

Final Report Number: NCAP-TRC-19-004

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

**GENERAL MOTORS LLC
2019 Cadillac XT4 SUV
NHTSA Number: M20190100**

**PREPARED BY:
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Report Date: May 10, 2019

FINAL REPORT

**Prepared For:
U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Office of Crashworthiness Standards
1200 New Jersey Ave, SE Room W43-410
Washington, DC 20590**

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Prepared By: ILO Project Operations Group

Approved By: John Shultz

Approval Date: May 10, 2019

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 2019 Cadillac XT4 SUV, in accordance with the specifications the Office of Crashworthiness Standards Laboratory Procedure for NCAP Full Frontal Rigid Barrier Impact Testing. This test was conducted to obtain data related to FMVSS Nos. 208, 212, 219 (partial), and 301 performance. The test was conducted at the Transportation Research Center Inc. in East Liberty, Ohio on February 19, 2019. The impact velocity was 56.53 km/h, and the ambient temperature at the barrier face at the time of impact was 21.2° C. The target vehicle post-test maximum crush was 490 millimeters at vehicle centerline. The test vehicle's performance is as follows:																																																																											
<table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th colspan="3">Driver ATD</th> <th colspan="3">Passenger ATD</th> </tr> <tr> <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>190</td> <td>NA</td> <td>700</td> <td>350</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>-25.7</td> <td>mm</td> <td>52</td> <td>-18.0</td> </tr> <tr> <td>3ms Chest Clip</td> <td>Gs</td> <td>60</td> <td>42.6</td> <td>Gs</td> <td>60</td> <td>44.9</td> </tr> <tr> <td>Nij</td> <td>NA</td> <td>1</td> <td>0.28</td> <td>NA</td> <td>1</td> <td>0.34</td> </tr> <tr> <td>Neck Tension</td> <td>Newtons</td> <td>4170</td> <td>970.4</td> <td>Newtons</td> <td>2620</td> <td>584.6</td> </tr> <tr> <td>Neck Compression</td> <td>Newtons</td> <td>4000</td> <td>-193.0</td> <td>Newtons</td> <td>2520</td> <td>-344.4</td> </tr> <tr> <td>Left Femur Force</td> <td>Newtons</td> <td>10000</td> <td>-806.3</td> <td>Newtons</td> <td>6800</td> <td>-323.9</td> </tr> <tr> <td>Right Femur Force</td> <td>Newtons</td> <td>10000</td> <td>-1028.0</td> <td>Newtons</td> <td>6800</td> <td>-776.5</td> </tr> </tbody> </table>							Measurement Description	Driver ATD			Passenger ATD			Units	Threshold	Result	Units	Threshold	Result	Head Injury Criteria (HIC ₁₅)	NA	700	190	NA	700	350	Maximum Chest Compression	mm	63	-25.7	mm	52	-18.0	3ms Chest Clip	Gs	60	42.6	Gs	60	44.9	Nij	NA	1	0.28	NA	1	0.34	Neck Tension	Newtons	4170	970.4	Newtons	2620	584.6	Neck Compression	Newtons	4000	-193.0	Newtons	2520	-344.4	Left Femur Force	Newtons	10000	-806.3	Newtons	6800	-323.9	Right Femur Force	Newtons	10000	-1028.0	Newtons	6800	-776.5
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1: PURPOSE AND SUMMARY OF THE TEST

PURPOSE

This 56 km/h frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-12-D-00257. 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 2019 Cadillac XT4 SUV at a velocity of 56.53 km/h. The test was performed at Transportation Research Center, Inc. on February 19, 2019. 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. 426) were qualified prior to this test. Certification details, along with instrumentation calibration data, are found in Appendix C of this report.

The 106 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 490 mm and both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

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

The occupant data is summarized below:

ATD Position	HIC₁₅	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)	190	0.28	970.4	-193.0	42.6	-25.7	-806.3	-1028.0
Passenger (5 th Female)	350	0.34	584.6	-344.4	44.9	-18.0	-323.9	-776.5

2.2 REPORT AREA 2: DATA SHEETS

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

Test Vehicle: 2019 Cadillac XT4 SUV
 Test Program: NCAP Frontal Impact

NHTSA No.: M20190100
 Test Date: 2/19/2019

TEST VEHICLE INFORMATION

NHTSA No.	M20190100
Model Year	2019
Make	XT4
Model	MPV
Body Style	1GYFZBR44KF120993
VIN	XT4
Body Color	Autumn Metallic
Odometer Reading (km/mi)	83 mi
Engine Displacement (L)	2.0
Type/No. Cylinders	Gas/4
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	9
Overdrive	Yes
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:	No

Does owner's manual provide instructions to turn off automatic door locks? No

DATA FROM CERTIFICATION LABEL

Manufactured by	GENERAL MOTORS LLC	GVWR (kg)	2350 (5180 lbs)
Date of Manufacture		10/18	GAWR Front (kg)
		GAWR Rear (kg)	1220 (2689 lbs)

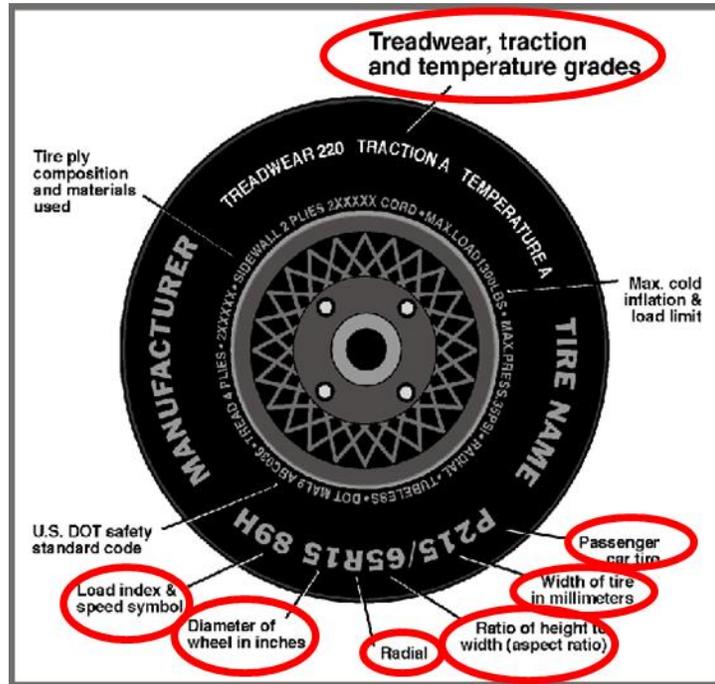
VEHICLE SEATING AND WEIGHT CAPACITY

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Split Bench	N/A	
Number of Occupants	2	3	N/A	5
Capacity Wt. (VCW) (kg)				534
Cargo Wt. (RCLW) (kg)				193.8

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

Test Vehicle: 2019 Cadillac XT4 SUV
 Test Program: NCAP Frontal Impact

NHTSA No.: M20190100
 Test Date: 2/19/2019



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold / Test Pressure (kPa)	240	240
Recommended Tire Size	235/60R18 H	235/60R18 H
Tire Size on Vehicle	235/60R18 H	235/60R18 H
Tire Manufacturer	Continental	Continental
Tire Model	Pro Contact TX	Pro Contact TX
Treadwear	500	500
Traction Grade	A	A
Temperature Grade	A	A
Tire Plies Sidewall	2	2
Tire Plies Body	5	5
Load Index/Speed Symbol	103 H	103 H
Tire Material	Polyester/Steel/Polyamide	Polyester/Steel/Polyamide
DOT Safety Code Right	A345 WD77 4118	A345 WD77 4118
DOT Safety Code Left	A345 WD77 4118	A345 WD77 4118

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

Test Vehicle: 2019 Cadillac XT4 SUV
 Test Program: NCAP Frontal Impact

NHTSA No.: M20190100
 Test Date: 2/19/2019

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	510.0	372.8		547.4	484.2	
Right	kg	507.6	339.8		518.6	448.2	
Ratio	%	58.8	41.2		53.3	46.7	
Totals	kg	1017.6	712.6	1730.2	1066.0	932.4	1998.4

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1730.2
Weight of 1 P572E ATD & 1 P572O ATD	kg	139.3
Rated Cargo/Luggage Weight (RCLW) ¹	kg	136.0
Vehicle Target Weight (TVTW)	kg	2005.5

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front)
As Delivered	mm	795	801	828	839	1143
As Tested	mm	784	795	793	807	1295
Post Test	mm	840	870	802	794	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2775
Total Vehicle Length at Left Side	mm	4360
Total Vehicle Length at Centerline	mm	4590
Total Vehicle Length at Right Side	mm	4360
Weight of Ballast in Cargo Area	kg	54.4
Weight of Vehicle Components Removed	kg	0.0
Amount of Stoddard Solvent in Fuel Tank	liters	57.4

LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT: None

¹ Rated cargo and luggage weight limited to 136.0 kg or 300.0 lbs.

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

Test Vehicle: 2019 Cadillac XT4 SUV
 Test Program: NCAP Frontal Impact

NHTSA No.: M20190100
 Test Date: 2/19/2019

TARGET VEHICLE STRUCTURAL MEASUREMENT

	Elements	Pre-Test (mm)
1	Total Length	4590
2	Total Width	1870
3	Bumper Top Height	579
4	Bumper Bottom Height	482
5	Longitudinal Member Top Height	579
6	Distance Between Longitudinal Members	907
7	Longitudinal Member Width	80
8	Engine Top Height	980
9	Engine Bottom Height	215
10	Engine and Gearbox Width	790
11	Front Bumper-Engine Distance	515
12	Front Shock Absorber Fixing Height	945
13	Bonnet Leading Edge Height	980
14	Front Shock Absorber Fixing Width	1200
15	Front Bumper – Front Axle Distance	958
16	Front Axle – A-Pillar Distance	570
17	A-Pillar – B-Pillar Distance	1045
18	B-Pillar – Rear Axle Distance	1175
19	B-Pillar – C-Pillar Distance	970
20	Roof Sill Bottom Height	1455
21	Roof Sill Top Height	1525
22	Floor Sill Bottom Height	395
23	Floor Sill Top Height	430

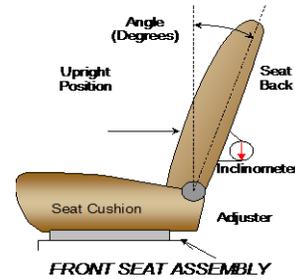
DATA SHEET NO. 2 - SEAT ADJUSTMENT, FUEL SYSTEM AND STEERING WHEEL DATA

Test Vehicle: 2019 Cadillac XT4 SUV
 Test Program: NCAP Frontal Impact

NHTSA No.: M20190100
 Test Date: 2/19/2019

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:	-8.9
Passenger Seat back angle:	-9.8

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	306	153
Passenger Seat	240	0

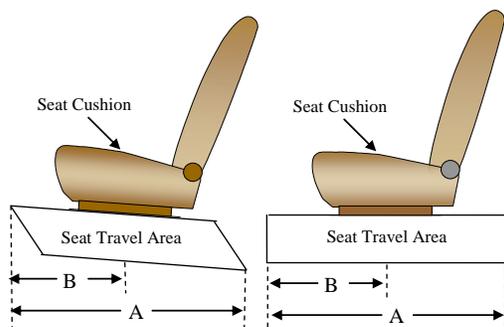
SEAT BELT UPPER ANCHORAGE

Describe the method of positioning seat belt upper anchorages.

Driver: Uppermost, Positioned according to Form 1

Passenger: Uppermost, Positioned according to Form 1

	Total No. of Positions	Placed in Position No.
Driver Seat	4	1, Uppermost
Passenger Seat	4	1, Uppermost



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

Test Vehicle: 2019 Cadillac XT4 SUV
 Test Program: NCAP Frontal Impact

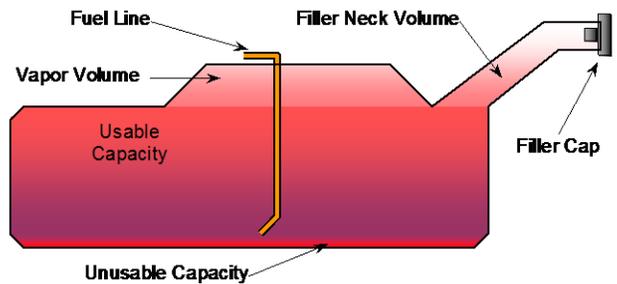
NHTSA No.: M20190100
 Test Date: 2/19/2019

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	60.2
Usable Capacity of "Optional Tank"	61.7
92%-94% of Usable Capacity	57.4
Actual Amount of Solvent Used	57.4
1/3 of Usable Capacity	20.6

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

With the key on (run mode) the pump will keep the lines pressurized.

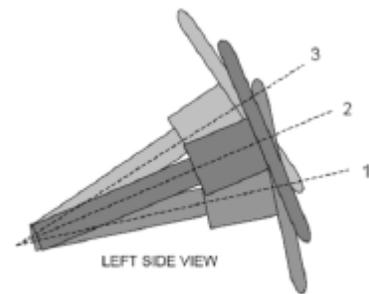


VEHICLE FUEL TANK ASSEMBLY

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

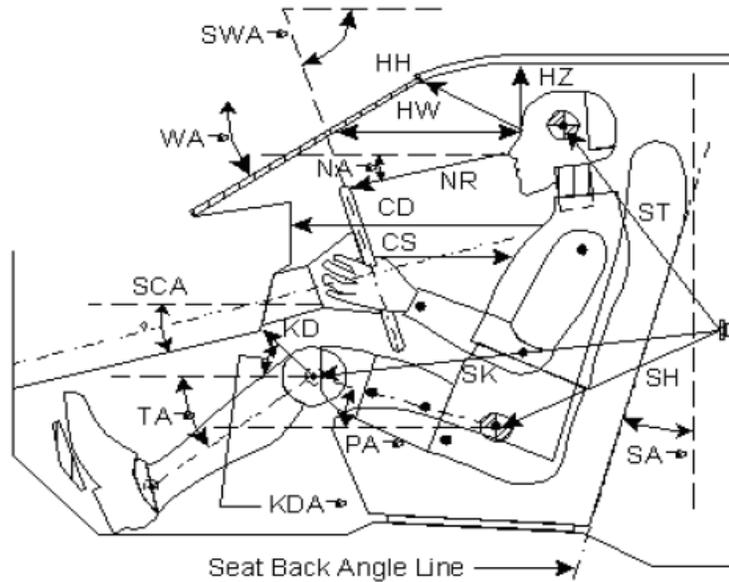
STEERING COLUMN POSITIONS

	Degrees	Fore/Aft Position (mm)
Lowermost Position No. 1	22.9	0
Geometric Center Position No. 2	25.0	30
Uppermost Position No. 3	27.3	60
Telescoping Steering Wheel Travel		60
Test Position	25.0	30

DATA SHEET NO. 3 - DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2019 Cadillac XT4 SUV
 Test Program: NCAP Frontal Impact

NHTSA No.: M20190100
 Test Date: 2/19/2019



Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		28.6		
SWA°	Steering Wheel Angle		25.0		
SCA°	Steering Column Angle		65.0		
SA°	Seat Back Angle (on head rest post)		-8.9		-9.8
HZ	Head to Roof (Z)	261		300	
HH	Head to Header	439		409	
HW	Head to Windshield	777		185	
NR	Nose to Rim	443	7.4		
CD	Chest to Dash	595		447	
CS	Chest to Steering Hub	392			
RA	Rim to Abdomen	240			
KDL	Left Knee to Dash	226	13.2	170	42.1
KDR	Right Knee to Dash	191	13.8	169	41.2
PA°	Pelvic Angle		23.7		21.1
TA°	Tibia Angle		47.0		59.3
SK	Striker to Knee	508	5.8	594	7.6
ST	Striker to Head	500	-89.0	415	-75.1
SH	Striker to H-Point	218	55.7	294	28.5

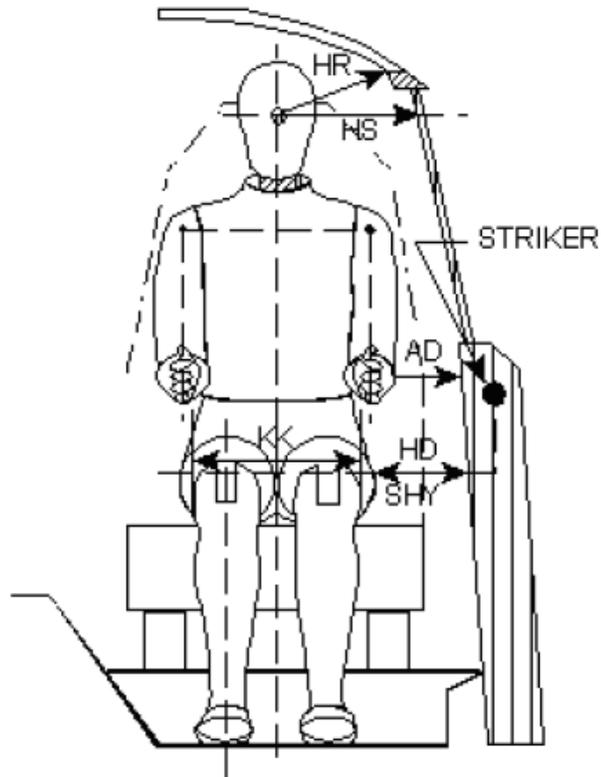
DATA SHEET NO. 4 - DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2019 Cadillac XT4 SUV

NHTSA No.: M20190100

Test Program: NCAP Frontal Impact

Test Date: 2/19/2019

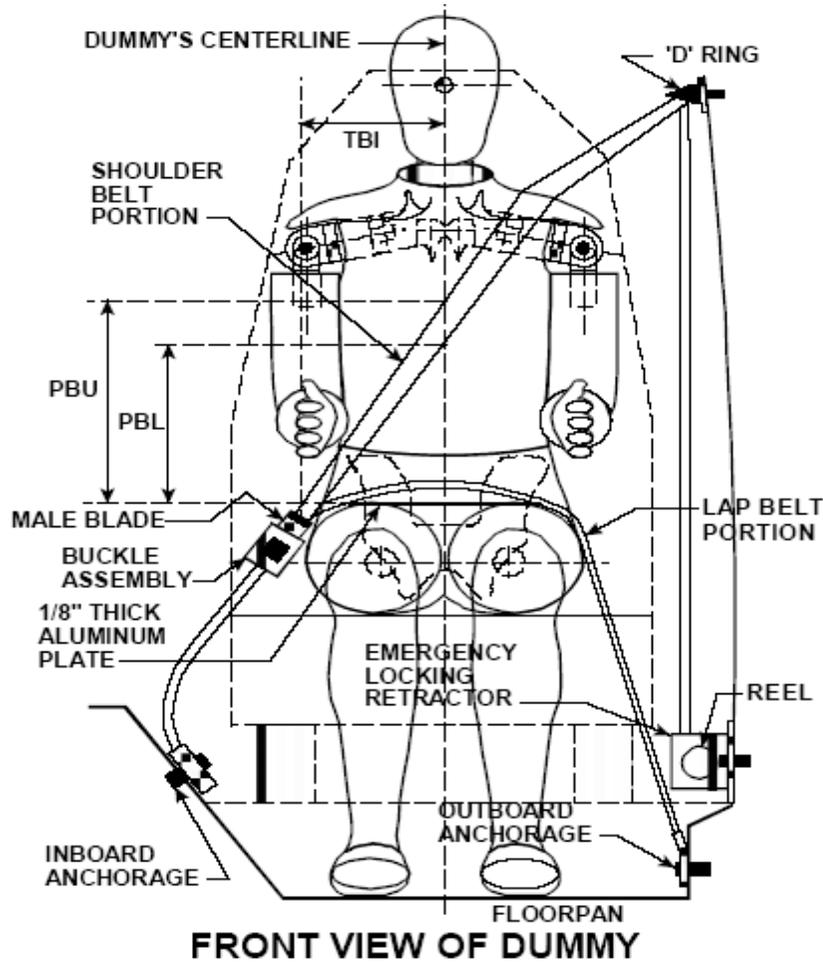


Code	Measurement Description	Driver	Passenger
AD	Arm to Door	131	104
HD	H-Point to Door	148	184
HR	Head to Side Header	284	339
HS	Head to Side Window	365	385
KK	Knee to Knee	247	171
SHY	Striker to H-Point (Y Direction)	252	294
AA	Ankle to Ankle	323	168

DATA SHEET NO. 5 - SEAT BELT POSITIONING DATA

Test Vehicle: 2019 Cadillac XT4 SUV
 Test Program: NCAP Frontal Impact

NHTSA No.: M20190100
 Test Date: 2/19/2019



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU – Top surface of reference to belt upper edge	mm	306	270
PBL – Top surface of reference to belt lower edge	mm	226	189

BELT LENGTH DATA

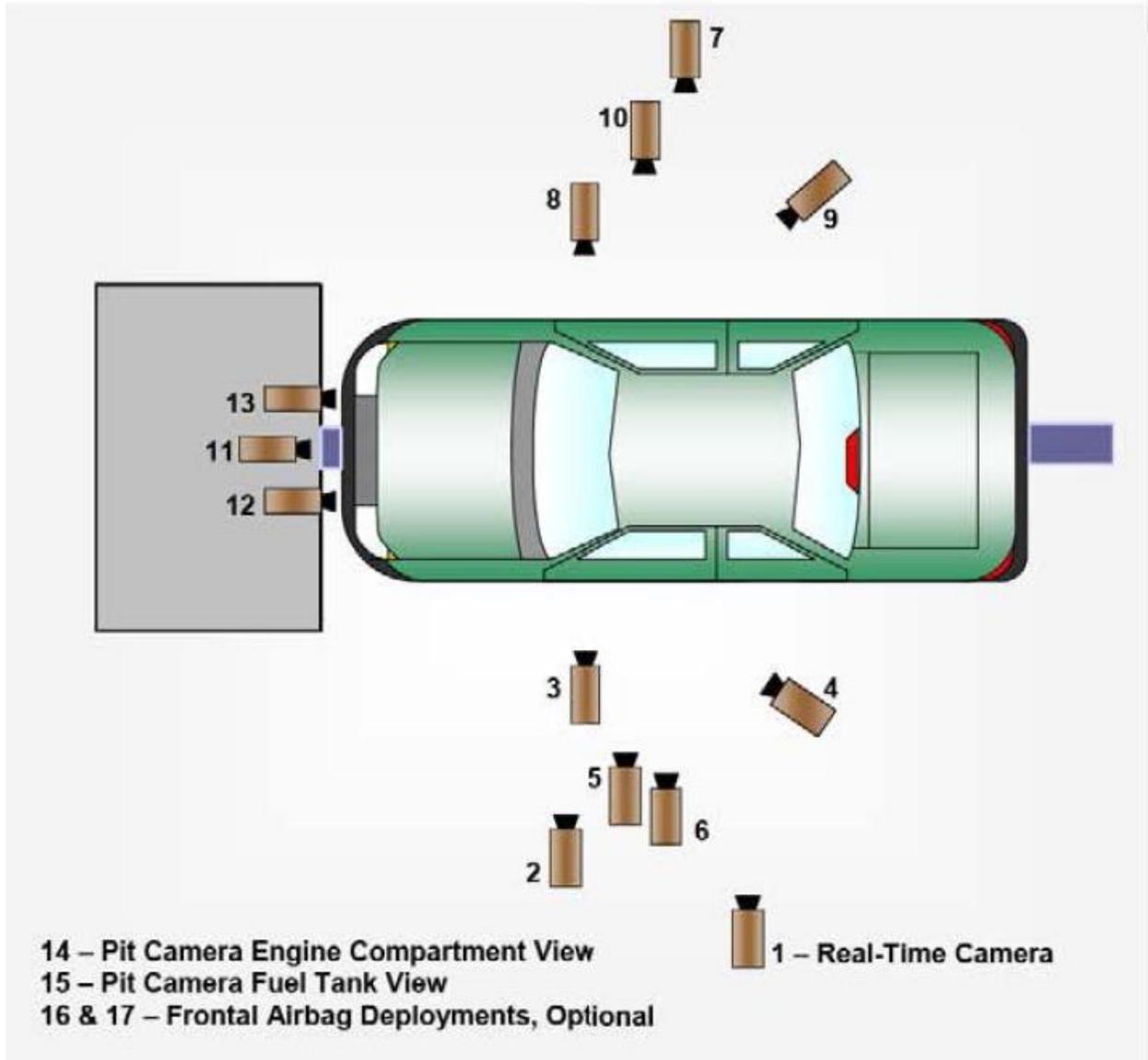
Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	822	890
Lap belt length as measured on ATD	mm	573	637
Remainder of belt on reel	mm	1030	900
Total belt length for continuous webbing systems	mm	2425	2427

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

Test Vehicle: 2019 Cadillac XT4 SUV
Test Program: NCAP Frontal Impact

NHTSA No.: M20190100
Test Date: 2/19/2019

CAMERA POSITIONS FOR FRONTAL IMPACTS



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

Test Vehicle: 2019 Cadillac XT4 SUV
 Test Program: NCAP Frontal Impact

NHTSA No.: M20190100
 Test Date: 2/19/2019

CAMERA LOCATIONS

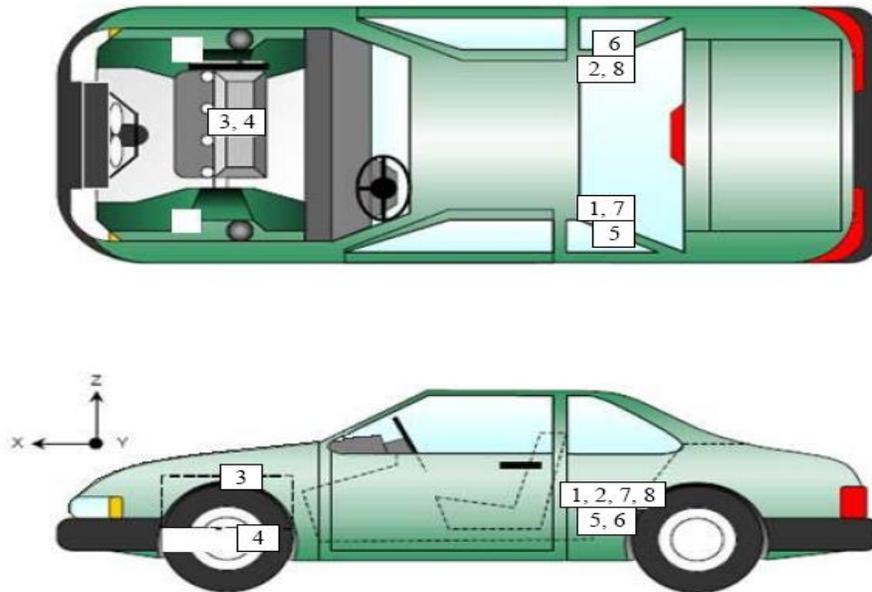
No.	Camera View	Location (mm)			Lens (mm)	Frame Speed (fps)
		X	Y	Z		
1	REAL-TIME LEFT OVERALL	1466	-5724	1568	Zoom	30
2	LEFT OVERALL	2523	-5670	1204	20	1000
3	DRIVER CLOSE-UP	1957	-4998	1341	50	1000
4	LEFT FRONT HALF	1253	-5446	1204	28	1000
5	LEFT ANGLE	4299	-3088	1927	25	1000
6	STEERING COLUMN	1925	-5625	3011	50	1000
7	RIGHT OVERALL	2127	6318	1163	20	1000
8	PASSENGER CLOSE-UP	1344	5830	1281	50	1000
9	RIGHT FRONT HALF	1048	5935	1213	25	1000
10	RIGHT ANGLE	4301	3037	1958	25	1000
11	WINDSHIELD	0	0	2591	12.5	1000
12	DRIVER WINDSHIELD	0	-604	2591	25	1000
13	PASSENGER WINDSHIELD	0	735	2591	25	1000
14	PIT FRONT	516	0	3214	25	1000
15	PIT REAR	3397	0	3214	12.5	1000
16	DRIVER ONBOARD				25	1000
17	PASSENGER ONBOARD				25	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: 2019 Cadillac XT4 SUV
 Test Program: NCAP Frontal Impact

NHTSA No.: M20190100
 Test Date: 2/19/2019



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Accelerometer – X Direction	1620	-390	-572
2	Right Rear Accelerometer – X Direction	1620	435	-583
3	Engine Top X	3800	-70	-835
4	Engine Bottom X	3730	100	-260
5	Left Rear Accelerometer – Z Direction	1620	-390	-577
6	Right Rear Accelerometer – Z Direction	1620	435	-588
7	Left Rear Accelerometer – X Direction Redundant	1620	-430	-572
8	Right Rear Accelerometer- X Direction Redundant	1620	400	-583

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

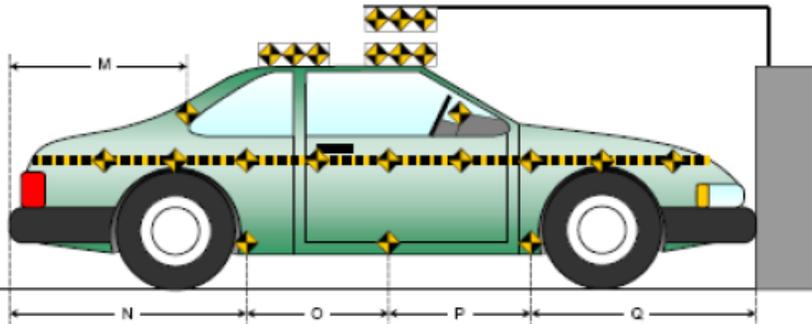
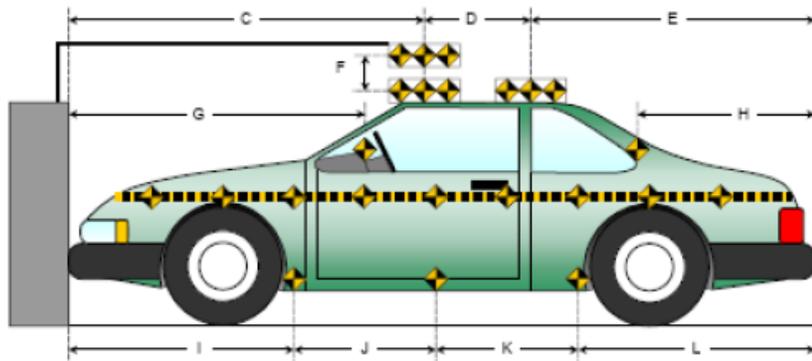
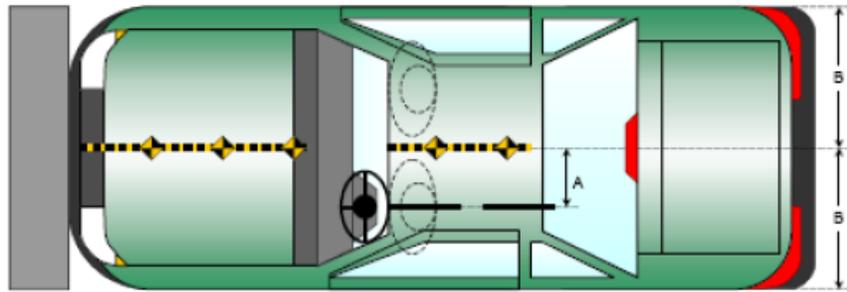
DATA SHEET NO. 8 - PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2019 Cadillac XT4 SUV
 Test Program: NCAP Frontal Impact

NHTSA No.: M20190100
 Test Date: 2/19/2019

Item	Value
A	390
B	935
C	2314
D	600
E	1687
F	247
G	1767
H	939
I	1440
J	900
K	840
L	1410
M	932
N	1415
O	835
P	892
Q	1448

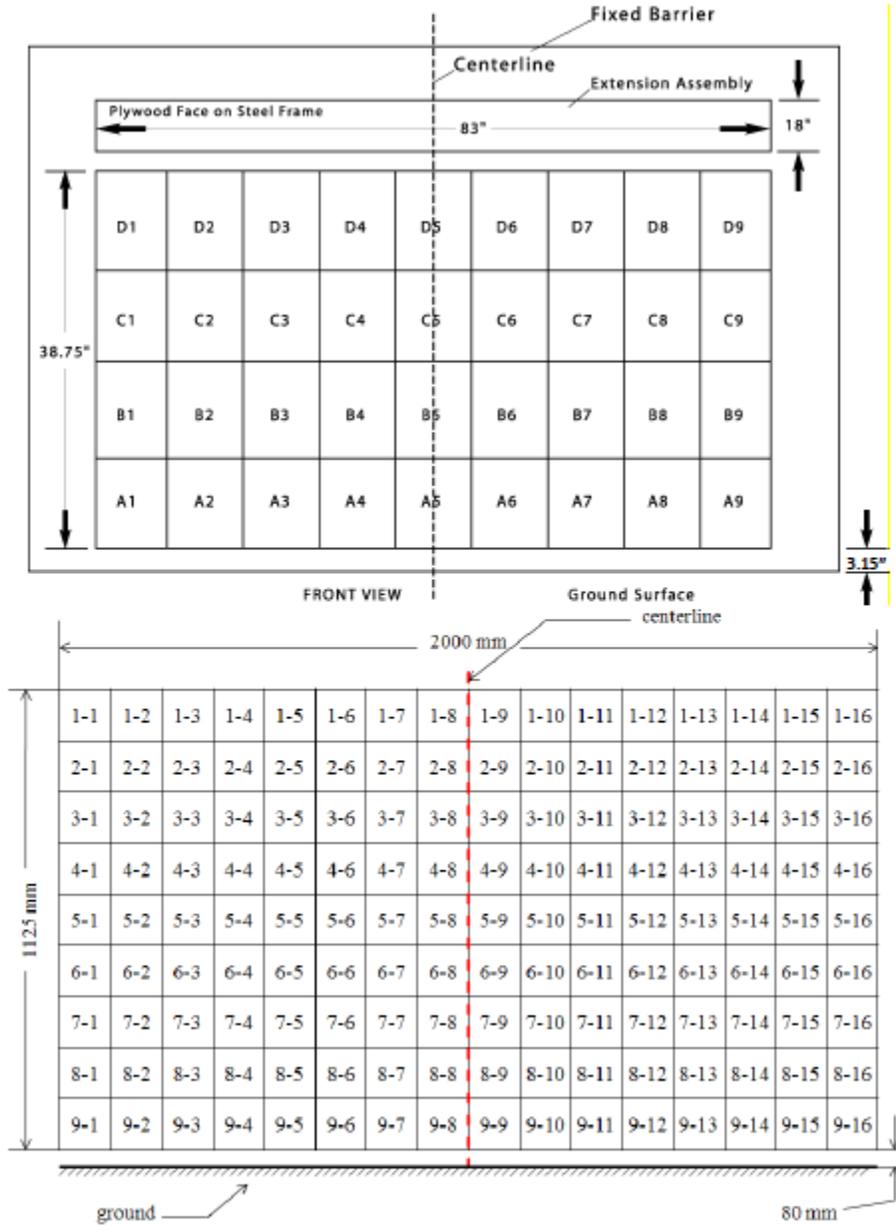
All units in millimeters



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

Test Vehicle: 2019 Cadillac XT4 SUV
 Test Program: NCAP Frontal Impact

NHTSA No.: M20190100
 Test Date: 2/19/2019



DATA SHEET NO. 10 - TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2019 Cadillac XT4 SUV
Test Program: NCAP Frontal Impact

NHTSA No.: M20190100
Test Date: 2/19/2019

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: 2019 Cadillac XT4 SUV
 Test Program: NCAP Frontal Impact

NHTSA No.: M20190100
 Test Date: 2/19/2019

TEST DUMMY INFORMATION AND CONTACT LOCATIONS

Description	Driver	Passenger
Dummy Type / Serial No.	Hybrid III 50th / 037	Hybrid III 5th / 426
Head Contact	Frontal Airbag and Head Restraint	Frontal Airbag, Side Curtain Airbag and Head Restraint
Upper Torso Contact	Frontal Airbag	Frontal Airbag
Lower Torso Contact	None	None
Left Knee Contact	Knee Airbag	Knee Airbag
Right Knee Contact	Knee Airbag	Knee Airbag

DOOR OPENING, TRUNK OPENING, AND SEAT TRACK INFORMATION

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

**NOTE: Indicate “No”, “N/A”, or “Yes”, and if “Yes”, describe

POST- OTHER VEHICLE POST-TEST OBSERVATIONS

Critical Areas of Performance	Observations
Windshield Damage	Small crack at lower right corner
Window Damage	None
Other Notable Effects	None

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	826
Center	mm	868
Right Side	mm	970
Average	mm	888

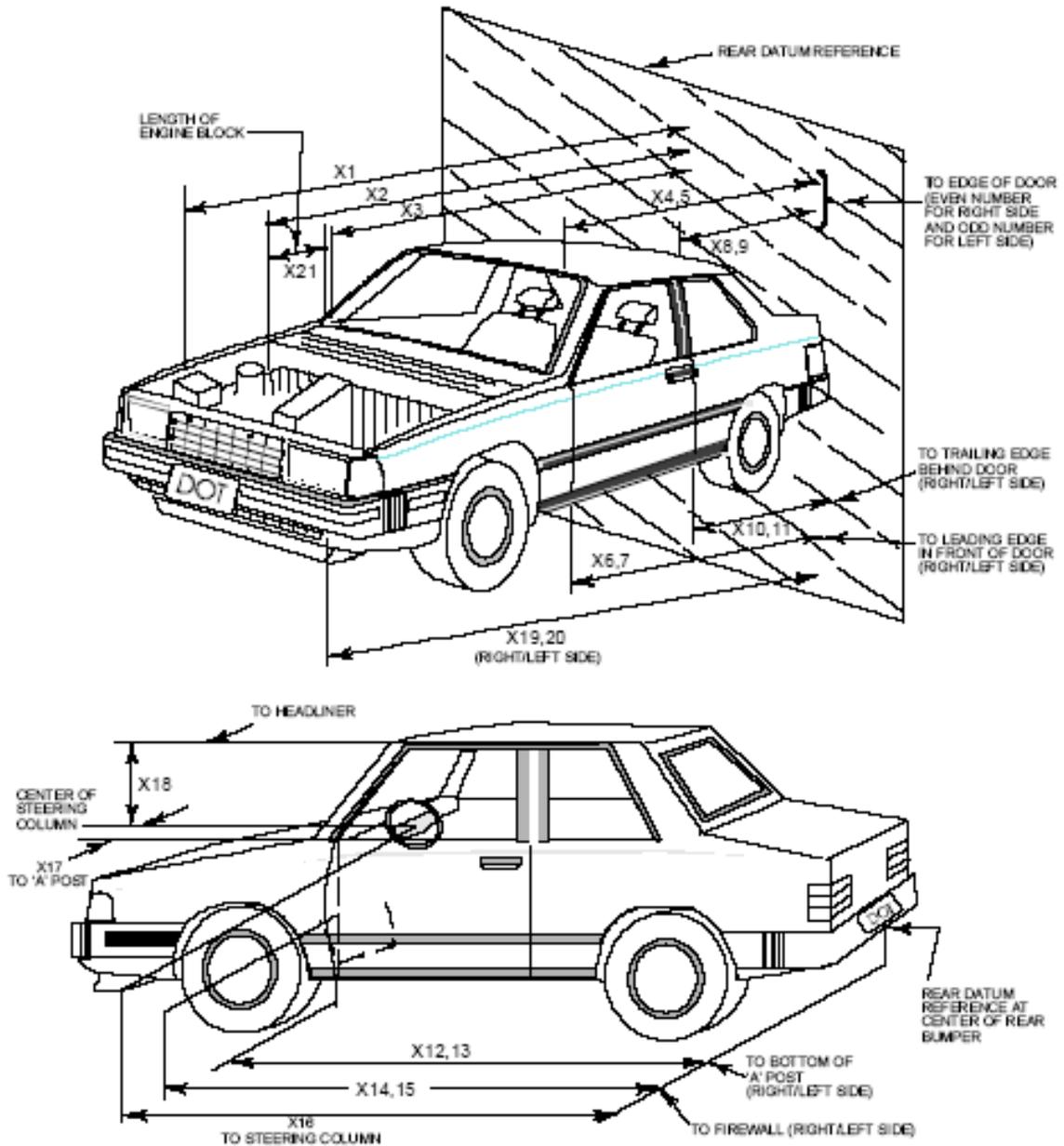
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

