guards 170.00  
Chrome Rear Bumper Protector 165.00  
Floor Mats with Cargo Area Protector  
& First Aid Kit 290.00

DESTINATION CHARGES 1,095.00

Total\* \$27,020.00

EPA DOT Fuel Economy and Environment

Small SUVs range from 16 to 120 MPG. The best vehicle rates 136 MPG.

**Fuel Economy**

**29** MPG  
combined city/hwy

26 city 33 highway

3.4 gallons per 100 miles

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

**Annual fuel cost \$1,400**

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

1 6 10 Best 1 10 Best

This vehicle emits 312 grams CO<sub>2</sub> per mile. The best emits 0 grams CO<sub>2</sub> per mile (electric only). Producing and distributing fuel also create emissions. Learn more at [fuel-economy.gov](http://fuel-economy.gov).

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 22 MPG and costs \$2,900 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$2.70 per gallon. MPG is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

**fuel-economy.gov**  
Calculate personalized estimates and compare vehicles

**GOVERNMENT 5-STAR SAFETY RATINGS**

**Overall Vehicle Score** ★★★★★  
Based on the combined ratings of frontal, side and rollover.  
Should ONLY be compared to other vehicles of similar size and weight.

**Frontal Crash** ★★★★★  
Based on the risk of injury in a frontal impact.  
Should ONLY be compared to other vehicles of similar size and weight.

**Side Crash** ★★★★★  
Based on the risk of injury in a side impact.

**Rollover** ★★★★★  
Based on the risk of rollover in a single-vehicle crash.

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

This Vehicle qualifies for Nissan's  
**Security+Plus Extended Protection Plan**  
The only service agreement backed by  
Nissan Extended Services North America  
Ask your dealer for details, or call 1-800-NISSAN-1  
for more information

**DELIVERY**

**VEHICLE COLORS:**  
EXT: GUN METALLIC  
INT: CHARCOAL

**FINAL ASSEMBLY POINT:**  
SMYRNA

**TRANSPORT METHOD:**  
TRUCK

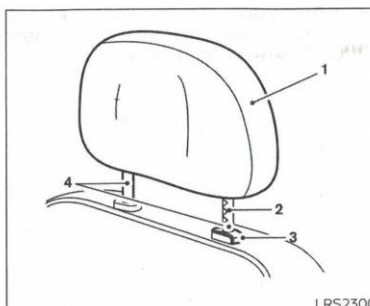
**DEALER:**  
GORDE BOUCHER NISSAN  
4141 S. 106TH STREET  
GREENFIELD WI  
53228

VIN: 5N1AT2MTLCF96364  
EMS: 50 STATE EMISSIONS  
MDL: 22110-796364 KAG-G  
OPT: F-892893LBC03502

2020052725300AS3070

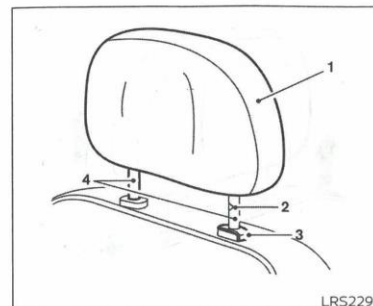
## No. 70 Monroney Label

- Adjustable head restraints/headrests have multiple notches along the stalk(s) to lock them in a desired adjustment position.
- The non-adjustable head restraints/headrests have a single locking notch to secure them to the seat frame.
- Proper Adjustment:
  - For the adjustable type, align the head restraint/headrest so the center of your ear is approximately level with the center of the head restraint/headrest.
  - If your ear position is still higher than the recommended alignment, place the head restraint/headrest at the highest position.
- If the head restraint/headrest has been removed, ensure that it is reinstalled and locked in place before riding in that designated seating position.



### ADJUSTABLE HEAD RESTRAINT/ HEADREST COMPONENTS

1. Removable head restraint/headrest
2. Multiple notches
3. Lock knob
4. Stalks



### NON-ADJUSTABLE HEAD RESTRAINT/HEADREST COMPONENTS

1. Removable head restraint/headrest
2. Single notch
3. Lock knob
4. Stalks

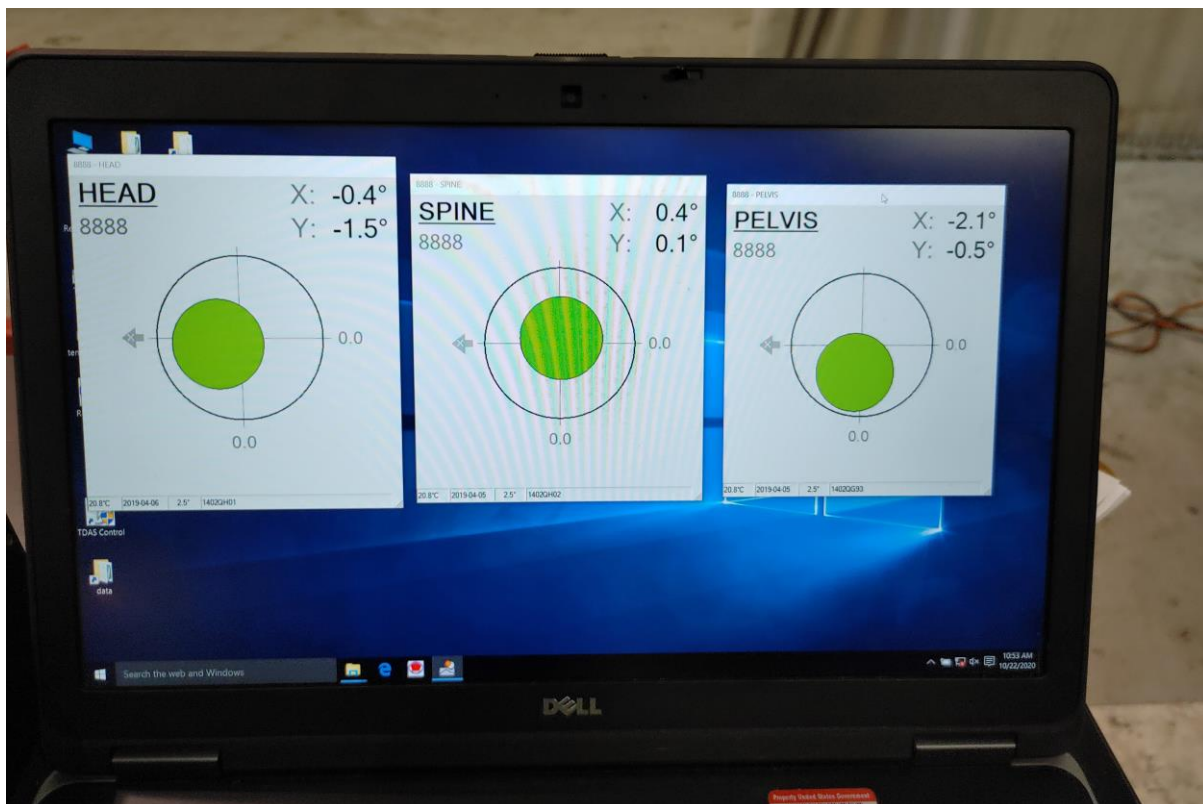
Safety—Seats, seat belts and supplemental restraint system 1-9

## No. 071 Head Restraint Use and Adjustment Information from Vehicle Owner Manual



PHOTO NOT APPLICABLE

No. 072 Post-Test View of Shattered Vehicle Inner Door Panel



No. 073 WorldSID-50M Pre-Test Tilt Sensor View

**APPENDIX B**  
**VEHICLE AND DUMMY RESPONSE DATA PLOTS**

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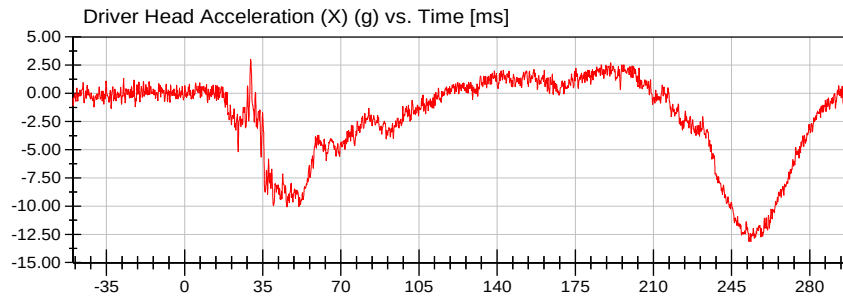


# VRTC

Test Date: 10/22/2020

Test Lab: CTF

Test Number: 201022 ()



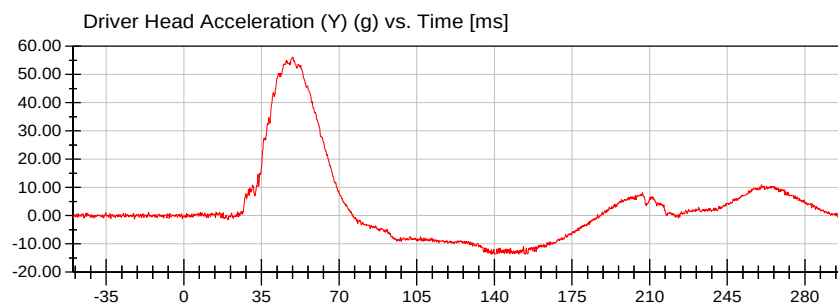
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-13.15 g at 252.80 ms

CFC\_1000



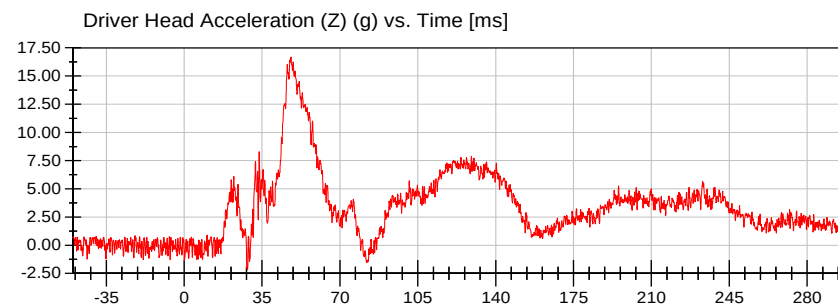
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-13.66 g at 151.05 ms

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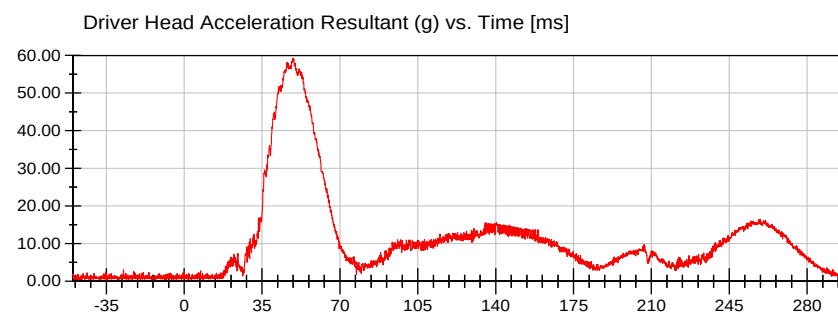
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-2.15 g at 28.45 ms

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0.45 g at -8.65 ms

Prefiltered\_> CFC 1000

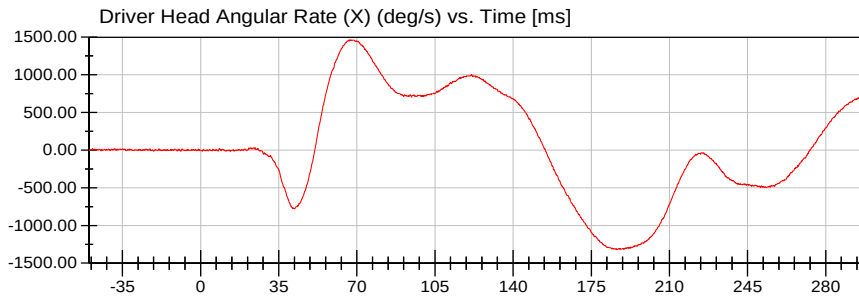


# VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



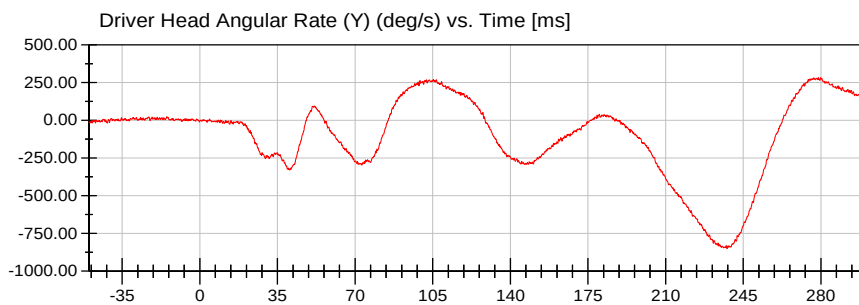
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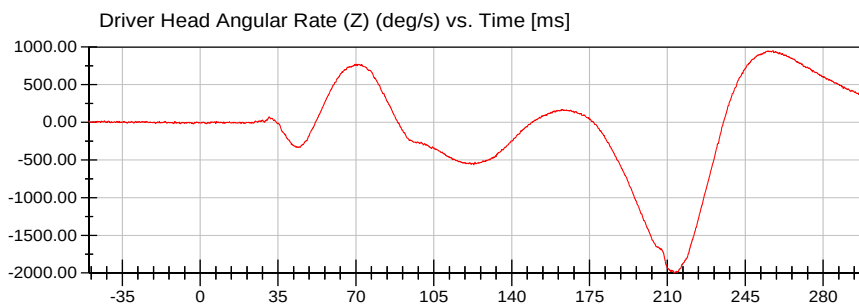
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CFC\_1000



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CFC\_1000

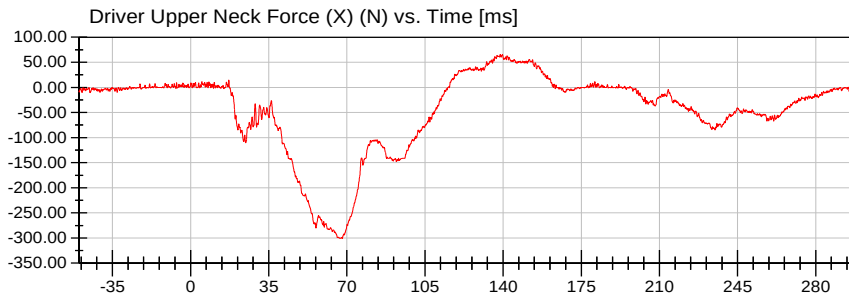


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Test Date: 10/22/2020



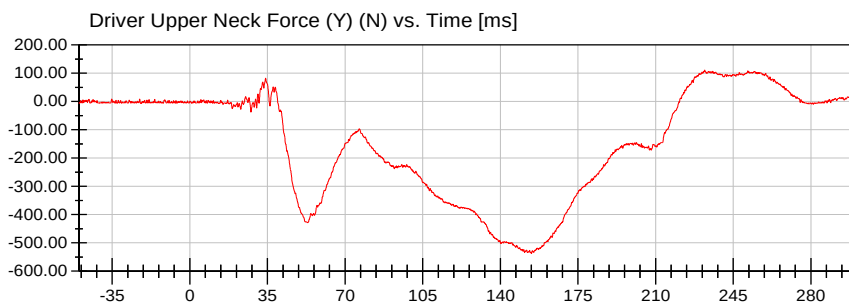
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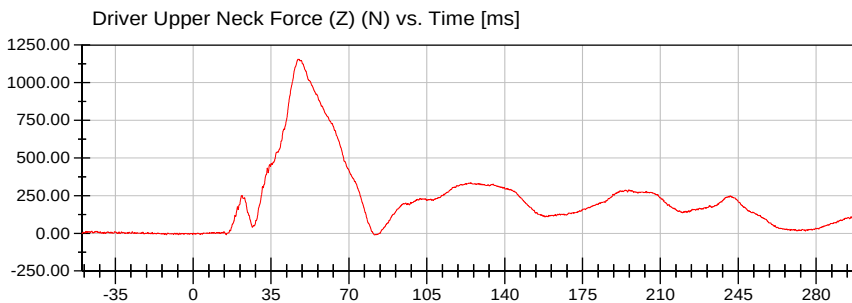
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-537.13 N at 154.00 ms

CFC\_1000



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-10.14 N at 81.45 ms

CFC\_1000

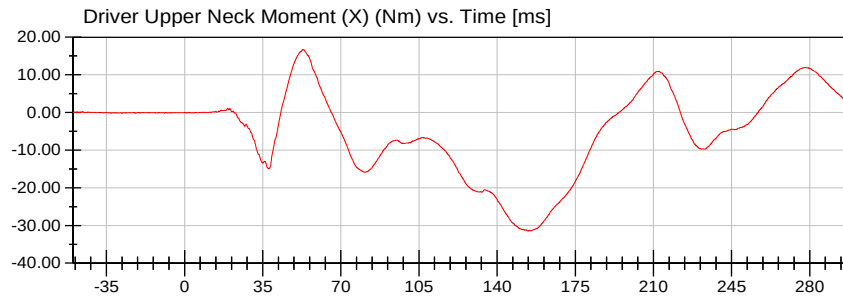


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Test Date: 10/22/2020



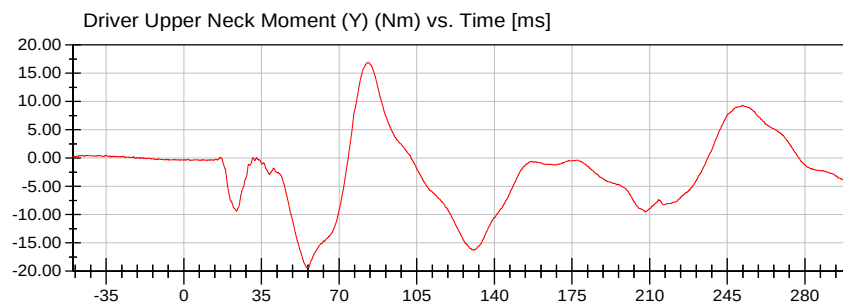
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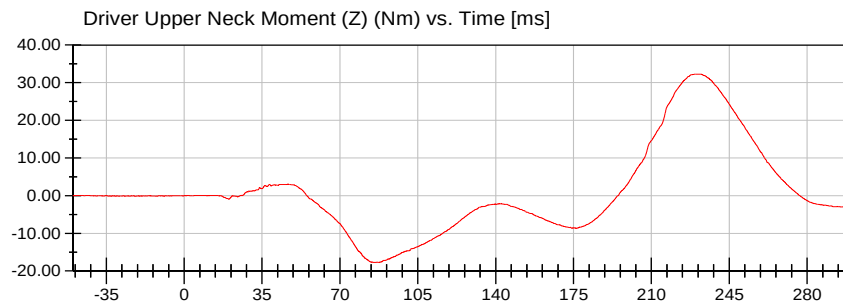
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16.86 Nm at 82.95 ms

<Min>

-19.39 Nm at 56.15 ms

CFC\_600



<Max>

32.29 Nm at 232.05 ms

<Min>

-17.76 Nm at 85.30 ms

CFC\_600



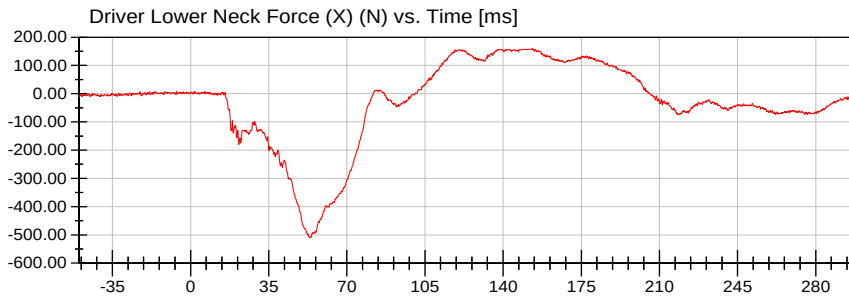


# VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



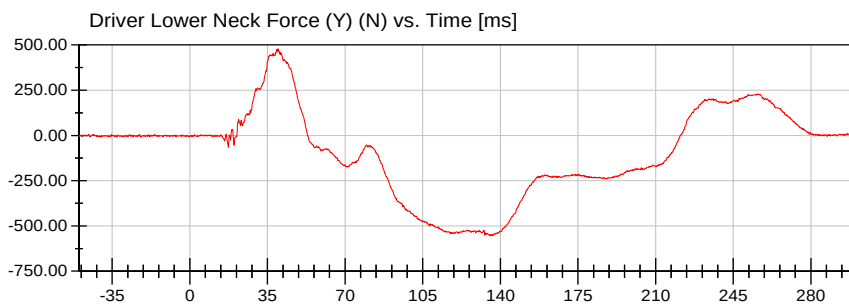
<Max>

159.64 N at 153.15 ms

<Min>

-510.80 N at 53.50 ms

CFC\_1000



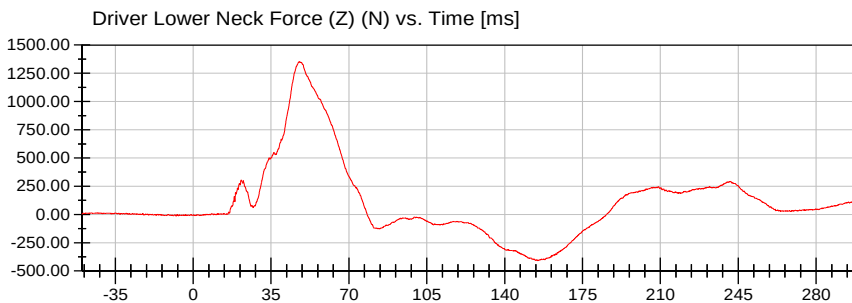
<Max>

477.93 N at 39.85 ms

<Min>

-555.10 N at 135.25 ms

CFC\_1000



<Max>

1,352.38 N at 47.75 ms

<Min>

-407.61 N at 154.90 ms

CFC\_1000

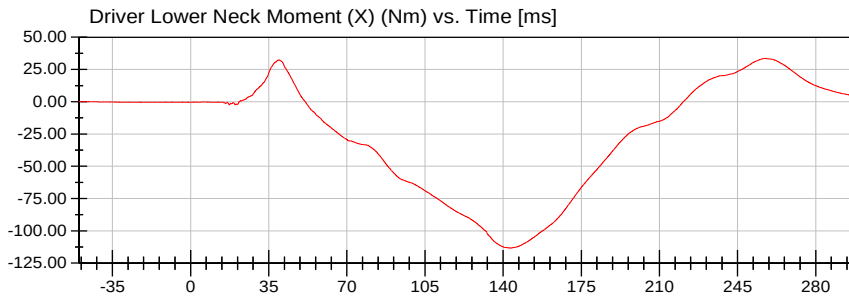


# VRTC

Test Date: 10/22/2020

Test Lab: CTF

Test Number: 201022 ()



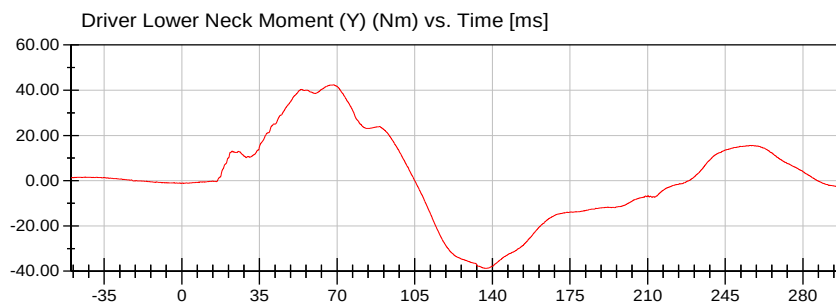
<Max>

33.50 Nm at 257.25 ms

<Min>

-113.36 Nm at 143.65 ms

CFC\_600



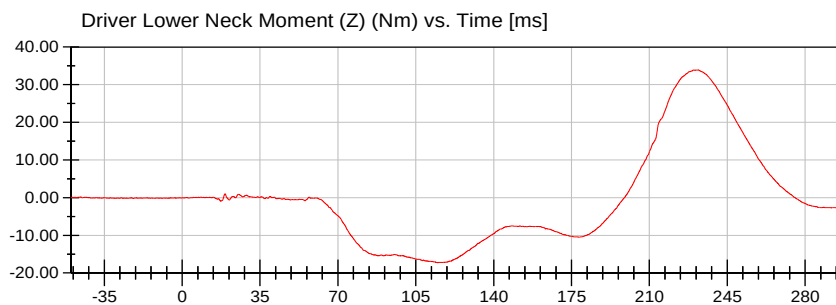
<Max>

42.36 Nm at 68.45 ms

<Min>

-38.75 Nm at 136.90 ms

CFC\_600



<Max>

33.92 Nm at 232.10 ms

<Min>

-17.27 Nm at 114.85 ms

CFC\_600

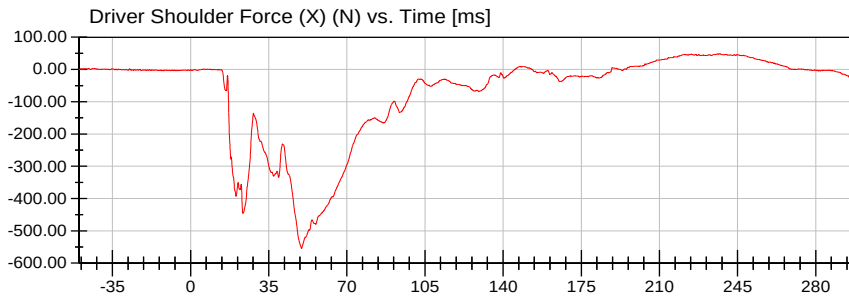


# VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



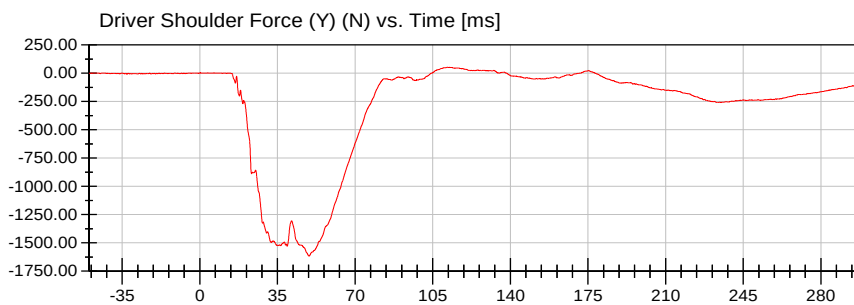
<Max>

48.75 N at 237.10 ms

<Min>

-554.43 N at 49.75 ms

CFC\_600



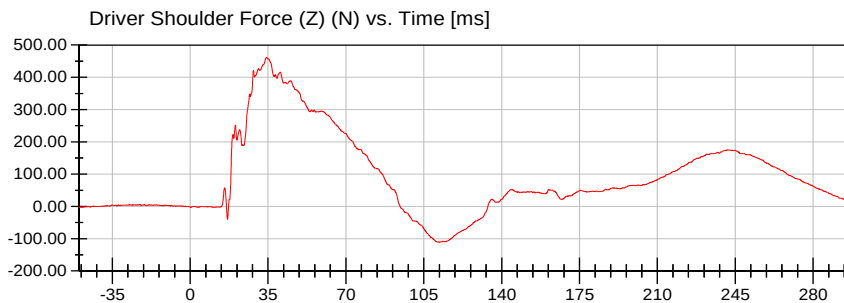
<Max>

53.45 N at 111.70 ms

<Min>

-1,616.24 N at 49.20 ms

CFC\_600



<Max>

461.20 N at 34.30 ms

<Min>

-111.24 N at 112.15 ms

CFC\_600

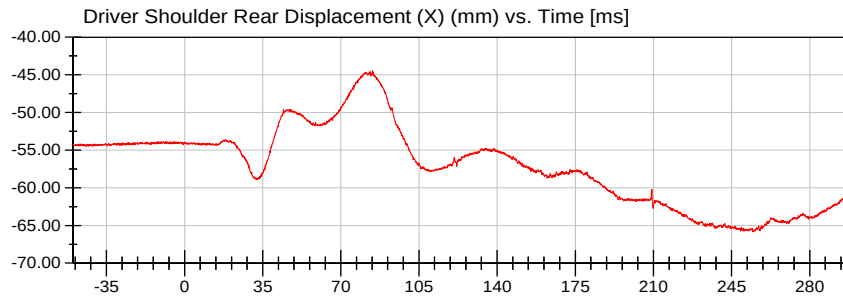


# VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



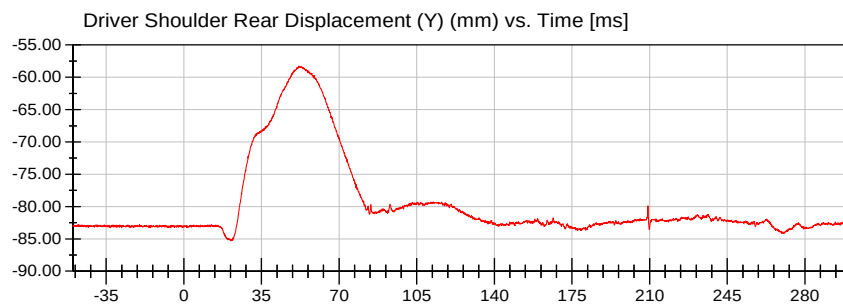
<Max>

-44.44 mm at 84.25 ms

<Min>

-65.87 mm at 254.60 ms

Unfiltered



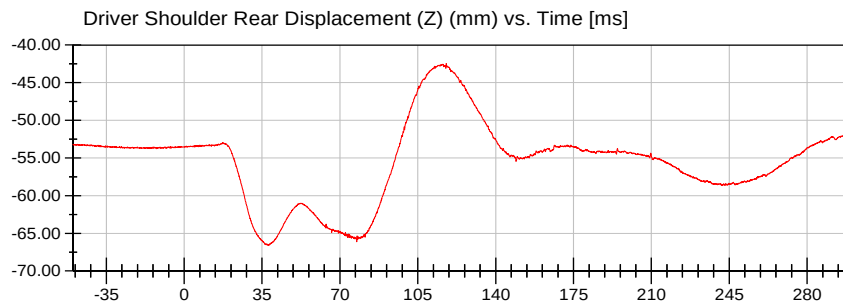
<Max>

-58.30 mm at 51.75 ms

<Min>

-85.29 mm at 21.15 ms

Unfiltered



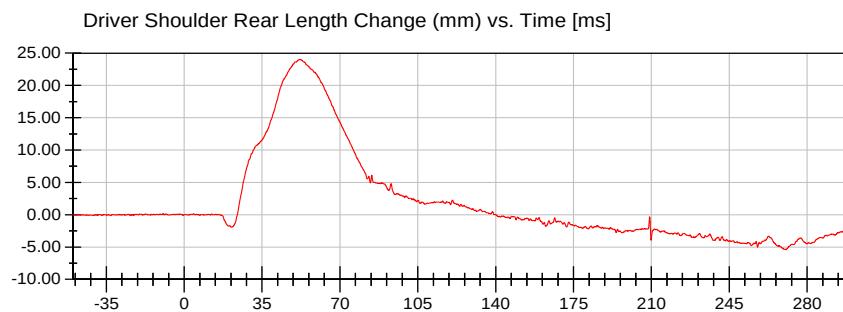
<Max>

-42.44 mm at 117.80 ms

<Min>

-66.58 mm at 37.60 ms

Unfiltered



<Max>

24.03 mm at 51.85 ms

<Min>

-5.41 mm at 270.50 ms

CFC\_600



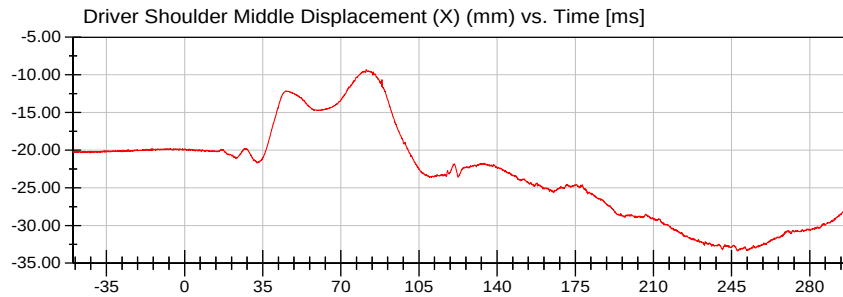


# VRTC

Test Date: 10/22/2020

Test Lab: CTF

Test Number: 201022 ()



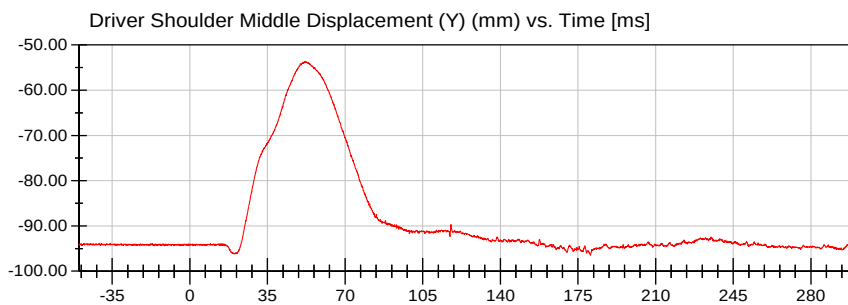
<Max>

-9.30 mm at 81.30 ms

<Min>

-33.39 mm at 247.70 ms

Unfiltered



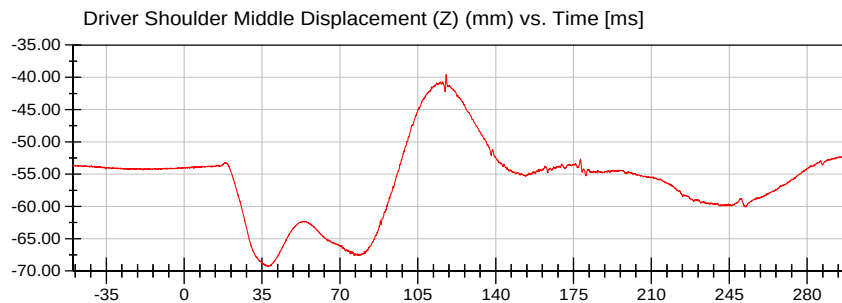
<Max>

-53.67 mm at 52.15 ms

<Min>

-96.46 mm at 180.60 ms

Unfiltered



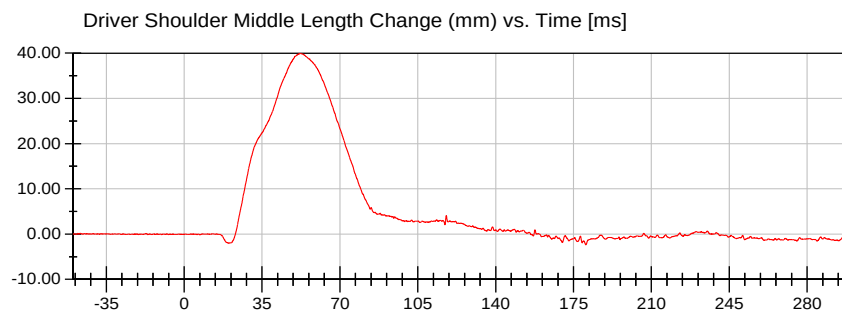
<Max>

-39.58 mm at 117.75 ms

<Min>

-69.29 mm at 37.80 ms

Unfiltered



<Max>

39.92 mm at 52.20 ms

<Min>

-2.37 mm at 180.55 ms

CFC\_600



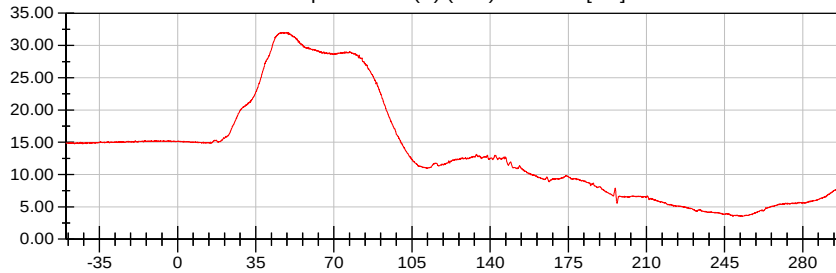
# VRTC

Test Date: 10/22/2020

Test Lab: CTF

Test Number: 201022 ()

Driver Shoulder Front Displacement (X) (mm) vs. Time [ms]



<Max>

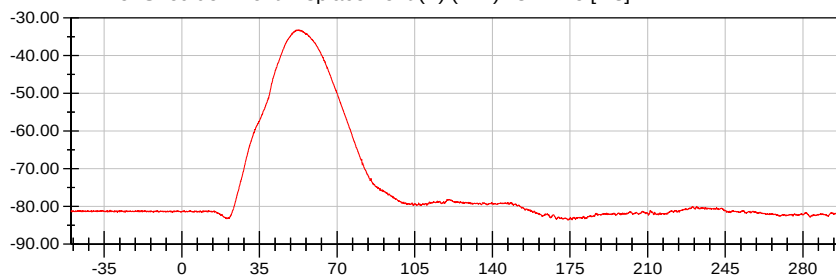
32.03 mm at 48.80 ms

<Min>

3.54 mm at 252.30 ms

Unfiltered

Driver Shoulder Front Displacement (Y) (mm) vs. Time [ms]



<Max>

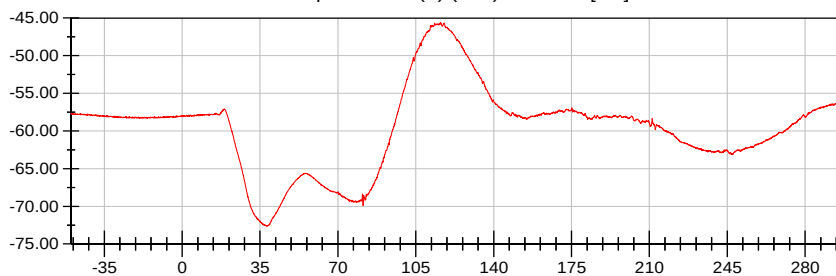
-33.17 mm at 52.45 ms

<Min>

-83.63 mm at 174.10 ms

Unfiltered

Driver Shoulder Front Displacement (Z) (mm) vs. Time [ms]



<Max>

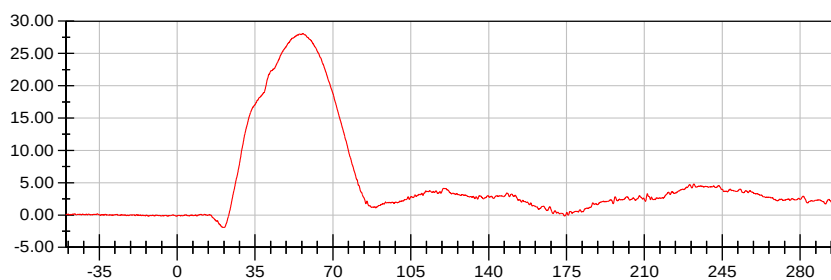
-45.60 mm at 116.10 ms

<Min>

-72.66 mm at 38.05 ms

Unfiltered

Driver Shoulder Front Length Change (mm) vs. Time [ms]



