

REPORT NUMBER: NCAP-MGA-2015-035

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

**MITSUBISHI MOTORS (THAILAND) CO., LTD.
2015 Mitsubishi Mirage ES 5-Dr Hatchback
NHTSA No.: M20155600**

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




Test Date: December 1, 2014

Final Report Date: January 16, 2015

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: January 16, 2015

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. NCAP-MGA-2015-035	2. Government Accession No.	3. Recipient's Catalog No.																																																					
4. Title and Subtitle Final Report of New Car Assessment Program Frontal Impact Testing of a 2015 Mitsubishi Mirage ES 5-Dr Hatchback, NHTSA No.: M20155600		5. Report Date January 16, 2015																																																					
		6. Performing Organization Code MGA																																																					
7. Author(s) Donna Janovicz, Project Manager Ben Fischer, Project Engineer		8. Performing Organization Report No. NCAP-MGA-2015-035																																																					
		10. Work Unit No.																																																					
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105		11. Contract or Grant No. DTNH22-12-D-00258																																																					
		13. Type of Report and Period Covered Final Test Report December 1, 2014 to January 16, 2015																																																					
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards (NVS-111) 1200 New Jersey Ave, SE, Room W43-410 Washington, D.C. 20590		14. Sponsoring Agency Code NVS-111																																																					
		15. Supplementary Notes																																																					
16. Abstract A 56.3 km/h NCAP Frontal Impact Test was conducted on a 2015 Mitsubishi Mirage ES 5-Dr Hatchback 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 December 1, 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 20.8°C. The target vehicle post-test maximum crush was 445 located to the left of the vehicle's centerline. The test vehicle's performance was as follows:																																																							
<table border="1" style="width: 100%; border-collapse: collapse;"> <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 style="background-color: yellow;">362</td> <td>700</td> <td style="background-color: yellow;">307</td> </tr> <tr> <td>Maximum Chest</td> <td>mm</td> <td>63</td> <td style="background-color: yellow;">24</td> <td>52</td> <td style="background-color: yellow;">10</td> </tr> <tr> <td>Nij</td> <td>N/A</td> <td>1</td> <td style="background-color: yellow;">0.40</td> <td>1</td> <td style="background-color: yellow;">0.43</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>4170</td> <td style="background-color: yellow;">1937</td> <td>2620</td> <td style="background-color: yellow;">908</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>4000</td> <td style="background-color: yellow;">303</td> <td>2520</td> <td style="background-color: yellow;">904</td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>10008</td> <td style="background-color: yellow;">1293</td> <td>6805</td> <td style="background-color: yellow;">1323</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>10008</td> <td style="background-color: yellow;">2018</td> <td>6805</td> <td style="background-color: yellow;">691</td> </tr> </tbody> </table>				Measurement Description	Units	Driver ATD		Passenger ATD		Threshold	Result	Threshold	Result	Head Injury Criteria (HIC ₁₅)	N/A	700	362	700	307	Maximum Chest	mm	63	24	52	10	Nij	N/A	1	0.40	1	0.43	Neck Tension	N	4170	1937	2620	908	Neck Compression	N	4000	303	2520	904	Left Femur Force	N	10008	1293	6805	1323	Right Femur Force	N	10008	2018	6805	691
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19. Security Classification of Report Unclassified	20. Security Classification of Page Unclassified	21. No. of Pages 170	22. Price																																																				

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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 Mitsubishi Mirage ES 5-Dr Hatchback at a velocity of 56.4 km/h. The test was performed at MGA Research Corporation on December 1, 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 and lap belts and the passenger's shoulder and lap belts to measure dummy torso and pelvic section 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 100 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 445 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 and headliner. The driver's knees contacted the knee airbag. 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 and headliner. The passenger's knees contacted the frontal airbag and glovebox.

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)	362	0.40	1937	303	49	24	1293	2018
Passenger (5 th)	307	0.43	908	904	41	10	1323	691

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

TEST NOTES

Barrier K-16 MY has no valid data collected.
Barrier I-05 MY has questionable data.

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 Mitsubishi Mirage ES 5-Dr Hatchback
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155600
 Test Date: 12/1/2014

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20155600	Traction Control System (TCS)	Yes
Model Year	2015	Power Steering	Yes
Make	Mitsubishi	Power Window Auto-Reverse	Yes
Model	Mirage	Driver Frontal Airbag	Yes
Body Style	5-Dr Hatchback	Driver Curtain Airbag	Yes
VIN	ML32A4HJ7FH003355	Driver Head/Torso Airbag	No
Body Color	Thunder Gray	Driver Torso Airbag	No
Odometer (km/mi)	88 / 55	Driver Torso/Pelvis Airbag	Yes
Engine Displacement (L)	1.2	Driver Pelvis Airbag	No
Type/No. Cylinders	3	Driver Knee Airbag	Yes
Engine Placement	Lateral	Front Pass. Frontal Airbag	Yes
Transmission Type	Automatic	Front Pass. Curtain Airbag	Yes
Transmission Speeds	CVT	Front Pass. Head/Torso Airbag	No
Overdrive	Yes	Front Pass. Torso Airbag	No
Final Drive	Front	Front Pass. Torso/Pelvis Airbag	Yes
Roof Rack	No	Front Pass. Pelvis Airbag	No
Sunroof/T-Top	No	Front Pass. Knee Airbag	No
Running Boards	No	Driver Pretensioner	Yes
Tilt Steering Wheel	Yes	Driver Load Limiter	Yes
Power Seats	No	Front Pass. Pretensioner	Yes
Anti-Lock Brakes (ABS)	Yes	Front Pass. Load Limiter	Yes
Automatic Door Locks (ADLs)	No	Other	N/A

Does owner's manual provide instructions to turn off automatic door locks?	N/A
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DATA FROM CERTIFICATION LABEL

Manufactured By	Mitsubishi Motors (Thailand) Co., Ltd.	GVWR (kg)	1370
		GAWR Front (kg)	730
Date of Manufacture	JUN 2014	GAWR Rear (kg)	670

VEHICLE SEATING AND WEIGHT CAPACITY DATA

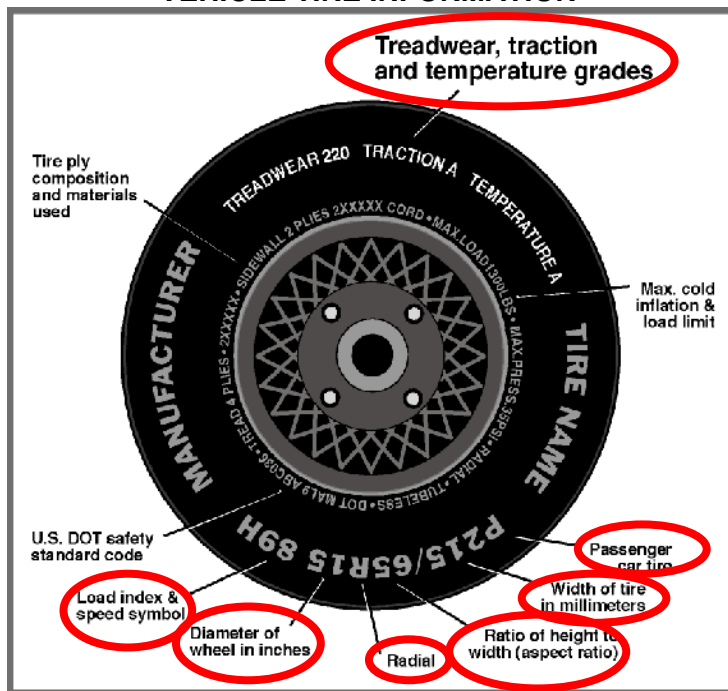
Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench		
Designated Seating Capacity (DSC)	2	3		5
Capacity Weight (VCW) (kg)				375
Cargo Weight (RCLW) (kg)				35

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

Test Vehicle: 2015 Mitsubishi Mirage ES 5-Dr Hatchback
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155600
 Test Date: 12/1/2014

VEHICLE TIRE INFORMATION



Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	240	240
Recommended Tire Size	165/65R14	165/65R14
Tire Size on Vehicle	165/65R14	165/65R14
Tire Manufacturer	Dunlop	Dunlop
Tire Model	Enasave 01 A/S	Enasave 01 A/S
Treadwear	340	340
Traction	A	A
Temperature Grade	B	B
Tire Plies Sidewall	1 Polyester	1 Polyester
Tire Plies Body	1 Polyester, 2 Steel, 1 Nylon	1 Polyester, 2 Steel, 1 Nylon
Load Index/Speed Symbol	79S	79S
Tire Material	Rubber	Rubber
DOT Safety Code Left	RL8X 2MMR 2114	RL8X 2MMR 2014
DOT Safety Code Right	RL8X 2MMR 2014	RL8X 2MMR 2014

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

Test Vehicle: 2015 Mitsubishi Mirage ES 5-Dr Hatchback
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155600
Test Date: 12/1/2014

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	292.0	191.0		328.0	244.5	
Right	kg	284.5	177.5		315.0	227.0	
Ratio	%	61.0	39.0		57.7	42.3	
Totals	kg	576.5	368.5	945.0	643.0	471.5	1114.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	945.0
Weight of 1 P572E ATD & 1 P572O ATD	kg	140.6
Rated Cargo/Luggage Weight (RCLW)	kg	35
Calculated Test Vehicle Target Weight (TVTW)	kg	1120.6

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	627	638	632	622	955
As Tested	mm	612	626	585	596	1036
Post Test	mm	558	566	571	585	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2450
Total Vehicle Length at Left Side	mm	3544
Total Vehicle Length at Centerline	mm	3663
Total Vehicle Length at Right Side	mm	3544
Weight of Ballast in Cargo Area	kg	0.0
Weight of Vehicle Components Removed	kg	62.2
Amount of Stoddard Solvent in Fuel Tank	L	32.2

List of components removed to meet test weight: Right rear door panel, left and right rear seats, left and right side mirrors, rear speaker, left taillight, right rear window glass/motor/track, rear wiper motor, rear bumper/cover.

List of components removed for instrumentation, data box, and equipment installation: Cargo carpet/cover, rear floor mats, jack & tools, right taillight, spare tire/cover, rear sill trim/cargo side trims.

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

Test Vehicle: 2015 Mitsubishi Mirage ES 5-Dr Hatchback
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155600
 Test Date: 12/1/2014

TARGET VEHICLE STRUCTURAL MEASUREMENT

	Elements	Pre-Test (mm)
1	Total Length	3663
2	Total Width	1646
3	Bumper Top Height	550
4	Bumper Bottom Height	420
5	Longitudinal Member Top Height	535
6	Distance between Longitudinal Members	840
7	Longitudinal Member Width	60
8	Engine Top Height	770
9	Engine Bottom Height	192
10	Engine and Gearbox Width	660
11	Front Bumper-Engine Distance	391
12	Front Shock Absorber Fixing Height	800
13	Bonnet Leading Edge Height	790
14	Front Shock Absorber Fixing Width	1090
15	Front Bumper – Front Axle Distance	737
16	Front Axle – A-Pillar Distance	410
17	A-Pillar – B-Pillar Distance	1070
18	B-Pillar – Rear Axle Distance	970
19	B-Pillar – C-Pillar Distance	976
20	Roof Sill Bottom Height	1450
21	Roof Sill Top Height	1465
22	Floor Sill Bottom Height	240
23	Floor Sill Top Height	322

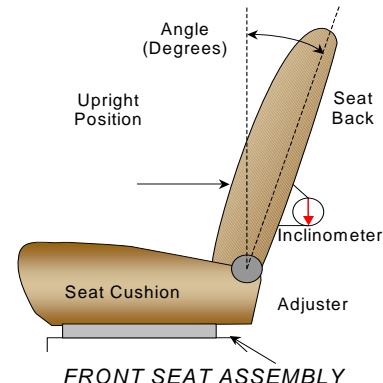
DATA SHEET NO. 2
SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

Test Vehicle: 2015 Mitsubishi Mirage ES 5-Dr Hatchback
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155600
 Test Date: 12/1/2014

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	0.5° on headrest post
Passenger Seat Back Angle	5.8° on headrest post

SEAT FORE/AFT POSITIONS

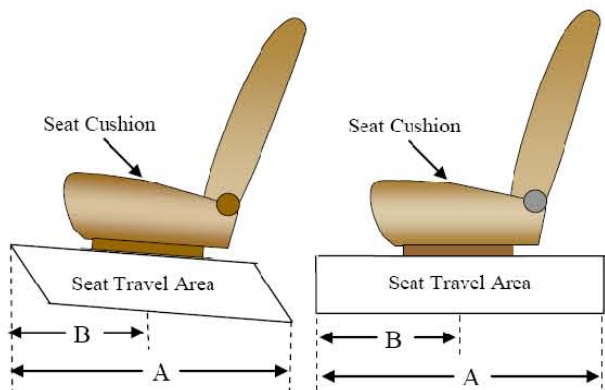
The driver and passenger seat fore/aft positions are adjusted following Appendix F, "Driver & Passenger Dummy Seating & Positioning Procedures" in the NCAP Test Procedure dated August 2013.

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	230 mm / 24 detents	120 mm / 12 th detent (1 st as 0)
Passenger Seat	230 mm / 24 detents	0 mm / 0 th detent (1 st 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	4 (1 st as 1)	0 (1 st as 0)
Passenger Seat	4 (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 Mitsubishi Mirage ES 5-Dr Hatchback
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155600
 Test Date: 12/1/2014

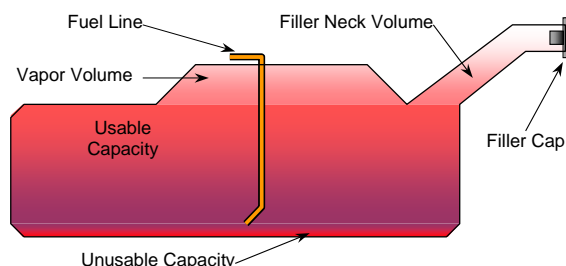
FUEL TANK CAPACITY DATA

	Liters
Usable Capacity of "Standard Tank"	34.8
Usable Capacity of "Optional Tank"	
92-94% of Usable Capacity	32.0 to 32.7
Actual Amount of Solvent used	32.2
1/3 of Usable Capacity	11.6

FUEL PUMP

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

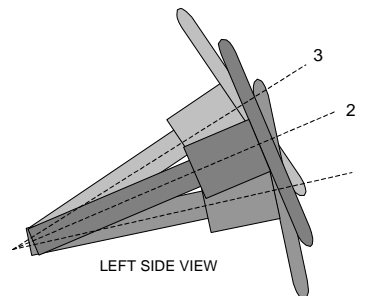
The vehicle is equipped with an electric fuel pump.
The electric fuel pump operates when the engine is running.
The fuel pipe is on the left side.



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

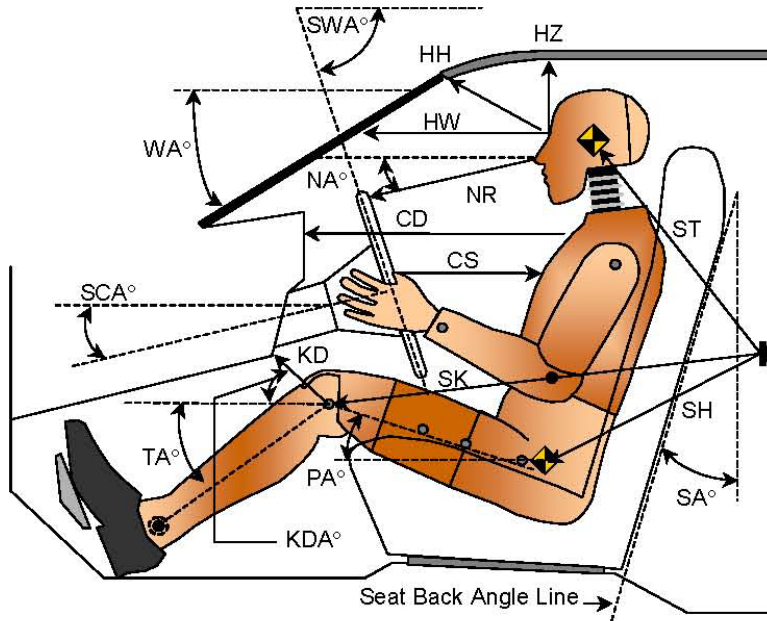
STEERING COLUMN POSITION

	Degrees	Fore/Aft Position (mm)
Lowermost Position 1	67.9	
Geometric Center Position 2	66.3	
Uppermost Position 3	64.6	
Telescoping Steering Wheel Travel		
Test Position	66.3	

**DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS**

Test Vehicle: 2015 Mitsubishi Mirage ES 5-Dr Hatchback
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155600
 Test Date: 12/1/2014



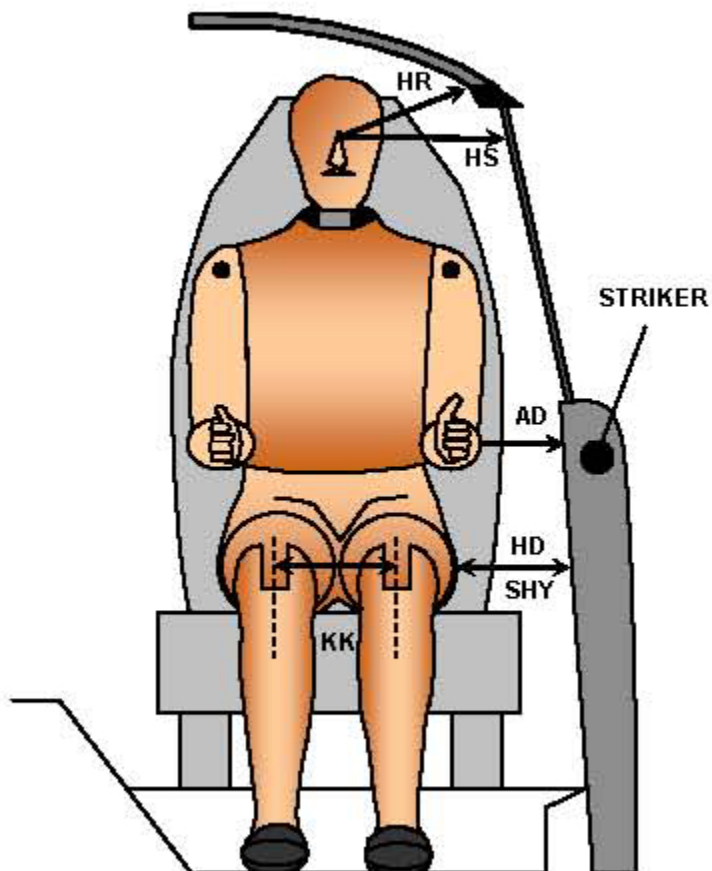
LEFT SIDE VIEW

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		23.0		
SWA°	Steering Wheel Angle		66.3		
SCA°	Steering Column Angle		23.7		
SA°	Seat Back Angle (on headrest post)		0.5		5.8
HZ	Head to Roof (Z)	178	90.0	278	90.0
HH	Head to Header	326	19.5	345	40.6
HW	Head to Windshield	569	0.0	710	0.0
NR	Nose to Rim	372	18.1		
CD	Chest to Dash	507		425	
CS	Chest to Steering Hub	298	6.3		
RA	Rim to Abdomen	187	0.0		
KDL	Left Knee to Dash	173	21.5	107	32.4
KDR	Right Knee to Dash	178	22.2	120	28.8
PA°	Pelvic Angle		24.3		20.0
TA°	Tibia Angle		55.2		49.8
SK	Striker to Knee	569	92.0	631	97.2
ST	Striker to Head	490	14.9	426	25.8
SH	Striker to H-Point	261	129.4	320	113.4

**DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS**

Test Vehicle: 2015 Mitsubishi Mirage ES 5-Dr Hatchback
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155600
 Test Date: 12/1/2014



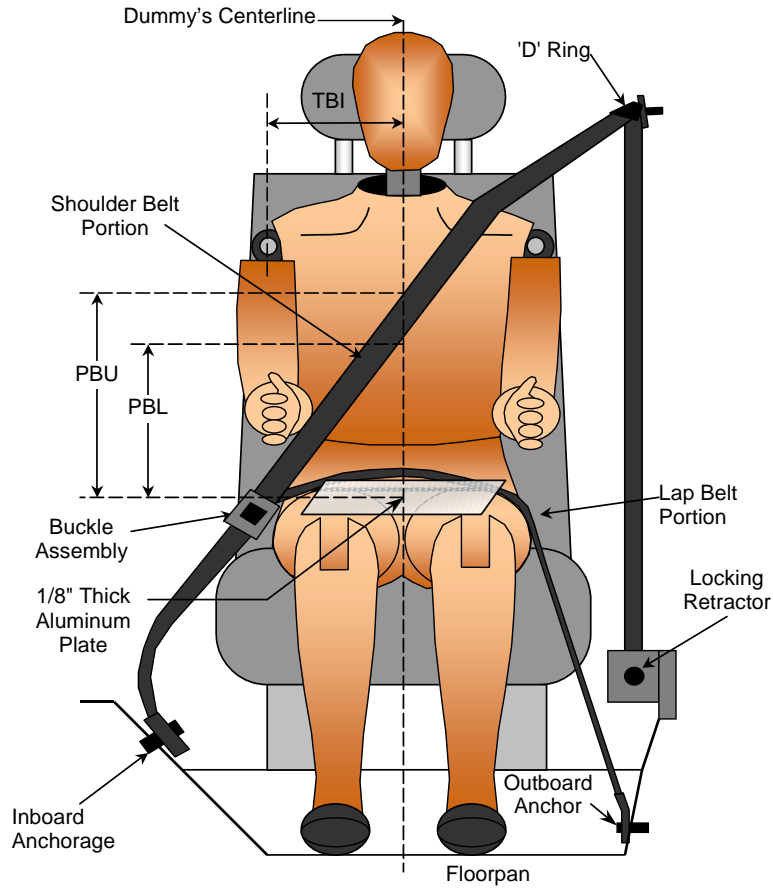
FRONT VIEW OF DUMMY

Code	Measurement Description	Driver	Passenger
		Length (mm)	
AD	Arm to Door	123	89
HD	H-Point to Door	129	147
HR	Head to Side Header	224	286
HS	Head to Side Window	332	370
KK	Knee to Knee	351	225
SHY	Striker to H-Point (Y Direction)	262	313
AA	Ankle to Ankle	342	173

**DATA SHEET NO. 5
SEAT BELT POSITIONING DATA**

Test Vehicle: 2015 Mitsubishi Mirage ES 5-Dr Hatchback
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155600
 Test Date: 12/1/2014



FRONT VIEW OF DUMMY

SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU - Top surface of reference to belt upper edge	mm	345	320
PBL - Top surface of reference to belt lower edge	mm	270	230

BELT LENGTH DATA

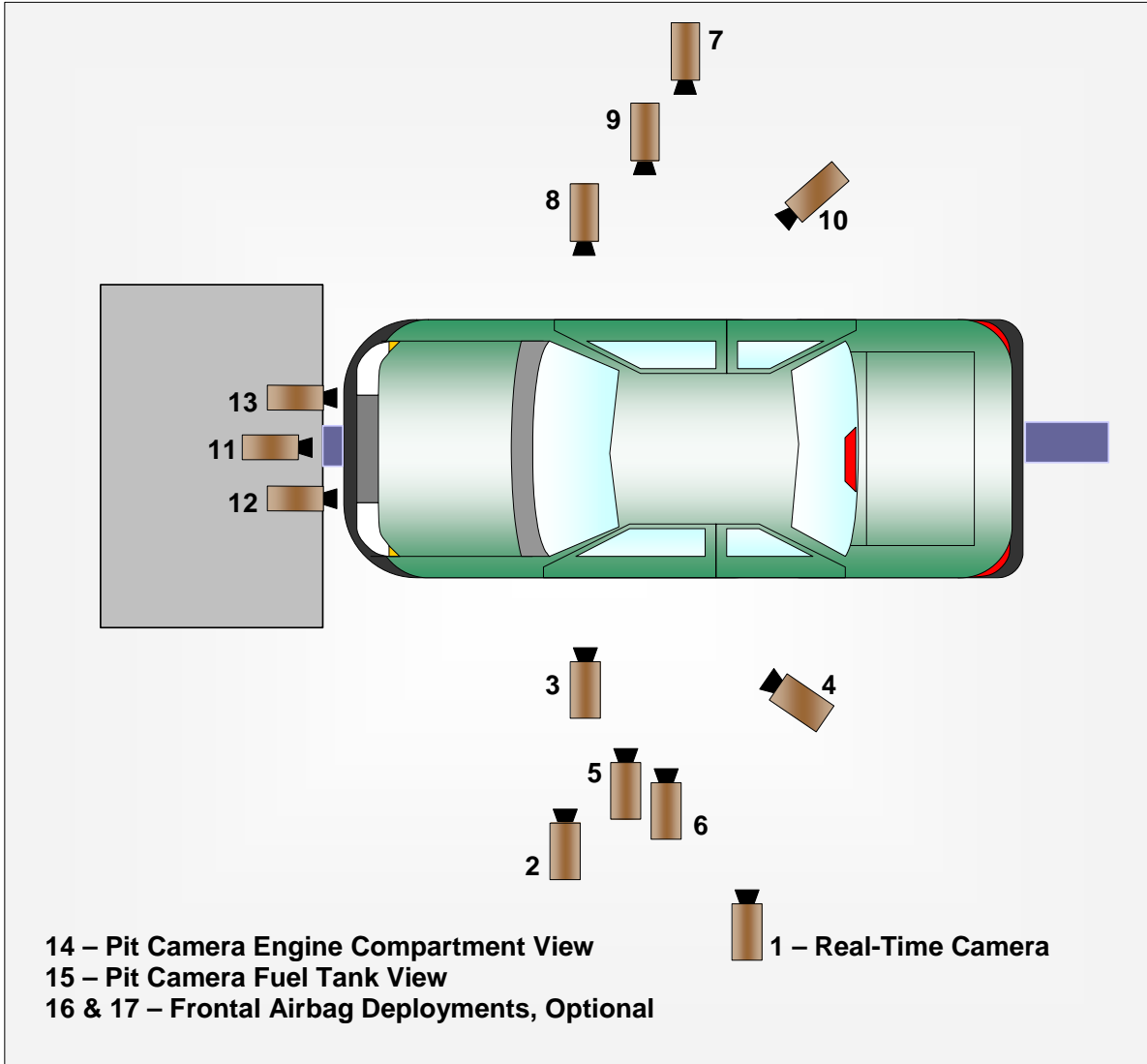
Measurement Description	Units	Driver	Passenger
Shoulder Belt Length as measured on ATD	mm	935	920
Lap Belt Length as measured on ATD	mm	865	830
Remainder of belt on reel	mm	1500	1770
Total Belt Length for Continuous Webbing Systems	mm	3300	3520

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

Test Vehicle: 2015 Mitsubishi Mirage ES 5-Dr Hatchback
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155600
Test Date: 12/1/2014

CAMERA POSITIONS FOR FRONTAL IMPACTS



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

Test Vehicle: 2015 Mitsubishi Mirage ES 5-Dr Hatchback
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155600
 Test Date: 12/1/2014

CAMERA LOCATIONS

No.	Camera View	Coordinates (mm)			Lens (mm)	Speed (fps)
		X*	Y*	Z*		
1	Real-Time Left Overall					30
2	Driver Close-Up	1080	-6250	-1900	35	1000
3	Left Front Half	860	-4880	-1310	24	1000
4	Left Angle	5570	-5020	-1950	50	1000
5	Steering Column - Top					
6	Steering Column - Bottom					
7	Right Overall	1840	5920	-1290	20	1000
8	Passenger Close-Up	1250	6420	-1910	35	1000
9	Right Front Half	880	4820	-1320	24	1000
10	Right Angle	5480	5050	-1950	50	1000
11	Windshield	-430	0	-2810	20	1000
12	Driver Windshield	40	-450	-2030	8.5	1000
13	Passenger Windshield	40	450	-2030	8.5	1000
14	Pit Front	1050	0	3150	24	1000
15	Pit Rear	2570	0	3150	24	1000
16	Onboard Driver Side				12	1000
17	Onboard Passenger Side				12	1000
18	Real-Time Pan View					30

***COORDINATES:**

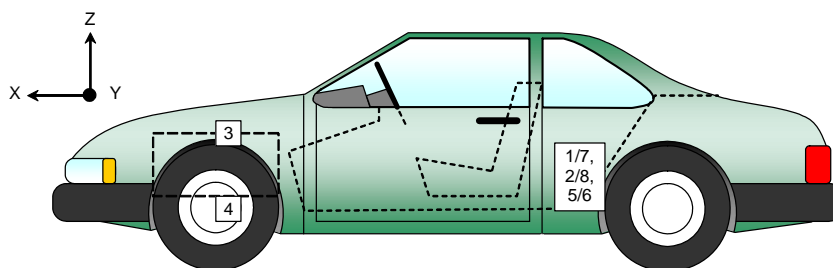
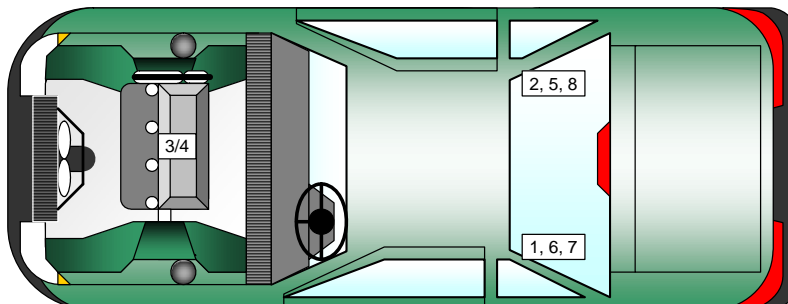
- +X = forward of impact plane
- +Y = right of monorail centerline
- +Z = below ground level

Cameras 5 & 6 were not used for this test.

**DATA SHEET NO. 7
VEHICLE ACCELEROMETER LOCATIONS**

Test Vehicle: 2015 Mitsubishi Mirage ES 5-Dr Hatchback
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155600
 Test Date: 12/1/2014



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Crossmember Accelerometer – X Direction	1268	-405	-260
2	Right Rear Crossmember Accelerometer – X Direction	1268	405	-260
3	Engine Top X	3015	168	-777
4	Engine Bottom X	3054	98	-187
5	Left Rear Crossmember Accelerometer – Z Direction	1268	-405	-260
6	Right Rear Crossmember Accelerometer – Z Direction	1268	405	-260
7	Left Rear Crossmember Accelerometer Redundant – X Direction	1268	-405	-260
8	Right Rear Crossmember Accelerometer Redundant – X Direction	1268	405	-260

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

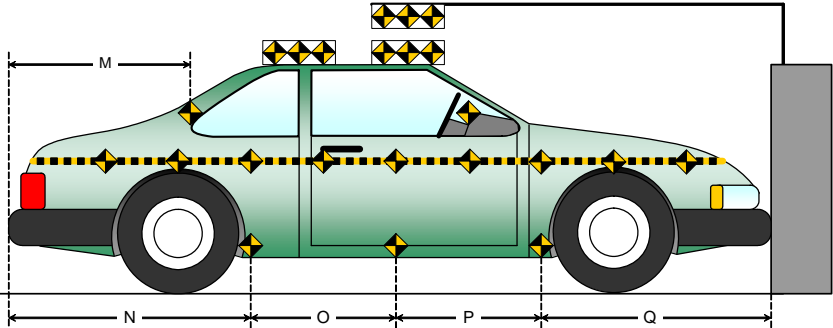
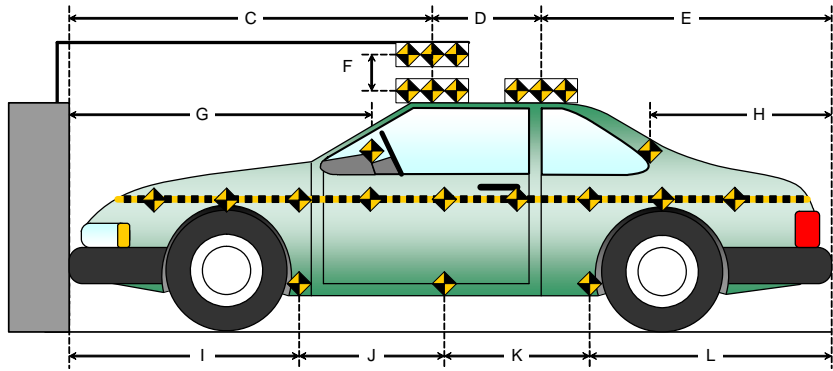
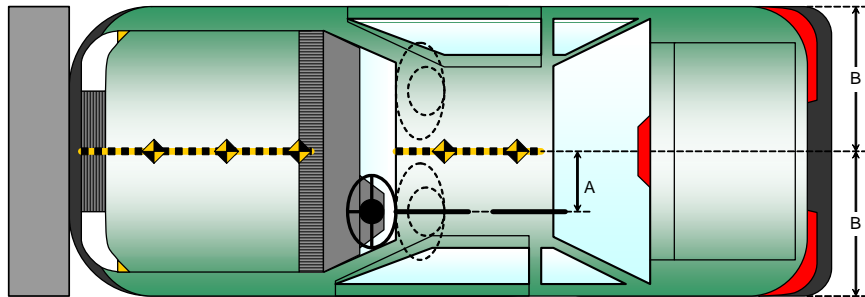
DATA SHEET NO. 8

PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2015 Mitsubishi Mirage ES 5-Dr Hatchback
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155600
 Test Date: 12/1/2014

Item	Value (mm)
A	310
B	823
C	1990
D	607
E	1066
F	15
G	
H	470
I	1147
J	833
K	833
L	850
M	470
N	850
O	833
P	833
Q	1147



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

Test Vehicle: 2015 Mitsubishi Mirage ES 5-Dr Hatchback
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155600
 Test Date: 12/1/2014

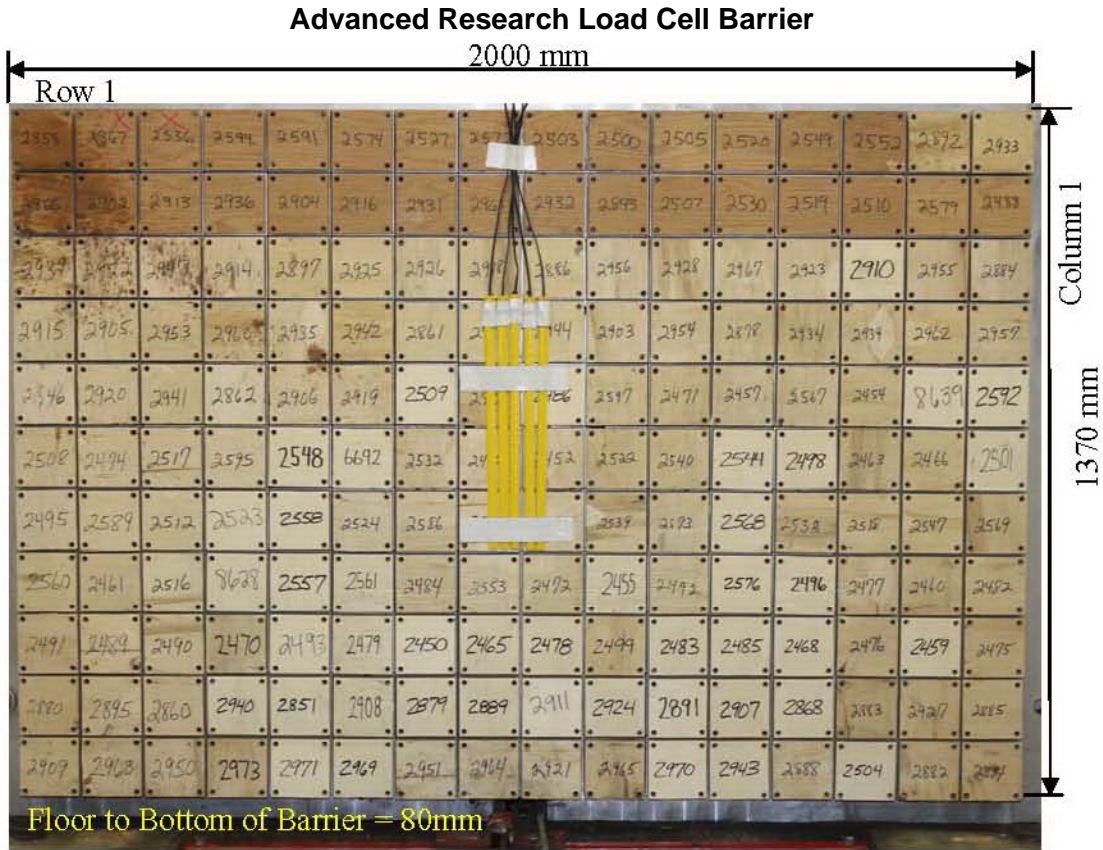


Photo for Reference Only

								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 Mitsubishi Mirage ES 5-Dr Hatchback
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155600
Test Date: 12/1/2014

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	2
High-Speed Offboard	12
Real-Time	2
Total	16

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

Test Vehicle: 2015 Mitsubishi Mirage ES 5-Dr Hatchback
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155600
 Test Date: 12/1/2014

TEST DUMMY INFORMATION AND CONTACT LOCATIONS

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

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Locked/Unlocked Doors	Doors were unlocked	Doors were unlocked
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	1015
Center	mm	1000
Right Side	mm	1045
Average	mm	1020

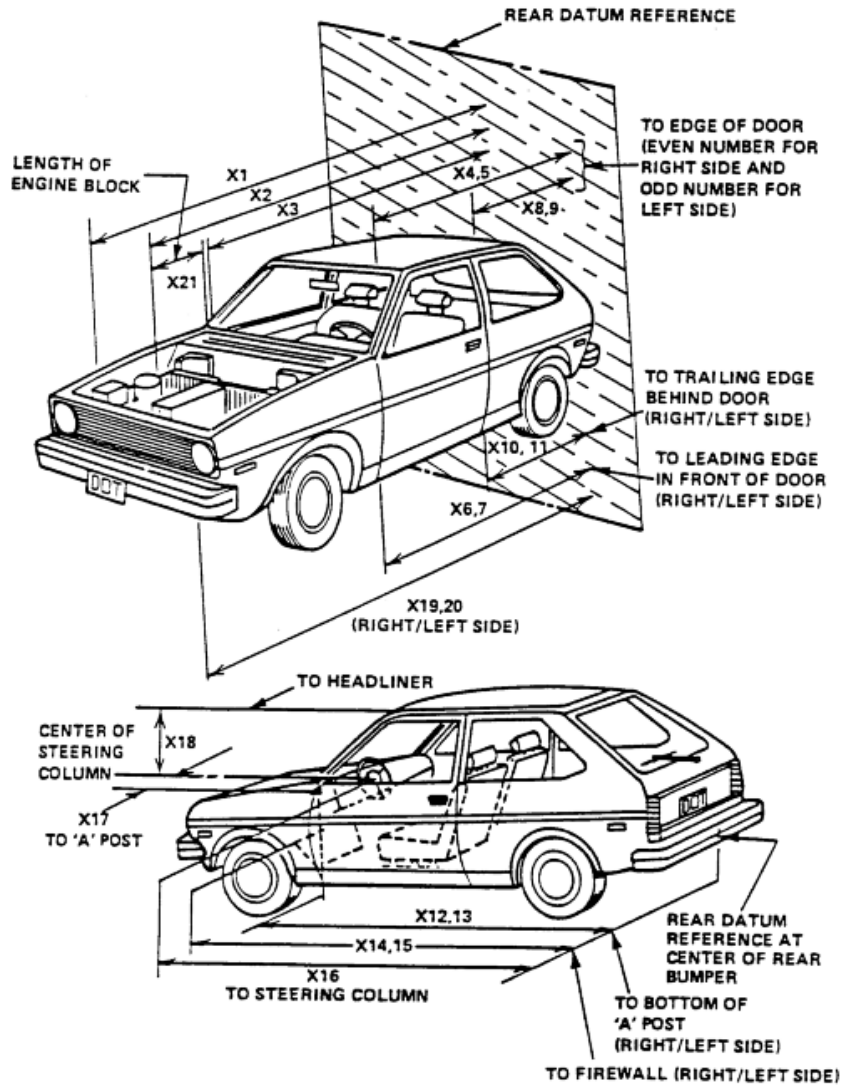
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

DATA SHEET NO. 12 VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2015 Mitsubishi Mirage ES 5-Dr Hatchback
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155600
 Test Date: 12/1/2014



**DATA SHEET NO. 12 (CONTINUED)
VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2015 Mitsubishi Mirage ES 5-Dr Hatchback
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155600
Test Date: 12/1/2014

RSOV (Rear Surface of Vehicle)

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	mm	3663	3237	426
2	RSOV to Front of Engine	mm	3226	2995	231
3	RSOV to Firewall	mm	2871	2788	83
4	RSOV to Upper Leading Edge of Right Door	mm	2477	2477	0
5	RSOV to Upper Leading Edge of Left Door	mm	2477	2477	0
6	RSOV to Lower Leading Edge of Right Door	mm	2440	2440	0
7	RSOV to Lower Leading Edge of Left Door	mm	2440	2440	0
8	RSOV to Upper Trailing Edge of Right Door	mm	1400	1400	0
9	RSOV to Upper Trailing Edge of Left Door	mm	1400	1400	0
10	RSOV to Lower Trailing Edge of Right Door	mm	1430	1430	0
11	RSOV to Lower Trailing Edge of Left Door	mm	1430	1430	0
12	RSOV to Bottom of "A" Post of Right Side	mm	2447	2444	3
13	RSOV to Bottom of "A" Post of Left Side	mm	2447	2443	4
14	RSOV to Firewall, Right Side	mm	2808	2806	2
15	RSOV to Firewall, Left Side	mm	2808	2798	10
16	RSOV to Steering Column	mm	2020	2052	-32
17	Center of Steering Column to "A" Post	mm	407	401	6
18	Center of Steering Column to Headliner	mm	414	420	-6
19	RSOV to Right Side of Front Bumper	mm	3544	3216	328
20	RSOV to Left Side of Front Bumper	mm	3544	3178	366
21	Length of Engine Block	mm	376	376	0
RD	RSOV to Right Side of Dash Panel	mm	2300	2298	2
CD	RSOV to Center of Dash Panel	mm	2364	2367	-3
LD	RSOV to Left Side of Dash Panel	mm	2307	2302	5

DATA SHEET NO. 13
ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2015 Mitsubishi Mirage ES 5-Dr Hatchback
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155600
Test Date: 12/1/2014

VEHICLE INFORMATION

VIN: ML32A4HJ7FH003355 Wheelbase (mm): 2450
Vehicle Size Category: Passenger Car Test Weight (kg): 1114.5

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): 61.1

Time of Separation (msec): 80.8

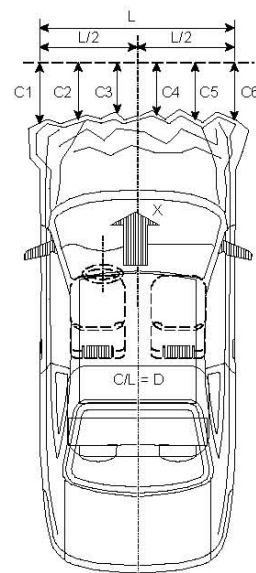
CRUSH PROFILE

Collision Deformation Classification: Frontal

Midpoint of Damage: Centerline

Damage Region Length (mm): 1040

Impact Mode: Frontal



No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	3544	3178	366
C2	Crush zone 2 at left side	mm	3594	3149	445
C3	Crush zone 3 at left side	mm	3612	3172	440
C4	Crush zone 4 at right side	mm	3612	3190	422
C5	Crush zone 5 at right side	mm	3594	3205	389
C6	Crush zone 6 at right side	mm	3544	3216	328
L	C1 TO C6	mm	1040	1026	14

**DATA SHEET NO. 14
VEHICLE INTRUSION MEASUREMENTS**

Test Vehicle: 2015 Mitsubishi Mirage ES 5-Dr Hatchback
 Test Program: NCAP Frontal Barrier Impact Test

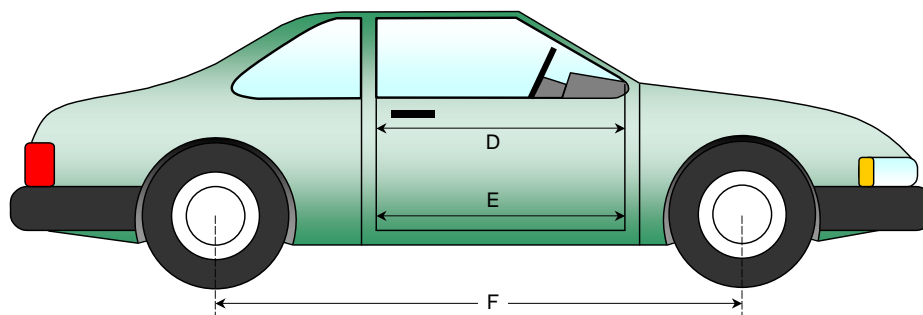
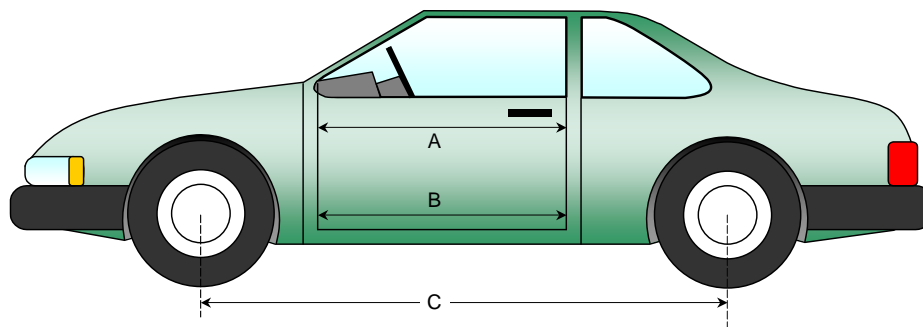
NHTSA No.: M20155600
 Test Date: 12/1/2014

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	1000	1000	0
B	Left Side Lower	mm	891	891	0
D	Right Side Upper	mm	1000	1000	0
E	Right Side Lower	mm	891	891	0

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2450	2415	35
F	Right Side Wheelbase	mm	2450	2405	45



DATA SHEET NO. 14 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

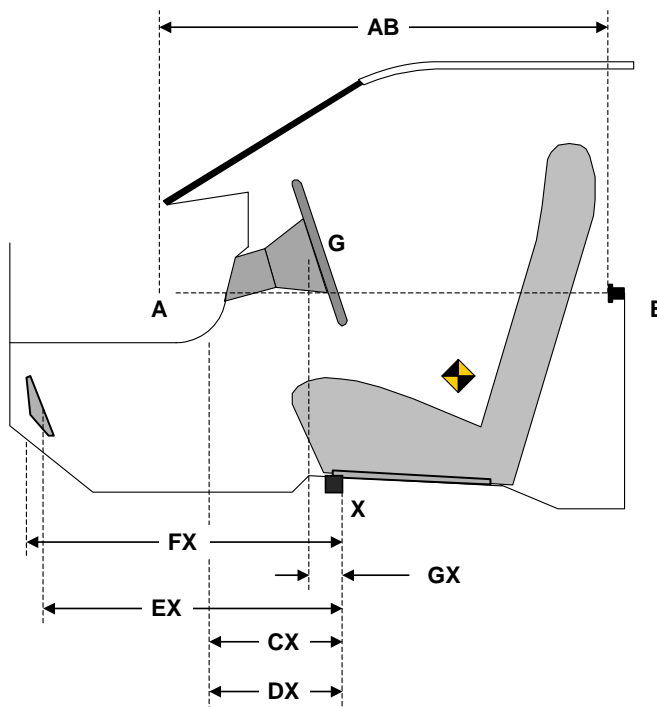
Test Vehicle: 2015 Mitsubishi Mirage ES 5-Dr Hatchback
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155600
 Test Date: 12/1/2014

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	833	833	0
CX	Left Knee Bolster to X	mm	238	260	-22
DX	Right Knee Bolster to X	mm	190	224	-34
EX	Brake Pedal to X	mm	499	442	57
FX	Foot Rest to X	mm	494	480	14
GX	Center of Steering Column Wheel Hub to X	mm	25	86	-61

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 Mitsubishi Mirage ES 5-Dr Hatchback
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155600
 Test Date: 12/1/2014

Windshield Mounting Details:

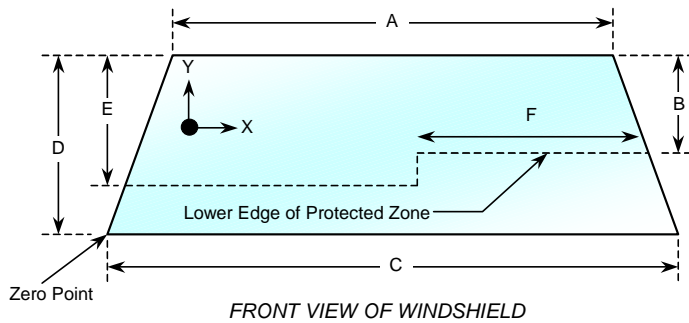
Windshield glass is secured to the vehicle frame with a rubber trim and glue.

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: 20.8° C.

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% of Retention
Left Side	2034	2034	100
Right Side	2034	2034	100
Total	4068	4068	100



Item	Units	Value
A	mm	1160
B	mm	522
C	mm	1220
D	mm	844
E	mm	494
F	mm	542

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: 2015 Mitsubishi Mirage ES 5-Dr Hatchback
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155600
Test Date: 12/1/2014

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 20.8°C Test Time: 12:07 p.m.

