

Final Report Number: NCAP-TRC-23-002

New Car Assessment Program (NCAP)

Frontal Barrier Impact Test

MITSUBISHI MOTOR CORPORATION, JAPAN

2023 Mitsubishi Outlander

NHTSA Number: M20235600

PREPARED BY:

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Report Date: August 22, 2023

FINAL REPORT

Prepared For:

U. S. DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

Office of Crashworthiness Standards

1200 New Jersey Ave, SE

Washington, DC 20590

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Prepared By: ILO Project Operations Group

Approved By: John Shultz

Approval Date: August 22, 2023

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 _____

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16. Abstract A 56.0 km/h NCAP Frontal Impact Test was conducted on a 2023 Mitsubishi Outlander, 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 28, 2023. The impact velocity was 56.47 km/h, and the ambient temperature at the barrier face at the time of impact was 20.6° C. The target vehicle post-test maximum crush was 430 millimeters at vehicle center line and crush zone 5 right side. The test vehicle's performance is as follows: <table border="1"> <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>320</td> <td>NA</td> <td>700</td> <td>281</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>-23.0</td> <td>mm</td> <td>52</td> <td>-19.8</td> </tr> <tr> <td>3ms Chest Clip</td> <td>Gs</td> <td>60</td> <td>48.0</td> <td>Gs</td> <td>60</td> <td>43.8</td> </tr> <tr> <td>Nij</td> <td>NA</td> <td>1</td> <td>0.35</td> <td>NA</td> <td>1</td> <td>0.44</td> </tr> <tr> <td>Neck Tension</td> <td>Newtons</td> <td>4170</td> <td>2229.8</td> <td>Newtons</td> <td>2620</td> <td>1044.8</td> </tr> <tr> <td>Neck Compression</td> <td>Newtons</td> <td>4000</td> <td>-194.6</td> <td>Newtons</td> <td>2520</td> <td>-469.3</td> </tr> <tr> <td>Left Femur Force</td> <td>Newtons</td> <td>10008</td> <td>-1805.2</td> <td>Newtons</td> <td>6805</td> <td>-2003.8</td> </tr> <tr> <td>Right Femur Force</td> <td>Newtons</td> <td>10008</td> <td>-1750.6</td> <td>Newtons</td> <td>6805</td> <td>-1905.1</td> </tr> </tbody> </table>								Driver ATD			Passenger ATD			Measurement Description	Units	Threshold	Result	Units	Threshold	Result	Head Injury Criteria (HIC ₁₅)	NA	700	320	NA	700	281	Maximum Chest Compression	mm	63	-23.0	mm	52	-19.8	3ms Chest Clip	Gs	60	48.0	Gs	60	43.8	Nij	NA	1	0.35	NA	1	0.44	Neck Tension	Newtons	4170	2229.8	Newtons	2620	1044.8	Neck Compression	Newtons	4000	-194.6	Newtons	2520	-469.3	Left Femur Force	Newtons	10008	-1805.2	Newtons	6805	-2003.8	Right Femur Force	Newtons	10008	-1750.6	Newtons	6805	-1905.1
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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 Mitsubishi Outlander at a velocity of 56.47 km/h. The test was performed at Transportation Research Center, Inc. on February 28, 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 430 mm and both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

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

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)	320	0.35	2229.8	-194.6	48.0	-23.0	-1805.2	-1750.6
Passenger (5 th Female)	281	0.44	1044.8	-469.3	43.8	-19.8	-2003.8	-1905.1

TEST COMMENTS:

Passenger Left Foot Aft Z: Channel failed at 63.0 ms
Vehicle Engine Bottom X: Channel failed at 25.0 ms

2.2 REPORT AREA 2: DATA SHEETS

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

Test Vehicle: 2023 Mitsubishi Outlander
 Test Program: NCAP Frontal Impact

NHTSA No.: M20235600
 Test Date: 2/28/2023

TEST VEHICLE INFORMATION

NHTSA No.	M20235600
Model Year	2023
Make	Mitsubishi
Model	Outlander
Body Style	MPV
VIN	JA4J4UA89PZ019196
Body Color	White Diamond
Odometer Reading (km/mi)	8.0 mi
Engine Displacement (L)	2.5
Type/No. Cylinders	Straight/4
Engine Placement	Transverse
Transmission Type	CVT
Transmission Speeds	N/A
Overdrive	N/A
Final Drive	AWD
Roof Rack	No
Sunroof/T-Top	No
Running Boards	No
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: Front Center Airbag	Yes

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

Yes

DATA FROM CERTIFICATION LABEL

Manufactured by	MITSUBISHI MOTOR CORPORATION, JAPAN	GVWR (kg)	2355 (5192 lbs)
Date of Manufacture		GAWR Front (kg)	1210 (2668 lbs)
		GAWR Rear (kg)	1365 (3009 lbs)

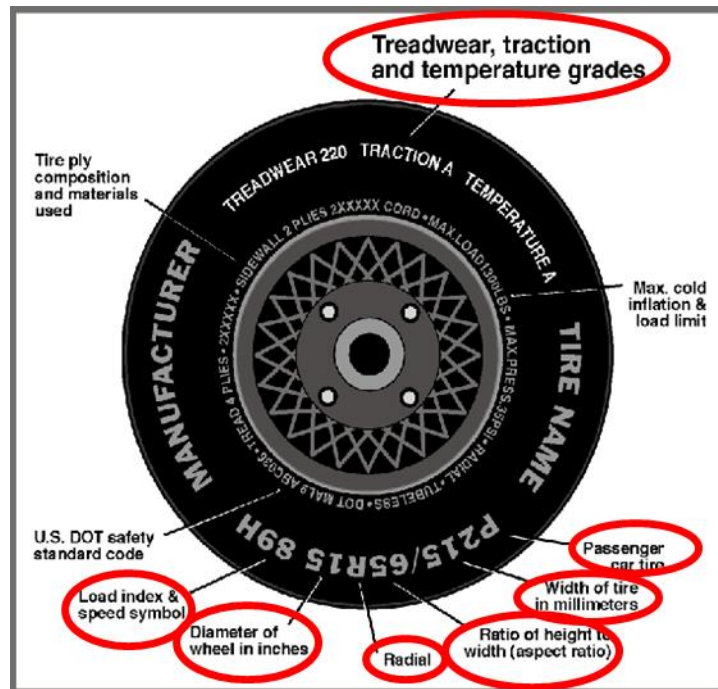
VEHICLE SEATING AND WEIGHT CAPACITY

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Split Bench	Split Bench	
Number of Occupants	2	3	2	7
Capacity Wt. (VCW) (kg)				525.0
Cargo Wt. (RCLW) (kg)				49.0

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

Test Vehicle: 2023 Mitsubishi Outlander
Test Program: NCAP Frontal Impact

NHTSA No.: M20235600
Test Date: 2/28/2023



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold / Test Pressure (kPa)	240	240
Recommended Tire Size	P255/45R20	P255/45R20
Tire Size on Vehicle	P255/45R20	P255/45R20
Tire Manufacturer	Bridgestone	Bridgestone
Tire Model	Ecopia H/L 422	Ecopia H/L 422
Treadwear	600	600
Traction Grade	A	A
Temperature Grade	A	A
Tire Plies Sidewall	2	2
Tire Plies Body	5	5
Load Index/Speed Symbol	101W	101W
Tire Material	Polyester, Steel	Polyester, Steel
DOT Safety Code Right	EL A9 CDJ 4222	EL A9 CDJ 4222
DOT Safety Code Left	EL A9 CDJ 4222	EL A9 CDJ 4222

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

Test Vehicle: 2023 Mitsubishi Outlander
Test Program: NCAP Frontal Impact

NHTSA No.: M20235600
Test Date: 2/28/2023

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	494.6	381.2		520.0	447.0	
Right	kg	490.6	370.6		508.4	445.0	
Ratio	%	56.7	43.3		53.6	46.4	
Totals	kg	985.2	751.8	1737.0	1028.4	892.0	1920.4

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1737.0
Weight of 1 P572E ATD & 1 P572O ATD	kg	139.3
Rated Cargo/Luggage Weight (RCLW)	kg	49.0
Vehicle Target Weight (TVTW)	kg	1925.3

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front)
As Delivered	mm	840	840	845	842	1169
As Tested	mm	834	830	820	815	1254
Post Test	mm	N/A	N/A	842	843	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2700
Total Vehicle Length at Left Side	mm	4520
Total Vehicle Length at Centerline	mm	4690
Total Vehicle Length at Right Side	mm	4520
Weight of Ballast in Cargo Area	kg	55.4
Weight of Vehicle Components Removed	kg	0.0
Amount of Stoddard Solvent in Fuel Tank	liters	55.0

LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT: None

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

Test Vehicle: 2023 Mitsubishi Outlander
Test Program: NCAP Frontal Impact

NHTSA No.: M20235600
Test Date: 2/28/2023

TARGET VEHICLE STRUCTURAL MEASUREMENT

	Elements	Pre-Test (mm)
1	Total Length	4690
2	Total Width	1863
3	Bumper Top Height	695
4	Bumper Bottom Height	545
5	Longitudinal Member Top Height	695
6	Distance Between Longitudinal Members	920
7	Longitudinal Member Width	55
8	Engine Top Height	880
9	Engine Bottom Height	305
10	Engine and Gearbox Width	700
11	Front Bumper-Engine Distance	500
12	Front Shock Absorber Fixing Height	980
13	Bonnet Leading Edge Height	830
14	Front Shock Absorber Fixing Width	1200
15	Front Bumper – Front Axle Distance	900
16	Front Axle – A-Pillar Distance	530
17	A-Pillar – B-Pillar Distance	1080
18	B-Pillar – Rear Axle Distance	1090
19	B-Pillar – C-Pillar Distance	890
20	Roof Sill Bottom Height	1515
21	Roof Sill Top Height	1580
22	Floor Sill Bottom Height	425
23	Floor Sill Top Height	485

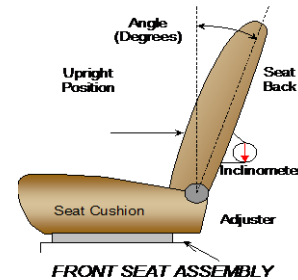
DATA SHEET NO. 2 - SEAT ADJUSTMENT, FUEL SYSTEM AND STEERING WHEEL DATA

Test Vehicle: 2023 Mitsubishi Outlander
Test Program: NCAP Frontal Impact

NHTSA No.: M20235600
Test Date: 2/28/2023

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:	6.6
Passenger Seat back angle:	-1.4

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	260 mm	Mid
Passenger Seat	260 mm	Full Forward

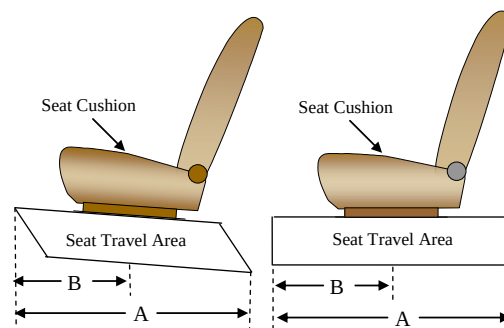
SEAT BELT UPPER ANCHORAGE

Describe the method of positioning seat belt upper anchorages.

Driver: One below uppermost, Positioned according to Form 1

Passenger: One below uppermost, Positioned according to Form 1

	Total No. of Positions	Placed in Position No.
Driver Seat	4	1, One below uppermost
Passenger Seat	4	1, One below uppermost



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

Test Vehicle: 2023 Mitsubishi Outlander
Test Program: NCAP Frontal Impact

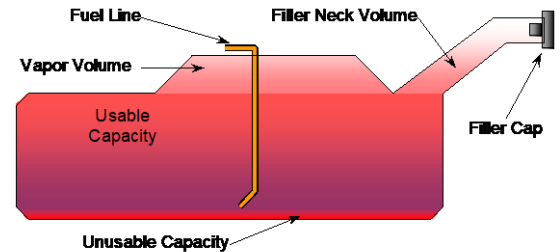
NHTSA No.: M20235600
Test Date: 2/28/2023

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	55.0
Usable Capacity of "Optional Tank"	N/A
92%-94% of Usable Capacity	51.0
Actual Amount of Solvent Used	51.0
1/3 of Usable Capacity	18.3

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

Pump runs with ignition on

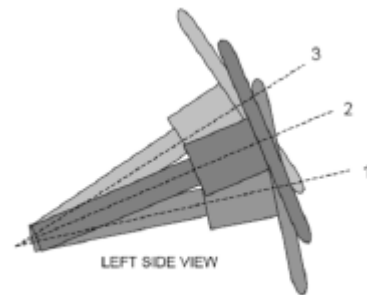


VEHICLE FUEL TANK ASSEMBLY

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

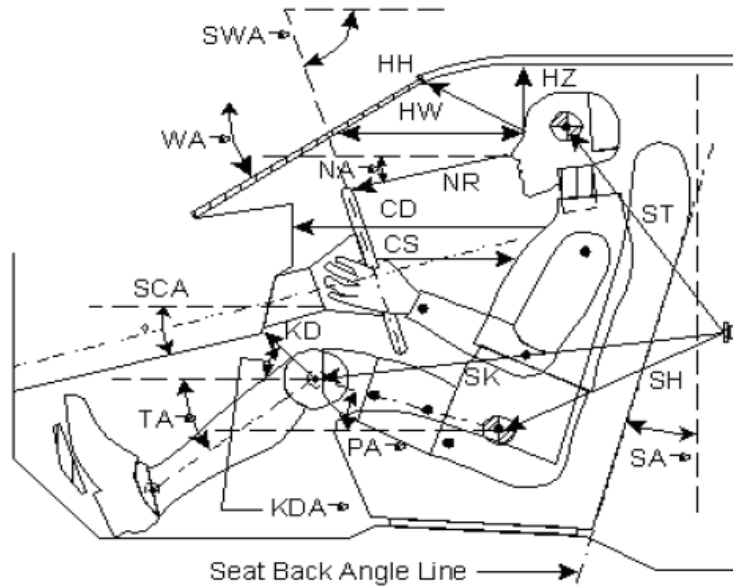
STEERING COLUMN POSITIONS

	Degrees	Fore/Aft Position (mm)
Lowermost Position No. 1	23.1	0
Geometric Center Position No. 2	25.8	27.5
Uppermost Position No. 3	28.5	55
Telescoping Steering Wheel Travel		55
Test Position	25.8	27.5

DATA SHEET NO. 3 - DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2023 Mitsubishi Outlander
 Test Program: NCAP Frontal Impact

NHTSA No.: M20235600
 Test Date: 2/28/2023



Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		29.0		
SWA°	Steering Wheel Angle		24.7		
SCA°	Steering Column Angle		64.2		
SA°	Seat Back Angle (on head rest post)		6.8		5.0
HZ	Head to Roof (Z)	153		211	
HH	Head to Header	350		309	
HW	Head to Windshield	630		684	
NR	Nose to Rim	405	30.5		
CD	Chest to Dash	425		353	
CS	Chest to Steering Hub	310			
RA	Rim to Abdomen	191			
KDL	Left Knee to Dash	154	27.0	71	38.6
KDR	Right Knee to Dash	80	31.8	88	29.2
PA°	Pelvic Angle		23.1		19.9
TA°	Tibia Angle		52.6		59.0
SK	Striker to Knee	664	12.5	760	17.0
ST	Striker to Head	452	65.1	421	47.0
SH	Striker to H-Point	356	44.1	469	30.7

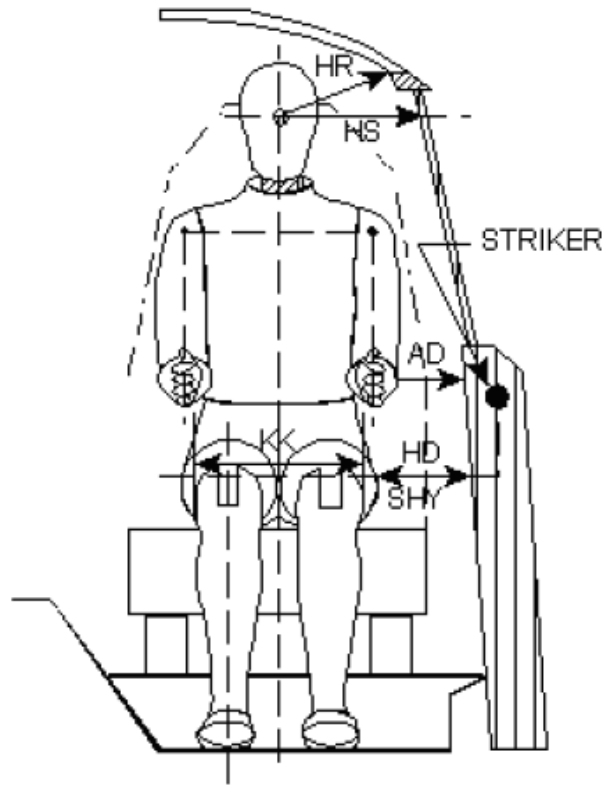
DATA SHEET NO. 4 - DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2023 Mitsubishi Outlander

NHTSA No.: M20235600

Test Program: NCAP Frontal Impact

Test Date: 2/28/2023

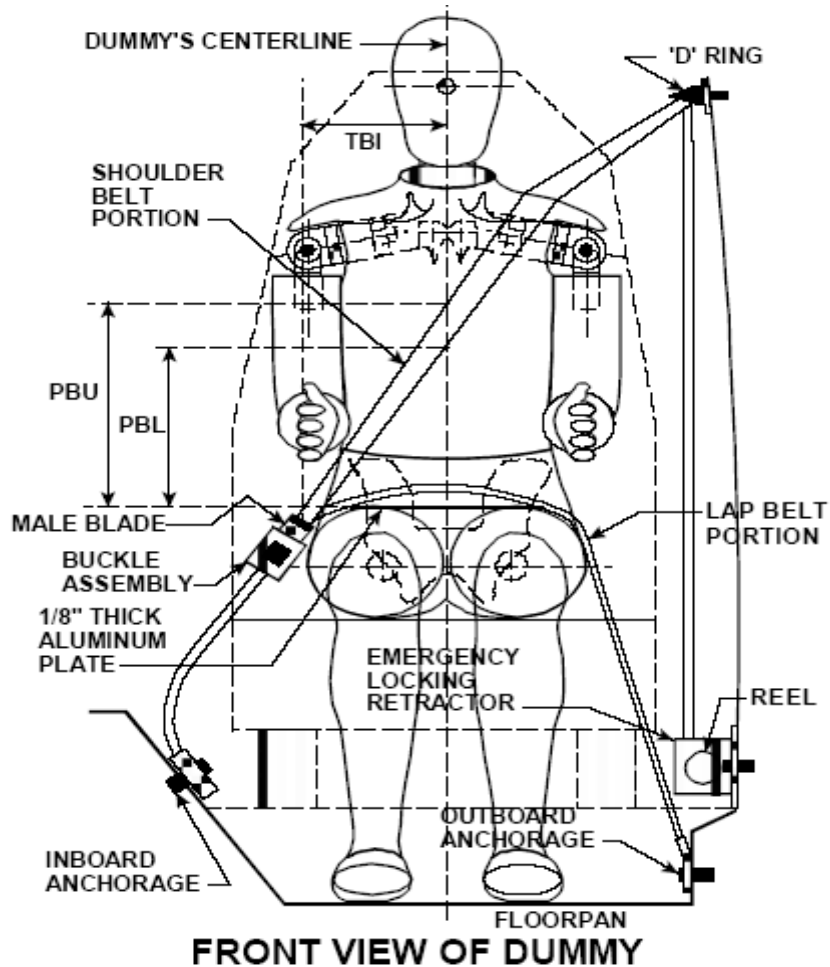


Code	Measurement Description	Driver	Passenger
AD	Arm to Door	125	50
HD	H-Point to Door	126	166
HR	Head to Side Header	225	265
HS	Head to Side Window	345	402
KK	Knee to Knee	260	165
SHY	Striker to H-Point (Y Direction)	227	280
AA	Ankle to Ankle	340	165

DATA SHEET NO. 5 - SEAT BELT POSITIONING DATA

Test Vehicle: 2023 Mitsubishi Outlander
 Test Program: NCAP Frontal Impact

NHTSA No.: M20235600
 Test Date: 2/28/2023



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU – Top surface of reference to belt upper edge	mm	310	305
PBL – Top surface of reference to belt lower edge	mm	226	211

BELT LENGTH DATA

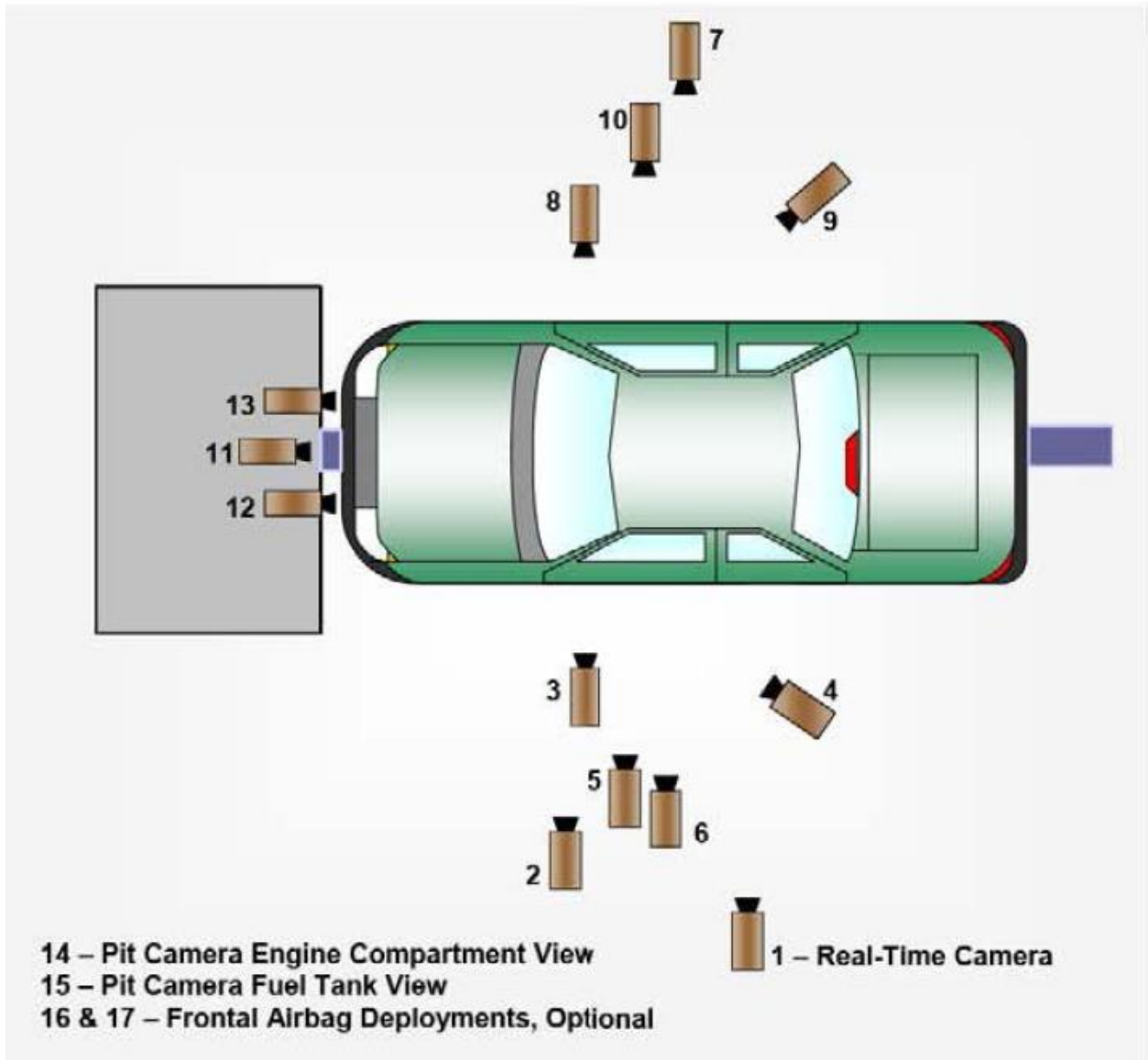
Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	915	939
Lap belt length as measured on ATD	mm	710	815
Remainder of belt on reel	mm	1025	844
Total belt length for continuous webbing systems	mm	2650	2598

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

Test Vehicle: 2023 Mitsubishi Outlander
Test Program: NCAP Frontal Impact

NHTSA No.: M20235600
Test Date: 2/28/2023

CAMERA POSITIONS FOR FRONTAL IMPACTS



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

Test Vehicle: 2023 Mitsubishi Outlander
Test Program: NCAP Frontal Impact

NHTSA No.: M20235600
Test Date: 2/28/2023

CAMERA LOCATIONS

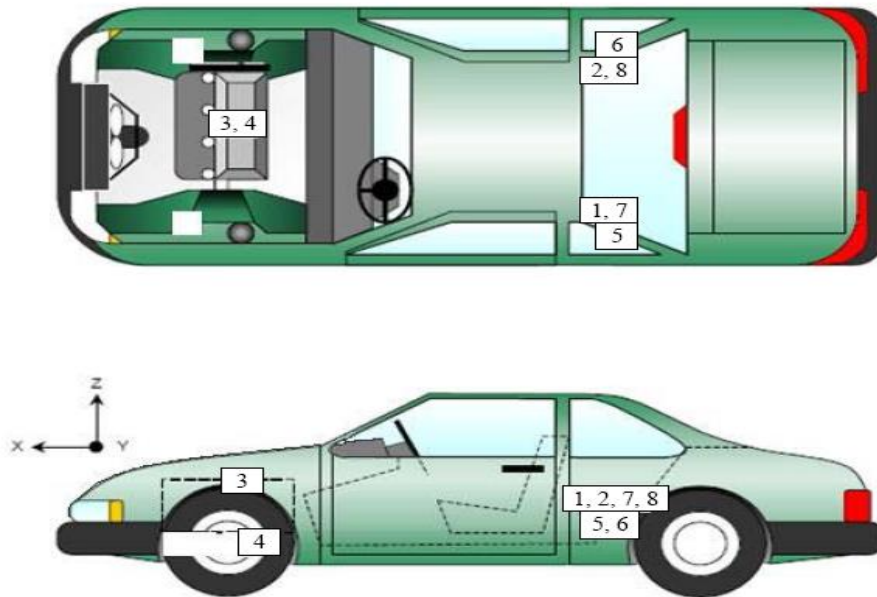
No.	Camera View	Location (mm)			Lens (mm)	Frame Speed (fps)
		X	Y	Z		
1	REAL-TIME LEFT OVERALL	-920	-5823	-1478	Zoom	30
2	LEFT OVERALL	-2602	-4020	-1422	8.5	1000
3	DRIVER CLOSE-UP	-2423	-4029	-1525	50	1000
4	LEFT FRONT HALF	-1550	-4985	-1206	25	1000
5	LEFT ANGLE	-3540	-2418	-1655	20	1000
6	STEERING COLUMN	-2320	-4020	-1528	50	1000
7	RIGHT OVERALL	-2458	4453	-1403	8.5	1000
8	PASSENGER CLOSE-UP	-1992	4396	-1513	50	1000
9	RIGHT FRONT HALF	-1582	4952	-1252	25	1000
10	RIGHT ANGLE	-3002	2127	-1732	20	1000
11	WINDSHIELD	0	0	-2648	20	1000
12	DRIVER WINDSHIELD	0	-310	-2640	16	1000
13	PASSENGER WINDSHIELD	0	205	-2641	16	1000
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 Mitsubishi Outlander
 Test Program: NCAP Frontal Impact

NHTSA No.: M20235600
 Test Date: 2/28/2023



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Accelerometer – X Direction	1797	-640	-448
2	Right Rear Accelerometer – X Direction	1797	635	-449
3	Engine Top X	3860	150	-875
4	Engine Bottom X	3970	175	-265
5	Left Rear Accelerometer – Z Direction	1797	-640	-452
6	Right Rear Accelerometer – Z Direction	1797	635	-452
7	Left Rear Accelerometer – X Direction Redundant	1797	-670	-448
8	Right Rear Accelerometer- X Direction Redundant	1797	675	-449

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

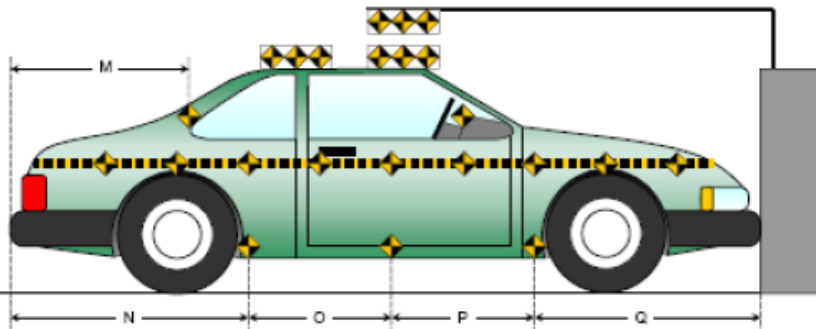
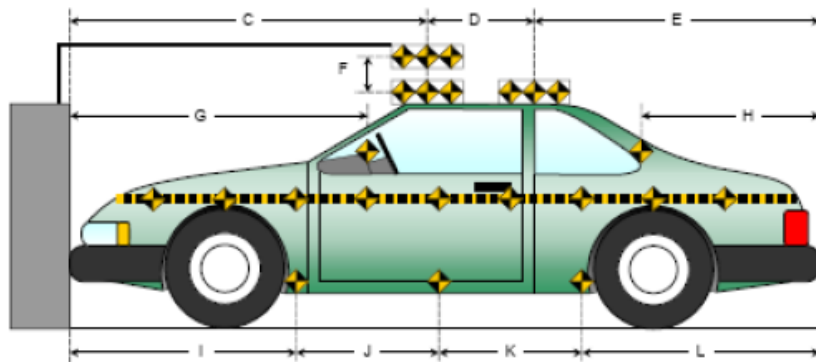
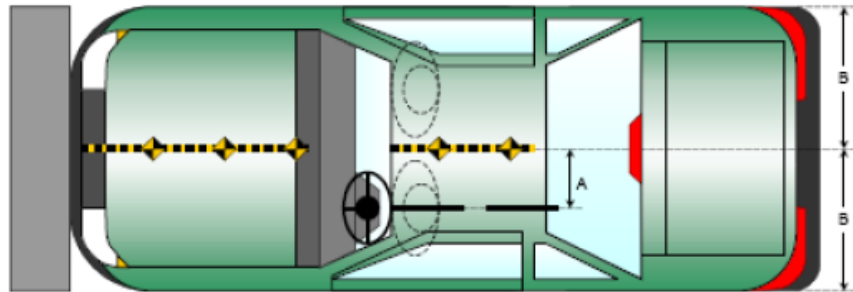
DATA SHEET NO. 8 - PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2023 Mitsubishi Outlander
 Test Program: NCAP Frontal Impact

NHTSA No.: M20235600
 Test Date: 2/28/2023

Item	Value
A	330
B	932
C	2535
D	610
E	1673
F	224
G	1546
H	1246
I	1441
J	880
K	877
L	1492
M	1245
N	1498
O	877
P	882
Q	1433

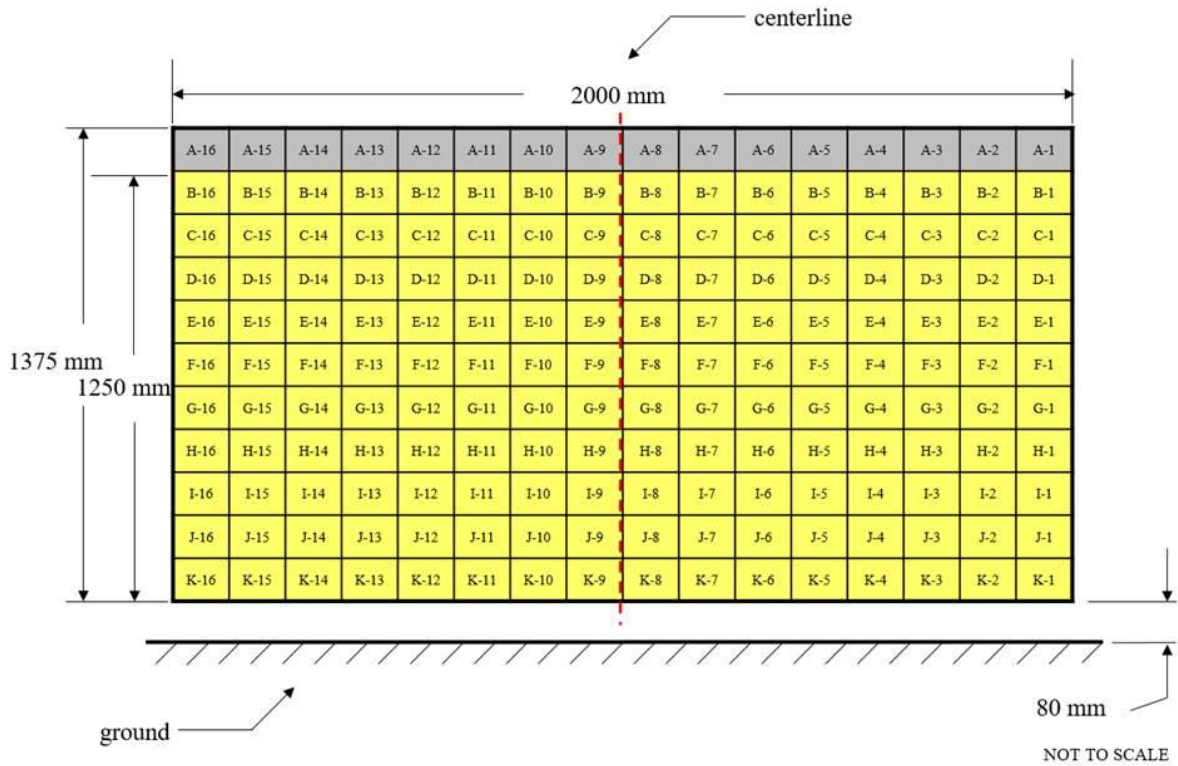
All units in millimeters



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

Test Vehicle: 2023 Mitsubishi Outlander
 Test Program: NCAP Frontal Impact

NHTSA No.: M20235600
 Test Date: 2/28/2023



DATA SHEET NO. 10 - TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2023 Mitsubishi Outlander

NHTSA No.: M20235600

Test Program: NCAP Frontal Impact

Test Date: 2/28/2023

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 Mitsubishi Outlander
 Test Program: NCAP Frontal Impact

NHTSA No.: M20235600
 Test Date: 2/28/2023

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	Frontal Airbag	Frontal Airbag
Lower Torso Contact	Frontal Airbag	Frontal Airbag
Left Knee Contact	Knee Airbag	Knee Airbag/Glove Box
Right Knee Contact	Knee Airbag	Knee Airbag

DOOR OPENING, TRUNK OPENING, AND SEAT TRACK INFORMATION

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

POST- OTHER VEHICLE POST-TEST OBSERVATIONS

Critical Areas of Performance	Observations
Windshield Damage	Cracked along bottom
Window Damage	None
Other Notable Effects	None

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	2848
Center	mm	2829
Right Side	mm	2843
Average	mm	2840

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

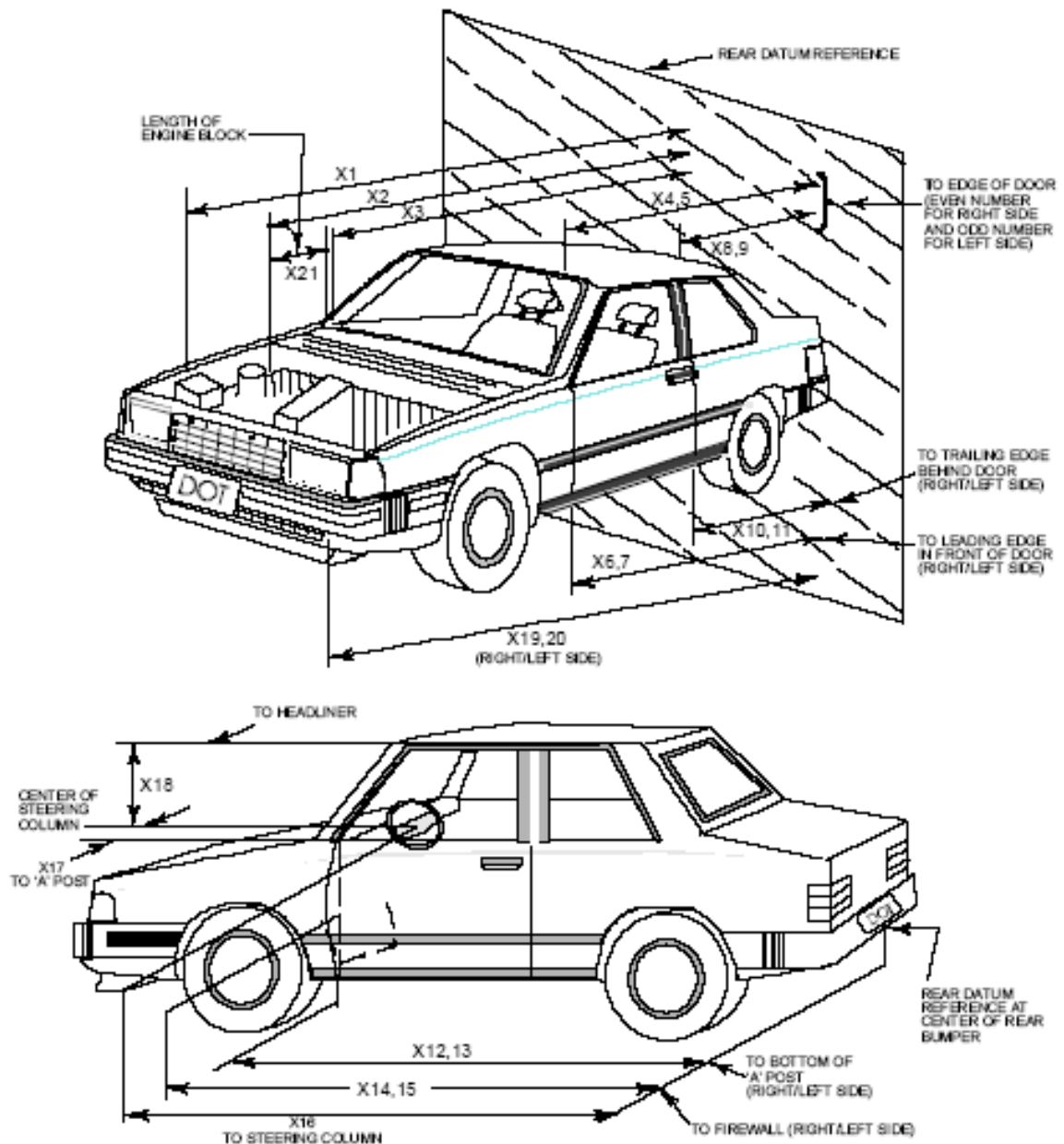
DATA SHEET NO. 12 - VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2023 Mitsubishi Outlander

NHTSA No.: M20235600

Test Program: NCAP Frontal Impact

Test Date: 2/28/2023



DATA SHEET NO. 12 - VEHICLE PROFILE MEASUREMENTS (CONT'D)Test Vehicle: 2023 Mitsubishi OutlanderNHTSA No.: M20235600Test Program: NCAP Frontal ImpactTest Date: 2/28/2023

No.	Measurement Description	Pre-Test	Post-Test	Change
1	Total Length of Vehicle at Centerline	4690	4260	-430
2	Rear Surface of Vehicle (RSOV) to Front of Engine	4200	3997	-203
3	RSOV to Firewall	3660	3593	-67
4	RSOV to Upper Leading Edge of Right Door	3235	3229	-6
5	RSOV to Upper Leading Edge of Left Door	3238	3237	-1
6	RSOV to Lower Leading Edge of Right Door	3190	3192	2
7	RSOV to Lower Leading Edge of Left Door	3188	3188	0
8	RSOV to Upper Trailing Edge of Right Door	2138	2128	-10
9	RSOV to Upper Trailing Edge of Left Door	2135	2133	-2
10	RSOV to Lower Trailing Edge of Right Door	2172	2174	2
11	RSOV to Lower Trailing Edge of Left Door	2172	2174	2
12	RSOV to Bottom of "A" Post-of Right Side	3195	3183	-12
13	RSOV to Bottom of "A" Post-of Left Side	3204	3195	-9
14	RSOV to Firewall, Right Side	3620	3583	-37
15	RSOV to Firewall, Left Side	3615	3575	-40
16	RSOV to Steering Column	2752	2798	46
17	Center of Steering Column to "A" Post	320	342	22
18	Center of Steering Column to Headliner	433	449	16
19	RSOV to Right Side of Front Bumper	4520	4211	-309
20	RSOV to Left Side of Front Bumper	4520	4212	-308
21	Length of Engine Block	600	600	0
RD	RSOV to Right Side of Dash Panel	3075	3068	-7
CD	RSOV to Center of Dash Panel	2968	2978	10
LD	RSOV to Left Side of Dash Panel	3070	3072	2

All Dimensions in mm

DATA SHEET NO. 13 - ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2023 Mitsubishi Outlander
Test Program: NCAP Frontal Impact

NHTSA No.: M20235600
Test Date: 2/28/2023

VEHICLE INFORMATION

VIN: JA4J4UA89PZ019196
Vehicle Size Category: MPV

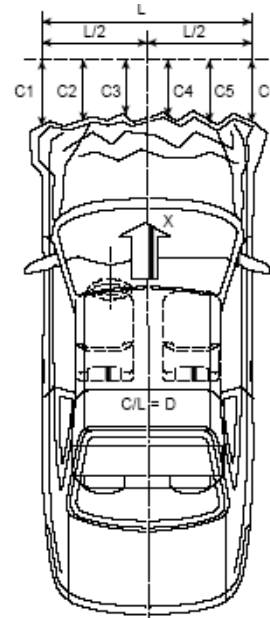
Wheelbase: 2700
Test Weight (kg): 1920.4