<Max>

28.11 mm at 56.45 ms

<Min>

-1.91 mm at 20.45 ms

CFC\_600

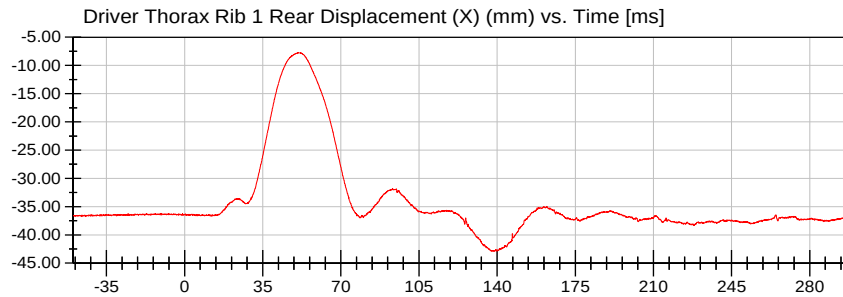


# VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



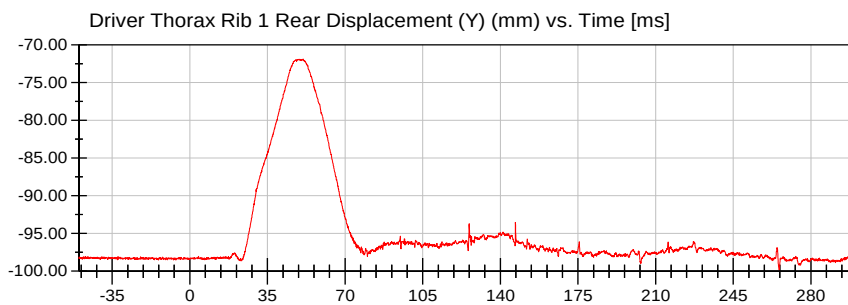
<Max>

-7.71 mm at 50.70 ms

<Min>

-42.94 mm at 138.60 ms

Unfiltered



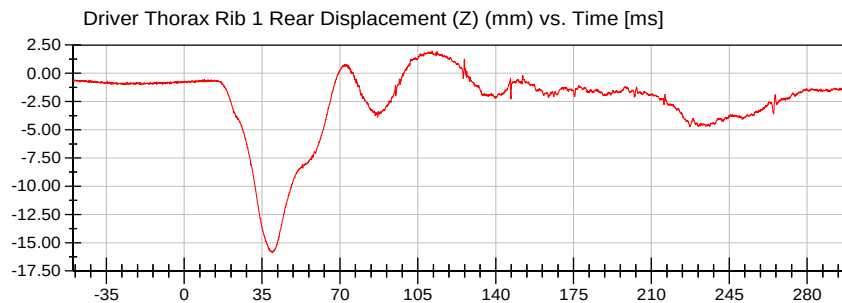
<Max>

-71.87 mm at 51.10 ms

<Min>

-99.80 mm at 265.70 ms

Unfiltered



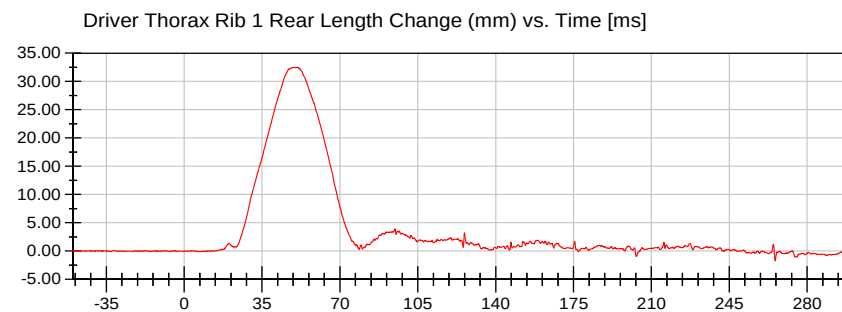
<Max>

1.98 mm at 111.45 ms

<Min>

-15.85 mm at 39.75 ms

Unfiltered



<Max>

32.48 mm at 51.00 ms

<Min>

-1.72 mm at 265.65 ms

CFC\_600

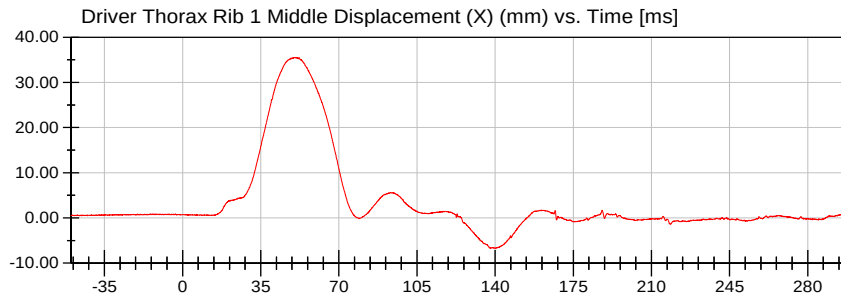


# VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



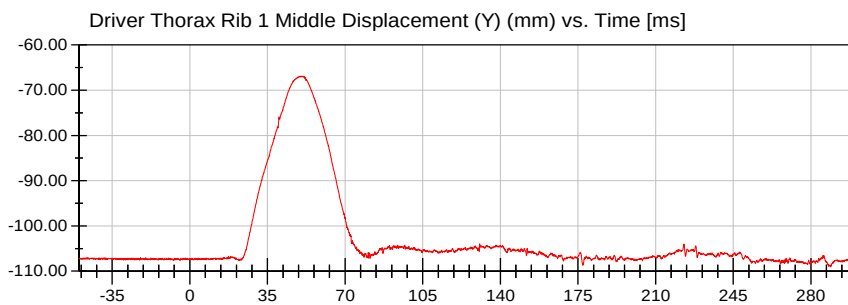
<Max>

35.51 mm at 50.45 ms

<Min>

-6.78 mm at 140.00 ms

Unfiltered



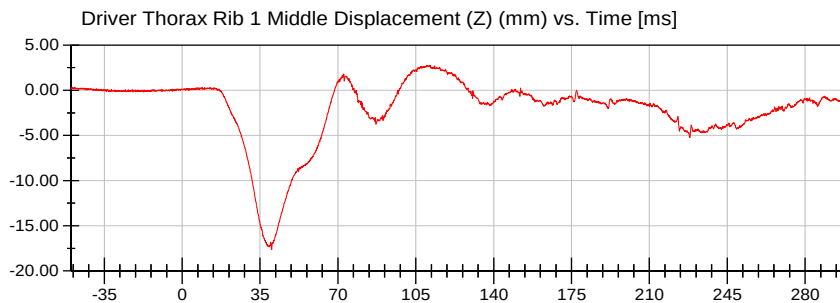
<Max>

-66.89 mm at 50.10 ms

<Min>

-109.00 mm at 288.95 ms

Unfiltered



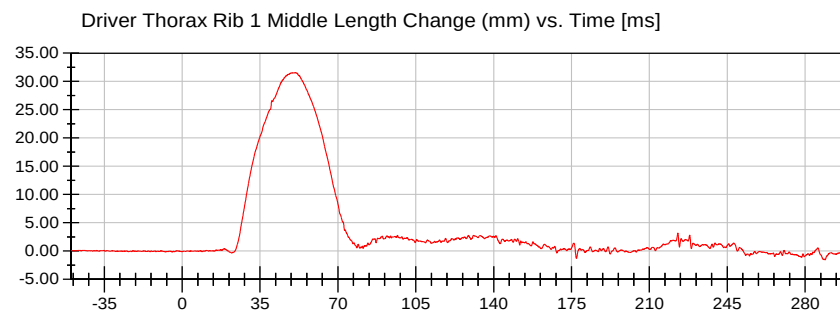
<Max>

2.75 mm at 111.40 ms

<Min>

-17.61 mm at 40.25 ms

Unfiltered



<Max>

31.55 mm at 50.90 ms

<Min>

-1.57 mm at 288.95 ms

CFC\_600

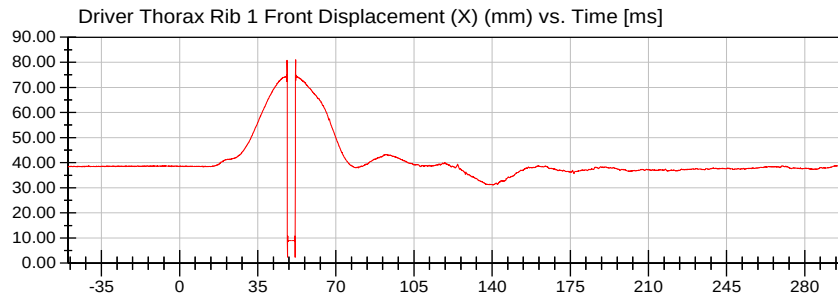


# VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



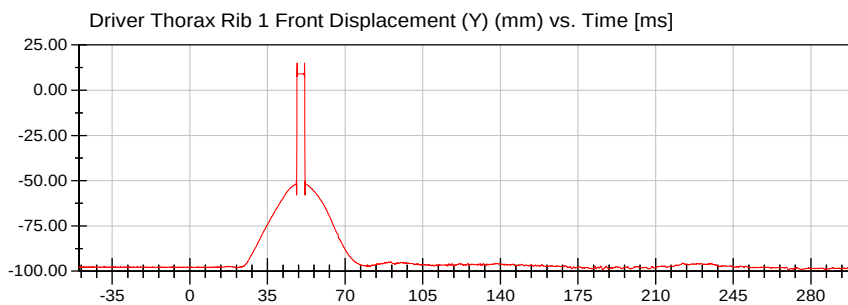
<Max>

81.02 mm at 51.95 ms

<Min>

2.41 mm at 48.35 ms

Unfiltered



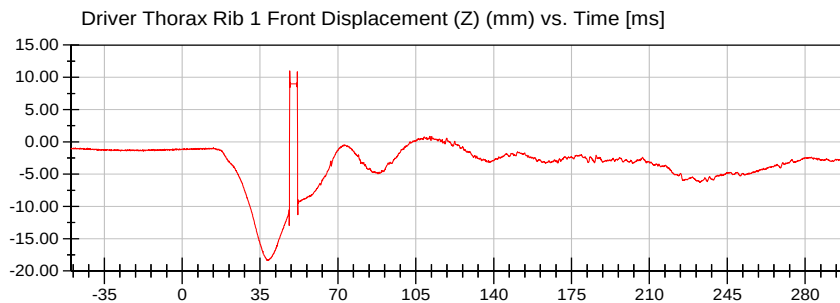
<Max>

15.11 mm at 48.35 ms

<Min>

-99.17 mm at 270.00 ms

Unfiltered



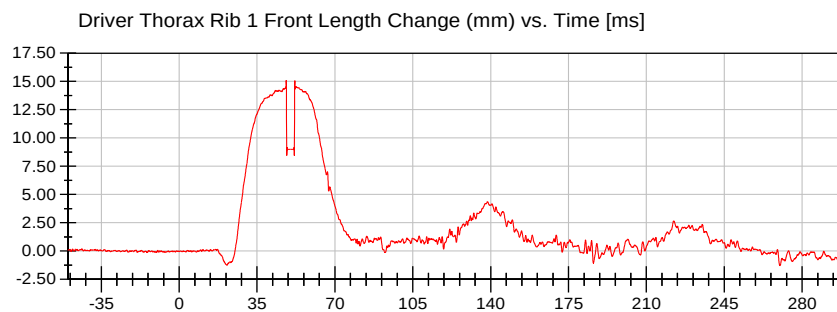
<Max>

11.01 mm at 48.35 ms

<Min>

-18.37 mm at 38.30 ms

Unfiltered



<Max>

15.07 mm at 48.15 ms

<Min>

-1.29 mm at 270.00 ms

CFC\_600



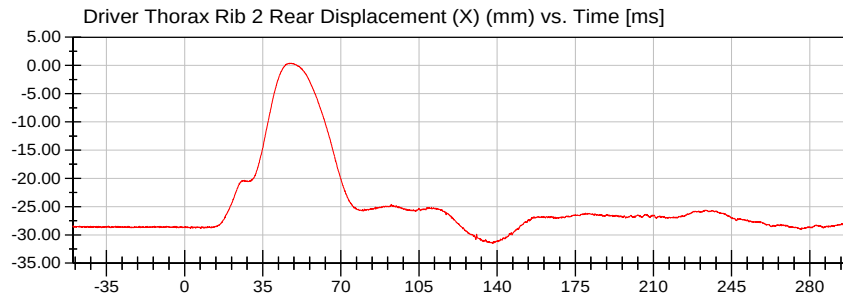


# VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



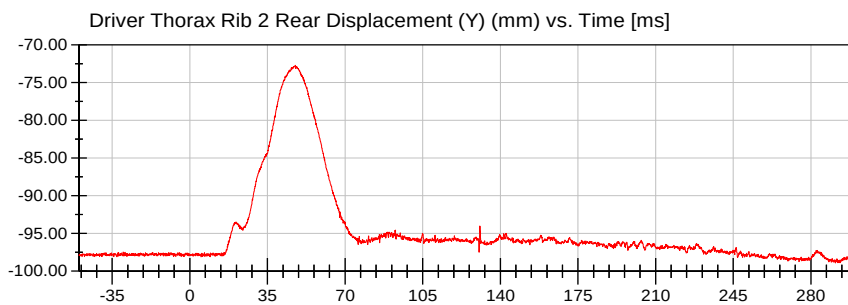
<Max>

0.38 mm at 47.40 ms

<Min>

-31.53 mm at 138.15 ms

Unfiltered



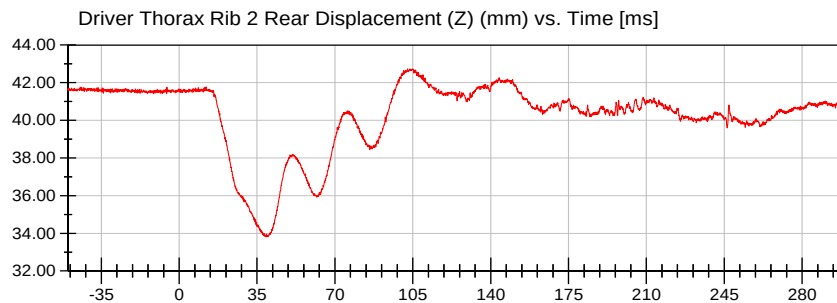
<Max>

-72.70 mm at 47.60 ms

<Min>

-98.91 mm at 291.10 ms

Unfiltered



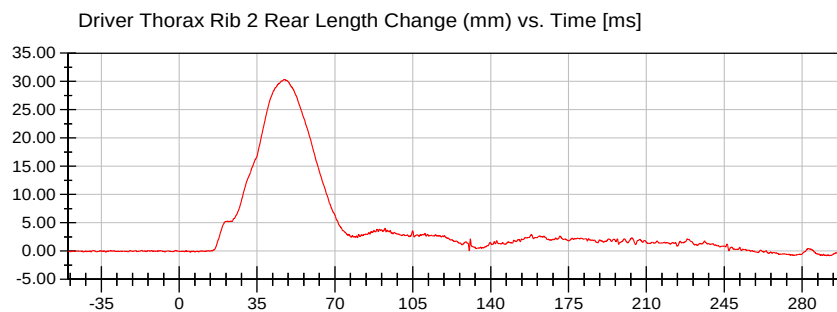
<Max>

42.74 mm at 105.00 ms

<Min>

33.80 mm at 39.50 ms

Unfiltered



<Max>

30.34 mm at 47.35 ms

<Min>

-0.83 mm at 291.05 ms

CFC\_600

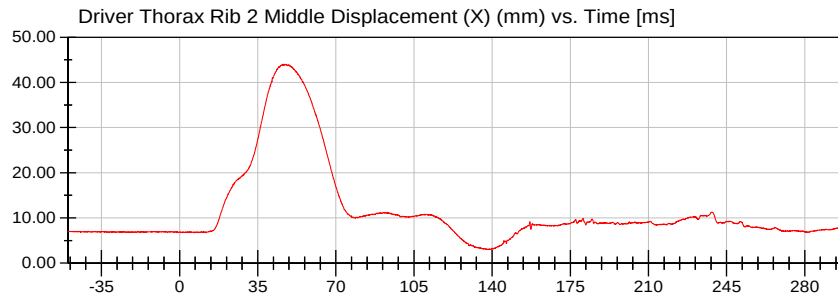


# VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



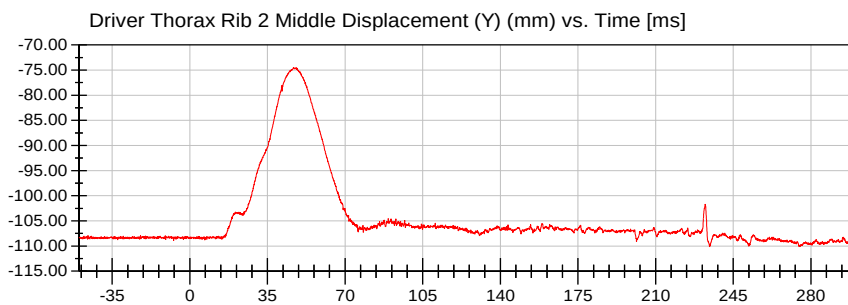
<Max>

44.02 mm at 47.35 ms

<Min>

2.99 mm at 139.10 ms

Unfiltered



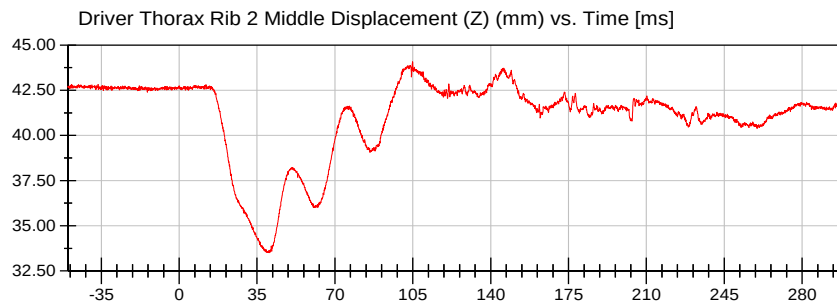
<Max>

-74.49 mm at 46.80 ms

<Min>

-110.12 mm at 274.70 ms

Unfiltered



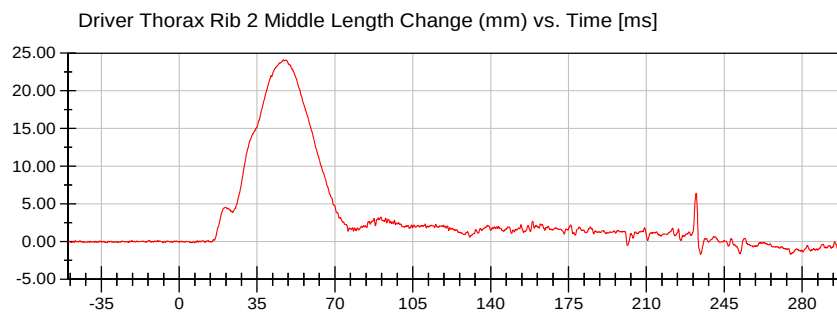
<Max>

44.08 mm at 104.90 ms

<Min>

33.51 mm at 40.10 ms

Unfiltered



<Max>

24.12 mm at 46.85 ms

<Min>

-1.69 mm at 234.40 ms

CFC\_600

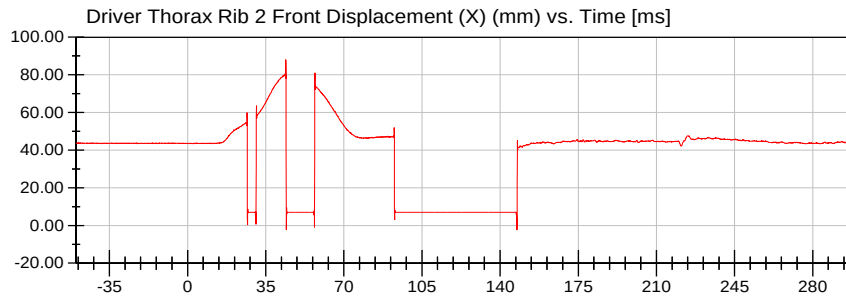


# VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



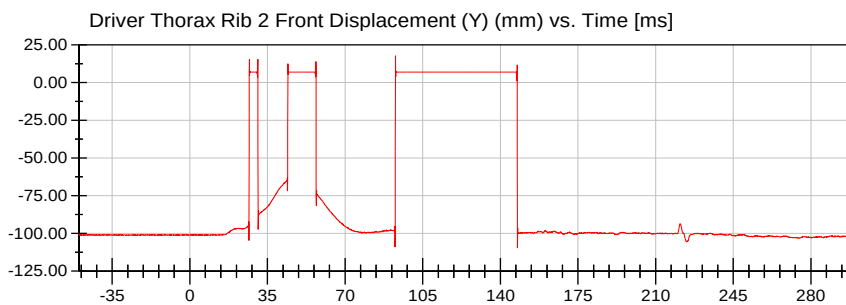
<Max>

87.98 mm at 44.05 ms

<Min>

-2.34 mm at 147.55 ms

Unfiltered



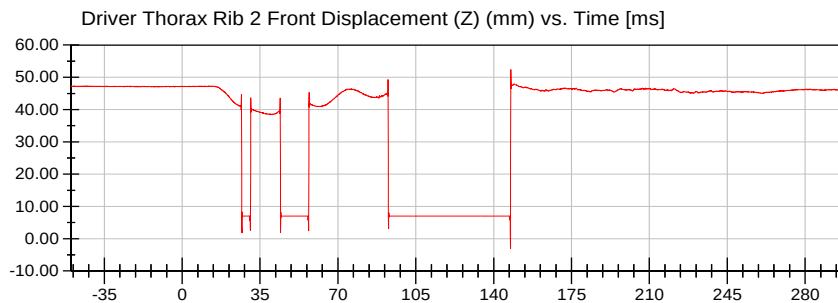
<Max>

17.60 mm at 92.75 ms

<Min>

-109.50 mm at 147.75 ms

Unfiltered



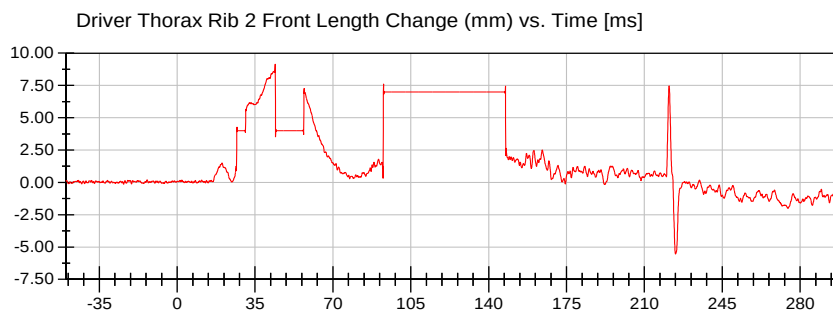
<Max>

52.37 mm at 147.75 ms

<Min>

-3.00 mm at 147.55 ms

Unfiltered



<Max>

9.15 mm at 44.05 ms

<Min>

-5.54 mm at 224.00 ms

CFC\_600

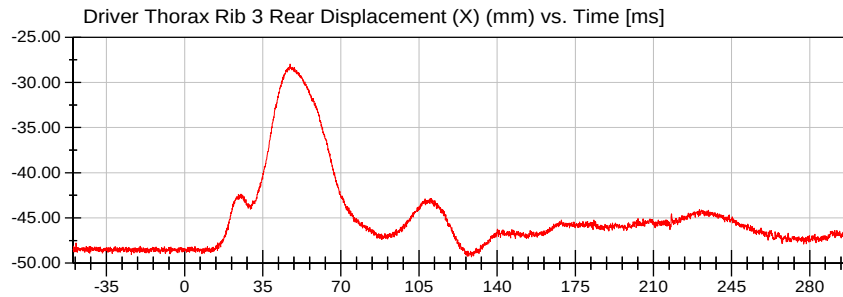


# VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



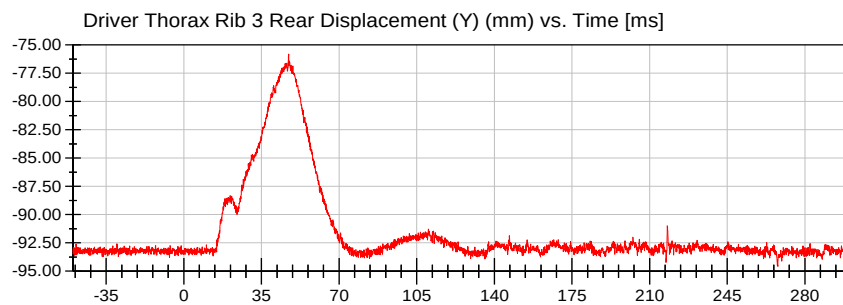
<Max>

-27.97 mm at 47.30 ms

<Min>

-49.31 mm at 128.50 ms

Unfiltered



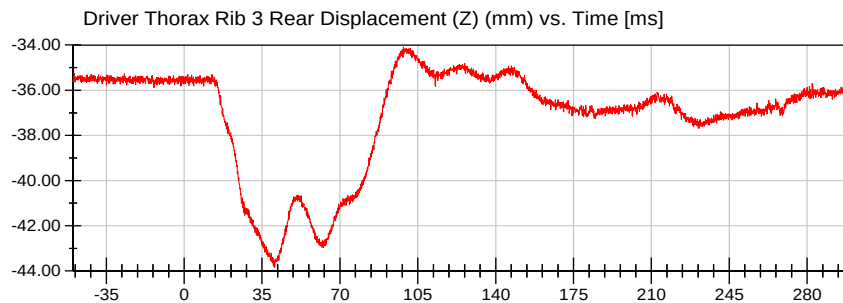
<Max>

-75.79 mm at 47.25 ms

<Min>

-94.55 mm at 267.80 ms

Unfiltered



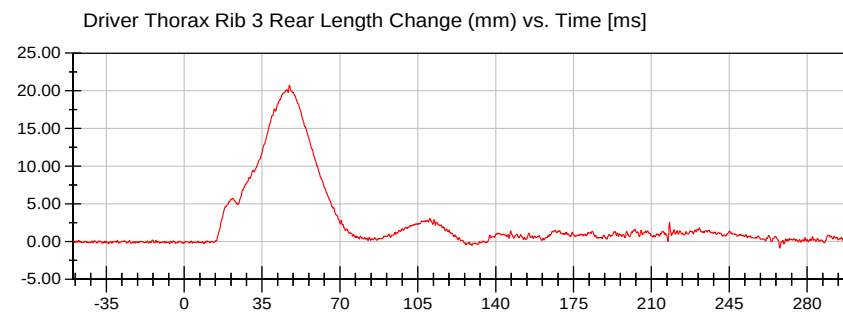
<Max>

-34.09 mm at 98.55 ms

<Min>

-43.83 mm at 40.50 ms

Unfiltered



<Max>

20.73 mm at 47.30 ms

<Min>

-0.88 mm at 267.70 ms

CFC\_600

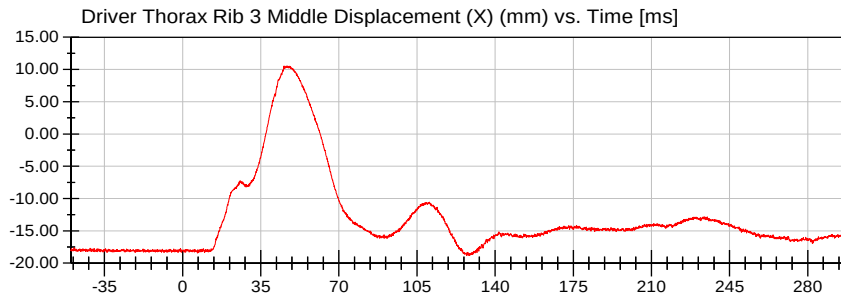


# VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



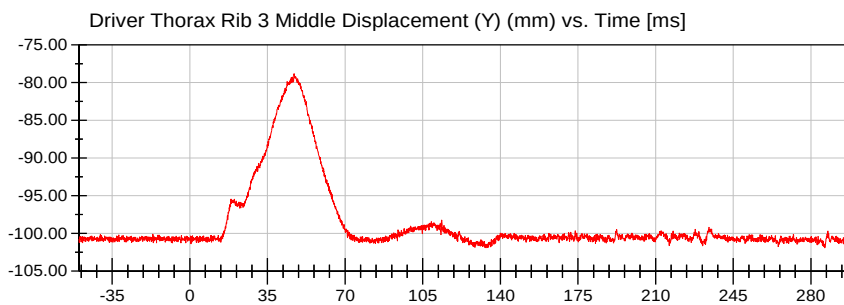
<Max>

10.54 mm at 47.10 ms

<Min>

-18.83 mm at 128.30 ms

Unfiltered



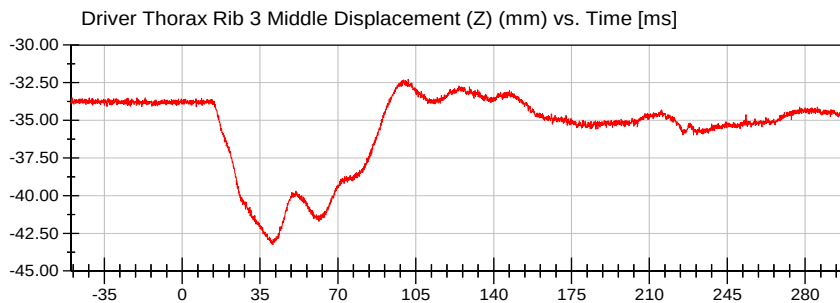
<Max>

-78.79 mm at 47.00 ms

<Min>

-101.91 mm at 133.50 ms

Unfiltered



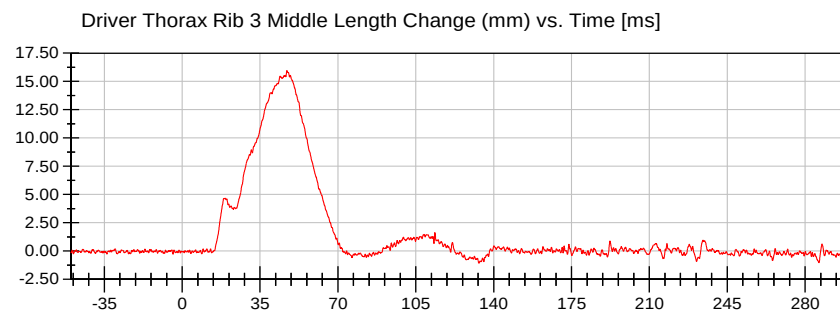
<Max>

-32.27 mm at 101.60 ms

<Min>

-43.25 mm at 40.75 ms

Unfiltered



<Max>

15.95 mm at 47.10 ms

<Min>

-1.07 mm at 133.40 ms

CFC\_600



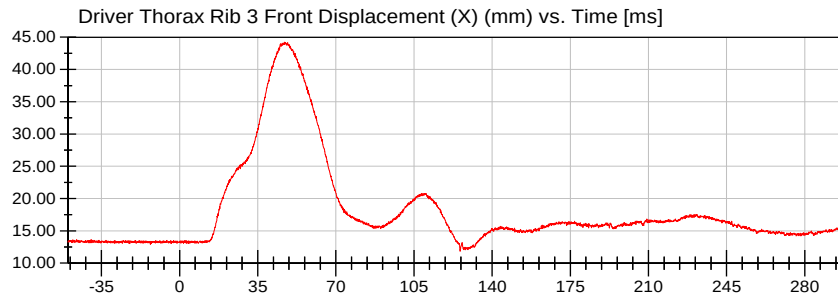


# VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



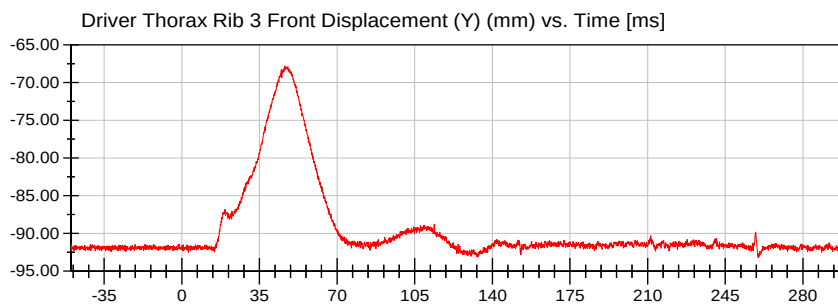
<Max>

44.23 mm at 47.00 ms

<Min>

11.83 mm at 125.70 ms

Unfiltered



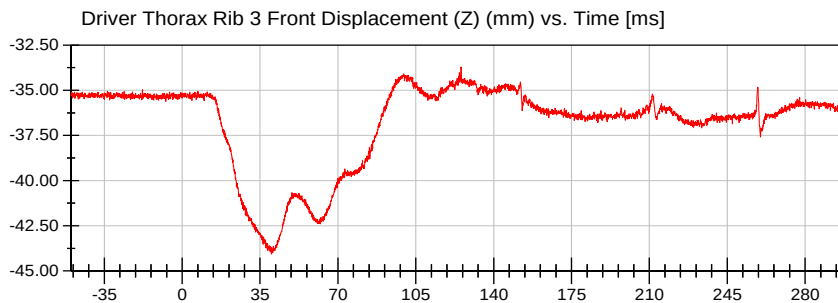
<Max>

-67.79 mm at 46.40 ms

<Min>

-93.19 mm at 259.90 ms

Unfiltered



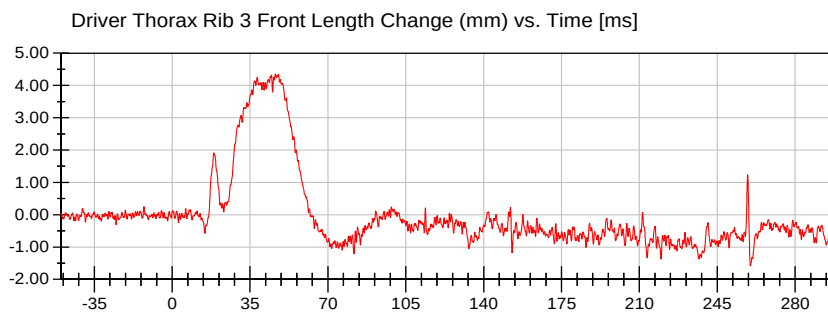
<Max>

-33.71 mm at 125.35 ms

<Min>

-44.06 mm at 40.15 ms

Unfiltered



<Max>

4.35 mm at 47.75 ms

<Min>

-1.59 mm at 259.85 ms

CFC\_600

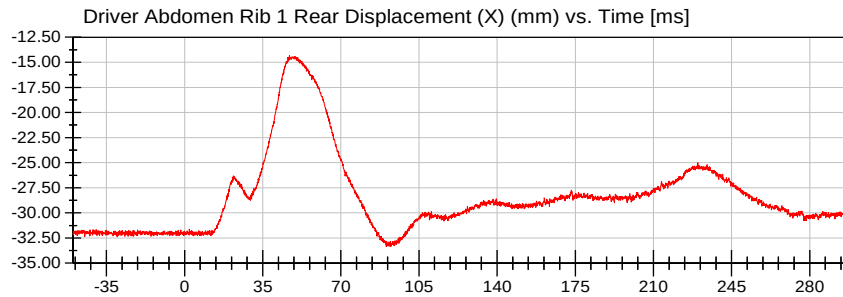


# VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



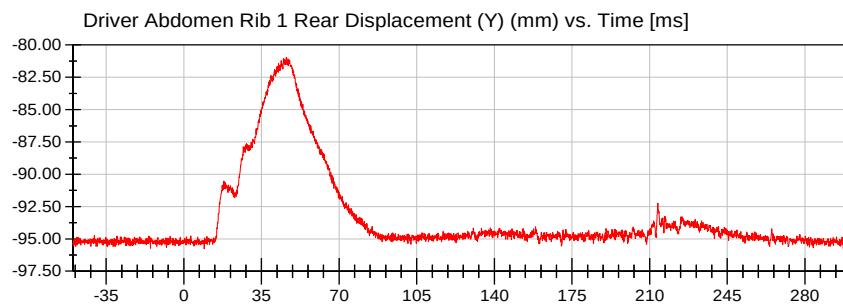
<Max>

-14.32 mm at 47.00 ms

<Min>

-33.37 mm at 90.30 ms

Unfiltered



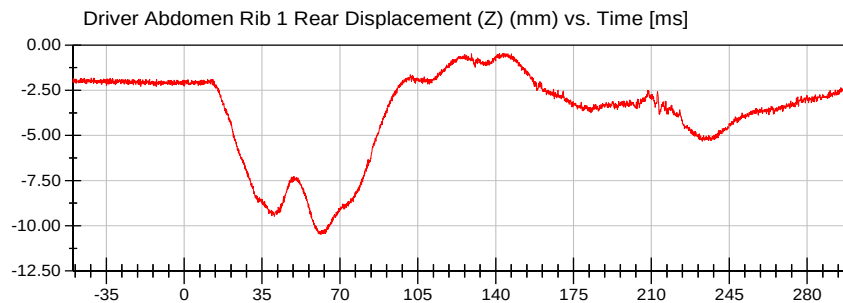
<Max>

-80.97 mm at 46.20 ms

<Min>

-96.09 mm at 297.50 ms

Unfiltered



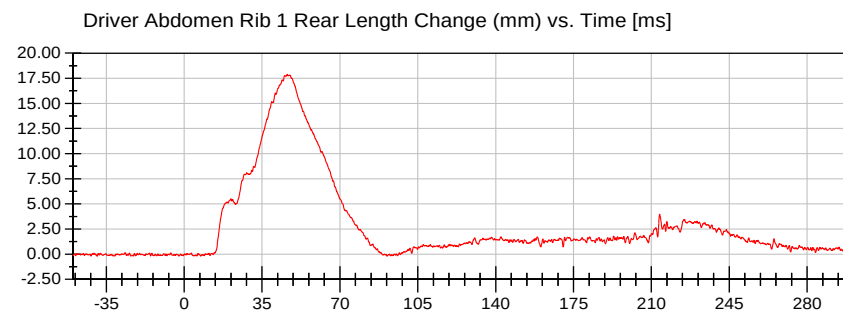
<Max>

-0.46 mm at 141.70 ms

<Min>

-10.47 mm at 61.50 ms

Unfiltered



<Max>

17.89 mm at 46.30 ms

<Min>

-0.22 mm at 297.50 ms

CFC\_600

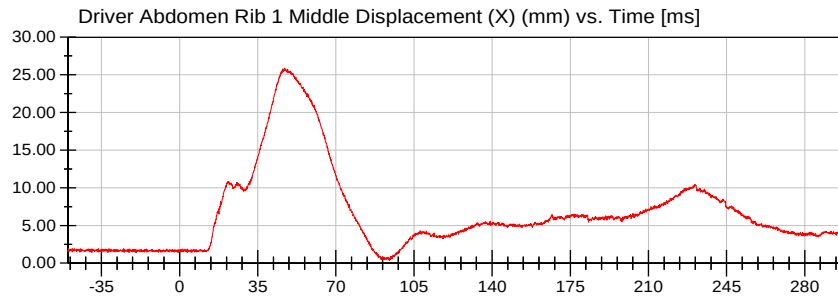


# VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



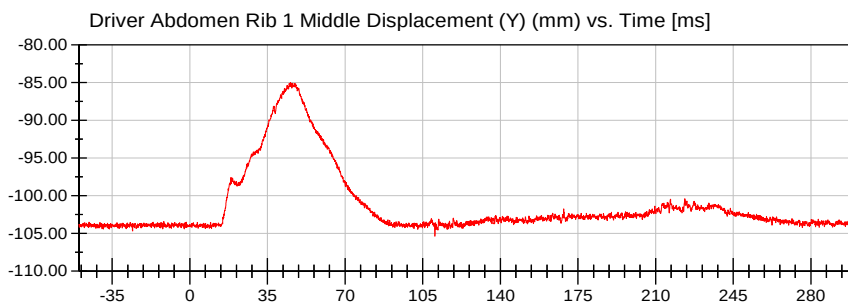
<Max>

25.88 mm at 47.05 ms

<Min>

0.36 mm at 94.00 ms

Unfiltered



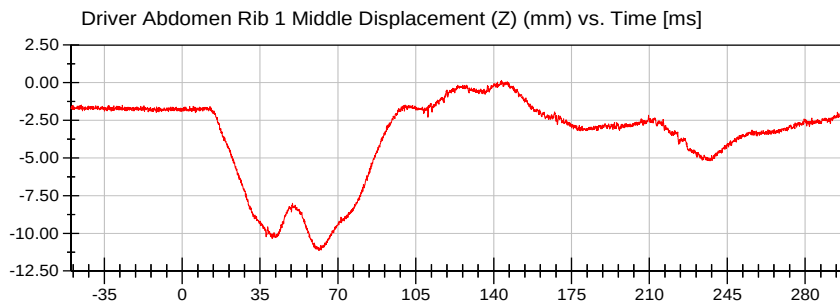
<Max>

-84.99 mm at 45.40 ms

<Min>

-105.39 mm at 110.50 ms

Unfiltered



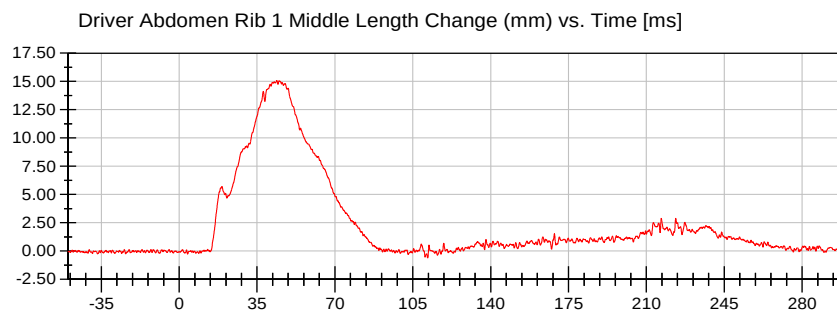
<Max>

0.15 mm at 143.50 ms

<Min>

-11.14 mm at 61.50 ms

Unfiltered



<Max>

15.09 mm at 43.90 ms

<Min>

-0.61 mm at 111.70 ms

CFC\_600

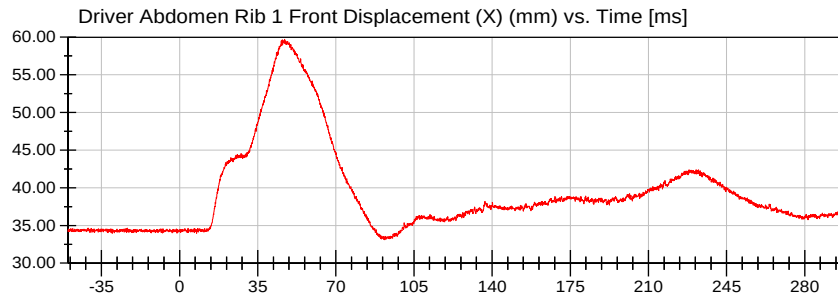


# VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



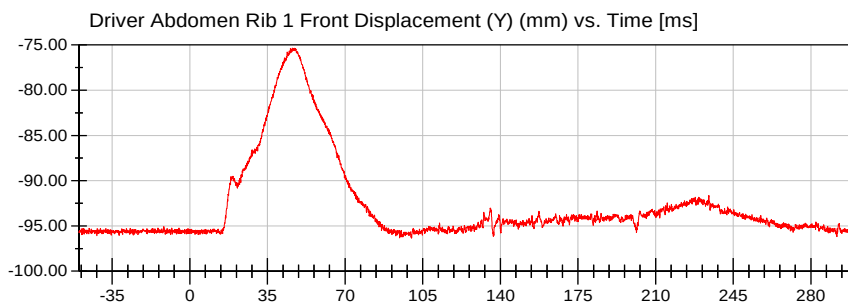
<Max>

59.72 mm at 47.05 ms

<Min>

33.10 mm at 91.95 ms

Unfiltered



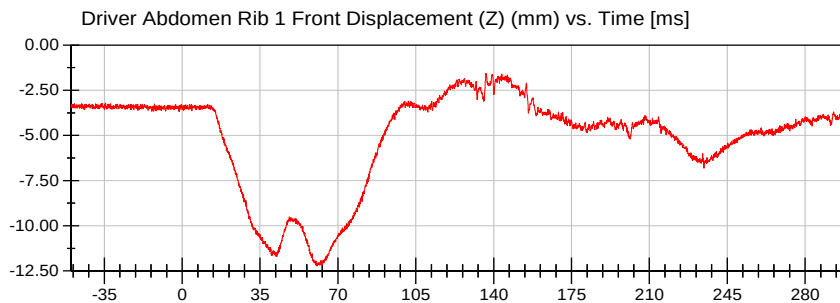
<Max>

-75.35 mm at 46.20 ms

<Min>

-96.34 mm at 100.00 ms

Unfiltered



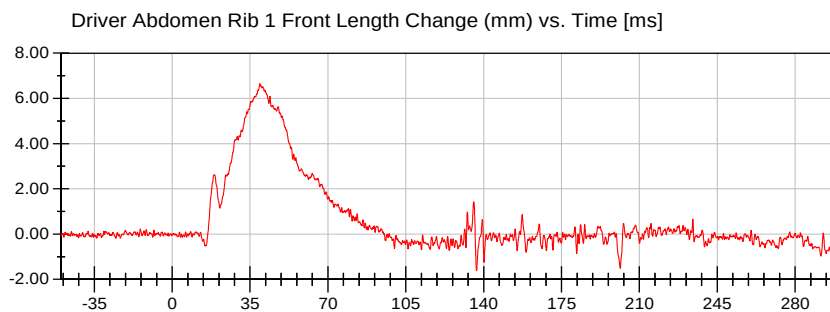
<Max>

-1.58 mm at 136.50 ms

<Min>

-12.22 mm at 60.70 ms

Unfiltered



<Max>

6.65 mm at 39.40 ms

<Min>

-1.61 mm at 136.80 ms

CFC\_600

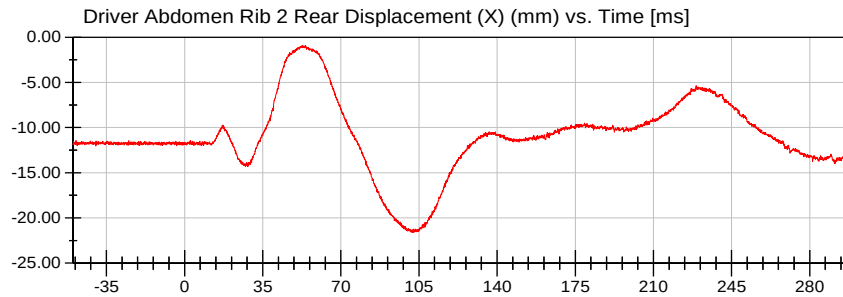


# VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



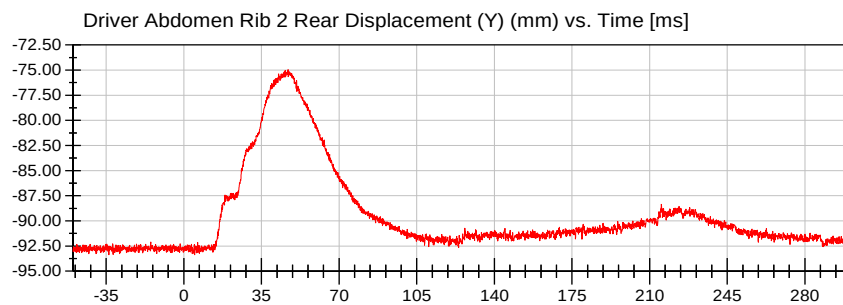
<Max>

-0.90 mm at 52.70 ms

<Min>

-21.61 mm at 102.45 ms

Unfiltered



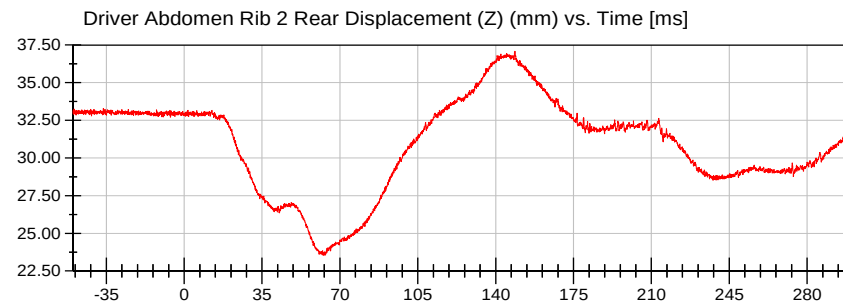
<Max>

-74.95 mm at 47.00 ms

<Min>

-93.38 mm at -33.80 ms

Unfiltered



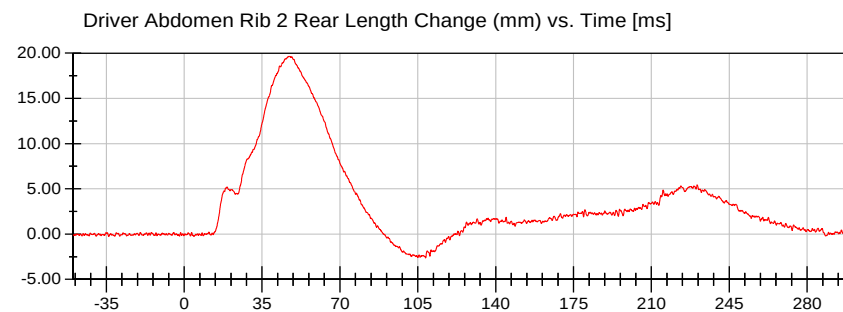
<Max>

37.08 mm at 148.60 ms

<Min>

23.53 mm at 62.55 ms

Unfiltered



<Max>

19.64 mm at 47.40 ms

<Min>

-2.61 mm at 108.50 ms

CFC\_600



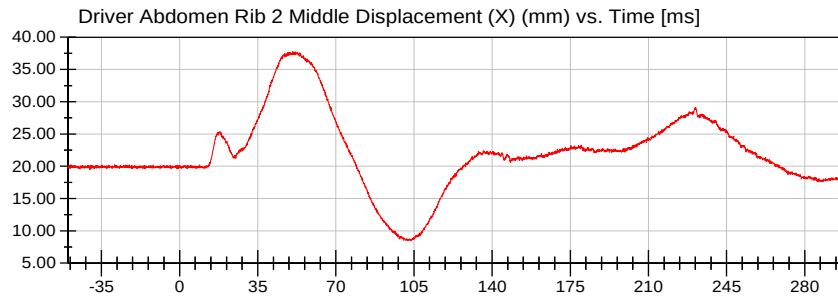


# VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



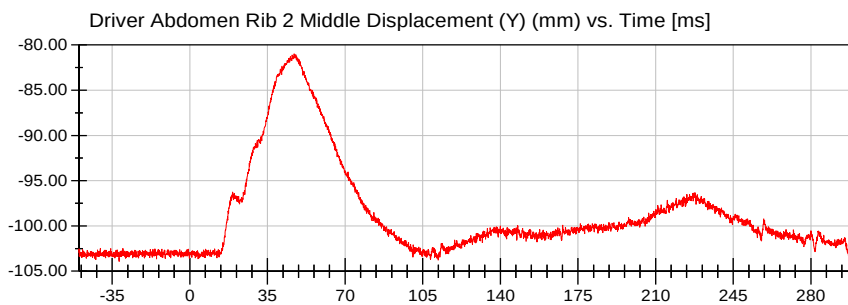
<Max>

37.76 mm at 50.70 ms

<Min>

8.49 mm at 103.55 ms

Unfiltered



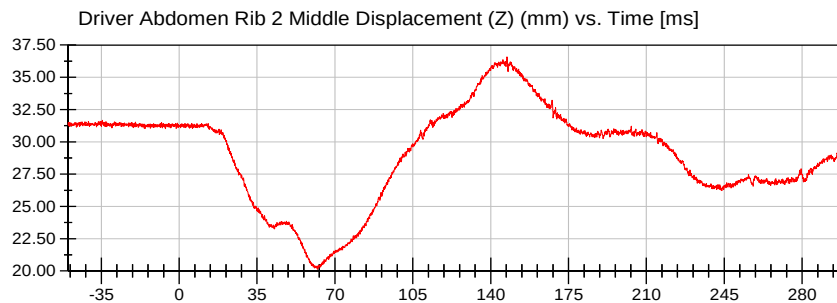
<Max>

-80.98 mm at 47.00 ms

<Min>

-103.93 mm at -31.90 ms

Unfiltered



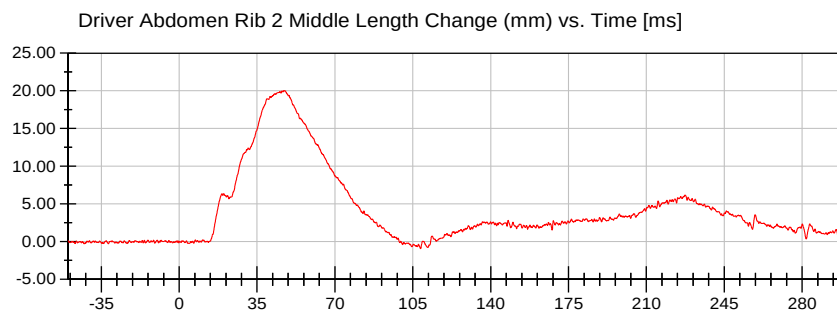
<Max>

36.59 mm at 147.35 ms

<Min>

20.14 mm at 62.10 ms

Unfiltered



<Max>

20.01 mm at 47.10 ms

<Min>

-0.94 mm at 108.50 ms

CFC\_600

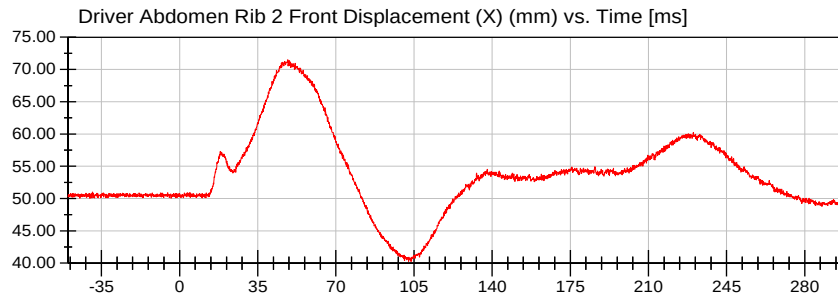


# VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



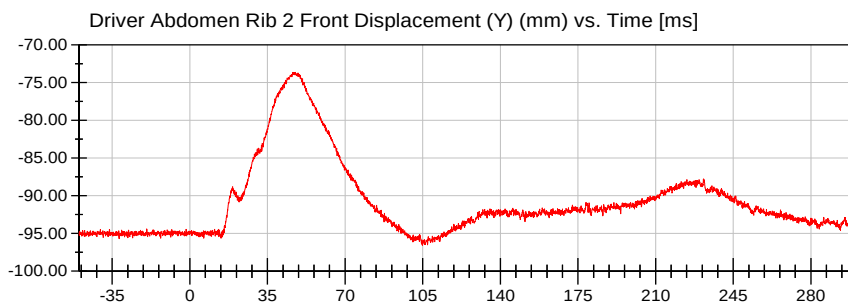
<Max>

71.49 mm at 48.45 ms

<Min>

40.28 mm at 103.60 ms

Unfiltered



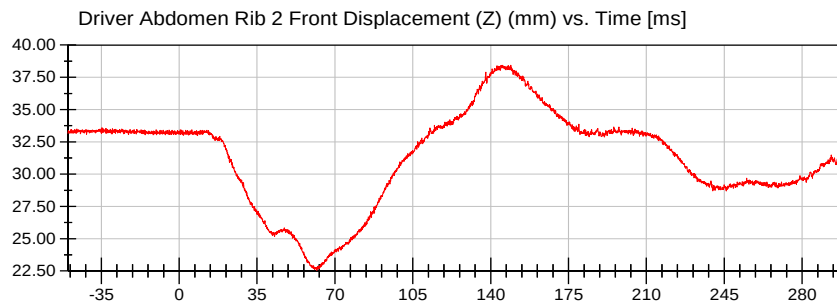
<Max>

-73.63 mm at 46.40 ms

<Min>

-96.58 mm at 104.85 ms

Unfiltered



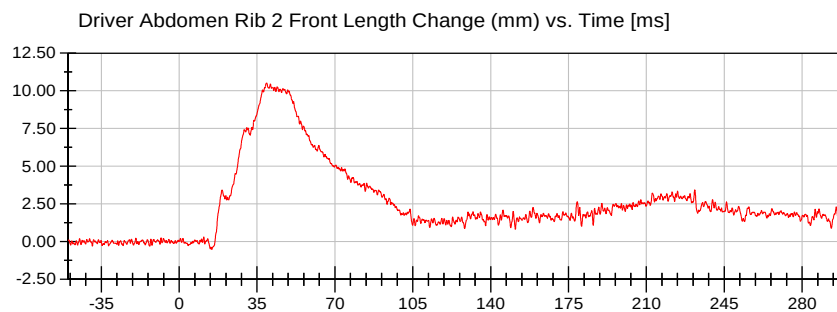
<Max>

38.43 mm at 149.00 ms

<Min>

22.55 mm at 61.85 ms

Unfiltered



<Max>

10.52 mm at 39.30 ms

<Min>

-0.52 mm at 14.65 ms

CFC\_600

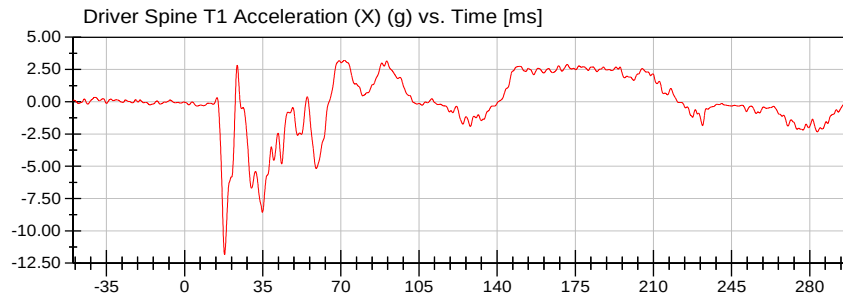


# VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



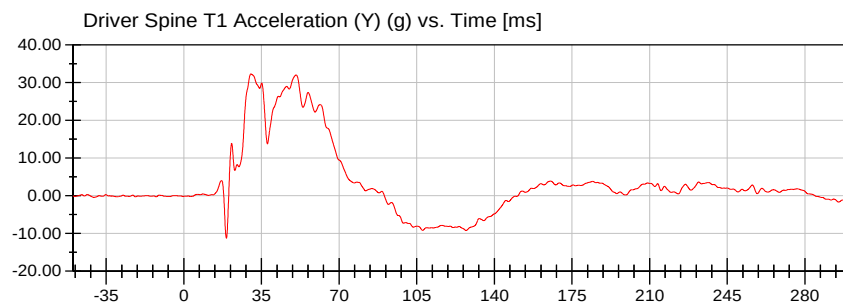
<Max>

3.20 g at 71.65 ms

<Min>

-11.83 g at 17.90 ms

CFC\_180



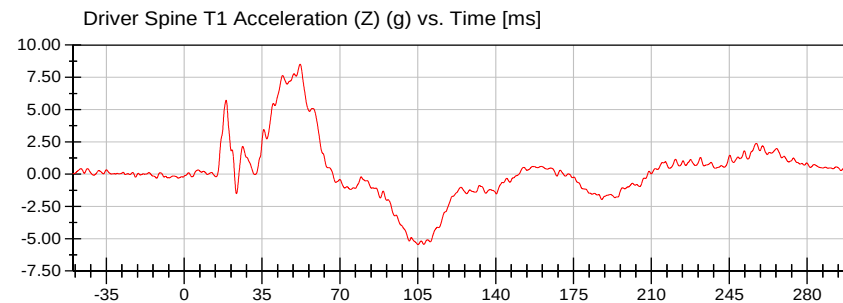
<Max>

32.31 g at 30.25 ms

<Min>

-11.25 g at 19.20 ms

CFC\_180



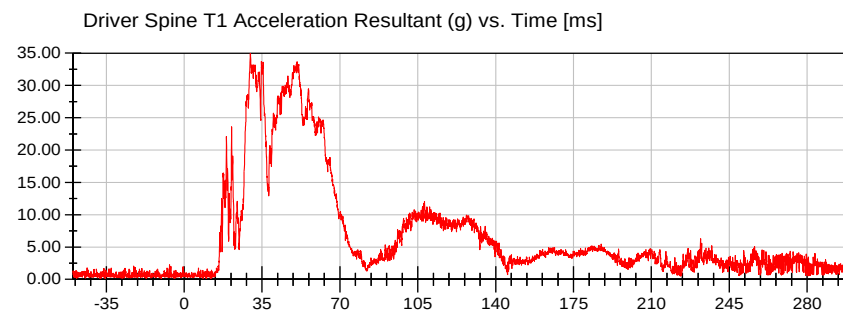
<Max>

8.51 g at 52.10 ms

<Min>

-5.45 g at 105.05 ms

CFC\_180



<Max>

34.94 g at 29.75 ms

<Min>

0.13 g at -48.30 ms

Prefiltered\_> CFC 1000

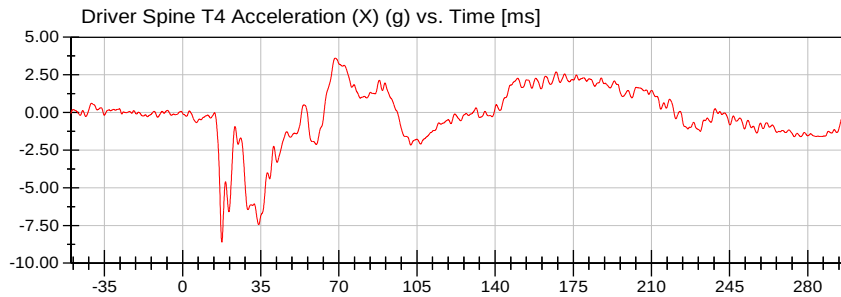


# VRTC

Test Date: 10/22/2020

Test Lab: CTF

Test Number: 201022 ()



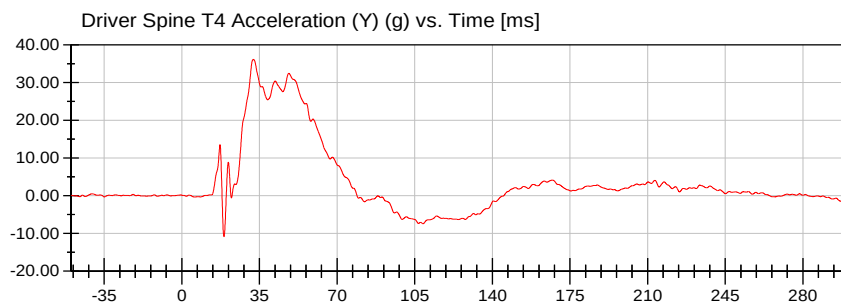
<Max>

3.60 g at 68.40 ms

<Min>

-8.60 g at 17.60 ms

CFC\_180



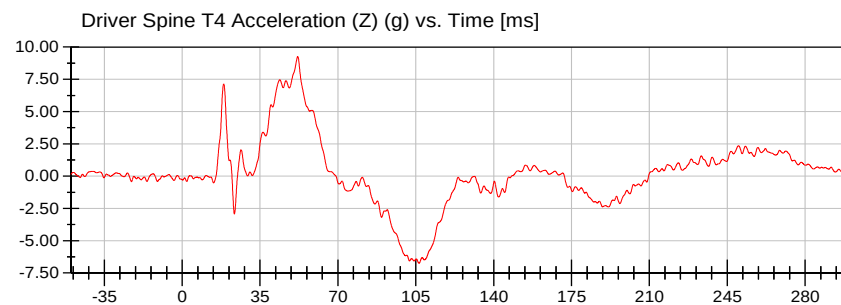
<Max>

36.20 g at 32.20 ms

<Min>

-10.88 g at 19.05 ms

CFC\_180



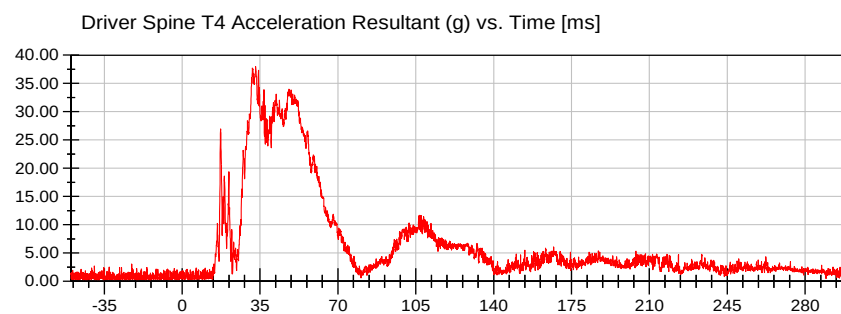
<Max>

9.27 g at 51.95 ms

<Min>

-6.74 g at 106.45 ms

CFC\_180



<Max>

37.98 g at 33.05 ms

<Min>

0.27 g at -46.90 ms

Prefiltered\_> CFC 1000

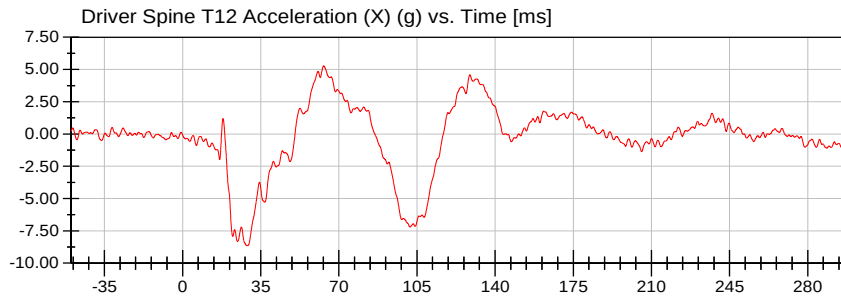


# VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



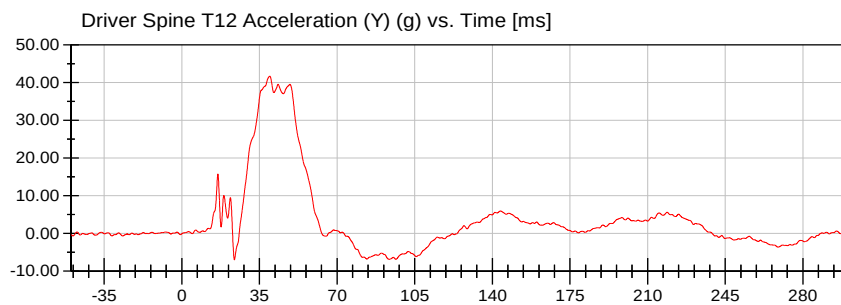
<Max>

5.29 g at 63.20 ms

<Min>

-8.66 g at 28.75 ms

CFC\_180



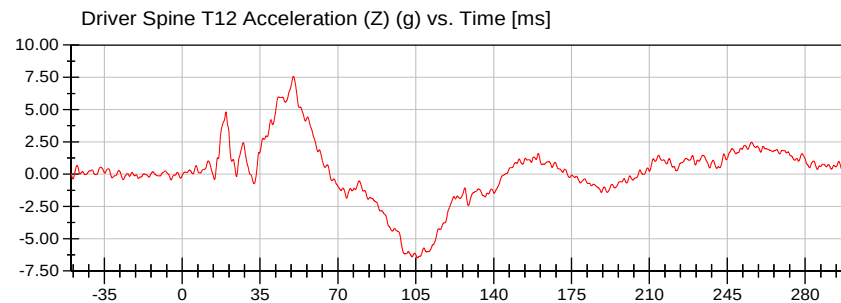
<Max>

41.75 g at 39.65 ms

<Min>

-6.97 g at 23.70 ms

CFC\_180



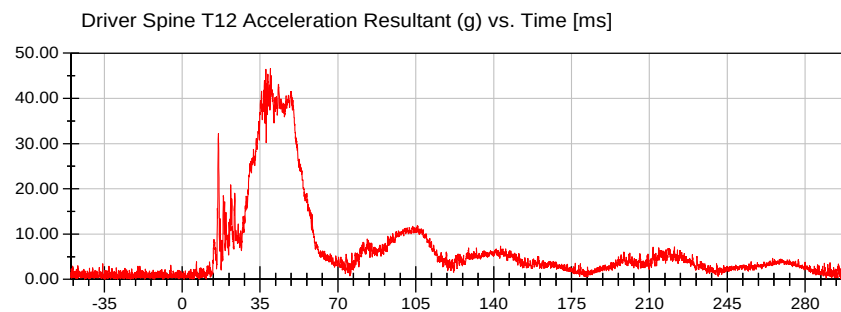
<Max>

7.57 g at 50.00 ms

<Min>

-6.49 g at 105.80 ms

CFC\_180



<Max>

46.59 g at 39.65 ms

<Min>

0.06 g at -43.85 ms

Prefiltered\_> CFC 1000



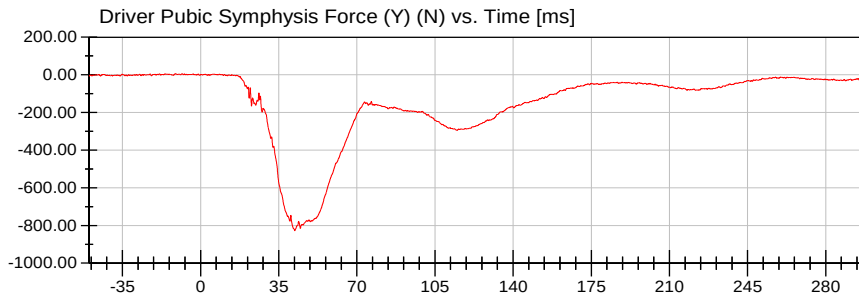


# VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



<Max>

6.05 N at -8.25 ms

<Min>

-828.00 N at 42.20 ms

CFC\_600

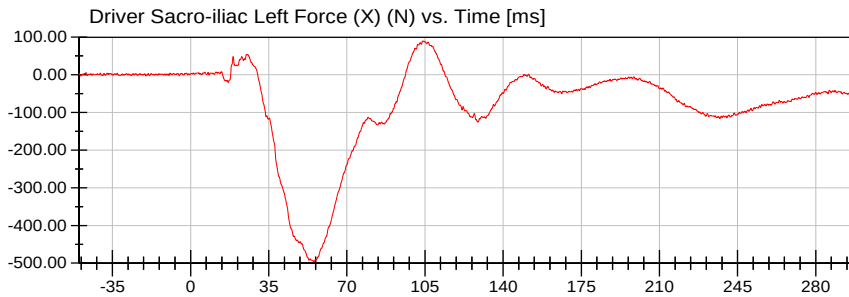
TRC

# VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



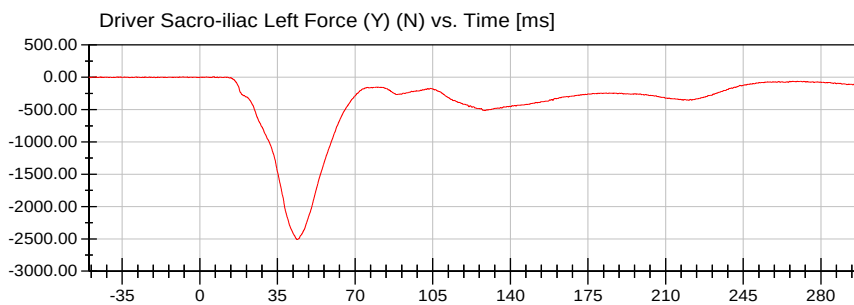
<Max>

89.53 N at 103.95 ms

<Min>

-497.18 N at 55.25 ms

CFC\_600



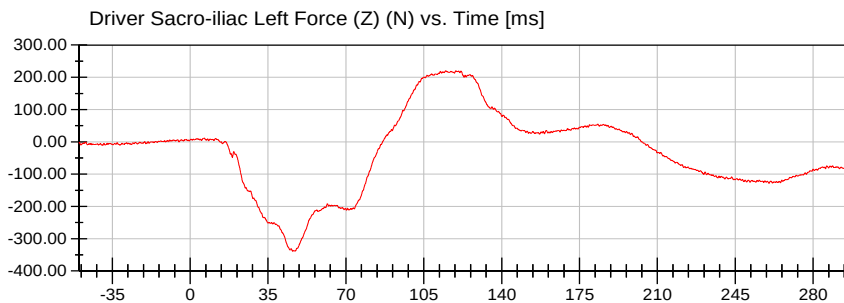
<Max>

8.53 N at -46.80 ms

<Min>

-2,510.07 N at 44.00 ms

CFC\_600



<Max>

220.03 N at 114.80 ms

<Min>

-338.68 N at 46.10 ms

CFC\_600

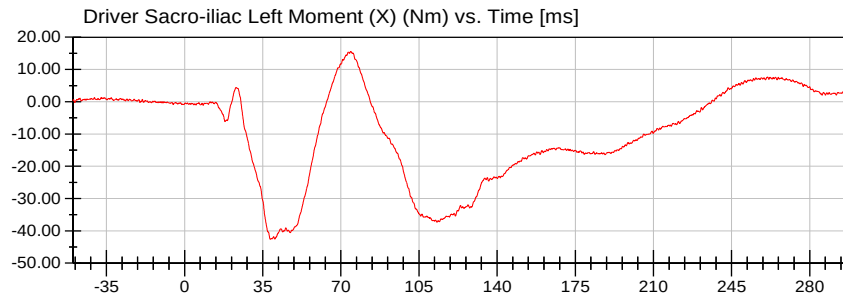


# VRTC

Test Date: 10/22/2020

Test Lab: CTF

Test Number: 201022 ()



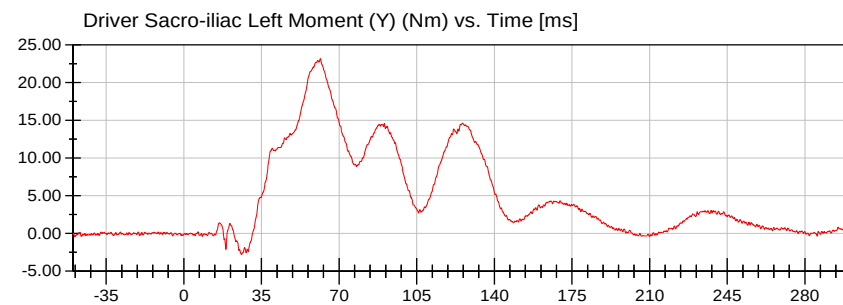
<Max>

15.52 Nm at 74.40 ms

<Min>

-42.61 Nm at 38.35 ms

CFC\_600



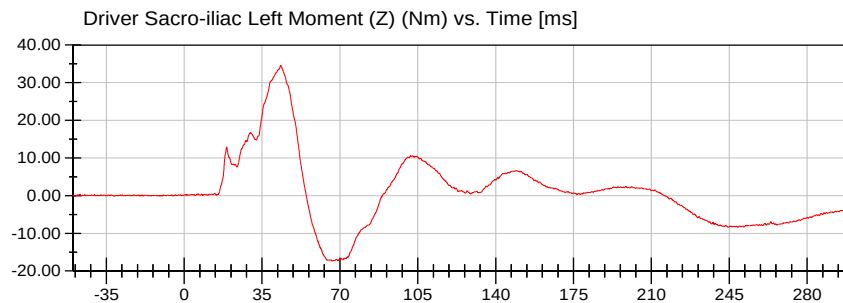
<Max>

23.18 Nm at 61.60 ms

<Min>

-2.77 Nm at 26.05 ms

CFC\_600



<Max>

34.58 Nm at 43.40 ms

<Min>

-17.35 Nm at 66.60 ms

CFC\_600

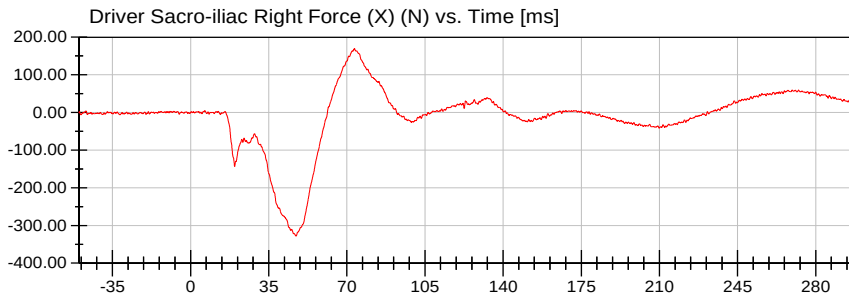


# VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



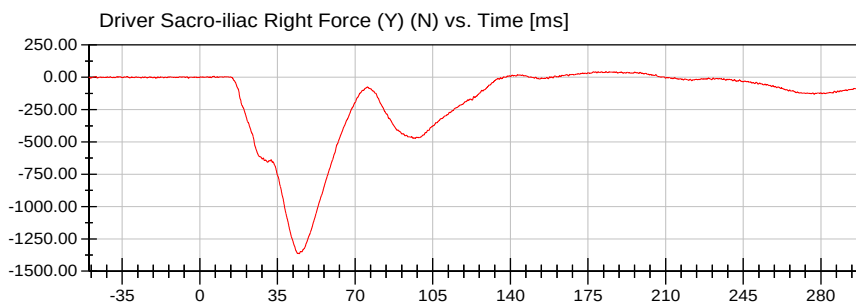
**<Max>**

169.59 N at 73.40 ms

**<Min>**

-328.21 N at 47.30 ms

CFC\_600



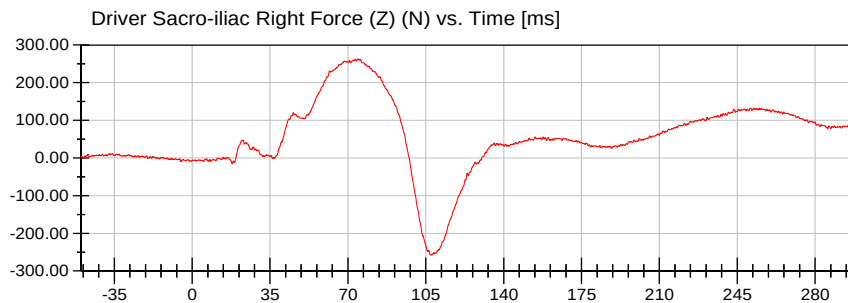
**<Max>**

44.30 N at 183.20 ms

**<Min>**

-1,364.48 N at 44.75 ms

CFC\_600



**<Max>**

263.10 N at 74.45 ms

**<Min>**

-257.93 N at 107.40 ms

CFC\_600

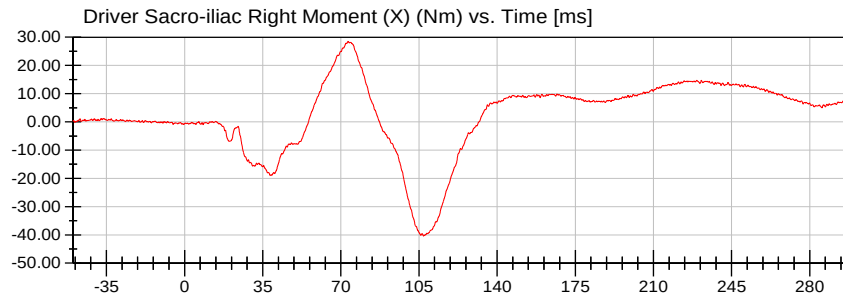


# VRTC

Test Date: 10/22/2020

Test Lab: CTF

Test Number: 201022 ()



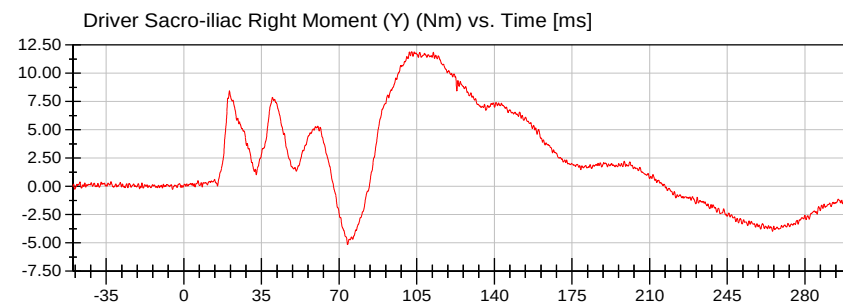
<Max>

28.49 Nm at 73.20 ms

<Min>

-40.36 Nm at 107.00 ms

CFC\_600



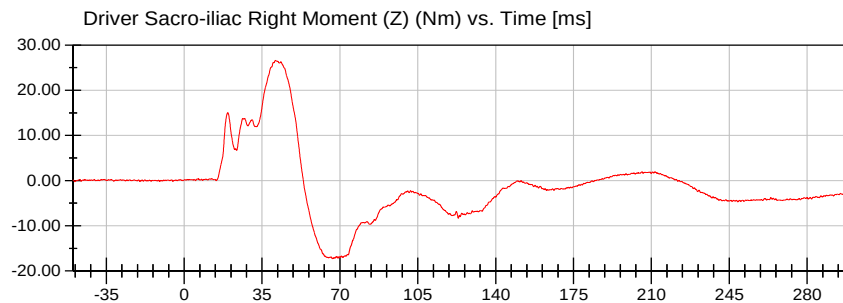
<Max>

11.91 Nm at 102.75 ms

<Min>

-5.15 Nm at 73.85 ms

CFC\_600



<Max>

26.59 Nm at 41.00 ms

<Min>

-17.28 Nm at 66.65 ms

CFC\_600



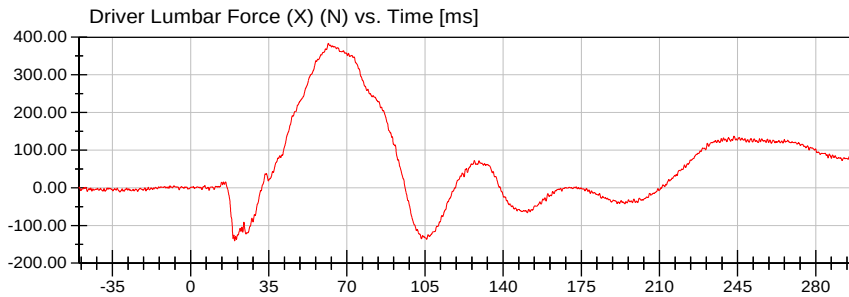


# VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



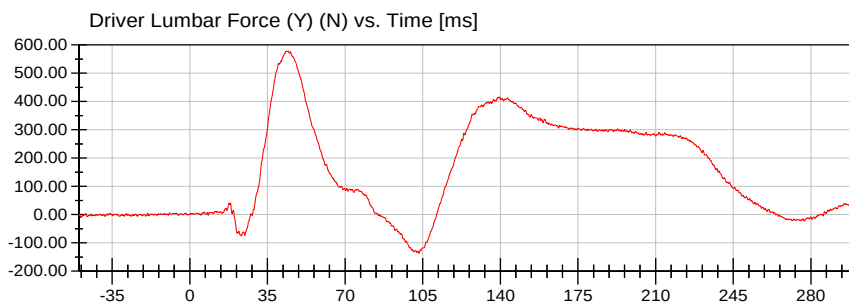
<Max>

383.72 N at 61.70 ms

<Min>

-140.69 N at 19.75 ms

CFC\_600



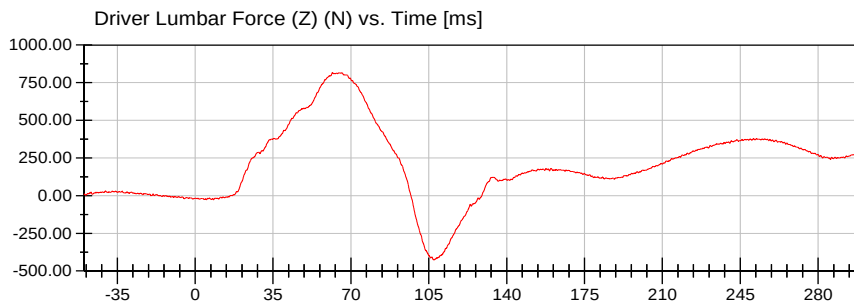
<Max>

578.16 N at 43.50 ms

<Min>

-136.55 N at 103.35 ms

CFC\_600



<Max>

816.27 N at 61.70 ms

<Min>

-425.82 N at 107.35 ms

CFC\_600

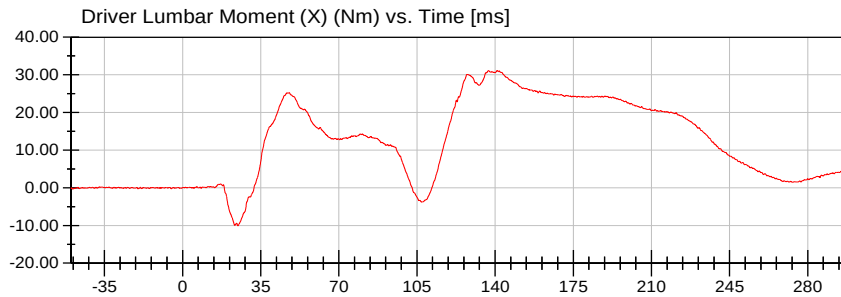


# VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



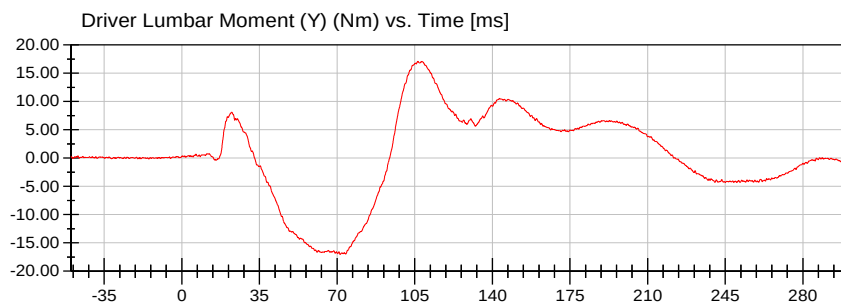
<Max>

31.12 Nm at 141.00 ms

<Min>

-10.10 Nm at 24.75 ms

CFC\_600



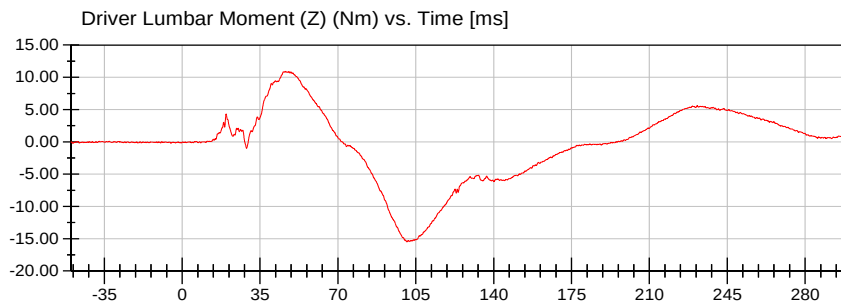
<Max>

17.10 Nm at 106.50 ms

<Min>

-17.06 Nm at 71.45 ms

CFC\_600



<Max>

10.90 Nm at 46.35 ms

<Min>

-15.49 Nm at 101.00 ms

CFC\_600

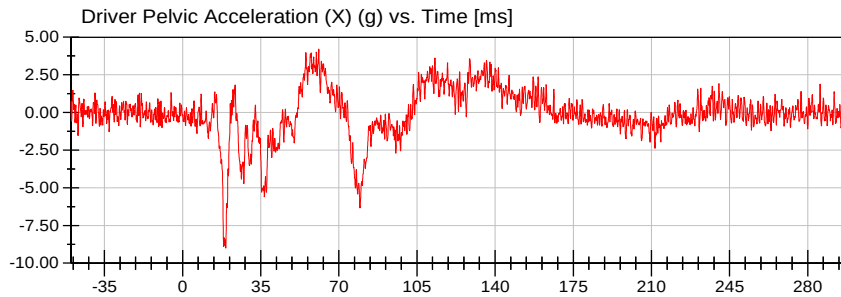


# VRTC

Test Date: 10/22/2020

Test Lab: CTF

Test Number: 201022 ()