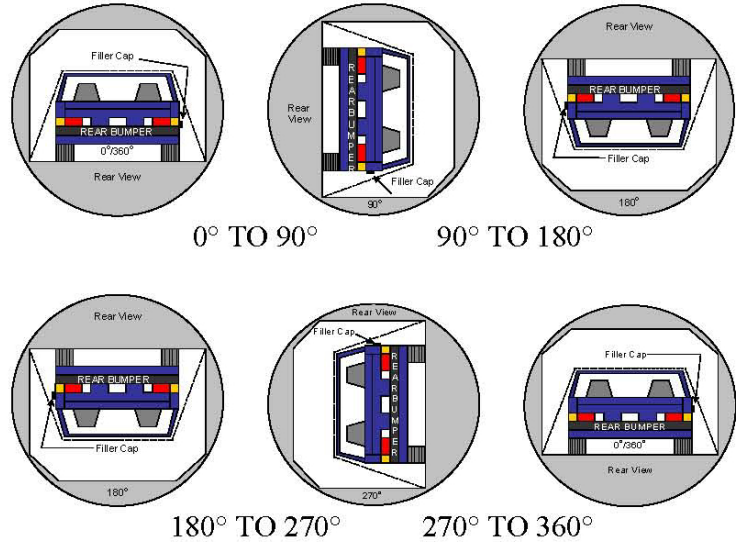
- A. From impact until vehicle motion ceases: 0 oz.
(Maximum allowable = 1 oz.)
- B. For the 5 minute period after motion ceases: 0 oz.
(Maximum allowable = 5 oz.)
- C. For the following 25 minutes: 0 oz.
(Maximum allowable = 1 oz./minute)
- D. Spillage: None

**DATA SHEET NO. 16
FMVSS 301 STATIC ROLLOVER RESULTS**

Test Vehicle: 2015 Mitsubishi Mirage ES 5-Dr Hatchback
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155600
 Test Date: 12/1/2014

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°	107	300	407
90° to 180°	110	300	410
180° to 270°	106	300	406
270° to 360°	110	300	410

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

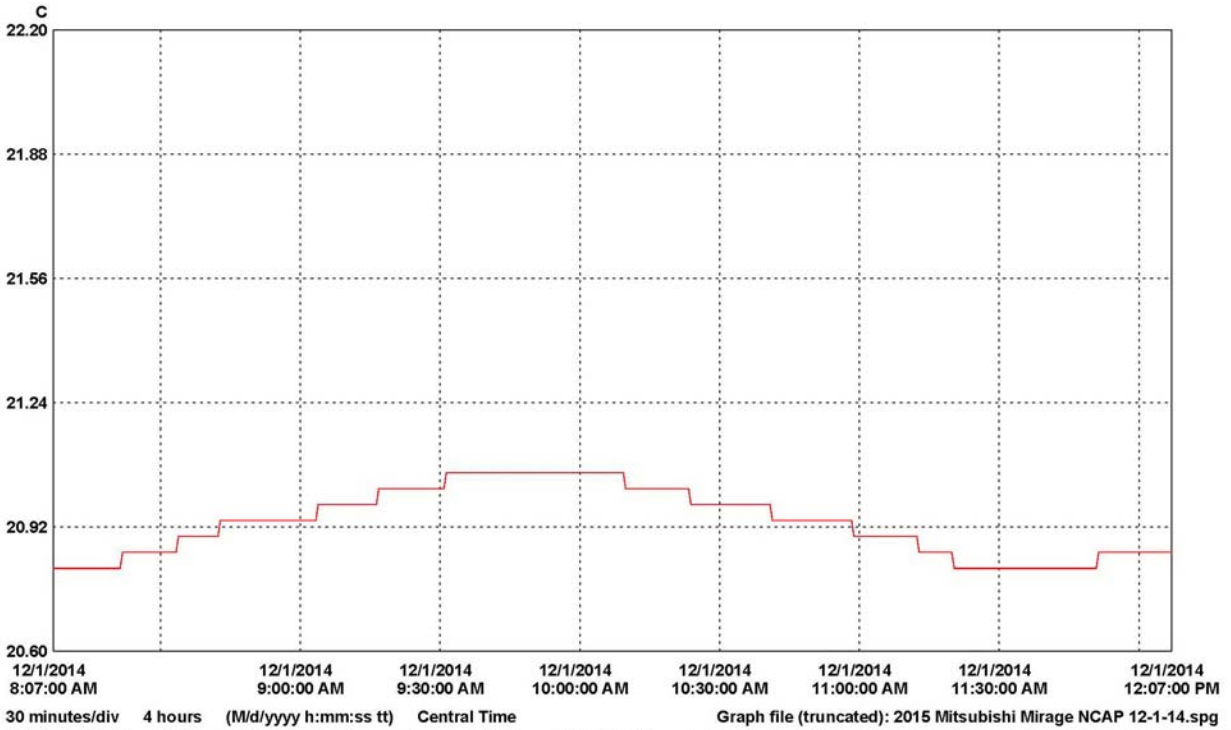
SOLVENT SPILLAGE LOCATION TABLE

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 Mitsubishi Mirage ES 5-Dr Hatchback
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155600
 Test Date: 12/1/2014



LN	Serial #	Description	CH	Value	Maximum	Average	Minimum	Units	CH description	Logger file
1	14182020	Crash1	1	21.06	20.93	20.81	C	Temperature	14182020_Crash1.spl	
LN	Logger file			ID #	Security	Created by	Creation time			
1	C:\Program Files (x86)\Veriteq Instruments\iVLog 4.4\Prep 2014\14182020_Crash1.spl									

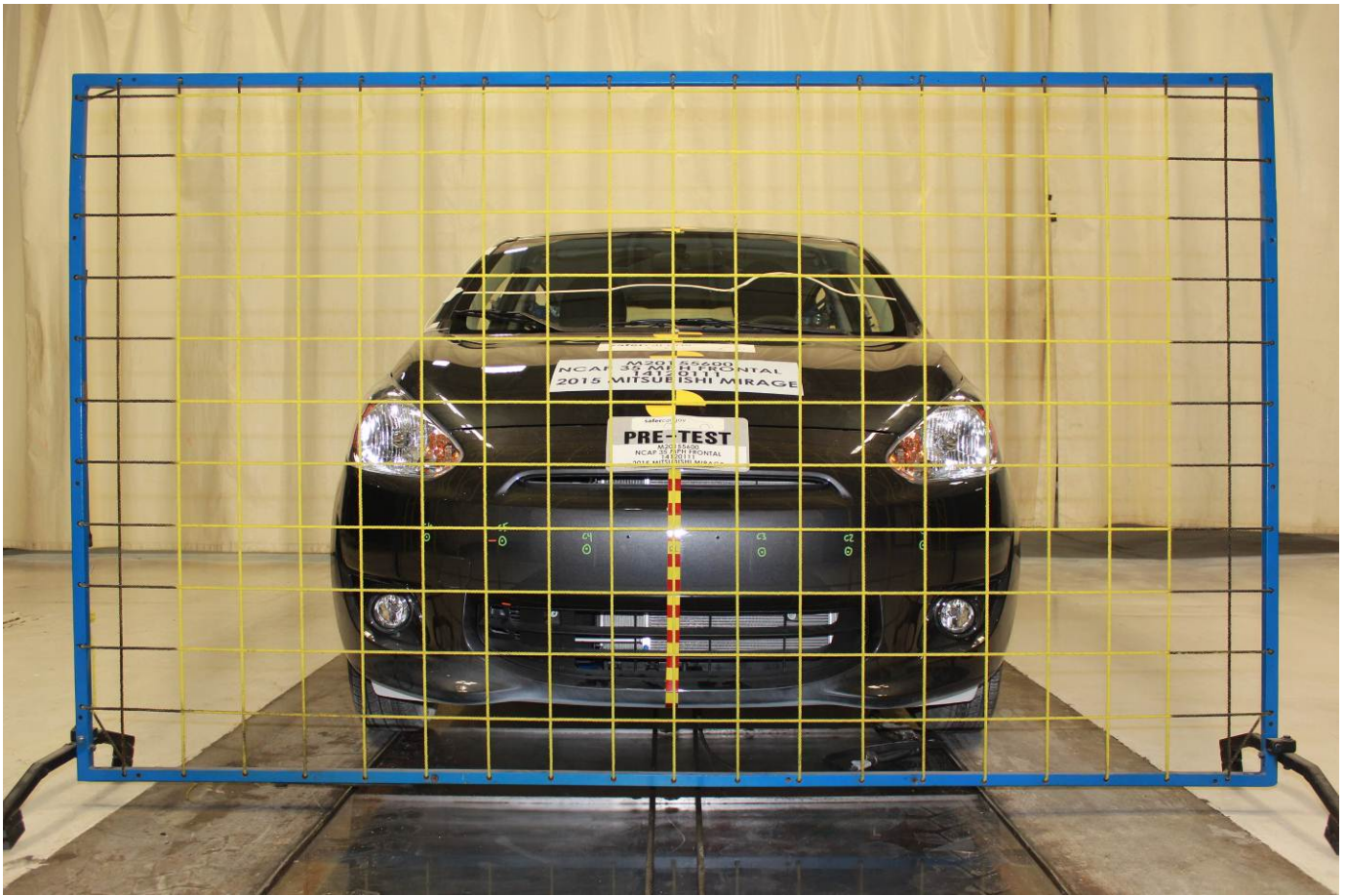
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PHOTOGRAPHS**

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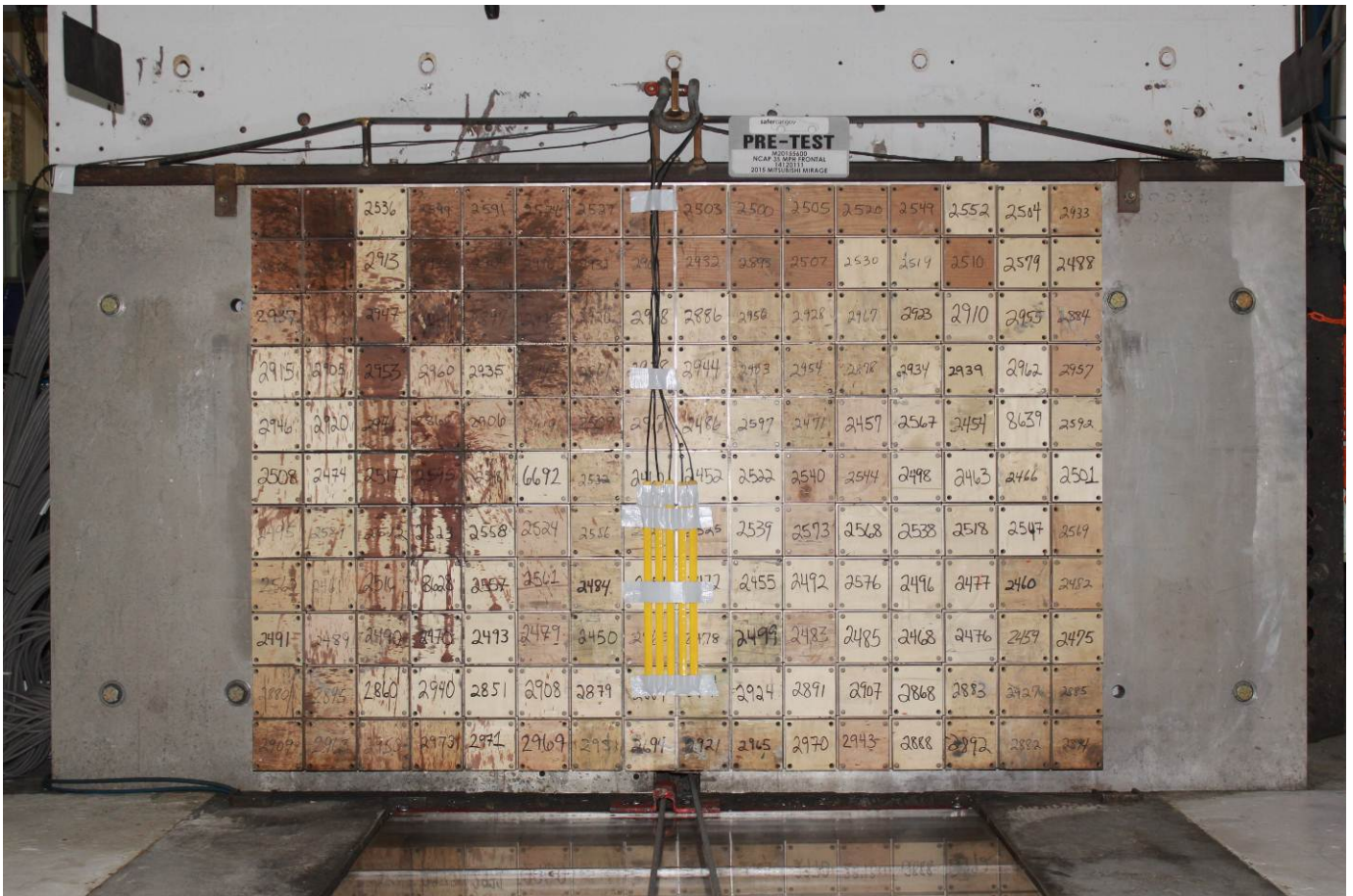
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Load Cell Location



Load Cell Wall

M20155600

MFD. BY MITSUBISHI MOTORS (THAILAND) CO., LTD.

GVWR 3020LBS/1370KG JUN 2014
GAWR FR 1609LBS/ 730KG
GAWR RR 1477LBS/ 670KG

THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR VEHICLE SAFETY, BUMPER, AND THEFT PREVENTION STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.



ML32A4HJ7FH003355

VEHICLE TYPE: PASSENGER CAR 7430B 728

Manufacturer's Label

SRS SIDE AIRBAG
WARNING
TO AVOID SERIOUS INJURY OR DEATH:
• Do not lean against the door.
• Do not use seat belt.

TIRE AND LOADING INFORMATION RENSEIGNEMENTS SUR LES PNEUS ET LE CHARGEMENT

SEATING CAPACITY / NOMBRE DE PLACES: TOTAL 5 FRONT AVANT 2 REAR ARRIERE 3

The combined weight of occupants and cargo should never exceed 375 kg or 827 lbs.
Le poids total des occupants et du chargement ne doit jamais dépasser 375 kg ou 827 lbs.

TIRE PNEU	SIZE DIMENSIONS	COLD TIRE PRESSURE / PRESSION DES PNEUS A FROID
FRONT AVANT	165/65R14	240 kPa, 35 psi
REAR ARRIERE	165/65R14	240 kPa, 35 psi
SPARE DE SECOURS	T115/70D14	420 kPa, 60 psi

SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION
VOIR LE MANUEL DE L'USAGER POUR PLUS DE RENSEIGNEMENTS

7430B235

M20155600

Tire Placard



2015 Mitsubishi Mirage Frontal As Delivered



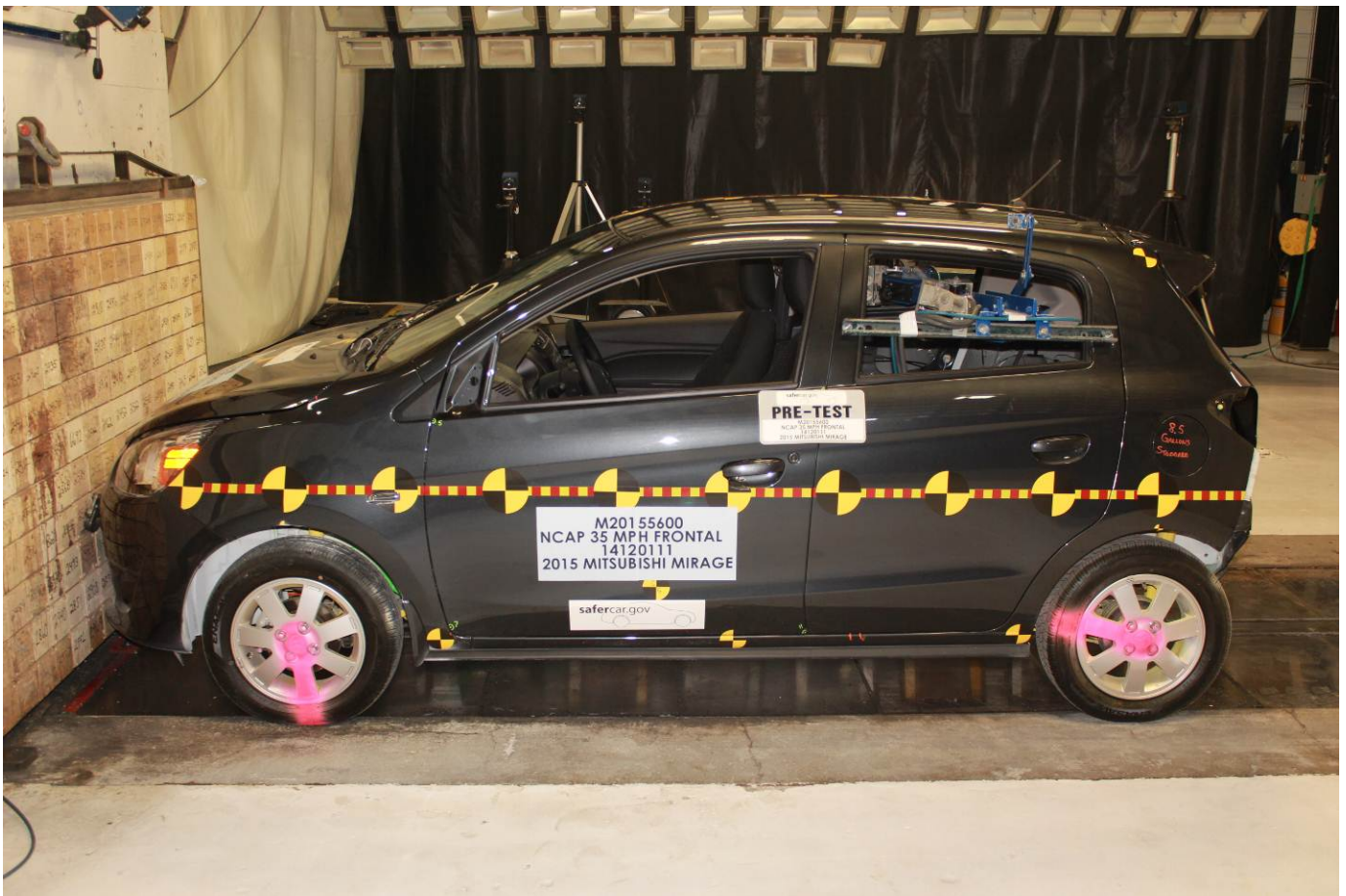
Left Rear 3-4 View, As Received



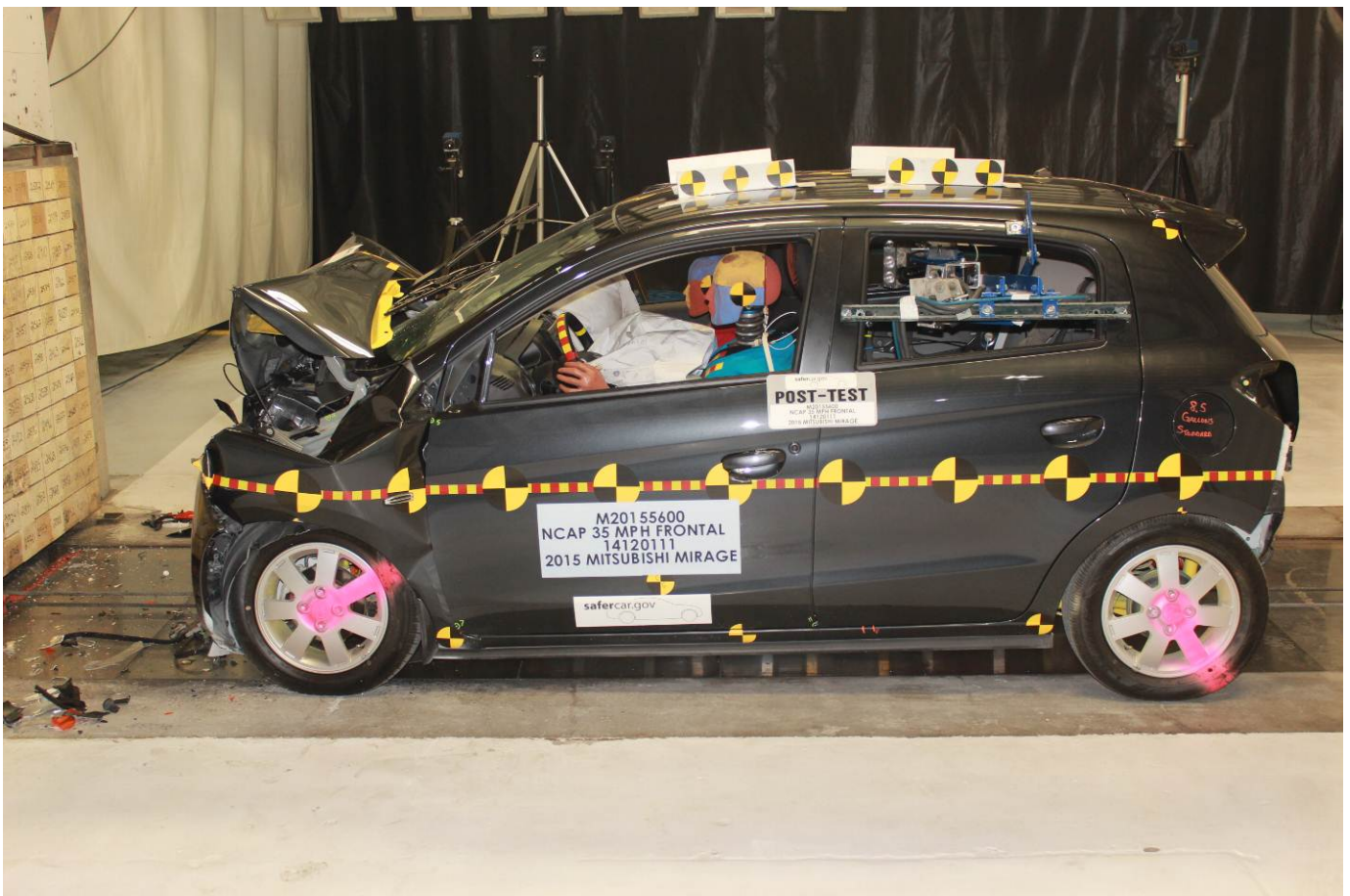
Pre-Test Front View of Test Vehicle



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



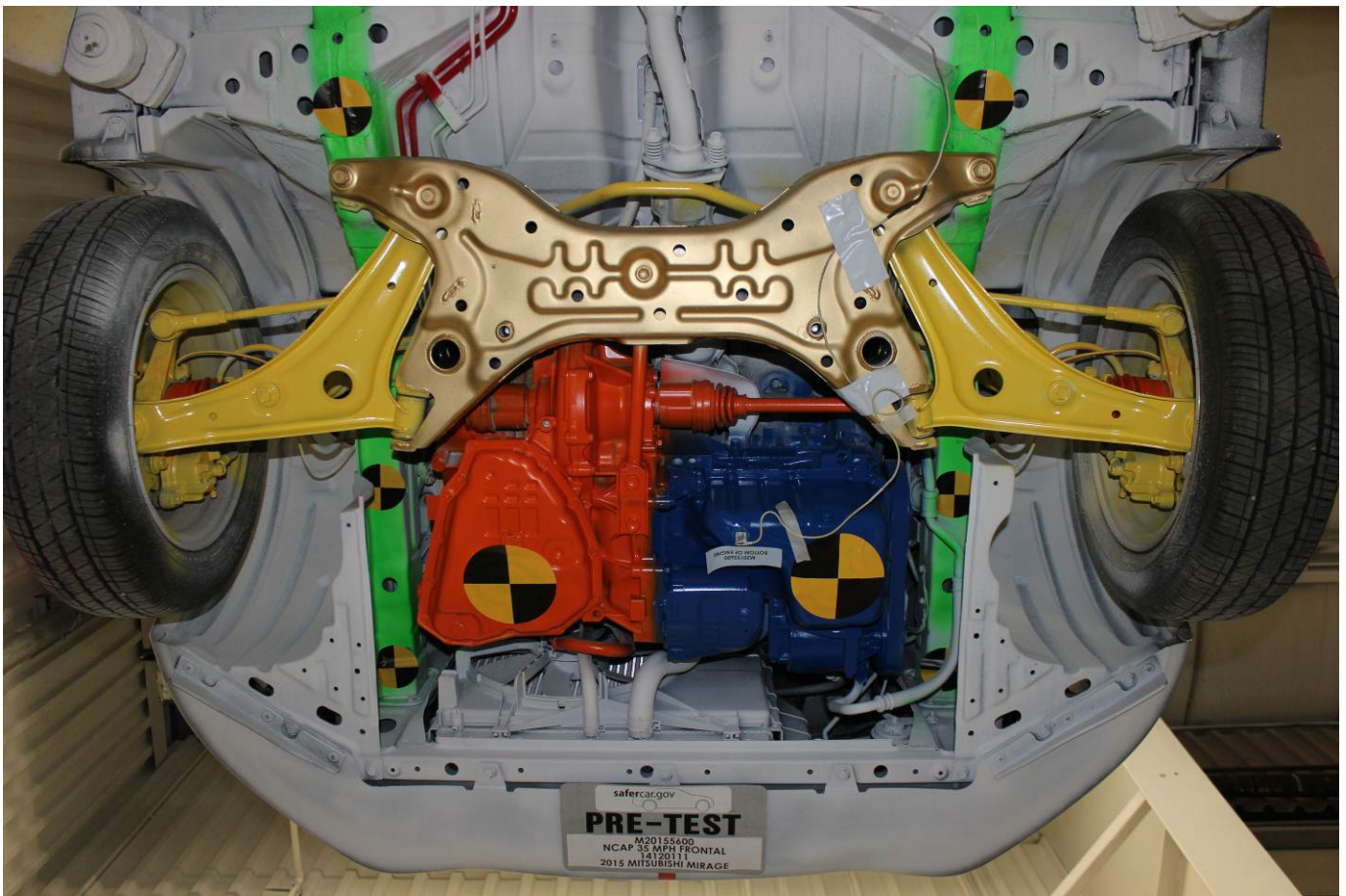
Post-Test Engine Compartment View



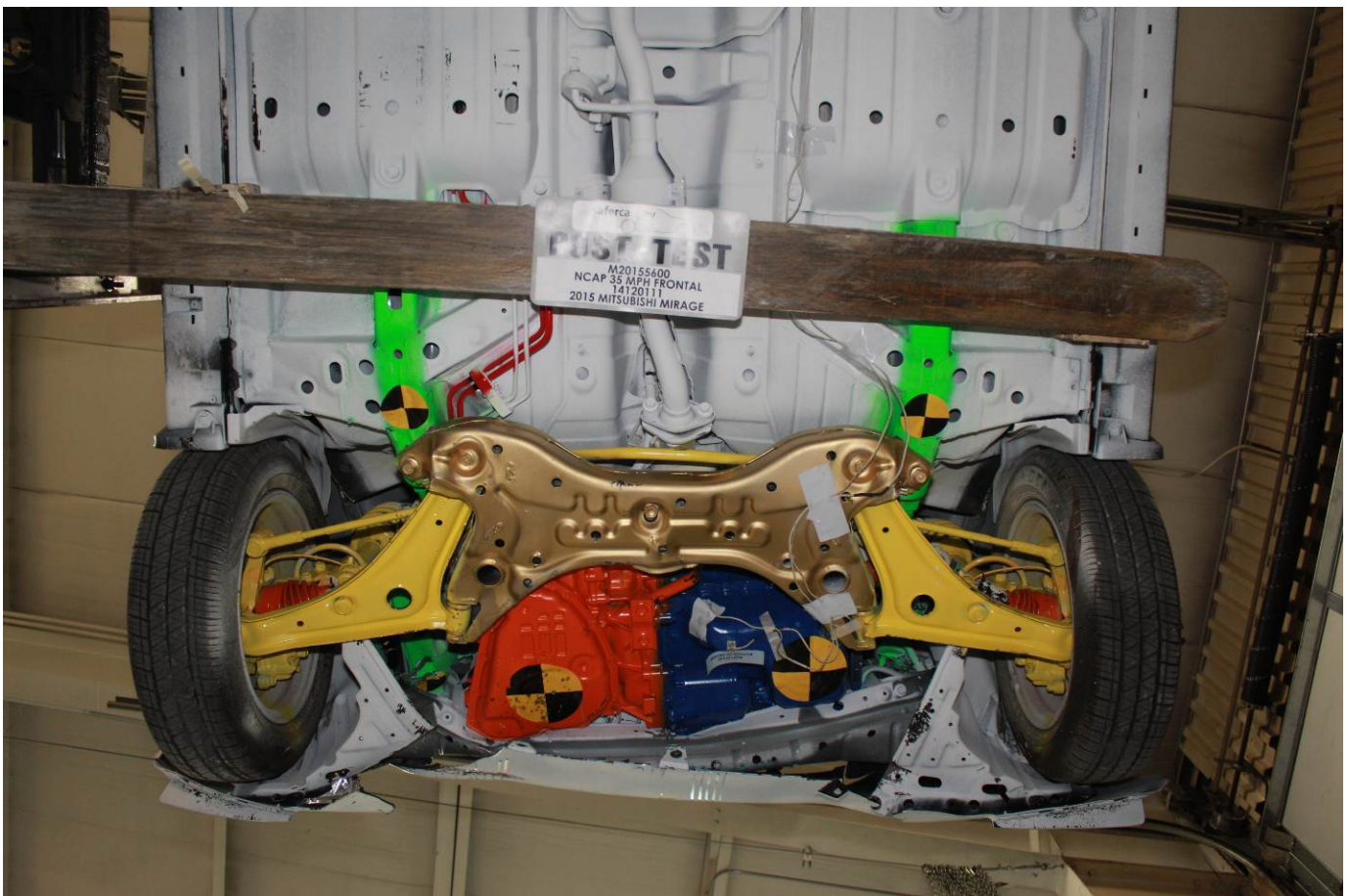
Pre-Test Fuel Filler Cap View



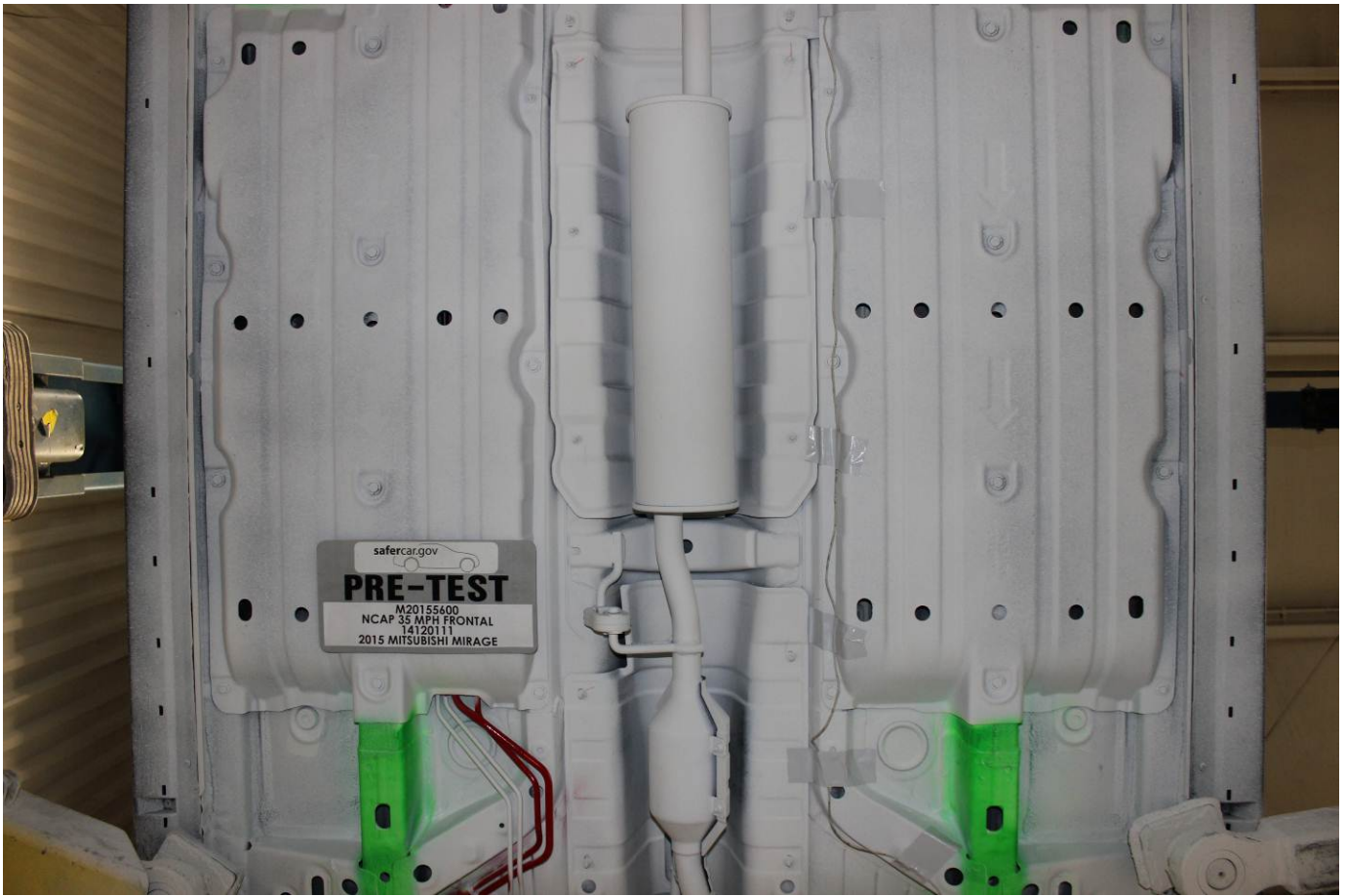
Post-Test Fuel Filler Cap View



Pre-Test Front Underbody View



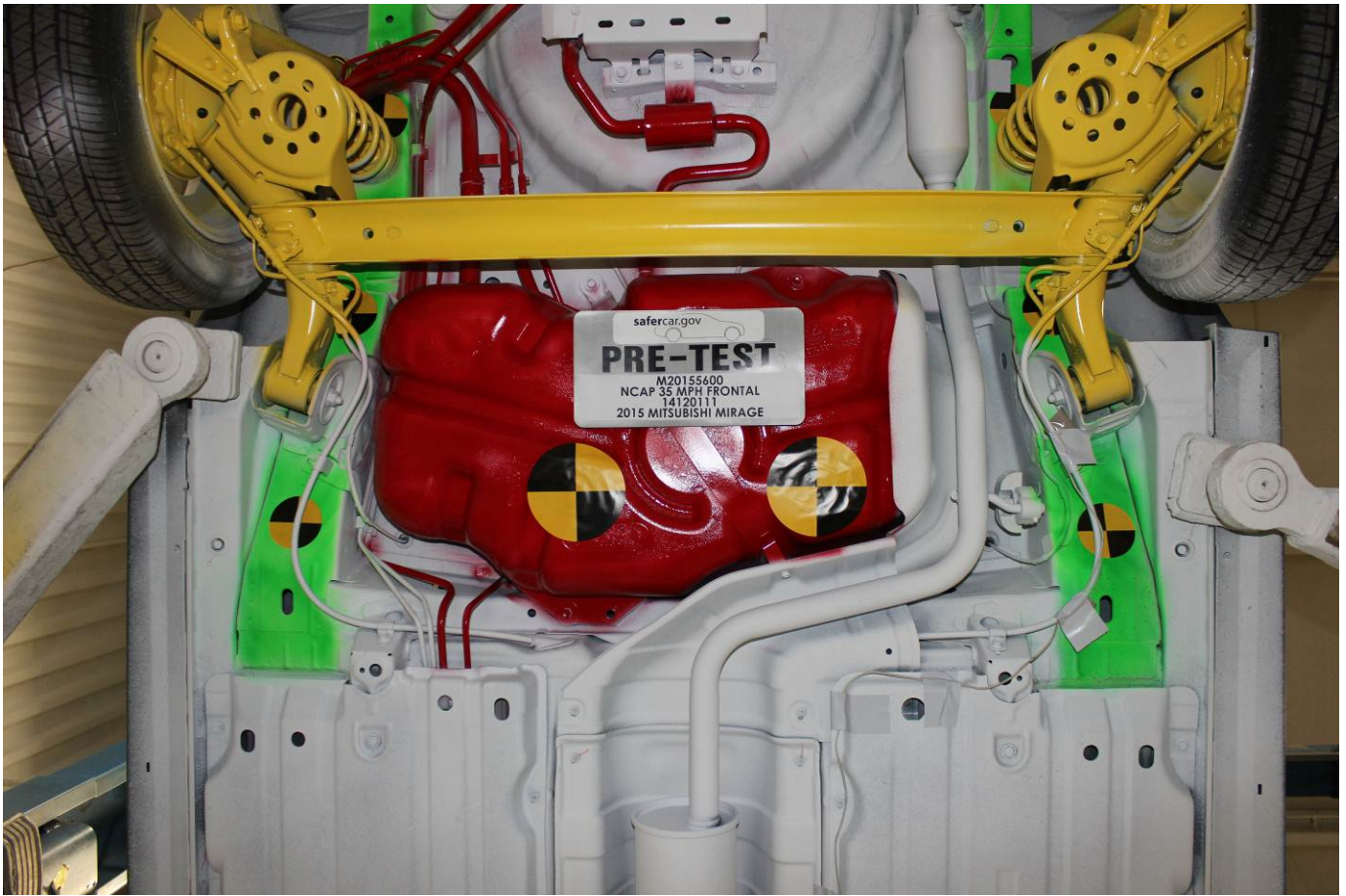
Post-Test Front Underbody View



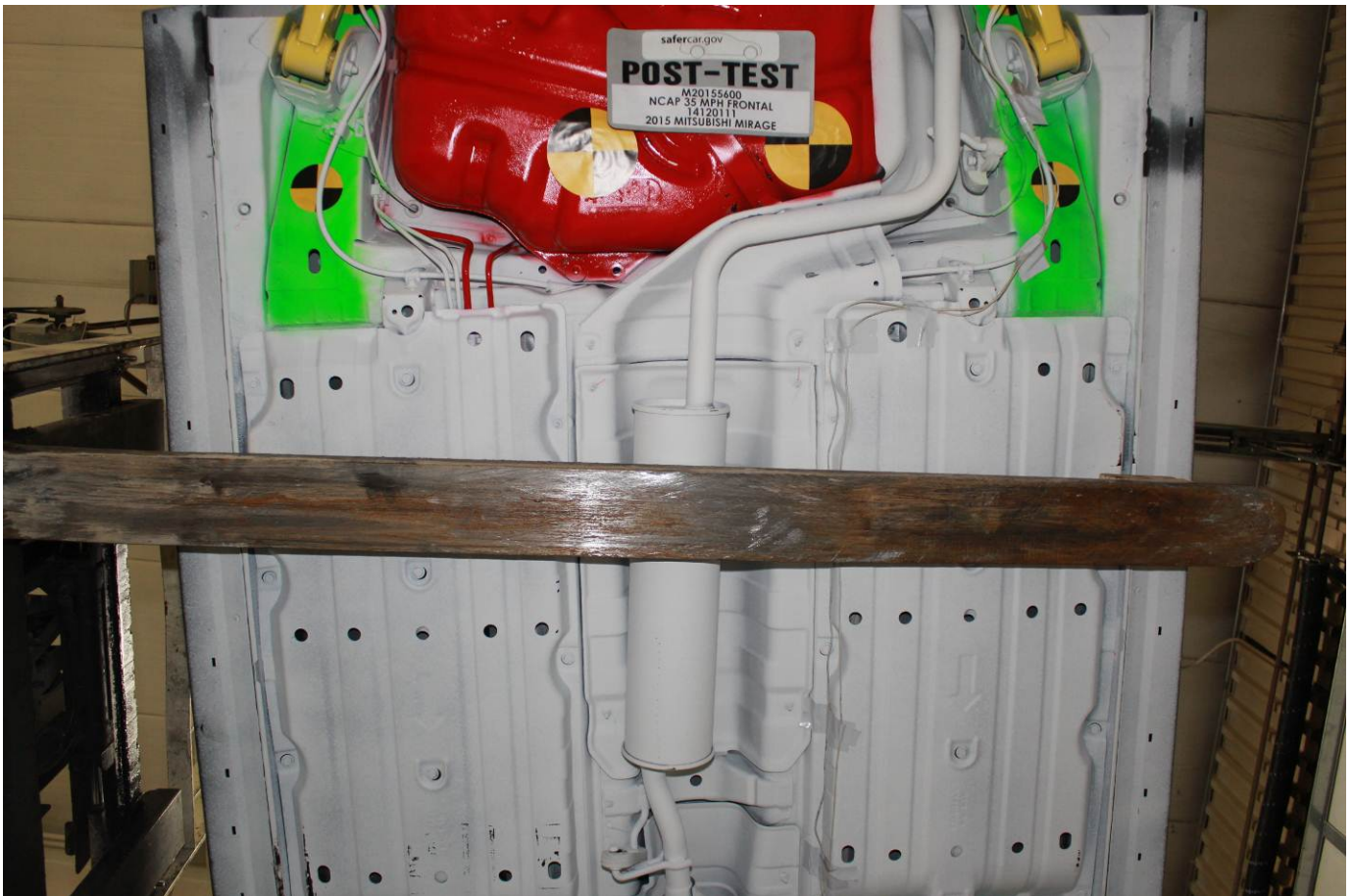
Pre-Test Mid Front Underbody View



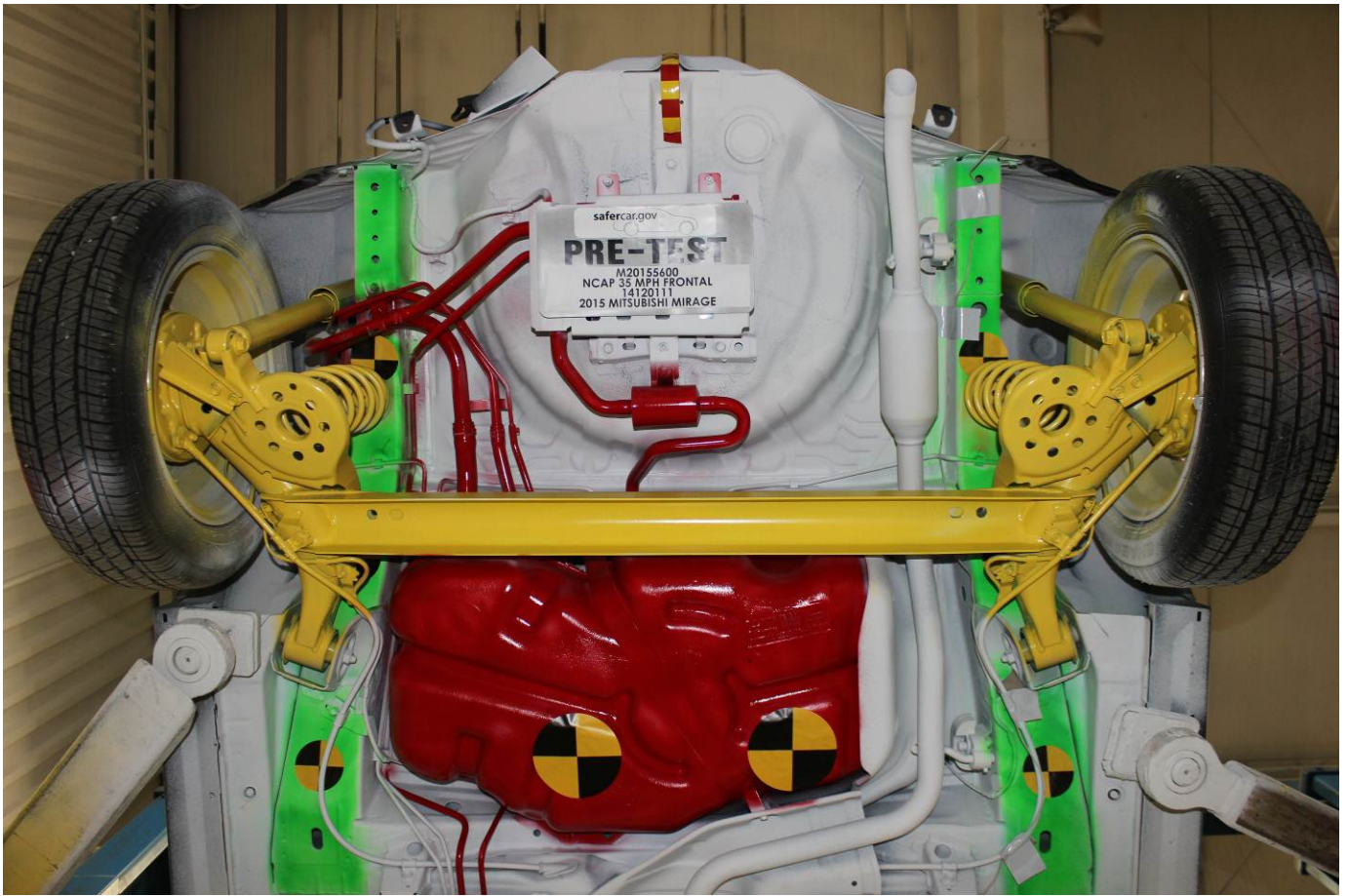
Post-Test Mid Front Underbody View



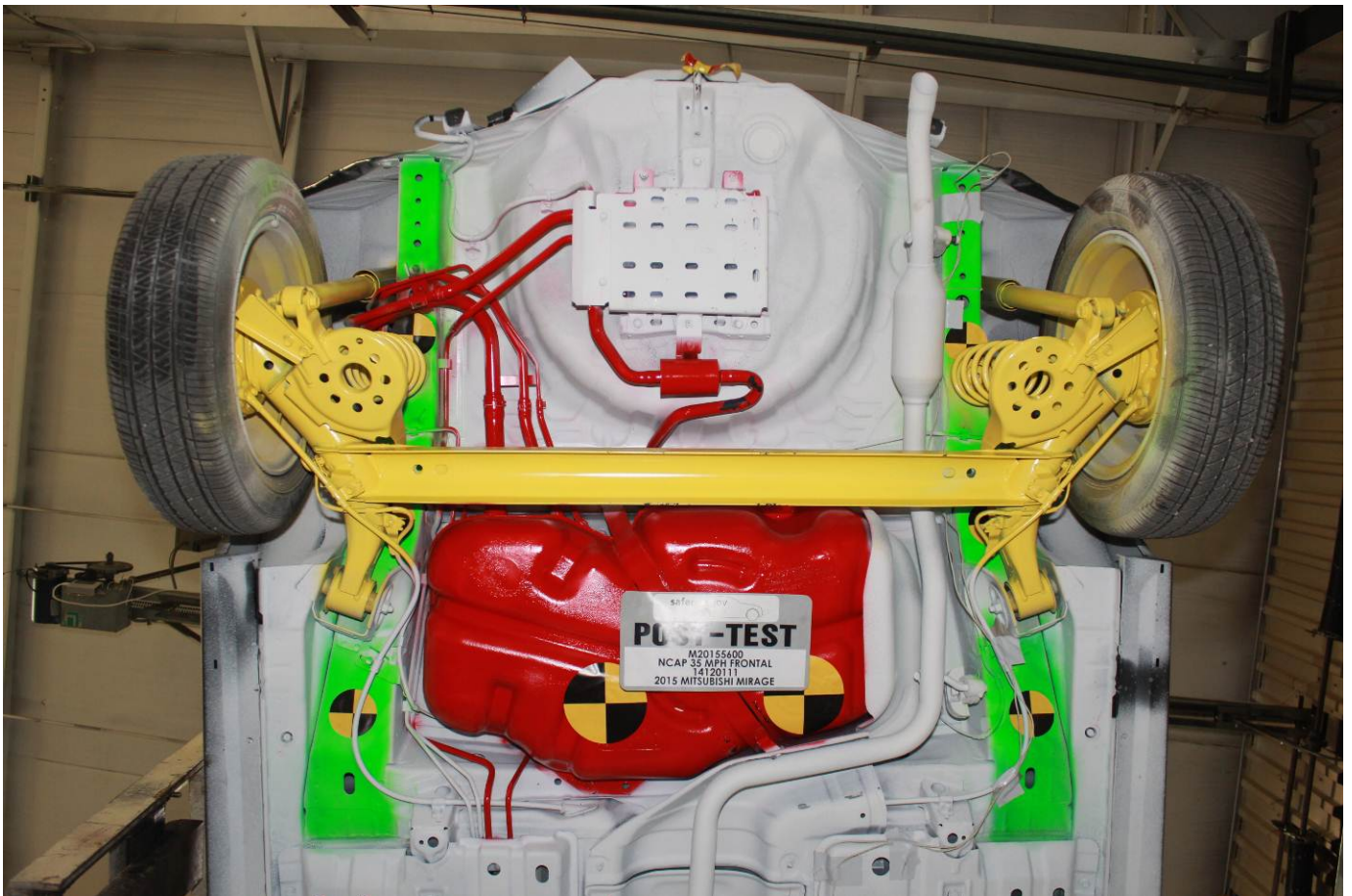
Pre-Test Mid Rear Underbody View



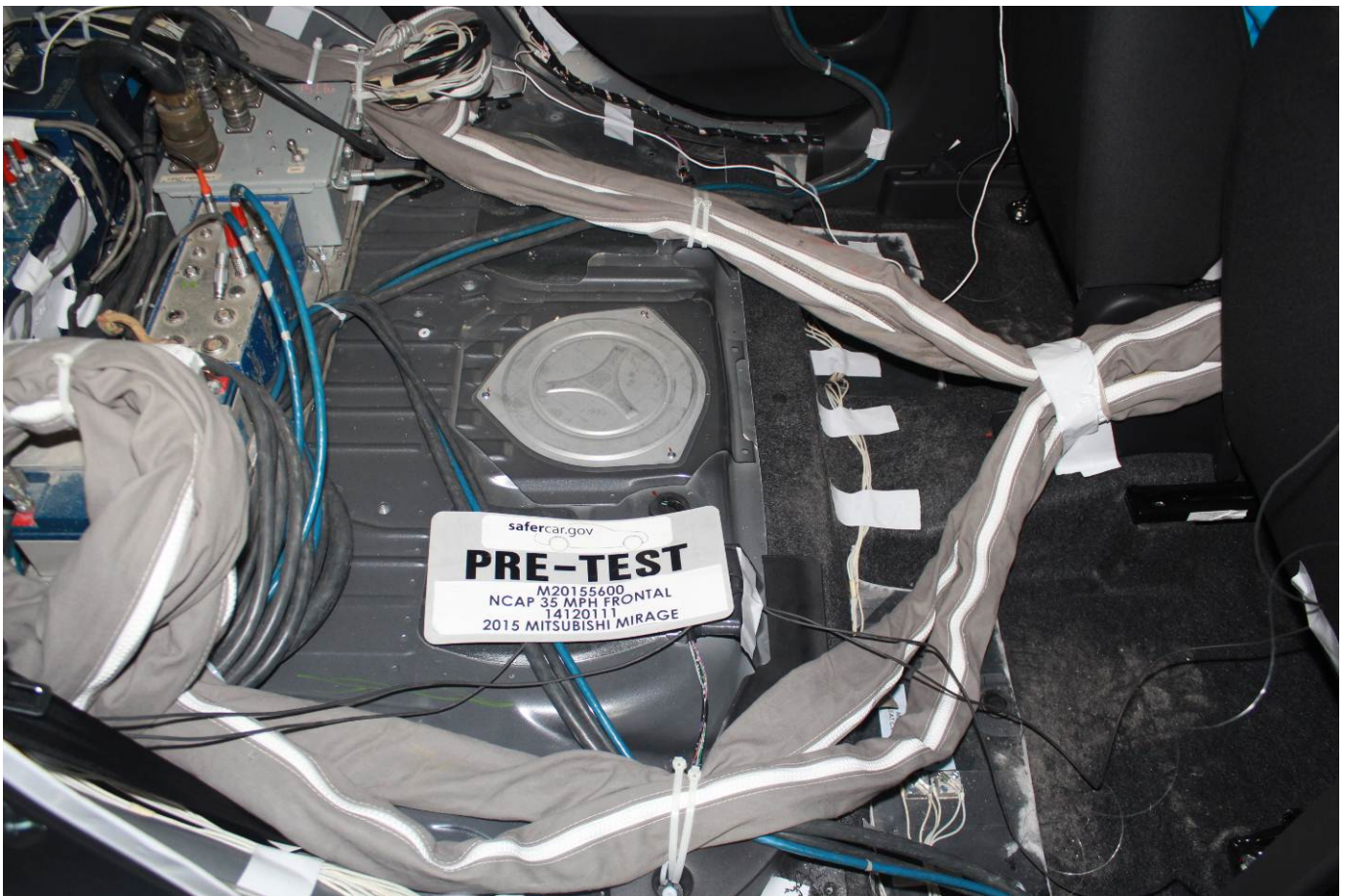
Post-Test Mid Rear Underbody View



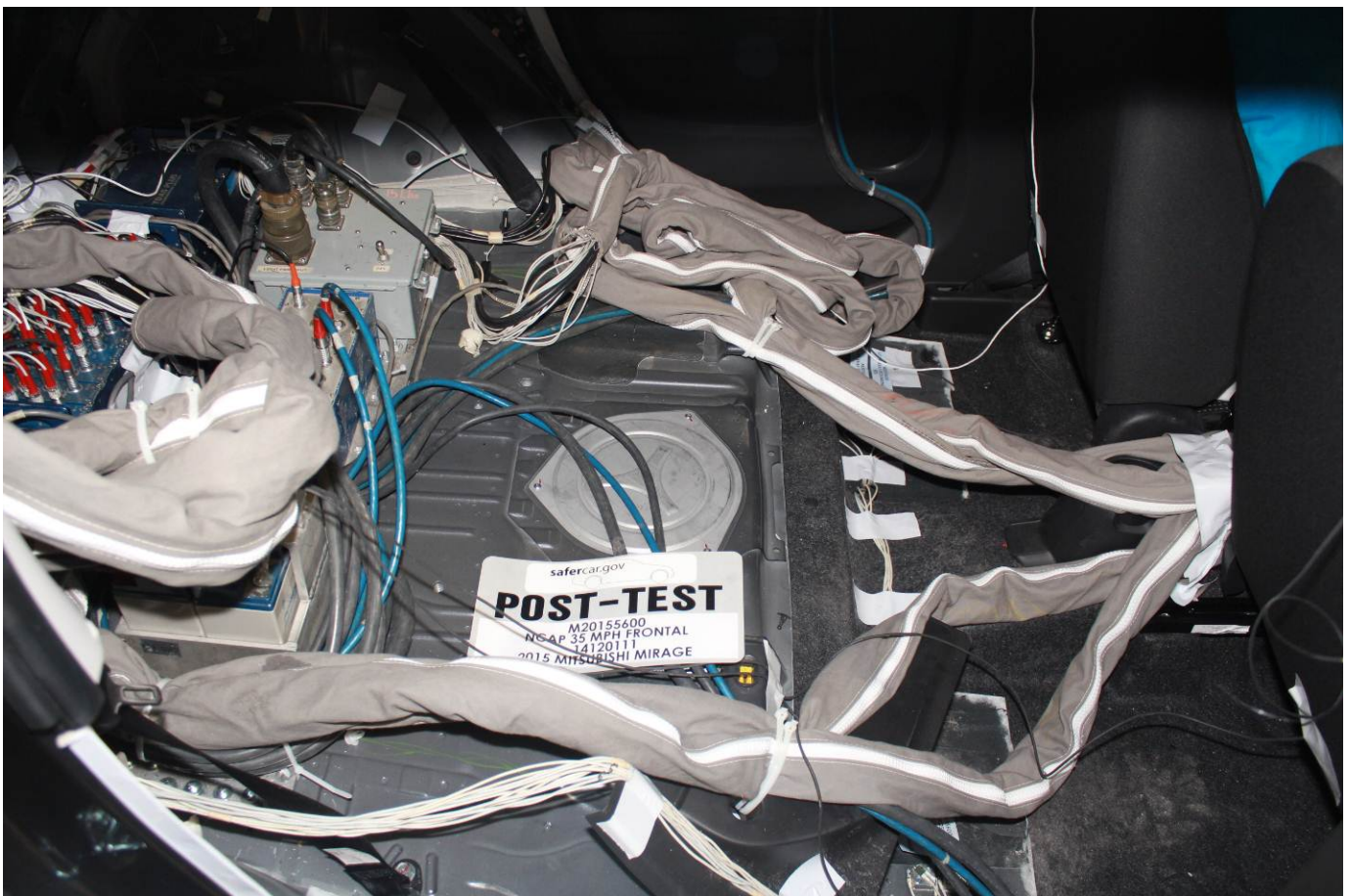
Pre-Test Rear Underbody View



Post-Test Rear Underbody View



Pre-Test Dummy Cable Routing



Post-Test Dummy Cable Routing



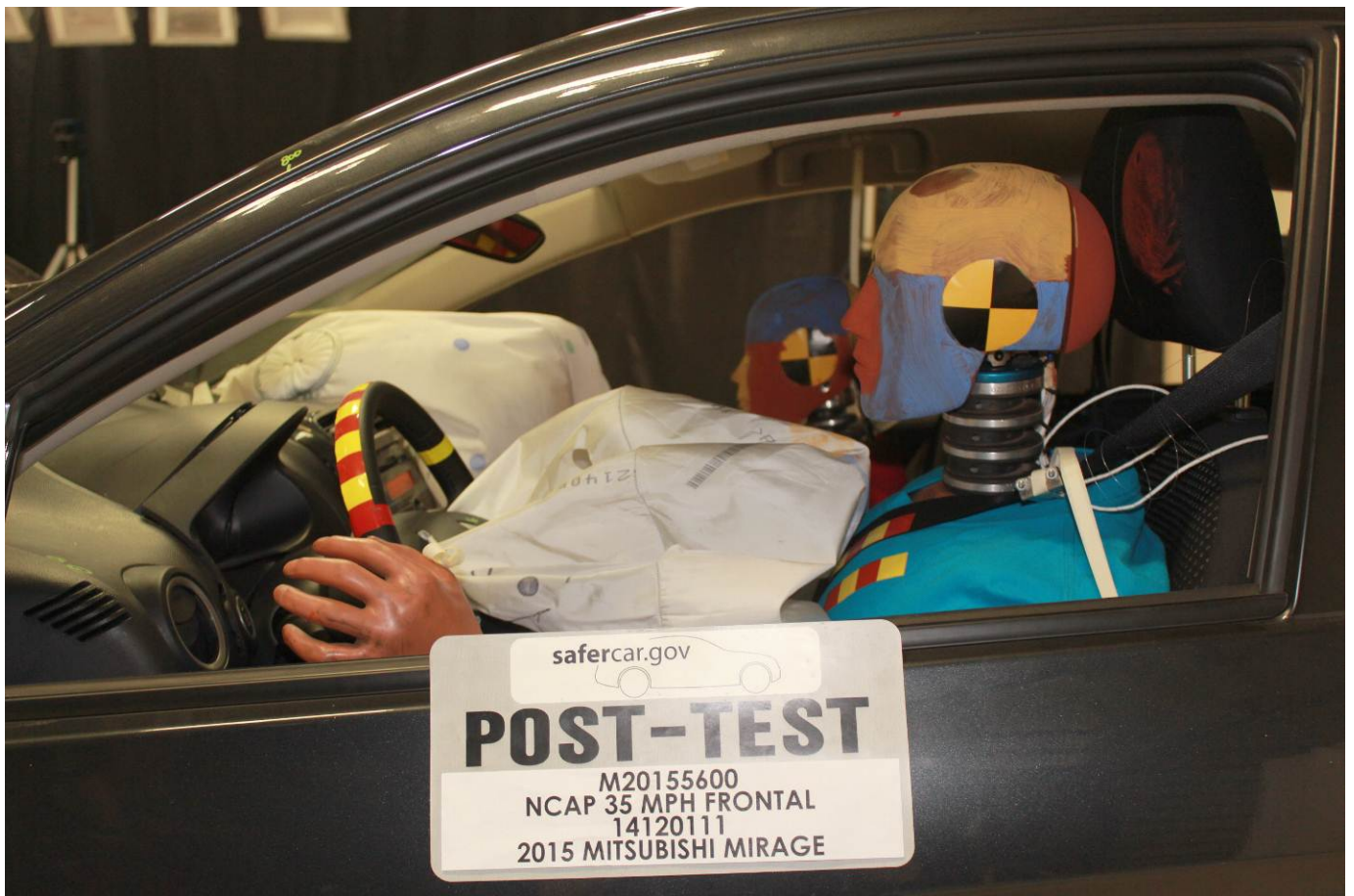
Pre-Test Driver Dummy Front View



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)



