Final Report Number: NCAP-TRC-19-007

New Car Assessment Program (NCAP)

Frontal Barrier Impact Test

GENERAL MOTORS DE MEXICO, S. DE R.L. DE C.V.

2019 Chevrolet Blazer SUV

NHTSA Number: M20190103

PREPARED BY:
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Report Date: August 23, 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: August 23, 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 Chevrolet Blazer 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 May 15, 2019.

The impact velocity was 56.46 km/h, and the ambient temperature at the barrier face at the time of impact was 21.6° C. The target vehicle post-test maximum crush was 494 millimeters at vehicle centerline. The test vehicle's performance is as follows:

	Driver ATD			Passenger ATD		
Measurement Description	Units	Threshold	Result	Units	Threshold	Result
Head Injury Criteria (HIC_{15})	NA	700	182	NA	700	313
Maximum Chest Compression	mm	63	-13.7	mm	52	-19.4
3ms Chest Clip	Gs	60	42.5	Gs	60	38.3
Nij	NA	1	0.22	NA	1	0.43
Neck Tension	Newtons	4170	792.9	Newtons	2620	553.8
Neck Compression	Newtons	4000	-111.9	Newtons	2520	-622.3
Left Femur Force	Newtons	10000	-462.1	Newtons	6800	-123.3
Right Femur Force	Newtons	10000	-1934.8	Newtons	6800	-9.2

17. Key Words	18. Distribution Statement
56.3 km/h (35 mph) Full Frontal Rigid Barrier Impact Test New Car Assessment Program (NCAP)	Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division, NPO-411 1200 New Jersey Ave, SE Washington, DC 20590 e-mail: tis@nhtsa.dot.gov FAX: 202-493-2833

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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 Chevrolet Blazer SUV at a velocity of 56.46 km/h. The test was performed at Transportation Research Center, Inc. on May 15, 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 494 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, side curtain airbag and knee airbag. The passenger's visible contact points were as follows: front airbag, headrest and glove box.

The occupant data is summarized below:

ATD Position	HIC_{15}	Nij	Neck Tension (N)	Neck Compression (N)	3 ms Chest Clip (Gs)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver (50^{th} Male)	182	0.22	792.9	-111.9	42.5	-13.7	-462.1	-1934.8
Passenger (5^{th} Female)	313	0.43	553.8	-622.3	38.3	-19.4	-123.3	-9.2

TEST COMMENTS:

Primary and redundant speed traps malfunctioned. The impact velocity was determined from the tow system tachometers and validated against the left and right overall high-speed camera views.

Vehicle Engine Top X: Channel failed at 24.0 ms

Vehicle Engine Bottom: Channel failed at 24.0 ms

Barrier 7-7: Questionable data

Barrier 8-2: Questionable data

2.2 REPORT AREA 2: DATA SHEETS

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

Test Vehicle: 2019 Chevrolet Blazer SUV NHTSA No.: M20190103
Test Program: NCAP Frontal Impact Test Date: 5/15/2019

TEST VEHICLE INFORMATION

NHTSA No.	M20190103
Model Year	2019
Make	Chevrolet
Model	Blazer
Body Style	MPV
VIN	3GNKBGRS3KS587698
Body Color	Nightfall Gray Metallic
Odometer Reading (km/mi)	106 mi
Engine Displacement (L)	3.6
Type/No. Cylinders	Gas/6
Engine Placement	Front 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	Driver Only
Anti-Lock Brakes (ABS)	Yes
Automatic Door Locks (ADLs)	Yes

TEST VEHICLE OPTIONS

Traction Control System (TCS)	Yes
Power Steering	Yes
Power Window Auto-Reverse	Yes
Driver Frontal Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	Yes
Front Pass. Frontal Airbag	Yes
Front Pass. Curtain Airbag	Yes
Front Pass. Head/Torso Airbag	No
Front Pass. Torso Airbag	No
Front Pass. Torso/Pelvis Airbag	Yes
Front Pass. Pelvis Airbag	No
Front Pass. Knee Airbag	No
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 DE MEXICO, S. DE R.L. DE C.V.
Date of Manufacture	01/19

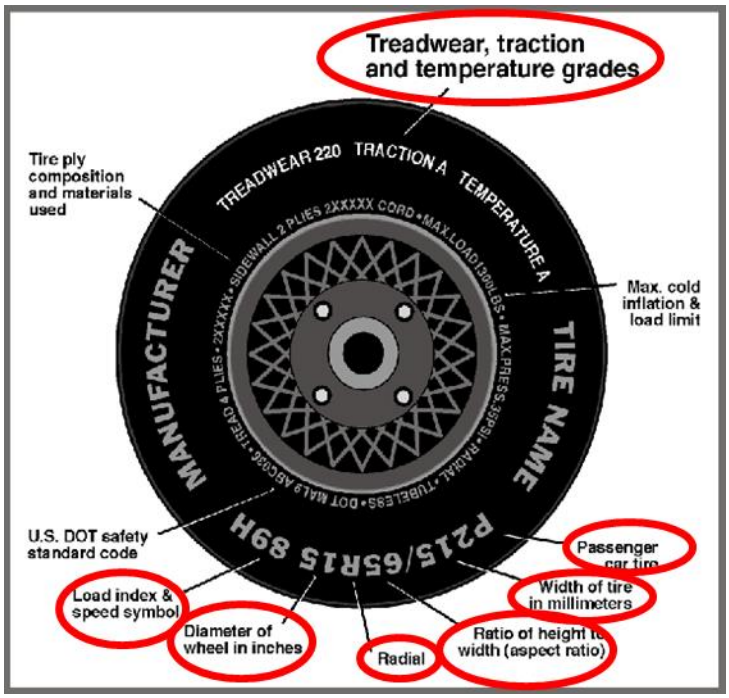
GVWR (kg)	2722 (6001 lbs)
GAWR Front (kg)	1350 (2976 lbs)
GAWR Rear (kg)	1450 (3196 lbs)

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)				777.0
Cargo Wt. (RCLW) (kg)				437.0

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

Test Vehicle: 2019 Chevrolet Blazer SUV NHTSA No.: M20190103
Test Program: NCAP Frontal Impact Test Date: 5/15/2019



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold / Test Pressure (kPa)	240	240
Recommended Tire Size	235/65R18 H	235/65R18 H
Tire Size on Vehicle	235/65R18	235/65R18
Tire Manufacturer	Continental	Continental
Tire Model	CrossContact LX Sport	CrossContact LX Sport
Treadwear	480	480
Traction Grade	A	A
Temperature Grade	A	A
Tire Plies Sidewall	2	2
Tire Plies Body	5	5
Load Index/Speed Symbol	106H	106H
Tire Material	Polyester, Steel, Polyamide	Polyester, Steel, Polyamide
DOT Safety Code Right	A3LM WD30 4918	A3LM WD30 4918
DOT Safety Code Left	A3LM WD30 4918	A3LM WD30 4918

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

Test Vehicle: 2019 Chevrolet Blazer SUV NHTSA No.: M20190103
Test Program: NCAP Frontal Impact Test Date: 5/15/2019

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	571.8	405.8		591.0	508.4	
Right	kg	561.2	374.6		574.8	506.8	
Ratio	%	59.2	40.8		53.5	46.5	
Totals	kg	1133.0	780.4	1913.4	1165.8	1015.2	2181.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1913.4
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	2188.7

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front)
As Delivered	mm	843	842	874	884	1168
As Tested	mm	840	837	846	847	1333
Post Test	mm	582	844	861	844	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2863
Total Vehicle Length at Left Side	mm	4625
Total Vehicle Length at Centerline	mm	4820
Total Vehicle Length at Right Side	mm	4622
Weight of Ballast in Cargo Area	kg	100.7
Weight of Vehicle Components Removed	kg	0.0
Amount of Stoddard Solvent in Fuel Tank	liters	76.4

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 Chevrolet Blazer SUV NHTSA No.: M20190103
Test Program: NCAP Frontal Impact Test Date: 5/15/2019

TARGET VEHICLE STRUCTURAL MEASUREMENT

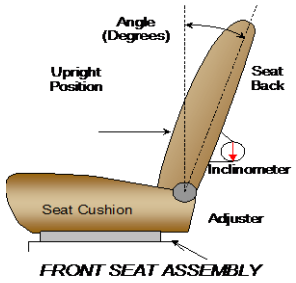
	Elements	Pre-Test (mm)
1	Total Length	4820
2	Total Width	1955
3	Bumper Top Height	535
4	Bumper Bottom Height	485
5	Longitudinal Member Top Height	655
6	Distance Between Longitudinal Members	965
7	Longitudinal Member Width	100
8	Engine Top Height	1052
9	Engine Bottom Height	215
10	Engine and Gearbox Width	900
11	Front Bumper-Engine Distance	527
12	Front Shock Absorber Fixing Height	1025
13	Bonnet Leading Edge Height	884
14	Front Shock Absorber Fixing Width	1205
15	Front Bumper – Front Axle Distance	996
16	Front Axle – A-Pillar Distance	525
17	A-Pillar – B-Pillar Distance	1060
18	B-Pillar – Rear Axle Distance	1217
19	B-Pillar – C-Pillar Distance	940
20	Roof Sill Bottom Height	1497
21	Roof Sill Top Height	1582
22	Floor Sill Bottom Height	415
23	Floor Sill Top Height	455

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

Test Vehicle: 2019 Chevrolet Blazer SUV NHTSA No.: M20190103
Test Program: NCAP Frontal Impact Test Date: 5/15/2019

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:	-20.4
Passenger Seat back angle:	-16.0

SEAT FORE/AFT POSITIONS

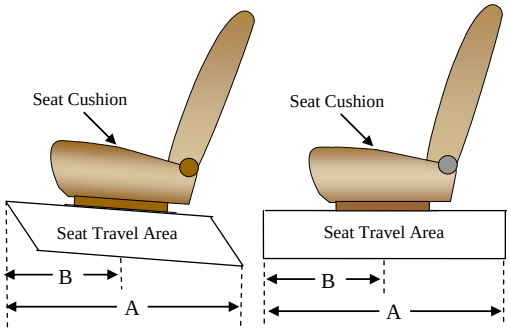
Describe the method of determining seat fore/aft positions.
Driver: Mid position, Positioned according to Form 1
Passenger: Full forward, Positioned according to Form 1

	Total Fore/Aft Travel	Placed in Position No.
Driver Seat	310 mm	155 mm
Passenger Seat	234mm; 25 notches	0 mm, 1st notch

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)

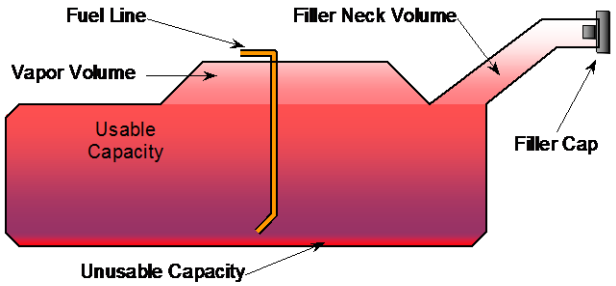
Test Vehicle: 2019 Chevrolet Blazer SUV NHTSA No.: M20190103
Test Program: NCAP Frontal Impact Test Date: 5/15/2019

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	82.1
Usable Capacity of "Optional Tank"	N/A
92%-94% of Usable Capacity	76.4
Actual Amount of Solvent Used	76.4
1/3 of Usable Capacity	27.4

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

Pump will run for about 3 seconds when the key is turned on and then will not run Unless the engine is cranking or running

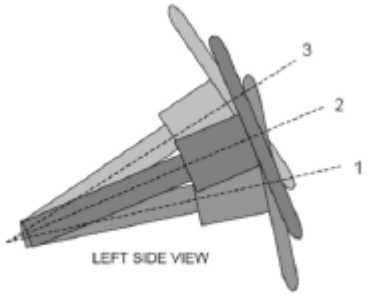


VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

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

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



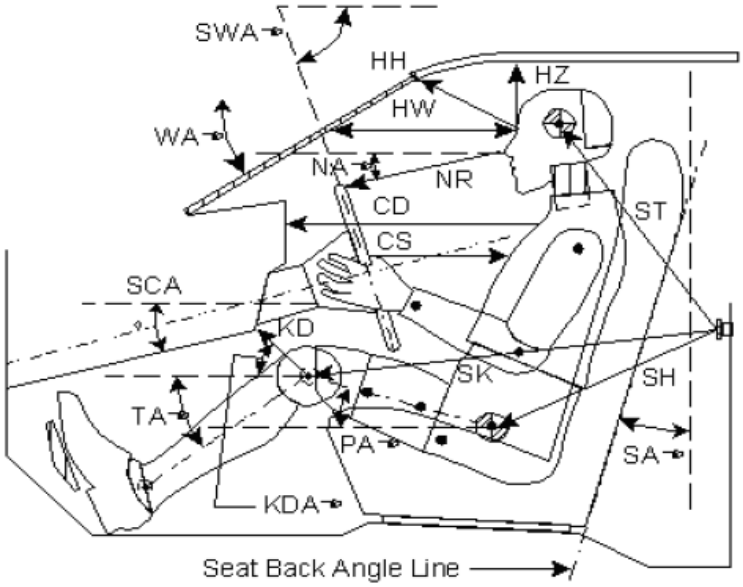
STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONS

	Degrees	Fore/Aft Position (mm)
Lowermost Position No. 1	20.5	0
Geometric Center Position No. 2	22.7	30
Uppermost Position No. 3	24.8	60
Telescoping Steering Wheel Travel		60
Test Position	22.7	30

DATA SHEET NO. 3 - DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

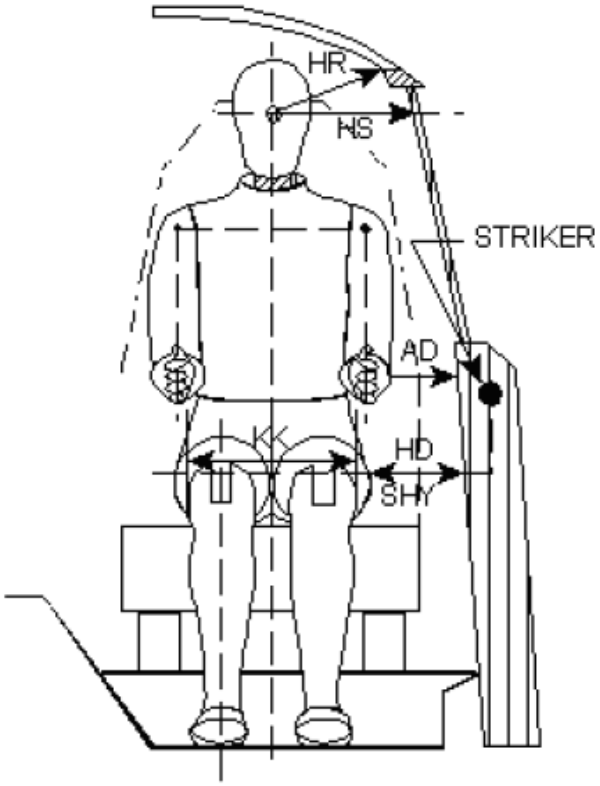
Test Vehicle: 2019 Chevrolet Blazer SUV NHTSA No.: M20190103
Test Program: NCAP Frontal Impact Test Date: 5/15/2019



Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WAº	Windshield Angle		26.6		
SWAº	Steering Wheel Angle		67.3		
SCAº	Steering Column Angle		22.7		
SAº	Seat Back Angle (on head rest post)		-20.4		-16.0
HZ	Head to Roof (Z)	248		255	
HH	Head to Header	421		402	
HW	Head to Windshield	760		780	
NR	Nose to Rim	398	5.7		
CD	Chest to Dash	556		453	
CS	Chest to Steering Hub	337			
RA	Rim to Abdomen	217			
KDL	Left Knee to Dash	202	25.9	157	22.6
KDR	Right Knee to Dash	203	25.4	166	22.2
PAº	Pelvic Angle		22.3		19.0
TAº	Tibia Angle		46.7		53.4
SK	Striker to Knee	569	1.0	646	4.2
ST	Striker to Head	567	-77.1	513	-68.7
SH	Striker to H-Point	253	33.0	325	15.8

DATA SHEET NO. 4 - DUMMY LATERAL CLEARANCE DIMENSIONS

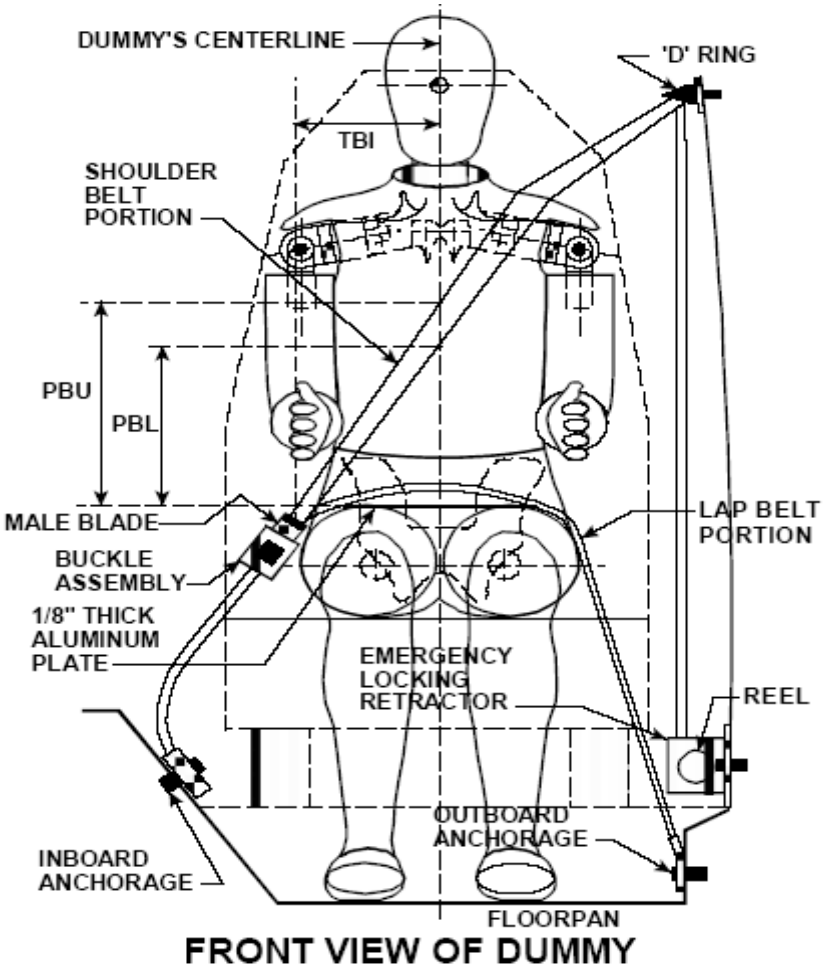
Test Vehicle: 2019 Chevrolet Blazer SUV NHTSA No.: M20190103
Test Program: NCAP Frontal Impact Test Date: 5/15/2019



Code	Measurement Description	Driver	Passenger
AD	Arm to Door	25	94
HD	H-Point to Door	147	192
HR	Head to Side Header	280	325
HS	Head to Side Window	353	411
KK	Knee to Knee	315	170
SHY	Striker to H-Point (Y Direction)	234	280
AA	Ankle to Ankle	325	175

DATA SHEET NO. 5 - SEAT BELT POSITIONING DATA

Test Vehicle: 2019 Chevrolet Blazer SUV NHTSA No.: M20190103
Test Program: NCAP Frontal Impact Test Date: 5/15/2019



FRONT VIEW OF DUMMY

SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU – Top surface of reference to belt upper edge	mm	342	256
PBL – Top surface of reference to belt lower edge	mm	262	176

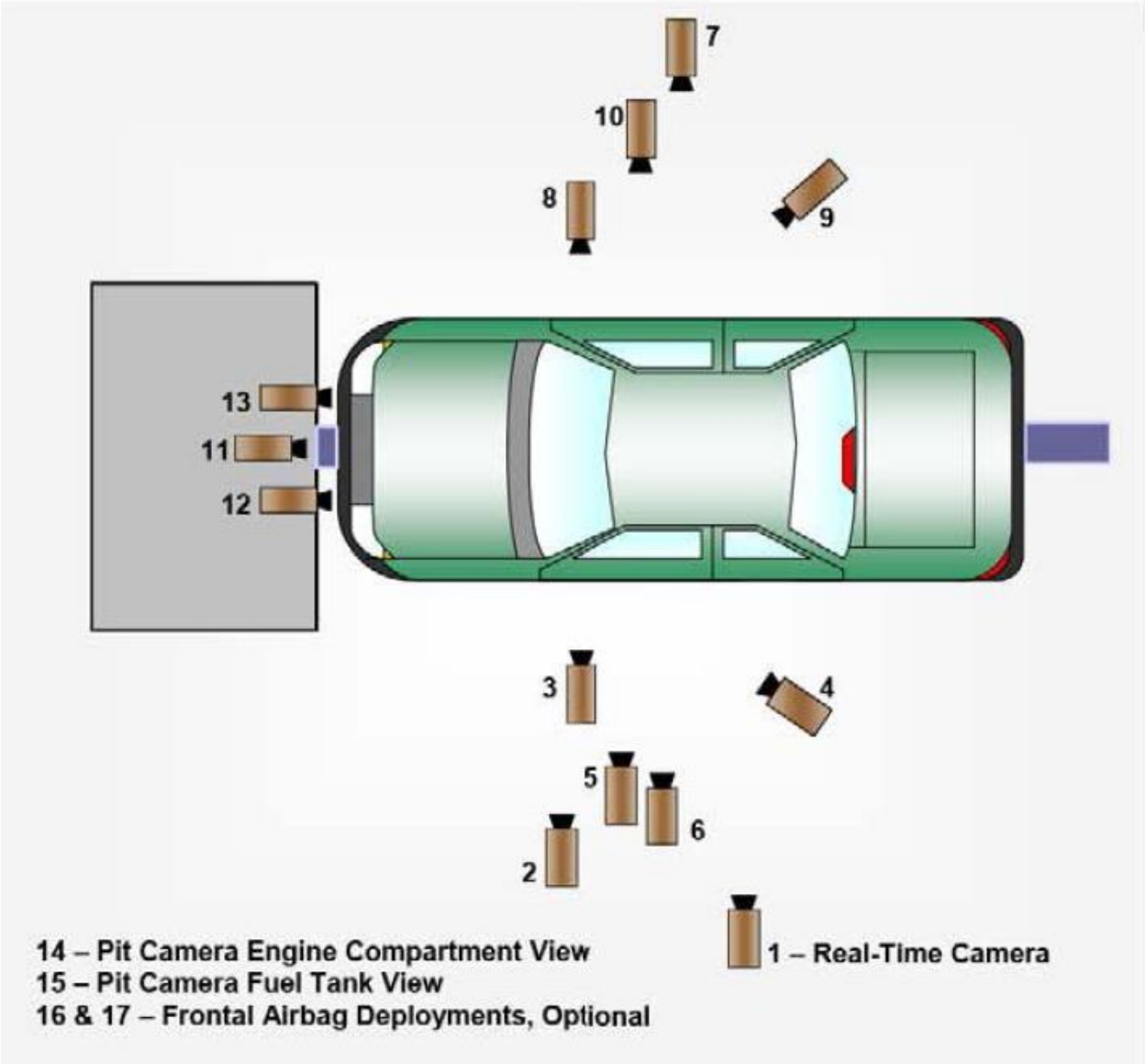
BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	873	925
Lap belt length as measured on ATD	mm	428	483
Remainder of belt on reel	mm	1301	1408
Total belt length for continuous webbing systems	mm	2520	2530

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

Test Vehicle: 2019 Chevrolet Blazer SUV NHTSA No.: M20190103
Test Program: NCAP Frontal Impact Test Date: 5/15/2019

CAMERA POSITIONS FOR FRONTAL IMPACTS



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

Test Vehicle: 2019 Chevrolet Blazer SUV NHTSA No.: M20190103
Test Program: NCAP Frontal Impact Test Date: 5/15/2019

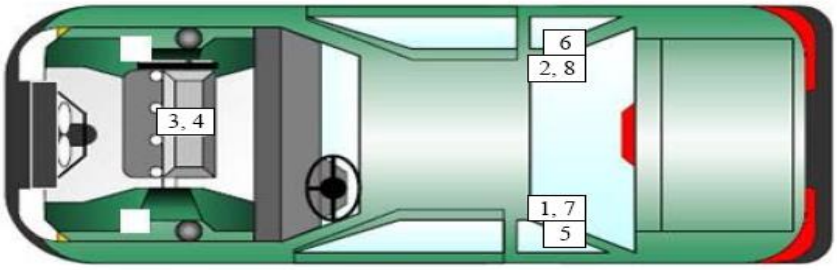
CAMERA LOCATIONS

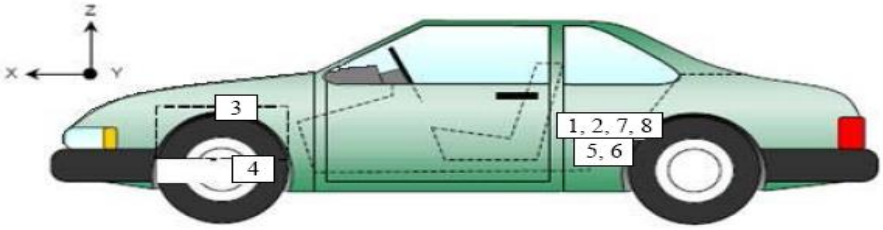
No.	Camera View	Location (mm)			Lens (mm)	Frame Speed (fps)
		X	Y	Z		
1	REAL-TIME LEFT OVERALL	611	-5825	-1430	Zoom	30
2	LEFT OVERALL	2360	-6042	-1431	20	1000
3	DRIVER CLOSE-UP	1650	-5423	-1445	50	1000
4	LEFT FRONT HALF	1322	-5287	-1299	25	1000
5	LEFT ANGLE	3733	-2300	-1861	25	1000
6	STEERING COLUMN	1979	-5840	-1334	50	1000
7	RIGHT OVERALL	2262	6457	-1212	20	1000
8	PASSENGER CLOSE-UP	1600	6346	-1422	50	1000
9	RIGHT FRONT HALF	1329	5534	-1343	25	1000
10	RIGHT ANGLE	4065	2783	-1950	25	1000
11	WINDSHIELD	0	0	-2588	8.5	1000
12	DRIVER WINDSHIELD	0	-443	-2588	20	1000
13	PASSENGER WINDSHIELD	0	-411	-2588	20	1000
14	PIT FRONT	703	0	3272	25	1000
15	PIT REAR	2618	0	3272	12.5	1000
16	DRIVER ONBOARD				12.5	1000
17	PASSENGER ONBOARD				12.5	1000

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

DATA SHEET NO. 7 - VEHICLE ACCELEROMETER DATA

Test Vehicle: 2019 Chevrolet Blazer SUV NHTSA No.: M20190103
Test Program: NCAP Frontal Impact Test Date: 5/15/2019





VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Accelerometer – X Direction	1810	-548	-471
2	Right Rear Accelerometer – X Direction	1810	555	-468
3	Engine Top X	800	60	-969
4	Engine Bottom X	4120	-20	-214
5	Left Rear Accelerometer – Z Direction	1810	-548	-478
6	Right Rear Accelerometer – Z Direction	1810	555	-481
7	Left Rear Accelerometer – X Direction Redundant	1810	-507	-471
8	Right Rear Accelerometer- X Direction Redundant	1810	515	-468

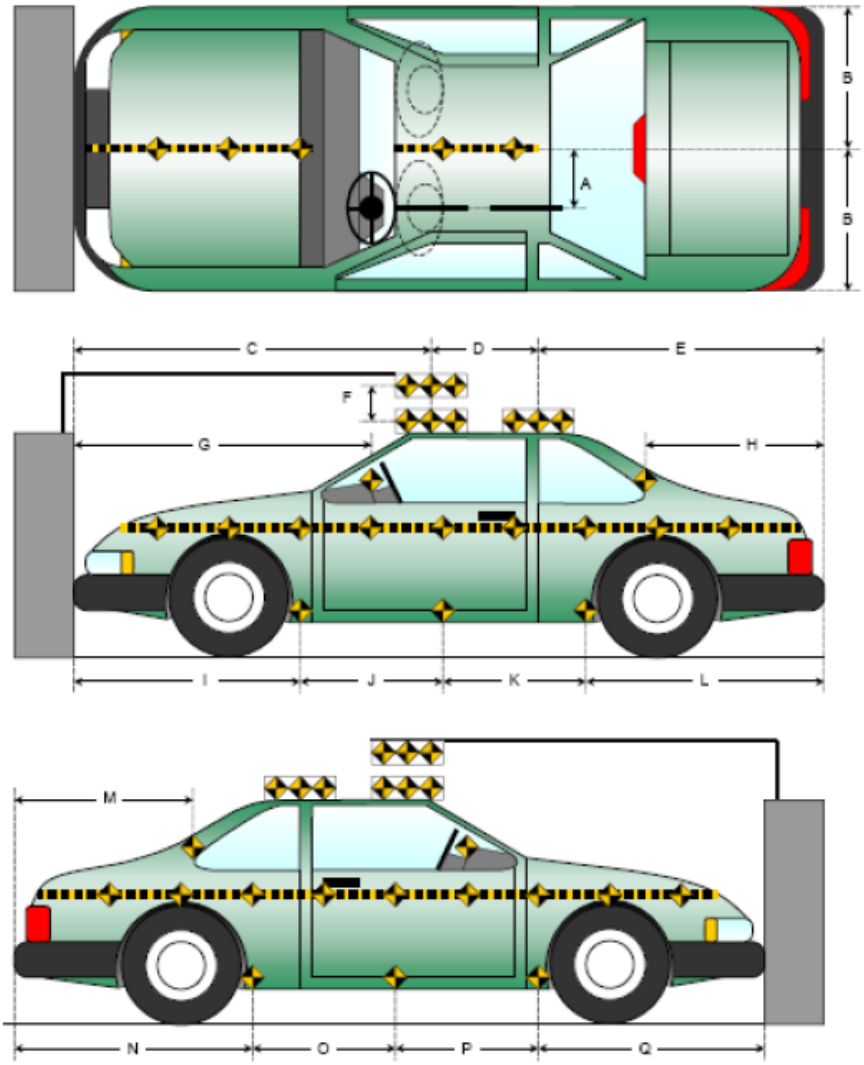
Reference Points: X – Rear Surface of Vehicle (+ forward)
Y – Vehicle Centerline (+ to right)
Z – Ground Plane (+ down)

DATA SHEET NO. 8 - PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2019 Chevrolet Blazer SUV NHTSA No.: M20190103
Test Program: NCAP Frontal Impact Test Date: 5/15/2019

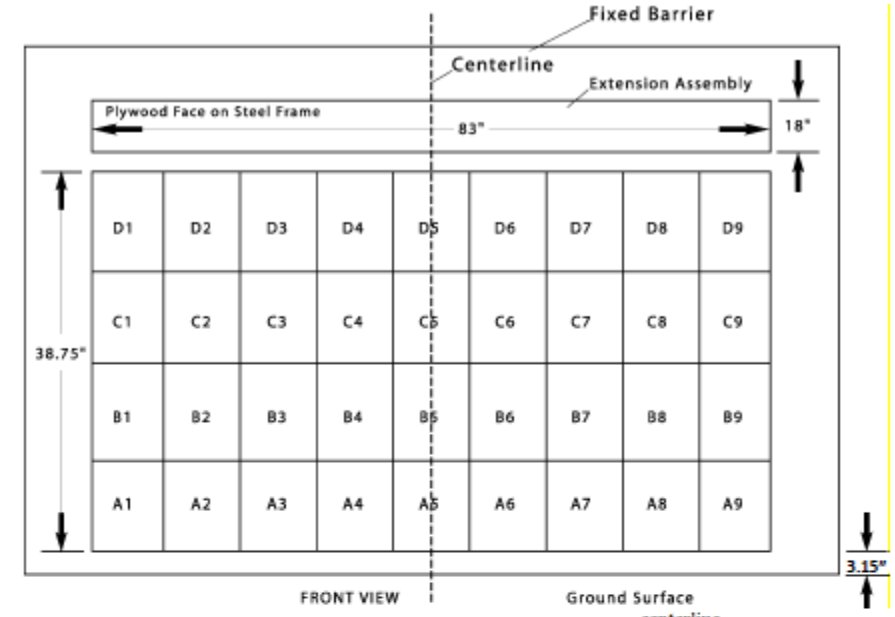
Item	Value
A	405
B	978
C	2470
D	610
E	1772
F	377
G	1795
H	932
I	1494
J	932
K	895
L	1502
M	933
N	1502
O	885
P	935
Q	1492

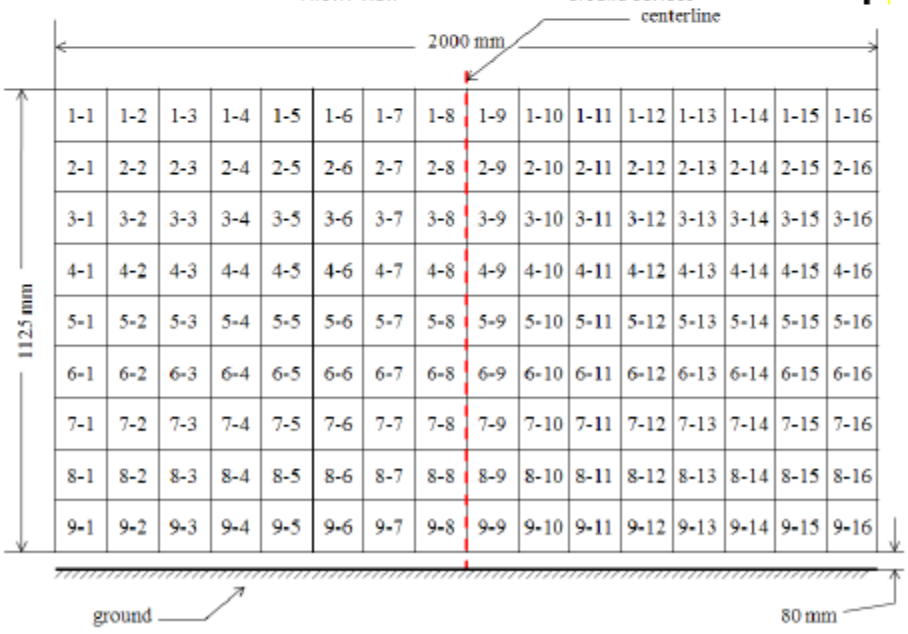
All units in millimeters



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

Test Vehicle: 2019 Chevrolet Blazer SUV NHTSA No.: M20190103
Test Program: NCAP Frontal Impact Test Date: 5/15/2019





DATA SHEET NO. 10 - TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2019 Chevrolet Blazer SUV NHTSA No.: M20190103
Test Program: NCAP Frontal Impact Test Date: 5/15/2019

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 Chevrolet Blazer SUV NHTSA No.: M20190103
Test Program: NCAP Frontal Impact Test Date: 5/15/2019

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, Head Restraint and SCAB	Frontal Airbag and Head Restraint
Upper Torso Contact	Airbag	Airbag
Lower Torso Contact	None	None
Left Knee Contact	Knee Airbag	Glove Box
Right Knee Contact	Knee Airbag	Glove Box

DOOR OPENING, TRUNK OPENING, AND SEAT TRACK INFORMATION

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

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

POST- OTHER VEHICLE POST-TEST OBSERVATIONS

Critical Areas of Performance	Observations
Windshield Damage	Slight damage from hood at lower outboard corners
Window Damage	None
Other Notable Effects	None

VEHICLE REBOUND FROM BARRIER

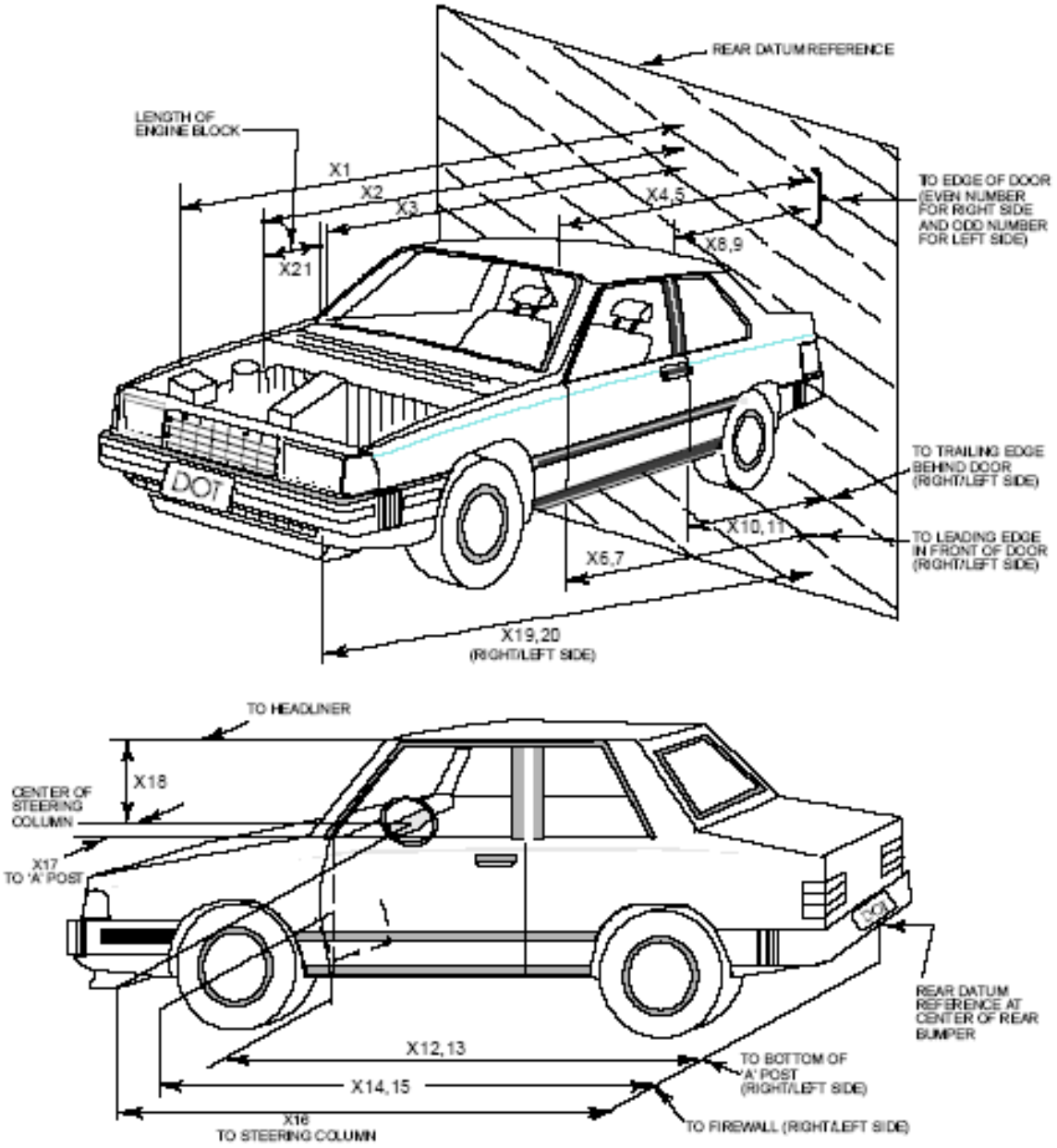
Measured Parameter	Units	Value
Left Side	mm	1005
Center	mm	1048
Right Side	mm	1060
Average	mm	1038

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	No	N/A
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 Chevrolet Blazer SUV NHTSA No.: M20190103
Test Program: NCAP Frontal Impact Test Date: 5/15/2019



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

Test Vehicle: 2019 Chevrolet Blazer SUV NHTSA No.: M20190103
Test Program: NCAP Frontal Impact Test Date: 5/15/2019

No.	Measurement Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	4820	4326	494
2	Rear Surface of Vehicle (RSOV) to Front of Engine	4293	4046	247
3	RSOV to Firewall	3725	3706	19
4	RSOV to Upper Leading Edge of Right Door	3268	3268	0
5	RSOV to Upper Leading Edge of Left Door	3270	3270	0
6	RSOV to Lower Leading Edge of Right Door	3255	3259	-4
7	RSOV to Lower Leading Edge of Left Door	3258	3263	-5
8	RSOV to Upper Trailing Edge of Right Door	2205	2208	-3
9	RSOV to Upper Trailing Edge of Left Door	2205	2205	0
10	RSOV to Lower Trailing Edge of Right Door	2240	2245	-5
11	RSOV to Lower Trailing Edge of Left Door	2243	2248	-5
12	RSOV to Bottom of "A" Post-of Right Side	3240	3238	2
13	RSOV to Bottom of "A" Post-of Left Side	3240	3244	-4
14	RSOV to Firewall, Right Side	3847	3831	16
15	RSOV to Firewall, Left Side	3850	3867	-17
16	RSOV to Steering Column	2872	2912	-40
17	Center of Steering Column to "A" Post	330	340	-10
18	Center of Steering Column to Headliner	450	475	-25
19	RSOV to Right Side of Front Bumper	4622	4301	321
20	RSOV to Left Side of Front Bumper	4625	4350	275
21	Length of Engine Block	500	500	0
RD	RSOV to Right Side of Dash Panel	3045	3046	-1
CD	RSOV to Center of Dash Panel	2955	2977	-22
LD	RSOV to Left Side of Dash Panel	3048	3050	-2

All Dimensions in mm

DATA SHEET NO. 13 - ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2019 Chevrolet Blazer SUV NHTSA No.: M20190103
Test Program: NCAP Frontal Impact Test Date: 5/15/2019

VEHICLE INFORMATION

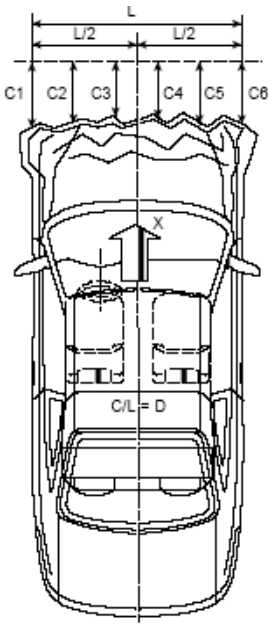
VIN: 3GNKBGRS3KS587698 Wheelbase: 2863
Vehicle Size Category: MPV Test Weight (kg): 2181.0

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): 56.46
Velocity Change (km/h): 66.26
Time of Separation (ms): 176

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	4625	4350	275
C2	Crush zone 2 at left side	mm	4755	4340	415
C3	Crush zone 3 at left side	mm	4808	4335	473
C4	Crush zone 4 at right side	mm	4810	4340	470
C5	Crush zone 5 at right side	mm	4760	4310	450
C6	Crush zone 6 at right side	mm	4622	4301	321
L	C1 to C6	mm	1524	1495	29

DATA SHEET NO. 14 - VEHICLE INTRUSION MEASUREMENTS

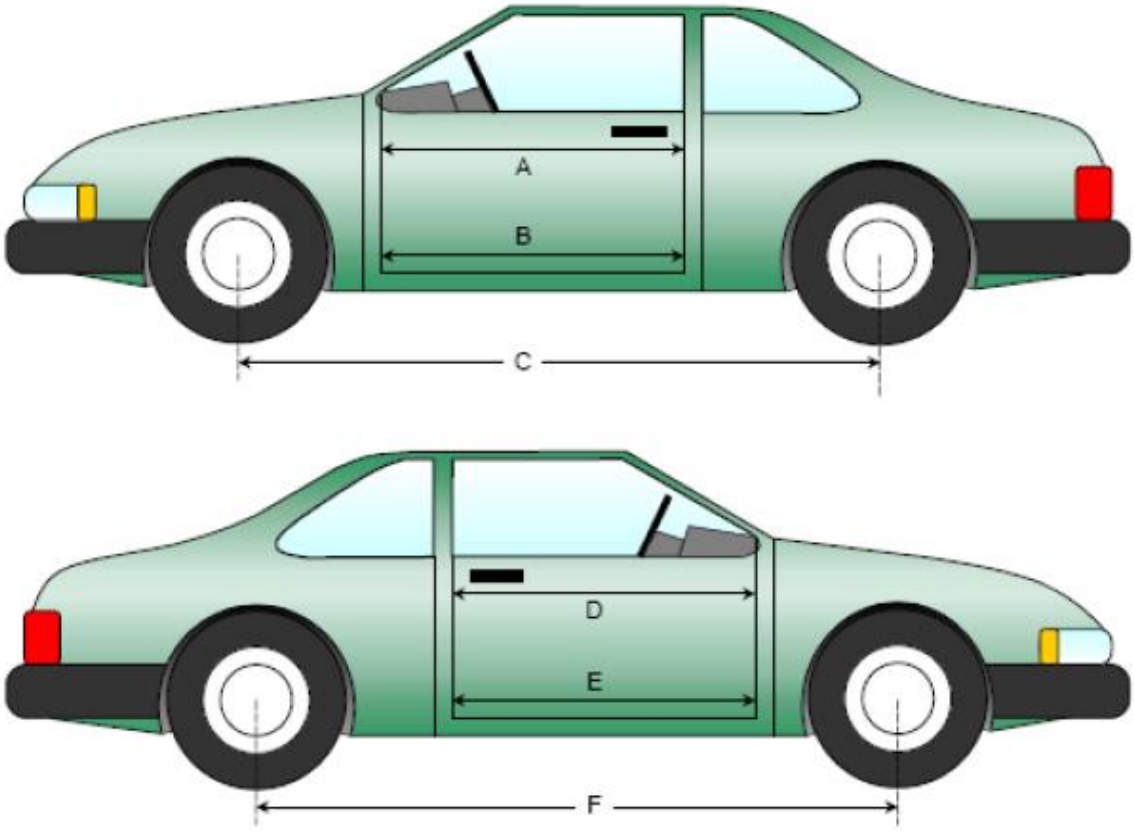
Test Vehicle: 2019 Chevrolet Blazer SUV NHTSA No.: M20190103
Test Program: NCAP Frontal Impact Test Date: 5/15/2019

DOOR OPENING WIDTH

No.	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	990	990	0
B	Left Side Lower	mm	875	875	0
D	Right Side Upper	mm	990	990	0
E	Right Side Lower	mm	875	875	0

WHEELBASE MEASUREMENTS

No.	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2863	2840	23
F	Right Side Wheelbase	mm	2863	2792	71



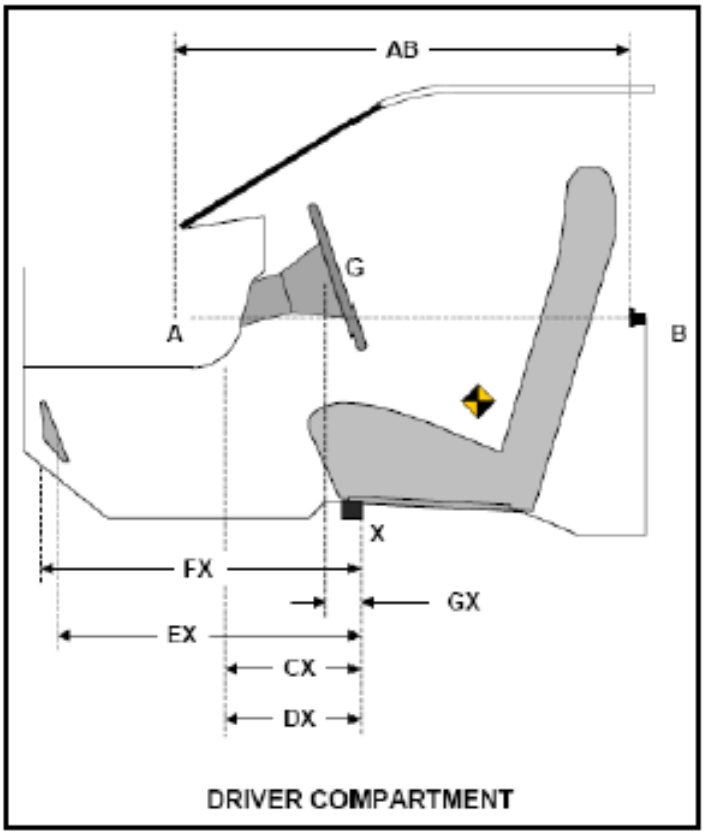
DATA SHEET NO. 14 - VEHICLE INTRUSION MEASUREMENTS (CONT'D)

Test Vehicle: 2019 Chevrolet Blazer SUV NHTSA No.: M20190103
Test Program: NCAP Frontal Impact Test Date: 5/15/2019

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	990	990	0
CX	Left Knee Bolster to X	mm	330	345	-15
DX	Right Knee Bolster to X	mm	335	330	5
EX	Brake Pedal to X	mm	580	555	25
FX	Foot Rest to X	mm	600	590	10
GX	Center of Steering Column Wheel Hub to X	mm	120	158	-38

X = Front of Seat Track (Stationary)



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

Test Vehicle: 2019 Chevrolet Blazer SUV NHTSA No.: M20190103
Test Program: NCAP Frontal Impact Test Date: 5/15/2019

Please provide windshield mounting details.

