

Final Report Number: NCAP-TRC-23-001

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

NISSAN MOTOR CO., LTD.

2023 Nissan Armada

NHTSA Number: M20235203

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



Report Date: January 12, 2024

FINAL REPORT

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

Notice

Transportation Research Center Inc. does not endorse or certify products of manufacturers. The manufacturer's name appears solely to identify the test article. Transportation Research Center Inc. assumes no liability for the report or use thereof. It is responsible for the facts and the accuracy of the data presented herein. This report does not constitute a standard, specification, or regulation.

Prepared By: ILO Project Operations Group

Approved By: John Shultz

Approval Date: January 12, 2024

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date _____

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

Date _____

1. Report No. NCAP-TRC-23-001	2. Government Accession No.	3. Recipient's Catalog No.																																																																										
4. Title and Subtitle Final Report of NEW CAR ASSESSMENT PROGRAM Frontal Impact Testing of a 2023 Nissan Armada NHTSA No. M20235203				5. Report Date January 12, 2024																																																																								
				6. Performing Organization Code TRC Inc.																																																																								
7. Author(s) John Shultz, Project Manager				8. Performing Organization Report No. 230214																																																																								
9. Performing Organization Name and Address Transportation Research Center Inc. 10820 State Route 347 East Liberty, OH 43319-0367				10. Work Unit No. (TRAIS)																																																																								
				11. Contract or Grant No. 693JJ919D000007																																																																								
12. Sponsoring Agency Name and Address U. S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards 1200 New Jersey Ave SE Washington, DC 20590				13. Type of Report and Period Covered Final Report February 14, 2023 – January 12, 2024																																																																								
				14. Sponsoring Agency Code NRM-110																																																																								
15. Supplemental Notes																																																																												
16. Abstract A 56.0 km/h NCAP Frontal Impact Test was conducted on a 2023 Nissan Armada, 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 February 14, 2023. The impact velocity was 56.47 km/h, and the ambient temperature at the barrier face at the time of impact was 21.8° C. The target vehicle post-test maximum crush was 532 millimeters at crush zone 3 at left 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 (HIC₁₅)</td> <td>NA</td> <td>700</td> <td>371.387</td> <td>NA</td> <td>700</td> <td>225.358</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>32.660</td> <td>mm</td> <td>52</td> <td>25.890</td> </tr> <tr> <td>3ms Chest Clip</td> <td>Gs</td> <td>60</td> <td>39.840</td> <td>Gs</td> <td>60</td> <td>44.850</td> </tr> <tr> <td>Nij</td> <td>NA</td> <td>1</td> <td>0.316</td> <td>NA</td> <td>1</td> <td>0.478</td> </tr> <tr> <td>Neck Tension</td> <td>Newtons</td> <td>4170</td> <td>1809.670</td> <td>Newtons</td> <td>2620</td> <td>916.950</td> </tr> <tr> <td>Neck Compression</td> <td>Newtons</td> <td>4000</td> <td>515.650</td> <td>Newtons</td> <td>2520</td> <td>248.480</td> </tr> <tr> <td>Left Femur Force</td> <td>Newtons</td> <td>10008</td> <td>1729.150</td> <td>Newtons</td> <td>6805</td> <td>2754.210</td> </tr> <tr> <td>Right Femur Force</td> <td>Newtons</td> <td>10008</td> <td>1700.690</td> <td>Newtons</td> <td>6805</td> <td>2274.530</td> </tr> </tbody> </table>								Driver ATD			Passenger ATD			Measurement Description	Units	Threshold	Result	Units	Threshold	Result	Head Injury Criteria (HIC ₁₅)	NA	700	371.387	NA	700	225.358	Maximum Chest Compression	mm	63	32.660	mm	52	25.890	3ms Chest Clip	Gs	60	39.840	Gs	60	44.850	Nij	NA	1	0.316	NA	1	0.478	Neck Tension	Newtons	4170	1809.670	Newtons	2620	916.950	Neck Compression	Newtons	4000	515.650	Newtons	2520	248.480	Left Femur Force	Newtons	10008	1729.150	Newtons	6805	2754.210	Right Femur Force	Newtons	10008	1700.690	Newtons	6805	2274.530
	Driver ATD			Passenger ATD																																																																								
Measurement Description	Units	Threshold	Result	Units	Threshold	Result																																																																						
Head Injury Criteria (HIC ₁₅)	NA	700	371.387	NA	700	225.358																																																																						
Maximum Chest Compression	mm	63	32.660	mm	52	25.890																																																																						
3ms Chest Clip	Gs	60	39.840	Gs	60	44.850																																																																						
Nij	NA	1	0.316	NA	1	0.478																																																																						
Neck Tension	Newtons	4170	1809.670	Newtons	2620	916.950																																																																						
Neck Compression	Newtons	4000	515.650	Newtons	2520	248.480																																																																						
Left Femur Force	Newtons	10008	1729.150	Newtons	6805	2754.210																																																																						
Right Femur Force	Newtons	10008	1700.690	Newtons	6805	2274.530																																																																						
17. Key Words 56.3 km/h (35 mph) Full Frontal Rigid Barrier Impact Test New Car Assessment Program (NCAP)				18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division 1200 New Jersey Ave, SE Washington, DC 20590																																																																								
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified		21. Number of Pages 177		22. Price																																																																							

¹ Passenger 3ms Chest Clip redundant used

Table of Contents

<u>Section</u>		<u>Page</u>
1	Purpose and Summary of the Test	1
2	Occupant and Vehicle Information / Data Sheets	3
<u>Data Sheet</u>		<u>Page</u>
1	General Test and Vehicle Parameter Data	4
2	Seat Adjustment, Fuel System, and Steering Wheel Data	8
3	Dummy Longitudinal Clearance Dimensions	10
4	Dummy Lateral Clearance Dimensions	11
5	Seat Belt Positioning Data	12
6	High-Speed Camera Locations and Data	13
7	Vehicle Accelerometer Locations	15
8	Photographic Reference Target Locations	16
9	Load Cell Locations on Fixed Barrier	17
10	Test Vehicle Summary of Results	18
11	Post-Test Observations	19
12	Vehicle Profile Measurements	20
13	Accident Investigation Division Data	22
14	Vehicle Intrusion Measurements	23
15	Summary of Indicant FMVSS No. 212 and FMVSS No. 219 (Partial) Data	25
16	FMVSS 301 Barrier Impact and Static Rollover Results	26
17	Dummy/Vehicle Temperature Stabilization Chart	28
<u>Appendix</u>		<u>Page</u>
A	Photographs	A-1
B	Vehicle and Dummy Response Data Plots	B-1
C	Dummy Calibration and Performance Verification Data	C-1
D	Test Equipment and Instrumentation Calibration	D-1

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 2023 Nissan Armada at a velocity of 56.47 km/h. The test was performed at Transportation Research Center, Inc. on February 14, 2023. 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 532 mm at crush zone 3 at left side 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 ₁₅	Nij	Neck Tension (N)	Neck Compression (N)	3 ms Chest Clip (Gs)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver (50 th Male)	371.387	0.316	1809.670	515.650	39.840	32.660	1729.150	1700.690
Passenger (5 th Female)	225.358	0.478	916.950	248.480	44.850	25.890	2754.210	2274.530

TEST COMMENTS:

Driver Right Foot Z: Channel failed at 95.0

Passenger Chest Y Acceleration: Channel failed

Passenger Left Lower Tibia Moment Y: Questionable data throughout

Passenger Left Lower Tibia Force Z: Questionable data throughout

Vehicle Engine Top X: Channel failed at 45.0 ms

Left Rear Seat Crossmember X Redundant: Questionable data after 38.0 ms

2.2 REPORT AREA 2: DATA SHEETS

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

Test Vehicle: 2023 Nissan Armada
 Test Program: NCAP Frontal Impact

NHTSA No.: M20235203
 Test Date: 2/14/2023

TEST VEHICLE INFORMATION

NHTSA No.	M20235203
Model Year	2023
Make	Nissan
Model	Armada
Body Style	MPV
VIN	JN8AY2BD0P9690805
Body Color	Hermosa Blue PE
Odometer Reading (km/mi)	51 mi
Engine Displacement (L)	5.6
Type/No. Cylinders	V/8
Engine Placement	Inline Front
Transmission Type	Automatic
Transmission Speeds	7
Overdrive	Yes
Final Drive	4WD
Roof Rack	Yes
Sunroof/T-Top	Yes
Running Boards	Yes
Tilt Steering Wheel	Yes
Power Seats	Yes
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?

No

DATA FROM CERTIFICATION LABEL

Manufactured by	NISSAN MOTOR CO., LTD.	GVWR (LB)	7500
Date of Manufacture		GAWR Front (LB)	3616
		GAWR Rear (LB)	4343

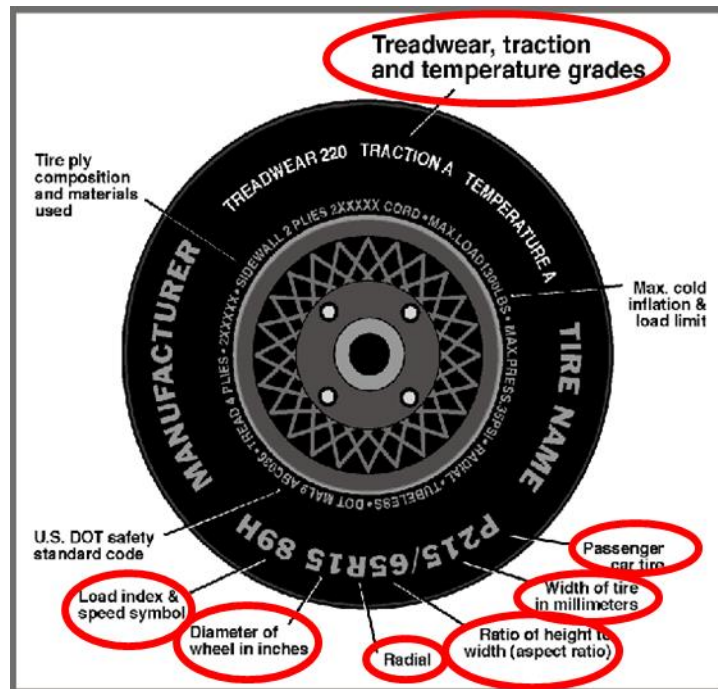
VEHICLE SEATING AND WEIGHT CAPACITY

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Split Bench	Split Bench	
Number of Occupants	2	3	3	8
Capacity Wt. (VCW) (kg)				660.0
Cargo Wt. (RCLW) (kg)				115.68

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

Test Vehicle: 2023 Nissan Armada
Test Program: NCAP Frontal Impact

NHTSA No.: M20235203
Test Date: 2/14/2023



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold / Test Pressure (kPa)	240	240
Recommended Tire Size	P275/60R20	P275/60R20
Tire Size on Vehicle	P275/60R20	P275/60R20
Tire Manufacturer	Bridgestone	Bridgestone
Tire Model	Dueler	Dueler
Treadwear	360	360
Traction Grade	B	B
Temperature Grade	B	B
Tire Plies Sidewall	2	2
Tire Plies Body	5	5
Load Index/Speed Symbol	114H	114H
Tire Material	Polyester , Steel , Nylon	Polyester , Steel , Nylon
DOT Safety Code Right	DOT EJ NU DEM4022	DOT EJ NU DEM4022
DOT Safety Code Left	DOT EJ NU DEM4022	DOT EJ NU DEM4022

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

Test Vehicle: 2023 Nissan Armada
Test Program: NCAP Frontal Impact

NHTSA No.: M20235203
Test Date: 2/14/2023

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	687.2	670.4		715.6	759.8	
Right	kg	701.0	629.6		714.2	748.6	
Ratio	%	51.6	48.4		48.7	51.3	
Totals	kg	1388.2	1300.0	2688.2	1429.8	1508.4	2938.2

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	2688.2
Weight of 1 P572E ATD & 1 P572O ATD	kg	139.3
Rated Cargo/Luggage Weight (RCLW)	kg	115.7
Vehicle Target Weight (TVTW)	kg	2943.2

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front)
As Delivered	mm	908	905	894	898	1487
As Tested	mm	902	905	861	860	1579
Post Test	mm	N/A	N/A	843	896	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	3075
Total Vehicle Length at Left Side	mm	5122
Total Vehicle Length at Centerline	mm	5270
Total Vehicle Length at Right Side	mm	5130
Weight of Ballast in Cargo Area	kg	56.7
Weight of Vehicle Components Removed	kg	0.0
Amount of Stoddard Solvent in Fuel Tank	liters	91.5

LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT: None

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

Test Vehicle: 2023 Nissan Armada
Test Program: NCAP Frontal Impact

NHTSA No.: M20235203
Test Date: 2/14/2023

TARGET VEHICLE STRUCTURAL MEASUREMENT

	Elements	Pre-Test (mm)
1	Total Length	5270
2	Total Width	2036
3	Bumper Top Height	760
4	Bumper Bottom Height	700
5	Longitudinal Member Top Height	540
6	Distance Between Longitudinal Members	800
7	Longitudinal Member Width	65
8	Engine Top Height	1140
9	Engine Bottom Height	320
10	Engine and Gearbox Width	570
11	Front Bumper-Engine Distance	640
12	Front Shock Absorber Fixing Height	730
13	Bonnet Leading Edge Height	1095
14	Front Shock Absorber Fixing Width	911
15	Front Bumper – Front Axle Distance	970
16	Front Axle – A-Pillar Distance	670
17	A-Pillar – B-Pillar Distance	1080
18	B-Pillar – Rear Axle Distance	1320
19	B-Pillar – C-Pillar Distance	1010
20	Roof Sill Bottom Height	1728
21	Roof Sill Top Height	1770
22	Floor Sill Bottom Height	537
23	Floor Sill Top Height	580

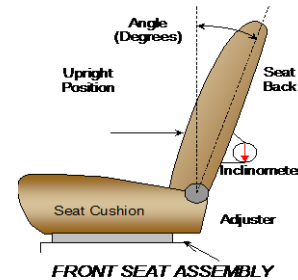
DATA SHEET NO. 2 - SEAT ADJUSTMENT, FUEL SYSTEM AND STEERING WHEEL DATA

Test Vehicle: 2023 Nissan Armada
Test Program: NCAP Frontal Impact

NHTSA No.: M20235203
Test Date: 2/14/2023

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:	10.4
Passenger Seat back angle:	11.1

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	240 mm	120 mm
Passenger Seat	240 mm	120 mm

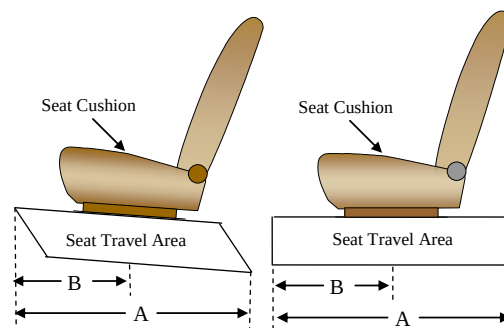
SEAT BELT UPPER ANCHORAGE

Describe the method of positioning seat belt upper anchorages.

Driver: Uppermost, Positioned according to Form 1

Passenger: Uppermost, Positioned according to Form 1

	Total No. of Positions	Placed in Position No.
Driver Seat	4	0, Uppermost
Passenger Seat	4	0, Uppermost



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

Test Vehicle: 2023 Nissan Armada
Test Program: NCAP Frontal Impact

NHTSA No.: M20235203
Test Date: 2/14/2023

FUEL TANK CAPACITY

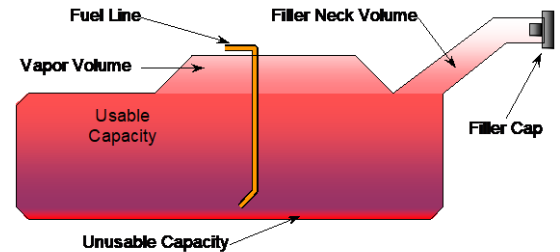
	Liters
Usable Capacity of "Standard Tank"	98.4
Usable Capacity of "Optional Tank"	N/A
92%-94% of Usable Capacity	91.5
Actual Amount of Solvent Used	91.5
1/3 of Usable Capacity	32.8

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

Approximately 1 second after the ignition is switched to "ON"

While the engine is running.

Approximately for 1.5 seconds after the engine stops running

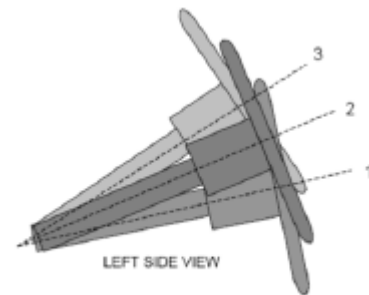


VEHICLE FUEL TANK ASSEMBLY

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 ASSEMBLY

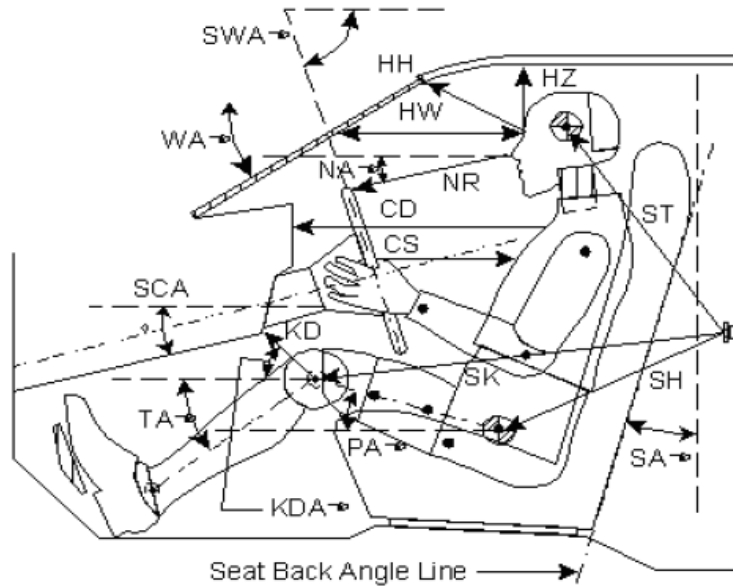
STEERING COLUMN POSITIONS

	Degrees	Fore/Aft Position (mm)
Lowermost Position No. 1	16.9	0
Geometric Center Position No. 2	23.8	15
Uppermost Position No. 3	30.8	30
Telescoping Steering Wheel Travel		30
Test Position	23.8	15

DATA SHEET NO. 3 - DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2023 Nissan Armada
 Test Program: NCAP Frontal Impact

NHTSA No.: M20235203
 Test Date: 2/14/2023

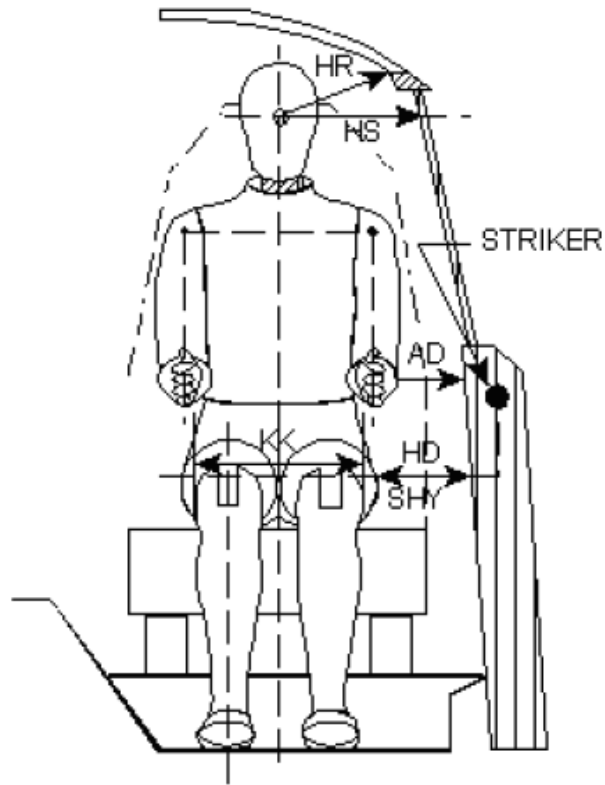


Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		35.4		
SWA°	Steering Wheel Angle		27.2		
SCA°	Steering Column Angle		28.5		
SA°	Seat Back Angle (on head rest post)		10.5		11.1
HZ	Head to Roof (Z)	230		230	
HH	Head to Header	383		311	
HW	Head to Windshield	650		566	
NR	Nose to Rim	385	12.0		
CD	Chest to Dash	520		364	
CS	Chest to Steering Hub	296			
RA	Rim to Abdomen	167			
KDL	Left Knee to Dash	130	22.5	65	3.5
KDR	Right Knee to Dash	111	22.8	65	3.6
PA°	Pelvic Angle		24.1		19.6
TA°	Tibia Angle		55.6		65.1
SK	Striker to Knee	699	4.0	801	1.6
ST	Striker to Head	720	58.1	706	58.1
SH	Striker to H-Point	270	13.2	476	2.1

DATA SHEET NO. 4 - DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2023 Nissan Armada
Test Program: NCAP Frontal Impact

NHTSA No.: M20235203
Test Date: 2/14/2023

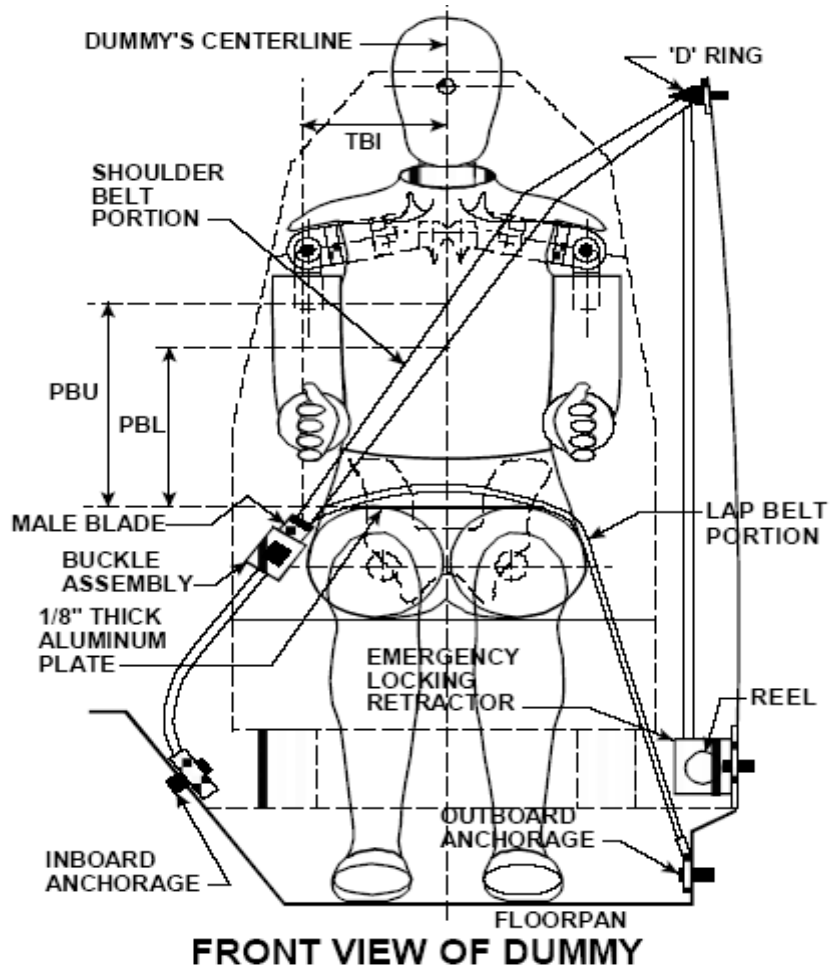


Code	Measurement Description	Driver	Passenger
AD	Arm to Door	130	73
HD	H-Point to Door	132	161
HR	Head to Side Header	255	309
HS	Head to Side Window	345	351
KK	Knee to Knee	345	215
SHY	Striker to H-Point (Y Direction)	260	292
AA	Ankle to Ankle	345	167

DATA SHEET NO. 5 - SEAT BELT POSITIONING DATA

Test Vehicle: 2023 Nissan Armada
 Test Program: NCAP Frontal Impact

NHTSA No.: M20235203
 Test Date: 2/14/2023



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU – Top surface of reference to belt upper edge	mm	360	290
PBL – Top surface of reference to belt lower edge	mm	270	210

BELT LENGTH DATA

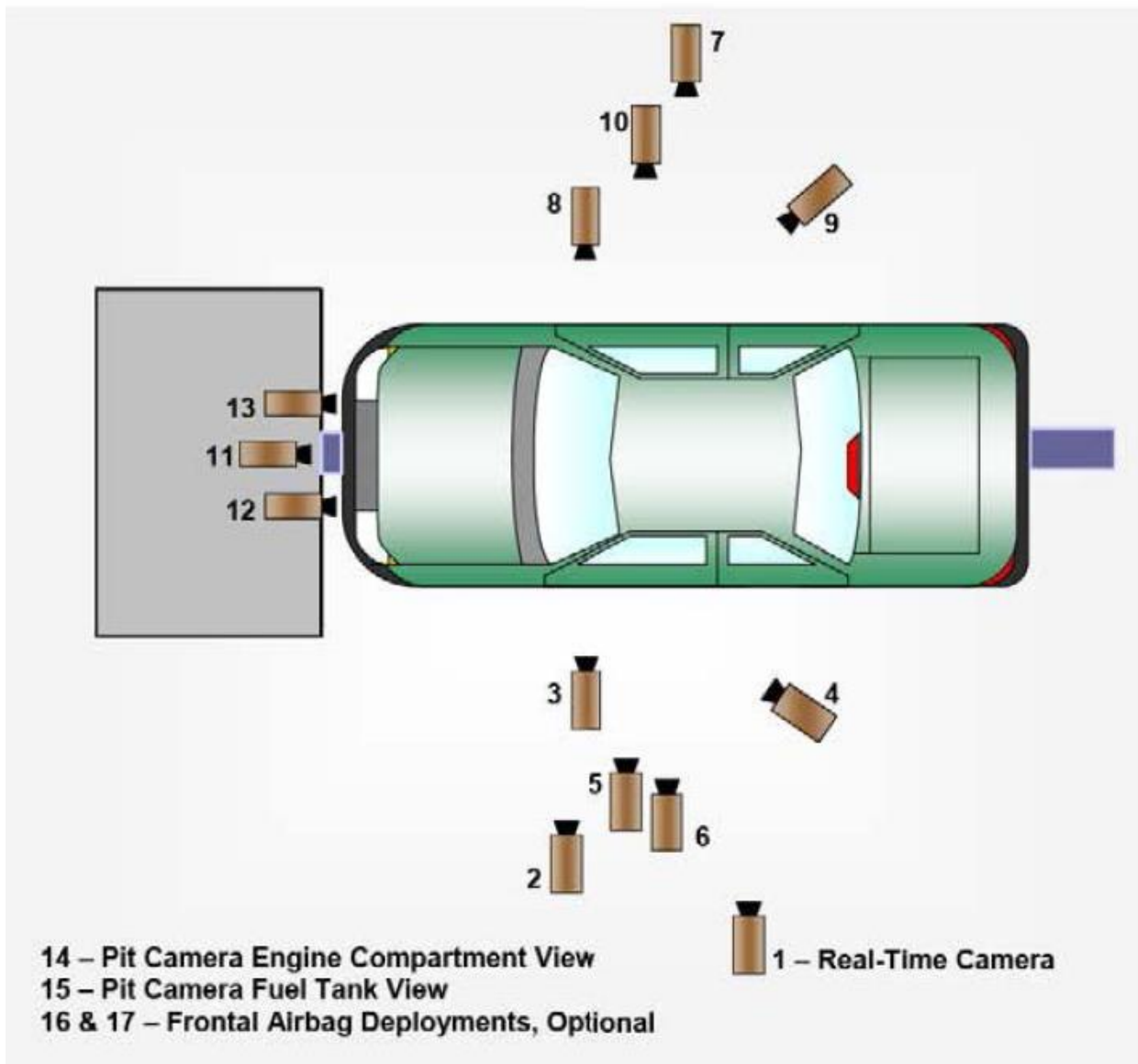
Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	980	1015
Lap belt length as measured on ATD	mm	660	767
Remainder of belt on reel	mm	654	515
Total belt length for continuous webbing systems	mm	2294	2297

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

Test Vehicle: 2023 Nissan Armada
Test Program: NCAP Frontal Impact

NHTSA No.: M20235203
Test Date: 2/14/2023

CAMERA POSITIONS FOR FRONTAL IMPACTS



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

Test Vehicle: 2023 Nissan Armada
Test Program: NCAP Frontal Impact

NHTSA No.: M20235203
Test Date: 2/14/2023

CAMERA LOCATIONS

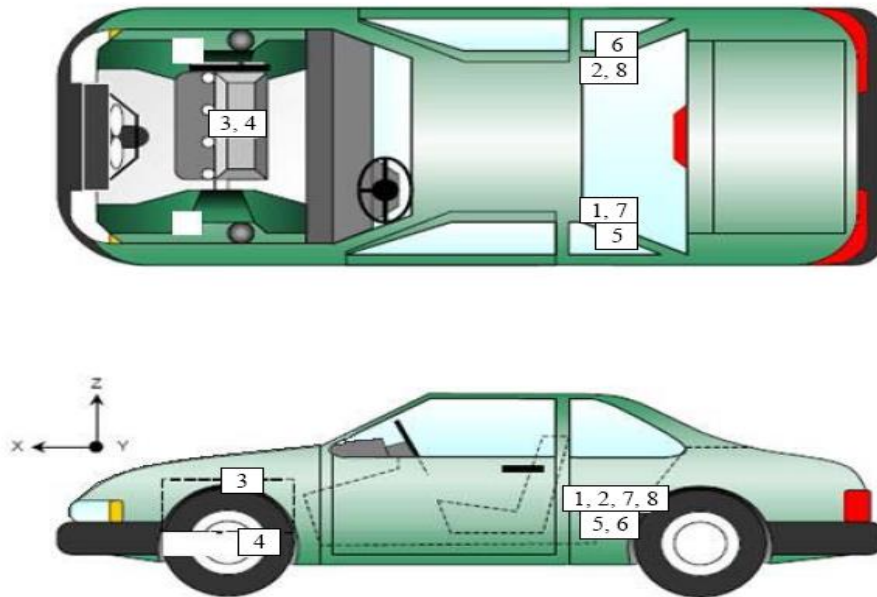
No.	Camera View	Location (mm)			Lens (mm)	Frame Speed (fps)
		X	Y	Z		
1	REAL-TIME LEFT OVERALL	-710	-5387	-1475	Zoom	30
2	LEFT OVERALL	-2696	-4004	-1495	8.5	50
3	DRIVER CLOSE-UP	-2491	-4000	-1591	50	50
4	LEFT FRONT HALF	-1350	-4485	-1406	25	50
5	LEFT ANGLE	-3540	-2418	-1655	20	50
6	STEERING COLUMN	-2320	-4020	-1606	50	50
7	RIGHT OVERALL	-2458	4453	-1403	8.5	50
8	PASSENGER CLOSE-UP	-1992	4396	-1513	50	50
9	RIGHT FRONT HALF	-1300	4837	-1274	25	50
10	RIGHT ANGLE	-3052	2257	-1746	20	50
11	WINDSHIELD	0	0	-2648	20	50
12	DRIVER WINDSHIELD	0	-310	-2640	16	50
13	PASSENGER WINDSHIELD	0	205	-2641	16	50
14	PIT FRONT	-881	0	3021	20	1000
15	PIT REAR	-3109	0	3049	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

DATA SHEET NO. 7 - VEHICLE ACCELEROMETER DATA

Test Vehicle: 2023 Nissan Armada
 Test Program: NCAP Frontal Impact

NHTSA No.: M20235203
 Test Date: 2/14/2023



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Accelerometer – X Direction	2120	-300	-716
2	Right Rear Accelerometer – X Direction	2120	310	-715
3	Engine Top X	4600	-20	-1057
4	Engine Bottom X	4210	29	-263
5	Left Rear Accelerometer – Z Direction	2120	-300	-720
6	Right Rear Accelerometer – Z Direction	2120	310	-720
7	Left Rear Accelerometer – X Direction Redundant	2120	-260	-715
8	Right Rear Accelerometer- X Direction Redundant	2120	280	-714

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

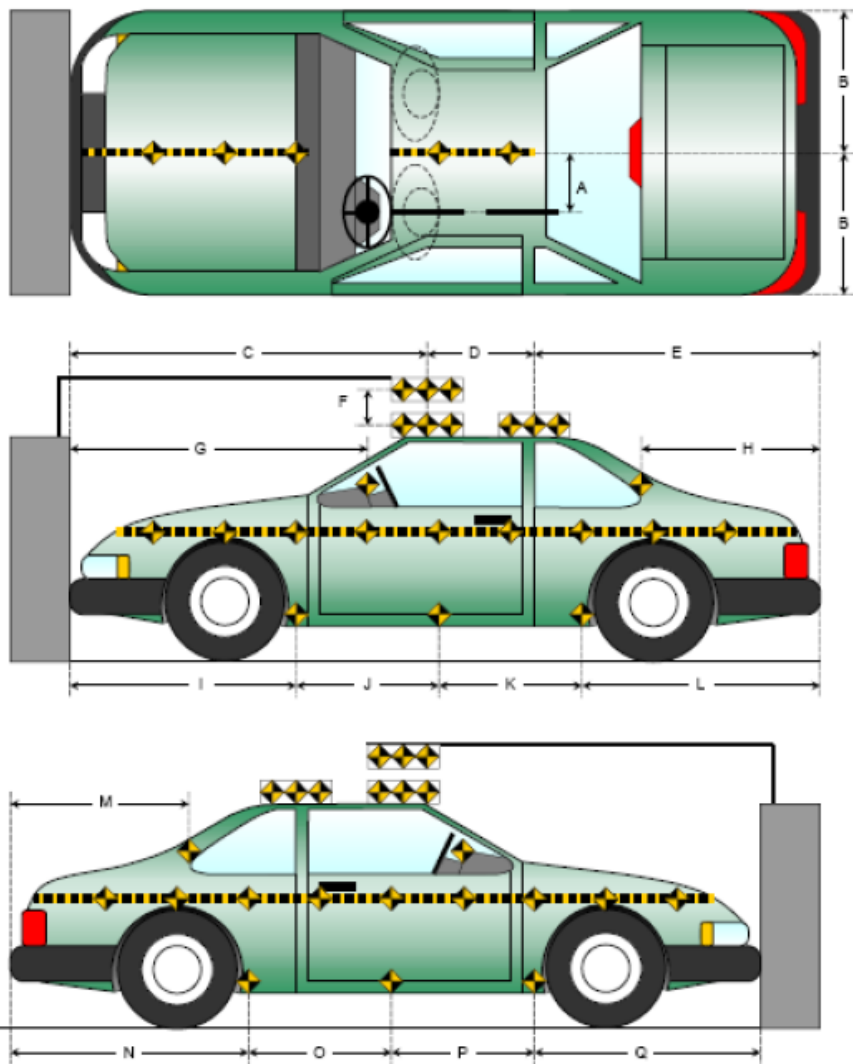
DATA SHEET NO. 8 - PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2023 Nissan Armada
 Test Program: NCAP Frontal Impact

NHTSA No.: M20235203
 Test Date: 2/14/2023

Item	Value
A	482
B	1018
C	2380
D	600
E	2288
F	177
G	1805
H	1560
I	1532
J	955
K	978
L	1805
M	1570
N	1803
O	982
P	954
Q	1531

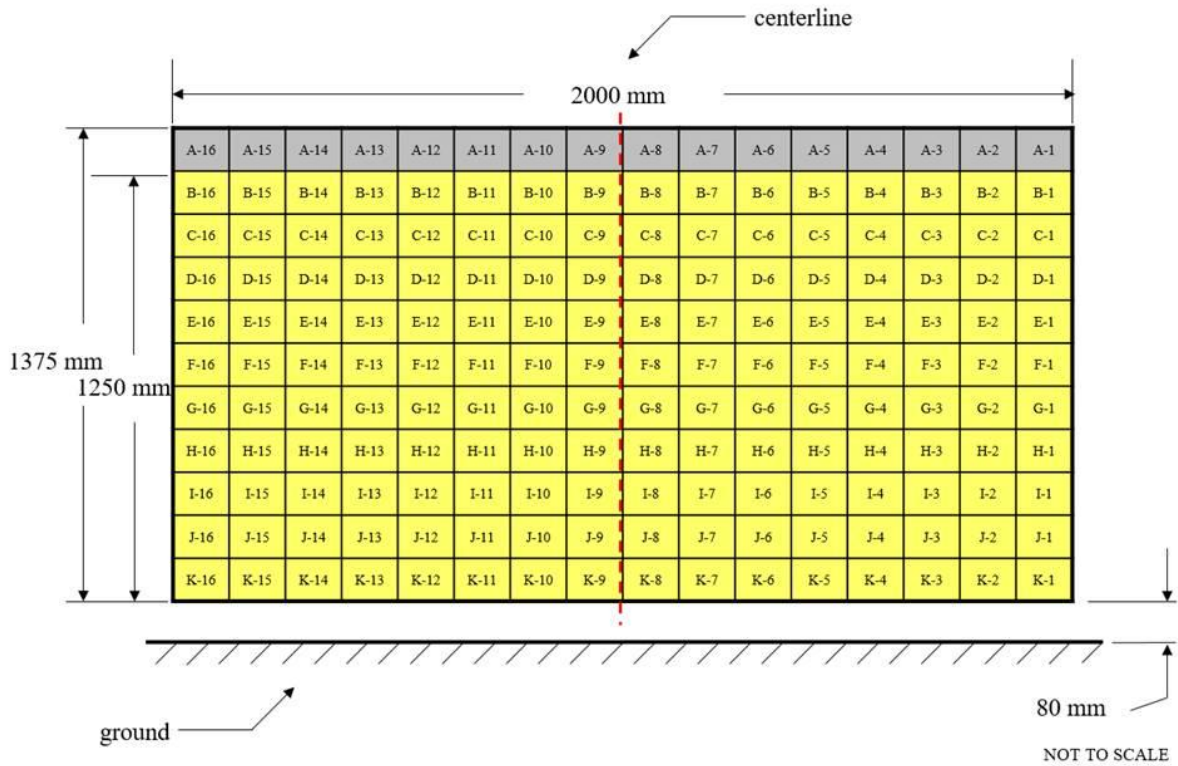
All units in millimeters



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

Test Vehicle: 2023 Nissan Armada
 Test Program: NCAP Frontal Impact

NHTSA No.: M20235203
 Test Date: 2/14/2023



DATA SHEET NO. 10 - TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2023 Nissan Armada
Test Program: NCAP Frontal Impact

NHTSA No.: M20235203
Test Date: 2/14/2023

INSTRUMENTATION

Instrumentation	Number of Channels Collected
Driver Dummy Accelerometers	47
Passenger Dummy Accelerometers	47
Vehicle Structure Accelerometers	8
Total	102

CAMERA COVERAGE

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

DATA SHEET NO. 11 - POST-TEST OBSERVATIONS

Test Vehicle: 2023 Nissan Armada
 Test Program: NCAP Frontal Impact

NHTSA No.: M20235203
 Test Date: 2/14/2023

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	Locked	Locked	
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	

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	373
Center	mm	351
Right Side	mm	320
Average	mm	348

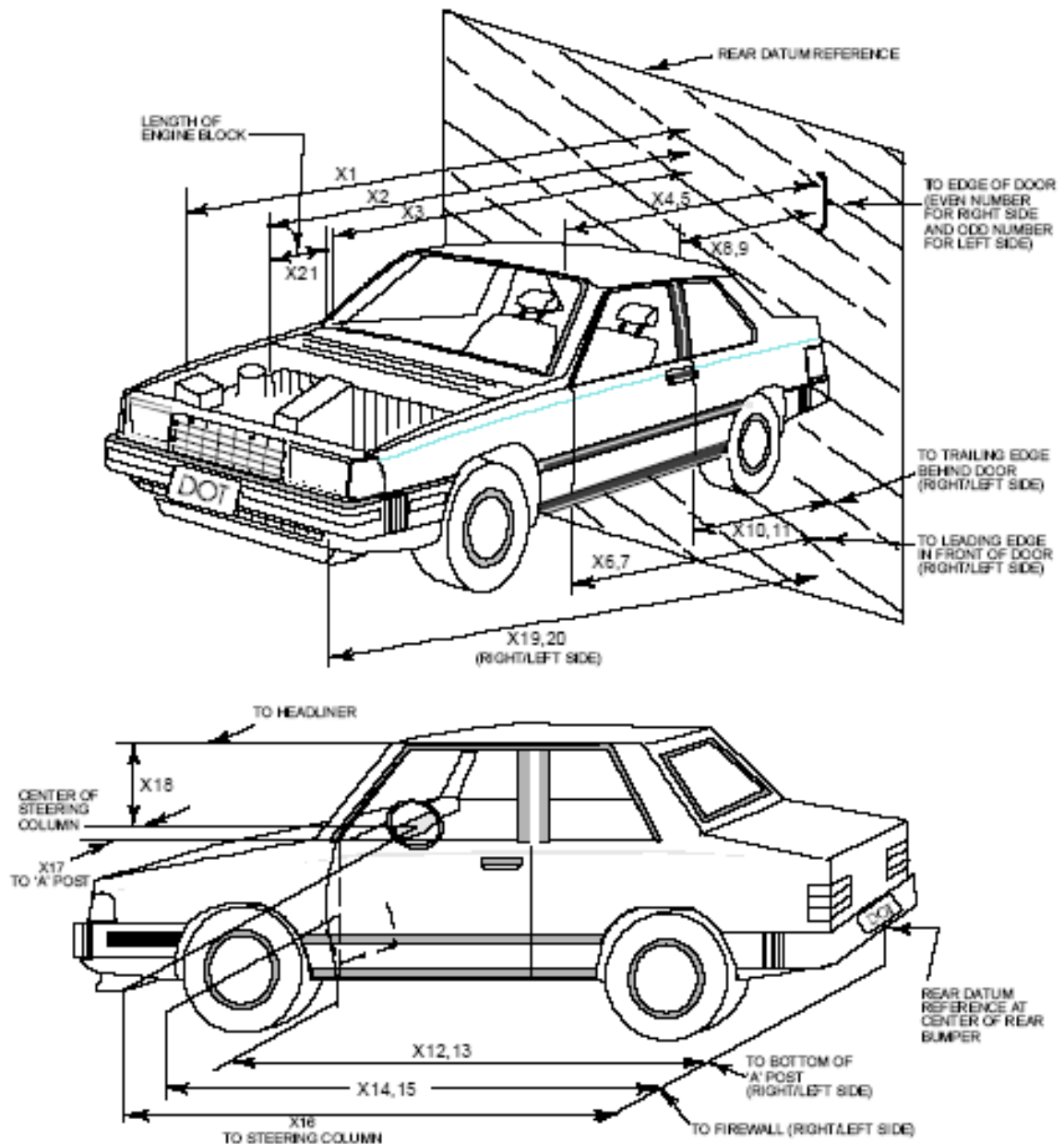
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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	Yes	Yes	Yes
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	No	N/A	No	N/A