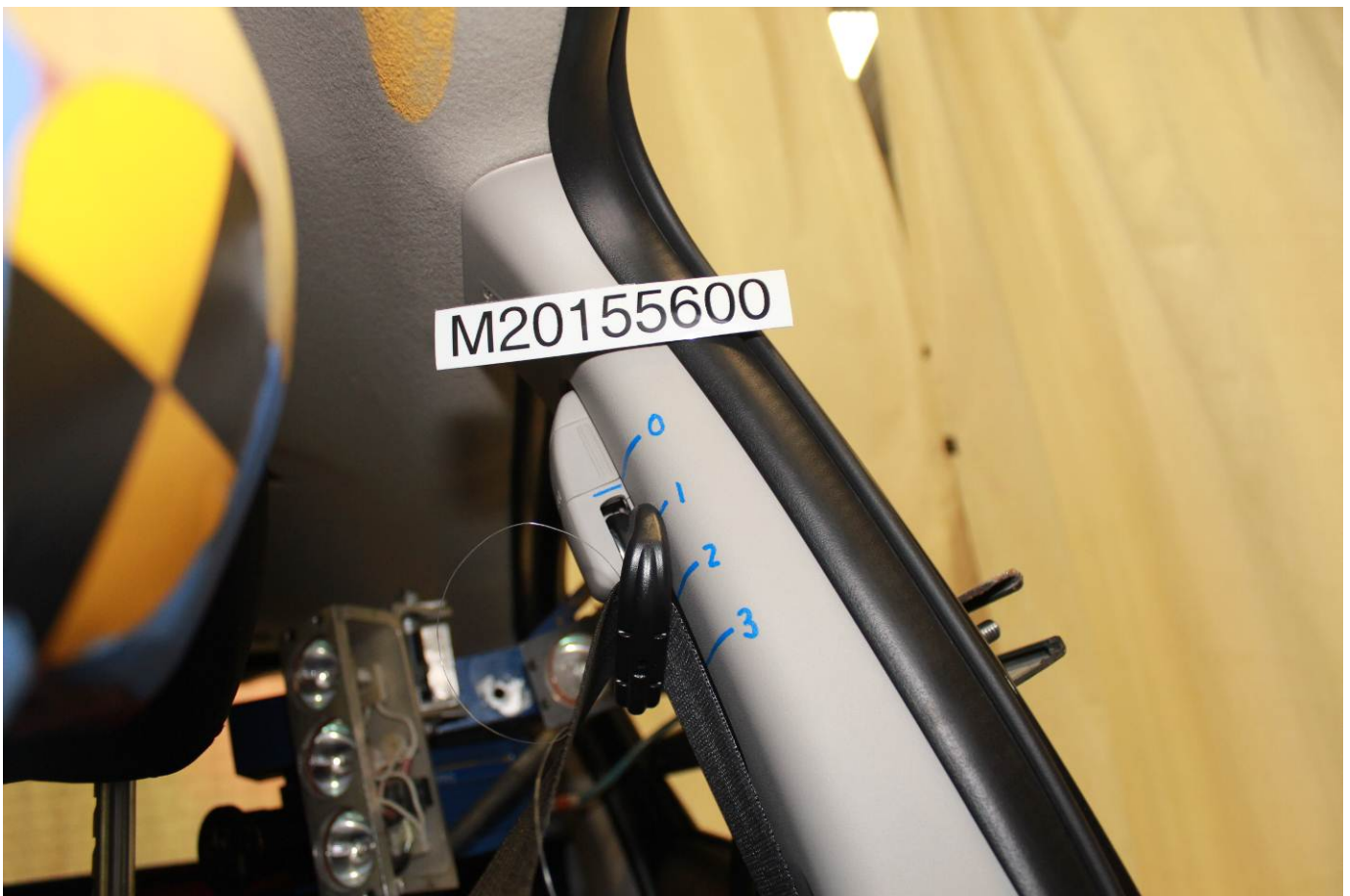
Pre-Test Driver's Seat Fore-Aft Markings



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



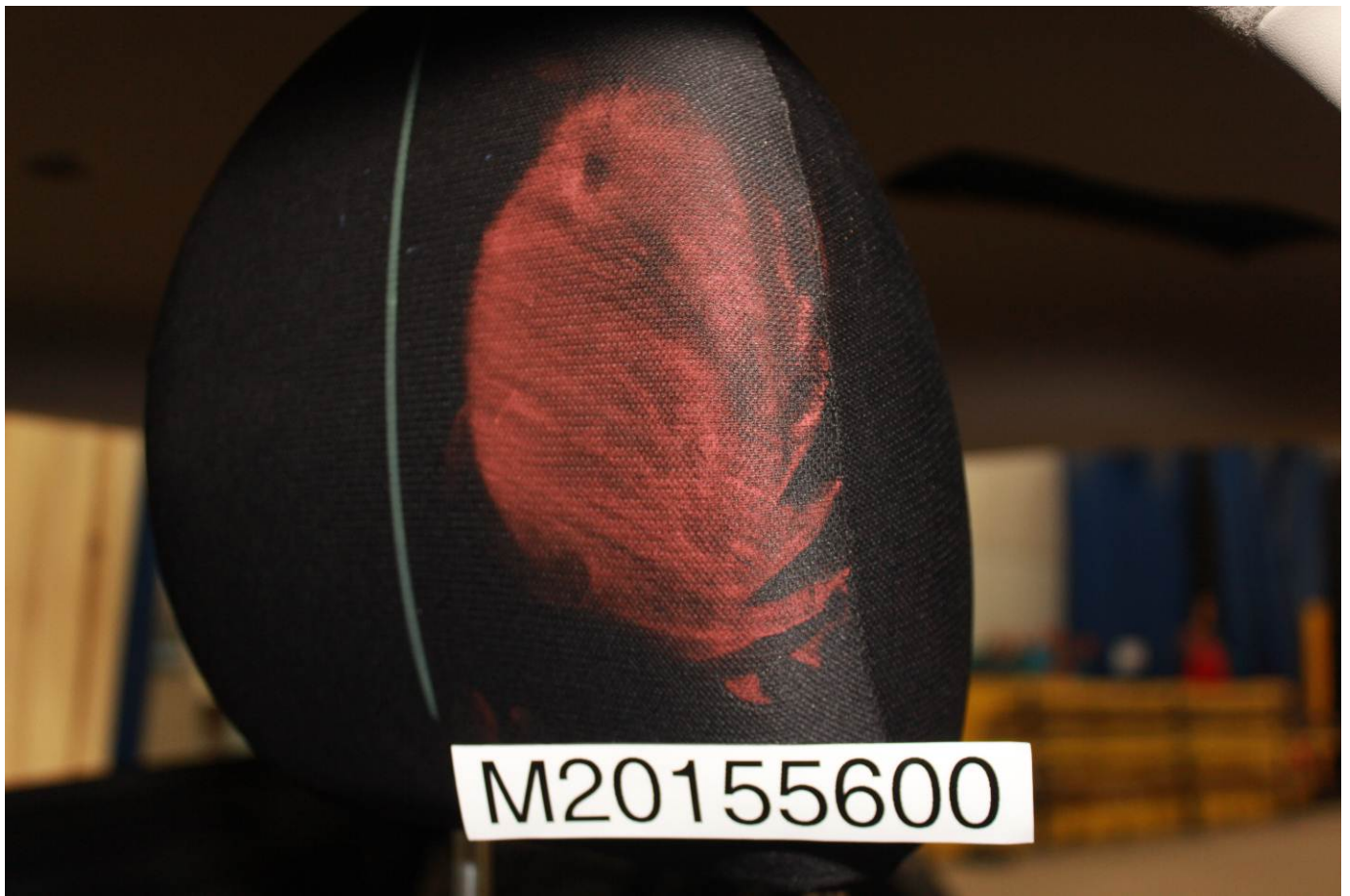
Post-Test Driver's Side Floorpan



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 Airbag



Post-Test Driver Dummy Contact with Headliner



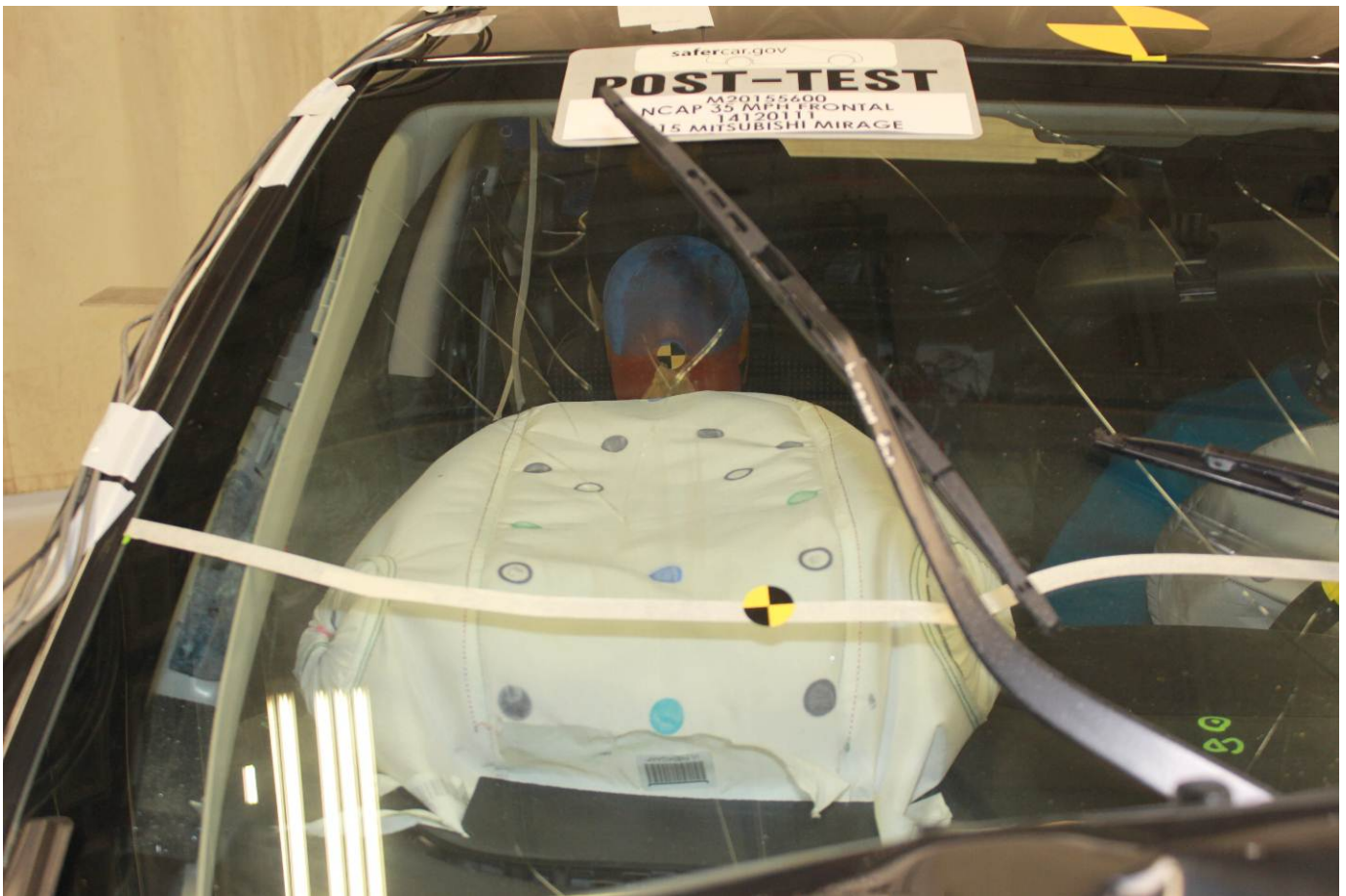
Pre-Test View of the Steering Wheel



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



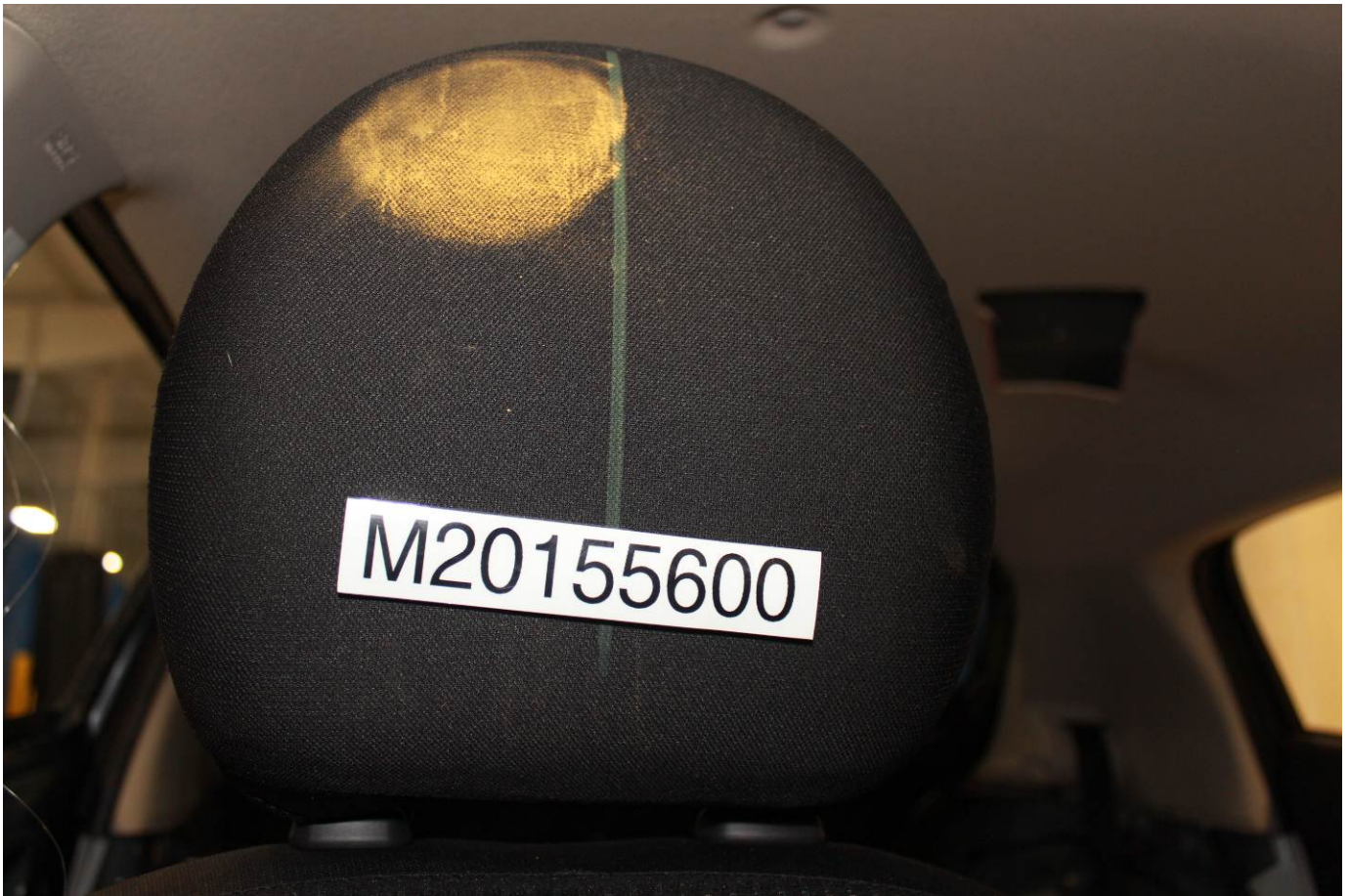
Post-Test Passenger Dummy Face



Post-Test Passenger Dummy Contact with Airbag



Post-Test Passenger Dummy Contact with Airbag



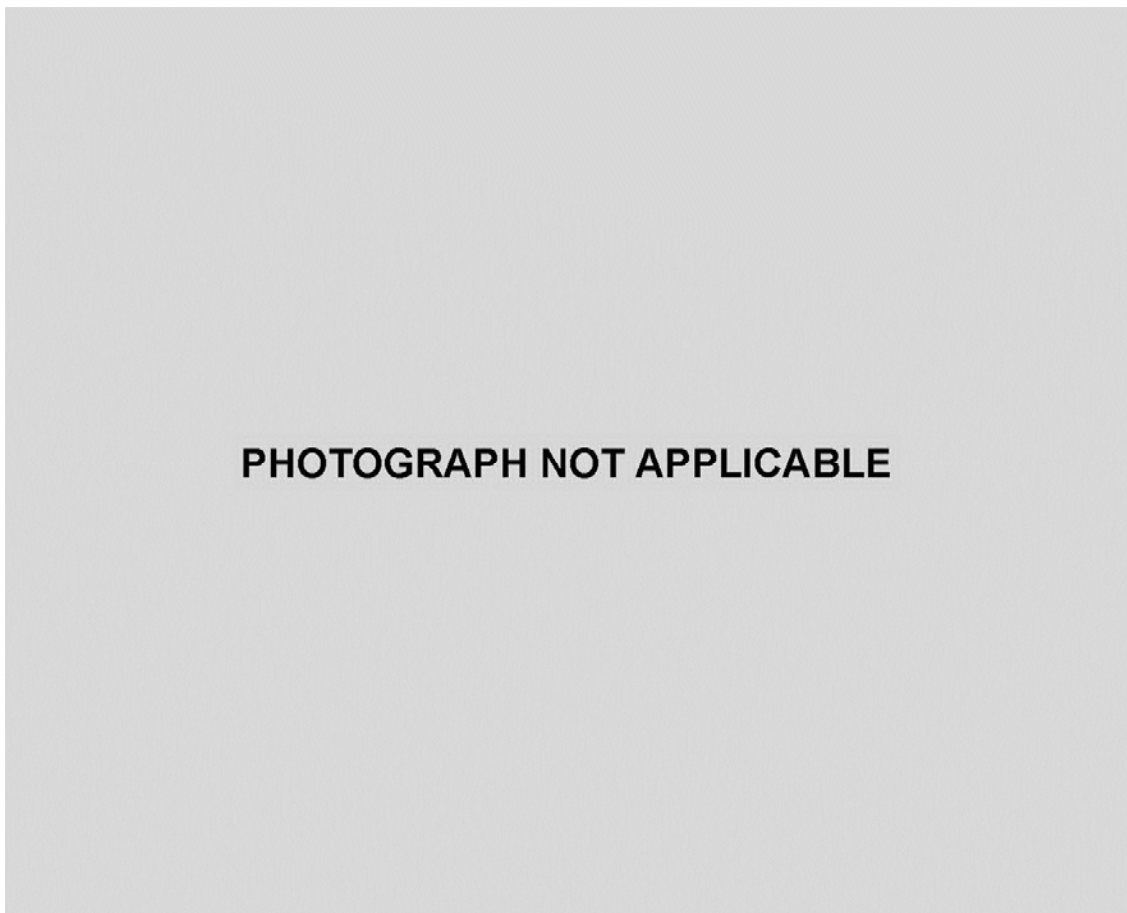
Post-Test Passenger Dummy Contact with Headrest



Post-Test Passenger Dummy Contact with Glovebox



Post-Test Passenger Dummy Contact with Headliner



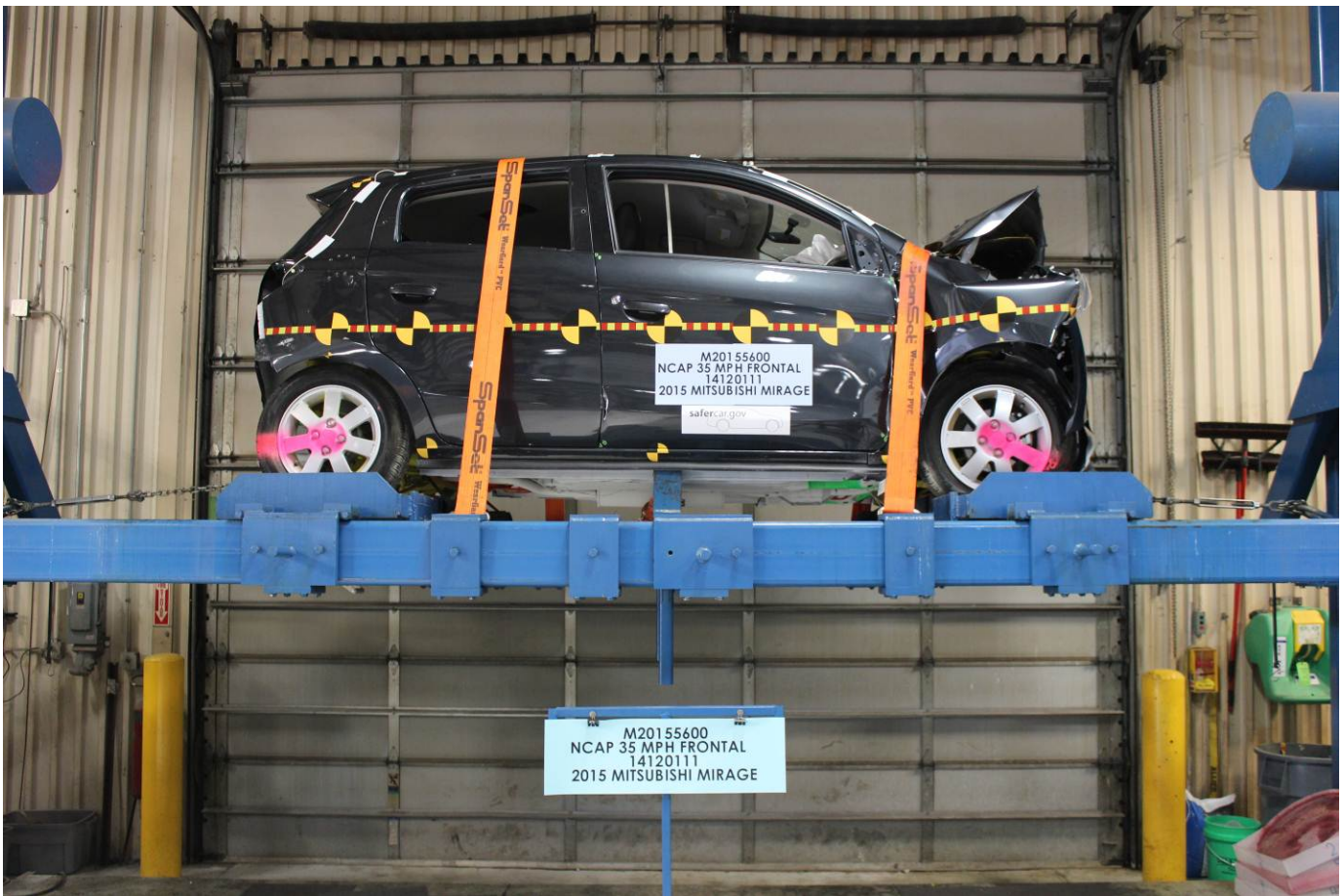
Ballast Installed in Vehicle

PHOTOGRAPH NOT APPLICABLE

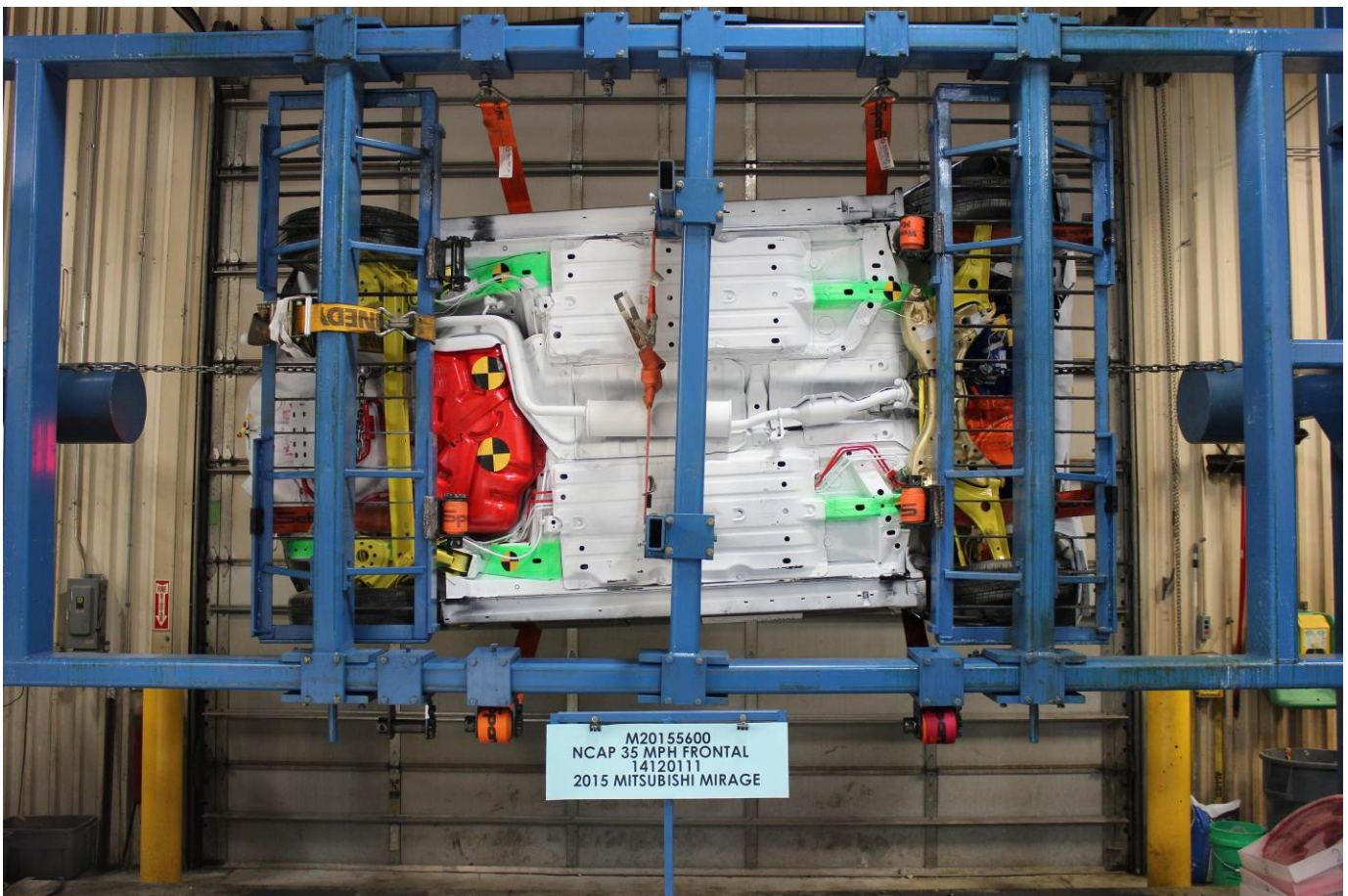
Post-Test Stoddard Solvent Spillage Location View



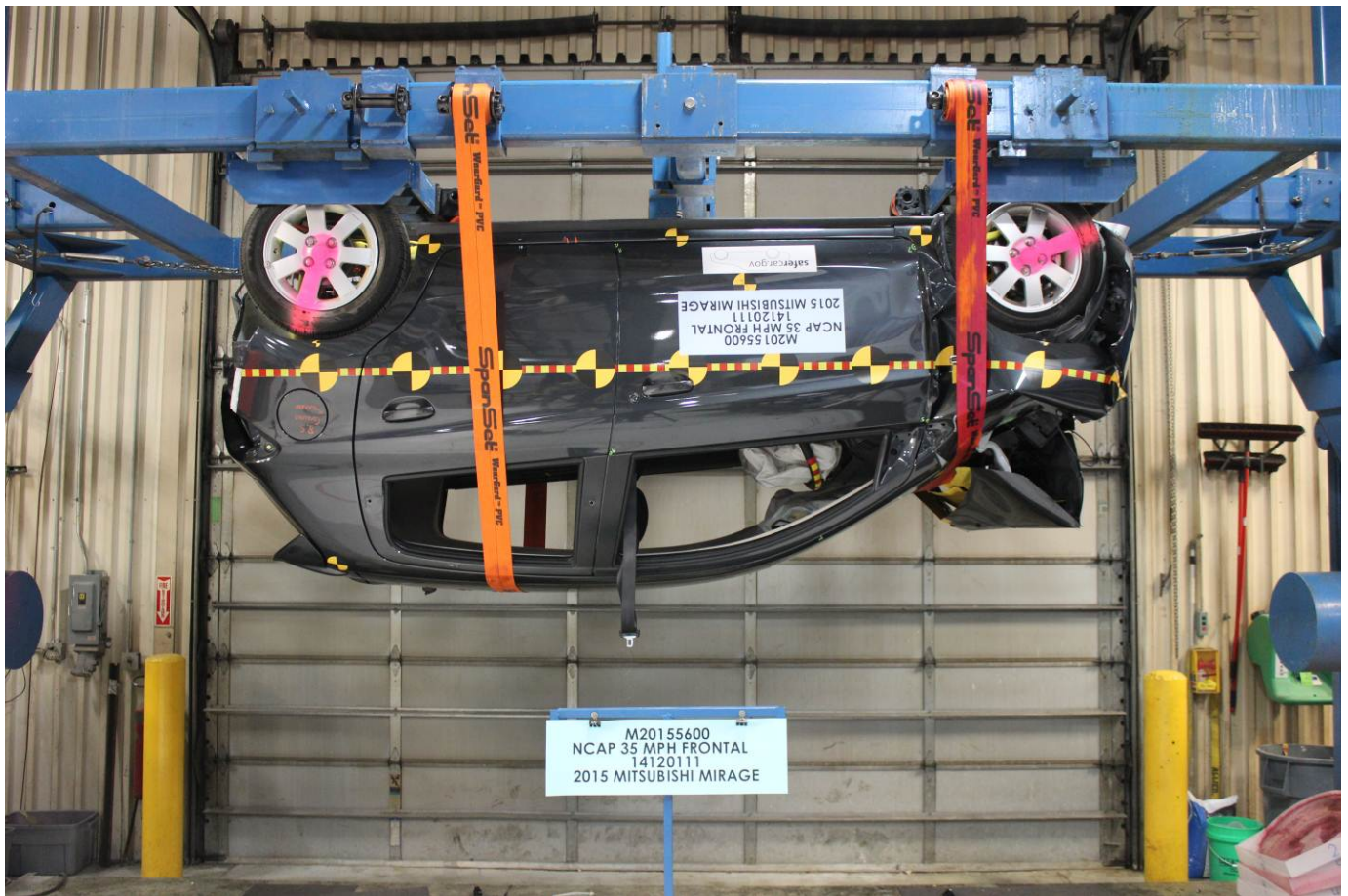
Post-Test Speed Trap Read-Out



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 Mitsubishi Mirage Frontal Impact Event



2015 MIRAGE ES
5-DOOR HATCHBACK
THUNDER GRAY / BLACK

1.8L DOHC 3C1L MIVEC
CONTINUOUSLY VARIABLE TRANSMISSION
50-STATE EMISSIONS STANDARD

Mechanical Features

- Electric Power Steering Assist
- Front MacPherson strut suspension with stabilizer bar
- Rear torsion beam suspension
- Front Wheel Drive (FWD)

Exterior Features

- Halogen headlights
- Fog lights
- High mount rear stop light
- Lower side air dam
- Rear spoiler
- Color-keyed front and rear bumpers
- Color-keyed folding side-view mirrors with turn signals
- Color-keyed outer door handles
- Color-keyed tail gate handle
- Front windshield variable intermittent wipers and washers
- Rear intermittent wiper
- Power side-view mirrors
- Rear window defroster with timer
- 14" alloy wheels
- Spare saver temporary spare tire
- Short pole antenna

Interior Features

- Speedometer/tachometer gauge cluster
- ECO status indicator light
- Front room light
- Cargo light
- 6-way adjustable driver's seat, 4-way adjustable front passenger seat
- Split folding high-back rear seat
- Rear seat head restraints (x2)
- Automatic air condition climate control
- Micron air filtration
- Rear heater floor ducts
- Chrome accents for HVAC
- Leather-wrapped steering wheel
- Tilt steering wheel
- Silver painted meter bezel
- Leather-wrapped shift knob with silver accent
- Gloss black center panel
- Chrome-plated front inner door handles
- Driver and passenger sun visors with driver's side vanity mirror, lid and ticket holder
- Carpeted floor mats
- Fuel lid release lever
- Rear shelf

Convenience Features

- 140-watt AM/FM/CD/MP3 audio system with 4 speakers
- Bluetooth® hands free phone system
- USB port
- Steering wheel mounted cruise control
- Steering wheel mounted audio controls
- Steering wheel mounted Bluetooth® controls
- FAST-Key passive entry system with panic alarm feature

Convenience Features (cont'd)

- Push button start
- Power windows
- Power door locks
- 12-volt accessory outlet (x1)
- Floor center console with cup holders (x3)
- Retractable assist grips (x2)

Safety & Security

- Anti-lock Braking System (ABS) with Electronic Brakeforce Distribution (EBD) and brake assist
- Active Stability Control (ASC)
- Tire Pressure Monitoring System (TPMS)
- Side curtain airbags
- Driver's side knee airbag
- Advanced dual-stage front airbags
- Three-point seatbelts and head restraints for all seating positions
- Height-adjustable front shoulder belts with pretensioner
- LATCH child-restraint system
- Child safety rear door locks
- Anti-theft engine immobilizer
- RISE body construction

Optional Equipment

FULL TANK OF GAS	INCLUDED
PROTECTION PACKAGE ■ COLOR-KEYED FRONT AND REAR MUDGUARDS ■ REAR BUMPER PROTECTOR (BLACK) ■ SCUFF PLATES	\$295.00
ACCY WHEEL LOCKS	\$60.00

MSRP*	\$15,395.00
Total Optional Equipment	\$355.00
Subtotal†	\$15,750.00
Destination/Handling‡	\$810.00
Total MSRP*	\$16,560.00

Visit us at www.mitsubishicars.com

EPA DOT Fuel Economy and Environment Gasoline Vehicle

Fuel Economy

40 MPG combined city/hwy
2.5 gallons per 100 miles

Compact Cars range from 14 to 105 MPG. The best vehicle rates 119 MPG.

You save \$4,500 in fuel costs over 5 years compared to the average new vehicle.

Annual fuel Cost \$1,300

Fuel Economy & Greenhouse Gas Rating (tailpipe only) **9**

Smog Rating (tailpipe only) **5**

This vehicle emits 222 grams CO₂ per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions. Learn more at fuelconomy.gov.

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

fuelconomy.gov
Calculate personalized estimates and compare vehicles.

10-year 100,000-mile LIMITED POWERTRAIN WARRANTY

10"/100,000" POWERTRAIN
5"/60,000" NEW VEHICLE LIMITED WARRANTY

7"/100,000" ANTI-CORROSION/PERFORATION
5"/UNLIMITED" ROADSIDE ASSISTANCE

GOVERNMENT 5-STAR SAFETY RATINGS

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

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

Parts Content Information

For vehicles in this country:
U.S./Canadian Parts Content: 0%
Foreign Parts Content: THAILAND 92%

For this vehicle:
Final Assembly Point: CHONBURI, THAILAND
Country of Origin: THAILAND
Engine: THAILAND
Transmission: THAILAND

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

MITSUBISHI MOTORS

Ship To: (DGA) SCHLOSSMANN CITY MITSUBISHI 49052 4640 S. 27TH STREET MILWAUKEE, WI 53221

Sold To: (Same unless indicated)

Method of Transport: RAIL
Point of Entry: TACOMA, WA

VIN: ML32A4HJ7FH003355
Route Code: RJO

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

Monroney Label Photograph

APPENDIX B
DUMMY RESPONSE DATA TRACES

TABLE OF DATA PLOTS

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List of Data Plots Provided in the Test Report

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Figure No. 4.	Driver Head Resultant Acceleration vs. Time	B-1
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Figure No. 12.	Driver Neck Moment Y vs. Time	B-4
Figure No. 13.	Driver Nij (NTF) vs. Time	B-5
Figure No. 14.	Driver Nij (NTE) vs. Time	B-5
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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

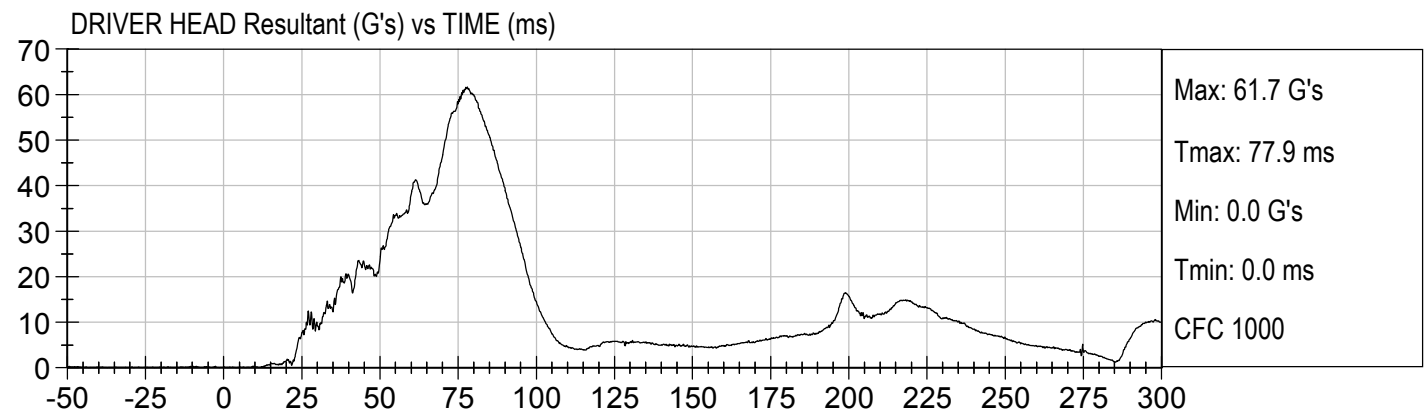
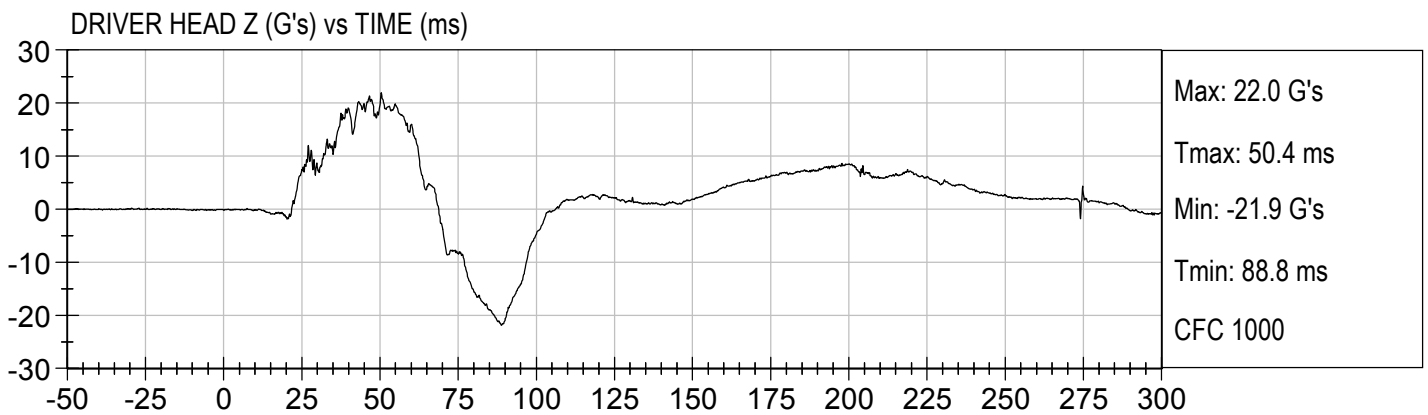
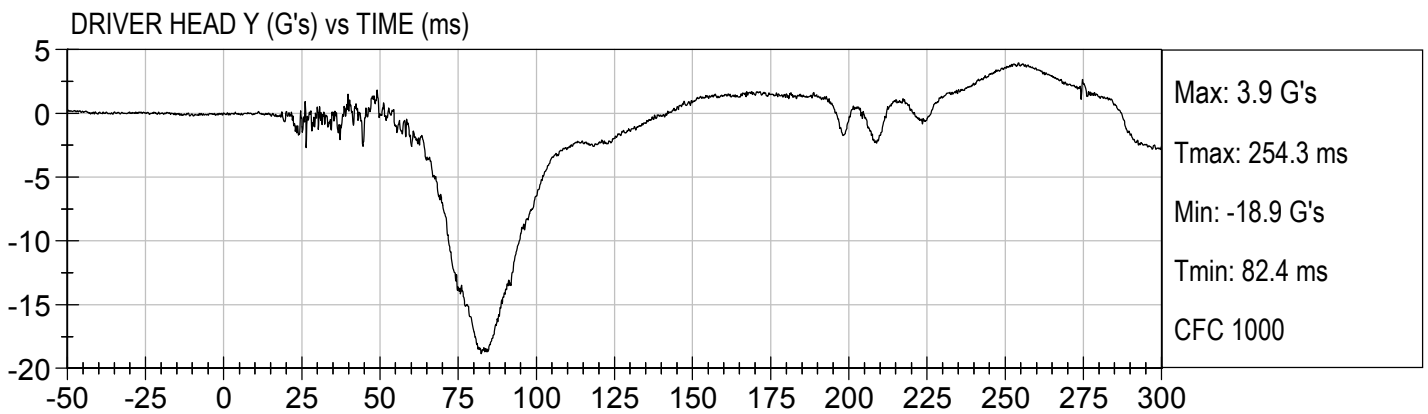
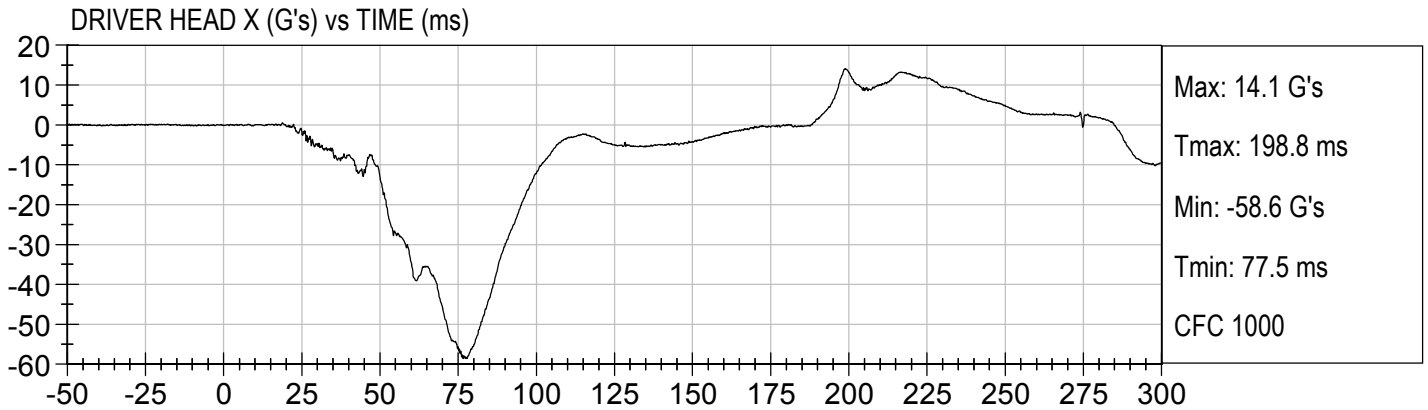
	<u>Page No.</u>
Figure No. 28. Passenger Neck Force X vs. Time	B-10
Figure No. 29. Passenger Neck Force Z vs. Time	B-10
Figure No. 30. Passenger Neck Moment Y vs. Time	B-10
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Figure No. 33. Passenger Nij (NCF) vs. Time	B-11
Figure No. 34. Passenger Nij (NCE) vs. Time	B-11
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Figure No. 36. Passenger Right Femur Force vs. Time	B-12

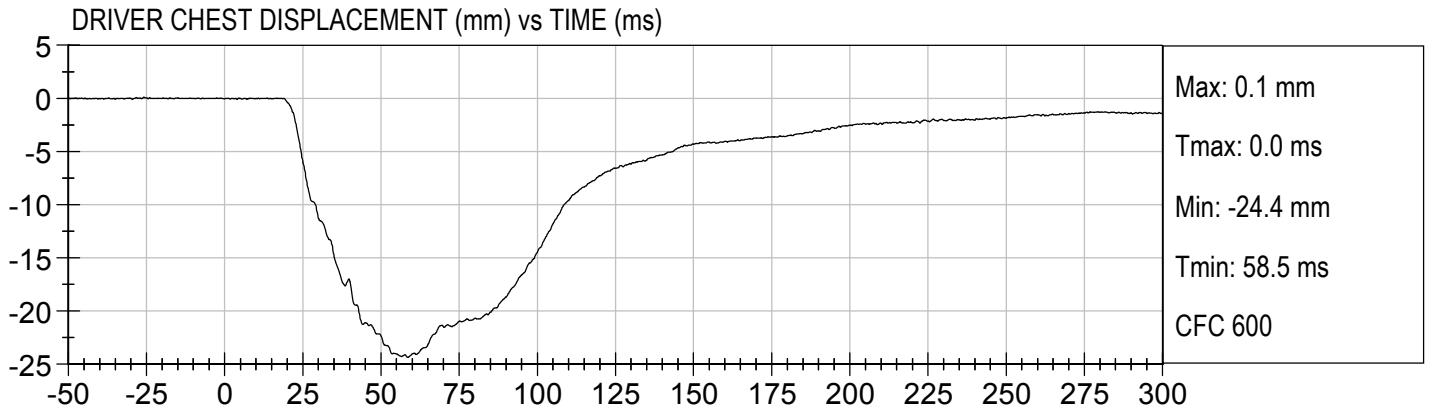
The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at www.nhtsa.dot.gov

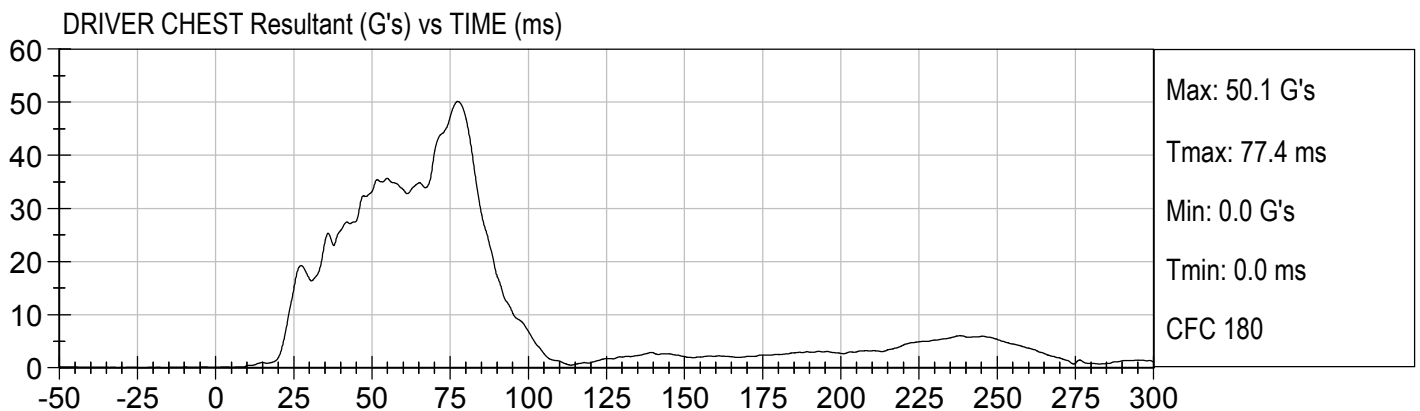
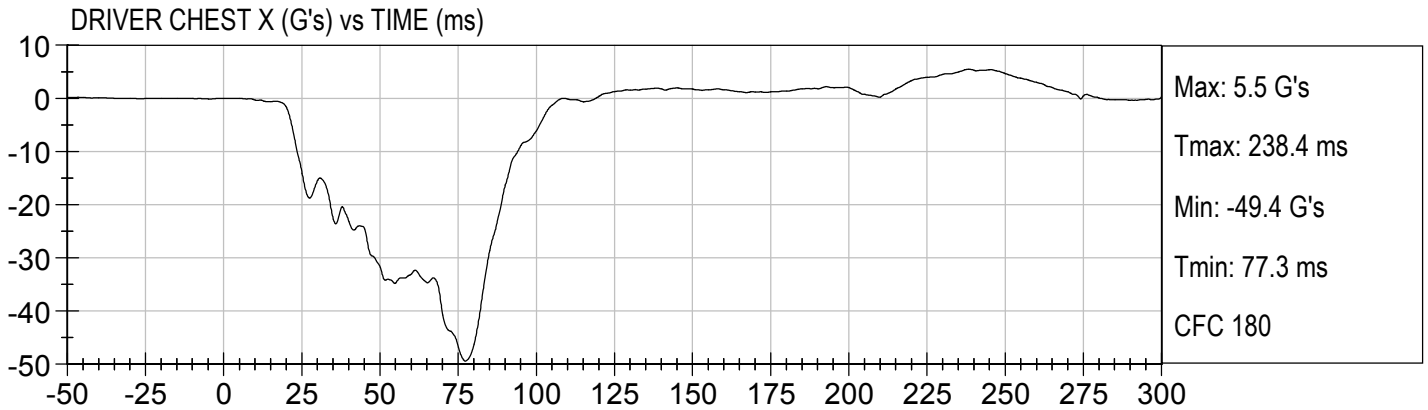
Driver Head X Redundant
Driver Head Y Redundant
Driver Head Z Redundant
Driver Upper Neck Force Y
Driver Upper Neck Moment X
Driver Upper Neck Moment Z
Driver Chest X Redundant
Driver Chest Y Redundant
Driver Chest Z Redundant
Driver Pelvis X
Driver Pelvis Y
Driver Pelvis Z
Driver Left Femur Redundant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

