Final Report Number: NCAP-TRC-15-001

New Car Assessment Program (NCAP)

Frontal Barrier Impact Test

General Motors LLC
2015 Chevrolet Tahoe 4-Door SUV

NHTSA Number: M20150109

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

Report Date: May 9, 2014

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

Notice

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

Prepared By: Impact Laboratory Project Operations Group

Approved By: Jeffery W. Sankey

Approval Date: May 9, 2014

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 _____

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
NCAP-TRC-15-001		

4. Title and Subtitle	5. Report Date
Final Report of NEW CAR ASSESSMENT PROGRAM Frontal Impact Testing of a 2015 Chevrolet Tahoe 4-Door SUV NHTSA No. M20150109	May 9, 2014
	6. Performing Organization Code TRC Inc.

7. Author(s)	8. Performing Organization Report No.
Jeffery W. Sankey, Project Manager	140409

9. Performing Organization Name and Address	10. Work Unit No. (TRAIS)
Transportation Research Center Inc. 10820 State Route 347 East Liberty, OH 43319-0367	11. Contract or Grant No. DTNH22-12-D-00257

12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
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	Final Report April 9, 2014 – May 9, 2014
	14. Sponsoring Agency Code NVS-111

15. Supplemental Notes

16. Abstract

A 56.0 km/h NCAP Frontal Impact Test was conducted on a 2015 Chevrolet Tahoe 4-Door SUV in accordance with the specifications of the Office of Crashworthiness Standards Frontal NCAP Laboratory Test Procedure. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301 and foot well intrusion performance. This test was conducted at the Transportation Research Center Inc. in East Liberty, Ohio on April 9, 2014.

The impact velocity was 56.15 km/h, and the ambient temperature at the barrier face at the time of impact was 22° C. The target vehicle post-test maximum crush was 662 millimeters at crush zone 3 at left side. 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	223	NA	700	285
Maximum Chest Compression	mm	63	-22.9	mm	52	-14.8
3ms Chest Clip	Gs	60	40.5	Gs	60	42.2
Nij	NA	1	0.33	NA	1	0.34
Neck Tension	Newtons	4170	1652.6	Newtons	2620	886.0
Neck Compression	Newtons	4000	-882.4	Newtons	2520	-330.5
Left Femur Force	Newtons	10008	-741.4	Newtons	6805	-432.0
Right Femur Force	Newtons	10008	-1087.0	Newtons	6805	-1483.0

17. Key Words	18. Distribution Statement
35 mph Frontal 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

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. Number of Pages	22. Price
Unclassified	Unclassified	166	

Table of Contents

1: PURPOSE AND SUMMARY OF 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 Front NCAP Laboratory Test Procedure dated August 2013.

SUMMARY

A 2015 Chevrolet Tahoe 4-Door SUV impacted the barrier wall at a velocity of 56.15 km/h. The test was performed at Transportation Research Center, Inc. on April 9, 2014. 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 Frontal NCAP Laboratory Test Procedure.

Both ATDs were fully instrumented with head, chest and pelvis tri-axial accelerometers, chest displacement potentiometers, upper neck load cells, right/left femur load cells, and lower leg instrumentation. Seat belt load cells were also on the driver's shoulder belt and the passenger's lap and shoulder belts to measure dummy torso and pelvic section loading.

The driver (position 1) ATD (Serial No. 037), and the right-front passenger (position 2) ATD (Serial No. 426) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C of this report.

The 95 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 after the event or during any phase of the static rollover.

The maximum static crush of the vehicle was 662 mm and both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

The driver's visible contact points were as follows: front airbag, headrest, and knee bolster. The passenger's visible contact points were as follows: front airbag, headrest, 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)	223	0.33	1652.6	-822.4	40.52	-22.9	-741.4	-1087.0
Passenger (5^{th} Female)	285	0.34	886.0	-330.5	42.2	-14.8	-432.0	-1483.0

2: OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 Chevrolet Tahoe 4-Door SUV NHTSA No.: M20150109
Test Program: NCAP Frontal Impact Test Date: 4/09/14

TEST VEHICLE INFORMATION

NHTSA No.	M20150109
Model Year	2015
Make	Chevrolet
Model	Tahoe
Body Style	SUV
VIN	1GNSKBKC8FR114443
Body Color	Red
Odometer Reading (km/mi)	142 mi
Engine Displacement (L)	5.3
Type/No. Cylinders	Gas/8
Engine Placement	Front/Longitudinal
Transmission Type	Automatic
Transmission Speeds	6
Overdrive	Yes
Final Drive	4WD
Roof Rack	Yes
Sunroof/T-Top	No
Running Boards	Yes
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	Yes
Automatic Door Locks (ADLs)	Yes

TEST VEHICLE OPTIONS

Traction Control System (TCS)	Yes
Power Steering	Yes
Power Window Auto-Reverse	Yes
Driver Frontal Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	No
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	Driver I/B SAB

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

DATA FROM CERTIFICATION LABEL

Manufactured by	General Motors LLC
Date of Manufacture	02/14

GVWR (kg)	3311
GAWR Front (kg)	1633
GAWR Rear (kg)	1860

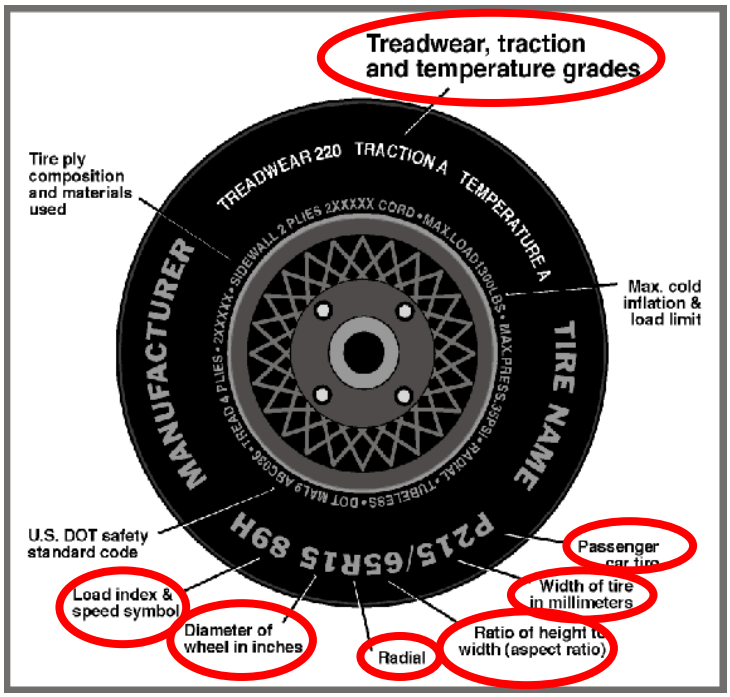
VEHICLE SEATING AND WEIGHT CAPACITY

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Split Bench	Bench	
Number of Occupants	2	3	3	8
Capacity Wt. (VCW) (kg)				691.0
Cargo Wt. (RCLW) (kg)				146.68

DATA SHEET NO. 1 (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 Chevrolet Tahoe 4-Door SUV NHTSA No.: M20150109
Test Program: NCAP Frontal Impact Test Date: 4/09/14



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold / Test Pressure (kPa)	240	240
Recommended Tire Size	P275/55R20	P275/55R20
Tire Size on Vehicle	P275/55R20	P275/55R20
Tire Manufacturer	Continental	Continental
Tire Model	CrossContact LX20	CrossContact LX20
Treadwear	740	740
Traction Grade	A	A
Temperature Grade	B	B
Tire Plies Sidewall	2	2
Tire Plies Body	5	5
Load Index/Speed Symbol	111S	111S
Tire Material	Polyester, steel &	Polyester, steel &
DOT Safety Code Right	A32A WBDE 0414	A32A WBDE 0414
DOT Safety Code Left	A32A WBDE 0514	A32A WBDE 0414

DATA SHEET NO. 1 (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 Chevrolet Tahoe 4-Door SUV NHTSA No.: M20150109
Test Program: NCAP Frontal Impact Test Date: 4/09/14

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	665.0	640.2		710.4	738.0	
Right	kg	653.0	619.4		678.8	718.4	
Ratio	%	51.1	48.9		48.8	51.2	
Totals	kg	1318.0	1259.6	2577.6	1389.2	1456.4	2845.6

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	2577.6
Weight of 1 P572E ATD & 1 P572O ATD	kg	139.3
Rated Cargo/Luggage Weight (RCLW)	kg	136[1]
Vehicle Target Weight (TVTW)	kg	2852.9

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	920	922	970	973	1442
As Tested	mm	908	917	940	951	1510
Post Test	mm	925	922	958	941	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2950.0
Total Vehicle Length at Left Side	mm	4990.0
Total Vehicle Length at Centerline	mm	5165.0
Total Vehicle Length at Right Side	mm	5010.0
Weight of Ballast in Cargo Area	kg	128.0
Weight of Vehicle Components Removed	kg	0.0
Amount of Stoddard Solvent in Fuel Tank	liters	91.6

LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT: None

[1]Rated cargo/luggage weight (RCLW) limited to 136 kg

DATA SHEET NO. 1 (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 Chevrolet Tahoe 4-Door SUV NHTSA No.: M20150109
Test Program: NCAP Frontal Impact Test Date: 4/09/14

TARGET VEHICLE STRUCTURAL MEASUREMENT

	Elements	Pre-Test (mm)
1	Total Length	5165
2	Total Width	2040
3	Bumper Top Height	626
4	Bumper Bottom Height	496
5	Longitudinal Member Top Height	588
6	Distance Between Longitudinal Members	710
7	Longitudinal Member Width	90
8	Engine Top Height	1150
9	Engine Bottom Height	316
10	Engine and Gearbox Width	600
11	Front Bumper-Engine Distance	880
12	Front Shock Absorber Fixing Height	750
13	Bonnet Leading Edge Height	1097
14	Front Shock Absorber Fixing Width	950
15	Front Bumper – Front Axle Distance	1030
16	Front Axle – A-Pillar Distance	895
17	A-Pillar – B-Pillar Distance	1100
18	B-Pillar – Rear Axle Distance	1270
19	B-Pillar – C-Pillar Distance	970
20	Roof Sill Bottom Height	1710
21	Roof Sill Top Height	1780
22	Floor Sill Bottom Height	530
23	Floor Sill Top Height	575

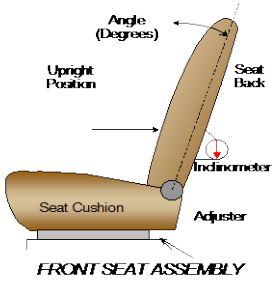
DATA SHEET NO. 2

SEAT ADJUSTMENT, FUEL SYSTEM AND STEERING WHEEL DATA

Test Vehicle: 2015 Chevrolet Tahoe 4-Door SUV NHTSA No.: M20150109
Test Program: NCAP Frontal Impact Test Date: 4/09/14

NORMAL DESIGN RIDING POSITION

For adjustable driver and passenger seat back. 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. Inclinometer measurement at the top of the backrest at the seat centerline, according to Form 1 attachment.



	Degree
Driver Seat back angle:	2.7 rearward
Passenger Seat back angle:	5.2 rearward

SEAT FORE/AFT POSITIONS

Describe the method used of determining seat for/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	330	165
Passenger Seat	210	0

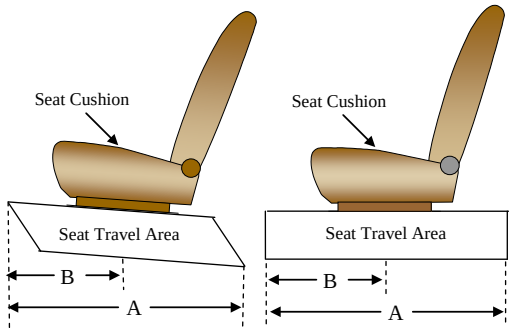
SEAT BELT UPPER ANCHORAGE

Describe the method of positioning seat belt upper anchorages.

Driver: Uppermost, Positioned according to Form 1

Passenger: Uppermost, Positioned according to Form 1

	Total No. of Positions	Placed in Position No.
Driver Seat	5, numbered 0 to 4	0, Uppermost
Passenger Seat	5, numbered 0 to 4	0, Uppermost



DATA SHEET NO. 2 (CONTINUED)

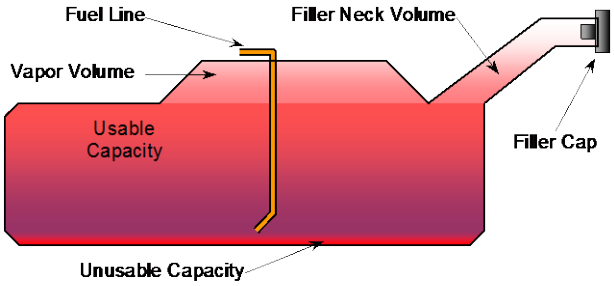
SEAT ADJUSTMENT, FUEL SYSTEM AND STEERING WHEEL DATA

Test Vehicle: 2015 Chevrolet Tahoe 4-Door SUV NHTSA No.: M20150109
Test Program: NCAP Frontal Impact Test Date: 4/09/14

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	98.4
Usable Capacity of "Optional Tank"	N/A
92%-94% of Usable Capacity	91.6
Actual Amount of Solvent Used	91.6
1/3 of Usable Capacity	32.8

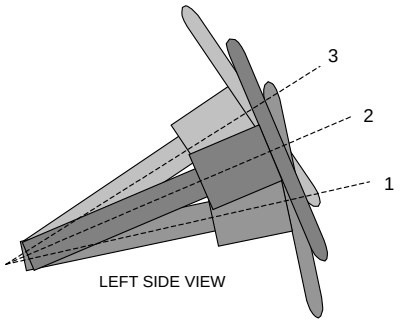
The vehicle is equipped with an electric fuel pump. If ignition key is at "ON" position and engine is not running, the fuel pump operates for 2 seconds. If the engine is running, then the fuel pump will run continuously.



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



STEERING COLUMN ASSEMBLY

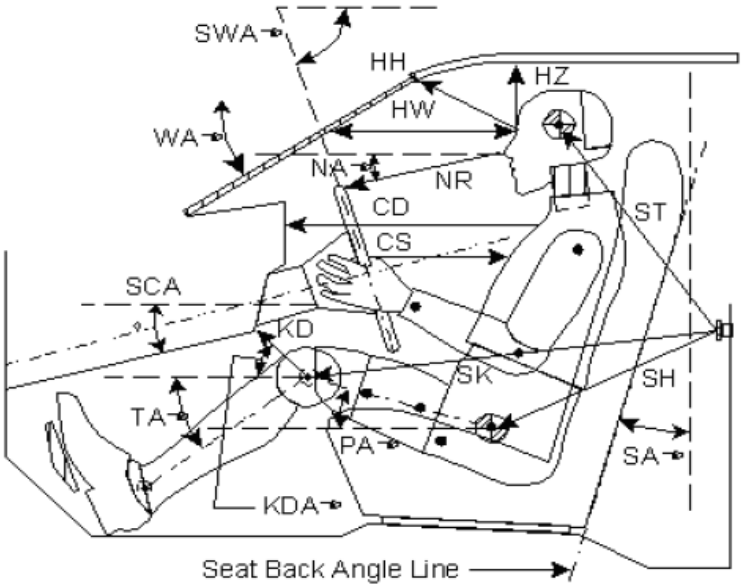
STEERING COLUMN POSITIONS

	Degrees	Fore/Aft Position (mm)
Lowermost Position No. 1	9.7	300
Geometric Center Position No. 2	20.1	300
Uppermost Position No. 3	30.4	300
Telescoping Steering Wheel Travel		35
Test Position	20.1	317

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2015 Chevrolet Tahoe 4-Door SUV NHTSA No.: M20150109
Test Program: NCAP Frontal Impact Test Date: 4/09/14

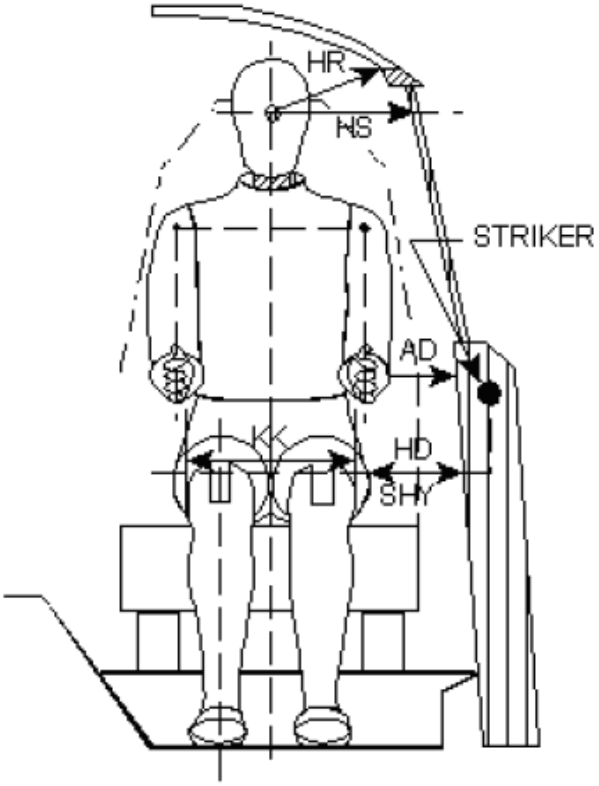


Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (º)	Length (mm)	Angle (º)
WAº	Windshield Angle		33.7		
SWAº	Steering Wheel Angle		20.1		
SCAº	Steering Column Angle		69.9		
SAº	Seat Back Angle (on headrest post)		2.7 rearward		5.2 rearward
HZ	Head to Roof (Z)	297		330	
HH	Head to Header	588		465	
HW	Head to Windshield	760		789	
NR	Nose to Rim	379	N/A		
CD	Chest to Dash	547		460	
CS	Chest to Steering Hub	316			
RA	Rim to Abdomen	209			
KDL	Left Knee to Dash	177	32.5	141	35
KDR	Right Knee to Dash	162	32.5	147	35.5
PAº	Pelvic Angle		24.5		18.1
TAº	Tibia Angle		44.5		52
SK	Striker to Knee	606	-6.3	667	-3.2
ST	Striker to Head	605	-79.7	572	-73.5
SH	Striker to H-Point	231	15.2	322	4.0

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2015 Chevrolet Tahoe 4-Door SUV NHTSA No.: M20150109
Test Program: NCAP Frontal Impact Test Date: 4/09/14

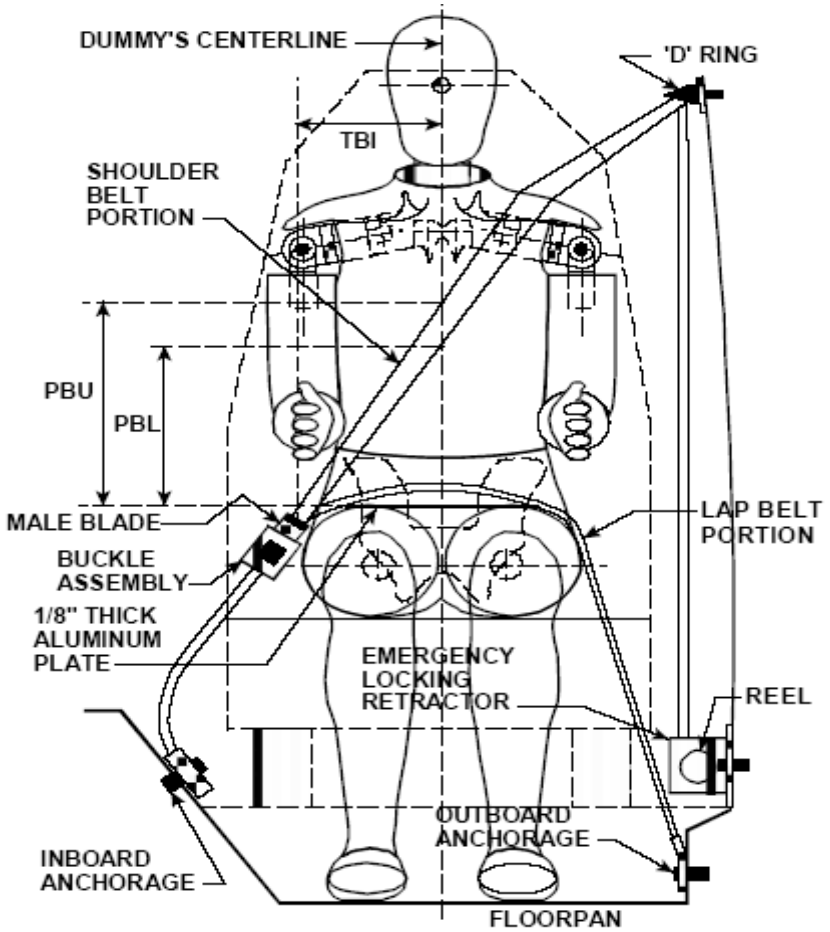


Code	Measurement Description	Driver	Passenger
AD	Arm to Door	139	180
HD	H-Point to Door	159	171
HR	Head to Side Header	273	330
HS	Head to Side Window	365	383
KK	Knee to Knee	350	165
SHY	Striker to H-Point (Y Direction)	263	274
AA	Ankle to Ankle	370	162

DATA SHEET NO. 5

SEAT BELT POSITIONING DATA

Test Vehicle: 2015 Chevrolet Tahoe 4-Door SUV NHTSA No.: M20150109
Test Program: NCAP Frontal Impact Test Date: 4/09/14



FRONT VIEW OF DUMMY

SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU – Top surface of reference to belt upper edge	mm	313	284
PBL – Top surface of reference to belt lower edge	mm	236	187

BELT LENGTH DATA

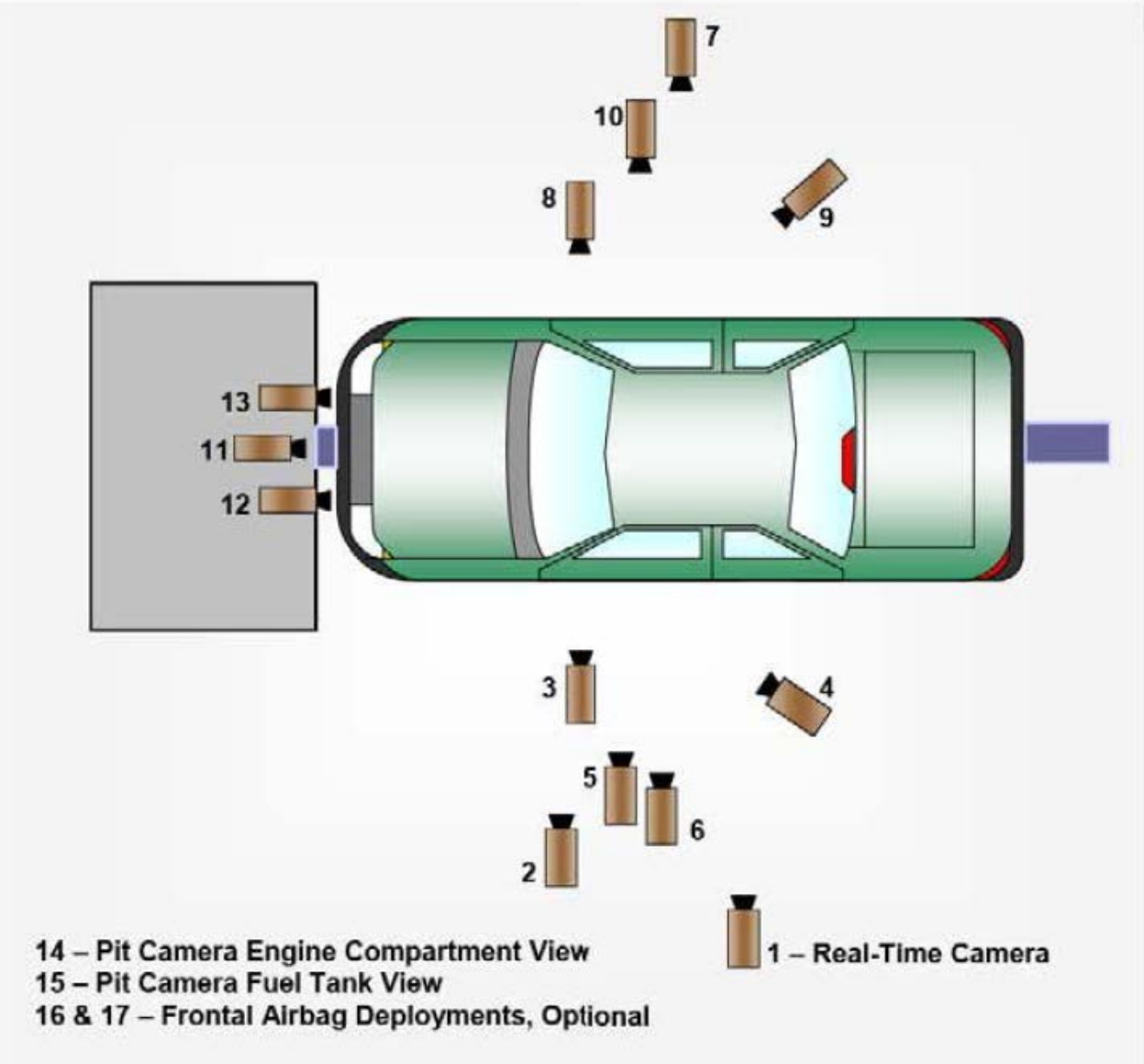
Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	843	875
Lap belt length as measured on ATD	mm	438	474
Remainder of belt on reel	mm	1004	1008
Total belt length for continuous webbing systems	mm	2285	2357

DATA SHEET NO. 6

HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle:	2015 Chevrolet Tahoe 4-Door SUV	NHTSA No.:	M20150109
Test Program:	NCAP Frontal Impact	Test Date:	4/09/14

CAMERA POSITIONS FOR FRONTAL IMPACTS



DATA SHEET NO. 6 (CONTINUED)

HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2015 Chevrolet Tahoe 4-Door SUV NHTSA No.: M20150109
Test Program: NCAP Frontal Impact Test Date: 4/09/14

CAMERA LOCATIONS

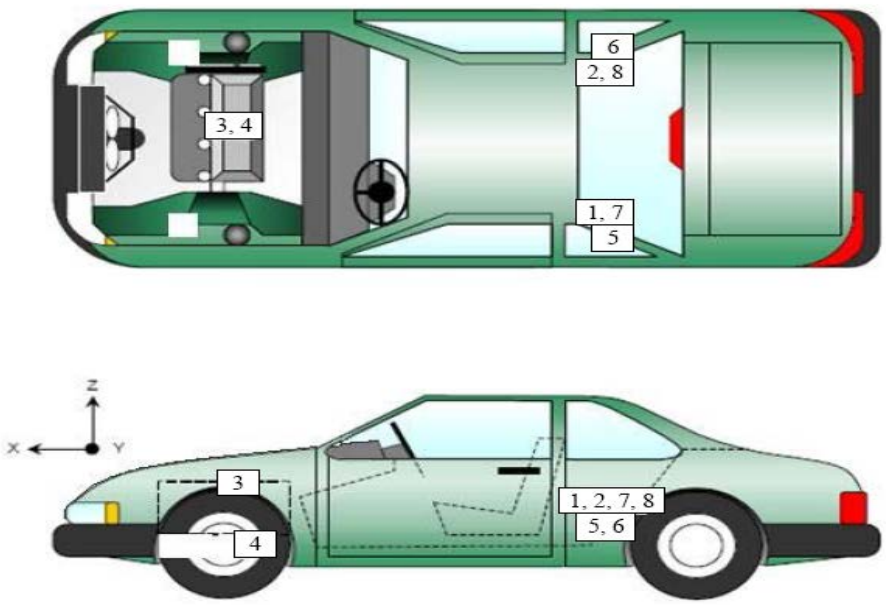
No.	Camera View	Location (mm)			Lens (mm)	Frame Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall	-513	-6214	-1201	Zoom	30
2	Driver Close-Up	-2719	-4903	-1291	20	1000
3	Left Front Half	-1116	-5578	-1299	25	1000
4	Left Angle	-4210	-2682	-1879	Zoom	1000
5	Steering Column - Top	-1957	-5423	-2023	50	1000
6	Steering Column – Bottom	-1962	-5188	-1516	50	1000
7	Right Overall	-1456	6232	-1598	Zoom	1000
8	Passenger Close-Up	-2462	6582	-1135	16	1000
9	Right Front Half	-5377	3529	-2014	50	1000
10	Right Angle	-1112	6757	-1285	Zoom	1000
11	Windshield	-380	0	-2628	8.5	1000
12	Driver Windshield	-380	-445	-2628	Zoom	1000
13	Passenger Windshield	-380	305	-2628	25	1000
14	Pit Front	-1229	0	2963	16	1000
15	Pit Rear	-4060	-100	2903	12.5	1000
16	Onboard Driver Airbag (Optional)				8.5	1000
17	Onboard Passenger Airbag (Optional)				8.5	1000

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

DATA SHEET NO. 7

VEHICLE ACCELEROMETER DATA

Test Vehicle: 2015 Chevrolet Tahoe 4-Door SUV NHTSA No.: M20150109
Test Program: NCAP Frontal Impact Test Date: 4/09/14



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Camera View	Location (mm)		
		X	Y	Z
1	Left Rear Accelerometer – X Direction	2130	480	-615
2	Right Rear Accelerometer – X Direction	2100	500	-615
3	Engine Top X	4085	-117	-1065
4	Engine Bottom X	4015	65	-335
5	Left Rear Accelerometer – Z Direction	2130	480	-615
6	Right Rear Accelerometer – Z Direction	2100	-500	-615
7	Left Rear Accelerometer – X Direction Redundant	2130	410	-615
8	Right Rear Accelerometer- X Direction Redundant	2100	-440	-615

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

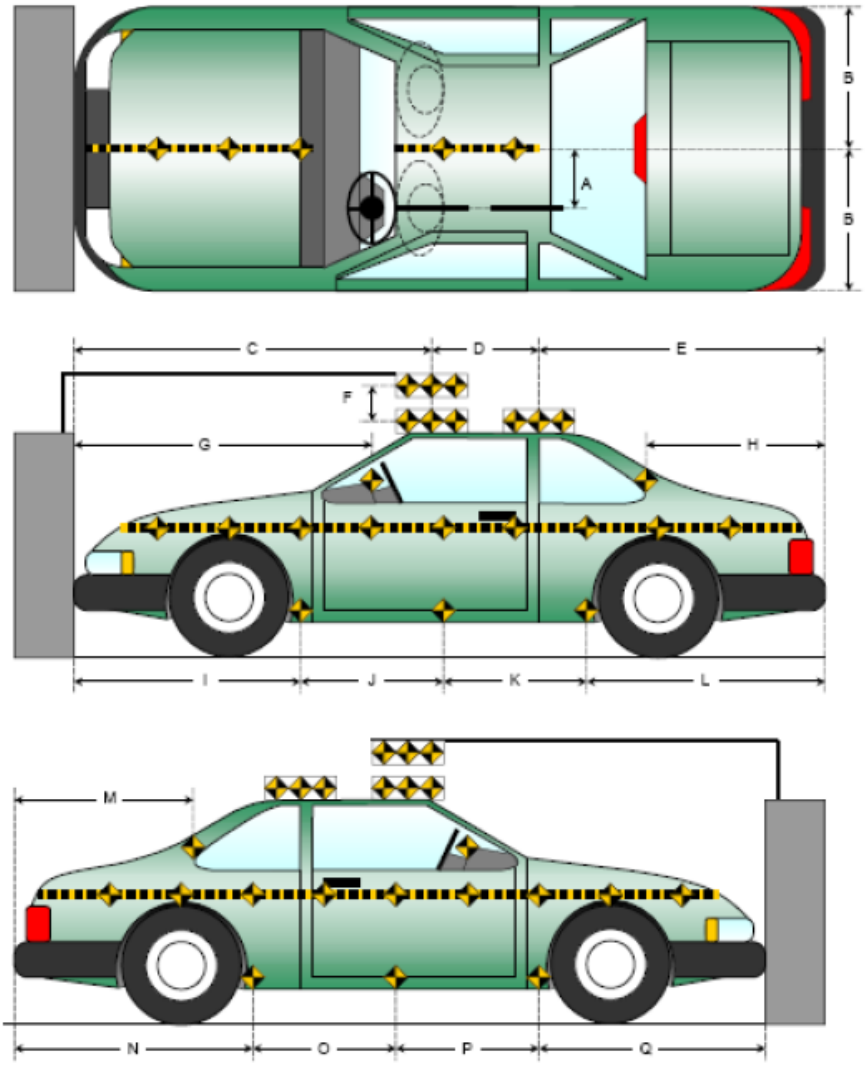
DATA SHEET NO. 8

PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2015 Chevrolet Tahoe 4-Door SUV NHTSA No.: M20150109
Test Program: NCAP Frontal Impact Test Date: 4/09/14

Item	Value
A	360
B	1020
C	2550
D	610
E	2715
F	290
G	1870
H	2065
I	1560
J	945
K	937
L	2435
M	2040
N	2415
O	937
P	947
Q	1560

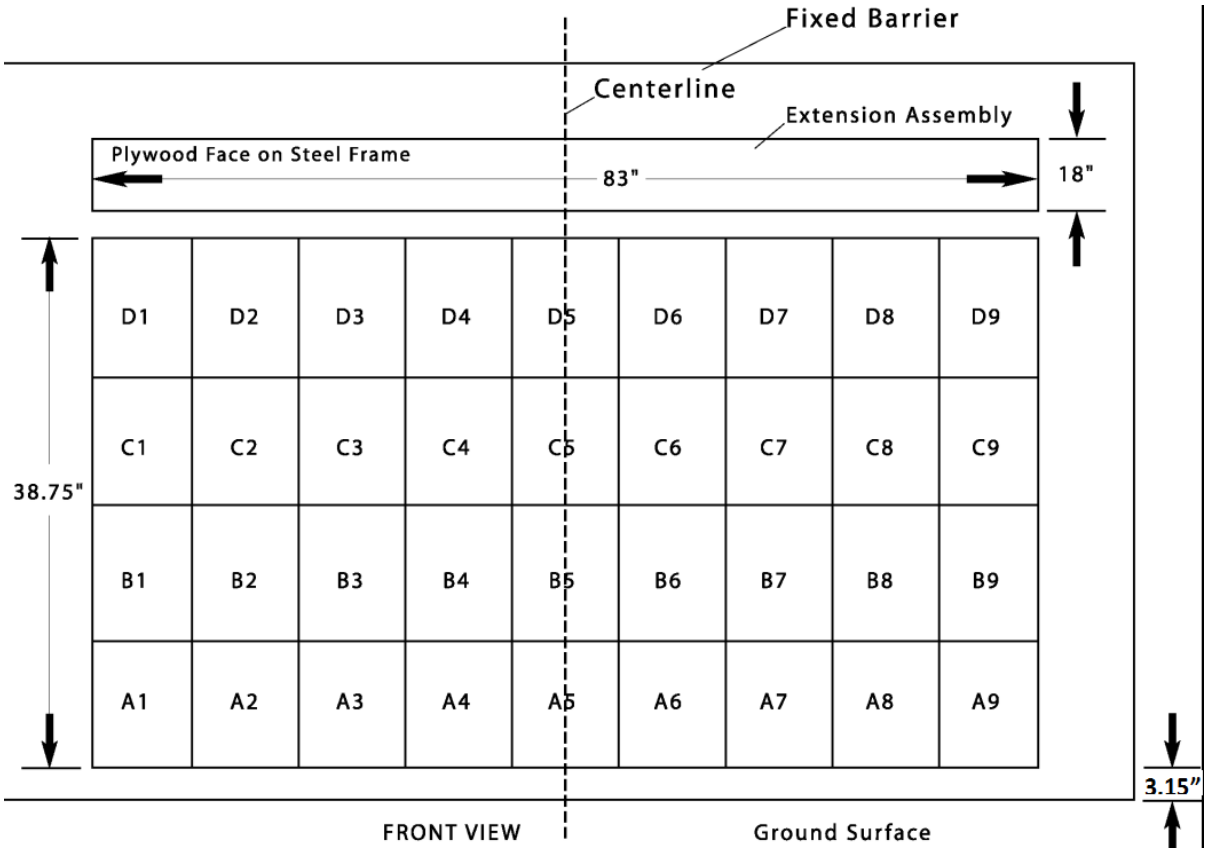
All units in millimeters



DATA SHEET NO. 9

LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2015 Chevrolet Tahoe 4-Door SUV NHTSA No.: M20150109
Test Program: NCAP Frontal Impact Test Date: 4/09/14



DATA SHEET NO. 10

TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2015 Chevrolet Tahoe 4-Door SUV NHTSA No.: M20150109
Test Program: NCAP Frontal Impact Test Date: 4/09/14

INSTRUMENTATION

Instrumentation	Number of Channels Collected
Driver Dummy Accelerometers	15
Passenger Dummy Accelerometers	15
Vehicle Structure Accelerometers	8
Total	95

CAMERA COVERAGE

Type of Camera	Number Used in this Test
High-Speed Vehicle Onboard	2
High-Speed Offboard	14
Real-Time Panning	1
Total	17

DATA SHEET NO. 11

POST-TEST OBSERVATIONS

Test Vehicle: 2015 Chevrolet Tahoe 4-Door SUV NHTSA No.: M20150109
Test Program: NCAP Frontal Impact Test Date: 4/09/14

TEST DUMMY INFORMATION AND CONTACT LOCATIONS

Description	Driver	Passenger
Dummy Type / Serial No.	Hybrid III 50th/ 037	Hybrid III 5th/ 426
Head Contact	Front airbag, head restraint	Front airbag, head restraint
Upper Torso Contact	None	None
Lower Torso Contact	None	None
Left Knee Contact	Knee bolster	Glove box door
Right Knee Contact	Knee bolster	Glove box door

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Front	Rear
Locked/Unlocked Doors	Unlocked	Unlocked
Front Door Opening	Remained closed & latched, operational	Remained closed & latched, operational
Rear Door Opening	Remained closed & latched, operational	Remained closed & latched, operational
Seat Track Shift (mm)	None	None
Seat Back Failure	None	None

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Windshield Damage	Broken
Window Damage	None
Other Notable Effects	None

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	688
Center	mm	904
Right Side	mm	866
Average	mm	819

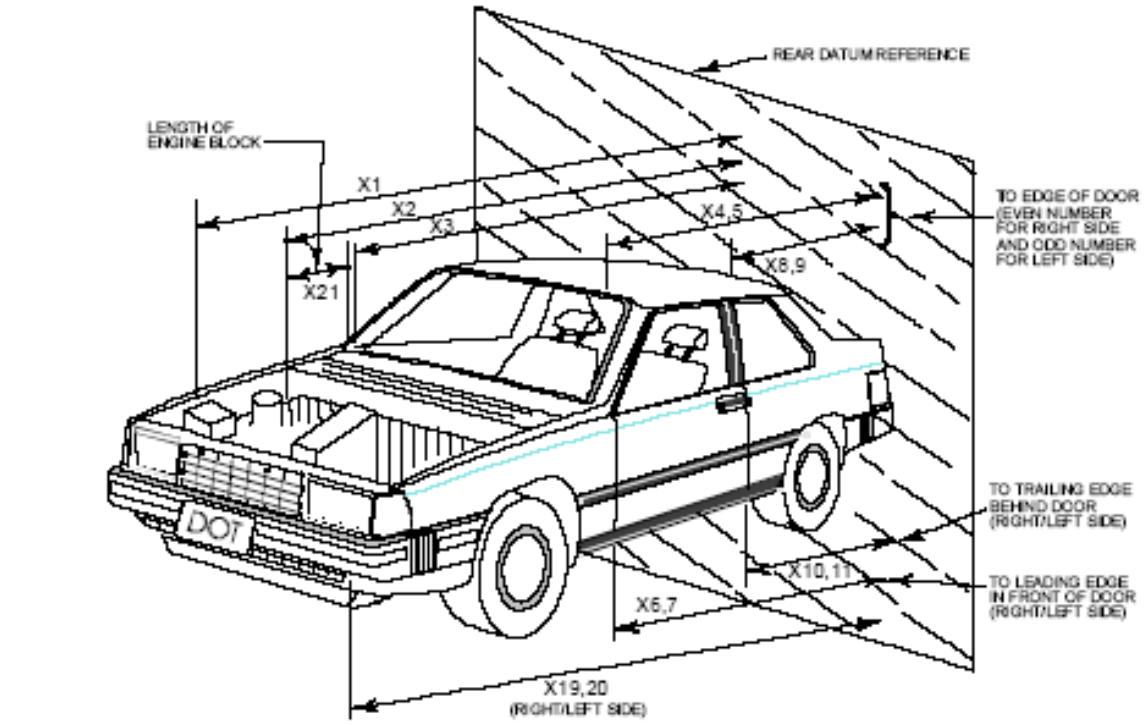
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

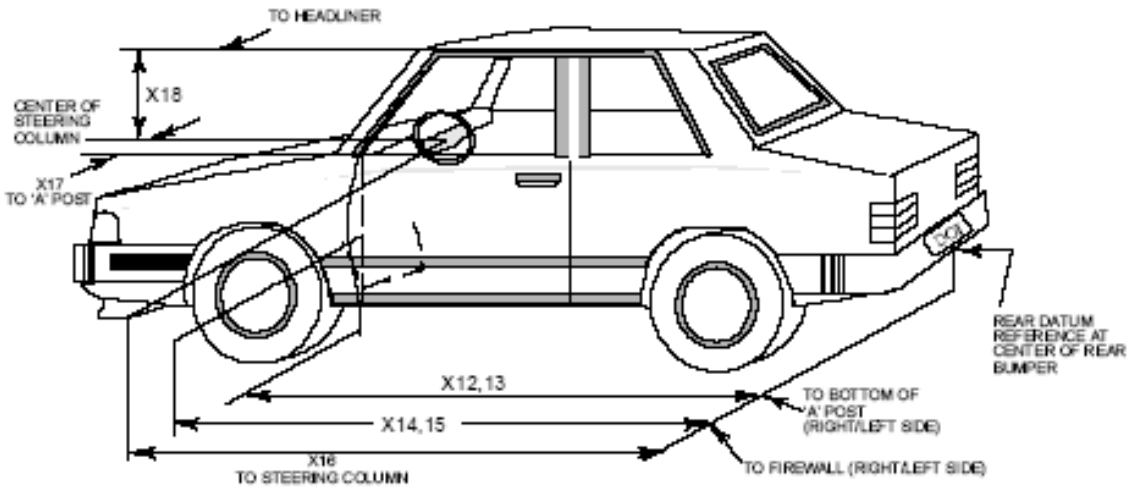
Restraint Type	Driver (Occupant 1)		Passenger (Occupant 2)	
	Installed	Deployed	Installed	Deployed
Front Airbag	Yes	Yes	Yes	Yes
Side Curtain Airbag	Yes	No	Yes	No
Torso/Pelvis Airbag	Yes	No	Yes	No
Pelvis Airbag	No	N/A	No	N/A
Knee Airbag	No	N/A	No	N/A
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load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

DATA SHEET NO. 12

VEHICLE PROFILE MEASUREMENTS

Test Vehicle:	2015 Chevrolet Tahoe 4-Door SUV	NHTSA No.:	M20150109
Test Program:	NCAP Frontal Impact	Test Date:	4/09/14





DATA SHEET NO. 12 (CONTINUED)

VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2015 Chevrolet Tahoe 4-Door SUV NHTSA No.: M20150109
Test Program: NCAP Frontal Impact Test Date: 4/09/14

No.	Measurement Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	5165	4483	682
2	Rear Surface of Vehicle (RSOV) to Front of Engine	4305	4173	132
3	RSOV to Firewall	3948	3953	-5
4	RSOV to Upper Leading Edge of Right Door	3547	3610	-63
5	RSOV to Upper Leading Edge of Left Door	3576	3613	-37
6	RSOV to Lower Leading Edge of Right Door	3480	3488	-8
7	RSOV to Lower Leading Edge of Left Door	3512	3498	14
8	RSOV to Upper Trailing Edge of Right Door	2434	2499	-65
9	RSOV to Upper Trailing Edge of Left Door	2464	2503	-39
10	RSOV to Lower Trailing Edge of Right Door	2427	2433	-6
11	RSOV to Lower Trailing Edge of Left Door	2450	2441	9
12	RSOV to Bottom of “A” Post-of Right Side	3525	3583	-58
13	RSOV to Bottom of “A” Post-of Left Side	3550	3578	-28
14	RSOV to Firewall, Right Side	3915	3889	26
15	RSOV to Firewall, Left Side	3895	3925	-30
16	RSOV to Steering Column	3090	3113	-23
17	Center of Steering Column to “A” Post	340	310	30
18	Center of Steering Column to Headliner	425	360	65
19	RSOV to Right Side of Front Bumper	5010	4580	430
20	RSOV to Left Side of Front Bumper	4990	4823	167
21	Length of Engine Block	600	600	0
RD	RSOV to Right Side of Dash Panel	3295	3336	-41
CD	RSOV to Center of Dash Panel	3240	3303	-63
LD	RSOV to Left Side of Dash Panel	3333	3373	-40

All Dimensions in mm

DATA SHEET NO. 13

ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2015 Chevrolet Tahoe 4-Door SUV NHTSA No.: M20150109
Test Program: NCAP Frontal Impact Test Date: 4/09/14

VEHICLE INFORMATION

VIN: 1GNSKBKC8FR114443 Wheelbase: 2950
Vehicle Size Category: Standard SUV Test Weight (kg): 2845.6

ACCELEROMETER DATA

Accelerometer Locations: As listed on Page 15 of this report.

