

REPORT NUMBER: NCAP-MGA-2014-064

**NEW CAR ASSESSMENT PROGRAM (NCAP)
Frontal Barrier Impact Test**

**GENERAL MOTORS LLC
2015 Chevrolet Suburban 4WD 1500 LS SUV
NHTSA No.: M20150106**

**MGA RESEARCH CORPORATION
5000 Warren Road
Burlington, WI 53105**



Test Date: May 13, 2014

Final Report Date: June 12, 2014

FINAL REPORT

**U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Office of Crashworthiness Standards
Mail Code: NVS-111
1200 New Jersey Ave, SE
Room W43-410
Washington, DC 20590**

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Approval Date: June 12, 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

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Technical Report Documentation Page

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		16. Abstract A 56.3 km/h NCAP Frontal Impact Test was conducted on a 2015 Chevrolet Suburban 4WD 1500 LS 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), and 301 performance. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on May 13, 2014. The impact velocity of the vehicle was 56.4 km/h and the ambient temperature at the barrier face at the time of impact was 21.8°C. The target vehicle post-test maximum crush was 976 located at the vehicle's centerline. The test vehicle's performance was as follows: <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th rowspan="2">Units</th> <th colspan="2">Driver ATD</th> <th colspan="2">Passenger ATD</th> </tr> <tr> <th>Threshold</th> <th>Result</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₁₅)</td> <td>N/A</td> <td>700</td> <td>318</td> <td>700</td> <td>227</td> </tr> <tr> <td>Maximum Chest</td> <td>mm</td> <td>63</td> <td>19</td> <td>52</td> <td>8</td> </tr> <tr> <td>Nij</td> <td>N/A</td> <td>1</td> <td>0.36</td> <td>1</td> <td>0.43</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>4170</td> <td>1563</td> <td>2620</td> <td>881</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>4000</td> <td>975</td> <td>2520</td> <td>534</td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>10008</td> <td>1153</td> <td>6805</td> <td>951</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>10008</td> <td>1967</td> <td>6805</td> <td>1991</td> </tr> </tbody> </table>				Measurement Description	Units	Driver ATD		Passenger ATD		Threshold	Result	Threshold	Result	Head Injury Criteria (HIC ₁₅)	N/A	700	318	700	227	Maximum Chest	mm	63	19	52	8	Nij	N/A	1	0.36	1	0.43	Neck Tension	N	4170	1563	2620	881	Neck Compression	N	4000	975	2520	534	Left Femur Force	N	10008	1153	6805	951	Right Femur Force	N	10008	1967
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SECTION 1 PURPOSE AND SUMMARY OF TEST

PURPOSE

This 56.3 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 number DTNH22-12-D-00258. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for consumer information purposes.

The 56.3 km/h frontal barrier impact was conducted in accordance with the Office of Crashworthiness Standards Frontal NCAP Laboratory Test Procedure.

SUMMARY

A load cell barrier consisting of 176 load cells was impacted by a 2015 Chevrolet Suburban 4WD 1500 LS SUV at a velocity of 56.4 km/h. The test was performed at MGA Research Corporation on May 13, 2014. Pre-test and post-test photographs of the vehicle and dummies can be found in Appendix A.

Two (2) real-time cameras and fourteen (14) 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 test device (ATD) was placed in the right-front passenger seating 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 transducers, right/left femur load cells, and lower leg instrumentation. Seat belt load cells were also installed on the driver's shoulder belt and the passenger's shoulder belt to measure dummy torso loading.

The driver (position 1) ATD (Serial No. 351) and the right-front passenger (position 2) ATD (Serial No. 634) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C of this report.

The 628 channels of data were recorded on a data acquisition system. Appendix B contains the dummy response data traces.

There was 89 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 976 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: The driver's head and chest contacted the airbag. The driver's head also contacted the headrest. The driver's knees contacted the knee bolster. The passenger's visible contact points were as follows: The passenger's head and chest contacted the airbag. The passenger's head also contacted the headrest. The passenger's knees contacted the glovebox and frontal airbag.

The occupant data is summarized below:

ATD position	HIC ₁₅	Nij	Neck Tension (N)	Neck Comp. (N)	3ms Chest Clip (Gs)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver (50 th)	318	0.36	1563	975	46	19	1153	1967
Passenger (5 th)	227	0.43	881	534	39	8	951	1991

The test data can be found on the NHTSA website at www.nhtsa.dot.gov.

TEST NOTES

Passenger Left Ankle X has no valid data after 100ms

MGA does not endorse or certify products. The manufacturer's name appears solely for identification purposes.

SECTION 2
OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 Chevrolet Suburban 4WD 1500 LS SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20150106
Test Date: 5/13/2014

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20150106	Traction Control System (TCS)	Yes
Model Year	2015	Power Steering	Yes
Make	Chevrolet	Power Window Auto-Reverse	Yes
Model	Suburban 1500	Driver Frontal Airbag	Yes
Body Style	MPV	Driver Curtain Airbag	Yes
VIN	1GNSKHKC2FR123254	Driver Head/Torso Airbag	No
Body Color	Silver Ice Metallic	Driver Torso Airbag	No
Odometer (km/mi)	243 / 151	Driver Torso/Pelvis Airbag	Yes
Engine Displacement (L)	5.3	Driver Pelvis Airbag	No
Type/No. Cylinders	8	Driver Knee Airbag	No
Engine Placement	Longitudinal	Front Pass. Frontal Airbag	Yes
Transmission Type	Automatic	Front Pass. Curtain Airbag	Yes
Transmission Speeds	6	Front Pass. Head/Torso Airbag	No
Overdrive	Yes	Front Pass. Torso Airbag	No
Final Drive	4WD	Front Pass. Torso/Pelvis Airbag	Yes
Roof Rack	Yes	Front Pass. Pelvis Airbag	No
Sunroof/T-Top	No	Front Pass. Knee Airbag	No
Running Boards	Yes	Driver Pretensioner	Yes
Tilt Steering Wheel	Yes	Driver Load Limiter	Yes
Power Seats	Yes	Front Pass. Pretensioner	Yes
Anti-Lock Brakes (ABS)	Yes	Front Pass. Load Limiter	Yes
Automatic Door Locks (ADLs)	Yes	Driver Inboard Seat Airbag	Yes

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

DATA FROM CERTIFICATION LABEL

Manufactured By	General Motors LLC	GVWR (kg)	3402
Date of Manufacture	03/14	GAWR Front (kg)	1633
		GAWR Rear (kg)	1996

VEHICLE SEATING AND WEIGHT CAPACITY DATA

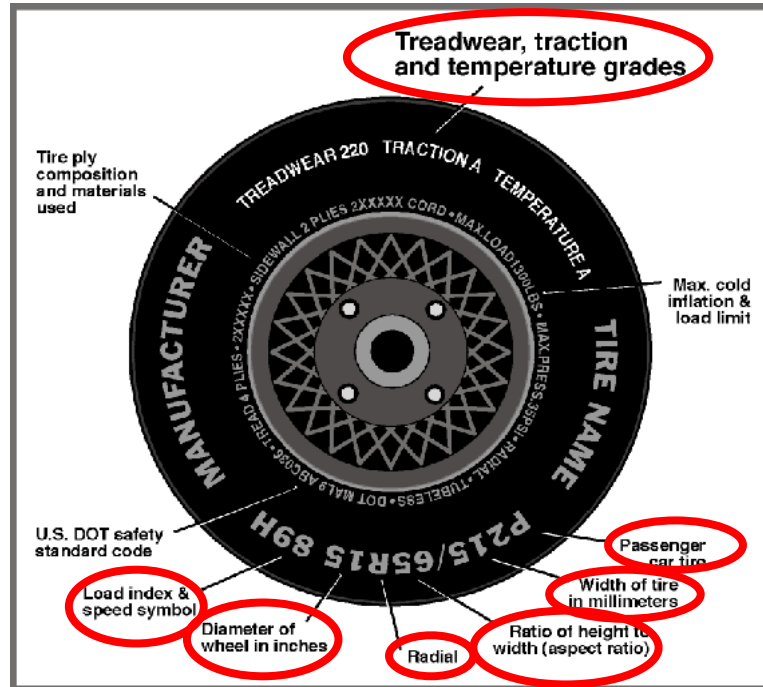
Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Split Bench	Split Bench	
Designated Seating Capacity (DSC)	2	3	3	8
Capacity Weight (VCW) (kg)				711
Cargo Weight (RCLW) (kg)				167

DATA SHEET NO. 1 (CONTINUED)
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 Chevrolet Suburban 4WD 1500 LS SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20150106
 Test Date: 5/13/2014

VEHICLE TIRE INFORMATION



Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	240	240
Recommended Tire Size	P265/65R18	P265/65R18
Tire Size on Vehicle	P265/65R18	P265/65R18
Tire Manufacturer	Goodyear	Goodyear
Tire Model	Assurance CS	Assurance CS
Treadwear	600	600
Traction	A	A
Temperature Grade	B	B
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel 1 Polyamide	2 Polyester, 2 Steel 1 Polyamide
Load Index/Speed Symbol	112T	112T
Tire Material	Rubber	Rubber
DOT Safety Code Left	PJXP JK1R 0714	PJXP JK1R 0714
DOT Safety Code Right	PJXP JK1R 0714	PJXP JK1R 0714

DATA SHEET NO. 1 (CONTINUED)
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 Chevrolet Suburban 4WD 1500 LS SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20150106
 Test Date: 5/13/2014

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	699.5	650.5		714.0	763.0	
Right	kg	672.2	630.5		687.7	758.0	
Ratio	%	51.7	48.3		48.0	52.0	
Totals	kg	1371.7	1281.0	2652.7	1401.7	1521.0	2922.7

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	2652.7
Weight of 1 P572E ATD & 1 P572O ATD	kg	140.6
Rated Cargo/Luggage Weight (RCLW)	kg	136
Calculated Test Vehicle Target Weight (TVTW)	kg	2929.3

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	930	938	958	958	1598
As Tested	mm	910	906	913	915	1723
Post Test	mm	893	912	929	912	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	3310
Total Vehicle Length at Left Side	mm	5565
Total Vehicle Length at Centerline	mm	5987
Total Vehicle Length at Right Side	mm	5565
Weight of Ballast in Cargo Area	kg	139.3
Weight of Vehicle Components Removed	kg	27.2
Amount of Stoddard Solvent in Fuel Tank	L	110.9

List of components removed to meet test weight: Right taillight, rear floor mats, and cargo area carpet/divider/cover.

DATA SHEET NO. 1 (CONTINUED)
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 Chevrolet Suburban 4WD 1500 LS SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20150106
 Test Date: 5/13/2014

TARGET VEHICLE STRUCTURAL MEASUREMENT

	Elements	Pre-Test (mm)
1	Total Length	5987
2	Total Width	2003
3	Bumper Top Height	666
4	Bumper Bottom Height	546
5	Longitudinal Member Top Height	607
6	Distance between Longitudinal Members	716
7	Longitudinal Member Width	90
8	Engine Top Height	1166
9	Engine Bottom Height	324
10	Engine and Gearbox Width	1372
11	Front Bumper-Engine Distance	604
12	Front Shock Absorber Fixing Height	775
13	Bonnet Leading Edge Height	1116
14	Front Shock Absorber Fixing Width	957
15	Front Bumper – Front Axle Distance	1331
16	Front Axle – A-Pillar Distance	572
17	A-Pillar – B-Pillar Distance	1154
18	B-Pillar – Rear Axle Distance	1575
19	B-Pillar – C-Pillar Distance	1052
20	Roof Sill Bottom Height	1704
21	Roof Sill Top Height	1805
22	Floor Sill Bottom Height	410
23	Floor Sill Top Height	508

DATA SHEET NO. 2

SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

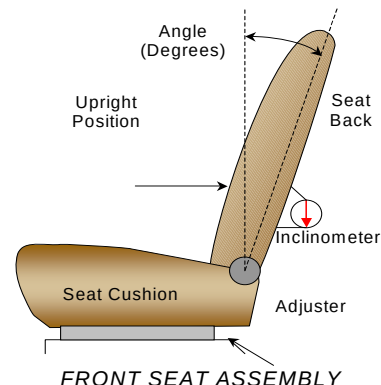
Test Vehicle: 2015 Chevrolet Suburban 4WD 1500 LS SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20150106
 Test Date: 5/13/2014

NOMINAL DESIGN RIDING POSITION

The driver seat back is positioned as close as possible to the manufacturer's design angle. For the passenger seat back, seat back is adjusted following Appendix F, "Driver & Passenger Dummy Seating & Positioning Procedures" in the NCAP Test Procedure dated August 2013.

	Degrees
Driver Seat Back Angle	3.1° on headrest post
Passenger Seat Back Angle	4.3° on headrest post



SEAT FORE/AFT POSITIONS

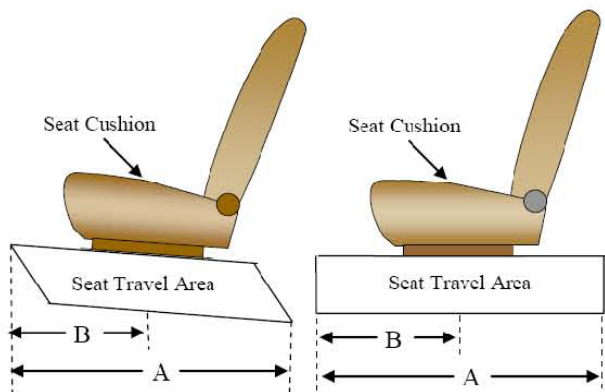
The driver and passenger seat fore/aft positions are adjusted following Appendix F, "Driver & Passenger Dummy Seating & Positioning Procedures" in the NCAP Test Procedure dated August 2013.

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	330 mm	165 mm (foremost as 0)
Passenger Seat	212 mm	0 mm (foremost as 0)

SEAT BELT UPPER ANCHORAGES

The seat belt upper anchorages are positioning following the manufacturer's specified position as listed in Form 1.

	Total # of Positions	Placed in Position #
Driver Seat	5 (1 st as 1)	0 (1 st as 0)
Passenger Seat	5 (1 st as 1)	0 (1 st as 0)



DATA SHEET NO. 2 (CONTINUED)
SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

Test Vehicle: 2015 Chevrolet Suburban 4WD 1500 LS SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20150106
 Test Date: 5/13/2014

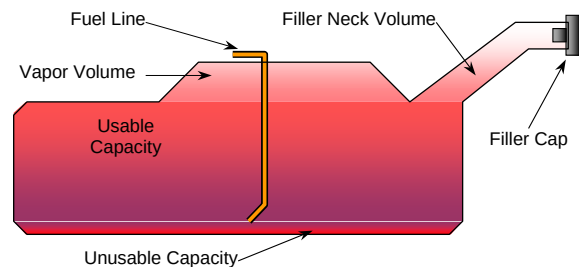
FUEL TANK CAPACITY DATA

	Liters
Usable Capacity of "Standard Tank"	119.2
Usable Capacity of "Optional Tank"	
92-94% of Usable Capacity	109.7 to 112.0
Actual Amount of Solvent used	110.9
1/3 of Usable Capacity	39.7

FUEL PUMP

Describe the fuel pump type, its behavior, and the location of the fuel filler pipe.

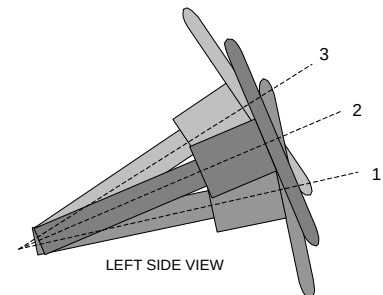
The vehicle is equipped with an electric fuel pump. Pump will run when engine is running. Also, it will run briefly when ignition key is turned to the "on" position without starting the engine. The fuel pipe is on the left side.



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. An aluminum plate is placed across the rim of the steering wheel, an inclinometer is placed on the plate and the angle is measured.



STEERING COLUMN ASSEMBLY

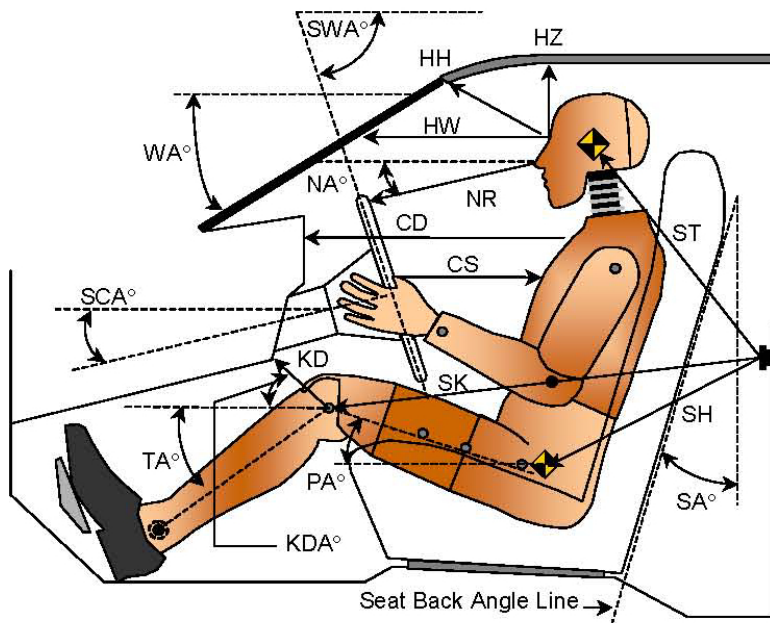
STEERING COLUMN POSITION

	Degrees	Fore/Aft Position (mm)
Lowermost Position 1	81.4	
Geometric Center Position 2	70.4	
Uppermost Position 3	59.4	
Telescoping Steering Wheel Travel		
Test Position	71.4	

DATA SHEET NO. 3 DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2015 Chevrolet Suburban 4WD 1500 LS SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20150106
Test Date: 5/13/2014



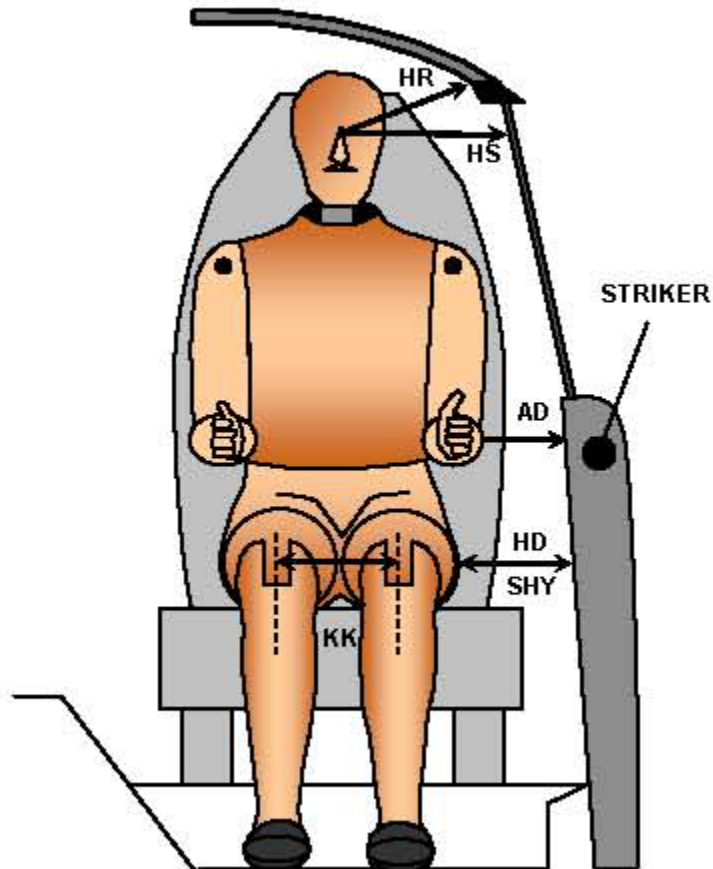
LEFT SIDE VIEW

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		29.0		
SWA°	Steering Wheel Angle		69.8		
SCA°	Steering Column Angle		20.2		
SA°	Seat Back Angle (on headrest post)		3.1		4.3
HZ	Head to Roof (Z)	302	90.0	366	90.0
HH	Head to Header	461	26.5	458	38.3
HW	Head to Windshield	764	0.0	809	0.0
NR	Nose to Rim	399	7.4		
CD	Chest to Dash	544		462	
CS	Chest to Steering Hub	325	0.2		
RA	Rim to Abdomen	230	0.0		
KDL	Left Knee to Dash	185	30.5	148	32.2
KDR	Right Knee to Dash	184	31.2	159	31.0
PA°	Pelvic Angle		24.5		21.3
TA°	Tibia Angle		46.0		47.8
SK	Striker to Knee	599	88.2	657	88.0
ST	Striker to Head	606	13.6	558	17.4
SH	Striker to H-Point	222	104.9	321	98.5

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2015 Chevrolet Suburban 4WD 1500 LS SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20150106
 Test Date: 5/13/2014



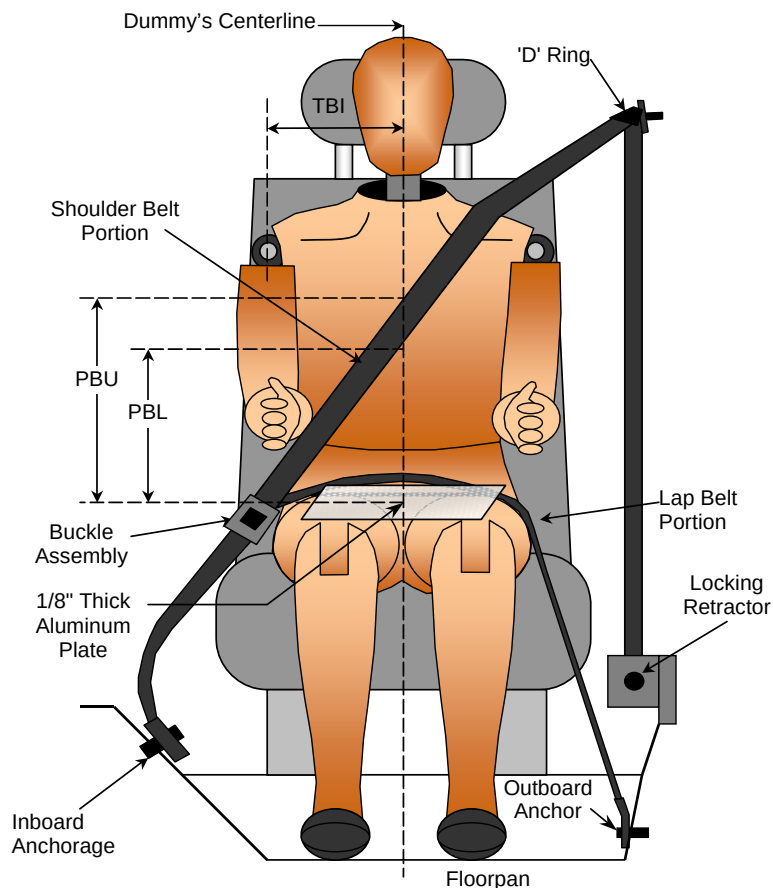
FRONT VIEW OF DUMMY

Code	Measurement Description	Driver	Passenger
		Length (mm)	
AD	Arm to Door	127	99
HD	H-Point to Door	133	170
HR	Head to Side Header	271	326
HS	Head to Side Window	349	369
KK	Knee to Knee	355	230
SHY	Striker to H-Point (Y Direction)	282	307
AA	Ankle to Ankle	336	166

DATA SHEET NO. 5 SEAT BELT POSITIONING DATA

Test Vehicle: 2015 Chevrolet Suburban 4WD 1500 LS SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20150106
Test Date: 5/13/2014



FRONT VIEW OF DUMMY

SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU - Top surface of reference to belt upper edge	mm	335	335
PBL - Top surface of reference to belt lower edge	mm	255	245

BELT LENGTH DATA

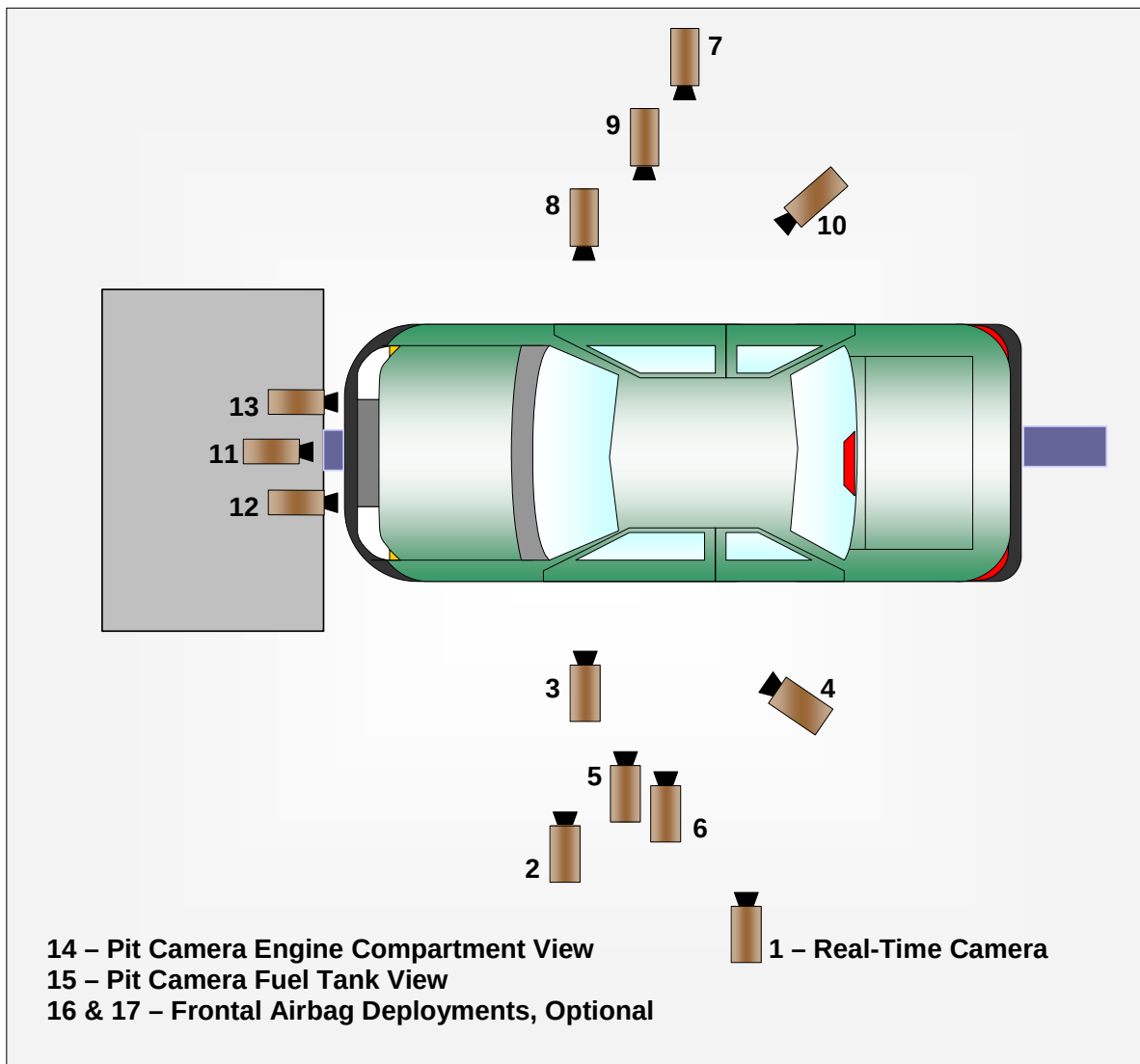
Measurement Description	Units	Driver	Passenger
Shoulder Belt Length as measured on ATD	mm	820	855
Lap Belt Length as measured on ATD	mm	420	450
Remainder of belt on reel	mm	1760	1695
Total Belt Length for Continuous Webbing Systems	mm	3000	3000

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

Test Vehicle: 2015 Chevrolet Suburban 4WD 1500 LS SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20150106
Test Date: 5/13/2014

CAMERA POSITIONS FOR FRONTAL IMPACTS



DATA SHEET NO. 6 (CONTINUED)
CAMERA LOCATIONS AND DATA

Test Vehicle: 2015 Chevrolet Suburban 4WD 1500 LS SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20150106
 Test Date: 5/13/2014

CAMERA LOCATIONS

No.	Camera View	Coordinates (mm)			Lens (mm)	Speed (fps)
		X*	Y*	Z*		
1	Real-Time Left Overall					30
2	Driver Close-Up	1430	-6690	-1830	35	1000
3	Left Front Half	1110	-5610	-1070	24	1000
4	Left Angle	5540	-4960	-1970	50	1000
5	Steering Column - Top	380	-5470	-1240	24	1000
6	Steering Column - Bottom	400	-5470	-830	24	1000
7	Right Overall	2350	7190	-1170	20	1000
8	Passenger Close-Up	1850	6880	-1820	35	1000
9	Right Front Half	1280	5820	-1120	24	1000
10	Right Angle	5600	4810	-1950	50	1000
11	Windshield	-290	0	-2860	20	1000
12	Driver Windshield	-30	-360	-2010	8.5	1000
13	Passenger Windshield	-30	360	-2010	8.5	1000
14	Pit Front	970	0	3150	24	1000
15	Pit Rear	2930	0	3150	24	1000
16	Onboard Driver Side (optional)					
17	Onboard Passenger Side (optional)					
18	Real-Time Pan View					30

***COORDINATES:**

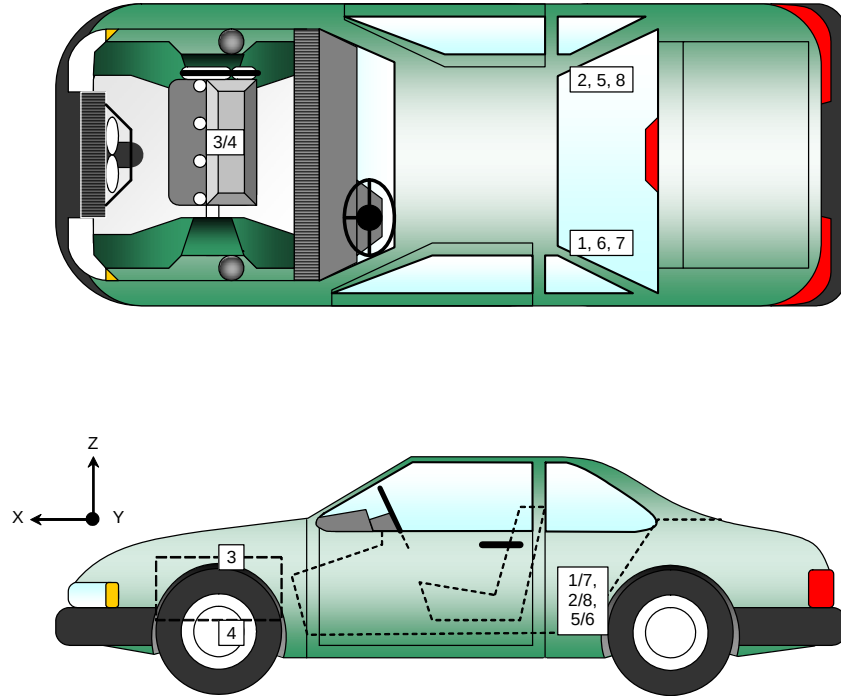
- +X = forward of impact plane
- +Y = right of monorail centerline
- +Z = below ground level

Cameras 16 & 17 were not used for this test.

DATA SHEET NO. 7 VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2015 Chevrolet Suburban 4WD 1500 LS SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20150106
Test Date: 5/13/2014



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Crossmember Accelerometer – X Direction	2756	-410	-565
2	Right Rear Crossmember Accelerometer – X Direction	2756	420	-565
3	Engine Top X	4704	30	-1167
4	Engine Bottom X	4521	50	-315
5	Left Rear Crossmember Accelerometer – Z Direction	2756	-410	-565
6	Right Rear Crossmember Accelerometer – Z Direction	2756	420	-565
7	Left Rear Crossmember Accelerometer Redundant – X Direction	2756	-410	-565
8	Right Rear Crossmember Accelerometer Redundant – X Direction	2756	420	-565

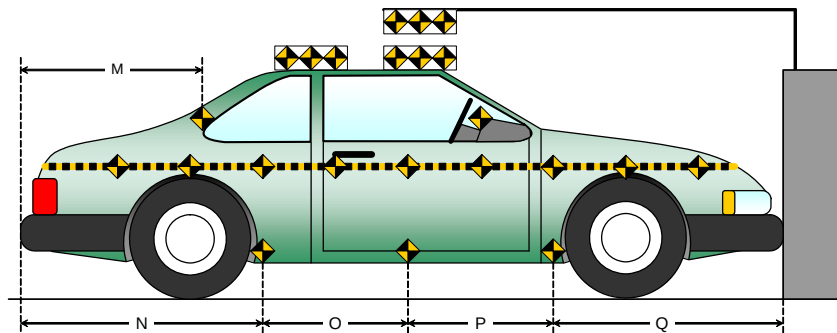
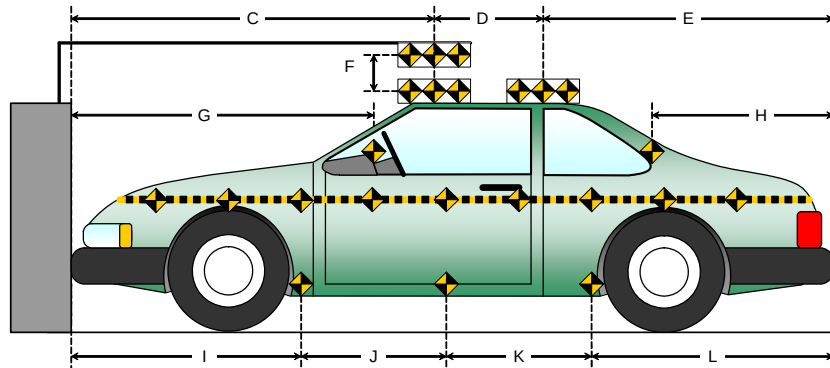
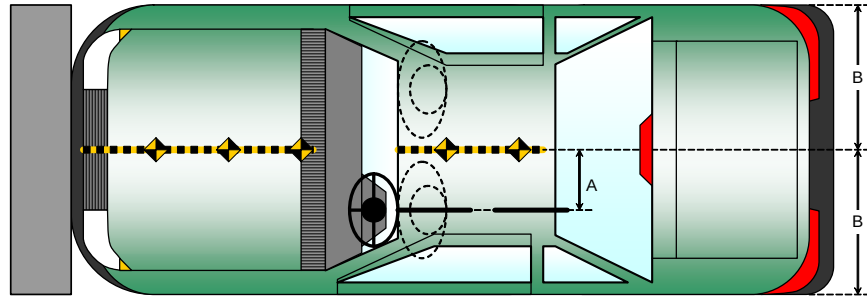
Reference Points: X - Rear Surface of Vehicle (+ forward)
Y - Vehicle Centerline (+ to right)
Z - Ground Plane (+ down)

DATA SHEET NO. 8
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2015 Chevrolet Suburban 4WD 1500 LS SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20150106
 Test Date: 5/13/2014

Item	Value (mm)
A	454
B	1002
C	2553
D	
E	3434
F	27
G	
H	1913
I	1903
J	1107
K	1107
L	1870
M	1913
N	1870
O	1107
P	1107
Q	1903



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

Test Vehicle: 2015 Chevrolet Suburban 4WD 1500 LS SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20150106
 Test Date: 5/13/2014

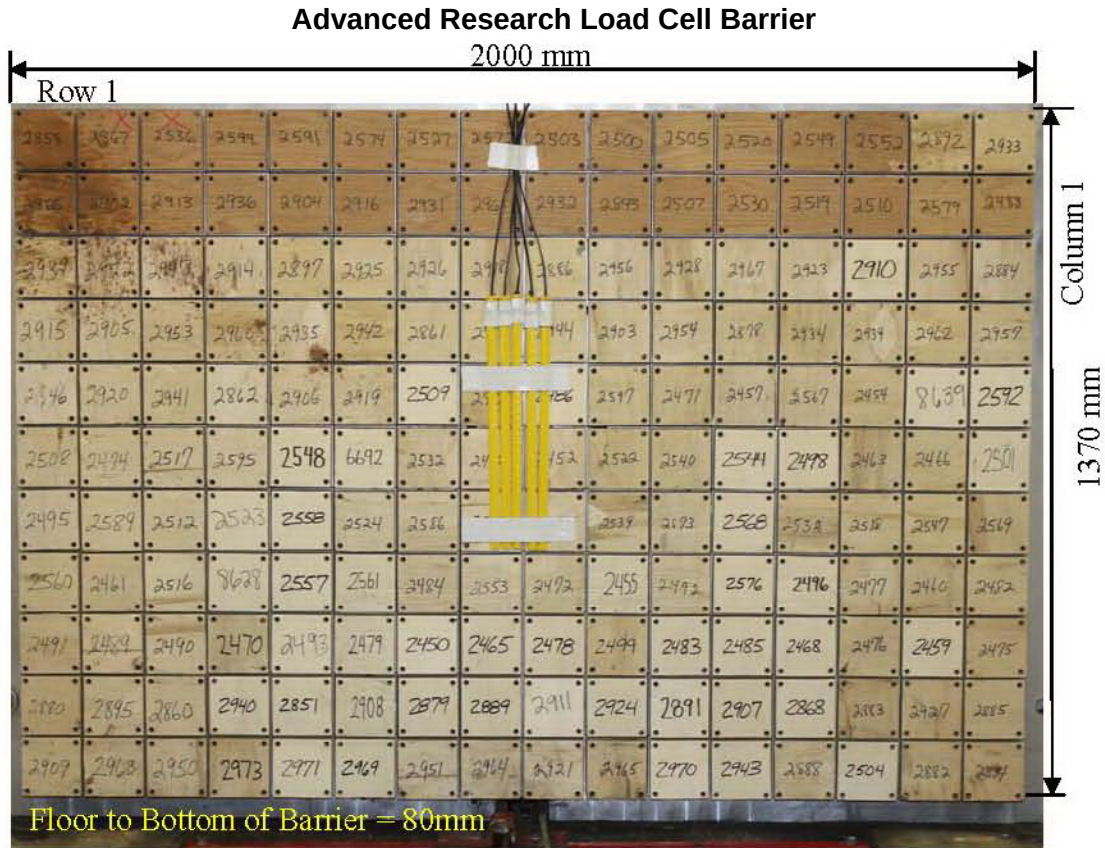


Photo for Reference Only

Centerline															
A-16	A-15	A-14	A-13	A-12	A-11	A-10	A-09	A-08	A-07	A-06	A-05	A-04	A-03	A-02	A-01
B-16	B-15	B-14	B-13	B-12	B-11	B-10	B-09	B-08	B-07	B-06	B-05	B-04	B-03	B-02	B-01
C-16	C-15	C-14	C-13	C-12	C-11	C-10	C-09	C-08	C-07	C-06	C-05	C-04	C-03	C-02	C-01
D-16	D-15	D-14	D-13	D-12	D-11	D-10	D-09	D-08	D-07	D-06	D-05	D-04	D-03	D-02	D-01
E-16	E-15	E-14	E-13	E-12	E-11	E-10	E-09	E-08	E-07	E-06	E-05	E-04	E-03	E-02	E-01
F-16	F-15	F-14	F-13	F-12	F-11	F-10	F-09	F-08	F-07	F-06	F-05	F-04	F-03	F-02	F-01
G-16	G-15	G-14	G-13	G-12	G-11	G-10	G-09	G-08	G-07	G-06	G-05	G-04	G-03	G-02	G-01
H-16	H-15	H-14	H-13	H-12	H-11	H-10	H-09	H-08	H-07	H-06	H-05	H-04	H-03	H-02	H-01
I-16	I-15	I-14	I-13	I-12	I-11	I-10	I-09	I-08	I-07	I-06	I-05	I-04	I-03	I-02	I-01
J-16	J-15	J-14	J-13	J-12	J-11	J-10	J-09	J-08	J-07	J-06	J-05	J-04	J-03	J-02	J-01
K-16	K-15	K-14	K-13	K-12	K-11	K-10	K-09	K-08	K-07	K-06	K-05	K-04	K-03	K-02	K-01

Load Cells are 121 mm x 121 mm with a 7 mm gap in between each load cell.

DATA SHEET NO. 10
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2015 Chevrolet Suburban 4WD 1500 LS SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20150106
Test Date: 5/13/2014

INSTRUMENTATION

Driver Dummy Data Channels	46
Passenger Dummy Data Channels	46
Vehicle Structure Accelerometers	8
Barrier Channels	528
Total	628

CAMERA COVERAGE

High-Speed Vehicle Onboard	0
High-Speed Offboard	14
Real-Time	2
Total	16

**DATA SHEET NO. 11
POST-TEST OBSERVATIONS**

Test Vehicle: 2015 Chevrolet Suburban 4WD 1500 LS SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20150106
Test Date: 5/13/2014

TEST DUMMY INFORMATION AND CONTACT LOCATIONS

Description	Driver	Passenger
Dummy Type / Serial No.	HIII 50% / 351	HIII 5% / 634
Head Contact	Airbag, Headrest	Airbag, Headrest
Upper Torso Contact	Airbag	Airbag
Lower Torso Contact	None	None
Left Knee Contact	Knee Bolster	Glovebox and Frontal Airbag
Right Knee Contact	Knee Bolster	Glovebox and Frontal Airbag

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Locked/Unlocked Doors	Doors were locked	Doors were locked
Front Door Opening	Door remained closed and latched; Door opened without tools	Door remained closed and latched; Door opened without tools
Rear Door Opening	Door remained closed and latched; Door opened without tools	Door remained closed and latched; Door opened without tools
Seat Track Shift (mm)	0	0
Seat Back Failure	None	None

POST TEST STRUCTURAL OBSERVATIONS

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

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	1104
Center	mm	1048
Right Side	mm	1066
Average	mm	1073

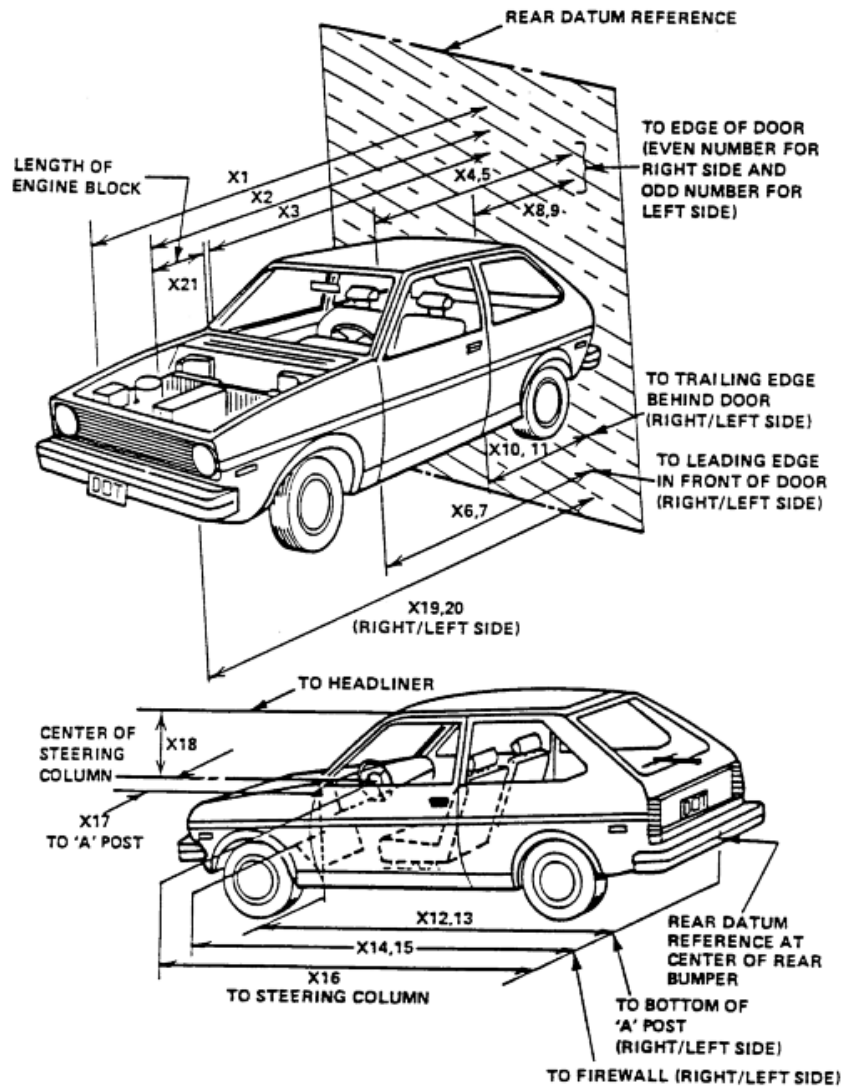
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Driver (Occupant 1)		Passenger (Occupant 2)	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	Yes	Yes	Yes
Curtain Side Airbag	Yes	Disabled	Yes	Disabled
Torso/Pelvis Side Airbag	Yes	No	Yes	No
Inboard Seat Airbag	Yes	No	No	
Knee Airbag	No		No	
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes		Yes	

DATA SHEET NO. 12 VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2015 Chevrolet Suburban 4WD 1500 LS SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20150106
Test Date: 5/13/2014



DATA SHEET NO. 12 (CONTINUED)
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2015 Chevrolet Suburban 4WD 1500 LS SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20150106
 Test Date: 5/13/2014

RSOV (Rear Surface of Vehicle)

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	mm	5987	5011	976
2	RSOV to Front of Engine	mm	4771	4585	186
3	RSOV to Firewall	mm	4436	4352	84
4	RSOV to Upper Leading Edge of Right Door	mm	4081	4092	-11
5	RSOV to Upper Leading Edge of Left Door	mm	4081	4077	4
6	RSOV to Lower Leading Edge of Right Door	mm	4003	4009	-6
7	RSOV to Lower Leading Edge of Left Door	mm	4003	4001	2
8	RSOV to Upper Trailing Edge of Right Door	mm	2924	2922	2
9	RSOV to Upper Trailing Edge of Left Door	mm	2924	2918	6
10	RSOV to Lower Trailing Edge of Right Door	mm	2902	2902	0
11	RSOV to Lower Trailing Edge of Left Door	mm	2902	2897	5
12	RSOV to Bottom of "A" Post of Right Side	mm	4065	4063	2
13	RSOV to Bottom of "A" Post of Left Side	mm	4065	4061	4
14	RSOV to Firewall, Right Side	mm	4377	4362	15
15	RSOV to Firewall, Left Side	mm	4377	4360	17
16	RSOV to Steering Column	mm	3525	3556	-31
17	Center of Steering Column to "A" Post	mm	410	385	25
18	Center of Steering Column to Headliner	mm	440	428	12
19	RSOV to Right Side of Front Bumper	mm	5565	4959	606
20	RSOV to Left Side of Front Bumper	mm	5565	4992	573
21	Length of Engine Block	mm	510	510	0
RD	RSOV to Right Side of Dash Panel	mm	3802	3802	0
CD	RSOV to Center of Dash Panel	mm	3695	3682	13
LD	RSOV to Left Side of Dash Panel	mm	3833	3813	20

DATA SHEET NO. 13
ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2015 Chevrolet Suburban 4WD 1500 LS SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20150106
Test Date: 5/13/2014

VEHICLE INFORMATION

VIN: 1GNSKHKC2FR123254 Wheelbase (mm): 3310
Vehicle Size Category: MPV Test Weight (kg): 2922.7

ACCELEROMETER DATA

Accelerometer Locations: As per measurements on Page 15

Cal. Procedure/Interval: MGA procedure / 6 month

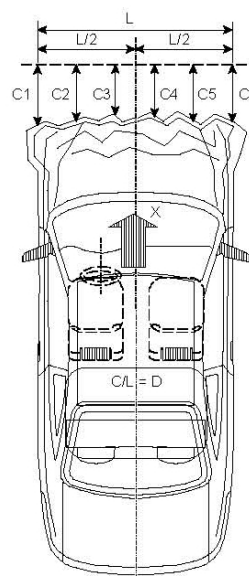
Integration Algorithm: Trapezoidal

Linearity: > 99%

Impact Velocity (km/h): 56.4

Velocity Change (km/h): 65.8

Time of Separation (msec): 136.7



CRUSH PROFILE

Collision Deformation Classification: Frontal

Midpoint of Damage: Centerline

Damage Region Length (mm): 1220

Impact Mode: Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	5565	4992	573
C2	Crush zone 2 at left side	mm	5616	4942	674
C3	Crush zone 3 at left side	mm	5639	4967	672
C4	Crush zone 4 at right side	mm	5639	4964	675
C5	Crush zone 5 at right side	mm	5616	4949	667
C6	Crush zone 6 at right side	mm	5565	4959	606
L	C1 TO C6	mm	1220	1209	11

DATA SHEET NO. 14
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2015 Chevrolet Suburban 4WD 1500 LS SUV
Test Program: NCAP Frontal Barrier Impact Test

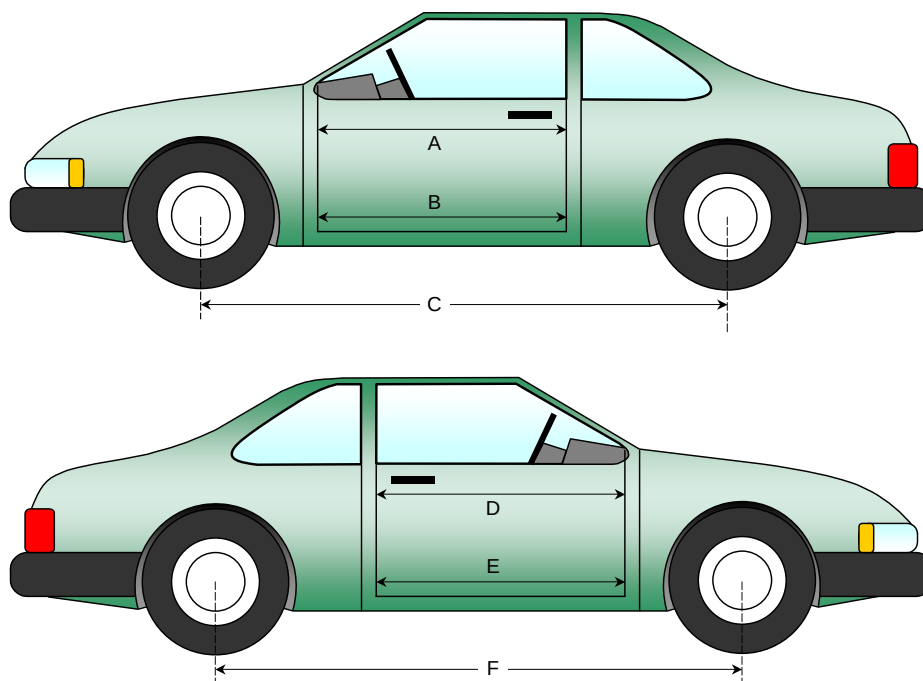
NHTSA No.: M20150106
Test Date: 5/13/2014

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	1044	1034	10
B	Left Side Lower	mm	1002	998	4
D	Right Side Upper	mm	1044	1041	3
E	Right Side Lower	mm	1002	1001	1

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	3310	3224	86
F	Right Side Wheelbase	mm	3310	3233	77



DATA SHEET NO. 14 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

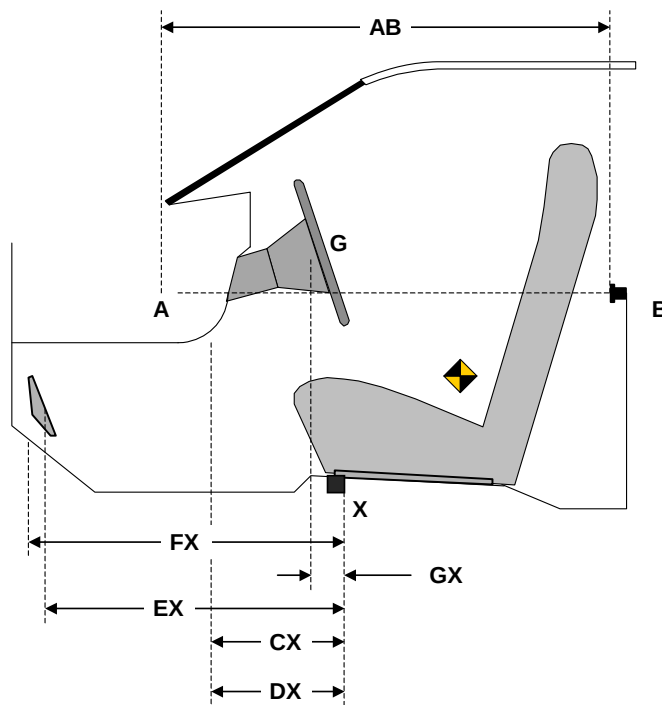
Test Vehicle: 2015 Chevrolet Suburban 4WD 1500 LS SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20150106
 Test Date: 5/13/2014

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	770	770	0
CX	Left Knee Bolster to X	mm	308	277	31
DX	Right Knee Bolster to X	mm	291	257	34
EX	Brake Pedal to X	mm	568	509	59
FX	Foot Rest to X	mm	637	638	-1
GX	Center of Steering Column Wheel Hub to X	mm	96	96	0

X = Front of Seat Track (stationary)



DRIVER COMPARTMENT

DATA SHEET NO. 15
SUMMARY OF FMVSS 212, FMVSS 219 (PARTIAL) DATA, AND 301 DATA

Test Vehicle: 2015 Chevrolet Suburban 4WD 1500 LS SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20150106
 Test Date: 5/13/2014

Windshield Mounting Details:

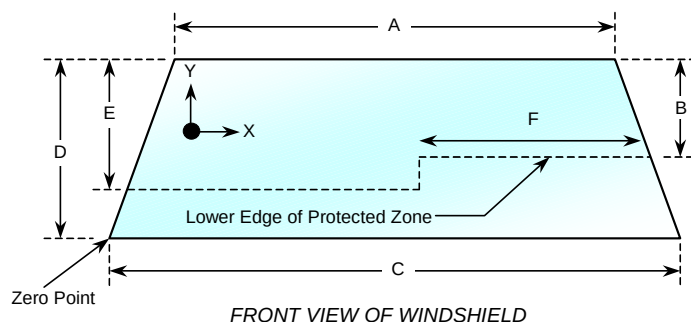
Windshield glass is secured to the vehicle frame with a rubber trim and glue.