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): 66.52
Time of Separation (ms): 114

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	4520	4211	309
C2	Crush zone 2 at left side	mm	4660	4246	414
C3	Crush zone 3 at left side	mm	4690	4265	425
C4	Crush zone 4 at right side	mm	4690	4270	420
C5	Crush zone 5 at right side	mm	4660	4230	430
C6	Crush zone 6 at right side	mm	4520	4212	308
L	C1 to C6	mm	1524	1515	9

DATA SHEET NO. 14 - VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2023 Mitsubishi Outlander
Test Program: NCAP Frontal Impact

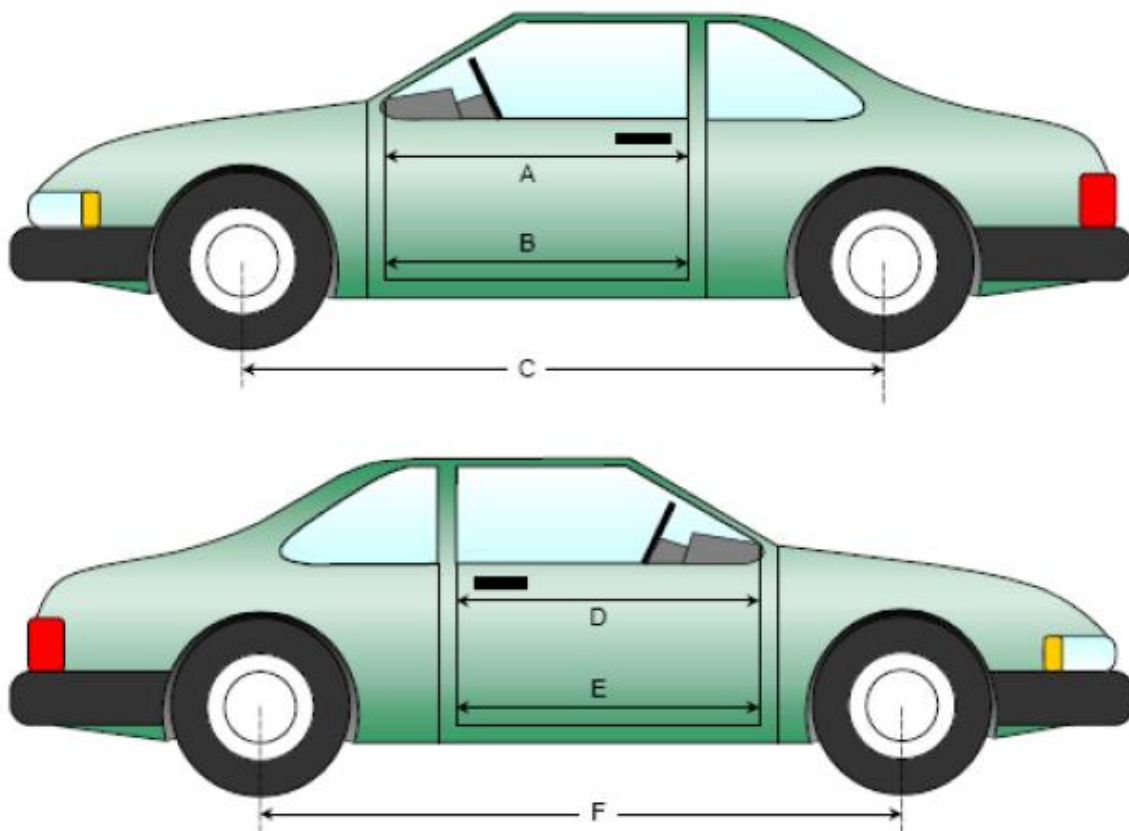
NHTSA No.: M20235600
Test Date: 2/28/2023

DOOR OPENING WIDTH

No.	Description	Units	Pre-Test	Post-Test	Change
A	Left Side Upper	mm	1025	1025	0
B	Left Side Lower	mm	880	880	0
D	Right Side Upper	mm	1025	1025	0
E	Right Side Lower	mm	885	885	0

WHEELBASE MEASUREMENTS

No.	Description	Units	Pre-Test	Post-Test	Change
C	Left Side Wheelbase	mm	2700	2670	-30
F	Right Side Wheelbase	mm	2700	2690	-10



¹ Front suspension damaged and wheels fell off measurements not available

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

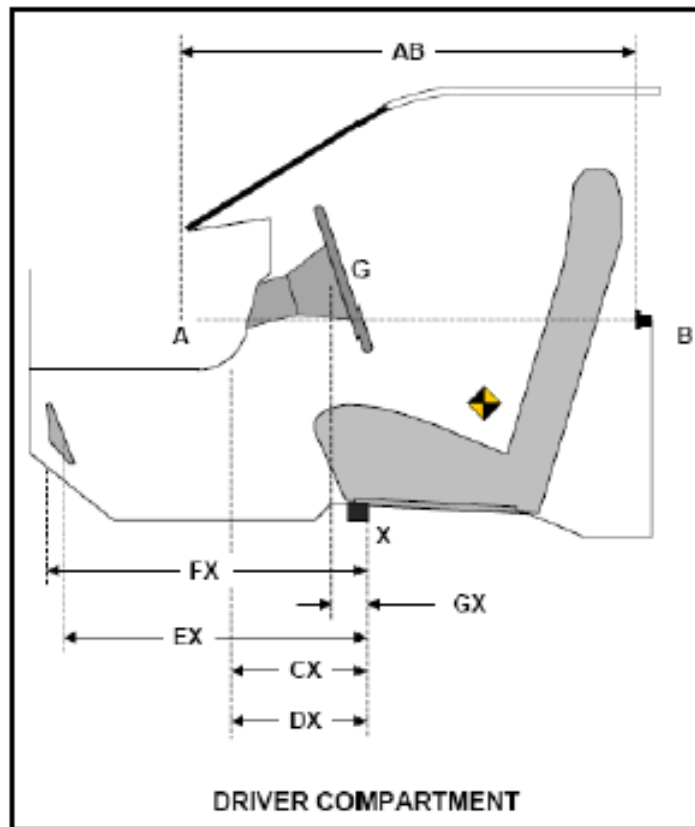
Test Vehicle: 2023 Mitsubishi Outlander
 Test Program: NCAP Frontal Impact

NHTSA No.: M20235600
 Test Date: 2/28/2023

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Change
AB	Door Opening (Inside Window Jam)	mm	1010	1010	0
CX	Left Knee Bolster to X	mm	270	272	2
DX	Right Knee Bolster to X	mm	255	256	1
EX	Brake Pedal to X	mm	545	532	-13
FX	Foot Rest to X	mm	570	576	6
GX	Center of Steering Column Wheel Hub to X	mm	60	115	55

X = Front of Seat Track (Stationary)



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

Test Vehicle: 2023 Mitsubishi Outlander
Test Program: NCAP Frontal Impact

NHTSA No.: M20235600
Test Date: 2/28/2023

Please provide windshield mounting details.

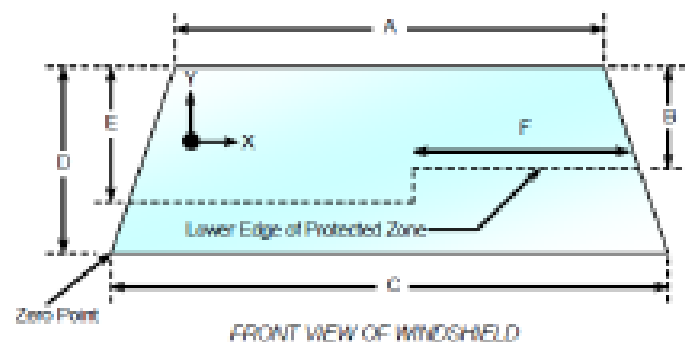
The standard requires that the post-test retention measurement be a minimum of 75% of the pre-test total periphery measurement for vehicle not equipped with occupant passive restraint and 50% for each side of the windshield for vehicle which are equipped with occupant passive restraints.

Temperature of windshield molding during test: 20.6°C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2210	2210	100.0
Right Side	2210	2210	100.0
Total	4420	4420	100.0

Item	Units	Value
A	mm	1230
B	mm	480
C	mm	1570
D	mm	810
E	mm	524
F	mm	586



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 Mitsubishi Outlander
Test Program: NCAP Frontal Impact

NHTSA No.: M20235600
Test Date: 2/28/2023

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 20.6°C

Test Time: 16:35

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

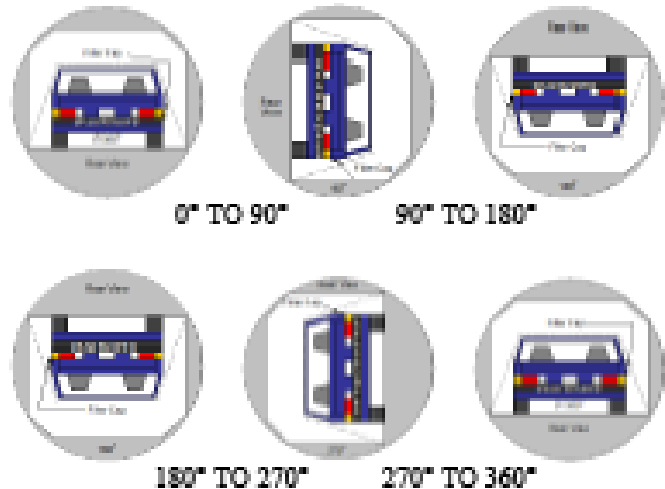
DATA SHEET NO. 16 - FMVSS 301 BARRIER IMPACT AND STATIC ROLLOVER RESULTS (CONT'D)

Test Vehicle: 2023 Mitsubishi Outlander
 Test Program: NCAP Frontal Impact

NHTSA No.: M20235600
 Test Date: 2/28/2023

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

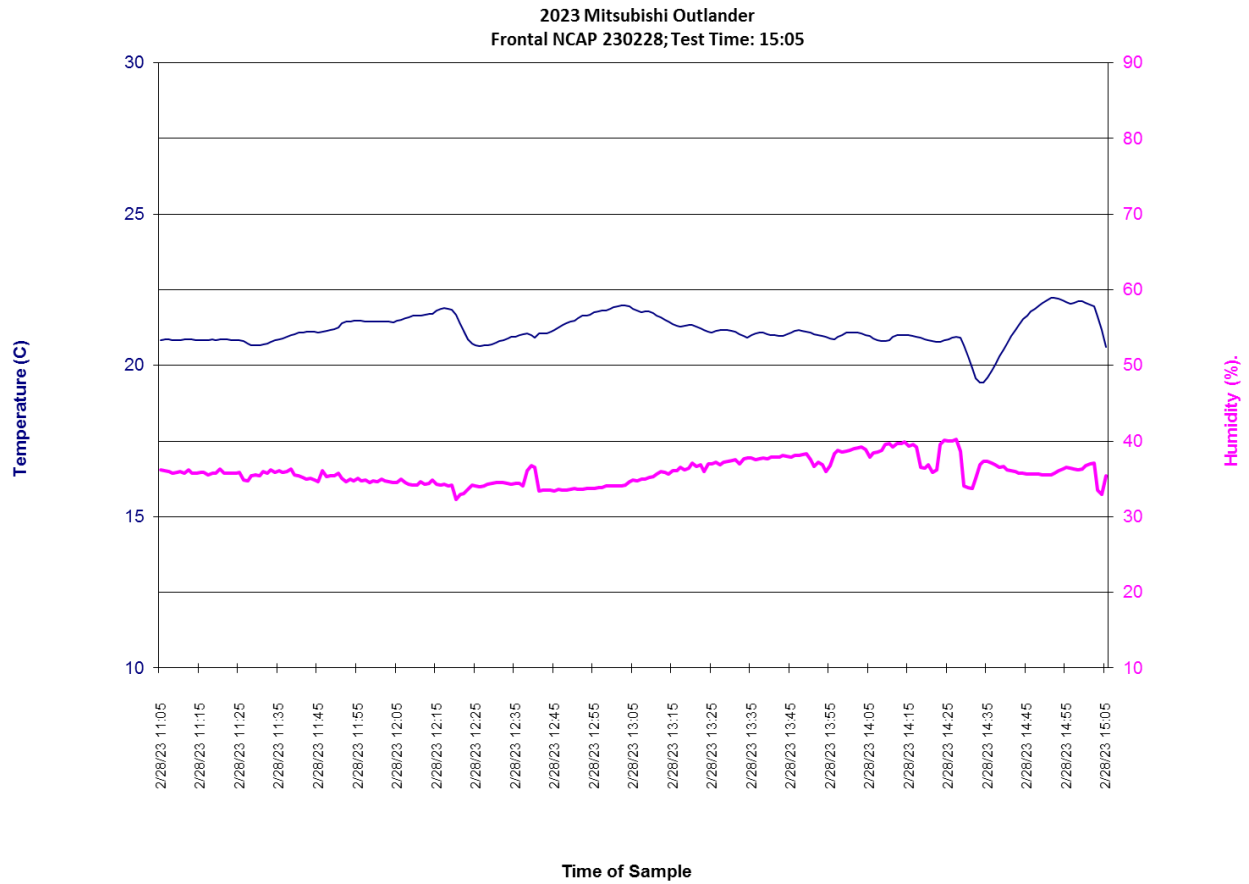
SOLVENT SPILLAGE LOCATION TABLE

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 Mitsubishi Outlander
Test Program: NCAP Frontal Impact

NHTSA No.: M20235600
Test Date: 2/28/2023



APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

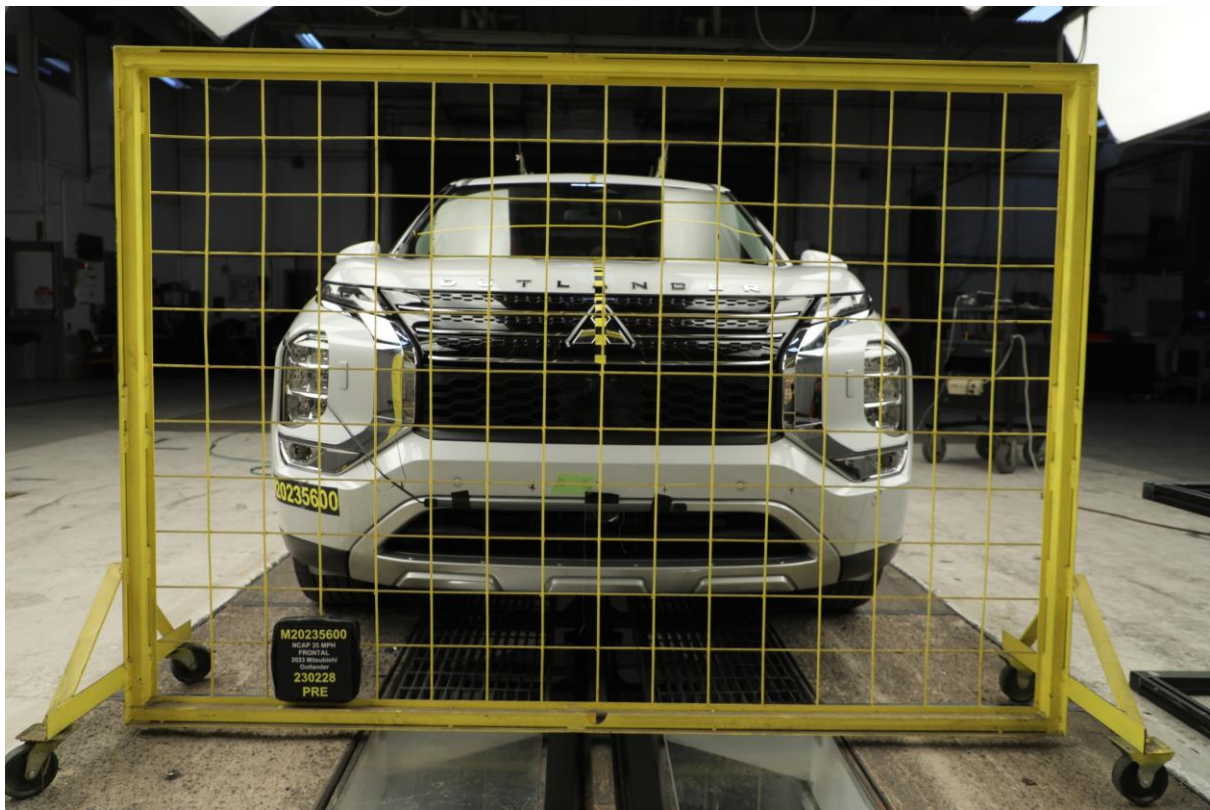
No.	Description	Page
1	Load Cell Location	A-5
2	Pre-Test Load Cell Wall	A-5
3	Post-Test Load Cell Wall	A-6
4	Manufacturer's Label	A-6
5	Tire Placard	A-7
6	2023 Mitsubishi Outlander Frontal As Delivered	A-8
7	Left Rear 3-4 View, as Received	A-8
8	Pre-Test Front View of Test Vehicle	A-9
9	Post-Test Front 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)

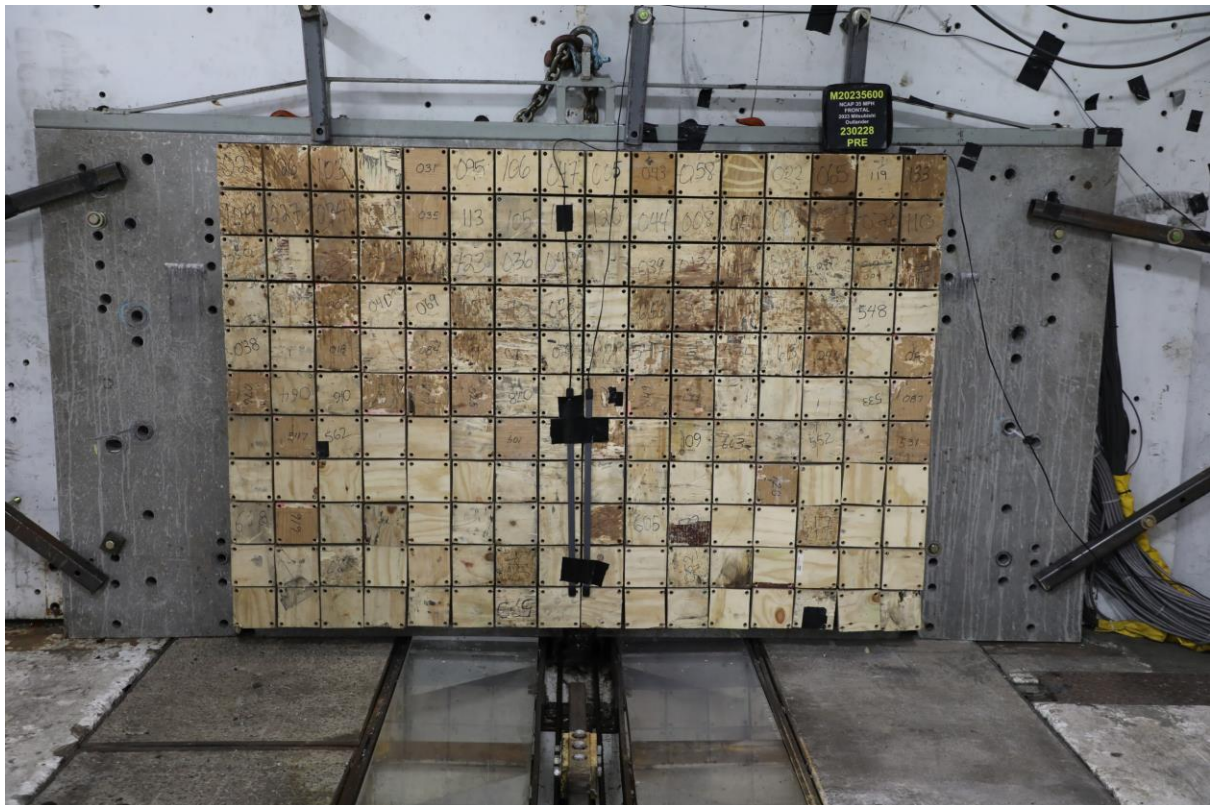
No.	Description	Page
34	Pre-Test Driver Dummy and Vehicle Interior View	A-24
35	Post-Test Driver Dummy and Vehicle Interior View	A-24
36	Pre-Test Driver's Seat Fore-Aft Markings	A-25
37	Post-Test Driver's Seat Fore-Aft Markings	A-25
38	Pre-Test View of Belt Anchorage for Driver Dummy	A-26
39	Post-Test 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)

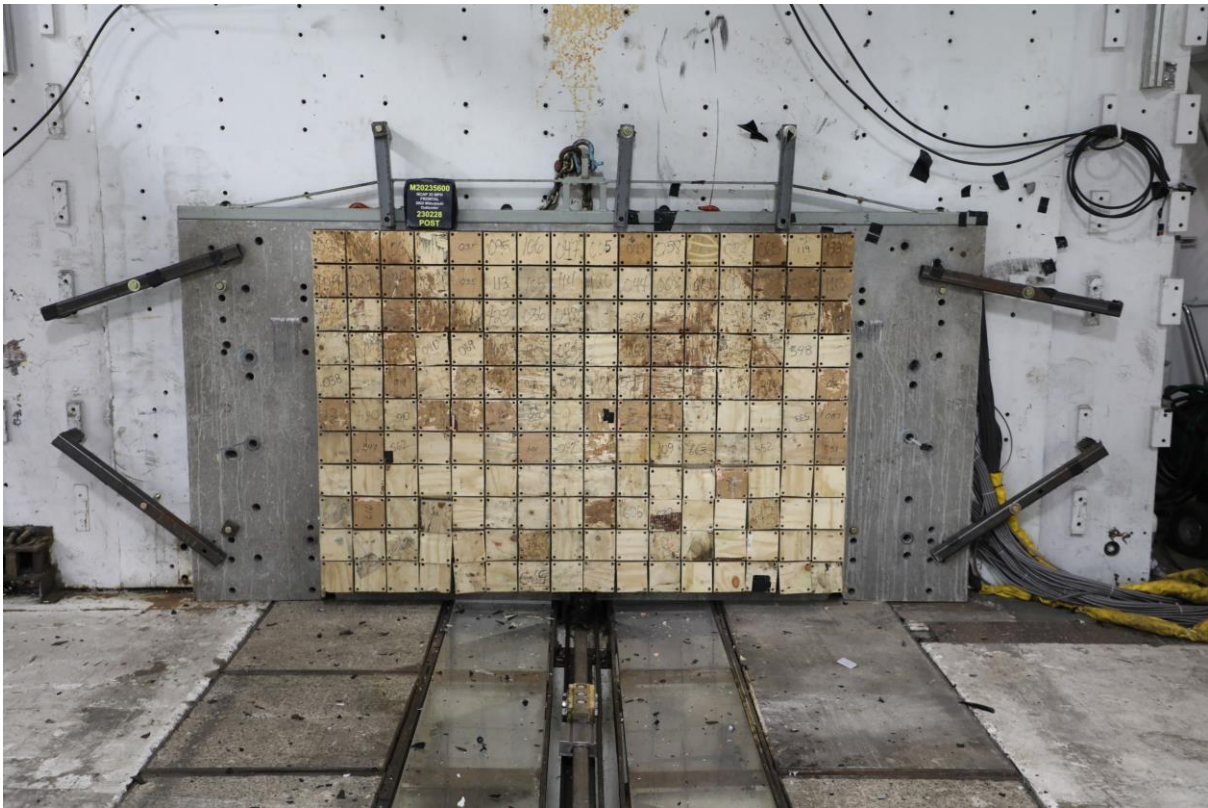
No.	Description	Page
71	Post-Test Passenger Dummy Face	A-43
72	Post-Test Passenger Dummy Contact with Airbag	A-43
73	Post-Test Passenger Dummy Contact with Headrest	A-44
74	Photograph of Ballast Installed in Vehicle View	A-44
75	Post-Test Stoddard Solvent Spillage Location View, if required	A-45
76	Post-Test 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 Mitsubishi Outlander Frontal Impact Event	A-48
83	Monroney Label Photograph	A-49