DATA SHEET NO. 12 - VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2023 Nissan Armada
 Test Program: NCAP Frontal Impact

NHTSA No.: M20235203
 Test Date: 2/14/2023



DATA SHEET NO. 12 - VEHICLE PROFILE MEASUREMENTS (CONT'D)

Test Vehicle: 2023 Nissan Armada
Test Program: NCAP Frontal Impact

NHTSA No.: M20235203
Test Date: 2/14/2023

No.	Measurement Description	Pre-Test	Post-Test	Change
1	Total Length of Vehicle at Centerline	5270	4730	-540
2	Rear Surface of Vehicle (RSOV) to Front of Engine	4615	4530	-85
3	RSOV to Firewall	4048	4020	-28
4	RSOV to Upper Leading Edge of Right Door	3638	3639	1
5	RSOV to Upper Leading Edge of Left Door	3636	3636	0
6	RSOV to Lower Leading Edge of Right Door	3650	3652	2
7	RSOV to Lower Leading Edge of Left Door	3650	3651	1
8	RSOV to Upper Trailing Edge of Right Door	2597	2598	1
9	RSOV to Upper Trailing Edge of Left Door	2596	2593	-3
10	RSOV to Lower Trailing Edge of Right Door	2590	2590	0
11	RSOV to Lower Trailing Edge of Left Door	2592	2591	-1
12	RSOV to Bottom of "A" Post-of Right Side	3650	3652	2
13	RSOV to Bottom of "A" Post-of Left Side	3650	3649	-1
14	RSOV to Firewall, Right Side	4050	4021	-29
15	RSOV to Firewall, Left Side	4048	3875	-173
16	RSOV to Steering Column	3212	3237	25
17	Center of Steering Column to "A" Post	350	385	35
18	Center of Steering Column to Headliner	457	430	-27
19	RSOV to Right Side of Front Bumper	5130	4731	-399
20	RSOV to Left Side of Front Bumper	5122	4720	-402
21	Length of Engine Block	750	750	0
RD	RSOV to Right Side of Dash Panel	3504	3540	36
CD	RSOV to Center of Dash Panel	3402	3438	36
LD	RSOV to Left Side of Dash Panel	3504	3540	36

All Dimensions in mm

DATA SHEET NO. 13 - ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2023 Nissan Armada
Test Program: NCAP Frontal Impact

NHTSA No.: M20235203
Test Date: 2/14/2023

VEHICLE INFORMATION

VIN: JN8AY2BD0P9690805
Vehicle Size Category: MPV

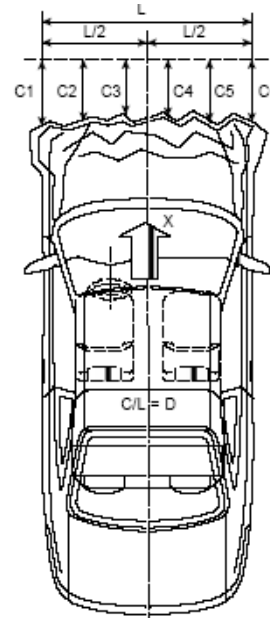
Wheelbase: 3075
Test Weight (kg): 2938.2

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): 56.47
Velocity Change (km/h): 63.47
Time of Separation (ms): 172

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	Crush
C1	Crush zone 1 at left side	mm	5122	4720	402
C2	Crush zone 2 at left side	mm	5230	4744	486
C3	Crush zone 3 at left side	mm	5260	4728	532
C4	Crush zone 4 at right side	mm	5260	4729	531
C5	Crush zone 5 at right side	mm	5232	4747	485
C6	Crush zone 6 at right side	mm	5130	4731	399
L	C1 to C6	mm	1524	1240	284

DATA SHEET NO. 14 - VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2023 Nissan Armada
Test Program: NCAP Frontal Impact

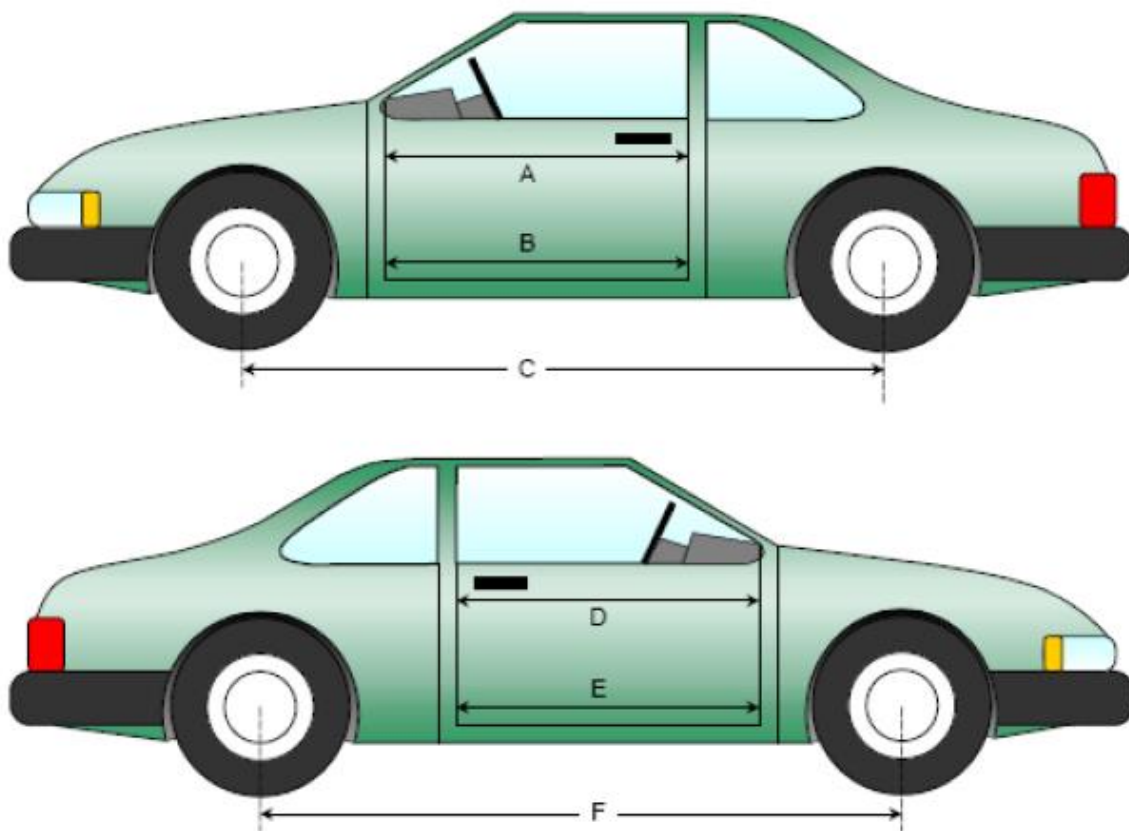
NHTSA No.: M20235203
Test Date: 2/14/2023

DOOR OPENING WIDTH

No.	Description	Units	Pre-Test	Post-Test	Change
A	Left Side Upper	mm	1007	1007	0
B	Left Side Lower	mm	856	856	0
D	Right Side Upper	mm	1007	1007	0
E	Right Side Lower	mm	874	874	0

WHEELBASE MEASUREMENTS

No.	Description	Units	Pre-Test	Post-Test	Change
C	Left Side Wheelbase	mm	3075	3045	-30
F	Right Side Wheelbase	mm	3075	3047	-28



¹ Front suspension damaged and wheels fell off measurements not available

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

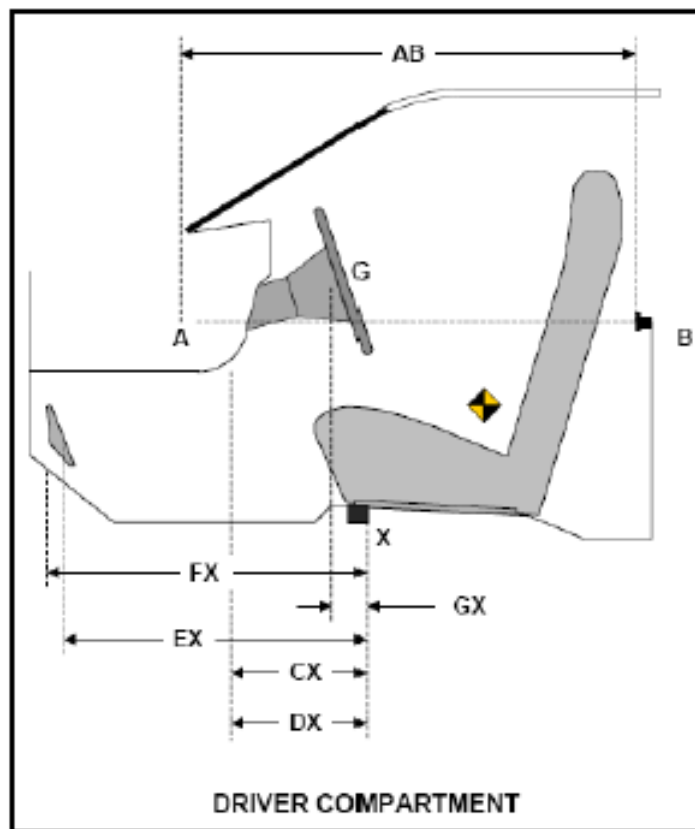
Test Vehicle: 2023 Nissan Armada
Test Program: NCAP Frontal Impact

NHTSA No.: M20235203
Test Date: 2/14/2023

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Change
AB	Door Opening (Inside Window Jam)	mm	990	990	0
CX	Left Knee Bolster to X	mm	260	285	25
DX	Right Knee Bolster to X	mm	250	275	25
EX	Brake Pedal to X	mm	528	610	82
FX	Foot Rest to X	mm	530	535	5
GX	Center of Steering Column Wheel Hub to X	mm	50	75	25

X = Front of Seat Track (Stationary)



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

Test Vehicle: 2023 Nissan Armada
Test Program: NCAP Frontal Impact

NHTSA No.: M20235203
Test Date: 2/14/2023

Please provide windshield mounting details.

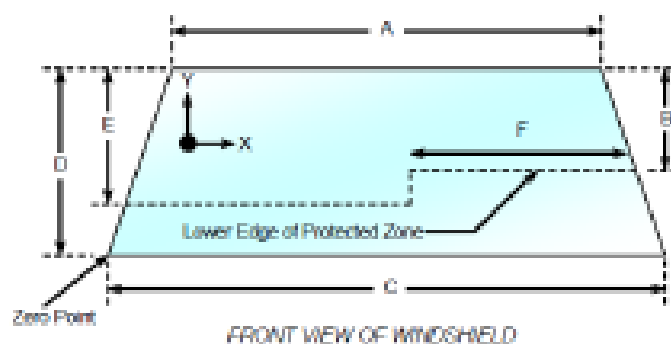
The standard requires that the post-test retention measurement be a minimum of 75% of the pre-test total periphery measurement for vehicle not equipped with occupant passive restraint and 50% for each side of the windshield for vehicle which are equipped with occupant passive restraints.

Temperature of windshield molding during test: 21.8°C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2339	2339	100.0
Right Side	2339	2339	100.0
Total	4678	4678	100.0

Item	Units	Value
A	mm	1445
B	mm	429
C	mm	1713
D	mm	760
E	mm	465
F	mm	542



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: 2023 Nissan Armada
Test Program: NCAP Frontal Impact

NHTSA No.: M20235203
Test Date: 2/14/2023

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 21.8°C

Test Time: 15:05

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

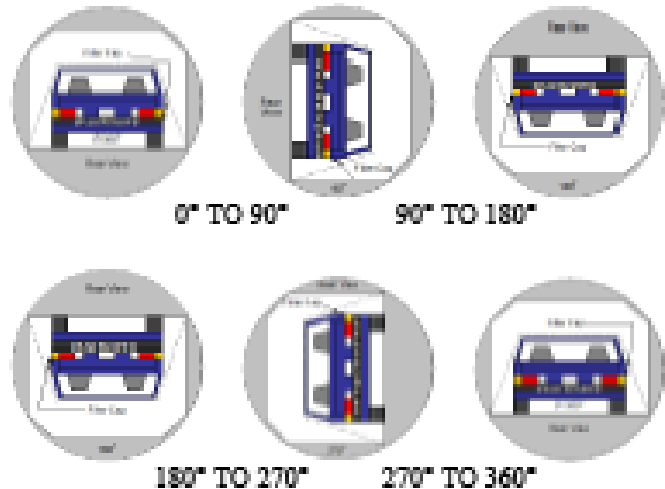
DATA SHEET NO. 16 - FMVSS 301 BARRIER IMPACT AND STATIC ROLLOVER RESULTS (CONT'D)

Test Vehicle: 2023 Nissan Armada
Test Program: NCAP Frontal Impact

NHTSA No.: M20235203
Test Date: 2/14/2023

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

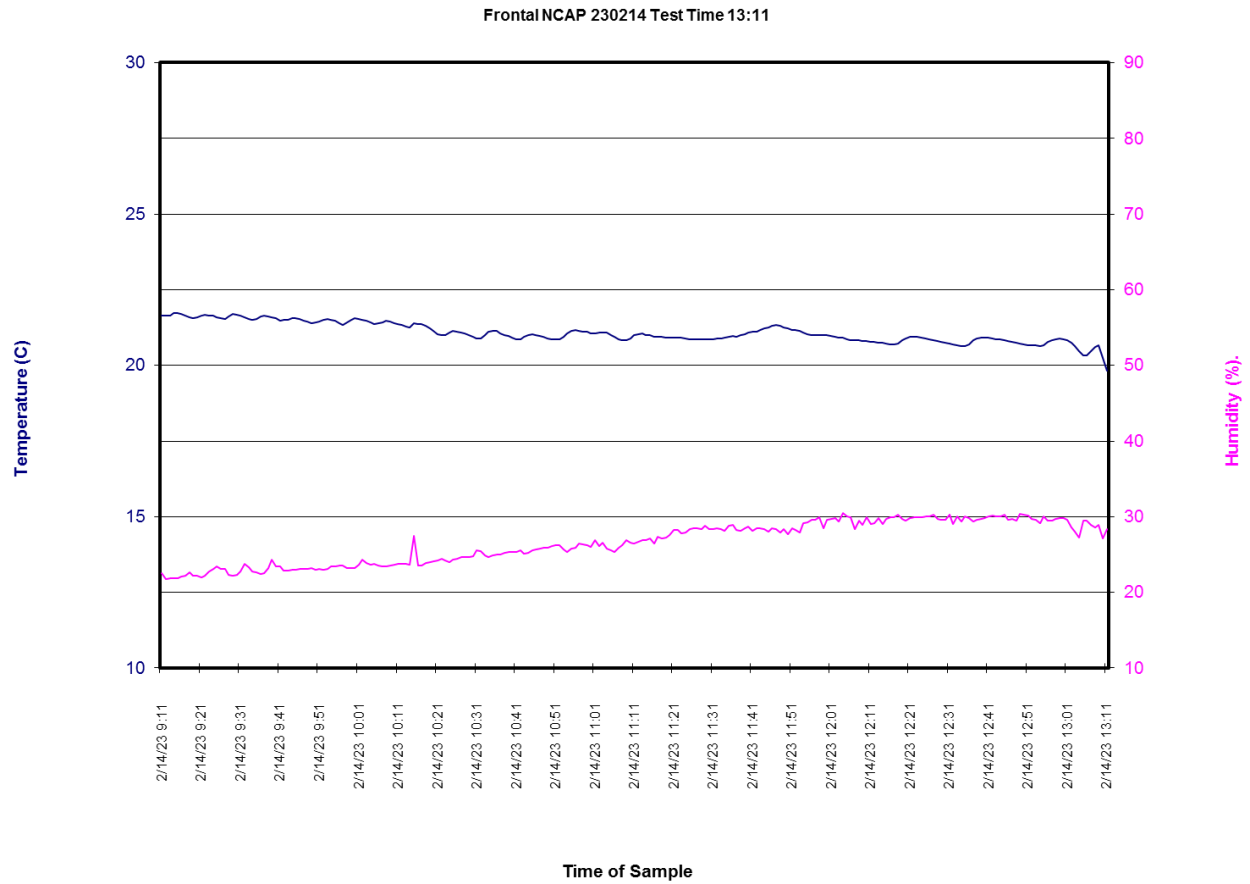
SOLVENT SPILLAGE LOCATION TABLE

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: 2023 Nissan Armada
Test Program: NCAP Frontal Impact

NHTSA No.: M20235203
Test Date: 2/14/2023



APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

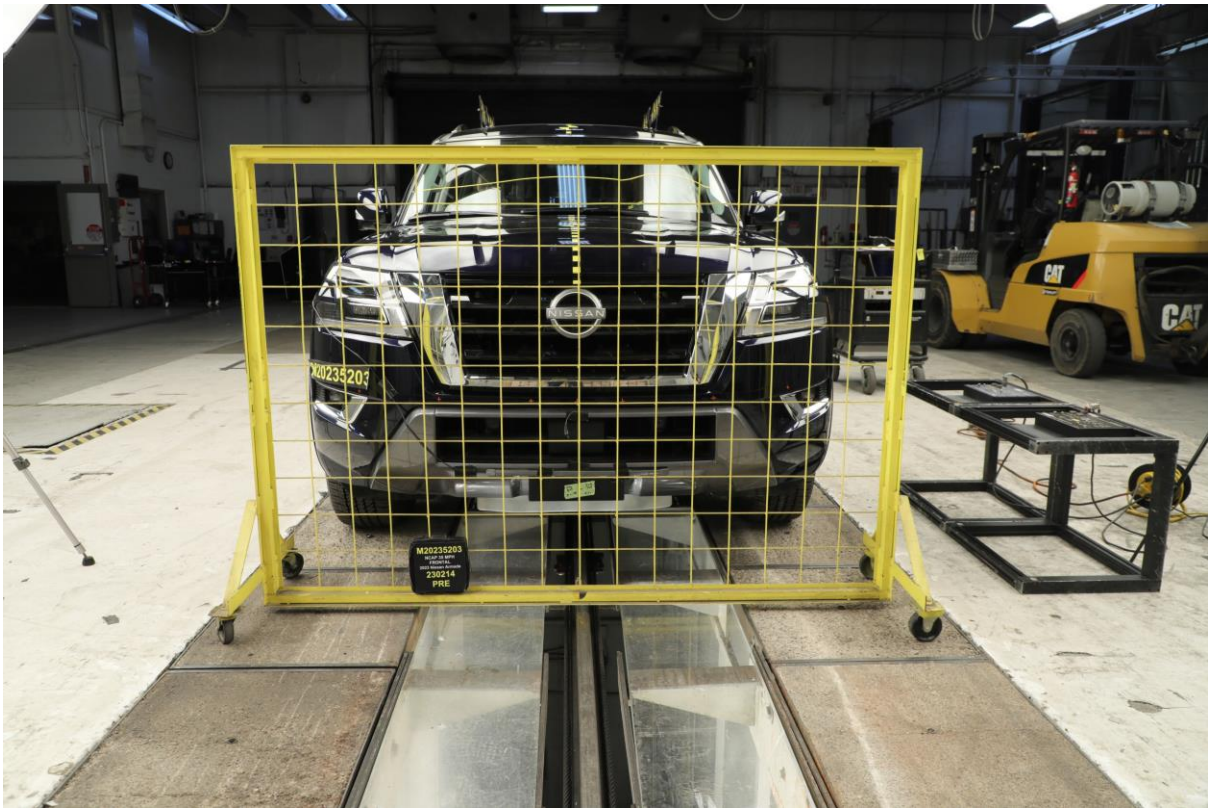
No.	Description	Page
1	Load Cell Location	A-5
2	Pre-Test Load Cell Wall	A-5
3	Post-Test Load Cell Wall	A-6
4	Manufacturer's Label	A-6
5	Tire Placard	A-7
6	2023 Nissan Armada Frontal As Delivered	A-8
7	Left Rear 3-4 View, as Received	A-8
8	Pre-Test Front View of Test Vehicle	A-9
9	Post-Test Front View of Test Vehicle	A-9
10	Pre-Test Left View of Test Vehicle	A-10
11	Post-Test Left View of Test Vehicle	A-10
12	Pre-Test Right View of Test Vehicle	A-11
13	Post-Test Right View of Test Vehicle	A-11
14	Pre-Test Right Front 3-4 View	A-12
15	Post-Test Right Front 3-4 View	A-12
16	Pre-Test Left Rear 3-4 View	A-13
17	Post-Test Left Rear 3-4 View	A-13
18	Pre-Test Windshield View	A-14
19	Post-Test Windshield View	A-14
20	Pre-Test Engine Compartment View	A-15
21	Post-Test Engine Compartment View	A-15
22	Pre-Test Fuel Filler Cap View	A-16
23	Post-Test Fuel Filler Cap View	A-16
24	Pre-Test Front Underbody View	A-17
25	Post-Test Front Underbody View	A-17
25a	Pre-Test Mid Front Underbody View	A-18
25b	Post-Test Mid Front Underbody View	A-18
25c	Pre-Test Mid Rear Underbody View	A-19
25d	Post-Test Mid Rear Underbody View	A-19
26	Pre-Test Rear Underbody View	A-20
27	Post-Test Rear Underbody View	A-20
28	Pre-Test Dummy Cable Routing	A-21
29	Post-Test Dummy Cable Routing	A-21
30	Pre-Test Driver Dummy Front View	A-22
31	Post-Test Driver Dummy Front View	A-22
32	Pre-Test Driver Dummy Window View	A-23
33	Post-Test Driver Dummy Window View	A-23

TABLE OF PHOTOGRAPHS (CONTINUED)

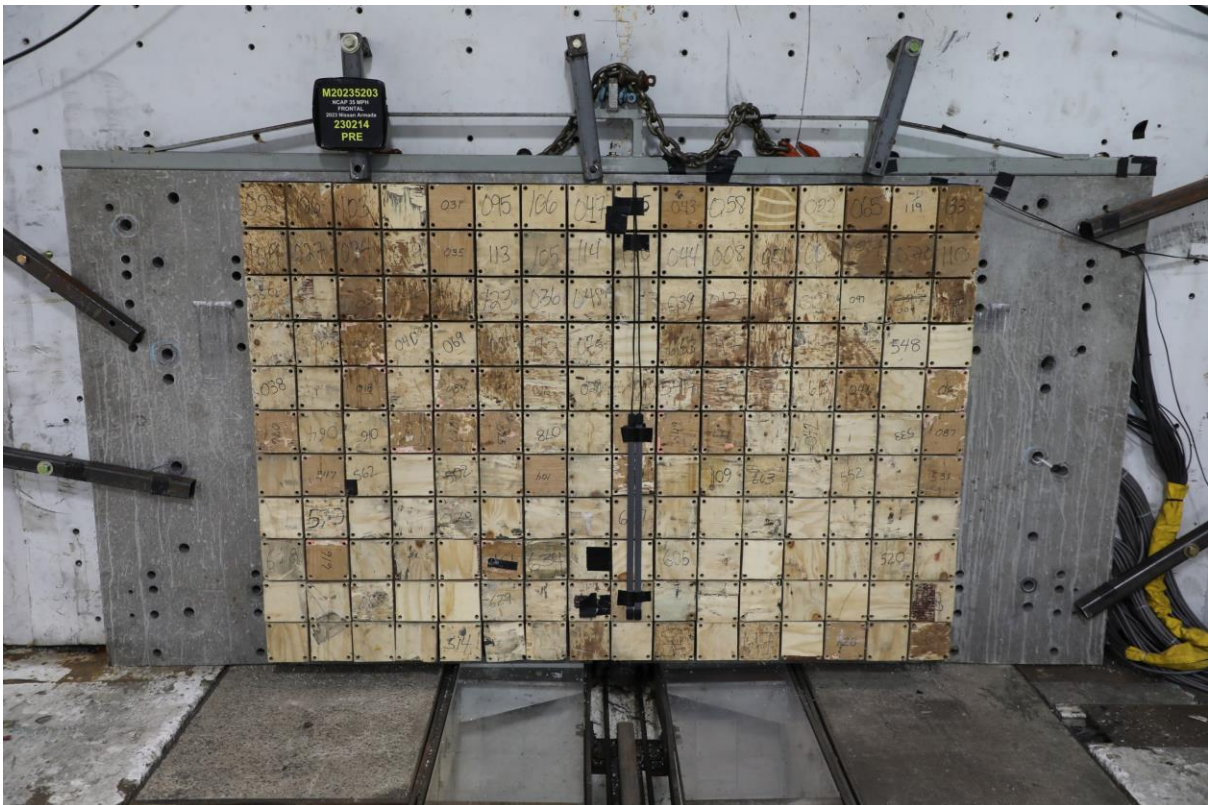
No.	Description	Page
34	Pre-Test Driver Dummy and Vehicle Interior View	A-24
35	Post-Test Driver Dummy and Vehicle Interior View	A-24
36	Pre-Test Driver's Seat Fore-Aft Markings	A-25
37	Post-Test Driver's Seat Fore-Aft Markings	A-25
38	Pre-Test View of Belt Anchorage for Driver Dummy	A-26
39	Post-Test View of Belt Anchorage for Driver Dummy	A-26
40	Pre-Test View of Belt Buckle and Latch Plate for Driver Dummy	A-27
41	Post-Test View of Belt Buckle and Latch Plate for Driver Dummy	A-27
42	Pre-Test Driver Dummy Feet	A-28
43	Post-Test Driver Dummy Feet	A-28
44	Pre-Test Driver's Side Knee Bolster	A-29
45	Post-Test Driver's Side Knee Bolster	A-29
46	Pre-Test Driver's Side Floorpan	A-30
47	Post-Test Driver's Side Floorpan	A-30
48	Post-Test Driver Dummy Face	A-31
49	Post-Test Driver Dummy Contact with Airbag	A-32
50	Post-Test Driver Dummy Contact with Headrest	A-32
51	Pre-Test View of the Steering Wheel	A-33
52	Post-Test View of the Steering Wheel	A-33
53	Pre-Test Passenger Dummy Front View	A-34
54	Post-Test Passenger Dummy Front View	A-34
55	Pre-Test Passenger Dummy Window View	A-35
56	Post-Test Passenger Dummy Window View	A-35
57	Pre-Test Passenger Dummy and Vehicle Interior View	A-36
58	Post-Test Passenger Dummy and Vehicle Interior View	A-36
59	Pre-Test Passenger Seat Fore-Aft Markings	A-37
60	Post-Test Passenger Seat Fore-Aft Markings	A-37
61	Pre-Test View of Belt Anchorage for Passenger Dummy	A-38
62	Post-Test View of Belt Anchorage for Passenger Dummy	A-38
63	Pre-Test View of Belt Buckle and Latch Plate for Passenger Dummy	A-39
64	Post-Test View of Belt Buckle and Latch Plate for Passenger Dummy	A-39
65	Pre-Test Passenger Dummy Feet	A-40
66	Post-Test Passenger Dummy Feet	A-40
67	Pre-Test Passenger Side Knee Bolster	A-41
68	Post-Test Passenger Side Knee Bolster	A-41
69	Pre-Test Passenger Side Floorpan	A-42
70	Post-Test Passenger Side Floorpan	A-42

TABLE OF PHOTOGRAPHS (CONTINUED)

No.	Description	Page
71	Post-Test Passenger Dummy Face	A-43
72	Post-Test Passenger Dummy Contact with Airbag	A-43
73	Post-Test Passenger Dummy Contact with Headrest	A-44
74	Photograph of Ballast Installed in Vehicle View	A-44
75	Post-Test Stoddard Solvent Spillage Location View, if required	A-45
76	Post-Test Speed Trap Read-out	A-45
77	Vehicle at 0° on Static Rollover Device	A-46
78	Vehicle at 90° on Static Rollover Device	A-46
79	Vehicle at 180° on Static Rollover Device	A-47
80	Vehicle at 270° on Static Rollover Device	A-47
81	Vehicle at 360° on Static Rollover Device	A-48
82	2023 Nissan Armada Frontal Impact Event	A-48
83	Monroney Label Photograph	A-49



001 Load Cell Location



002 Pre-Test Load Cell Wall



003 Post-Test Load Cell Wall



004 Manufacturer's Label

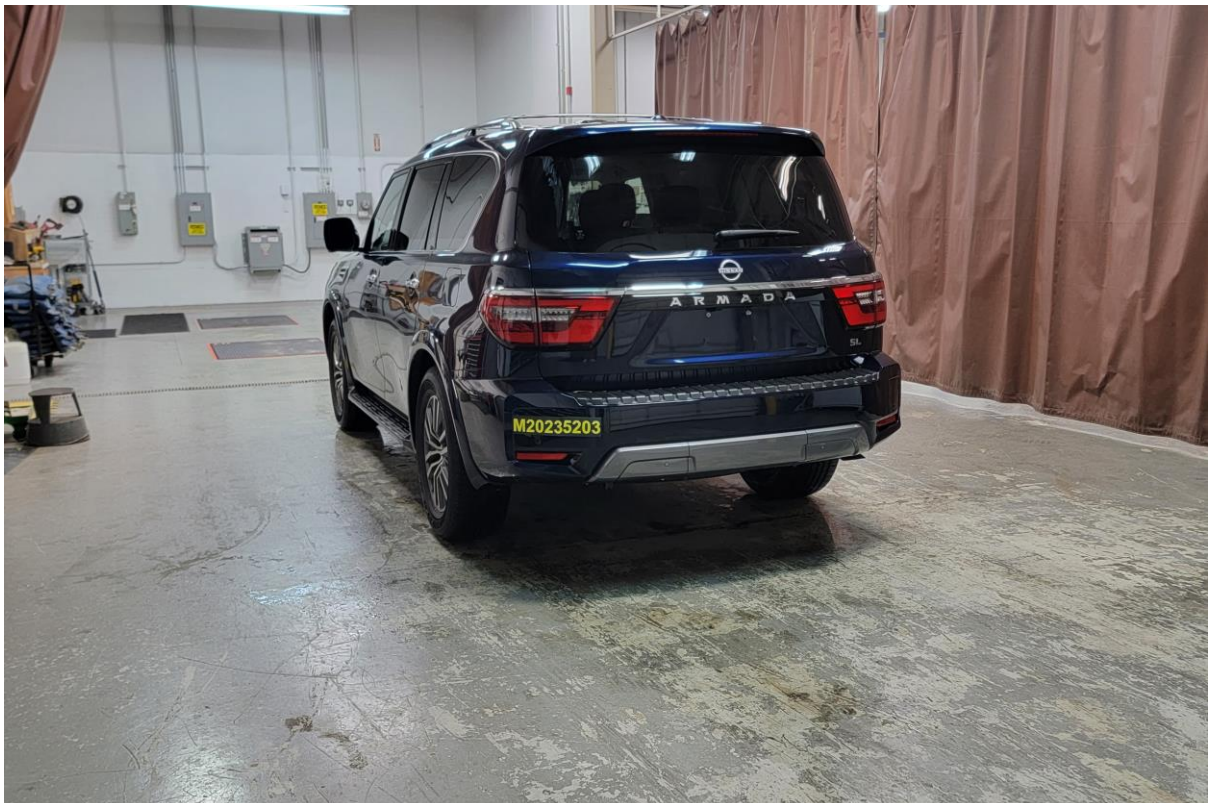


005 Tire Placard

Intentionally Left Blank



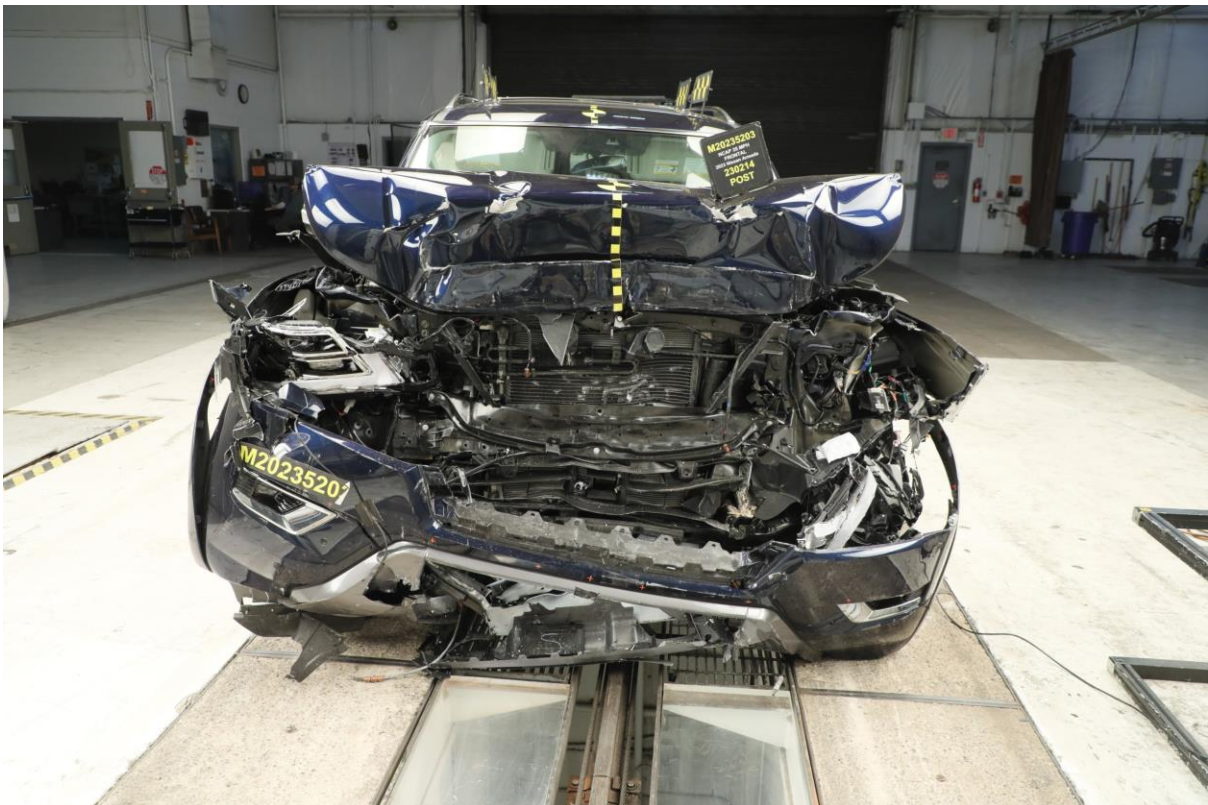
006 2023 Nissan Armada Frontal As Delivered