DATA SHEET NO. 12 - VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2019 Cadillac XT4 SUV
 Test Program: NCAP Frontal Impact

NHTSA No.: M20190100
 Test Date: 2/19/2019



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

Test Vehicle: 2019 Cadillac XT4 SUV

NHTSA No.: M20190100

Test Program: NCAP Frontal Impact

Test Date: 2/19/2019

No.	Measurement Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	4590	4100	490
2	Rear Surface of Vehicle (RSOV) to Front of Engine	4085	3810	275
3	RSOV to Firewall	3555	3552	3
4	RSOV to Upper Leading Edge of Right Door	3122	3120	2
5	RSOV to Upper Leading Edge of Left Door	3122	3116	6
6	RSOV to Lower Leading Edge of Right Door	3105	3128	-23
7	RSOV to Lower Leading Edge of Left Door	3109	3128	-19
8	RSOV to Upper Trailing Edge of Right Door	2050	2047	3
9	RSOV to Upper Trailing Edge of Left Door	2047	2043	4
10	RSOV to Lower Trailing Edge of Right Door	2093	2109	-16
11	RSOV to Lower Trailing Edge of Left Door	2092	2113	-21
12	RSOV to Bottom of "A" Post-of Right Side	3090	3084	6
13	RSOV to Bottom of "A" Post-of Left Side	3095	3091	4
14	RSOV to Firewall, Right Side	3560	3589	-29
15	RSOV to Firewall, Left Side	3550	3561	-11
16	RSOV to Steering Column	2643	2675	-32
17	Center of Steering Column to "A" Post	330	335	-5
18	Center of Steering Column to Headliner	435	490	-55
19	RSOV to Right Side of Front Bumper	4360	4070	290
20	RSOV to Left Side of Front Bumper	4360	4051	309
21	Length of Engine Block	550	550	0
RD	RSOV to Right Side of Dash Panel	2950	2940	10
CD	RSOV to Center of Dash Panel	2894	2885	9
LD	RSOV to Left Side of Dash Panel	2965	2960	5

All Dimensions in mm

DATA SHEET NO. 13 - ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2019 Cadillac XT4 SUV
 Test Program: NCAP Frontal Impact

NHTSA No.: M20190100
 Test Date: 2/19/2019

VEHICLE INFORMATION

VIN: 1GYFZBR44KF120993
 Vehicle Size Category: SUV

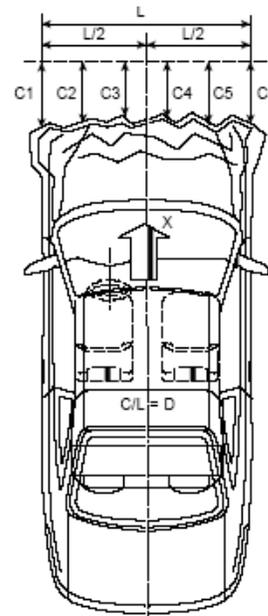
Wheelbase: 2775
 Test Weight (kg): 1998.4

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): 56.53
 Velocity Change (km/h): 67.84
 Time of Separation (ms): 200

CRUSH PROFILE

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



No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	4360	4070	290
C2	Crush zone 2 at left side	mm	4510	4051	459
C3	Crush zone 3 at left side	mm	4580	4105	475
C4	Crush zone 4 at right side	mm	4580	4106	474
C5	Crush zone 5 at right side	mm	4513	4070	443
C6	Crush zone 6 at right side	mm	4360	4030	330
L	C1 to C6	mm	1524	1524	0

DATA SHEET NO. 14 - VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2019 Cadillac XT4 SUV
 Test Program: NCAP Frontal Impact

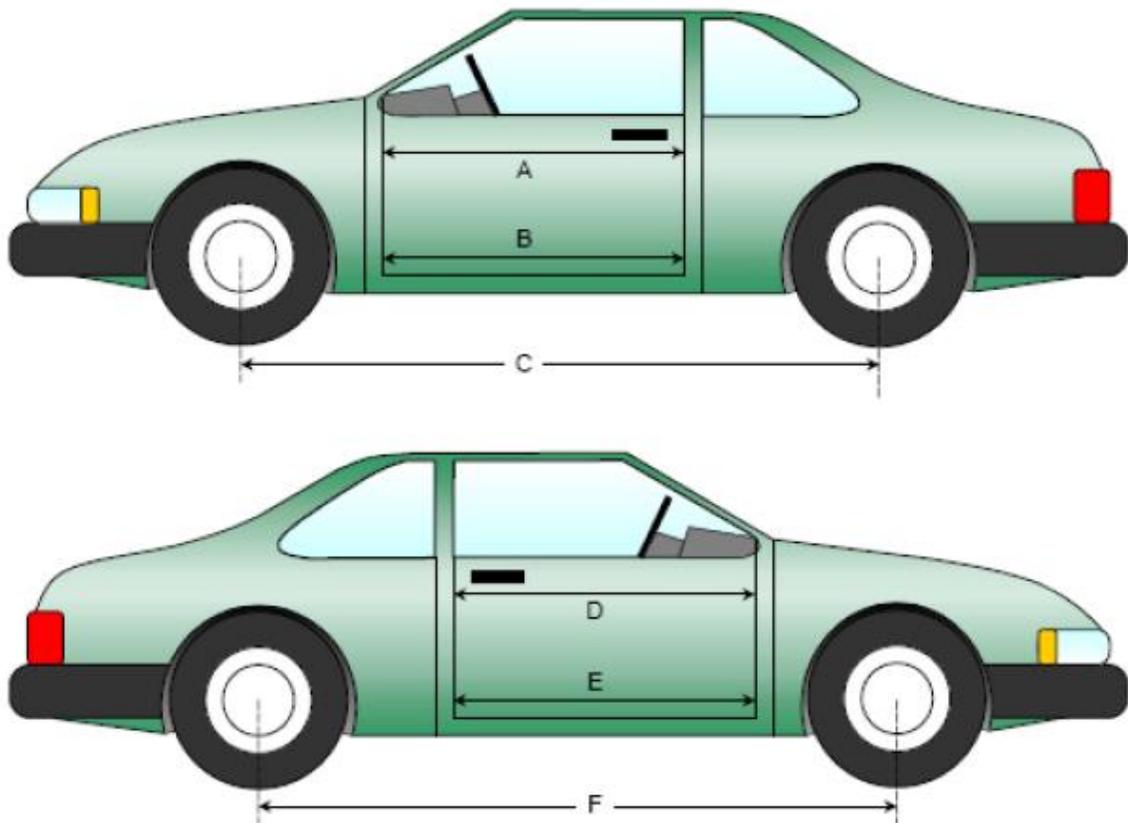
NHTSA No.: M20190100
 Test Date: 2/19/2019

DOOR OPENING WIDTH

No.	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	983	987	-4
B	Left Side Lower	mm	872	872	0
D	Right Side Upper	mm	983	983	0
E	Right Side Lower	mm	872	872	0

WHEELBASE MEASUREMENTS

No.	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2775	2710	65
F	Right Side Wheelbase	mm	2775	2744	31



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

Test Vehicle: 2019 Cadillac XT4 SUV

NHTSA No.: M20190100

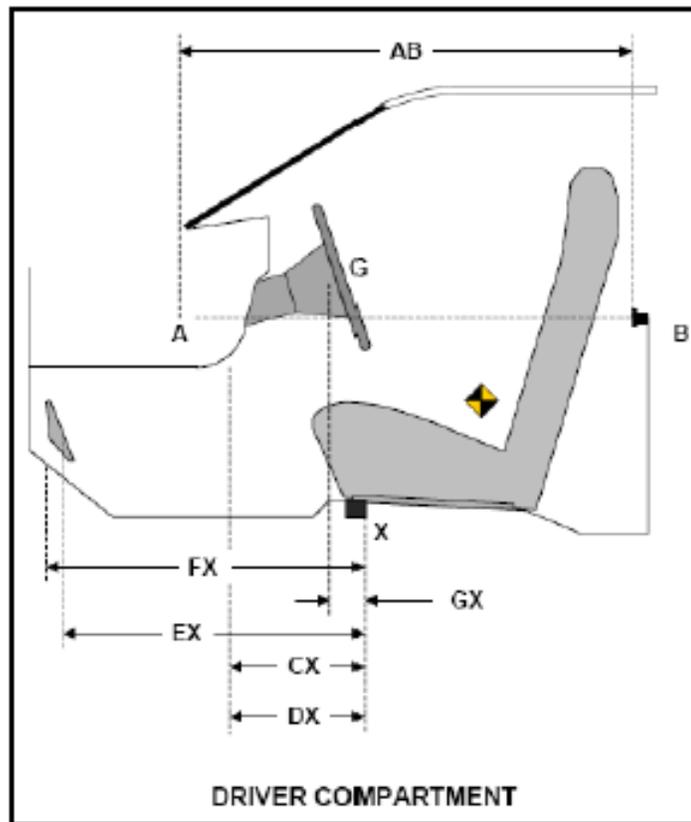
Test Program: NCAP Frontal Impact

Test Date: 2/19/2019

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	992	992	0
CX	Left Knee Bolster to X	mm	330	292	38
DX	Right Knee Bolster to X	mm	310	265	45
EX	Brake Pedal to X	mm	555	536	19
FX	Foot Rest to X	mm	585	587	-2
GX	Center of Steering Column Wheel Hub to X	mm	110	172	-62

X = Front of Seat Track (Stationary)



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

Test Vehicle: 2019 Cadillac XT4 SUV
 Test Program: NCAP Frontal Impact

NHTSA No.: M20190100
 Test Date: 2/19/2019

Please provide windshield mounting details.

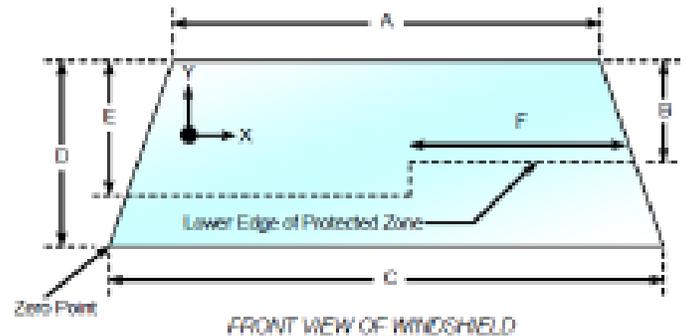
The standard requires that the post-test retention measurement be a minimum of 75% of the pre-test total periphery measurement for vehicle not equipped with occupant passive restraint and 50% for each side of the windshield for vehicle which are equipped with occupant passive restraints.

Temperature of windshield molding during test: 21.2°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	1240
B	mm	503
C	mm	1500
D	mm	840
E	mm	537
F	mm	445



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

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

X	Y
NA	NA

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

Test Vehicle: 2019 Cadillac XT4 SUV
Test Program: NCAP Frontal Impact

NHTSA No.: M20190100
Test Date: 2/19/2019

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 21.2°C

Test Time: 15:19

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

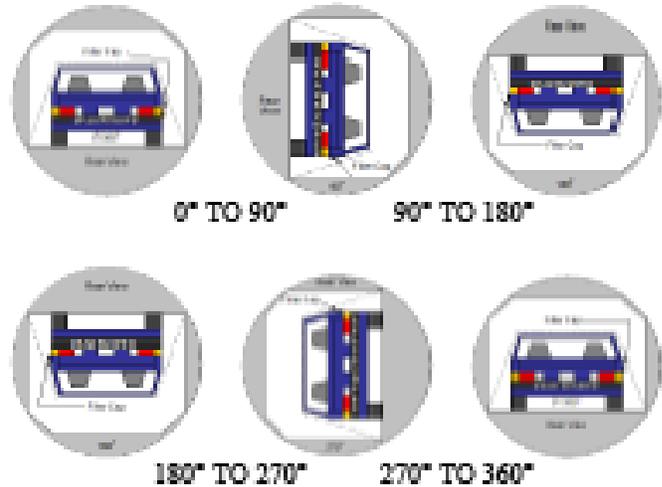
DATA SHEET NO. 16 - FMVSS 301 BARRIER IMPACT AND STATIC ROLLOVER RESULTS (CONT'D)

Test Vehicle: 2019 Cadillac XT4 SUV
 Test Program: NCAP Frontal Impact

NHTSA No.: M20190100
 Test Date: 2/19/2019

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

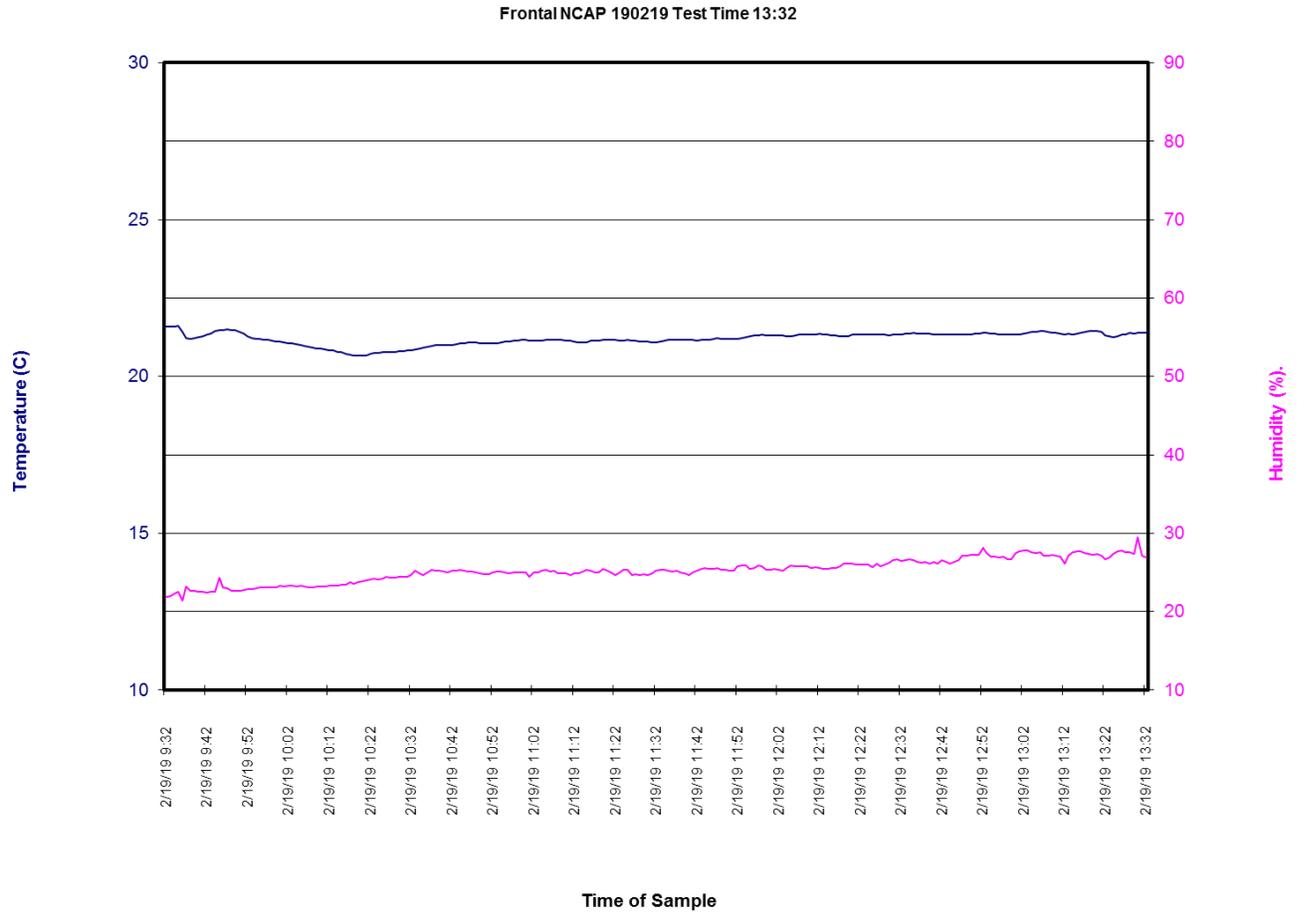
SOLVENT SPILLAGE LOCATION TABLE

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: 2019 Cadillac XT4 SUV
Test Program: NCAP Frontal Impact

NHTSA No.: M20190100
Test Date: 2/19/2019



APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

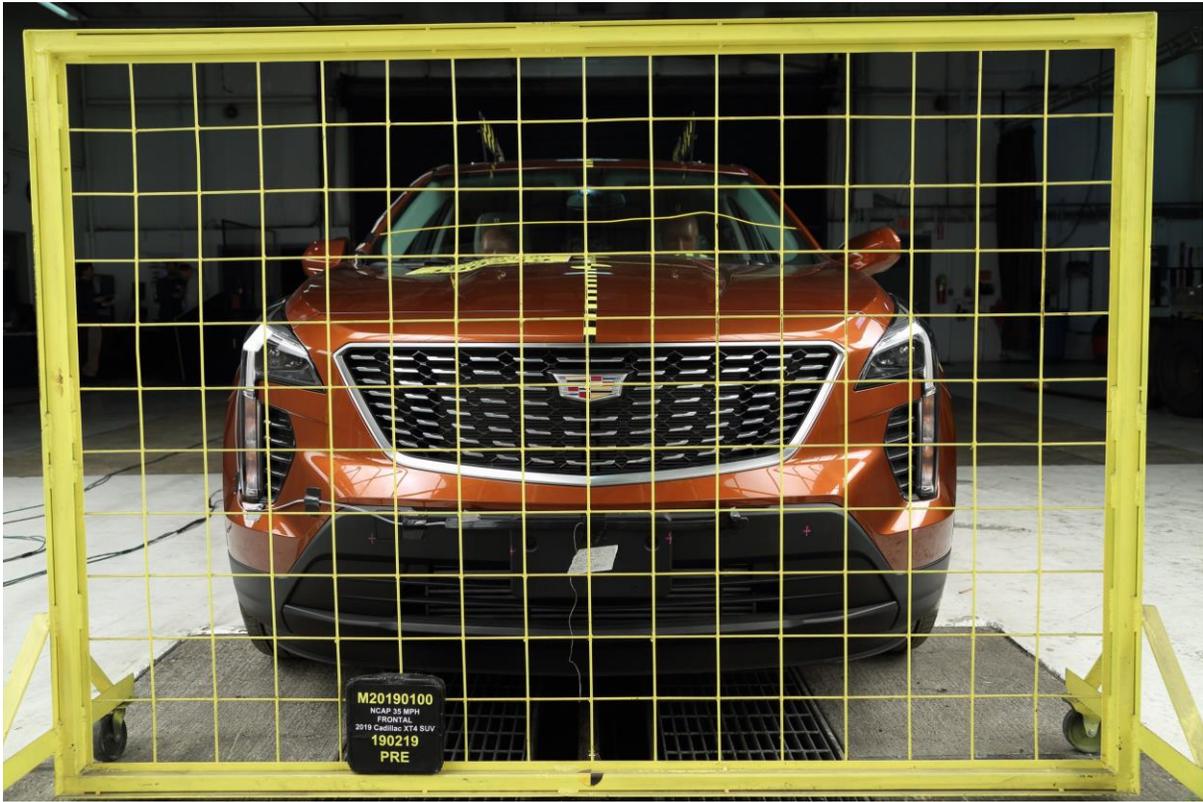
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3	Post-Test Load Cell Wall	A-6
4	Manufacturer's Label	A-6
5	Tire Placard	A-7
6	2019 Cadillac XT4 SUV Frontal As Delivered	A-8
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10	Pre-Test Left View of Test Vehicle	A-10
11	Post-Test Left View of 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
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17	Post-Test Left Rear 3-4 View	A-13
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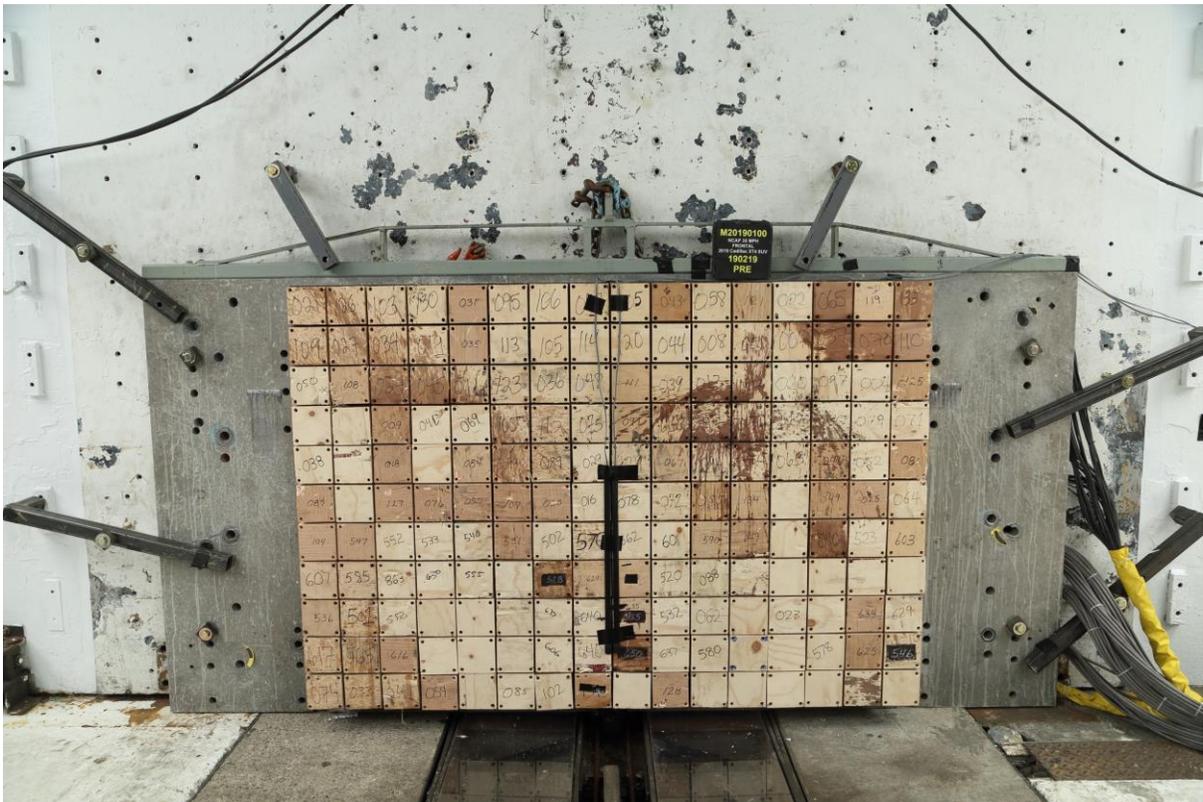
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39	Post-Test View of Belt Anchorage for Driver Dummy	A-25
40	Pre-Test View of Belt Buckle and Latch Plate for Driver Dummy	A-26
41	Post-Test View of Belt Buckle and Latch Plate for Driver Dummy	A-26
42	Pre-Test Driver Dummy Feet	A-27
43	Post-Test Driver Dummy Feet	A-27
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67	Pre-Test Passenger Side Knee Bolster	A-40
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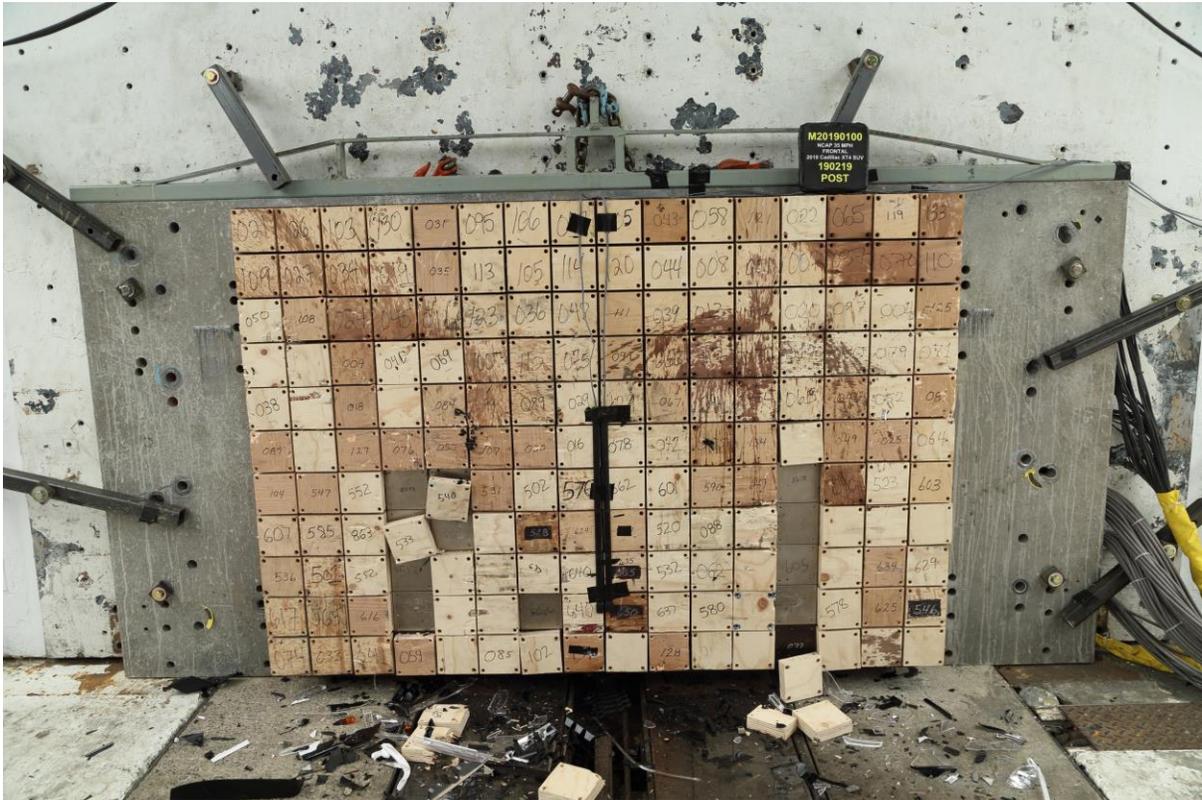
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001 Load Cell Location