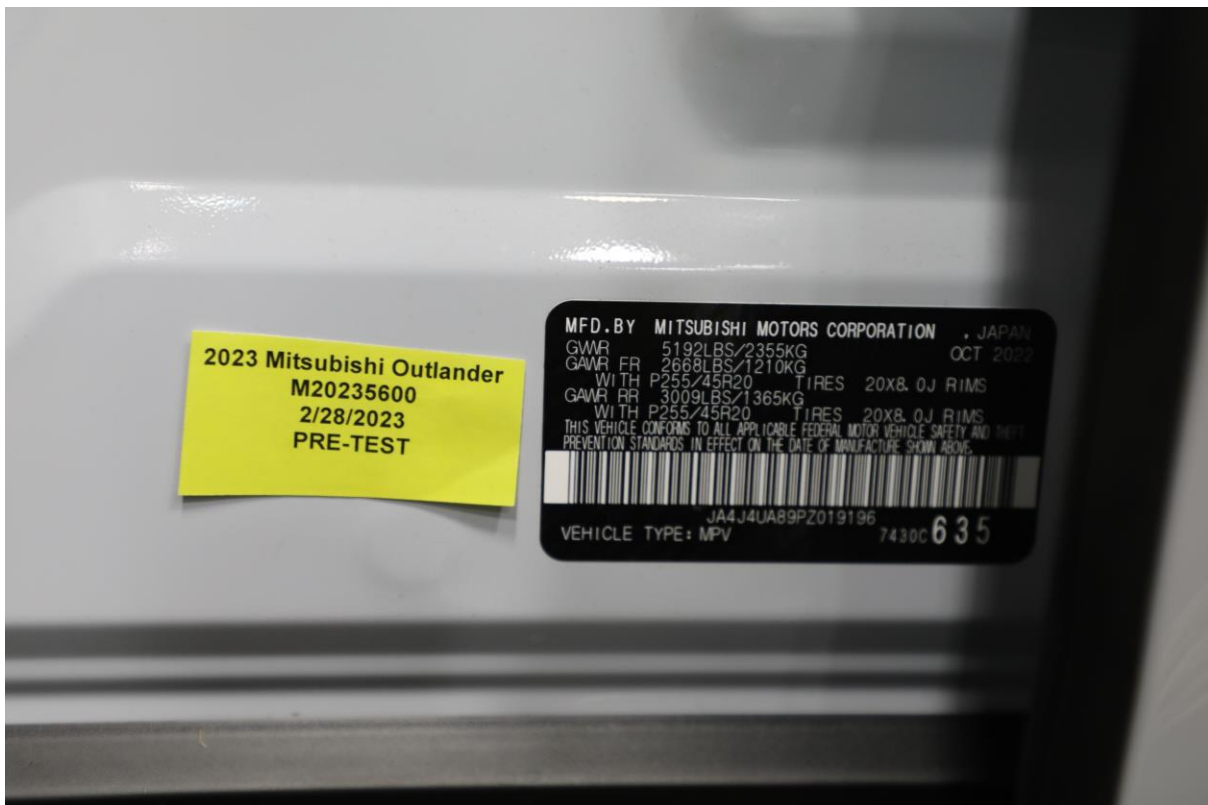
001 Load Cell Location



002 Pre-Test Load Cell Wall



003 Post-Test Load Cell Wall

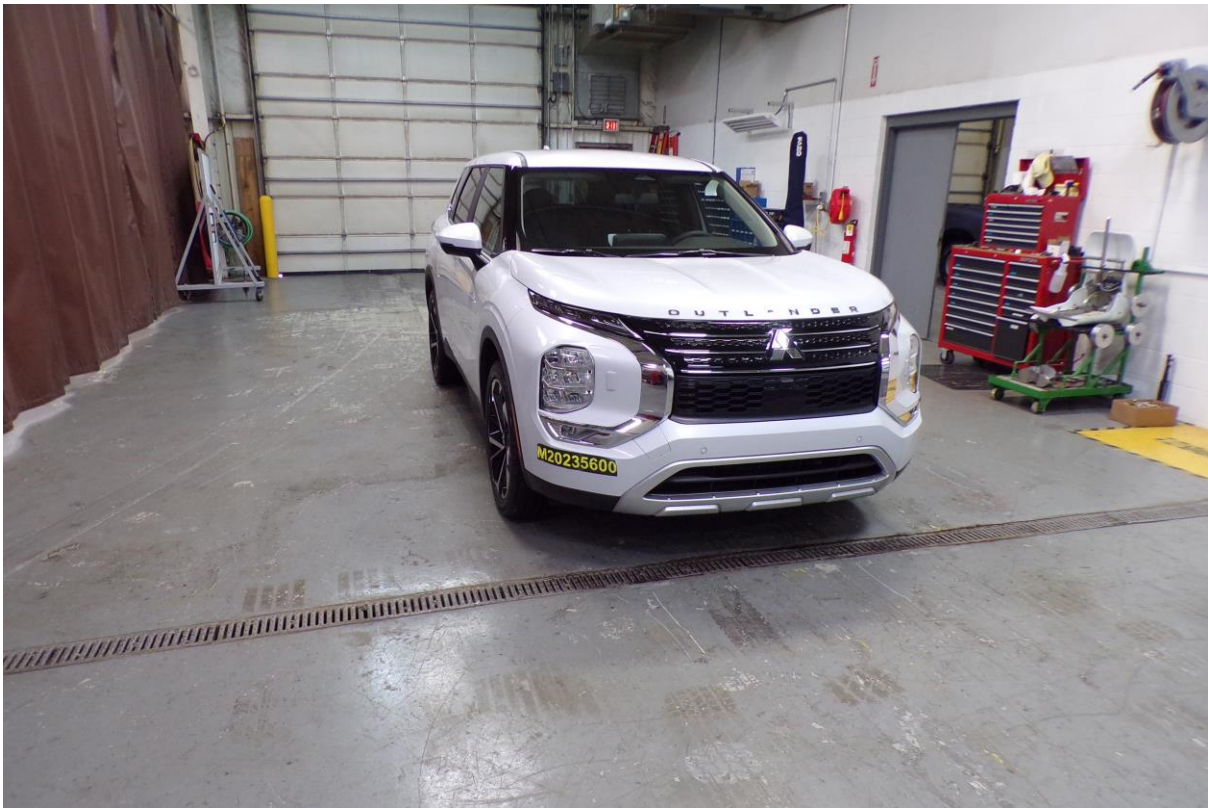


004 Manufacturer's Label



005 Tire Placard

Intentionally Left Blank



006 2023 Mitsubishi Outlander Frontal As Delivered



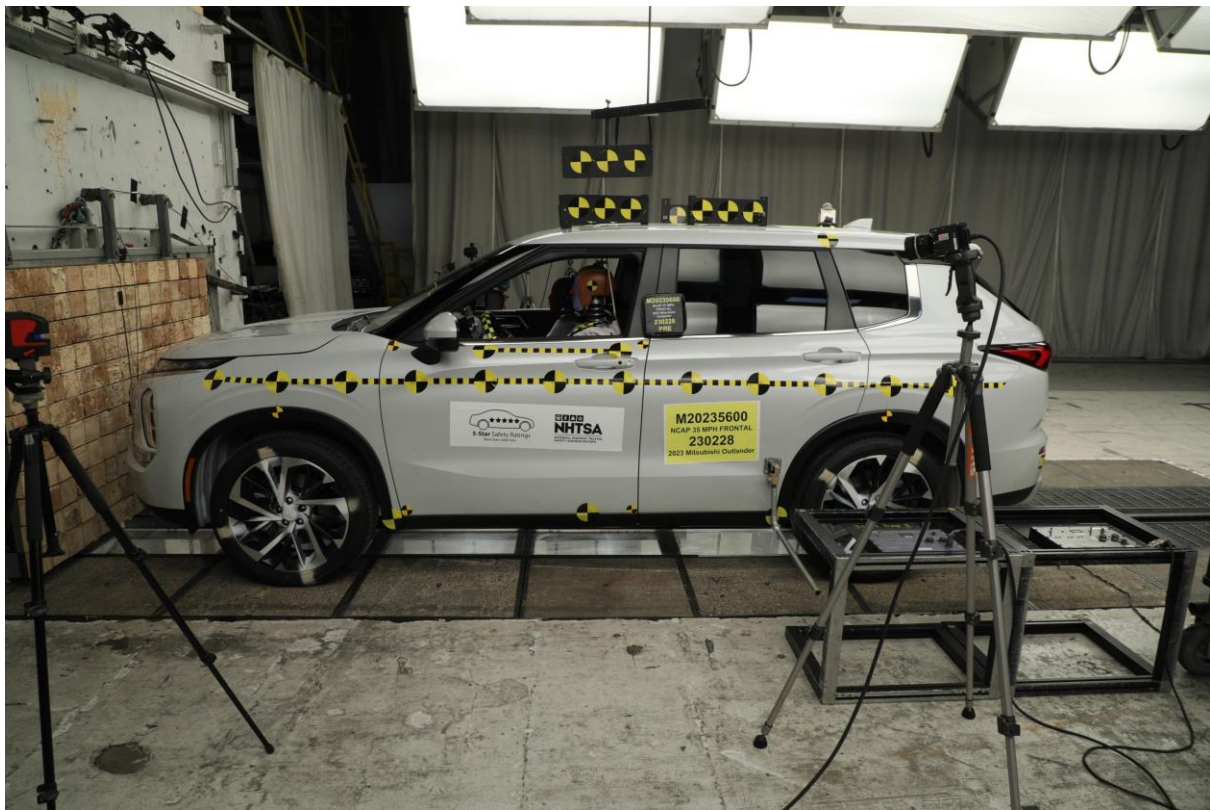
007 Left Rear 3-4 View, as Received



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



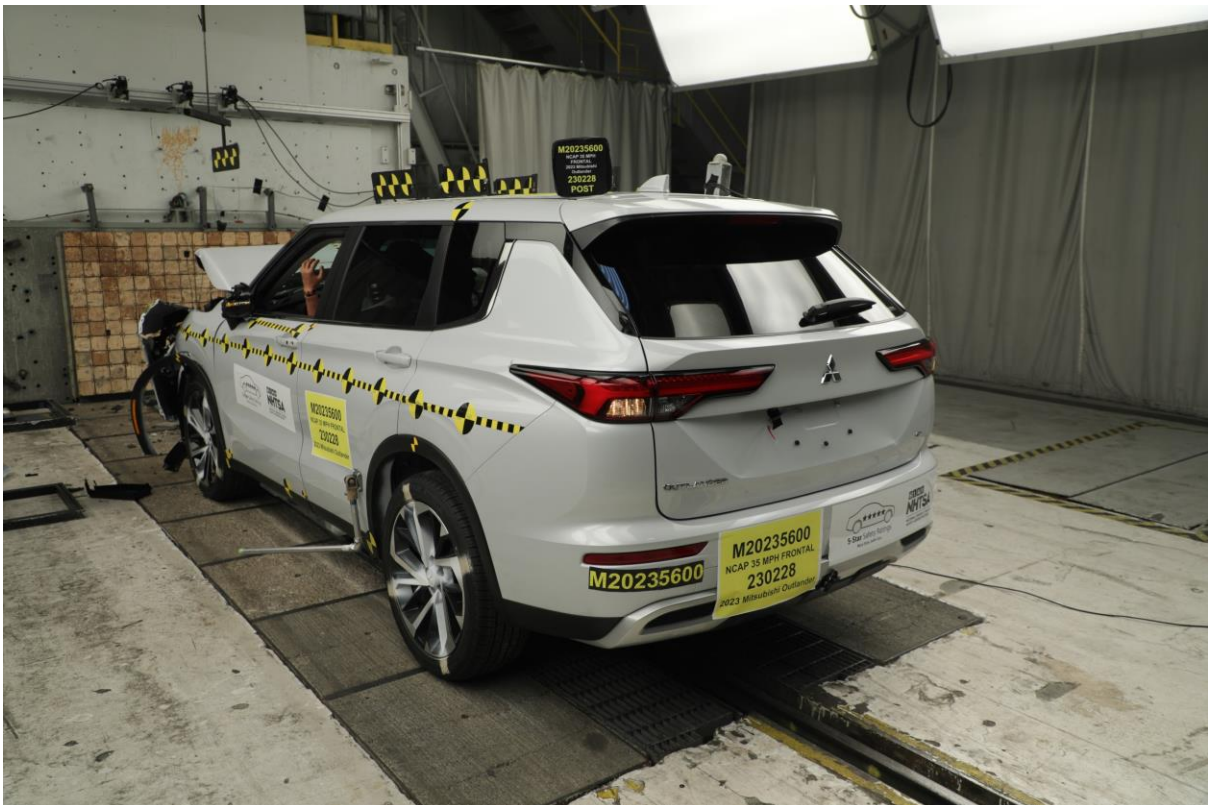
014 Pre-Test Right Front 3-4 View



015 Post-Test Right Front 3-4 View



016 Pre-Test Left Rear 3-4 View



017 Post-Test Left Rear 3-4 View



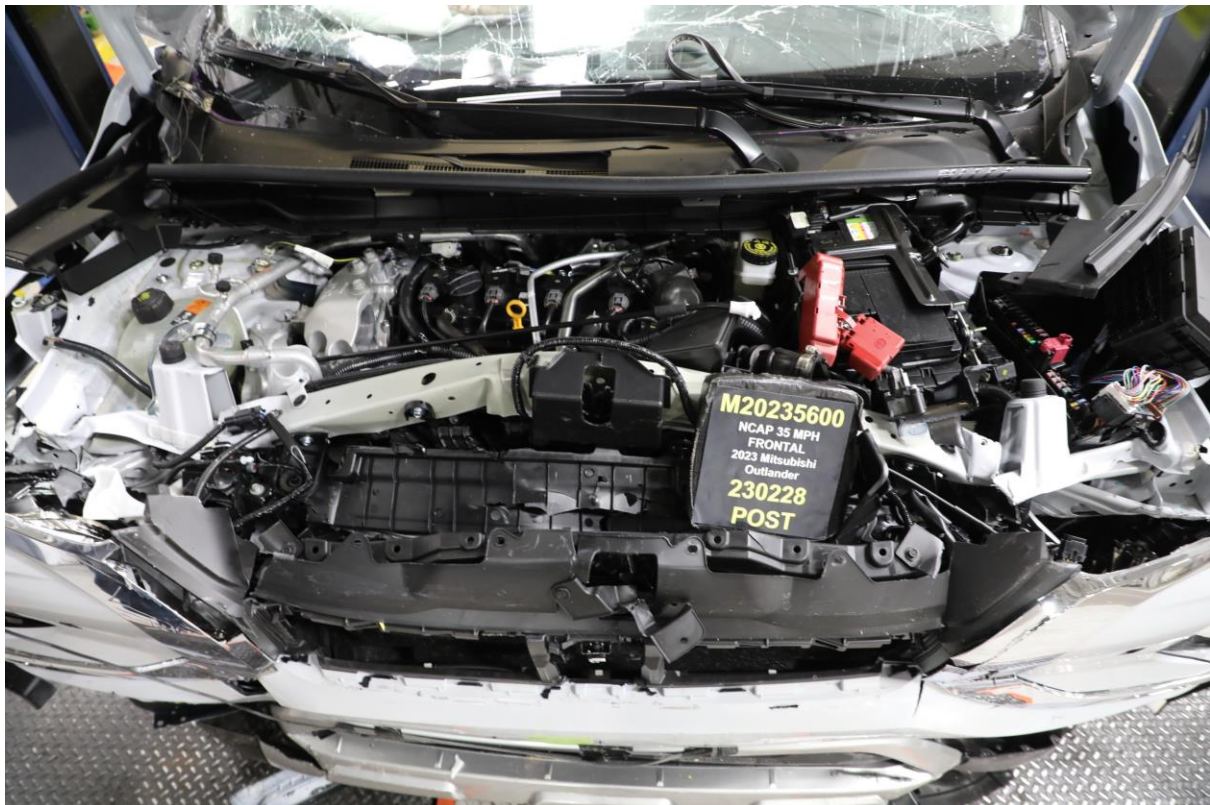
018 Pre-Test Windshield View



019 Post-Test Windshield View



020 Pre-Test Engine Compartment View



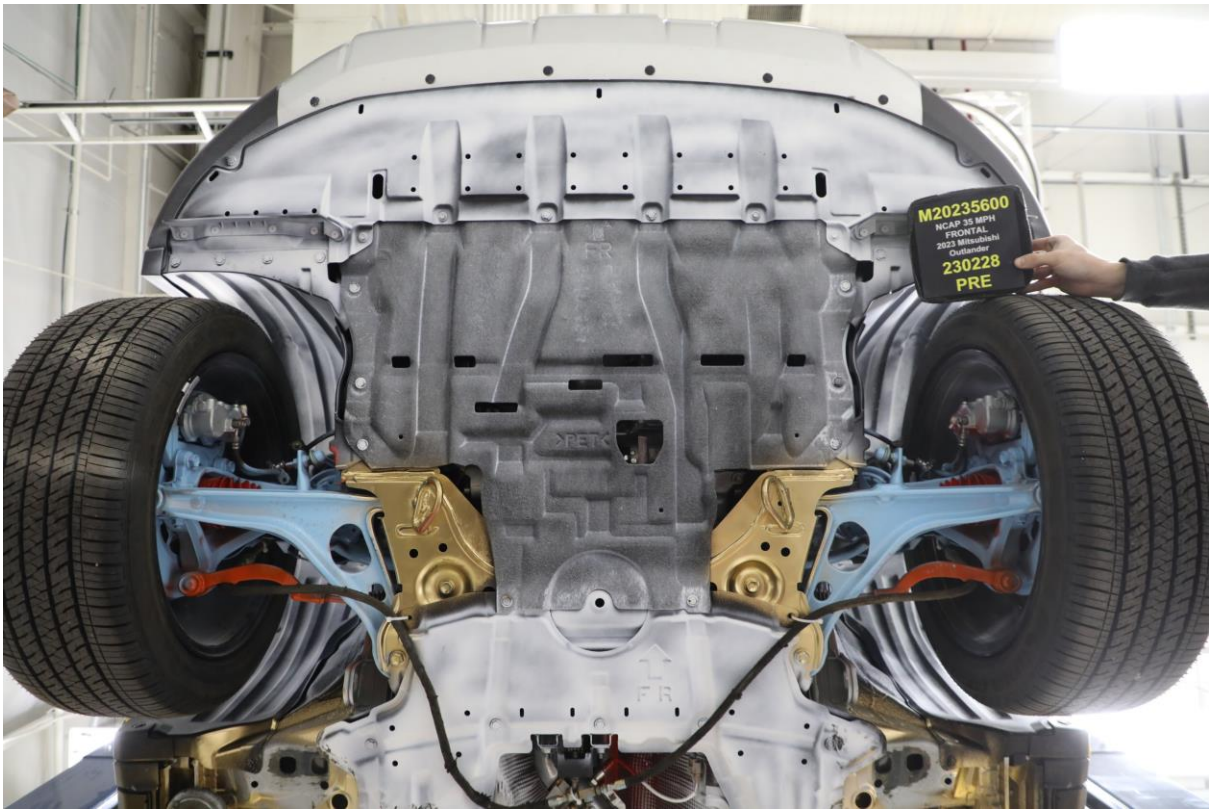
021 Post-Test Engine Compartment View



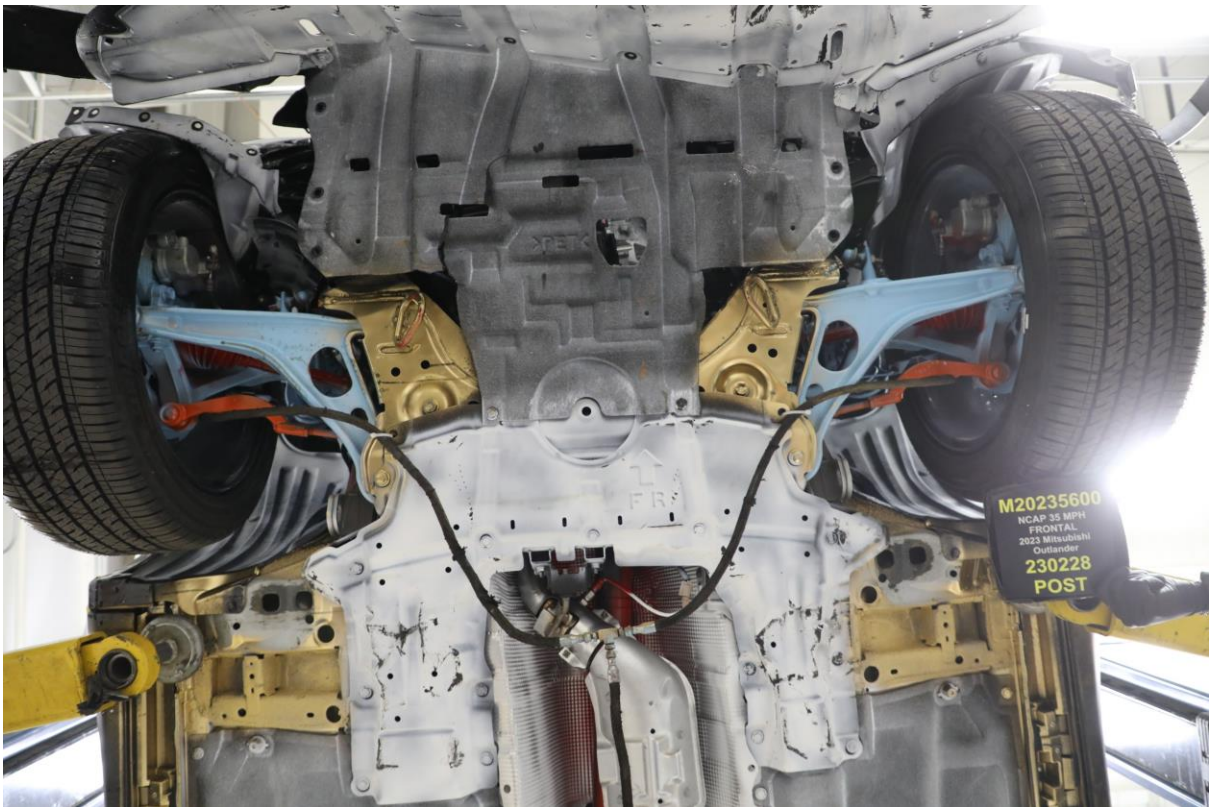
022 Pre-Test Fuel Filler Cap View



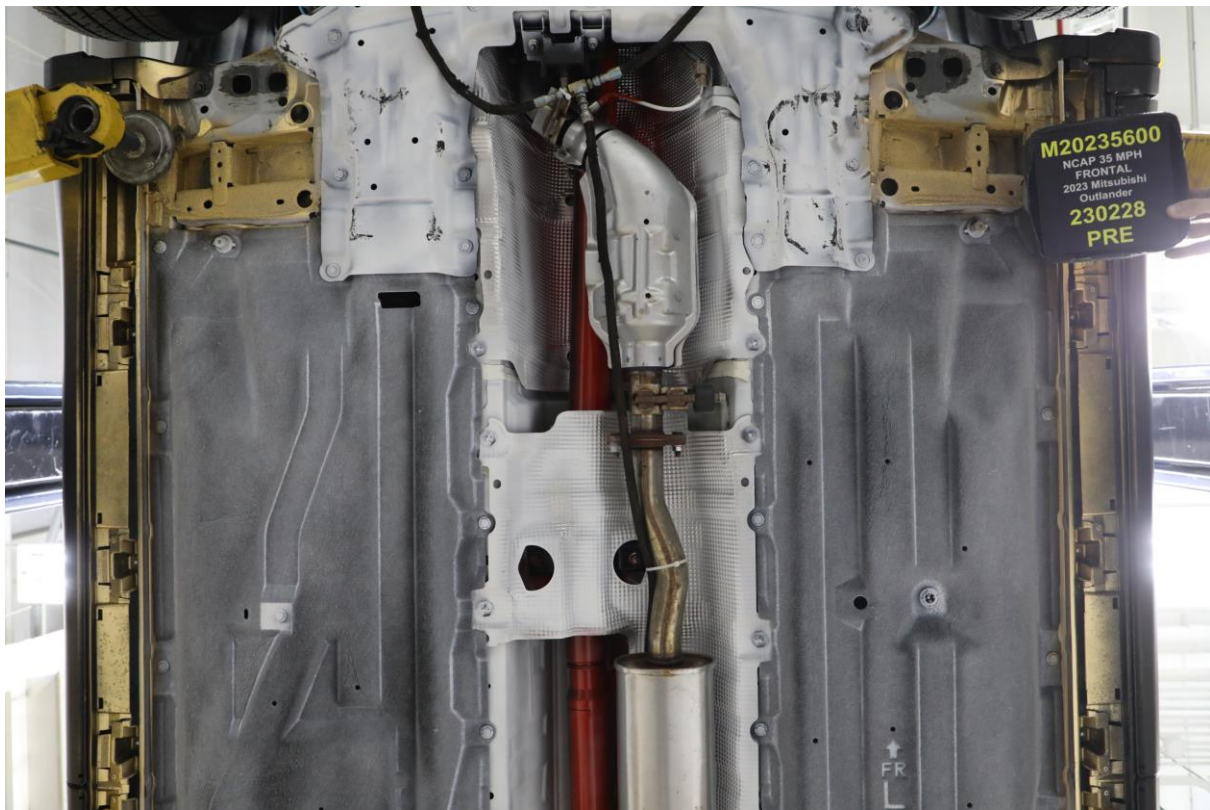
023 Post-Test Fuel Filler Cap View



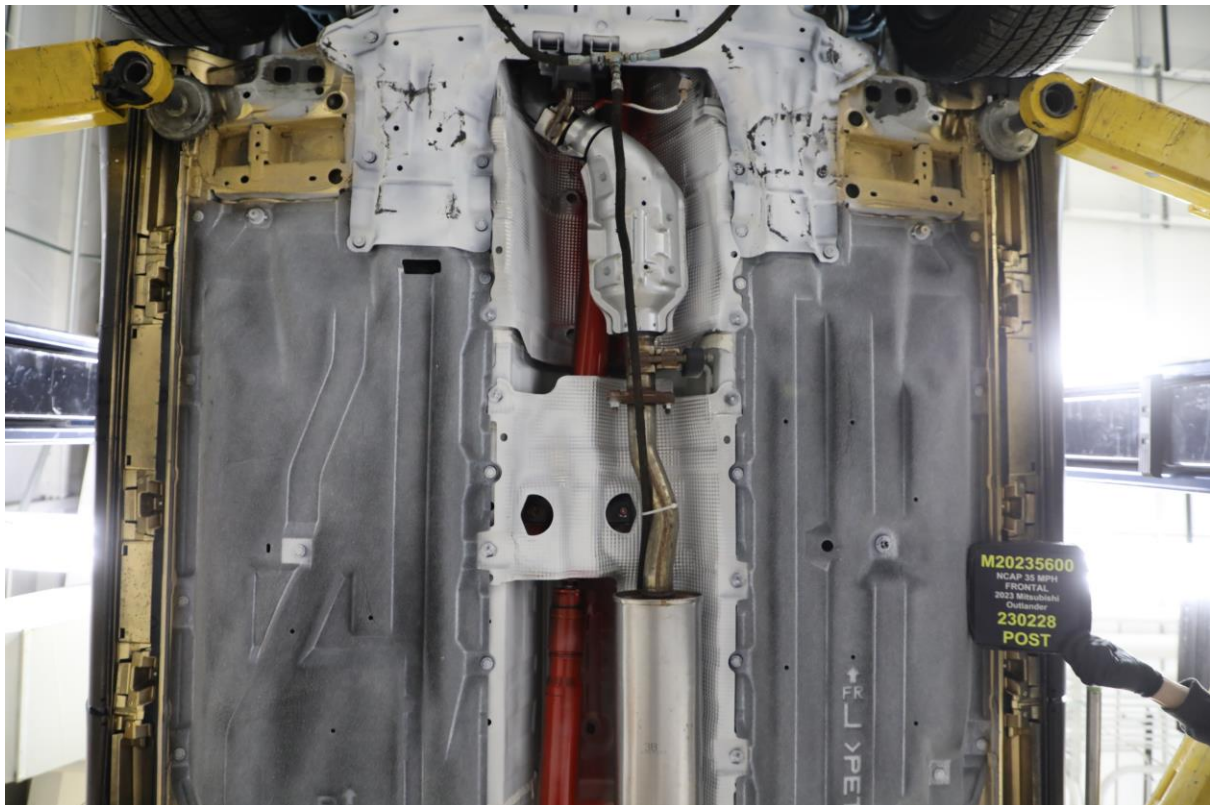
024 Pre-Test Front Underbody View



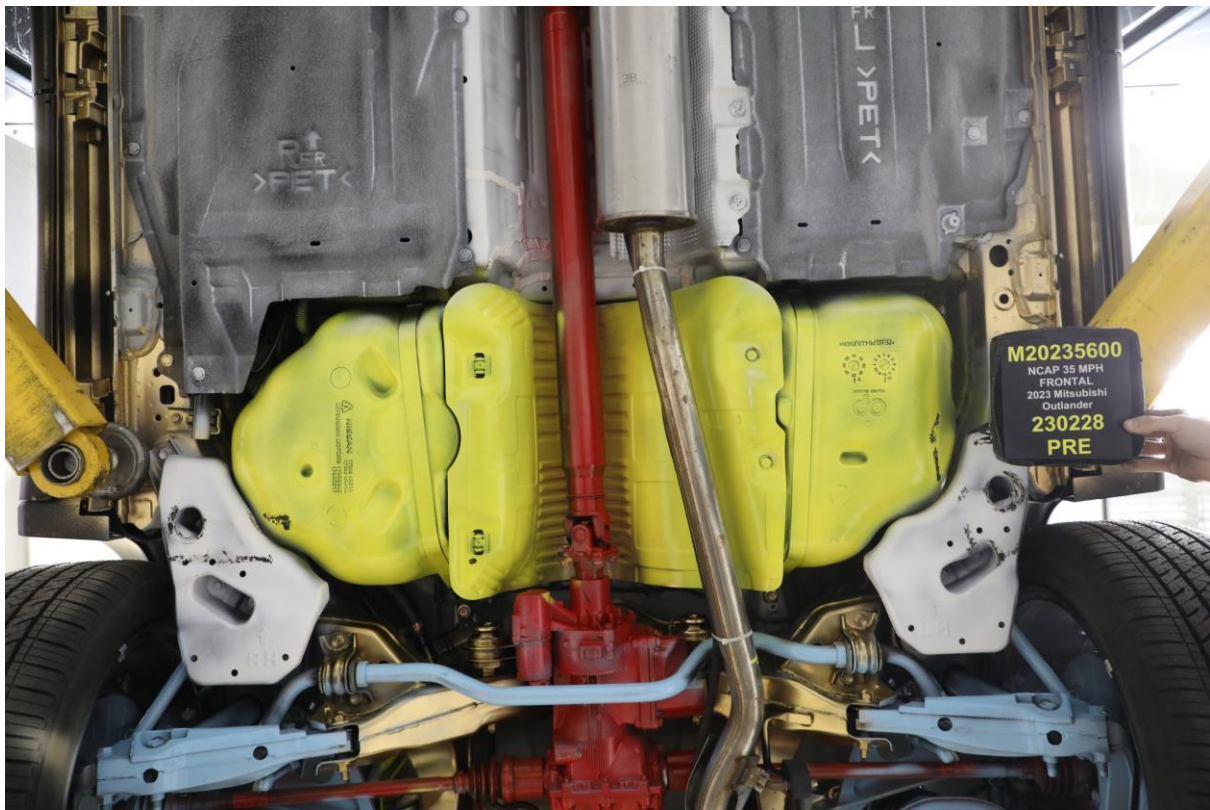
025 Post-Test Front Underbody View



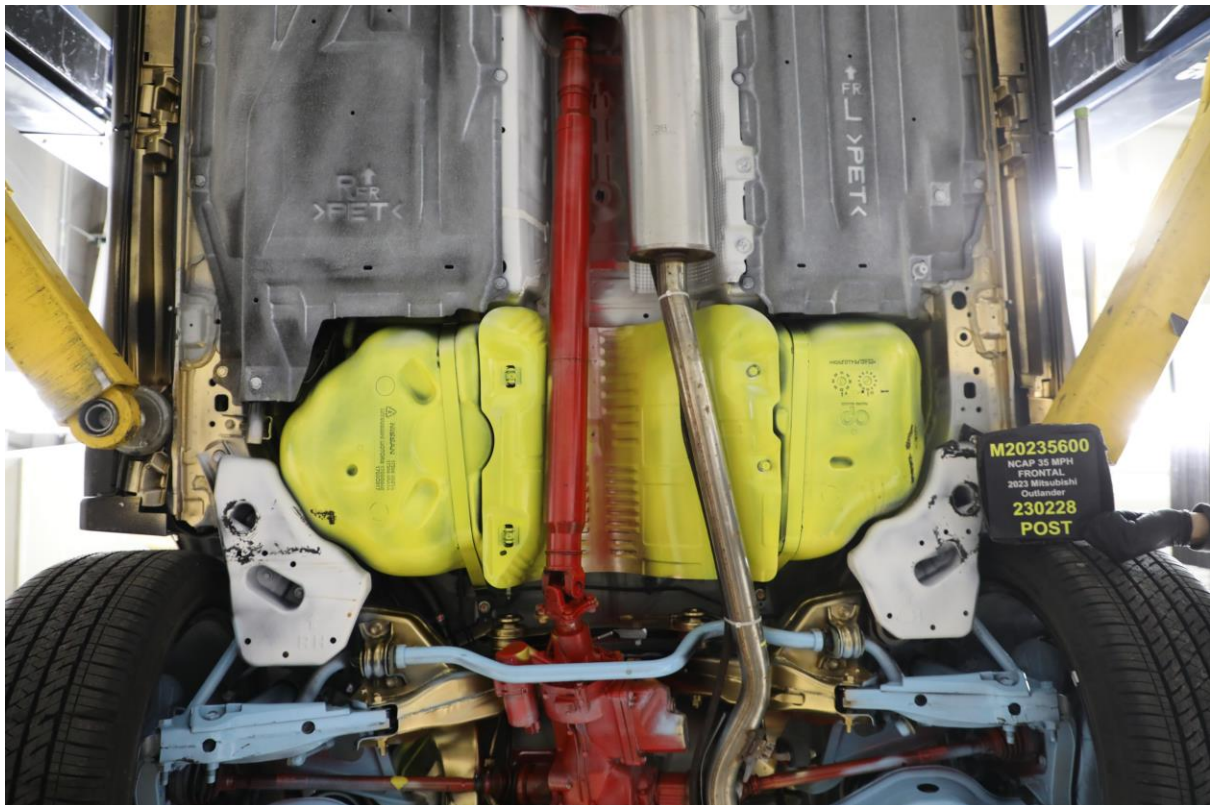
025a Pre-Test Mid Front Underbody View



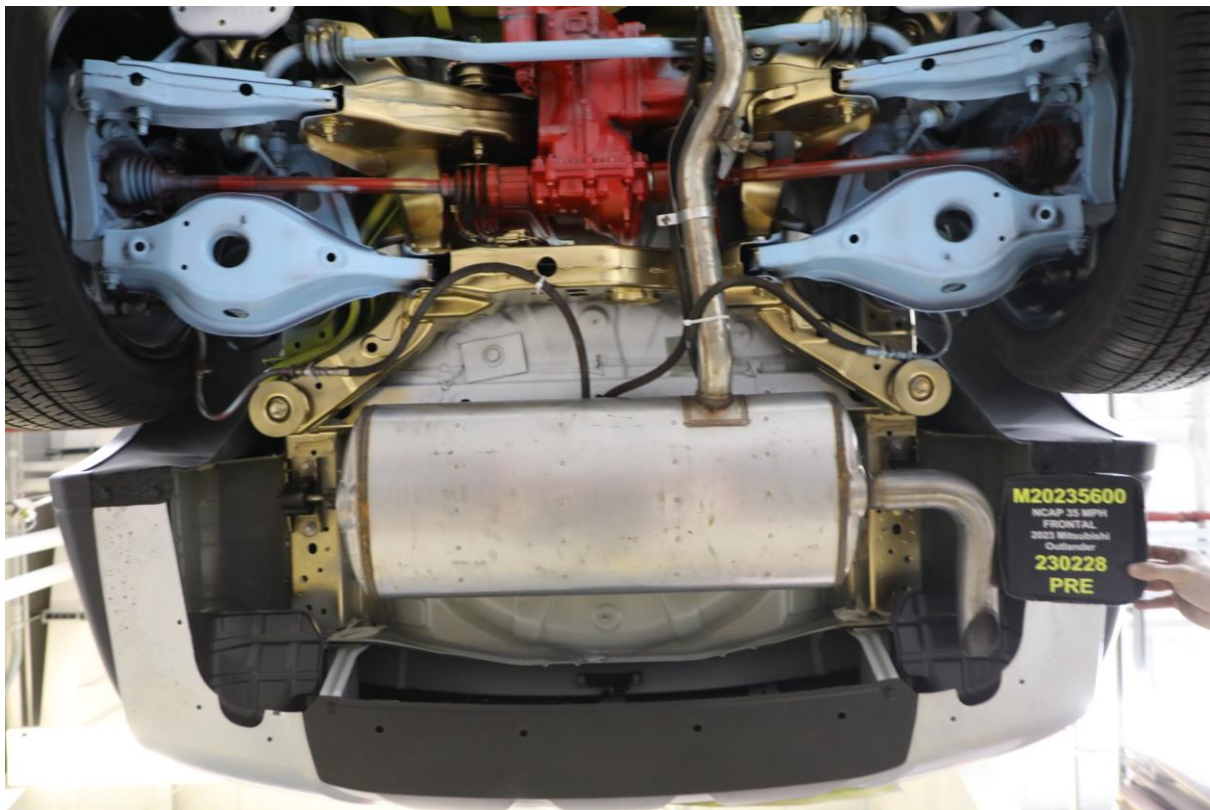
025b Post-Test Mid Front Underbody View



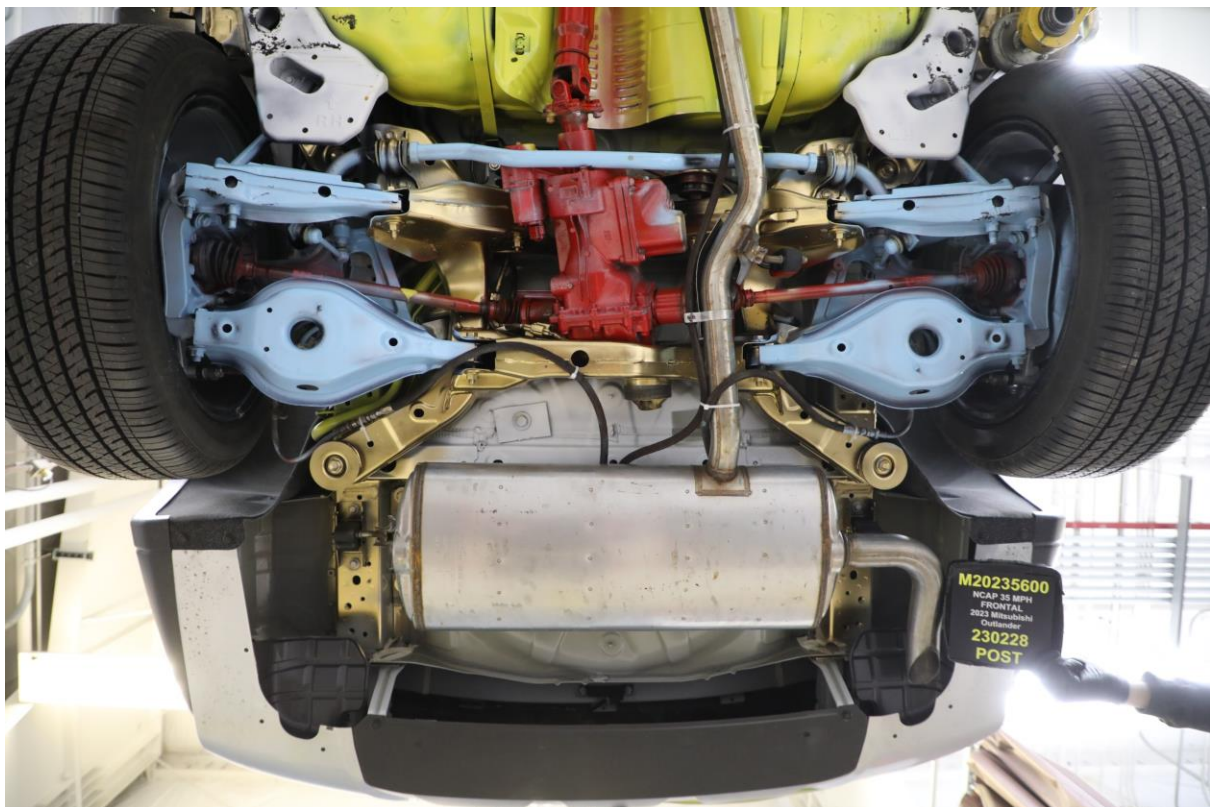
025c Pre-Test Mid Rear Underbody View



025d Post-Test Mid Rear Underbody View



026 Pre-Test Rear Underbody View



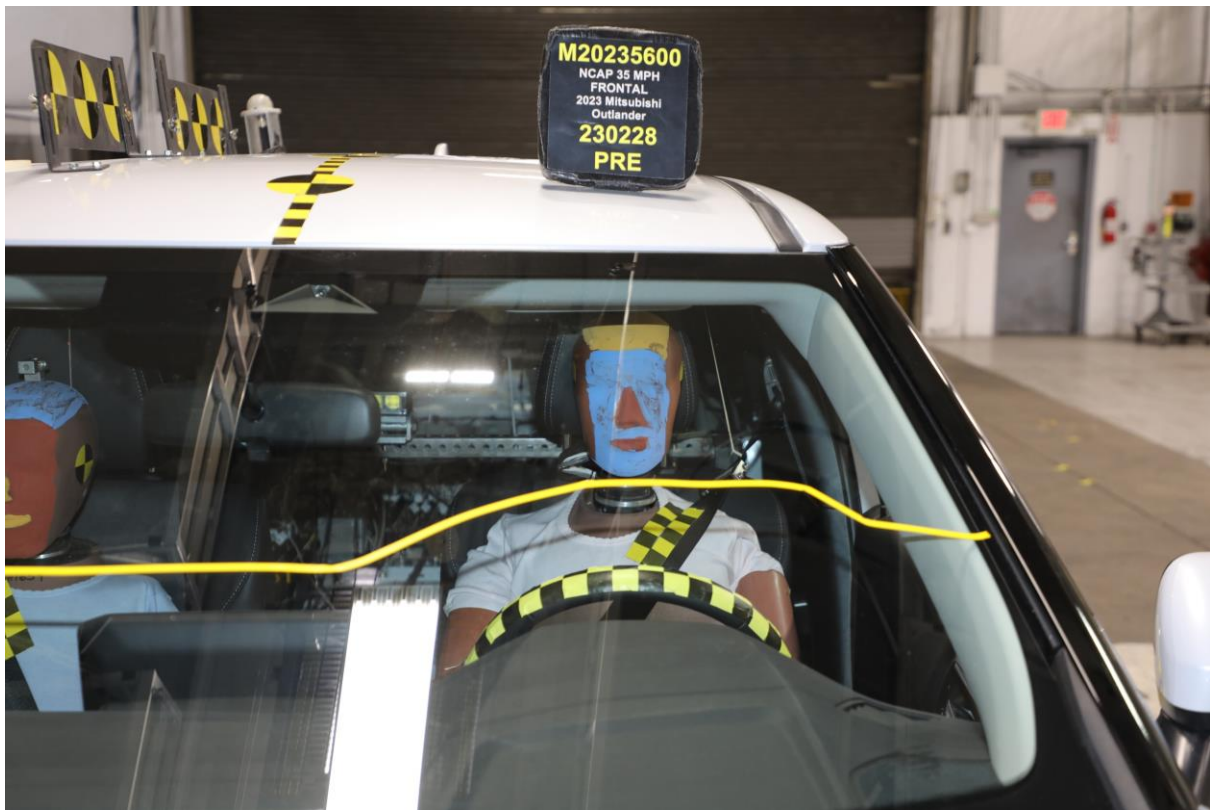
027 Post-Test Rear Underbody View



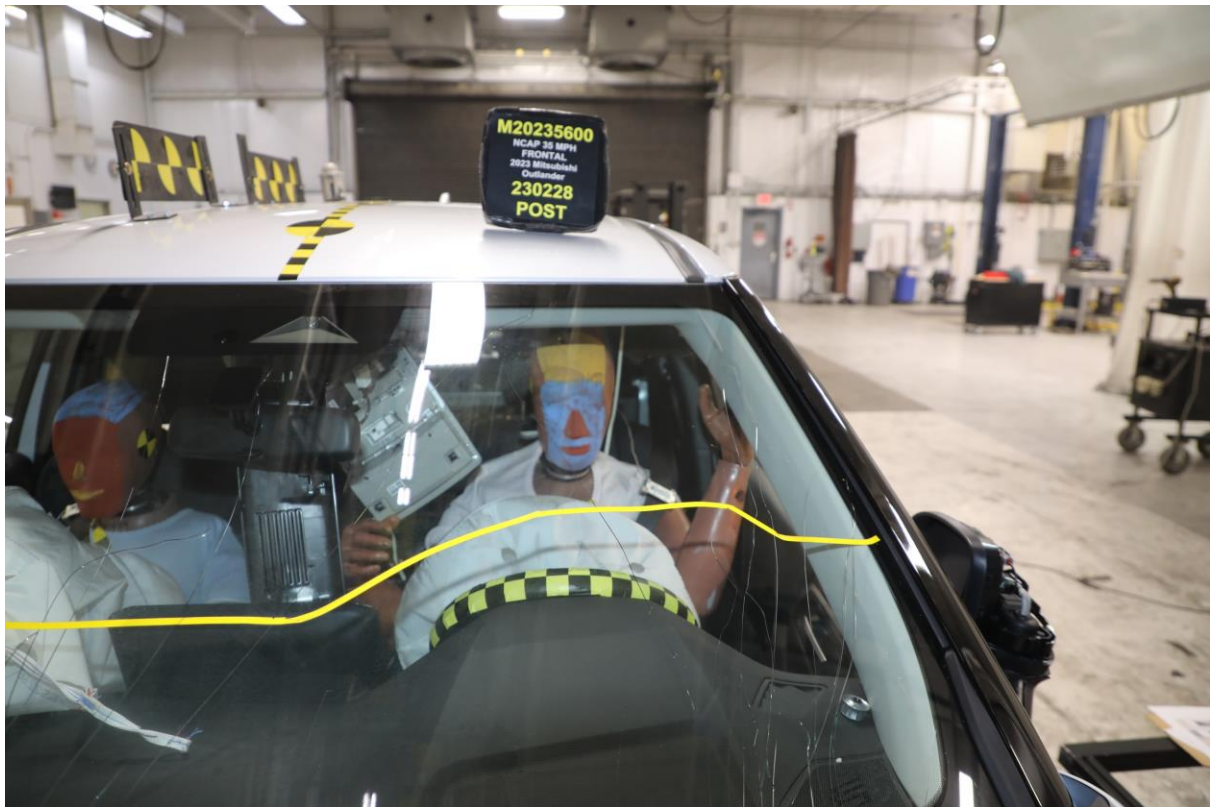
028 Pre-Test Dummy Cable Routing



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



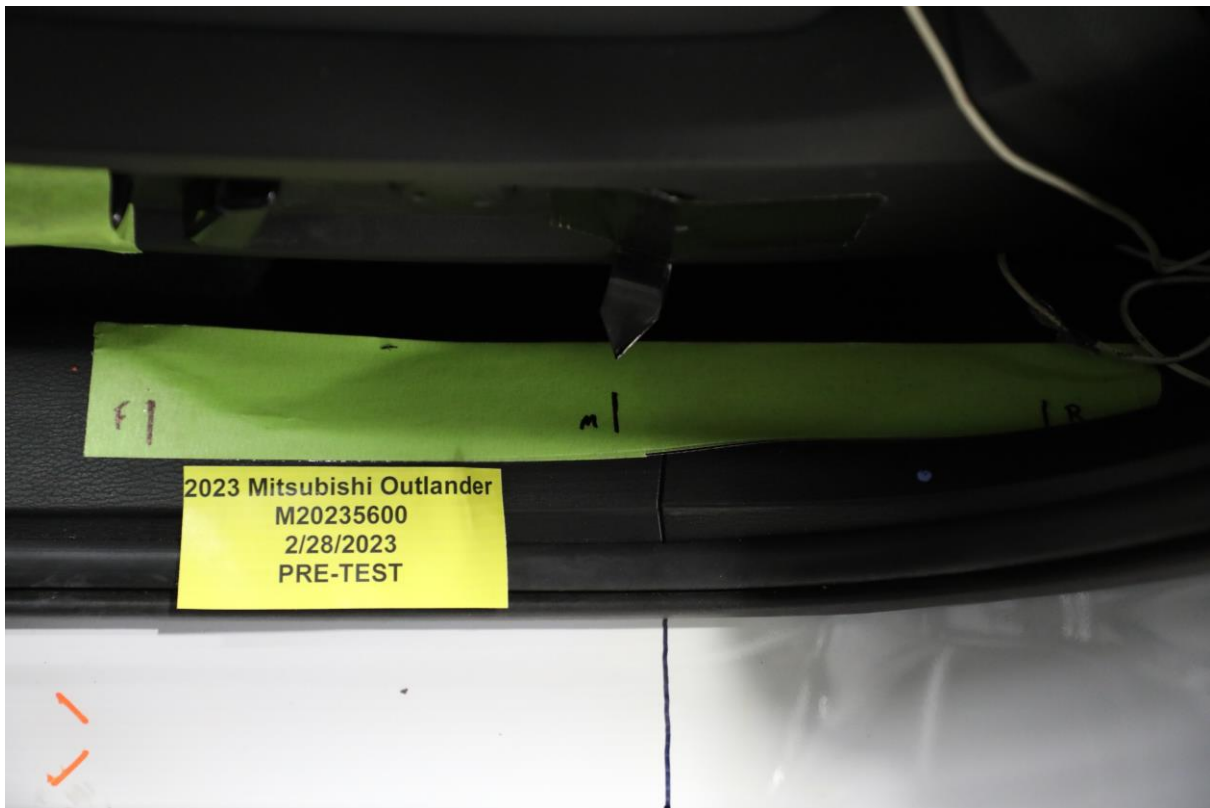
033 Post-Test Driver Dummy Window View



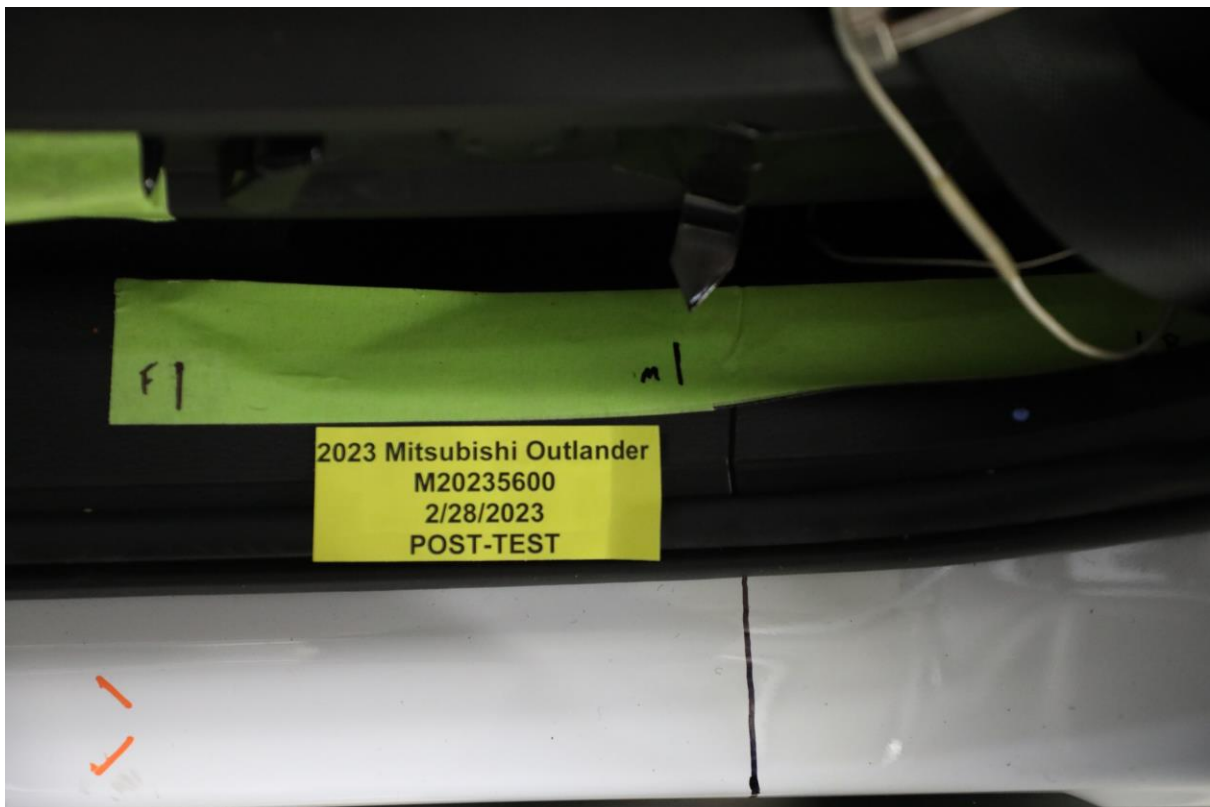
034 Pre-Test Driver Dummy and Vehicle Interior View



035 Post-Test Driver Dummy and Vehicle Interior View



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



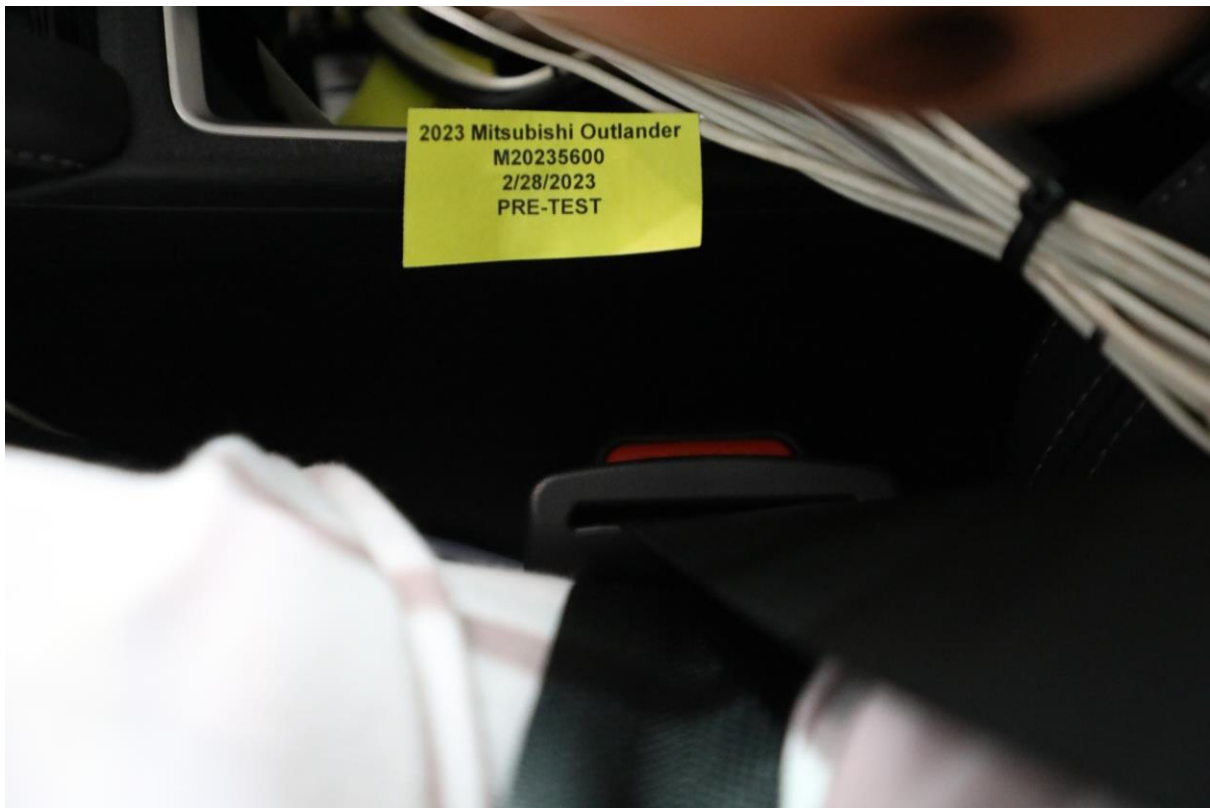
037 Post-Test Driver's Seat Fore-Aft Markings