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



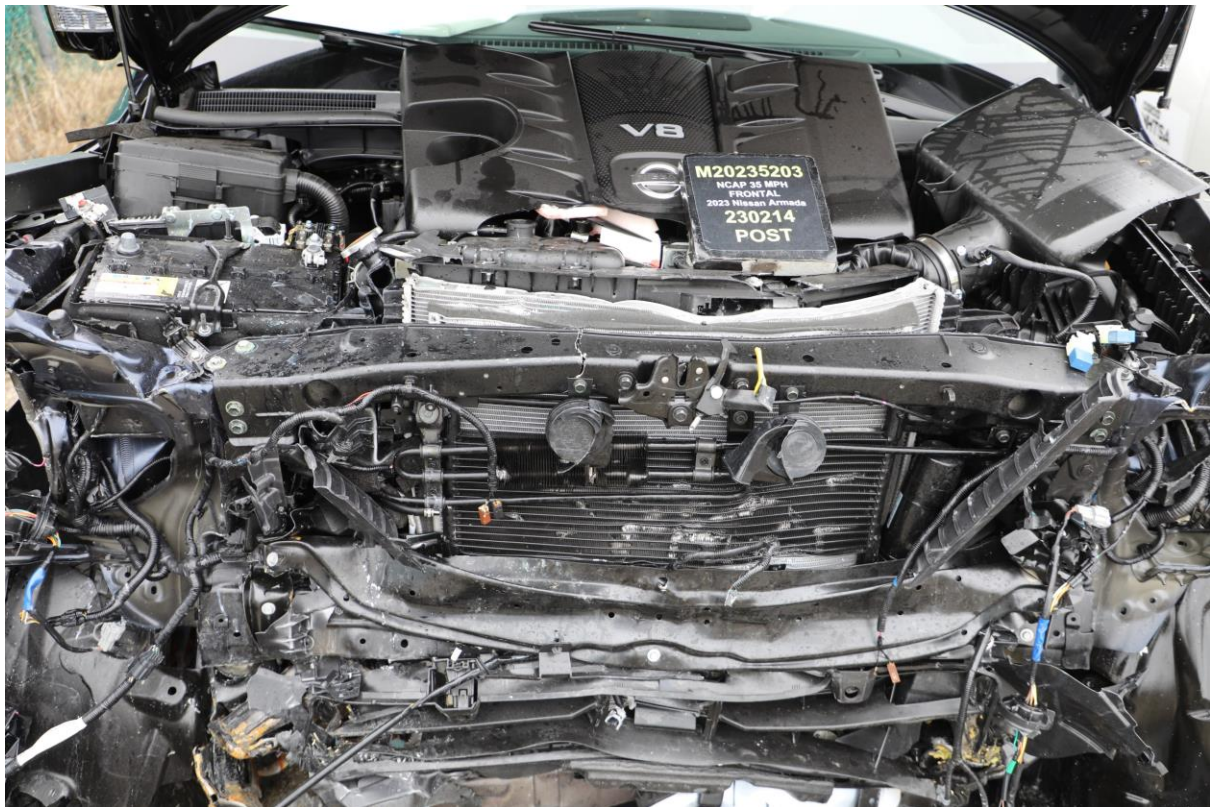
018 Pre-Test Windshield View



019 Post-Test Windshield View



020 Pre-Test Engine Compartment View



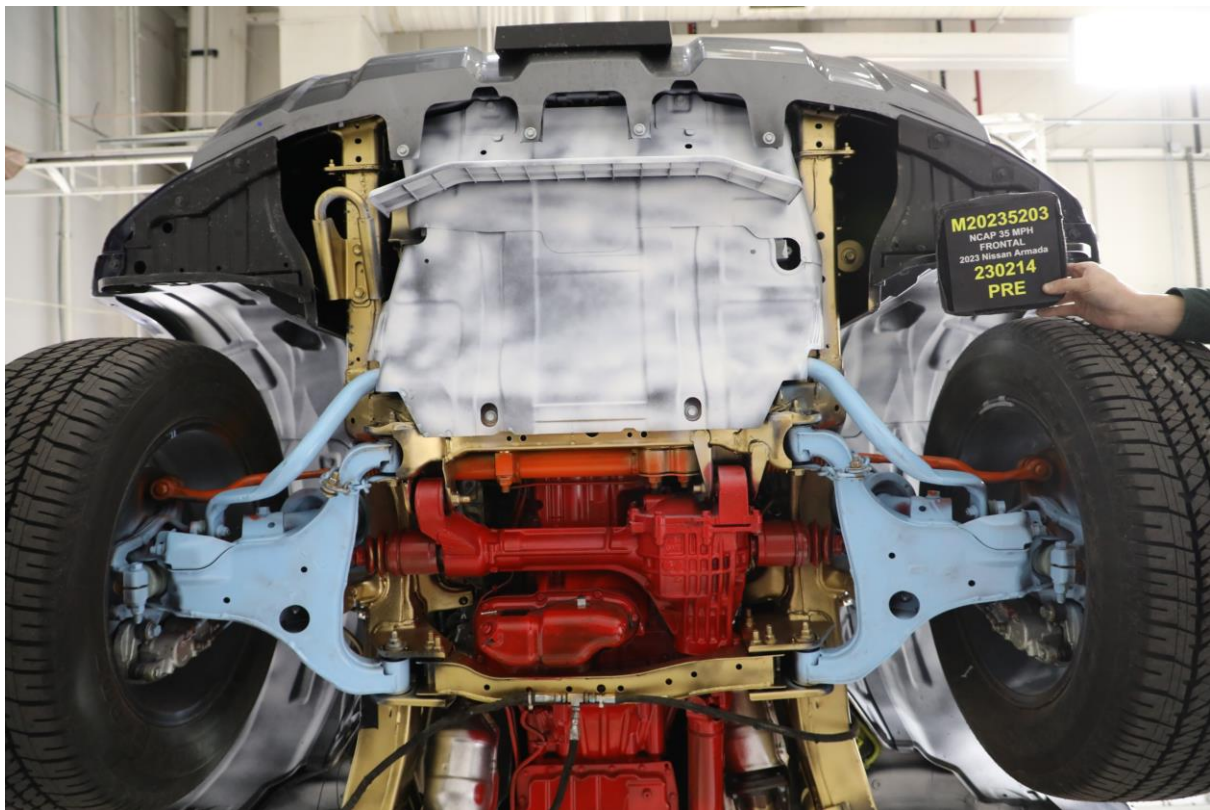
021 Post-Test Engine Compartment View



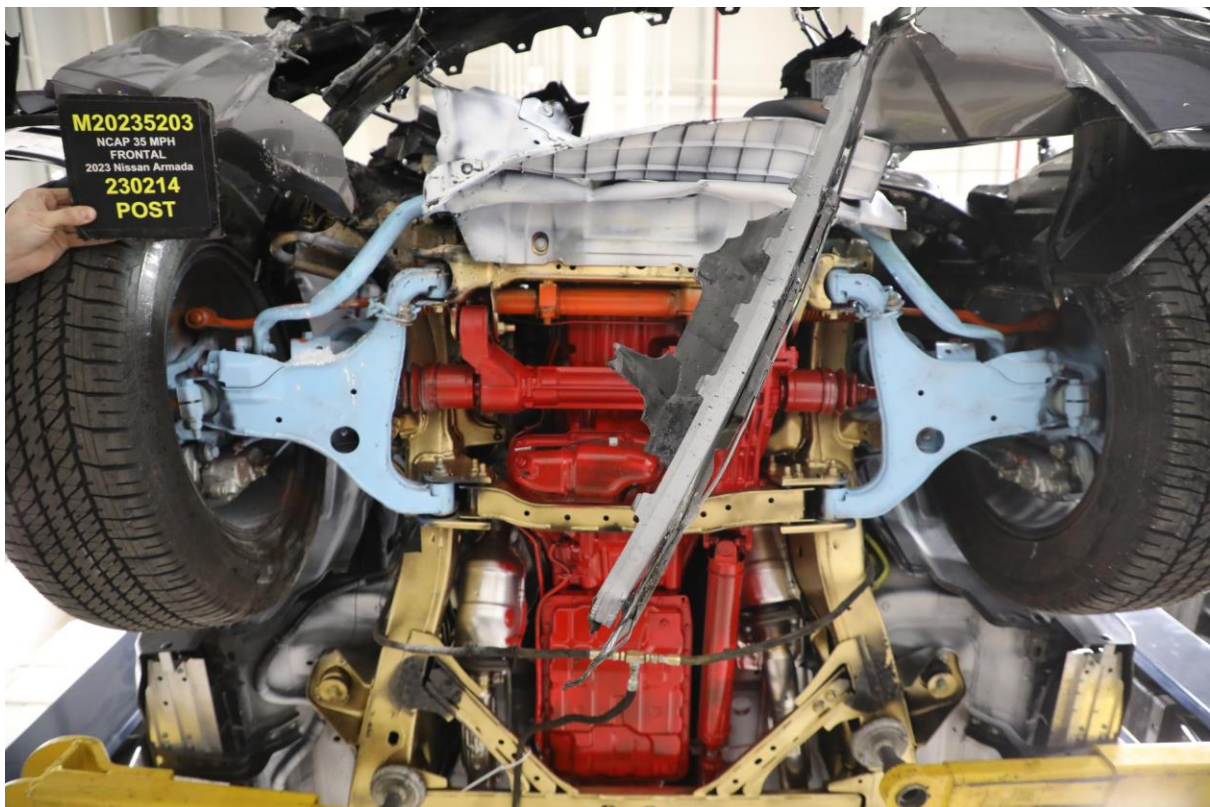
022 Pre-Test Fuel Filler Cap View



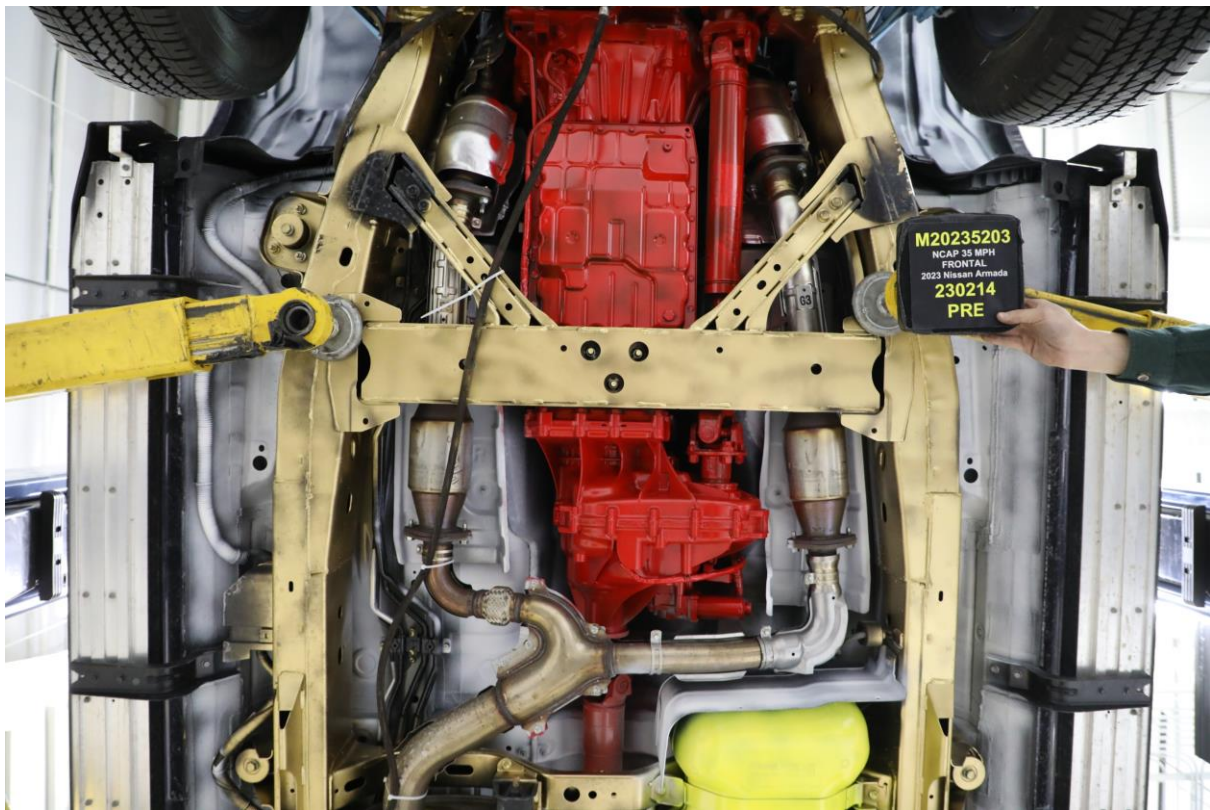
023 Post-Test Fuel Filler Cap View



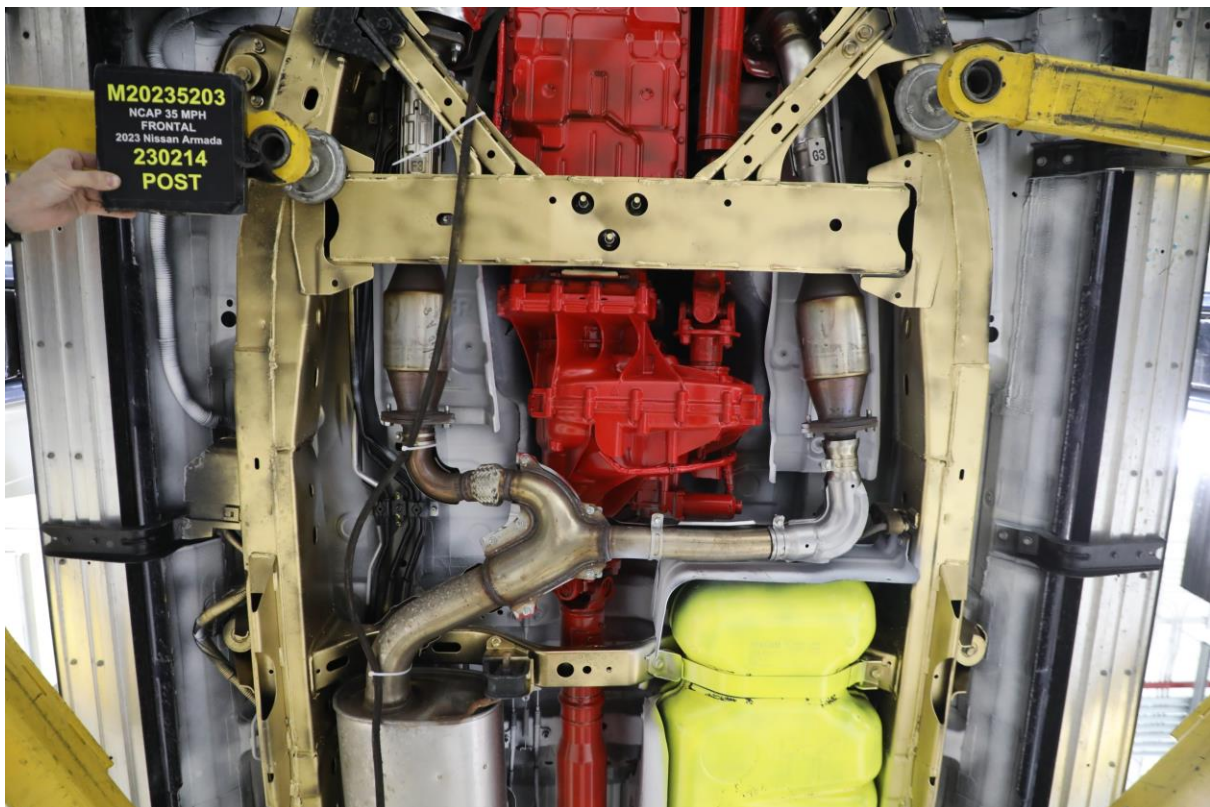
024 Pre-Test Front Underbody View



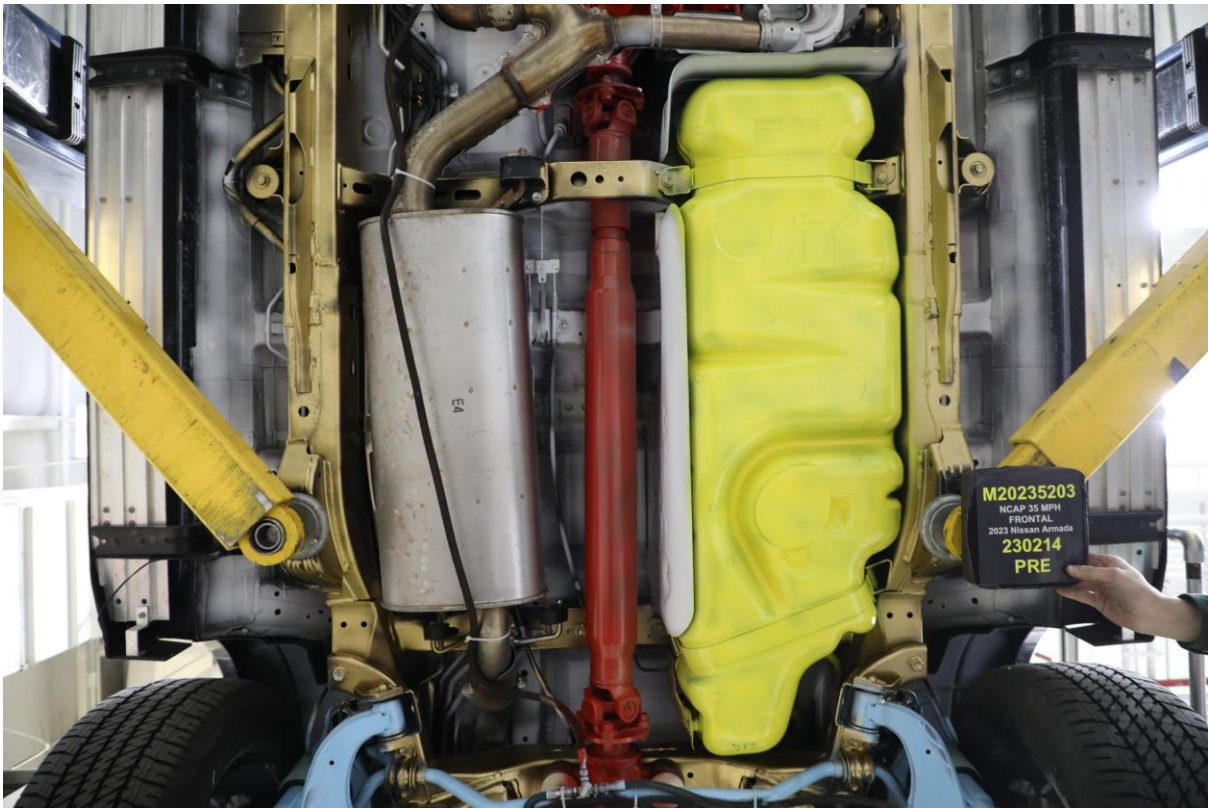
025 Post-Test Front Underbody View



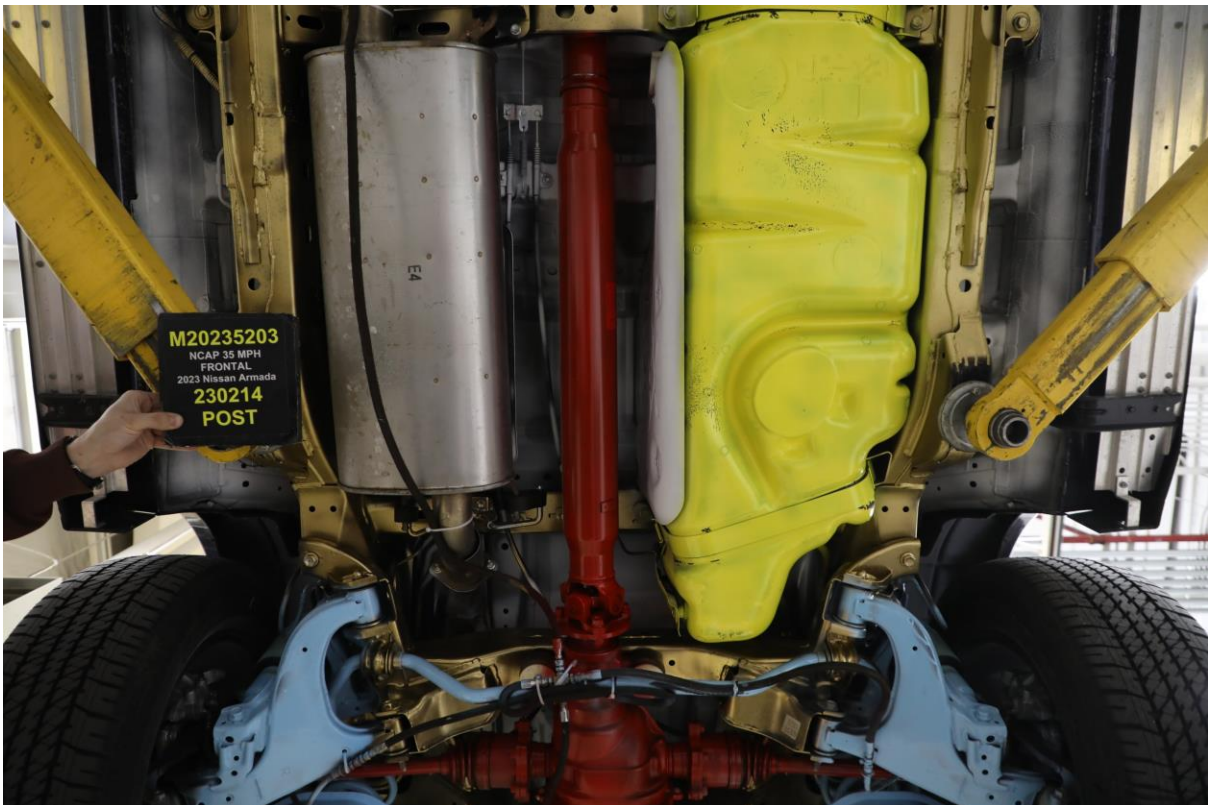
025a Pre-Test Mid Front Underbody View



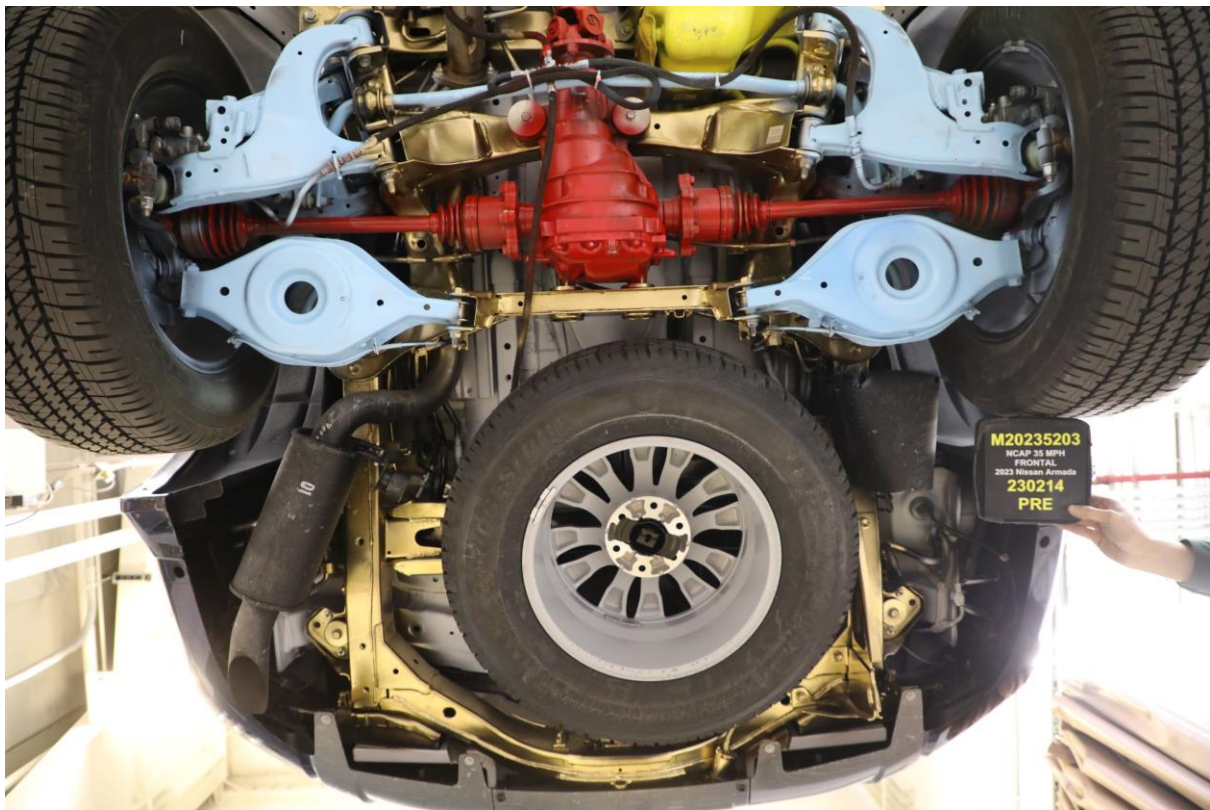
025b Post-Test Mid Front Underbody View



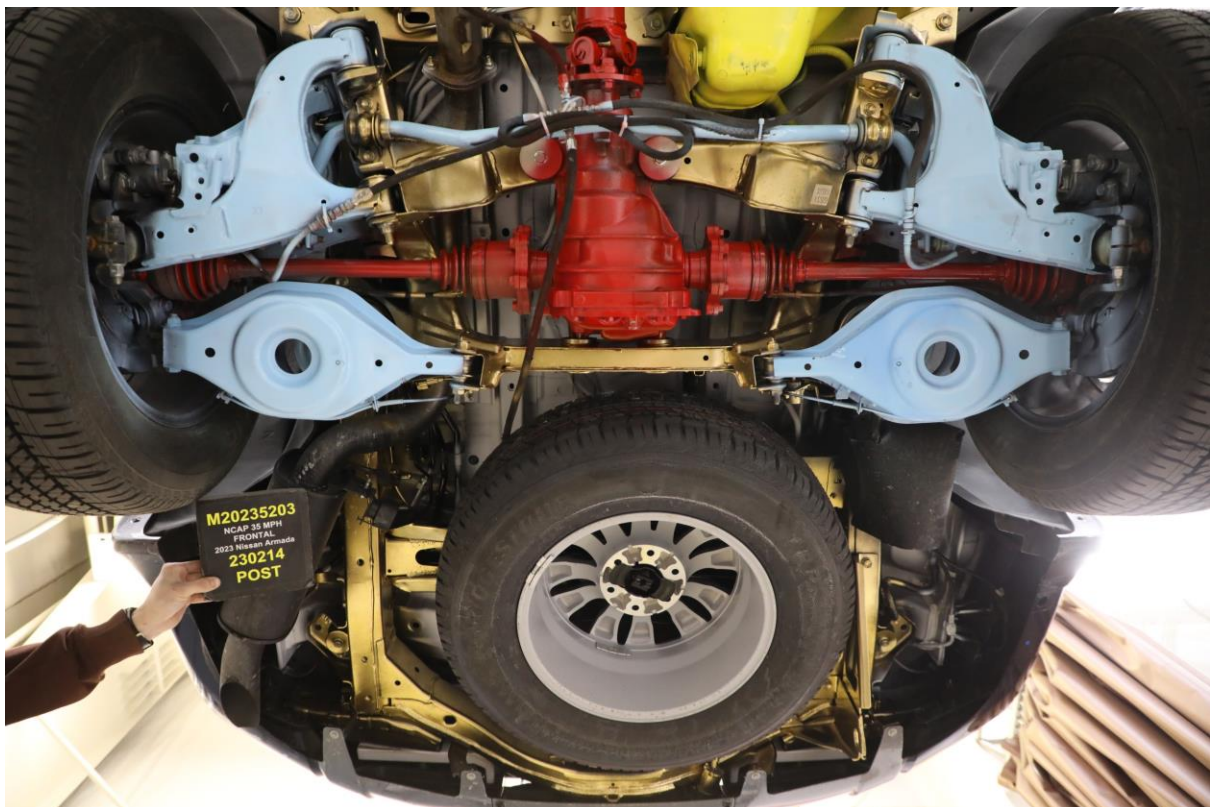
025c Pre-Test Mid Rear Underbody View



025d Post-Test Mid Rear Underbody View



026 Pre-Test Rear Underbody View



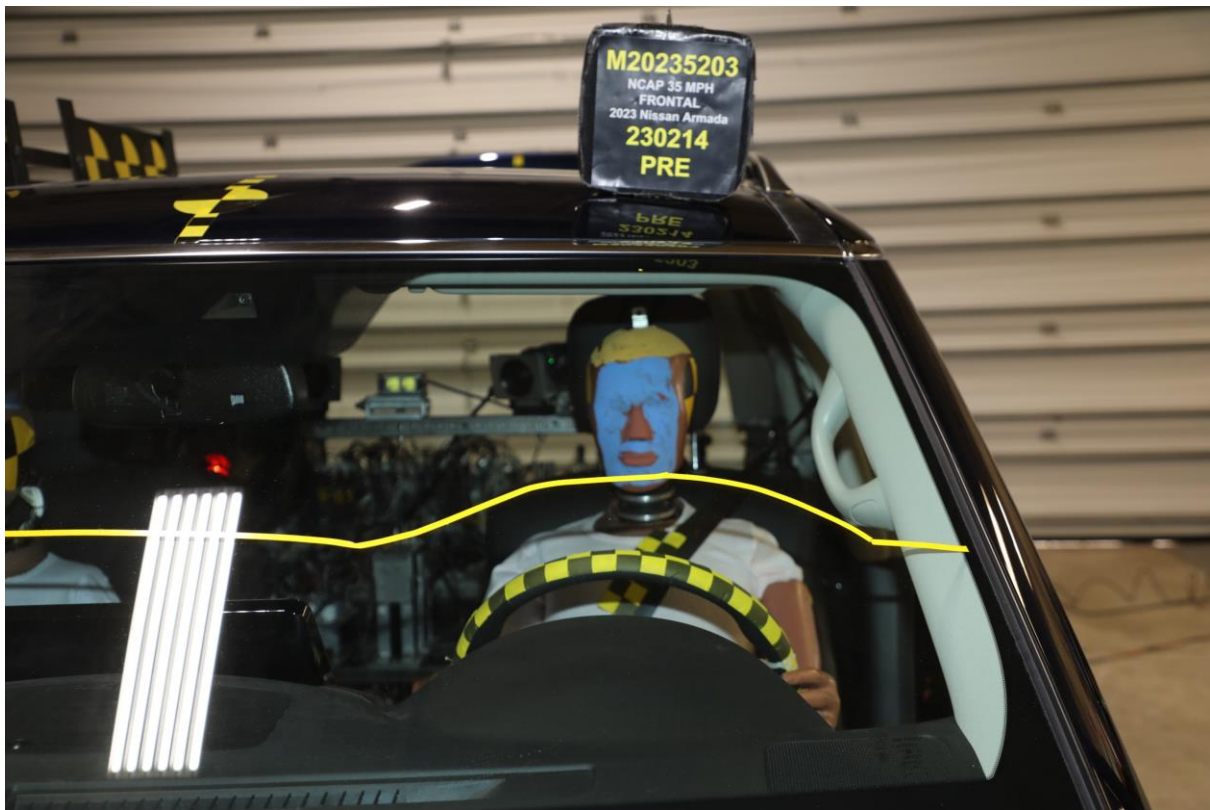
027 Post-Test Rear Underbody View



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



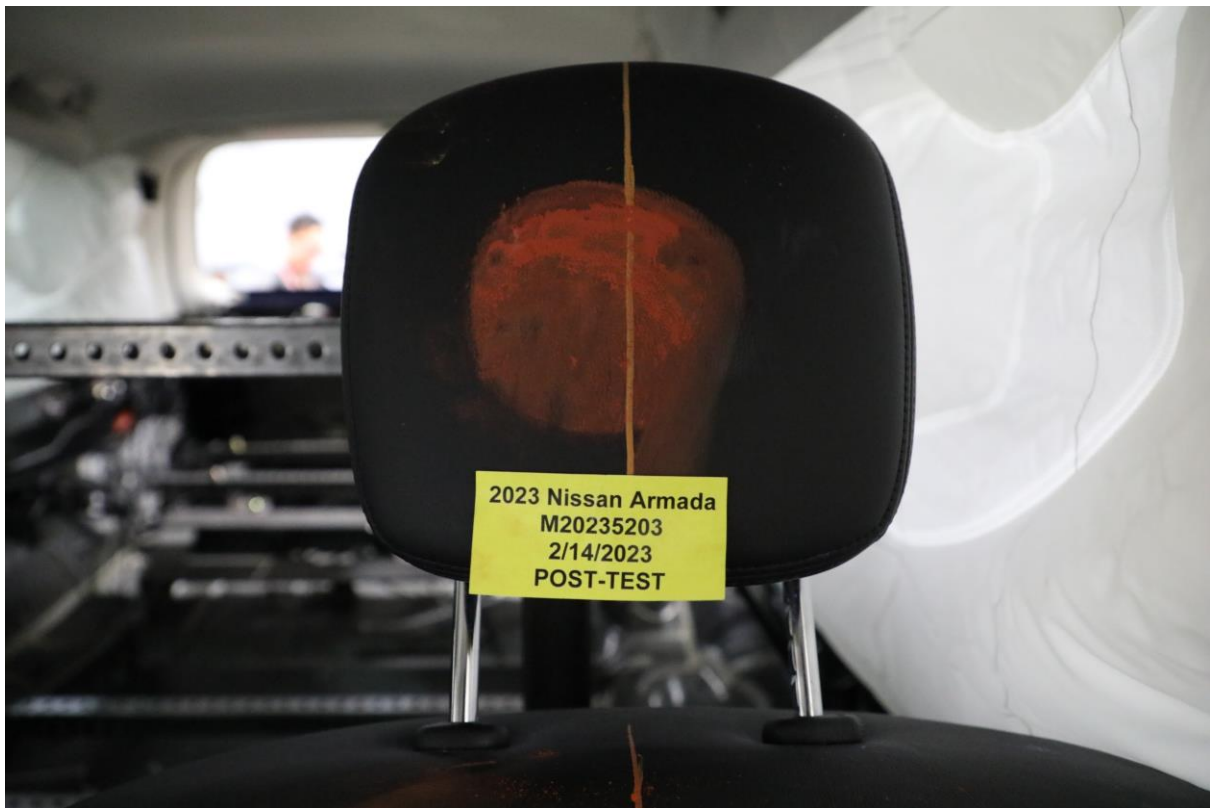
047 Post-Test Driver's Side Floorpan



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



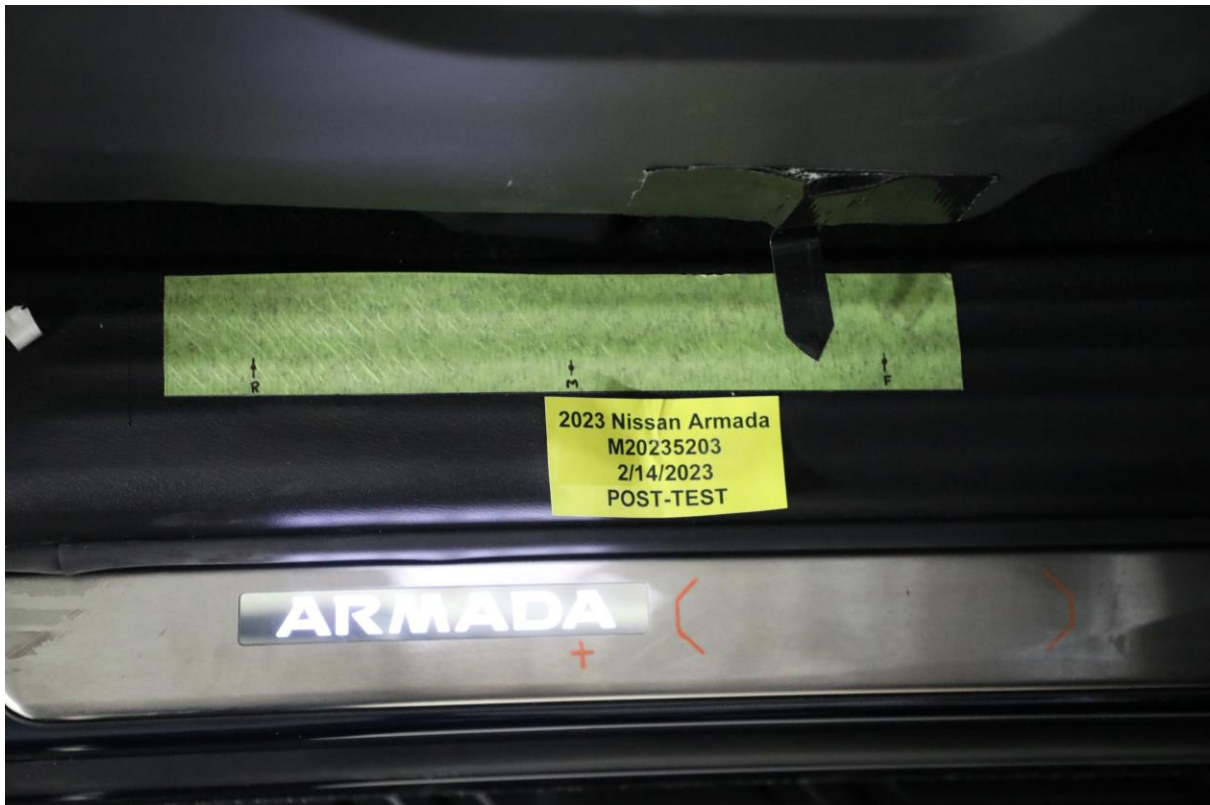
057 Pre-Test Passenger Dummy and Vehicle Interior View



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



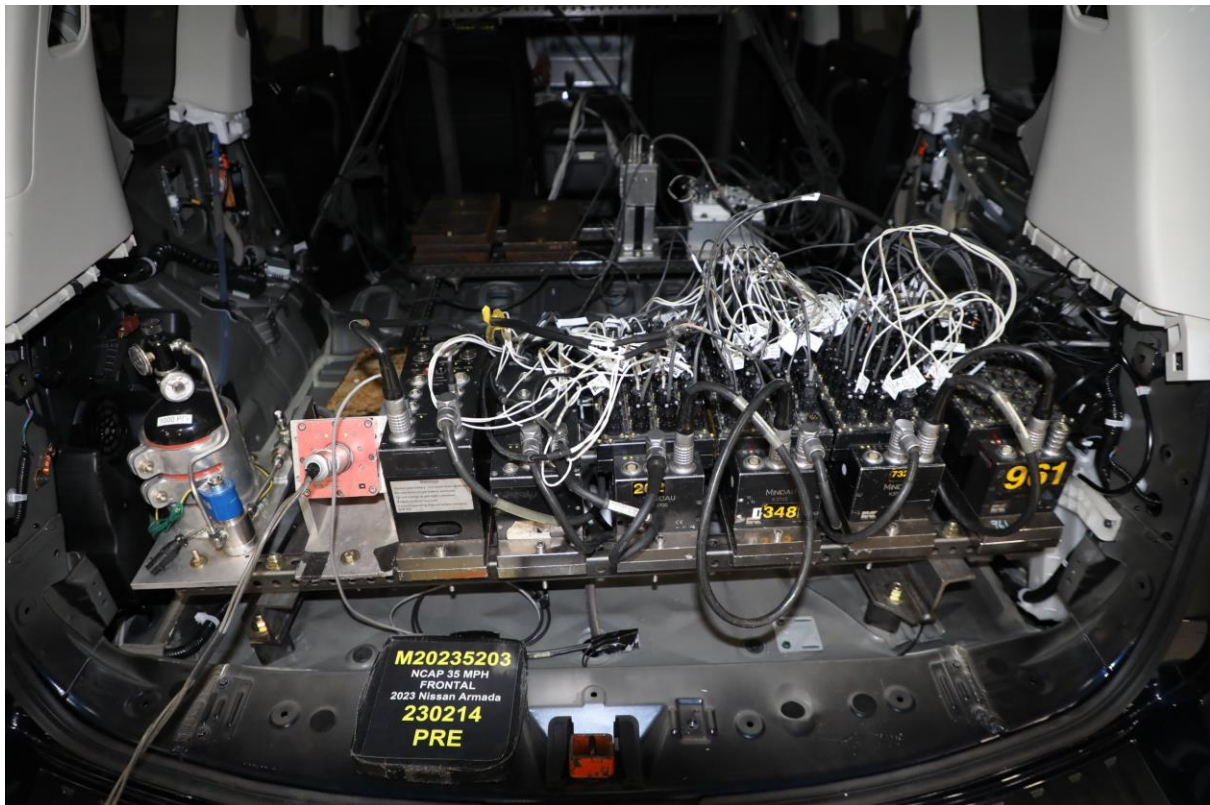
071 Post-Test Passenger Dummy Face



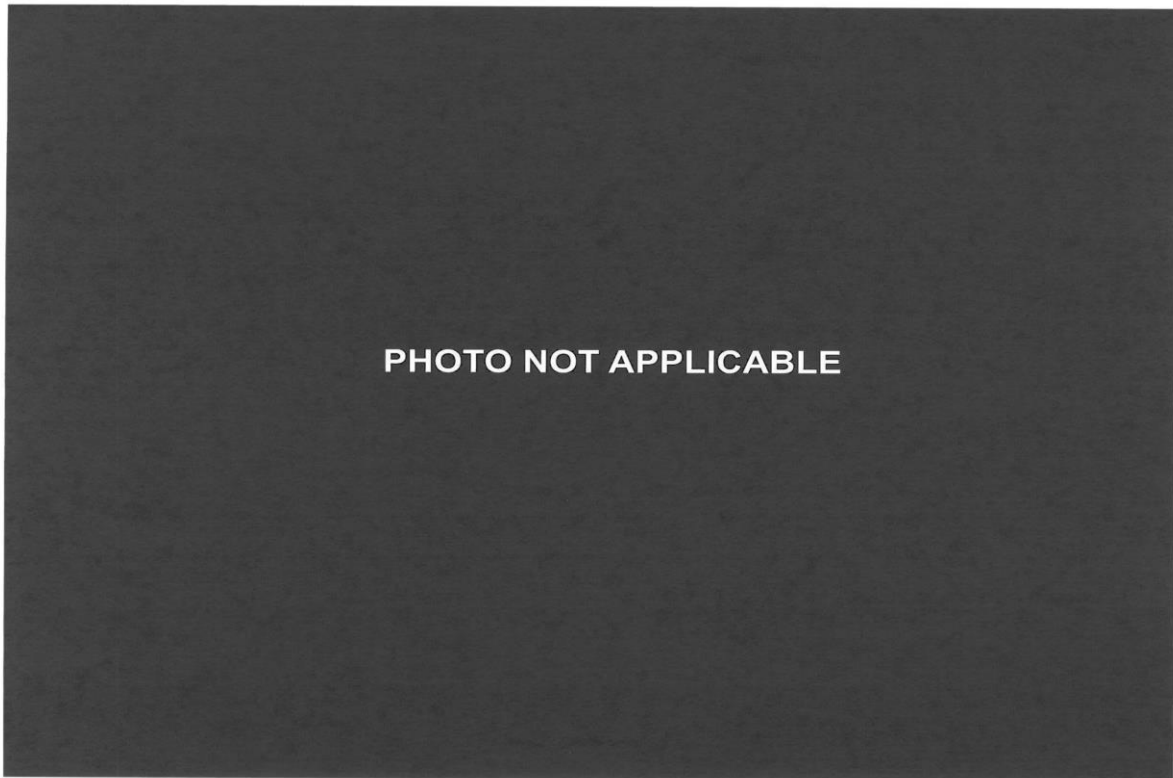
072 Post-Test Passenger Dummy Contact with Airbag



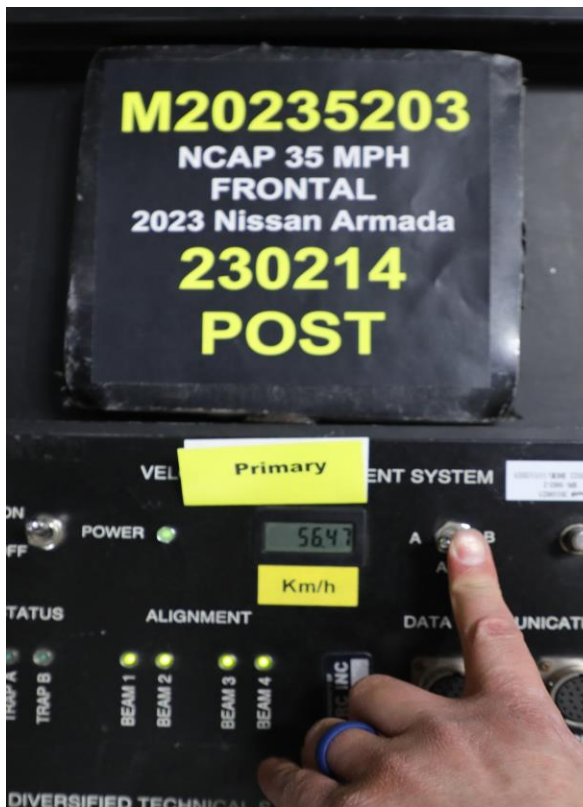
073 Post-Test Passenger Dummy Contact with Headrest



074 Photograph of Ballast Installed in Vehicle



075 Post-Test Stoddard Spillage Location View



076 Post-Test Speed Trap Read out



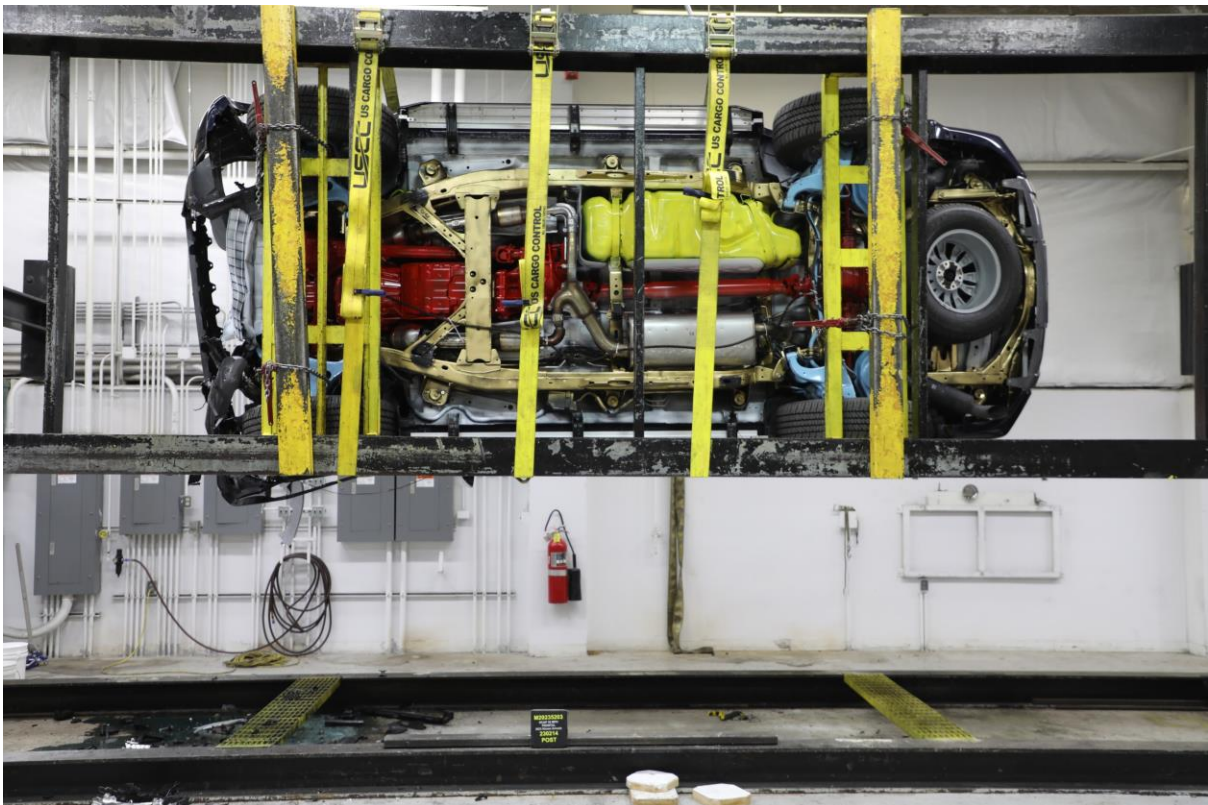
077 Vehicle at 0° on Static Rollover Device



