

**Final Report Number: NCAP-TRC-22-003**

**New Car Assessment Program (NCAP)  
Frontal Barrier Impact Test**

**FCA US LLC  
2022 Jeep Grand Cherokee L  
NHTSA Number: M20220303**

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



**Report Date: July 26, 2023**

**FINAL REPORT**

**Prepared For:  
U. S. DEPARTMENT OF TRANSPORTATION  
National Highway Traffic Safety Administration  
Office of Crashworthiness Standards  
1200 New Jersey Ave, SE  
Washington, DC 20590**

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Prepared By: ILO Project Operations Group

Approved By: John Shultz

Approval Date: July 26, 2023

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date \_\_\_\_\_

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

Date \_\_\_\_\_

| 1. Report No.<br>NCAP-TRC-22-003                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2. Government Accession No.                          | 3. Recipient's Catalog No. |                            |                                                                                                                                                                                                                         |           |         |  |            |  |  |               |  |  |                         |       |           |        |       |           |        |                                           |    |     |     |    |     |     |                           |    |    |       |    |    |       |                |    |    |      |    |    |      |     |    |   |      |    |   |      |              |         |      |       |         |      |       |                  |         |      |        |         |      |        |                  |         |       |         |         |      |         |                   |         |       |         |         |      |         |
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| 4. Title and Subtitle<br>Final Report of NEW CAR ASSESSMENT PROGRAM<br>Frontal Impact Testing of a 2022 Jeep Grand Cherokee L<br>NHTSA No. M20220303                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                      |                            |                            | 5. Report Date<br>July 26, 2023                                                                                                                                                                                         |           |         |  |            |  |  |               |  |  |                         |       |           |        |       |           |        |                                           |    |     |     |    |     |     |                           |    |    |       |    |    |       |                |    |    |      |    |    |      |     |    |   |      |    |   |      |              |         |      |       |         |      |       |                  |         |      |        |         |      |        |                  |         |       |         |         |      |         |                   |         |       |         |         |      |         |
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| 7. Author(s)<br>John Shultz, Project Manager                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                      |                            |                            | 8. Performing Organization Report No.<br>220818                                                                                                                                                                         |           |         |  |            |  |  |               |  |  |                         |       |           |        |       |           |        |                                           |    |     |     |    |     |     |                           |    |    |       |    |    |       |                |    |    |      |    |    |      |     |    |   |      |    |   |      |              |         |      |       |         |      |       |                  |         |      |        |         |      |        |                  |         |       |         |         |      |         |                   |         |       |         |         |      |         |
| 9. Performing Organization Name and Address<br>Transportation Research Center Inc.<br>10820 State Route 347<br>East Liberty, OH 43319-0367                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                      |                            |                            | 10. Work Unit No. (TRAIS)                                                                                                                                                                                               |           |         |  |            |  |  |               |  |  |                         |       |           |        |       |           |        |                                           |    |     |     |    |     |     |                           |    |    |       |    |    |       |                |    |    |      |    |    |      |     |    |   |      |    |   |      |              |         |      |       |         |      |       |                  |         |      |        |         |      |        |                  |         |       |         |         |      |         |                   |         |       |         |         |      |         |
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| 12. Sponsoring Agency Name and Address<br>U. S. Department of Transportation<br>National Highway Traffic Safety Administration<br>Office of Crashworthiness Standards<br>1200 New Jersey Ave SE<br>Washington, DC 20590                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                      |                            |                            | 13. Type of Report and Period Covered<br>Final Report<br>August 18, 2022 –<br>July 26, 2023                                                                                                                             |           |         |  |            |  |  |               |  |  |                         |       |           |        |       |           |        |                                           |    |     |     |    |     |     |                           |    |    |       |    |    |       |                |    |    |      |    |    |      |     |    |   |      |    |   |      |              |         |      |       |         |      |       |                  |         |      |        |         |      |        |                  |         |       |         |         |      |         |                   |         |       |         |         |      |         |
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| 15. Supplemental Notes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                      |                            |                            |                                                                                                                                                                                                                         |           |         |  |            |  |  |               |  |  |                         |       |           |        |       |           |        |                                           |    |     |     |    |     |     |                           |    |    |       |    |    |       |                |    |    |      |    |    |      |     |    |   |      |    |   |      |              |         |      |       |         |      |       |                  |         |      |        |         |      |        |                  |         |       |         |         |      |         |                   |         |       |         |         |      |         |
| 16. Abstract<br><br>A 56.0 km/h NCAP Frontal Impact Test was conducted on a 2022 Jeep Grand Cherokee L, in accordance with the specifications of the Office of Crashworthiness Standards Laboratory Procedure for NCAP Full Frontal Rigid Barrier Impact Testing. The test was conducted at the Transportation Research Center Inc. in East Liberty, Ohio on August 18, 2022.<br>The impact velocity was 56.44 km/h, and the ambient temperature at the barrier face at the time of impact was 22.8° C. The target vehicle post-test maximum crush was 533 millimeters at crush zone 6 at right side. The test vehicle's performance is as follows: <table border="1" data-bbox="230 1062 1411 1516"> <thead> <tr> <th></th> <th colspan="3">Driver ATD</th> <th colspan="3">Passenger ATD</th> </tr> <tr> <th>Measurement Description</th> <th>Units</th> <th>Threshold</th> <th>Result</th> <th>Units</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC<sub>15</sub>)</td> <td>NA</td> <td>700</td> <td>129</td> <td>NA</td> <td>700</td> <td>137</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>-21.2</td> <td>mm</td> <td>52</td> <td>-14.9</td> </tr> <tr> <td>3ms Chest Clip</td> <td>Gs</td> <td>60</td> <td>31.7</td> <td>Gs</td> <td>60</td> <td>29.7</td> </tr> <tr> <td>Nij</td> <td>NA</td> <td>1</td> <td>0.21</td> <td>NA</td> <td>1</td> <td>0.28</td> </tr> <tr> <td>Neck Tension</td> <td>Newtons</td> <td>4170</td> <td>674.1</td> <td>Newtons</td> <td>2620</td> <td>556.0</td> </tr> <tr> <td>Neck Compression</td> <td>Newtons</td> <td>4000</td> <td>-372.6</td> <td>Newtons</td> <td>2520</td> <td>-183.0</td> </tr> <tr> <td>Left Femur Force</td> <td>Newtons</td> <td>10000</td> <td>-2142.5</td> <td>Newtons</td> <td>6800</td> <td>-1778.6</td> </tr> <tr> <td>Right Femur Force</td> <td>Newtons</td> <td>10000</td> <td>-1152.0</td> <td>Newtons</td> <td>6800</td> <td>-1542.9</td> </tr> </tbody> </table> |                                                      |                            |                            |                                                                                                                                                                                                                         |           |         |  | Driver ATD |  |  | Passenger ATD |  |  | Measurement Description | Units | Threshold | Result | Units | Threshold | Result | Head Injury Criteria (HIC <sub>15</sub> ) | NA | 700 | 129 | NA | 700 | 137 | Maximum Chest Compression | mm | 63 | -21.2 | mm | 52 | -14.9 | 3ms Chest Clip | Gs | 60 | 31.7 | Gs | 60 | 29.7 | Nij | NA | 1 | 0.21 | NA | 1 | 0.28 | Neck Tension | Newtons | 4170 | 674.1 | Newtons | 2620 | 556.0 | Neck Compression | Newtons | 4000 | -372.6 | Newtons | 2520 | -183.0 | Left Femur Force | Newtons | 10000 | -2142.5 | Newtons | 6800 | -1778.6 | Right Femur Force | Newtons | 10000 | -1152.0 | Newtons | 6800 | -1542.9 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Driver ATD                                           |                            |                            | Passenger ATD                                                                                                                                                                                                           |           |         |  |            |  |  |               |  |  |                         |       |           |        |       |           |        |                                           |    |     |     |    |     |     |                           |    |    |       |    |    |       |                |    |    |      |    |    |      |     |    |   |      |    |   |      |              |         |      |       |         |      |       |                  |         |      |        |         |      |        |                  |         |       |         |         |      |         |                   |         |       |         |         |      |         |
| Measurement Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Units                                                | Threshold                  | Result                     | Units                                                                                                                                                                                                                   | Threshold | Result  |  |            |  |  |               |  |  |                         |       |           |        |       |           |        |                                           |    |     |     |    |     |     |                           |    |    |       |    |    |       |                |    |    |      |    |    |      |     |    |   |      |    |   |      |              |         |      |       |         |      |       |                  |         |      |        |         |      |        |                  |         |       |         |         |      |         |                   |         |       |         |         |      |         |
| Head Injury Criteria (HIC <sub>15</sub> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | NA                                                   | 700                        | 129                        | NA                                                                                                                                                                                                                      | 700       | 137     |  |            |  |  |               |  |  |                         |       |           |        |       |           |        |                                           |    |     |     |    |     |     |                           |    |    |       |    |    |       |                |    |    |      |    |    |      |     |    |   |      |    |   |      |              |         |      |       |         |      |       |                  |         |      |        |         |      |        |                  |         |       |         |         |      |         |                   |         |       |         |         |      |         |
| Maximum Chest Compression                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | mm                                                   | 63                         | -21.2                      | mm                                                                                                                                                                                                                      | 52        | -14.9   |  |            |  |  |               |  |  |                         |       |           |        |       |           |        |                                           |    |     |     |    |     |     |                           |    |    |       |    |    |       |                |    |    |      |    |    |      |     |    |   |      |    |   |      |              |         |      |       |         |      |       |                  |         |      |        |         |      |        |                  |         |       |         |         |      |         |                   |         |       |         |         |      |         |
| 3ms Chest Clip                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Gs                                                   | 60                         | 31.7                       | Gs                                                                                                                                                                                                                      | 60        | 29.7    |  |            |  |  |               |  |  |                         |       |           |        |       |           |        |                                           |    |     |     |    |     |     |                           |    |    |       |    |    |       |                |    |    |      |    |    |      |     |    |   |      |    |   |      |              |         |      |       |         |      |       |                  |         |      |        |         |      |        |                  |         |       |         |         |      |         |                   |         |       |         |         |      |         |
| Nij                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | NA                                                   | 1                          | 0.21                       | NA                                                                                                                                                                                                                      | 1         | 0.28    |  |            |  |  |               |  |  |                         |       |           |        |       |           |        |                                           |    |     |     |    |     |     |                           |    |    |       |    |    |       |                |    |    |      |    |    |      |     |    |   |      |    |   |      |              |         |      |       |         |      |       |                  |         |      |        |         |      |        |                  |         |       |         |         |      |         |                   |         |       |         |         |      |         |
| Neck Tension                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Newtons                                              | 4170                       | 674.1                      | Newtons                                                                                                                                                                                                                 | 2620      | 556.0   |  |            |  |  |               |  |  |                         |       |           |        |       |           |        |                                           |    |     |     |    |     |     |                           |    |    |       |    |    |       |                |    |    |      |    |    |      |     |    |   |      |    |   |      |              |         |      |       |         |      |       |                  |         |      |        |         |      |        |                  |         |       |         |         |      |         |                   |         |       |         |         |      |         |
| Neck Compression                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Newtons                                              | 4000                       | -372.6                     | Newtons                                                                                                                                                                                                                 | 2520      | -183.0  |  |            |  |  |               |  |  |                         |       |           |        |       |           |        |                                           |    |     |     |    |     |     |                           |    |    |       |    |    |       |                |    |    |      |    |    |      |     |    |   |      |    |   |      |              |         |      |       |         |      |       |                  |         |      |        |         |      |        |                  |         |       |         |         |      |         |                   |         |       |         |         |      |         |
| Left Femur Force                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Newtons                                              | 10000                      | -2142.5                    | Newtons                                                                                                                                                                                                                 | 6800      | -1778.6 |  |            |  |  |               |  |  |                         |       |           |        |       |           |        |                                           |    |     |     |    |     |     |                           |    |    |       |    |    |       |                |    |    |      |    |    |      |     |    |   |      |    |   |      |              |         |      |       |         |      |       |                  |         |      |        |         |      |        |                  |         |       |         |         |      |         |                   |         |       |         |         |      |         |
| Right Femur Force                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Newtons                                              | 10000                      | -1152.0                    | Newtons                                                                                                                                                                                                                 | 6800      | -1542.9 |  |            |  |  |               |  |  |                         |       |           |        |       |           |        |                                           |    |     |     |    |     |     |                           |    |    |       |    |    |       |                |    |    |      |    |    |      |     |    |   |      |    |   |      |              |         |      |       |         |      |       |                  |         |      |        |         |      |        |                  |         |       |         |         |      |         |                   |         |       |         |         |      |         |
| 17. Key Words<br>56.3 km/h (35 mph) Full Frontal Rigid Barrier Impact Test<br>New Car Assessment Program (NCAP)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                      |                            |                            | 18. Distribution Statement<br>Copies of this report are available from:<br>National Highway Traffic Safety Administration<br>Technical Information Services Division<br>1200 New Jersey Ave, SE<br>Washington, DC 20590 |           |         |  |            |  |  |               |  |  |                         |       |           |        |       |           |        |                                           |    |     |     |    |     |     |                           |    |    |       |    |    |       |                |    |    |      |    |    |      |     |    |   |      |    |   |      |              |         |      |       |         |      |       |                  |         |      |        |         |      |        |                  |         |       |         |         |      |         |                   |         |       |         |         |      |         |
| 19. Security Classif. (of this report)<br>Unclassified                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 20. Security Classif. (of this page)<br>Unclassified |                            | 21. Number of Pages<br>178 |                                                                                                                                                                                                                         | 22. Price |         |  |            |  |  |               |  |  |                         |       |           |        |       |           |        |                                           |    |     |     |    |     |     |                           |    |    |       |    |    |       |                |    |    |      |    |    |      |     |    |   |      |    |   |      |              |         |      |       |         |      |       |                  |         |      |        |         |      |        |                  |         |       |         |         |      |         |                   |         |       |         |         |      |         |

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## **1: PURPOSE AND SUMMARY OF THE TEST**

### **PURPOSE**

This 56 km/h frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. 693JJ919D000007. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for consumer information purposes.

This 56 km/h frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Test Procedure or NCAP Full Frontal Rigid Barrier Impact Testing dated May 2018.

### **SUMMARY**

A load cell barrier consisting of 288 load cells was impacted by a 2022 Jeep Grand Cherokee L at a velocity of 56.44 km/h. The test was performed at Transportation Research Center, Inc. on August 18, 2022. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

One real-time camera and 16 high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in this report.

One Part 572E 50th percentile male anthropomorphic test device (ATD) was placed in the driver seating position and one Part 572O 5th percentile female ATD was placed in the right-front passenger position according to dummy placement instructions specified in the Laboratory Procedure for NCAP Full Frontal Rigid Barrier Impact Testing.

Both ATDs were fully instrumented with head, chest and pelvis tri-axial accelerometers, chest displacement potentiometers, upper neck transducers, femur load cells, and lower leg instrumentation.

The driver (position 1) ATD (Serial No. 037), and the right-front passenger (position 2) ATD (Serial No. DH1659) were qualified prior to this test. Certification details, along with instrumentation calibration data, are found in Appendix C of this report.

The 102 channels of data were recorded on an on-board data acquisition system. Appendix B contains the vehicle, load cell barrier and dummy response data traces.

There was 100.0 percent windshield retention and no intrusion into the protected zone of the windshield during the event. There was no Stoddard solvent leakage (or electrolyte spillage) after the event or during any phase of the static rollover.

The maximum static crush of the vehicle was 533 mm and both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

The driver's visible contact points were as follows: front airbag, headrest and knee airbag. The passenger's visible contact points were as follows: front airbag, headrest and knee airbag.

The occupant data is summarized below:

| ATD Position                          | HIC <sub>15</sub> | Nij  | Neck<br>Tension<br>(N) | Neck<br>Compression<br>(N) | 3 ms<br>Chest<br>Clip<br>(Gs) | Chest<br>Disp.<br>(mm) | Left<br>Femur<br>(N) | Right<br>Femur<br>(N) |
|---------------------------------------|-------------------|------|------------------------|----------------------------|-------------------------------|------------------------|----------------------|-----------------------|
| Driver<br>(50 <sup>th</sup> Male)     | 129               | 0.21 | 674.1                  | -372.6                     | 31.7                          | -21.2                  | -2142.5              | -1152.0               |
| Passenger<br>(5 <sup>th</sup> Female) | 137               | 0.28 | 556.0                  | -183.0                     | 29.7                          | -14.9                  | -1778.6              | -1542.9               |

**TEST COMMENTS:**

ENGINE TOP X; Channel Failed at 43.0 ms

## **2.2 REPORT AREA 2: DATA SHEETS**

## DATA SHEET NO. 1 - GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2022 Jeep Grand Cherokee L  
 Test Program: NCAP Frontal Impact

NHTSA No.: M20220303  
 Test Date: 8/18/2022

### TEST VEHICLE INFORMATION

|                             |                      |
|-----------------------------|----------------------|
| NHTSA No.                   | M20220303            |
| Model Year                  | 2022                 |
| Make                        | Jeep                 |
| Model                       | Grand Cherokee       |
| Body Style                  | MPV                  |
| VIN                         | 1C4RJKA9N8526180     |
| Body Color                  | Baltic Gray Metallic |
| Odometer Reading (km/mi)    | 17 MI                |
| Engine Displacement (L)     | 3.6L                 |
| Type/No. Cylinders          | 6                    |
| Engine Placement            | Front/Longitudinal   |
| Transmission Type           | Automatic            |
| Transmission Speeds         | 8                    |
| Overdrive                   | Yes                  |
| Final Drive                 | 4WD                  |
| Roof Rack                   | No                   |
| Sunroof/T-Top               | No                   |
| Running Boards              | No                   |
| Tilt Steering Wheel         | Yes                  |
| Power Seats                 | Yes, Driver Only     |
| Anti-Lock Brakes (ABS)      | Yes                  |
| Automatic Door Locks (ADLs) | Yes                  |

### TEST VEHICLE OPTIONS

|                                 |     |
|---------------------------------|-----|
| Traction Control System (TCS)   | Yes |
| Power Steering                  | Yes |
| Power Window Auto-Reverse       | Yes |
| Driver Frontal Airbag           | Yes |
| Driver Curtain Airbag           | Yes |
| Driver Head/Torso Airbag        | No  |
| Driver Torso Airbag             | No  |
| Driver Torso/Pelvis Airbag      | Yes |
| Driver Pelvis Airbag            | No  |
| Driver Knee Airbag              | Yes |
| Front Pass. Frontal Airbag      | Yes |
| Front Pass. Curtain Airbag      | Yes |
| Front Pass. Head/Torso Airbag   | No  |
| Front Pass. Torso Airbag        | No  |
| Front Pass. Torso/Pelvis Airbag | Yes |
| Front Pass. Pelvis Airbag       | No  |
| Front Pass. Knee Airbag         | Yes |
| Driver Pretensioner             | Yes |
| Driver Load Limiter             | Yes |
| Front Pass. Pretensioner        | Yes |
| Front Pass. Load Limiter        | Yes |
| Other:                          | No  |

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

Yes

### DATA FROM CERTIFICATION LABEL

|                     |            |                 |                    |
|---------------------|------------|-----------------|--------------------|
| Manufactured by     | FCA US LLC | GVWR (kg)       | 2949<br>(6500 lbs) |
| Date of Manufacture | 3-22       | GAWR Front (kg) | 1293<br>(2850 lbs) |
|                     |            | GAWR Rear (kg)  | 1679<br>(3700 lbs) |

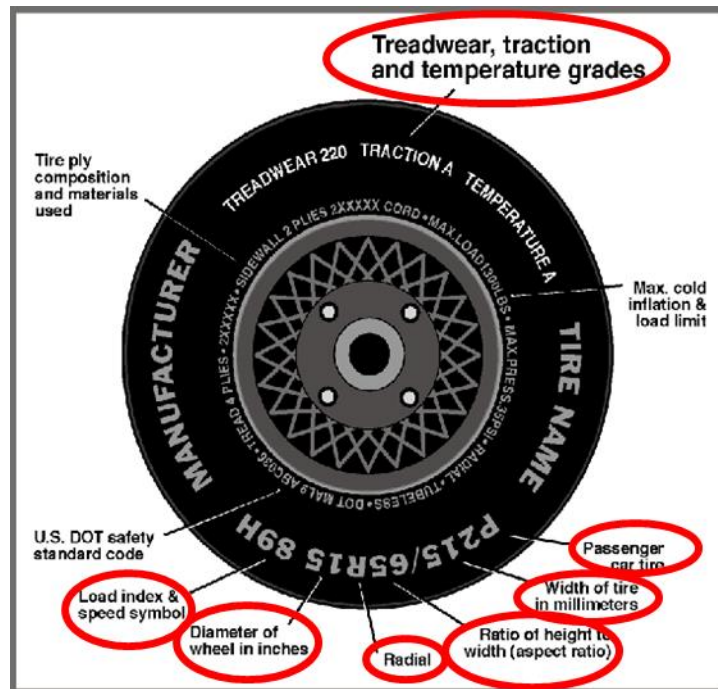
### VEHICLE SEATING AND WEIGHT CAPACITY

| Measured Parameter      | Front  | Rear   | Third       | Total |
|-------------------------|--------|--------|-------------|-------|
| Type of Seats           | Bucket | Bucket | Split Bench |       |
| Number of Occupants     | 2      | 2      | 2           | 6     |
| Capacity Wt. (VCW) (kg) |        |        |             | 544.0 |
| Cargo Wt. (RCLW) (kg)   |        |        |             | 136.0 |

## DATA SHEET NO. 1 - GENERAL TEST AND VEHICLE PARAMETER DATA (CONT'D)

Test Vehicle: 2022 Jeep Grand Cherokee L  
Test Program: NCAP Frontal Impact

NHTSA No.: M20220303  
Test Date: 8/18/2022



### DATA FROM TIRE PLACARD

| Measured Parameter          | Front                   | Rear                    |
|-----------------------------|-------------------------|-------------------------|
| Maximum Tire Pressure (kPa) | 300                     | 300                     |
| Cold / Test Pressure (kPa)  | 250                     | 250                     |
| Recommended Tire Size       | 265/50R20               | 265/50R20               |
| Tire Size on Vehicle        | 265/50R20               | 265/50R20               |
| Tire Manufacturer           | Bridgestone             | Bridgestone             |
| Tire Model                  | Dueler H/L 400          | Dueler H/L 400          |
| Treadwear                   | 600                     | 600                     |
| Traction Grade              | A                       | A                       |
| Temperature Grade           | B                       | B                       |
| Tire Plies Sidewall         | 2                       | 2                       |
| Tire Plies Body             | 5                       | 5                       |
| Load Index/Speed Symbol     | 107T                    | 107T                    |
| Tire Material               | Polyester, Steel, Nylon | Polyester, Steel, Nylon |
| DOT Safety Code Right       | 7XUM 401 3921           | 7XUM 401 3921           |
| DOT Safety Code Left        | 7XUM 401 3921           | 7XUM 401 3921           |

# DATA SHEET NO. 1 - GENERAL TEST AND VEHICLE PARAMETER DATA (CONT'D)

Test Vehicle: 2022 Jeep Grand Cherokee L  
Test Program: NCAP Frontal Impact

NHTSA No.: M20220303  
Test Date: 8/18/2022

## TEST VEHICLE WEIGHTS

|        | Units | As Delivered (UVW) (Axle) |        |        | As Tested (ATW) (Axle) |        |        |
|--------|-------|---------------------------|--------|--------|------------------------|--------|--------|
|        |       | Front                     | Rear   | Total  | Front                  | Rear   | Total  |
| Left   | kg    | 540.2                     | 530.4  |        | 581.8                  | 634.6  |        |
| Right  | kg    | 556.0                     | 510.6  |        | 562.0                  | 625.8  |        |
| Ratio  | %     | 51.3                      | 48.7   |        | 47.6                   | 52.4   |        |
| Totals | kg    | 1096.2                    | 1041.0 | 2137.2 | 1143.8                 | 1260.4 | 2404.2 |

## TARGET TEST WEIGHT CALCULATION

| Measured Parameter                  | Units | Value  |
|-------------------------------------|-------|--------|
| Total Delivered Weight (UVW)        | kg    | 2137.2 |
| Weight of 1 P572E ATD & 1 P572O ATD | kg    | 139.3  |
| Rated Cargo/Luggage Weight (RCLW)   | kg    | 136.0  |
| Vehicle Target Weight (TVTW)        | kg    | 2412.5 |

## TEST VEHICLE ATTITUDES AND CG

|              | Units | LF   | RF   | LR  | RR  | CG (aft of front) |
|--------------|-------|------|------|-----|-----|-------------------|
| As Delivered | mm    | 891  | 890  | 913 | 916 | 1506              |
| As Tested    | mm    | 888  | 890  | 883 | 875 | 1620              |
| Post Test    | mm    | 1030 | 1035 | 915 | 893 |                   |

## GENERAL TEST VEHICLE DATA

| Measurement Description                 | Units  | Value |
|-----------------------------------------|--------|-------|
| Test Vehicle Wheel Base                 | mm     | 3091  |
| Total Vehicle Length at Left Side       | mm     | 5040  |
| Total Vehicle Length at Centerline      | mm     | 5200  |
| Total Vehicle Length at Right Side      | mm     | 5040  |
| Weight of Ballast in Cargo Area         | kg     | 139.0 |
| Weight of Vehicle Components Removed    | kg     | 0.0   |
| Amount of Stoddard Solvent in Fuel Tank | liters | 81.0  |

**LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT:** None

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**DATA SHEET NO. 1 - GENERAL TEST AND VEHICLE PARAMETER DATA  
(CONT'D)**

Test Vehicle: 2022 Jeep Grand Cherokee L  
Test Program: NCAP Frontal Impact

NHTSA No.: M20220303  
Test Date: 8/18/2022

**TARGET VEHICLE STRUCTURAL MEASUREMENT**

|    | <b>Elements</b>                       | <b>Pre-Test<br/>(mm)</b> |
|----|---------------------------------------|--------------------------|
| 1  | Total Length                          | 5200                     |
| 2  | Total Width                           | 1950                     |
| 3  | Bumper Top Height                     | 620                      |
| 4  | Bumper Bottom Height                  | 510                      |
| 5  | Longitudinal Member Top Height        | 647                      |
| 6  | Distance Between Longitudinal Members | 870                      |
| 7  | Longitudinal Member Width             | 70                       |
| 8  | Engine Top Height                     | 1070                     |
| 9  | Engine Bottom Height                  | 270                      |
| 10 | Engine and Gearbox Width              | 500                      |
| 11 | Front Bumper-Engine Distance          | 700                      |
| 12 | Front Shock Absorber Fixing Height    | 1057                     |
| 13 | Bonnet Leading Edge Height            | 1005                     |
| 14 | Front Shock Absorber Fixing Width     | 945                      |
| 15 | Front Bumper – Front Axle Distance    | 900                      |
| 16 | Front Axle – A-Pillar Distance        | 730                      |
| 17 | A-Pillar – B-Pillar Distance          | 1025                     |
| 18 | B-Pillar – Rear Axle Distance         | 1340                     |
| 19 | B-Pillar – C-Pillar Distance          | 1067                     |
| 20 | Roof Sill Bottom Height               | 1575                     |
| 21 | Roof Sill Top Height                  | 1655                     |
| 22 | Floor Sill Bottom Height              | 450                      |
| 23 | Floor Sill Top Height                 | 500                      |

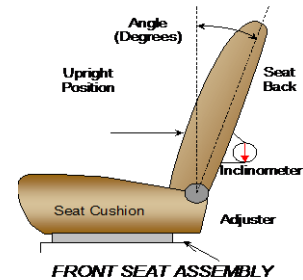
## DATA SHEET NO. 2 - SEAT ADJUSTMENT, FUEL SYSTEM AND STEERING WHEEL DATA

Test Vehicle: 2022 Jeep Grand Cherokee L  
Test Program: NCAP Frontal Impact

NHTSA No.: M20220303  
Test Date: 8/18/2022

### NORMAL DESIGN RIDING POSITION

For adjustable driver and passenger seat backs. Please describe how to position the inclinometer to measure the seat back angle. Include description of the location of the adjustment latch detent, if applicable



|                            | Degree |
|----------------------------|--------|
| Driver Seat back angle:    | 5      |
| Passenger Seat back angle: | 0.5    |

### SEAT FORE/AFT POSITIONS

Describe the method of determining seat fore/aft positions.

Driver: Mid position, Positioned according to Form 1

Passenger: Full forward, Positioned according to Form 1

|                | Total Fore/Aft Travel | Placed in Position No. |
|----------------|-----------------------|------------------------|
| Driver Seat    | 287 mm                | 143 mm                 |
| Passenger Seat | 254 mm, 38 Notches    | 0 mm                   |

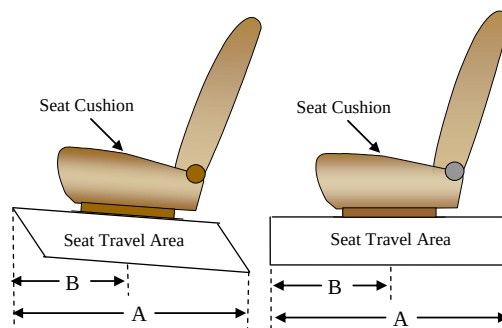
### SEAT BELT UPPER ANCHORAGE

Describe the method of positioning seat belt upper anchorages.

Driver: Uppermost, Positioned according to Form 1

Passenger: Full Down, Positioned according to Form 1

|                | Total No. of Positions | Placed in Position No. |
|----------------|------------------------|------------------------|
| Driver Seat    | 4                      | 0, Full Up             |
| Passenger Seat | 4                      | 3, Full Down           |





## DATA SHEET NO. 2 - SEAT ADJUSTMENT, FUEL SYSTEM AND STEERING WHEEL DATA (CONT'D)

Test Vehicle: 2022 Jeep Grand Cherokee L  
Test Program: NCAP Frontal Impact

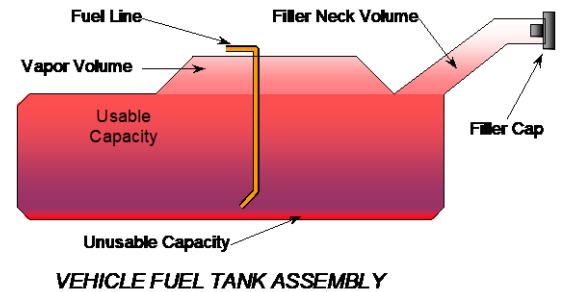
NHTSA No.: M20220303  
Test Date: 8/18/2022

### FUEL TANK CAPACITY

|                                    | Liters |
|------------------------------------|--------|
| Usable Capacity of "Standard Tank" | 87.1   |
| Usable Capacity of "Optional Tank" | N/A    |
| 92%-94% of Usable Capacity         | 81.0   |
| Actual Amount of Solvent Used      | 81.0   |
| 1/3 of Usable Capacity             | 29.0   |

Describe the fuel system - what type of fuel pump, details about how it operates, etc.

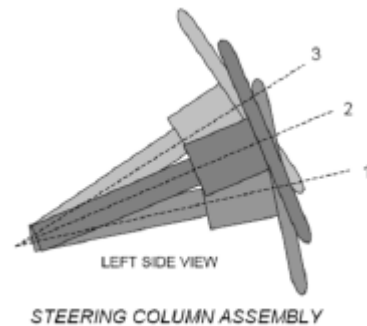
The fuel pump starts pumping fuel when the key is "ON" position. However, the fuel pump will stop in 5 seconds if the engine is not started.



### STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. Describe how this measurement was taken.

Steel square was placed across the rim of the steering wheel, an inclinometer was placed on plate and the angle was measured. Telescope travel was measured full in and full out and set at the midpoint.



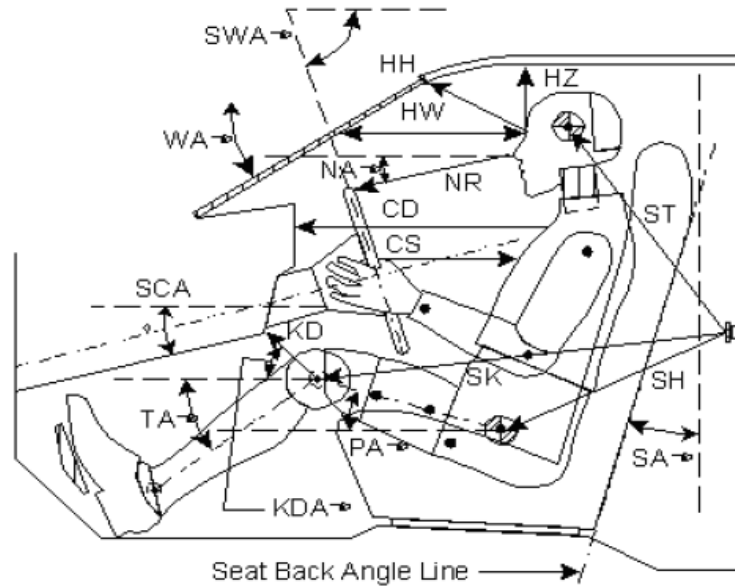
### STEERING COLUMN POSITIONS

|                                   | Degrees | Fore/Aft Position (mm) |
|-----------------------------------|---------|------------------------|
| Lowermost Position No. 1          | 18.7    | 0                      |
| Geometric Center Position No. 2   | 21.4    | 30                     |
| Uppermost Position No. 3          | 24.1    | 60                     |
| Telescoping Steering Wheel Travel |         | 60                     |
| Test Position                     | 21.4    | 30                     |

### DATA SHEET NO. 3 - DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2022 Jeep Grand Cherokee L  
 Test Program: NCAP Frontal Impact

NHTSA No.: M20220303  
 Test Date: 8/18/2022

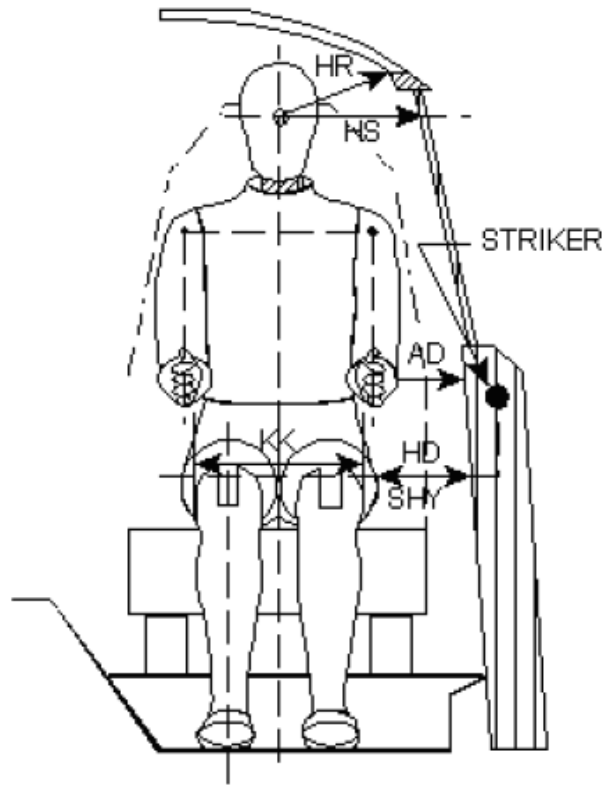


| Code        | Measurement Description             | Driver      |           | Passenger   |           |
|-------------|-------------------------------------|-------------|-----------|-------------|-----------|
|             |                                     | Length (mm) | Angle (°) | Length (mm) | Angle (°) |
| <b>WA°</b>  | Windshield Angle                    |             | 30.7      |             |           |
| <b>SWA°</b> | Steering Wheel Angle                |             | 30.0      |             |           |
| <b>SCA°</b> | Steering Column Angle               |             | 28.5      |             |           |
| <b>SA°</b>  | Seat Back Angle (on head rest post) |             | 5.4       |             | 0.5       |
| <b>HZ</b>   | Head to Roof (Z)                    | 241         |           | 204         |           |
| <b>HH</b>   | Head to Header                      | 493         |           | 376         |           |
| <b>HW</b>   | Head to Windshield                  | 733         |           | 669         |           |
| <b>NR</b>   | Nose to Rim                         | 453         | 8.7       |             |           |
| <b>CD</b>   | Chest to Dash                       | 633         |           | 451         |           |
| <b>CS</b>   | Chest to Steering Hub               | 380         |           |             |           |
| <b>RA</b>   | Rim to Abdomen                      | 247         |           |             |           |
| <b>KDL</b>  | Left Knee to Dash                   | 211         | 31.6      | 123         | 16.1      |
| <b>KDR</b>  | Right Knee to Dash                  | 218         | 31.3      | 131         | 16.2      |
| <b>PA°</b>  | Pelvic Angle                        |             | 24.4      |             | 21.6      |
| <b>TA°</b>  | Tibia Angle                         |             | 39.7      |             | 61.8      |
| <b>SK</b>   | Striker to Knee                     | 608         | 1.0       | 740         | 3.0       |
| <b>ST</b>   | Striker to Head                     | 682         | 59.0      | 640         | 59.5      |
| <b>SH</b>   | Striker to H-Point                  | 225         | 28.7      | 342         | 7.0       |

#### DATA SHEET NO. 4 - DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2022 Jeep Grand Cherokee L  
Test Program: NCAP Frontal Impact

NHTSA No.: M20220303  
Test Date: 8/18/2022

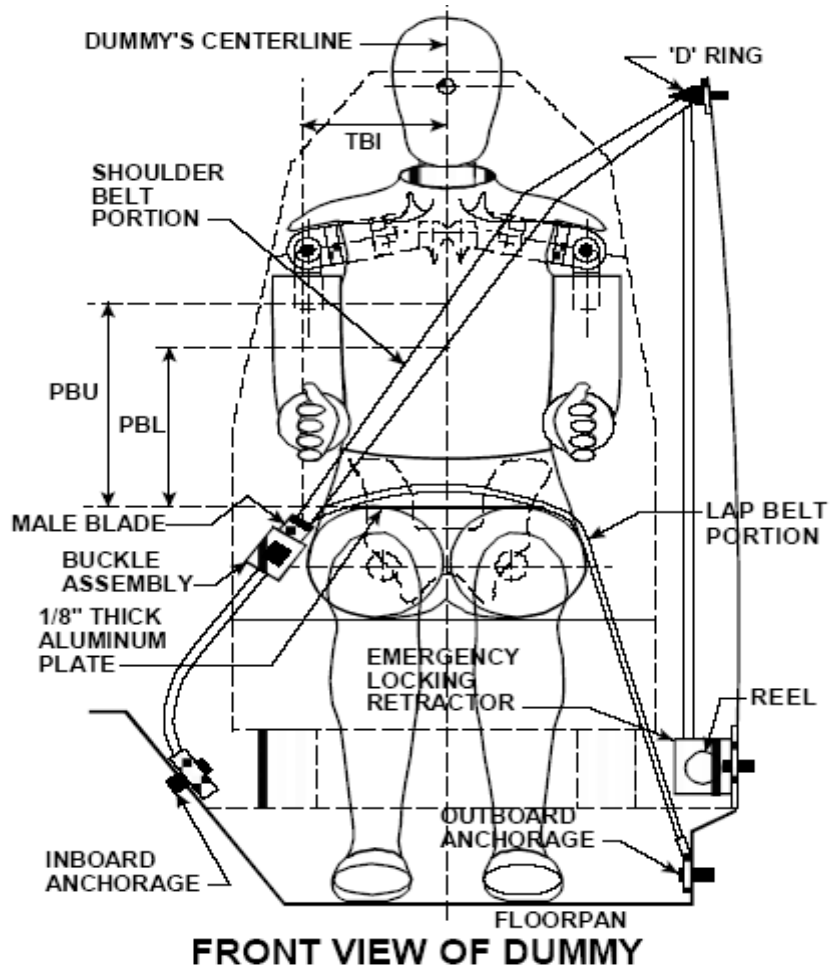


| Code | Measurement Description          | Driver | Passenger |
|------|----------------------------------|--------|-----------|
| AD   | Arm to Door                      | 134    | 104       |
| HD   | H-Point to Door                  | 152    | 184       |
| HR   | Head to Side Header              | 241    | 282       |
| HS   | Head to Side Window              | 365    | 328       |
| KK   | Knee to Knee                     | 305    | 167       |
| SHY  | Striker to H-Point (Y Direction) | 235    | 290       |
| AA   | Ankle to Ankle                   | 315    | 185       |

## DATA SHEET NO. 5 - SEAT BELT POSITIONING DATA

Test Vehicle: 2022 Jeep Grand Cherokee L  
 Test Program: NCAP Frontal Impact

NHTSA No.: M20220303  
 Test Date: 8/18/2022



### SEAT BELT POSITIONING MEASUREMENTS

| Measurement Description                                  | Units | Driver | Passenger |
|----------------------------------------------------------|-------|--------|-----------|
| <b>PBU</b> – Top surface of reference to belt upper edge | mm    | 325    | 260       |
| <b>PBL</b> – Top surface of reference to belt lower edge | mm    | 231    | 175       |

### BELT LENGTH DATA

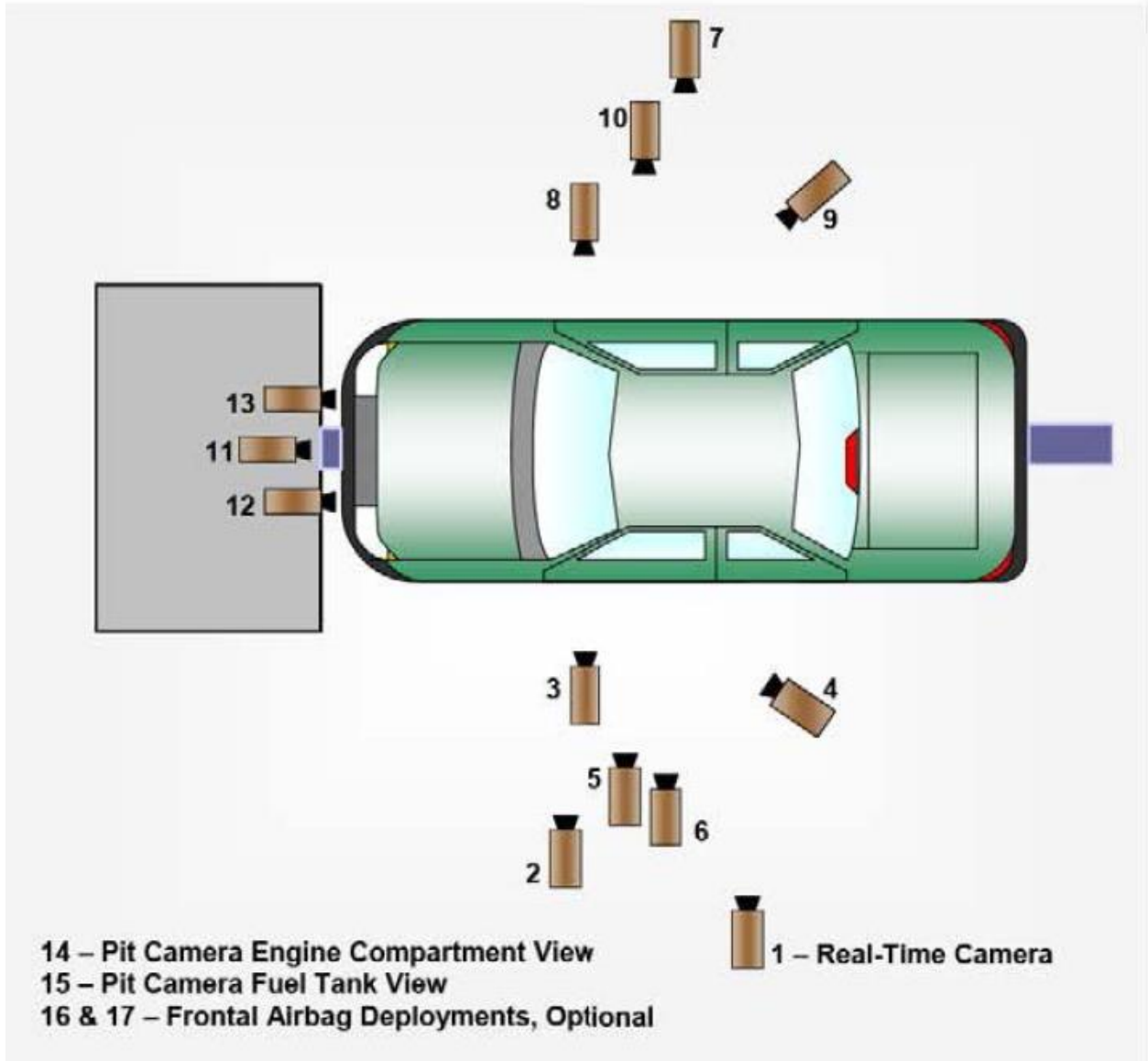
| Measurement Description                          | Units | Driver | Passenger |
|--------------------------------------------------|-------|--------|-----------|
| Shoulder belt length as measured on ATD          | mm    | 841    | 875       |
| Lap belt length as measured on ATD               | mm    | 861    | 735       |
| Remainder of belt on reel                        | mm    | 768    | 835       |
| Total belt length for continuous webbing systems | mm    | 2470   | 2445      |

## DATA SHEET NO. 6 - HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2022 Jeep Grand Cherokee L  
Test Program: NCAP Frontal Impact

NHTSA No.: M20220303  
Test Date: 8/18/2022

### CAMERA POSITIONS FOR FRONTAL IMPACTS



**DATA SHEET NO. 6 - HIGH SPEED CAMERA LOCATIONS AND DATA  
(CONT'D)**

Test Vehicle: 2022 Jeep Grand Cherokee L  
Test Program: NCAP Frontal Impact

NHTSA No.: M20220303  
Test Date: 8/18/2022

**CAMERA LOCATIONS**

| No. | Camera View            | Location (mm)    |                  |                  | Lens (mm) | Frame Speed (fps) |
|-----|------------------------|------------------|------------------|------------------|-----------|-------------------|
|     |                        | X                | Y                | Z                |           |                   |
| 1   | REAL-TIME LEFT OVERALL | --- <sup>1</sup> | --- <sup>1</sup> | --- <sup>1</sup> | Zoom      | 30                |
| 2   | LEFT OVERALL           | -1450            | -4440            | -1432            | 8.5       | 1000              |
| 3   | DRIVER CLOSE-UP        | -2059            | -4465            | -1493            | 50        | 1000              |
| 4   | LEFT FRONT HALF        | -853             | -4514            | -1383            | 25        | 1000              |
| 5   | LEFT ANGLE             | -3218            | -2280            | -1640            | 20        | 1000              |
| 6   | STEERING COLUMN        | -3134            | -3696            | -1507            | 50        | 1000              |
| 7   | RIGHT OVERALL          | -1731            | -4391            | -1524            | 8.5       | 1000              |
| 8   | PASSENGER CLOSE-UP     | -2134            | 4330             | -1501            | 50        | 1000              |
| 9   | RIGHT FRONT HALF       | -901             | 4372             | -1467            | 25        | 1000              |
| 10  | RIGHT ANGLE            | -3160            | 3696             | -1619            | 20        | 1000              |
| 11  | WINDSHIELD             | -379             | 0                | -2610            | 20        | 1000              |
| 12  | DRIVER WINDSHIELD      | -380             | -652             | -2601            | 25        | 1000              |
| 13  | PASSENGER WINDSHIELD   | -380             | 480              | -2590            | 25        | 1000              |
| 14  | PIT FRONT              | -875             | 0                | 3020             | 20        | 1000              |
| 15  | PIT REAR               | -3105            | 0                | 3050             | 20        | 1000              |
| 16  | DRIVER ONBOARD         |                  |                  |                  | 8.5       | 1000              |
| 17  | PASSENGER ONBOARD      |                  |                  |                  | 8.5       | 1000              |

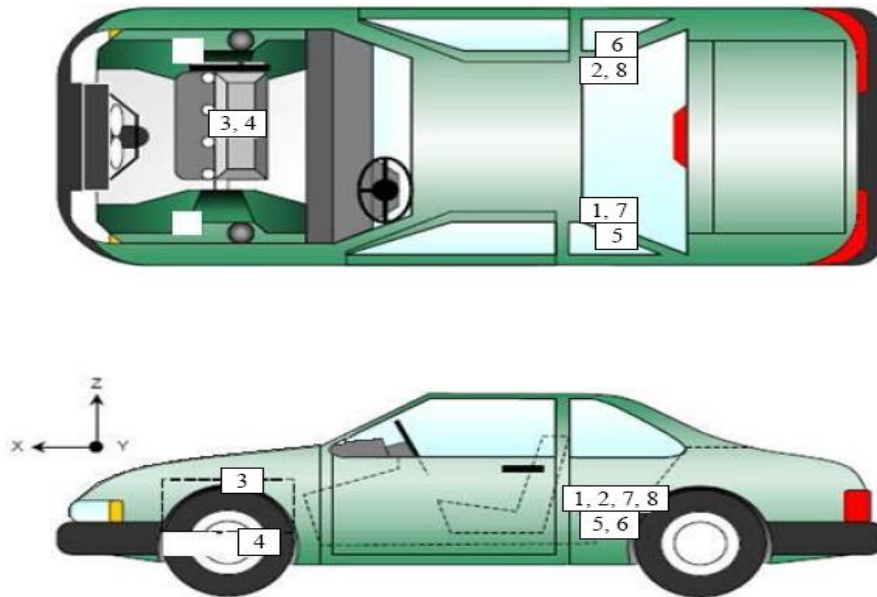
Reference Points: +X – forward of impact plane  
+Y – right of monorail center  
+Z – into ground

<sup>1</sup> Measurements not recorded

## DATA SHEET NO. 7 - VEHICLE ACCELEROMETER DATA

Test Vehicle: 2022 Jeep Grand Cherokee L  
 Test Program: NCAP Frontal Impact

NHTSA No.: M20220303  
 Test Date: 8/18/2022



### VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

| No. | Accelerometer Location                          | Measurements (mm) |      |                  |
|-----|-------------------------------------------------|-------------------|------|------------------|
|     |                                                 | X                 | Y    | Z                |
| 1   | Left Rear Accelerometer – X Direction           | 2105              | -465 | --- <sup>1</sup> |
| 2   | Right Rear Accelerometer – X Direction          | 2100              | 455  | --- <sup>1</sup> |
| 3   | Engine Top X                                    | 4255              | 120  | --- <sup>1</sup> |
| 4   | Engine Bottom X                                 | 4595              | 0    | --- <sup>1</sup> |
| 5   | Left Rear Accelerometer – Z Direction           | 2105              | -455 | --- <sup>1</sup> |
| 6   | Right Rear Accelerometer – Z Direction          | 2100              | 455  | --- <sup>1</sup> |
| 7   | Left Rear Accelerometer – X Direction Redundant | 2125              | -350 | --- <sup>1</sup> |
| 8   | Right Rear Accelerometer- X Direction Redundant | 2120              | 350  | --- <sup>1</sup> |

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

<sup>1</sup> Measurements not recorded

## DATA SHEET NO. 8 - PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2022 Jeep Grand Cherokee L

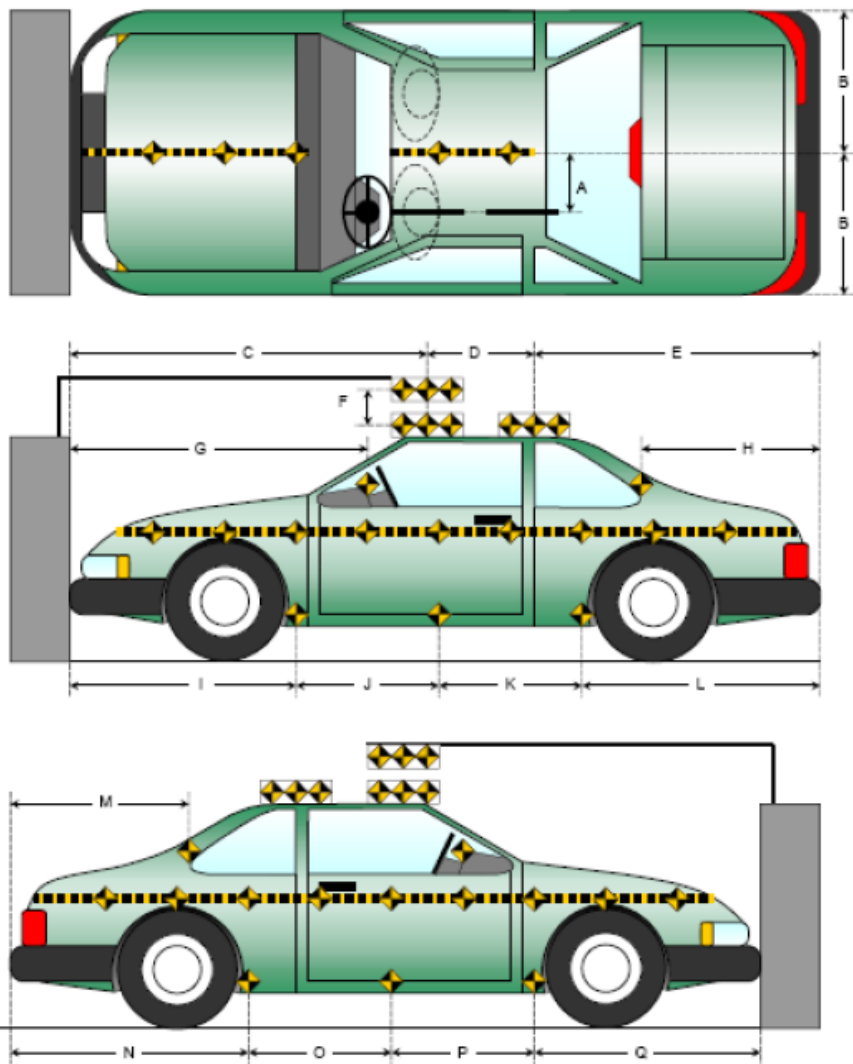
NHTSA No.: M20220303

Test Program: NCAP Frontal Impact

Test Date: 8/18/2022

| Item | Value |
|------|-------|
| A    | 405   |
| B    | 975   |
| C    | 2575  |
| D    | 610   |
| E    | 2015  |
| F    | 176   |
| G    | 1860  |
| H    | 1505  |
| I    | 1450  |
| J    | 985   |
| K    | 1000  |
| L    | 1765  |
| M    | 1505  |
| N    | 1755  |
| O    | 1005  |
| P    | 980   |
| Q    | 1460  |