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



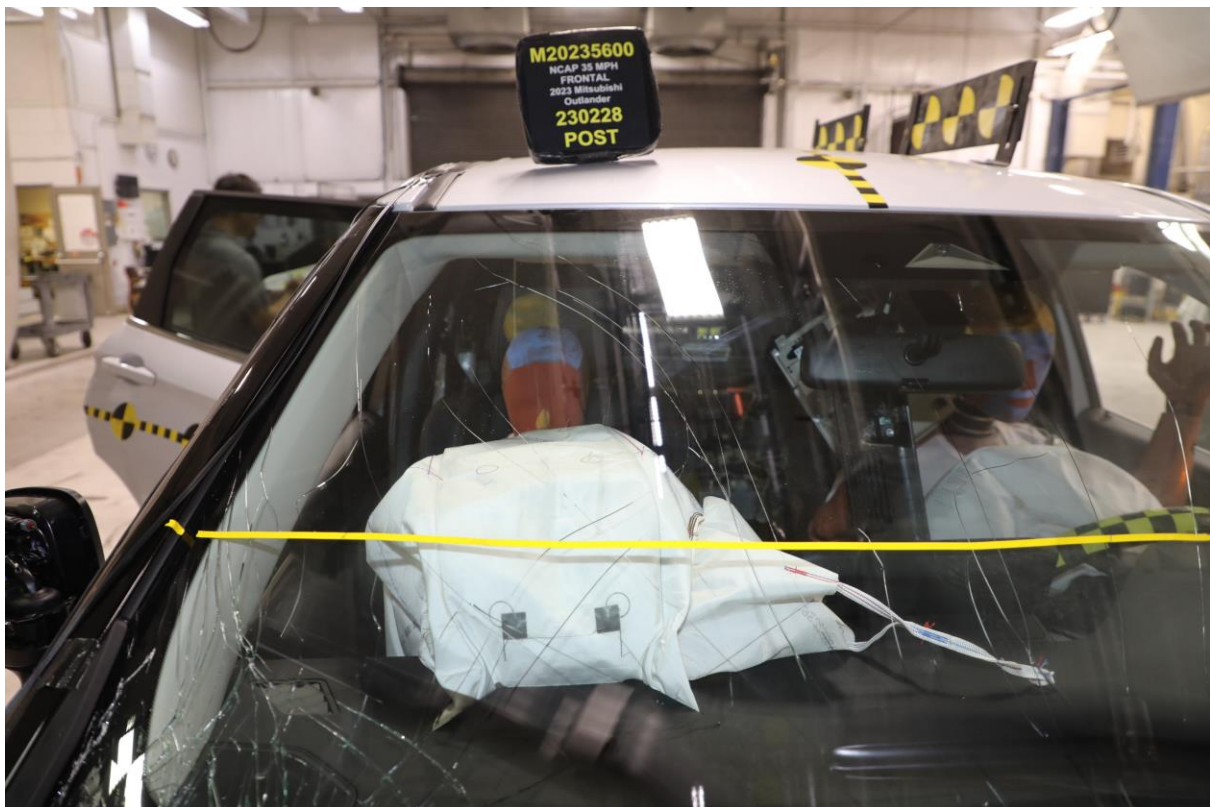
051 Pre-Test View of the Steering Wheel



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



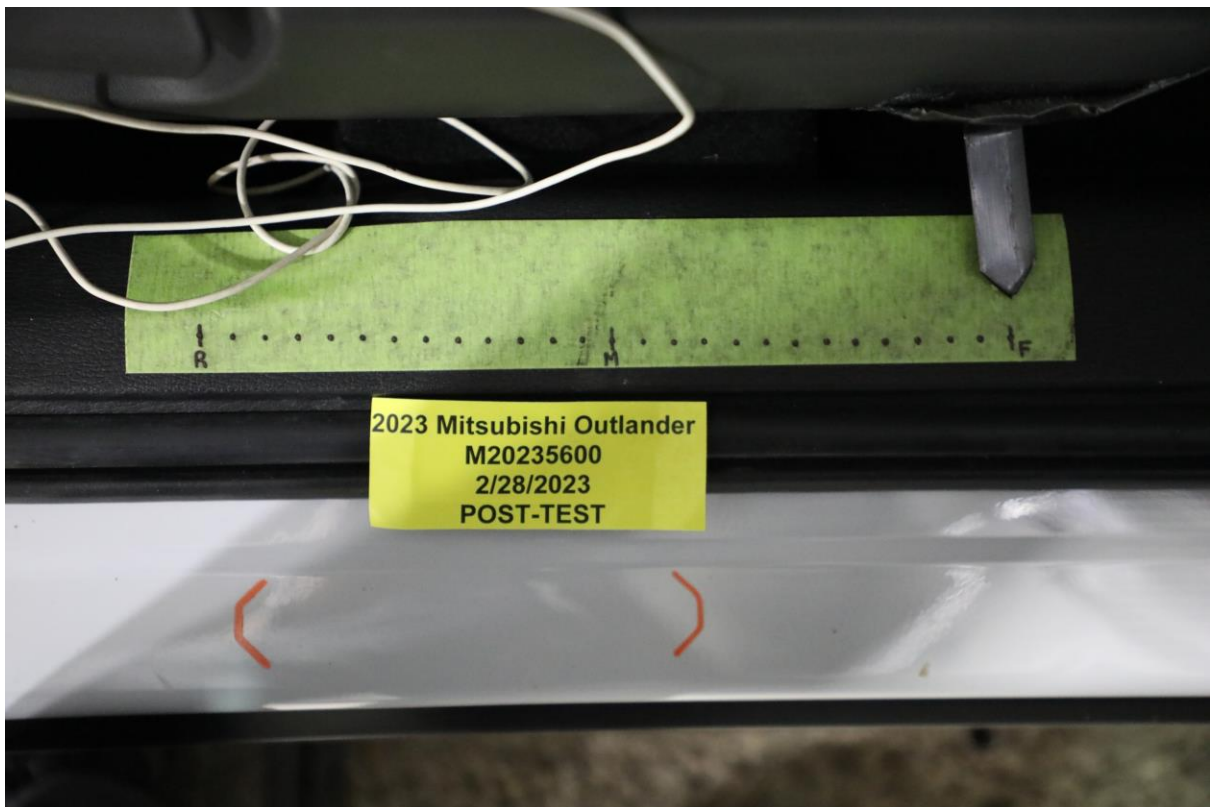
057 Pre-Test Passenger Dummy and Vehicle Interior View



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



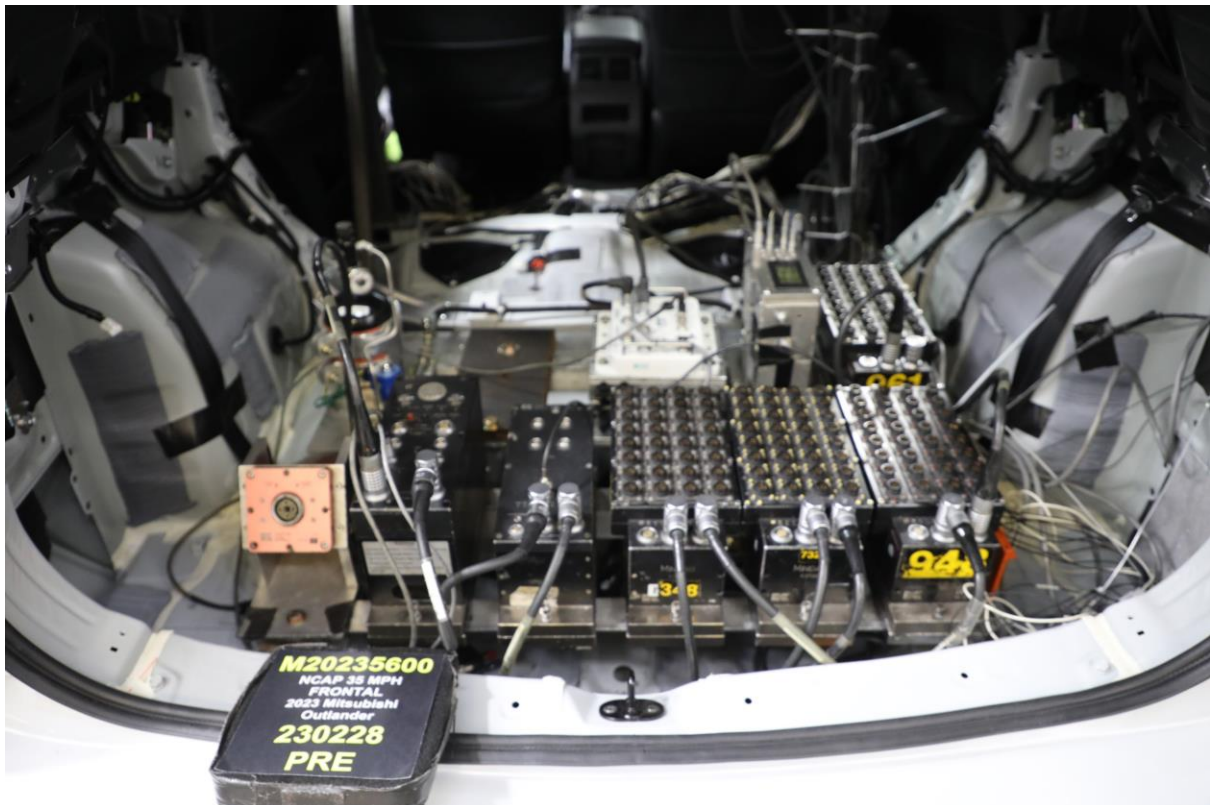
071 Post-Test Passenger Dummy Face



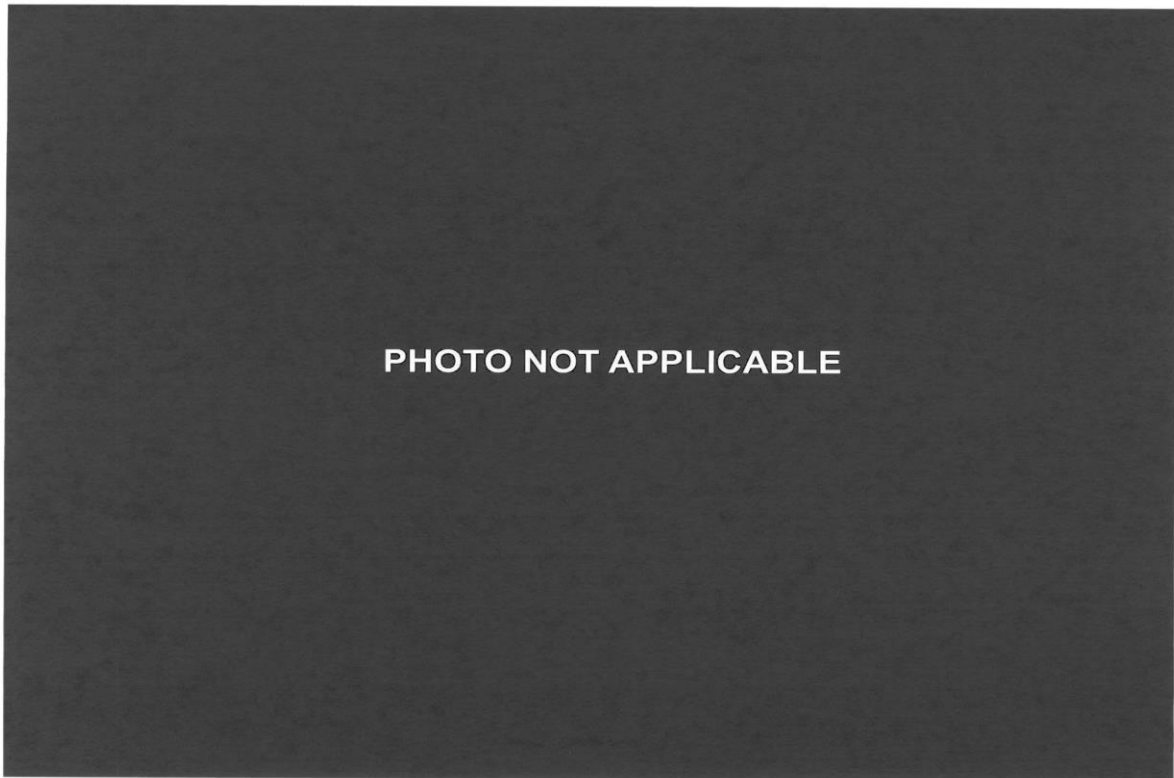
072 Post-Test Passenger Dummy Contact with Airbag



073 Post-Test Passenger Dummy Contact with Headrest



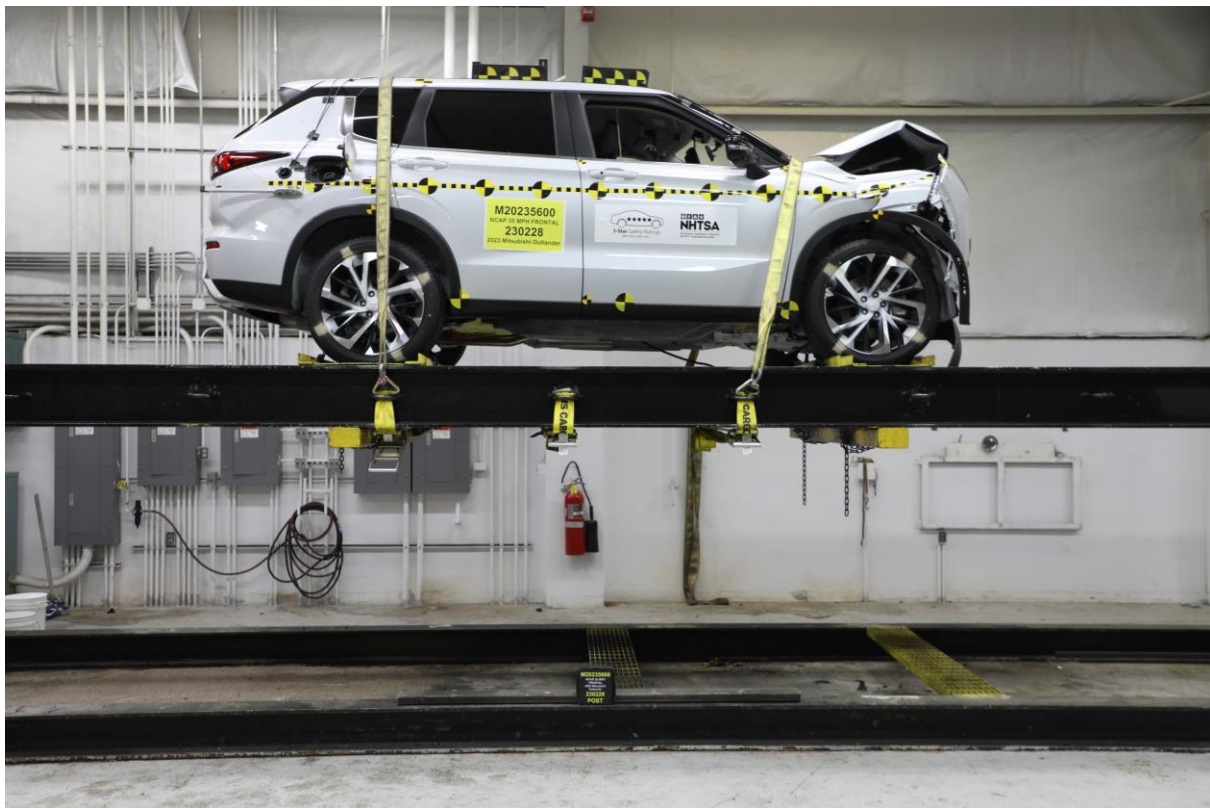
074 Photograph of Ballast Installed in Vehicle



075 Post-Test Stoddard Spillage Location View



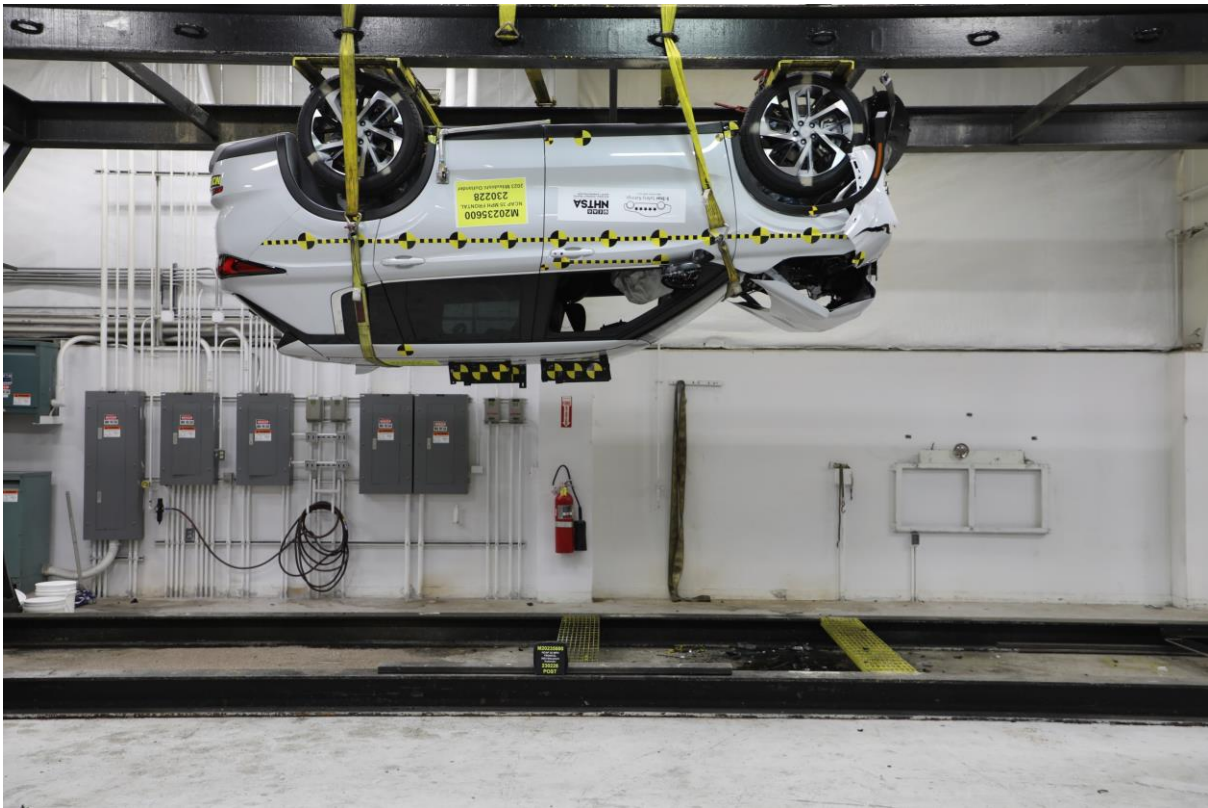
076 Post-Test Speed Trap Read out



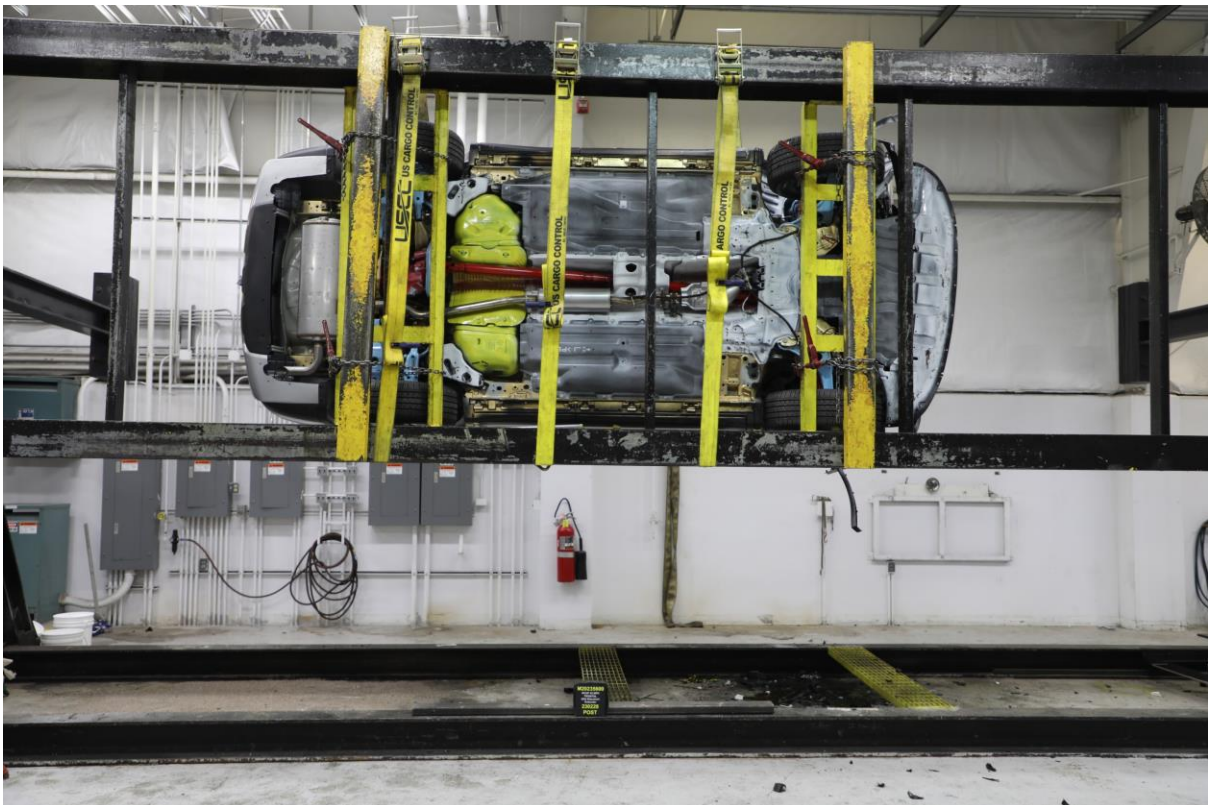
077 Vehicle at 0° on Static Rollover Device



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 Mitsubishi Outlander Frontal Impact Event



2023 OUTLANDER SE 2.5 S-AWC
4-DOOR SUV
WHITE DIAMOND / BLACK

2.5L DOHC 4-CYLINDER DIRECT-INJECTION
CONTINUOUSLY VARIABLE TRANSMISSION
50-STATE EMISSIONS STANDARD

Mechanical Features

- 2.5L 2000cc 4-cylinder Direct-Injection
- 8-Speed Continuously Variable Transmission (CVT)
- Super All-wheel Control (S-AWC)
- Shift by wire
- Paddle shifters

Exterior Features

- LED low and high beam headlights
- LED fog lights
- LED daytime running lights
- Headlight washers
- Automatic headlights
- Sliver front and rear bumper lower trim
- Body-colored side mirrors w/ LED turn indicators
- Power folding side mirrors
- Heated side mirrors
- Front wiper de-icer
- Front variable intermittent wipers w/integrated washers
- Front rain-sensing wipers
- Power (P)gate with adjustable height
- Rear window defroster with timer
- Cupkick fuel filler
- Body-colored rear spoiler with LED high-mount stop light
- SE badge
- 5-AWC decal
- 20-inch two-tone alloy wheels
- P255/45 R20 all-season tires
- Tire repair kit

Interior Features

- Leather-wrapped steering wheel
- Leather-wrapped shift knob
- Gloss black shift panel
- Synthetic leather door insert
- 8-way power adjustable driver seat
- Heated front seats
- Synthetic leather suede seating surfaces
- 40/20/40 split type 2nd row seat with folding function
- 7 Passenger seating

Convenience Features

- 9.0" navigation system with Smartphone-link (display Audio (SDA))
- Wireless Apple CarPlay®
- Google Android Auto
- SXM All Access and SXM Traffic & Travel Link with 90-day subscription
- 7.0" Multi-information display
- HD Radio®
- 6 speakers
- Smartphone wireless charger
- Bluetooth® wireless technology
- Steering wheel audio and phone controls
- Steering wheel voice recognition control
- Rear 1x USB-C and 1x USB-A
- Front 1x USB-C and 1x USB-A

Additional Equipment

Full Tank of Gas INCLUDED

Mitsubishi Connect Subscriptions INCLUDED

- 30-month trial from the date of vehicle delivery (enrollment required)
- Safeguard Services
- Remote Services

White Diamond Paint \$1595.00

REMOVE PHONE WIRELESS CHARGING -\$50.00

Remove Smartphone Wireless Charger \$205.00

Tonneau Cover \$125.00

- Tonneau Cover, Retractable

Hood Badge, Chrome \$125.00

- Hood Emblem, Chrome

White Package \$175.00

- Touch Up Paint Pen (Body Color)
- Console Tray Mat
- Floor Mats, Carpet
- Vehicle Manuals Binder

All-Weather Essentials \$225.00

- Cargo Mat, Reversible
- Floor Mats, All-Weather

MSRP*: \$32,455.00

Total Additional Equipment: \$1,270.00

Subtotal: \$33,715.00

Destination/Handling: \$1,945.00

Total MSRP*: \$35,040.00

*MSRP includes manufacturer's suggested retail price. Excludes taxes, title, license, and dealer fees.

Visit us at www.mitsubishicars.com

EPA DOT Fuel Economy and Environment

Fuel Economy

26 MPG

combined city/hwy

3.8 gallons per 100 miles

Small SUVs range from 14 to 129 MPG. The best vehicle rates 132 MPG.

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

Annual fuel cost \$1,700

Fuel Economy & Greenhouse Gas Rating (tailpipe only)

5

Best

This vehicle emits 342 grams CO₂ per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also creates emissions; learn more at fuelconomy.gov.

Smog Rating (tailpipe only)

10

Best

This vehicle emits 0 grams of ozone per mile (tailpipe only). Producing and distributing fuel also creates 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 24 MPG and costs \$8000 to fuel over 5 years. Cost estimates are based on 15000 miles per year at \$2.35 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

10-year 100,000-mile LIMITED POWERTRAIN WARRANTY

10"/100,000" 7"/100,000"

5"/60,000" 5"/UNLIMITED"

GOVERNMENT 5-STAR SAFETY RATINGS

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

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

Parts Content Information

For vehicles in this class:

U.S./Canadian Parts Content: Major Sources of Foreign Parts Content: JAPAN 84%

For this vehicle:

Final Assembly: OKAZAKI, JAPAN

Country of Origin: JAPAN

Engine: JAPAN

Transmission: JAPAN

Note: Parts content does not include final assembly, distribution, or other non-parts costs.

Ship To: (DBA) MAX MADSEN'S AURORA

Sold To: (Same unless indicated)

15090 MITSUBISHI 3900 S. GORDEN AVENUE AURORA, IL 60504-7108

Cumulative Accessory Weight is 31.1 lbs

Method of Transport: RAIL Plant/Port of Entry: TACOMA, WA VIN : 3A436UAB9P2019196 Route Code : R30

Gasoline, license and title fees, applicable federal, state and local taxes and dealer and distributor installed options and accessories are not included in the manufacturer's suggested retail price. This label has been applied to this vehicle pursuant to federal law and cannot be moved or altered prior to delivery to the ultimate purchaser.

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

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

NHTSA

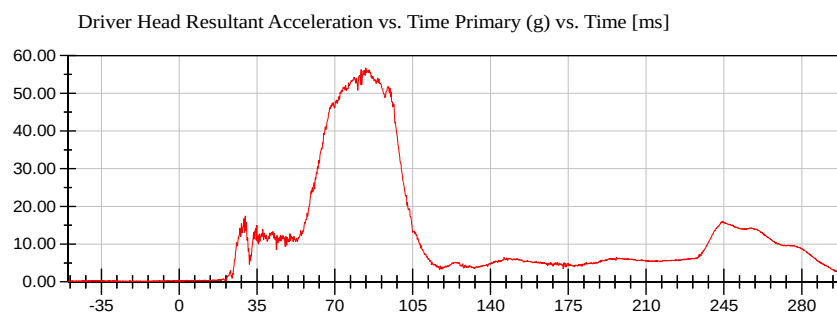
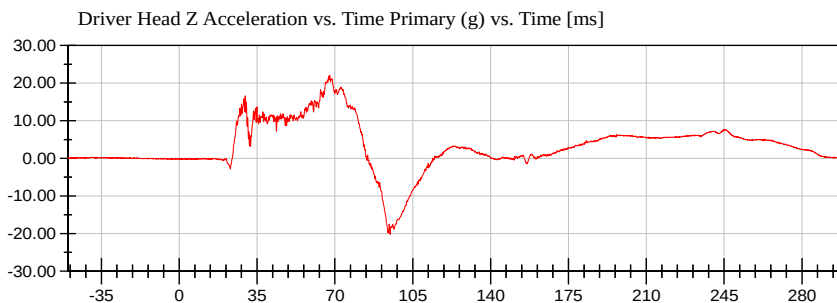
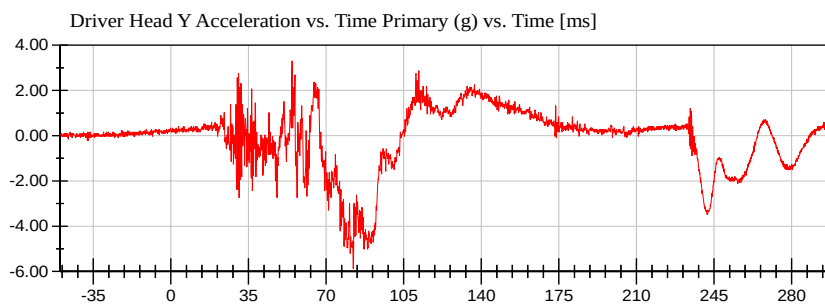
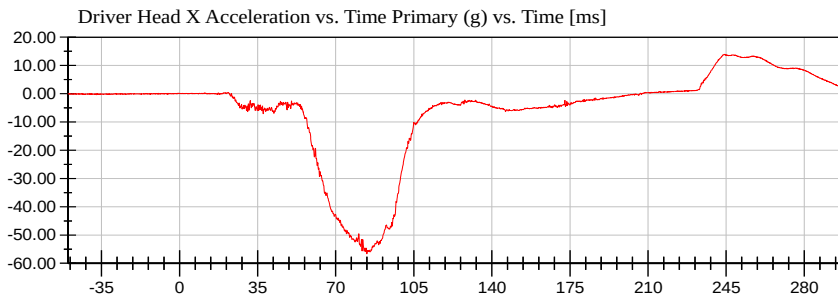
Test Lab: CTF

Test Number: 230228 (M20235600)

Test Date: 02/28/2023

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

Position #2 Hybrid III Small Adult Female (DH1659)



NHTSA

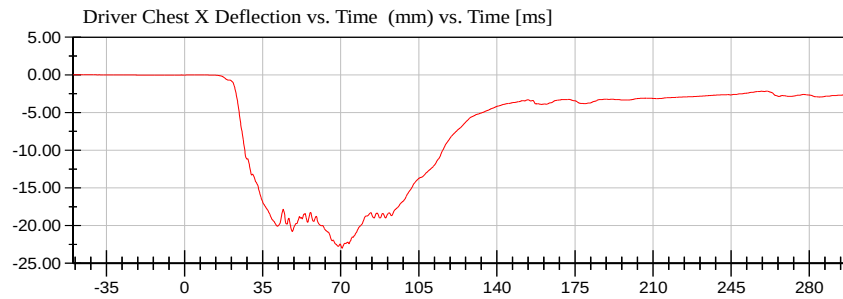
Test Lab: CTF

Test Number: 230228 (M20235600)

Test Date: 02/28/2023

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

Position #2 Hybrid III Small Adult Female (DH1659)



<Max>

0.02 mm at -49.92 ms

<Min>

-23.01 mm at 70.64 ms

CFC_600



NHTSA

Test Lab: CTF

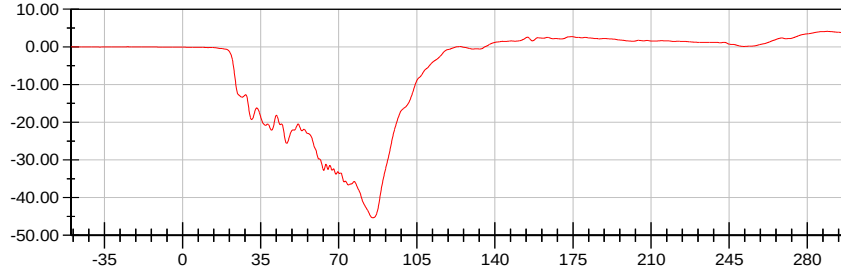
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Test Date: 02/28/2023

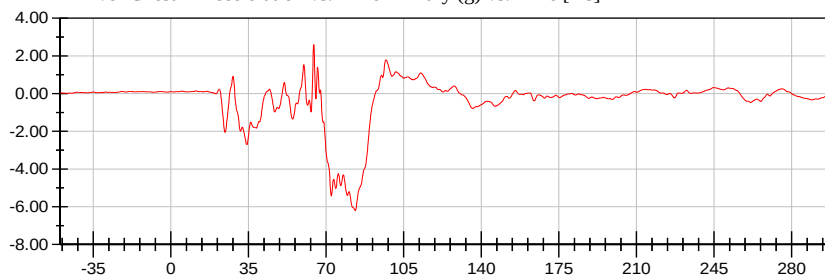
Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Position #2 Hybrid III Small Adult Female (DH1659)

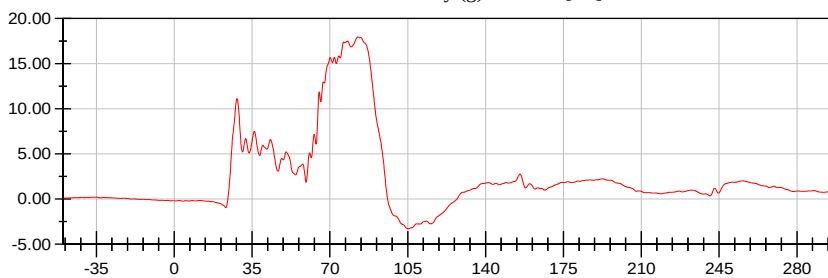
Driver Chest X Acceleration vs. Time Primary (g) vs. Time [ms]



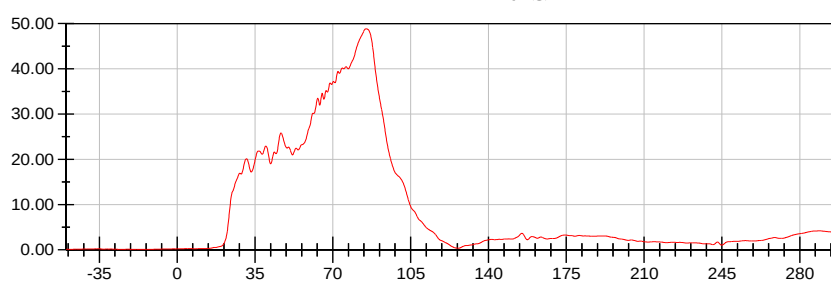
Driver Chest Y Acceleration vs. Time Primary (g) vs. Time [ms]



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



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



NHTSA

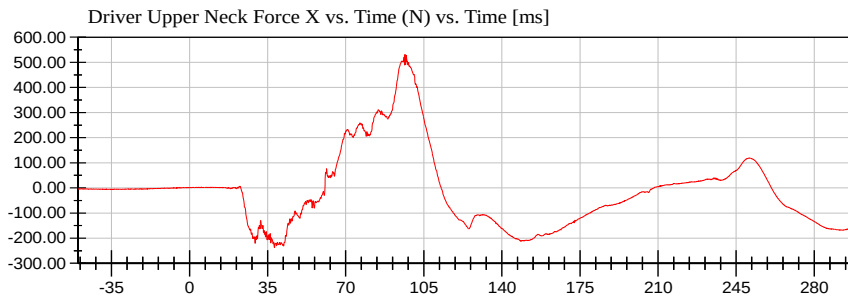
Test Lab: CTF

Test Number: 230228 (M20235600)

Test Date: 02/28/2023

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

Position #2 Hybrid III Small Adult Female (DH1659)



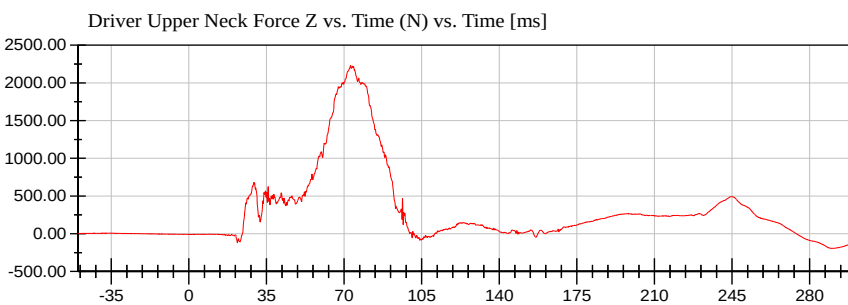
<Max>

531.36 N at 96.56 ms

<Min>

-237.38 N at 38.00 ms

CFC_1000



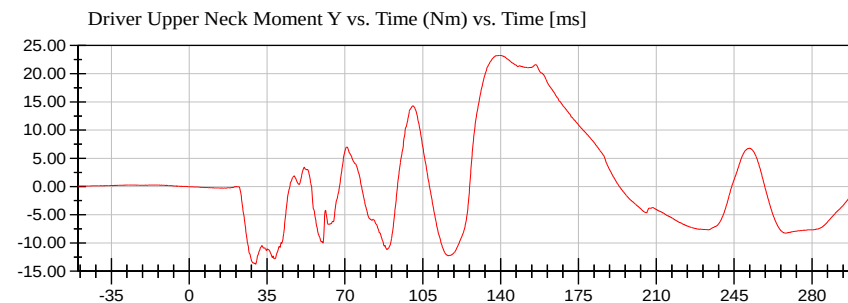
<Max>

2,231.11 N at 72.96 ms

<Min>

-194.55 N at 289.92 ms

CFC_1000



<Max>

23.23 Nm at 140.08 ms

<Min>

-13.78 Nm at 29.92 ms

CFC_600



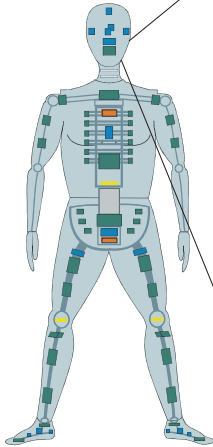


2023 Mitsubishi Outlander NCAP 35 mph Frontal Impact Neck Injury Predictor (NIJ)

Date: 02/28/2023
Time: 15:05

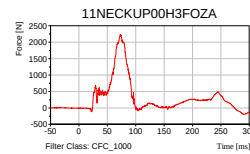
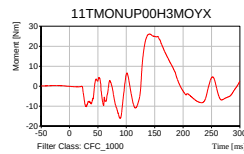
Customer: NHTSA
Test Number: M20235600

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

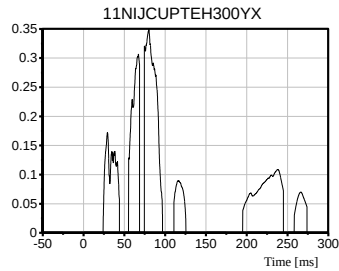


Dummy: HIII 50th Male
Seating Position:
Driver

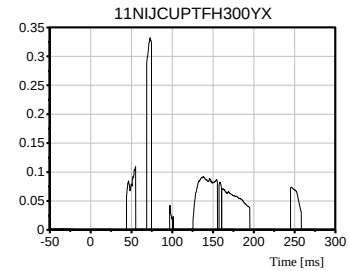
NIJ Source Code: (Fz/Fzc)+(Myl/Myc)



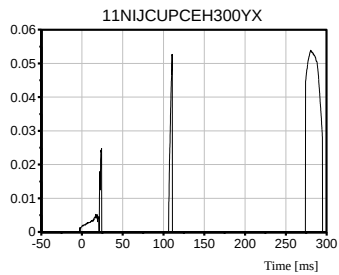
TRC Inc. Test Lab: CTF
Test Number: 230228



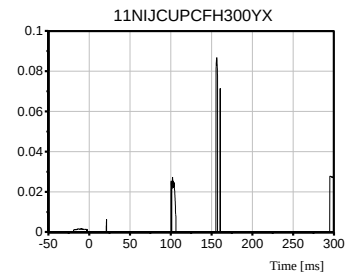
Max [NTE] 0.3494 at 80.16 ms



Max [NTF] 0.3322 at 72.88 ms



Max [NCE] 0.0539 at 280.80 ms



Max [NCF] 0.0868 at 156.40 ms

NHTSA

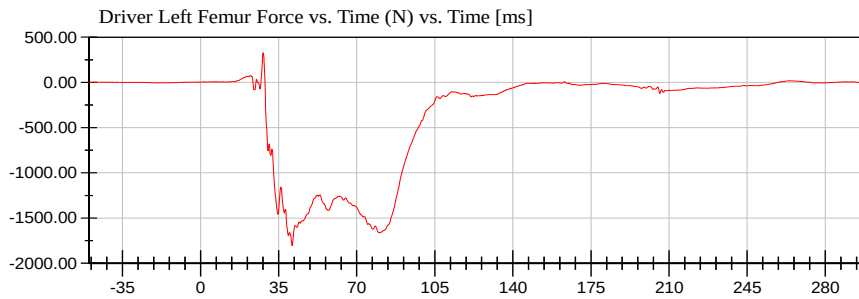
Test Lab: CTF

Test Number: 230228 (M20235600)

Test Date: 02/28/2023

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

Position #2 Hybrid III Small Adult Female (DH1659)



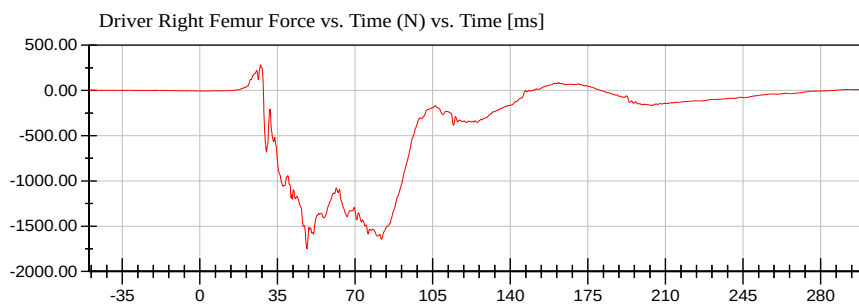
<Max>

326.78 N at 28.08 ms

<Min>

-1,805.20 N at 41.04 ms

CFC_600



<Max>

284.17 N at 27.36 ms

<Min>

-1,750.61 N at 48.32 ms

CFC_600



NHTSA

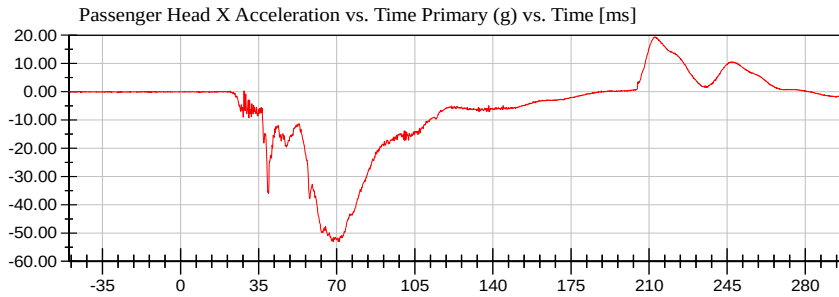
Test Lab: CTF

Test Number: 230228 (M20235600)

Test Date: 02/28/2023

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

Position #2 Hybrid III Small Adult Female (DH1659)