002 Pre-Test Load Cell Wall



003 Post-Test Load Cell Wall



004 Manufacturer's Label



005 Tire Placard

Intentionally Left Blank



006 2019 Cadillac XT4 SUV 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



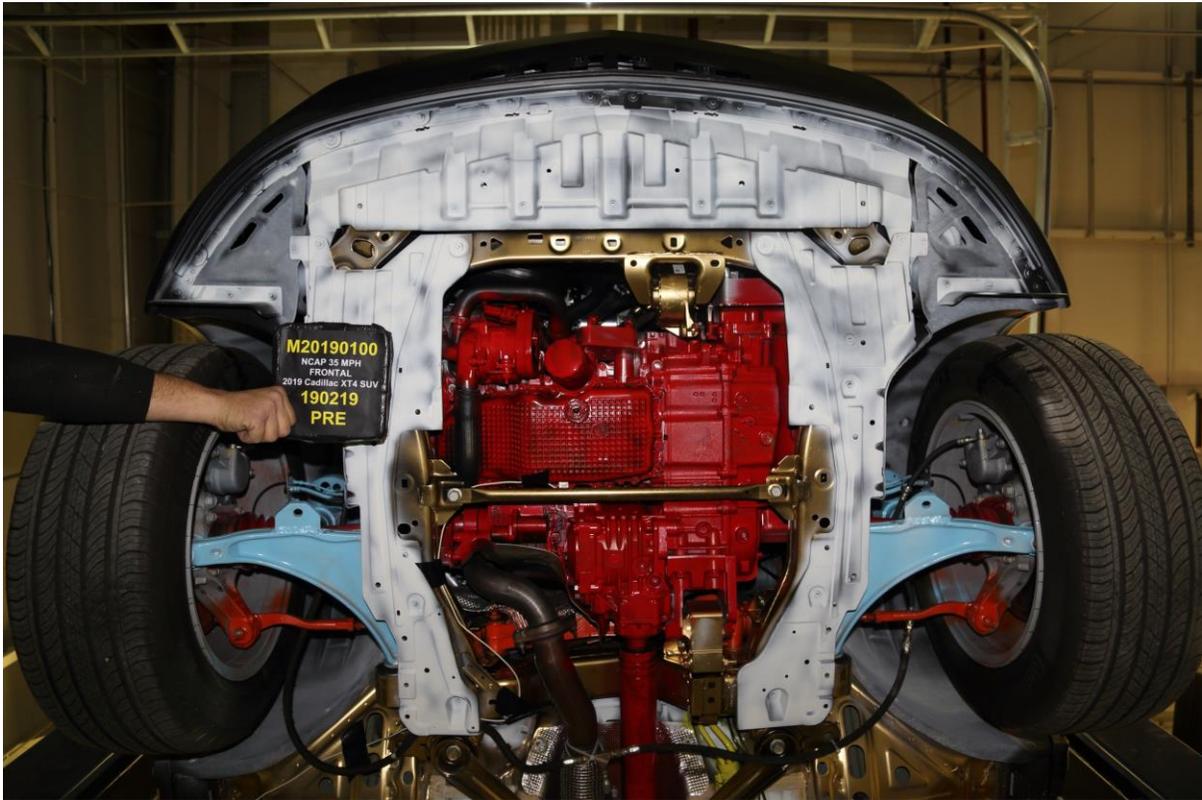
021 Post-Test Engine Compartment View



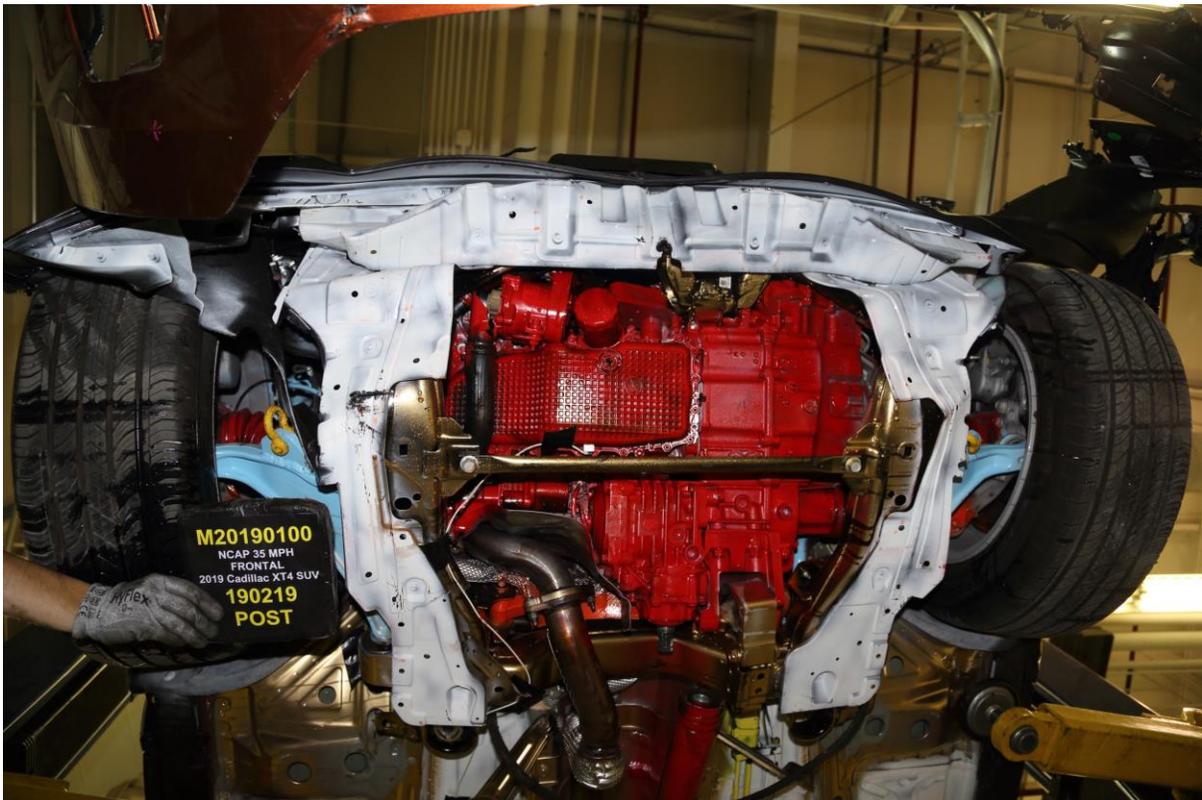
022 Pre-Test Fuel Filler Cap View



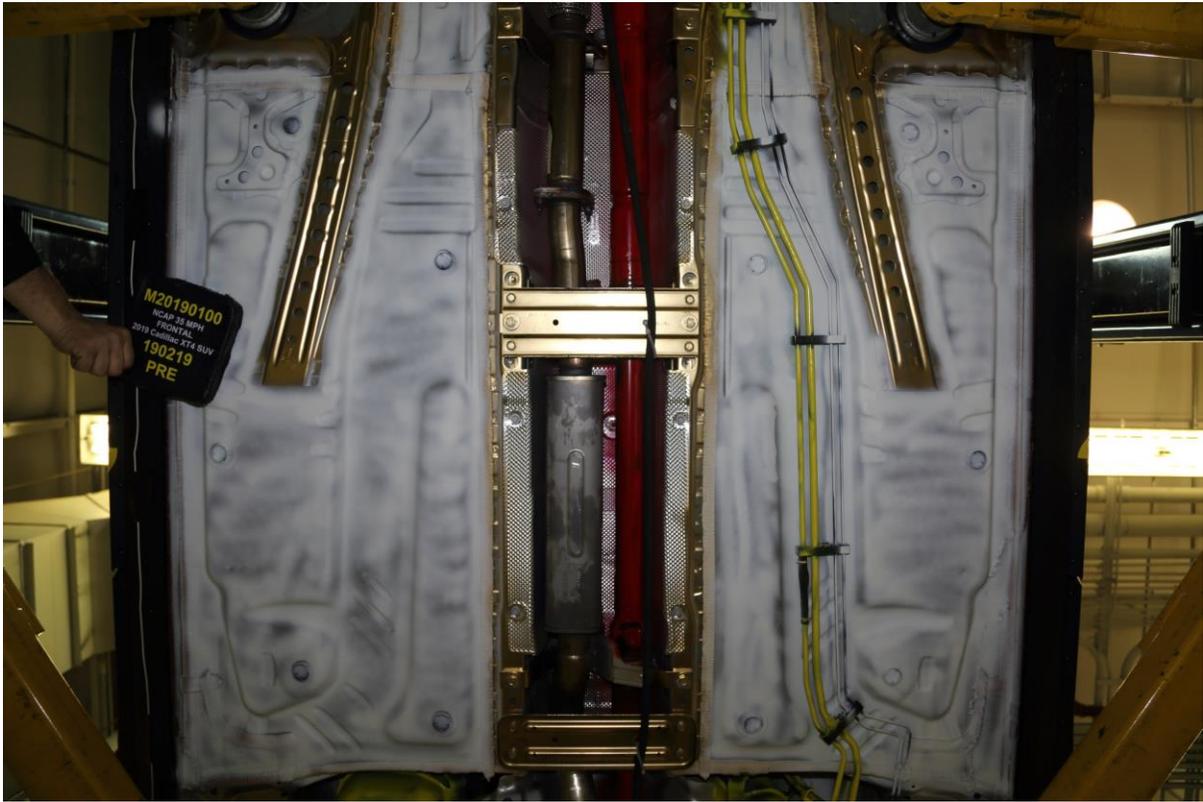
023 Post-Test Fuel Filler Cap View



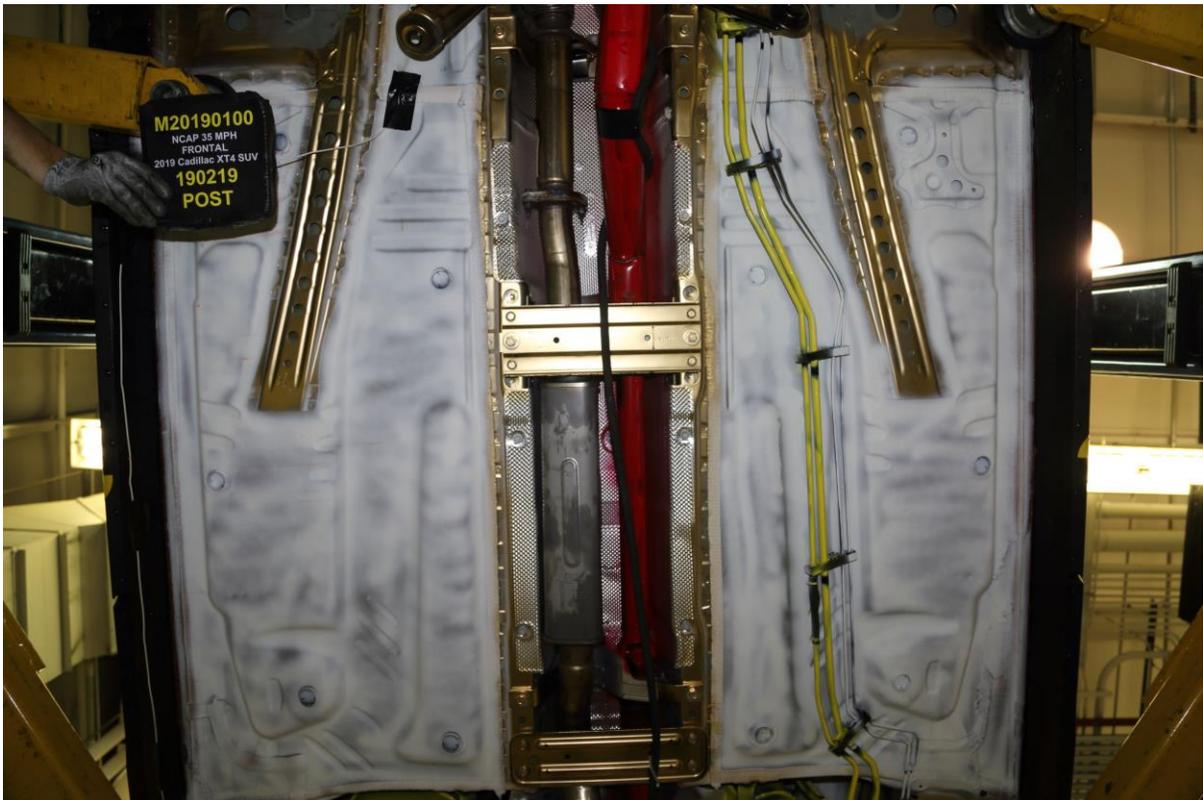
024 Pre-Test Front Underbody View



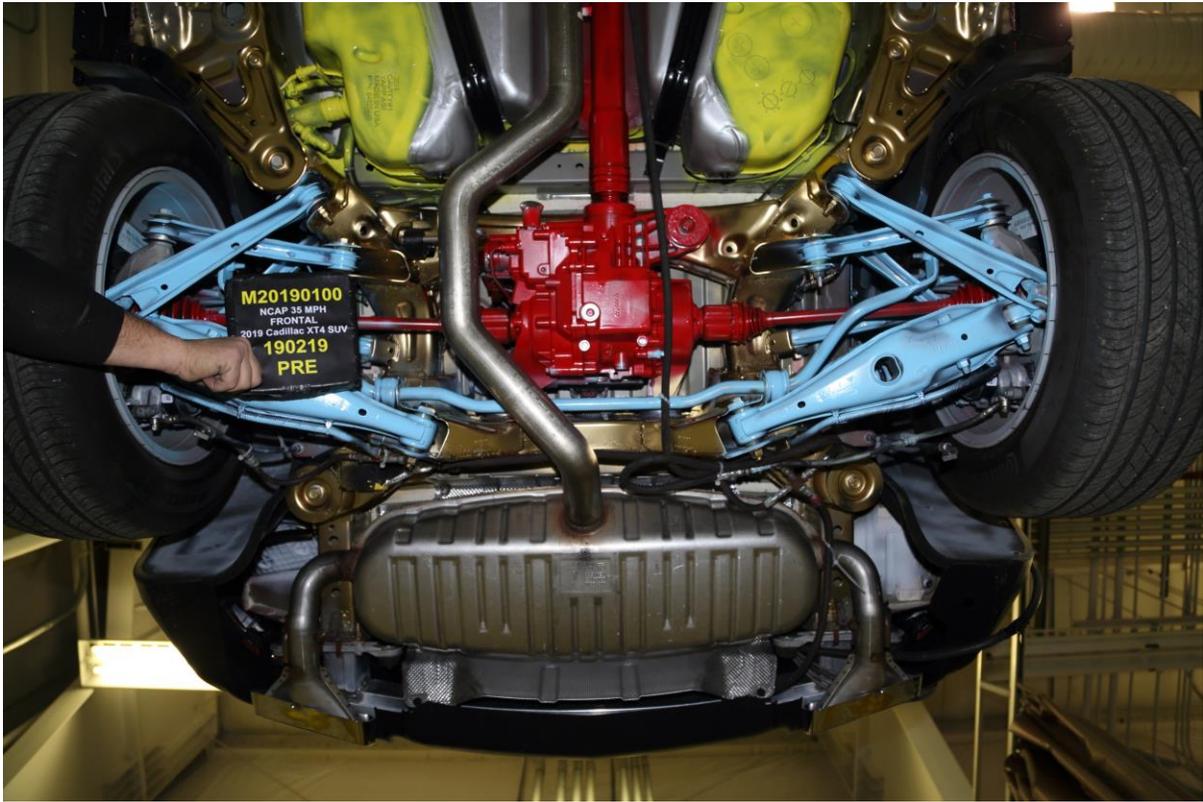
025 Post-Test Front Underbody View



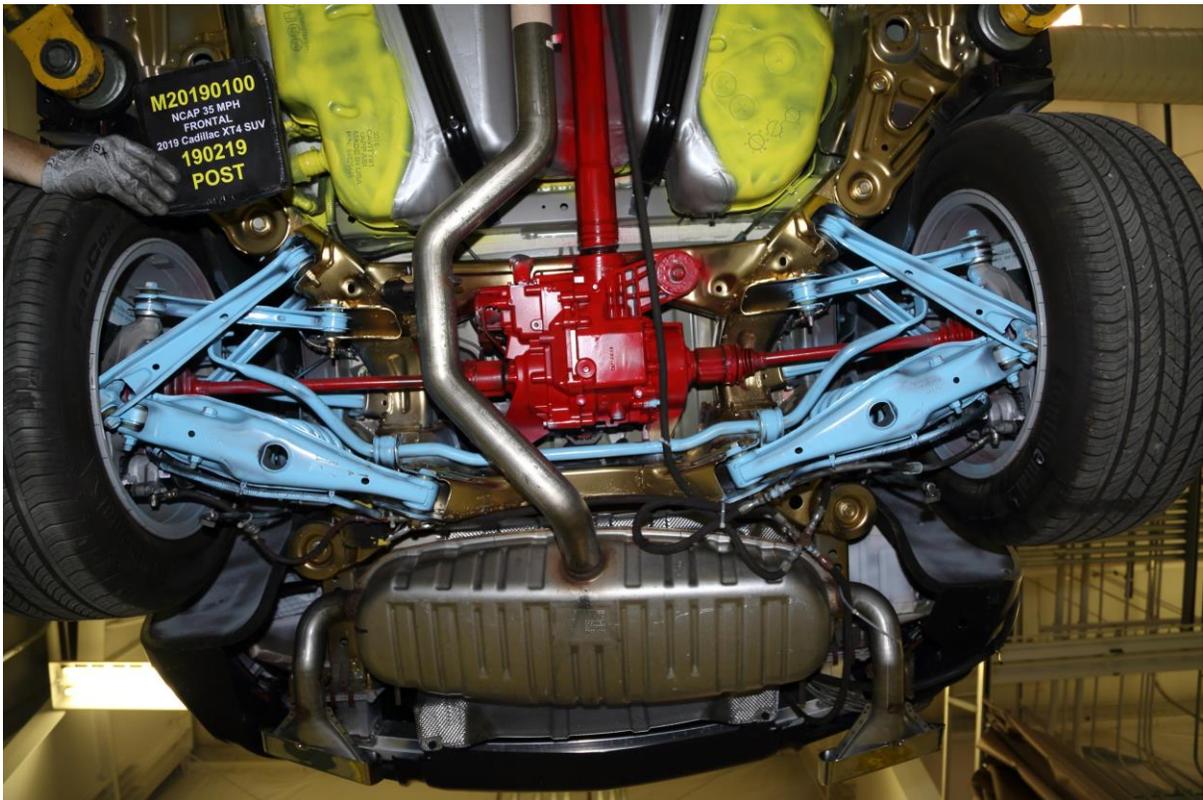
025a Pre-Test Mid Underbody View



025b Post-Test Mid Underbody View



026 Pre-Test Rear Underbody View



027 Post-Test Rear Underbody View



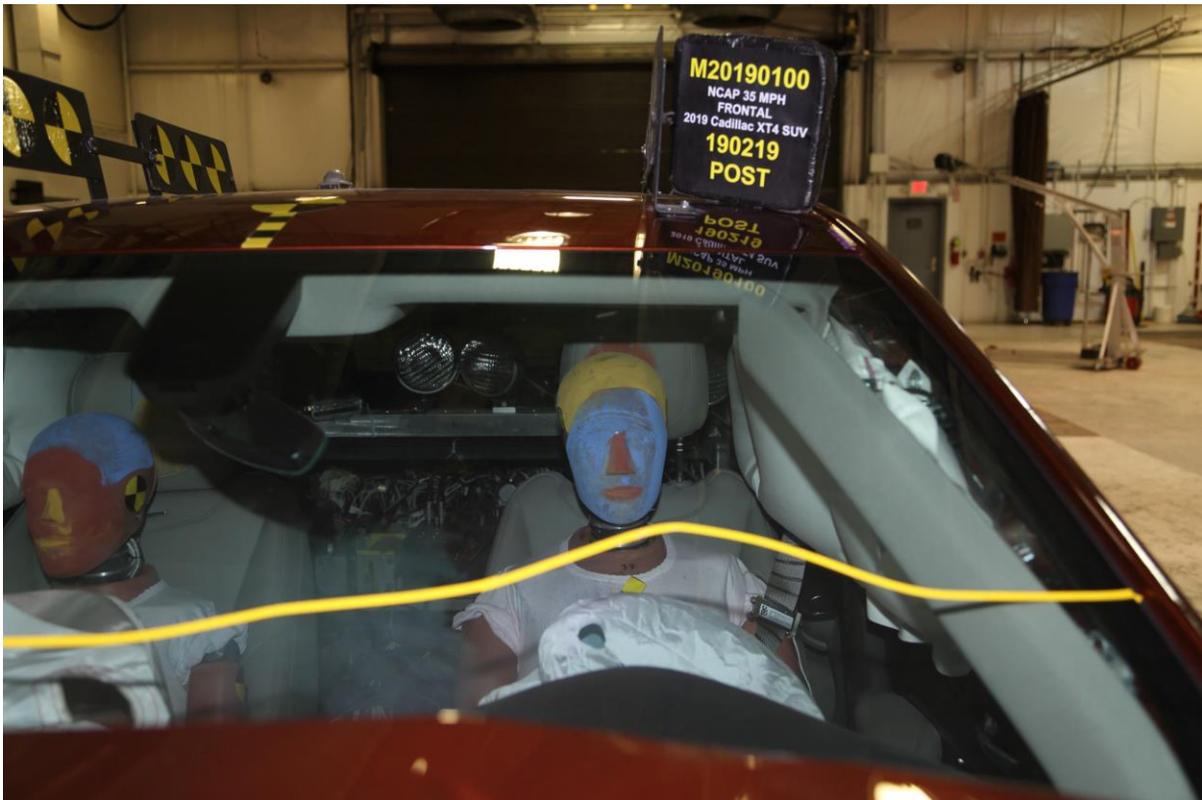
028 Pre-Test Dummy Cable Routing



029 Post-Test Dummy Cable Routing



030 Pre-Test Driver Dummy Front View



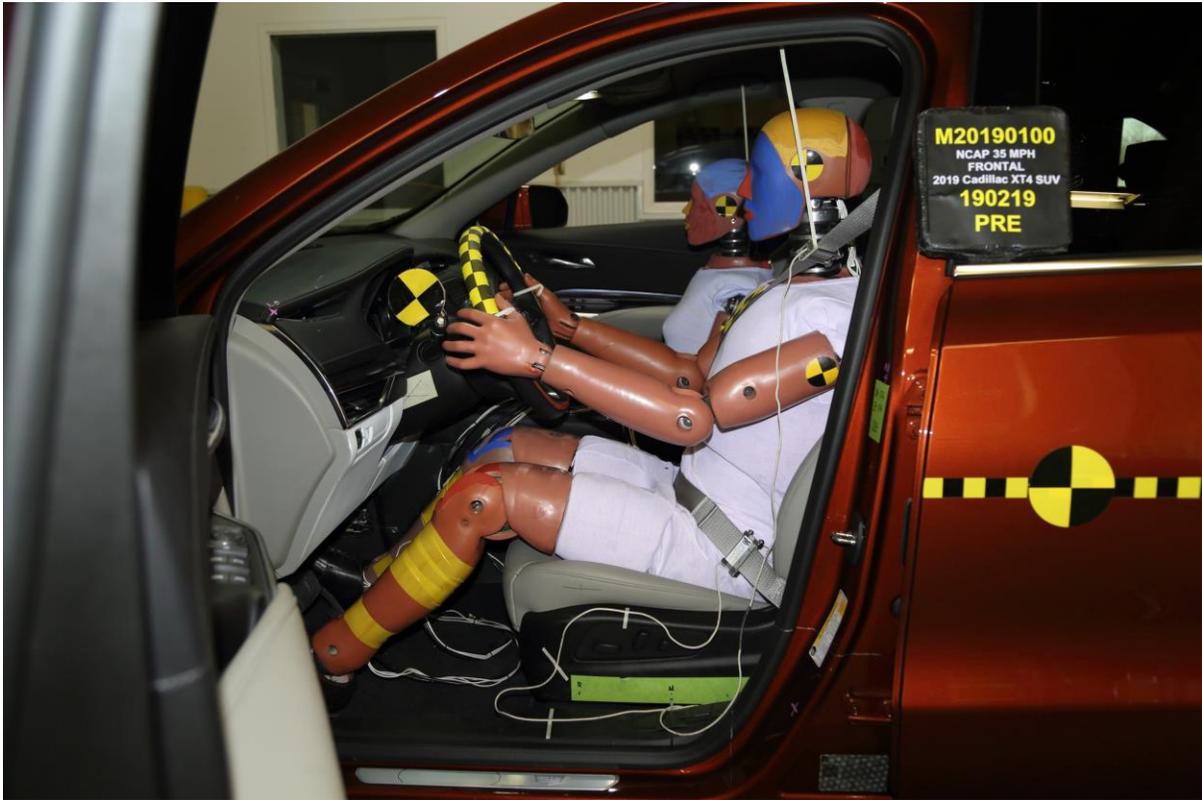
031 Post-Test Driver Dummy Front View



032 Pre-Test Driver Dummy Window View



033 Post-Test Driver Dummy Window View



034 Pre-Test Driver Dummy and Vehicle Interior View



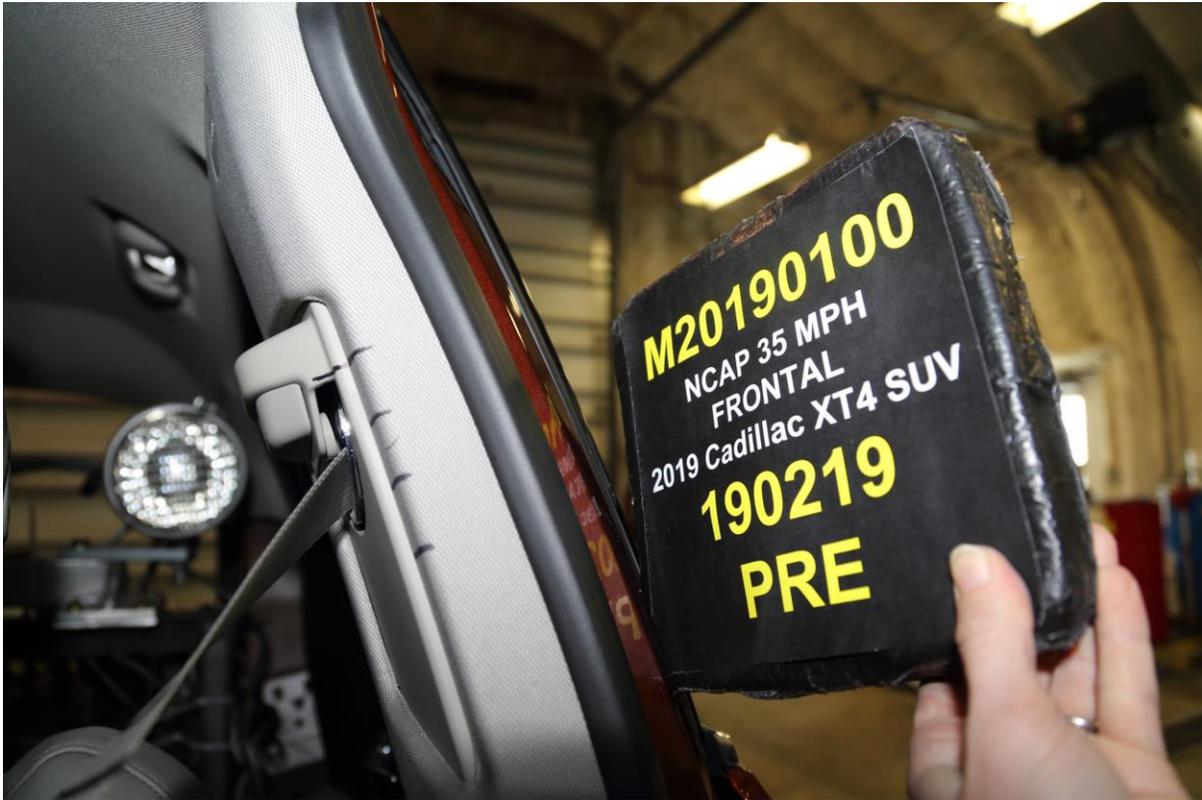
035 Post-Test Driver Dummy and Vehicle Interior View



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



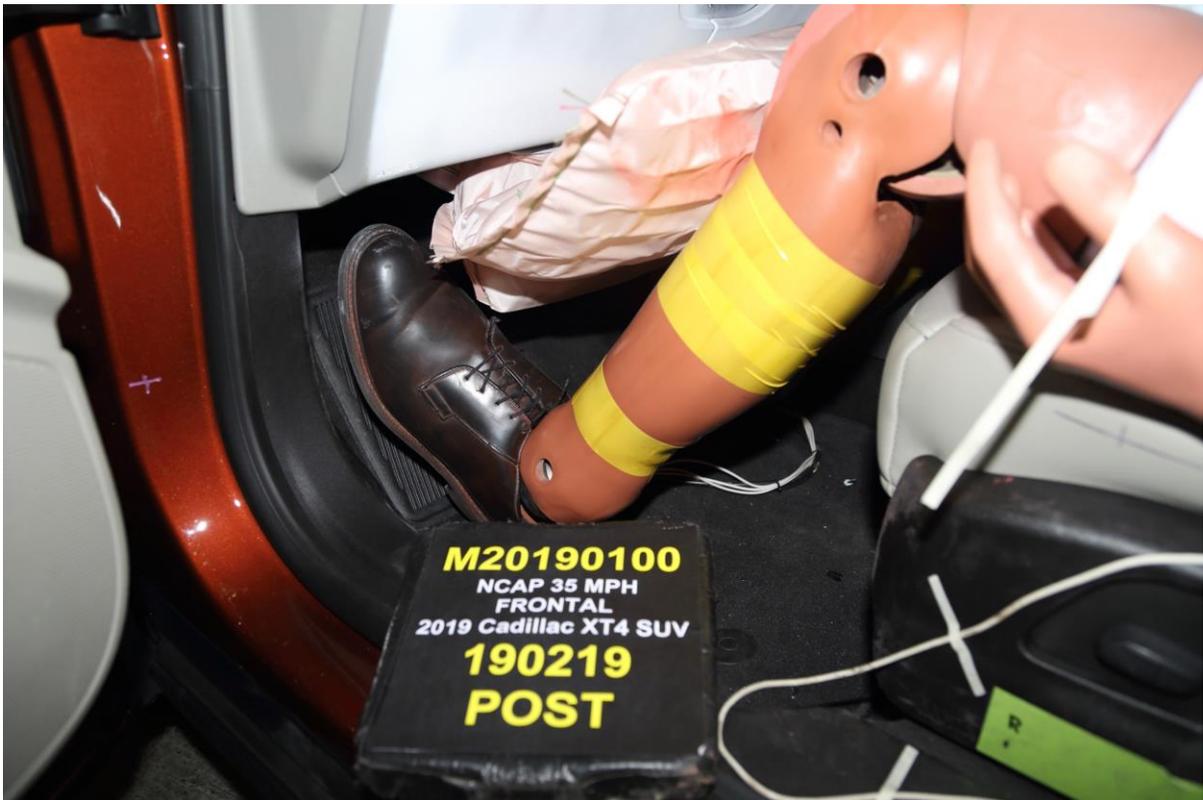
040 Pre-Test View of Belt Buckle and Latch Plate for Driver Dummy



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



053 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



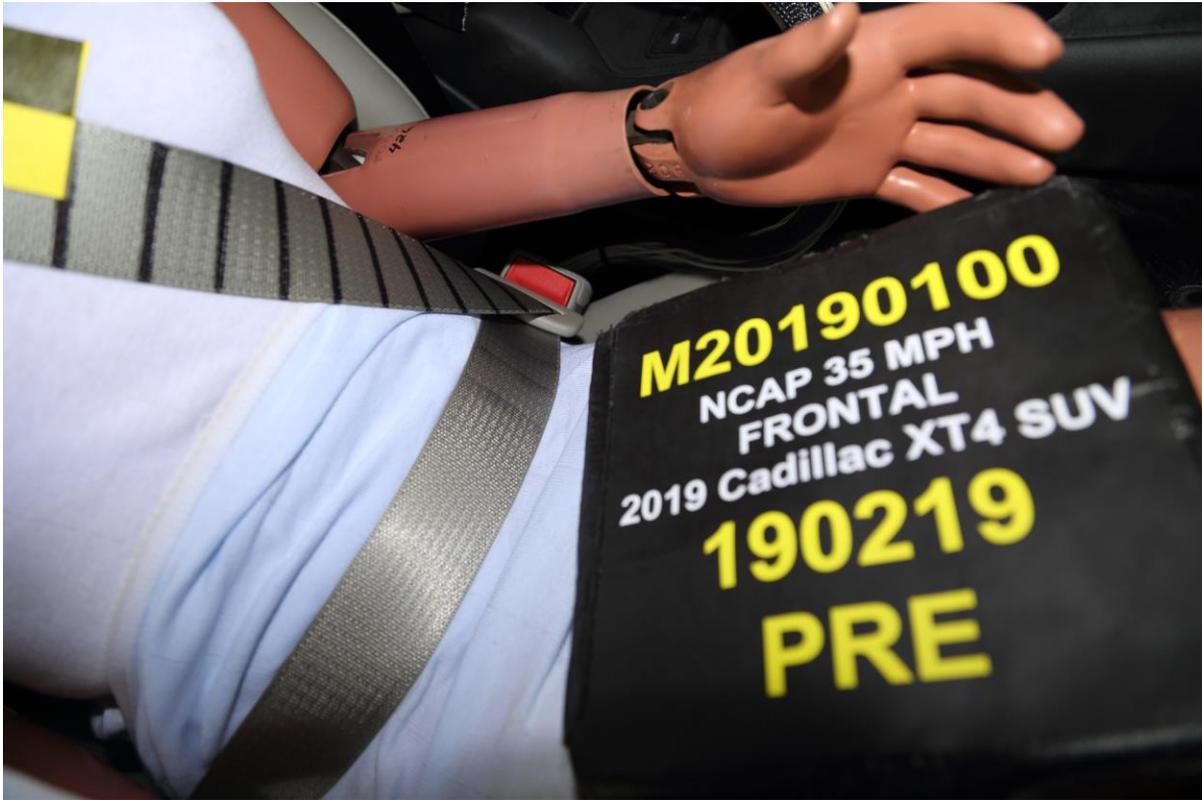
060 Post-Test Passenger's Seat Fore-Aft Markings



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



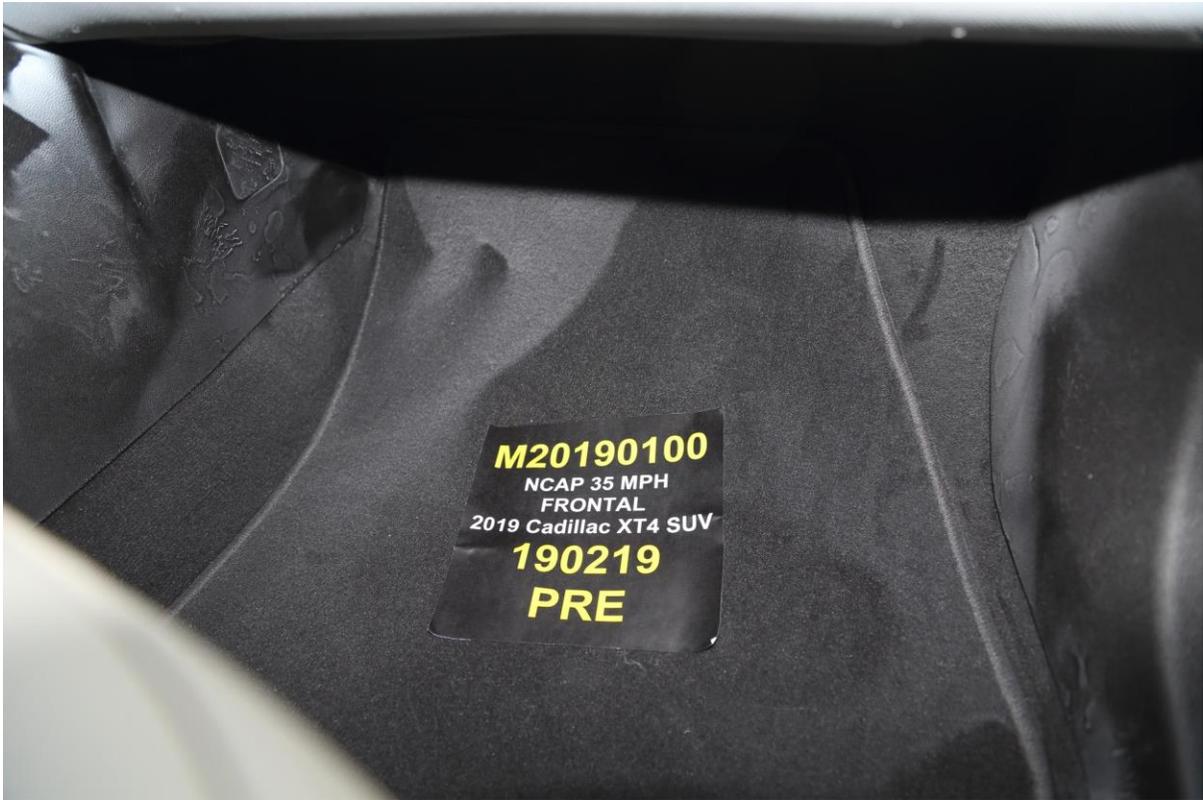
066 Post-Test Passenger Dummy Feet



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



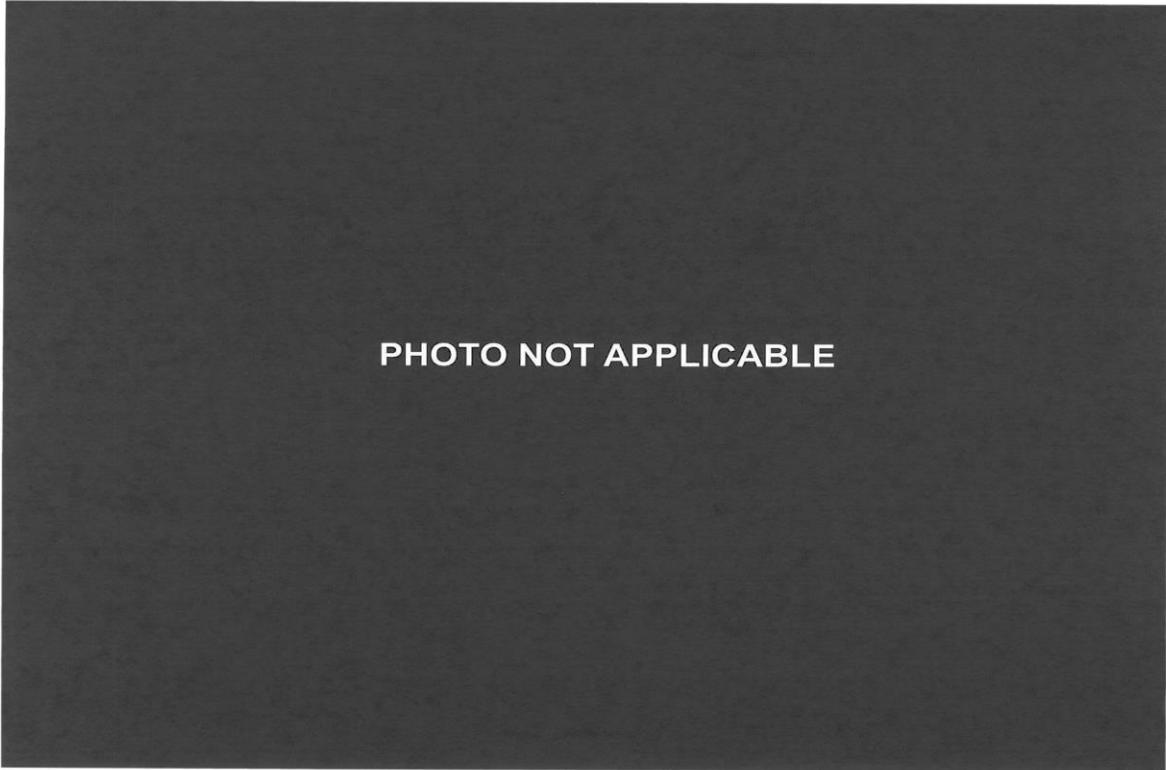
072 Post-Test Passenger Dummy Contact with Airbag



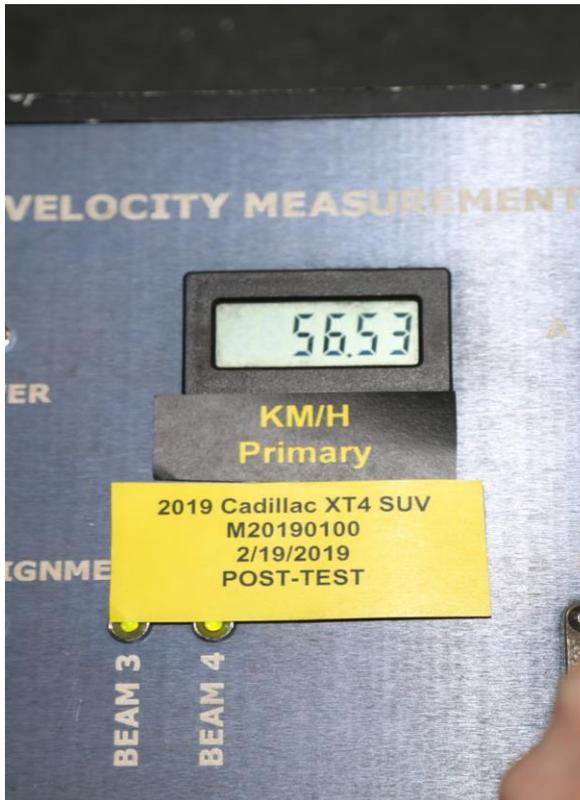
073 Post-Test Passenger Dummy Contact with Headrest



074 Photograph of Ballast Installed in Vehicle



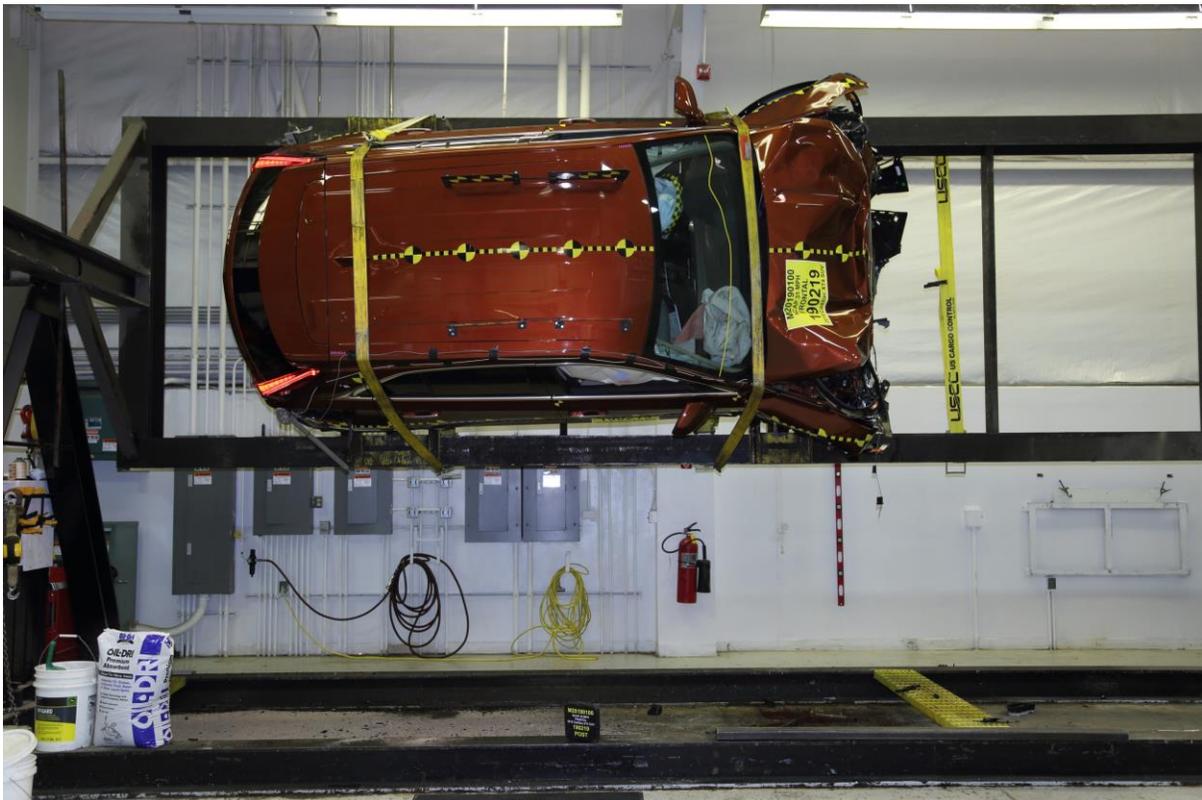
075 Post-Test Stoddard Spillage Location View



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 2019 Cadillac XT4 SUV Frontal Impact Event



2019 XT4 AWD LUXURY

**EXTERIOR: AUTUMN METALLIC
INTERIOR: LIGHT PLATINUM / JET
BLACK**

**ENGINE: 2.0L 4-CYLINDER TURBO
TRANSMISSION: 9-SPD AUTOMATIC**

Visit us at www.cadillac.com

<p>STANDARD EQUIPMENT</p> <p><small>ITEMS FEATURED BELOW ARE INCLUDED AT NO EXTRA CHARGE IN THE STANDARD MSRP. SEE DEALER FOR DETAILS.</small></p> <p>CADILLAC OWNER BENEFITS</p> <ul style="list-style-type: none"> • 4 YEAR / 50,000 MILE* BUMPER-TO-BUMPER LTD WARRANTY • 6 YEAR / 70,000 MILE* POWERTRAIN LTD WARRANTY • FIRST MAINTENANCE VISIT OIL CHANGE AND TIRE ROTATION SEE WWW.CADILLAC.COM • 6 YEAR / 70,000 MILE* COURTESY TRANSPORTATION • 6 YEAR / 70,000 MILE* ROADSIDE ASSISTANCE • WHICHEVER COMES FIRST, SEE DEALER FOR DETAILS. • ONSTAR (R) SERVICES CAPABLE (SUBJECT TO TERMS SEE ONSTAR.COM) • 4G LTE WI-FI (R) HOTSPOT CAPABLE (SUBJECT TO TERMS SEE ONSTAR.COM) 	<p>PERFORMANCE</p> <ul style="list-style-type: none"> • ENGINE, 2.0L 4-CYLINDER TURBO • ALL WHEEL DRIVE, TWIN-CLUTCH • TRANSMISSION, 9-SPD AUTOMATIC • 18" 10-SPOKE ALLOY WHEELS • 4 WHL INDEP SUSPENSION • SELECTABLE DRIVING MODES • STABILITRAK STABILITY CONTROL INCLUDES TRACTION CONTROL <p>LUXURY & CONVENIENCE</p> <ul style="list-style-type: none"> • LED HEADLAMPS & TAILLAMPS • PASSIVE ENTRY & KEYLESS START • POWER SEAT ADJUSTER, DRIVER • 8-WAY & PASS 6-WAY • POWER LUMBAR, 2-WAY, DRIVER & FRONT PASSENGER • ADAPTIVE REMOTE START • REAR SEAT, 60/40 SPLIT FOLDING SEATBACK • 8" COLOR TOUCH DISPLAY • ROTARY INFOTAINMENT CONTROLLER 	<p>SAFETY & SECURITY</p> <ul style="list-style-type: none"> • UNIVERSAL HOME REMOTE • AIRBAGS, FRONTAL, KNEE AND SEAT SIDE IMPACT FOR DRIVER AND FRONT PASSENGER, HEAD CURTAIN FOR ALL OUTBOARD SEATING POSITIONS • HD REAR VISION CAMERA • REAR PARK ASSIST <p>OPTIONS & PRICING</p> <p><small>MANUFACTURER'S SUGGESTED RETAIL PRICE (STANDARD EQUIPMENT SHOWN)</small></p> <table border="1"> <tr> <td>STANDARD VEHICLE PRICE</td> <td>\$37,295.00</td> </tr> </table> <p><small>OPTIONS INSTALLED BY THE MANUFACTURER (MAY REPLACE STANDARD EQUIPMENT SHOWN)</small></p> <table border="1"> <tr> <td>AUTUMN METALLIC</td> <td>625.00</td> </tr> <tr> <td>FLOOR MATS, ALL WEATHER FRONT AND REAR (DEALER INSTALLED)</td> <td>150.00</td> </tr> <tr> <td>WHEEL LOCKS (DLR INSTALLED)</td> <td>75.00</td> </tr> </table>	STANDARD VEHICLE PRICE	\$37,295.00	AUTUMN METALLIC	625.00	FLOOR MATS, ALL WEATHER FRONT AND REAR (DEALER INSTALLED)	150.00	WHEEL LOCKS (DLR INSTALLED)	75.00	<p>TOTAL OPTIONS \$850.00</p> <p>TOTAL VEHICLE & OPTIONS \$38,145.00</p> <p>DESTINATION CHARGE 995.00</p> <hr/> <p>TOTAL VEHICLE PRICE* \$39,140.00</p>
STANDARD VEHICLE PRICE	\$37,295.00										
AUTUMN METALLIC	625.00										
FLOOR MATS, ALL WEATHER FRONT AND REAR (DEALER INSTALLED)	150.00										
WHEEL LOCKS (DLR INSTALLED)	75.00										

EPA DOT Fuel Economy and Environment

Fuel Economy

24 MPG combined city/hwy
22 MPG city
29 MPG highway

You spend \$2,500 more in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost \$1,900

Fuel Economy & Greenhouse Gas Rating (tailpipe only): 5 (Best)

Smog Rating (tailpipe only): 6 (Best)

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 27 MPG and costs \$7,000 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$3.00 per gallon. MPG is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fuelconomy.gov

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 1-888-327-4226

Equipped with the safety and security of OnStar®

Visit onstar.com for details.

PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS CARLINE:
U.S./CANADIAN PARTS CONTENT: 49%
MAJOR SOURCES OF FOREIGN PARTS CONTENT: MEXICO 28%

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

FOR THIS VEHICLE:
FINAL ASSEMBLY POINT: KANSAS CITY, KS U.S.A.
COUNTRY OF ORIGIN: ENGINE: UNITED STATES
TRANSMISSION: UNITED STATES

©2018 General Motors LLC. English, VIN# 3G619081400000000

ORDER NO. 402086 SALES CODE E
 SALES MODEL CODE 42926
 FINAL ASSEMBLY POINT: KANSAS CITY, KS U.S.A.
 VIN 1GYTZB044K120993
 DEALER TO WHOM DELIVERED: BOUCHER CADILLAC
 2145 E MORELAND RD WALKESHA, WI 53186-4020

WO
1AG3390679

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-5
2	Driver Head Y Acceleration vs. Time Primary	B-5
3	Driver Head Z Acceleration vs. Time Primary	B-5
4	Driver Head Resultant Acceleration vs. Time Primary	B-5
5	Driver Chest X Deflection vs. Time	B-6
6	Driver Chest X Acceleration vs. Time Primary	B-7
7	Driver Chest Y Acceleration vs. Time Primary	B-7
8	Driver Chest Z Acceleration vs. Time Primary	B-7
9	Driver Chest Resultant Acceleration vs. Time Primary	B-7
10	Driver Upper Neck Force X vs. Time	B-8
11	Driver Upper Neck Force Z vs. Time	B-8
12	Driver Upper Neck Moment Y vs. Time	B-8
13	Driver Nij vs. Time	B-9
14	Driver Left Femur Force vs. Time	B-10
15	Driver Right Femur Force vs. Time	B-10
16	Passenger Head X Acceleration vs. Time Primary	B-11
17	Passenger Head Y Acceleration vs. Time Primary	B-11
18	Passenger Head Z Acceleration vs. Time Primary	B-11
19	Passenger Head Resultant Acceleration vs. Time Primary	B-11
20	Passenger Chest X Deflection vs. Time	B-12
21	Passenger Chest X Acceleration vs. Time Primary	B-13
22	Passenger Chest Y Acceleration vs. Time Primary	B-13
23	Passenger Chest Z Acceleration vs. Time Primary	B-13
24	Passenger Chest Resultant Acceleration vs. Time Primary	B-13
25	Passenger Upper Neck Force X vs. Time	B-14
26	Passenger Upper Neck Force Z vs. Time	B-14
27	Passenger Upper Neck Moment Y vs. Time	B-14
28	Passenger Nij vs. Time	B-15
29	Passenger Left Femur Force vs. Time	B-16
30	Passenger Right Femur Force vs. Time	B-16

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 Pelvis Resultant
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 Shoulder Belt Force
Driver Lap Belt Force

Driver Head Angular Velocity X
Driver Head Angular Velocity Y
Driver Head Angular Velocity Z
Passenger Head Acceleration X Redundant
Passenger Head Acceleration Y Redundant
Passenger Head Acceleration Z Redundant
Passenger Upper Neck Force Y
Passenger Upper Neck Moment X
Passenger Upper Neck Moment Z
Passenger Chest X Acceleration Redundant
Passenger Chest Y Acceleration Redundant
Passenger Chest Z Acceleration Redundant
Passenger Pelvis X
Passenger Pelvis Y
Passenger Pelvis Z
Passenger Pelvis Resultant
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 Shoulder Belt Force
Passenger Lap Belt Force

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

NHTSA

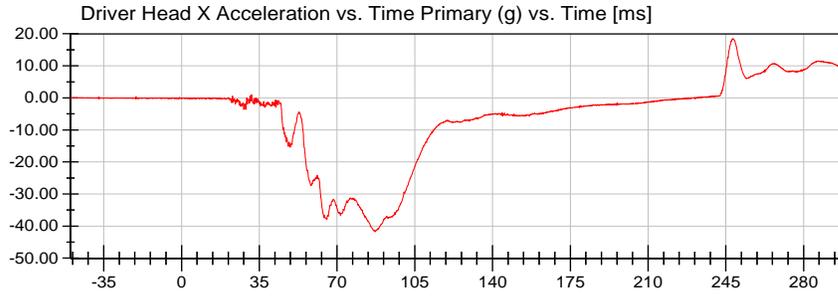
Test Lab: CTF

Test Number: 190219 (M20190100)

Test Date: 02/19/2019

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

Position #2 Hybrid III Small Adult Female (426)



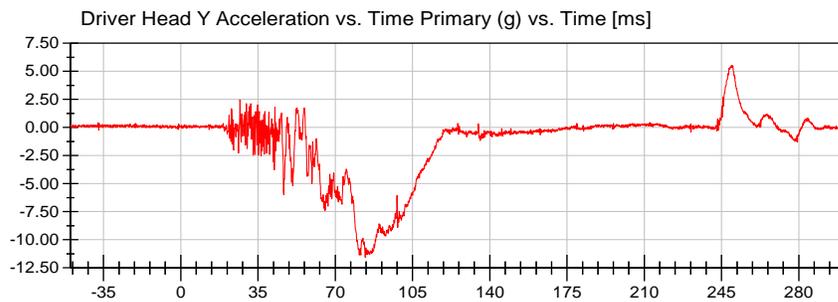
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18.49 g at 247.92 ms

<Min>

-41.72 g at 87.28 ms

CFC_1000



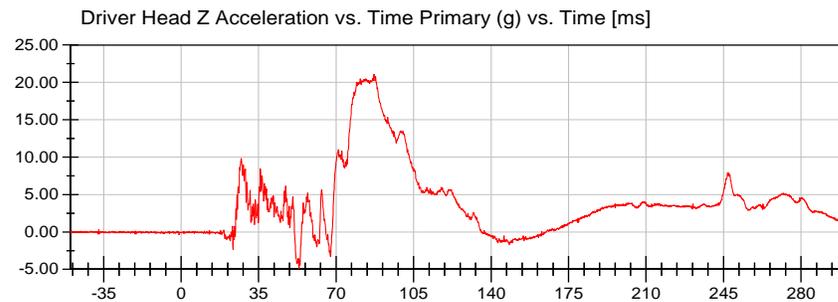
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-11.56 g at 83.60 ms

CFC_1000



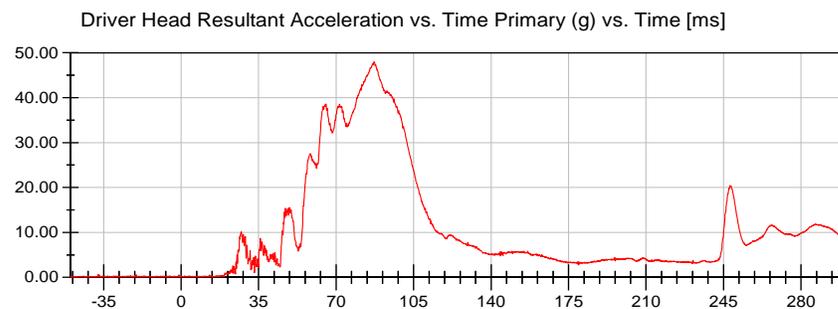
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21.11 g at 87.12 ms

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-4.87 g at 53.28 ms

CFC_1000



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47.96 g at 87.20 ms

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0.03 g at -41.44 ms

CFC_1000



NHTSA

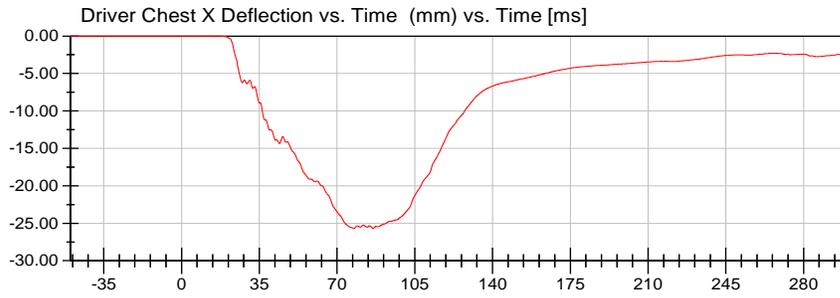
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Test Date: 02/19/2019

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

Position #2 Hybrid III Small Adult Female (426)



<Max>

0.00 mm at 12.48 ms

<Min>

-25.69 mm at 86.32 ms

CFC_600



NHTSA

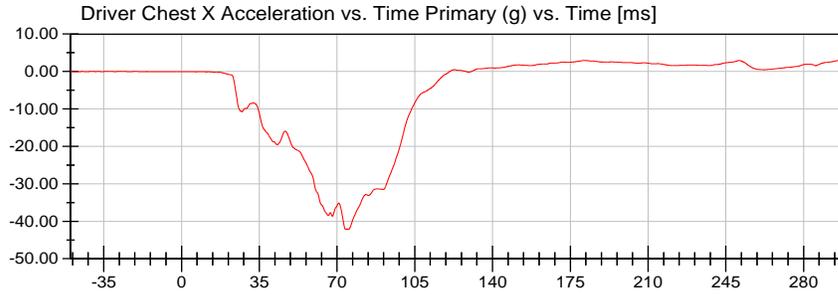
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Test Date: 02/19/2019

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

Position #2 Hybrid III Small Adult Female (426)



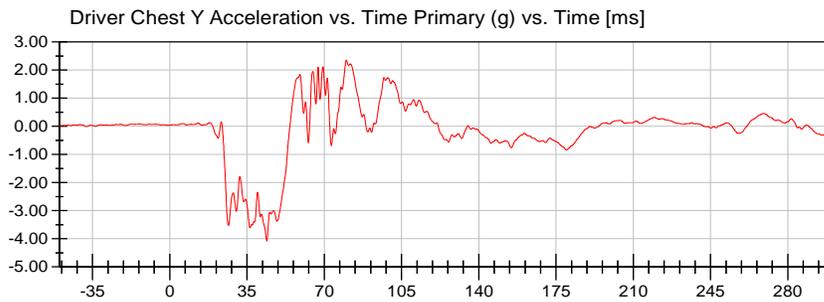
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3.10 g at 300.00 ms

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-42.19 g at 73.92 ms

CFC_180



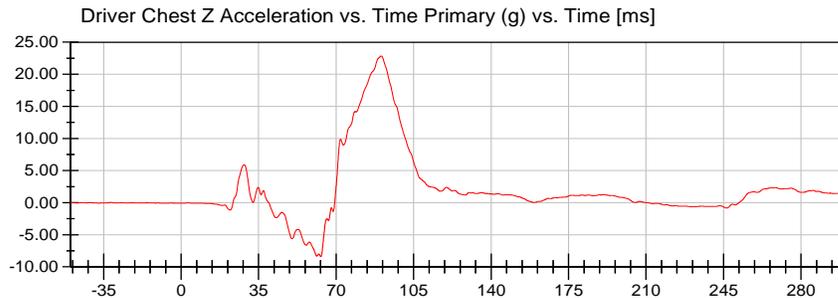
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2.36 g at 80.00 ms

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-4.08 g at 43.92 ms

CFC_180



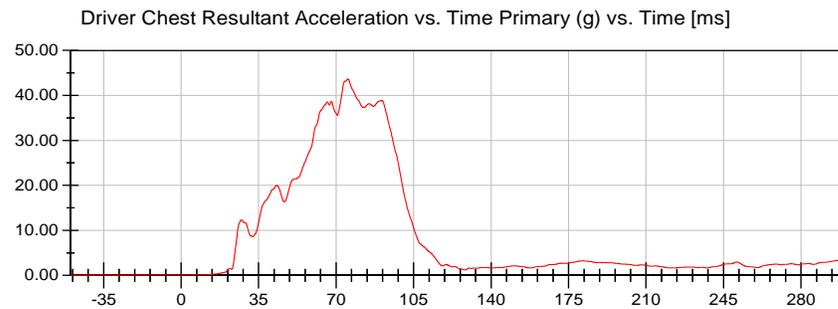
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22.84 g at 90.32 ms

<Min>

-8.42 g at 63.04 ms

CFC_180



<Max>

43.65 g at 75.36 ms

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0.03 g at -32.80 ms

CFC_180



NHTSA

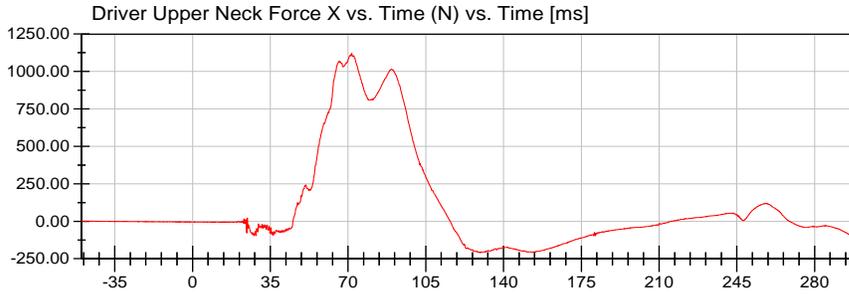
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Test Date: 02/19/2019

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

Position #2 Hybrid III Small Adult Female (426)



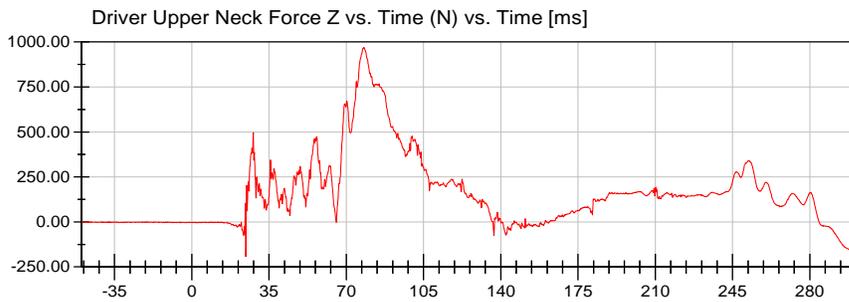
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1,121.10 N at 71.68 ms

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-209.84 N at 129.60 ms

CFC_1000



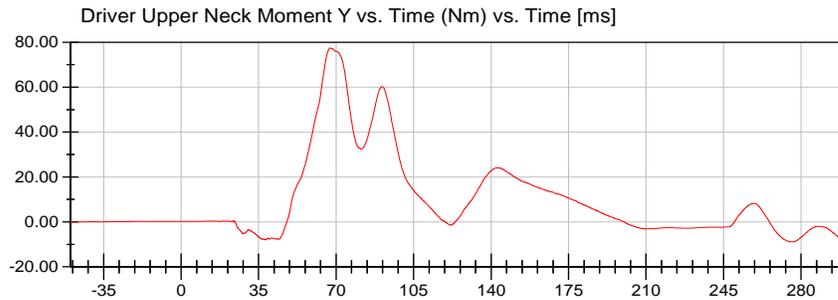
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970.37 N at 77.92 ms

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-192.95 N at 24.48 ms

CFC_1000



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77.44 Nm at 67.28 ms

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-8.94 Nm at 300.00 ms

CFC_600



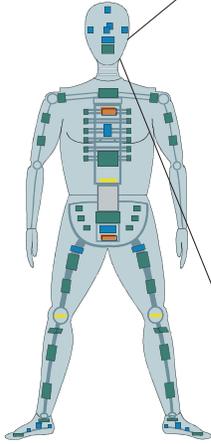


2019 Cadillac XT4 SUV NCAP 35 mph Frontal Impact Neck Injury Predictor (NIJ)

Date: 02/19/2019
Time: 13:32

Customer: NHTSA
Test Number: M20190100

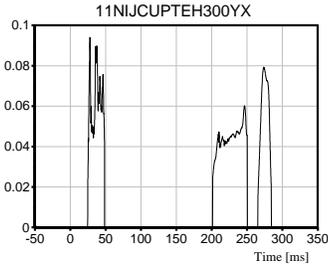
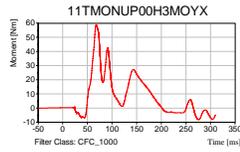
Test Orientation = Frontal
Fzc(Tension) = 6806
Fzc(Compression) = 6160
Myc(Extension) = 135
Myc(Flexion) = 310



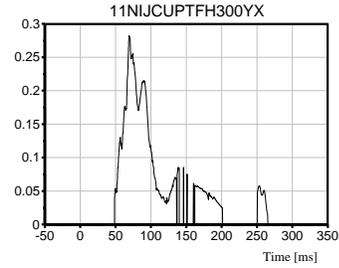
Dummy: HIII 50th Male
Seating Position:
Driver

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

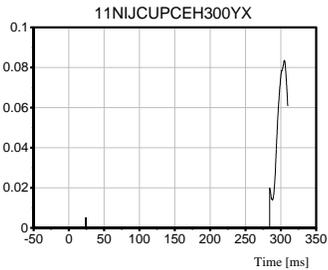
TRC Inc. Test Lab: CTF
Test Number: 190219



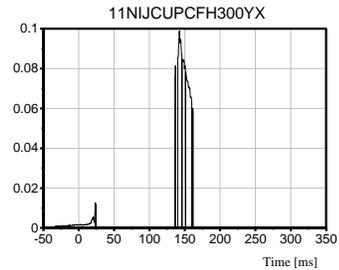
Max [NTE] 0.0940 at 27.84 ms



Max [NTF] 0.2821 at 69.20 ms



Max [NCE] 0.0836 at 305.20 ms



Max [NCF] 0.0990 at 142.40 ms

NHTSA

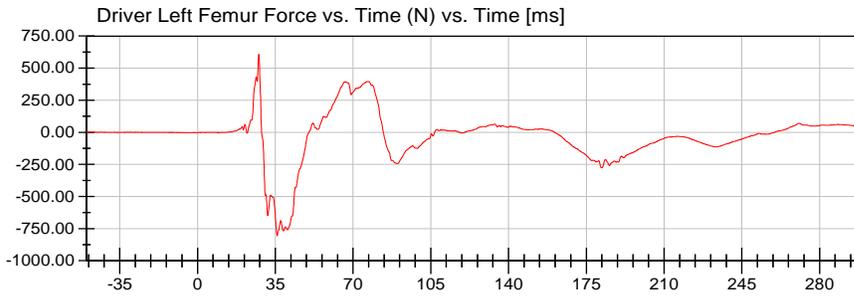
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Test Number: 190219 (M20190100)

Test Date: 02/19/2019

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

Position #2 Hybrid III Small Adult Female (426)



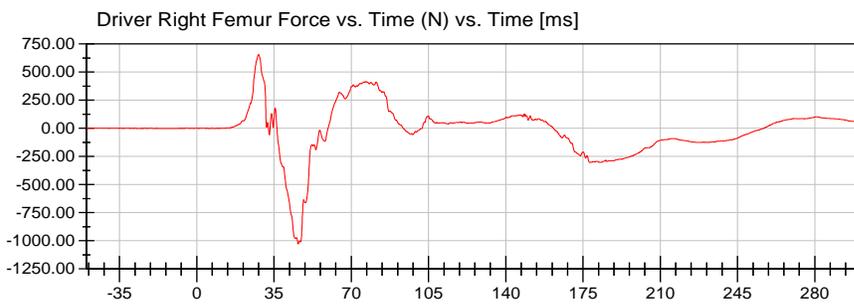
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606.30 N at 27.60 ms

<Min>

-806.30 N at 35.92 ms

CFC_600



<Max>

656.82 N at 28.00 ms

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-1,028.02 N at 45.92 ms

CFC_600



NHTSA

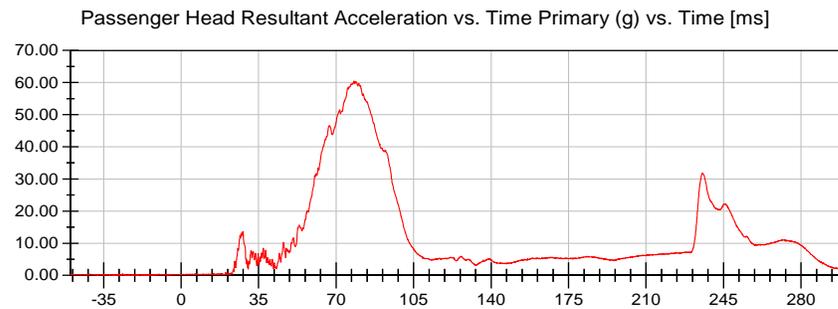
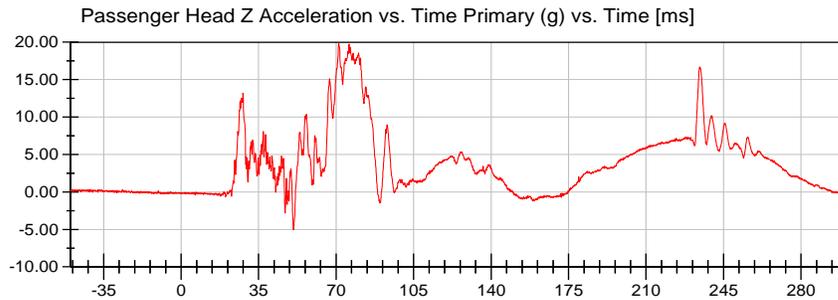
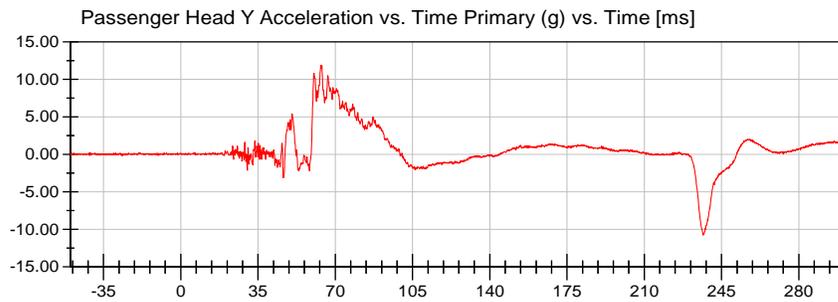
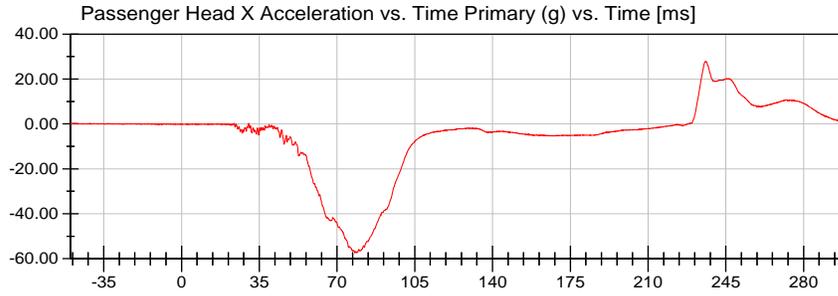
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Test Number: 190219 (M20190100)

Test Date: 02/19/2019

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

Position #2 Hybrid III Small Adult Female (426)



NHTSA

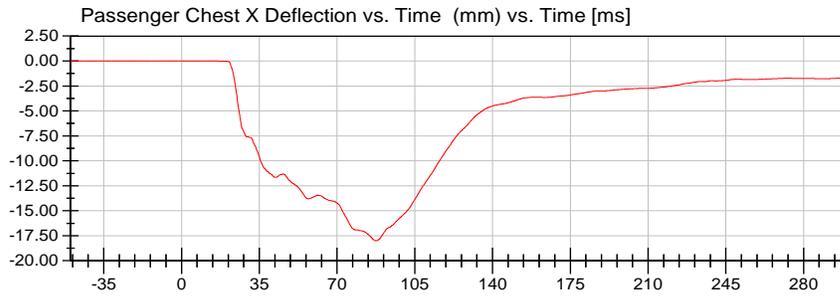
Test Lab: CTF

Test Number: 190219 (M20190100)

Test Date: 02/19/2019

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

Position #2 Hybrid III Small Adult Female (426)



<Max>

0.01 mm at -35.20 ms

<Min>

-18.00 mm at 87.44 ms

CFC_600



NHTSA

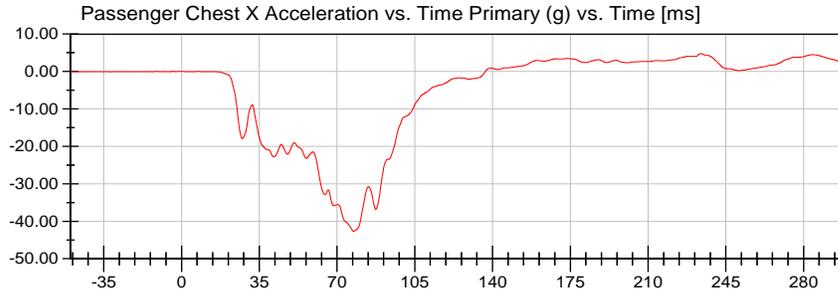
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Test Date: 02/19/2019

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

Position #2 Hybrid III Small Adult Female (426)



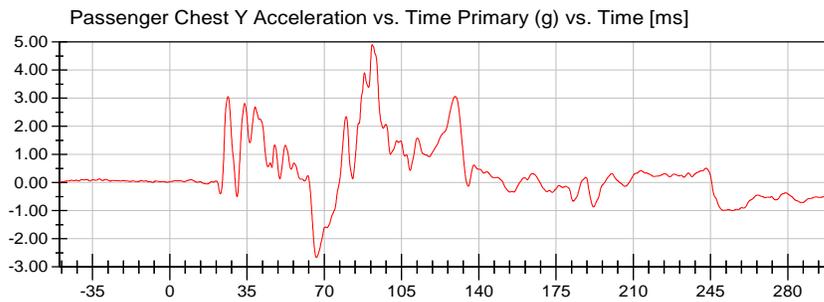
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4.79 g at 233.76 ms

<Min>

-42.69 g at 77.44 ms

CFC_180



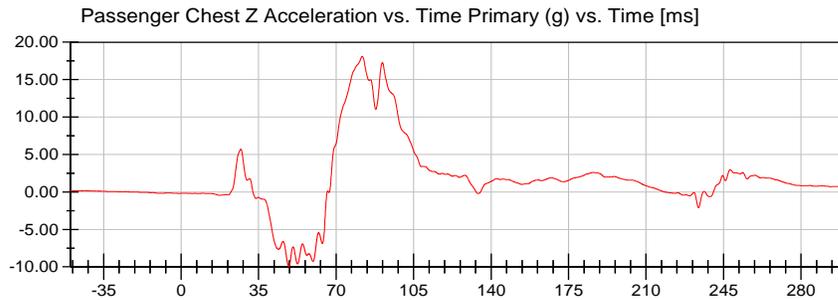
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4.91 g at 91.68 ms

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-2.66 g at 66.48 ms

CFC_180



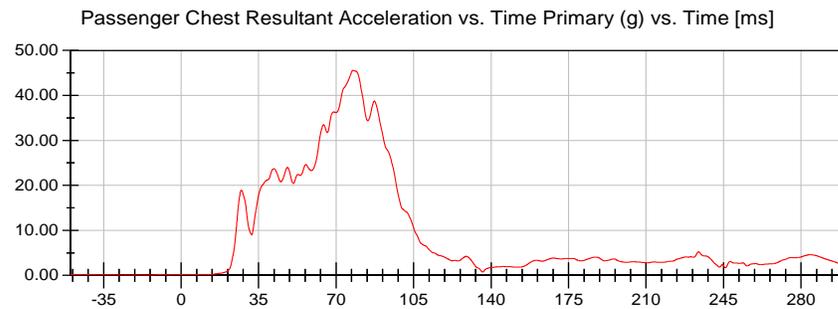
<Max>

18.08 g at 81.84 ms

<Min>

-9.96 g at 48.64 ms

CFC_180



<Max>

45.57 g at 77.68 ms

<Min>

0.06 g at -15.44 ms

CFC_180



NHTSA

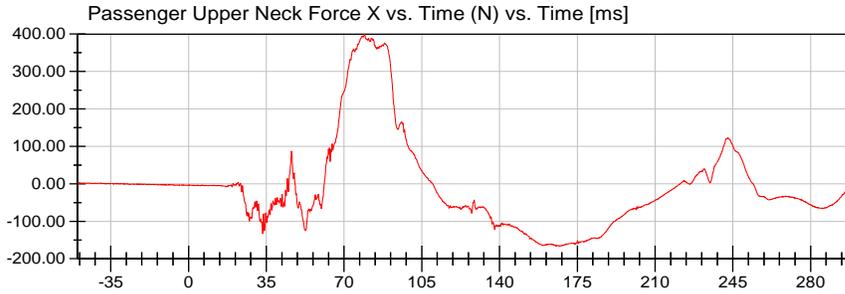
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Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Position #2 Hybrid III Small Adult Female (426)



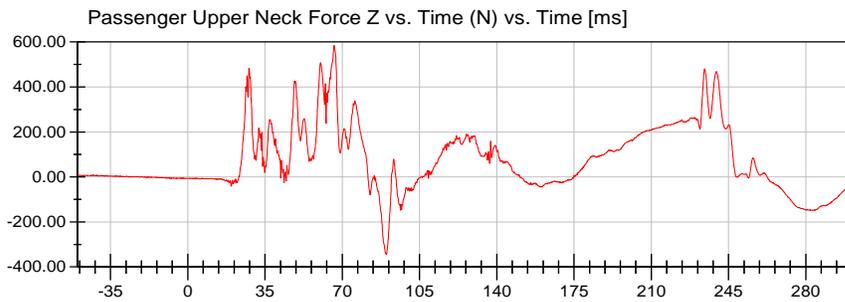
<Max>

399.77 N at 79.20 ms

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-166.59 N at 167.28 ms

CFC_1000



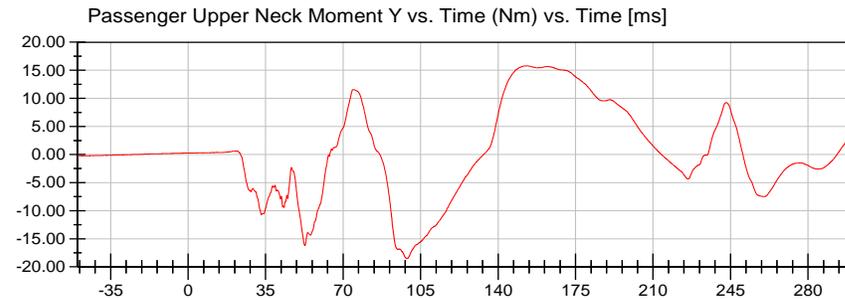
<Max>

584.58 N at 66.32 ms

<Min>

-344.42 N at 90.00 ms

CFC_1000



<Max>

15.80 Nm at 153.12 ms

<Min>

-18.50 Nm at 98.80 ms

CFC_600



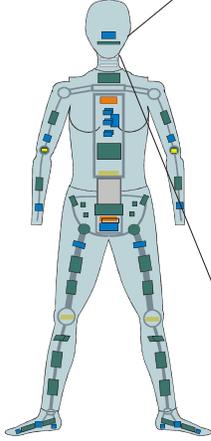


2019 Cadillac XT4 SUV NCAP 35 mph Frontal Impact Neck Injury Predictor (NIJ)

Date: 02/19/2019
Time: 13:32

Customer: NHTSA
Test Number: M20190100

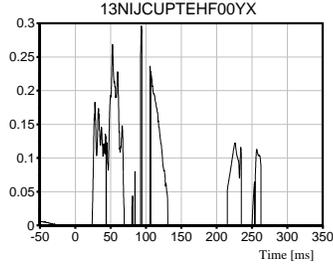
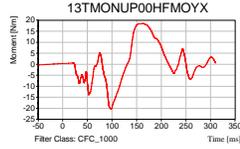
Test Orientation = Frontal
Fzc(Tension) = 4287
Fzc(Compression) = 3880
Myc(Extension) = 67
Myc(Flexion) = 155



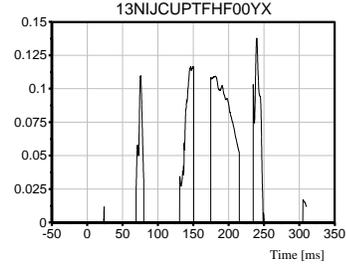
Dummy: HIII 5th Female
Seating Position:
Right Front Passenger

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

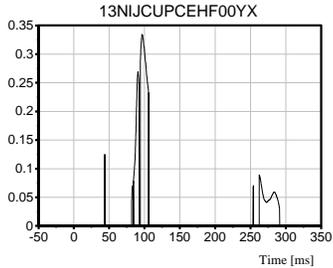
TRC Inc. Test Lab: CTF
Test Number: 190219



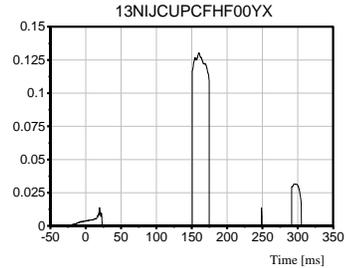
Max [NTE] 0.2960 at 93.52 ms



Max [NTF] 0.1379 at 239.76 ms



Max [NCE] 0.3348 at 96.40 ms



Max [NCF] 0.1304 at 160.16 ms

NHTSA

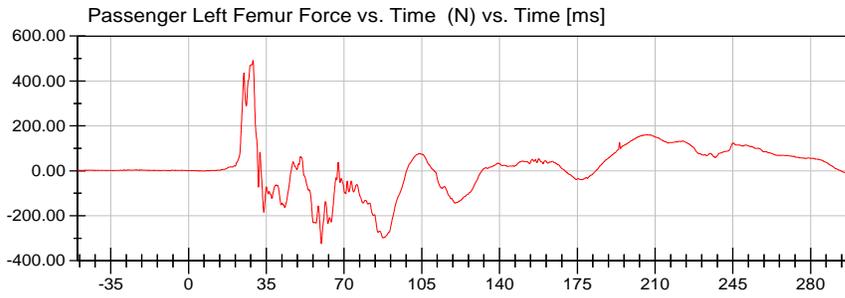
Test Lab: CTF

Test Number: 190219 (M20190100)

Test Date: 02/19/2019

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

Position #2 Hybrid III Small Adult Female (426)



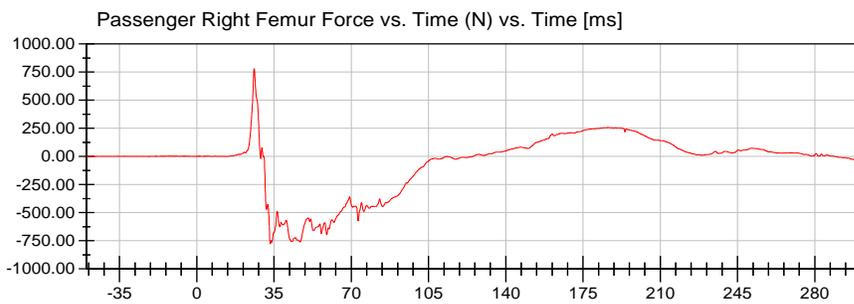
<Max>

491.26 N at 29.04 ms

<Min>

-323.85 N at 59.76 ms

CFC_600



<Max>

779.99 N at 26.00 ms

<Min>

-776.47 N at 33.28 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. 54

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	511	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	91	Yes
F	Thigh Clearance	139.7 - 154.9	145	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	199	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	226	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

Transportation Research Center Inc.

Front Head Drop
HIII 50th Serial No. 037 Certification No. 54-1
Test Date: 1/8/2019

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	22.0 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Peak Head Resultant Acceleration	225 - 275 g	232.8 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	-9.6 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

Test meets specifications.

Condition: Used

Comments:

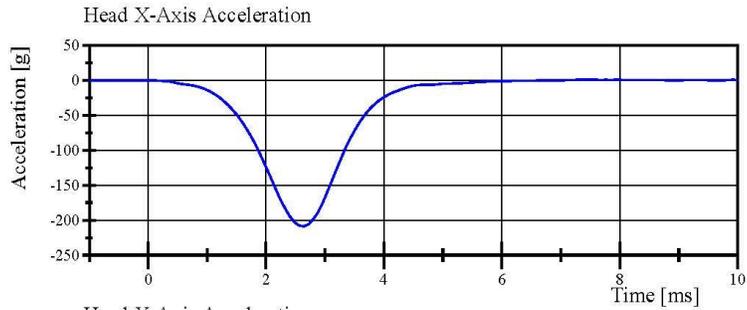
Head Skin S/N: N/A

Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 037 Certification No. 54-1

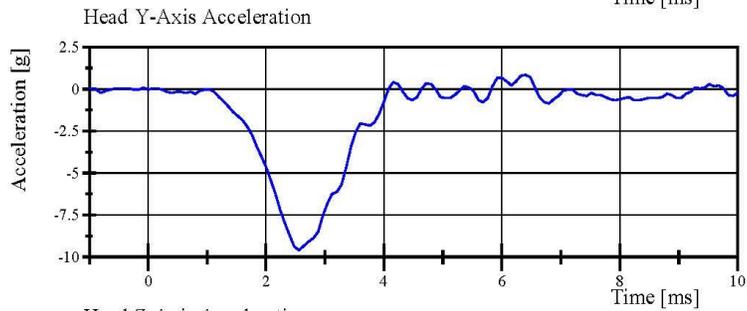
Test Date: 1/8/2019



Filter Class: CFC_1000

Max: 1.0 g at 7.4 ms

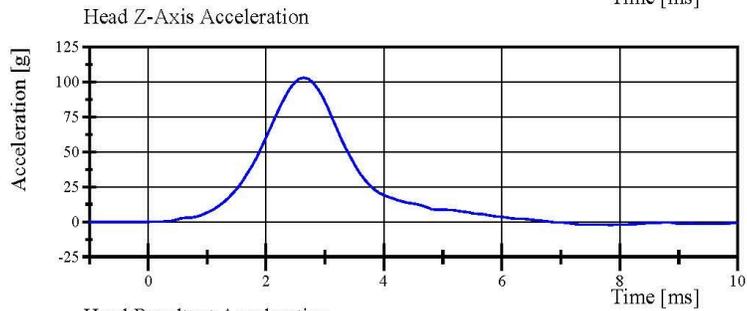
Min: -208.5 g at 2.6 ms



Filter Class: CFC_1000

Max: 0.9 g at 6.4 ms

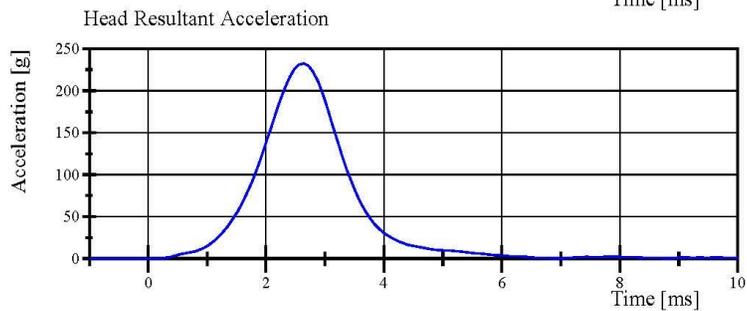
Min: -9.6 g at 2.6 ms



Filter Class: CFC_1000

Max: 103.0 g at 2.6 ms

Min: -2.1 g at 7.8 ms



Filter Class: CFC_1000

Max: 232.8 g at 2.6 ms

Min: 0.1 g at -0.9 ms

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

01.08.2019 07:32:608



Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 037 Certification No. 54-2

Test Date: 1/8/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	6.934 m/s	Yes
Pendulum Acceleration Decay Crossing -5g	34 - 42 ms	39.7 ms	Yes
Pendulum Acceleration at 10ms	(-22.5) - (-27.5) g	-25.46 g	Yes
Pendulum Acceleration at 20ms	(-17.6) - (-22.6) g	-20.46 g	Yes
Pendulum Acceleration at 30ms	(-12.5) - (-18.5) g	-14.50 g	Yes
Pendulum Acceleration > 30ms	>= (-29.0) g	-14.50 g	Yes
Total Head D-Plane Rotation			
Peak	(-64) - (-78) °	-65.9 °	Yes
Time of Peak	57 - 64 ms	59.3 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	99.37 N·m	Yes
Time of Peak	47 - 58 ms	52.7 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	97 - 107 ms	102.2 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Neck S/N: 4728

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

01.08.2019 10:44 1865



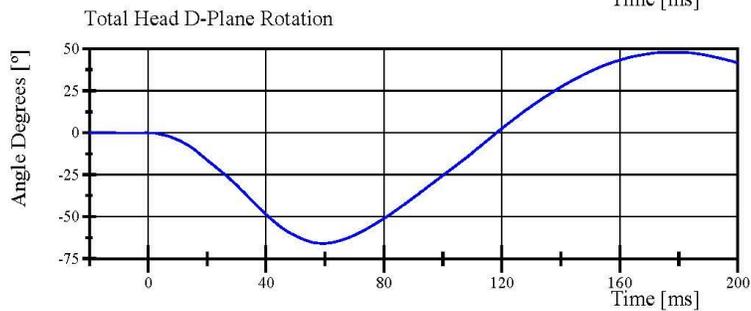
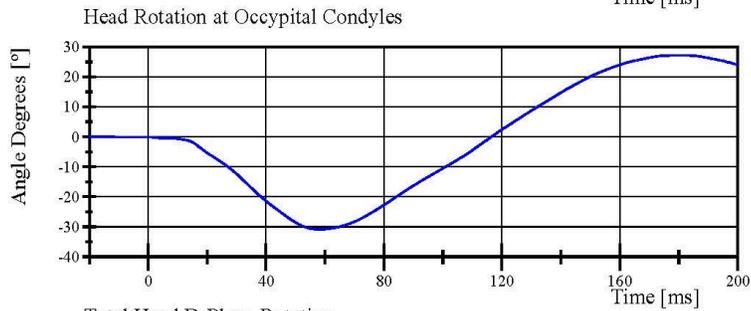
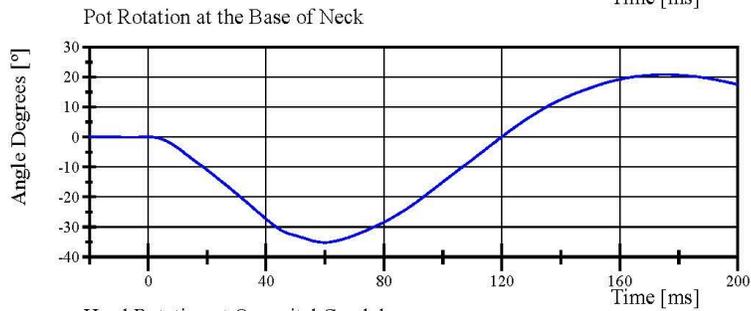
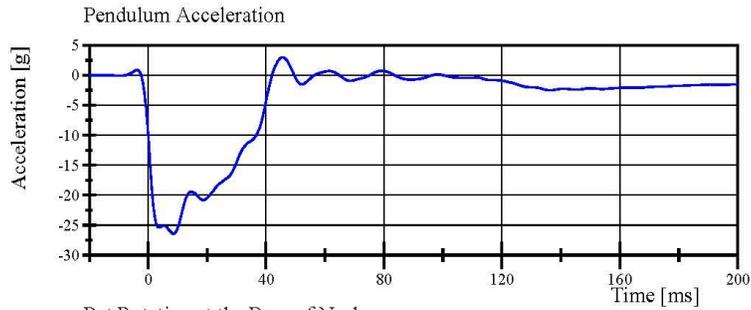
Page 11 of 27

Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 037 Certification No. 54-2

Test Date: 1/8/2019



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

01.08.2019 10:44 1865

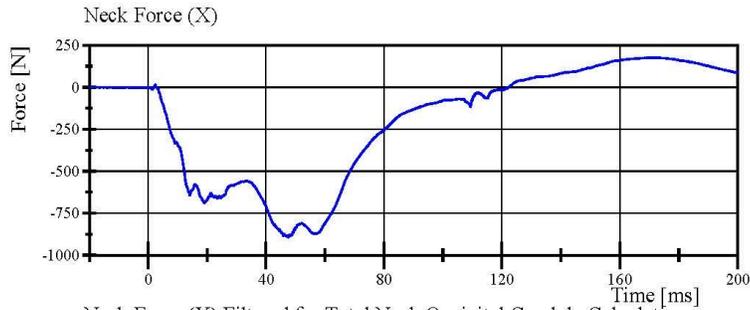


Transportation Research Center Inc.