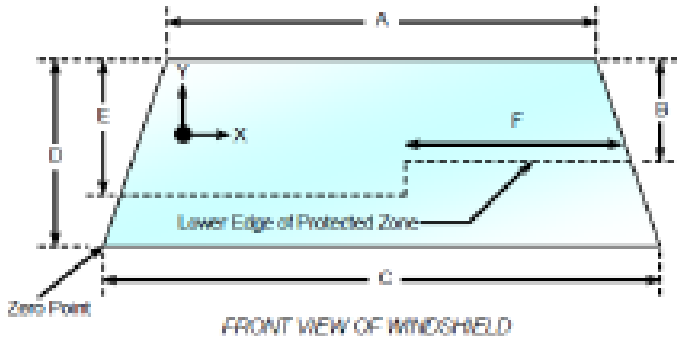
The standard requires that the post-test retention measurement be a minimum of 75% of the pre-test total periphery measurement for vehicle not equipped with occupant passive restraint and 50% for each side of the windshield for vehicle which are equipped with occupant passive restraints.

Temperature of windshield molding during test: 21.6°C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2275	2275	100.0
Right Side	2275	2275	100.0
Total	4550	4550	100.0

Item	Units	Value
A	mm	1280
B	mm	522
C	mm	1570
D	mm	850
E	mm	505
F	mm	510



FRONT VIEW OF WINDSHIELD

AREAS OF PROTECTED ZONE FAILURES

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

X	Y
NA	NA
NA	NA
NA	NA
NA	NA

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

X	Y
NA	NA
NA	NA
NA	NA
NA	NA

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

Test Vehicle: 2019 Chevrolet Blazer SUV NHTSA No.: M20190103
Test Program: NCAP Frontal Impact Test Date: 5/15/2019

FMVSS 301 FUEL SYSTEM INTEGRTY POST IMPACT DATA

Temperature at Time of Impact: 21.4°C Test Time: 14:17

Stoddard Solvent Spillage Measurements

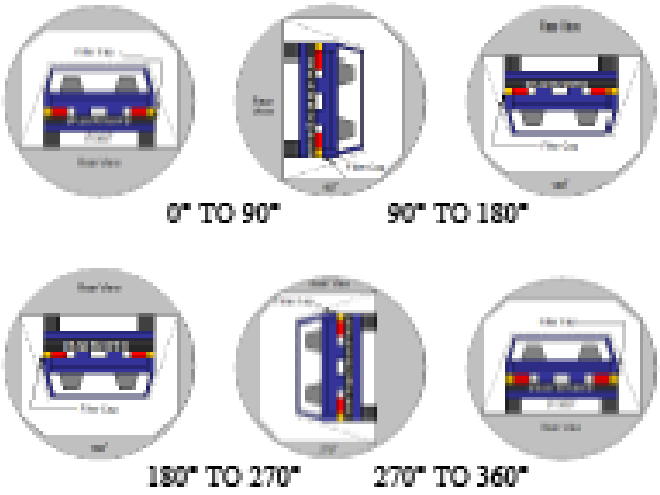
A	From impact until vehicle motion ceases: (maximum allowable – 1 oz.)	0 oz.
B	For the 5-minute period after motion ceases: (maximum allowable – 5 oz.)	0 oz.
C	For the following 25 minutes: (maximum allowable – 1 oz./minutes)	0 oz.
D	Spillage: None	

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

Test Vehicle: 2019 Chevrolet Blazer SUV NHTSA No.: M20190103
Test Program: NCAP Frontal Impact Test Date: 5/15/2019

1. The specified fixture rollover rate for each 90º 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
0º to 90º	90	330	420
90º to 180º	90	330	840
180º to 270º	90	330	1260
270º to 360º	90	330	1480

FMVSS 301 SPILLAGE TABLE

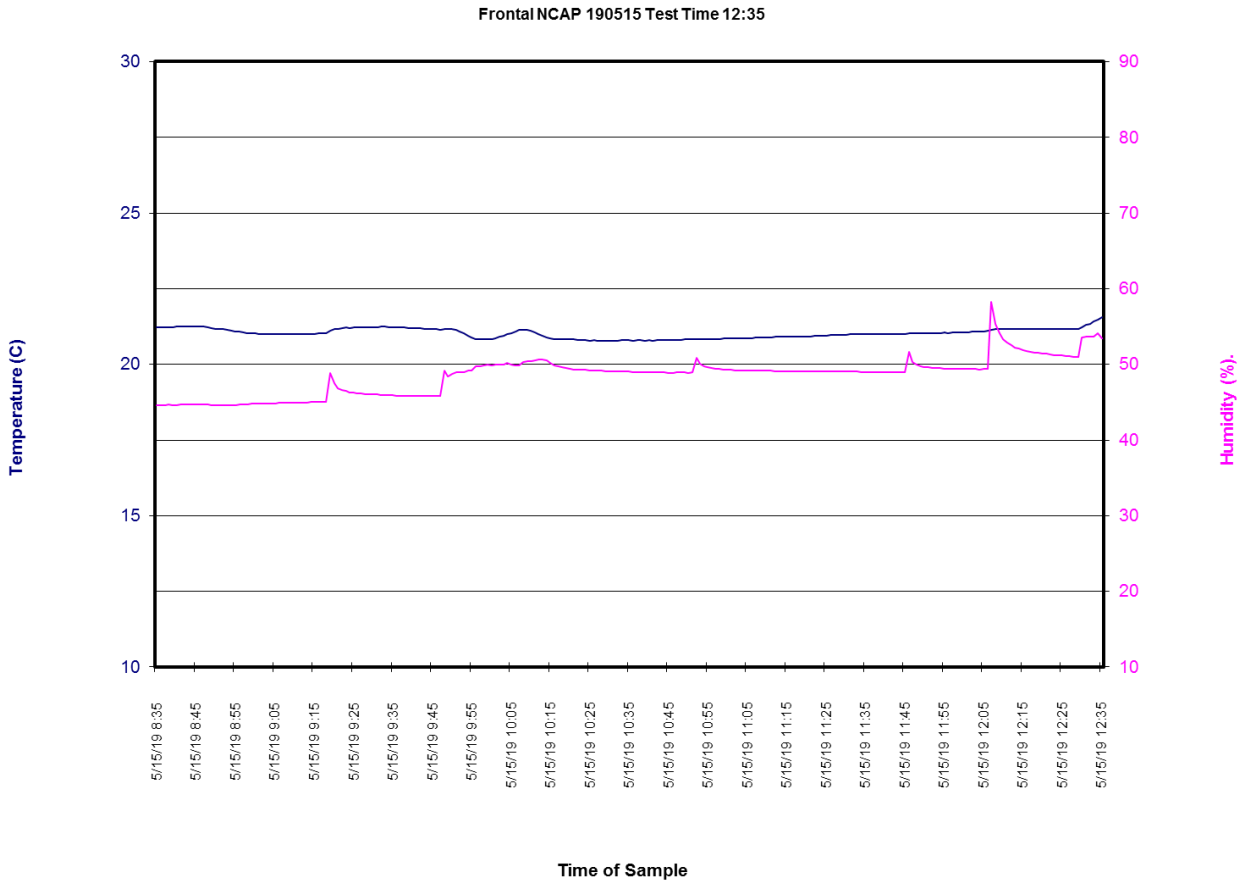
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0º to 90º	0	0	0	N/A
90º to 180º	0	0	0	N/A
180º to 270º	0	0	0	N/A
270º to 360º	0	0	0	N/A

SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0º to 90º	None
90º to 180º	None
180º to 270º	None
270º to 360º	None

DATA SHEET NO. 17 - DUMMY/VEHICLE TEMPERATURE STABILIZATION

Test Vehicle: 2019 Chevrolet Blazer SUV NHTSA No.: M20190103
Test Program: NCAP Frontal Impact Test Date: 5/15/2019



APPENDIX A
PHOTOGRAPHS

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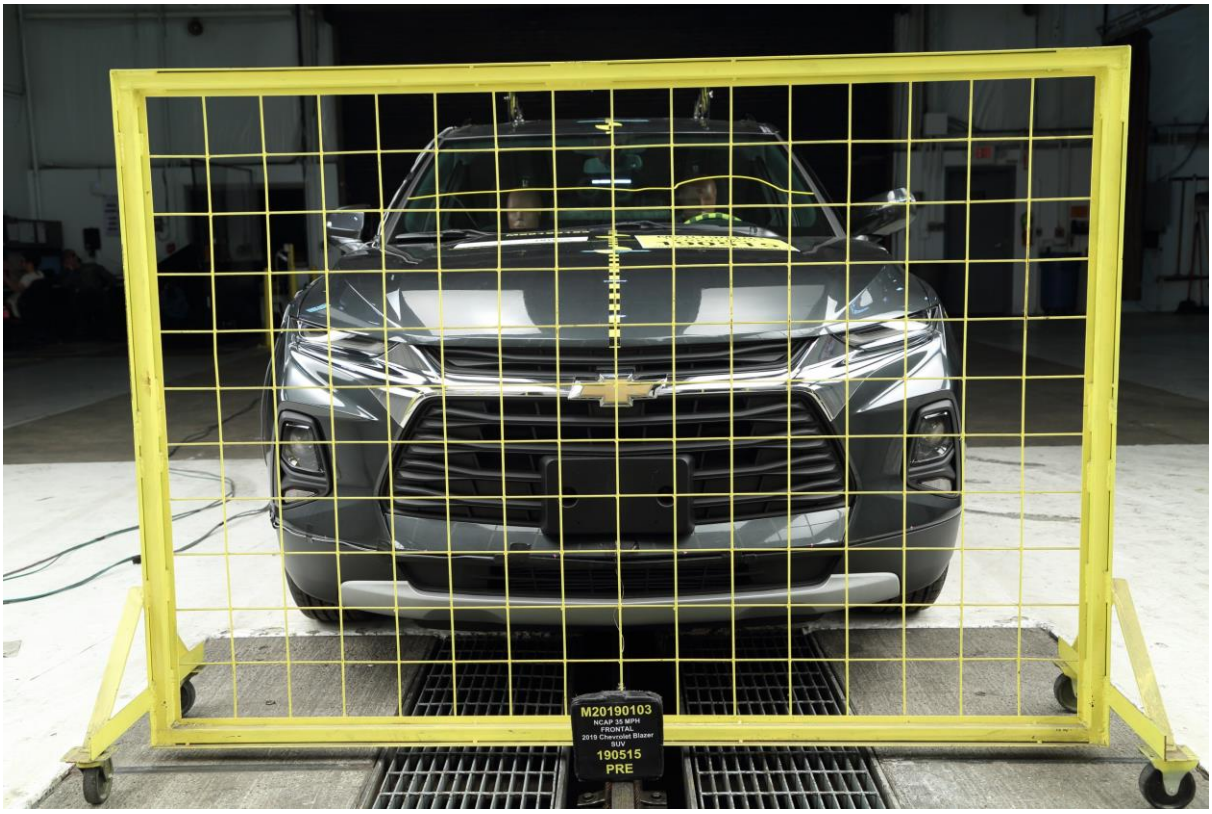
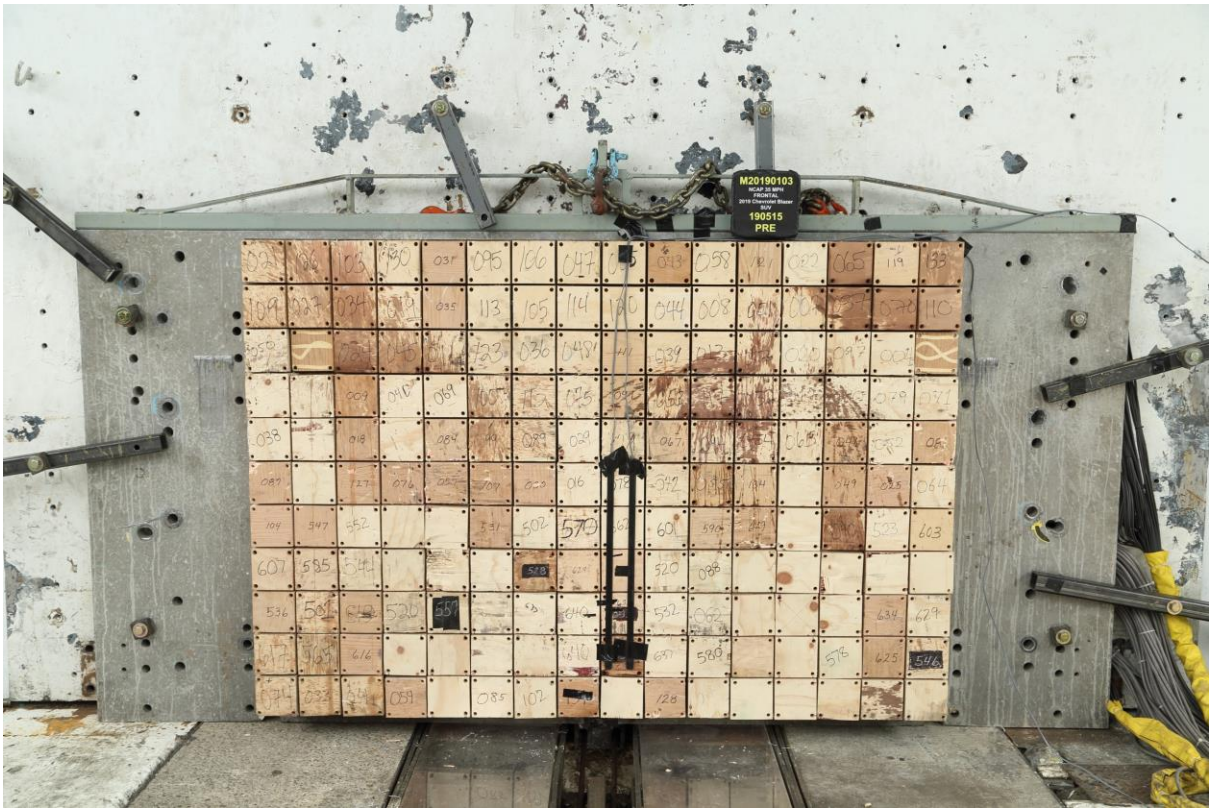
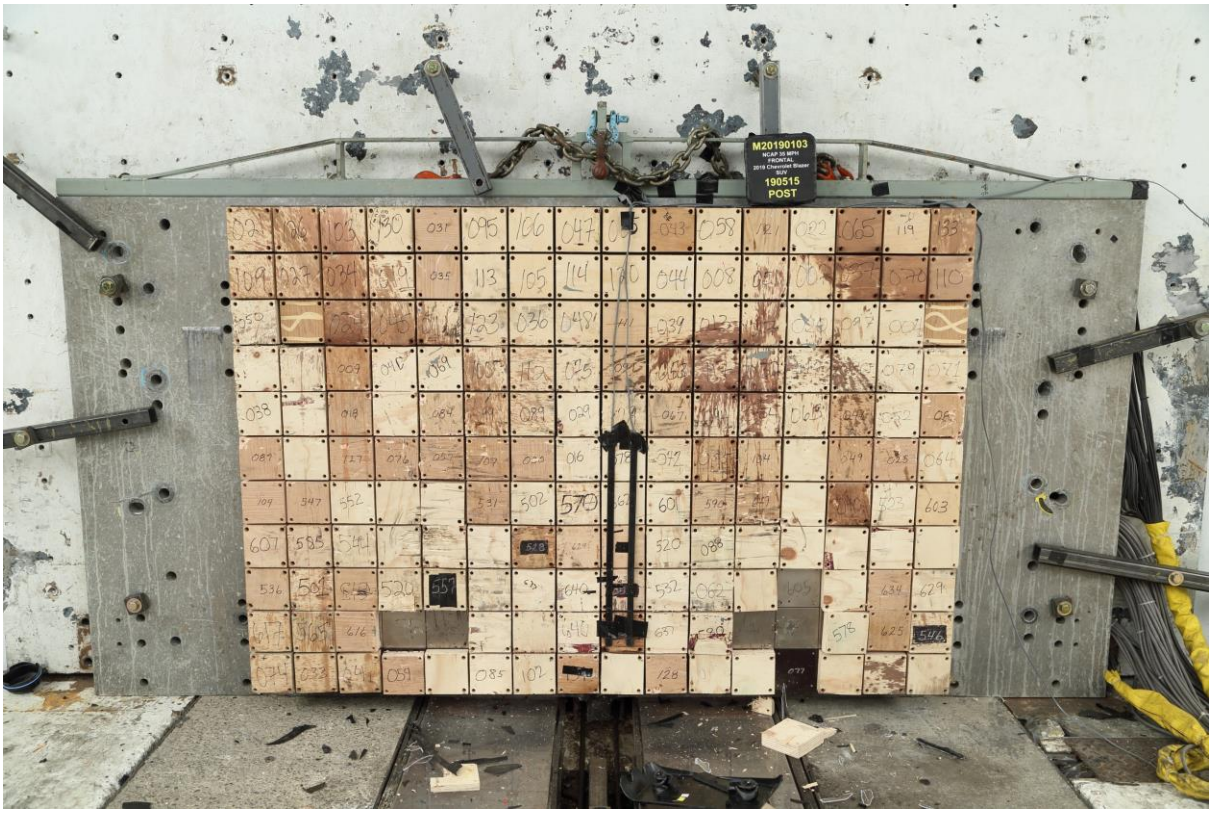