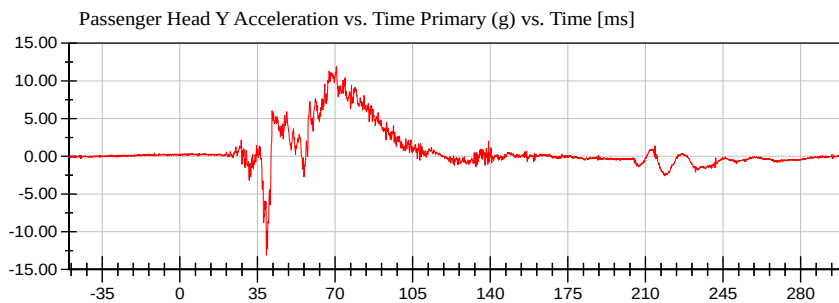
<Max>

19.39 g at 212.64 ms

<Min>

-53.07 g at 68.40 ms

CFC_1000



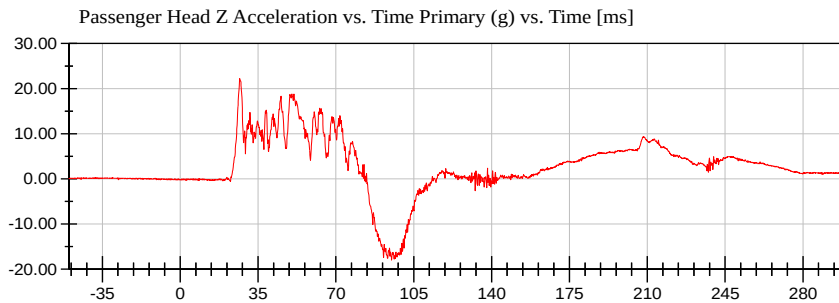
<Max>

11.93 g at 70.64 ms

<Min>

-13.08 g at 39.04 ms

CFC_1000



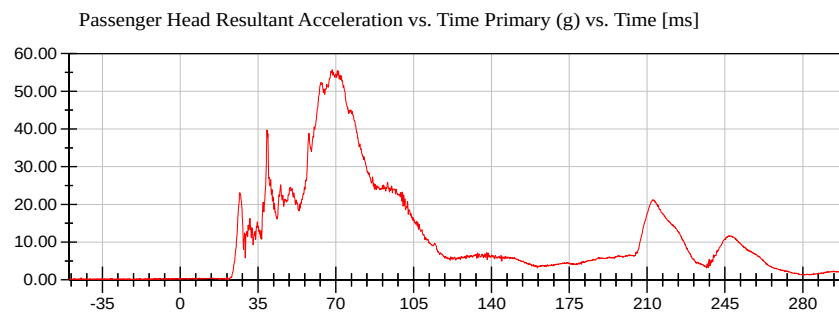
<Max>

22.24 g at 26.72 ms

<Min>

-17.98 g at 95.04 ms

CFC_1000



<Max>

55.72 g at 68.40 ms

<Min>

0.06 g at -24.08 ms

CFC_1000



NHTSA

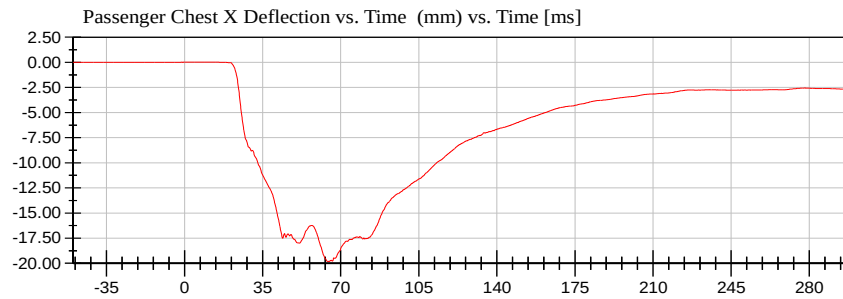
Test Lab: CTF

Test Number: 230228 (M20235600)

Test Date: 02/28/2023

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

Position #2 Hybrid III Small Adult Female (DH1659)



<Max>

0.02 mm at 8.48 ms

<Min>

-19.82 mm at 64.24 ms

CFC_600



NHTSA

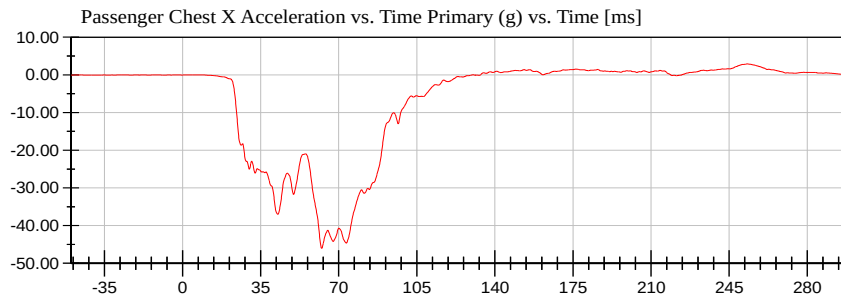
Test Lab: CTF

Test Number: 230228 (M20235600)

Test Date: 02/28/2023

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

Position #2 Hybrid III Small Adult Female (DH1659)



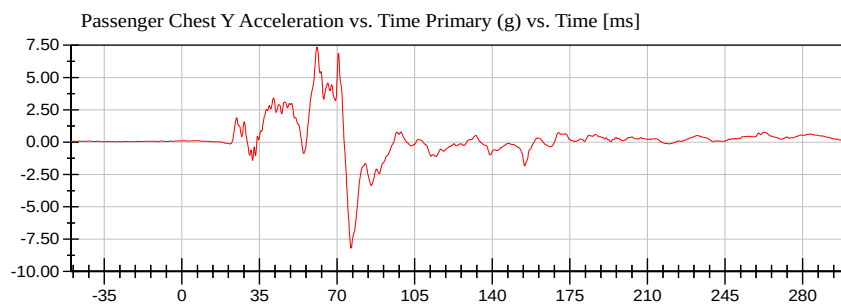
<Max>

2.91 g at 253.12 ms

<Min>

-46.03 g at 62.40 ms

CFC_180



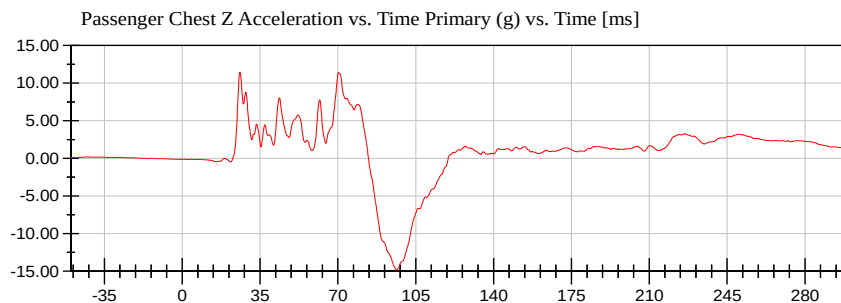
<Max>

7.36 g at 60.96 ms

<Min>

-8.20 g at 76.32 ms

CFC_180



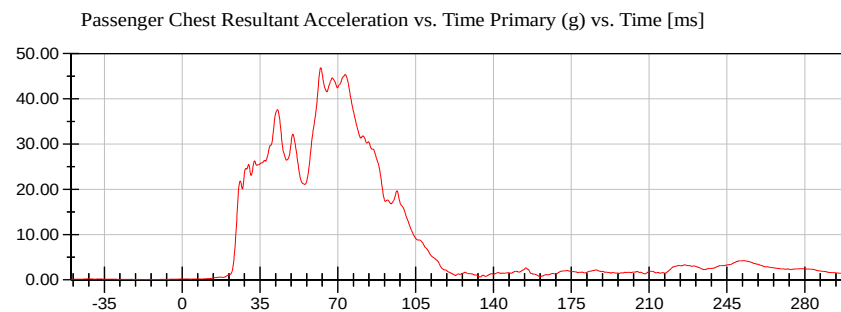
<Max>

11.43 g at 26.00 ms

<Min>

-14.84 g at 96.32 ms

CFC_180



<Max>

46.86 g at 62.32 ms

<Min>

0.06 g at -17.68 ms

CFC_180



NHTSA

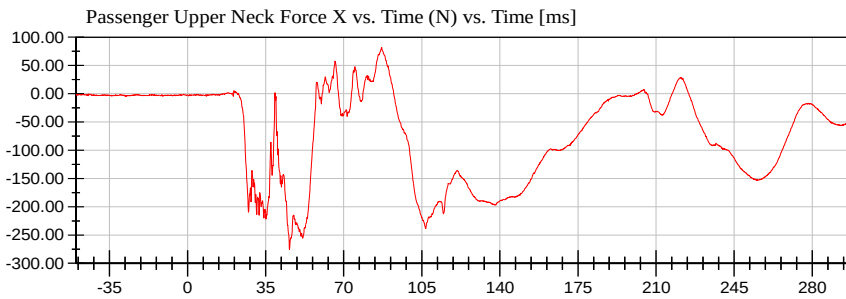
Test Lab: CTF

Test Number: 230228 (M20235600)

Test Date: 02/28/2023

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

Position #2 Hybrid III Small Adult Female (DH1659)



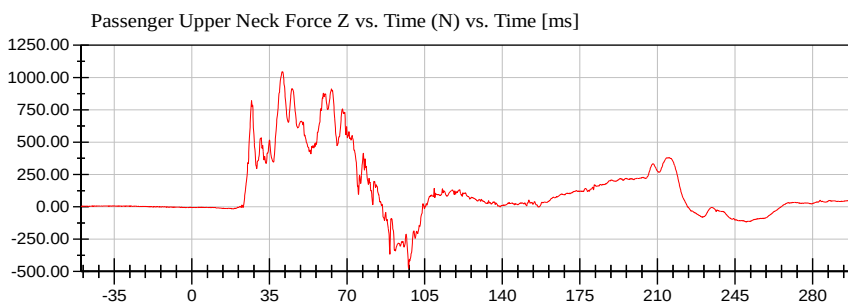
<Max>

81.85 N at 86.96 ms

<Min>

-275.39 N at 45.68 ms

CFC_1000



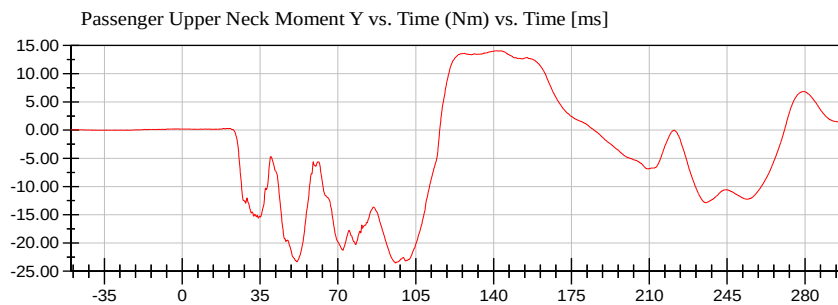
<Max>

1,044.57 N at 40.72 ms

<Min>

-475.89 N at 97.76 ms

CFC_1000



<Max>

14.05 Nm at 141.60 ms

<Min>

-23.54 Nm at 95.92 ms

CFC_600



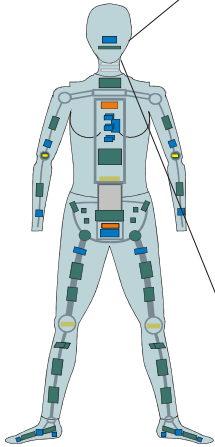


2023 Mitsubishi Outlander NCAP 35 mph Frontal Impact Neck Injury Predictor (NIJ)

Date: 02/28/2023
Time: 15:05

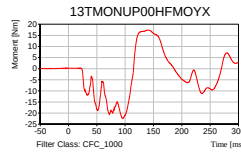
Customer: NHTSA
Test Number: M20235600

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

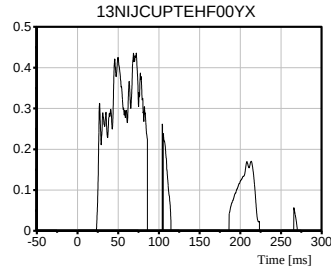


Dummy: HIII 5th Female
Seating Position:
Right Front Passenger

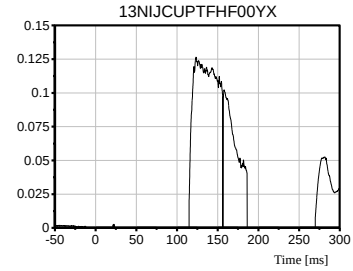
NIJ Source Code: (Fz/Fzc)+(My/Myc)



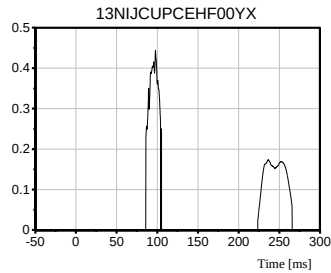
TRC Inc. Test Lab: CTF
Test Number: 230228



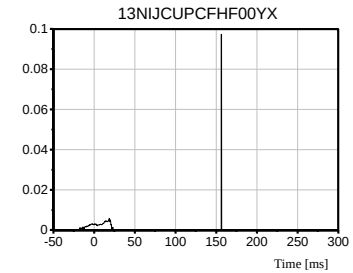
Max [NTE] 0.4360 at 72.32 ms



Max [NTF] 0.1265 at 123.44 ms



Max [NCE] 0.4442 at 97.76 ms



Max [NCF] 0.0974 at 156.32 ms

NHTSA

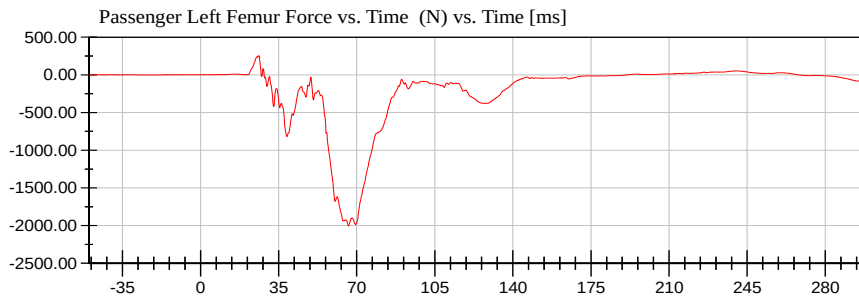
Test Lab: CTF

Test Number: 230228 (M20235600)

Test Date: 02/28/2023

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

Position #2 Hybrid III Small Adult Female (DH1659)



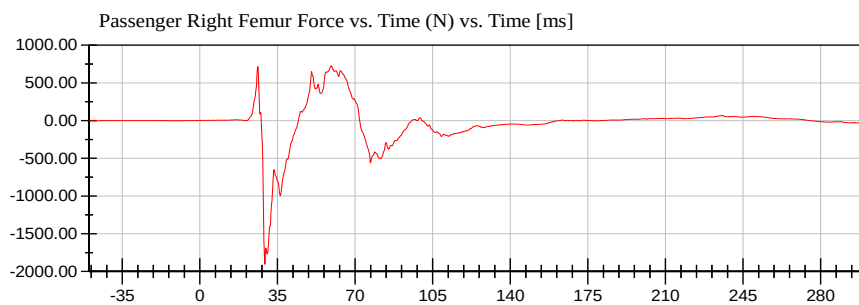
<Max>

254.75 N at 26.08 ms

<Min>

-2,003.81 N at 66.32 ms

CFC_600



<Max>

726.84 N at 59.20 ms

<Min>

-1,905.10 N at 29.28 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. 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

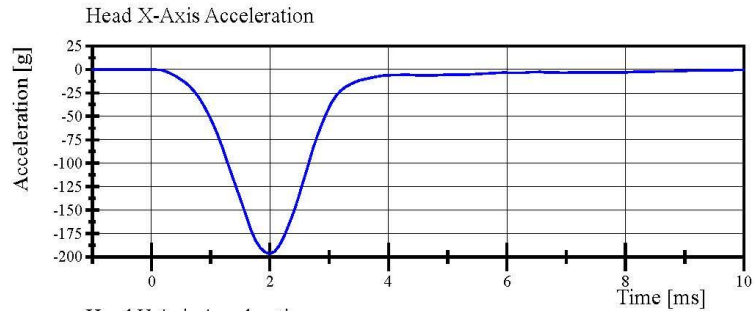


Transportation Research Center Inc.

Front Head Drop

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

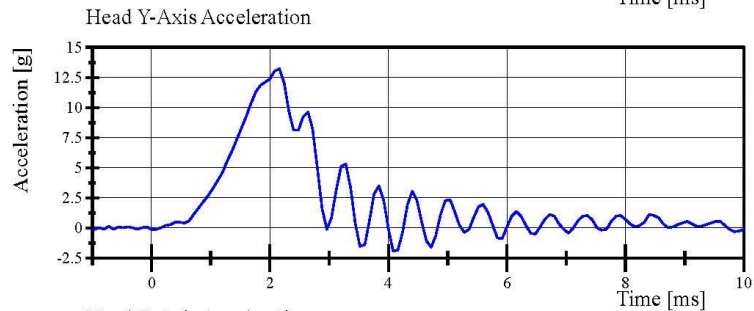
Test Date: 2/14/2023



Filter Class: CFC_1000

Max: 0.1 g at -0.4 ms

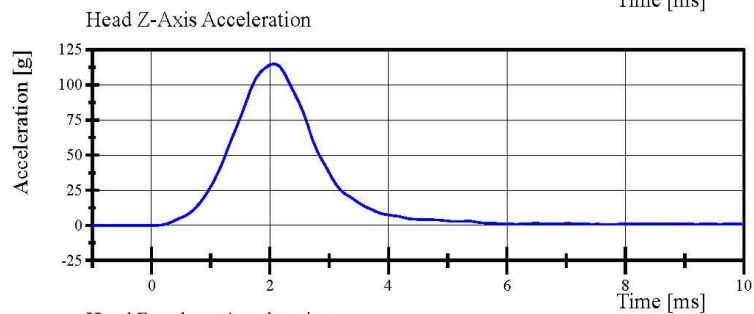
Min: -196.4 g at 2.0 ms



Filter Class: CFC_1000

Max: 13.2 g at 2.2 ms

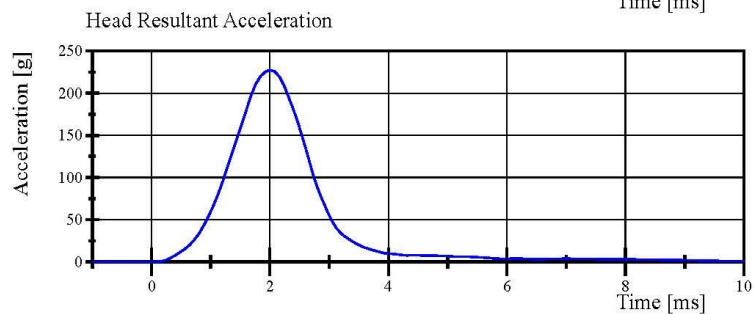
Min: -1.9 g at 4.1 ms



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

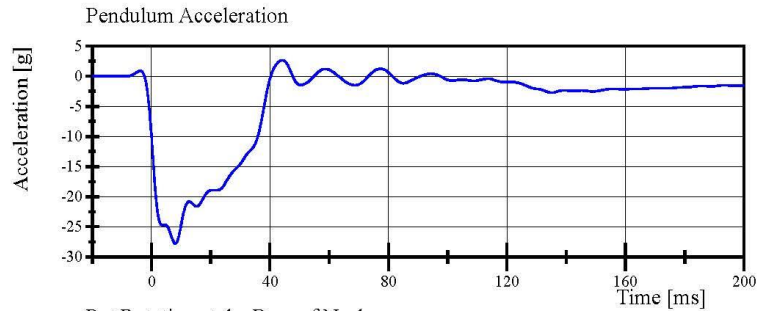


Transportation Research Center Inc.

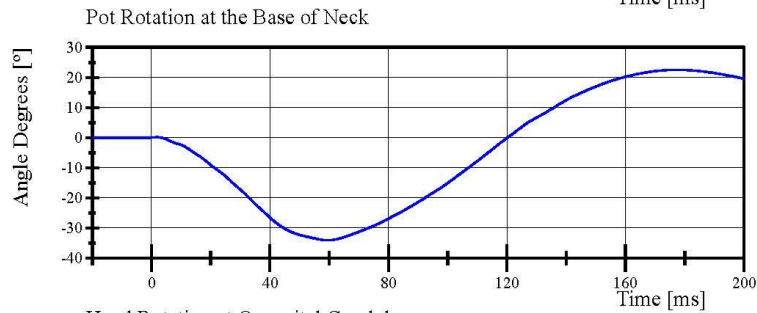
Neck Flexion

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

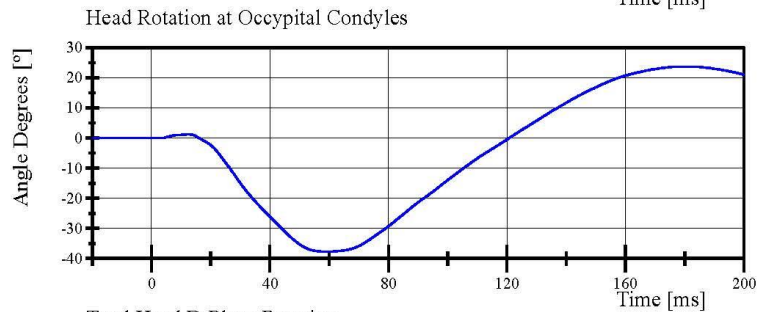
Test Date: 2/14/2023



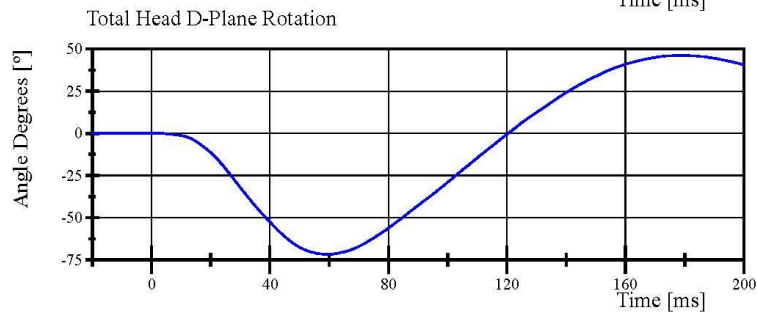
Filter Class: CFC_60
Max: 2.6 g at 44.2 ms
Min: -27.8 g at 8.1 ms



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

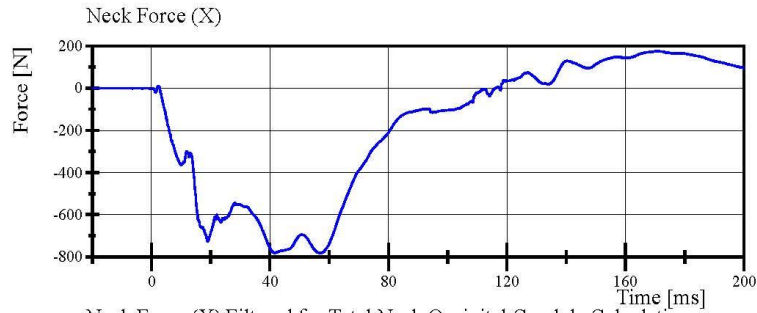


Transportation Research Center Inc.

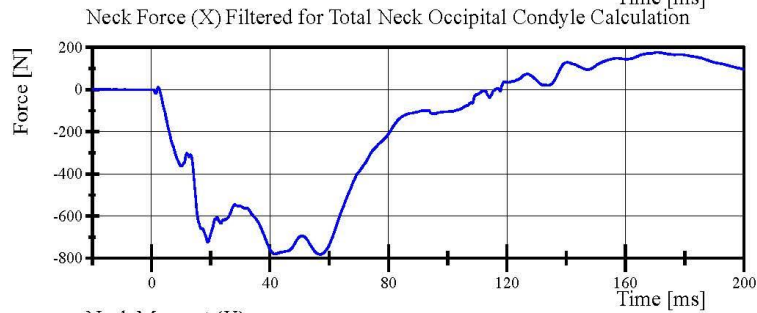
Neck Flexion

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

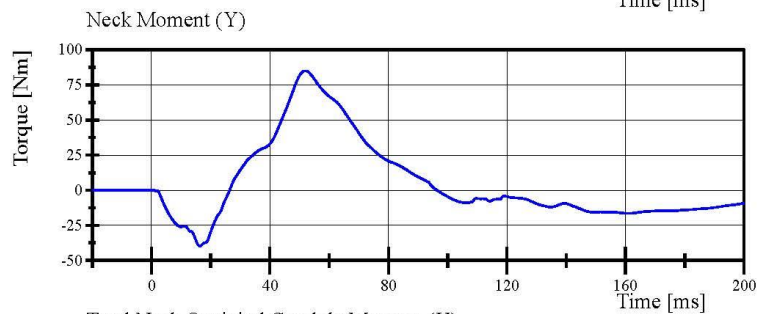
Test Date: 2/14/2023



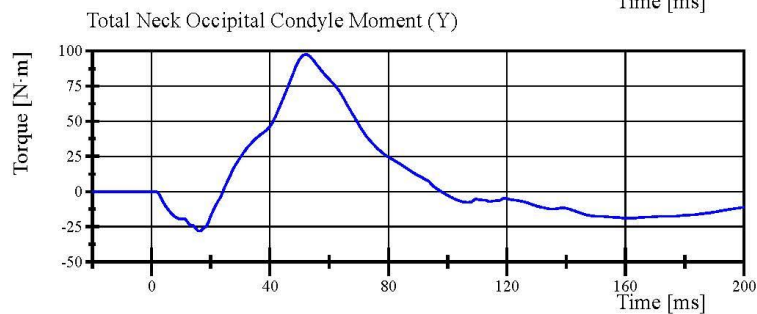
Filter Class: CFC_1000
Max: 176.1 N at 170.3 ms
Min: -782.2 N at 56.8 ms



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

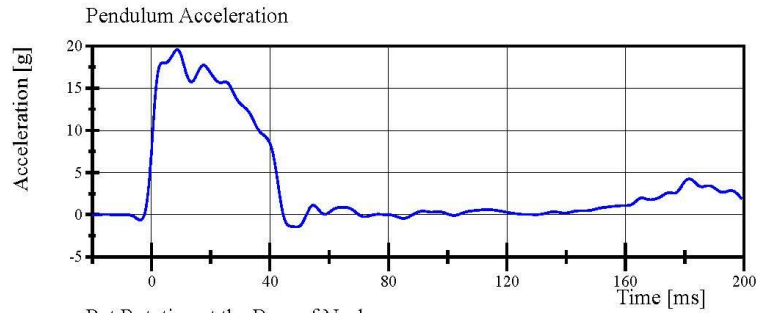


Transportation Research Center Inc.

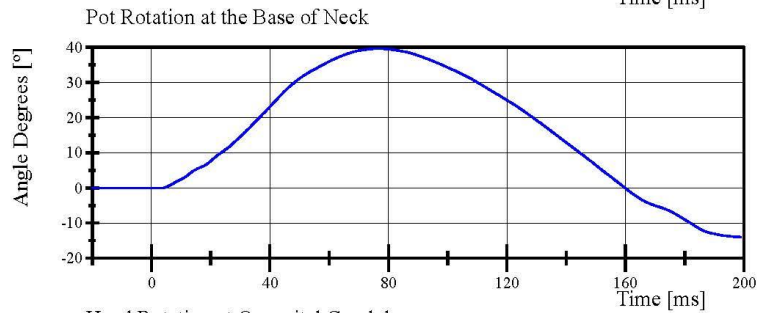
Neck Extension

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

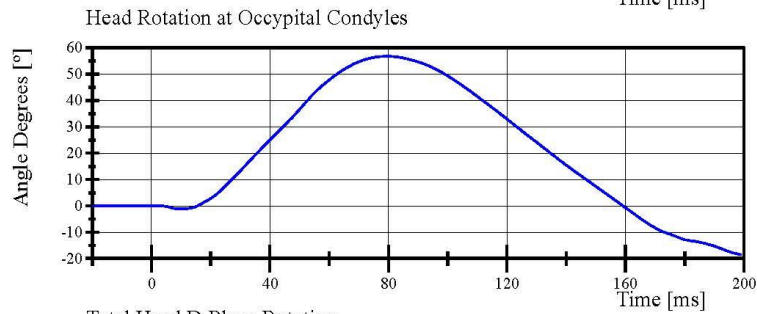
Test Date: 2/14/2023



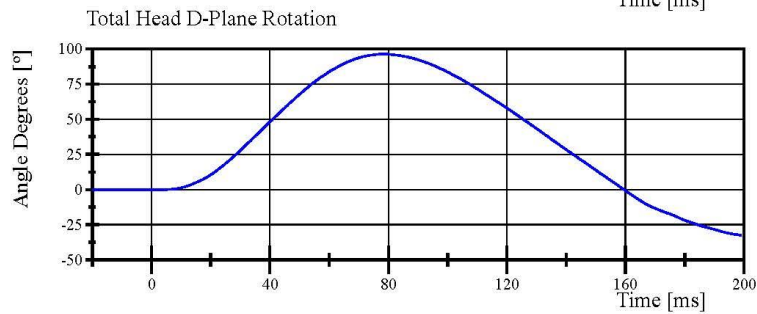
Filter Class: CFC_60
Max: 19.6 g at 8.7 ms
Min: -1.5 g at 48.9 ms



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

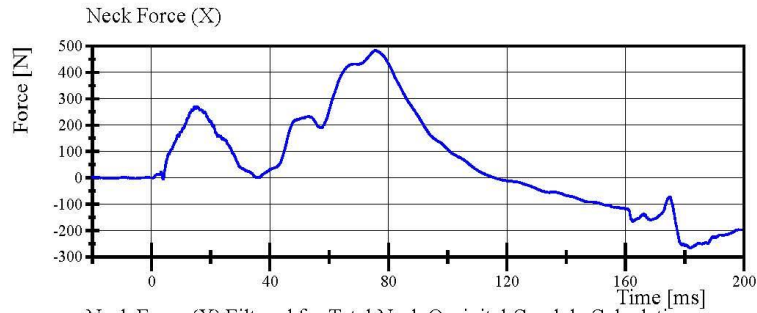


Transportation Research Center Inc.

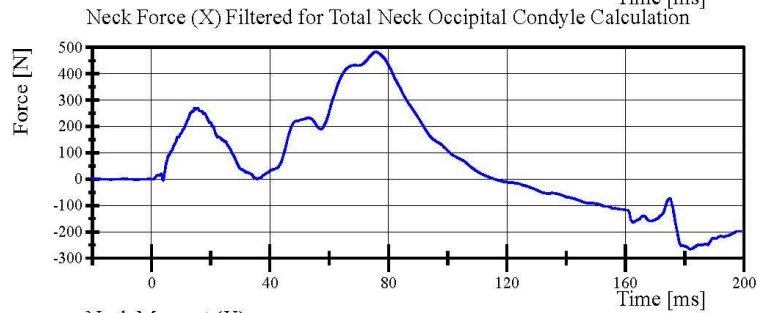
Neck Extension

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

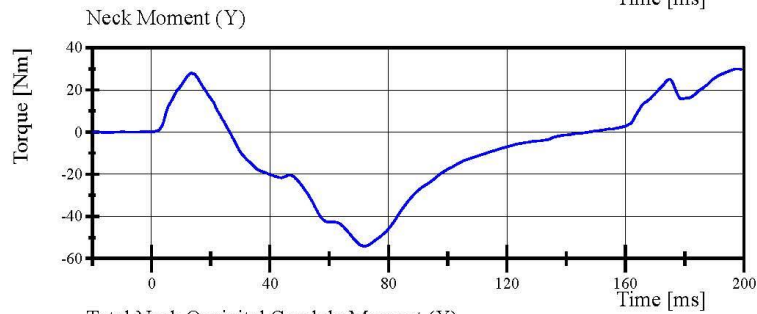
Test Date: 2/14/2023



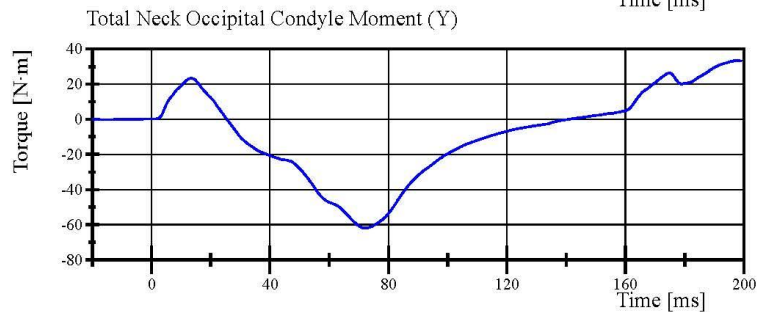
Filter Class: CFC_1000
Max: 483.6 N at 75.8 ms
Min: -266.1 N at 181.9 ms



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

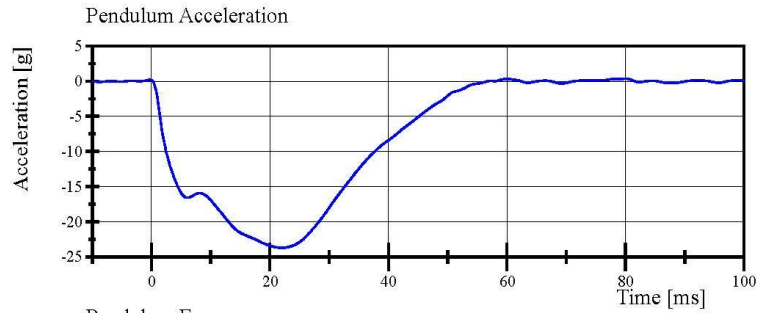


Transportation Research Center Inc.

Front Thorax

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

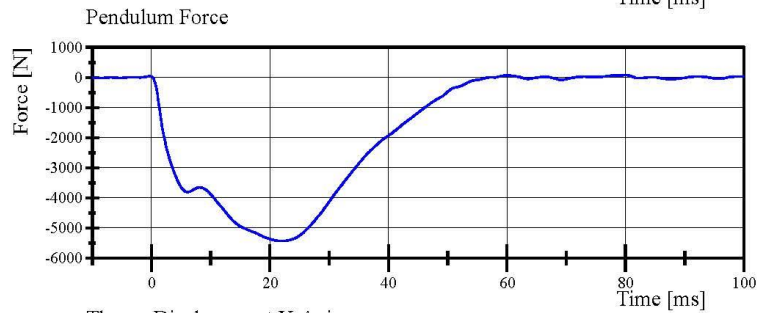
Test Date: 2/14/2023



Filter Class: CFC_180

Max: 0.4 g at 80.0 ms

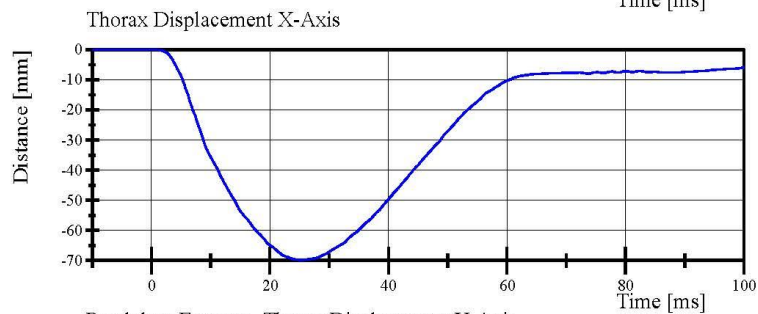
Min: -23.7 g at 21.9 ms



Filter Class: CFC_180

Max: 83.3 N at 80.0 ms

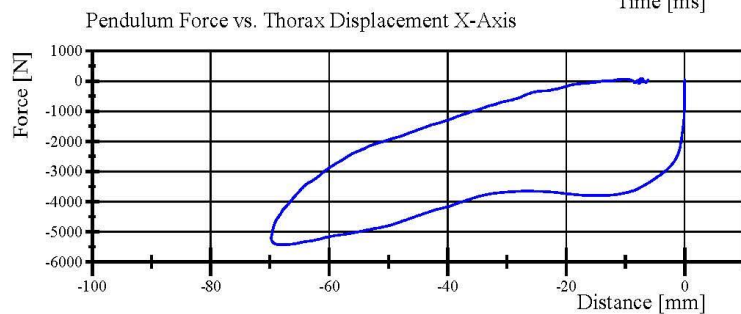
Min: -5,431.4 N at 21.9 ms



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



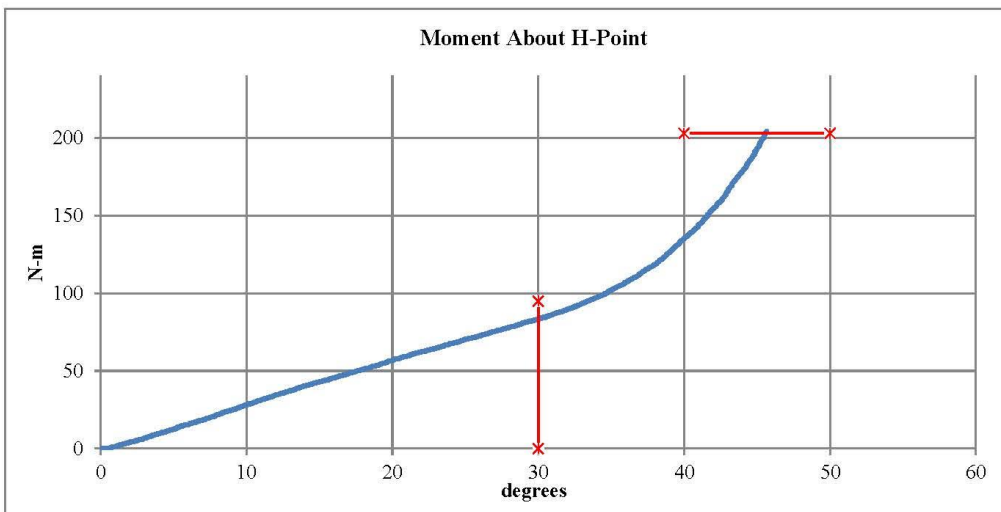
Transportation Research Center Inc.

Hybrid III 50th Male Hip Range of Motion

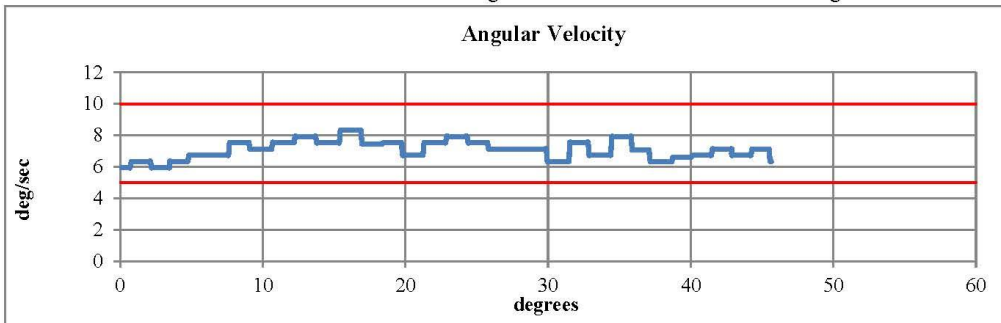


Serial Number: 037 Date: 14-Feb-2023
Side Tested: Left Hip Time: 15:53
Test Number: 1

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

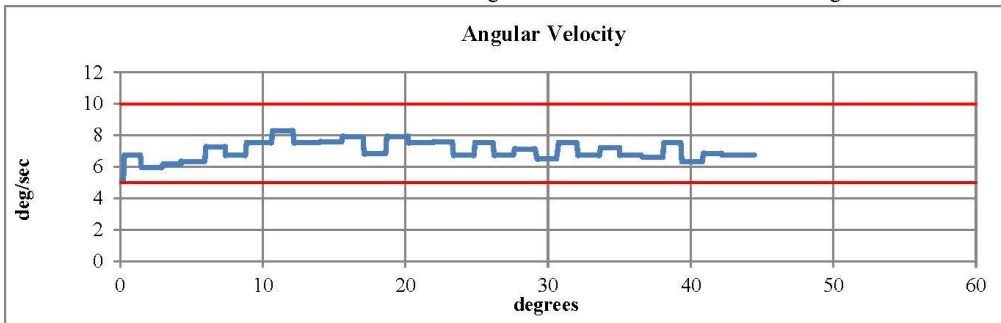
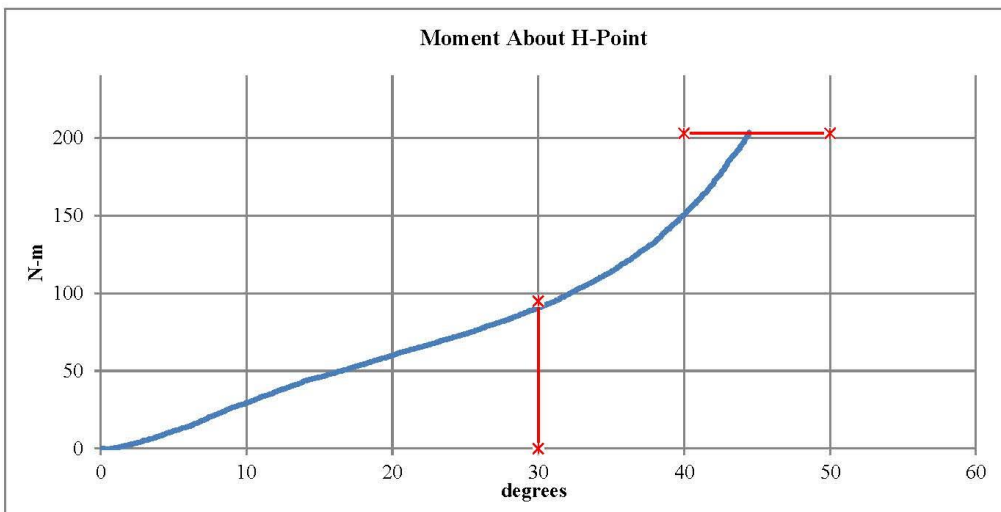
Transportation Research Center Inc.