Cal. Procedure/Interval: TRC procedure / 6 month interval

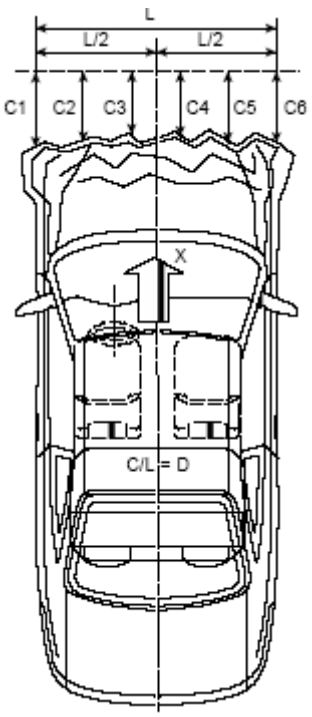
Integration Algorithm: Trapezoidal

Linearity: > 99%

Impact Velocity (km/h): 56.15

Velocity Change (km/h): 64.1

Time of Separation (ms): 111



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	4990	4823	167
C2	Crush zone 2 at left side	mm	5105	4481	624
C3	Crush zone 3 at left side	mm	5150	4488	662
C4	Crush zone 4 at right side	mm	5150	4498	652
C5	Crush zone 5 at right side	mm	5105	4507	598
C6	Crush zone 6 at right side	mm	5010	4580	430
L	C1 to C6	mm	1524	1515	9

DATA SHEET NO. 14

VEHICLE INTRUSION MEASUREMENTS

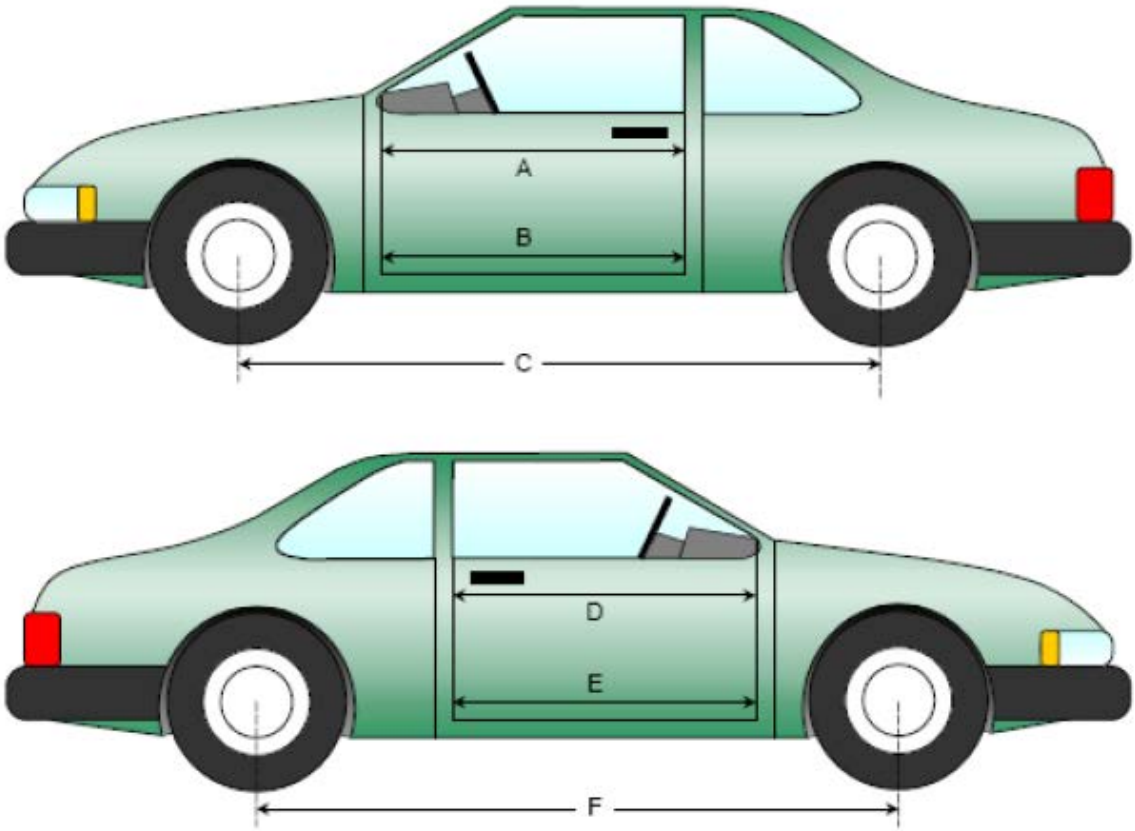
Test Vehicle: 2015 Chevrolet Tahoe 4-Door SUV NHTSA No.: M20150109
Test Program: NCAP Frontal Impact Test Date: 4/09/14

DOOR OPENING WIDTH

No.	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	1047	1043	4
B	Left Side Lower	mm	988	987	1
C	Right Side Upper	mm	1047	1048	-1
D	Right Side Lower	mm	974	972	2

WHEELBASE MEASUREMENTS

No.	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2950	2880	70
F	Right Side Wheelbase	mm	2950	2900	50



DATA SHEET NO. 14 (CONTINUED)

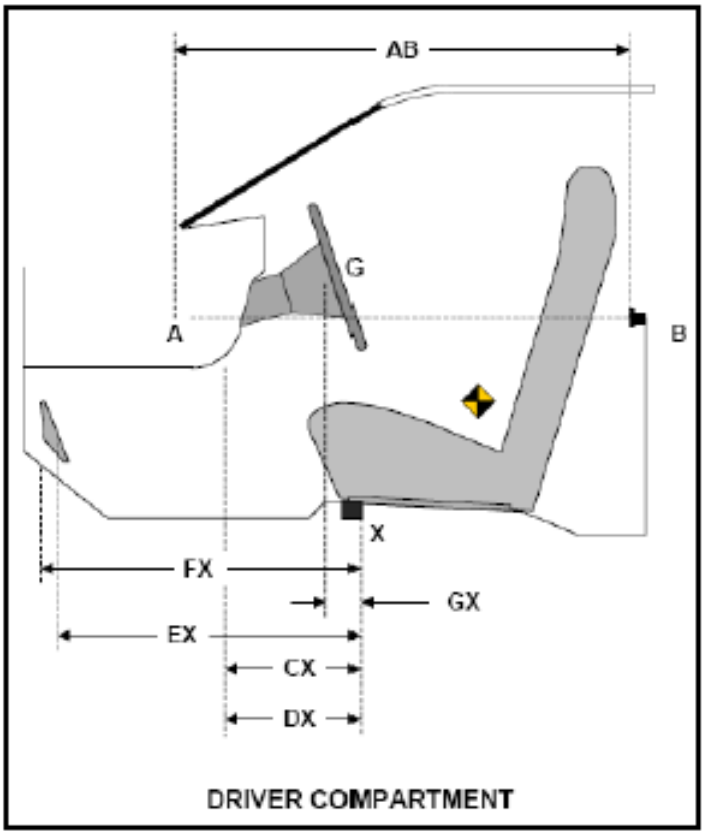
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2015 Chevrolet Tahoe 4-Door SUV NHTSA No.: M20150109
Test Program: NCAP Frontal Impact Test Date: 4/09/14

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	1050	1046	4
CX	Left Knee Bolster to X	mm	290	315	-25
DX	Right Knee Bolster to X	mm	290	290	0
EX	Brake Pedal to X	mm	545	557	-12
FX	Foot Rest to X	mm	600	610	-10
GX	Center of Steering Column Wheel Hub to X	mm	70	140	-70

X = Front of Seat Track (Stationary)



DATA SHEET NO. 15

SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA

Test Vehicle: 2015 Chevrolet Tahoe 4-Door SUV NHTSA No.: M20150109
Test Program: NCAP Frontal Impact Test Date: 4/09/14

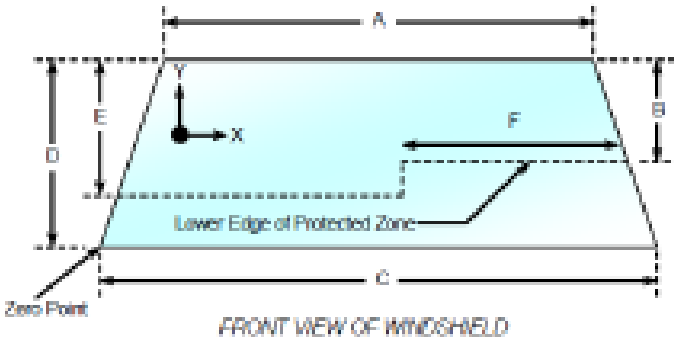
Please provide windshield mounting details.

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:

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2275	2275	100
Right Side	2275	2275	100
Total	4550	4550	100

Item	Units	Value
A	mm	1370
B	mm	470
C	mm	1660
D	mm	760
E	mm	457
F	mm	555



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. 15 (CONTINUED)

SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA

Test Vehicle: 2015 Chevrolet Tahoe 4-Door SUV NHTSA No.: M20150109
Test Program: NCAP Frontal Impact Test Date: 4/09/14

FMVSS 301 FUEL SYSTEM INTEGRTY POST IMPACT DATA

Temperature at Time of Impact: 21.6°C Test Time: 17:32

Stoddard Solvent Spillage Measurements

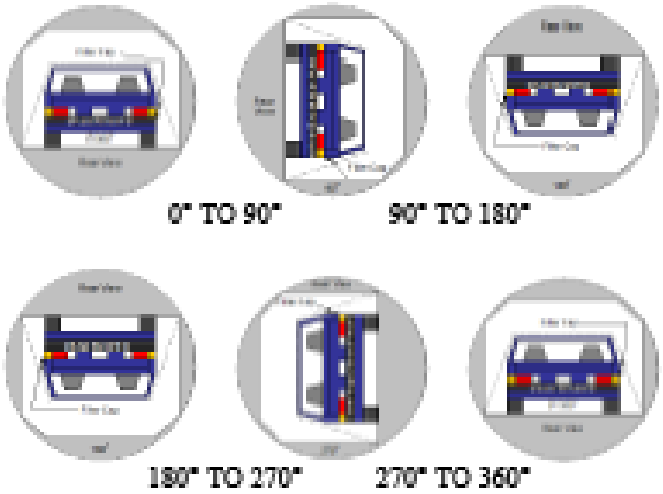
A	From impact until vehicle motion ceases: (maximum allowable – 1 oz.)	0 oz.
B	For the 5-minute period after motion ceases: (maximum allowable – 5 oz.)	0 oz.
C	For the following 25 minutes: (maximum allowable – 1 oz./minutes)	0 oz.
D	Spillage: None	

DATA SHEET NO. 16

FMVSS 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2015 Chevrolet Tahoe 4-Door SUV NHTSA No.: M20150109
Test Program: NCAP Frontal Impact Test Date: 4/09/14

1. The specified fixture rollover rate for each 90º of rotation is 50 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	90º	330	420
90º to 180º	90º	330	840
180º to 270º	90º	330	1260
270º to 360º	90º	330	1680

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

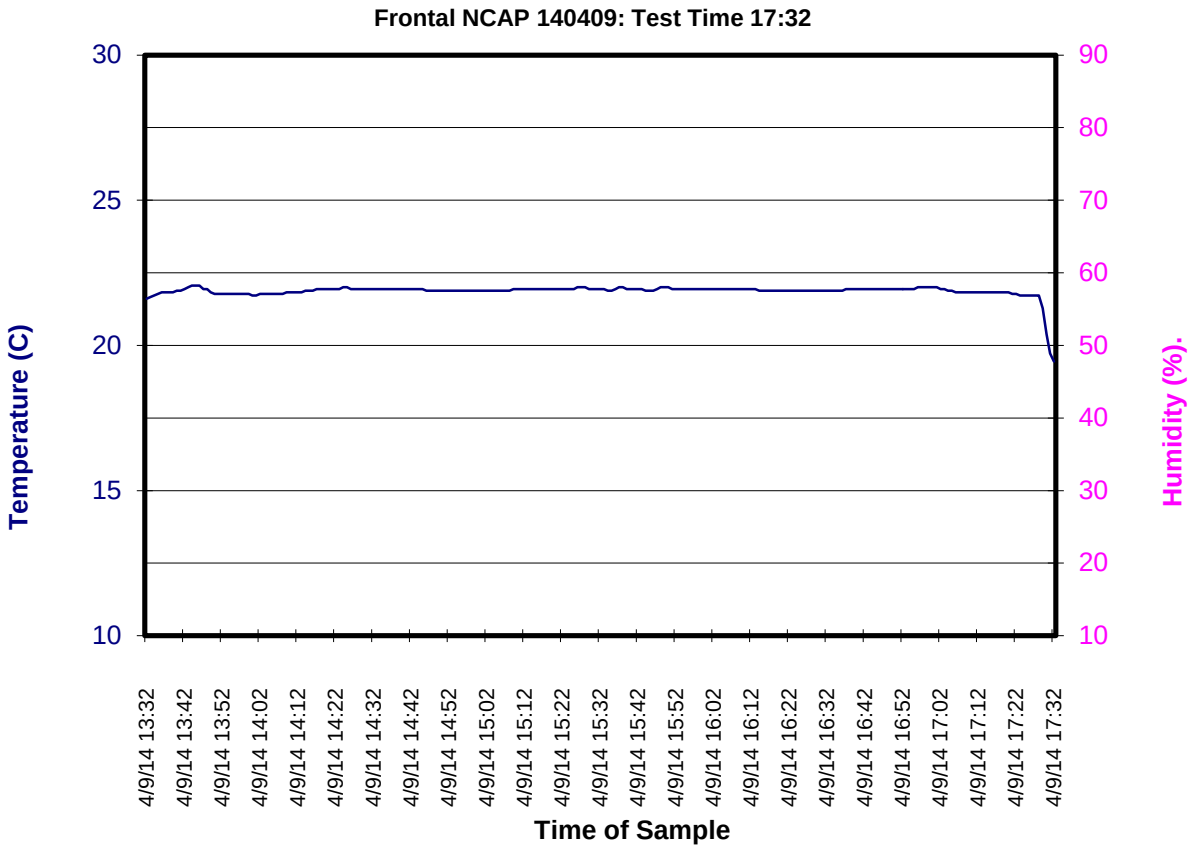
SOLVENT SPILLAGE LOCATION TABLE

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: 2015 Chevrolet Tahoe 4-Door SUV NHTSA No.: M20150109
Test Program: NCAP Frontal Impact Test Date: 4/09/14

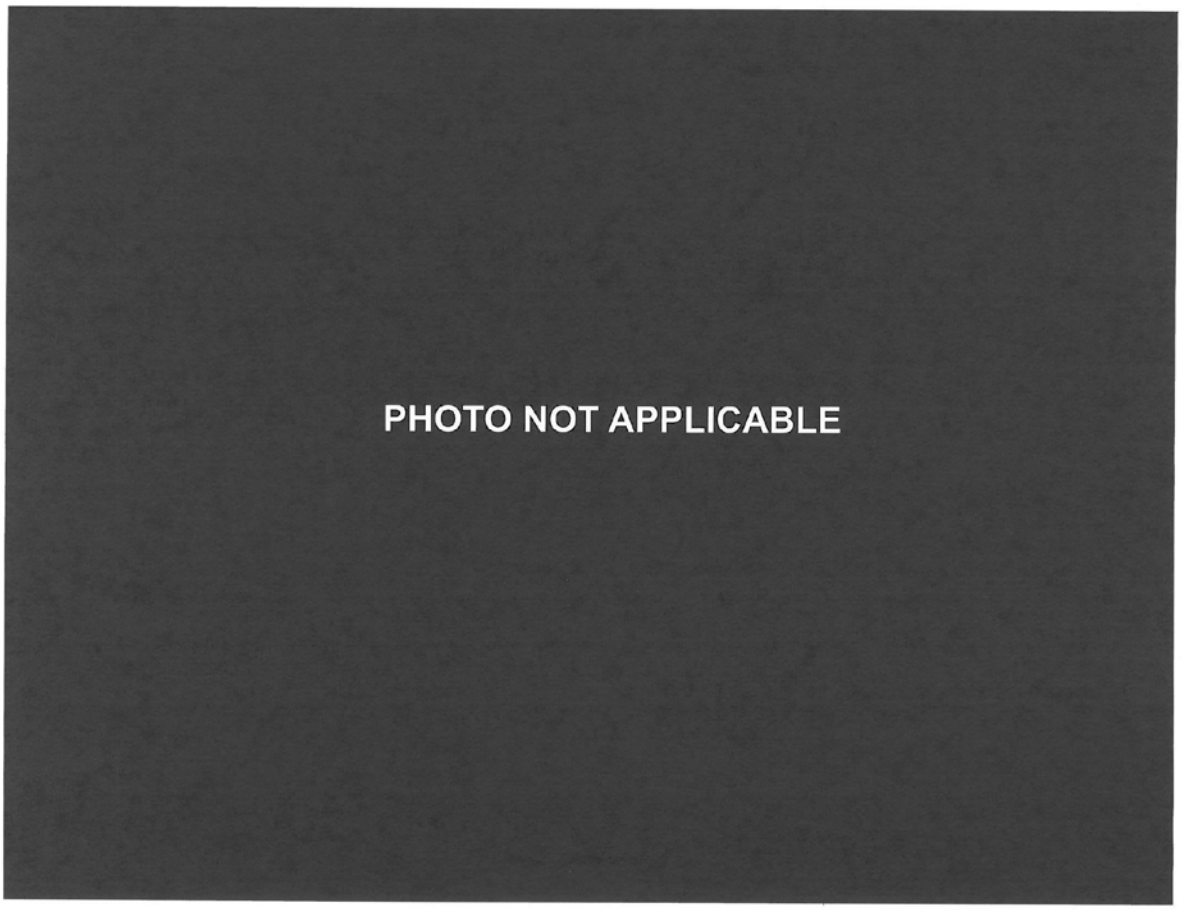


Humidity was not recorded.

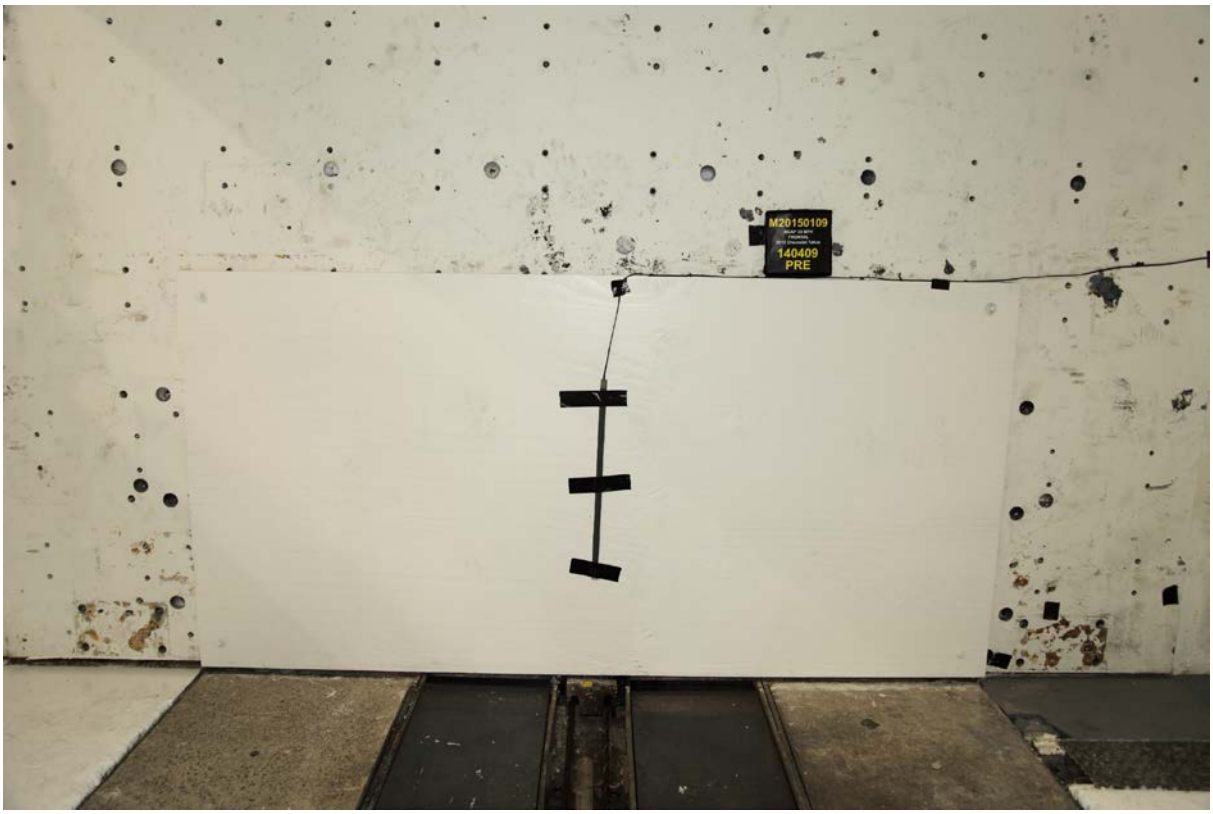
APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

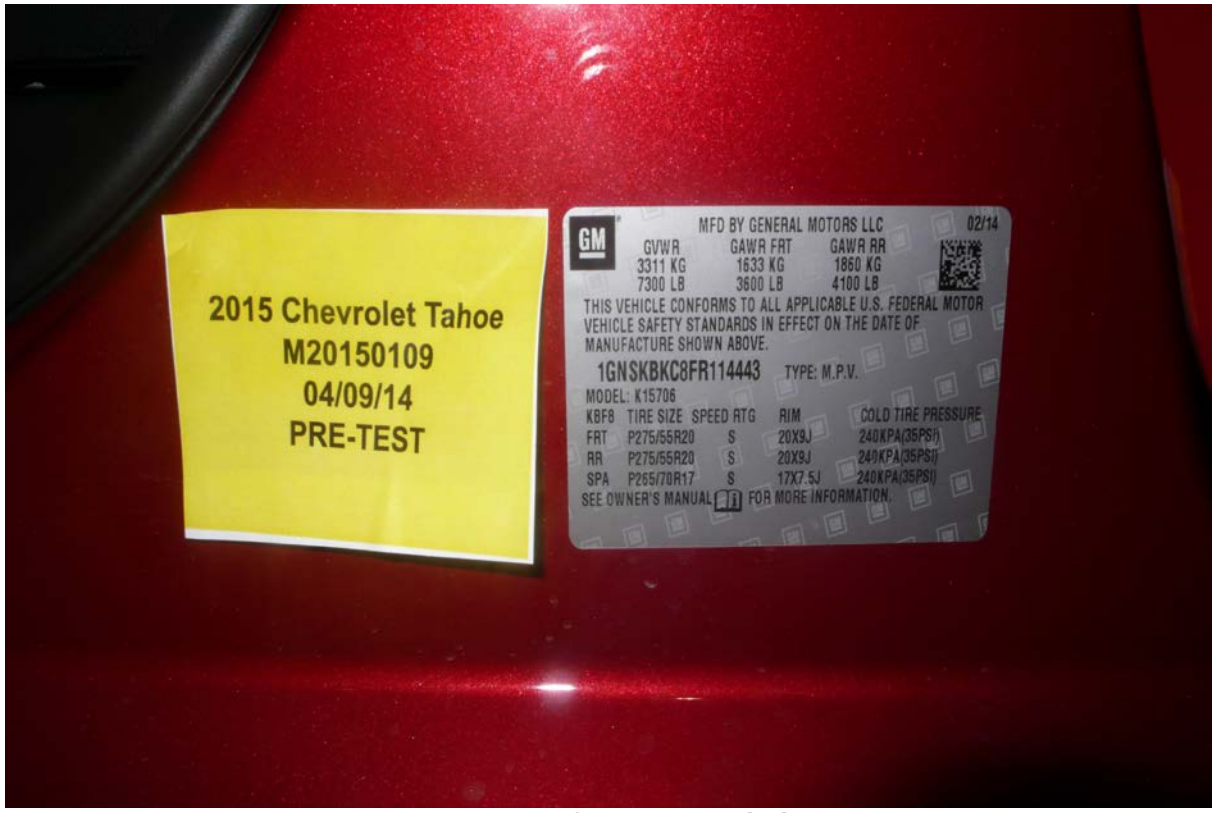
TABLE OF PHOTOGRAPHS (CONTINUED)



001 Load Cell Location



002 Load Cell Wall



003 Manufacturer's Label

004 Tire Placard

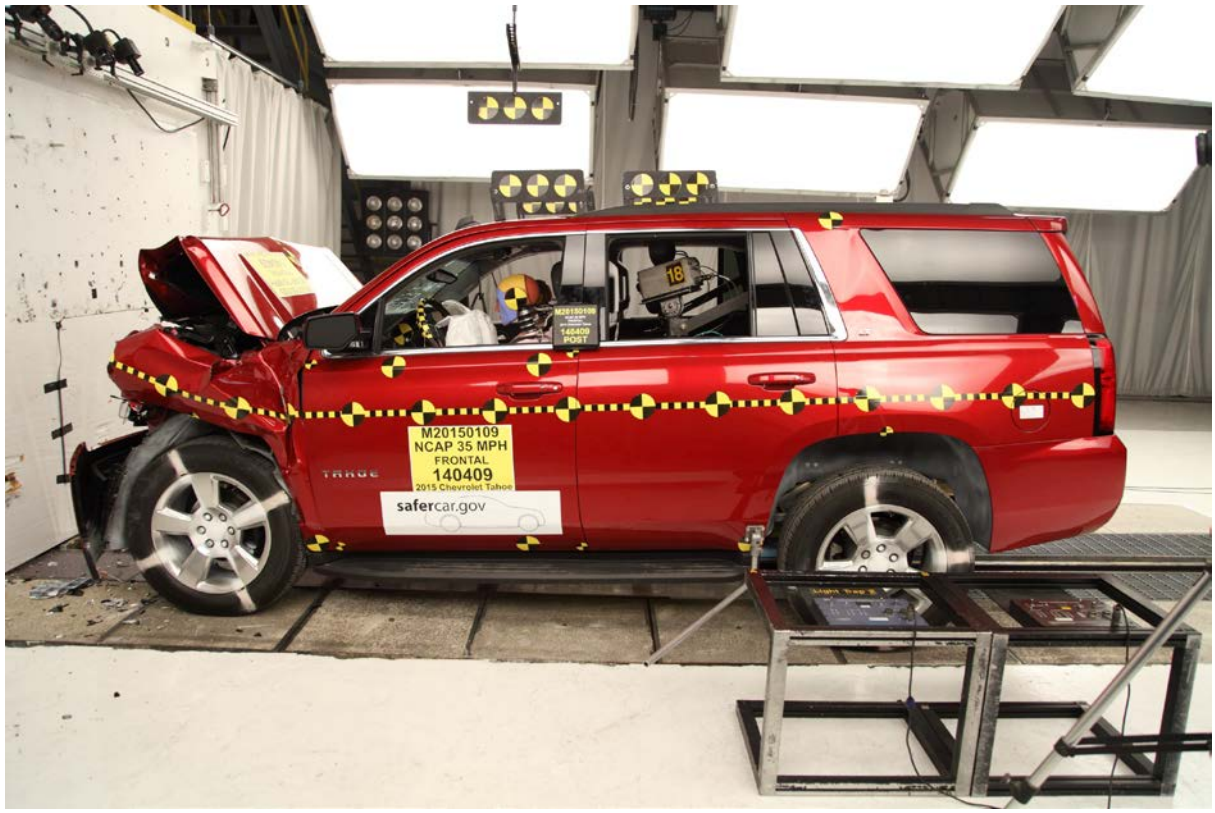
005 2015 Chevrolet Tahoe 4-Door SUV Frontal As Delivered

006 Left Rear 3-4 View, as Received

007 Pre-Test Front View of Test Vehicle

008 Post-Test Front View of Test Vehicle

009 Pre-Test Left View of Test Vehicle



010 Post-Test Left View of Test Vehicle

011 Pre-Test Right View of Test Vehicle

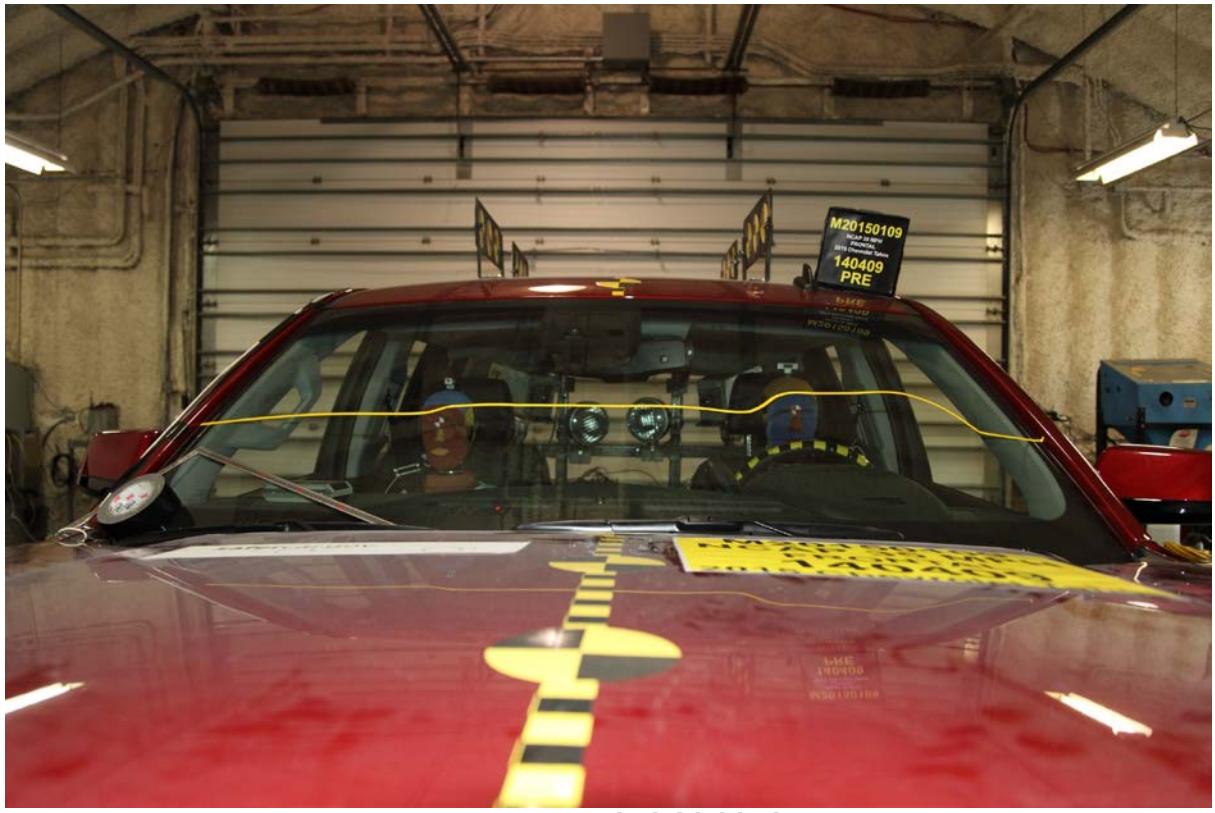
012 Post-Test Right View of Test Vehicle