All units in millimeters

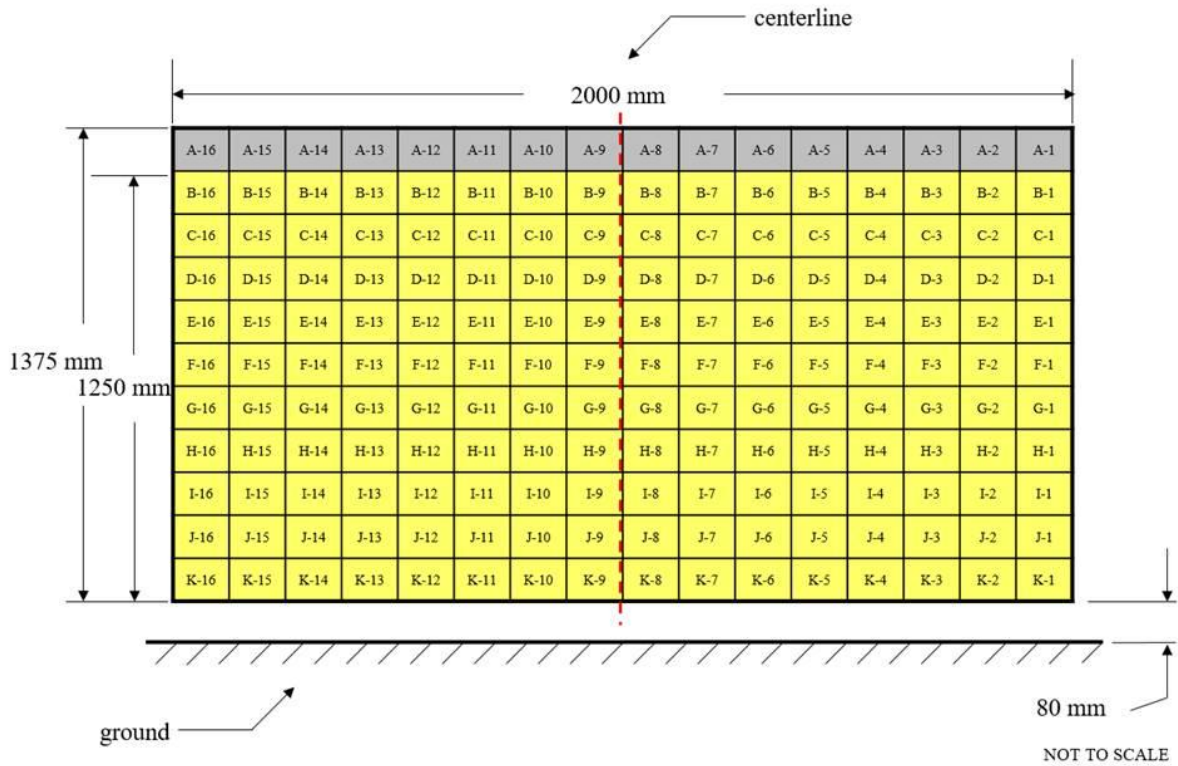




## DATA SHEET NO. 9 - LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2022 Jeep Grand Cherokee L  
 Test Program: NCAP Frontal Impact

NHTSA No.: M20220303  
 Test Date: 8/18/2022



## DATA SHEET NO. 10 - TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2022 Jeep Grand Cherokee L  
Test Program: NCAP Frontal Impact

NHTSA No.: M20220303  
Test Date: 8/18/2022

### INSTRUMENTATION

| Instrumentation                  | Number of Channels Collected |
|----------------------------------|------------------------------|
| Driver Dummy Accelerometers      | 47                           |
| Passenger Dummy Accelerometers   | 47                           |
| Vehicle Structure Accelerometers | 8                            |
| <b>Total</b>                     | 102                          |

### CAMERA COVERAGE

| Type of Camera             | Number Used in this Test |
|----------------------------|--------------------------|
| High-Speed Vehicle Onboard | 2                        |
| High-Speed Offboard        | 14                       |
| Real-Time Panning          | 2                        |
| <b>Total</b>               | 18                       |

**DATA SHEET NO. 11 - POST-TEST OBSERVATIONS**

Test Vehicle: 2022 Jeep Grand Cherokee L  
 Test Program: NCAP Frontal Impact

NHTSA No.: M20220303  
 Test Date: 8/18/2022

**TEST DUMMY INFORMATION AND CONTACT LOCATIONS**

| Description             | Driver                            | Passenger                         |
|-------------------------|-----------------------------------|-----------------------------------|
| Dummy Type / Serial No. | Hybrid III 50th / 037             | Hybrid III 5th / DH1659           |
| Head Contact            | Frontal Airbag and Head Restraint | Frontal Airbag and Head Restraint |
| Upper Torso Contact     | Airbag                            | Airbag                            |
| Lower Torso Contact     | Airbag                            | Airbag                            |
| Left Knee Contact       | Knee Airbag                       | Knee Airbag                       |
| Right Knee Contact      | Knee Airbag                       | Knee Airbag                       |

**DOOR OPENING, TRUNK OPENING, AND SEAT TRACK INFORMATION**

| Description                                | Driver   | Passenger | Other |
|--------------------------------------------|----------|-----------|-------|
| Locked/Unlocked Doors**                    | Unlocked | Unlocked  |       |
| Front Door Opening**                       | No       | No        |       |
| Rear Door Opening**                        | No       | No        |       |
| Trunk/Hatch/Tailgate Opening**             |          |           | No    |
| Seat Track Shift (mm) **                   | No       | No        |       |
| Seat Back Movement from Initial Position** | No       | No        |       |

\*\*NOTE: Indicate "No", "N/A, or "Yes", and if "Yes", describe

**POST- OTHER VEHICLE POST-TEST OBSERVATIONS**

| Critical Areas of Performance | Observations |
|-------------------------------|--------------|
| Windshield Damage             | None         |
| Window Damage                 | None         |
| Other Notable Effects         | None         |

**VEHICLE REBOUND FROM BARRIER**

| Measured Parameter | Units | Value |
|--------------------|-------|-------|
| Left Side          | mm    | 925   |
| Center             | mm    | 920   |
| Right Side         | mm    | 927   |
| Average            | mm    | 924   |

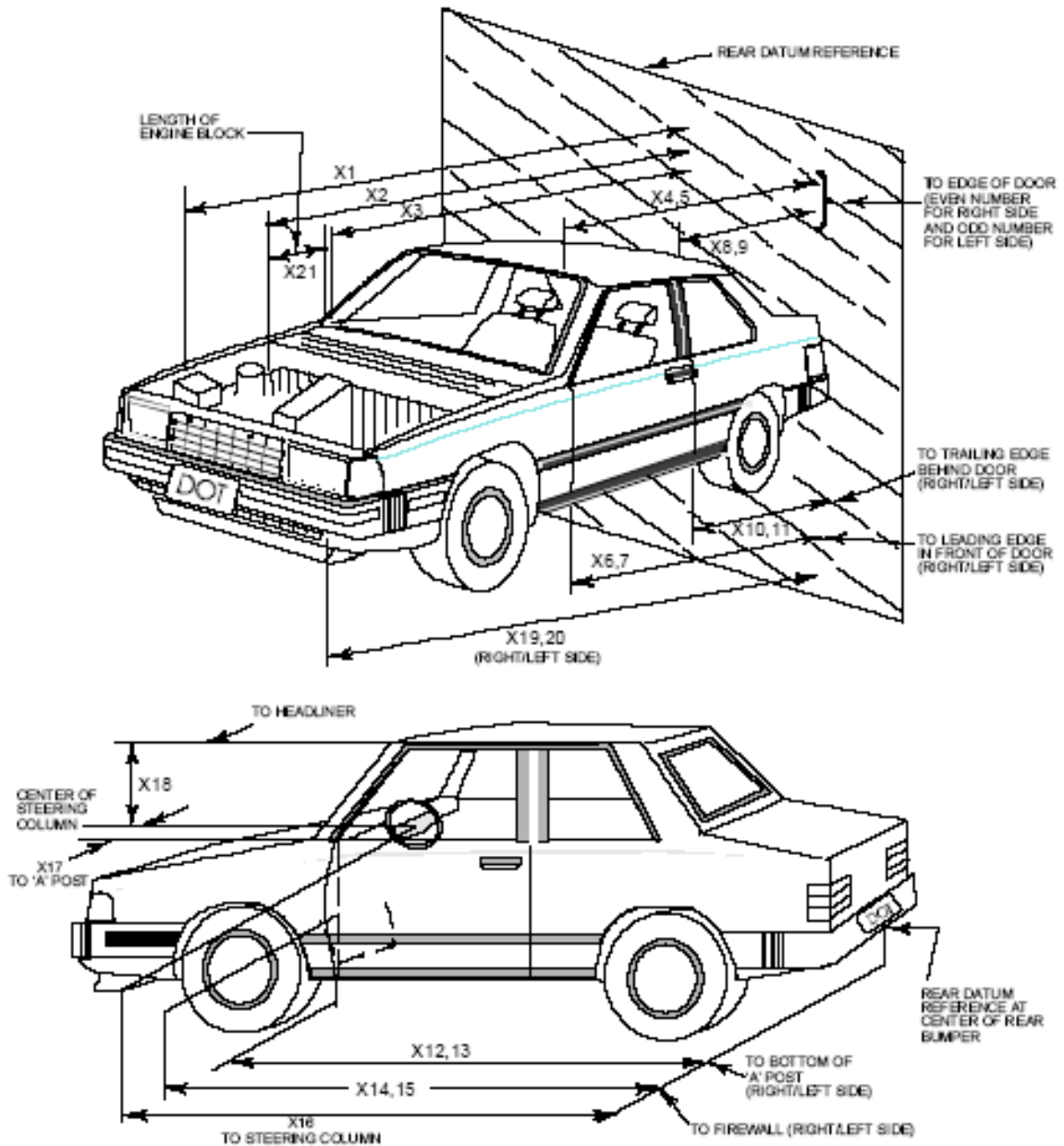
**SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION**

| Restraint Type                | Driver (Occupant 1) |          | Passenger (Occupant 2) |          |
|-------------------------------|---------------------|----------|------------------------|----------|
|                               | Installed           | Deployed | Installed              | Deployed |
| Front Airbag                  | Yes                 | Yes      | Yes                    | Yes      |
| Torso/Pelvis Side Airbag      | Yes                 | No       | Yes                    | No       |
| Curtain Side Airbag           | Yes                 | No       | Yes                    | No       |
| Knee Airbag                   | Yes                 | Yes      | Yes                    | Yes      |
| Seat Belt Pretensioner        | Yes                 | Yes      | Yes                    | Yes      |
| Seat Belt Load Limiter        | Yes                 | Yes      | Yes                    | Yes      |
| Seat Belt Buckle Pretensioner | No                  | N/A      | No                     | N/A      |
| Other                         | N/A                 | N/A      | N/A                    | N/A      |

## DATA SHEET NO. 12 - VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2022 Jeep Grand Cherokee L  
 Test Program: NCAP Frontal Impact

NHTSA No.: M20220303  
 Test Date: 8/18/2022



**DATA SHEET NO. 12 - VEHICLE PROFILE MEASUREMENTS (CONT'D)**Test Vehicle: 2022 Jeep Grand Cherokee LNHTSA No.: M20220303Test Program: NCAP Frontal ImpactTest Date: 8/18/2022

| No. | Measurement Description                           | Pre-Test | Post-Test | Difference |
|-----|---------------------------------------------------|----------|-----------|------------|
| 1   | Total Length of Vehicle at Centerline             | 5200     | 4670      | -530       |
| 2   | Rear Surface of Vehicle (RSOV) to Front of Engine | 4495     | 4370      | -125       |
| 3   | RSOV to Firewall                                  | 4150     | 4140      | -10        |
| 4   | RSOV to Upper Leading Edge of Right Door          | 3650     | 3642      | -8         |
| 5   | RSOV to Upper Leading Edge of Left Door           | 3655     | 3650      | -5         |
| 6   | RSOV to Lower Leading Edge of Right Door          | 3630     | 3630      | 0          |
| 7   | RSOV to Lower Leading Edge of Left Door           | 3633     | 3640      | -7         |
| 8   | RSOV to Upper Trailing Edge of Right Door         | 2550     | 2545      | -5         |
| 9   | RSOV to Upper Trailing Edge of Left Door          | 2560     | 2555      | -5         |
| 10  | RSOV to Lower Trailing Edge of Right Door         | 2600     | 2602      | -2         |
| 11  | RSOV to Lower Trailing Edge of Left Door          | 2600     | 2607      | -7         |
| 12  | RSOV to Bottom of "A" Post-of Right Side          | 3583     | 3570      | -13        |
| 13  | RSOV to Bottom of "A" Post-of Left Side           | 3590     | 3600      | -10        |
| 14  | RSOV to Firewall, Right Side                      | 4000     | 3825      | -175       |
| 15  | RSOV to Firewall, Left Side                       | 3980     | 3752      | -228       |
| 16  | RSOV to Steering Column                           | 3226     | 3174      | -52        |
| 17  | Center of Steering Column to "A" Post             | 345      | 363       | -18        |
| 18  | Center of Steering Column to Headliner            | 420      | 468       | -48        |
| 19  | RSOV to Right Side of Front Bumper                | 5040     | 4660      | -380       |
| 20  | RSOV to Left Side of Front Bumper                 | 5040     | 4642      | -398       |
| 21  | Length of Engine Block                            | 500      | 500       | 0          |
| RD  | RSOV to Right Side of Dash Panel                  | 3455     | 3445      | -10        |
| CD  | RSOV to Center of Dash Panel                      | 3387     | 3377      | -10        |
| LD  | RSOV to Left Side of Dash Panel                   | 3465     | 3455      | -10        |

All Dimensions in mm

## DATA SHEET NO. 13 - ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2022 Jeep Grand Cherokee L  
Test Program: NCAP Frontal Impact

NHTSA No.: M20220303  
Test Date: 8/18/2022

### VEHICLE INFORMATION

VIN: 1C4RJKAG9N8526180  
Vehicle Size Category: MPV

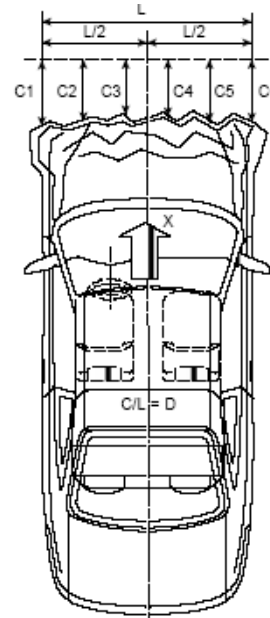
Wheelbase: 3091  
Test Weight (kg): 2404.2

### ACCELEROMETER DATA

Accelerometer Locations: As listed on Page 15 of this report.  
Cal. Procedure/Interval: TRC procedure / 6 month interval  
Integration Algorithm: Trapezoidal  
Linearity: > 99%  
Impact Velocity (km/h): 56.44  
Velocity Change (km/h): 65.53  
Time of Separation (ms): 121

### CRUSH PROFILE

Collision Deformation Classification: 12FDEW2  
Midpoint of Damage: Centerline  
Damage Region Length (mm): 1524  
Impact Mode: Frontal



| No. | Measurement Description    | Units | Pre-Test | Post-Test | Difference |
|-----|----------------------------|-------|----------|-----------|------------|
| C1  | Crush zone 1 at left side  | mm    | 5040     | 4642      | 398        |
| C2  | Crush zone 2 at left side  | mm    | 5155     | 4635      | 520        |
| C3  | Crush zone 3 at left side  | mm    | 5190     | 4675      | 515        |
| C4  | Crush zone 4 at right side | mm    | 5190     | 4665      | 525        |
| C5  | Crush zone 5 at right side | mm    | 5160     | 4627      | 533        |
| C6  | Crush zone 6 at right side | mm    | 5040     | 4660      | 380        |
| L   | C1 to C6                   | mm    | 1524     | 1490      | 34         |

## DATA SHEET NO. 14 - VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2022 Jeep Grand Cherokee L  
Test Program: NCAP Frontal Impact

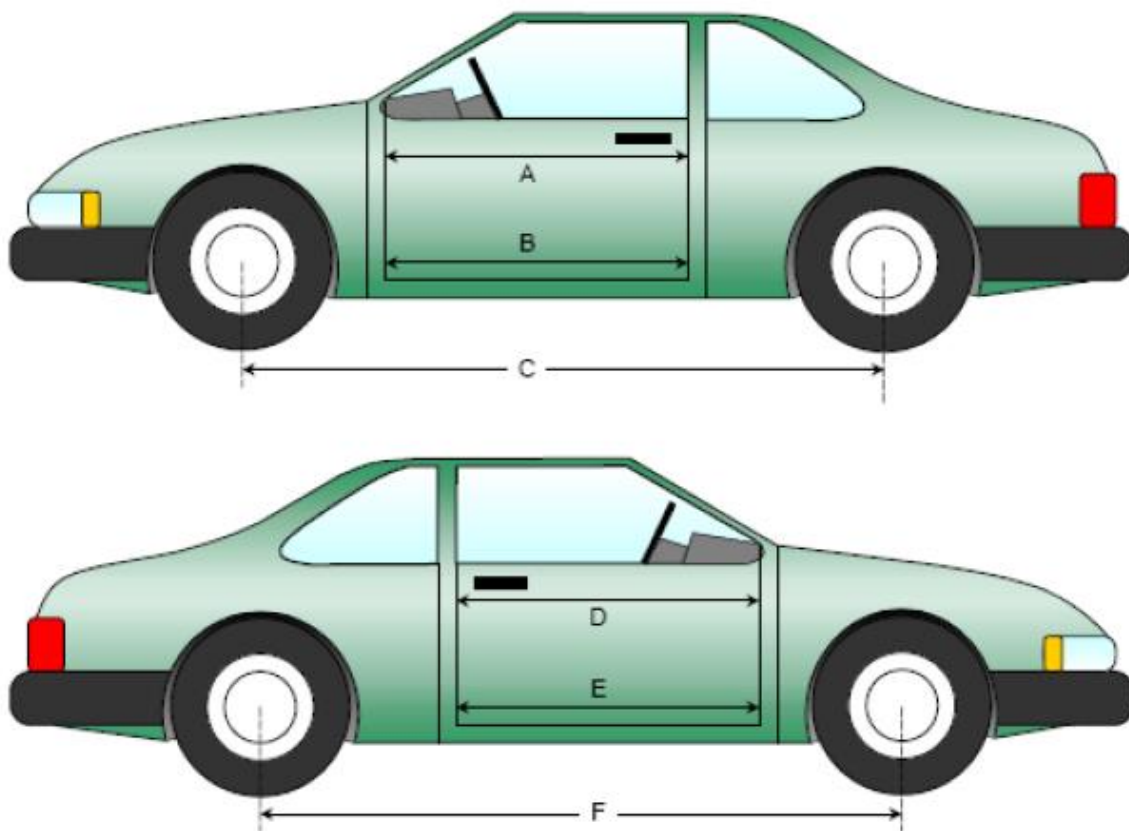
NHTSA No.: M20220303  
Test Date: 8/18/2022

### DOOR OPENING WIDTH

| No. | Description      | Units | Pre-Test | Post-Test | Difference |
|-----|------------------|-------|----------|-----------|------------|
| A   | Left Side Upper  | mm    | 981      | 981       | 0          |
| B   | Left Side Lower  | mm    | 880      | 880       | 0          |
| D   | Right Side Upper | mm    | 975      | 975       | 0          |
| E   | Right Side Lower | mm    | 975      | 975       | 0          |

### WHEELBASE MEASUREMENTS

| No. | Description          | Units | Pre-Test | Post-Test | Difference |
|-----|----------------------|-------|----------|-----------|------------|
| C   | Left Side Wheelbase  | mm    | 3104     | 2990      | -114       |
| F   | Right Side Wheelbase | mm    | 3098     | 2975      | -123       |



<sup>1</sup> Front suspension damaged and wheels fell off measurements not available

## DATA SHEET NO. 14 - VEHICLE INTRUSION MEASUREMENTS (CONT'D)

Test Vehicle: 2022 Jeep Grand Cherokee L

NHTSA No.: M20220303

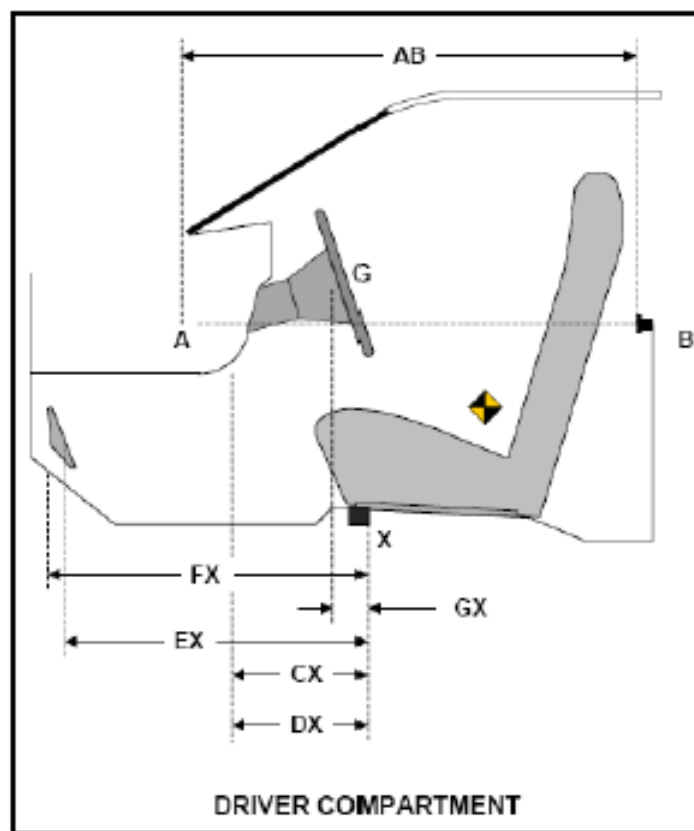
Test Program: NCAP Frontal Impact

Test Date: 8/18/2022

### DRIVER COMPARTMENT INTRUSION

| Item | Description                              | Units | Pre-Test | Post-Test | Difference |
|------|------------------------------------------|-------|----------|-----------|------------|
| AB   | Door Opening (Inside Window Jam)         | mm    | 984      | 984       | 0          |
| CX   | Left Knee Bolster to X                   | mm    | 324      | 309       | -15        |
| DX   | Right Knee Bolster to X                  | mm    | 294      | 275       | -19        |
| EX   | Brake Pedal to X                         | mm    | 593      | 561       | -32        |
| FX   | Foot Rest to X                           | mm    | 630      | 612       | -18        |
| GX   | Center of Steering Column Wheel Hub to X | mm    | 91       | 140       | 49         |

X = Front of Seat Track (Stationary)





## DATA SHEET NO. 15 - SUMMARY OF INDICANT FMVSS 212 AND FMVSS 219 (PARTIAL) DATA

Test Vehicle: 2022 Jeep Grand Cherokee L  
Test Program: NCAP Frontal Impact

NHTSA No.: M20220303  
Test Date: 8/18/2022

Please provide windshield mounting details.

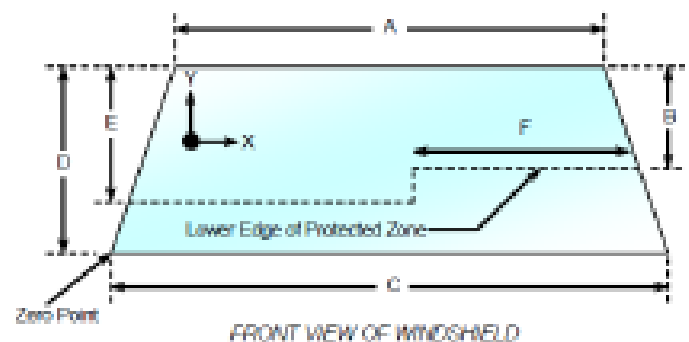
The standard requires that the post-test retention measurement be a minimum of 75% of the pre-test total periphery measurement for vehicle not equipped with occupant passive restraint and 50% for each side of the windshield for vehicle which are equipped with occupant passive restraints.

Temperature of windshield molding during test: 22.8°C

### WINDSHIELD PERIPHERY MEASUREMENTS

| Measurement | Pre-Test (mm) | Post-Test (mm) | % Retention |
|-------------|---------------|----------------|-------------|
| Left Side   | 2327          | 2327           | 100.0       |
| Right Side  | 2327          | 2327           | 100.0       |
| Total       | 4654          | 4654           | 100.0       |

| Item | Units | Value |
|------|-------|-------|
| A    | mm    | 1335  |
| B    | mm    | 600   |
| C    | mm    | 1700  |
| D    | mm    | 810   |
| E    | mm    | 468   |
| F    | mm    | 550   |



### AREAS OF PROTECTED ZONE FAILURES

A. Provide coordinates of the area that the protected zone was penetrated more than .25 inches by a vehicle component other than one that is normally in contact with the windshield.

| X  | Y  |
|----|----|
| NA | NA |
| NA | NA |
| NA | NA |
| NA | NA |

B. The inner surface of the windshield was penetrated by the hood support beneath the protected zone.

| X  | Y  |
|----|----|
| NA | NA |
| NA | NA |
| NA | NA |
| NA | NA |

**DATA SHEET NO. 16 - FMVSS 301 BARRIER IMPACT AND STATIC ROLLOVER  
RESULTS**

Test Vehicle: 2022 Jeep Grand Cherokee L  
Test Program: NCAP Frontal Impact

NHTSA No.: M20220303  
Test Date: 8/18/2022

**FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA**

Temperature at Time of Impact: 22.8°C

Test Time: 14:20

**Stoddard Solvent Spillage Measurements**

- A From impact until vehicle motion ceases: 0 oz.  
(maximum allowable – 1 oz.)
- B For the 5-minute period after motion ceases: 0 oz.  
(maximum allowable – 5 oz.)
- C For the following 25 minutes: 0 oz.  
(maximum allowable – 1 oz./minutes)
- D Spillage: None

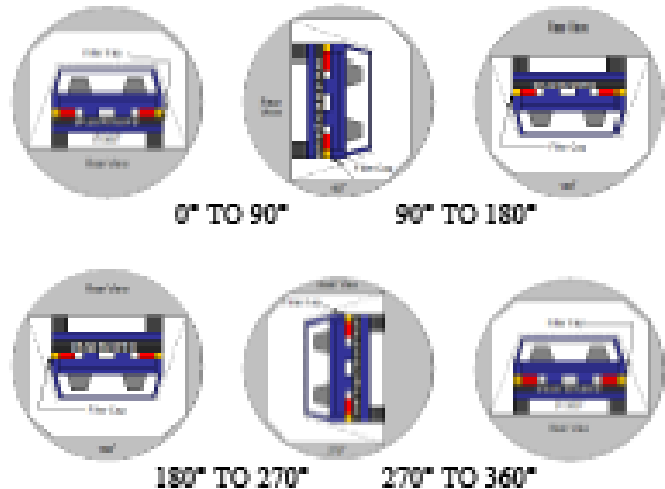
## DATA SHEET NO. 16 - FMVSS 301 BARRIER IMPACT AND STATIC ROLLOVER RESULTS (CONT'D)

Test Vehicle: 2022 Jeep Grand Cherokee L  
Test Program: NCAP Frontal Impact

NHTSA No.: M20220303  
Test Date: 8/18/2022

1. The specified fixture rollover rate for each 90° of rotation is 60 to 180 seconds.
2. The position hold time at each position is 300 seconds (minimum).
3. Details of Stoddard Solvent spillage:

None  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



**SOLVENT COLLECTION TIME TABLE IN SECONDS**

| Test Phase   | Rotation Time | Hold Time | Total Time |
|--------------|---------------|-----------|------------|
| 0° to 90°    | 90            | 330       | 420        |
| 90° to 180°  | 90            | 330       | 840        |
| 180° to 270° | 90            | 330       | 1260       |
| 270° to 360° | 90            | 330       | 1480       |

**FMVSS 301 SPILLAGE TABLE**

| Test Phase   | First 5 Minutes | Sixth Minute | Seventh Minute | Eighth Minute |
|--------------|-----------------|--------------|----------------|---------------|
| 0° to 90°    | 0               | 0            | 0              | N/A           |
| 90° to 180°  | 0               | 0            | 0              | N/A           |
| 180° to 270° | 0               | 0            | 0              | N/A           |
| 270° to 360° | 0               | 0            | 0              | N/A           |

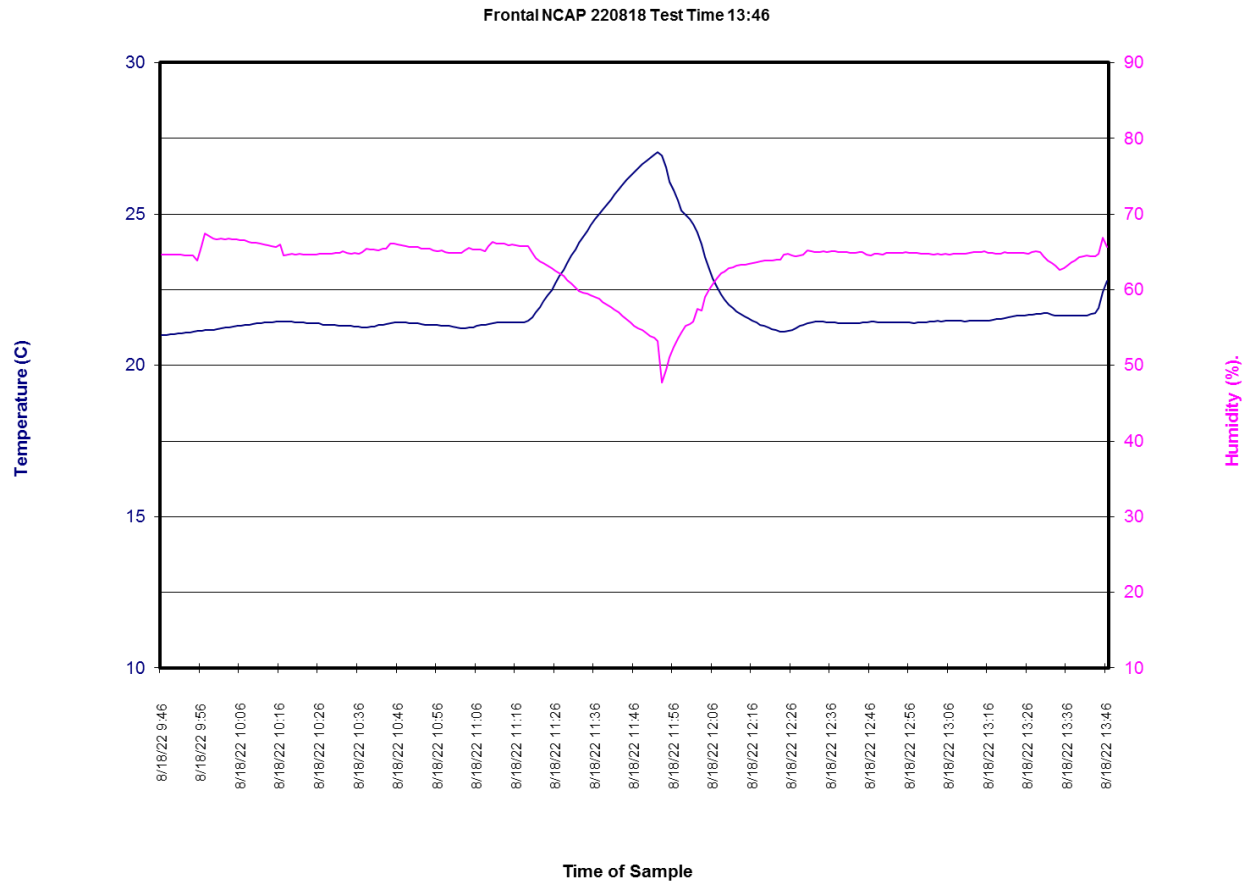
**SOLVENT SPILLAGE LOCATION TABLE**

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

## DATA SHEET NO. 17 - DUMMY/VEHICLE TEMPERATURE STABILIZATION

Test Vehicle: 2022 Jeep Grand Cherokee L  
Test Program: NCAP Frontal Impact

NHTSA No.: M20220303  
Test Date: 8/18/2022



**APPENDIX A**  
**PHOTOGRAPHS**

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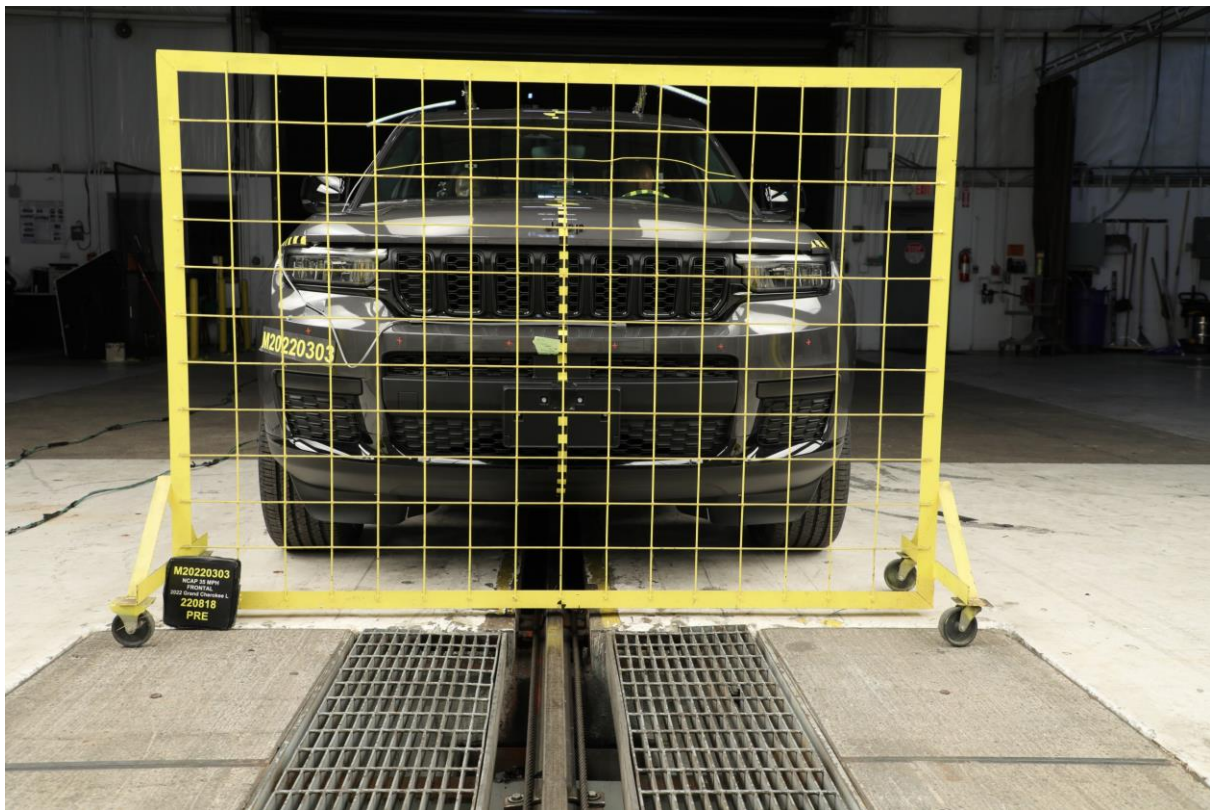
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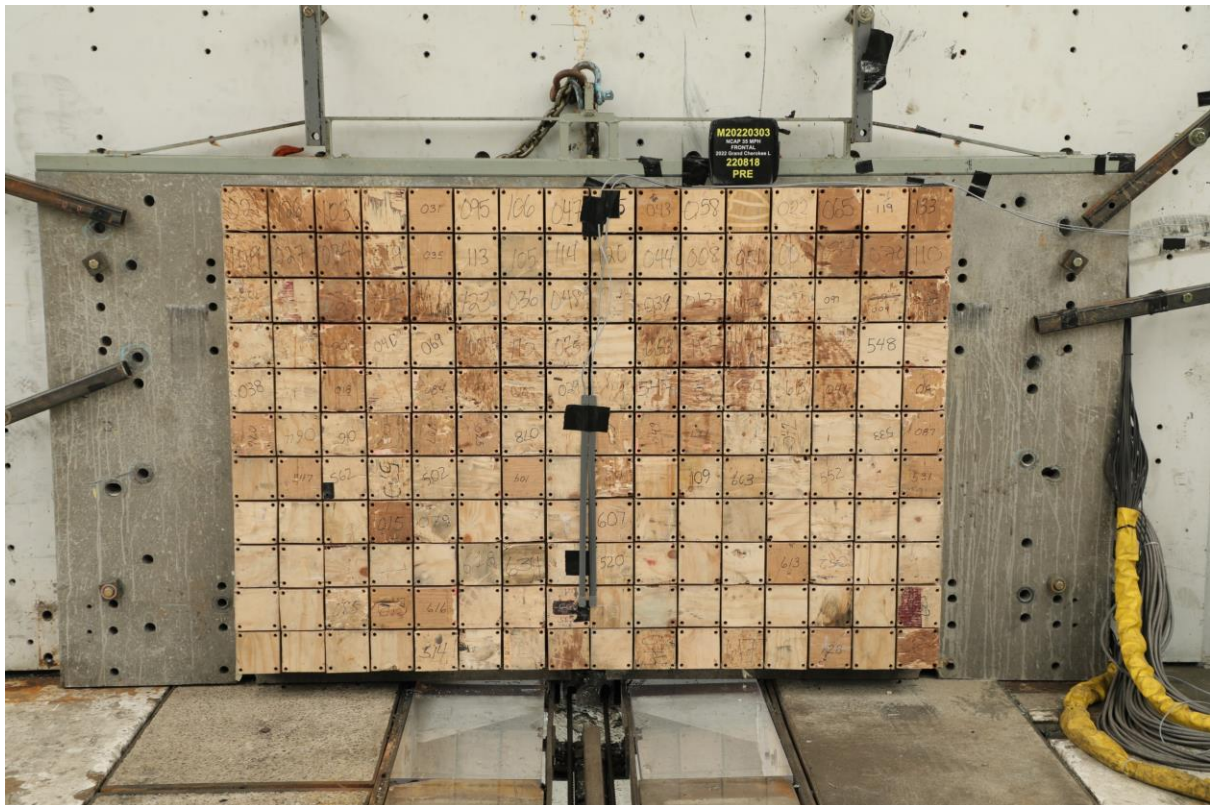
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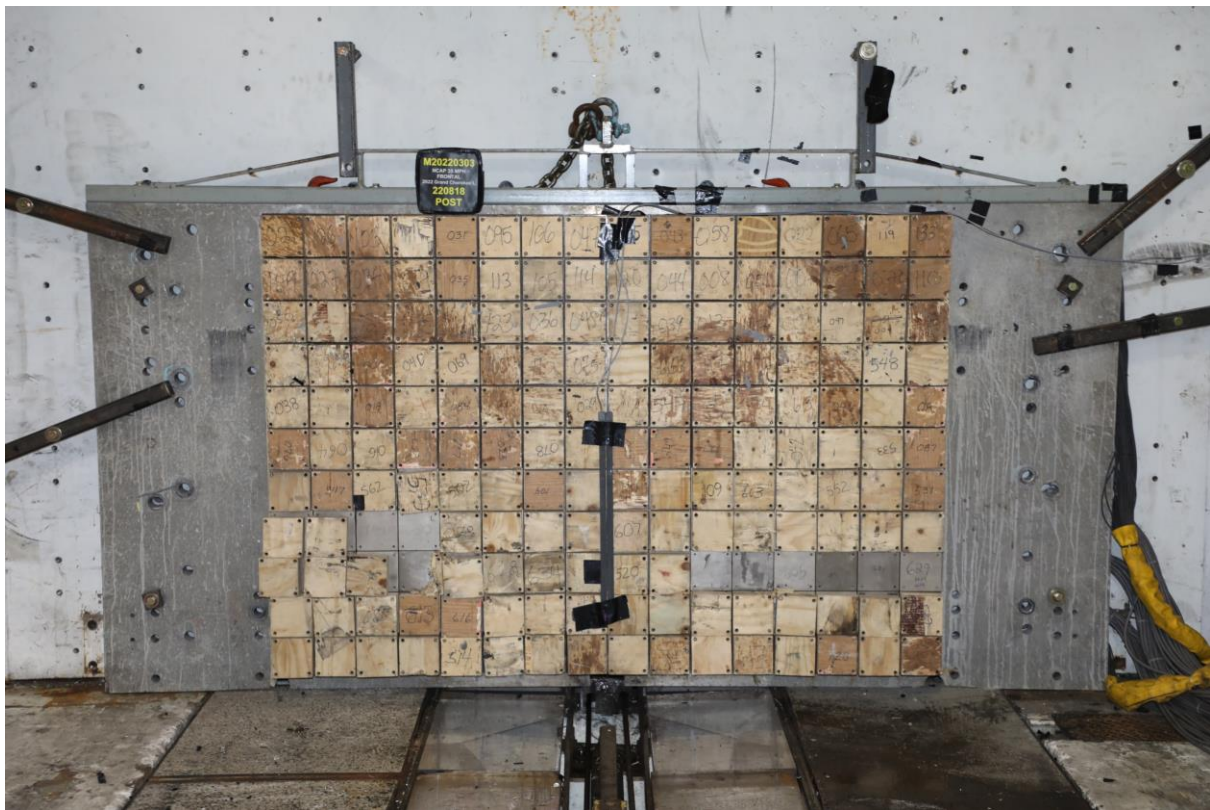