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



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

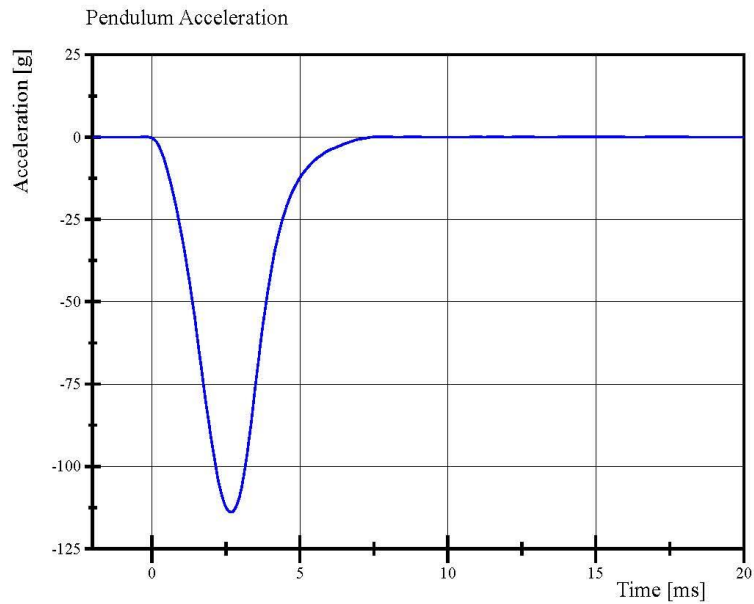
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

02.14.2023 15:23:36 1777

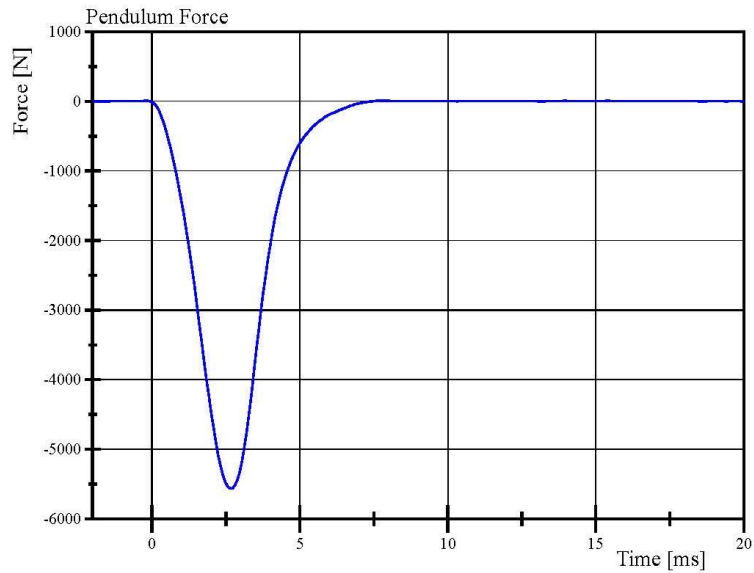


Transportation Research Center Inc.

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

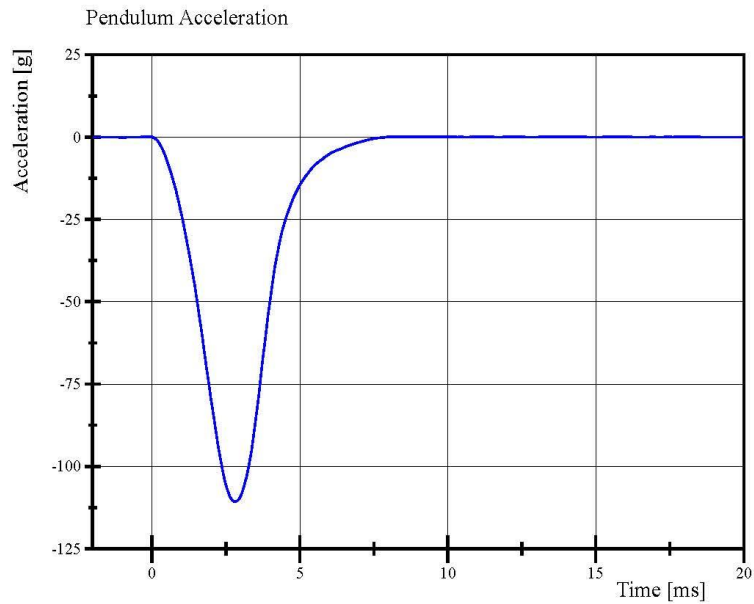


Report Number: 037_H3F82

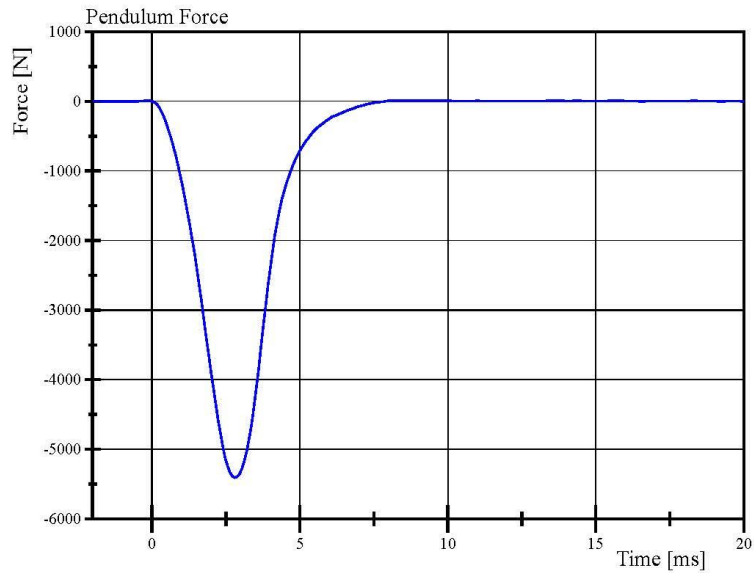
Page 23 of 27

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



Post-Test Calibration Sheets

Driver S/N 037

Transportation Research Center Inc.
572E HIII 50th Male Dummy
External Dimensions
Serial No. 037
Calibration No. 83

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Total Sitting Height	878.8 - 889.0	880	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	150	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	223	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	992	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_H3F83

Page 25 of 27

Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 037 Certification No. 83-1

Test Date: 3/1/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Peak Head Resultant Acceleration	225 - 275 g	232.6 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	4.4 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	1.39 %	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

03.01.2023 10:04:04 612

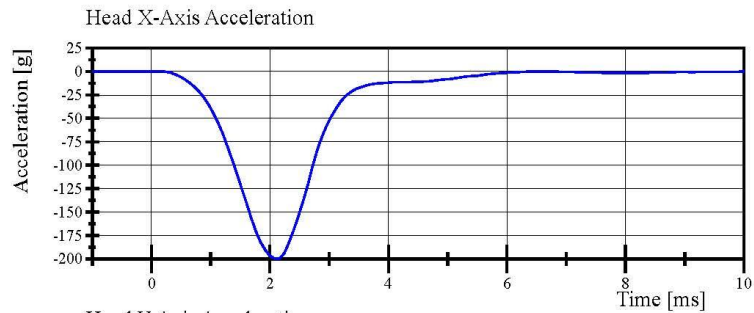


Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 037 Certification No. 83-1

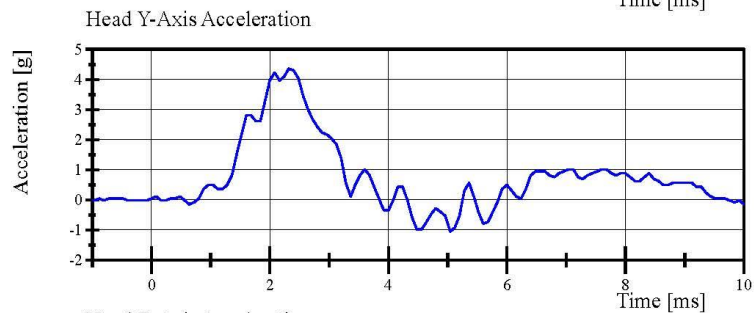
Test Date: 3/1/2023



Filter Class: CFC_1000

Max: 0.1 g at -1.0 ms

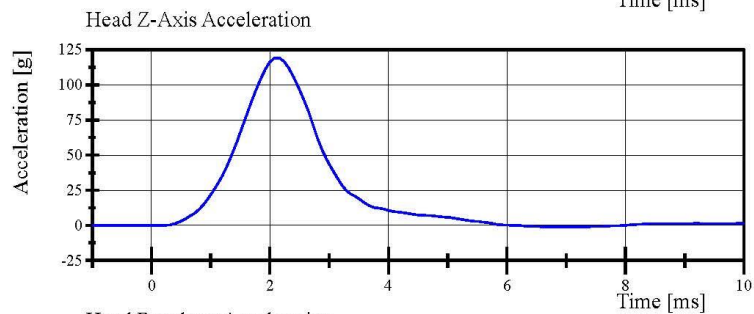
Min: -199.7 g at 2.1 ms



Filter Class: CFC_1000

Max: 4.4 g at 2.3 ms

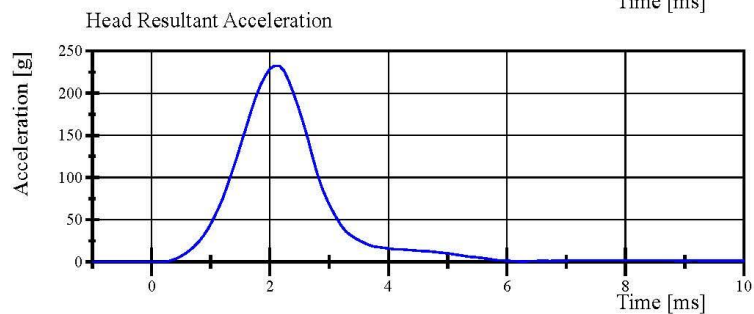
Min: -1.0 g at 5.0 ms



Filter Class: CFC_1000

Max: 119.1 g at 2.1 ms

Min: -1.1 g at 7.0 ms



Filter Class: CFC_1000

Max: 232.6 g at 2.1 ms

Min: 0.0 g at -1.0 ms

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

03.01.2023 10:04:38 612



Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 037 Certification No. 83-1

Test Date: 3/1/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	6.900 m/s	Yes
Pendulum Acceleration Decay Crossing -5g	34 - 42 ms	35.3 ms	Yes
Pendulum Acceleration at 10ms	(-22.5) - (-27.5) g	-25.84 g	Yes
Pendulum Acceleration at 20ms	(-17.6) - (-22.6) g	-20.22 g	Yes
Pendulum Acceleration at 30ms	(-12.5) - (-18.5) g	-17.16 g	Yes
Pendulum Acceleration > 30ms	>= (-29.0) g	-17.16 g	Yes
Total Head D-Plane Rotation			
Peak	(-64) - (-78) °	-67.7 °	Yes
Time of Peak	57 - 64 ms	58.7 ms	Yes
Total Head D-Plane Rotation			
Decay to 0°	113 - 128 ms	118.2 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	88.1 - 108.4 N·m	98.34 N·m	Yes
Time of Peak	47 - 58 ms	49.8 ms	Yes
Total Neck Occipital Condyles Moment			
Decay to 0 N·m	97 - 107 ms	97.3 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

03.01.2023 10:45:50 1872

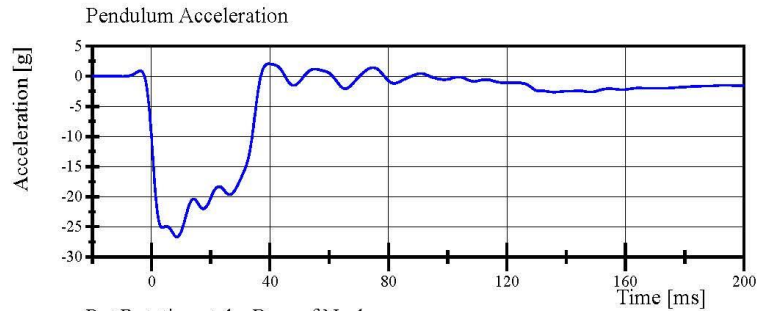


Transportation Research Center Inc.

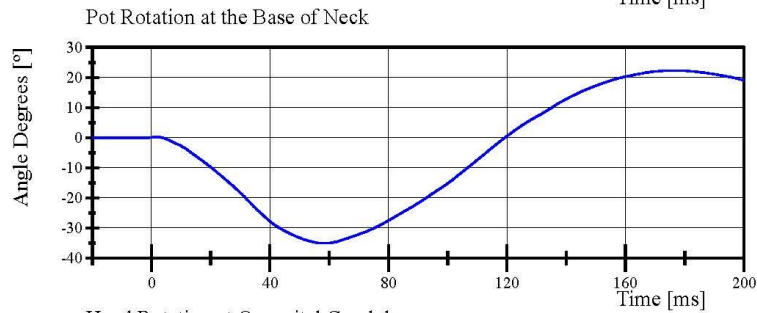
Neck Flexion

HIII 50th Serial No. 037 Certification No. 83-1

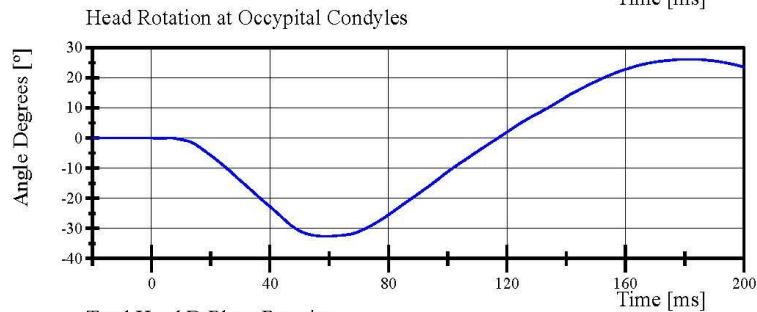
Test Date: 3/1/2023



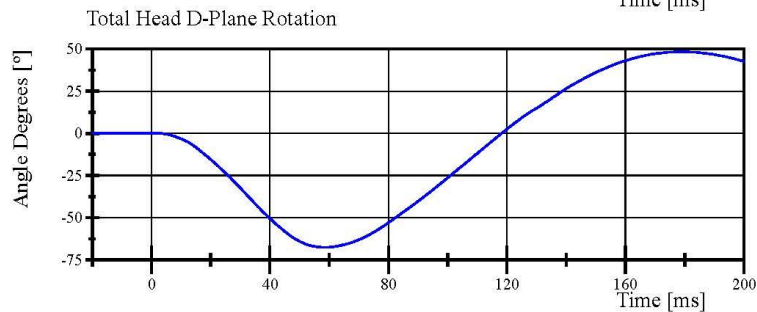
Filter Class: CFC_60
Max: 2.1 g at 39.6 ms
Min: -26.7 g at 8.6 ms



Filter Class: CFC_60
Max: 22.3 ° at 176.8 ms
Min: -35.0 ° at 58.5 ms



Filter Class: CFC_60
Max: 26.2 ° at 181.7 ms
Min: -32.6 ° at 59.2 ms



Filter Class: CFC_60
Max: 48.4 ° at 179.0 ms
Min: -67.7 ° at 58.7 ms

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

03.01.2023 10:46:13 1872

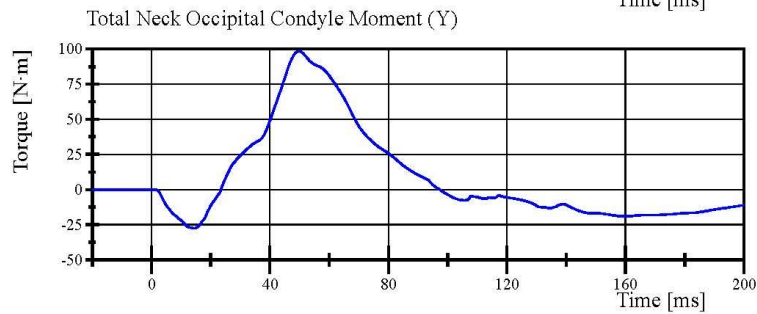
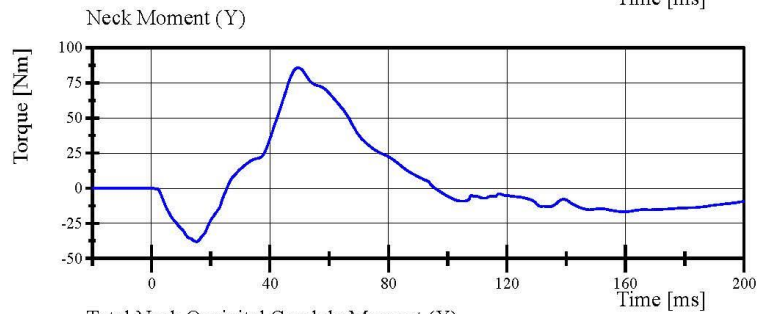
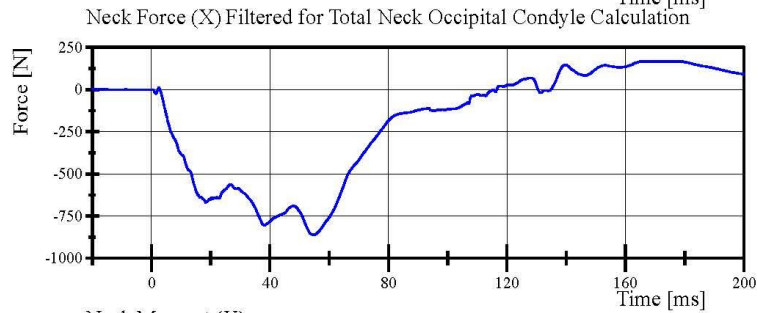
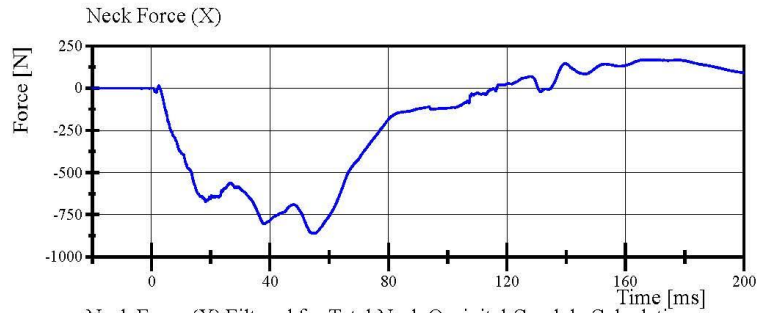


Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 037 Certification No. 83-1

Test Date: 3/1/2023



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

03.01.2023 10:46:13 1872



Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 037 Certification No. 83-1

Test Date: 3/1/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Pendulum Velocity	(-5.95) - (-6.18) m/s	-5.963 m/s	Yes
Pendulum Acceleration Decay Crossing 5g	38 - 46 ms	39.5 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	20.15 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	17.07 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	13.56 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	13.83 g	Yes
Total Head D-Plane Rotation			
Peak	81 - 106 °	93.0 °	Yes
Time of Peak	72 - 82 ms	77.6 ms	Yes
Total Head D-Plane Rotation Decay to 0°	147 - 174 ms	158.6 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	(-52.9) - (-80) N·m	-65.54 N·m	Yes
Time of Peak	65 - 79 ms	71.2 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	120 - 148 ms	142.1 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

03.01.2023 11:16:26 2012

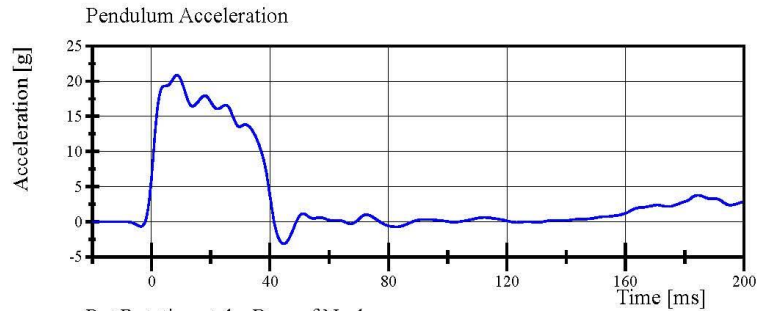


Transportation Research Center Inc.

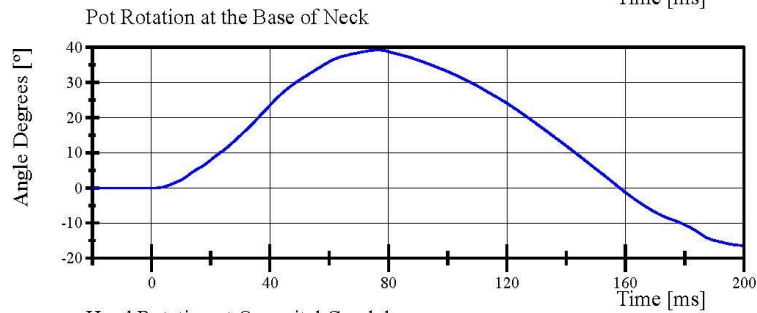
Neck Extension

HIII 50th Serial No. 037 Certification No. 83-1

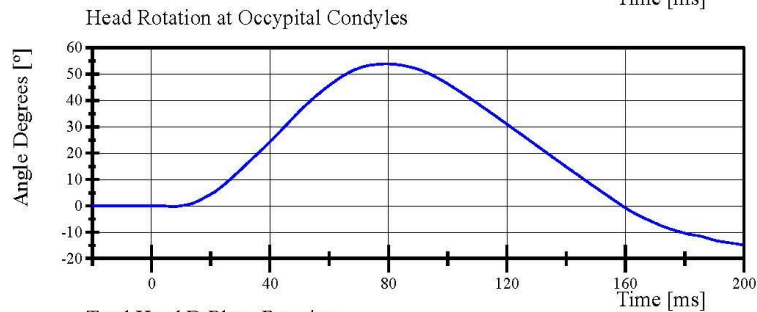
Test Date: 3/1/2023



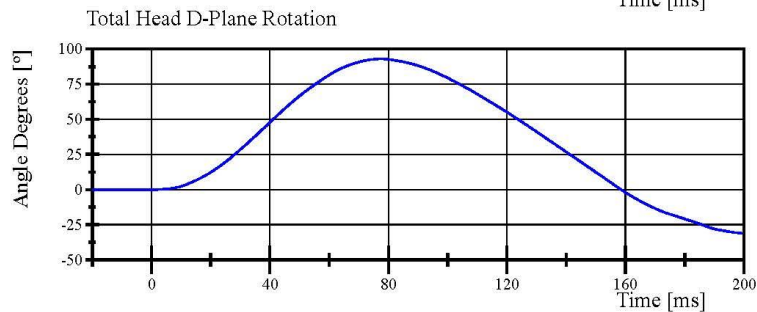
Filter Class: CFC_60
Max: 20.9 g at 8.6 ms
Min: -3.1 g at 44.7 ms



Filter Class: CFC_60
Max: 39.2 ° at 76.2 ms
Min: -16.4 ° at 199.4 ms



Filter Class: CFC_60
Max: 53.9 ° at 79.4 ms
Min: -14.7 ° at 199.4 ms



Filter Class: CFC_60
Max: 93.0 ° at 77.6 ms
Min: -31.1 ° at 199.4 ms

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

03.01.2023 11:17:08 2012

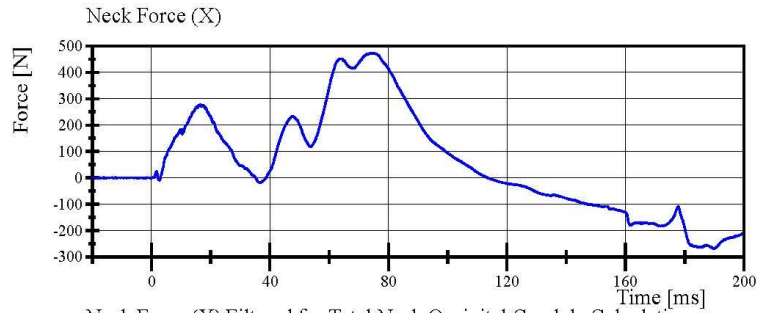


Transportation Research Center Inc.

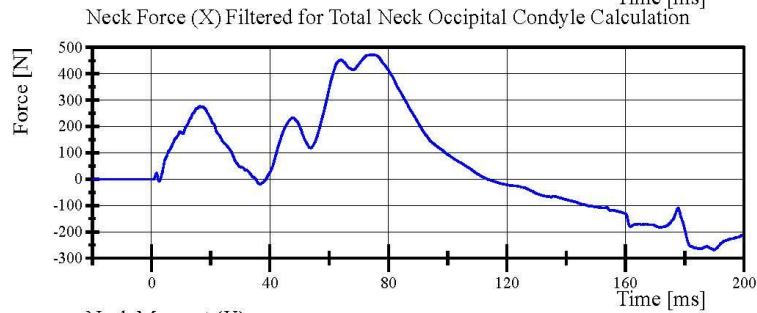
Neck Extension

HIII 50th Serial No. 037 Certification No. 83-1

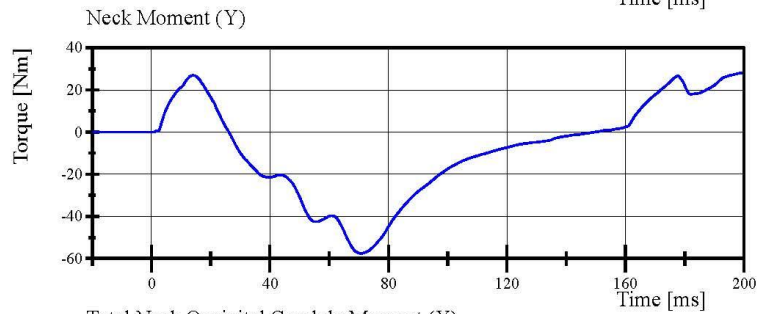
Test Date: 3/1/2023



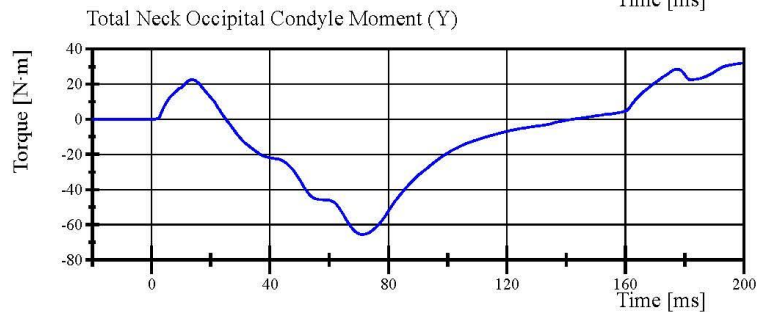
Filter Class: CFC_1000
Max: 473.2 N at 74.4 ms
Min: -269.1 N at 189.8 ms



Filter Class: CFC_600
Max: 472.5 N at 74.4 ms
Min: -268.3 N at 189.9 ms



Filter Class: CFC_600
Max: 28.1 Nm at 199.4 ms
Min: -57.6 Nm at 70.9 ms



Filter Class: Without_(Constar
Max: 31.9 N·m at 199.4 ms
Min: -65.5 N·m at 71.2 ms

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

03.01.2023 11:17:08 2012



Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 037 Certification No. 83-1

Test Date: 3/1/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.605 m/s	Yes
Probe Force Peak	(-5,160) - (-5,894) N	-5,434.5 N	Yes
Maximum Chest Compression	(-63.5) - (-72.6) mm	-66.67 mm	Yes
Internal Hysteresis	69 - 85 %	69.2 %	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

03.01.2023 08:17:13 428

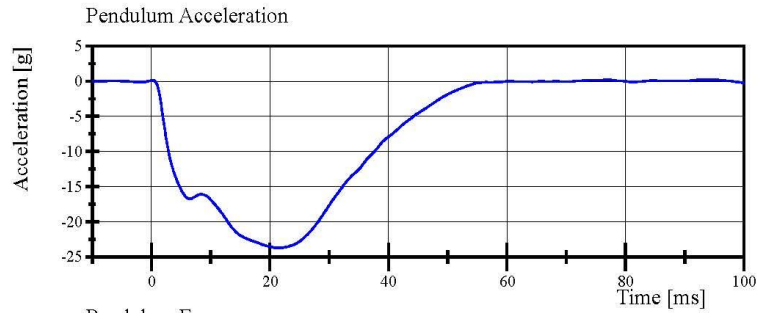


Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 037 Certification No. 83-1

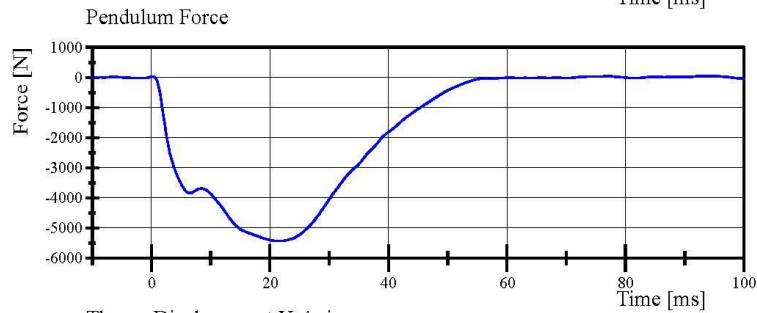
Test Date: 3/1/2023



Filter Class: CFC_180

Max: 0.2 g at 93.6 ms

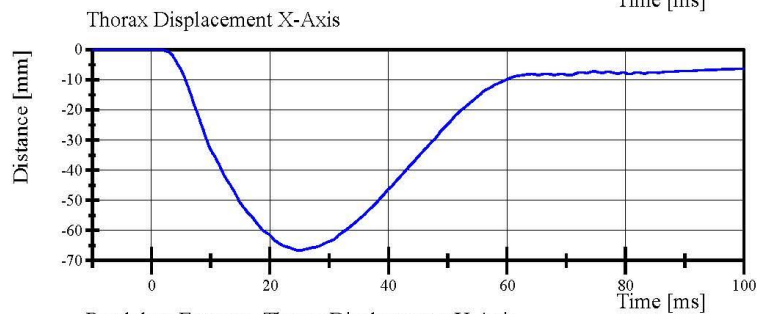
Min: -23.7 g at 21.4 ms



Filter Class: CFC_180

Max: 43.4 N at 93.6 ms

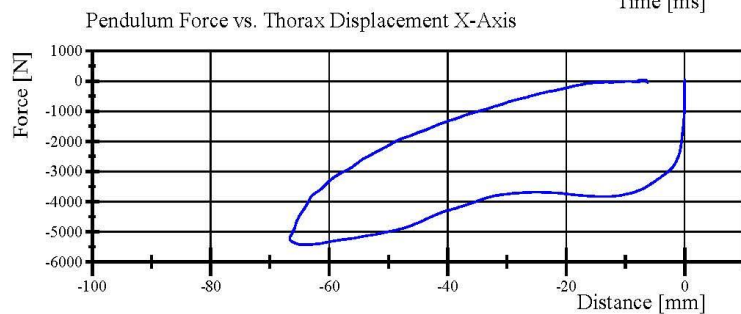
Min: -5,434.5 N at 21.4 ms



Filter Class: CFC_600

Max: 0.0 mm at -5.8 ms

Min: -66.7 mm at 25.0 ms



Filter Class: CFC_180

Max: 43.4 N at -6.7 mm

Min: -5,434.5 N at -64.2 mm

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

03.01.2023 08:17:51 428



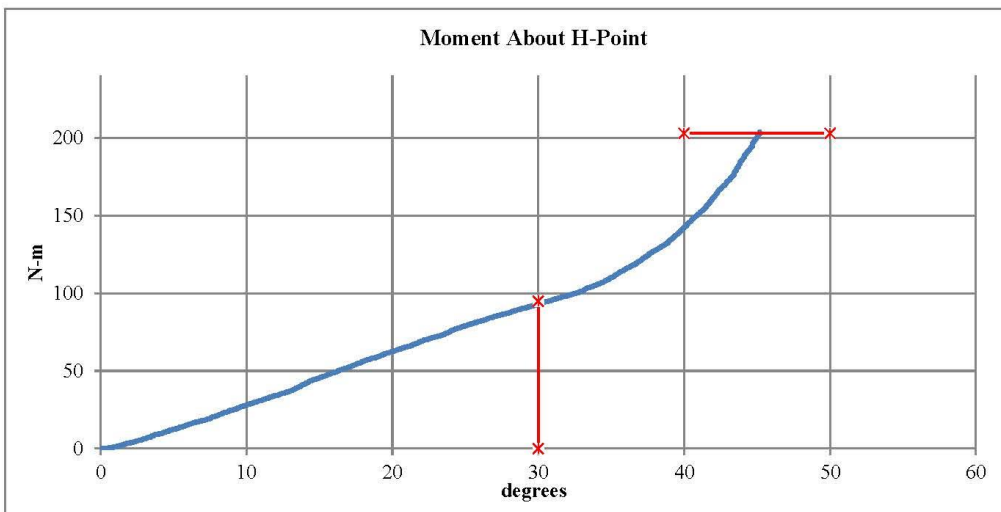
Transportation Research Center Inc.

Hybrid III 50th Male Hip Range of Motion

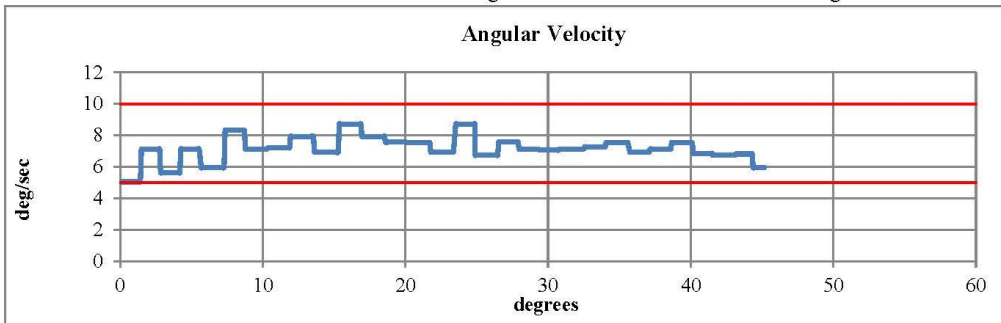


Serial Number: 037 Date: 01-Mar-2023
Side Tested: Left Hip Time: 9:04
Test Number: 1

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	20.9	°C	Pass
Humidity	10	-	70	35	%	Pass
Moment at 30°	0	≤	94.9	93.01	N-m	Pass
Angle at 203 Nm	40	-	50	45.17	deg	Pass
Average Velocity	5	-	10	7.15	deg/sec	Pass



Max: 8.72 deg/sec Min: 5.04 deg/sec



Comments: Pelvis S/N: EU6859

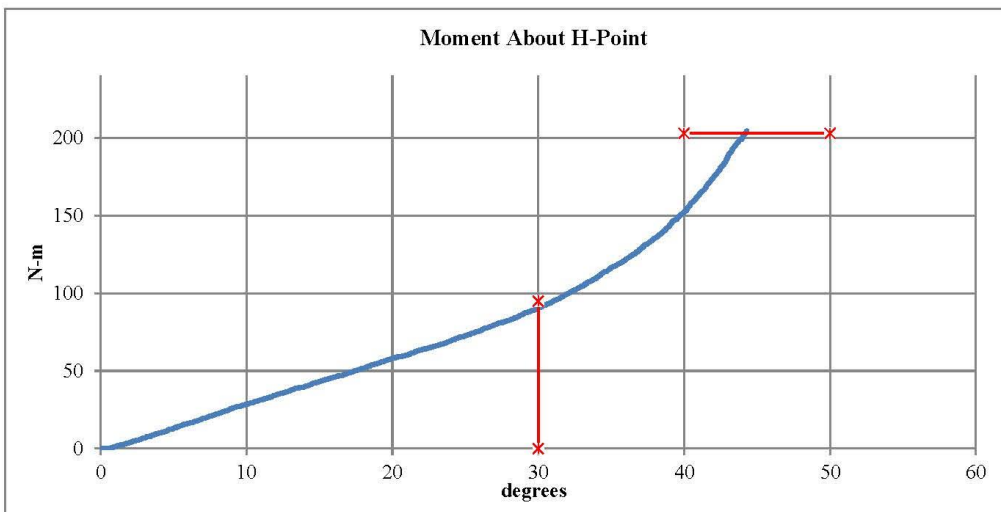
Transportation Research Center Inc.

Hybrid III 50th Male Hip Range of Motion

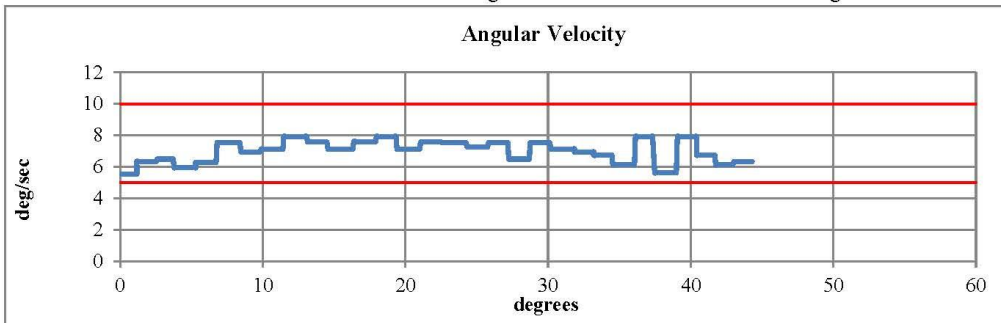


Serial Number: 037 Date: 01-Mar-2023
Side Tested: Right Hip Time: 9:59
Test Number: 1

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	21.1	°C	Pass
Humidity	10	-	70	36	%	Pass
Moment at 30°	0	≤	94.9	90.59	N-m	Pass
Angle at 203 Nm	40	-	50	44.3	deg	Pass
Average Velocity	5	-	10	6.97	deg/sec	Pass



Max: 7.93 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. 83-1
Test Date: 3/1/2023

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.100 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,526.29 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

03.01.2023 08:24:12 1817

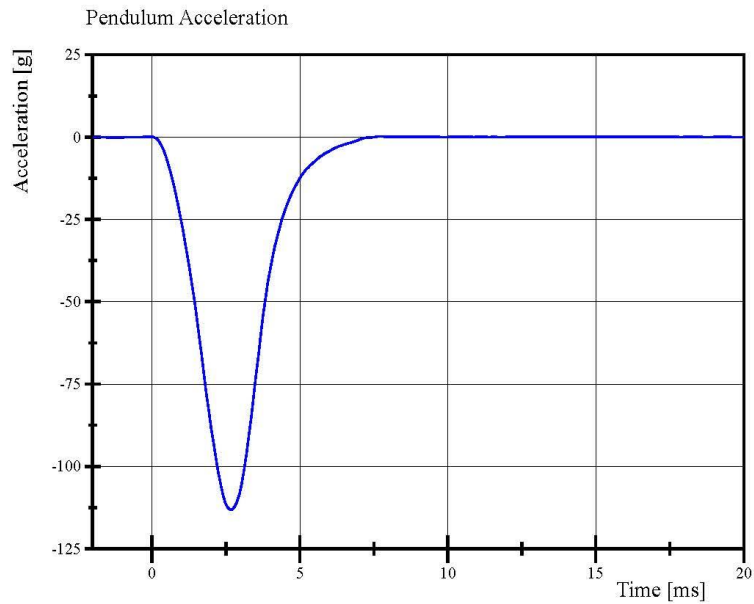


Report Number: 037_H3F83

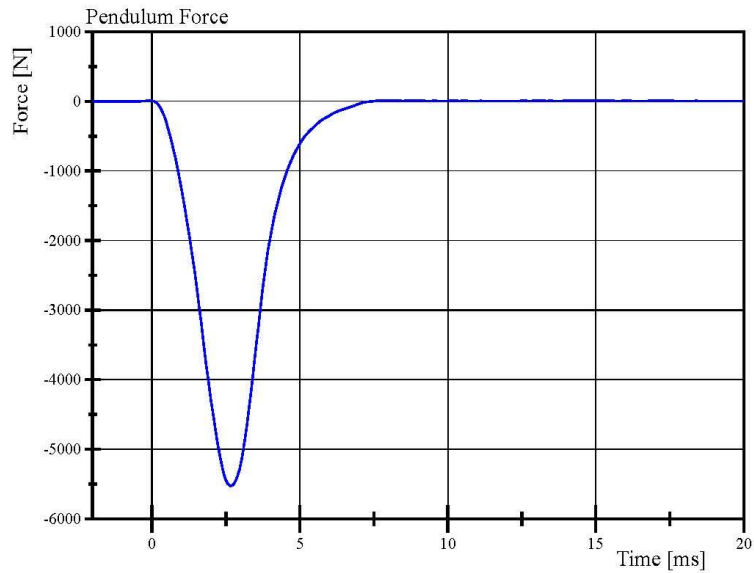
Page 21 of 27

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 83-1
Test Date: 3/1/2023



Filter Class: CFC_600
Max: 0.2 g at 7.8 ms
Min: -113.2 g at 2.6 ms



Filter Class: CFC_600
Max: 11.0 N at 7.8 ms
Min: -5,526.3 N at 2.6 ms

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

03.01.2023 08:24:43 1817



Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 83-1
Test Date: 3/1/2023

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.101 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,392.95 N	Yes

Test meets specifications.