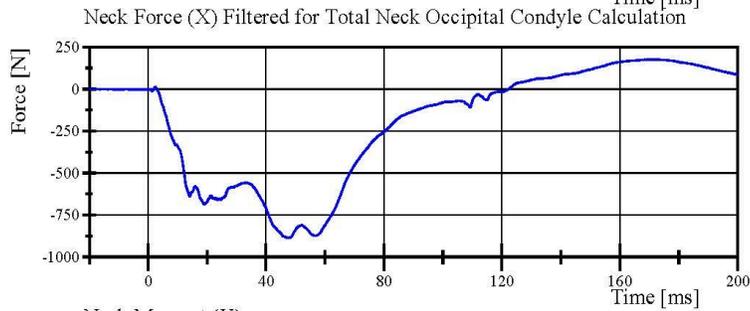
Neck Flexion

HIII 50th Serial No. 037 Certification No. 54-2

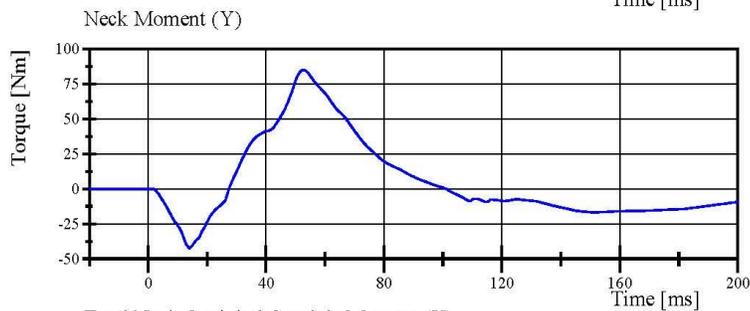
Test Date: 1/8/2019



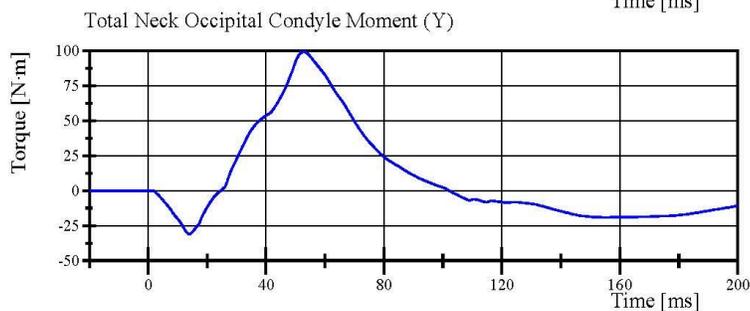
Filter Class: CFC_1000
Max: 176.6 N at 169.4 ms
Min: -891.8 N at 47.7 ms



Filter Class: CFC_600
Max: 176.0 N at 171.9 ms
Min: -887.2 N at 47.7 ms



Filter Class: CFC_600
Max: 85.0 Nm at 52.6 ms
Min: -42.3 Nm at 14.1 ms



Filter Class: Without_(Consta
Max: 99.4 N·m at 52.7 ms
Min: -31.0 N·m at 14.0 ms

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

01.08.2019 10:44 1865



Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 037 Certification No. 54-3

Test Date: 1/8/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Pendulum Velocity	(-5.95) - (-6.19) m/s	-6.003 m/s	Yes
Pendulum Acceleration Decay Crossing 5g	38 - 46 ms	39.3 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	20.20 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	17.66 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	13.96 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	14.15 g	Yes
Total Head D-Plane Rotation Peak	81 - 106 °	93.1 °	Yes
Time of Peak	72 - 82 ms	76.8 ms	Yes
Total Head D-Plane Rotation Decay to 0°	147 - 174 ms	158.7 ms	Yes
Total Neck Occipital Condyles Moment Peak	(-52.9) - (-80) N·m	-71.62 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	147.5 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Neck S/N: 4728

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

01.08.2019 13:55 2010



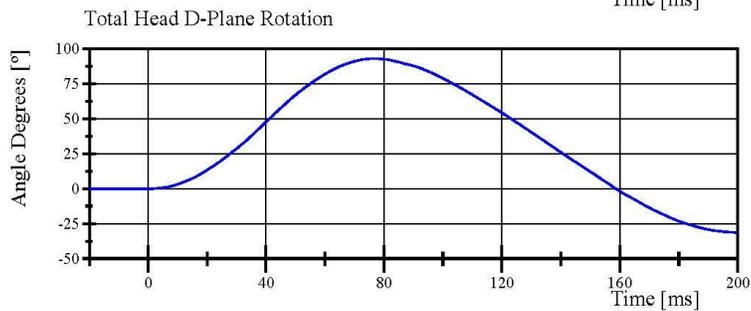
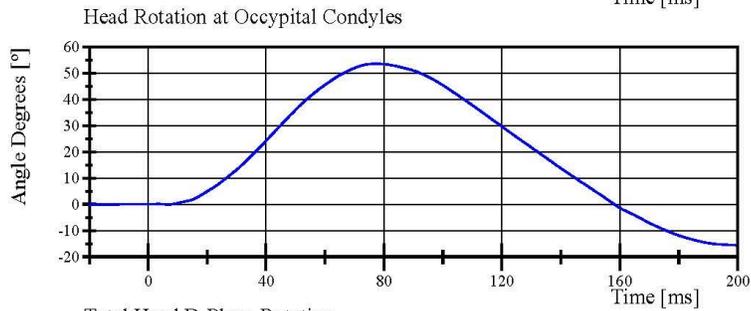
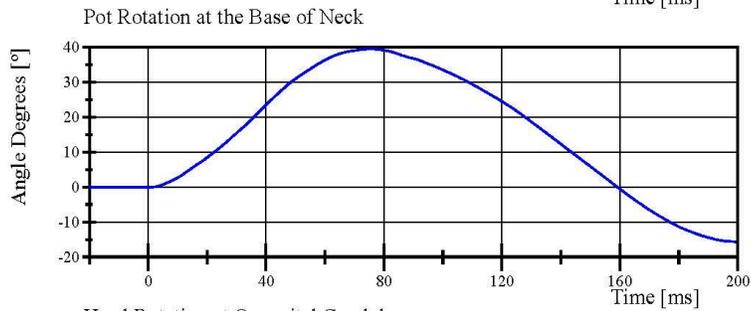
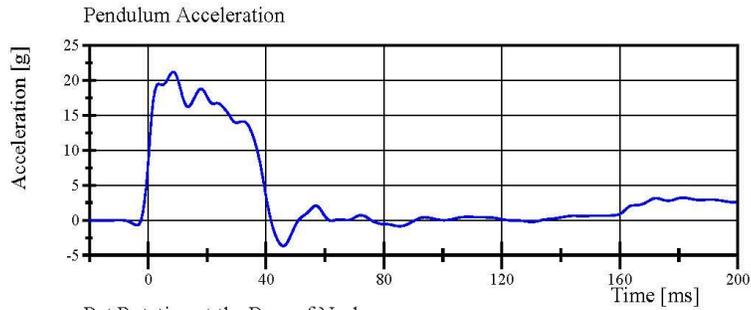
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Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 037 Certification No. 54-3

Test Date: 1/8/2019



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

01.08.2019 13:55 2010

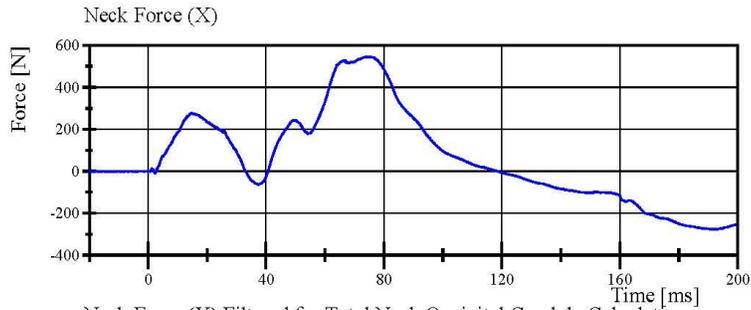


Transportation Research Center Inc.

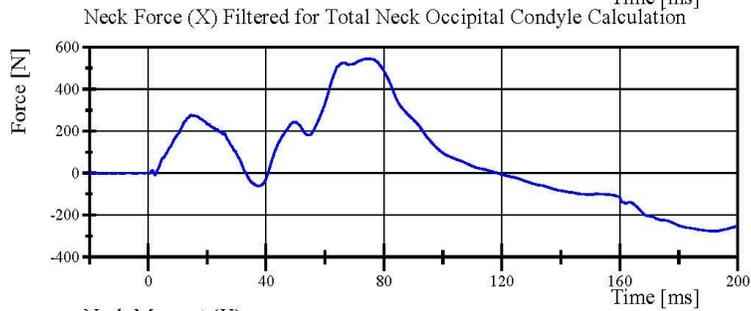
Neck Extension

HIII 50th Serial No. 037 Certification No. 54-3

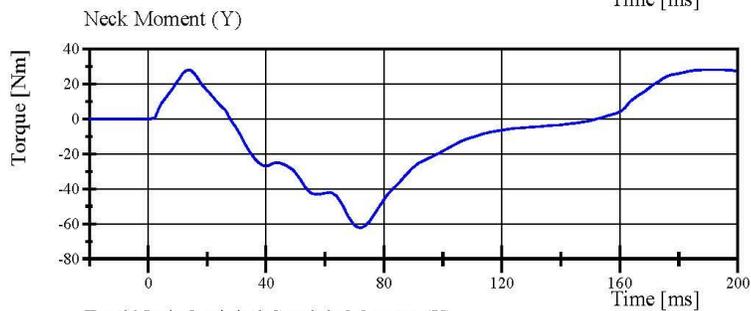
Test Date: 1/8/2019



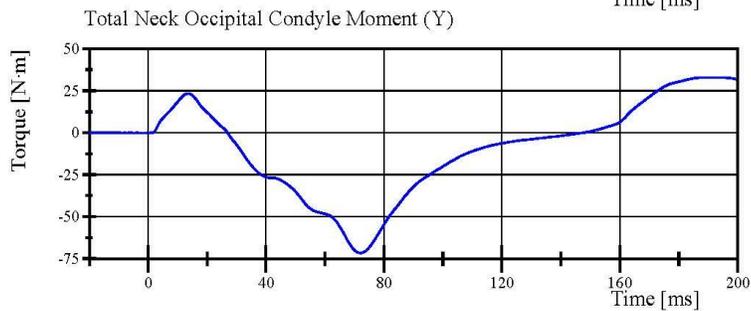
Filter Class: CFC_1000
Max: 545.7 N at 73.9 ms
Min: -275.9 N at 191.5 ms



Filter Class: CFC_600
Max: 545.4 N at 74.5 ms
Min: -275.5 N at 191.6 ms



Filter Class: CFC_600
Max: 28.1 Nm at 189.7 ms
Min: -62.1 Nm at 72.0 ms



Filter Class: Without_(Consta
Max: 33.0 N·m at 190.5 ms
Min: -71.6 N·m at 72.1 ms

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

01.08.2019 13:55 2010



Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 037 Certification No. 54-1

Test Date: 1/8/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	47 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.657 m/s	Yes
Probe Force Peak	(-5,160) - (-5,894) N	-5,372.3 N	Yes
Maximum Chest Compression	(-63.5) - (-72.6) mm	-72.42 mm	Yes
Internal Hysteresis	69 - 85 %	71.1 %	Yes

Test meets specifications.

Condition: Used

Comments:

Jacket S/N: 2565

Rib #1 Assembly S/N: 178051-35 HI6550

Rib #2 Assembly S/N: 36 16526

Rib #3 Assembly S/N: 37 16543

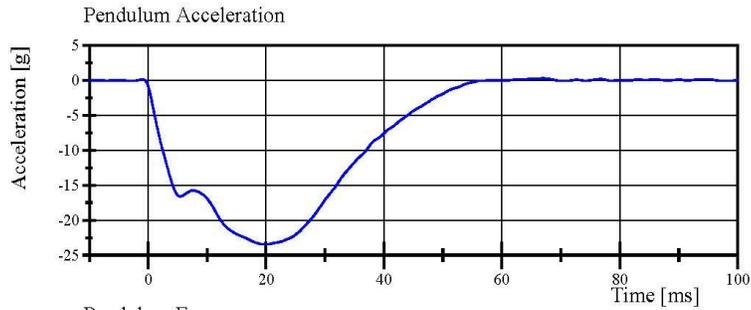
Rib #4 Assembly S/N: 38 16538

Rib #5 Assembly S/N: 39 HI6530

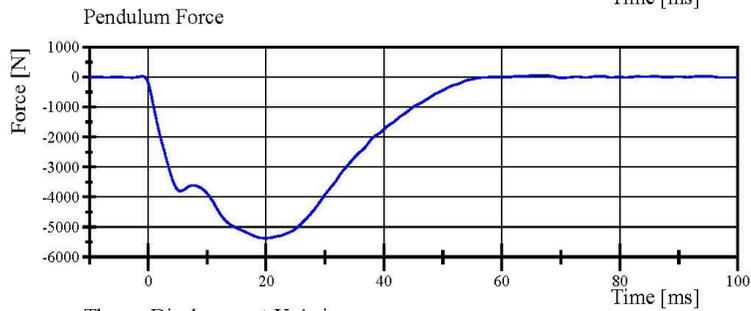
Rib #6 Assembly S/N: 40 16548

Transportation Research Center Inc.

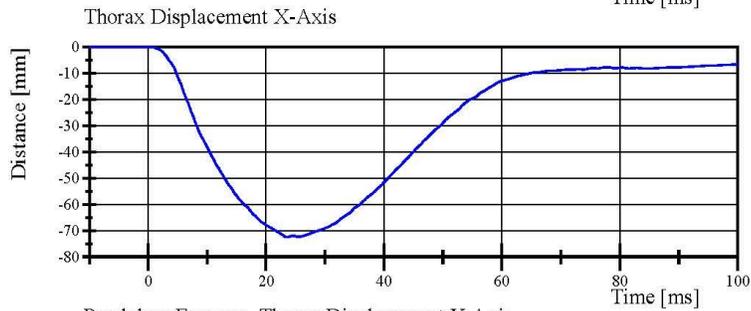
Front Thorax
HIII 50th Serial No. 037 Certification No. 54-1
Test Date: 1/8/2019



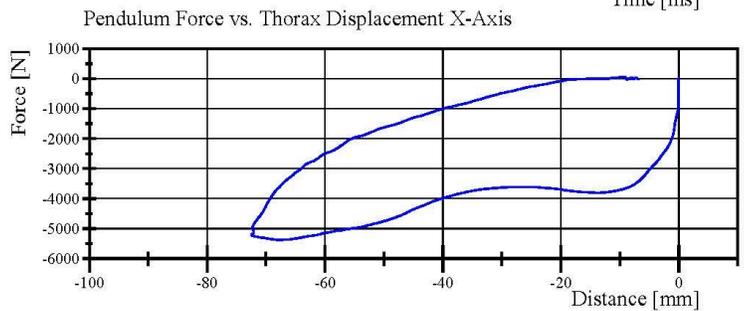
Filter Class: CFC_180
Max: 0.3 g at 67.0 ms
Min: -23.4 g at 19.8 ms



Filter Class: CFC_180
Max: 66.0 N at 67.0 ms
Min: -5,372.3 N at 19.8 ms



Filter Class: CFC_600
Max: 0.0 mm at -9.7 ms
Min: -72.4 mm at 23.5 ms



Filter Class: CFC_180
Max: 66.0 N at -9.4 mm
Min: -5,372.3 N at -67.7 mm

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

01.08.2019 07:39 434

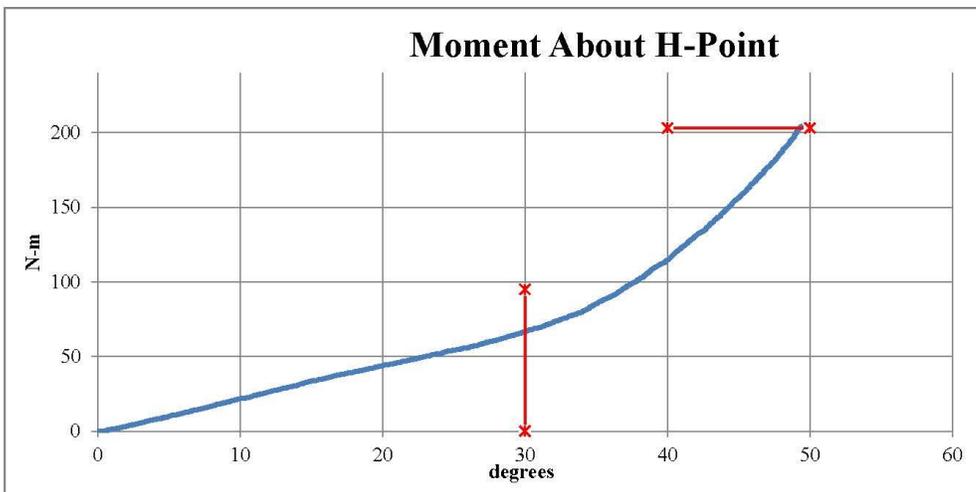


Transportation Research Center Inc.
Hybrid III 50th Male Hip Range of Motion

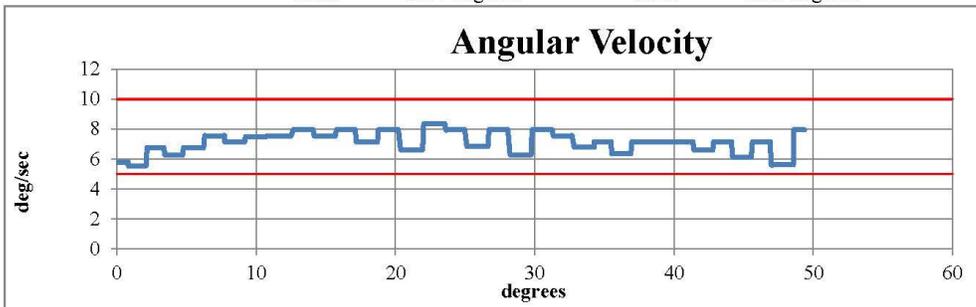


Serial Number: 037 Date: 08-Jan-2019
Side Tested: Left Hip Time: 13:25
Test Number: 1 Comments:

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 - 25.6	21.9 °C Pass
Humidity	10 - 70	40 % Pass
Moment at 30°	0 ≤ 94.9	66.93 N-m Pass
Angle at 203 Nm	40 - 50	49.37 deg Pass
Average Velocity	5 - 10	7.1 deg/sec Pass



Max: 8.34 deg/sec Min: 5.56 deg/sec



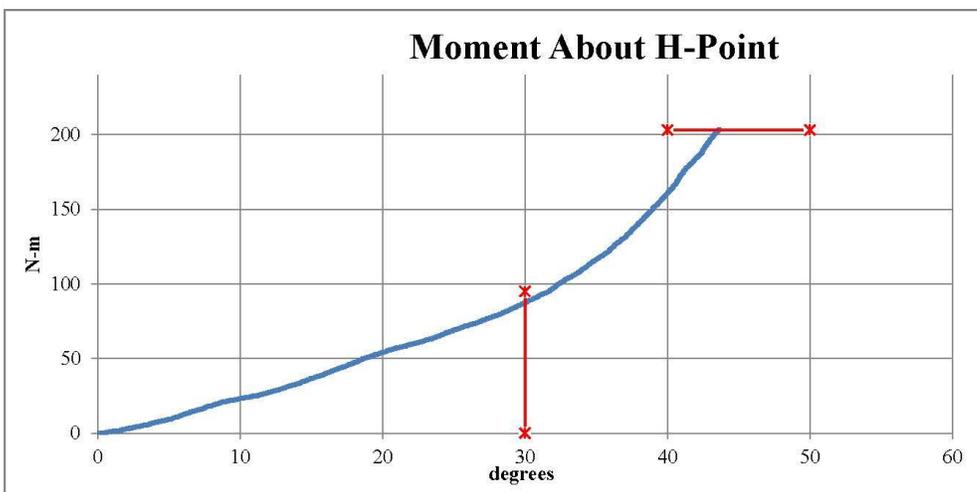
Comments:
Pelvis Skin S/N: N/A
Lumbar Spine S/N: 0551
Lumbar Cable S/N: N/A

Transportation Research Center Inc.
Hybrid III 50th Male Hip Range of Motion

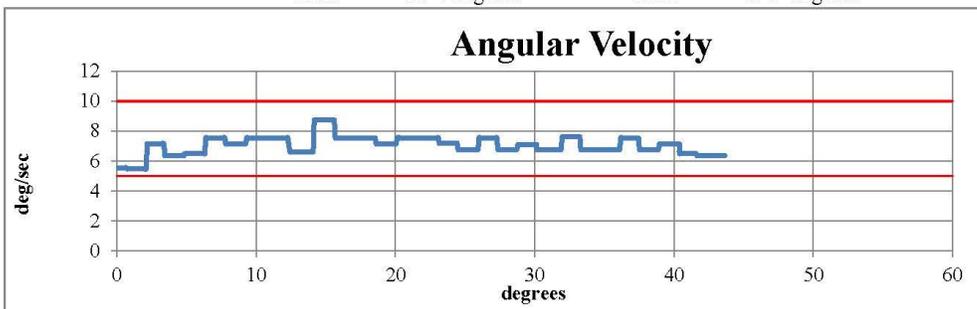


Serial Number: 037 Date: 08-Jan-2019
Side Tested: Right Hip Time: 14:31
Test Number: 1 Comments:

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 - 25.6	21.4 °C Pass
Humidity	10 - 70	42 % Pass
Moment at 30°	0 ≤ 94.9	87.66 N-m Pass
Angle at 203 Nm	40 - 50	43.65 deg Pass
Average Velocity	5 - 10	7.04 deg/sec Pass



Max: 8.74 deg/sec Min: 5.47 deg/sec



Comments:
Pelvis Skin S/N: N/A
Lumbar Spine S/N: 0551
Lumbar Cable S/N: N/A

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 54-1
Test Date: 1/8/2019

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	47 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.121 m/s	Yes
Peak Femur Force	(-4,715) - (-5,782) N	-5,600.7 N	Yes

Test meets specifications.

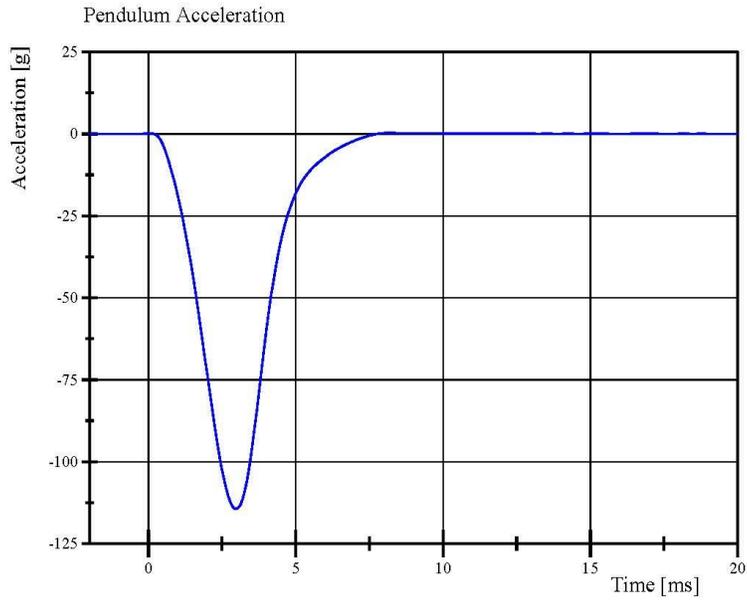
Condition: Used

Comments:

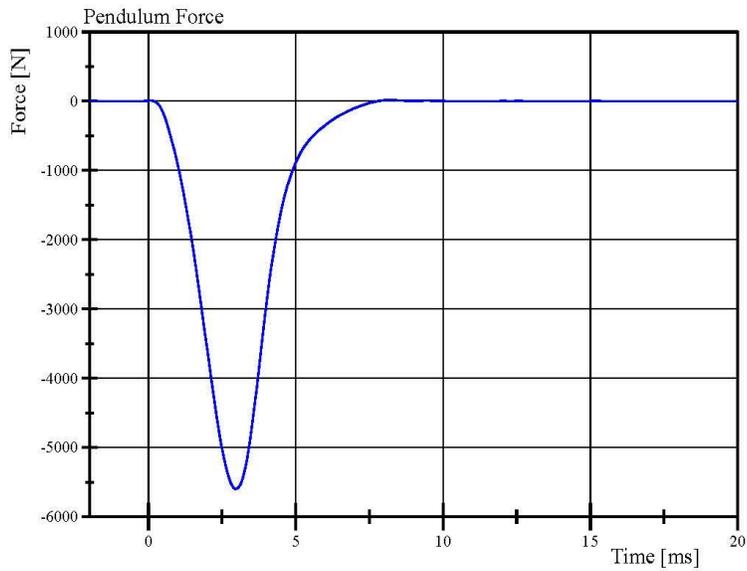
Knee Skin S/N: 2672

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 54-1
Test Date: 1/8/2019



Filter Class: CFC_600
Max: 0.3 g at 8.2 ms
Min: -114.5 g at 3.0 ms



Filter Class: CFC_600
Max: 16.8 N at 8.2 ms
Min: -5,600.7 N at 3.0 ms

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

01.08.2019 07:55 1743



Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 54-1
Test Date: 1/8/2019

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.122 m/s	Yes
Peak Femur Force	(-4,715) - (-5,782) N	-5,446.8 N	Yes

Test meets specifications.

Condition: Used

Comments:

Knee Skin S/N: 3131

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

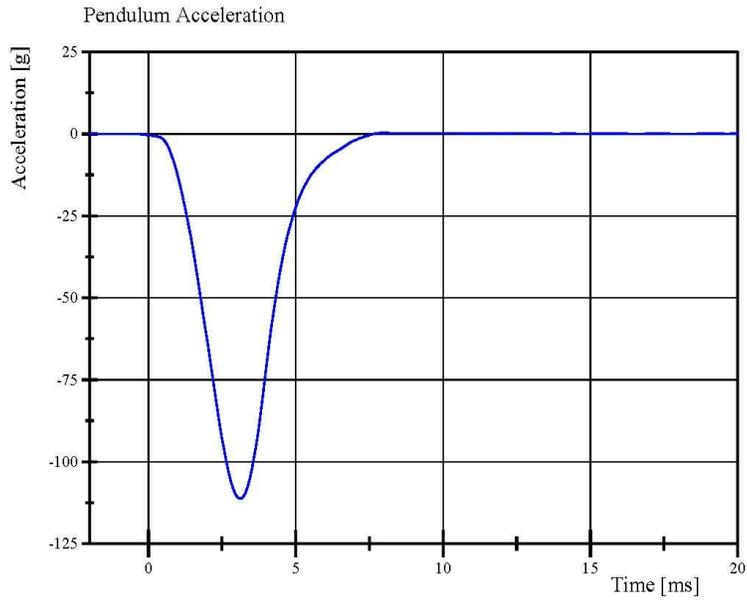
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01.08.2019 08:00 1738

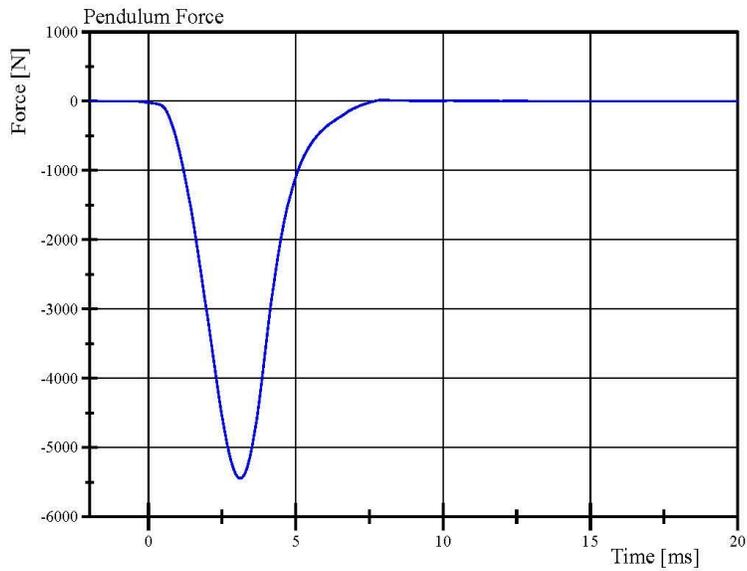


Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 54-1
Test Date: 1/8/2019



Filter Class: CFC_600
Max: 0.3 g at 8.0 ms
Min: -111.3 g at 3.1 ms



Filter Class: CFC_600
Max: 16.5 N at 8.0 ms
Min: -5,446.8 N at 3.1 ms

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

01.08.2019 08:00 1738



Post-Test Calibration Sheets

Driver S/N 037

Transportation Research Center Inc.
572E HIII 50th Male Dummy
External Dimensions
Serial No. 037
Calibration No. 55

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	511	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	91	Yes
F	Thigh Clearance	139.7 - 154.9	145	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	199	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	222	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

Transportation Research Center Inc.

Front Head Drop
HIII 50th Serial No. 037 Certification No. 55-1
Test Date: 2/20/2019

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	46 %	Yes
Peak Head Resultant Acceleration	225 - 275 g	261.1 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	5.9 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

Test meets specifications.

Condition: Used

Comments:

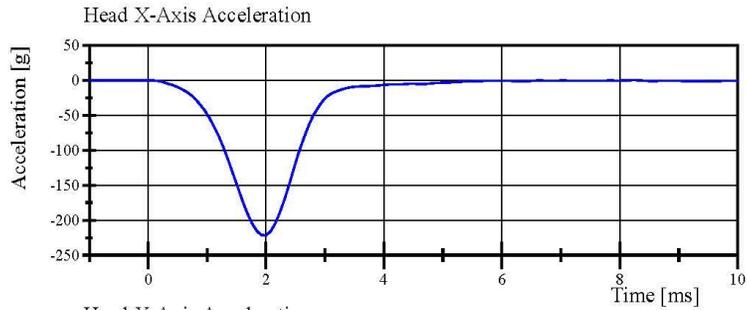
Head Skin S/N: N/A

Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 037 Certification No. 55-1

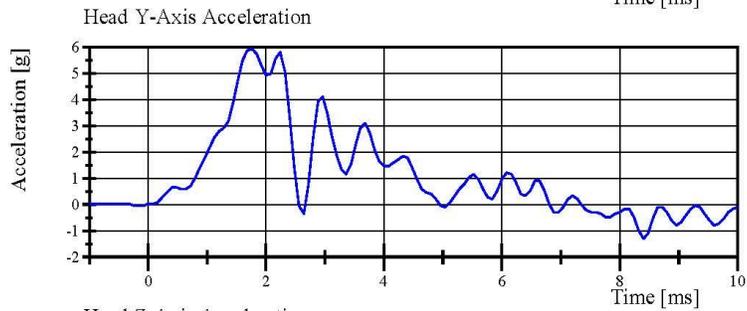
Test Date: 2/20/2019



Filter Class: CFC_1000

Max: 0.3 g at 8.2 ms

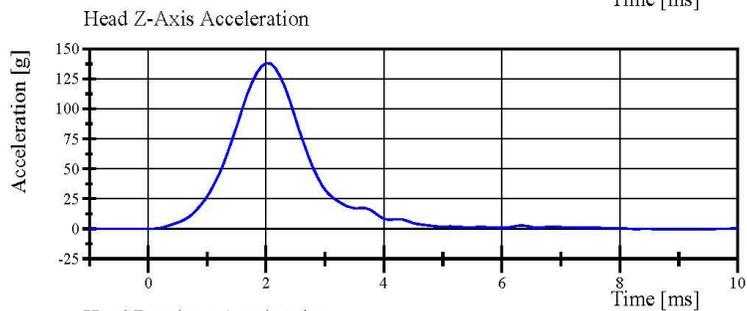
Min: -221.4 g at 2.0 ms



Filter Class: CFC_1000

Max: 5.9 g at 1.8 ms

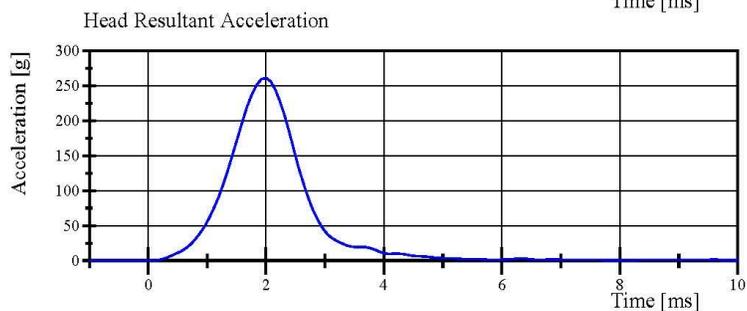
Min: -1.3 g at 8.4 ms



Filter Class: CFC_1000

Max: 138.2 g at 2.0 ms

Min: -0.7 g at 8.8 ms



Filter Class: CFC_1000

Max: 261.1 g at 2.0 ms

Min: 0.0 g at -1.0 ms

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

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Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 037 Certification No. 55-1

Test Date: 2/20/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	6.917 m/s	Yes
Pendulum Acceleration Decay Crossing -5g	34 - 42 ms	36.8 ms	Yes
Pendulum Acceleration at 10ms	(-22.5) - (-27.5) g	-26.26 g	Yes
Pendulum Acceleration at 20ms	(-17.6) - (-22.6) g	-20.18 g	Yes
Pendulum Acceleration at 30ms	(-12.5) - (-18.5) g	-16.27 g	Yes
Pendulum Acceleration > 30ms	>= (-29.0) g	-16.27 g	Yes
Total Head D-Plane Rotation			
Peak	(-64) - (-78) °	-72.1 °	Yes
Time of Peak	57 - 64 ms	57.6 ms	Yes
Total Head D-Plane Rotation Decay to 0°	113 - 128 ms	115.8 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	88.1 - 108.4 N·m	99.81 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	99.4 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Neck S/N: 4728

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

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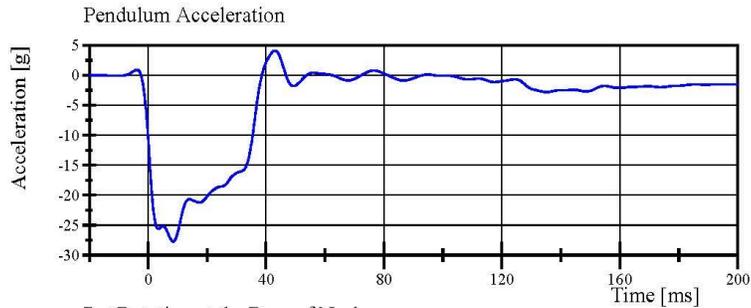
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Transportation Research Center Inc.

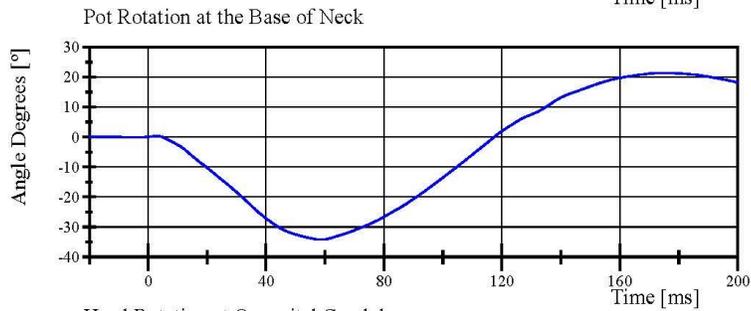
Neck Flexion

HIII 50th Serial No. 037 Certification No. 55-1

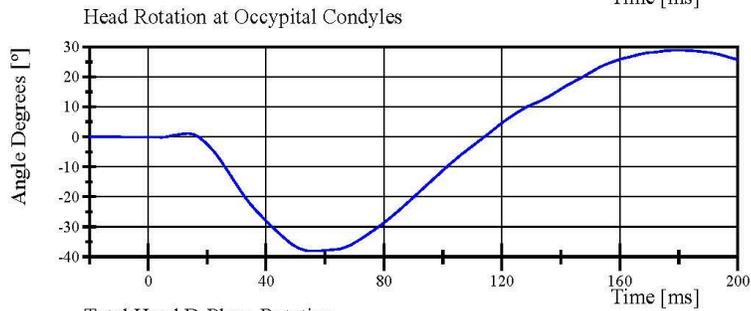
Test Date: 2/20/2019



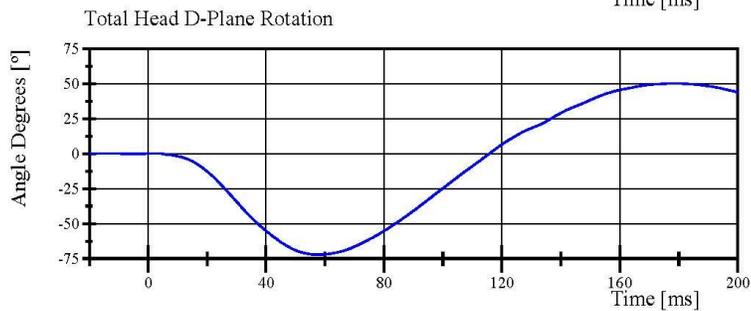
Filter Class: CFC_60
Max: 4.1 g at 43.0 ms
Min: -27.7 g at 8.5 ms



Filter Class: CFC_60
Max: 21.4 ° at 174.4 ms
Min: -34.1 ° at 58.6 ms



Filter Class: CFC_60
Max: 29.0 ° at 179.6 ms
Min: -38.1 ° at 56.4 ms



Filter Class: CFC_60
Max: 50.3 ° at 178.4 ms
Min: -72.1 ° at 57.6 ms

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

02.20.2019 15:40:41 1837

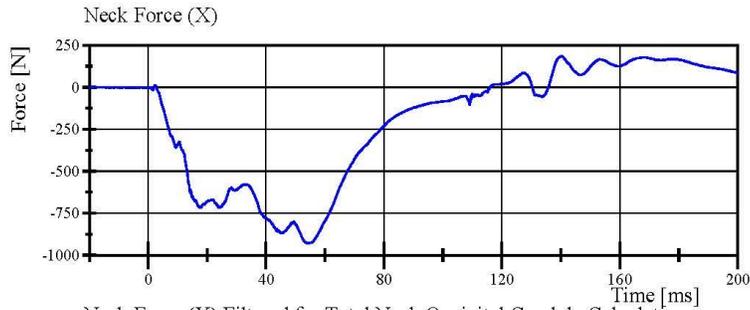


Transportation Research Center Inc.