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

Temperature of windshield molding during test: 21.8° C.

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% of Retention
Left Side	2299	2038	89
Right Side	2299	2038	89
Total	4598	4076	89



Item	Units	Value
A	mm	1374
B	mm	459
C	mm	1630
D	mm	797
E	mm	468
F	mm	537

AREA OF PROTECTED ZONE FAILURES - NONE

A. Provide coordinates of the area that the protected zone was penetrated more than 0.25 inches by a vehicle component other than one that is normally in contact with the windshield. **None**

X	Y

B. Provide coordinates of the area beneath the protected zone that the inner surface of the windshield was penetrated by a vehicle component. **None**

X	Y

DATA SHEET NO. 15 (CONTINUED)
SUMMARY OF FMVSS 212, FMVSS 219 (PARTIAL), AND 301 DATA

Test Vehicle:	<u>2015 Chevrolet Suburban 4WD 1500 LS SUV</u>	NHTSA No.:	<u>M20150106</u>
Test Program:	<u>NCAP Frontal Barrier Impact Test</u>	Test Date:	<u>5/13/2014</u>

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 21.8°C Test Time: 10:45 a.m.

- | | |
|--|--------------|
| A. From impact until vehicle motion ceases:
(Maximum allowable = 1 oz.) | <u>0</u> oz. |
| B. For the 5 minute period after motion ceases:
(Maximum allowable = 5 oz.) | <u>0</u> oz. |
| C. For the following 25 minutes:
(Maximum allowable = 1 oz./minute) | <u>0</u> oz. |
| D. Spillage: | <u>None</u> |

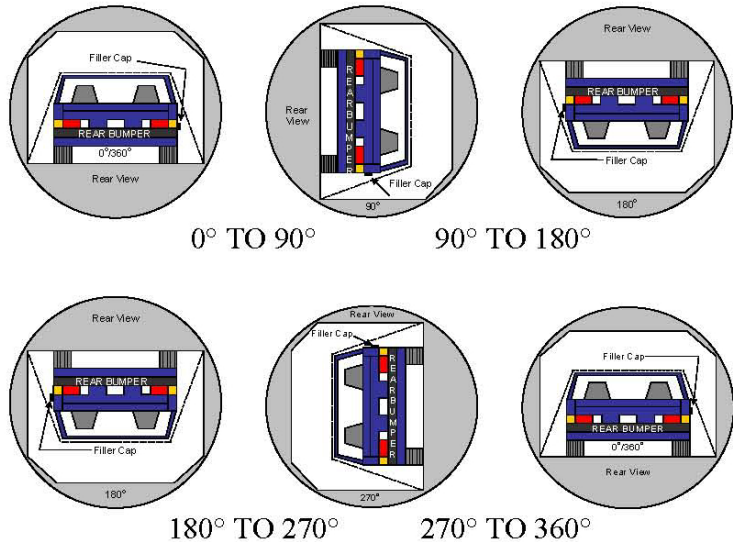
DATA SHEET NO. 16

FMVSS 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2015 Chevrolet Suburban 4WD 1500 LS SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20150106
 Test Date: 5/13/2014

1. The specified fixture rollover rate for each 90° of rotation is 60 to 180 seconds.
2. The position hold time at each position is 300 seconds (minimum).
3. Details of Stoddard Solvent spillage: **None**



SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	160	300	460
90° to 180°	141	300	441
180° to 270°	142	300	442
270° to 360°	159	300	459

FMVSS 301 SPILLAGE TABLE (units in ounces)

Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eight Minute
0° to 90°	0	0	0	0
90° to 180°	0	0	0	0
180° to 270°	0	0	0	0
270° to 360°	0	0	0	0

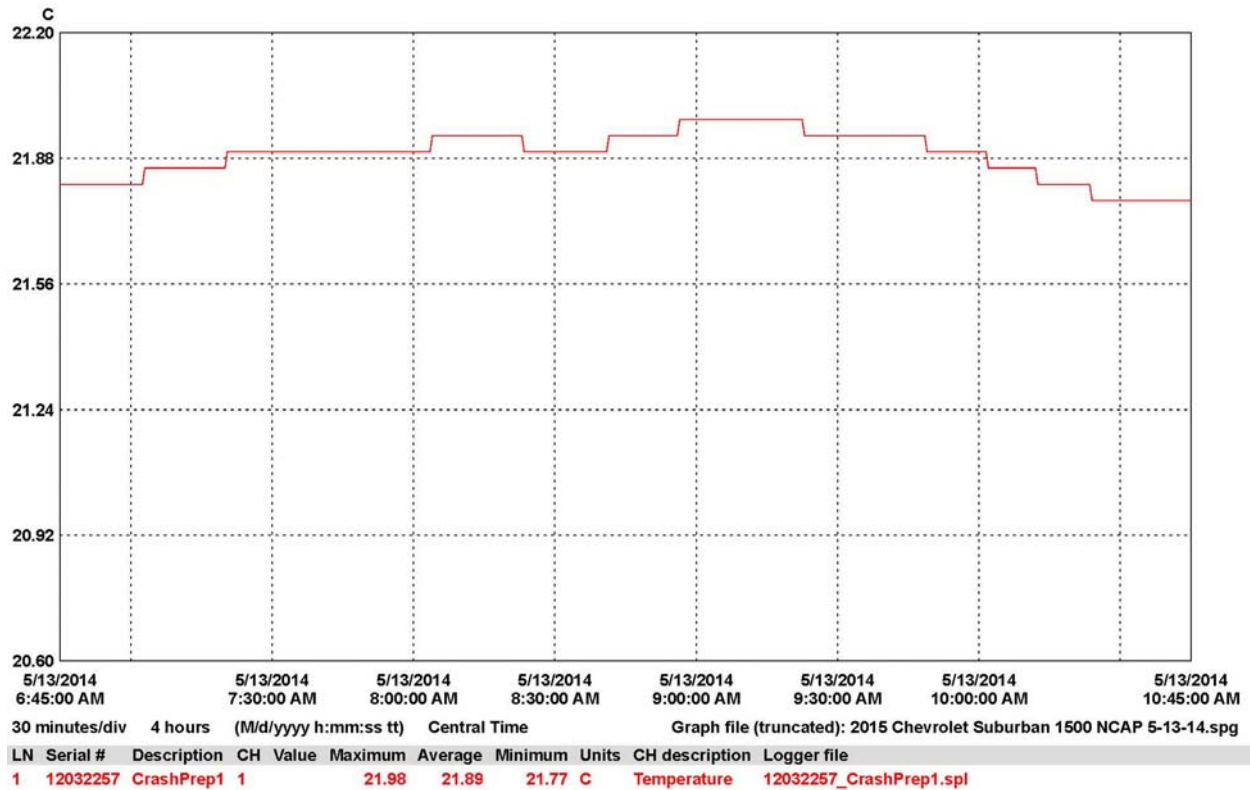
SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0° to 90°	
90° to 180°	
180° to 270°	
270° to 360°	

DATA SHEET NO. 17 **DUMMY/VEHICLE TEMPERATURE STABILIZATION DATA**

Test Vehicle: 2015 Chevrolet Suburban 4WD 1500 LS SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20150106
 Test Date: 5/13/2014



APPENDIX A
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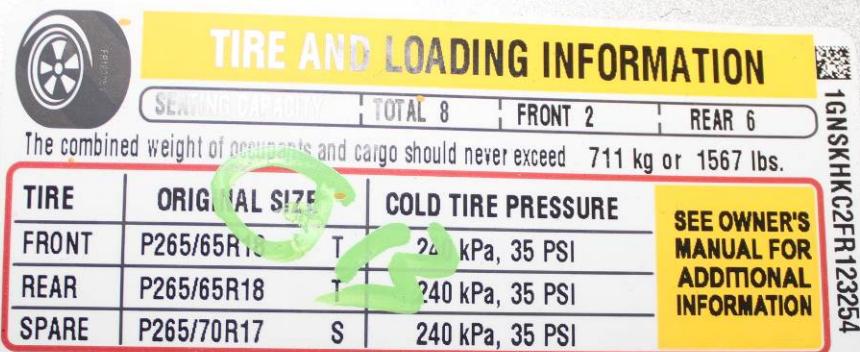
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M20150106

Manufacturer's Label



M20150106

Tire Placard



2015 Chevrolet Suburban Frontal As Delivered



Left Rear 3-4 View, As Received



Pre-Test Front View of Test Vehicle



Post-Test Front View of Test Vehicle



Pre-Test Left View of Test Vehicle



Post-Test Left View of Test Vehicle



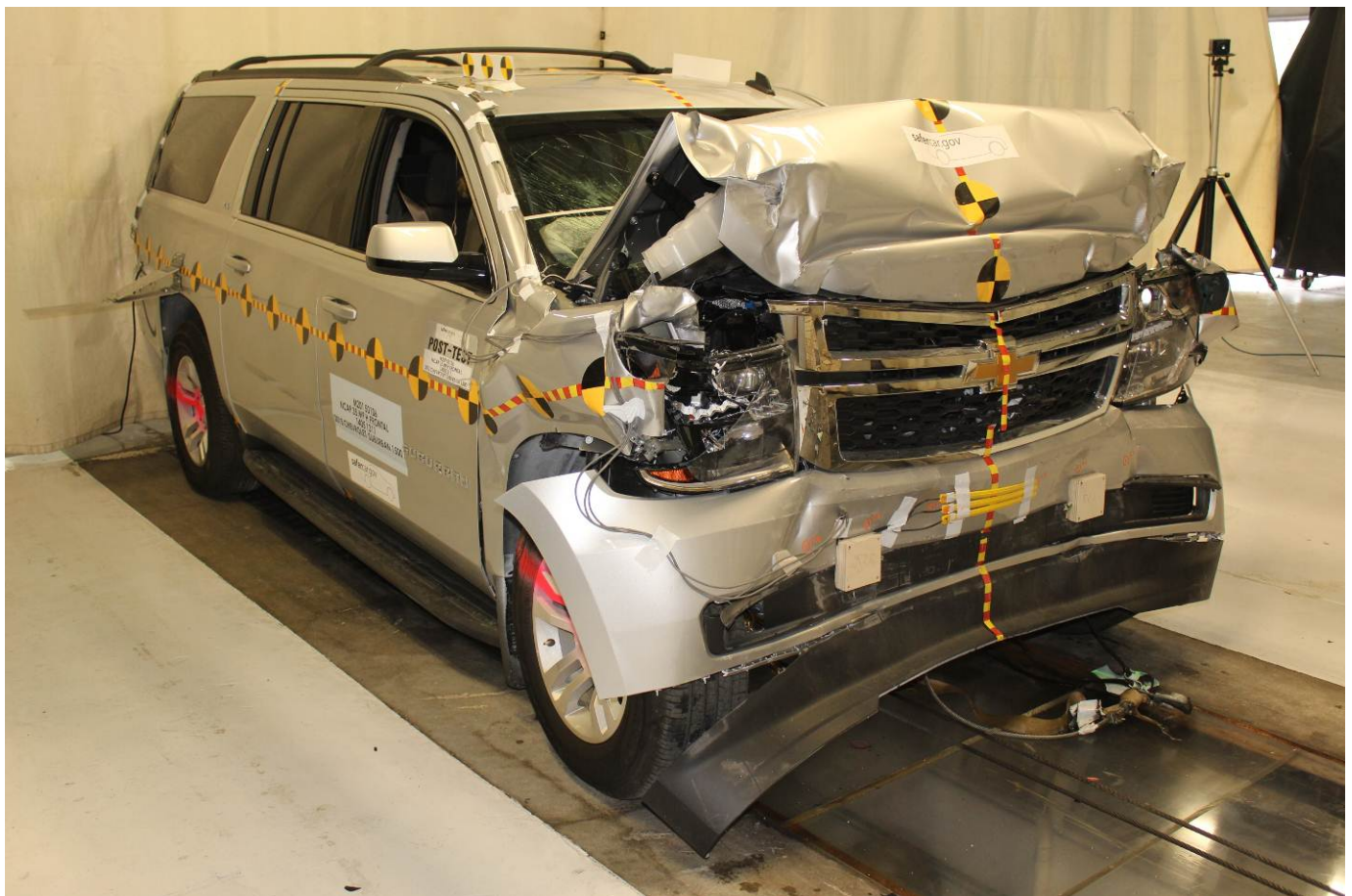
Pre-Test Right View of Test Vehicle



Post-Test Right View of Test Vehicle



Pre-Test Right Front 3-4 View



Post-Test Right Front 3-4 View



Pre-Test Left Rear 3-4 View



Post-Test Left Rear 3-4 View



Pre-Test Windshield View



Post-Test Windshield View



Pre-Test Engine Compartment View



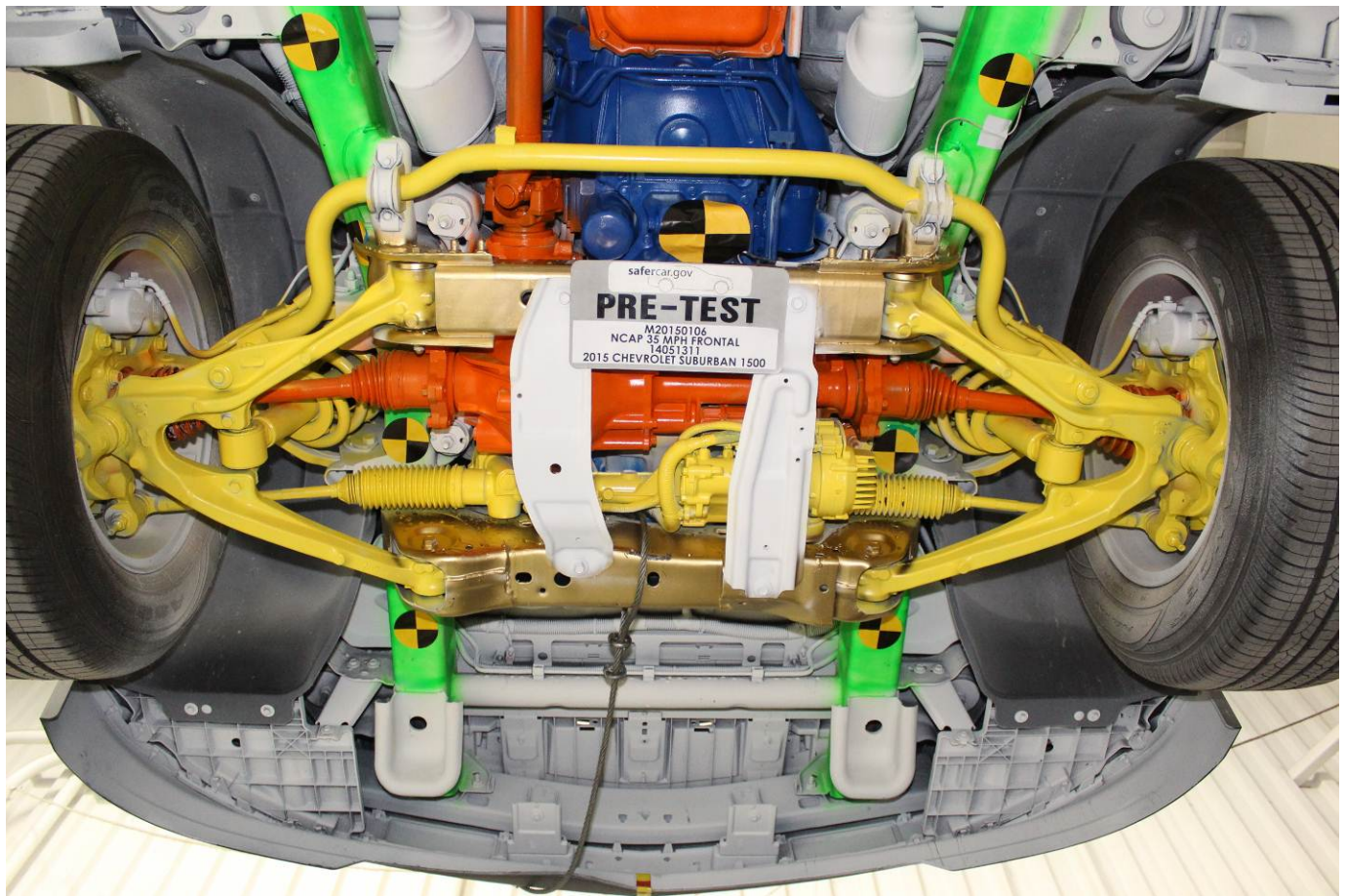
Post-Test Engine Compartment View



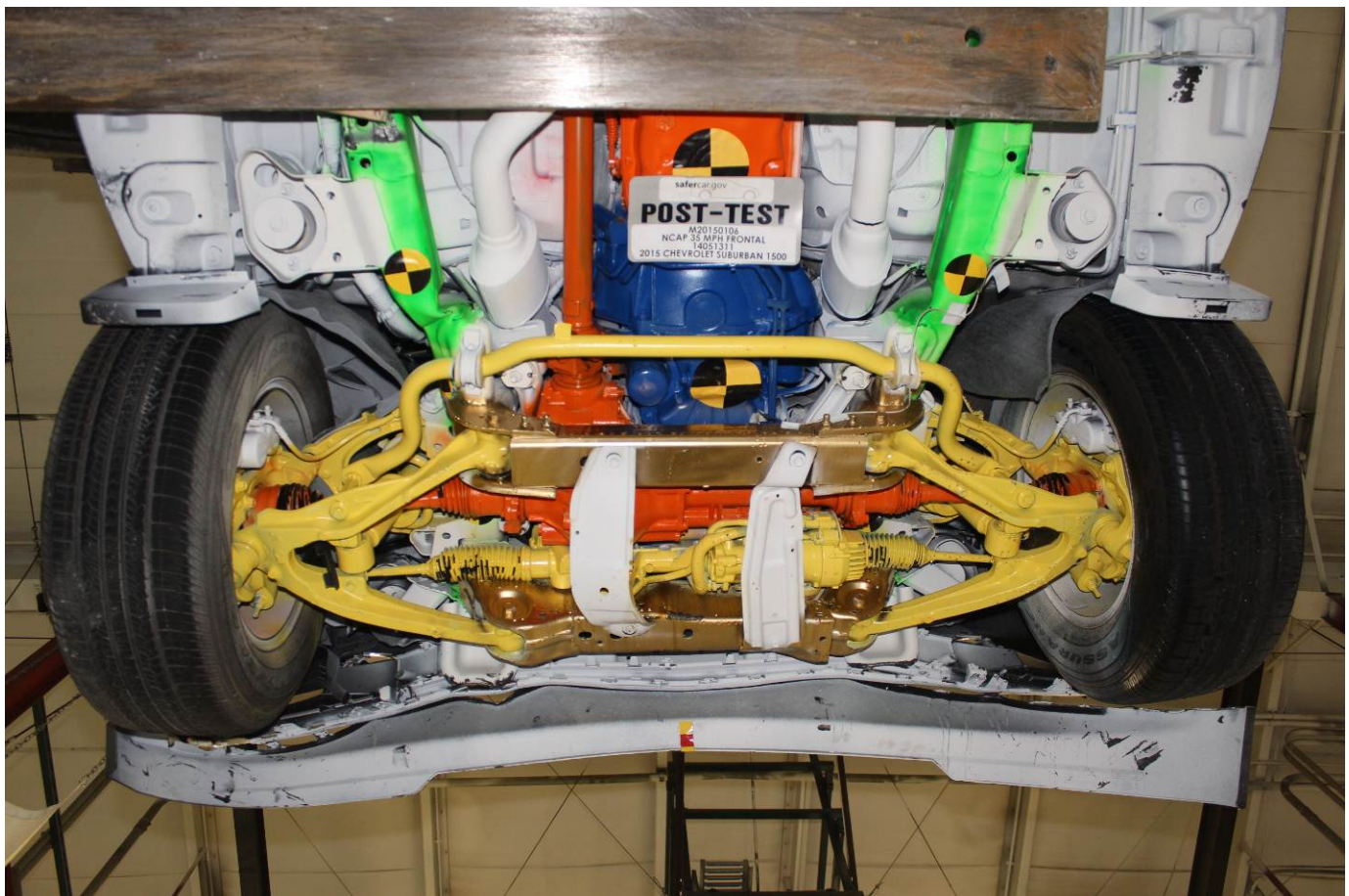
Pre-Test Fuel Filler Cap View



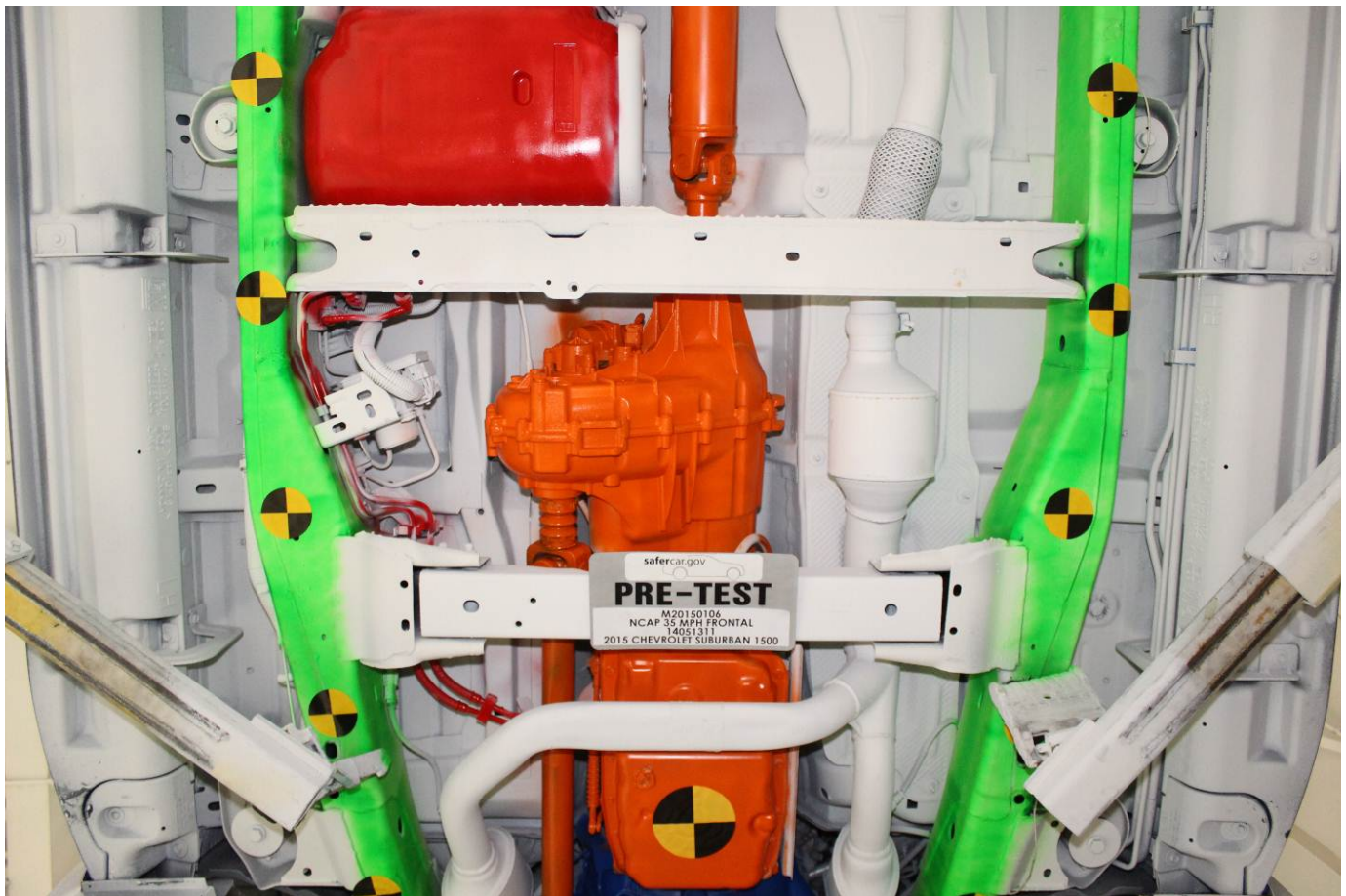
Post-Test Fuel Filler Cap View



Pre-Test Front Underbody View



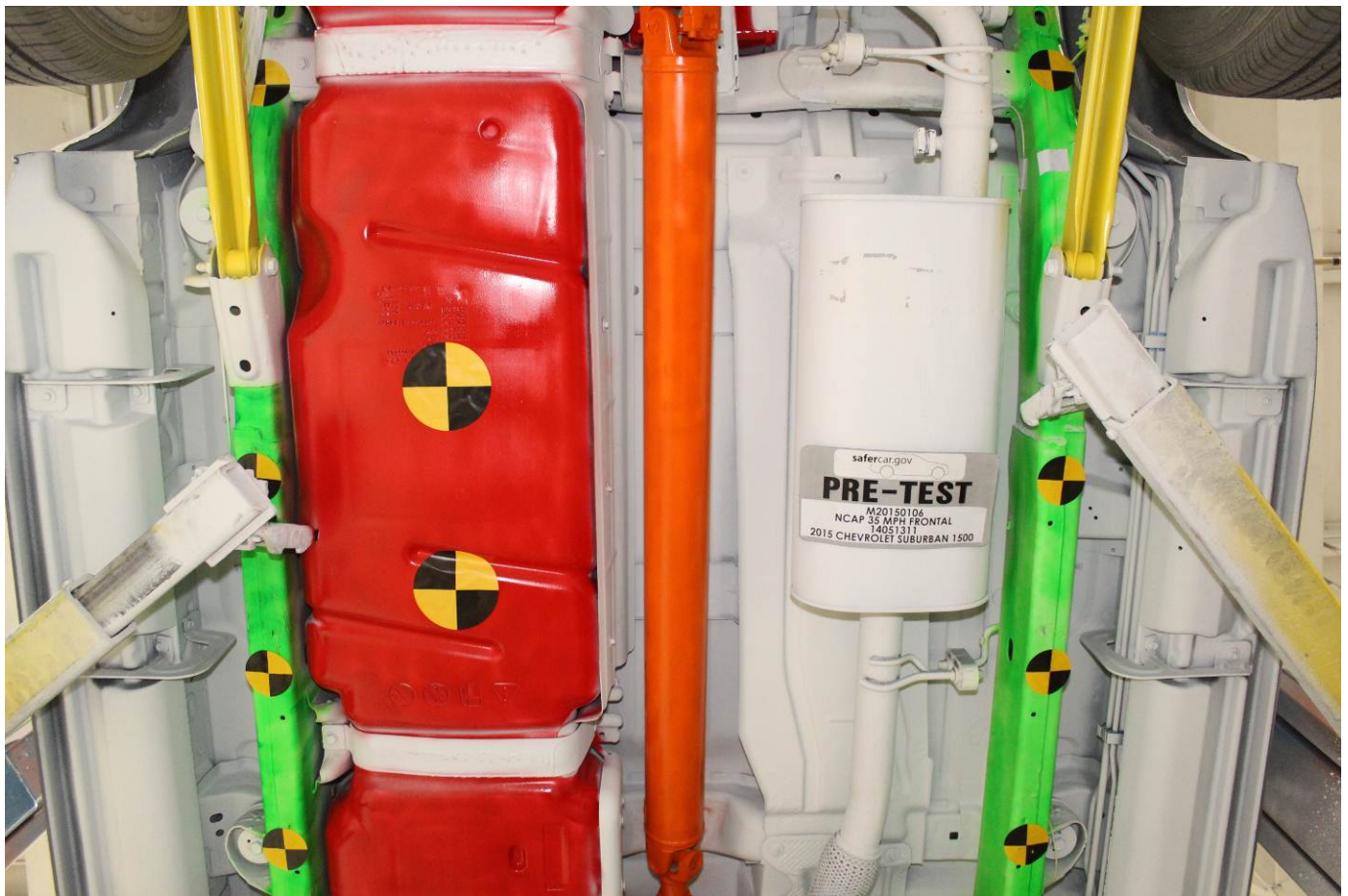
Post-Test Front Underbody View



Pre-Test Mid Front Underbody View



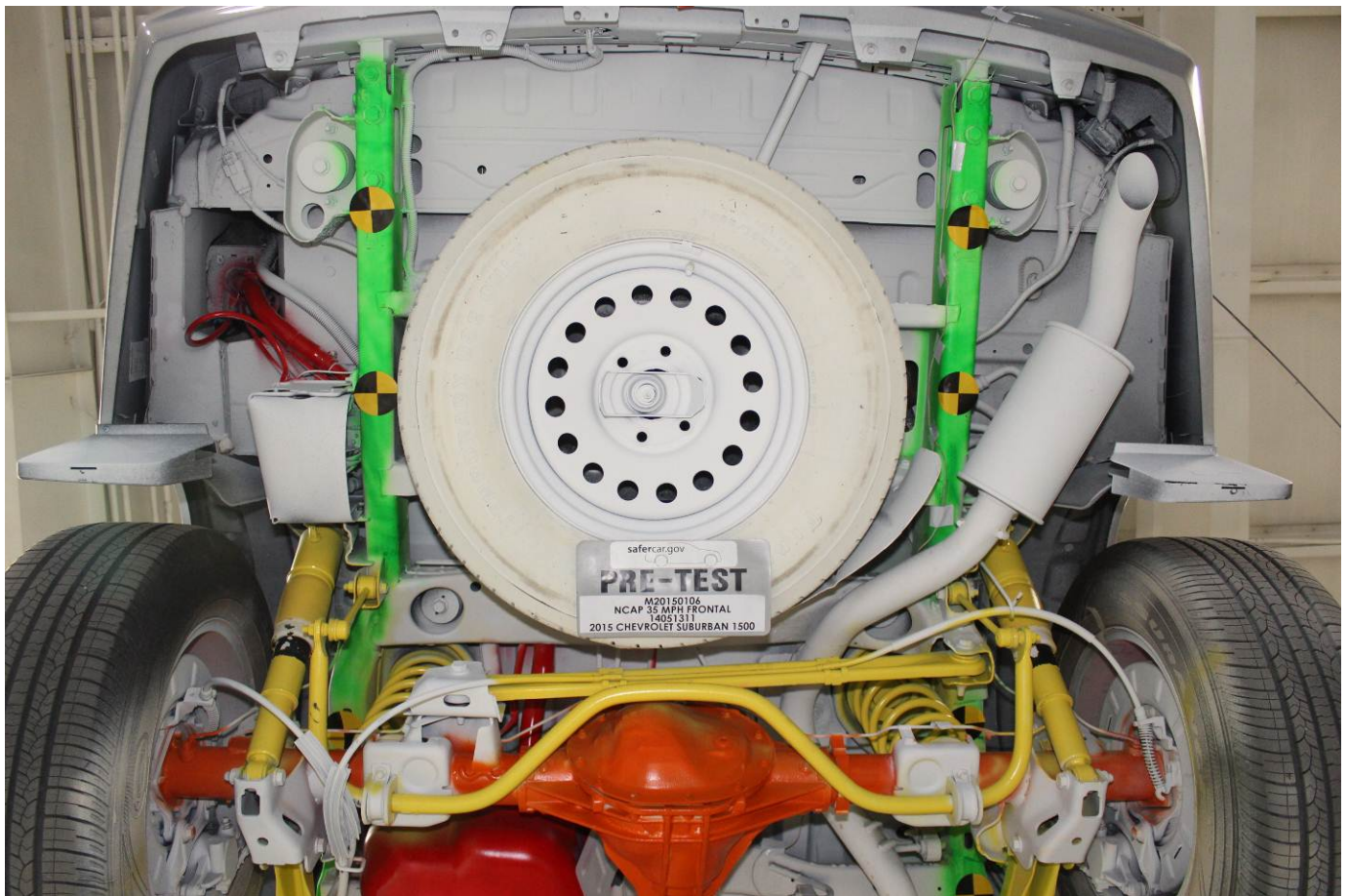
Post-Test Mid Front Underbody View



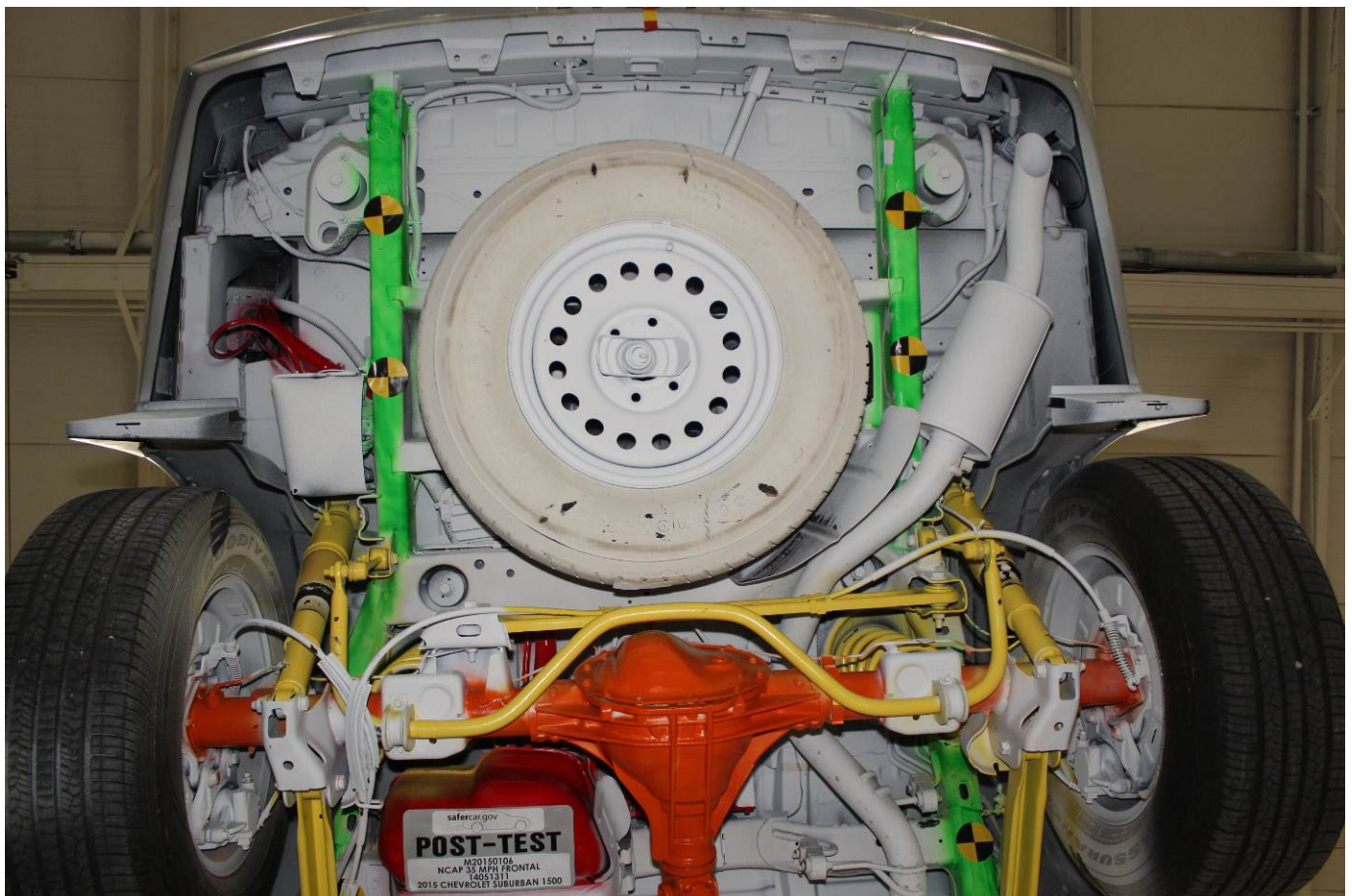
Pre-Test Mid Rear Underbody View



Post-Test Mid Rear Underbody View



Pre-Test Rear Underbody View



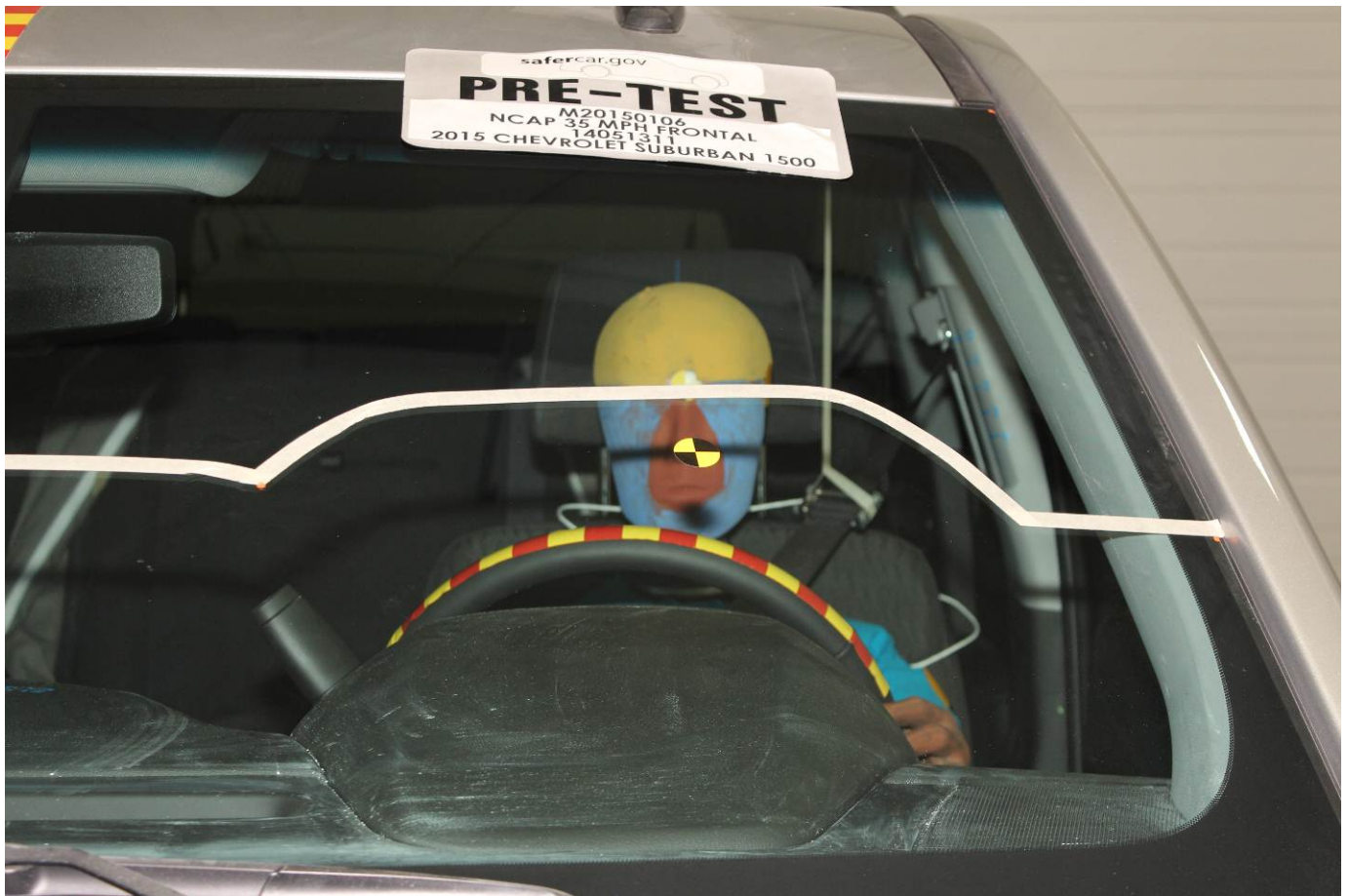
Post-Test Rear Underbody View



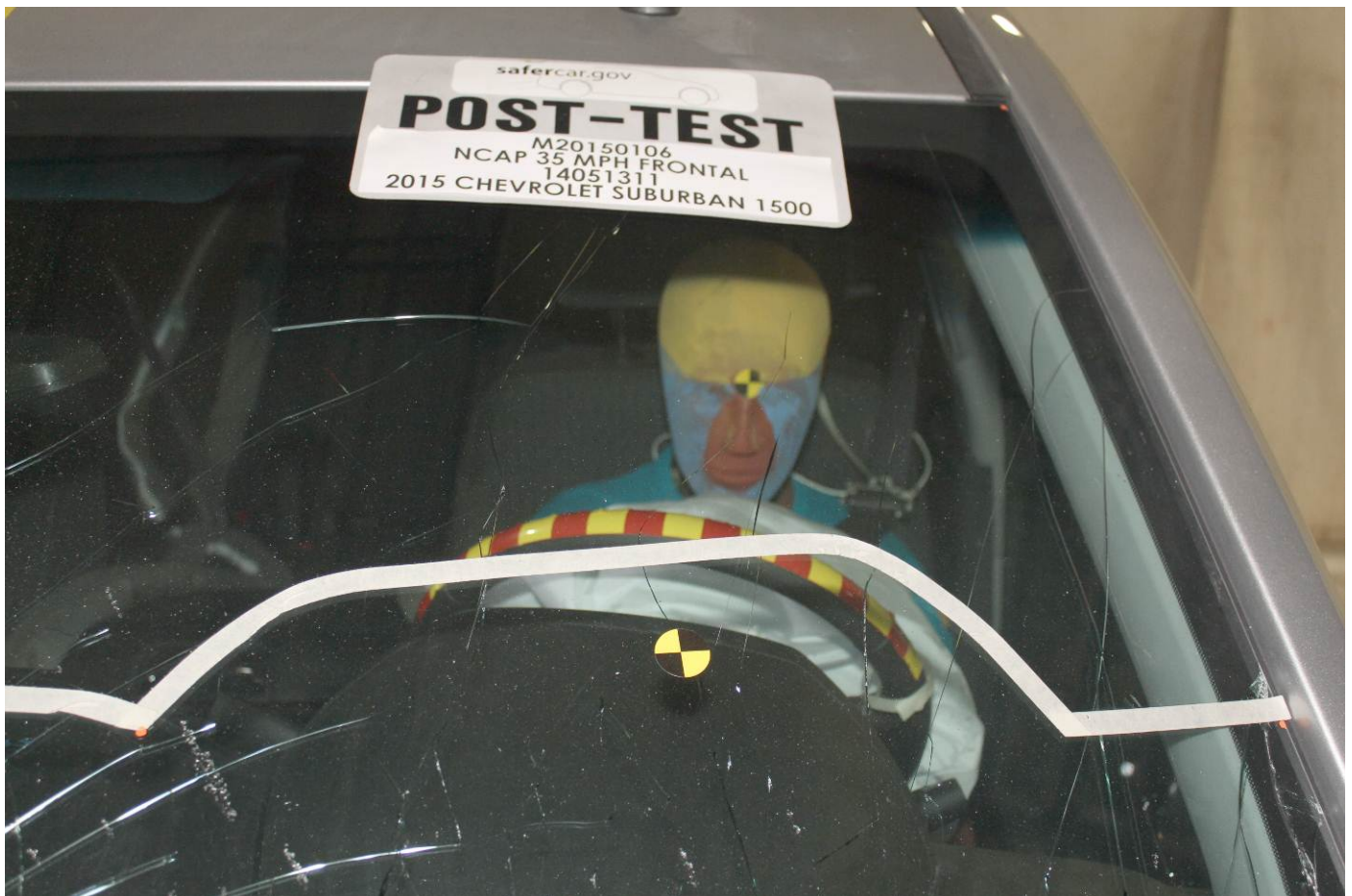
Pre-Test Dummy Cable Routing



Post-Test Dummy Cable Routing



Pre-Test Driver Dummy Front View



Post-Test Driver Dummy Front View



Pre-Test Driver Dummy Window View



Post-Test Driver Dummy Window View



Pre-Test Driver Dummy and Vehicle Interior (Door Open)



Post-Test Driver Dummy and Vehicle Interior (Door Open)



Pre-Test Driver's Seat Fore-Aft Markings



Post-Test Driver's Seat Fore-Aft Markings



Pre-Test View of Belt Anchorage for Driver Dummy



Post-Test View of Belt Anchorage for Driver Dummy



Pre-Test Driver Dummy Feet



Post-Test Driver Dummy Feet



Pre-Test Driver's Side Knee Bolster (without dummy)



Post-Test Driver's Side Knee Bolster (without dummy)