001 Load Cell Location



002 Pre-Test Load Cell Wall



003 Post-Test Load Cell Wall

004 Manufacturer's Label

005 Tire Placard

Intentionally Left Blank

006 2019 Chevrolet Blazer 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

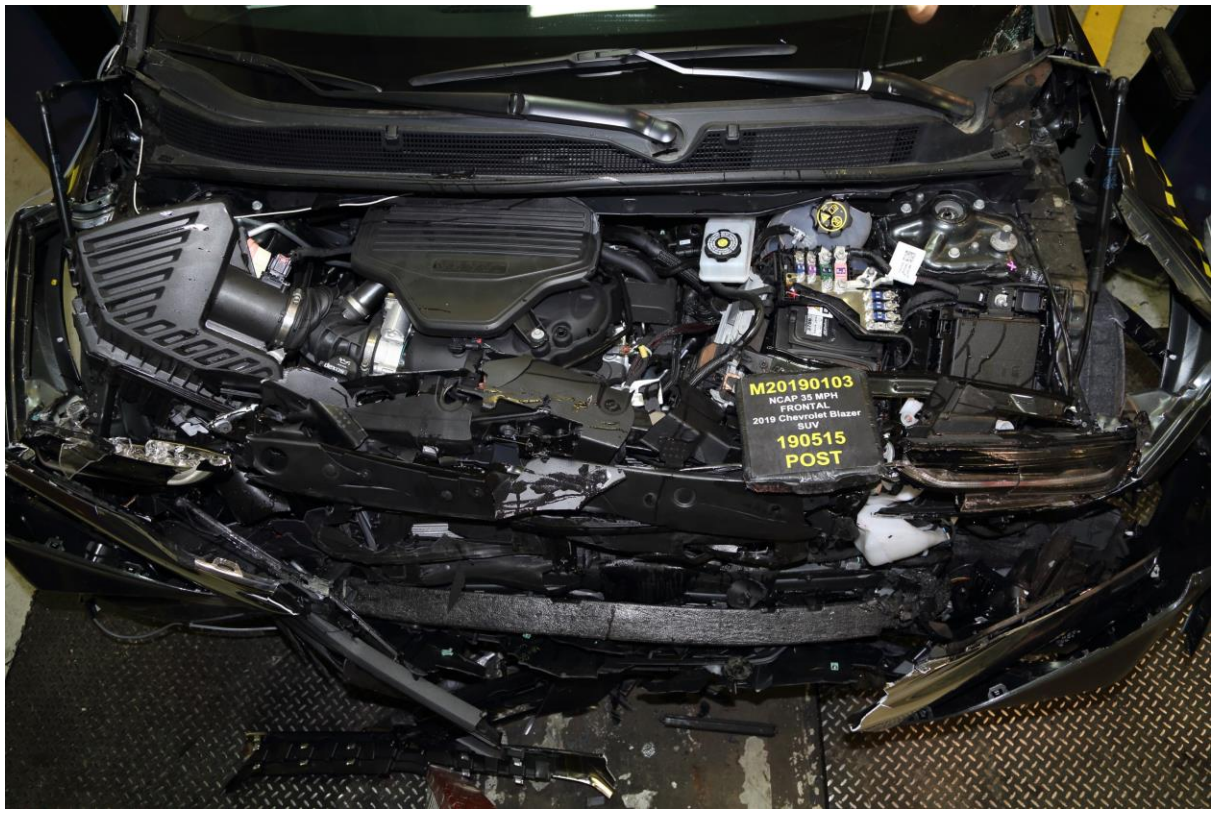
016 Pre-Test Left Rear 3-4 View

017 Post-Test Left Rear 3-4 View

018 Pre-Test Windshield View

019 Post-Test Windshield View

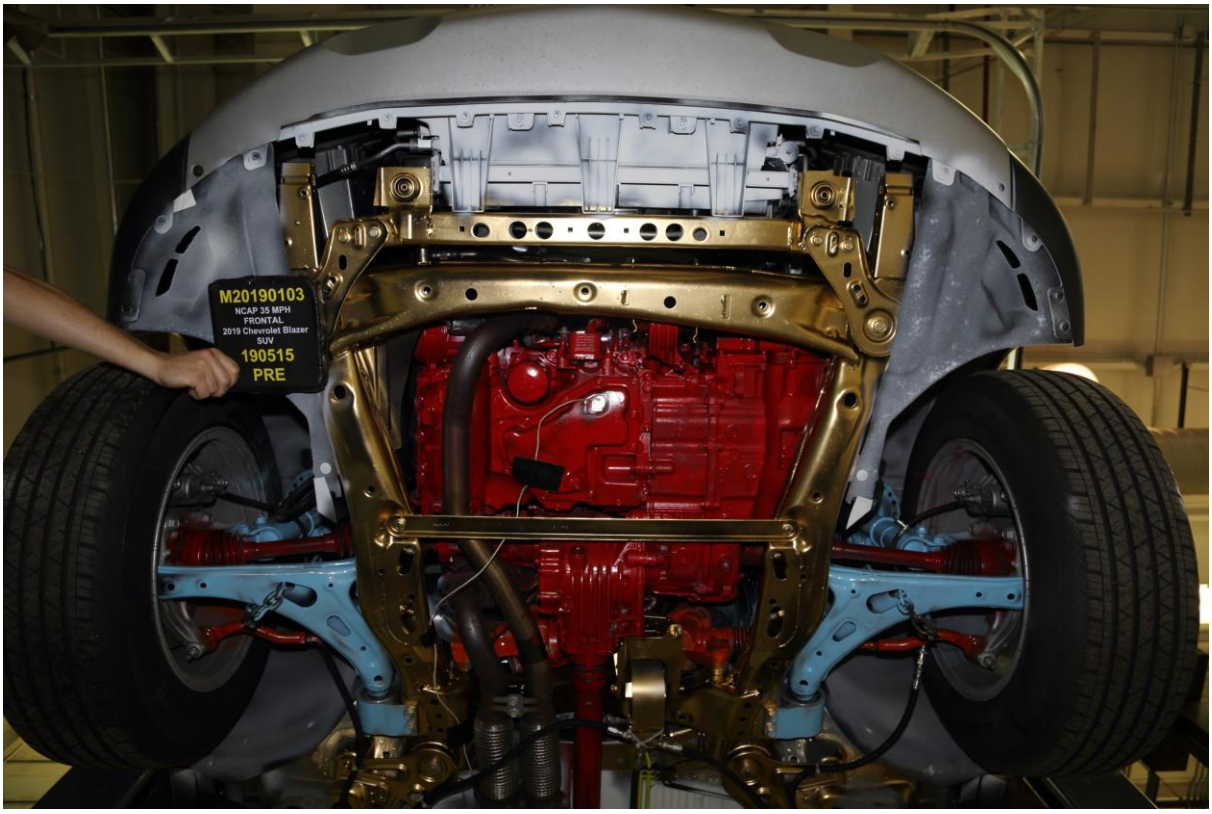
020 Pre-Test Engine Compartment View



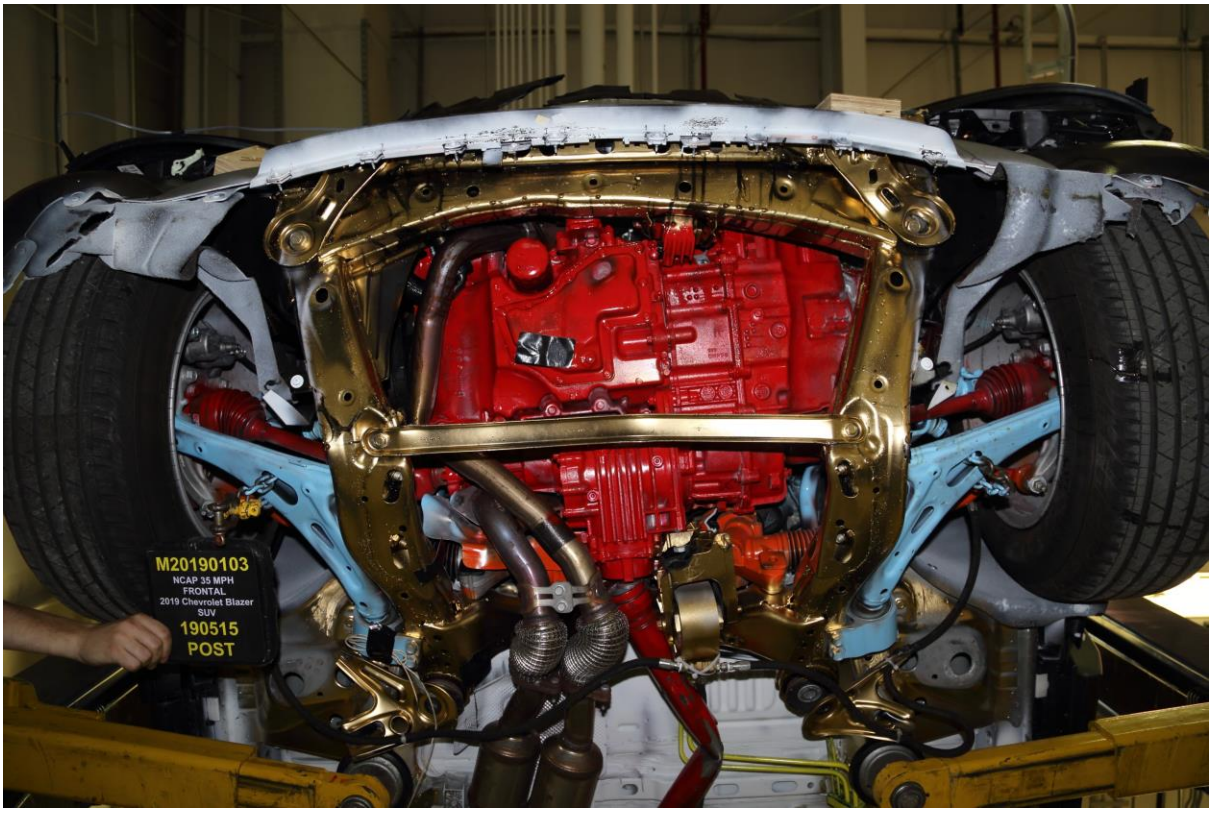
021 Post-Test Engine Compartment View

022 Pre-Test Fuel Filler Cap View

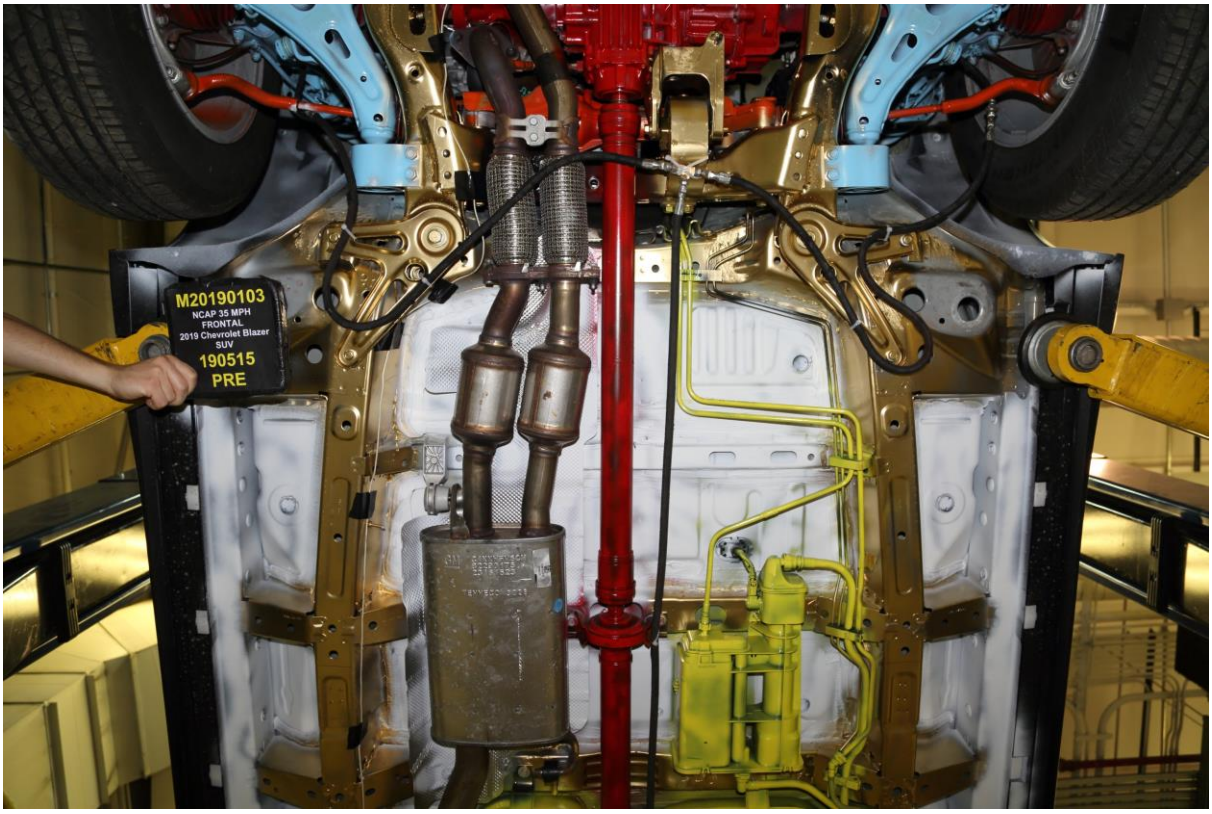
023 Post-Test Fuel Filler Cap View



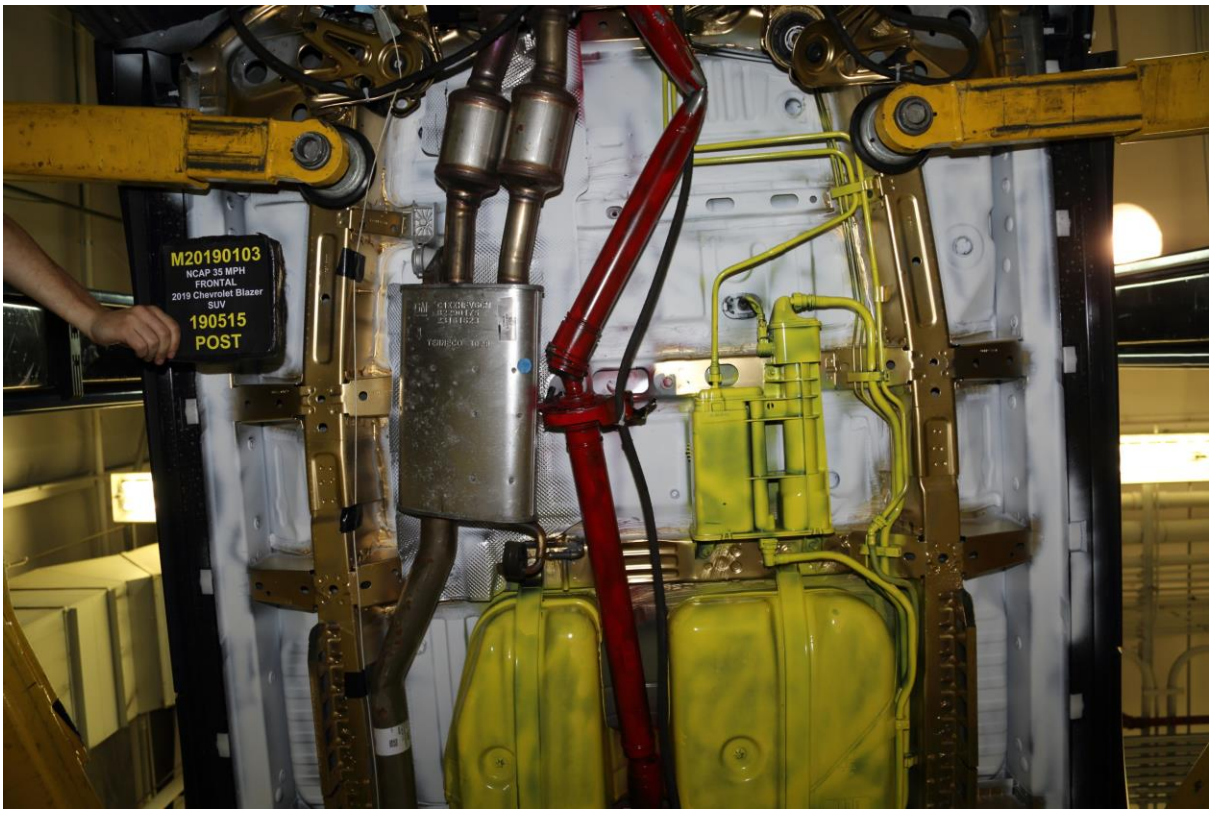
024 Pre-Test Front Underbody View



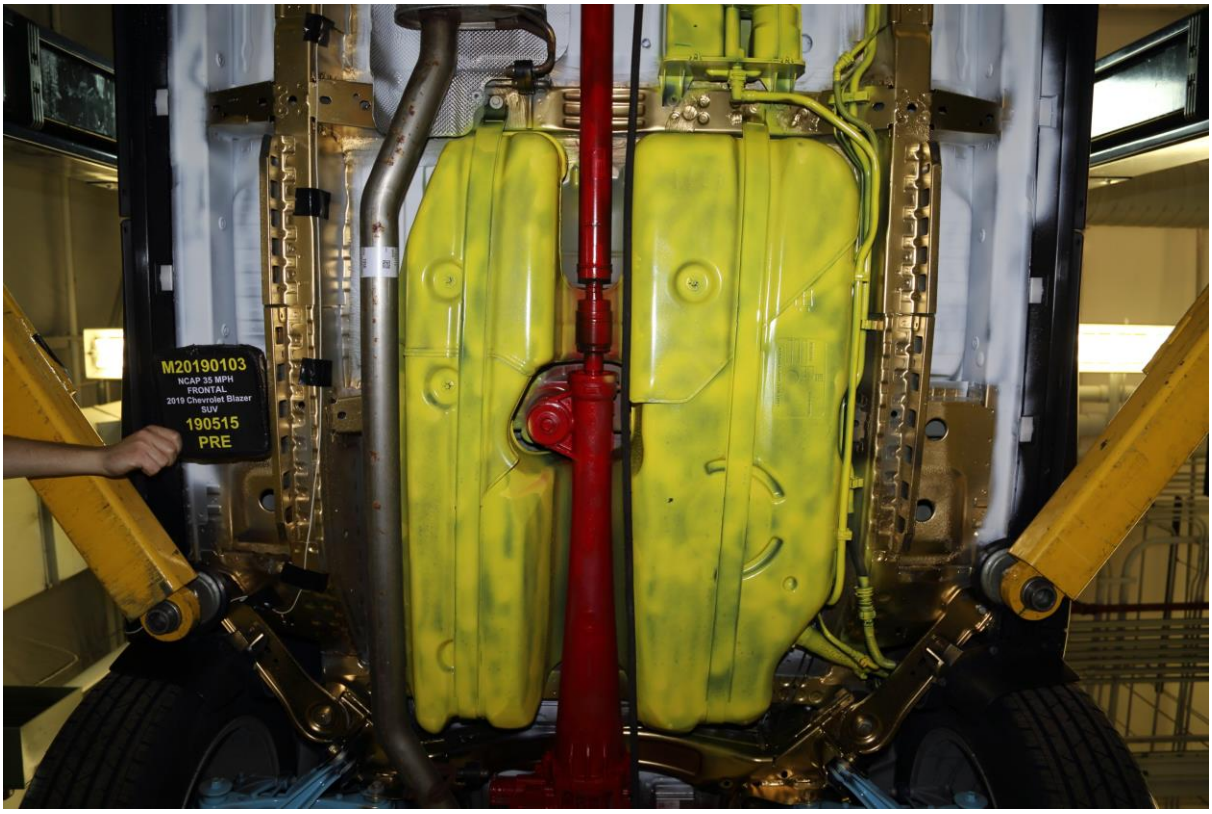
025 Post-Test Front Underbody View



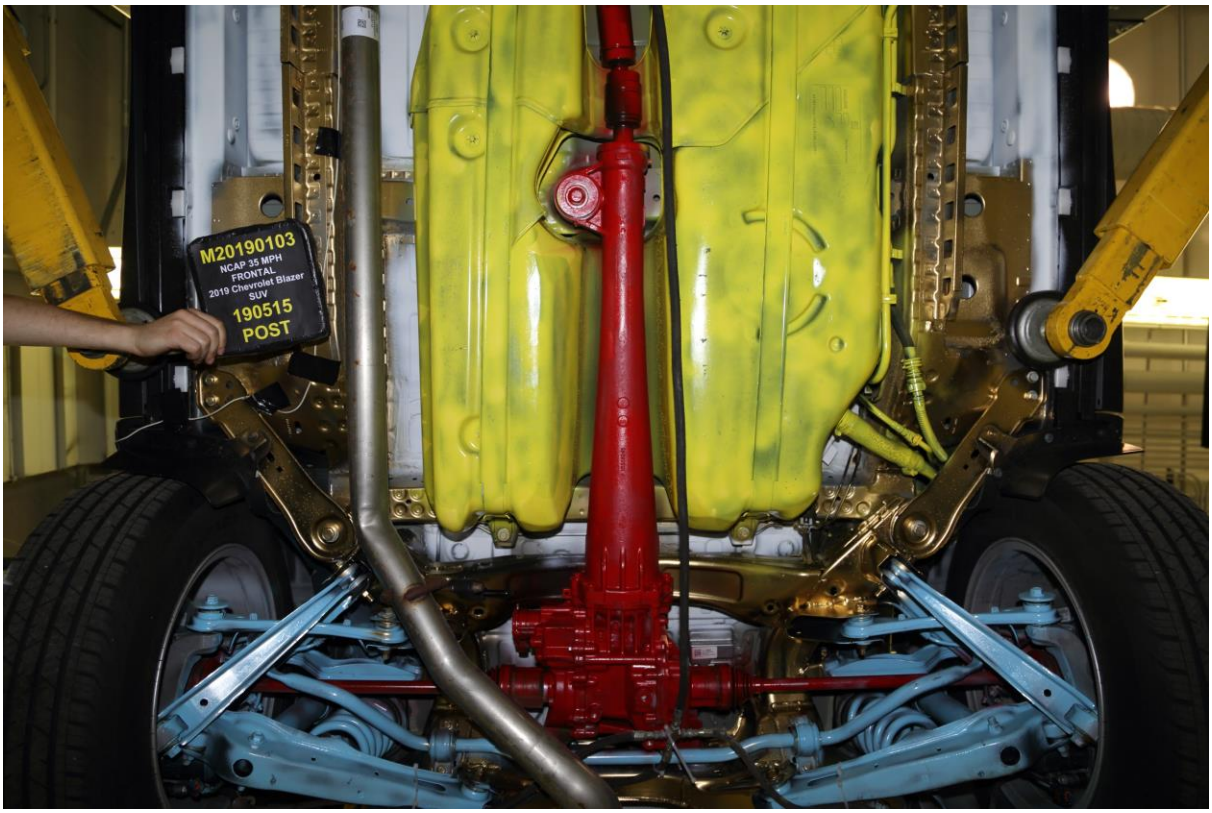
025a Pre-Test Mid Front Underbody View



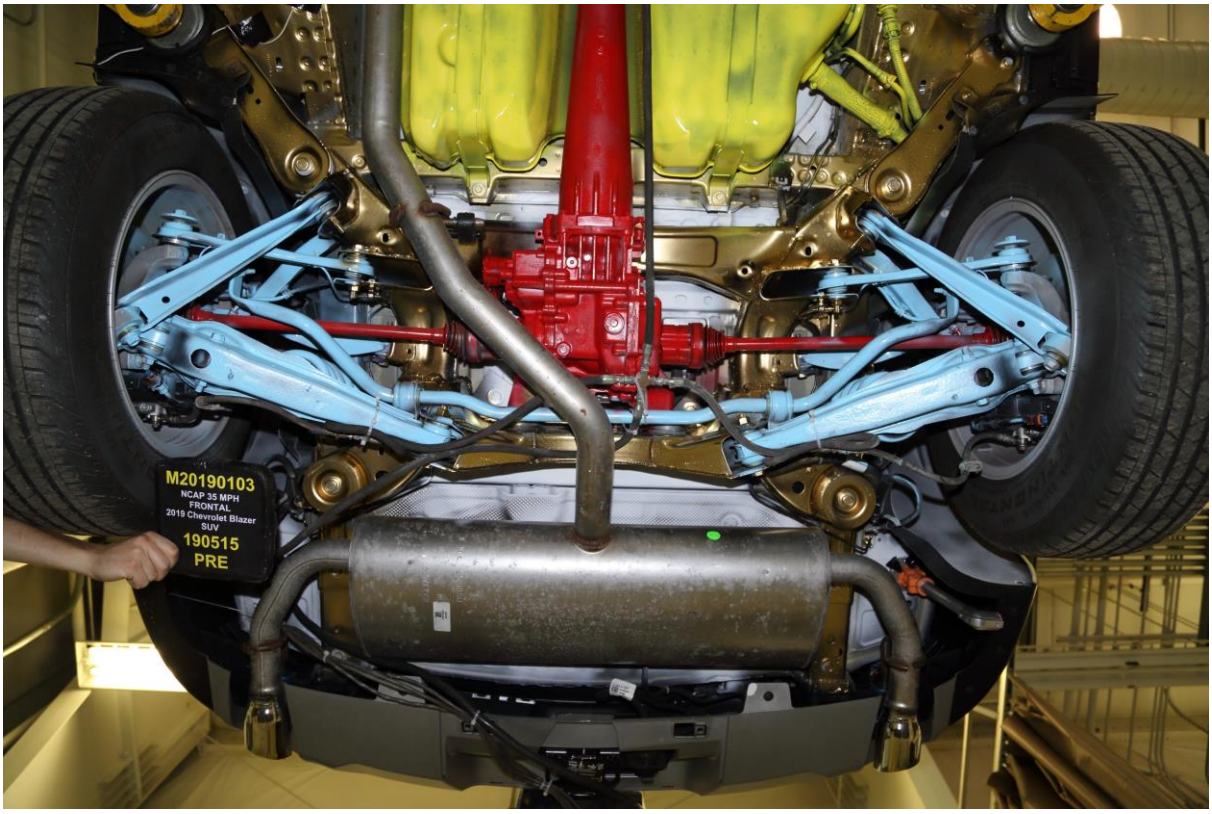
025b Post-Test Mid Front Underbody View



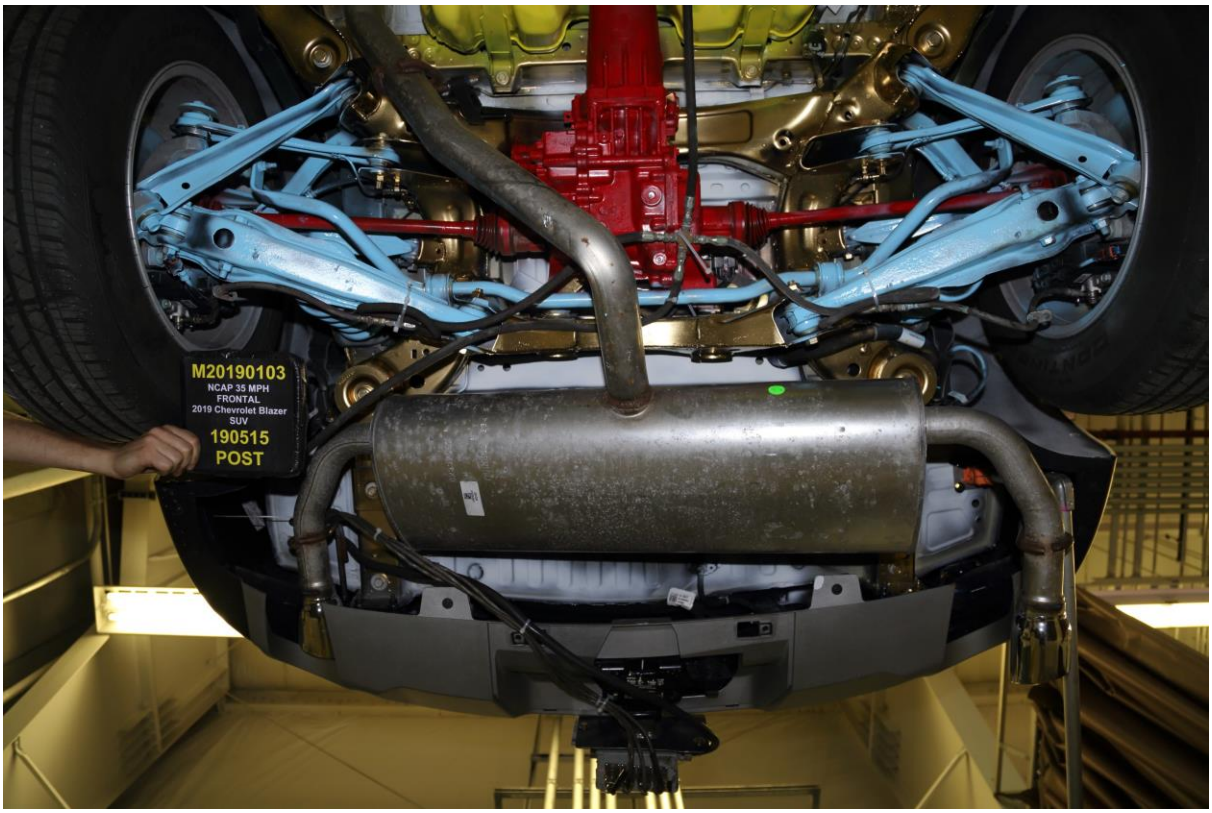
025c Pre-Test Mid Rear Underbody View



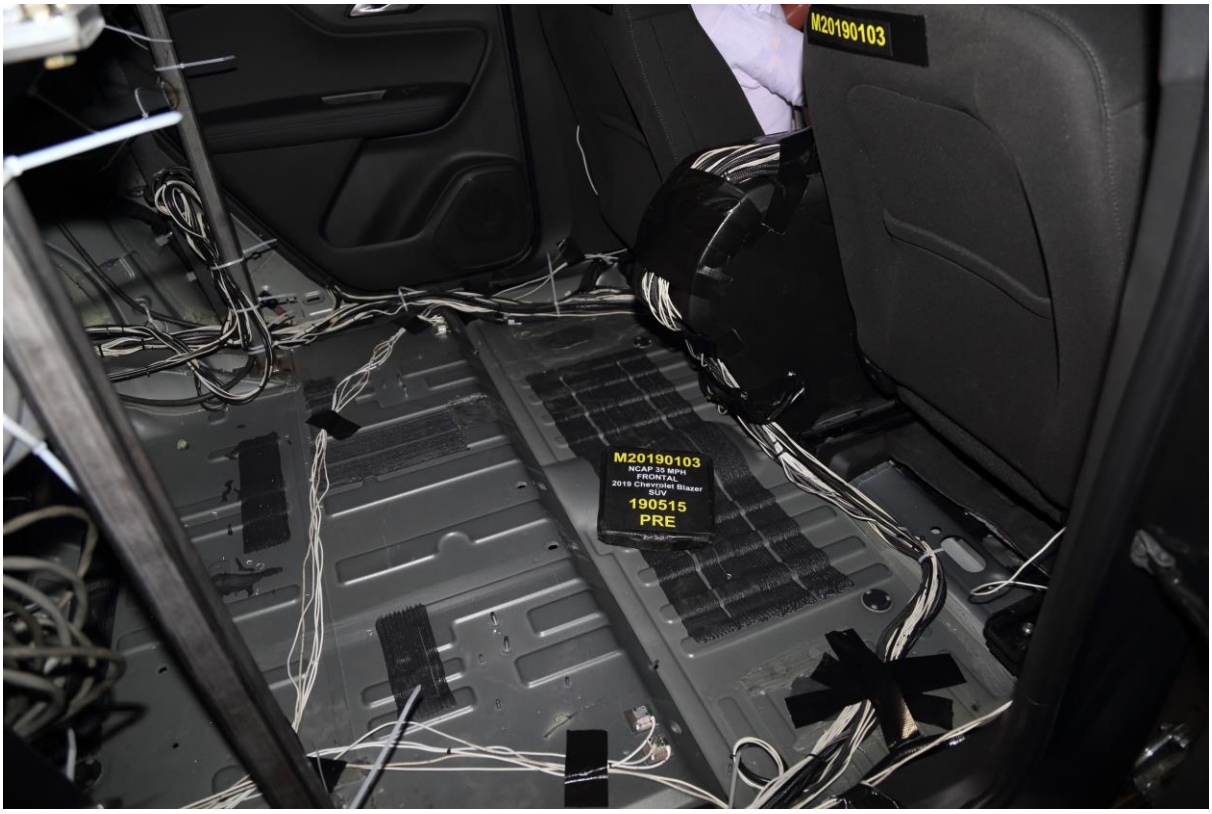
025d Post-Test Mid Rear Underbody View



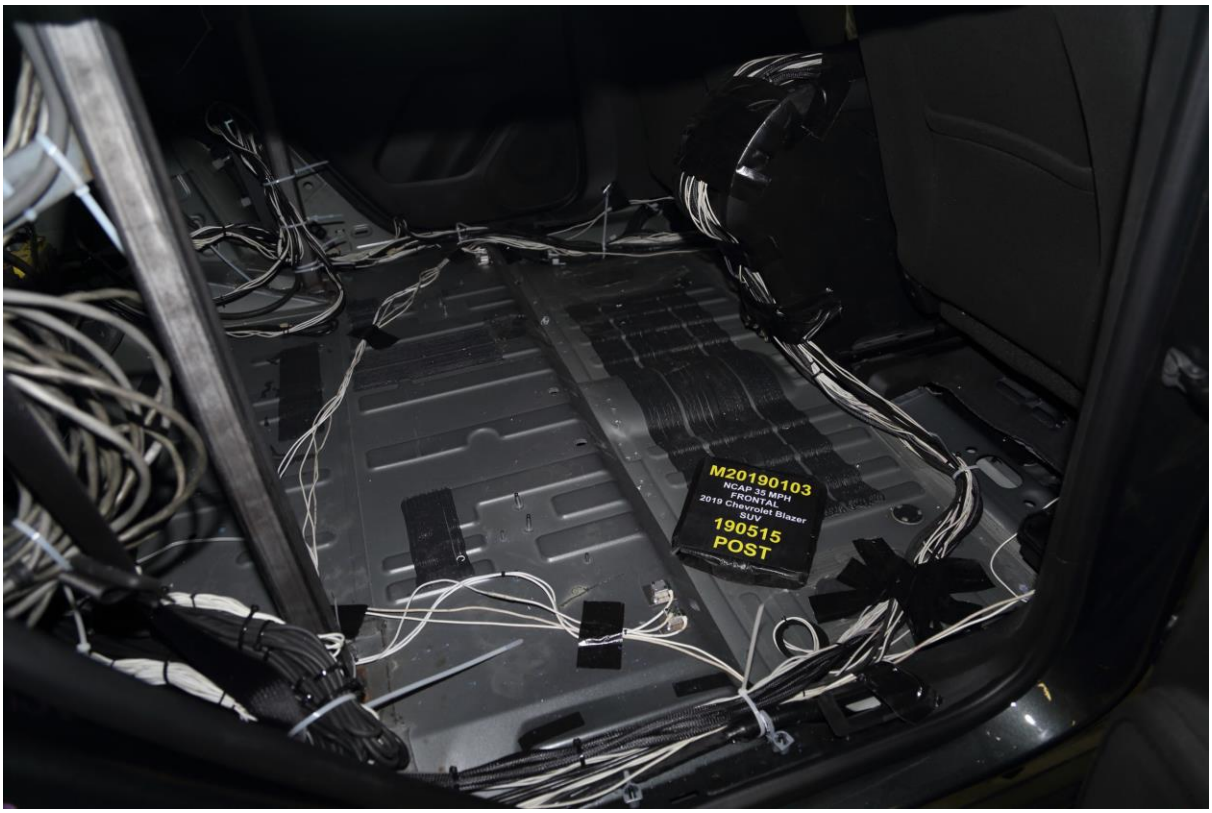
026 Pre-Test Rear Underbody View



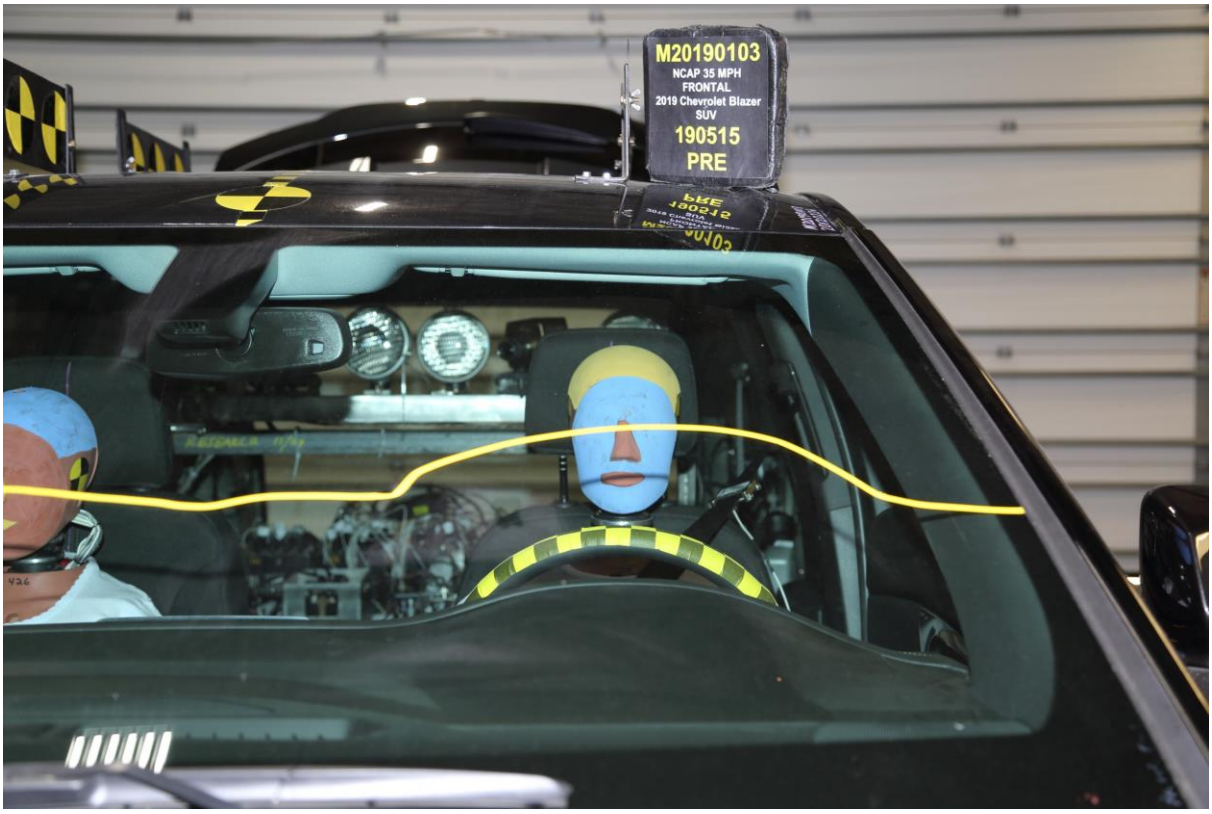
027 Post-Test Rear Underbody View



028 Pre-Test Dummy Cable Routing



029 Post-Test Dummy Cable Routing



030 Pre-Test Driver Dummy Front View

031 Post-Test Driver Dummy Front View

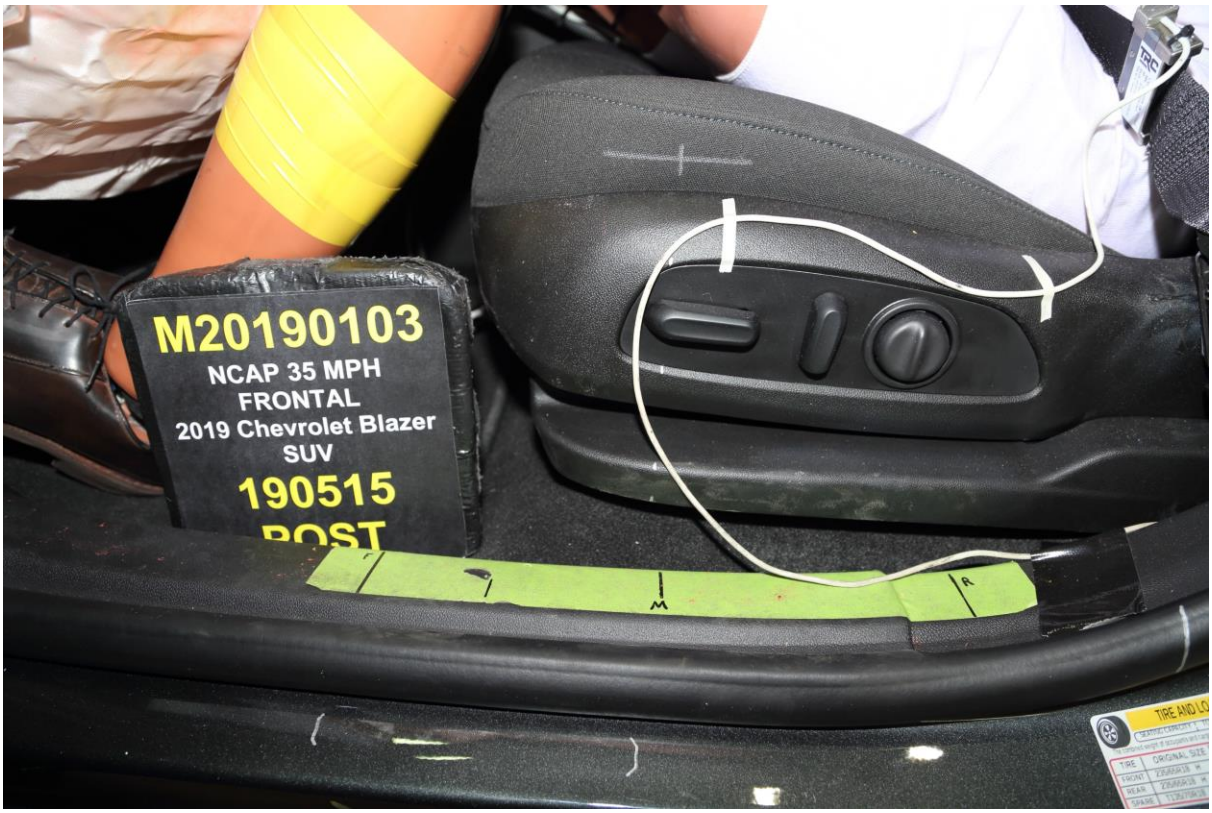
032 Pre-Test Driver Dummy Window View

033 Post-Test Driver Dummy Window View

034 Pre-Test Driver Dummy and Vehicle Interior View

035 Post-Test Driver Dummy and Vehicle Interior View

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



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

038 Pre-Test View of Belt Anchorage for Driver Dummy

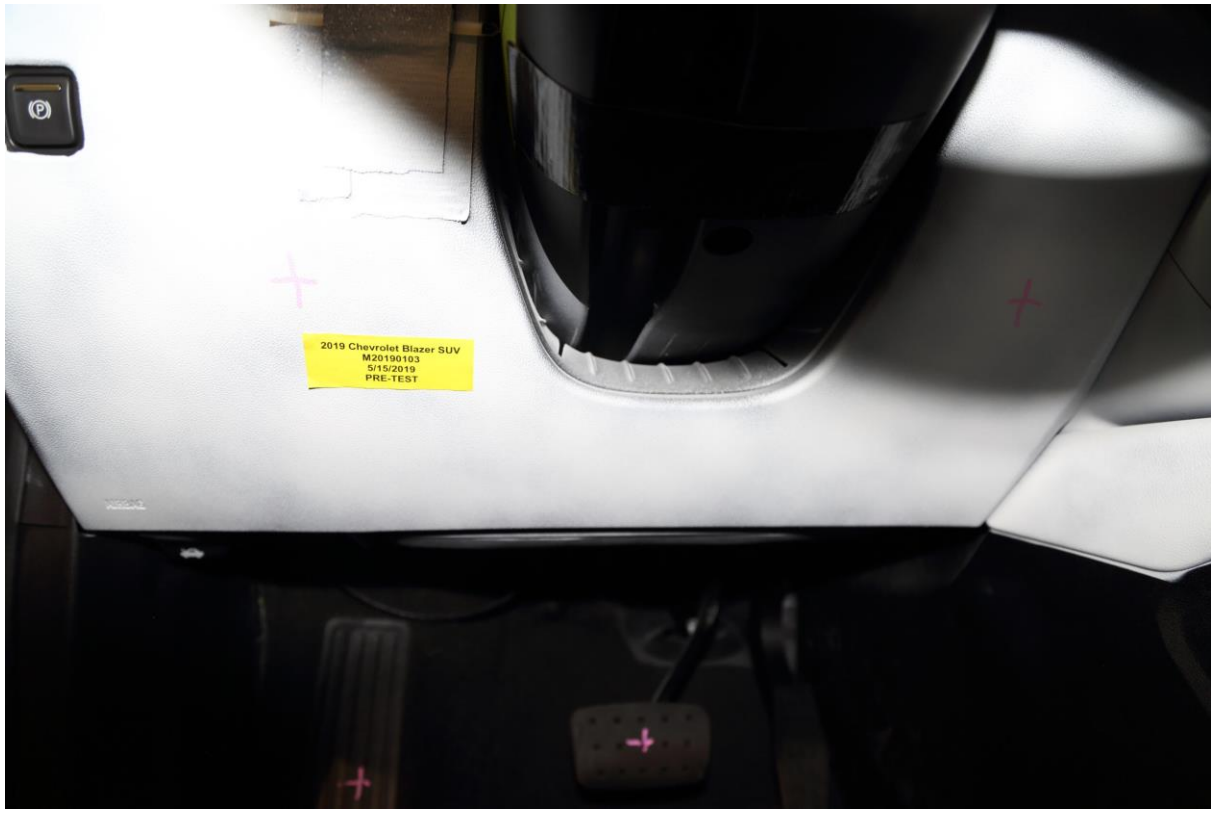
039 Post-Test View of Belt Anchorage for Driver Dummy

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

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

042 Pre-Test Driver Dummy Feet

043 Post-Test Driver Dummy Feet



044 Pre-Test Driver's Side Knee Bolster

045 Post-Test Driver's Side Knee Bolster

046 Pre-Test Driver's Side Floorpan

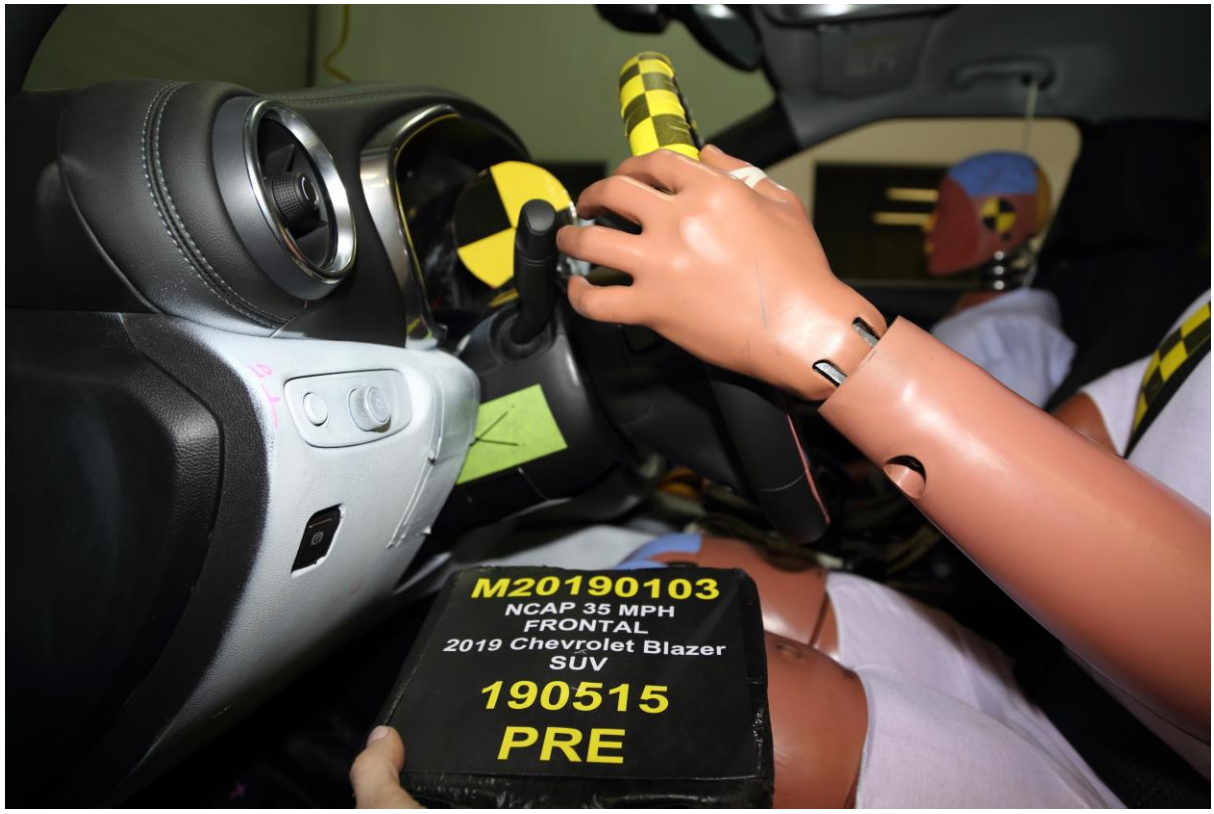
047 Post-Test Driver's Side Floorpan

048 Post-Test Driver Dummy Face

049 Post-Test Driver Dummy Contact with Airbag

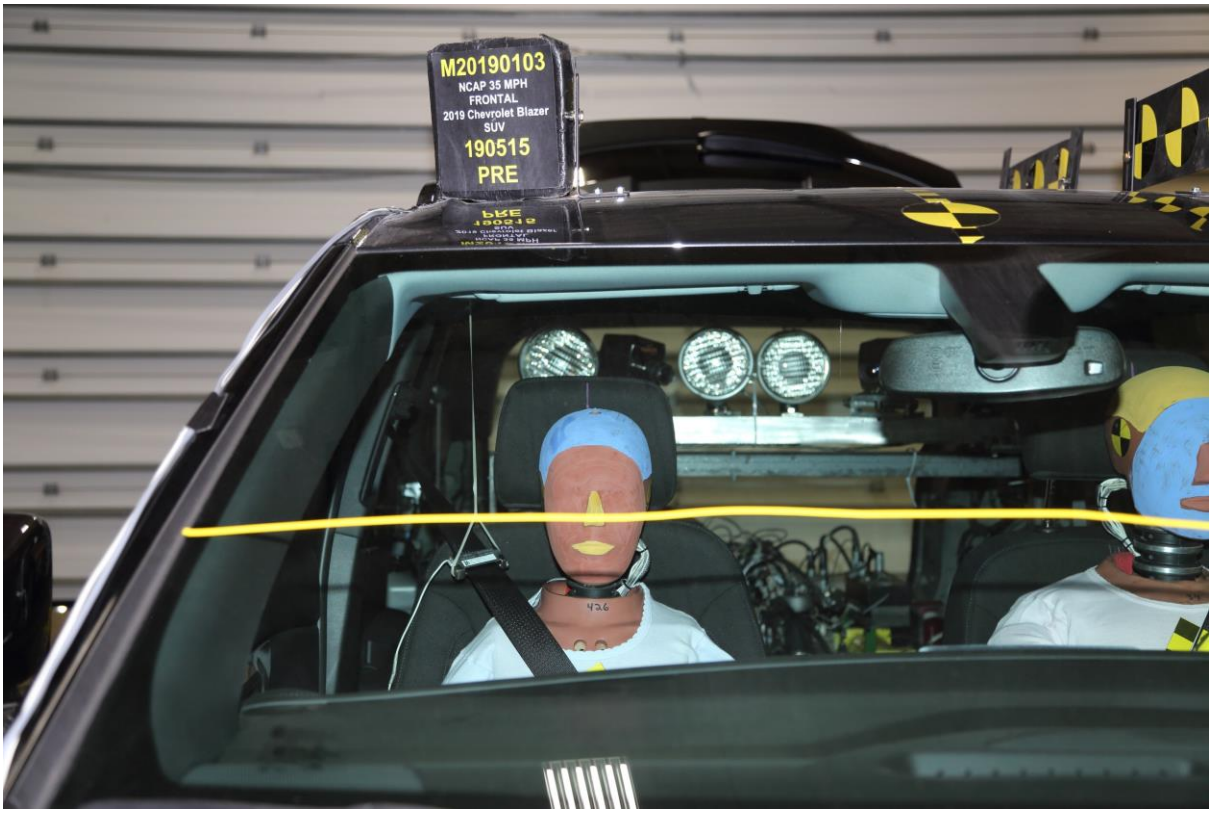
050 Post-Test Driver Dummy Contact with Headrest

Intentionally Left Blank

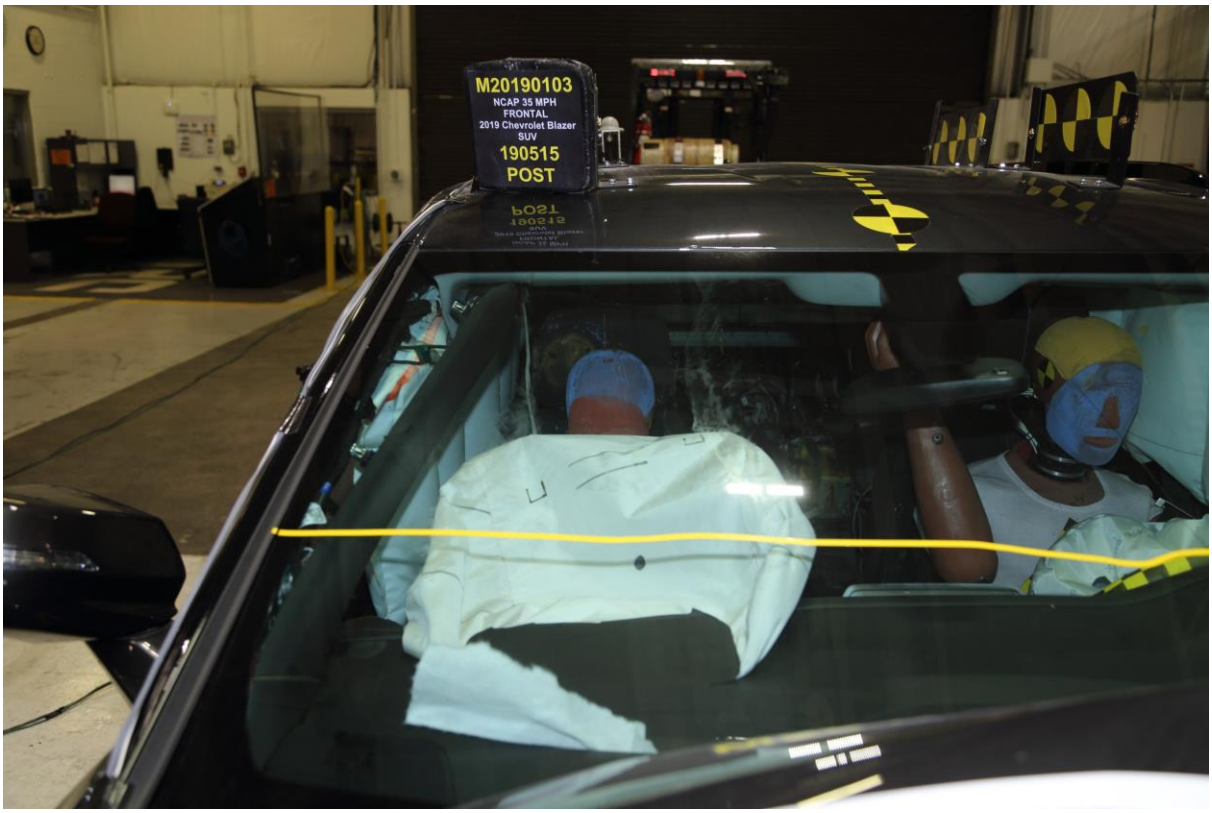


051 Pre-Test View of the Steering Wheel

052 Post-Test View of the Steering Wheel



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

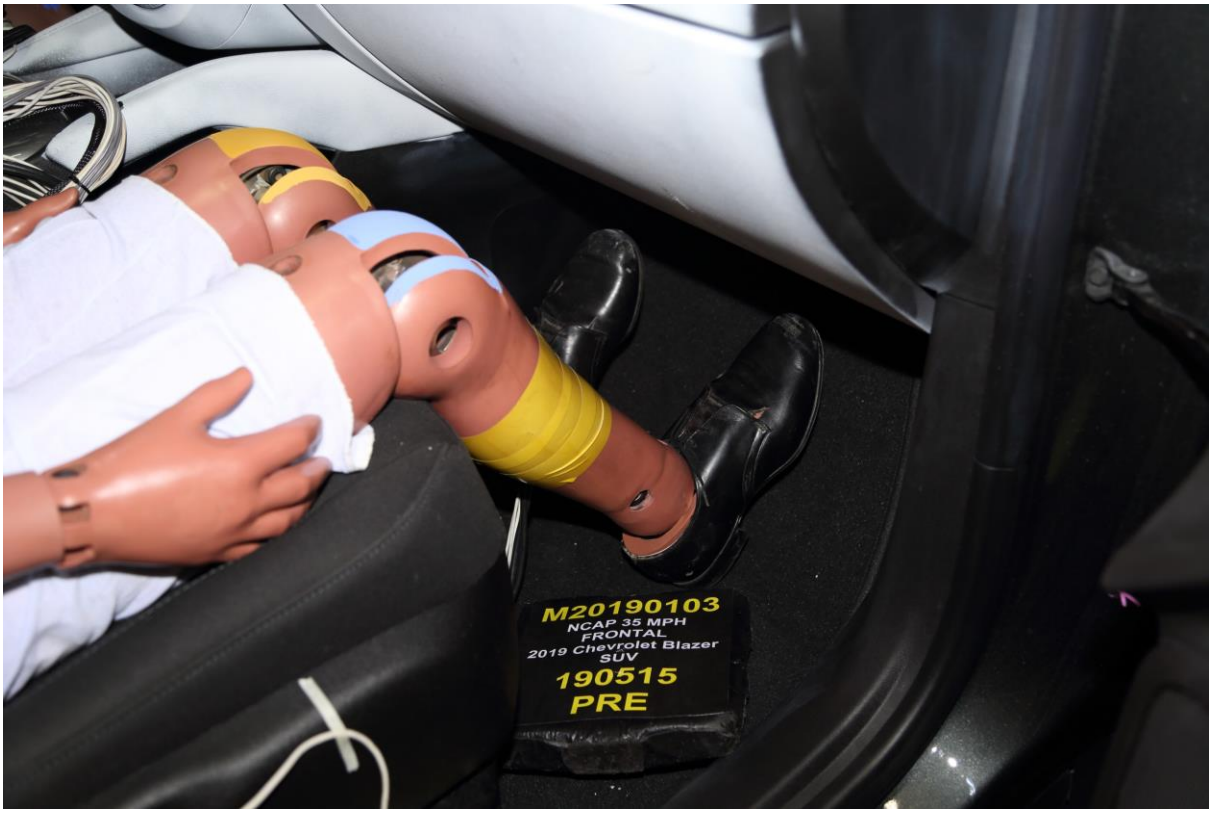
060 Post-Test Passenger's Seat Fore-Aft Markings

061 Pre-Test View of Belt Anchorage for Passenger Dummy

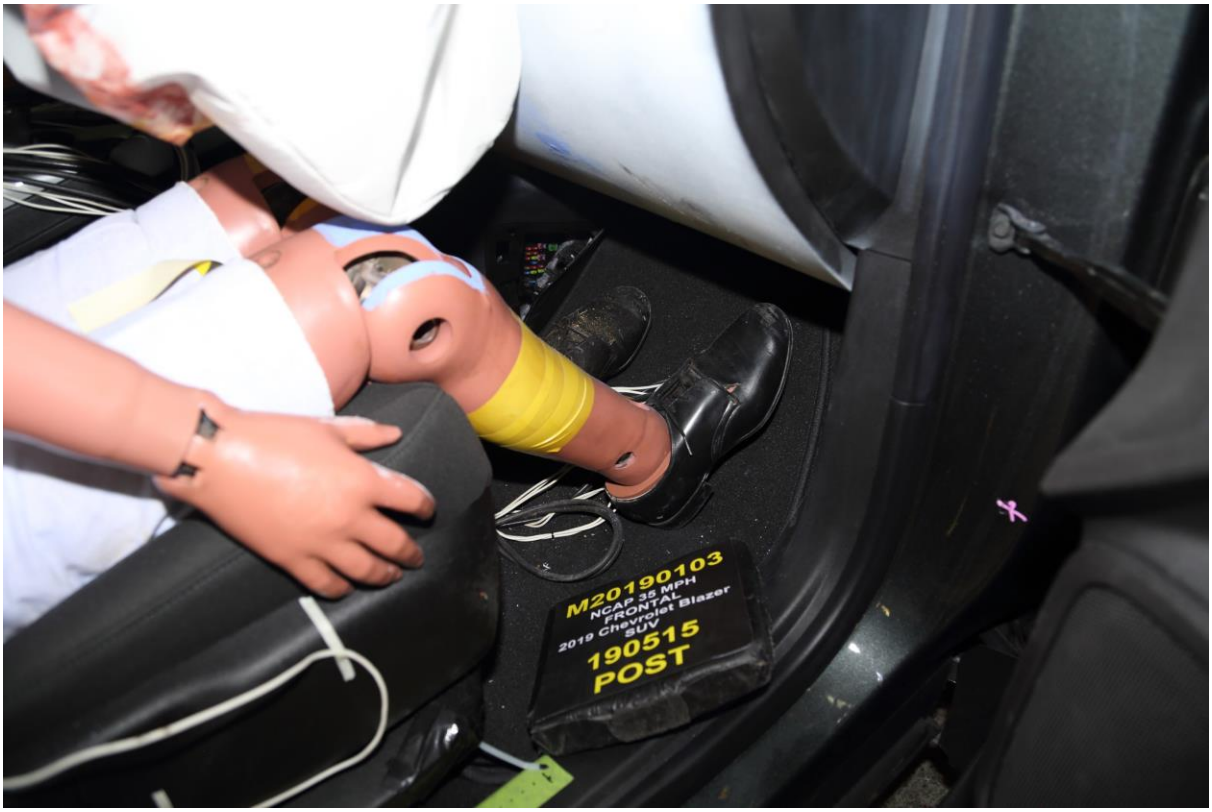
062 Post-Test View of Belt Anchorage for Passenger Dummy