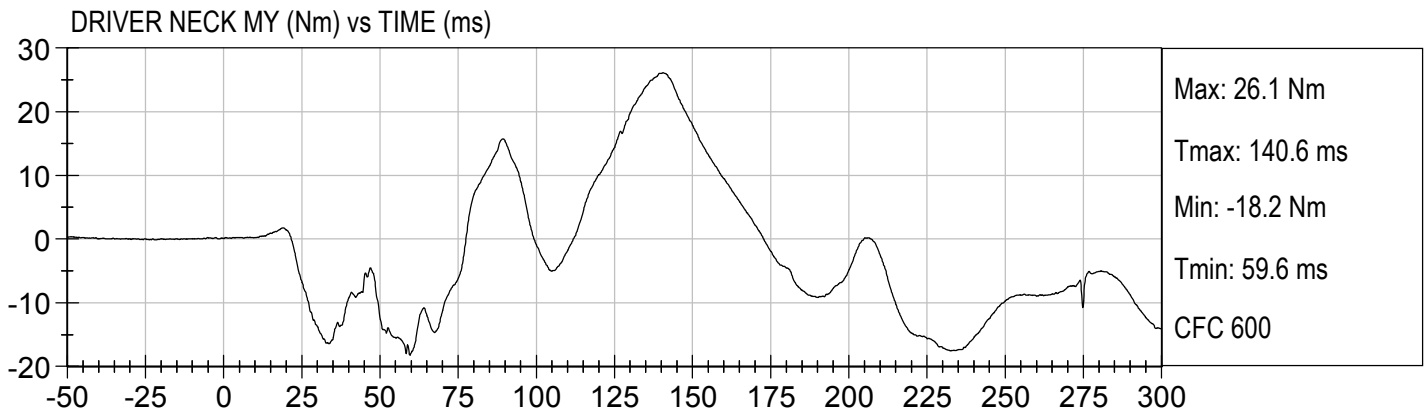
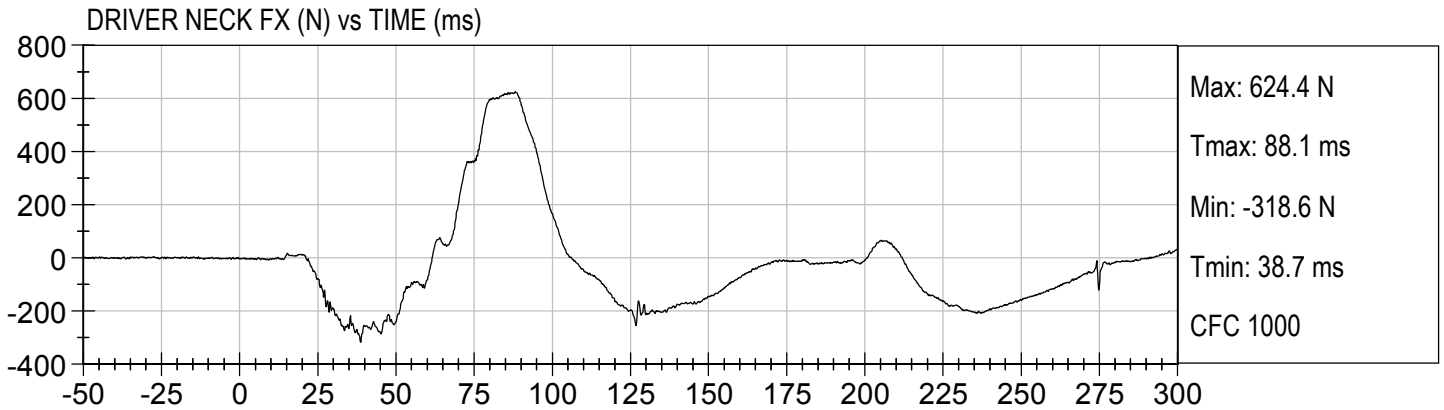
Driver Left Lower Tibia Moment Y
Driver Left Lower Tibia Force Z
Driver Right Upper Tibia Moment X
Driver Right Upper Tibia Moment Y
Driver Right Upper Tibia Force Z
Driver Right Lower Tibia Moment X
Driver Right Lower Tibia Moment Y
Driver Right Lower Tibia Force Z
Driver Left Foot Fore Z
Driver Left 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

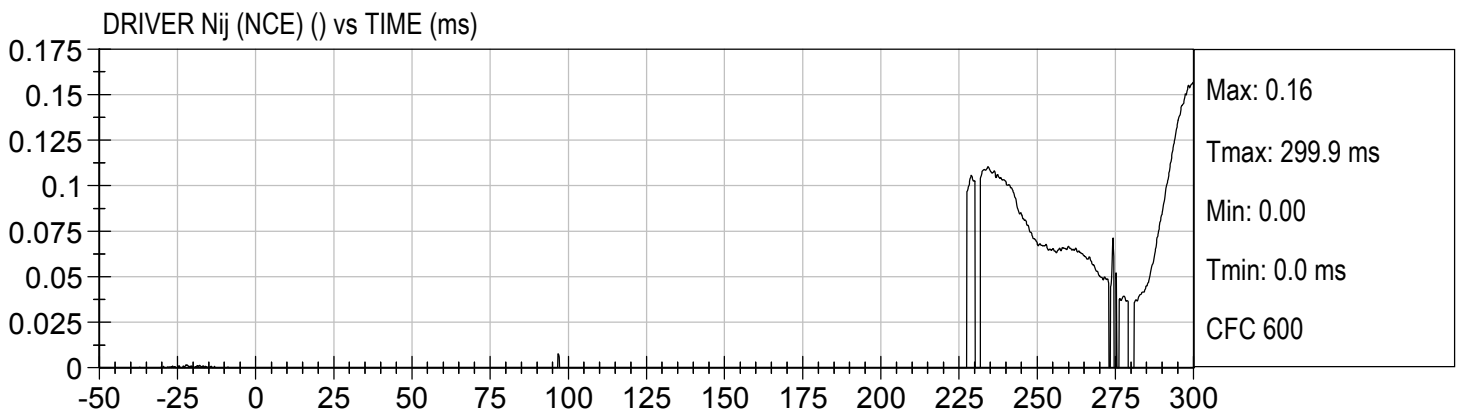
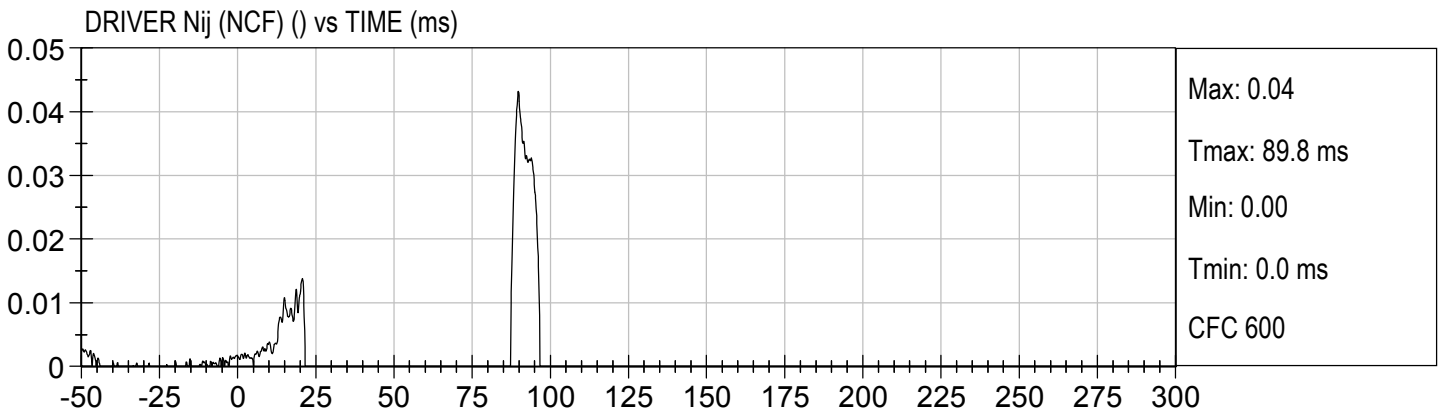
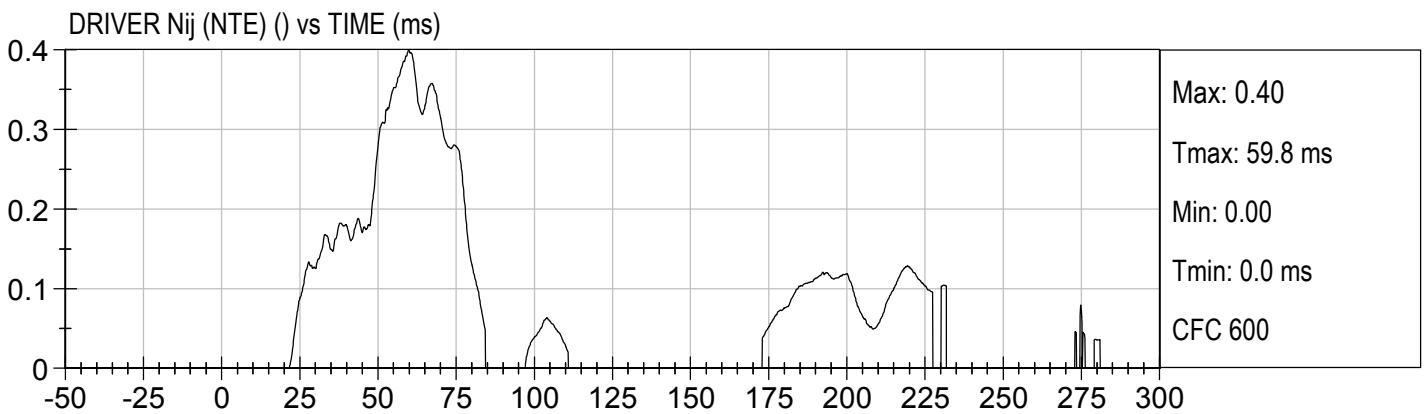
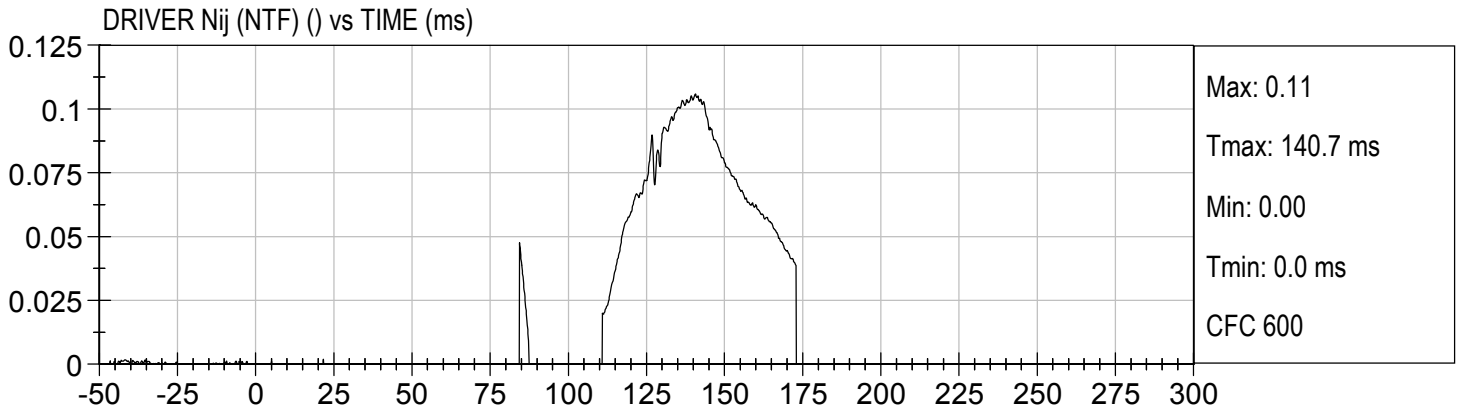
Passenger Left Upper Tibia Moment Y
Passenger Left Upper Tibia Force Z
Passenger Left Lower Tibia Moment X
Passenger Left Lower Tibia Moment Y
Passenger Left Lower Tibia Force Z
Passenger Right Upper Tibia Moment X
Passenger Right Upper Tibia Moment Y
Passenger Right Upper Tibia Force Z
Passenger Right 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

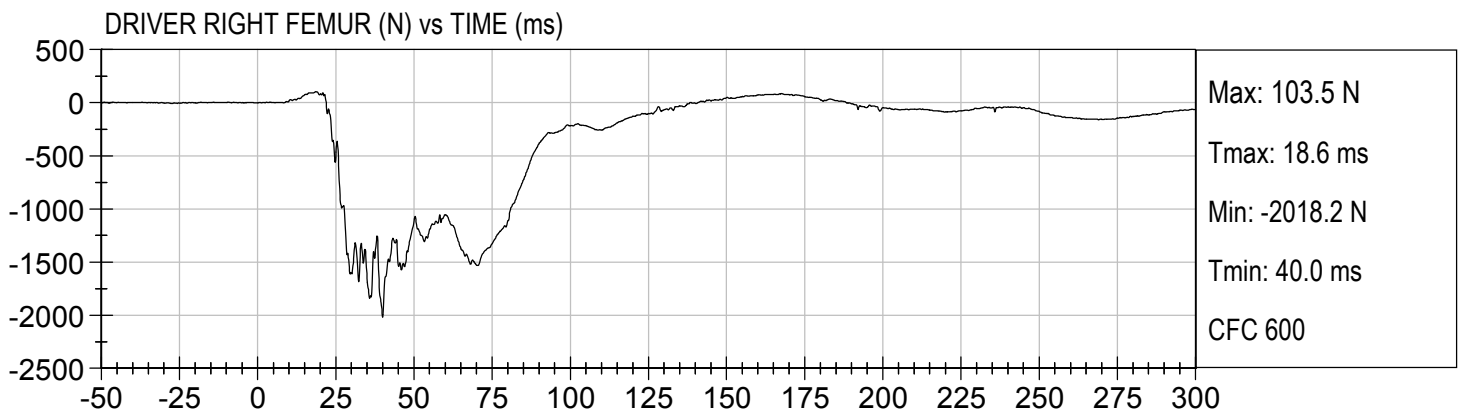
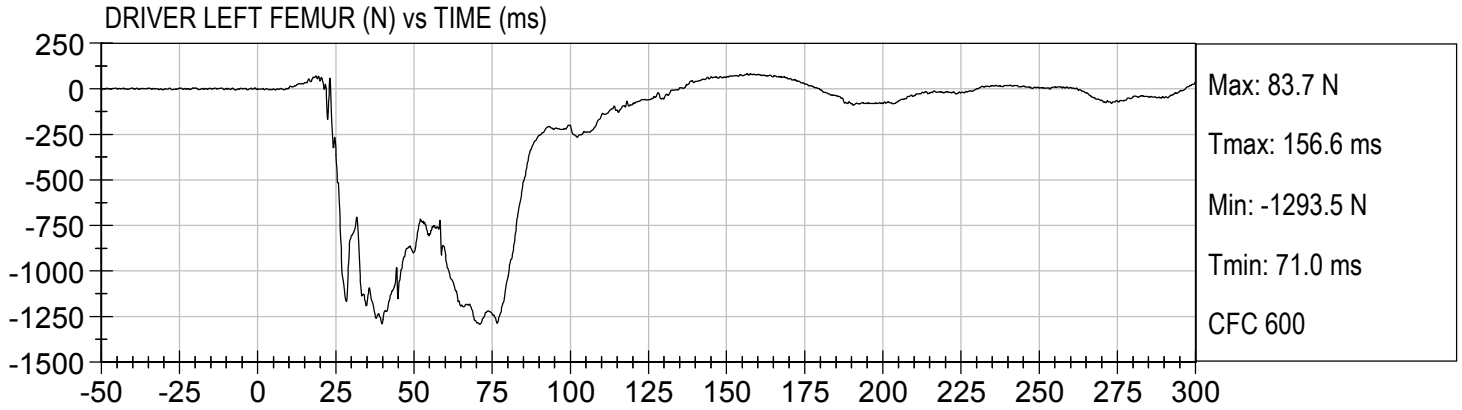


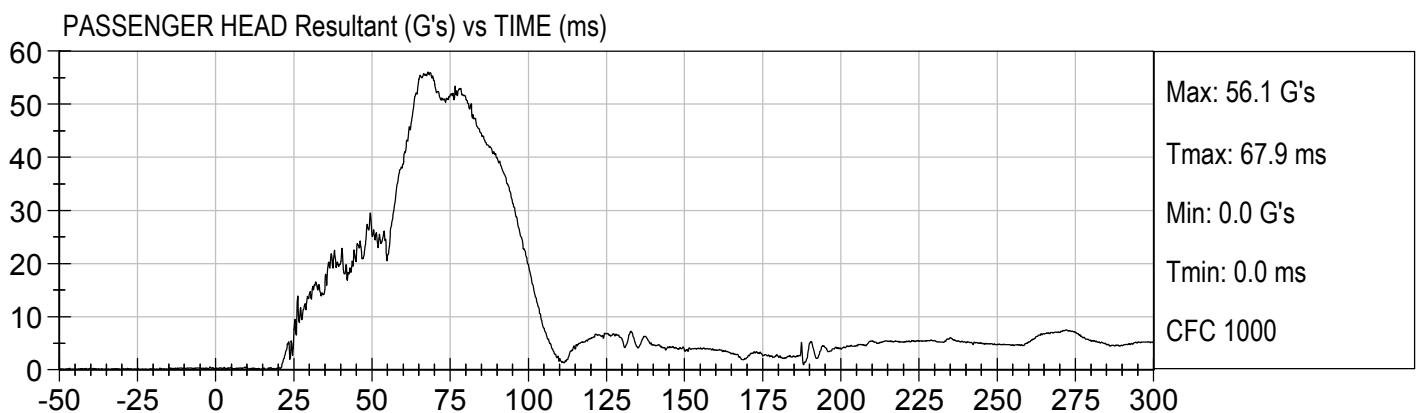
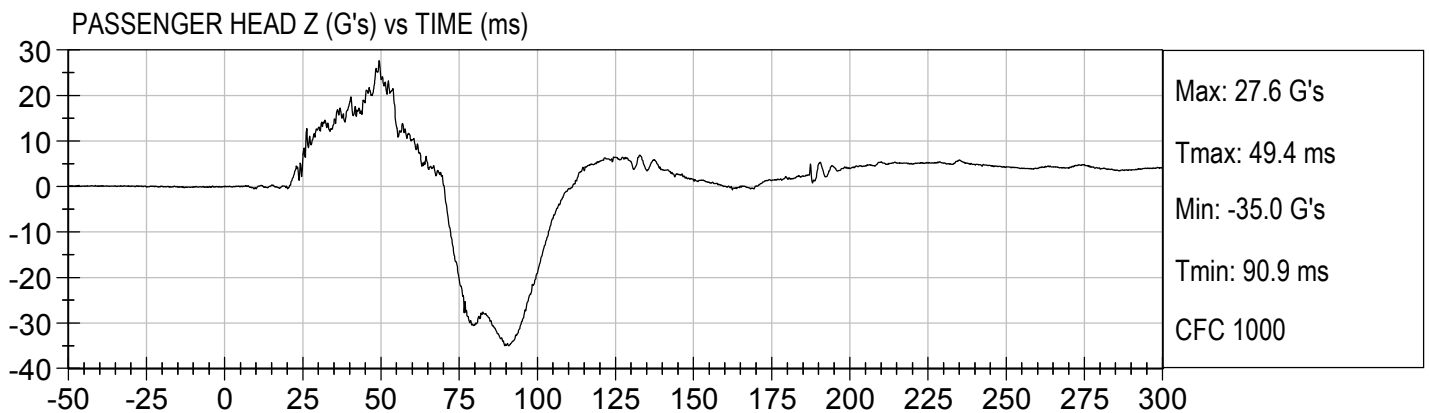
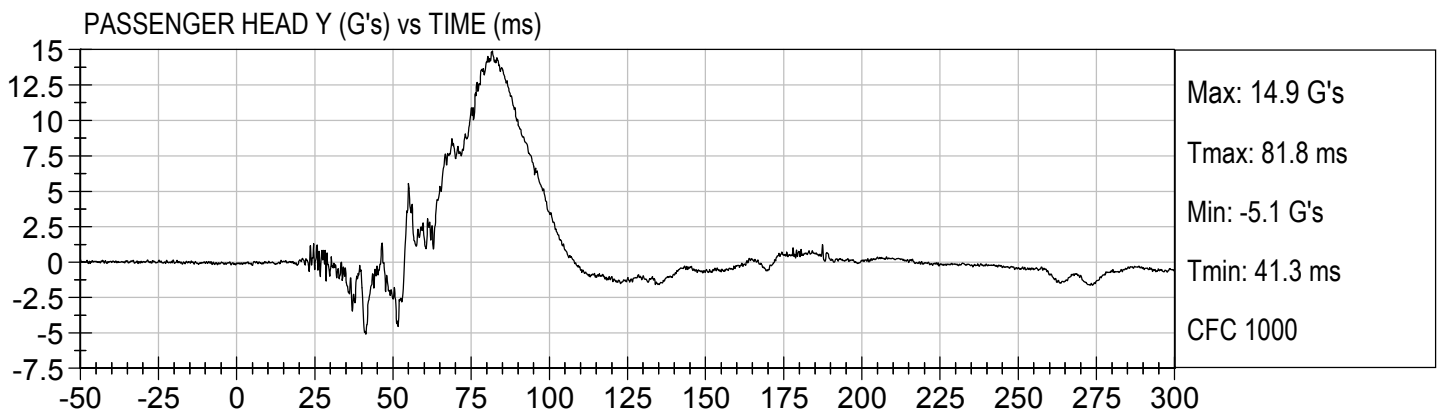
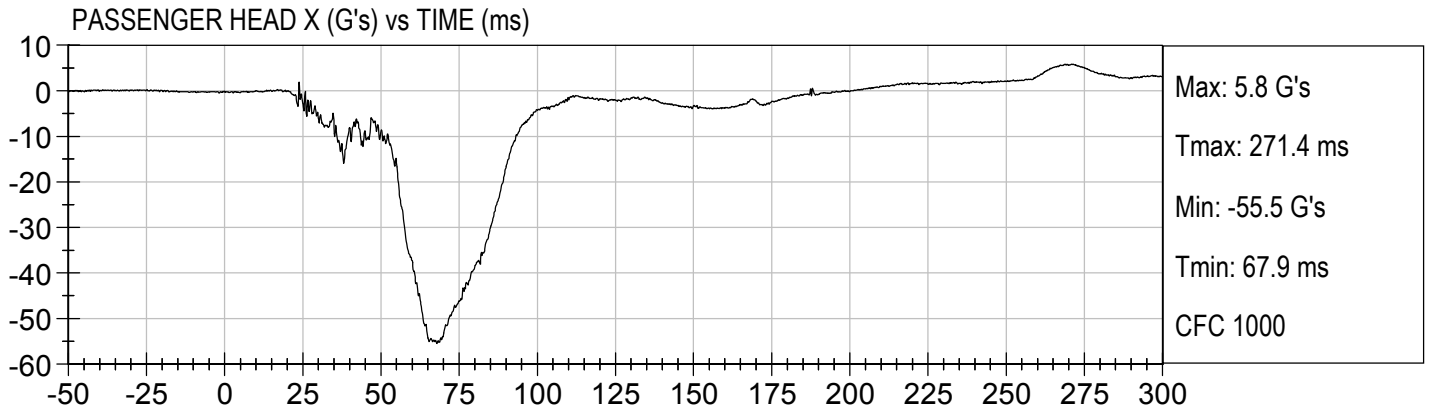


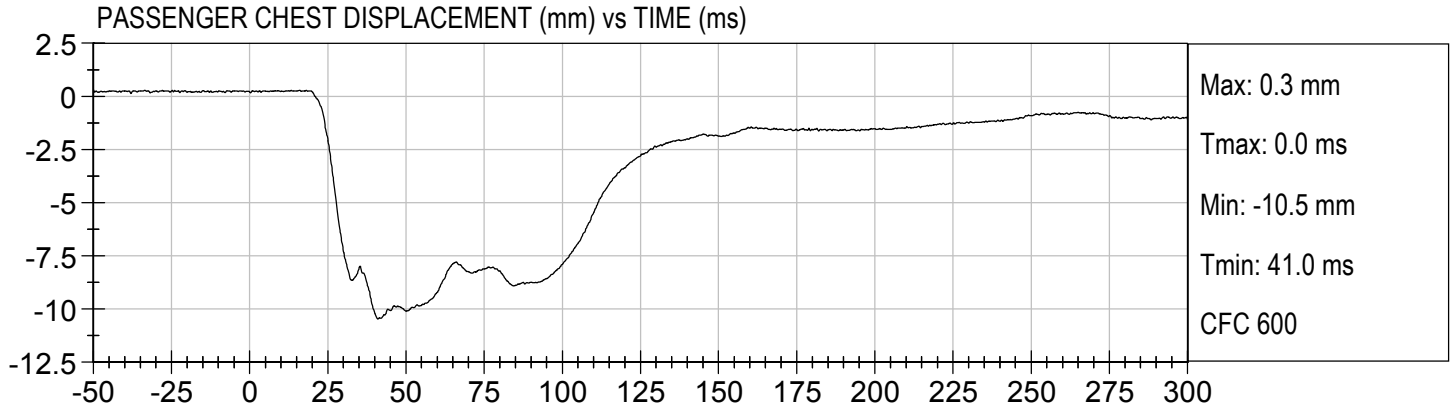


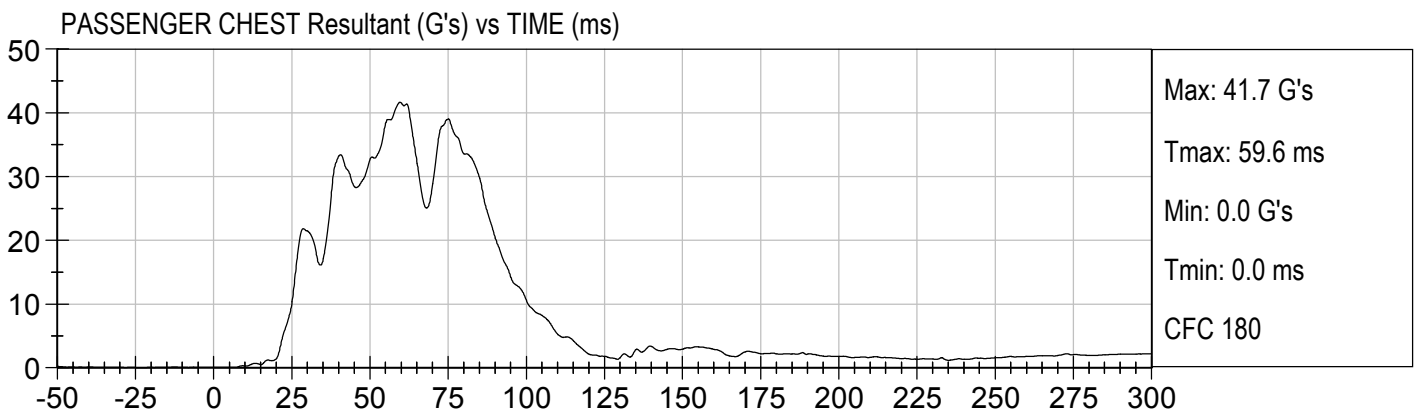
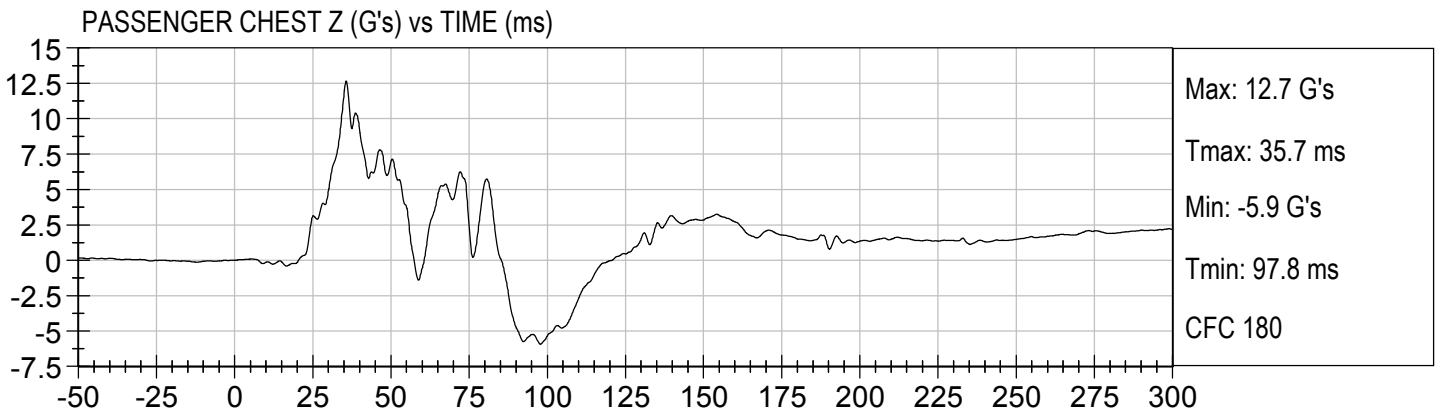
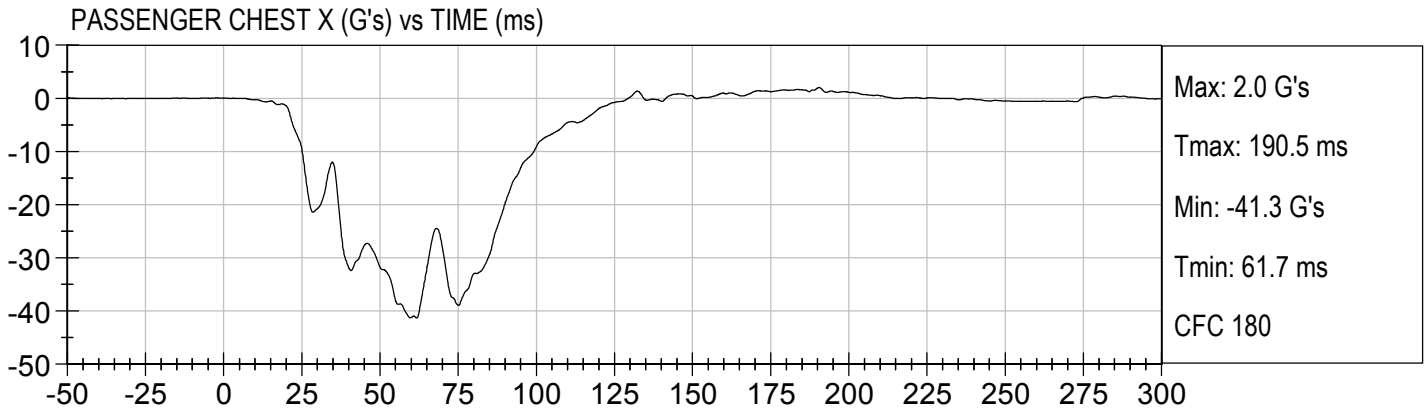


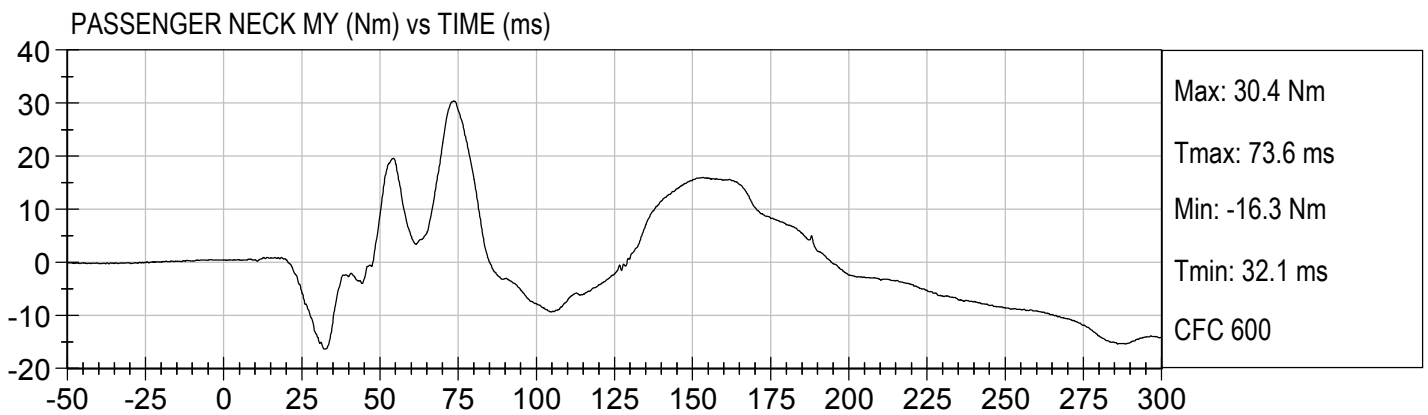
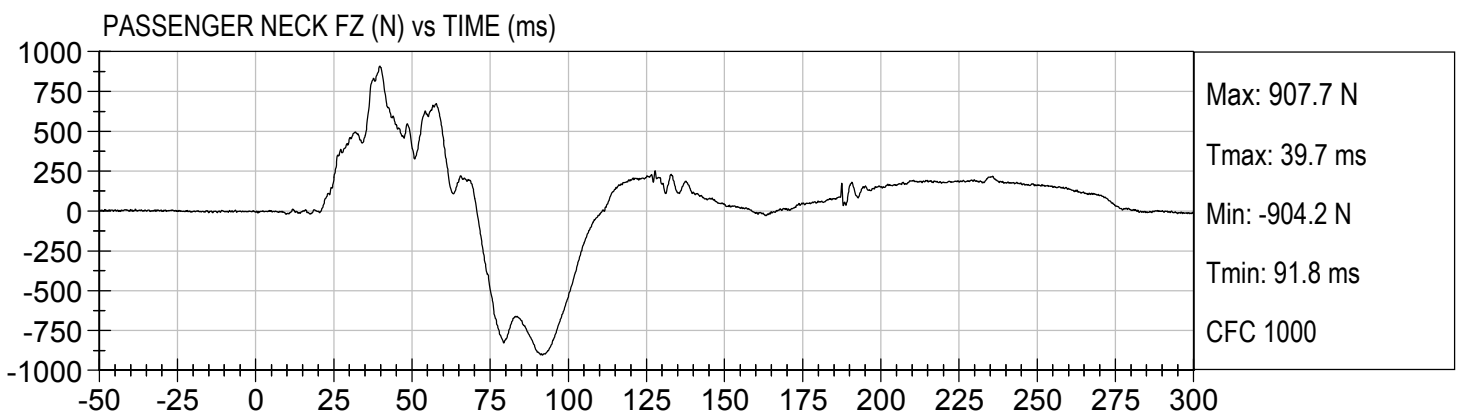
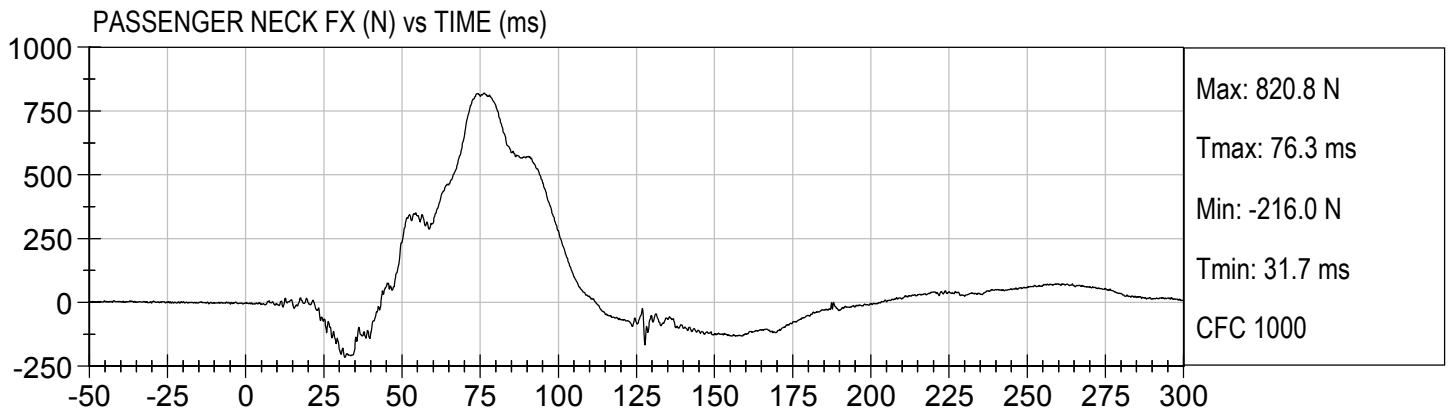


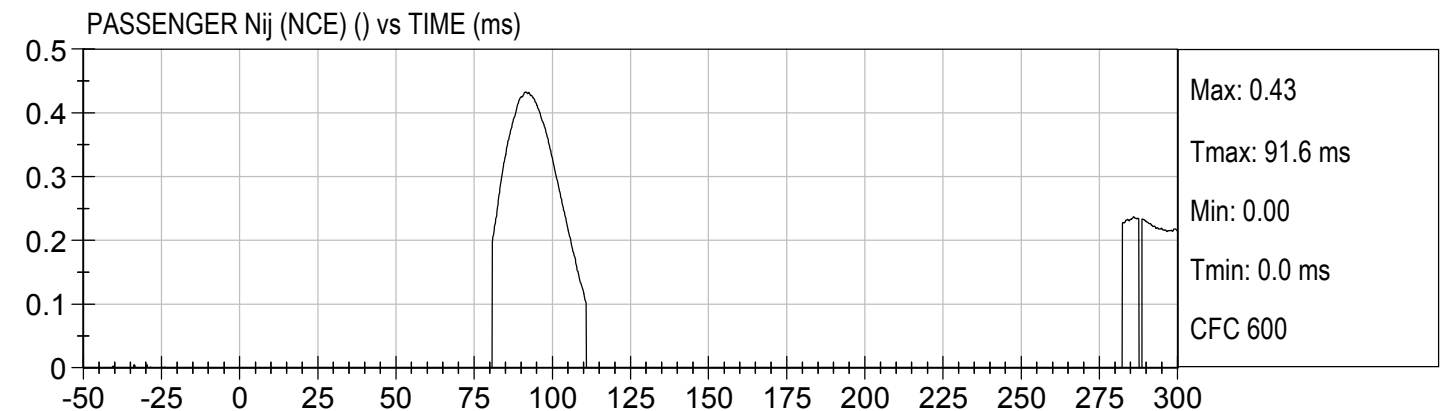
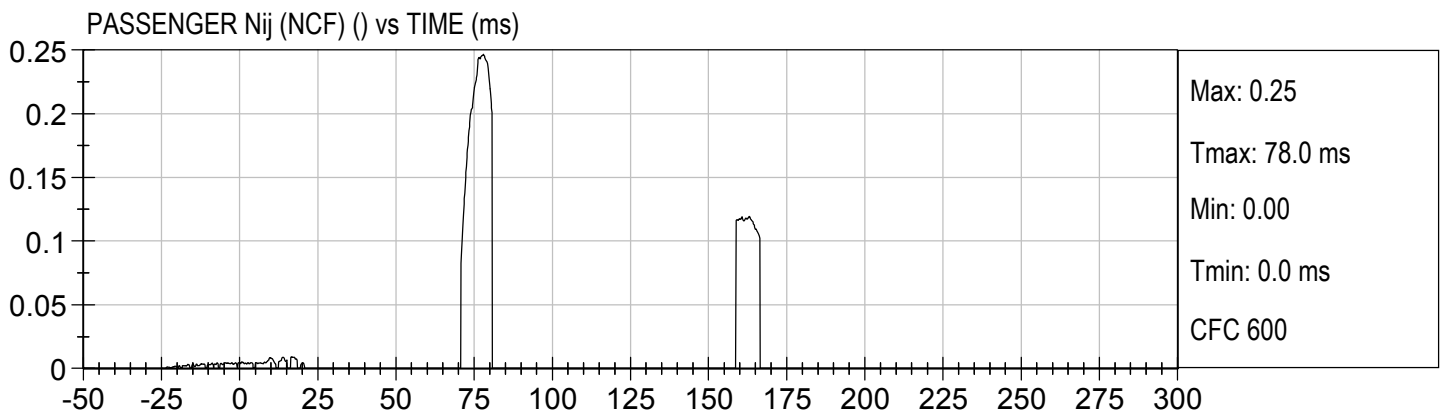
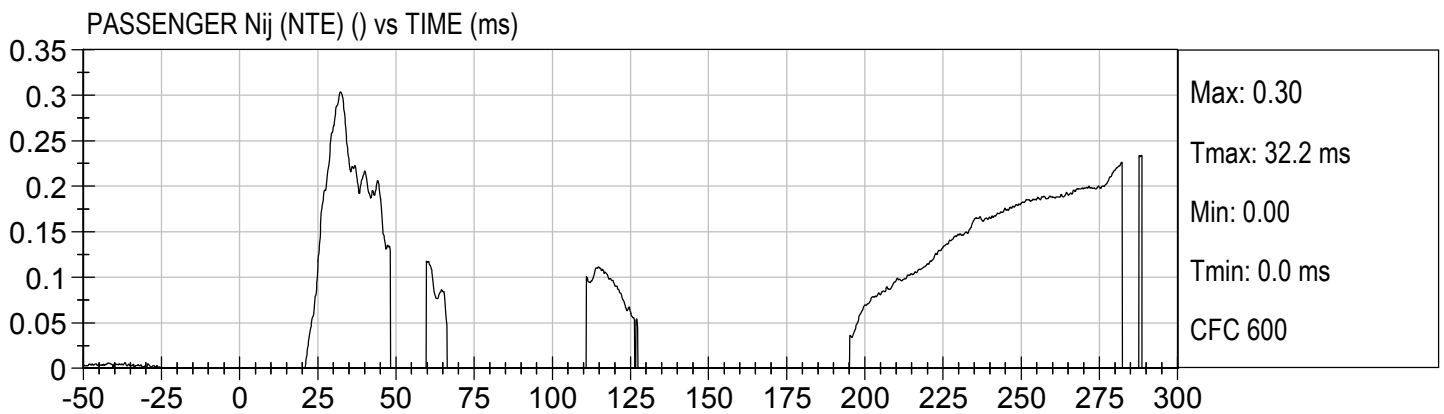
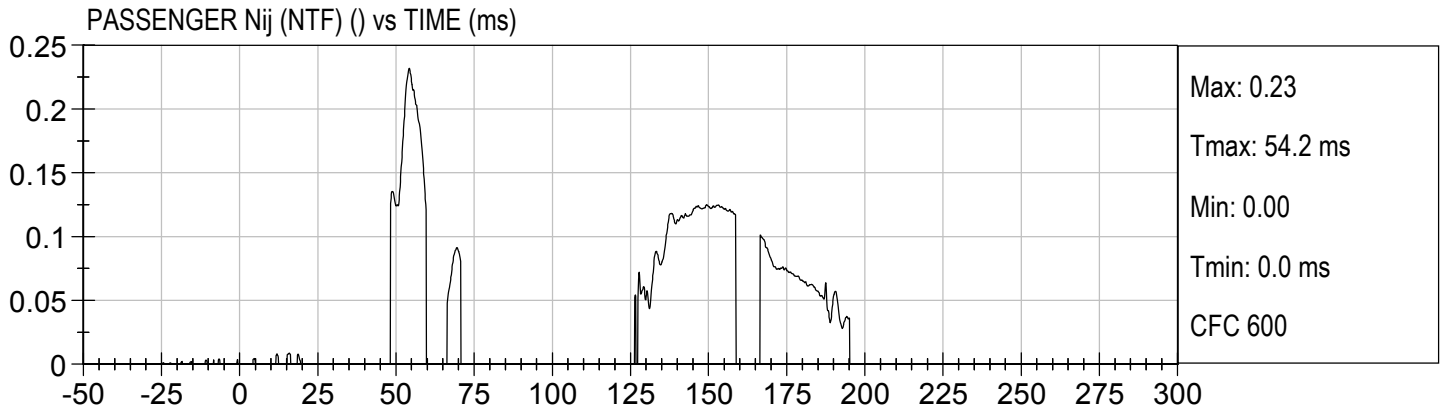


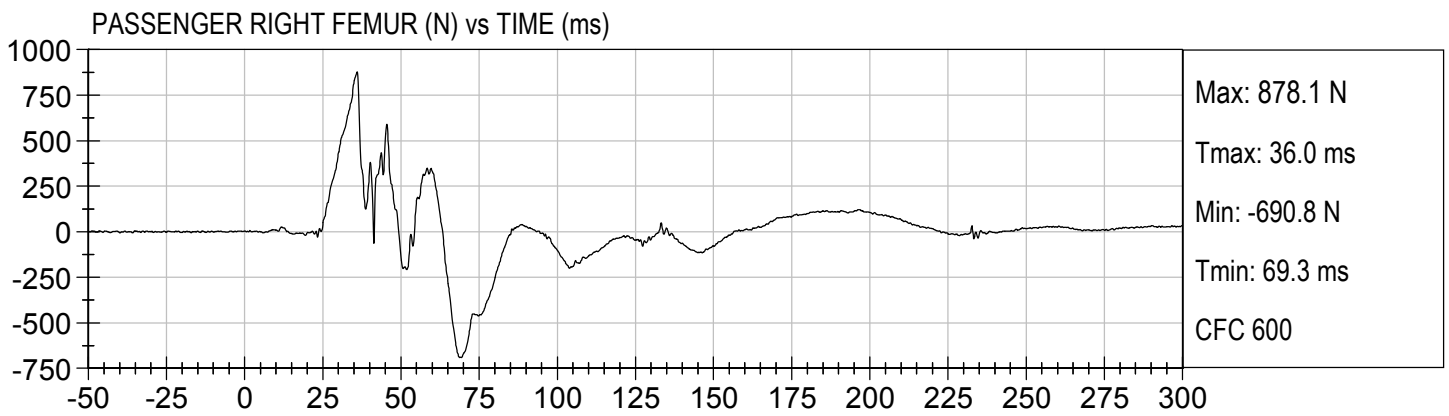
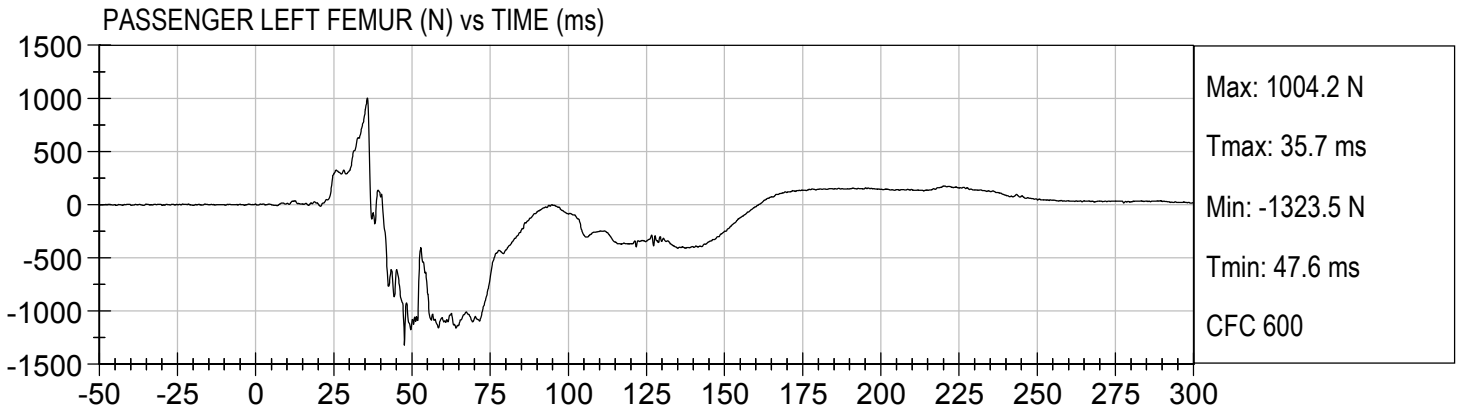