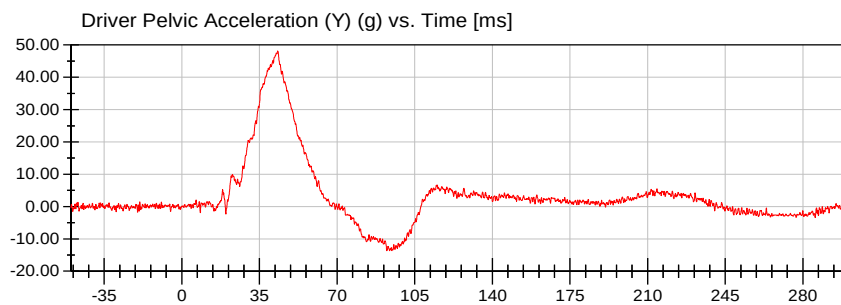
<Max>

4.21 g at 61.00 ms

<Min>

-9.00 g at 19.35 ms

CFC\_1000



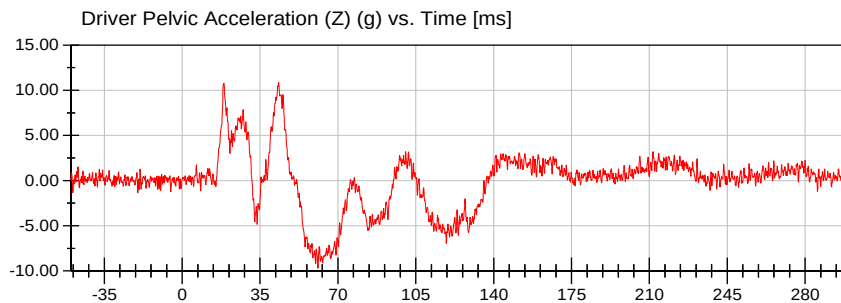
<Max>

48.14 g at 43.30 ms

<Min>

-13.69 g at 92.45 ms

CFC\_1000



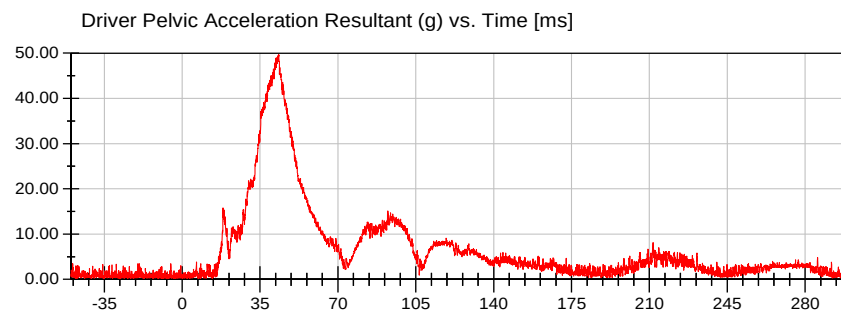
<Max>

10.84 g at 43.35 ms

<Min>

-9.67 g at 61.00 ms

CFC\_1000



<Max>

49.64 g at 43.30 ms

<Min>

0.17 g at -21.75 ms

Prefiltered\_> CFC 1000

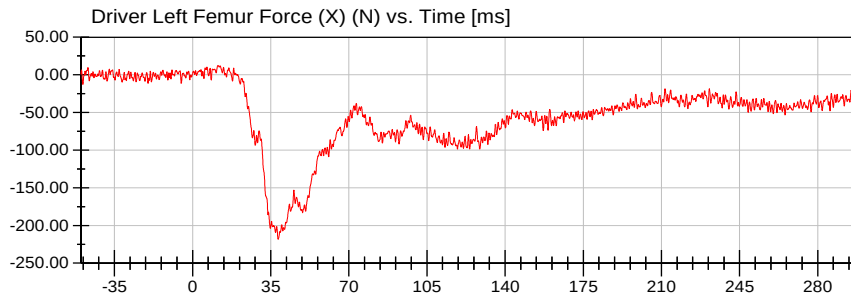


# VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



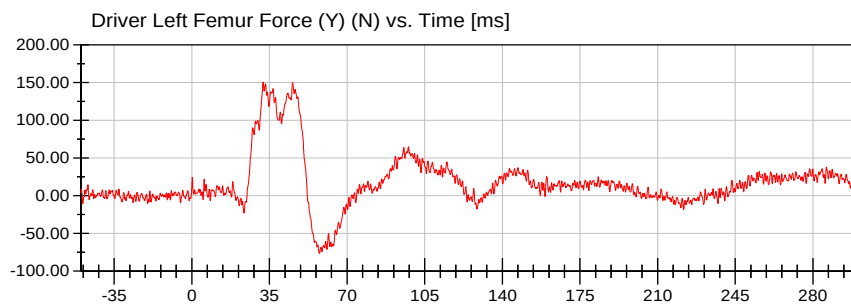
<Max>

12.33 N at 11.30 ms

<Min>

-218.50 N at 38.30 ms

CFC\_600



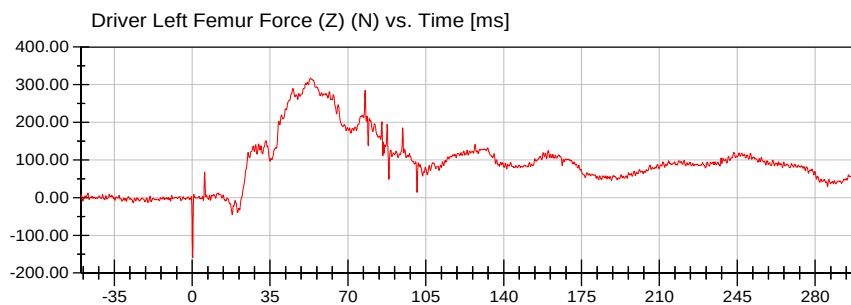
<Max>

150.72 N at 32.10 ms

<Min>

-76.49 N at 57.55 ms

CFC\_600



<Max>

317.41 N at 53.20 ms

<Min>

-159.19 N at 0.20 ms

CFC\_600

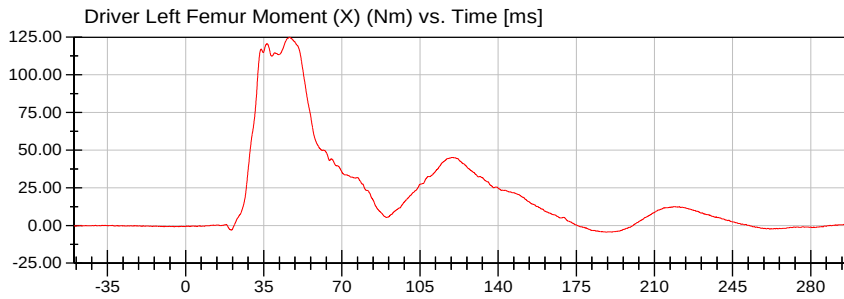
TRC

# VRTC

Test Date: 10/22/2020

Test Lab: CTF

Test Number: 201022 ()



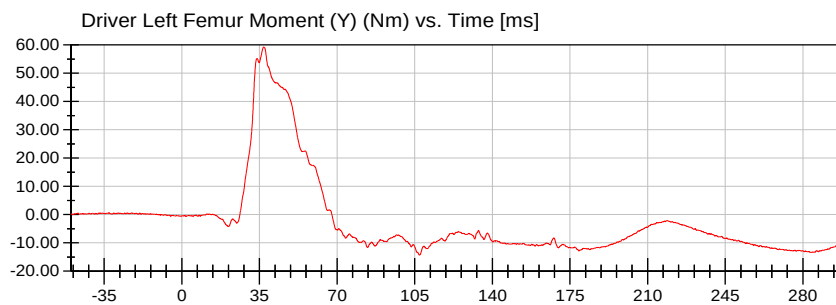
<Max>

124.98 Nm at 46.60 ms

<Min>

-4.49 Nm at 188.45 ms

CFC\_600



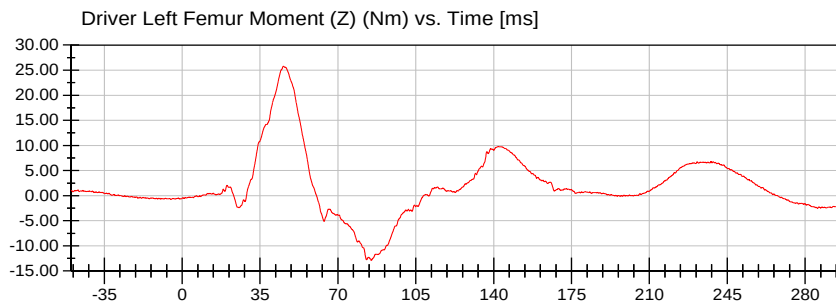
<Max>

59.29 Nm at 36.90 ms

<Min>

-14.31 Nm at 107.15 ms

CFC\_600



<Max>

25.77 Nm at 45.45 ms

<Min>

-12.88 Nm at 85.00 ms

CFC\_600



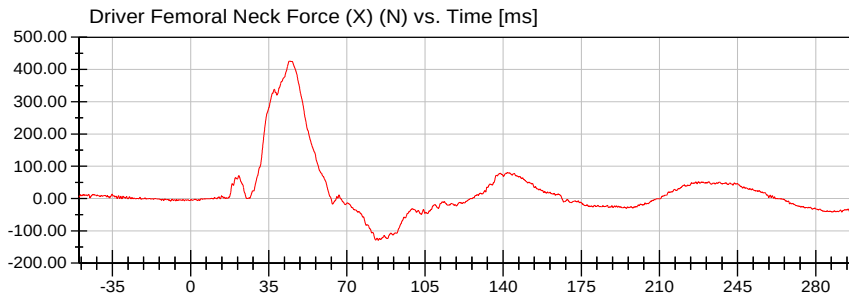


# VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



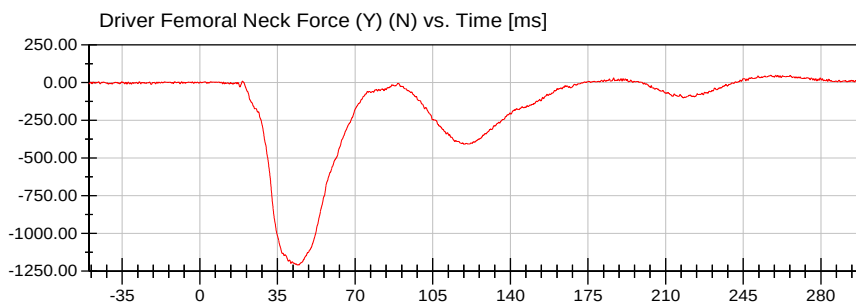
<Max>

425.53 N at 44.25 ms

<Min>

-129.13 N at 84.05 ms

CFC\_600



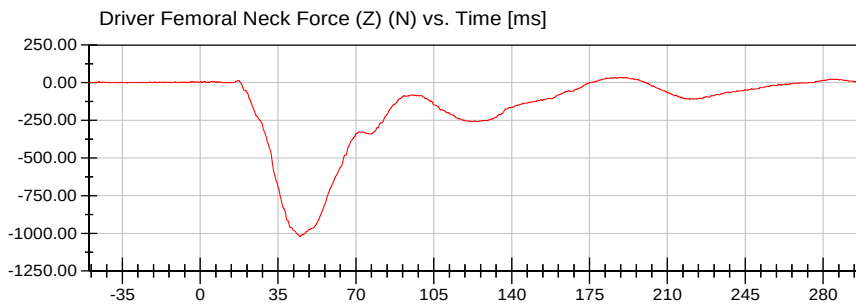
<Max>

49.58 N at 259.65 ms

<Min>

-1,208.68 N at 44.15 ms

CFC\_600



<Max>

36.92 N at 186.60 ms

<Min>

-1,021.26 N at 44.90 ms

CFC\_600

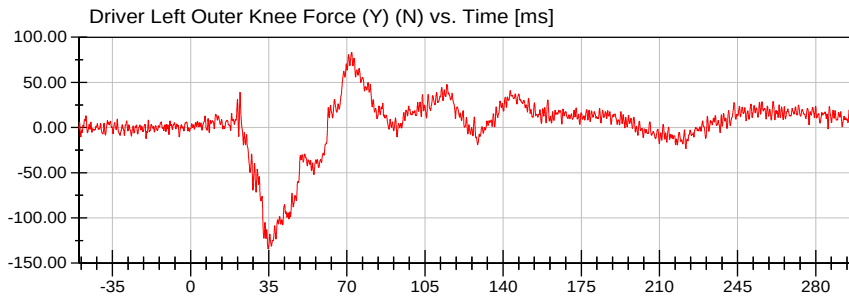


## VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



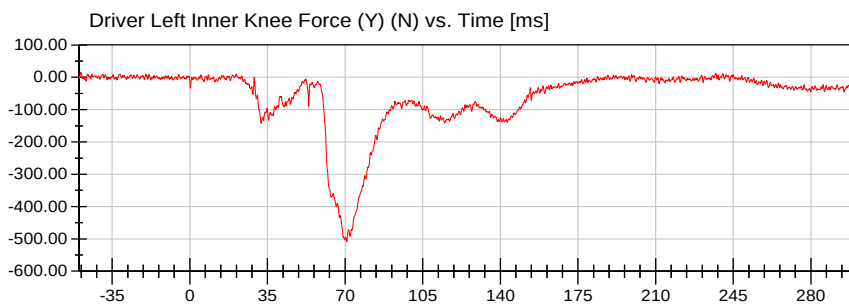
<Max>

83.21 N at 72.15 ms

<Min>

-134.22 N at 34.75 ms

CFC\_600



<Max>

15.95 N at -49.15 ms

<Min>

-509.03 N at 70.75 ms

CFC\_600

TRC

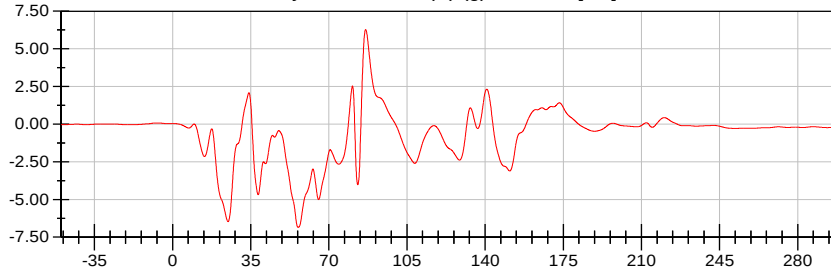
# VRTC

Test Date: 10/22/2020

Test Lab: CTF

Test Number: 201022 ()

Vehicle Center of Gravity Acceleration (X) (g) vs. Time [ms]



<Max>

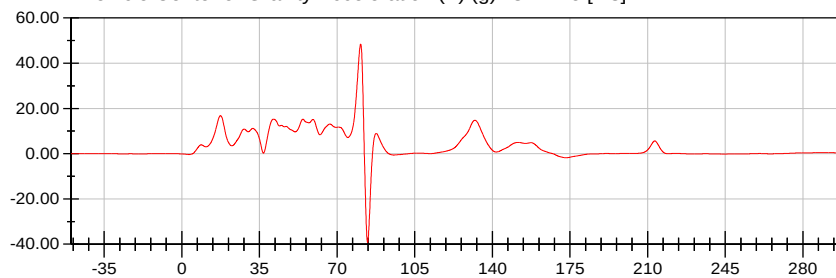
6.28 g at 86.45 ms

<Min>

-6.85 g at 56.30 ms

CFC\_60

Vehicle Center of Gravity Acceleration (Y) (g) vs. Time [ms]



<Max>

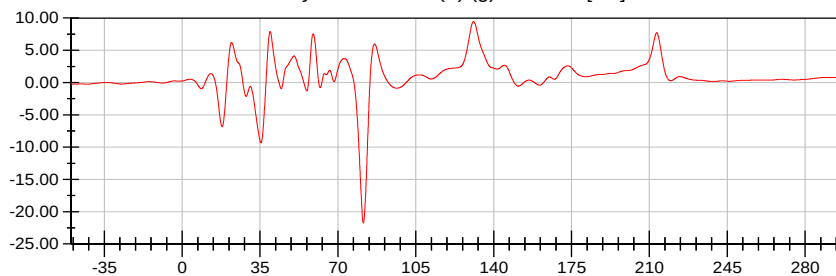
48.46 g at 80.60 ms

<Min>

-39.24 g at 83.75 ms

CFC\_60

Vehicle Center of Gravity Acceleration (Z) (g) vs. Time [ms]



<Max>

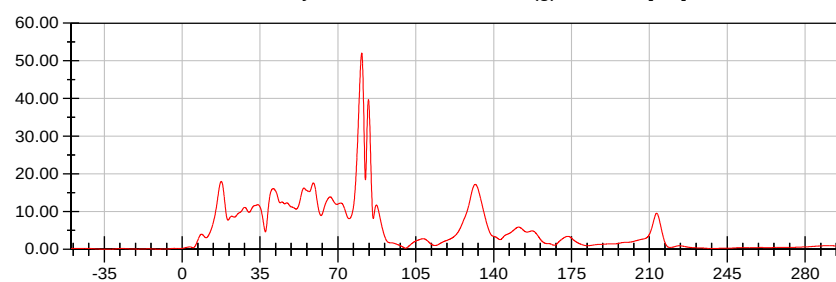
9.46 g at 130.95 ms

<Min>

-21.76 g at 81.45 ms

CFC\_60

Vehicle Center of Gravity Acceleration Resultant (g) vs. Time [ms]



<Max>

52.08 g at 80.70 ms

<Min>

0.01 g at -33.05 ms

CFC\_60

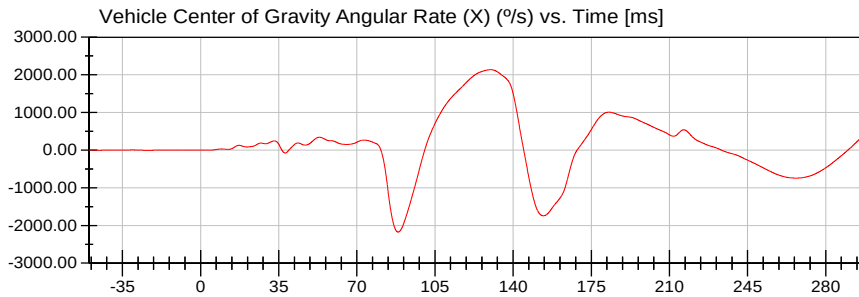


## VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



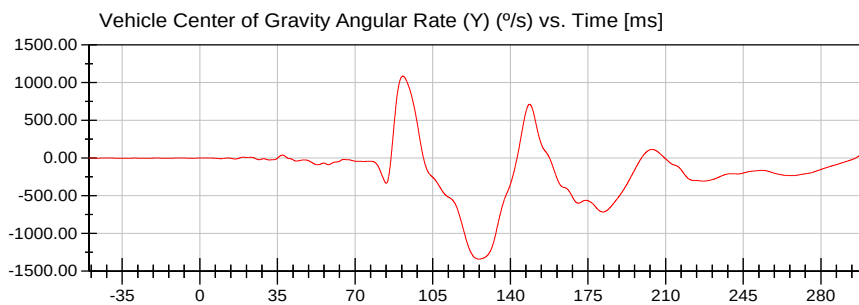
<Max>

2,135.99 °/s at 129.90 ms

<Min>

-2,176.35 °/s at 88.45 ms

CFC\_60



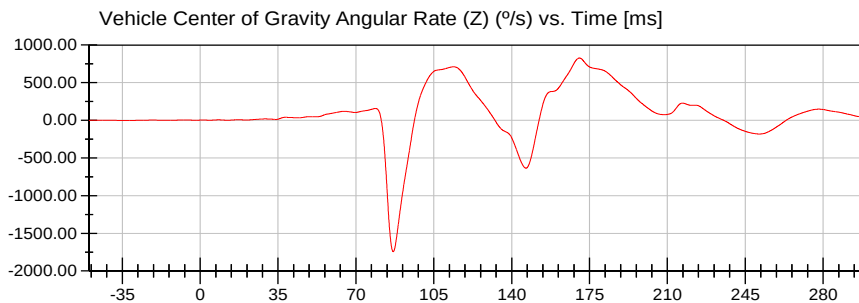
<Max>

1,088.07 °/s at 91.55 ms

<Min>

-1,339.89 °/s at 125.90 ms

CFC\_60



<Max>

827.89 °/s at 170.45 ms

<Min>

-1,743.48 °/s at 86.75 ms

CFC\_60

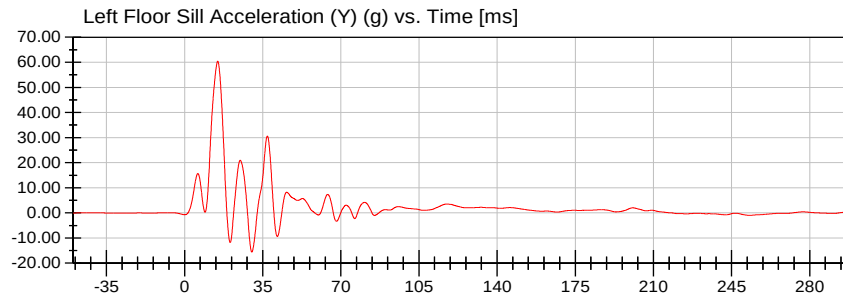


# VRTC

Test Date: 10/22/2020

Test Lab: CTF

Test Number: 201022 ()



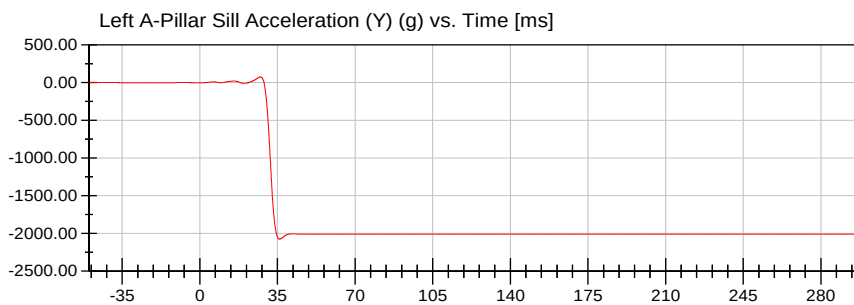
**<Max>**

60.42 g at 14.85 ms

**<Min>**

-15.60 g at 30.15 ms

CFC\_60



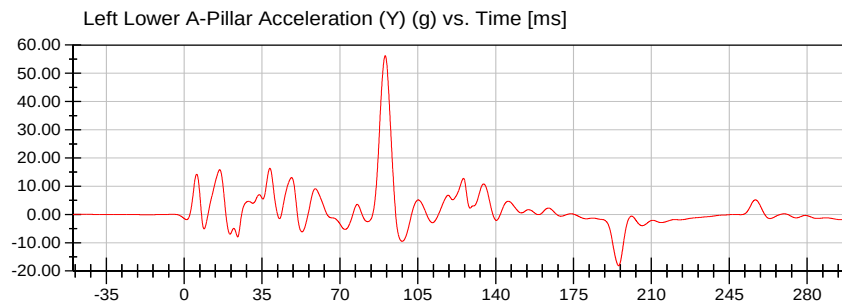
**<Max>**

75.61 g at 27.35 ms

**<Min>**

-2,075.07 g at 36.00 ms

CFC\_60



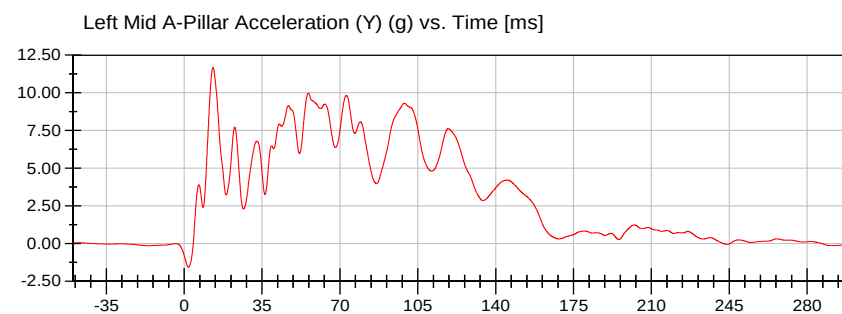
**<Max>**

56.25 g at 90.35 ms

**<Min>**

-18.12 g at 195.25 ms

CFC\_60



**<Max>**

11.68 g at 13.00 ms

**<Min>**

-1.56 g at 1.95 ms

CFC\_60

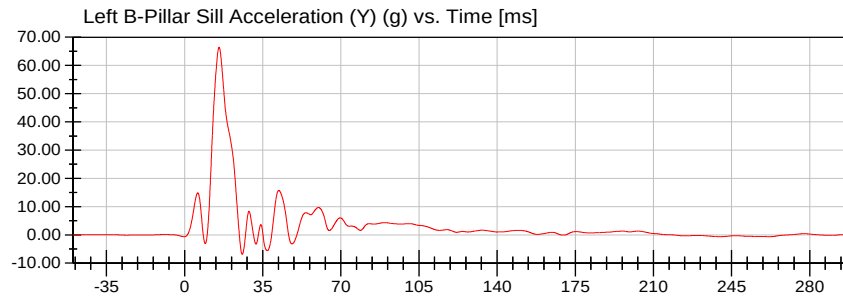


# VRTC

Test Date: 10/22/2020

Test Lab: CTF

Test Number: 201022 ()



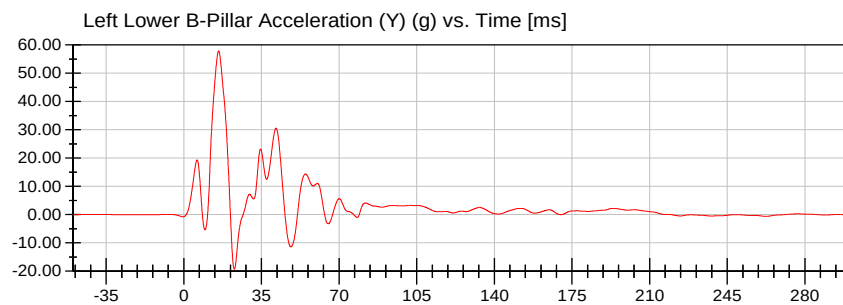
<Max>

66.44 g at 15.45 ms

<Min>

-6.92 g at 25.85 ms

CFC\_60



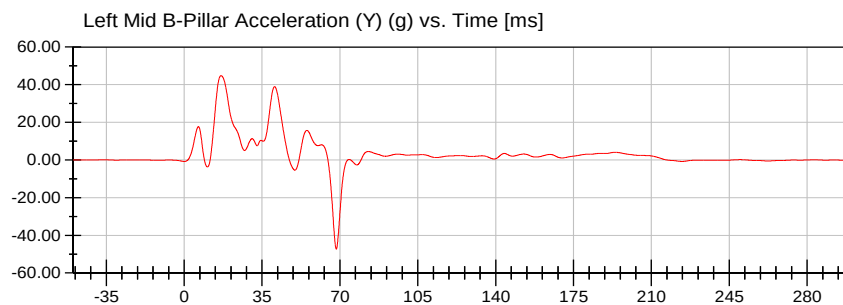
<Max>

57.87 g at 15.70 ms

<Min>

-19.28 g at 22.80 ms

CFC\_60



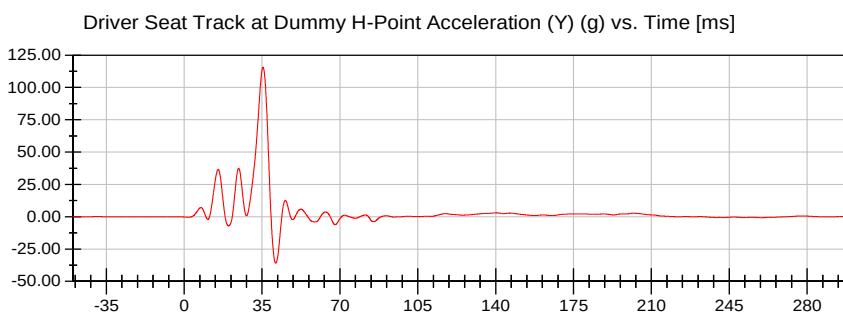
<Max>

44.84 g at 16.60 ms

<Min>

-47.31 g at 68.40 ms

CFC\_60



<Max>

115.69 g at 35.45 ms

<Min>

-36.00 g at 41.15 ms

CFC\_60



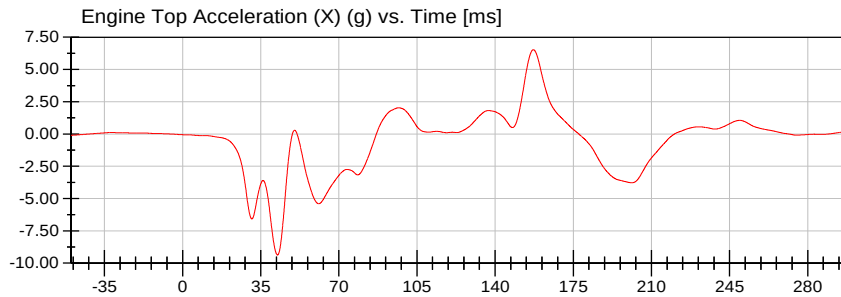


# VRTC

Test Date: 10/22/2020

Test Lab: CTF

Test Number: 201022 ()



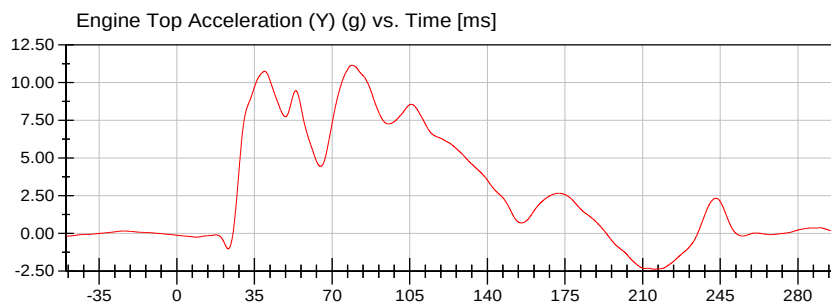
<Max>

6.53 g at 157.10 ms

<Min>

-9.37 g at 42.55 ms

CFC\_60



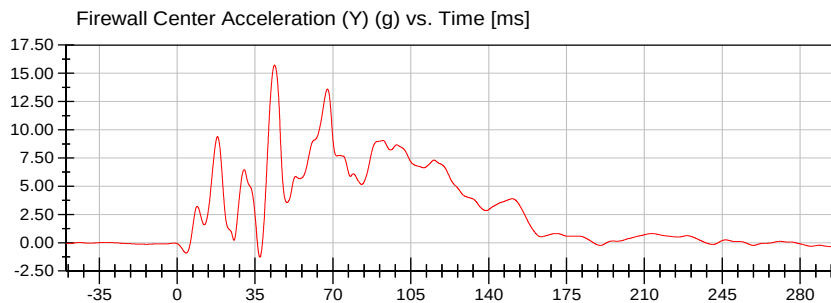
<Max>

11.16 g at 79.00 ms

<Min>

-2.37 g at 215.35 ms

CFC\_60



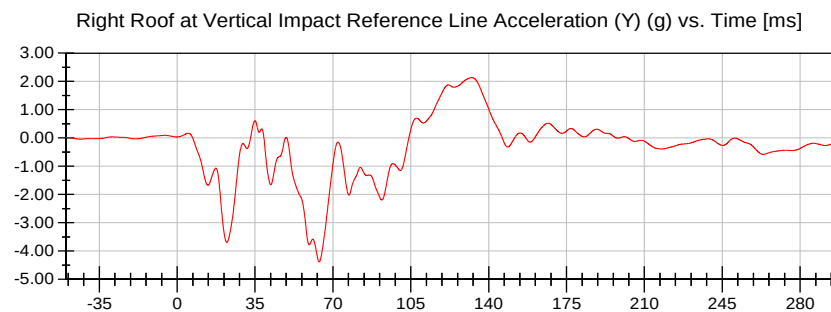
<Max>

15.72 g at 43.80 ms

<Min>

-1.28 g at 37.15 ms

CFC\_60



<Max>

2.14 g at 132.35 ms

<Min>

-4.38 g at 63.85 ms

CFC\_60

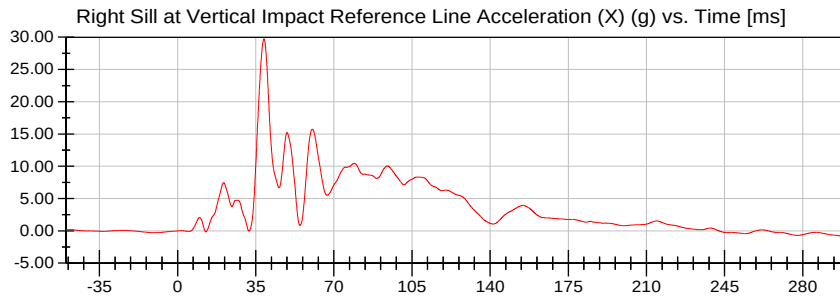


# VRTC

Test Date: 10/22/2020

Test Lab: CTF

Test Number: 201022 ()



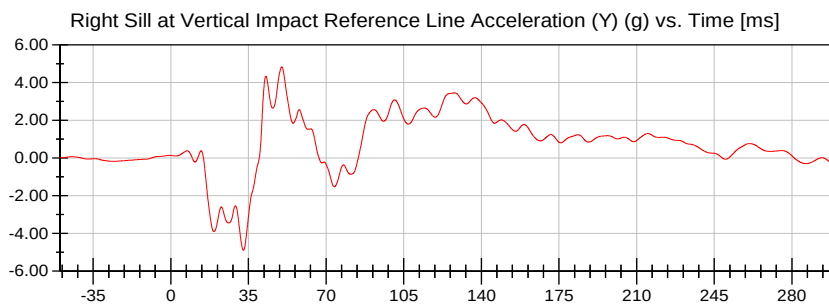
<Max>

29.72 g at 38.70 ms

<Min>

-1.00 g at 300.00 ms

CFC\_60



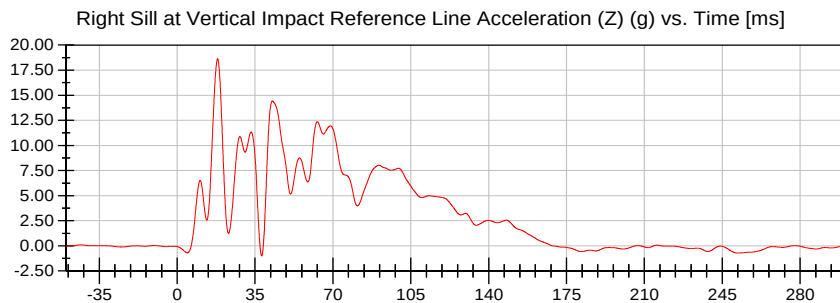
<Max>

4.84 g at 50.00 ms

<Min>

-4.89 g at 32.75 ms

CFC\_60



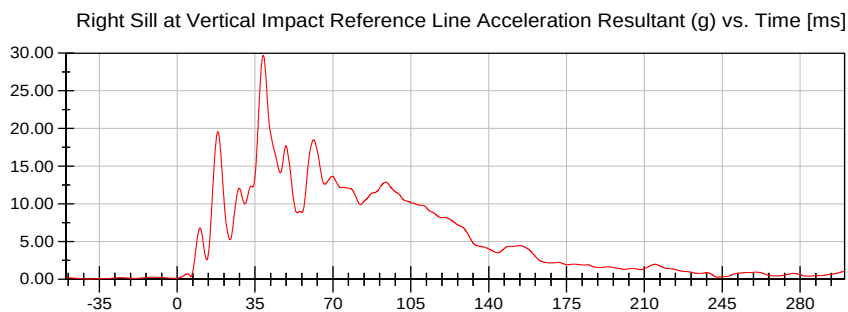
<Max>

18.65 g at 18.20 ms

<Min>

-1.00 g at 38.00 ms

CFC\_60



<Max>

29.73 g at 38.70 ms

<Min>

0.03 g at -39.70 ms

CFC\_60

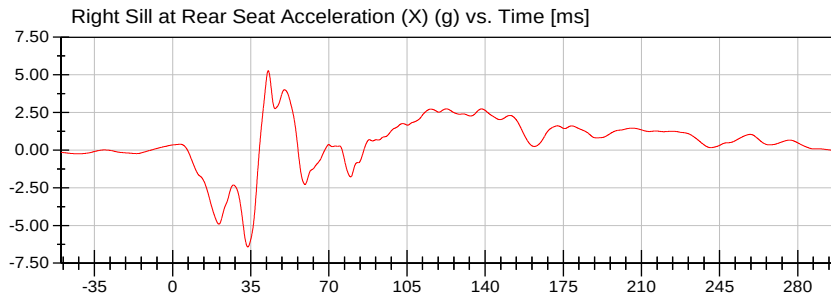
TRC

# VRTC

Test Date: 10/22/2020

Test Lab: CTF

Test Number: 201022 ()



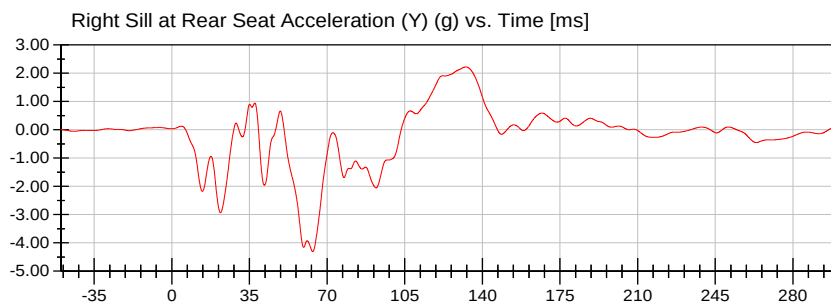
<Max>

5.27 g at 42.85 ms

<Min>

-6.42 g at 33.70 ms

CFC\_60



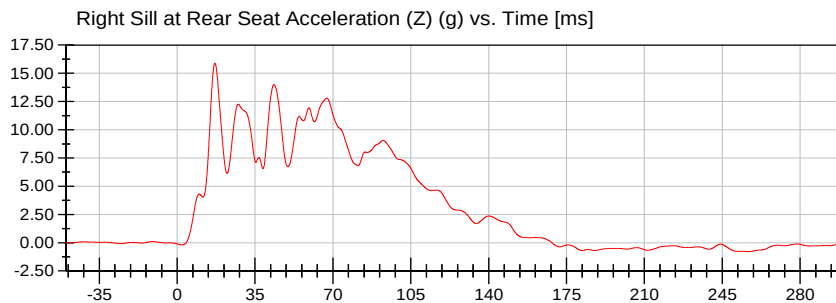
<Max>

2.22 g at 132.55 ms

<Min>

-4.31 g at 63.55 ms

CFC\_60



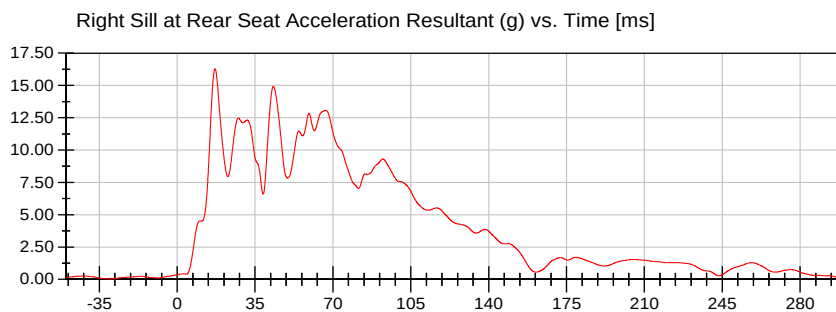
<Max>

15.89 g at 16.95 ms

<Min>

-0.79 g at 256.45 ms

CFC\_60



<Max>

16.30 g at 17.00 ms

<Min>

0.03 g at -30.00 ms

CFC\_60

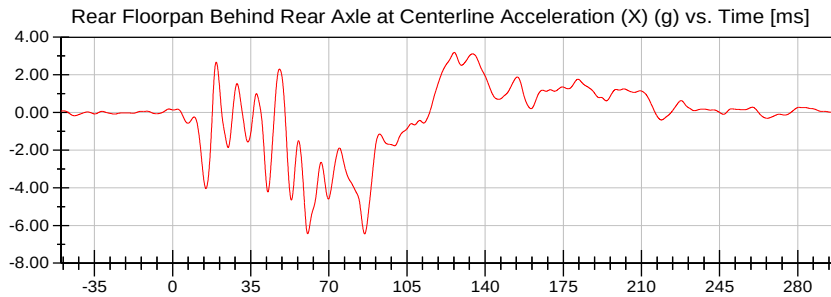


# VRTC

Test Date: 10/22/2020

Test Lab: CTF

Test Number: 201022 ()



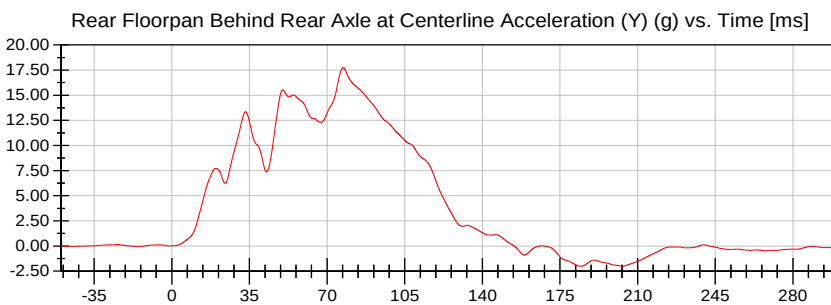
<Max>

3.19 g at 126.15 ms

<Min>

-6.44 g at 86.05 ms

CFC\_60



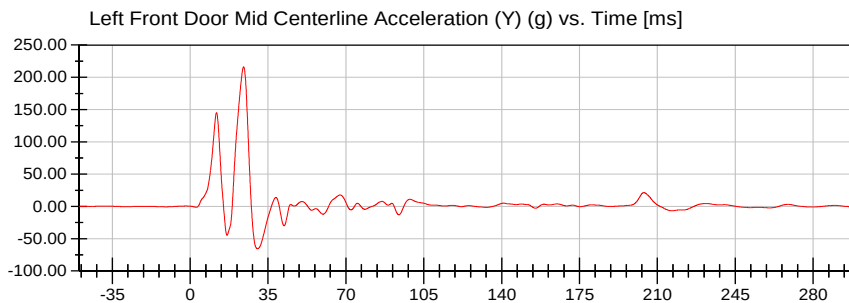
<Max>

17.74 g at 77.25 ms

<Min>

-2.01 g at 184.30 ms

CFC\_60



<Max>

216.22 g at 24.00 ms

<Min>

-65.57 g at 30.25 ms

CFC\_60



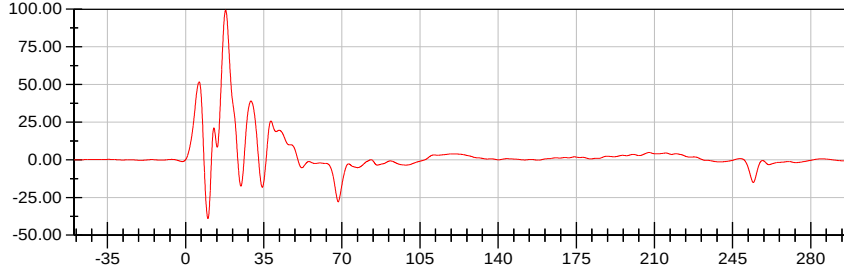
# VRTC

Test Date: 10/22/2020

Test Lab: CTF

Test Number: 201022 ()

Left Front Door Mid Rear Acceleration (Y) (g) vs. Time [ms]



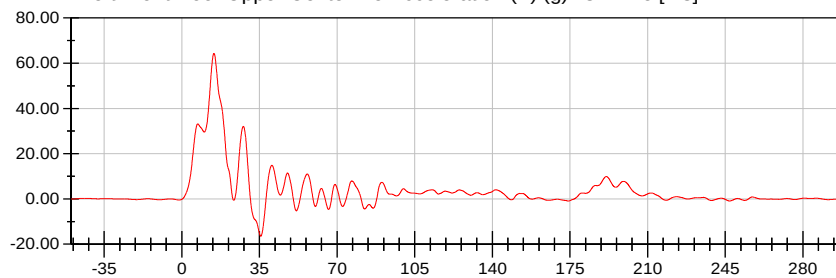
<Max>

99.42 g at 17.95 ms

<Min>

-38.98 g at 10.05 ms

Left Front Door Upper Centerline Acceleration (Y) (g) vs. Time [ms]



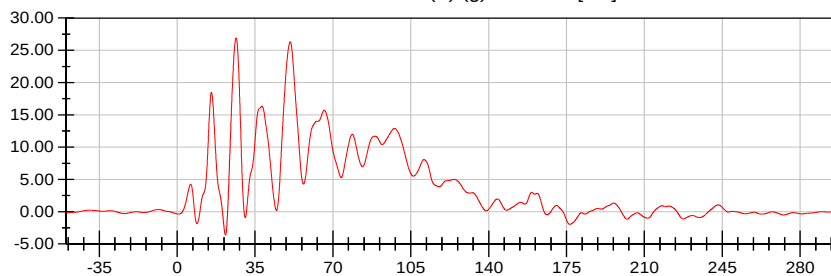
<Max>

64.32 g at 14.45 ms

<Min>

-16.48 g at 35.60 ms

Left Rear Door Mid Rear Acceleration (Y) (g) vs. Time [ms]



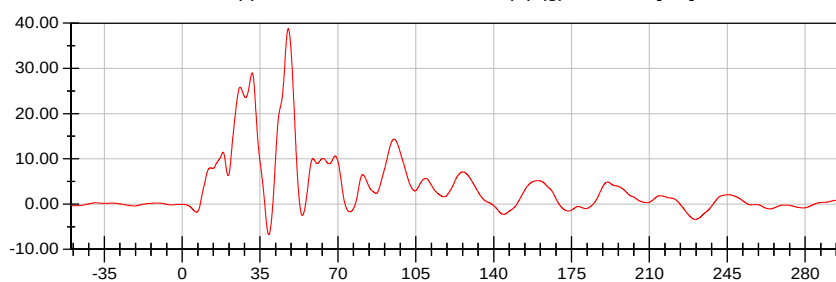
<Max>

26.90 g at 26.50 ms

<Min>

-3.61 g at 21.70 ms

Left Rear Door Upper Centerline Acceleration (Y) (g) vs. Time [ms]



<Max>

38.77 g at 47.70 ms

<Min>

-6.73 g at 38.95 ms

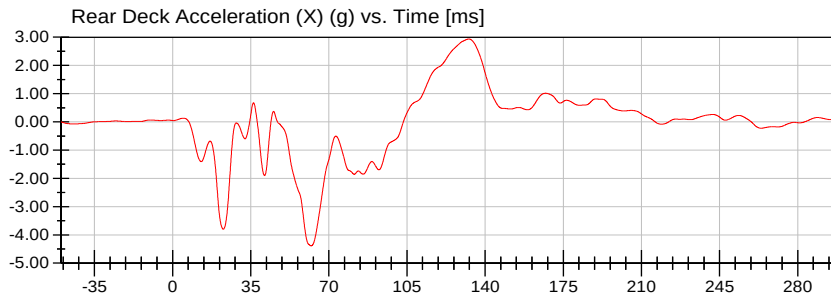


# VRTC

Test Date: 10/22/2020

Test Lab: CTF

Test Number: 201022 ()



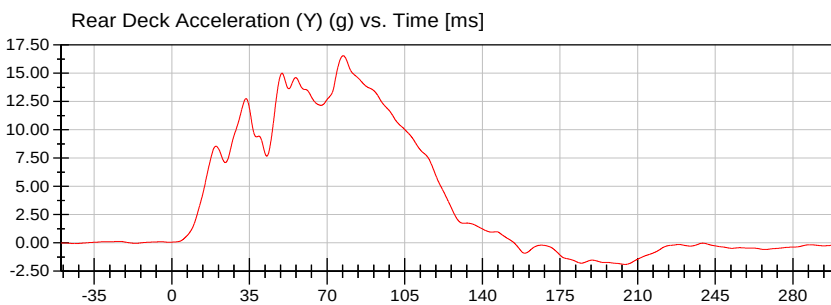
<Max>

2.93 g at 132.65 ms

<Min>

-4.39 g at 62.10 ms

CFC\_60



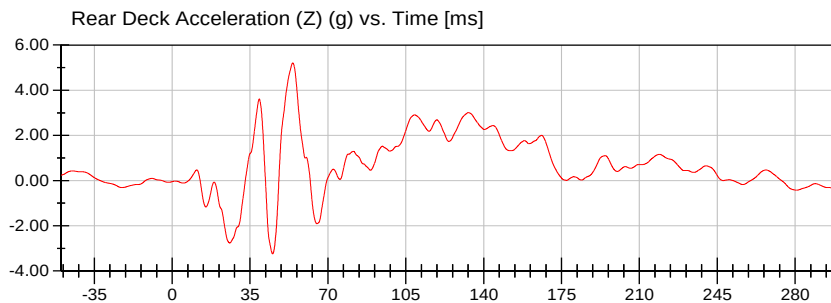
<Max>

16.55 g at 77.25 ms

<Min>

-1.90 g at 204.40 ms

CFC\_60



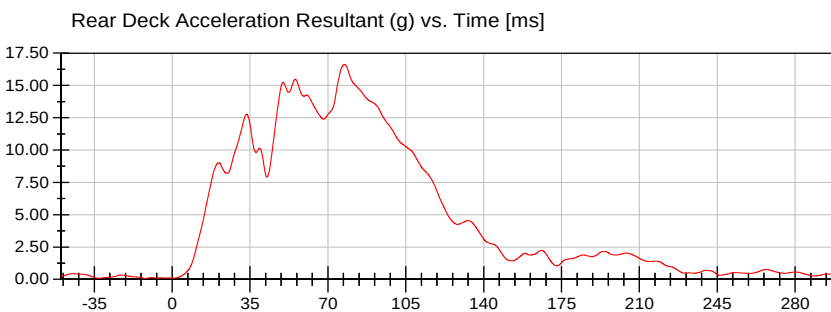
<Max>

5.21 g at 54.20 ms

<Min>

-3.24 g at 45.15 ms

CFC\_60



<Max>

16.62 g at 77.35 ms

<Min>

0.06 g at -12.25 ms

CFC\_60



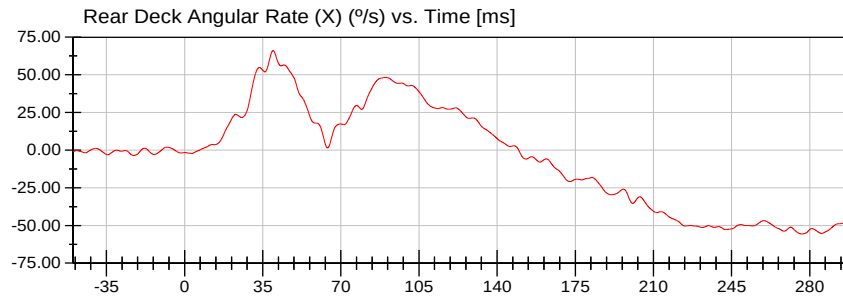


# VRTC

Test Date: 10/22/2020

Test Lab: CTF

Test Number: 201022 ()



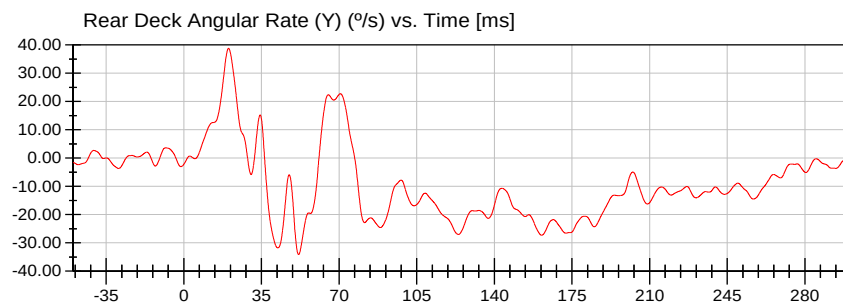
<Max>

66.06 °/s at 39.65 ms

<Min>

-55.66 °/s at 276.45 ms

CFC\_60



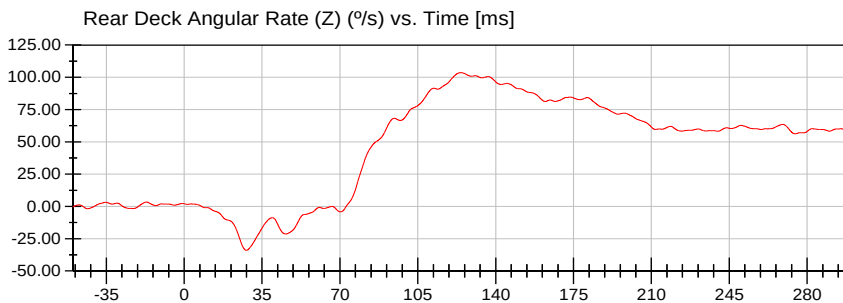
<Max>

38.84 °/s at 20.20 ms

<Min>

-34.13 °/s at 51.80 ms

CFC\_60



<Max>

103.54 °/s at 124.35 ms

<Min>

-33.97 °/s at 27.95 ms

CFC\_60

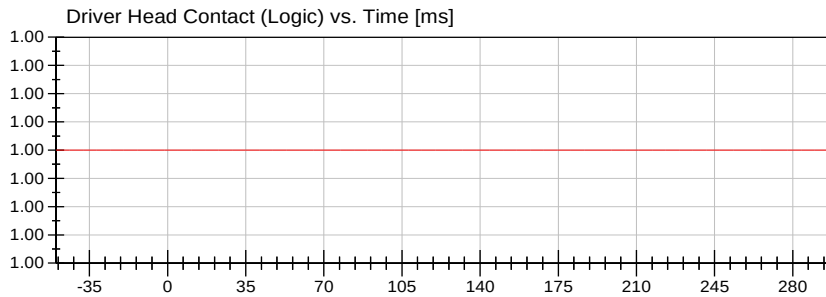


# VRTC

Test Date: 10/22/2020

Test Lab: CTF

Test Number: 201022 ()



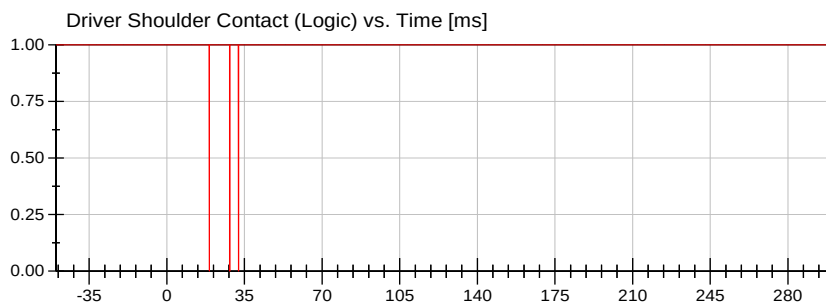
<Max>

1.00 Logic at -50.00 ms

<Min>

1.00 Logic at -50.00 ms

Unfiltered



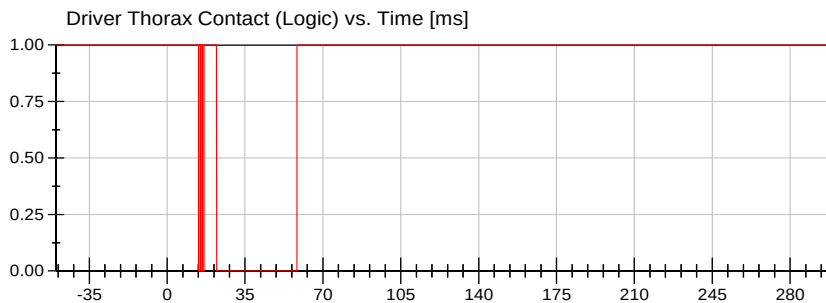
<Max>

1.00 Logic at -50.00 ms

<Min>

0.00 Logic at 19.15 ms

Unfiltered



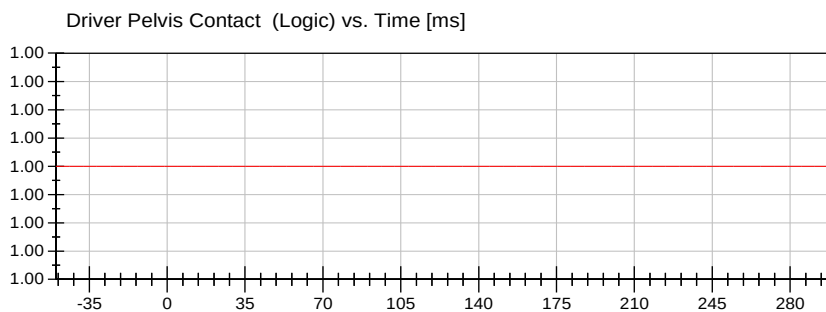
<Max>

1.00 Logic at -50.00 ms

<Min>

0.00 Logic at 14.15 ms

Unfiltered



<Max>

1.00 Logic at -50.00 ms

<Min>

1.00 Logic at -50.00 ms

Unfiltered

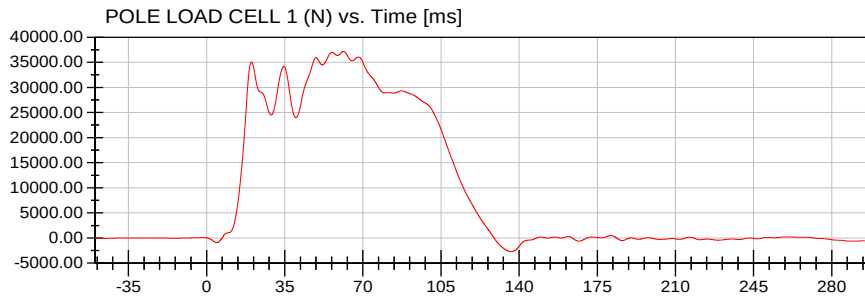


# VRTC

Test Lab: CTF

Test Number: 201022 ()

Test Date: 10/22/2020



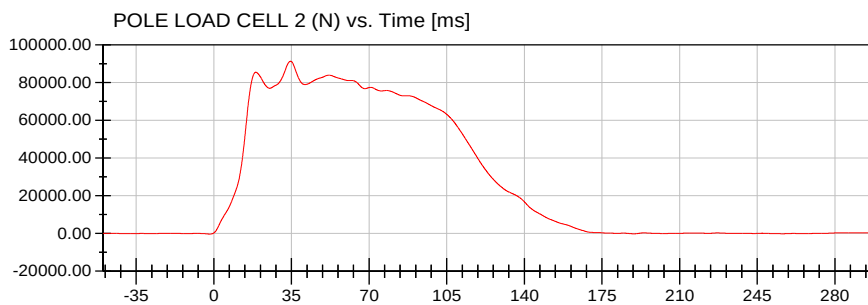
<Max>

37,148.36 N at 61.35 ms

<Min>

-2,694.47 N at 136.35 ms

CFC\_60



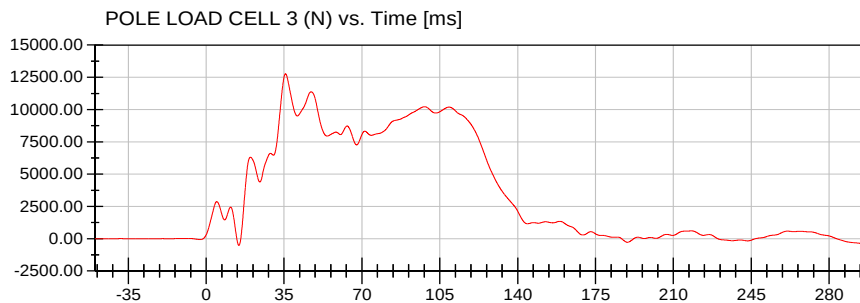
<Max>

91,354.97 N at 34.60 ms

<Min>

-309.41 N at -1.85 ms

CFC\_60



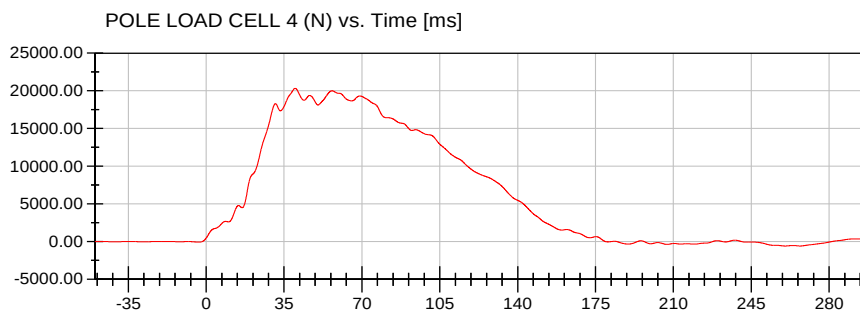
<Max>

12,778.70 N at 35.65 ms

<Min>

-524.61 N at 14.70 ms

CFC\_60



<Max>

20,330.12 N at 40.05 ms

<Min>

-577.05 N at 267.00 ms

CFC\_60



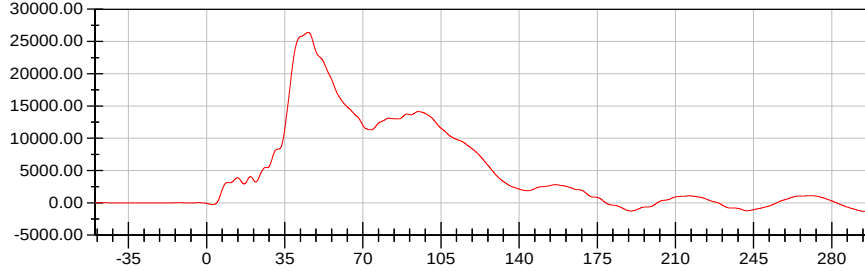
# VRTC

Test Date: 10/22/2020

Test Lab: CTF

Test Number: 201022 ()

POLE LOAD CELL 5 (N) vs. Time [ms]



<Max>

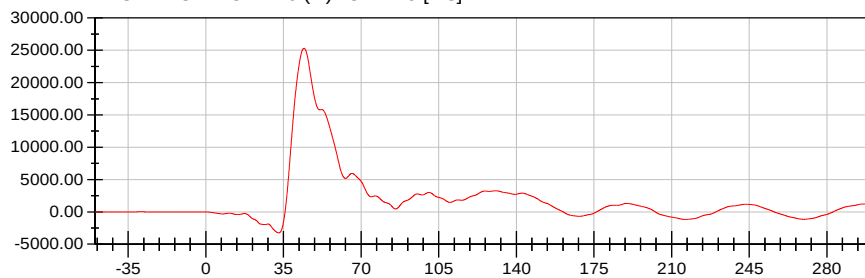
26,401.73 N at 45.50 ms

<Min>

-1,319.83 N at 294.95 ms

CFC\_60

POLE LOAD CELL 6 (N) vs. Time [ms]



<Max>

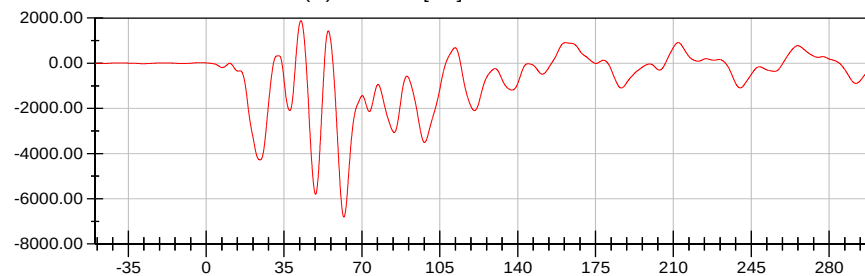
25,313.80 N at 44.25 ms

<Min>

-3,256.05 N at 32.90 ms

CFC\_60

POLE LOAD CELL 7 (N) vs. Time [ms]