**001 Load Cell Location**

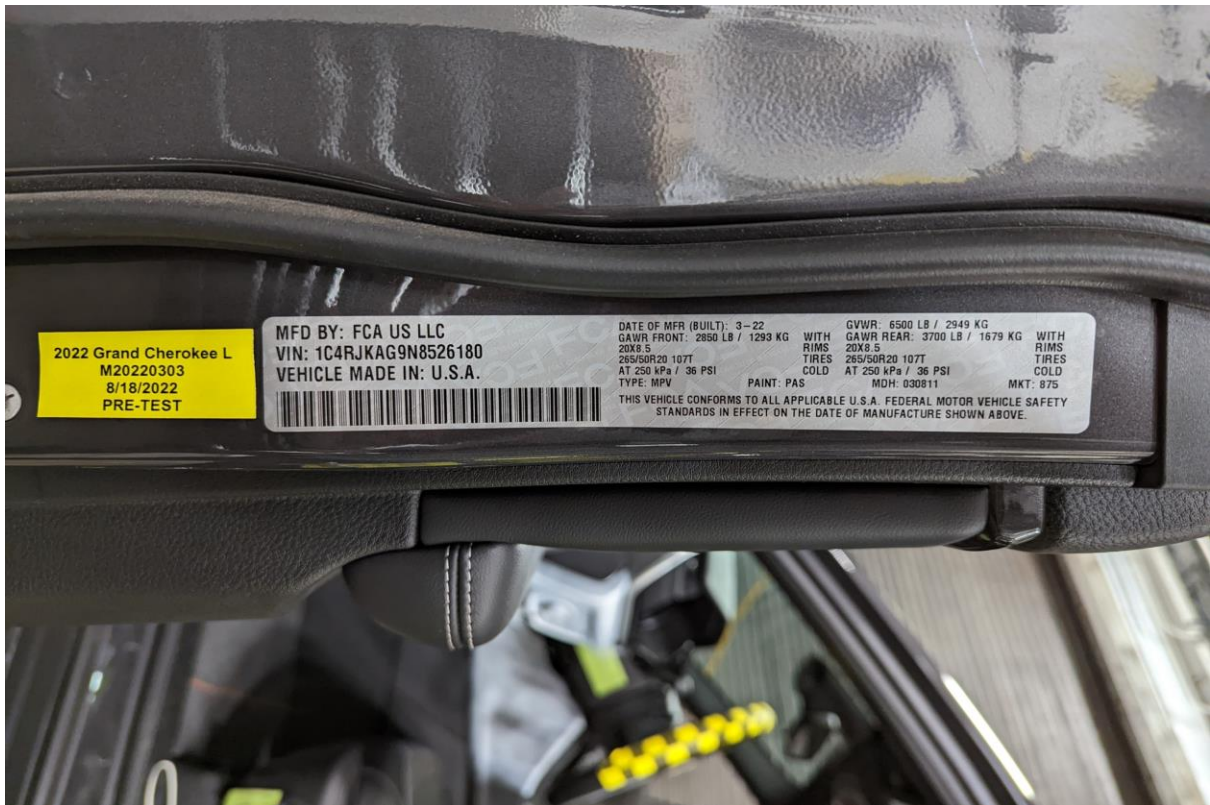


**002 Pre-Test Load Cell Wall**





**003 Post-Test Load Cell Wall**



**004 Manufacturer's Label**



**005 Tire Placard**

**Intentionally Left Blank**





**006 2022 Jeep Grand Cherokee L Frontal As Delivered**



**007 Left Rear 3-4 View, as Received**



**008 Pre-Test Front View of Test Vehicle**

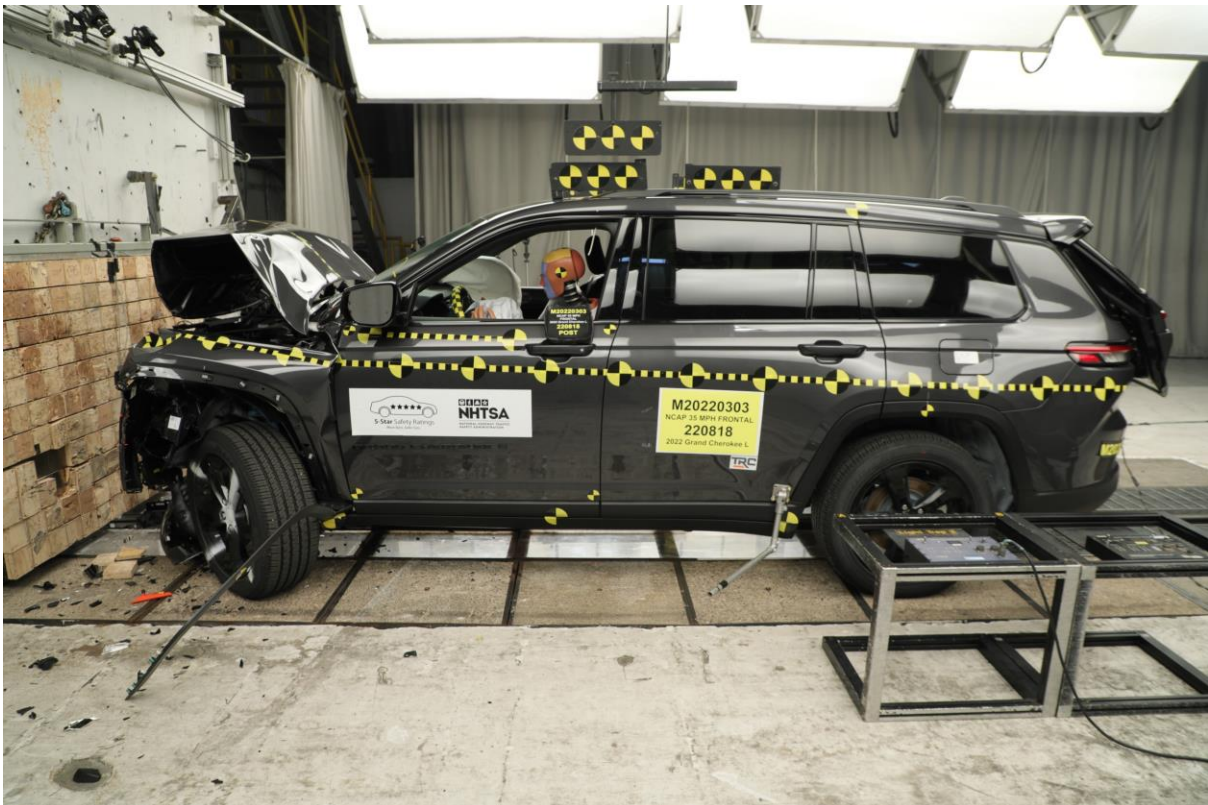


**009 Post-Test Front View of Test Vehicle**



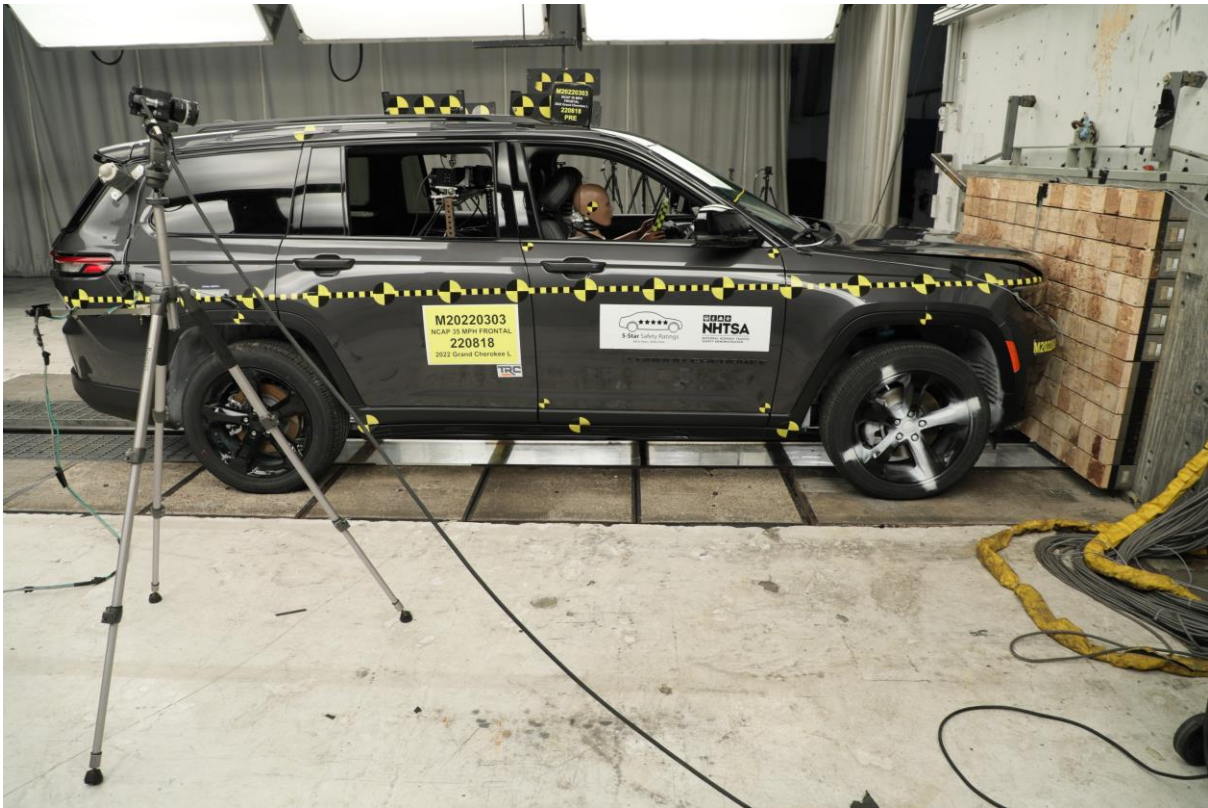


**010 Pre-Test Left View of Test Vehicle**



**011 Post-Test Left View of Test Vehicle**





**012 Pre-Test Right View of Test Vehicle**



**013 Post-Test Right View of Test Vehicle**



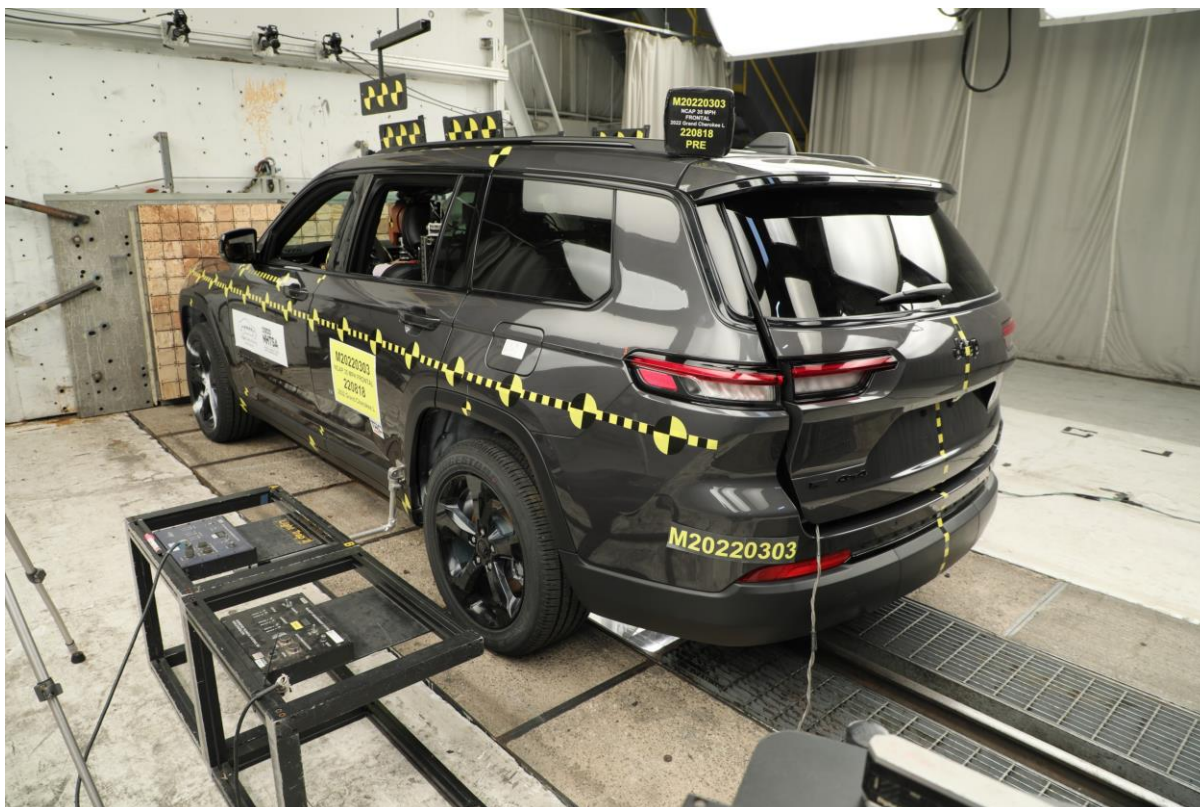


**014 Pre-Test Right Front 3-4 View**



**015 Post-Test Right Front 3-4 View**





**016 Pre-Test Left Rear 3-4 View**

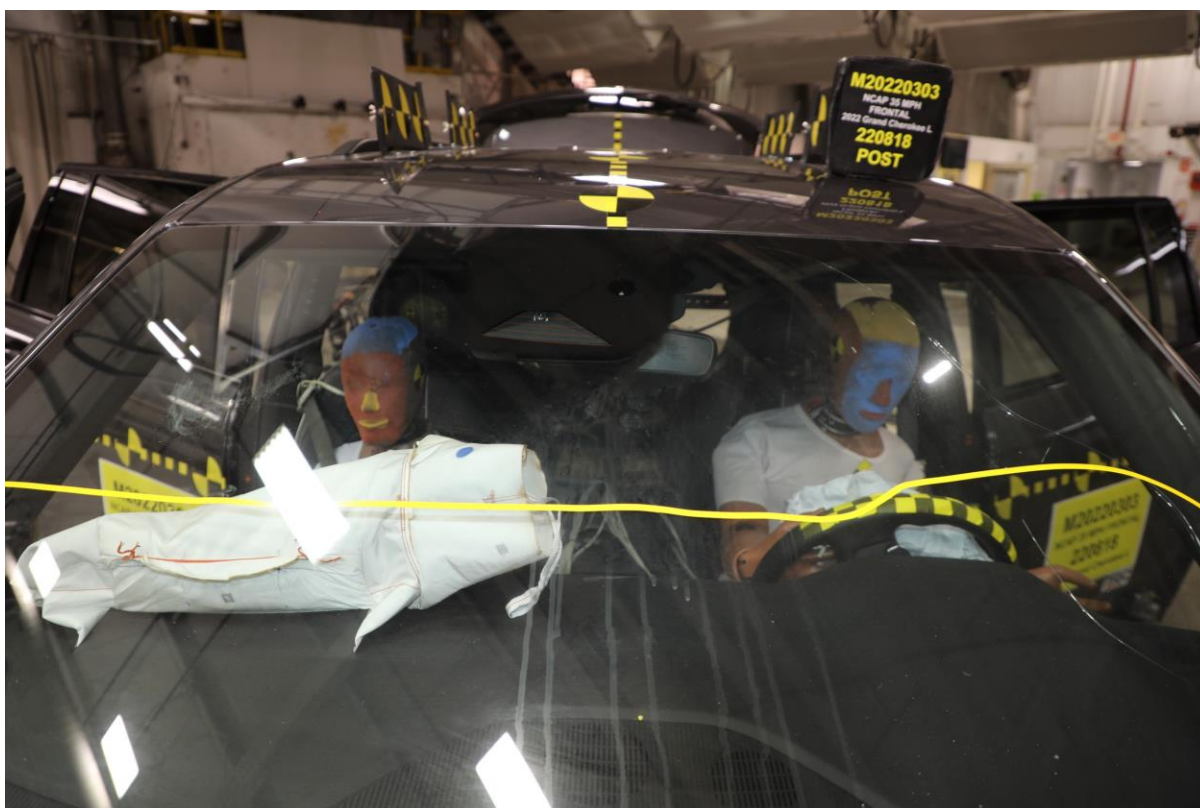


**017 Post-Test Left Rear 3-4 View**





**018 Pre-Test Windshield View**



**019 Post-Test Windshield View**



**020 Pre-Test Engine Compartment View**



**021 Post-Test Engine Compartment View**

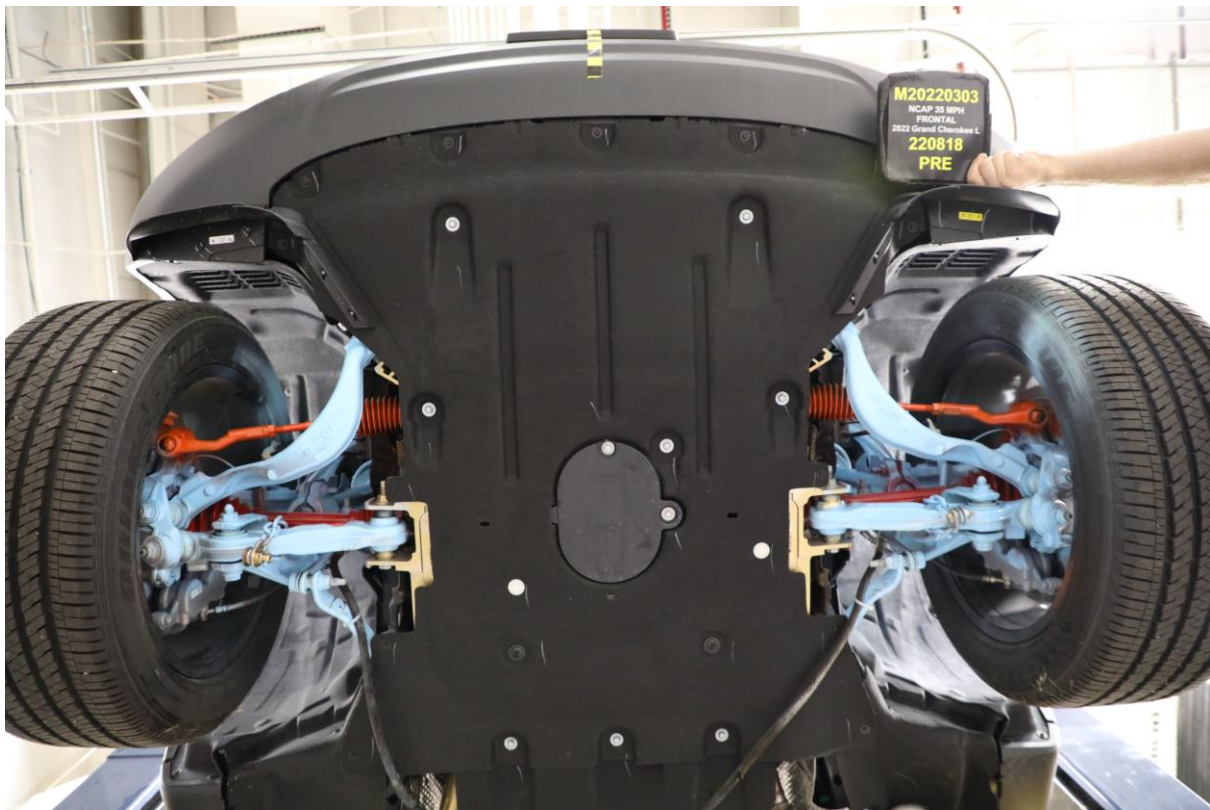




022 Pre-Test Fuel Filler Cap View



023 Post-Test Fuel Filler Cap View

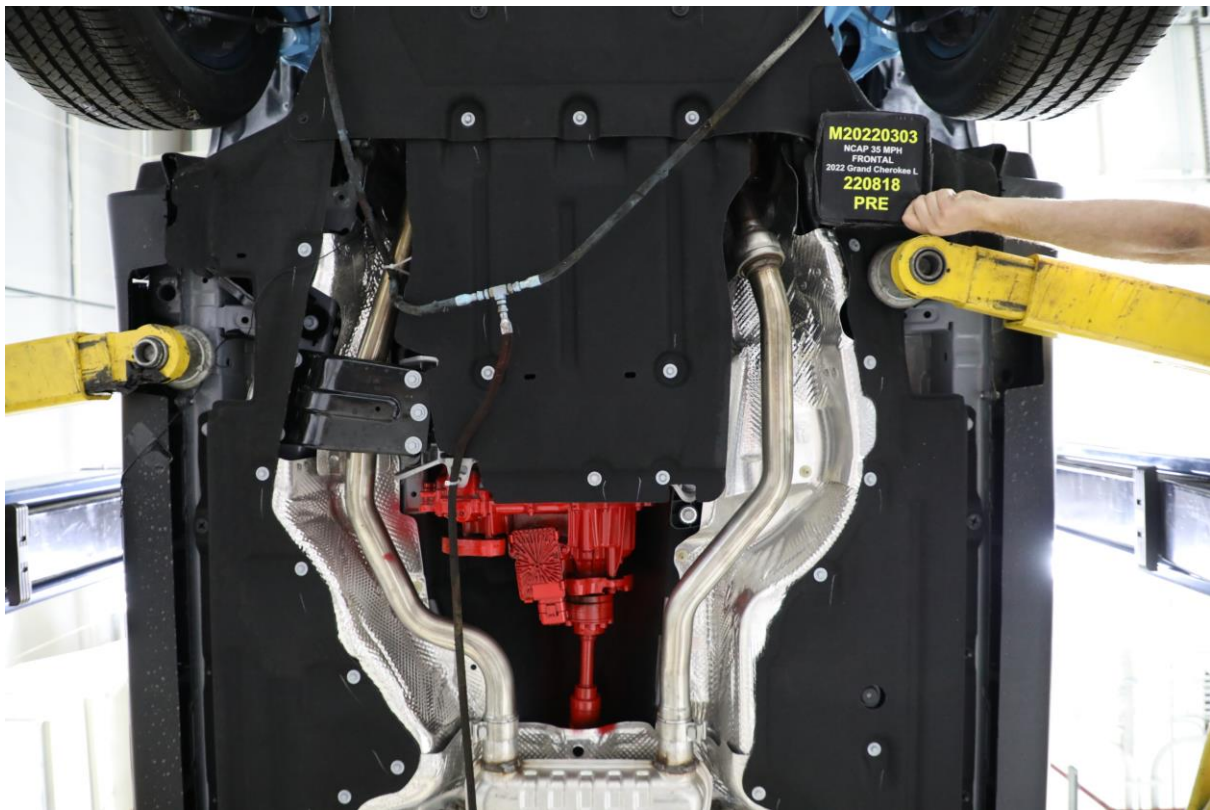


**024 Pre-Test Front Underbody View**

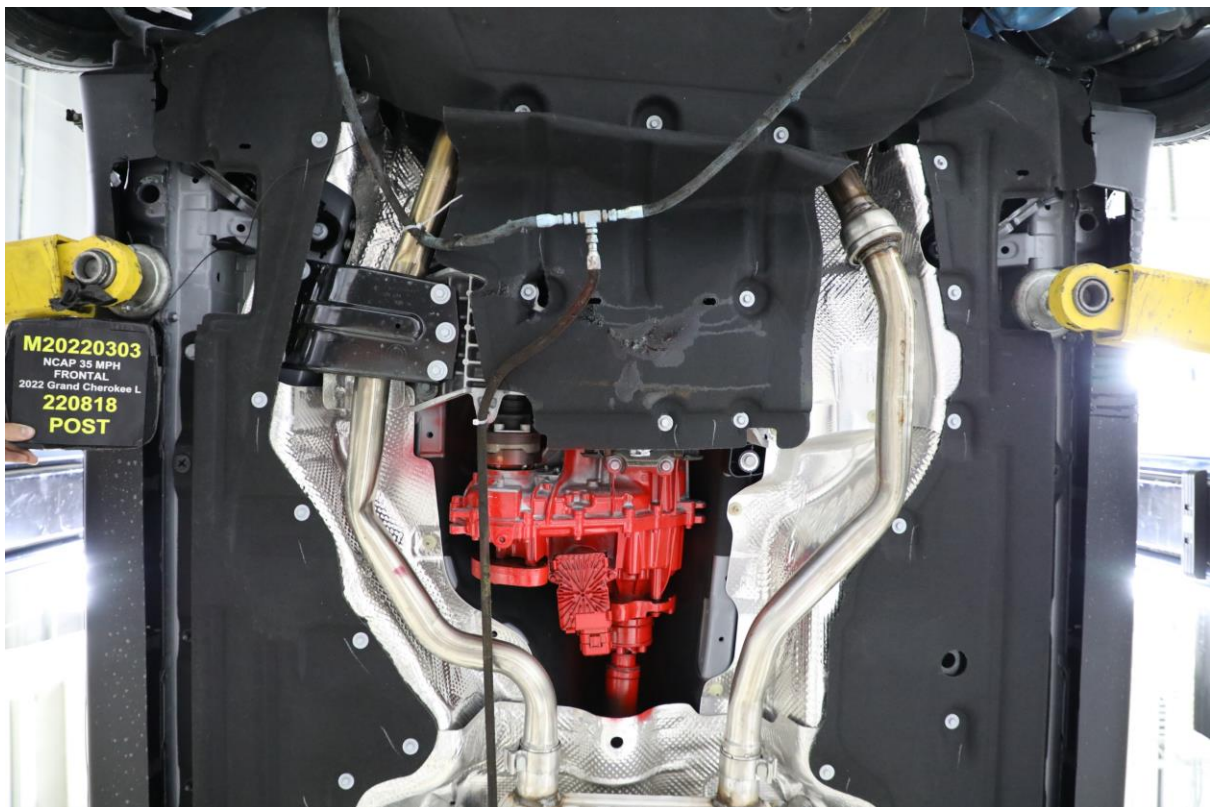


**025 Post-Test Front Underbody View**



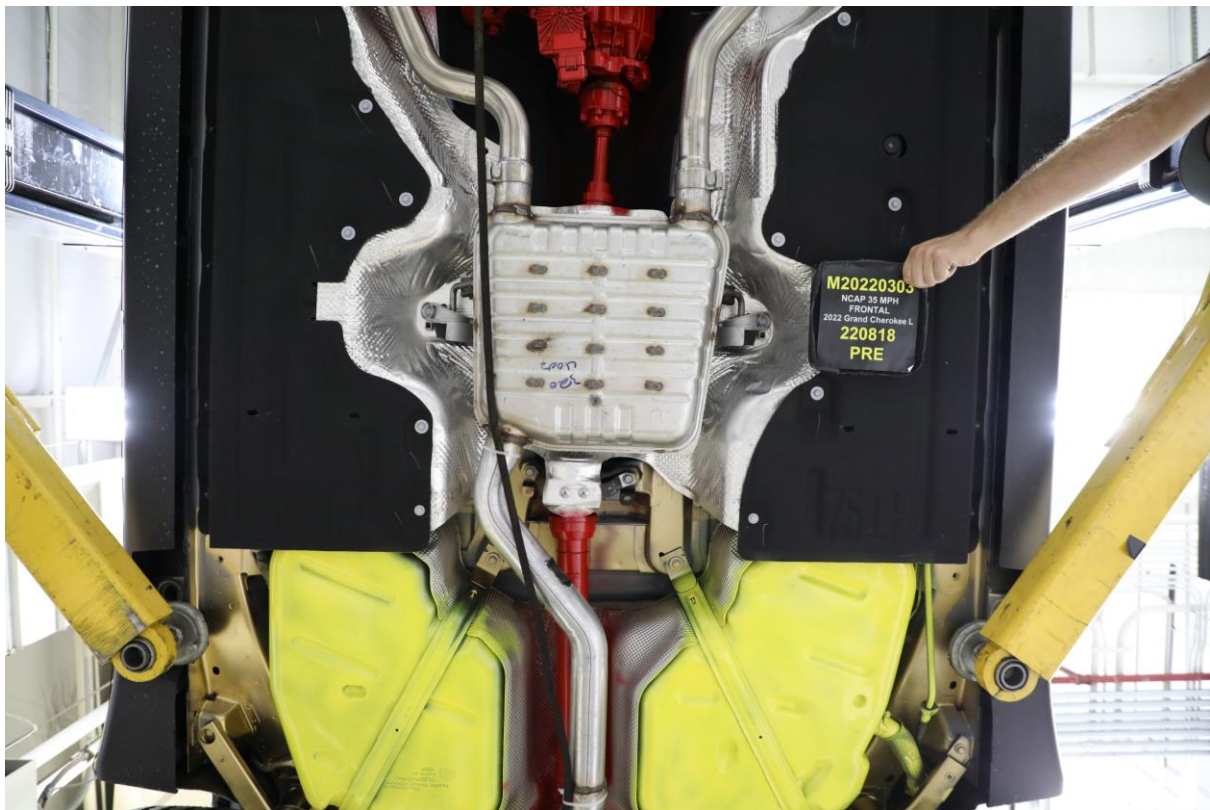


**025a Pre-Test Mid Front Underbody View**

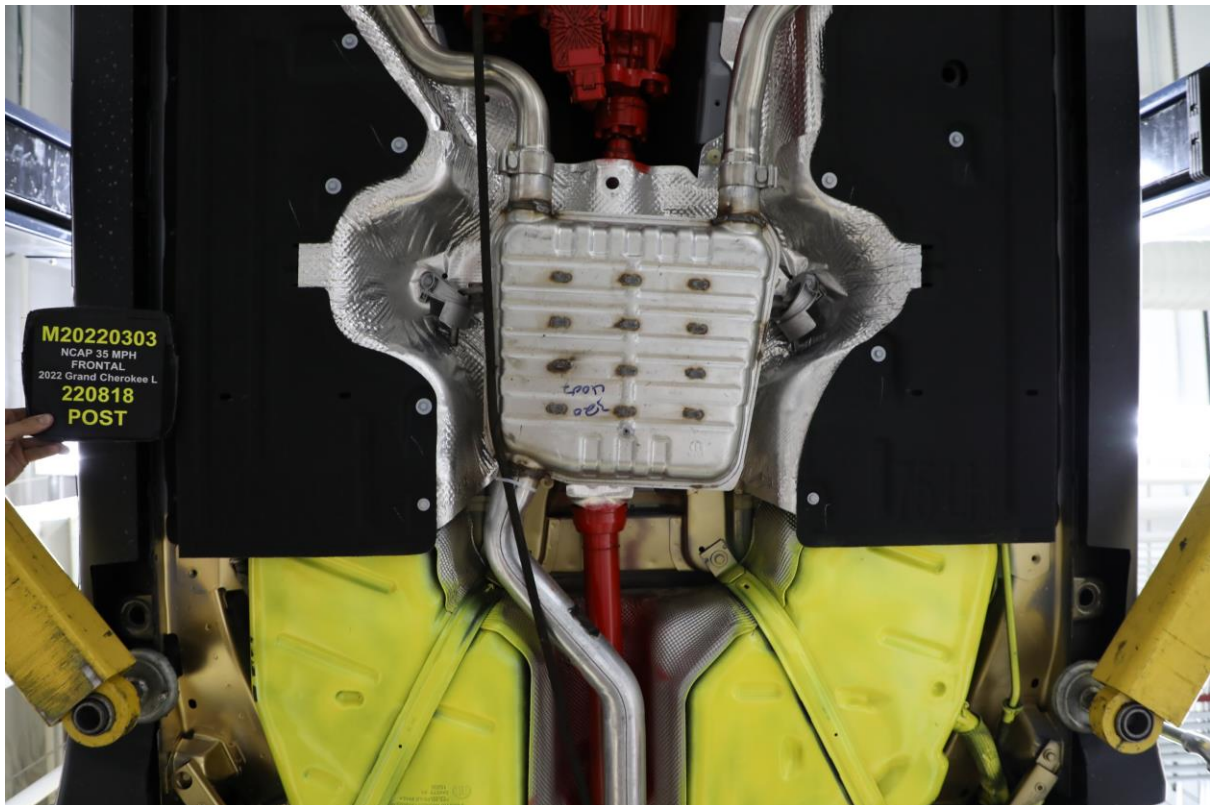


**025b Post-Test Mid Front Underbody View**



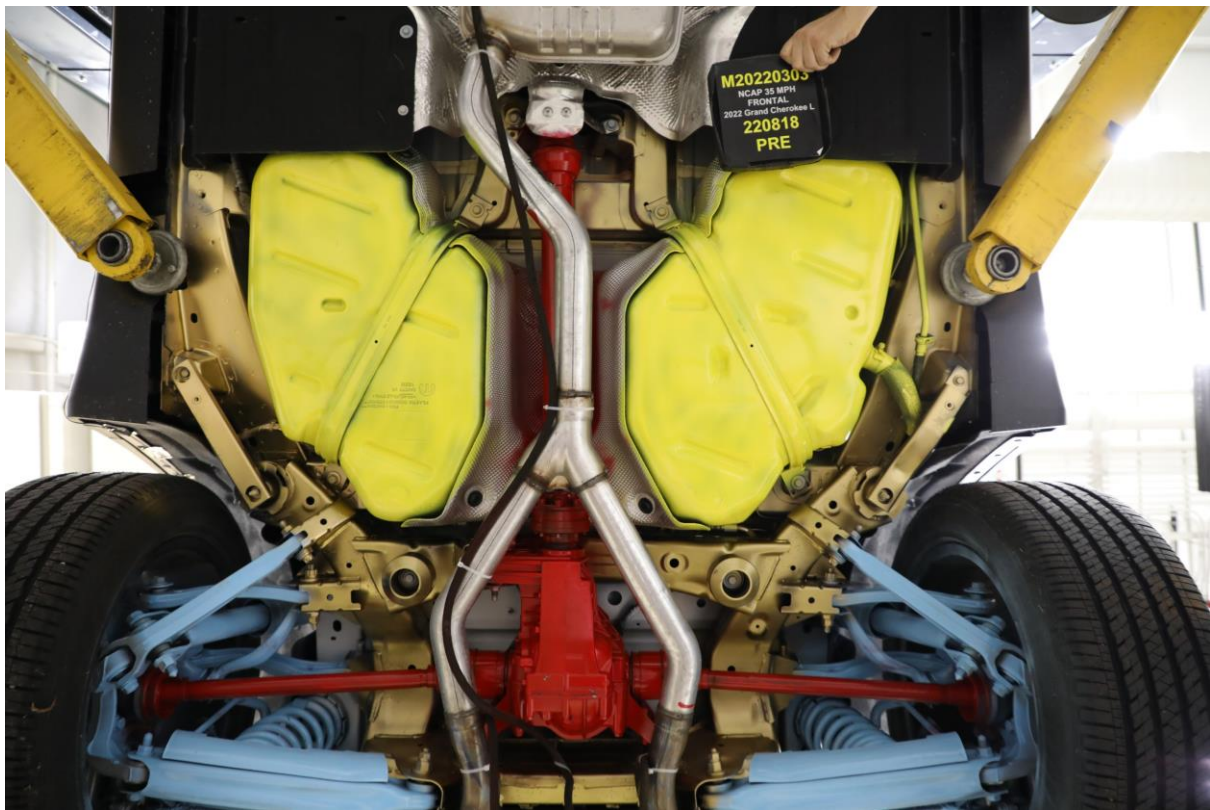


**025c Pre-Test Mid Underbody View**

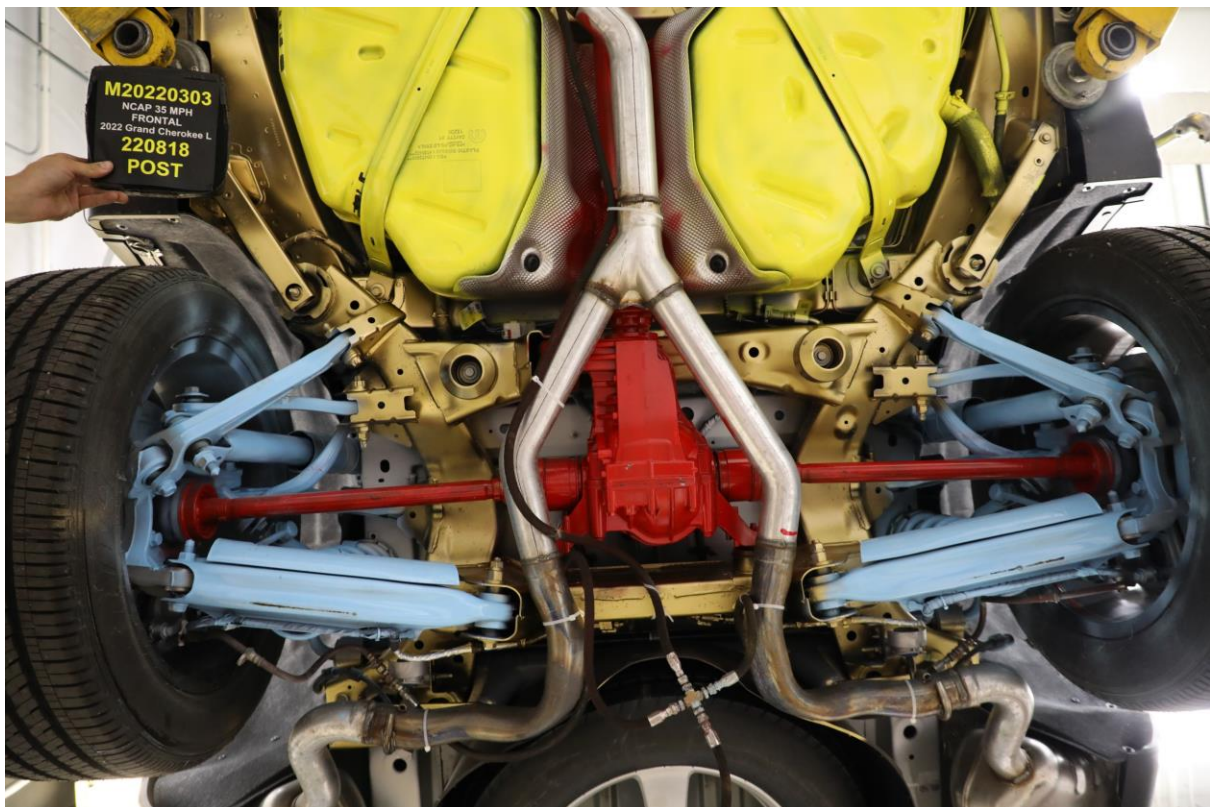


**025d Post-Test Mid Underbody View**



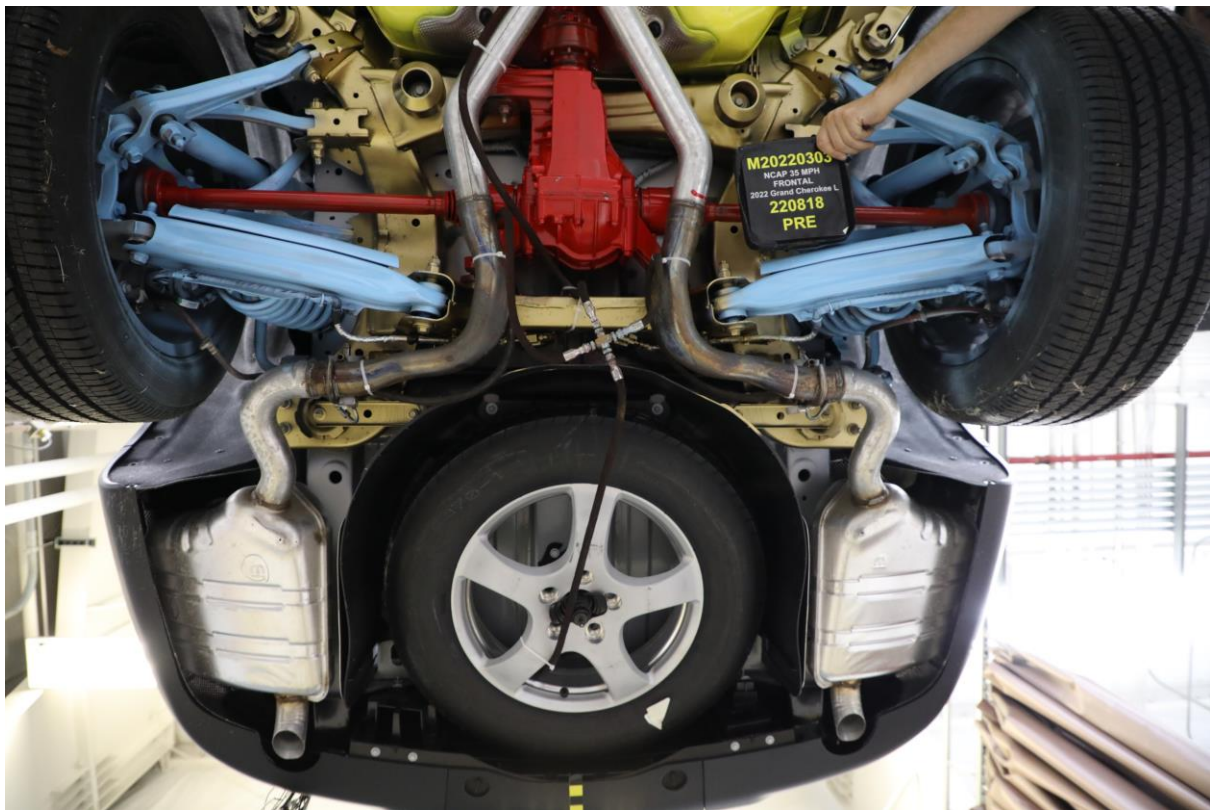


**025e Pre-Test Mid Rear Underbody View**

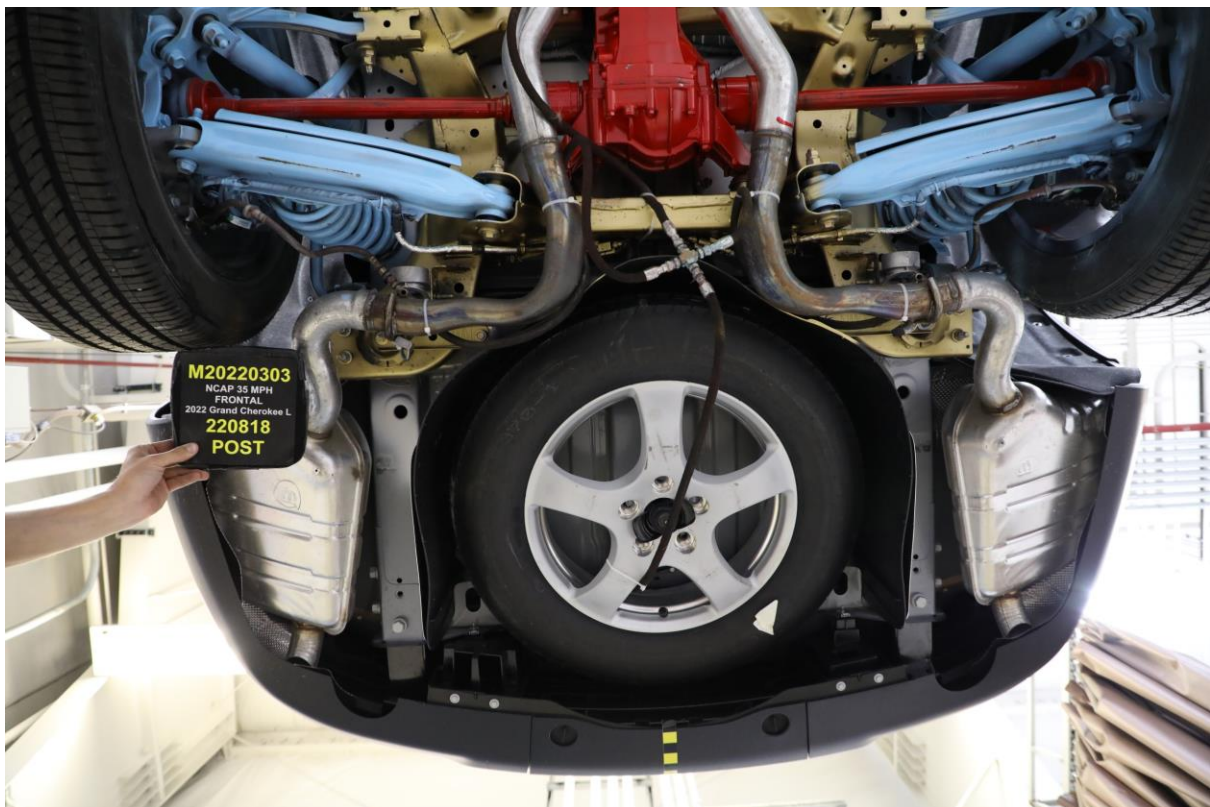


**025f Post-Test Mid Rear Underbody View**





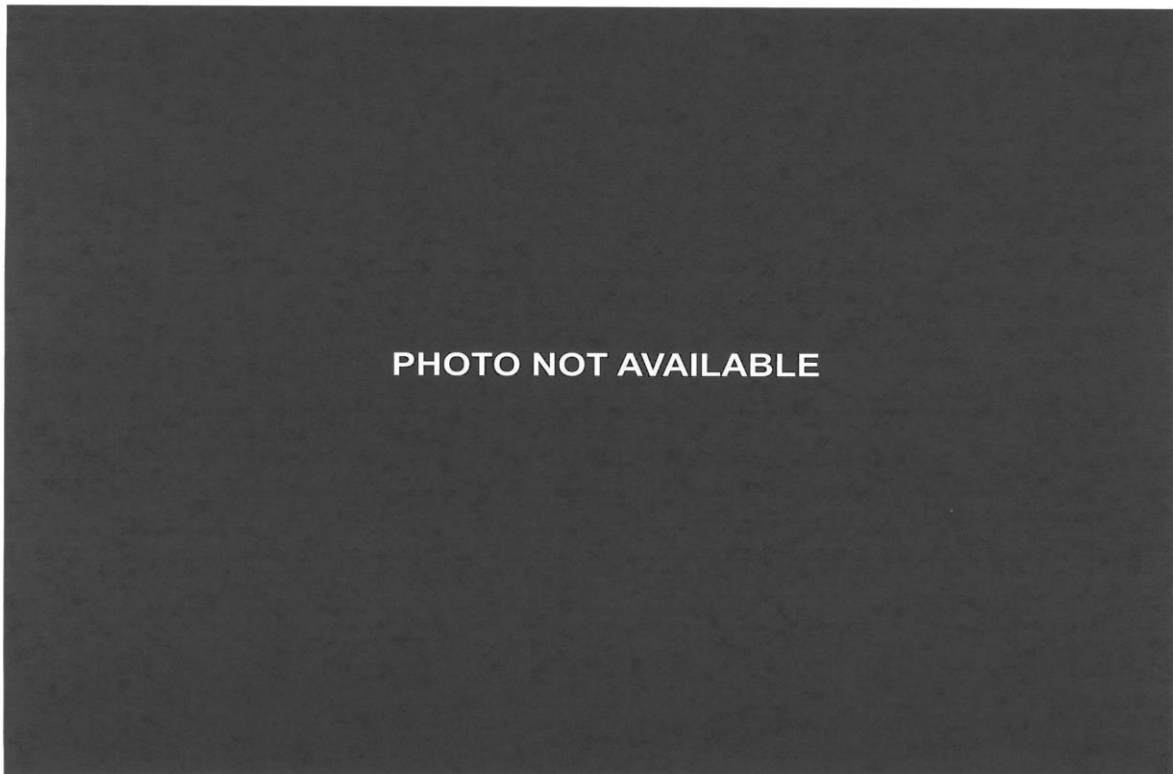
**026 Pre-Test Rear Underbody View**



**027 Post-Test Rear Underbody View**



**028 Pre-Test Dummy Cable Routing**



**029 Post-Test Dummy Cable Routing**





**030 Pre-Test Driver Dummy Front View**



**031 Post-Test Driver Dummy Front View**





**032 Pre-Test Driver Dummy Window View**



**033 Post-Test Driver Dummy Window View**



**034 Pre-Test Driver Dummy and Vehicle Interior View**



**035 Post-Test Driver Dummy and Vehicle Interior View**

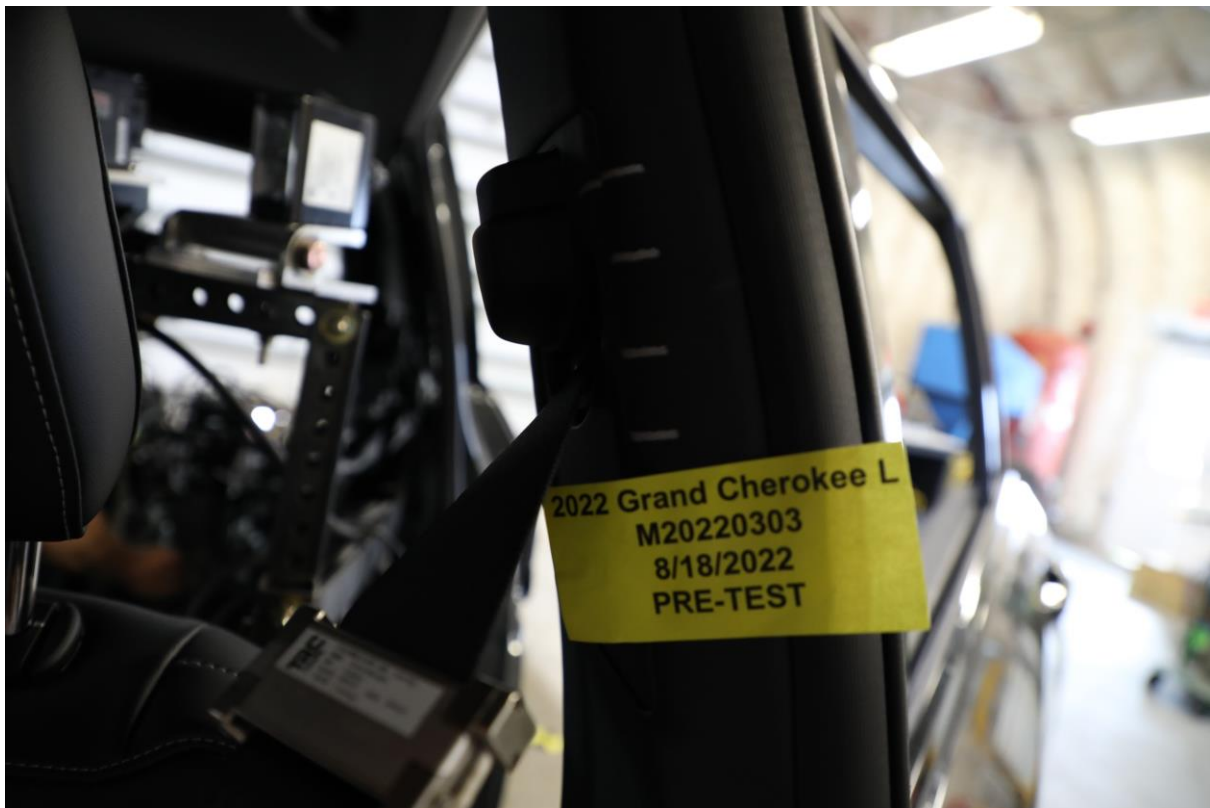




**036 Pre-Test Driver's Seat Fore-Aft Markings**



**037 Post-Test Driver's Seat Fore-Aft Markings**



**038 Pre-Test View of Belt Anchorage for Driver Dummy**



**039 Post-Test View of Belt Anchorage for Driver Dummy**





**040 Pre-Test View of Belt Buckle and Latch Plate for Driver Dummy**



**041 Post-Test View of Belt Buckle and Latch Plate for Driver Dummy**



**042 Pre-Test Driver Dummy Feet**



**043 Post-Test Driver Dummy Feet**





**044 Pre-Test Driver's Side Knee Bolster**



**045 Post-Test Driver's Side Knee Bolster**



**046 Pre-Test Driver's Side Floorpan**



**047 Post-Test Driver's Side Floorpan**





**048 Post-Test Driver Dummy Face**

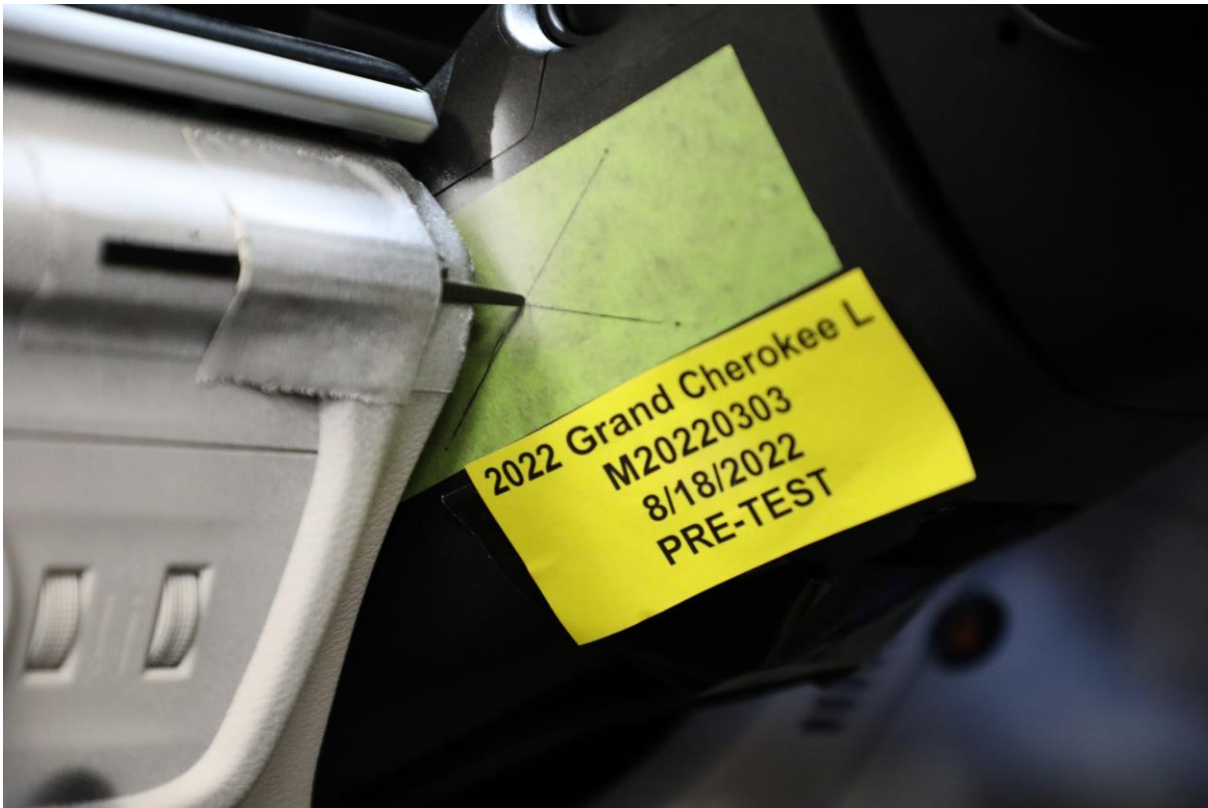


**049 Post-Test Driver Dummy Contact with Airbag**



**050 Post-Test Driver Dummy Contact with Headrest**

**Intentionally Left Blank**



**051 Pre-Test View of the Steering Wheel**



**052 Post-Test View of the Steering Wheel**





**53 Pre-Test Passenger Dummy Front View**



**054 Post-Test Passenger Dummy Front View**





**055 Pre-Test Passenger Dummy Window View**



**056 Post-Test Passenger Dummy Window View**

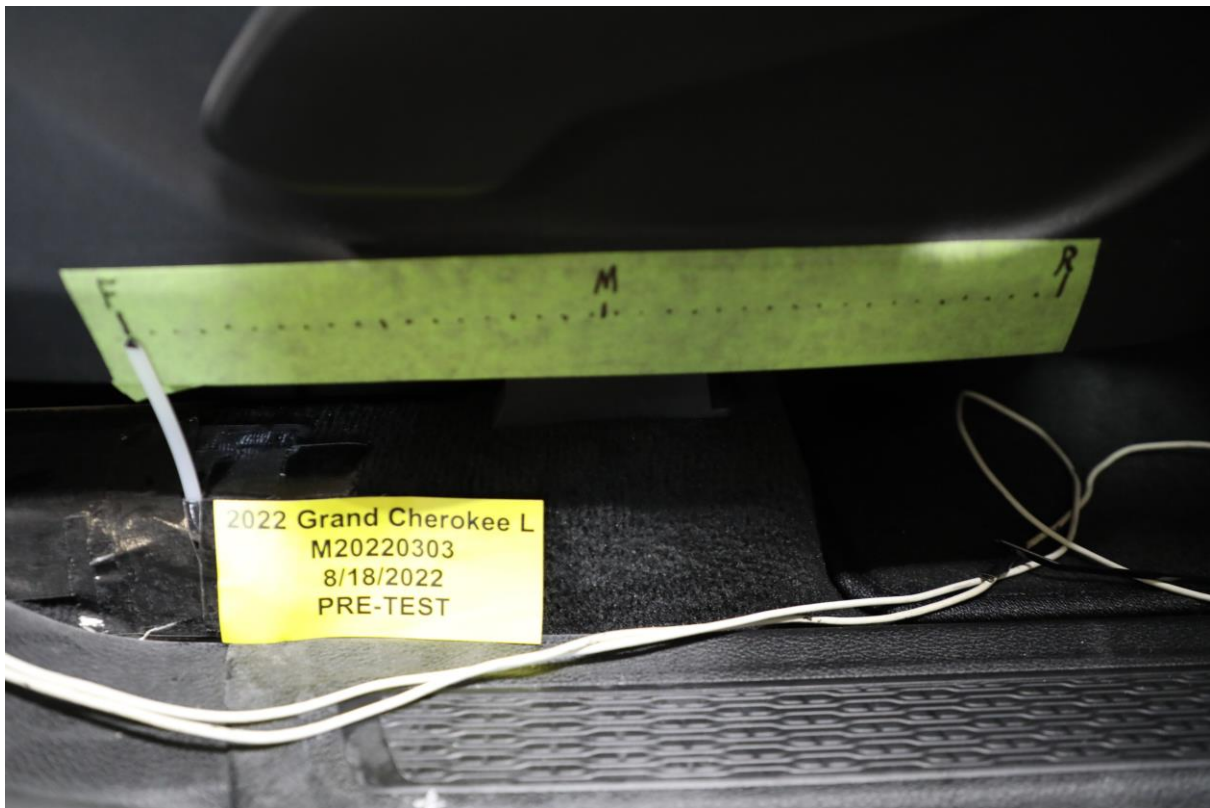


057 Pre-Test Passenger Dummy and Vehicle Interior View



058 Post-Test Passenger Dummy and Vehicle Interior View





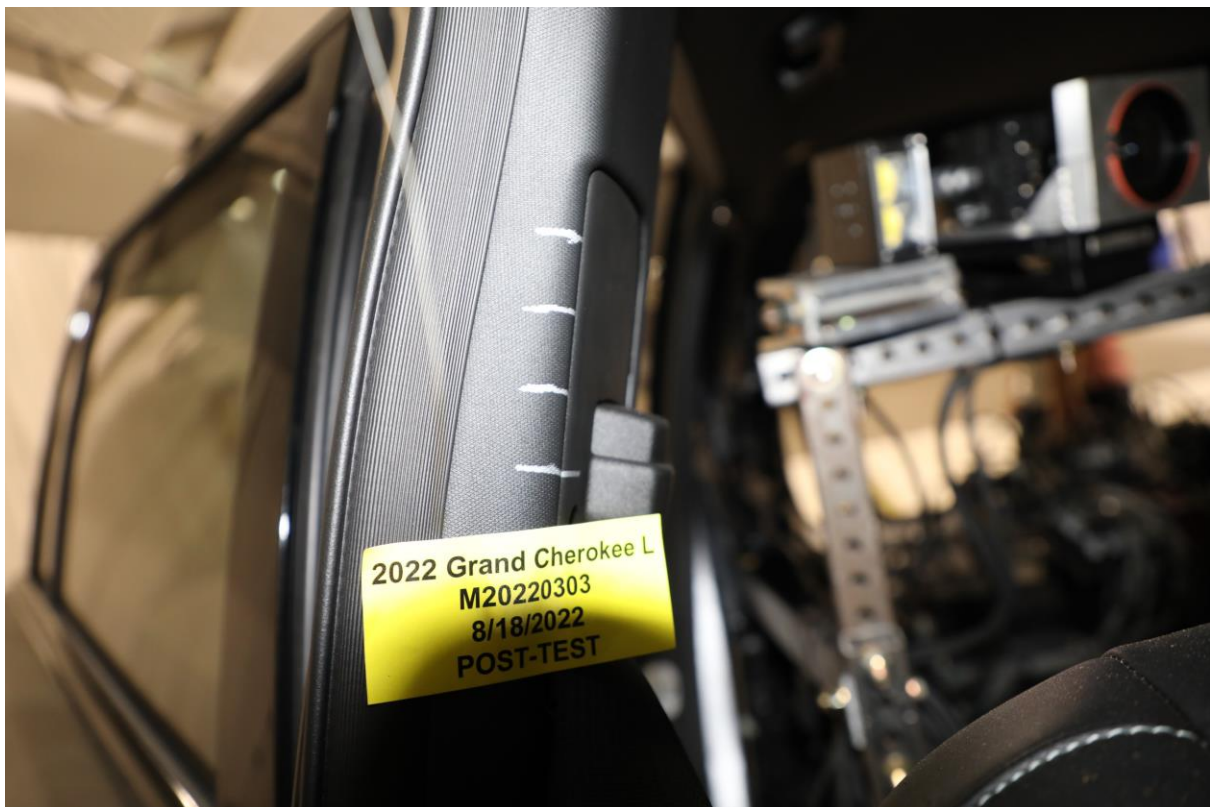
**059 Pre-Test Passenger's Seat Fore-Aft Markings**