APPENDIX C
DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA

**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

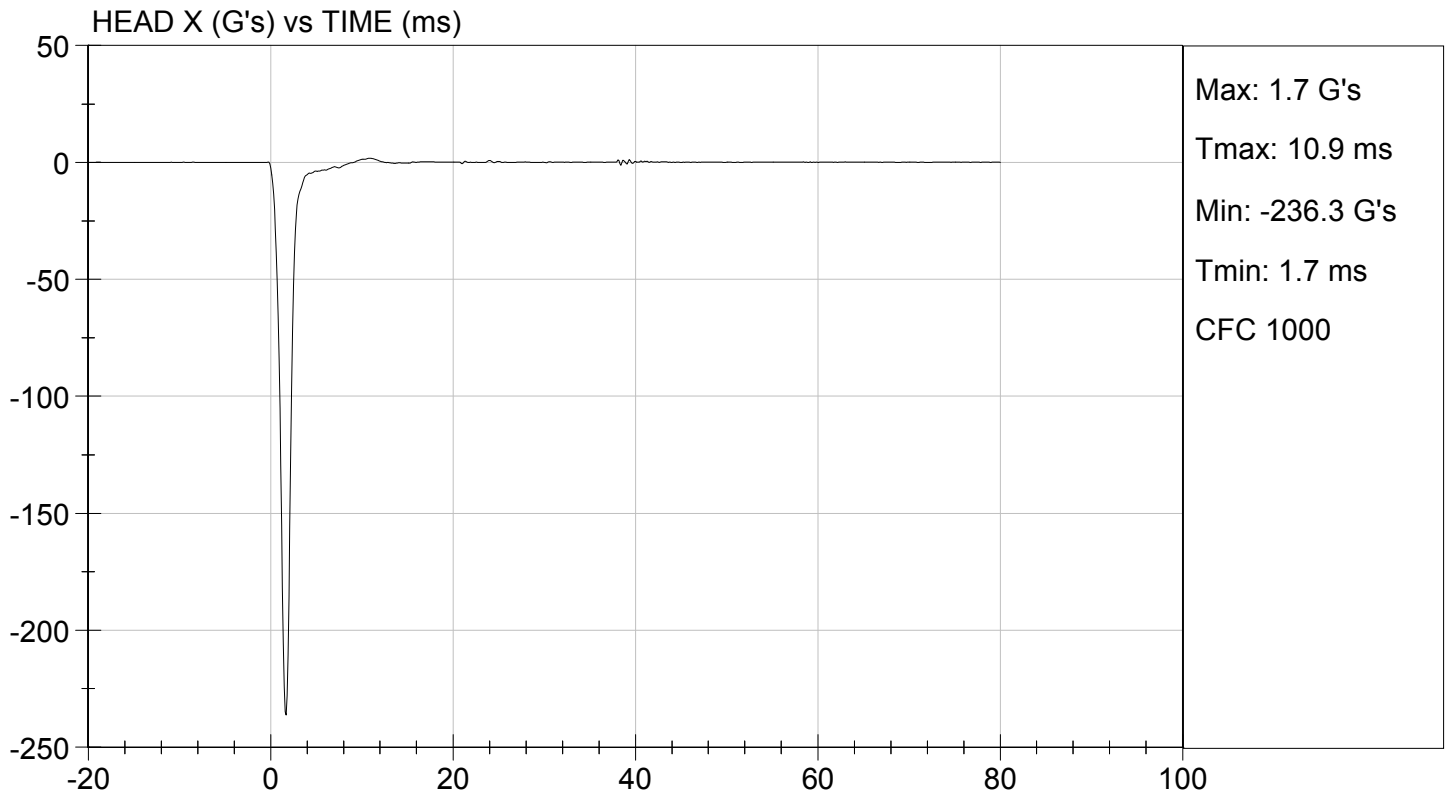
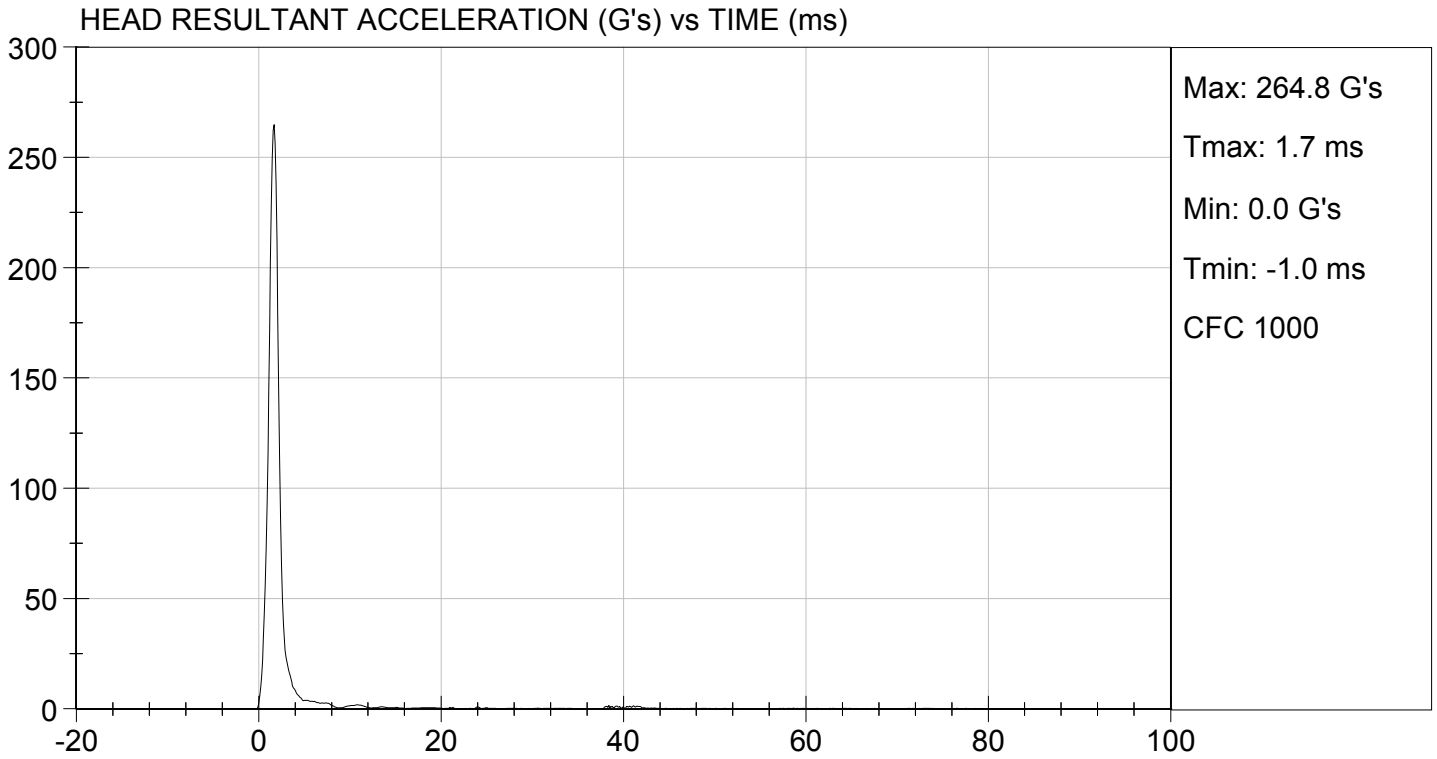
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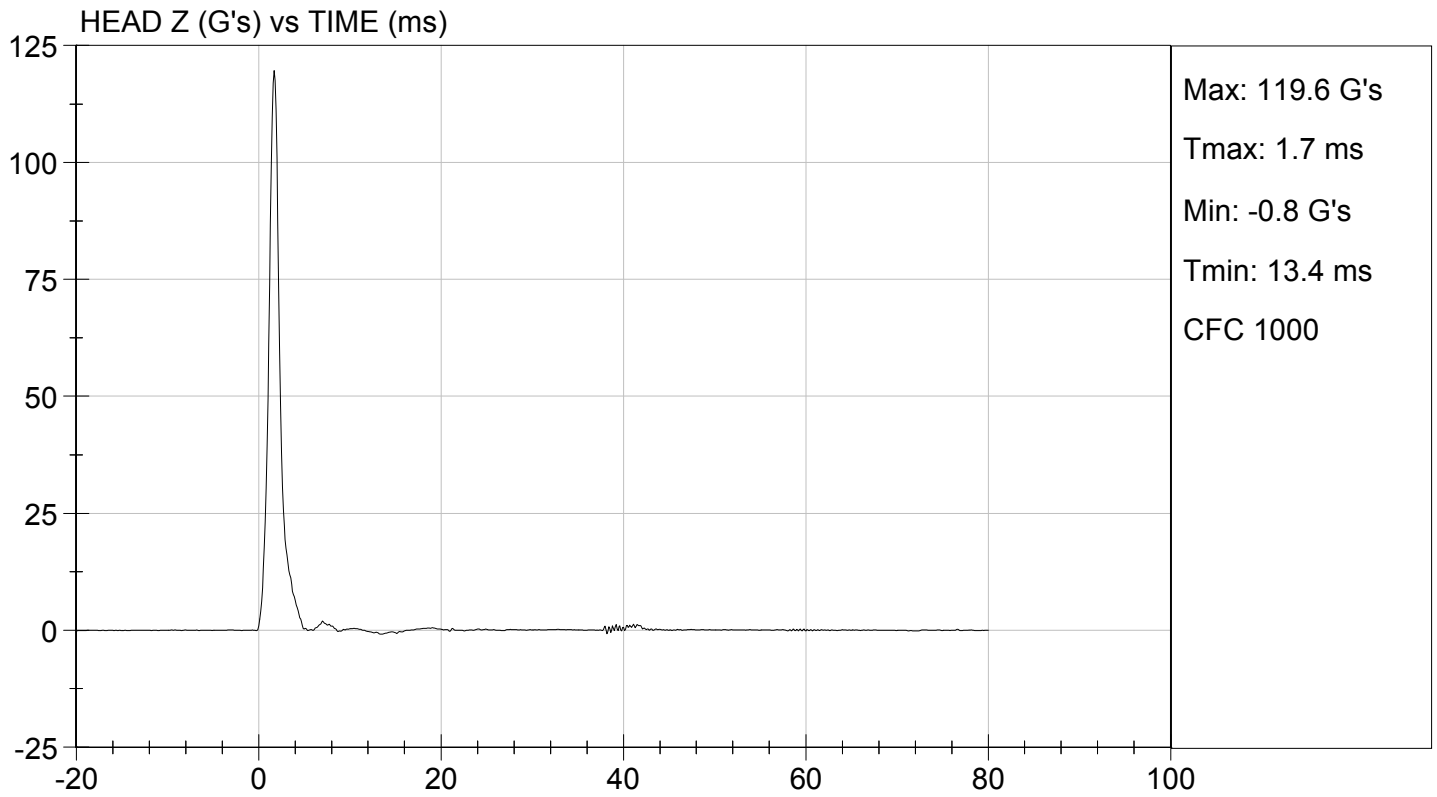
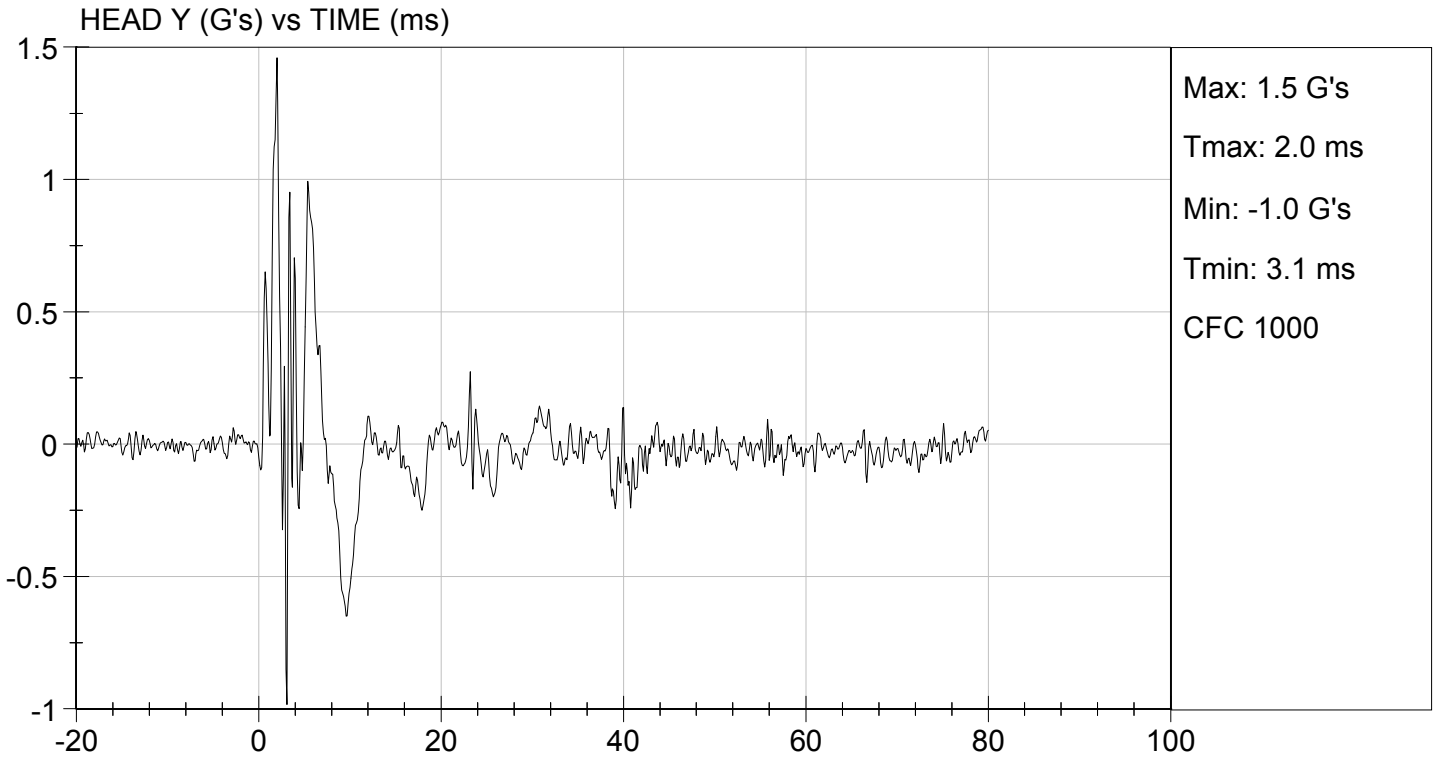
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	39	Pass
Peak Resultant Acceleration	G's	225 to 275	265	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	1.5	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
Overall Test Results				Pass

David Schoedel
 Laboratory Technician

11/25/2014
 Test Date

Jessica Hall
 Approved By





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

ATD Serial No: 351

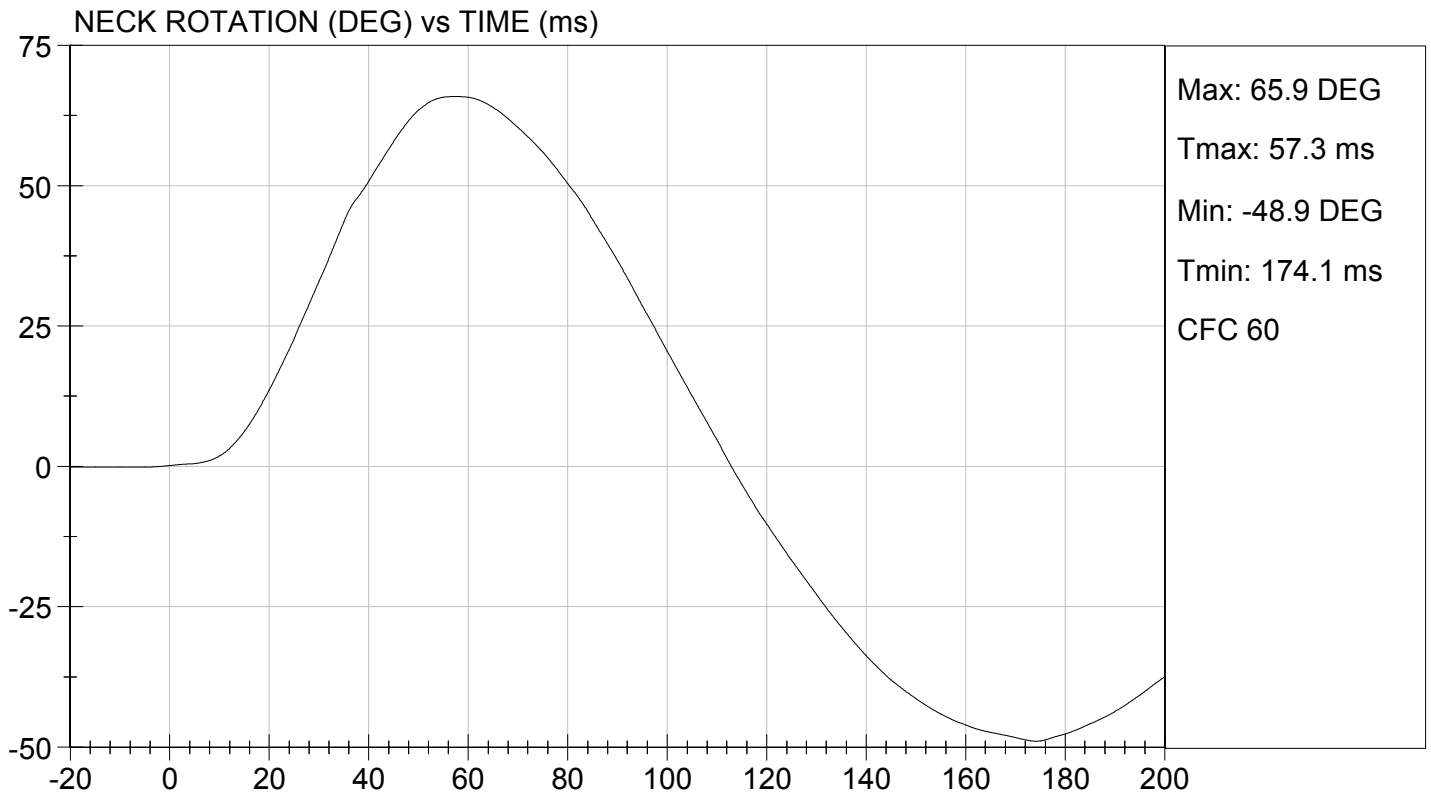
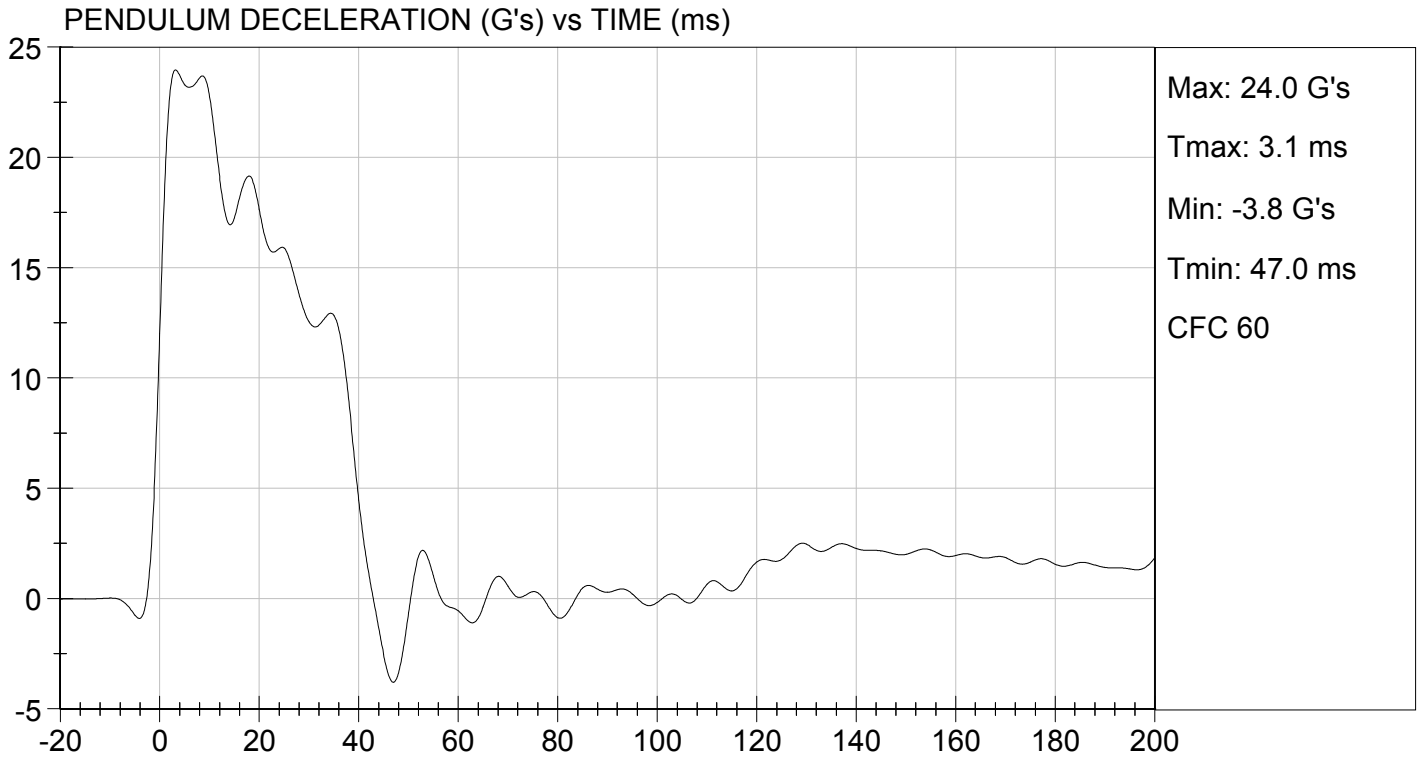
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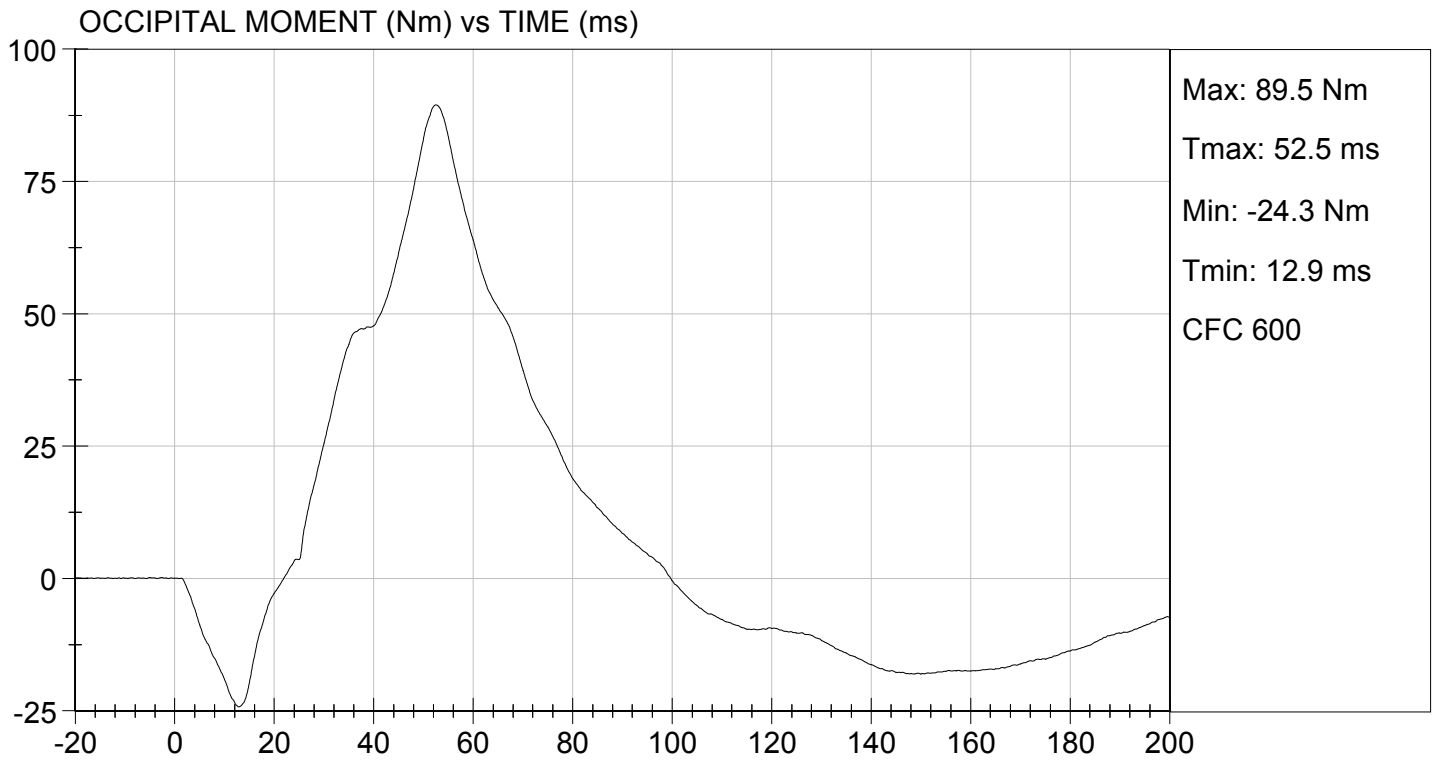
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity		%	10 to 70	39	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.96	Pass
Pendulum Deceleration	10 ms	G's	22.50 to 27.50	22.75	Pass
	20 ms	G's	17.60 to 22.60	17.65	Pass
	30 ms	G's	12.50 to 18.50	12.53	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 29.0	12.9	Pass
Deceleration Decay Time to Cross 5 G's		ms	34.0 to 42.0	39.8	Pass
Maximum "D" Plane Rotation	Maximum	Deg	64.0 to 78.0	65.9	Pass
	Time	ms	57.0 to 64.0	57.3	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	113.0 to 128.0	113.1	Pass
Moment About Occipital Condyle	Maximum	Nm	88.1 to 108.5	89.5	Pass
	Time	ms	47.0 to 58.0	52.5	Pass
Positive Moment Decay Time To Zero Crossing		ms	97.0 to 107.0	99.9	Pass
Overall Test Results					Pass

David Schoedel
Laboratory Technician

11/24/2014
Test Date

Jessica Hall
Approved By





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

ATD Serial No: 351

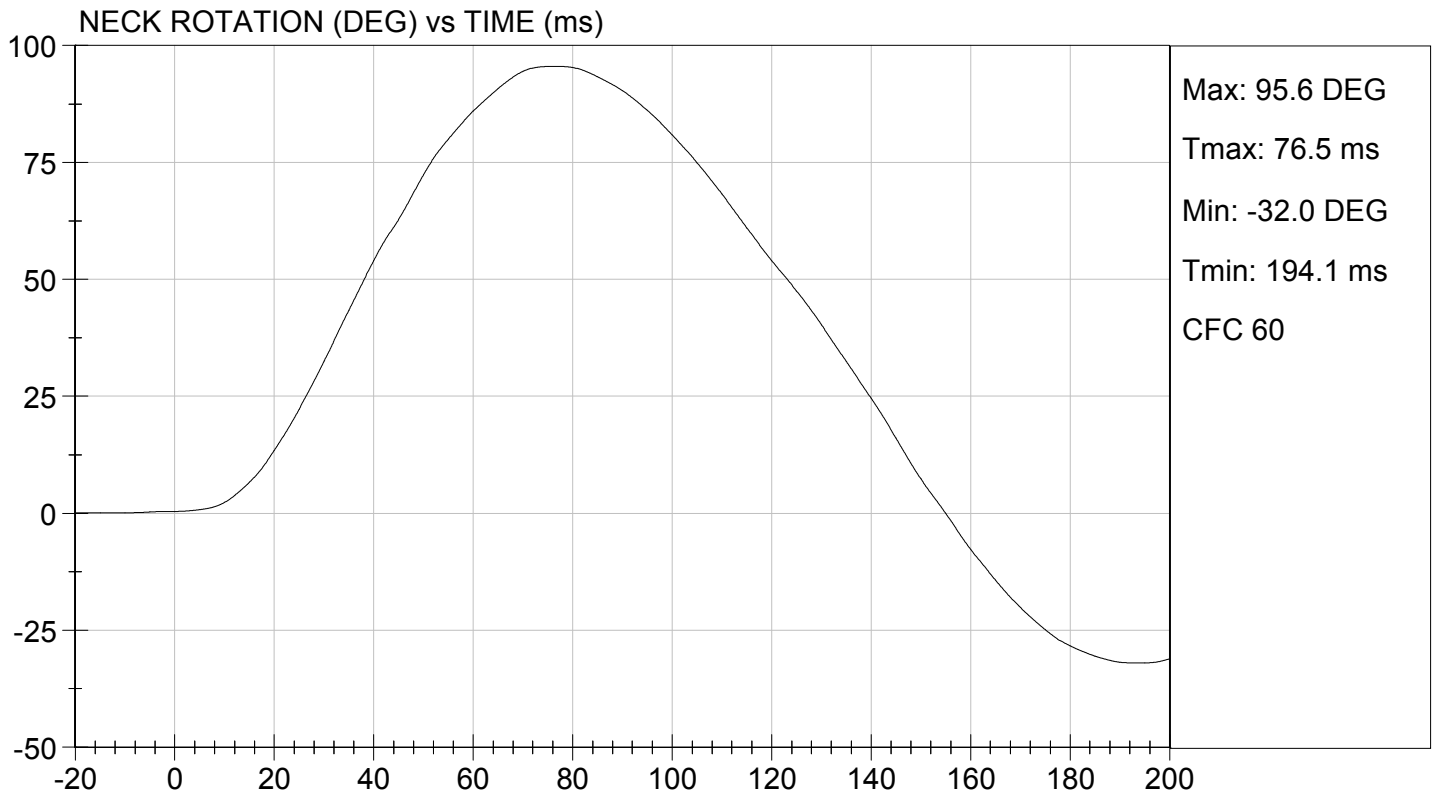
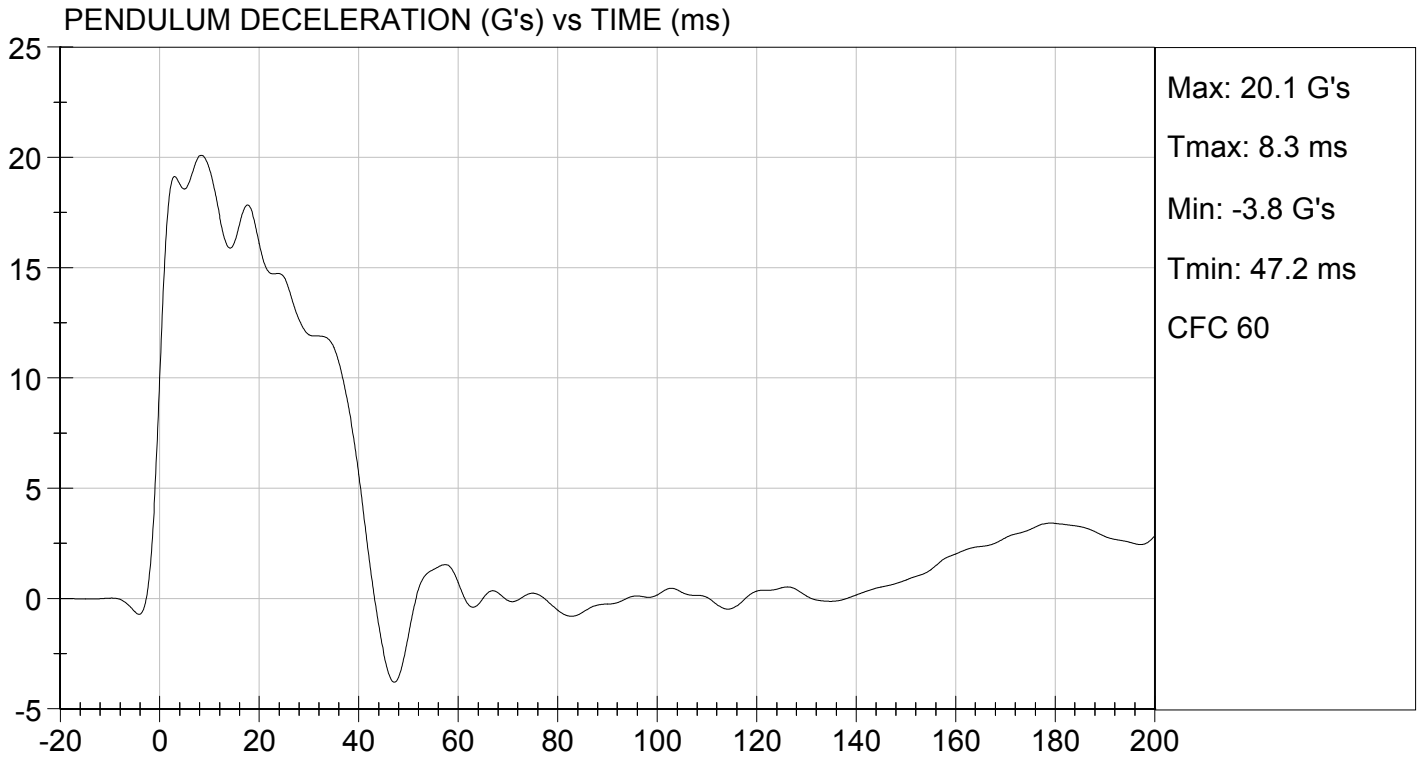
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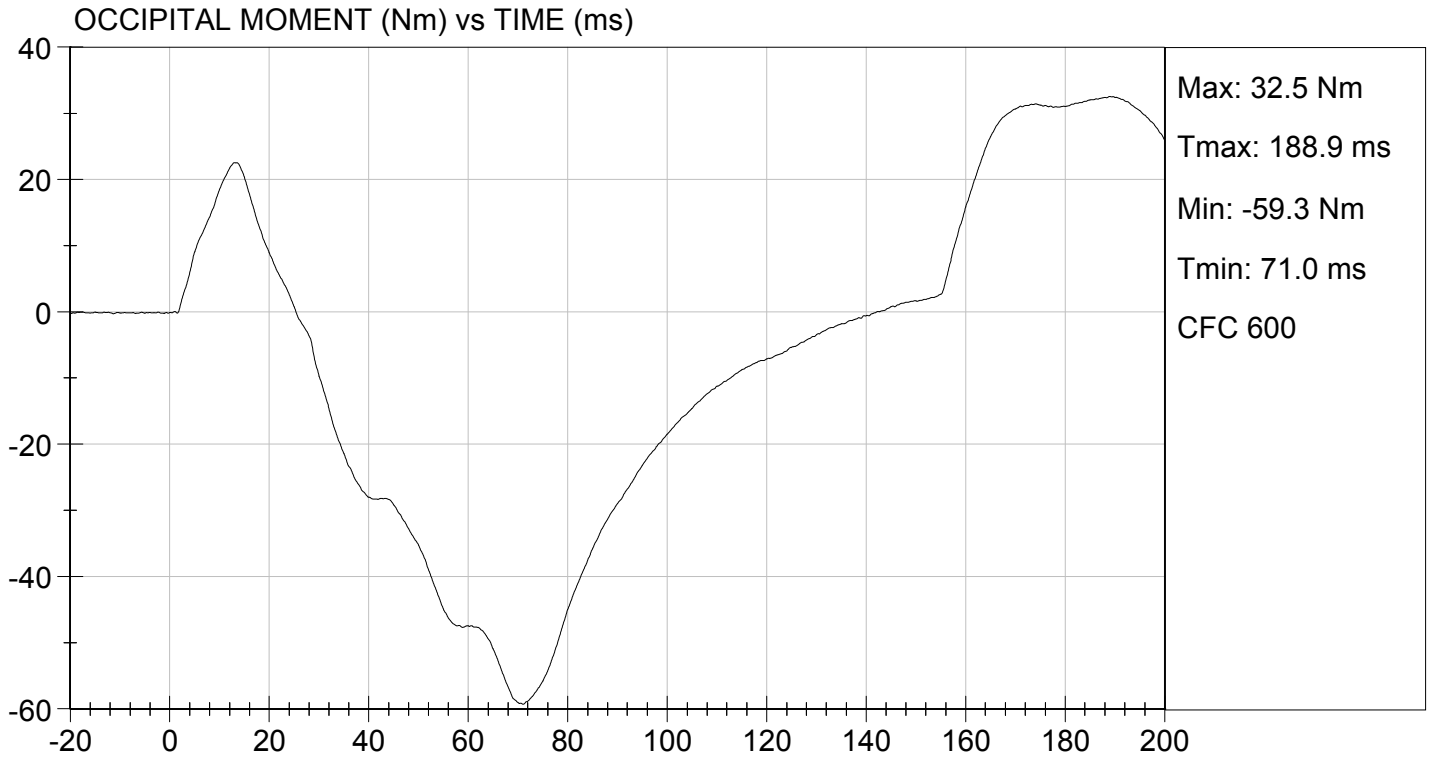
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity		%	10 to 70	39	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.12	Pass
Pendulum Deceleration	10 ms	G's	17.20 to 21.20	19.45	Pass
	20 ms	G's	14.00 to 19.00	16.09	Pass
	30 ms	G's	11.00 to 16.00	11.96	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 22.0	11.9	Pass
Deceleration Decay Time to Cross 5 G's		ms	38.0 to 46.0	40.5	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	95.6	Pass
	Time	ms	72.0 to 82.0	76.5	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	147.0 to 174.0	155.1	Pass
Moment About Occipital Condyle	Maximum	Nm	-52.9 to -79.9	-59.3	Pass
	Time	ms	65.0 to 79.0	71.0	Pass
Negative Moment Decay Time To Zero Crossing		ms	120.0 to 148.0	142.2	Pass
Overall Test Results					Pass

David Schoedel
Laboratory Technician

11/24/2014
Test Date

Jessica Hall
Approved By





MGA RESEARCH CORPORATION
THORAX IMPACT
HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351

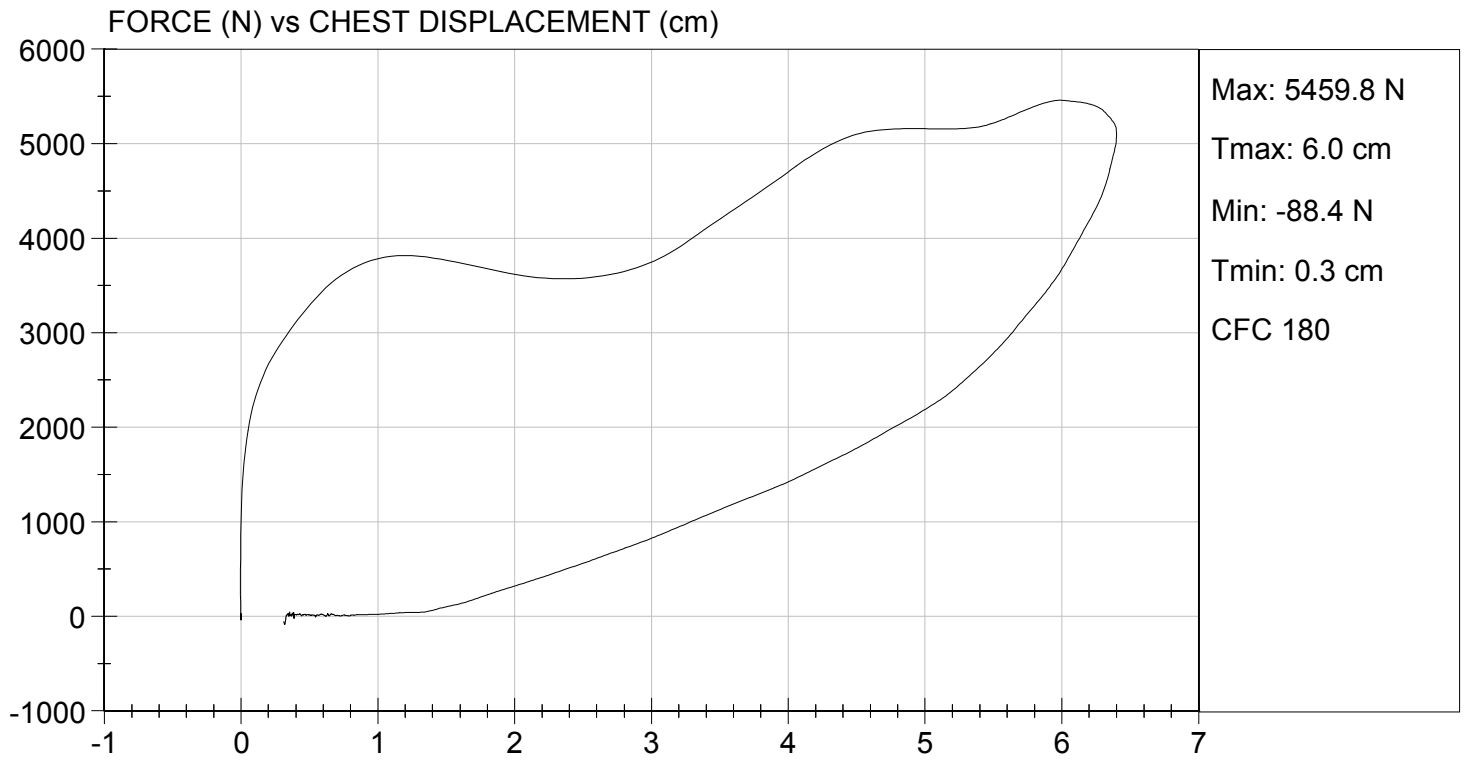
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Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	27	Pass
Probe Velocity	m/s	6.58 to 6.82	6.60	Pass
Peak Probe Force	N	5159 to 5893	5,460	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.40	Pass
Internal Hysteresis	%	69 to 85	70	Pass
Overall Test Results				Pass

David Schoedel
 Laboratory Technician

11/25/2014
 Test Date

Jessica Hall
 Approved By



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

ATD Serial No: 351

Test I.D: D144165

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	38	Pass
Probe Velocity	m/s	2.07 to 2.13	2.13	Pass
Peak Probe Force	N	4715 to 5782	5,136	Pass
Overall Test Results				Pass

David Schoedel
 Laboratory Technician

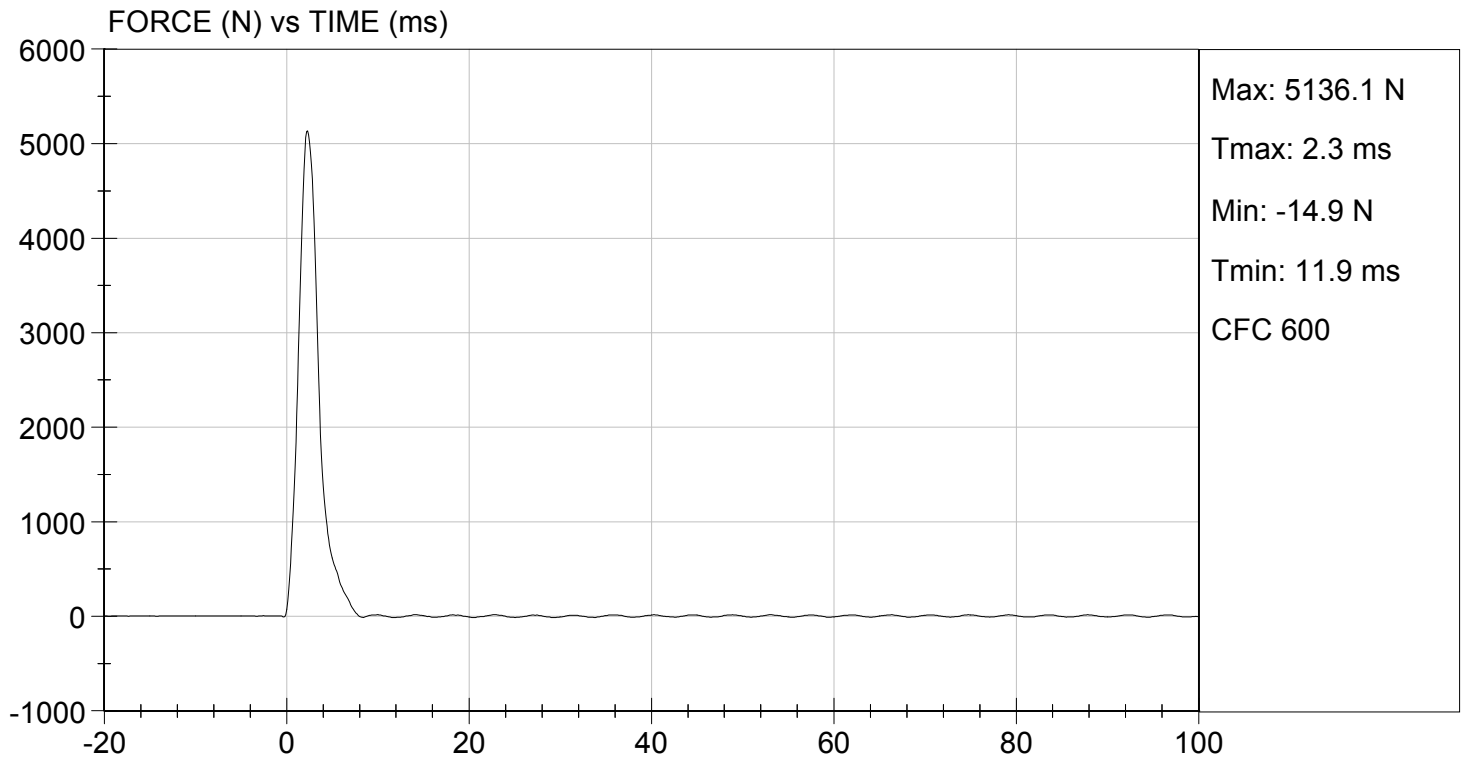
11/24/2014
 Test Date

Jessica Hall
 Approved By



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

TEST DATE: 11/24/2014
TEST #: D144165



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

ATD Serial No: 351

Test I.D: D144166

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	38	Pass
Probe Velocity	m/s	2.07 to 2.13	2.13	Pass
Peak Probe Force	N	4715 to 5782	5,073	Pass
Overall Test Results				Pass

David Schoedel
 Laboratory Technician

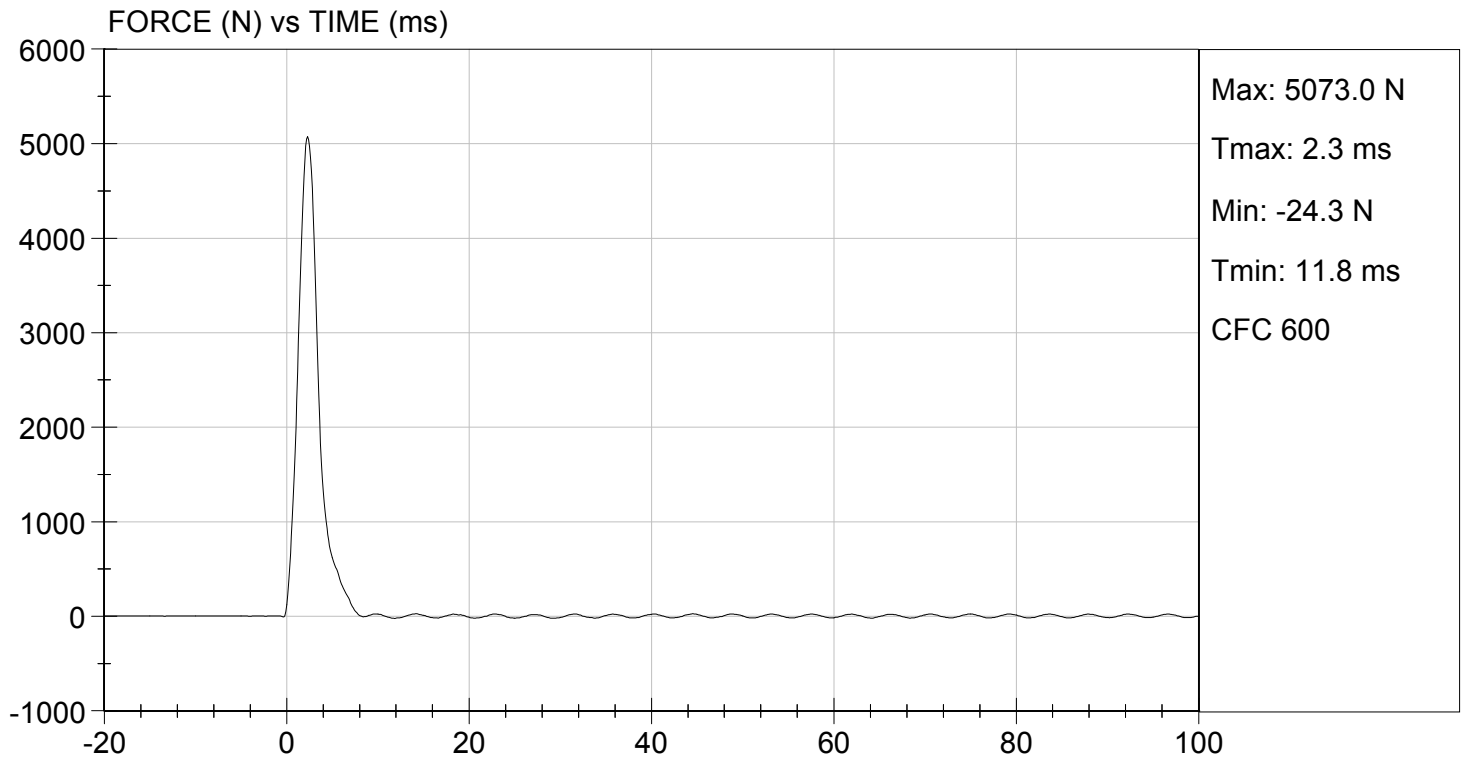
11/24/2014
 Test Date

Jessica Hall
 Approved By



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

TEST DATE: 11/24/2014
TEST #: D144166



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

ATD Serial No: 351

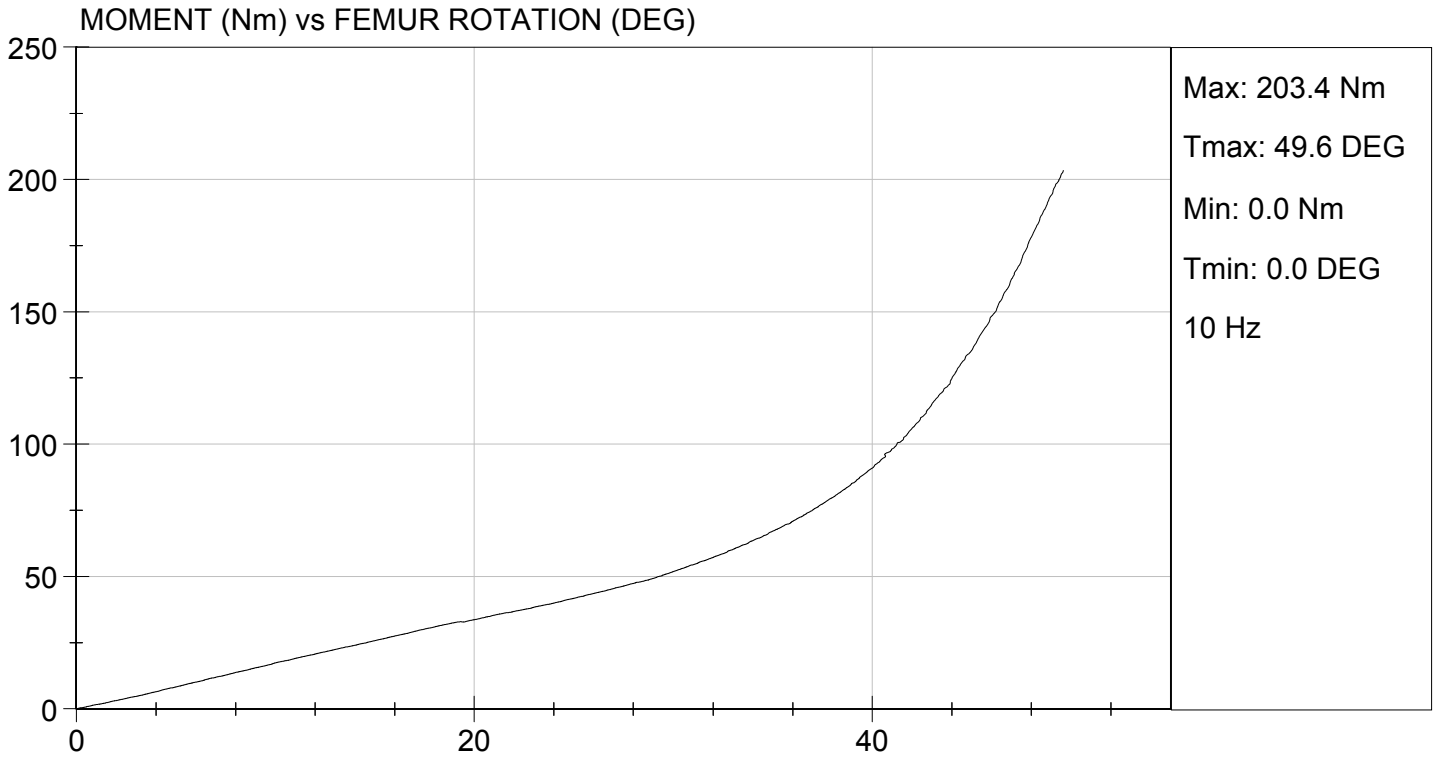
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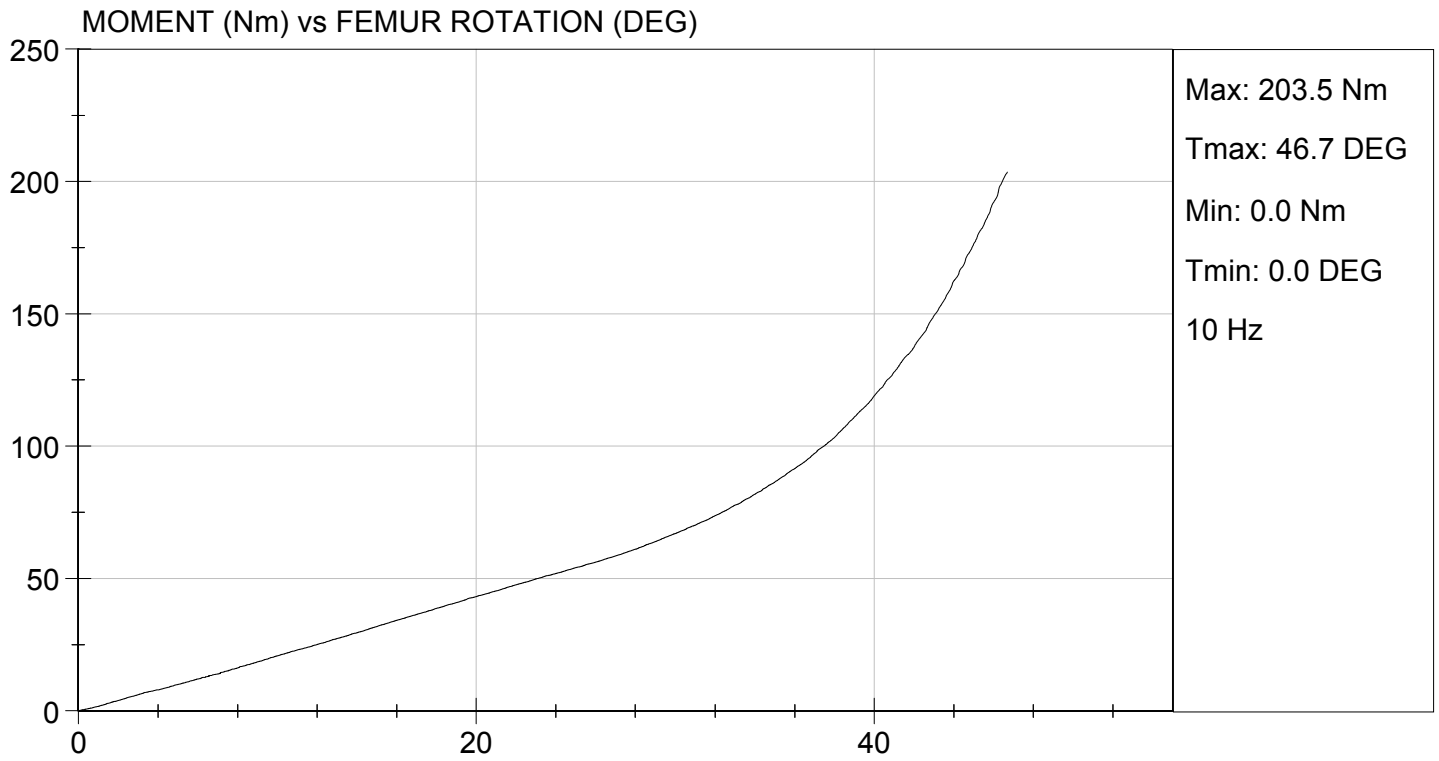
Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	21.8	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	38	38	Pass
Rotation Rate	deg/s	5.0 to 10.0	6.3	6.3	Pass
30 Degrees	Nm	94.9 Nm Max	51.8	66.9	Pass
150 ft-lbf / 203.4 Nm	Deg	40.0 to 50.0 Degree Max Rotation	49.6	46.7	Pass
Overall Test Results					Pass