013 Pre-Test Right Front 3-4 View

014 Post-Test Right Front 3-4 View

015 Pre-Test Left Rear 3-4 View

016 Post-Test Left Rear 3-4 View



017 Pre-Test Windshield View

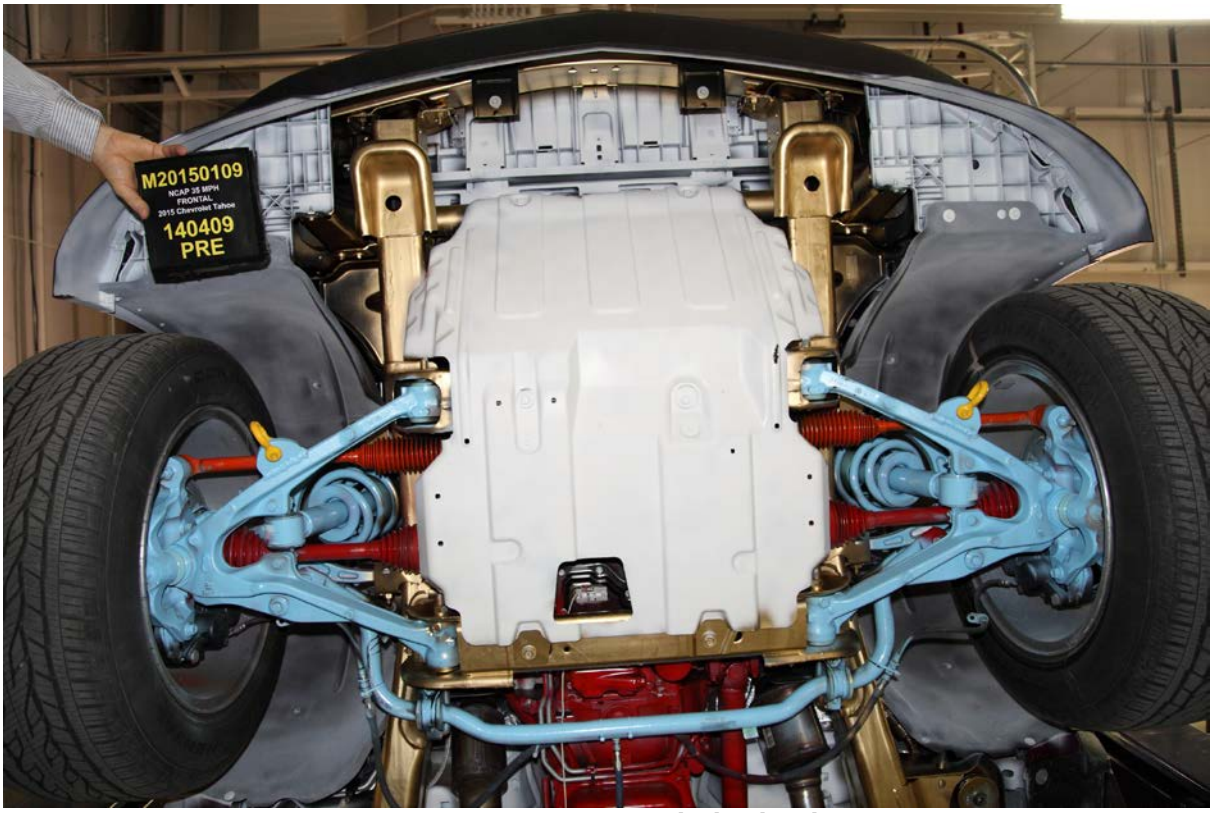
018 Post-Test Windshield View

019 Pre-Test Engine Compartment View

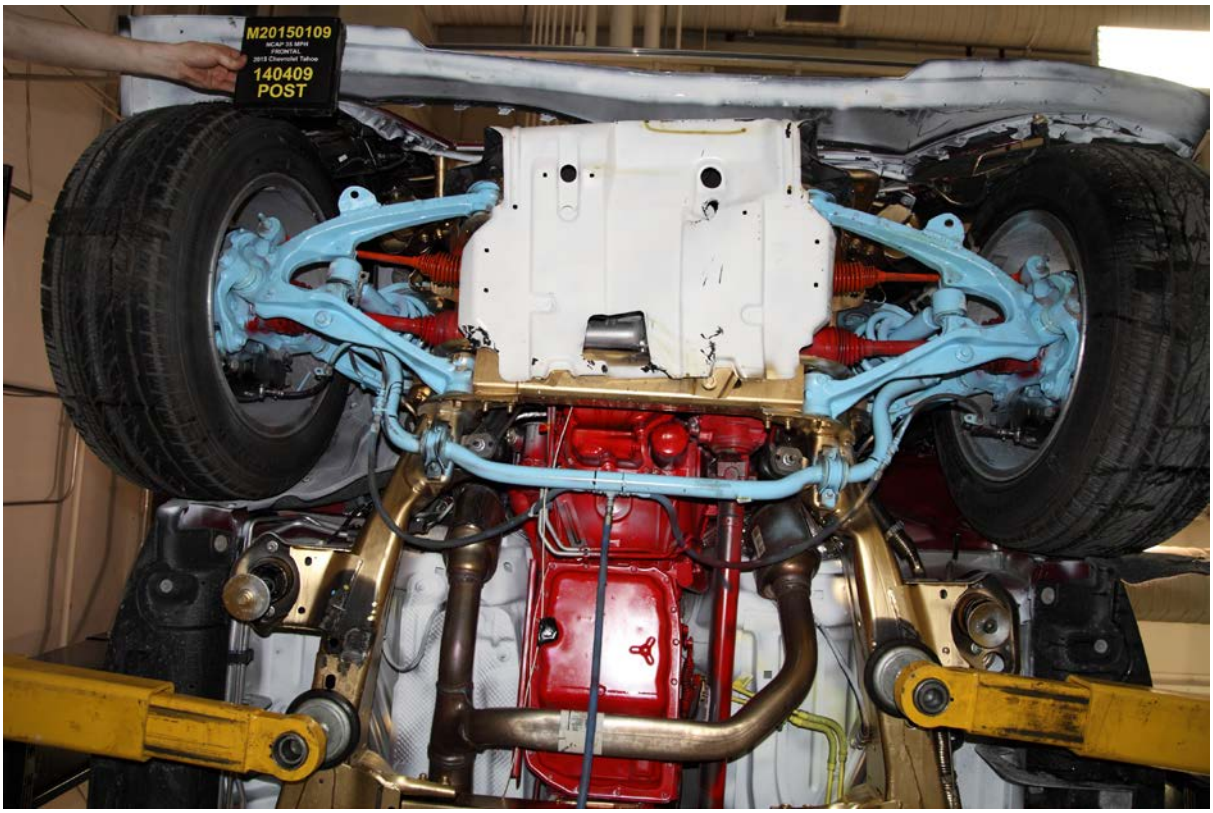
020 Post-Test Engine Compartment View

021 Pre-Test Fuel Filler Cap View

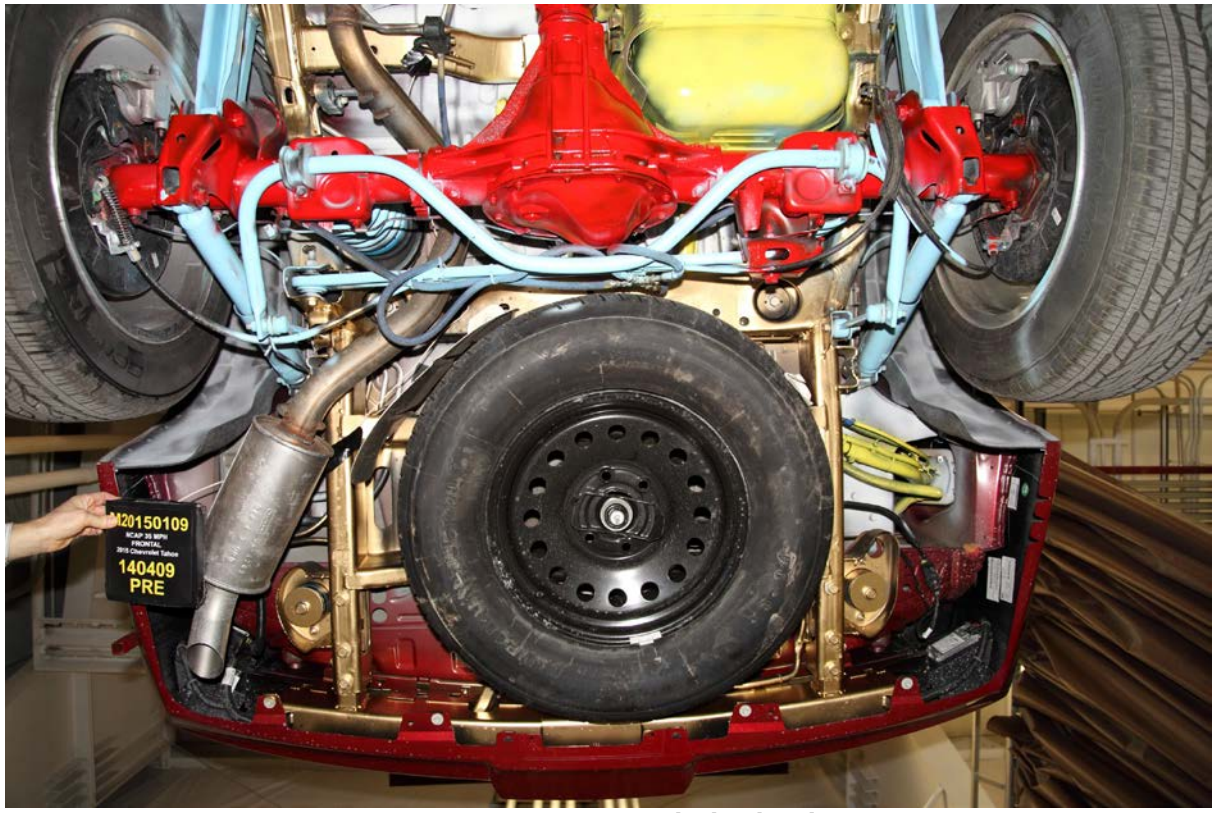
022 Post-Test Fuel Filler Cap View



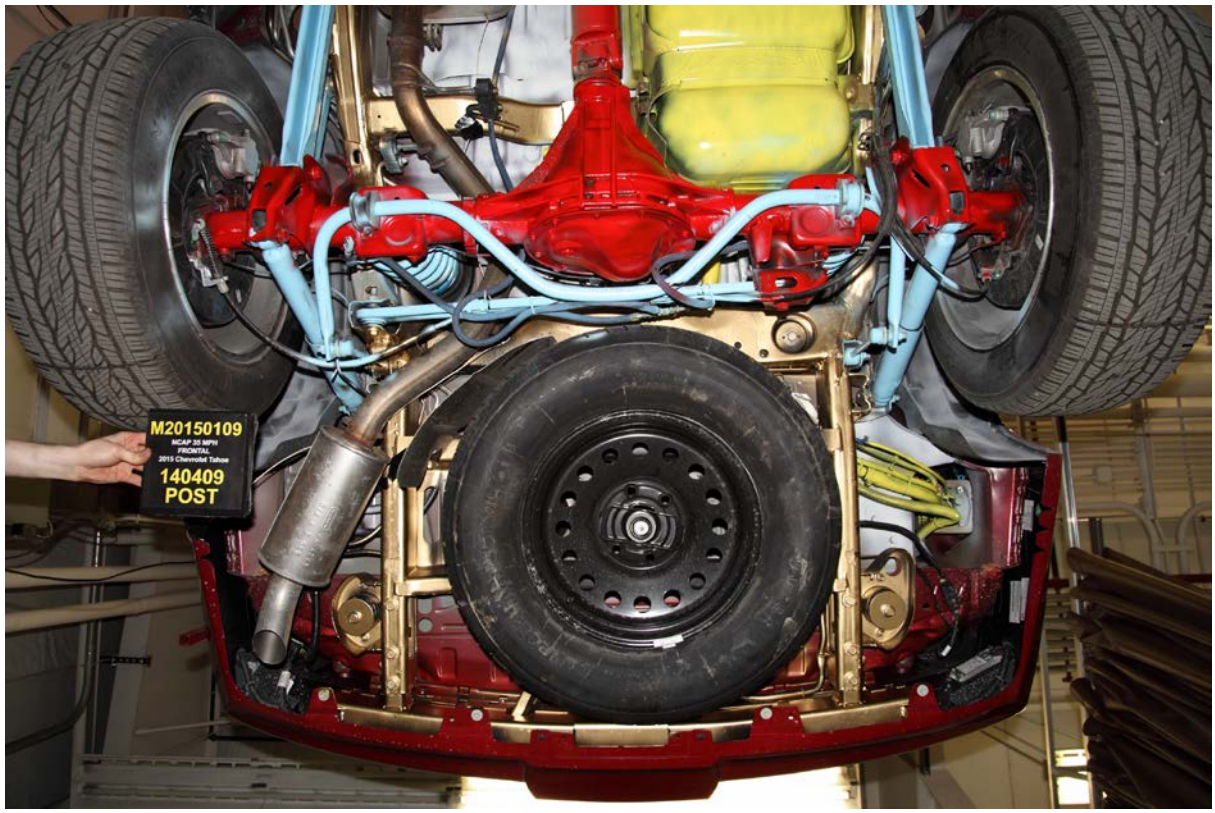
023 Pre-Test Front Underbody View



024 Post-Test Front Underbody View

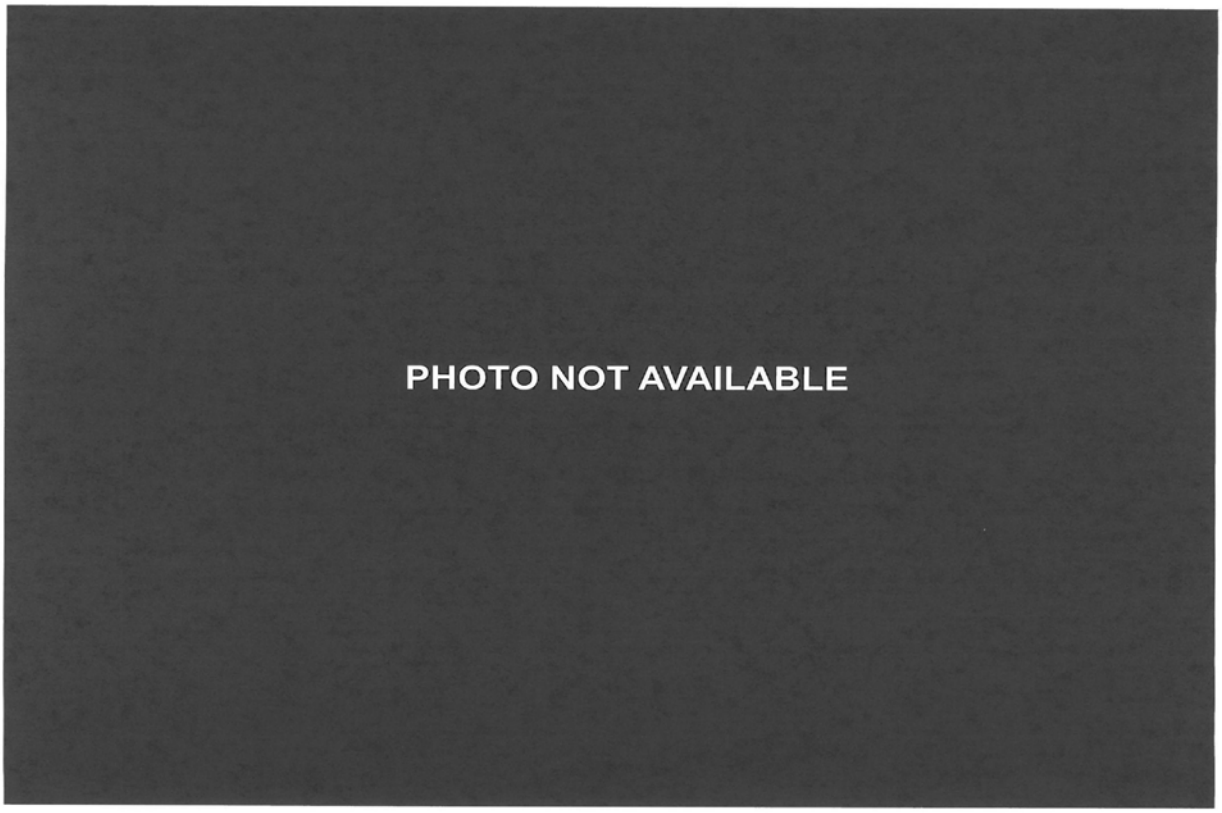


025 Pre-Test Rear Underbody View

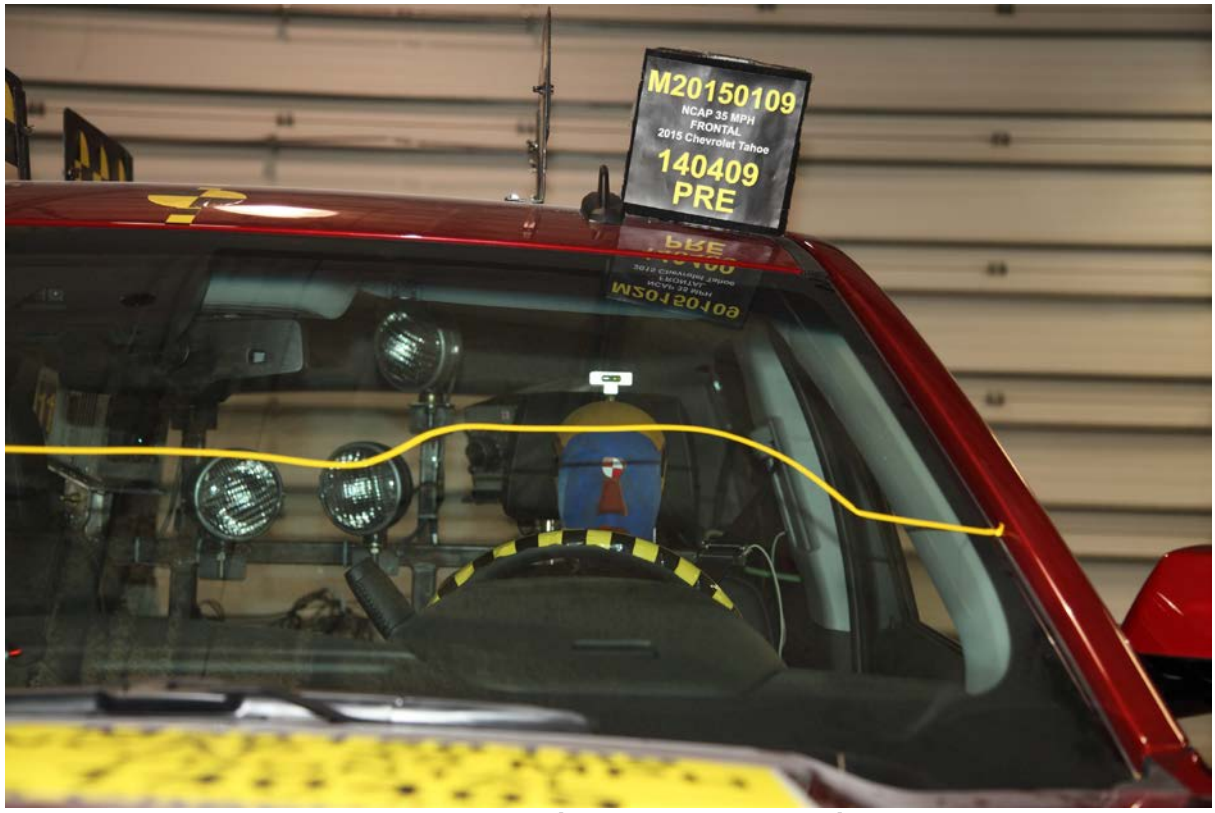


026 Post-Test Rear Underbody View

027 Pre-Test Dummy Cable Routing



028 Post-Test Dummy Cable Routing



029 Pre-Test Driver Dummy Front View

030 Post-Test Driver Dummy Front View

031 Pre-Test Driver Dummy Window View

032 Post-Test Driver Dummy Window View

033 Pre-Test Driver Dummy and Vehicle Interior View

034 Post-Test Driver Dummy and Vehicle Interior View

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

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

037 Pre-Test View of Belt Anchorage for Driver Dummy

038 Post-Test View of Belt Anchorage for Driver Dummy

039 Pre-Test Driver Dummy Feet

040 Post-Test Driver Dummy Feet

041 Pre-Test Driver's Side Knee Bolster

042 Post-Test Driver's Side Knee Bolster

043 Pre-Test Driver's Side Floorpan

044 Post-Test Driver's Side Floorpan

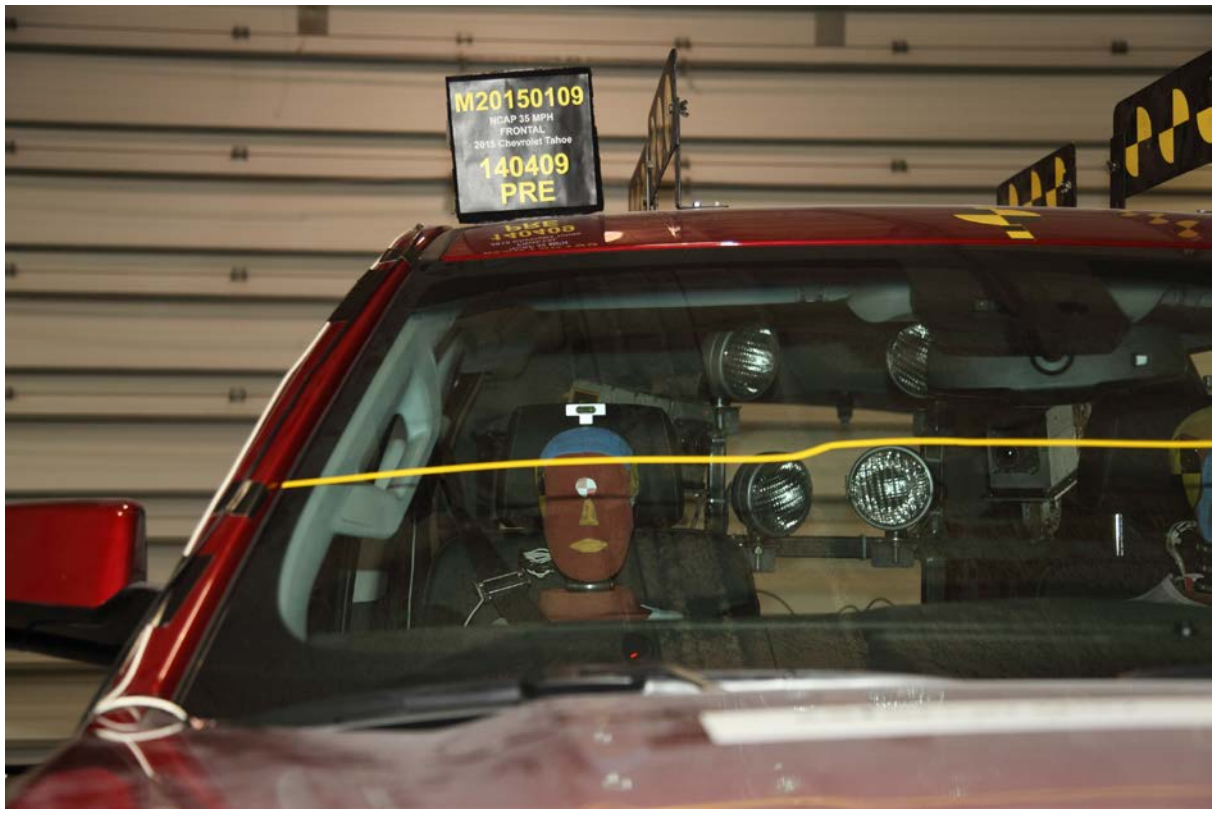
045 Post-Test Driver Dummy Face

046 Post-Test Driver Dummy Contact With Airbag

047 Post-Test Driver Dummy Contact With Headrest

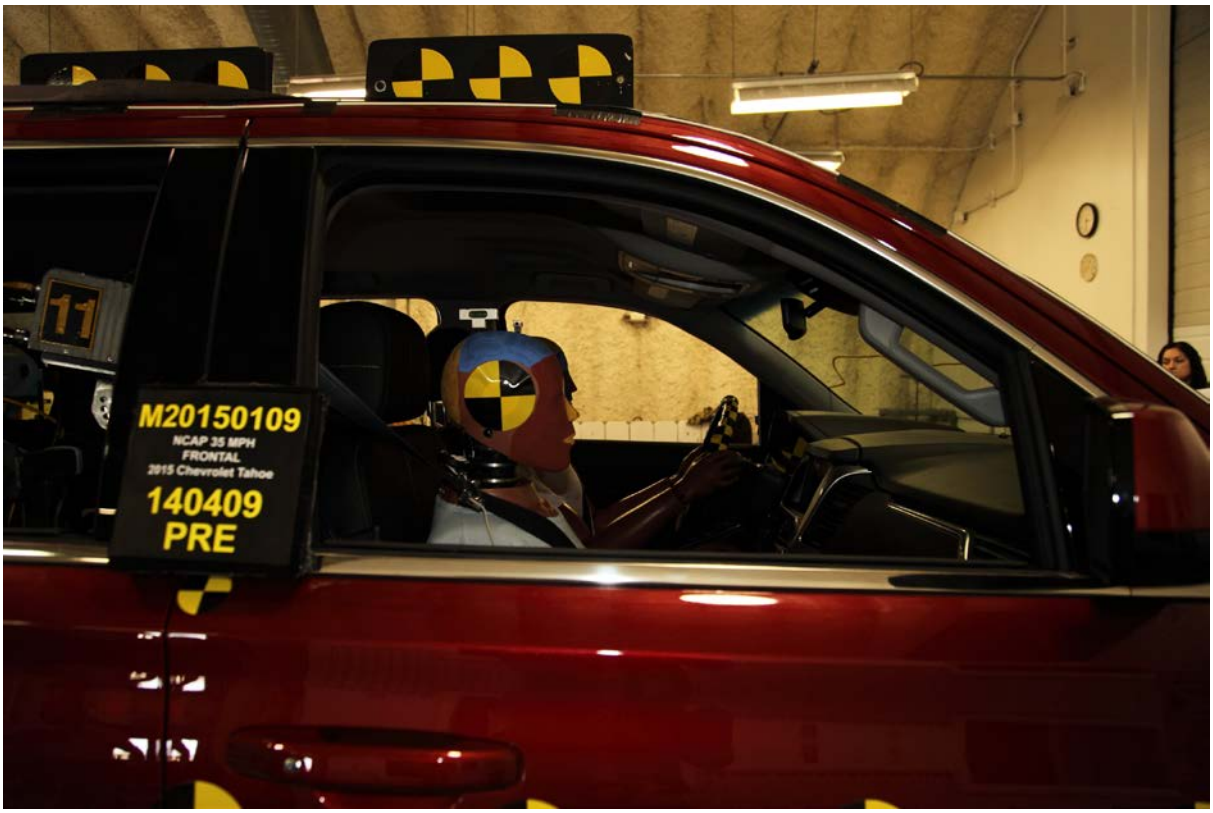
048 Pre-Test View of the Steering Wheel

049 Post-Test View of the Steering Wheel



050 Pre-Test Passenger Dummy Front View

051 Post-Test Passenger Dummy Front View



052 Pre-Test Passenger Dummy Window View

053 Post-Test Passenger Dummy Window View

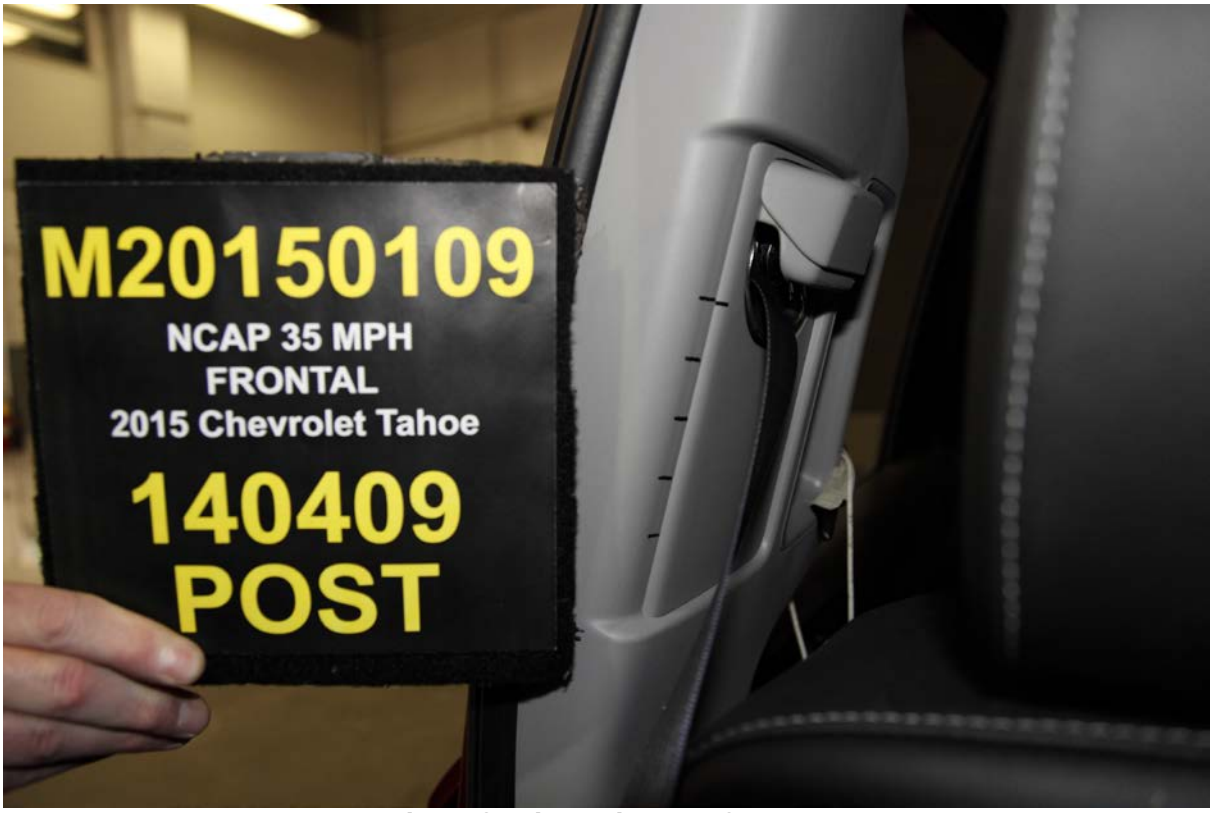
054 Pre-Test Passenger Dummy and Vehicle Interior View

055 Post-Test Passenger Dummy and Vehicle Interior View

056 Pre-Test Passenger's Seat Fore-Aft Markings

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

058 Pre-Test View of Belt Anchorage for Passenger Dummy



059 Post-Test View of Belt Anchorage for Passenger Dummy

060 Pre-Test Passenger Dummy Feet

061 Post-Test Passenger Dummy Feet

062 Pre-Test Passenger's Side Knee Bolster

063 Post-Test Passenger's Side Knee Bolster

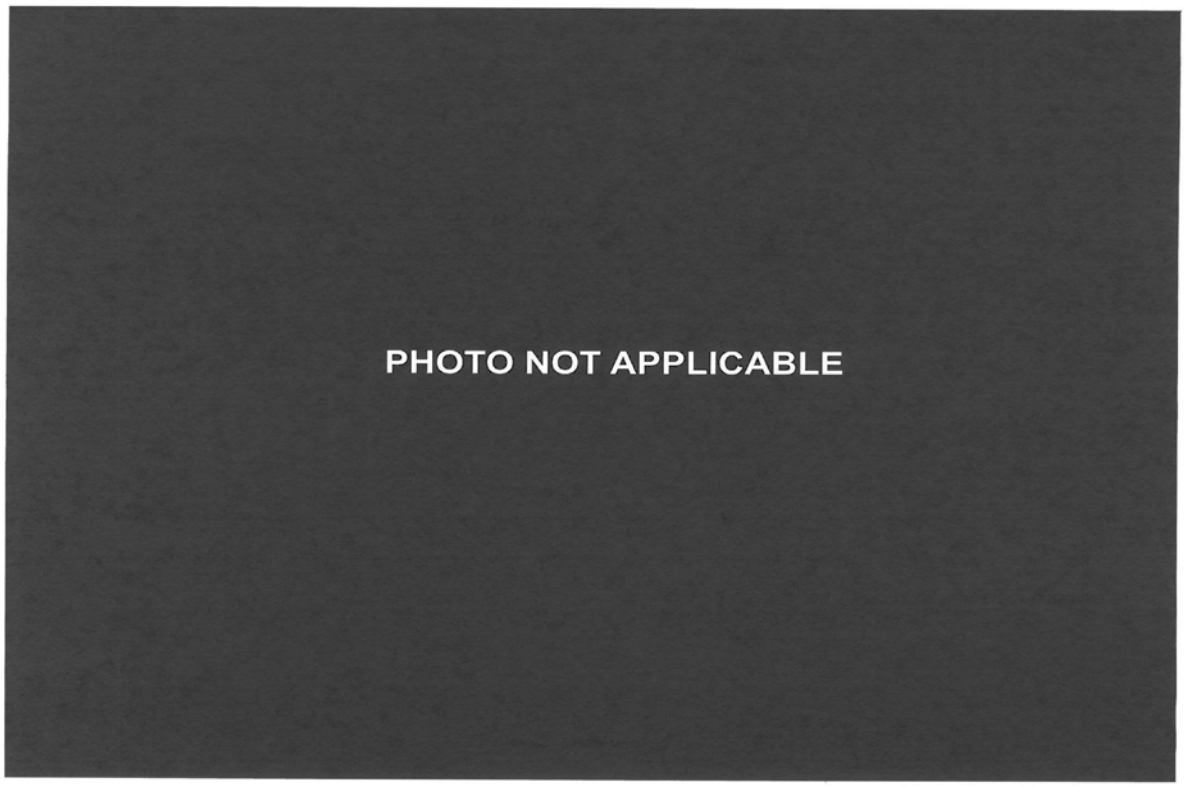
064 Pre-Test Passenger's Side Floorpan

065 Post-Test Passenger's Side Floorpan

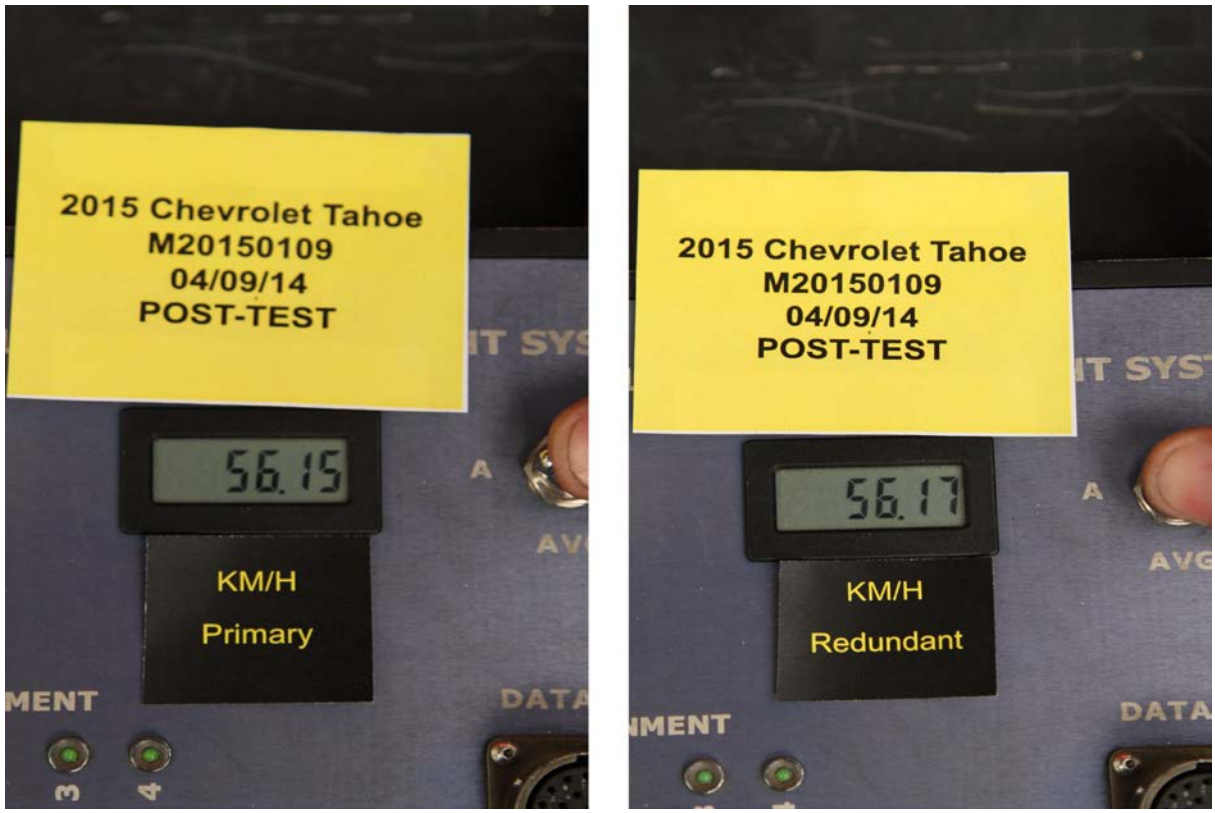
066 Post Test Passenger Dummy Contact With Headrest

066a Post-Test Passenger Dummy Contact With Airbag

067 Photograph of Ballast Installed in Vehicle

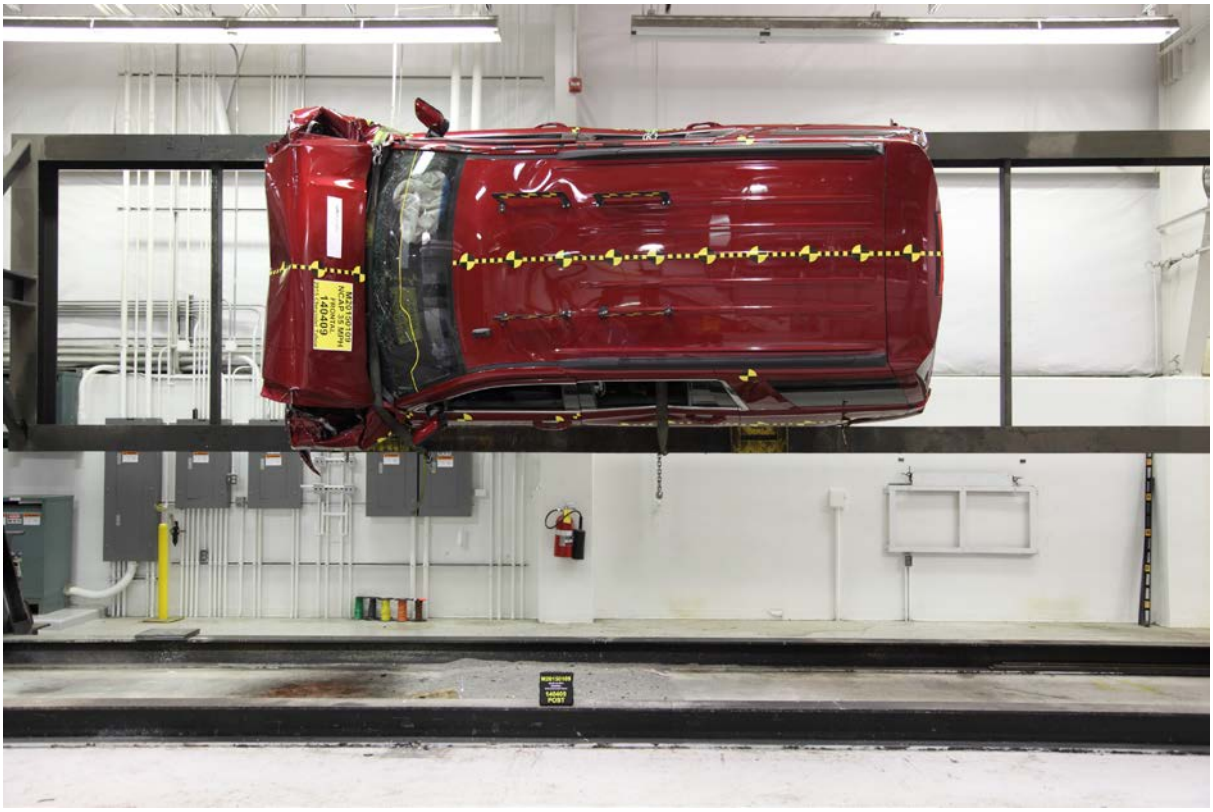


068 Post-Test Stoddard Solvent Spillage Location View, if required

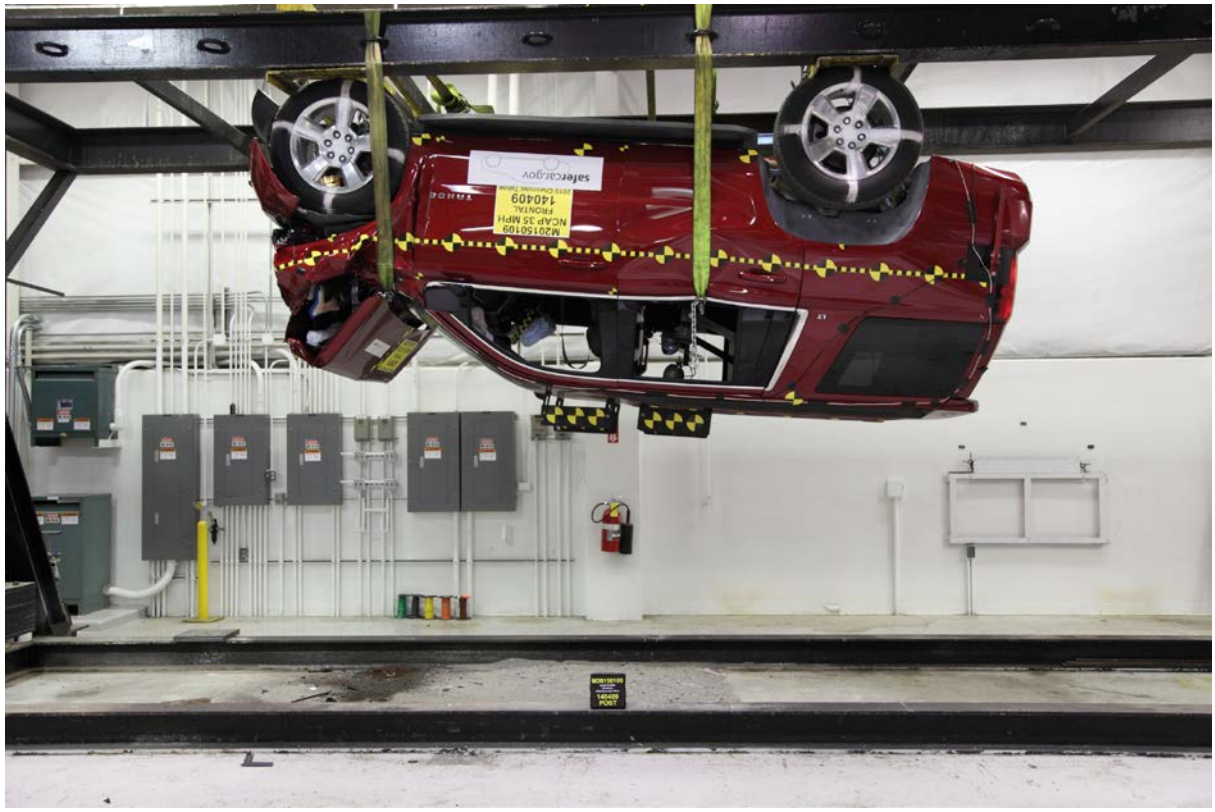


069 Post-Test Speed Trap Read-out

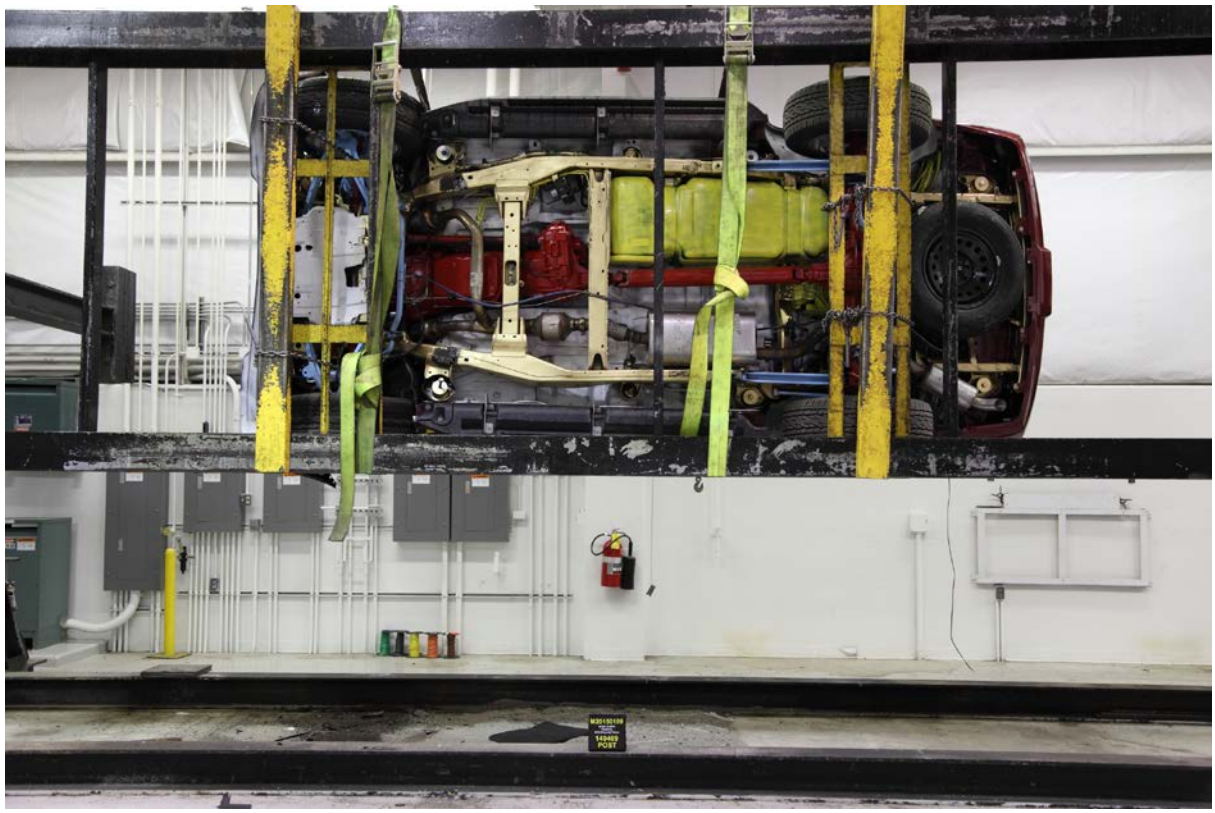
070 Vehicle at 0º on Static Rollover Device