Pre-Test Driver's Side Floorpan



Post-Test Driver's Side Floorpan



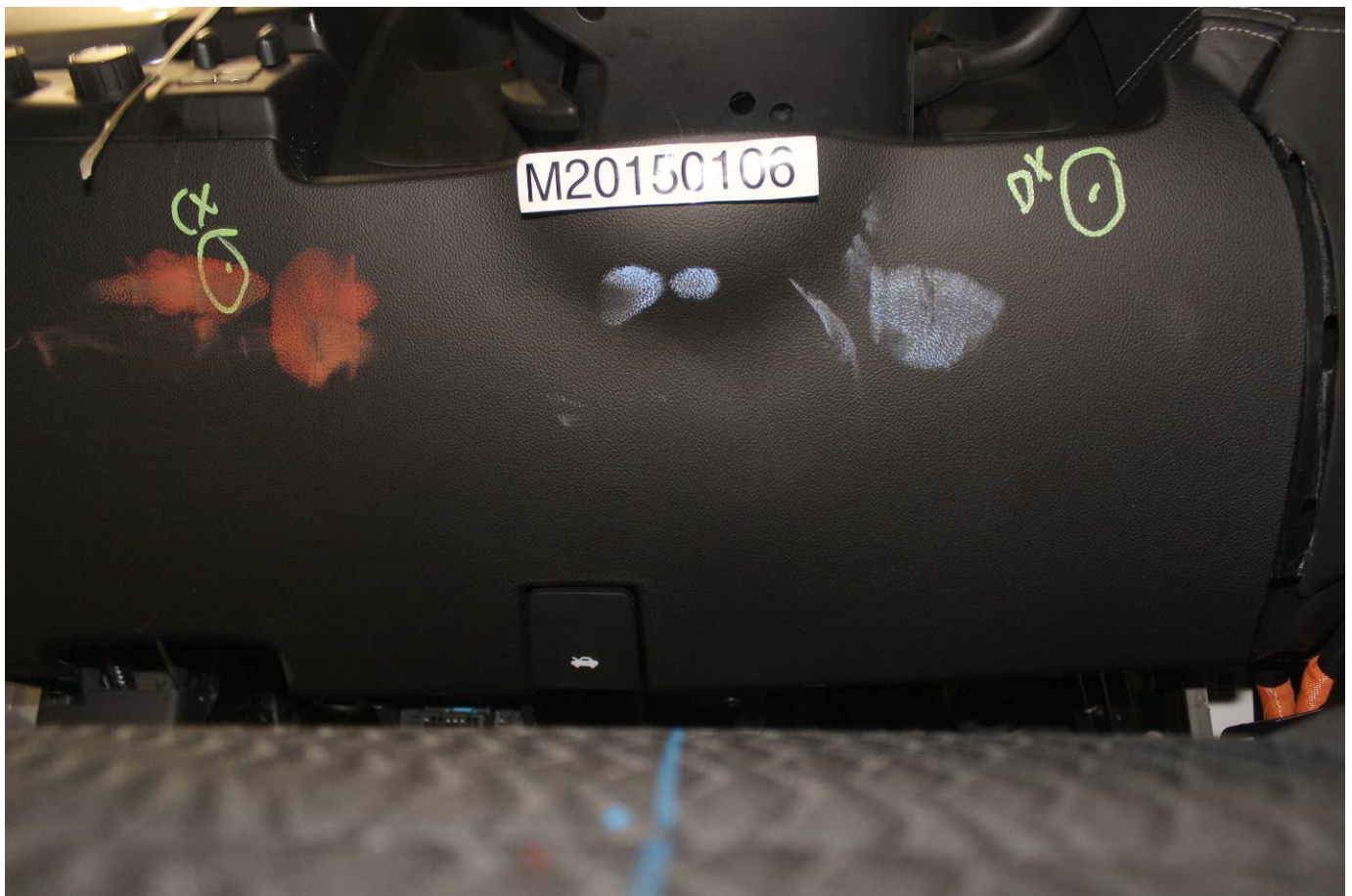
Post-Test Driver Dummy Face



Post-Test Driver Dummy Contact with Airbag



Post-Test Driver Dummy Contact with Headrest



Post-Test Driver Dummy Contact with Knee Bolster



Pre-Test View of the Steering Wheel



Post-Test View of the Steering Wheel



Pre-Test Passenger Dummy Front View



Post-Test Passenger Dummy Front View



Pre-Test Passenger Dummy Window View



Post-Test Passenger Dummy Window View



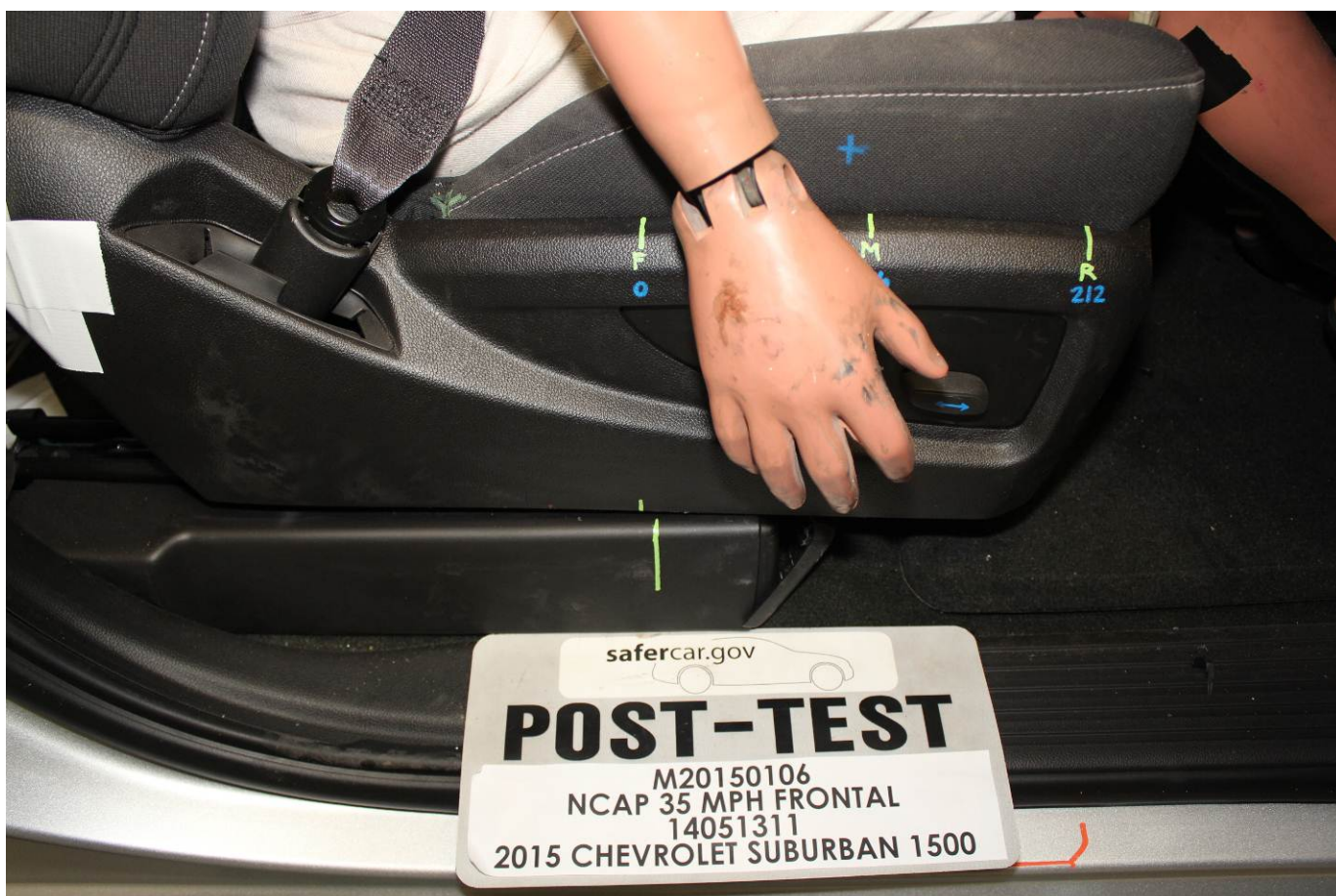
Pre-Test Passenger Dummy and Vehicle Interior (Door Open)



Post-Test Passenger Dummy and Vehicle Interior (Door Open)



Pre-Test Passenger's Seat Fore-Aft Markings



Post-Test Passenger's Seat Fore-Aft Markings



Pre-Test View of Belt Anchorage for Passenger Dummy



Post-Test View of Belt Anchorage for Passenger Dummy



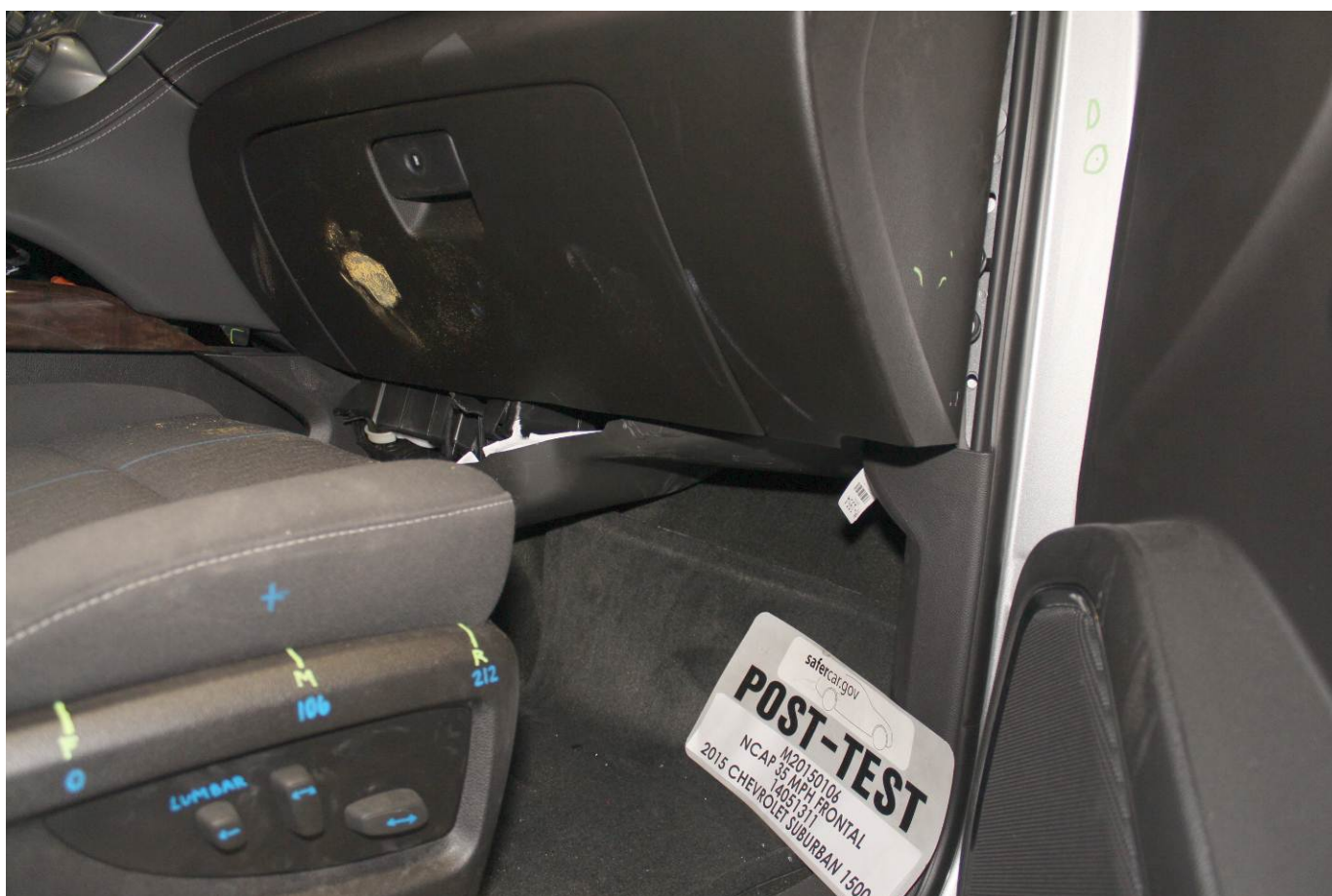
Pre-Test Passenger Dummy Feet



Post-Test Passenger Dummy Feet



Pre-Test Passenger's Side Knee Bolster (without dummy)



Post-Test Passenger's Side Knee Bolster (without dummy)



Pre-Test Passenger's Side Floorpan



Post-Test Passenger's Side Floorpan



Post-Test Passenger Dummy Face



Post-Test Passenger Dummy Contact with Airbag



Post-Test Passenger Dummy Contact with Headrest



Post-Test Passenger Dummy Contact with Glovebox



Post-Test Passenger Dummy Contact with Frontal Airbag



Ballast Installed in Vehicle

PHOTOGRAPH NOT APPLICABLE

Post-Test Stoddard Solvent Spillage Location View



Post-Test Speed Trap Read-Out



Vehicle at 0 Degree on Static Rollover Device



Vehicle at 90 Degrees on Static Rollover Device



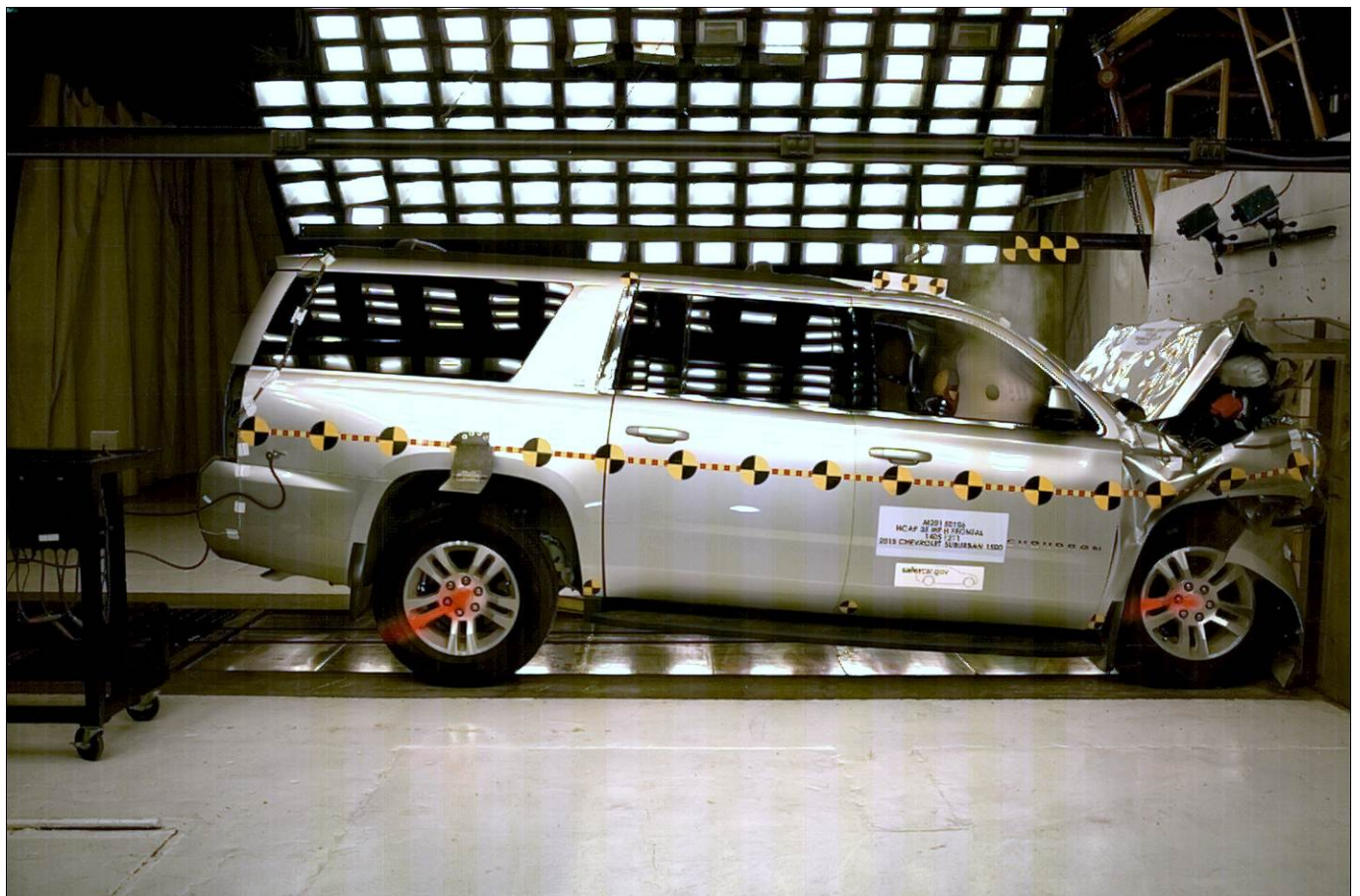
Vehicle at 180 Degrees on Static Rollover Device



Vehicle at 270 Degrees on Static Rollover Device



Vehicle at 360 Degrees on Static Rollover Device



2015 Chevrolet Suburban Frontal Impact Event



2015 SUBURBAN 4WD 1/2 TON LS



EXTERIOR: SILVER ICE METALLIC
INTERIOR: JET BLACK

ENGINE, 5.3L V8 ECOTEC3
TRANSMISSION, 6 SPD AUTOMATIC

Visit us at www.chevy.com

STANDARD EQUIPMENT

ITEMS FEATURED BELOW ARE INCLUDED AT NO EXTRA CHARGE IN THE STANDARD VEHICLE PRICE SHOWN

- 5 YEAR / 100,000 MILE POWERTRAIN LIMITED WARRANTY
- SCHEDULED MAINTENANCE 2YR/24,000 MILES
- OIL & FILTER
- 4 WHEEL TIRE ROTATION
- SEE WWW.CHEVY.COM OR DEALER FOR DETAILS

MECHANICAL

- 5.3L V8 ECOTEC3 ENGINE
- 6 SPD AUTOMATIC TRANSMISSION
- PREMIUM RIDE SUSPENSION
- REAR AXLE 3.08 RATIO
- ENGINE OIL COOLING SYSTEM
- TRANSFER CASE SINGLE SPEED
- REAR PARK ASSIST
- TRAILERING EQUIPMENT
- BRAKES, 4-WHEEL DISC ANTI-LOCK

SAFETY & SECURITY

- 6 MTH ONSTAR(R) DIRECTIONS & CONNECTIONS W/ AUTOMATIC CRASH RESPONSE & TURN-BY-TURN NAV PLUS 5-YEAR ONSTAR BASIC PLAN (OMITS SAFETY, SECURITY & NAV) (SEE ONSTAR.COM)
- REAR VISION CAMERA
- TIRE PRESSURE MONITOR SYSTEM (EXCL. SPARE TIRE)
- AIR BAGS, FRONTAL AND SIDE-IMPACT, FOR DRIVER AND FRONT PASSENGER, DRIVER INBOARD SEAT MOUNTED, SIDE-IMPACT AND HEAD CURTAIN SIDE-IMPACT FOR ALL ROWS IN OUTBOARD SEAT POSITIONS
- EXTERIOR**
- RAIN SENSING WINDSHIELD WIPERS
- POWER HEATED OUTSIDE MIRRORS
- LUGGAGE RACK SIDE RAILS

- ASSIST STEPS
- REMOTE KEYLESS ENTRY, EXTENDED RANGE
- 18 POLISHED ALUMINUM WHEELS
- 17 STEEL SPARE WHEEL

INTERIOR

- CLOTH FRONT BUCKET SEATS
- PWR SEAT ADJUSTER, FRONT DRIVER AND PASSENGER
- SECOND ROW 60/40 SPLIT FOLD FLAT BENCH SEAT
- 3RD ROW 60/40 FOLD FLAT BENCH SEAT
- REMOTE VEHICLE START
- EXPRESS DOWN, EXPRESS UP FRONT, POWER WINDOWS
- POWER DOOR LOCKS
- TILTING STEERING COLUMN
- LEATHER WRAP STEERING WHEEL
- STEERING WHEEL CONTROLS
- BLUETOOTH FOR PHONE
- TRI-ZONE AUTOMATIC

- CLIMATE CONTROL
- AUDIO SYSTEM, W/ 4.2" DIAGONAL COLOR SCREEN
- 110-VOLT AC POWER OUTLET

OPTIONS & PRICING

MANUFACTURER'S SUGGESTED RETAIL PRICE

STANDARD VEHICLE PRICE **\$50,300.00**

OPTIONS INSTALLED BY THE MANUFACTURER (MAY REPLACE STANDARD EQUIPMENT SHOWN)

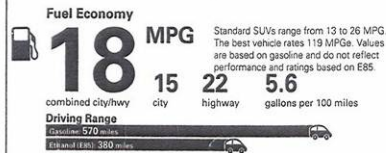
MAX TRAILERING PACKAGE:	650.00
• REAR AXLE, 3.42 RATIO	
• TRAILER BRAKE CONTROLLER	
• TRANSFER CASE 2-SPEED	
• SUSPENSION PACKAGE	
AUTO LOCKING REAR DIFFERENTIAL	295.00
ROOF RACK CROSS RAILS	210.00
(DEALER INSTALLED)	
GVW RATING 7,500 LBS	INC.
TOTAL OPTIONS	\$1,155.00

TOTAL VEHICLE & OPTIONS	\$51,455.00
DESTINATION CHARGE	995.00

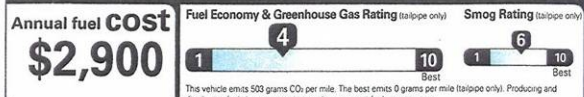
TOTAL VEHICLE PRICE* \$52,450.00

EPA DOT Fuel Economy and Environment

Flexible-Fuel Vehicle
Gasoline-Ethanol (E85)



You spend \$3,500 more in fuel costs over 5 years compared to the average new vehicle.



Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 24 MPG and costs \$11,000 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$3.50 per gallon. This is a dual-fuelled automobile. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fuelconomy.gov

Calculate personalized estimates and compare vehicles



GOVERNMENT 5-STAR SAFETY RATINGS

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

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



Equipped with the safety and connectivity of OnStar.

Push your blue button or visit onstar.com for details.

PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS CARLINE:
U.S./CANADIAN PARTS CONTENT: 60%
MAJOR SOURCES OF FOREIGN PARTS CONTENT: MEXICO 28%

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

FOR THIS VEHICLE:
FINAL ASSEMBLY POINT:
ARLINGTON, TX U.S.A.
COUNTRY OF ORIGIN:
ENGINE: UNITED STATES
TRANSMISSION: UNITED STATES

This label has been applied pursuant to Federal law - Do not remove prior to delivery to the ultimate purchaser. *Includes Manufacturer's Recommended Pre-Delivery Service. Does not include dealer-installed options and accessories not listed above. Local taxes or license fees.

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GM/LSL_PPCD_2009-1017/9/2014

ORDER NO. RNTWCC SALES CODE E
SALES MODEL CODE CH15900
DEALER NO. 13590
FINAL ASSEMBLY:
ARLINGTON, TX U.S.A.

VIN 1GNSKHKC2FR123254

REISSUE

DEALER TO WHOM DELIVERED
KIGHTLINGER MOTORS, INC.
358 ROUTE 6 WEST
COUDERSPORT, PA 16915-8450



Monroney Label Photograph

APPENDIX B
DUMMY RESPONSE DATA TRACES

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Figure No. 5.	Driver Chest Displacement vs. Time	B-2
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Figure No. 26.	Passenger Chest Z Acceleration vs. Time	B-9
Figure No. 27.	Passenger Chest Resultant Z Acceleration vs. Time	B-9

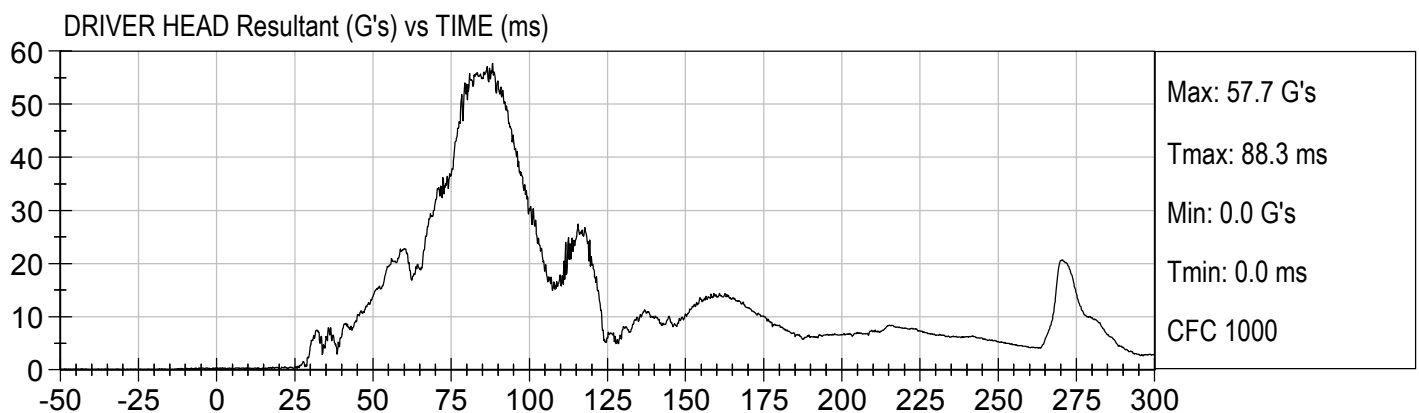
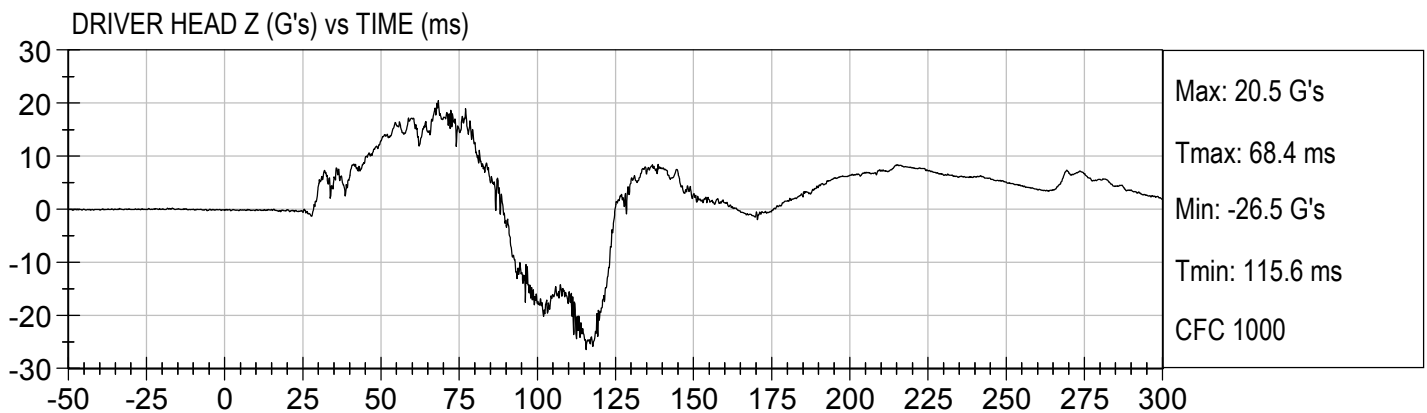
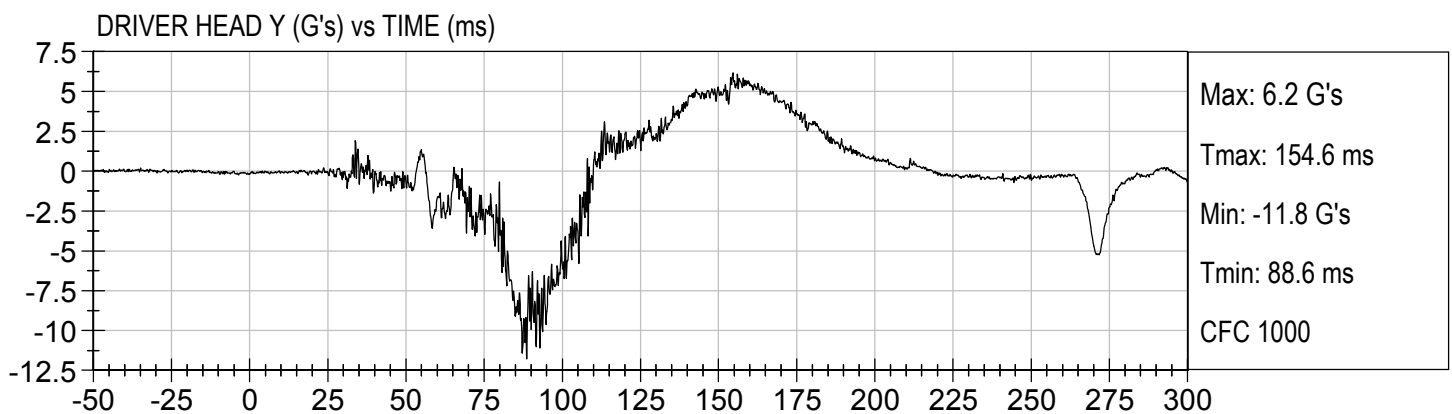
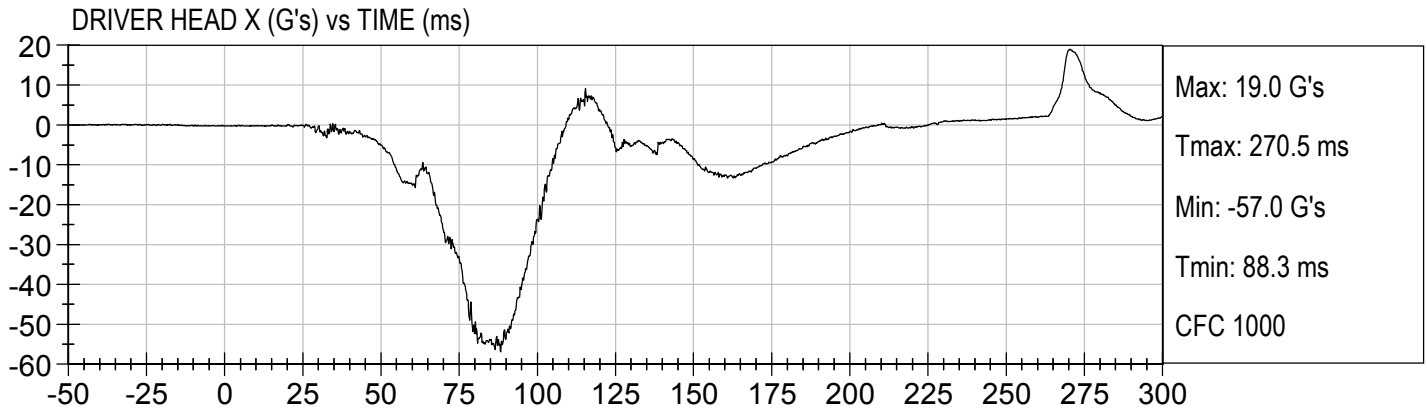
	<u>Page No.</u>
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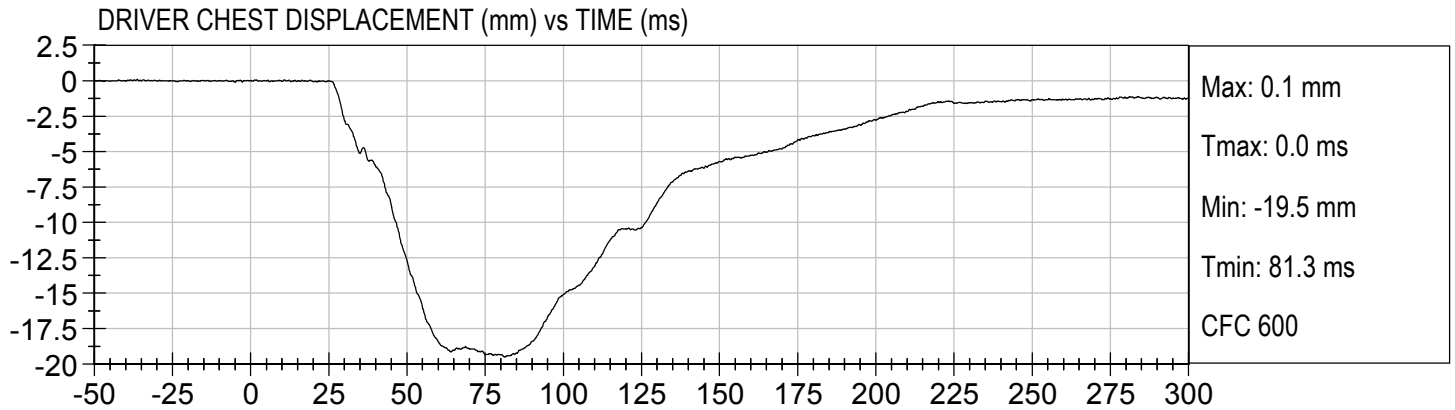
The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at www.nhtsa.dot.gov

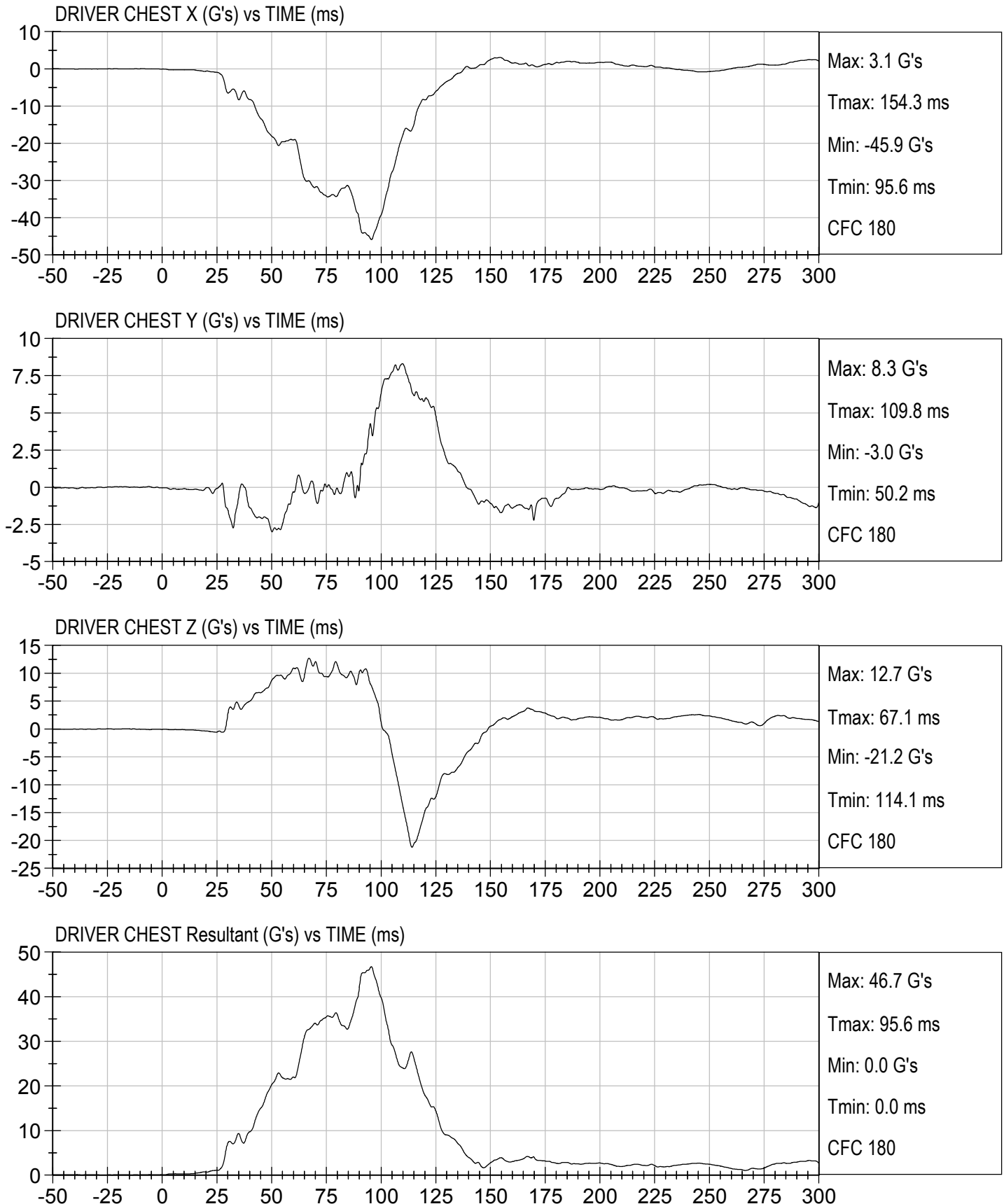
Driver Head X Redundant
 Driver Head Y Redundant
 Driver Head Z Redundant
 Driver Upper Neck Force Y
 Driver Upper Neck Moment X
 Driver Upper Neck Moment Z
 Driver Chest X Redundant
 Driver Chest Y Redundant
 Driver Chest Z Redundant
 Driver Pelvis X
 Driver Pelvis Y
 Driver Pelvis Z
 Driver Left Femur Redundant
 Driver Right Femur Redundant
 Driver Left Upper Tibia Moment X
 Driver Left Upper Tibia Moment Y
 Driver Left Upper Tibia Force Z
 Driver Left Lower Tibia Moment X

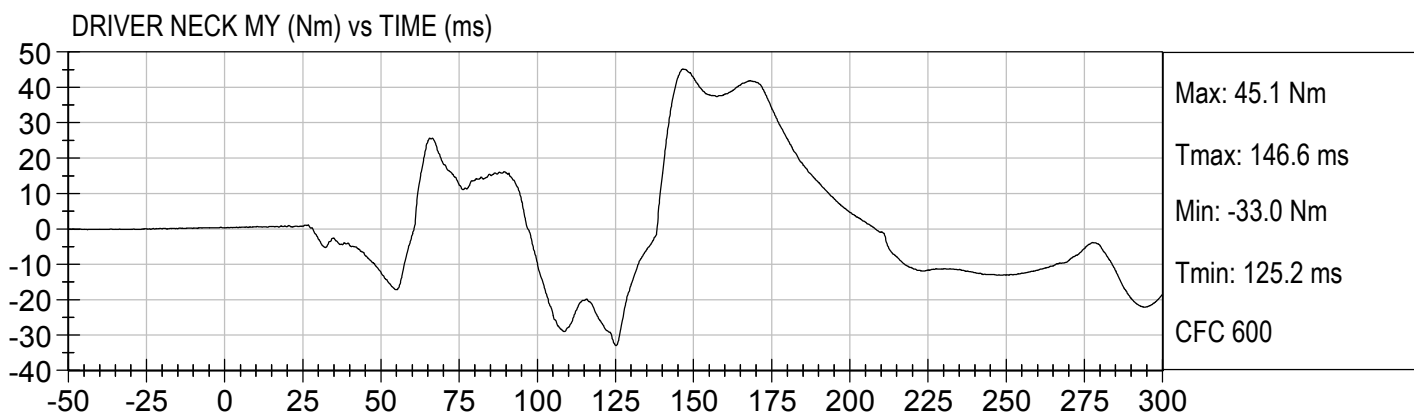
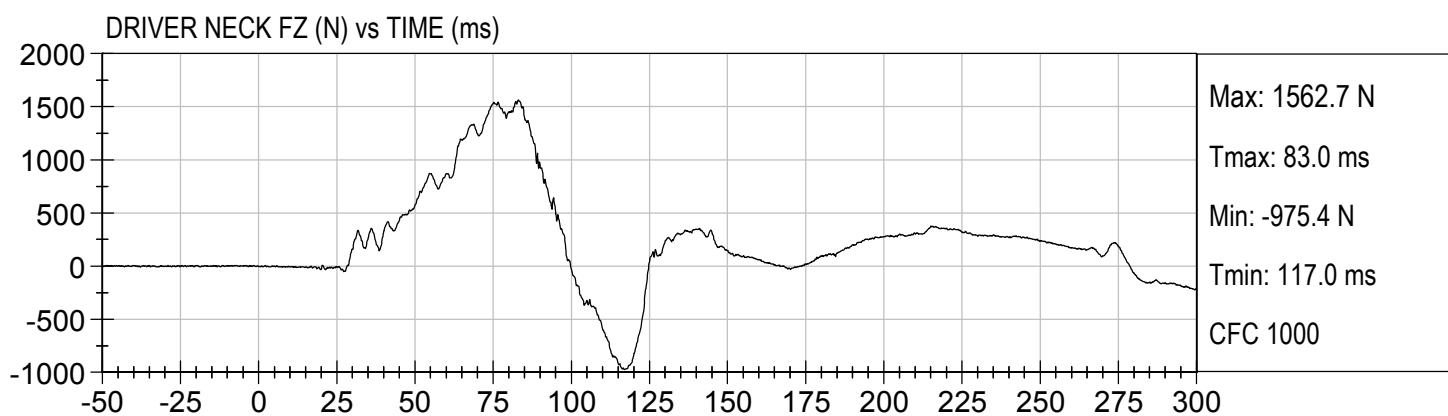
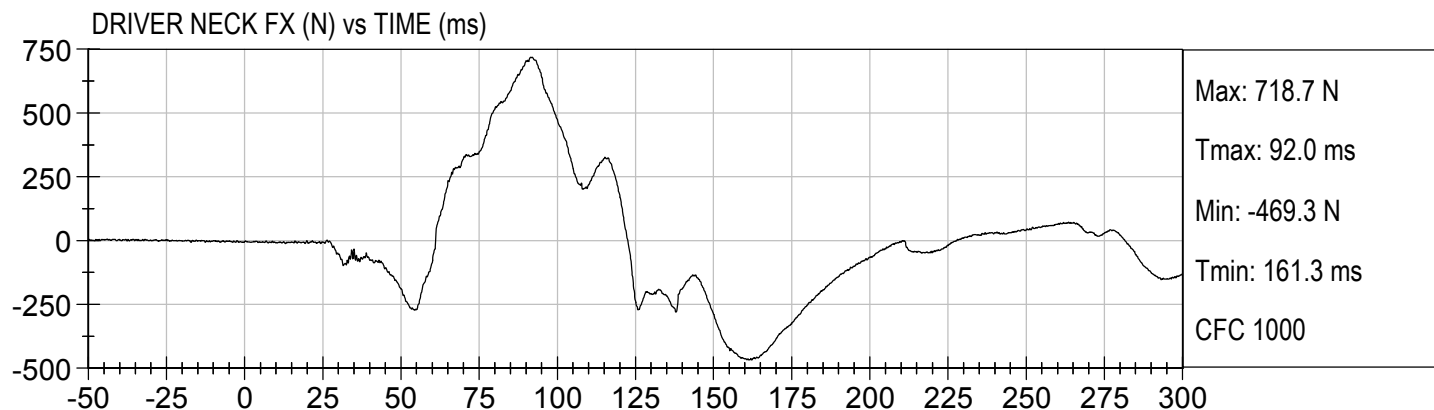
Driver Left Lower Tibia Moment Y
Driver Left Lower Tibia Force Z
Driver Right Upper Tibia Moment X
Driver Right Upper Tibia Moment Y
Driver Right Upper Tibia Force Z
Driver Right Lower Tibia Moment X
Driver Right Lower Tibia Moment Y
Driver Right Lower Tibia Force Z
Driver Left Foot Fore Z
Driver Left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

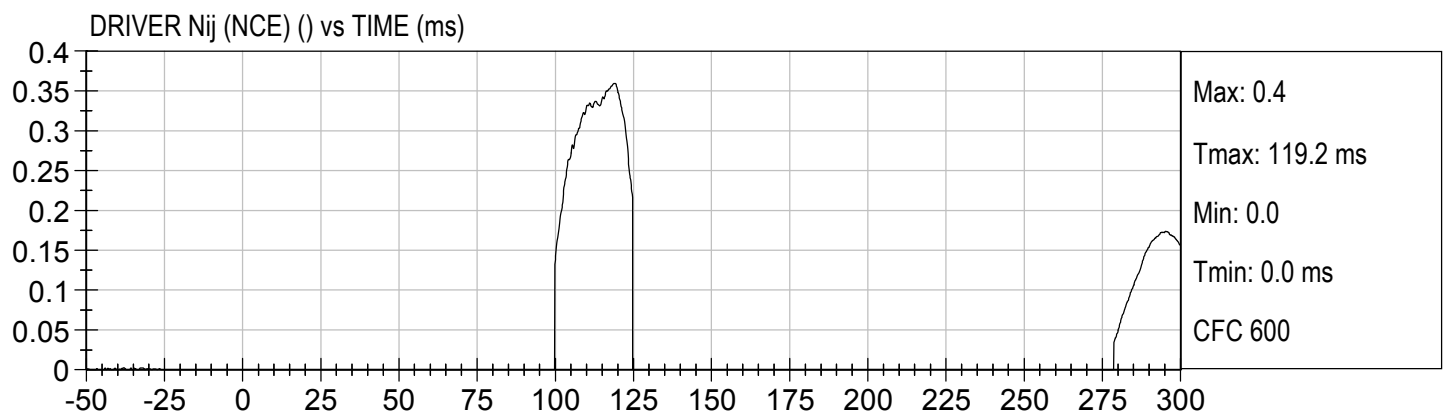
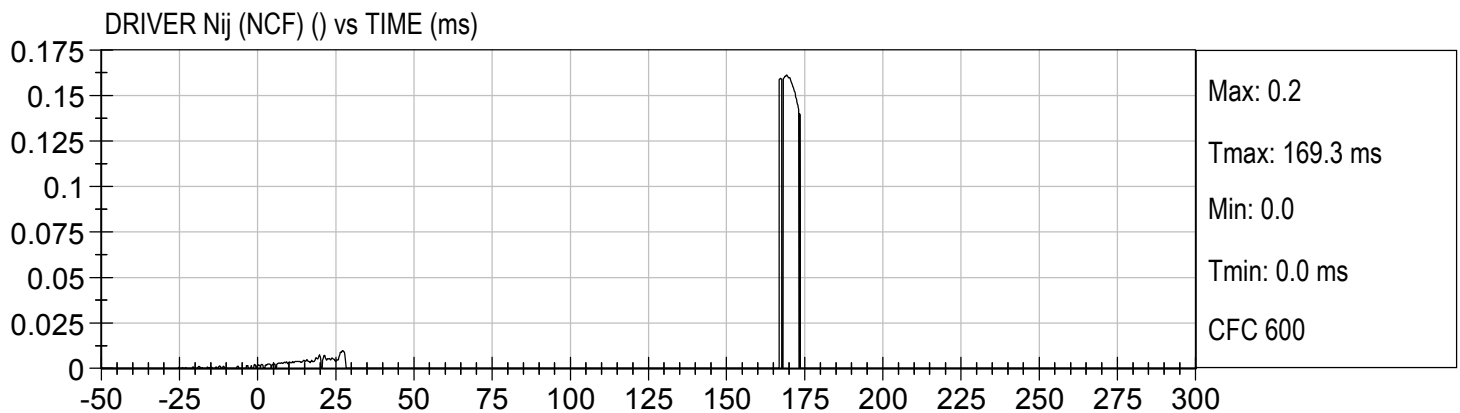
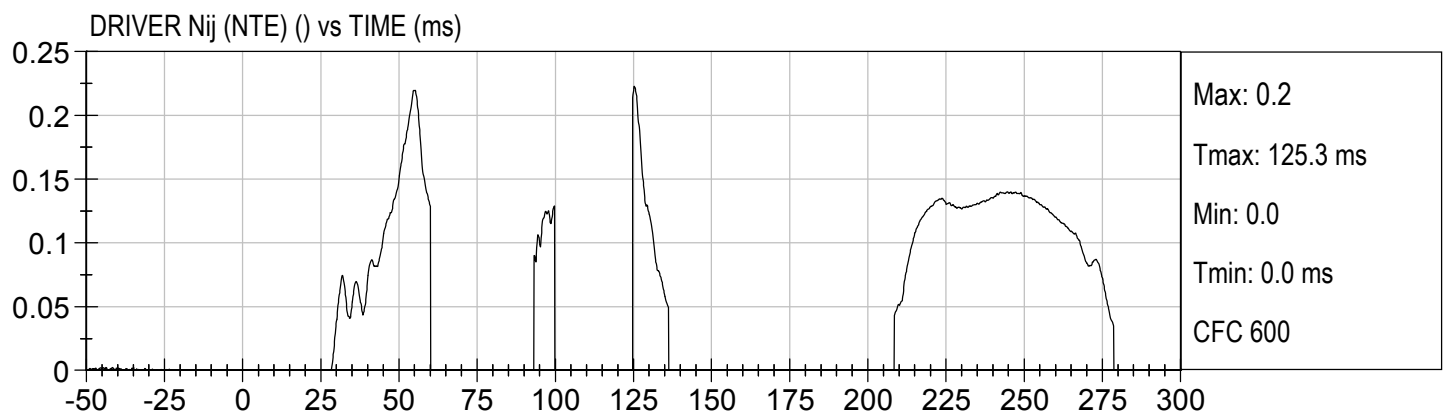
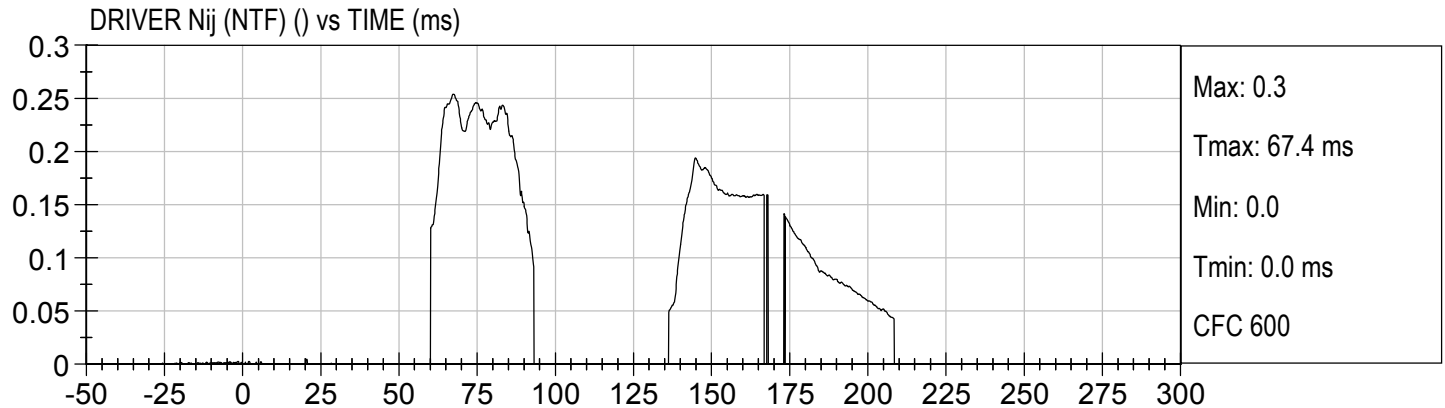
Passenger Left Upper Tibia Moment Y
Passenger Left Upper Tibia Force Z
Passenger Left Lower Tibia Moment X
Passenger Left Lower Tibia Moment Y
Passenger Left Lower Tibia Force Z
Passenger Right Upper Tibia Moment X
Passenger Right Upper Tibia Moment Y
Passenger Right Upper Tibia Force Z
Passenger Right Lower Tibia Moment X
Passenger Right Lower Tibia Moment Y
Passenger Right Lower Tibia Force Z
Passenger Left Foot Fore Z
Passenger Left Foot Aft X
Passenger Left Foot Aft Z
Passenger Right Foot Fore Z
Passenger Right Foot Aft X
Passenger Right Foot Aft Z
Passenger Lap Belt Force
Passenger Shoulder Belt Force
Left Rear Seat Crossmember X
Right Rear Seat Crossmember X
Vehicle Engine Top X
Vehicle Engine Bottom X
Left Rear Seat Crossmember Z
Right Rear Seat Crossmember Z
Left Rear Seat Crossmember Xr
Right Rear Seat Crossmember Xr
Advanced Research Load Cell Barrier – 528 channels

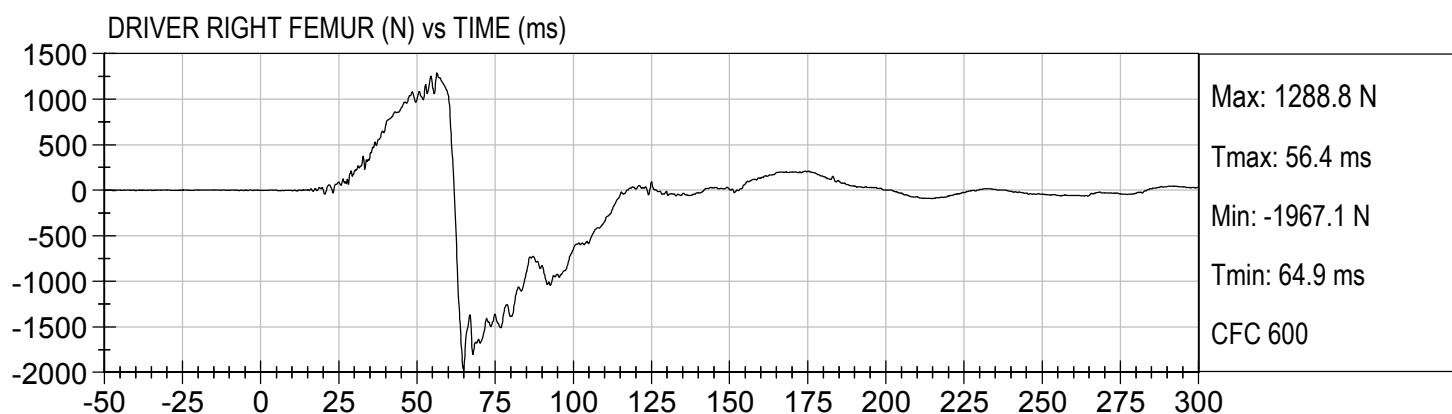
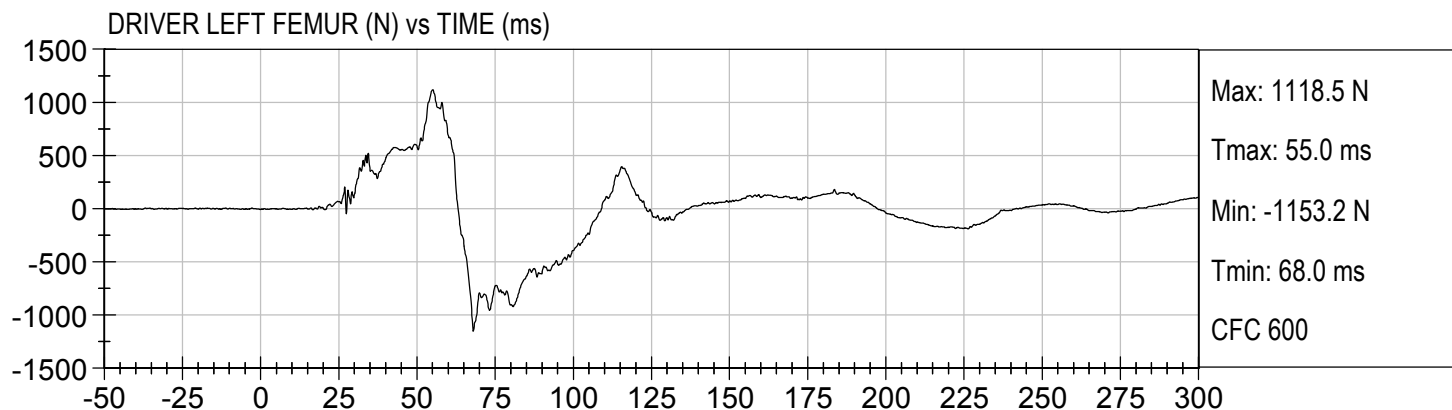