<Max>

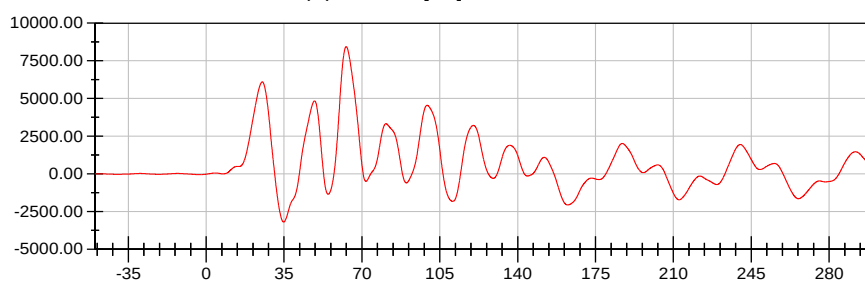
1,885.04 N at 42.60 ms

<Min>

-6,805.93 N at 61.90 ms

CFC\_60

POLE LOAD CELL 8 (N) vs. Time [ms]



<Max>

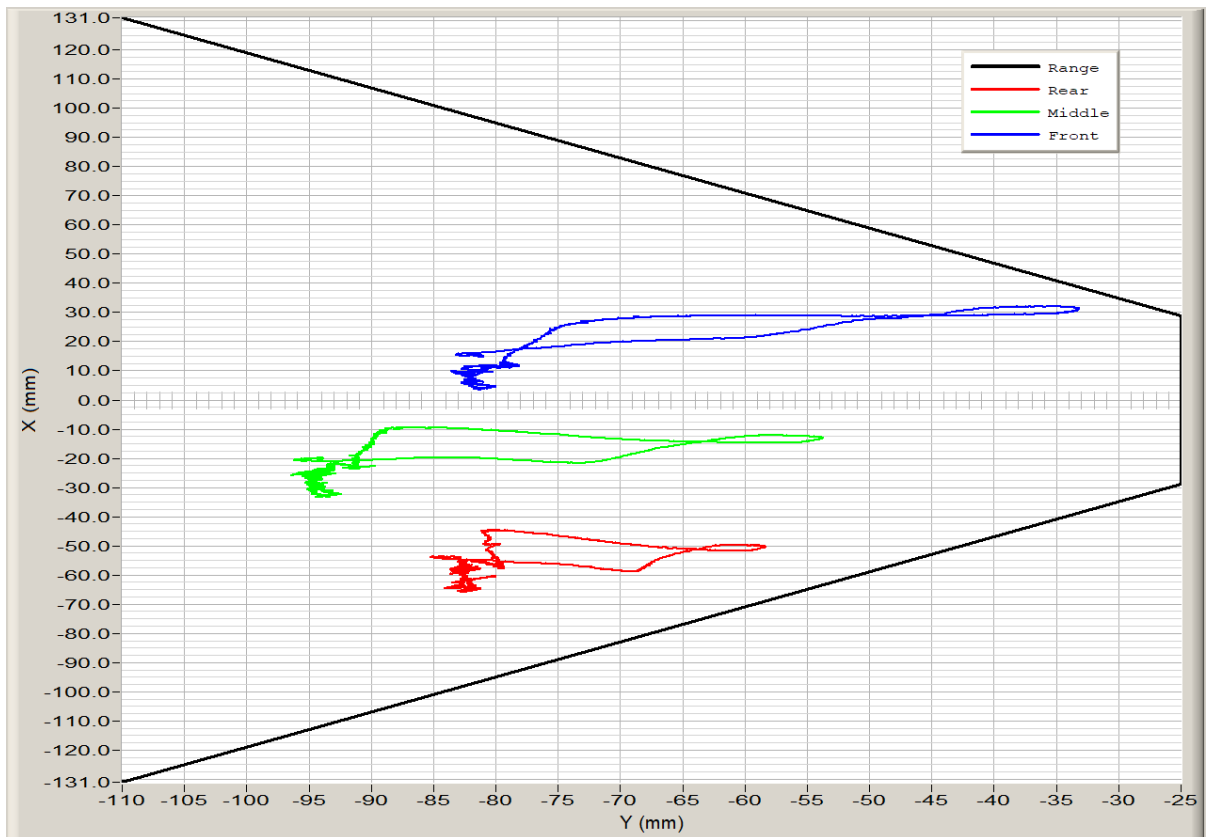
8,443.59 N at 62.95 ms

<Min>

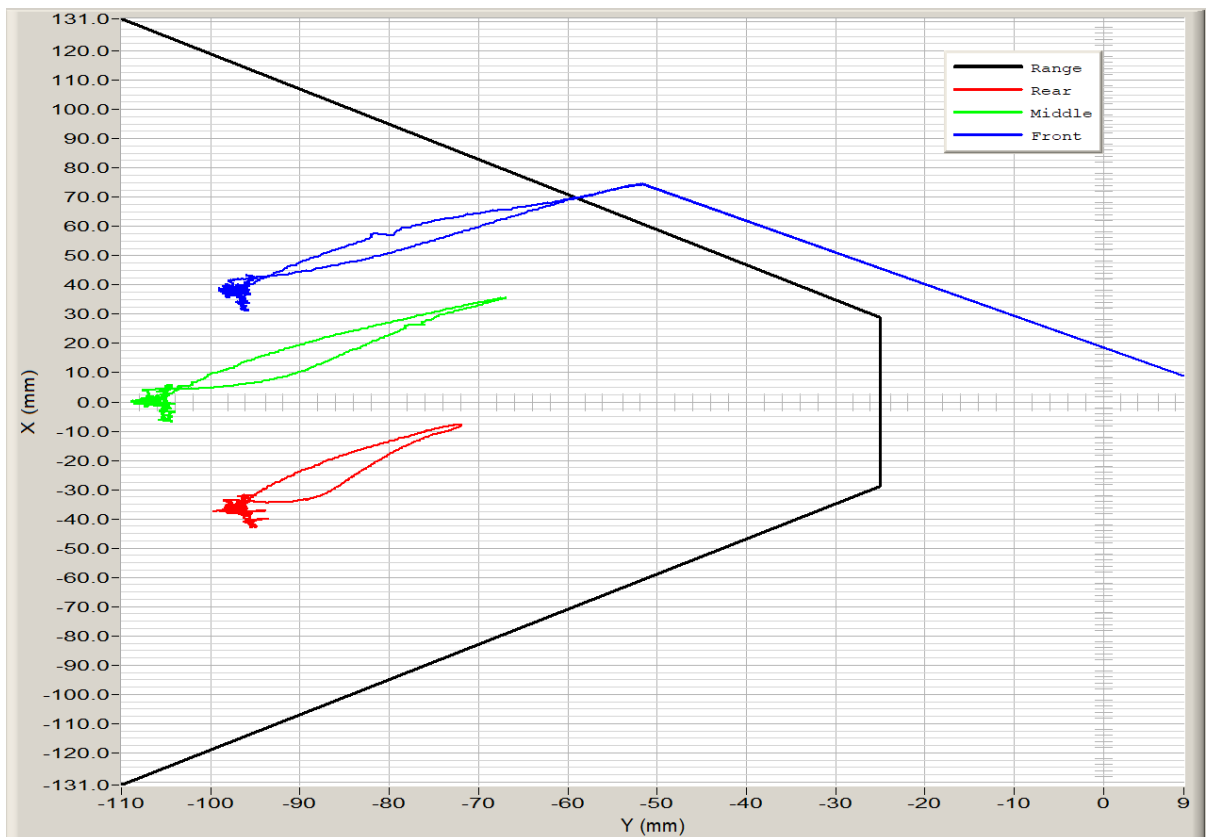
-3,191.91 N at 34.80 ms

CFC\_60

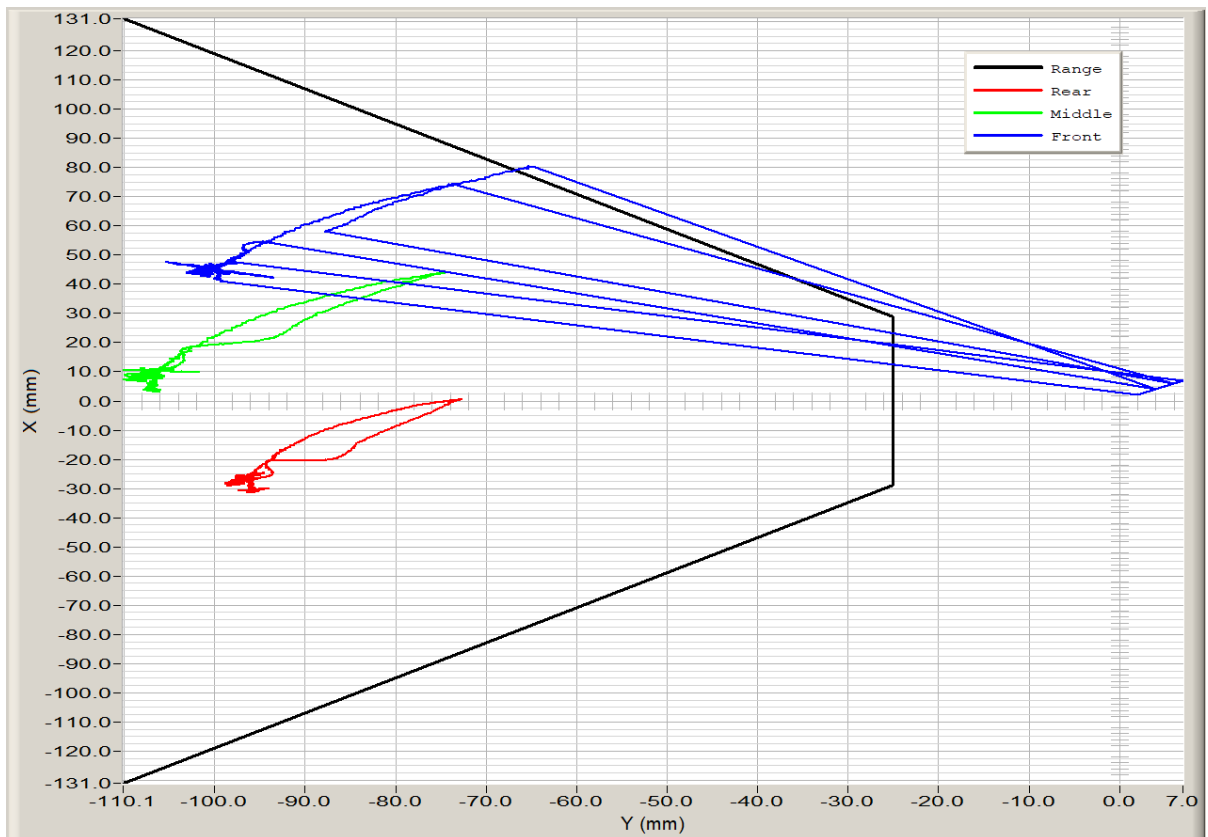




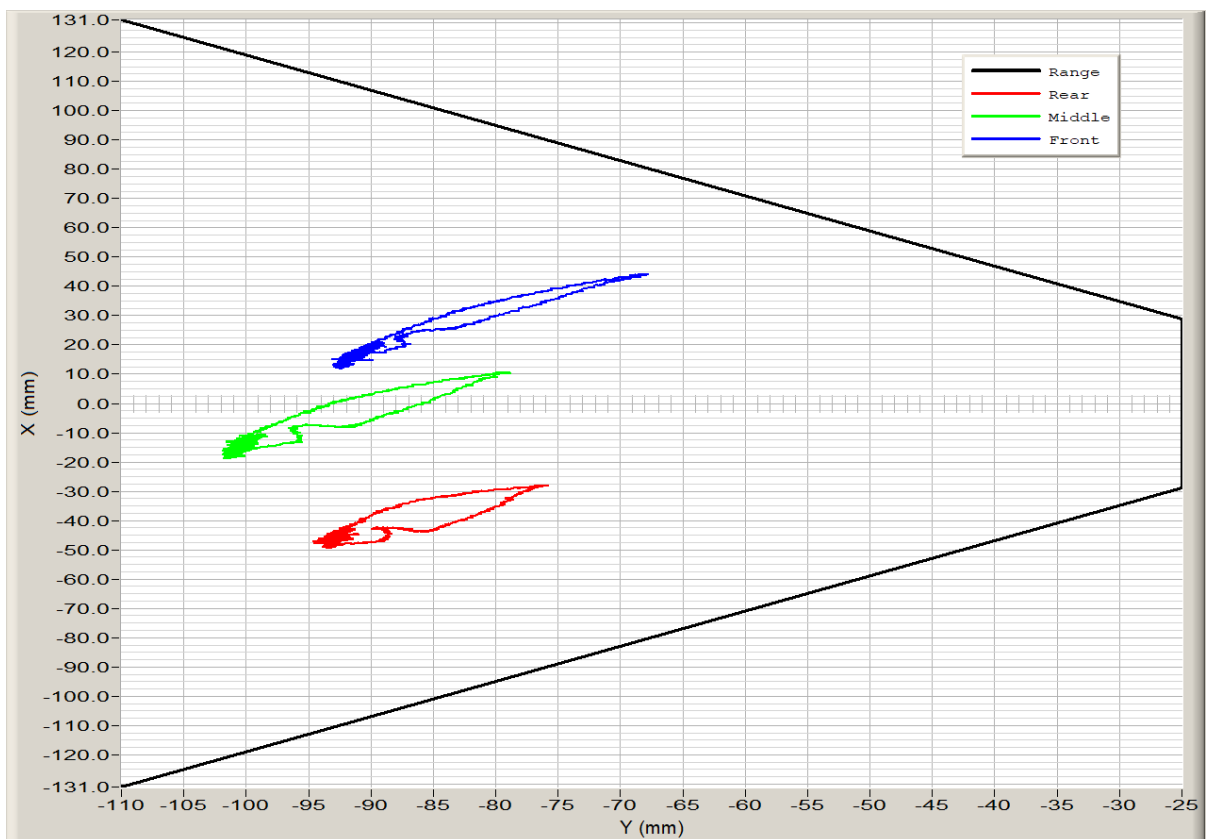
Shoulder\_XY



Thorax\_1\_XY

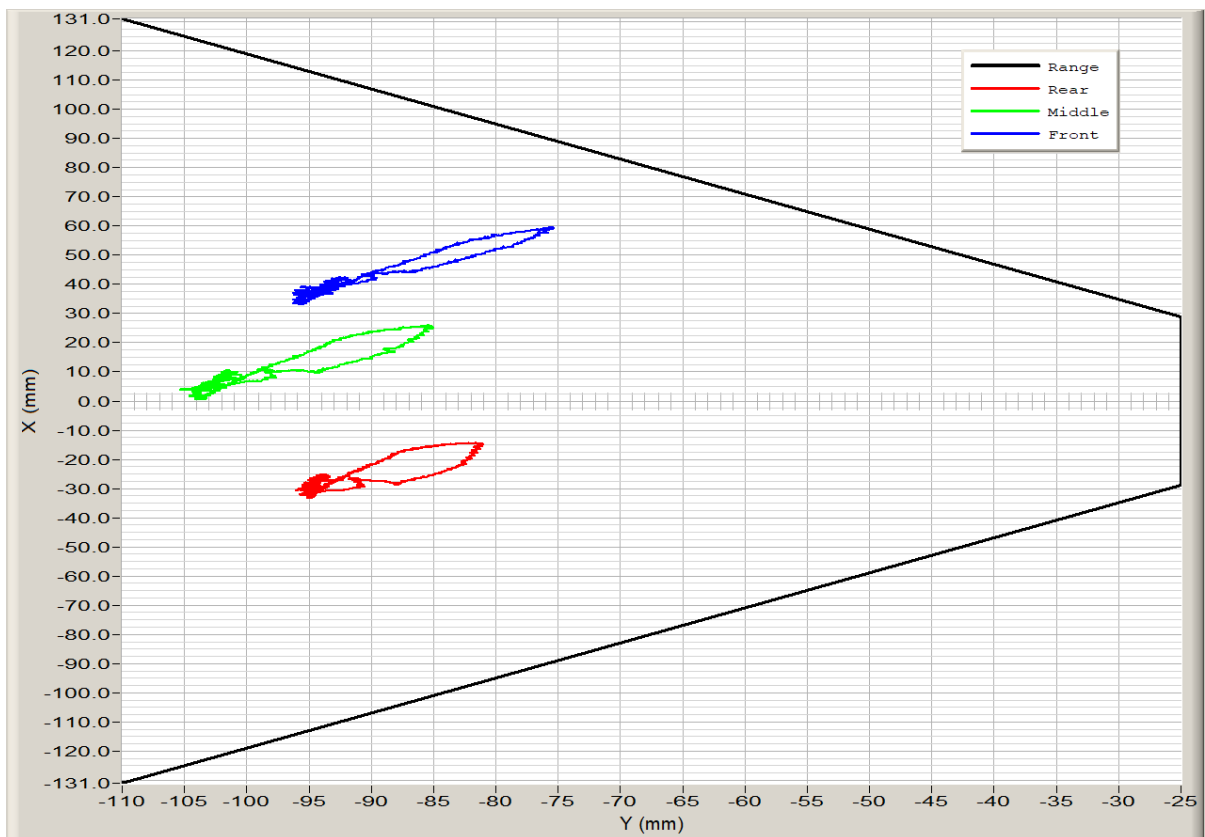


Thorax\_2\_XY

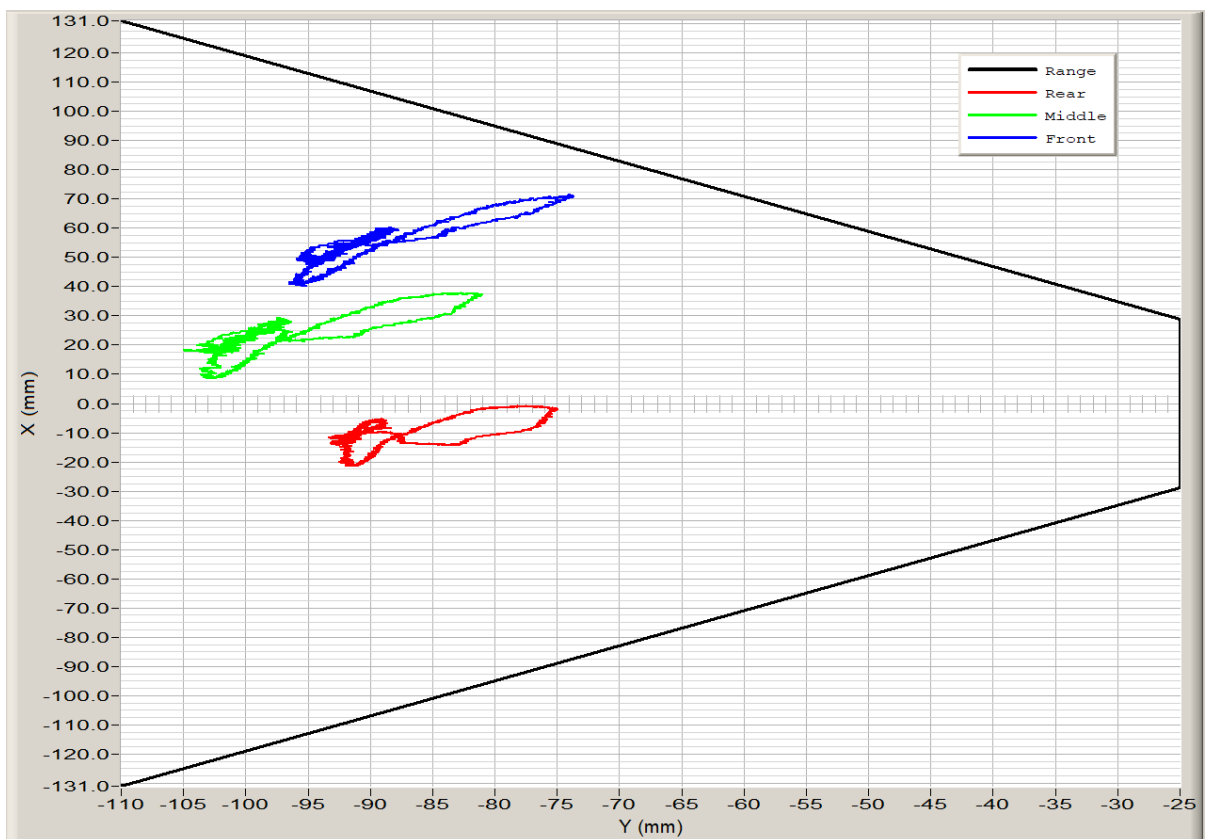


Thorax\_3\_XY





Abdomen\_1\_XY



Abdomen\_2\_XY

**APPENDIX C**  
**DUMMY PERFORMANCE QUALIFICATION TEST DATA**

## TABLE OF QUALIFICATION MEASUREMENTS AND PLOTS

### WorldSID-50M (Driver) Dummy

#### Description

**Table 1.** External Measurements

**Table 2.** Front Head Drop Test

Resultant Head Acceleration (G's) vs. Time (ms)

Head (X) Acceleration (G's) vs. Time (ms)

Head (Y) Acceleration (G's) vs. Time (ms)

Head (Z) Acceleration (G's) vs. Time (ms)

**Table 3.** Left Lateral Head Drop Test

Resultant Head Acceleration (G's) vs. Time (ms)

Head (X) Acceleration (G's) vs. Time (ms)

Head (Y) Acceleration (G's) vs. Time (ms)

Head (Z) Acceleration (G's) vs. Time (ms)

**Table 4.** Right Lateral Head Drop Test

Resultant Head Acceleration (G's) vs. Time (ms)

Head (X) Acceleration (G's) vs. Time (ms)

Head (Y) Acceleration (G's) vs. Time (ms)

Head (Z) Acceleration (G's) vs. Time (ms)

**Table 5.** Left Lateral Neck Pendulum Test

Pendulum Acceleration (G's) vs. Time (ms)

Pendulum Velocity (m/s) vs. Time (ms)

Flexion Angle (°) vs. Time (ms)

Forward Potentiometer Rotation at Base of Pendulum (°) vs. Time (ms)

Rear Potentiometer Rotation at Base of Pendulum (°) vs. Time (ms)

Center Headform Potentiometer Rotation at CG (°) vs. Time (ms)

Neck Force Y (N) vs. Time (ms)

Neck Force Y (N) Filtered for Total Neck Occipital Condyle Moment Calculation vs. Time (ms)

Neck Moment X (Nm) vs. Time (ms)

Total Neck Occipital Condyle Moment X (Nm) vs. Time (ms)

**Table 6.** Right Lateral Neck Pendulum Test

Pendulum Acceleration (G's) vs. Time (ms)

Pendulum Velocity (m/s) vs. Time (ms)

Flexion Angle (°) vs. Time (ms)

Forward Potentiometer Rotation at Base of Pendulum (°) vs. Time (ms)

Rear Potentiometer Rotation at Base of Pendulum (°) vs. Time (ms)

Center Headform Potentiometer Rotation at CG (°) vs. Time (ms)

Neck Force Y (N) vs. Time (ms)

Neck Force Y (N) Filtered for Total Neck Occipital Condyle Moment Calculation vs. Time (ms)

Neck Moment X (Nm) vs. Time (ms)

Total Neck Occipital Condyle Moment X (Nm) vs. Time (ms)

**Table 7.** Left Lateral Shoulder Impact Test

Impactor Acceleration (G's) vs. Time (ms)

Impactor Force (N) vs. Time (ms)

Shoulder Displacement (mm) vs. Time (ms)

**Table 8.** Left Lateral Thorax with Arm Impact Test

Impactor Acceleration (G's) vs. Time (ms)

Impactor Force (N) vs. Time (ms)

## TABLE OF QUALIFICATION MEASUREMENTS AND PLOTS (CONTUNUED)

### WorldSID-50M (Driver) Dummy

#### Description

Upper Spine Acceleration (G's) vs. Time (ms)  
Lower Spine Acceleration (G's) vs. Time (ms)  
Upper Thorax Rib Displacement (mm) vs. Time (ms)  
Center Thorax Rib Displacement (mm) vs. Time (ms)  
Lower Thorax Rib Displacement (mm) vs. Time (ms)

**Table 9.** Left Lateral Thorax without Arm Impact Test

Impactor Acceleration (G's) vs. Time (ms)  
Impactor Force (N) vs. Time (ms)  
Upper Spine Acceleration (G's) vs. Time (ms)  
Lower Spine Acceleration (G's) vs. Time (ms)  
Upper Thorax Rib Displacement (mm) vs. Time (ms)  
Center Thorax Rib Displacement (mm) vs. Time (ms)  
Lower Thorax Rib Displacement (mm) vs. Time (ms)

**Table 10.** Left Lateral Abdomen Impact Test

Impactor Acceleration (G's) vs. Time (ms)  
Impactor Force (N) vs. Time (ms)  
Upper Abdominal Rib Displacement (mm) vs. Time (ms)  
Lower Abdominal Rib Displacement (mm) vs. Time (ms)  
Lower Spine Acceleration (G's) vs. Time (ms)

**Table 11.** Left Lateral Pelvis Impact Test

Impactor Acceleration (G's) vs. Time (ms)  
Impactor Force (N) vs. Time (ms)  
Pelvis Acceleration Y (G's) vs. Time (ms)  
Lower Spine Acceleration Y (G's) vs. Time (ms)

**Pre-Test Calibration Sheets**  
**Driver S/N EB8888**

## WorldSID-50M Head Front Qualification Test Results Summary

Dummy Serial Number: EB8888

Tested Components

Head: EG2845

Test ID: 200903-9

Test Date: 9/3/2020

Test Time: 10:24 AM

### Test Results

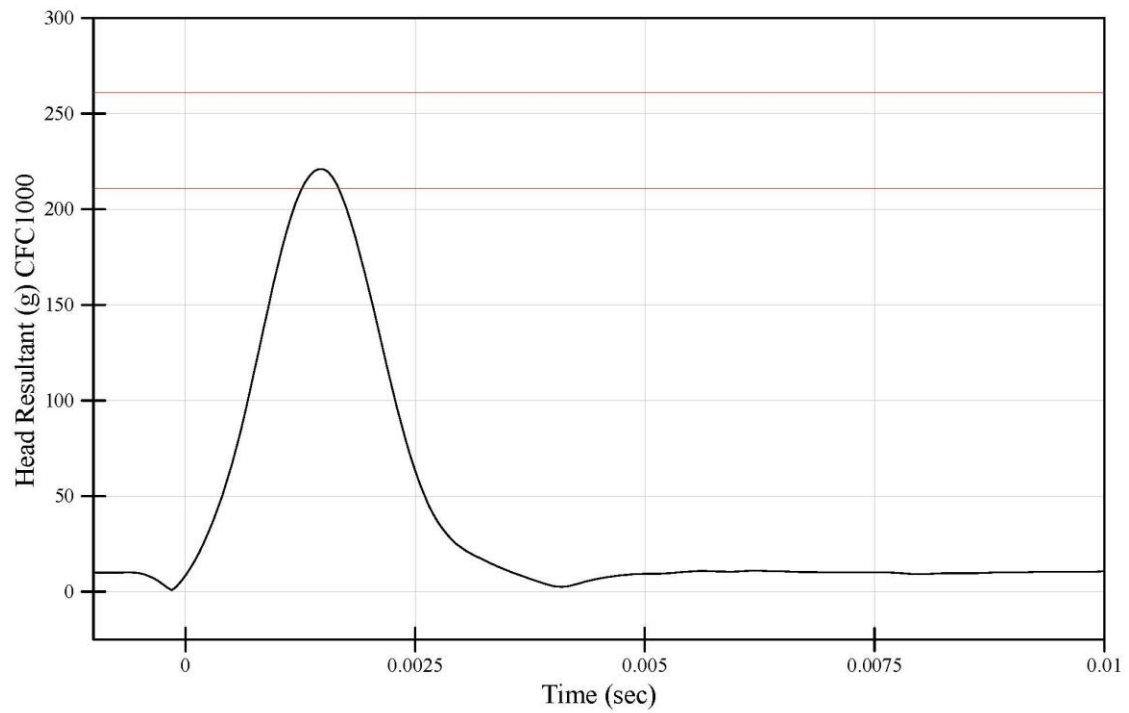
| <u>Test Parameter</u>                                           | <u>Specification Range*</u> | <u>Result</u> | <u>Pass/Fail</u> |
|-----------------------------------------------------------------|-----------------------------|---------------|------------------|
| Test Temperature (°C)                                           | 20.6 - 22.2                 | 21.7          | Pass             |
| Test Humidity (%)                                               | 10 - 70                     | 64            | Pass             |
| Peak Resultant Acceleration (g)                                 | 211.0 - 261.0               | 221.1         | Pass             |
| Peak Acceleration, y-axis (g)                                   | -15.00 - 15.00              | 3.19          | Pass             |
| Oscillations occurring after<br>the main acceleration pulse (%) | -10.0 - 10.0                | 4.95          | Pass             |

\* WorldSID-50M Qualification Manual - November 2020

File Name: 200903-9 processed



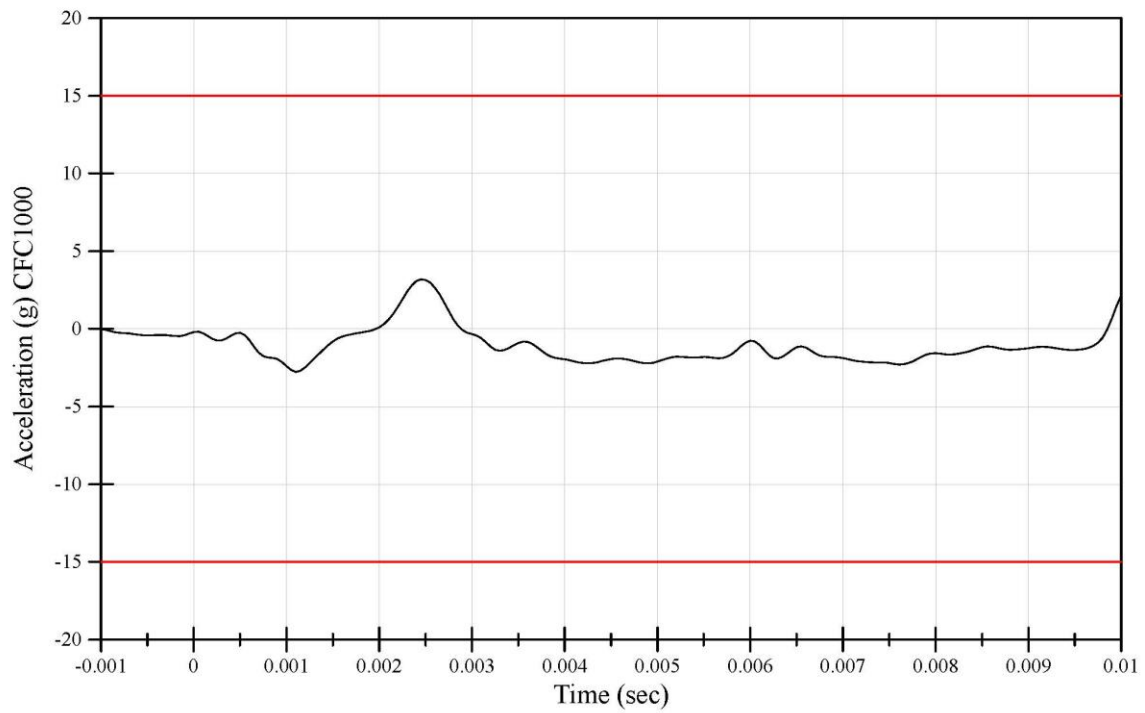
WorldSID-50M Head Front Qualification  
Peak Resultant Acceleration  
Head Serial Number: EG2845



File Name: 200903-9 processed

9/3/2020 10:24 AM

WorldSID-50M Head Front Qualification  
Peak Lateral Y Acceleration  
Head Serial Number: EG2845



File Name: 200903-9 processed

9/3/2020 10:24 AM

**WorldSID-50M Head Left Lateral Qualification  
Test Results Summary**

Dummy Serial Number: EB8888

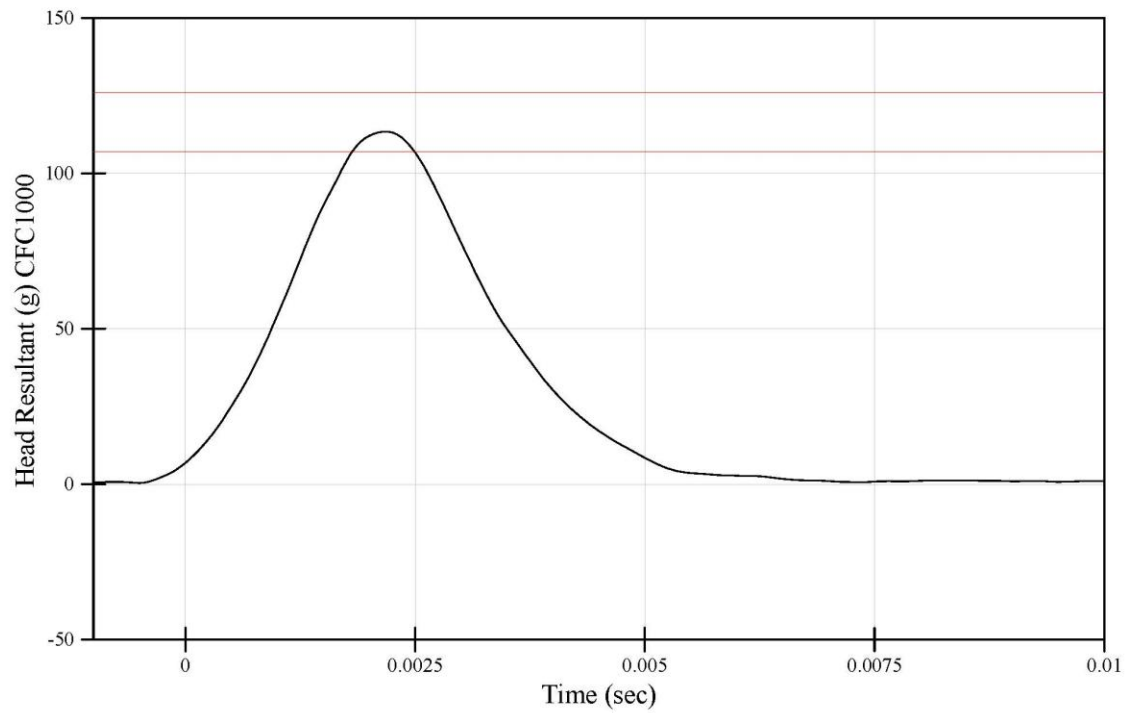
|                          |                     |
|--------------------------|---------------------|
| <u>Tested Components</u> | Test ID: 200903-2   |
| Head: EG2845             | Test Date: 9/3/2020 |
|                          | Test Time: 6:08 AM  |

| Test Results                                                    |                             |               |                  |
|-----------------------------------------------------------------|-----------------------------|---------------|------------------|
| <u>Test Parameter</u>                                           | <u>Specification Range*</u> | <u>Result</u> | <u>Pass/Fail</u> |
| Test Temperature (°C)                                           | 20.6 - 22.2                 | 20.8          | Pass             |
| Test Humidity (%)                                               | 10 - 70                     | 69            | Pass             |
| Peak Resultant Acceleration (g)                                 | 107.0 - 126.0               | 113.5         | Pass             |
| Peak Acceleration, x-axis (g)                                   | -15.00 - 15.00              | -1.48         | Pass             |
| Oscillations occurring after<br>the main acceleration pulse (%) | -10.0 - 10.0                | 1.03          | Pass             |

\* WorldSID-50M Qualification Manual - November 2020

File Name: 200903-2 processed

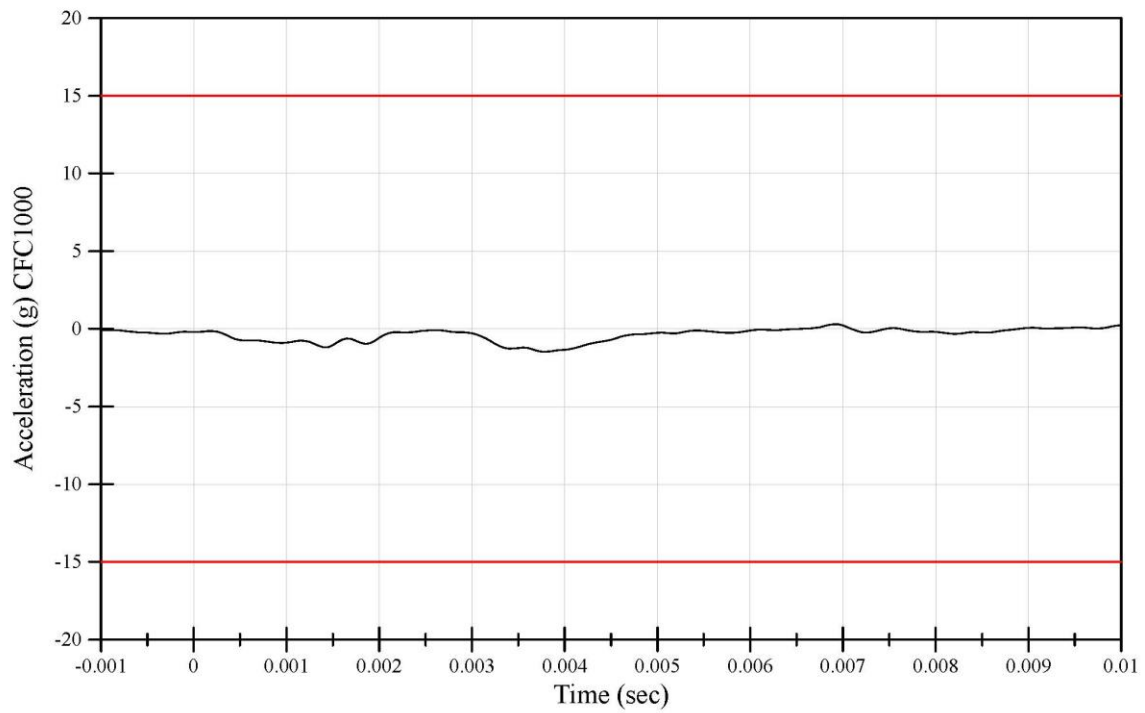
WorldSID-50M Head Left Lateral Qualification  
Peak Resultant Acceleration  
Head Serial Number: EG2845



File Name: 200903-2 processed

9/3/2020 6:08 AM

WorldSID-50M Head Left Lateral Qualification  
Peak Lateral X Acceleration  
Head Serial Number: EG2845



File Name: 200903-2 processed

9/3/2020 6:08 AM

**WorldSID-50M Head Right Lateral Qualification  
Test Results Summary**

Dummy Serial Number: EB8888

Tested Components  
Head: EG2845

Test ID: 200903-6  
Test Date: 9/3/2020  
Test Time: 8:19 AM

**Test Results**

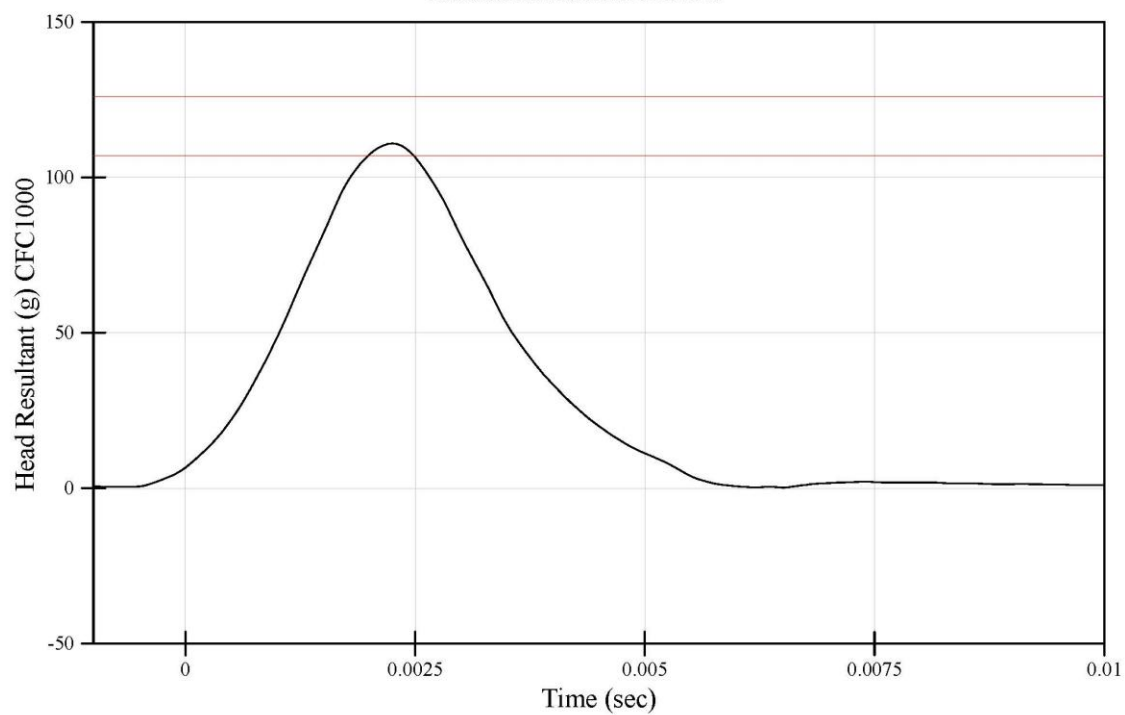
| <u>Test Parameter</u>                                           | <u>Specification Range*</u> | <u>Result</u> | <u>Pass/Fail</u> |
|-----------------------------------------------------------------|-----------------------------|---------------|------------------|
| Test Temperature (°C)                                           | 20.6 - 22.2                 | 21.7          | Pass             |
| Test Humidity (%)                                               | 10 - 70                     | 70            | Pass             |
| Peak Resultant Acceleration (g)                                 | 107.0 - 126.0               | 110.9         | Pass             |
| Peak Acceleration, x-axis (g)                                   | -15.00 - 15.00              | 1.32          | Pass             |
| Oscillations occurring after<br>the main acceleration pulse (%) | -10.0 - 10.0                | 1.84          | Pass             |

\* WorldSID-50M Qualification Manual - November 2020

File Name: 200903-6 processed



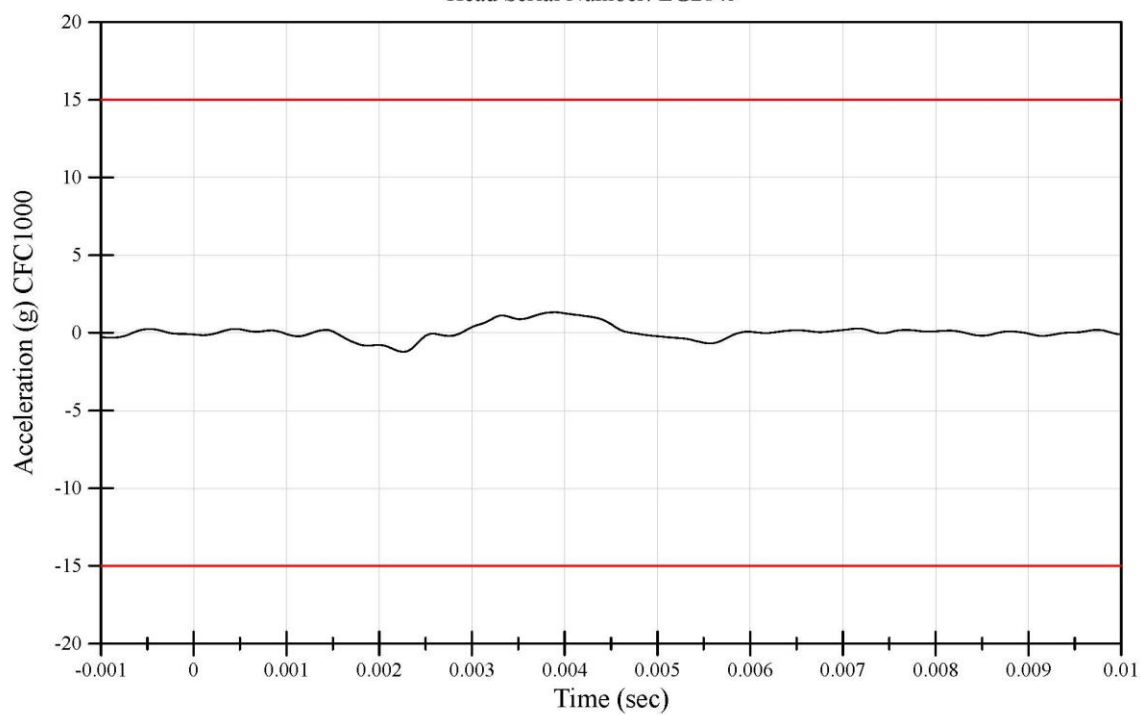
WorldSID-50M Head Right Lateral Qualification  
Peak Resultant Acceleration  
Head Serial Number: EG2845



File Name: 200903-6 processed

9/3/2020 8:19 AM

WorldSID-50M Head Right Lateral Qualification  
Peak Lateral Y Acceleration  
Head Serial Number: EG2845



File Name: 200903-6 processed

9/3/2020 8:19 AM

## WorldSID-50M Neck Left Lateral Qualification Test Results Summary

Dummy Serial Number: EB8888

### Tested Components

Neck: EE8804

Test ID: 200902-1

Test Date: 9/2/2020

Test Time: 10:09 AM

### Test Results

| <u>Test Parameter</u>                                              | <u>Specification Range*</u> | <u>Result</u> | <u>Pass/Fail</u> |
|--------------------------------------------------------------------|-----------------------------|---------------|------------------|
| Test Temperature (°C)                                              | 20.6 - 22.2                 | 21.7          | Pass             |
| Test Humidity (%)                                                  | 10 - 70                     | 67            | Pass             |
| Test Velocity (m/s)                                                | 3.30 - 3.50                 | 3.391         | Pass             |
| Pendulum Velocity at 4 ms after T0 (m/s)                           | 0.87 - 1.09                 | 0.95          | Pass             |
| Pendulum Velocity at 8 ms after T0 (m/s)                           | 1.72 - 2.10                 | 1.87          | Pass             |
| Pendulum Velocity at 12 ms after T0 (m/s)                          | 2.63 - 3.17                 | 2.84          | Pass             |
| Peak Headform Flexion Angle (deg)                                  | -61.0 - (-50.0)             | -57.28        | Pass             |
| Peak Headform Flexion Angle Decay<br>Time to 0 degrees (ms)        | 58.0 - 72.0                 | 64.55         | Pass             |
| Peak X-Axis Moment at Occipital Condyle (Nm)                       | 54.0 - 67.0                 | 62.07         | Pass             |
| Peak X-Axis Moment at Occipital Condyle<br>Decay Time to 0 Nm (ms) | 71.0 - 87.0                 | 75.70         | Pass             |
| Peak Headform X-Axis Angular Rate (deg/sec)                        | -2503 - (-2047)             | -2307.12      | Pass             |

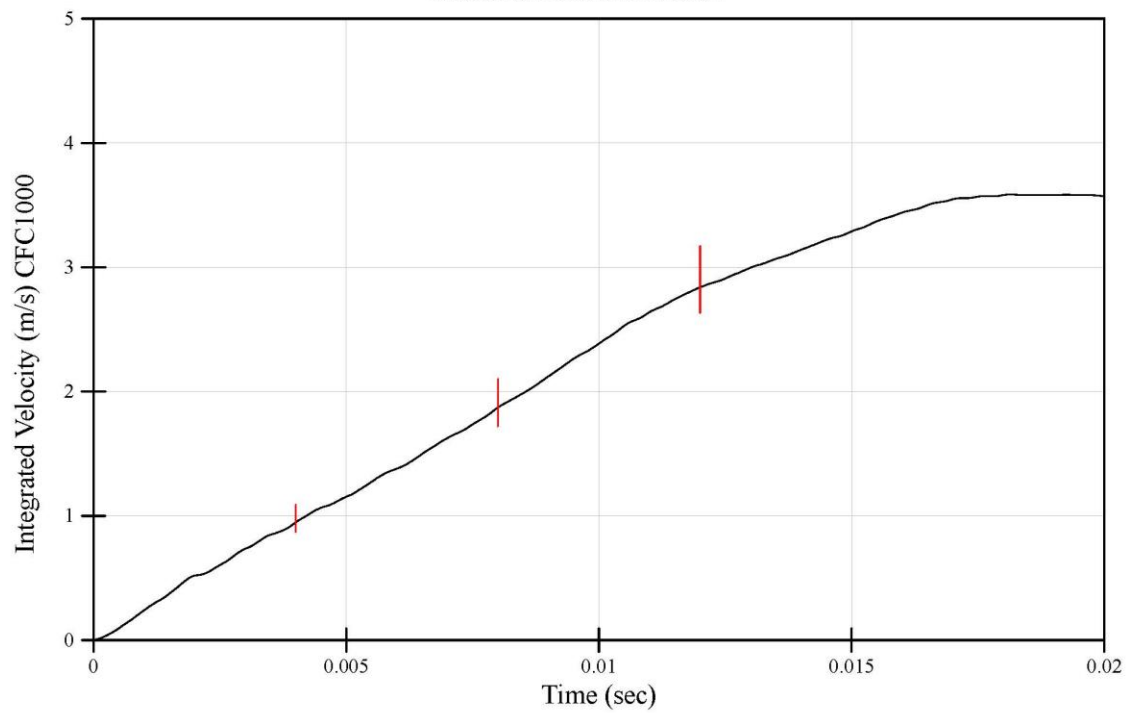
\* WorldSID-50M Qualification Manual - November 2020

File Name: 200902-1 processed

WorldSID-50M Neck Left Lateral Qualification

Probe Acceleration

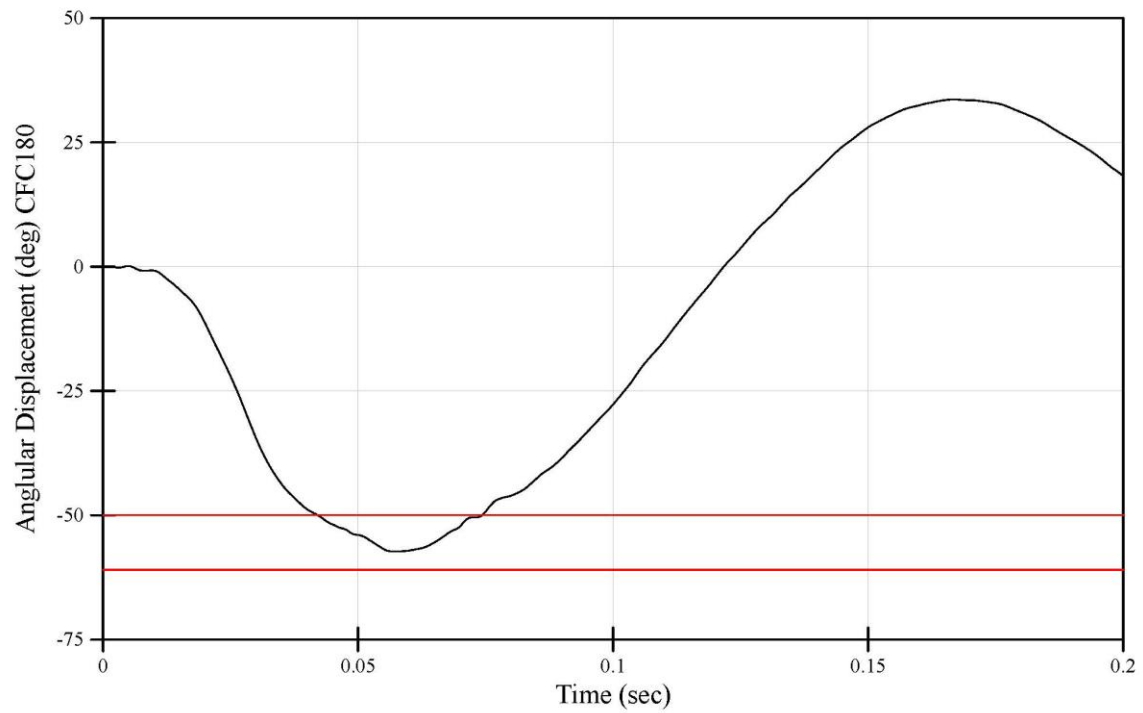
Neck Serial Number: EE8804



File Name: 200902-1 processed

9/2/2020 10:09 AM

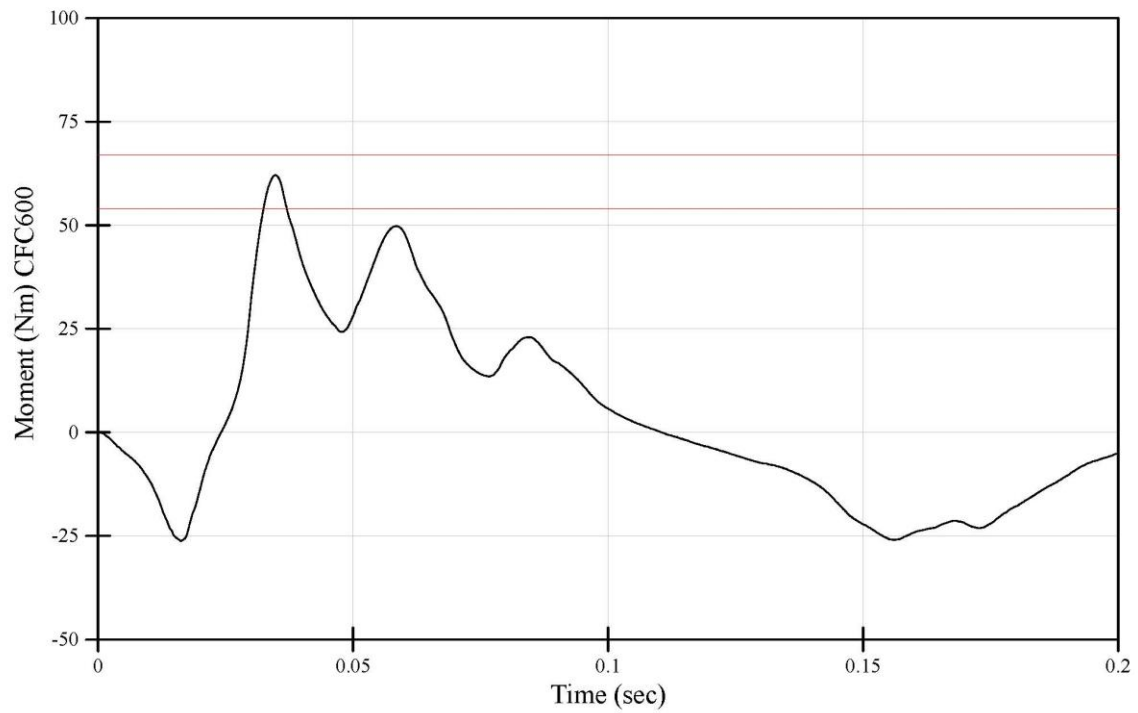
WorldSID-50M Neck Left Lateral Qualification  
Peak Headform Flexion Angle  
Neck Serial Number: EE8804



File Name: 200902-1 processed

9/2/2020 10:09 AM

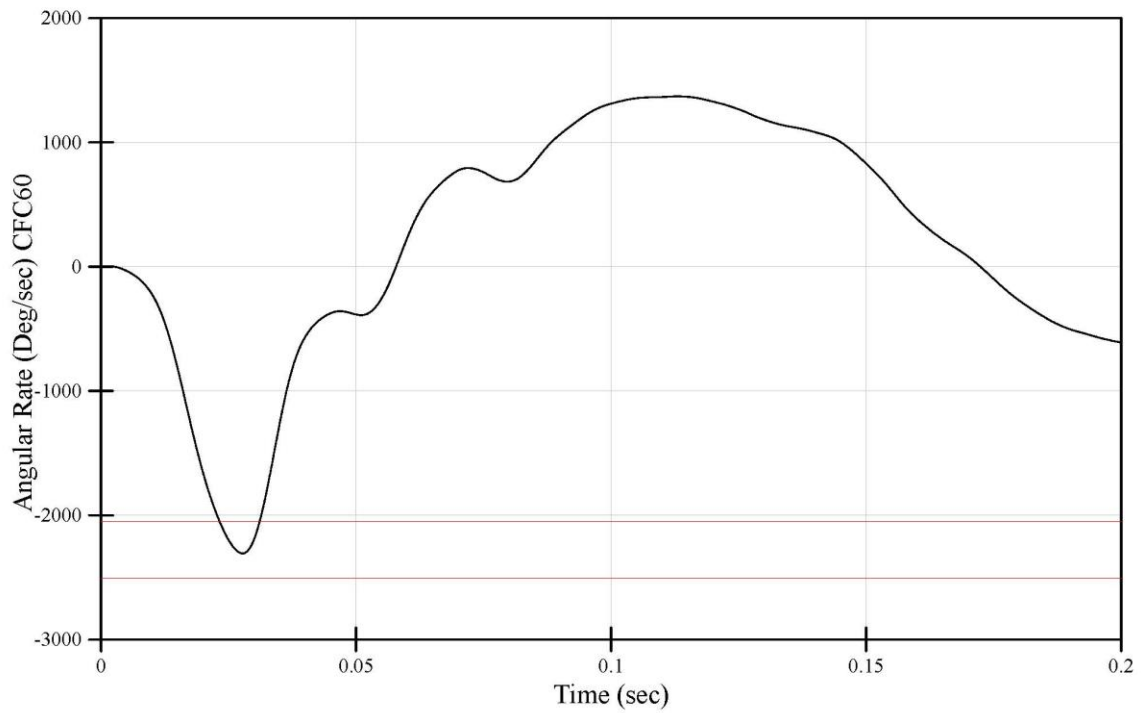
WorldSID-50M Neck Left Lateral Qualification  
Peak Moment at Occipital Condyle  
Neck Serial Number: EE8804



File Name: 200902-1 processed

9/2/2020 10:09 AM

WorldSID-50M Neck Left Lateral Qualification  
Peak Headform X Angular Rate  
Neck Serial Number: EE8804



File Name: 200902-1 processed

9/2/2020 10:09 AM



## WorldSID-50M Neck Right Lateral Qualification Test Results Summary

Dummy Serial Number: EB8888

|                          |                     |
|--------------------------|---------------------|
| <u>Tested Components</u> | Test ID: 200902-3   |
| Neck: EE8804             | Test Date: 9/2/2020 |
|                          | Test Time: 12:18 PM |

| Test Results                                 |                             |               |                  |
|----------------------------------------------|-----------------------------|---------------|------------------|
| <u>Test Parameter</u>                        | <u>Specification Range*</u> | <u>Result</u> | <u>Pass/Fail</u> |
| Test Temperature (°C)                        | 20.6 - 22.2                 | 21.6          | Pass             |
| Test Humidity (%)                            | 10 - 70                     | 60            | Pass             |
| Test Velocity (m/s)                          | 3.30 - 3.50                 | 3.391         | Pass             |
| Pendulum Velocity at 4 ms after T0 (m/s)     | 0.87 - 1.09                 | 0.93          | Pass             |
| Pendulum Velocity at 8 ms after T0 (m/s)     | 1.72 - 2.10                 | 1.87          | Pass             |
| Pendulum Velocity at 12 ms after T0 (m/s)    | 2.63 - 3.17                 | 2.84          | Pass             |
| Peak Headform Flexion Angle (deg)            | 50.0 - 61.0                 | 55.82         | Pass             |
| Peak Headform Flexion Angle Decay            |                             |               |                  |
| Time to 0 degrees (ms)                       | 58.0 - 72.0                 | 62.55         | Pass             |
| Peak X-Axis Moment at Occipital Condyle (Nm) | -67.0 - (-54.0)             | -63.78        | Pass             |
| Peak X-Axis Moment at Occipital Condyle      |                             |               |                  |
| Decay Time to 0 Nm (ms)                      | 71.0 - 87.0                 | 76.70         | Pass             |
| Peak Headform X-Axis Angular Rate (deg/sec)  | 2047 - 2503                 | 2304.48       | Pass             |

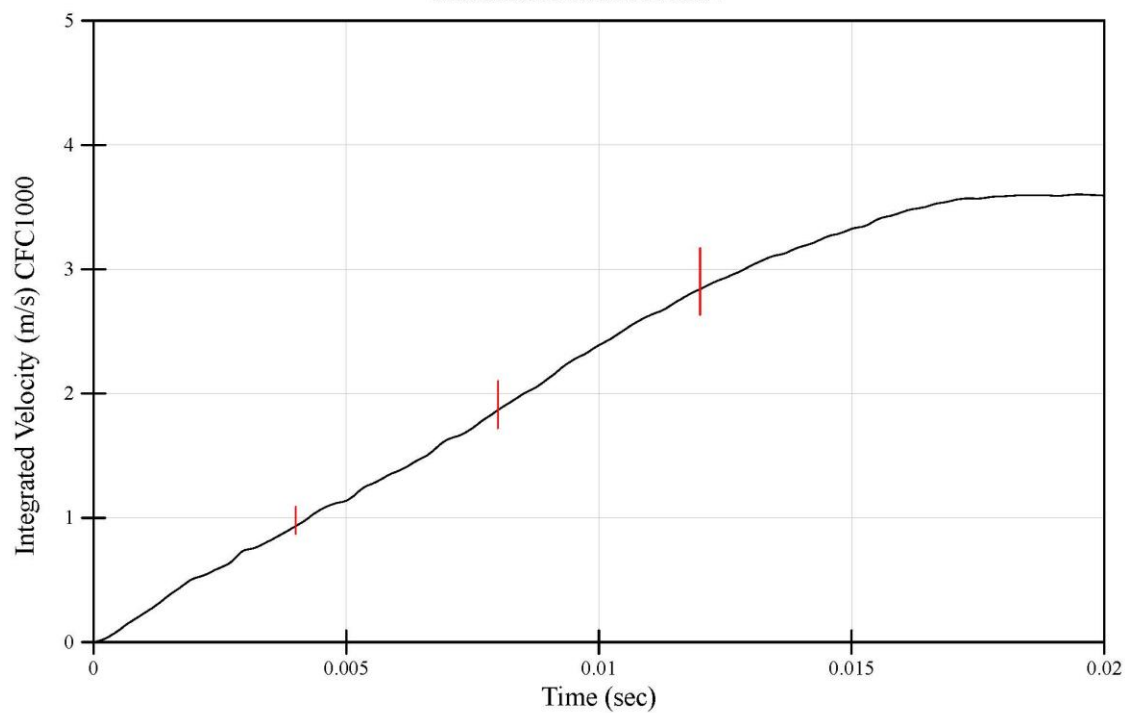
\* WorldSID-50M Qualification Manual - November 2020