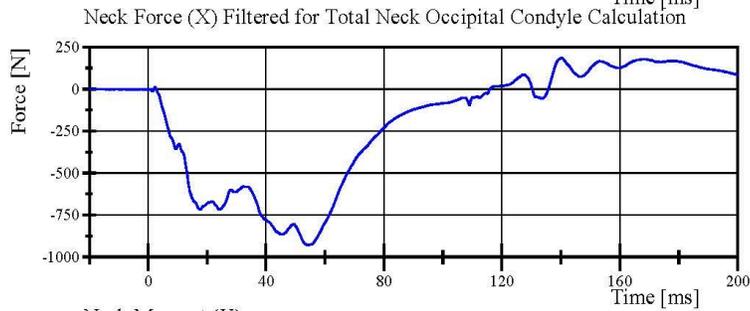
Neck Flexion

HIII 50th Serial No. 037 Certification No. 55-1

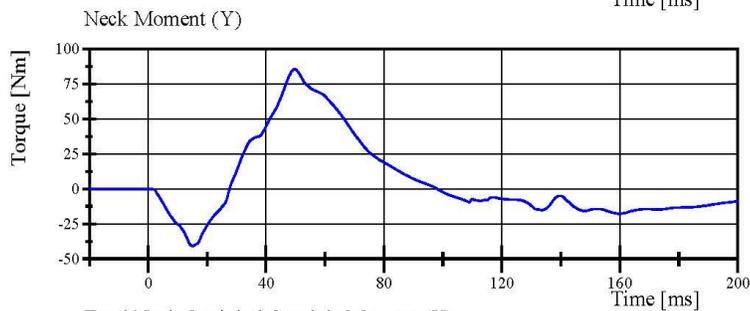
Test Date: 2/20/2019



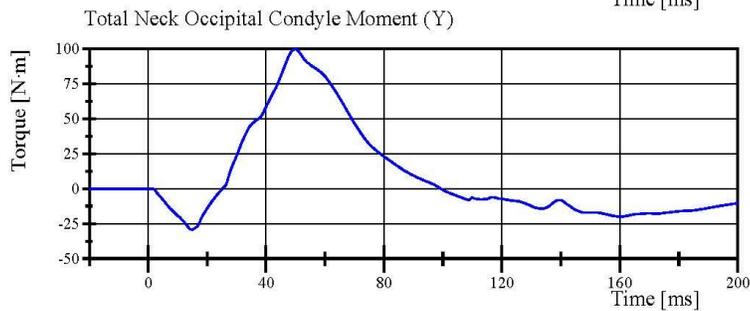
Filter Class: CFC_1000
Max: 185.2 N at 140.0 ms
Min: -928.4 N at 54.1 ms



Filter Class: CFC_600
Max: 185.3 N at 140.2 ms
Min: -927.9 N at 54.2 ms



Filter Class: CFC_600
Max: 85.5 Nm at 49.7 ms
Min: -40.7 Nm at 15.0 ms



Filter Class: Without_(Consta
Max: 99.8 N·m at 49.8 ms
Min: -29.2 N·m at 14.9 ms

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

02.20.2019 15:40:42 1837



Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 037 Certification No. 55-3

Test Date: 2/21/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Pendulum Velocity	(-5.95) - (-6.19) m/s	-5.969 m/s	Yes
Pendulum Acceleration Decay Crossing 5g	38 - 46 ms	40.0 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	20.48 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	17.41 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	13.27 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	13.27 g	Yes
Total Head D-Plane Rotation Peak	81 - 106 °	99.9 °	Yes
Time of Peak	72 - 82 ms	77.5 ms	Yes
Total Head D-Plane Rotation Decay to 0°	147 - 174 ms	158.3 ms	Yes
Total Neck Occipital Condyles Moment Peak	(-52.9) - (-80) N·m	-70.13 N·m	Yes
Time of Peak	65 - 79 ms	71.7 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	120 - 148 ms	147.1 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Neck S/N: 4728

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

02.21.2019 07:45:02 1984



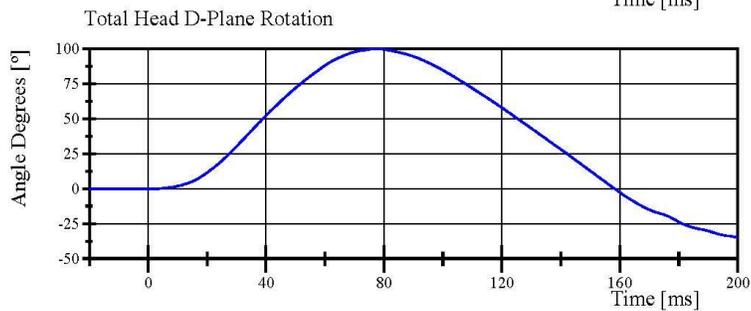
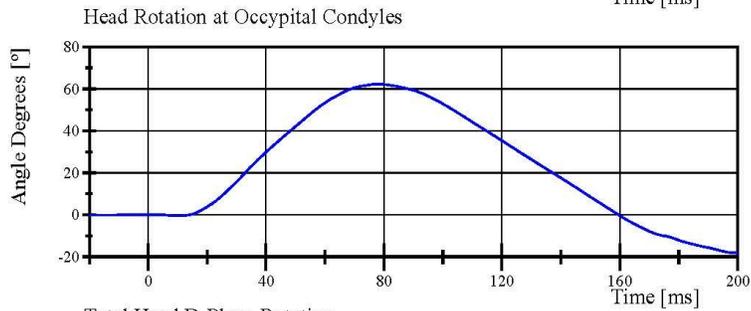
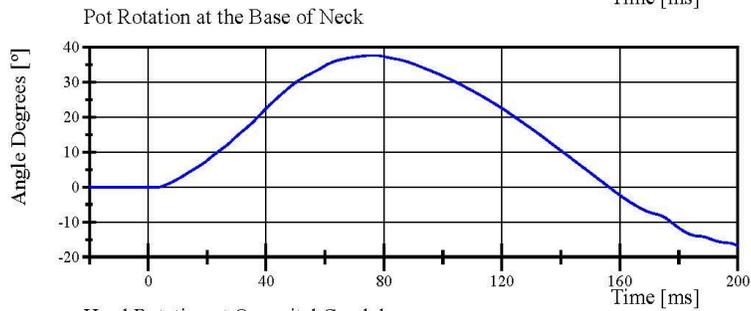
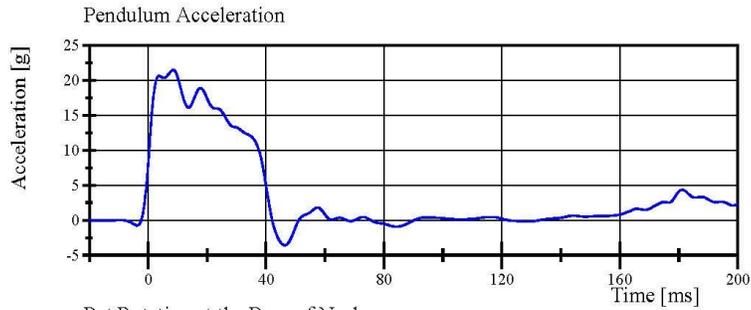
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Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 037 Certification No. 55-3

Test Date: 2/21/2019



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

02.21.2019 07:45:33 1984

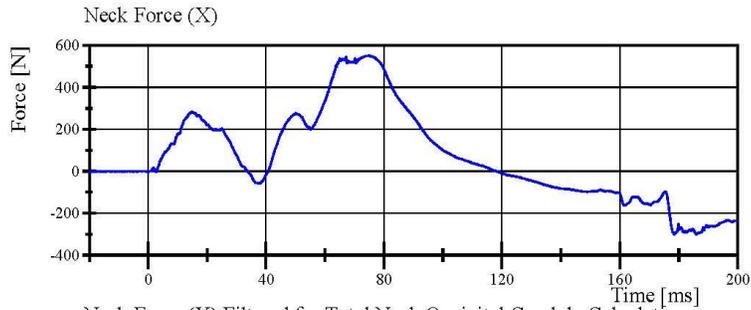


Transportation Research Center Inc.

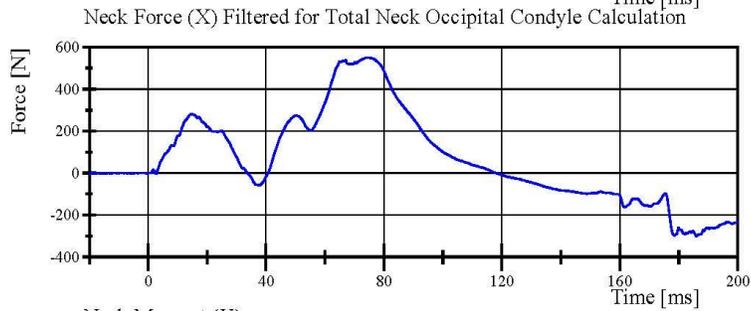
Neck Extension

HIII 50th Serial No. 037 Certification No. 55-3

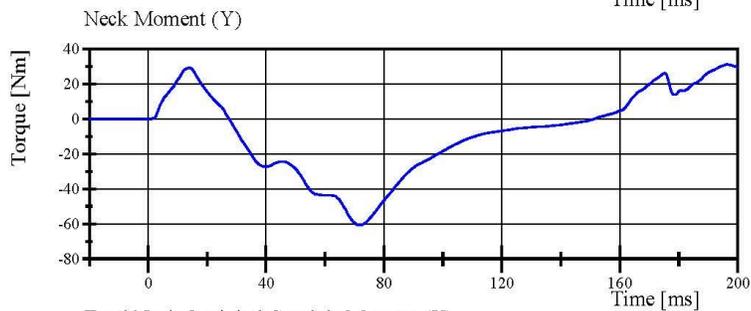
Test Date: 2/21/2019



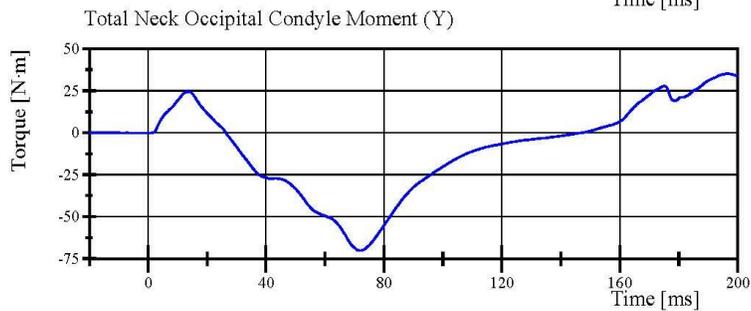
Filter Class: CFC_1000
Max: 551.7 N at 74.9 ms
Min: -301.7 N at 186.0 ms



Filter Class: CFC_600
Max: 550.7 N at 74.0 ms
Min: -300.6 N at 186.1 ms



Filter Class: CFC_600
Max: 31.1 Nm at 196.5 ms
Min: -60.7 Nm at 71.6 ms



Filter Class: Without_(Consta
Max: 35.2 N.m at 196.4 ms
Min: -70.1 N.m at 71.7 ms

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

02.21.2019 07:45:34 1984



Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 037 Certification No. 55-5

Test Date: 2/22/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.592 m/s	Yes
Probe Force Peak	(-5,160) - (-5,894) N	-5,449.5 N	Yes
Maximum Chest Compression	(-63.5) - (-72.6) mm	-83.19 mm	No
Internal Hysteresis	69 - 85 %	63.9 %	No

Test does not meet specifications.

Condition: Used

Comments:

Jacket S/N: 2565

Rib #1 Assembly S/N: 178051-35 HI6550

Rib #2 Assembly S/N: 36 16526

Rib #3 Assembly S/N: 37 16543

Rib #4 Assembly S/N: 38 16538

Rib #5 Assembly S/N: 39 HI6530

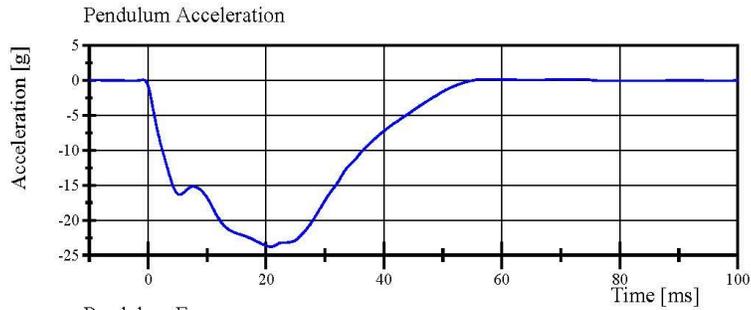
Rib #6 Assembly S/N: 40 16548

Transportation Research Center Inc.

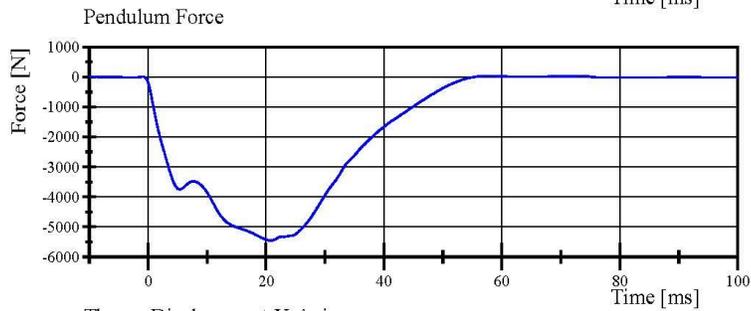
Front Thorax

HIII 50th Serial No. 037 Certification No. 55-5

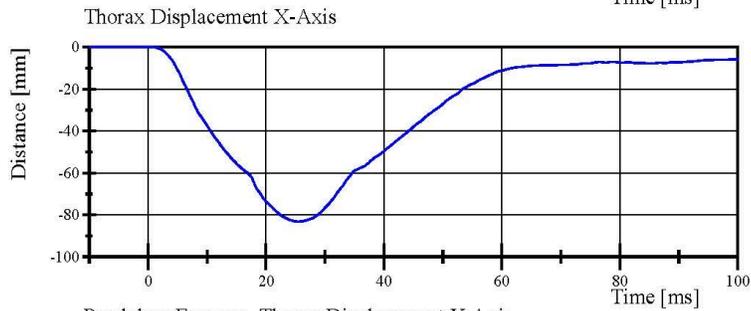
Test Date: 2/22/2019



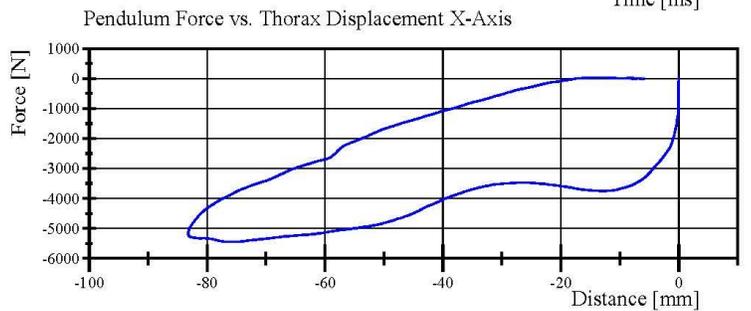
Filter Class: CFC_180
Max: 0.2 g at 73.7 ms
Min: -23.8 g at 20.8 ms



Filter Class: CFC_180
Max: 39.6 N at 73.7 ms
Min: -5,449.5 N at 20.8 ms



Filter Class: CFC_600
Max: 0.0 mm at -7.8 ms
Min: -83.2 mm at 25.4 ms



Filter Class: CFC_180
Max: 39.6 N at -7.9 mm
Min: -5,449.5 N at -75.8 mm

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

02.22.2019 11:59:54 405



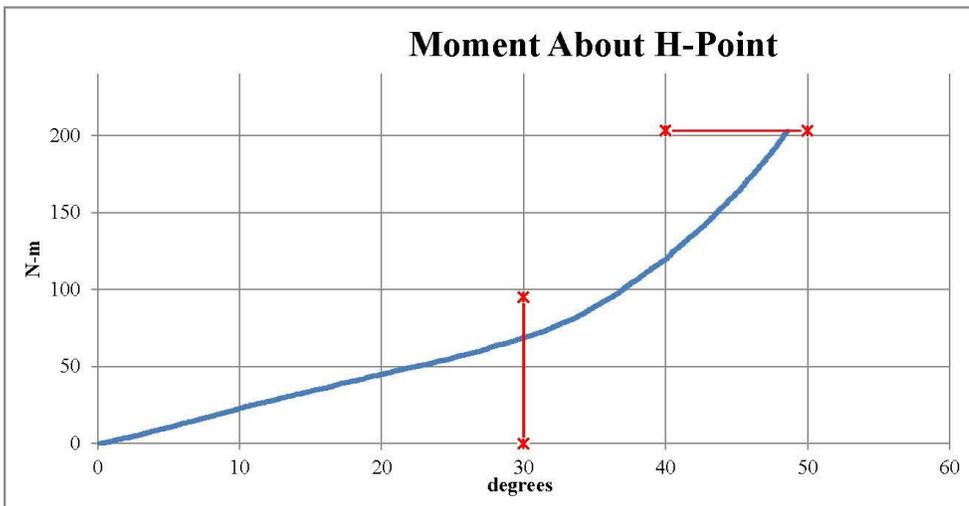
Transportation Research Center Inc.

Hybrid III 50th Male Hip Range of Motion

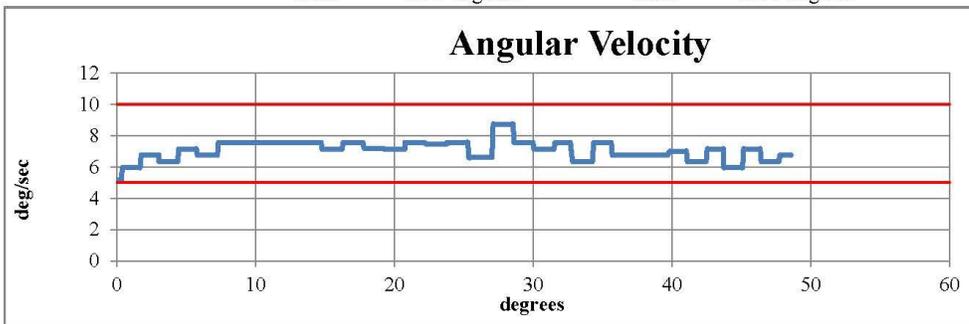


Serial Number: 037 Date: 20-Feb-2019
 Side Tested: Left Hip Time: 14:58
 Test Number: 1

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 - 25.6	21.4 °C Pass
Humidity	10 - 70	31 % Pass
Moment at 30°	0 ≤ 94.9	68.71 N-m Pass
Angle at 203 Nm	40 - 50	48.66 deg Pass
Average Velocity	5 - 10	7.07 deg/sec Pass



Max: 8.74 deg/sec Min: 5.17 deg/sec



Comments:
 Pelvis Skin S/N: N/A
 Lumbar Spine S/N: 0551
 Lumbar Cable S/N: N/A

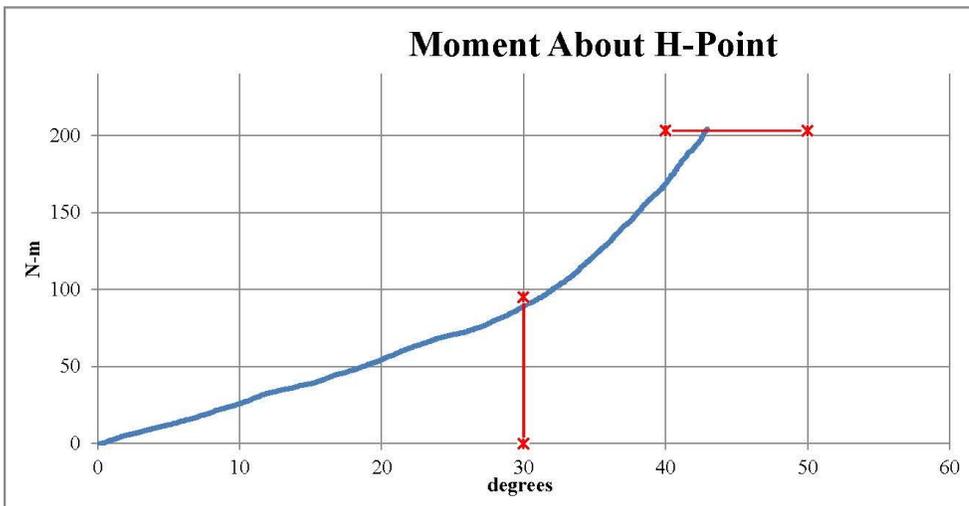
Transportation Research Center Inc.

Hybrid III 50th Male Hip Range of Motion

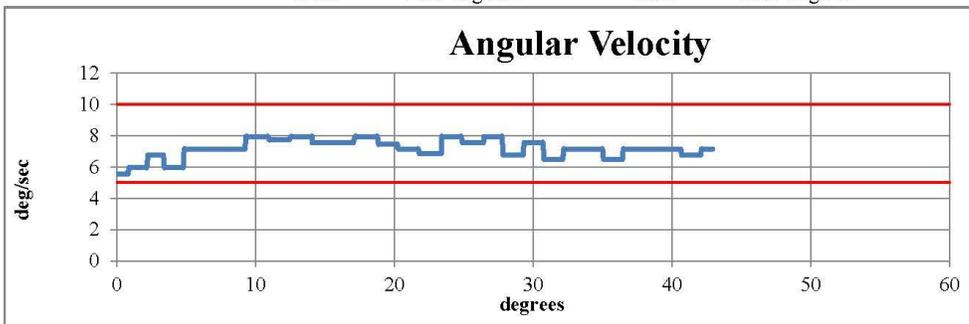


NHTSA
 Serial Number: 037 Date: 20-Feb-2019
 Side Tested: Right Hip Time: 16:01
 Test Number: 1

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 - 25.6	21.3 °C Pass
Humidity	10 - 70	35 % Pass
Moment at 30°	0 ≤ 94.9	89.14 N-m Pass
Angle at 203 Nm	40 - 50	42.94 deg Pass
Average Velocity	5 - 10	7.16 deg/sec Pass



Max: 7.95 deg/sec Min: 5.56 deg/sec



Comments:
 Pelvis Skin S/N: N/A
 Lumbar Spine S/N: 0551
 Lumbar Cable S/N: N/A

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 55-1
Test Date: 2/21/2019

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.123 m/s	Yes
Peak Femur Force	(-4,715) - (-5,782) N	-5,706.6 N	Yes

Test meets specifications.

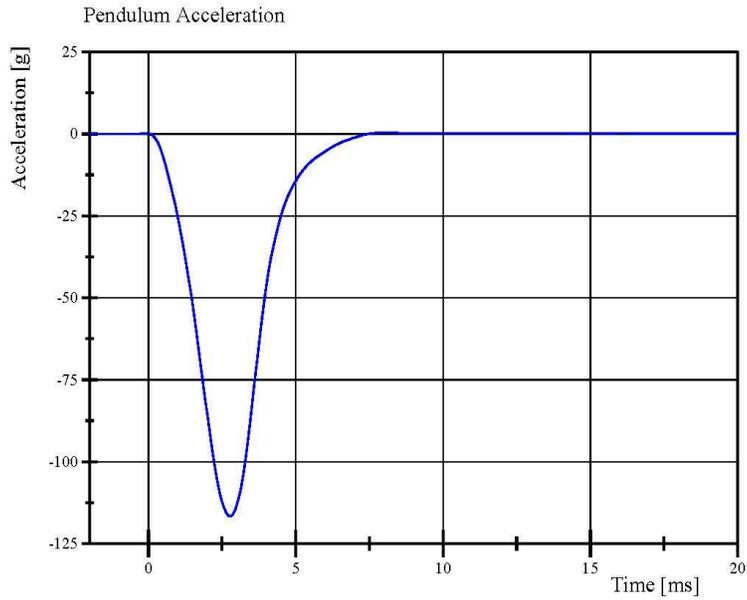
Condition: Used

Comments:

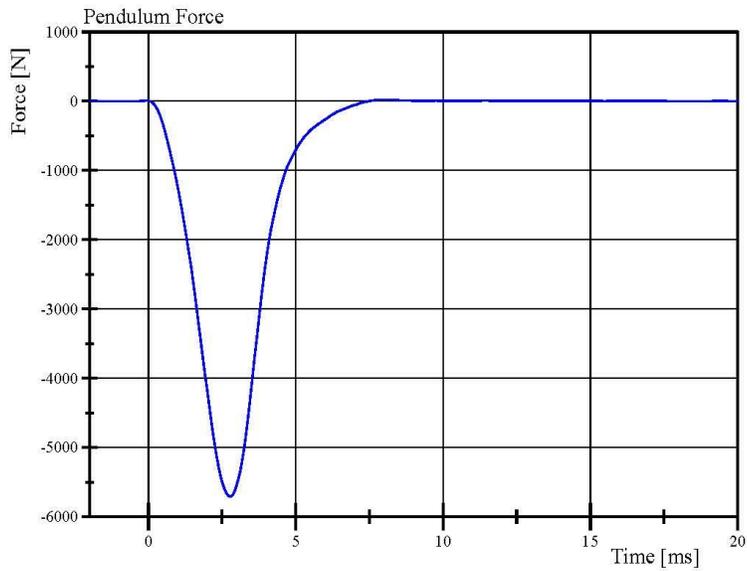
Knee Skin S/N: 2672

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 55-1
Test Date: 2/21/2019



Filter Class: CFC_600
Max: 0.5 g at 8.1 ms
Min: -116.6 g at 2.8 ms



Filter Class: CFC_600
Max: 22.2 N at 8.1 ms
Min: -5,706.6 N at 2.8 ms

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

02.21.2019 07:07:38 1722



Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 55-1
Test Date: 2/21/2019

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.111 m/s	Yes
Peak Femur Force	(-4,715) - (-5,782) N	-5,586.7 N	Yes

Test meets specifications.

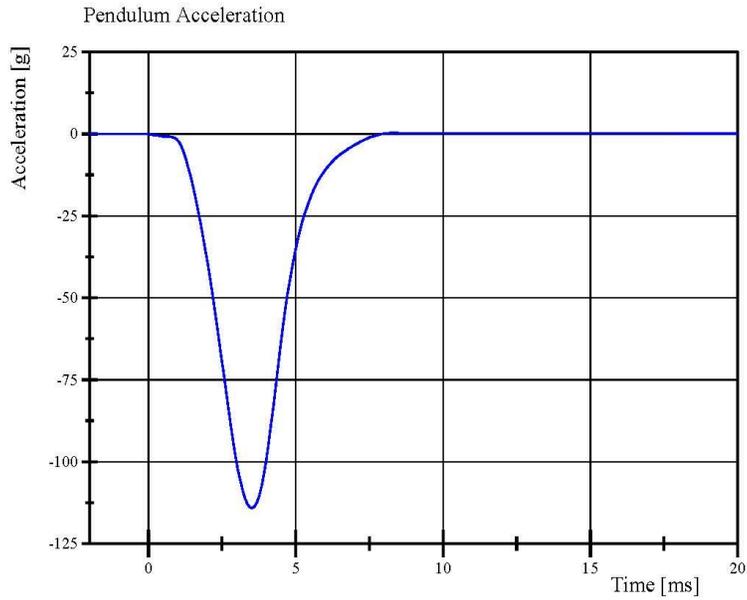
Condition: Used

Comments:

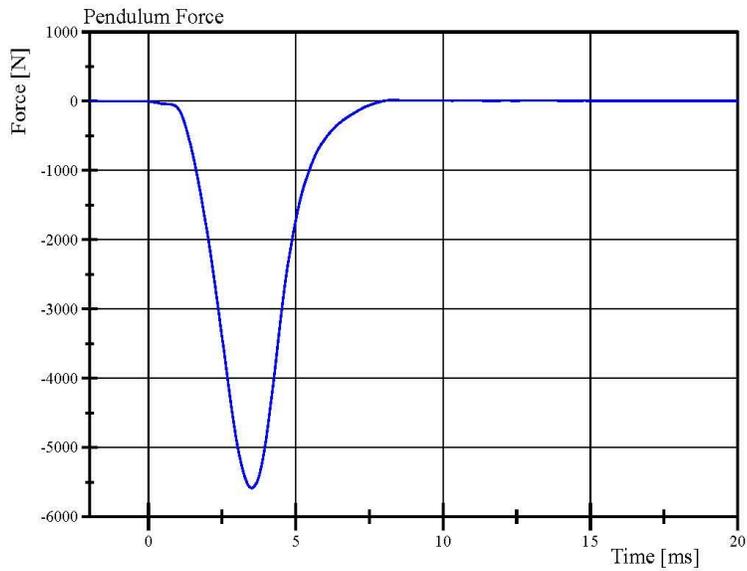
Knee Skin S/N: 3131

Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 55-1
Test Date: 2/21/2019



Filter Class: CFC_600
Max: 0.3 g at 8.3 ms
Min: -114.2 g at 3.5 ms



Filter Class: CFC_600
Max: 16.8 N at 8.3 ms
Min: -5,586.7 N at 3.5 ms

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

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Pre-Test Calibration Sheets

Front Passenger S/N 426

Transportation Research Center Inc.
5720 HIII 5th Dummy
External Dimensions
Serial No. 426 Calibration No. 48

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Total Sitting Height	774.7 - 800.1	780	Yes
B	Shoulder Pivot Height	431.8 - 457.2	443	Yes
C	Hip Pivot Height	81.3 - 86.3	85	Yes
D	Hip Pivot from Backline	144.8 - 149.8	147	Yes
E	Shoulder Pivot from Backline	68.6 - 83.8	79	Yes
F	Thigh Clearance	119.4 - 134.6	129	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	197	Yes
K	Buttock Knee Length	520.7 - 546.1	534	Yes
L	Popliteal Height	355.6 - 376.0	359	Yes
M	Knee Pivot Height	393.7 - 419.1	409	Yes
N	Buttock Popliteal Length	414.0 - 439.4	429	Yes
O	Chest Depth without Jacket	175.3 - 190.5	182	Yes
P	Foot Length	218.5 - 233.7	225	Yes
R	Buttock to Knee Pivot Length	457.2 - 482.6	473	Yes
S	Head Breadth	137.1 - 147.3	141	Yes
T	Head Depth	177.8 - 188.0	180	Yes
U	Hip Breadth	299.7 - 314.9	306	Yes
V	Shoulder Breadth	350.5 - 365.7	356	Yes
W	Foot Breadth	78.8 - 94.0	85	Yes
X	Head Circumference	528.3 - 548.7	539	Yes
Y	Chest Circumference with Jacket	850.9 - 881.3	870	Yes
Z	Waist Circumference	759.5 - 789.9	775	Yes
AA	Reference Location for Chest Circumference	332.7 - 358.1	345	Yes
BB	Reference Location for Waist Circumference	160.0 - 170.2	164	Yes

Revised 8/10/12



Transportation Research Center Inc.

Front Head Drop
HIII 5th Serial No. 426 Certification No. 48-1
Test Date: 1/8/2019

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	47 %	Yes
Peak Head Resultant Acceleration	250 - 300 g	283.6 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	-1.8 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

Test meets specifications.

Condition: Used

Comments:

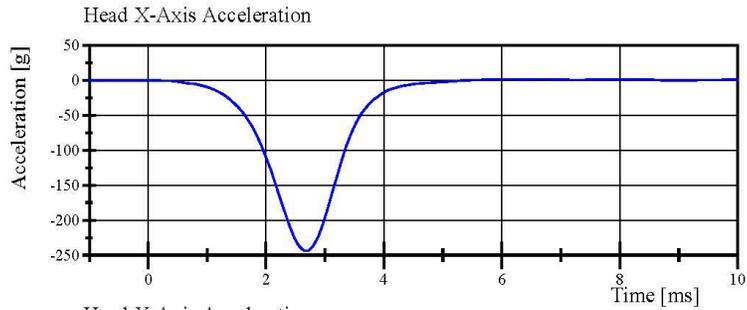
Head Skin S/N: 1348

Transportation Research Center Inc.

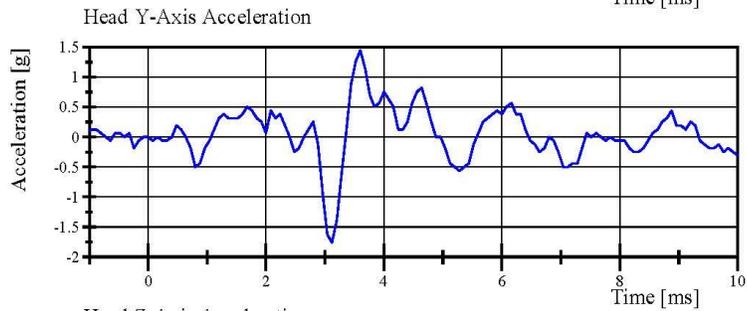
Front Head Drop

HIII 5th Serial No. 426 Certification No. 48-1

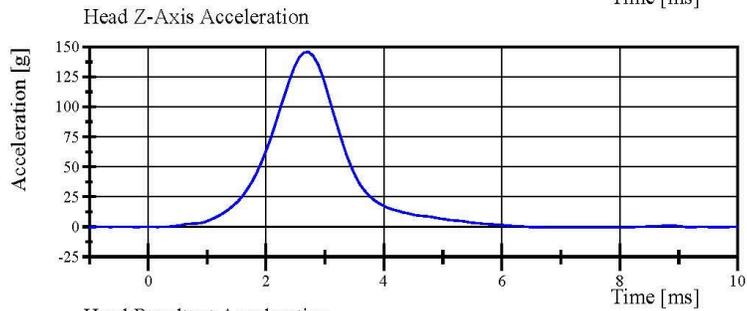
Test Date: 1/8/2019



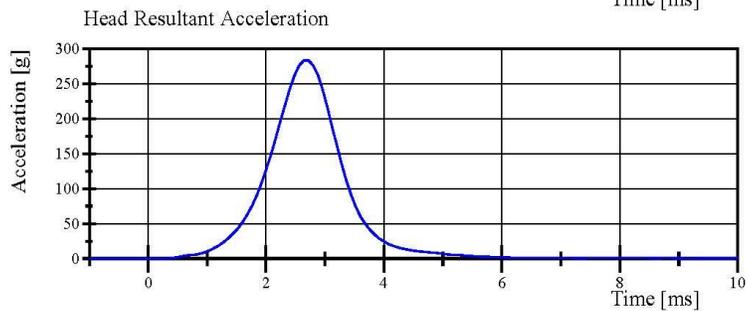
Filter Class: CFC_1000
Max: 1.5 g at 6.0 ms
Min: -243.4 g at 2.6 ms



Filter Class: CFC_1000
Max: 1.4 g at 3.6 ms
Min: -1.8 g at 3.1 ms



Filter Class: CFC_1000
Max: 145.9 g at 2.7 ms
Min: -0.7 g at 7.2 ms



Filter Class: CFC_1000
Max: 283.6 g at 2.7 ms
Min: 0.1 g at -0.4 ms

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

01.08.2019 09:56 606



Transportation Research Center Inc.

Neck Flexion

HIII 5th Serial No. 426 Certification No. 48-1

Test Date: 1/8/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	7.061 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	(-2.1) - (-2.5) m/s	-2.33 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	(-4.0) - (-5.0) m/s	-4.48 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	(-5.8) - (-7.0) m/s	-6.53 m/s	Yes
Total Head D-Plane Rotation	(-77) - (-91) °	-80.8 °	Yes
Total Neck Occipital Condyles Moment Between -77° and -91° Rotation	69 - 83 N·m	77.1 N·m	Yes
Total Neck Occipital Condyles Moment Decay to 10 N·m	80 - 100 ms	88.9 ms	Yes

Test meets specifications.

Condition: Used

Comments:

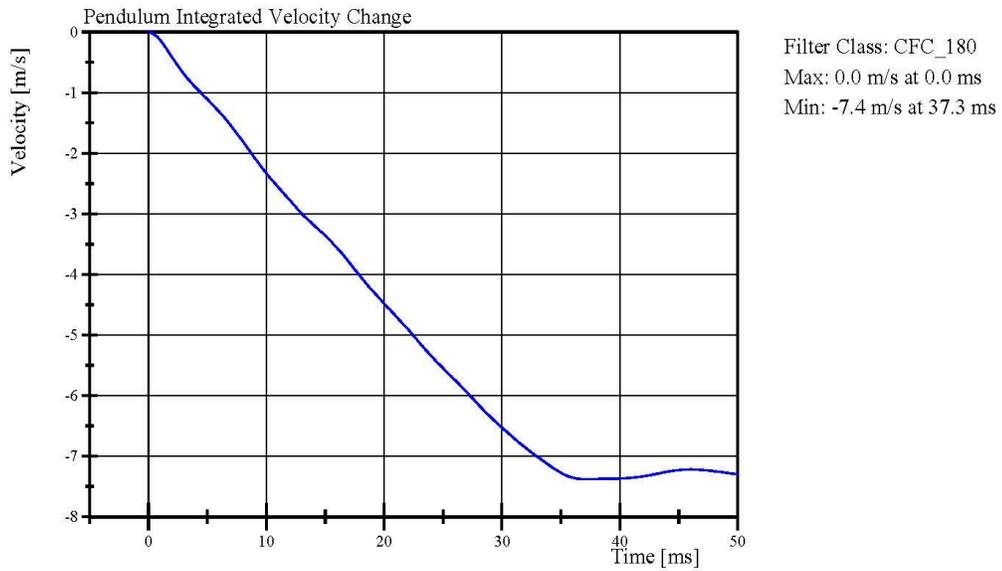
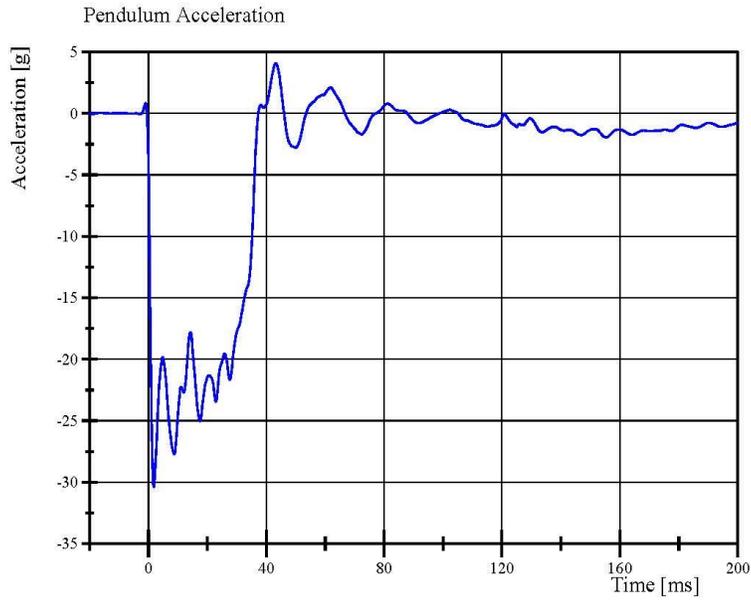
Neck S/N: DM2392

Transportation Research Center Inc.