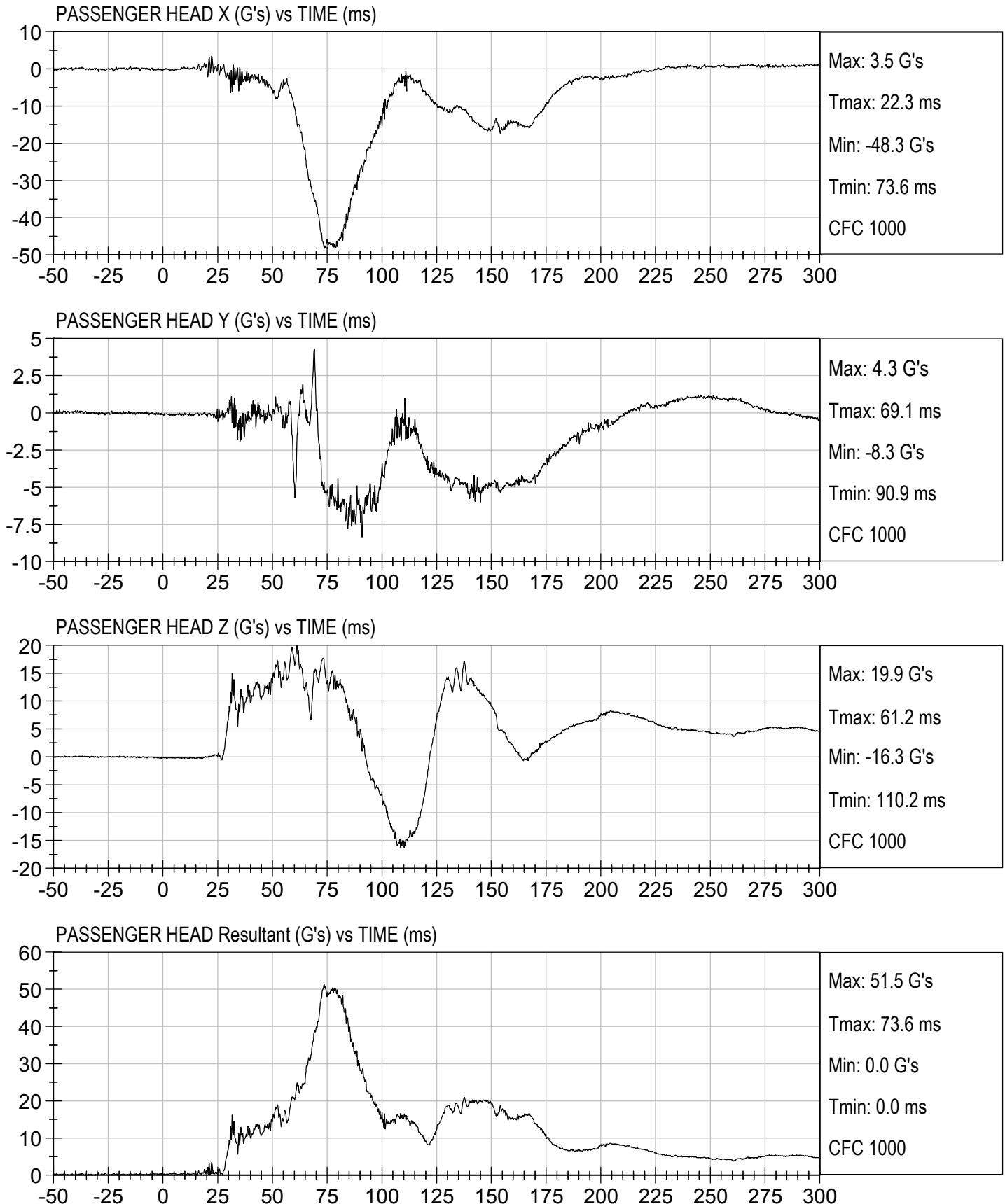


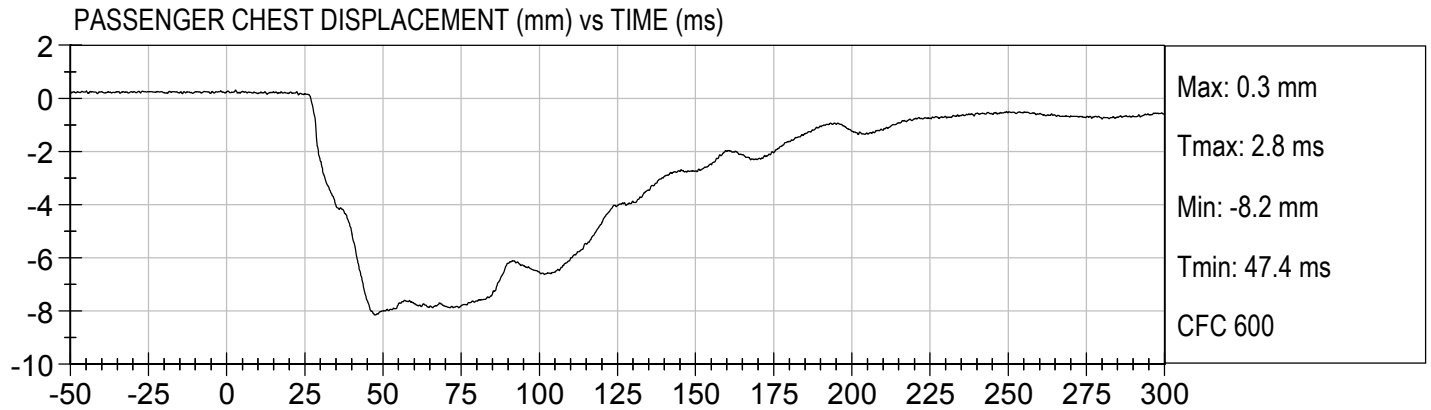


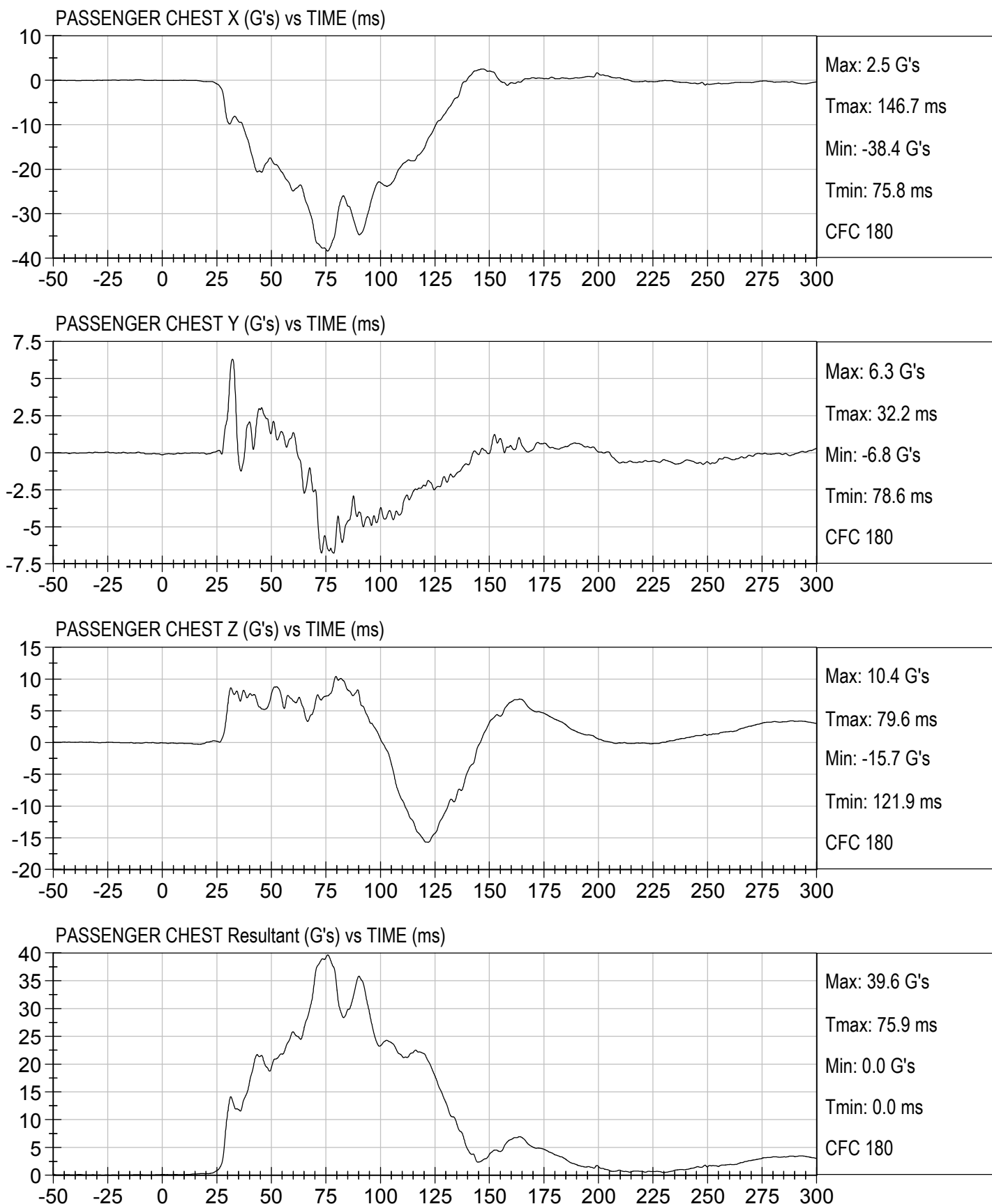


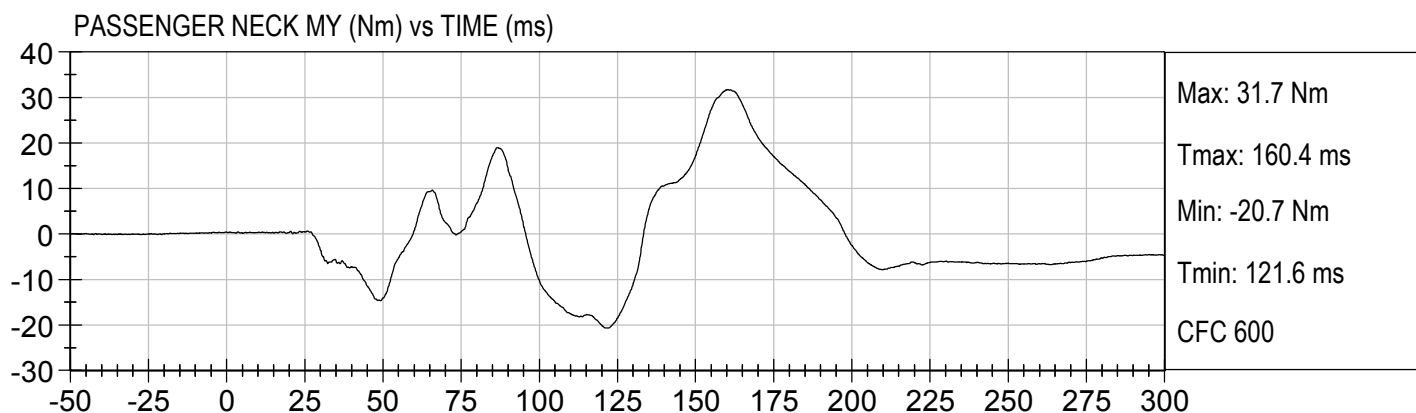
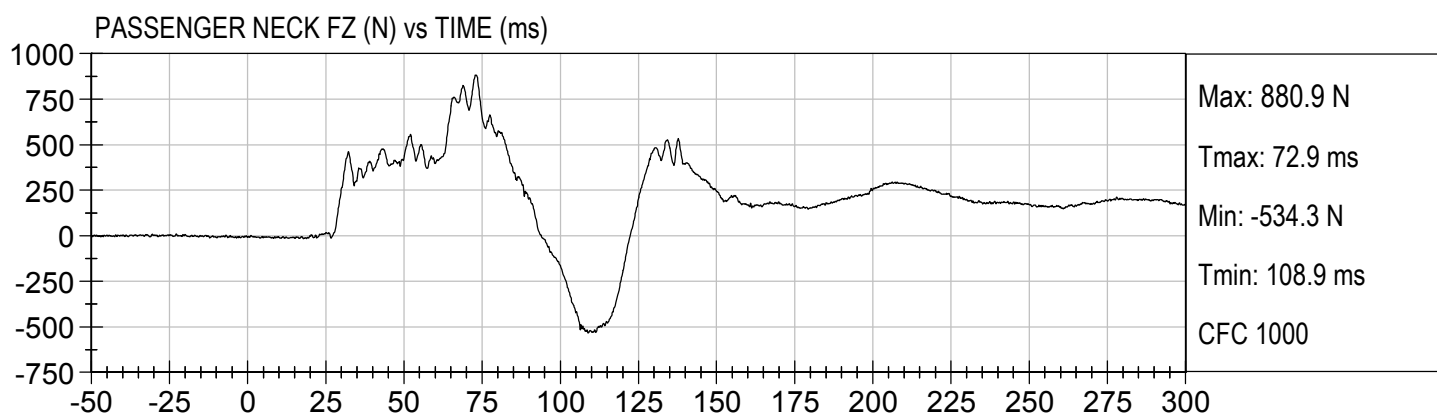
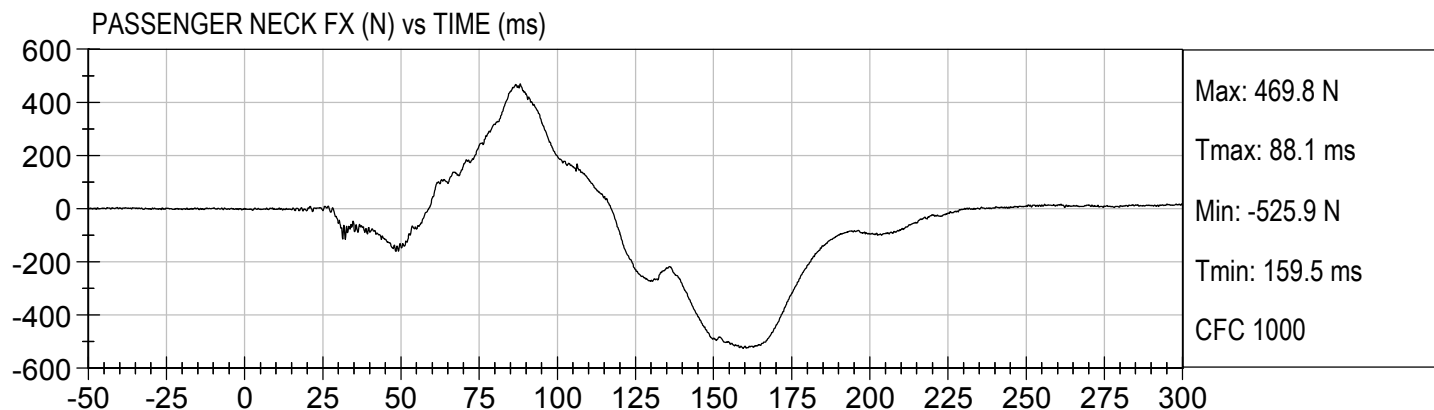


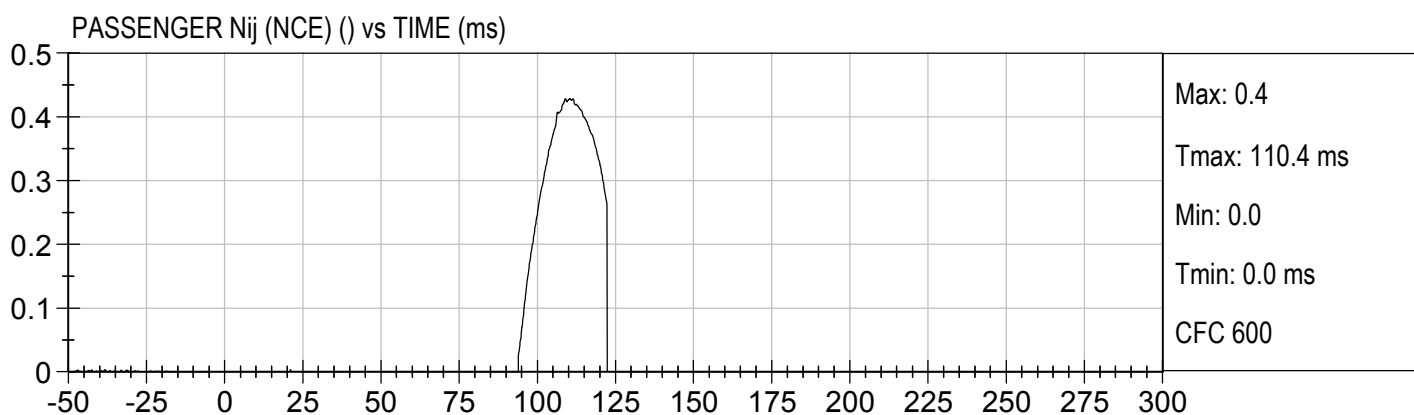
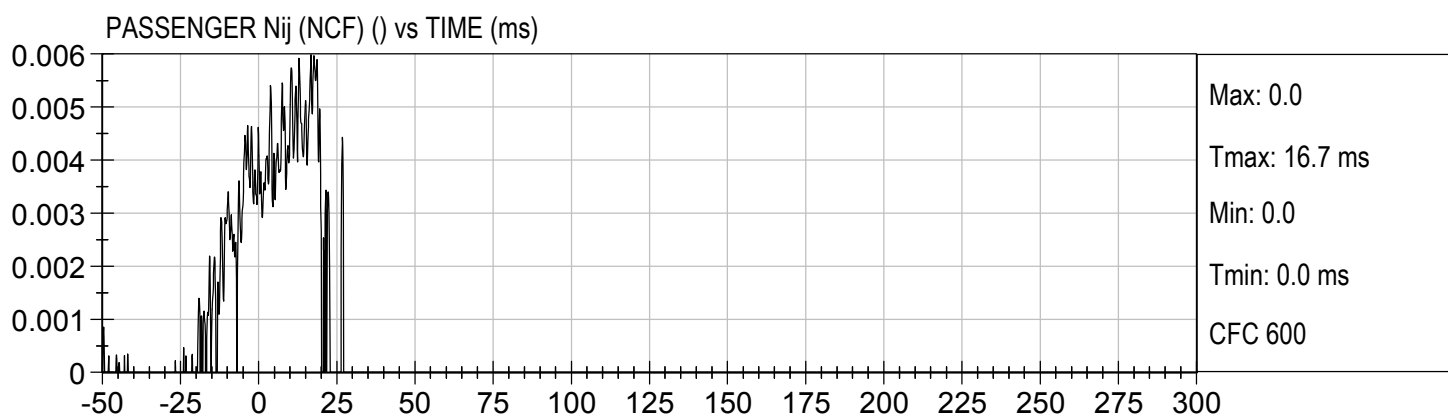
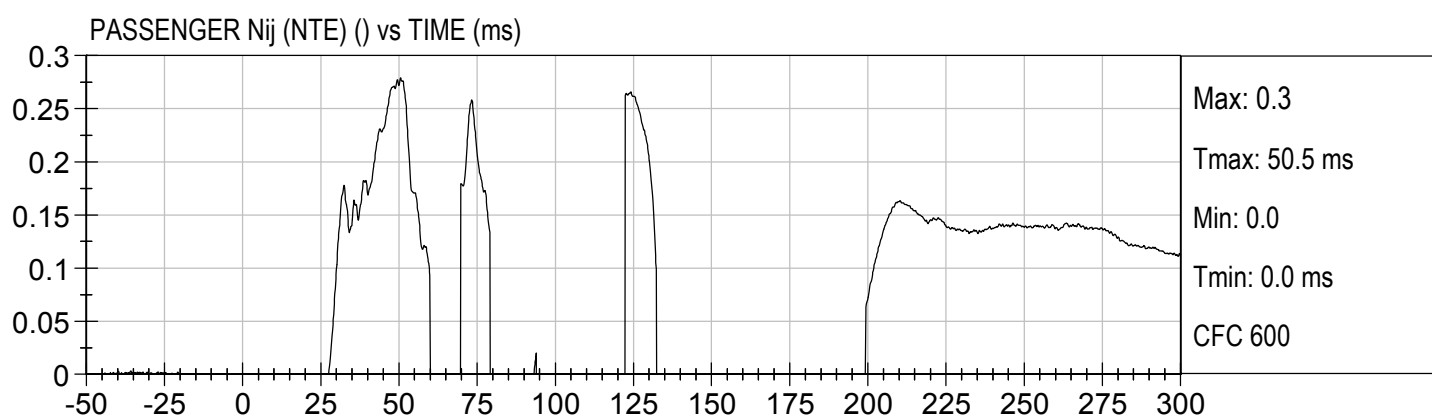
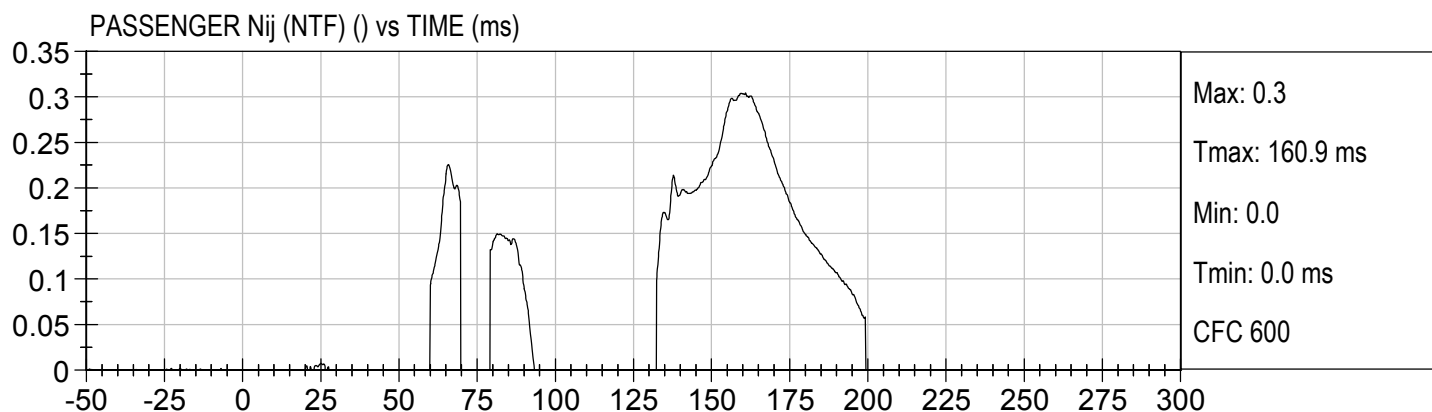


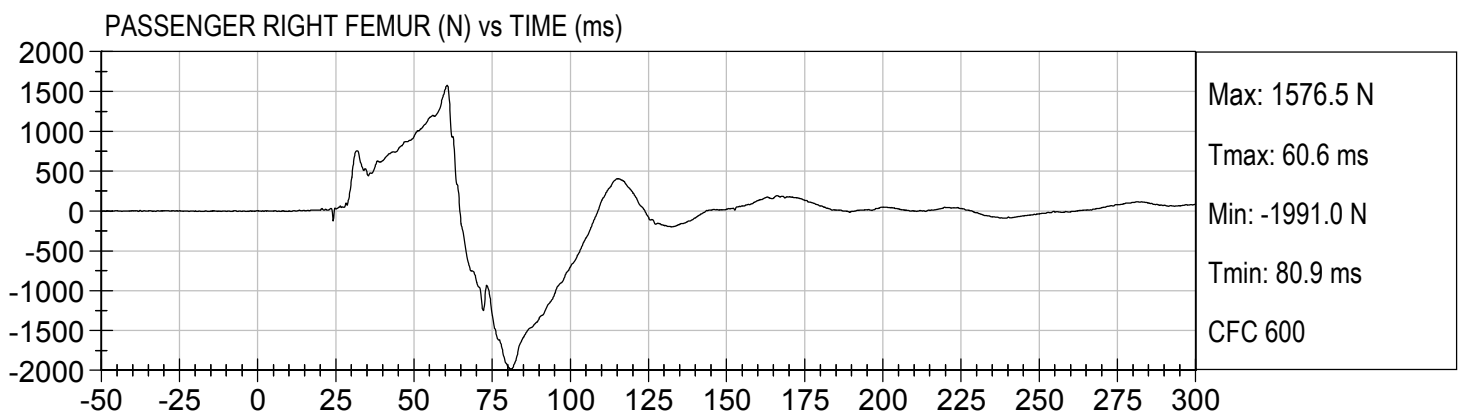
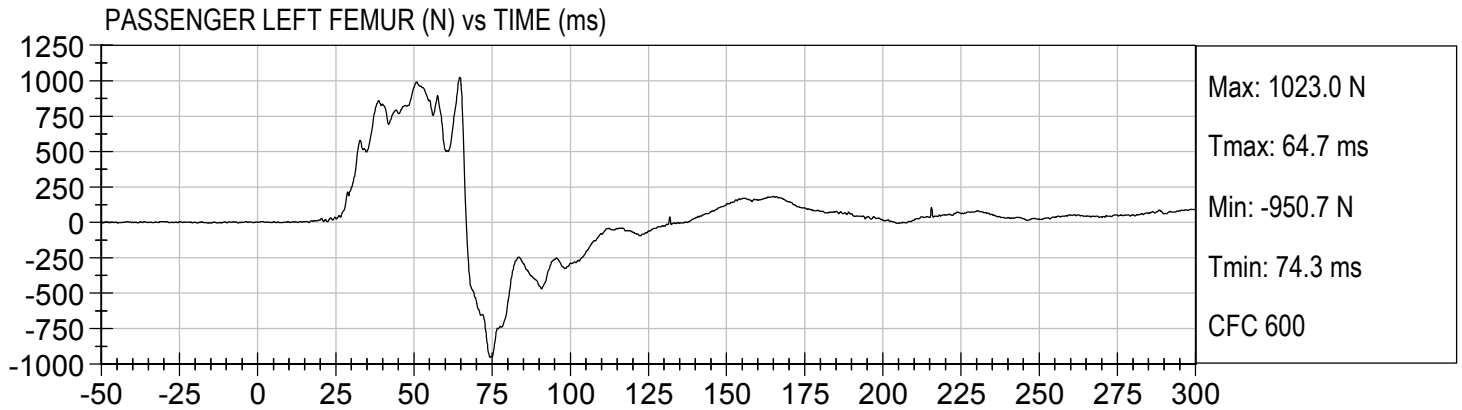












APPENDIX C
DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA

Hybrid III, 50th External Measurements
SN: 351

HYBRID III, PART 572, SUBPART E EXTERNAL DIMENSIONS				
DIMENSION	DESCRIPTION	DETAILS	ASSEMBLY DIMENSION (inches)	ACTUAL MEASUREMENT
A	TOTAL SITTING HEIGHT	Seat surface to highest point on top of the head.	34.6–35.0	34.8
B	SHOULDER PIVOT HEIGHT	Centerline of shoulder pivot bolt to the seat surface.	19.9-20.5	20.0
C	H-POINT HEIGHT	Reference	3.3-3.5	3.4
D	H-POINT LOCATION FROM BACKLINE	Reference	5.3-5.5	5.5
E	SHOULDER PIVOT FROM BACKLINE	Center of the shoulder clevis to the rear vertical surface of the fixture.	3.3-3.7	3.5
F	THIGH CLEARANCE	Measured at the highest point on the upper femur segment.	5.5-6.1	6.0
G	BACK OF ELBOW TO WRIST PIVOT	back of the elbow flesh to the wrist pivot in line with the elbow and wrist pivots	11.4-12.0	11.8
H	HEAD BACK TO BACKLINE	Back of Skull cap skin to seat rear vertical surface (Reference)	1.6-1.8	1.7
I	SHOULDER TO- ELBOW LENGTH	Measure from the highest point on top of the shoulder clevis to the lowest part of the flesh on the elbow in line with the elbow pivot bolt.	13.0-13.6	13.3
J	ELBOW REST HEIGHT	Measure from the flesh below the elbow pivot bolt to the seat surface.	7.5-8.3	7.8
K	BUTTOCK TO KNEE LENGTH	The forward most part of the knee flesh to the rear vertical surface of the fixture.	22.8-23.8	23.8
L	POPLITEAL HEIGHT	Seat surface to the plane of the horizontal plane of the bottom of the feet.	16.9-17.9	17.0
M	KNEE PIVOT HEIGHT	Centerline of knee pivot bolt to the horizontal plane of the bottom of the feet.	19.1-19.7	19.5
N	BUTTOCK POPLITEAL LENGTH	The rearmost surface of the lower leg to the same point on the rear surface of the buttocks used for dim. "K".	17.8-18.8	18.8

HYBRID III, SUBPART E EXTERIOR DIMENSIONS, continued				
DIMENSION	DESCRIPTION	DETAILS		ACTUAL MEASUREMENT
O	CHEST DEPTH WITHOUT JACKET	Measured 16.9-17.1 in. above seat surface	8.4-9.0	8.5
P	FOOT LENGTH	Tip of toe to rear of heel	9.9-10.5	10.3
V	SHOULDER BREADTH	Outside edges of right and left shoulder clevises	16.3-17.2	16.5
W	FOOT BREADTH	The widest part of the foot	3.6-4.2	4.0
Y	CHEST CIRCUMFERENCE (WITH CHEST JACKET)	Measured 16.9-17.1 in. above seat surface	38.2-39.4	39.2
Z	WAIST CIRCUMFERENCE	Measured 8.9-9.1 in. above seat surface	32.9-34.1	33.7
AA	REFERENCE LOCATION FOR MEASUREMENT OF CHEST CIRCUMFERENCE	Reference	16.9-17.1	17.0
BB	REFERENCE LOCATION FOR MEASUREMENT OF WAIST CIRCUMFERENCE	Reference	8.9-9.1	9.0

NOTE: THE H-POINT IS LOCATED 1.83 INCHES FORWARD AND 2.57 INCHES DOWN FROM THE CENTER OF THE PELVIS ANGLE REFERENCE HOLE.

MGA RESEARCH CORPORATION
HEAD DROP TEST
HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351

Test ID: D141581

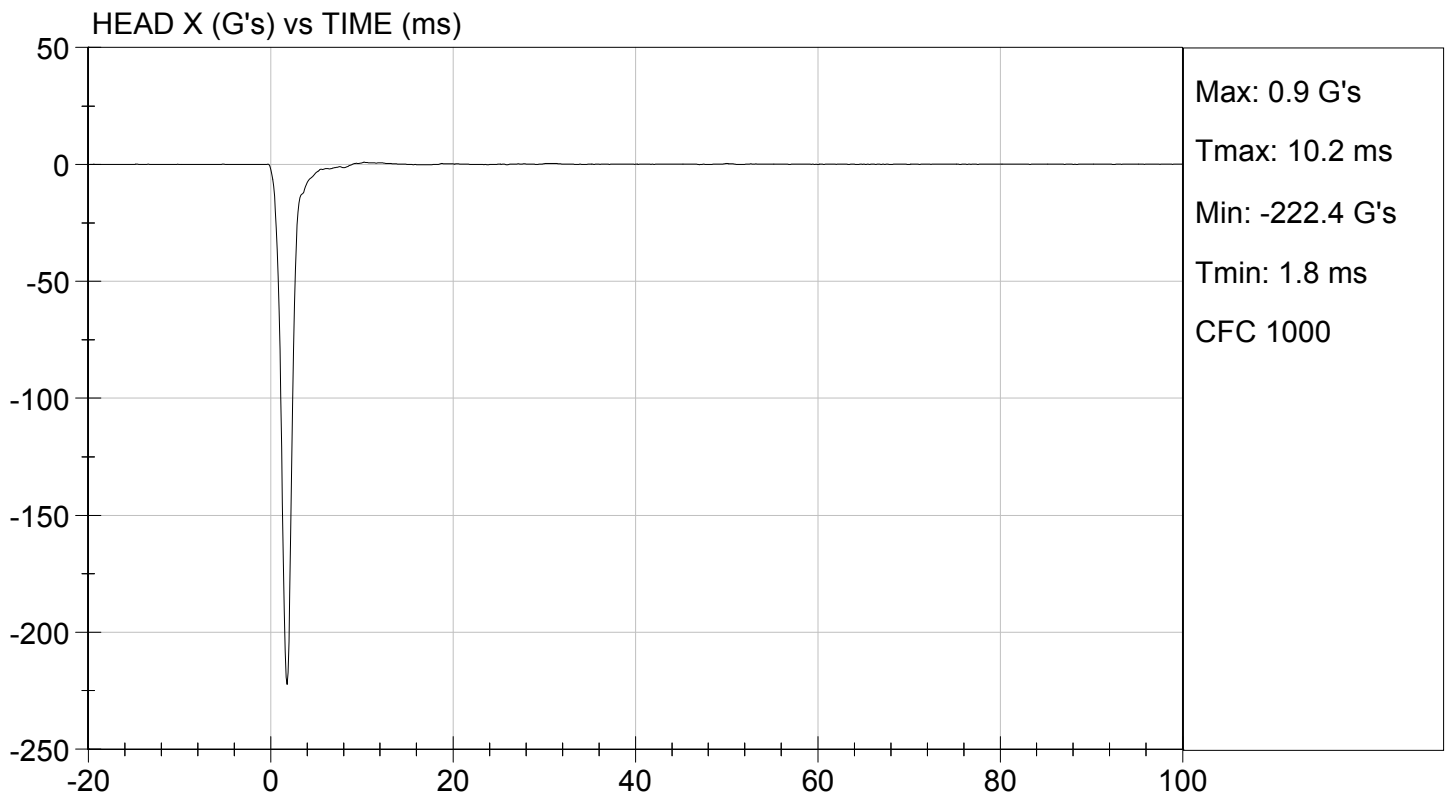
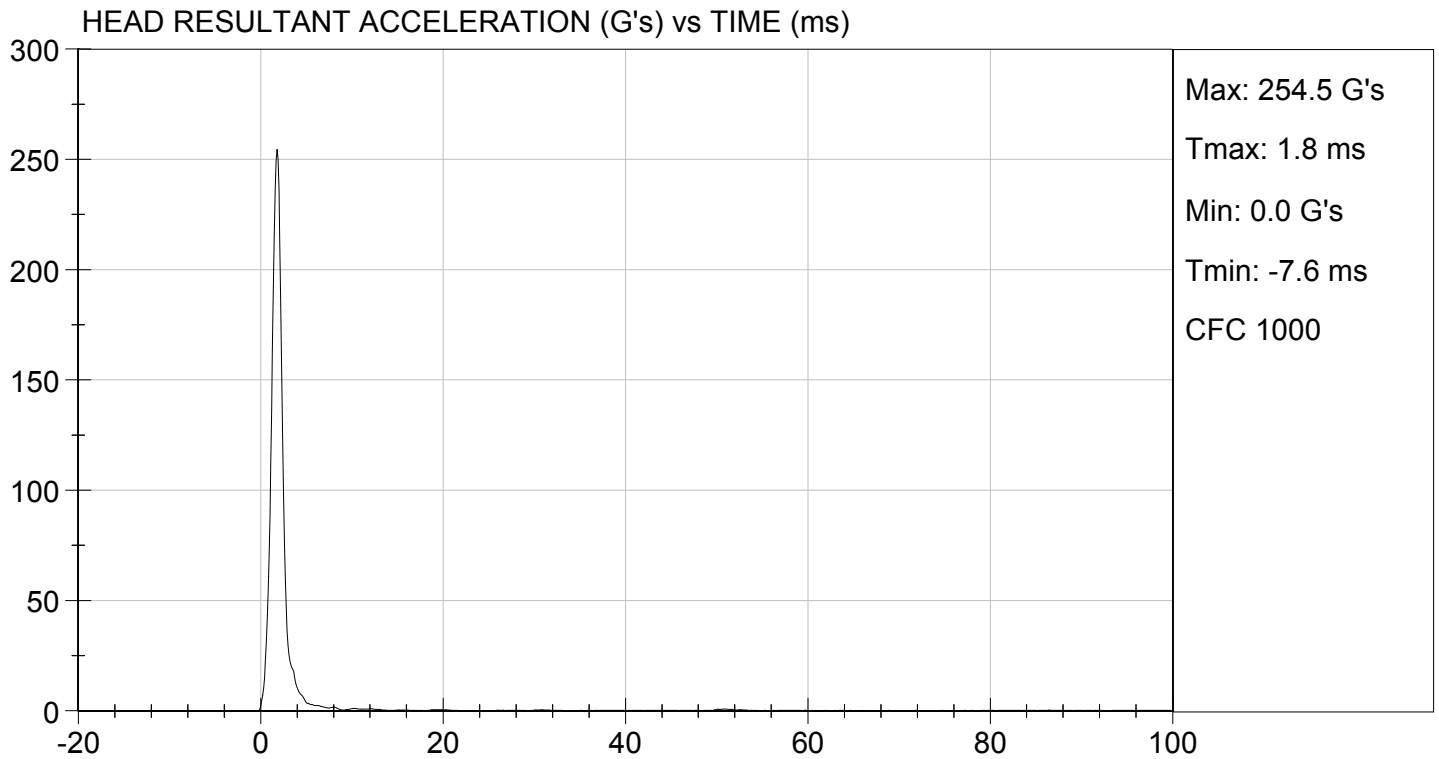
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	225 to 275	255	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	-7.1	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
Overall Test Results				Pass

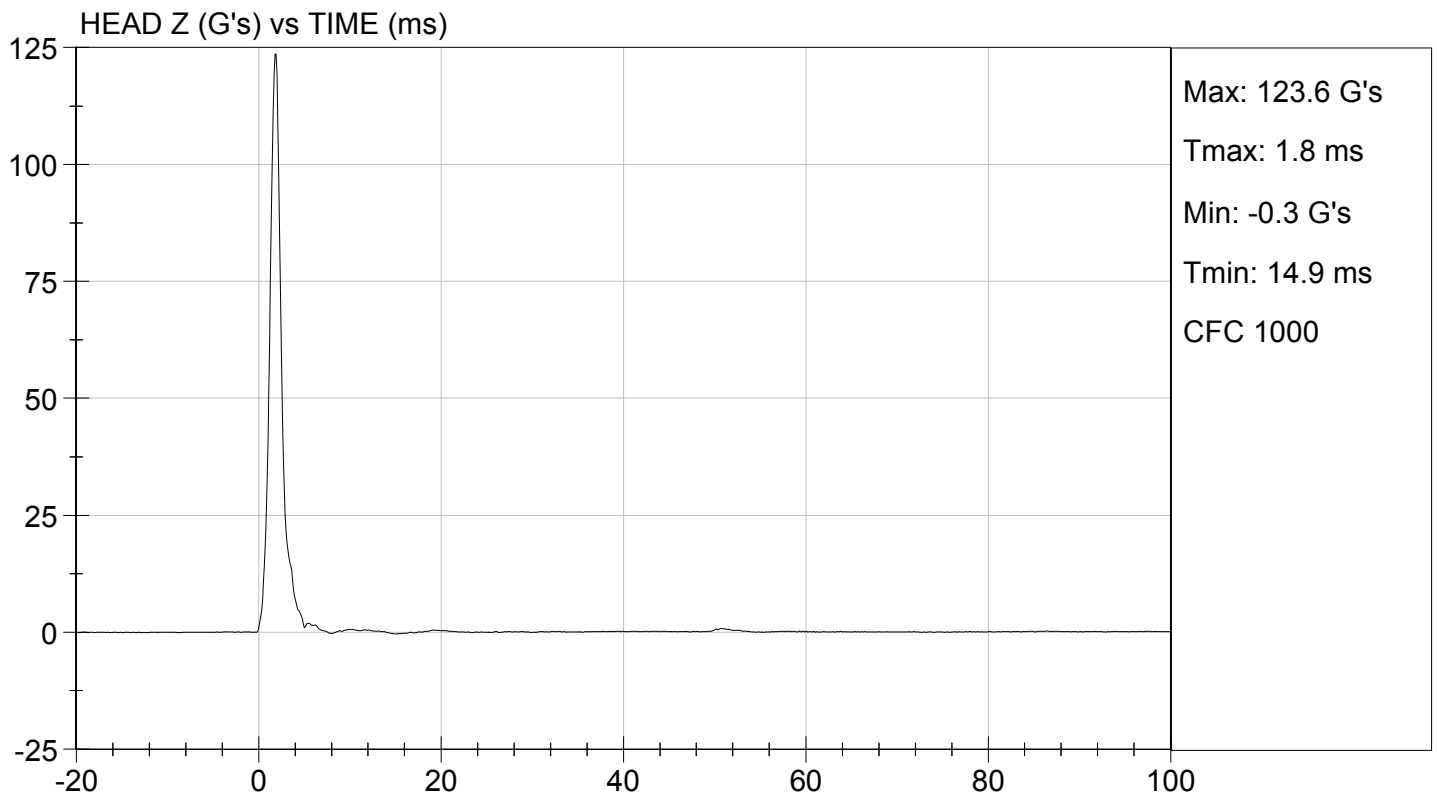
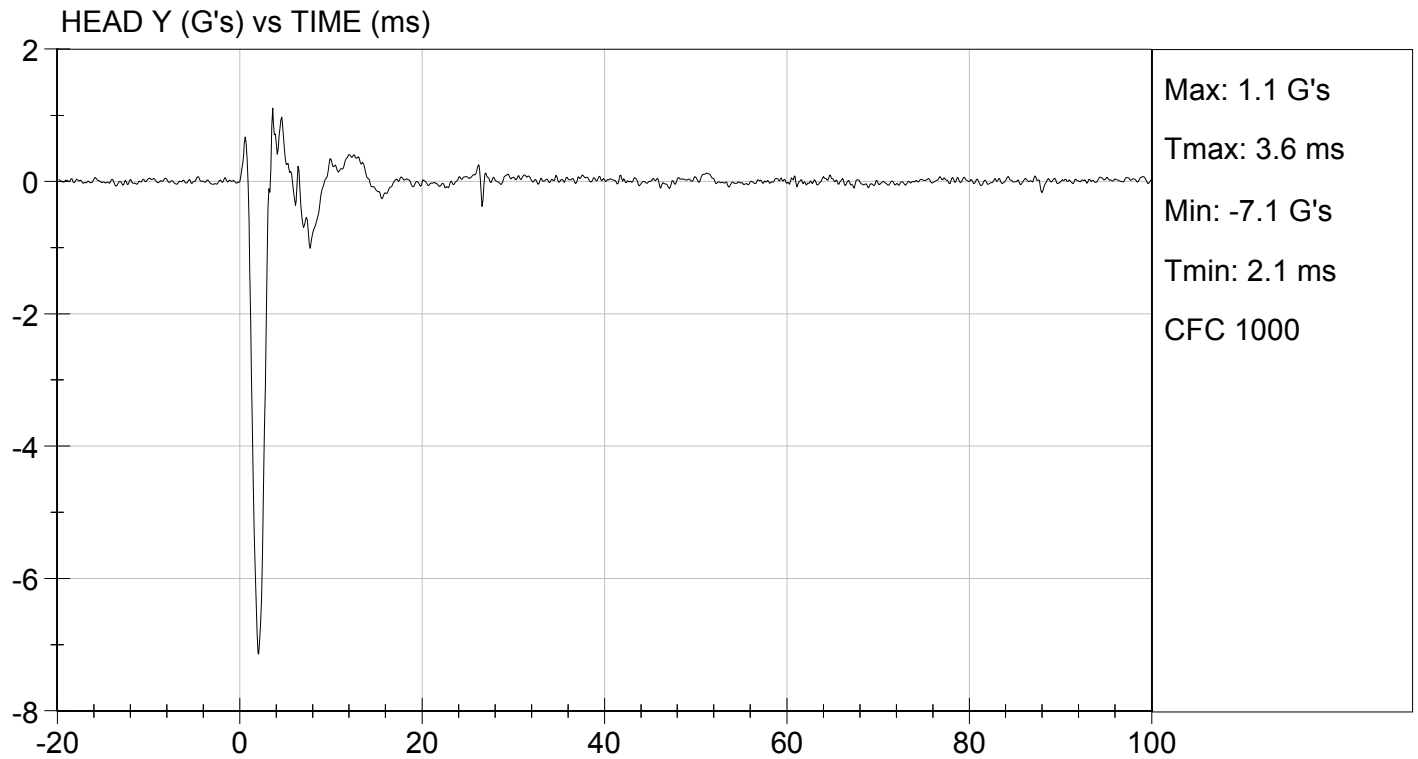
Jessica Hall
Laboratory Technician

04/24/2014

Test Date

David Winkelbauer
Approved By





MGA RESEARCH CORPORATION
NECK FLEXION TEST
HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351

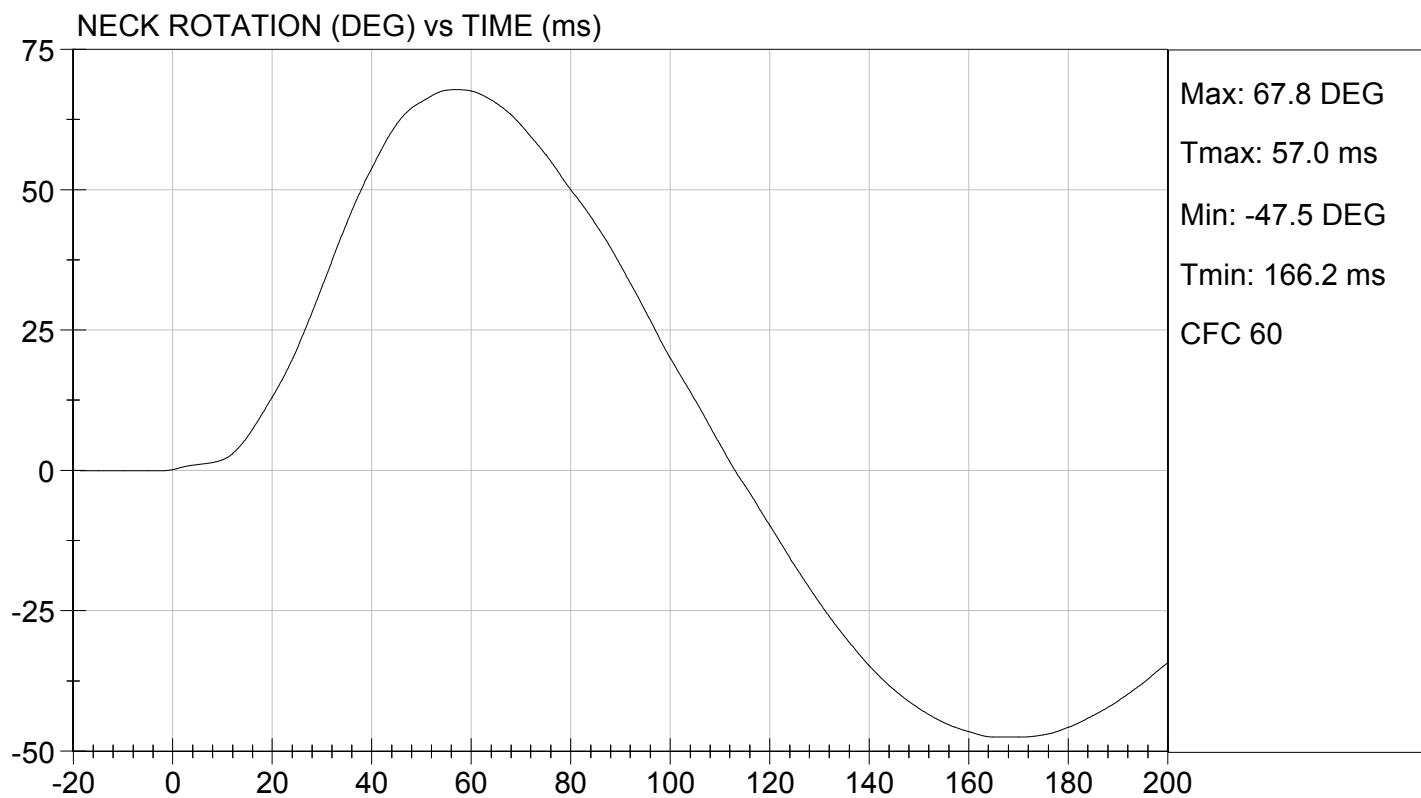
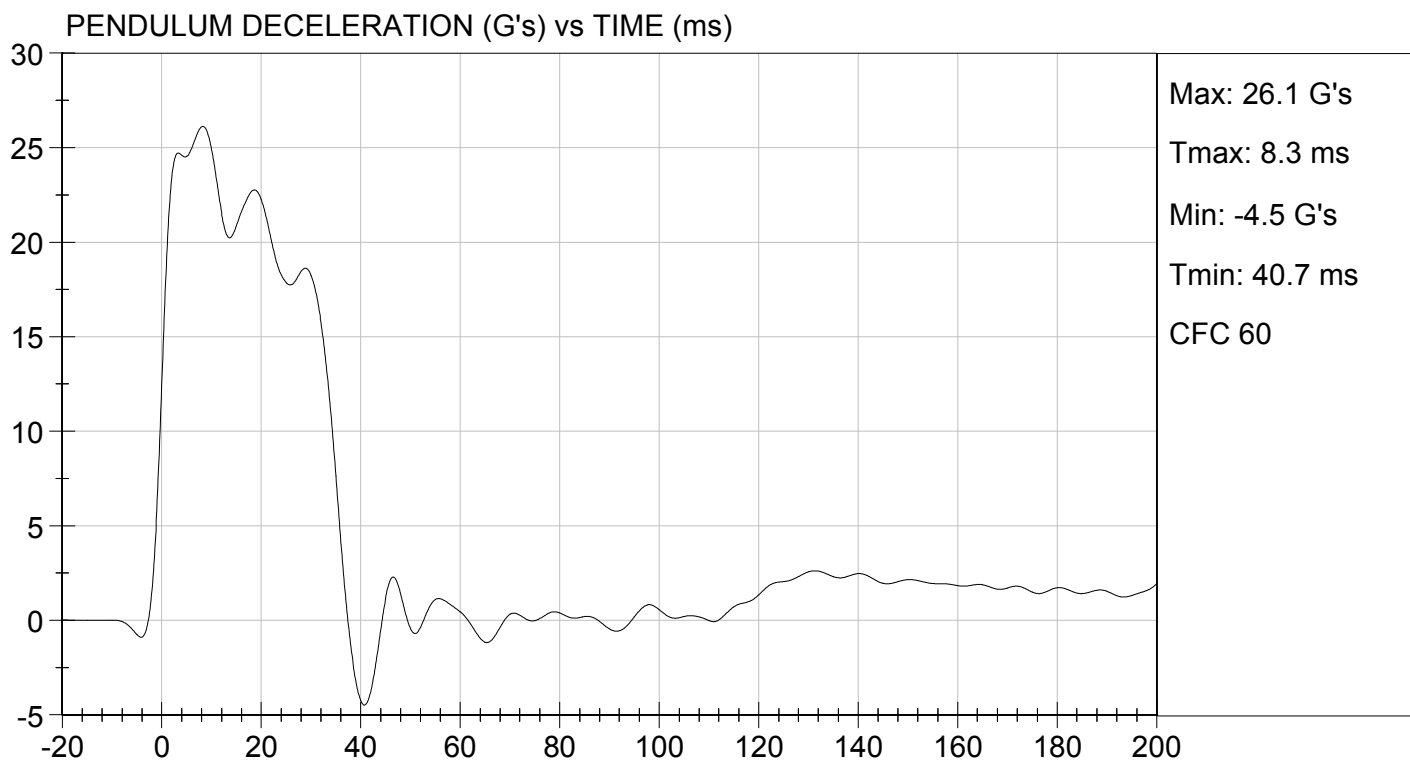
Test I.D: D141582