File Name: 200902-3 processed

WorldSID-50M Neck Right Lateral Qualification

Probe Acceleration

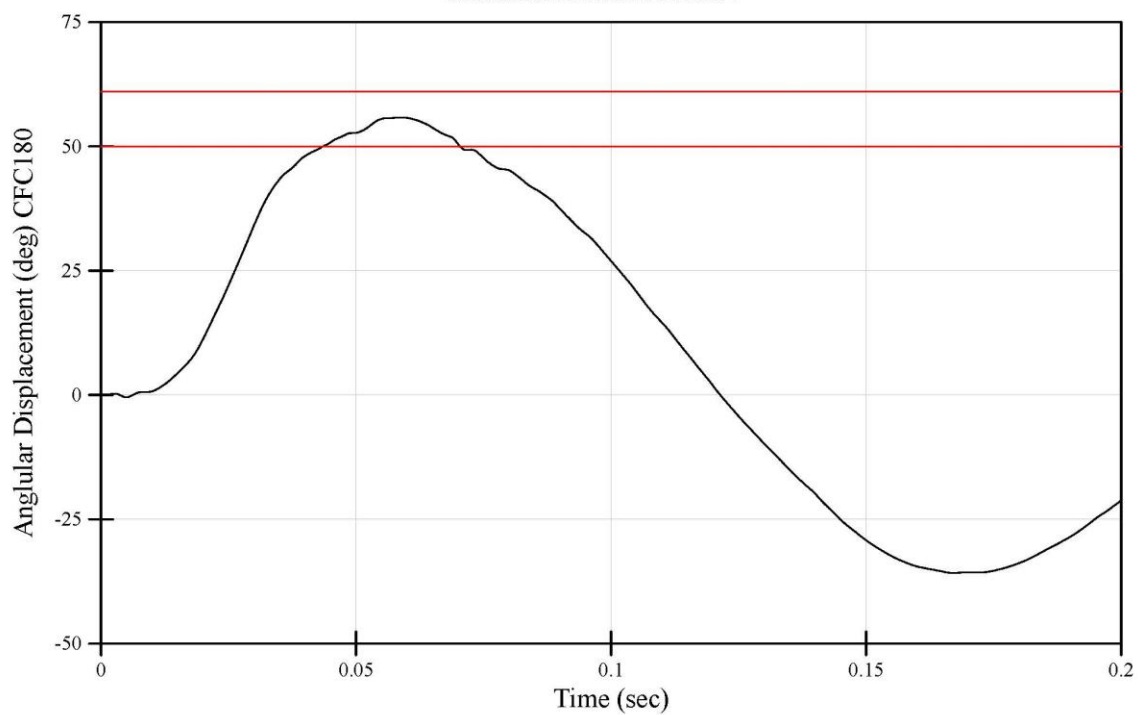
Neck Serial Number: EE8804



File Name: 200902-3 processed

9/2/2020 12:18 PM

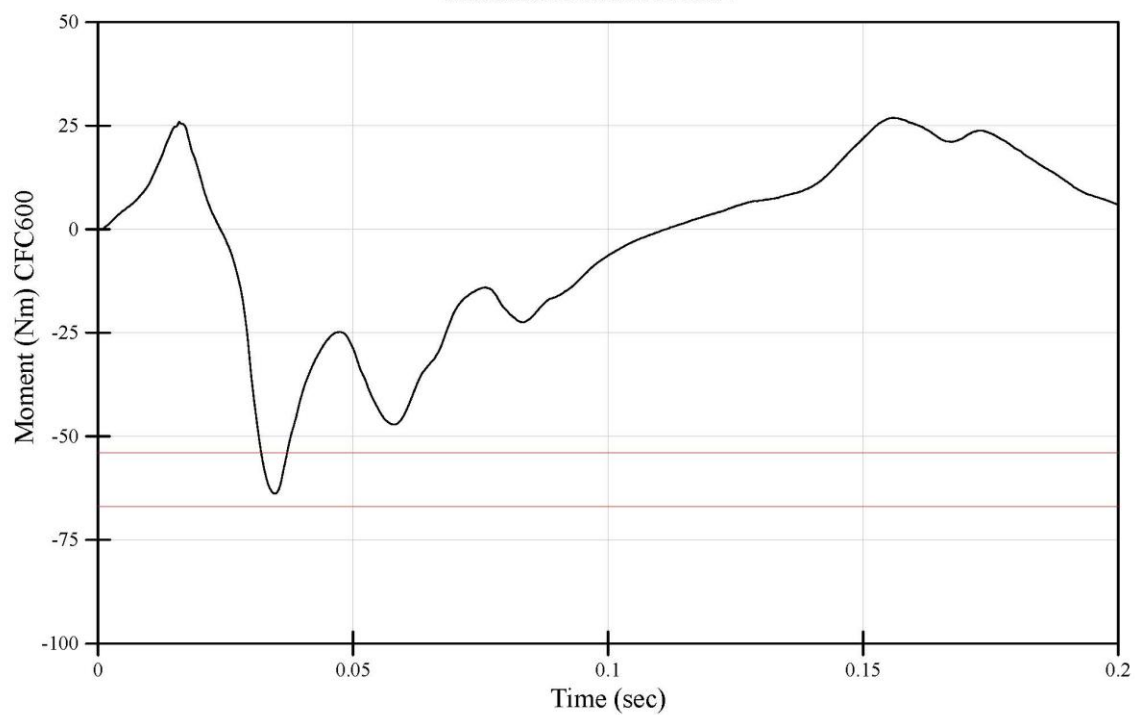
WorldSID-50M Neck Right Lateral Qualification  
Peak Headform Flexion Angle  
Neck Serial Number: EE8804



File Name: 200902-3 processed

9/2/2020 12:18 PM

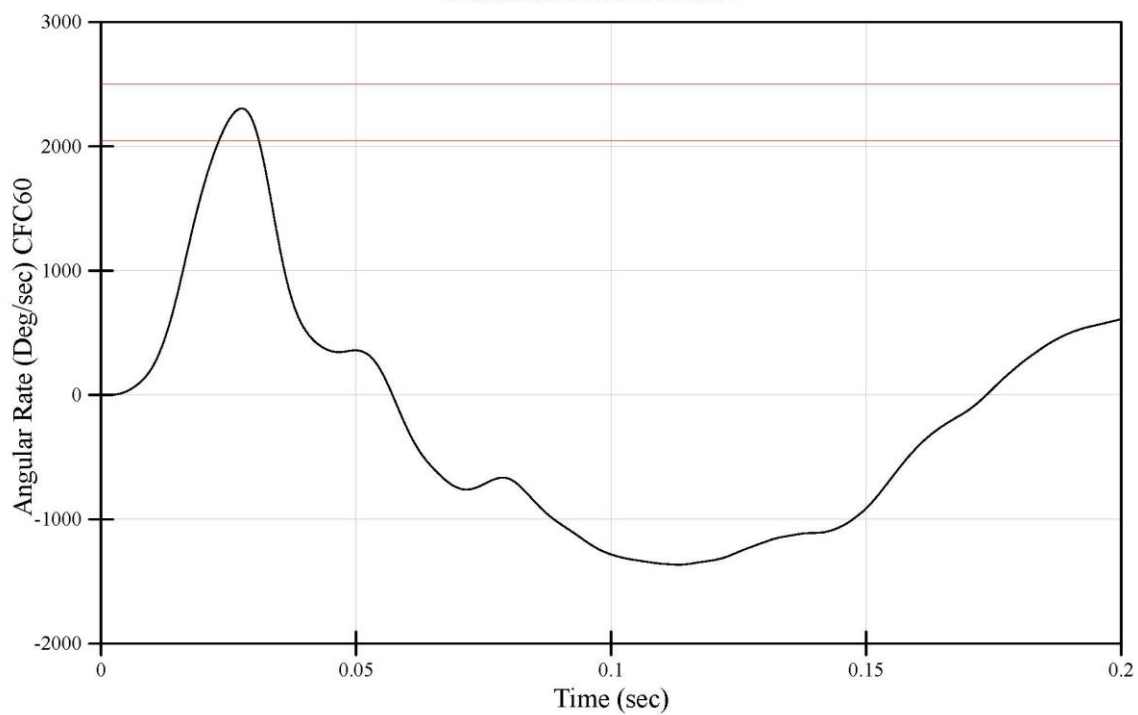
WorldSID-50M Neck Right Lateral Qualification  
Peak Moment at Occipital Condyle  
Neck Serial Number: EE8804



File Name: 200902-3 processed

9/2/2020 12:18 PM

WorldSID-50M Neck Right Lateral Qualification  
Peak Headform X Angular Rate  
Neck Serial Number: EE8804



File Name: 200902-3 processed

9/2/2020 12:18 PM

## WorldSID-50M Neck Left Torsion Qualification Test Results Summary

Dummy Serial Number: EB8888

### Tested Components

Neck: EE8804

Test ID: 200901-19

Test Date: 9/1/2020

Test Time: 12:50 PM

### Test Results

| <u>Test Parameter</u>                                    | <u>Specification Range*</u> | <u>Result</u> | <u>Pass/Fail</u> |
|----------------------------------------------------------|-----------------------------|---------------|------------------|
| Test Temperature (°C)                                    | 20.6 - 22.2                 | 20.6          | Pass             |
| Test Humidity (%)                                        | 10 - 70                     | 65            | Pass             |
| Test Velocity (m/s)                                      | 5.10 - 5.30                 | 5.180         | Pass             |
| Pendulum Velocity at 10 ms after T0 (m/s)                | 2.09 - 2.37                 | 2.28          | Pass             |
| Pendulum Velocity at 15 ms after T0 (m/s)                | 3.19 - 3.63                 | 3.45          | Pass             |
| Pendulum Velocity at 20 ms after T0 (m/s)                | 4.27 - 4.87                 | 4.55          | Pass             |
| Peak Torsion Fixture Rotation (deg)                      | -51.0 - (-41.5)             | -47.11        | Pass             |
| Torsion Fixture Rotation Decay Time<br>to 0 degrees (ms) | 35.0 - 43.0                 | 39.40         | Pass             |
| Peak Fixture Angular Rate, Z-Axis (deg/sec)              | -1655 - (-1345)             | -1506.32      | Pass             |
| Peak Lower Neck MZ (Nm)                                  | 34.0 - 42.0                 | 38.41         | Pass             |

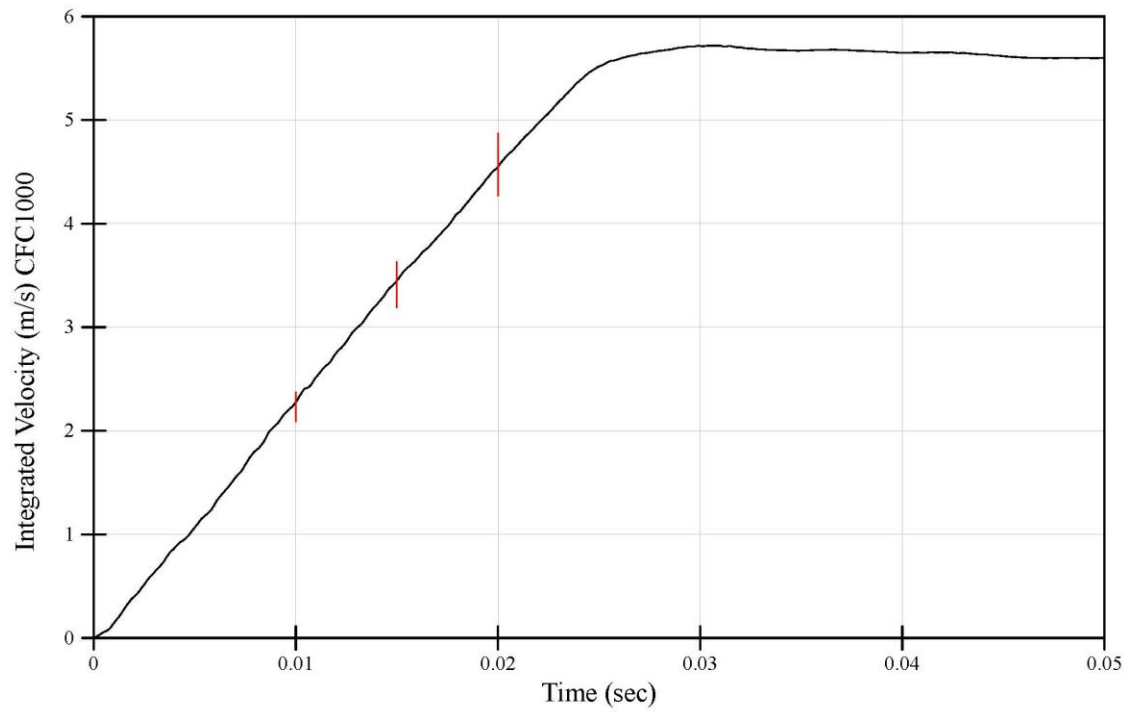
\* WorldSID-50M Qualification Manual - November 2020

File Name: 200901-19 processed

WorldSID-50M Neck Left Torsion Qualification

Probe Acceleration

Neck Serial Number: EE8804

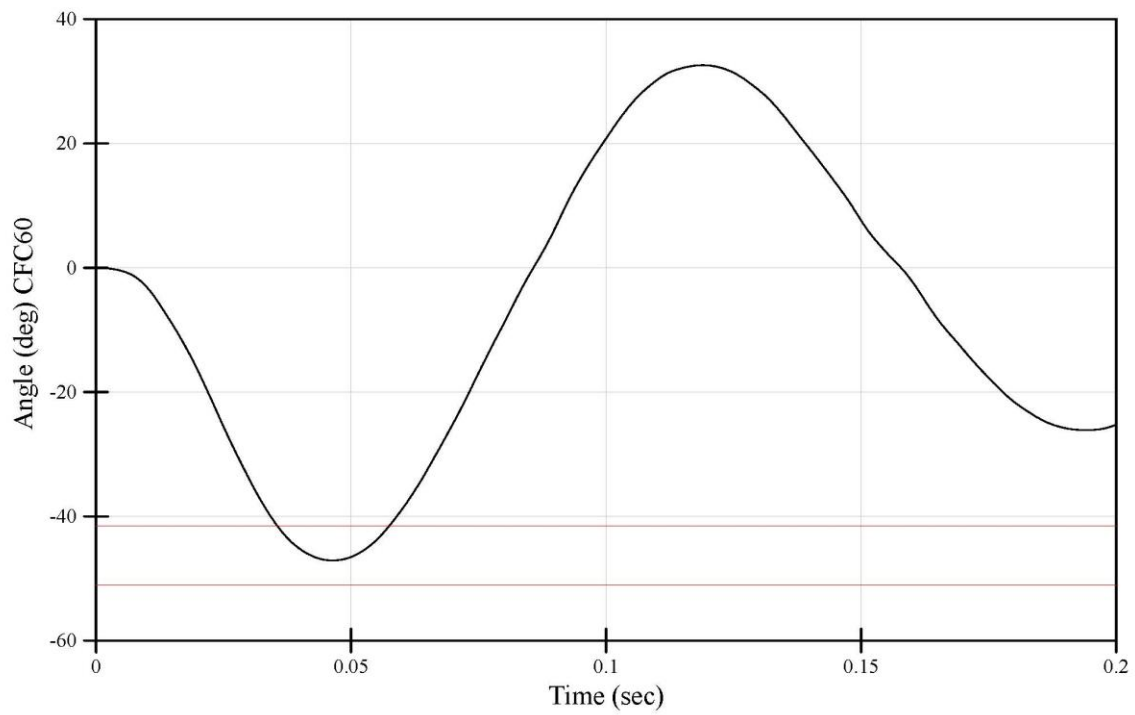


File Name: 200901-19 processed

9/1/2020 12:50 PM



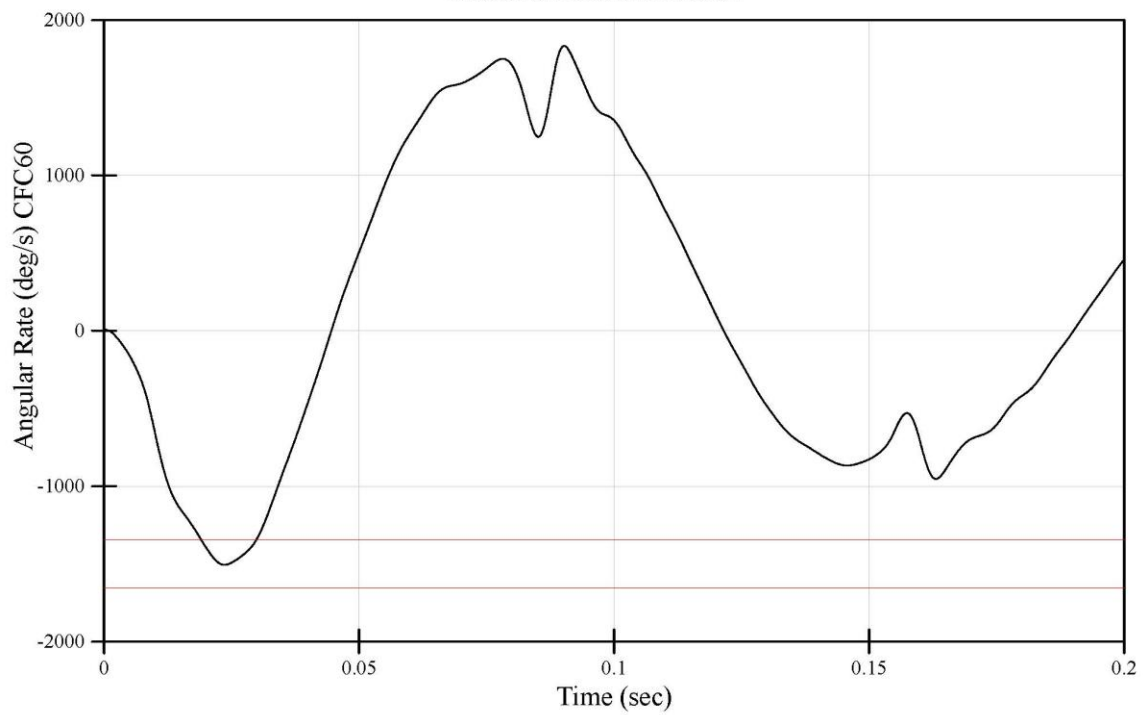
WorldSID-50M Neck Left Torsion Qualification  
Neck Fixture Rotation  
Neck Serial Number: EE8804



File Name: 200901-19 processed

9/1/2020 12:50 PM

WorldSID-50M Neck Left Torsion Qualification  
Peak Angular Rate  
Neck Serial Number: EE8804



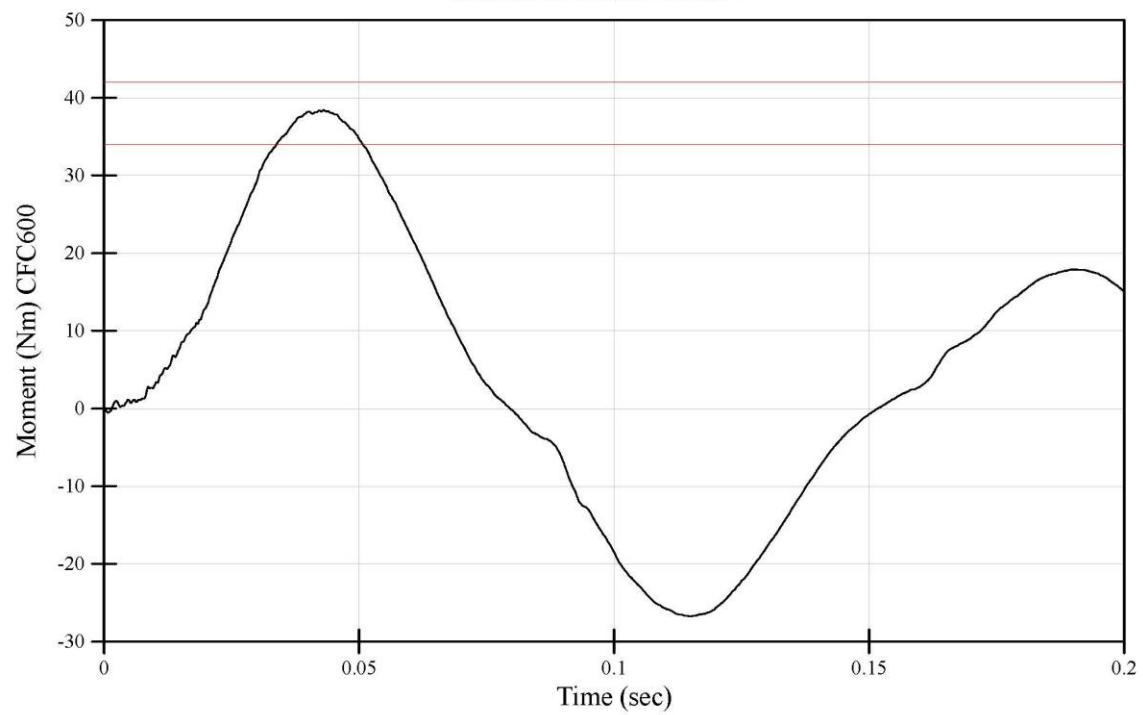
File Name: 200901-19 processed

9/1/2020 12:50 PM

WorldSID-50M Neck Left Torsion Qualification

Z-Moment as Measured

Neck Serial Number: EE8804



File Name: 200901-19 processed

9/1/2020 12:50 PM

## WorldSID-50M Neck Right Torsion Qualification Test Results Summary

Dummy Serial Number: EB8888

### Tested Components

Neck: EE8804

Test ID: 200901-20

Test Date: 9/1/2020

Test Time: 1:36 PM

### Test Results

| <u>Test Parameter</u>                                    | <u>Specification Range*</u> | <u>Result</u> | <u>Pass/Fail</u> |
|----------------------------------------------------------|-----------------------------|---------------|------------------|
| Test Temperature (°C)                                    | 20.6 - 22.2                 | 20.8          | Pass             |
| Test Humidity (%)                                        | 10 - 70                     | 68            | Pass             |
| Test Velocity (m/s)                                      | 5.10 - 5.30                 | 5.228         | Pass             |
| Pendulum Velocity at 10 ms after T0 (m/s)                | 2.09 - 2.37                 | 2.28          | Pass             |
| Pendulum Velocity at 15 ms after T0 (m/s)                | 3.19 - 3.63                 | 3.47          | Pass             |
| Pendulum Velocity at 20 ms after T0 (m/s)                | 4.27 - 4.87                 | 4.64          | Pass             |
| Peak Torsion Fixture Rotation (deg)                      | 41.5 - 51.0                 | 46.37         | Pass             |
| Torsion Fixture Rotation Decay Time<br>to 0 degrees (ms) | 35.0 - 43.0                 | 39.75         | Pass             |
| Peak Fixture Angular Rate, Z-Axis (deg/sec)              | 1345 - 1655                 | 1533.25       | Pass             |
| Peak Lower Neck MZ (Nm)                                  | -42.0 - (-34.0)             | -38.82        | Pass             |

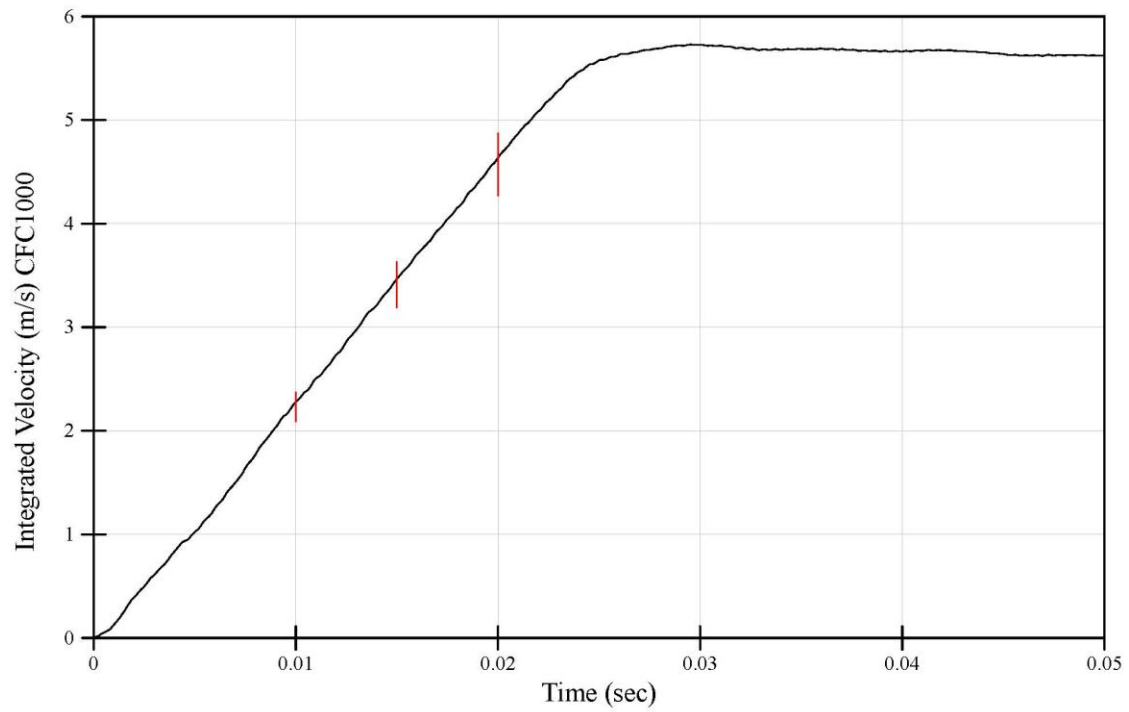
\* WorldSID-50M Qualification Manual - November 2020

File Name: 200901-20 processed

WorldSID-50M Neck Right Torsion Qualification

Probe Acceleration

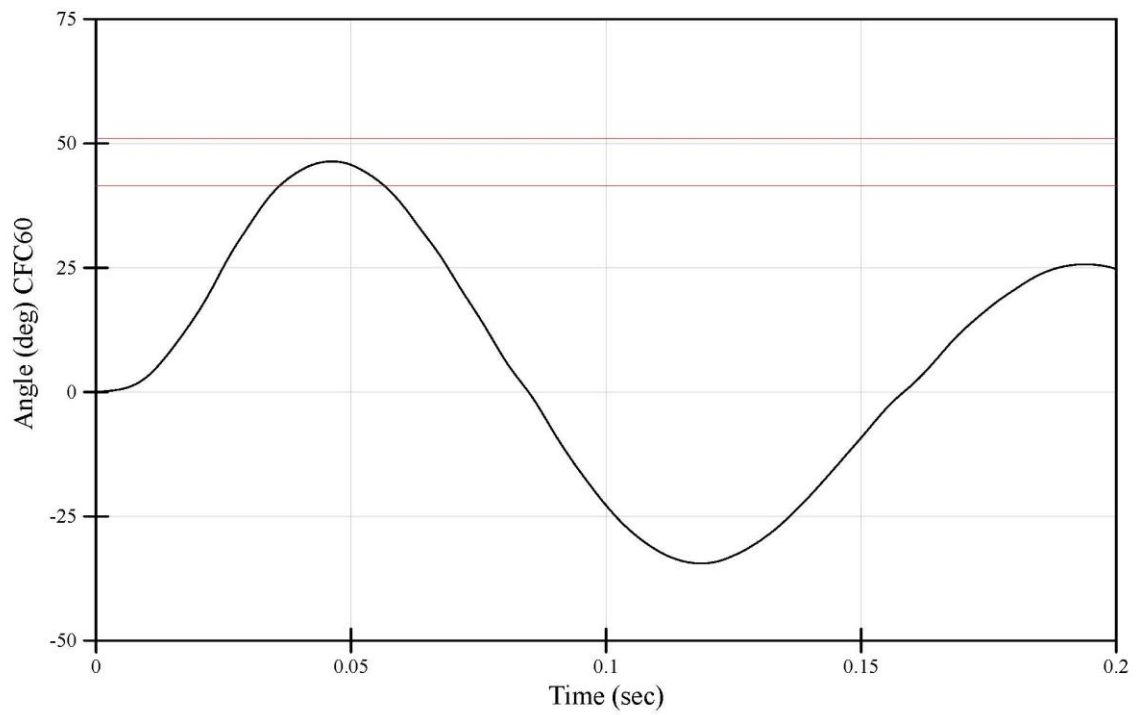
Neck Serial Number: EE8804



File Name: 200901-20 processed

9/1/2020 1:36 PM

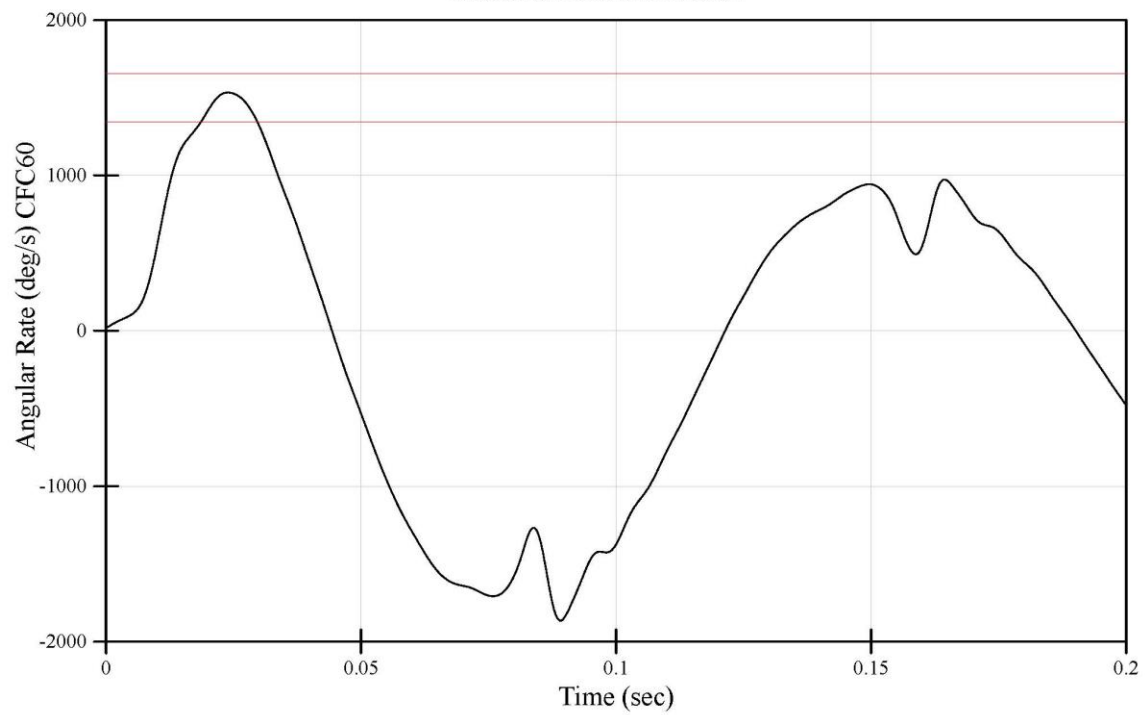
WorldSID-50M Neck Right Torsion Qualification  
Neck Fixture Rotation  
Neck Serial Number: EE8804



File Name: 200901-20 processed

9/1/2020 1:36 PM

WorldSID-50M Neck Right Torsion Qualification  
Peak Angular Rate  
Neck Serial Number: EE8804

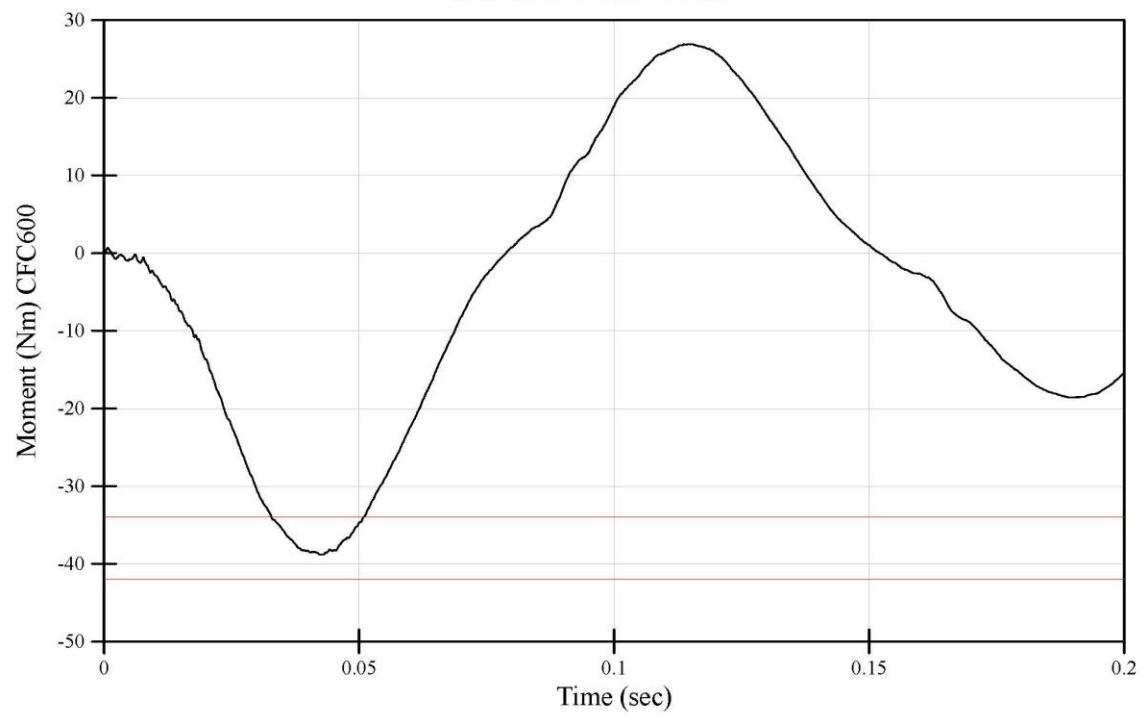


File Name: 200901-20 processed

9/1/2020 1:36 PM



WorldSID-50M Neck Right Torsion Qualification  
Z-Moment as Measured  
Neck Serial Number: EE8804



File Name: 200901-20 processed

9/1/2020 1:36 PM

## WorldSID-50M Shoulder Qualification Test Results Summary

Dummy Serial Number: EB8888

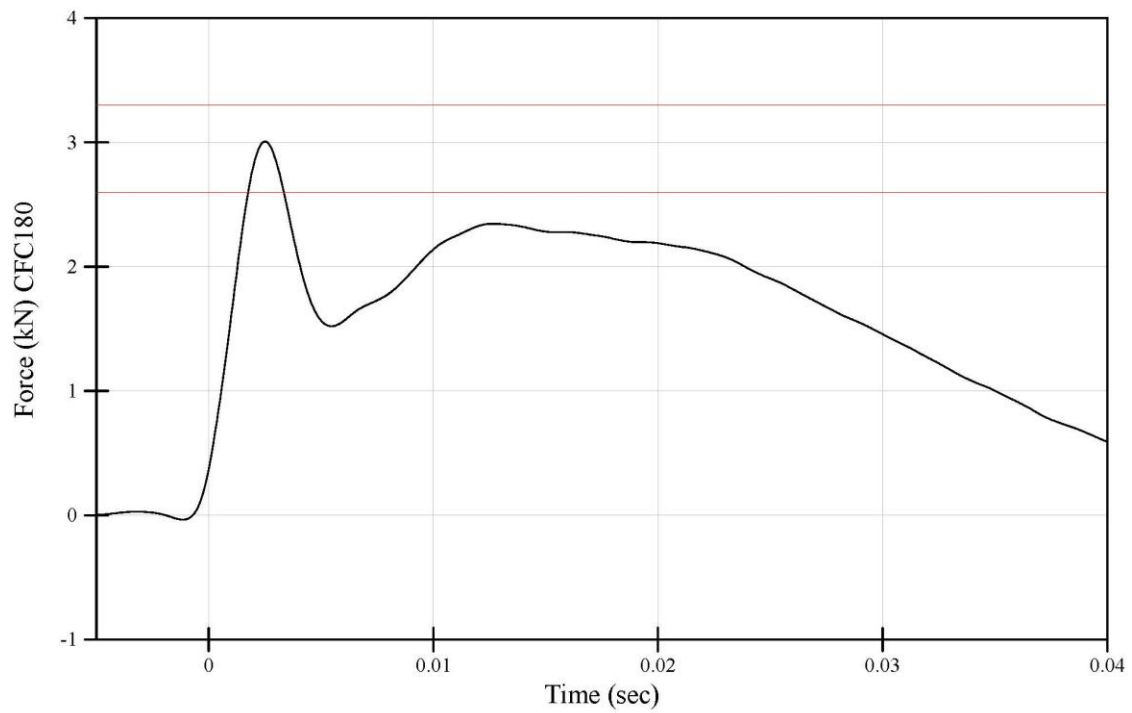
| <u>Tested Components</u> |                       | Test ID: 200902-4   |
|--------------------------|-----------------------|---------------------|
| Shoulder Rib: DW1913     | Abdomen Rib 1: DY5252 | Test Date: 9/2/2020 |
| Thorax Rib 1: EB5400     | Abdomen Rib 2: DY5254 | Test Time: 1:34 PM  |
| Thorax Rib 2: EB5401     | RibEye: 124           |                     |
| Thorax Rib 3: EB5402     | Impacted Arm: EC3799  |                     |

| <u>Test Results</u>                  |                             |               |                  |
|--------------------------------------|-----------------------------|---------------|------------------|
| <u>Test Parameter</u>                | <u>Specification Range*</u> | <u>Result</u> | <u>Pass/Fail</u> |
| Test Temperature (°C)                | 20.6 - 22.2                 | 21.7          | Pass             |
| Test Humidity (%)                    | 10 - 70                     | 64            | Pass             |
| Test Velocity (m/s)                  | 4.20 - 4.40                 | 4.314         | Pass             |
| Thorax Rib Temperature Sensor (°C)   | 20.6 - 23.8                 | 22.6          | Pass             |
| Peak Probe Force (kN)                | 2.60 - 3.30                 | 3.01          | Pass             |
| Peak Shoulder Fy (kN)                | -1.80 - (-1.47)             | -1.64         | Pass             |
| Peak Shoulder Rib Length Change (mm) | 37.0 - 46.0                 | 42.29         | Pass             |

\* WorldSID-50M Qualification Manual - November 2020

File Name: 200902-4 processed

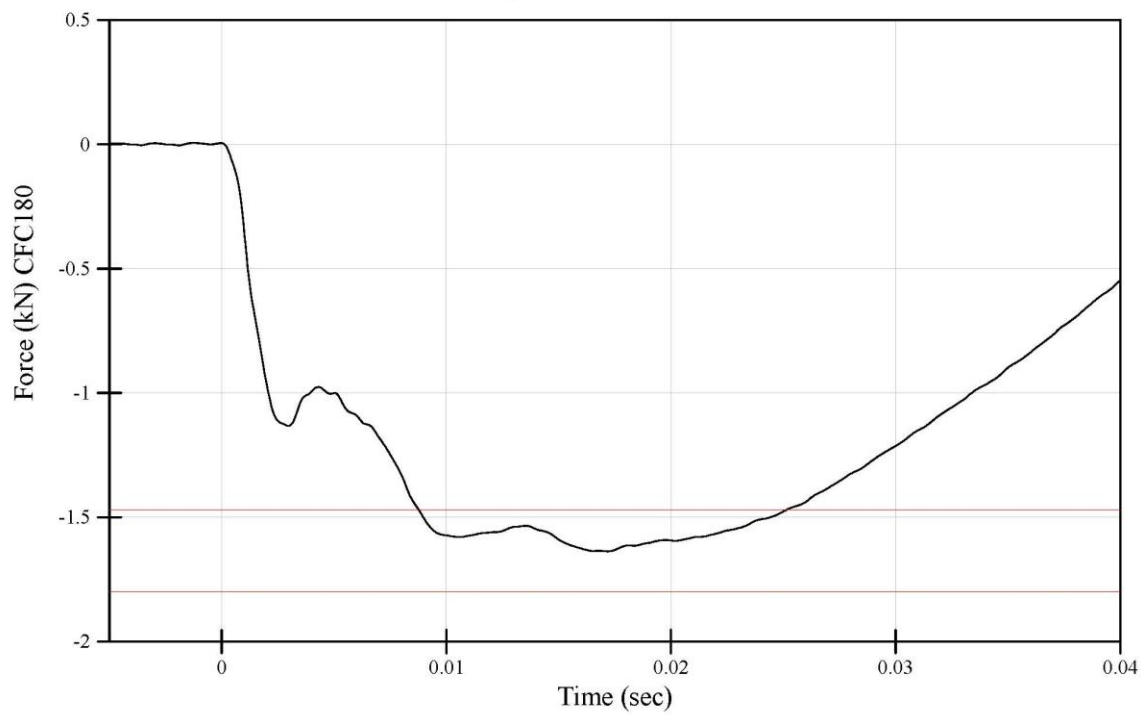
WorldSID-50M Shoulder Qualification  
Peak Pendulum Force  
Dummy Serial Number: EB8888



File Name: 200902-4 processed

9/2/2020 1:34 PM

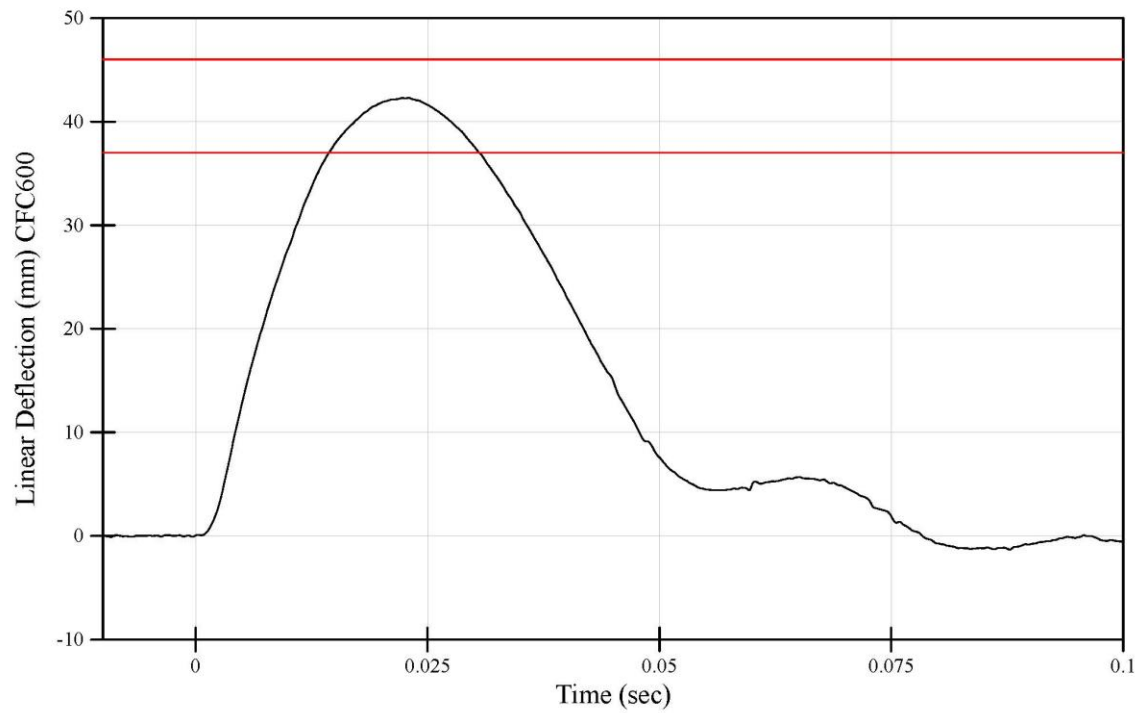
WorldSID-50M Shoulder Qualification  
Peak Shoulder Y Force  
Dummy Serial Number: EB8888



File Name: 200902-4 processed

9/2/2020 1:34 PM

WorldSID-50M Shoulder Qualification  
Maximum Shoulder Y Deflection  
Dummy Serial Number: EB8888



File Name: 200902-4 processed

9/2/2020 1:34 PM

## WorldSID-50M Left Thorax with Arm Qualification

### Test Results Summary

Dummy Serial Number: EB8888

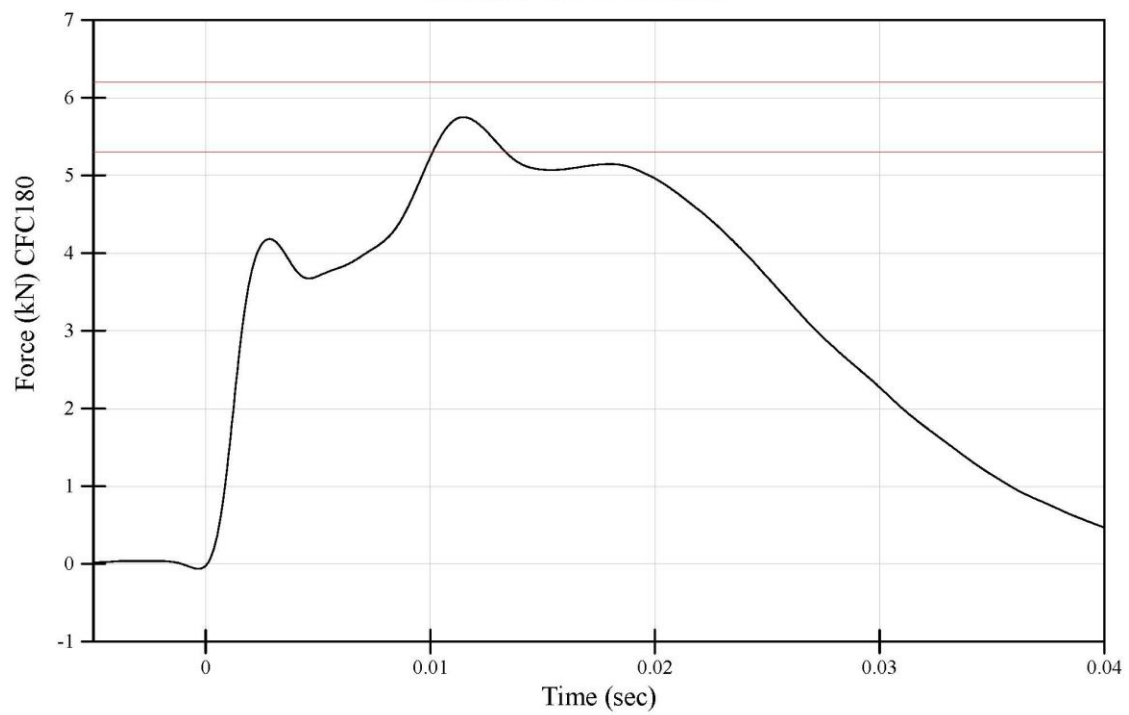
| Tested Components    |                       | Test ID: 200903-5   |
|----------------------|-----------------------|---------------------|
| Shoulder Rib: DW1913 | Abdomen Rib 1: DY5252 | Test Date: 9/3/2020 |
| Thorax Rib 1: EB5400 | Abdomen Rib 2: DY5254 | Test Time: 7:56 AM  |
| Thorax Rib 2: EB5401 | RibEye: 124           |                     |
| Thorax Rib 3: EB5402 | Impacted Arm: EC3799  |                     |

| Test Results                         |                             |               |                  |
|--------------------------------------|-----------------------------|---------------|------------------|
| <u>Test Parameter</u>                | <u>Specification Range*</u> | <u>Result</u> | <u>Pass/Fail</u> |
| Test Temperature (°C)                | 20.6 - 22.2                 | 21.6          | Pass             |
| Test Humidity (%)                    | 10 - 70                     | 69            | Pass             |
| Test Velocity (m/s)                  | 6.60 - 6.80                 | 6.698         | Pass             |
| Thorax Rib Temperature Sensor (°C)   | 20.6 - 23.8                 | 21.3          | Pass             |
| Peak Probe Force (kN)                | 5.30 - 6.20                 | 5.75          | Pass             |
| Peak Thorax Rib 1 Length Change (mm) | 35.0 - 47.0                 | 40.96         | Pass             |
| Peak Thorax Rib 2 Length Change (mm) | 46.0 - 56.0                 | 46.88         | Pass             |
| Peak Thorax Rib 3 Length Change (mm) | 33.5 - 40.5                 | 34.80         | Pass             |
| Peak T4 Acceleration (g)             | 28.0 - 37.0                 | 31.84         | Pass             |
| Peak T12 Acceleration (g)            | 22.0 - 28.0                 | 22.37         | Pass             |

\* WorldSID-50M Qualification Manual - November 2020

File Name: 200903-5 processed

WorldSID-50M Left Thorax with Arm Qualification  
Peak Pendulum Force  
Dummy Serial Number: EB8888

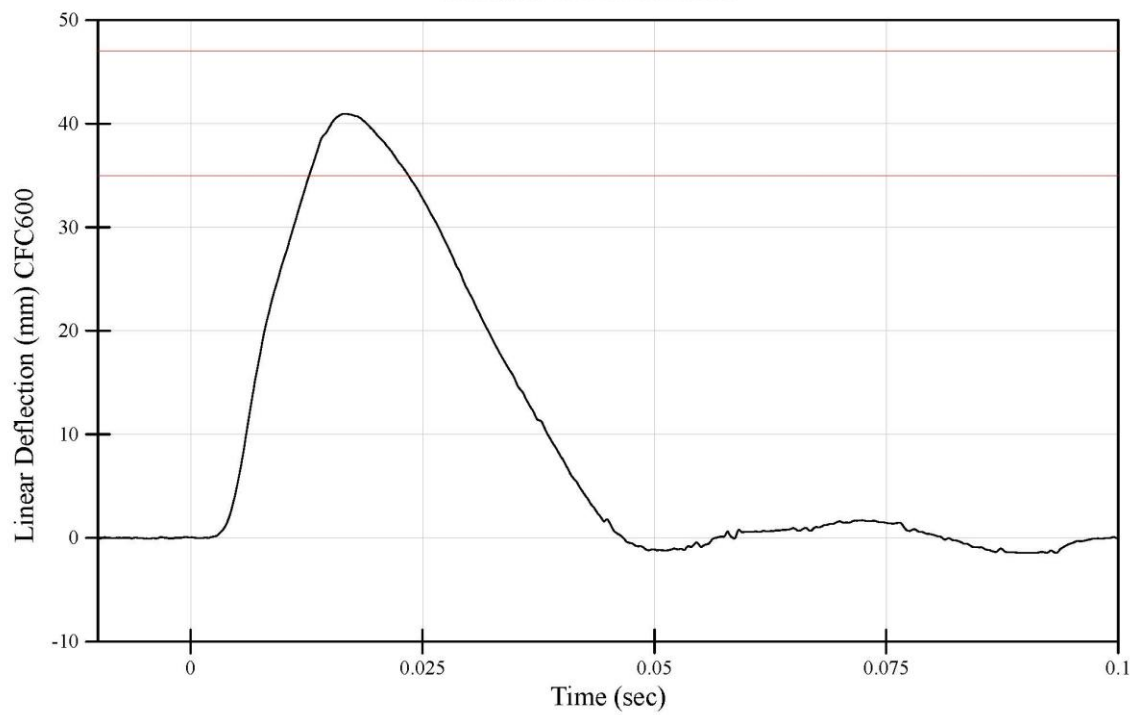


File Name: 200903-5 processed

9/3/2020 7:56 AM



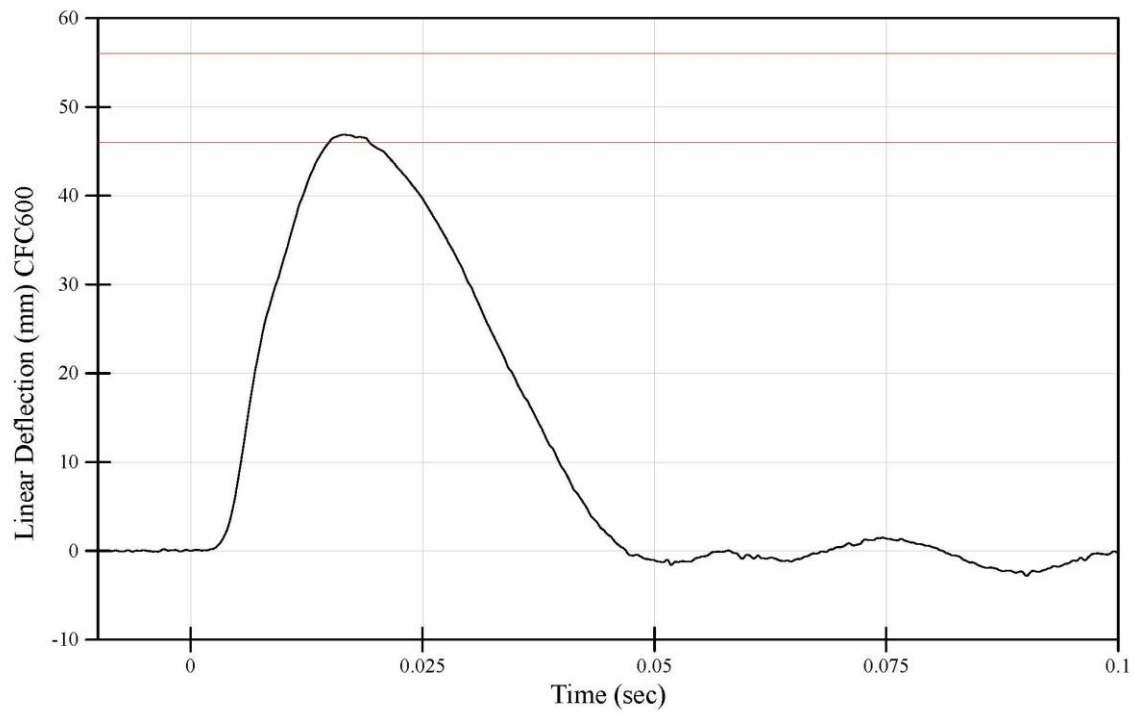
WorldSID-50M Left Thorax with Arm Qualification  
Max Thorax Rib 1 Y Deflection  
Dummy Serial Number: EB8888



File Name: 200903-5 processed

9/3/2020 7:56 AM

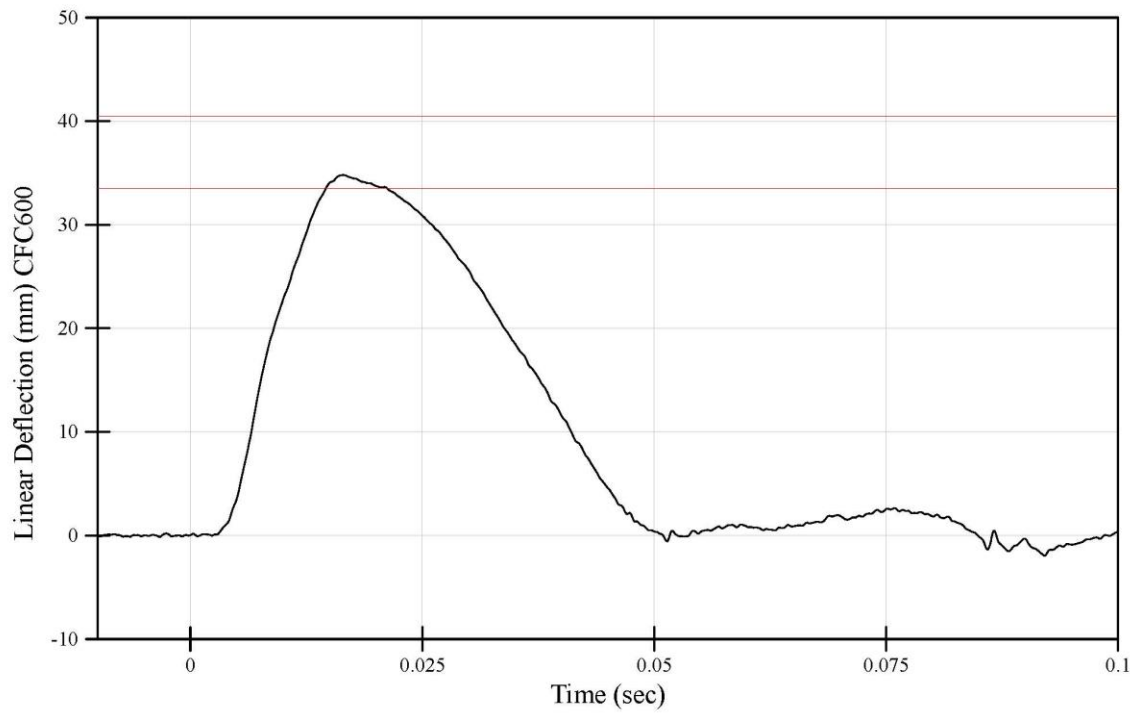
WorldSID-50M Left Thorax with Arm Qualification  
Max Thorax Rib 2 Y Deflection  
Dummy Serial Number: EB8888



File Name: 200903-5 processed

9/3/2020 7:56 AM

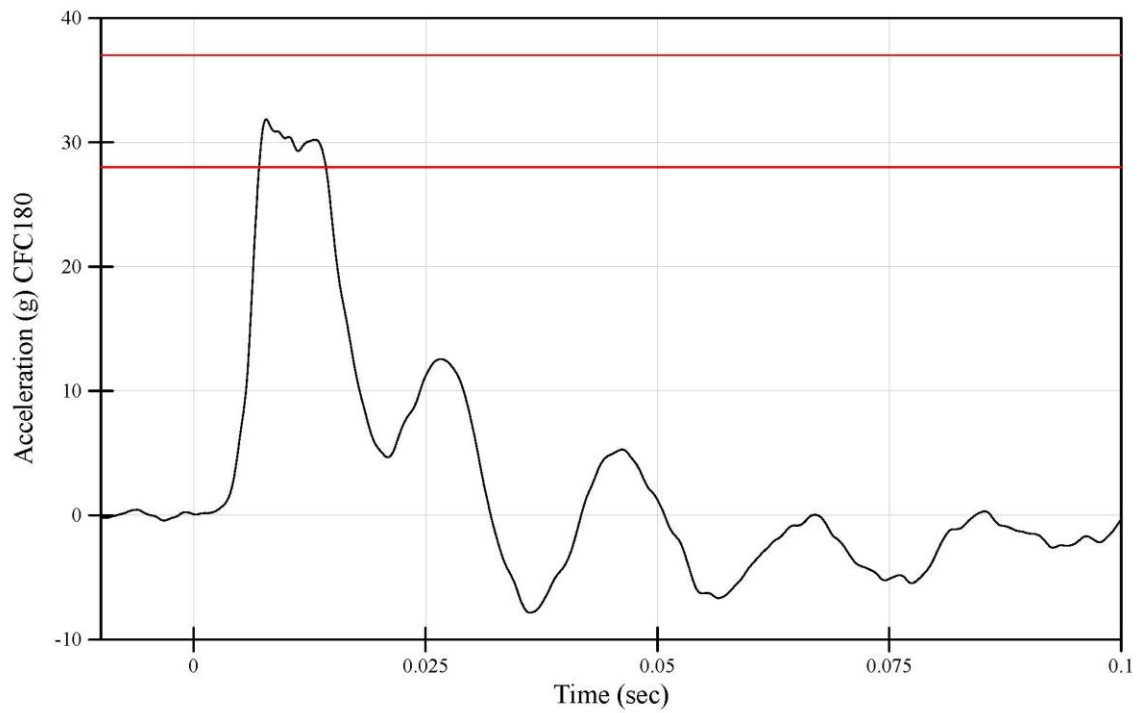
WorldSID-50M Left Thorax with Arm Qualification  
Max Thorax Rib 3 Y Deflection  
Dummy Serial Number: EB8888



File Name: 200903-5 processed

9/3/2020 7:56 AM

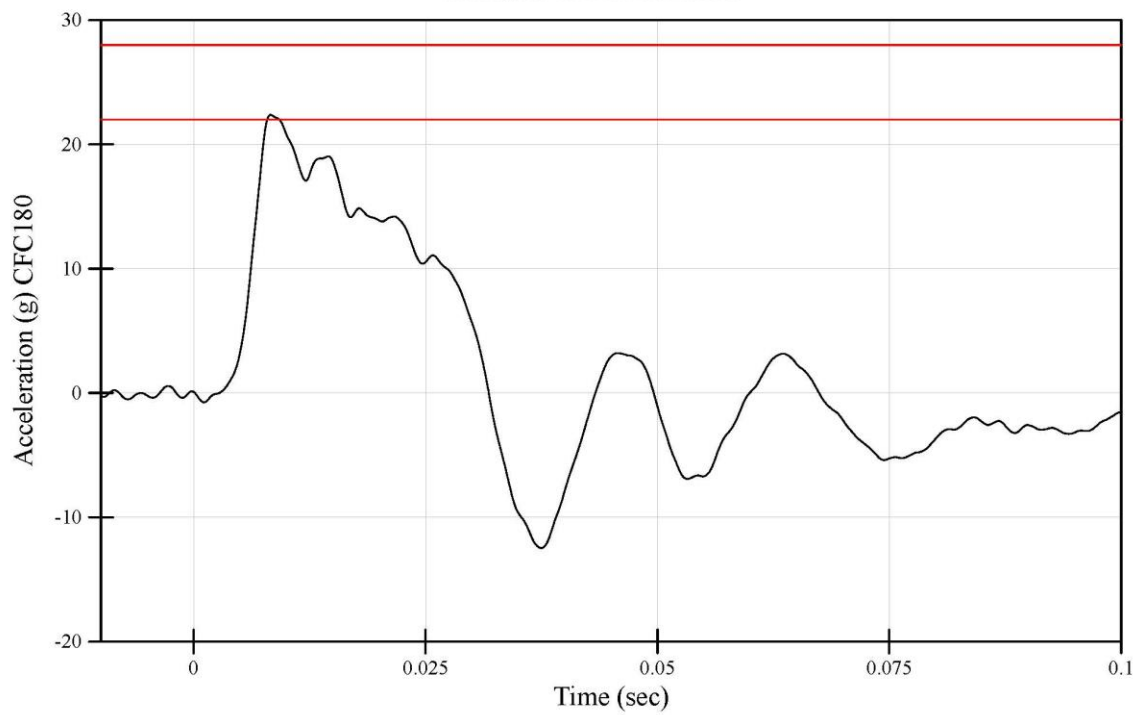
WorldSID-50M Left Thorax with Arm Qualification  
Peak T4 Y Axis Acceleration  
Dummy Serial Number: EB8888



File Name: 200903-5 processed

9/3/2020 7:56 AM

WorldSID-50M Left Thorax with Arm Qualification  
Peak T12 Y Axis Acceleration  
Dummy Serial Number: EB8888



File Name: 200903-5 processed

9/3/2020 7:56 AM

## WorldSID-50M Left Thorax without Arm Qualification

### Test Results Summary

Dummy Serial Number: EB8888

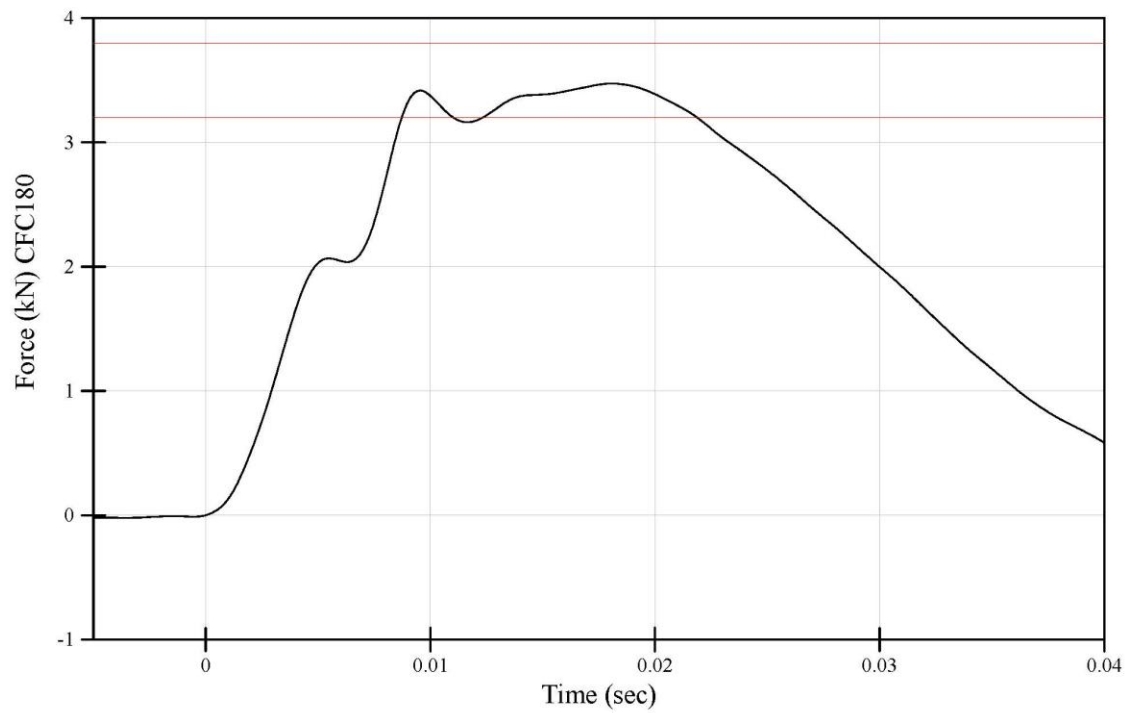
| Tested Components    |                       | Test ID: 200903-1   |
|----------------------|-----------------------|---------------------|
| Shoulder Rib: DW1913 | Abdomen Rib 1: DY5252 | Test Date: 9/3/2020 |
| Thorax Rib 1: EB5400 | Abdomen Rib 2: DY5254 | Test Time: 6:36 AM  |
| Thorax Rib 2: EB5401 | RibEye: 124           |                     |
| Thorax Rib 3: EB5402 |                       |                     |

| Test Results                         |                             |               |                  |
|--------------------------------------|-----------------------------|---------------|------------------|
| <u>Test Parameter</u>                | <u>Specification Range*</u> | <u>Result</u> | <u>Pass/Fail</u> |
| Test Temperature (°C)                | 20.6 - 22.2                 | 21.0          | Pass             |
| Test Humidity (%)                    | 10 - 70                     | 69            | Pass             |
| Test Velocity (m/s)                  | 4.20 - 4.40                 | 4.312         | Pass             |
| Thorax Rib Temperature Sensor (°C)   | 20.6 - 23.8                 | 22.3          | Pass             |
| Peak Probe Force (kN)                | 3.20 - 3.80                 | 3.47          | Pass             |
| Peak Thorax Rib 1 Length Change (mm) | 33.0 - 43.0                 | 35.28         | Pass             |
| Peak Thorax Rib 2 Length Change (mm) | 35.0 - 43.0                 | 38.08         | Pass             |
| Peak Thorax Rib 3 Length Change (mm) | 32.0 - 40.0                 | 33.95         | Pass             |
| Peak T4 Acceleration (g)             | 14.0 - 20.0                 | 15.46         | Pass             |
| Peak T12 Acceleration (g)            | 14.0 - 22.0                 | 17.12         | Pass             |