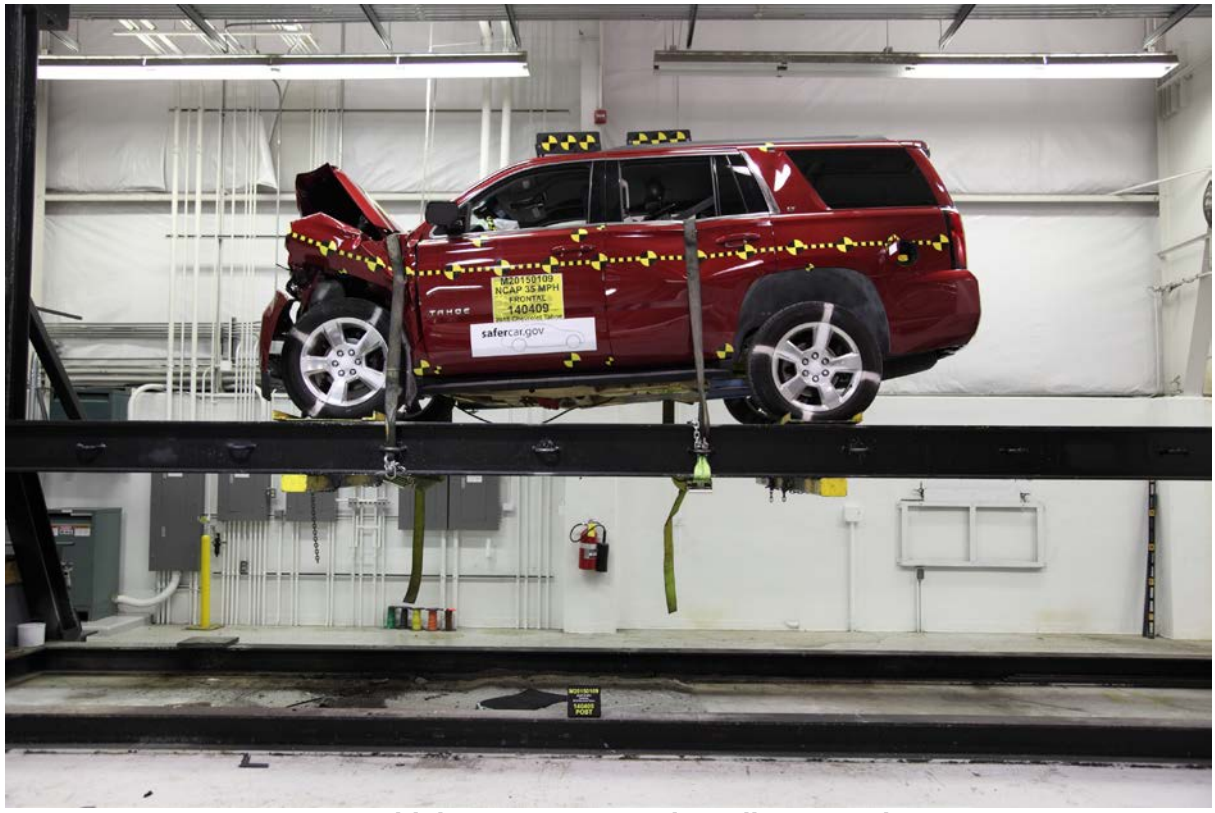
071 Vehicle at 90º on Static Rollover Device



072 Vehicle at 180º on Static Rollover Device

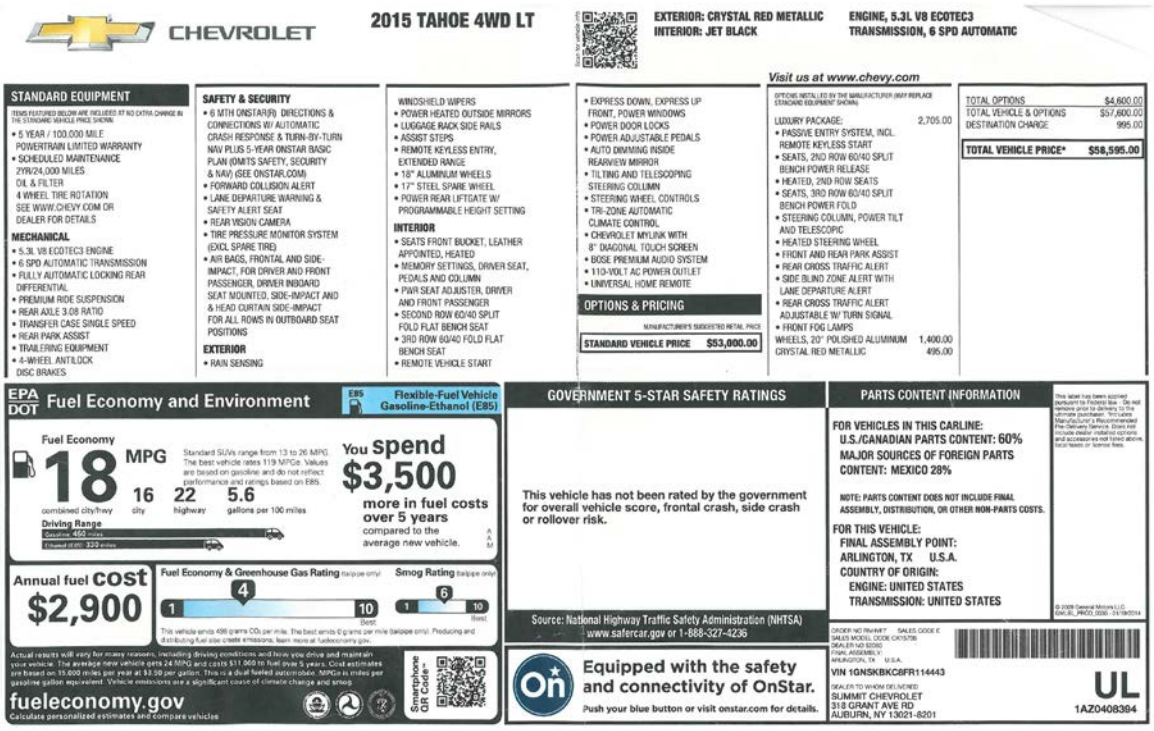


073 Vehicle at 270º on Static Rollover Device



074 Vehicle at 360º on Static Rollover Device

075 2014 Jeep Cherokee MPV Frontal Impact Event



076 Monroney Label Photograph

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

The following additional dummy and vehicle response data can be found in the R & D section of the NHTSA website at: www.nhtsa.dot.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 Acceleration
Driver Pelvis Y Acceleration
Driver Pelvis Z Acceleration
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
Passenger Head Acceleration X Redundant
Passenger Head Acceleration Y Redundant
Passenger Head Acceleration Z Redundant
Passenger Upper Neck Force Y
Passenger Upper Neck Moment X
Passenger Upper Neck Moment Z
Passenger Chest X Acceleration Redundant
Passenger Chest Y Acceleration Redundant
Passenger Chest Z Acceleration Redundant
Passenger Pelvis X
Passenger Pelvis Y
Passenger Pelvis Z
Passenger Left 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
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
BARRIER LOAD A1
BARRIER LOAD A2
BARRIER LOAD A3
BARRIER LOAD A4
BARRIER LOAD A5
BARRIER LOAD A6
BARRIER LOAD A7
BARRIER LOAD A8
BARRIER LOAD A9
BARRIER LOAD B1
BARRIER LOAD B2
BARRIER LOAD B3
BARRIER LOAD B4
BARRIER LOAD B5

BARRIER LOAD B6
BARRIER LOAD B7
BARRIER LOAD B8
BARRIER LOAD B9
BARRIER LOAD C1
BARRIER LOAD C2
BARRIER LOAD C3
BARRIER LOAD C4
BARRIER LOAD C5
BARRIER LOAD C6
BARRIER LOAD C7
BARRIER LOAD C8
BARRIER LOAD C9
BARRIER LOAD D1
BARRIER LOAD D2
BARRIER LOAD D3
BARRIER LOAD D4
BARRIER LOAD D5
BARRIER LOAD D6
BARRIER LOAD D7
BARRIER LOAD D8
BARRIER LOAD D9

NHTSA

Test Date: 04/09/2014

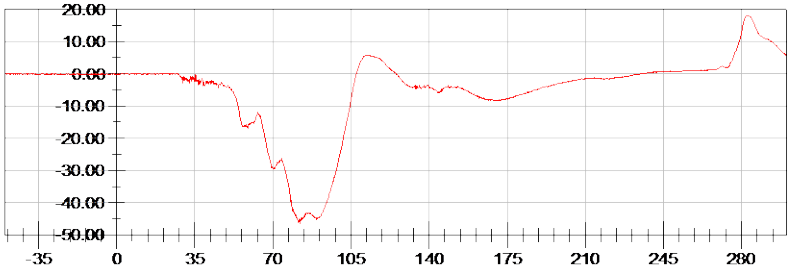
Test Lab: CTF

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

Test Number: 140409 (M20150109)

Position #2 Hybrid III Small Adult Female (426)

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



<Max>

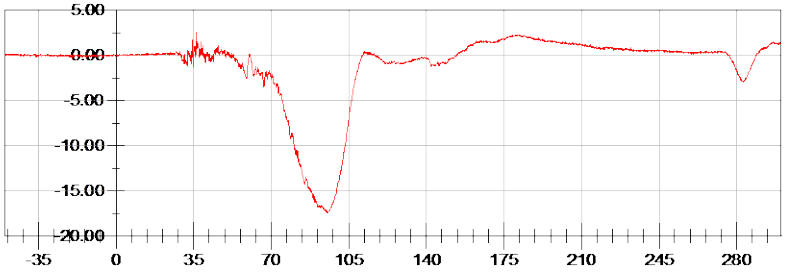
18.02 g at 282.56 ms

<Min>

-46.47 g at 82.24 ms

CFC_1000

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



<Max>

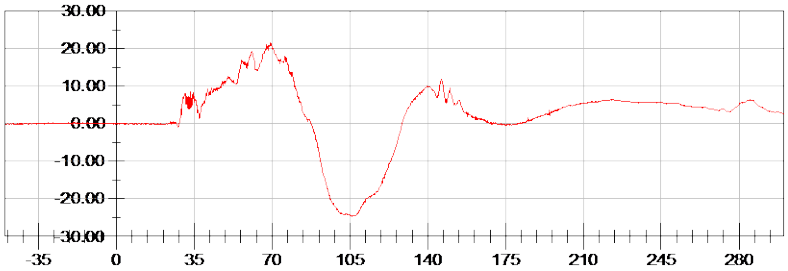
2.56 g at 36.24 ms

<Min>

-17.50 g at 95.52 ms

CFC_1000

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



<Max>

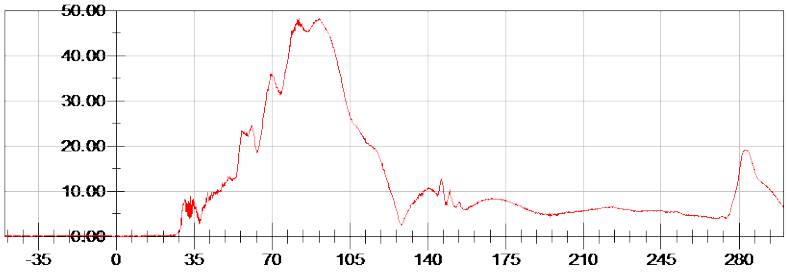
21.51 g at 69.36 ms

<Min>

-24.78 g at 105.84 ms

CFC_1000

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



<Max>

48.33 g at 82.24 ms

<Min>

0.03 g at -47.84 ms

CFC_1000

NHTSA

Test Date: 04/09/2014

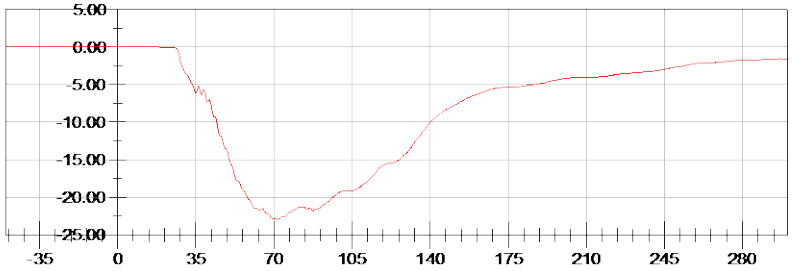
Test Lab: CTF

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

Test Number: 140409 (M20150109)

Position #2 Hybrid III Small Adult Female (426)

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



<Max>

0.01 mm at -19.76 ms

<Min>

-22.93 mm at 71.84 ms

CFC_600

NHTSA

Test Date: 04/09/2014

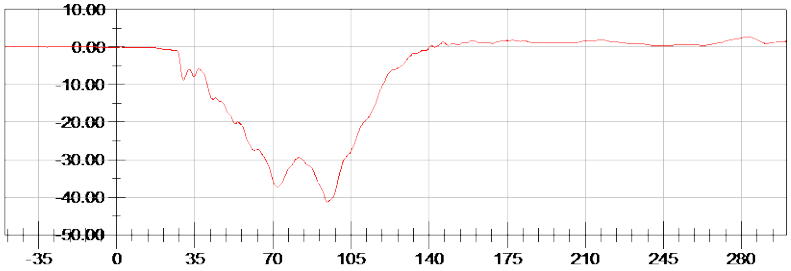
Test Lab: CTF

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

Test Number: 140409 (M20150109)

Position #2 Hybrid III Small Adult Female (426)

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



<Max>

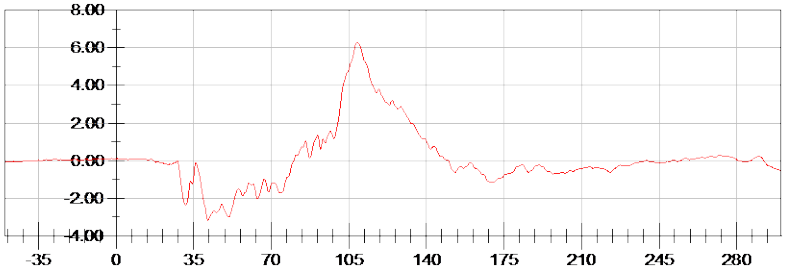
2.67 g at 283.20 ms

<Min>

-41.26 g at 94.32 ms

CFC_180

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



<Max>

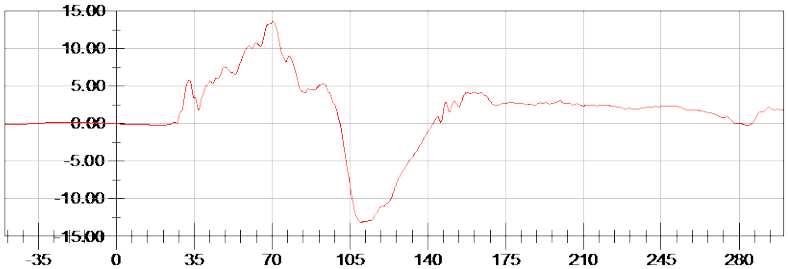
6.28 g at 108.72 ms

<Min>

-3.19 g at 41.52 ms

CFC_180

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



<Max>

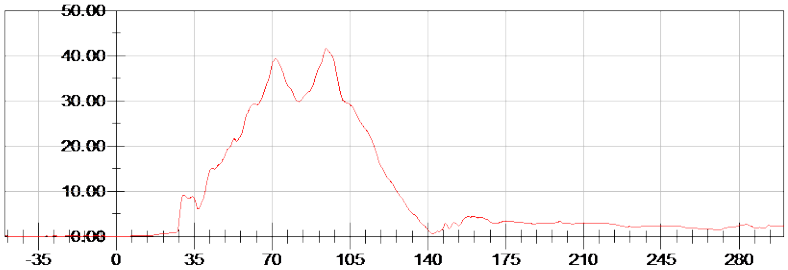
13.55 g at 70.32 ms

<Min>

-13.12 g at 110.16 ms

CFC_180

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



<Max>

41.57 g at 94.24 ms

<Min>

0.02 g at -37.28 ms

CFC_180

NHTSA

Test Date: 04/09/2014

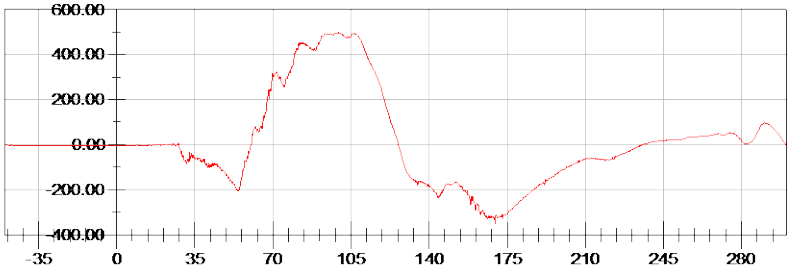
Test Lab: CTF

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

Test Number: 140409 (M20150109)

Position #2 Hybrid III Small Adult Female (426)

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



<Max>

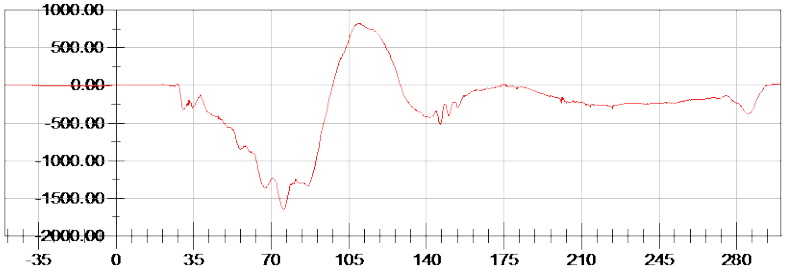
497.14 N at 98.40 ms

<Min>

-346.94 N at 169.60 ms

CFC_1000

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



<Max>

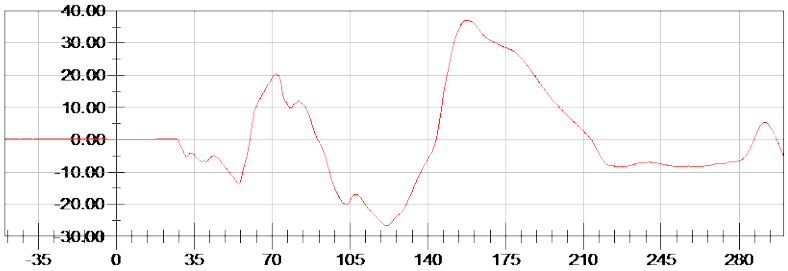
822.38 N at 109.04 ms

<Min>

-1,652.58 N at 75.36 ms

CFC_1000

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



<Max>

37.13 Nm at 157.44 ms

<Min>

-26.60 Nm at 121.28 ms

CFC_600

2015 Chevrolet Tahoe NCAP 35mph Frontal Impact into Rigid Barrier

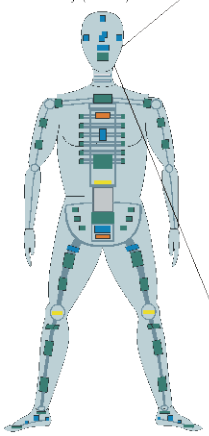
Date: 04/09/2014
Time: 17:37

Neck Injury Predictor (NIJ)

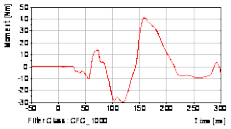
Customer: NHTSA
Test Number: M20150109

TRC Inc. Test Lab: CTF
Test Number: 140409

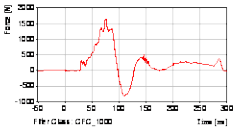
Test Orientation = Frontal
Fzc(Tension) = 6806
Fzc(Compression) = 6160
Myc(Extension) = 135
Myc(Flexion) = 310



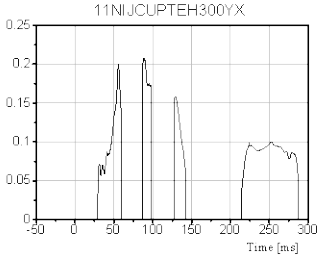
11TMONUP00H3MOYX



11NECKUP00H3FOZA

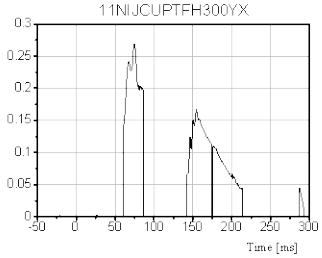


11NIJCUPTEH300YX



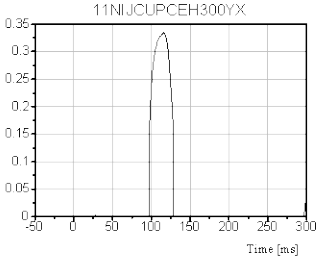
Max [NTE] 0.2078 at 88.56 ms

11NIJCUPTFH300YX



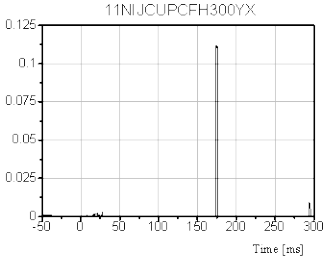
Max [NTF] 0.2697 at 74.56 ms

11NIJCUPCEH300YX



Max [NCE] 0.3342 at 115.76 ms

11NIJCUPCFH300YX



Max [NCF] 0.1123 at 174.16 ms

Dummy:HIII 50th Male
Seating Position:
Driver

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

NHTSA

Test Date: 04/09/2014

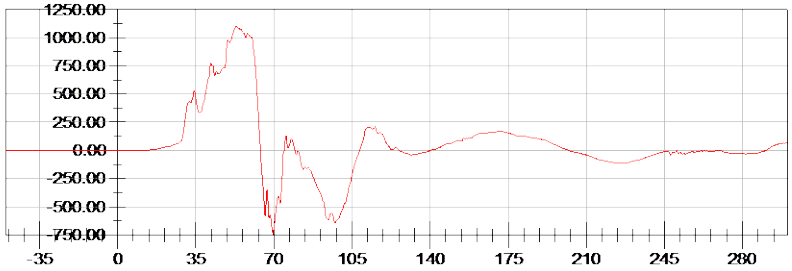
Test Lab: CTF

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

Test Number: 140409 (M20150109)

Position #2 Hybrid III Small Adult Female (426)

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



<Max>

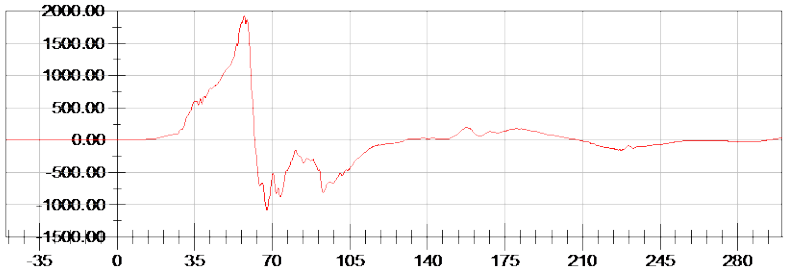
1,097.69 N at 52.96 ms

<Min>

-741.42 N at 69.60 ms

CFC_600

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



<Max>

1,922.36 N at 57.44 ms

<Min>

-1,086.98 N at 67.68 ms

CFC_600

NHTSA

Test Date: 04/09/2014

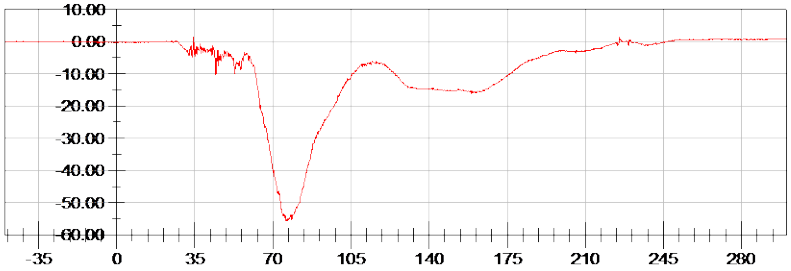
Test Lab: CTF

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

Test Number: 140409 (M20150109)

Position #2 Hybrid III Small Adult Female (426)

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



<Max>

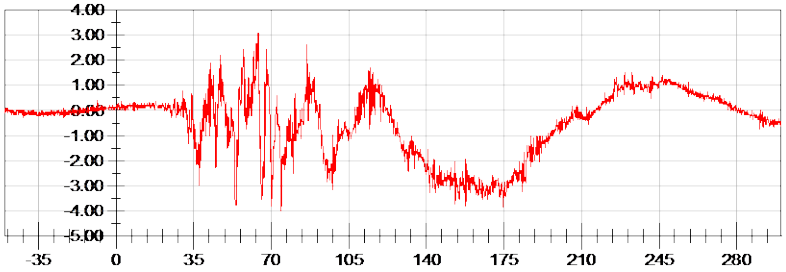
1.49 g at 225.36 ms

<Min>

-55.75 g at 76.32 ms

CFC_1000

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



<Max>

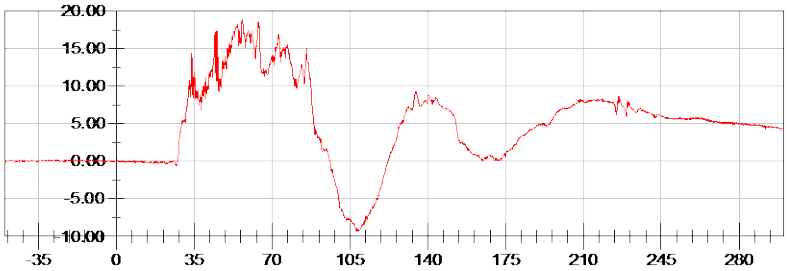
3.08 g at 64.08 ms

<Min>

-4.01 g at 74.48 ms

CFC_1000

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



<Max>

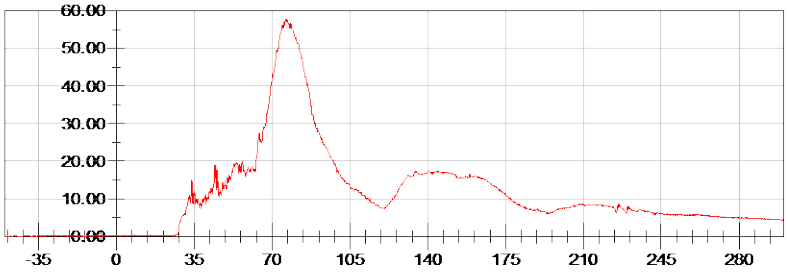
18.93 g at 56.48 ms

<Min>

-9.33 g at 107.92 ms

CFC_1000

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



<Max>

57.80 g at 76.32 ms

<Min>

0.02 g at -48.56 ms

CFC_1000

NHTSA

Test Date: 04/09/2014

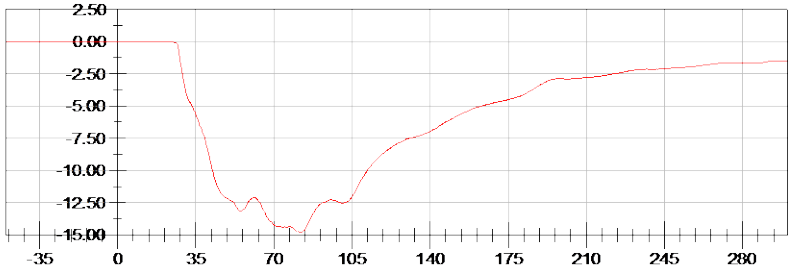
Test Lab: CTF

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

Test Number: 140409 (M20150109)

Position #2 Hybrid III Small Adult Female (426)

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



<Max>

0.00 mm at 0.80 ms

<Min>

-14.80 mm at 81.60 ms

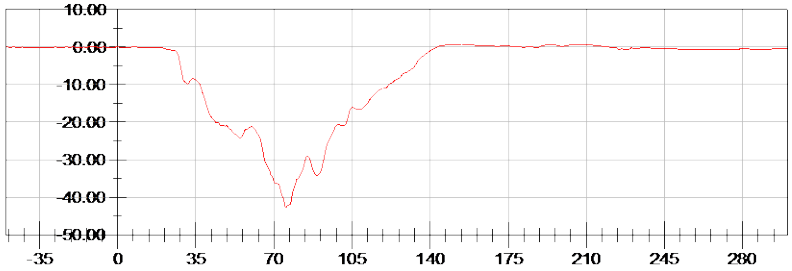
CFC_600

NHTSA

Test Lab: CTF
Test Number: 140409 (M20150109)

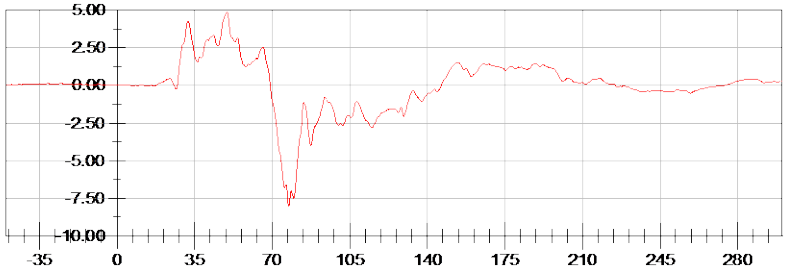
Test Date: 04/09/2014
Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)
Position #2 Hybrid III Small Adult Female (426)

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



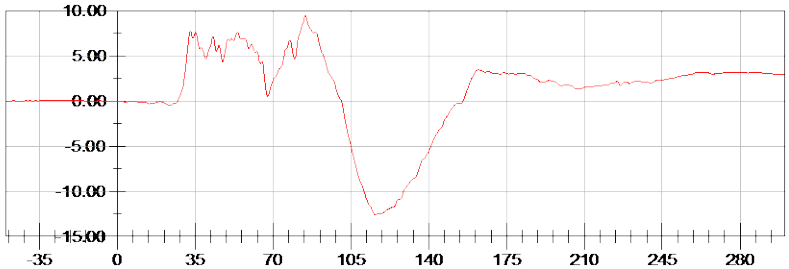
<Max>
0.69 g at 192.64 ms
<Min>
-42.55 g at 75.52 ms
CFC_180

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



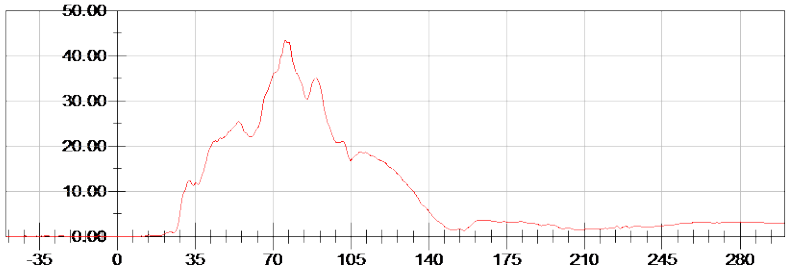
<Max>
4.87 g at 49.68 ms
<Min>
-8.03 g at 77.52 ms
CFC_180

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



<Max>
9.54 g at 84.56 ms
<Min>
-12.61 g at 116.24 ms
CFC_180

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



<Max>
43.46 g at 75.52 ms
<Min>
0.04 g at -11.92 ms
CFC_180

NHTSA

Test Date: 04/09/2014

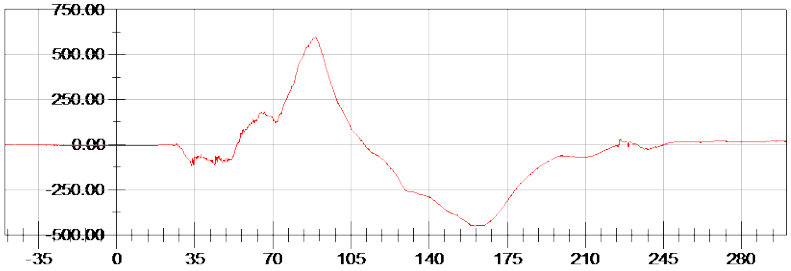
Test Lab: CTF

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

Test Number: 140409 (M20150109)

Position #2 Hybrid III Small Adult Female (426)

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



<Max>

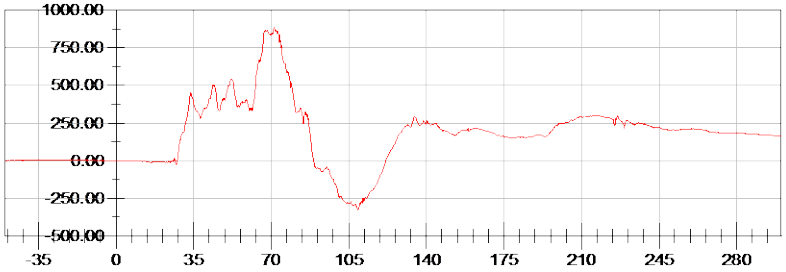
595.96 N at 88.96 ms

<Min>

-450.10 N at 160.64 ms

CFC_1000

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



<Max>

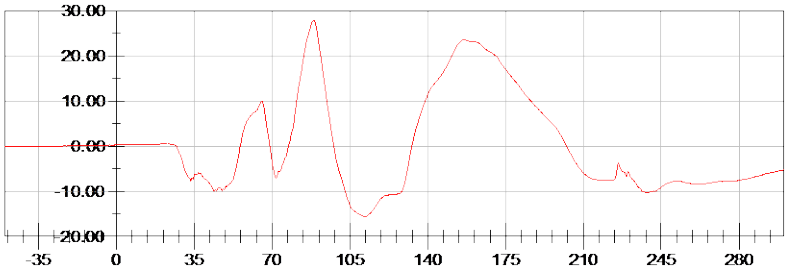
885.96 N at 71.28 ms

<Min>

-330.53 N at 109.12 ms

CFC_1000

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



<Max>

27.84 Nm at 88.64 ms

<Min>

-15.62 Nm at 111.12 ms

CFC_600

2015 Chevrolet Tahoe NCAP 35mph Frontal Impact into Rigid Barrier

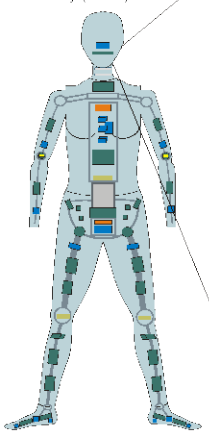
Date: 04/09/2014
Time: 17:37

Neck Injury Predictor (NIJ)

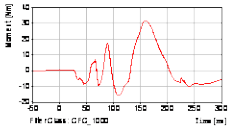
Customer: NHTSA
Test Number: M20150109

TRC Inc. Test Lab: CTF
Test Number: 140409

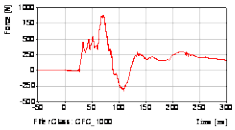
Test Orientation = Frontal
Fzc(Tension) = 4287
Fzc(Compression) = 3880
Myc(Extension) = 67
Myc(Flexion) = 155



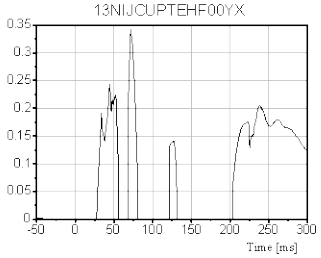
13TMONUP00HFMOYX



13NECKUP00HFFOZA

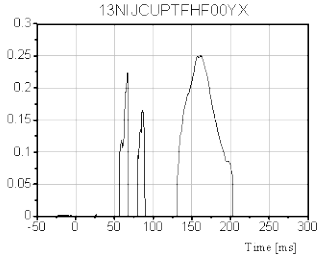


13NIJCUPTEHF00YX



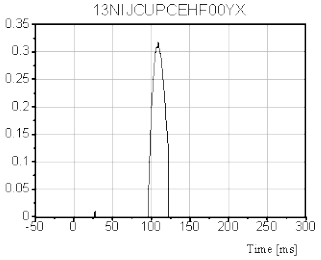
Max [NTE] 0.3416 at 71.68 ms

13NIJCUPTFHF00YX



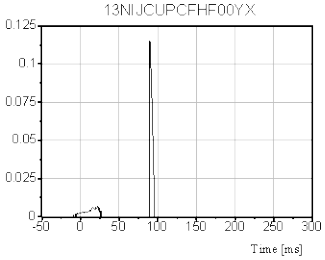
Max [NTF] 0.2514 at 161.68 ms

13NIJCUPCEHF00YX



Max [NCE] 0.3180 at 109.12 ms

13NIJCUPCFHF00YX



Max [NCF] 0.1154 at 89.60 ms

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

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

NHTSA

Test Date: 04/09/2014

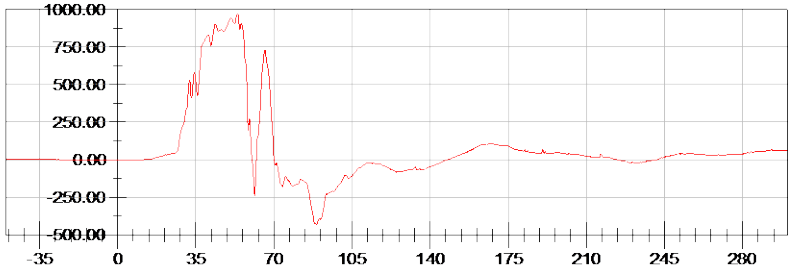
Test Lab: CTF

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

Test Number: 140409 (M20150109)

Position #2 Hybrid III Small Adult Female (426)

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



<Max>

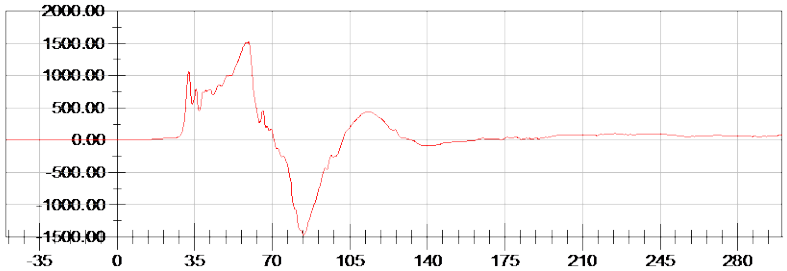
972.09 N at 53.84 ms

<Min>

-432.05 N at 89.04 ms

CFC_600

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



<Max>

1,529.52 N at 59.36 ms

<Min>

-1,483.00 N at 84.16 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. 24

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Total Sitting Height	878.8 - 889.0	885	Yes
B	Shoulder Pivot Height	505.5 - 520.7	520	Yes
C	H-Point Height	83.8 - 88.9	85	Yes
D	H-Point From Seatback	134.6 - 139.7	138	Yes
E	Shoulder Pivot From Backline	83.8 - 94.0	92	Yes
F	Thigh Clearance	139.7 - 154.9	151	Yes
G	Back Of Elbow To Wrist Pivot	289.6 - 304.8	294	Yes
H	Skull Cap To Backline	40.6 - 45.7	45	Yes
I	Shoulder-Elbow Length	330.2 - 345.4	340	Yes
J	Elbow Rest Height	190.5 - 210.8	200	Yes
K	Buttock Knee Length	579.1 - 604.5	600	Yes
L	Popliteal Height	429.3 - 454.7	440	Yes
M	Knee Pivot Height	485.1 - 500.4	495	Yes
N	Buttock Popliteal Length	452.1 - 477.5	470	Yes
O	Chest Depth	213.4 - 228.6	225	Yes
P	Foot Length	251.5 - 266.7	264	Yes
V	Shoulder Breadth	421.6 - 436.9	428	Yes
W	Foot Breadth	91.4 - 106.7	97	Yes
Y	Chest Circumference	970.3 - 1000.8	987	Yes
Z	Waist Circumference	835.7 - 866.1	865	Yes
AA	Location For Chest Circumference	429.3 - 434.3	430	Yes
BB	Location For Waist Circumference	226.1 - 231.1	230	Yes

Comments:

Technician

Approved

Revised 8/10/12

Transportation Research Center Inc.