**060 Post-Test Passenger's Seat Fore-Aft Markings**

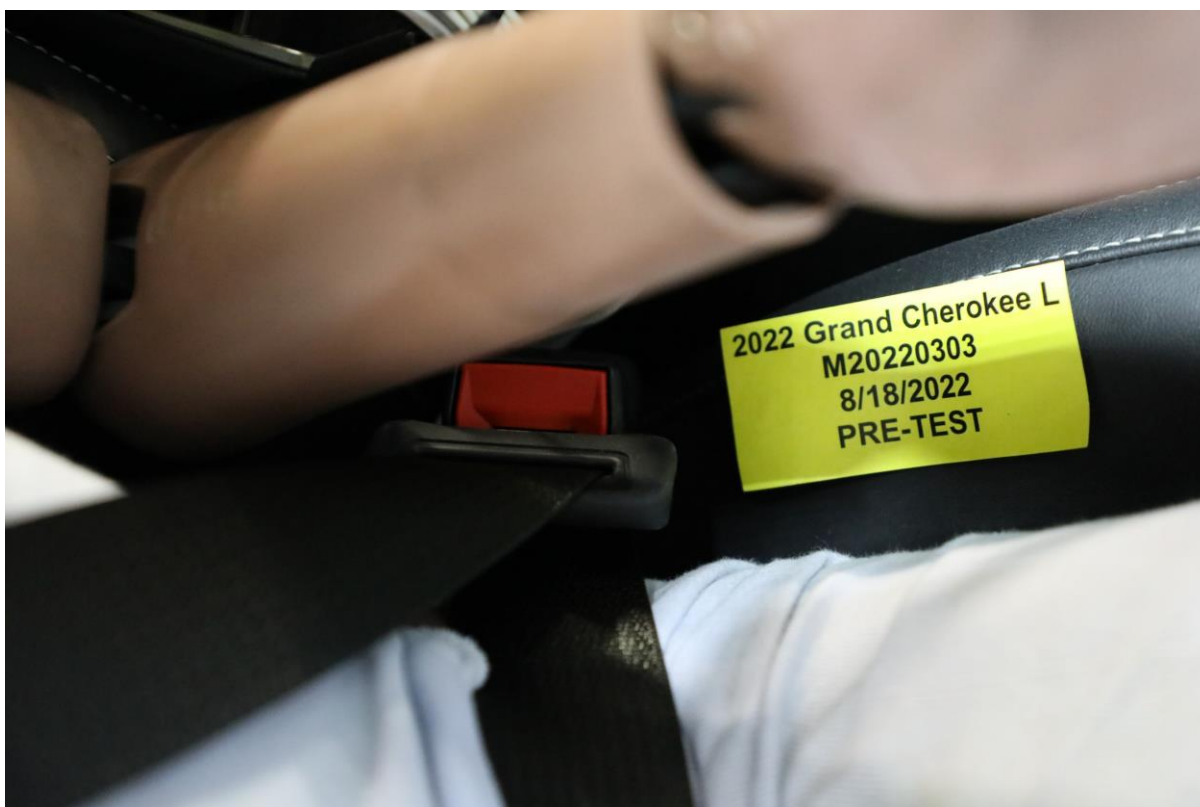


**061 Pre-Test View of Belt Anchorage for Passenger Dummy**



**062 Post-Test View of Belt Anchorage for Passenger Dummy**





**063 Pre-Test View of Belt Buckle and Latch Plate for Passenger Dummy**



**064 Post-Test View of Belt Buckle and Latch Plate for Passenger Dummy**



**065 Pre-Test Passenger Dummy Feet**



**066 Post-Test Passenger Dummy Feet**



**067 Pre-Test Passenger's Side Knee Bolster**



**068 Post-Test Passenger's Side Knee Bolster**





**069 Pre-Test Passenger's Side Floorpan**



**070 Post-Test Passenger's Side Floorpan**



**071 Post-Test Passenger Dummy Face**

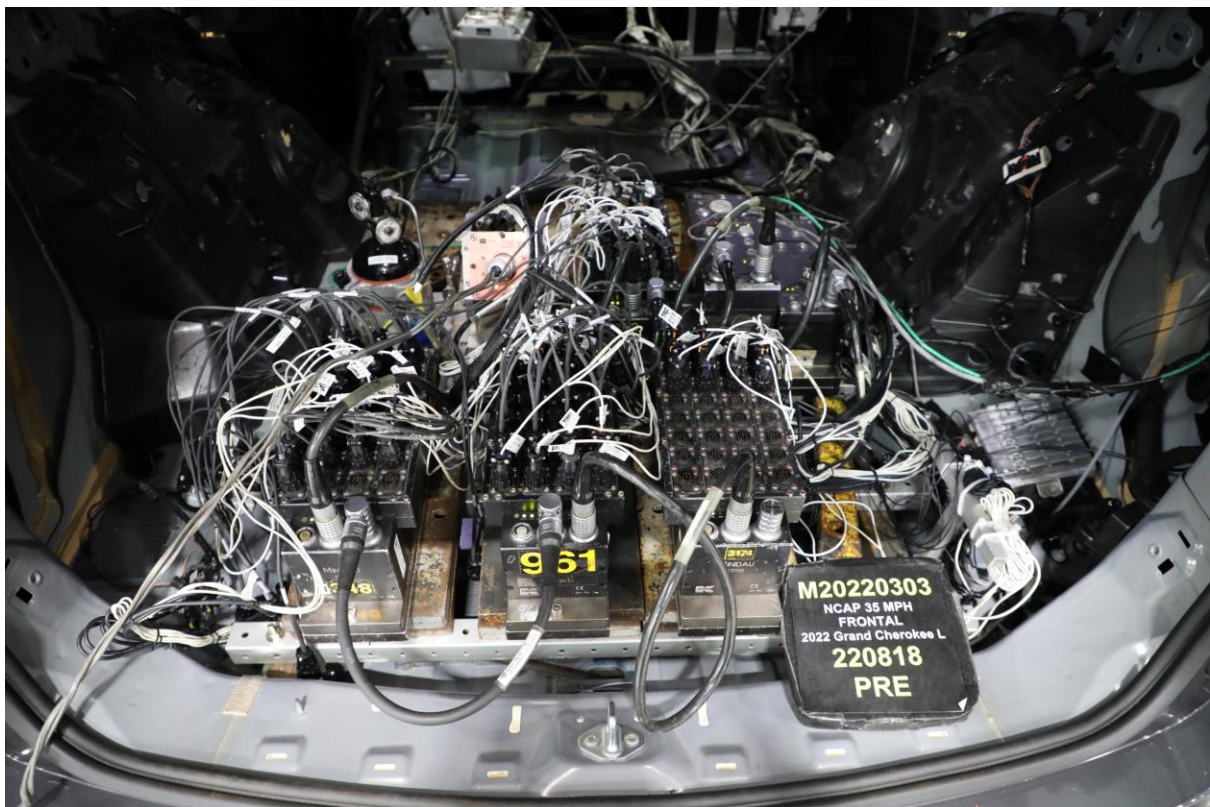


**072 Post-Test Passenger Dummy Contact with Airbag**



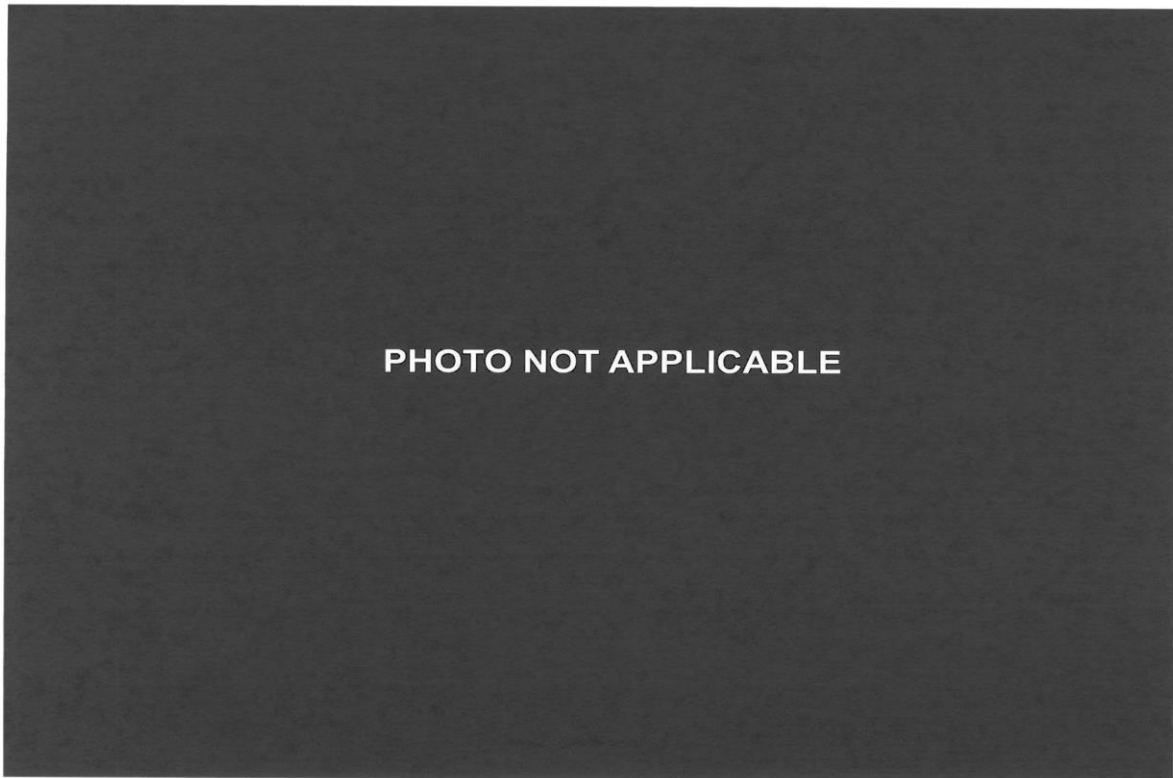


**073 Post-Test Passenger Dummy Contact with Headrest**



**074 Photograph of Ballast Installed in Vehicle**





075 Post-Test Stoddard Spillage Location View



076 Post-Test Speed Trap Read out

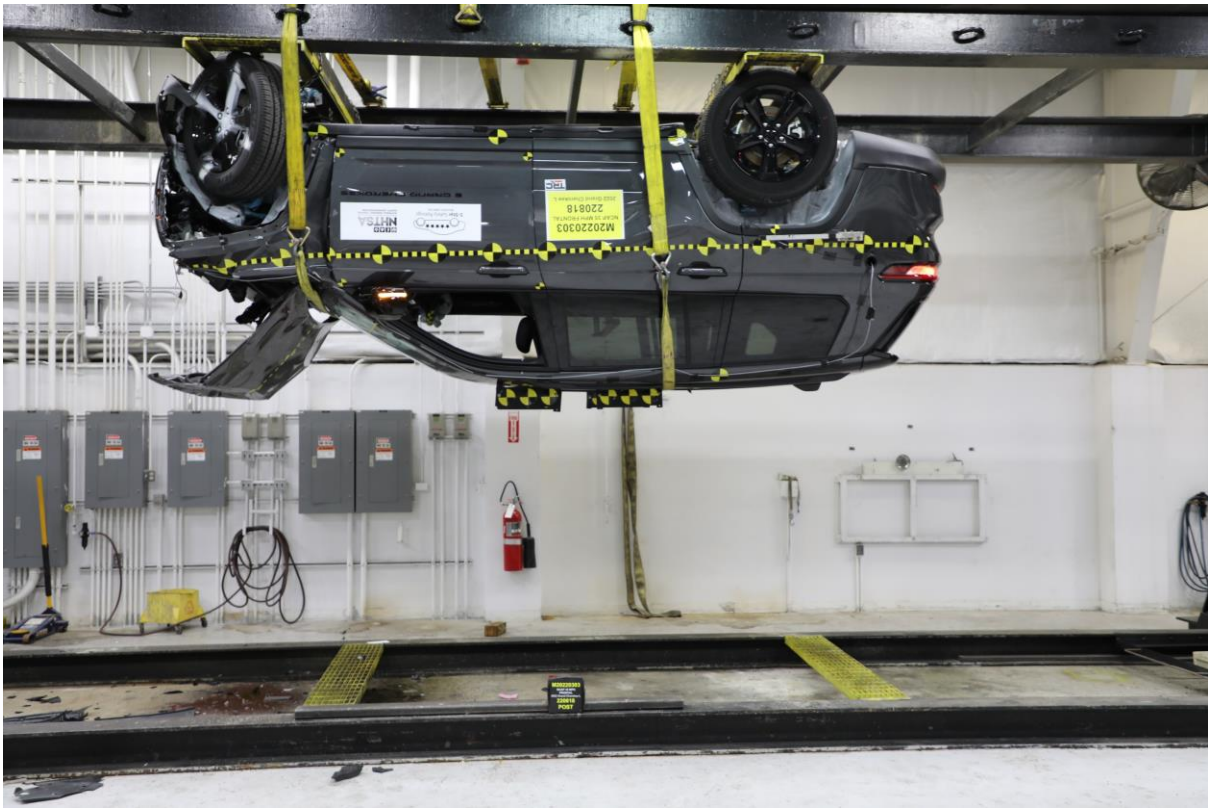


**077 Vehicle at 0° on Static Rollover Device**

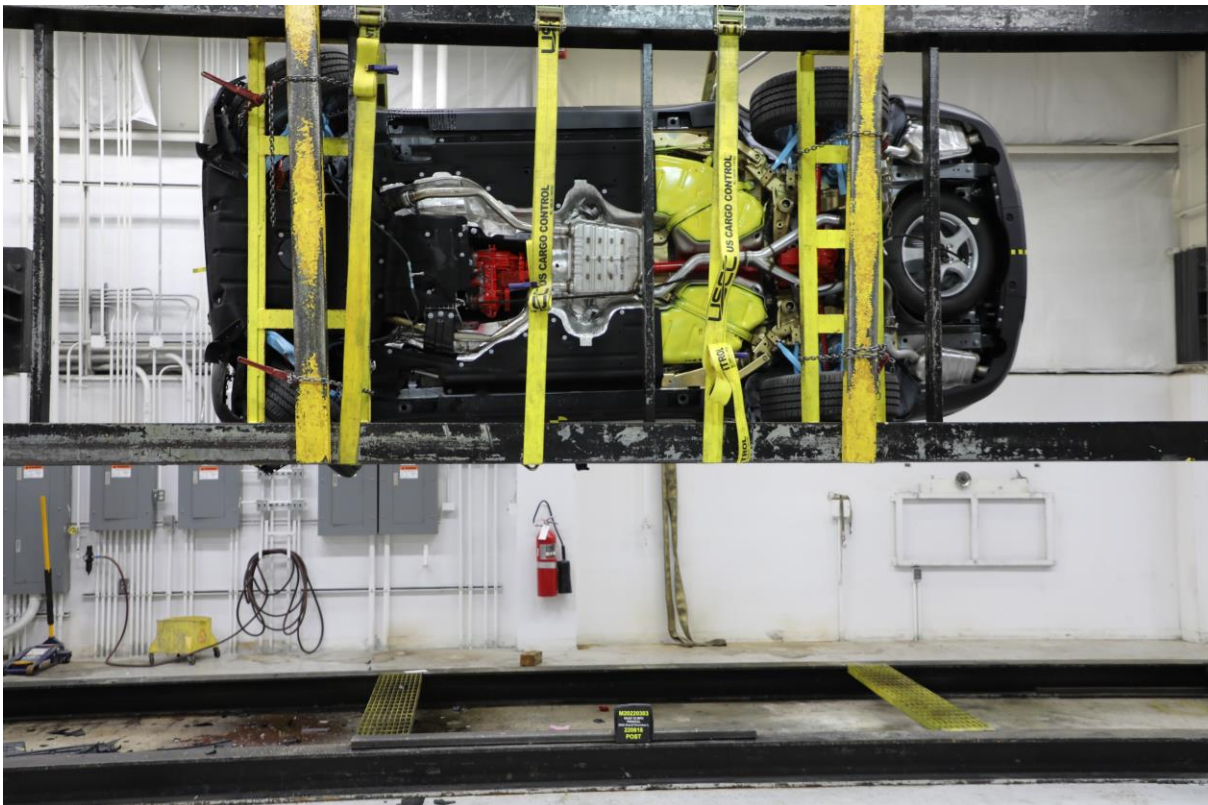


**078 Vehicle at 90° on Static Rollover Device**



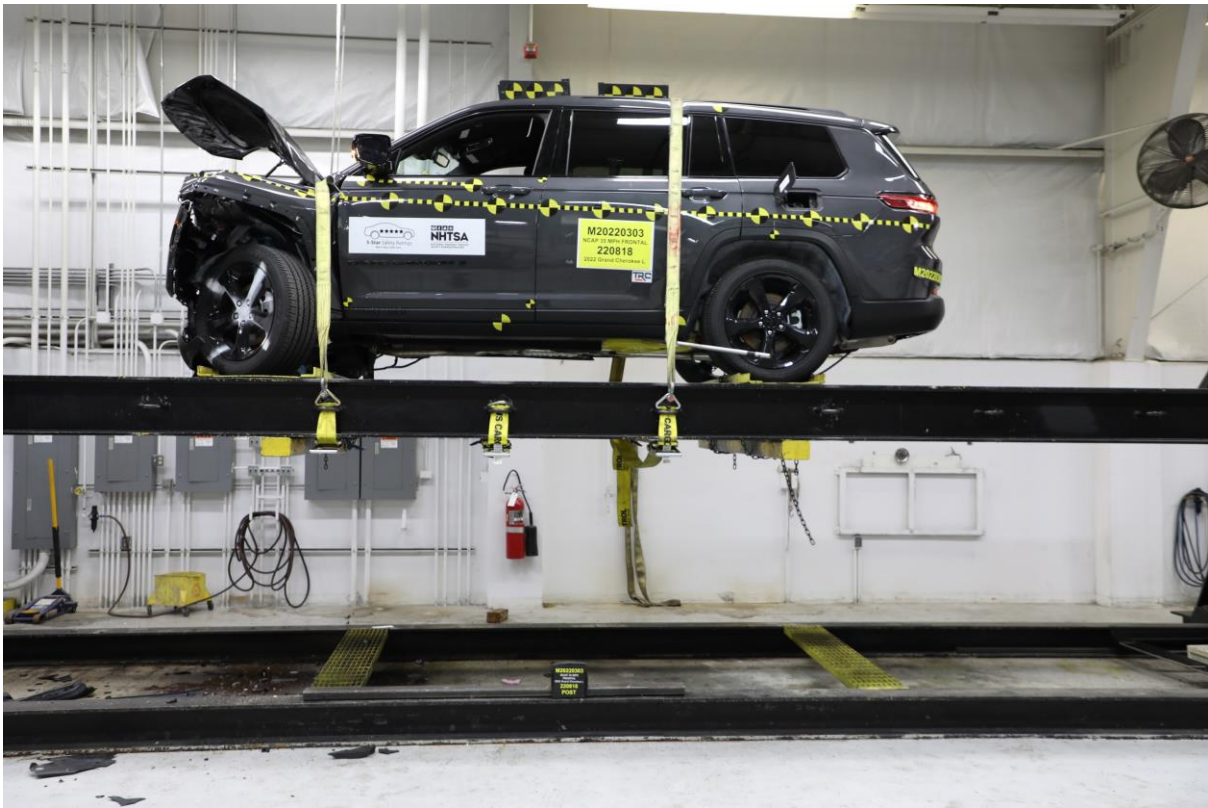


**079 Vehicle at 180° on Static Rollover Device**



**080 Vehicle at 270° on Static Rollover Device**





**081 Vehicle at 360° on Static Rollover Device**



**082 2022 Jeep Grand Cherokee L Frontal Impact Event**

2022 MODEL YEAR

# Jeep GRAND CHEROKEE L ALTITUDE 4X4

For more information visit: [www.jeep.com](http://www.jeep.com)  
or call 1-877-IAM-JEEP

FCA US LLC

THIS VEHICLE IS MANUFACTURED TO MEET SPECIFIC UNITED STATES REQUIREMENTS. THIS VEHICLE IS NOT MANUFACTURED FOR SALE OR REGISTRATION OUTSIDE OF THE UNITED STATES.

MANUFACTURER'S SUGGESTED RETAIL PRICE OF THIS MODEL INCLUDING DEALER PREPARATION

Base Price: \$42,325

Jeep GRAND CHEROKEE L ALTITUDE 4X4  
Exterior Color: Satin Gray Metallic Clear-Coat Exterior Paint  
Interior Color: Graphite Black Interior Color  
Interior: Leather-Trimmed Bucket Seats  
Engine: 3.6L V6 24V 171" Crank w/ 3.6L  
Transmission: 8-Speed Automatic 650RE Transmission

STANDARD EQUIPMENT (UNLESS REPLACED BY OPTIONAL EQUIPMENT)

FUNCTIONAL SAFETY FEATURES

Jeep Wreath Membership (Retail Sales@50 States Only)  
Advanced MultiStage Front Air Bags  
Supplemental Side-Curtain Front and Rear Air Bags  
Supplemental Front Seat-Mounted Side Air Bags  
Driver Inflatable Knee-Bolster Air Bag  
Passenger Inflatable Knee-Bolster Air Bag  
Quadra-Trac I8 4WD System  
Adaptive Cruise Control with Stop and Go  
Active Lane-Management System  
Full-Speed Forward-Collision Warning Plus  
ParkView Rear Back-Up Camera  
ParkSense® Rear Park-Assist with Stop  
Blind-Spot and Cross-Path Detection  
Advanced Brake-Assist  
Pedestrian / Cyclist Emergency Braking  
Rear-View Day / Night Mirror  
Anti-Lock 4-Wheel Disc Brakes  
Electronic Stability Control  
Hill-Start Assist  
Tire Pressure Monitoring Display  
Compact Spare Tire  
Conventional Differential Front Axle w/ Disconnect  
Speed-Sensitive Power-Locks  
Security Alarm  
Rear-Side Object Alert

INTERIOR FEATURES  
Unconnected 5 with 8.4-inch Touch Screen Display  
Cluster 10.25-inch TFT Color Display  
Apple CarPlay®  
Google Android Auto™  
Jeep Connect (Connected Services) w/ Trial  
4G LTE Wi-Fi Hot Spot with Trial Included  
Integrated Voice Command with Bluetooth®  
6 Speakers  
Illuminated Cupholders  
Deep-Tint Privacy Glass  
12-Volt Auxiliary Power Outlet  
Steering-Wheel-Mounted Audio Controls  
2nd Row Buckets with Manual Entry-Entry Side  
3rd Row 50/50 Manual Folding Seat  
8-Way Power Adjustable Driver Seat

Assembly Plant/Port of Entry: DETROIT, MICHIGAN, U.S.A.  
VIN: 1C4RJKA9N9-526180 MSRP: \$42,325

Destination Charge \$1,795

4-Way Manual Adjustable Front Passenger Seat

Air Conditioning with 3-Zone Automatic Temp Control

Full Function Media Hub with 2-USB Plus Aux Port

2nd Row Dual Charge-Only USB Ports

EXTERIOR FEATURES

18-inch x 8.0-inch Fully-Painted Aluminum Wheels

265/60R18 BSW Overload Rated Tires

LED Reflector Headlamps

OPTIONAL EQUIPMENT (May Replace Standard Equipment)

Baltic Gray Metallic Clear-Coat Exterior Paint \$395

Customer Preferred Package 22B \$3,185

265/60R18 BSW All-Season PRR Tires

Leather-Trimmed Bucket Seats

Altitude Appearance Package

Rain-Sensitive Windshield Wipers

Remote-Start System

Selectable Tire-Fill Alert

Wireless Charging-Pad

Heated Steering Wheel

Heated Front Seats

Black Headliner

115-Volt Auxiliary Power-Outlet

Power Liftgate

Leather-Wrapped Steering Wheel

Black / Gloss-Black Roof Rails

3rd Row Charge-Only USB Ports

Destination Charge \$1,795

TOTAL PRICE: \* \$49,620

WARRANTY COVERAGE

5-year or 60,000-mile Powertrain Limited Warranty

3-year or 36,000-mile Basic Limited Warranty

Ask Dealer for a copy of the limited warranties or see your owner's manual for details.

5 YEAR / 60,000 MILE POWERTRAIN WARRANTY

EPA DOT

**Fuel Economy and Environment**

Gasoline Vehicle

**Fuel Economy** These estimates reflect new EPA methods beginning with 2017 models.

**21** MPG  
combined city/hwy

18 city 25 highway

4.8 gallons per 100 miles

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

**Annual fuel Cost \$1,700**

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

1 4 10

**Smog Rating** (tailpipe only)

1 7 10

This vehicle emits 430 grams CO2 per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also creates emissions. Learn more at [fuelconomy.gov](http://fuelconomy.gov)

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 27 MPG and cost \$6,600 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$2.39 per gallon. EPA's a miles per gallon-to-gallon system. Vehicle emissions are a significant cause of climate change and smog.

**fuelconomy.gov**  
Calculate personalized estimates and compare vehicles

Smartphone QR Code

**GOVERNMENT 5-STAR SAFETY RATINGS**

This vehicle has not been rated by the government for overall vehicle score, frontal crash, side crash, or rollover risk.

Source: National Highway Traffic Safety Administration (NHTSA)  
[www.safercar.gov](http://www.safercar.gov) or 1-888-327-4236

**PARTS CONTENT INFORMATION**

FOR VEHICLES IN THIS CARLINE:  
U.S./CANADIAN PARTS CONTENT: 66%  
MAJOR SOURCES OF FOREIGN PARTS CONTENT:

MEXICO : 24%  
NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.

FOR THIS VEHICLE:  
FINAL ASSEMBLY POINT:  
DETROIT, MICHIGAN, U.S.A.  
COUNTRY OF ORIGIN:  
ENGINE: MEXICO  
TRANSMISSION: UNITED STATES

**VEHICLE PROTECTION**  
A PRODUCT OF FCA US LLC

**MOPIR**  
Ask for Major Vehicle Protection for your vehicle. See Dealer for details.



THIS LABEL IS ADDED TO THIS VEHICLE TO COMPLY WITH FEDERAL LAW. THE LABEL CANNOT BE REMOVED OR ALTERED PRIOR TO DELIVERY TO THE ULTIMATE PHOENIX.

\* EXCLUDES AND/OR LOCAL TAXES, AND LICENSE AND TITLE FEES AND DEALER SUPPLIES AND INSTALLATION OPTIONS AND ACCESSORIES ARE NOT INCLUDED IN THIS PRICE. DISCOUNTS, IF ANY, ARE BASED ON PRICE OF OPTION IF PURCHASED SEPARATELY.

## 083 Monroney Label Photograph

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



## TABLE OF DATA PLOTS

| No. | List of Data Plots Provided in the Test Report          | Page |
|-----|---------------------------------------------------------|------|
| 1   | Driver Head X Acceleration vs. Time Primary             | B-6  |
| 2   | Driver Head Y Acceleration vs. Time Primary             | B-6  |
| 3   | Driver Head Z Acceleration vs. Time Primary             | B-6  |
| 4   | Driver Head Resultant Acceleration vs. Time Primary     | B-6  |
| 5   | Driver Chest X Deflection vs. Time                      | B-7  |
| 6   | Driver Chest X Acceleration vs. Time Primary            | B-8  |
| 7   | Driver Chest Y Acceleration vs. Time Primary            | B-8  |
| 8   | Driver Chest Z Acceleration vs. Time Primary            | B-8  |
| 9   | Driver Chest Resultant Acceleration vs. Time Primary    | B-8  |
| 10  | Driver Upper Neck Force X vs. Time                      | B-9  |
| 11  | Driver Upper Neck Force Z vs. Time                      | B-9  |
| 12  | Driver Upper Neck Moment Y vs. Time                     | B-9  |
| 13  | Driver Nij vs. Time                                     | B-10 |
| 14  | Driver Left Femur Force vs. Time                        | B-11 |
| 15  | Driver Right Femur Force vs. Time                       | B-11 |
| 16  | Passenger Head X Acceleration vs. Time Primary          | B-12 |
| 17  | Passenger Head Y Acceleration vs. Time Primary          | B-12 |
| 18  | Passenger Head Z Acceleration vs. Time Primary          | B-12 |
| 19  | Passenger Head Resultant Acceleration vs. Time Primary  | B-12 |
| 20  | Passenger Chest X Deflection vs. Time                   | B-13 |
| 21  | Passenger Chest X Acceleration vs. Time Primary         | B-14 |
| 22  | Passenger Chest Y Acceleration vs. Time Primary         | B-14 |
| 23  | Passenger Chest Z Acceleration vs. Time Primary         | B-14 |
| 24  | Passenger Chest Resultant Acceleration vs. Time Primary | B-14 |
| 25  | Passenger Upper Neck Force X vs. Time                   | B-15 |
| 26  | Passenger Upper Neck Force Z vs. Time                   | B-15 |
| 27  | Passenger Upper Neck Moment Y vs. Time                  | B-15 |
| 28  | Passenger Nij vs. Time                                  | B-16 |
| 29  | Passenger Left Femur Force vs. Time                     | B-17 |
| 30  | Passenger Right Femur Force vs. Time                    | B-17 |

The following additional dummy and vehicle response data can be found in the R & D section of the NHTSA website at: [www.nhtsa.gov](http://www.nhtsa.gov).

Driver Head Acceleration X Redundant  
Driver Head Acceleration Y Redundant  
Driver Head Acceleration Z Redundant  
Driver Upper Neck Force Y  
Driver Upper Neck Moment X  
Driver Upper Neck Moment Z  
Driver Chest X Acceleration Redundant  
Driver Chest Y Acceleration Redundant  
Driver Chest Z Acceleration Redundant  
Driver Pelvis X  
Driver Pelvis Y  
Driver Pelvis Z  
Driver Left Femur Redundant  
Driver Right Femur Redundant  
Driver Left Upper Tibia Moment X  
Driver Left Upper Tibia Moment Y  
Driver Left Upper Tibia Force Z  
Driver Left Lower Tibia Moment X  
Driver Left Lower Tibia Moment Y  
Driver Left Lower Tibia Force Z  
Driver Right Upper Tibia Moment X  
Driver Right Upper Tibia Moment Y  
Driver Right Upper Tibia Force Z  
Driver Right Lower Tibia Moment X  
Driver Right Lower Tibia Moment Y  
Driver Right Lower Tibia Force Z  
Driver Left Foot Fore Z  
Driver Left Foot Aft X  
Driver Left Foot Aft Z  
Driver Right Foot Fore Z  
Driver Right Foot Aft X  
Driver Right Foot Aft Z

Driver Head Angular Velocity X  
Driver Head Angular Velocity Y  
Driver Head Angular Velocity Z  
Driver Shoulder Belt  
Driver Lap Belt  
Passenger Head Acceleration X Redundant  
Passenger Head Acceleration Y Redundant  
Passenger Head Acceleration Z Redundant  
Passenger Upper Neck Force Y  
Passenger Upper Neck Moment X  
Passenger Upper Neck Moment Z  
Passenger Chest X Acceleration Redundant  
Passenger Chest Y Acceleration Redundant  
Passenger Chest Z Acceleration Redundant  
Passenger Pelvis X  
Passenger Pelvis Y  
Passenger Pelvis Z  
Passenger Left Femur Redundant  
Passenger Right Femur Redundant  
Passenger Left Upper Tibia Moment X  
Passenger Left Upper Tibia Moment Y  
Passenger Left Upper Tibia Force Z  
Passenger Left Lower Tibia Moment X  
Passenger Left Lower Tibia Moment Y  
Passenger Left Lower Tibia Force Z  
Passenger Right Upper Tibia Moment X  
Passenger Right Upper Tibia Moment Y  
Passenger Right Upper Tibia Force Z  
Passenger Right Lower Tibia Moment X  
Passenger Right Lower Tibia Moment Y  
Passenger Right Lower Tibia Force Z  
Passenger Left Foot Fore Z  
Passenger Left Foot Aft X  
Passenger Left Foot Aft Z  
Passenger Right Foot Fore Z  
Passenger Right Foot Aft X  
Passenger Right Foot Aft Z



Passenger Head Angular Velocity X  
Passenger Head Angular Velocity Y  
Passenger Head Angular Velocity Z  
Left Rear Seat Crossmember X  
Left Rear Seat Crossmember Z  
Passenger Shoulder Belt  
Passenger Lap Belt  
Right Rear Seat Crossmember X  
Right Rear Seat Crossmember Z  
Left Rear Seat Crossmember X Redundant  
Right Rear Seat Crossmember X Redundant  
Vehicle Engine Top X  
Vehicle Engine Bottom X  
Load Cell Barrier Forces and Moments

# NHTSA

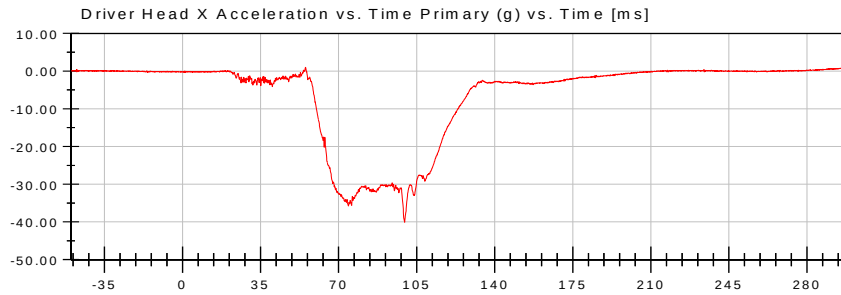
Test Lab: CTF

Test Number: 220818 (M20220303)

Test Date: 08/18/2022

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Position #2 Hybrid III Small Adult Female (DH1659)



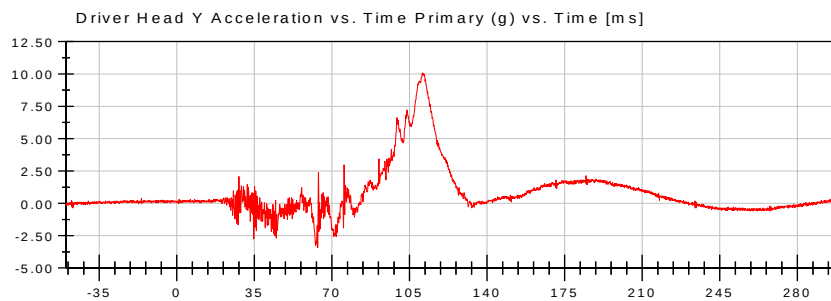
<Max>

1.00 g at 55.20 ms

<Min>

-40.07 g at 99.60 ms

CFC\_1000



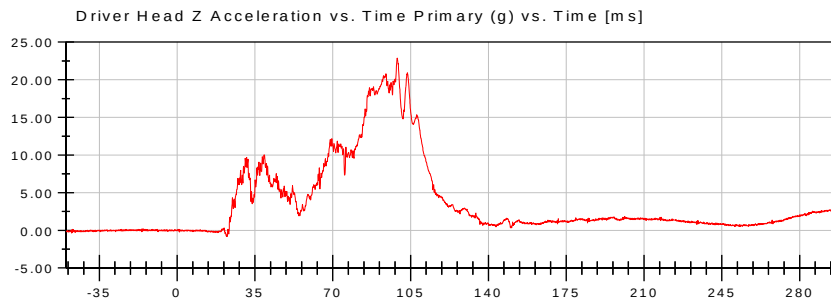
<Max>

10.09 g at 110.72 ms

<Min>

-3.41 g at 63.60 ms

CFC\_1000



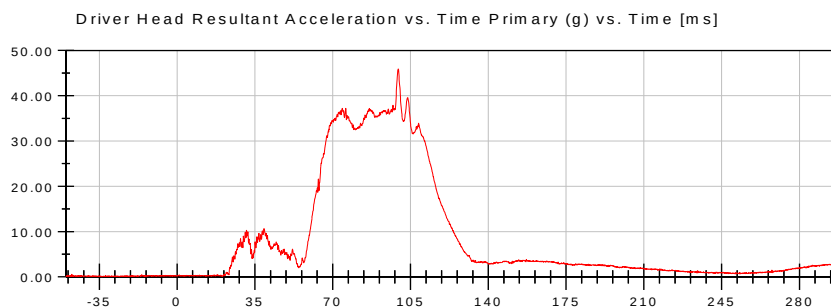
<Max>

22.89 g at 99.04 ms

<Min>

-0.81 g at 22.16 ms

CFC\_1000



<Max>

45.90 g at 99.44 ms

<Min>

0.03 g at -34.16 ms

CFC\_1000



# NHTSA

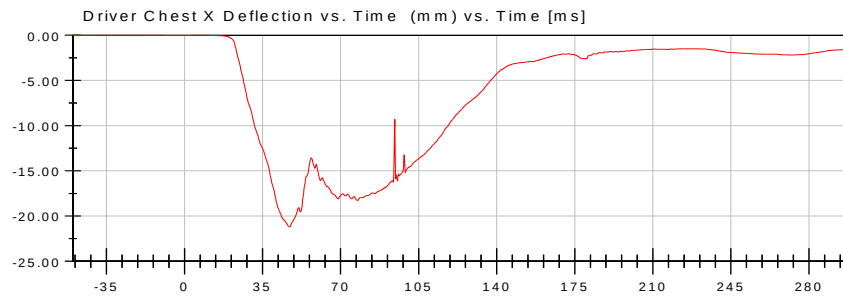
Test Lab: CTF

Test Number: 220818 (M20220303)

Test Date: 08/18/2022

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Position #2 Hybrid III Small Adult Female (DH1659)



<Max>

-0.01 mm at -24.40 ms

<Min>

-21.19 mm at 47.12 ms

CFC\_600





# NHTSA

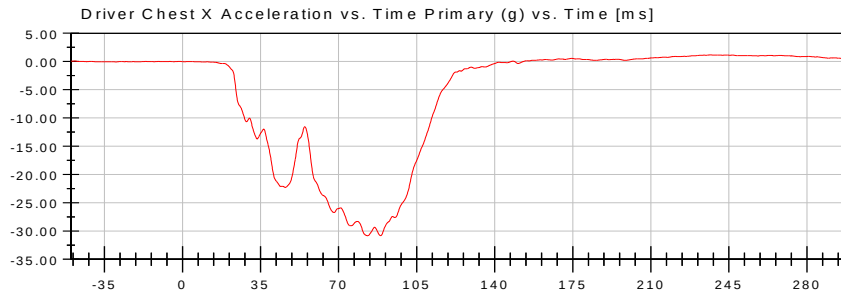
Test Lab: CTF

Test Number: 220818 (M20220303)

Test Date: 08/18/2022

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Position #2 Hybrid III Small Adult Female (DH1659)



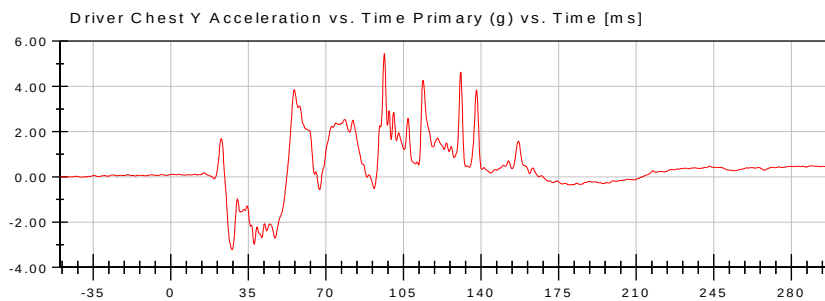
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1.16 g at 236.64 ms

<Min>

-30.85 g at 83.04 ms

CFC\_180



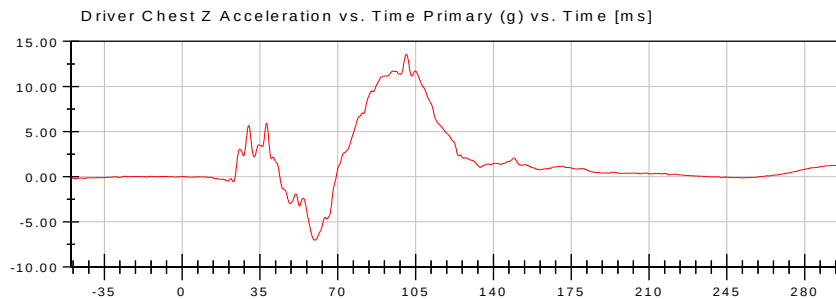
<Max>

5.45 g at 96.32 ms

<Min>

-3.22 g at 27.60 ms

CFC\_180



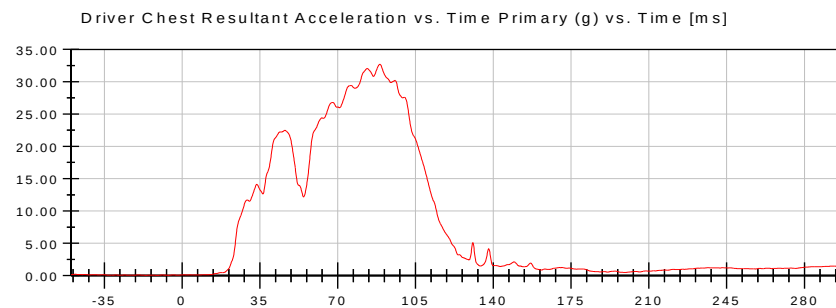
<Max>

13.56 g at 100.88 ms

<Min>

-7.03 g at 59.76 ms

CFC\_180



<Max>

32.68 g at 88.96 ms

<Min>

0.05 g at -11.12 ms

CFC\_180



# NHTSA

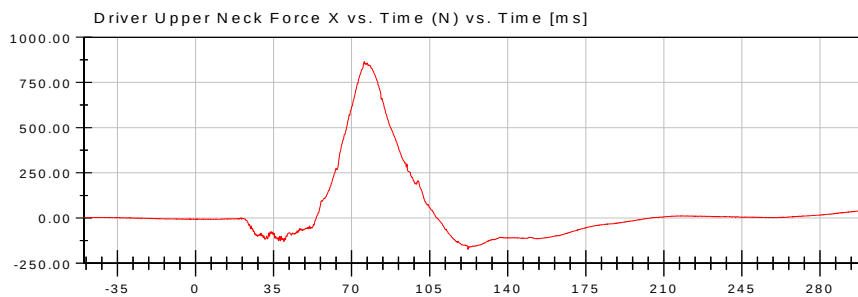
Test Lab: CTF

Test Number: 220818 (M20220303)

Test Date: 08/18/2022

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Position #2 Hybrid III Small Adult Female (DH1659)



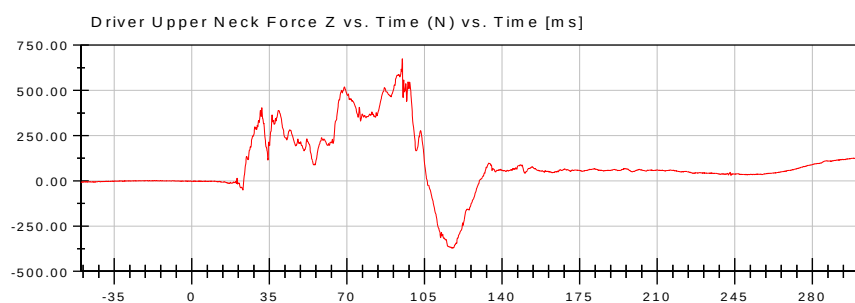
<Max>

865.25 N at 75.68 ms

<Min>

-173.73 N at 122.16 ms

CFC\_1000



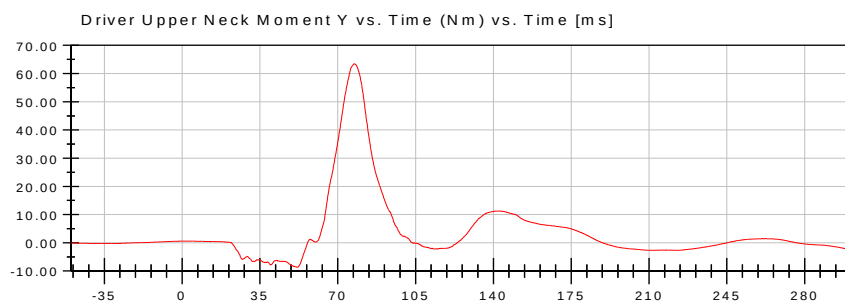
<Max>

674.09 N at 94.96 ms

<Min>

-372.58 N at 117.76 ms

CFC\_1000



<Max>

63.44 Nm at 77.36 ms

<Min>

-8.71 Nm at 51.68 ms

CFC\_600





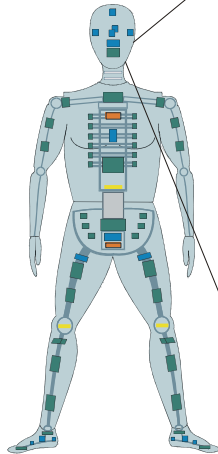
# 2022 Jeep Grand Cherokee L NCAP 35 mph Frontal Impact Neck Injury Predictor (NIJ)

Date: 08/18/2022  
Time: 13:46

Customer: NHTSA

Test Number: M20220303

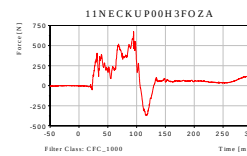
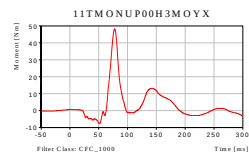
Test Orientation = Frontal  
Fzc(Tension) = 6806  
Fzc(Compression) = 6160  
Myc(Extension) = 135  
Myc(Flexion) = 310



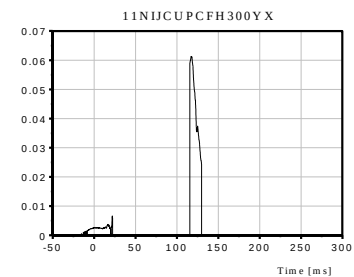
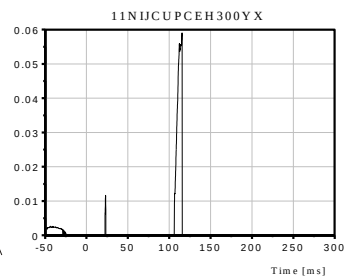
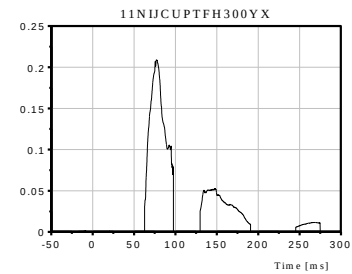
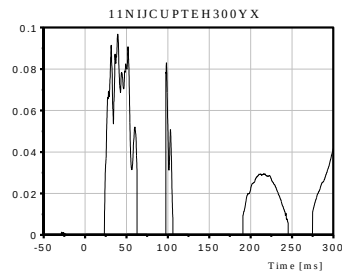
Dummy: HIII 50th Male  
Seating Position:

Driver

NIJ Source Code: (Fz/Fzc)+(Myc/Myc)



TRC Inc. Test Lab: CTF  
Test Number: 220818





# NHTSA

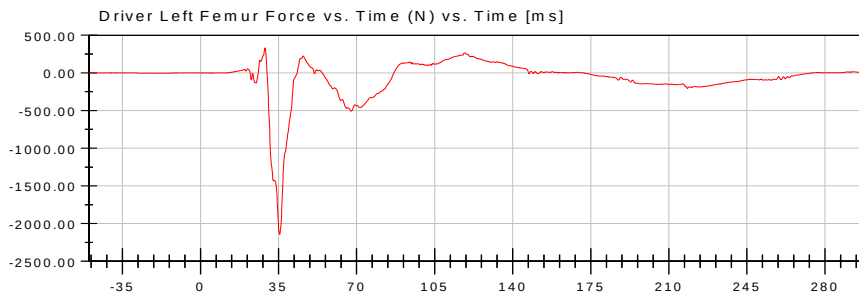
Test Lab: CTF

Test Number: 220818 (M20220303)

Test Date: 08/18/2022

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Position #2 Hybrid III Small Adult Female (DH1659)



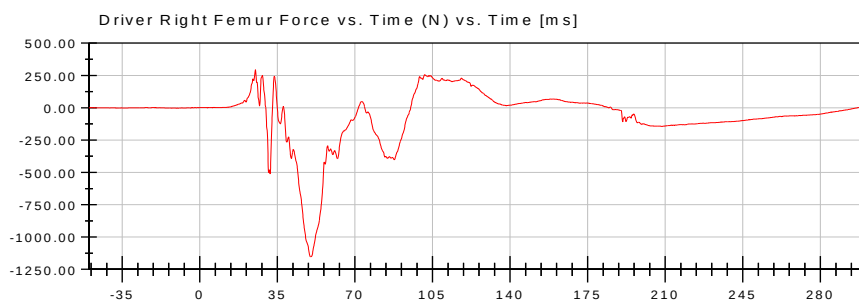
<Max>

330.74 N at 28.96 ms

<Min>

-2,142.51 N at 35.52 ms

CFC\_600



<Max>

293.61 N at 25.12 ms

<Min>

-1,152.00 N at 50.00 ms

CFC\_600



# NHTSA

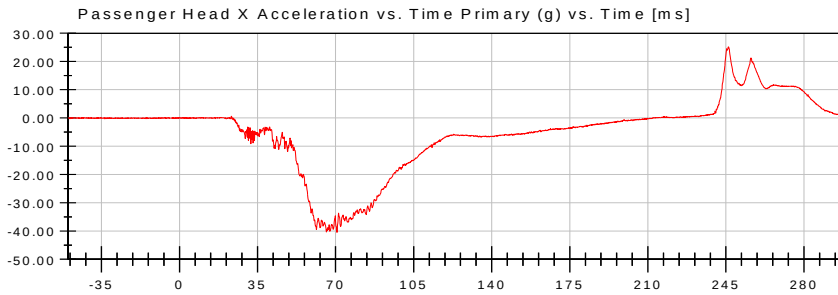
Test Lab: CTF

Test Number: 220818 (M20220303)

Test Date: 08/18/2022

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Position #2 Hybrid III Small Adult Female (DH1659)



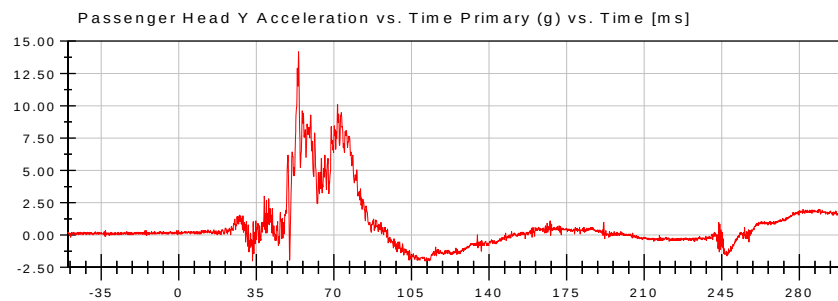
<Max>

25.15 g at 246.16 ms

<Min>

-40.48 g at 70.64 ms

CFC\_1000



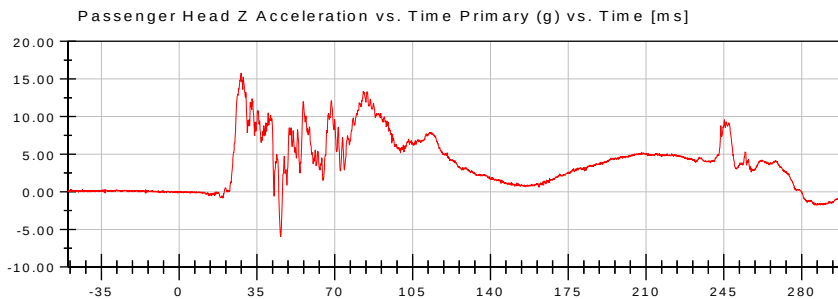
<Max>

14.18 g at 54.08 ms

<Min>

-2.01 g at 33.28 ms

CFC\_1000



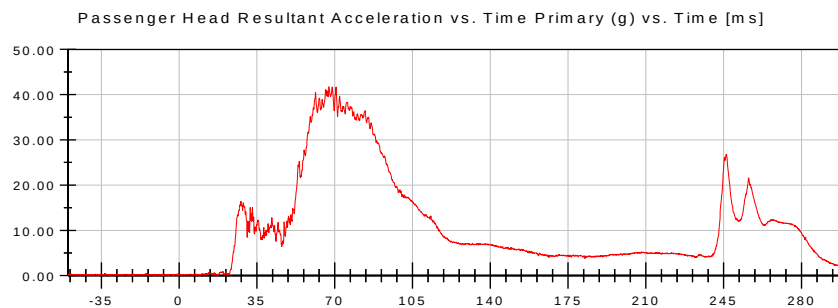
<Max>

15.78 g at 27.84 ms

<Min>

-5.95 g at 45.68 ms

CFC\_1000



<Max>

41.79 g at 67.36 ms

<Min>

0.03 g at -20.64 ms

CFC\_1000



# NHTSA

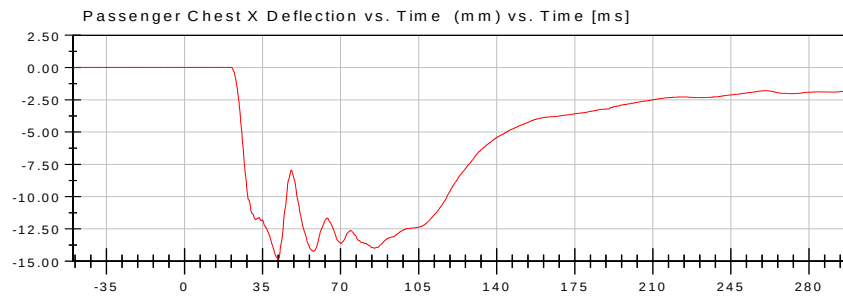
Test Lab: CTF

Test Number: 220818 (M20220303)

Test Date: 08/18/2022

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Position #2 Hybrid III Small Adult Female (DH1659)



<Max>

0.01 mm at 18.56 ms

<Min>

-14.86 mm at 42.08 ms

CFC\_600



# NHTSA

Test Lab: CTF

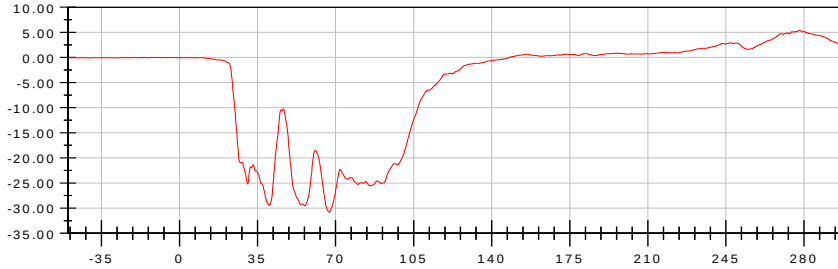
Test Number: 220818 (M20220303)