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



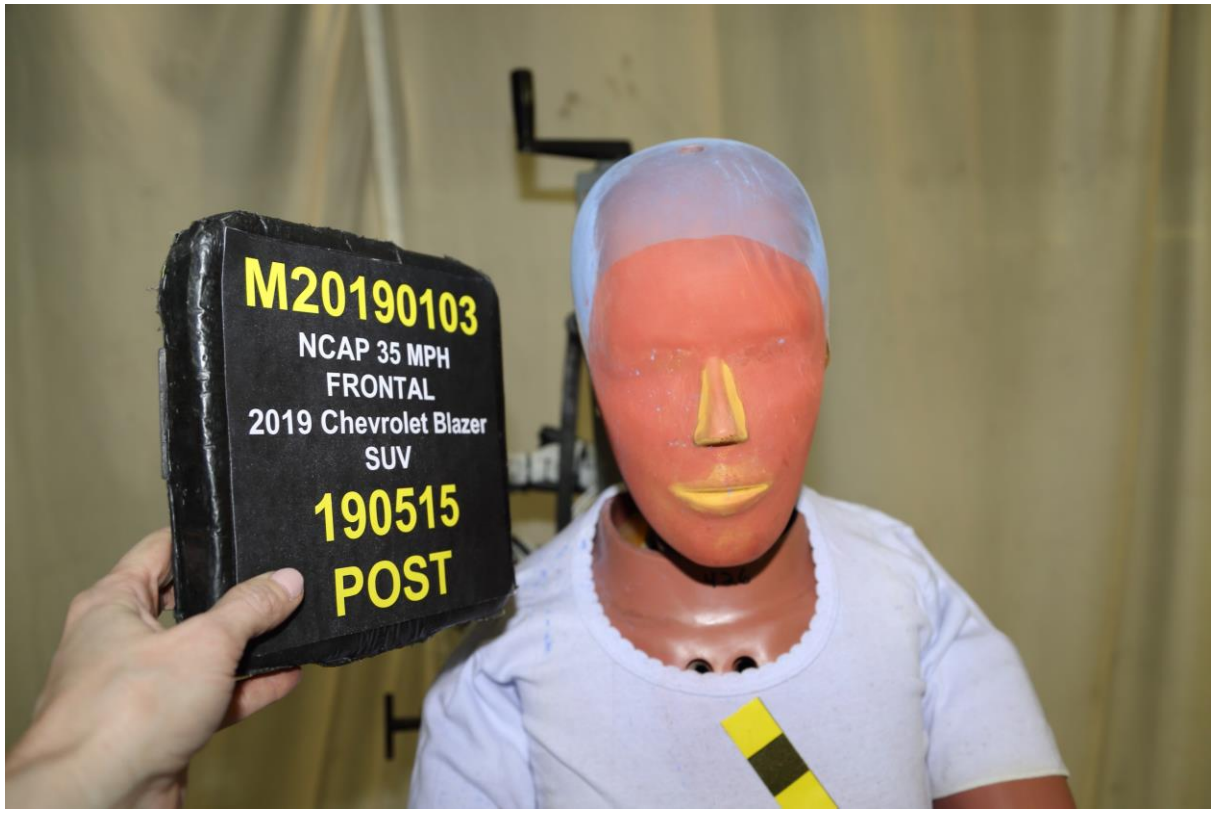
066 Post-Test Passenger Dummy Feet

067 Pre-Test Passenger's Side Knee Bolster

068 Post-Test Passenger's Side Knee Bolster

069 Pre-Test Passenger's Side Floorpan

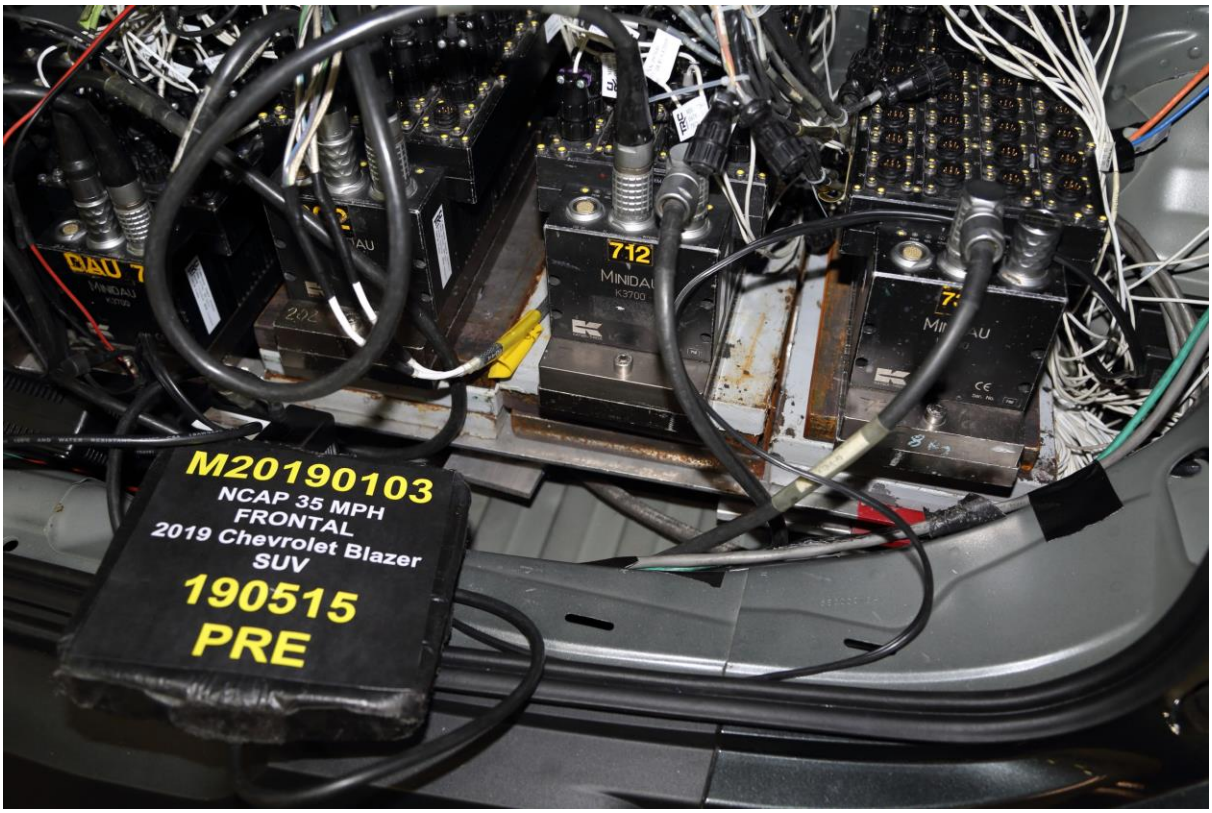
070 Post-Test Passenger's Side Floorpan



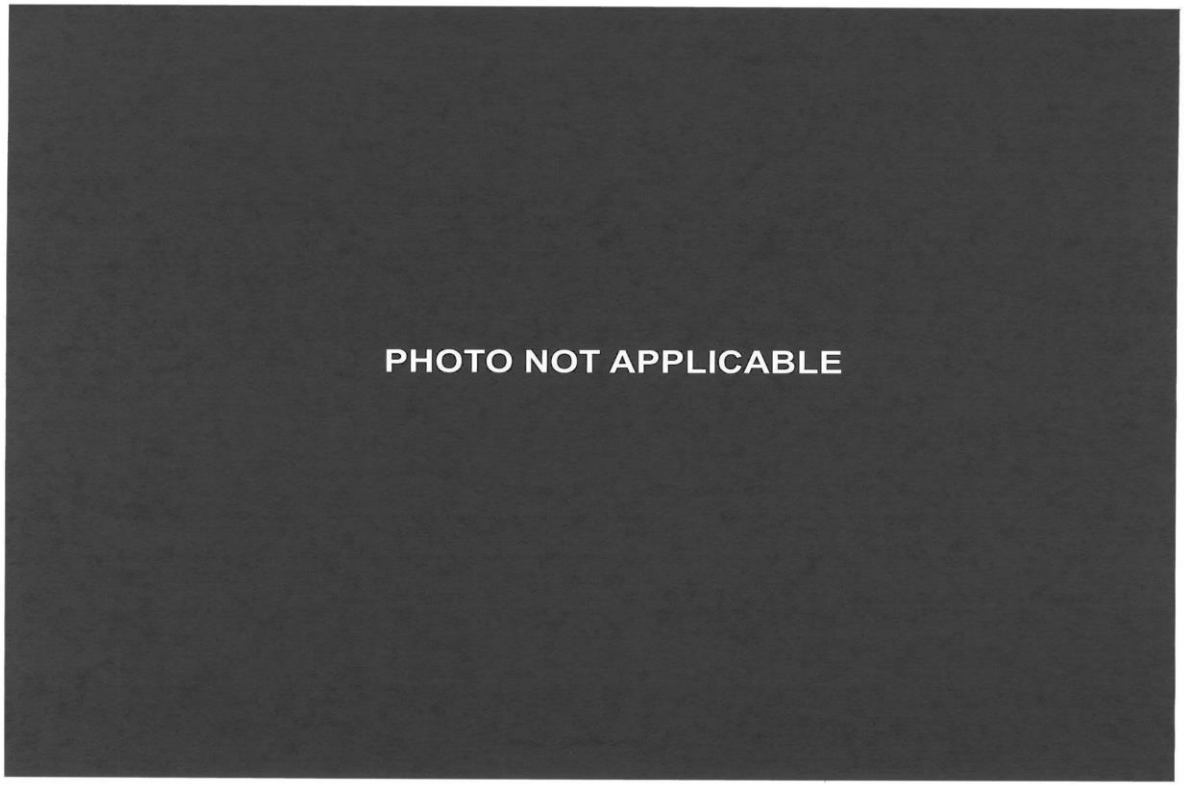
071 Post-Test Passenger Dummy Face

072 Post-Test Passenger Dummy Contact with Airbag

073 Post-Test Passenger Dummy Contact with Headrest

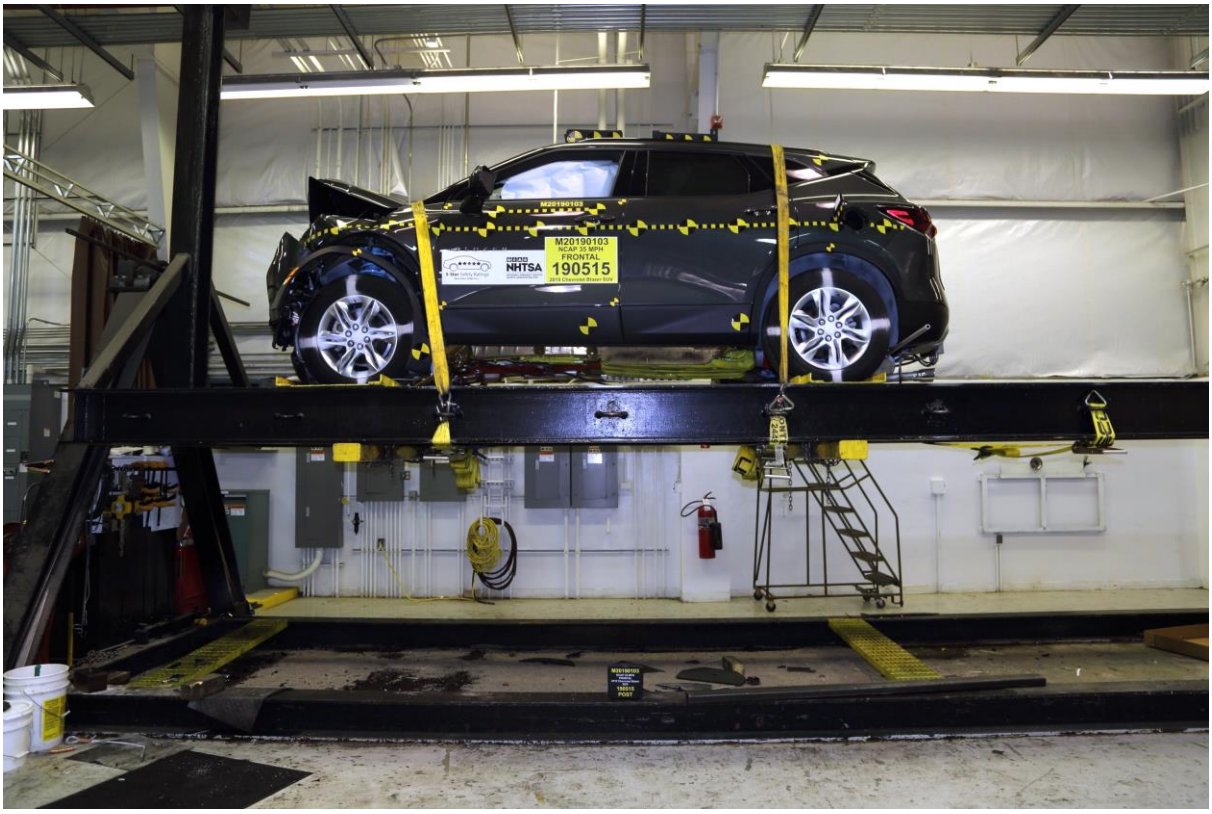


074 Photograph of Ballast Installed in Vehicle



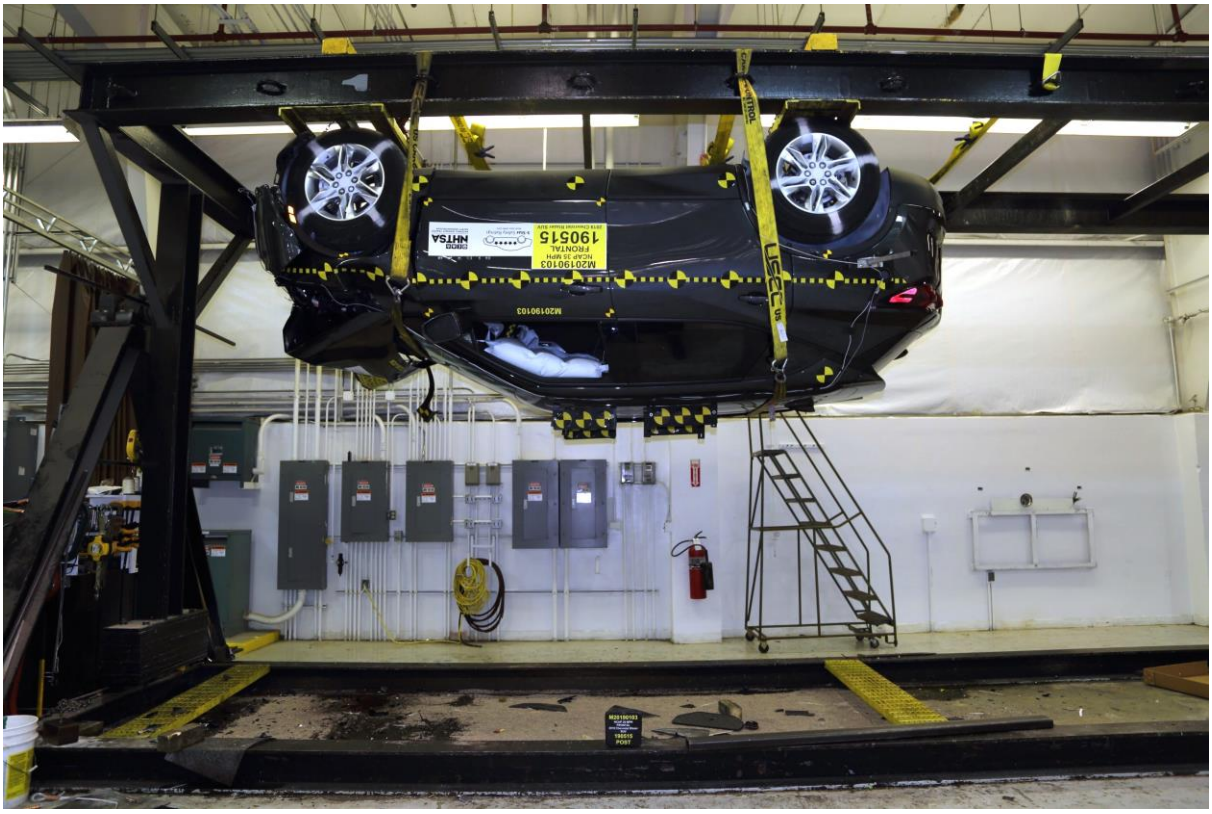
075 Post-Test Stoddard Spillage Location View

076 Post-Test Speed Trap Read out

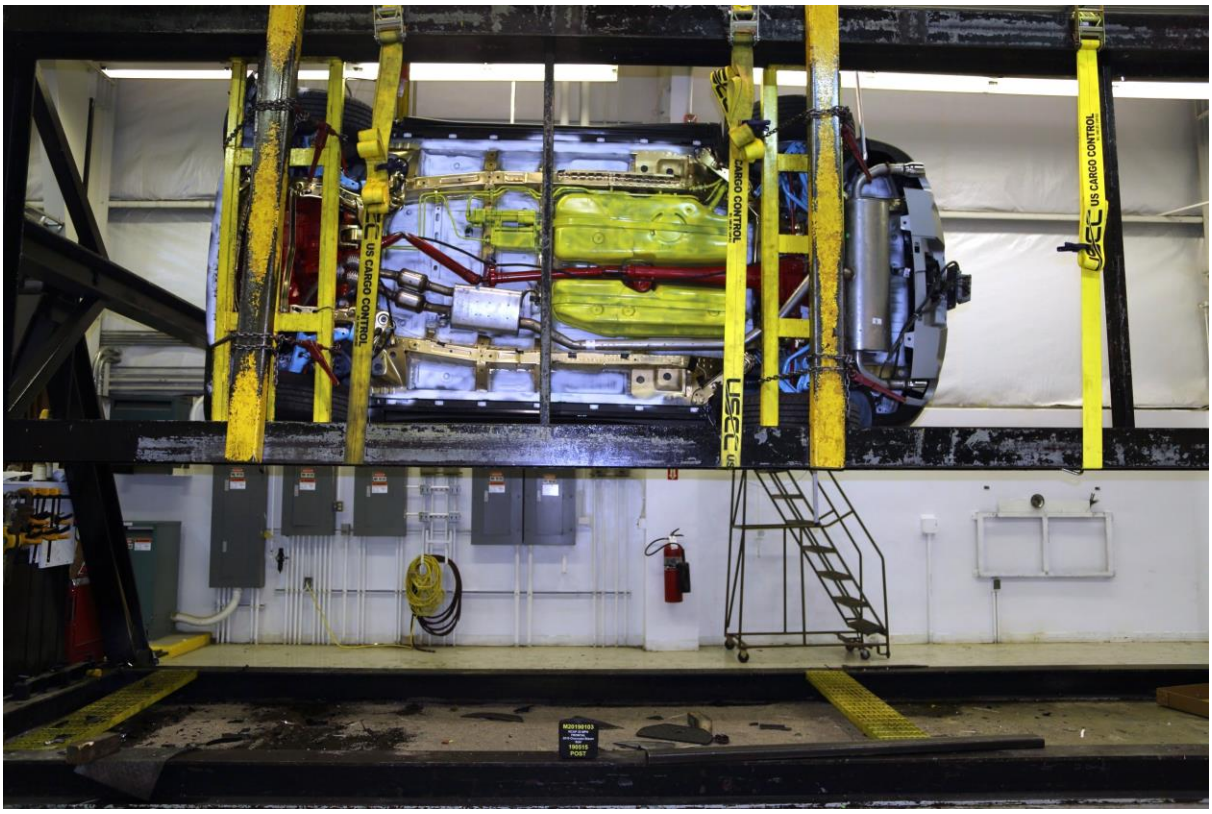


077 Vehicle at 0º on Static Rollover Device

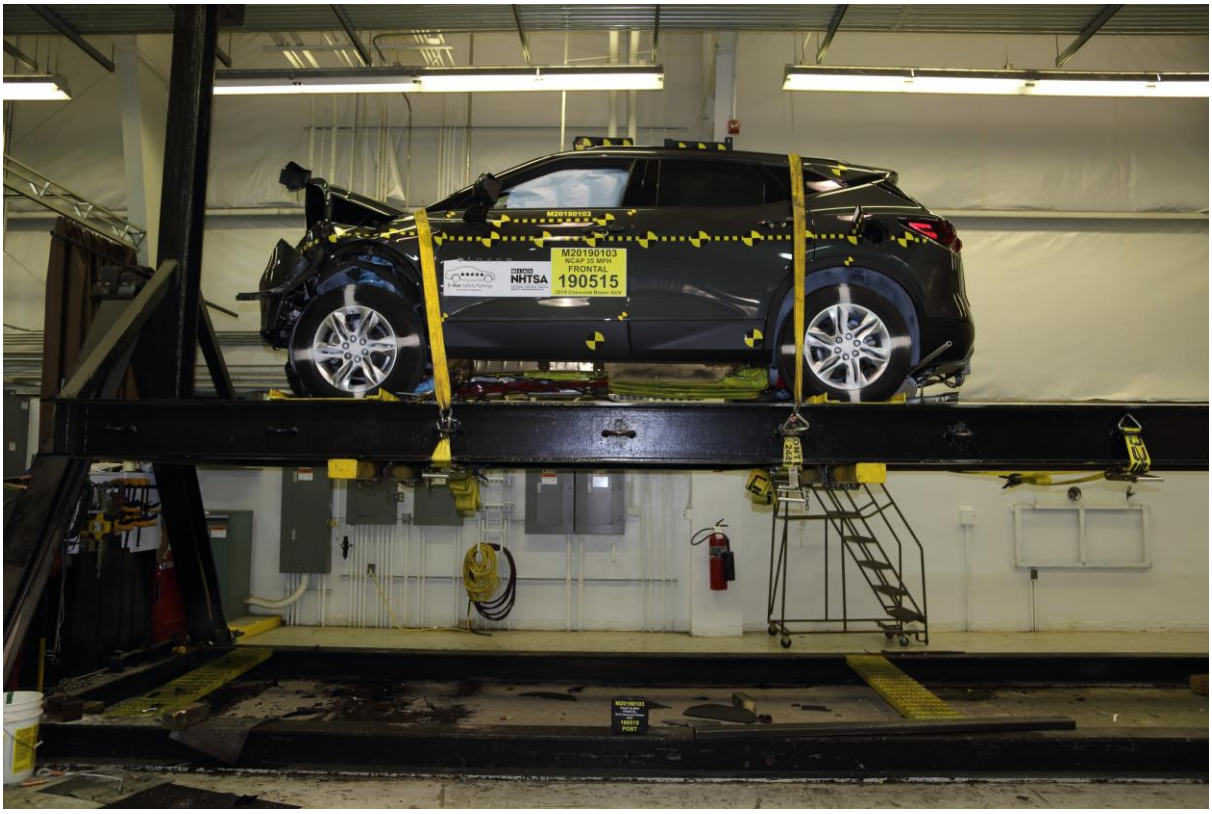
078 Vehicle at 90º on Static Rollover Device



079 Vehicle at 180º on Static Rollover Device

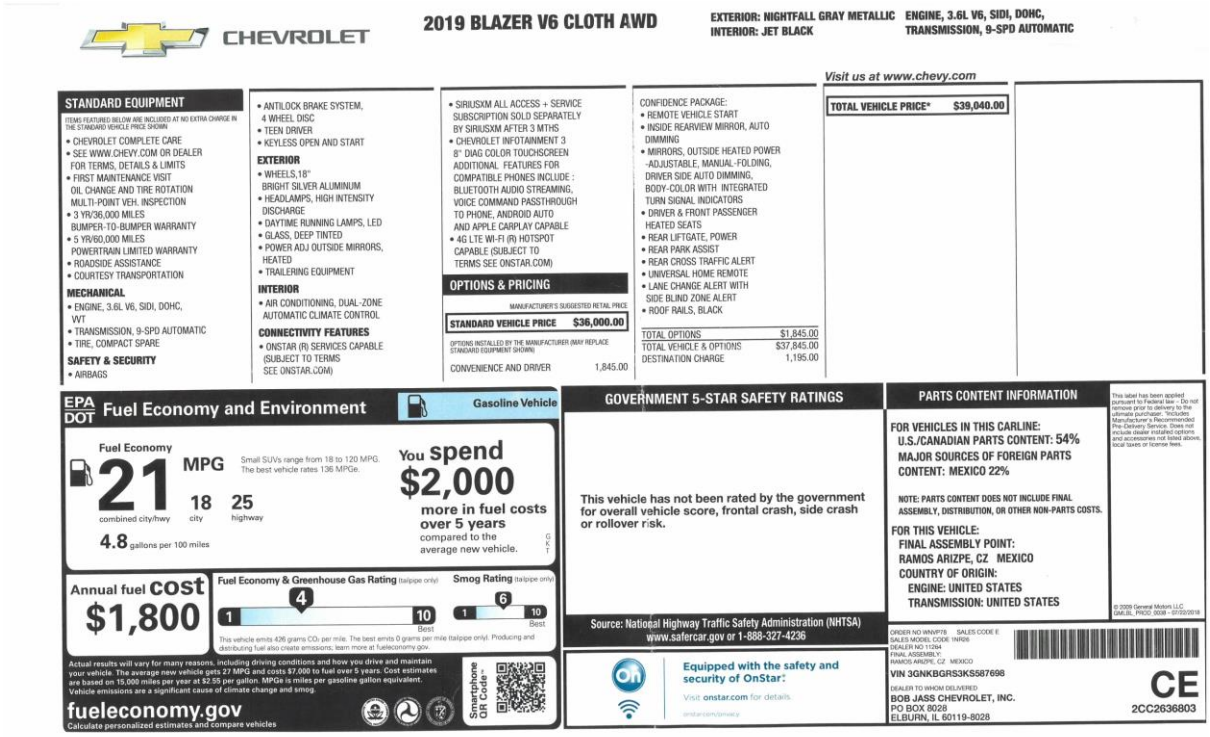


080 Vehicle at 270º on Static Rollover Device



081 Vehicle at 360º on Static Rollover Device

082 2019 Chevrolet Blazer SUV Frontal Impact Event



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**
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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 Date: 05/15/2019

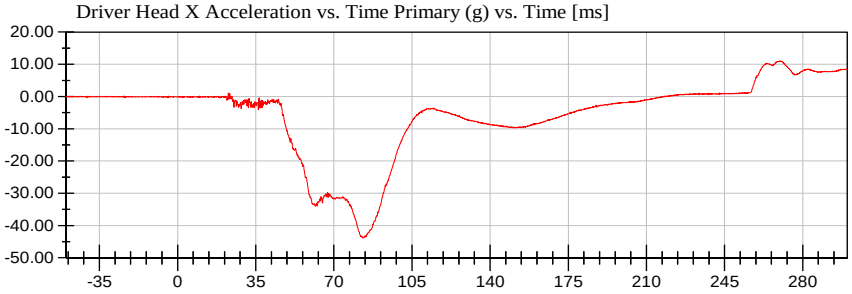
Test Lab: CTF

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

Test Number: 190515 (M20190103)

Position #2 Hybrid III Small Adult Female (426)

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



<Max>

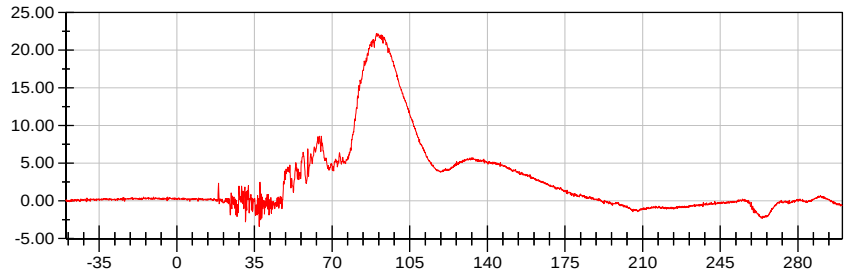
11.03 g at 269.76 ms

<Min>

-43.91 g at 82.96 ms

CFC_1000

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



<Max>

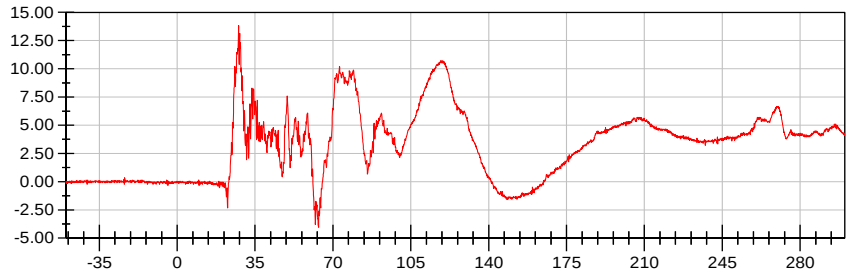
22.23 g at 90.08 ms

<Min>

-3.38 g at 37.12 ms

CFC_1000

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



<Max>

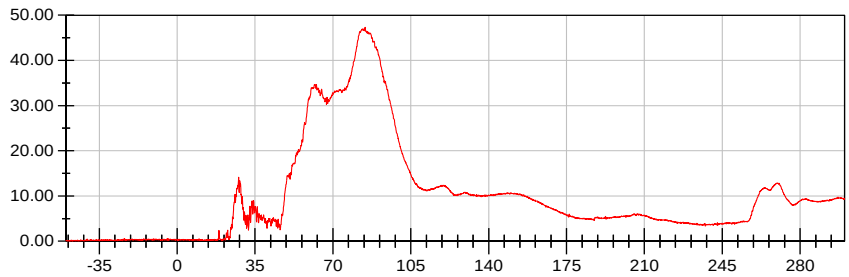
13.83 g at 27.60 ms

<Min>

-4.04 g at 63.52 ms

CFC_1000

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



<Max>

47.31 g at 84.48 ms

<Min>

0.04 g at -48.40 ms

CFC_1000

NHTSA

Test Date: 05/15/2019

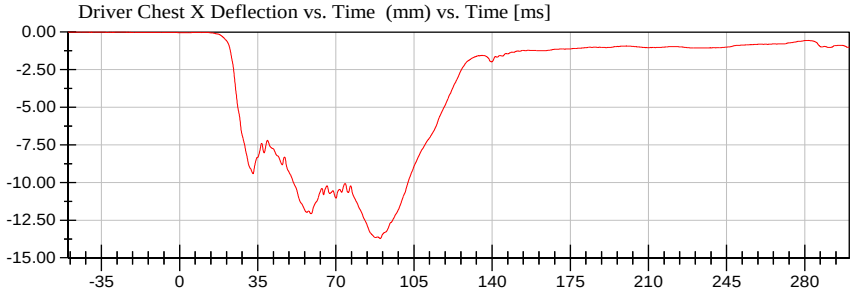
Test Lab: CTF

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

Test Number: 190515 (M20190103)

Position #2 Hybrid III Small Adult Female (426)

Driver Chest X Deflection vs. Time (mm) vs. Time [ms]



<Max>

-0.01 mm at -49.28 ms

<Min>

-13.72 mm at 89.84 ms

CFC_600

NHTSA

Test Date: 05/15/2019

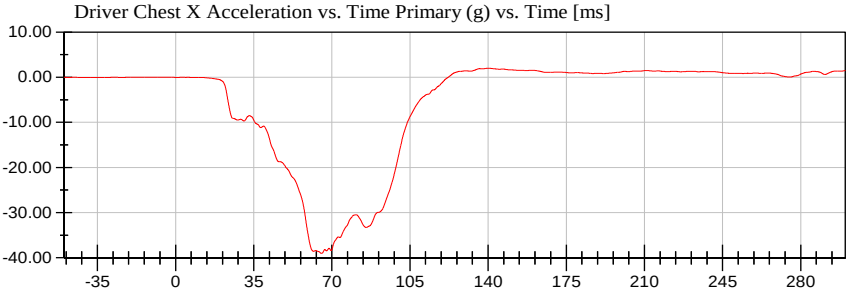
Test Lab: CTF

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

Test Number: 190515 (M20190103)

Position #2 Hybrid III Small Adult Female (426)

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



<Max>

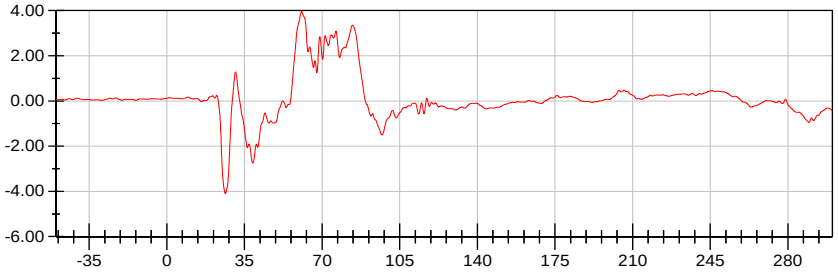
1.97 g at 139.60 ms

<Min>

-39.02 g at 65.36 ms

CFC_180

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



<Max>

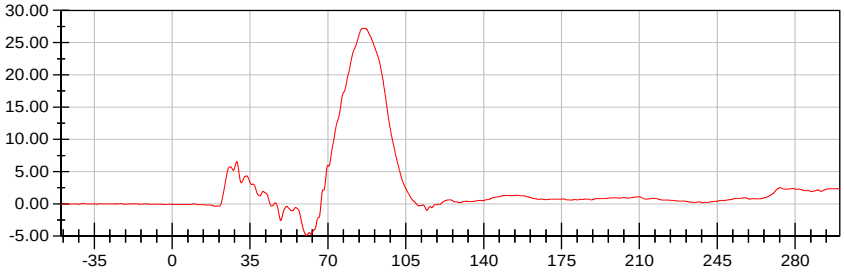
3.96 g at 60.80 ms

<Min>

-4.10 g at 26.40 ms

CFC_180

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



<Max>

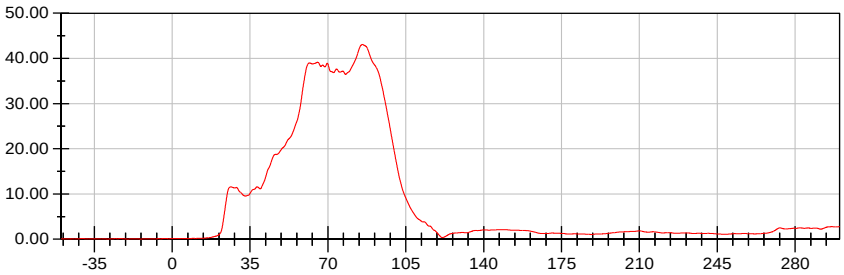
27.22 g at 85.76 ms

<Min>

-4.91 g at 60.48 ms

CFC_180

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



<Max>

43.08 g at 85.52 ms

<Min>

0.04 g at -14.00 ms

CFC_180

NHTSA

Test Date: 05/15/2019

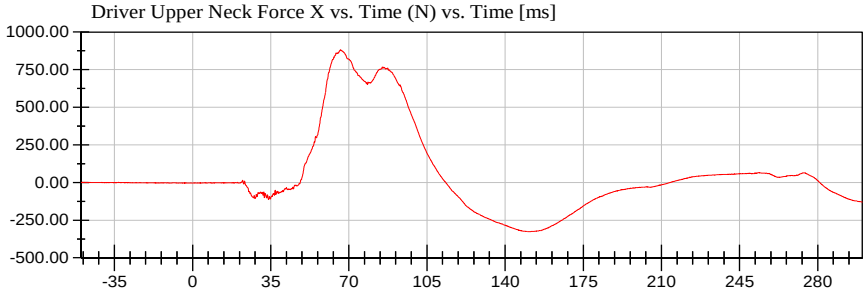
Test Lab: CTF

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

Test Number: 190515 (M20190103)

Position #2 Hybrid III Small Adult Female (426)

Driver Upper Neck Force X vs. Time (N) vs. Time [ms]



<Max>

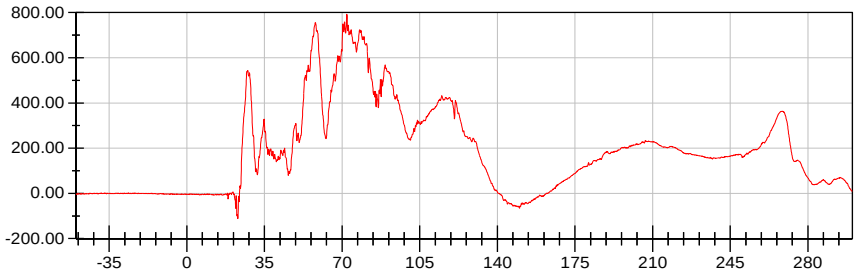
881.82 N at 66.24 ms

<Min>

-326.92 N at 150.24 ms

CFC_1000

Driver Upper Neck Force Z vs. Time (N) vs. Time [ms]



<Max>

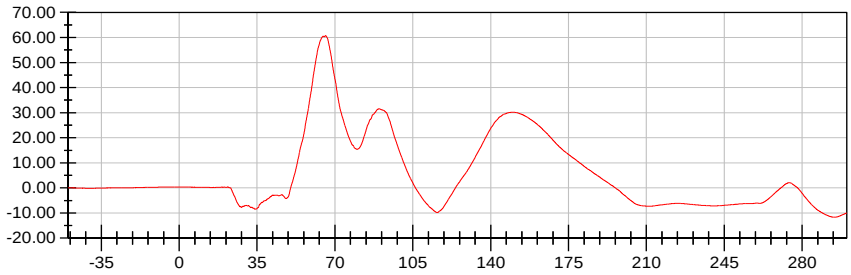
792.91 N at 72.16 ms

<Min>

-111.87 N at 23.04 ms

CFC_1000

Driver Upper Neck Moment Y vs. Time (Nm) vs. Time [ms]



<Max>

60.74 Nm at 65.76 ms

<Min>

-11.65 Nm at 294.56 ms

CFC_600

2019 Chevrolet Blazer SUV NCAP 35 mph Frontal Impact

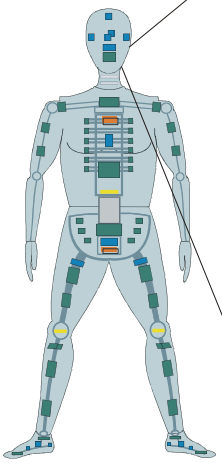
Neck Injury Predictor (NIJ)

Date: 05/15/2019
Time: 12:35

Customer: NHTSA
Test Number: M20190103

TRC Inc. Test Lab: CTF
Test Number: 190515

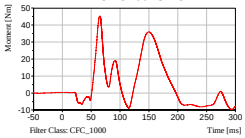
Test Orientation = Frontal
Fzc(Tension) = 6806
Fzc(Compression) = 6160
Myc(Extension) = 135
Myc(Flexion) = 310



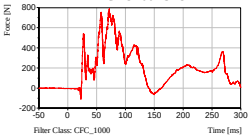
Dummy:HIII 50th Male
Seating Position:
Driver

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

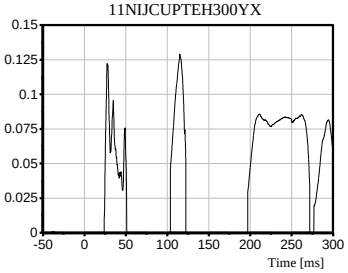
11TMONUP00H3MOYX



11NECKUP00H3FOZA

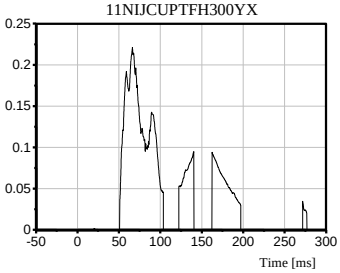


11NIJCUPTEH300YX



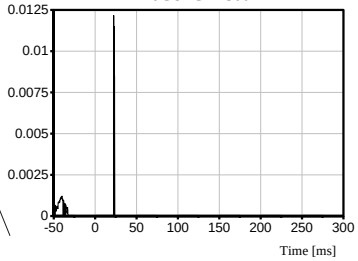
Max [NTE] 0.1290 at 115.04 ms

11NIJCUPTFH300YX



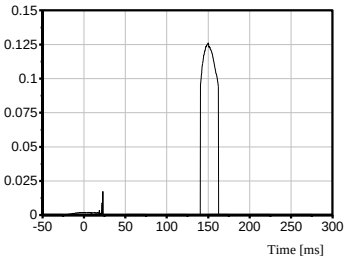
Max [NTF] 0.2211 at 66.32 ms

11NIJCUPCEH300YX



Max [NCE] 0.0122 at 22.56 ms

11NIJCUPCFH300YX



Max [NCF] 0.1261 at 150.00 ms

NHTSA

Test Date: 05/15/2019

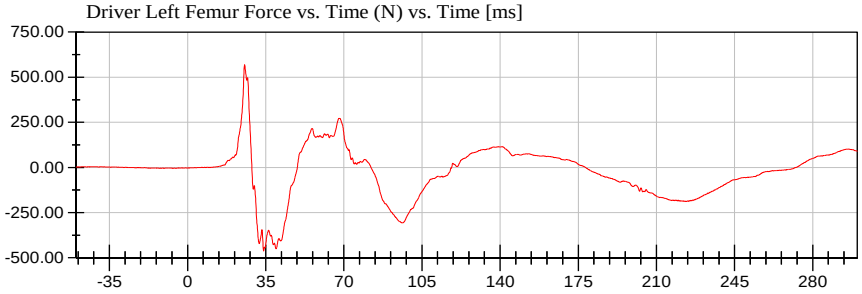
Test Lab: CTF

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

Test Number: 190515 (M20190103)

Position #2 Hybrid III Small Adult Female (426)

Driver Left Femur Force vs. Time (N) vs. Time [ms]



<Max>

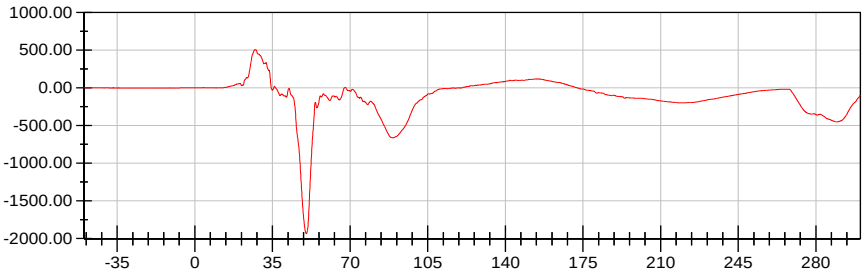
568.75 N at 25.60 ms

<Min>

-462.11 N at 34.08 ms

CFC_600

Driver Right Femur Force vs. Time (N) vs. Time [ms]



<Max>

509.51 N at 27.20 ms

<Min>

-1,934.83 N at 50.32 ms

CFC_600

NHTSA

Test Date: 05/15/2019

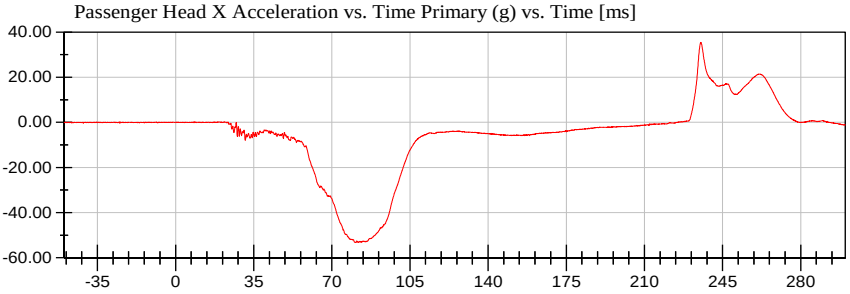
Test Lab: CTF

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

Test Number: 190515 (M20190103)

Position #2 Hybrid III Small Adult Female (426)