Front Head Drop
HIII 50th Serial No. 037 Certification No. 24-1
Test Date: 4/2/2014

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	20.7 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Peak Head Resultant Acceleration	225 - 275 g	260.5 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	-2.3 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Approved

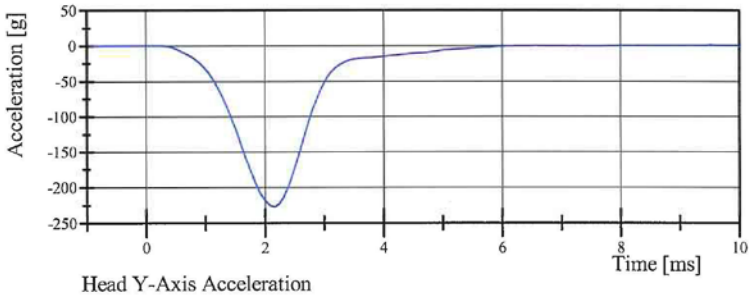
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

04.02.2014 15:15:44 611

Transportation Research Center Inc.

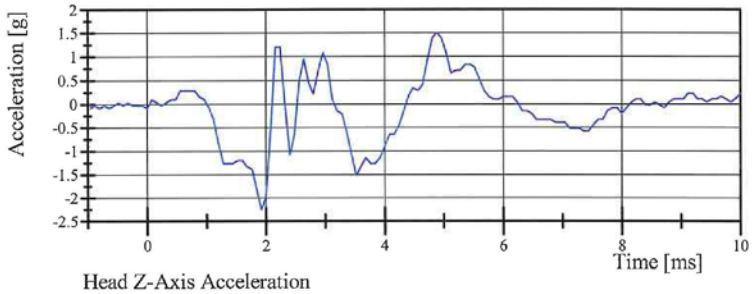
Front Head Drop
HIII 50th Serial No. 037 Certification No. 24-1
Test Date: 4/2/2014

Head X-Axis Acceleration



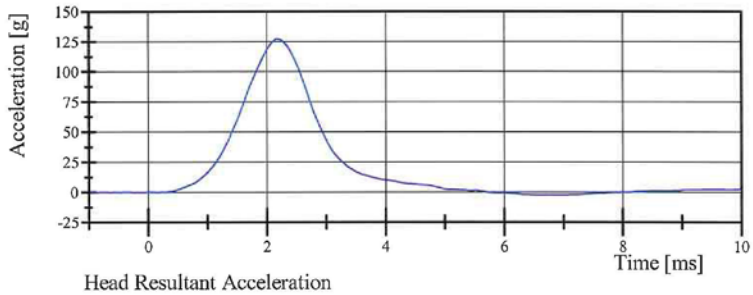
Filter Class: CFC_1000
Max: 0.3 g at 9.5 ms
Min: -227.3 g at 2.2 ms

Head Y-Axis Acceleration



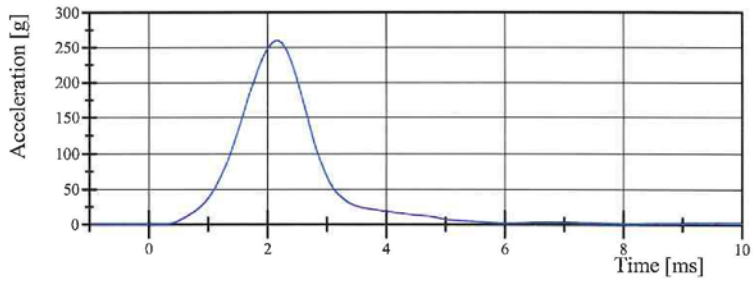
Filter Class: CFC_1000
Max: 1.5 g at 4.9 ms
Min: -2.3 g at 1.9 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 127.3 g at 2.2 ms
Min: -2.7 g at 6.6 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 260.5 g at 2.2 ms
Min: 0.1 g at -0.6 ms

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

04.02.2014 15:15:50 611

Transportation Research Center Inc.

Neck Flexion
HIII 50th Serial No. 037 Certification No. 24-2
Test Date: 4/3/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	6.920 m/s	Yes
Pendulum Acceleration Decay Crossing -5g	34 - 42 ms	38.3 ms	Yes
Pendulum Acceleration at 10ms	(-22.5) - (-27.5) g	-24.47 g	Yes
Pendulum Acceleration at 20ms	(-17.6) - (-22.6) g	-20.30 g	Yes
Pendulum Acceleration at 30ms	(-12.5) - (-18.5) g	-15.83 g	Yes
Pendulum Acceleration > 30ms	>= (-29.0) g	-15.83 g	Yes
Total Head D-Plane Rotation			
Peak	(-64) - (-78) °	-74.7 °	Yes
Time of Peak	57 - 64 ms	59.8 ms	Yes
Total Head D-Plane Rotation Decay to 0°	113 - 128 ms	119.0 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	88 - 108 N·m	102.1 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	99.5 ms	Yes

Test meets specifications.

Comments:

Technician 

Approved 

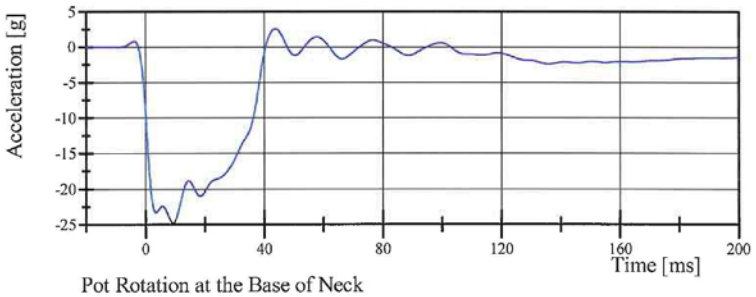
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

04.03.2014 12:57:58 2950

Transportation Research Center Inc.

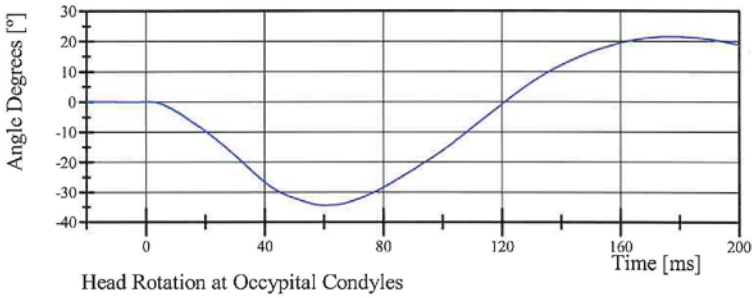
Neck Flexion
HIII 50th Serial No. 037 Certification No. 24-2
Test Date: 4/3/2014

Pendulum Acceleration



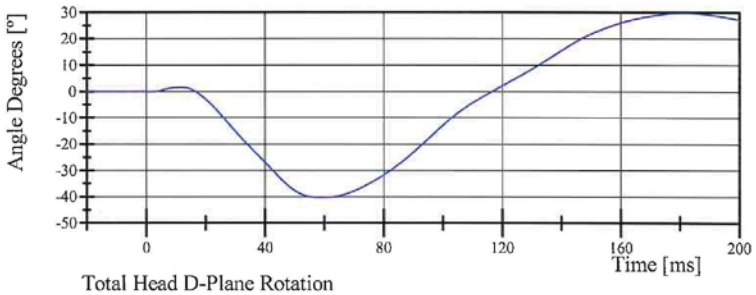
Filter Class: CFC_60
Max: 2.6 g at 43.8 ms
Min: -24.8 g at 9.2 ms

Pot Rotation at the Base of Neck



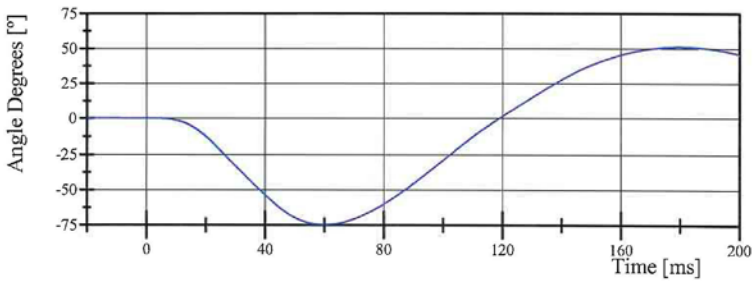
Filter Class: CFC_60
Max: 21.5 ° at 176.8 ms
Min: -34.4 ° at 60.2 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 29.6 ° at 181.3 ms
Min: -40.3 ° at 59.2 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 51.0 ° at 179.4 ms
Min: -74.7 ° at 59.8 ms

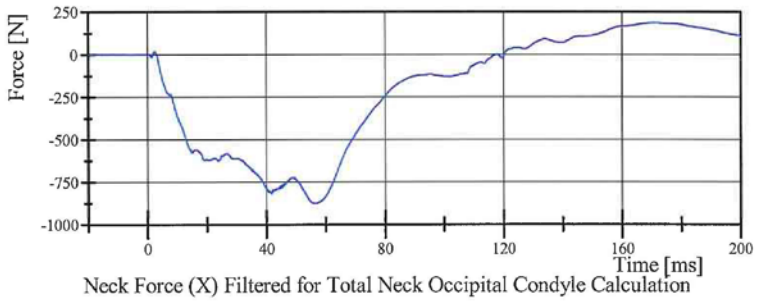
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

04.03.2014 12:58:05 2950

Transportation Research Center Inc.

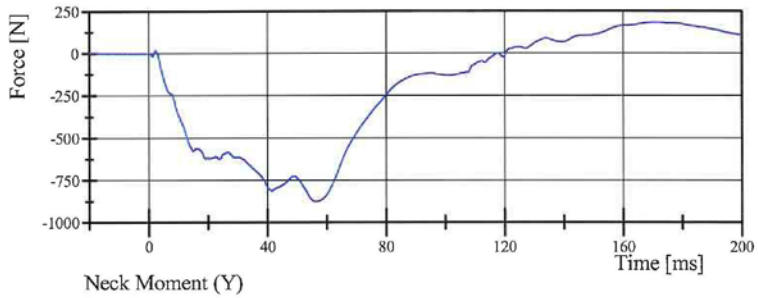
Neck Flexion
HIII 50th Serial No. 037 Certification No. 24-2
Test Date: 4/3/2014

Neck Force (X)



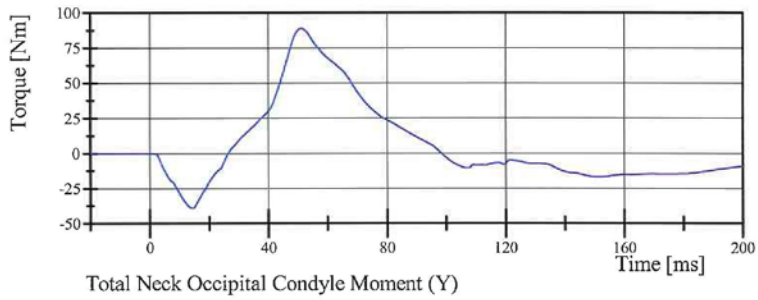
Filter Class: CFC_1000
Max: 182.5 N at 170.6 ms
Min: -876.7 N at 55.9 ms

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



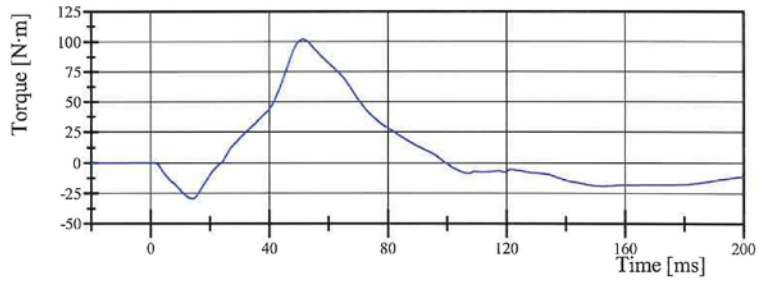
Filter Class: CFC_600
Max: 182.2 N at 170.5 ms
Min: -876.4 N at 56.1 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 88.6 Nm at 51.0 ms
Min: -39.3 Nm at 14.4 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Consta
Max: 102.1 N·m at 51.4 ms
Min: -29.4 N·m at 14.1 ms

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

04.03.2014 12:58:06 2950

Transportation Research Center Inc.

Neck Extension
HIII 50th Serial No. 037 Certification No. 24-1
Test Date: 4/3/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Pendulum Velocity	(-5.95) - (-6.18) m/s	-5.953 m/s	Yes
Pendulum Acceleration Decay Crossing 5g	38 - 46 ms	39.9 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	20.11 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	16.72 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	13.67 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	13.67 g	Yes
Total Head D-Plane Rotation			
Peak	81 - 106 °	96.7 °	Yes
Time of Peak	72 - 82 ms	77.1 ms	Yes
Total Head D-Plane Rotation Decay to 0°	147 - 174 ms	158.9 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	(-53) - (-80) N·m	-70.4 N·m	Yes
Time of Peak	65 - 79 ms	71.6 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	120 - 148 ms	145.4 ms	Yes

Test meets specifications.

Comments:

Technician

Approved

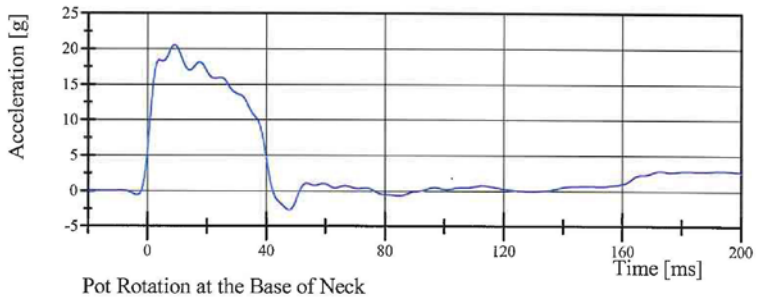
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

04.03.2014 13:28:18 3025

Transportation Research Center Inc.

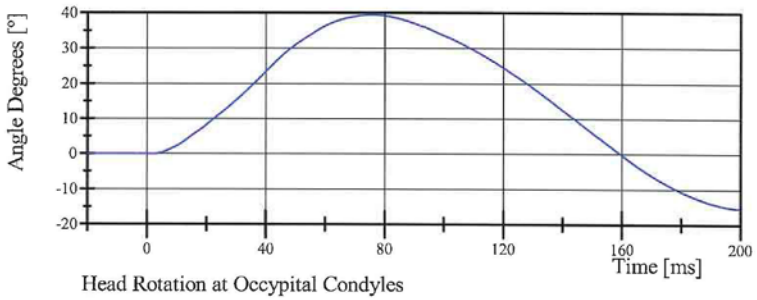
Neck Extension
HIII 50th Serial No. 037 Certification No. 24-1
Test Date: 4/3/2014

Pendulum Acceleration



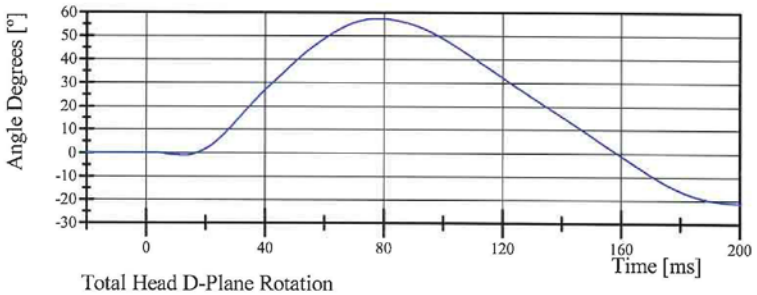
Filter Class: CFC_60
Max: 20.5 g at 9.0 ms
Min: -2.8 g at 47.7 ms

Pot Rotation at the Base of Neck



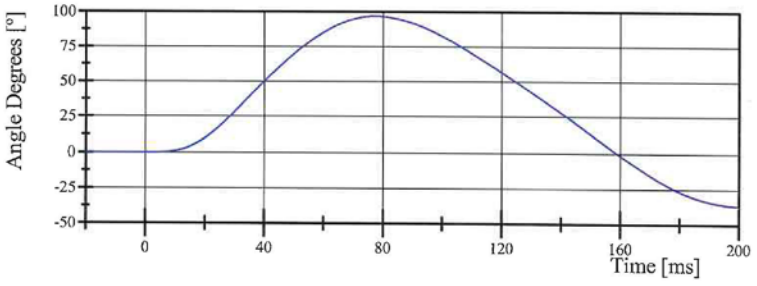
Filter Class: CFC_60
Max: 39.5 ° at 75.8 ms
Min: -15.6 ° at 200.0 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 57.3 ° at 78.2 ms
Min: -21.5 ° at 200.0 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 96.7 ° at 77.1 ms
Min: -37.1 ° at 200.0 ms

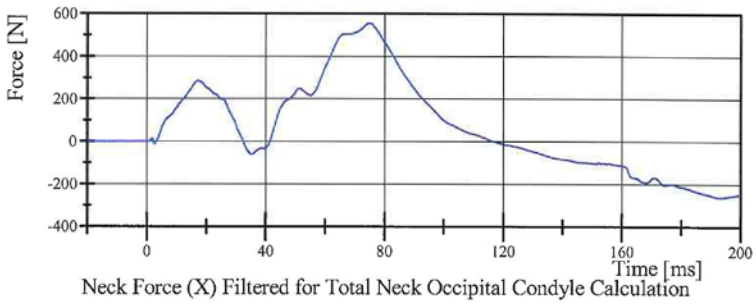
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

04.03.2014 13:28:24 3025

Transportation Research Center Inc.

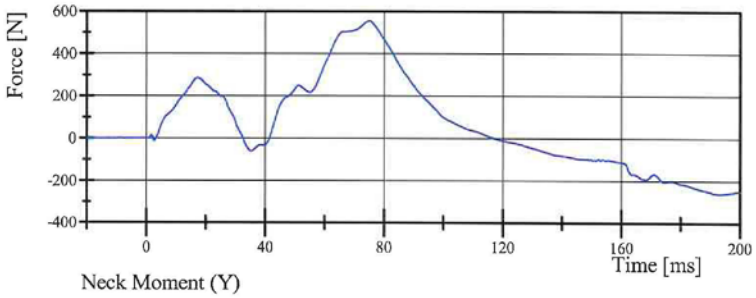
Neck Extension
HIII 50th Serial No. 037 Certification No. 24-1
Test Date: 4/3/2014

Neck Force (X)



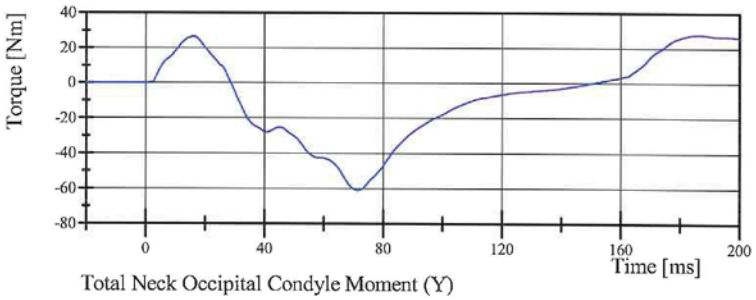
Filter Class: CFC_1000
Max: 555.1 N at 75.0 ms
Min: -262.4 N at 192.6 ms

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



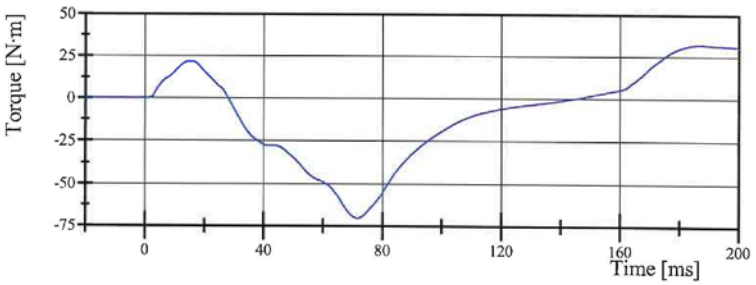
Filter Class: CFC_600
Max: 554.8 N at 75.0 ms
Min: -262.2 N at 193.3 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 27.6 Nm at 185.7 ms
Min: -61.2 Nm at 71.4 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constai
Max: 31.9 N·m at 186.8 ms
Min: -70.4 N·m at 71.6 ms

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

04.03.2014 13:28:25 3025

Transportation Research Center Inc.

Front Thorax
HIII 50th Serial No. 037 Certification No. 24-1
Test Date: 4/3/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.619 m/s	Yes
Probe Force Peak	(-5,160) - (-5,893) N	-5,463.1 N	Yes
Maximum Chest Compression	(-63.5) - (-72.6) mm	-68.67 mm	Yes
Internal Hysteresis	65 - 85 %	73.9 %	Yes

Test meets specifications.

Comments:

Technician

Approved

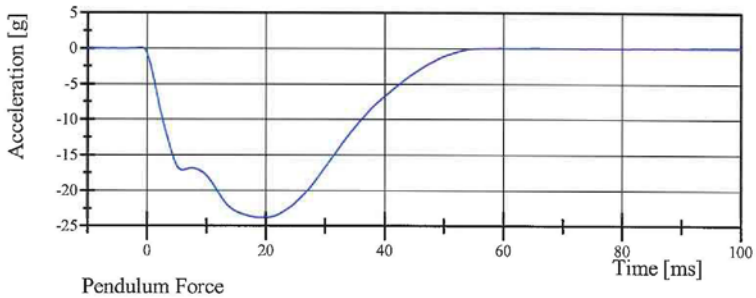
Specification Source: CFR49 Part 572 Subpart P
with Polarity in accordance with J211

04.03.2014 14:09:55 428

Transportation Research Center Inc.

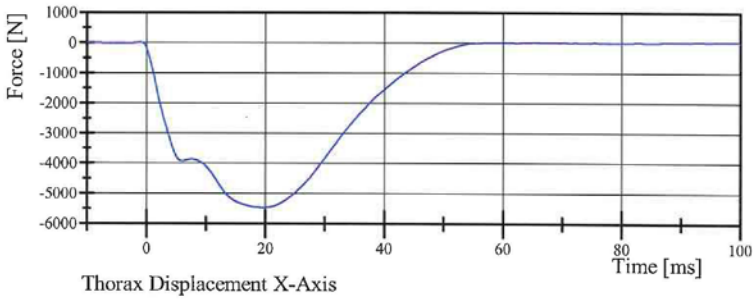
Front Thorax
HIII 50th Serial No. 037 Certification No. 24-1
Test Date: 4/3/2014

Pendulum Acceleration



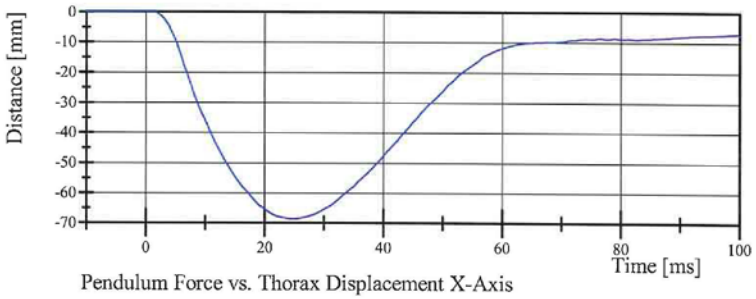
Filter Class: CFC_180
Max: 0.1 g at -1.0 ms
Min: -23.8 g at 19.5 ms

Pendulum Force



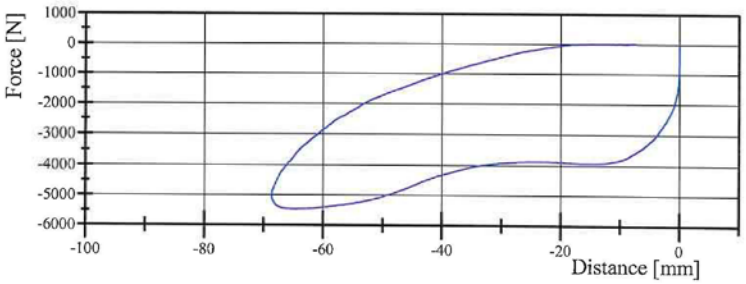
Filter Class: CFC_180
Max: 20.4 N at -1.0 ms
Min: -5,463.1 N at 19.5 ms

Thorax Displacement X-Axis



Filter Class: CFC_600
Max: 0.0 mm at -5.9 ms
Min: -68.7 mm at 24.8 ms

Pendulum Force vs. Thorax Displacement X-Axis



Filter Class: CFC_180
Max: 20.4 N at -0.0 mm
Min: -5,463.1 N at -64.8 mm

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

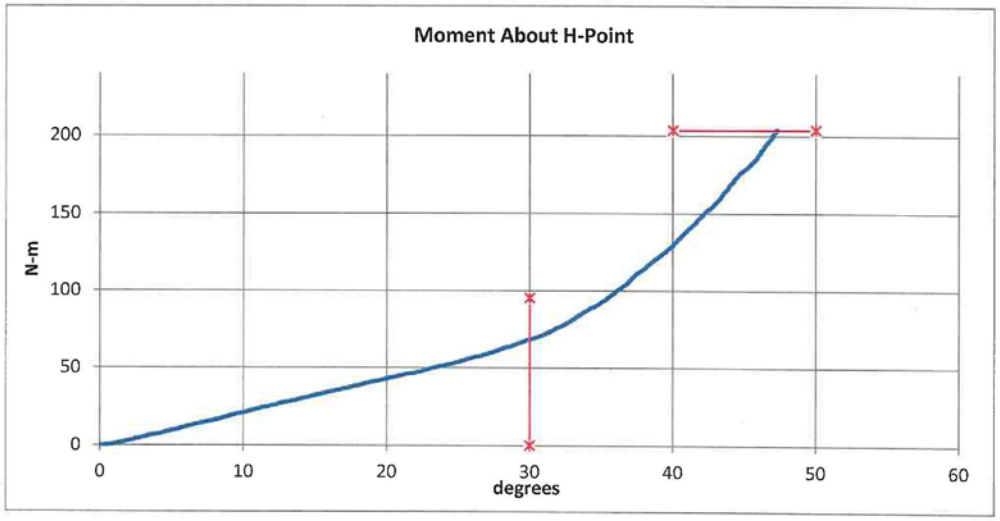
04.03.2014 14:10:02 428

Transportation Research Center Inc.

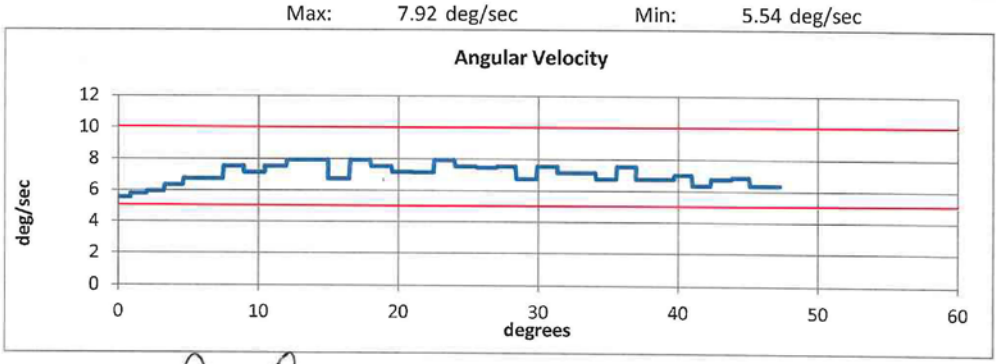
Hybrid III 50th Male Hip Range of Motion

Serial Number:	37	Date:	03-Apr-2014
Test Number:	1	Time:	11:30
Comments:	Left		

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	21.7	°C	Pass
Humidity	10	-	70	36	%	Pass
Moment at 30°	0	≤	94.9	68.34	N-m	Pass
Angle at 203 Nm	40	-	50	47.27	deg	Pass
Average Velocity	5	-	10	7.01	deg/sec	Pass



Max: 7.92 deg/sec Min: 5.54 deg/sec



Technician

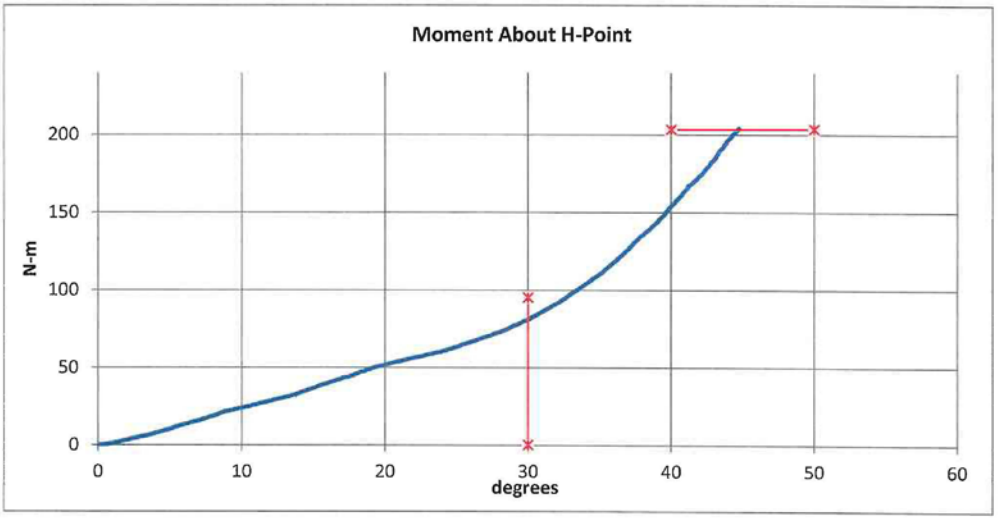
Approved

Transportation Research Center Inc.

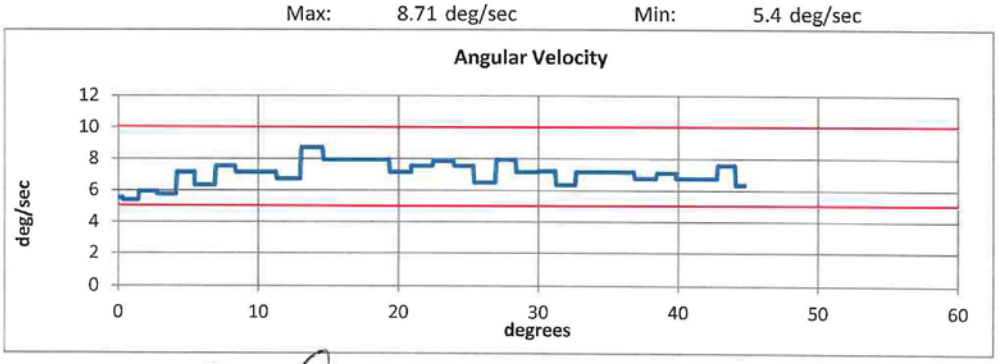
Hybrid III 50th Male Hip Range of Motion

Serial Number:	37	Date:	03-Apr-2014
Test Number:	1	Time:	12:25
Comments:	Right		

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	21.7	°C	Pass
Humidity	10	-	70	39	%	Pass
Moment at 30°	0	≤	94.9	80.94	N-m	Pass
Angle at 203 Nm	40	-	50	44.74	deg	Pass
Average Velocity	5	-	10	7.07	deg/sec	Pass



Max: 8.71 deg/sec Min: 5.4 deg/sec



Technician

Approved

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 24-1
Test Date: 4/2/2014

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.086 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,177.08 N	Yes

Test meets specifications.

Comments:

Technician

Approved

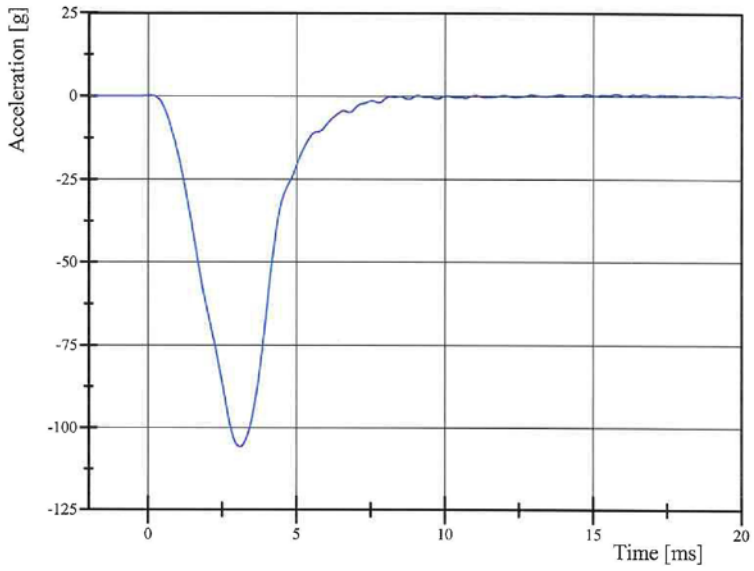
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

04.02.2014 11:32:21 1775

Transportation Research Center Inc.

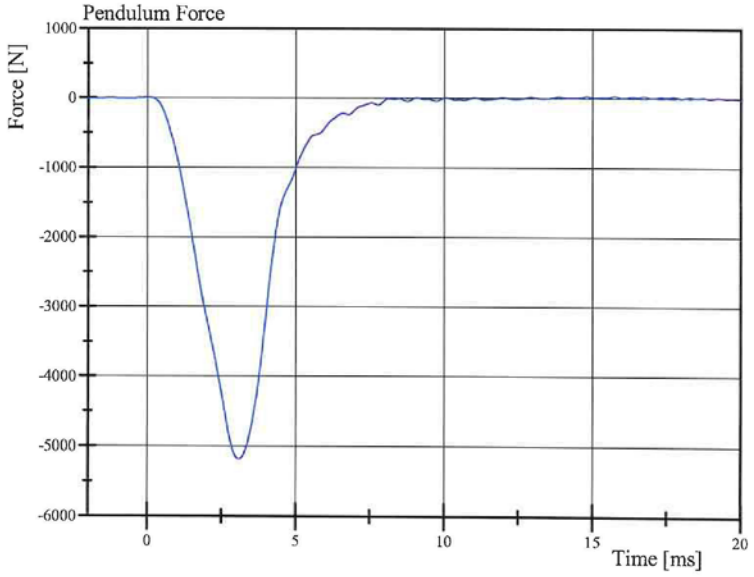
Left Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 24-1
Test Date: 4/2/2014

Pendulum Acceleration



Filter Class: CFC_600
Max: 0.6 g at 15.8 ms
Min: -105.8 g at 3.1 ms

Pendulum Force



Filter Class: CFC_600
Max: 29.4 N at 15.8 ms
Min: -5,177.1 N at 3.1 ms

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

04.02.2014 11:32:30 1775

Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 24-1
Test Date: 4/2/2014

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.103 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,593.91 N	Yes

Test meets specifications.

Comments:

Technician

Approved

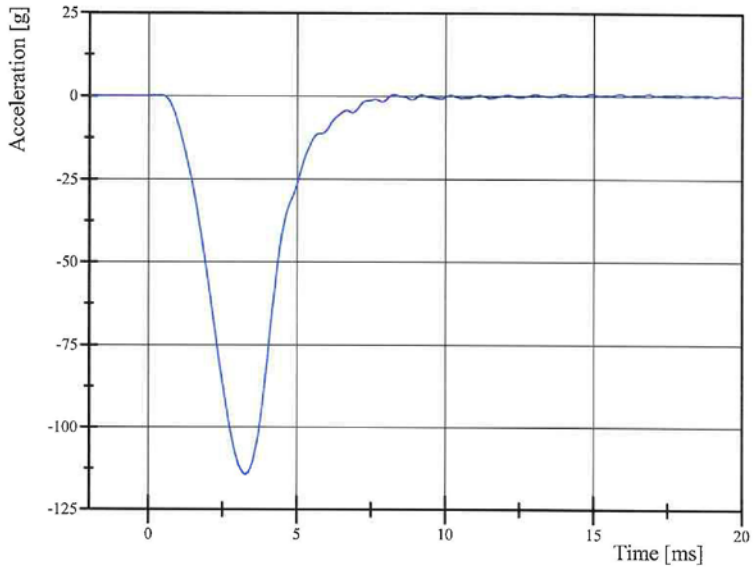
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

04.02.2014 14:11:03 1765

Transportation Research Center Inc.

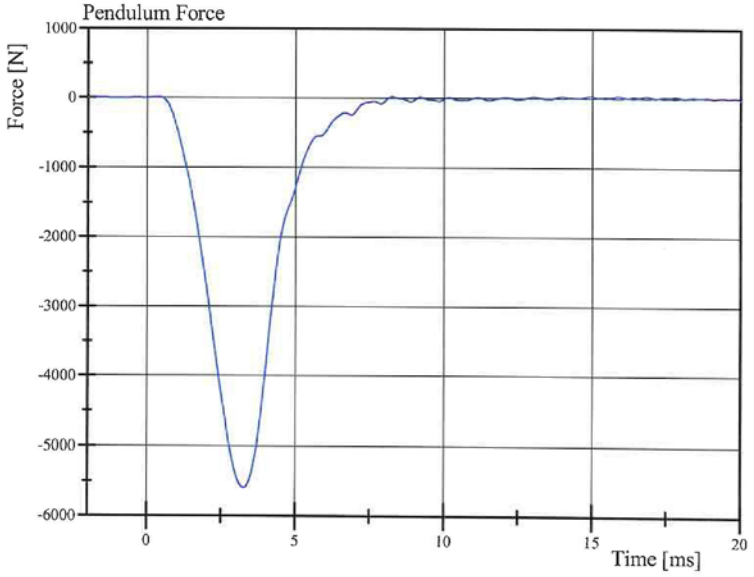
Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 24-1
Test Date: 4/2/2014

Pendulum Acceleration



Filter Class: CFC_600
Max: 0.6 g at 15.8 ms
Min: -114.3 g at 3.3 ms

Pendulum Force



Filter Class: CFC_600
Max: 31.6 N at 15.8 ms
Min: -5,593.9 N at 3.3 ms

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

04.02.2014 14:11:13 1765

Driver S/N 037

Post-Test Calibration Sheets

Transportation Research Center Inc.
572E HIII 50th Male Dummy
External Dimensions
Serial No. 037
Calibration No. 25

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Total Sitting Height	878.8 - 889.0	885	Yes
B	Shoulder Pivot Height	505.5 - 520.7	520	Yes
C	H-Point Height	83.8 - 88.9	85	Yes
D	H-Point From Seatback	134.6 - 139.7	138	Yes
E	Shoulder Pivot From Backline	83.8 - 94.0	92	Yes
F	Thigh Clearance	139.7 - 154.9	150	Yes
G	Back Of Elbow To Wrist Pivot	289.6 - 304.8	295	Yes
H	Skull Cap To Backline	40.6 - 45.7	45	Yes
I	Shoulder-Elbow Length	330.2 - 345.4	340	Yes
J	Elbow Rest Height	190.5 - 210.8	200	Yes
K	Buttock Knee Length	579.1 - 604.5	600	Yes
L	Popliteal Height	429.3 - 454.7	440	Yes
M	Knee Pivot Height	485.1 - 500.4	495	Yes
N	Buttock Popliteal Length	452.1 - 477.5	470	Yes
O	Chest Depth	213.4 - 228.6	224	Yes
P	Foot Length	251.5 - 266.7	264	Yes
V	Shoulder Breadth	421.6 - 436.9	428	Yes
W	Foot Breadth	91.4 - 106.7	97	Yes
Y	Chest Circumference	970.3 - 1000.8	987	Yes
Z	Waist Circumference	835.7 - 866.1	865	Yes
AA	Location For Chest Circumference	429.3 - 434.3	430	Yes
BB	Location For Waist Circumference	226.1 - 231.1	230	Yes

Comments:

Technician

Approved

Revised 8/10/12

Transportation Research Center Inc.