Jack Coleman
 Laboratory Technician

11/24/2014
 Test Date

Jessica Hall
 Approved By





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

ATD Serial No: 351

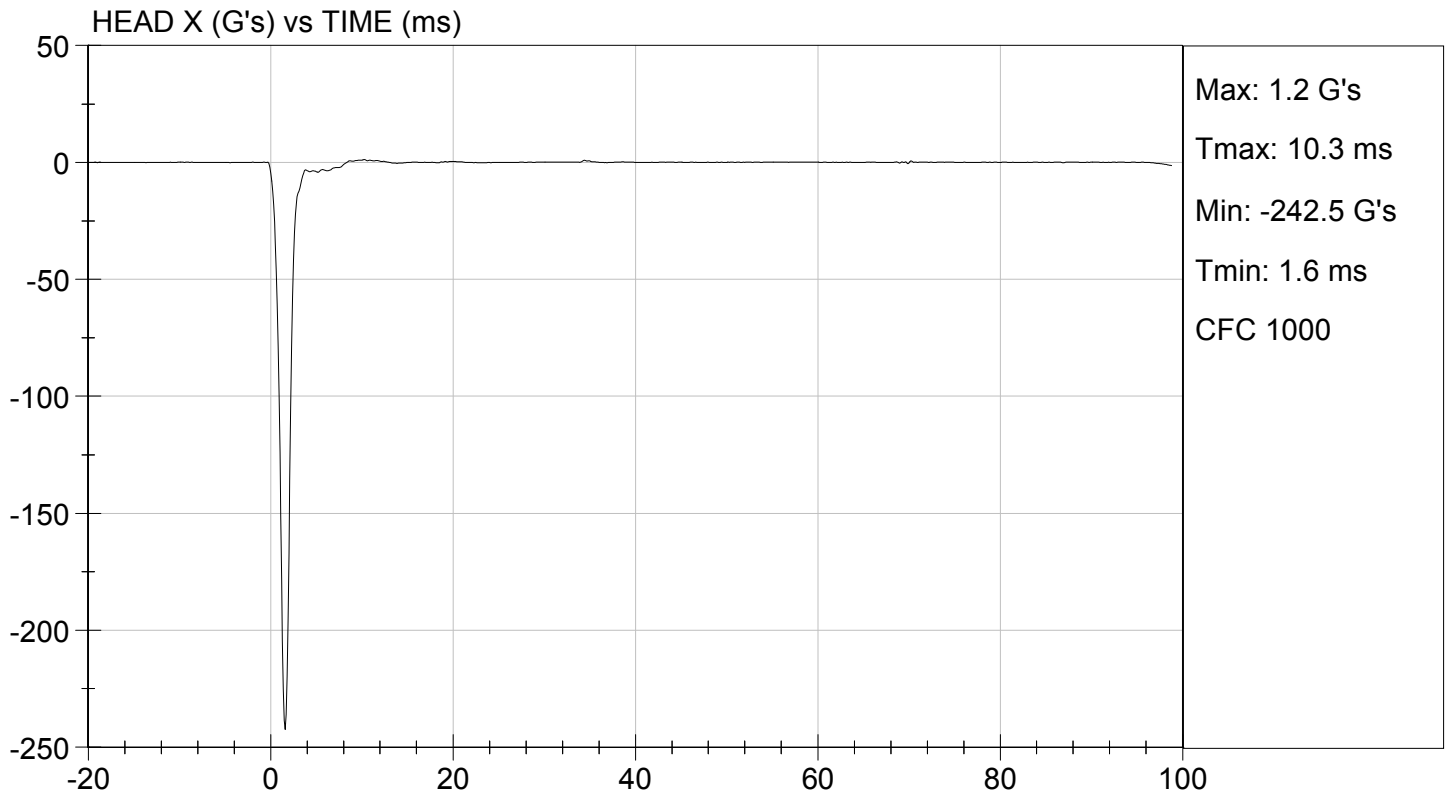
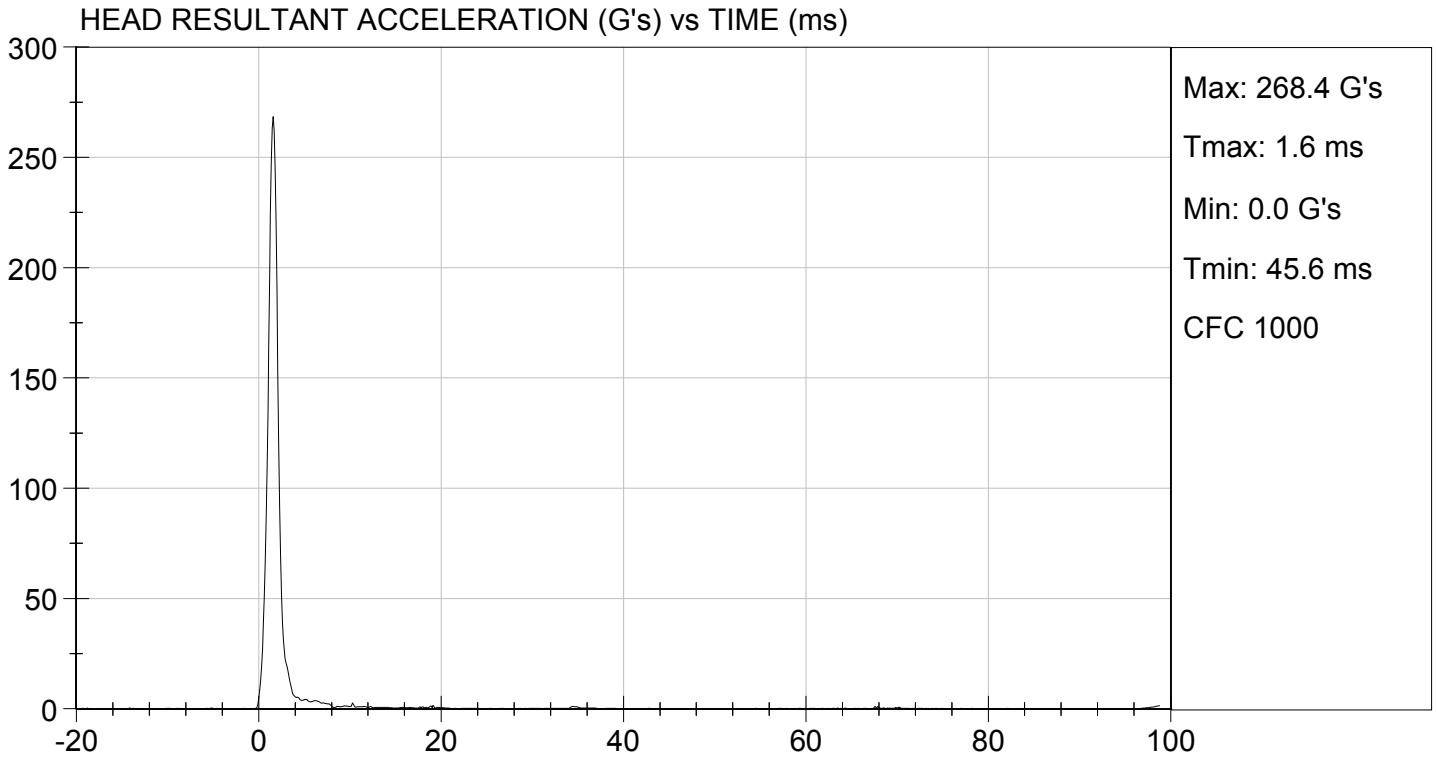
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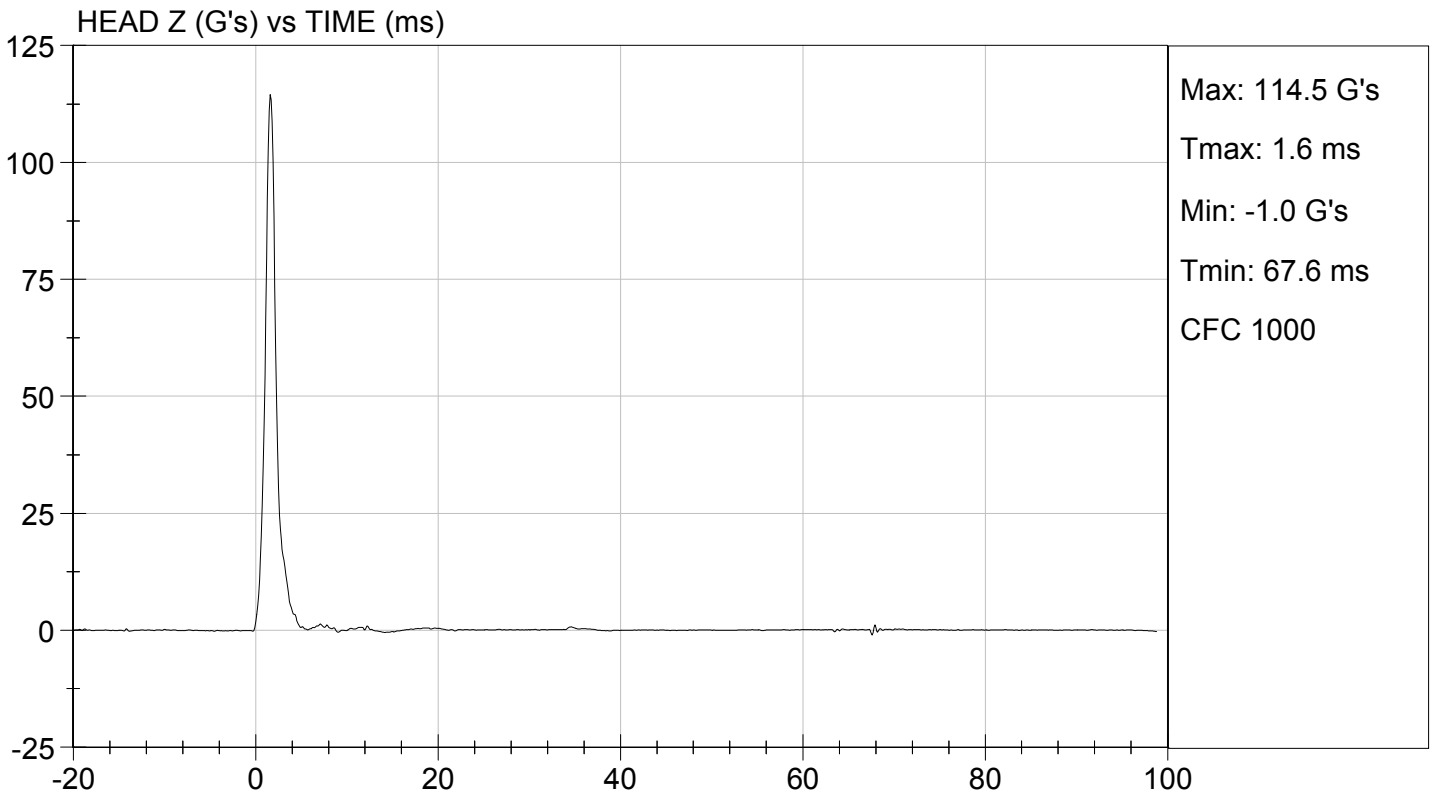
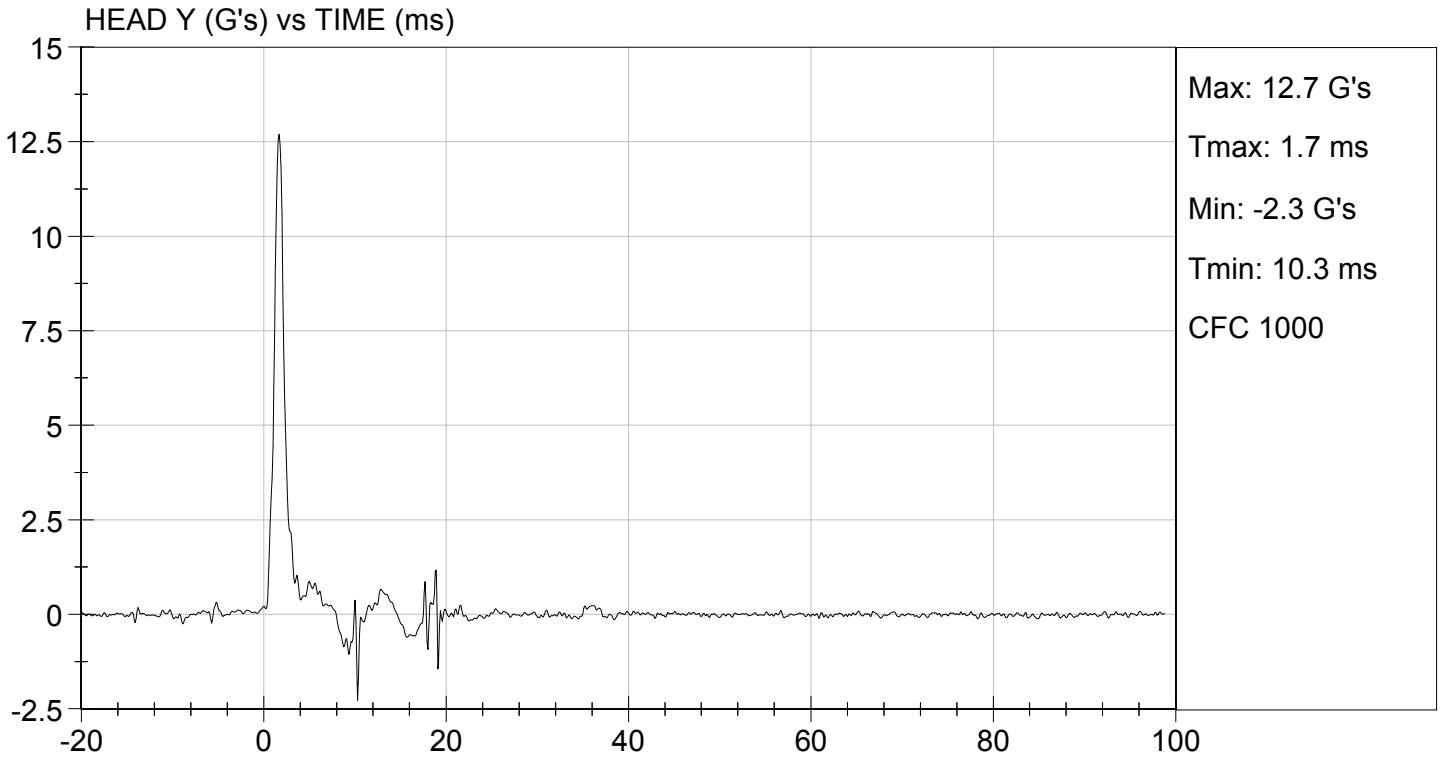
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	16	Pass
Peak Resultant Acceleration	G's	225 to 275	268	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	12.7	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
Overall Test Results				Pass

Maxime Chamberland
 Laboratory Technician

12/01/2014
 Test Date

Jessica Hall
 Approved By





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

ATD Serial No: 351

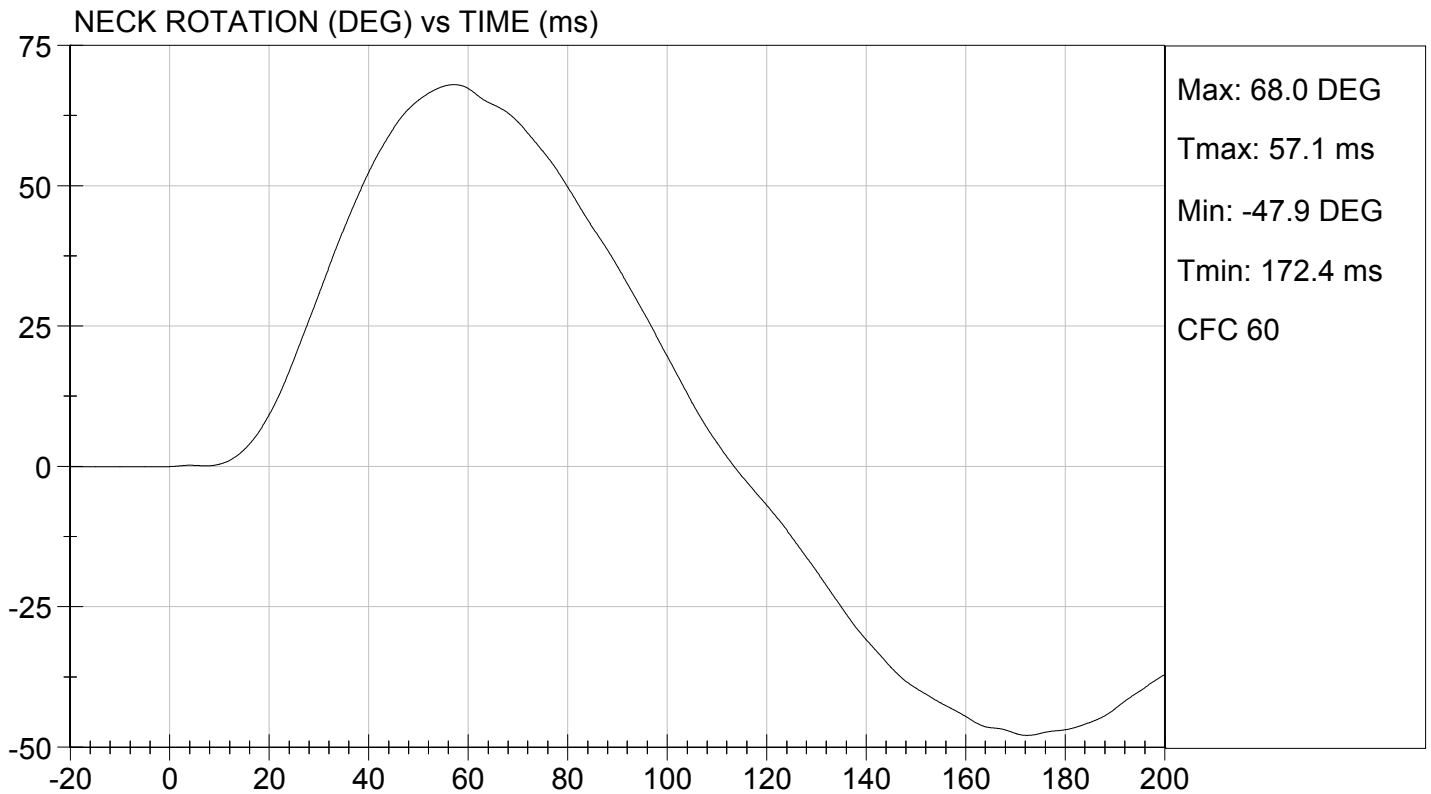
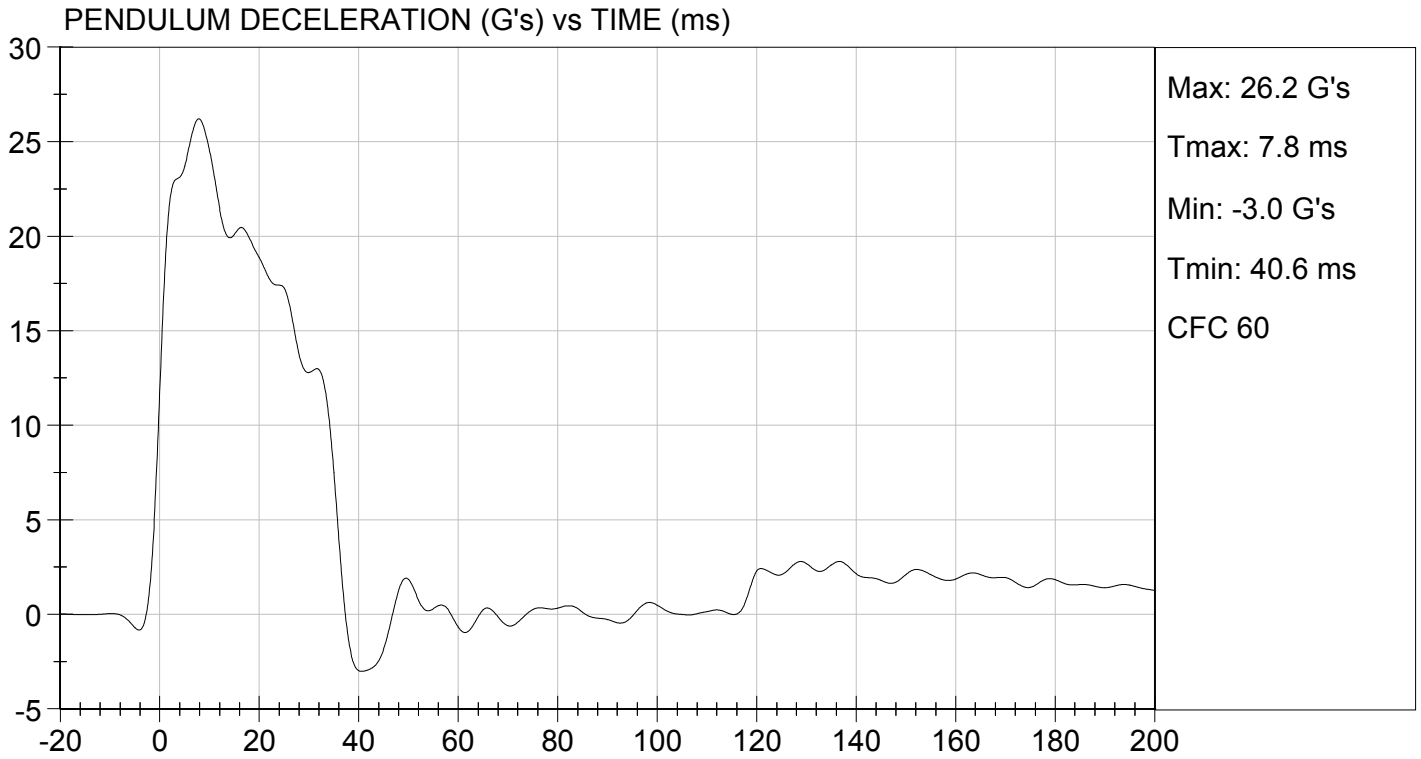
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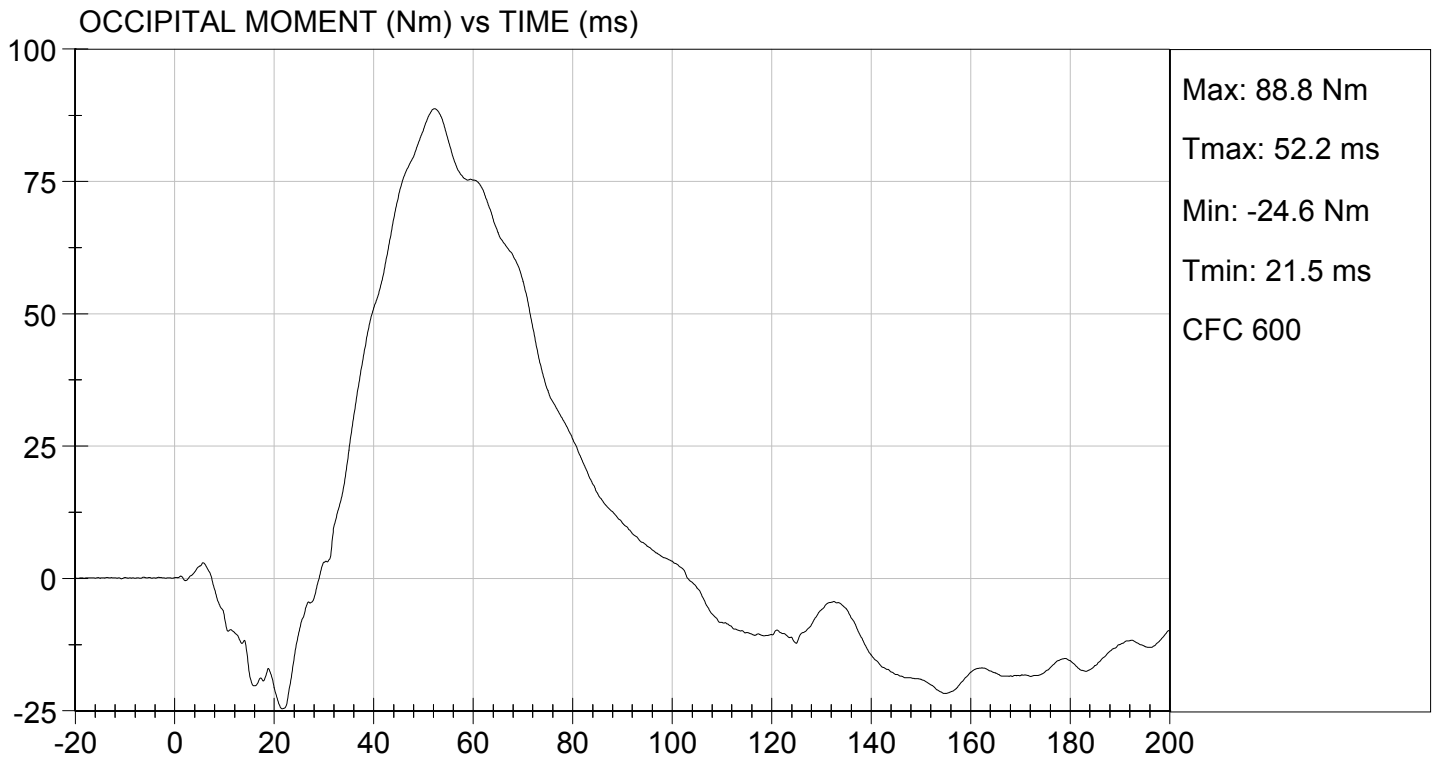
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity		%	10 to 70	16	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.96	Pass
Pendulum Deceleration	10 ms	G's	22.50 to 27.50	24.51	Pass
	20 ms	G's	17.60 to 22.60	18.87	Pass
	30 ms	G's	12.50 to 18.50	12.79	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 29.0	13.0	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	68.0	Pass
	Time	ms	57.0 to 64.0	57.1	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	113.0 to 128.0	113.6	Pass
Moment About Occipital Condyle	Maximum	Nm	88.1 to 108.5	88.8	Pass
	Time	ms	47.0 to 58.0	52.2	Pass
Positive Moment Decay Time To Zero Crossing		ms	97.0 to 107.0	103.2	Pass
Overall Test Results					Pass

Maxime Chamberland
 Laboratory Technician

12/01/2014
 Test Date

Jessica Hall
 Approved By





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

ATD Serial No: 351

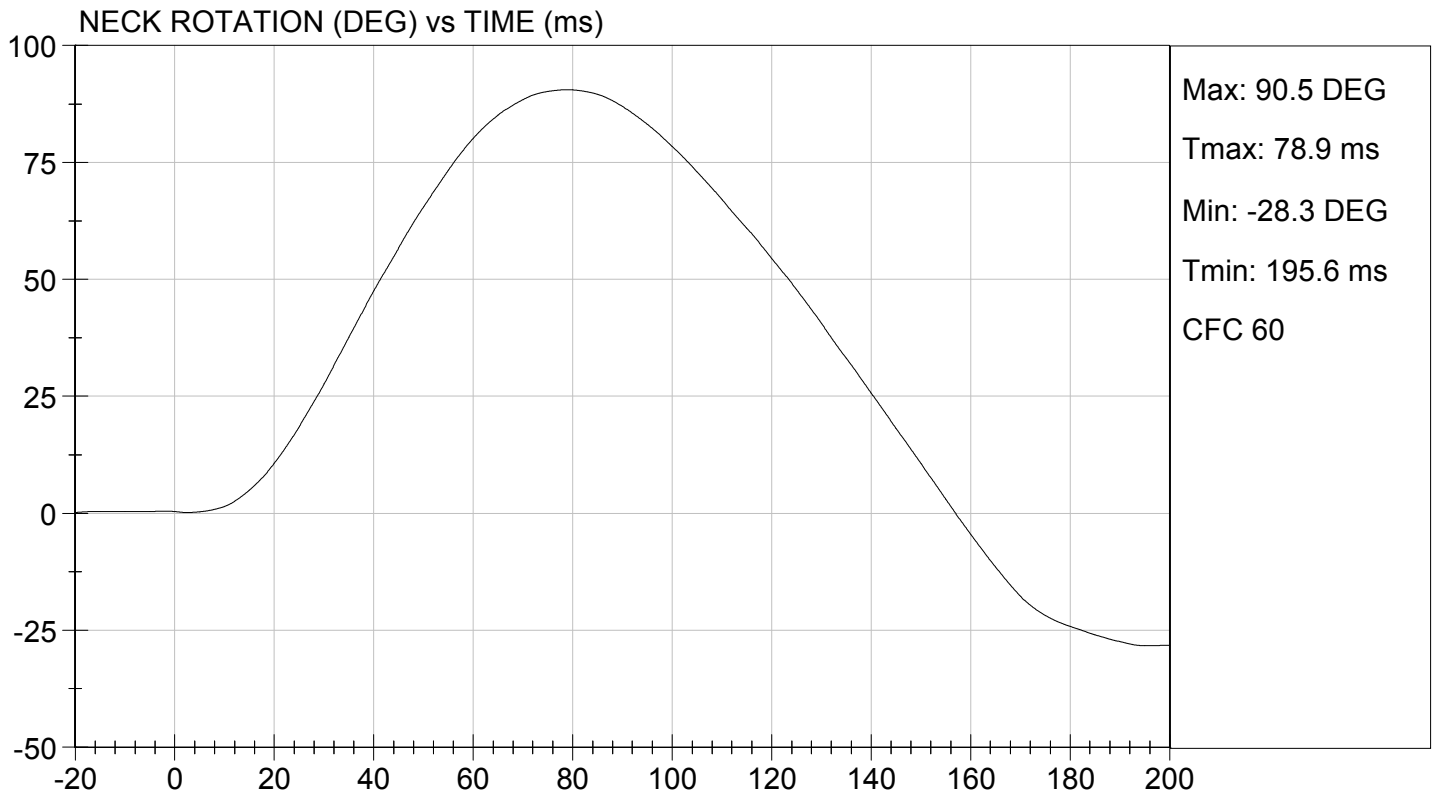
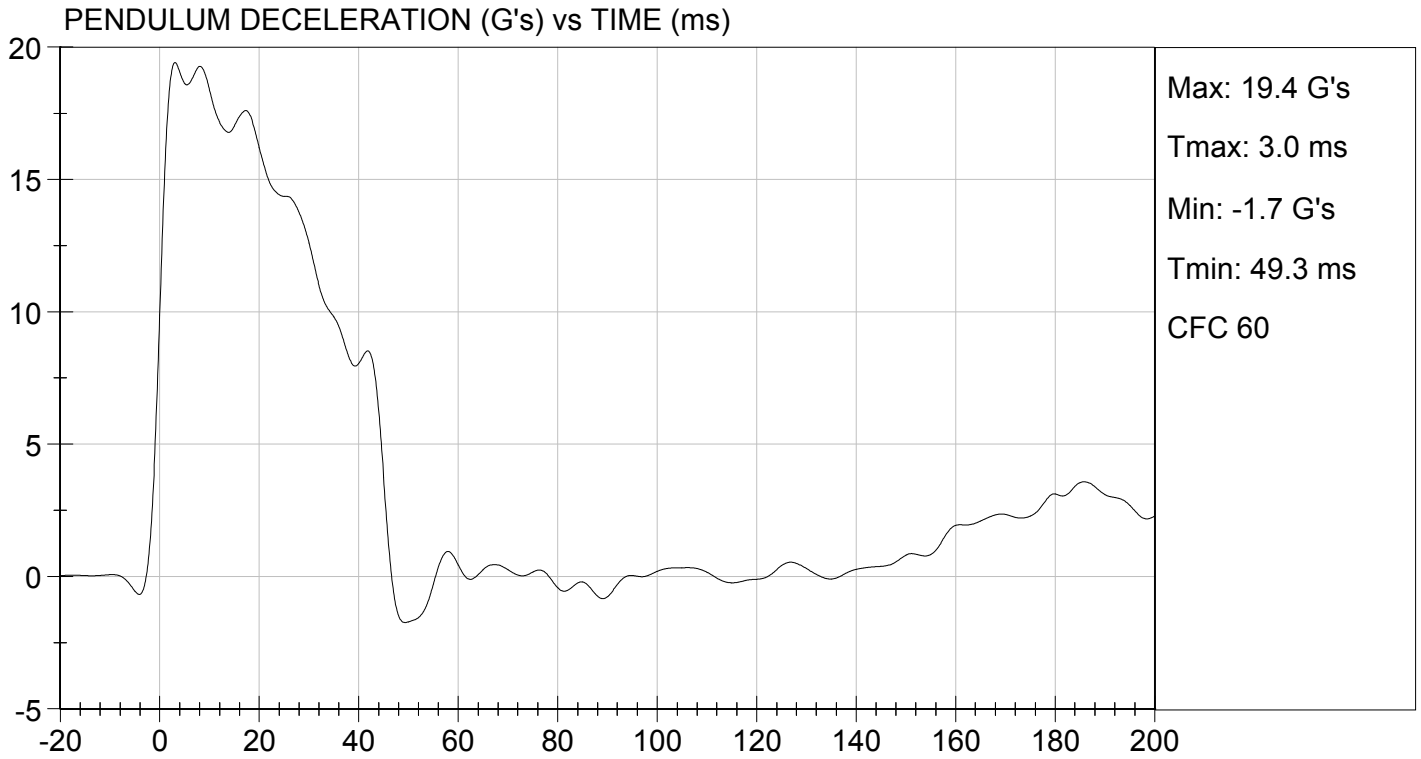
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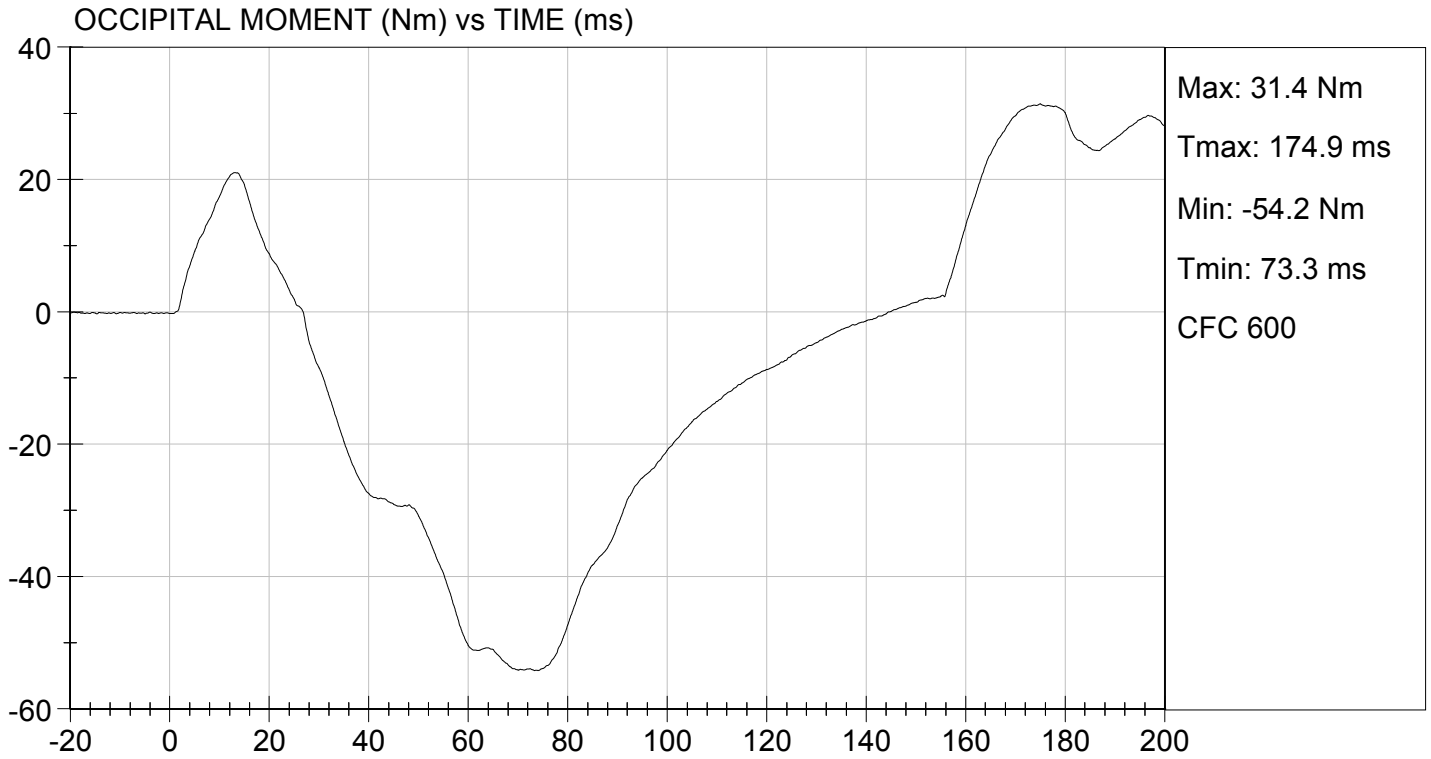
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity		%	10 to 70	16	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.12	Pass
Pendulum Deceleration	10 ms	G's	17.20 to 21.20	18.37	Pass
	20 ms	G's	14.00 to 19.00	16.21	Pass
	30 ms	G's	11.00 to 16.00	12.59	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 22.0	12.5	Pass
Deceleration Decay Time to Cross 5 G's		ms	38.0 to 46.0	44.6	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	90.5	Pass
	Time	ms	72.0 to 82.0	78.9	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	147.0 to 174.0	157.1	Pass
Moment About Occipital Condyle	Maximum	Nm	-52.9 to -79.9	-54.2	Pass
	Time	ms	65.0 to 79.0	73.3	Pass
Negative Moment Decay Time To Zero Crossing		ms	120.0 to 148.0	144.6	Pass
Overall Test Results					Pass

Maxime Chamberland
Laboratory Technician

12/01/2014
Test Date

Jessica Hall
Approved By





**MGA RESEARCH CORPORATION
THORAX IMPACT
HYBRID III 50TH PERCENTILE MALE**

ATD Serial No: 351

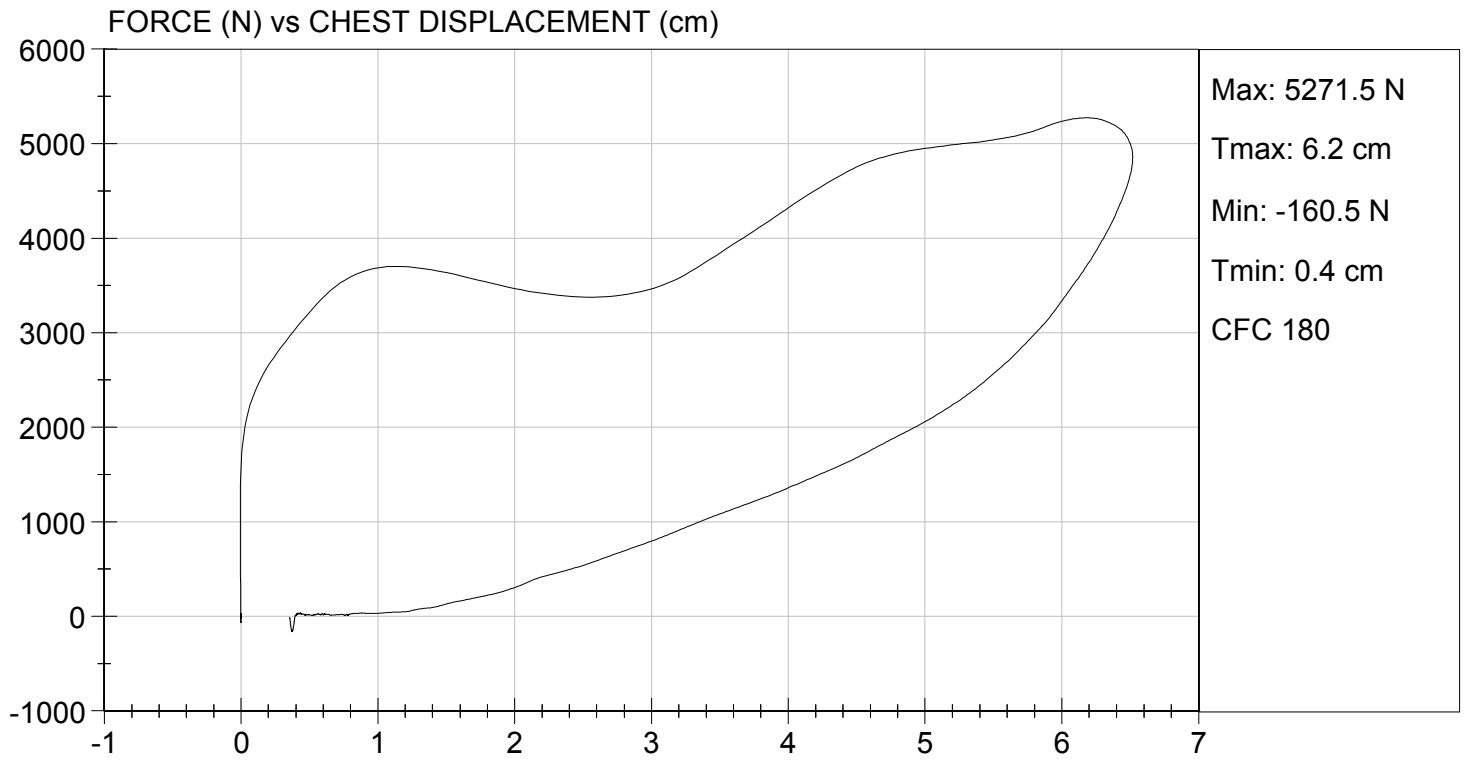
Test I.D: D144234

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	17	Pass
Probe Velocity	m/s	6.58 to 6.82	6.68	Pass
Peak Probe Force	N	5159 to 5893	5,272	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.52	Pass
Internal Hysteresis	%	69 to 85	69	Pass
Overall Test Results				Pass

Maxime Chamberland
Laboratory Technician

12/02/2014
Test Date

Jessica Hall
Approved By



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

ATD Serial No: 351

Test I.D: D144235

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	16	Pass
Probe Velocity	m/s	2.07 to 2.13	2.09	Pass
Peak Probe Force	N	4715 to 5782	4,742	Pass
Overall Test Results				Pass

David Schoedel
 Laboratory Technician

12/01/2014

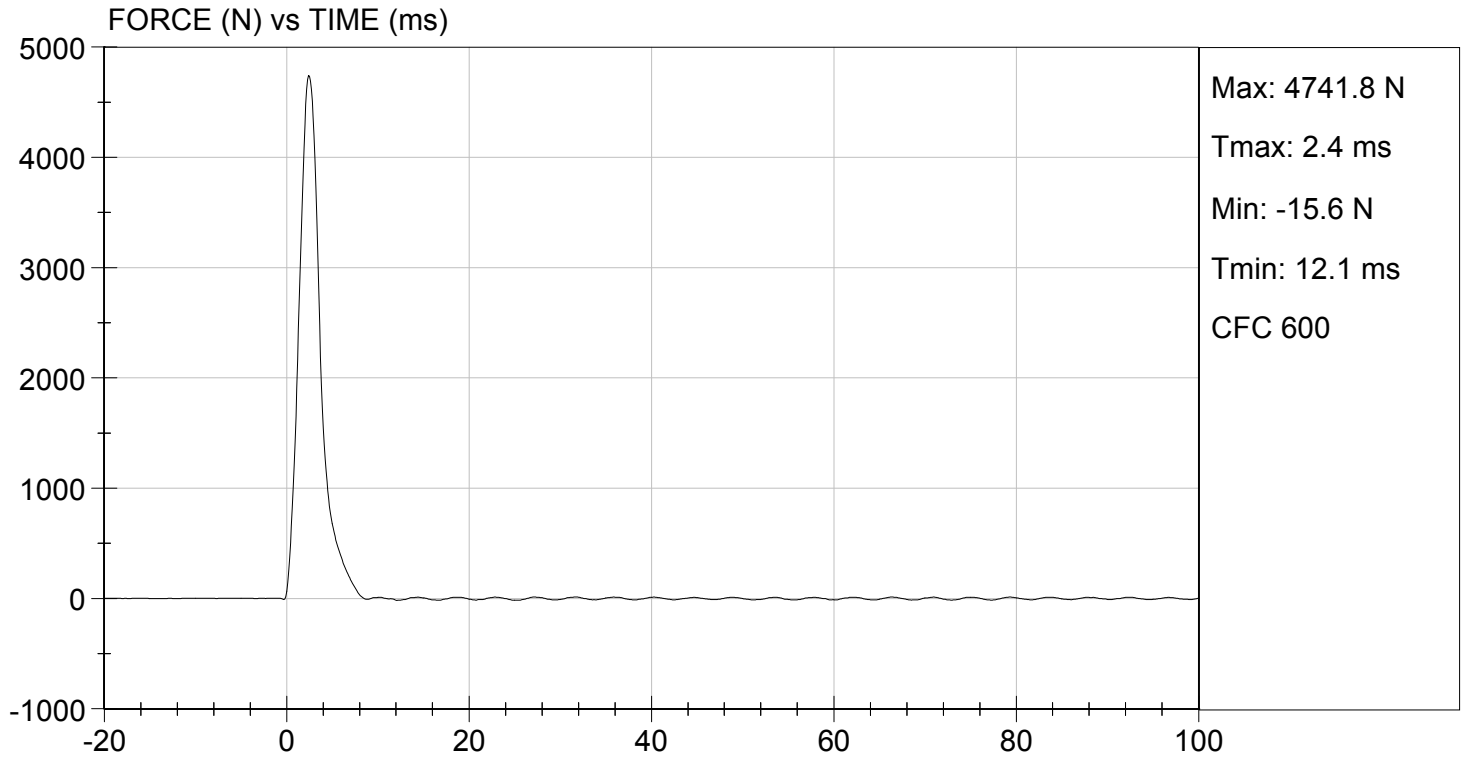
Test Date

Jessica Hall
 Approved By



TEST DESC: RIGHT KNEE
VELOCITY: 6.86 ft/s, 2.09 m/s

TEST DATE: 12/01/2014
TEST #: D144235



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

ATD Serial No: 351

Test I.D: D144236

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	16	Pass
Probe Velocity	m/s	2.07 to 2.13	2.13	Pass
Peak Probe Force	N	4715 to 5782	5,129	Pass
Overall Test Results				Pass

David Schoedel
 Laboratory Technician

12/01/2014

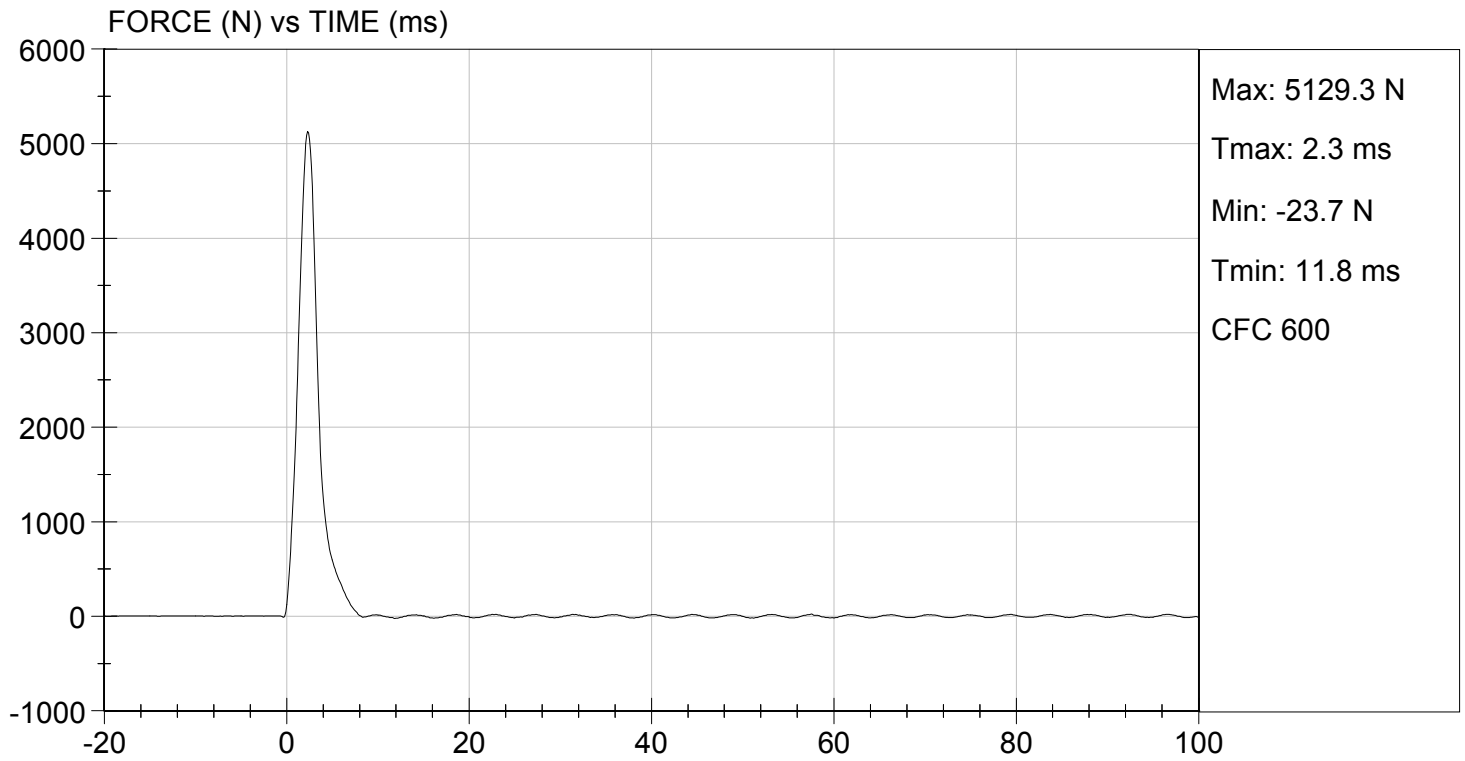
Test Date

Jessica Hall
 Approved By



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

TEST DATE: 12/01/2014
TEST #: D144236



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

ATD Serial No: 351

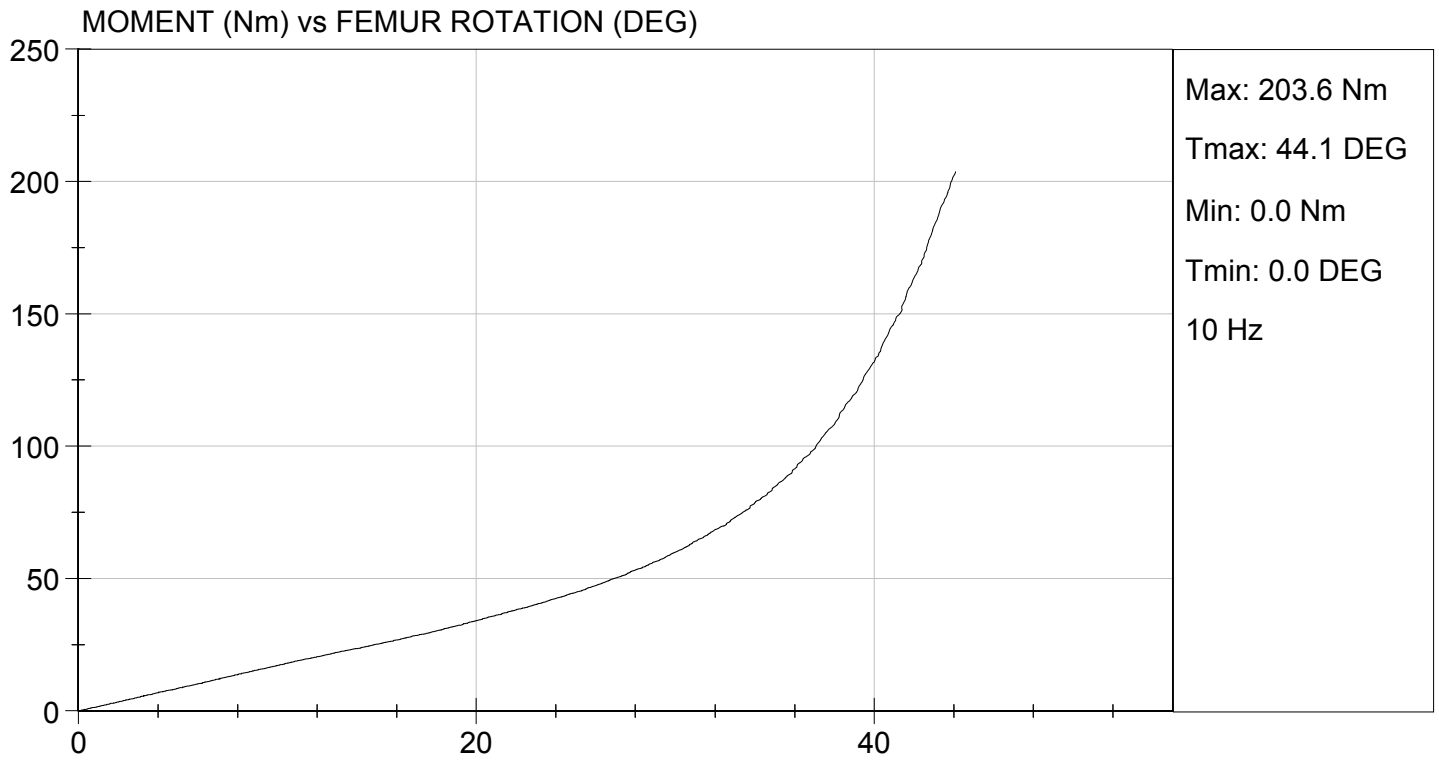
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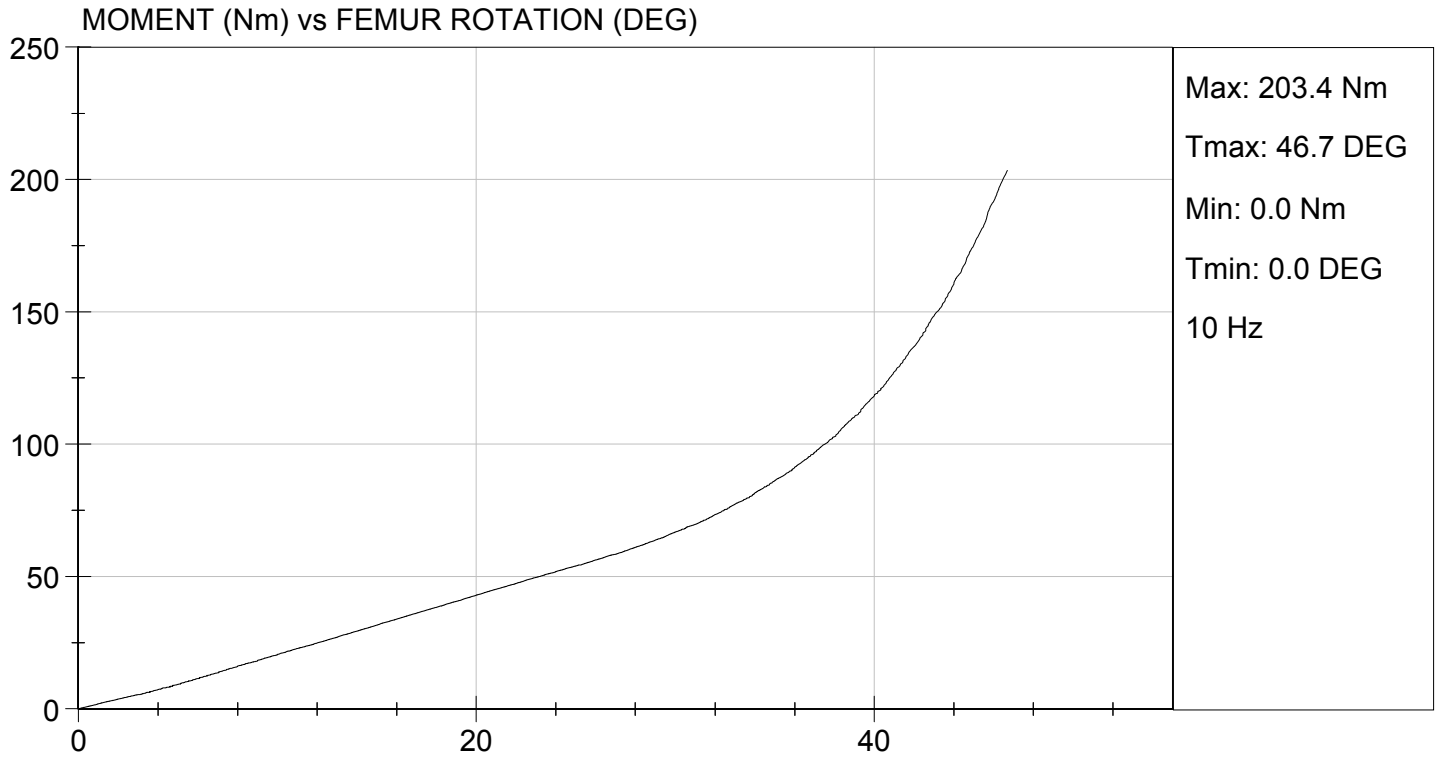
Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	21.8	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	18	18	Pass
Rotation Rate	deg/s	5.0 to 10.0	6.1	6.3	Pass
30 Degrees	Nm	94.9 Nm Max	60.0	66.7	Pass
150 ft-lbf / 203.4 Nm	Deg	40.0 to 50.0 Degree Max Rotation	44.1	46.7	Pass
Overall Test Results					Pass