\* WorldSID-50M Qualification Manual - November 2020

File Name: 200903-1 processed

WorldSID-50M Left Thorax without Arm Qualification  
Peak Pendulum Force  
Dummy Serial Number: EB8888

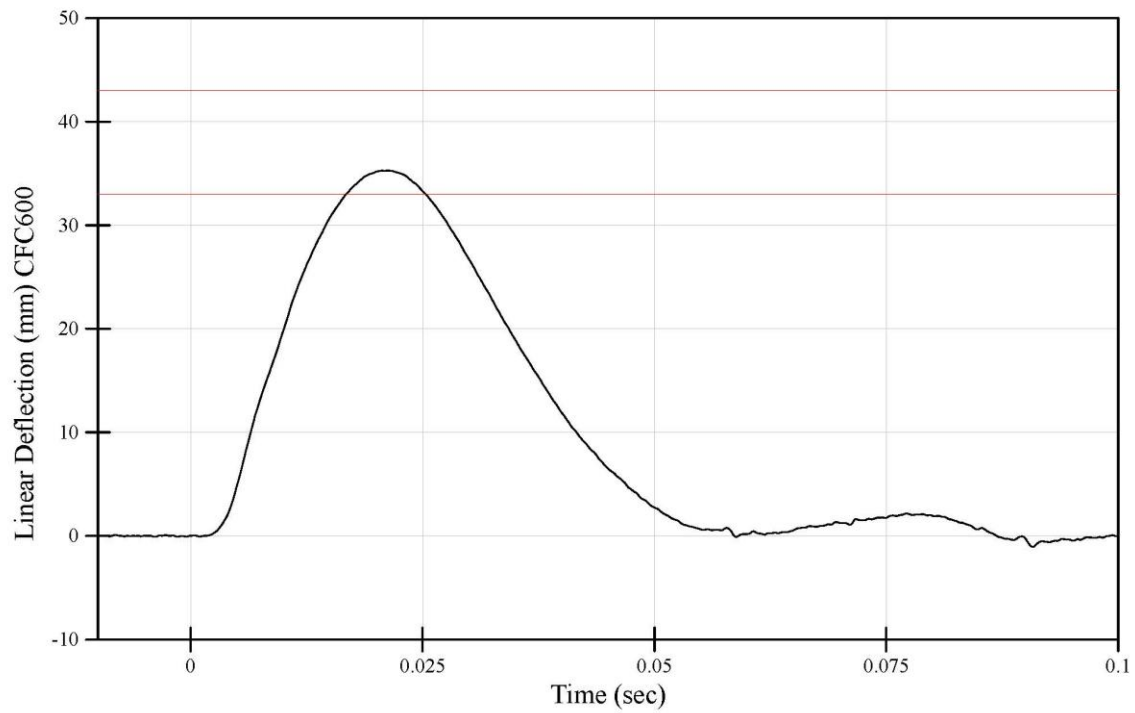


File Name: 200903-1 processed

9/3/2020 6:36 AM



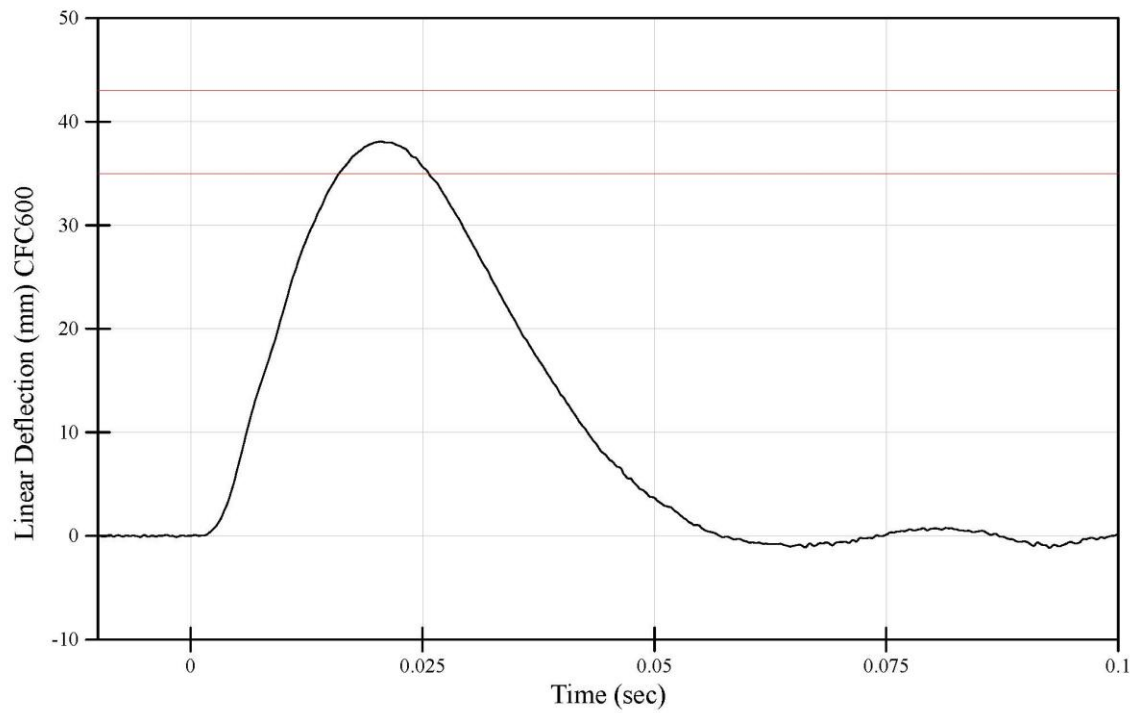
WorldSID-50M Left Thorax without Arm Qualification  
Max Thorax Rib 1 Y Deflection  
Dummy Serial Number: EB8888



File Name: 200903-1 processed

9/3/2020 6:36 AM

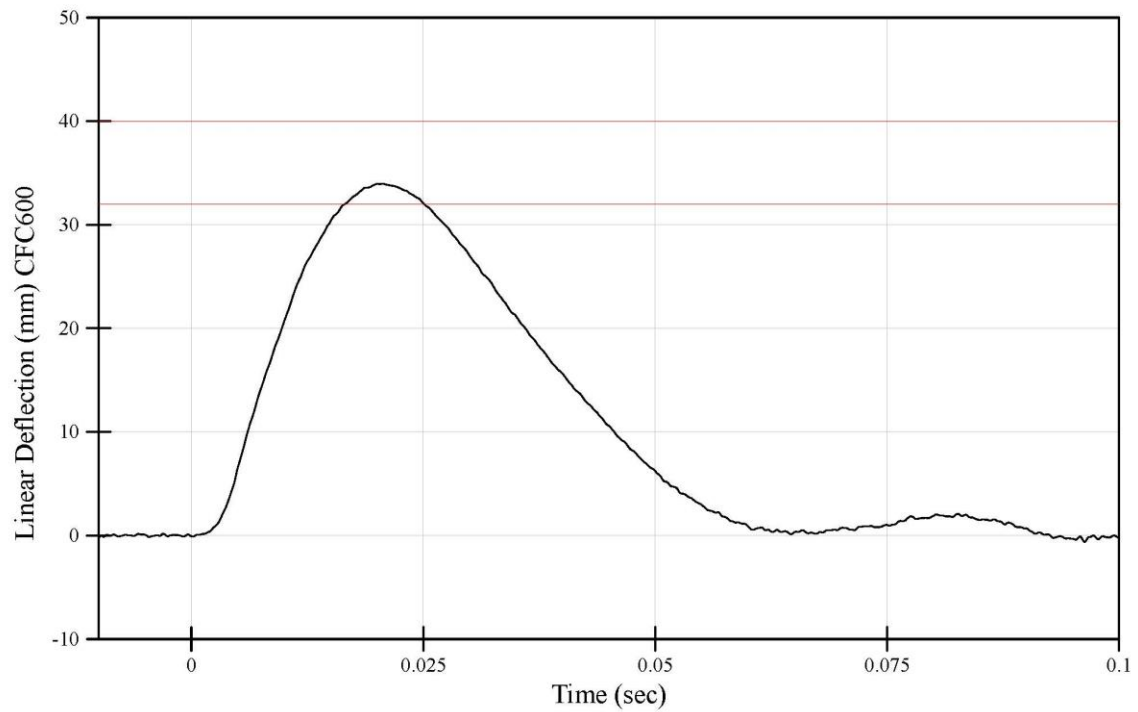
WorldSID-50M Left Thorax without Arm Qualification  
Max Thorax Rib 2 Y Deflection  
Dummy Serial Number: EB8888



File Name: 200903-1 processed

9/3/2020 6:36 AM

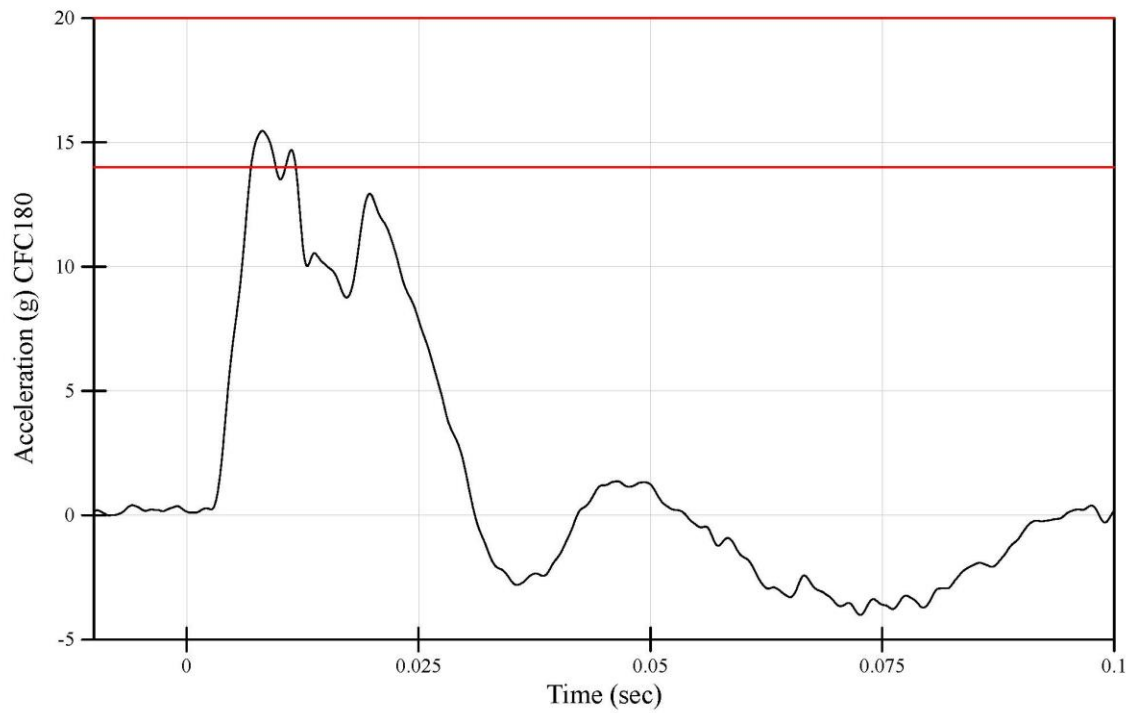
WorldSID-50M Left Thorax without Arm Qualification  
Max Thorax Rib 3 Y Deflection  
Dummy Serial Number: EB8888



File Name: 200903-1 processed

9/3/2020 6:36 AM

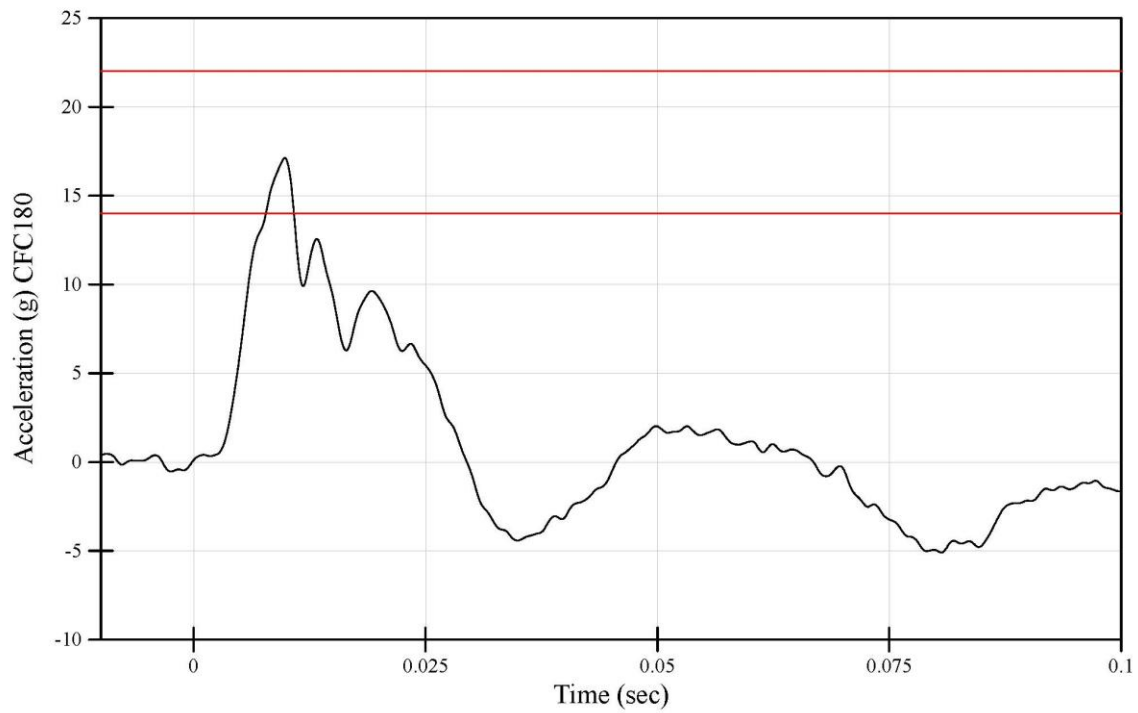
WorldSID-50M Left Thorax without Arm Qualification  
Peak T4 Y Axis Acceleration  
Dummy Serial Number: EB8888



File Name: 200903-1 processed

9/3/2020 6:36 AM

WorldSID-50M Left Thorax without Arm Qualification  
Peak T12 Y Axis Acceleration  
Dummy Serial Number: EB8888



File Name: 200903-1 processed

9/3/2020 6:36 AM

## WorldSID-50M Left Abdomen Qualification Test Results Summary

Dummy Serial Number: EB8888

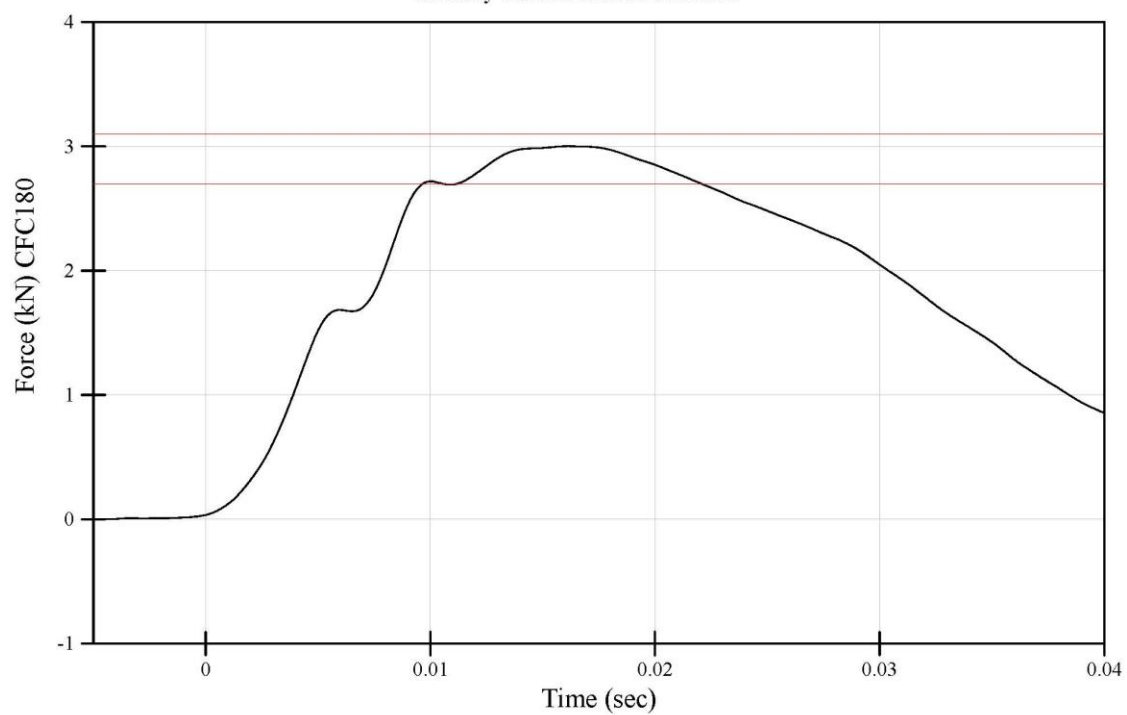
| <u>Tested Components</u> |                       | Test ID: 200903-10  |
|--------------------------|-----------------------|---------------------|
| Shoulder Rib: DW1913     | Abdomen Rib 1: DY5252 | Test Date: 9/3/2020 |
| Thorax Rib 1: EB5400     | Abdomen Rib 2: DY5254 | Test Time: 11:43 AM |
| Thorax Rib 2: EB5401     | RibEye: 124           |                     |
| Thorax Rib 3: EB5402     |                       |                     |

| <u>Test Results</u>                   |                             |               |                  |
|---------------------------------------|-----------------------------|---------------|------------------|
| <u>Test Parameter</u>                 | <u>Specification Range*</u> | <u>Result</u> | <u>Pass/Fail</u> |
| Test Temperature (°C)                 | 20.6 - 22.2                 | 22.0          | Pass             |
| Test Humidity (%)                     | 10 - 70                     | 63            | Pass             |
| Test Velocity (m/s)                   | 4.20 - 4.40                 | 4.314         | Pass             |
| Thorax Rib Temperature Sensor (°C)    | 20.6 - 23.8                 | 23.8          | Pass             |
| Peak Probe Force (kN)                 | 2.70 - 3.10                 | 3.00          | Pass             |
| Peak Abdomen Rib 1 Length Change (mm) | 32.5 - 39.5                 | 35.05         | Pass             |
| Peak Abdomen Rib 2 Length Change (mm) | 32.0 - 38.0                 | 35.20         | Pass             |
| Peak T12 Acceleration (g)             | 14.5 - 19.5                 | 17.73         | Pass             |

\* WorldSID-50M Qualification Manual - November 2020

File Name: 200903-10 processed

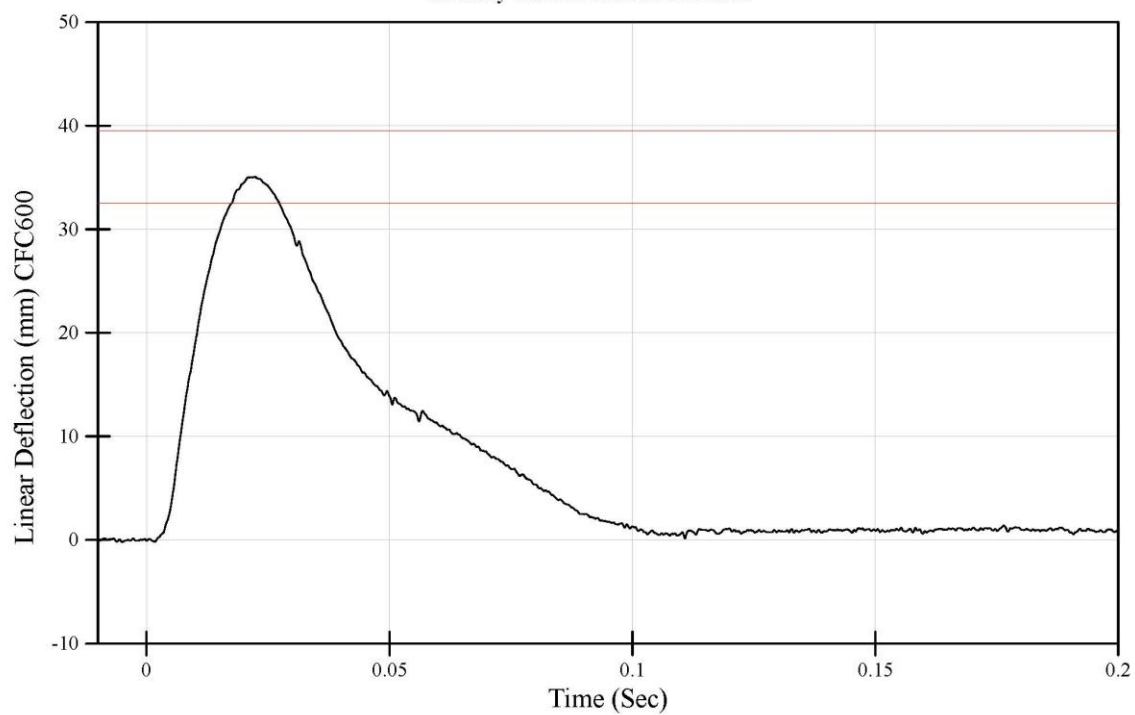
WorldSID-50M Left Abdomen Qualification  
Peak Pendulum Force  
Dummy Serial Number: EB8888



File Name: 200903-10 processed

9/3/2020 11:43 AM

WorldSID-50M Left Abdomen Qualification  
Max Abdomen Rib 1 Y Deflection  
Dummy Serial Number: EB8888

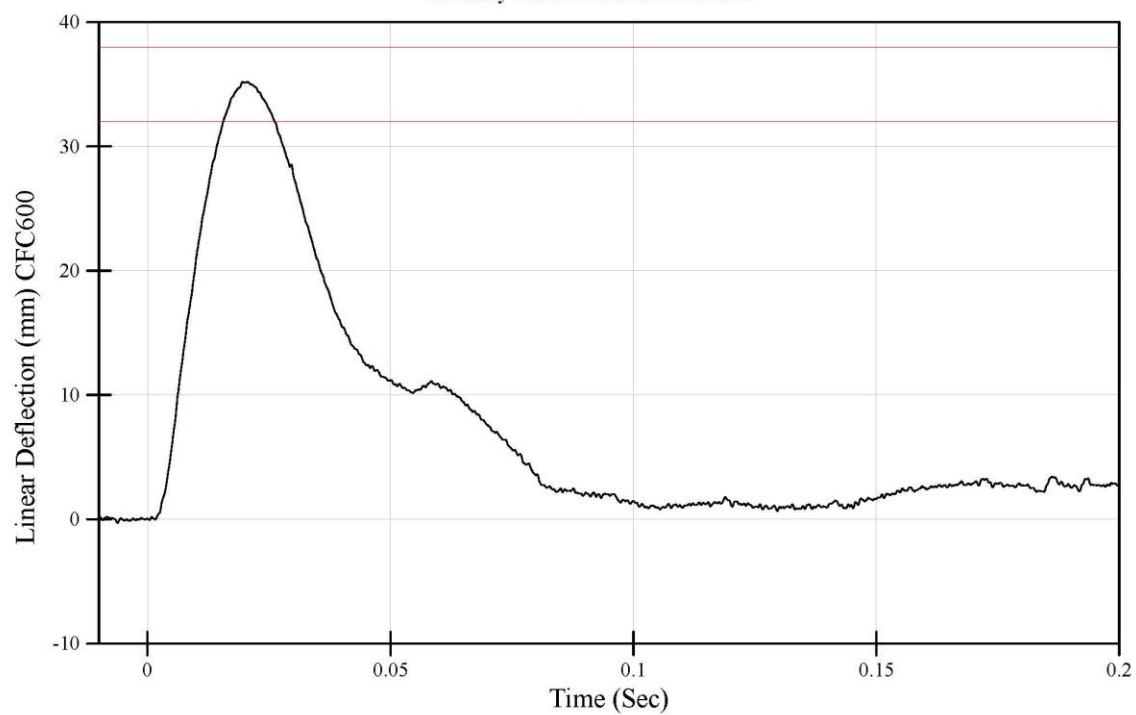


File Name: 200903-10 processed

9/3/2020 11:43 AM



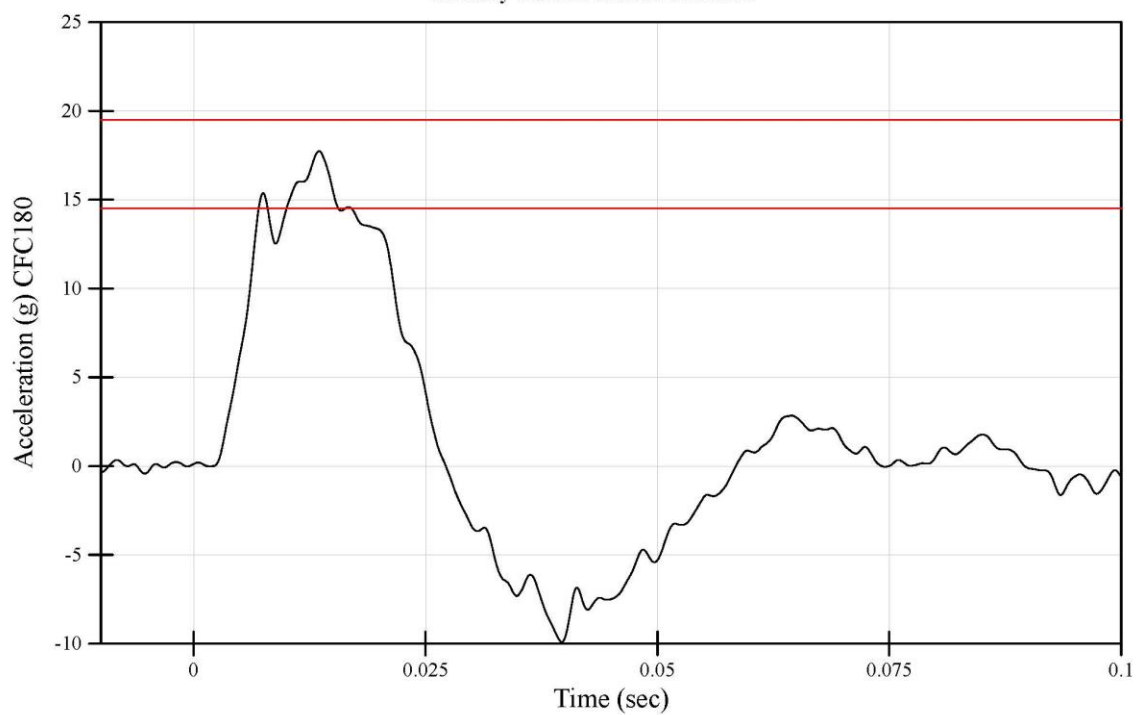
WorldSID-50M Left Abdomen Qualification  
Max Abdomen Rib 2 Y Deflection  
Dummy Serial Number: EB8888



File Name: 200903-10 processed

9/3/2020 11:43 AM

WorldSID-50M Left Abdomen Qualification  
T12 Acceleration along Y axis  
Dummy Serial Number: EB8888



File Name: 200903-10 processed

9/3/2020 11:43 AM

## WorldSID-50M Left Pelvis Qualification Test Results Summary

Dummy Serial Number: EB8888

### Tested Components

Pelvis Bone:

Test ID: 200910-1  
Test Date: 9/10/2020  
Test Time: 10:01 AM

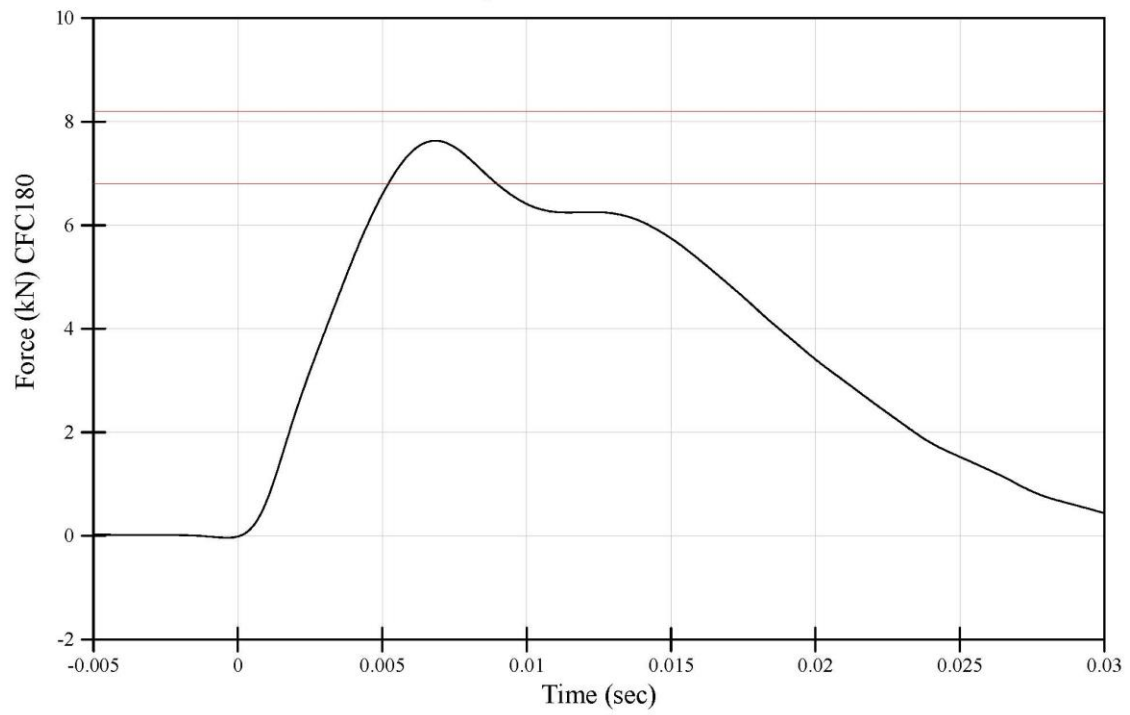
### Test Results

| <u>Test Parameter</u>              | <u>Specification Range*</u> | <u>Result</u> | <u>Pass/Fail</u> |
|------------------------------------|-----------------------------|---------------|------------------|
| Test Temperature (°C)              | 20.6 - 22.2                 | 20.6          | Pass             |
| Test Humidity (%)                  | 10 - 70                     | 63            | Pass             |
| Test Velocity (m/s)                | 6.60 - 6.80                 | 6.800         | Pass             |
| Thorax Rib Temperature Sensor (°C) | 20.6 - 23.8                 | 23.8          | Pass             |
| Peak Probe Force (kN)              | 6.80 - 8.20                 | 7.63          | Pass             |
| Peak Pubic Force FY (kN)           | -1.6 - (-1.3)               | -1.33         | Pass             |
| Peak Sacroiliac Force FY (kN)      | -2.3 - (-1.9)               | -2.08         | Pass             |
| Peak T12 Acceleration (g)          | 10.0 - 14.0                 | 12.07         | Pass             |
| Peak Pelvis Acceleration (g)       | 38.5 - 48.5                 | 41.64         | Pass             |

\* WorldSID-50M Qualification Manual - November 2020

File Name: 200910-1 processed

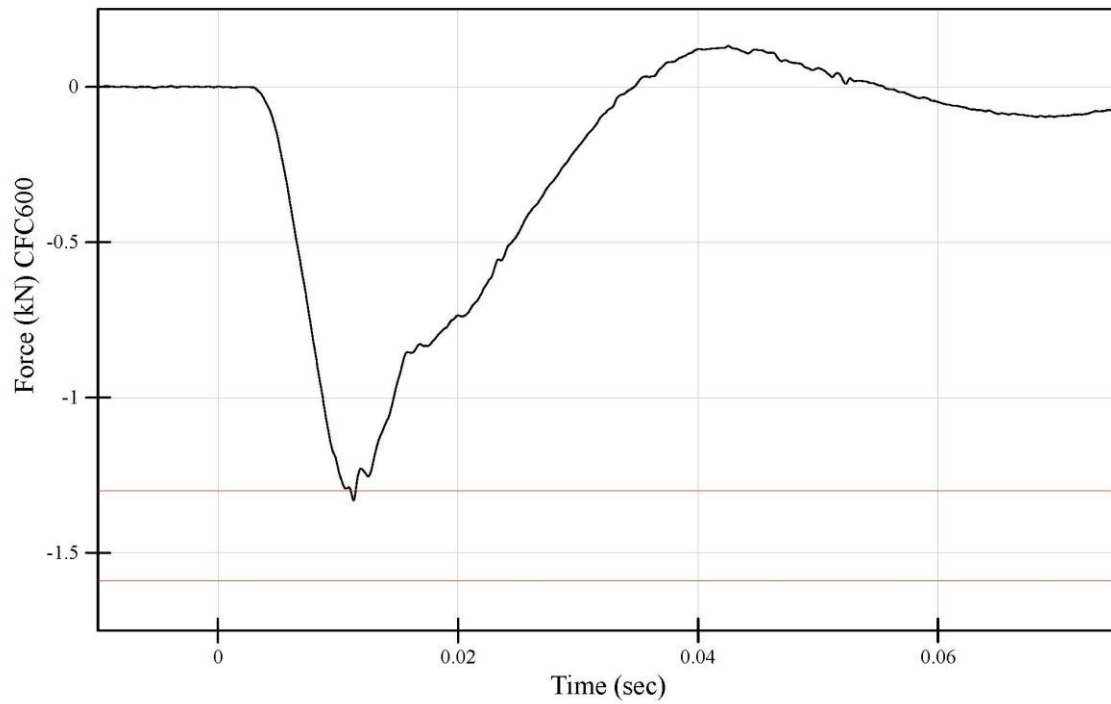
WorldSID-50M Left Pelvis Qualification  
Peak Pendulum Force  
Dummy Serial Number: EB8888



File Name: 200910-1 processed

9/10/2020 10:01 AM

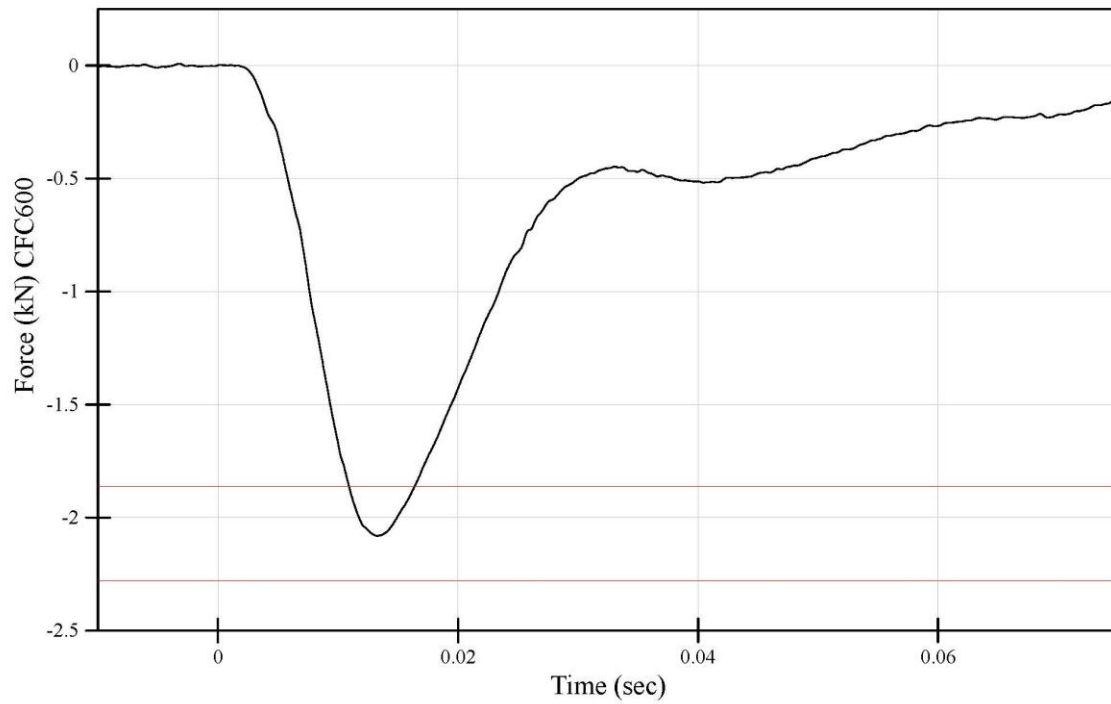
WorldSID-50M Left Pelvis Qualification  
Peak Pubic Y axis Force  
Dummy Serial Number: EB8888



File Name: 200910-1 processed

9/10/2020 10:01 AM

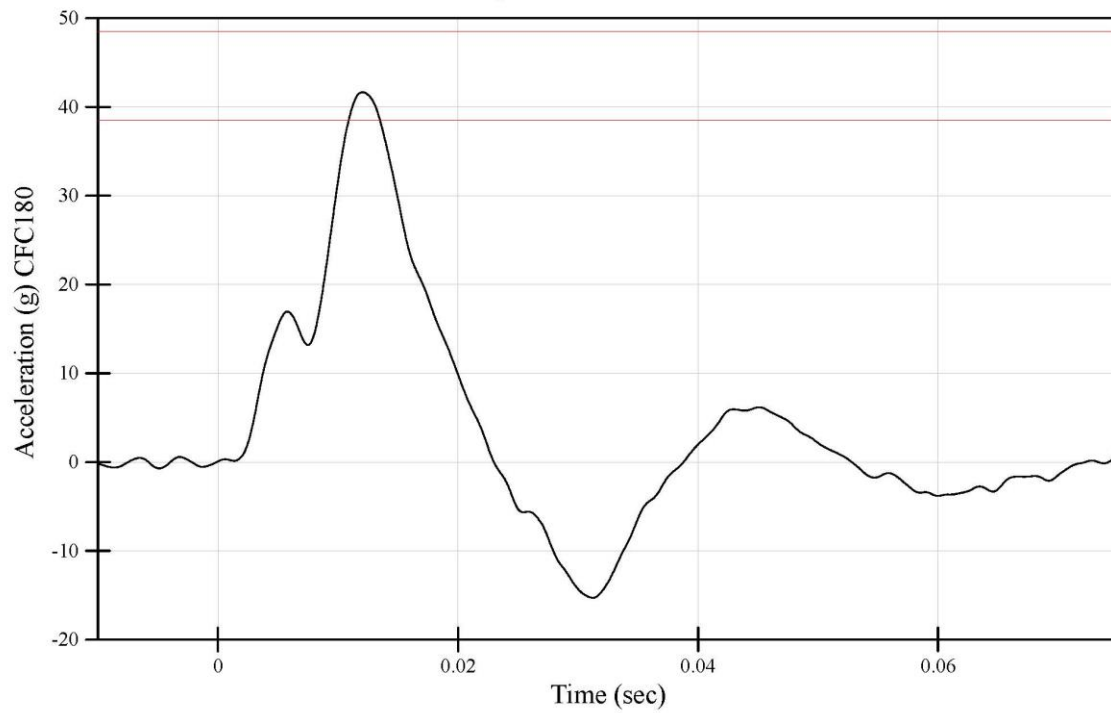
WorldSID-50M Left Pelvis Qualification  
Peak Sacro-Iliac Y axis Force  
Dummy Serial Number: EB8888



File Name: 200910-1 processed

9/10/2020 10:01 AM

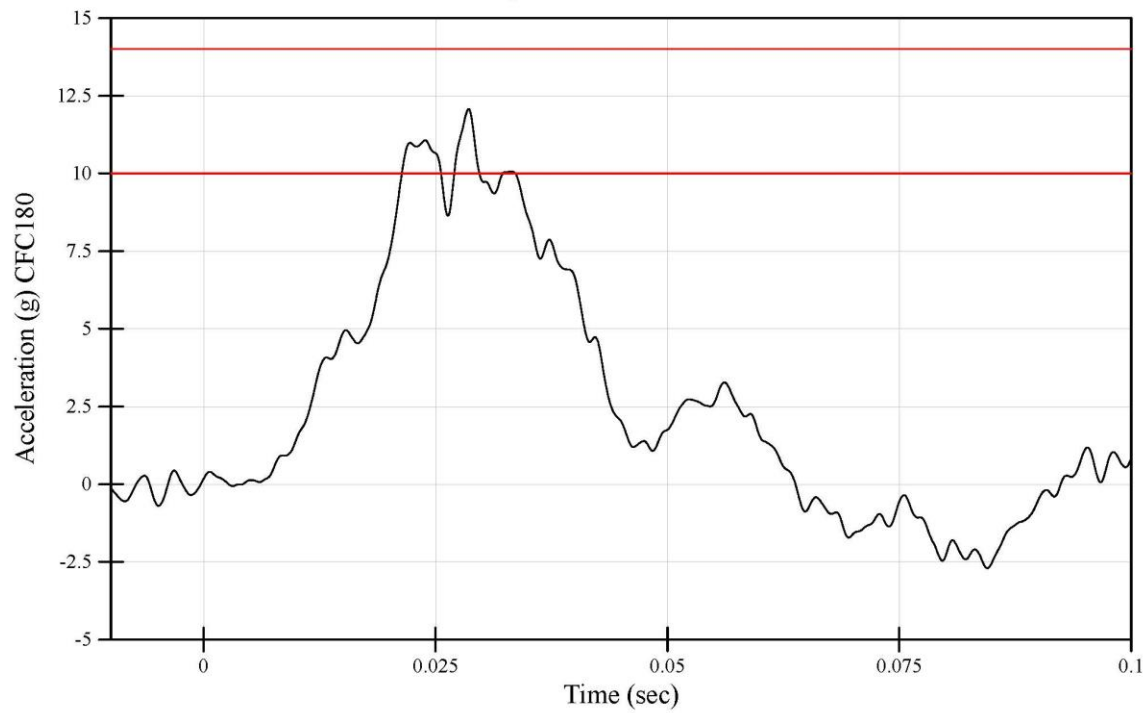
WorldSID-50M Left Pelvis Qualification  
Peak Pelvis Y Axis Acceleration  
Dummy Serial Number: EB8888



File Name: 200910-1 processed

9/10/2020 10:01 AM

WorldSID-50M Left Pelvis Qualification  
Peak T12 Y Axis Acceleration  
Dummy Serial Number: EB8888



File Name: 200910-1 processed

9/10/2020 10:01 AM



**Post-Test Calibration Sheets**  
**Driver S/N EB8888**

Transportation Research Center Inc.  
WorldSID-50M  
External Measurements  
Serial No. EB8888      Certification No. 04

| WorldSID-50M Angular Reference Measurements |        |                 |                  |      |        |
|---------------------------------------------|--------|-----------------|------------------|------|--------|
| Parameter                                   | Symbol | Tilt Sensor (°) | Inclinometer (°) |      |        |
|                                             |        |                 | Center           | Left | Right  |
| Head X-Axis                                 | A1     | 0               | n/a              | n/a  | n/a    |
| Head Y-Axis                                 | A2     | 2.2             | n/a              | 2    | Note 1 |
| Neck Bracket X-Axis                         | A3     | n/a             | -0.5             | n/a  | n/a    |
| Neck Bracket Y-Axis                         | A4     | n/a             | -3.1             | n/a  | n/a    |
| Thorax X-Axis                               | A5     | 1.3             | n/a              | n/a  | n/a    |
| Thorax Y-Axis                               | A6     | 3.9             | n/a              | n/a  | n/a    |
| Pelvis X-Axis                               | A7     | 0.7             | n/a              | n/a  | n/a    |
| Pelvis Y-Axis                               | A8     | 10.2            | n/a              | n/a  | n/a    |
| H-point Tool                                | A9     | n/a             | n/a              | 32.8 | 33.7   |

| WorldSID-50M External Linear Dimensions |        |                    |      |       |
|-----------------------------------------|--------|--------------------|------|-------|
| Parameter                               | Symbol | Specification (mm) |      |       |
|                                         |        | Center             | Left | Right |
| Seated Height                           | L1     | 870                | n/a  | n/a   |
| Hip Pivot Height                        | L2     | n/a                | 89   | 89    |
| Hip Pivot to Back Line                  | L3     | n/a                | 187  | 176   |
| Thigh Clearance                         | L4     | n/a                | 181  | 180   |
| Knee Height                             | L5     | n/a                | 580  | 583   |
| Knee to Backline                        | L6     | n/a                | 667  | 670   |
| Head Back to Seat Back                  | L7     | 156                | n/a  | n/a   |
| Thorax Rib 1 Front to Back              | L8     | n/a                | 209  | 209   |
| Abdomen Rib 2 Front to Back             | L9     | n/a                | 223  | 226   |
| Arm Length                              | L10    | n/a                | 330  | 330   |
| Width Across Arms                       | L11    | 482                | n/a  | n/a   |
| Waist Width                             | L12    | 341                | n/a  | n/a   |

Note 1: No land marks on the right side of head. Unable to align level.

## Transportation Research Center Inc.

Front Head Drop

WorldSID 50th Serial No. EB8888 Certification No. 4-1

Test Date: 10/28/2020

| Test Parameter                                     | Specification  | Test Results | Pass |
|----------------------------------------------------|----------------|--------------|------|
| Temperature                                        | 20.6 - 22.2 °C | 21.3 °C      | Yes  |
| Relative Humidity                                  | 10 - 70 %      | 42 %         | Yes  |
| Peak Head Resultant Acceleration                   | 211 - 261 g    | 230.0 g      | Yes  |
| Peak Head Lateral Acceleration                     | (-15) - 15 g   | 4.3 g        | Yes  |
| Is Acceleration Curve Unimodal within 10% of Peak? | < 10 %         | 1.48 %       | Yes  |

**Test meets specifications.**

**Condition: Used**

**Comments:**

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx  
WorldSID 50th\_Qalification Manual 11\_09\_2020

Report Number: EB8888\_WSH04

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11.29.2020 14:55:46 952

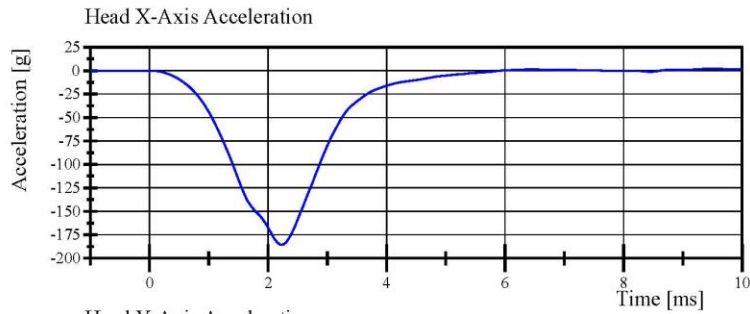


## Transportation Research Center Inc.

### Front Head Drop

WorldSID 50th Serial No. EB8888 Certification No. 4-1

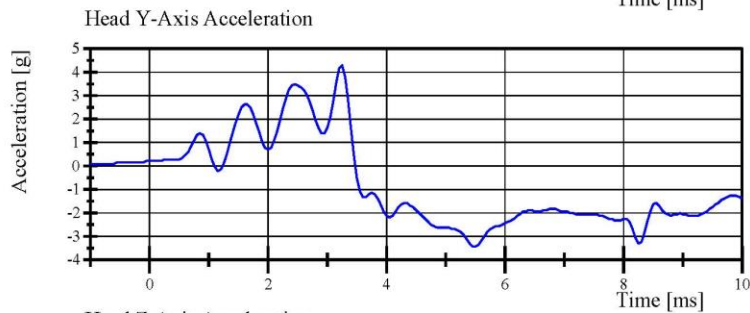
Test Date: 10/28/2020



Filter Class: CFC\_1000

Max: 2.2 g at 9.5 ms

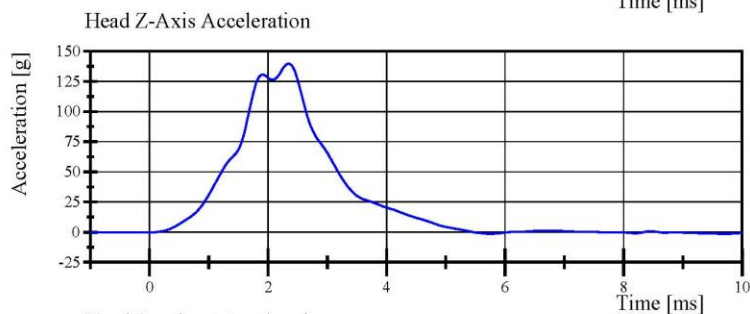
Min: -185.6 g at 2.3 ms



Filter Class: CFC\_1000

Max: 4.3 g at 3.3 ms

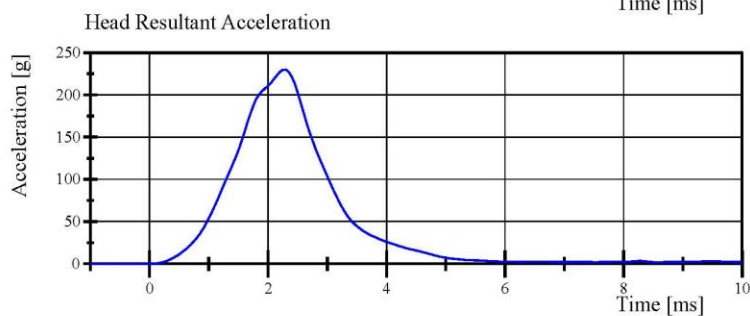
Min: -3.4 g at 5.5 ms



Filter Class: CFC\_1000

Max: 140.1 g at 2.4 ms

Min: -1.4 g at 5.8 ms



Filter Class: CFC\_1000

Max: 230.0 g at 2.3 ms

Min: 0.1 g at -1.0 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx  
WorldSID 50th\_Qualification Manual 11\_09\_2020

Report Number: EB8888\_WSH04

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## Transportation Research Center Inc.

Left Lateral Head Drop

WorldSID 50th Serial No. EB8888 Certification No. 4-1

Test Date: 10/28/2020

| Test Parameter                                        | Specification  | Test Results | Pass |
|-------------------------------------------------------|----------------|--------------|------|
| Temperature                                           | 20.6 - 22.2 °C | 21.5 °C      | Yes  |
| Relative Humidity                                     | 10 - 70 %      | 42 %         | Yes  |
| Peak Head Resultant Acceleration                      | 107 - 126 g    | 117.4 g      | Yes  |
| Peak Head Longitudinal Acceleration                   | (-15) - 15 g   | -2.8 g       | Yes  |
| Is Acceleration Curve Unimodal<br>within 10% of Peak? | < 10 %         | 1.89 %       | Yes  |

**Test meets specifications.**

**Condition: Used**

**Comments:**

Specification Source: WordSID 50th(W5) VRTC Nov 2020.xlsx  
WorldSID 50th\_Qalification Manual 11\_09\_2020

Report Number: EB8888\_WSH04

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11.29.2020 15:09:47 946

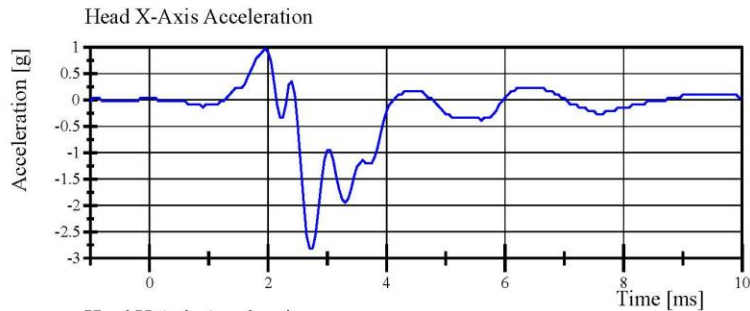


## Transportation Research Center Inc.

Left Lateral Head Drop

WorldSID 50th Serial No. EB8888 Certification No. 4-1

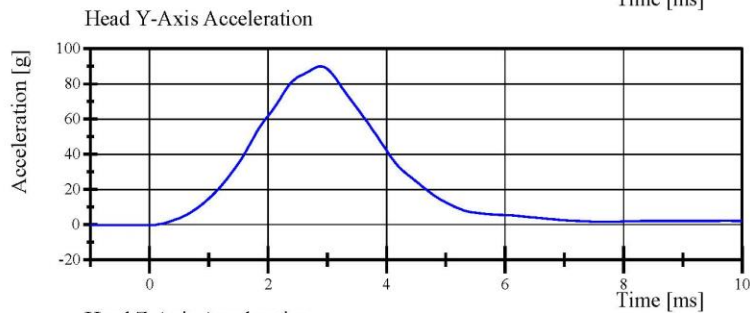
Test Date: 10/28/2020



Filter Class: CFC\_1000

Max: 1.0 g at 2.0 ms

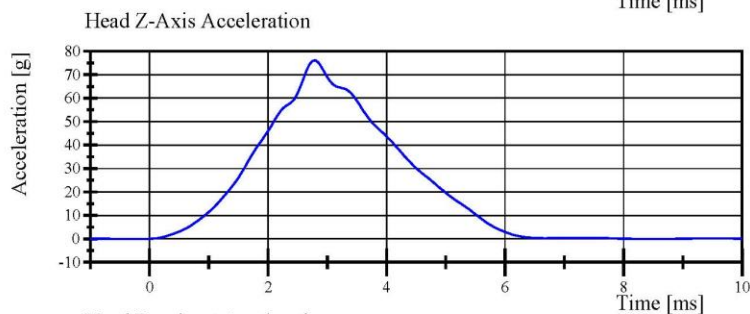
Min: -2.8 g at 2.7 ms



Filter Class: CFC\_1000

Max: 90.0 g at 2.9 ms

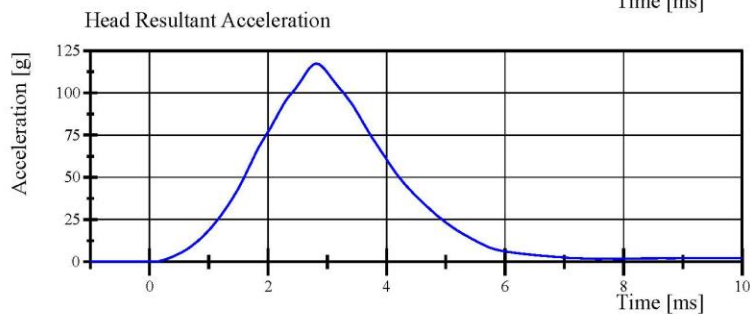
Min: -0.3 g at -0.8 ms



Filter Class: CFC\_1000

Max: 76.1 g at 2.8 ms

Min: -0.1 g at 8.5 ms



Filter Class: CFC\_1000

Max: 117.4 g at 2.8 ms

Min: 0.2 g at -0.5 ms

Specification Source: WordSID 50th(W5) VRTC Nov 2020.xlsx  
WorldSID 50th\_Qalification Manual 11\_09\_2020

Report Number: EB8888\_WSH04

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## Transportation Research Center Inc.

Right Lateral Head Drop

WorldSID 50th Serial No. EB8888 Certification No. 4-1

Test Date: 10/28/2020

| Test Parameter                                        | Specification  | Test Results | Pass |
|-------------------------------------------------------|----------------|--------------|------|
| Temperature                                           | 20.6 - 22.2 °C | 21.4 °C      | Yes  |
| Relative Humidity                                     | 10 - 70 %      | 41 %         | Yes  |
| Peak Head Resultant Acceleration                      | 107 - 126 g    | 112.3 g      | Yes  |
| Peak Head Longitudinal Acceleration                   | (-15) - 15 g   | -3.9 g       | Yes  |
| Is Acceleration Curve Unimodal<br>within 10% of Peak? | < 10 %         | 1.88 %       | Yes  |

**Test meets specifications.**

**Condition: Used**

**Comments:**

Specification Source: WordSID 50th(W5) VRTC Nov 2020.xlsx  
WorldSID 50th\_Qalification Manual 11\_09\_2020

Report Number: EB8888\_WSH04

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11.29.2020 15:14:24 944

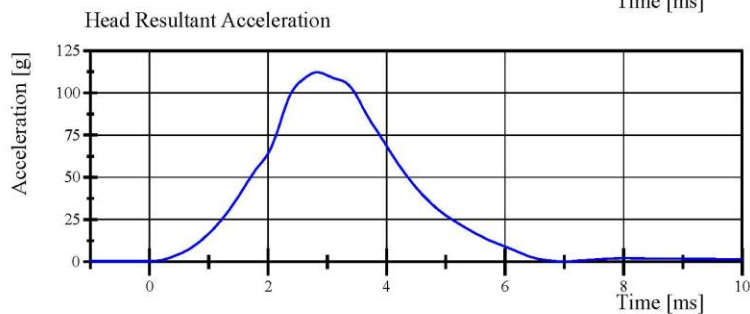
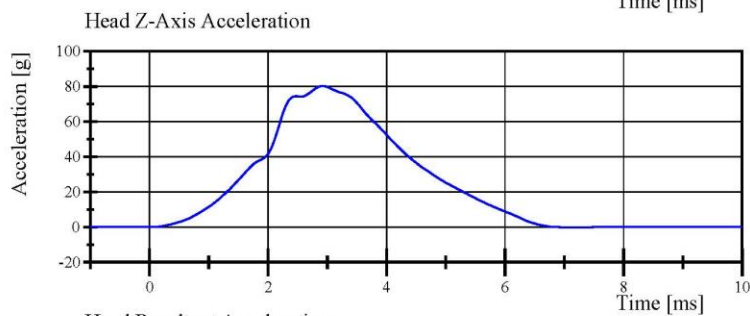
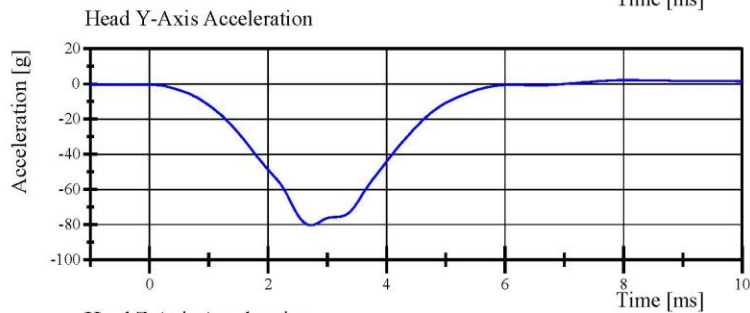
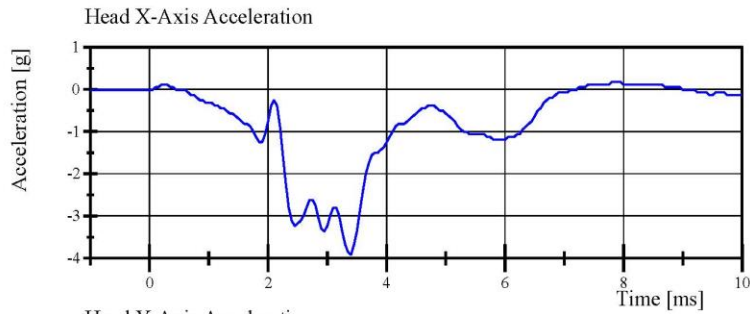


## Transportation Research Center Inc.

Right Lateral Head Drop

WorldSID 50th Serial No. EB8888 Certification No. 4-1

Test Date: 10/28/2020



Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx  
WorldSID 50th\_Qalification Manual 11\_09\_2020

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## Transportation Research Center Inc.