Front Head Drop
HIII 50th Serial No. 037 Certification No. 25-1
Test Date: 4/10/2014

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Peak Head Resultant Acceleration	225 - 275 g	245.8 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	-3.3 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Approved

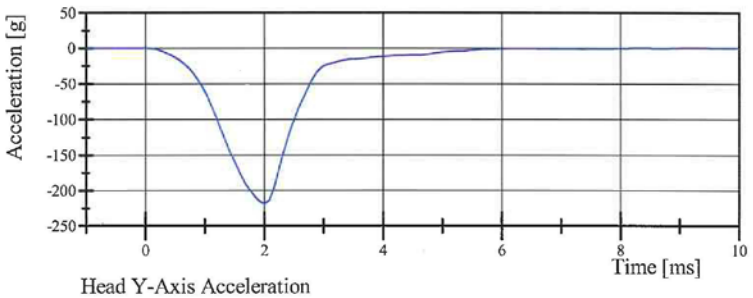
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

04.10.2014 08:39:53 614

Transportation Research Center Inc.

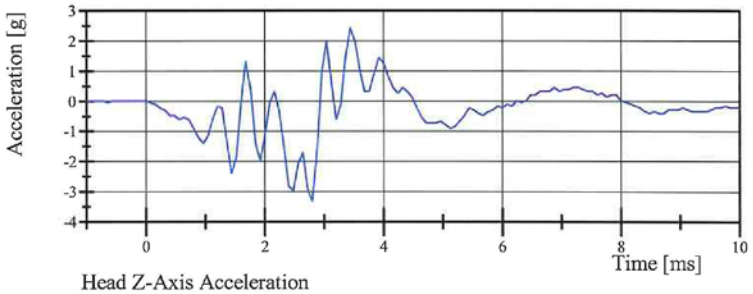
Front Head Drop
HIII 50th Serial No. 037 Certification No. 25-1
Test Date: 4/10/2014

Head X-Axis Acceleration



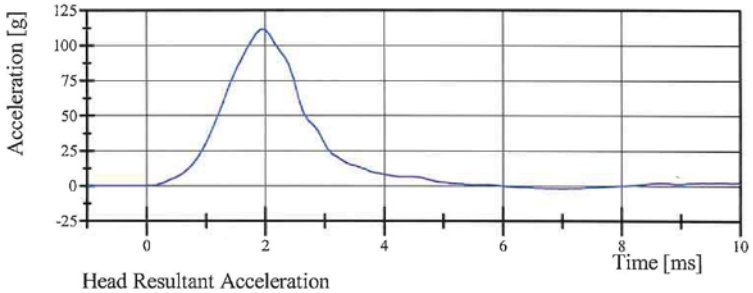
Filter Class: CFC_1000
Max: 0.2 g at 8.4 ms
Min: -219.1 g at 2.0 ms

Head Y-Axis Acceleration



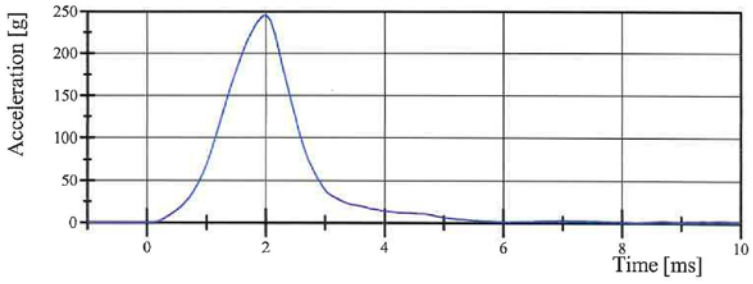
Filter Class: CFC_1000
Max: 2.4 g at 3.4 ms
Min: -3.3 g at 2.8 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 111.7 g at 1.9 ms
Min: -2.2 g at 7.0 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 245.8 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

04.10.2014 08:40:00 614

Transportation Research Center Inc.

Neck Flexion
HIII 50th Serial No. 037 Certification No. 25-1
Test Date: 4/10/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	6.920 m/s	Yes
Pendulum Acceleration Decay Crossing -5g	34 - 42 ms	39.0 ms	Yes
Pendulum Acceleration at 10ms	(-22.5) - (-27.5) g	-25.12 g	Yes
Pendulum Acceleration at 20ms	(-17.6) - (-22.6) g	-19.80 g	Yes
Pendulum Acceleration at 30ms	(-12.5) - (-18.5) g	-12.97 g	Yes
Pendulum Acceleration > 30ms	>= (-29.0) g	-12.97 g	Yes
Total Head D-Plane Rotation			
Peak	(-64) - (-78) °	-73.8 °	Yes
Time of Peak	57 - 64 ms	59.4 ms	Yes
Total Head D-Plane Rotation Decay to 0°	113 - 128 ms	118.2 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	88 - 108 N·m	102.4 N·m	Yes
Time of Peak	47 - 58 ms	51.8 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	97 - 107 ms	99.0 ms	Yes

Test meets specifications.

Comments:

Technician 

Approved 

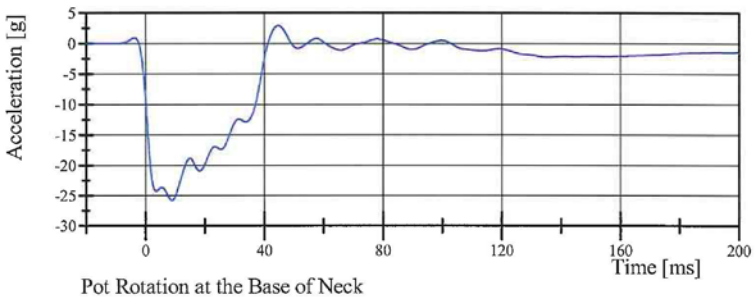
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

04.10.2014 10:38:31 2947

Transportation Research Center Inc.

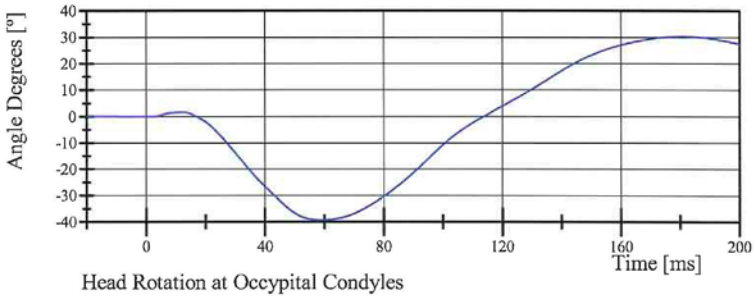
Neck Flexion
HIII 50th Serial No. 037 Certification No. 25-1
Test Date: 4/10/2014

Pendulum Acceleration



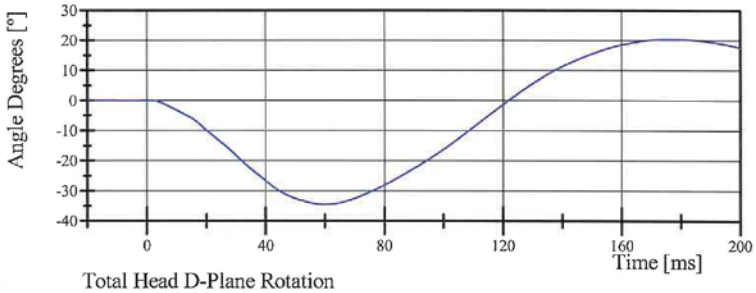
Filter Class: CFC_60
Max: 2.9 g at 44.7 ms
Min: -25.8 g at 8.9 ms

Pot Rotation at the Base of Neck



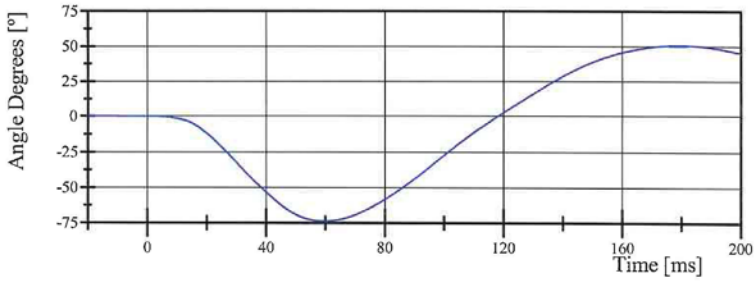
Filter Class: CFC_60
Max: 30.3 ° at 180.9 ms
Min: -39.3 ° at 59.2 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 20.3 ° at 176.3 ms
Min: -34.5 ° at 59.6 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 50.5 ° at 179.0 ms
Min: -73.8 ° at 59.4 ms

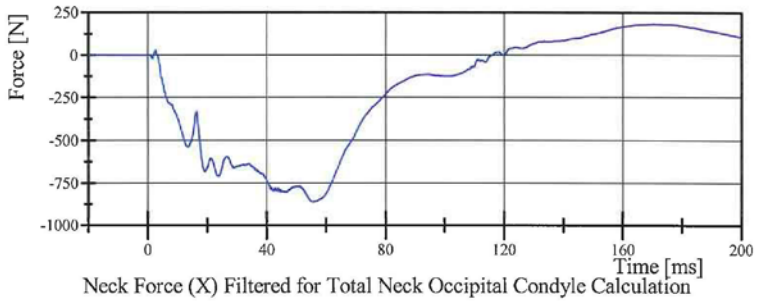
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

04.10.2014 10:38:38 2947

Transportation Research Center Inc.

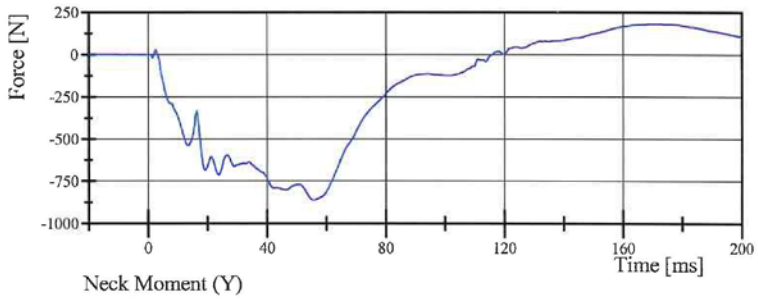
Neck Flexion
HIII 50th Serial No. 037 Certification No. 25-1
Test Date: 4/10/2014

Neck Force (X)



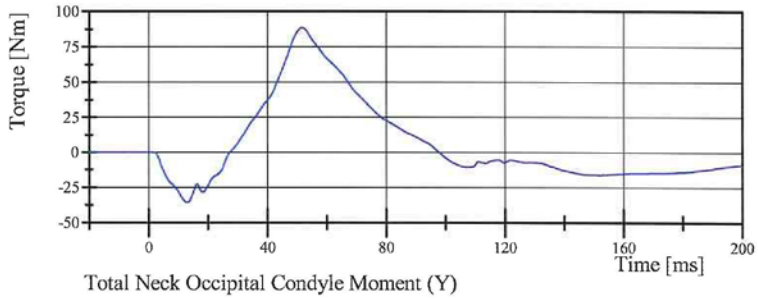
Filter Class: CFC_1000
Max: 180.6 N at 170.4 ms
Min: -863.4 N at 55.6 ms

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



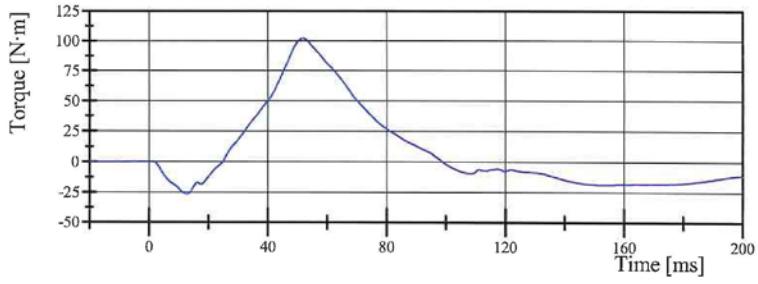
Filter Class: CFC_600
Max: 180.2 N at 170.4 ms
Min: -862.8 N at 55.6 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 88.6 Nm at 51.7 ms
Min: -35.8 Nm at 12.9 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constai
Max: 102.4 N·m at 51.8 ms
Min: -26.5 N·m at 12.7 ms

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

04.10.2014 10:38:39 2947

Transportation Research Center Inc.

Neck Extension
HIII 50th Serial No. 037 Certification No. 25-1
Test Date: 4/10/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Pendulum Velocity	(-5.95) - (-6.18) m/s	-5.958 m/s	Yes
Pendulum Acceleration Decay Crossing 5g	38 - 46 ms	41.3 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	19.48 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	16.44 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	12.70 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	12.70 g	Yes
Total Head D-Plane Rotation			
Peak	81 - 106 °	95.1 °	Yes
Time of Peak	72 - 82 ms	79.0 ms	Yes
Total Head D-Plane Rotation Decay to 0°	147 - 174 ms	157.9 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	(-53) - (-80) N·m	-69.3 N·m	Yes
Time of Peak	65 - 79 ms	72.5 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	120 - 148 ms	146.0 ms	Yes

Test meets specifications.

Comments:

Technician

Approved

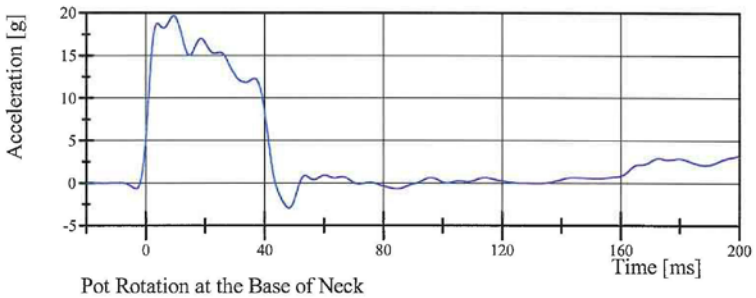
Specification Source: CFR49 Part 572 Subpart E with Polarity in accordance with J211

04.10.2014 09:29:27 3022

Transportation Research Center Inc.

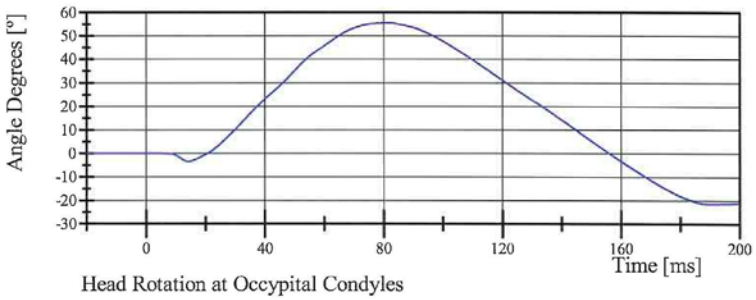
Neck Extension
HIII 50th Serial No. 037 Certification No. 25-1
Test Date: 4/10/2014

Pendulum Acceleration



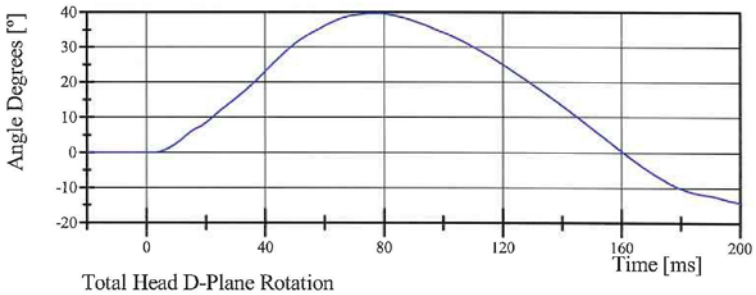
Filter Class: CFC_60
Max: 19.6 g at 9.4 ms
Min: -3.0 g at 48.2 ms

Pot Rotation at the Base of Neck



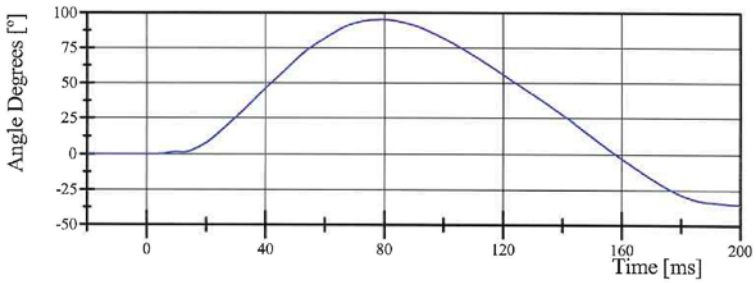
Filter Class: CFC_60
Max: 55.6 ° at 81.1 ms
Min: -21.7 ° at 190.5 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 39.7 ° at 77.2 ms
Min: -14.4 ° at 200.0 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 95.1 ° at 79.0 ms
Min: -35.7 ° at 200.0 ms

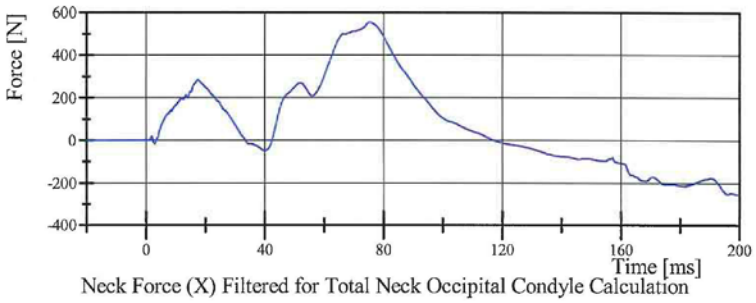
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

04.10.2014 09:29:35 3022

Transportation Research Center Inc.

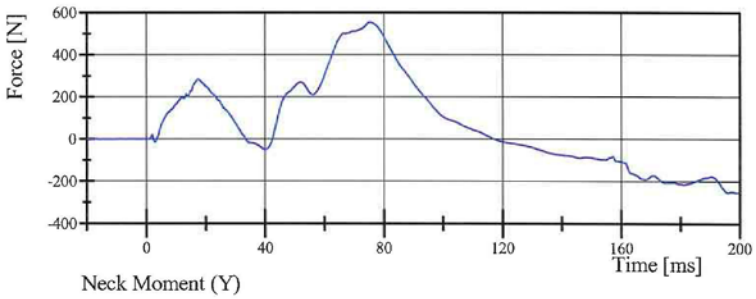
Neck Extension
HIII 50th Serial No. 037 Certification No. 25-1
Test Date: 4/10/2014

Neck Force (X)



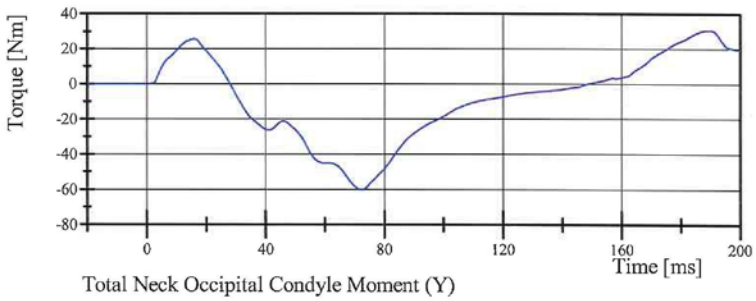
Filter Class: CFC_1000
Max: 554.8 N at 75.4 ms
Min: -255.9 N at 198.7 ms

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



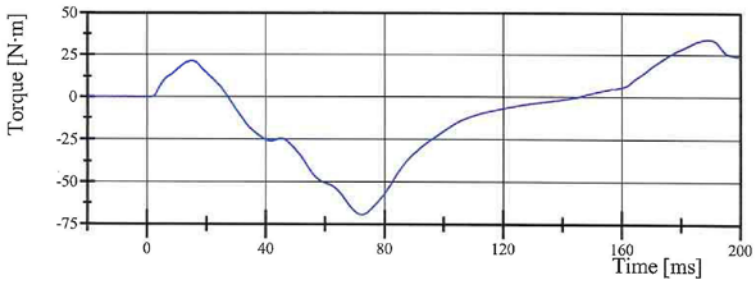
Filter Class: CFC_600
Max: 554.5 N at 75.4 ms
Min: -255.6 N at 198.9 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 30.6 Nm at 189.5 ms
Min: -60.1 Nm at 72.2 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Consta
Max: 33.8 N·m at 189.4 ms
Min: -69.3 N·m at 72.5 ms

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

04.10.2014 09:29:35 3022

Transportation Research Center Inc.

Front Thorax
HIII 50th Serial No. 037 Certification No. 25-1
Test Date: 4/10/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.617 m/s	Yes
Probe Force Peak	(-5,160) - (-5,893) N	-5,505.6 N	Yes
Maximum Chest Compression	(-63.5) - (-72.6) mm	-68.62 mm	Yes
Internal Hysteresis	65 - 85 %	72.6 %	Yes

Test meets specifications.

Comments:

Technician

Approved

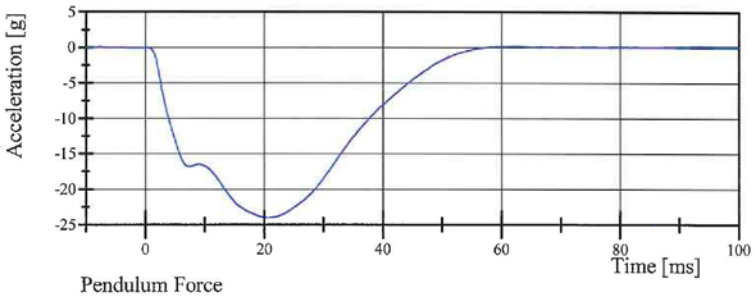
Specification Source: CFR49 Part 572 Subpart P
with Polarity in accordance with J211

04.10.2014 10:35:46 373

Transportation Research Center Inc.

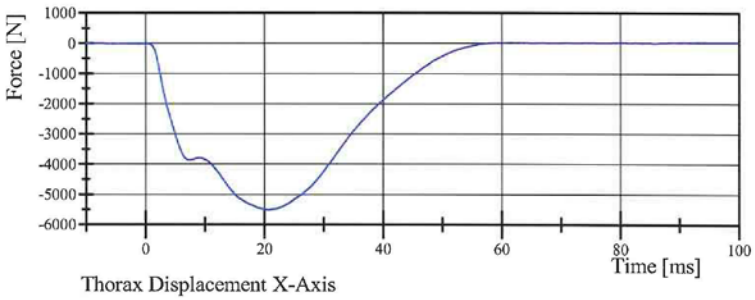
Front Thorax
HIII 50th Serial No. 037 Certification No. 25-1
Test Date: 4/10/2014

Pendulum Acceleration



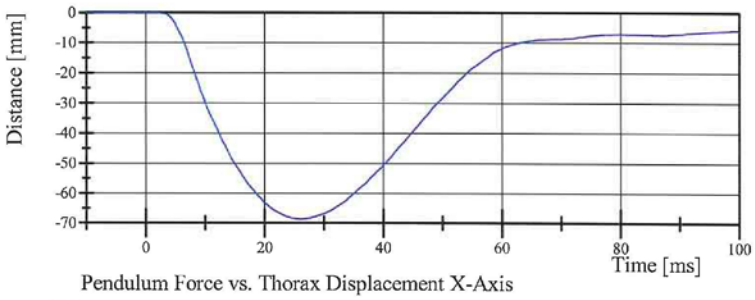
Filter Class: CFC_180
Max: 0.2 g at 93.6 ms
Min: -24.0 g at 20.7 ms

Pendulum Force



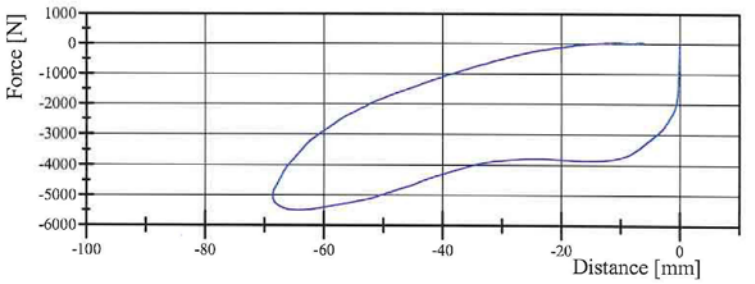
Filter Class: CFC_180
Max: 36.7 N at 93.6 ms
Min: -5,505.6 N at 20.7 ms

Thorax Displacement X-Axis



Filter Class: CFC_600
Max: 0.0 mm at -9.1 ms
Min: -68.6 mm at 26.2 ms

Pendulum Force vs. Thorax Displacement X-Axis



Filter Class: CFC_180
Max: 36.7 N at -6.7 mm
Min: -5,505.6 N at -64.4 mm

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

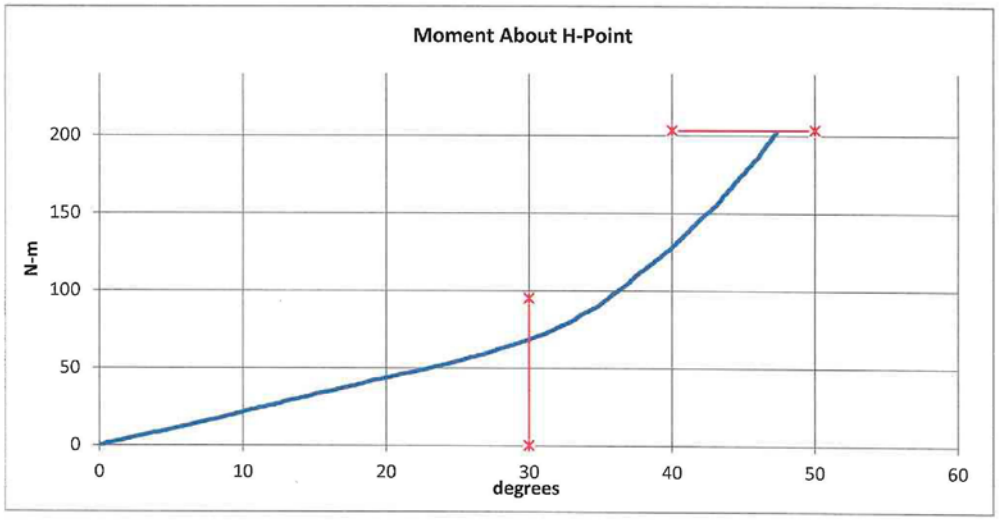
04.10.2014 10:35:53 373

Transportation Research Center Inc.

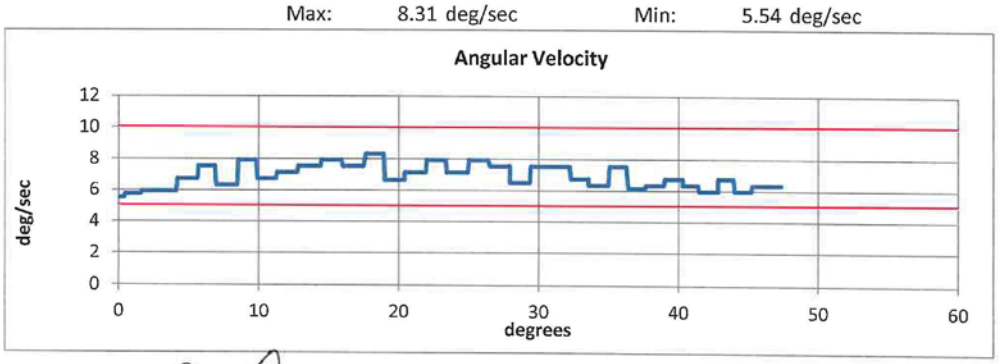
Hybrid III 50th Male Hip Range of Motion

Serial Number:	37	Date:	10-Apr-2014
Test Number:	1	Time:	7:41
Comments:	Left		

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	21.4	°C	Pass
Humidity	10	-	70	38	%	Pass
Moment at 30°	0	≤	94.9	68.62	N-m	Pass
Angle at 203 Nm	40	-	50	47.43	deg	Pass
Average Velocity	5	-	10	6.89	deg/sec	Pass



Max: 8.31 deg/sec Min: 5.54 deg/sec



Technician

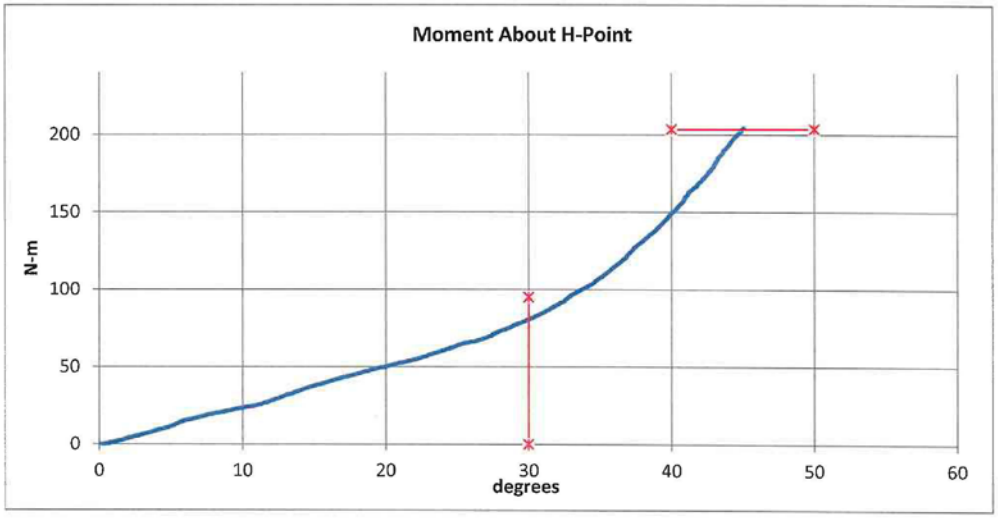
Approved

Transportation Research Center Inc.

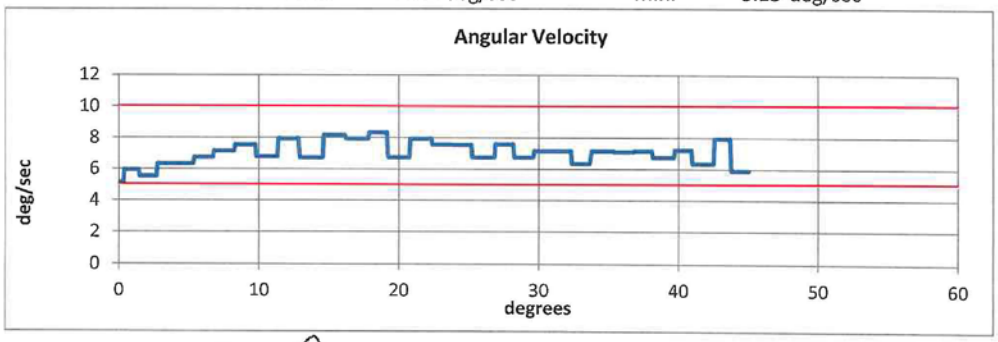
Hybrid III 50th Male Hip Range of Motion

Serial Number:	37	Date:	10-Apr-2014
Test Number:	1	Time:	8:12
Comments:	Right		

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	21.9	°C	Pass
Humidity	10	-	70	34	%	Pass
Moment at 30°	0	≤	94.9	80.66	N-m	Pass
Angle at 203 Nm	40	-	50	45.06	deg	Pass
Average Velocity	5	-	10	7.02	deg/sec	Pass



Max: 8.31 deg/sec Min: 5.15 deg/sec



Technician

Approved

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 25-1
Test Date: 4/10/2014

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.116 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,542.62 N	Yes

Test meets specifications.

Comments:

Technician

Approved

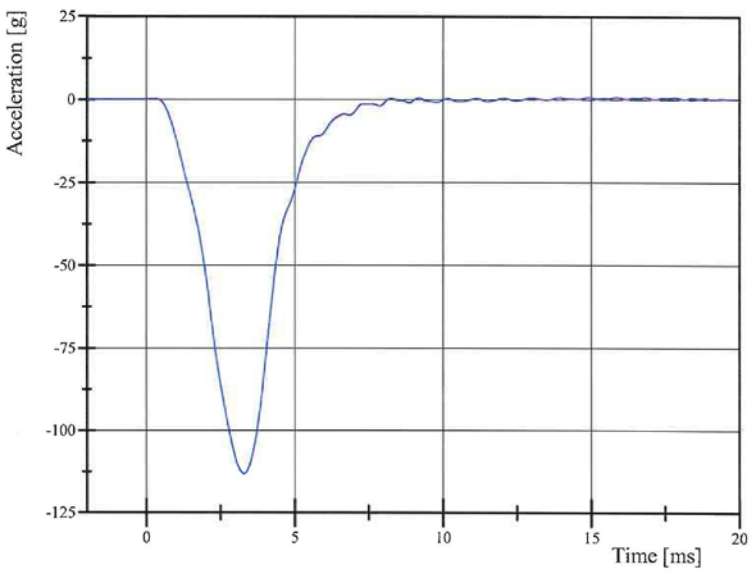
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

04.10.2014 07:54:10 1760

Transportation Research Center Inc.

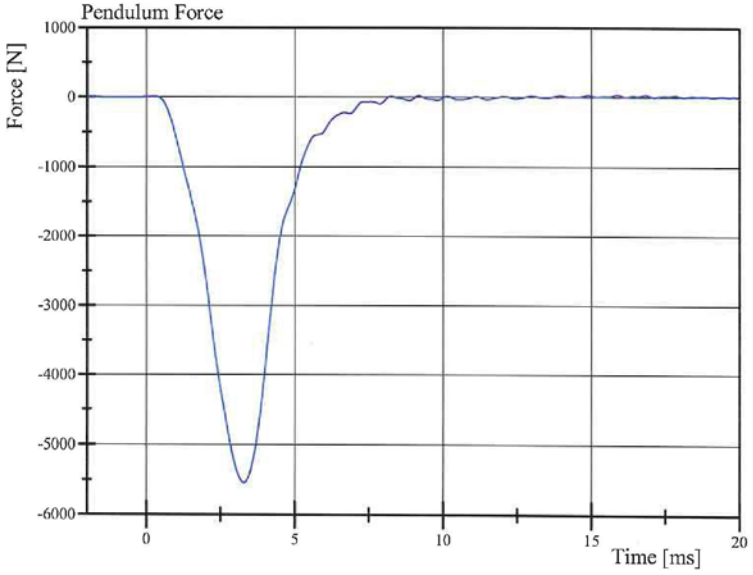
Left Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 25-1
Test Date: 4/10/2014

Pendulum Acceleration



Filter Class: CFC_600
Max: 0.6 g at 15.8 ms
Min: -113.3 g at 3.3 ms

Pendulum Force



Filter Class: CFC_600
Max: 30.6 N at 15.8 ms
Min: -5,542.6 N at 3.3 ms

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

04.10.2014 07:54:17 1760

Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 25-1
Test Date: 4/10/2014

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	20.6 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.116 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,555.72 N	Yes

Test meets specifications.

Comments:

Technician

Approved

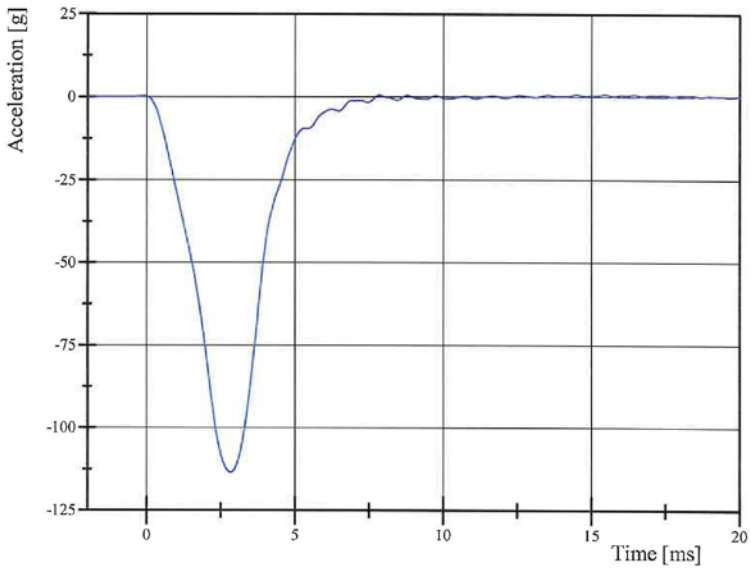
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

04.10.2014 08:00:26 1763

Transportation Research Center Inc.

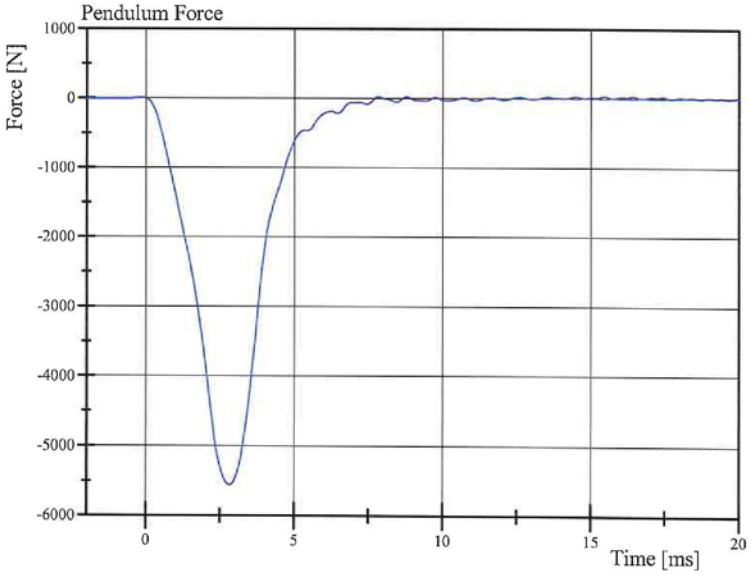
Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 25-1
Test Date: 4/10/2014

Pendulum Acceleration



Filter Class: CFC_600
Max: 0.6 g at 15.4 ms
Min: -113.5 g at 2.8 ms

Pendulum Force



Filter Class: CFC_600
Max: 30.4 N at 15.4 ms
Min: -5,555.7 N at 2.8 ms

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

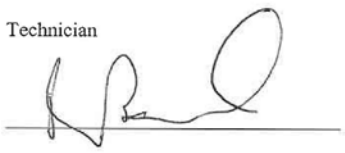
04.10.2014 08:00:34 1763

Pre-Test Calibration Sheets
Front Passenger S/N 426

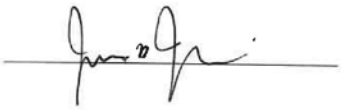
Transportation Research Center Inc.
572O HIII 5th Dummy
External Dimensions
Serial No. 426 Calibration No. 26

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	78	Yes
F	Thigh Clearance	119.4 - 134.6	130	Yes
G	Back of Elbow to Wrist Pivot	243.9 - 259.1	250	Yes
H	Head Back to Backline	43.2 - 48.2	45	Yes
I	Shoulder to Elbow Length	276.8 - 297.2	283	Yes
J	Elbow Rest Height	182.8 - 203.2	193	Yes
K	Buttock Knee Length	520.7 - 546.1	533	Yes
L	Popliteal Height	355.6 - 376.0	368	Yes
M	Knee Pivot Height	393.7 - 419.1	410	Yes
N	Buttock Popliteal Length	414.0 - 439.4	435	Yes
O	Chest Depth without Jacket	175.3 - 190.5	183	Yes
P	Foot Length	218.5 - 233.7	222	Yes
R	Buttock to Knee Pivot Length	457.2 - 482.6	473	Yes
S	Head Breadth	137.1 - 147.3	140	Yes
T	Head Depth	177.8 - 188.0	182	Yes
U	Hip Breadth	299.7 - 314.9	306	Yes
V	Shoulder Breadth	350.5 - 365.7	359	Yes
W	Foot Breadth	78.8 - 94.0	83	Yes
X	Head Circumference	528.3 - 548.7	539	Yes
Y	Chest Circumference with Jacket	850.9 - 881.3	865	Yes
Z	Waist Circumference	759.5 - 789.9	773	Yes
AA	Reference Location for Chest Circumference	332.7 - 358.1	345	Yes
BB	Reference Location for Waist Circumference	160.0 - 170.2	165	Yes

Technician



Approved



Revised 8/10/12

Transportation Research Center Inc.

Front Head Drop
HIII 5th Serial No. 426 Certification No. 26-1
Test Date: 4/1/2014

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Peak Head Resultant Acceleration	250 - 300 g	273.1 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	-3.3 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Approved

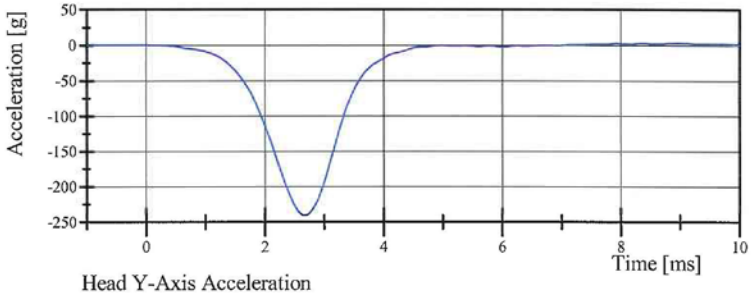
Specification Source: CFR49 Part 572 Subpart O with Polarity in accordance with J211

04.01.2014 12:26:32 606

Transportation Research Center Inc.