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



<Max>

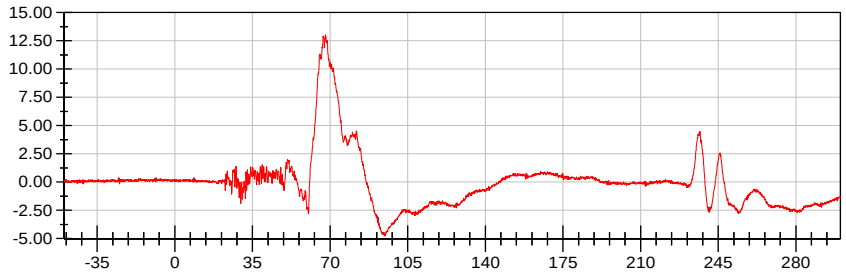
35.41 g at 235.28 ms

<Min>

-53.22 g at 80.24 ms

CFC_1000

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



<Max>

13.03 g at 68.00 ms

<Min>

-4.77 g at 94.48 ms

CFC_1000

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

<Max>

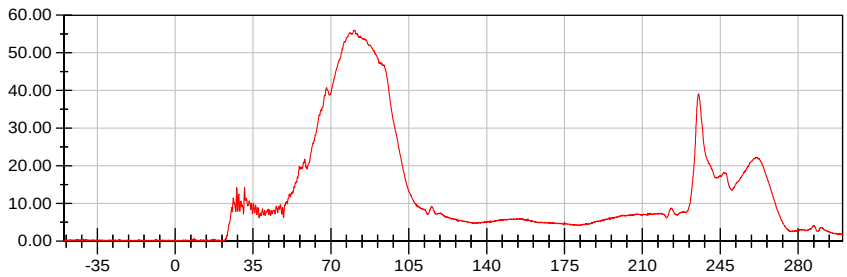
20.85 g at 67.68 ms

<Min>

-3.57 g at 287.04 ms

CFC_1000

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



<Max>

55.99 g at 80.80 ms

<Min>

0.03 g at 18.64 ms

CFC_1000

NHTSA

Test Date: 05/15/2019

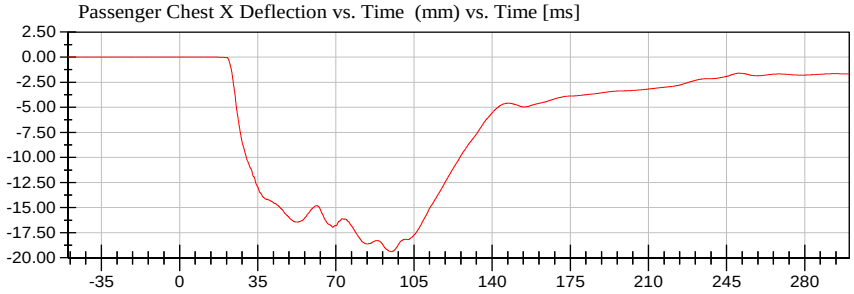
Test Lab: CTF

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

Test Number: 190515 (M20190103)

Position #2 Hybrid III Small Adult Female (426)

Passenger Chest X Deflection vs. Time (mm) vs. Time [ms]



<Max>

0.00 mm at -48.96 ms

<Min>

-19.38 mm at 94.72 ms

CFC_600

NHTSA

Test Date: 05/15/2019

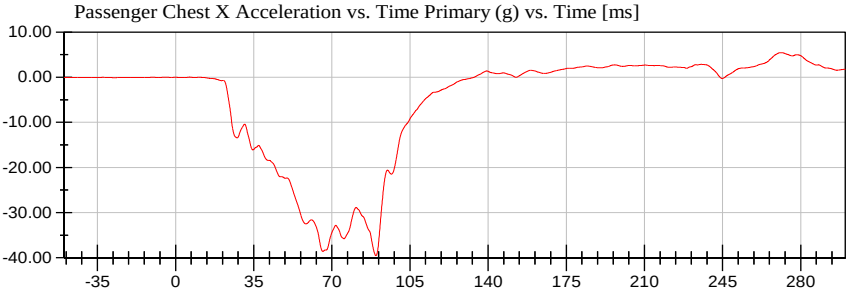
Test Lab: CTF

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

Test Number: 190515 (M20190103)

Position #2 Hybrid III Small Adult Female (426)

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



<Max>

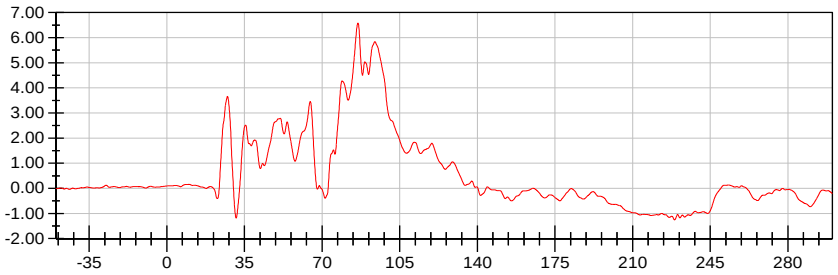
5.41 g at 271.76 ms

<Min>

-39.53 g at 89.76 ms

CFC_180

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



<Max>

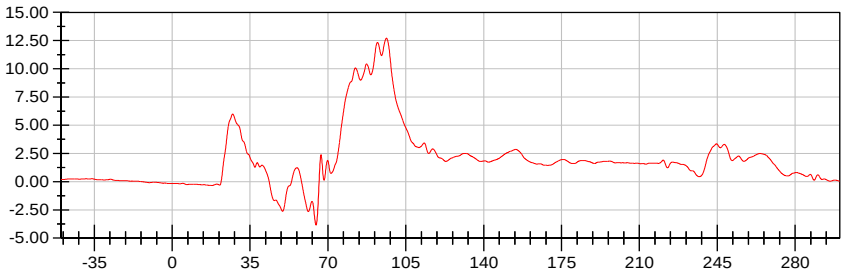
6.58 g at 86.16 ms

<Min>

-1.25 g at 228.96 ms

CFC_180

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



<Max>

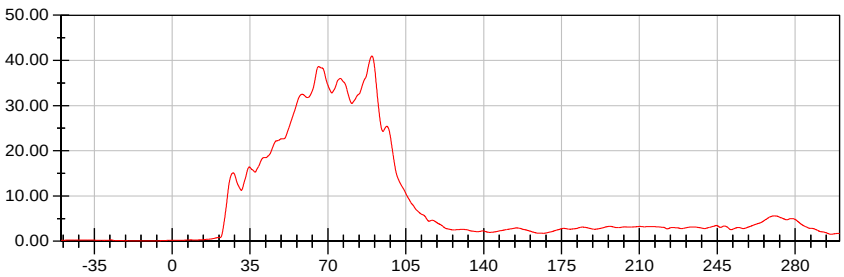
12.72 g at 96.32 ms

<Min>

-3.83 g at 64.64 ms

CFC_180

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



<Max>

40.99 g at 89.76 ms

<Min>

0.07 g at -9.28 ms

CFC_180

NHTSA

Test Date: 05/15/2019

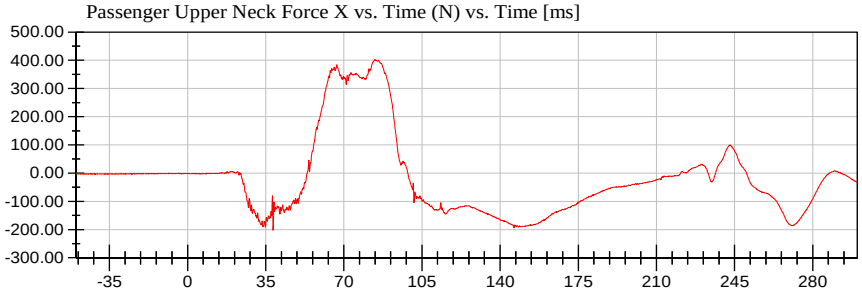
Test Lab: CTF

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

Test Number: 190515 (M20190103)

Position #2 Hybrid III Small Adult Female (426)

Passenger Upper Neck Force X vs. Time (N) vs. Time [ms]



<Max>

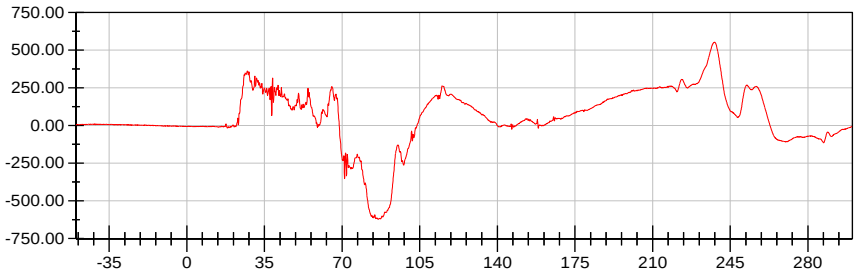
402.68 N at 83.92 ms

<Min>

-202.35 N at 38.32 ms

CFC_1000

Passenger Upper Neck Force Z vs. Time (N) vs. Time [ms]



<Max>

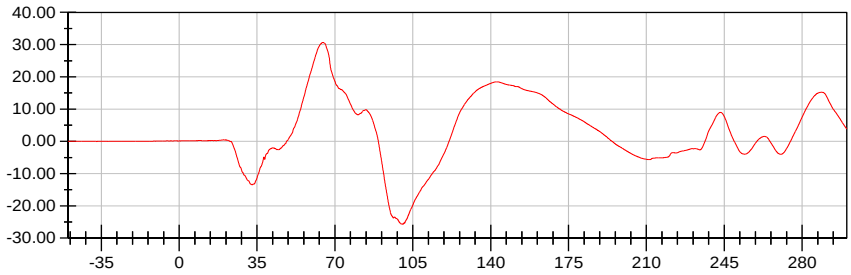
553.80 N at 237.84 ms

<Min>

-622.34 N at 86.24 ms

CFC_1000

Passenger Upper Neck Moment Y vs. Time (Nm) vs. Time [ms]



<Max>

30.68 Nm at 64.64 ms

<Min>

-25.68 Nm at 100.40 ms

CFC_600

2019 Chevrolet Blazer SUV NCAP 35 mph Frontal Impact

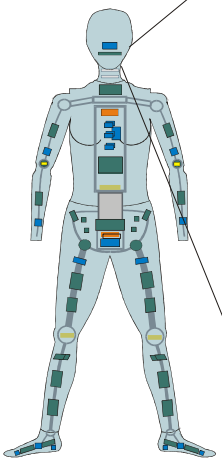
Neck Injury Predictor (NIJ)

Date: 05/15/2019
Time: 12:35

Customer: NHTSA
Test Number: M20190103

TRC Inc. Test Lab: CTF
Test Number: 190515

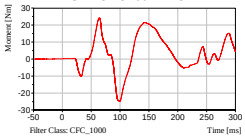
Test Orientation = Frontal
Fzc(Tension) = 4287
Fzc(Compression) = 3880
Myc(Extension) = 67
Myc(Flexion) = 155



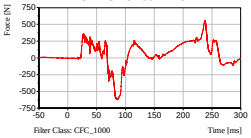
Dummy:HIII 5th Female
Seating Position:
Right Front Passenger

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

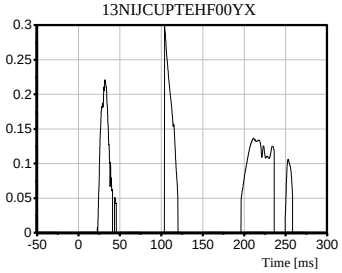
13TMONUP00HFMOYX



13NECKUP00HFFOZA

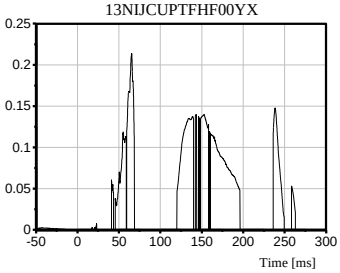


13NIJCUPTEHF00YX



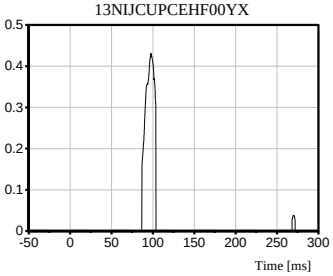
Max [NTE] 0.2984 at 103.84 ms

13NIJCUPTFHF00YX



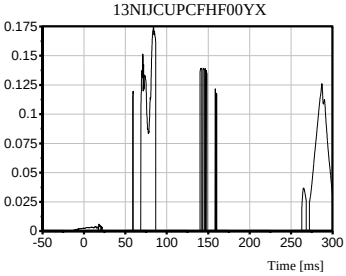
Max [NTF] 0.2136 at 65.36 ms

13NIJCUPCEHF00YX



Max [NCE] 0.4314 at 97.76 ms

13NIJCUPCFHF00YX



Max [NCF] 0.1742 at 84.08 ms

NHTSA

Test Date: 05/15/2019

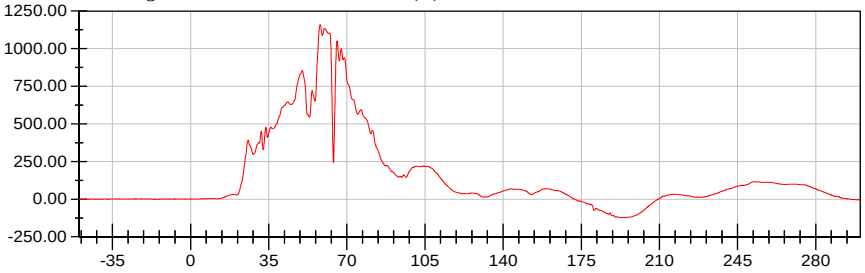
Test Lab: CTF

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

Test Number: 190515 (M20190103)

Position #2 Hybrid III Small Adult Female (426)

Passenger Left Femur Force vs. Time (N) vs. Time [ms]



<Max>

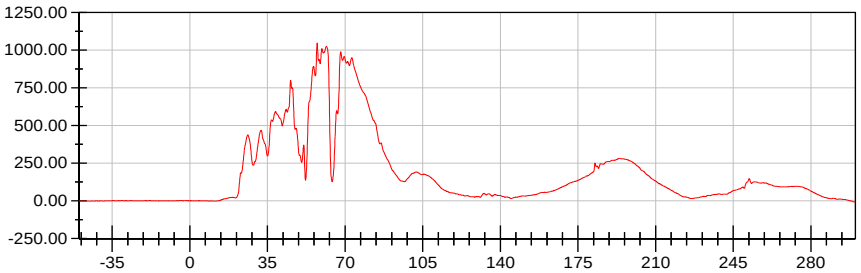
1,158.83 N at 58.08 ms

<Min>

-123.25 N at 194.16 ms

CFC_600

Passenger Right Femur Force vs. Time (N) vs. Time [ms]



<Max>

1,048.11 N at 57.44 ms

<Min>

-8.65 N at 300.00 ms

CFC_600

APPENDIX C
DUMMY CALIBRATION AND PERFORMANCE VERIFICATION

Pre-Test Calibration Sheets

Driver S/N 037

Transportation Research Center Inc.
572E HIII 50th Male Dummy
External Dimensions
Serial No. 037
Calibration No. 58

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. 58-1
Test Date: 5/12/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Peak Head Resultant Acceleration	225 - 275 g	263.5 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	3.2 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

Test meets specifications.

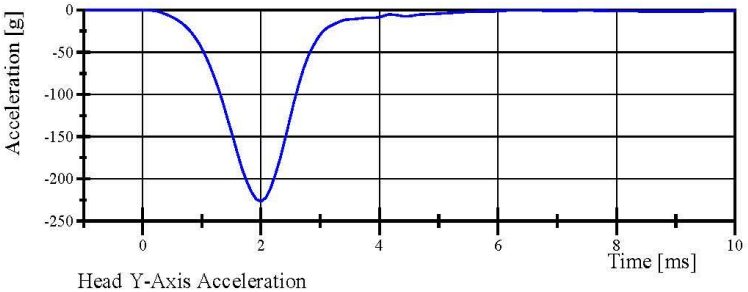
Condition: Used

Comments:
Head Skin S/N: N/A

Transportation Research Center Inc.

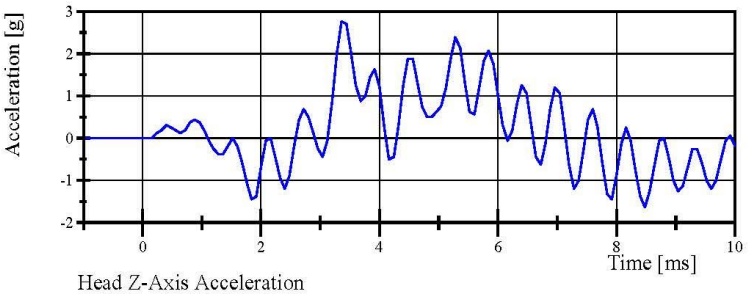
Front Head Drop
HIII 50th Serial No. 037 Certification No. 58-1
Test Date: 5/12/2019

Head X-Axis Acceleration



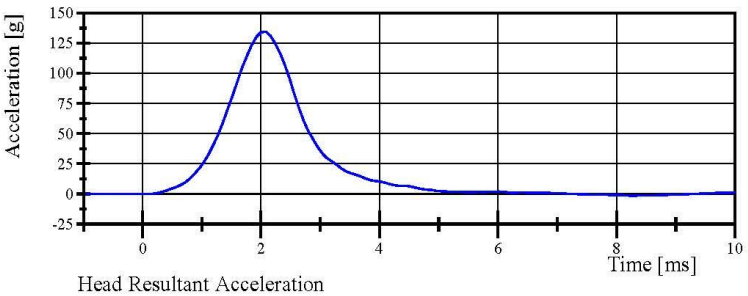
Filter Class: CFC_1000
Max: 0.0 g at -1.0 ms
Min: -226.7 g at 2.0 ms

Head Y-Axis Acceleration



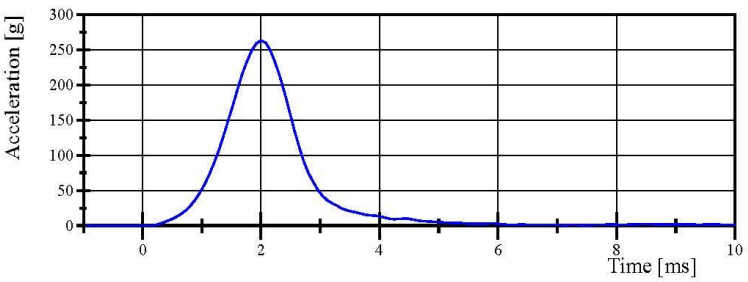
Filter Class: CFC_1000
Max: 2.8 g at 3.4 ms
Min: -1.6 g at 8.5 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 134.7 g at 2.1 ms
Min: -1.3 g at 8.2 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 263.5 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

05.12.2019 07:58:59 577

Transportation Research Center Inc.

Neck Flexion
HIII 50th Serial No. 037 Certification No. 58-1
Test Date: 5/10/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	6.910 m/s	Yes
Pendulum Acceleration Decay Crossing -5g	34 - 42 ms	38.5 ms	Yes
Pendulum Acceleration at 10ms	(-22.5) - (-27.5) g	-25.22 g	Yes
Pendulum Acceleration at 20ms	(-17.6) - (-22.6) g	-20.07 g	Yes
Pendulum Acceleration at 30ms	(-12.5) - (-18.5) g	-15.23 g	Yes
Pendulum Acceleration > 30ms	>= (-29.0) g	-15.23 g	Yes
Total Head D-Plane Rotation			
Peak	(-64) - (-78) °	-70.7 °	Yes
Time of Peak	57 - 64 ms	58.4 ms	Yes
Total Head D-Plane Rotation Decay to 0°	113 - 128 ms	116.4 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	88.1 - 108.4 N·m	100.87 N·m	Yes
Time of Peak	47 - 58 ms	51.4 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	97 - 107 ms	99.3 ms	Yes

Test meets specifications.

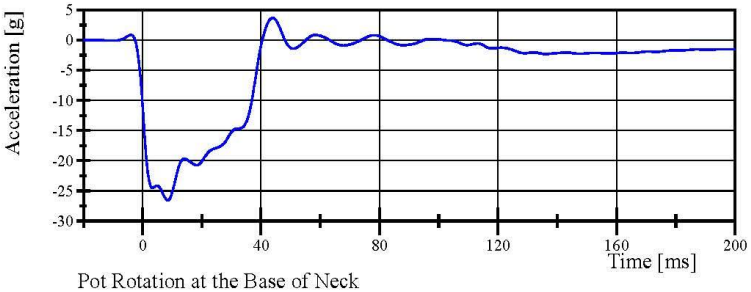
Condition: Used

Comments:
Neck S/N: 4728

Transportation Research Center Inc.

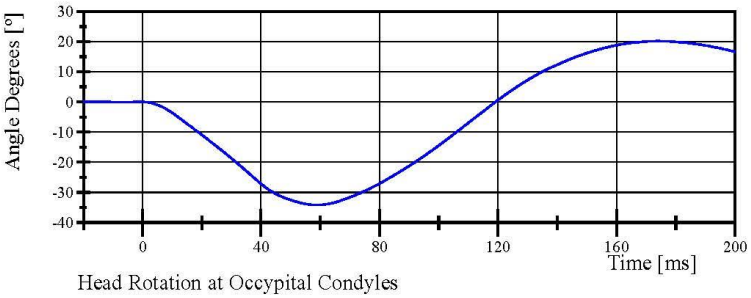
Neck Flexion
HIII 50th Serial No. 037 Certification No. 58-1
Test Date: 5/10/2019

Pendulum Acceleration



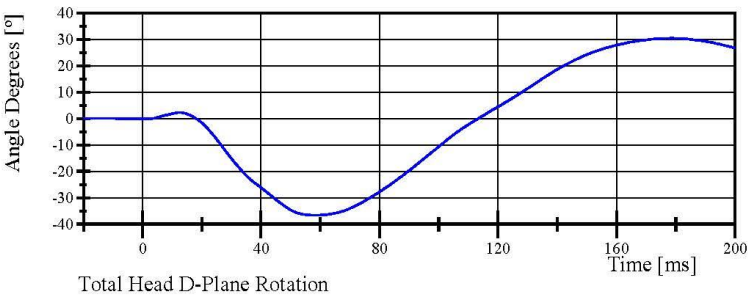
Filter Class: CFC_60
Max: 3.7 g at 43.9 ms
Min: -26.6 g at 8.6 ms

Pot Rotation at the Base of Neck



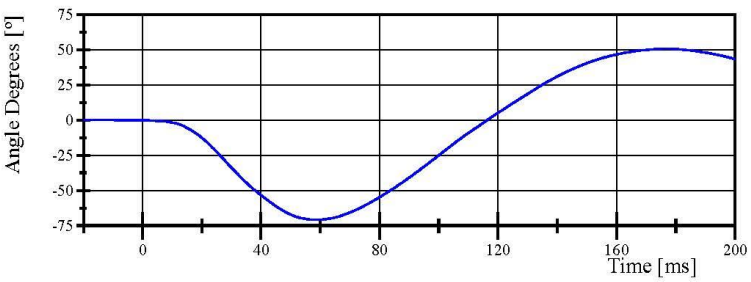
Filter Class: CFC_60
Max: 20.2 ° at 173.9 ms
Min: -34.1 ° at 58.7 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 30.5 ° at 178.7 ms
Min: -36.6 ° at 58.3 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 50.6 ° at 177.0 ms
Min: -70.7 ° at 58.4 ms

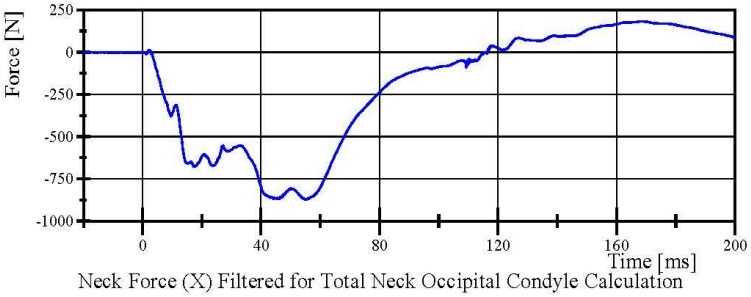
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

05.10.2019 14:03:21 1841

Transportation Research Center Inc.

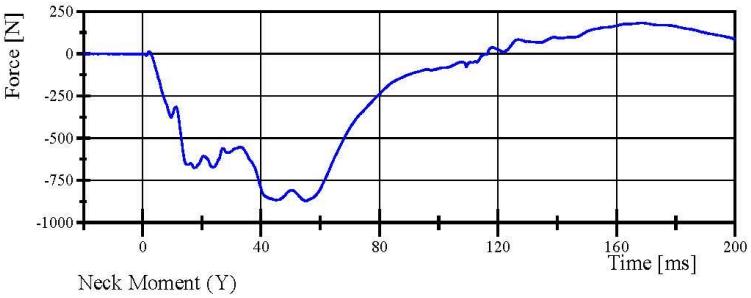
Neck Flexion
HIII 50th Serial No. 037 Certification No. 58-1
Test Date: 5/10/2019

Neck Force (X)



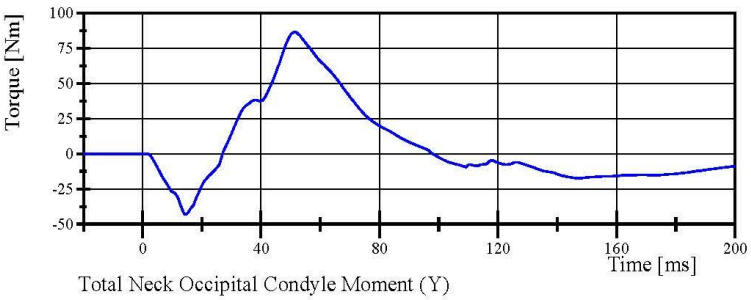
Filter Class: CFC_1000
Max: 183.4 N at 167.9 ms
Min: -871.0 N at 55.2 ms

Neck Force (X) Filtered for Total Neck Occipital Condyle Calculation



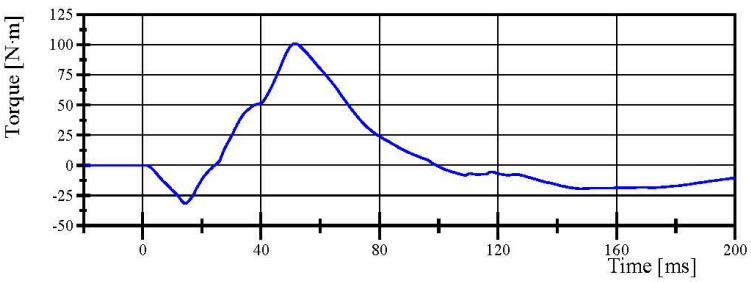
Filter Class: CFC_600
Max: 183.0 N at 168.8 ms
Min: -871.1 N at 55.1 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 86.5 Nm at 51.3 ms
Min: -43.0 Nm at 14.6 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 100.9 N·m at 51.4 ms
Min: -31.5 N·m at 14.4 ms

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

05.10.2019 14:03:22 1841

Transportation Research Center Inc.

Neck Extension
HIII 50th Serial No. 037 Certification No. 58-1
Test Date: 5/10/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Pendulum Velocity	(-5.95) - (-6.18) m/s	-5.970 m/s	Yes
Pendulum Acceleration Decay Crossing 5g	38 - 46 ms	38.4 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	20.48 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	17.05 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	14.05 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	14.60 g	Yes
Total Head D-Plane Rotation			
Peak	81 - 106 °	100.0 °	Yes
Time of Peak	72 - 82 ms	75.7 ms	Yes
Total Head D-Plane Rotation Decay to 0°	147 - 174 ms	157.9 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	(-52.9) - (-80) N·m	-71.81 N·m	Yes
Time of Peak	65 - 79 ms	71.5 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	120 - 148 ms	146.0 ms	Yes

Test meets specifications.

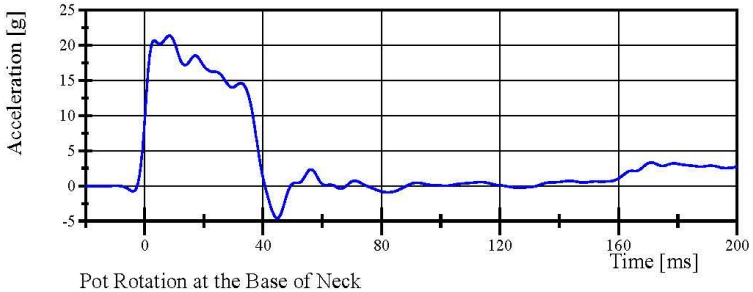
Condition: Used

Comments:
Neck S/N: 4728

Transportation Research Center Inc.

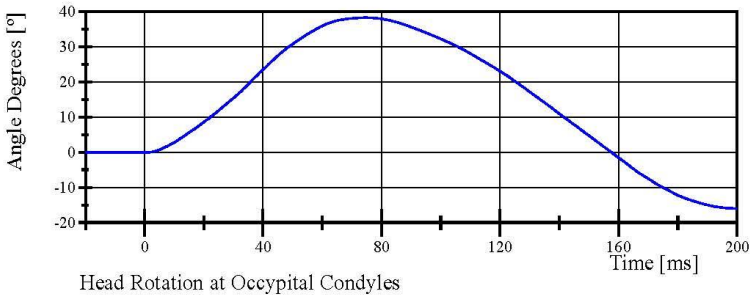
Neck Extension
HIII 50th Serial No. 037 Certification No. 58-1
Test Date: 5/10/2019

Pendulum Acceleration



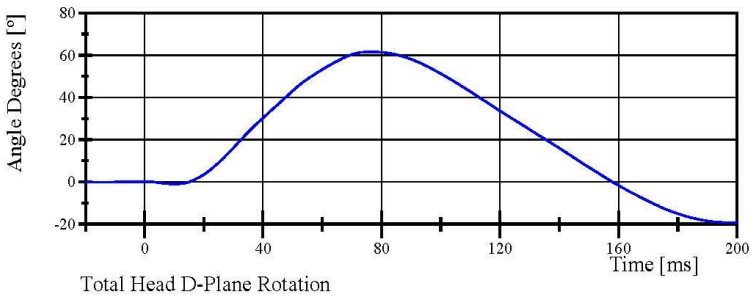
Filter Class: CFC_60
Max: 21.4 g at 8.4 ms
Min: -4.6 g at 44.8 ms

Pot Rotation at the Base of Neck



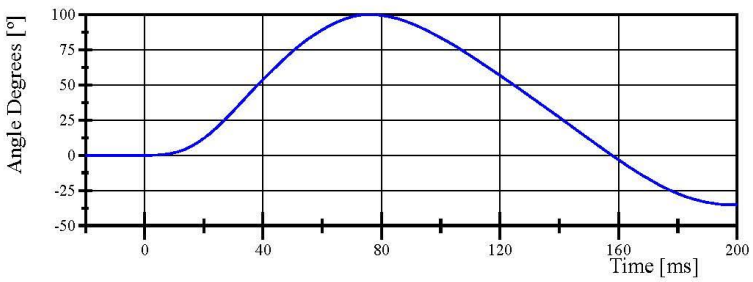
Filter Class: CFC_60
Max: 38.3 ° at 74.6 ms
Min: -15.9 ° at 200.0 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 61.7 ° at 76.4 ms
Min: -19.3 ° at 197.6 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 100.0 ° at 75.7 ms
Min: -35.2 ° at 198.2 ms

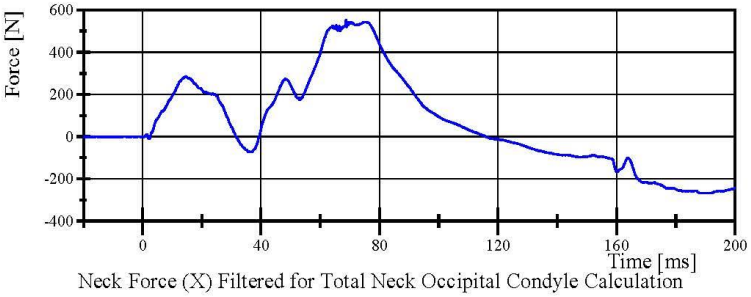
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

05.10.2019 14:48:12 1986

Transportation Research Center Inc.

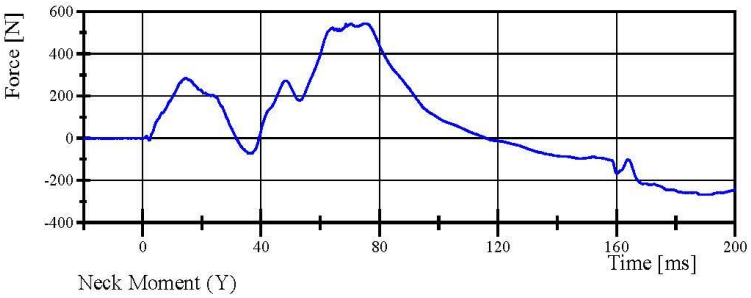
Neck Extension
HIII 50th Serial No. 037 Certification No. 58-1
Test Date: 5/10/2019

Neck Force (X)



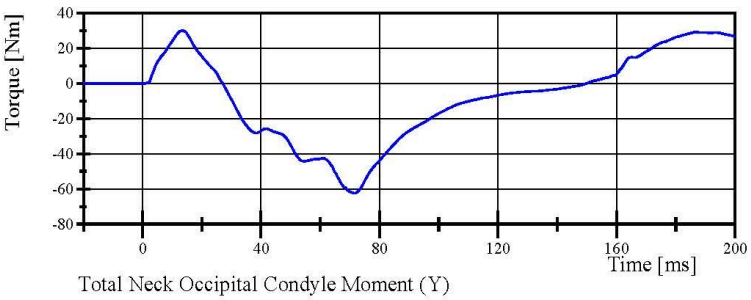
Filter Class: CFC_1000
Max: 553.4 N at 68.7 ms
Min: -267.1 N at 188.5 ms

Neck Force (X) Filtered for Total Neck Occipital Condyle Calculation



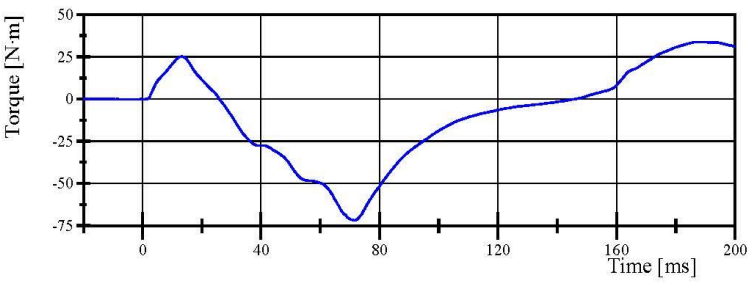
Filter Class: CFC_600
Max: 544.1 N at 75.2 ms
Min: -266.9 N at 191.2 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 30.0 Nm at 13.4 ms
Min: -62.4 Nm at 71.6 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 33.7 N·m at 186.9 ms
Min: -71.8 N·m at 71.5 ms

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

05.10.2019 14:48:12 1986

Transportation Research Center Inc.

Front Thorax
HIII 50th Serial No. 037 Certification No. 58-1
Test Date: 5/13/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	42 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.783 m/s	Yes
Probe Force Peak	(-5,160) - (-5,894) N	-5,725.8 N	Yes
Maximum Chest Compression	(-63.5) - (-72.6) mm	-65.25 mm	Yes
Internal Hysteresis	69 - 85 %	73.7 %	Yes

Test meets specifications.

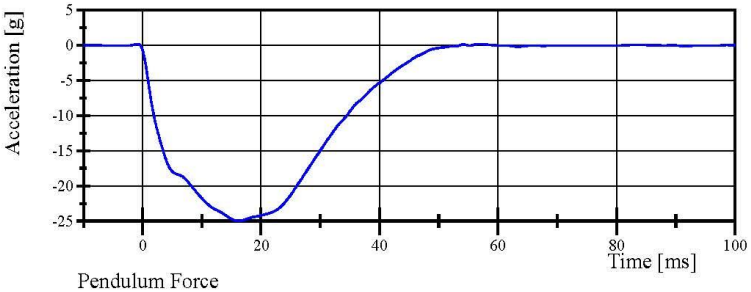
Condition: Used

Comments:
Jacket S/N: 2565
Rib Set S/N: 02033121A

Transportation Research Center Inc.

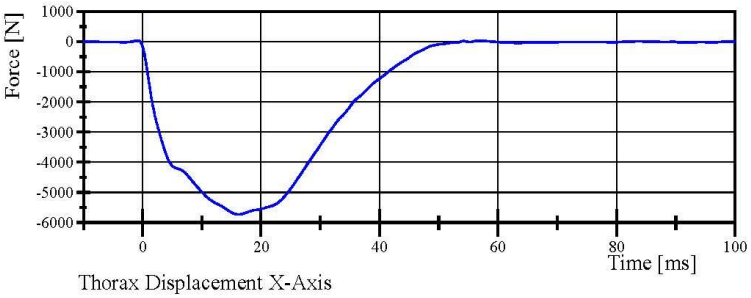
Front Thorax
HIII 50th Serial No. 037 Certification No. 58-1
Test Date: 5/13/2019

Pendulum Acceleration



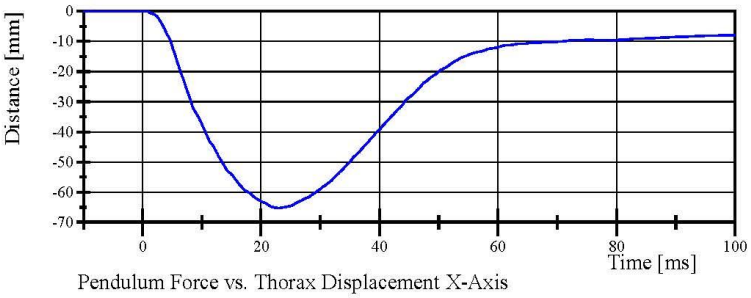
Filter Class: CFC_180
Max: 0.2 g at -0.8 ms
Min: -25.0 g at 16.2 ms

Pendulum Force



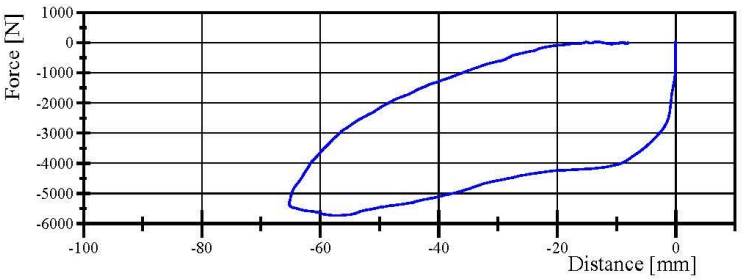
Filter Class: CFC_180
Max: 38.5 N at -0.8 ms
Min: -5,725.8 N at 16.2 ms

Thorax Displacement X-Axis



Filter Class: CFC_600
Max: 0.0 mm at -8.7 ms
Min: -65.2 mm at 23.0 ms

Pendulum Force vs. Thorax Displacement X-Axis



Filter Class: CFC_180
Max: 38.5 N at -0.0 mm
Min: -5,725.8 N at -57.2 mm

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

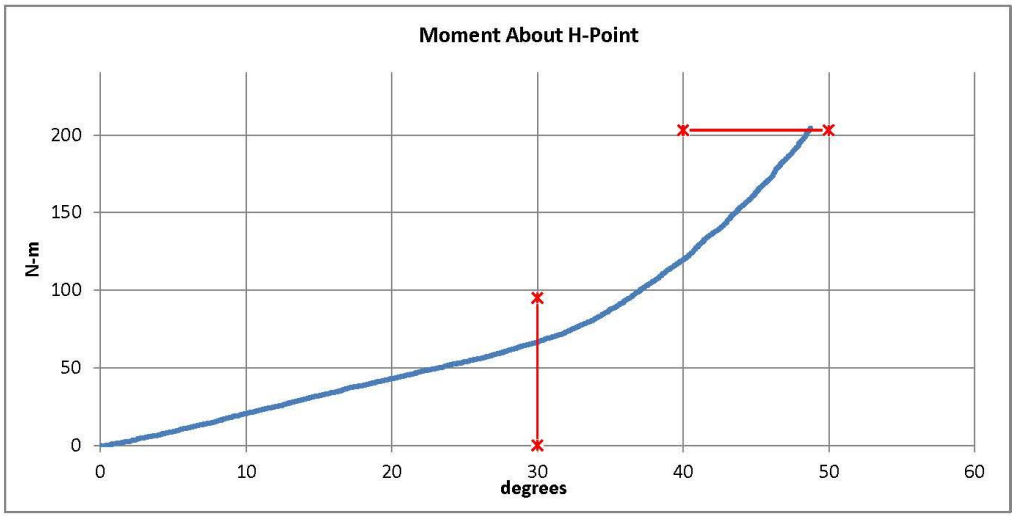
05.13.2019 07:37:46 367

Transportation Research Center Inc.

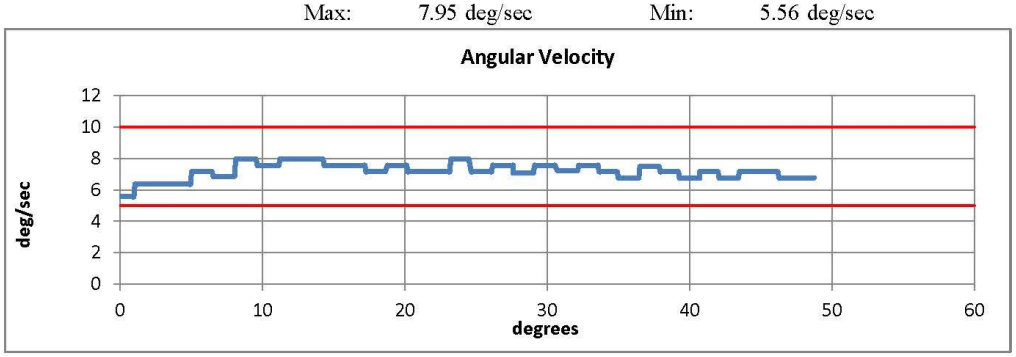
Hybrid III 50th Male Hip Range of Motion

Serial Number:	037	Date:	10-May-2019
Side Tested:	Left Hip	Time:	13:32
Test Number:	1		

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	21	°C	Pass
Humidity	10	-	70	50	%	Pass
Moment at 30°	0	≤	94.9	66.63	N-m	Pass
Angle at 203 Nm	40	-	50	48.74	deg	Pass
Average Velocity	5	-	10	7.16	deg/sec	Pass



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



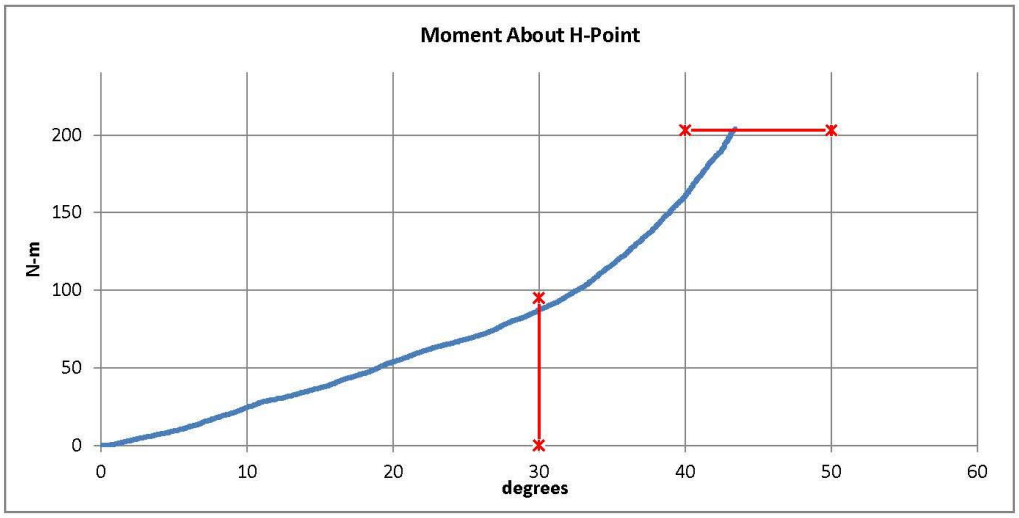
Comments:
Pelvis Skin S/N: N/A
Lumbar S/N: 0550

Transportation Research Center Inc.