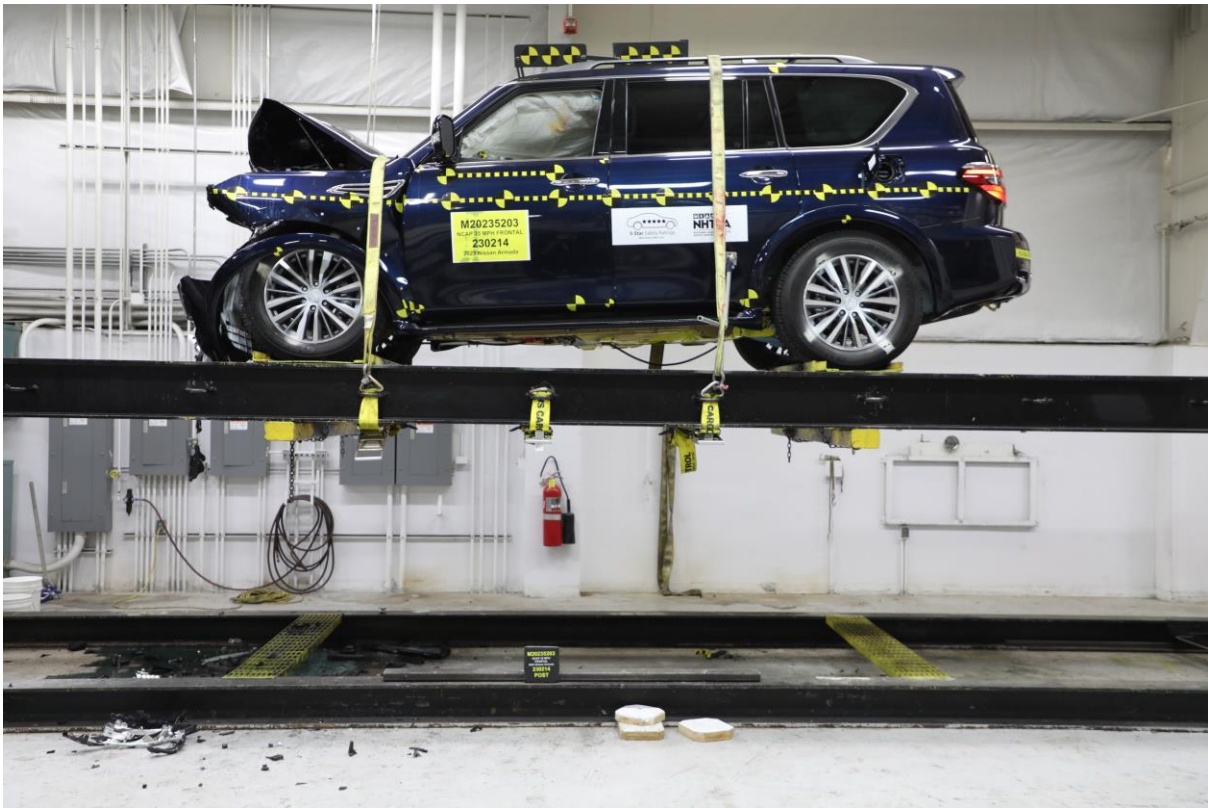
078 Vehicle at 90° on Static Rollover Device



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 2023 Nissan Armada Frontal Impact Event



2023 NISSAN ARMADA

SL
4WD AUTO



Scan QR code for general model information and options

Standard Equipment Included at No Extra Charge

MECHANICAL & PERFORMANCE
5.6-liter Endurance V8 Engine
400 Horsepower & 413 lb-ft Torque
7-speed Automatic Transmission
4WD Selector Switch
2-Speed Transfer Case with 4H & 4L
Class IV Integrated Receiver Hitch**

SAFETY & SECURITY
Nissan Safety Shield 360
High Beam Assist
Automatic Emergency Braking
with Pedestrian Detection
Lane Departure Warning
Blind Spot Warning
Rear Automatic Braking
Rear Cross Traffic Alert
Intelligent Forward Collision Warning
Intelligent Lane Intervention
Intelligent Blind Spot Intervention
Intelligent Around View Monitor

COMFORT & CONVENIENCE
Power Driver Seat
Power Passenger Seats
Driver Memory Functions
Heated Driver and Front Passenger Seats
Heated Leather Wrapped Steering Wheel w/ Memory
Leather Wrapped Shift Knob
Leather-appointed 1st & 2nd Row Seats
4 USB Ports (2) Type-A & (2) Type-C
Three (3) 12-Volt Power Outlets
120-volt AC power outlet
Wireless Charging
Mid Flow Auto Dual Zone A/C &
Rear Indirect Auto A/C w/ Micro Filter
Driver Attention Alert
Intelligent Cruise Control (ICC)
Hill Start Assist
Trailer Brake Controller**
Trailer Sway Control**
Auto-dimming Inside Mirror with
Homelink® Universal Transceiver
Remote Engine Start***
Memory Intelligent Key

AUDIO & INFOTAINMENT

NissanConnect®
12.3" Color Touch-Screen Display
Wireless Apple CarPlay®
Android Auto™
Nissan Door to Door Navigation+
Bluetooth® Hands-free Phone System+
Wi-Fi Hotspot+
SiriusXM® Radio, Traffic, & Travel Link
with Trial Subscription Included+
NissanConnect® Services powered by
SiriusXM® w/ Trial Subscription Included+
7" Color Meter Display
Voice Recognition+
13 Speaker BOSE® Audio System
Alexa Built-In

EXTERIOR

20" Painted Alloy Wheels
LED Headlamps & Fog Lamps
Power Sliding Moonroof
Power Liftgate
Power Folding Heated Outside Mirrors
with LED Turn Signal Indicators

+For more information, see dealer, owner's manual or www.NissanUSA.com/connect/legal

**Towing capability varies by configuration. See Nissan towing guide and owner's manual for additional information.

***Federal/State/Local laws or rules may apply. Review before using.

Manufacturer's Suggested Retail Base Price:	\$61,370.00
Options Included by Manufacturer	
CARPETED FLOOR MATS	360.00
CARGO PACKAGE	230.00
Cargo Area Protector	
Cargo Net	
First Aid Kit	
ILLUMINATED KICK PLATES	300.00
CROSS BARS	380.00

DESTINATION CHARGES 1,695.00

Total* \$84,445.00

Fuel Economy and Environment

Fuel Economy

15 MPG

combined city/hwy

13 city

18 highway

6.7 gallons per 100 miles

STANDARD SUVs range from 14 to 102 MPG. The best vehicle rates 132 MPG.

You spend \$10,250 more in fuel costs over 5 years compared to the average new vehicle.

Annual fuel COST \$3,650

Fuel Economy & Greenhouse Gas Rating

1 **2** **3** **4** **5** **6** **7** **8** **9** **10**

Best

This vehicle emits 194 grams CO₂ per mile. The best emits 0 grams per mile (electric only). Producing and distributing fuel also create emissions. Learn more at 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 28 MPG and costs \$8,000 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$3.05 per gallon. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fuelconomy.gov

Calculate personalized estimates and compare vehicles

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score Not Rated

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

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

Star ratings range from 1 to 5 stars (★★★★★) with 5 being the highest.

Source: National Highway Traffic Safety Administration (NHTSA)

www.safercar.gov or 1-888-327-4236

DELIVERY

VEHICLE COLORS:
EXT: HERMOSA BLUE PE
INT: CHARCOAL

FINAL ASSEMBLY POINT:
TACOMA

TRANSPORT METHOD:
TRUCK

DEALER:
ROSEN NISSAN
5505 S 27TH STREET
MILWAUKEE WI 53221

VIN: JN8AY2SD0P960605
EMS: 50 STATE EMISSIONS
MDL: 20613-69095 BWS-G
OPT: E-12M92N69586C03

20221114224321A55522

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.

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
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
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

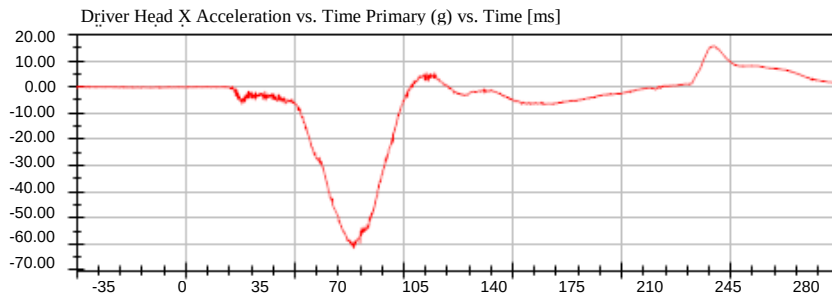
Test Lab: CTF

Test Number: 230214 (M20235203)

Test Date: 02/14/2023

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

Position #2 Hybrid III Small Adult Female (DH1659)



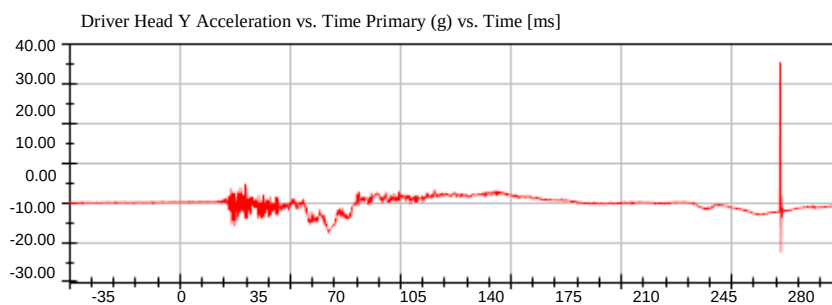
<Max>

15.71 g at 242.24 ms

<Min>

-61.53 g at 76.96 ms

CFC_1000



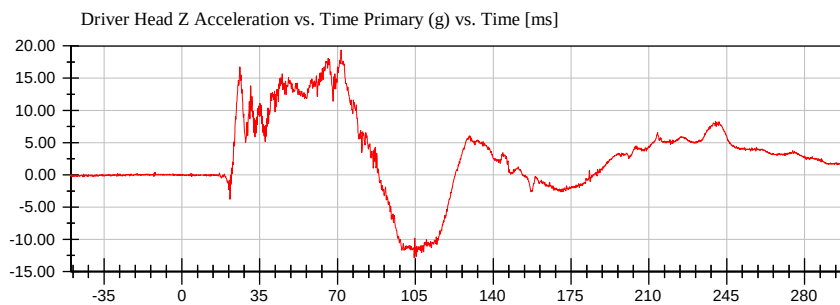
<Max>

35.47 g at 271.92 ms

<Min>

-23.84 g at 69.12 ms

CFC_1000



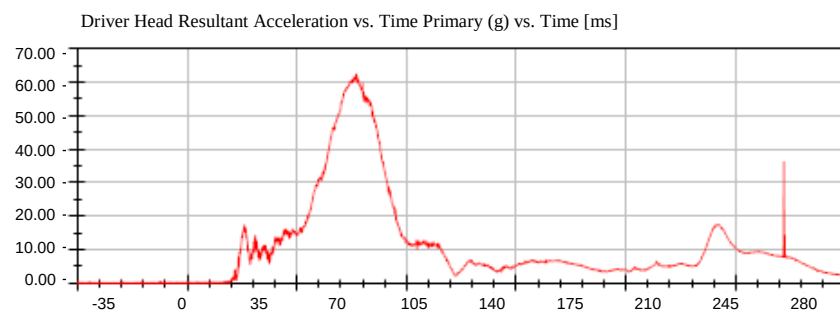
<Max>

19.40 g at 71.60 ms

<Min>

-12.84 g at 104.48 ms

CFC_1000



<Max>

63.90 g at 69.28 ms

<Min>

0.03 g at -32.16 ms

CFC_1000



Plots No. 1 and 2: An anomalous data spike at 69 ms was remove as instructed by the COR. The original data can be found in the R & D section of the NHTSA website at: www.nhtsa.gov .

NHTSA

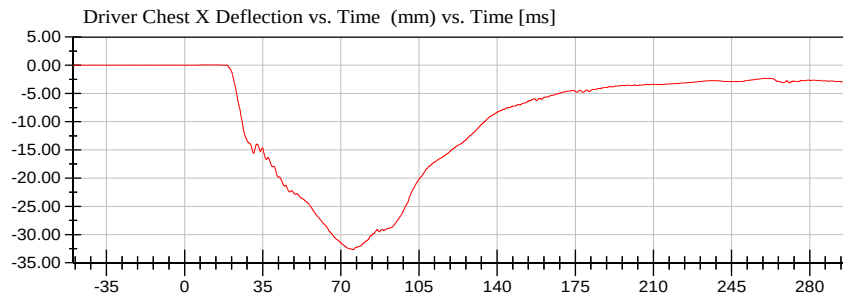
Test Lab: CTF

Test Number: 230214 (M20235203)

Test Date: 02/14/2023

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

Position #2 Hybrid III Small Adult Female (DH1659)



<Max>

0.06 mm at 11.44 ms

<Min>

-32.66 mm at 75.52 ms

CFC_600



NHTSA

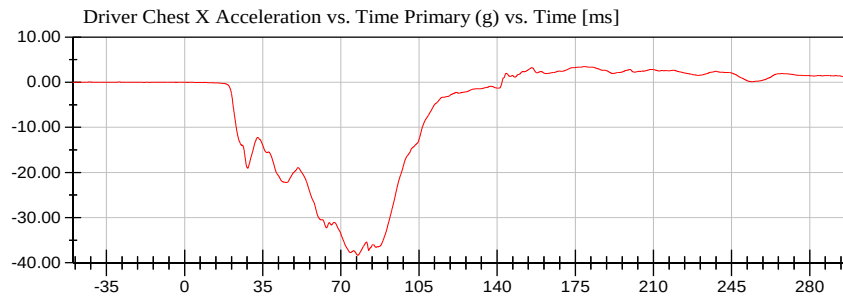
Test Lab: CTF

Test Number: 230214 (M20235203)

Test Date: 02/14/2023

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

Position #2 Hybrid III Small Adult Female (DH1659)



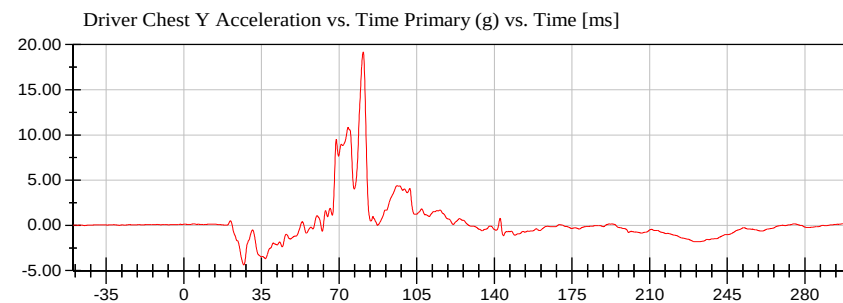
<Max>

3.45 g at 178.96 ms

<Min>

-38.33 g at 77.60 ms

CFC_180



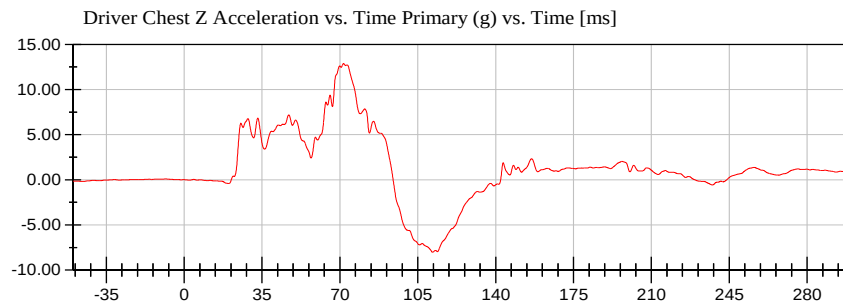
<Max>

19.17 g at 80.88 ms

<Min>

-4.38 g at 27.04 ms

CFC_180



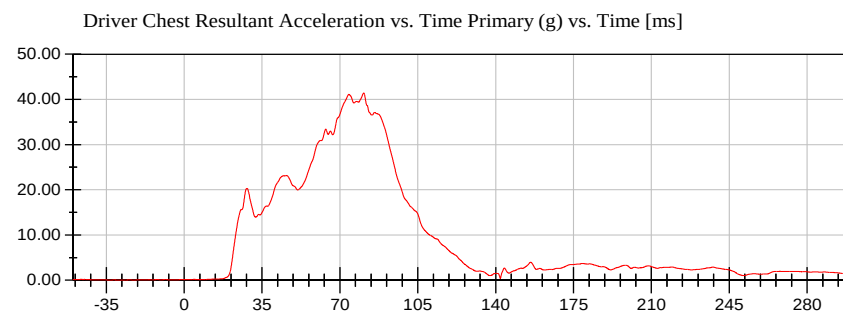
<Max>

12.87 g at 71.60 ms

<Min>

-8.01 g at 111.68 ms

CFC_180



<Max>

41.40 g at 80.72 ms

<Min>

0.03 g at -26.40 ms

CFC_180



NHTSA

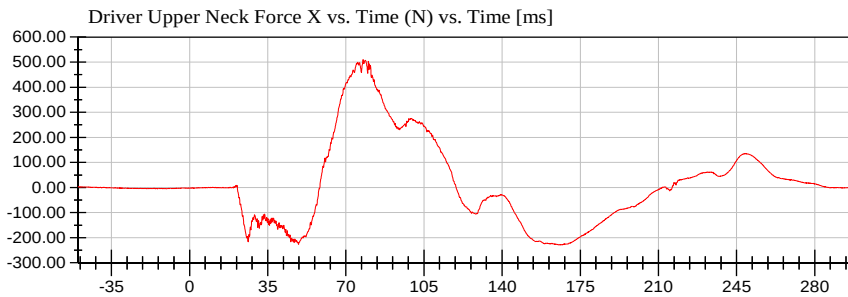
Test Lab: CTF

Test Number: 230214 (M20235203)

Test Date: 02/14/2023

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

Position #2 Hybrid III Small Adult Female (DH1659)



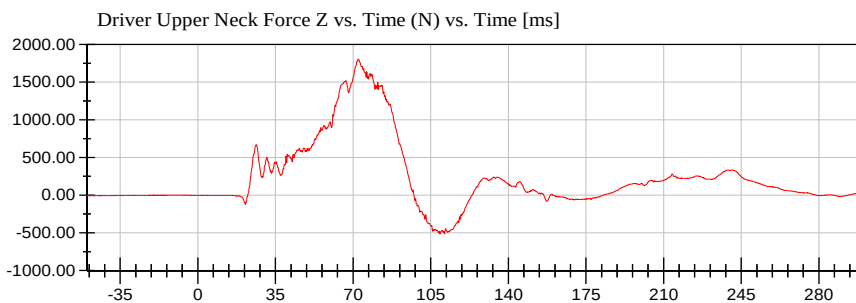
<Max>

510.25 N at 77.76 ms

<Min>

-228.85 N at 166.40 ms

CFC_1000



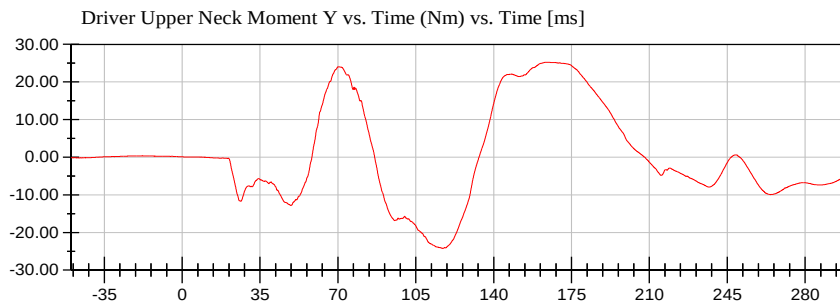
<Max>

1,809.67 N at 72.32 ms

<Min>

-515.65 N at 109.20 ms

CFC_1000



<Max>

25.24 Nm at 164.08 ms

<Min>

-24.21 Nm at 117.20 ms

CFC_600





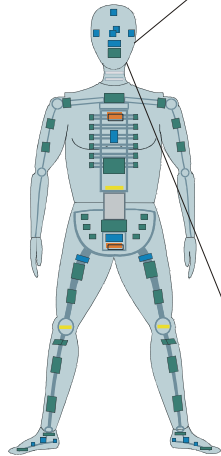
2023 Nissan Armada NCAP 35 mph Frontal Impact Neck Injury Predictor (NIJ)

Date: 02/14/2023
Time: 13:11

Customer: NHTSA

Test Number: M20235203

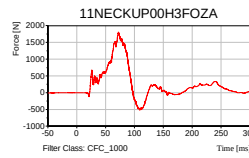
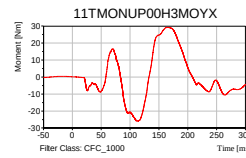
Test Orientation = Frontal
Fzc(Tension) = 6806
Fzc(Compression) = 6160
Myc(Extension) = 135
Myc(Flexion) = 310



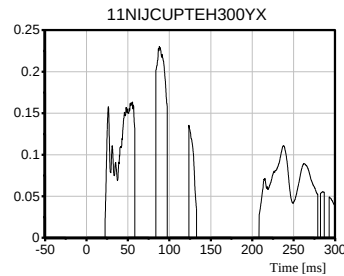
Dummy: HIII 50th Male
Seating Position:

Driver

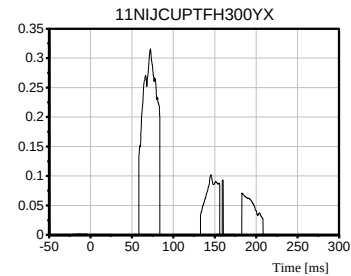
NIJ Source Code: (Fz/Fzc)+(Myc/Myc)



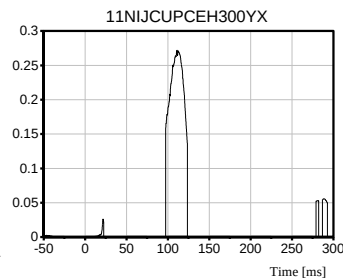
TRC Inc. Test Lab: CTF
Test Number: 230214



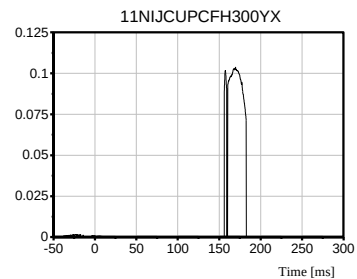
Max [NTE] 0.2303 at 88.00 ms



Max [NTF] 0.3156 at 72.32 ms



Max [NCE] 0.2722 at 111.20 ms



Max [NCF] 0.1037 at 169.60 ms

NHTSA

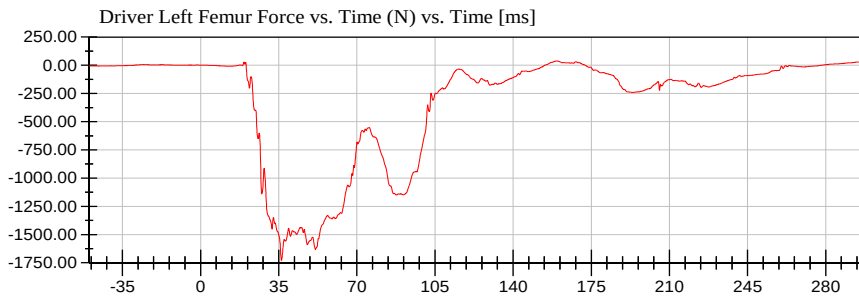
Test Lab: CTF

Test Number: 230214 (M20235203)

Test Date: 02/14/2023

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

Position #2 Hybrid III Small Adult Female (DH1659)



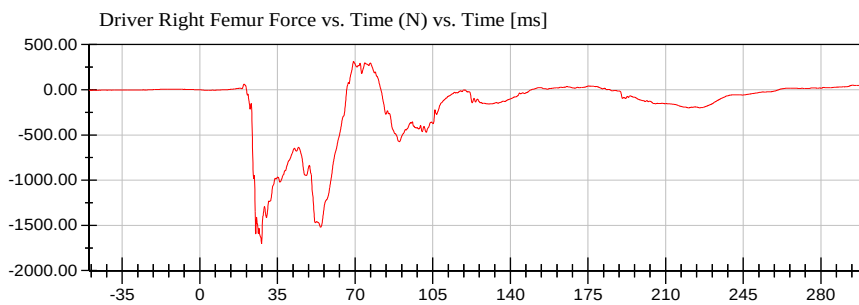
<Max>

36.59 N at 300.00 ms

<Min>

-1,729.15 N at 36.24 ms

CFC_600



<Max>

312.96 N at 69.28 ms

<Min>

-1,700.69 N at 27.84 ms

CFC_600



NHTSA

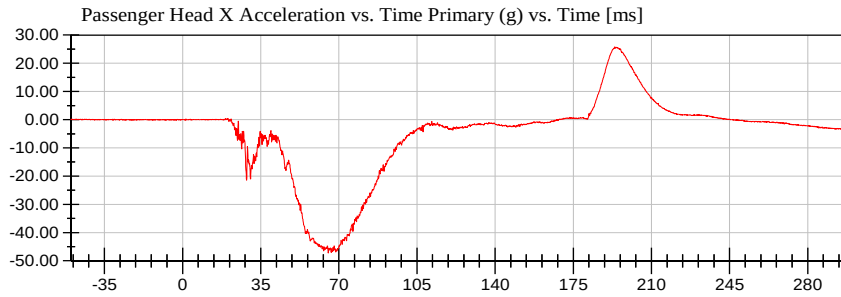
Test Lab: CTF

Test Number: 230214 (M20235203)

Test Date: 02/14/2023

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

Position #2 Hybrid III Small Adult Female (DH1659)



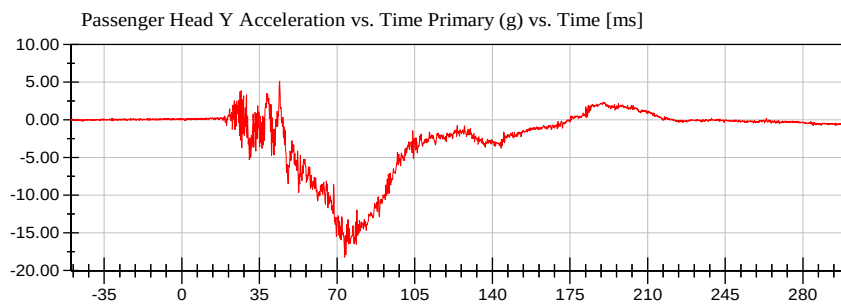
<Max>

25.79 g at 193.52 ms

<Min>

-47.23 g at 65.28 ms

CFC_1000



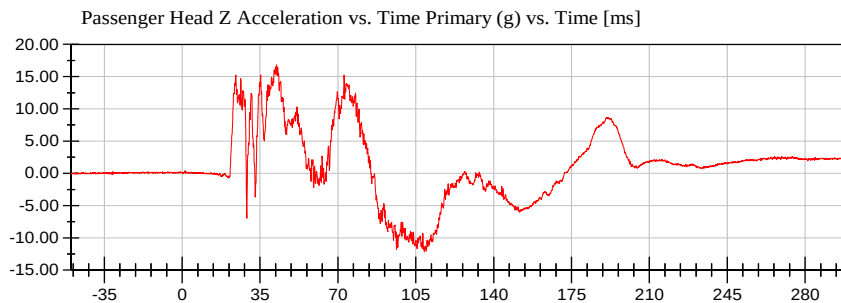
<Max>

5.15 g at 44.08 ms

<Min>

-18.22 g at 73.44 ms

CFC_1000



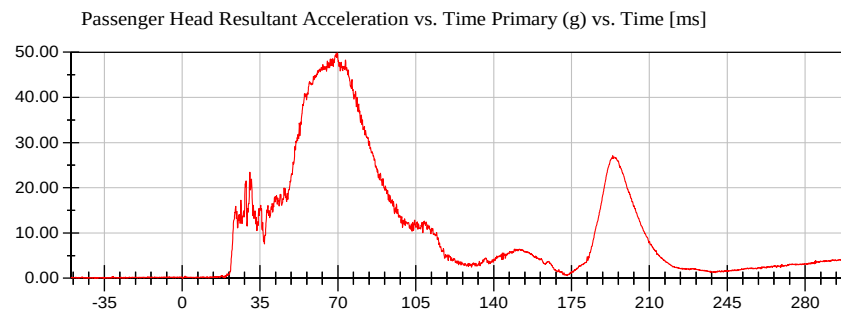
<Max>

16.83 g at 42.40 ms

<Min>

-12.18 g at 108.88 ms

CFC_1000



<Max>

49.86 g at 69.68 ms

<Min>

0.04 g at -46.80 ms

CFC_1000



NHTSA

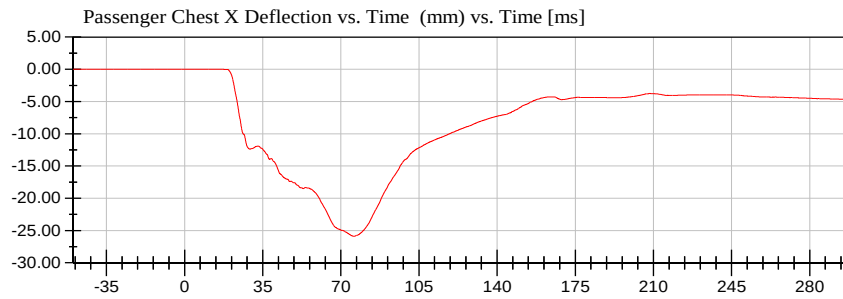
Test Lab: CTF

Test Number: 230214 (M20235203)

Test Date: 02/14/2023

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

Position #2 Hybrid III Small Adult Female (DH1659)



<Max>

0.01 mm at 3.04 ms

<Min>

-25.89 mm at 75.92 ms

CFC_600



NHTSA

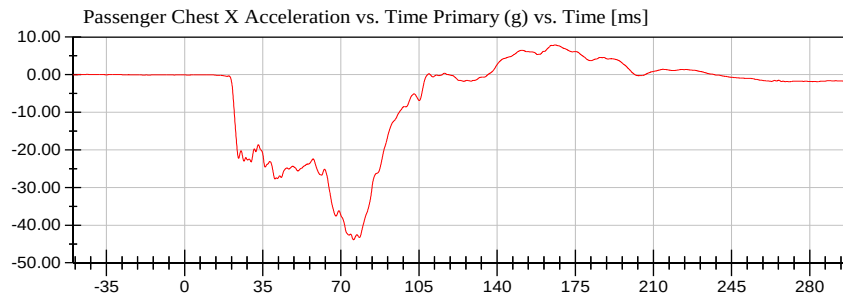
Test Lab: CTF

Test Number: 230214 (M20235203)

Test Date: 02/14/2023

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

Position #2 Hybrid III Small Adult Female (DH1659)



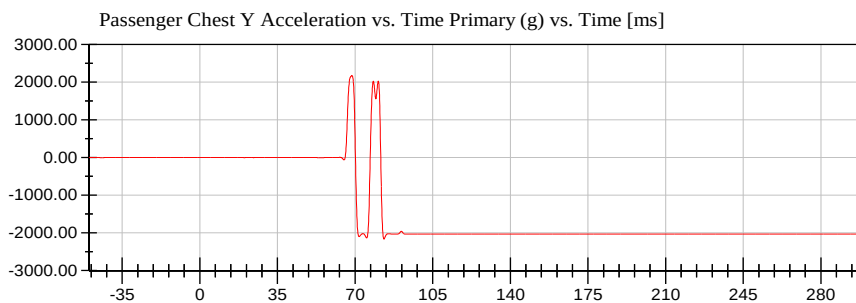
<Max>

7.87 g at 166.00 ms

<Min>

-43.86 g at 75.68 ms

CFC_180



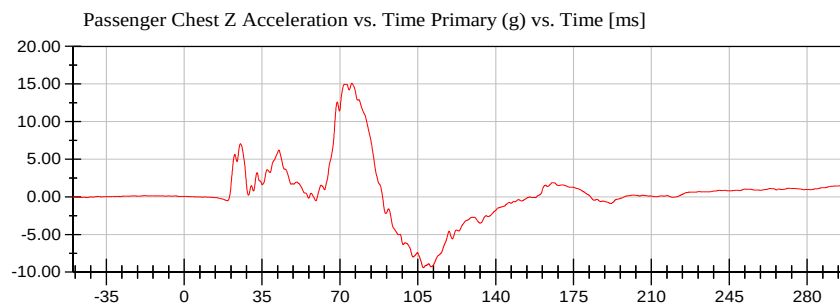
<Max>

2,178.44 g at 68.56 ms

<Min>

-2,162.59 g at 83.04 ms

CFC_180



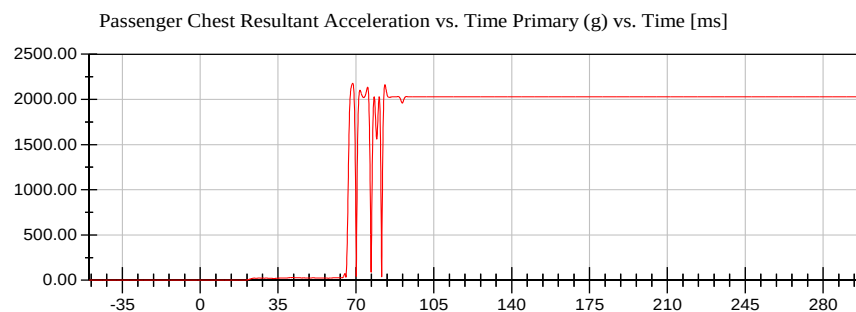
<Max>

15.10 g at 75.36 ms

<Min>

-9.42 g at 107.52 ms

CFC_180



<Max>

2,178.79 g at 68.56 ms

<Min>

0.04 g at -48.48 ms

CFC_180



NHTSA

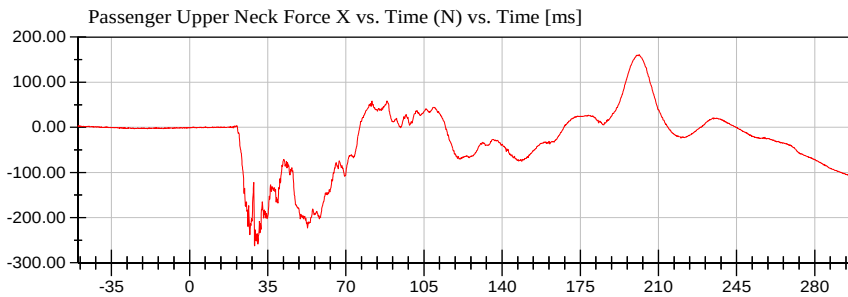
Test Lab: CTF

Test Number: 230214 (M20235203)

Test Date: 02/14/2023

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

Position #2 Hybrid III Small Adult Female (DH1659)



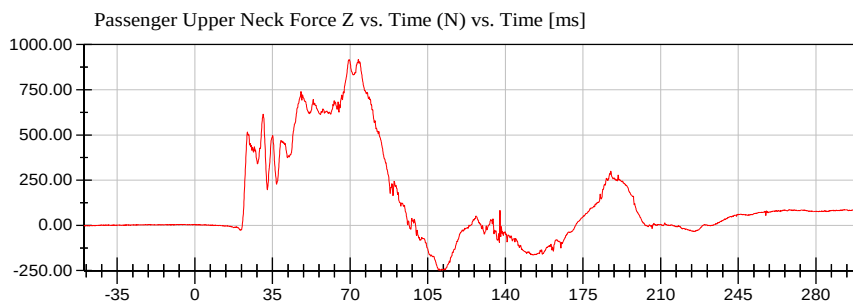
<Max>

160.63 N at 201.44 ms

<Min>

-262.36 N at 29.20 ms

CFC_1000



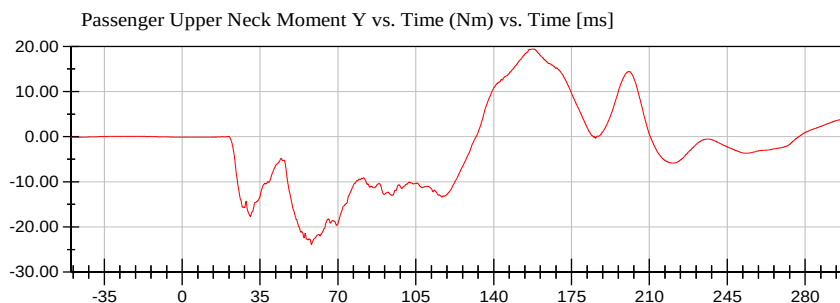
<Max>

916.95 N at 73.68 ms

<Min>

-248.48 N at 110.56 ms

CFC_1000



<Max>

19.42 Nm at 157.12 ms

<Min>

-23.89 Nm at 58.16 ms

CFC_600





2023 Nissan Armada NCAP 35 mph Frontal Impact Neck Injury Predictor (NIJ)

Date: 02/14/2023
Time: 13:11

Customer: NHTSA

Test Number: M20235203

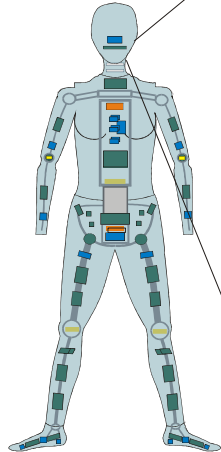
Test Orientation = Frontal

Fzc(Tension) = 4287

Fzc(Compression) = 3880

Myc(Extension) = 67

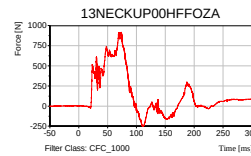
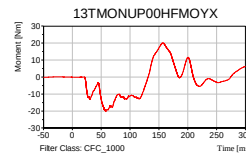
Myc(Flexion) = 155



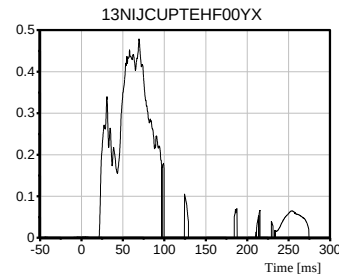
Dummy: HIII 5th Female
Seating Position:

Right Front Passenger

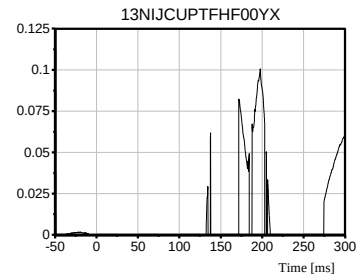
NIJ Source Code: (Fz/Fzc)+(Myc/Myc)



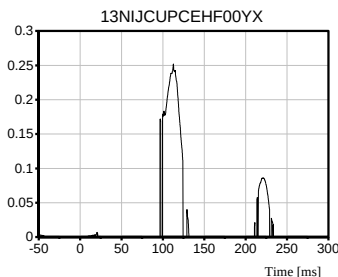
TRC Inc. Test Lab: CTF
Test Number: 230214



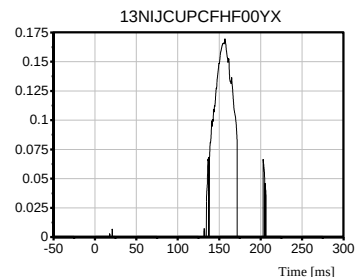
Max [NTE] 0.4784 at 69.44 ms



Max [NTF] 0.1005 at 197.60 ms



Max [NCE] 0.2518 at 112.80 ms



Max [NCF] 0.1696 at 156.88 ms

NHTSA

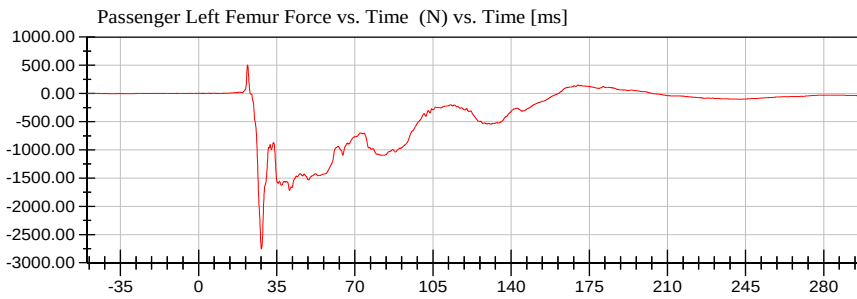
Test Lab: CTF

Test Number: 230214 (M20235203)

Test Date: 02/14/2023

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

Position #2 Hybrid III Small Adult Female (DH1659)



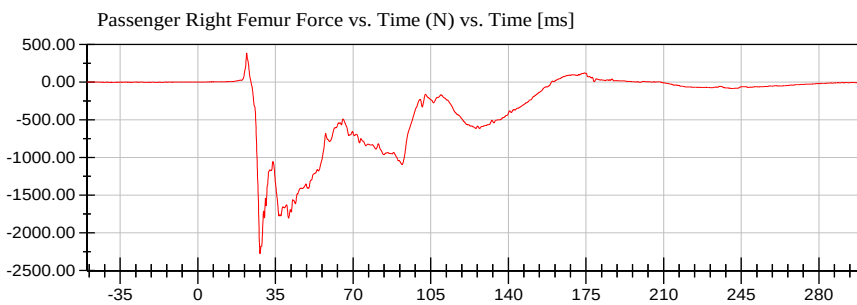
<Max>

507.37 N at 22.00 ms

<Min>

-2,754.21 N at 28.08 ms

CFC_600



<Max>

387.41 N at 22.00 ms

<Min>

-2,274.53 N at 28.00 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. 81

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_H3F81

Page 25 of 27

Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 037 Certification No. 81-1

Test Date: 1/20/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	31 %	Yes
Peak Head Resultant Acceleration	225 - 275 g	254.2 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	5.2 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	1.66 %	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

01.20.2023 13:51:08 611

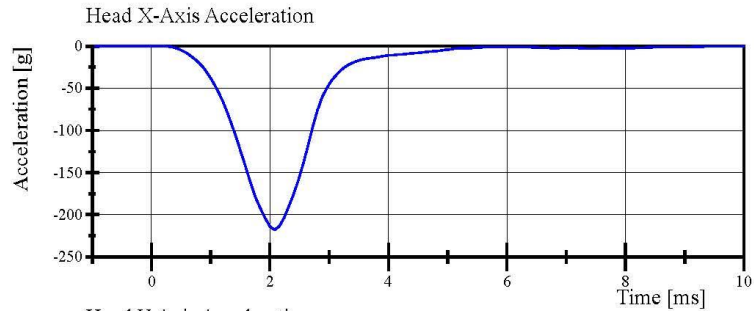


Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 037 Certification No. 81-1

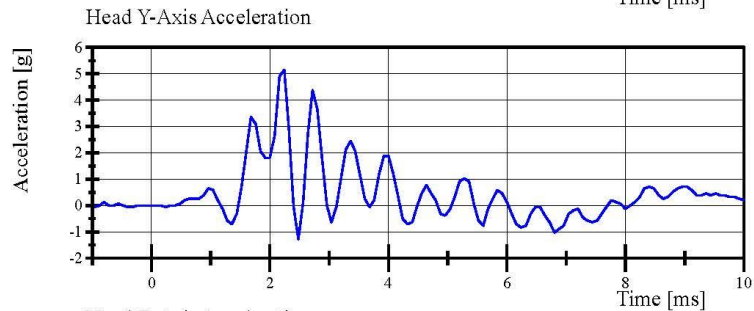
Test Date: 1/20/2023



Filter Class: CFC_1000

Max: 0.0 g at -0.9 ms

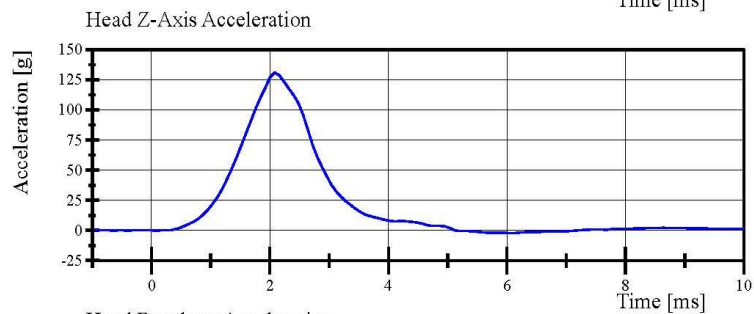
Min: -217.8 g at 2.1 ms



Filter Class: CFC_1000

Max: 5.2 g at 2.2 ms

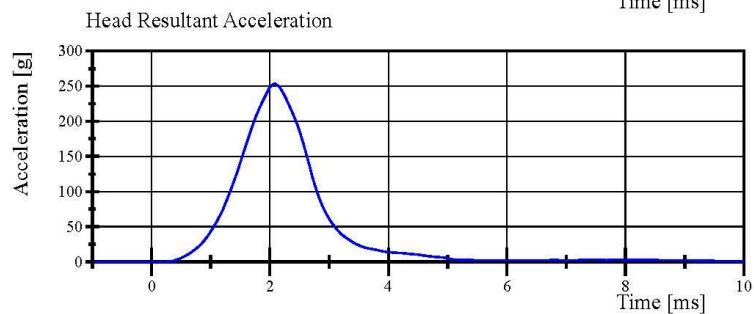
Min: -1.3 g at 2.5 ms



Filter Class: CFC_1000

Max: 131.1 g at 2.1 ms

Min: -2.2 g at 6.1 ms



Filter Class: CFC_1000

Max: 254.2 g at 2.1 ms

Min: 0.0 g at -0.7 ms

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

01.20.2023 13:53:05 611



Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 037 Certification No. 81-1

Test Date: 1/20/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	30 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	6.897 m/s	Yes
Pendulum Acceleration Decay Crossing -5g	34 - 42 ms	35.7 ms	Yes
Pendulum Acceleration at 10ms	(-22.5) - (-27.5) g	-25.82 g	Yes
Pendulum Acceleration at 20ms	(-17.6) - (-22.6) g	-19.81 g	Yes
Pendulum Acceleration at 30ms	(-12.5) - (-18.5) g	-15.63 g	Yes
Pendulum Acceleration > 30ms	>= (-29.0) g	-15.63 g	Yes
Total Head D-Plane Rotation			
Peak	(-64) - (-78) °	-69.8 °	Yes
Time of Peak	57 - 64 ms	59.1 ms	Yes
Total Head D-Plane Rotation			
Decay to 0°	113 - 128 ms	117.1 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	88.1 - 108.4 N·m	96.58 N·m	Yes
Time of Peak	47 - 58 ms	50.4 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

01.20.2023 14:09:44 1875

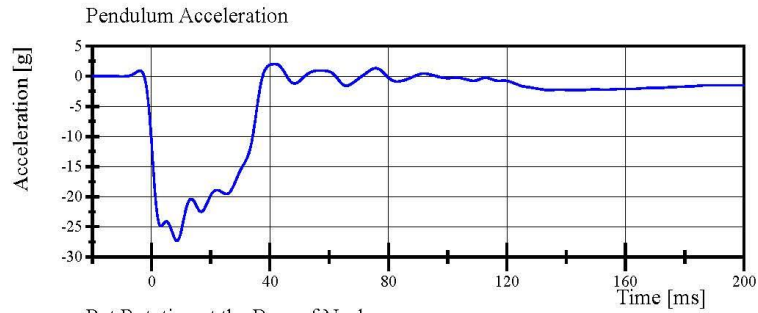


Transportation Research Center Inc.