Neck Flexion

HIII 5th Serial No. 426 Certification No. 48-1

Test Date: 1/8/2019



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

01.08.2019 08:10 1851



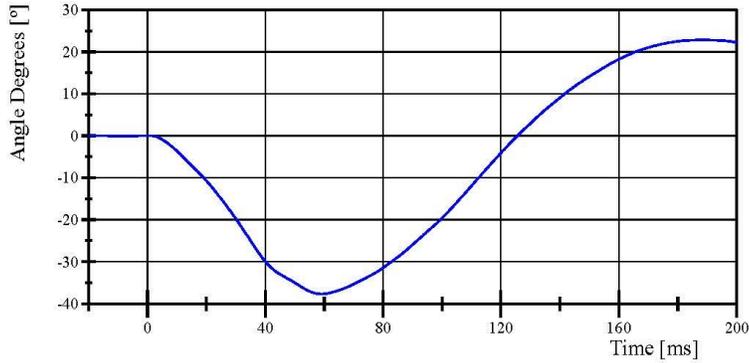
Transportation Research Center Inc.

Neck Flexion

HIII 5th Serial No. 426 Certification No. 48-1

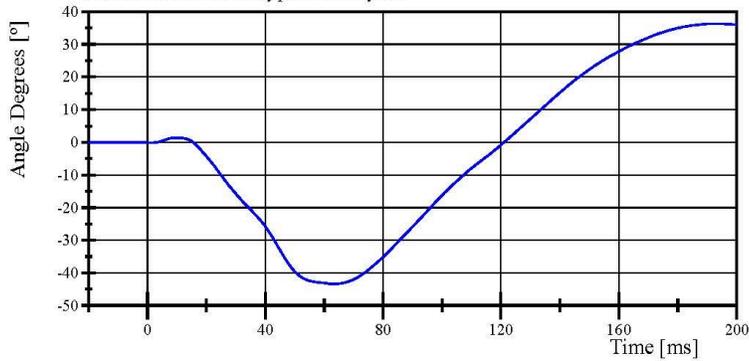
Test Date: 1/8/2019

Pot Rotation at the Base of Neck



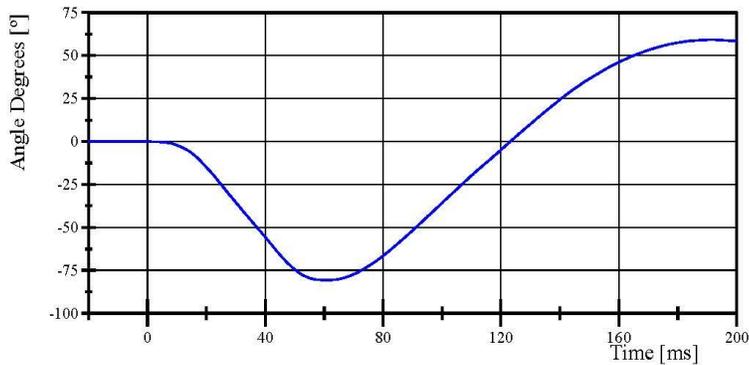
Filter Class: CFC_60
Max: 22.9 ° at 188.3 ms
Min: -37.7 ° at 59.1 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 36.3 ° at 192.5 ms
Min: -43.4 ° at 63.4 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 59.2 ° at 191.5 ms
Min: -80.8 ° at 60.9 ms

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

01.08.2019 08:10 1851

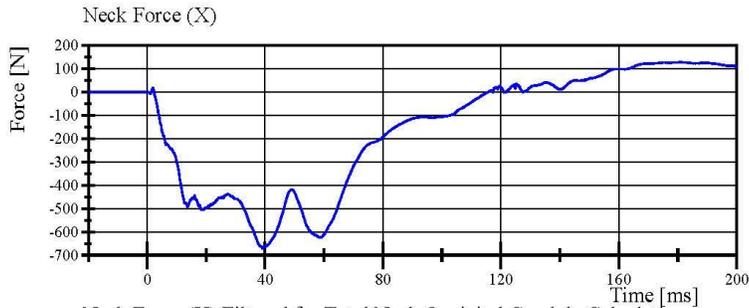


Transportation Research Center Inc.

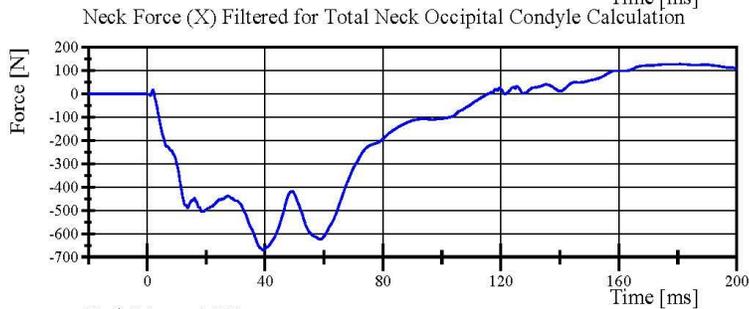
Neck Flexion

HIII 5th Serial No. 426 Certification No. 48-1

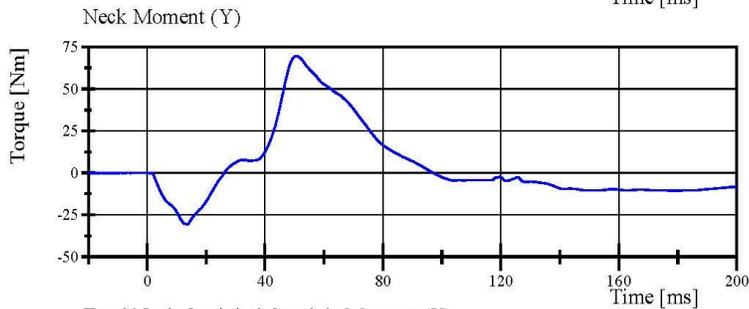
Test Date: 1/8/2019



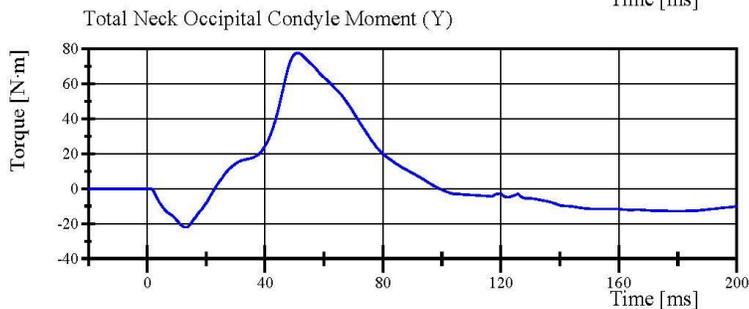
Filter Class: CFC_1000
Max: 128.4 N at 180.7 ms
Min: -669.4 N at 39.1 ms



Filter Class: CFC_600
Max: 128.1 N at 180.7 ms
Min: -669.2 N at 39.3 ms



Filter Class: CFC_600
Max: 69.6 Nm at 50.6 ms
Min: -30.7 Nm at 13.6 ms



Filter Class: Without_(Consta
Max: 77.6 N·m at 51.1 ms
Min: -22.0 N·m at 13.4 ms

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

01.08.2019 08:10 1851



Transportation Research Center Inc.

Neck Extension

HIII 5th Serial No. 426 Certification No. 48-2

Test Date: 1/8/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Pendulum Velocity	(-5.95) - (-6.19) m/s	-6.106 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	1.5 - 1.9 m/s	1.81 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	3.1 - 3.9 m/s	3.43 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	4.6 - 5.6 m/s	4.95 m/s	Yes
Total Head D-Plane Rotation	99 - 114 °	110.9 °	Yes
Total Neck Occipital Condyles Moment Between 99° and 114° Rotation	(-53) - (-65) N·m	-53.7 N·m	Yes
Total Neck Occipital Condyles Moment Decay to -10 N·m	94 - 114 ms	108.6 ms	Yes

Test meets specifications.

Condition: Used

Comments:

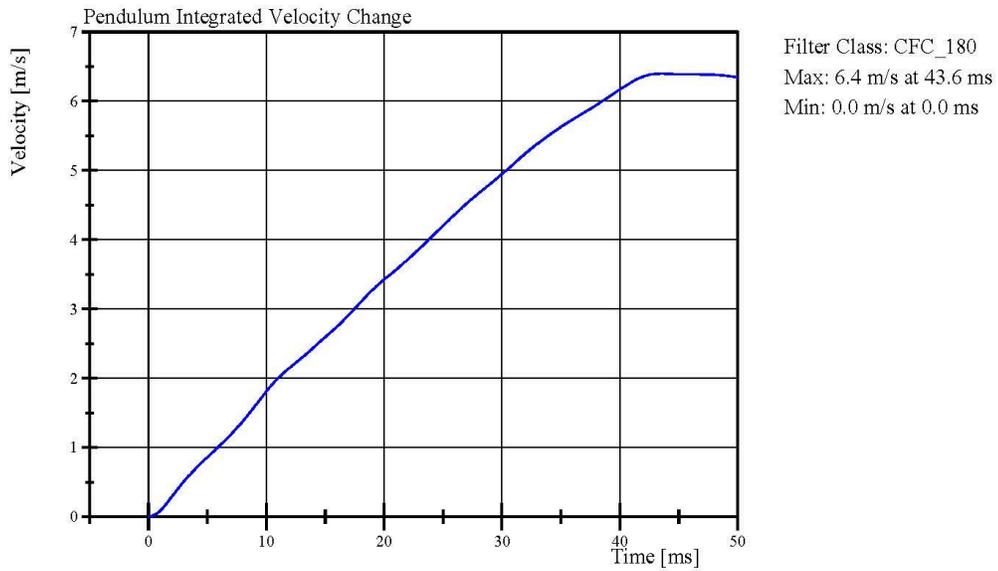
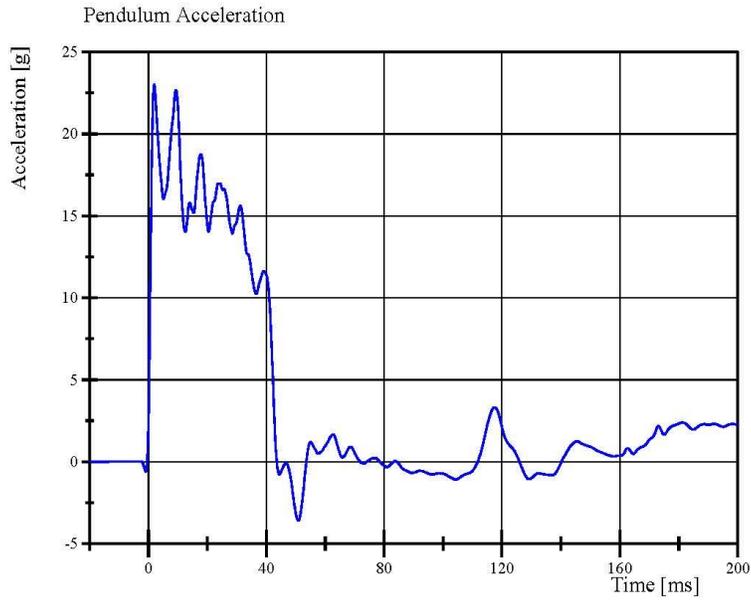
Neck S/N: DM2392

Transportation Research Center Inc.

Neck Extension

HIII 5th Serial No. 426 Certification No. 48-2

Test Date: 1/8/2019



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

01.08.2019 09:27 1989



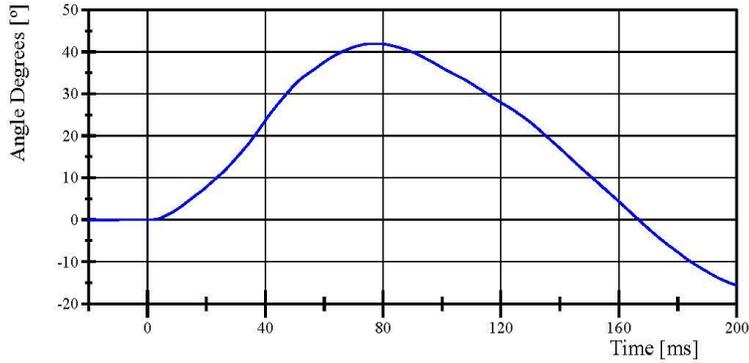
Transportation Research Center Inc.

Neck Extension

HIII 5th Serial No. 426 Certification No. 48-2

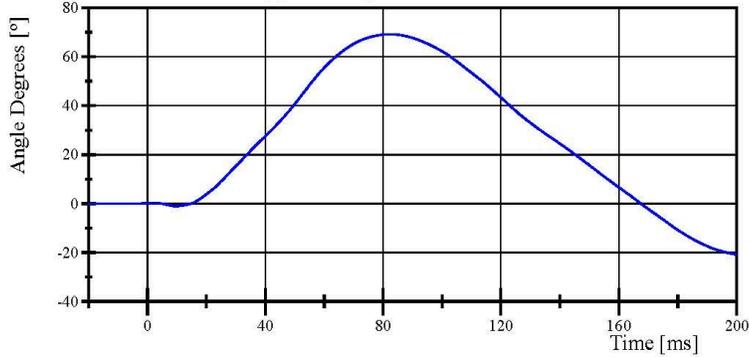
Test Date: 1/8/2019

Pot Rotation at the Base of Neck



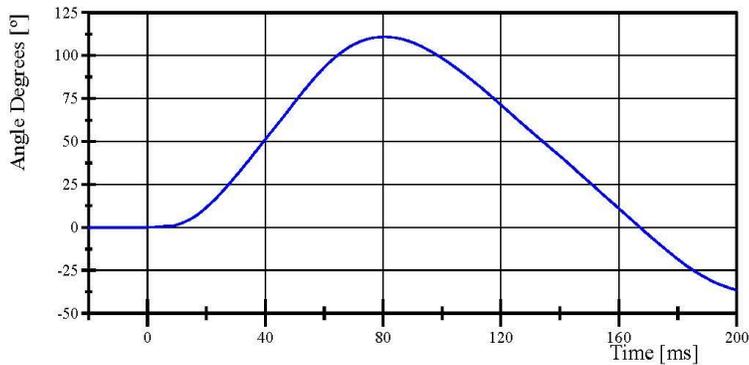
Filter Class: CFC_60
Max: 42.0 ° at 77.3 ms
Min: -15.6 ° at 200.0 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 69.1 ° at 82.3 ms
Min: -20.9 ° at 200.0 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 110.9 ° at 80.6 ms
Min: -36.5 ° at 200.0 ms

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

01.08.2019 09:27 1989

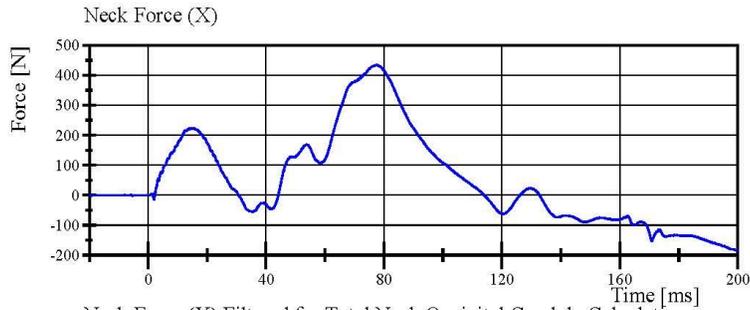


Transportation Research Center Inc.

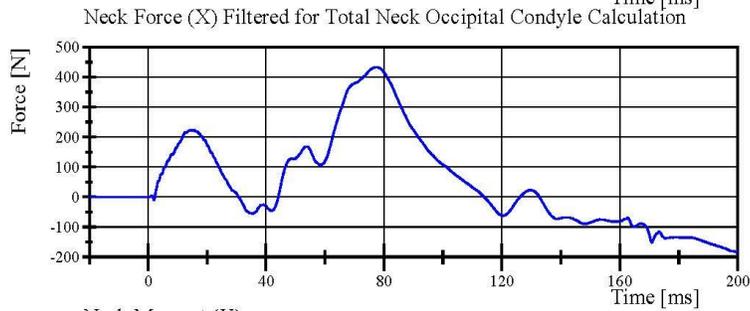
Neck Extension

HIII 5th Serial No. 426 Certification No. 48-2

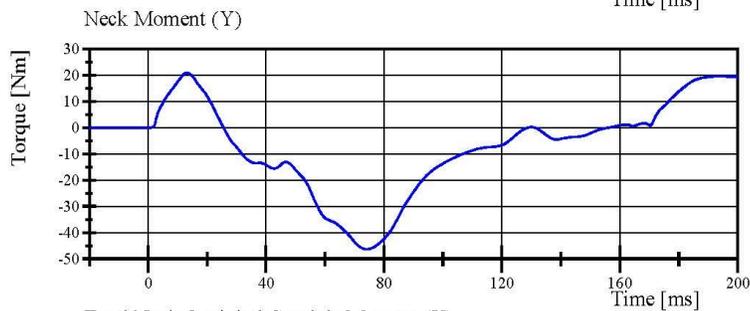
Test Date: 1/8/2019



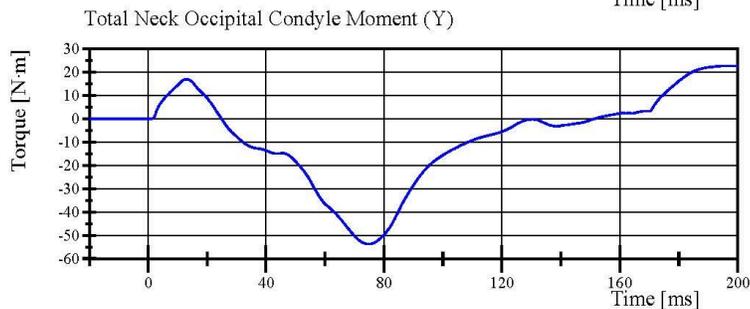
Filter Class: CFC_1000
Max: 434.0 N at 77.4 ms
Min: -183.5 N at 199.8 ms



Filter Class: CFC_600
Max: 433.6 N at 77.4 ms
Min: -183.2 N at 199.7 ms



Filter Class: CFC_600
Max: 20.8 Nm at 13.4 ms
Min: -46.3 Nm at 74.1 ms



Filter Class: Without_(Consta
Max: 22.7 N.m at 200.0 ms
Min: -53.7 N.m at 74.6 ms

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

01.08.2019 09:27 1989



Transportation Research Center Inc.

Front Thorax

HIII 5th Serial No. 426 Certification No. 48-2

Test Date: 1/8/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.733 m/s	Yes
Probe Force Peak Between 50.0 mm and 58.0 mm Chest Deflection	(-3,900) - (-4,400) N	-4,343.9 N	Yes
Probe Force Peak Between 18.0 mm and 50.0 mm Chest Deflection	>= (-4,600) N	-4,430.4 N	Yes
Maximum Chest Compression	(-50) - (-58) mm	-51.0 mm	Yes
Internal Hysteresis	69 - 85 %	74.6 %	Yes

Test meets specifications.

Condition: Used

Comments:

Jacket S/N: DG9935

Rib Set S/N: DJ1164

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

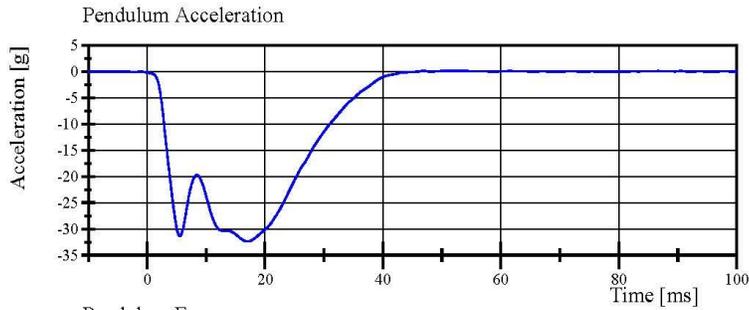
Page 19 of 28

01.08.2019 14:43 430

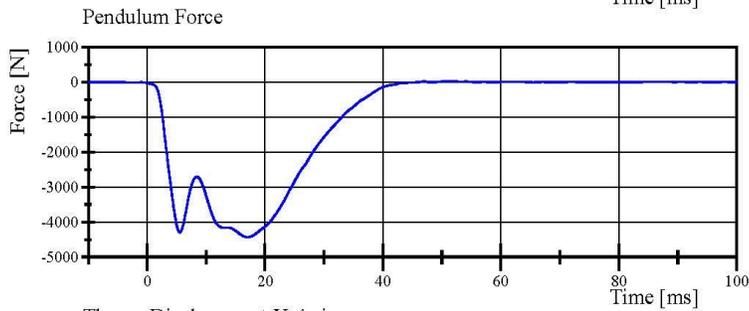


Transportation Research Center Inc.

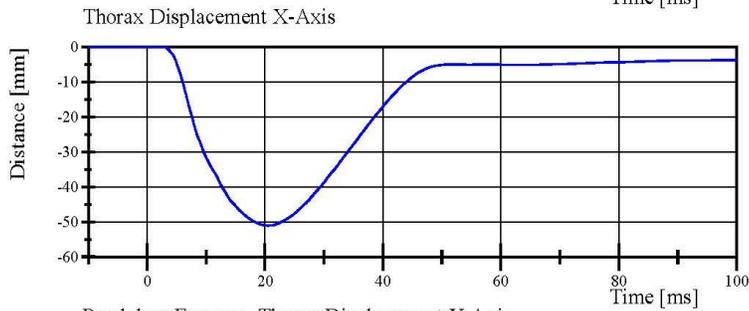
Front Thorax
HIII 5th Serial No. 426 Certification No. 48-2
Test Date: 1/8/2019



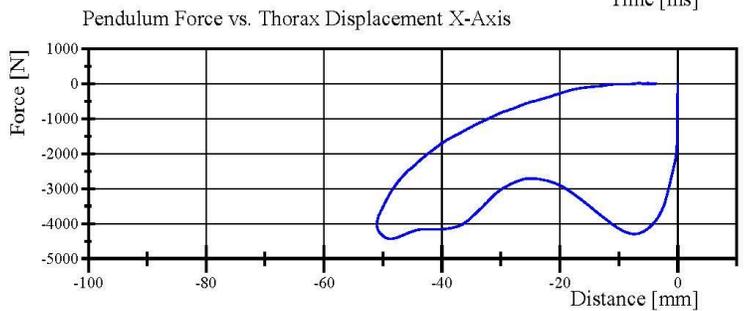
Filter Class: CFC_180
Max: 0.2 g at 50.6 ms
Min: -32.3 g at 17.0 ms



Filter Class: CFC_180
Max: 22.1 N at 50.6 ms
Min: -4,430.4 N at 17.0 ms



Filter Class: CFC_600
Max: 0.0 mm at -8.2 ms
Min: -51.0 mm at 20.6 ms



Filter Class: CFC_180
Max: 22.1 N at -5.0 mm
Min: -4,430.4 N at -48.7 mm

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

01.08.2019 14:43 430



Transportation Research Center Inc.

Hybrid III Small Female Torso Flexion

NHTSA

Serial Number: 426

Date: 1/8/2019

Test Number: 1

Time: 12:59



TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 - 25.6	21.7 °C Pass
Humidity	10 - 70	47 % Pass
Average Angular Velocity	0.5 - 1.5	0.96 deg/sec Pass
Initial Angle	0 - 20	15.17 deg Pass
Peak Force at 45.21°	320 - 390	333.76 N Pass
Final Angle	-8 - 8	5.65 deg Pass



Comments:
Abdomen S/N: 1047
Pelvis S/N: 885
Lumbar S/N: N/A

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 5th Serial No. 426 Certification No. 48-1
Test Date: 1/8/2019

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.127 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-3,944.8 N	Yes

Test meets specifications.

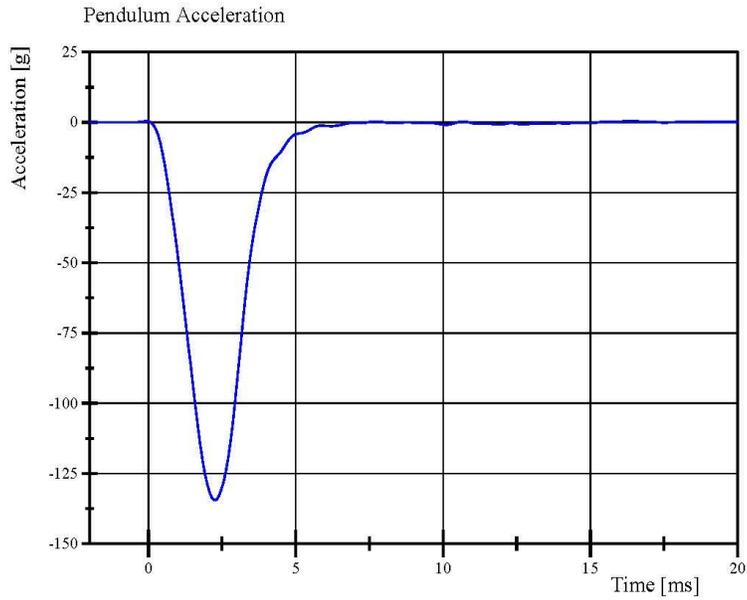
Condition: Used

Comments:

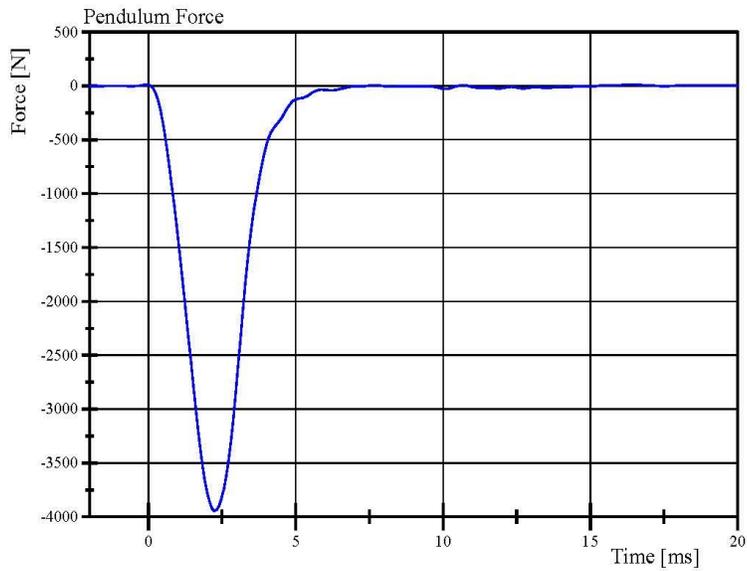
Knee Skin S/N: 1366

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 5th Serial No. 426 Certification No. 48-1
Test Date: 1/8/2019



Filter Class: CFC_600
Max: 0.4 g at 16.3 ms
Min: -134.5 g at 2.2 ms



Filter Class: CFC_600
Max: 12.6 N at 16.3 ms
Min: -3,944.8 N at 2.2 ms

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

01.08.2019 08:25 1708



Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 5th Serial No. 426 Certification No. 48-1
Test Date: 1/8/2019

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.123 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-3,854.9 N	Yes

Test meets specifications.

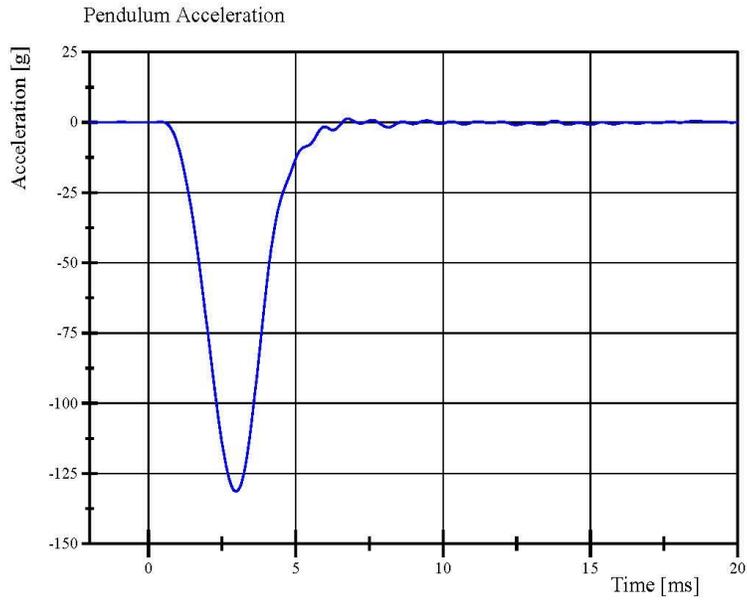
Condition: Used

Comments:

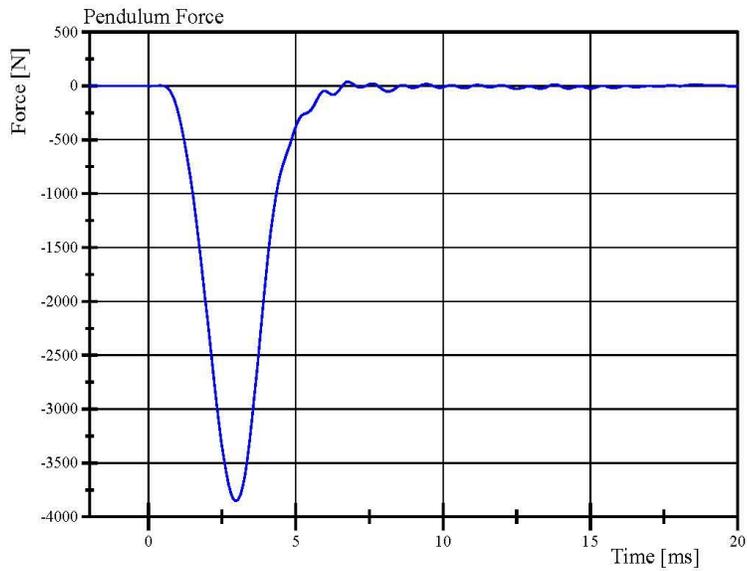
Knee Skin S/N: 1402

Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 5th Serial No. 426 Certification No. 48-1
Test Date: 1/8/2019



Filter Class: CFC_600
Max: 1.3 g at 6.8 ms
Min: -131.5 g at 3.0 ms



Filter Class: CFC_600
Max: 37.6 N at 6.8 ms
Min: -3,854.9 N at 3.0 ms

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

01.08.2019 08:32 1698



Post-Test Calibration Sheets

Front Passenger S/N 426

Transportation Research Center Inc.
5720 HIII 5th Dummy
External Dimensions
Serial No. 426 Calibration No. 49

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Total Sitting Height	774.7 - 800.1	780	Yes
B	Shoulder Pivot Height	431.8 - 457.2	443	Yes
C	Hip Pivot Height	81.3 - 86.3	85	Yes
D	Hip Pivot from Backline	144.8 - 149.8	147	Yes
E	Shoulder Pivot from Backline	68.6 - 83.8	79	Yes
F	Thigh Clearance	119.4 - 134.6	129	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	197	Yes
K	Buttock Knee Length	520.7 - 546.1	534	Yes
L	Popliteal Height	355.6 - 376.0	359	Yes
M	Knee Pivot Height	393.7 - 419.1	409	Yes
N	Buttock Popliteal Length	414.0 - 439.4	429	Yes
O	Chest Depth without Jacket	175.3 - 190.5	182	Yes
P	Foot Length	218.5 - 233.7	225	Yes
R	Buttock to Knee Pivot Length	457.2 - 482.6	473	Yes
S	Head Breadth	137.1 - 147.3	141	Yes
T	Head Depth	177.8 - 188.0	180	Yes
U	Hip Breadth	299.7 - 314.9	306	Yes
V	Shoulder Breadth	350.5 - 365.7	356	Yes
W	Foot Breadth	78.8 - 94.0	85	Yes
X	Head Circumference	528.3 - 548.7	539	Yes
Y	Chest Circumference with Jacket	850.9 - 881.3	870	Yes
Z	Waist Circumference	759.5 - 789.9	775	Yes
AA	Reference Location for Chest Circumference	332.7 - 358.1	345	Yes
BB	Reference Location for Waist Circumference	160.0 - 170.2	164	Yes

Revised 8/10/12



Transportation Research Center Inc.

Front Head Drop
HIII 5th Serial No. 426 Certification No. 49-1
Test Date: 2/20/2019

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Peak Head Resultant Acceleration	250 - 300 g	282.8 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	3.9 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

Test meets specifications.

Condition: Used

Comments:

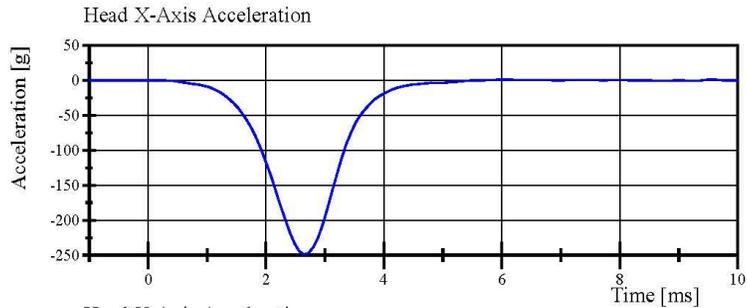
Head Skin S/N: 1348

Transportation Research Center Inc.

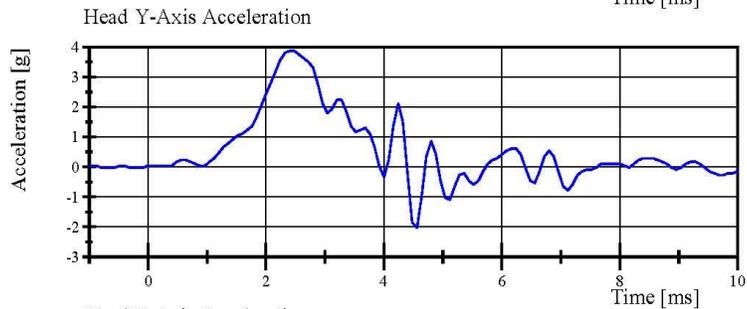
Front Head Drop

HIII 5th Serial No. 426 Certification No. 49-1

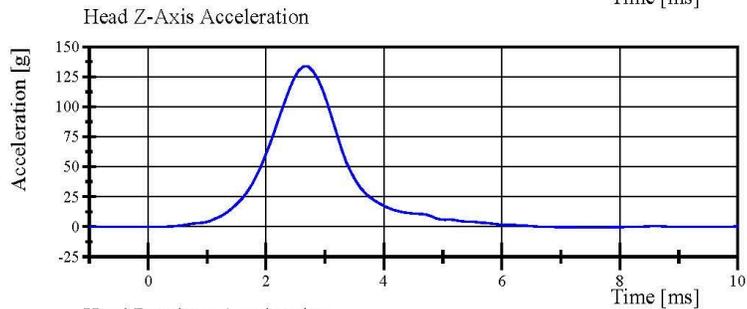
Test Date: 2/20/2019



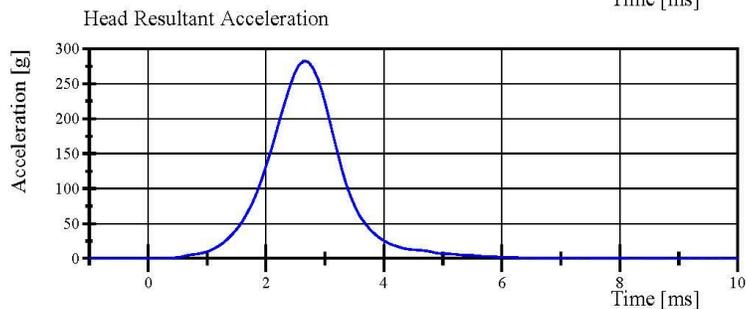
Filter Class: CFC_1000
Max: 1.2 g at 9.5 ms
Min: -249.1 g at 2.6 ms



Filter Class: CFC_1000
Max: 3.9 g at 2.4 ms
Min: -2.0 g at 4.6 ms



Filter Class: CFC_1000
Max: 133.9 g at 2.6 ms
Min: -0.6 g at 7.4 ms



Filter Class: CFC_1000
Max: 282.8 g at 2.6 ms
Min: 0.0 g at -0.8 ms

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

02.20.2019 09:07:40 572



Transportation Research Center Inc.

Neck Flexion

HIII 5th Serial No. 426 Certification No. 49-1

Test Date: 2/20/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	7.036 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	(-2.1) - (-2.5) m/s	-2.48 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	(-4.0) - (-5.0) m/s	-4.81 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	(-5.8) - (-7.0) m/s	-6.72 m/s	Yes
Total Head D-Plane Rotation	(-77) - (-91) °	-80.3 °	Yes
Total Neck Occipital Condyles Moment Between -77° and -91° Rotation	69 - 83 N·m	74.4 N·m	Yes
Total Neck Occipital Condyles Moment Decay to 10 N·m	80 - 100 ms	87.9 ms	Yes

Test meets specifications.