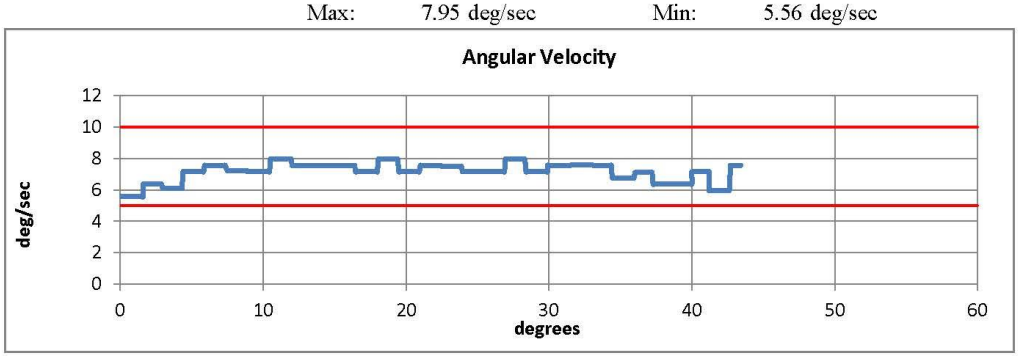
Hybrid III 50th Male Hip Range of Motion

Serial Number:	037	Date:	12-May-2019
Side Tested:	Right Hip	Time:	6:13
Test Number:	1		

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	20.9	°C	Pass
Humidity	10	-	70	39	%	Pass
Moment at 30°	0	≤	94.9	87.66	N-m	Pass
Angle at 203 Nm	40	-	50	43.41	deg	Pass
Average Velocity	5	-	10	7.13	deg/sec	Pass



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



Comments:
Pelvis Skin S/N: N/A
Lumbar S/N: 0550

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 58-4
Test Date: 5/10/2019

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.086 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,397.67 N	Yes

Test meets specifications.

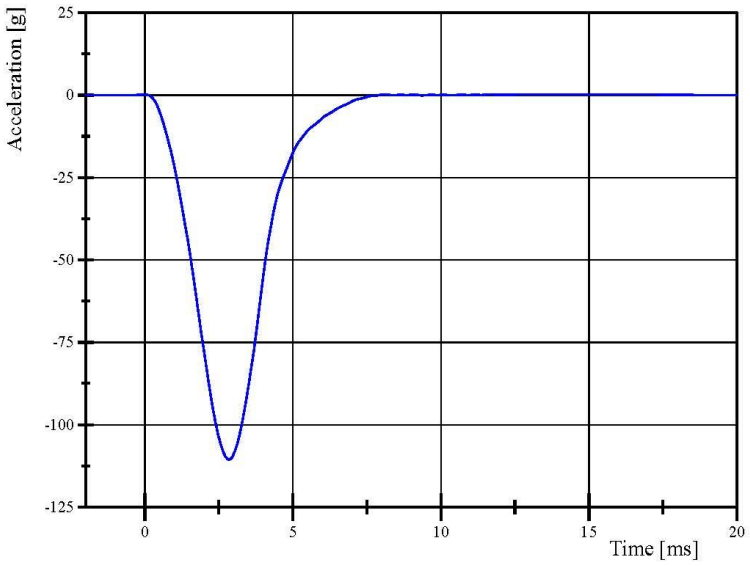
Condition: Used

Comments:
Knee Skin S/N: 2672

Transportation Research Center Inc.

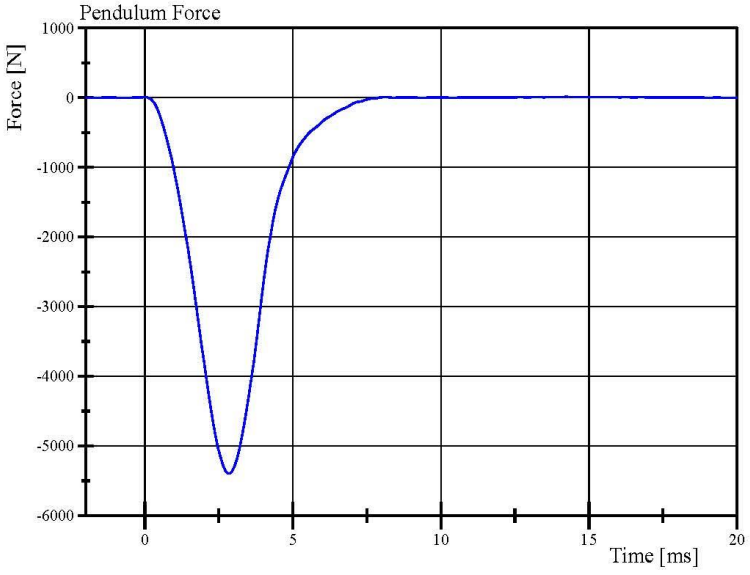
Left Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 58-4
Test Date: 5/10/2019

Pendulum Acceleration



Filter Class: CFC_600
Max: 0.3 g at 14.2 ms
Min: -110.5 g at 2.9 ms

Pendulum Force



Filter Class: CFC_600
Max: 13.3 N at 14.2 ms
Min: -5,397.7 N at 2.9 ms

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

05.10.2019 11:54:19 1759

Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 58-2
Test Date: 5/10/2019

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.083 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,178.84 N	Yes

Test meets specifications.

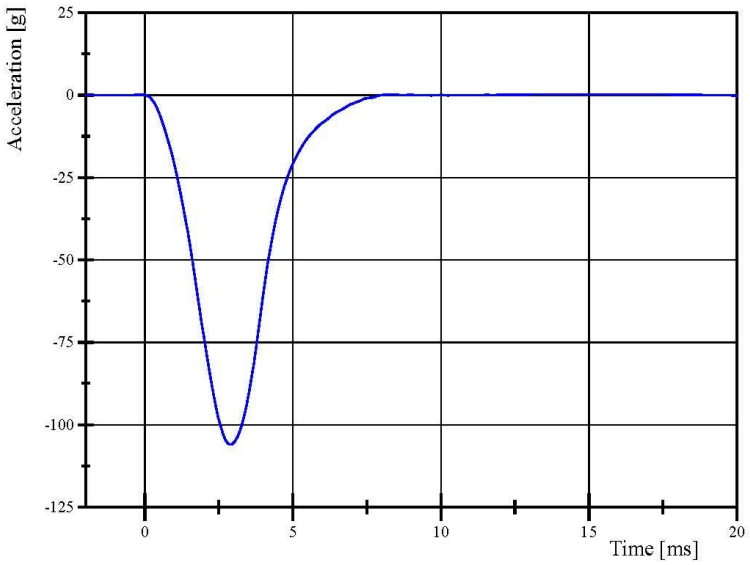
Condition: Used

Comments:
Knee Skin S/N: 176

Transportation Research Center Inc.

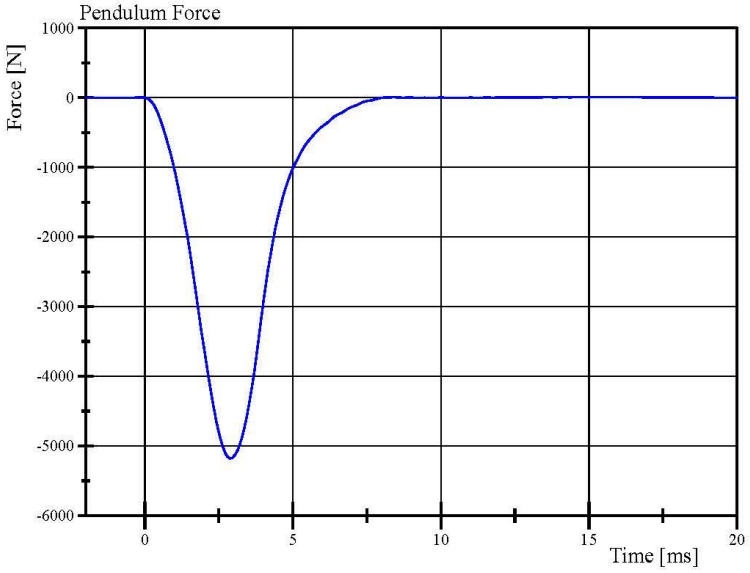
Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 58-2
Test Date: 5/10/2019

Pendulum Acceleration



Filter Class: CFC_600
Max: 0.3 g at 15.1 ms
Min: -106.0 g at 2.9 ms

Pendulum Force



Filter Class: CFC_600
Max: 12.3 N at 15.1 ms
Min: -5,178.8 N at 2.9 ms

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

05.10.2019 11:39:58 1756

Post-Test Calibration Sheets

Driver S/N 037

Transportation Research Center Inc.
572E HIII 50th Male Dummy
External Dimensions
Serial No. 037
Calibration No. 59

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. 59-1
Test Date: 5/16/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Peak Head Resultant Acceleration	225 - 275 g	262.4 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	8.5 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

Test meets specifications.

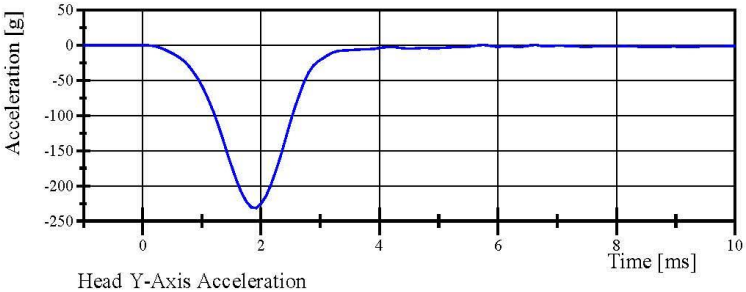
Condition: Used

Comments:
Head Skin S/N: N/A

Transportation Research Center Inc.

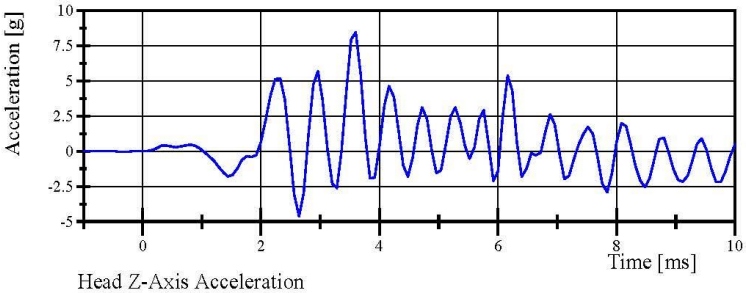
Front Head Drop
HIII 50th Serial No. 037 Certification No. 59-1
Test Date: 5/16/2019

Head X-Axis Acceleration



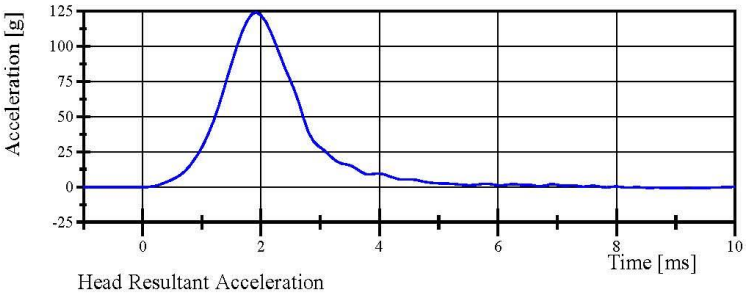
Filter Class: CFC_1000
Max: 0.6 g at 5.8 ms
Min: -231.3 g at 1.9 ms

Head Y-Axis Acceleration



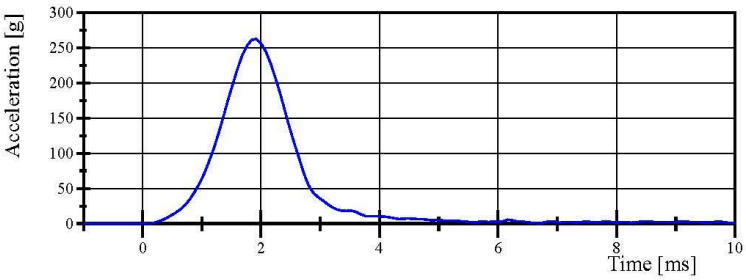
Filter Class: CFC_1000
Max: 8.5 g at 3.6 ms
Min: -4.6 g at 2.6 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 124.1 g at 1.9 ms
Min: -0.8 g at 9.2 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 262.4 g at 1.9 ms
Min: 0.0 g at -0.3 ms

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

05.16.2019 08:45:19 578

Transportation Research Center Inc.

Neck Flexion
HIII 50th Serial No. 037 Certification No. 59-1
Test Date: 5/16/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	6.914 m/s	Yes
Pendulum Acceleration Decay Crossing -5g	34 - 42 ms	38.4 ms	Yes
Pendulum Acceleration at 10ms	(-22.5) - (-27.5) g	-24.56 g	Yes
Pendulum Acceleration at 20ms	(-17.6) - (-22.6) g	-20.80 g	Yes
Pendulum Acceleration at 30ms	(-12.5) - (-18.5) g	-15.33 g	Yes
Pendulum Acceleration > 30ms	>= (-29.0) g	-15.33 g	Yes
Total Head D-Plane Rotation			
Peak	(-64) - (-78) °	-66.1 °	Yes
Time of Peak	57 - 64 ms	59.9 ms	Yes
Total Head D-Plane Rotation Decay to 0°	113 - 128 ms	118.6 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	88.1 - 108.4 N·m	100.25 N·m	Yes
Time of Peak	47 - 58 ms	51.6 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	97 - 107 ms	101.2 ms	Yes

Test meets specifications.

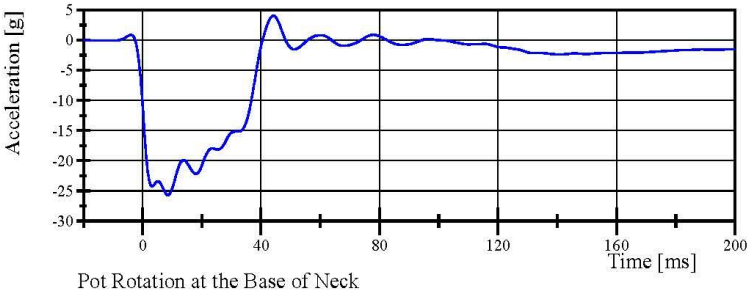
Condition: Used

Comments:
Neck S/N: 4728

Transportation Research Center Inc.

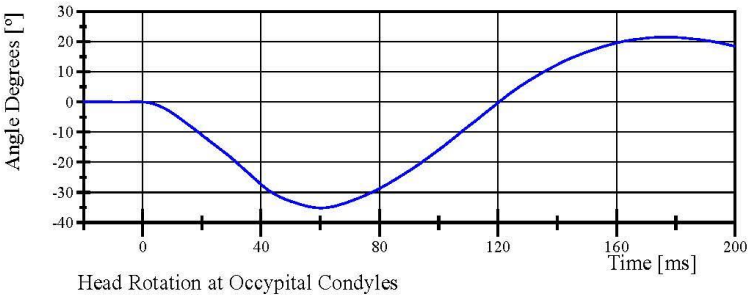
Neck Flexion
HIII 50th Serial No. 037 Certification No. 59-1
Test Date: 5/16/2019

Pendulum Acceleration



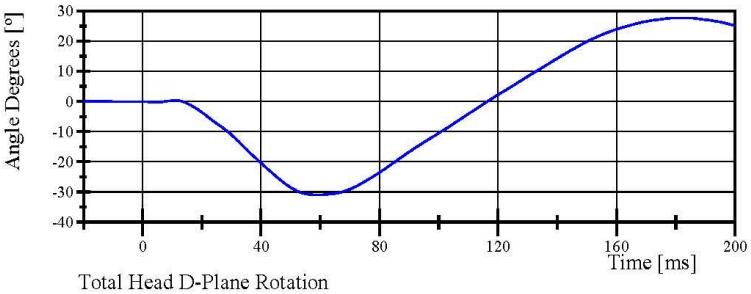
Filter Class: CFC_60
Max: 4.1 g at 44.2 ms
Min: -25.7 g at 8.6 ms

Pot Rotation at the Base of Neck



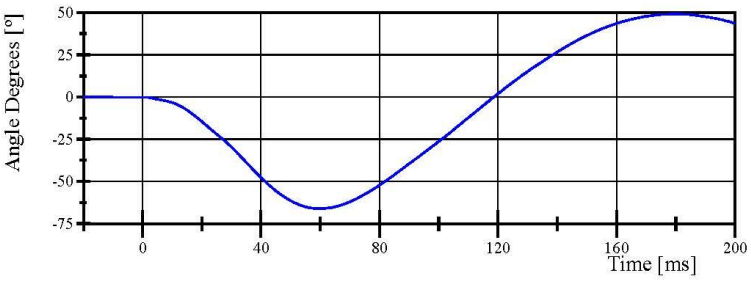
Filter Class: CFC_60
Max: 21.5 ° at 177.2 ms
Min: -35.1 ° at 60.2 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 27.8 ° at 182.3 ms
Min: -31.0 ° at 59.0 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 49.2 ° at 180.0 ms
Min: -66.1 ° at 59.9 ms

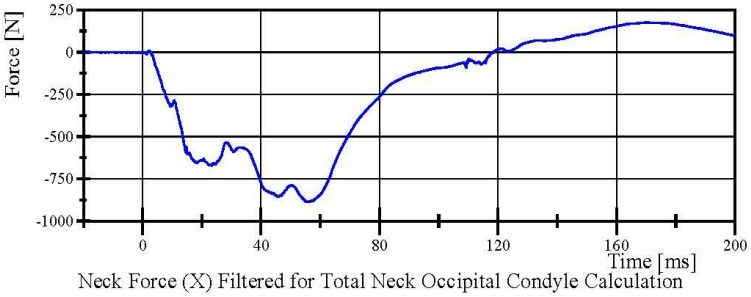
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

05.16.2019 10:30:06 1840

Transportation Research Center Inc.

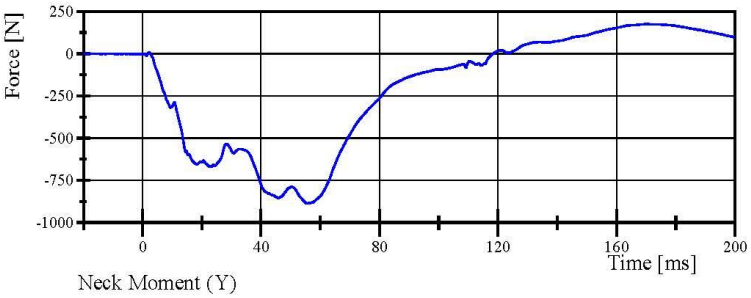
Neck Flexion
HIII 50th Serial No. 037 Certification No. 59-1
Test Date: 5/16/2019

Neck Force (X)



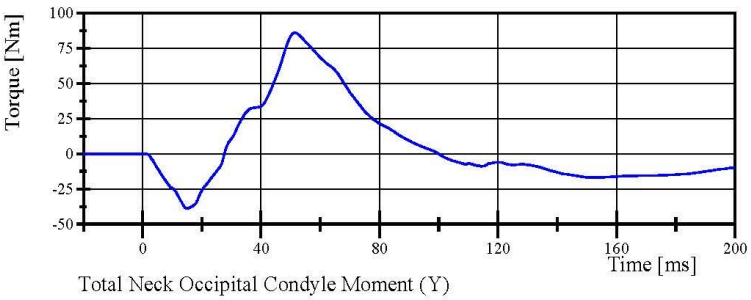
Filter Class: CFC_1000
Max: 175.8 N at 169.7 ms
Min: -885.1 N at 55.3 ms

Neck Force (X) Filtered for Total Neck Occipital Condyle Calculation



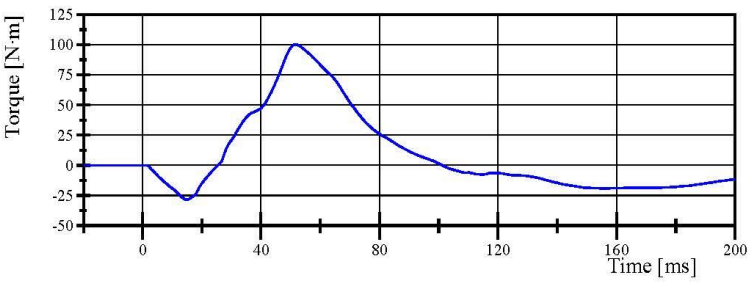
Filter Class: CFC_600
Max: 175.5 N at 170.4 ms
Min: -885.1 N at 55.4 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 86.1 Nm at 51.4 ms
Min: -38.8 Nm at 15.2 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 100.3 N·m at 51.6 ms
Min: -28.3 N·m at 14.8 ms

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

05.16.2019 10:30:07 1840

Transportation Research Center Inc.

Neck Extension
HIII 50th Serial No. 037 Certification No. 59-2
Test Date: 5/16/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Pendulum Velocity	(-5.95) - (-6.18) m/s	-5.964 m/s	Yes
Pendulum Acceleration Decay Crossing 5g	38 - 46 ms	39.1 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	20.34 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	17.10 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	13.85 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	13.85 g	Yes
Total Head D-Plane Rotation			
Peak	81 - 106 °	95.8 °	Yes
Time of Peak	72 - 82 ms	77.2 ms	Yes
Total Head D-Plane Rotation Decay to 0°	147 - 174 ms	159.4 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	(-52.9) - (-80) N·m	-72.75 N·m	Yes
Time of Peak	65 - 79 ms	71.9 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	120 - 148 ms	147.4 ms	Yes

Test meets specifications.

Condition: Used

Comments:
Neck S/N: 4728

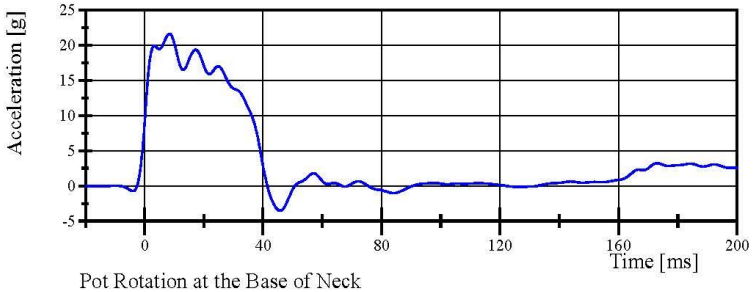
Specification Source: CFR49 Part 572 Subpart E with Polarity in accordance with J211

05.16.2019 12:29:08 1988

Transportation Research Center Inc.

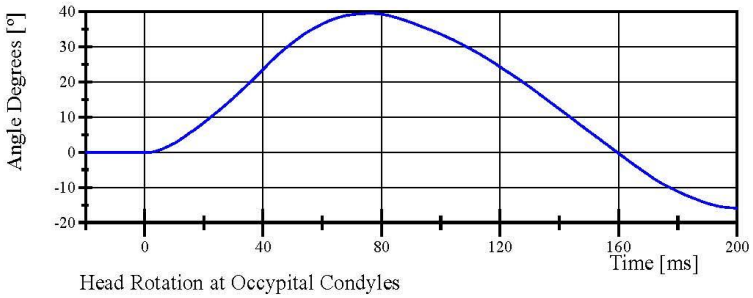
Neck Extension
HIII 50th Serial No. 037 Certification No. 59-2
Test Date: 5/16/2019

Pendulum Acceleration



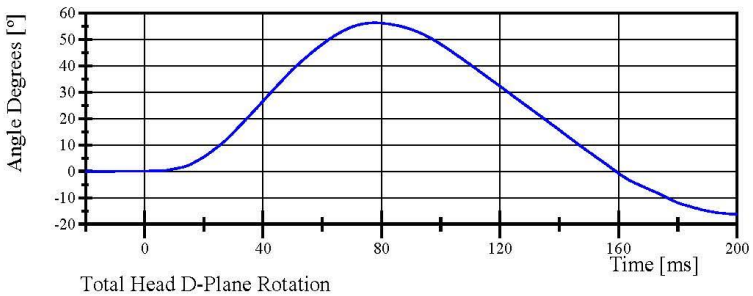
Filter Class: CFC_60
Max: 21.6 g at 8.5 ms
Min: -3.5 g at 45.8 ms

Pot Rotation at the Base of Neck



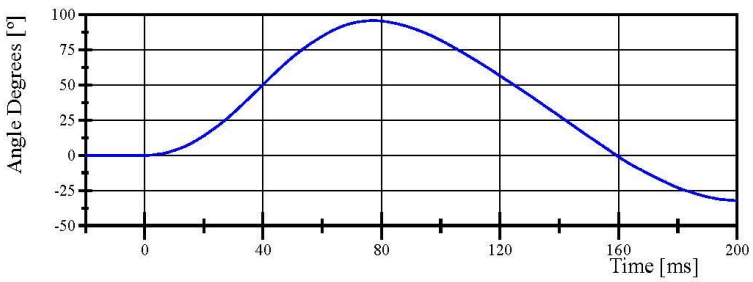
Filter Class: CFC_60
Max: 39.4 ° at 76.3 ms
Min: -15.9 ° at 200.0 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 56.4 ° at 77.7 ms
Min: -16.2 ° at 200.0 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 95.8 ° at 77.2 ms
Min: -32.2 ° at 200.0 ms

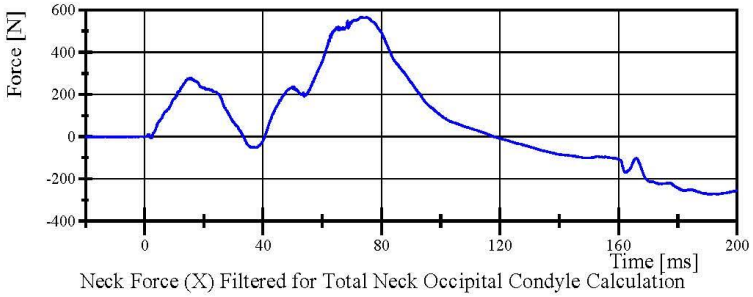
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

05.16.2019 12:29:35 1988

Transportation Research Center Inc.

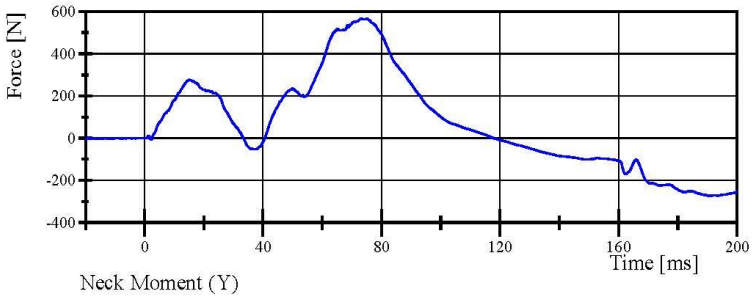
Neck Extension
HIII 50th Serial No. 037 Certification No. 59-2
Test Date: 5/16/2019

Neck Force (X)



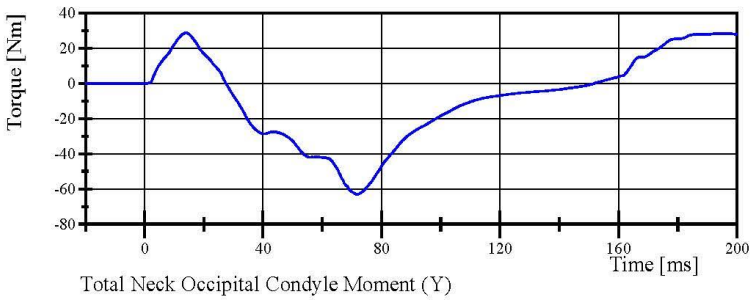
Filter Class: CFC_1000
Max: 565.3 N at 73.1 ms
Min: -273.4 N at 191.4 ms

Neck Force (X) Filtered for Total Neck Occipital Condyle Calculation



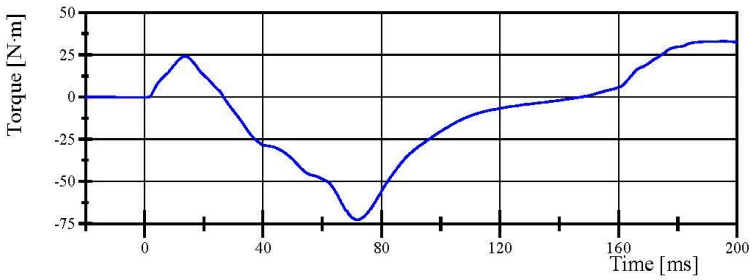
Filter Class: CFC_600
Max: 565.2 N at 73.2 ms
Min: -272.7 N at 190.9 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 28.9 Nm at 13.9 ms
Min: -62.9 Nm at 71.8 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 33.1 N·m at 195.7 ms
Min: -72.7 N·m at 71.9 ms

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

05.16.2019 12:29:36 1988

Transportation Research Center Inc.

Front Thorax
HIII 50th Serial No. 037 Certification No. 59-1
Test Date: 5/16/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	44 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.788 m/s	Yes
Probe Force Peak	(-5,160) - (-5,894) N	-5,648.2 N	Yes
Maximum Chest Compression	(-63.5) - (-72.6) mm	-66.62 mm	Yes
Internal Hysteresis	69 - 85 %	73.0 %	Yes

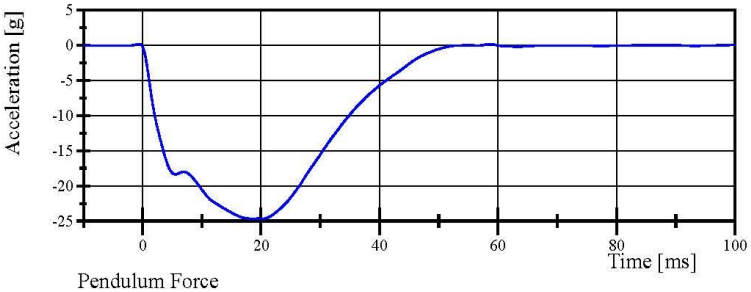
Test meets specifications.

Condition: Used
Comments:
Jacket S/N: 2565
Rib Set S/N: 02033121A

Transportation Research Center Inc.

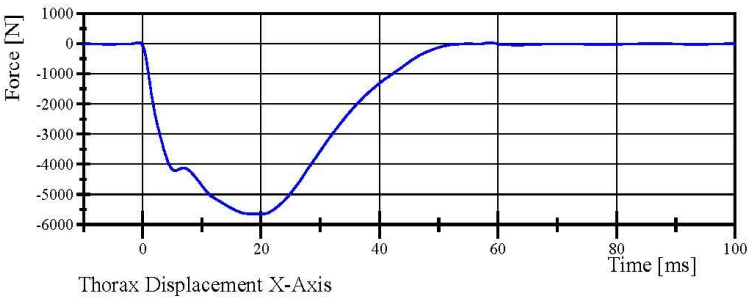
Front Thorax
HIII 50th Serial No. 037 Certification No. 59-1
Test Date: 5/16/2019

Pendulum Acceleration



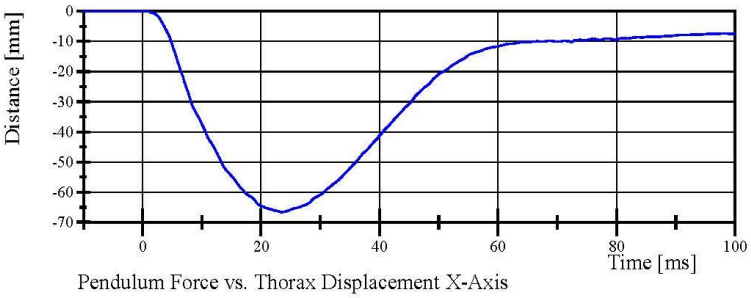
Filter Class: CFC_180
Max: 0.2 g at -0.6 ms
Min: -24.6 g at 20.2 ms

Pendulum Force



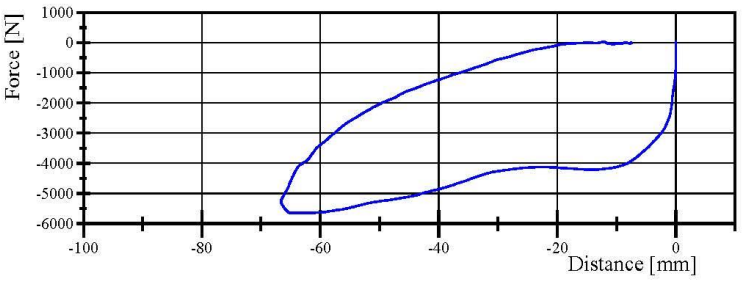
Filter Class: CFC_180
Max: 42.8 N at -0.6 ms
Min: -5,648.2 N at 20.2 ms

Thorax Displacement X-Axis



Filter Class: CFC_600
Max: 0.0 mm at -10.0 ms
Min: -66.6 mm at 23.5 ms

Pendulum Force vs. Thorax Displacement X-Axis



Filter Class: CFC_180
Max: 42.8 N at -0.0 mm
Min: -5,648.2 N at -64.7 mm

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

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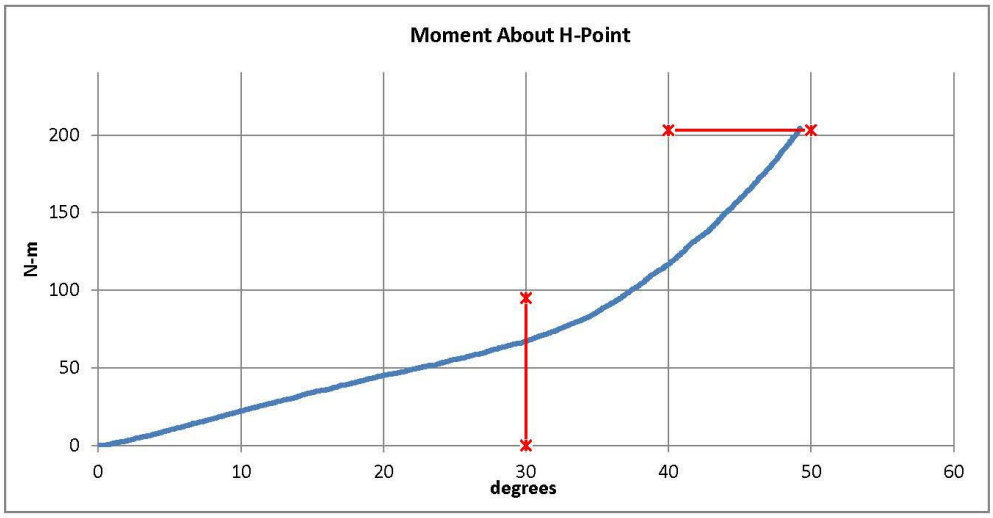
Transportation Research Center Inc.

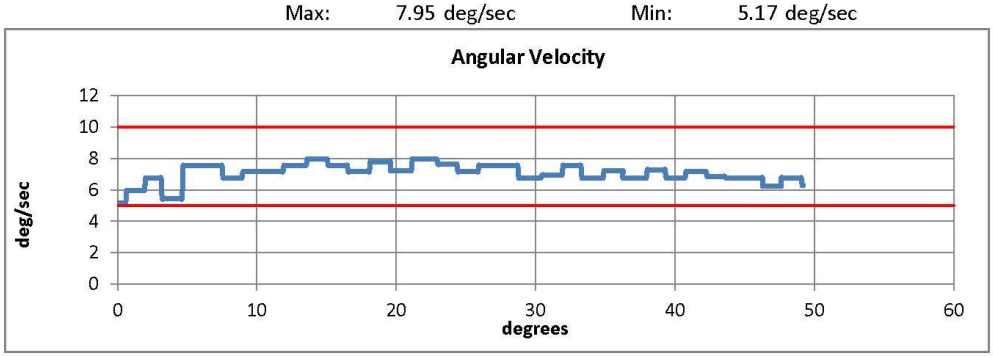
Hybrid III 50th Male Hip Range of Motion

Serial Number:	037	Date:	16-May-2019
Side Tested:	Left Hip	Time:	7:37
Test Number:	1		

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	21.3	°C	Pass
Humidity	10	-	70	48	%	Pass
Moment at 30°	0	≤	94.9	67.22	N-m	Pass
Angle at 203 Nm	40	-	50	49.21	deg	Pass
Average Velocity	5	-	10	7.06	deg/sec	Pass



Max: 7.95 deg/sec Min: 5.17 deg/sec



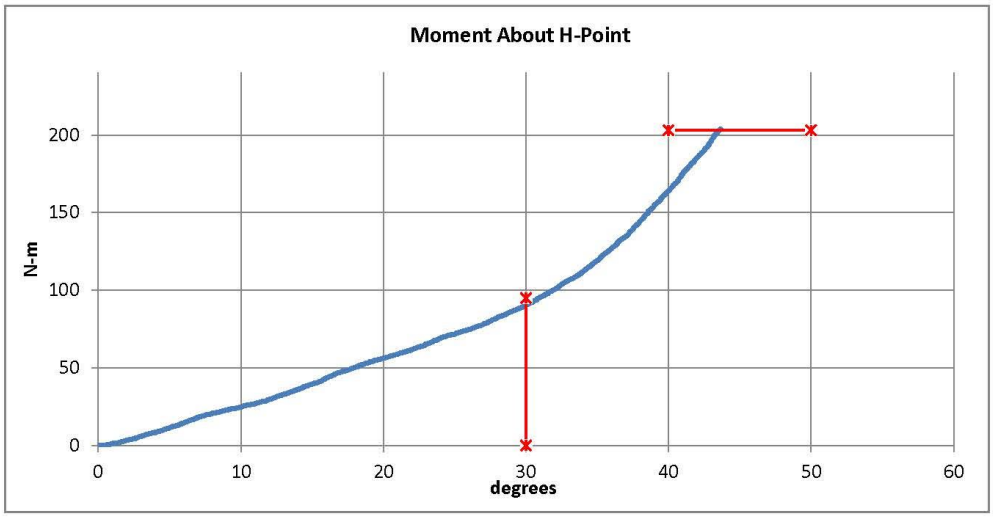
Comments:
Pelvis Skin S/N: N/A
Lumbar S/N: 0550

Transportation Research Center Inc.

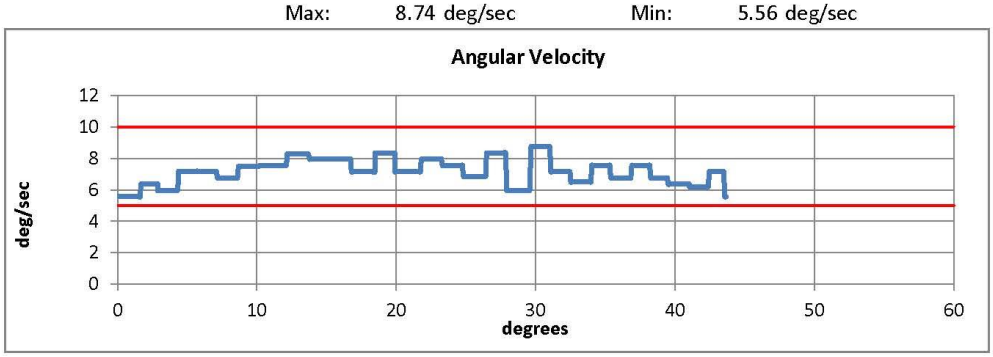
Hybrid III 50th Male Hip Range of Motion

Serial Number:	037	Date:	16-May-2019
Side Tested:	Right Hip	Time:	8:42
Test Number:	1		

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	21.4	°C	Pass
Humidity	10	-	70	48	%	Pass
Moment at 30°	0	≤	94.9	90.62	N-m	Pass
Angle at 203 Nm	40	-	50	43.65	deg	Pass
Average Velocity	5	-	10	7.16	deg/sec	Pass



Max: 8.74 deg/sec Min: 5.56 deg/sec



Comments:
Pelvis Skin S/N: N/A
Lumbar S/N: 0550

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 59-1
Test Date: 5/16/2019

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	46 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.090 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,776.72 N	Yes

Test meets specifications.

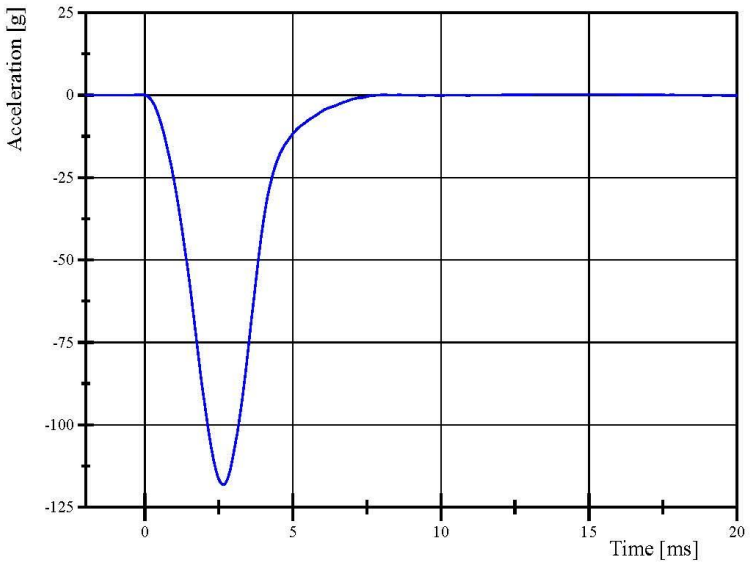
Condition: Used

Comments:
Knee Skin S/N: 2672

Transportation Research Center Inc.

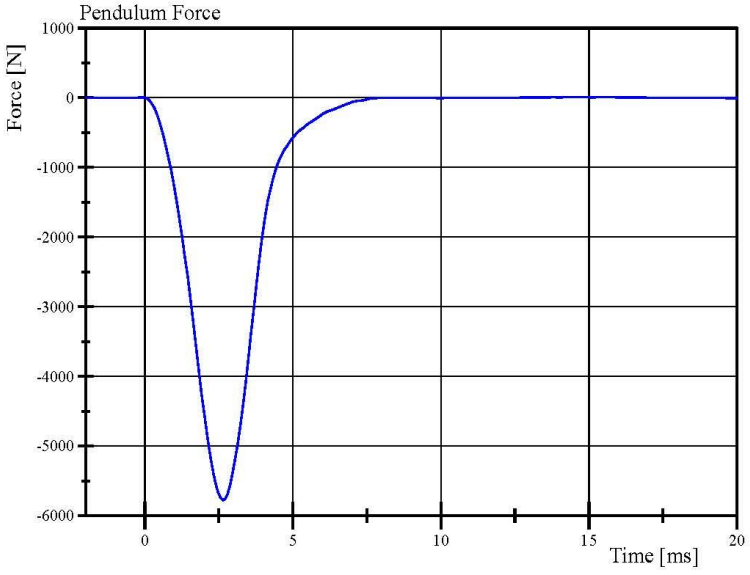
Left Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 59-1
Test Date: 5/16/2019

Pendulum Acceleration



Filter Class: CFC_600
Max: 0.2 g at 14.7 ms
Min: -118.3 g at 2.6 ms

Pendulum Force



Filter Class: CFC_600
Max: 11.4 N at 14.7 ms
Min: -5,776.7 N at 2.6 ms

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

05.16.2019 07:45:14 1719

Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 59-1
Test Date: 5/16/2019

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.094 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,316.95 N	Yes

Test meets specifications.

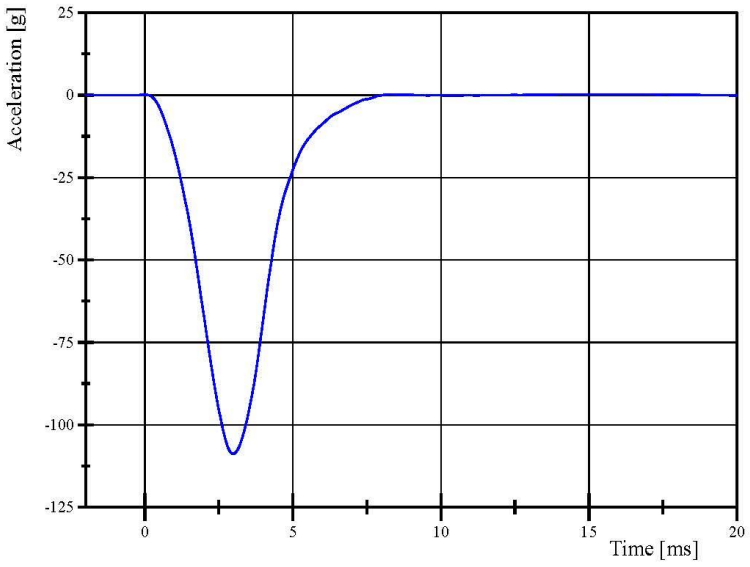
Condition: Used

Comments:
Knee Skin S/N: 176

Transportation Research Center Inc.