Test Date: 08/18/2022

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Position #2 Hybrid III Small Adult Female (DH1659)

Passenger Chest X Acceleration vs. Time Primary (g) vs. Time [ms]



<Max>

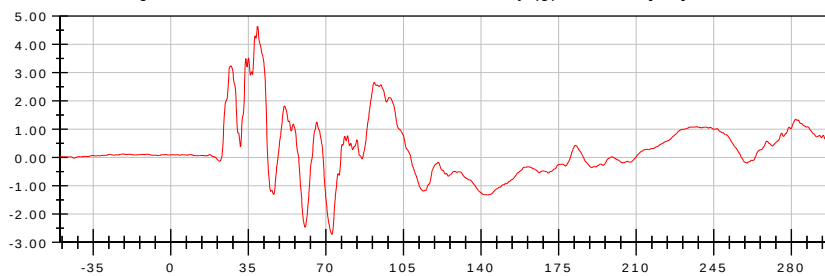
5.37 g at 278.08 ms

<Min>

-30.82 g at 67.12 ms

CFC\_180

Passenger Chest Y Acceleration vs. Time Primary (g) vs. Time [ms]



<Max>

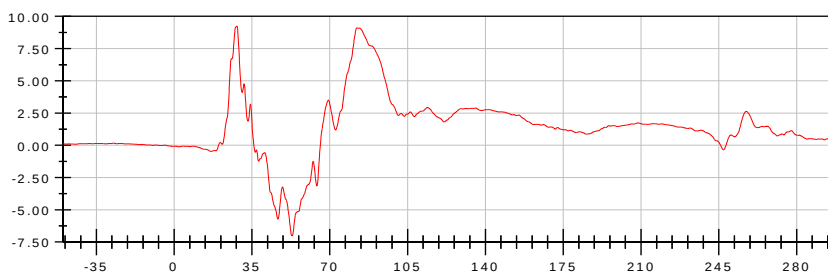
4.64 g at 39.20 ms

<Min>

-2.71 g at 72.64 ms

CFC\_180

Passenger Chest Z Acceleration vs. Time Primary (g) vs. Time [ms]



<Max>

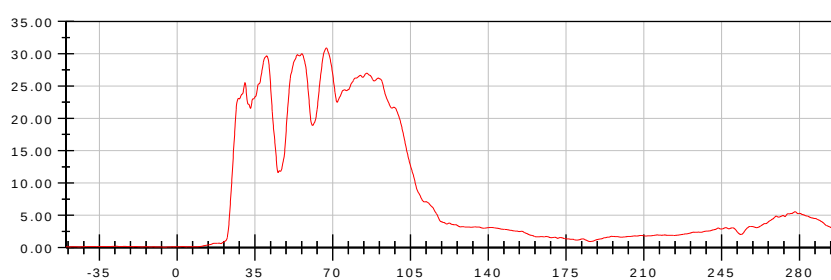
9.24 g at 28.24 ms

<Min>

-7.02 g at 53.04 ms

CFC\_180

Passenger Chest Resultant Acceleration vs. Time Primary (g) vs. Time [ms]



<Max>

30.89 g at 67.12 ms

<Min>

0.08 g at -5.28 ms

CFC\_180





# NHTSA

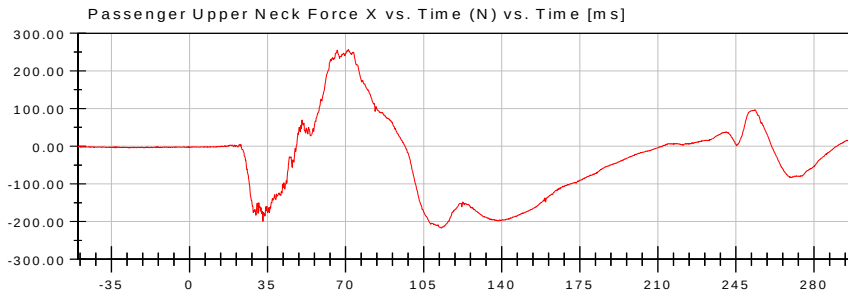
Test Lab: CTF

Test Number: 220818 (M20220303)

Test Date: 08/18/2022

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Position #2 Hybrid III Small Adult Female (DH1659)



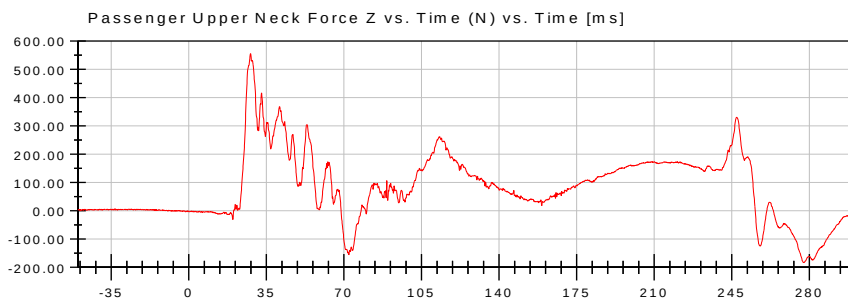
<Max>

256.39 N at 71.28 ms

<Min>

-217.23 N at 112.96 ms

CFC\_1000



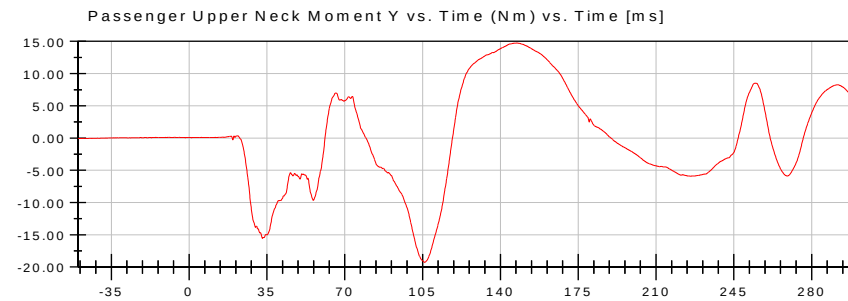
<Max>

556.02 N at 27.84 ms

<Min>

-183.05 N at 277.36 ms

CFC\_1000



<Max>

14.74 Nm at 147.44 ms

<Min>

-19.27 Nm at 105.84 ms

CFC\_600





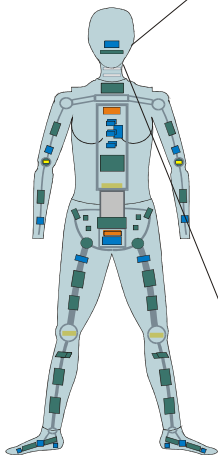
2022 Jeep Grand Cherokee L NCAP 35 mph Frontal Impact  
Neck Injury Predictor (NIJ)

Date: 08/18/2022  
Time: 13:46

Customer: NHTSA

Test Number: M20220303

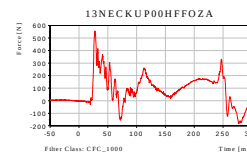
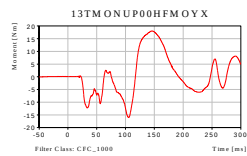
Test Orientation = Frontal  
Fzc(Tension) = 4287  
Fzc(Compression) = 3880  
Myc(Extension) = 67  
Myc(Flexion) = 155



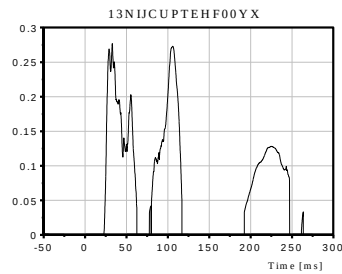
Dummy: HIII 5th Female  
Seating Position:

Right Front Passenger

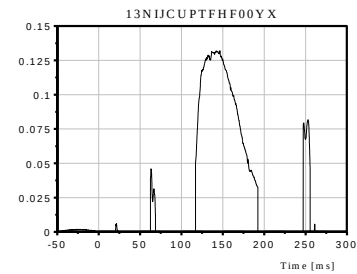
NIJ Source Code: (Fz/Fzc)-(My/Myc)



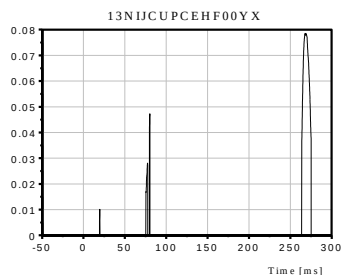
TRC Inc. Test Lab: CTF  
Test Number: 220818



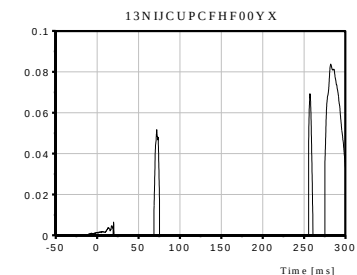
Max [NTE] 0.2770 at 32.88 ms



Max [NTF] 0.1321 at 146.56 ms



Max [NCE] 0.0786 at 267.84 ms



Max [NCF] 0.0838 at 282.32 ms

# NHTSA

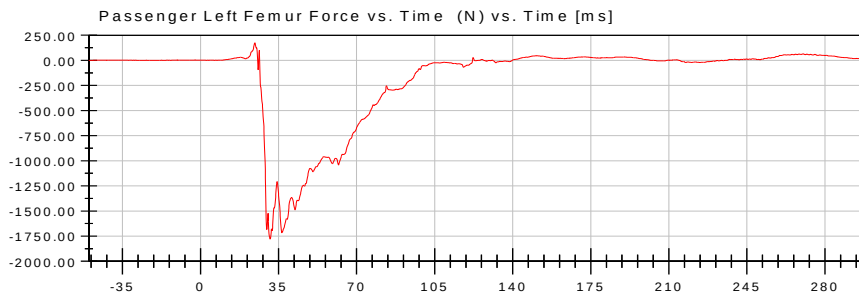
Test Lab: CTF

Test Number: 220818 (M20220303)

Test Date: 08/18/2022

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Position #2 Hybrid III Small Adult Female (DH1659)



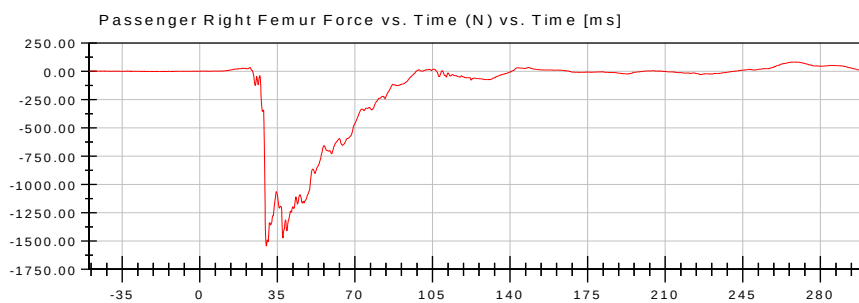
<Max>

173.41 N at 24.40 ms

<Min>

-1,778.59 N at 31.20 ms

CFC\_600



<Max>

83.13 N at 267.20 ms

<Min>

-1,542.93 N at 30.08 ms

CFC\_600



**APPENDIX C**  
**DUMMY CALIBRATION AND PERFORMANCE VERIFICATION**



**Pre-Test Calibration Sheets**

**Driver S/N 037**

**Transportation Research Center Inc.**  
**572E HIII 50th Male Dummy**  
**External Dimensions**  
**Serial No. 037**  
**Calibration No. 78**

| Symbol | Description                      | Specification  | Results | Pass |
|--------|----------------------------------|----------------|---------|------|
|        |                                  | mm             | mm      |      |
| A      | Total Sitting Height             | 878.8 - 889.0  | 881     | Yes  |
| B      | Shoulder Pivot Height            | 505.5 - 520.7  | 510     | Yes  |
| C      | H-Point Height                   | 83.8 - 88.9    | 86      | Yes  |
| D      | H-Point From Seatback            | 134.6 - 139.7  | 137     | Yes  |
| E      | Shoulder Pivot From Backline     | 83.8 - 94.0    | 90      | Yes  |
| F      | Thigh Clearance                  | 139.7 - 154.9  | 147     | Yes  |
| G      | Back Of Elbow To Wrist Pivot     | 289.6 - 304.8  | 295     | Yes  |
| H      | Skull Cap To Backline            | 40.6 - 45.7    | 45      | Yes  |
| I      | Shoulder-Elbow Length            | 330.2 - 345.4  | 337     | Yes  |
| J      | Elbow Rest Height                | 190.5 - 210.8  | 198     | Yes  |
| K      | Buttock Knee Length              | 579.1 - 604.5  | 601     | Yes  |
| L      | Popliteal Height                 | 429.3 - 454.7  | 440     | Yes  |
| M      | Knee Pivot Height                | 485.1 - 500.4  | 494     | Yes  |
| N      | Buttock Popliteal Length         | 452.1 - 477.5  | 470     | Yes  |
| O      | Chest Depth                      | 213.4 - 228.6  | 221     | Yes  |
| P      | Foot Length                      | 251.5 - 266.7  | 264     | Yes  |
| V      | Shoulder Breadth                 | 421.6 - 436.9  | 425     | Yes  |
| W      | Foot Breadth                     | 91.4 - 106.7   | 96      | Yes  |
| Y      | Chest Circumference              | 970.3 - 1000.8 | 991     | Yes  |
| Z      | Waist Circumference              | 835.7 - 866.1  | 865     | Yes  |
| AA     | Location For Chest Circumference | 429.3 - 434.3  | 432     | Yes  |
| BB     | Location For Waist Circumference | 226.1 - 231.1  | 229     | Yes  |



Revised 8/10/12

Report Number: 037\_H3F78

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## Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 037 Certification No. 78-3

Test Date: 7/29/2022

| Test Parameter                                        | Specification  | Test Results | Pass |
|-------------------------------------------------------|----------------|--------------|------|
| Temperature                                           | 20.6 - 22.2 °C | 21.6 °C      | Yes  |
| Relative Humidity                                     | 10 - 70 %      | 65 %         | Yes  |
| Peak Head Resultant Acceleration                      | 225 - 275 g    | 229.7 g      | Yes  |
| Peak Head Lateral Acceleration                        | (-15) - 15 g   | -13.3 g      | Yes  |
| Is Acceleration Curve Unimodal<br>within 10% of Peak? | < 10 %         | 5.27 %       | Yes  |

**Test meets specifications.**

**Condition:** Used

**Comments:**

**Head Skin S/N:** N/A

Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

07.29.2022 11:12:33 614

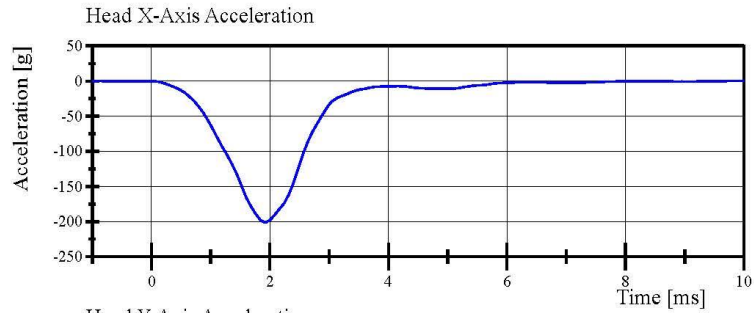


## Transportation Research Center Inc.

### Front Head Drop

HIII 50th Serial No. 037 Certification No. 78-3

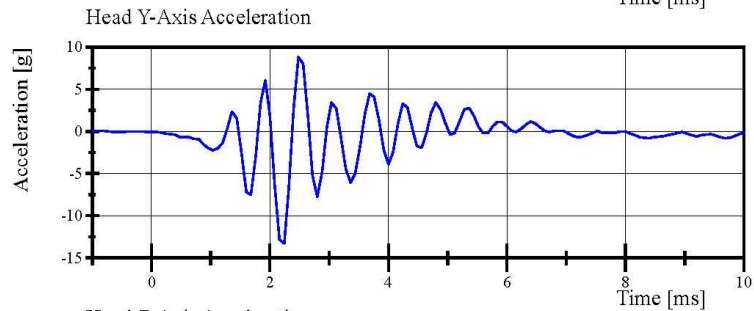
Test Date: 7/29/2022



Filter Class: CFC\_1000

Max: 0.3 g at 9.8 ms

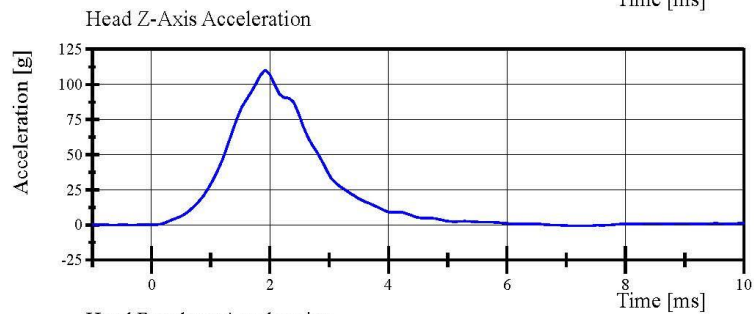
Min: -201.3 g at 1.9 ms



Filter Class: CFC\_1000

Max: 8.8 g at 2.5 ms

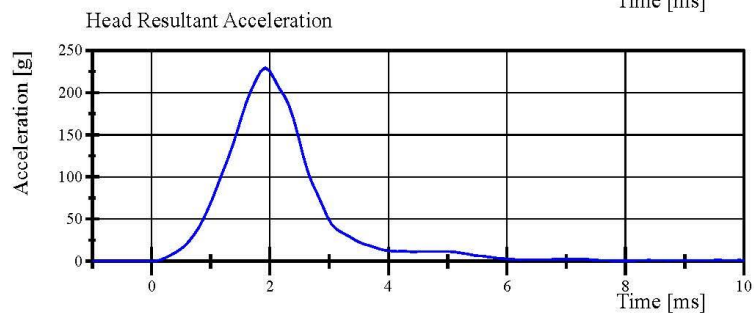
Min: -13.3 g at 2.2 ms



Filter Class: CFC\_1000

Max: 110.4 g at 1.9 ms

Min: -0.7 g at 7.2 ms



Filter Class: CFC\_1000

Max: 229.7 g at 1.9 ms

Min: 0.0 g at -0.2 ms

Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

07.29.2022 11:13:16 614





## Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 037 Certification No. 78-1

Test Date: 7/29/2022

| Test Parameter                                      | Specification       | Test Results | Pass |
|-----------------------------------------------------|---------------------|--------------|------|
| Temperature                                         | 20.6 - 22.2 °C      | 20.8 °C      | Yes  |
| Relative Humidity                                   | 10 - 70 %           | 68 %         | Yes  |
| Pendulum Velocity                                   | 6.89 - 7.13 m/s     | 6.926 m/s    | Yes  |
| Pendulum Acceleration Decay Crossing -5g            | 34 - 42 ms          | 36.3 ms      | Yes  |
| Pendulum Acceleration at 10ms                       | (-22.5) - (-27.5) g | -22.91 g     | Yes  |
| Pendulum Acceleration at 20ms                       | (-17.6) - (-22.6) g | -18.87 g     | Yes  |
| Pendulum Acceleration at 30ms                       | (-12.5) - (-18.5) g | -14.02 g     | Yes  |
| Pendulum Acceleration > 30ms                        | >= (-29.0) g        | -14.02 g     | Yes  |
| Total Head D-Plane Rotation                         |                     |              |      |
| Peak                                                | (-64) - (-78) °     | -68.1 °      | Yes  |
| Time of Peak                                        | 57 - 64 ms          | 58.9 ms      | Yes  |
| Total Head D-Plane Rotation Decay to 0°             | 113 - 128 ms        | 119.1 ms     | Yes  |
| Total Neck Occipital Condyles Moment                |                     |              |      |
| Peak                                                | 88.1 - 108.4 N·m    | 98.49 N·m    | Yes  |
| Time of Peak                                        | 47 - 58 ms          | 50.2 ms      | Yes  |
| Total Neck Occipital Condyles Moment Decay to 0 N·m | 97 - 107 ms         | 98.0 ms      | Yes  |

**Test meets specifications.**

**Condition:** Used

**Comments:**

**Neck S/N: 4728**

Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

07.29.2022 08:26:00 1867

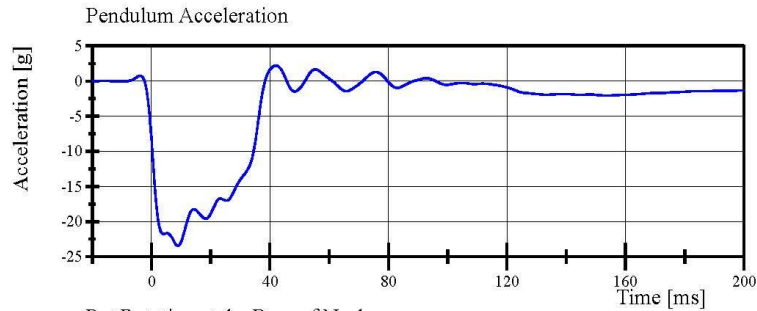


## Transportation Research Center Inc.

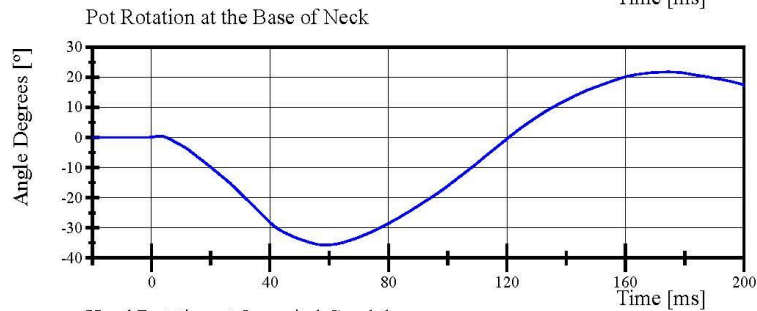
Neck Flexion

HIII 50th Serial No. 037 Certification No. 78-1

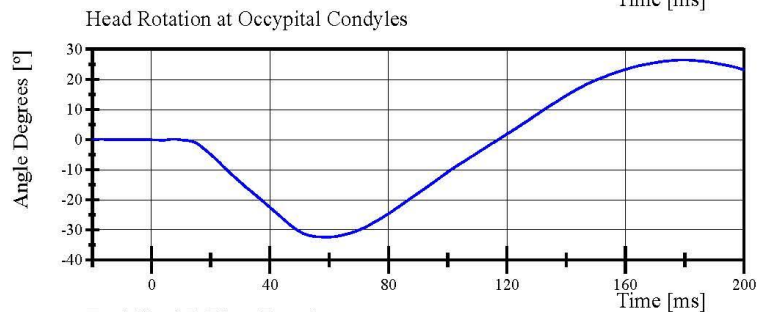
Test Date: 7/29/2022



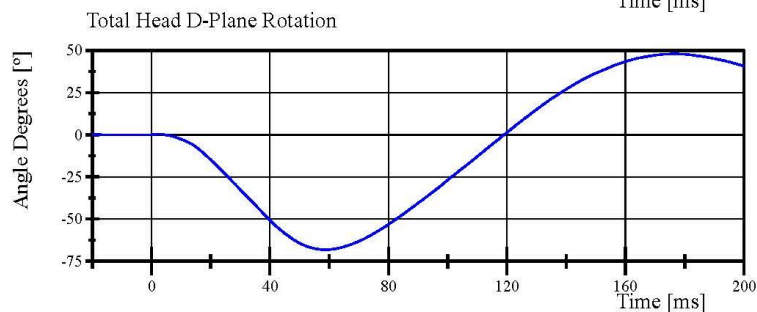
Filter Class: CFC\_60  
Max: 2.2 g at 42.0 ms  
Min: -23.4 g at 9.0 ms



Filter Class: CFC\_60  
Max: 21.8 ° at 174.6 ms  
Min: -35.7 ° at 58.8 ms



Filter Class: CFC\_60  
Max: 26.4 ° at 179.6 ms  
Min: -32.4 ° at 59.1 ms



Filter Class: CFC\_60  
Max: 48.0 ° at 176.7 ms  
Min: -68.1 ° at 58.9 ms

Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

07.29.2022 08:26:30 1867

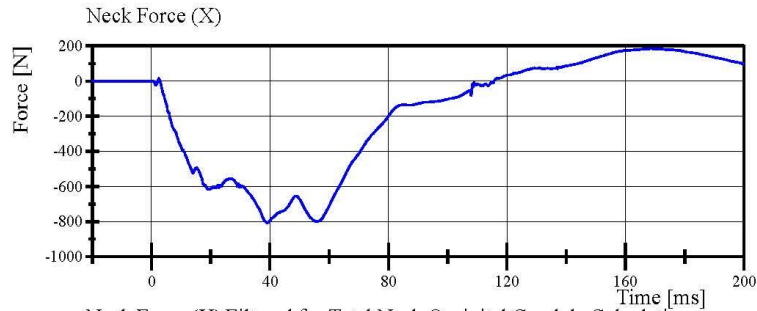


## Transportation Research Center Inc.

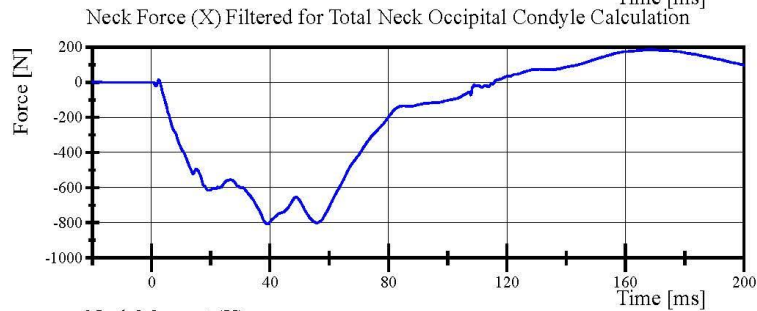
Neck Flexion

HIII 50th Serial No. 037 Certification No. 78-1

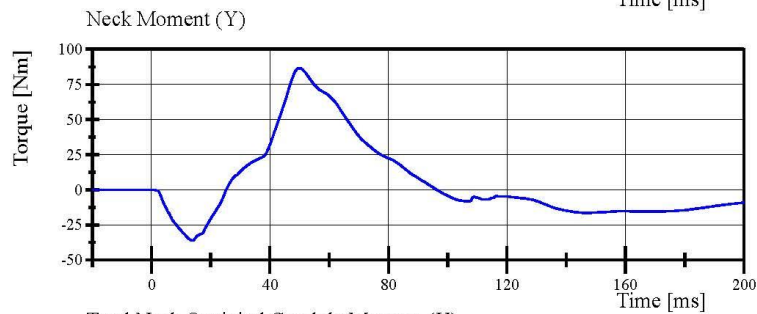
Test Date: 7/29/2022



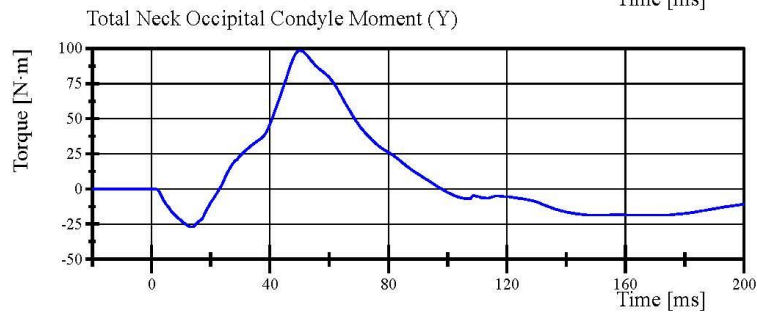
Filter Class: CFC\_1000  
Max: 184.8 N at 166.9 ms  
Min: -807.2 N at 38.9 ms



Filter Class: CFC\_600  
Max: 184.2 N at 168.4 ms  
Min: -807.1 N at 39.1 ms



Filter Class: CFC\_600  
Max: 86.6 Nm at 50.0 ms  
Min: -36.2 Nm at 14.0 ms



Filter Class: Without\_(Constar  
Max: 98.5 N·m at 50.2 ms  
Min: -27.0 N·m at 13.6 ms

Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

07.29.2022 08:26:31 1867



## Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 037 Certification No. 78-2

Test Date: 7/29/2022

| Test Parameter                                      | Specification         | Test Results | Pass |
|-----------------------------------------------------|-----------------------|--------------|------|
| Temperature                                         | 20.6 - 22.2 °C        | 20.8 °C      | Yes  |
| Relative Humidity                                   | 10 - 70 %             | 66 %         | Yes  |
| Pendulum Velocity                                   | (-5.95) - (-6.18) m/s | -5.970 m/s   | Yes  |
| Pendulum Acceleration Decay Crossing 5g             | 38 - 46 ms            | 38.3 ms      | Yes  |
| Pendulum Acceleration at 10ms                       | 17.2 - 21.2 g         | 17.27 g      | Yes  |
| Pendulum Acceleration at 20ms                       | 14.0 - 19.0 g         | 16.42 g      | Yes  |
| Pendulum Acceleration at 30ms                       | 11.0 - 16.0 g         | 13.36 g      | Yes  |
| Pendulum Acceleration > 30ms                        | <= 22.0 g             | 13.36 g      | Yes  |
| Total Head D-Plane Rotation                         |                       |              |      |
| Peak                                                | 81 - 106 °            | 95.4 °       | Yes  |
| Time of Peak                                        | 72 - 82 ms            | 76.2 ms      | Yes  |
| Total Head D-Plane Rotation Decay to 0°             | 147 - 174 ms          | 157.4 ms     | Yes  |
| Total Neck Occipital Condyles Moment                |                       |              |      |
| Peak                                                | (-52.9) - (-80) N·m   | -69.33 N·m   | Yes  |
| Time of Peak                                        | 65 - 79 ms            | 70.8 ms      | Yes  |
| Total Neck Occipital Condyles Moment Decay to 0 N·m | 120 - 148 ms          | 142.7 ms     | Yes  |

**Test meets specifications.**

**Condition:** Used

**Comments:**

**Neck S/N: 4728**

Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

07.29.2022 09:39:08 2011



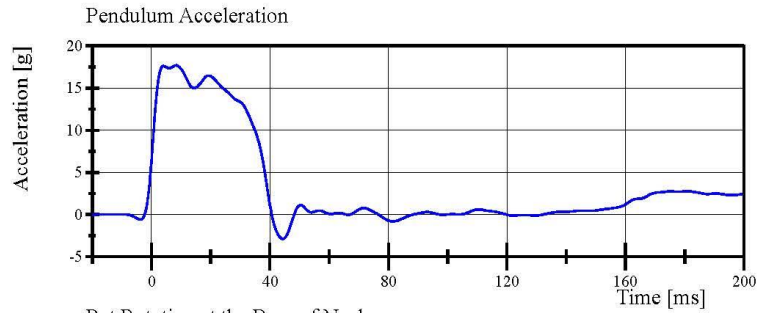


## Transportation Research Center Inc.

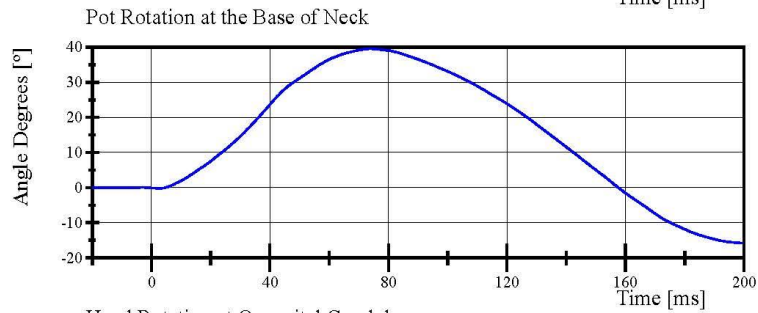
Neck Extension

HIII 50th Serial No. 037 Certification No. 78-2

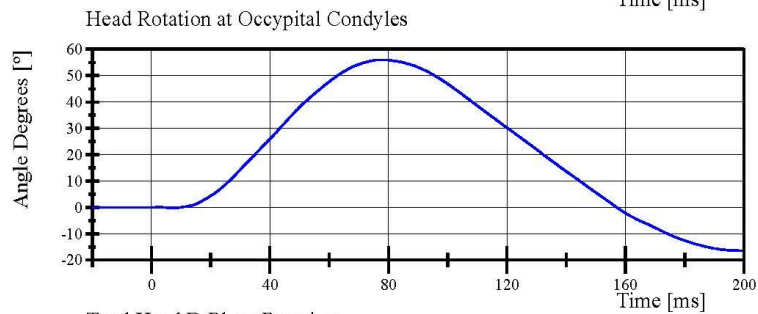
Test Date: 7/29/2022



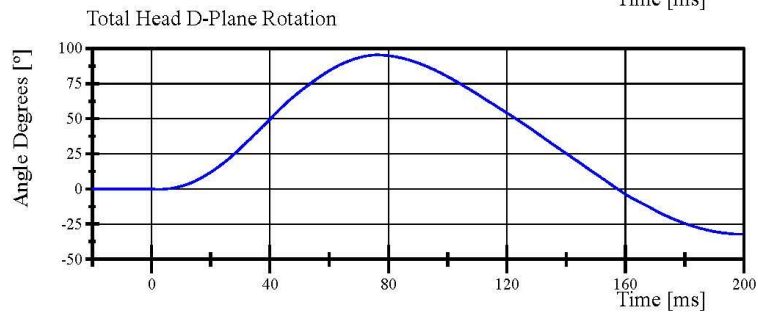
Filter Class: CFC\_60  
Max: 17.7 g at 8.3 ms  
Min: -2.9 g at 44.3 ms



Filter Class: CFC\_60  
Max: 39.6 ° at 73.8 ms  
Min: -15.8 ° at 199.5 ms



Filter Class: CFC\_60  
Max: 56.0 ° at 77.5 ms  
Min: -16.5 ° at 199.5 ms



Filter Class: CFC\_60  
Max: 95.4 ° at 76.2 ms  
Min: -32.3 ° at 199.5 ms

Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

07.29.2022 09:39:29 2011

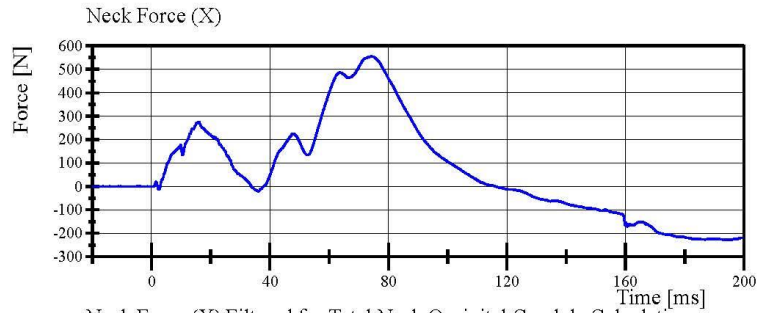


## Transportation Research Center Inc.

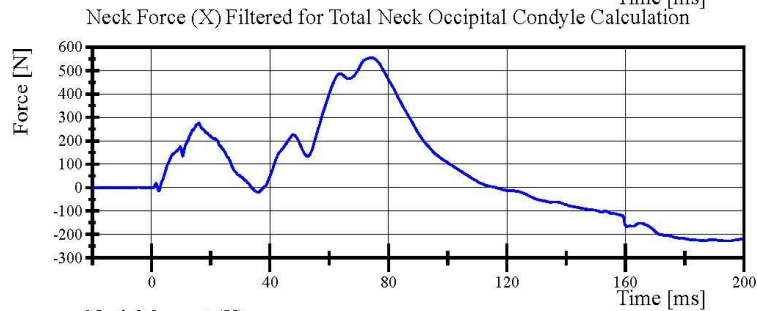
Neck Extension

HIII 50th Serial No. 037 Certification No. 78-2

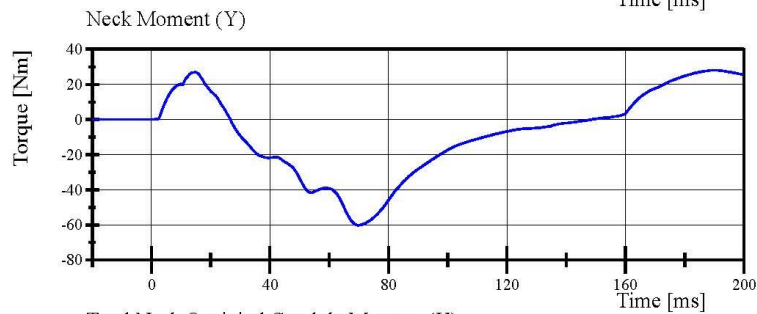
Test Date: 7/29/2022



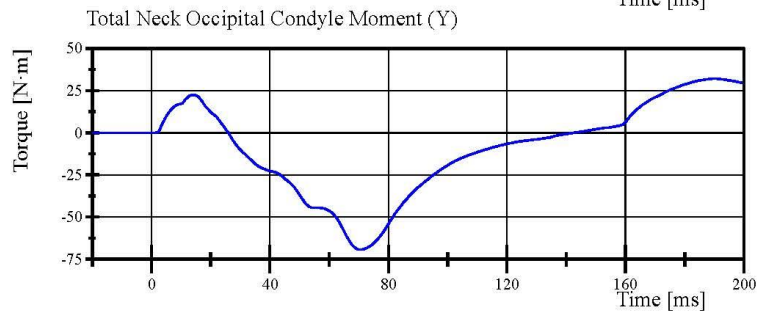
Filter Class: CFC\_1000  
Max: 555.9 N at 74.2 ms  
Min: -228.2 N at 193.4 ms



Filter Class: CFC\_600  
Max: 555.5 N at 74.2 ms  
Min: -228.0 N at 193.5 ms



Filter Class: CFC\_600  
Max: 28.1 Nm at 190.0 ms  
Min: -60.2 Nm at 69.7 ms



Filter Class: Without\_(Constar  
Max: 32.1 N·m at 190.0 ms  
Min: -69.3 N·m at 70.8 ms

Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

07.29.2022 09:39:29 2011



## Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 037 Certification No. 78-1

Test Date: 7/29/2022

| Test Parameter            | Specification         | Test Results | Pass |
|---------------------------|-----------------------|--------------|------|
| Temperature               | 20.6 - 22.2 °C        | 21.6 °C      | Yes  |
| Relative Humidity         | 10 - 70 %             | 62 %         | Yes  |
| Probe Velocity            | 6.59 - 6.83 m/s       | 6.599 m/s    | Yes  |
| Probe Force Peak          | (-5,160) - (-5,894) N | -5,368.6 N   | Yes  |
| Maximum Chest Compression | (-63.5) - (-72.6) mm  | -71.63 mm    | Yes  |
| Internal Hysteresis       | 69 - 85 %             | 69.9 %       | Yes  |

**Test meets specifications.**

**Condition:** Used

**Comments:**

**Jacket S/N:** 2565

**Rib Set S/N:** 02033121A

Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

07.29.2022 13:33:35 392

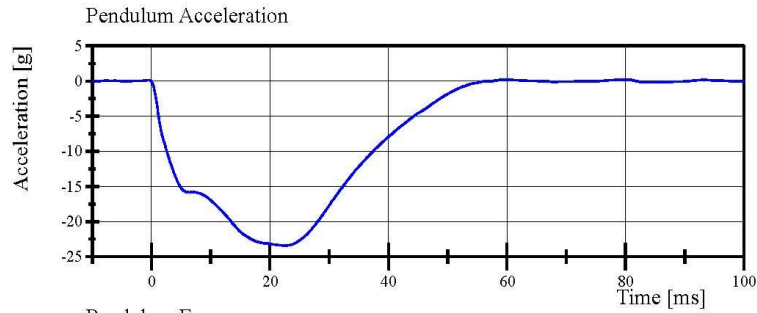


## Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 037 Certification No. 78-1

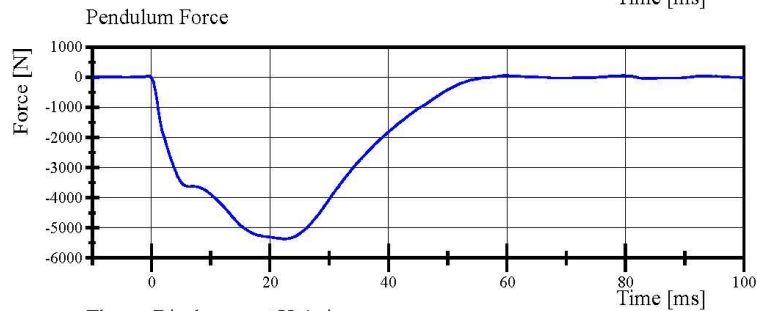
Test Date: 7/29/2022



Filter Class: CFC\_180

Max: 0.3 g at 59.8 ms

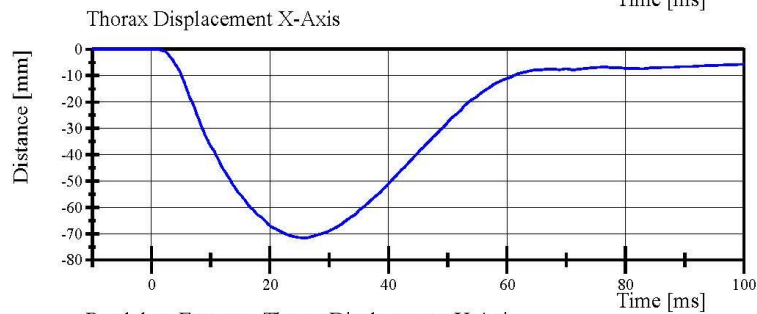
Min: -23.4 g at 22.5 ms



Filter Class: CFC\_180

Max: 57.8 N at 59.8 ms

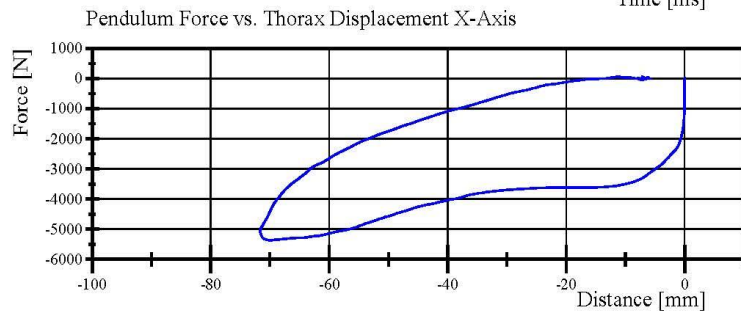
Min: -5,368.6 N at 22.5 ms



Filter Class: CFC\_600

Max: 0.0 mm at -8.3 ms

Min: -71.6 mm at 25.8 ms



Filter Class: CFC\_180

Max: 57.8 N at -11.3 mm

Min: -5,368.6 N at -69.9 mm

Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

07.29.2022 13:35:46 392





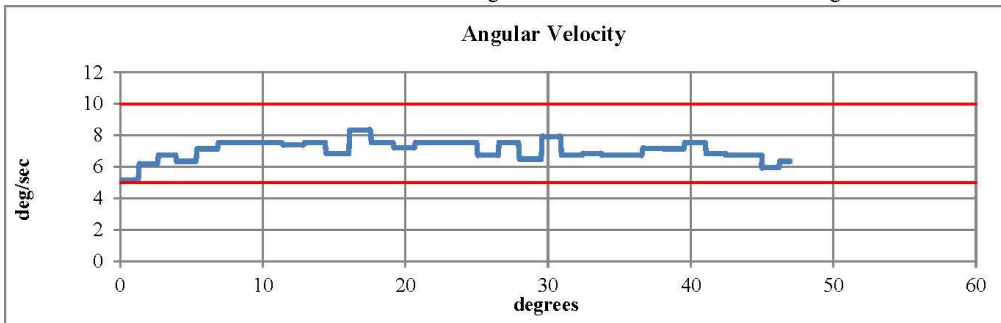
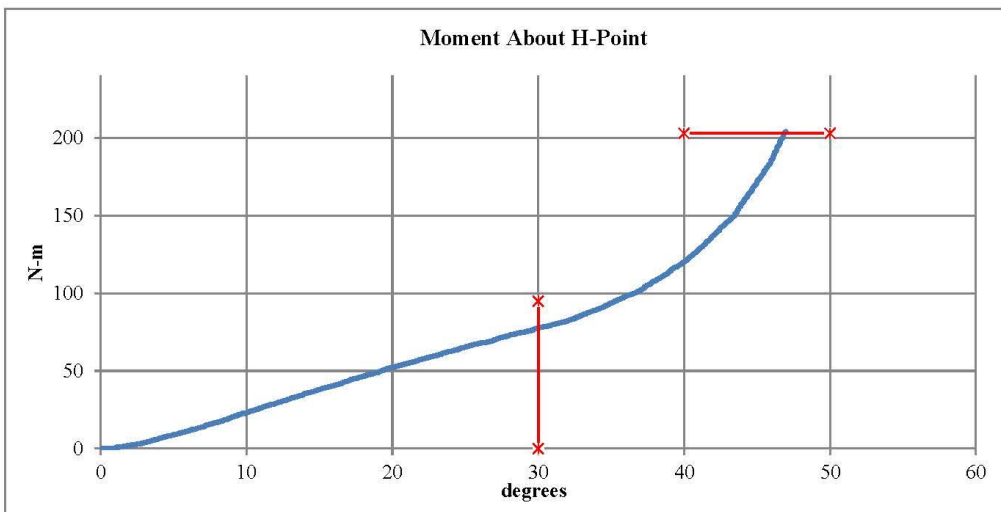
# Transportation Research Center Inc.

Hybrid III 50th Male Hip Range of Motion



Serial Number: 037 Date: 12-Aug-2022  
Side Tested: Left Hip Time: 11:48  
Test Number: 1

| TEST PARAMETER   | SPECIFICATION |        | TEST RESULTS |         |      |
|------------------|---------------|--------|--------------|---------|------|
| Temperature      | 18.9          | - 25.6 | 21.7         | °C      | Pass |
| Humidity         | 10            | - 70   | 61           | %       | Pass |
| Moment at 30°    | 0             | ≤ 94.9 | 77.86        | N-m     | Pass |
| Angle at 203 Nm  | 40            | - 50   | 46.97        | deg     | Pass |
| Average Velocity | 5             | - 10   | 7.04         | deg/sec | Pass |



Comments: Pelvis S/N: EU6859

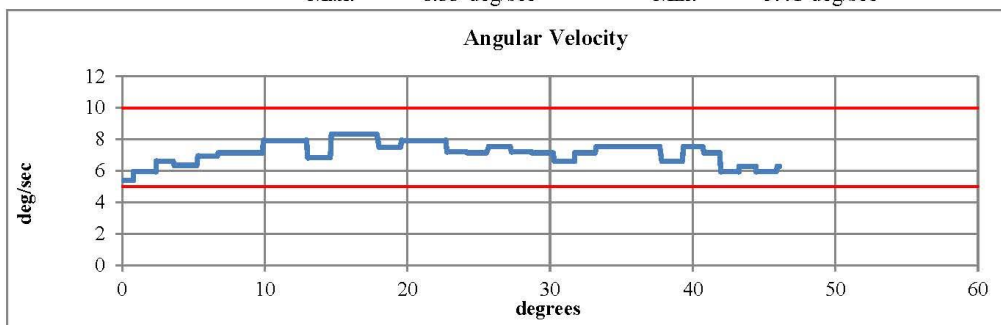
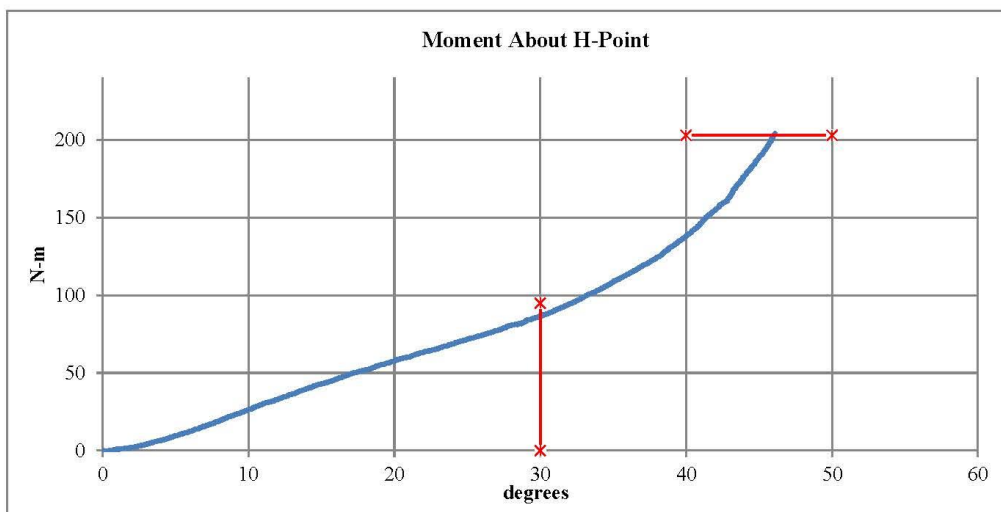
# Transportation Research Center Inc.

Hybrid III 50th Male Hip Range of Motion



Serial Number: 037 Date: 12-Aug-2022  
Side Tested: Right Hip Time: 10:41  
Test Number: 1

| TEST PARAMETER   | SPECIFICATION |        | TEST RESULTS |         |      |
|------------------|---------------|--------|--------------|---------|------|
| Temperature      | 18.9          | - 25.6 | 20.8         | °C      | Pass |
| Humidity         | 10            | - 70   | 60           | %       | Pass |
| Moment at 30°    | 0             | ≤ 94.9 | 86.81        | N-m     | Pass |
| Angle at 203 Nm  | 40            | - 50   | 46.09        | deg     | Pass |
| Average Velocity | 5             | - 10   | 7.12         | deg/sec | Pass |



Comments:  
Pelvis S/N: EU6859

## Transportation Research Center Inc.

Left Knee Femur Response Test  
HIII 50th Serial No. 037 Certification No. 78-1  
Test Date: 7/29/2022

| Test Parameter    | Specification             | Test Results | Pass |
|-------------------|---------------------------|--------------|------|
| Temperature       | 18.9 - 25.5 °C            | 20.8 °C      | Yes  |
| Relative Humidity | 10 - 70 %                 | 68 %         | Yes  |
| Probe Velocity    | 2.07 - 2.13 m/s           | 2.095 m/s    | Yes  |
| Peak Femur Force  | (-4,715.2) - (-5,782.6) N | -5,692.64 N  | Yes  |

**Test meets specifications.**

**Condition: Used**

**Comments:**

**Knee Skin S/N: 2672**

Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

07.29.2022 08:50:26 1790

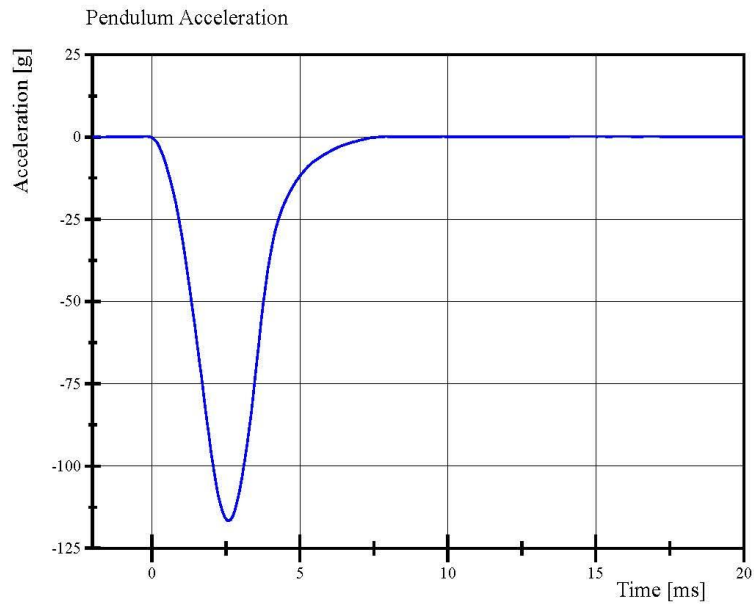


Report Number: 037\_H3F78

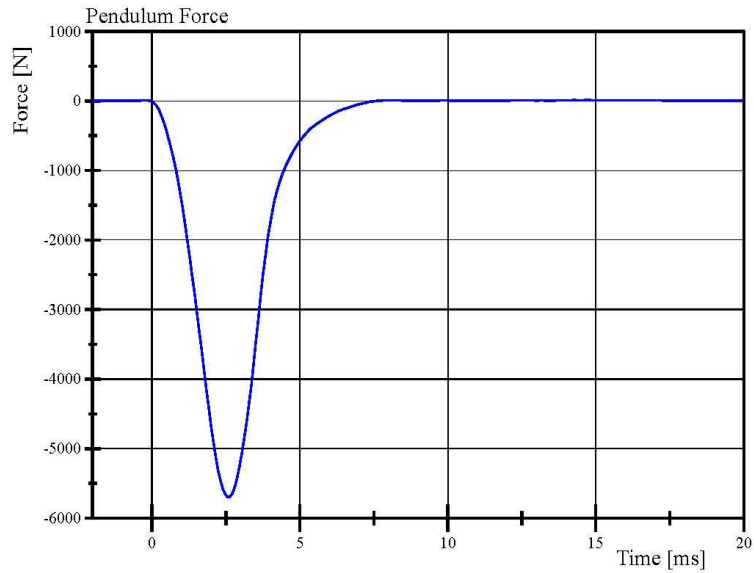
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## Transportation Research Center Inc.