Condition: Used

Comments:

Knee Skin S/N: 1248

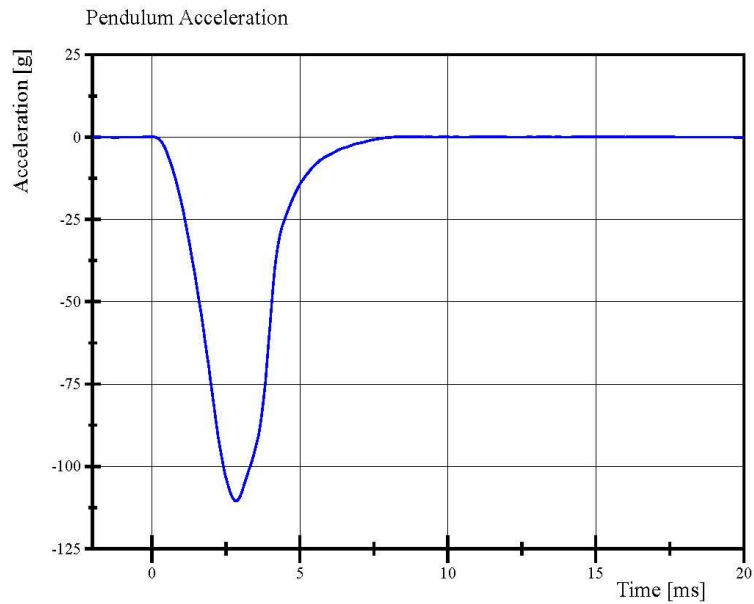
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

03.01.2023 08:27:49 1812

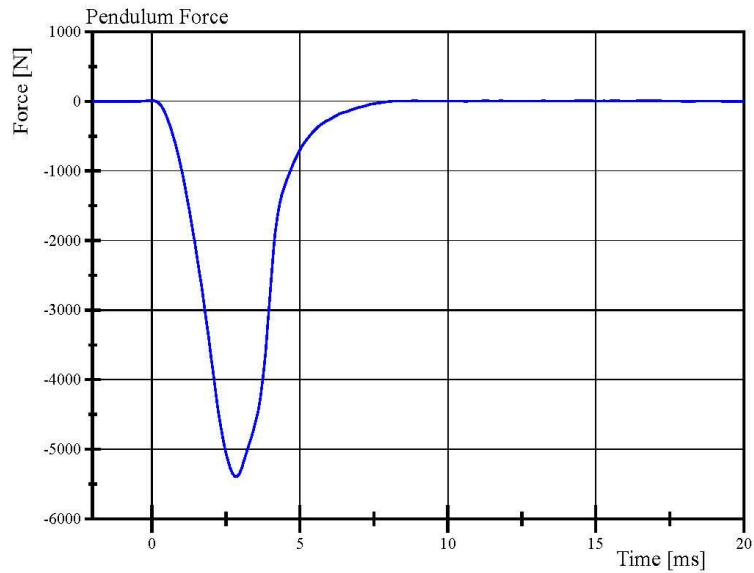


Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 83-1
Test Date: 3/1/2023



Filter Class: CFC_600
Max: 0.2 g at 0.0 ms
Min: -110.4 g at 2.9 ms



Filter Class: CFC_600
Max: 8.0 N at 0.0 ms
Min: -5,393.0 N at 2.9 ms

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

03.01.2023 08:28:14 1812



Pre-Test Calibration Sheets

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: 2/21/2023

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Peak Head Resultant Acceleration	250 - 300 g	259.4 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	8.7 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	1.40 %	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

02.21.2023 09:05:42 614

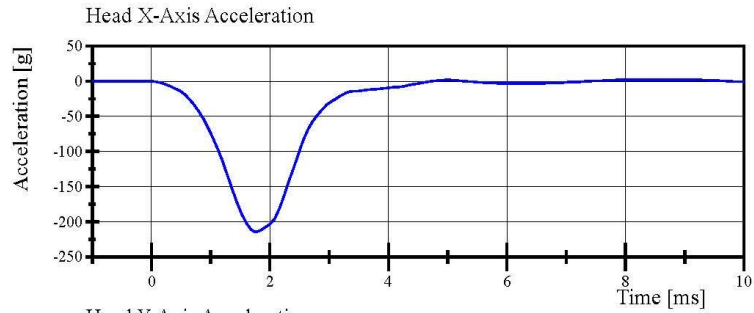


Transportation Research Center Inc.

Front Head Drop

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

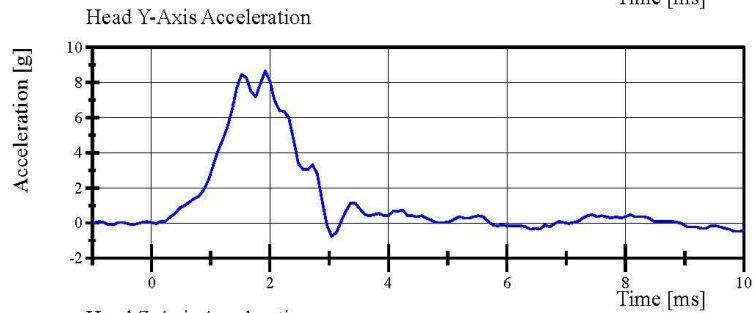
Test Date: 2/21/2023



Filter Class: CFC_1000

Max: 2.3 g at 8.7 ms

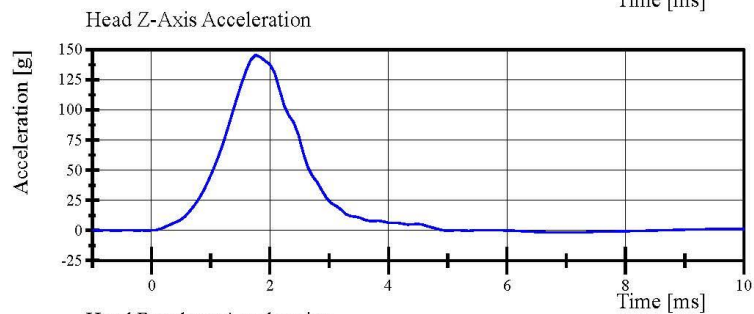
Min: -214.7 g at 1.8 ms



Filter Class: CFC_1000

Max: 8.7 g at 1.9 ms

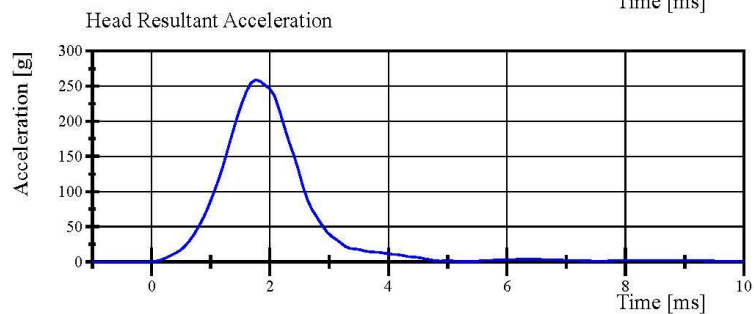
Min: -0.7 g at 3.0 ms



Filter Class: CFC_1000

Max: 145.5 g at 1.8 ms

Min: -1.8 g at 7.0 ms



Filter Class: CFC_1000

Max: 259.4 g at 1.8 ms

Min: 0.0 g at -1.0 ms

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

02.21.2023 09:06:06 614



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

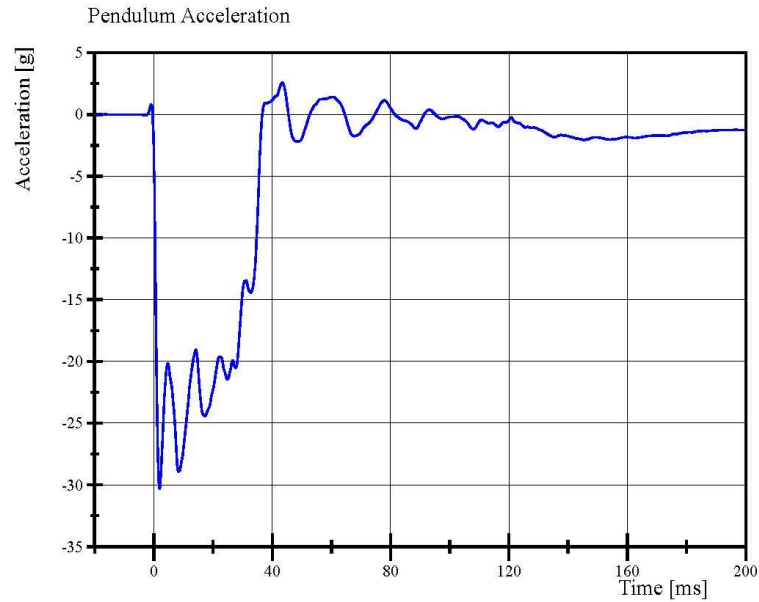


Transportation Research Center Inc.

Neck Flexion

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

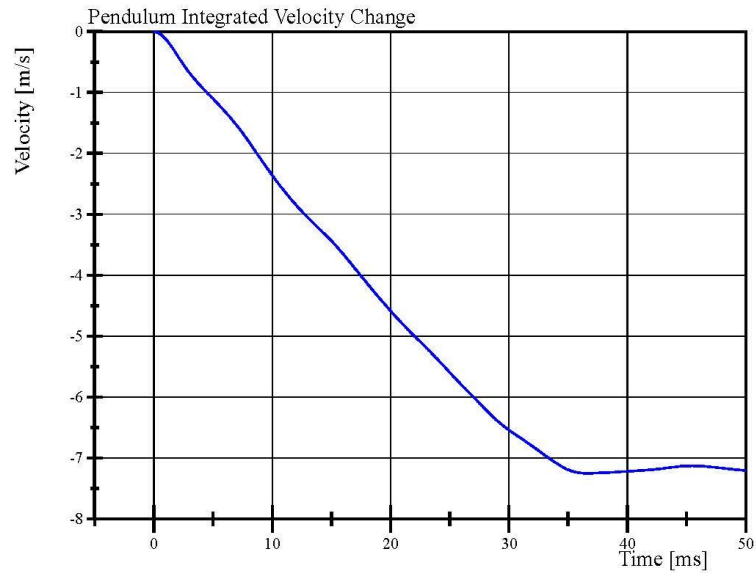
Test Date: 2/15/2023



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



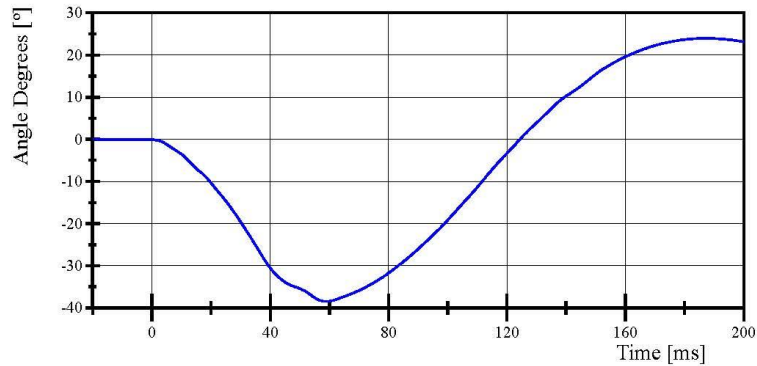
Transportation Research Center Inc.

Neck Flexion

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

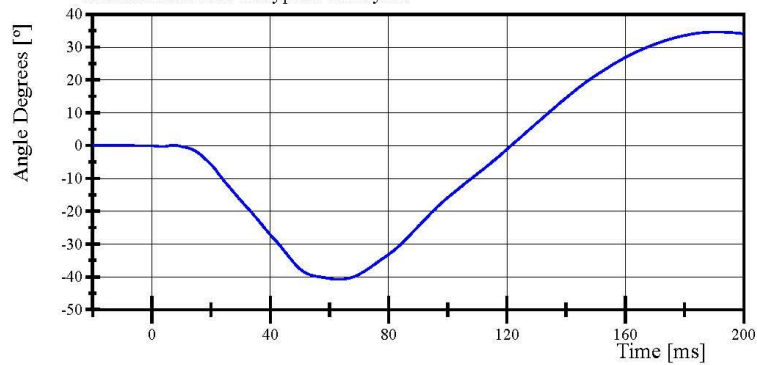
Test Date: 2/15/2023

Pot Rotation at the Base of Neck



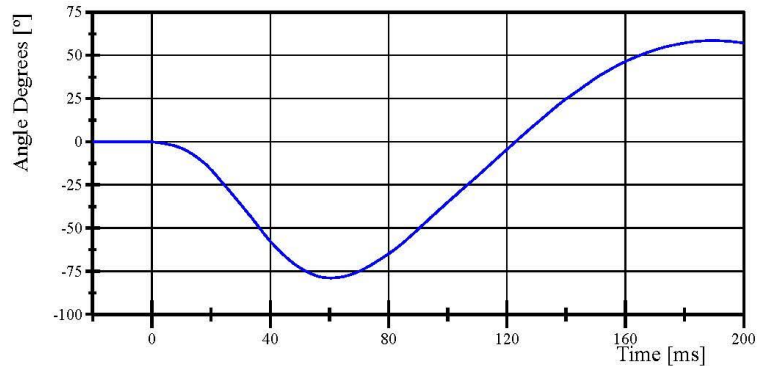
Filter Class: CFC_60
Max: 24.0 ° at 187.2 ms
Min: -38.4 ° at 59.0 ms

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

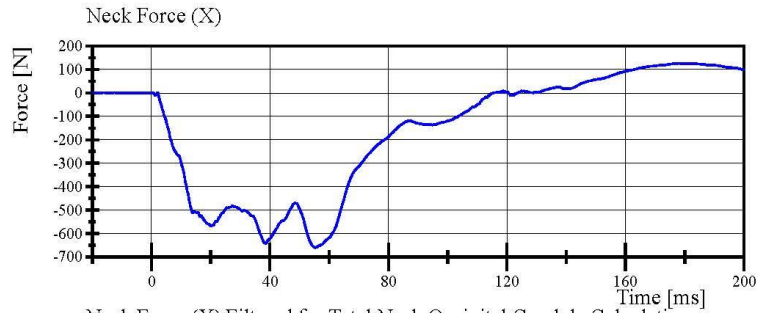


Transportation Research Center Inc.

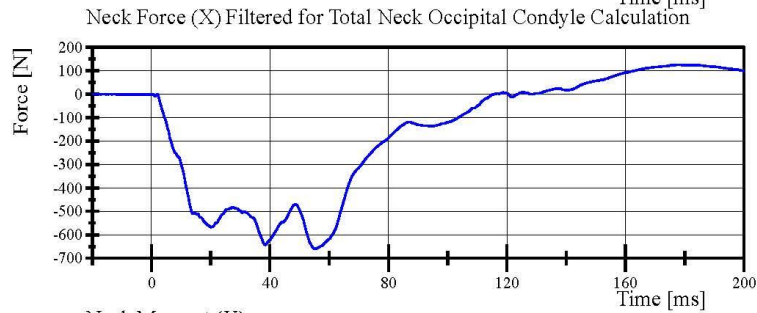
Neck Flexion

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

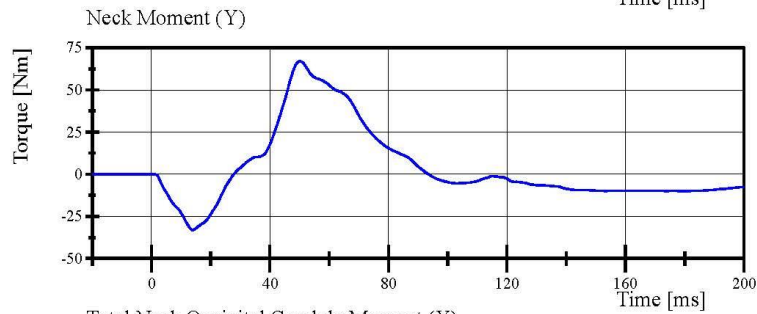
Test Date: 2/15/2023



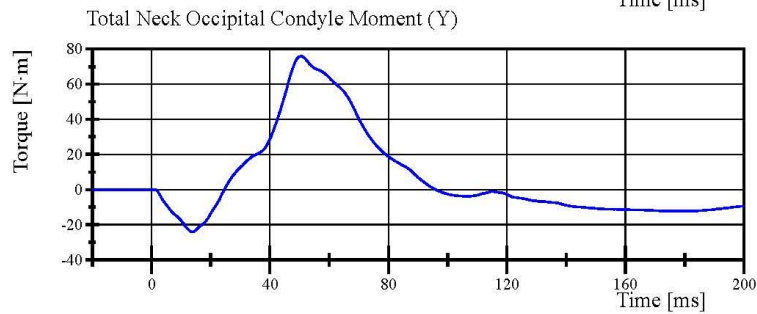
Filter Class: CFC_1000
Max: 126.0 N at 177.9 ms
Min: -660.4 N at 55.3 ms



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

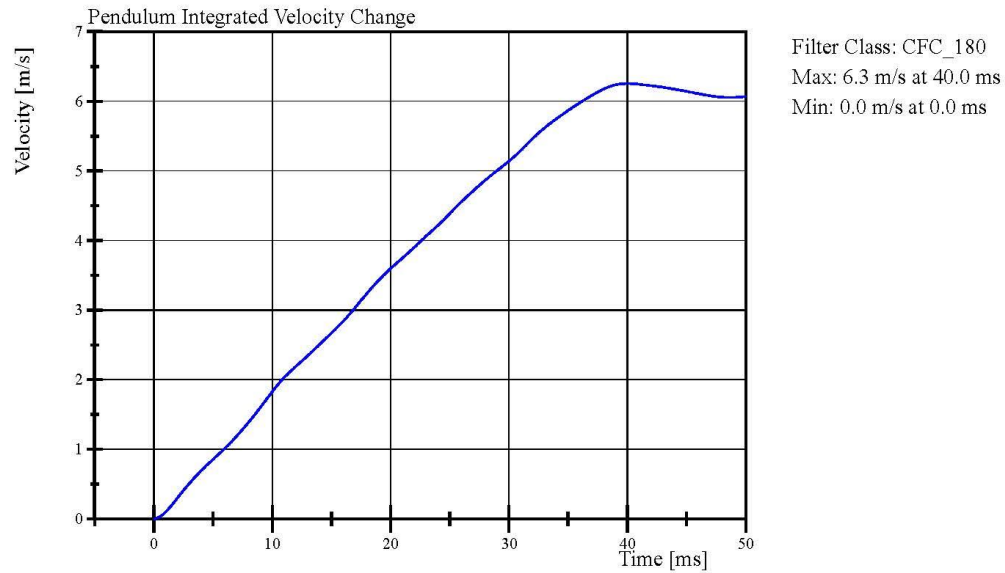
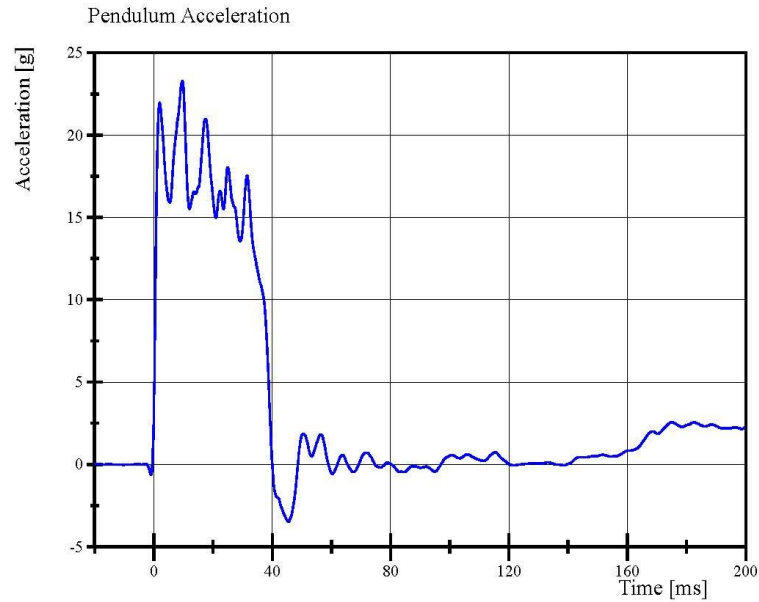


Transportation Research Center Inc.

Neck Extension

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

Test Date: 2/15/2023



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

02.15.2023 12:40:54 2008



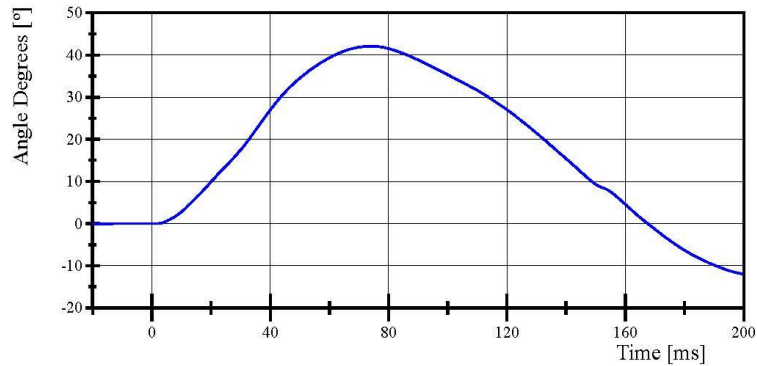
Transportation Research Center Inc.

Neck Extension

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

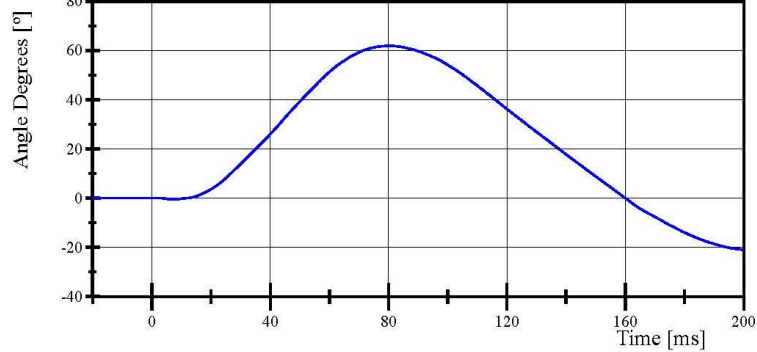
Test Date: 2/15/2023

Pot Rotation at the Base of Neck



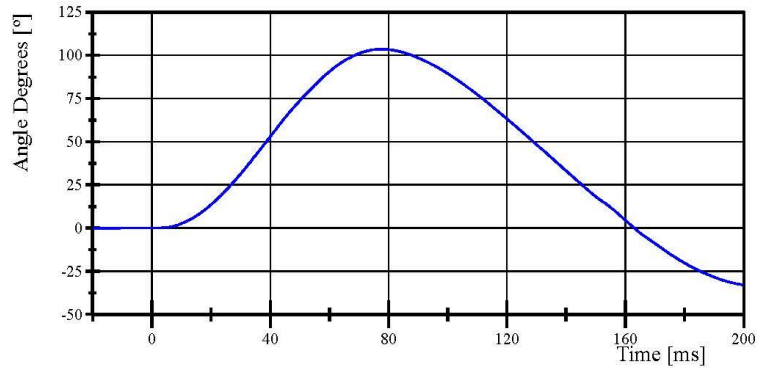
Filter Class: CFC_60
Max: 42.1 ° at 74.2 ms
Min: -12.0 ° at 199.6 ms

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

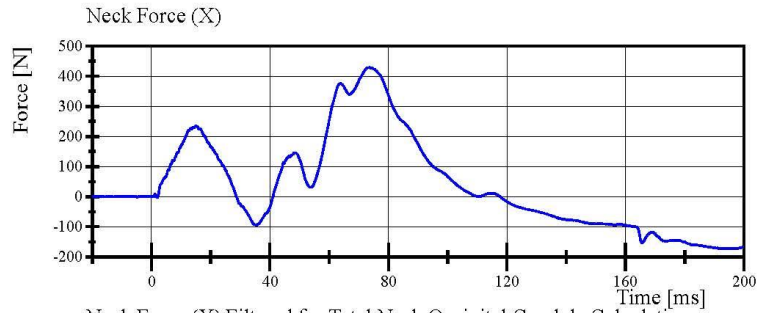


Transportation Research Center Inc.

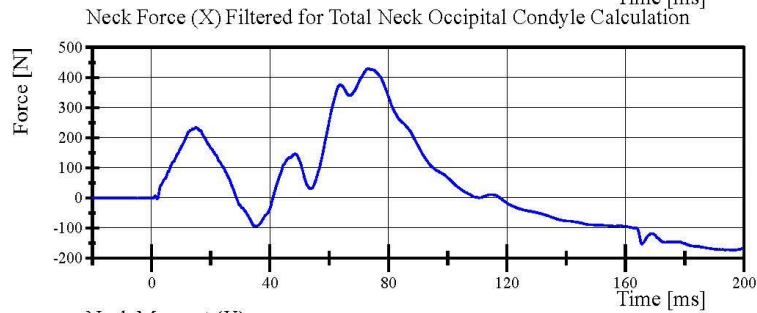
Neck Extension

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

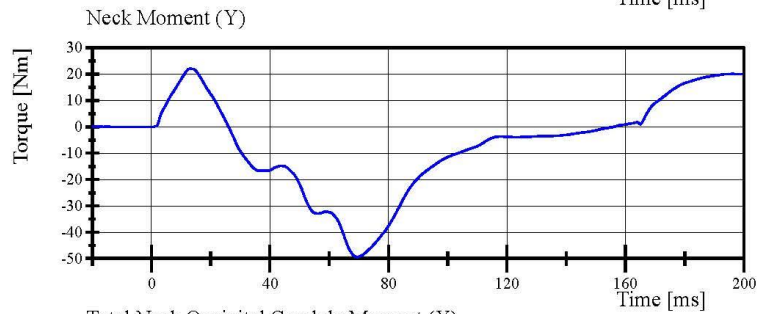
Test Date: 2/15/2023



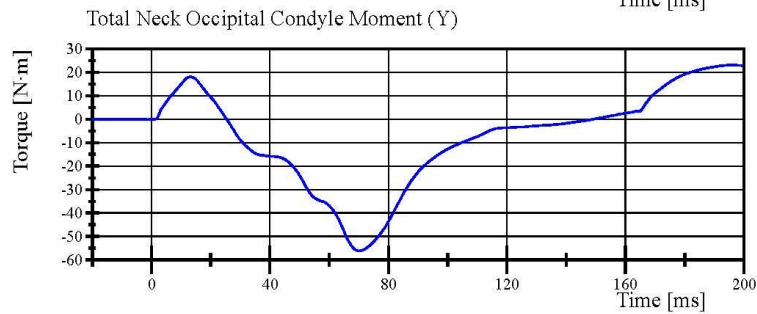
Filter Class: CFC_1000
Max: 429.0 N at 73.6 ms
Min: -173.0 N at 196.6 ms



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. 8-9

Test Date: 2/22/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.799 m/s	Yes
Probe Force Peak Between 50.0 mm and 58.0 mm Chest Deflection	(-3,900) - (-4,400) N	-3,966.3 N	Yes
Probe Force Peak Between 18.0 mm and 50.0 mm Chest Deflection	>= (-4,600) N	-4,456.5 N	Yes
Maximum Chest Compression	(-50) - (-58) mm	-50.0 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

02.22.2023 12:47:24 464

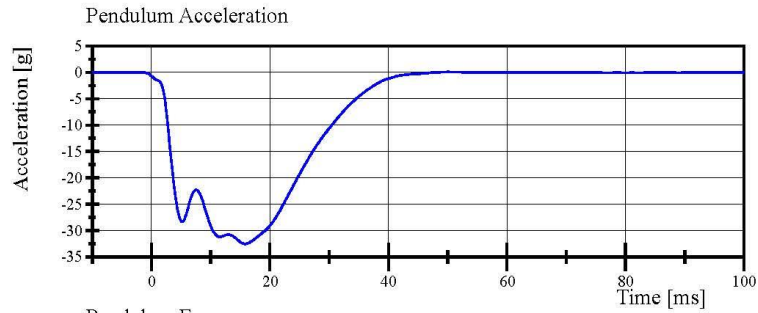


Transportation Research Center Inc.

Front Thorax

HIII 5th Serial No. DH1659 Certification No. 8-9

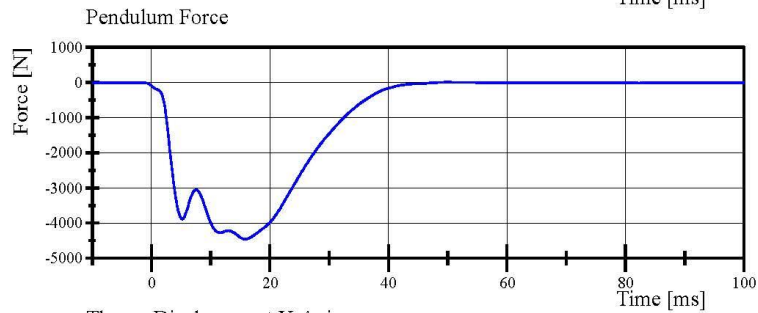
Test Date: 2/22/2023



Filter Class: CFC_180

Max: 0.1 g at 50.2 ms

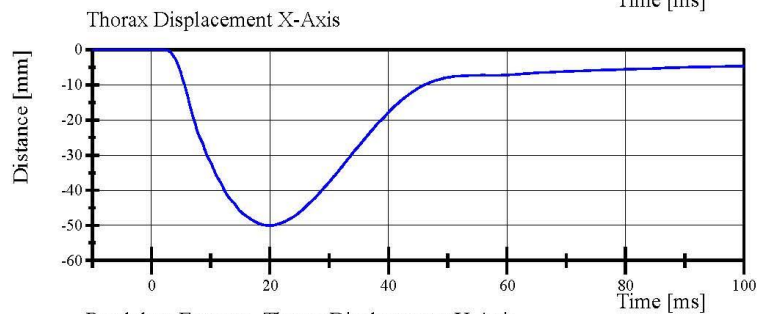
Min: -32.5 g at 15.8 ms



Filter Class: CFC_180

Max: 12.2 N at 50.2 ms

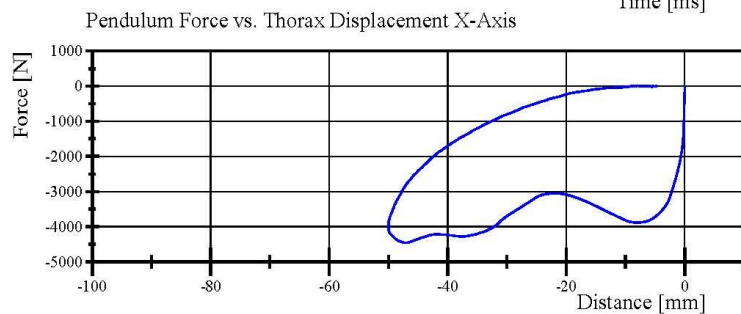
Min: -4,456.5 N at 15.8 ms



Filter Class: CFC_600

Max: 0.0 mm at -9.4 ms

Min: -50.0 mm at 20.2 ms



Filter Class: CFC_180

Max: 12.2 N at -7.8 mm

Min: -4,456.5 N at -47.1 mm

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

02.22.2023 12:51:20 464

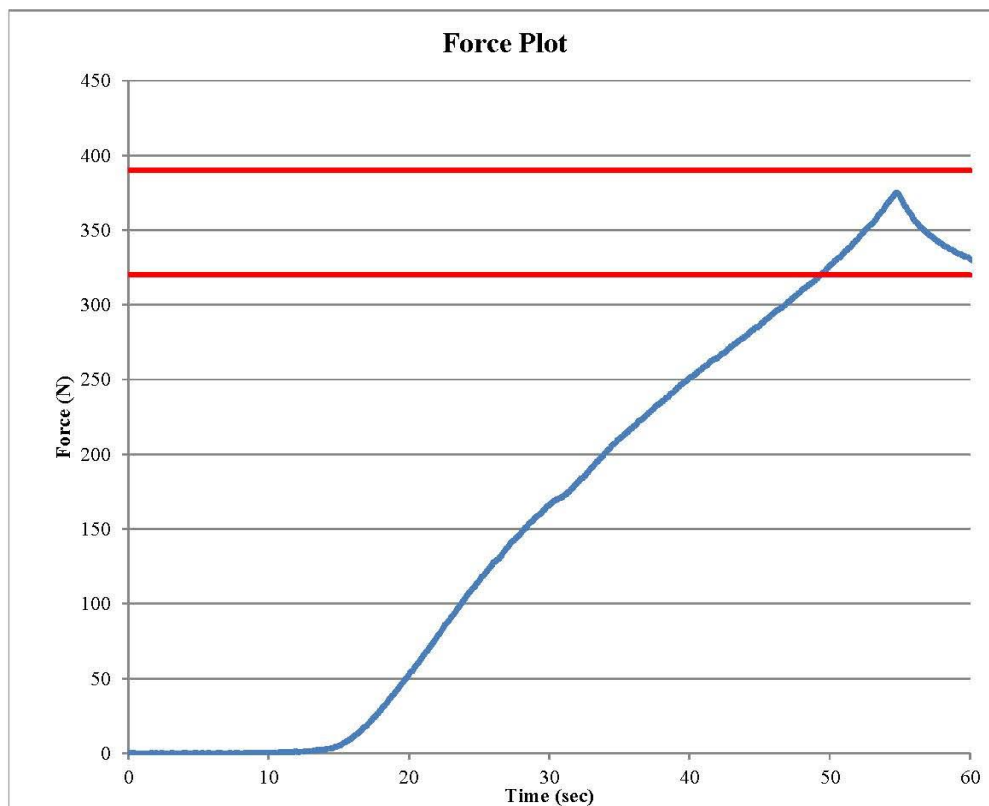


Transportation Research Center Inc.
Hybrid III Small Female Torso Flexion



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

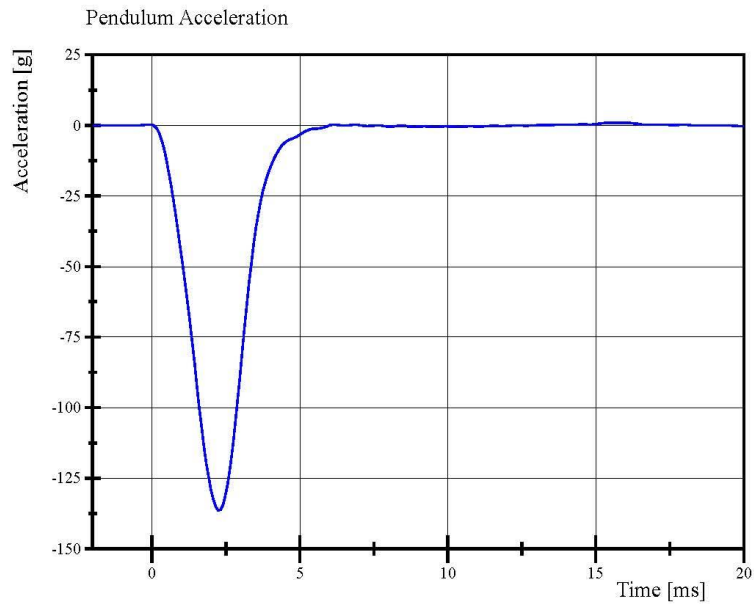
Page 22 of 28

Transportation Research Center Inc.

Left Knee Femur Response Test

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

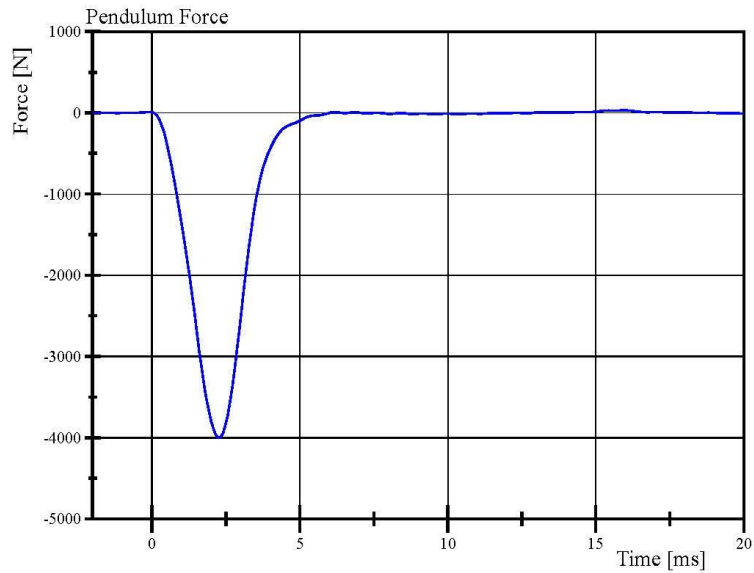
Test Date: 2/15/2023



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

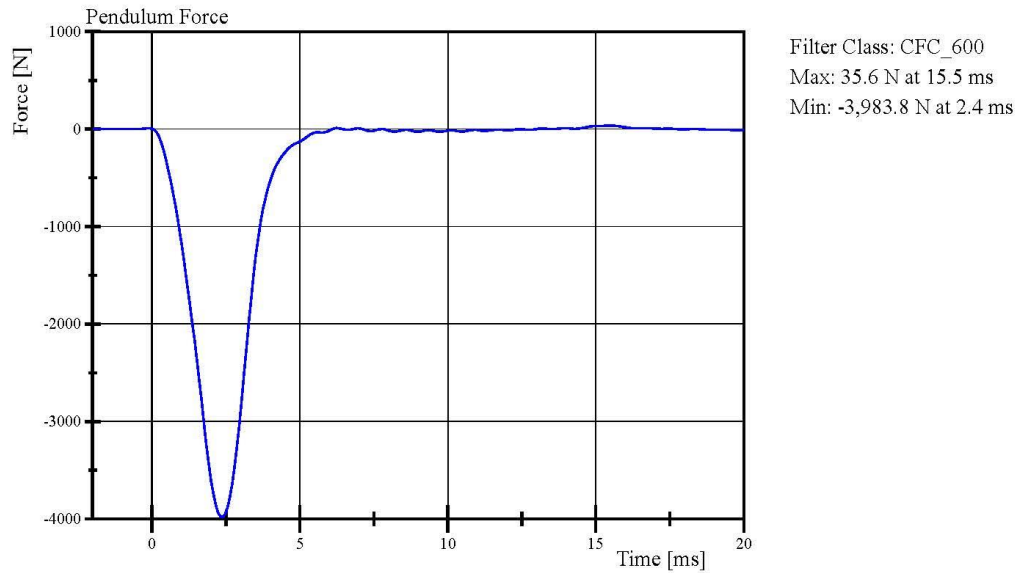
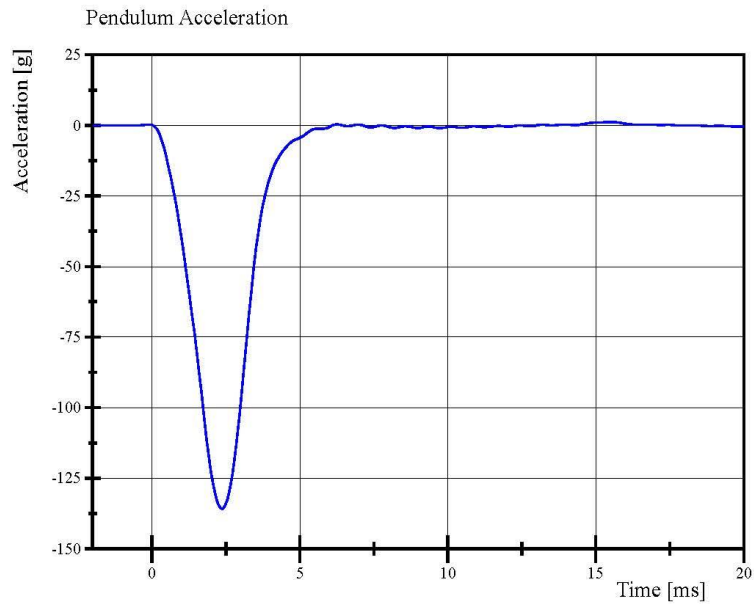
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

02.15.2023 08:45:47 1842



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



Post-Test Calibration Sheets

Passenger S/N DH1659

Transportation Research Center Inc.
5720 HIII 5th Dummy
External Dimensions
Serial No. DH1659 Calibration No. 09

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	130	Yes
G	Back of Elbow to Wrist Pivot	243.9 - 259.1	249	Yes
H	Head Back to Backline	43.2 - 48.2	45	Yes
I	Shoulder to Elbow Length	276.8 - 297.2	286	Yes
J	Elbow Rest Height	182.8 - 203.2	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	185	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_HFH09

Page 26 of 28

Transportation Research Center Inc.

Front Head Drop

HIII 5th Serial No. DH1659 Certification No. 9-1

Test Date: 3/1/2023

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Peak Head Resultant Acceleration	250 - 300 g	255.3 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	7.7 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	4.10 %	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

03.01.2023 15:14:38 608

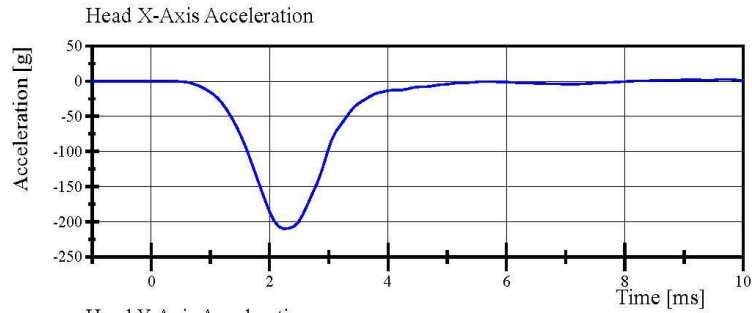


Transportation Research Center Inc.