Left Lateral Neck

WorldSID 50th Serial No. EB8888 Certification No. 4-5

Test Date: 11/6/2020

| Test Parameter                                              | Specification           | Test Results | Pass |
|-------------------------------------------------------------|-------------------------|--------------|------|
| Temperature                                                 | 20.6 - 22.2 °C          | 21.4 °C      | Yes  |
| Relative Humidity                                           | 10 - 70 %               | 40 %         | Yes  |
| Pendulum Velocity                                           | (-3.30) - (-3.50) m/s   | -3.332 m/s   | Yes  |
| Pendulum Integrated Velocity<br>Change at 4 ms              | 0.87 - 1.09 m/s         | 0.999 m/s    | Yes  |
| Change at 8 ms                                              | 1.72 - 2.1 m/s          | 2.003 m/s    | Yes  |
| Change at 12 ms                                             | 2.63 - 3.17 m/s         | 3.001 m/s    | Yes  |
| Maximum Headform Flexion                                    | (-50) - (-61) deg       | -55.3 deg    | Yes  |
| Headform Flexion Decay<br>- from Peak to Zero Degrees       | 58 - 72 ms              | 61.0 ms      | Yes  |
| Total Neck Occipital Condyles Moment                        | 54 - 67 N·m             | 60.8 N·m     | Yes  |
| Total Neck Occipital Condyles Moment<br>Decay Time to 0 N·m | 71 - 87 ms              | 77.4 ms      | Yes  |
| Maximum Forward Pot Rotation                                |                         |              |      |
| Peak                                                        | (-32) - (-39) °         | -35.9 °      | Yes  |
| Time of Peak                                                | 56 - 68 ms              | 62.2 ms      | Yes  |
| Maximum Rear Pot Rotation                                   |                         |              |      |
| Peak                                                        | (-29) - (-36) °         | -32.0 °      | Yes  |
| Time of Peak                                                | 56 - 68 ms              | 64.0 ms      | Yes  |
| Maximum Headform Angular Rate                               | (-2,047) - (-2,503) °/s | -2,307.3 °/s | Yes  |

**Test meets specifications.**

**Condition: Used**

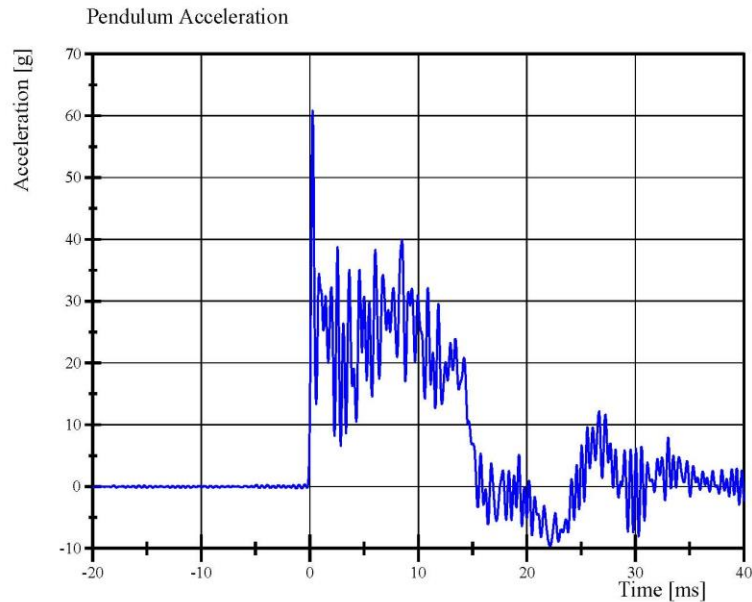
**Comments:**

## Transportation Research Center Inc.

Left Lateral Neck

WorldSID 50th Serial No. EB8888 Certification No. 4-5

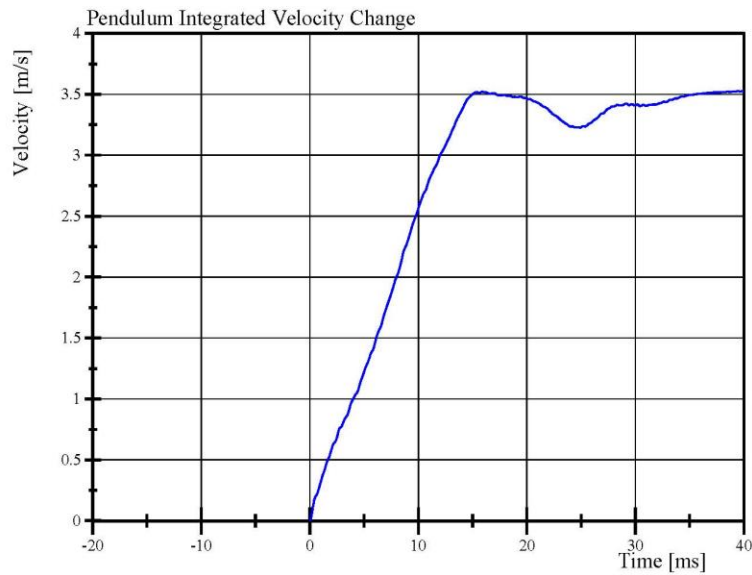
Test Date: 11/6/2020



Filter Class: CFC\_1000

Max: 60.8 g at 0.3 ms

Min: -9.6 g at 22.2 ms



Filter Class: CFC\_1000

Max: 3.5 m/s at 39.5 ms

Min: 0.0 m/s at -0.0 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx  
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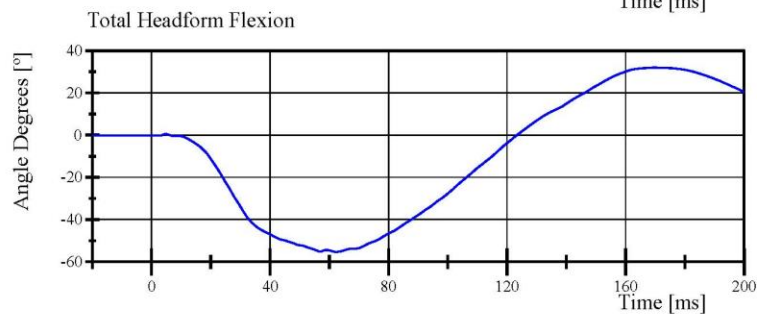
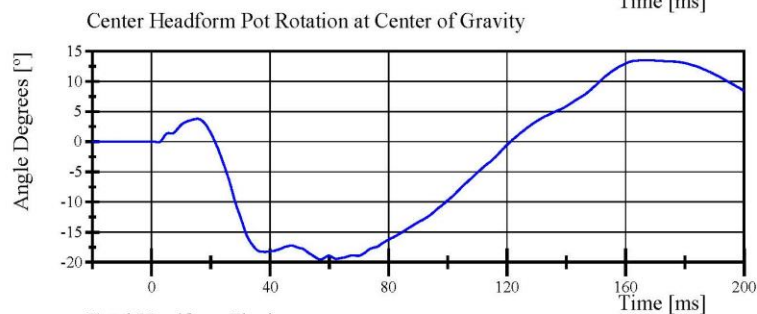
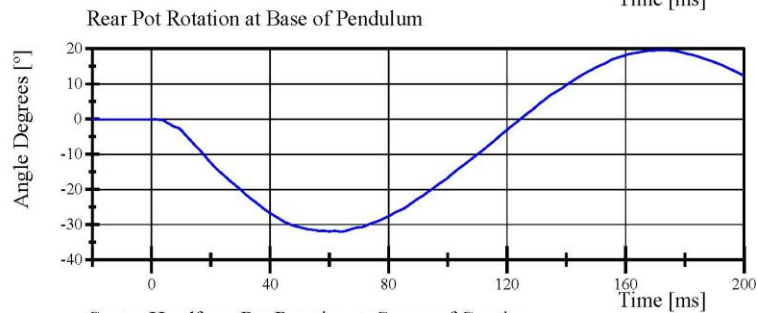
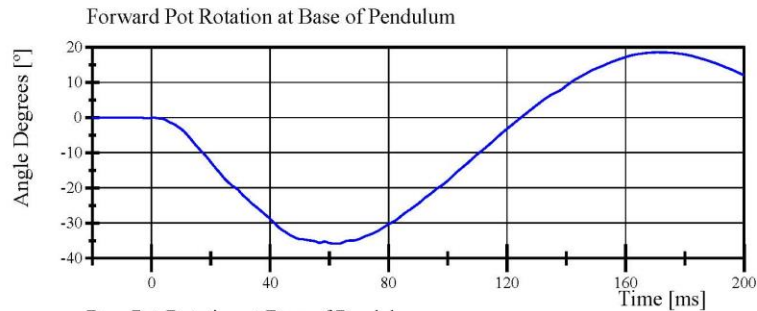


## Transportation Research Center Inc.

Left Lateral Neck

WorldSID 50th Serial No. EB8888 Certification No. 4-5

Test Date: 11/6/2020



Specification Source: WordSID 50th(W5) VRTC Nov 2020.xlsx  
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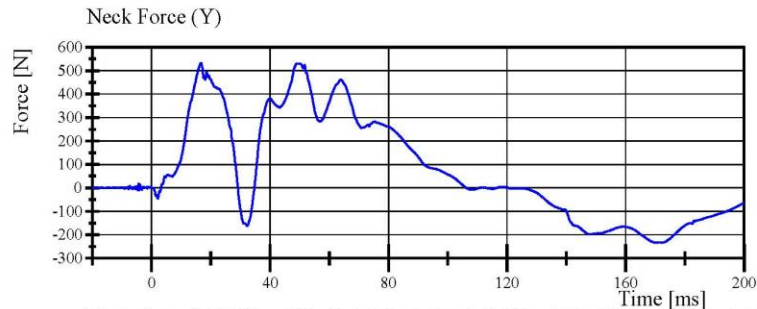


## Transportation Research Center Inc.

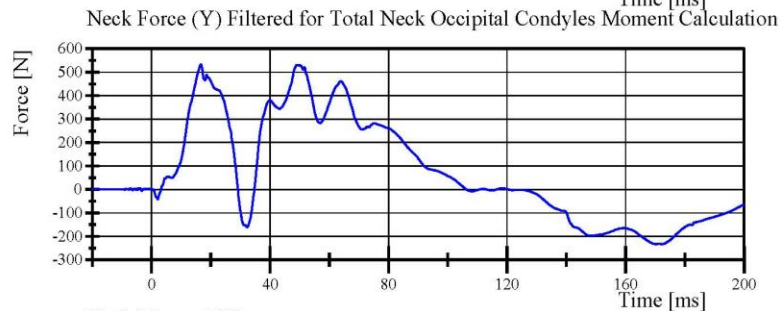
Left Lateral Neck

WorldSID 50th Serial No. EB8888 Certification No. 4-5

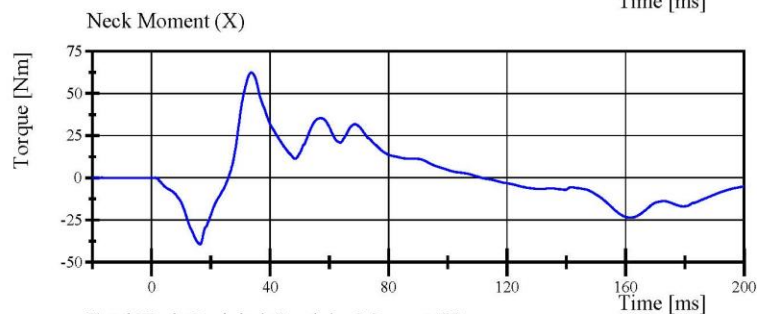
Test Date: 11/6/2020



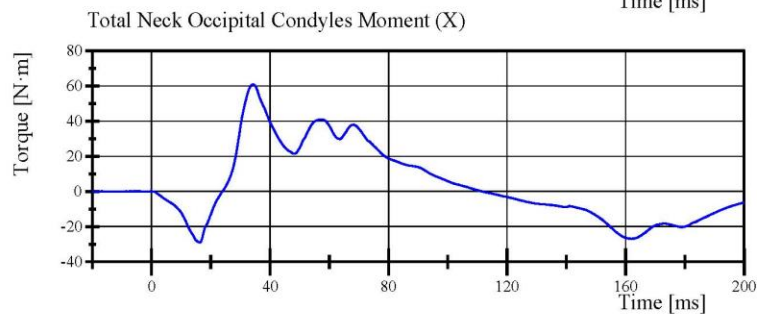
Filter Class: CFC\_1000  
Max: 532.9 N at 16.7 ms  
Min: -233.8 N at 172.2 ms



Filter Class: CFC\_600  
Max: 532.4 N at 16.7 ms  
Min: -233.4 N at 172.2 ms



Filter Class: CFC\_600  
Max: 62.4 Nm at 33.7 ms  
Min: -39.2 Nm at 16.4 ms



Filter Class: Without\_(Consta  
Max: 60.8 N·m at 34.2 ms  
Min: -29.0 N·m at 16.3 ms

Specification Source: WorldSID 50th(W5) VRTC Nov 2020.xlsx  
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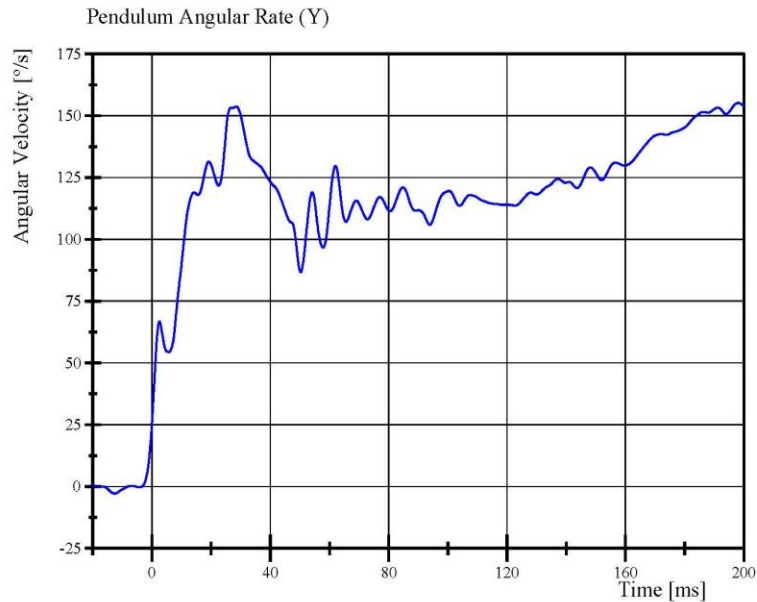


## Transportation Research Center Inc.

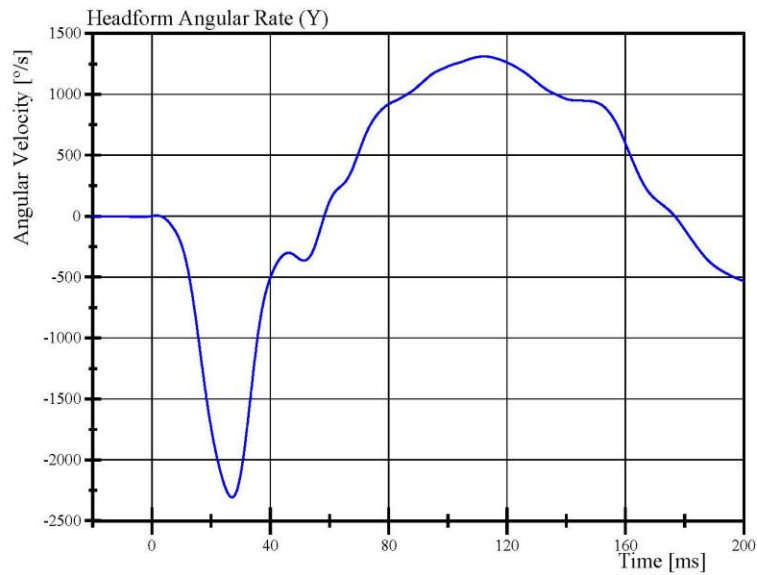
Left Lateral Neck

WorldSID 50th Serial No. EB8888 Certification No. 4-5

Test Date: 11/6/2020



Filter Class: CFC\_60  
Max: 155.1 °/s at 198.1 ms  
Min: -2.8 °/s at -12.6 ms



Filter Class: CFC\_60  
Max: 1,311.0 °/s at 112.2 ms  
Min: -2,307.3 °/s at 27.1 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx  
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## Transportation Research Center Inc.

Right Lateral Neck

WorldSID 50th Serial No. EB8888 Certification No. 4-2

Test Date: 11/5/2020

| Test Parameter                                              | Specification         | Test Results | Pass |
|-------------------------------------------------------------|-----------------------|--------------|------|
| Temperature                                                 | 20.6 - 22.2 °C        | 21.2 °C      | Yes  |
| Relative Humidity                                           | 10 - 70 %             | 40 %         | Yes  |
| Pendulum Velocity                                           | 3.30 - 3.50 m/s       | 3.322 m/s    | Yes  |
| Pendulum Integrated Velocity<br>Change at 4 ms              | (-0.87) - (-1.09) m/s | -0.984 m/s   | Yes  |
| Change at 8 ms                                              | (-1.72) - (-2.1) m/s  | -1.948 m/s   | Yes  |
| Change at 12 ms                                             | (-2.63) - (-3.17) m/s | -2.941 m/s   | Yes  |
| Maximum Headform Flexion                                    | 50 - 61 deg           | 52.9 deg     | Yes  |
| Headform Flexion Decay<br>- from Peak to Zero Degrees       | 58 - 72 ms            | 60.2 ms      | Yes  |
| Total Neck Occipital Condyles Moment                        | (-54) - (-67) N·m     | -61.5 N·m    | Yes  |
| Total Neck Occipital Condyles Moment<br>Decay Time to 0 N·m | 71 - 87 ms            | 77.1 ms      | Yes  |
| Maximum Forward Pot Rotation                                |                       |              |      |
| Peak                                                        | 32 - 39 °             | 34.2 °       | Yes  |
| Time of Peak                                                | 56 - 68 ms            | 62.3 ms      | Yes  |
| Maximum Rear Pot Rotation                                   |                       |              |      |
| Peak                                                        | 29 - 36 °             | 30.6 °       | Yes  |
| Time of Peak                                                | 56 - 68 ms            | 60.4 ms      | Yes  |
| Maximum Headform Angular Rate                               | 2,047 - 2,503 °/s     | 2,257.1 °/s  | Yes  |

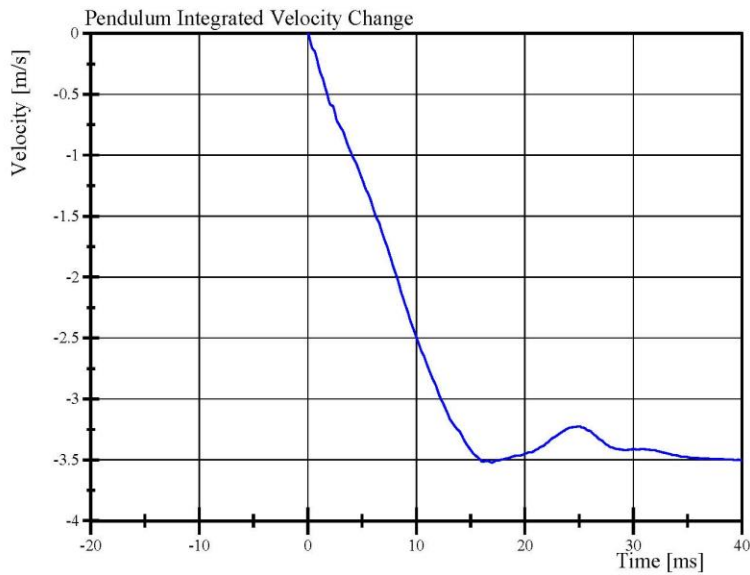
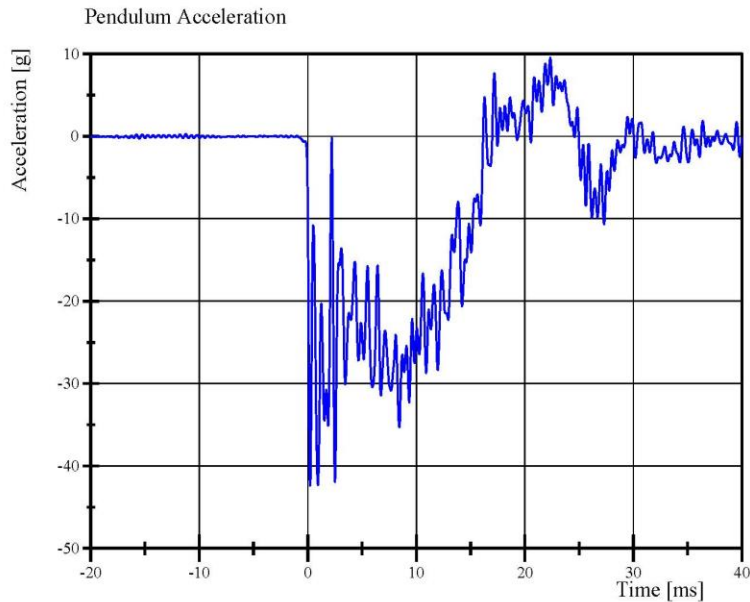
**Test meets specifications.**

**Condition: Used**

**Comments:**

## Transportation Research Center Inc.

Right Lateral Neck  
WorldSID 50th Serial No. EB8888 Certification No. 4-2  
Test Date: 11/5/2020



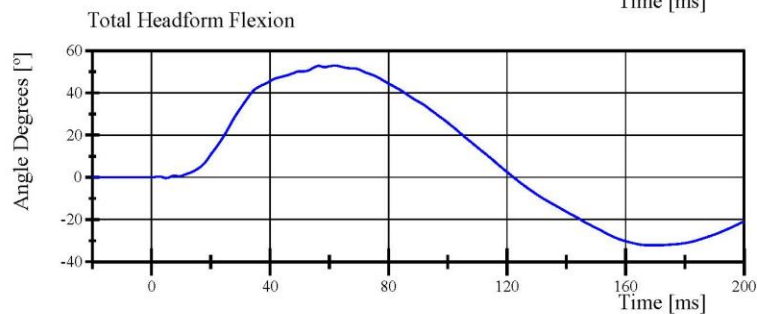
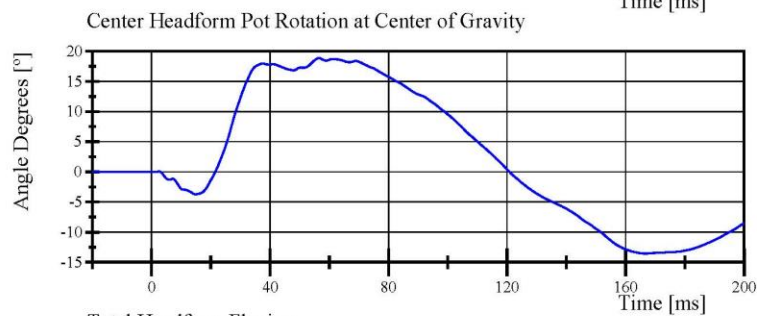
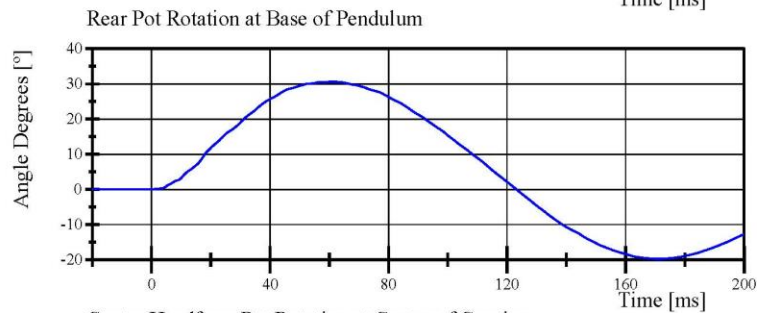
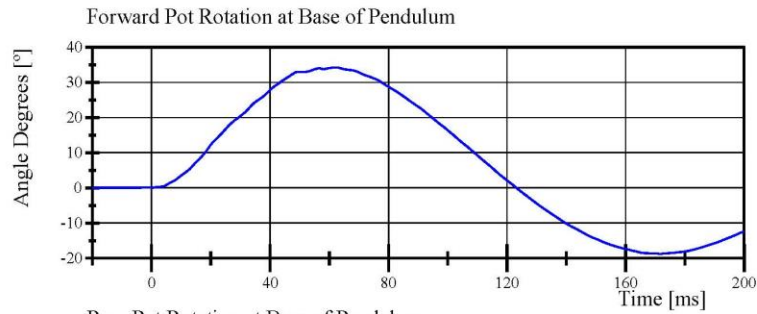


## Transportation Research Center Inc.

Right Lateral Neck

WorldSID 50th Serial No. EB8888 Certification No. 4-2

Test Date: 11/5/2020



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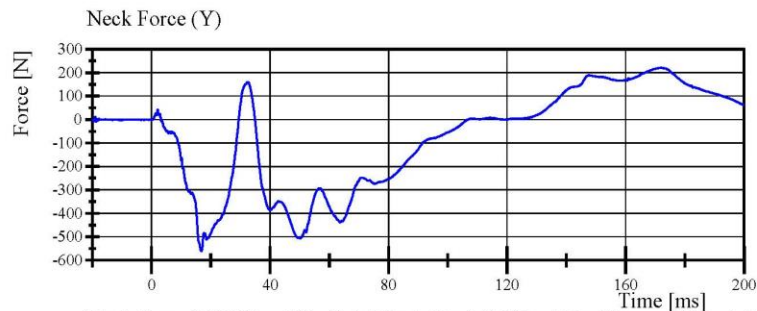


## Transportation Research Center Inc.

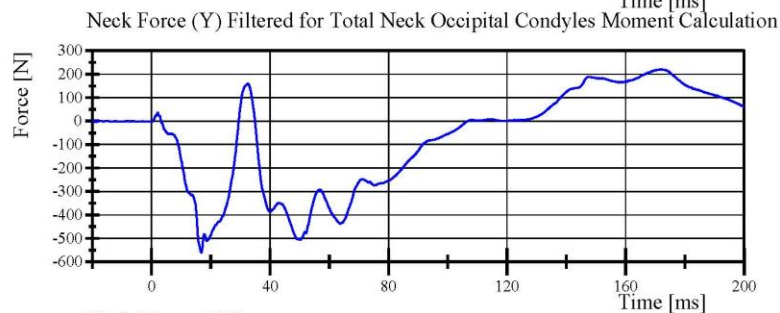
Right Lateral Neck

WorldSID 50th Serial No. EB8888 Certification No. 4-2

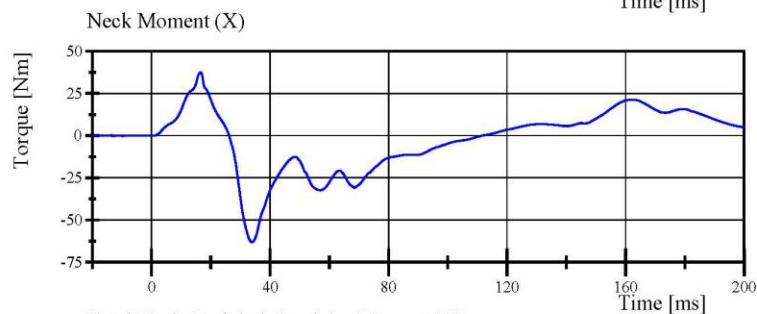
Test Date: 11/5/2020



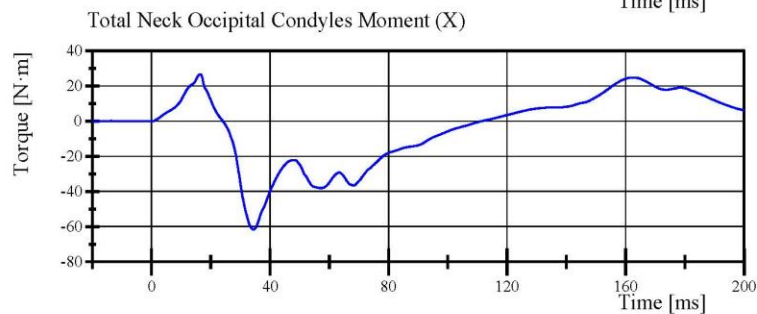
Filter Class: CFC\_1000  
Max: 221.4 N at 172.0 ms  
Min: -560.9 N at 16.8 ms



Filter Class: CFC\_600  
Max: 220.9 N at 172.0 ms  
Min: -560.9 N at 16.8 ms



Filter Class: CFC\_600  
Max: 37.5 Nm at 16.6 ms  
Min: -63.0 Nm at 33.9 ms



Filter Class: Without\_(Consta  
Max: 26.7 N·m at 16.5 ms  
Min: -61.5 N·m at 34.4 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx  
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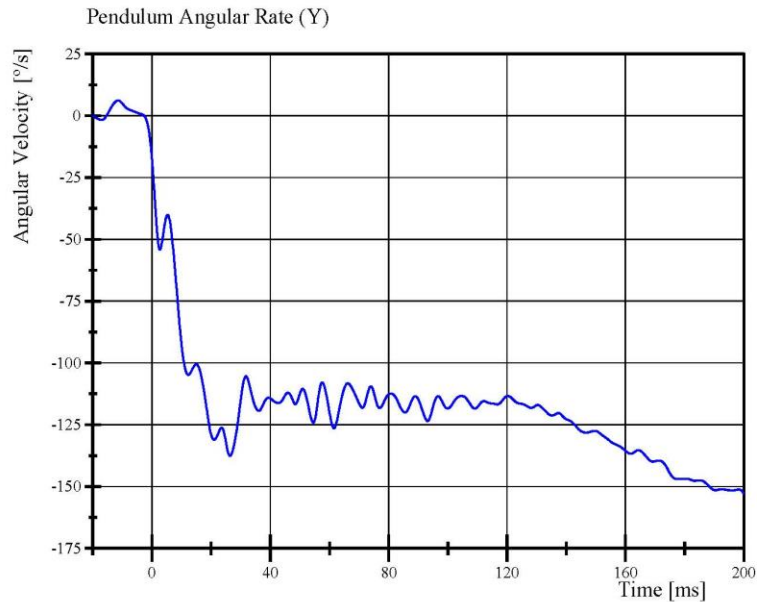


## Transportation Research Center Inc.

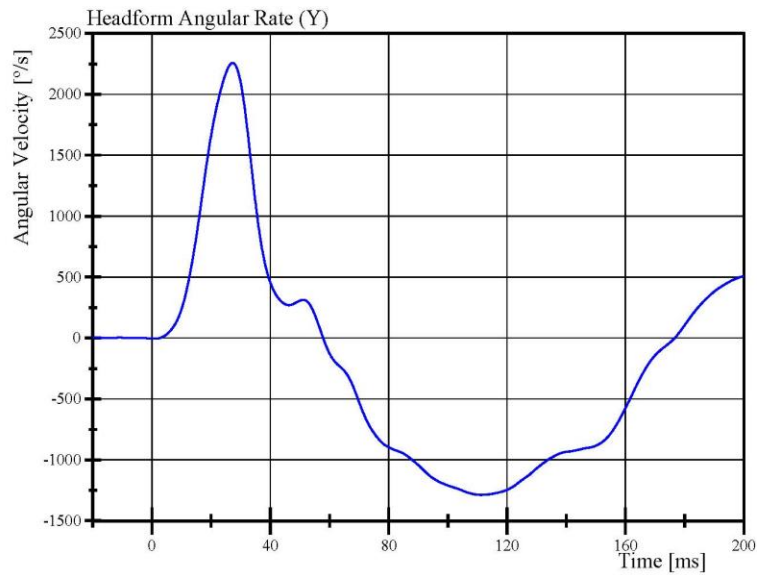
Right Lateral Neck

WorldSID 50th Serial No. EB8888 Certification No. 4-2

Test Date: 11/5/2020



Filter Class: CFC\_60  
Max: 6.2 °/s at -11.5 ms  
Min: -152.9 °/s at 200.0 ms



Filter Class: CFC\_60  
Max: 2,257.1 °/s at 27.3 ms  
Min: -1,287.4 °/s at 111.2 ms

## Transportation Research Center Inc.

Left Neck Torsion  
WorldSID 50th Serial No. EB8888 Certification No. 4-3  
Test Date:10/30/2020

| Test Parameter                                  | Specification           | Test Results | Pass |
|-------------------------------------------------|-------------------------|--------------|------|
| Temperature                                     | 20.6 - 22.2 °C          | 21.3 °C      | Yes  |
| Relative Humidity                               | 10 - 70 %               | 40 %         | Yes  |
| Pendulum Velocity                               | 5.1 - 5.3 m/s           | 5.18 m/s     | Yes  |
| Pendulum Integrated Velocity<br>Change at 10 ms | 2.09 - 2.37 m/s         | 2.261 m/s    | Yes  |
| Change at 15 ms                                 | 3.19 - 3.63 m/s         | 3.436 m/s    | Yes  |
| Change at 20 ms                                 | 4.27 - 4.87 m/s         | 4.575 m/s    | Yes  |
| Peak Fixture Rotation                           | (-41.5) - (-51) °       | -47.83 °     | Yes  |
| Decay Time to 0 deg from Peak Angle             | 35 - 43 ms              | 39.7 ms      | Yes  |
| Peak Head Angular Velocity Z-axis               | (-1,345) - (-1,655) °/s | -1,548.3 °/s | Yes  |
| Peak Lower Neck Moment Z-axis                   | 34 - 42 N·m             | 38.5 N·m     | Yes  |

**Test meets specifications.**

**Condition:** Used

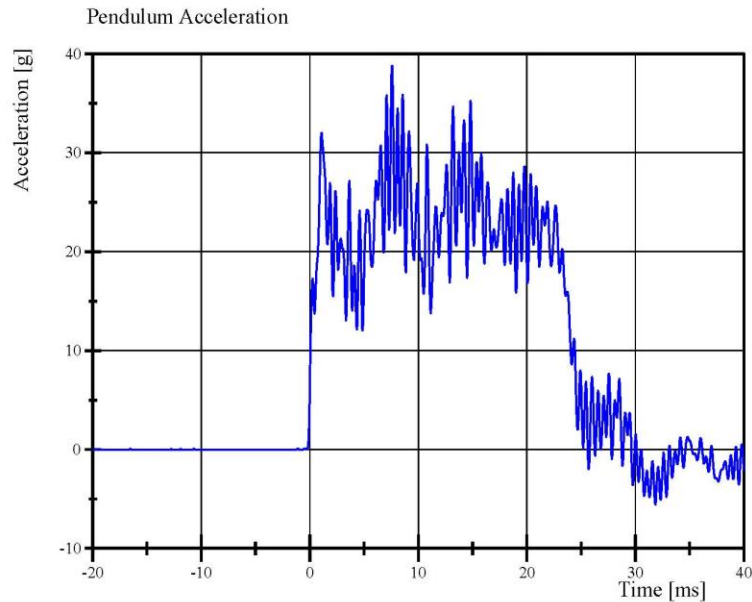
**Comments:**

## Transportation Research Center Inc.

Left Lateral

WorldSID 50th Serial No. EB8888 Certification No. 4-3

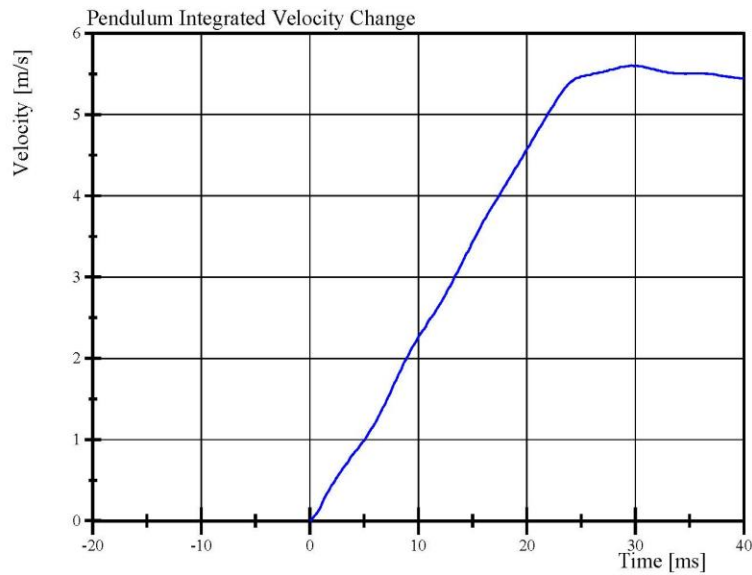
Test Date: 10/30/2020



Filter Class: CFC\_1000

Max: 38.8 g at 7.6 ms

Min: -5.6 g at 31.9 ms



Filter Class: CFC\_1000

Max: 5.6 m/s at 29.7 ms

Min: 0.0 m/s at 0.0 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx  
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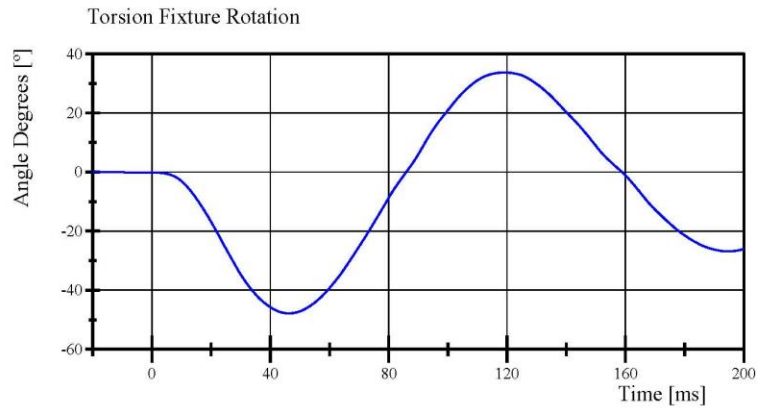


## Transportation Research Center Inc.

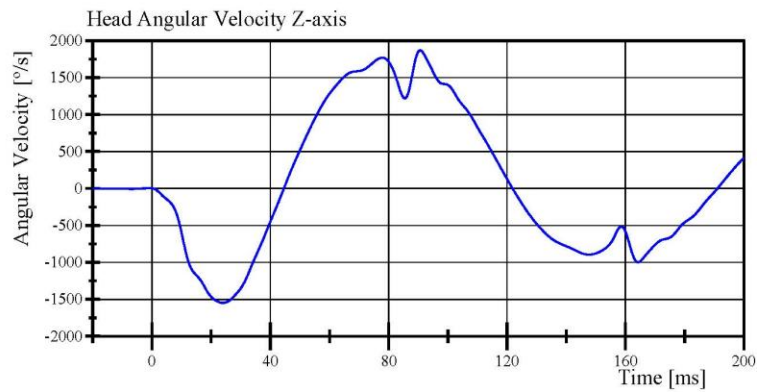
Left Lateral

WorldSID 50th Serial No. EB8888 Certification No. 4-3

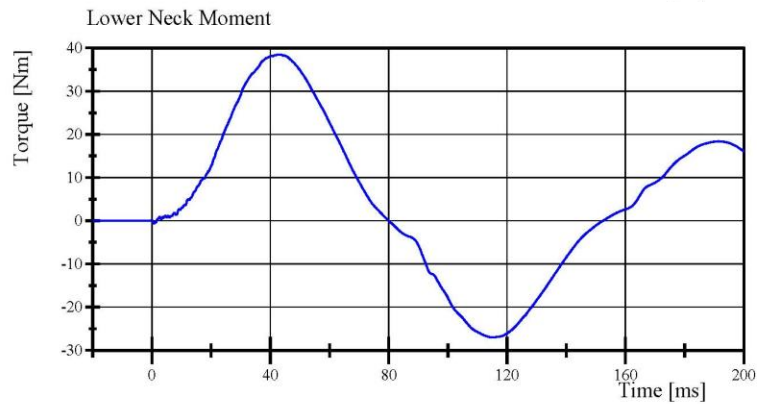
Test Date: 10/30/2020



Filter Class: CFC\_60  
Max: 33.7 ° at 119.1 ms  
Min: -47.8 ° at 46.3 ms



Filter Class: CFC\_60  
Max: 1,868.8 °/s at 90.6 ms  
Min: -1,548.3 °/s at 24.0 ms



Filter Class: CFC\_600  
Max: 38.5 Nm at 43.3 ms  
Min: -26.9 Nm at 115.3 ms

Specification Source: WorldSID 50th(WS) VRTC Nov 2020.xlsx  
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## Transportation Research Center Inc.

Right Neck Torsion  
WorldSID 50th Serial No. EB8888 Certification No. 4-6  
Test Date: 11/4/2020

| Test Parameter                                  | Specification     | Test Results | Pass |
|-------------------------------------------------|-------------------|--------------|------|
| Temperature                                     | 20.6 - 22.2 °C    | 21.4 °C      | Yes  |
| Relative Humidity                               | 10 - 70 %         | 41 %         | Yes  |
| Pendulum Velocity                               | 5.1 - 5.3 m/s     | 5.19 m/s     | Yes  |
| Pendulum Integrated Velocity<br>Change at 10 ms | 2.09 - 2.37 m/s   | 2.239 m/s    | Yes  |
| Change at 15 ms                                 | 3.19 - 3.63 m/s   | 3.386 m/s    | Yes  |
| Change at 20 ms                                 | 4.27 - 4.87 m/s   | 4.544 m/s    | Yes  |
| Peak Fixture Rotation                           | 41.5 - 51 °       | 46.80 °      | Yes  |
| Decay Time to 0 deg from Peak Angle             | 35 - 43 ms        | 39.2 ms      | Yes  |
| Peak Head Angular Velocity Z-axis               | 1,345 - 1,655 %/s | 1,557.8 %/s  | Yes  |
| Peak Lower Neck Moment Z-axis                   | (-34) - (-42) N·m | -38.7 N·m    | Yes  |

**Test meets specifications.**

**Condition:** Used

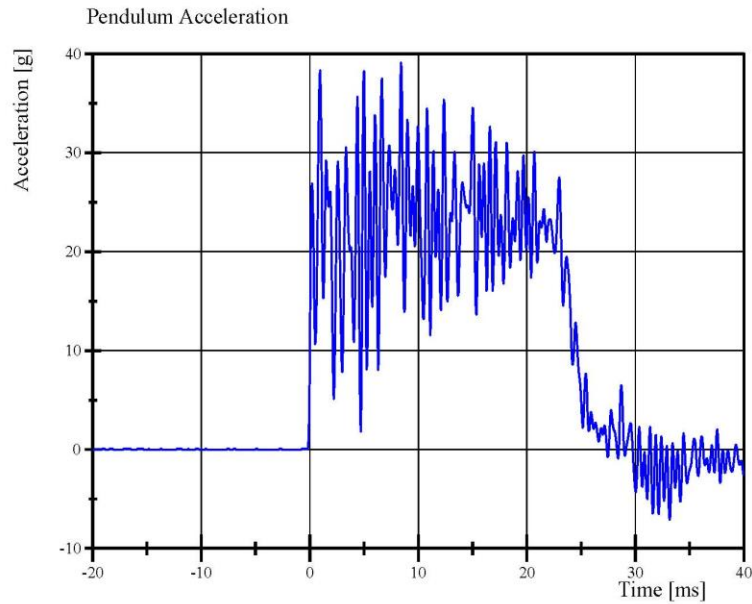
**Comments:**

## Transportation Research Center Inc.

Right Lateral

WorldSID 50th Serial No. EB8888 Certification No. 4-6

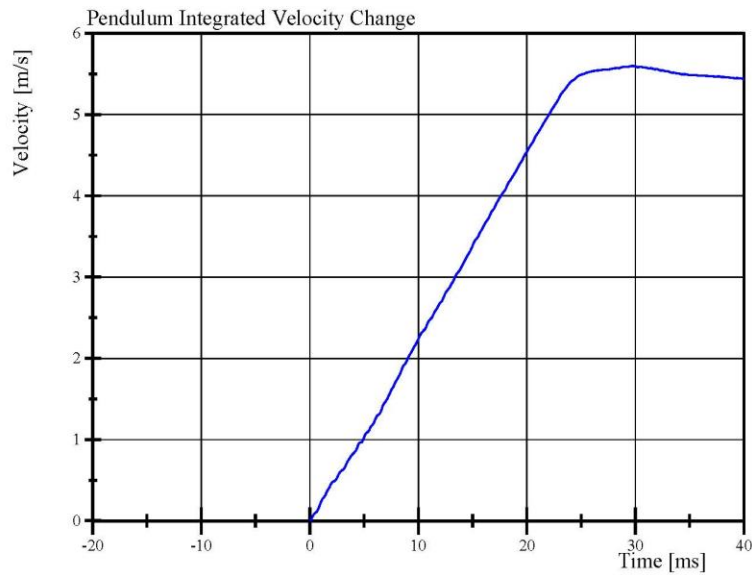
Test Date: 11/4/2020



Filter Class: CFC\_1000

Max: 39.1 g at 8.4 ms

Min: -7.1 g at 33.2 ms



Filter Class: CFC\_1000

Max: 5.6 m/s at 29.8 ms

Min: 0.0 m/s at 0.0 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx  
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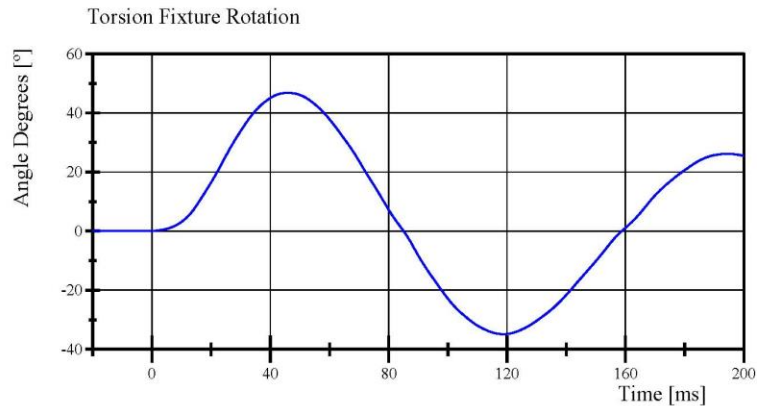


## Transportation Research Center Inc.

Right Lateral

WorldSID 50th Serial No. EB8888 Certification No. 4-6

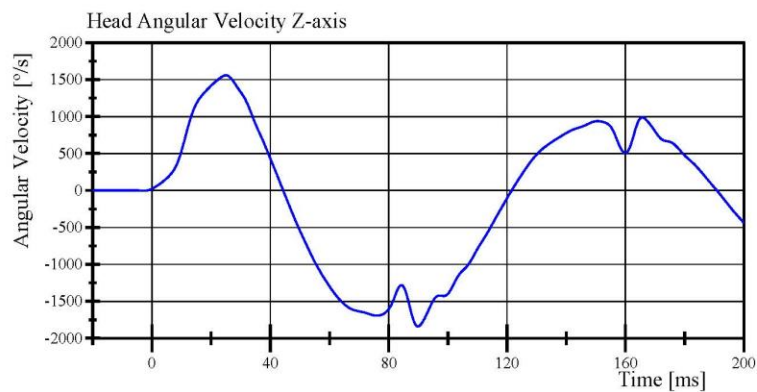
Test Date: 11/4/2020



Filter Class: CFC\_60

Max: 46.8 ° at 45.9 ms

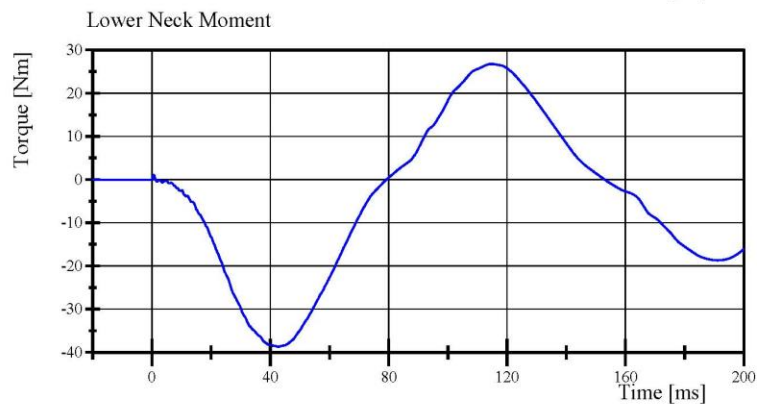
Min: -34.9 ° at 118.8 ms



Filter Class: CFC\_60

Max: 1,557.8 °/s at 25.0 ms

Min: -1,840.1 °/s at 89.9 ms



Filter Class: CFC\_600

Max: 26.7 Nm at 114.9 ms

Min: -38.7 Nm at 42.7 ms

Specification Source: WordSID 50th(W5) VRTC Nov 2020.xlsx  
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## Transportation Research Center Inc.

Left Lateral Shoulder

WorldSID 50th Serial No. EB8888 Certification No. 4-2

Test Date: 10/27/2020

| Test Parameter    | Specification         | Test Results | Pass |
|-------------------|-----------------------|--------------|------|
| Temperature       | 20.6 - 22.2 °C        | 21.4 °C      | Yes  |
| Relative Humidity | 10 - 70 %             | 36 %         | Yes  |
| Impactor Velocity | 4.2 - 4.4 m/s         | 4.31 m/s     | Yes  |
| Impactor Force    | 2,600 - 3,300 N       | 3,090.7 N    | Yes  |
| Shoulder Force    | (-1,470) - (-1,800) N | -1,553.9 N   | Yes  |
| S1 RibEye Max     | 37 - 46 mm            | 43.6 mm      | Yes  |

**Test meet specifications.**

**Condition: Used**

**Comments:**

**Internal Temp: 22.1°C**

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx  
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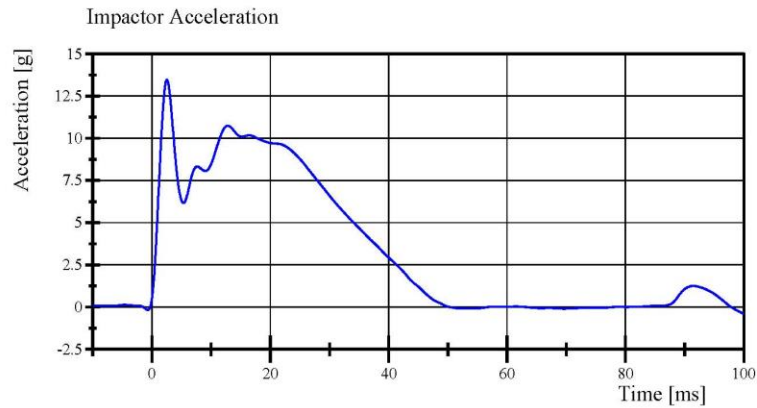


## Transportation Research Center Inc.

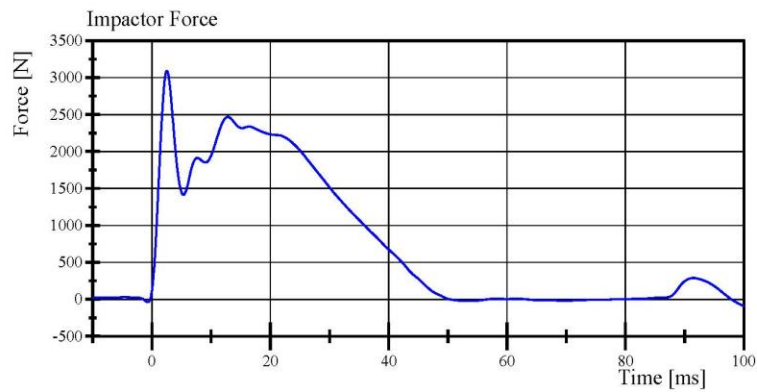
Left Lateral Shoulder

WorldSID 50th Serial No. EB8888 Certification No. 4-2

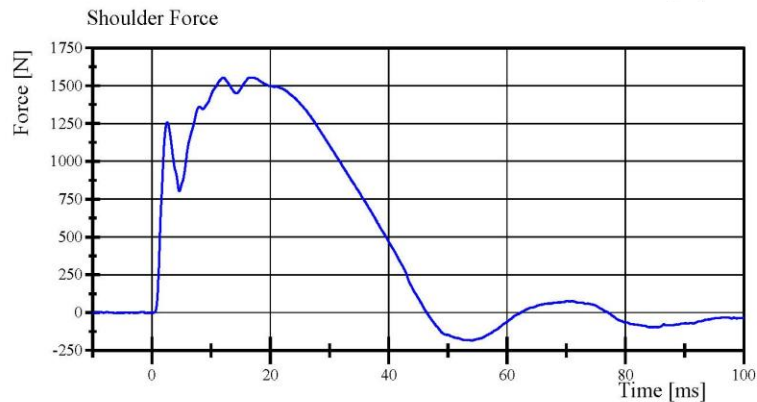
Test Date: 10/27/2020



Filter Class: CFC\_180  
Max: 13.5 g at 2.6 ms  
Min: -0.4 g at 100.1 ms



Filter Class: CFC\_180  
Max: 3,090.7 N at 2.6 ms  
Min: -95.9 N at 100.1 ms



Filter Class: CFC\_600  
Max: 1,553.9 N at 16.6 ms  
Min: -184.3 N at 54.1 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx  
WorldSID 50th\_Qalification Manual 11\_09\_2020

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## Transportation Research Center Inc.

Left Lateral Thorax with Arm

WorldSID 50th Serial No. EB8888 Certification No. 4-3

Test Date: 10/28/2020

| Test Parameter                   | Specification   | Test Results | Pass |
|----------------------------------|-----------------|--------------|------|
| Temperature                      | 20.6 - 22.2 °C  | 21.4 °C      | Yes  |
| Relative Humidity                | 10 - 70 %       | 40 %         | Yes  |
| Impactor Velocity                | 6.6 - 6.8 m/s   | 6.69 m/s     | Yes  |
| Impactor Force                   | 5,300 - 6,200 N | 5,743.0 N    | Yes  |
| Upper Thorax Rib Displacement    | 35 - 47 mm      | 39.4 mm      | Yes  |
| Center Thorax Rib Displacement   | 46 - 56 mm      | 48.5 mm      | Yes  |
| Lower Thorax Rib Displacement    | 33.5 - 40.5 mm  | 33.93 mm     | Yes  |
| Upper Spine Lateral Acceleration | 28 - 37 g       | 33.8 g       | Yes  |
| Lower Spine Lateral Acceleration | 22 - 28 g       | 24.9 g       | Yes  |

**Test meets specifications.**

**Condition:** Used

**Comments:**

**Internal Temp:** 21.1°C

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx  
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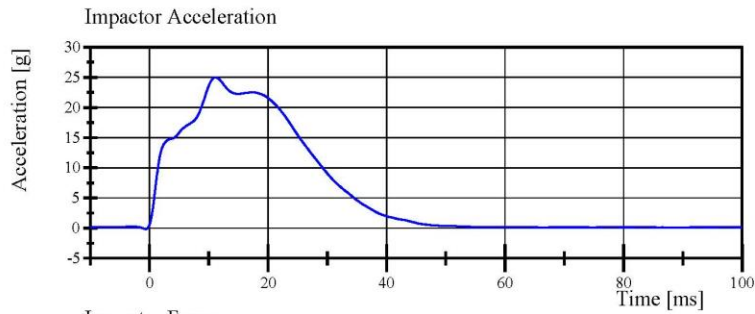


## Transportation Research Center Inc.

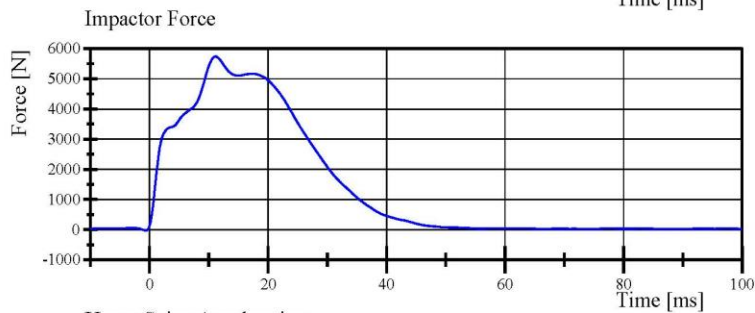
Left Lateral Thorax with Arm

WorldSID 50th Serial No. EB8888 Certification No. 4-3

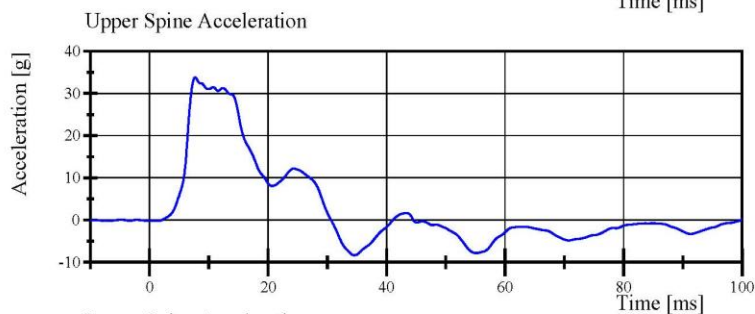
Test Date: 10/28/2020



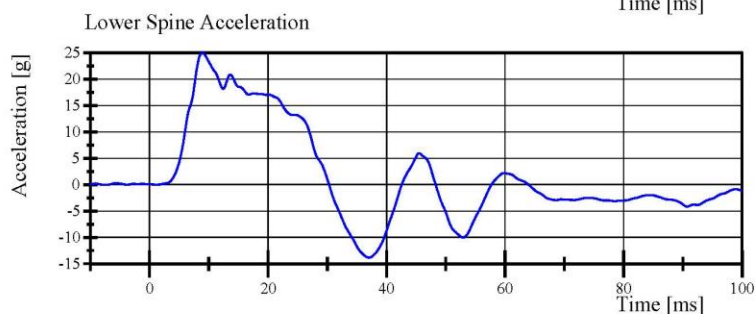
Filter Class: CFC\_180  
Max: 25.0 g at 11.1 ms  
Min: -0.1 g at -0.6 ms



Filter Class: CFC\_180  
Max: 5,743.0 N at 11.1 ms  
Min: -31.8 N at -0.6 ms



Filter Class: CFC\_180  
Max: 33.8 g at 7.7 ms  
Min: -8.3 g at 34.6 ms



Filter Class: CFC\_180  
Max: 24.9 g at 8.9 ms  
Min: -13.8 g at 37.1 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx  
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## Transportation Research Center Inc.

Left Lateral Thorax without Arm  
WorldSID 50th Serial No. EB8888 Certification No. 4-2  
Test Date: 10/26/2020

| Test Parameter                   | Specification   | Test Results | Pass |
|----------------------------------|-----------------|--------------|------|
| Temperature                      | 20.6 - 22.2 °C  | 21.4 °C      | Yes  |
| Relative Humidity                | 10 - 70 %       | 40 %         | Yes  |
| Impactor Velocity                | 4.2 - 4.4 m/s   | 4.30 m/s     | Yes  |
| Impactor Force                   | 3,200 - 3,800 N | 3,482.4 N    | Yes  |
| Upper Thorax Rib Displacement    | 33 - 43 mm      | 37.2 mm      | Yes  |
| Center Thorax Rib Displacement   | 35 - 43 mm      | 39.6 mm      | Yes  |
| Lower Thorax Rib Displacement    | 32 - 40 mm      | 33.9 mm      | Yes  |
| Upper Spine Lateral Acceleration | 14 - 20 g       | 14.9 g       | Yes  |
| Lower Spine Lateral Acceleration | 14 - 22 g       | 14.6 g       | Yes  |

**Test meets specifications.**

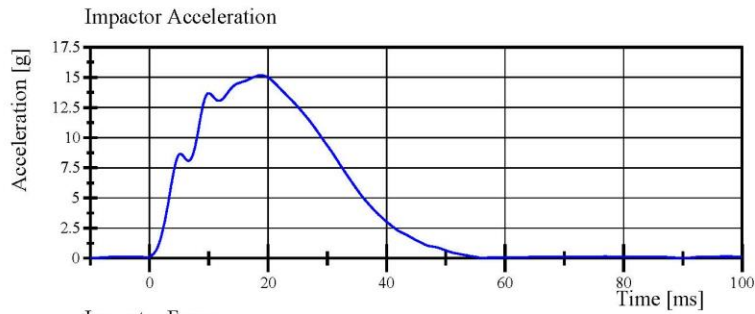
**Condition:** Used

**Comments:**

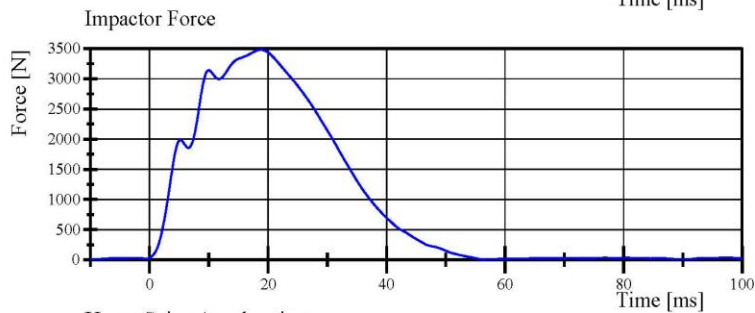
**Internal Temp:** 23.9°C

## Transportation Research Center Inc.

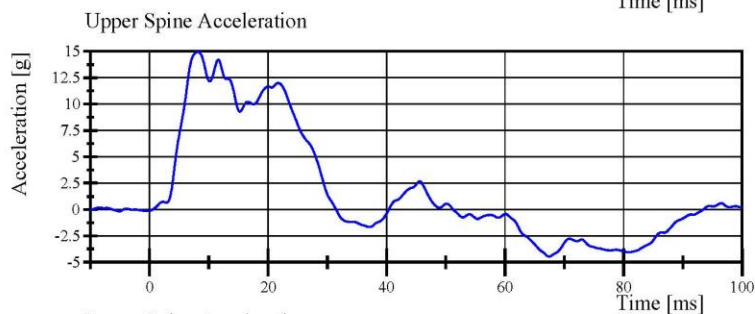
Left Lateral Thorax without Arm  
WorldSID 50th Serial No. EB8888 Certification No. 4-2  
Test Date: 10/26/2020



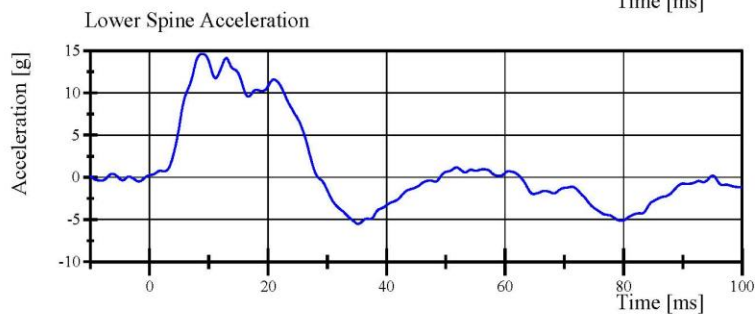
Filter Class: CFC\_180  
Max: 15.2 g at 18.8 ms  
Min: 0.0 g at 56.3 ms



Filter Class: CFC\_180  
Max: 3,482.4 N at 18.8 ms  
Min: 4.7 N at 56.3 ms



Filter Class: CFC\_180  
Max: 14.9 g at 8.2 ms  
Min: -4.5 g at 67.4 ms



Filter Class: CFC\_180  
Max: 14.6 g at 8.9 ms  
Min: -5.5 g at 35.2 ms

## Transportation Research Center Inc.

Left Lateral Abdomen

WorldSID 50th Serial No. EB8888 Certification No. 4-1

Test Date: 10/27/2020

| Test Parameter                   | Specification   | Test Results | Pass |
|----------------------------------|-----------------|--------------|------|
| Temperature                      | 20.6 - 22.2 °C  | 21.4 °C      | Yes  |
| Relative Humidity                | 10 - 70 %       | 37 %         | Yes  |
| Impactor Velocity                | 4.2 - 4.4 m/s   | 4.33 m/s     | Yes  |
| Impactor Force                   | 2,700 - 3,100 N | 2,996.5 N    | Yes  |
| Upper Abdominal Rib Displacement | 32.5 - 39.5 mm  | 33.82 mm     | Yes  |
| Lower Abdominal Rib Displacement | 32 - 38 mm      | 33.1 mm      | Yes  |
| Lower Spine Lateral Acceleration | 14.5 - 19.5 g   | 17.99 g      | Yes  |

**Test meets specifications.**

**Condition: Used**

**Comments:**

**Internal Temp: 21°C**

Specification Source: WordSID 50th(W5) VRTC Nov 2020.xlsx  
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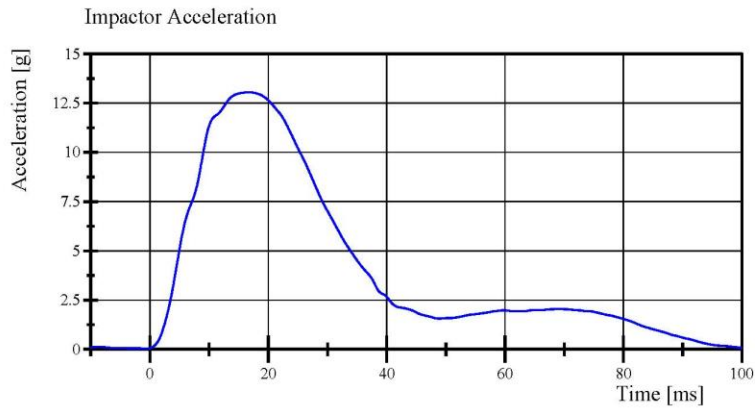


## Transportation Research Center Inc.

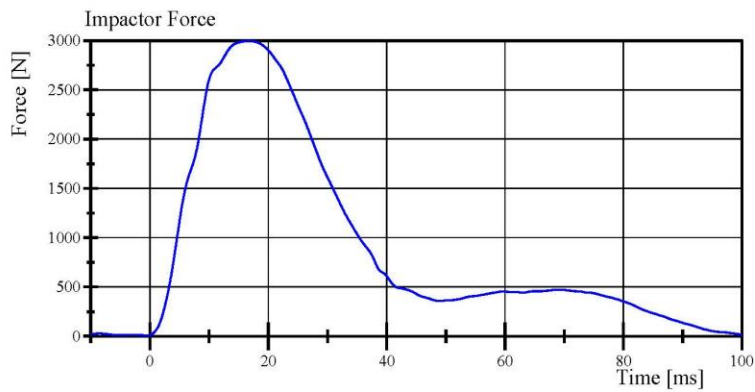
Left Lateral Abdomen

WorldSID 50th Serial No. EB8888 Certification No. 4-1

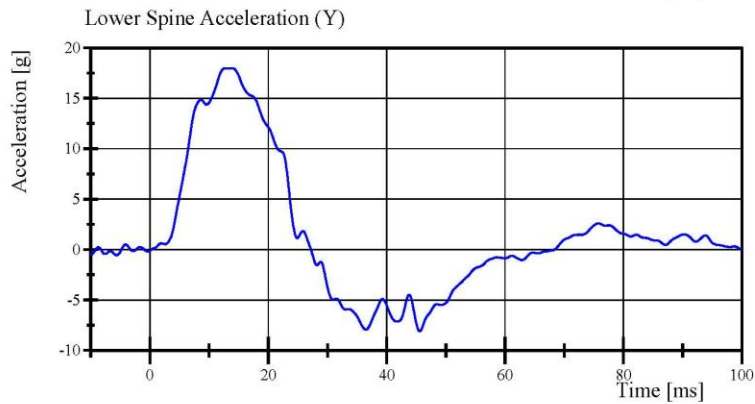
Test Date: 10/27/2020



Filter Class: CFC\_180  
Max: 13.1 g at 16.7 ms  
Min: 0.0 g at -0.5 ms



Filter Class: CFC\_180  
Max: 2,996.5 N at 16.7 ms  
Min: 7.8 N at -0.5 ms



Filter Class: CFC\_180  
Max: 18.0 g at 14.0 ms  
Min: -8.1 g at 45.6 ms

Specification Source: WorldSID 50th(WS) VRTC Nov 2020.xlsx  
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## Transportation Research Center Inc.