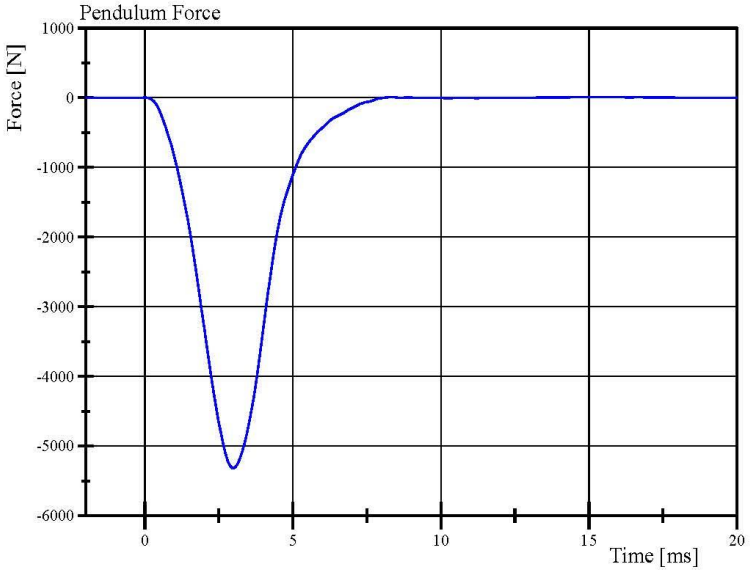
Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 59-1
Test Date: 5/16/2019

Pendulum Acceleration



Filter Class: CFC_600
Max: 0.2 g at 15.0 ms
Min: -108.9 g at 3.0 ms

Pendulum Force



Filter Class: CFC_600
Max: 11.2 N at 15.0 ms
Min: -5,317.0 N at 3.0 ms

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

05.16.2019 07:54:22 1710

Pre-Test Calibration Sheets

Front Passenger S/N 426

Transportation Research Center Inc.
572O HIII 5th Dummy
External Dimensions
Serial No. 426 Calibration No. 51

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

Transportation Research Center Inc.

Front Head Drop
HIII 5th Serial No. 426 Certification No. 51-1
Test Date: 5/12/2019

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	42 %	Yes
Peak Head Resultant Acceleration	250 - 300 g	278.6 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	-2.6 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

Test meets specifications.

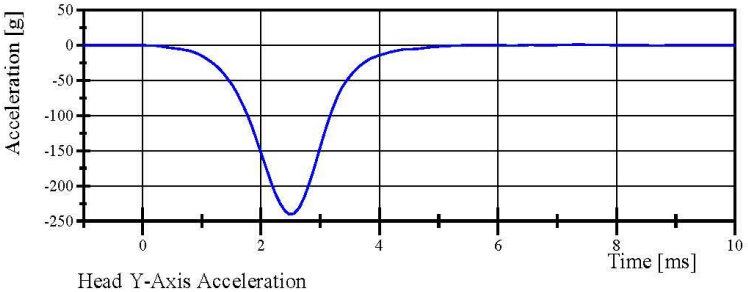
Condition: Used

Comments:
Head Skin S/N: 1348

Transportation Research Center Inc.

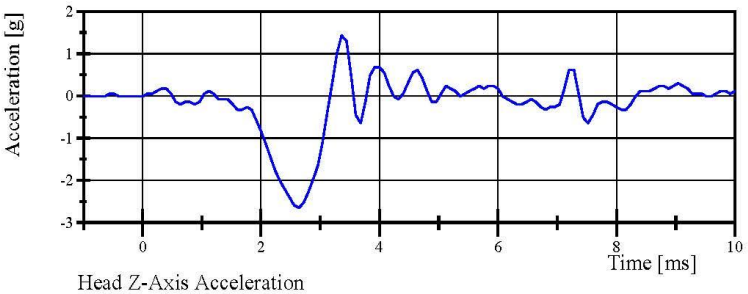
Front Head Drop
HIII 5th Serial No. 426 Certification No. 51-1
Test Date: 5/12/2019

Head X-Axis Acceleration



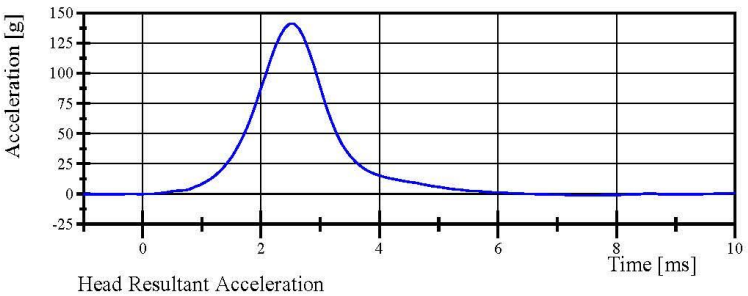
Filter Class: CFC_1000
Max: 0.8 g at 7.4 ms
Min: -240.3 g at 2.5 ms

Head Y-Axis Acceleration



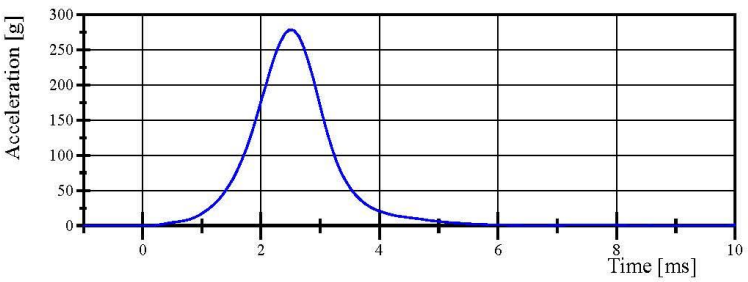
Filter Class: CFC_1000
Max: 1.4 g at 3.4 ms
Min: -2.6 g at 2.6 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 141.0 g at 2.5 ms
Min: -1.2 g at 7.6 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 278.6 g at 2.5 ms
Min: 0.0 g at -1.0 ms

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

05.12.2019 10:43:11 574

Transportation Research Center Inc.

Neck Flexion
HIII 5th Serial No. 426 Certification No. 51-1
Test Date: 5/12/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	7.040 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	(-2.1) - (-2.5) m/s	-2.34 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	(-4.0) - (-5.0) m/s	-4.41 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	(-5.8) - (-7.0) m/s	-6.30 m/s	Yes
Total Head D-Plane Rotation	(-77) - (-91) °	-79.5 °	Yes
Total Neck Occipital Condyles Moment Between -77° and -91° Rotation	69 - 83 N·m	79.8 N·m	Yes
Total Neck Occipital Condyles Moment Decay to 10 N·m	80 - 100 ms	89.2 ms	Yes

Test meets specifications.

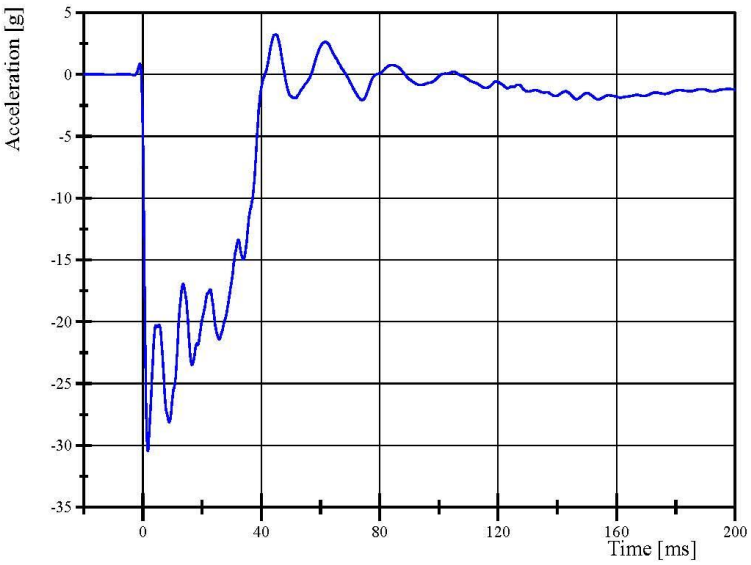
Condition: Used

Comments:
Neck S/N: DM2392

Transportation Research Center Inc.

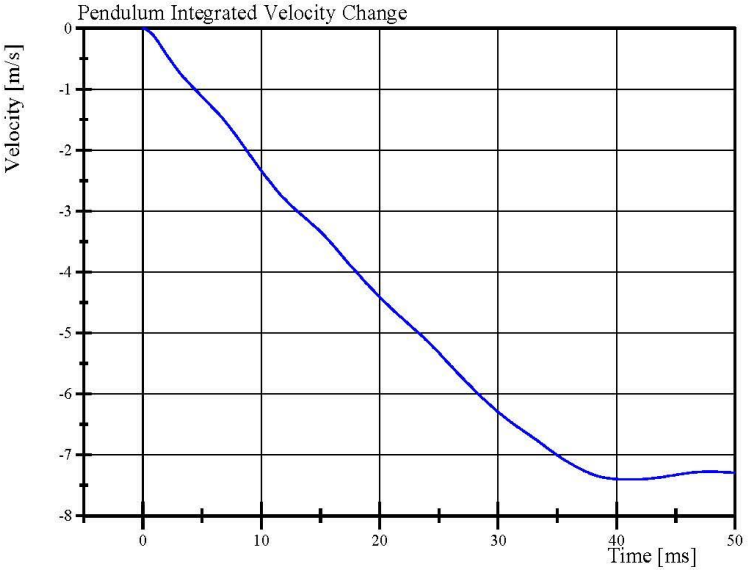
Neck Flexion
HIII 5th Serial No. 426 Certification No. 51-1
Test Date: 5/12/2019

Pendulum Acceleration



Filter Class: CFC_180
Max: 3.2 g at 44.9 ms
Min: -30.4 g at 1.7 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 0.0 m/s at 0.0 ms
Min: -7.4 m/s at 41.3 ms

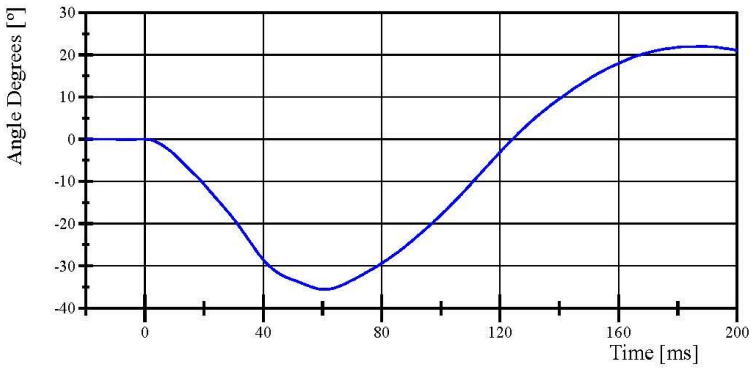
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

05.12.2019 11:11:31 1824

Transportation Research Center Inc.

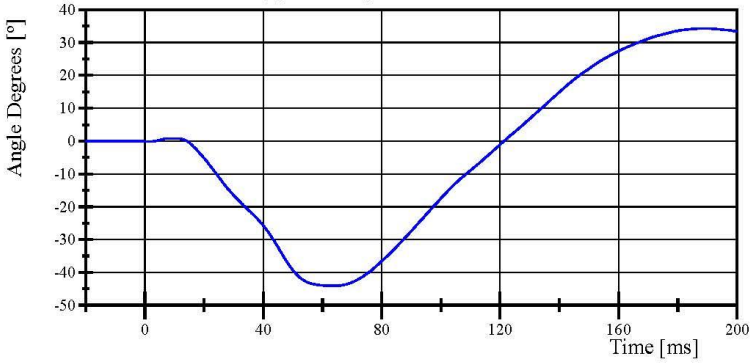
Neck Flexion
HIII 5th Serial No. 426 Certification No. 51-1
Test Date: 5/12/2019

Pot Rotation at the Base of Neck



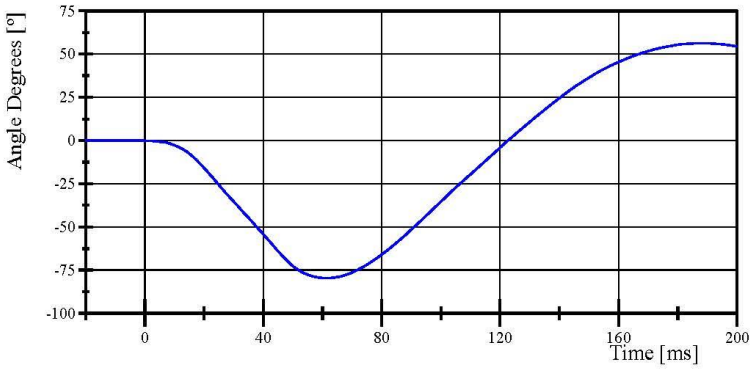
Filter Class: CFC_60
Max: 22.0 ° at 188.3 ms
Min: -35.5 ° at 60.7 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 34.3 ° at 189.1 ms
Min: -44.1 ° at 63.9 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 56.3 ° at 188.7 ms
Min: -79.5 ° at 61.5 ms

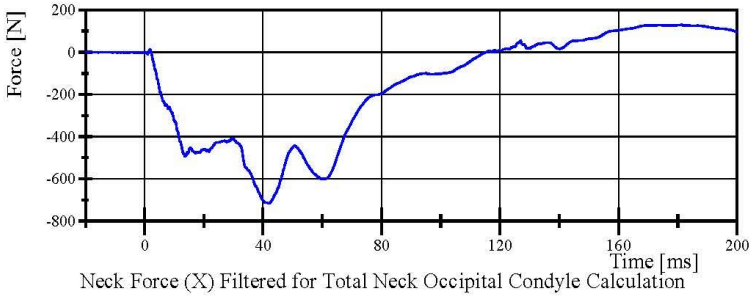
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

05.12.2019 11:11:32 1824

Transportation Research Center Inc.

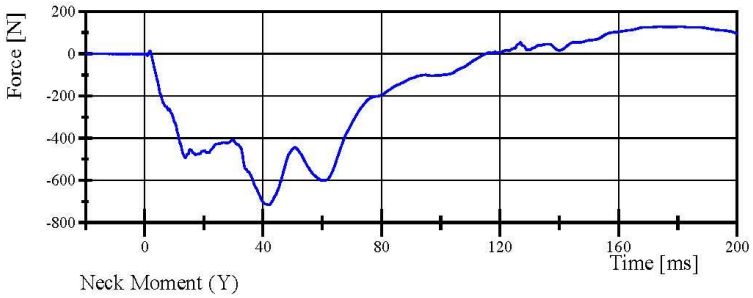
Neck Flexion
HIII 5th Serial No. 426 Certification No. 51-1
Test Date: 5/12/2019

Neck Force (X)



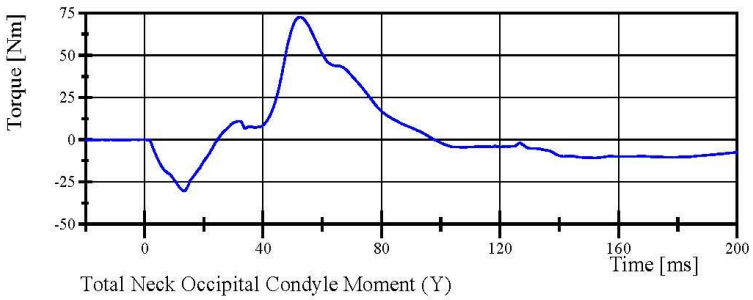
Filter Class: CFC_1000
Max: 130.2 N at 181.2 ms
Min: -716.4 N at 41.8 ms

Neck Force (X) Filtered for Total Neck Occipital Condyle Calculation



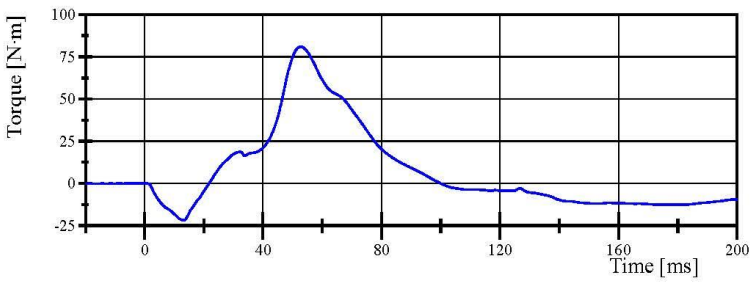
Filter Class: CFC_600
Max: 129.8 N at 180.5 ms
Min: -716.2 N at 42.0 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 72.6 Nm at 52.5 ms
Min: -30.3 Nm at 13.4 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 81.0 N·m at 52.8 ms
Min: -21.8 N·m at 13.1 ms

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

05.12.2019 11:11:33 1824

Transportation Research Center Inc.

Neck Extension
HIII 5th Serial No. 426 Certification No. 51-1
Test Date: 5/12/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Pendulum Velocity	(-5.95) - (-6.19) m/s	-6.083 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	1.5 - 1.9 m/s	1.77 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	3.1 - 3.9 m/s	3.40 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	4.6 - 5.6 m/s	4.96 m/s	Yes
Total Head D-Plane Rotation	99 - 114 °	109.2 °	Yes
Total Neck Occipital Condyles Moment Between 99° and 114° Rotation	(-53) - (-65) N·m	-55.3 N·m	Yes
Total Neck Occipital Condyles Moment Decay to -10 N·m	94 - 114 ms	107.2 ms	Yes

Test meets specifications.

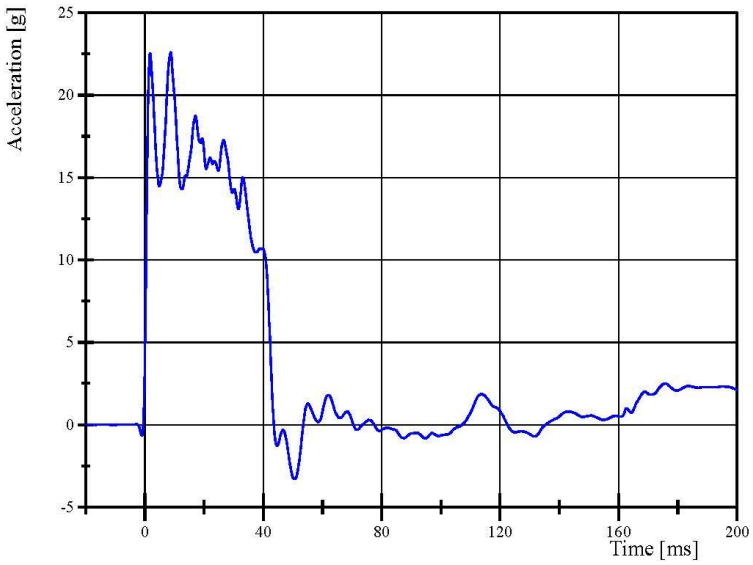
Condition: Used

Comments:
Neck S/N: DM2392

Transportation Research Center Inc.

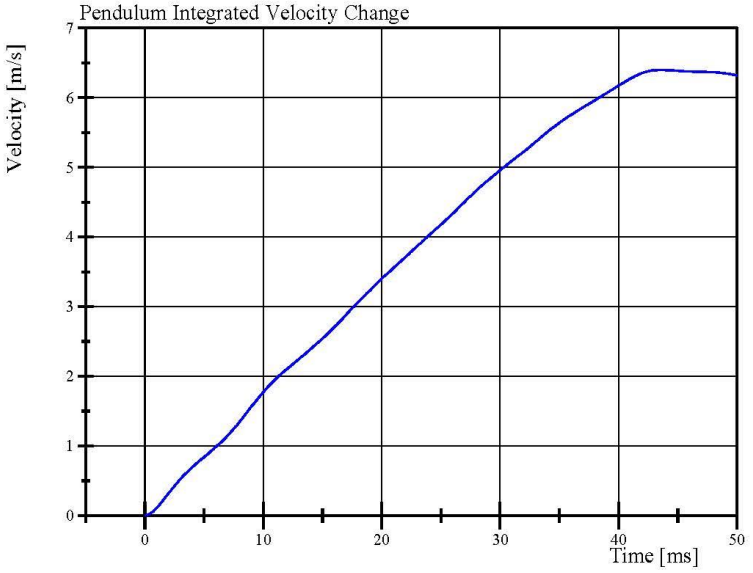
Neck Extension
HIII 5th Serial No. 426 Certification No. 51-1
Test Date: 5/12/2019

Pendulum Acceleration



Filter Class: CFC_180
Max: 22.6 g at 8.7 ms
Min: -3.3 g at 50.7 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 6.4 m/s at 43.6 ms
Min: 0.0 m/s at 0.0 ms

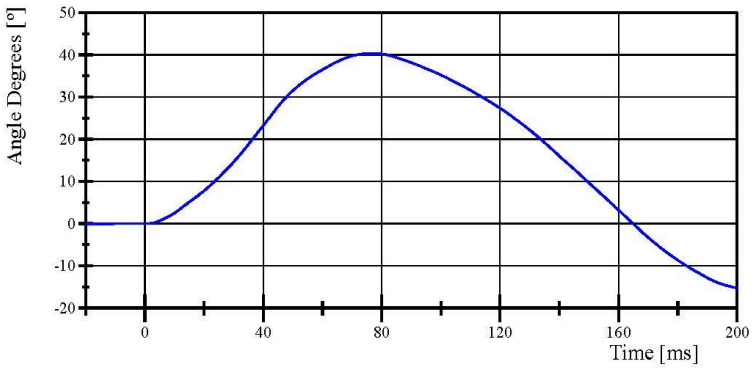
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

05.12.2019 12:23:42 1968

Transportation Research Center Inc.

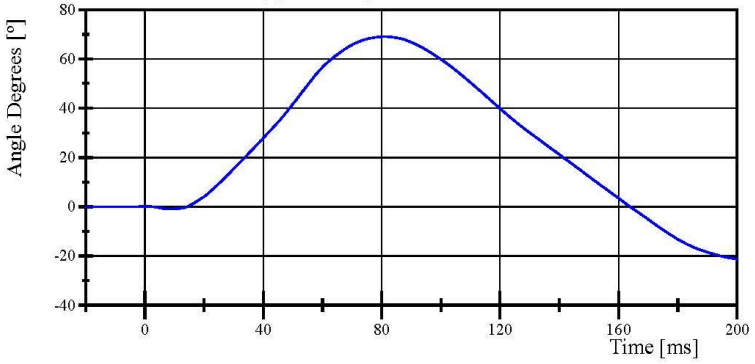
Neck Extension
HIII 5th Serial No. 426 Certification No. 51-1
Test Date: 5/12/2019

Pot Rotation at the Base of Neck



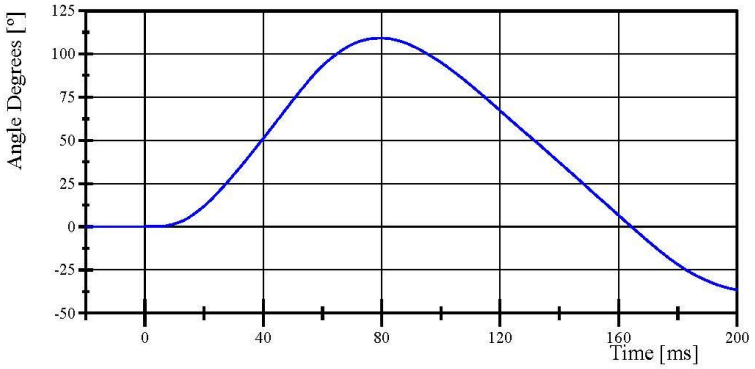
Filter Class: CFC_60
Max: 40.3 ° at 76.5 ms
Min: -15.2 ° at 200.0 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 69.0 ° at 81.1 ms
Min: -21.3 ° at 200.0 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 109.2 ° at 79.8 ms
Min: -36.5 ° at 200.0 ms

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

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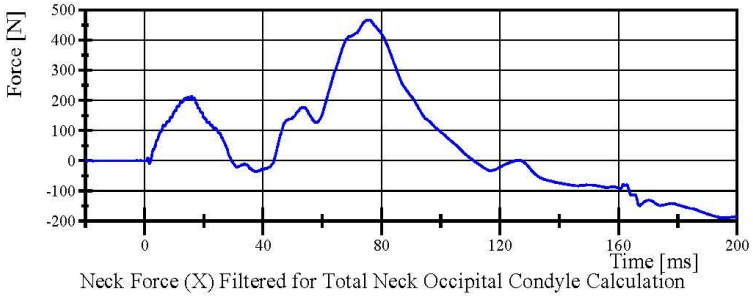
Transportation Research Center Inc.

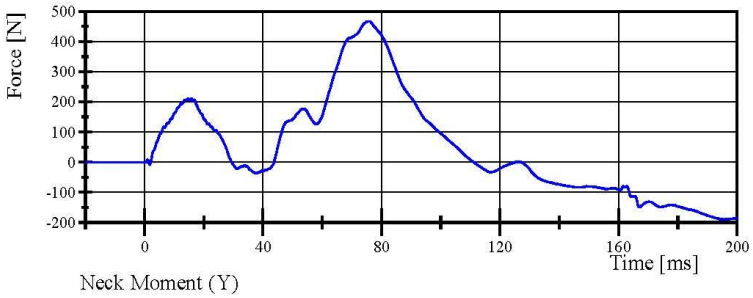
Neck Extension
HIII 5th Serial No. 426 Certification No. 51-1
Test Date: 5/12/2019

Neck Force (X)



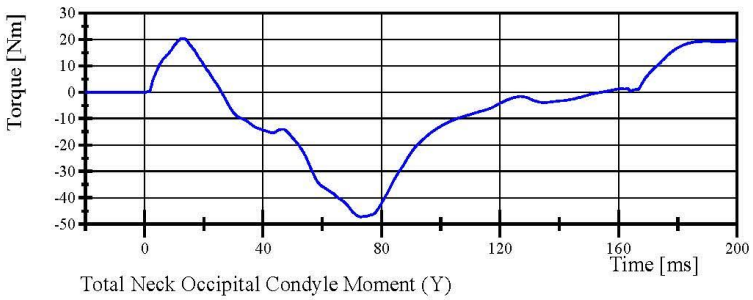
Filter Class: CFC_1000
Max: 467.6 N at 76.0 ms
Min: -189.5 N at 195.5 ms

Neck Force (X) Filtered for Total Neck Occipital Condyle Calculation



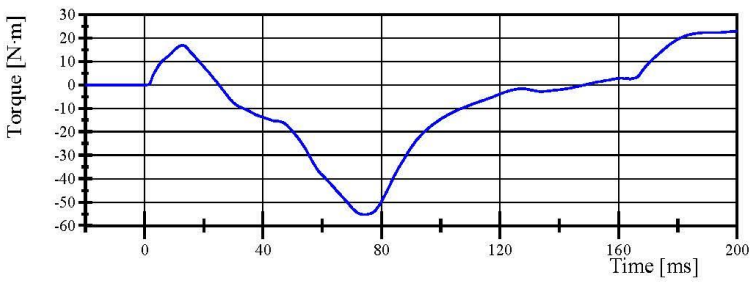
Filter Class: CFC_600
Max: 467.4 N at 76.0 ms
Min: -189.3 N at 195.6 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 20.3 Nm at 13.3 ms
Min: -47.3 Nm at 72.9 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 22.8 N·m at 199.6 ms
Min: -55.3 N·m at 74.7 ms

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

05.12.2019 12:23:43 1968

Transportation Research Center Inc.

Front Thorax
HIII 5th Serial No. 426 Certification No. 51-1
Test Date: 5/13/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	43 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.741 m/s	Yes
Probe Force Peak Between 50.0 mm and 58.0 mm Chest Deflection	(-3,900) - (-4,400) N	-4,280.6 N	Yes
Probe Force Peak Between 18.0 mm and 50.0 mm Chest Deflection	>= (-4,600) N	-4,393.8 N	Yes
Maximum Chest Compression	(-50) - (-58) mm	-50.7 mm	Yes
Internal Hysteresis	69 - 85 %	75.0 %	Yes

Test meets specifications.

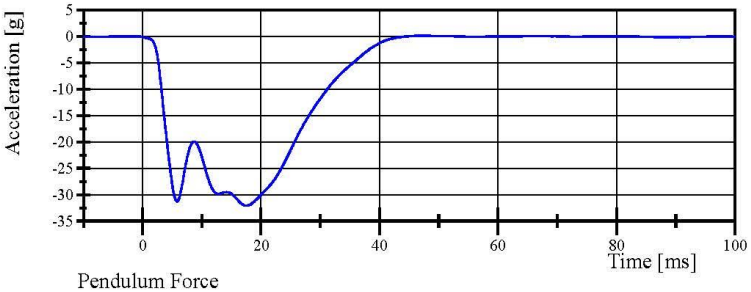
Condition: Used

Comments:
Jacket S/N: DG9935
Rib Set S/N: DJ1164

Transportation Research Center Inc.

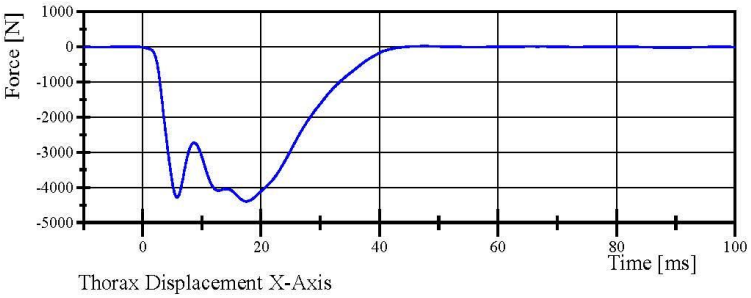
Front Thorax
HIII 5th Serial No. 426 Certification No. 51-1
Test Date: 5/13/2019

Pendulum Acceleration



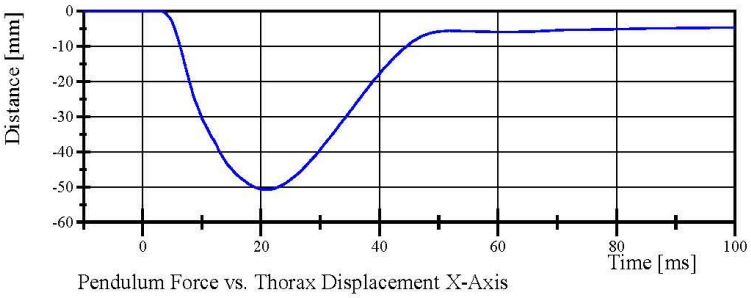
Filter Class: CFC_180
Max: 0.1 g at 47.8 ms
Min: -32.1 g at 17.5 ms

Pendulum Force



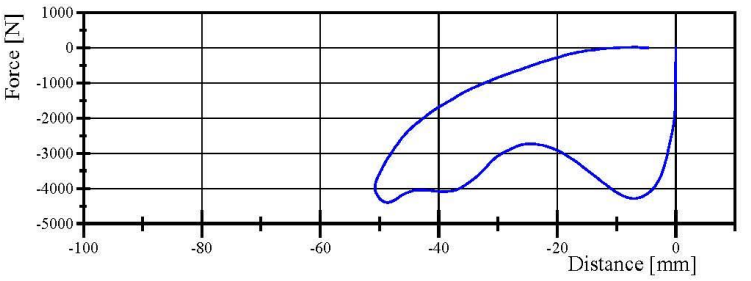
Filter Class: CFC_180
Max: 15.6 N at 47.8 ms
Min: -4,393.8 N at 17.5 ms

Thorax Displacement X-Axis



Filter Class: CFC_600
Max: 0.0 mm at -8.6 ms
Min: -50.7 mm at 20.6 ms

Pendulum Force vs. Thorax Displacement X-Axis



Filter Class: CFC_180
Max: 15.6 N at -6.7 mm
Min: -4,393.8 N at -48.6 mm

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

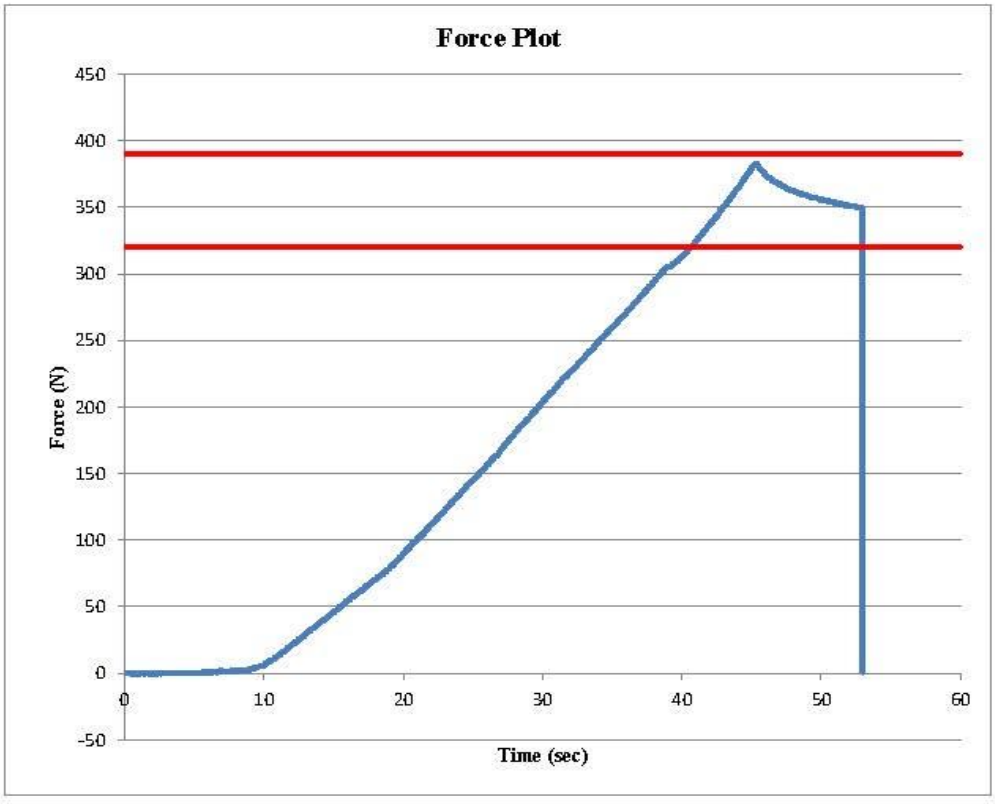
05.13.2019 11:01:21 379

Transportation Research Center Inc.

Hybrid III Small Female Torso Flexion

Customer:	NHTSA		
Serial Number:	426	Date:	5/12/2019
Test Number:	1	Time:	12:53

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	21.4	°C	Pass
Humidity	10	-	70	40	%	Pass
Average Angular Velocity	0.5	-	1.5	0.89	deg/sec	Pass
Initial Angle	0	-	20	13.2	deg	Pass
Peak Force at 45.15°	320	-	390	382.51	N	Pass
Final Angle	-8	-	8	7.12	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. 51-1
Test Date: 5/12/2019

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 ºC	21.4 ºC	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.100 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-3,989.9 N	Yes

Test meets specifications.

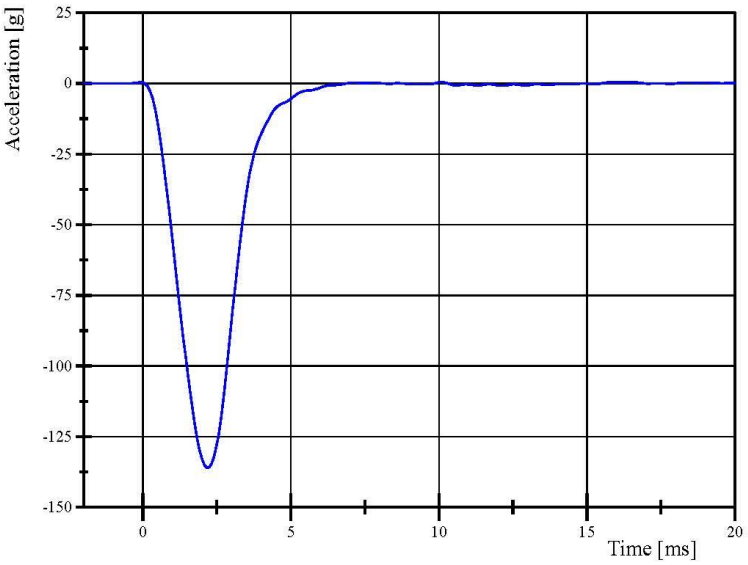
Condition: Used

Comments:
Knee Skin S/N: 1366

Transportation Research Center Inc.

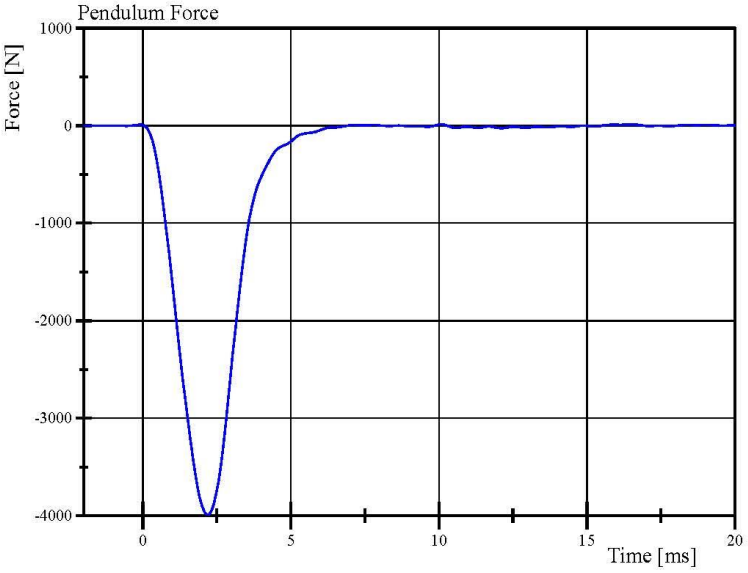
Left Knee Femur Response Test
HIII 5th Serial No. 426 Certification No. 51-1
Test Date: 5/12/2019

Pendulum Acceleration



Filter Class: CFC_600
Max: 0.5 g at 10.1 ms
Min: -136.1 g at 2.2 ms

Pendulum Force



Filter Class: CFC_600
Max: 13.7 N at 10.1 ms
Min: -3,989.9 N at 2.2 ms

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

05.12.2019 10:15:49 2091

Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 5th Serial No. 426 Certification No. 51-1
Test Date: 5/12/2019

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 ºC	21.4 ºC	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.106 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-3,897.8 N	Yes

Test meets specifications.

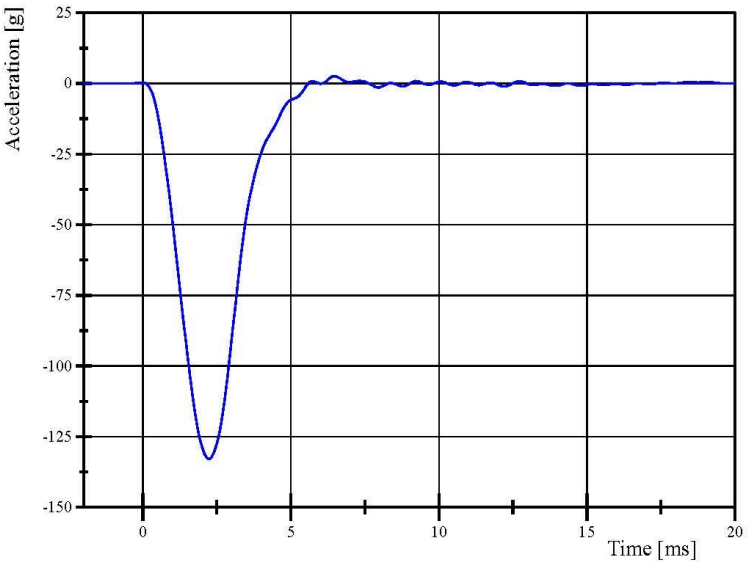
Condition: Used

Comments:
Knee Skin S/N: 1402

Transportation Research Center Inc.

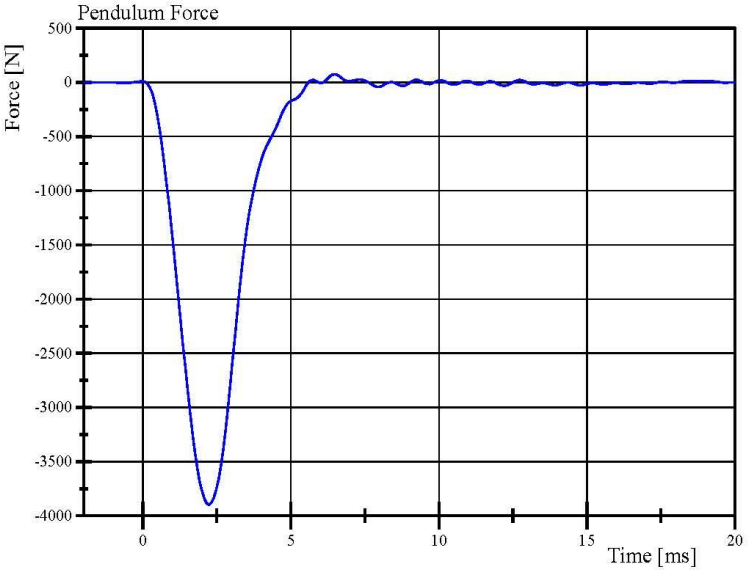
Right Knee Femur Response Test
HIII 5th Serial No. 426 Certification No. 51-1
Test Date: 5/12/2019

Pendulum Acceleration



Filter Class: CFC_600
Max: 2.6 g at 6.5 ms
Min: -132.9 g at 2.2 ms

Pendulum Force



Filter Class: CFC_600
Max: 75.0 N at 6.5 ms
Min: -3,897.8 N at 2.2 ms

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

05.12.2019 10:24:42 2084

Post-Test Calibration Sheets

Front Passenger S/N 426

Transportation Research Center Inc.
572O HIII 5th Dummy
External Dimensions
Serial No. 426 Calibration No. 52

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

Transportation Research Center Inc.

Front Head Drop
HIII 5th Serial No. 426 Certification No. 52-1
Test Date: 5/16/2019

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	44 %	Yes
Peak Head Resultant Acceleration	250 - 300 g	280.2 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	3.5 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

Test meets specifications.

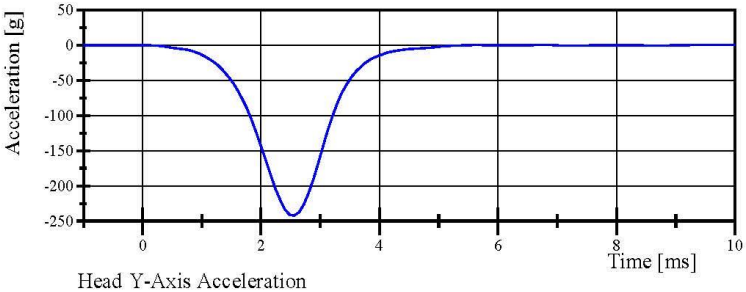
Condition: Used

Comments:
Head Skin S/N: 1348

Transportation Research Center Inc.