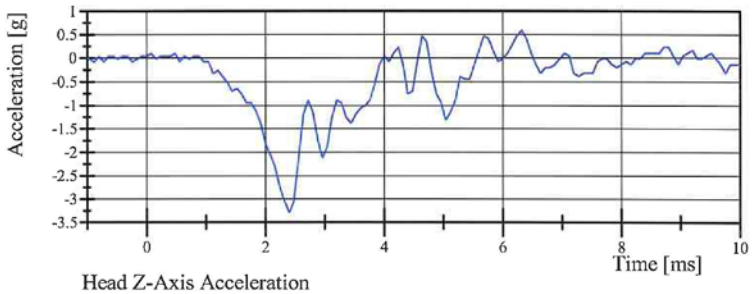
Front Head Drop
HIII 5th Serial No. 426 Certification No. 26-1
Test Date: 4/1/2014

Head X-Axis Acceleration



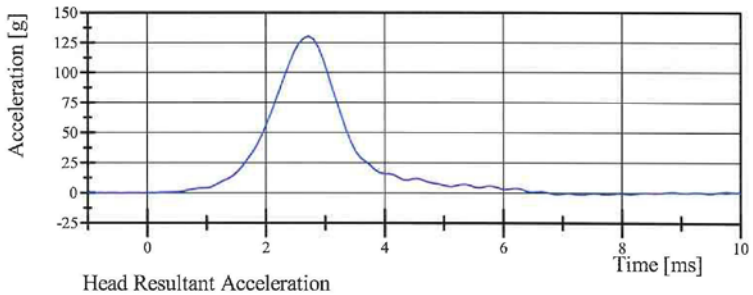
Filter Class: CFC_1000
Max: 2.4 g at 9.0 ms
Min: -240.6 g at 2.6 ms

Head Y-Axis Acceleration



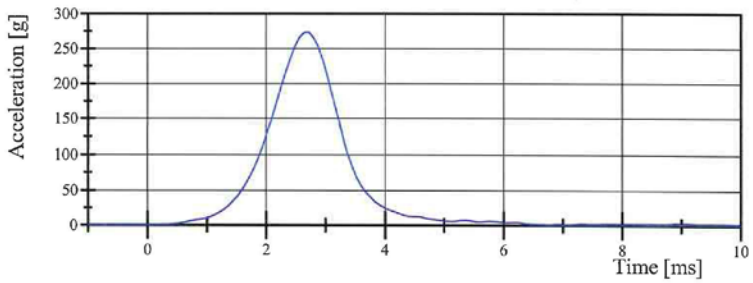
Filter Class: CFC_1000
Max: 0.6 g at 6.3 ms
Min: -3.3 g at 2.4 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 130.4 g at 2.7 ms
Min: -1.6 g at 7.3 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 273.1 g at 2.7 ms
Min: 0.1 g at -1.0 ms

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

04.01.2014 12:26:43 606

Transportation Research Center Inc.

Neck Flexion
HIII 5th Serial No. 426 Certification No. 26-1
Test Date: 4/1/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	7.016 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	(-2.1) - (-2.5) m/s	-2.32 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	(-4.0) - (-5.0) m/s	-4.56 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	(-5.8) - (-7.0) m/s	-6.49 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	73.4 N·m	Yes
Total Neck Occipital Condyles Moment Decay to 10 N·m	80 - 100 ms	88.0 ms	Yes

Test meets specifications.

Comments:

Technician

Approved

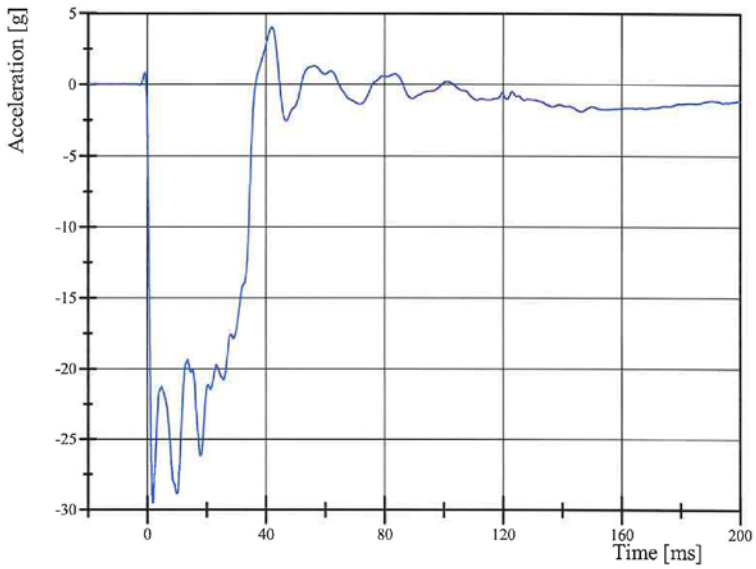
Specification Source: CFR49 Part 572 Subpart O with Polarity in accordance with J211

04.01.2014 15:19:03 1714

Transportation Research Center Inc.

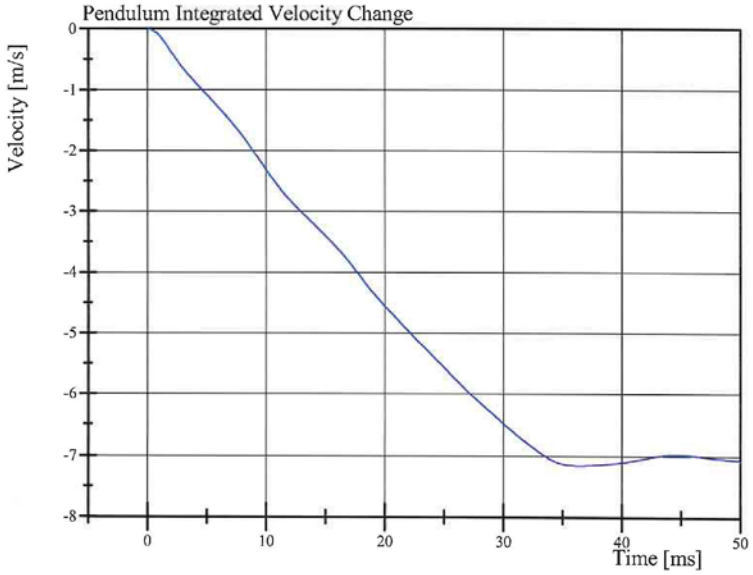
Neck Flexion
HIII 5th Serial No. 426 Certification No. 26-1
Test Date: 4/1/2014

Pendulum Acceleration



Filter Class: CFC_180
Max: 4.0 g at 41.9 ms
Min: -29.5 g at 1.9 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 0.0 m/s at 0.0 ms
Min: -7.2 m/s at 36.4 ms

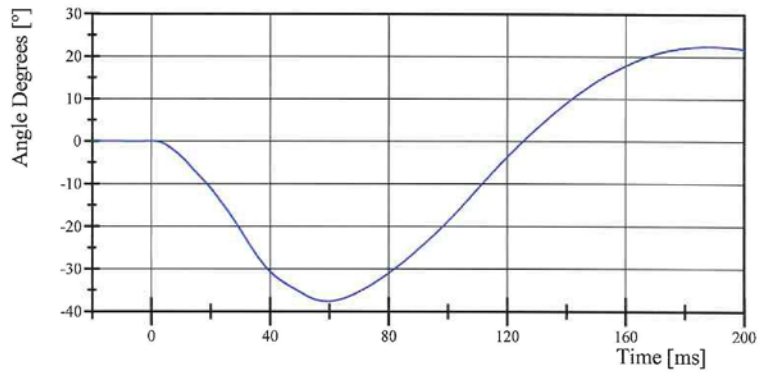
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

04.01.2014 15:19:12 1714

Transportation Research Center Inc.

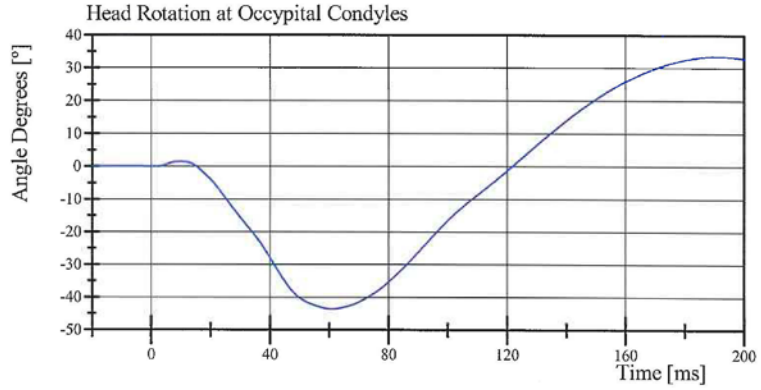
Neck Flexion
HIII 5th Serial No. 426 Certification No. 26-1
Test Date: 4/1/2014

Pot Rotation at the Base of Neck



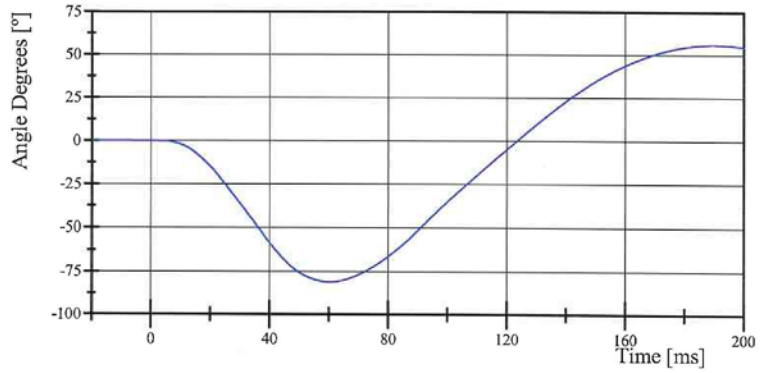
Filter Class: CFC_60
Max: 22.3 ° at 188.0 ms
Min: -37.7 ° at 59.3 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 33.4 ° at 190.8 ms
Min: -43.6 ° at 60.9 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 55.7 ° at 189.6 ms
Min: -81.3 ° at 60.3 ms

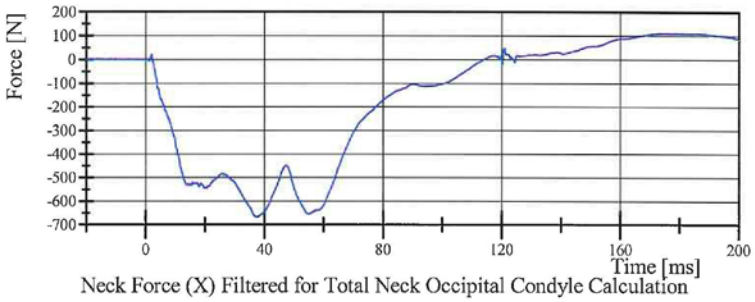
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

04.01.2014 15:19:13 1714

Transportation Research Center Inc.

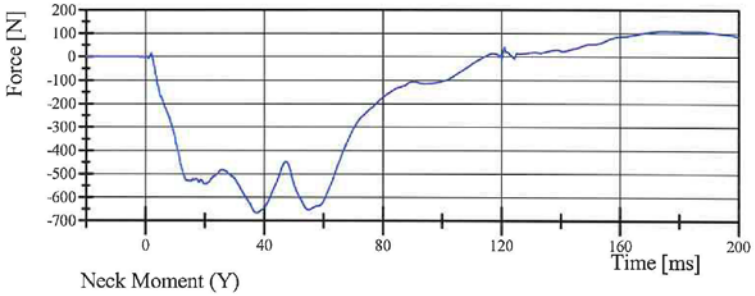
Neck Flexion
HIII 5th Serial No. 426 Certification No. 26-1
Test Date: 4/1/2014

Neck Force (X)



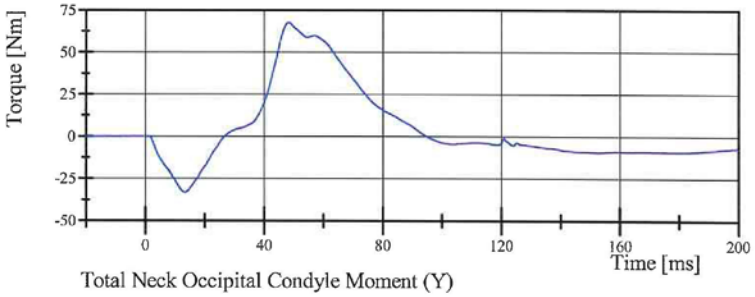
Filter Class: CFC_1000
Max: 109.7 N at 173.1 ms
Min: -668.2 N at 37.4 ms

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



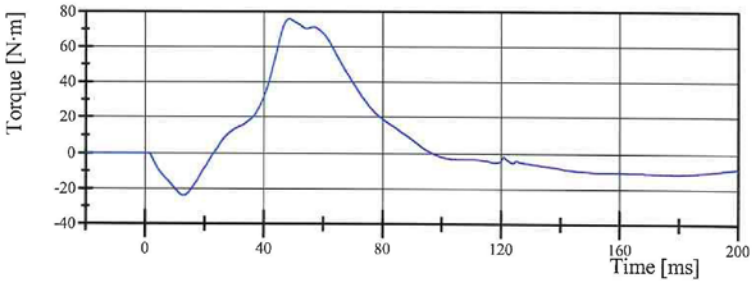
Filter Class: CFC_600
Max: 109.5 N at 175.0 ms
Min: -667.9 N at 37.5 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 67.5 Nm at 48.3 ms
Min: -33.3 Nm at 13.4 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constai
Max: 75.9 N·m at 48.6 ms
Min: -24.1 N·m at 13.0 ms

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

04.01.2014 15:19:14 1714

Transportation Research Center Inc.

Neck Extension
HIII 5th Serial No. 426 Certification No. 26-1
Test Date: 4/1/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Pendulum Velocity	(-5.95) - (-6.19) m/s	-6.104 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	1.5 - 1.9 m/s	1.81 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	3.1 - 3.9 m/s	3.55 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	4.6 - 5.6 m/s	5.09 m/s	Yes
Total Head D-Plane Rotation	99 - 114 °	110.8 °	Yes
Total Neck Occipital Condyles Moment Between 99° and 114° Rotation	(-53) - (-65) N·m	-60.7 N·m	Yes
Total Neck Occipital Condyles Moment Decay to -10 N·m	94 - 114 ms	103.7 ms	Yes

Test meets specifications.

Comments:

Technician

Approved

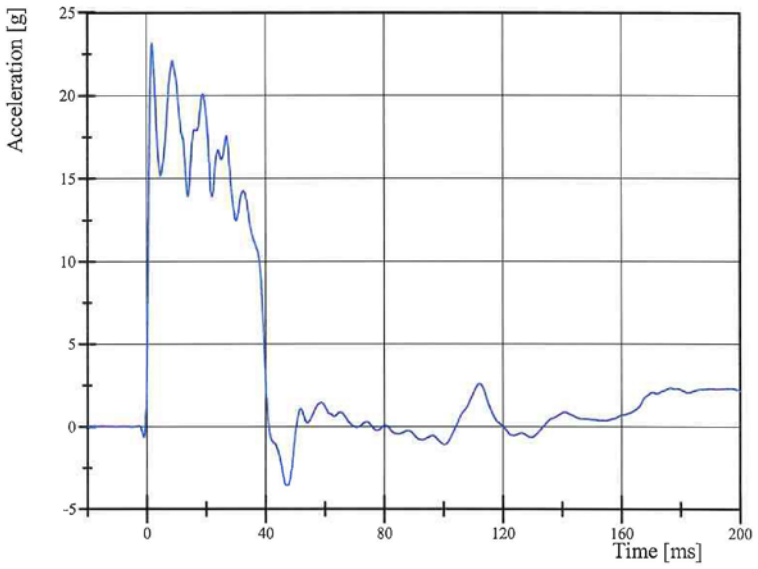
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

04.01.2014 16:14:58 1828

Transportation Research Center Inc.

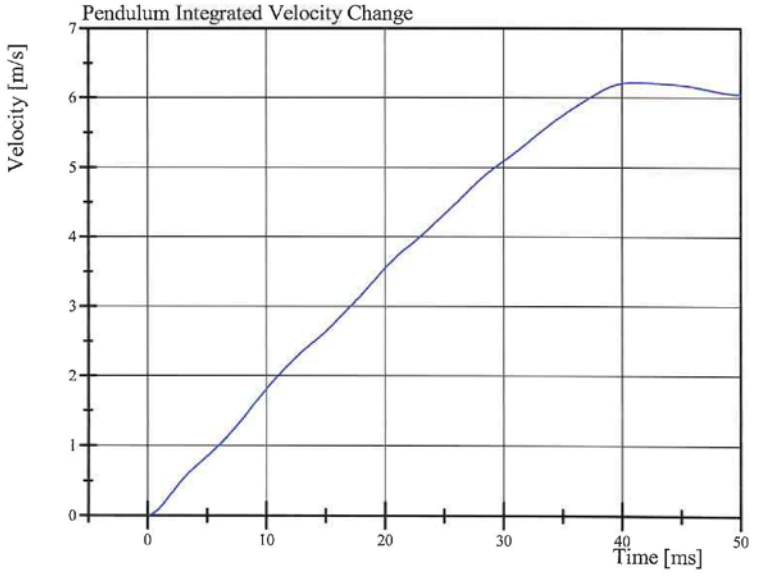
Neck Extension
HIII 5th Serial No. 426 Certification No. 26-1
Test Date: 4/1/2014

Pendulum Acceleration



Filter Class: CFC_180
Max: 23.1 g at 1.9 ms
Min: -3.6 g at 47.3 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 6.2 m/s at 41.1 ms
Min: 0.0 m/s at 0.0 ms

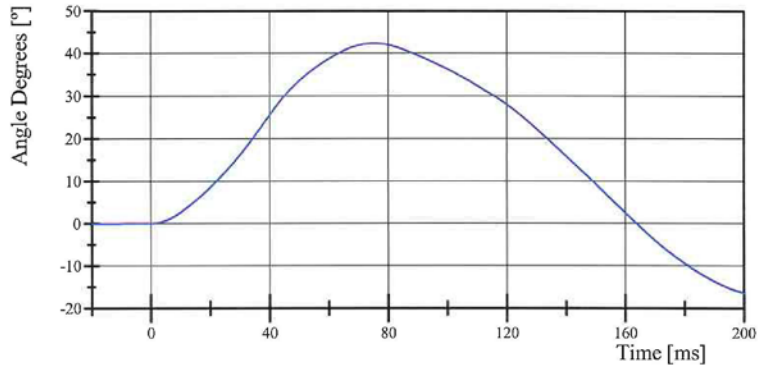
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

04.01.2014 16:15:08 1828

Transportation Research Center Inc.

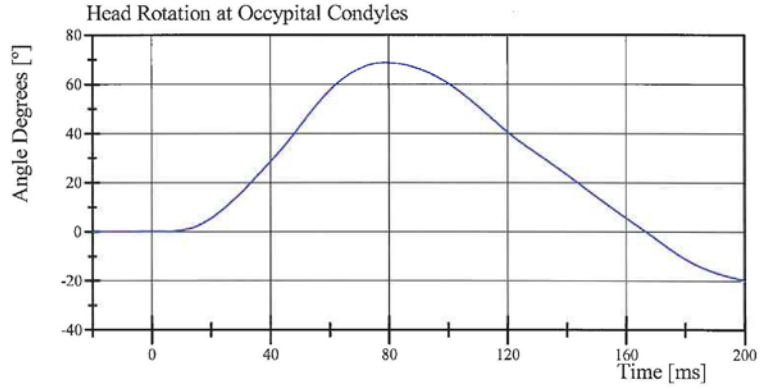
Neck Extension
HIII 5th Serial No. 426 Certification No. 26-1
Test Date: 4/1/2014

Pot Rotation at the Base of Neck



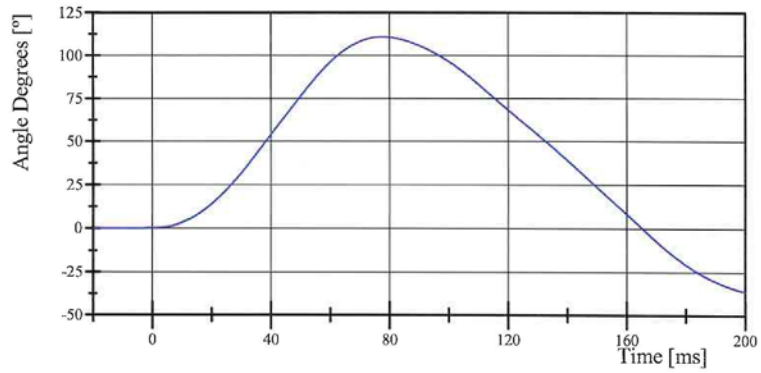
Filter Class: CFC_60
Max: 42.2 ° at 75.1 ms
Min: -16.5 ° at 200.0 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 68.6 ° at 78.7 ms
Min: -20.0 ° at 200.0 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 110.8 ° at 77.7 ms
Min: -36.5 ° at 200.0 ms

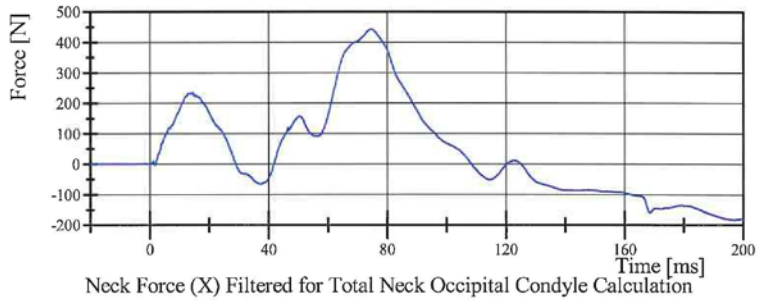
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

04.01.2014 16:15:08 1828

Transportation Research Center Inc.

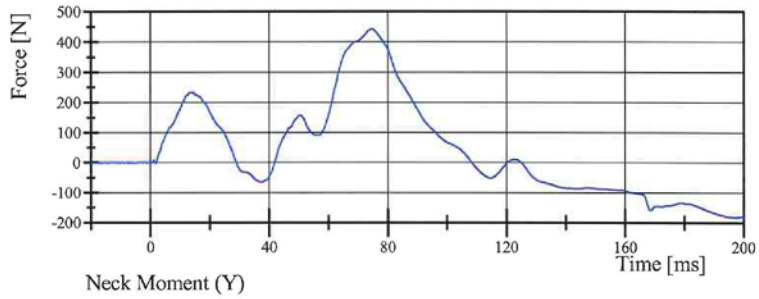
Neck Extension
HIII 5th Serial No. 426 Certification No. 26-1
Test Date: 4/1/2014

Neck Force (X)



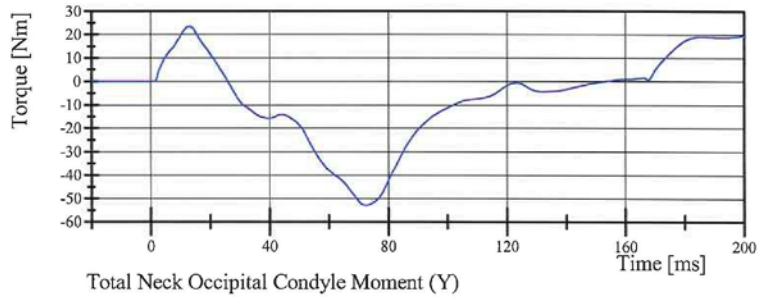
Filter Class: CFC_1000
Max: 443.2 N at 74.4 ms
Min: -184.5 N at 197.4 ms

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



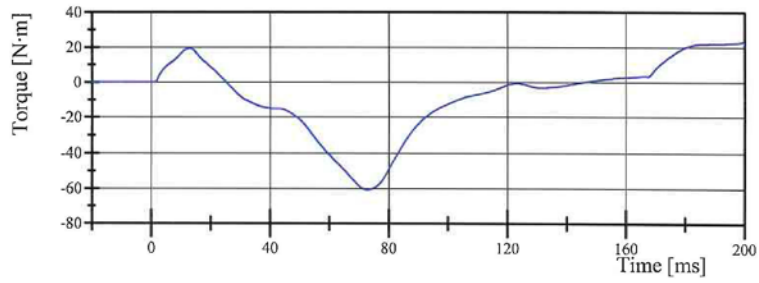
Filter Class: CFC_600
Max: 443.0 N at 74.5 ms
Min: -184.1 N at 197.3 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 23.4 Nm at 13.0 ms
Min: -53.1 Nm at 72.4 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constai
Max: 22.7 N·m at 200.0 ms
Min: -60.7 N·m at 72.9 ms

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

04.01.2014 16:15:09 1828

Transportation Research Center Inc.

Front Thorax
HIII 5th Serial No. 426 Certification No. 26-1
Test Date: 4/3/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.620 m/s	Yes
Probe Force Peak Between 50.0 mm and 58.0 mm Chest Deflection	(-3,900) - (-4,400) N	-4,103.3 N	Yes
Probe Force Peak Between 18.0 mm and 50.0 mm Chest Deflection	>= (-4,600) N	-4,380.5 N	Yes
Maximum Chest Compression	(-50) - (-58) mm	-50.1 mm	Yes
Internal Hysteresis	69 - 85 %	75.6 %	Yes

Test meets specifications.

Comments:

Technician

Approved

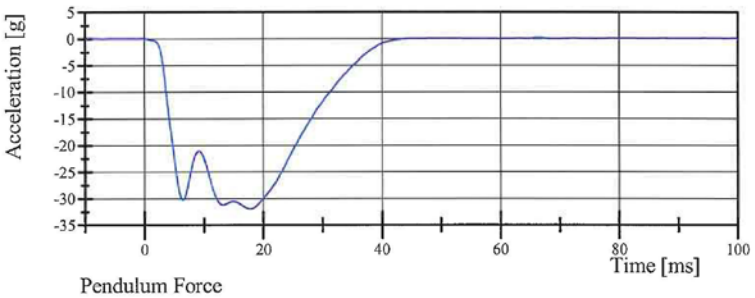
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

04.03.2014 07:19:07 393

Transportation Research Center Inc.

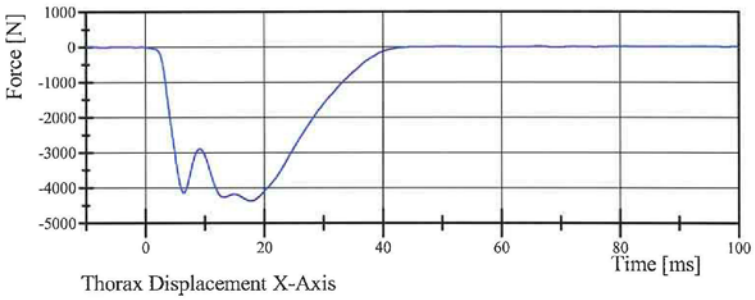
Front Thorax
HIII 5th Serial No. 426 Certification No. 26-1
Test Date: 4/3/2014

Pendulum Acceleration



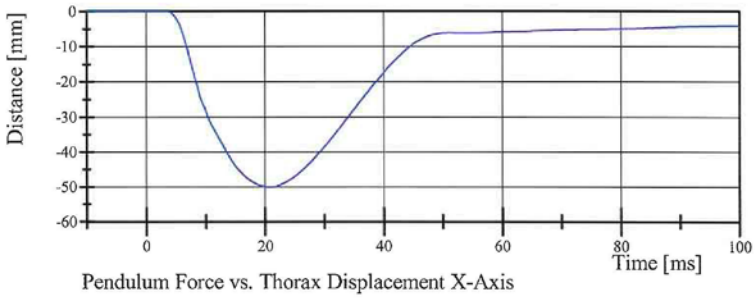
Filter Class: CFC_180
Max: 0.1 g at 66.2 ms
Min: -32.0 g at 17.8 ms

Pendulum Force



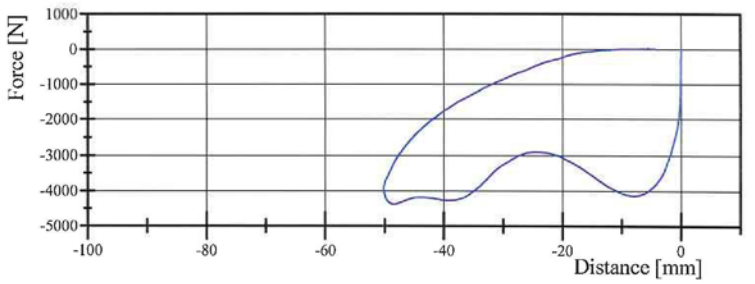
Filter Class: CFC_180
Max: 19.6 N at 66.2 ms
Min: -4,380.5 N at 17.8 ms

Thorax Displacement X-Axis



Filter Class: CFC_600
Max: 0.0 mm at -7.7 ms
Min: -50.1 mm at 20.8 ms

Pendulum Force vs. Thorax Displacement X-Axis



Filter Class: CFC_180
Max: 19.6 N at -5.6 mm
Min: -4,380.5 N at -48.5 mm

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

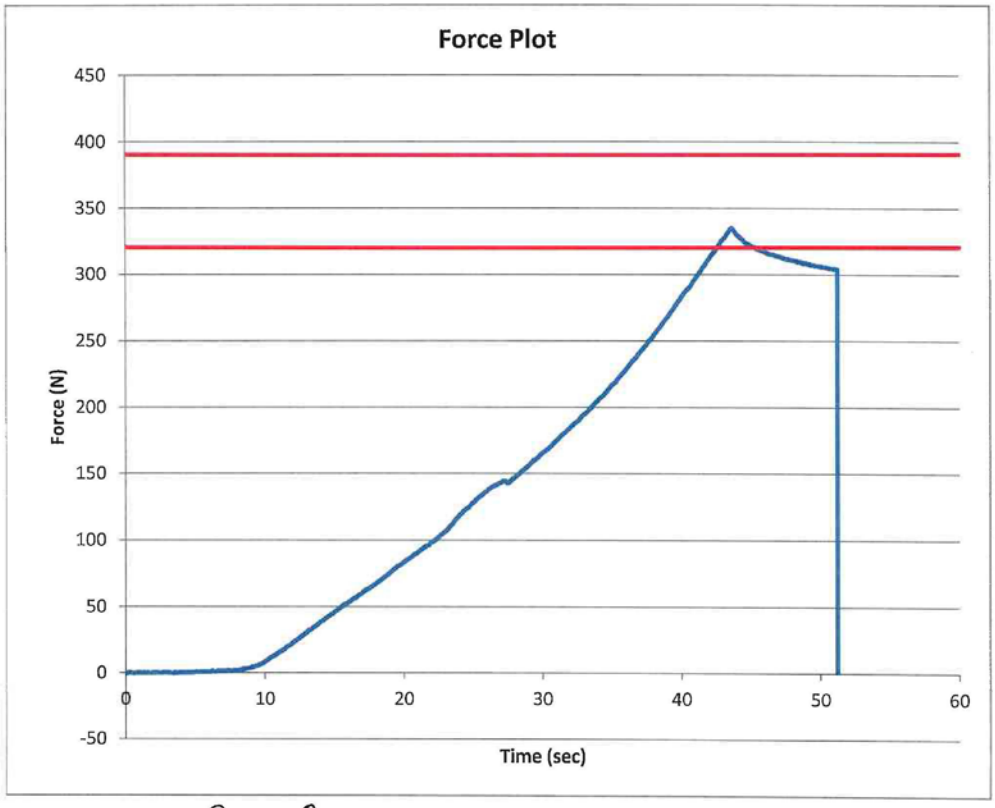
04.03.2014 07:20:17 393

Transportation Research Center Inc.

Hybrid III Small Female Torso Flexion

Serial Number:	426	Date:	4/1/2014
Test Number:	1	Time:	9:48
Comments:			

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	21.7	°C	Pass
Humidity	10	-	70	37	%	Pass
Average Angular Velocity	0.5	-	1.5	0.91	deg/sec	Pass
Initial Angle	0	-	20	13.2	deg	Pass
Peak Force at 45.19°	320	-	390	335.07	N	Pass
Final Angle	-8	-	8	6.13	deg	Pass



Technician

Approved

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 5th Serial No. 426 Certification No. 26-1
Test Date: 4/2/2014

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	22.0 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.123 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-3,864.8 N	Yes

Test meets specifications.

Comments:

Technician

Approved

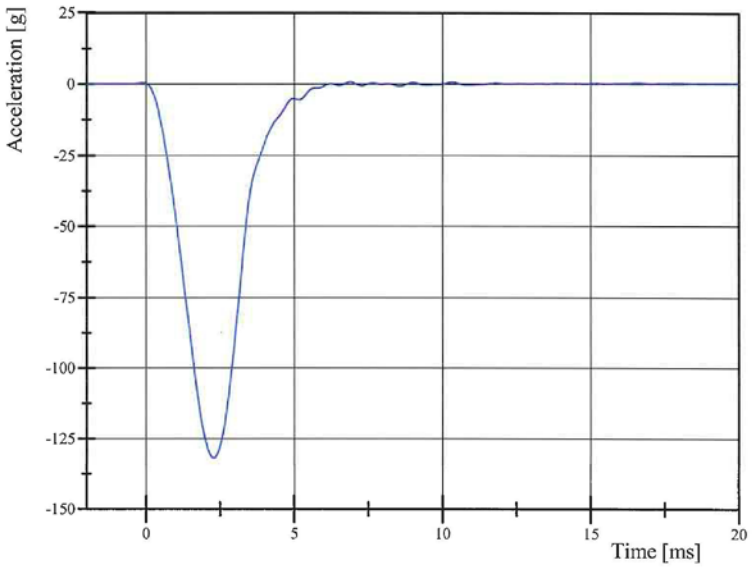
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

04.02.2014 09:30:30 1735

Transportation Research Center Inc.

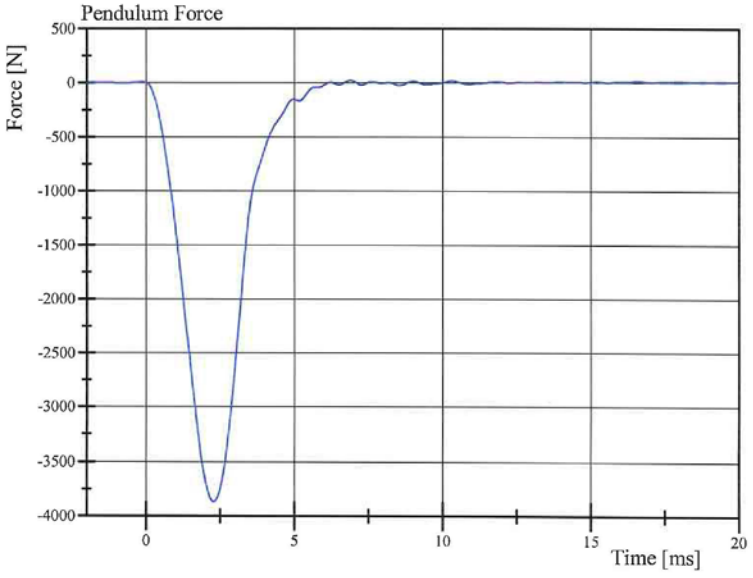
Left Knee Femur Response Test
HIII 5th Serial No. 426 Certification No. 26-1
Test Date: 4/2/2014

Pendulum Acceleration



Filter Class: CFC_600
Max: 0.8 g at 6.9 ms
Min: -131.8 g at 2.2 ms

Pendulum Force



Filter Class: CFC_600
Max: 23.5 N at 6.9 ms
Min: -3,864.8 N at 2.2 ms

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

04.02.2014 09:30:42 1735

Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 5th Serial No. 426 Certification No. 26-1
Test Date: 4/2/2014

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.097 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-3,793.4 N	Yes

Test meets specifications.

Comments:

Technician

Approved

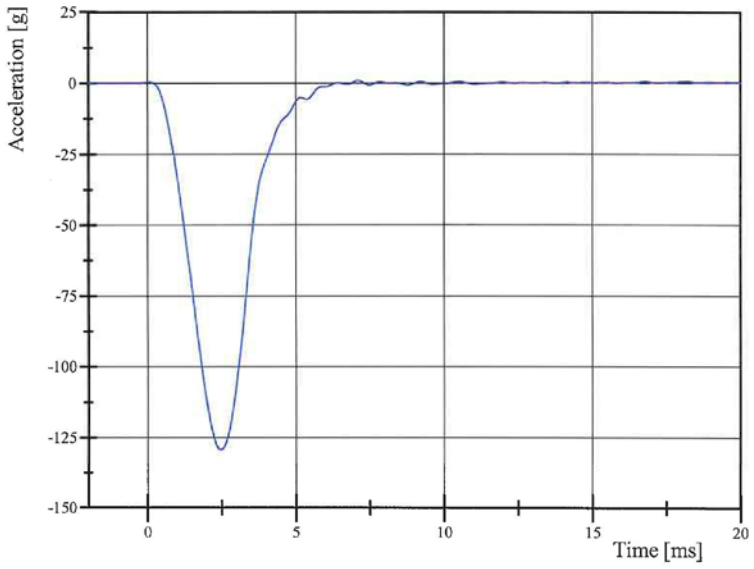
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

04.02.2014 10:44:39 1749

Transportation Research Center Inc.

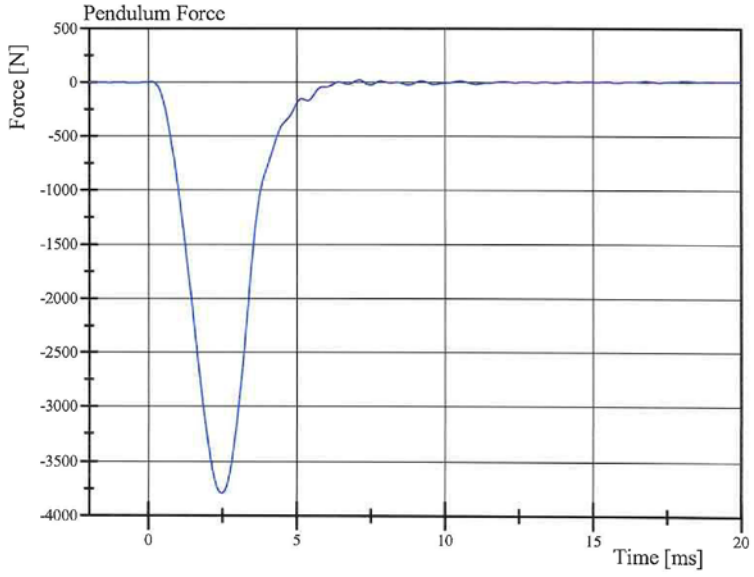
Right Knee Femur Response Test
HIII 5th Serial No. 426 Certification No. 26-1
Test Date: 4/2/2014

Pendulum Acceleration



Filter Class: CFC_600
Max: 0.9 g at 7.1 ms
Min: -129.4 g at 2.5 ms

Pendulum Force



Filter Class: CFC_600
Max: 25.7 N at 7.1 ms
Min: -3,793.4 N at 2.5 ms

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

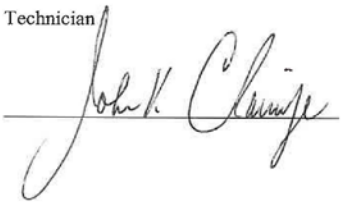
04.02.2014 10:44:51 1749

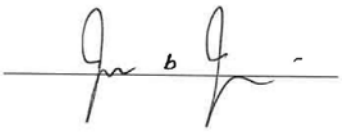
Passenger S/N 426

Post-Test Calibration Sheets

Transportation Research Center Inc.
572O HIII 5th Dummy
External Dimensions
Serial No. 426 Calibration No. 27

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	442	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	78	Yes
F	Thigh Clearance	119.4 - 134.6	129	Yes
G	Back of Elbow to Wrist Pivot	243.9 - 259.1	250	Yes
H	Head Back to Backline	43.2 - 48.2	45	Yes
I	Shoulder to Elbow Length	276.8 - 297.2	283	Yes
J	Elbow Rest Height	182.8 - 203.2	193	Yes
K	Buttock Knee Length	520.7 - 546.1	533	Yes
L	Popliteal Height	355.6 - 376.0	368	Yes
M	Knee Pivot Height	393.7 - 419.1	410	Yes
N	Buttock Popliteal Length	414.0 - 439.4	435	Yes
O	Chest Depth without Jacket	175.3 - 190.5	182	Yes
P	Foot Length	218.5 - 233.7	222	Yes
R	Buttock to Knee Pivot Length	457.2 - 482.6	473	Yes
S	Head Breadth	137.1 - 147.3	140	Yes
T	Head Depth	177.8 - 188.0	182	Yes
U	Hip Breadth	299.7 - 314.9	306	Yes
V	Shoulder Breadth	350.5 - 365.7	358	Yes
W	Foot Breadth	78.8 - 94.0	83	Yes
X	Head Circumference	528.3 - 548.7	539	Yes
Y	Chest Circumference with Jacket	850.9 - 881.3	864	Yes
Z	Waist Circumference	759.5 - 789.9	774	Yes
AA	Reference Location for Chest Circumference	332.7 - 358.1	345	Yes
BB	Reference Location for Waist Circumference	160.0 - 170.2	165	Yes

Technician 

Approved 

Revised 8/10/12

Transportation Research Center Inc.