Left Knee Femur Response Test  
HIII 50th Serial No. 037 Certification No. 78-1  
Test Date: 7/29/2022



Filter Class: CFC\_600  
Max: 0.2 g at 14.7 ms  
Min: -116.6 g at 2.6 ms



Filter Class: CFC\_600  
Max: 8.9 N at 14.7 ms  
Min: -5,692.6 N at 2.6 ms

Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

07.29.2022 08:51:27 1790





## Transportation Research Center Inc.

Right Knee Femur Response Test  
HIII 50th Serial No. 037 Certification No. 78-1  
Test Date: 7/29/2022

| Test Parameter    | Specification             | Test Results | Pass |
|-------------------|---------------------------|--------------|------|
| Temperature       | 18.9 - 25.5 °C            | 20.8 °C      | Yes  |
| Relative Humidity | 10 - 70 %                 | 67 %         | Yes  |
| Probe Velocity    | 2.07 - 2.13 m/s           | 2.098 m/s    | Yes  |
| Peak Femur Force  | (-4,715.2) - (-5,782.6) N | -5,642.32 N  | Yes  |

**Test meets specifications.**

**Condition: Used**

**Comments:**

**Knee Skin S/N: 1248**

Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

07.29.2022 08:57:56 1784

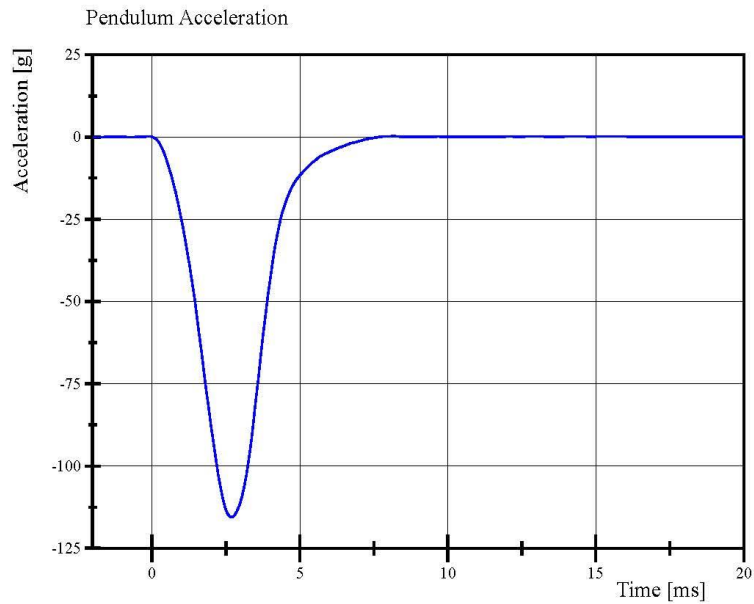


Report Number: 037\_H3F78

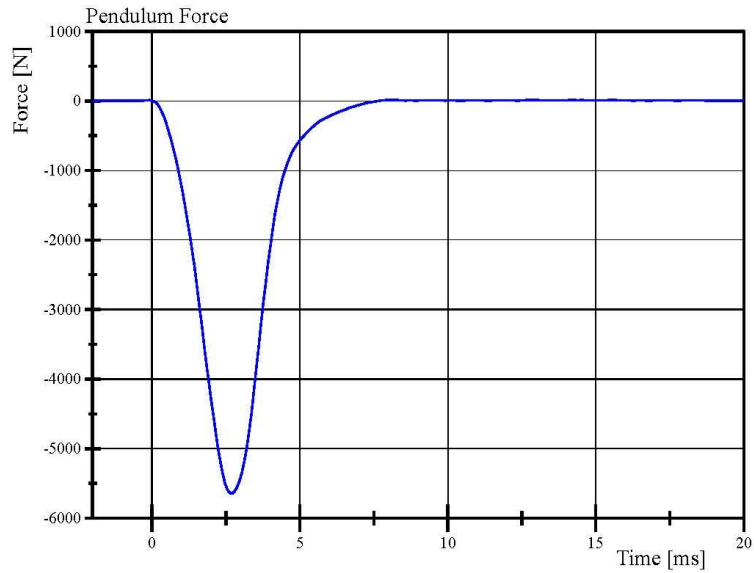
Page 23 of 27

## Transportation Research Center Inc.

Right Knee Femur Response Test  
HIII 50th Serial No. 037 Certification No. 78-1  
Test Date: 7/29/2022



Filter Class: CFC\_600  
Max: 0.2 g at 8.2 ms  
Min: -115.5 g at 2.7 ms



Filter Class: CFC\_600  
Max: 11.7 N at 8.2 ms  
Min: -5,642.3 N at 2.7 ms

Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

07.29.2022 08:59:08 1784



**Post-Test Calibration Sheets**

**Driver S/N 037**

**Transportation Research Center Inc.**  
**572E HIII 50th Male Dummy**  
**External Dimensions**  
**Serial No. 037**  
**Calibration No. 79**

| Symbol | Description                      | Specification  | Results | Pass |
|--------|----------------------------------|----------------|---------|------|
|        |                                  | mm             | mm      |      |
| A      | Total Sitting Height             | 878.8 - 889.0  | 881     | Yes  |
| B      | Shoulder Pivot Height            | 505.5 - 520.7  | 510     | Yes  |
| C      | H-Point Height                   | 83.8 - 88.9    | 86      | Yes  |
| D      | H-Point From Seatback            | 134.6 - 139.7  | 137     | Yes  |
| E      | Shoulder Pivot From Backline     | 83.8 - 94.0    | 90      | Yes  |
| F      | Thigh Clearance                  | 139.7 - 154.9  | 148     | Yes  |
| G      | Back Of Elbow To Wrist Pivot     | 289.6 - 304.8  | 295     | Yes  |
| H      | Skull Cap To Backline            | 40.6 - 45.7    | 45      | Yes  |
| I      | Shoulder-Elbow Length            | 330.2 - 345.4  | 337     | Yes  |
| J      | Elbow Rest Height                | 190.5 - 210.8  | 198     | Yes  |
| K      | Buttock Knee Length              | 579.1 - 604.5  | 601     | Yes  |
| L      | Popliteal Height                 | 429.3 - 454.7  | 440     | Yes  |
| M      | Knee Pivot Height                | 485.1 - 500.4  | 494     | Yes  |
| N      | Buttock Popliteal Length         | 452.1 - 477.5  | 470     | Yes  |
| O      | Chest Depth                      | 213.4 - 228.6  | 221     | Yes  |
| P      | Foot Length                      | 251.5 - 266.7  | 264     | Yes  |
| V      | Shoulder Breadth                 | 421.6 - 436.9  | 425     | Yes  |
| W      | Foot Breadth                     | 91.4 - 106.7   | 96      | Yes  |
| Y      | Chest Circumference              | 970.3 - 1000.8 | 991     | Yes  |
| Z      | Waist Circumference              | 835.7 - 866.1  | 865     | Yes  |
| AA     | Location For Chest Circumference | 429.3 - 434.3  | 432     | Yes  |
| BB     | Location For Waist Circumference | 226.1 - 231.1  | 229     | Yes  |



Revised 8/10/12

Report Number: 037\_H3F79

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## Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 037 Certification No. 79-1

Test Date: 8/19/2022

| Test Parameter                                        | Specification  | Test Results | Pass |
|-------------------------------------------------------|----------------|--------------|------|
| Temperature                                           | 20.6 - 22.2 °C | 21.1 °C      | Yes  |
| Relative Humidity                                     | 10 - 70 %      | 66 %         | Yes  |
| Peak Head Resultant Acceleration                      | 225 - 275 g    | 263.8 g      | Yes  |
| Peak Head Lateral Acceleration                        | (-15) - 15 g   | 10.5 g       | Yes  |
| Is Acceleration Curve Unimodal<br>within 10% of Peak? | < 10 %         | 4.05 %       | Yes  |

**Test meets specifications.**

**Condition: Used**

**Comments:**

**Head Skin S/N: N/A**

Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

08.19.2022 10:26:24 614

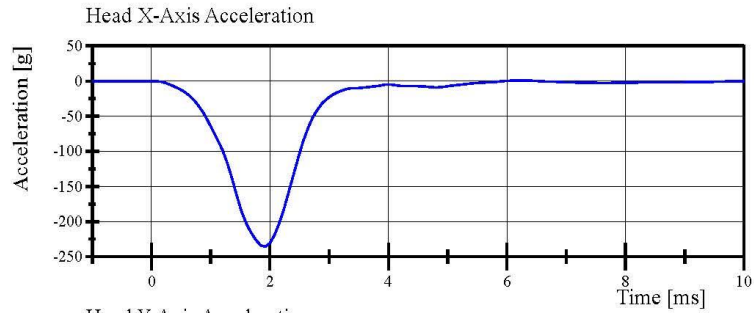


## Transportation Research Center Inc.

### Front Head Drop

HIII 50th Serial No. 037 Certification No. 79-1

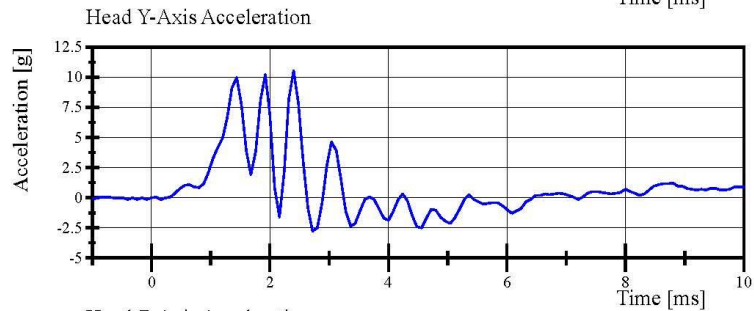
Test Date: 8/19/2022



Filter Class: CFC\_1000

Max: 0.8 g at 6.2 ms

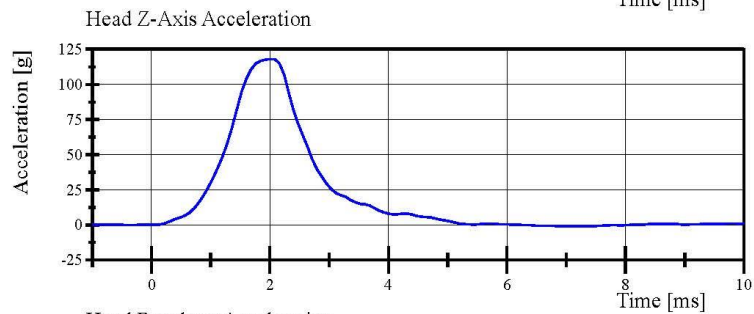
Min: -235.9 g at 1.9 ms



Filter Class: CFC\_1000

Max: 10.5 g at 2.4 ms

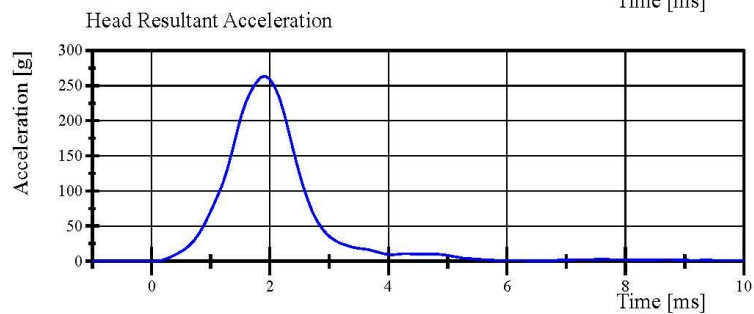
Min: -2.8 g at 2.7 ms



Filter Class: CFC\_1000

Max: 118.0 g at 2.0 ms

Min: -0.9 g at 7.0 ms



Filter Class: CFC\_1000

Max: 263.8 g at 1.9 ms

Min: 0.0 g at -1.0 ms

Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

08.19.2022 10:27:00 614



## Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 037 Certification No. 79-1

Test Date: 8/19/2022

| Test Parameter                                      | Specification       | Test Results | Pass |
|-----------------------------------------------------|---------------------|--------------|------|
| Temperature                                         | 20.6 - 22.2 °C      | 20.9 °C      | Yes  |
| Relative Humidity                                   | 10 - 70 %           | 67 %         | Yes  |
| Pendulum Velocity                                   | 6.89 - 7.13 m/s     | 6.919 m/s    | Yes  |
| Pendulum Acceleration Decay Crossing -5g            | 34 - 42 ms          | 37.0 ms      | Yes  |
| Pendulum Acceleration at 10ms                       | (-22.5) - (-27.5) g | -25.35 g     | Yes  |
| Pendulum Acceleration at 20ms                       | (-17.6) - (-22.6) g | -20.54 g     | Yes  |
| Pendulum Acceleration at 30ms                       | (-12.5) - (-18.5) g | -15.81 g     | Yes  |
| Pendulum Acceleration > 30ms                        | >= (-29.0) g        | -15.81 g     | Yes  |
| Total Head D-Plane Rotation                         |                     |              |      |
| Peak                                                | (-64) - (-78) °     | -72.0 °      | Yes  |
| Time of Peak                                        | 57 - 64 ms          | 59.4 ms      | Yes  |
| Total Head D-Plane Rotation Decay to 0°             | 113 - 128 ms        | 118.1 ms     | Yes  |
| Total Neck Occipital Condyles Moment                |                     |              |      |
| Peak                                                | 88.1 - 108.4 N·m    | 98.66 N·m    | Yes  |
| Time of Peak                                        | 47 - 58 ms          | 50.7 ms      | Yes  |
| Total Neck Occipital Condyles Moment Decay to 0 N·m | 97 - 107 ms         | 97.6 ms      | Yes  |

**Test meets specifications.**

**Condition:** Used

**Comments:**

**Neck S/N: 47287**

Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

08.19.2022 11:00:40 1869

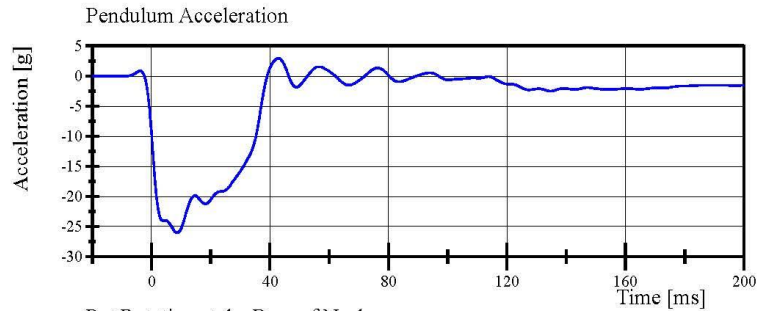


## Transportation Research Center Inc.

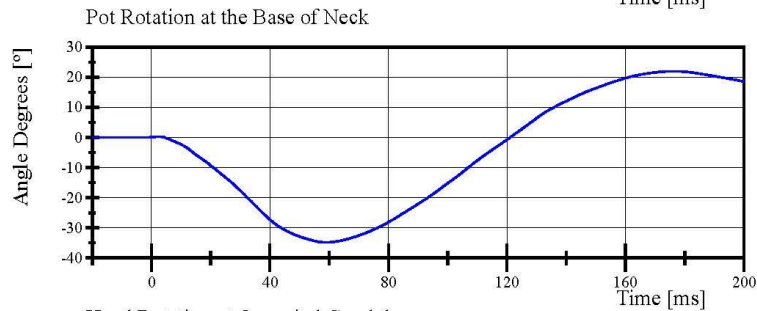
Neck Flexion

HIII 50th Serial No. 037 Certification No. 79-1

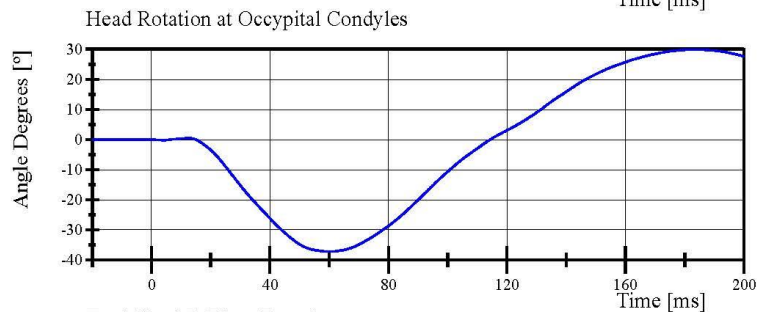
Test Date: 8/19/2022



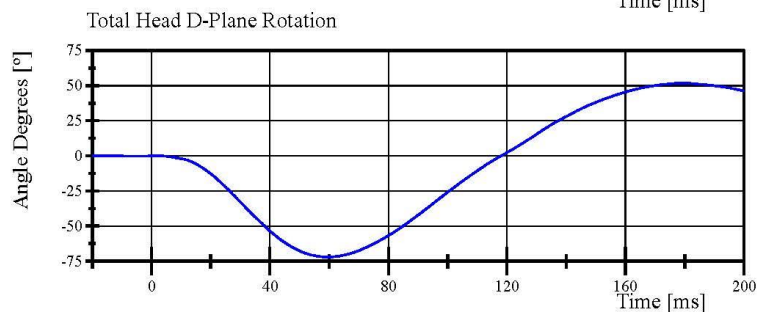
Filter Class: CFC\_60  
Max: 3.0 g at 42.9 ms  
Min: -26.0 g at 8.7 ms



Filter Class: CFC\_60  
Max: 22.0 ° at 176.2 ms  
Min: -34.9 ° at 59.0 ms



Filter Class: CFC\_60  
Max: 29.9 ° at 183.3 ms  
Min: -37.2 ° at 60.2 ms



Filter Class: CFC\_60  
Max: 51.7 ° at 179.2 ms  
Min: -72.0 ° at 59.4 ms

Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

08.19.2022 11:01:40 1869



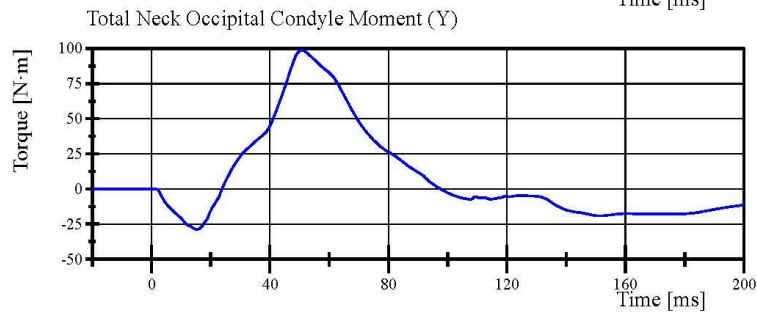
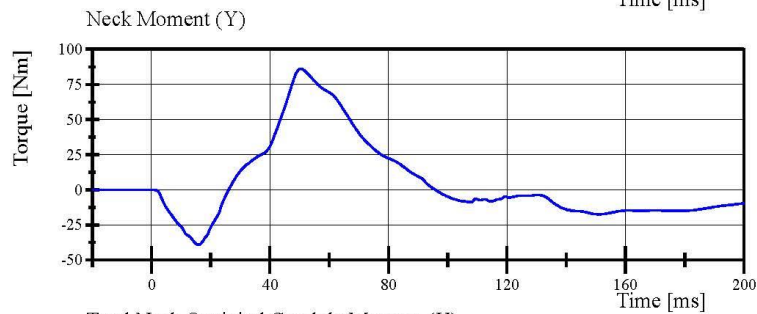
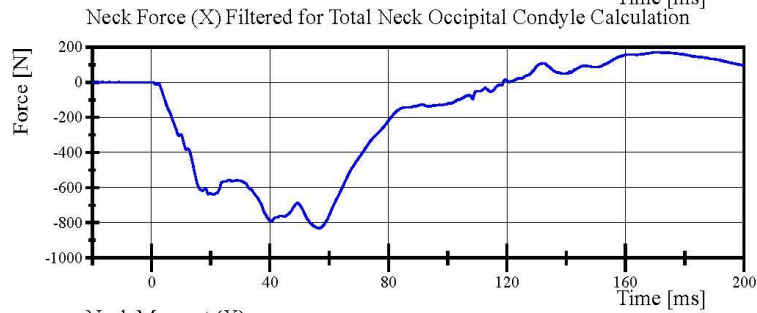
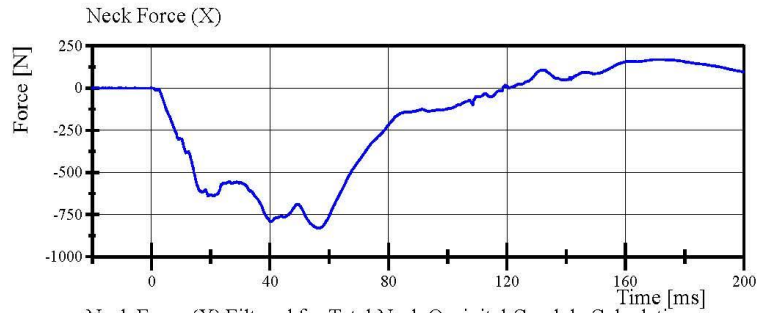


## Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 037 Certification No. 79-1

Test Date: 8/19/2022



Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

08.19.2022 11:01:41 1869



## Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 037 Certification No. 79-1

Test Date: 8/19/2022

| Test Parameter                                      | Specification         | Test Results | Pass |
|-----------------------------------------------------|-----------------------|--------------|------|
| Temperature                                         | 20.6 - 22.2 °C        | 20.8 °C      | Yes  |
| Relative Humidity                                   | 10 - 70 %             | 64 %         | Yes  |
| Pendulum Velocity                                   | (-5.95) - (-6.18) m/s | -5.970 m/s   | Yes  |
| Pendulum Acceleration Decay Crossing 5g             | 38 - 46 ms            | 38.1 ms      | Yes  |
| Pendulum Acceleration at 10ms                       | 17.2 - 21.2 g         | 20.08 g      | Yes  |
| Pendulum Acceleration at 20ms                       | 14.0 - 19.0 g         | 18.31 g      | Yes  |
| Pendulum Acceleration at 30ms                       | 11.0 - 16.0 g         | 15.04 g      | Yes  |
| Pendulum Acceleration > 30ms                        | <= 22.0 g             | 15.04 g      | Yes  |
| Total Head D-Plane Rotation                         |                       |              |      |
| Peak                                                | 81 - 106 °            | 97.1 °       | Yes  |
| Time of Peak                                        | 72 - 82 ms            | 78.2 ms      | Yes  |
| Total Head D-Plane Rotation Decay to 0°             | 147 - 174 ms          | 158.7 ms     | Yes  |
| Total Neck Occipital Condyles Moment                |                       |              |      |
| Peak                                                | (-52.9) - (-80) N·m   | -69.58 N·m   | Yes  |
| Time of Peak                                        | 65 - 79 ms            | 70.4 ms      | Yes  |
| Total Neck Occipital Condyles Moment Decay to 0 N·m | 120 - 148 ms          | 143.0 ms     | Yes  |

**Test meets specifications.**

**Condition:** Used

**Comments:**

**Neck S/N: 47287**

Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

08.19.2022 11:39:52 2010

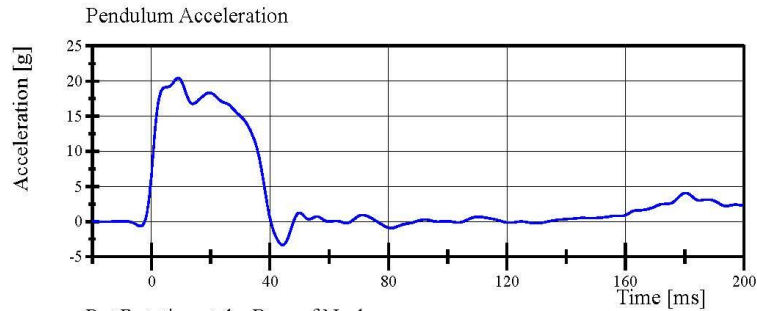


## Transportation Research Center Inc.

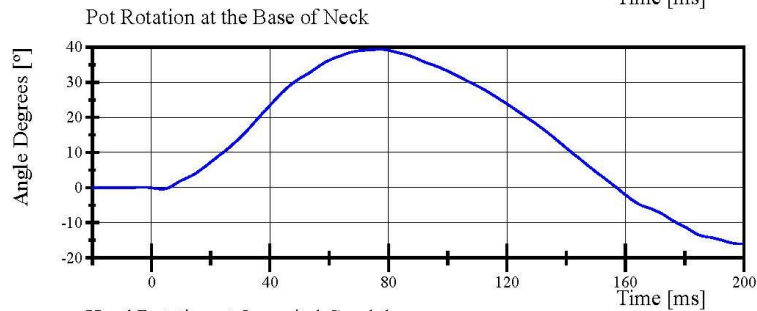
Neck Extension

HIII 50th Serial No. 037 Certification No. 79-1

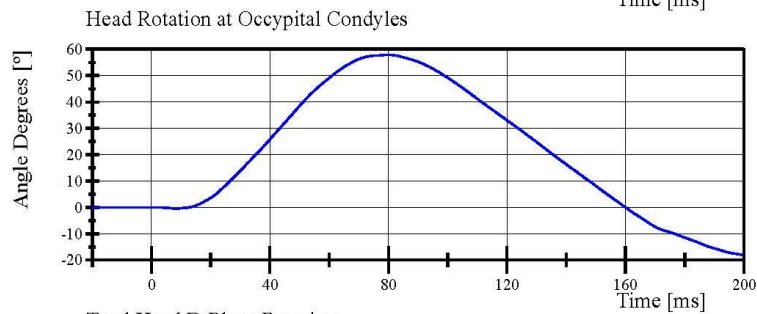
Test Date: 8/19/2022



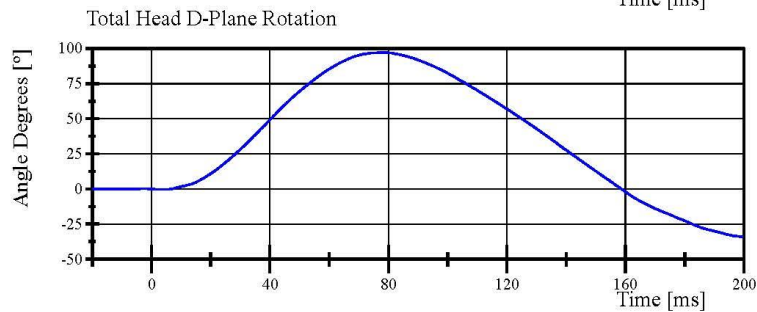
Filter Class: CFC\_60  
Max: 20.4 g at 9.1 ms  
Min: -3.3 g at 44.3 ms



Filter Class: CFC\_60  
Max: 39.4 ° at 77.1 ms  
Min: -16.0 ° at 199.5 ms



Filter Class: CFC\_60  
Max: 57.9 ° at 80.1 ms  
Min: -18.0 ° at 199.5 ms



Filter Class: CFC\_60  
Max: 97.1 ° at 78.2 ms  
Min: -34.0 ° at 199.5 ms

Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

08.19.2022 11:41:19 2010

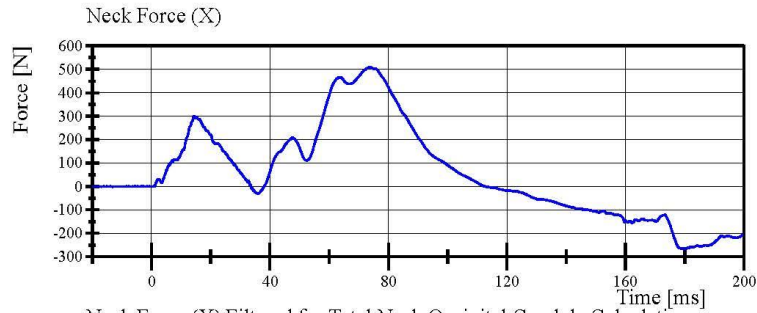


## Transportation Research Center Inc.

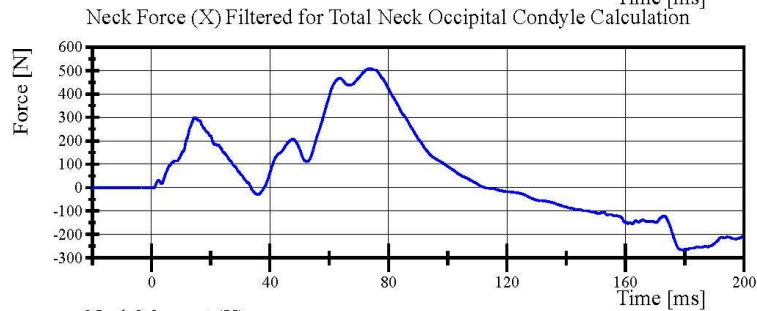
Neck Extension

HIII 50th Serial No. 037 Certification No. 79-1

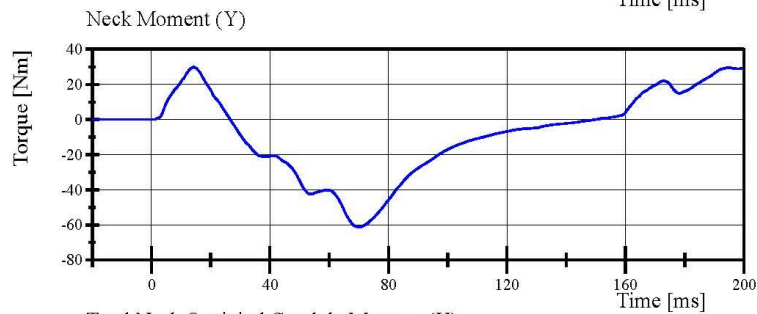
Test Date: 8/19/2022



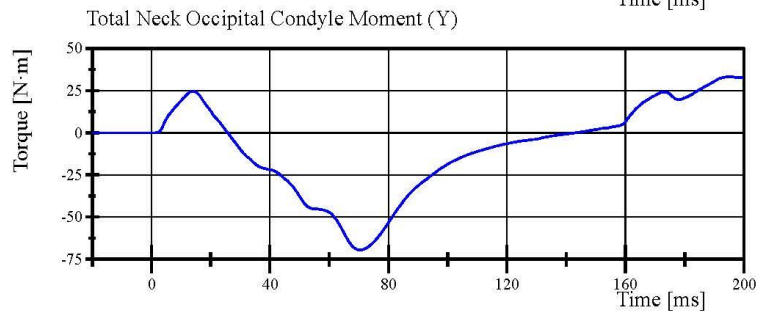
Filter Class: CFC\_1000  
Max: 510.1 N at 73.7 ms  
Min: -266.4 N at 179.4 ms



Filter Class: CFC\_600  
Max: 509.3 N at 73.8 ms  
Min: -265.6 N at 179.3 ms



Filter Class: CFC\_600  
Max: 29.9 Nm at 14.3 ms  
Min: -61.2 Nm at 70.1 ms



Filter Class: Without\_(Constar  
Max: 33.3 N·m at 195.2 ms  
Min: -69.6 N·m at 70.4 ms

Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

08.19.2022 11:41:19 2010





## Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 037 Certification No. 79-1

Test Date: 8/19/2022

| Test Parameter            | Specification         | Test Results | Pass |
|---------------------------|-----------------------|--------------|------|
| Temperature               | 20.6 - 22.2 °C        | 21.7 °C      | Yes  |
| Relative Humidity         | 10 - 70 %             | 65 %         | Yes  |
| Probe Velocity            | 6.59 - 6.83 m/s       | 6.601 m/s    | Yes  |
| Probe Force Peak          | (-5,160) - (-5,894) N | -5,227.2 N   | Yes  |
| Maximum Chest Compression | (-63.5) - (-72.6) mm  | -70.54 mm    | Yes  |
| Internal Hysteresis       | 69 - 85 %             | 70.4 %       | Yes  |

**Test meets specifications.**

**Condition:** Used

**Comments:**

**Jacket S/N:** 2565

**Rib Set S/N:** 02033121A

Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

08.19.2022 08:15:24 405

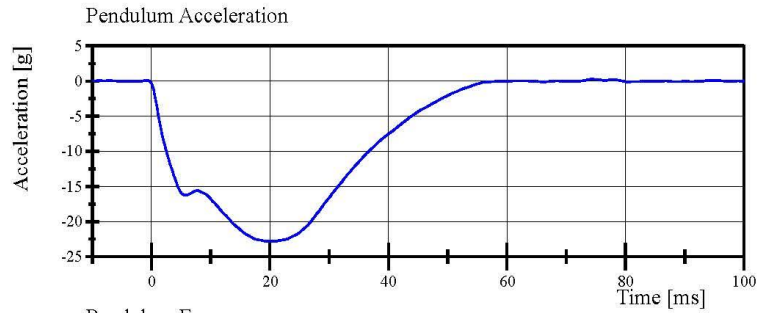


## Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 037 Certification No. 79-1

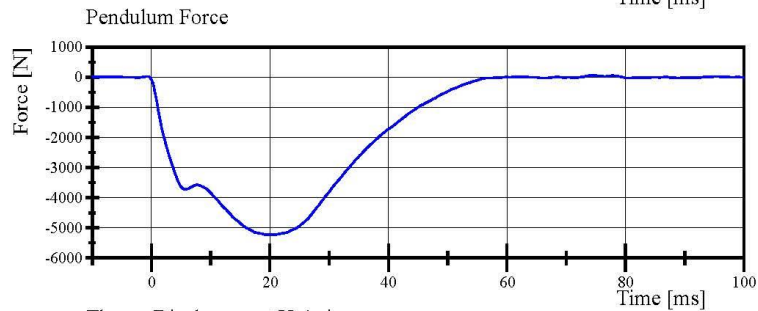
Test Date: 8/19/2022



Filter Class: CFC\_180

Max: 0.3 g at 74.3 ms

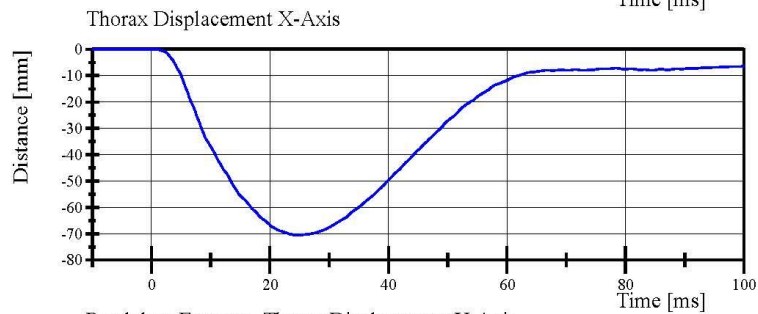
Min: -22.8 g at 19.4 ms



Filter Class: CFC\_180

Max: 64.9 N at 74.3 ms

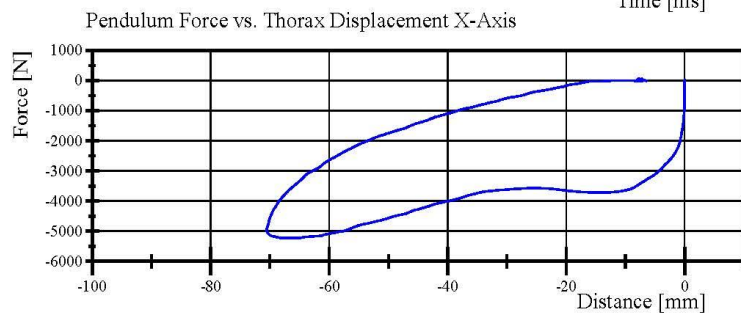
Min: -5,227.2 N at 19.4 ms



Filter Class: CFC\_600

Max: 0.0 mm at 8.3 ms

Min: -70.5 mm at 24.9 ms



Filter Class: CFC\_180

Max: 64.9 N at -7.8 mm

Min: -5,227.2 N at -65.5 mm

Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

08.19.2022 08:17:32 405



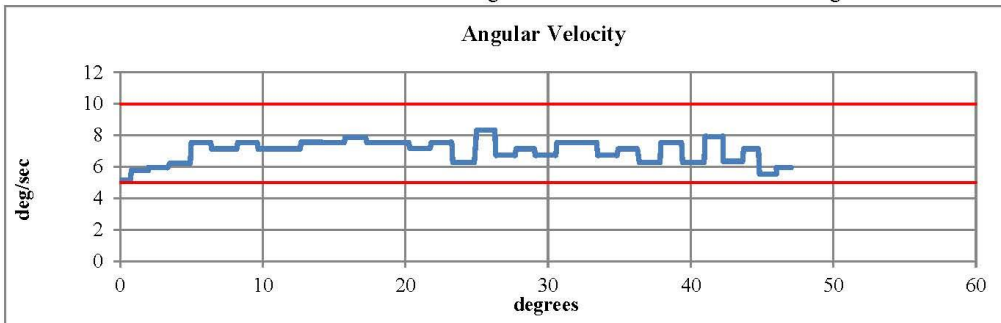
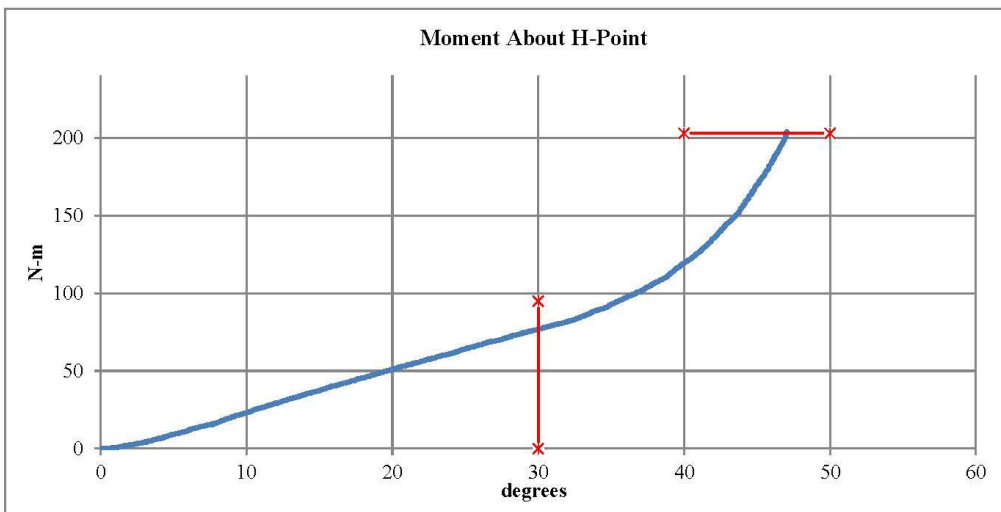
# Transportation Research Center Inc.

Hybrid III 50th Male Hip Range of Motion



Serial Number: 037 Date: 19-Aug-2022  
Side Tested: Left Hip Time: 8:31  
Test Number: 1

| TEST PARAMETER   | SPECIFICATION |        | TEST RESULTS |         |      |
|------------------|---------------|--------|--------------|---------|------|
| Temperature      | 18.9          | - 25.6 | 20.9         | °C      | Pass |
| Humidity         | 10            | - 70   | 65           | %       | Pass |
| Moment at 30°    | 0             | ≤ 94.9 | 76.97        | N-m     | Pass |
| Angle at 203 Nm  | 40            | - 50   | 47.04        | deg     | Pass |
| Average Velocity | 5             | - 10   | 6.99         | deg/sec | Pass |



Comments: Pelvis S/N: EU6859

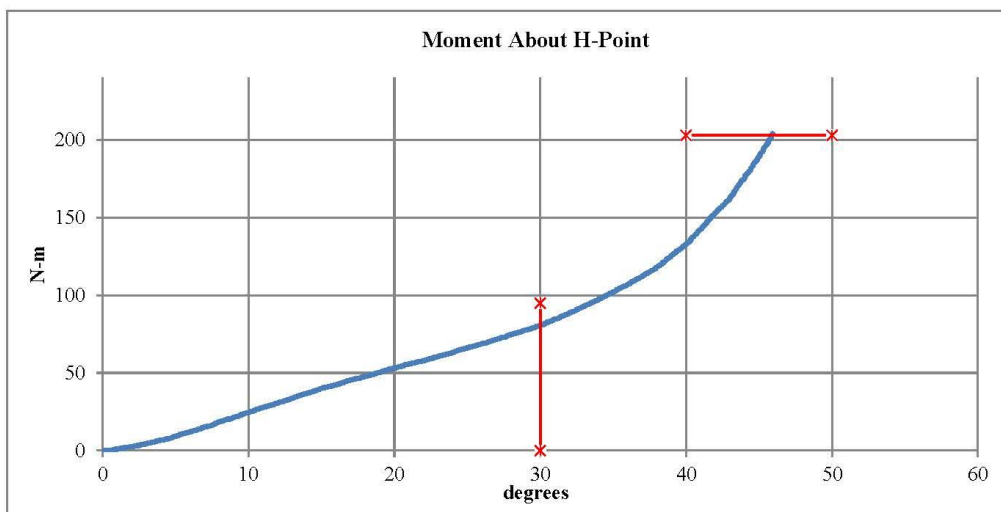
# Transportation Research Center Inc.

Hybrid III 50th Male Hip Range of Motion

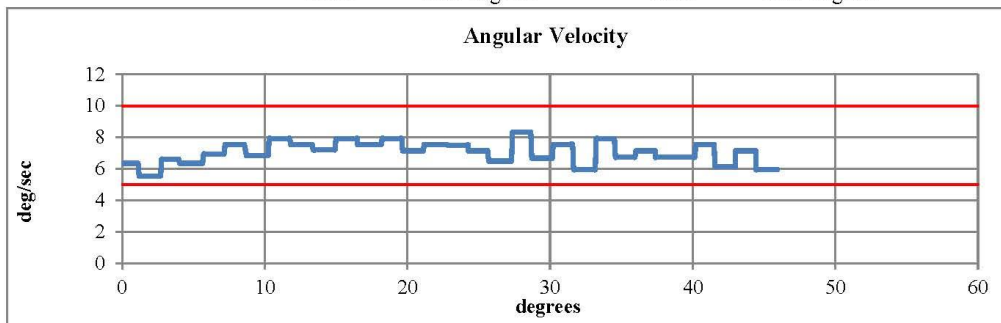


Serial Number: 037 Date: 19-Aug-2022  
Side Tested: Right Hip Time: 9:06  
Test Number: 1

| TEST PARAMETER   | SPECIFICATION |        | TEST RESULTS |         |      |
|------------------|---------------|--------|--------------|---------|------|
| Temperature      | 18.9          | - 25.6 | 20.8         | °C      | Pass |
| Humidity         | 10            | - 70   | 67           | %       | Pass |
| Moment at 30°    | 0             | ≤ 94.9 | 80.85        | N-m     | Pass |
| Angle at 203 Nm  | 40            | - 50   | 45.93        | deg     | Pass |
| Average Velocity | 5             | - 10   | 7.04         | deg/sec | Pass |



Max: 8.33 deg/sec Min: 5.55 deg/sec



Comments: Pelvis S/N: EU6859

## Transportation Research Center Inc.

Left Knee Femur Response Test  
HIII 50th Serial No. 037 Certification No. 79-2  
Test Date: 8/19/2022

| Test Parameter    | Specification             | Test Results | Pass |
|-------------------|---------------------------|--------------|------|
| Temperature       | 18.9 - 25.5 °C            | 21.4 °C      | Yes  |
| Relative Humidity | 10 - 70 %                 | 67 %         | Yes  |
| Probe Velocity    | 2.07 - 2.13 m/s           | 2.116 m/s    | Yes  |
| Peak Femur Force  | (-4,715.2) - (-5,782.6) N | -5,539.09 N  | Yes  |

**Test meets specifications.**

**Condition: Used**

**Comments:**

**Knee Skin S/N: 2672**

Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

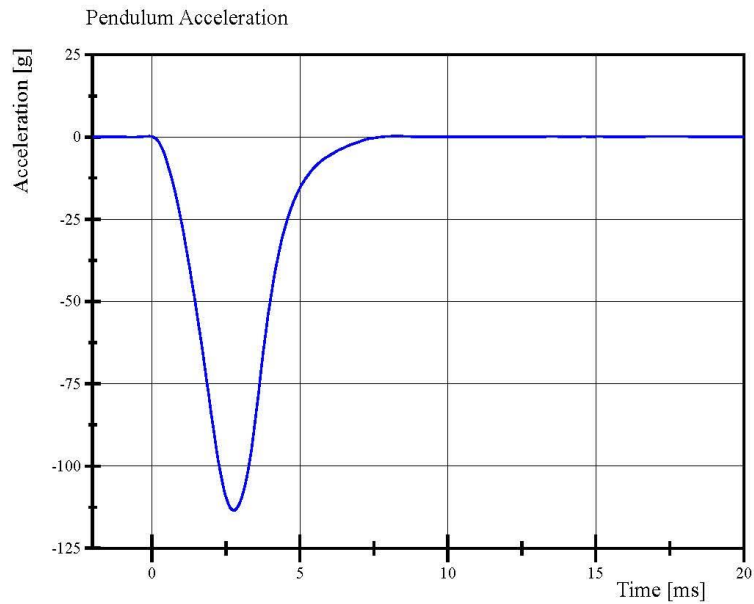
08.19.2022 09:35:31 1966



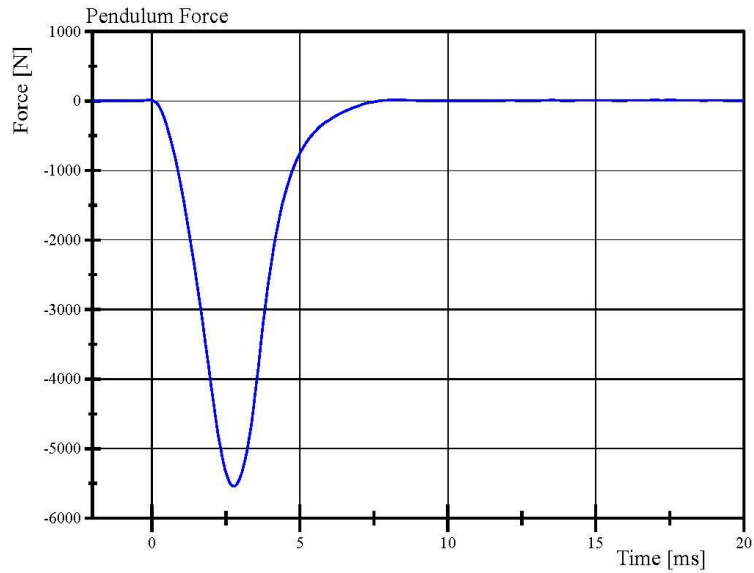


## Transportation Research Center Inc.

Left Knee Femur Response Test  
HIII 50th Serial No. 037 Certification No. 79-2  
Test Date: 8/19/2022



Filter Class: CFC\_600  
Max: 0.3 g at 8.2 ms  
Min: -113.4 g at 2.8 ms



Filter Class: CFC\_600  
Max: 15.7 N at 8.2 ms  
Min: -5,539.1 N at 2.8 ms

Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

08.19.2022 09:36:20 1966



## Transportation Research Center Inc.

Right Knee Femur Response Test  
HIII 50th Serial No. 037 Certification No. 79-1  
Test Date: 8/19/2022

| Test Parameter    | Specification             | Test Results | Pass |
|-------------------|---------------------------|--------------|------|
| Temperature       | 18.9 - 25.5 °C            | 21.4 °C      | Yes  |
| Relative Humidity | 10 - 70 %                 | 67 %         | Yes  |
| Probe Velocity    | 2.07 - 2.13 m/s           | 2.120 m/s    | Yes  |
| Peak Femur Force  | (-4,715.2) - (-5,782.6) N | -5,473.29 N  | Yes  |

**Test meets specifications.**

**Condition: Used**

**Comments:**

**Knee Skin S/N: 1248**

Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

08.26.2022 12:48:41 1957

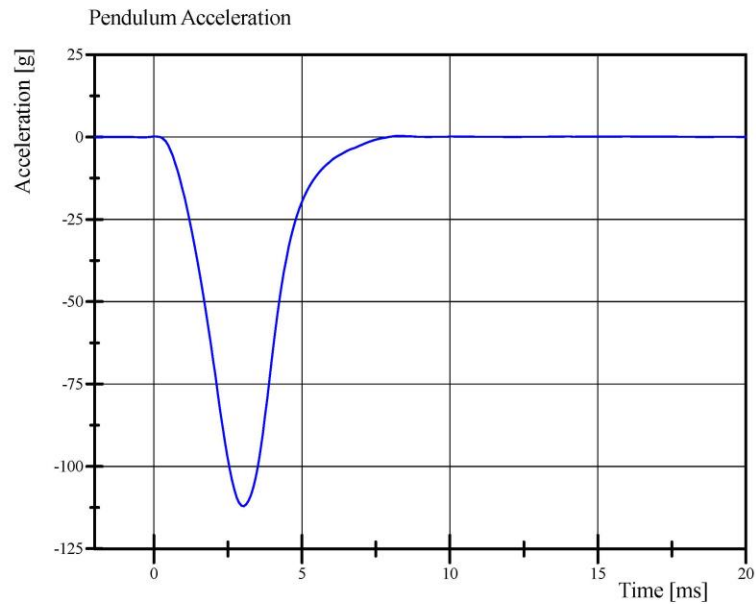


Report Number: 037\_H3F79

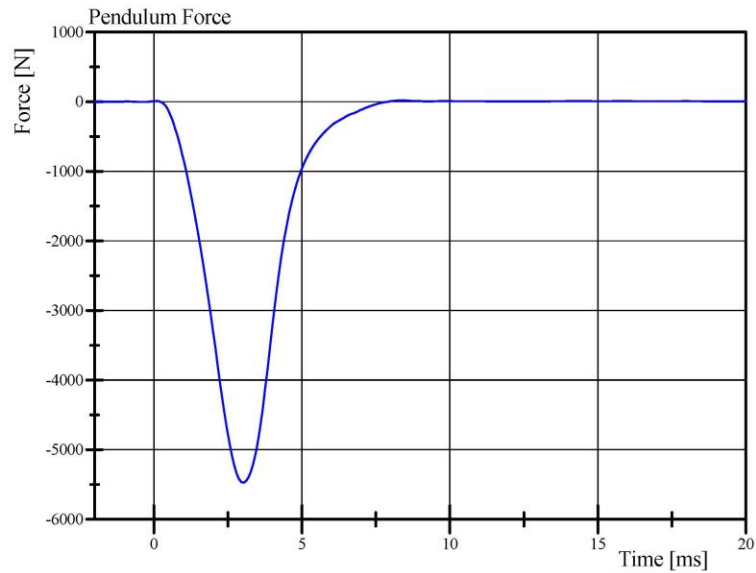
Page 23 of 27

## Transportation Research Center Inc.

Right Knee Femur Response Test  
HIII 50th Serial No. 037 Certification No. 79-1  
Test Date: 8/19/2022



Filter Class: CFC\_600  
Max: 0.4 g at 8.5 ms  
Min: -112.1 g at 3.0 ms



Filter Class: CFC\_600  
Max: 17.7 N at 8.5 ms  
Min: -5,473.3 N at 3.0 ms

Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

08.26.2022 12:54:42 1957



**Pre-Test Calibration Sheets**

**Passenger S/N DH1659**

**Transportation Research Center Inc.**  
**5720 HIII 5th Dummy**  
**External Dimensions**  
**Serial No. DH1659 Calibration No. 04**

| Symbol | Description                                | Specification | Results | Pass |
|--------|--------------------------------------------|---------------|---------|------|
|        |                                            | mm            | mm      |      |
| A      | Total Sitting Height                       | 774.7 - 800.1 | 780     | Yes  |
| B      | Shoulder Pivot Height                      | 431.8 - 457.2 | 445     | Yes  |
| C      | Hip Pivot Height                           | 81.3 - 86.3   | 85      | Yes  |
| D      | Hip Pivot from Backline                    | 144.8 - 149.8 | 148     | Yes  |
| E      | Shoulder Pivot from Backline               | 68.6 - 83.8   | 80      | Yes  |
| F      | Thigh Clearance                            | 119.4 - 134.6 | 130     | Yes  |
| G      | Back of Elbow to Wrist Pivot               | 243.9 - 259.1 | 249     | Yes  |
| H      | Head Back to Backline                      | 43.2 - 48.2   | 45      | Yes  |
| I      | Shoulder to Elbow Length                   | 276.8 - 297.2 | 286     | Yes  |
| J      | Elbow Rest Height                          | 182.8 - 203.2 | 199     | Yes  |
| K      | Buttock Knee Length                        | 520.7 - 546.1 | 533     | Yes  |
| L      | Popliteal Height                           | 355.6 - 376.0 | 359     | Yes  |
| M      | Knee Pivot Height                          | 393.7 - 419.1 | 409     | Yes  |
| N      | Buttock Popliteal Length                   | 414.0 - 439.4 | 430     | Yes  |
| O      | Chest Depth without Jacket                 | 175.3 - 190.5 | 183     | Yes  |
| P      | Foot Length                                | 218.5 - 233.7 | 225     | Yes  |
| R      | Buttock to Knee Pivot Length               | 457.2 - 482.6 | 473     | Yes  |
| S      | Head Breadth                               | 137.1 - 147.3 | 141     | Yes  |
| T      | Head Depth                                 | 177.8 - 188.0 | 180     | Yes  |
| U      | Hip Breadth                                | 299.7 - 314.9 | 306     | Yes  |
| V      | Shoulder Breadth                           | 350.5 - 365.7 | 356     | Yes  |
| W      | Foot Breadth                               | 78.8 - 94.0   | 85      | Yes  |
| X      | Head Circumference                         | 528.3 - 548.7 | 539     | Yes  |
| Y      | Chest Circumference with Jacket            | 850.9 - 881.3 | 867     | Yes  |
| Z      | Waist Circumference                        | 759.5 - 789.9 | 775     | Yes  |
| AA     | Reference Location for Chest Circumference | 332.7 - 358.1 | 345     | Yes  |
| BB     | Reference Location for Waist Circumference | 160.0 - 170.2 | 165     | Yes  |