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity		%	10 to 70	29	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.13	Pass
Pendulum Deceleration	10 ms	G's	22.50 to 27.50	24.90	Pass
	20 ms	G's	17.60 to 22.60	22.26	Pass
	30 ms	G's	12.50 to 18.50	18.24	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 29.0	18.2	Pass
Deceleration Decay Time to Cross 5 G's		ms	34.0 to 42.0	35.8	Pass
Maximum "D" Plane Rotation	Maximum	Deg	64.0 to 78.0	67.8	Pass
	Time	ms	57.0 to 64.0	57.0	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	113.0 to 128.0	113.2	Pass
Moment About Occipital Condyle	Maximum	Nm	88.1 to 108.5	95.9	Pass
	Time	ms	47.0 to 58.0	47.1	Pass
Positive Moment Decay Time To Zero Crossing		ms	97.0 to 107.0	100.4	Pass
Overall Test Results					Pass

Jessica Hall
Laboratory Technician

04/24/2014
Test Date

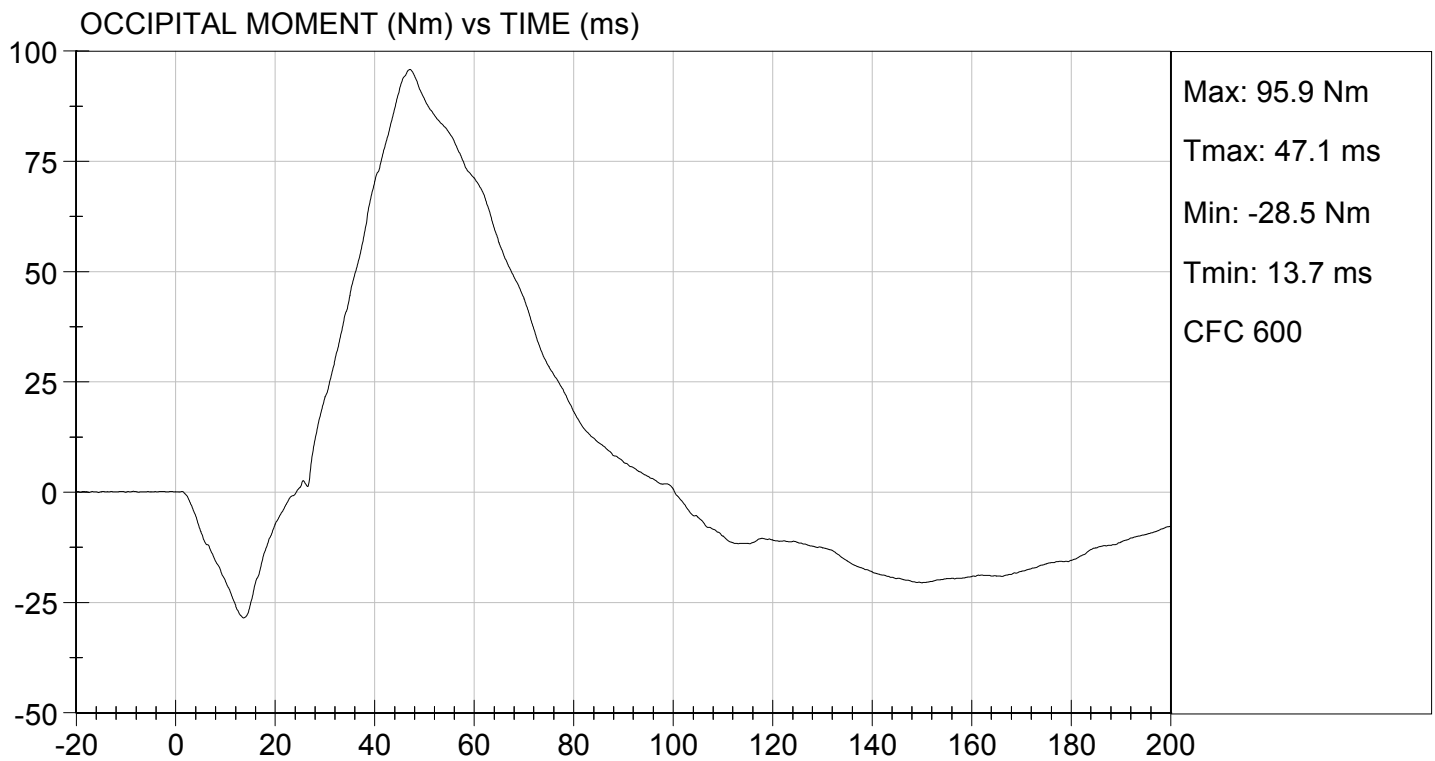
David Winkelbauer
Approved By





TEST DESC: NECK FLEXION
VELOCITY: 23.40 ft/s, 7.13 m/s

TEST DATE: 04/24/2014
TEST #: D141582



MGA RESEARCH CORPORATION
NECK EXTENSION TEST
HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351

Test I.D: D141583

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity		%	10 to 70	29	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.19	Pass
Pendulum Deceleration	10 ms	G's	17.20 to 21.20	20.00	Pass
	20 ms	G's	14.00 to 19.00	18.64	Pass
	30 ms	G's	11.00 to 16.00	13.41	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 22.0	18.9	Pass
Deceleration Decay Time to Cross 5 G's		ms	38.0 to 46.0	42.8	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	96.7	Pass
	Time	ms	72.0 to 82.0	74.1	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	147.0 to 174.0	153.6	Pass
Moment About Occipital Condyle	Maximum	Nm	-52.9 to -79.9	-65.7	Pass
	Time	ms	65.0 to 79.0	67.1	Pass
Negative Moment Decay Time To Zero Crossing		ms	120.0 to 148.0	136.2	Pass
Overall Test Results					Pass

Jessica Galt
Laboratory Technician

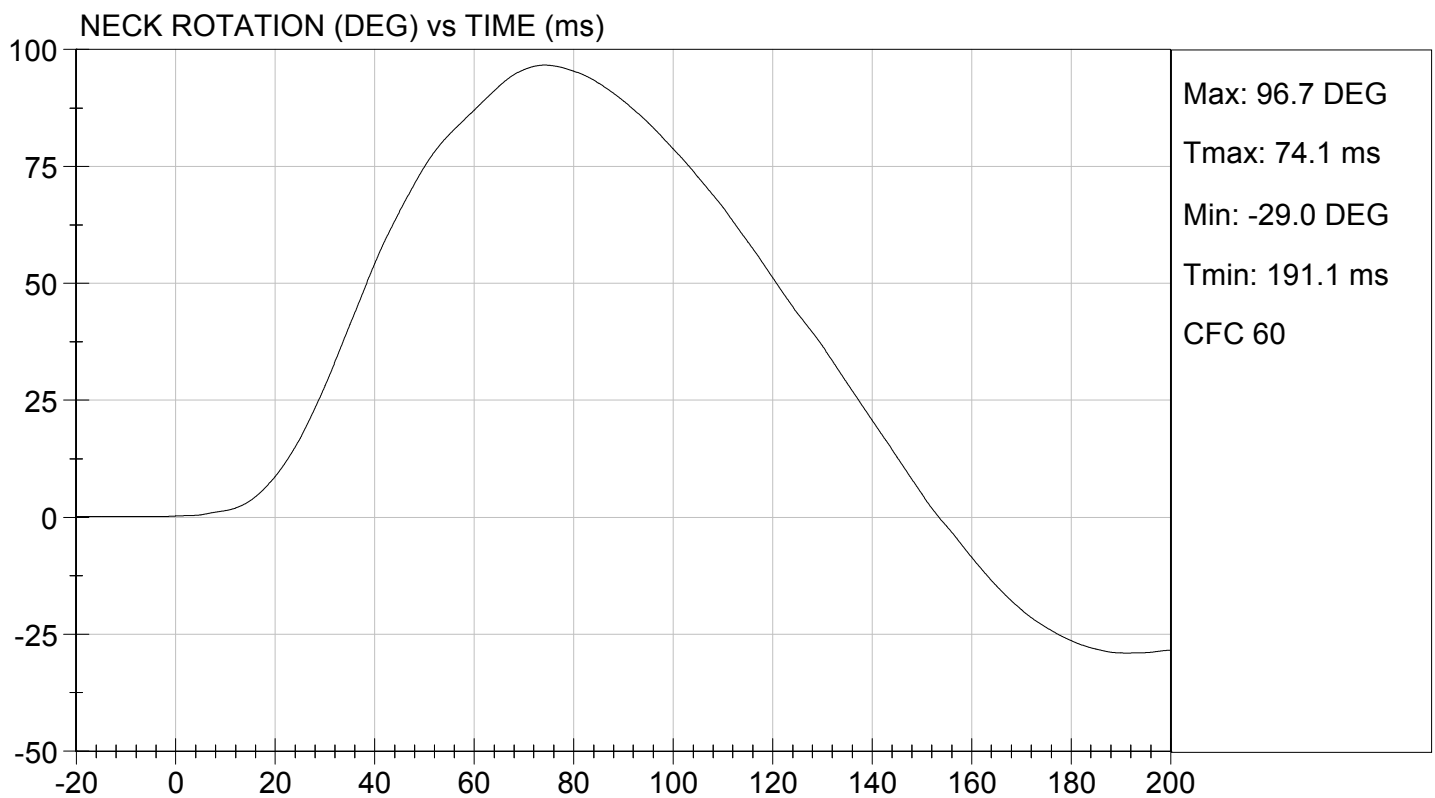
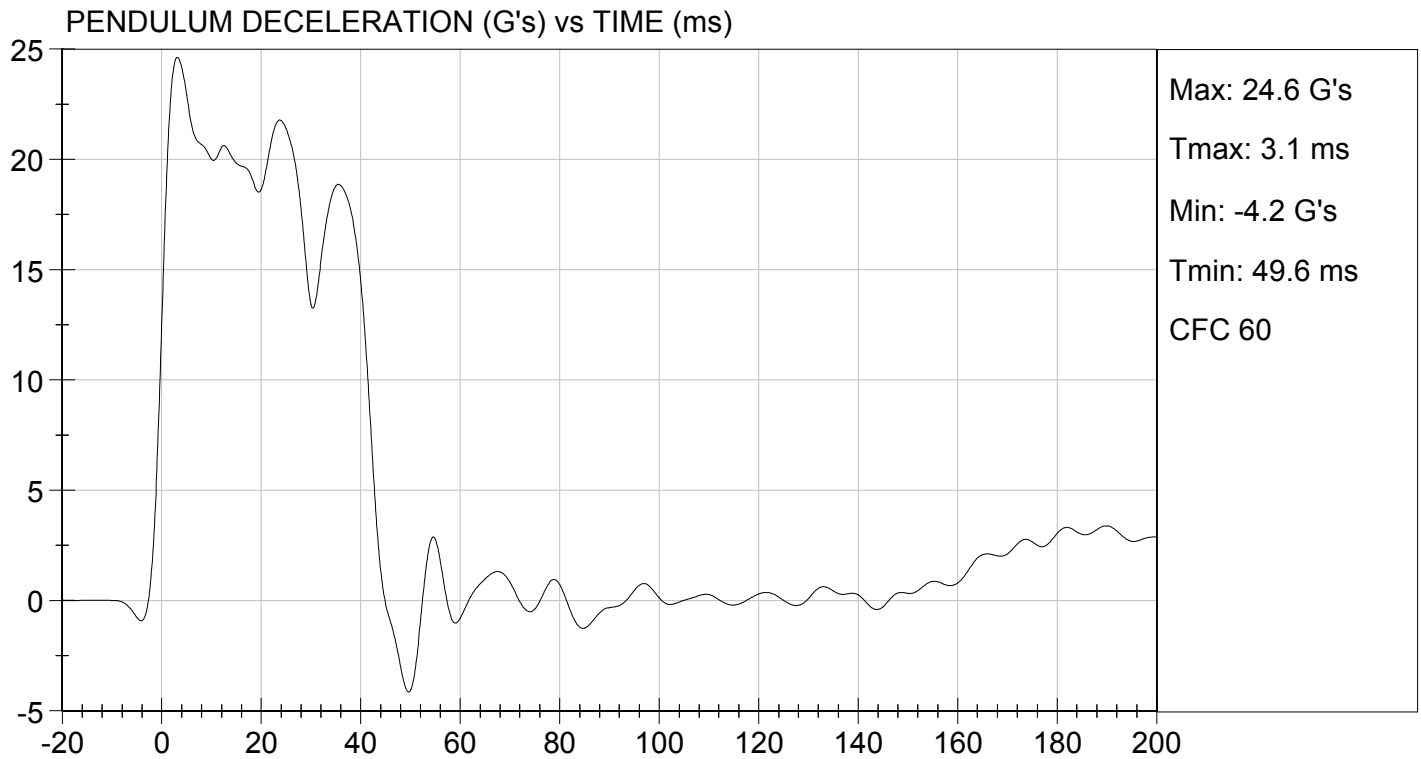
04/24/2014
Test Date

David Winkelbauer
Approved By



TEST DESC: NECK EXTENSION
VELOCITY: 20.30 ft/s, 6.19 m/s

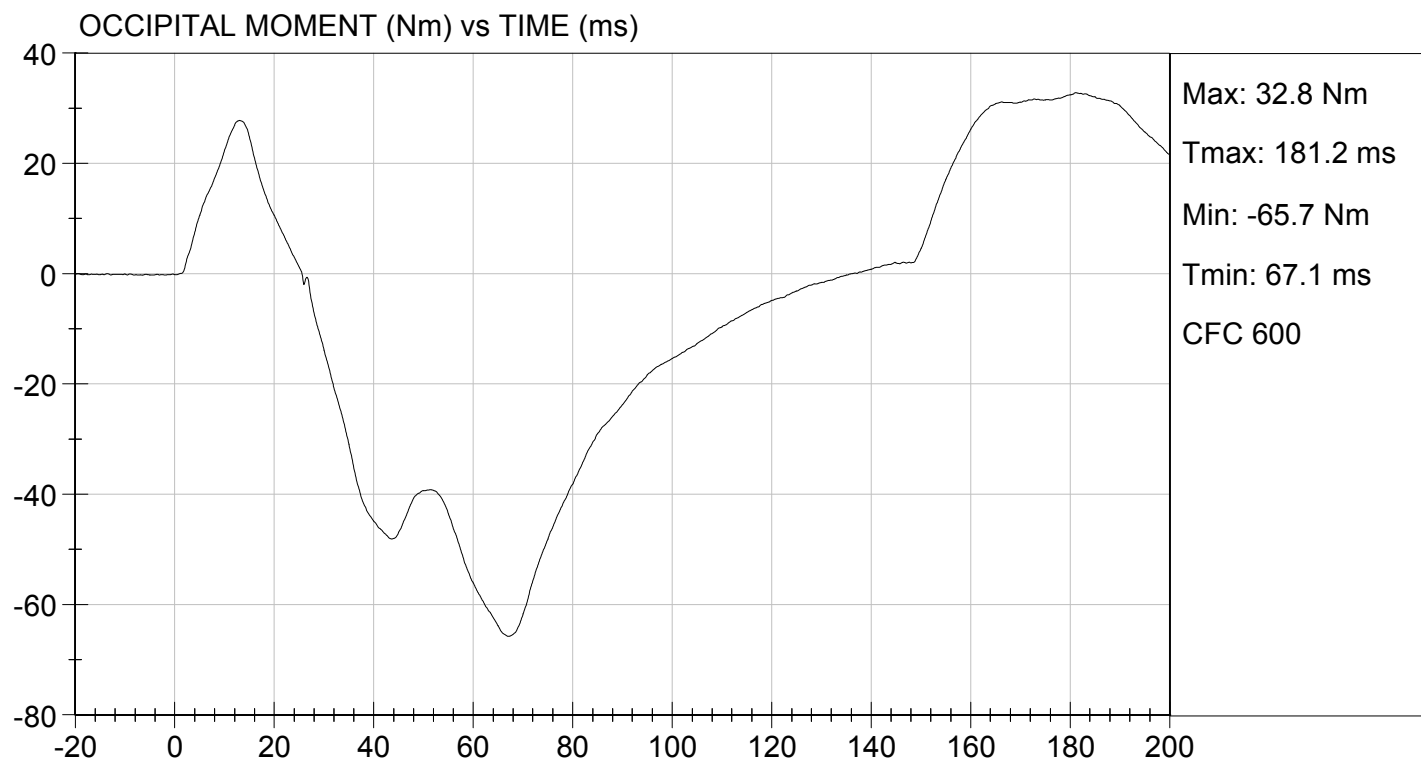
TEST DATE: 04/24/2014
TEST #: D141583





TEST DESC: NECK EXTENSION
VELOCITY: 20.30 ft/s, 6.19 m/s

TEST DATE: 04/24/2014
TEST #: D141583



MGA RESEARCH CORPORATION
THORAX IMPACT
HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351

Test I.D: D141584

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	35	Pass
Probe Velocity	m/s	6.58 to 6.82	6.77	Pass
Peak Probe Force	N	5159 to 5893	5,317	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.57	Pass
Internal Hysteresis	%	69 to 85	70	Pass
Overall Test Results			Pass	


Laboratory Technician

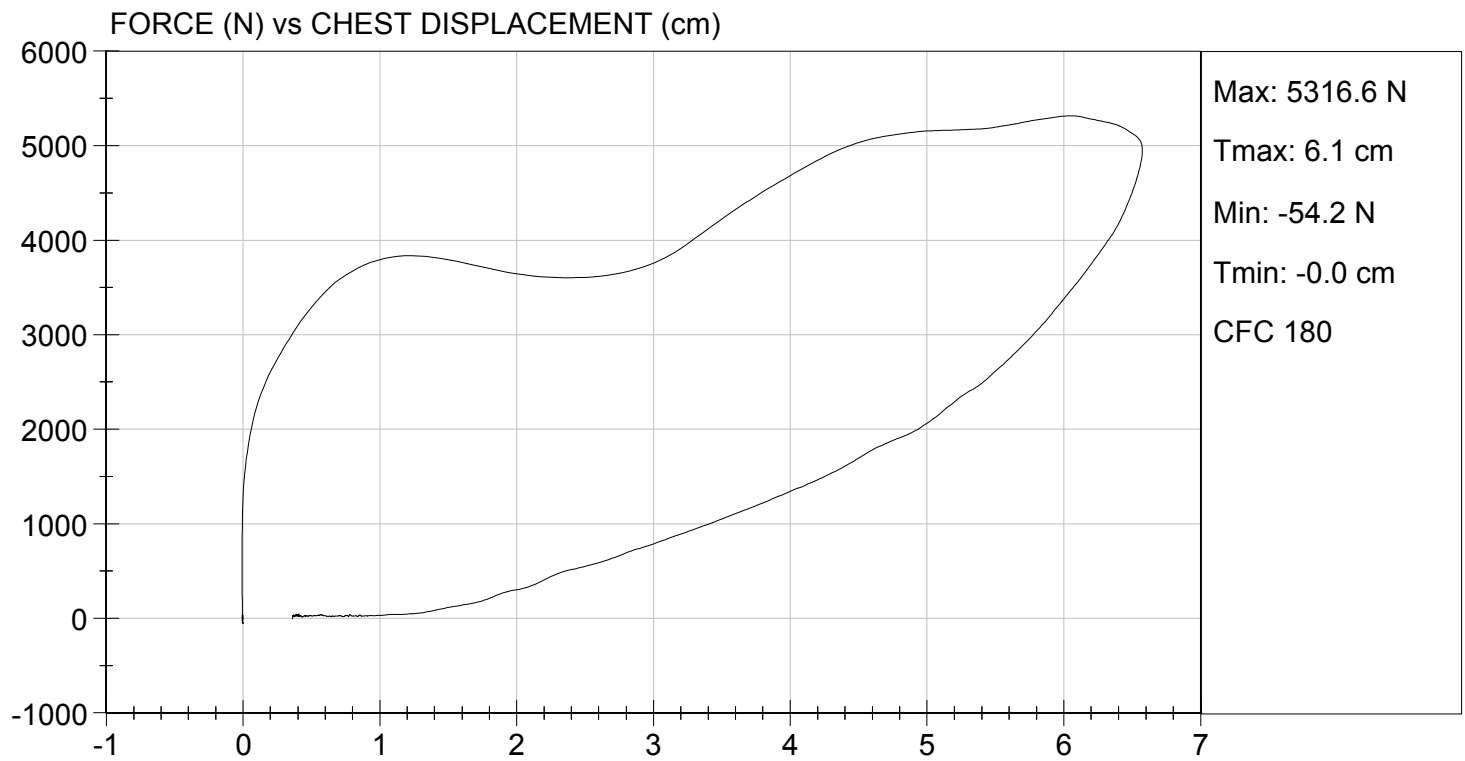
04/25/2014
Test Date


Approved By



TEST DESC: THORAX IMPACT
VELOCITY: 22.22 ft/s, 6.77 m/s

TEST DATE: 04/25/2014
TEST #: D141584

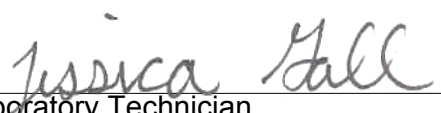


MGA RESEARCH CORPORATION
RIGHT KNEE IMPACT TEST
HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351

Test I.D: D141585

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Probe Velocity	m/s	2.07 to 2.13	2.12	Pass
Peak Probe Force	N	4715 to 5782	5,195	Pass
			Overall Test Results	Pass


Laboratory Technician

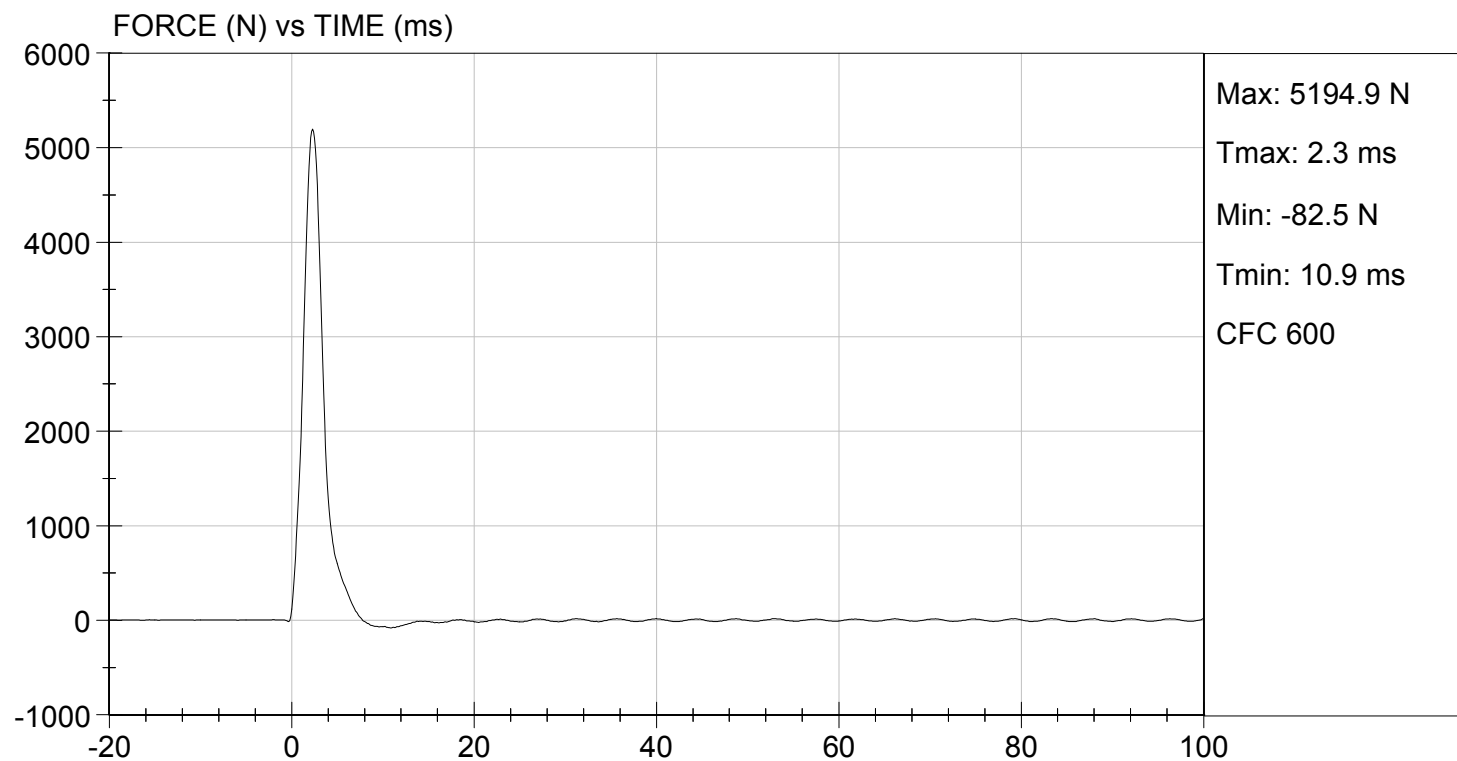
04/24/2014
Test Date


Approved By



TEST DESC: RIGHT KNEE
VELOCITY: 6.97 ft/s, 2.12 m/s

TEST DATE: 04/24/2014
TEST #: D141585



MGA RESEARCH CORPORATION
LEFT KNEE IMPACT TEST
HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351

Test I.D: D141586

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Probe Velocity	m/s	2.07 to 2.13	2.13	Pass
Peak Probe Force	N	4715 to 5782	5,139	Pass
Overall Test Results				Pass


Laboratory Technician

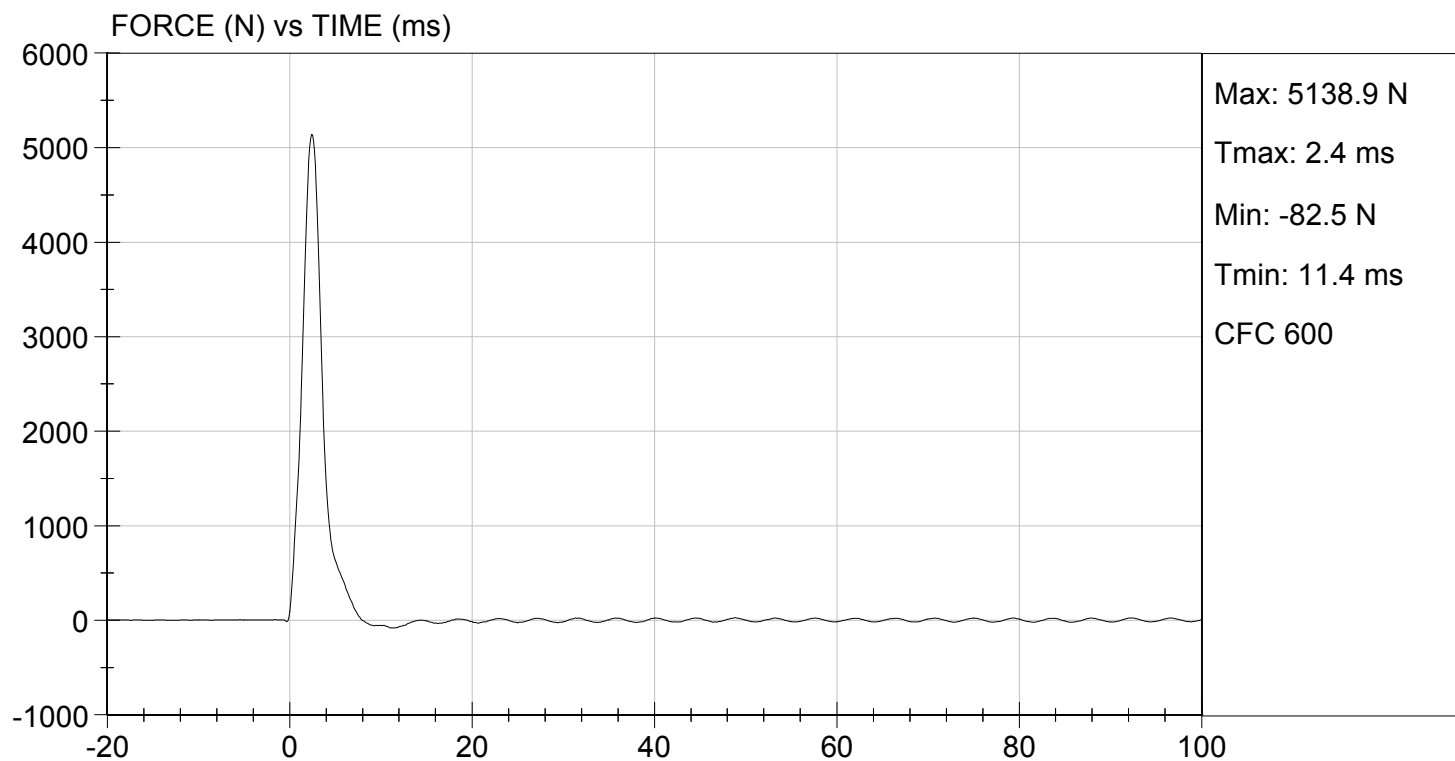
04/24/2014
Test Date


Approved By



TEST DESC: LEFT KNEE
VELOCITY: 7.00 ft/s, 2.13 m/s

TEST DATE: 04/24/2014
TEST #: D141586



MGA RESEARCH CORPORATION
HIP-FEMUR FLEXION TEST
HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351

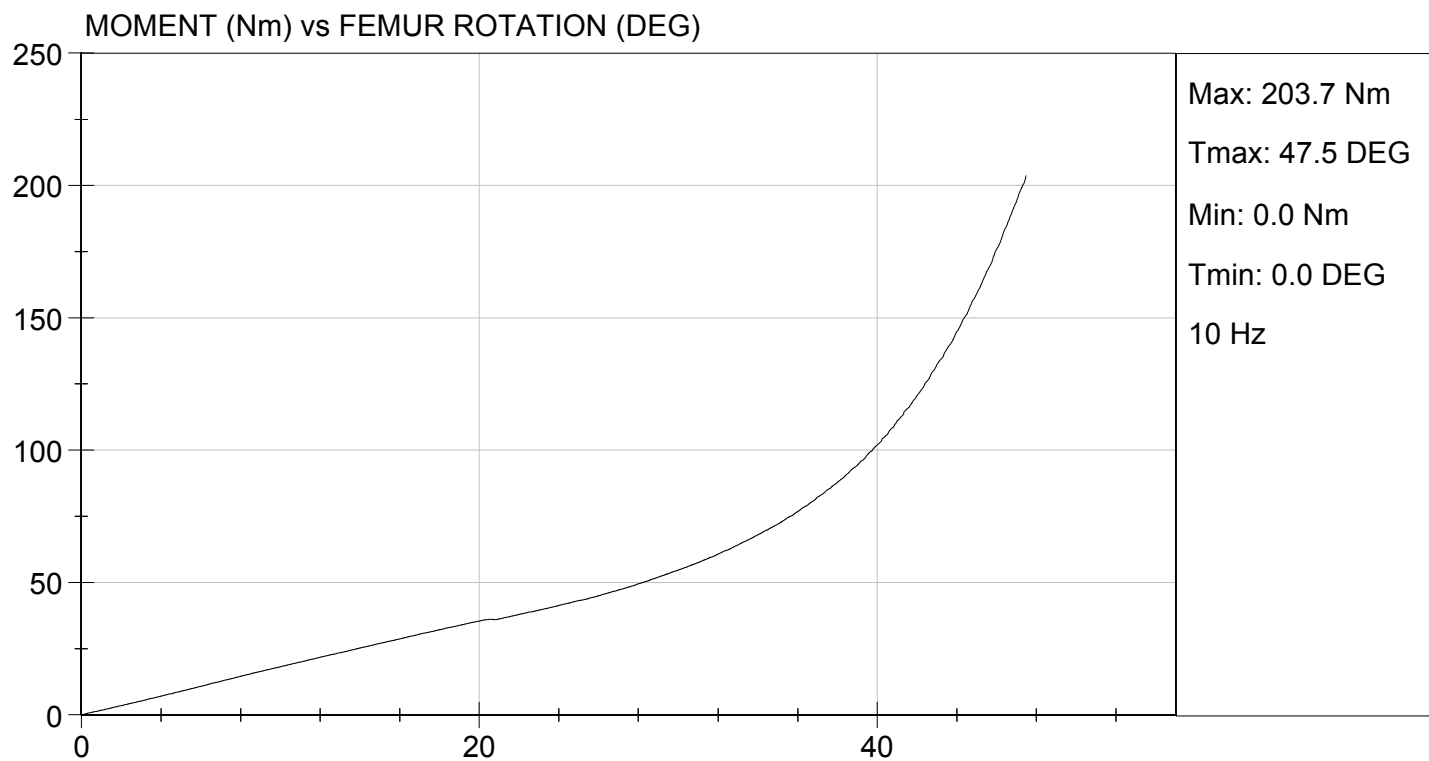
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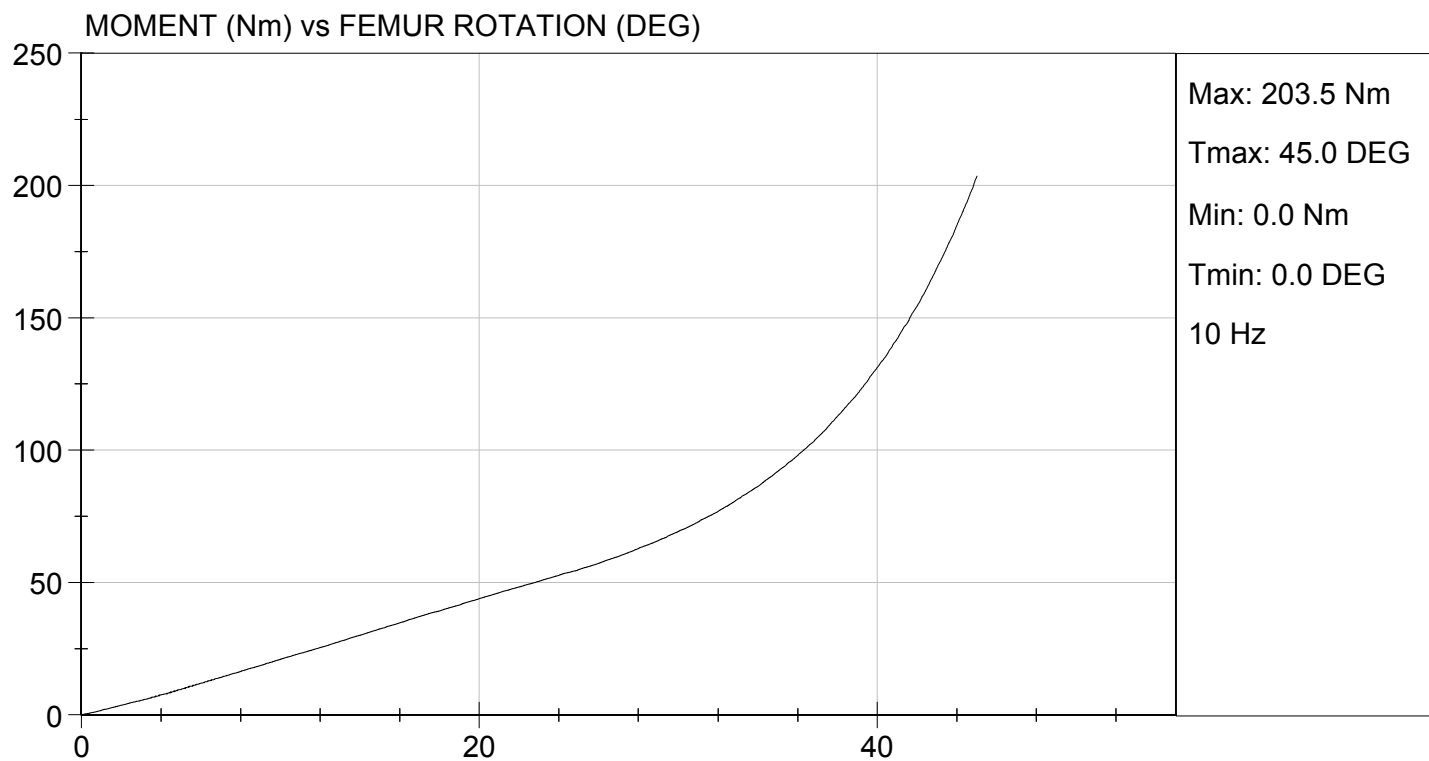
Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	21.8	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	30	30	Pass
Rotation Rate	deg/s	5.0 to 10.0	6.1	6.1	Pass
30 Degrees	Nm	94.9 Nm Max	54.8	69.2	Pass
150 ft-lbf / 203.4 Nm	Deg	40.0 to 50.0 Degree Max Rotation	47.5	45.0	Pass
Overall Test Results					Pass


 Laboratory Technician

04/24/2014
 Test Date


 Approved By





MGA RESEARCH CORPORATION
HEAD DROP TEST
HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351

Test ID: D141831

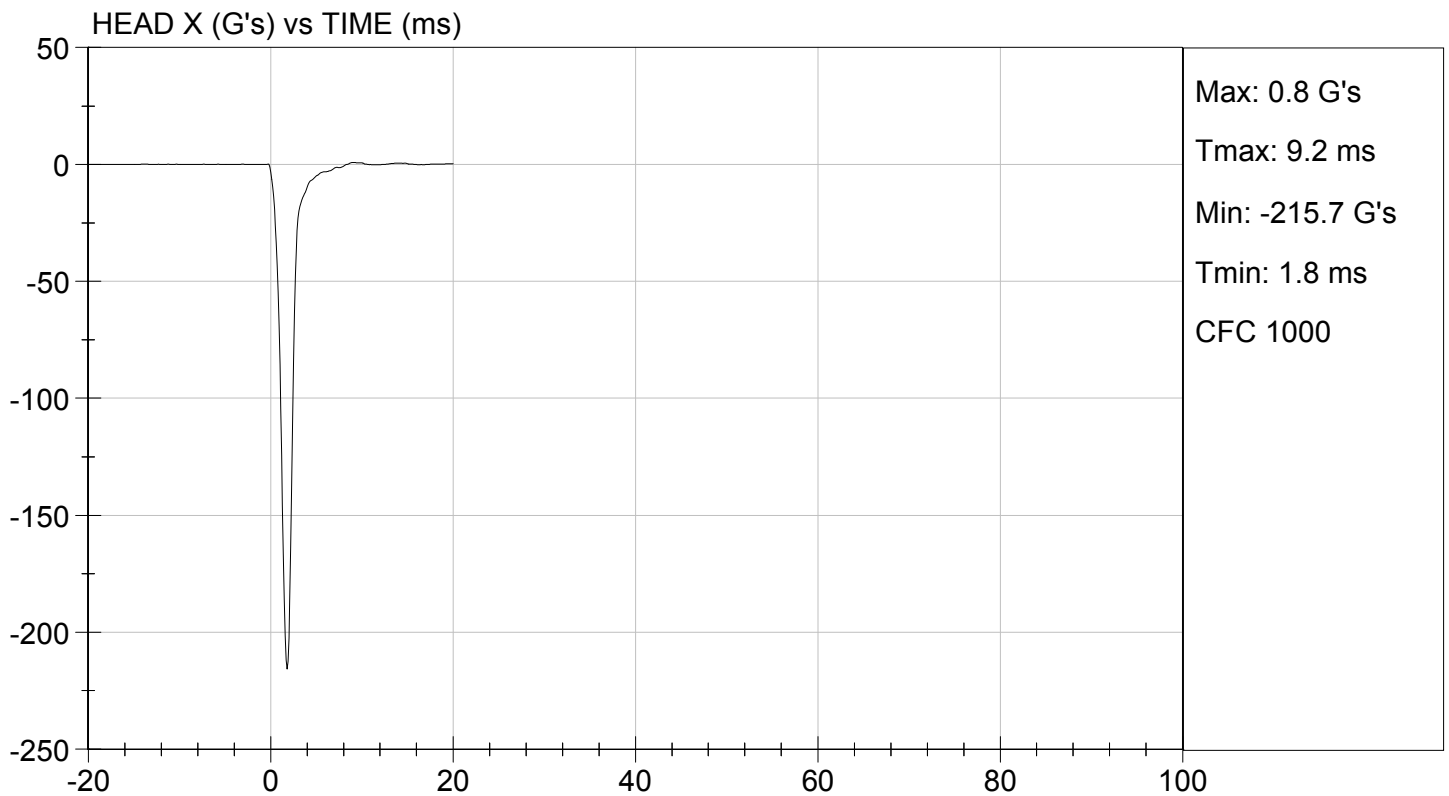
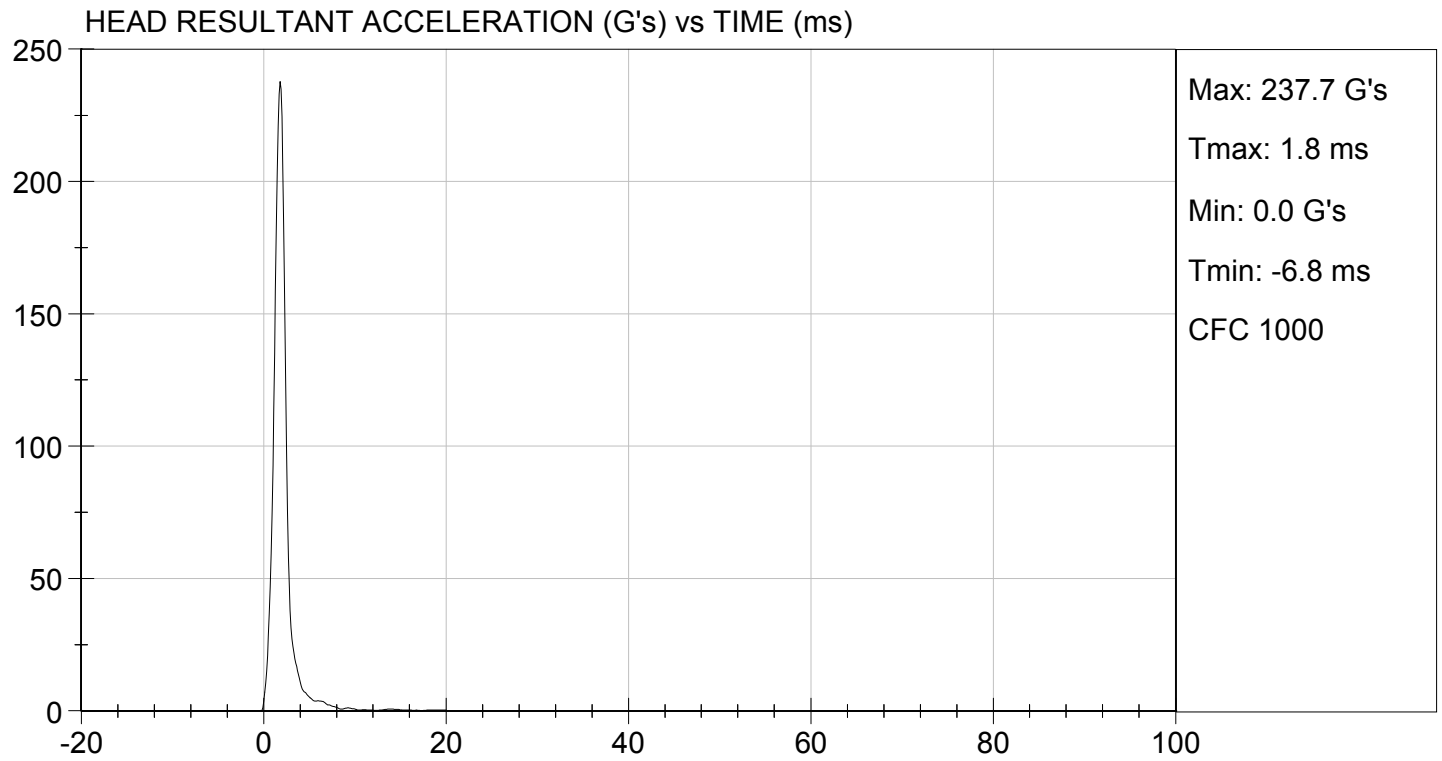
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	50	Pass
Peak Resultant Acceleration	G's	225 to 275	238	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	-12.6	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
Overall Test Results				Pass

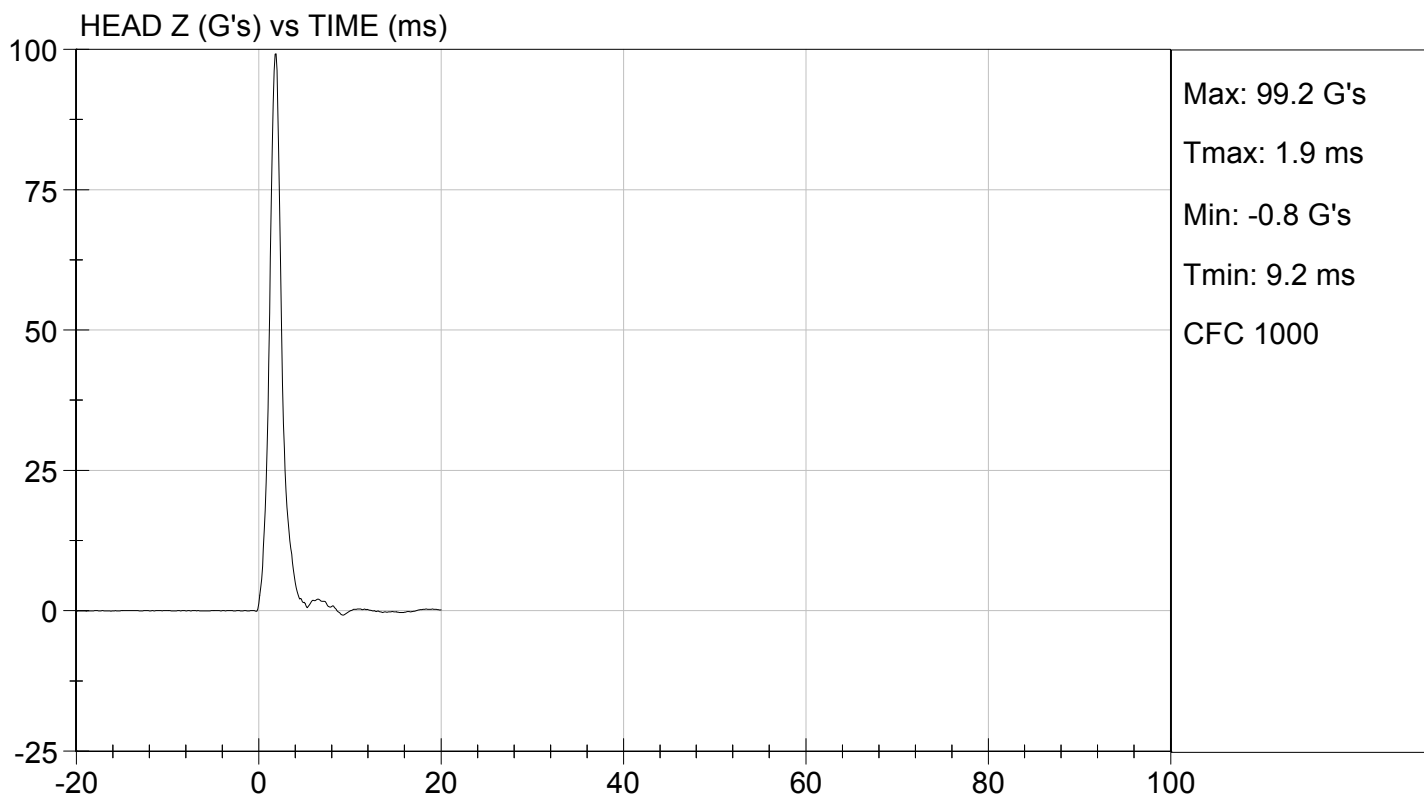
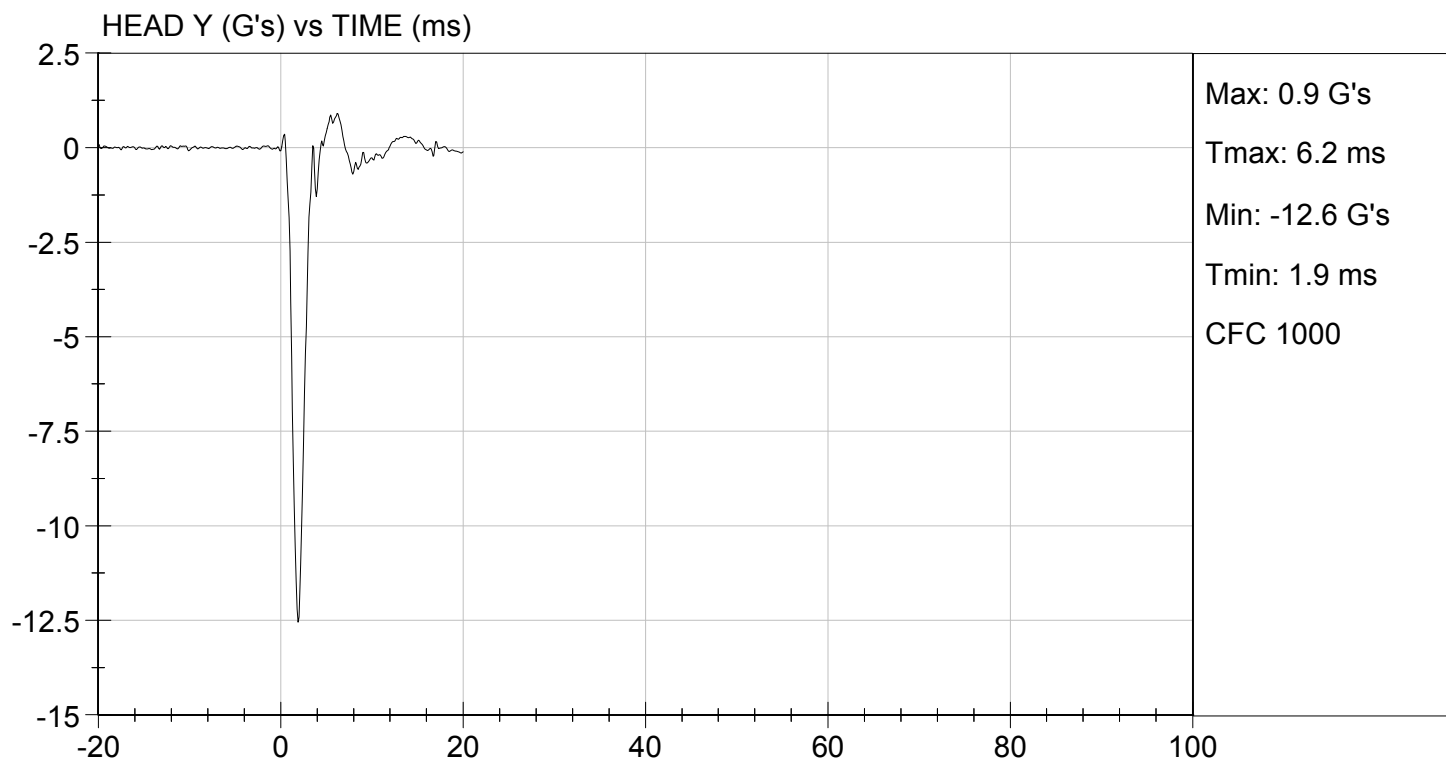
Jessica Gall
Laboratory Technician