Front Head Drop

HIII 5th Serial No. DH1659 Certification No. 9-1

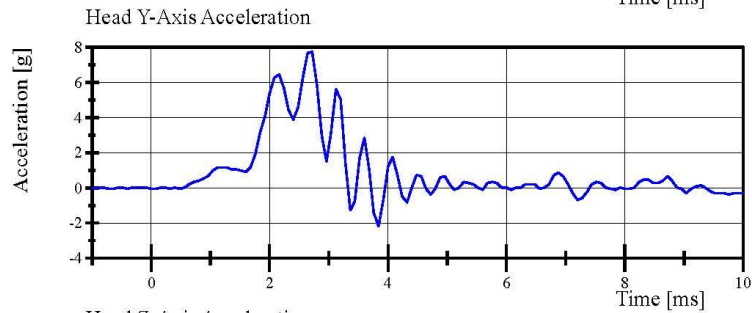
Test Date: 3/1/2023



Filter Class: CFC_1000

Max: 2.7 g at 9.7 ms

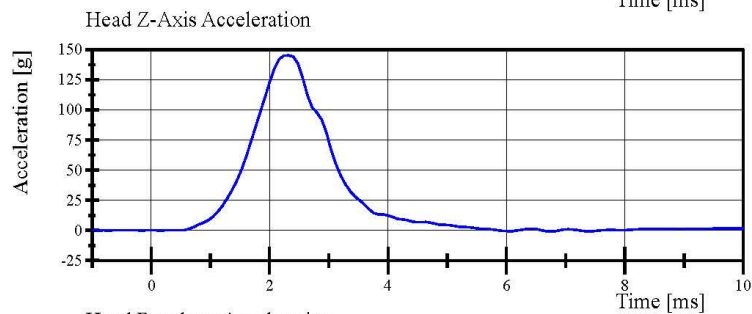
Min: -210.1 g at 2.2 ms



Filter Class: CFC_1000

Max: 7.7 g at 2.7 ms

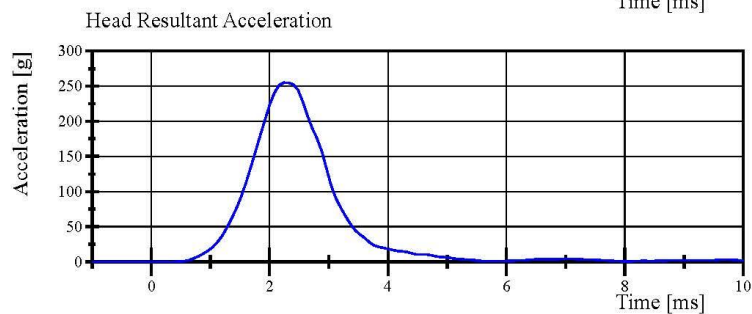
Min: -2.2 g at 3.8 ms



Filter Class: CFC_1000

Max: 145.3 g at 2.3 ms

Min: -0.9 g at 6.7 ms



Filter Class: CFC_1000

Max: 255.3 g at 2.2 ms

Min: 0.0 g at -0.6 ms

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

03.01.2023 15:15:13 608



Transportation Research Center Inc.

Neck Flexion

HIII 5th Serial No. DH1659 Certification No. 9-1

Test Date: 3/1/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	7.057 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	(-2.1) - (-2.5) m/s	-2.37 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	(-4.0) - (-5.0) m/s	-4.58 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	(-5.8) - (-7.0) m/s	-6.45 m/s	Yes
Total Head D-Plane Rotation	(-77) - (-91) °	-81.8 °	Yes
Total Neck Occipital Condyles Moment Between -77° and -91° Rotation	69 - 83 N·m	76.2 N·m	Yes
Total Neck Occipital Condyles Moment Decay to 10 N·m	80 - 100 ms	88.6 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

03.01.2023 15:26:40 1850

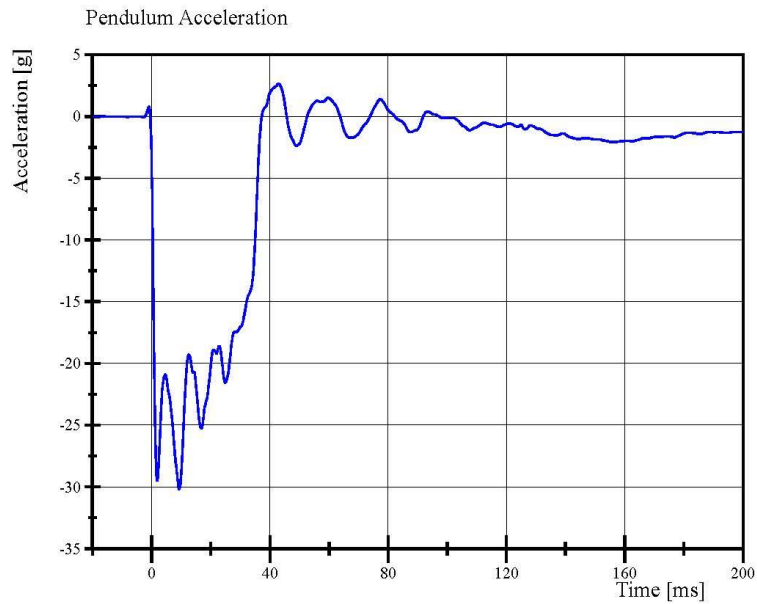


Transportation Research Center Inc.

Neck Flexion

HIII 5th Serial No. DH1659 Certification No. 9-1

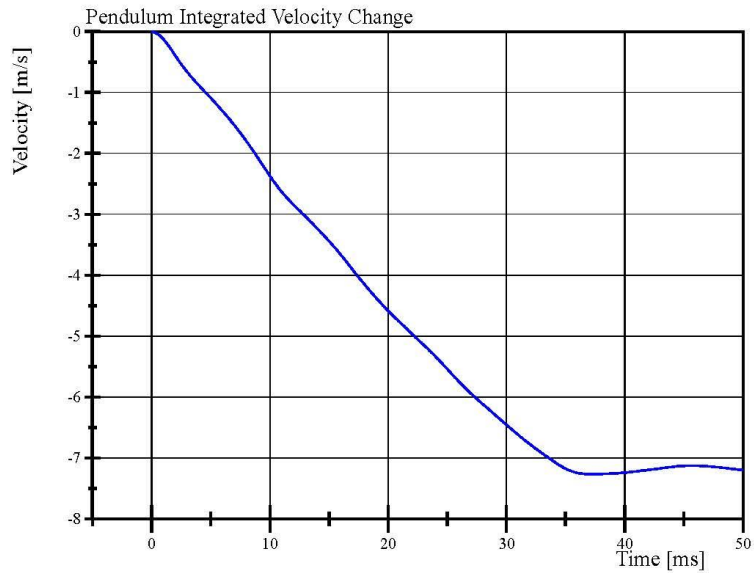
Test Date: 3/1/2023



Filter Class: CFC_180

Max: 2.7 g at 43.0 ms

Min: -30.2 g at 9.3 ms



Filter Class: CFC_180

Max: 0.0 m/s at 0.0 ms

Min: -7.3 m/s at 37.3 ms

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

03.01.2023 15:27:10 1850



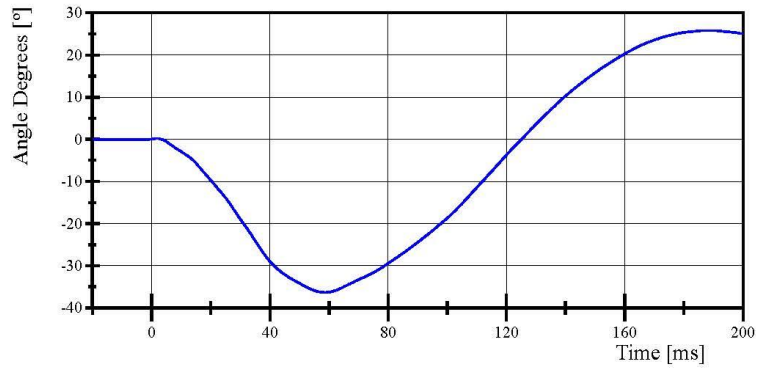
Transportation Research Center Inc.

Neck Flexion

HIII 5th Serial No. DH1659 Certification No. 9-1

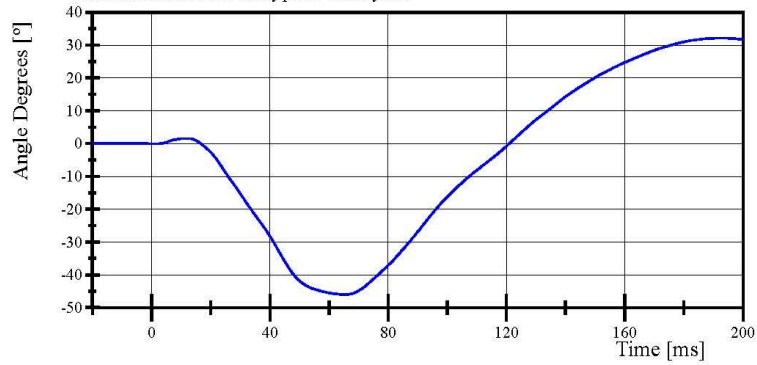
Test Date: 3/1/2023

Pot Rotation at the Base of Neck



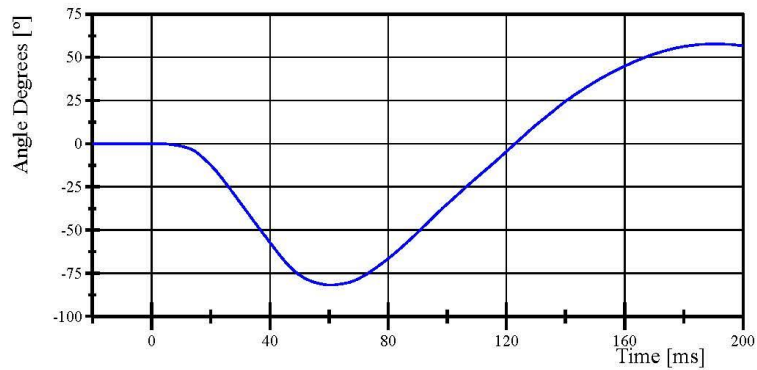
Filter Class: CFC_60
Max: 25.8 ° at 188.6 ms
Min: -36.3 ° at 58.7 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 32.1 ° at 192.9 ms
Min: -46.0 ° at 65.3 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 57.9 ° at 190.5 ms
Min: -81.8 ° at 60.5 ms

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

03.01.2023 15:27:11 1850

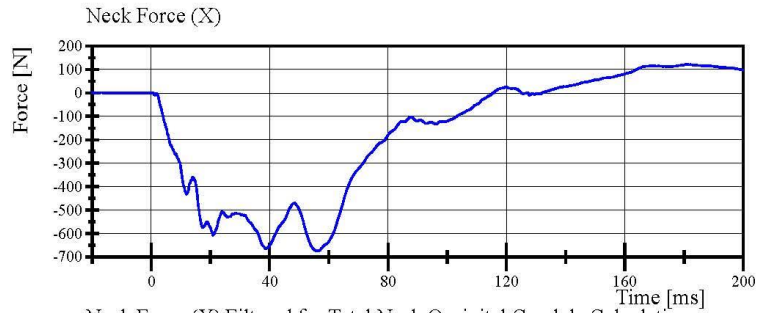


Transportation Research Center Inc.

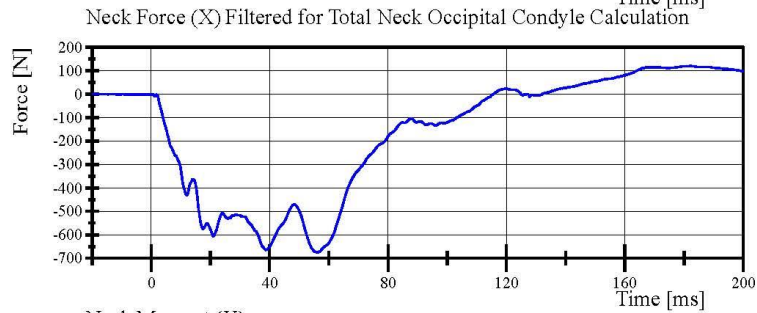
Neck Flexion

HIII 5th Serial No. DH1659 Certification No. 9-1

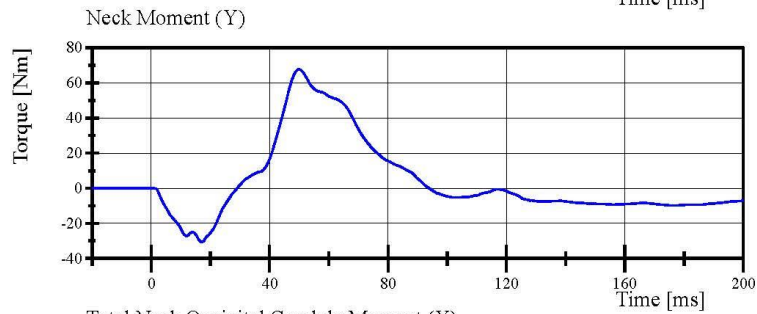
Test Date: 3/1/2023



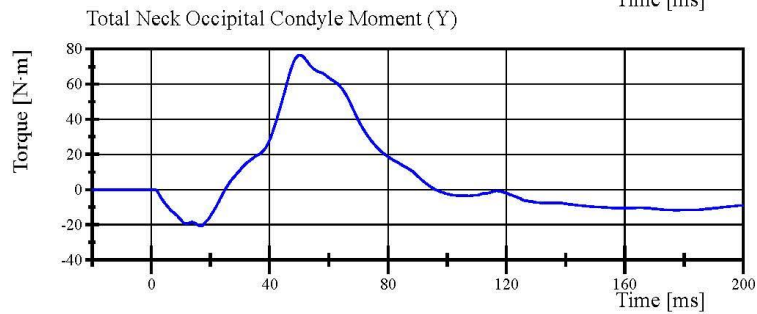
Filter Class: CFC_1000
Max: 121.2 N at 182.0 ms
Min: -674.8 N at 56.2 ms



Filter Class: CFC_600
Max: 120.8 N at 182.1 ms
Min: -674.5 N at 56.3 ms



Filter Class: CFC_600
Max: 67.6 Nm at 49.9 ms
Min: -30.6 Nm at 17.2 ms



Filter Class: Without_(Constar
Max: 76.5 N·m at 50.2 ms
Min: -20.7 N·m at 16.6 ms

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

03.01.2023 15:27:11 1850



Transportation Research Center Inc.

Neck Extension

HIII 5th Serial No. DH1659 Certification No. 9-1

Test Date: 3/1/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	35 %	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	1.85 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	3.1 - 3.9 m/s	3.67 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	4.6 - 5.6 m/s	5.30 m/s	Yes
Total Head D-Plane Rotation	99 - 114 °	107.5 °	Yes
Total Neck Occipital Condyles Moment Between 99° and 114° Rotation	(-53) - (-65) N·m	-57.0 N·m	Yes
Total Neck Occipital Condyles Moment Decay to -10 N·m	94 - 114 ms	104.0 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Neck S/N: EE9454

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

03.01.2023 15:56:15 2003

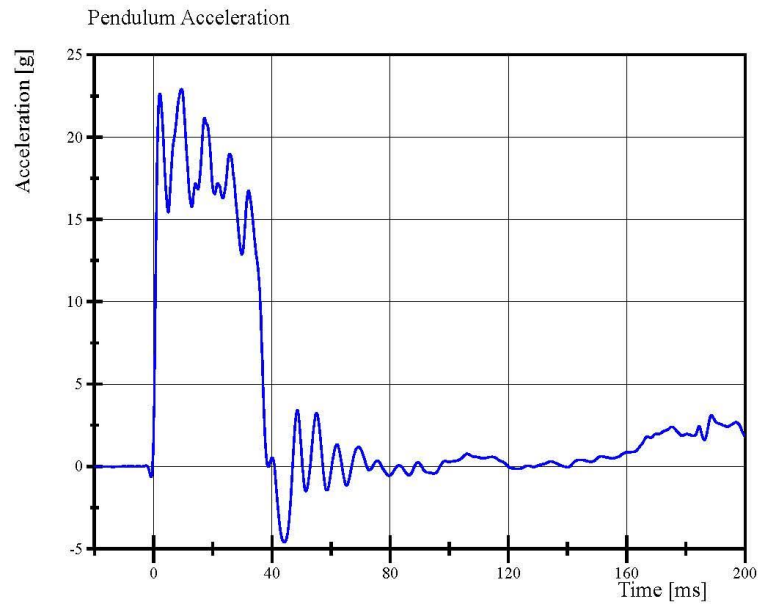


Transportation Research Center Inc.

Neck Extension

HIII 5th Serial No. DH1659 Certification No. 9-1

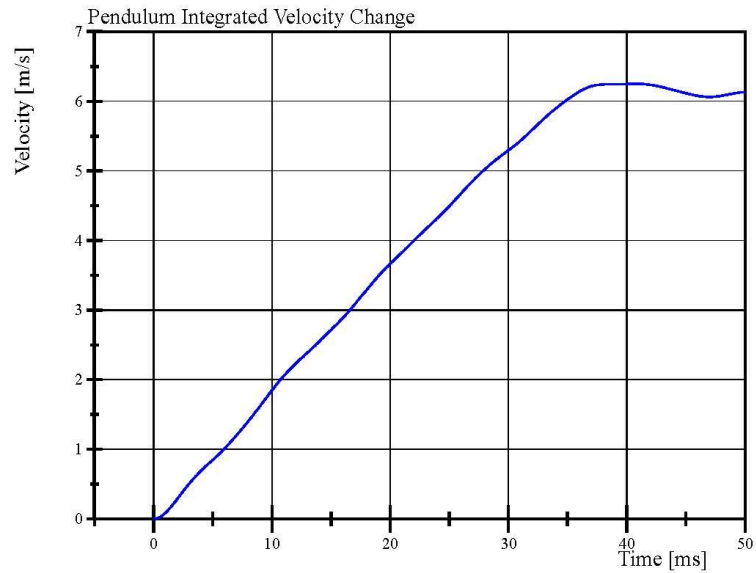
Test Date: 3/1/2023



Filter Class: CFC_180

Max: 22.9 g at 9.4 ms

Min: -4.6 g at 44.3 ms



Filter Class: CFC_180

Max: 6.2 m/s at 40.9 ms

Min: 0.0 m/s at 0.0 ms

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

03.01.2023 15:56:36 2003



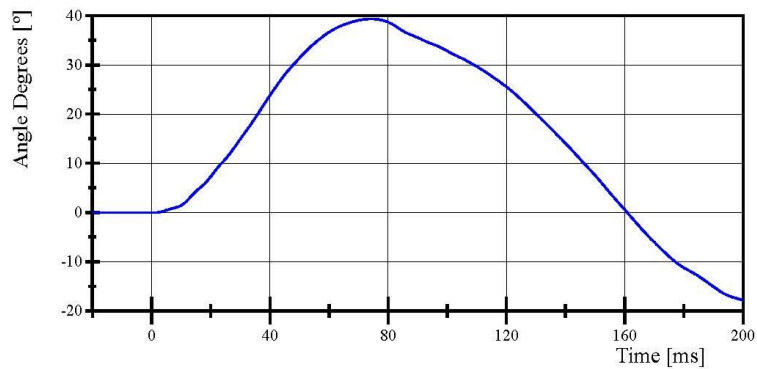
Transportation Research Center Inc.

Neck Extension

HIII 5th Serial No. DH1659 Certification No. 9-1

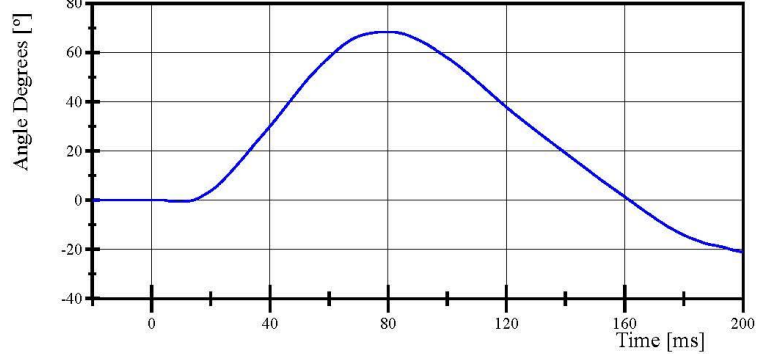
Test Date: 3/1/2023

Pot Rotation at the Base of Neck



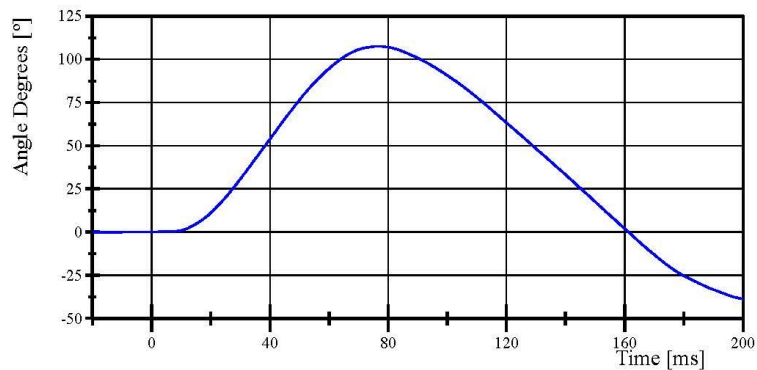
Filter Class: CFC_60
Max: 39.4 ° at 74.2 ms
Min: -17.8 ° at 199.9 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 68.4 ° at 79.5 ms
Min: -21.0 ° at 199.9 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 107.5 ° at 76.8 ms
Min: -38.8 ° at 199.9 ms

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

03.01.2023 15:56:36 2003

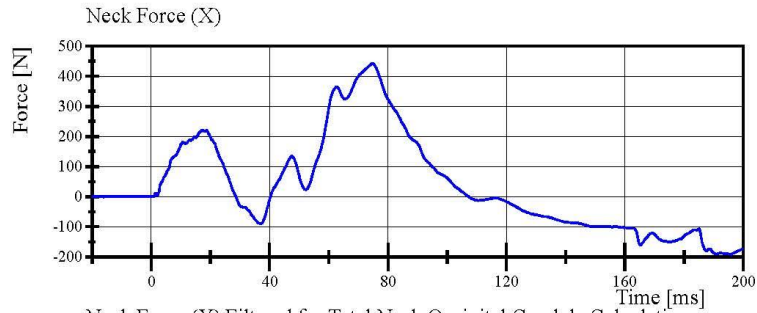


Transportation Research Center Inc.

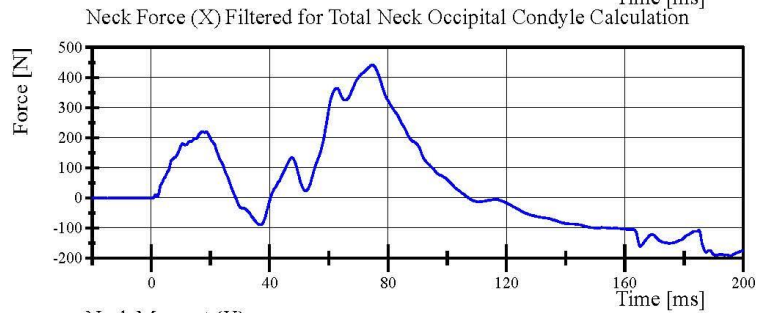
Neck Extension

HIII 5th Serial No. DH1659 Certification No. 9-1

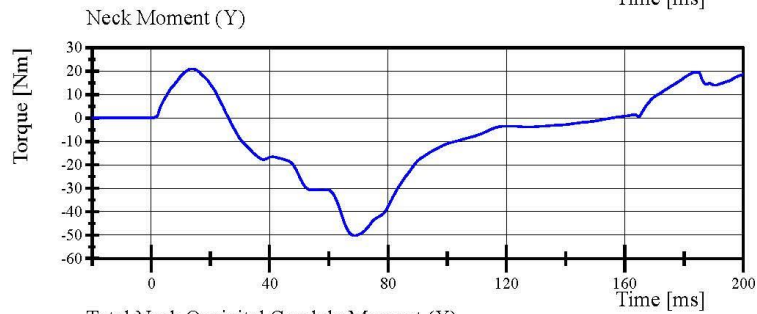
Test Date: 3/1/2023



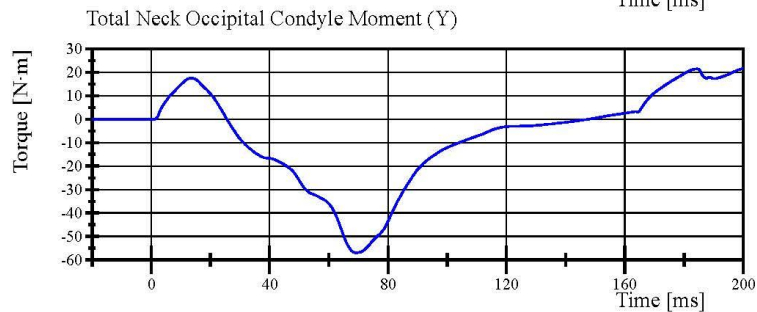
Filter Class: CFC_1000
Max: 441.8 N at 74.5 ms
Min: -192.3 N at 195.7 ms



Filter Class: CFC_600
Max: 441.8 N at 74.8 ms
Min: -192.0 N at 195.8 ms



Filter Class: CFC_600
Max: 21.0 Nm at 13.9 ms
Min: -50.2 Nm at 68.9 ms



Filter Class: Without_(Constar
Max: 21.7 N·m at 199.9 ms
Min: -57.0 N·m at 69.4 ms

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

03.01.2023 15:56:36 2003



Transportation Research Center Inc.

Front Thorax

HIII 5th Serial No. DH1659 Certification No. 9-1

Test Date: 3/1/2023

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.811 m/s	Yes
Probe Force Peak Between 50.0 mm and 58.0 mm Chest Deflection	(-3,900) - (-4,400) N	-4,198.9 N	Yes
Probe Force Peak Between 18.0 mm and 50.0 mm Chest Deflection	>= (-4,600) N	-4,410.4 N	Yes
Maximum Chest Compression	(-50) - (-58) mm	-50.3 mm	Yes
Internal Hysteresis	69 - 85 %	76.5 %	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

03.01.2023 14:05:28 423

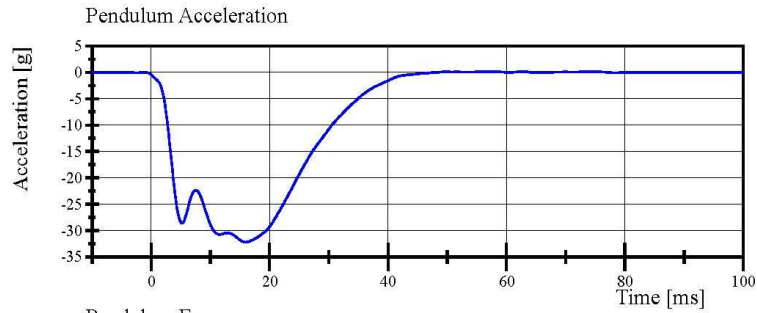


Transportation Research Center Inc.

Front Thorax

HIII 5th Serial No. DH1659 Certification No. 9-1

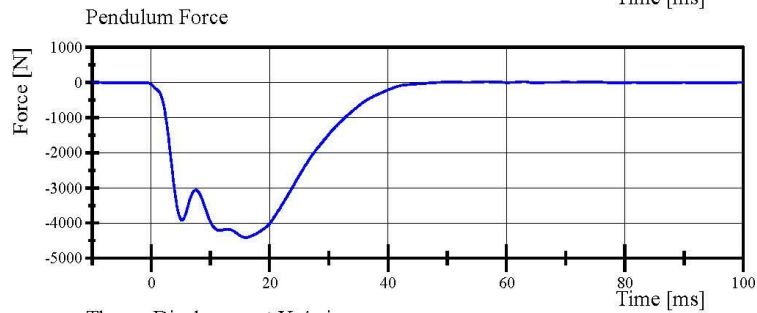
Test Date: 3/1/2023



Filter Class: CFC_180

Max: 0.1 g at 63.0 ms

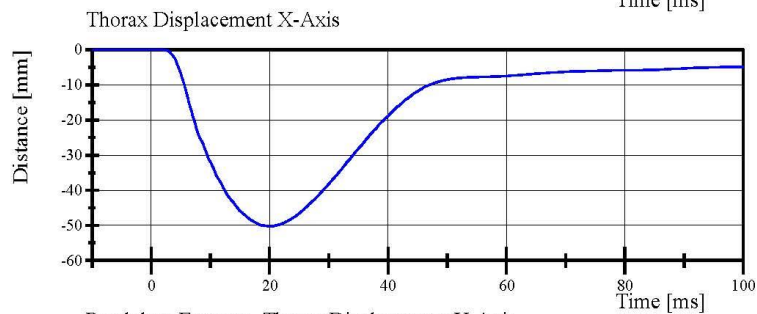
Min: -32.2 g at 15.9 ms



Filter Class: CFC_180

Max: 19.7 N at 63.0 ms

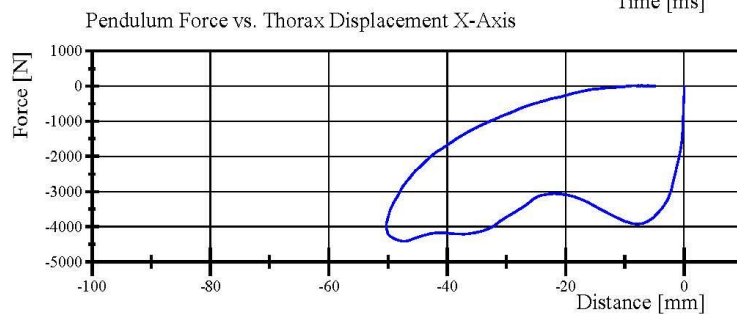
Min: -4,410.4 N at 15.9 ms



Filter Class: CFC_600

Max: 0.0 mm at -6.2 ms

Min: -50.3 mm at 20.2 ms



Filter Class: CFC_180

Max: 19.7 N at -7.1 mm

Min: -4,410.4 N at -47.2 mm

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

03.01.2023 14:07:01 423

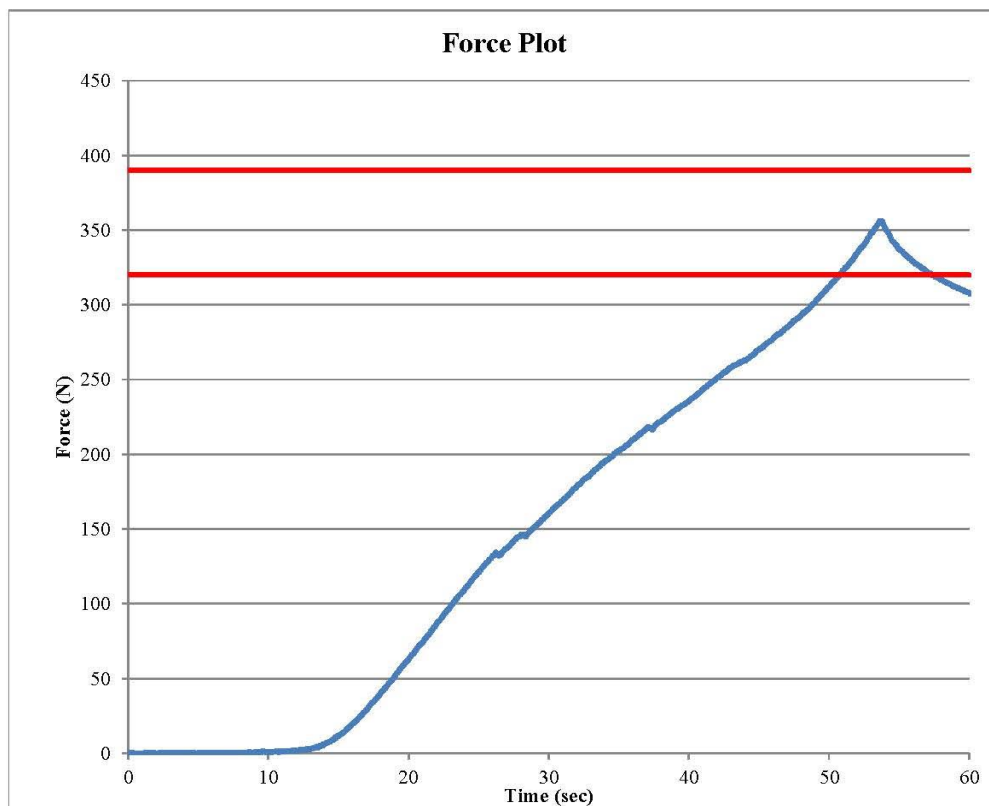


Transportation Research Center Inc.
Hybrid III Small Female Torso Flexion



Customer: NHTSA
Serial Number: DH1659 Date: 3/1/2023
Test Number: 1 Time: 14:30

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 - 25.6	20.9 °C Pass
Humidity	10 - 70	35 % Pass
Average Angular Rate	0.5 - 1.5	0.77 deg/sec Pass
Initial Angle	0 - 20	15.14 deg Pass
Peak Force at 45.53°	320 - 390	356.24 N Pass
Final Angle	-8 - 8	3.5 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. 9-1

Test Date: 3/1/2023

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.078 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-3,985.8 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

03.01.2023 14:52:49 1876

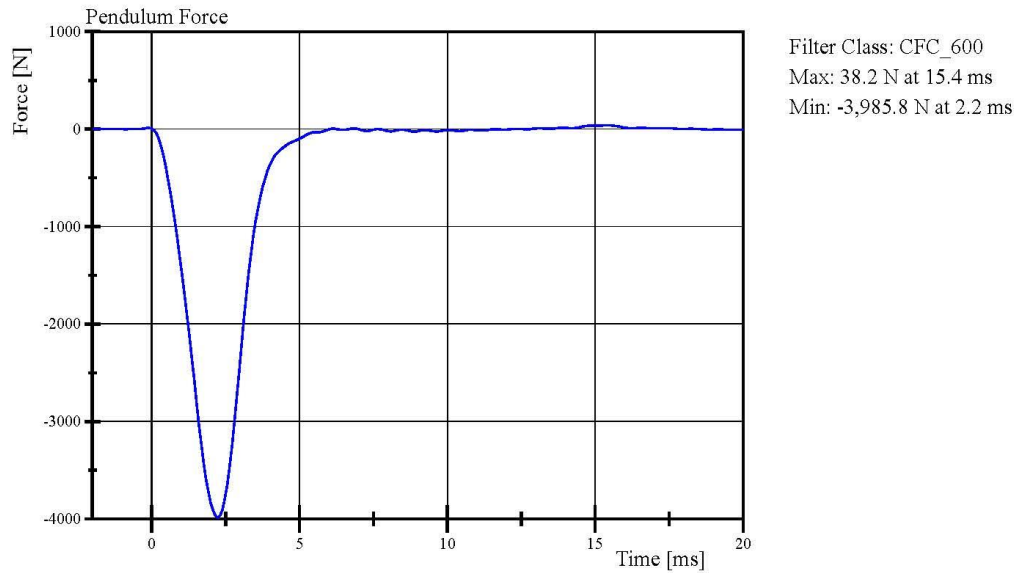
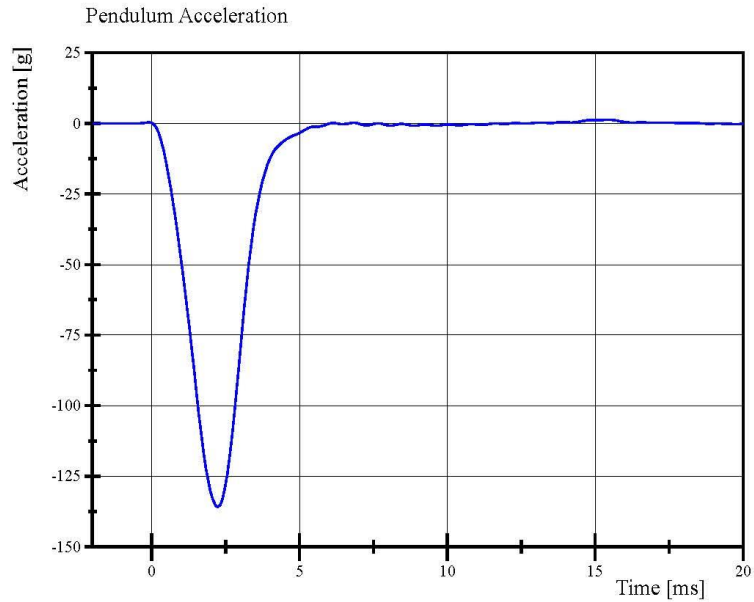


Report Number: DH1659_HFH09

Page 22 of 28

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 5th Serial No. DH1659 Certification No. 9-1
Test Date: 3/1/2023



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

03.01.2023 14:53:48 1876



Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 5th Serial No. DH1659 Certification No. 9-1
Test Date: 3/1/2023

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.095 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-4,041.6 N	Yes

Test meets specifications.

Condition: Used

Comments:

Knee Skin S/N: EC5852

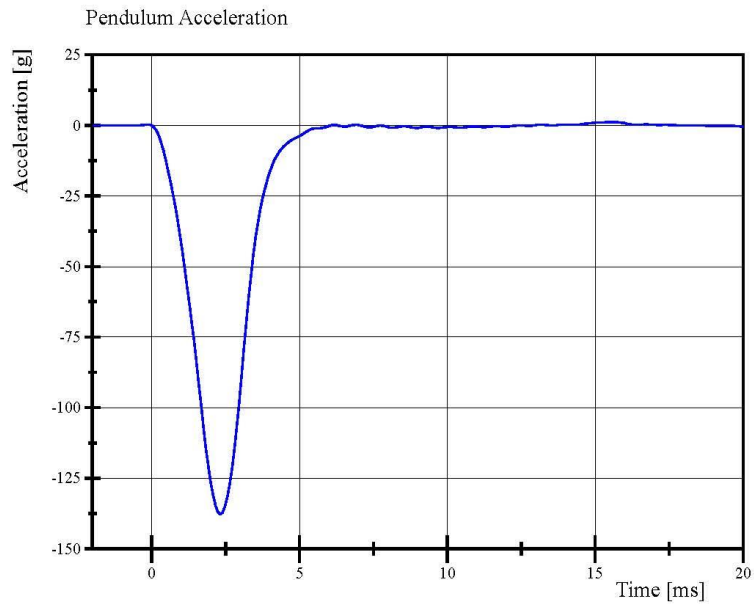
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

03.01.2023 14:56:56 1864

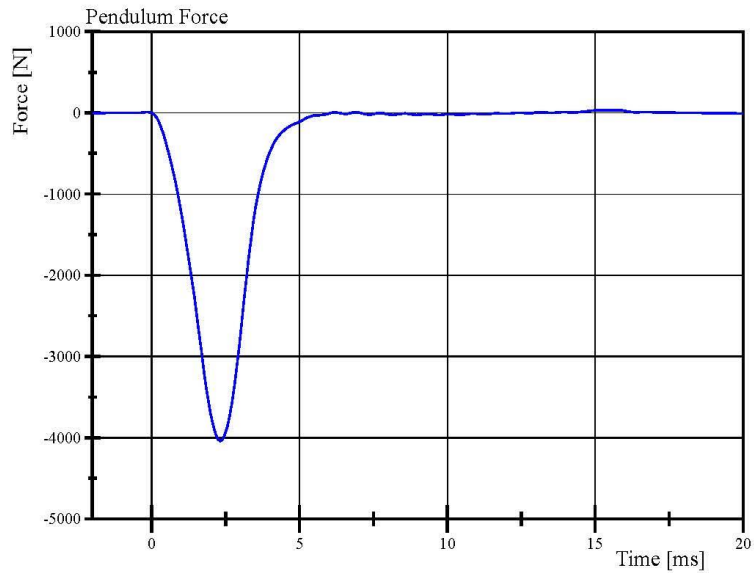


Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 5th Serial No. DH1659 Certification No. 9-1
Test Date: 3/1/2023



Filter Class: CFC_600
Max: 1.1 g at 15.7 ms
Min: -137.8 g at 2.3 ms



Filter Class: CFC_600
Max: 33.5 N at 15.7 ms
Min: -4,041.6 N at 2.3 ms

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

03.01.2023 14:57:59 1864



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	R141C8	Measurement Specialties	3-Aug-2022
			Shoulder	N/A	R141CA	Measurement Specialties	19-Oct-2022

TABLE 2 – Front Passenger Dummy Instrumentation

Instrumentation			Axis/Location	Hybrid III 5th S/N DH1659		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers	Primary		X	P44972	Endevco	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	N100EC	Measurement Specialties	3-Aug-2022
		Shoulder	N/A	T1210D	Measurement Specialties	26-May-2022

TABLE 3 – Vehicle Instrumentation

Instrumentation			Axis	Serial Number	Manufacturer	Calibration Date
Crossmember/Rear Seat Accelerometers	Left	Primary	X	A400097	Measurement Specialties	2-Feb-2023
			Z	A378330	Measurement Specialties	3-Feb-2023
		Redundant	X	A367452	Measurement Specialties	2-Feb-2023
	Right	Primary	X	A400114	Measurement Specialties	2-Feb-2023
			Z	A349795	Measurement Specialties	2-Feb-2023
		Redundant	X	A378327	Measurement Specialties	2-Feb-2023
Engine Accelerometers	Top		X	A298542	Measurement Specialties	2-Feb-2023
	Bottom		X	A298532	Measurement Specialties	3-Feb-2023