Revised 8/10/12





## Transportation Research Center Inc.

Front Head Drop

HIII 5th Serial No. DH1659 Certification No. 4-1

Test Date: 7/27/2022

| Test Parameter                                        | Specification  | Test Results | Pass |
|-------------------------------------------------------|----------------|--------------|------|
| Temperature                                           | 18.9 - 25.5 °C | 20.8 °C      | Yes  |
| Relative Humidity                                     | 10 - 70 %      | 68 %         | Yes  |
| Peak Head Resultant Acceleration                      | 250 - 300 g    | 298.3 g      | Yes  |
| Peak Head Lateral Acceleration                        | (-15) - 15 g   | -12.1 g      | Yes  |
| Is Acceleration Curve Unimodal<br>within 10% of Peak? | < 10 %         | 1.65 %       | Yes  |

**Test meets specifications.**

**Condition: Used**

**Comments:**

**Head Skin S/N: DU2864**

Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

07.27.2022 10:12:54 613

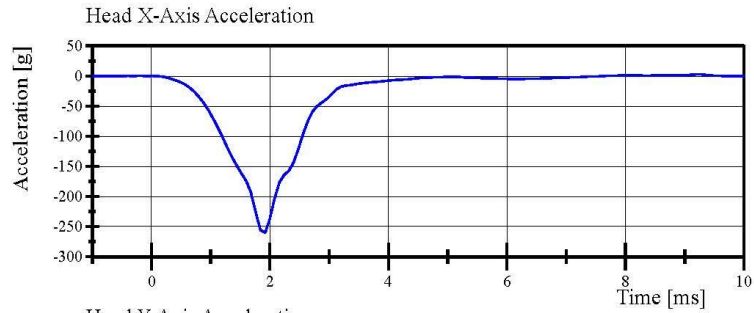


## Transportation Research Center Inc.

Front Head Drop

HIII 5th Serial No. DH1659 Certification No. 4-1

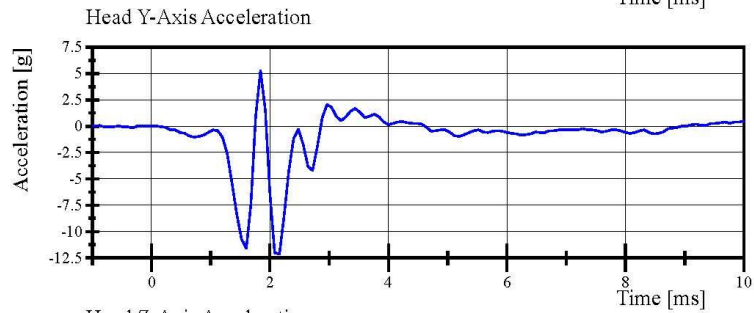
Test Date: 7/27/2022



Filter Class: CFC\_1000

Max: 2.9 g at 9.2 ms

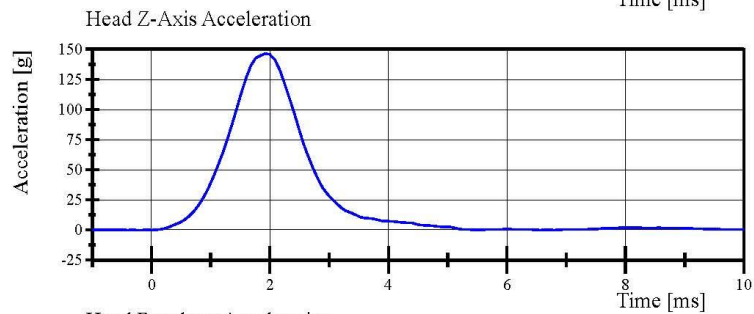
Min: -260.0 g at 1.9 ms



Filter Class: CFC\_1000

Max: 5.3 g at 1.8 ms

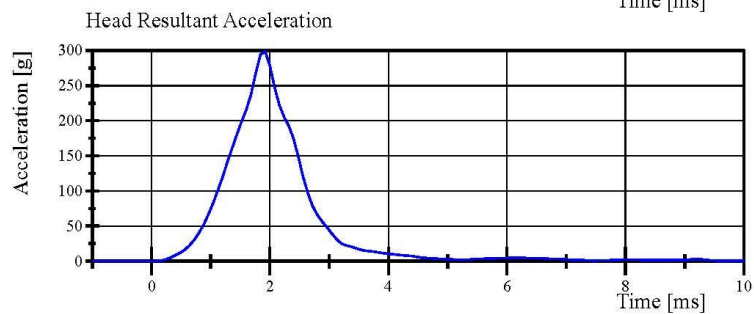
Min: -12.1 g at 2.2 ms



Filter Class: CFC\_1000

Max: 146.4 g at 1.9 ms

Min: -0.1 g at -0.2 ms



Filter Class: CFC\_1000

Max: 298.3 g at 1.9 ms

Min: 0.0 g at -0.6 ms

Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

07.27.2022 10:15:52 613



## Transportation Research Center Inc.

Neck Flexion

HIII 5th Serial No. DH1659 Certification No. 4-3

Test Date: 7/27/2022

| Test Parameter                                                         | Specification       | Test Results | Pass |
|------------------------------------------------------------------------|---------------------|--------------|------|
| Temperature                                                            | 20.6 - 22.2 °C      | 20.8 °C      | Yes  |
| Relative Humidity                                                      | 10 - 70 %           | 67 %         | Yes  |
| Pendulum Velocity                                                      | 6.89 - 7.13 m/s     | 7.088 m/s    | Yes  |
| Pendulum Integrated Velocity<br>Change at 10ms                         | (-2.1) - (-2.5) m/s | -2.45 m/s    | Yes  |
| Pendulum Integrated Velocity<br>Change at 20ms                         | (-4.0) - (-5.0) m/s | -4.71 m/s    | Yes  |
| Pendulum Integrated Velocity<br>Change at 30ms                         | (-5.8) - (-7.0) m/s | -6.65 m/s    | Yes  |
| Total Head D-Plane Rotation                                            | (-77) - (-91) °     | -83.3 °      | Yes  |
| Total Neck Occipital Condyles Moment<br>Between -77° and -91° Rotation | 69 - 83 N·m         | 74.0 N·m     | Yes  |
| Total Neck Occipital Condyles Moment<br>Decay to 10 N·m                | 80 - 100 ms         | 88.1 ms      | Yes  |

**Test meets specifications.**

**Condition:** Used

**Comments:**

**Neck S/N: EE9454**

Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

07.27.2022 15:11:36 1844

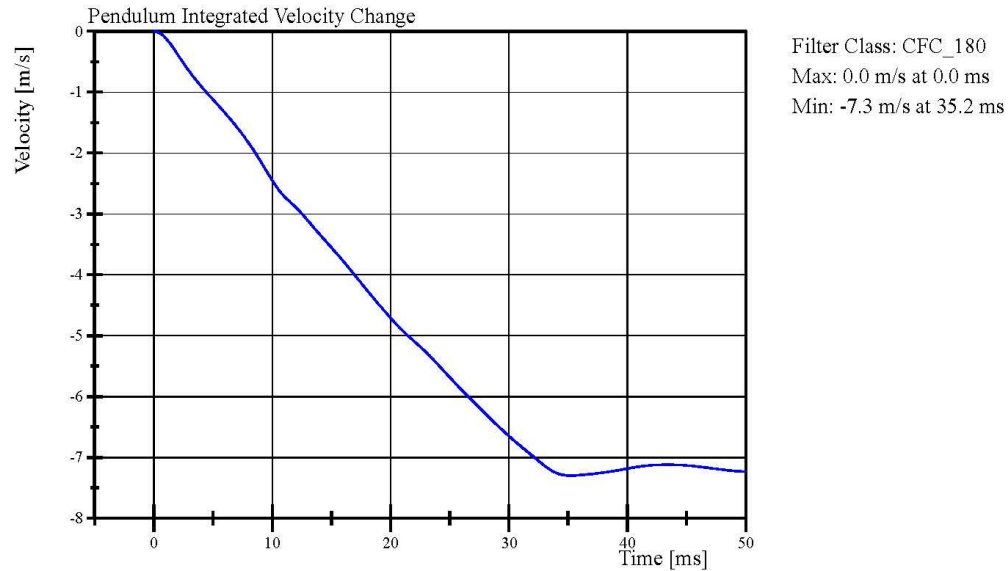
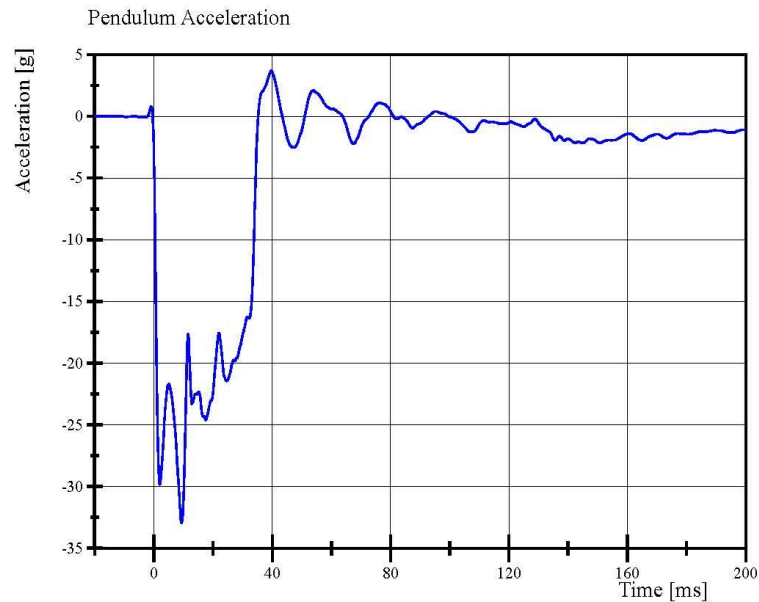


## Transportation Research Center Inc.

Neck Flexion

HIII 5th Serial No. DH1659 Certification No. 4-3

Test Date: 7/27/2022



Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

07.27.2022 15:12:40 1844



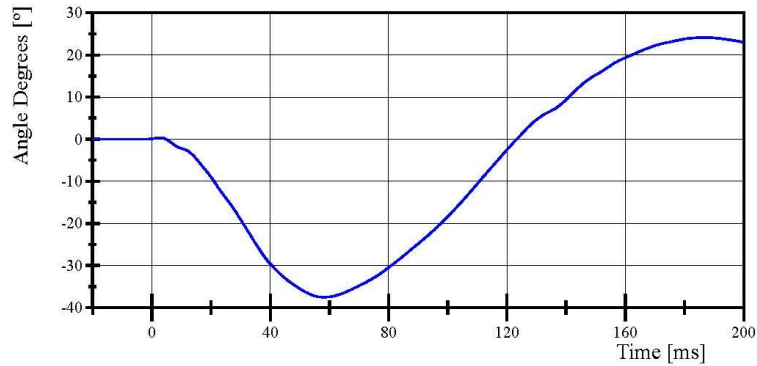
## Transportation Research Center Inc.

Neck Flexion

HIII 5th Serial No. DH1659 Certification No. 4-3

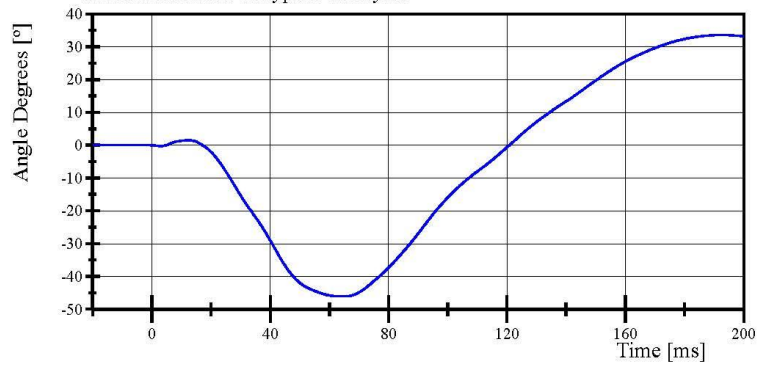
Test Date: 7/27/2022

Pot Rotation at the Base of Neck



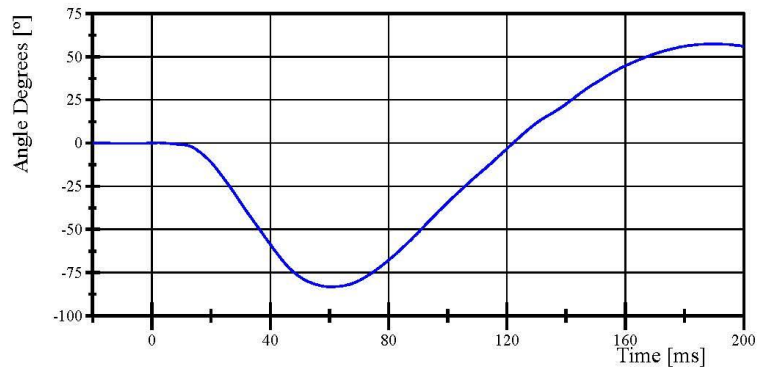
Filter Class: CFC\_60  
Max: 24.1 ° at 186.9 ms  
Min: -37.5 ° at 58.2 ms

Head Rotation at Occypital Condyles



Filter Class: CFC\_60  
Max: 33.6 ° at 192.7 ms  
Min: -46.1 ° at 64.6 ms

Total Head D-Plane Rotation



Filter Class: CFC\_60  
Max: 57.6 ° at 189.6 ms  
Min: -83.3 ° at 60.5 ms

Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

07.27.2022 15:12:41 1844



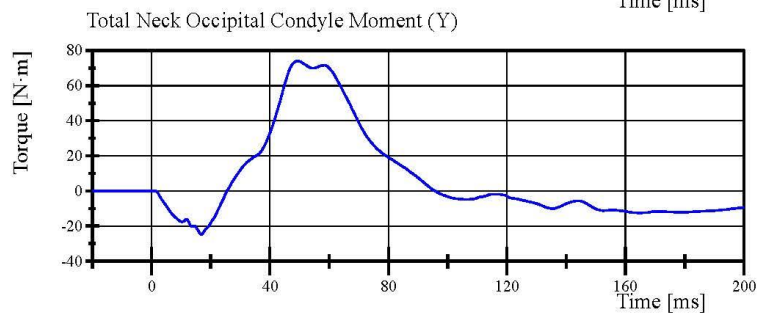
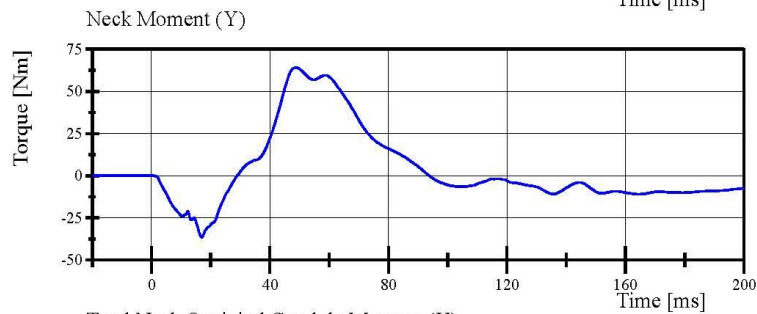
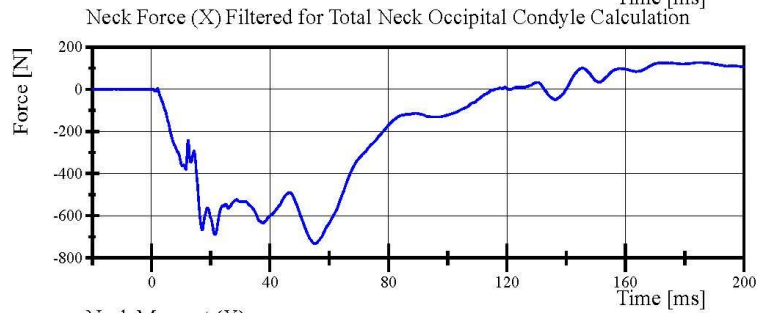
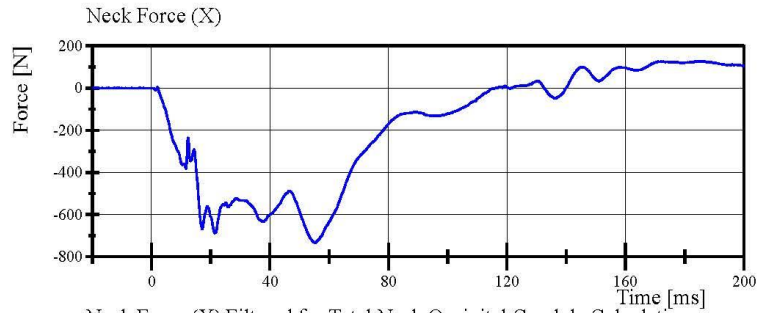


## Transportation Research Center Inc.

Neck Flexion

HIII 5th Serial No. DH1659 Certification No. 4-3

Test Date: 7/27/2022



Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

07.27.2022 15:12:41 1844



## Transportation Research Center Inc.

Neck Extension

HIII 5th Serial No. DH1659 Certification No. 4-2

Test Date: 7/28/2022

| Test Parameter                                                        | Specification         | Test Results | Pass |
|-----------------------------------------------------------------------|-----------------------|--------------|------|
| Temperature                                                           | 20.6 - 22.2 °C        | 20.8 °C      | Yes  |
| Relative Humidity                                                     | 10 - 70 %             | 68 %         | Yes  |
| Pendulum Velocity                                                     | (-5.95) - (-6.19) m/s | -6.056 m/s   | Yes  |
| Pendulum Integrated Velocity<br>Change at 10ms                        | 1.5 - 1.9 m/s         | 1.87 m/s     | Yes  |
| Pendulum Integrated Velocity<br>Change at 20ms                        | 3.1 - 3.9 m/s         | 3.62 m/s     | Yes  |
| Pendulum Integrated Velocity<br>Change at 30ms                        | 4.6 - 5.6 m/s         | 5.20 m/s     | Yes  |
| Total Head D-Plane Rotation                                           | 99 - 114 °            | 101.6 °      | Yes  |
| Total Neck Occipital Condyles Moment<br>Between 99° and 114° Rotation | (-53) - (-65) N·m     | -56.2 N·m    | Yes  |
| Total Neck Occipital Condyles Moment<br>Decay to -10 N·m              | 94 - 114 ms           | 102.9 ms     | Yes  |

**Test meets specifications.**

**Condition:** Used

**Comments:**

**Neck S/N: EE9454**

Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

07.28.2022 08:14:55 2002

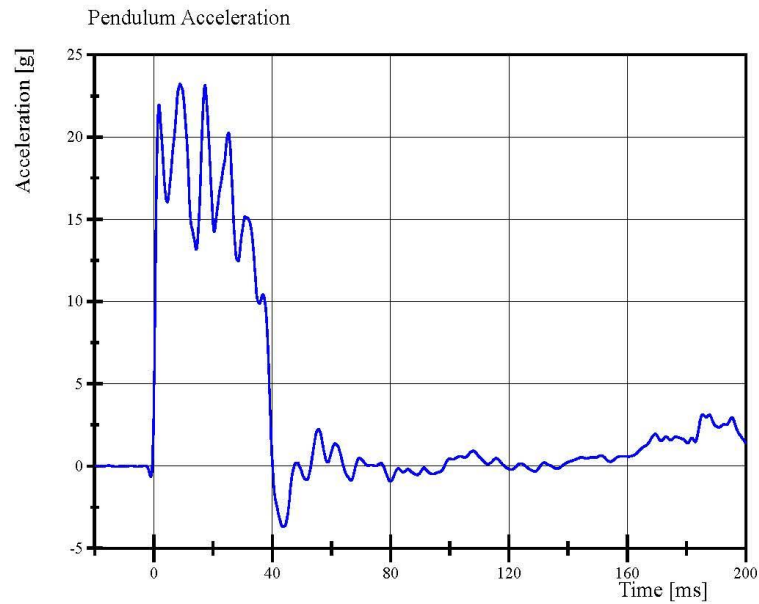


## Transportation Research Center Inc.

Neck Extension

HIII 5th Serial No. DH1659 Certification No. 4-2

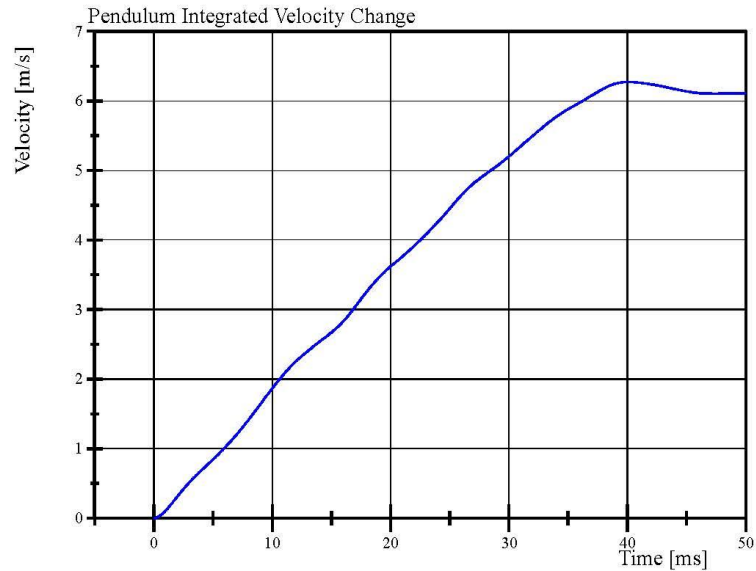
Test Date: 7/28/2022



Filter Class: CFC\_180

Max: 23.2 g at 8.9 ms

Min: -3.7 g at 43.5 ms



Filter Class: CFC\_180

Max: 6.3 m/s at 40.1 ms

Min: 0.0 m/s at 0.0 ms

Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

07.28.2022 08:15:27 2002



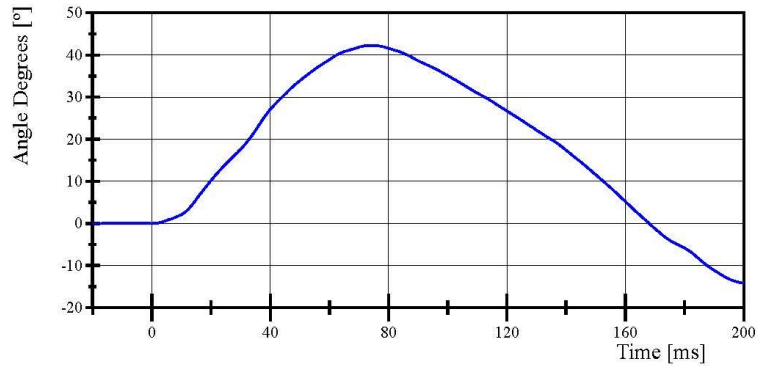
## Transportation Research Center Inc.

Neck Extension

HIII 5th Serial No. DH1659 Certification No. 4-2

Test Date: 7/28/2022

Pot Rotation at the Base of Neck

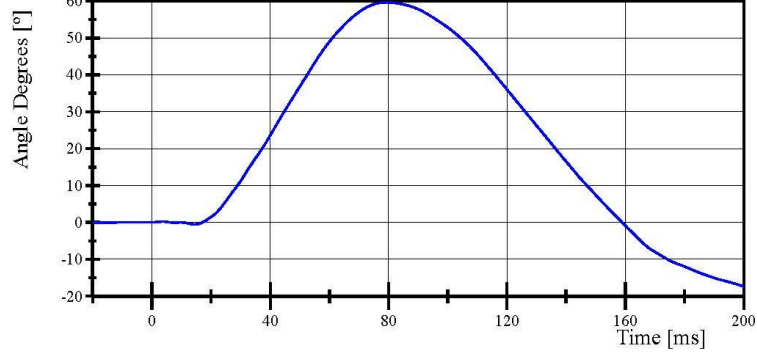


Filter Class: CFC\_60

Max: 42.2 ° at 74.0 ms

Min: -14.2 ° at 199.9 ms

Head Rotation at Occypital Condyles

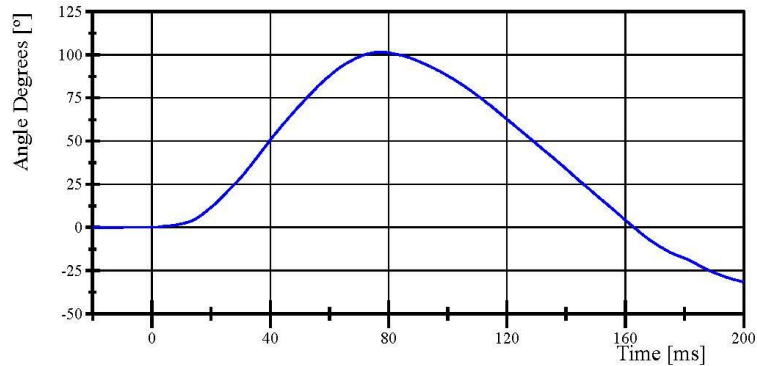


Filter Class: CFC\_60

Max: 59.6 ° at 79.3 ms

Min: -17.3 ° at 199.9 ms

Total Head D-Plane Rotation



Filter Class: CFC\_60

Max: 101.6 ° at 77.4 ms

Min: -31.5 ° at 199.9 ms

Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

07.28.2022 08:15:28 2002

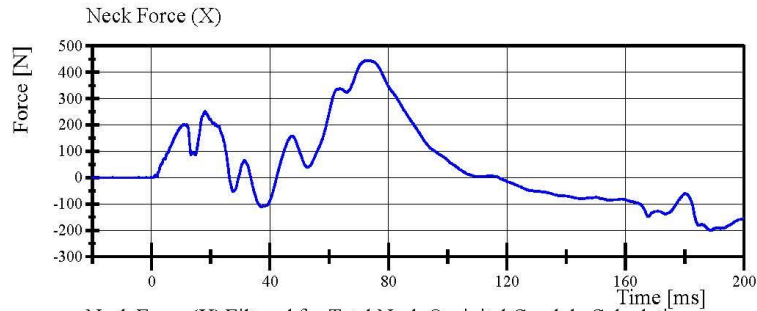


## Transportation Research Center Inc.

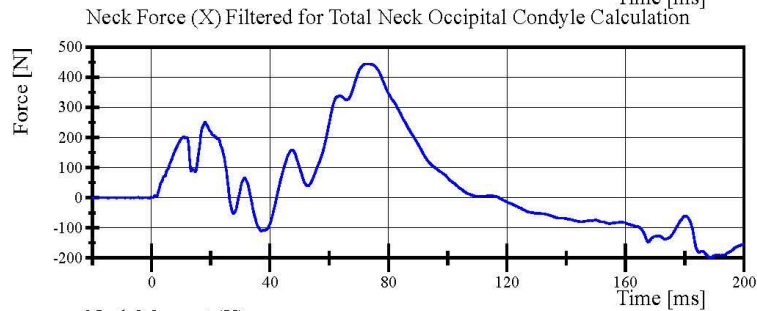
Neck Extension

HIII 5th Serial No. DH1659 Certification No. 4-2

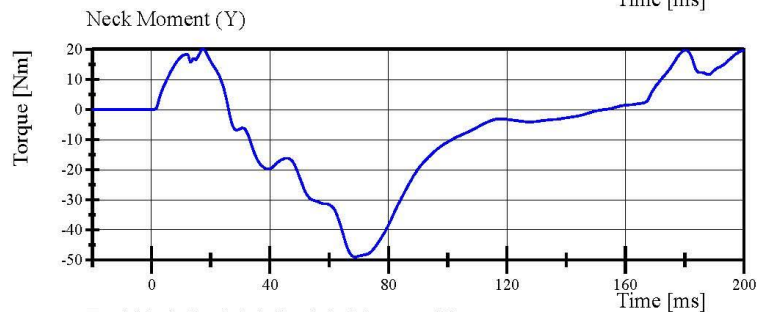
Test Date: 7/28/2022



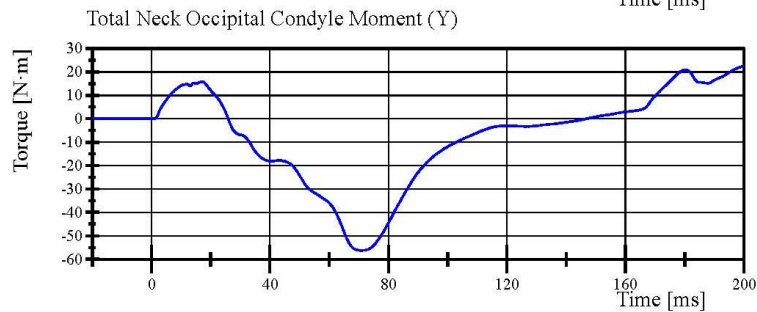
Filter Class: CFC\_1000  
Max: 444.8 N at 72.7 ms  
Min: -200.0 N at 188.6 ms



Filter Class: CFC\_600  
Max: 444.3 N at 72.6 ms  
Min: -199.9 N at 188.8 ms



Filter Class: CFC\_600  
Max: 20.0 Nm at 17.2 ms  
Min: -48.9 Nm at 68.9 ms



Filter Class: Without\_(Constar  
Max: 22.5 N·m at 199.9 ms  
Min: -56.2 N·m at 71.0 ms

Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

07.28.2022 08:15:28 2002





## Transportation Research Center Inc.

Front Thorax

HIII 5th Serial No. DH1659 Certification No. 4-5

Test Date: 7/28/2022

| Test Parameter                                                   | Specification         | Test Results | Pass |
|------------------------------------------------------------------|-----------------------|--------------|------|
| Temperature                                                      | 20.6 - 22.2 °C        | 20.8 °C      | Yes  |
| Relative Humidity                                                | 10 - 70 %             | 67 %         | Yes  |
| Probe Velocity                                                   | 6.59 - 6.83 m/s       | 6.796 m/s    | Yes  |
| Probe Force Peak Between 50.0 mm<br>and 58.0 mm Chest Deflection | (-3,900) - (-4,400) N | -4,304.8 N   | Yes  |
| Probe Force Peak Between 18.0 mm<br>and 50.0 mm Chest Deflection | >= (-4,600) N         | -4,579.3 N   | Yes  |
| Maximum Chest Compression                                        | (-50) - (-58) mm      | -50.1 mm     | Yes  |
| Internal Hysteresis                                              | 69 - 85 %             | 75.9 %       | Yes  |

**Test meets specifications.**

**Condition:** Used

**Comments:**

**Jacket S/N:** EE8365

**Ribset S/N:** EA4110

Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

07.28.2022 15:49:41 416

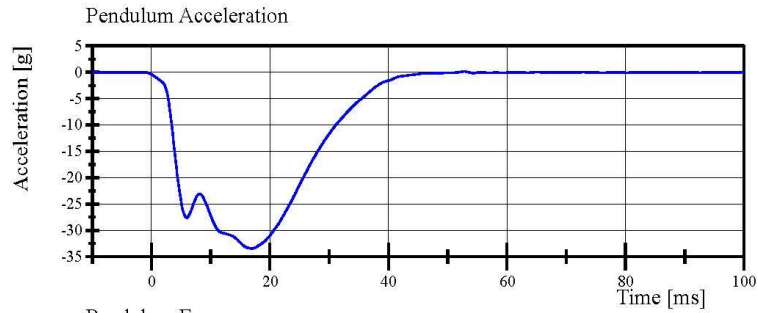


## Transportation Research Center Inc.

Front Thorax

HIII 5th Serial No. DH1659 Certification No. 4-5

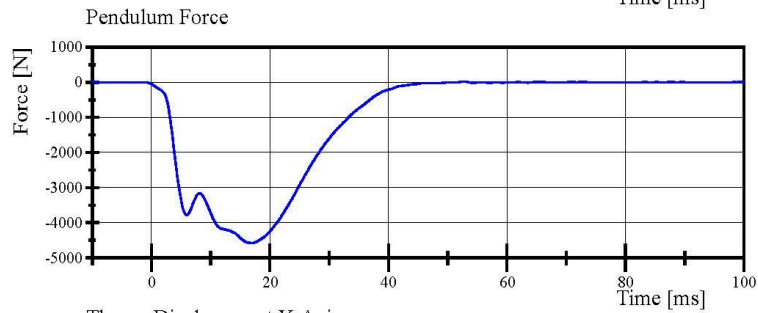
Test Date: 7/28/2022



Filter Class: CFC\_180

Max: 0.1 g at 52.8 ms

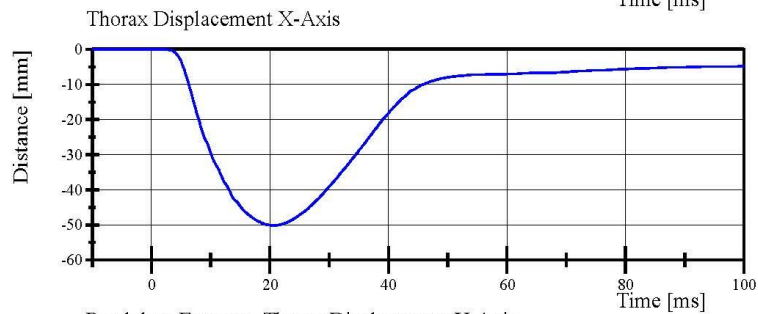
Min: -33.4 g at 16.9 ms



Filter Class: CFC\_180

Max: 20.2 N at 52.8 ms

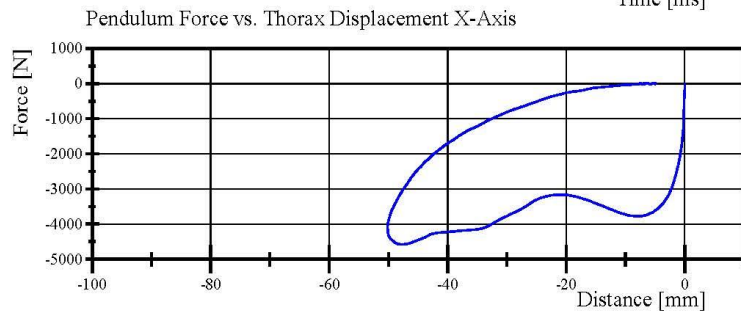
Min: -4,579.3 N at 16.9 ms



Filter Class: CFC\_600

Max: 0.0 mm at -4.1 ms

Min: -50.1 mm at 20.8 ms



Filter Class: CFC\_180

Max: 20.2 N at -7.4 mm

Min: -4,579.3 N at -47.7 mm

Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

07.28.2022 15:51:39 416



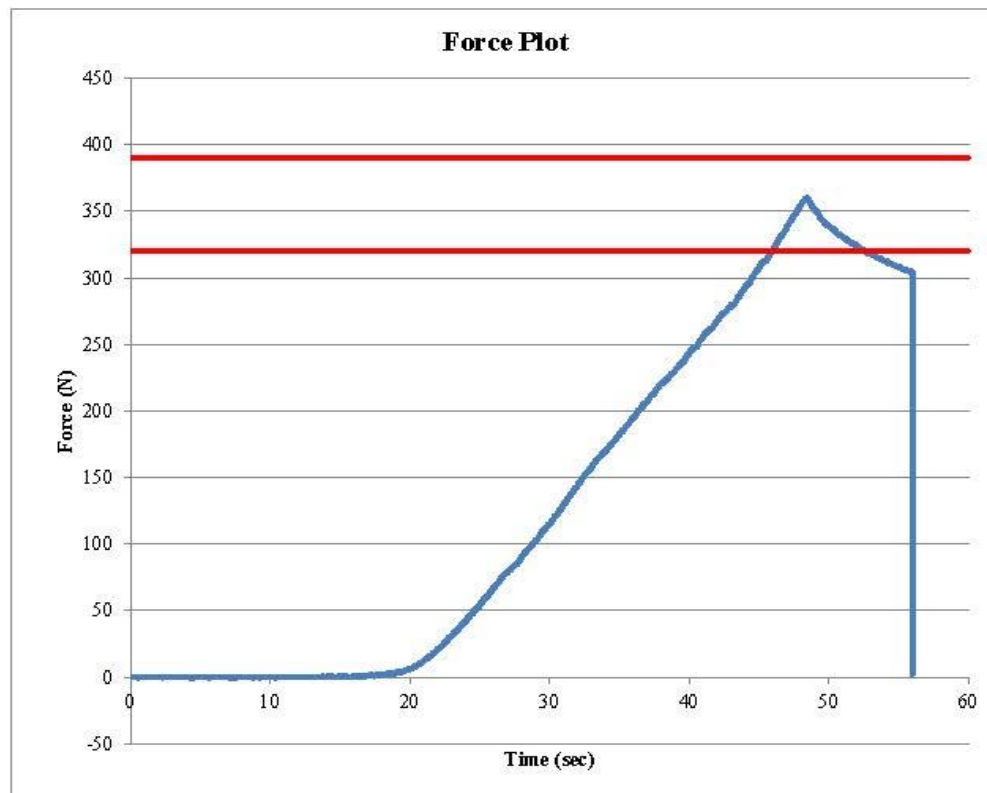
## Transportation Research Center Inc.

Hybrid III Small Female Torso Flexion



Customer: NHTSA  
Serial Number: DH1659 Date: 7/29/2022  
Test Number: 1 Time: 9:23

| TEST PARAMETER       | SPECIFICATION |        | TEST RESULTS |         |      |
|----------------------|---------------|--------|--------------|---------|------|
| Temperature          | 18.9          | - 25.6 | 20.8         | °C      | Pass |
| Humidity             | 10            | - 70   | 69           | %       | Pass |
| Average Angular Rate | 0.5           | - 1.5  | 0.94         | deg/sec | Pass |
| Initial Angle        | 0             | - 20   | 19.19        | deg     | Pass |
| Peak Force at 45.35° | 320           | - 390  | 359.65       | N       | Pass |
| Final Angle          | -8            | - 8    | 4.38         | deg     | Pass |



**Comments:**

Jacket S/N: EE8385  
Abdomen S/N: EE8393  
Lumbar S/N: DG9121

## Transportation Research Center Inc.

Left Knee Femur Response Test  
HIII 5th Serial No. DH1659 Certification No. 4-1  
Test Date: 7/27/2022

| Test Parameter    | Specification         | Test Results | Pass |
|-------------------|-----------------------|--------------|------|
| Temperature       | 18.9 - 25.6 °C        | 20.8 °C      | Yes  |
| Relative Humidity | 10 - 70 %             | 69 %         | Yes  |
| Probe Velocity    | 2.07 - 2.13 m/s       | 2.119 m/s    | Yes  |
| Peak Femur Force  | (-3,450) - (-4,060) N | -3,990.4 N   | Yes  |

**Test meets specifications.**

**Condition:** Used

**Comments:**

Left Knee Skin S/N: ED6729

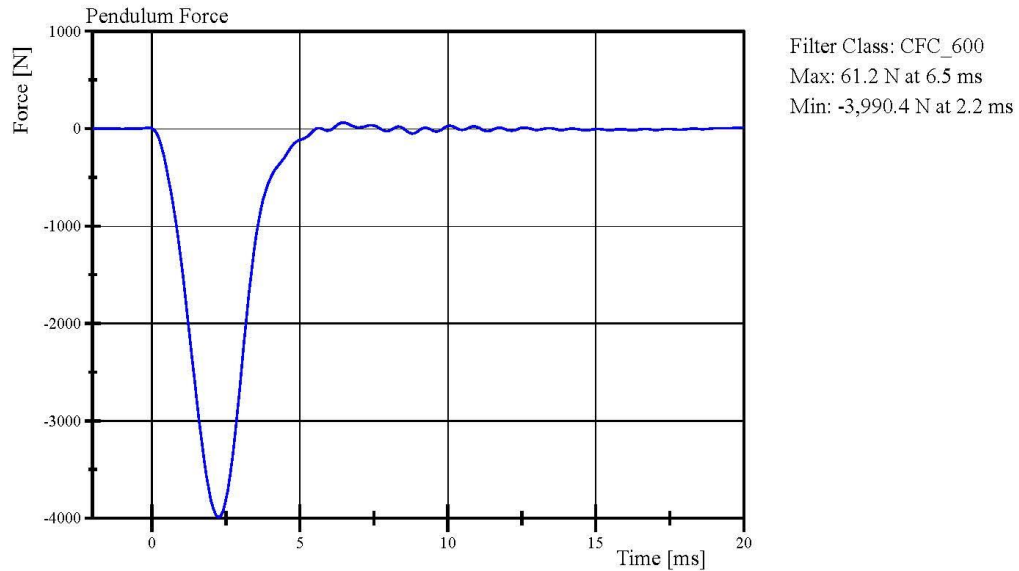
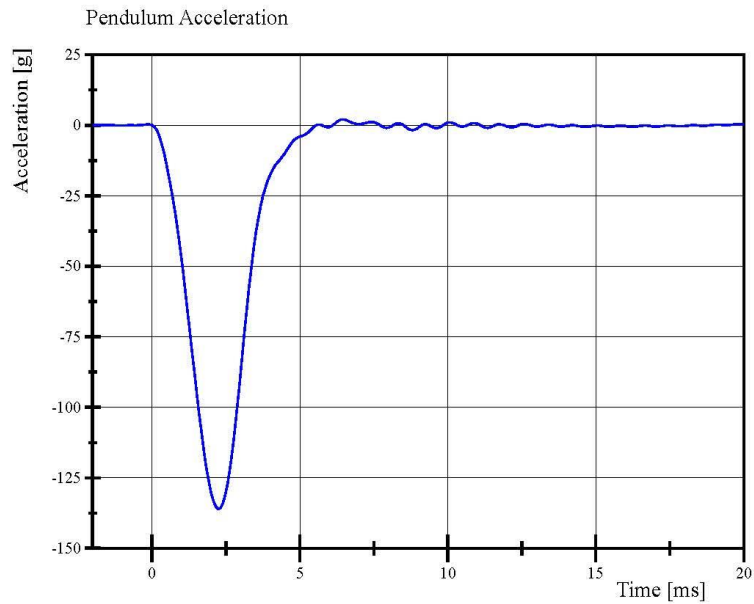
Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

07.27.2022 10:37:39 1760



## Transportation Research Center Inc.

Left Knee Femur Response Test  
HIII 5th Serial No. DH1659 Certification No. 4-1  
Test Date: 7/27/2022



Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

07.27.2022 10:43:47 1760





## Transportation Research Center Inc.

Right Knee Femur Response Test  
HIII 5th Serial No. DH1659 Certification No. 4-4  
Test Date: 7/27/2022

| Test Parameter    | Specification         | Test Results | Pass |
|-------------------|-----------------------|--------------|------|
| Temperature       | 18.9 - 25.6 °C        | 20.8 °C      | Yes  |
| Relative Humidity | 10 - 70 %             | 68 %         | Yes  |
| Probe Velocity    | 2.07 - 2.13 m/s       | 2.085 m/s    | Yes  |
| Peak Femur Force  | (-3,450) - (-4,060) N | -3,728.4 N   | Yes  |

**Test meets specifications.**

**Condition: Used**

**Comments:**

**Right Knee Skin S/N: EC5852**

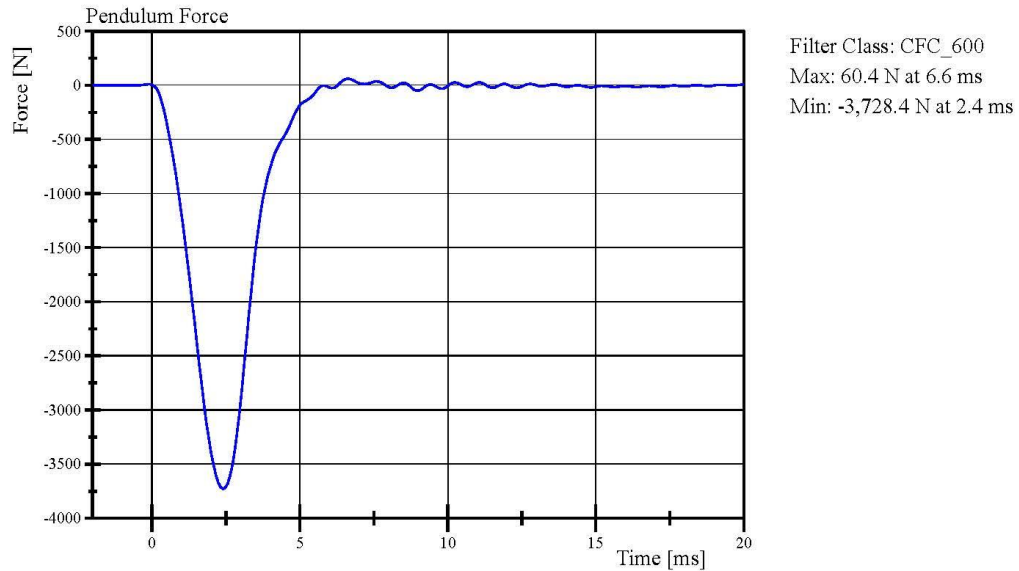
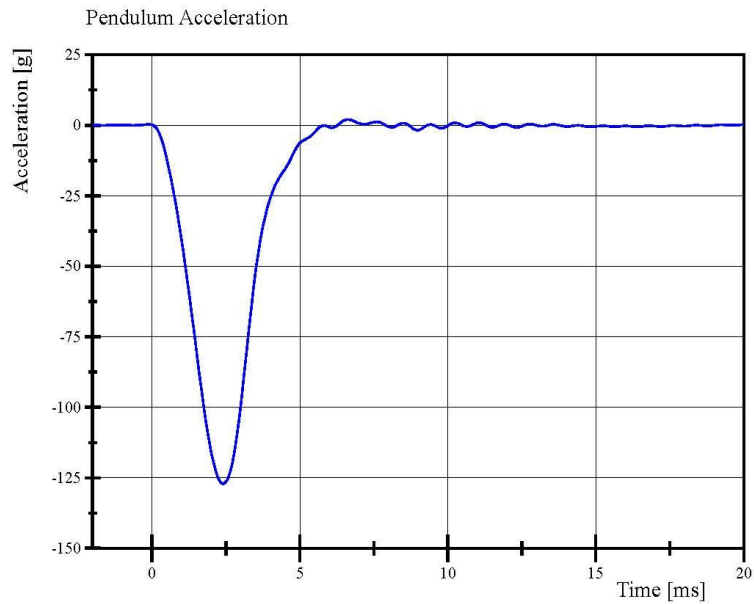
Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

07.27.2022 13:18:08 1778



## Transportation Research Center Inc.

Right Knee Femur Response Test  
HIII 5th Serial No. DH1659 Certification No. 4-4  
Test Date: 7/27/2022



Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

07.27.2022 13:19:59 1778



**Post-Test Calibration Sheets**

**Passenger S/N DH1659**

**Transportation Research Center Inc.**  
**5720 HIII 5th Dummy**  
**External Dimensions**  
**Serial No. DH1659 Calibration No. 05**

| Symbol | Description                                | Specification | Results | Pass |
|--------|--------------------------------------------|---------------|---------|------|
|        |                                            | mm            | mm      |      |
| A      | Total Sitting Height                       | 774.7 - 800.1 | 781     | Yes  |
| B      | Shoulder Pivot Height                      | 431.8 - 457.2 | 445     | Yes  |
| C      | Hip Pivot Height                           | 81.3 - 86.3   | 86      | Yes  |
| D      | Hip Pivot from Backline                    | 144.8 - 149.8 | 148     | Yes  |
| E      | Shoulder Pivot from Backline               | 68.6 - 83.8   | 80      | Yes  |
| F      | Thigh Clearance                            | 119.4 - 134.6 | 131     | Yes  |
| G      | Back of Elbow to Wrist Pivot               | 243.9 - 259.1 | 249     | Yes  |
| H      | Head Back to Backline                      | 43.2 - 48.2   | 45      | Yes  |
| I      | Shoulder to Elbow Length                   | 276.8 - 297.2 | 286     | Yes  |
| J      | Elbow Rest Height                          | 182.8 - 203.2 | 198     | Yes  |
| K      | Buttock Knee Length                        | 520.7 - 546.1 | 533     | Yes  |
| L      | Popliteal Height                           | 355.6 - 376.0 | 360     | Yes  |
| M      | Knee Pivot Height                          | 393.7 - 419.1 | 409     | Yes  |
| N      | Buttock Popliteal Length                   | 414.0 - 439.4 | 430     | Yes  |
| O      | Chest Depth without Jacket                 | 175.3 - 190.5 | 184     | Yes  |
| P      | Foot Length                                | 218.5 - 233.7 | 225     | Yes  |
| R      | Buttock to Knee Pivot Length               | 457.2 - 482.6 | 473     | Yes  |
| S      | Head Breadth                               | 137.1 - 147.3 | 141     | Yes  |
| T      | Head Depth                                 | 177.8 - 188.0 | 180     | Yes  |
| U      | Hip Breadth                                | 299.7 - 314.9 | 305     | Yes  |
| V      | Shoulder Breadth                           | 350.5 - 365.7 | 356     | Yes  |
| W      | Foot Breadth                               | 78.8 - 94.0   | 85      | Yes  |
| X      | Head Circumference                         | 528.3 - 548.7 | 539     | Yes  |
| Y      | Chest Circumference with Jacket            | 850.9 - 881.3 | 869     | Yes  |
| Z      | Waist Circumference                        | 759.5 - 789.9 | 776     | Yes  |
| AA     | Reference Location for Chest Circumference | 332.7 - 358.1 | 345     | Yes  |
| BB     | Reference Location for Waist Circumference | 160.0 - 170.2 | 165     | Yes  |

Revised 8/10/12



Report Number: DH1659\_HFH05

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## Transportation Research Center Inc.