05/14/2014

Test Date

David Winkelbauer
Approved By





MGA RESEARCH CORPORATION
NECK FLEXION TEST
HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351

Test I.D: D141832

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.0	Pass
Laboratory Relative Humidity		%	10 to 70	50	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.13	Pass
Pendulum Deceleration	10 ms	G's	22.50 to 27.50	27.02	Pass
	20 ms	G's	17.60 to 22.60	18.13	Pass
	30 ms	G's	12.50 to 18.50	17.87	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 29.0	17.8	Pass
Deceleration Decay Time to Cross 5 G's		ms	34.0 to 42.0	39.4	Pass
Maximum "D" Plane Rotation	Maximum	Deg	64.0 to 78.0	68.9	Pass
	Time	ms	57.0 to 64.0	58.0	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	113.0 to 128.0	119.3	Pass
Moment About Occipital Condyle	Maximum	Nm	88.1 to 108.5	94.8	Pass
	Time	ms	47.0 to 58.0	51.8	Pass
Positive Moment Decay Time To Zero Crossing		ms	97.0 to 107.0	99.5	Pass
Overall Test Results					Pass

Jessica Hall
Laboratory Technician

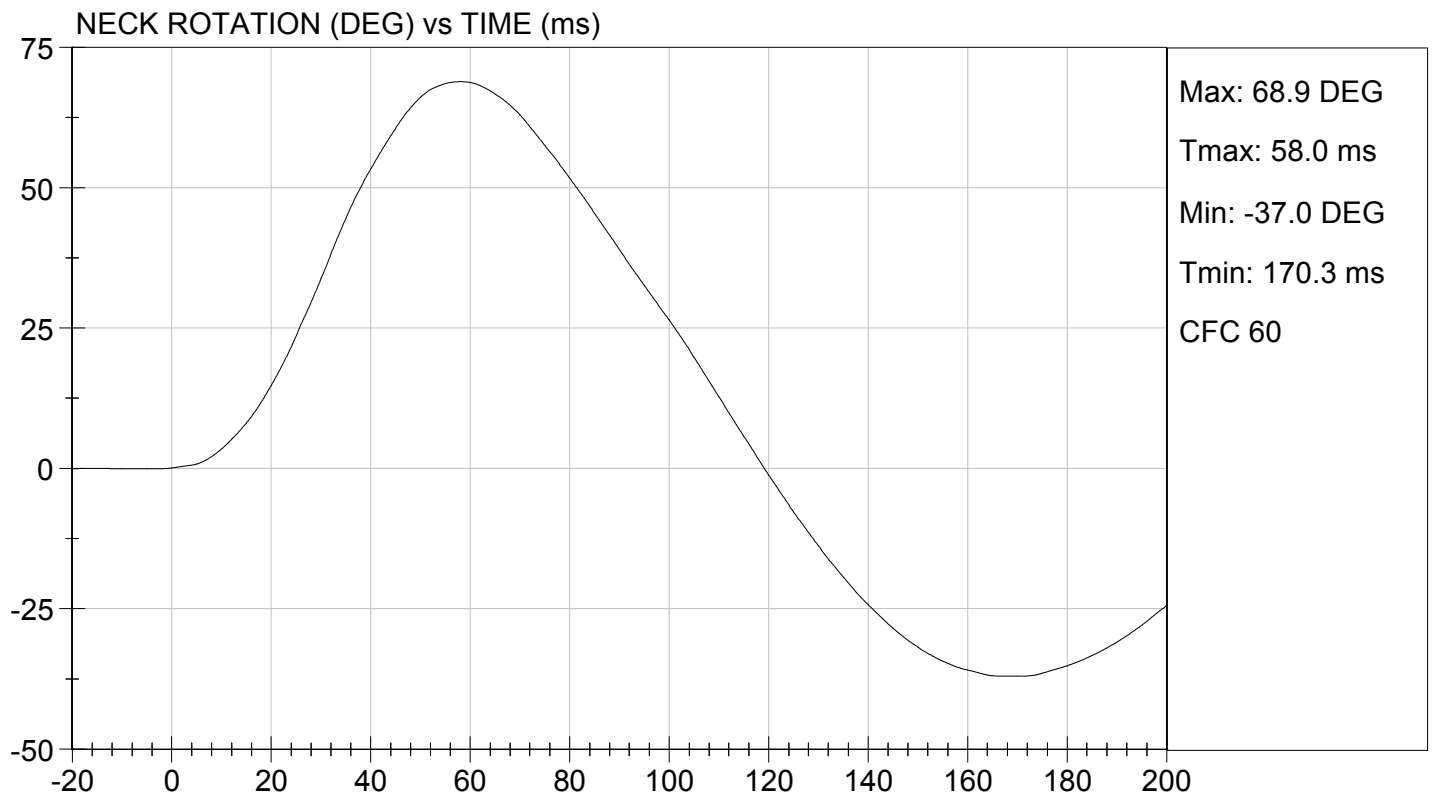
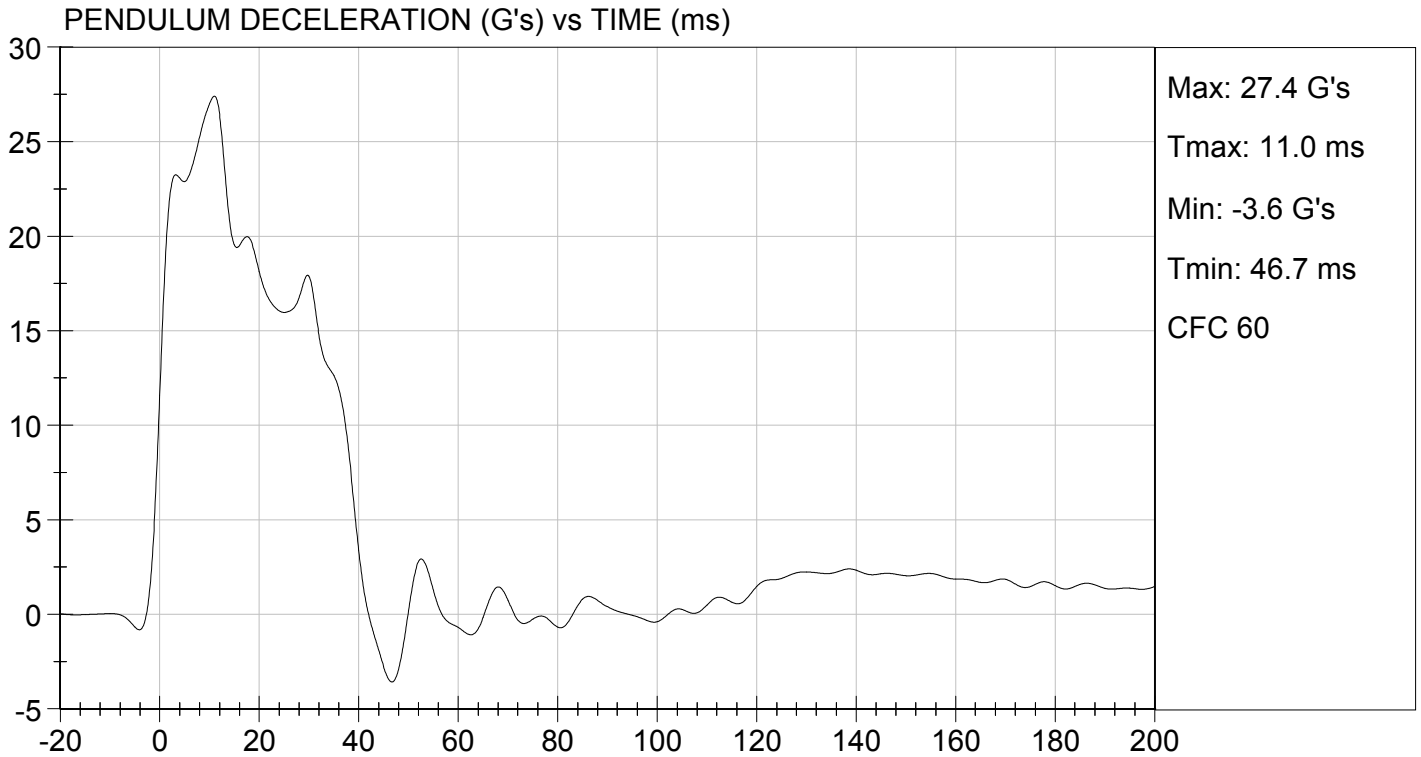
05/14/2014
Test Date

David Winkelbauer
Approved By



TEST DESC: NECK FLEXION
VELOCITY: 23.40 ft/s, 7.13 m/s

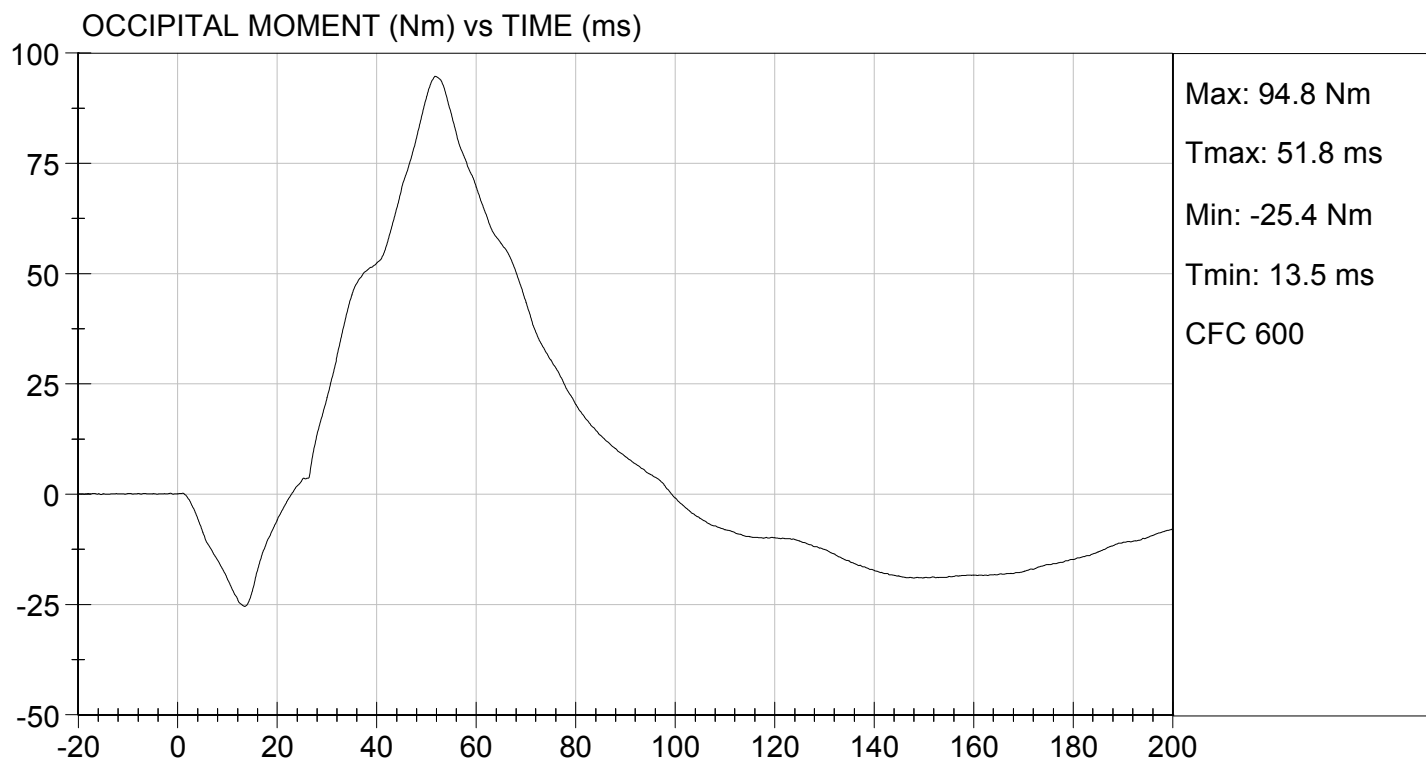
TEST DATE: 05/14/2014
TEST #: D141832





TEST DESC: NECK FLEXION
VELOCITY: 23.40 ft/s, 7.13 m/s

TEST DATE: 05/14/2014
TEST #: D141832

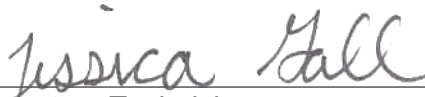


MGA RESEARCH CORPORATION
NECK EXTENSION TEST
HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351

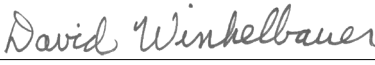
Test I.D: D141833

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.0	Pass
Laboratory Relative Humidity		%	10 to 70	50	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.19	Pass
Pendulum Deceleration	10 ms	G's	17.20 to 21.20	19.13	Pass
	20 ms	G's	14.00 to 19.00	15.77	Pass
	30 ms	G's	11.00 to 16.00	11.10	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 22.0	11.1	Pass
Deceleration Decay Time to Cross 5 G's		ms	38.0 to 46.0	41.2	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	91.6	Pass
	Time	ms	72.0 to 82.0	76.6	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	147.0 to 174.0	157.8	Pass
Moment About Occipital Condyle	Maximum	Nm	-52.9 to -79.9	-57.7	Pass
	Time	ms	65.0 to 79.0	71.3	Pass
Negative Moment Decay Time To Zero Crossing		ms	120.0 to 148.0	143.1	Pass
Overall Test Results					Pass


 Laboratory Technician

05/14/2014

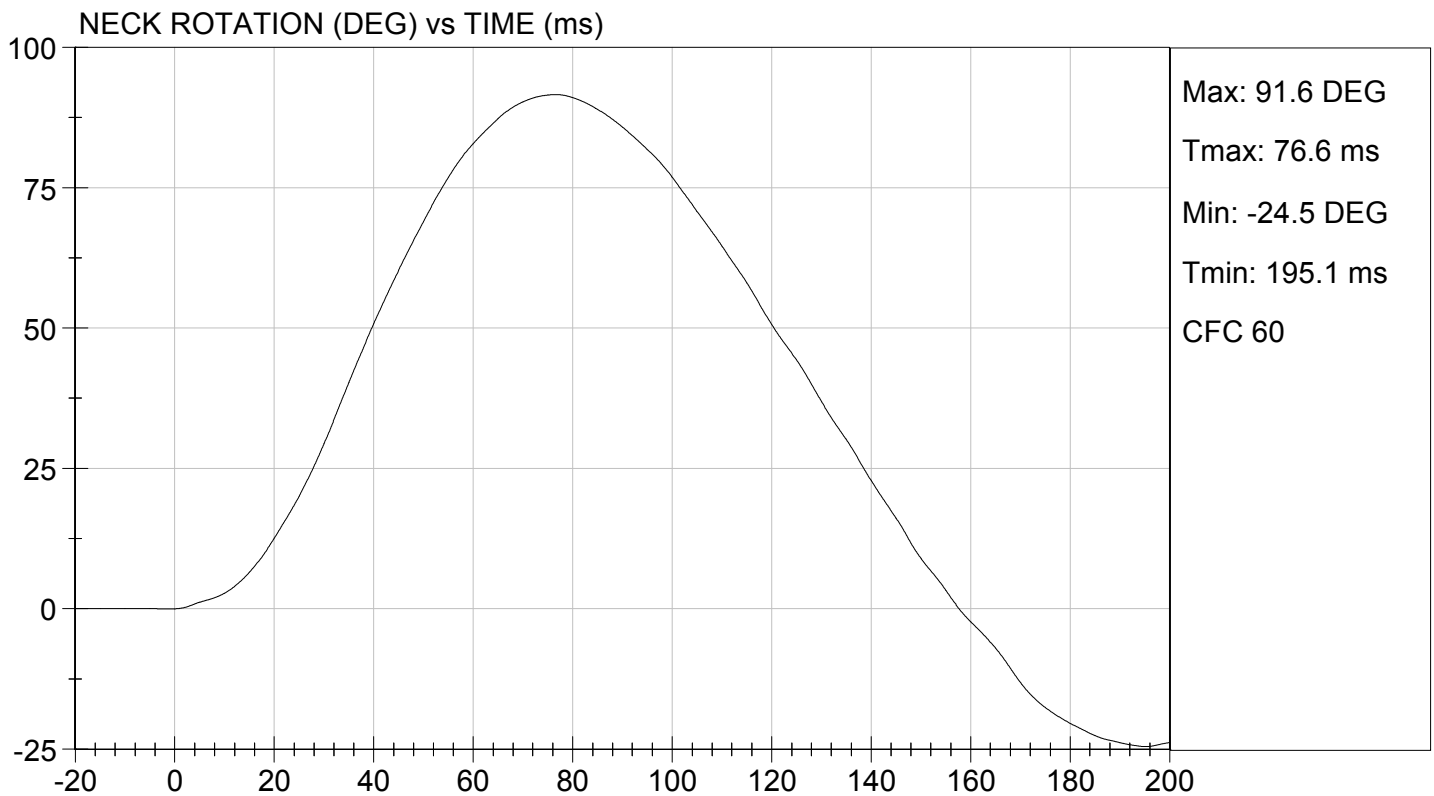
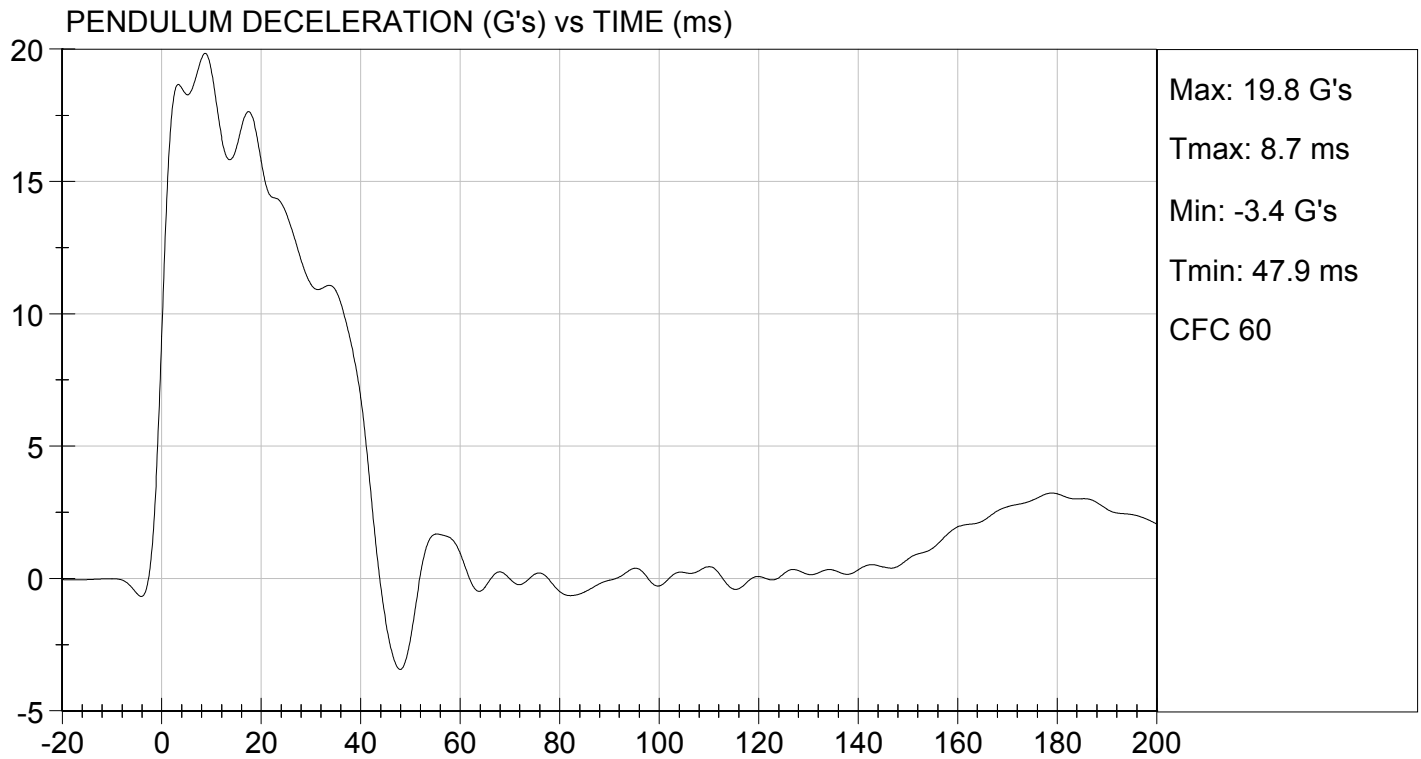
Test Date


 Approved By



TEST DESC: NECK EXTENSION
VELOCITY: 20.30 ft/s, 6.19 m/s

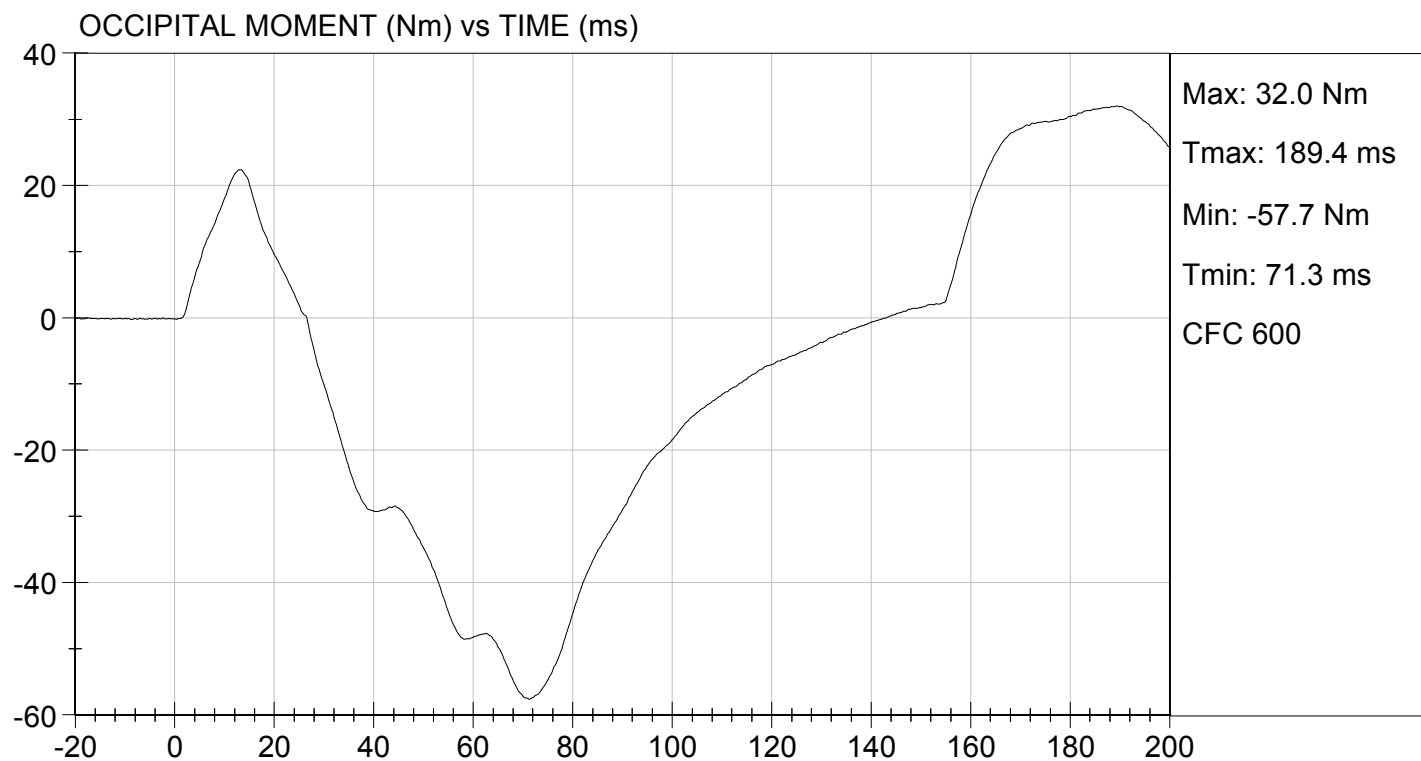
TEST DATE: 05/14/2014
TEST #: D141833





TEST DESC: NECK EXTENSION
VELOCITY: 20.30 ft/s, 6.19 m/s

TEST DATE: 05/14/2014
TEST #: D141833



MGA RESEARCH CORPORATION
THORAX IMPACT
HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351

Test I.D: D141834

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	50	Pass
Probe Velocity	m/s	6.58 to 6.82	6.68	Pass
Peak Probe Force	N	5159 to 5893	5,261	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.55	Pass
Internal Hysteresis	%	69 to 85	70	Pass
			Overall Test Results	Pass


Laboratory Technician

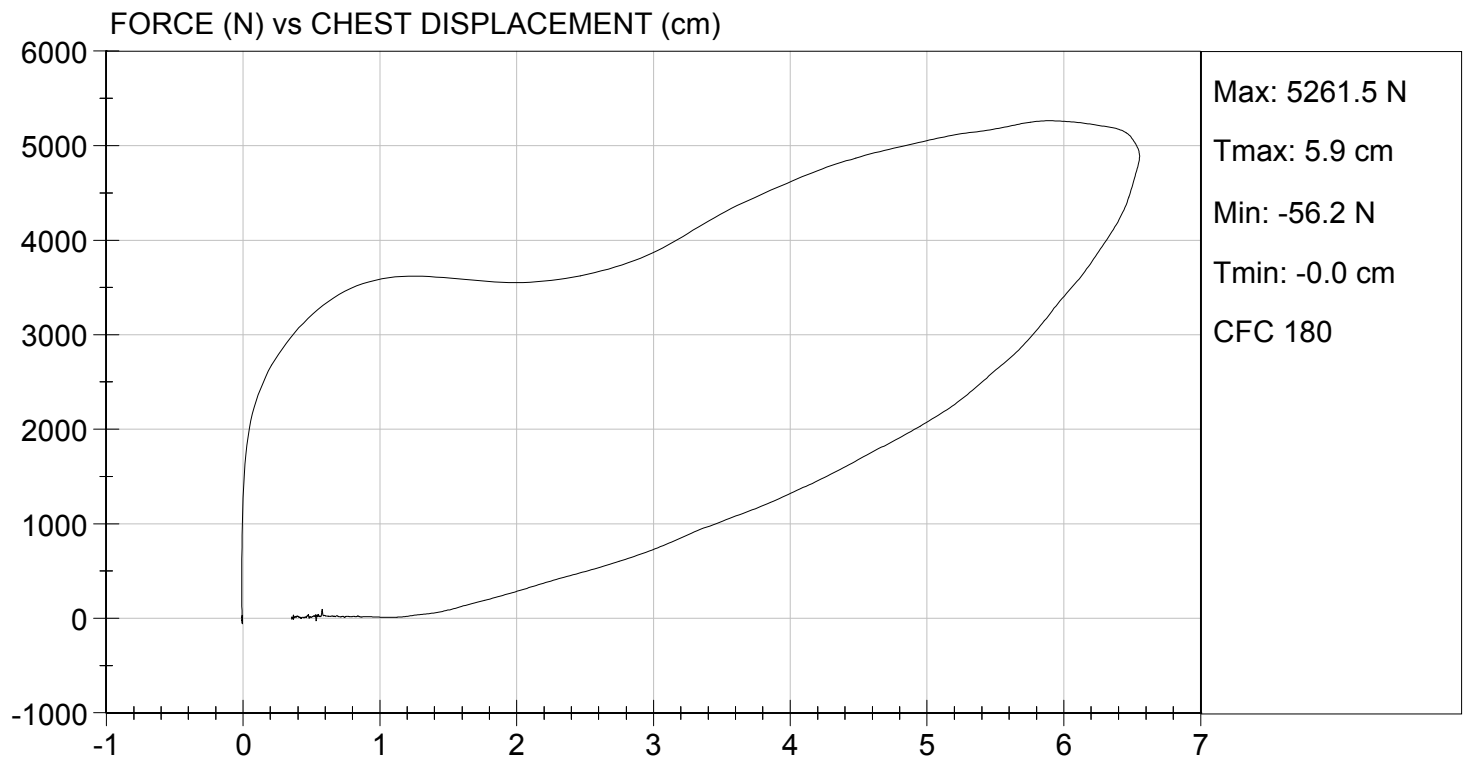
05/14/2014
Test Date


Approved By



TEST DESC: THORAX IMPACT
VELOCITY: 21.93 ft/s, 6.68 m/s

TEST DATE: 05/14/2014
TEST #: D141834

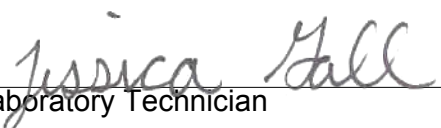


MGA RESEARCH CORPORATION
RIGHT KNEE IMPACT TEST
HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351

Test I.D: D141835

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	50	Pass
Probe Velocity	m/s	2.07 to 2.13	2.10	Pass
Peak Probe Force	N	4715 to 5782	4,822	Pass
Overall Test Results				Pass


Laboratory Technician

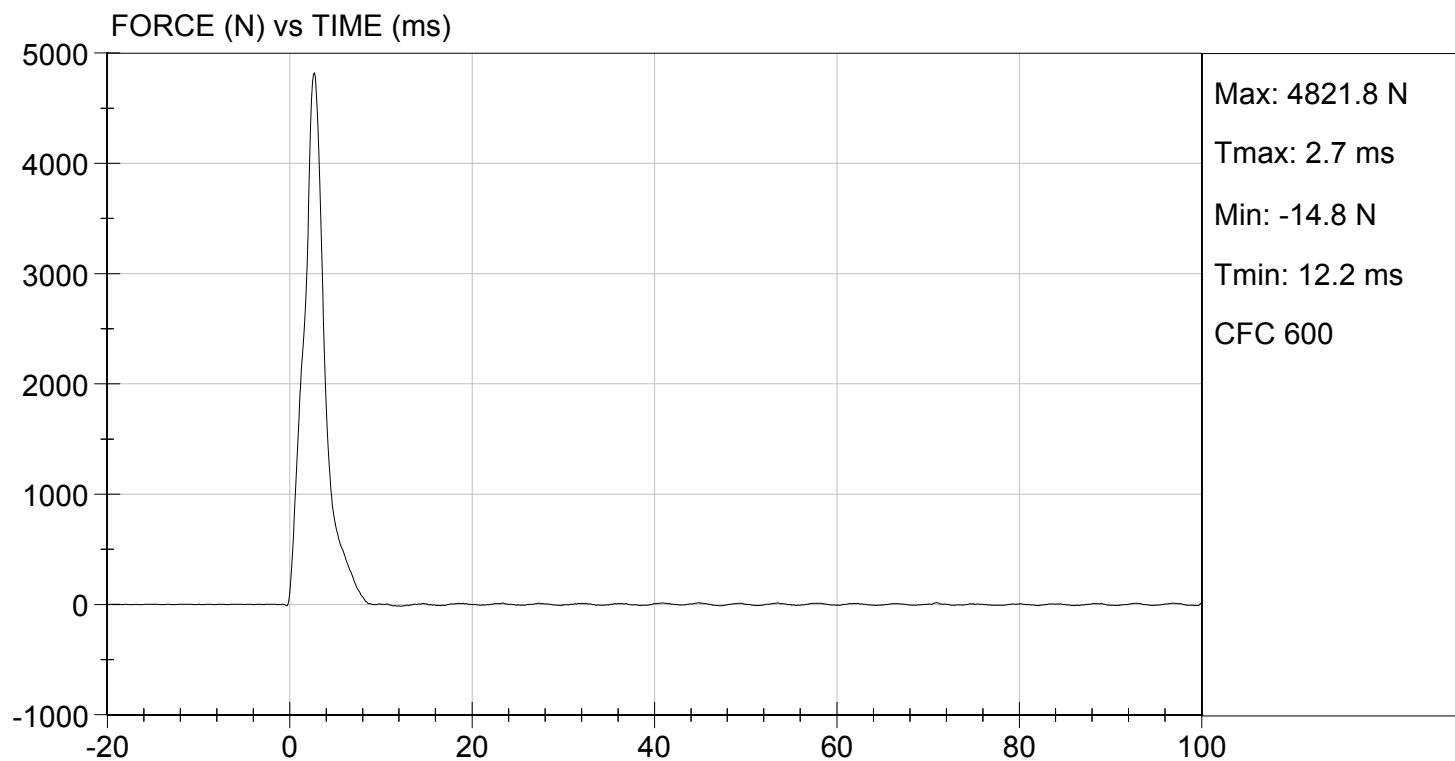
05/14/2014
Test Date


Approved By



TEST DESC: RIGHT KNEE
VELOCITY: 6.89 ft/s, 2.10 m/s

TEST DATE: 05/14/2014
TEST #: D141835

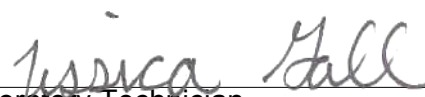


MGA RESEARCH CORPORATION
LEFT KNEE IMPACT TEST
HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351

Test I.D: D141836

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	50	Pass
Probe Velocity	m/s	2.07 to 2.13	2.13	Pass
Peak Probe Force	N	4715 to 5782	5,417	Pass
Overall Test Results				Pass


Laboratory Technician

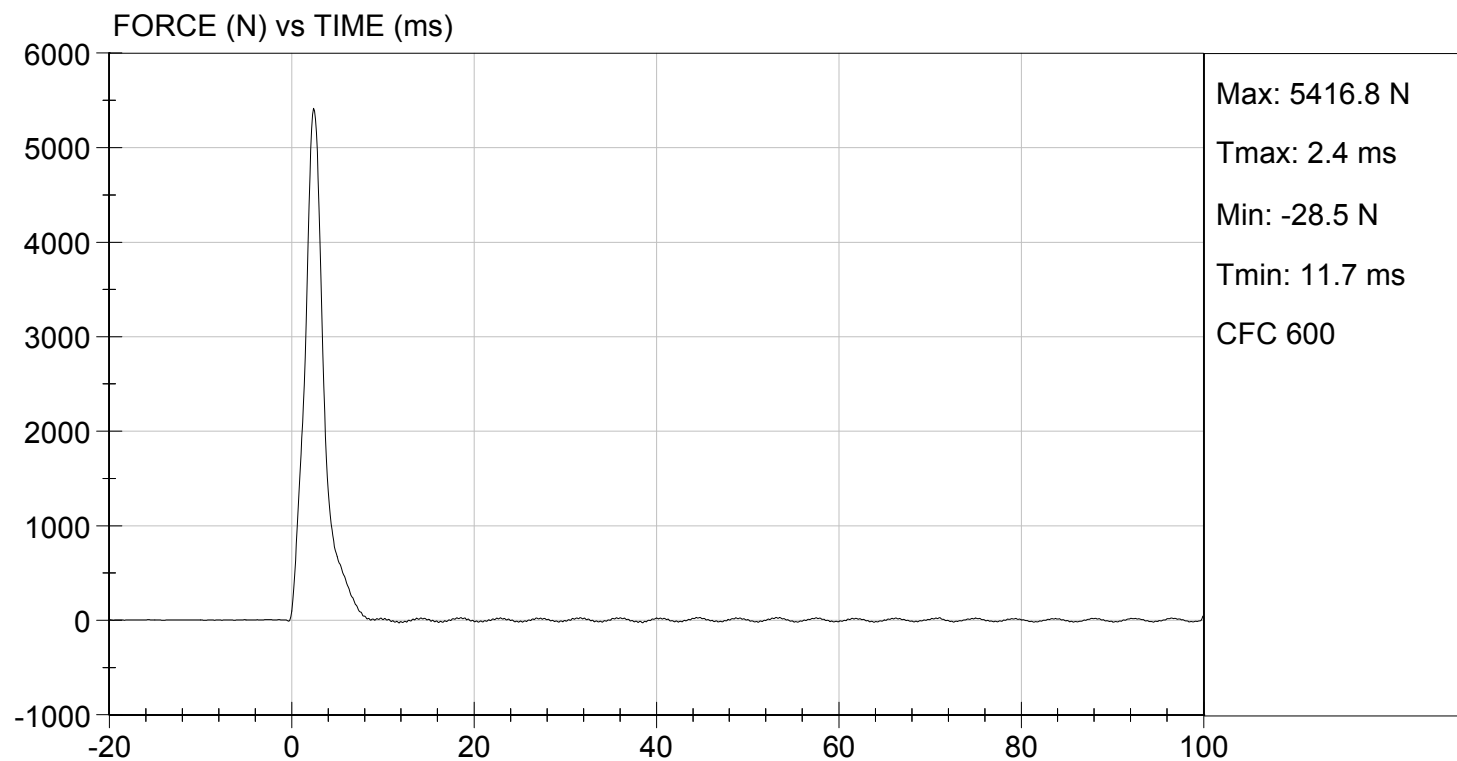
05/14/2014
Test Date


Approved By



TEST DESC: LEFT KNEE
VELOCITY: 7.00 ft/s, 2.13 m/s

TEST DATE: 05/14/2014
TEST #: D141836

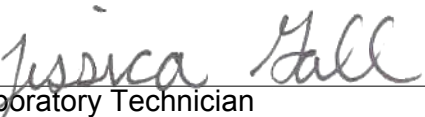


MGA RESEARCH CORPORATION
HIP-FEMUR FLEXION TEST
HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351

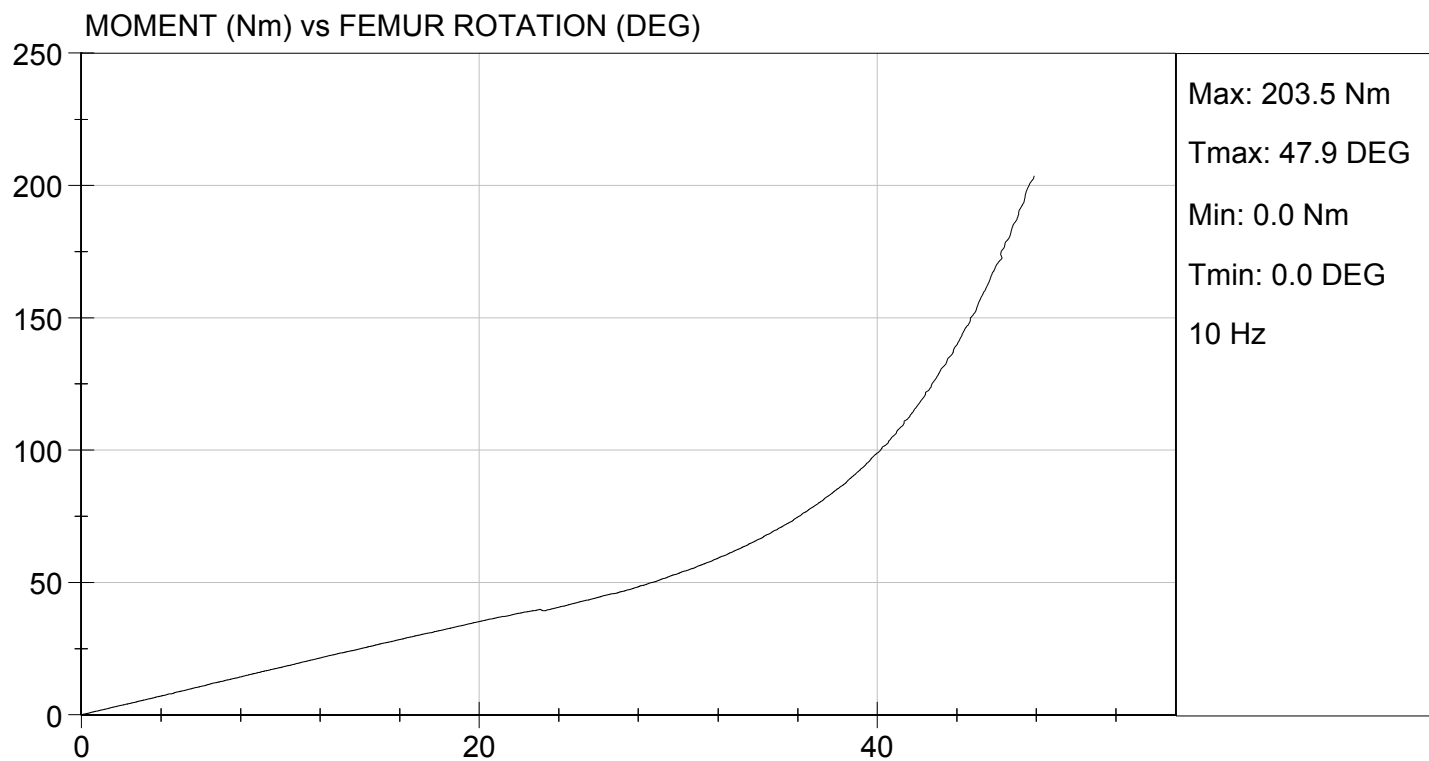
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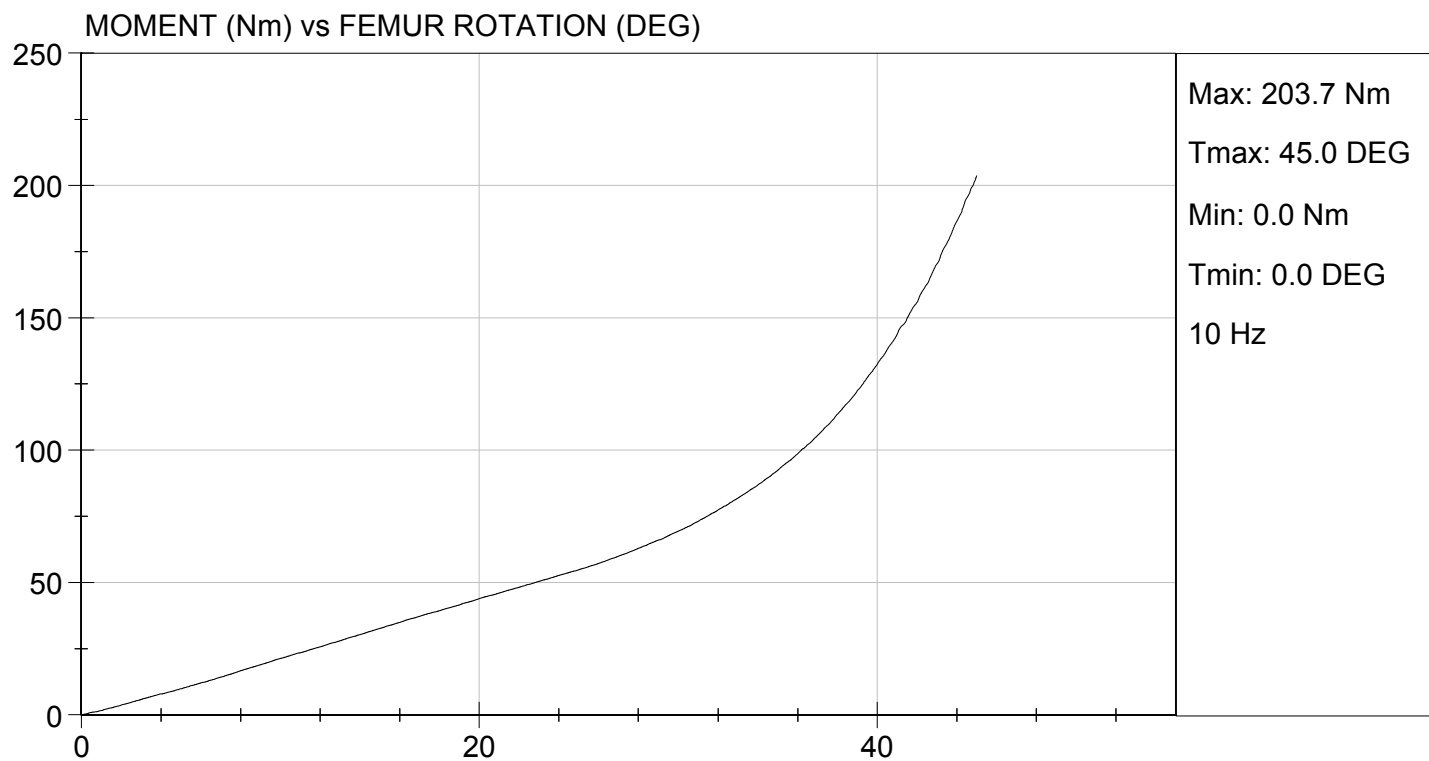
Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	21.1	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	50	50	Pass
Rotation Rate	deg/s	5.0 to 10.0	6.2	6.1	Pass
30 Degrees	Nm	94.9 Nm Max	53.3	69.3	Pass
150 ft-lbf / 203.4 Nm	Deg	40.0 to 50.0 Degree Max Rotation	47.9	45.0	Pass
Overall Test Results					Pass


 Laboratory Technician

05/14/2014
 Test Date


 Approved By





Hybrid III, 5th External Measurements
SN: 634

HYBRID III, PART 572, SUBPART O EXTERNAL DIMENSIONS				
DIMENSION	DESCRIPTION	DETAILS	ASSEMBLY DIMENSION (mm)	ACTUAL MEASUREMENT
A	TOTAL SITTING HEIGHT	Seat surface to highest point on top of the head.	774.7-800.1	784.6
B	SHOULDER PIVOT HEIGHT	Centerline of shoulder pivot bolt to the seat surface.	431.8-457.2	449.0
C	H-POINT HEIGHT	Reference	81.3-86.3	85.0
D	H-POINT LOCATION FROM BACKLINE	Reference	144.8-149.8	145.0
E	SHOULDER PIVOT FROM BACKLINE	Center of the shoulder clevis to the rear vertical surface of the fixture.	68.6-83.8	79.2
F	THIGH CLEARANCE	Measured at the highest point on the upper femur segment.	119.4-134.6	125.6
G	BACK OF ELBOW TO WRIST PIVOT	back of the elbow flesh to the wrist pivot in line with the elbow and wrist pivots	243.9-259.1	253.4
H	HEAD BACK TO BACKLINE	Back of Skull cap skin to seat rear vertical surface (Reference)	43.2-48.2	45.0
I	SHOULDER TO- ELBOW LENGTH	Measure from the highest point on top of the shoulder clevis to the lowest part of the flesh on the elbow in line with the elbow pivot bolt.	276.8-297.2	277.8
J	ELBOW REST HEIGHT	Measure from the flesh below the elbow pivot bolt to the seat surface.	182.8-203.2	197.5
K	BUTTOCK TO KNEE LENGTH	The forward most part of the knee flesh to the rear vertical surface of the fixture.	520.7-546.1	541.4
L	POPLITEAL HEIGHT	Seat surface to the plane of the horizontal plane of the bottom of the feet.	355.6-376.0	362.1
M	KNEE PIVOT HEIGHT	Centerline of knee pivot bolt to the horizontal plane of the bottom of the feet.	393.7-419.1	400.4
N	BUTTOCK POPLITEAL LENGTH	The rearmost surface of the lower leg to the same point on the rear surface of the buttocks used for dim. "K".	414-439.4	428.6

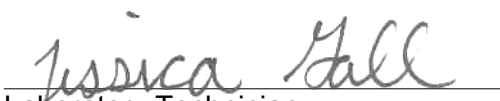
HYBRID III, SUBPART O EXTERNAL DIMENSIONS, continued				
DIMENSION	DESCRIPTION	DETAILS	ASSEMBLY DIMENSION (mm)	ACTUAL MEASUREMENT
O	CHEST DEPTH WITHOUT JACKET	Measured 304.8 ± 5.1 mm above seat surface	175.3-190.5	181.6
P	FOOT LENGTH	Tip of toe to rear of heel	218.5-233.7	224.7
Q	STANDING HEIGHT	(THEORETICAL)	1501.1	N/A
R	BUTTOCK TO KNEE PIVOT LENGTH	The rear surface of the buttocks to the knee pivot bolt	457.2-482.6	482.0
S	HEAD BREADTH	The widest part of the head	137.1-147.3	139.6
T	HEAD DEPTH	Back of the head to the forehead	177.8-188.0	179.2
U	HIP BREADTH	The widest part of the hip	299.7-314.9	306.1
V	SHOULDER BREADTH	Outside edges of right and left shoulder clevises	350.5-365.7	355.5
W	FOOT BREADTH	The widest part of the foot	78.8-94.0	90.0
X	HEAD CIRCUMFERENCE	Measured at the point as in dim. "T"	528.3-548.7	540.6
Y	CHEST CIRCUMFERENCE (WITH CHEST JACKET)	Measured 345.4 ± 12.7 mm above seat surface	850.9-881.3	868.7
Z	WAIST CIRCUMFERENCE	Measured 165.1 ± 5.1 mm above seat surface	759.5-789.9	786.8
AA	REFERENCE LOCATION FOR MEASUREMENT OF CHEST CIRCUMFERENCE	Reference	332.7-358.1	345.4
BB	REFERENCE LOCATION FOR MEASUREMENT OF WAIST CIRCUMFERENCE	Reference	160.1-170.2	165.1