Condition: Used

Comments:

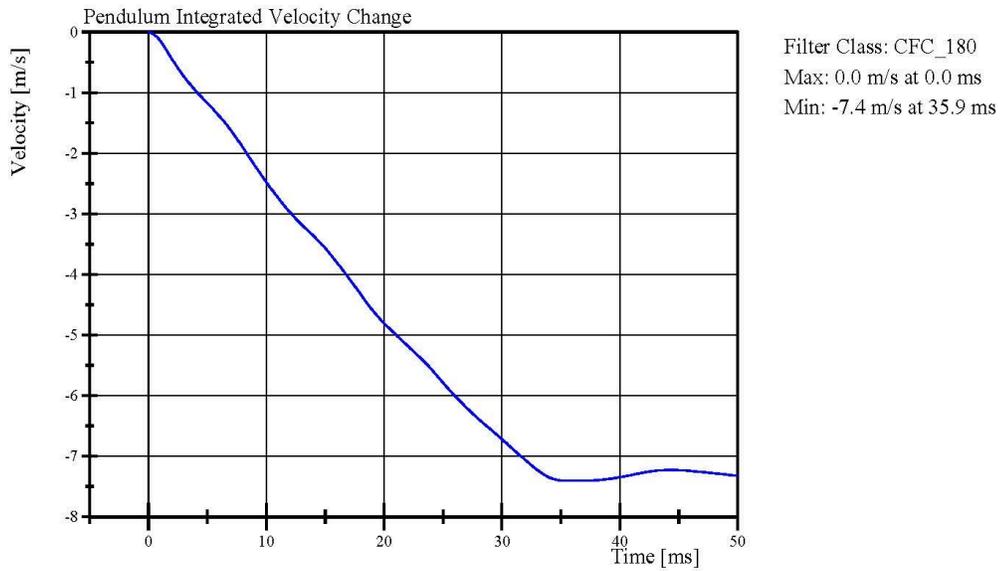
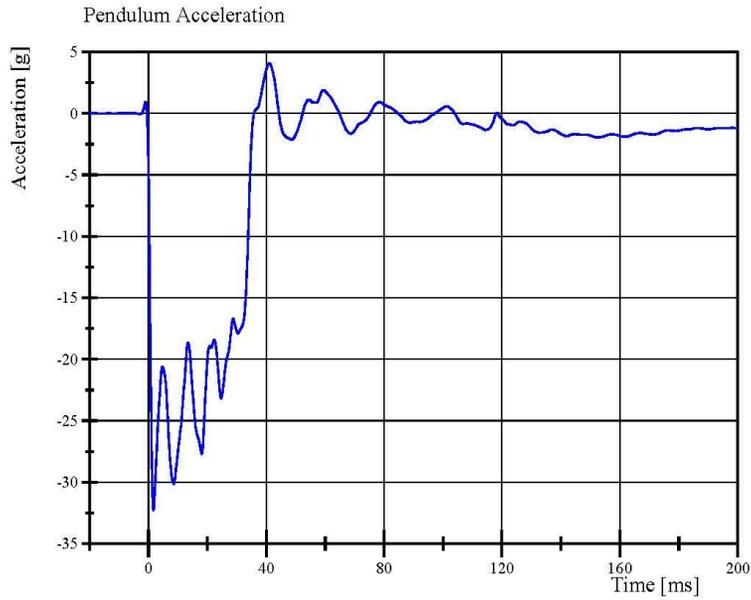
Neck S/N: DM2392

Transportation Research Center Inc.

Neck Flexion

HIII 5th Serial No. 426 Certification No. 49-1

Test Date: 2/20/2019



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

02.20.2019 13:02:52 1823



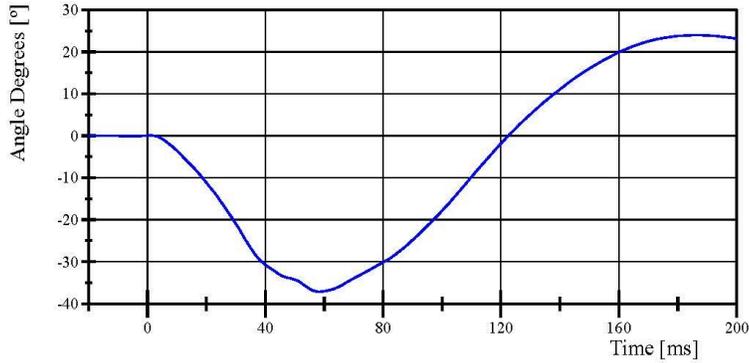
Transportation Research Center Inc.

Neck Flexion

HIII 5th Serial No. 426 Certification No. 49-1

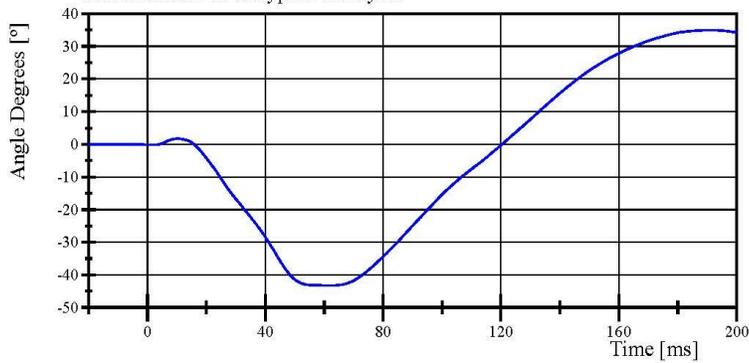
Test Date: 2/20/2019

Pot Rotation at the Base of Neck



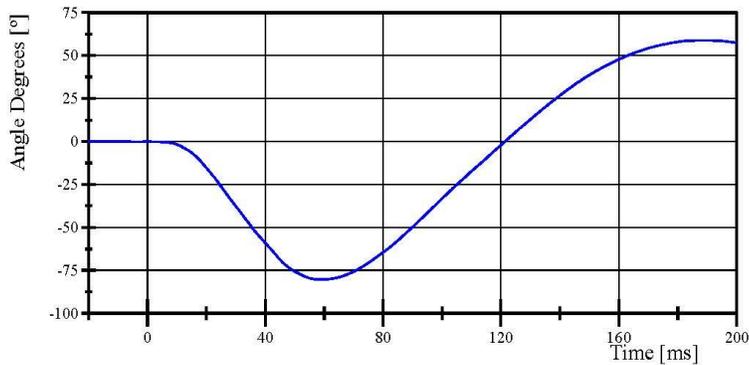
Filter Class: CFC_60
Max: 24.0 ° at 186.4 ms
Min: -37.1 ° at 58.2 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 34.9 ° at 191.2 ms
Min: -43.3 ° at 61.6 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 58.9 ° at 189.0 ms
Min: -80.3 ° at 58.4 ms

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

02.20.2019 13:02:53 1823

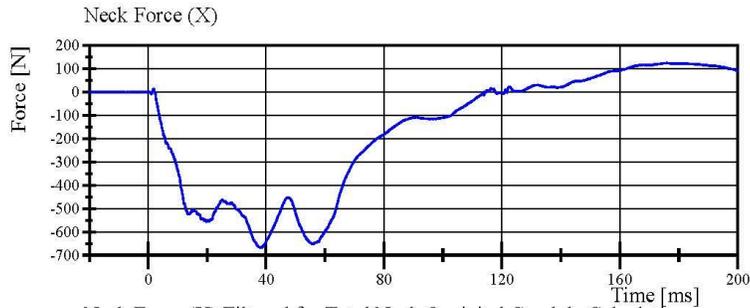


Transportation Research Center Inc.

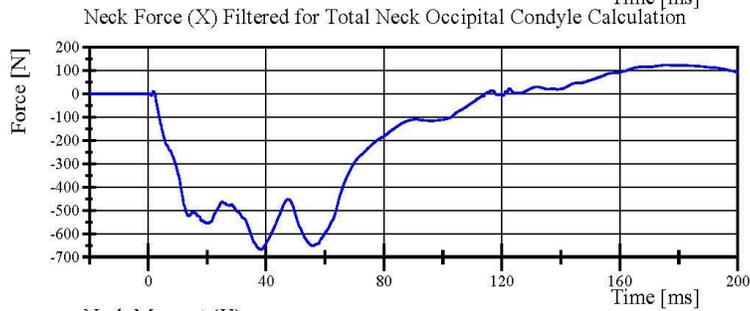
Neck Flexion

HIII 5th Serial No. 426 Certification No. 49-1

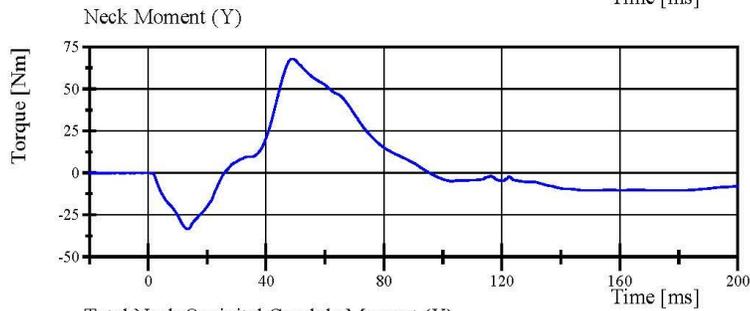
Test Date: 2/20/2019



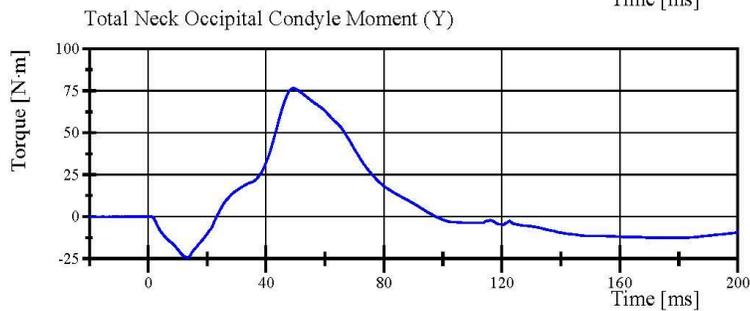
Filter Class: CFC_1000
Max: 124.4 N at 175.8 ms
Min: -666.9 N at 38.4 ms



Filter Class: CFC_600
Max: 124.1 N at 175.9 ms
Min: -666.9 N at 38.3 ms



Filter Class: CFC_600
Max: 68.0 Nm at 48.9 ms
Min: -33.4 Nm at 13.4 ms



Filter Class: Without_(Consta
Max: 76.5 N·m at 49.3 ms
Min: -24.2 N·m at 13.2 ms

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

02.20.2019 13:02:54 1823



Transportation Research Center Inc.

Neck Extension

HIII 5th Serial No. 426 Certification No. 49-3

Test Date: 2/20/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Pendulum Velocity	(-5.95) - (-6.19) m/s	-6.078 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	1.5 - 1.9 m/s	1.87 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	3.1 - 3.9 m/s	3.65 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	4.6 - 5.6 m/s	5.24 m/s	Yes
Total Head D-Plane Rotation	99 - 114 °	110.5 °	Yes
Total Neck Occipital Condyles Moment Between 99° and 114° Rotation	(-53) - (-65) N·m	-58.0 N·m	Yes
Total Neck Occipital Condyles Moment Decay to -10 N·m	94 - 114 ms	107.0 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Neck S/N: DM2392

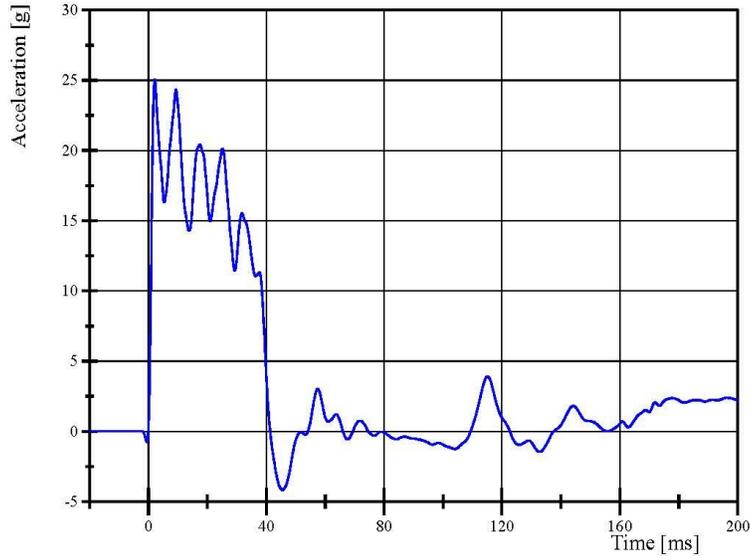
Transportation Research Center Inc.

Neck Extension

HIII 5th Serial No. 426 Certification No. 49-3

Test Date: 2/20/2019

Pendulum Acceleration

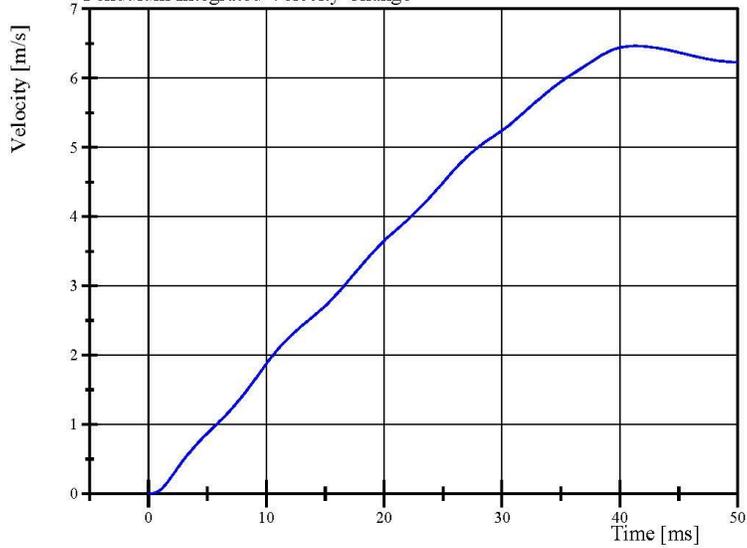


Filter Class: CFC_180

Max: 25.1 g at 2.2 ms

Min: -4.2 g at 45.6 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180

Max: 6.5 m/s at 41.4 ms

Min: 0.0 m/s at 0.0 ms

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

02.20.2019 14:51:34 1957



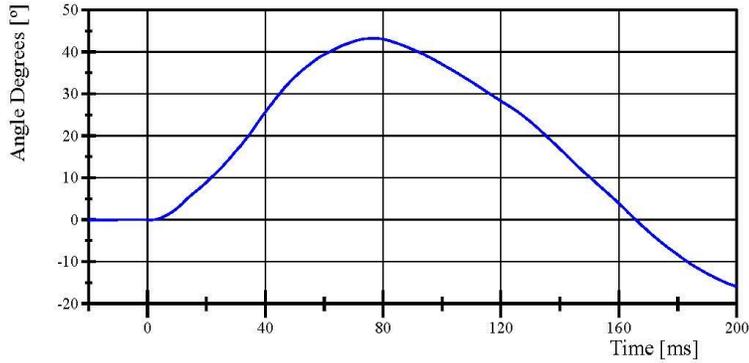
Transportation Research Center Inc.

Neck Extension

HIII 5th Serial No. 426 Certification No. 49-3

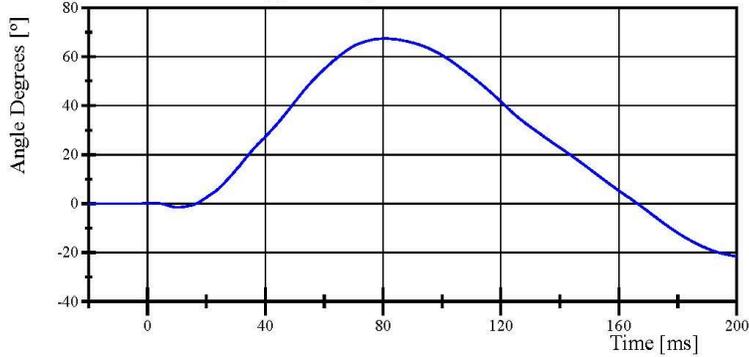
Test Date: 2/20/2019

Pot Rotation at the Base of Neck



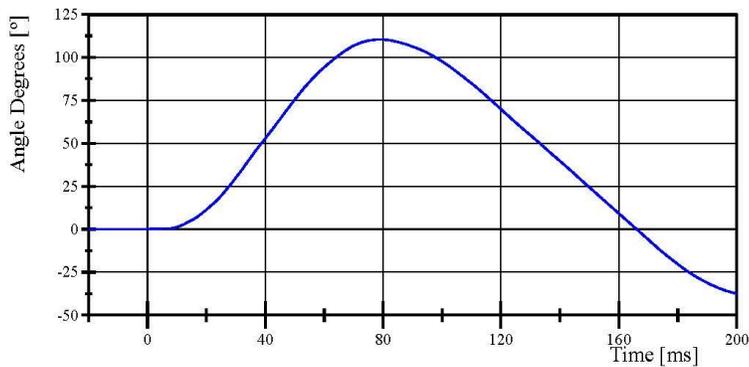
Filter Class: CFC_60
Max: 43.3 ° at 77.1 ms
Min: -15.9 ° at 200.0 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 67.4 ° at 80.7 ms
Min: -21.6 ° at 200.0 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 110.5 ° at 79.0 ms
Min: -37.5 ° at 200.0 ms

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

02.20.2019 14:51:35 1957

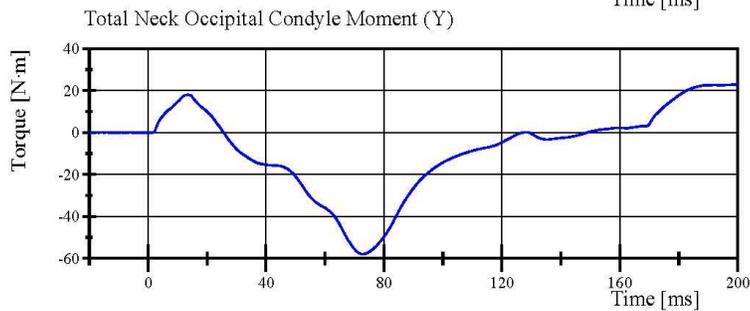
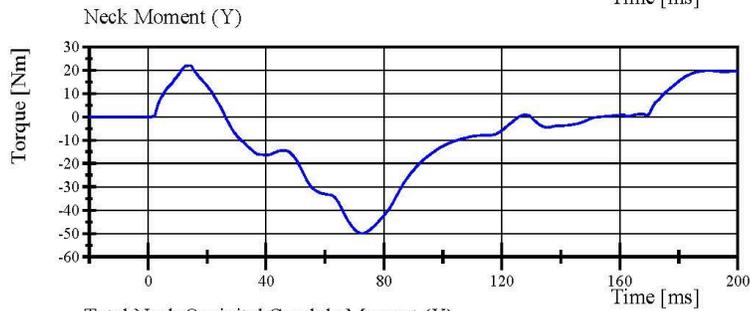
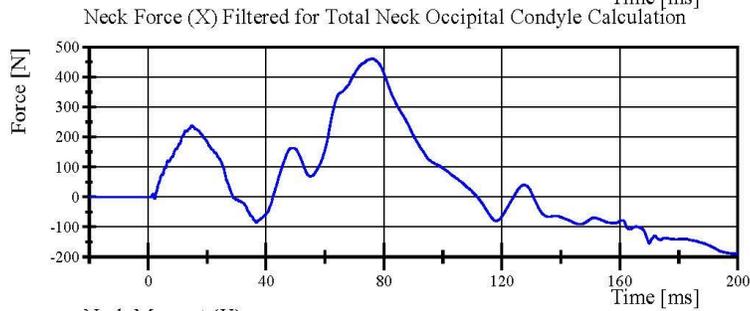
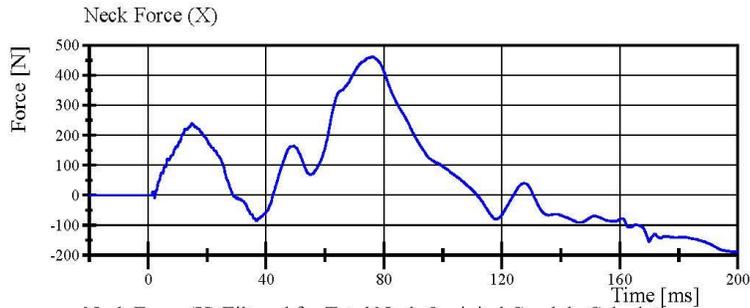


Transportation Research Center Inc.

Neck Extension

HIII 5th Serial No. 426 Certification No. 49-3

Test Date: 2/20/2019



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

02.20.2019 14:51:36 1957



Transportation Research Center Inc.

Front Thorax

HIII 5th Serial No. 426 Certification No. 49-2

Test Date: 2/20/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.759 m/s	Yes
Probe Force Peak Between 50.0 mm and 58.0 mm Chest Deflection	(-3,900) - (-4,400) N	-4,359.0 N	Yes
Probe Force Peak Between 18.0 mm and 50.0 mm Chest Deflection	>= (-4,600) N	-4,519.7 N	Yes
Maximum Chest Compression	(-50) - (-58) mm	-50.6 mm	Yes
Internal Hysteresis	69 - 85 %	74.6 %	Yes

Test meets specifications.

Condition: Used

Comments:

Jacket S/N: DG9935

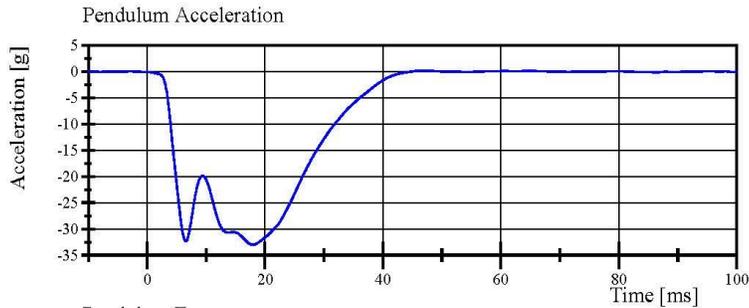
Rib Set S/N: DJ1164

Transportation Research Center Inc.

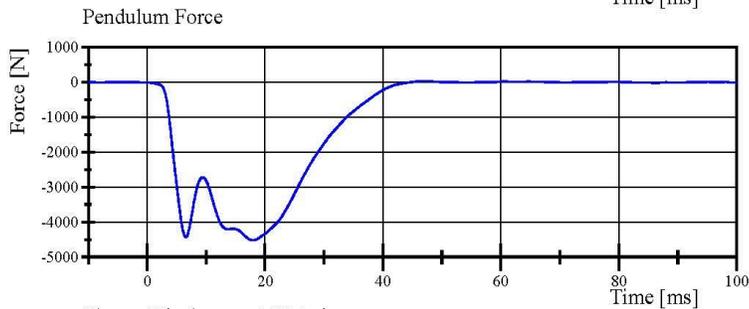
Front Thorax

HIII 5th Serial No. 426 Certification No. 49-2

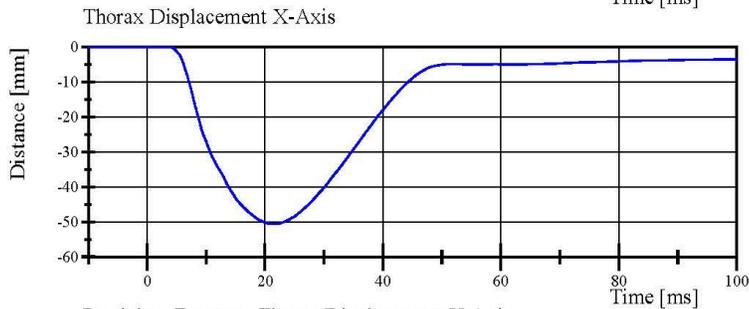
Test Date: 2/20/2019



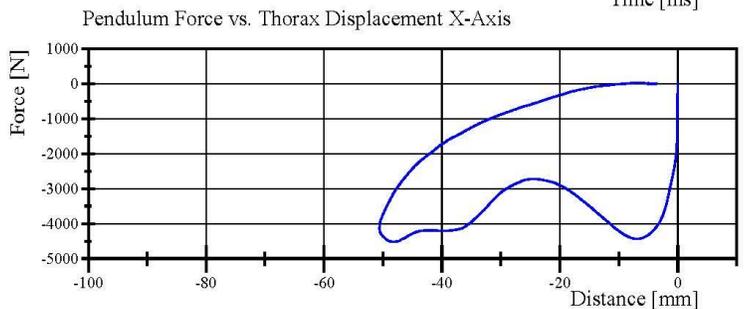
Filter Class: CFC_180
Max: 0.2 g at 47.2 ms
Min: -33.0 g at 17.9 ms



Filter Class: CFC_180
Max: 31.5 N at 47.2 ms
Min: -4,519.7 N at 17.9 ms



Filter Class: CFC_600
Max: 0.0 mm at -5.7 ms
Min: -50.6 mm at 21.4 ms



Filter Class: CFC_180
Max: 31.5 N at -6.4 mm
Min: -4,519.7 N at -48.2 mm

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

02.20.2019 08:10:10 383



Transportation Research Center Inc.

Hybrid III Small Female Torso Flexion

NHTSA

Serial Number: 426

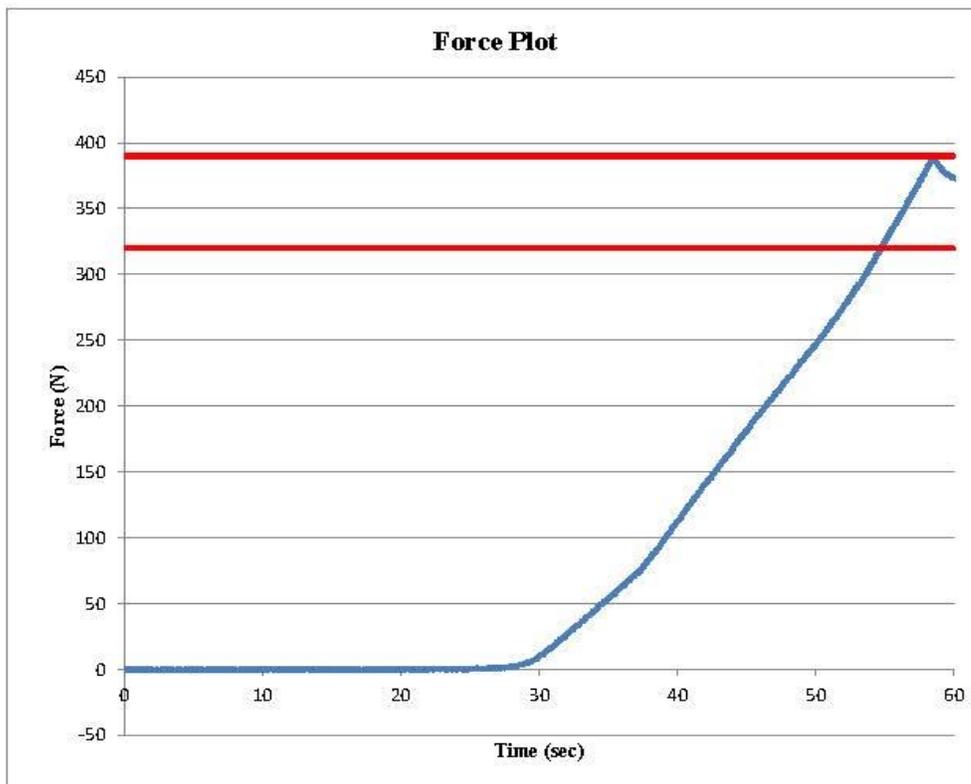
Date: 2/20/2019

Test Number: 1

Time: 12:02



TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 - 25.6	21.6 °C Pass
Humidity	10 - 70	38 % Pass
Average Angular Velocity	0.5 - 1.5	0.91 deg/sec Pass
Initial Angle	0 - 20	18.1 deg Pass
Peak Force at 45.21°	320 - 390	388.41 N Pass
Final Angle	-8 - 8	5.34 deg Pass



Comments:
Abdomen S/N: 1047
Pelvis S/N: 885
Lumbar S/N: N/A

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 5th Serial No. 426 Certification No. 49-1
Test Date: 2/20/2019

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.088 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-3,812.9 N	Yes

Test meets specifications.

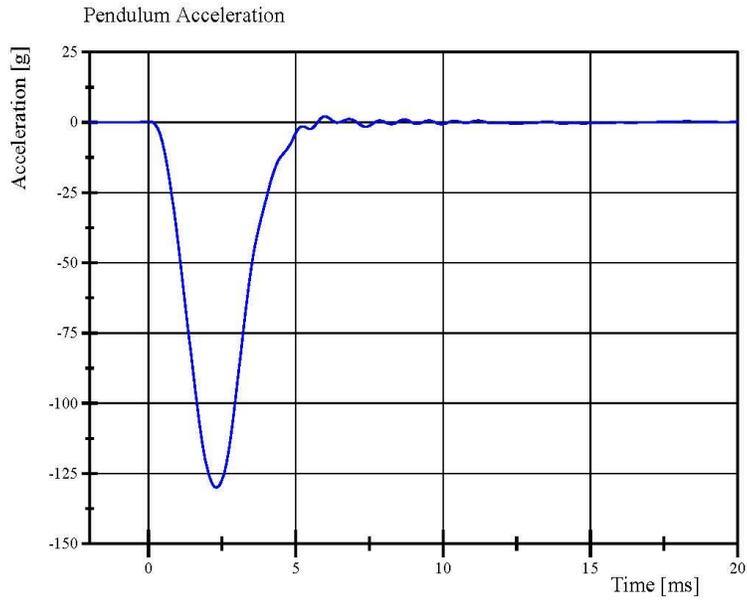
Condition: Used

Comments:

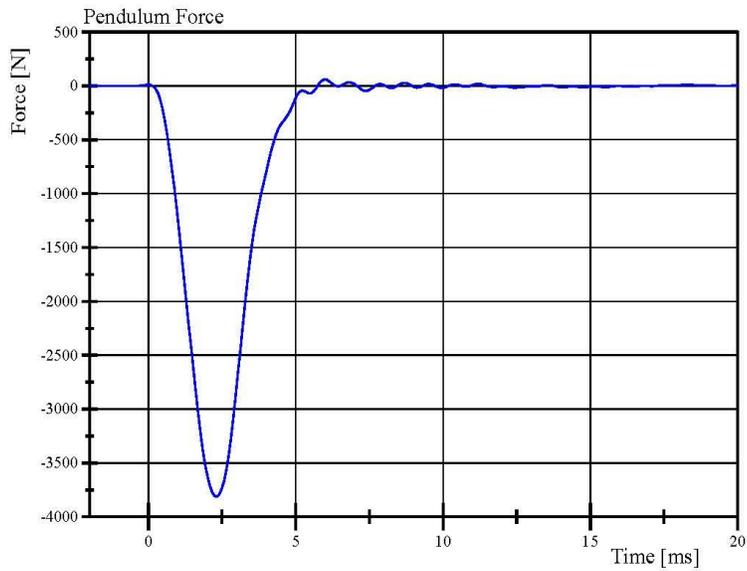
Knee Skin S/N: 1366

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 5th Serial No. 426 Certification No. 49-1
Test Date: 2/20/2019



Filter Class: CFC_600
Max: 2.1 g at 6.0 ms
Min: -130.0 g at 2.3 ms



Filter Class: CFC_600
Max: 60.6 N at 6.0 ms
Min: -3,812.9 N at 2.3 ms

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

02.20.2019 07:51:00 1812



Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 5th Serial No. 426 Certification No. 49-1
Test Date: 2/20/2019

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.087 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-3,618.9 N	Yes

Test meets specifications.

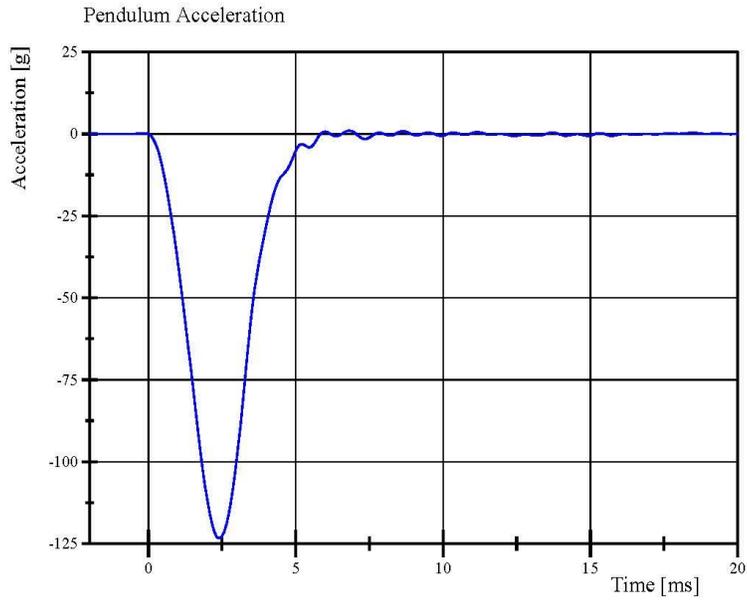
Condition: Used

Comments:

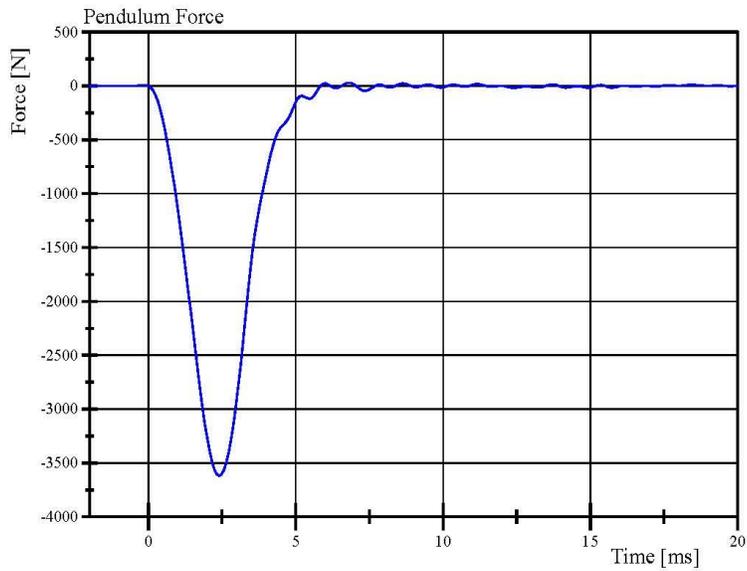
Knee Skin S/N: 1402

Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 5th Serial No. 426 Certification No. 49-1
Test Date: 2/20/2019



Filter Class: CFC_600
Max: 1.0 g at 6.8 ms
Min: -123.4 g at 2.4 ms



Filter Class: CFC_600
Max: 29.5 N at 6.8 ms
Min: -3,618.9 N at 2.4 ms

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

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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	P94536	Endevco	19-Sep-2018		
		Y	P94650	Endevco	19-Sep-2018		
		Z	P94622	Endevco	19-Sep-2018		
	Redundant	X	P94431	Endevco	19-Sep-2018		
		Y	P94487	Endevco	19-Sep-2018		
		Z	P94645	Endevco	19-Sep-2018		
Head Angular Rate Sensors			X	ARS14945	DTS	15-Oct-2018	
			Y	ARS14946	DTS	15-Oct-2018	
			Z	ARS14947	DTS	15-Oct-2018	
Upper Neck Load Cell			FX, FY, FZ, MX, MY, MZ	2021	Humanetics	2-Apr-2018	
Chest Accelerometers	Primary	X	P87834	Endevco	19-Sep-2018		
		Y	P61255	Endevco	20-Sep-2018		
		Z	P45008	Endevco	20-Sep-2018		
	Redundant	X	P91177	Endevco	19-Sep-2018		
		Y	P94570	Endevco	20-Sep-2018		
		Z	P91172	Endevco	20-Sep-2018		
Chest Potentiometer			X	CST037	Servo	29-Mar-2018	
Pelvis Accelerometers			X	P91185	Endevco	19-Sep-2018	
			Y	P91876	Endevco	19-Sep-2018	
			Z	T10338	Endevco	21-Aug-2018	
Femur Load Cells	Left	Primary	Z	DI4215-FZ1	Denton	30-Mar-2018	
		Redundant	Z	DI4215-FZ2	Denton	30-Mar-2018	
	Right	Primary	Z	DI4216-FZ1	Denton	30-Mar-2018	
		Redundant	Z	DI4216-FZ2	Denton	30-Mar-2018	
Tibia Load Cells	Left	Upper	MX, MY, FZ	3643-94	Denton	30-Mar-2018	
		Lower	MX, MY, FZ	3644-370	Denton	2-Apr-2018	
	Right	Upper	MX, MY, FZ	3643-413	Denton	2-Apr-2018	
		Lower	MX, MY, FZ	3644-401	Denton	2-Apr-2018	
Foot Accelerometers	Left	Rear	X	P90848	Endevco	19-Sep-2018	
			Z	P91498	Endevco	19-Sep-2018	
		Front	Z	P90841	Endevco	19-Sep-2018	
	Right	Rear	X	P93467	Endevco	19-Sep-2018	
			Z	P97619	Endevco	19-Sep-2018	
		Front	Z	P94523	Endevco	19-Sep-2018	
Seat Belt Load Cells			Lap	N/A	R141CC	Measurement Specialties	10-Jul-2018
			Shoulder	N/A	R141C5	Measurement Specialties	10-Jul-2018

TABLE 2 – Front Passenger Dummy Instrumentation

Instrumentation			Axis/Location	Hybrid III 5th S/N 426		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers	Primary	X	P90285	Endevco	1-Oct-2018	
		Y	P90302	Endevco	1-Oct-2018	
		Z	P94534	Endevco	1-Oct-2018	
	Redundant	X	P89014	Endevco	1-Oct-2018	
		Y	P90855	Endevco	1-Oct-2018	
		Z	P94525	Endevco	1-Oct-2018	
Head Angular Rate Sensors			X	ARS14948	DTS	15-Oct-2018
			Y	ARS14949	DTS	15-Oct-2018
			Z	ARS14952	DTS	15-Oct-2018
Upper Neck Load Cell			FX, FY, FZ, MX, MY, MZ	2207	Denton	1-Oct-2018
Chest Accelerometers	Primary	X	P93543	Endevco	1-Oct-2018	
		Y	P93533	Endevco	1-Oct-2018	
		Z	P93402	Endevco	1-Oct-2018	
	Redundant	X	P91664	Endevco	1-Oct-2018	
		Y	P93546	Endevco	1-Oct-2018	
		Z	P93547	Endevco	1-Oct-2018	
Chest Potentiometer			X	CST426	Servo	1-Oct-2018
Pelvis Accelerometers			X	P93514	Endevco	1-Oct-2018
			Y	P87467	Endevco	1-Oct-2018
			Z	P93766	Endevco	1-Oct-2018
Femur Load Cells	Left	Primary	Z	DI4214-FZ1	Denton	1-Oct-2018
		Redundant	Z	DI4214-FZ2	Denton	1-Oct-2018
	Right	Primary	Z	DI4217-FZ1	Denton	1-Oct-2018
		Redundant	Z	DI4217-FZ2	Denton	1-Oct-2018
Tibia Load Cells	Left	Upper	MX, MY, FZ	3643-92	Denton	1-Oct-2018
		Lower	MX, MY, FZ	3644-92	Denton	1-Oct-2018
	Right	Upper	MX, MY, FZ	3643-484	Denton	1-Oct-2018
		Lower	MX, MY, FZ	3644-369	Denton	1-Oct-2018
Foot Accelerometers	Left	Rear	X	P90866	Endevco	1-Oct-2018
			Z	P91909	Endevco	1-Oct-2018
		Front	Z	P97890	Endevco	4-Jan-2019
	Right	Rear	X	P97640	Endevco	1-Oct-2018
			Z	P91471	Endevco	1-Oct-2018
		Front	Z	P91907	Endevco	1-Oct-2018
Seat Belt Load Cells		Lap	N/A	R141CA	Measurement Specialties	10-Jul-2018
		Shoulder	N/A	T1210A	Measurement Specialties	20-Jul-2018

TABLE 3 – Vehicle Instrumentation

Instrumentation			Axis	Serial Number	Manufacturer	Calibration Date
Crossmember/Rear Seat Accelerometers	Left	Primary	X	T11864	Endevco	7-Jan-2019
			Z	T11452	Endevco	7-Jan-2019
	Right	Redundant	X	T11820	Endevco	7-Jan-2019
			Z	T11844	Endevco	8-Jan-2019
		Primary	X	T11844	Endevco	8-Jan-2019
			Z	T11839	Endevco	8-Jan-2019
Redundant	X	T11835	Endevco	8-Jan-2019		
	Z	T11835	Endevco	8-Jan-2019		
Engine Accelerometers	Top		X	P88455	Endevco	3-Jan-2019
	Bottom		X	T11451	Endevco	3-Jan-2019