Front Head Drop

HIII 5th Serial No. DH1659 Certification No. 5-2

Test Date: 8/22/2022

| Test Parameter                                        | Specification  | Test Results | Pass |
|-------------------------------------------------------|----------------|--------------|------|
| Temperature                                           | 18.9 - 25.5 °C | 21.1 °C      | Yes  |
| Relative Humidity                                     | 10 - 70 %      | 67 %         | Yes  |
| Peak Head Resultant Acceleration                      | 250 - 300 g    | 274.0 g      | Yes  |
| Peak Head Lateral Acceleration                        | (-15) - 15 g   | -6.6 g       | Yes  |
| Is Acceleration Curve Unimodal<br>within 10% of Peak? | < 10 %         | 1.60 %       | Yes  |

**Test meets specifications.**

**Condition: Used**

**Comments:**

**Head Skin S/N: DU2864**

Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

08.22.2022 08:16:28 614



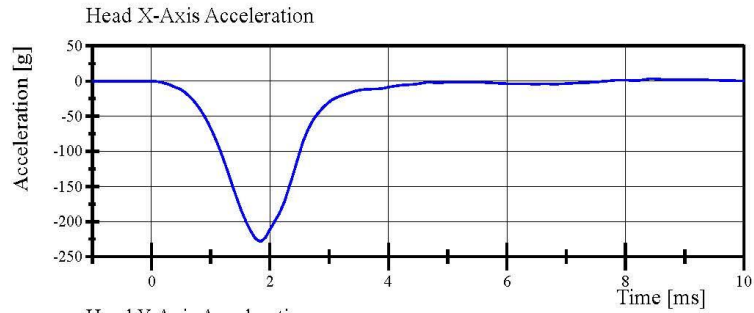


## Transportation Research Center Inc.

Front Head Drop

HIII 5th Serial No. DH1659 Certification No. 5-2

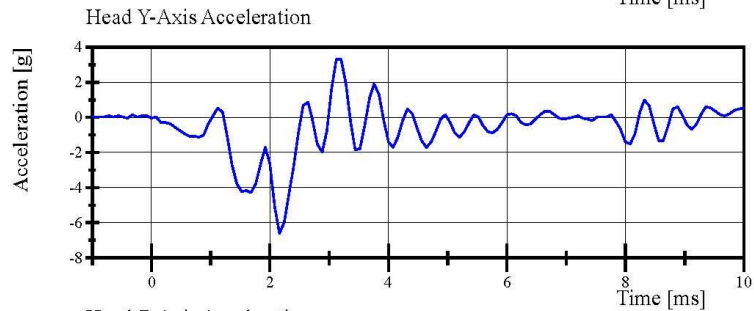
Test Date: 8/22/2022



Filter Class: CFC\_1000

Max: 3.4 g at 8.5 ms

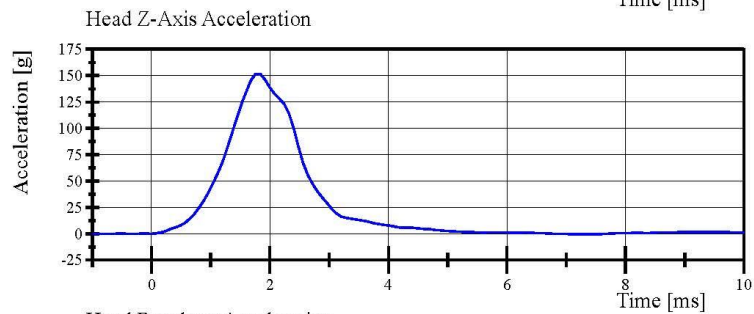
Min: -228.5 g at 1.8 ms



Filter Class: CFC\_1000

Max: 3.3 g at 3.1 ms

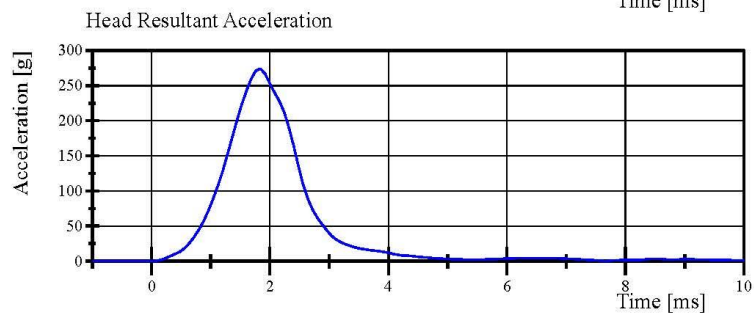
Min: -6.6 g at 2.2 ms



Filter Class: CFC\_1000

Max: 151.7 g at 1.8 ms

Min: -0.6 g at 7.4 ms



Filter Class: CFC\_1000

Max: 274.0 g at 1.8 ms

Min: 0.0 g at -0.9 ms

Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

08.22.2022 08:18:34 614



## Transportation Research Center Inc.

Neck Flexion

HIII 5th Serial No. DH1659 Certification No. 5-1

Test Date: 8/22/2022

| Test Parameter                                                         | Specification       | Test Results | Pass |
|------------------------------------------------------------------------|---------------------|--------------|------|
| Temperature                                                            | 20.6 - 22.2 °C      | 20.9 °C      | Yes  |
| Relative Humidity                                                      | 10 - 70 %           | 70 %         | Yes  |
| Pendulum Velocity                                                      | 6.89 - 7.13 m/s     | 7.076 m/s    | Yes  |
| Pendulum Integrated Velocity<br>Change at 10ms                         | (-2.1) - (-2.5) m/s | -2.30 m/s    | Yes  |
| Pendulum Integrated Velocity<br>Change at 20ms                         | (-4.0) - (-5.0) m/s | -4.49 m/s    | Yes  |
| Pendulum Integrated Velocity<br>Change at 30ms                         | (-5.8) - (-7.0) m/s | -6.48 m/s    | Yes  |
| Total Head D-Plane Rotation                                            | (-77) - (-91) °     | -82.6 °      | Yes  |
| Total Neck Occipital Condyles Moment<br>Between -77° and -91° Rotation | 69 - 83 N·m         | 77.3 N·m     | Yes  |
| Total Neck Occipital Condyles Moment<br>Decay to 10 N·m                | 80 - 100 ms         | 89.0 ms      | Yes  |

**Test meets specifications.**

**Condition:** Used

**Comments:**

**Neck S/N: EE9454**

Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

08.22.2022 08:58:40 1847

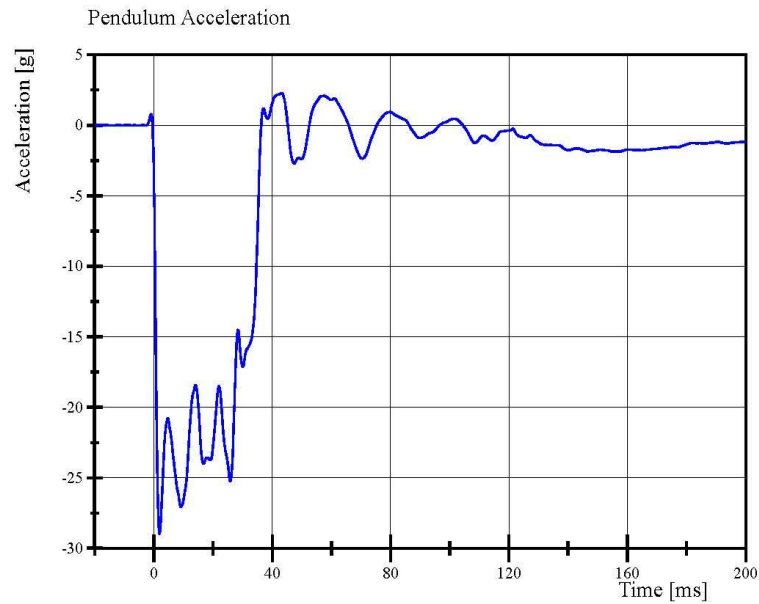


## Transportation Research Center Inc.

Neck Flexion

HIII 5th Serial No. DH1659 Certification No. 5-1

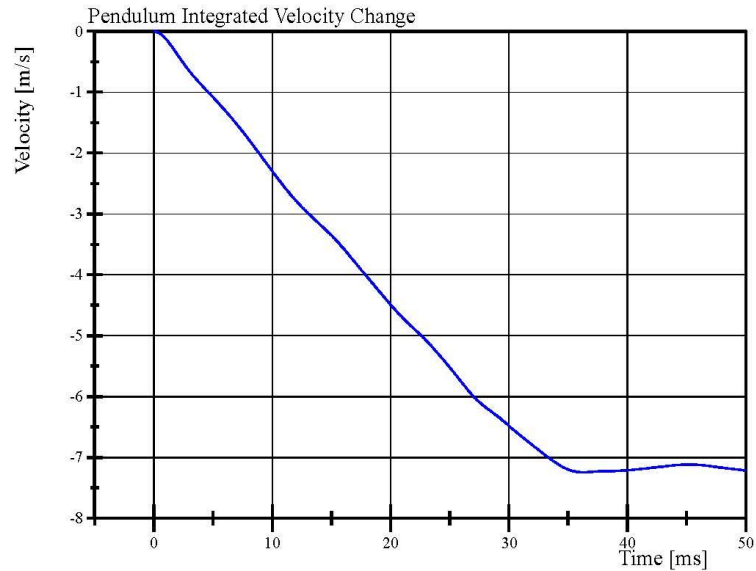
Test Date: 8/22/2022



Filter Class: CFC\_180

Max: 2.3 g at 43.1 ms

Min: -28.9 g at 1.9 ms



Filter Class: CFC\_180

Max: 0.0 m/s at 0.0 ms

Min: -7.2 m/s at 36.3 ms

Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

08.22.2022 08:59:43 1847



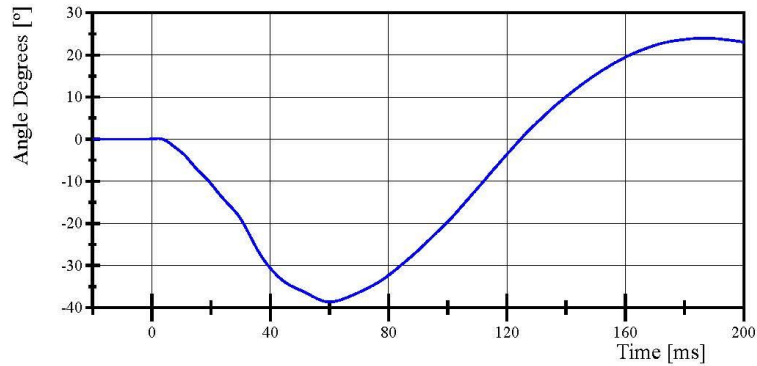
## Transportation Research Center Inc.

Neck Flexion

HIII 5th Serial No. DH1659 Certification No. 5-1

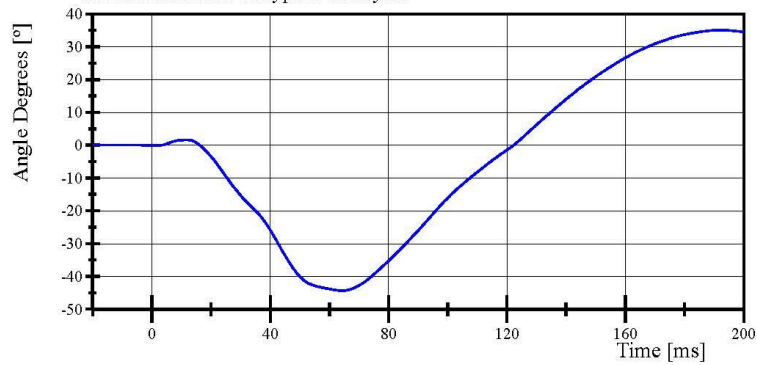
Test Date: 8/22/2022

Pot Rotation at the Base of Neck



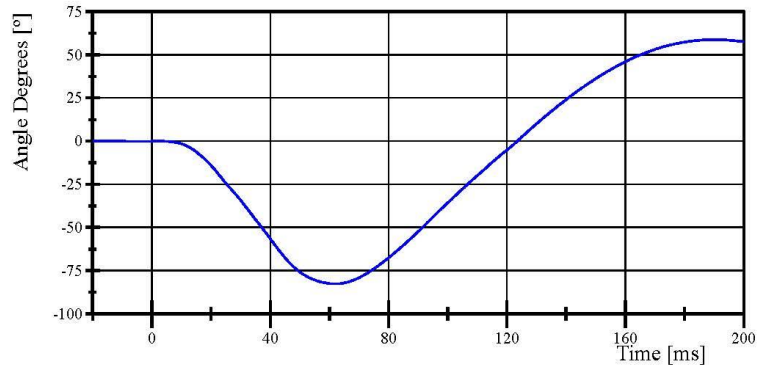
Filter Class: CFC\_60  
Max: 23.9 ° at 187.0 ms  
Min: -38.6 ° at 60.1 ms

Head Rotation at Occypital Condyles



Filter Class: CFC\_60  
Max: 35.1 ° at 192.3 ms  
Min: -44.3 ° at 64.2 ms

Total Head D-Plane Rotation



Filter Class: CFC\_60  
Max: 58.9 ° at 190.2 ms  
Min: -82.6 ° at 62.0 ms

Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

08.22.2022 08:59:43 1847

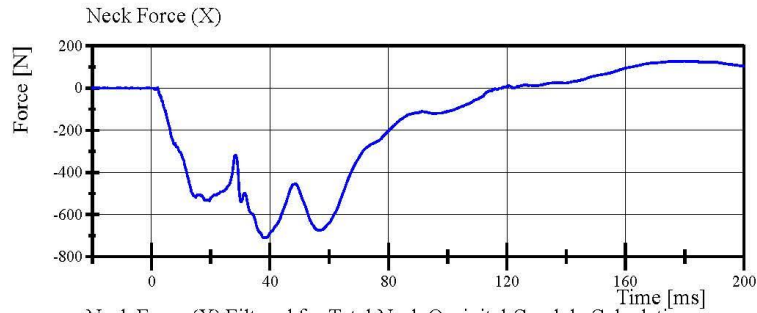


## Transportation Research Center Inc.

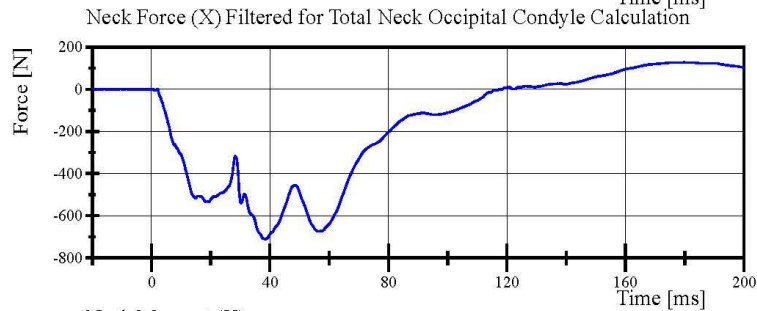
Neck Flexion

HIII 5th Serial No. DH1659 Certification No. 5-1

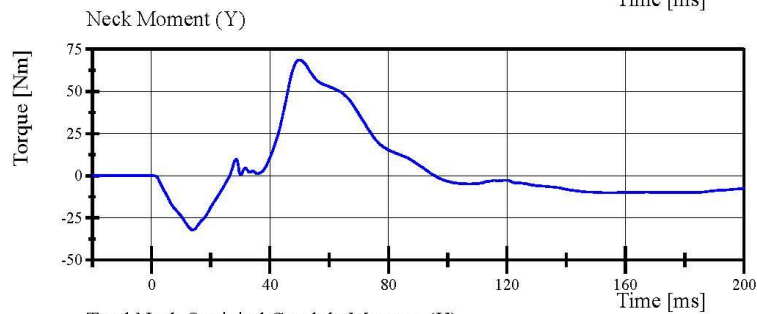
Test Date: 8/22/2022



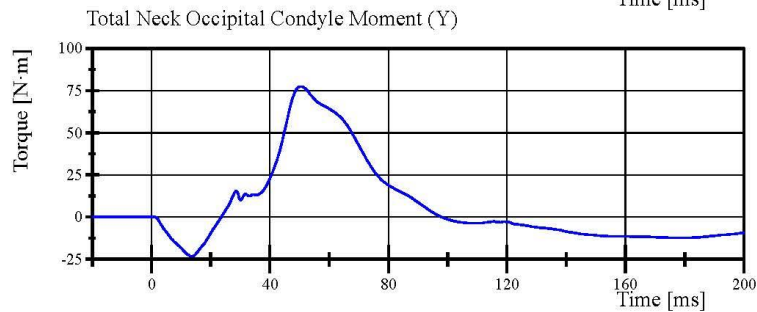
Filter Class: CFC\_1000  
Max: 128.3 N at 178.6 ms  
Min: -711.1 N at 38.6 ms



Filter Class: CFC\_600  
Max: 128.1 N at 179.8 ms  
Min: -710.4 N at 38.5 ms



Filter Class: CFC\_600  
Max: 68.7 Nm at 49.9 ms  
Min: -32.1 Nm at 13.9 ms



Filter Class: Without\_(Constar  
Max: 77.5 N·m at 50.4 ms  
Min: -23.3 N·m at 13.6 ms

Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

08.22.2022 08:59:44 1847





## Transportation Research Center Inc.

Neck Extension

HIII 5th Serial No. DH1659 Certification No. 5-1

Test Date: 8/22/2022

| Test Parameter                                                        | Specification         | Test Results | Pass |
|-----------------------------------------------------------------------|-----------------------|--------------|------|
| Temperature                                                           | 20.6 - 22.2 °C        | 21.2 °C      | Yes  |
| Relative Humidity                                                     | 10 - 70 %             | 67 %         | Yes  |
| Pendulum Velocity                                                     | (-5.95) - (-6.19) m/s | -6.049 m/s   | Yes  |
| Pendulum Integrated Velocity<br>Change at 10ms                        | 1.5 - 1.9 m/s         | 1.84 m/s     | Yes  |
| Pendulum Integrated Velocity<br>Change at 20ms                        | 3.1 - 3.9 m/s         | 3.63 m/s     | Yes  |
| Pendulum Integrated Velocity<br>Change at 30ms                        | 4.6 - 5.6 m/s         | 5.25 m/s     | Yes  |
| Total Head D-Plane Rotation                                           | 99 - 114 °            | 112.0 °      | Yes  |
| Total Neck Occipital Condyles Moment<br>Between 99° and 114° Rotation | (-53) - (-65) N·m     | -56.6 N·m    | Yes  |
| Total Neck Occipital Condyles Moment<br>Decay to -10 N·m              | 94 - 114 ms           | 103.8 ms     | Yes  |

**Test meets specifications.**

**Condition:** Used

**Comments:**

**Neck S/N: EE9454**

Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

08.22.2022 09:50:17 2003

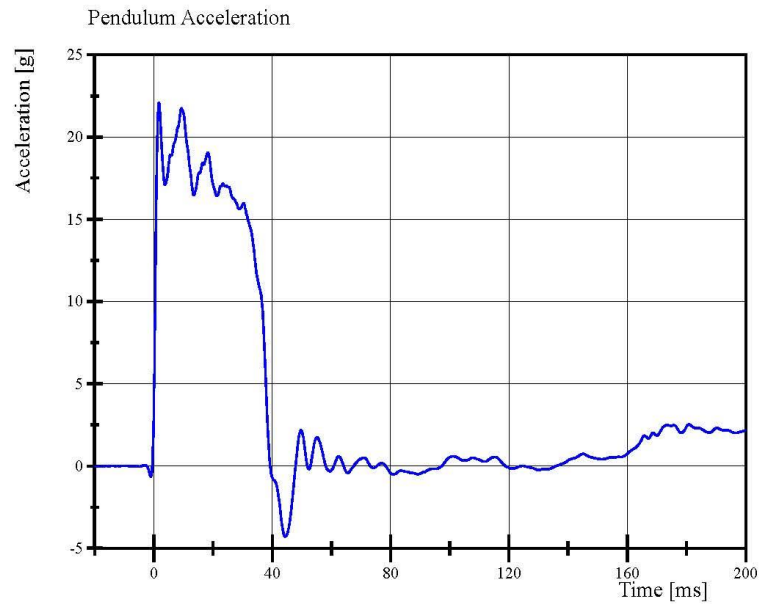


## Transportation Research Center Inc.

Neck Extension

HIII 5th Serial No. DH1659 Certification No. 5-1

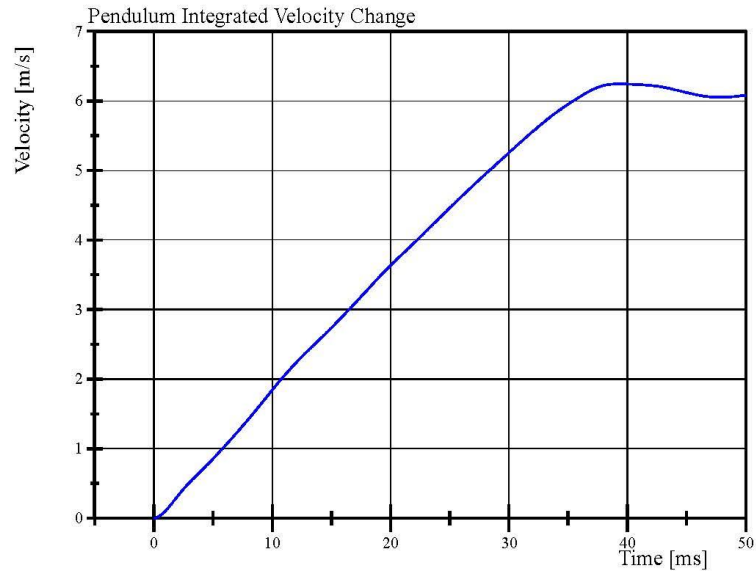
Test Date: 8/22/2022



Filter Class: CFC\_180

Max: 22.1 g at 1.7 ms

Min: -4.3 g at 44.4 ms



Filter Class: CFC\_180

Max: 6.2 m/s at 39.3 ms

Min: 0.0 m/s at 0.0 ms

Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

08.22.2022 09:50:58 2003



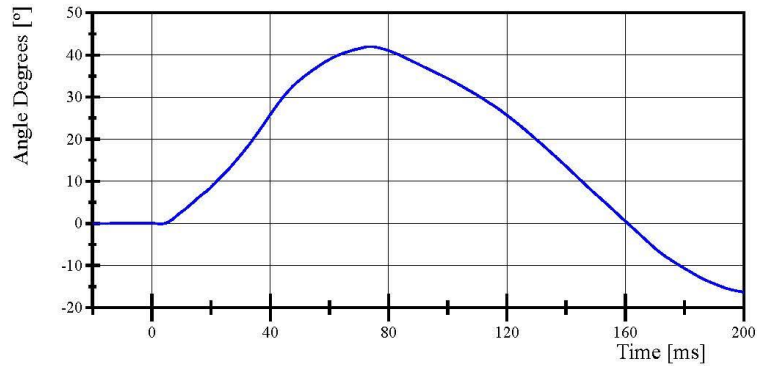
## Transportation Research Center Inc.

Neck Extension

HIII 5th Serial No. DH1659 Certification No. 5-1

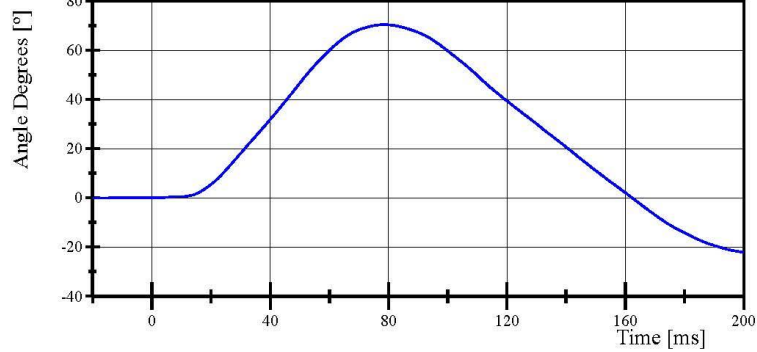
Test Date: 8/22/2022

Pot Rotation at the Base of Neck



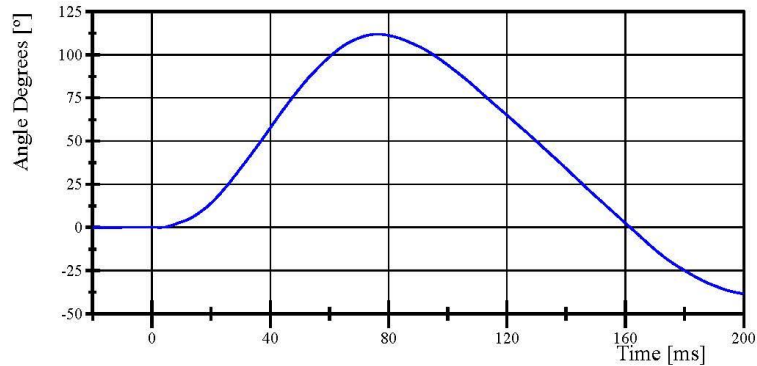
Filter Class: CFC\_60  
Max: 42.0 ° at 73.8 ms  
Min: -16.3 ° at 199.9 ms

Head Rotation at Occypital Condyles



Filter Class: CFC\_60  
Max: 70.4 ° at 78.5 ms  
Min: -22.2 ° at 199.9 ms

Total Head D-Plane Rotation



Filter Class: CFC\_60  
Max: 112.0 ° at 76.4 ms  
Min: -38.5 ° at 199.9 ms

Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

08.22.2022 09:50:58 2003

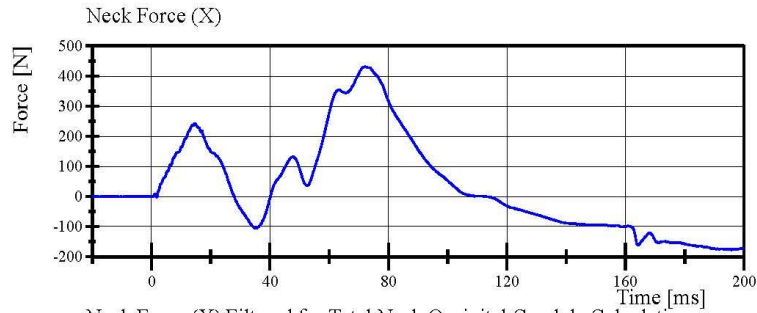


## Transportation Research Center Inc.

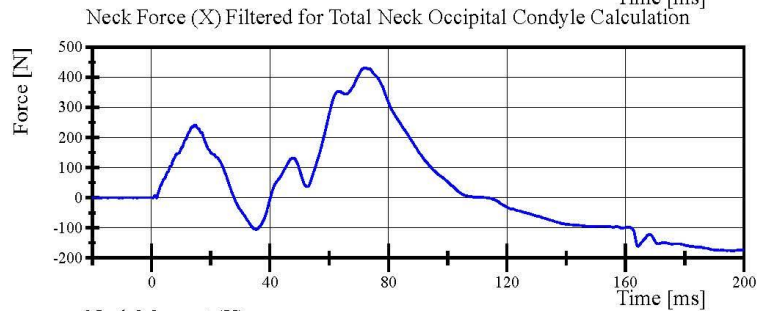
Neck Extension

HIII 5th Serial No. DH1659 Certification No. 5-1

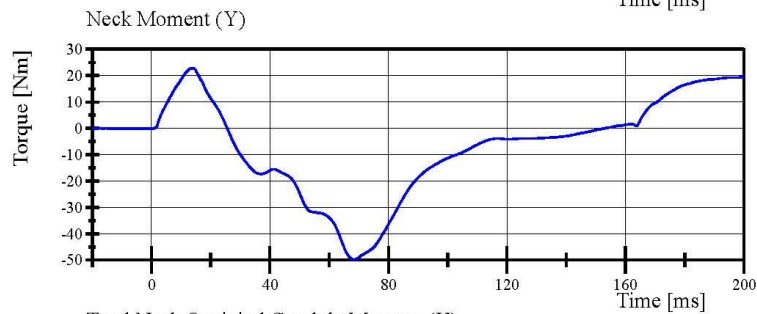
Test Date: 8/22/2022



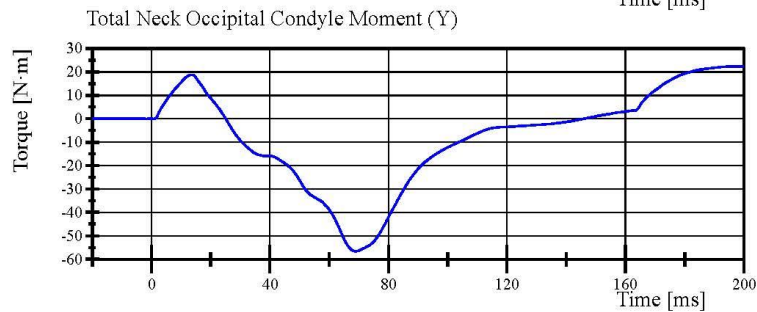
Filter Class: CFC\_1000  
Max: 431.4 N at 72.2 ms  
Min: -176.6 N at 194.3 ms



Filter Class: CFC\_600  
Max: 430.8 N at 72.2 ms  
Min: -176.2 N at 195.8 ms



Filter Class: CFC\_600  
Max: 22.9 Nm at 13.7 ms  
Min: -49.8 Nm at 68.4 ms



Filter Class: Without\_(Constar  
Max: 22.4 N·m at 199.1 ms  
Min: -56.6 N·m at 69.0 ms

Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

08.22.2022 09:50:59 2003



## Transportation Research Center Inc.

Front Thorax

HIII 5th Serial No. DH1659 Certification No. 5-3

Test Date: 8/19/2022

| Test Parameter                                                   | Specification         | Test Results | Pass |
|------------------------------------------------------------------|-----------------------|--------------|------|
| Temperature                                                      | 20.6 - 22.2 °C        | 21.5 °C      | Yes  |
| Relative Humidity                                                | 10 - 70 %             | 67 %         | Yes  |
| Probe Velocity                                                   | 6.59 - 6.83 m/s       | 6.830 m/s    | Yes  |
| Probe Force Peak Between 50.0 mm<br>and 58.0 mm Chest Deflection | (-3,900) - (-4,400) N | -4,261.6 N   | Yes  |
| Probe Force Peak Between 18.0 mm<br>and 50.0 mm Chest Deflection | >= (-4,600) N         | -4,437.6 N   | Yes  |
| Maximum Chest Compression                                        | (-50) - (-58) mm      | -50.3 mm     | Yes  |
| Internal Hysteresis                                              | 69 - 85 %             | 75.6 %       | Yes  |

**Test meets specifications.**

**Condition:** Used

**Comments:**

**Jacket S/N:** EE8365

**Ribset S/N:** EA4110

Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

08.19.2022 10:19:33 477



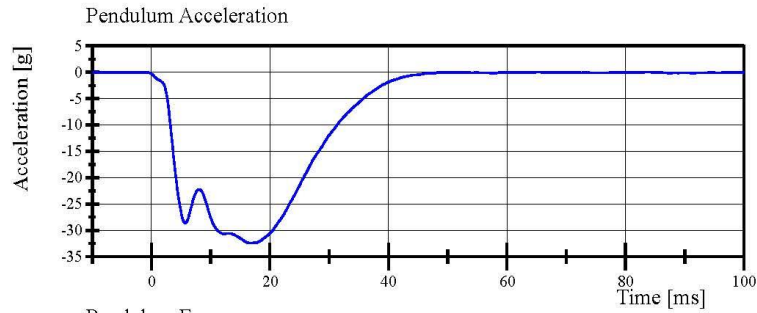


## Transportation Research Center Inc.

Front Thorax

HIII 5th Serial No. DH1659 Certification No. 5-3

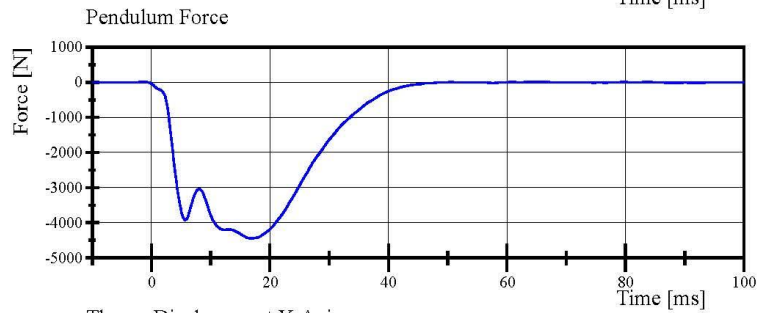
Test Date: 8/19/2022



Filter Class: CFC\_180

Max: 0.1 g at 83.8 ms

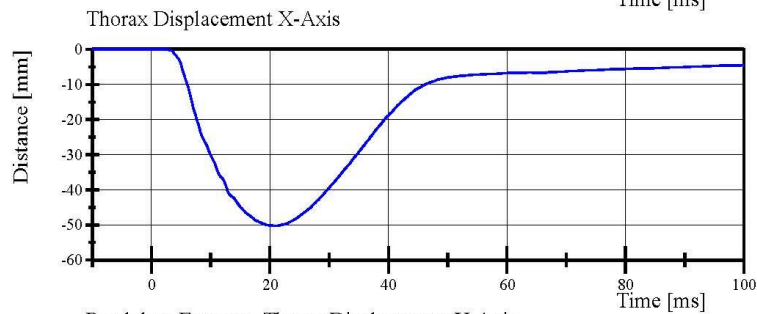
Min: -32.4 g at 16.7 ms



Filter Class: CFC\_180

Max: 8.1 N at 83.8 ms

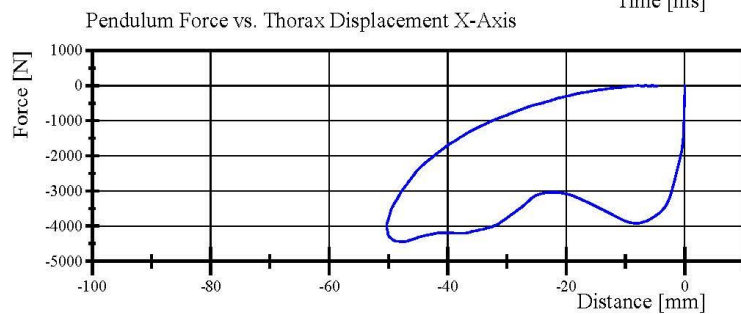
Min: -4,437.6 N at 16.7 ms



Filter Class: CFC\_600

Max: 0.0 mm at -2.6 ms

Min: -50.3 mm at 21.0 ms



Filter Class: CFC\_180

Max: 8.1 N at -5.4 mm

Min: -4,437.6 N at -47.5 mm

Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

08.19.2022 10:21:01 477

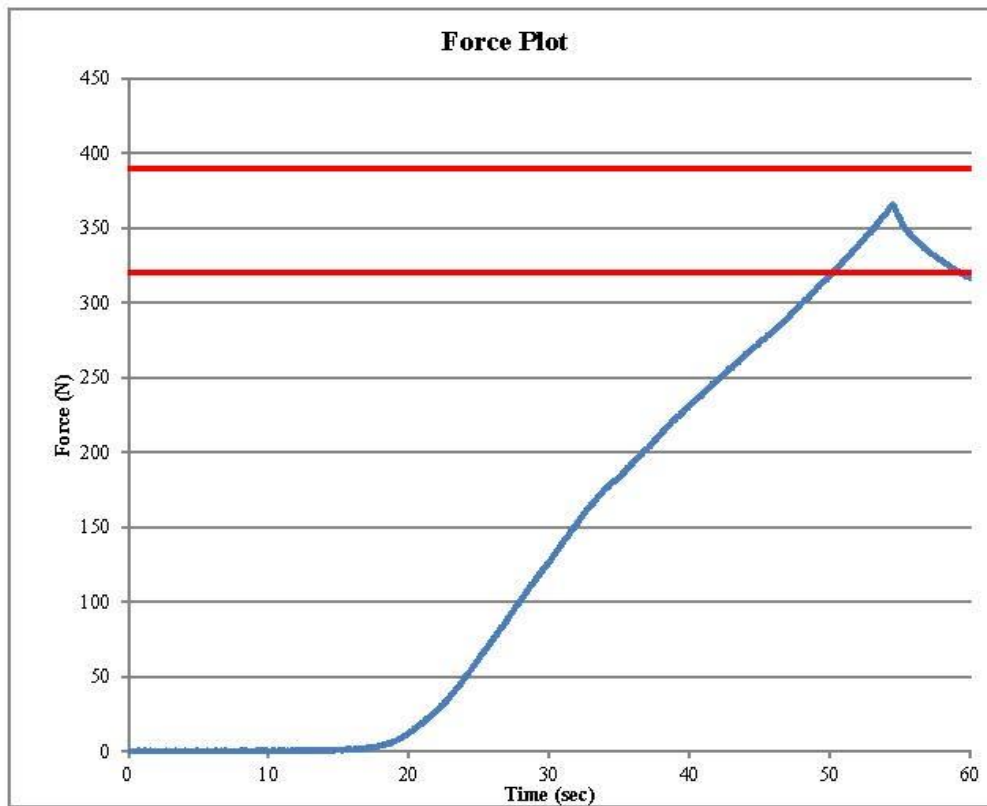


Transportation Research Center Inc.  
Hybrid III Small Female Torso Flexion



Customer: NHTSA  
Serial Number: DH1659 Date: 8/19/2022  
Test Number: 1 Time: 11:13

| TEST PARAMETER       | SPECIFICATION | TEST RESULTS      |
|----------------------|---------------|-------------------|
| Temperature          | 18.9 - 25.6   | 21.1 °C Pass      |
| Humidity             | 10 - 70       | 69 % Pass         |
| Average Angular Rate | 0.5 - 1.5     | 0.89 deg/sec Pass |
| Initial Angle        | 0 - 20        | 13.49 deg Pass    |
| Peak Force at 45.24° | 320 - 390     | 365.53 N Pass     |
| Final Angle          | -8 - 8        | 4.38 deg Pass     |



Components: Comments:  
Jacket S/N: EE8385  
Abdomen S/N: EE8393  
Lumbar S/N: DG9121

## Transportation Research Center Inc.

Left Knee Femur Response Test  
HIII 5th Serial No. DH1659 Certification No. 5-6  
Test Date: 8/19/2022

| Test Parameter    | Specification         | Test Results | Pass |
|-------------------|-----------------------|--------------|------|
| Temperature       | 18.9 - 25.6 °C        | 20.7 °C      | Yes  |
| Relative Humidity | 10 - 70 %             | 60 %         | Yes  |
| Probe Velocity    | 2.07 - 2.13 m/s       | 2.071 m/s    | Yes  |
| Peak Femur Force  | (-3,450) - (-4,060) N | -4,004.7 N   | Yes  |

**Test meets specifications.**

**Condition:** Used

**Comments:**

**Left Knee Skin S/N: ED6729**

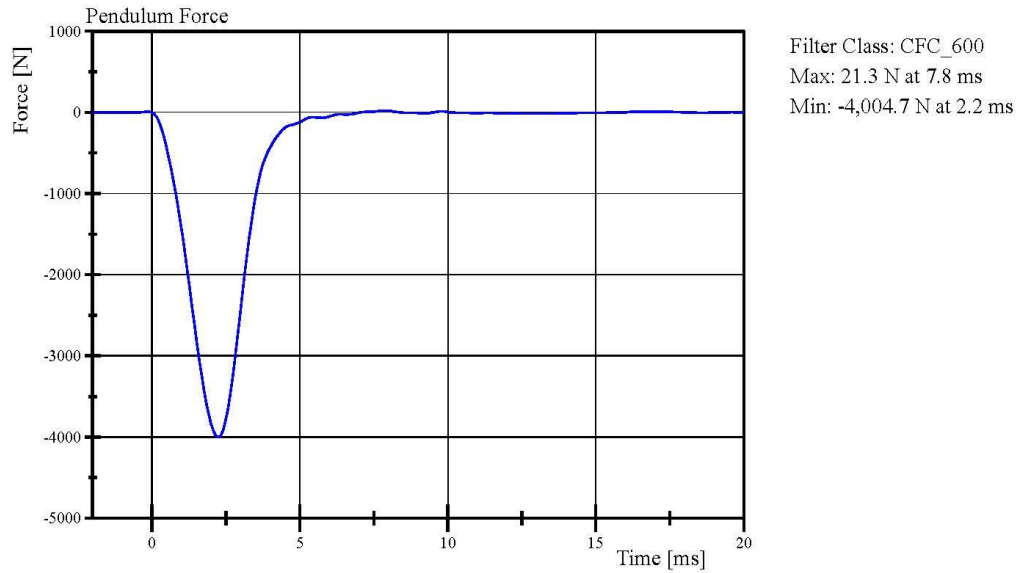
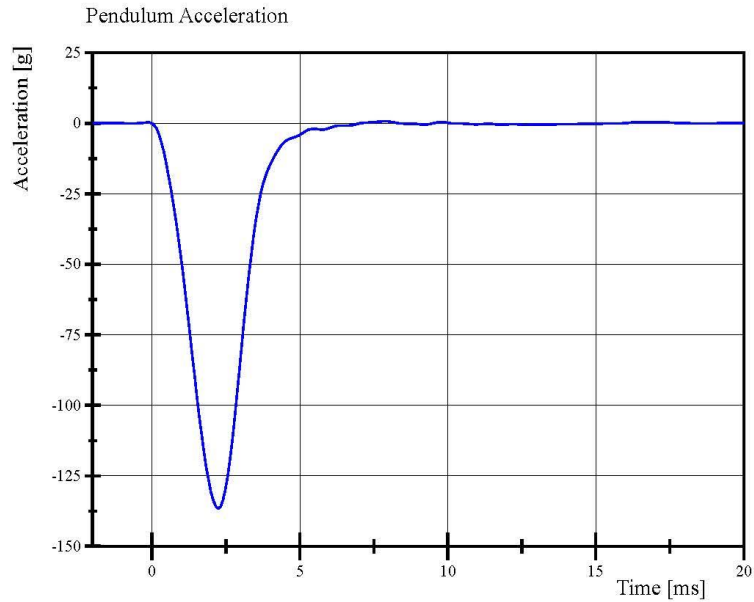
Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

08.19.2022 16:51:37 1756



## Transportation Research Center Inc.

Left Knee Femur Response Test  
HIII 5th Serial No. DH1659 Certification No. 5-6  
Test Date: 8/19/2022



Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

08.19.2022 16:53:08 1756



## Transportation Research Center Inc.

Right Knee Femur Response Test  
HIII 5th Serial No. DH1659 Certification No. 5-2  
Test Date: 8/19/2022

| Test Parameter    | Specification         | Test Results | Pass |
|-------------------|-----------------------|--------------|------|
| Temperature       | 18.9 - 25.6 °C        | 21.3 °C      | Yes  |
| Relative Humidity | 10 - 70 %             | 63 %         | Yes  |
| Probe Velocity    | 2.07 - 2.13 m/s       | 2.097 m/s    | Yes  |
| Peak Femur Force  | (-3,450) - (-4,060) N | -4,038.3 N   | Yes  |

**Test meets specifications.**

**Condition: Used**

**Comments:**

**Right Knee Skin S/N: EC5852**

Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

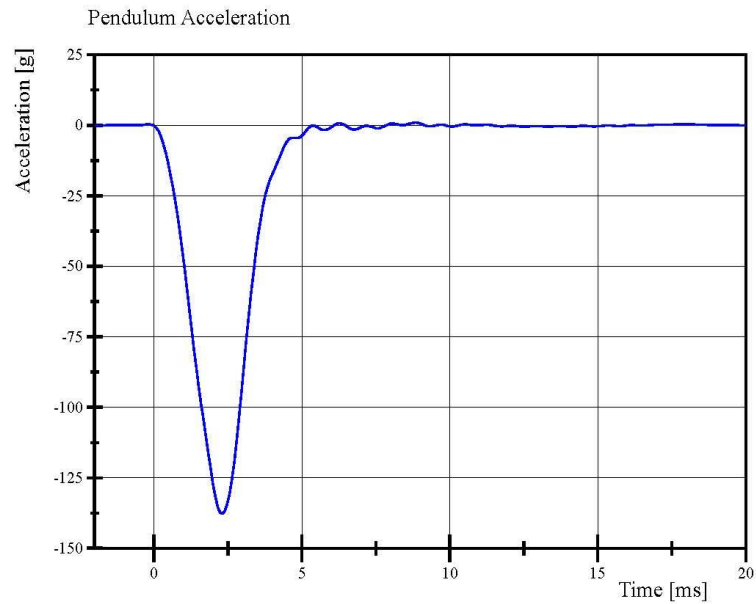
08.19.2022 17:03:44 1737



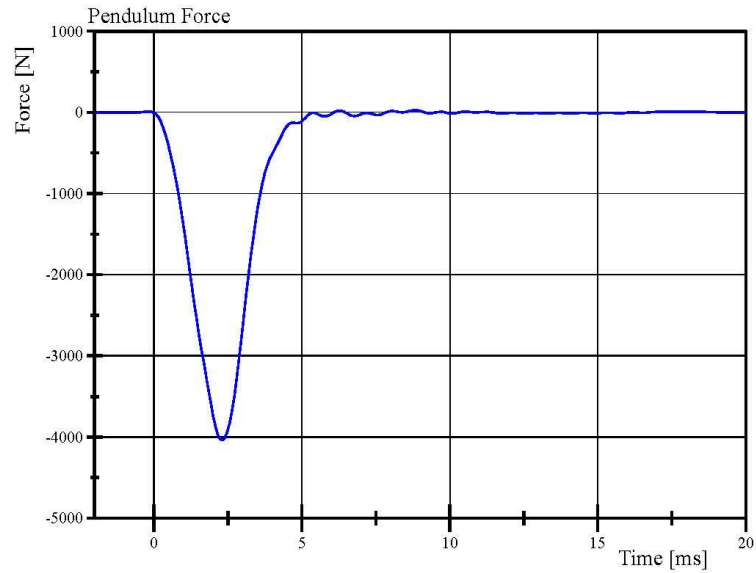


## Transportation Research Center Inc.

Right Knee Femur Response Test  
HIII 5th Serial No. DH1659 Certification No. 5-2  
Test Date: 8/19/2022



Filter Class: CFC\_600  
Max: 0.9 g at 8.8 ms  
Min: -137.7 g at 2.3 ms



Filter Class: CFC\_600  
Max: 27.4 N at 8.8 ms  
Min: -4,038.3 N at 2.3 ms

Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

08.19.2022 17:04:41 1737



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

**TABLE 1 – Driver Dummy Instrumentation**

| Instrumentation           |           |                        | Axis/Location | Hybrid III 50th S/N 037 |                         |                  |
|---------------------------|-----------|------------------------|---------------|-------------------------|-------------------------|------------------|
|                           |           |                        |               | Serial Number           | Manufacturer            | Calibration Date |
| Head Accelerometers       | Primary   |                        | X             | T10650                  | Endevco                 | 28-Jul-2022      |
|                           |           |                        | Y             | P94650                  | Endevco                 | 28-Jul-2022      |
|                           |           |                        | Z             | P94622                  | Endevco                 | 28-Jul-2022      |
|                           | Redundant |                        | X             | P94431                  | Endevco                 | 28-Jul-2022      |
|                           |           |                        | Y             | P94487                  | Endevco                 | 28-Jul-2022      |
|                           |           |                        | Z             | P94645                  | Endevco                 | 28-Jul-2022      |
| Head Angular Rate Sensors |           |                        | X             | ARS10787                | DTS                     | 15-Mar-2022      |
|                           |           |                        | Y             | ARS10789                | DTS                     | 15-Mar-2022      |
|                           |           |                        | Z             | ARS10793                | DTS                     | 15-Mar-2022      |
| Upper Neck Load Cell      |           | FX, FY, FZ, MX, MY, MZ | 2021          | Humanetics              | 21-Feb-2022             |                  |
| Chest Accelerometers      | Primary   |                        | X             | P97714                  | Endevco                 | 28-Jul-2022      |
|                           |           |                        | Y             | P61255                  | Endevco                 | 28-Jul-2022      |
|                           |           |                        | Z             | P45008                  | Endevco                 | 28-Jul-2022      |
|                           | Redundant |                        | X             | P91177                  | Endevco                 | 28-Jul-2022      |
|                           |           |                        | Y             | P94570                  | Endevco                 | 28-Jul-2022      |
|                           |           |                        | Z             | P91172                  | Endevco                 | 28-Jul-2022      |
| Chest Potentiometer       |           | X                      | CST037        | Servo                   | 23-Feb-2022             |                  |
| Pelvis Accelerometers     |           |                        | X             | T11801                  | Endevco                 | 28-Jul-2022      |
|                           |           |                        | Y             | P91876                  | Endevco                 | 28-Jul-2022      |
|                           |           |                        | Z             | T11390                  | Endevco                 | 28-Jul-2022      |
| Femur Load Cells          | Left      | Primary                | Z             | DI4215-FZ1              | Denton                  | 22-Feb-2022      |
|                           |           | Redundant              | Z             | DI4215-FZ2              | Denton                  | 22-Feb-2022      |
|                           | Right     | Primary                | Z             | DI4216-FZ1              | Denton                  | 22-Feb-2022      |
|                           |           | Redundant              | Z             | DI4216-FZ2              | Denton                  | 22-Feb-2022      |
| Tibia Load Cells          | Left      | Upper                  | MX, MY, FZ    | 3643-94                 | Denton                  | 22-Feb-2022      |
|                           |           | Lower                  | MX, MY, FZ    | 3644-370                | Denton                  | 21-Feb-2022      |
|                           | Right     | Upper                  | MX, MY, FZ    | 3643-413                | Denton                  | 22-Feb-2022      |
|                           |           | Lower                  | MX, MY, FZ    | 3644-401                | Denton                  | 22-Feb-2022      |
| Foot Accelerometers       | Left      | Rear                   | X             | P90848                  | Endevco                 | 28-Jul-2022      |
|                           |           |                        | Z             | P91498                  | Endevco                 | 28-Jul-2022      |
|                           |           | Front                  | Z             | P90841                  | Endevco                 | 28-Jul-2022      |
|                           | Right     | Rear                   | X             | P93467                  | Endevco                 | 28-Jul-2022      |
|                           |           |                        | Z             | P97619                  | Endevco                 | 28-Jul-2022      |
|                           |           | Front                  | Z             | P94523                  | Endevco                 | 28-Jul-2022      |
| Seat Belt Load Cells      |           | Lap                    | N/A           | R141CC                  | Measurement Specialties | 03-Aug-2022      |
|                           |           | Shoulder               | N/A           | N100EA                  | Measurement Specialties | 03-Aug-2022      |

**TABLE 2 – Front Passenger Dummy Instrumentation**

| Instrumentation           |           |                        | Axis/Location | Hybrid III 5th S/N DH1659 |                         |                  |
|---------------------------|-----------|------------------------|---------------|---------------------------|-------------------------|------------------|
|                           |           |                        |               | Serial Number             | Manufacturer            | Calibration Date |
| Head Accelerometers       | Primary   |                        | X             | P44972                    | Endevco                 | 27-Jul-2022      |
|                           |           |                        | Y             | T11806                    | Endevco                 | 27-Jul-2022      |
|                           |           |                        | Z             | P69062                    | Endevco                 | 27-Jul-2022      |
|                           | Redundant |                        | X             | T11046                    | Endevco                 | 27-Jul-2022      |
|                           |           |                        | Y             | P97525                    | Endevco                 | 27-Jul-2022      |
|                           |           |                        | Z             | P73228                    | Endevco                 | 27-Jul-2022      |
| Head Angular Rate Sensors |           |                        | X             | ARS4731                   | DTS                     | 15-Mar-2022      |
|                           |           |                        | Y             | ARS4735                   | DTS                     | 15-Mar-2022      |
|                           |           |                        | Z             | ARS6644                   | DTS                     | 15-Mar-2022      |
| Upper Neck Load Cell      |           | FX, FY, FZ, MX, MY, MZ | 1874          | Denton                    | 17-Feb-2022             |                  |
| Chest Accelerometers      | Primary   |                        | X             | P80855                    | Endevco                 | 27-Jul-2022      |
|                           |           |                        | Y             | P97544                    | Endevco                 | 27-Jul-2022      |
|                           |           |                        | Z             | P57791                    | Endevco                 | 27-Jul-2022      |
|                           | Redundant |                        | X             | P73221                    | Endevco                 | 27-Jul-2022      |
|                           |           |                        | Y             | T11872                    | Endevco                 | 27-Jul-2022      |
|                           |           |                        | Z             | T16784                    | Endevco                 | 27-Jul-2022      |
| Chest Potentiometer       |           | X                      | CST3410       | Servo                     | 27-Jul-2022             |                  |
| Pelvis Accelerometers     |           |                        | X             | P91969                    | Endevco                 | 27-Jul-2022      |
|                           |           |                        | Y             | P91958                    | Endevco                 | 27-Jul-2022      |
|                           |           |                        | Z             | P80721                    | Endevco                 | 27-Jul-2022      |
| Femur Load Cells          | Left      | Primary                | Z             | DT0997-FZ1                | Denton                  | 17-Feb-2022      |
|                           |           | Redundant              | Z             | DT0997-FZ2                | Denton                  | 17-Feb-2022      |
|                           | Right     | Primary                | Z             | DS4140-FZ1                | Denton                  | 17-Feb-2022      |
|                           |           | Redundant              | Z             | DS4140-FZ2                | Denton                  | 17-Feb-2022      |
| Tibia Load Cells          | Left      | Upper                  | MX, MY, FZ    | 3643-92                   | Denton                  | 18-Feb-2022      |
|                           |           | Lower                  | MX, MY, FZ    | 3644-92                   | Denton                  | 18-Feb-2022      |
|                           | Right     | Upper                  | MX, MY, FZ    | 3643-484                  | Denton                  | 18-Feb-2022      |
|                           |           | Lower                  | MX, MY, FZ    | 3644-369                  | Denton                  | 21-Feb-2022      |
| Foot Accelerometers       | Left      | Rear                   | X             | P90866                    | Endevco                 | 27-Jul-2022      |
|                           |           |                        | Z             | T11816                    | Endevco                 | 27-Jul-2022      |
|                           |           | Front                  | Z             | P97890                    | Endevco                 | 27-Jul-2022      |
|                           | Right     | Rear                   | X             | P97640                    | Endevco                 | 27-Jul-2022      |
|                           |           |                        | Z             | P91471                    | Endevco                 | 27-Jul-2022      |
|                           |           | Front                  | Z             | P91907                    | Endevco                 | 27-Jul-2022      |
| Seat Belt Load Cells      |           | Lap                    | N/A           | R141C8                    | Measurement Specialties | 03-Aug-2022      |
|                           |           | Shoulder               | N/A           | N100EC                    | Measurement Specialties | 03-Aug-2022      |

**TABLE 3 – Vehicle Instrumentation**

| Instrumentation                      |        |           | Axis | Serial Number | Manufacturer            | Calibration Date |
|--------------------------------------|--------|-----------|------|---------------|-------------------------|------------------|
| Crossmember/Rear Seat Accelerometers | Left   | Primary   | X    | A378325       | Measurement Specialties | 31-Mar-2022      |
|                                      |        |           | Z    | A400097       | Measurement Specialties | 31-Mar-2022      |
|                                      |        | Redundant | X    | A400114       | Measurement Specialties | 31-Mar-2022      |
|                                      | Right  | Primary   | X    | A378330       | Measurement Specialties | 4-Apr-2022       |
|                                      |        |           | Z    | A378329       | Measurement Specialties | 4-Apr-2022       |
|                                      |        | Redundant | X    | A381837       | Measurement Specialties | 31-Mar-2022      |
| Engine Accelerometers                | Top    |           | X    | A381839       | Measurement Specialties | 31-Mar-2022      |
|                                      | Bottom |           | X    | A367452       | Measurement Specialties | 31-Mar-2022      |