MGA RESEARCH CORPORATION
HEAD DROP TEST
HYBRID III 5TH PERCENTILE

ATD Serial No: 634

Test ID: D141701

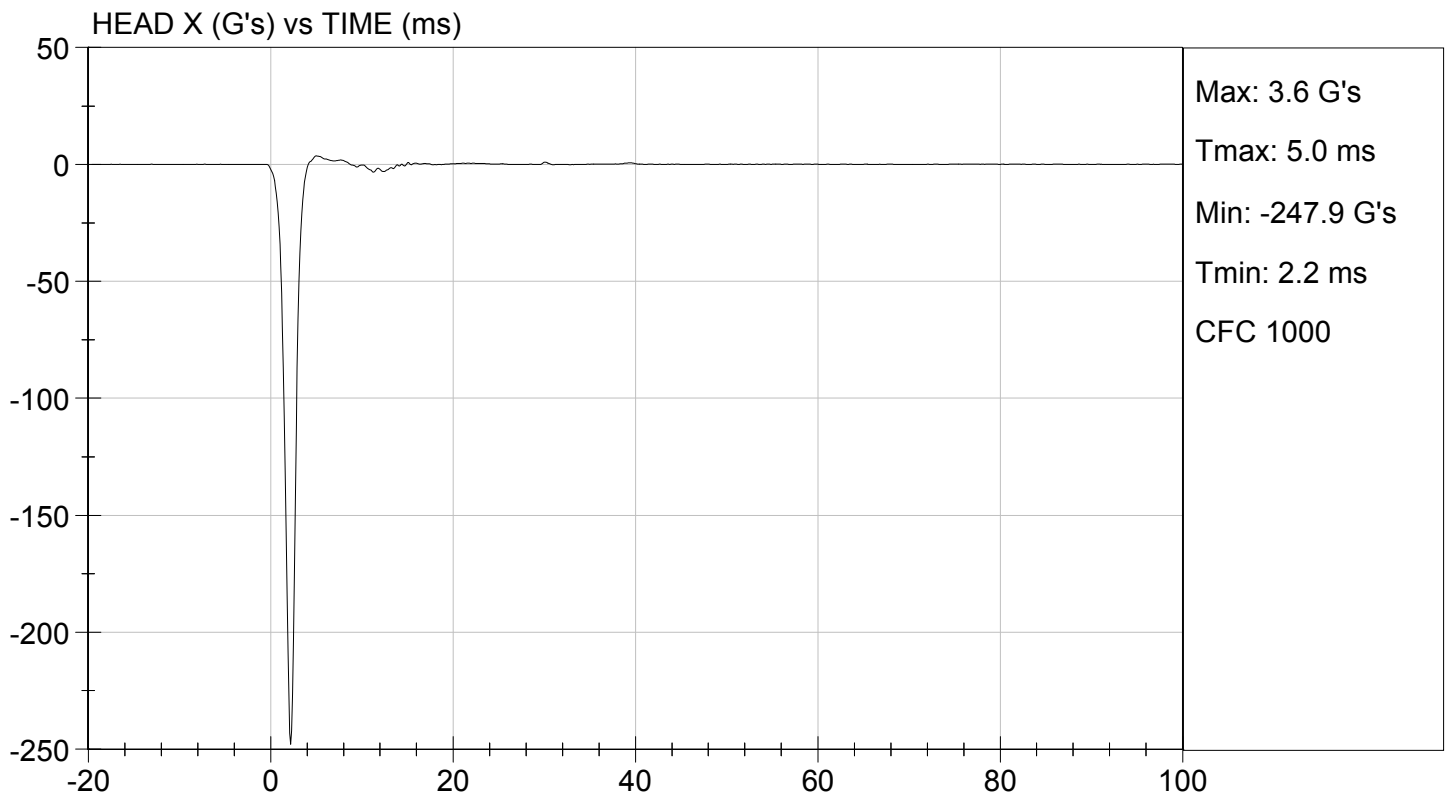
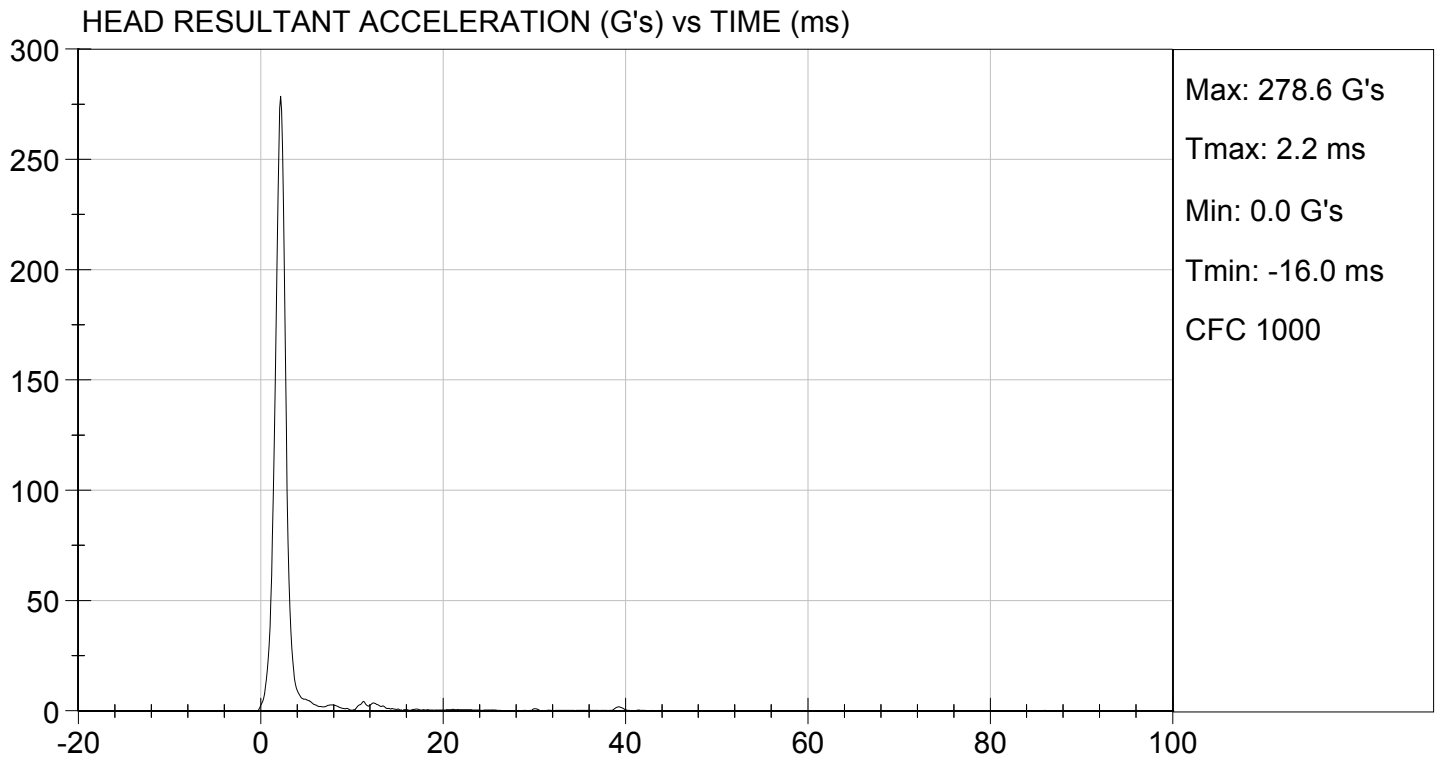
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	33	Pass
Peak Resultant Acceleration	G's	250 to 300	279	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	-13.2	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
Overall Test Results				Pass

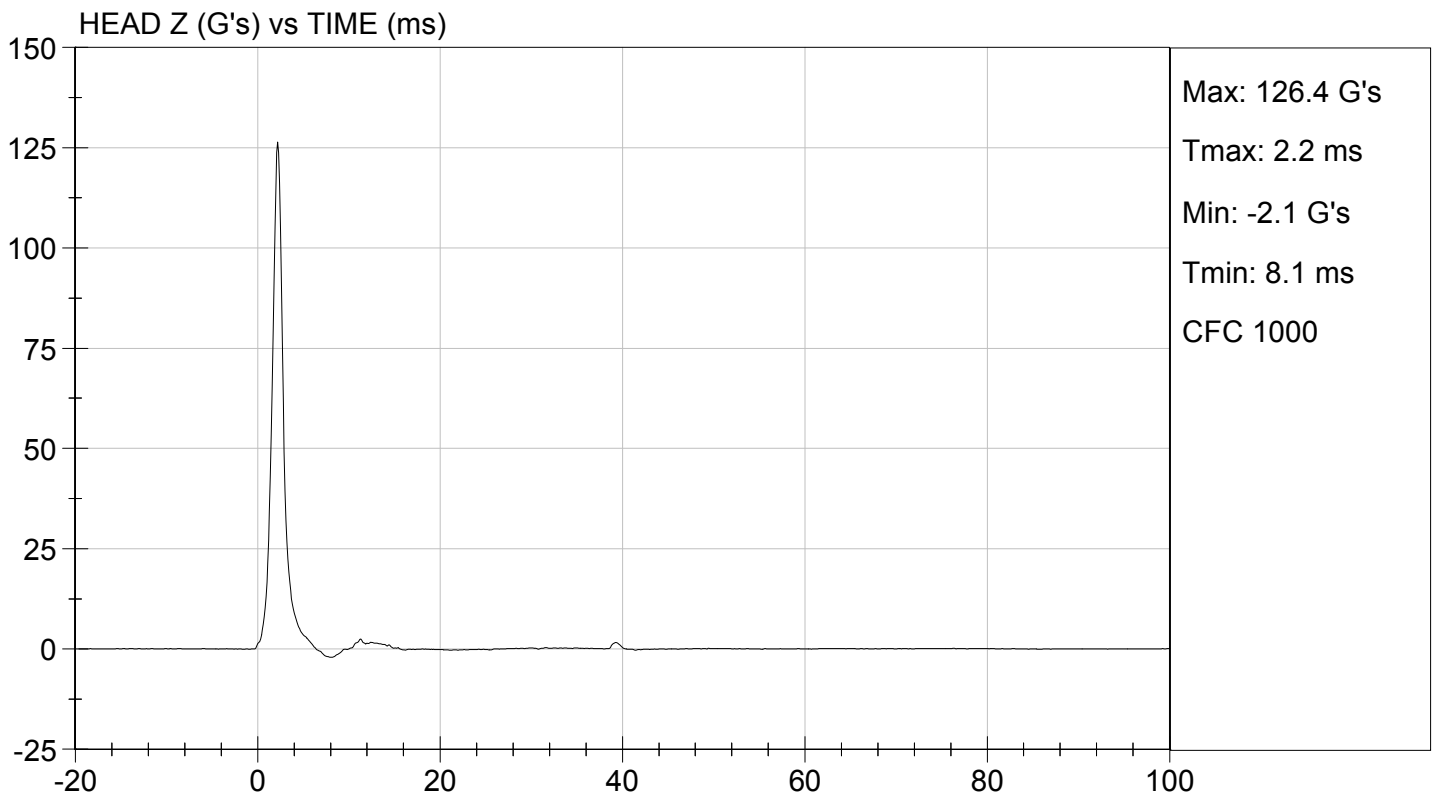
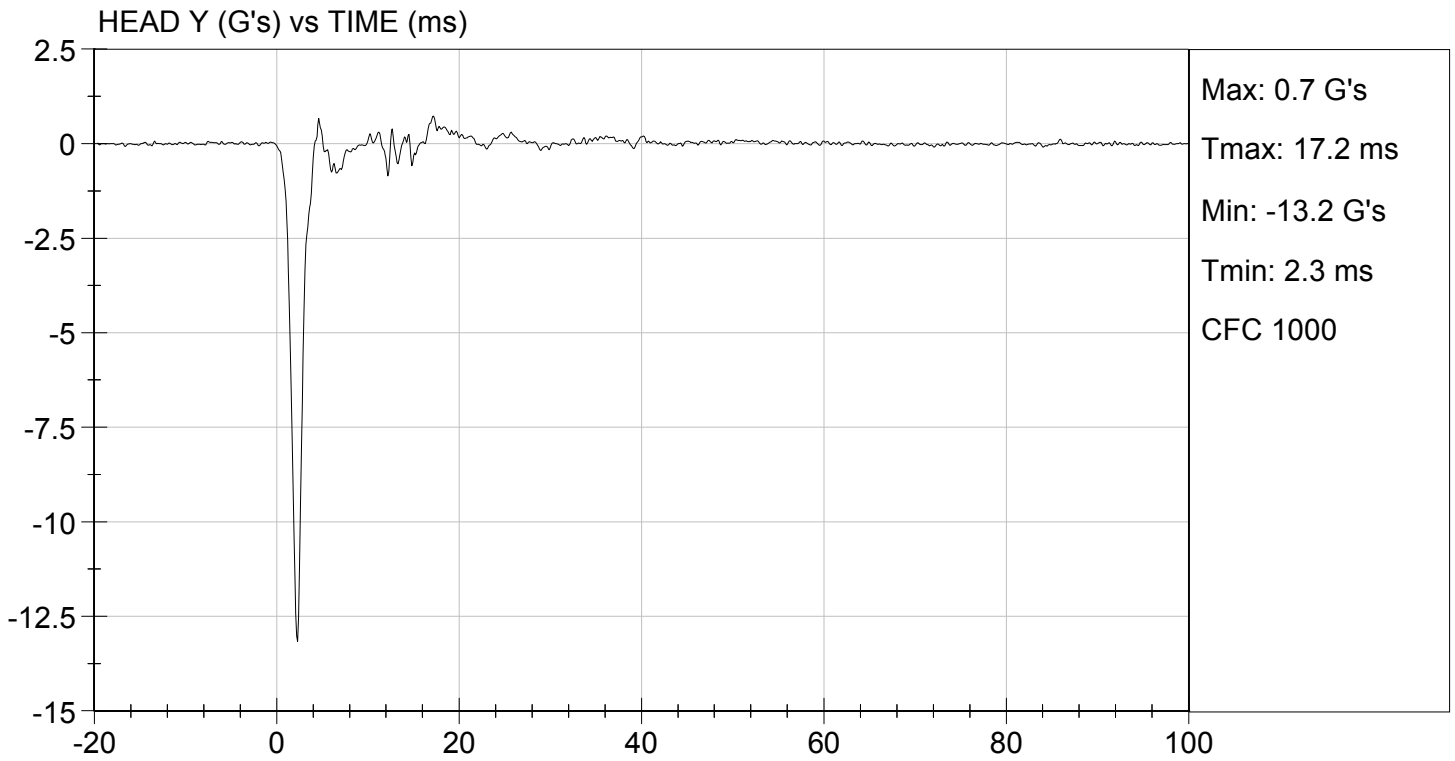

Laboratory Technician

05/01/2014

Test Date


Approved By





MGA RESEARCH CORPORATION

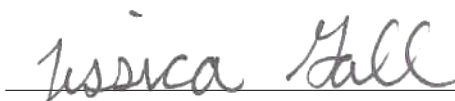
NECK FLEXION TEST

HYBRID III 5TH PERCENTILE

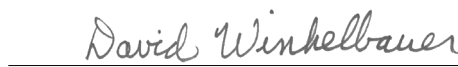
ATD Serial No: 634

Test I.D: D141702

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity		%	10 to 70	43	Pass
Pendulum Speed		m/s	6.89 to 7.13	7.13	Pass
Pendulum Velocity	10 ms	m/s	2.1 to 2.5	2.5	Pass
	20 ms	m/s	4.0 to 5.0	4.4	Pass
	30 ms	m/s	5.8 to 7.0	6.0	Pass
D Plane Rotation	Max	deg	77 to 91	88	Pass
Occipital Condyle Moment within Rotation Corridor		Nm	69 to 83	69	Pass
Positive Moment Time Curve Decay to 10 Nm		ms	80 to 100	89	Pass
Overall Results					Pass


 Laboratory Technician

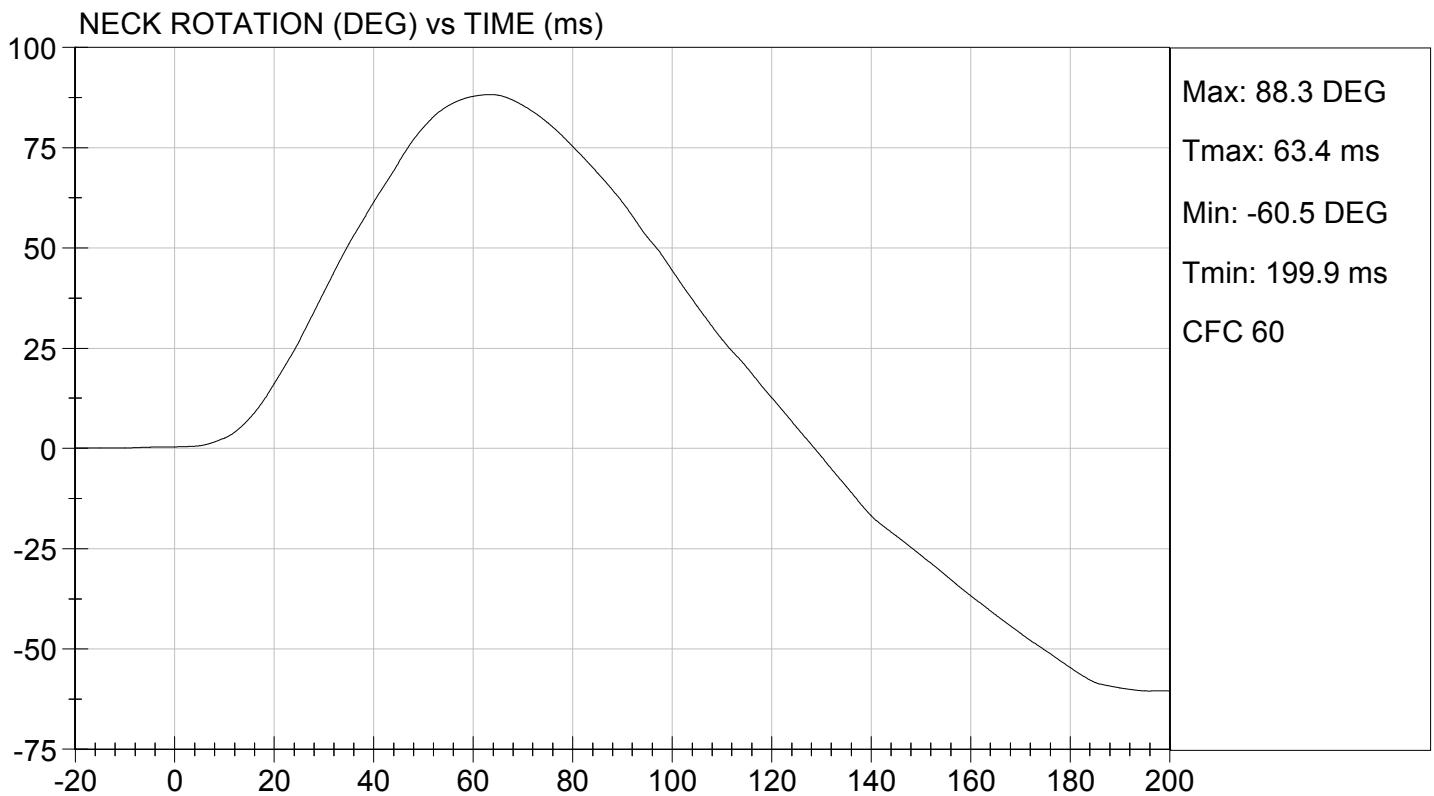
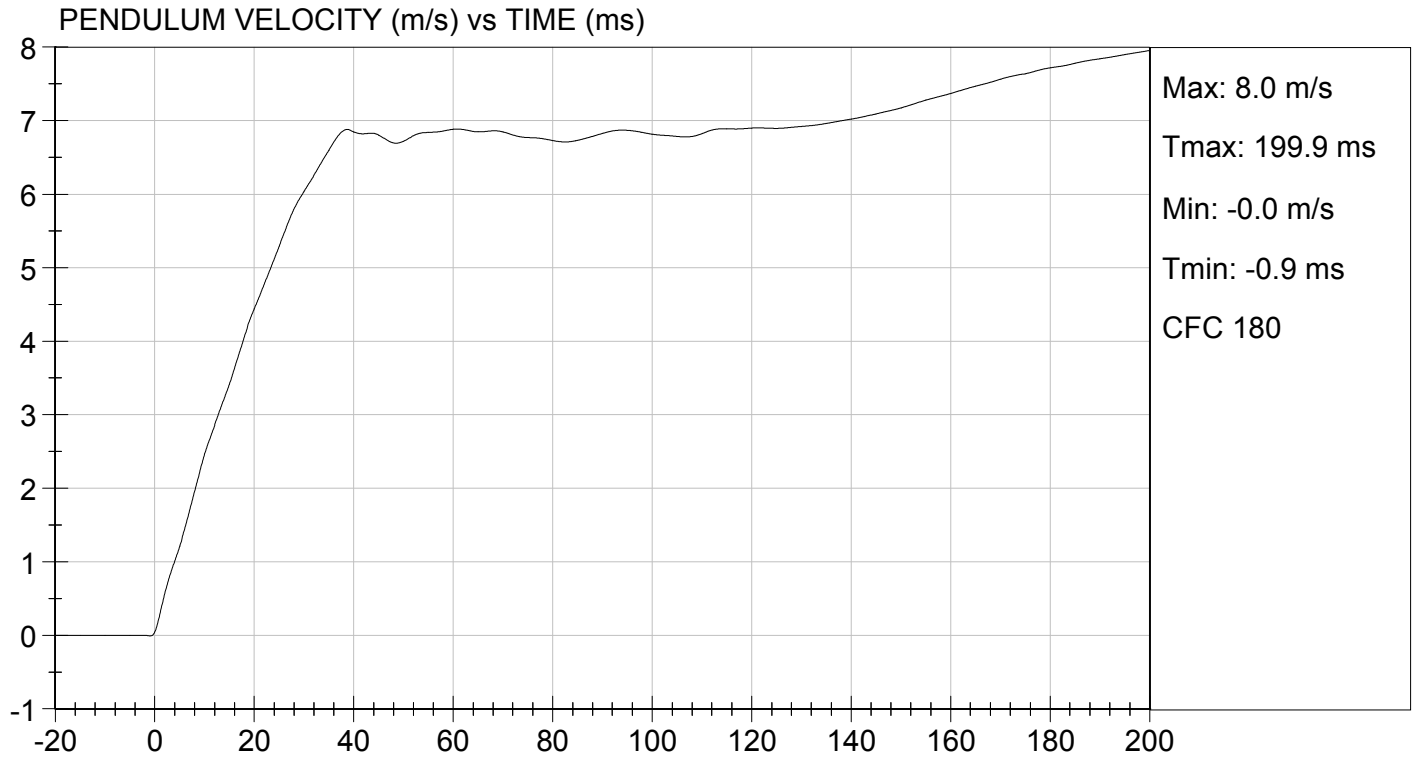
05/01/2014
 Test Date


 Approved By



TEST DESC: NECK FLEXION
VELOCITY: 23.40 ft/s, 7.13 m/s

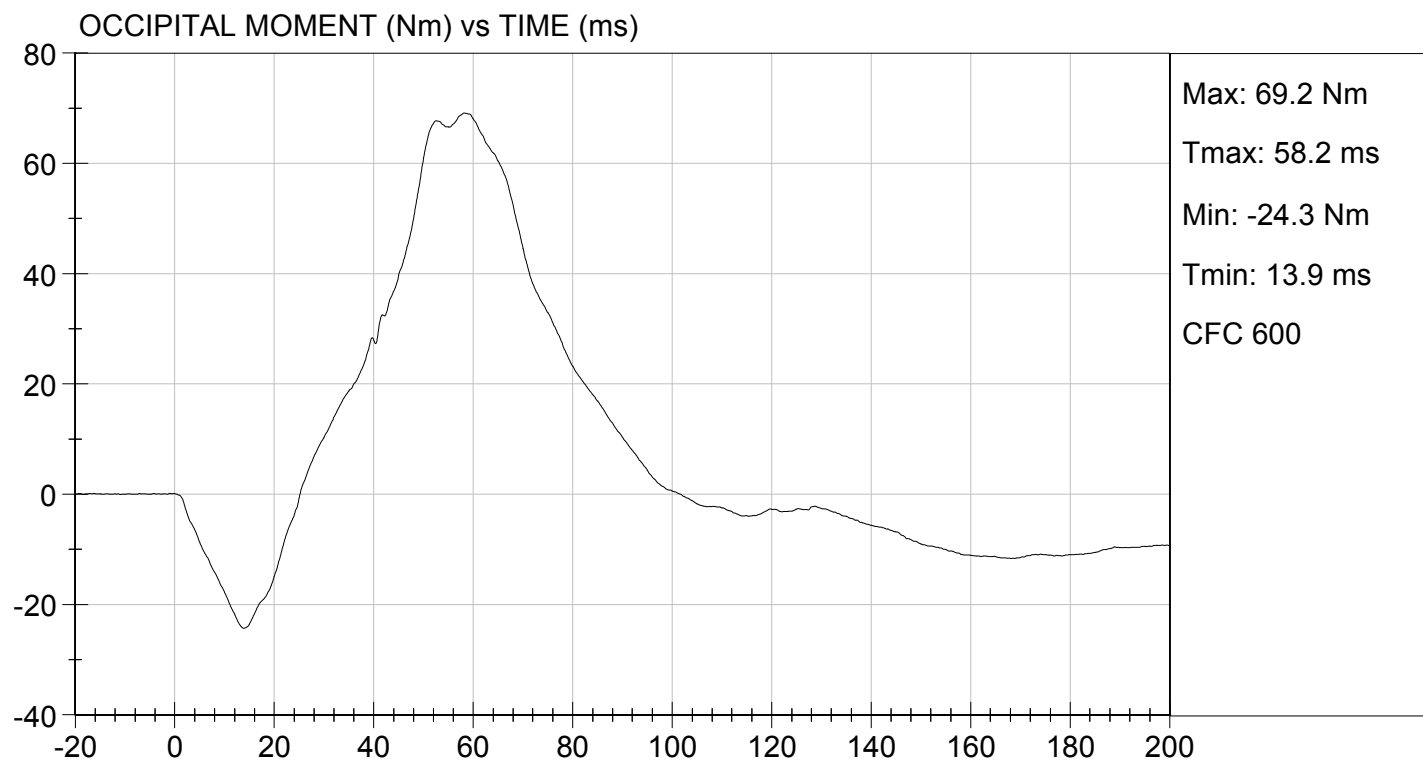
TEST DATE: 05/01/2014
TEST #: D141702





TEST DESC: NECK FLEXION
VELOCITY: 23.40 ft/s, 7.13 m/s

TEST DATE: 05/01/2014
TEST #: D141702



MGA RESEARCH CORPORATION
NECK EXTENSION TEST
HYBRID III 5TH PERCENTILE

ATD Serial No: 634

Test I.D: D141703

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity		%	10 to 70	43	Pass
Pendulum Speed		m/s	5.95 to 6.19	6.19	Pass
Pendulum Velocity	10 ms	m/s	1.5 to 1.9	1.7	Pass
	20 ms	m/s	3.1 to 3.9	3.6	Pass
	30 ms	m/s	4.6 to 5.6	5.2	Pass
D Plane Rotation	Max	deg	99 to 114	110	Pass
Occipital Condyle Moment within Rotation Corridor		Nm	-65 to -53	-55	Pass
Negative Moment Time Curve Decay to -10 Nm		ms	94 to 114	96	Pass
Overall Results					Pass

Jessica Hall
Laboratory Technician

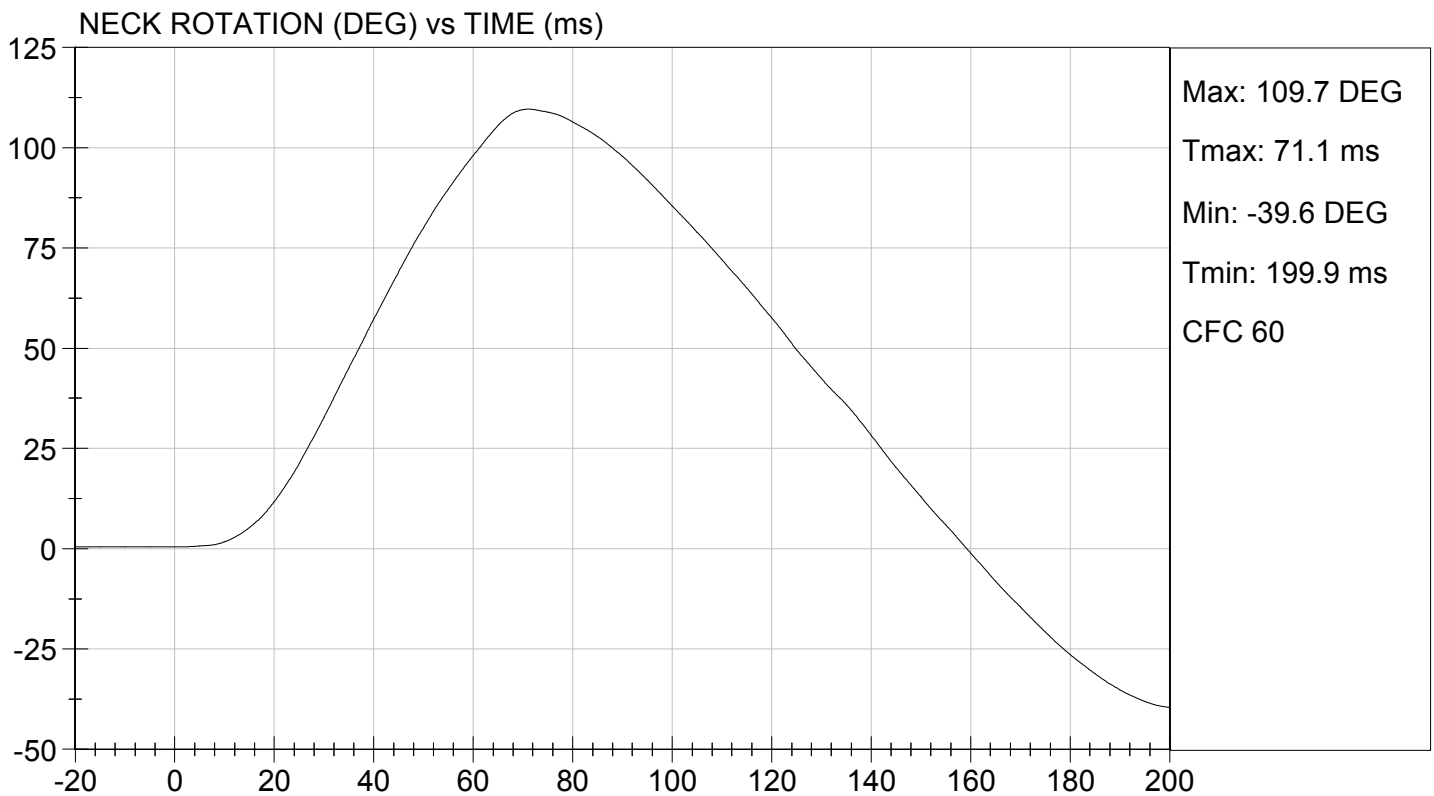
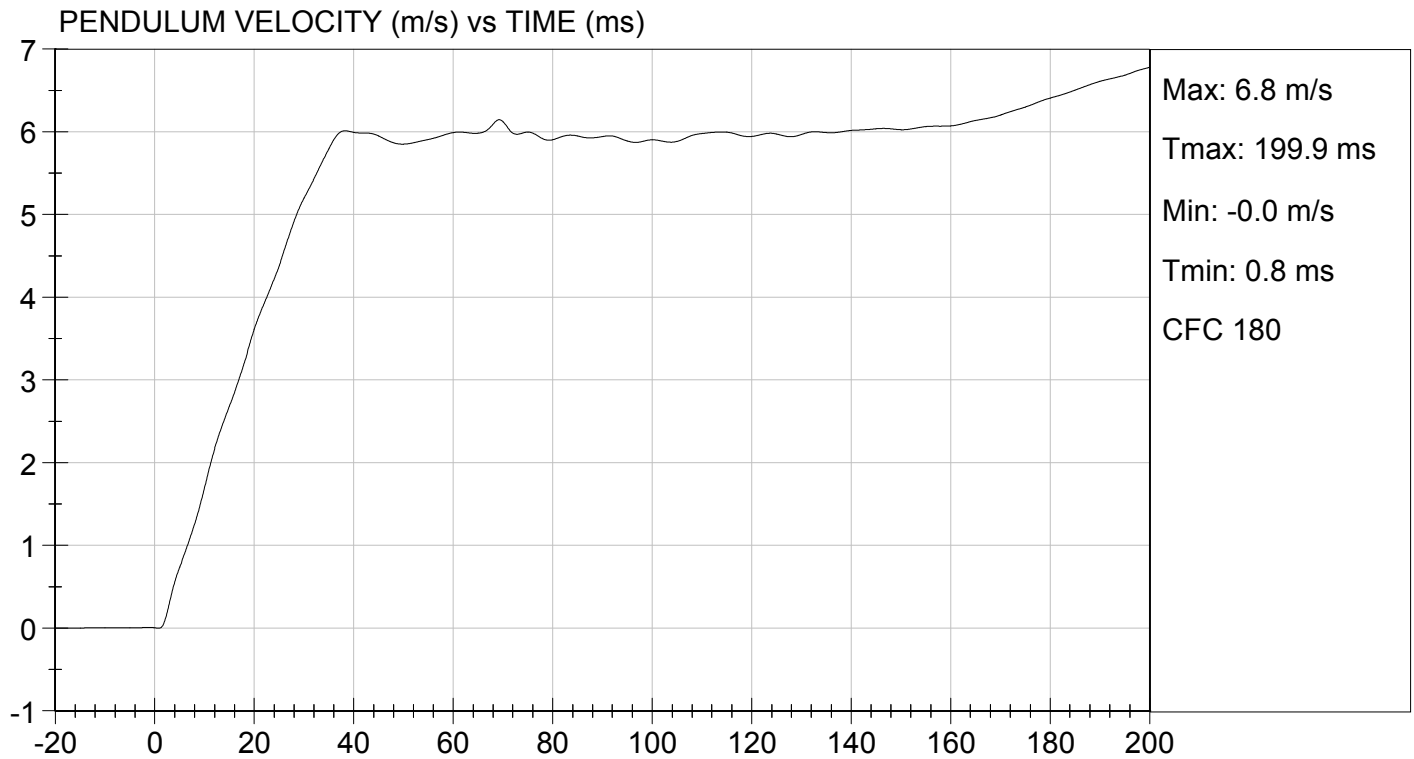
05/01/2014
Test Date

David Winkelbauer
Approved By



TEST DESC: NECK EXTENSION
VELOCITY: 20.30 ft/s, 6.19 m/s

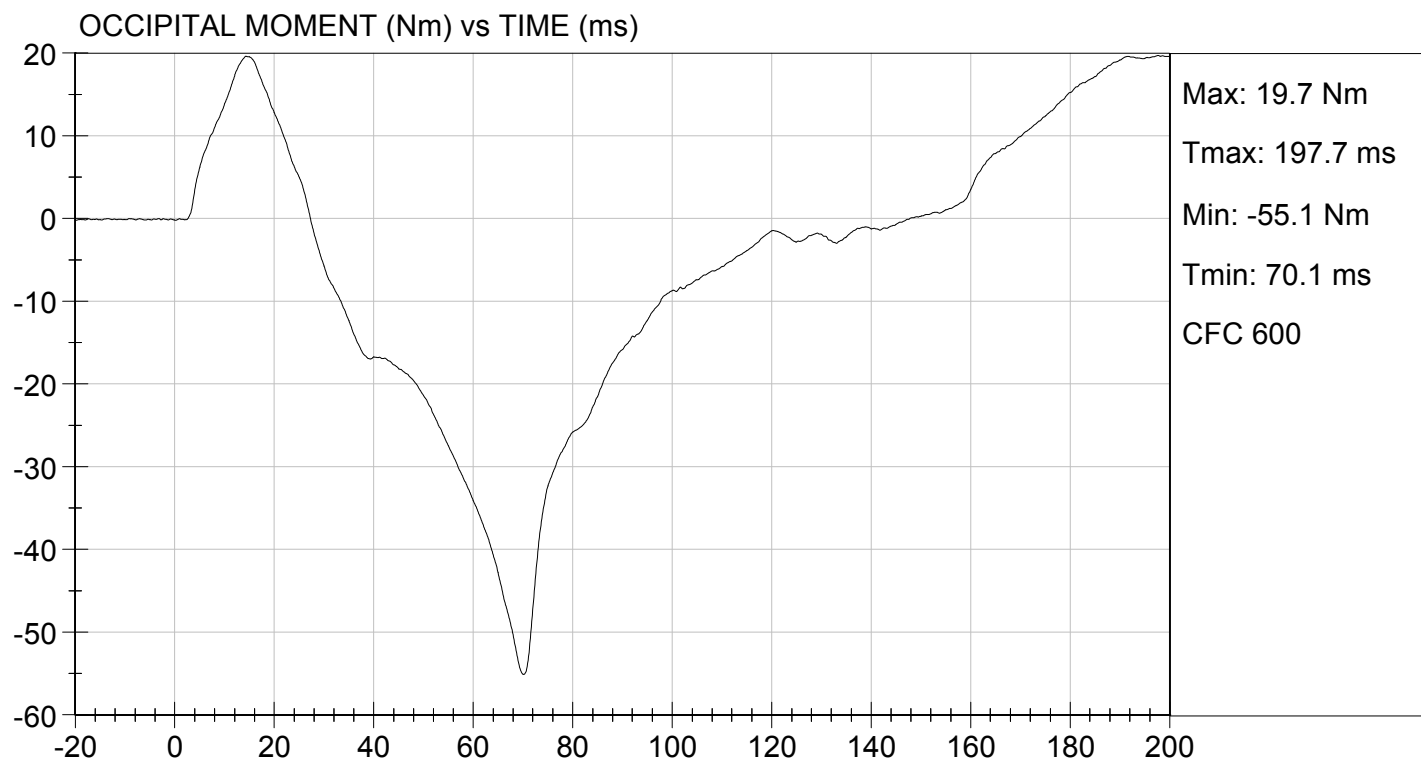
TEST DATE: 05/01/2014
TEST #: D141703





TEST DESC: NECK EXTENSION
VELOCITY: 20.30 ft/s, 6.19 m/s

TEST DATE: 05/01/2014
TEST #: D141703

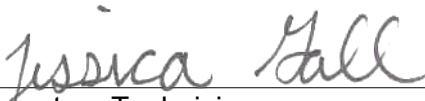


MGA RESEARCH CORPORATION
THORAX IMPACT
HYBRID III 5TH PERCENTILE

ATD Serial No: 634

Test I.D: D141704

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.6	Pass
Relative Humidity	%	10 to 70	35	Pass
Probe Speed	m/s	6.59 to 6.83	6.68	Pass
Peak Deflection	mm	50 to 58	56	Pass
Peak Resistive Force w/in Deflection Corridor	N	3900 to 4400	4176	Pass
Internal Hysteresis	%	69 to 85	69	Pass
Peak Force 18 mm - 50 mm	N	<= 4600	4051	Pass
Overall Test Results				Pass


Laboratory Technician

05/02/2014

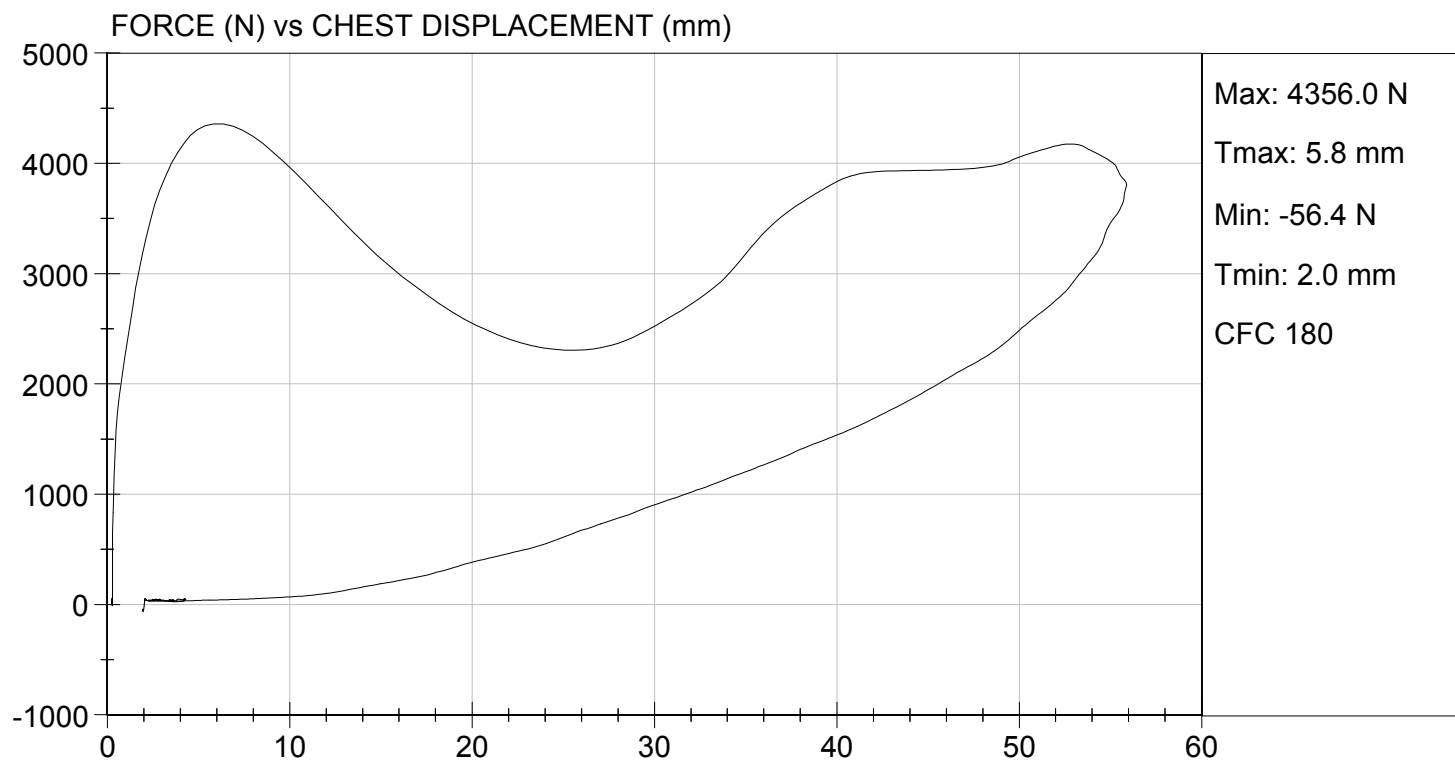
Test Date


Approved By



TEST DESC: THORAX IMPACT
VELOCITY: 21.93 ft/s, 6.68 m/s

TEST DATE: 05/02/2014
TEST #: D141704



MGA RESEARCH CORPORATION

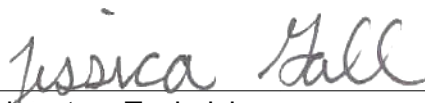
RIGHT KNEE IMPACT TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634

Test I.D: D141705

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	43	Pass
Probe Speed	m/s	2.07 to 2.13	2.13	Pass
Maximum Force	N	3450 to 4060	3909	Pass
Overall Test Results				Pass


Laboratory Technician

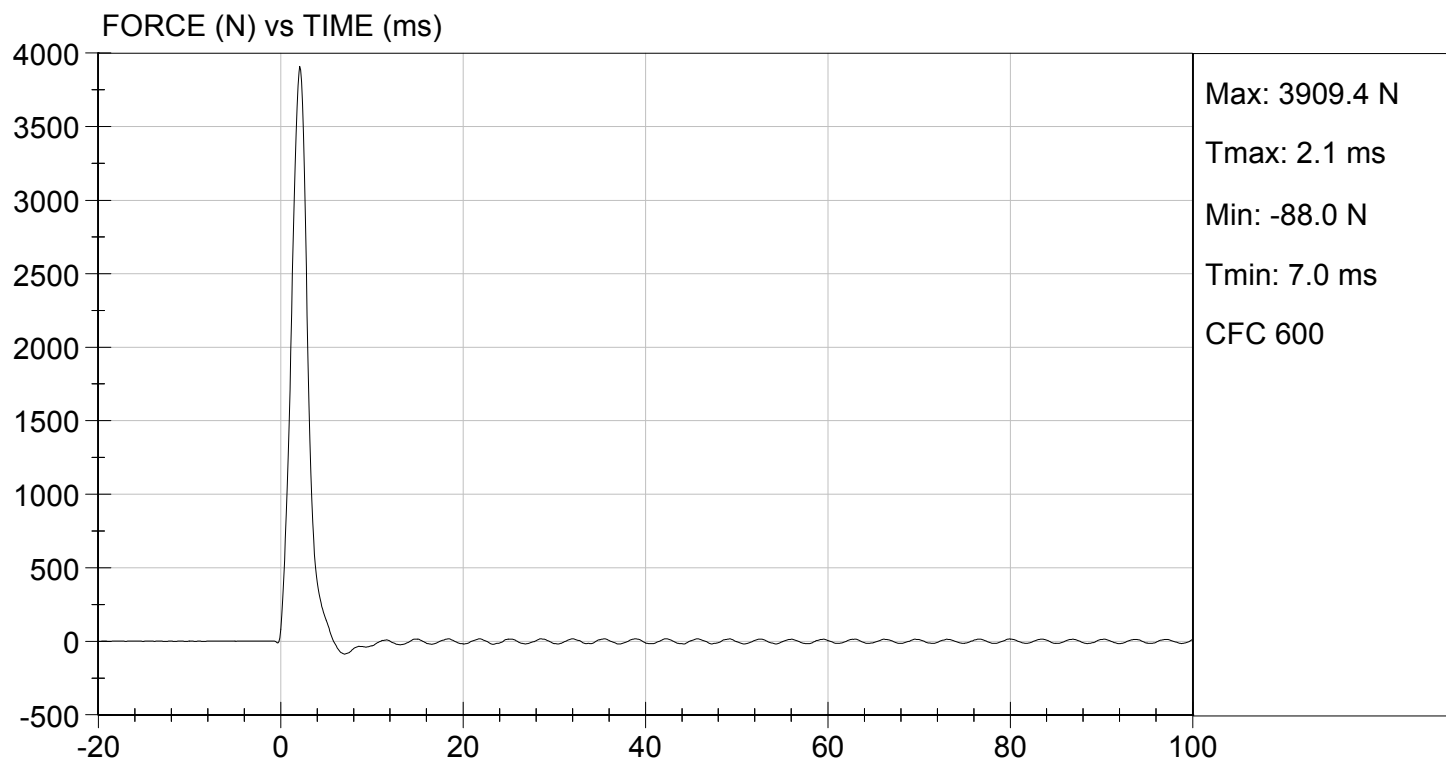
05/01/2014
Test Date


Approved By



TEST DESC: RIGHT KNEE
VELOCITY: 7.00 ft/s, 2.13 m/s

TEST DATE: 05/01/2014
TEST #: D141705



MGA RESEARCH CORPORATION

**LEFT KNEE IMPACT TEST
HYBRID III 5TH PERCENTILE**

ATD Serial No: 634

Test I.D: D141706

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	43	Pass
Probe Speed	m/s	2.07 to 2.13	2.13	Pass
Maximum Force	N	3450 to 4060	3532	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

05/01/2014

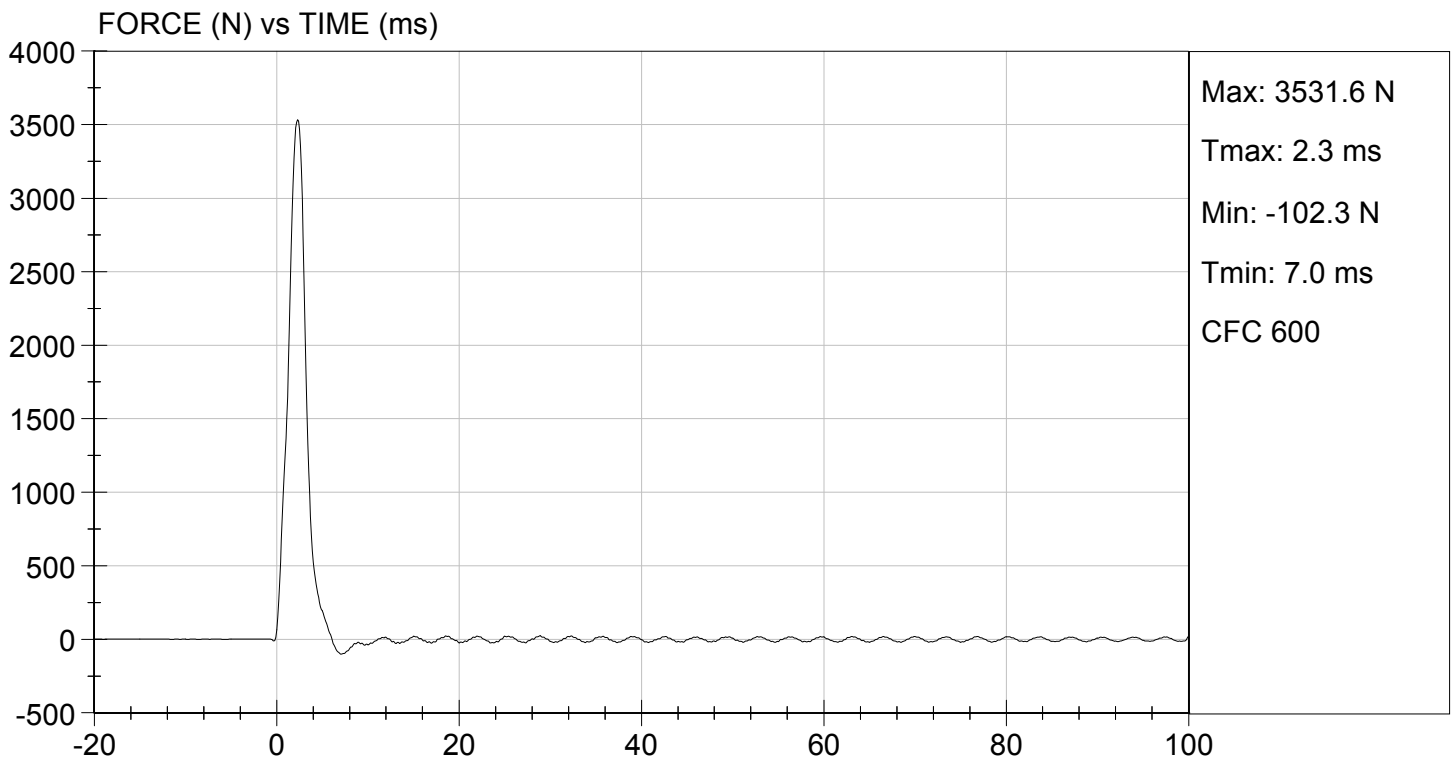
Test Date

David Winkelbauer
Approved By



TEST DESC: LEFT KNEE
VELOCITY: 7.00 ft/s, 2.13 m/s

TEST DATE: 05/01/2014
TEST #: D141706



MGA RESEARCH CORPORATION

TORSO FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634

Test I.D: D141707

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	33	Pass
Initial Angle	deg	0 to 20	18	Pass
Return Angle	deg	+/- 8	5	Pass
Force at 45 deg	N	320 to 390	328	Pass
Upper Torso Deflection Rate	deg/s	0.5 to 1.5	0.9	Pass
Overall Result				Pass