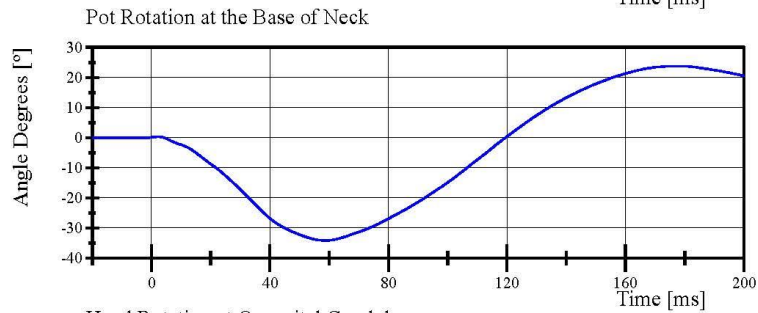
Neck Flexion

HIII 50th Serial No. 037 Certification No. 81-1

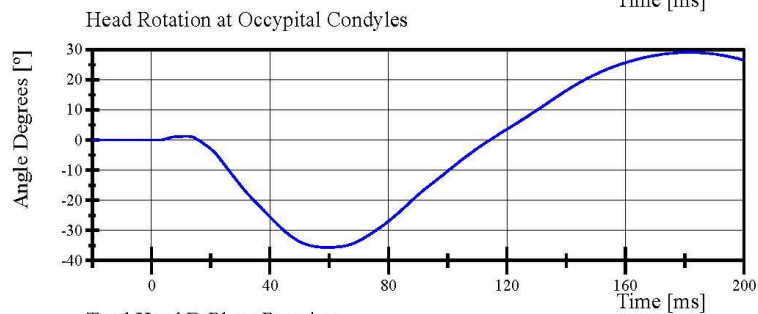
Test Date: 1/20/2023



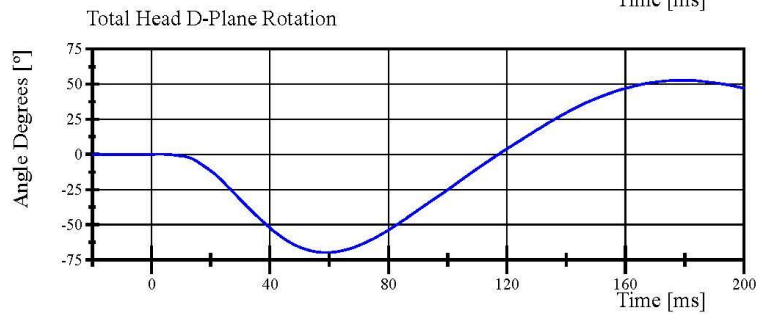
Filter Class: CFC_60
Max: 2.0 g at 41.6 ms
Min: -27.3 g at 8.6 ms



Filter Class: CFC_60
Max: 23.8 ° at 177.5 ms
Min: -34.1 ° at 58.8 ms



Filter Class: CFC_60
Max: 29.1 ° at 181.6 ms
Min: -35.7 ° at 59.5 ms



Filter Class: CFC_60
Max: 52.8 ° at 179.7 ms
Min: -69.8 ° at 59.1 ms

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

01.20.2023 14:10:10 1875

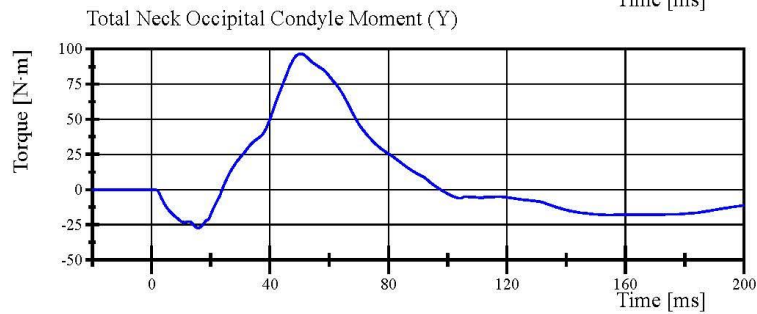
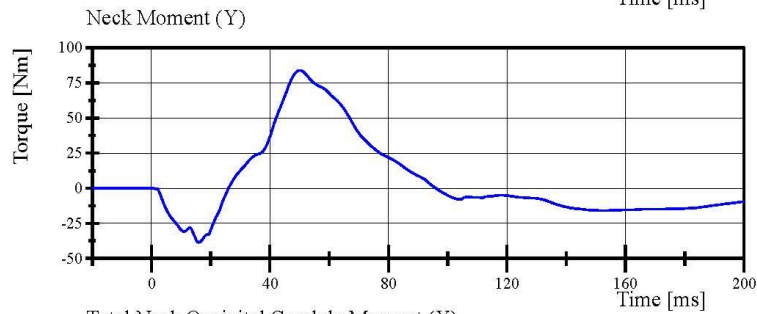
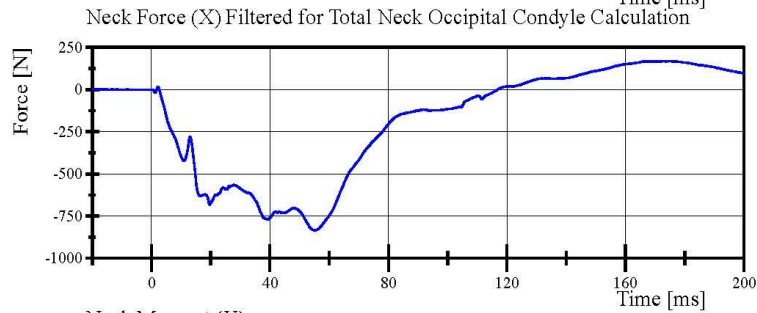
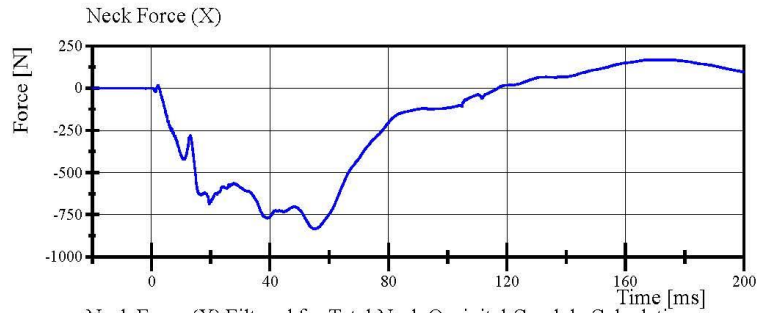


Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 037 Certification No. 81-1

Test Date: 1/20/2023



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

01.20.2023 14:10:10 1875



Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 037 Certification No. 81-1

Test Date: 1/20/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	32 %	Yes
Pendulum Velocity	(-5.95) - (-6.18) m/s	-5.951 m/s	Yes
Pendulum Acceleration Decay Crossing 5g	38 - 46 ms	39.3 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	19.41 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	17.30 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	13.79 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	13.95 g	Yes
Total Head D-Plane Rotation			
Peak	81 - 106 °	97.0 °	Yes
Time of Peak	72 - 82 ms	78.5 ms	Yes
Total Head D-Plane Rotation Decay to 0°	147 - 174 ms	161.1 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	(-52.9) - (-80) N·m	-66.06 N·m	Yes
Time of Peak	65 - 79 ms	72.4 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	120 - 148 ms	144.9 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

01.20.2023 14:41:08 2020

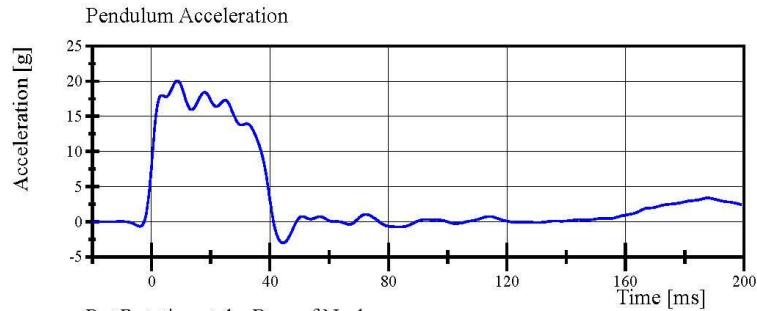


Transportation Research Center Inc.

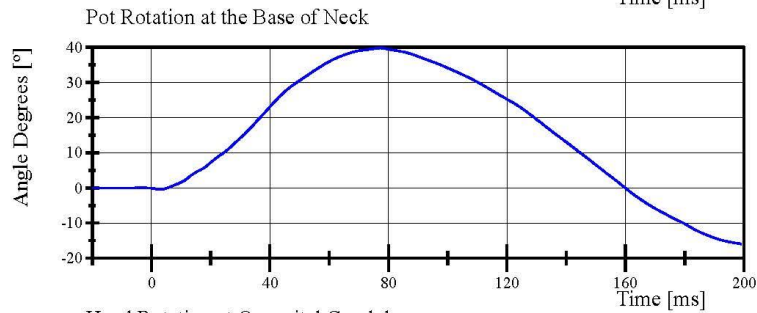
Neck Extension

HIII 50th Serial No. 037 Certification No. 81-1

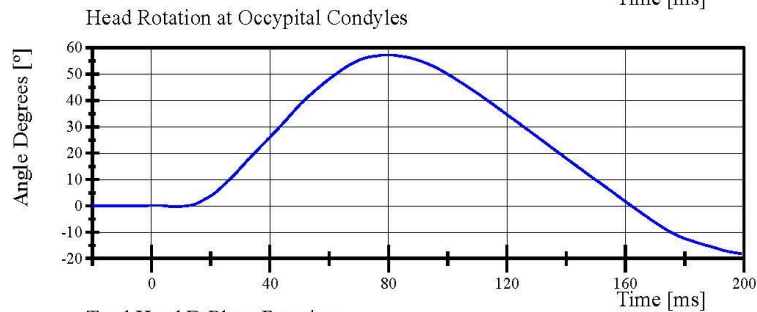
Test Date: 1/20/2023



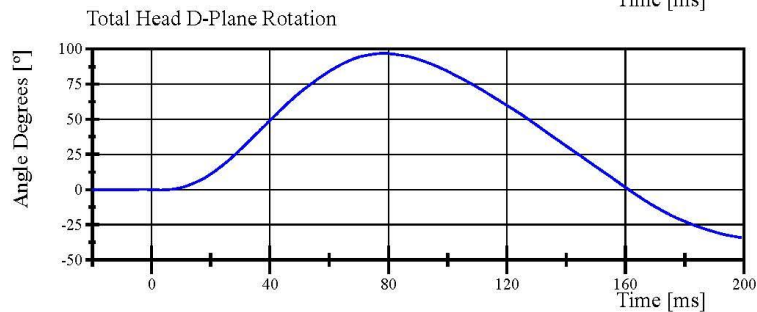
Filter Class: CFC_60
Max: 20.1 g at 8.8 ms
Min: -3.0 g at 44.4 ms



Filter Class: CFC_60
Max: 39.8 ° at 77.2 ms
Min: -15.9 ° at 199.0 ms



Filter Class: CFC_60
Max: 57.3 ° at 79.9 ms
Min: -18.2 ° at 199.0 ms



Filter Class: CFC_60
Max: 97.0 ° at 78.5 ms
Min: -34.1 ° at 199.0 ms

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

01.20.2023 14:41:29 2020

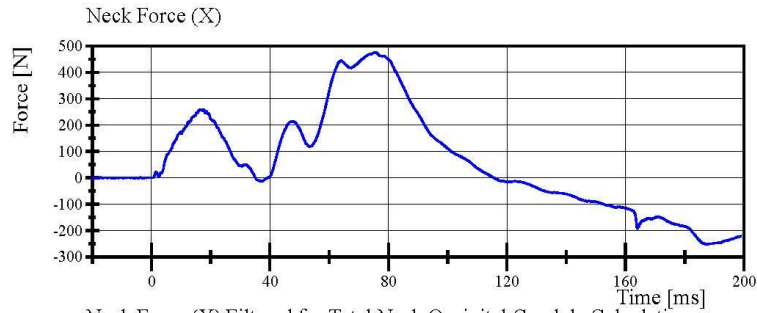


Transportation Research Center Inc.

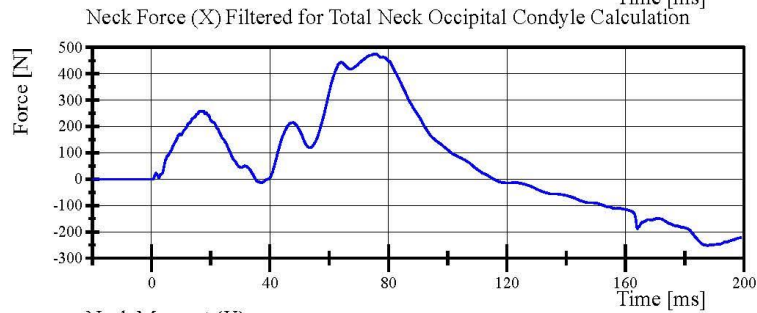
Neck Extension

HIII 50th Serial No. 037 Certification No. 81-1

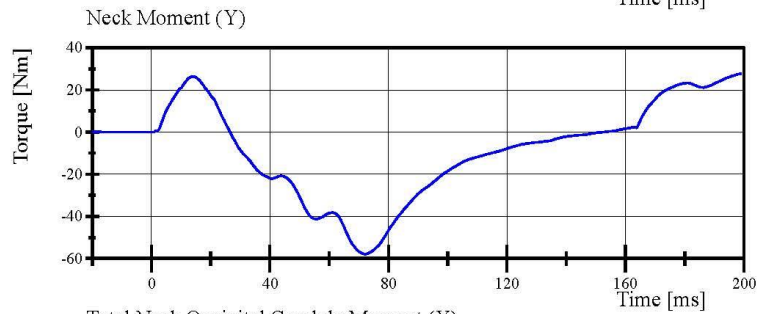
Test Date: 1/20/2023



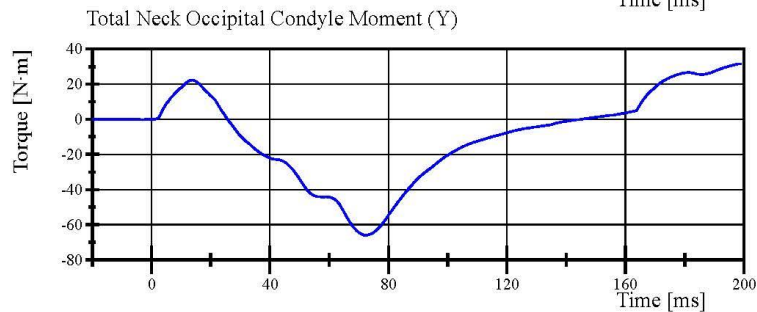
Filter Class: CFC_1000
Max: 475.9 N at 75.8 ms
Min: -251.6 N at 187.8 ms



Filter Class: CFC_600
Max: 475.1 N at 75.8 ms
Min: -251.4 N at 187.8 ms



Filter Class: CFC_600
Max: 27.7 Nm at 199.0 ms
Min: -57.9 Nm at 72.2 ms



Filter Class: Without_(Constar
Max: 31.6 N·m at 199.0 ms
Min: -66.1 N·m at 72.4 ms

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

01.20.2023 14:41:29 2020



Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 037 Certification No. 81-2

Test Date: 1/20/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	29 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.617 m/s	Yes
Probe Force Peak	(-5,160) - (-5,894) N	-5,515.3 N	Yes
Maximum Chest Compression	(-63.5) - (-72.6) mm	-65.62 mm	Yes
Internal Hysteresis	69 - 85 %	71.5 %	Yes

Test meets specifications.

Condition: Used

Comments:

Jacket S/N: ER6442

Rib Set S/N: 02033121A

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

01.20.2023 11:43:22 447

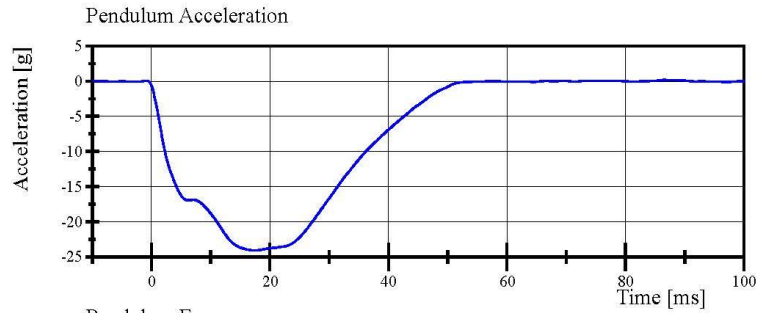


Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 037 Certification No. 81-2

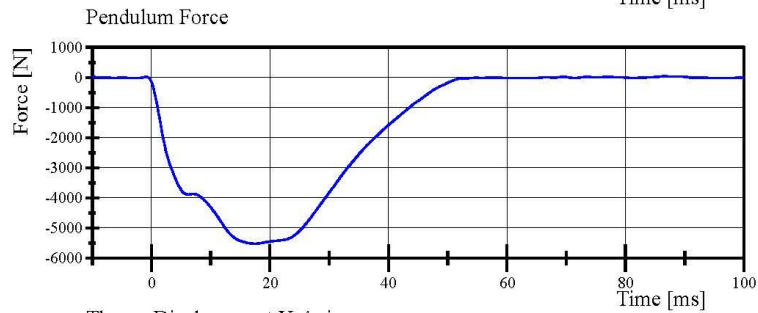
Test Date: 1/20/2023



Filter Class: CFC_180

Max: 0.2 g at 86.6 ms

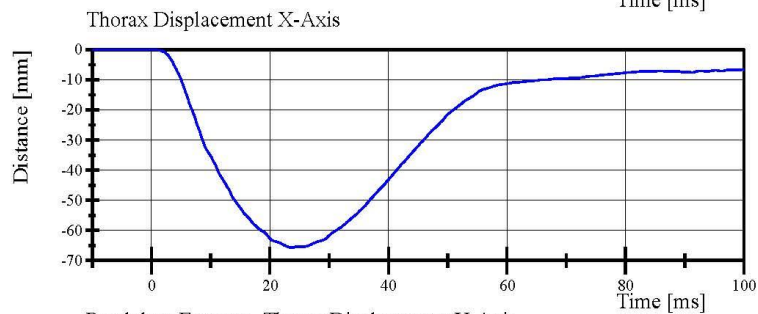
Min: -24.1 g at 17.4 ms



Filter Class: CFC_180

Max: 37.9 N at 86.6 ms

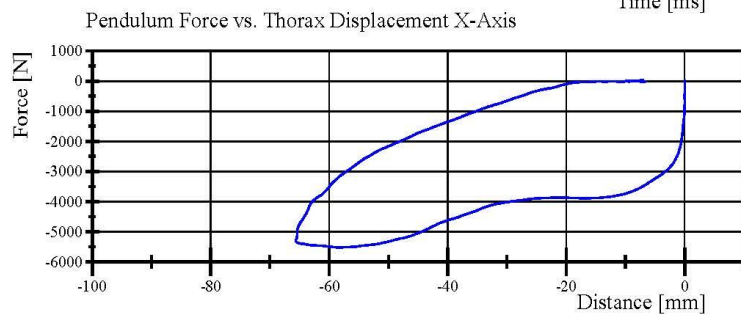
Min: -5,515.3 N at 17.4 ms



Filter Class: CFC_600

Max: 0.0 mm at -7.4 ms

Min: -65.6 mm at 23.7 ms



Filter Class: CFC_180

Max: 37.9 N at -7.1 mm

Min: -5,515.3 N at -58.2 mm

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

01.20.2023 11:44:02 447



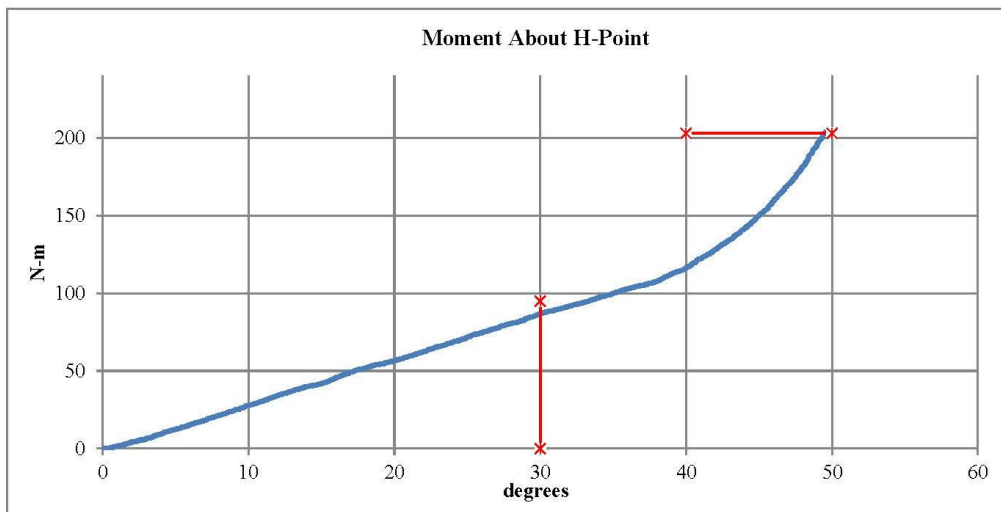
Transportation Research Center Inc.

Hybrid III 50th Male Hip Range of Motion

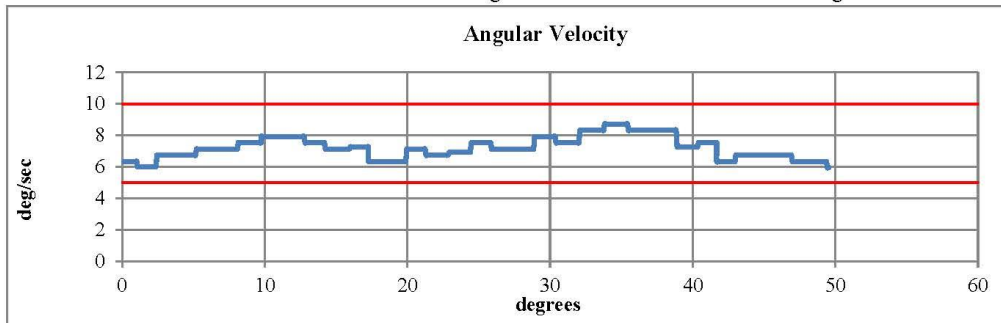


Serial Number: 037 Date: 20-Jan-2023
Side Tested: Left Hip Time: 13:28
Test Number: 1

TEST PARAMETER	SPECIFICATION		TEST RESULTS		
Temperature	18.9	- 25.6	21.1	°C	Pass
Humidity	10	- 70	30	%	Pass
Moment at 30°	0	≤ 94.9	86.95	N-m	Pass
Angle at 203 Nm	40	- 50	49.53	deg	Pass
Average Velocity	5	- 10	7.18	deg/sec	Pass



Max: 8.72 deg/sec Min: 5.95 deg/sec



Comments: Pelvis S/N: EU6859

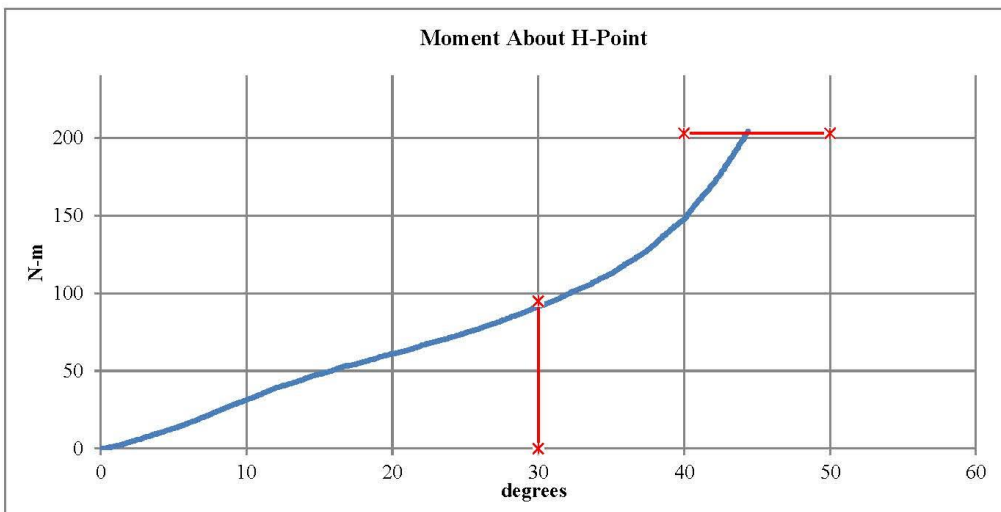
Transportation Research Center Inc.

Hybrid III 50th Male Hip Range of Motion

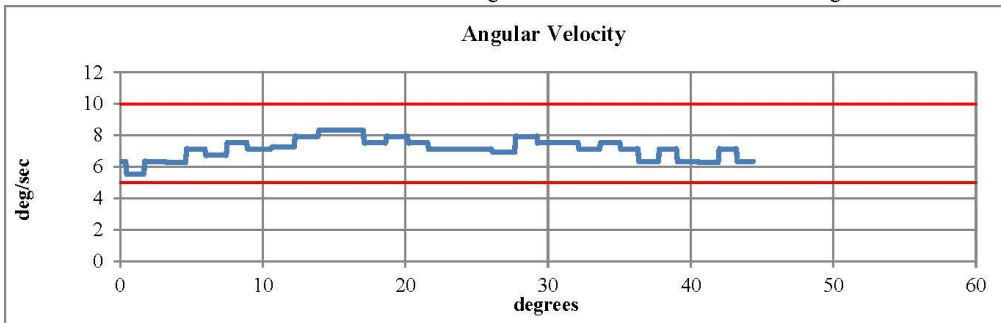


Serial Number: 037 Date: 20-Jan-2023
Side Tested: Right Hip Time: 14:11
Test Number: 1

TEST PARAMETER	SPECIFICATION		TEST RESULTS		
Temperature	18.9	- 25.6	20.8	°C	Pass
Humidity	10	- 70	31	%	Pass
Moment at 30°	0	≤ 94.9	91.5	N-m	Pass
Angle at 203 Nm	40	- 50	44.38	deg	Pass
Average Velocity	5	- 10	7.13	deg/sec	Pass



Max: 8.32 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. 81-1
Test Date: 1/20/2023

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	31 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.095 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,752.05 N	Yes

Test meets specifications.

Condition: Used

Comments:

Knee Skin S/N: 2672

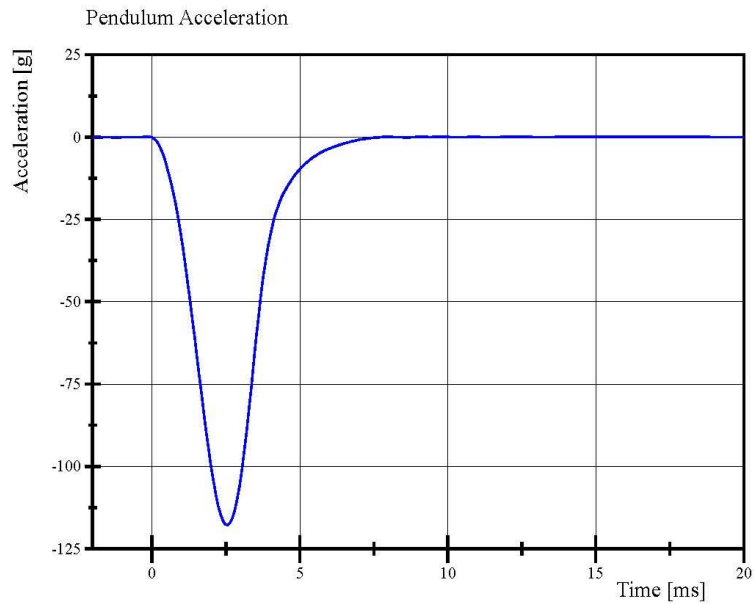
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

01.20.2023 10:46:11 1805

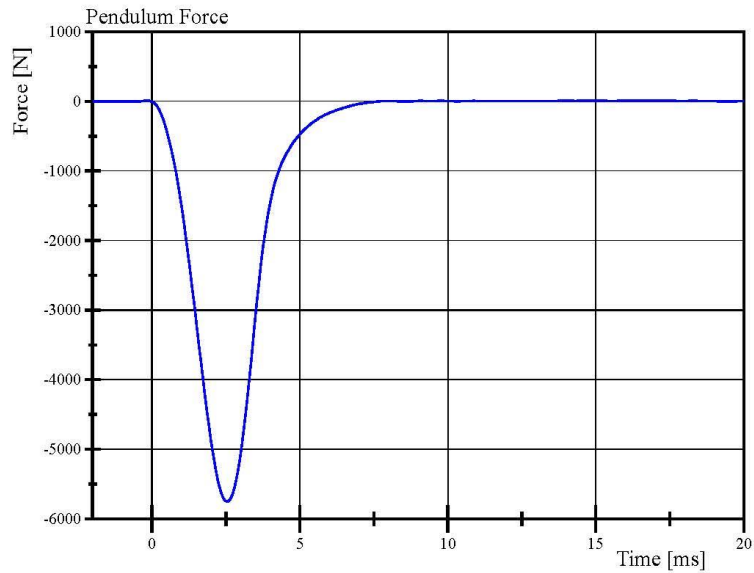


Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 81-1
Test Date: 1/20/2023



Filter Class: CFC_600
Max: 0.2 g at 15.0 ms
Min: -117.8 g at 2.6 ms



Filter Class: CFC_600
Max: 8.8 N at 15.0 ms
Min: -5,752.1 N at 2.6 ms

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

01.20.2023 10:46:45 1805



Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 81-1
Test Date: 1/20/2023

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	32 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.099 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,515.55 N	Yes

Test meets specifications.

Condition: Used

Comments:

Knee Skin S/N: 1248

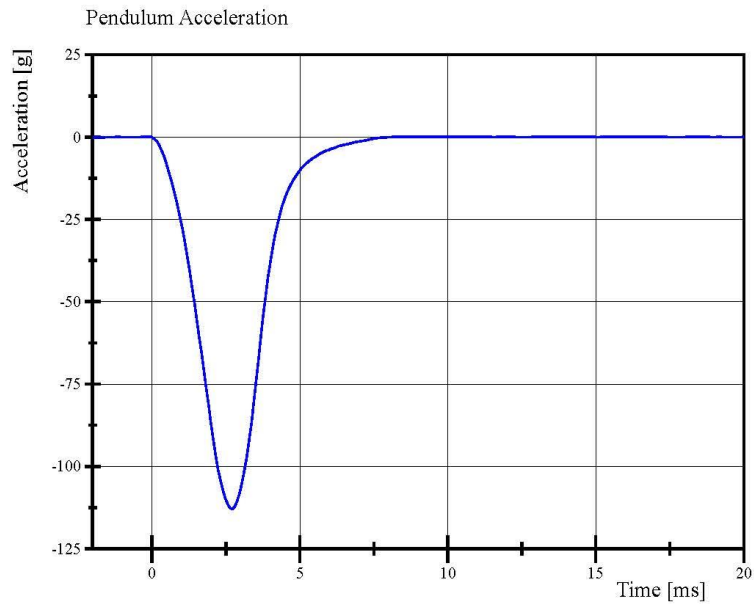
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

01.20.2023 10:49:29 1796

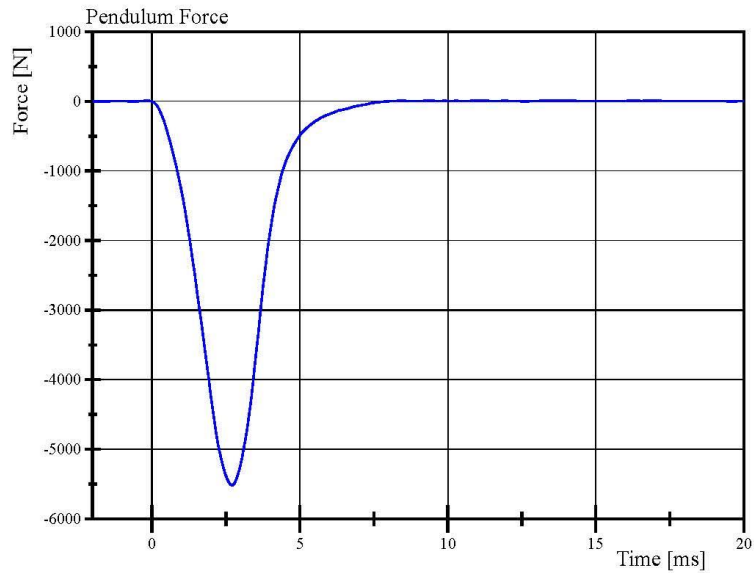


Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 81-1
Test Date: 1/20/2023



Filter Class: CFC_600
Max: 0.2 g at -0.2 ms
Min: -112.9 g at 2.7 ms



Filter Class: CFC_600
Max: 8.4 N at -0.2 ms
Min: -5,515.5 N at 2.7 ms

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

01.20.2023 10:49:55 1796



Post-Test Calibration Sheets

Driver S/N 037

Transportation Research Center Inc.
572E HIII 50th Male Dummy
External Dimensions
Serial No. 037
Calibration No. 82

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_H3F82

Page 25 of 27

Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 037 Certification No. 82-1

Test Date: 2/14/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Peak Head Resultant Acceleration	225 - 275 g	227.5 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	13.2 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	3.47 %	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

02.14.2023 15:42:02 613

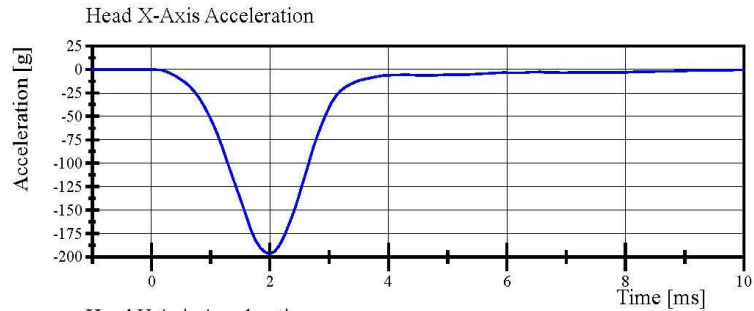


Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 037 Certification No. 82-1

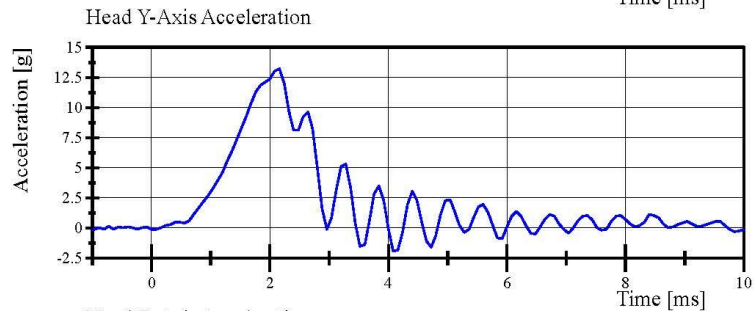
Test Date: 2/14/2023



Filter Class: CFC_1000

Max: 0.1 g at -0.4 ms

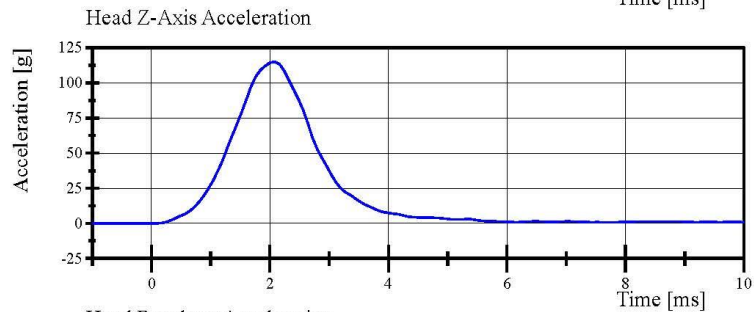
Min: -196.4 g at 2.0 ms



Filter Class: CFC_1000

Max: 13.2 g at 2.2 ms

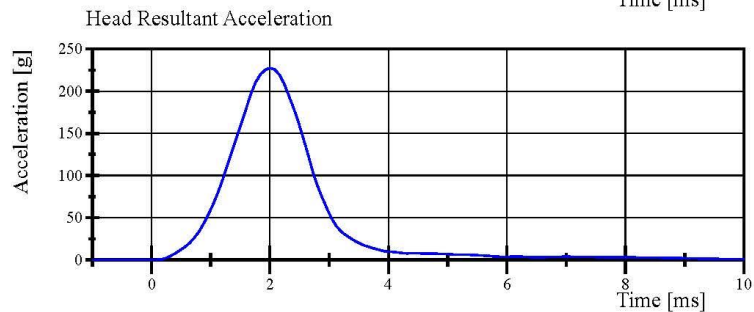
Min: -1.9 g at 4.1 ms



Filter Class: CFC_1000

Max: 115.0 g at 2.1 ms

Min: -0.1 g at -0.5 ms



Filter Class: CFC_1000

Max: 227.5 g at 2.0 ms

Min: 0.0 g at -0.2 ms

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

02.14.2023 15:42:40 613



Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 037 Certification No. 82-1

Test Date: 2/14/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	6.900 m/s	Yes
Pendulum Acceleration Decay Crossing -5g	34 - 42 ms	38.0 ms	Yes
Pendulum Acceleration at 10ms	(-22.5) - (-27.5) g	-24.73 g	Yes
Pendulum Acceleration at 20ms	(-17.6) - (-22.6) g	-18.94 g	Yes
Pendulum Acceleration at 30ms	(-12.5) - (-18.5) g	-14.56 g	Yes
Pendulum Acceleration > 30ms	>= (-29.0) g	-14.56 g	Yes
Total Head D-Plane Rotation			
Peak	(-64) - (-78) °	-71.8 °	Yes
Time of Peak	57 - 64 ms	59.4 ms	Yes
Total Head D-Plane Rotation Decay to 0°	113 - 128 ms	120.5 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	88.1 - 108.4 N·m	97.51 N·m	Yes
Time of Peak	47 - 58 ms	52.0 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	97 - 107 ms	97.9 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

02.14.2023 16:12:12 1872

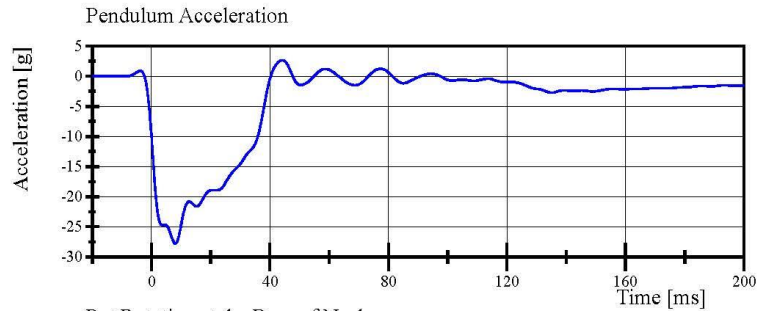


Transportation Research Center Inc.