Maxime Chamberland
 Laboratory Technician

12/01/2014
 Test Date

Jessica Hall
 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

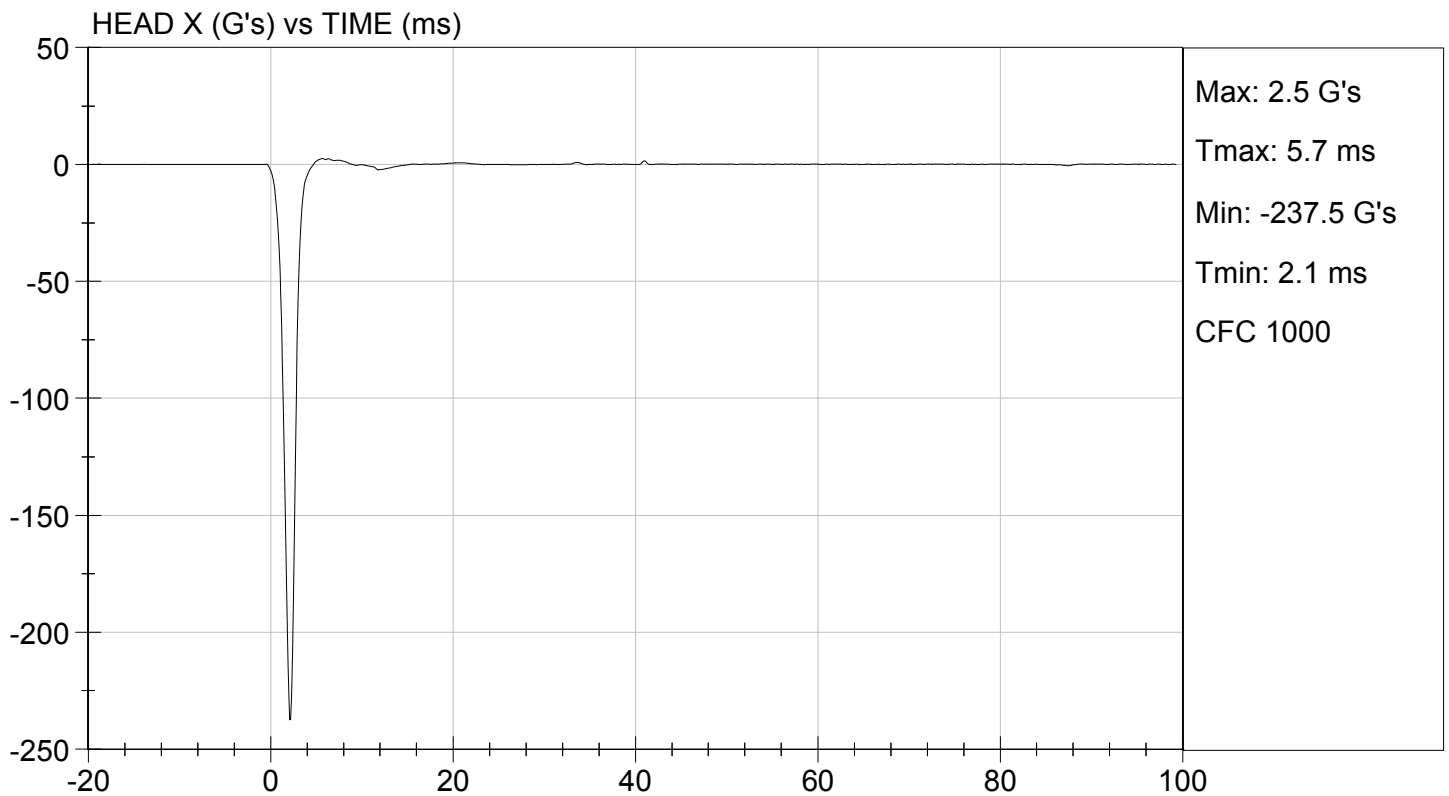
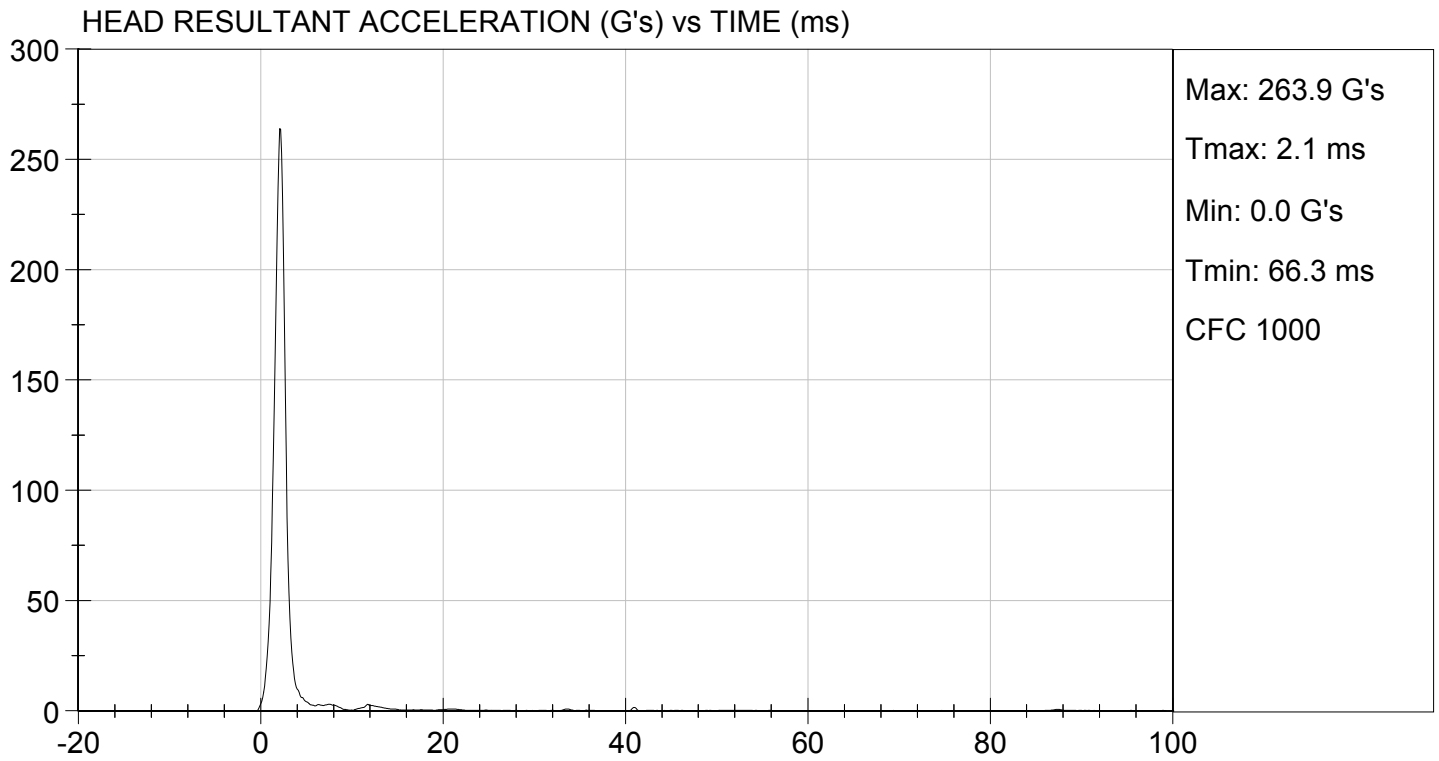
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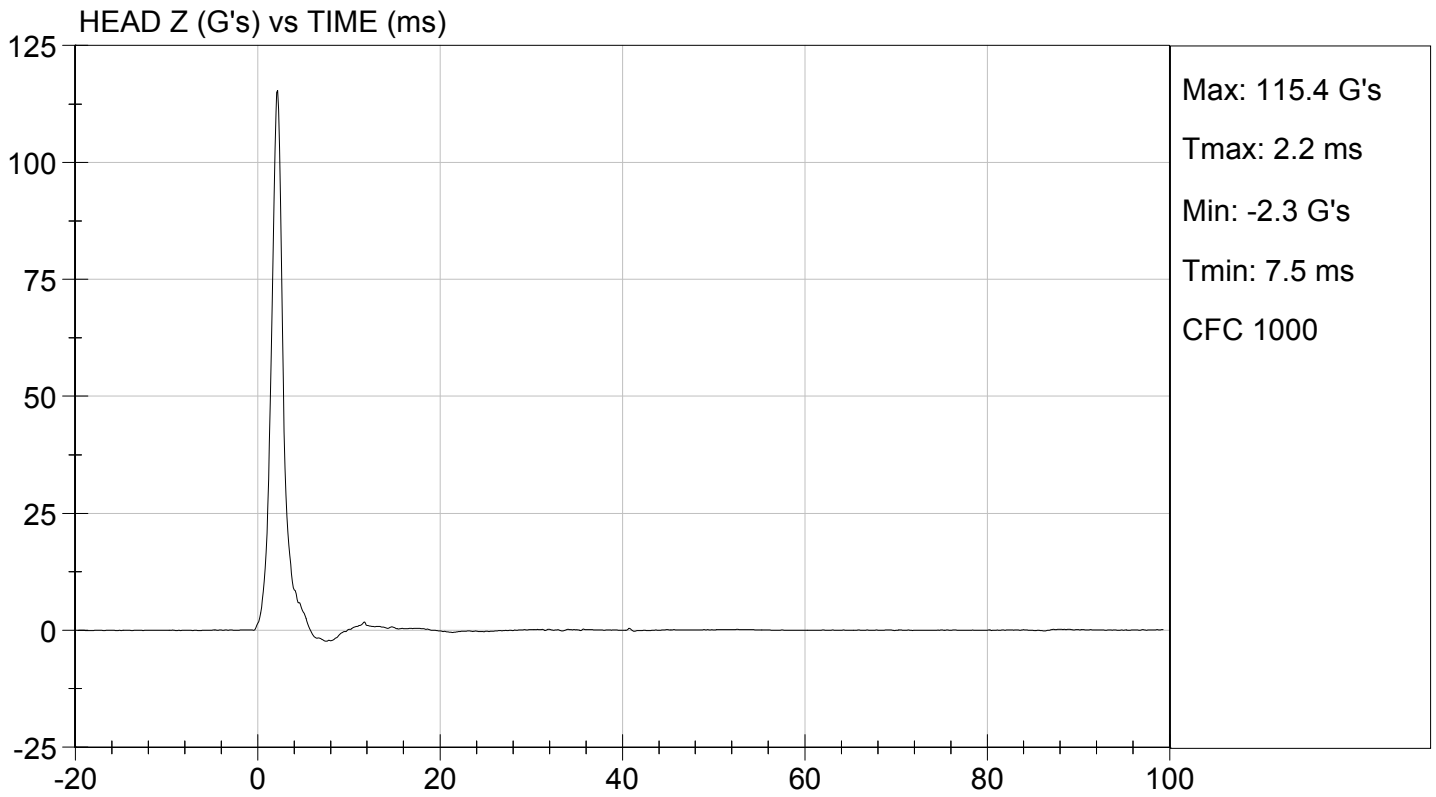
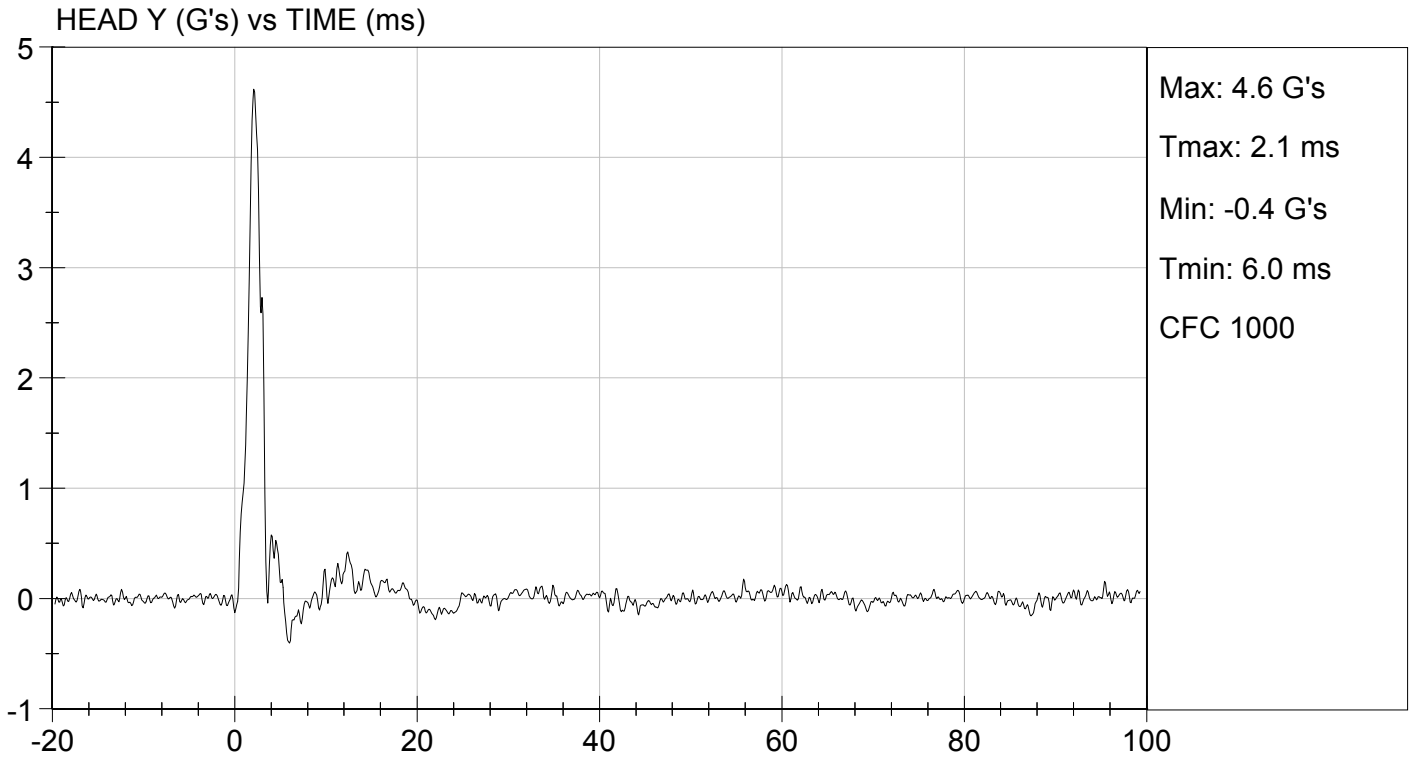
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	22.1	Pass
Laboratory Relative Humidity	%	10 to 70	16	Pass
Peak Resultant Acceleration	G's	250 to 300	264	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	4.6	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
Overall Test Results				Pass

Maxime Chamberland
Laboratory Technician

11/18/2014
Test Date

Jessica Hall
Approved By





MGA RESEARCH CORPORATION

NECK FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634

Test I.D.: D144062

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	16	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	4.6	Pass
	30 ms	m/s	5.8 to 7.0	6.4	Pass
D Plane Rotation	Max	deg	77 to 91	85	Pass
Occipital Condyle Moment within Rotation Corridor		Nm	69 to 83	70	Pass
Positive Moment Time Curve Decay to 10 Nm		ms	80 to 100	86	Pass
Overall Results					Pass

David Schoedel

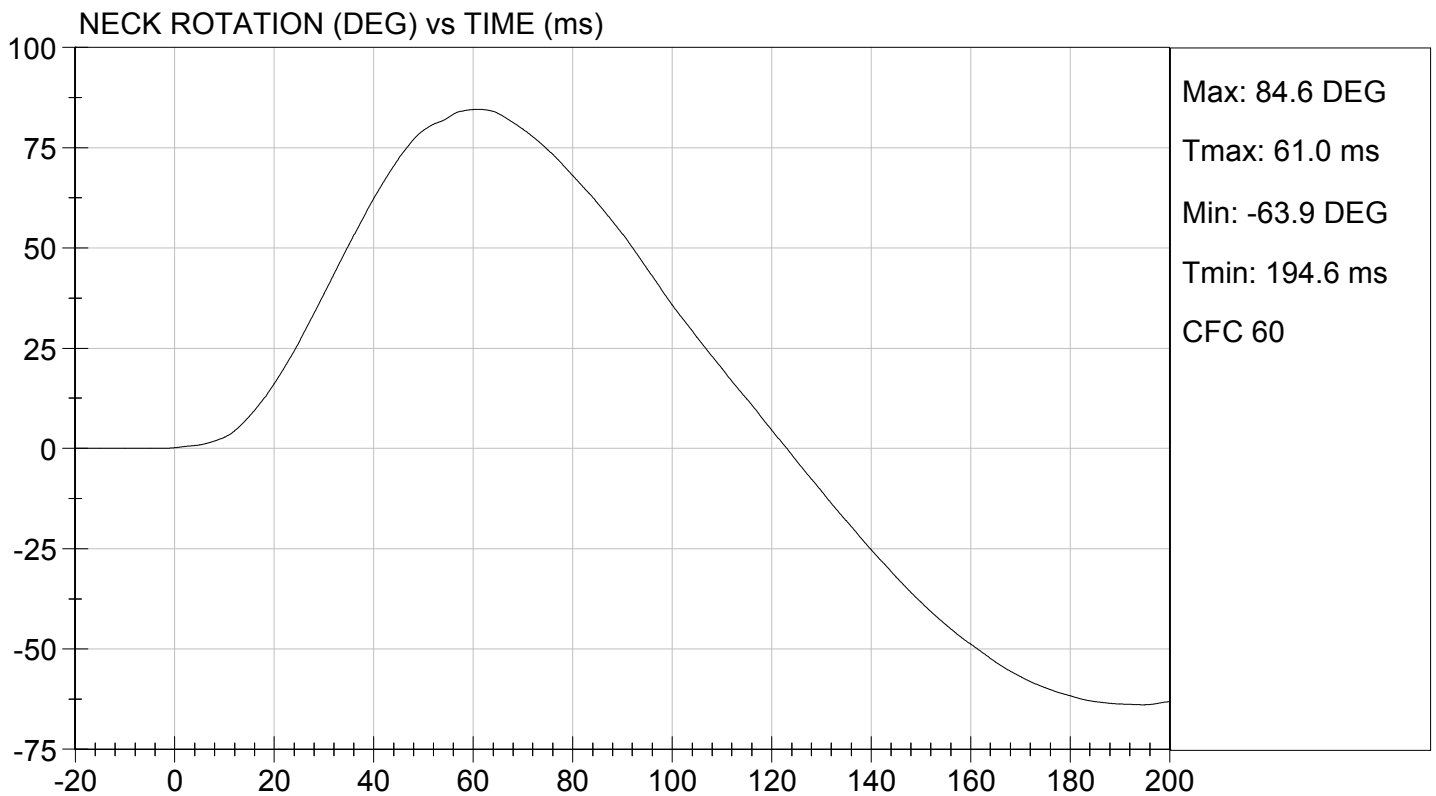
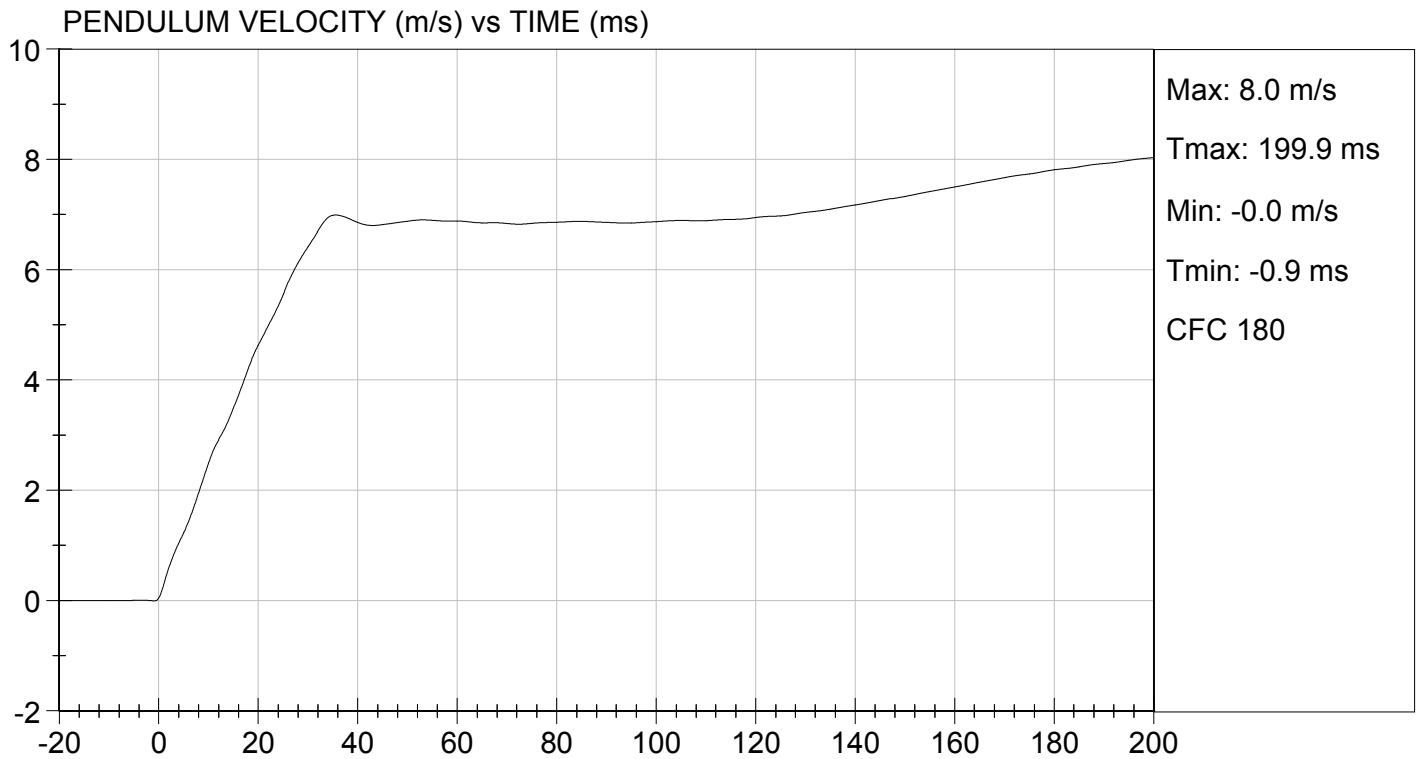
Laboratory Technician

11/18/2014

Test Date

Jessica Hall

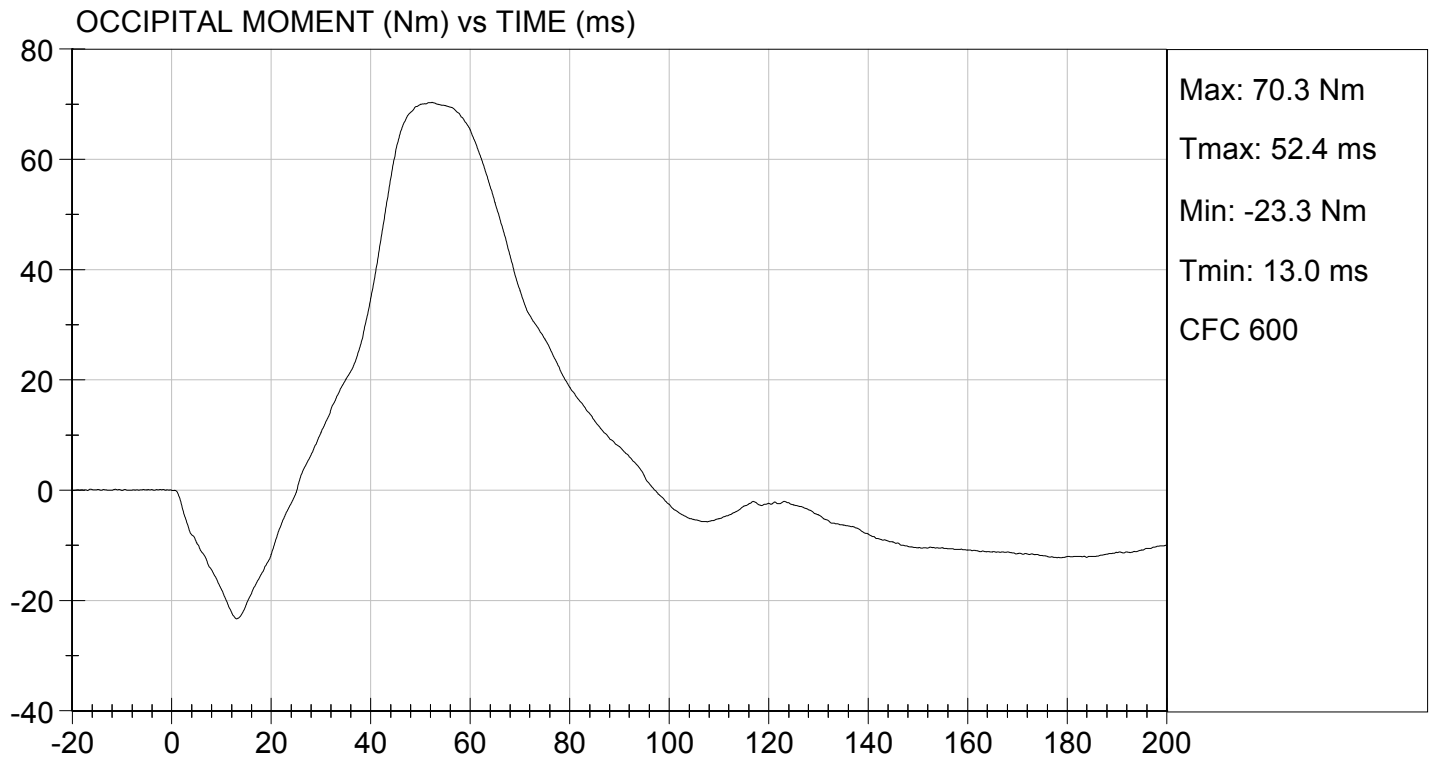
Approved By





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

TEST DATE: 11/18/2014
TEST #: D144062



MGA RESEARCH CORPORATION
NECK EXTENSION TEST
HYBRID III 5TH PERCENTILE

ATD Serial No: 634

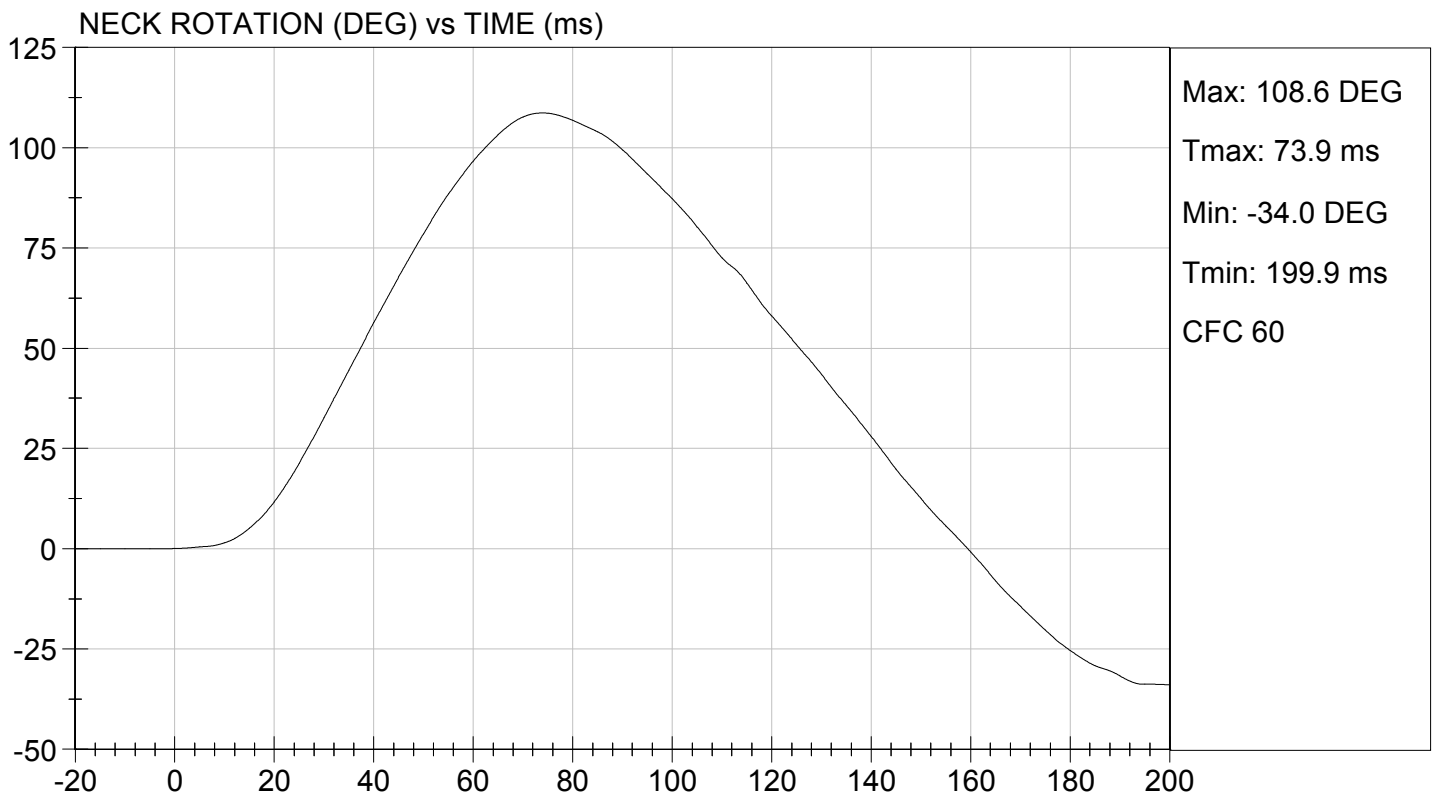
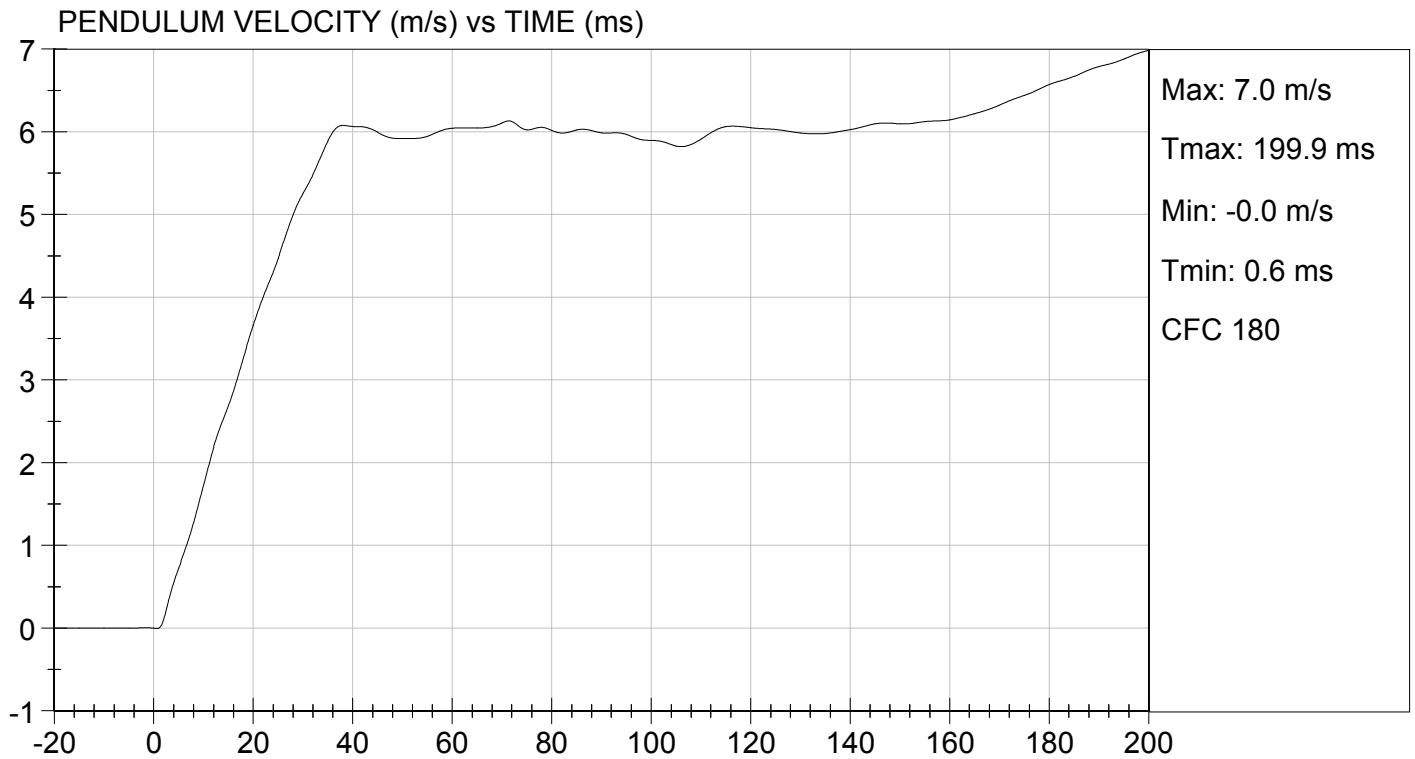
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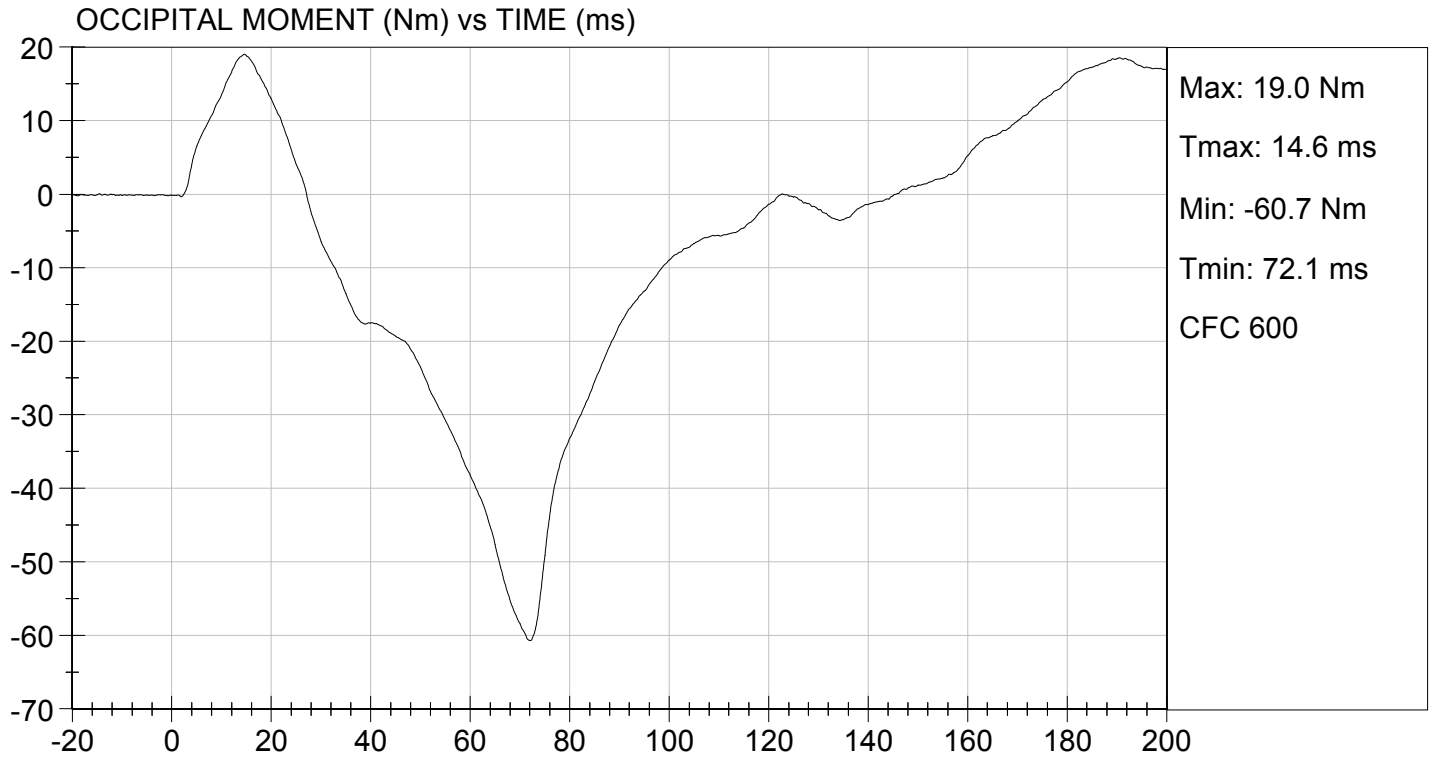
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity		%	10 to 70	16	Pass
Pendulum Speed		m/s	5.95 to 6.19	6.12	Pass
Pendulum Velocity	10 ms	m/s	1.5 to 1.9	1.7	Pass
	20 ms	m/s	3.1 to 3.9	3.7	Pass
	30 ms	m/s	4.6 to 5.6	5.2	Pass
D Plane Rotation	Max	deg	99 to 114	109	Pass
Occipital Condyle Moment within Rotation Corridor		Nm	-65 to -53	-61	Pass
Negative Moment Time Curve Decay to -10 Nm		ms	94 to 114	97	Pass
Overall Results					Pass

David Schoedel
 Laboratory Technician

11/18/2014
 Test Date

Jessica Hall
 Approved By





MGA RESEARCH CORPORATION
THORAX IMPACT
HYBRID III 5TH PERCENTILE

ATD Serial No: 634

Test I.D: D144064

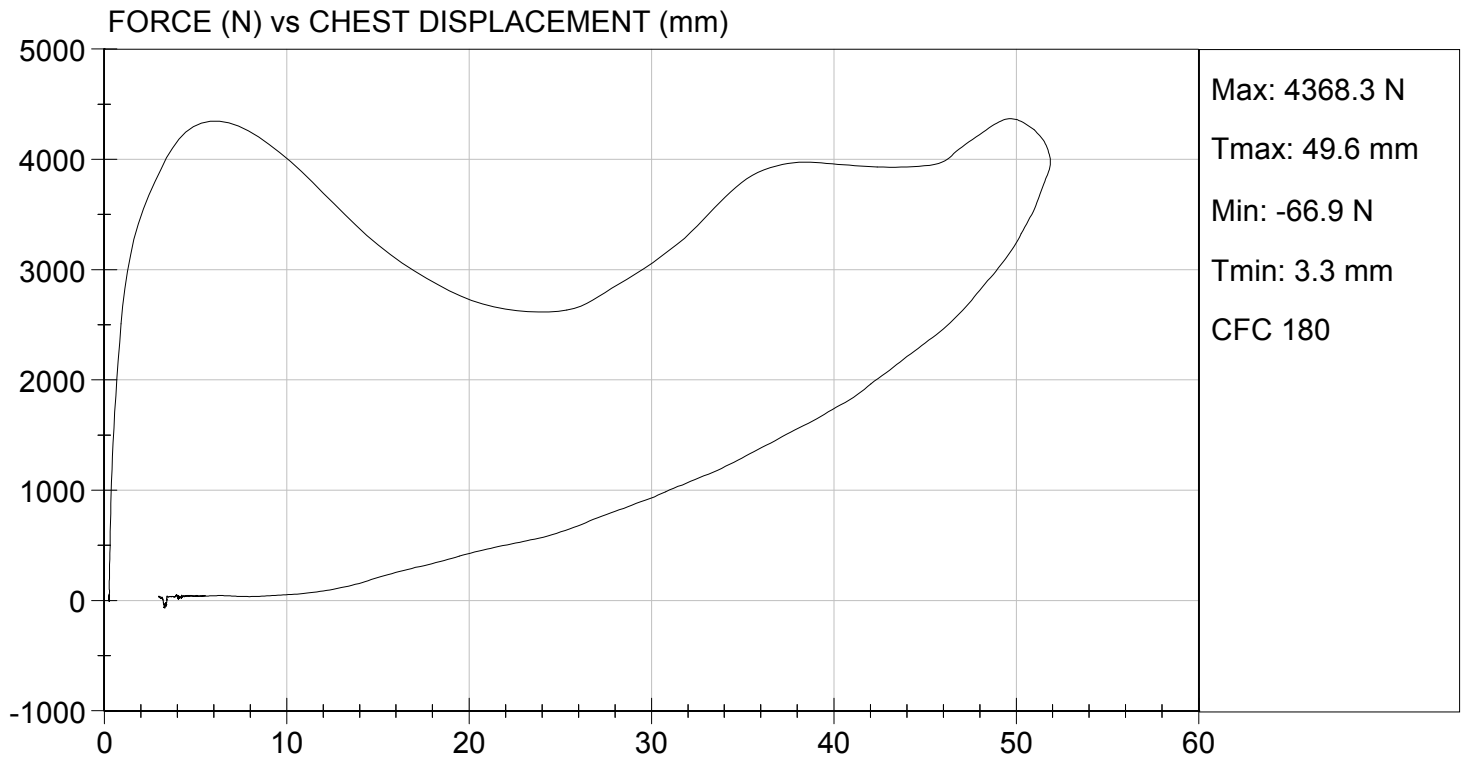
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.9	Pass
Relative Humidity	%	10 to 70	20	Pass
Probe Speed	m/s	6.59 to 6.83	6.68	Pass
Peak Deflection	mm	50 to 58	52	Pass
Peak Resistive Force w/in Deflection Corridor	N	3900 to 4400	4358	Pass
Internal Hysteresis	%	69 to 85	71	Pass
Peak Force 18 mm - 50 mm	N	<= 4600	4368	Pass
Overall Test Results				Pass

Maxime Chamberland
 Laboratory Technician

11/19/2014

Test Date

Jessica Hall
 Approved By



MGA RESEARCH CORPORATION
RIGHT KNEE IMPACT TEST
HYBRID III 5TH PERCENTILE

ATD Serial No: 634

Test I.D: D144065

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	15	Pass
Probe Speed	m/s	2.07 to 2.13	2.11	Pass
Maximum Force	N	3450 to 4060	4033	Pass
Overall Test Results				Pass

Maxime Chamberland
 Laboratory Technician

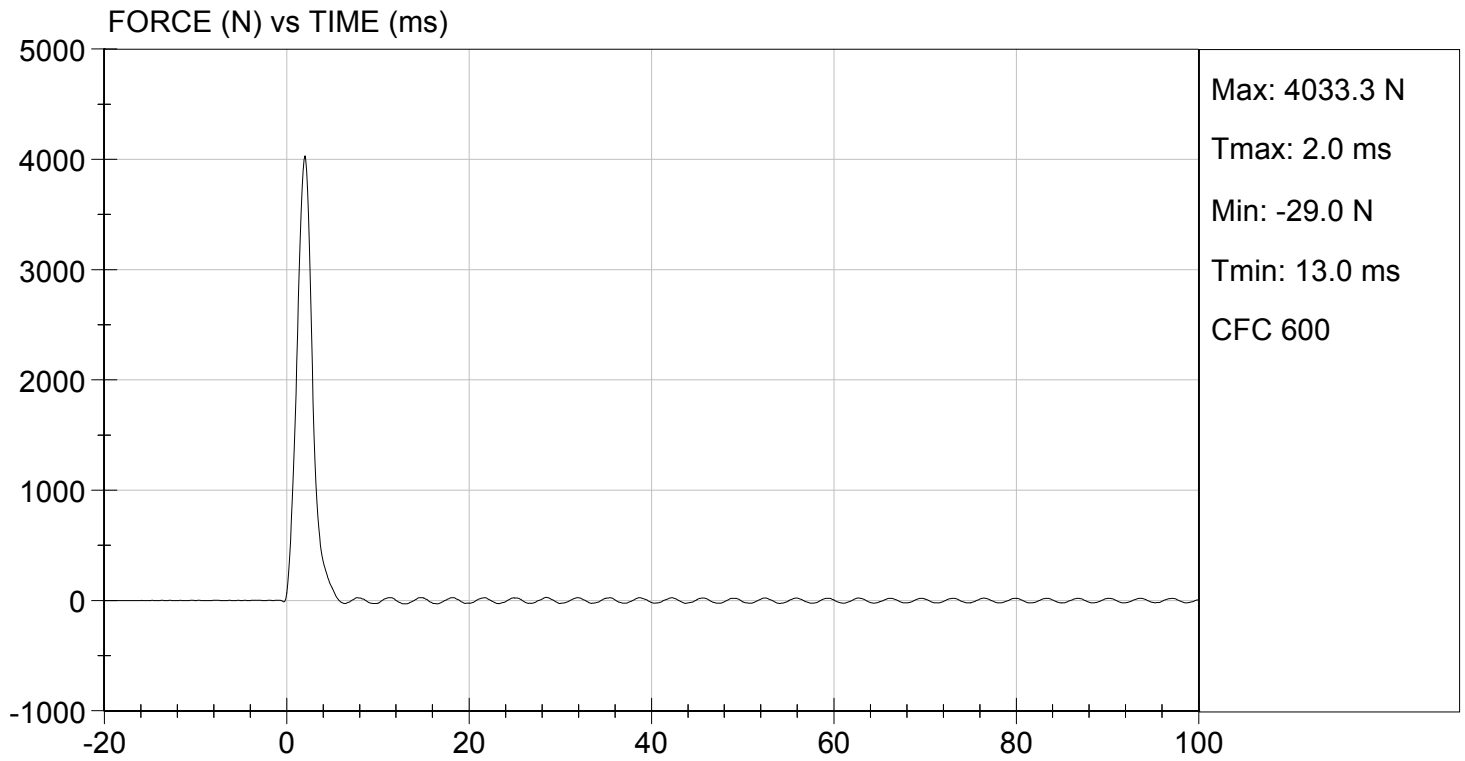
11/18/2014
 Test Date

Jessica Hall
 Approved By



TEST DESC: RIGHT KNEE
VELOCITY: 6.92 ft/s, 2.11 m/s

TEST DATE: 11/18/2014
TEST #: D144065



MGA RESEARCH CORPORATION
LEFT KNEE IMPACT TEST
HYBRID III 5TH PERCENTILE

ATD Serial No: 634

Test I.D: D144066

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	15	Pass
Probe Speed	m/s	2.07 to 2.13	2.11	Pass
Maximum Force	N	3450 to 4060	3498	Pass
Overall Test Results				Pass