Front Head Drop
HIII 5th Serial No. 426 Certification No. 27-1
Test Date: 4/10/2014

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Peak Head Resultant Acceleration	250 - 300 g	275.4 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	-1.4 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Approved

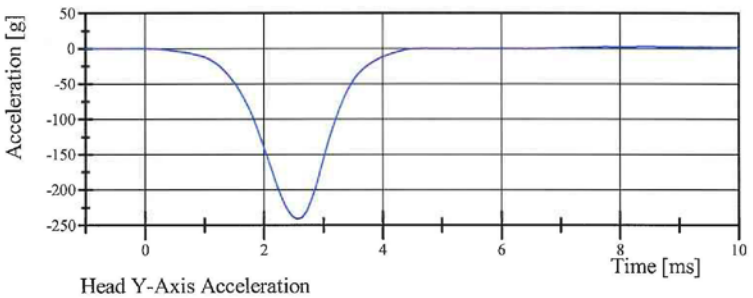
Specification Source: CFR49 Part 572 Subpart O with Polarity in accordance with J211

04.10.2014 11:01:39 608

Transportation Research Center Inc.

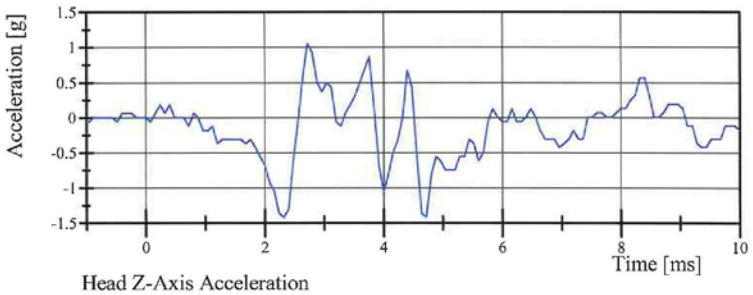
Front Head Drop
HIII 5th Serial No. 426 Certification No. 27-1
Test Date: 4/10/2014

Head X-Axis Acceleration



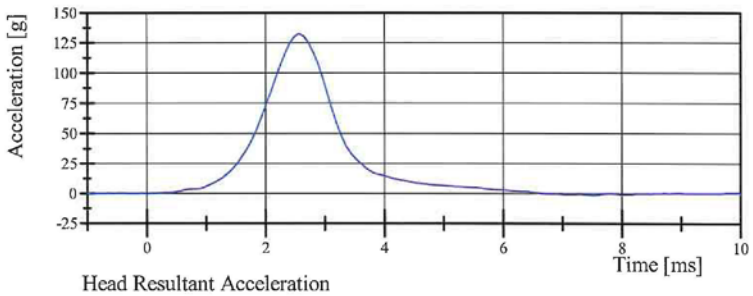
Filter Class: CFC_1000
Max: 2.2 g at 8.5 ms
Min: -241.4 g at 2.6 ms

Head Y-Axis Acceleration



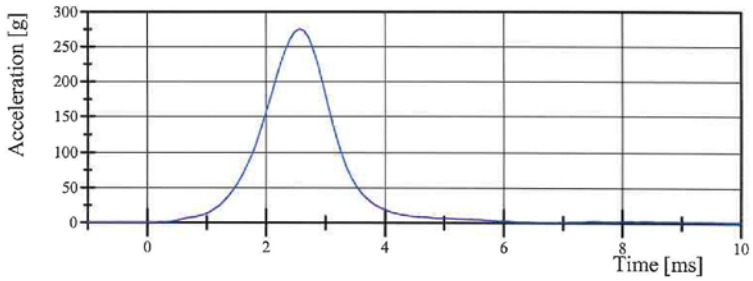
Filter Class: CFC_1000
Max: 1.1 g at 2.7 ms
Min: -1.4 g at 2.3 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 132.6 g at 2.6 ms
Min: -1.9 g at 7.5 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 275.4 g at 2.6 ms
Min: 0.0 g at -0.8 ms

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

04.10.2014 11:01:51 608

Transportation Research Center Inc.

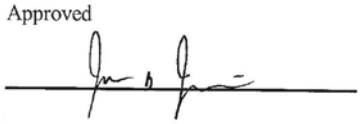
Neck Flexion
HIII 5th Serial No. 426 Certification No. 27-2
Test Date: 4/10/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	7.027 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	(-2.1) - (-2.5) m/s	-2.43 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	(-4.0) - (-5.0) m/s	-4.66 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	(-5.8) - (-7.0) m/s	-6.48 m/s	Yes
Total Head D-Plane Rotation	(-77) - (-91) °	-80.9 °	Yes
Total Neck Occipital Condyles Moment Between -77° and -91° Rotation	69 - 83 N·m	78.3 N·m	Yes
Total Neck Occipital Condyles Moment Decay to 10 N·m	80 - 100 ms	87.2 ms	Yes

Test meets specifications.

Comments:

Technician 

Approved 

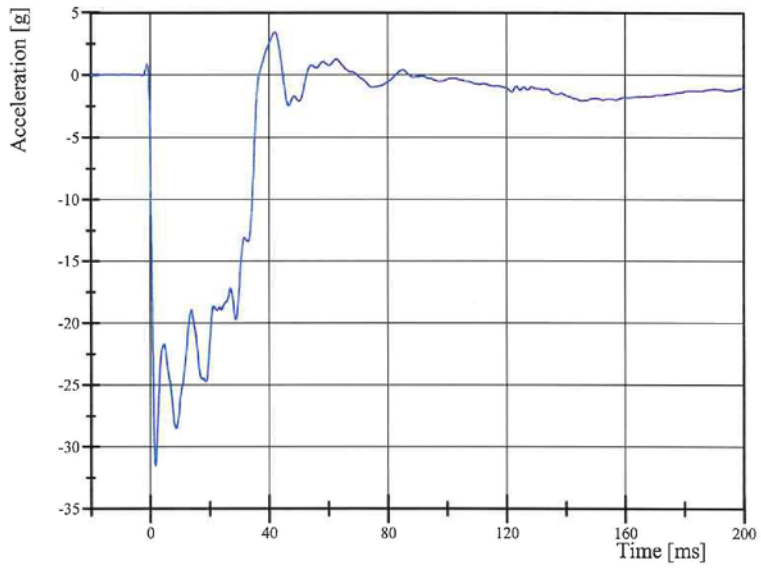
Specification Source: CFR49 Part 572 Subpart O with Polarity in accordance with J211

04.10.2014 13:42:45 1715

Transportation Research Center Inc.

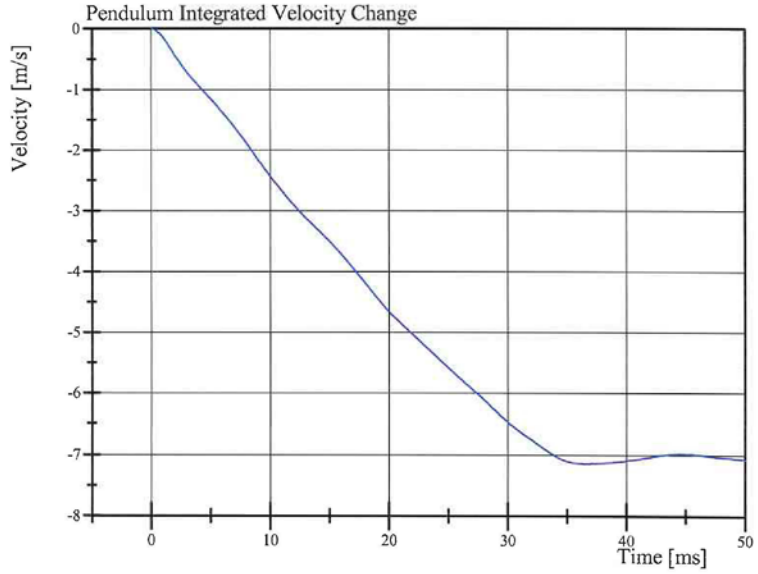
Neck Flexion
HIII 5th Serial No. 426 Certification No. 27-2
Test Date: 4/10/2014

Pendulum Acceleration



Filter Class: CFC_180
Max: 3.4 g at 42.0 ms
Min: -31.5 g at 1.7 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 0.0 m/s at 0.0 ms
Min: -7.1 m/s at 36.6 ms

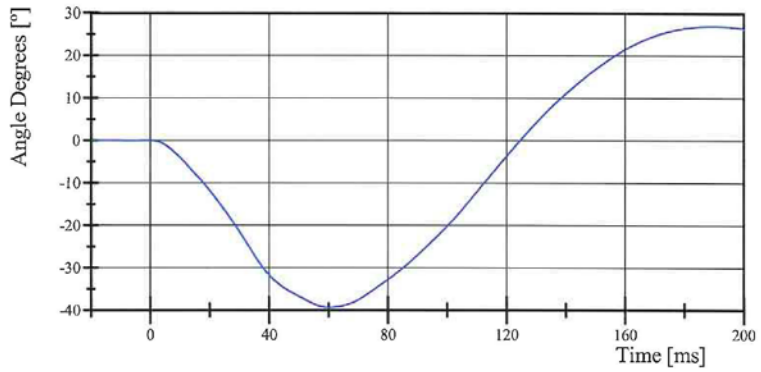
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

04.10.2014 13:42:55 1715

Transportation Research Center Inc.

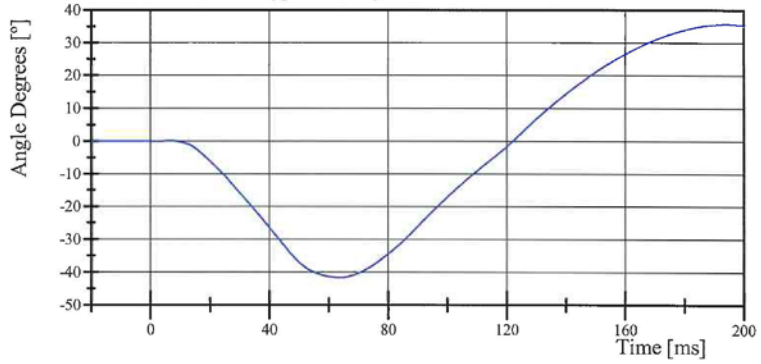
Neck Flexion
HIII 5th Serial No. 426 Certification No. 27-2
Test Date: 4/10/2014

Pot Rotation at the Base of Neck



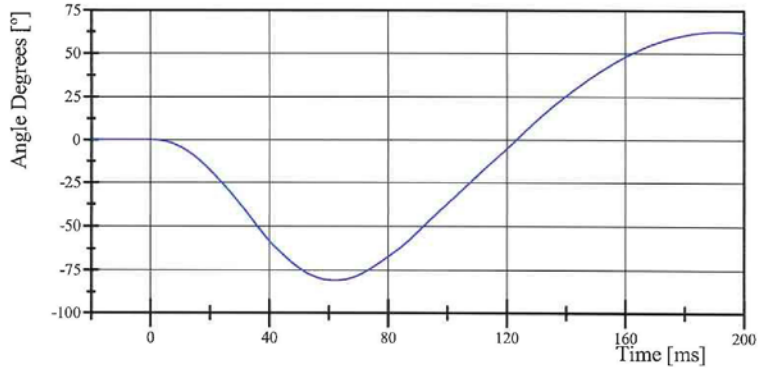
Filter Class: CFC_60
Max: 26.8 ° at 189.3 ms
Min: -39.4 ° at 60.0 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 35.5 ° at 194.0 ms
Min: -41.6 ° at 63.7 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 62.3 ° at 192.7 ms
Min: -80.9 ° at 62.3 ms

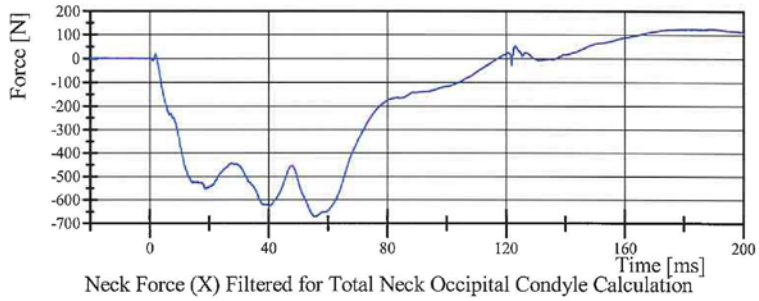
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

04.10.2014 13:42:56 1715

Transportation Research Center Inc.

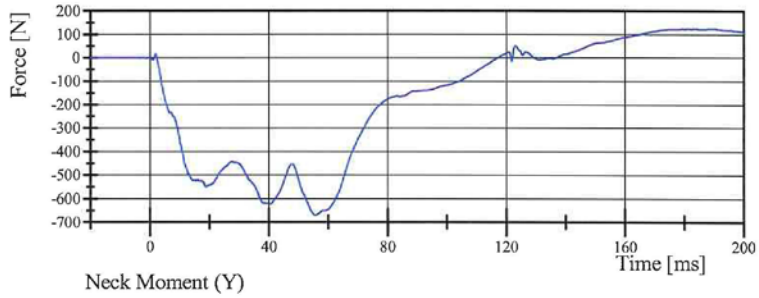
Neck Flexion
HIII 5th Serial No. 426 Certification No. 27-2
Test Date: 4/10/2014

Neck Force (X)



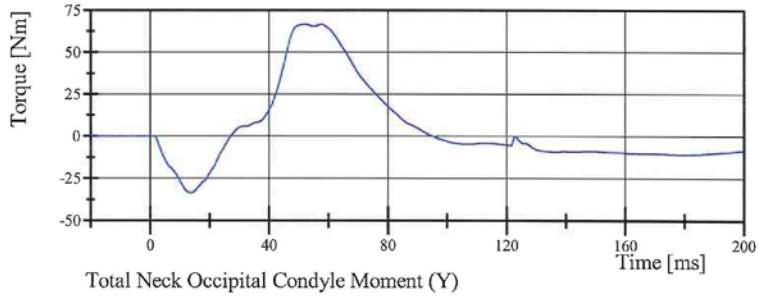
Filter Class: CFC_1000
Max: 123.1 N at 188.4 ms
Min: -671.1 N at 55.7 ms

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



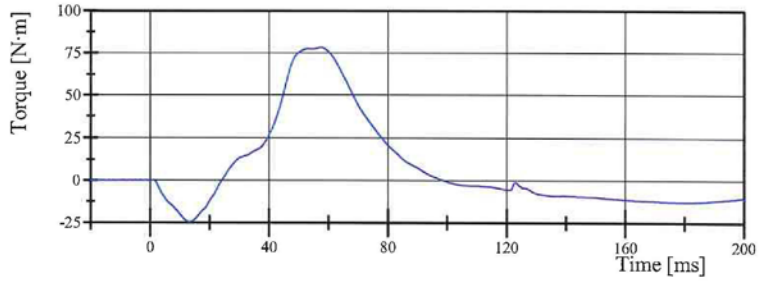
Filter Class: CFC_600
Max: 122.7 N at 189.1 ms
Min: -670.9 N at 55.6 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 66.6 Nm at 57.6 ms
Min: -33.6 Nm at 13.8 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Consta
Max: 78.3 N·m at 57.4 ms
Min: -24.5 N·m at 13.2 ms

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

04.10.2014 13:42:56 1715

Transportation Research Center Inc.

Neck Extension
HIII 5th Serial No. 426 Certification No. 27-1
Test Date: 4/10/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Pendulum Velocity	(-5.95) - (-6.19) m/s	-6.122 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	1.5 - 1.9 m/s	1.89 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	5.28 m/s	Yes
Total Head D-Plane Rotation	99 - 114 °	109.3 °	Yes
Total Neck Occipital Condyles Moment Between 99° and 114° Rotation	(-53) - (-65) N·m	-61.5 N·m	Yes
Total Neck Occipital Condyles Moment Decay to -10 N·m	94 - 114 ms	103.6 ms	Yes

Test meets specifications.

Comments:

Technician

Approved

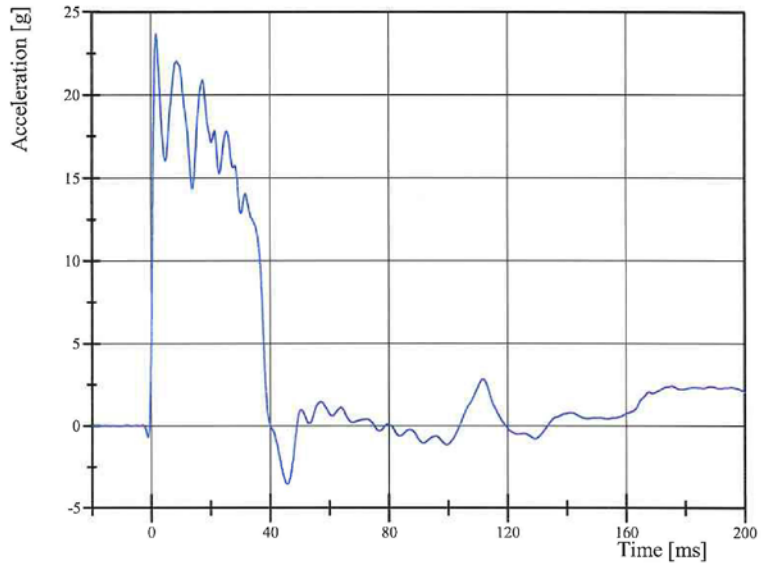
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

04.10.2014 14:17:35 1830

Transportation Research Center Inc.

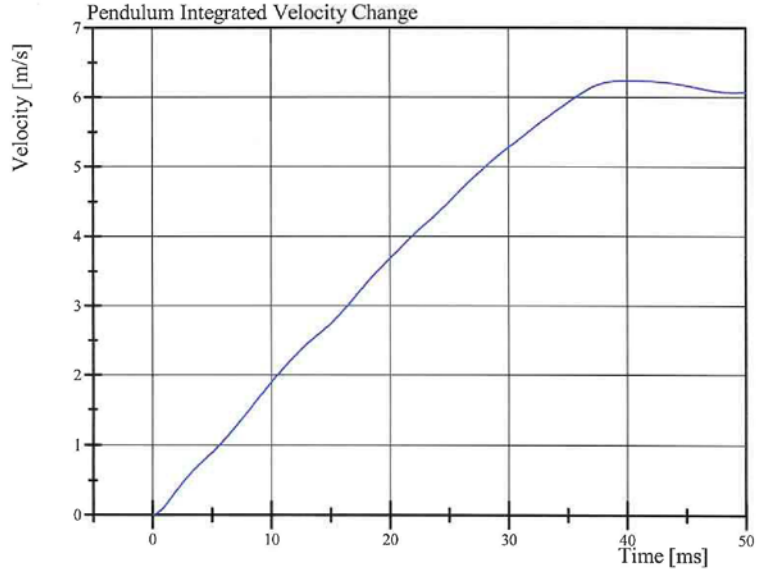
Neck Extension
HIII 5th Serial No. 426 Certification No. 27-1
Test Date: 4/10/2014

Pendulum Acceleration



Filter Class: CFC_180
Max: 23.7 g at 1.7 ms
Min: -3.5 g at 45.8 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 6.2 m/s at 40.0 ms
Min: 0.0 m/s at 0.0 ms

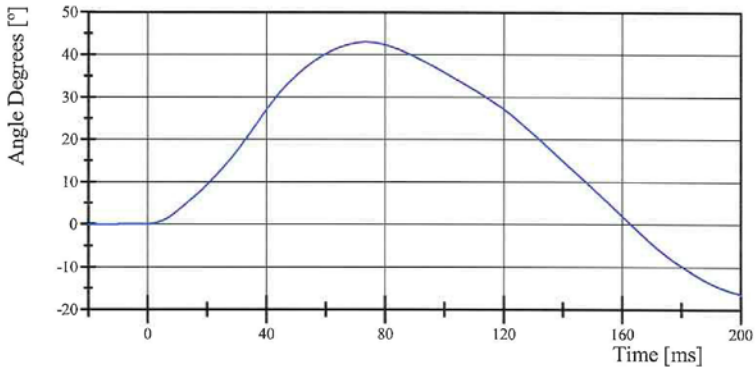
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

04.10.2014 14:17:44 1830

Transportation Research Center Inc.

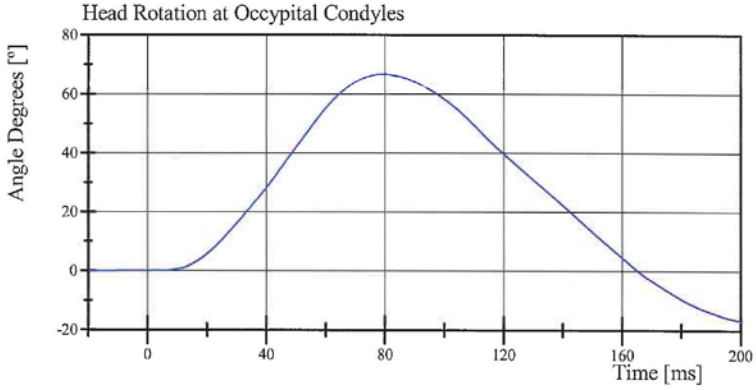
Neck Extension
HIII 5th Serial No. 426 Certification No. 27-1
Test Date: 4/10/2014

Pot Rotation at the Base of Neck



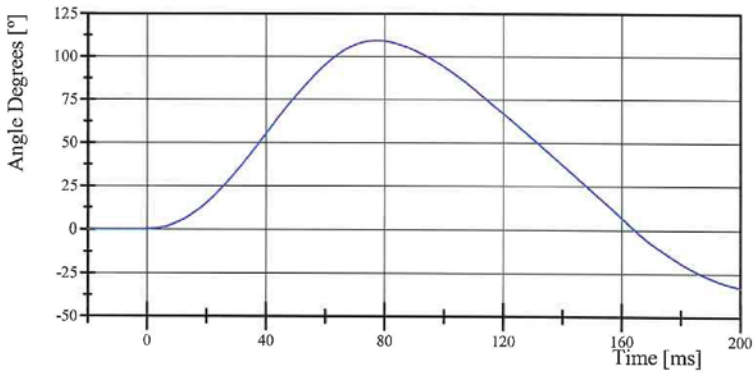
Filter Class: CFC_60
Max: 42.9 ° at 73.3 ms
Min: -16.5 ° at 200.0 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 66.7 ° at 79.1 ms
Min: -16.9 ° at 200.0 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 109.3 ° at 77.4 ms
Min: -33.3 ° at 200.0 ms

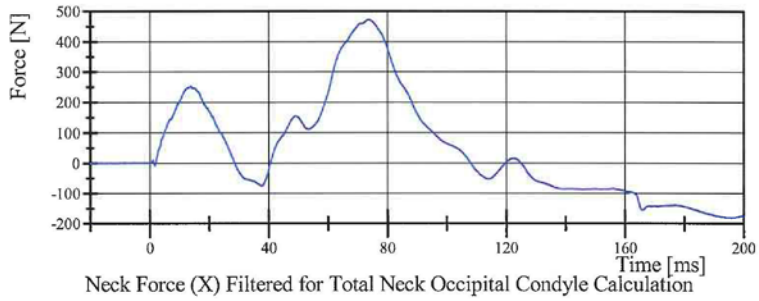
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

04.10.2014 14:17:45 1830

Transportation Research Center Inc.

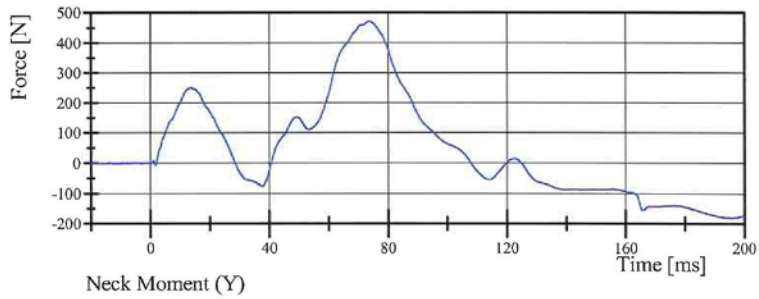
Neck Extension
HIII 5th Serial No. 426 Certification No. 27-1
Test Date: 4/10/2014

Neck Force (X)



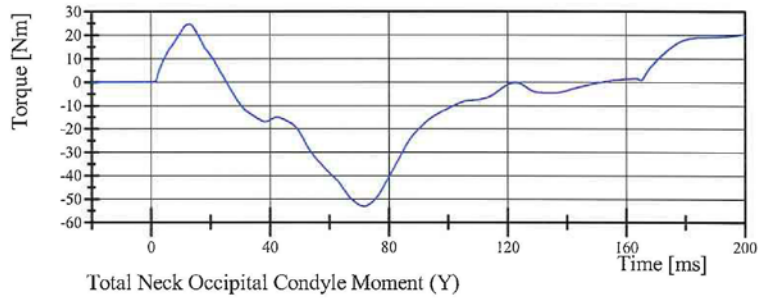
Filter Class: CFC_1000
Max: 471.5 N at 73.6 ms
Min: -183.3 N at 195.8 ms

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



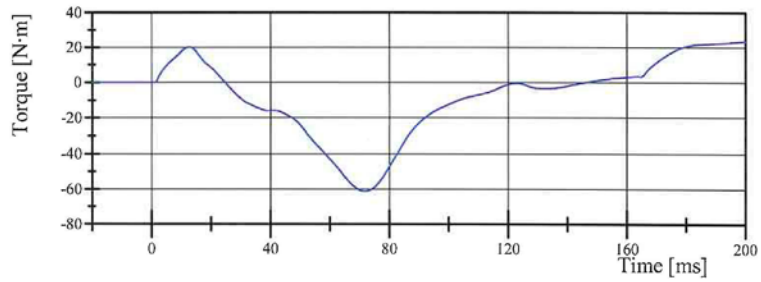
Filter Class: CFC_600
Max: 471.0 N at 73.7 ms
Min: -182.8 N at 195.8 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 24.6 Nm at 12.9 ms
Min: -53.3 Nm at 71.7 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constai
Max: 23.3 N·m at 200.0 ms
Min: -61.5 N·m at 71.8 ms

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

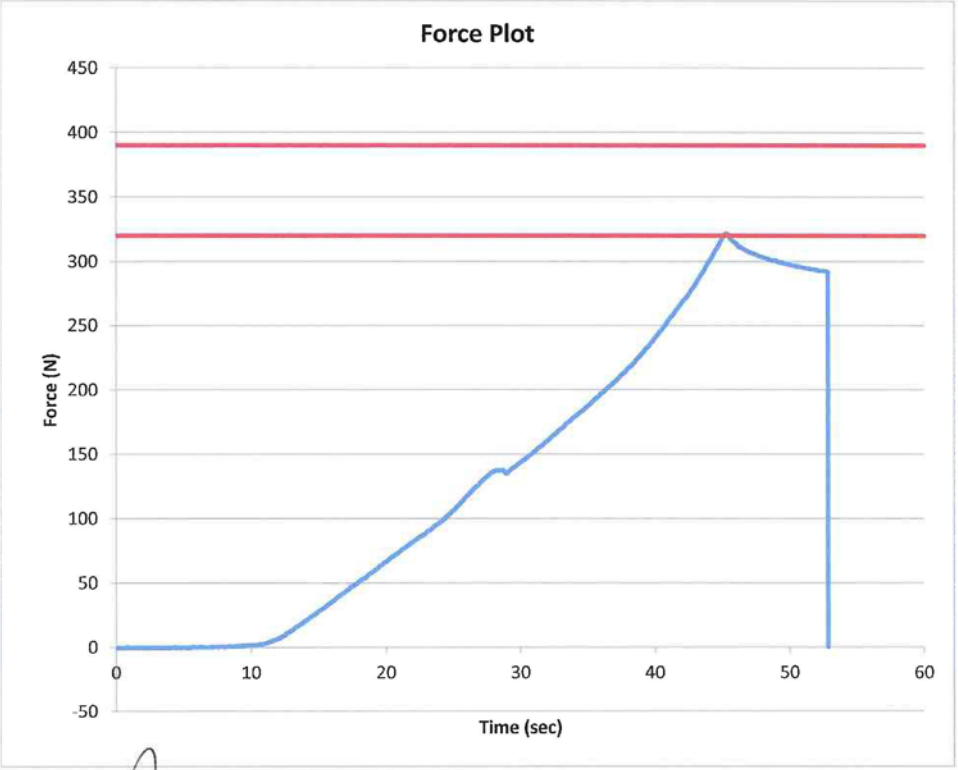
04.10.2014 14:17:45 1830

Transportation Research Center Inc.

Hybrid III Small Female Torso Flexion

Serial Number:	426	Date:	4/10/2014
Test Number:	1	Time:	8:29
Comments:			

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	21.3	°C	Pass
Humidity	10	-	70	35	%	Pass
Average Angular Velocity	0.5	-	1.5	0.89	deg/sec	Pass
Initial Angle	0	-	20	14.71	deg	Pass
Peak Force at 45.19°	320	-	390	321.82	N	Pass
Final Angle	-8	-	8	5.6	deg	Pass



Technician

Approved

Transportation Research Center Inc.

Front Thorax
HIII 5th Serial No. 426 Certification No. 27-1
Test Date: 4/10/2014

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	43 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.595 m/s	Yes
Probe Force Peak Between 50.0 mm and 58.0 mm Chest Deflection	(-3,900) - (-4,400) N	-4,273.8 N	Yes
Probe Force Peak Between 18.0 mm and 50.0 mm Chest Deflection	>= (-4,600) N	-4,322.4 N	Yes
Maximum Chest Compression	(-50) - (-58) mm	-51.1 mm	Yes
Internal Hysteresis	69 - 85 %	76.0 %	Yes

Test meets specifications.

Comments:

Technician

Approved

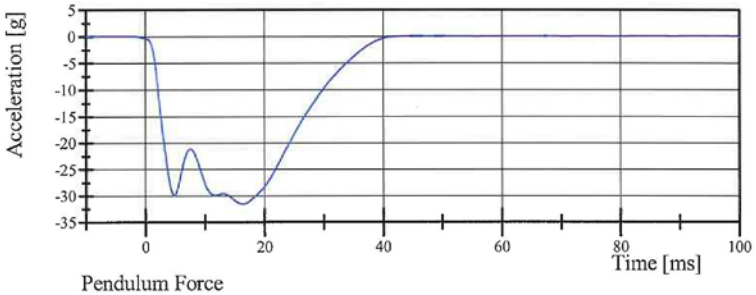
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

04.10.2014 15:59:55 439

Transportation Research Center Inc.

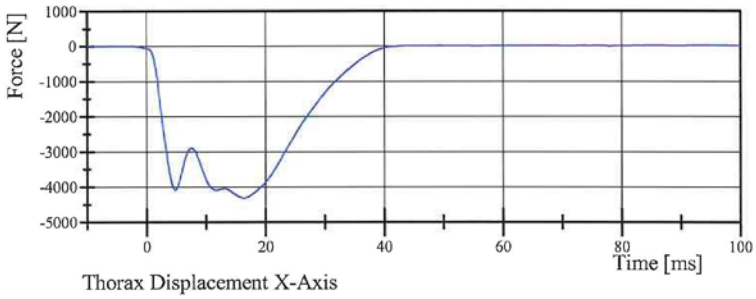
Front Thorax
HIII 5th Serial No. 426 Certification No. 27-1
Test Date: 4/10/2014

Pendulum Acceleration



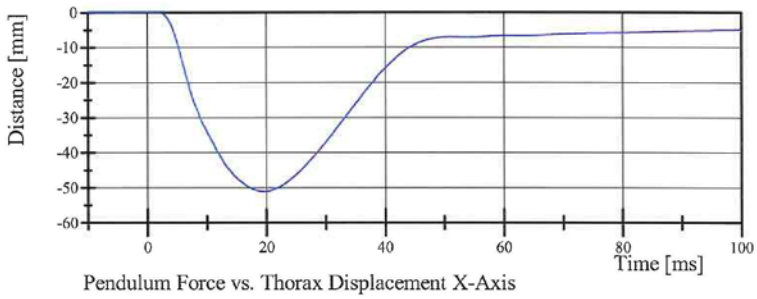
Filter Class: CFC_180
Max: 0.1 g at 49.4 ms
Min: -31.6 g at 16.3 ms

Pendulum Force



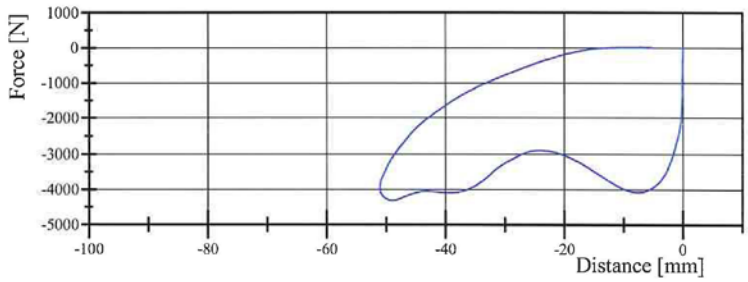
Filter Class: CFC_180
Max: 15.5 N at 49.4 ms
Min: -4,322.4 N at 16.3 ms

Thorax Displacement X-Axis



Filter Class: CFC_600
Max: 0.0 mm at -6.6 ms
Min: -51.1 mm at 19.4 ms

Pendulum Force vs. Thorax Displacement X-Axis



Filter Class: CFC_180
Max: 15.5 N at -7.2 mm
Min: -4,322.4 N at -49.0 mm

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

04.10.2014 16:00:06 439

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 5th Serial No. 426 Certification No. 27-1
Test Date: 4/10/2014

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.118 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-3,944.3 N	Yes

Test meets specifications.

Comments:

Technician

Approved

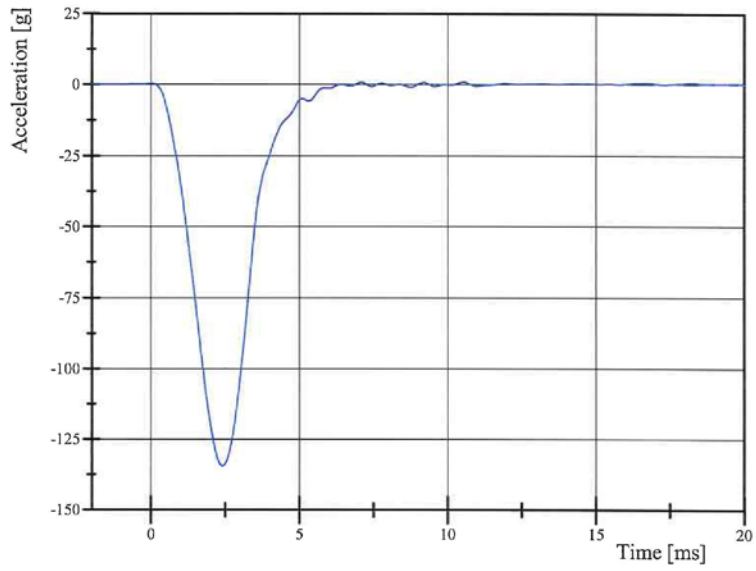
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

04.10.2014 13:23:25 1868

Transportation Research Center Inc.

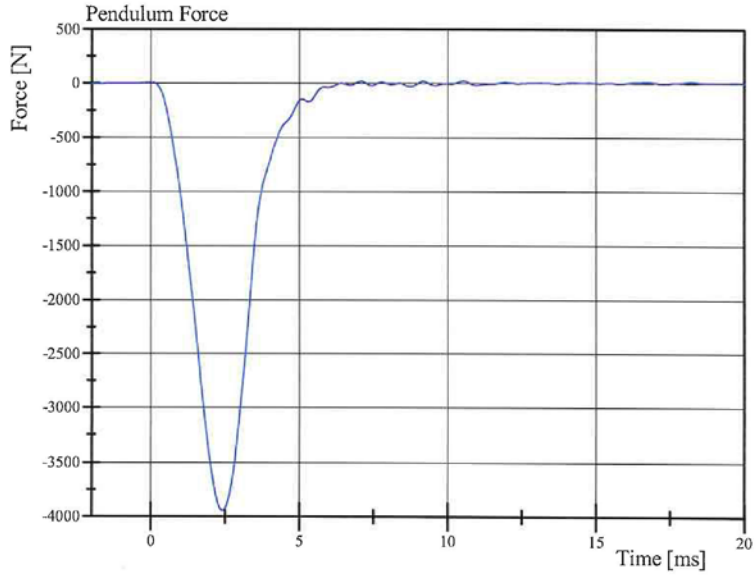
Left Knee Femur Response Test
HIII 5th Serial No. 426 Certification No. 27-1
Test Date: 4/10/2014

Pendulum Acceleration



Filter Class: CFC_600
Max: 0.8 g at 10.5 ms
Min: -134.5 g at 2.4 ms

Pendulum Force



Filter Class: CFC_600
Max: 23.9 N at 10.5 ms
Min: -3,944.3 N at 2.4 ms

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

04.10.2014 13:23:44 1868

Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 5th Serial No. 426 Certification No. 27-1
Test Date: 4/10/2014

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	42 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.120 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-3,822.2 N	Yes

Test meets specifications.

Comments:

Technician

Approved

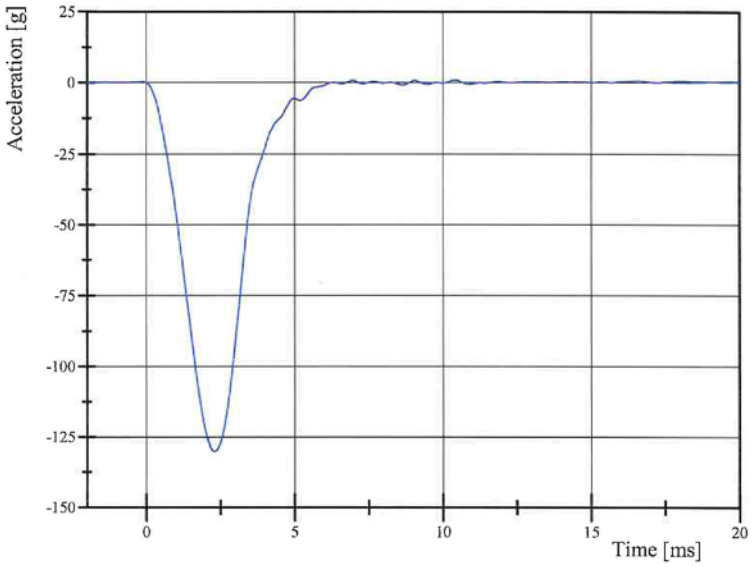
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

04.10.2014 13:33:15 1870

Transportation Research Center Inc.

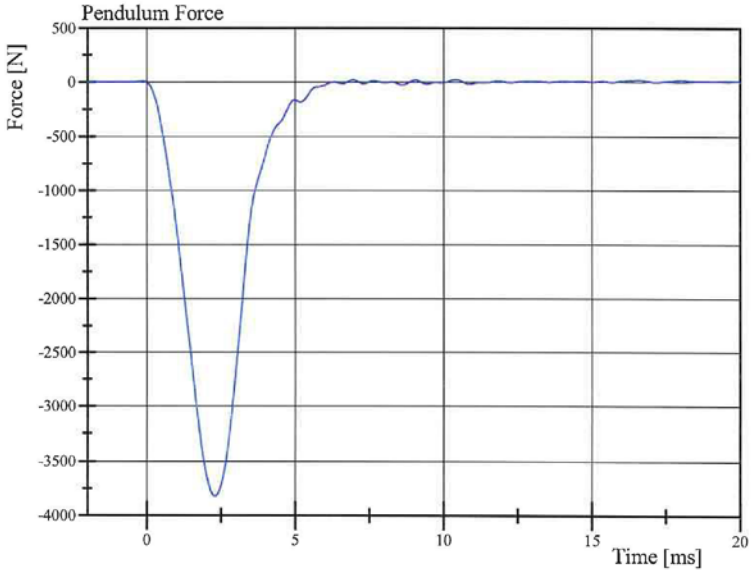
Right Knee Femur Response Test
HIII 5th Serial No. 426 Certification No. 27-1
Test Date: 4/10/2014

Pendulum Acceleration



Filter Class: CFC_600
Max: 0.8 g at 10.4 ms
Min: -130.4 g at 2.3 ms

Pendulum Force



Filter Class: CFC_600
Max: 23.6 N at 10.4 ms
Min: -3,822.2 N at 2.3 ms

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

04.10.2014 13:33:26 1870