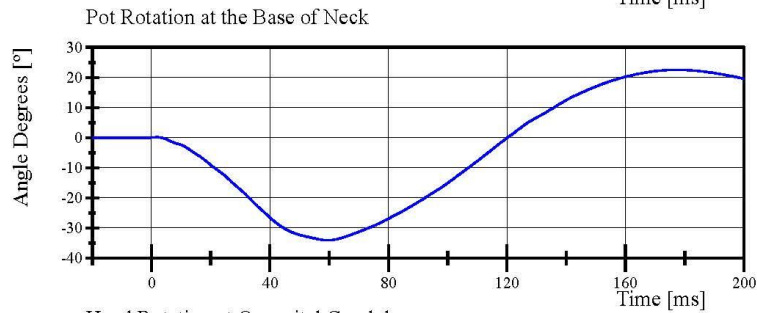
Neck Flexion

HIII 50th Serial No. 037 Certification No. 82-1

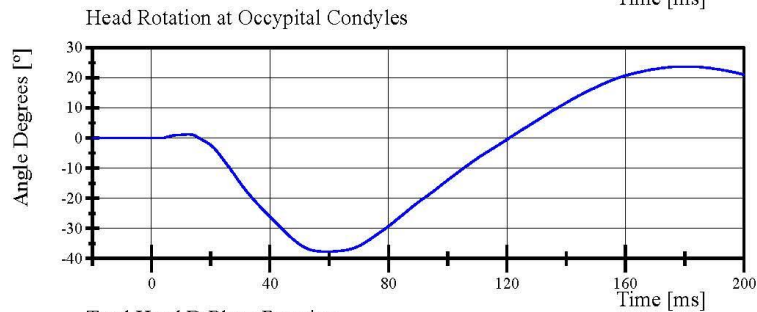
Test Date: 2/14/2023



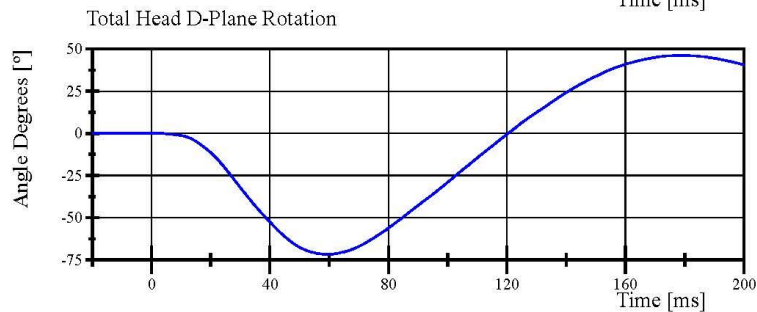
Filter Class: CFC_60
Max: 2.6 g at 44.2 ms
Min: -27.8 g at 8.1 ms



Filter Class: CFC_60
Max: 22.5 ° at 177.6 ms
Min: -34.0 ° at 59.5 ms



Filter Class: CFC_60
Max: 23.7 ° at 180.2 ms
Min: -37.7 ° at 59.2 ms



Filter Class: CFC_60
Max: 46.3 ° at 178.8 ms
Min: -71.8 ° at 59.4 ms

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

02.14.2023 16:12:39 1872

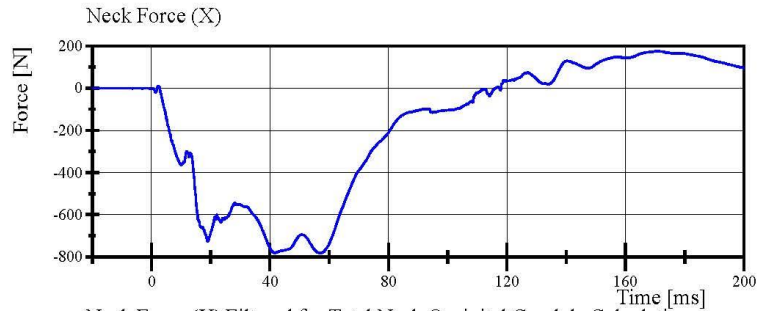


Transportation Research Center Inc.

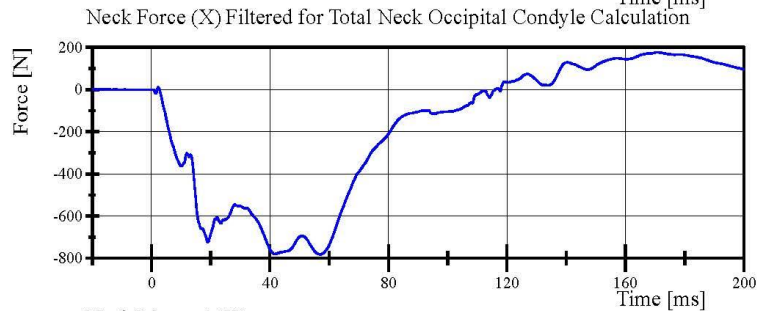
Neck Flexion

HIII 50th Serial No. 037 Certification No. 82-1

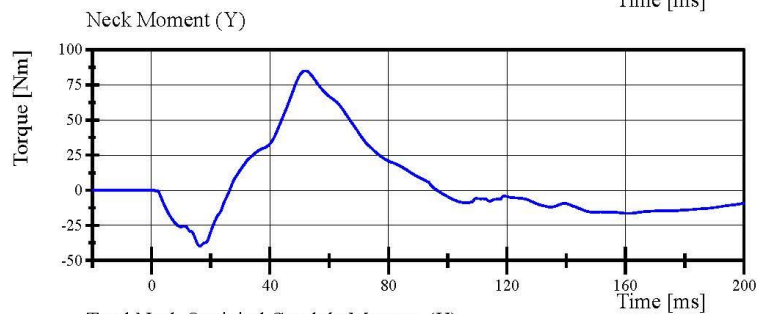
Test Date: 2/14/2023



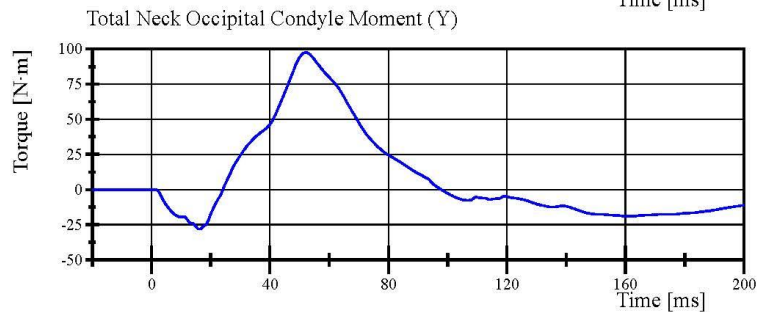
Filter Class: CFC_1000
Max: 176.1 N at 170.3 ms
Min: -782.2 N at 56.8 ms



Filter Class: CFC_600
Max: 175.6 N at 170.7 ms
Min: -781.9 N at 56.9 ms



Filter Class: CFC_600
Max: 85.1 Nm at 51.9 ms
Min: -39.7 Nm at 16.5 ms



Filter Class: Without_(Constar
Max: 97.5 N·m at 52.0 ms
Min: -28.2 N·m at 16.2 ms

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

02.14.2023 16:12:39 1872



Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 037 Certification No. 82-3

Test Date: 2/14/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Pendulum Velocity	(-5.95) - (-6.18) m/s	-5.957 m/s	Yes
Pendulum Acceleration Decay Crossing 5g	38 - 46 ms	42.2 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	18.89 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	16.80 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	13.19 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	13.19 g	Yes
Total Head D-Plane Rotation			
Peak	81 - 106 °	96.4 °	Yes
Time of Peak	72 - 82 ms	78.3 ms	Yes
Total Head D-Plane Rotation Decay to 0°	147 - 174 ms	159.5 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	(-52.9) - (-80) N·m	-61.98 N·m	Yes
Time of Peak	65 - 79 ms	72.1 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	120 - 148 ms	140.9 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

02.14.2023 17:56:44 2017

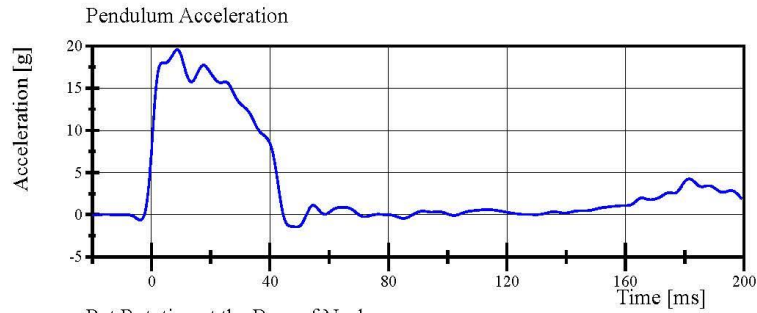


Transportation Research Center Inc.

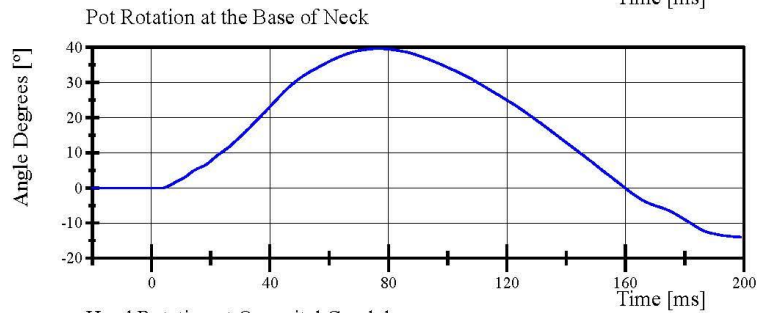
Neck Extension

HIII 50th Serial No. 037 Certification No. 82-3

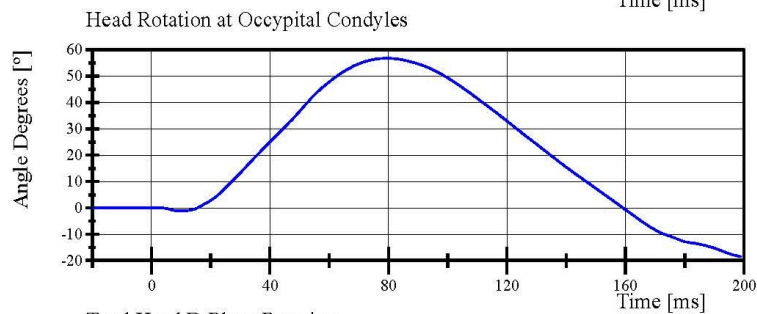
Test Date: 2/14/2023



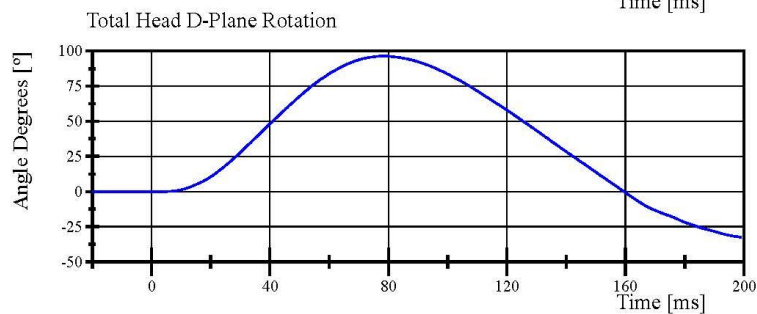
Filter Class: CFC_60
Max: 19.6 g at 8.7 ms
Min: -1.5 g at 48.9 ms



Filter Class: CFC_60
Max: 39.7 ° at 76.6 ms
Min: -14.0 ° at 199.2 ms



Filter Class: CFC_60
Max: 56.8 ° at 79.5 ms
Min: -18.6 ° at 199.2 ms



Filter Class: CFC_60
Max: 96.4 ° at 78.3 ms
Min: -32.6 ° at 199.2 ms

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

02.14.2023 17:57:10 2017

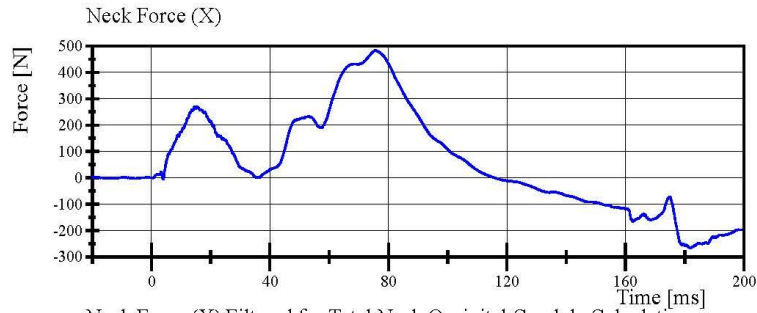


Transportation Research Center Inc.

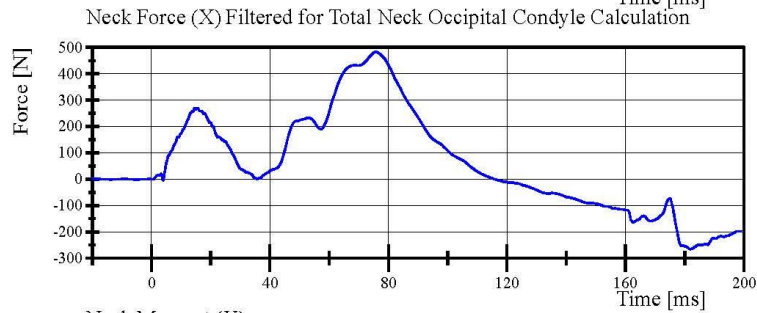
Neck Extension

HIII 50th Serial No. 037 Certification No. 82-3

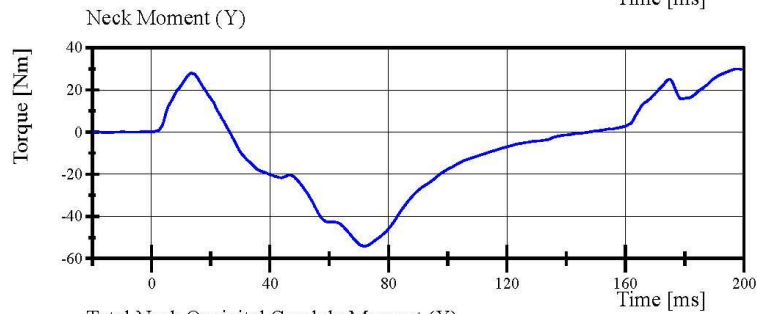
Test Date: 2/14/2023



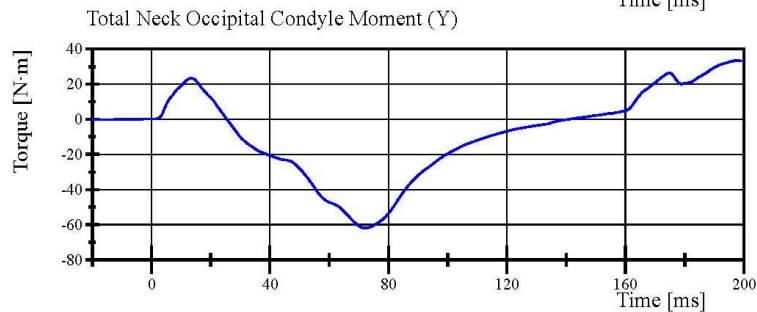
Filter Class: CFC_1000
Max: 483.6 N at 75.8 ms
Min: -266.1 N at 181.9 ms



Filter Class: CFC_600
Max: 482.7 N at 75.8 ms
Min: -265.5 N at 181.9 ms



Filter Class: CFC_600
Max: 30.0 Nm at 197.7 ms
Min: -54.1 Nm at 71.9 ms



Filter Class: Without_(Constar
Max: 33.5 N·m at 197.7 ms
Min: -62.0 N·m at 72.1 ms

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

02.14.2023 17:57:10 2017



Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 037 Certification No. 82-1

Test Date: 2/14/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.728 m/s	Yes
Probe Force Peak	(-5,160) - (-5,894) N	-5,431.4 N	Yes
Maximum Chest Compression	(-63.5) - (-72.6) mm	-69.79 mm	Yes
Internal Hysteresis	69 - 85 %	69.1 %	Yes

Test meets specifications.

Condition: Used

Comments:

Jacket S/N: ER6442

Rib Set S/N: 02033121A

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

02.14.2023 15:16:26 393

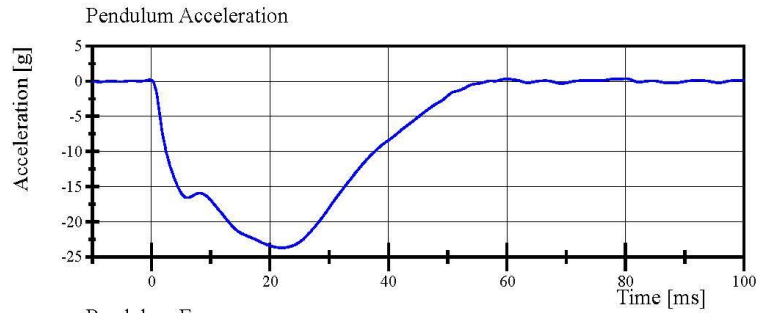


Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 037 Certification No. 82-1

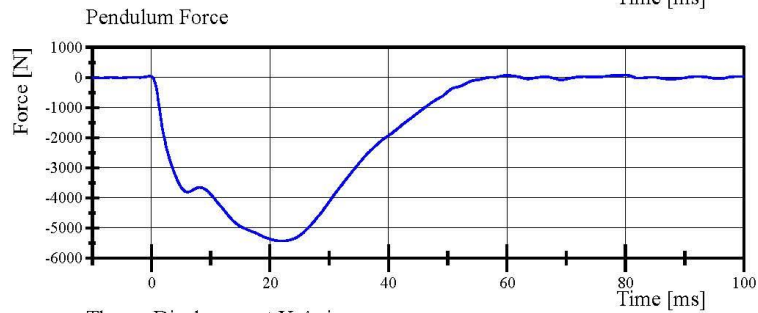
Test Date: 2/14/2023



Filter Class: CFC_180

Max: 0.4 g at 80.0 ms

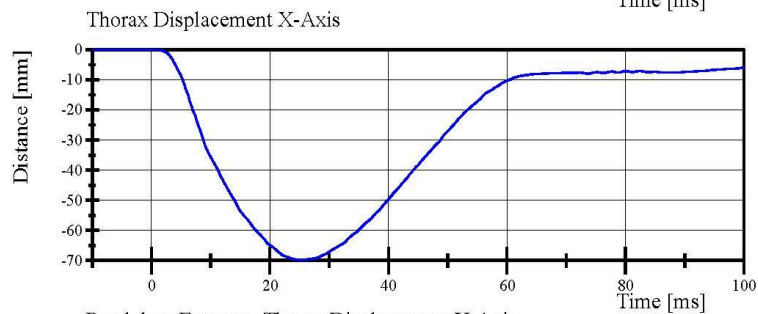
Min: -23.7 g at 21.9 ms



Filter Class: CFC_180

Max: 83.3 N at 80.0 ms

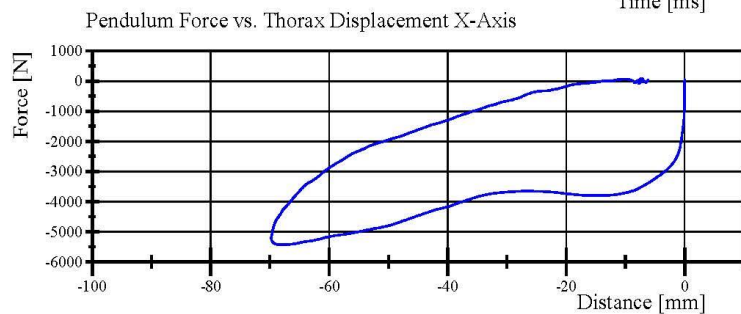
Min: -5,431.4 N at 21.9 ms



Filter Class: CFC_600

Max: 0.0 mm at -8.1 ms

Min: -69.8 mm at 25.4 ms



Filter Class: CFC_180

Max: 83.3 N at -7.1 mm

Min: -5,431.4 N at -67.9 mm

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

02.14.2023 15:16:57 393



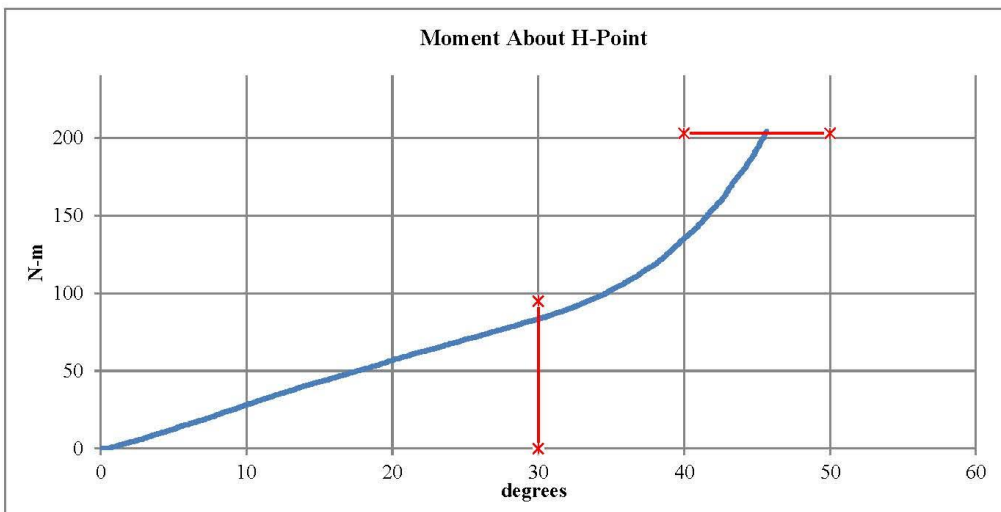
Transportation Research Center Inc.

Hybrid III 50th Male Hip Range of Motion

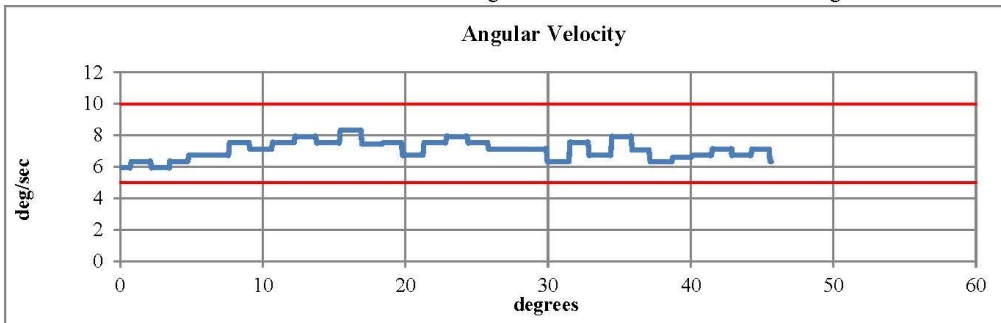


Serial Number: 037 Date: 14-Feb-2023
Side Tested: Left Hip Time: 15:53
Test Number: 1

TEST PARAMETER	SPECIFICATION		TEST RESULTS		
Temperature	18.9	- 25.6	21.1	°C	Pass
Humidity	10	- 70	33	%	Pass
Moment at 30°	0	≤ 94.9	83.32	N-m	Pass
Angle at 203 Nm	40	- 50	45.65	deg	Pass
Average Velocity	5	- 10	7.1	deg/sec	Pass



Max: 8.32 deg/sec Min: 5.95 deg/sec



Comments: S/N: EU6859

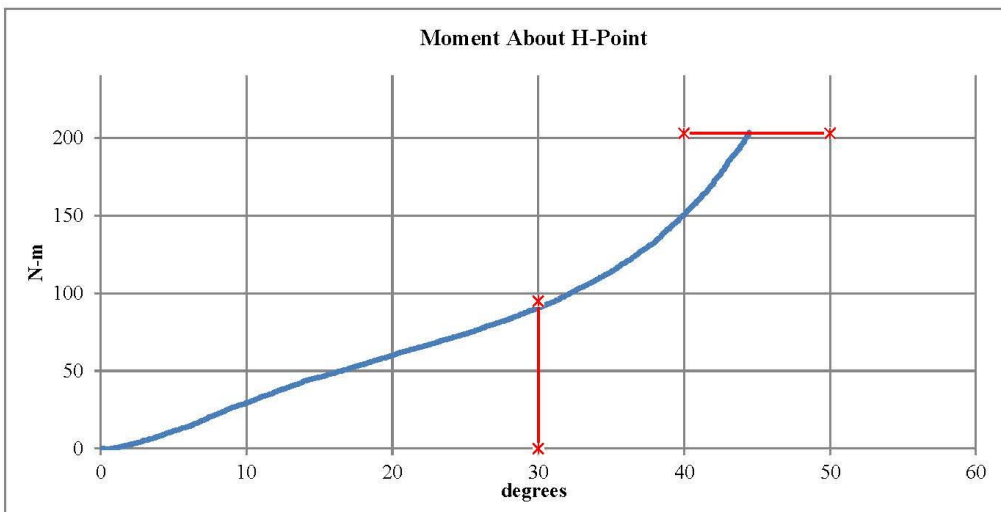
Transportation Research Center Inc.

Hybrid III 50th Male Hip Range of Motion

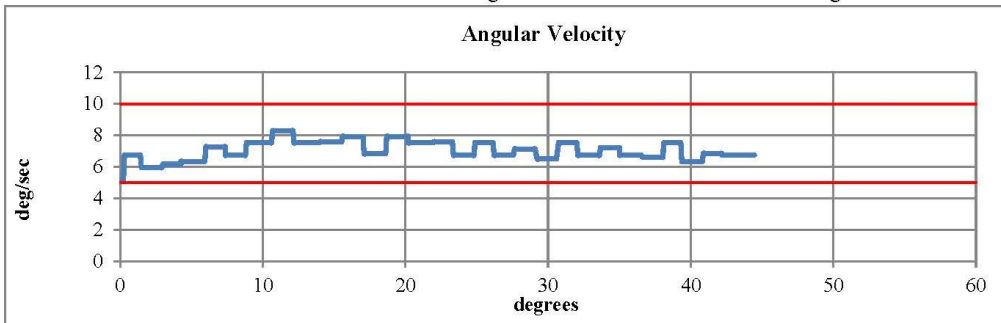


Serial Number: 037 Date: 14-Feb-2023
Side Tested: Right Hip Time: 16:40
Test Number: 1

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	21.1	°C	Pass
Humidity	10	-	70	34	%	Pass
Moment at 30°	0	≤	94.9	90.59	N-m	Pass
Angle at 203 Nm	40	-	50	44.46	deg	Pass
Average Velocity	5	-	10	7.05	deg/sec	Pass



Max: 8.29 deg/sec Min: 5.15 deg/sec



Comments: S/N: EU6859

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 82-1
Test Date: 2/14/2023

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.107 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,561.20 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

02.14.2023 15:23:36 1777

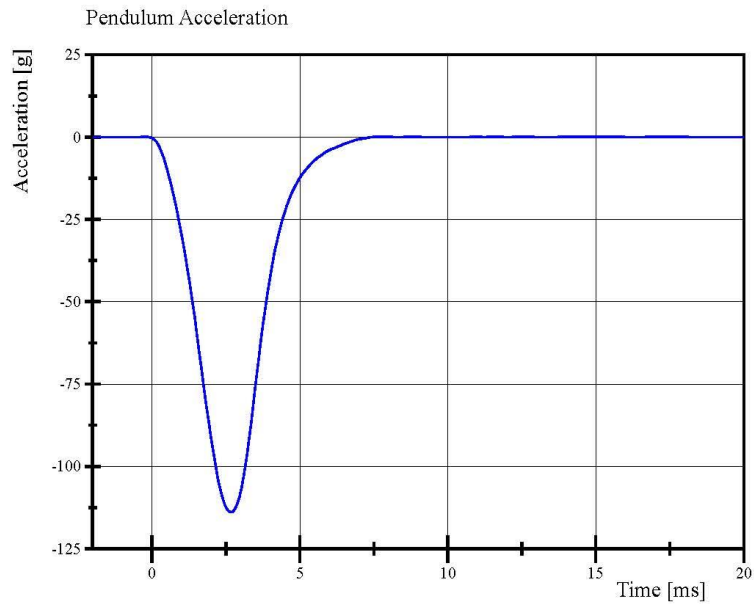


Report Number: 037_H3F82

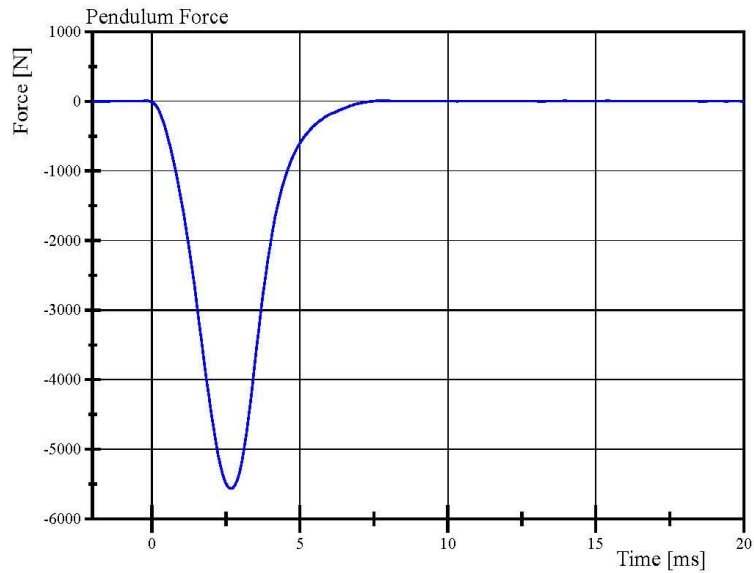
Page 21 of 27

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 82-1
Test Date: 2/14/2023



Filter Class: CFC_600
Max: 0.2 g at 7.8 ms
Min: -113.9 g at 2.6 ms



Filter Class: CFC_600
Max: 9.0 N at 7.8 ms
Min: -5,561.2 N at 2.6 ms

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

02.14.2023 15:24:09 1777



Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 82-1
Test Date: 2/14/2023

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.106 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,408.47 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

02.14.2023 15:26:43 1773

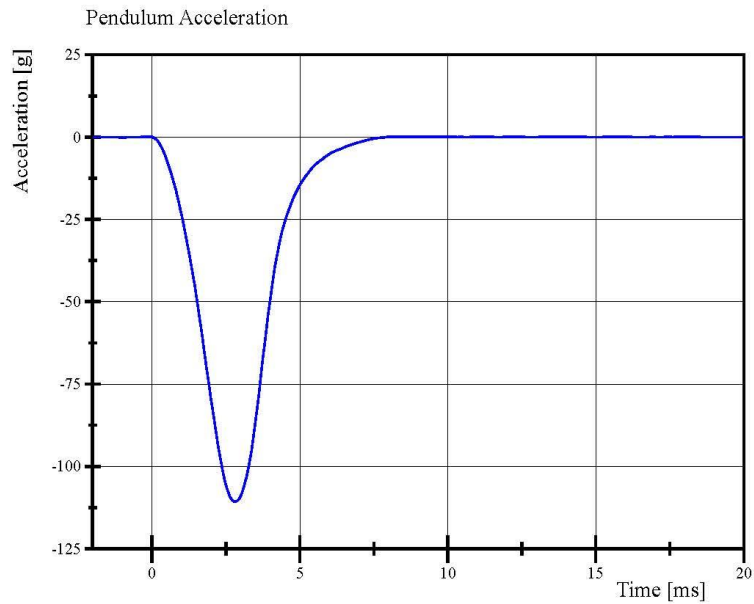


Report Number: 037_H3F82

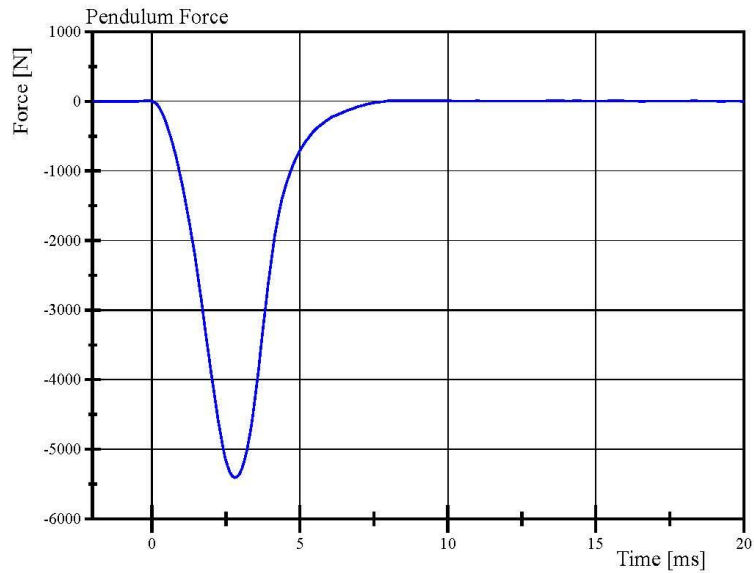
Page 23 of 27

Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 82-1
Test Date: 2/14/2023



Filter Class: CFC_600
Max: 0.2 g at 8.2 ms
Min: -110.7 g at 2.8 ms



Filter Class: CFC_600
Max: 10.3 N at 8.2 ms
Min: -5,408.5 N at 2.8 ms

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

02.14.2023 15:27:08 1773



Pre-Test Calibration Sheets

Front Passenger S/N DH1659

Transportation Research Center Inc.
5720 HIII 5th Dummy
External Dimensions
Serial No. DH1659 Calibration No. 07

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_HFH07

Page 26 of 28

Transportation Research Center Inc.

Front Head Drop

HIII 5th Serial No. DH1659 Certification No. 7-4

Test Date: 1/23/2023

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	30 %	Yes
Peak Head Resultant Acceleration	250 - 300 g	272.0 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	11.9 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	6.26 %	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

01.23.2023 08:18:54 612

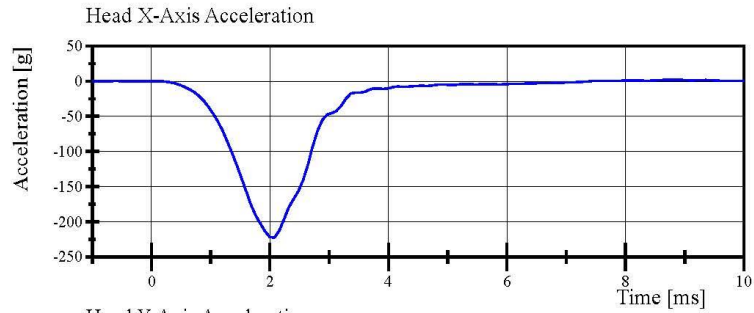


Transportation Research Center Inc.

Front Head Drop

HIII 5th Serial No. DH1659 Certification No. 7-4

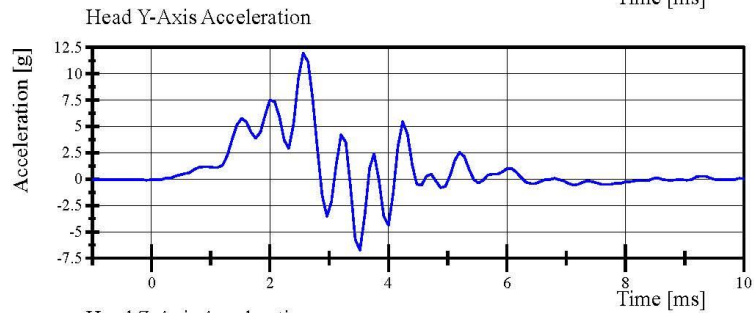
Test Date: 1/23/2023



Filter Class: CFC_1000

Max: 1.8 g at 8.6 ms

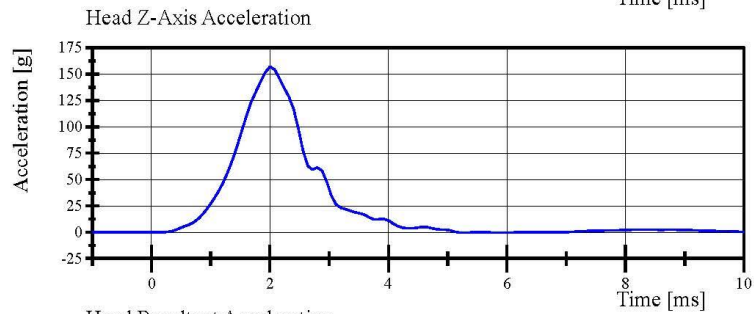
Min: -222.3 g at 2.1 ms



Filter Class: CFC_1000

Max: 11.9 g at 2.6 ms

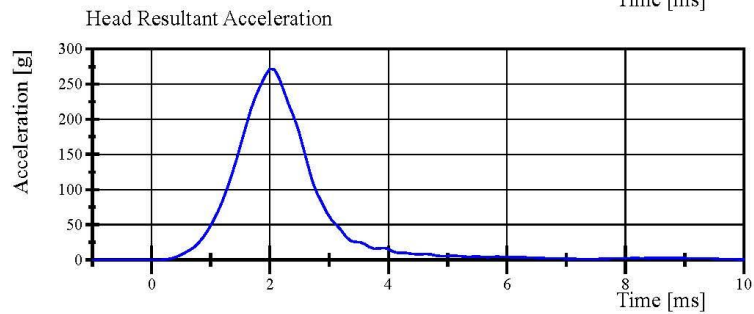
Min: -6.7 g at 3.5 ms



Filter Class: CFC_1000

Max: 157.1 g at 2.0 ms

Min: -0.5 g at 5.3 ms



Filter Class: CFC_1000

Max: 272.0 g at 2.0 ms

Min: 0.1 g at -0.5 ms

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

01.23.2023 08:20:14 612



Transportation Research Center Inc.

Neck Flexion

HIII 5th Serial No. DH1659 Certification No. 7-1

Test Date: 1/19/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	7.061 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	(-2.1) - (-2.5) m/s	-2.33 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	(-4.0) - (-5.0) m/s	-4.48 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	(-5.8) - (-7.0) m/s	-6.37 m/s	Yes
Total Head D-Plane Rotation	(-77) - (-91) °	-83.7 °	Yes
Total Neck Occipital Condyles Moment Between -77° and -91° Rotation	69 - 83 N·m	76.9 N·m	Yes
Total Neck Occipital Condyles Moment Decay to 10 N·m	80 - 100 ms	89.4 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

01.19.2023 14:15:51 1851

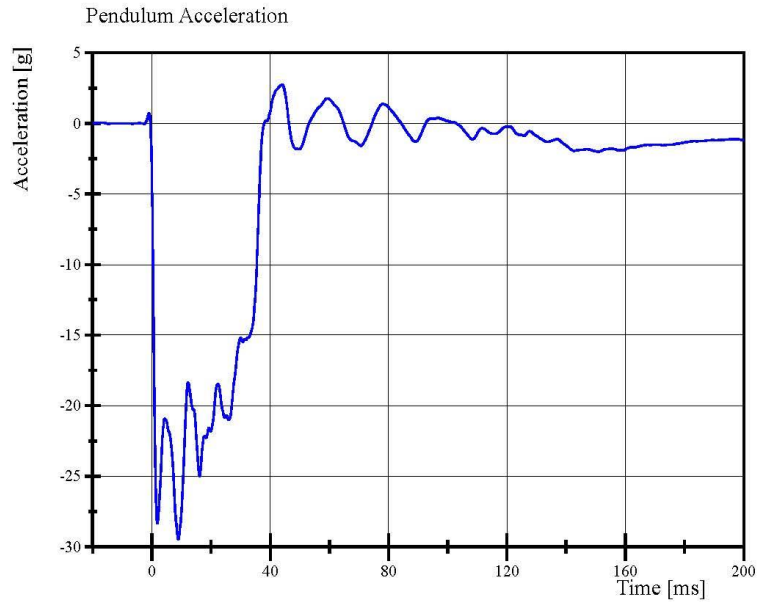


Transportation Research Center Inc.