Maxime Chamberland
 Laboratory Technician

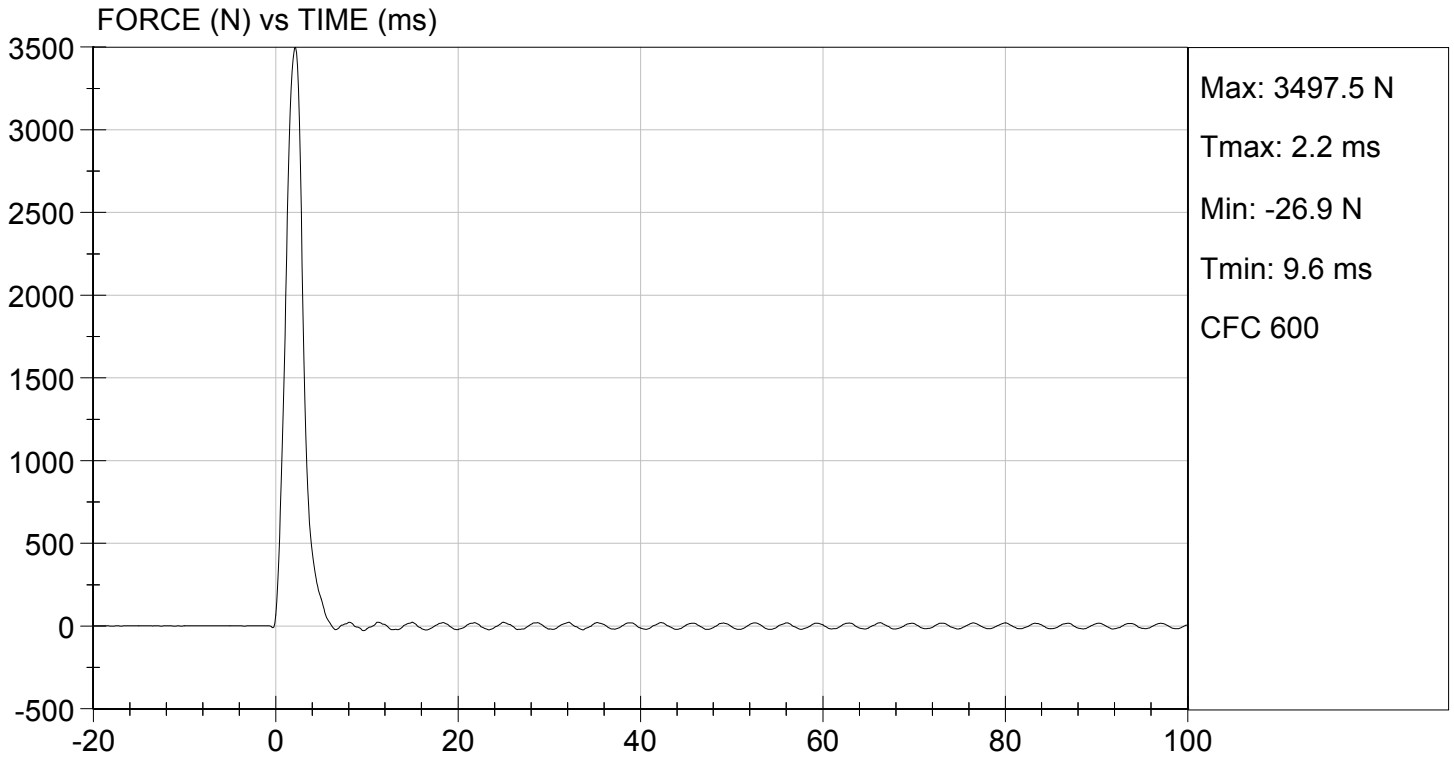
11/18/2014
 Test Date

Jessica Gall
 Approved By



TEST DESC: LEFT KNEE
VELOCITY: 6.92 ft/s, 2.11 m/s

TEST DATE: 11/18/2014
TEST #: D144066



MGA RESEARCH CORPORATION
TORSO FLEXION TEST
HYBRID III 5TH PERCENTILE

ATD Serial No: 634

Test I.D: D144067

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	18	Pass
Initial Angle	deg	0 to 20	20	Pass
Return Angle	deg	+/- 8	6	Pass
Force at 45 deg	N	320 to 390	339	Pass
Upper Torso Deflection Rate	deg/s	0.5 to 1.5	0.8	Pass
Overall Result				Pass

Jack Coleman
 Laboratory Technician

11/18/2014

Test Date

Jessica Hall
 Approved By

**MGA RESEARCH CORPORATION
HEAD DROP TEST
HYBRID III 5TH PERCENTILE**

ATD Serial No: 634

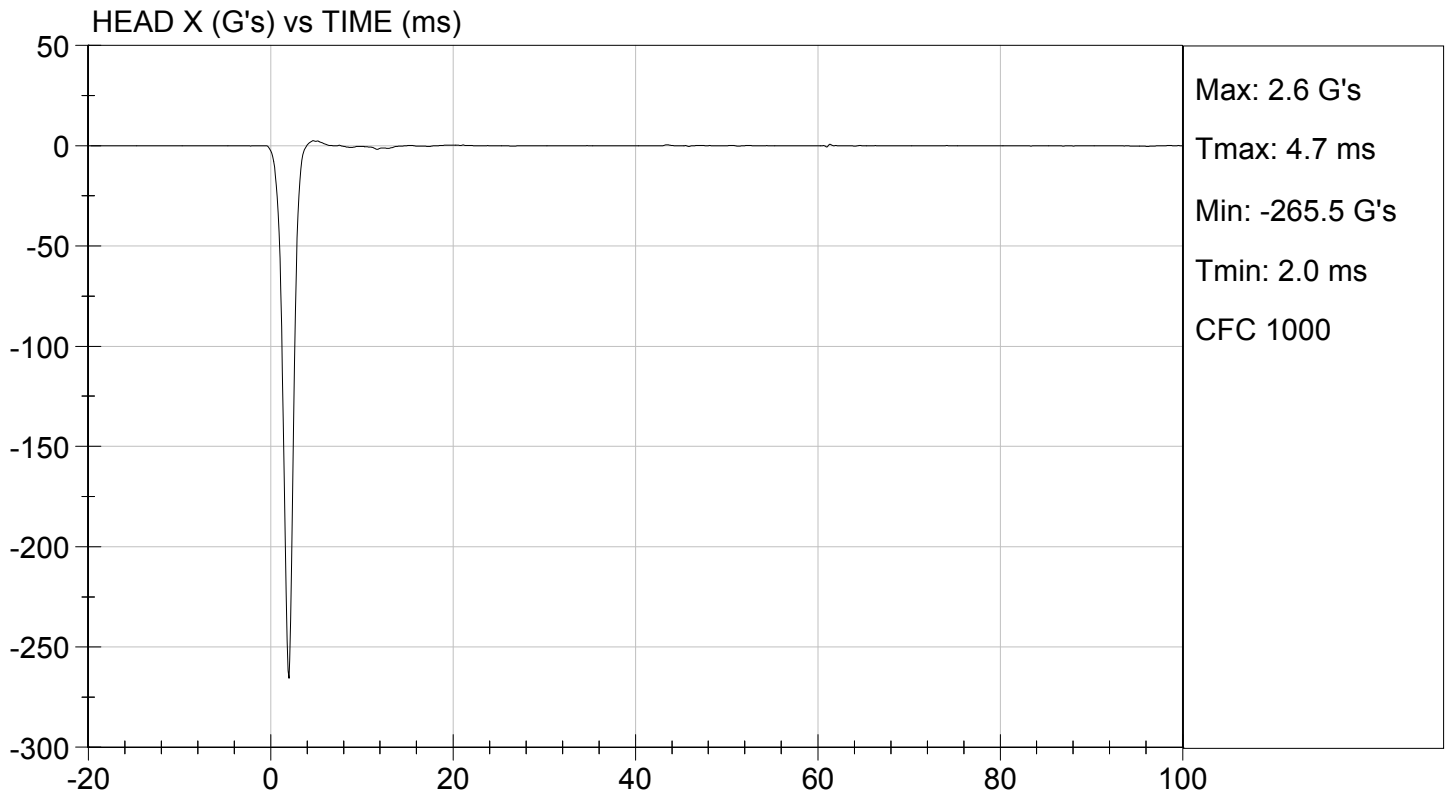
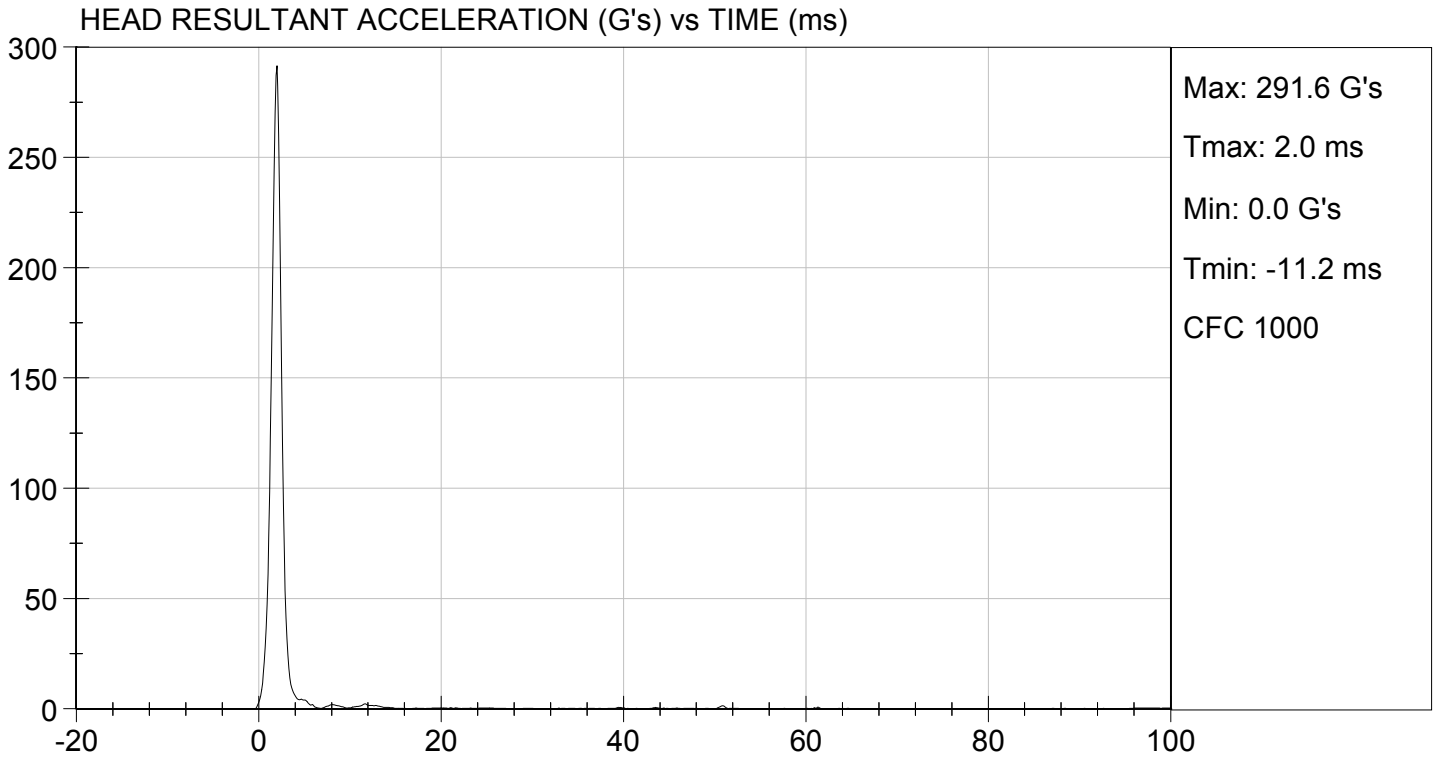
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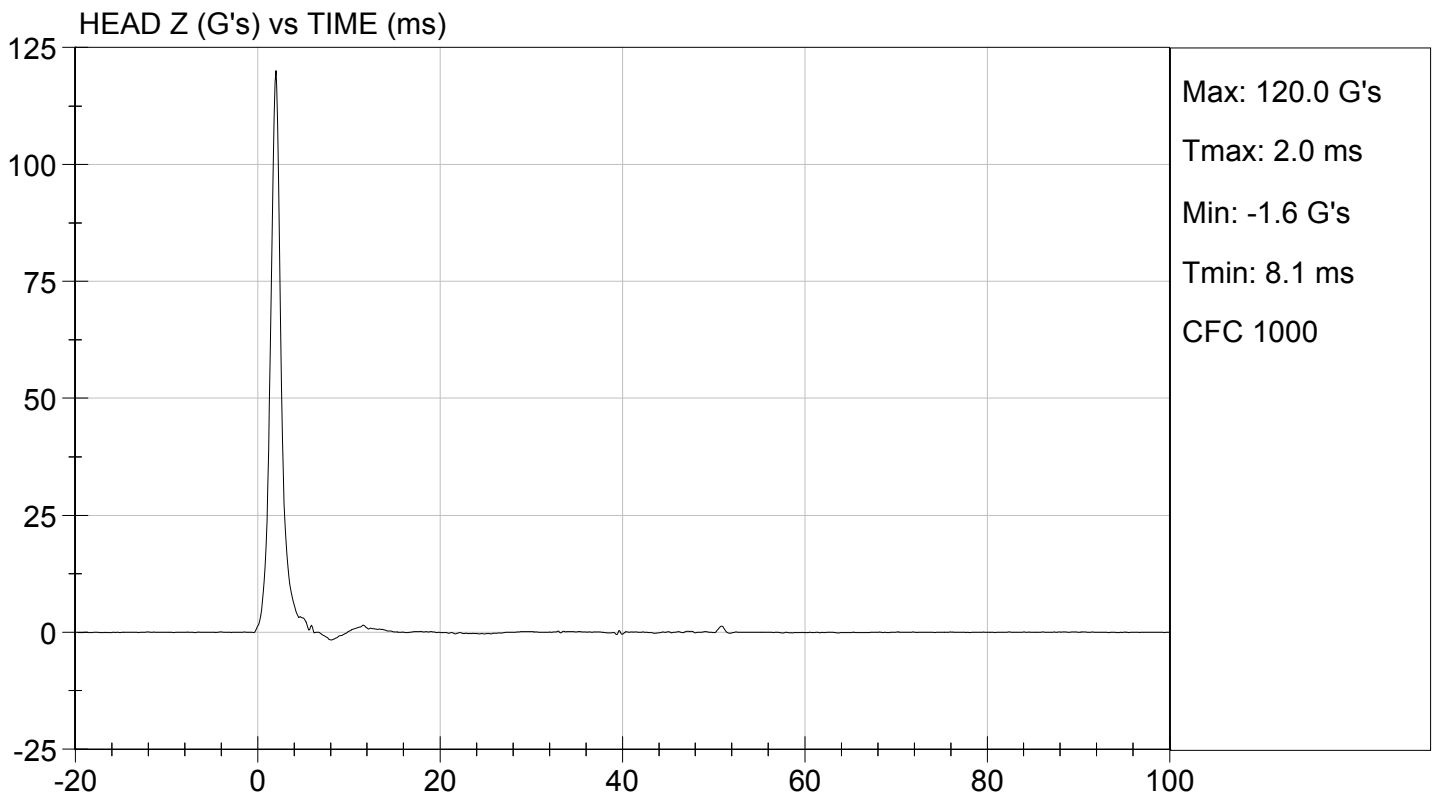
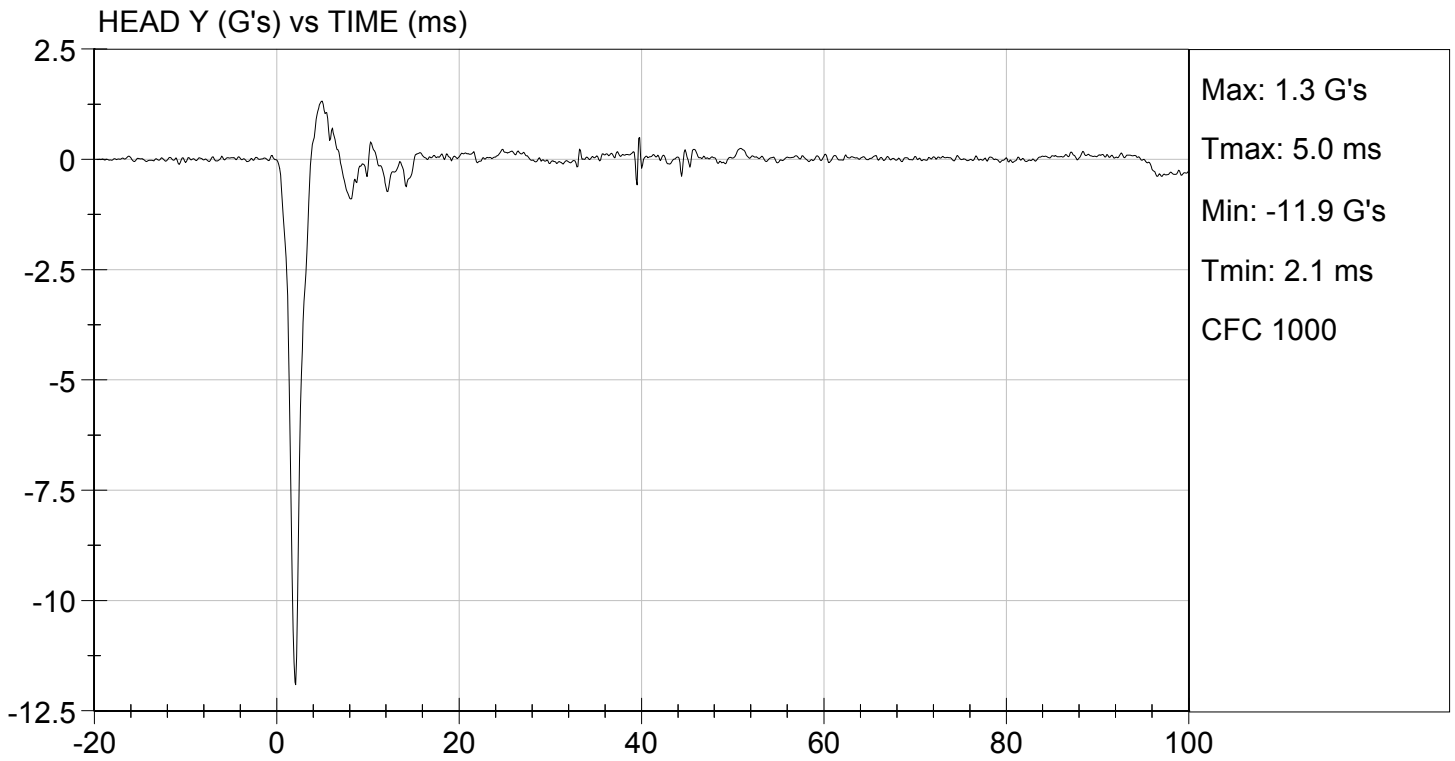
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	16	Pass
Peak Resultant Acceleration	G's	250 to 300	292	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	-11.9	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
Overall Test Results				Pass

David Schoedel
Laboratory Technician

12/01/2014
Test Date

Jessica Hall
Approved By





MGA RESEARCH CORPORATION

NECK FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634

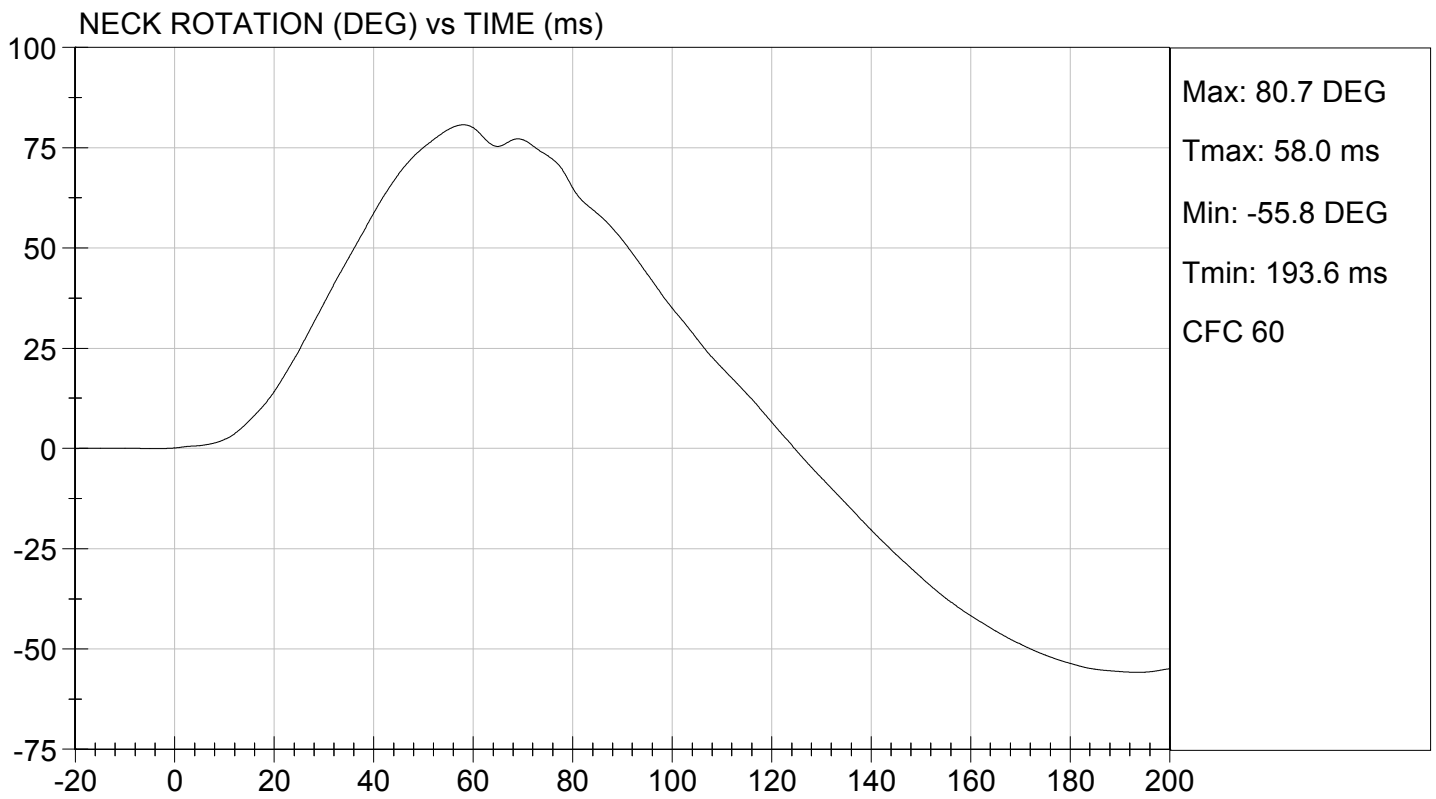
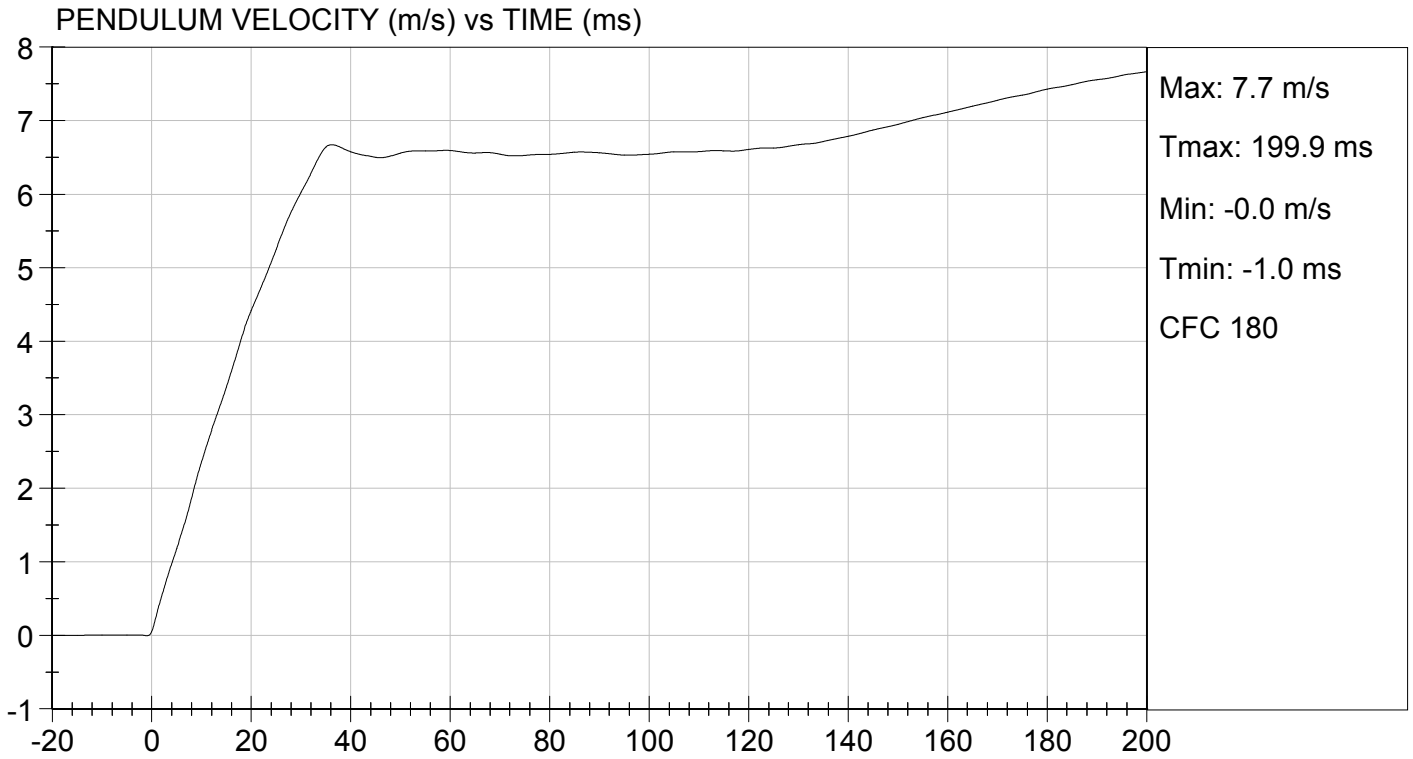
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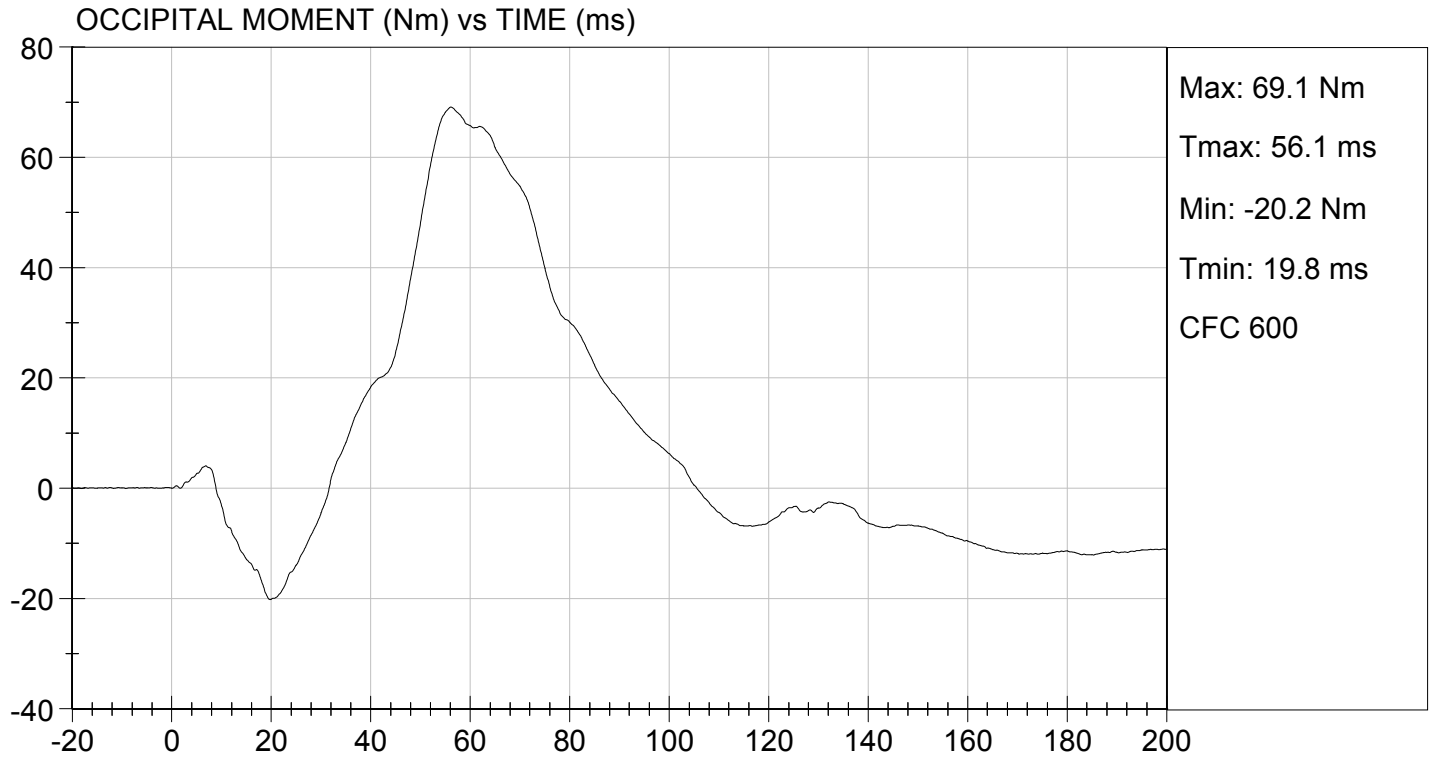
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity		%	10 to 70	17	Pass
Pendulum Speed		m/s	6.89 to 7.13	7.06	Pass
Pendulum Velocity	10 ms	m/s	2.1 to 2.5	2.4	Pass
	20 ms	m/s	4.0 to 5.0	4.4	Pass
	30 ms	m/s	5.8 to 7.0	6.0	Pass
D Plane Rotation	Max	deg	77 to 91	81	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	94	Pass
Overall Results					Pass

David Schoedel
 Laboratory Technician

12/02/2014
 Test Date

Jessica Hall
 Approved By





MGA RESEARCH CORPORATION
NECK EXTENSION TEST
HYBRID III 5TH PERCENTILE

ATD Serial No: 634

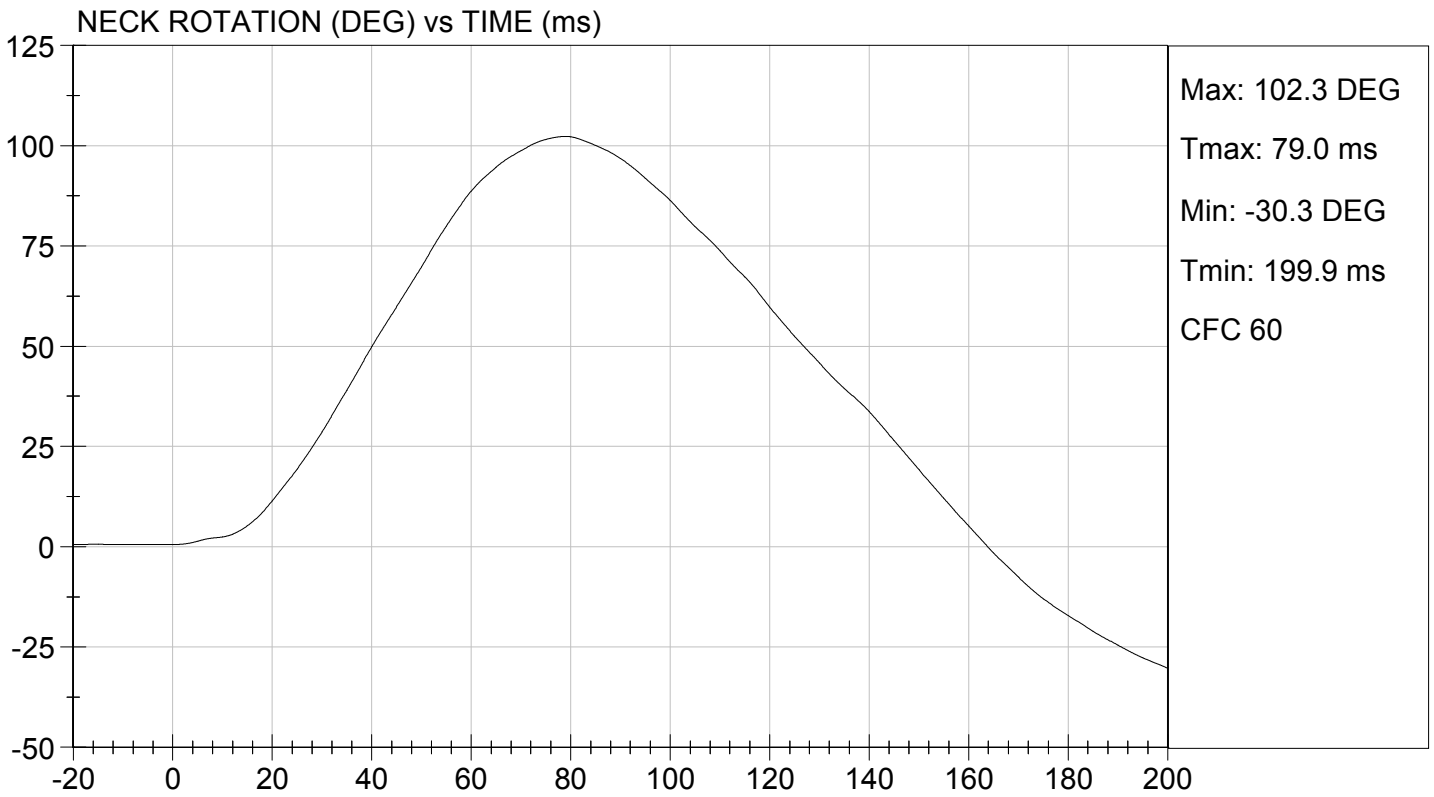
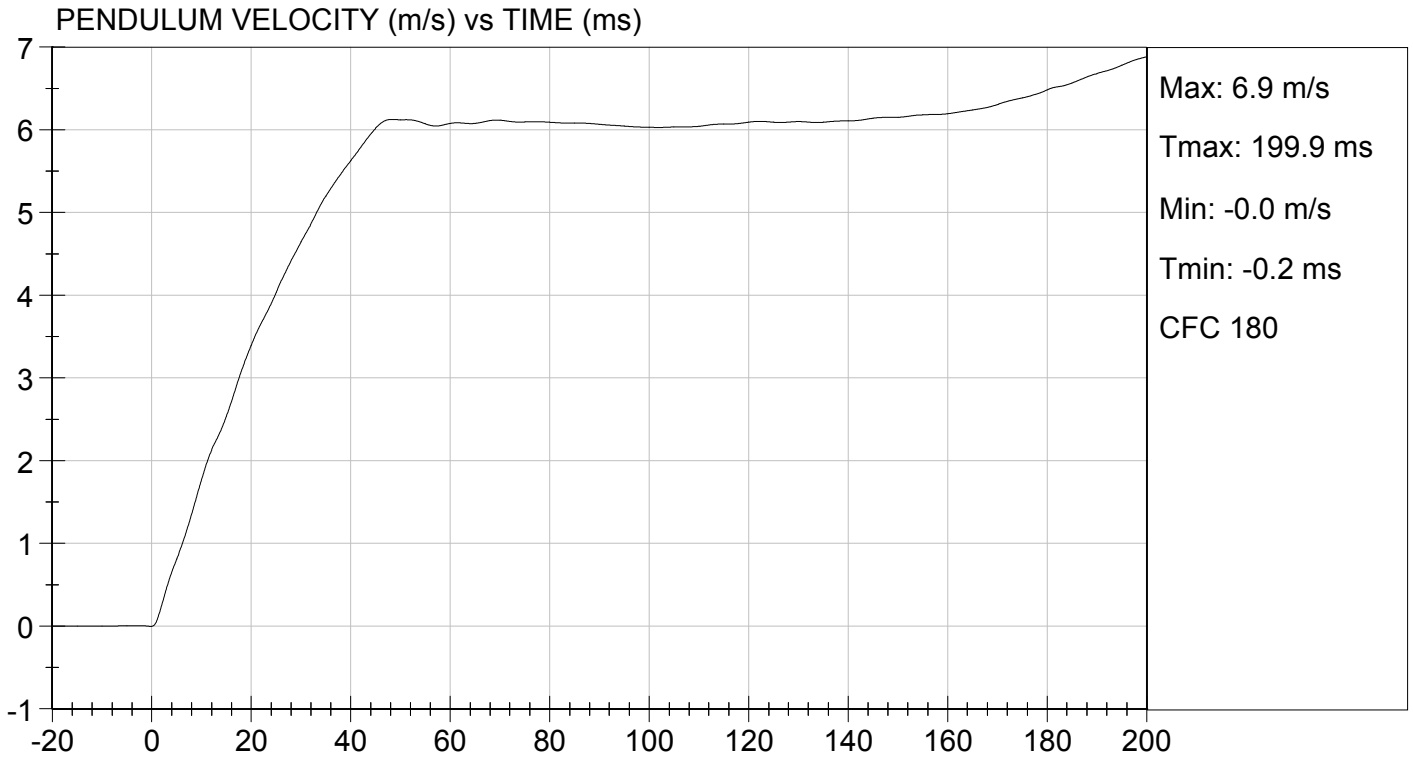
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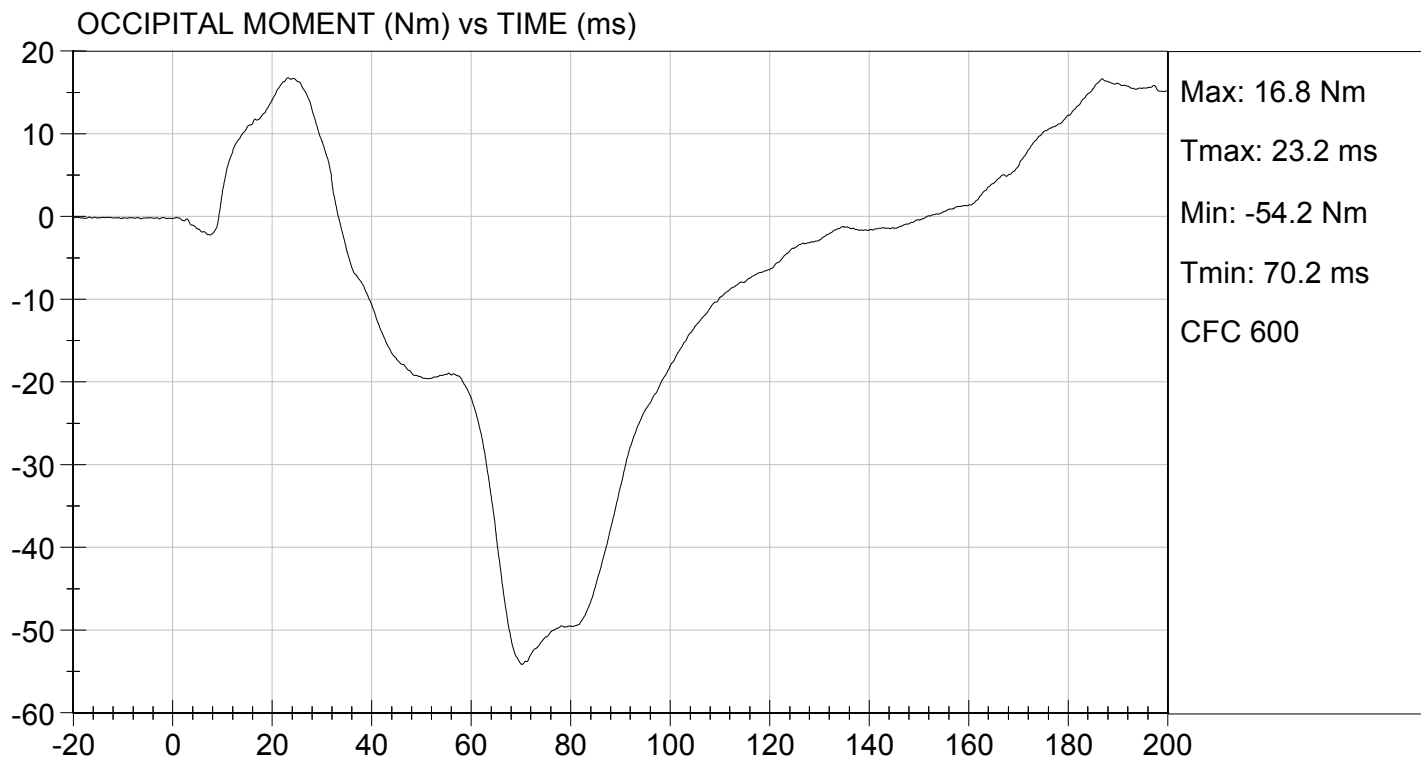
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity		%	10 to 70	17	Pass
Pendulum Speed		m/s	5.95 to 6.19	6.12	Pass
Pendulum Velocity	10 ms	m/s	1.5 to 1.9	1.8	Pass
	20 ms	m/s	3.1 to 3.9	3.4	Pass
	30 ms	m/s	4.6 to 5.6	4.6	Pass
D Plane Rotation	Max	deg	99 to 114	102	Pass
Occipital Condyle Moment within Rotation Corridor		Nm	-65 to -53	-54	Pass
Negative Moment Time Curve Decay to -10 Nm		ms	94 to 114	110	Pass
Overall Results					Pass

David Schoedel
 Laboratory Technician

12/02/2014
 Test Date

Jessica Hall
 Approved By





MGA RESEARCH CORPORATION
THORAX IMPACT
HYBRID III 5TH PERCENTILE

ATD Serial No: 634

Test I.D: D144244

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.9	Pass
Relative Humidity	%	10 to 70	17	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	4173	Pass
Internal Hysteresis	%	69 to 85	72	Pass
Peak Force 18 mm - 50 mm	N	<= 4600	4284	Pass
Overall Test Results				Pass

David Schoedel
 Laboratory Technician

12/02/2014

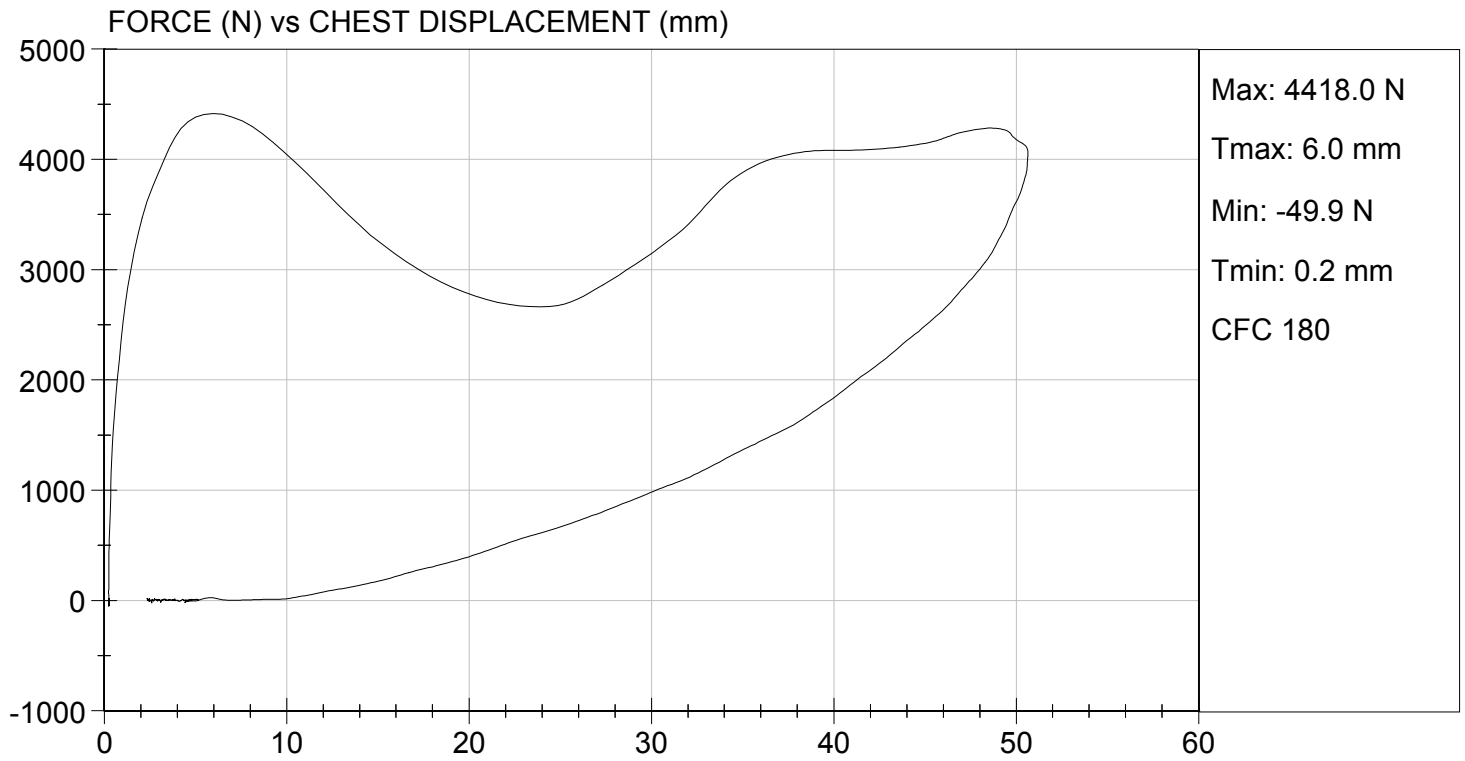
Test Date

Jessica Hall
 Approved By



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

TEST DATE: 12/02/2014
TEST #: D144244



MGA RESEARCH CORPORATION
RIGHT KNEE IMPACT TEST
HYBRID III 5TH PERCENTILE

ATD Serial No: 634

Test I.D.: D144245

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	16	Pass
Probe Speed	m/s	2.07 to 2.13	2.13	Pass
Maximum Force	N	3450 to 4060	3989	Pass
Overall Test Results				Pass

David Schoedel
Laboratory Technician

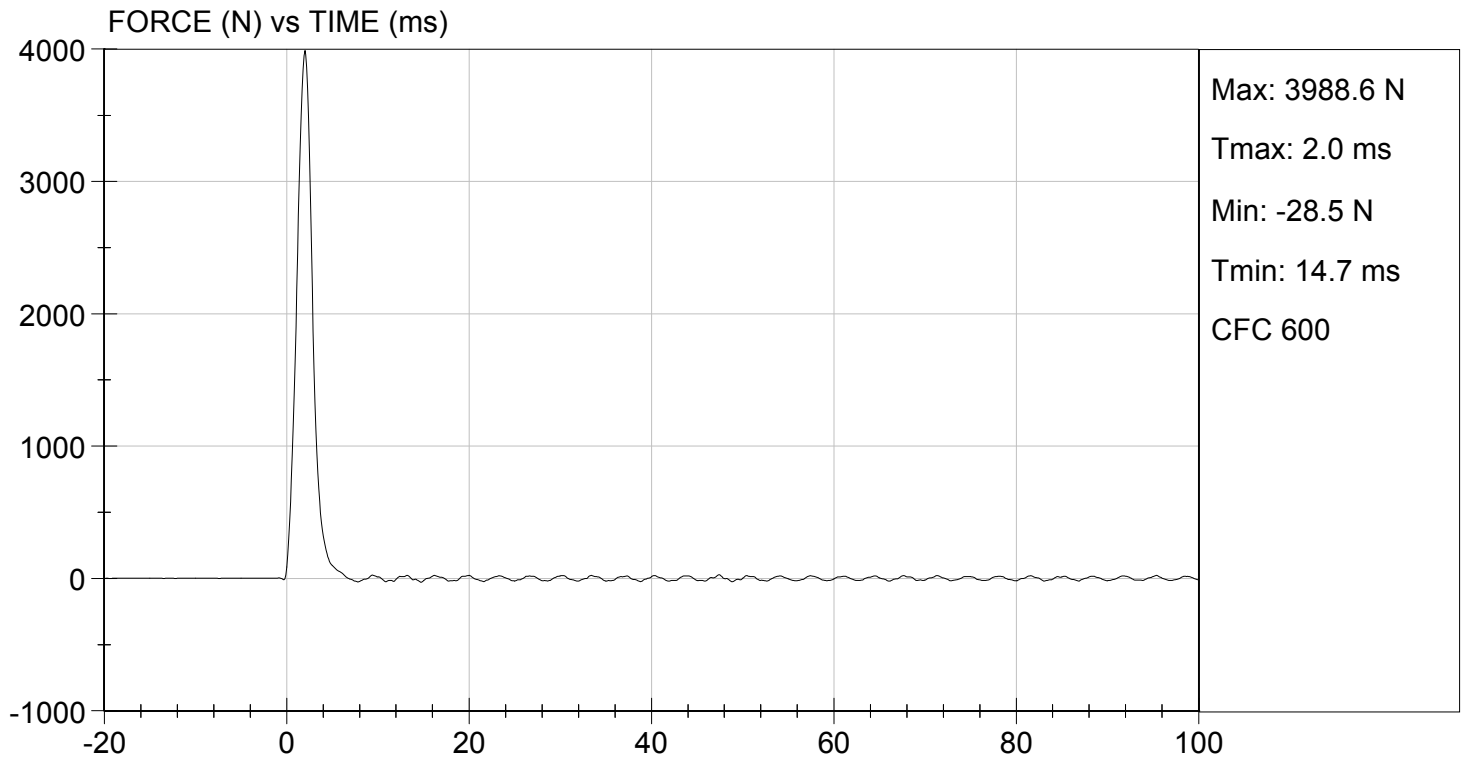
12/01/2014
Test Date

Jessica Hall
Approved By



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

TEST DATE: 12/01/2014
TEST #: D144245



MGA RESEARCH CORPORATION

LEFT KNEE IMPACT TEST
HYBRID III 5TH PERCENTILE

ATD Serial No: 634

Test I.D: D144246

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	16	Pass
Probe Speed	m/s	2.07 to 2.13	2.13	Pass
Maximum Force	N	3450 to 4060	3688	Pass
Overall Test Results				Pass

David Schoedel
Laboratory Technician

12/01/2014

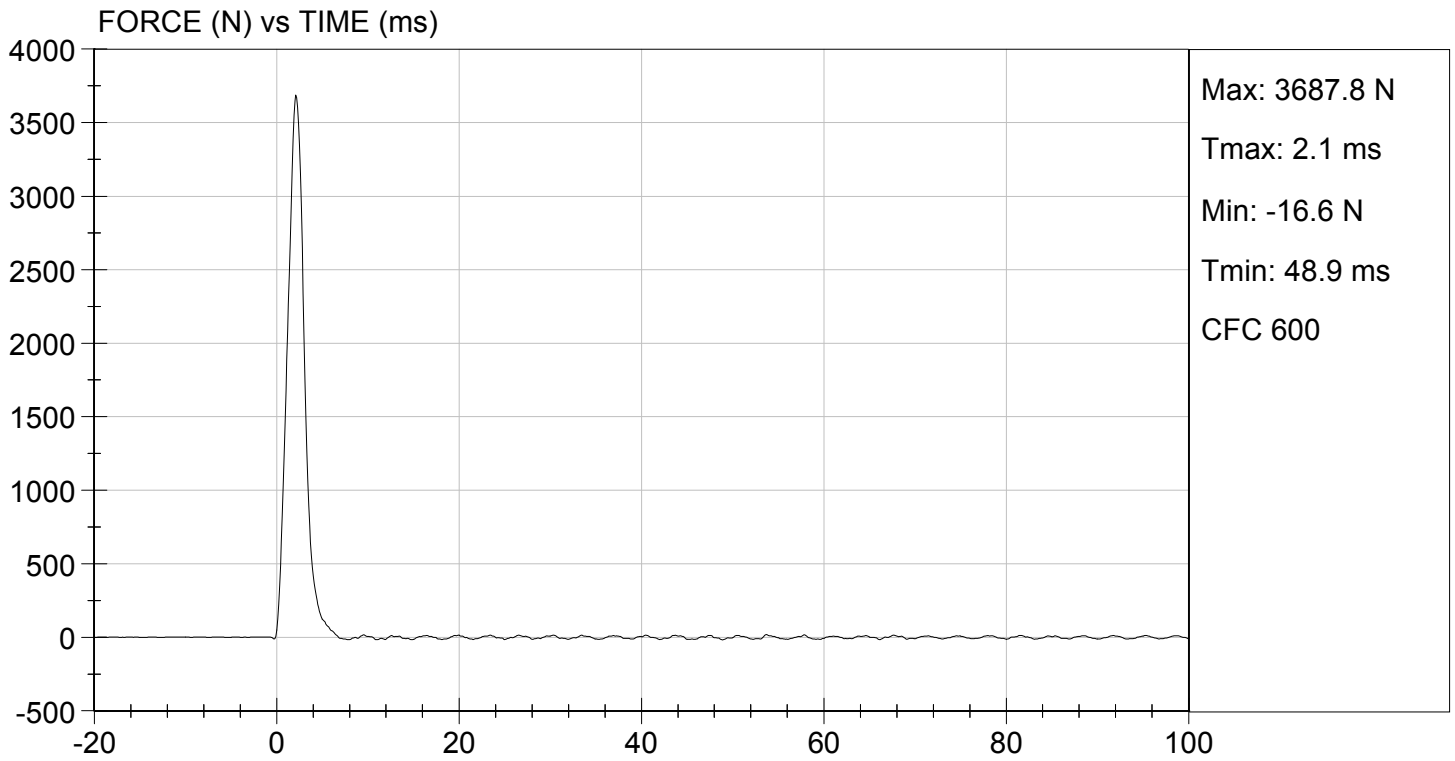
Test Date

Jessica Hall
Approved By



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

TEST DATE: 12/01/2014
TEST #: D144246



MGA RESEARCH CORPORATION
TORSO FLEXION TEST
HYBRID III 5TH PERCENTILE

ATD Serial No: 634

Test I.D: D144247

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	17	Pass
Initial Angle	deg	0 to 20	19	Pass
Return Angle	deg	+/- 8	5	Pass
Force at 45 deg	N	320 to 390	351	Pass
Upper Torso Deflection Rate	deg/s	0.5 to 1.5	0.8	Pass
Overall Result				Pass

David Schoedel
 Laboratory Technician

12/02/2014
 Test Date

Jessica Hall
 Approved By