Jessica Hall
Laboratory Technician

05/01/2014

Test Date

David Winkelbauer
Approved By

MGA RESEARCH CORPORATION
HEAD DROP TEST
HYBRID III 5TH PERCENTILE

ATD Serial No: 634

Test ID: D141841

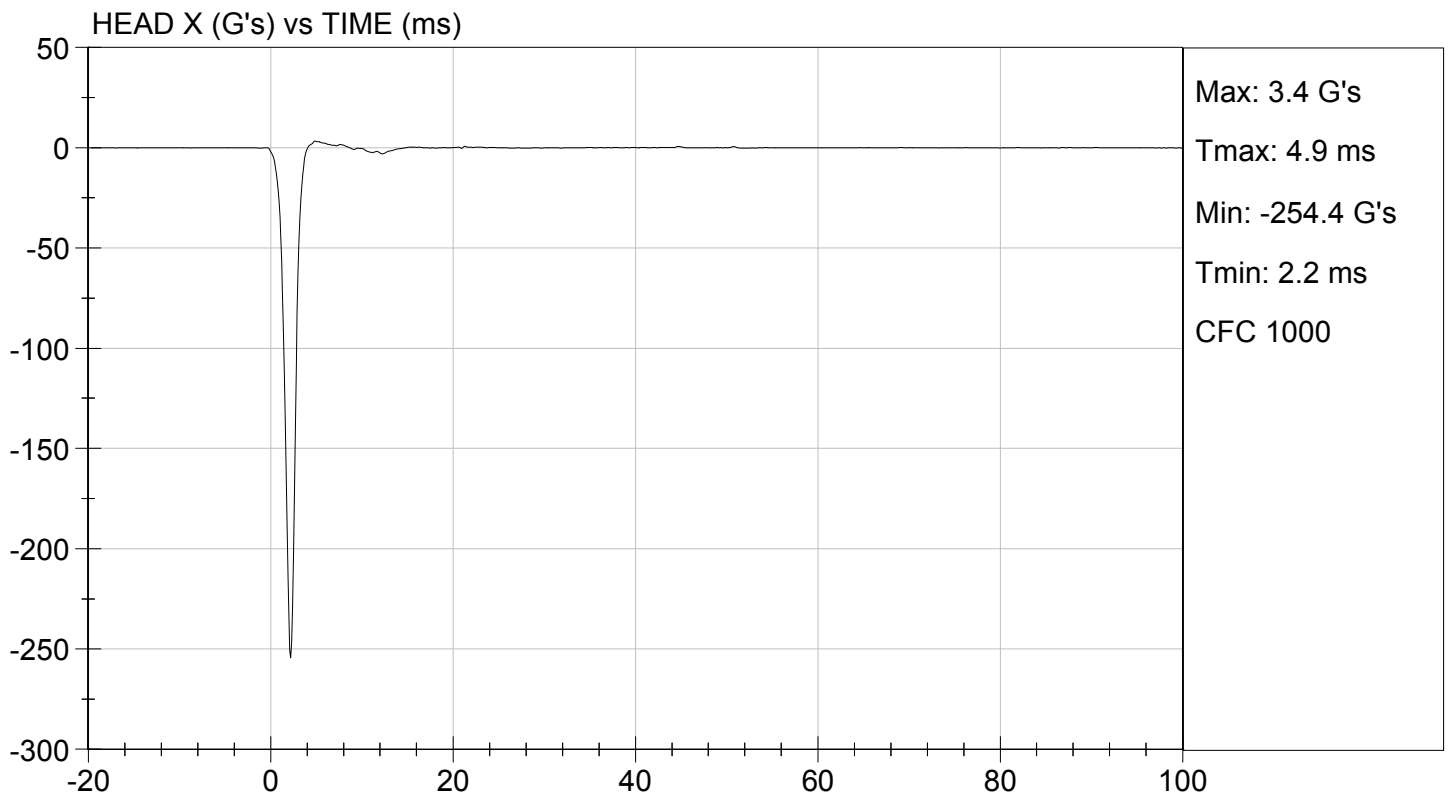
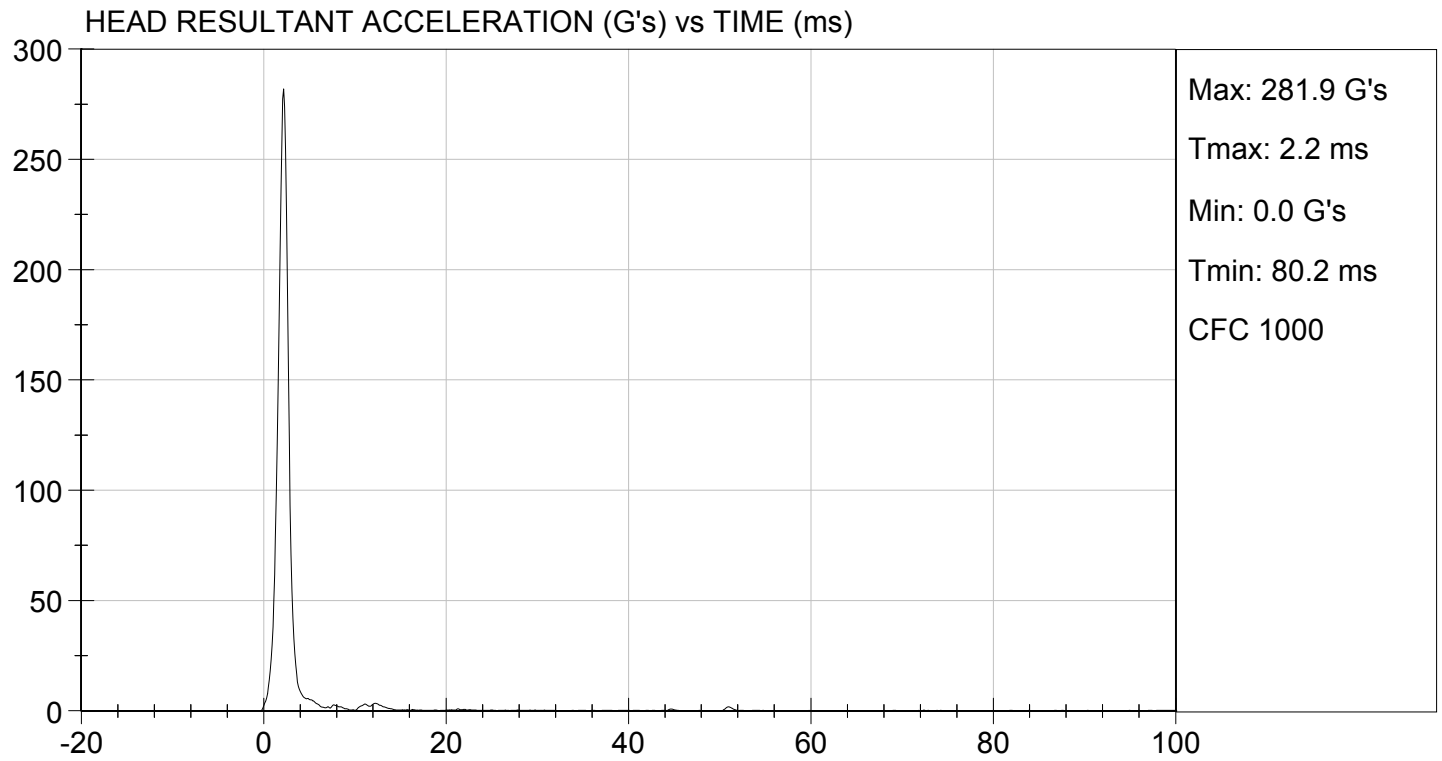
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	52	Pass
Peak Resultant Acceleration	G's	250 to 300	282	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	-6.8	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
Overall Test Results				Pass

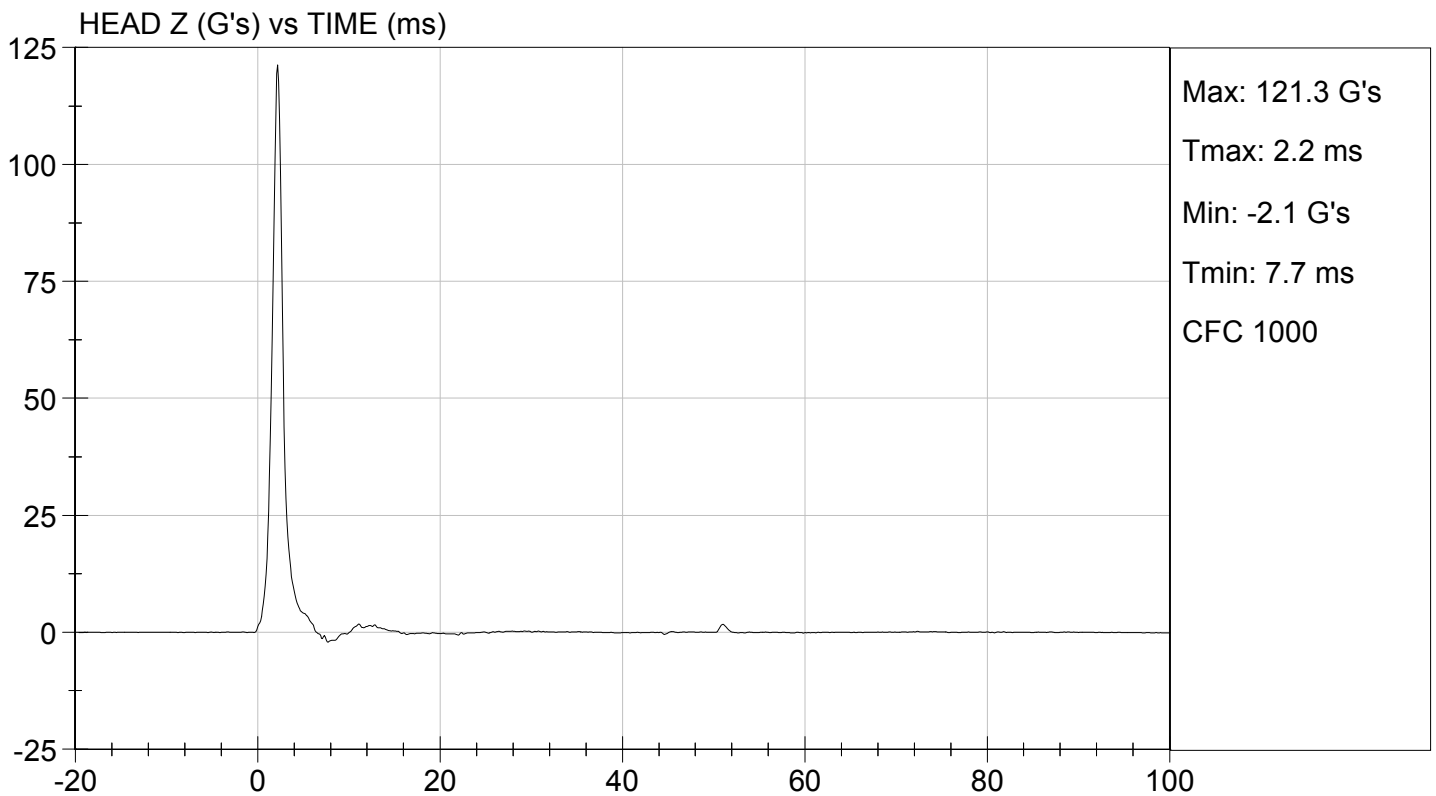
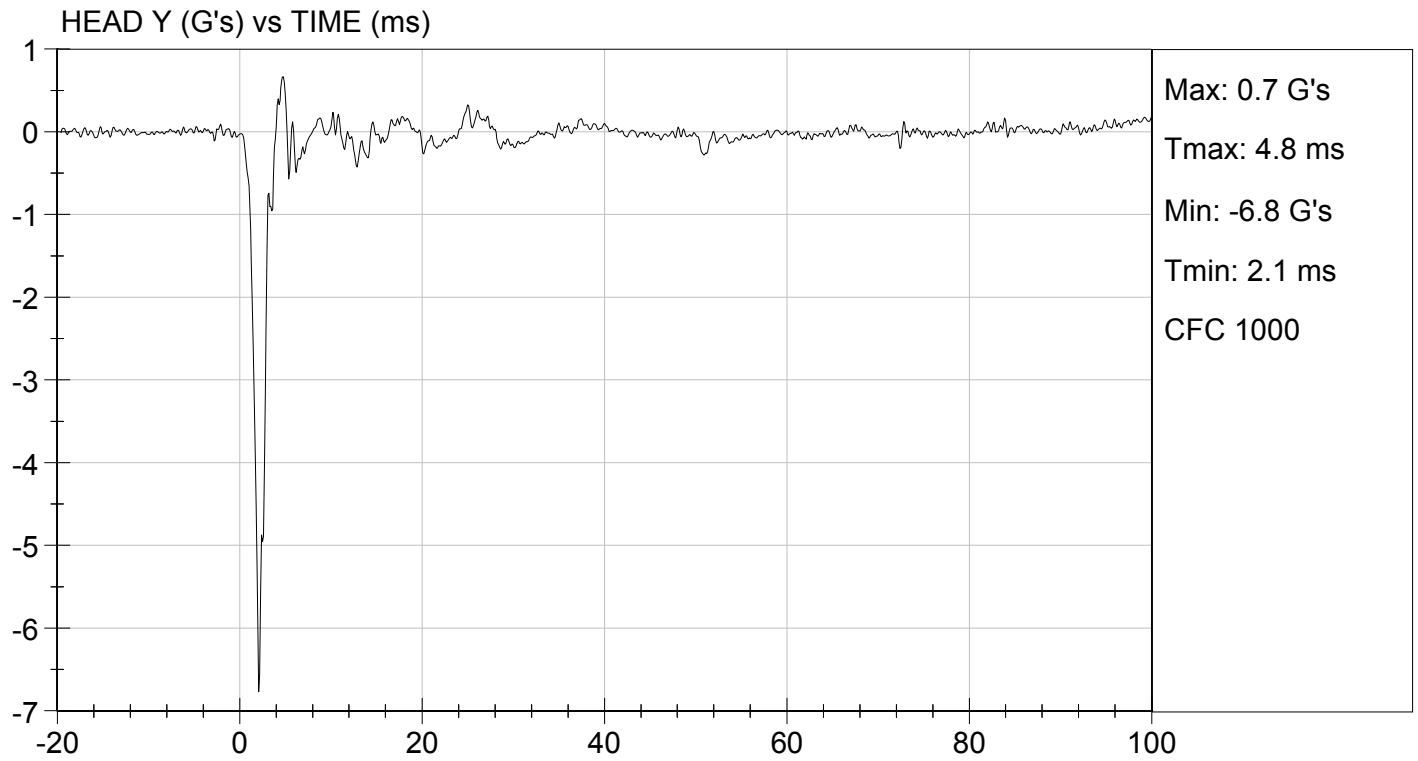

Laboratory Technician

05/13/2014

Test Date


Approved By





MGA RESEARCH CORPORATION

NECK FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634

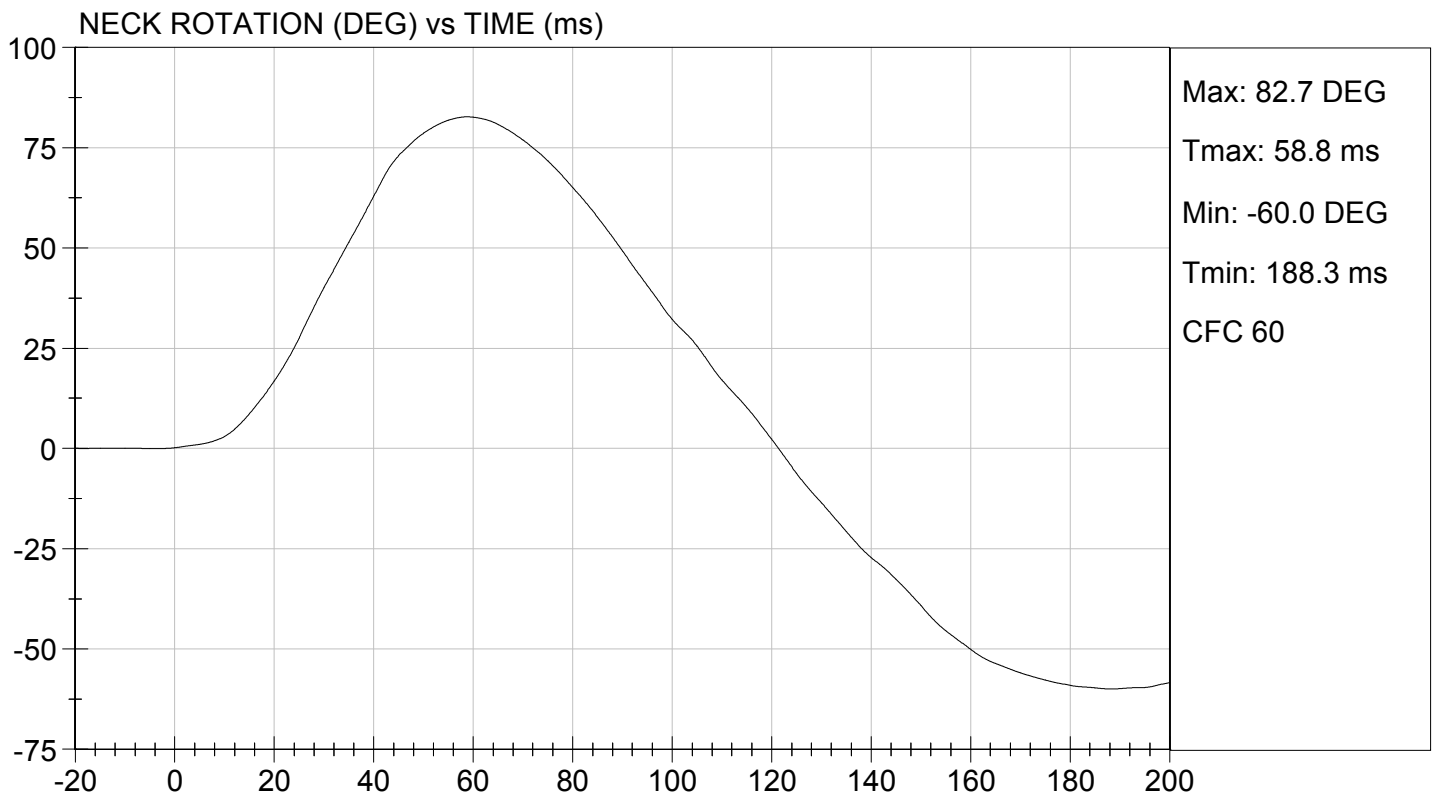
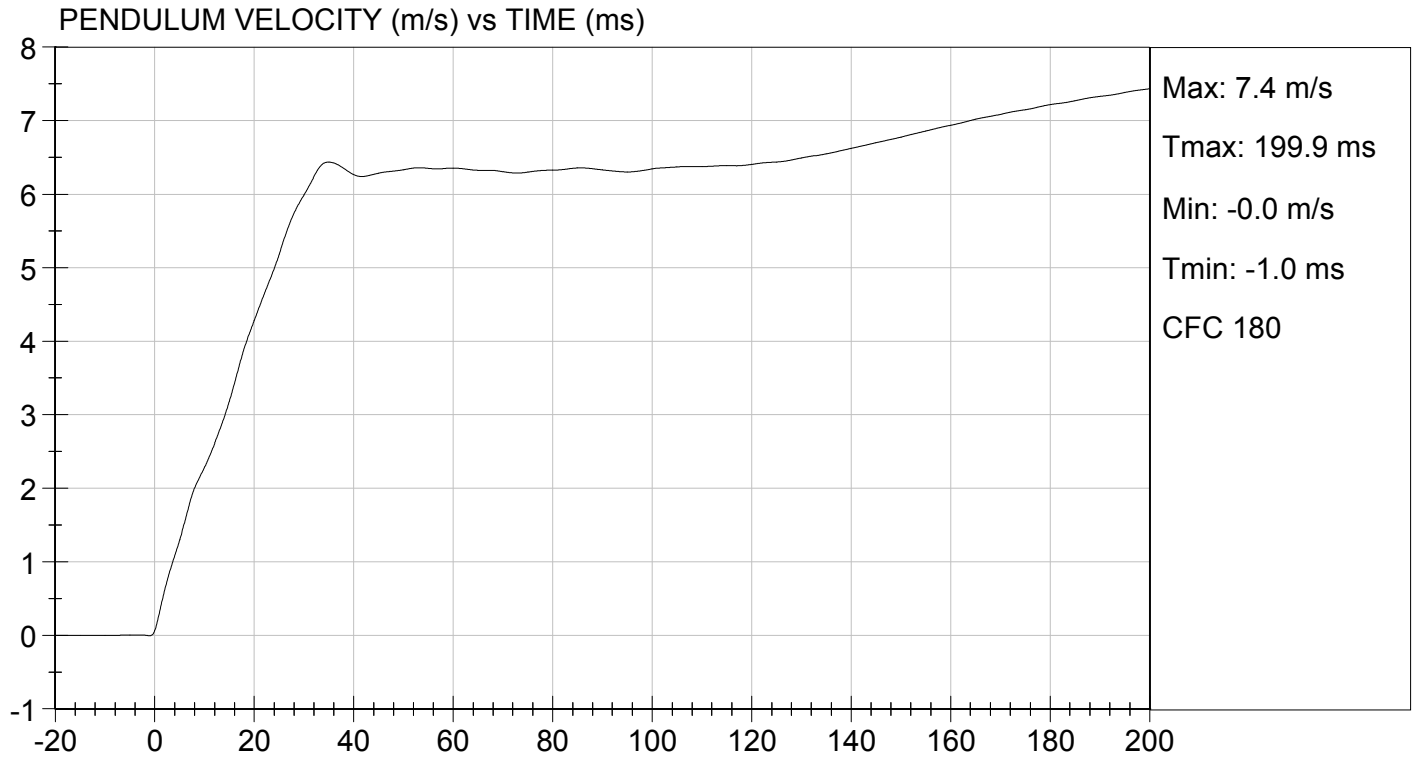
Test I.D: D141842

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity		%	10 to 70	52	Pass
Pendulum Speed		m/s	6.89 to 7.13	7.13	Pass
Pendulum Velocity	10 ms	m/s	2.1 to 2.5	2.3	Pass
	20 ms	m/s	4.0 to 5.0	4.3	Pass
	30 ms	m/s	5.8 to 7.0	6.0	Pass
D Plane Rotation	Max	deg	77 to 91	83	Pass
Occipital Condyle Moment within Rotation Corridor		Nm	69 to 83	71	Pass
Positive Moment Time Curve Decay to 10 Nm		ms	80 to 100	84	Pass
Overall Results					Pass

Jessica Hall
Laboratory Technician

05/13/2014
Test Date

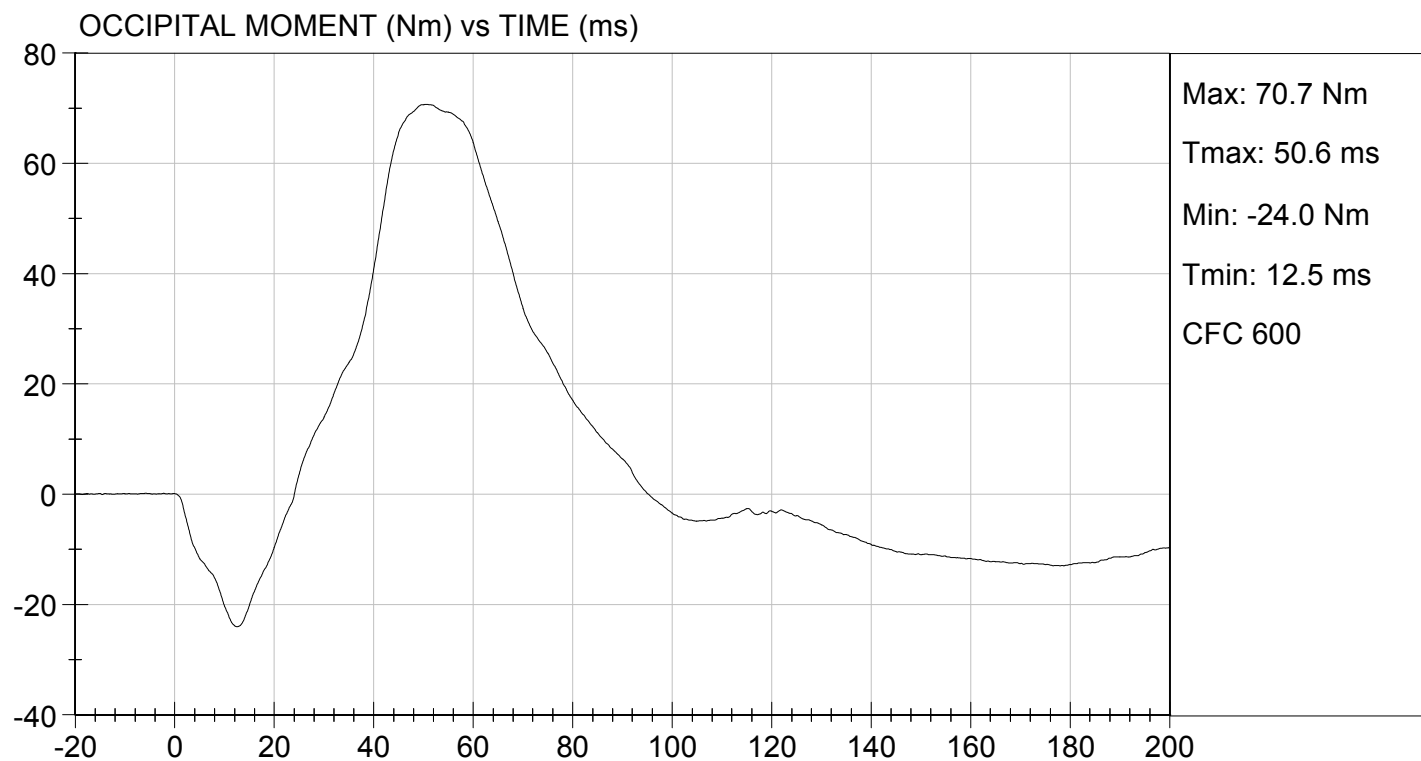
David Winkelbauer
Approved By





TEST DESC: NECK FLEXION
VELOCITY: 23.40 ft/s, 7.13 m/s

TEST DATE: 05/13/2014
TEST #: D141842

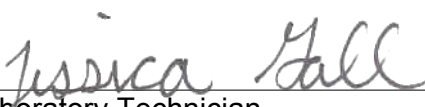


MGA RESEARCH CORPORATION
NECK EXTENSION TEST
HYBRID III 5TH PERCENTILE

ATD Serial No: 634

Test I.D: D141843

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity		%	10 to 70	52	Pass
Pendulum Speed		m/s	5.95 to 6.19	6.19	Pass
Pendulum Velocity	10 ms	m/s	1.5 to 1.9	1.7	Pass
	20 ms	m/s	3.1 to 3.9	3.5	Pass
	30 ms	m/s	4.6 to 5.6	4.8	Pass
D Plane Rotation	Max	deg	99 to 114	105	Pass
Occipital Condyle Moment within Rotation Corridor		Nm	-65 to -53	-55	Pass
Negative Moment Time Curve Decay to -10 Nm		ms	94 to 114	101	Pass
Overall Results					Pass


 Laboratory Technician

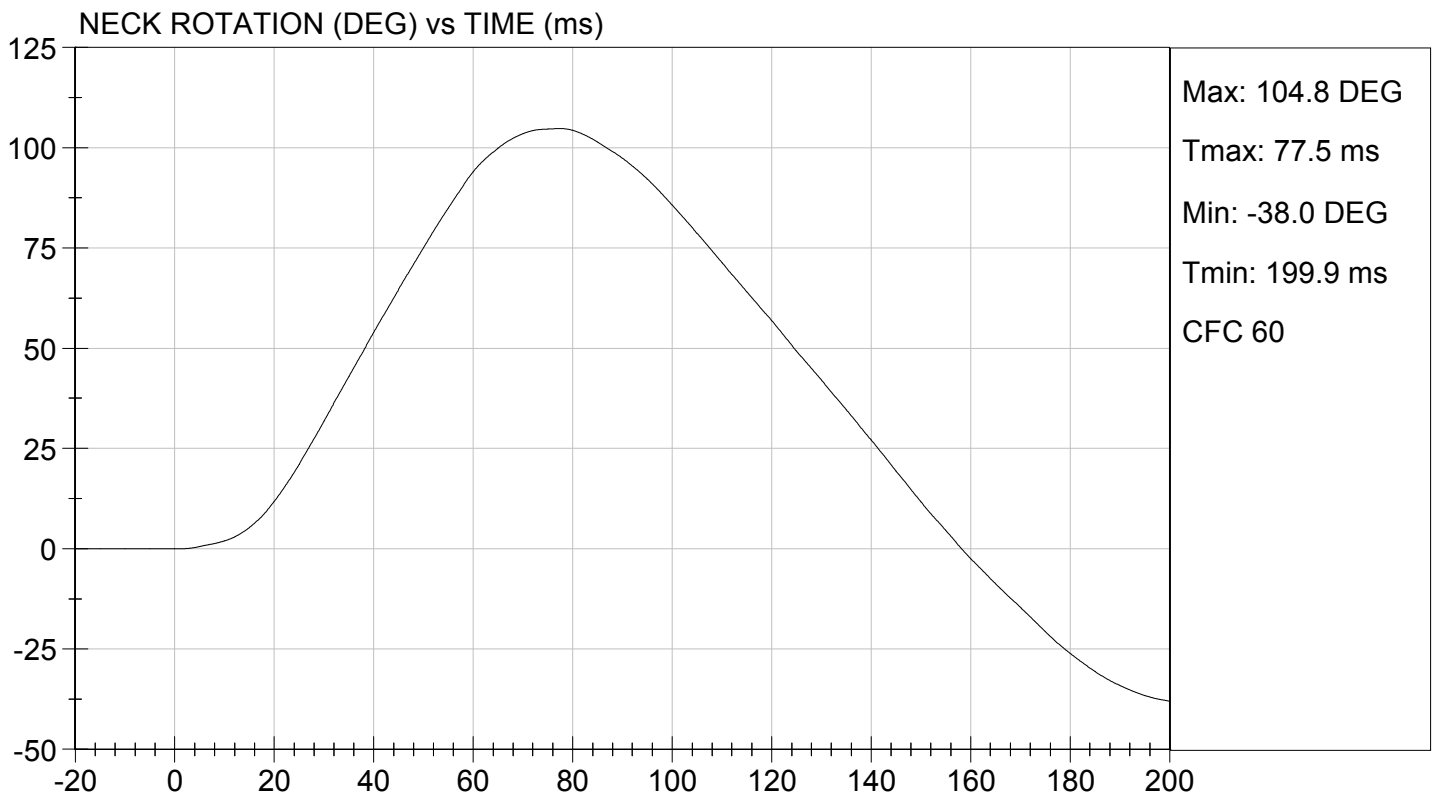
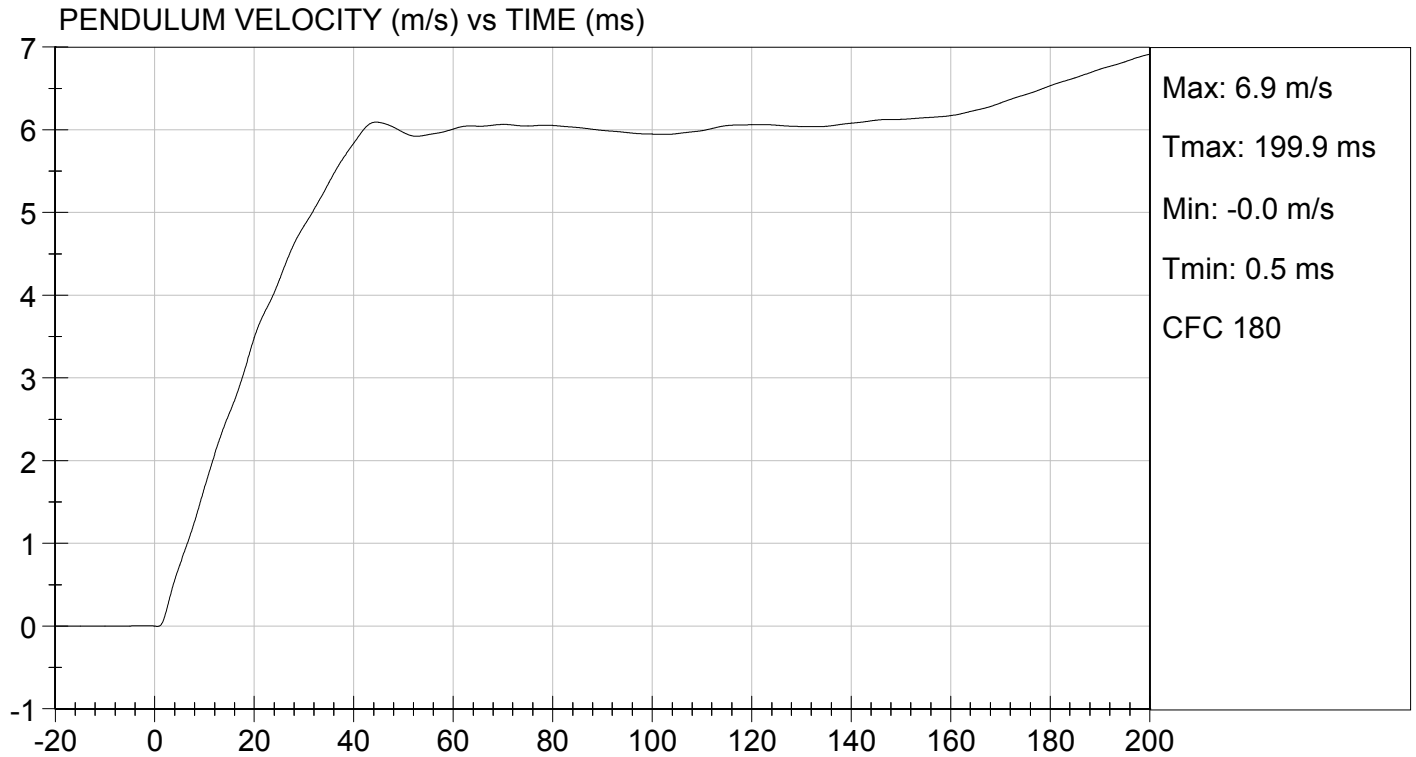
05/13/2014
 Test Date


 Approved By



TEST DESC: NECK EXTENSION
VELOCITY: 20.30 ft/s, 6.19 m/s

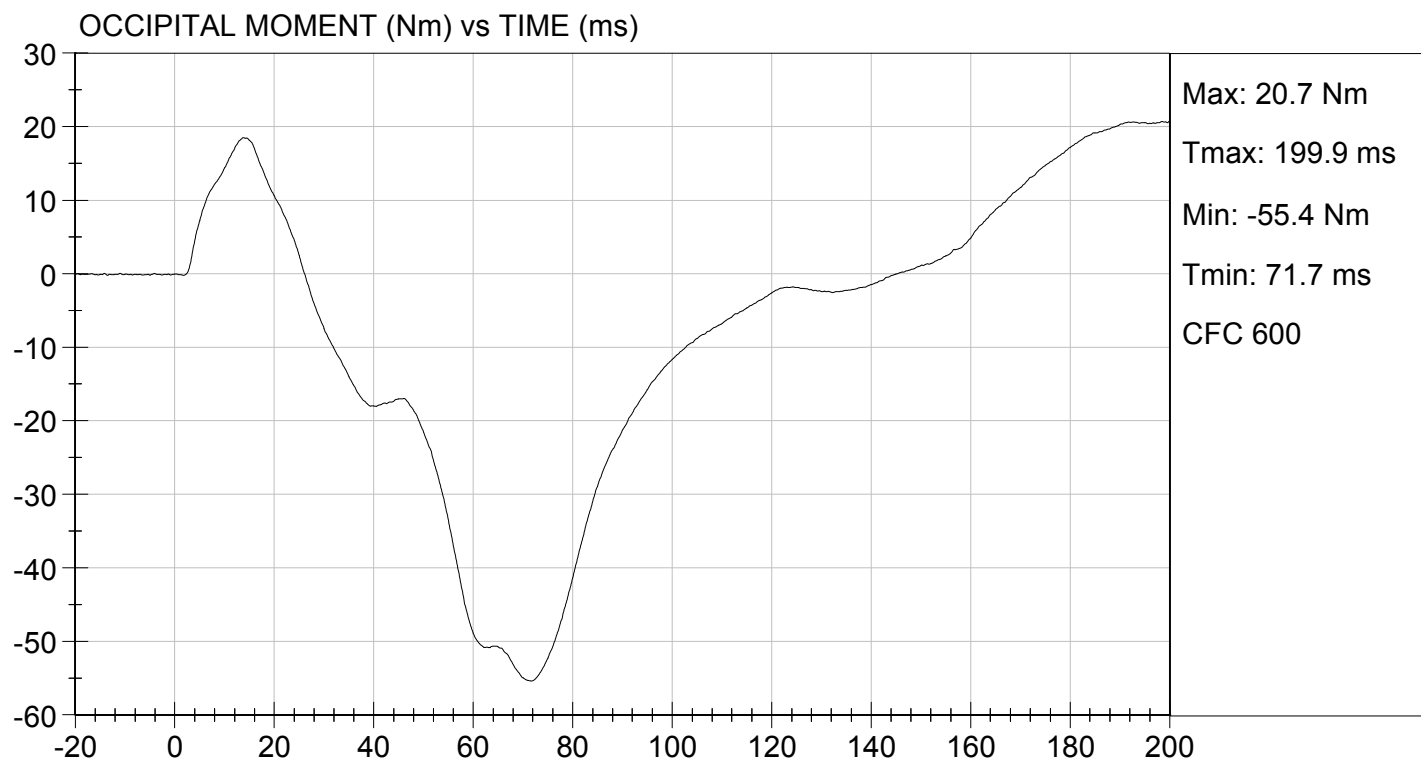
TEST DATE: 05/13/2014
TEST #: D141843





TEST DESC: NECK EXTENSION
VELOCITY: 20.30 ft/s, 6.19 m/s

TEST DATE: 05/13/2014
TEST #: D141843



MGA RESEARCH CORPORATION
THORAX IMPACT
HYBRID III 5TH PERCENTILE

ATD Serial No: 634

Test I.D: D141844

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Relative Humidity	%	10 to 70	52	Pass
Probe Speed	m/s	6.59 to 6.83	6.77	Pass
Peak Deflection	mm	50 to 58	51	Pass
Peak Resistive Force w/in Deflection Corridor	N	3900 to 4400	4251	Pass
Internal Hysteresis	%	69 to 85	73	Pass
Peak Force 18 mm - 50 mm	N	<= 4600	4372	Pass
Overall Test Results				Pass


Laboratory Technician

05/13/2014

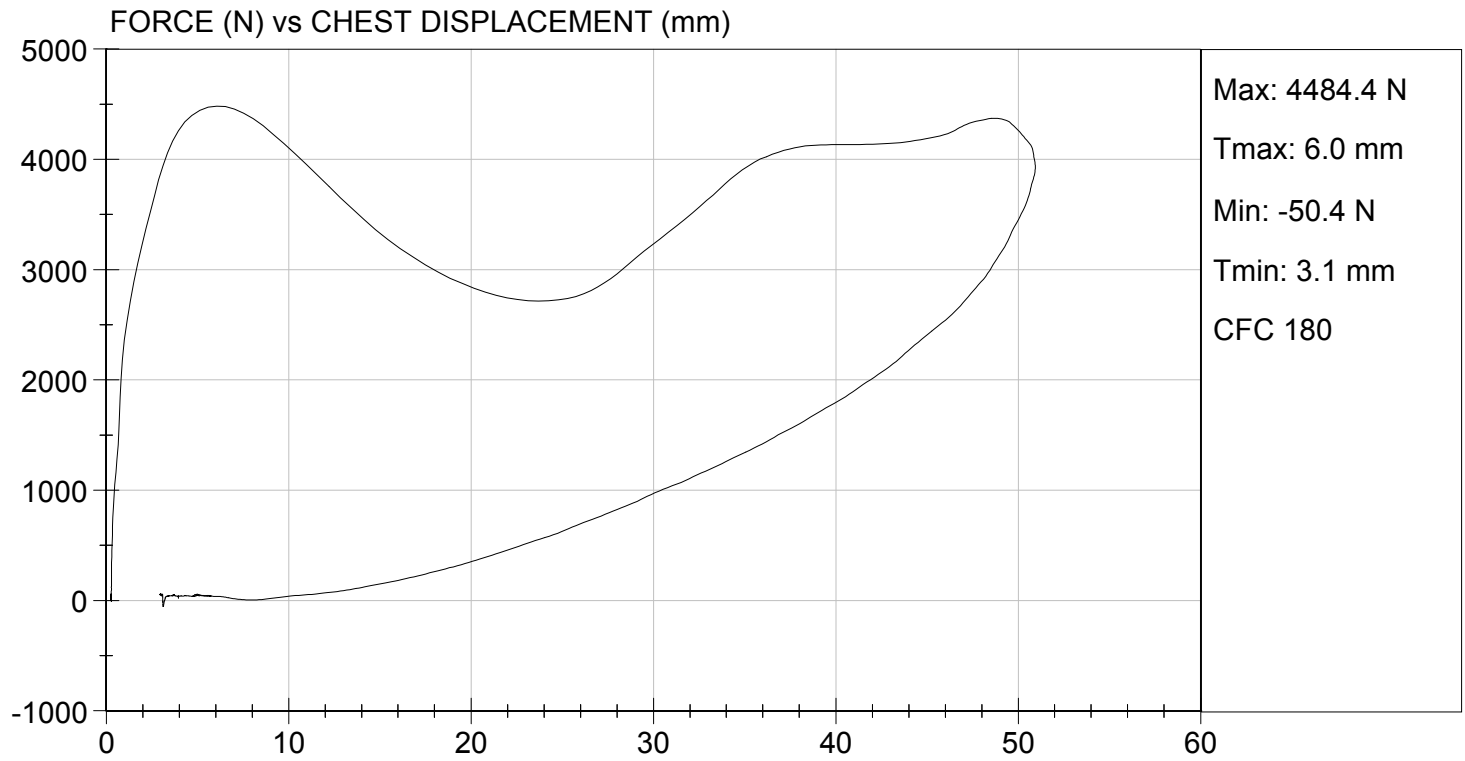
Test Date


Approved By



TEST DESC: THORAX IMPACT
VELOCITY: 22.22 ft/s, 6.77 m/s

TEST DATE: 05/13/2014
TEST #: D141844



MGA RESEARCH CORPORATION

RIGHT KNEE IMPACT TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634

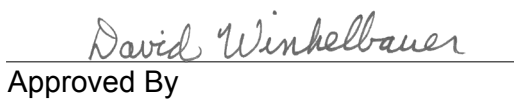
Test I.D: D141845

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	52	Pass
Probe Speed	m/s	2.07 to 2.13	2.13	Pass
Maximum Force	N	3450 to 4060	3778	Pass
Overall Test Results				Pass


Laboratory Technician

05/13/2014

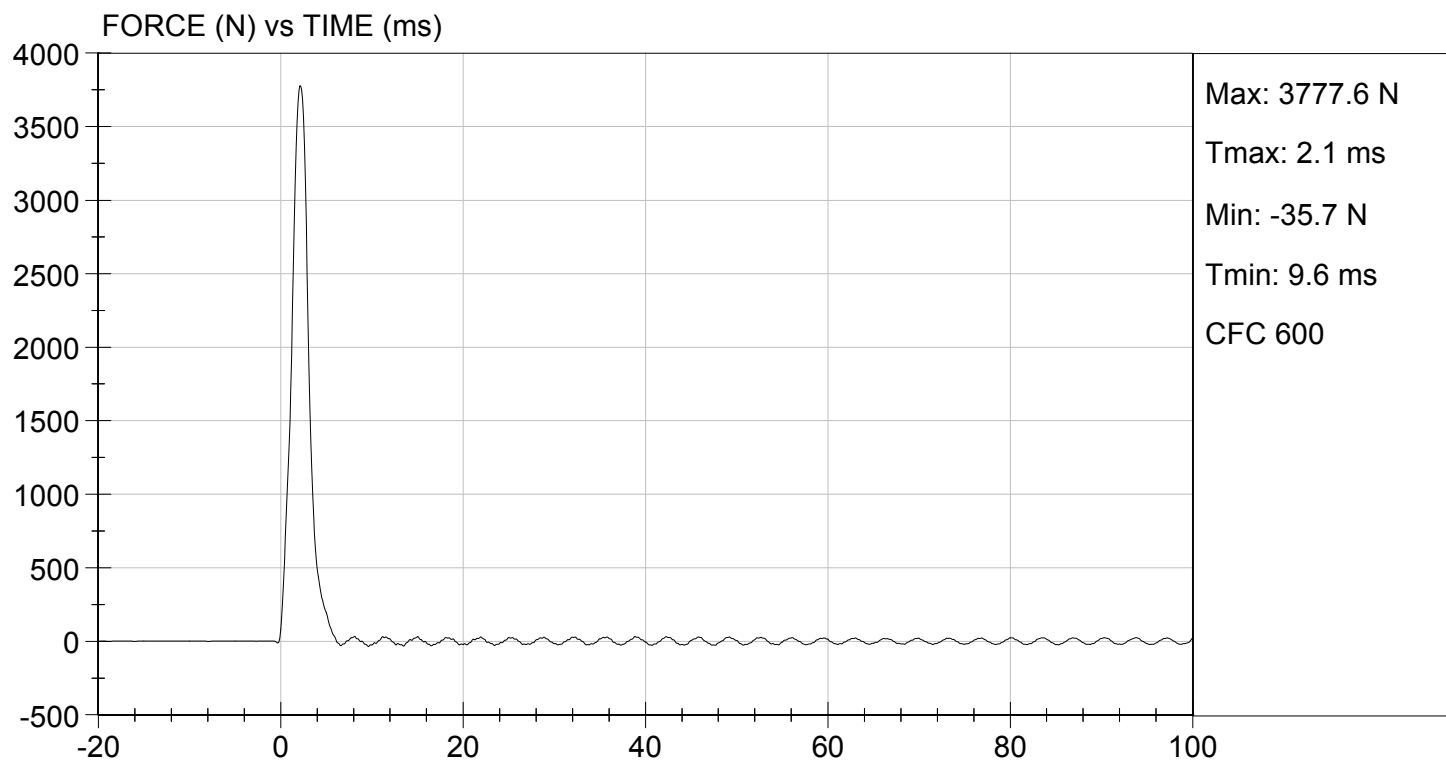
Test Date


Approved By



TEST DESC: RIGHT KNEE
VELOCITY: 7.00 ft/s, 2.13 m/s

TEST DATE: 05/13/2014
TEST #: D141845



MGA RESEARCH CORPORATION

**LEFT KNEE IMPACT TEST
HYBRID III 5TH PERCENTILE**

ATD Serial No: 634

Test I.D: D141846

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	52	Pass
Probe Speed	m/s	2.07 to 2.13	2.13	Pass
Maximum Force	N	3450 to 4060	3452	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

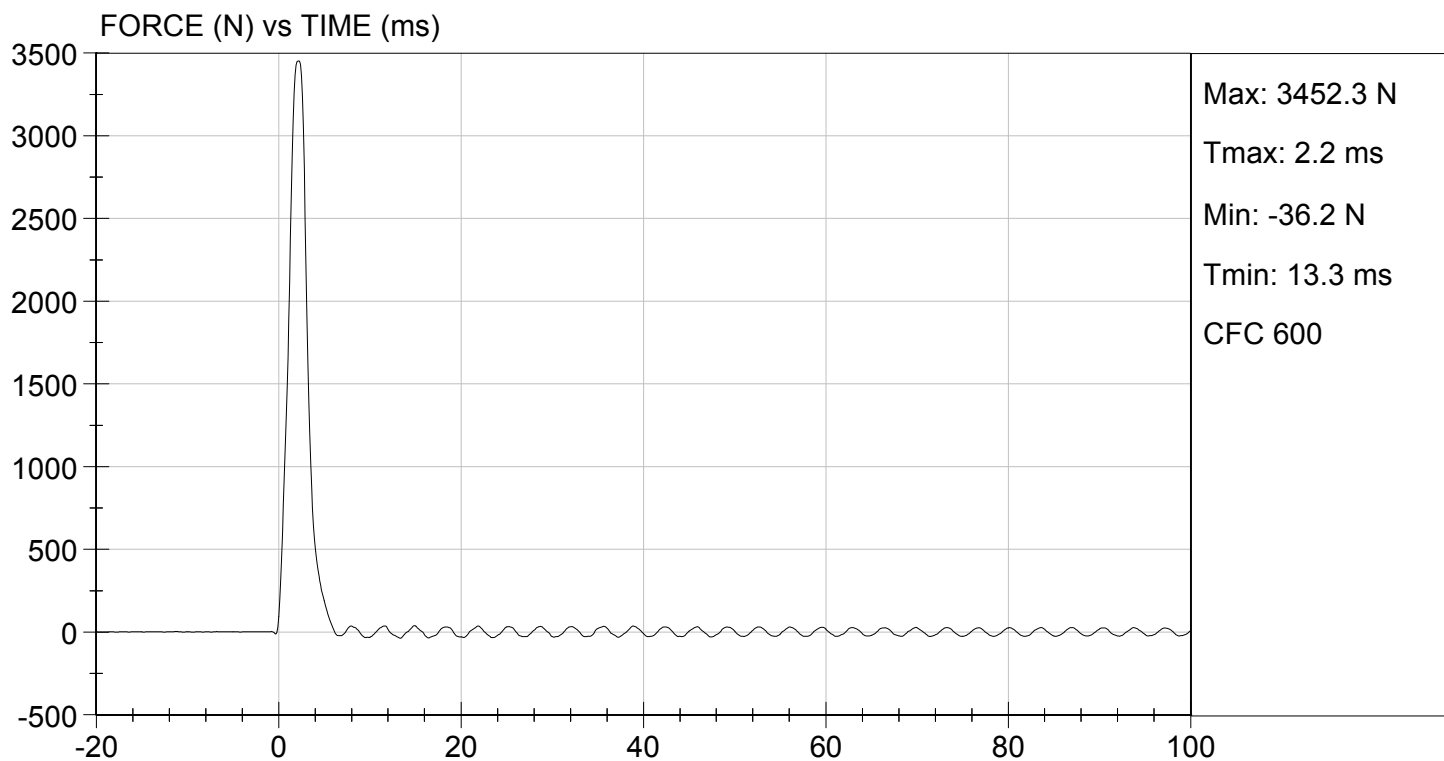
05/13/2014
Test Date

David Winkelbauer
Approved By



TEST DESC: LEFT KNEE
VELOCITY: 7.00 ft/s, 2.13 m/s

TEST DATE: 05/13/2014
TEST #: D141846



MGA RESEARCH CORPORATION

TORSO FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634

Test I.D: D141847

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	52	Pass
Initial Angle	deg	0 to 20	19	Pass
Return Angle	deg	+/- 8	5	Pass
Force at 45 deg	N	320 to 390	332	Pass
Upper Torso Deflection Rate	deg/s	0.5 to 1.5	0.9	Pass
Overall Result				Pass

Jessica Hall
Laboratory Technician

05/13/2014

Test Date

David Winkelbauer
Approved By