Neck Flexion

HIII 5th Serial No. DH1659 Certification No. 7-1

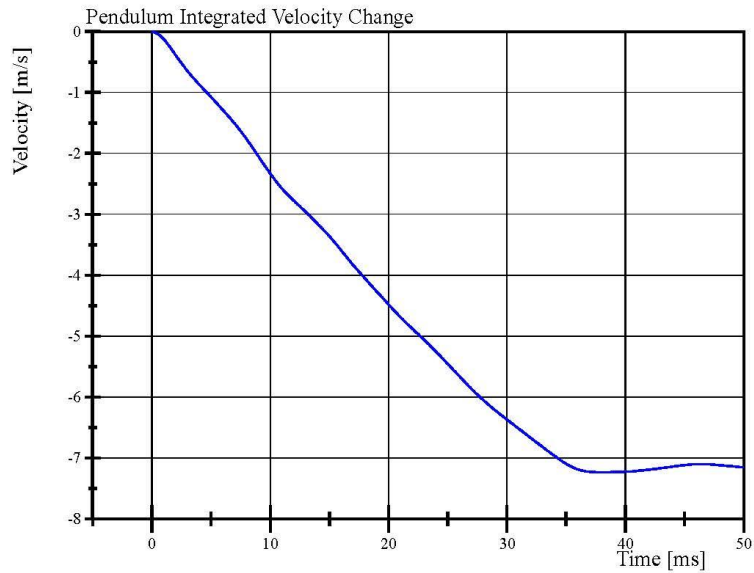
Test Date: 1/19/2023



Filter Class: CFC_180

Max: 2.7 g at 44.0 ms

Min: -29.5 g at 9.0 ms



Filter Class: CFC_180

Max: 0.0 m/s at 0.0 ms

Min: -7.2 m/s at 38.0 ms

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

01.19.2023 14:16:18 1851



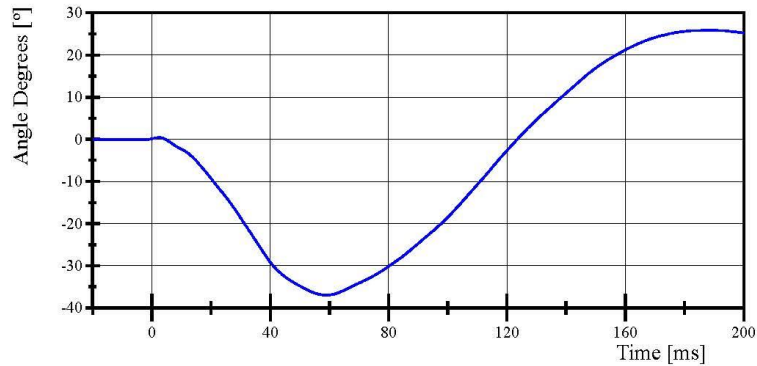
Transportation Research Center Inc.

Neck Flexion

HIII 5th Serial No. DH1659 Certification No. 7-1

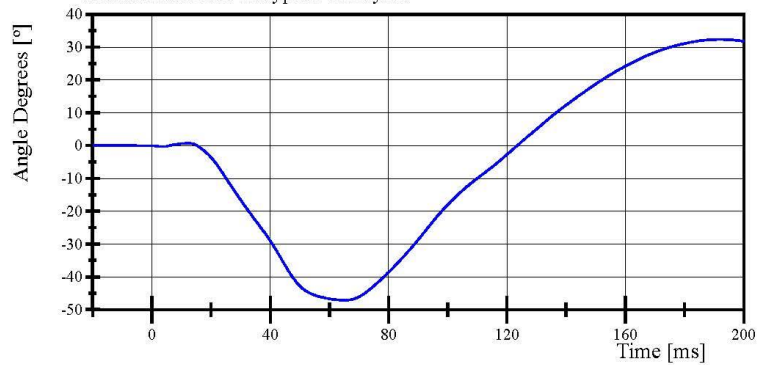
Test Date: 1/19/2023

Pot Rotation at the Base of Neck



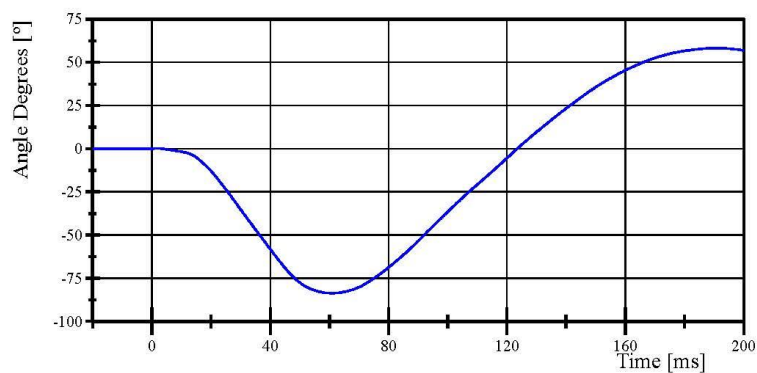
Filter Class: CFC_60
Max: 25.9 ° at 188.7 ms
Min: -37.0 ° at 58.9 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 32.4 ° at 192.1 ms
Min: -47.1 ° at 65.1 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 58.2 ° at 190.7 ms
Min: -83.7 ° at 60.9 ms

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

01.19.2023 14:16:18 1851

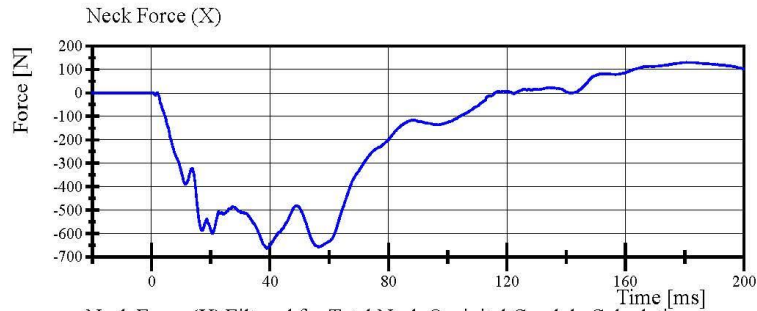


Transportation Research Center Inc.

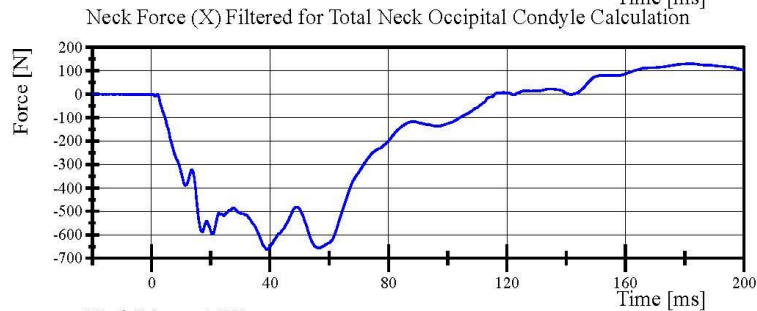
Neck Flexion

HIII 5th Serial No. DH1659 Certification No. 7-1

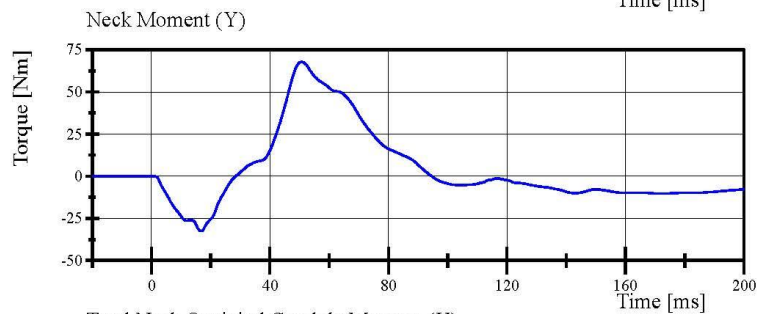
Test Date: 1/19/2023



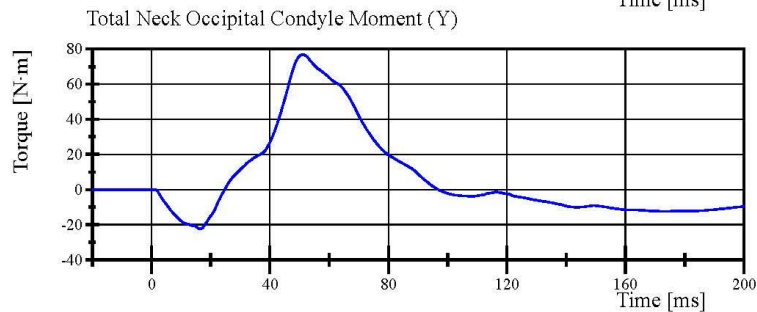
Filter Class: CFC_1000
Max: 131.0 N at 180.7 ms
Min: -664.1 N at 39.0 ms



Filter Class: CFC_600
Max: 130.6 N at 181.8 ms
Min: -664.0 N at 39.0 ms



Filter Class: CFC_600
Max: 67.8 Nm at 50.8 ms
Min: -32.6 Nm at 16.8 ms



Filter Class: Without_(Constar
Max: 76.9 N·m at 51.0 ms
Min: -22.3 N·m at 16.4 ms

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

01.19.2023 14:16:19 1851



Transportation Research Center Inc.

Neck Extension

HIII 5th Serial No. DH1659 Certification No. 7-2

Test Date: 1/19/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Pendulum Velocity	(-5.95) - (-6.19) m/s	-6.036 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	1.5 - 1.9 m/s	1.84 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	3.1 - 3.9 m/s	3.57 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	4.6 - 5.6 m/s	5.08 m/s	Yes
Total Head D-Plane Rotation	99 - 114 °	103.9 °	Yes
Total Neck Occipital Condyles Moment Between 99° and 114° Rotation	(-53) - (-65) N·m	-57.7 N·m	Yes
Total Neck Occipital Condyles Moment Decay to -10 N·m	94 - 114 ms	105.2 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

01.19.2023 15:18:50 2003

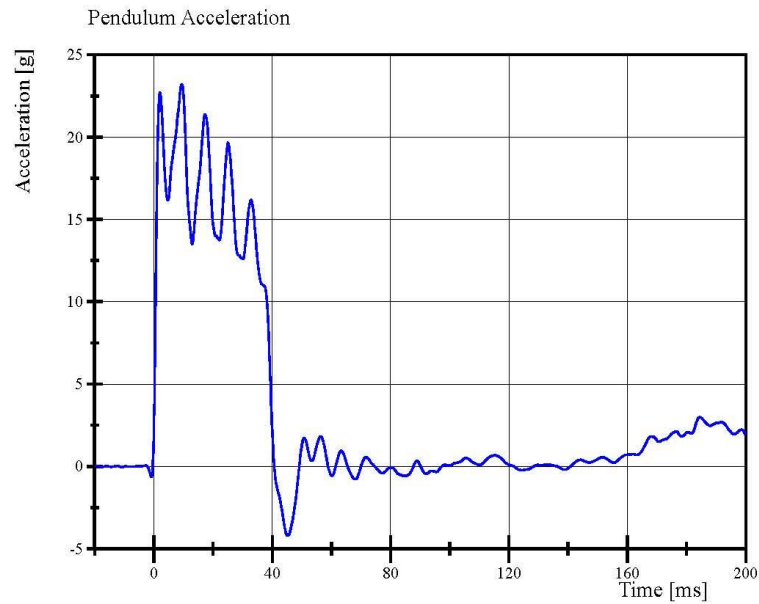


Transportation Research Center Inc.

Neck Extension

HIII 5th Serial No. DH1659 Certification No. 7-2

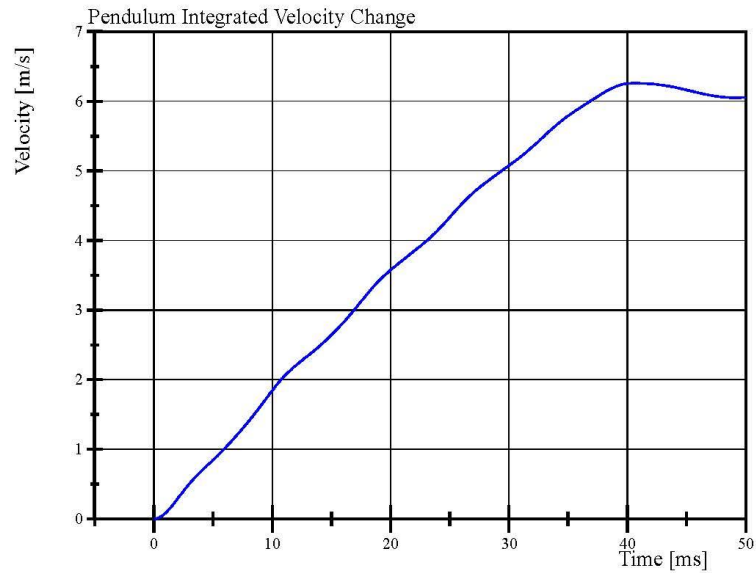
Test Date: 1/19/2023



Filter Class: CFC_180

Max: 23.2 g at 9.5 ms

Min: -4.2 g at 45.2 ms



Filter Class: CFC_180

Max: 6.3 m/s at 40.7 ms

Min: 0.0 m/s at 0.0 ms

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

01.19.2023 15:19:13 2003



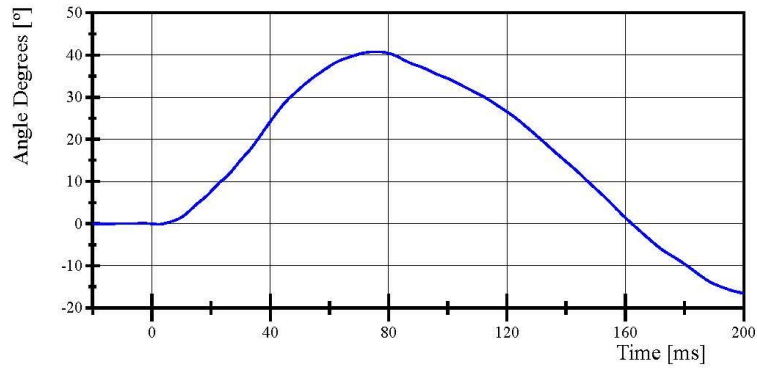
Transportation Research Center Inc.

Neck Extension

HIII 5th Serial No. DH1659 Certification No. 7-2

Test Date: 1/19/2023

Pot Rotation at the Base of Neck

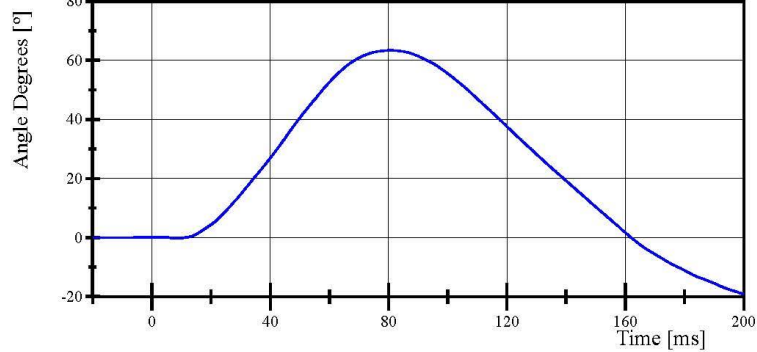


Filter Class: CFC_60

Max: 40.8 ° at 75.6 ms

Min: -16.6 ° at 199.9 ms

Head Rotation at Occypital Condyles

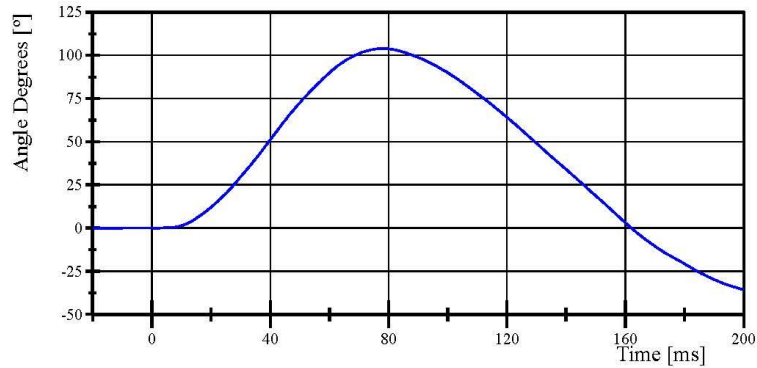


Filter Class: CFC_60

Max: 63.4 ° at 80.7 ms

Min: -19.2 ° at 199.9 ms

Total Head D-Plane Rotation



Filter Class: CFC_60

Max: 103.9 ° at 78.1 ms

Min: -35.7 ° at 199.9 ms

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

01.19.2023 15:19:13 2003

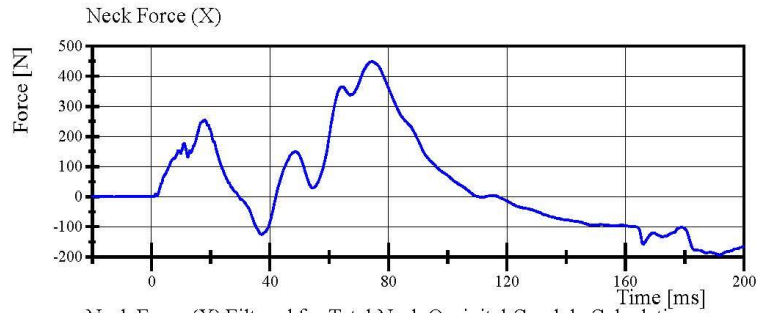


Transportation Research Center Inc.

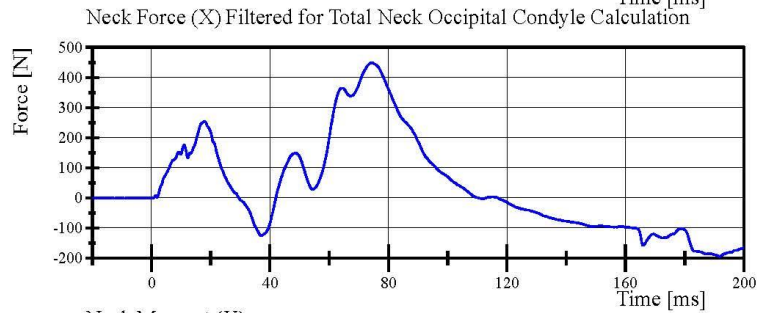
Neck Extension

HIII 5th Serial No. DH1659 Certification No. 7-2

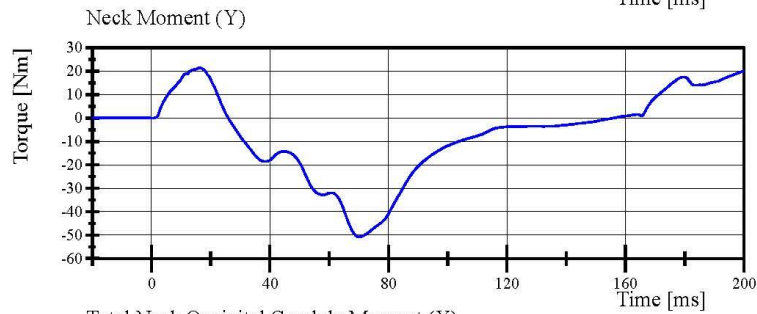
Test Date: 1/19/2023



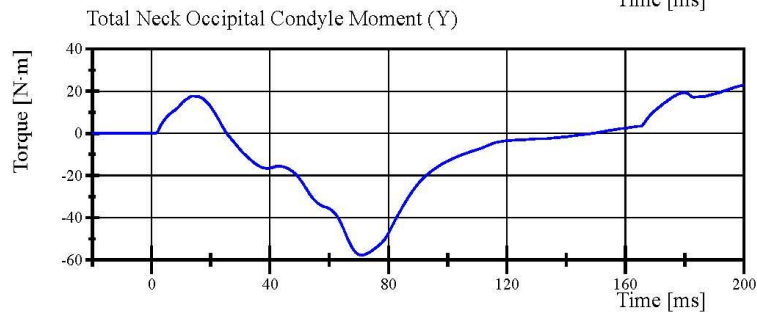
Filter Class: CFC_1000
Max: 448.9 N at 74.5 ms
Min: -194.6 N at 191.9 ms



Filter Class: CFC_600
Max: 448.5 N at 74.4 ms
Min: -194.1 N at 191.7 ms



Filter Class: CFC_600
Max: 21.5 Nm at 16.4 ms
Min: -50.8 Nm at 70.1 ms



Filter Class: Without_(Constar
Max: 22.9 N·m at 199.9 ms
Min: -57.7 N·m at 71.0 ms

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

01.19.2023 15:19:13 2003



Transportation Research Center Inc.

Front Thorax

HIII 5th Serial No. DH1659 Certification No. 7-2

Test Date: 1/19/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.829 m/s	Yes
Probe Force Peak Between 50.0 mm and 58.0 mm Chest Deflection	(-3,900) - (-4,400) N	-4,171.2 N	Yes
Probe Force Peak Between 18.0 mm and 50.0 mm Chest Deflection	>= (-4,600) N	-4,530.9 N	Yes
Maximum Chest Compression	(-50) - (-58) mm	-50.2 mm	Yes
Internal Hysteresis	69 - 85 %	76.6 %	Yes

Test meets specifications.

Condition: Used

Comments:

Jacket S/N: EE8365

Rib Set S/N: EA4110

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

01.19.2023 12:51:23 427

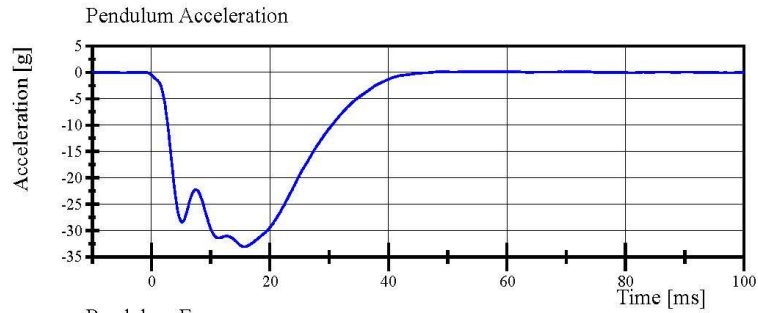


Transportation Research Center Inc.

Front Thorax

HIII 5th Serial No. DH1659 Certification No. 7-2

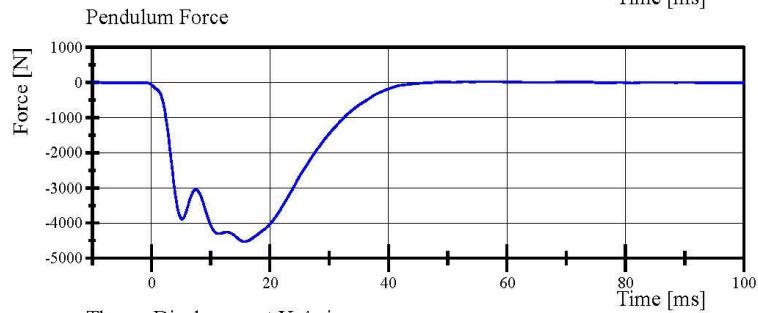
Test Date: 1/19/2023



Filter Class: CFC_180

Max: 0.2 g at 57.6 ms

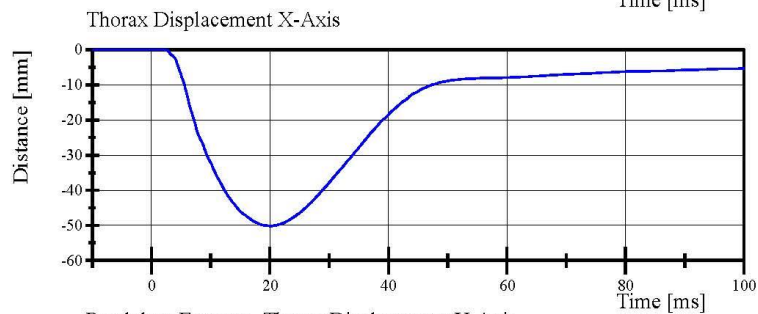
Min: -33.1 g at 15.7 ms



Filter Class: CFC_180

Max: 21.9 N at 57.6 ms

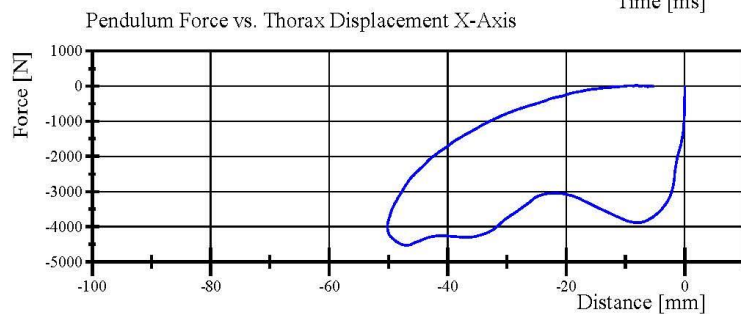
Min: -4,530.9 N at 15.7 ms



Filter Class: CFC_600

Max: 0.0 mm at -6.4 ms

Min: -50.2 mm at 20.2 ms



Filter Class: CFC_180

Max: 21.9 N at -8.0 mm

Min: -4,530.9 N at -46.9 mm

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

01.19.2023 12:51:57 427



Transportation Research Center Inc.

Hybrid III Small Female Torso Flexion



Customer: NHTSA

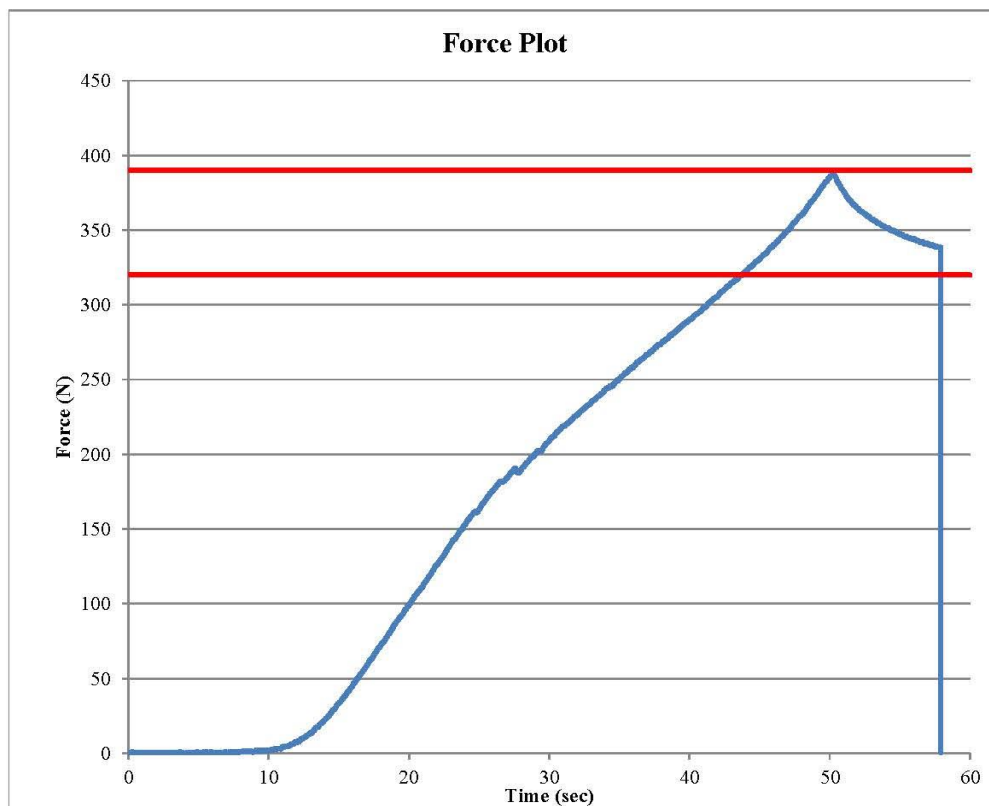
Serial Number: DH1659

Date: 1/19/2023

Test Number: 1

Time: 13:04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 - 25.6	20.9 °C Pass
Humidity	10 - 70	39 % Pass
Average Angular Rate	0.5 - 1.5	0.8 deg/sec Pass
Initial Angle	0 - 20	14.63 deg Pass
Peak Force at 45.63°	320 - 390	387.99 N Pass
Final Angle	-8 - 8	4.33 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. 7-1

Test Date: 1/19/2023

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.084 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-3,858.5 N	Yes

Test meets specifications.

Condition: Used

Comments:

Knee Skin S/N: ED6729

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

01.19.2023 11:40:18 1876

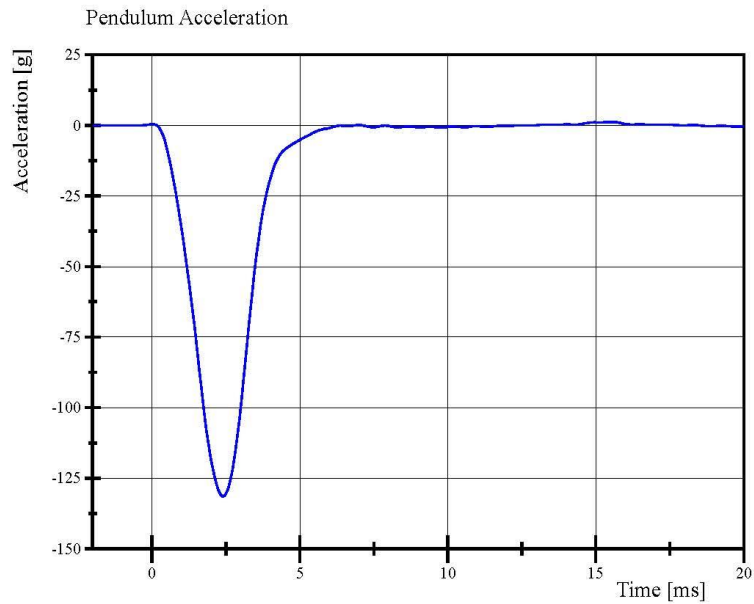


Report Number: DH1659_HFH07

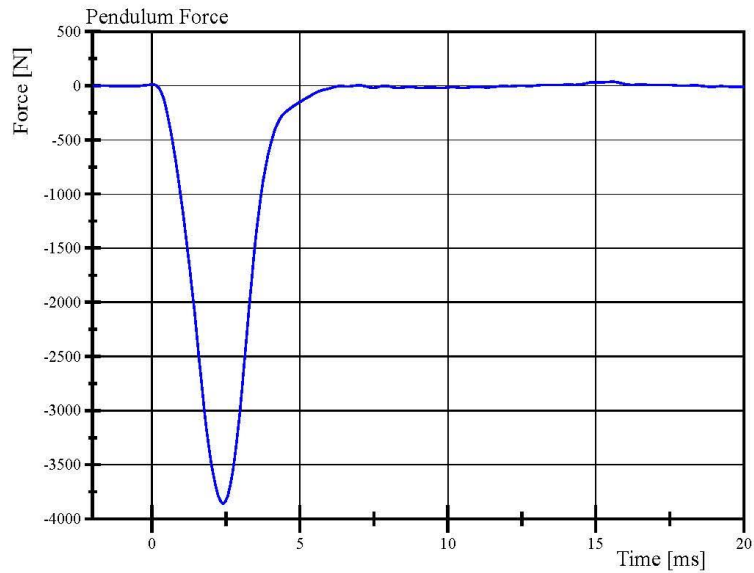
Page 22 of 28

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 5th Serial No. DH1659 Certification No. 7-1
Test Date: 1/19/2023



Filter Class: CFC_600
Max: 1.3 g at 15.5 ms
Min: -131.6 g at 2.4 ms



Filter Class: CFC_600
Max: 37.1 N at 15.5 ms
Min: -3,858.5 N at 2.4 ms

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

01.19.2023 11:41:41 1876



Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 5th Serial No. DH1659 Certification No. 7-1
Test Date: 1/19/2023

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.084 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-3,795.9 N	Yes

Test meets specifications.

Condition: Used

Comments:

Knee Skin S/N: EC5852

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

01.19.2023 11:43:53 1876

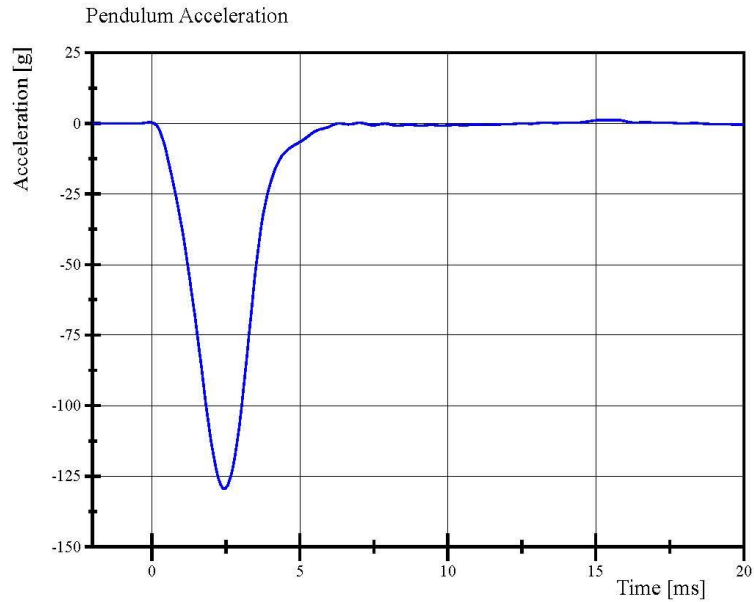


Report Number: DH1659_HFH07

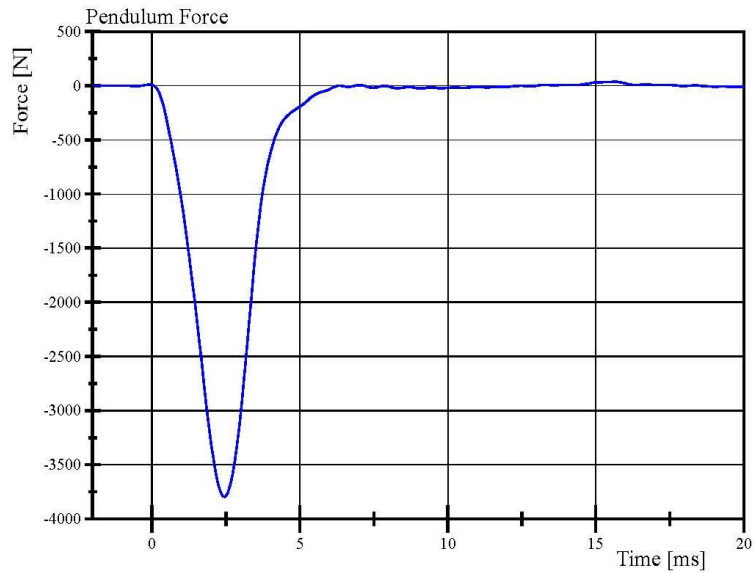
Page 24 of 28

Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 5th Serial No. DH1659 Certification No. 7-1
Test Date: 1/19/2023



Filter Class: CFC_600
Max: 1.3 g at 15.6 ms
Min: -129.5 g at 2.5 ms



Filter Class: CFC_600
Max: 36.9 N at 15.6 ms
Min: -3,795.9 N at 2.5 ms

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

01.19.2023 11:44:28 1876



Post-Test Calibration Sheets

Front Passenger S/N DH1659

Transportation Research Center Inc.
5720 HIII 5th Dummy
External Dimensions
Serial No. DH1659 Calibration No. 08

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_HFH08

Page 26 of 28

Transportation Research Center Inc.

Front Head Drop

HIII 5th Serial No. DH1659 Certification No. 8-1

Test Date: 2/15/2023

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Peak Head Resultant Acceleration	250 - 300 g	255.3 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	15.0 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	5.62 %	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

02.15.2023 11:06:02 613

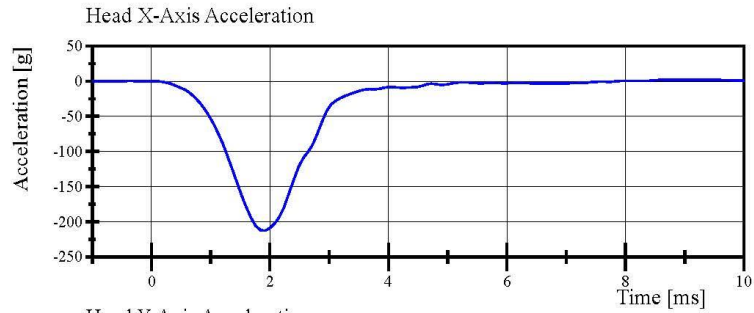


Transportation Research Center Inc.

Front Head Drop

HIII 5th Serial No. DH1659 Certification No. 8-1

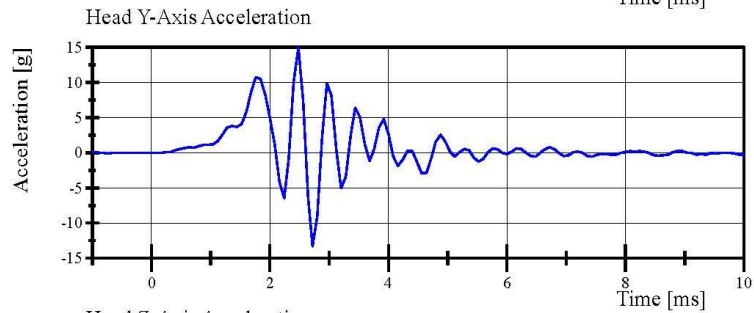
Test Date: 2/15/2023



Filter Class: CFC_1000

Max: 2.0 g at 8.6 ms

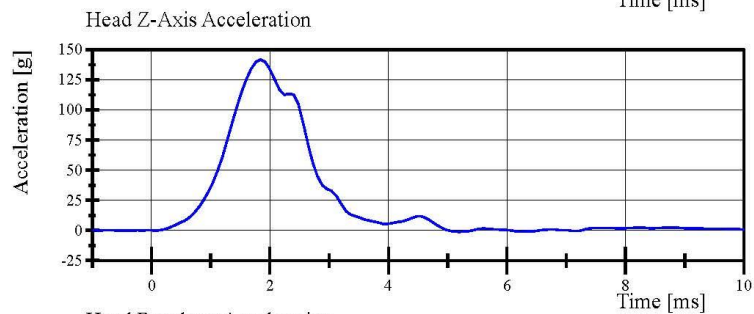
Min: -212.5 g at 1.9 ms



Filter Class: CFC_1000

Max: 15.0 g at 2.5 ms

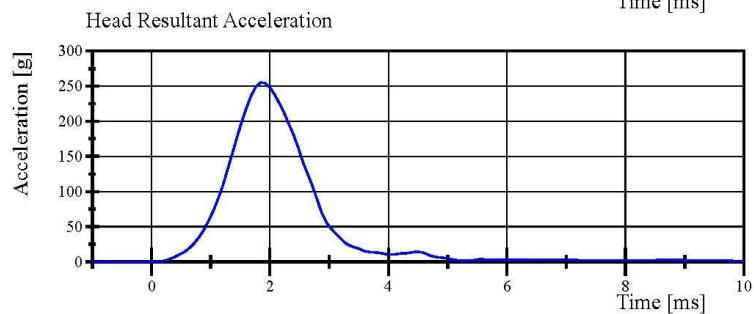
Min: -13.3 g at 2.7 ms



Filter Class: CFC_1000

Max: 141.9 g at 1.8 ms

Min: -1.2 g at 5.2 ms



Filter Class: CFC_1000

Max: 255.3 g at 1.8 ms

Min: 0.0 g at -0.6 ms

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

02.15.2023 11:06:29 613



Transportation Research Center Inc.

Neck Flexion

HIII 5th Serial No. DH1659 Certification No. 8-2

Test Date: 2/15/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	7.056 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	(-2.1) - (-2.5) m/s	-2.36 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	(-4.0) - (-5.0) m/s	-4.59 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	(-5.8) - (-7.0) m/s	-6.54 m/s	Yes
Total Head D-Plane Rotation	(-77) - (-91) °	-78.9 °	Yes
Total Neck Occipital Condyles Moment Between -77° and -91° Rotation	69 - 83 N·m	69.6 N·m	Yes
Total Neck Occipital Condyles Moment 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

02.15.2023 11:50:48 1850

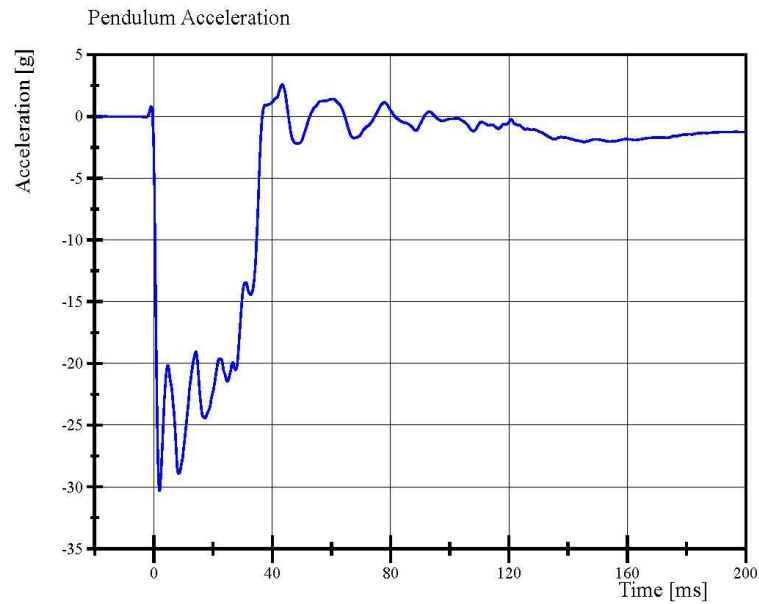


Transportation Research Center Inc.