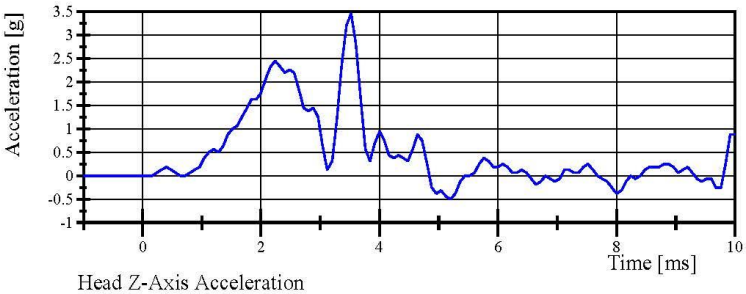
Front Head Drop
HIII 5th Serial No. 426 Certification No. 52-1
Test Date: 5/16/2019

Head X-Axis Acceleration



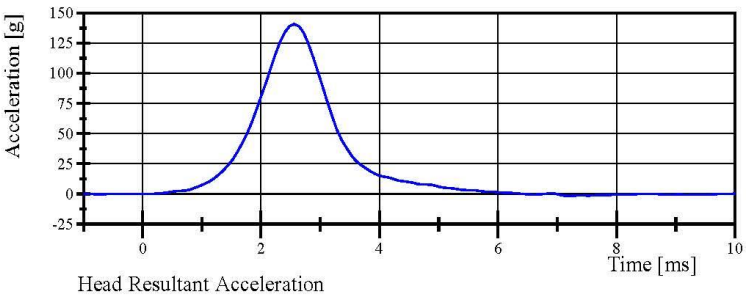
Filter Class: CFC_1000
Max: 0.6 g at 9.4 ms
Min: -242.2 g at 2.6 ms

Head Y-Axis Acceleration



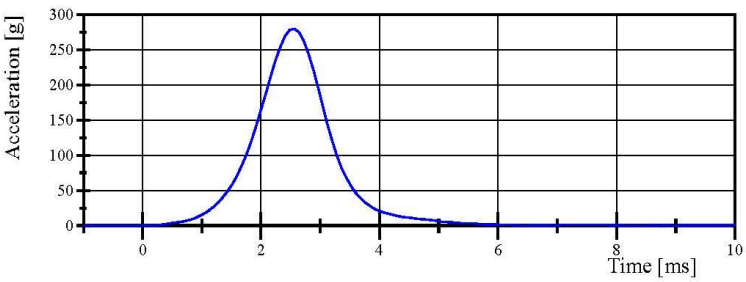
Filter Class: CFC_1000
Max: 3.5 g at 3.5 ms
Min: -0.5 g at 5.2 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 140.9 g at 2.6 ms
Min: -1.5 g at 7.2 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 280.2 g at 2.6 ms
Min: 0.0 g at -1.0 ms

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

05.16.2019 08:01:24 574

Transportation Research Center Inc.

Neck Flexion
HIII 5th Serial No. 426 Certification No. 52-1
Test Date: 5/16/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	46 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	7.044 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	(-2.1) - (-2.5) m/s	-2.30 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	(-4.0) - (-5.0) m/s	-4.38 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	(-5.8) - (-7.0) m/s	-6.20 m/s	Yes
Total Head D-Plane Rotation	(-77) - (-91) °	-81.3 °	Yes
Total Neck Occipital Condyles Moment Between -77° and -91° Rotation	69 - 83 N·m	82.4 N·m	Yes
Total Neck Occipital Condyles Moment Decay to 10 N·m	80 - 100 ms	88.7 ms	Yes

Test meets specifications.

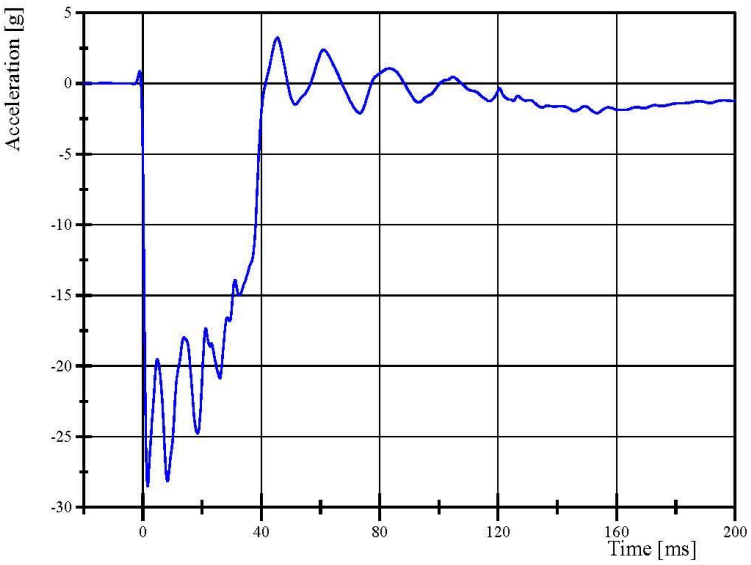
Condition: Used

Comments:
Neck S/N: DM2392

Transportation Research Center Inc.

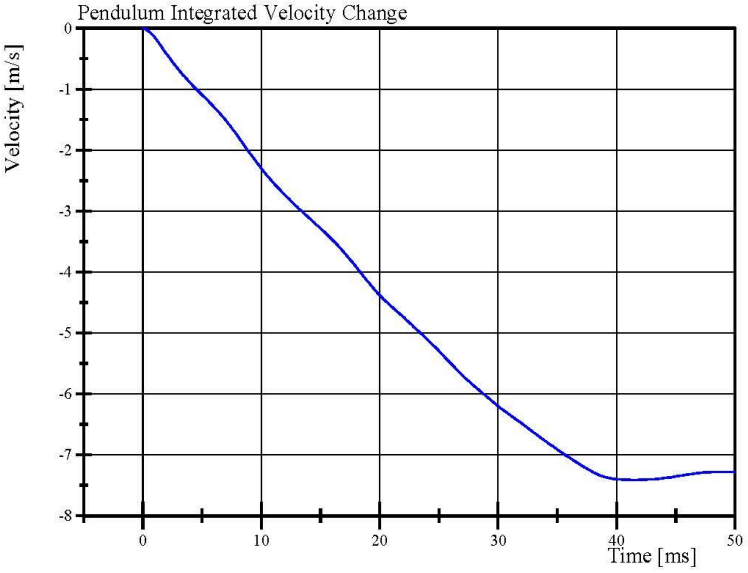
Neck Flexion
HIII 5th Serial No. 426 Certification No. 52-1
Test Date: 5/16/2019

Pendulum Acceleration



Filter Class: CFC_180
Max: 3.2 g at 45.5 ms
Min: -28.5 g at 1.7 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 0.0 m/s at 0.0 ms
Min: -7.4 m/s at 41.5 ms

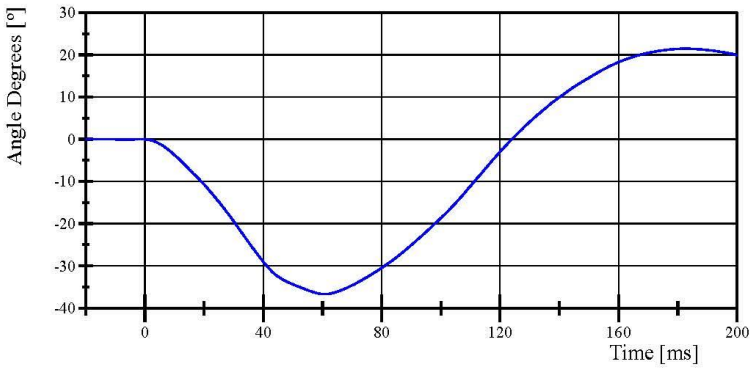
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

05.16.2019 08:36:16 1825

Transportation Research Center Inc.

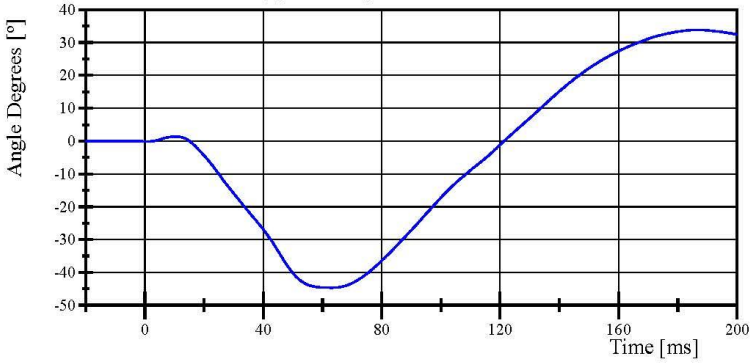
Neck Flexion
HIII 5th Serial No. 426 Certification No. 52-1
Test Date: 5/16/2019

Pot Rotation at the Base of Neck



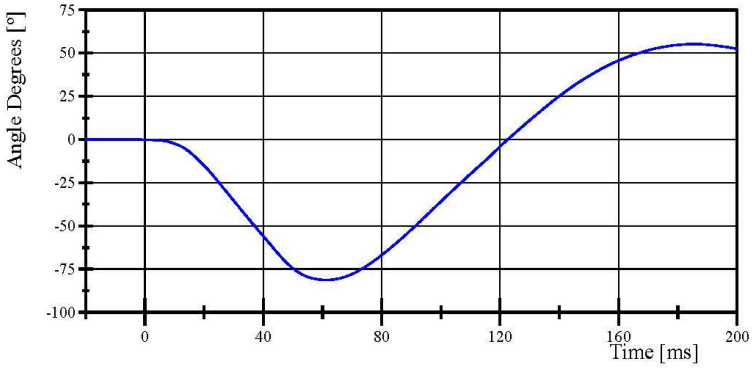
Filter Class: CFC_60
Max: 21.4 ° at 182.5 ms
Min: -36.7 ° at 60.7 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 33.8 ° at 186.8 ms
Min: -44.7 ° at 63.0 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 55.2 ° at 185.4 ms
Min: -81.3 ° at 61.3 ms

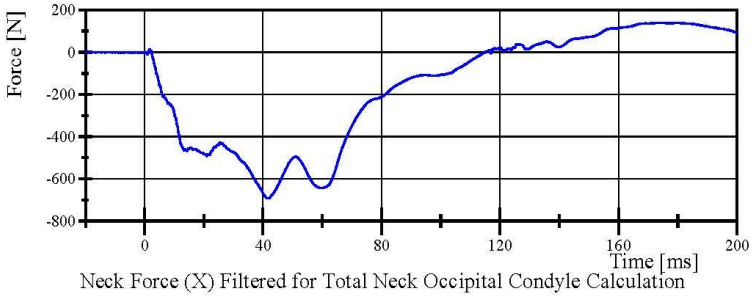
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

05.16.2019 08:36:16 1825

Transportation Research Center Inc.

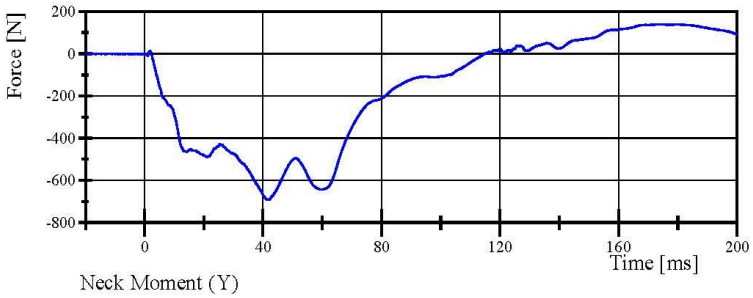
Neck Flexion
HIII 5th Serial No. 426 Certification No. 52-1
Test Date: 5/16/2019

Neck Force (X)



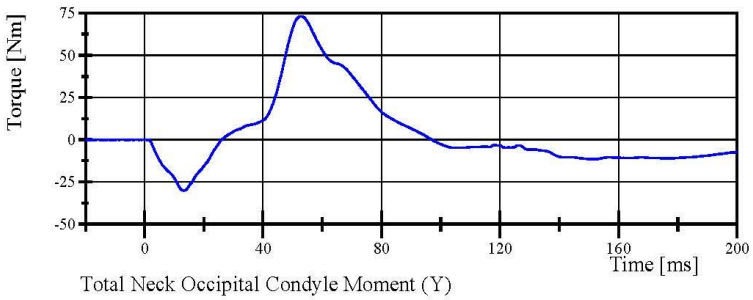
Filter Class: CFC_1000
Max: 140.0 N at 174.0 ms
Min: -691.9 N at 41.9 ms

Neck Force (X) Filtered for Total Neck Occipital Condyle Calculation



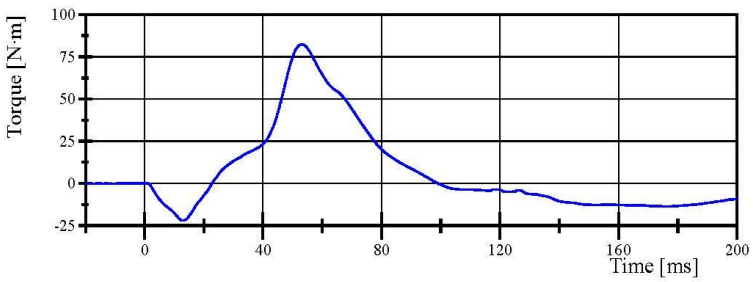
Filter Class: CFC_600
Max: 139.7 N at 174.0 ms
Min: -691.5 N at 41.9 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 73.2 Nm at 52.8 ms
Min: -30.1 Nm at 13.3 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 82.4 N·m at 53.1 ms
Min: -21.9 N·m at 13.1 ms

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

05.16.2019 08:36:17 1825

Transportation Research Center Inc.

Neck Extension
HIII 5th Serial No. 426 Certification No. 52-1
Test Date: 5/16/2019

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	-6.091 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	3.68 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	4.6 - 5.6 m/s	5.35 m/s	Yes
Total Head D-Plane Rotation	99 - 114 °	110.1 °	Yes
Total Neck Occipital Condyles Moment Between 99° and 114° Rotation	(-53) - (-65) N·m	-57.5 N·m	Yes
Total Neck Occipital Condyles Moment Decay to -10 N·m	94 - 114 ms	104.6 ms	Yes

Test meets specifications.

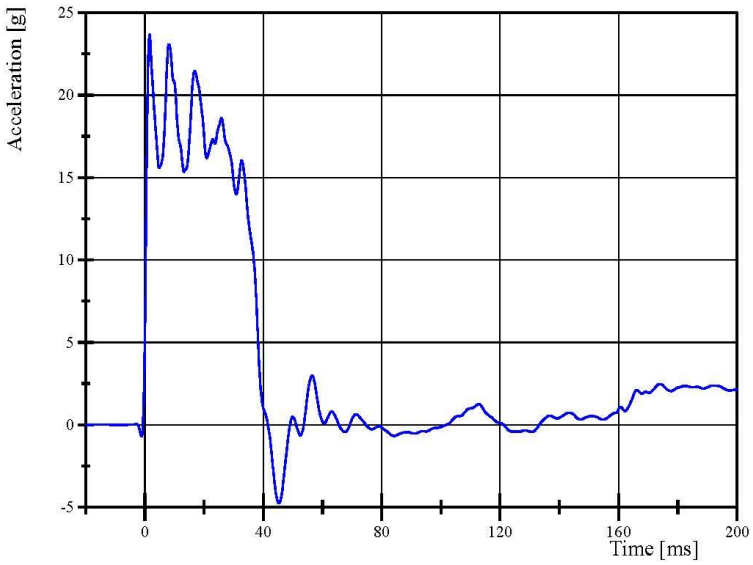
Condition: Used

Comments:
Neck S/N: DM2392

Transportation Research Center Inc.

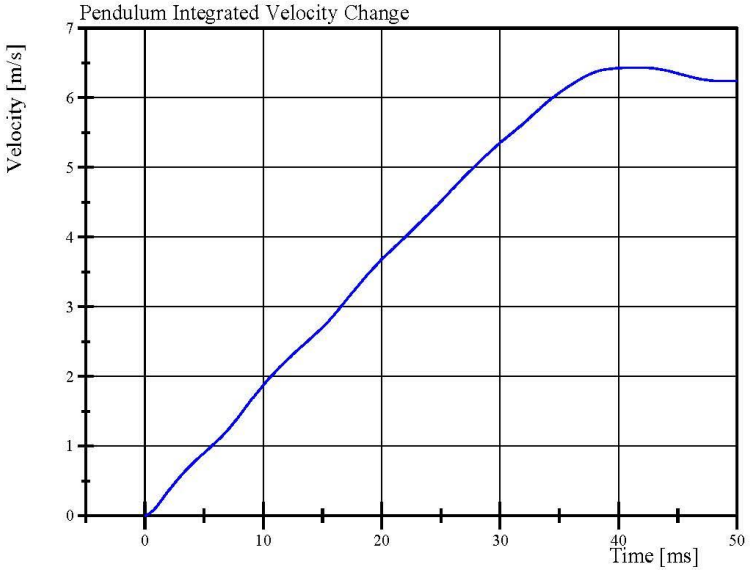
Neck Extension
HIII 5th Serial No. 426 Certification No. 52-1
Test Date: 5/16/2019

Pendulum Acceleration



Filter Class: CFC_180
Max: 23.7 g at 1.6 ms
Min: -4.7 g at 45.3 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 6.4 m/s at 41.6 ms
Min: 0.0 m/s at 0.0 ms

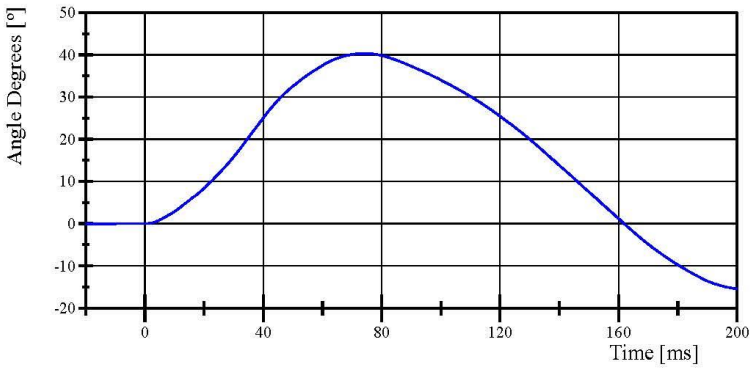
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

05.16.2019 09:15:18 1970

Transportation Research Center Inc.

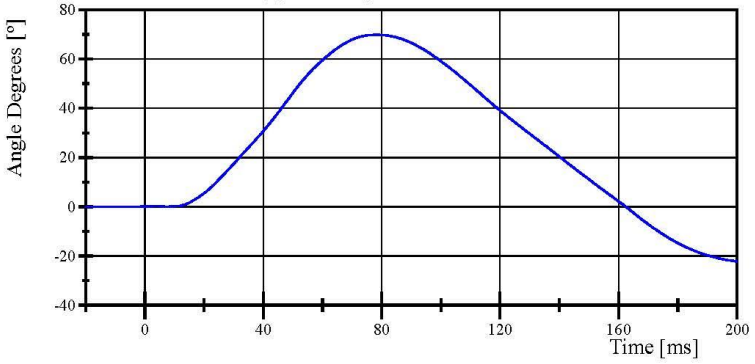
Neck Extension
HIII 5th Serial No. 426 Certification No. 52-1
Test Date: 5/16/2019

Pot Rotation at the Base of Neck



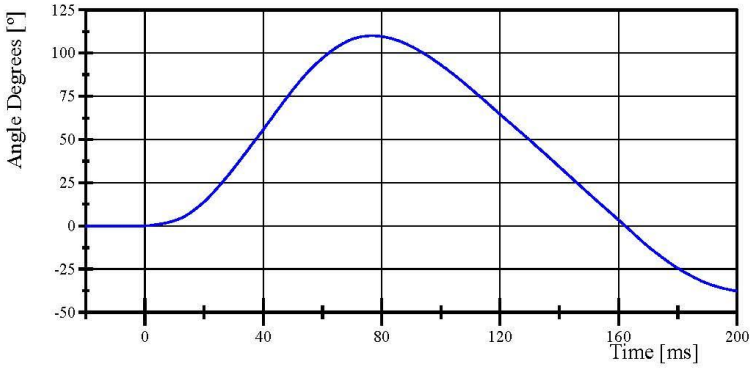
Filter Class: CFC_60
Max: 40.3 ° at 74.2 ms
Min: -15.4 ° at 200.0 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 69.9 ° at 78.2 ms
Min: -22.2 ° at 200.0 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 110.1 ° at 76.8 ms
Min: -37.7 ° at 200.0 ms

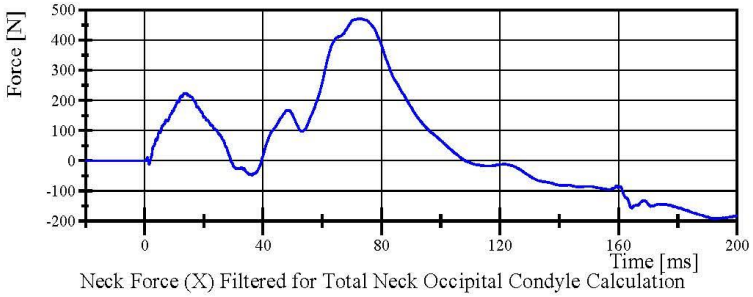
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

05.16.2019 09:15:19 1970

Transportation Research Center Inc.

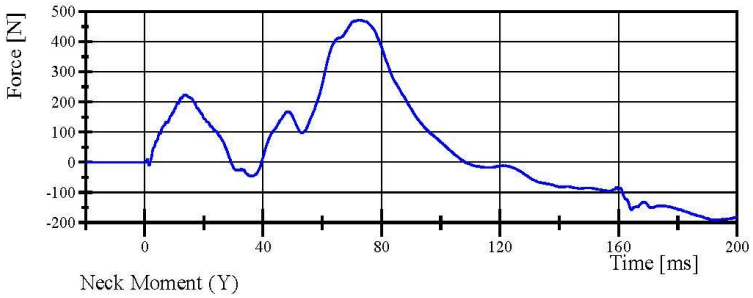
Neck Extension
HIII 5th Serial No. 426 Certification No. 52-1
Test Date: 5/16/2019

Neck Force (X)



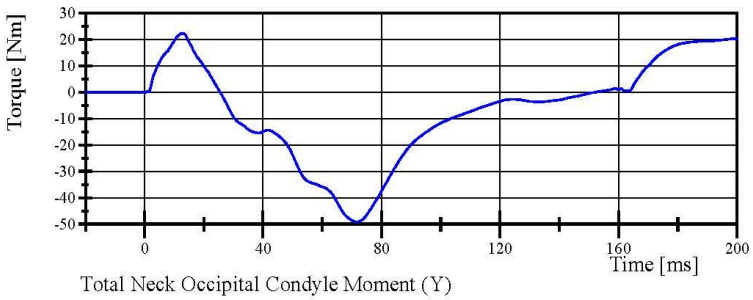
Filter Class: CFC_1000
Max: 472.6 N at 72.5 ms
Min: -191.3 N at 193.4 ms

Neck Force (X) Filtered for Total Neck Occipital Condyle Calculation



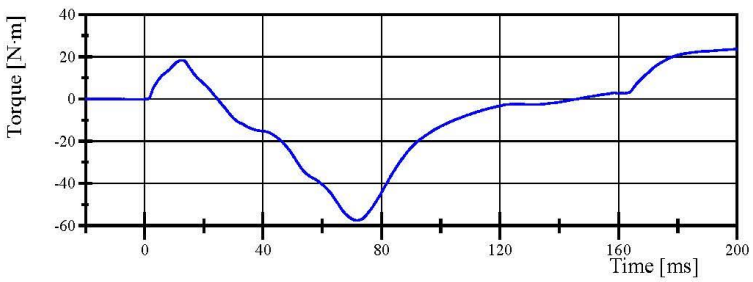
Filter Class: CFC_600
Max: 472.3 N at 72.6 ms
Min: -191.1 N at 193.4 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 22.2 Nm at 13.1 ms
Min: -49.2 Nm at 71.6 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 23.6 N·m at 200.0 ms
Min: -57.5 N·m at 71.6 ms

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

05.16.2019 09:15:20 1970

Transportation Research Center Inc.

Front Thorax
HIII 5th Serial No. 426 Certification No. 52-2
Test Date: 5/16/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.719 m/s	Yes
Probe Force Peak Between 50.0 mm and 58.0 mm Chest Deflection	(-3,900) - (-4,400) N	-4,353.7 N	Yes
Probe Force Peak Between 18.0 mm and 50.0 mm Chest Deflection	>= (-4,600) N	-4,422.0 N	Yes
Maximum Chest Compression	(-50) - (-58) mm	-51.0 mm	Yes
Internal Hysteresis	69 - 85 %	74.4 %	Yes

Test meets specifications.

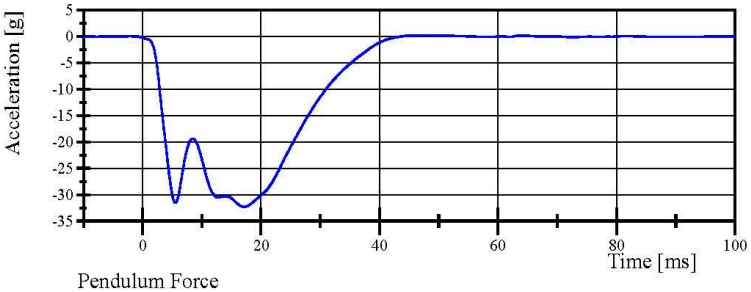
Condition: Used

Comments:
Jacket S/N: DG9935
Rib Set S/N: DJ1164

Transportation Research Center Inc.

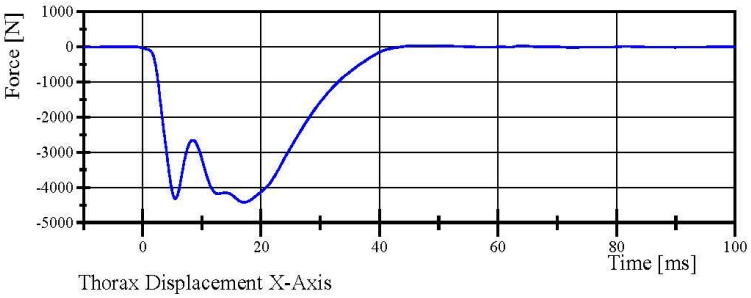
Front Thorax
HIII 5th Serial No. 426 Certification No. 52-2
Test Date: 5/16/2019

Pendulum Acceleration



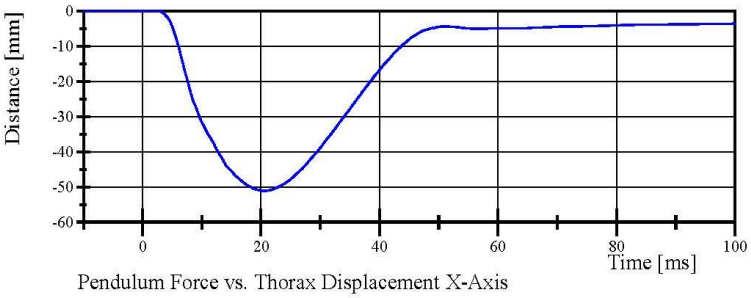
Filter Class: CFC_180
Max: 0.2 g at 47.8 ms
Min: -32.3 g at 17.1 ms

Pendulum Force



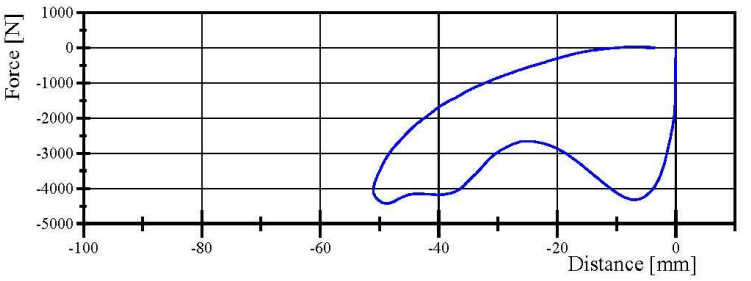
Filter Class: CFC_180
Max: 33.4 N at 47.8 ms
Min: -4,422.0 N at 17.1 ms

Thorax Displacement X-Axis



Filter Class: CFC_600
Max: 0.0 mm at -3.2 ms
Min: -51.0 mm at 20.4 ms

Pendulum Force vs. Thorax Displacement X-Axis



Filter Class: CFC_180
Max: 33.4 N at -5.4 mm
Min: -4,422.0 N at -48.8 mm

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

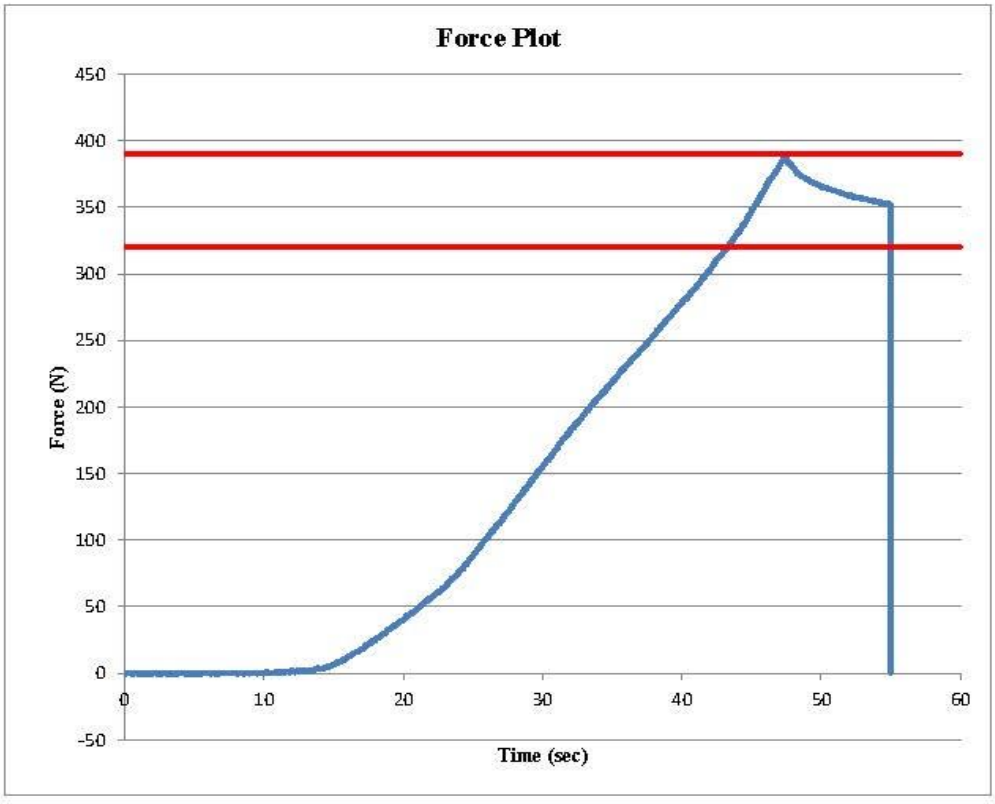
05.16.2019 11:40:18 417

Transportation Research Center Inc.

Hybrid III Small Female Torso Flexion

Customer:	NHTSA		
Serial Number:	426	Date:	5/16/2019
Test Number:	1	Time:	12:34

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	21.2	°C	Pass
Humidity	10	-	70	40	%	Pass
Average Angular Velocity	0.5	-	1.5	0.88	deg/sec	Pass
Initial Angle	0	-	20	16.03	deg	Pass
Peak Force at 45.26°	320	-	390	387.34	N	Pass
Final Angle	-8	-	8	5.13	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. 52-1
Test Date: 5/16/2019

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 ºC	21.6 ºC	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.114 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-3,878.2 N	Yes

Test meets specifications.

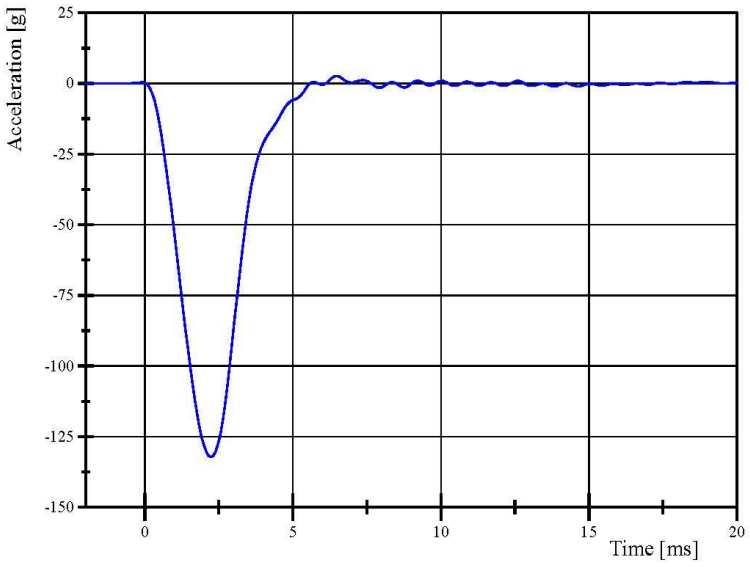
Condition: Used

Comments:
Knee Skin S/N: 1366

Transportation Research Center Inc.

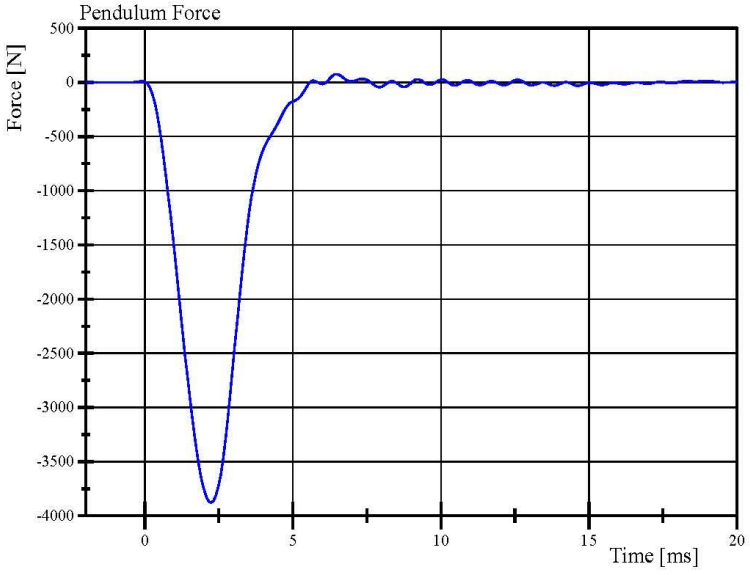
Left Knee Femur Response Test
HIII 5th Serial No. 426 Certification No. 52-1
Test Date: 5/16/2019

Pendulum Acceleration



Filter Class: CFC_600
Max: 2.6 g at 6.5 ms
Min: -132.3 g at 2.2 ms

Pendulum Force



Filter Class: CFC_600
Max: 76.9 N at 6.5 ms
Min: -3,878.2 N at 2.2 ms

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

05.16.2019 08:54:20 1770

Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 5th Serial No. 426 Certification No. 52-1
Test Date: 5/16/2019

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	46 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.115 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-4,055.4 N	Yes

Test meets specifications.

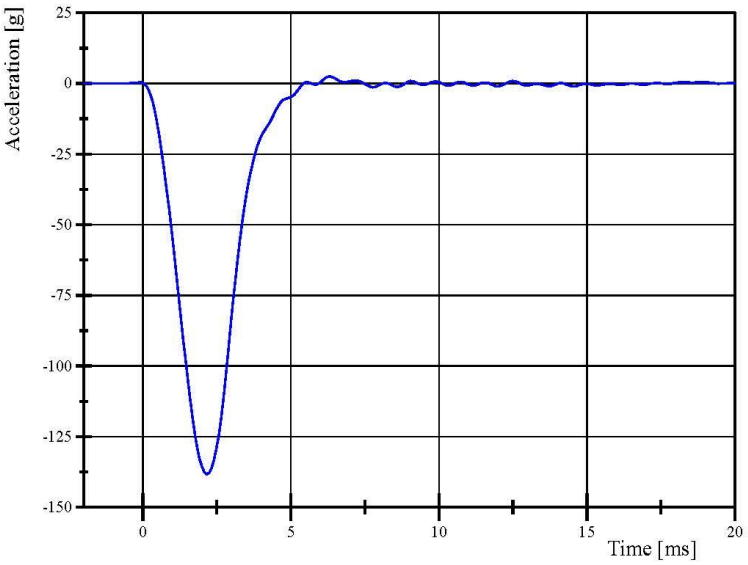
Condition: Used

Comments:
Knee Skin S/N: 1402

Transportation Research Center Inc.

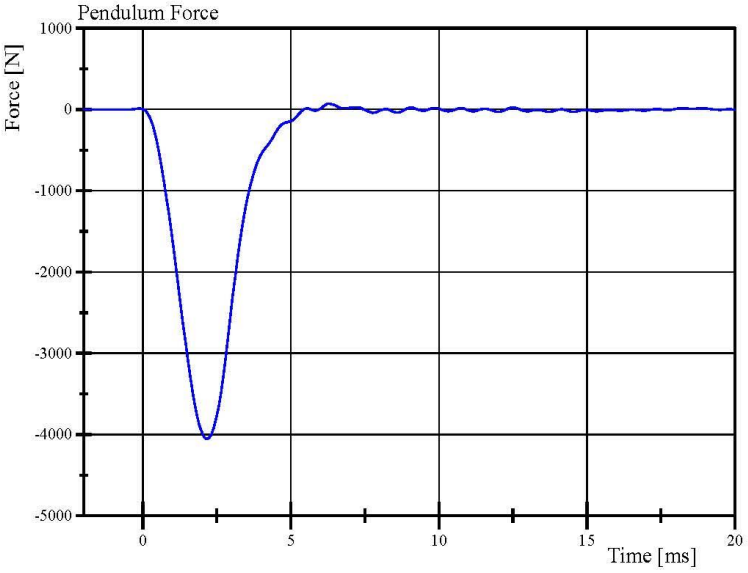
Right Knee Femur Response Test
HIII 5th Serial No. 426 Certification No. 52-1
Test Date: 5/16/2019

Pendulum Acceleration



Filter Class: CFC_600
Max: 2.4 g at 6.3 ms
Min: -138.3 g at 2.2 ms

Pendulum Force



Filter Class: CFC_600
Max: 71.5 N at 6.3 ms
Min: -4,055.4 N at 2.2 ms

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

05.16.2019 09:01:57 1771

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION

TABLE 1 – Driver Dummy Instrumentation

Instrumentation			Axis/Location	Hybrid III 50th S/N 037		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers		Primary	X	T10650	Endevco	5-Mar-2019
			Y	P94650	Endevco	4-Mar-2019
			Z	P94622	Endevco	4-Mar-2019
		Redundant	X	P94431	Endevco	4-Mar-2019
			Y	P94487	Endevco	4-Mar-2019
			Z	P94645	Endevco	4-Mar-2019
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	1-Mar-2019
Chest Accelerometers		Primary	X	P87834	Endevco	4-Mar-2019
			Y	P61255	Endevco	4-Mar-2019
			Z	P45008	Endevco	4-Mar-2019
		Redundant	X	P91177	Endevco	4-Mar-2019
			Y	P94570	Endevco	4-Mar-2019
			Z	P91172	Endevco	4-Mar-2019
Chest Potentiometer			X	CST037	Servo	5-Mar-2019
Pelvis Accelerometers			X	P91185	Endevco	4-Mar-2019
			Y	P91876	Endevco	4-Mar-2019
			Z	T11390	Endevco	23-Apr-2019
Femur Load Cells	Left	Primary	Z	DI4215-FZ1	Denton	1-Mar-2019
		Redundant	Z	DI4215-FZ2	Denton	1-Mar-2019
	Right	Primary	Z	DI4216-FZ1	Denton	1-Mar-2019
		Redundant	Z	DI4216-FZ2	Denton	1-Mar-2019
Tibia Load Cells	Left	Upper	MX, MY, FZ	3643-94	Denton	1-Mar-2019
		Lower	MX, MY, FZ	3644-370	Denton	1-Mar-2019
	Right	Upper	MX, MY, FZ	3643-413	Denton	1-Mar-2019
		Lower	MX, MY, FZ	3644-401	Denton	1-Mar-2019
Foot Accelerometers	Left	Rear	X	P90848	Endevco	4-Mar-2019
			Z	P91498	Endevco	4-Mar-2019
		Front	Z	P90841	Endevco	4-Mar-2019
	Right	Rear	X	P93467	Endevco	4-Mar-2019
			Z	P97619	Endevco	4-Mar-2019
		Front	Z	P94523	Endevco	4-Mar-2019
Seat Belt Load Cells		Lap	N/A	R141C9	Measurement Spec.	7-May-2019
		Shoulder	N/A	X08011	Measurement Spec.	7-May-2019

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	4-Mar-19
			Y	P90302	Endevco	4-Mar-19
			Z	P94534	Endevco	4-Mar-19
		Redundant	X	P89014	Endevco	4-Mar-19
			Y	P90855	Endevco	4-Mar-19
			Z	P94525	Endevco	4-Mar-19
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	5-Mar-19
			Y	P93533	Endevco	5-Mar-19
			Z	P93402	Endevco	5-Mar-19
		Redundant	X	P91664	Endevco	5-Mar-19
			Y	P93546	Endevco	5-Mar-19
			Z	P93547	Endevco	5-Mar-19
Chest Potentiometer			X	CST426	Servo	1-Oct-2018
Pelvis Accelerometers			X	P93514	Endevco	5-Mar-19
			Y	P87467	Endevco	5-Mar-19
			Z	P93766	Endevco	5-Mar-19
Femur Load Cells	Left	Primary	Z	DI4214-FZ1	Denton	1-Oct-18
		Redundant	Z	DI4214-FZ2	Denton	1-Oct-18
	Right	Primary	Z	DI4217-FZ1	Denton	1-Oct-18
		Redundant	Z	DI4217-FZ2	Denton	1-Oct-18
Tibia Load Cells	Left	Upper	MX, MY, FZ	3643-92	Denton	1-Oct-18
		Lower	MX, MY, FZ	3644-92	Denton	1-Oct-18
	Right	Upper	MX, MY, FZ	3643-484	Denton	1-Oct-18
		Lower	MX, MY, FZ	3644-369	Denton	1-Oct-18
Foot Accelerometers	Left	Rear	X	P90866	Endevco	4-Mar-19
			Z	T11451	Endevco	4-Mar-19
		Front	Z	P97890	Endevco	4-Mar-19
	Right	Rear	X	P97640	Endevco	4-Mar-19
			Z	P91471	Endevco	4-Mar-19
		Front	Z	P91907	Endevco	4-Mar-19
Seat Belt Load Cells		Lap	N/A	R141CC	Measurement Spec.	10-Jul-2018
		Shoulder	N/A	R141C8	Measurement Spec.	10-Dec-2018

TABLE 3 – Vehicle Instrumentation

Instrumentation			Axis	Serial Number	Manufacturer	Calibration Date
Crossmember/Rear Seat Accelerometers	Left	Primary	X	P45629	Endevco	7-May-2019
			Z	P80720	Endevco	7-May-2019
		Redundant	X	P78110	Endevco	7-May-2019
	Right	Primary	X	P41055	Endevco	7-May-2019
			Z	P57961	Endevco	7-May-2019
		Redundant	X	P91492	Endevco	7-May-2019
Engine Accelerometers	Top		X	P50293	Endevco	7-May-2019
	Bottom		X	P50428	Endevco	7-May-2019