Left Lateral Pelvis

WorldSID 50th Serial No. EB8888 Certification No. 4-1

Test Date: 10/27/2020

| Test Parameter                   | Specification         | Test Results | Pass |
|----------------------------------|-----------------------|--------------|------|
| Temperature                      | 20.6 - 22.2 °C        | 21.5 °C      | Yes  |
| Relative Humidity                | 10 - 70 %             | 35 %         | Yes  |
| Impactor Velocity                | 6.6 - 6.8 m/s         | 6.71 m/s     | Yes  |
| Impactor Force                   | 6,800 - 8,200 N       | 7,329.8 N    | Yes  |
| Pelvis Lateral Acceleration      | 38.5 - 48.5 g         | 40.75 g      | Yes  |
| Lower Spine Lateral Acceleration | 10 - 14 g             | 12.0 g       | Yes  |
| Pubic Lateral Force              | (-1,300) - (-1,590) N | -1,361.4 N   | Yes  |
| Sacroiliac Lateral Force         | (-1,860) - (-2,280) N | -2,051.1 N   | Yes  |

**Test meets specifications.**

**Condition: Used**

**Comments:**

**Intenal Temp: 24.5°C**

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx  
WorldSID 50th\_Qalification Manual 11\_09\_2020

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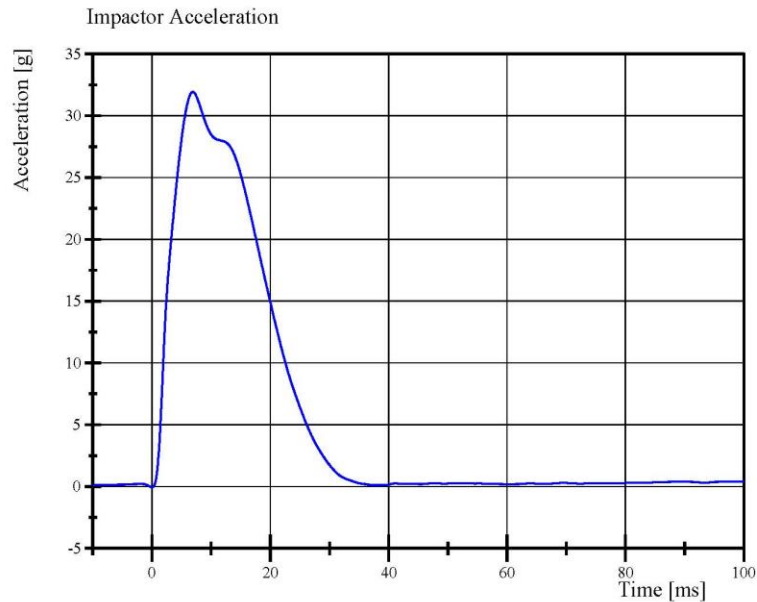


## Transportation Research Center Inc.

Left Lateral Pelvis

WorldSID 50th Serial No. EB8888 Certification No. 4-1

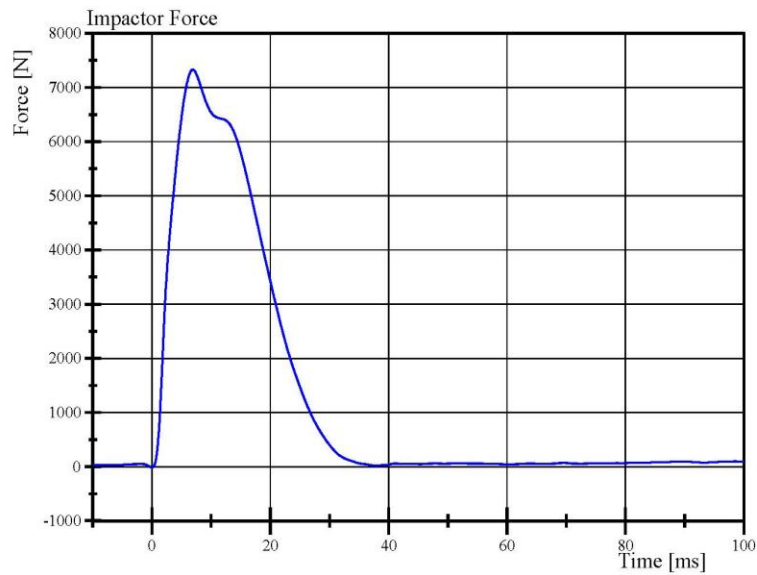
Test Date: 10/27/2020



Filter Class: CFC\_180

Max: 31.9 g at 6.9 ms

Min: -0.1 g at 0.0 ms



Filter Class: CFC\_180

Max: 7,329.8 N at 6.9 ms

Min: -13.1 N at 0.0 ms

Specification Source: WordSID 50th(W5) VRTC Nov 2020.xlsx  
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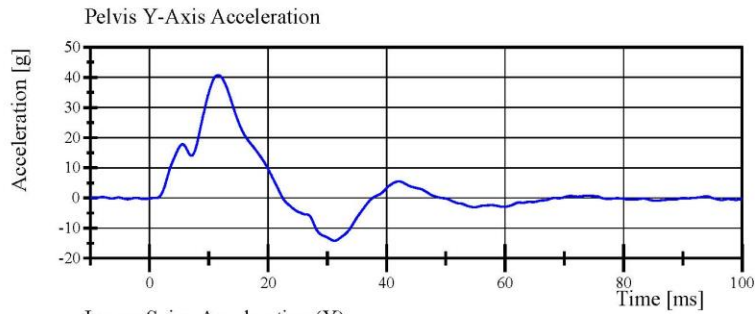


## Transportation Research Center Inc.

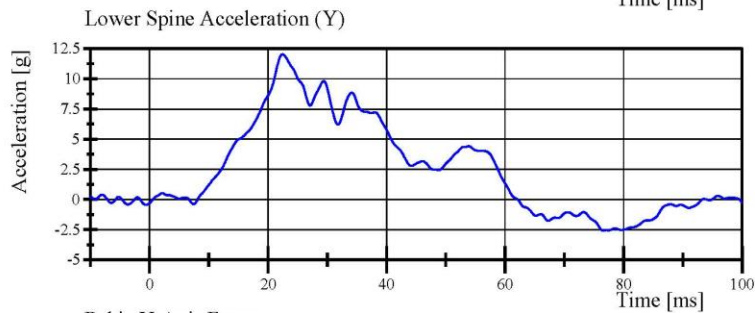
Left Lateral Pelvis

WorldSID 50th Serial No. EB8888 Certification No. 4-1

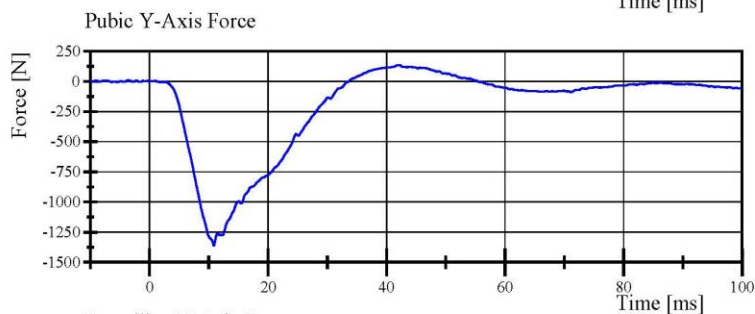
Test Date: 10/27/2020



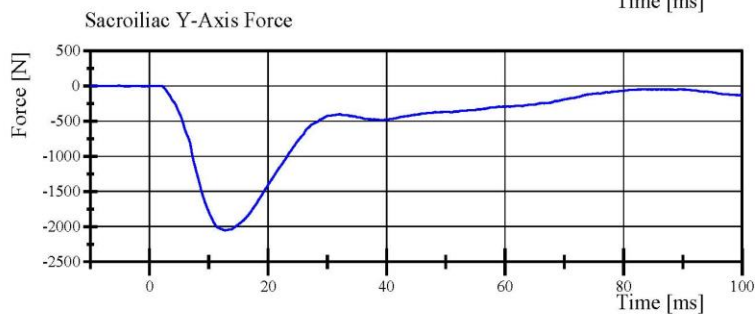
Filter Class: CFC\_180  
Max: 40.8 g at 11.6 ms  
Min: -14.2 g at 31.3 ms



Filter Class: CFC\_180  
Max: 12.0 g at 22.5 ms  
Min: -2.6 g at 76.6 ms



Filter Class: CFC\_600  
Max: 136.2 N at 42.1 ms  
Min: -1,361.4 N at 10.9 ms



Filter Class: CFC\_600  
Max: 3.9 N at -5.2 ms  
Min: -2,051.1 N at 12.8 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx  
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**APPENDIX D**  
**TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA**

**TABLE 1 – Dummy Instrumentation (WorldSID-50M with RibEye™)**

|                                      |   | WorldSID-50M S/N EB8888 |              |                  |
|--------------------------------------|---|-------------------------|--------------|------------------|
|                                      |   | Serial Number           | Manufacturer | Calibration Date |
| Head Accelerometers (g)              | X | 12324-1                 | Endevco      | 22-Jul-2020      |
|                                      | Y | 12324-3                 | Endevco      | 22-Jul-2020      |
|                                      | Z | 12324-2                 | Endevco      | 22-Jul-2020      |
| Head Angular Rates Sensors (deg/sec) | X | ARS12047                | DTS          | 4-Aug-2020       |
|                                      | Y | ARS15840                | DTS          | 4-Aug-2020       |
|                                      | Z | ARS15095                | DTS          | 4-Aug-2020       |
| Upper Neck Force (N)                 | X | DO9753                  | Humanetics   | 23-Jul-2020      |
|                                      | Y | DO9753                  | Humanetics   | 23-Jul-2020      |
|                                      | Z | DO9753                  | Humanetics   | 23-Jul-2020      |
| Upper Neck Moment (Nm)               | X | DO9753                  | Humanetics   | 23-Jul-2020      |
|                                      | Y | DO9753                  | Humanetics   | 23-Jul-2020      |
|                                      | Z | DO9753                  | Humanetics   | 23-Jul-2020      |
| Lower Neck Force (N)                 | X | EB8143                  | Humanetics   | 21-Jul-2020      |
|                                      | Y | EB8143                  | Humanetics   | 21-Jul-2020      |
|                                      | Z | EB8143                  | Humanetics   | 21-Jul-2020      |
| Lower Neck Moment (Nm)               | X | EB8143                  | Humanetics   | 21-Jul-2020      |
|                                      | Y | EB8143                  | Humanetics   | 21-Jul-2020      |
|                                      | Z | EB8143                  | Humanetics   | 21-Jul-2020      |
| Shoulder Force (N)                   | X | EC1630                  | Humanetics   | 23-Jul-2020      |
|                                      | Y | EC1630                  | Humanetics   | 23-Jul-2020      |
|                                      | Z | EC1630                  | Humanetics   | 23-Jul-2020      |
| Upper Spine Accelerometers (T1) (g)  | X | 12037-3                 | Endevco      | 22-Jul-2020      |
|                                      | Y | 12037-2                 | Endevco      | 22-Jul-2020      |
|                                      | Z | 12037-1                 | Endevco      | 22-Jul-2020      |
| Middle Spine Accelerometers (T4) (g) | X | 12352-3                 | Endevco      | 21-Jul-2020      |
|                                      | Y | 12352-2                 | Endevco      | 21-Jul-2020      |
|                                      | Z | 12352-1                 | Endevco      | 21-Jul-2020      |
| Lower Spine Accelerometers (T12) (g) | X | 12375-3                 | Endevco      | 22-Jul-2020      |
|                                      | Y | 12375-2                 | Endevco      | 22-Jul-2020      |
|                                      | Z | 12375-1                 | Endevco      | 22-Jul-2020      |
| Pubic Symphysis Force (N)            | Y | EC4386                  | Humanetics   | 23-Jul-2020      |
| Sacro-Iliac Left Force (N)           | X | EG4066                  | Humanetics   | 23-Jul-2020      |
|                                      | Y | EG4066                  | Humanetics   | 23-Jul-2020      |
|                                      | Z | EG4066                  | Humanetics   | 23-Jul-2020      |
| Sacro-Iliac Left Moment (Nm)         | X | EG4066                  | Humanetics   | 23-Jul-2020      |
|                                      | Y | EG4066                  | Humanetics   | 23-Jul-2020      |
|                                      | Z | EG4066                  | Humanetics   | 23-Jul-2020      |

**TABLE 1 – Dummy Instrumentation (WorldSID-50M with RibEye™) (CONTINUED)**

|                                  |   | WorldSID-50M S/N EB8888 |              |                  |
|----------------------------------|---|-------------------------|--------------|------------------|
|                                  |   | Serial Number           | Manufacturer | Calibration Date |
| Sacro-Iliac Right Force (N)      | X | EG4066                  | Humanetics   | 23-Jul-2020      |
|                                  | Y | EG4066                  | Humanetics   | 23-Jul-2020      |
|                                  | Z | EG4066                  | Humanetics   | 23-Jul-2020      |
| Sacro-Iliac Right Moment (Nm)    | X | EG4066                  | Humanetics   | 23-Jul-2020      |
|                                  | Y | EG4066                  | Humanetics   | 23-Jul-2020      |
|                                  | Z | EG4066                  | Humanetics   | 23-Jul-2020      |
| Lumbar Force (N)                 | X | EC2349                  | Humanetics   | 23-Jul-2020      |
|                                  | Y | EC2349                  | Humanetics   | 23-Jul-2020      |
|                                  | Z | EC2349                  | Humanetics   | 23-Jul-2020      |
| Lumbar Moment (Nm)               | X | EC2349                  | Humanetics   | 23-Jul-2020      |
|                                  | Y | EC2349                  | Humanetics   | 23-Jul-2020      |
|                                  | Z | EC2349                  | Humanetics   | 23-Jul-2020      |
| Pelvis Accelerometers (g)        | X | 11905-3                 | Endevco      | 22-Jul-2020      |
|                                  | Y | 11905-2                 | Endevco      | 22-Jul-2020      |
|                                  | Z | 11905-1                 | Endevco      | 22-Jul-2020      |
| Left Femur Force (N)             | X | EA4925TPS               | Humanetics   | 29-Jul-2020      |
|                                  | Y | EA4925TPS               | Humanetics   | 29-Jul-2020      |
|                                  | Z | EA4925TPS               | Humanetics   | 29-Jul-2020      |
| Left Femur Moment (Nm)           | X | EA4925TPS               | Humanetics   | 29-Jul-2020      |
|                                  | Y | EA4925TPS               | Humanetics   | 29-Jul-2020      |
|                                  | Z | EA4925TPS               | Humanetics   | 29-Jul-2020      |
| Left Femoral Neck Force (N)      | X | EB6234T                 | Humanetics   | 23-Jul-2020      |
|                                  | Y | EB6234T                 | Humanetics   | 23-Jul-2020      |
|                                  | Z | EB6234T                 | Humanetics   | 23-Jul-2020      |
| Driver Left Outer Knee Force (N) | Y | 93                      | Humanetics   | 23-Jul-2020      |
| Driver Left Inner Knee Force (N) | Y | 95                      | Humanetics   | 23-Jul-2020      |

**TABLE 1 – Dummy Instrumentation (WorldSID-50M with RibEye™) (CONTINUED)**

|                          |        |   | WorldSID-50M S/N EB8888 |                 |                  |
|--------------------------|--------|---|-------------------------|-----------------|------------------|
|                          |        |   | Serial Number           | Manufacturer    | Calibration Date |
| Shoulder RibEye (mm)     | Front  | X | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          |        | Y | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          |        | Z | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          | Middle | X | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          |        | Y | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          |        | Z | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          | Rear   | X | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          |        | Y | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          |        | Z | 124                     | Boxboro Systems | 7-Jul-2020       |
| Thorax Rib 1 RibEye (mm) | Front  | X | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          |        | Y | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          |        | Z | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          | Middle | X | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          |        | Y | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          |        | Z | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          | Rear   | X | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          |        | Y | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          |        | Z | 124                     | Boxboro Systems | 7-Jul-2020       |
| Thorax Rib 2 RibEye (mm) | Front  | X | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          |        | Y | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          |        | Z | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          | Middle | X | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          |        | Y | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          |        | Z | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          | Rear   | X | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          |        | Y | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          |        | Z | 124                     | Boxboro Systems | 7-Jul-2020       |
| Thorax Rib 3 RibEye (mm) | Front  | X | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          |        | Y | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          |        | Z | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          | Middle | X | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          |        | Y | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          |        | Z | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          | Rear   | X | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          |        | Y | 124                     | Boxboro Systems | 7-Jul-2020       |
|                          |        | Z | 124                     | Boxboro Systems | 7-Jul-2020       |

**TABLE 1 – Dummy Instrumentation (WorldSID-50M with RibEye™) (CONTINUED)**

|                              |        |   | WorldSID-50M S/N EB8888 |                 |                  |
|------------------------------|--------|---|-------------------------|-----------------|------------------|
|                              |        |   | Serial Number           | Manufacturer    | Calibration Date |
| Abdomen Rib 1<br>RibEye (mm) | Front  | X | 124                     | Boxboro Systems | 7-Jul-2020       |
|                              |        | Y | 124                     | Boxboro Systems | 7-Jul-2020       |
|                              |        | Z | 124                     | Boxboro Systems | 7-Jul-2020       |
|                              | Middle | X | 124                     | Boxboro Systems | 7-Jul-2020       |
|                              |        | Y | 124                     | Boxboro Systems | 7-Jul-2020       |
|                              |        | Z | 124                     | Boxboro Systems | 7-Jul-2020       |
|                              | Rear   | X | 124                     | Boxboro Systems | 7-Jul-2020       |
|                              |        | Y | 124                     | Boxboro Systems | 7-Jul-2020       |
|                              |        | Z | 124                     | Boxboro Systems | 7-Jul-2020       |
| Abdomen Rib 2<br>RibEye (mm) | Front  | X | 124                     | Boxboro Systems | 7-Jul-2020       |
|                              |        | Y | 124                     | Boxboro Systems | 7-Jul-2020       |
|                              |        | Z | 124                     | Boxboro Systems | 7-Jul-2020       |
|                              | Middle | X | 124                     | Boxboro Systems | 7-Jul-2020       |
|                              |        | Y | 124                     | Boxboro Systems | 7-Jul-2020       |
|                              |        | Z | 124                     | Boxboro Systems | 7-Jul-2020       |
|                              | Rear   | X | 124                     | Boxboro Systems | 7-Jul-2020       |
|                              |        | Y | 124                     | Boxboro Systems | 7-Jul-2020       |
|                              |        | Z | 124                     | Boxboro Systems | 7-Jul-2020       |



**TABLE 2 – VEHICLE INSTRUMENTATION**

| Vehicle Instrumentation                          |   | Serial Number | Manufacturer | Calibration Date |
|--------------------------------------------------|---|---------------|--------------|------------------|
| Vehicle Center of Gravity (g)                    | X | T11808        | ENDEVCO      | 27-Aug-2020      |
|                                                  | Y | T16764        | ENDEVCO      | 27-Aug-2020      |
|                                                  | Z | T11812        | ENDEVCO      | 27-Aug-2020      |
| Vehicle Center of Gravity Angular Rate (deg/sec) | X | ARS8001       | DTS          | 6-Jul-2020       |
|                                                  | Y | ARS9185       | DTS          | 6-Jul-2020       |
|                                                  | Z | ARS8290       | DTS          | 6-Jul-2020       |
| Left Floor Sill (g)                              | Y | T23885        | ENDEVCO      | 27-Aug-2020      |
| Left A-Pillar Sill (g)                           | Y | T23876        | ENDEVCO      | 15-Sep-2020      |
| Left Lower A-Pillar (g)                          | Y | P50491        | ENDEVCO      | 23-Jun-2020      |
| Left Mid A-Pillar (g)                            | Y | P50313        | ENDEVCO      | 23-Jun-2020      |
| Left B-Pillar Sill (g)                           | Y | T23845        | ENDEVCO      | 17-Sep-2020      |
| Left Lower B-Pillar (g)                          | Y | P57946        | ENDEVCO      | 3-Jun-2020       |
| Left Mid B-Pillar (g)                            | Y | P88038        | ENDEVCO      | 2-Jun-2020       |
| Driver Seat Track at Dummy H-Point (g)           | Y | T23811        | ENDEVCO      | 29-Sep-2020      |
| Engine Top (g)                                   | X | P44288        | ENDEVCO      | 23-Jun-2020      |
|                                                  | Y | T11449        | ENDEVCO      | 23-Jun-2020      |
| Firewall Center (g)                              | Y | T16770        | ENDEVCO      | 27-Aug-2020      |
| Right Roof at Vertical Impact Reference Line (g) | Y | P73587        | ENDEVCO      | 3-Aug-2020       |
| Right Sill at Vertical Impact Reference Line (g) | X | P74456        | ENDEVCO      | 3-Jun-2020       |
|                                                  | Y | P58494        | ENDEVCO      | 3-Jun-2020       |
|                                                  | Z | P58537        | ENDEVCO      | 3-Jun-2020       |
| Right Sill at Rear Seat Acceleration (g)         | X | P77747        | ENDEVCO      | 27-Aug-2020      |
|                                                  | Y | P58551        | ENDEVCO      | 27-Aug-2020      |
|                                                  | Z | P58549        | ENDEVCO      | 27-Aug-2020      |
| Rear Floorpan Behind Rear Axle at Centerline (g) | X | T23862        | ENDEVCO      | 15-Sep-2020      |
| Rear Floorpan Behind Rear Axle at Centerline (g) | Y | T16721        | ENDEVCO      | 27-Aug-2020      |
| Left Front Door Mid Centerline (g)               | Y | T23827        | ENDEVCO      | 15-Sep-2020      |
| Left Front Door Mid Rear (g)                     | Y | T23829        | ENDEVCO      | 15-Sep-2020      |
| Left Front Door Upper Centerline (g)             | Y | T23877        | ENDEVCO      | 15-Sep-2020      |
| Left Rear Door Mid Rear (g)                      | Y | T23779        | ENDEVCO      | 15-Sep-2020      |
| Left Rear Door Upper Centerline (g)              | Y | T23864        | ENDEVCO      | 15-Sep-2020      |
| Rear Deck (g)                                    | X | P50393        | ENDEVCO      | 3-Jun-2020       |
|                                                  | Y | P34046        | ENDEVCO      | 3-Jun-2020       |
|                                                  | Z | P57803        | ENDEVCO      | 3-Jun-2020       |
| Rear Deck Angular Rate (deg/sec)                 | X | ARS7974       | DTS          | 6-Jul-2020       |
|                                                  | Y | ARS9194       | DTS          | 11-Sep-2020      |
|                                                  | Z | ARS8743       | DTS          | 11-Sep-2020      |

**TABLE 3 – POLE INSTRUMENTATION**

| <b>Pole Instrumentation</b> | <b>Serial Number</b> | <b>Manufacturer</b> | <b>Calibration Date</b> |
|-----------------------------|----------------------|---------------------|-------------------------|
| Pole Load Cell 1            | DK7091S              | Humanetics          | 13-Nov-2019             |
| Pole Load Cell 2            | DK7120S              | Humanetics          | 13-Nov-2019             |
| Pole Load Cell 3            | DK7118S              | Humanetics          | 13-Nov-2019             |
| Pole Load Cell 4            | DK7124S              | Humanetics          | 13-Nov-2019             |
| Pole Load Cell 5            | DK7111S              | Humanetics          | 13-Nov-2019             |
| Pole Load Cell 6            | DK7126S              | Humanetics          | 13-Nov-2019             |
| Pole Load Cell 7            | DK7112S              | Humanetics          | 13-Nov-2019             |
| Pole Load Cell 8            | DK7074S              | Humanetics          | 13-Nov-2019             |

Sign Convention  
SAE J211 MAR95

Accelerometers:

+X: Forward  
+Y: Rightward  
+Z: Downward

Potentiometers:

+Chest longitudinal deflection: Outward  
+Chest lateral deflection: Rightward  
+Seat belt displacement: Outward  
+Seat belt extension: Elongation  
+Knee slider displacement: Distance between femur and tibia increased (in relation to a seated dummy)

Rotation potentiometers:

+About the X-axis: Left foot-eversion  
Right foot-inversion  
+About the Y-axis: Left/right foot-dorsiflexion  
+About the Z-axis: Left foot-internal  
Right foot-external

Load cells:

+Femur force: Tension  
+Seat belt force: Tension  
+Barrier force: Tension

Neck load cells:

+X force: Head pushed rearward  
+Y force: Head pushed leftward  
+Z force: Head pulled upward (tension on neck)  
+X moment: Left ear rotating toward left shoulder  
+Y moment: Chin rotating toward chest  
+Z moment: Chin rotating toward left shoulder

Tibia load cells:

+X force: Ankle forward, knee rearward  
+Y force: Ankle rightward, knee leftward  
+Z force: Tension  
+X moment: Bottom of tibia moving leftward  
+Y moment: Bottom of tibia moving rearward

Sign Convention (Continued)  
SAE J211 MAR95

|                           |            |                                                |
|---------------------------|------------|------------------------------------------------|
| <u>Lumbar load cells:</u> | +X force:  | Chest rearward, pelvis forward                 |
|                           | +Y force:  | Chest leftward, pelvis rightward               |
|                           | +Z force:  | Chest upward, pelvis downward                  |
|                           | +X moment: | Left shoulder toward left hip                  |
|                           | +Y moment: | Sternum toward front of legs                   |
|                           | +Z moment: | Right shoulder forward, left shoulder rearward |

Frequency Response Classes  
SAE J211 MAR95

| <u>Typical Test Measurements</u>             | <u>Channel Class</u> |
|----------------------------------------------|----------------------|
| Vehicle Structural Accelerations for use in: |                      |
| Total vehicle comparison                     | 60                   |
| Collision simulation input                   | 60                   |
| Component analysis                           | 600                  |
| Integration for velocity or displacement     | 180                  |
| Barrier Face Forces                          | 60                   |
| Belt Restraint System Loads                  | 60                   |
| Anthropomorphic Test Device                  |                      |
| Head accelerations (linear and angular)      | 1000                 |
| Neck                                         |                      |
| Forces                                       | 1000                 |
| Moments                                      | 600                  |
| Thorax                                       |                      |
| Spine accelerations                          | 180                  |
| Rib accelerations                            | 1000                 |
| Sternum accelerations                        | 1000                 |
| Deflections                                  | 600                  |
| Lumbar                                       |                      |
| Forces                                       | 1000                 |
| Moments                                      | 1000                 |
| Pelvis                                       |                      |
| Accelerations                                | 1000                 |
| Forces                                       | 1000                 |
| Moments                                      | 1000                 |
| Femur/Knee/Tibia/Ankle                       |                      |
| Forces                                       | 600                  |
| Moments                                      | 600                  |
| Displacements                                | 180                  |
| Sled Accelerations                           | 60                   |
| Steering Column Loads                        | 600                  |
| Head Form Accelerations                      | 1000                 |

| Channel Number | ISO mnemonic     | Channel Title                           | Filter Class | Flip | Zero | Full Scale |
|----------------|------------------|-----------------------------------------|--------------|------|------|------------|
| 1              | 11HEADCG00WSACXP | Driver Head Acceleration (X)            | 1000         | +    | yes  | 2000       |
| 2              | 11HEADCG00WSACYP | Driver Head Acceleration (Y)            | 1000         | +    | yes  | 2000       |
| 3              | 11HEADCG00WSACZP | Driver Head Acceleration (Z)            | 1000         | +    | yes  | 2000       |
| 3A             | 11HEADCG00WSACRP | Driver Head Acceleration Resultant      | 1000         |      |      |            |
| 4              | 11HEADCG00WSAVXP | Driver Head Angular Rate (X)            | 1000         | +    | yes  | 8000       |
| 5              | 11HEADCG00WSAVYP | Driver Head Angular Rate (Y)            | 1000         | +    | yes  | 8000       |
| 6              | 11HEADCG00WSAVZP | Driver Head Angular Rate (Z)            | 1000         | +    | yes  | 8000       |
| 7              | 11NECKUP00WSFOXP | Driver Upper Neck Force (X)             | 1000         | +    | yes  | 10000      |
| 8              | 11NECKUP00WSFOYP | Driver Upper Neck Force (Y)             | 1000         | +    | yes  | 10000      |
| 9              | 11NECKUP00WSFOZP | Driver Upper Neck Force (Z)             | 1000         | +    | yes  | 12000      |
| 10             | 11NECKUP00WSMOXP | Driver Upper Neck Moment (X)            | 600          | +    | yes  | 300        |
| 11             | 11NECKUP00WSMOYP | Driver Upper Neck Moment (Y)            | 600          | +    | yes  | 300        |
| 12             | 11NECKUP00WSMOZP | Driver Upper Neck Moment (Z)            | 600          | +    | yes  | 200        |
| 13             | 11NECKLO00WSFOXP | Driver Lower Neck Force (X)             | 1000         | +    | yes  | 10000      |
| 14             | 11NECKLO00WSFOYP | Driver Lower Neck Force (Y)             | 1000         | +    | yes  | 10000      |
| 15             | 11NECKLO00WSFOZP | Driver Lower Neck Force (Z)             | 1000         | +    | yes  | 12000      |
| 16             | 11NECKLO00WSMOXP | Driver Lower Neck Moment (X)            | 600          | +    | yes  | 300        |
| 17             | 11NECKLO00WSMOYP | Driver Lower Neck Moment (Y)            | 600          | +    | yes  | 300        |
| 18             | 11NECKLO00WSMOZP | Driver Lower Neck Moment (Z)            | 600          | +    | yes  | 200        |
| 19             | 11SHLDLE00WSFOXP | Driver Shoulder Force (X)               | 600          | +    | yes  | 5000       |
| 20             | 11SHLDLE00WSFOYP | Driver Shoulder Force (Y)               | 600          | +    | yes  | 10000      |
| 21             | 11SHLDLE00WSFOZP | Driver Shoulder Force (Z)               | 600          | +    | yes  | 5000       |
| 22             | 11SHRILEREWSDSX0 | Driver Shoulder Rear Displacement (X)   | 0            | +    | no   | 60         |
| 23             | 11SHRILEREWSDSY0 | Driver Shoulder Rear Displacement (Y)   | 0            | +    | no   | 60         |
| 24             | 11SHRILEREWSDSZ0 | Driver Shoulder Rear Displacement (Z)   | 0            | +    | no   | 60         |
| 25             | 11SHRILEREWSDSL0 | Driver Shoulder Rear Length Change      | 600          | +    | no   | 60         |
| 26             | 11SHRILEMIWSDSX0 | Driver Shoulder Middle Displacement (X) | 0            | +    | no   | 60         |
| 27             | 11SHRILEMIWSDSY0 | Driver Shoulder Middle Displacement (Y) | 0            | +    | no   | 60         |
| 28             | 11SHRILEMIWSDSZ0 | Driver Shoulder Middle Displacement (Z) | 0            | +    | no   | 60         |
| 29             | 11SHRILEMIWSDSL0 | Driver Shoulder Middle Length Change    | 600          | +    | no   | 60         |
| 30             | 11SHRILEFRWSDSX0 | Driver Shoulder Front Displacement (X)  | 0            | +    | no   | 60         |
| 31             | 11SHRILEFRWSDSY0 | Driver Shoulder Front Displacement (Y)  | 0            | +    | no   | 60         |
| 32             | 11SHRILEFRWSDSZ0 | Driver Shoulder Front Displacement (Z)  | 0            | +    | no   | 60         |
| 33             | 11SHRILEFRWSDSL0 | Driver Shoulder Front Length Change     | 600          | +    | no   | 60         |

| Channel Number | ISO mnemonic     | Channel Title                               | Filter Class | Flip | Zero | Full Scale |
|----------------|------------------|---------------------------------------------|--------------|------|------|------------|
| 34             | 11TRRILUREWSDSX0 | Driver Thorax Rib 1 Rear Displacement (X)   | 0            | +    | no   | 60         |
| 35             | 11TRRILUREWSDSY0 | Driver Thorax Rib 1 Rear Displacement (Y)   | 0            | +    | no   | 60         |
| 36             | 11TRRILUREWSDSZ0 | Driver Thorax Rib 1 Rear Displacement (Z)   | 0            | +    | no   | 60         |
| 37             | 11TRRILUREWSDSLB | Driver Thorax Rib 1 Rear Length Change      | 600          | +    | no   | 60         |
| 38             | 11TRRILUMIWSDSX0 | Driver Thorax Rib 1 Middle Displacement (X) | 0            | +    | no   | 60         |
| 39             | 11TRRILUMIWSDSY0 | Driver Thorax Rib 1 Middle Displacement (Y) | 0            | +    | no   | 60         |
| 40             | 11TRRILUMIWSDSZ0 | Driver Thorax Rib 1 Middle Displacement (Z) | 0            | +    | no   | 60         |
| 41             | 11TRRILUMIWSDSLB | Driver Thorax Rib 1 Middle Length Change    | 600          | +    | no   | 60         |
| 42             | 11TRRILUFRWSDSX0 | Driver Thorax Rib 1 Front Displacement (X)  | 0            | +    | no   | 60         |
| 43             | 11TRRILUFRWSDSY0 | Driver Thorax Rib 1 Front Displacement (Y)  | 0            | +    | no   | 60         |
| 44             | 11TRRILUFRWSDSZ0 | Driver Thorax Rib 1 Front Displacement (Z)  | 0            | +    | no   | 60         |
| 45             | 11TRRILUFRWSDSLB | Driver Thorax Rib 1 Front Length Change     | 600          | +    | no   | 60         |
| 46             | 11TRRILMREWSDSX0 | Driver Thorax Rib 2 Rear Displacement (X)   | 0            | +    | no   | 60         |
| 47             | 11TRRILMREWSDSY0 | Driver Thorax Rib 2 Rear Displacement (Y)   | 0            | +    | no   | 60         |
| 48             | 11TRRILMREWSDSZ0 | Driver Thorax Rib 2 Rear Displacement (Z)   | 0            | +    | no   | 60         |
| 49             | 11TRRILMREWSDSLB | Driver Thorax Rib 2 Rear Length Change      | 600          | +    | no   | 60         |
| 50             | 11TRRILMMIWSDSX0 | Driver Thorax Rib 2 Middle Displacement (X) | 0            | +    | no   | 60         |
| 51             | 11TRRILMMIWSDSY0 | Driver Thorax Rib 2 Middle Displacement (Y) | 0            | +    | no   | 60         |
| 52             | 11TRRILMMIWSDSZ0 | Driver Thorax Rib 2 Middle Displacement (Z) | 0            | +    | no   | 60         |
| 53             | 11TRRILMMIWSDSLB | Driver Thorax Rib 2 Middle Length Change    | 600          | +    | no   | 60         |
| 54             | 11TRRILMFRWSDSX0 | Driver Thorax Rib 2 Front Displacement (X)  | 0            | +    | no   | 60         |
| 55             | 11TRRILMFRWSDSY0 | Driver Thorax Rib 2 Front Displacement (Y)  | 0            | +    | no   | 60         |
| 56             | 11TRRILMFRWSDSZ0 | Driver Thorax Rib 2 Front Displacement (Z)  | 0            | +    | no   | 60         |
| 57             | 11TRRILMFRWSDSLB | Driver Thorax Rib 2 Front Length Change     | 600          | +    | no   | 60         |

| Channel Number | ISO mnemonic     | Channel Title                                | Filter Class | Flip | Zero | Full Scale |
|----------------|------------------|----------------------------------------------|--------------|------|------|------------|
| 58             | 11TRRILLREWSDSX0 | Driver Thorax Rib 3 Rear Displacement (X)    | 0            | +    | no   | 60         |
| 59             | 11TRRILLREWSDSY0 | Driver Thorax Rib 3 Rear Displacement (Y)    | 0            | +    | no   | 60         |
| 60             | 11TRRILLREWSDSZ0 | Driver Thorax Rib 3 Rear Displacement (Z)    | 0            | +    | no   | 60         |
| 61             | 11TRRILLREWSDSLB | Driver Thorax Rib 3 Rear Length Change       | 600          | +    | no   | 60         |
| 62             | 11TRRILLMIWSDSX0 | Driver Thorax Rib 3 Middle Displacement (X)  | 0            | +    | no   | 60         |
| 63             | 11TRRILLMIWSDSY0 | Driver Thorax Rib 3 Middle Displacement (Y)  | 0            | +    | no   | 60         |
| 64             | 11TRRILLMIWSDSZ0 | Driver Thorax Rib 3 Middle Displacement (Z)  | 0            | +    | no   | 60         |
| 65             | 11TRRILLMIWSDSLB | Driver Thorax Rib 3 Middle Length Change     | 600          | +    | no   | 60         |
| 66             | 11TRRILLFRWSDSX0 | Driver Thorax Rib 3 Front Displacement (X)   | 0            | +    | no   | 60         |
| 67             | 11TRRILLFRWSDSY0 | Driver Thorax Rib 3 Front Displacement (Y)   | 0            | +    | no   | 60         |
| 68             | 11TRRILLFRWSDSZ0 | Driver Thorax Rib 3 Front Displacement (Z)   | 0            | +    | no   | 60         |
| 69             | 11TRRILLFRWSDSLB | Driver Thorax Rib 3 Front Length Change      | 600          | +    | no   | 60         |
| 70             | 11ABRILUREWSDSX0 | Driver Abdomen Rib 1 Rear Displacement (X)   | 0            | +    | no   | 60         |
| 71             | 11ABRILUREWSDSY0 | Driver Abdomen Rib 1 Rear Displacement (Y)   | 0            | +    | no   | 60         |
| 72             | 11ABRILUREWSDSZ0 | Driver Abdomen Rib 1 Rear Displacement (Z)   | 0            | +    | no   | 60         |
| 73             | 11ABRILUREWSDSLB | Driver Abdomen Rib 1 Rear Length Change      | 600          | +    | no   | 60         |
| 74             | 11ABRILUMIWSDSX0 | Driver Abdomen Rib 1 Middle Displacement (X) | 0            | +    | no   | 60         |
| 75             | 11ABRILUMIWSDSY0 | Driver Abdomen Rib 1 Middle Displacement (Y) | 0            | +    | no   | 60         |
| 76             | 11ABRILUMIWSDSZ0 | Driver Abdomen Rib 1 Middle Displacement (Z) | 0            | +    | no   | 60         |
| 77             | 11ABRILUMIWSDSLB | Driver Abdomen Rib 1 Middle Length Change    | 600          | +    | no   | 60         |
| 78             | 11ABRILUFRWSDSX0 | Driver Abdomen Rib 1 Front Displacement (X)  | 0            | +    | no   | 60         |
| 79             | 11ABRILUFRWSDSY0 | Driver Abdomen Rib 1 Front Displacement (Y)  | 0            | +    | no   | 60         |
| 80             | 11ABRILUFRWSDSZ0 | Driver Abdomen Rib 1 Front Displacement (Z)  | 0            | +    | no   | 60         |
| 81             | 11ABRILUFRWSDSLB | Driver Abdomen Rib 1 Front Length Change     | 600          | +    | no   | 60         |



| Channel Number | ISO mnemonic     | Channel Title                                | Filter Class | Flip | Zero | Full Scale |
|----------------|------------------|----------------------------------------------|--------------|------|------|------------|
| 82             | 11ABRILLREWSDSX0 | Driver Abdomen Rib 2 Rear Displacement (X)   | 0            | +    | no   | 60         |
| 83             | 11ABRILLREWSDSY0 | Driver Abdomen Rib 2 Rear Displacement (Y)   | 0            | +    | no   | 60         |
| 84             | 11ABRILLREWSDSZ0 | Driver Abdomen Rib 2 Rear Displacement (Z)   | 0            | +    | no   | 60         |
| 85             | 11ABRILLREWSDSLB | Driver Abdomen Rib 2 Rear Length Change      | 600          | +    | no   | 60         |
| 86             | 11ABRILLMIWSDSX0 | Driver Abdomen Rib 2 Middle Displacement (X) | 0            | +    | no   | 60         |
| 87             | 11ABRILLMIWSDSY0 | Driver Abdomen Rib 2 Middle Displacement (Y) | 0            | +    | no   | 60         |
| 88             | 11ABRILLMIWSDSZ0 | Driver Abdomen Rib 2 Middle Displacement (Z) | 0            | +    | no   | 60         |
| 89             | 11ABRILLMIWSDSLB | Driver Abdomen Rib 2 Middle Length Change    | 600          | +    | no   | 60         |
| 90             | 11ABRILLFRWSDSX0 | Driver Abdomen Rib 2 Front Displacement (X)  | 0            | +    | no   | 60         |
| 91             | 11ABRILLFRWSDSY0 | Driver Abdomen Rib 2 Front Displacement (Y)  | 0            | +    | no   | 60         |
| 92             | 11ABRILLFRWSDSZ0 | Driver Abdomen Rib 2 Front Displacement (Z)  | 0            | +    | no   | 60         |
| 93             | 11ABRILLFRWSDSLB | Driver Abdomen Rib 2 Front Length Change     | 600          | +    | no   | 60         |
| 94             | 11THSP0100WSACXP | Driver Spine T1 Acceleration (X)             | 180          | +    | yes  | 2000       |
| 95             | 11THSP0100WSACYP | Driver Spine T1 Acceleration (Y)             | 180          | +    | yes  | 2000       |
| 96             | 11THSP0100WSACZP | Driver Spine T1 Acceleration (Z)             | 180          | +    | yes  | 2000       |
| 96A            | 11THSP0100WSACRP | Driver Spine T1 Acceleration Resultant       | 180          |      |      |            |
| 97             | 11THSP0400WSACXP | Driver Spine T4 Acceleration (X)             | 180          | +    | yes  | 2000       |
| 98             | 11THSP0400WSACYP | Driver Spine T4 Acceleration (Y)             | 180          | +    | yes  | 2000       |
| 99             | 11THSP0400WSACZP | Driver Spine T4 Acceleration (Z)             | 180          | +    | yes  | 2000       |
| 99A            | 11THSP0400WSACRP | Driver Spine T4 Acceleration Resultant       | 180          |      |      |            |
| 100            | 11THSP1200WSACXP | Driver Spine T12 Acceleration (X)            | 180          | +    | yes  | 2000       |
| 101            | 11THSP1200WSACYP | Driver Spine T12 Acceleration (Y)            | 180          | +    | yes  | 2000       |
| 102            | 11THSP1200WSACZP | Driver Spine T12 Acceleration (Z)            | 180          | +    | yes  | 2000       |
| 102A           | 11THSP1200WSACRP | Driver Spine T12 Acceleration Resultant      | 180          |      |      |            |
| 103            | 11PUBC0000WSFOYP | Driver Pubic Symphysis Force (Y)             | 600          | +    | yes  | 12000      |
| 104            | 11SACRLE00WSFOXP | Driver Sacro-iliac Left Force (X)            | 600          | +    | yes  | 6000       |
| 105            | 11SACRLE00WSFOYP | Driver Sacro-iliac Left Force (Y)            | 600          | +    | yes  | 12000      |
| 106            | 11SACRLE00WSFOZP | Driver Sacro-iliac Left Force (Z)            | 600          | +    | yes  | 6000       |
| 107            | 11SACRLE00WSMOXP | Driver Sacro-iliac Left Moment (X)           | 600          | +    | yes  | 800        |
| 108            | 11SACRLE00WSMOYP | Driver Sacro-iliac Left Moment (Y)           | 600          | +    | yes  | 400        |
| 109            | 11SACRLE00WSMOZP | Driver Sacro-iliac Left Moment (Z)           | 600          | +    | yes  | 400        |

| Channel Number | ISO mnemonic     | Channel Title                                    | Filter Class | Flip | Zero | Full Scale |
|----------------|------------------|--------------------------------------------------|--------------|------|------|------------|
| 110            | 11SACRRI00WSFOXP | Driver Sacro-iliac Right Force (X)               | 600          | +    | yes  | 6000       |
| 111            | 11SACRRI00WSFOYP | Driver Sacro-iliac Right Force (Y)               | 600          | +    | yes  | 12000      |
| 112            | 11SACRRI00WSFOZP | Driver Sacro-iliac Right Force (Z)               | 600          | +    | yes  | 6000       |
| 113            | 11SACRRI00WSMOXP | Driver Sacro-iliac Right Moment (X)              | 600          | +    | yes  | 800        |
| 114            | 11SACRRI00WSMOYP | Driver Sacro-iliac Right Moment (Y)              | 600          | +    | yes  | 400        |
| 115            | 11SACRRI00WSMOZP | Driver Sacro-iliac Right Moment (Z)              | 600          | +    | yes  | 400        |
| 116            | 11LUSP0000WSFOXP | Driver Lumbar Force (X)                          | 600          | +    | yes  | 10000      |
| 117            | 11LUSP0000WSFOYP | Driver Lumbar Force (Y)                          | 600          | +    | yes  | 10000      |
| 118            | 11LUSP0000WSFOZP | Driver Lumbar Force (Z)                          | 600          | +    | yes  | 12000      |
| 119            | 11LUSP0000WSMOXP | Driver Lumbar Moment (X)                         | 600          | +    | yes  | 300        |
| 120            | 11LUSP0000WSMOYP | Driver Lumbar Moment (Y)                         | 600          | +    | yes  | 300        |
| 121            | 11LUSP0000WSMOZP | Driver Lumbar Moment (Z)                         | 600          | +    | yes  | 200        |
| 122            | 11PELV0000WSACXP | Driver Pelvic Acceleration (X)                   | 1000         | +    | yes  | 2000       |
| 123            | 11PELV0000WSACYP | Driver Pelvic Acceleration (Y)                   | 1000         | +    | yes  | 2000       |
| 124            | 11PELV0000WSACZP | Driver Pelvic Acceleration (Z)                   | 1000         | +    | yes  | 2000       |
| 124A           | 11PELV0000WSACRP | Driver Pelvic Acceleration Resultant             | 1000         |      |      |            |
| 125            | 11FEMRLE00WSFOXP | Driver Left Femur Force (X)                      | 600          | +    | yes  | 15000      |
| 126            | 11FEMRLE00WSFOYP | Driver Left Femur Force (Y)                      | 600          | +    | yes  | 15000      |
| 127            | 11FEMRLE00WSFOZP | Driver Left Femur Force (Z)                      | 600          | +    | yes  | 15000      |
| 128            | 11FEMRLE00WSMOXP | Driver Left Femur Moment (X)                     | 600          | +    | yes  | 350        |
| 129            | 11FEMRLE00WSMOYP | Driver Left Femur Moment (Y)                     | 600          | +    | yes  | 200        |
| 130            | 11FEMRLE00WSMOZP | Driver Left Femur Moment (Z)                     | 600          | +    | yes  | 350        |
| 131            | 11FEACLE00WSFOXP | Driver Femoral Neck Force (X)                    | 600          | +    | yes  | 10000      |
| 132            | 11FEACLE00WSFOYP | Driver Femoral Neck Force (Y)                    | 600          | +    | yes  | 25000      |
| 133            | 11FEACLE00WSFOZP | Driver Femoral Neck Force (Z)                    | 600          | +    | yes  | 10000      |
| 134            | 11KNEELE0UWSFOYP | Driver Left Outer Knee Force (Y)                 | 600          | +    | yes  | 20000      |
| 135            | 11KNEELEINWSFOYP | Driver Left Inner Knee Force (Y)                 | 600          | +    | yes  | 20000      |
| 136            | 11VEHCCG0000ACXA | Vehicle Center of Gravity Acceleration (X)       | 60           | +    | yes  | 2000       |
| 137            | 11VEHCCG0000ACYA | Vehicle Center of Gravity Acceleration (Y)       | 60           | +    | yes  | 2000       |
| 138            | 11VEHCCG0000ACZA | Vehicle Center of Gravity Acceleration (Z)       | 60           | +    | yes  | 2000       |
| 138A           | 11VEHCCG0000ACRA | Vehicle Center of Gravity Acceleration Resultant | 60           |      |      |            |
| 139            | 11VEHCCG0000AVXA | Vehicle Center of Gravity Angular Rate (X)       | 60           | +    | yes  | 8000       |
| 140            | 11VEHCCG0000AVYA | Vehicle Center of Gravity Angular Rate (Y)       | 60           | +    | yes  | 1500       |
| 141            | 11VEHCCG0000AVZA | Vehicle Center of Gravity Angular Rate (Z)       | 60           | +    | yes  | 8000       |
| 142            | 11VEHC00LO00ACYA | Left Floor Sill Acceleration (Y)                 | 60           | +    | yes  | 2000       |
| 143            | 11APIL000000ACYA | Left A-Pillar Sill Acceleration (Y)              | 60           | +    | yes  | 2000       |
| 144            | 11APILLO0000ACYA | Left Lower A-Pillar Acceleration (Y)             | 60           | +    | yes  | 2000       |
| 145            | 11APILMI0000ACYA | Left Mid A-Pillar Acceleration (Y)               | 60           | +    | yes  | 2000       |

| Channel Number | ISO mnemonic      | Channel Title                                                       | Filter Class | Flip | Zero | Full Scale |
|----------------|-------------------|---------------------------------------------------------------------|--------------|------|------|------------|
| 146            | 11BPIL000000ACYA  | Left B-Pillar Sill Acceleration (Y)                                 | 60           | +    | yes  | 2000       |
| 147            | 11BPILLO0000ACYA  | Left Lower B-Pillar Acceleration (Y)                                | 60           | +    | yes  | 2000       |
| 148            | 11BPILMI0000ACYA  | Left Mid B-Pillar Acceleration (Y)                                  | 60           | +    | yes  | 2000       |
| 149            | 11SETR000000ACYA  | Driver Seat Track at Dummy H-Point Acceleration (Y)                 | 60           | +    | yes  | 2000       |
| 150            | 11ENGNTTP0000ACXA | Engine Top Acceleration (X)                                         | 60           | +    | yes  | 2000       |
| 151            | 11ENGNTTP0000ACYA | Engine Top Acceleration (Y)                                         | 60           | +    | yes  | 2000       |
| 152            | 12FIRCX000000ACYA | Firewall Center Acceleration (Y)                                    | 60           | +    | yes  | 2000       |
| 153            | 13ROFR000000ACYA  | Right Roof at Vertical Impact Reference Line Acceleration (Y)       | 60           | +    | yes  | 2000       |
| 154            | 13SILB000000ACXA  | Right Sill at Vertical Impact Reference Line Acceleration (X)       | 60           | +    | yes  | 2000       |
| 155            | 13SILB000000ACYA  | Right Sill at Vertical Impact Reference Line Acceleration (Y)       | 60           | +    | yes  | 2000       |
| 156            | 13SILB000000ACZA  | Right Sill at Vertical Impact Reference Line Acceleration (Z)       | 60           | +    | yes  | 2000       |
| 156A           | 13SILB000000ACRA  | Right Sill at Vertical Impact Reference Line Acceleration Resultant | 60           |      |      |            |
| 157            | 16SILB000000ACXA  | Right Sill at Rear Seat Acceleration (X)                            | 60           | +    | yes  | 2000       |
| 158            | 16SILB000000ACYA  | Right Sill at Rear Seat Acceleration (Y)                            | 60           | +    | yes  | 2000       |
| 159            | 16SILB000000ACZA  | Right Sill at Rear Seat Acceleration (Z)                            | 60           | +    | yes  | 2000       |
| 159A           | 16SILB000000ACRA  | Right Sill at Rear Seat Acceleration Resultant                      | 60           |      |      |            |
| 160            | 11FORA000000ACXA  | Rear Floorpan Behind Rear Axle at Centerline Acceleration (X)       | 60           | +    | yes  | 2000       |
| 161            | 11FORA000000ACYA  | Rear Floorpan Behind Rear Axle at Centerline Acceleration (Y)       | 60           | +    | yes  | 2000       |
| 162            | 11DOORMIMI71ACYA  | Left Front Door Mid Centerline Acceleration (Y)                     | 60           | +    | yes  | 2000       |
| 163            | 11DOORMIRE71ACYA  | Left Front Door Mid Rear Acceleration (Y)                           | 60           | +    | yes  | 2000       |
| 164            | 11DOORMIUP71ACYA  | Left Front Door Upper Centerline Acceleration (Y)                   | 60           | +    | yes  | 2000       |
| 165            | 14DOORMIRE71ACYA  | Left Rear Door Mid Rear Acceleration (Y)                            | 60           | +    | yes  | 2000       |
| 166            | 14DOORMIUP71ACYA  | Left Rear Door Upper Centerline Acceleration (Y)                    | 60           | +    | yes  | 2000       |
| 167            | 10FORARD0000ACXA  | Rear Deck Acceleration (X)                                          | 60           | +    | yes  | 2000       |
| 168            | 10FORARD0000ACYA  | Rear Deck Acceleration (Y)                                          | 60           | +    | yes  | 2000       |
| 169            | 10FORARD0000ACZA  | Rear Deck Acceleration (Z)                                          | 60           | +    | yes  | 2000       |
| 169A           | 10FORARD0000ACRA  | Rear Deck Acceleration Resultant                                    | 60           |      |      |            |
| 170            | 10FORARD0000AVXA  | Rear Deck Angular Rate (X)                                          | 60           | +    | yes  | 8000       |
| 171            | 10FORARD0000AVYA  | Rear Deck Angular Rate (Y)                                          | 60           | +    | yes  | 8000       |
| 172            | 10FORARD0000AVZA  | Rear Deck Angular Rate (Z)                                          | 60           | +    | yes  | 8000       |

| Channel Number | ISO mnemonic     | Channel Title           | Filter Class | Flip | Zero | Full Scale |
|----------------|------------------|-------------------------|--------------|------|------|------------|
| 173            | 11HEADCONT00VO00 | Driver Head Contact     | 0            | +    | no   | 1          |
| 174            | 11SHOUCONT00VO00 | Driver Shoulder Contact | 0            | +    | no   | 1          |
| 175            | 11THORCONT00VO00 | Driver Thorax Contact   | 0            | +    | no   | 1          |
| 176            | 11PELVCONT00VO00 | Driver Pelvis Contact   | 0            | +    | no   | 1          |
| 177            | K0FBAR010000FOXA | POLE LOAD CELL 1        | 60           | +    | yes  | 400000     |
| 178            | K0FBAR020000FOXA | POLE LOAD CELL 2        | 60           | +    | yes  | 400000     |
| 179            | K0FBAR030000FOXA | POLE LOAD CELL 3        | 60           | +    | yes  | 400000     |
| 180            | K0FBAR040000FOXA | POLE LOAD CELL 4        | 60           | +    | yes  | 400000     |
| 181            | K0FBAR050000FOXA | POLE LOAD CELL 5        | 60           | +    | yes  | 400000     |
| 182            | K0FBAR060000FOXA | POLE LOAD CELL 6        | 60           | +    | yes  | 400000     |
| 183            | K0FBAR070000FOXA | POLE LOAD CELL 7        | 60           | +    | yes  | 400000     |
| 184            | K0FBAR080000FOXA | POLE LOAD CELL 8        | 60           | +    | yes  | 400000     |

**APPENDIX E**  
**SEATING PROCEDURE WORKSHEETS AND PLOTS**

## Driver WSID 50th Seating Worksheet

|                |                   |                   |                |
|----------------|-------------------|-------------------|----------------|
| <b>Vehicle</b> | 2020 Nissan Rouge | <b>Technician</b> | Ramadan/Postle |
| <b>VIN #</b>   | 5N1AT2MT0LC798364 | <b>Position</b>   | Driver         |
| <b>ATD</b>     | WorldSID 50th     | <b>Date</b>       | 10/22/2020     |
| <b>Test #</b>  | 201022            |                   |                |

### SCRL Angle

|            |       |
|------------|-------|
| Max        | 16.1  |
| Min -      | 13.2  |
| Difference | 2.9   |
| /2         | 1.45  |
| Min +      | 1.45  |
| Mid Angle  | 14.65 |

### WSID 50th Tilt Sensors

|        |      | X    | Y    |
|--------|------|------|------|
| Head   | 0°±2 | -0.4 | -1.5 |
| T6     | 0°±2 | 0.4  | 0.1  |
| Pelvis | 0°±2 | -0.5 | -2.1 |

### Seat Back Angle

|           |      |
|-----------|------|
| W/Level ° | 19.7 |
|-----------|------|

### Seat Pan Angle

|           |      |
|-----------|------|
| W/Level ° | 10.8 |
|-----------|------|

### HEAD REST POST

|       |     |
|-------|-----|
| ANGLE | 2.9 |
|-------|-----|

### FINAL HEAD REST

|            |     |
|------------|-----|
| POST ANGLE | 2.9 |
|------------|-----|

### Pelvis Angle

WSID 50th 0° +/-2.5°

Manual  
Inclinometer

43.0

Tilt Sensor

-0.5

| Collected Points                                |          |          |          |
|-------------------------------------------------|----------|----------|----------|
| Name                                            | Meas X   | Meas Y   | Meas Z   |
| SBU -                                           | -34.2738 | -1.98192 | -13.828  |
| SBL -                                           | -32.0811 | -0.99741 | 13.14524 |
| STRIKER -                                       | 0        | 0        | 0        |
| FOSB -                                          | 442.3634 | 217.5179 | 371.7125 |
| FISB -                                          | 443.1004 | 627.0622 | 369.814  |
| ROSB -                                          | 48.332   | 216.917  | 394.548  |
| RISB -                                          | 49.501   | 628.419  | 395.568  |
| PCP - (Pedal Center Point)                      | 1068.425 | 619.347  | 281.951  |
| RHP - (Right Heel Point)                        | 934.774  | 590.115  | 430.449  |
| LHP - (Left Heel Point)                         | 923.110  | 170.869  | 440.956  |
| S0 -                                            | 559.527  | 425.234  | -242.081 |
| TS -                                            | 664.126  | 404.083  | -403.861 |
| BS -                                            | 504.781  | 443.029  | -84.007  |
| SC1 -                                           | 747.819  | 329.197  | -103.270 |
| OSCAR H-POINT -                                 | 265.087  | 231.824  | 92.406   |
| DR PROJECTED WSID H-POINT AT MID-POSITION -     | 285.000  |          | 72.000   |
| DRIVER STP 15.27 MID-POSITION -                 | 318.718  | 172.835  | 175.410  |
| DRIVER STP STEP 18.6 TRIAL 1 -                  | 298.385  | 175.770  | 174.944  |
| DR PROJECTED WSID H-POINT STEP 18.6.2 TRIAL 1 - | 273.359  | 212.902  | 82.210   |
| DRIVER STP STEP 18.6 TRIAL 2 -                  | 307.837  | 177.301  | 178.152  |
| DR PROJECTED WSID H-POINT STEP 18.6.2 TRIAL 2 - | 283.714  | 211.592  | 83.225   |
| DRIVER STP STEP 18.6 TRIAL 3 -                  |          |          |          |
| DR PROJECTED WSID H-POINT STEP 18.6.2 TRIAL 3 - |          |          |          |
| RHDCG -                                         | 95.003   | 492.613  | -588.672 |
| 3DLHCG -                                        | 120.726  | 338.112  | -584.237 |
| LHDCG -                                         | 98.719   | 334.245  | -585.619 |
| BON -                                           | 190.937  | 419.133  | -591.566 |
| TN -                                            | 187.966  | 419.005  | -532.541 |
| TC -                                            | 176.305  | 418.696  | -464.849 |
| SHLD R1 -                                       | 147.489  | 419.023  | -361.645 |
| THX R1 -                                        | 186.634  | 423.374  | -283.913 |
| THX R2 -                                        | 222.119  | 426.433  | -219.944 |
| THX R3 -                                        | 240.215  | 428.816  | -174.286 |
| ABD R1 -                                        | 261.678  | 434.423  | -119.328 |
| ABD R2 -                                        | 280.925  | 437.788  | -70.419  |
| TPS -                                           | 312.944  | 432.775  | -48.965  |
| C1 -                                            | 161.564  | 418.393  | -339.429 |
| C2 -                                            | 204.821  | 424.942  | -248.043 |
| C3 -                                            | 266.672  | 429.602  | -110.861 |
| SHT -                                           | 87.480   | 198.615  | -317.953 |
| E1 -                                            | 286.706  | 187.224  | -183.982 |
| P1 -                                            | 230.464  | 208.715  | 35.181   |
| H-POINT -                                       | 282.949  | 210.366  | 84.419   |
| H-POINT 2 -                                     | 282.949  | 220.366  | 84.419   |

|              |          |         |          |
|--------------|----------|---------|----------|
| OK -         | 671.502  | 195.361 | -17.214  |
| IK -         | 677.972  | 635.652 | -26.214  |
| OA -         | 914.968  | 243.670 | 317.295  |
| IA -         | 921.425  | 542.218 | 305.316  |
| OH -         | 936.124  | 249.392 | 437.785  |
| IH -         | 930.681  | 587.398 | 431.238  |
| OP -         | -127.021 | 338.501 | -412.430 |
| R -          | 188.759  | 414.858 | -795.453 |
| H -          | 549.704  | 415.319 | -719.210 |
| W1 -         | 932.638  | 415.672 | -531.969 |
| W1 - Outside | 947.314  | 415.550 | -532.192 |
| W2 - Outside | 1225.758 | 415.486 | -373.011 |
| D1 -         | 781.370  | 425.224 | -384.450 |
| D2 -         | 770.917  | 195.611 | -55.655  |
| D3 -         | 737.262  | 635.689 | -63.337  |
| HRP -        | 190.325  | 235.634 | -705.341 |
| HSP -        | 98.845   | 89.120  | -588.020 |
| ADP -        | 285.848  | 71.055  | -182.192 |
| HDP -        | 285.445  | 101.775 | 84.244   |

| Calculated Measurements |       |       |       |                 |      |
|-------------------------|-------|-------|-------|-----------------|------|
| Name                    | Cal X | Cal Y | Cal Z | Cal 3D Distance | Deg  |
| HZ -                    |       |       | 204   |                 |      |
| HH -                    |       |       |       | 381             |      |
| HW -                    | 742   |       |       |                 |      |
| NR -                    |       |       |       | 493             |      |
| CD -                    |       |       |       | 621             |      |
| CS -                    | 355   |       |       |                 |      |
| CBS -                   | 238   |       |       |                 |      |
| IKD -                   |       |       |       | 70              |      |
| OKD -                   |       |       |       | 107             |      |
| HR -                    |       |       |       | 216             |      |
| HS -                    |       | 330   |       |                 |      |
| AD -                    |       | 116   |       |                 |      |
| HD -                    |       | 109   |       |                 |      |
| HLHL -                  |       |       |       | 338             |      |
| KK -                    |       |       |       | 440             |      |
| SH -                    |       |       |       | 363             |      |
| HRA -                   |       |       |       |                 | 2.9  |
| H-POINT TOOL ANGLE -    |       |       |       |                 | 43.2 |
| TORSO ANGLE -           |       |       |       |                 | 15.4 |
| WINDSHIELD ANGLE -      |       |       |       |                 | 60.2 |