Neck Flexion

HIII 5th Serial No. DH1659 Certification No. 8-2

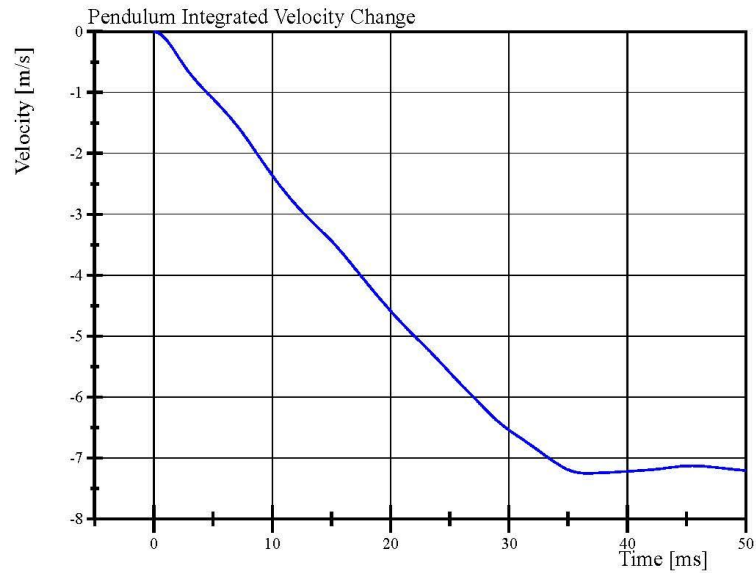
Test Date: 2/15/2023



Filter Class: CFC_180

Max: 2.6 g at 43.4 ms

Min: -30.3 g at 1.9 ms



Filter Class: CFC_180

Max: 0.0 m/s at 0.0 ms

Min: -7.3 m/s at 36.7 ms

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

02.15.2023 11:51:27 1850



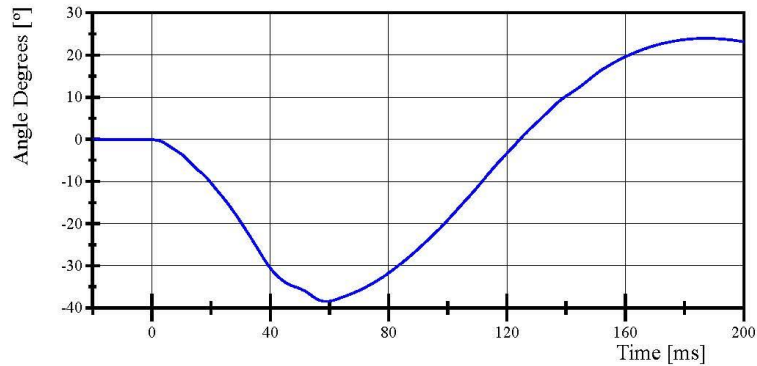
Transportation Research Center Inc.

Neck Flexion

HIII 5th Serial No. DH1659 Certification No. 8-2

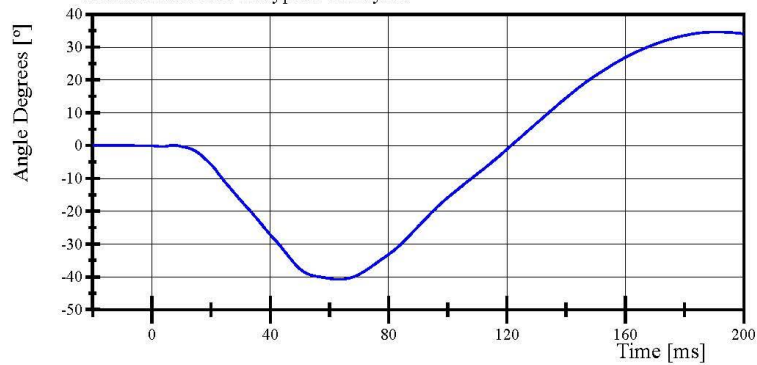
Test Date: 2/15/2023

Pot Rotation at the Base of Neck



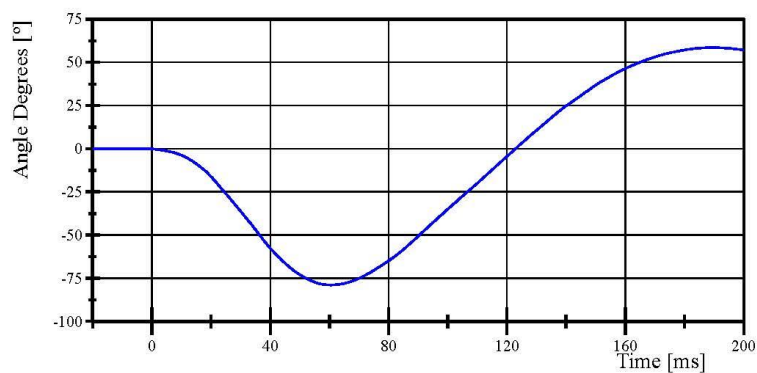
Filter Class: CFC_60
Max: 24.0 ° at 187.2 ms
Min: -38.4 ° at 59.0 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 34.7 ° at 190.8 ms
Min: -40.8 ° at 63.2 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 58.6 ° at 189.6 ms
Min: -78.9 ° at 60.5 ms

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

02.15.2023 11:51:28 1850

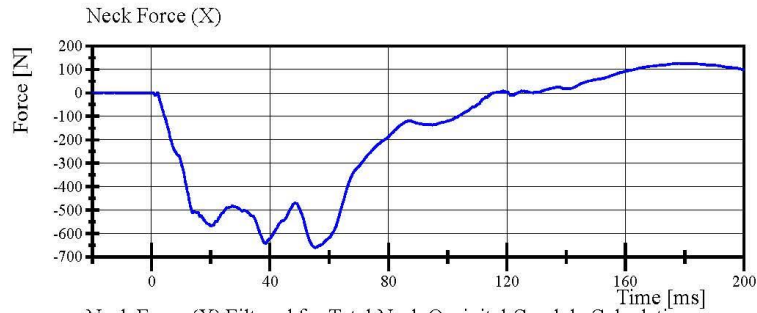


Transportation Research Center Inc.

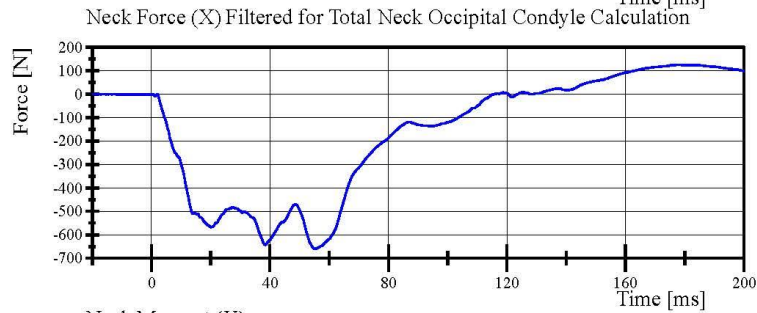
Neck Flexion

HIII 5th Serial No. DH1659 Certification No. 8-2

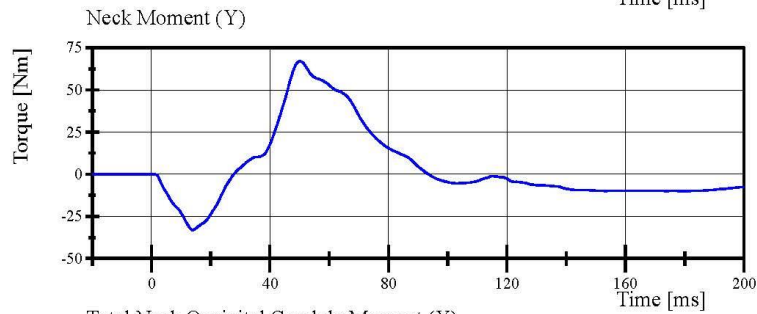
Test Date: 2/15/2023



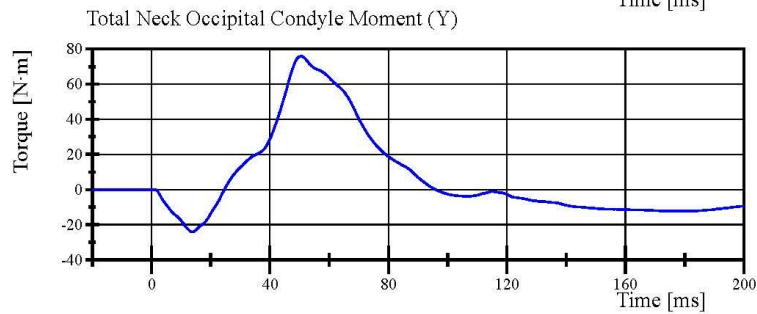
Filter Class: CFC_1000
Max: 126.0 N at 177.9 ms
Min: -660.4 N at 55.3 ms



Filter Class: CFC_600
Max: 125.7 N at 178.4 ms
Min: -660.1 N at 55.4 ms



Filter Class: CFC_600
Max: 66.9 Nm at 50.2 ms
Min: -33.1 Nm at 13.9 ms



Filter Class: Without_(Constar
Max: 75.9 N·m at 50.5 ms
Min: -24.0 N·m at 13.8 ms

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

02.15.2023 11:51:28 1850



Transportation Research Center Inc.

Neck Extension

HIII 5th Serial No. DH1659 Certification No. 8-1

Test Date: 2/15/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Pendulum Velocity	(-5.95) - (-6.19) m/s	-6.022 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	1.5 - 1.9 m/s	1.83 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	3.1 - 3.9 m/s	3.60 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	4.6 - 5.6 m/s	5.14 m/s	Yes
Total Head D-Plane Rotation	99 - 114 °	103.6 °	Yes
Total Neck Occipital Condyles Moment Between 99° and 114° Rotation	(-53) - (-65) N·m	-56.1 N·m	Yes
Total Neck Occipital Condyles Moment Decay to -10 N·m	94 - 114 ms	104.7 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

02.15.2023 12:40:33 2008

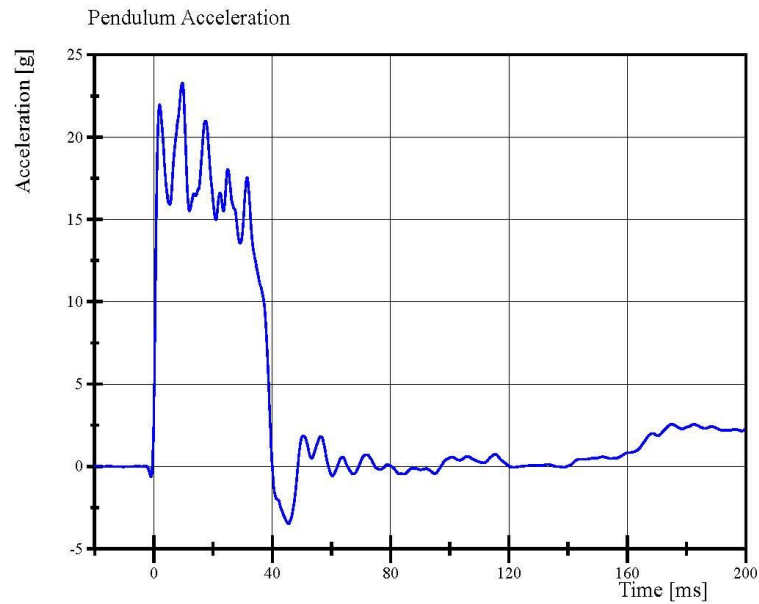


Transportation Research Center Inc.

Neck Extension

HIII 5th Serial No. DH1659 Certification No. 8-1

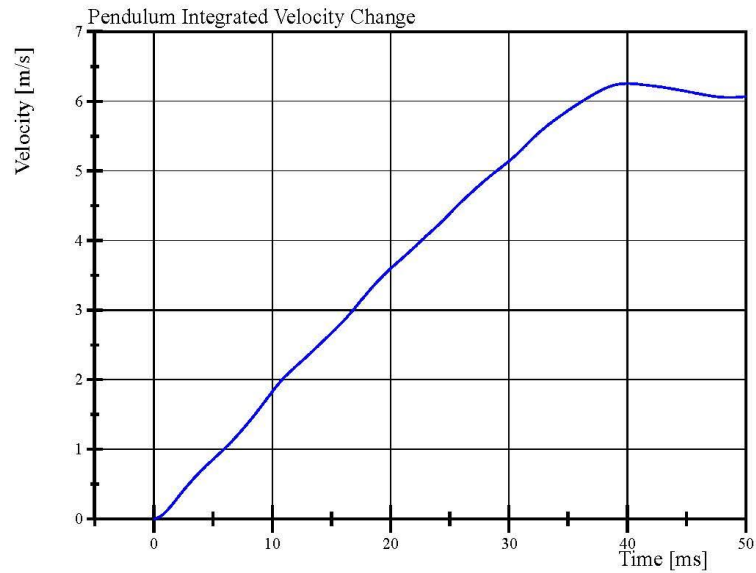
Test Date: 2/15/2023



Filter Class: CFC_180

Max: 23.3 g at 9.6 ms

Min: -3.5 g at 45.5 ms



Filter Class: CFC_180

Max: 6.3 m/s at 40.0 ms

Min: 0.0 m/s at 0.0 ms

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

02.15.2023 12:40:54 2008



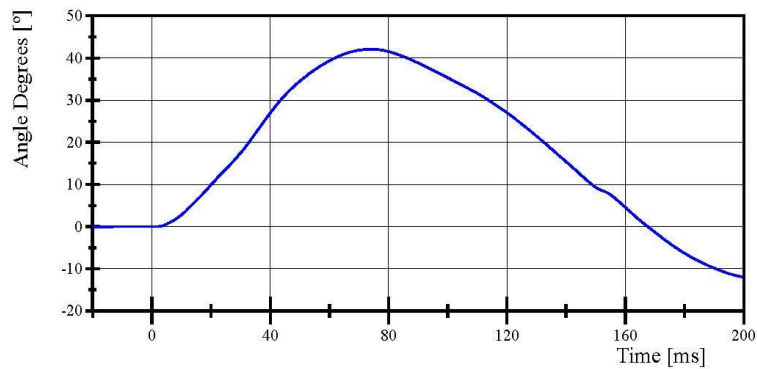
Transportation Research Center Inc.

Neck Extension

HIII 5th Serial No. DH1659 Certification No. 8-1

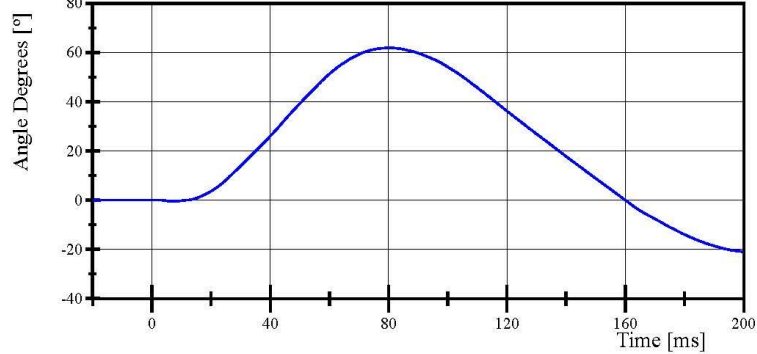
Test Date: 2/15/2023

Pot Rotation at the Base of Neck



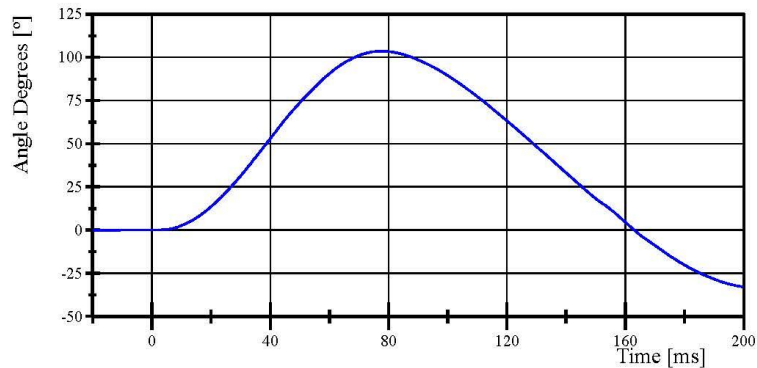
Filter Class: CFC_60
Max: 42.1 ° at 74.2 ms
Min: -12.0 ° at 199.6 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 61.9 ° at 80.4 ms
Min: -20.9 ° at 199.6 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 103.6 ° at 77.5 ms
Min: -32.9 ° at 199.6 ms

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

02.15.2023 12:40:54 2008

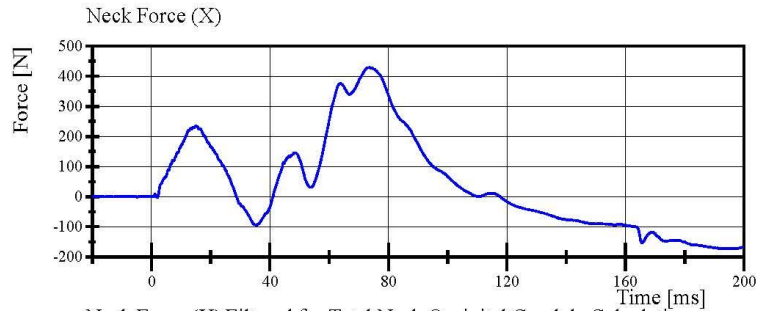


Transportation Research Center Inc.

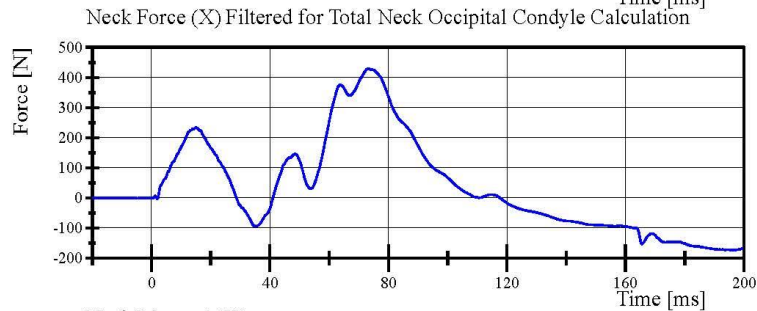
Neck Extension

HIII 5th Serial No. DH1659 Certification No. 8-1

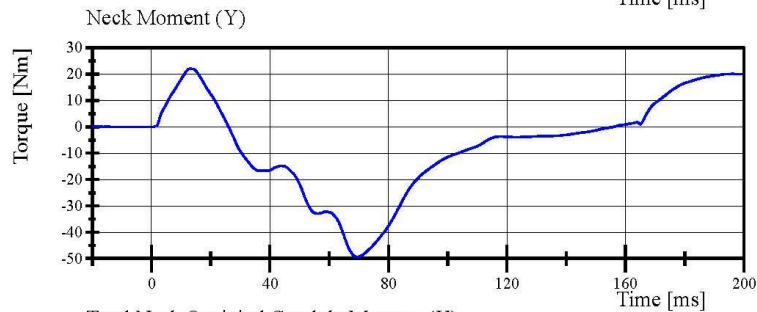
Test Date: 2/15/2023



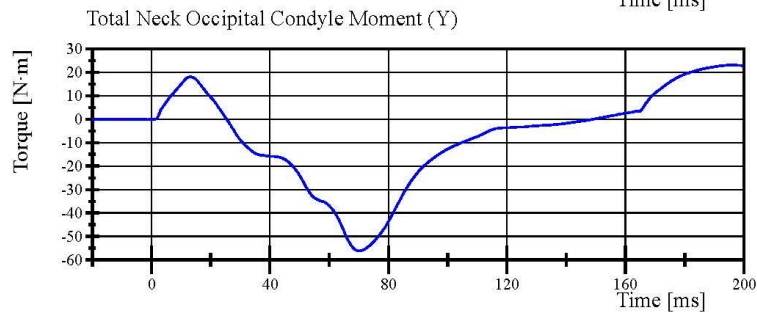
Filter Class: CFC_1000
Max: 429.0 N at 73.6 ms
Min: -173.0 N at 196.6 ms



Filter Class: CFC_600
Max: 428.8 N at 73.4 ms
Min: -172.7 N at 196.7 ms



Filter Class: CFC_600
Max: 22.1 Nm at 13.2 ms
Min: -49.4 Nm at 69.5 ms



Filter Class: Without_(Constar
Max: 23.1 N·m at 196.4 ms
Min: -56.1 N·m at 70.1 ms

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

02.15.2023 12:40:54 2008



Transportation Research Center Inc.

Front Thorax

HIII 5th Serial No. DH1659 Certification No. 8-1

Test Date: 2/15/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.829 m/s	Yes
Probe Force Peak Between 50.0 mm and 58.0 mm Chest Deflection	(-3,900) - (-4,400) N	Not Attained	No
Probe Force Peak Between 18.0 mm and 50.0 mm Chest Deflection	>= (-4,600) N	-4,430.3 N	Yes
Maximum Chest Compression	(-50) - (-58) mm	-47.5 mm	No
Internal Hysteresis	69 - 85 %	81.8 %	Yes

Test does not meet specifications.

Condition: Used

Comments:

Jacket S/N: EE8365

Rib Set S/N: EA4110

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

02.15.2023 10:19:01 412

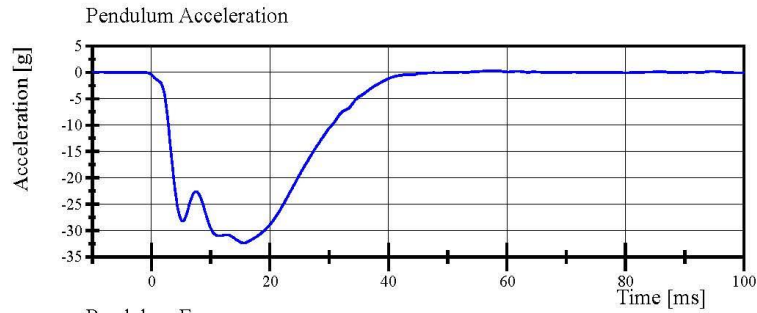


Transportation Research Center Inc.

Front Thorax

HIII 5th Serial No. DH1659 Certification No. 8-1

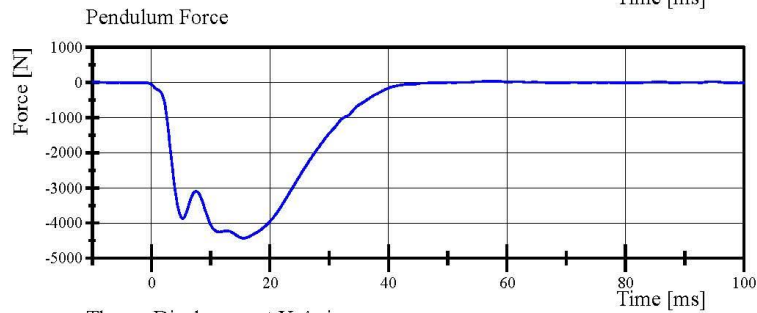
Test Date: 2/15/2023



Filter Class: CFC_180

Max: 0.3 g at 58.5 ms

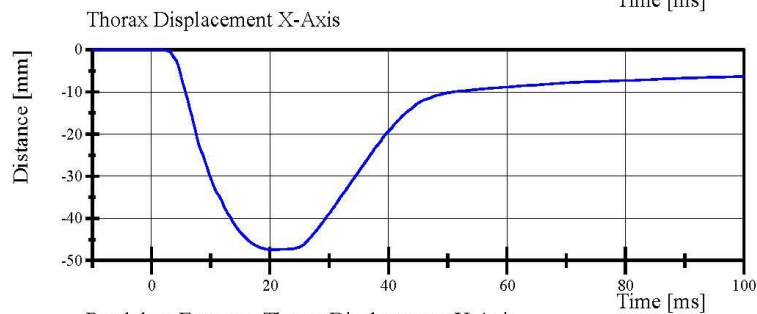
Min: -32.3 g at 15.6 ms



Filter Class: CFC_180

Max: 37.3 N at 58.5 ms

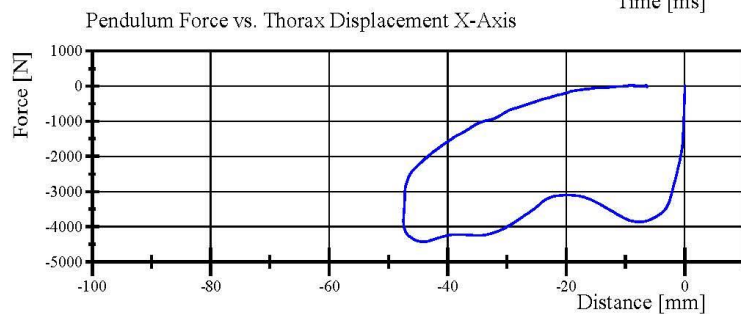
Min: -4,430.3 N at 15.6 ms



Filter Class: CFC_600

Max: 0.0 mm at -6.6 ms

Min: -47.5 mm at 20.7 ms



Filter Class: CFC_180

Max: 37.3 N at -9.0 mm

Min: -4,430.3 N at -44.2 mm

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

02.15.2023 10:19:13 412

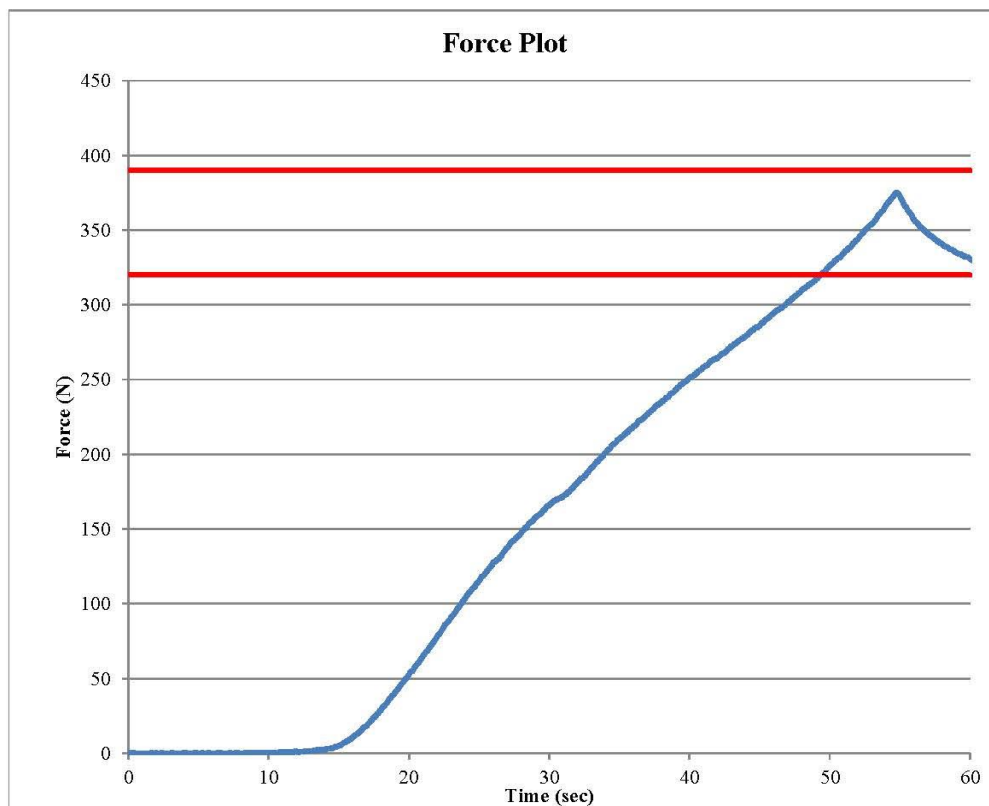


Transportation Research Center Inc.
Hybrid III Small Female Torso Flexion



Customer: NHTSA
Serial Number: DH1659 Date: 2/15/2023
Test Number: 1 Time: 10:33

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 - 25.6	20.9 °C Pass
Humidity	10 - 70	39 % Pass
Average Angular Rate	0.5 - 1.5	0.78 deg/sec Pass
Initial Angle	0 - 20	14.83 deg Pass
Peak Force at 45.63°	320 - 390	375.07 N Pass
Final Angle	-8 - 8	4.33 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. 8-1

Test Date: 2/15/2023

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.099 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-4,000.2 N	Yes

Test meets specifications.

Condition: Used

Comments:

Knee Skin S/N: ED6729

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

02.15.2023 08:41:03 1842

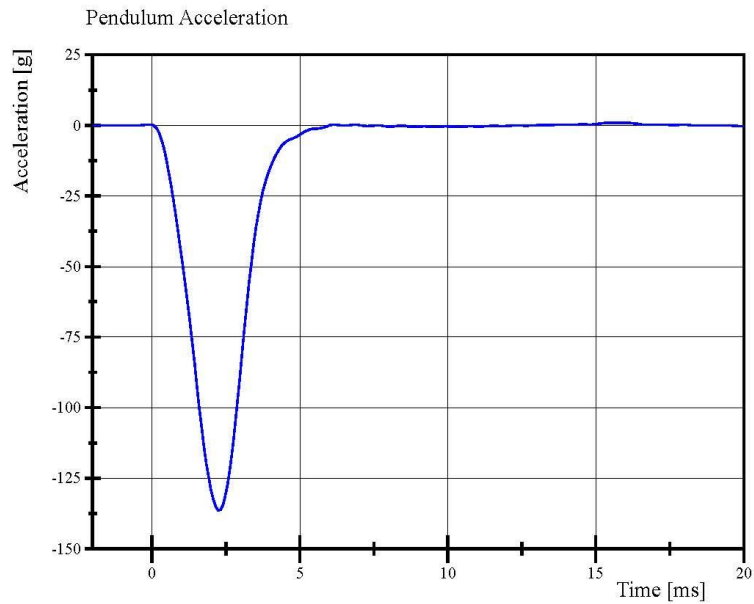


Report Number: DH1659_HFH08

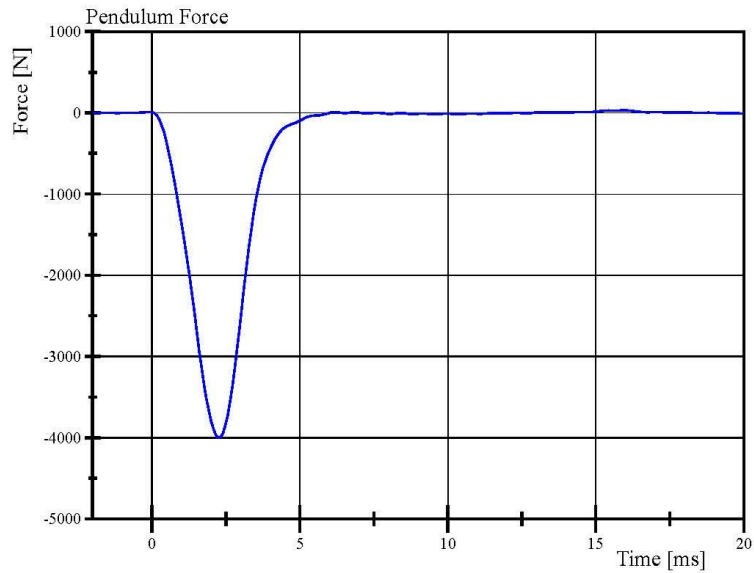
Page 22 of 28

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 5th Serial No. DH1659 Certification No. 8-1
Test Date: 2/15/2023



Filter Class: CFC_600
Max: 1.0 g at 16.0 ms
Min: -136.4 g at 2.2 ms



Filter Class: CFC_600
Max: 28.4 N at 16.0 ms
Min: -4,000.2 N at 2.2 ms

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

02.15.2023 08:42:34 1842



Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 5th Serial No. DH1659 Certification No. 8-1
Test Date: 2/15/2023

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.099 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-3,983.8 N	Yes

Test meets specifications.

Condition: Used

Comments:

Knee Skin S/N: EC5852

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

02.15.2023 08:45:47 1842

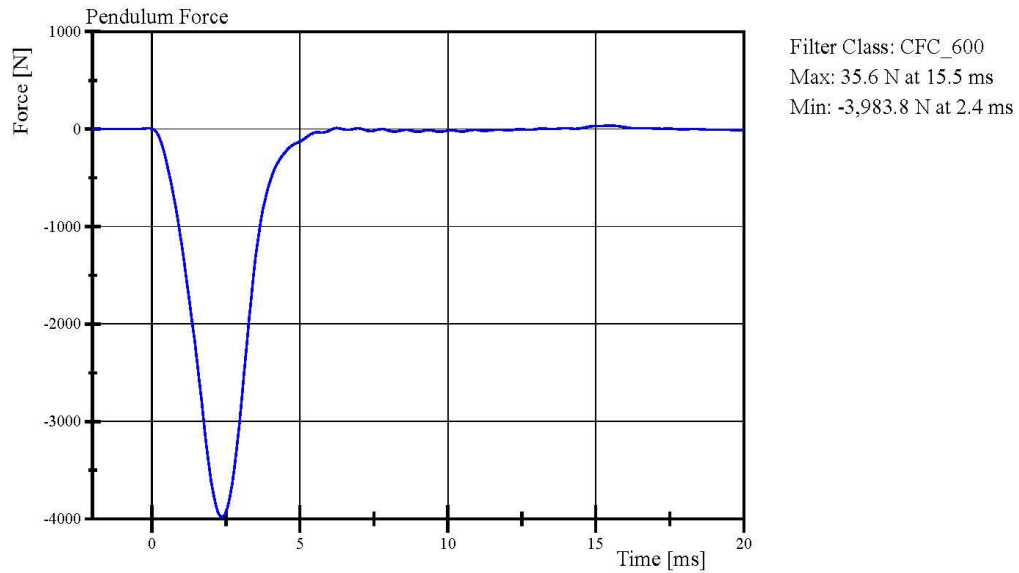
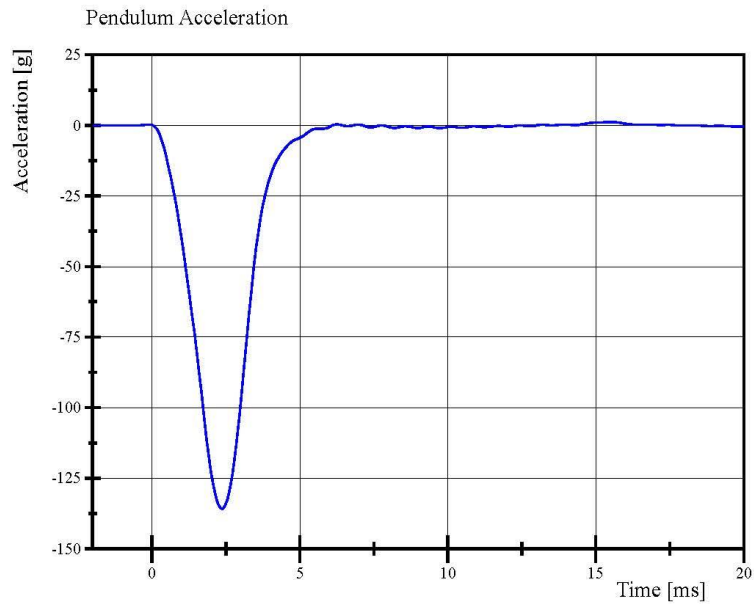


Report Number: DH1659_HFH08

Page 24 of 28

Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 5th Serial No. DH1659 Certification No. 8-1
Test Date: 2/15/2023



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

02.15.2023 08:46:54 1842



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	23-Jan-2023
			Y	P94650	Endevco	23-Jan-2023
			Z	P94622	Endevco	23-Jan-2023
	Redundant		X	P94431	Endevco	23-Jan-2023
			Y	P94487	Endevco	23-Jan-2023
			Z	P94645	Endevco	23-Jan-2023
Head Angular Rate Sensors			X	ARS14948	DTS	13-Sep-2022
			Y	ARS14949	DTS	13-Sep-2022
			Z	ARS14952	DTS	13-Sep-2022
Upper Neck Load Cell			FX, FY, FZ, MX, MY, MZ	2021	Humanetics	24-Jan-2023
Chest Accelerometers	Primary		X	P97714	Endevco	23-Jan-2023
			Y	P61255	Endevco	23-Jan-2023
			Z	P45008	Endevco	23-Jan-2023
	Redundant		X	P91177	Endevco	23-Jan-2023
			Y	P94570	Endevco	23-Jan-2023
			Z	P91172	Endevco	23-Jan-2023
Chest Potentiometer			X	CST037	Servo	24-Jan-2023
Pelvis Accelerometers			X	T11801	Endevco	23-Jan-2023
			Y	P91876	Endevco	23-Jan-2023
			Z	T11390	Endevco	23-Jan-2023
Femur Load Cells	Left	Primary	Z	DI4215-FZ1	Denton	24-Jan-2023
		Redundant	Z	DI4215-FZ2	Denton	24-Jan-2023
	Right	Primary	Z	DI4216-FZ1	Denton	24-Jan-2023
		Redundant	Z	DI4216-FZ2	Denton	24-Jan-2023
Tibia Load Cells	Left	Upper	MX, MY, FZ	3643-94	Denton	27-Jan-2023
		Lower	MX, MY, FZ	3644-370	Denton	27-Jan-2023
	Right	Upper	MX, MY, FZ	3643-413	Denton	27-Jan-2023
		Lower	MX, MY, FZ	3644-401	Denton	27-Jan-2023
Foot Accelerometers	Left	Rear	X	P90848	Endevco	27-Jan-2023
			Z	P91498	Endevco	30-Jan-2023
		Front	Z	P90841	Endevco	30-Jan-2023
	Right	Rear	X	P93467	Endevco	30-Jan-2023
			Z	P97619	Endevco	30-Jan-2023
		Front	Z	P94523	Endevco	30-Jan-2023
Seat Belt Load Cells		Lap	N/A	N/A	N/A	N/A
		Shoulder	N/A	N/A	N/A	N/A

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	26-Jan-2023
			Y	T11806	Endevco	26-Jan-2023
			Z	P69062	Endevco	26-Jan-2023
	Redundant		X	T11046	Endevco	26-Jan-2023
			Y	P97525	Endevco	26-Jan-2023
			Z	P73228	Endevco	26-Jan-2023
Head Angular Rate Sensors			X	ARS6120	DTS	13-Sep-2022
			Y	ARS10776	DTS	13-Sep-2022
			Z	ARS4732	DTS	13-Sep-2022
Upper Neck Load Cell			FX, FY, FZ, MX, MY, MZ	1874	Denton	24-Jan-2023
Chest Accelerometers	Primary		X	P80855	Endevco	26-Jan-2023
			Y	P93546	Endevco	26-Jan-2023
			Z	P57791	Endevco	26-Jan-2023
	Redundant		X	P73221	Endevco	26-Jan-2023
			Y	T11872	Endevco	27-Jan-2023
			Z	T16784	Endevco	26-Jan-2023
Chest Potentiometer			X	CST3410	Servo	27-Jan-2023
Pelvis Accelerometers			X	P91969	Endevco	26-Jan-2023
			Y	P91958	Endevco	26-Jan-2023
			Z	P80721	Endevco	26-Jan-2023
Femur Load Cells	Left	Primary	Z	DT0997-FZ1	Denton	26-Jan-2023
		Redundant	Z	DT0997-FZ2	Denton	26-Jan-2023
	Right	Primary	Z	DS4140-FZ1	Denton	26-Jan-2023
		Redundant	Z	DS4140-FZ2	Denton	26-Jan-2023
Tibia Load Cells	Left	Upper	MX, MY, FZ	3643-92	Denton	26-Jan-2023
		Lower	MX, MY, FZ	3644-92	Denton	26-Jan-2023
	Right	Upper	MX, MY, FZ	3643-484	Denton	26-Jan-2023
		Lower	MX, MY, FZ	3644-369	Denton	25-Jan-2023
Foot Accelerometers	Left	Rear	X	P90866	Endevco	26-Jan-2023
			Z	T11816	Endevco	26-Jan-2023
		Front	Z	P97890	Endevco	26-Jan-2023
	Right	Rear	X	P97640	Endevco	26-Jan-2023
			Z	P91471	Endevco	26-Jan-2023
		Front	Z	P91907	Endevco	26-Jan-2023
Seat Belt Load Cells		Lap	N/A	N/A	N/A	N/A
		Shoulder	N/A	N/A	N/A	N/A

TABLE 3 – Vehicle Instrumentation

Instrumentation			Axis	Serial Number	Manufacturer	Calibration Date
Crossmember/Rear Seat Accelerometers	Left	Primary	X	A318447	Measurement Specialties	7-Oct-2022
			Z	A400122	Measurement Specialties	7-Oct-2022
		Redundant	X	A297062	Measurement Specialties	7-Oct-2022
	Right	Primary	X	A251664	Measurement Specialties	19-Sep-2022
			Z	A377536	Measurement Specialties	7-Oct-2022
		Redundant	X	A400122	Measurement Specialties	7-Oct-2022
Engine Accelerometers	Top		X	A318467	Measurement Specialties	7-Oct-2022
	Bottom		X	A318488	Measurement Specialties	7-Oct-2022