REPORT NUMBER: NCAP-MGA-2014-046

NEW CAR ASSESSMENT PROGRAM (NCAP)
Frontal Barrier Impact Test

AUDI AG
2014 Audi A6 AWD 4-Dr Sedan
NHTSA No.: O20145802

MGA RESEARCH CORPORATION
5000 Warren Road
Burlington, WI 53105

Test Date: January 27, 2014

Final Report Date: February 20, 2014

FINAL REPORT

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

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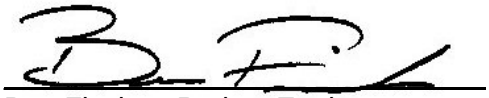
Approved by: 
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Approval Date: February 20, 2014

FINAL REPORT ACCEPTANCE BY OCWS:

_____
Division Chief, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

_____
COTR, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

Technical Report Documentation Page

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15. Supplementary Notes		

16. Abstract

A 56.3 km/h NCAP Frontal Impact Test was conducted on a 2014 Audi A6 AWD 4-Dr Sedan 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 January 27, 2014.

The impact velocity of the vehicle was 56.1 km/h and the ambient temperature at the barrier face at the time of impact was 21.8°C. The target vehicle post-test maximum crush was 600 located at the vehicle's centerline. The test vehicle's performance was as follows:

Measurement Description	Units	Driver ATD		Passenger ATD	
		Threshold	Result	Threshold	Result
Head Injury Criteria	N/A	700	144	700	141
Maximum Chest	mm	63	23	52	11
Nij	N/A	1	0.30	1	0.22
Neck Tension	N	4170	1121	2620	594
Neck Compression	N	4000	78	2520	53
Left Femur Force	N	10008	1823	6805	1661
Right Femur Force	N	10008	2020	6805	2126

17. Key Words 35 mph Frontal Barrier Impact Test New Car Assessment Program (NCAP)		*18. Distribution Statement* Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division, NPO-411 1200 New Jersey Ave, SE Washington, DC 20590 Email: tis@nhtsa.dot.gov FAX: 202-493-2833	
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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 2014 Audi A6 AWD 4-Dr Sedan at a velocity of 56.1 km/h. The test was performed at MGA Research Corporation on January 27, 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 lap and shoulder belts and the passenger's lap and shoulder 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 600 mm and both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

The driver's visible contact points were as follows: The driver's head and chest contacted the airbag. The driver's head also contacted the headrest. The driver's knees contacted the knee 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. The passenger's knees contacted the knee airbag.

The occupant data is summarized below:

ATD position	HIC_{15}	Nij	Neck Tension (N)	Neck Comp. (N)	3ms Chest Clip (Gs)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver (50^{th})	144	0.30	1121	78	36	23	1823	2020
Passenger (5^{th})	141	0.22	594	53	36	11	1661	2126

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
Barrier F-01 MZ has questionable data

SECTION 2
OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2014 Audi A6 AWD 4-Dr Sedan NHTSA No.: O20145802
Test Program: NCAP Frontal Barrier Impact Test Test Date: 1/27/2014

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	O20145802	Traction Control System (TCS)	Yes
Model Year	2014	Power Steering	Yes
Make	Audi	Power Window Auto-Reverse	Yes
Model	A6	Driver Frontal Airbag	Yes
Body Style	Sedan	Driver Curtain Airbag	Yes
VIN	WAUGFBFC2EN072898	Driver Head/Torso Airbag	No
Body Color	Oolong Gray Metallic	Driver Torso Airbag	No
Odometer (km/mi)	109 / 68	Driver Torso/Pelvis Airbag	Yes
Engine Displacement (L)	2.0	Driver Pelvis Airbag	No
Type/No. Cylinders	4	Driver Knee Airbag	Yes
Engine Placement	Longitudinal	Front Pass. Frontal Airbag	Yes
Transmission Type	Automatic	Front Pass. Curtain Airbag	Yes
Transmission Speeds	8	Front Pass. Head/Torso Airbag	No
Overdrive	Yes	Front Pass. Torso Airbag	No
Final Drive	AWD	Front Pass. Torso/Pelvis Airbag	Yes
Roof Rack	No	Front Pass. Pelvis Airbag	No
Sunroof/T-Top	Yes	Front Pass. Knee Airbag	Yes
Running Boards	No	Driver Pretensioner	Yes
Tilt Steering Wheel	Yes	Driver Load Limiter	Yes
Power Seats	Yes	Front Pass. Pretensioner	Yes
Anti-Lock Brakes (ABS)	Yes	Front Pass. Load Limiter	Yes
Automatic Door Locks (ADLs)	Yes	Other	N/A

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

DATA FROM CERTIFICATION LABEL

Manufactured By	AUDI AG
Date of Manufacture	10 13

GVWR (kg)	2315
GAWR Front (kg)	1160
GAWR Rear (kg)	1230

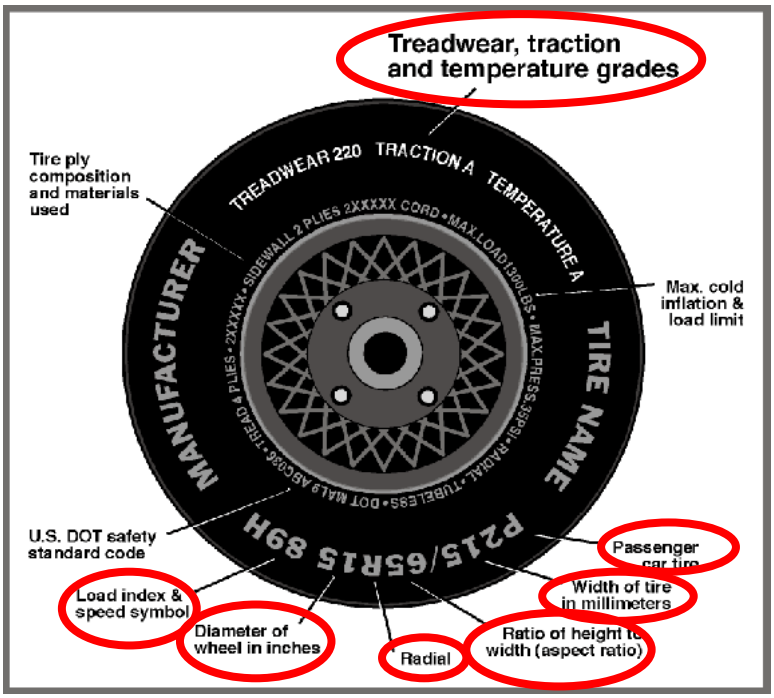
VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench		
Designated Seating Capacity (DSC)	2	3		5
Capacity Weight (VCW) (kg)				500
Cargo Weight (RCLW) (kg)				160

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

Test Vehicle: 2014 Audi A6 AWD 4-Dr Sedan NHTSA No.: O20145802
Test Program: NCAP Frontal Barrier Impact Test Test Date: 1/27/2014

VEHICLE TIRE INFORMATION



Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	240	260
Recommended Tire Size	245/45R18	245/45R18
Tire Size on Vehicle	245/45R18	245/45R18
Tire Manufacturer	Continental	Continental
Tire Model	Contipro Contact	Contipro Contact
Treadwear	500	500
Traction	AA	AA
Temperature Grade	A	A
Tire Plies Sidewall	1 Rayon	1 Rayon
Tire Plies Body	1 Rayon, 2 Steel, 2 Polyamide	1 Rayon, 2 Steel, 2 Polyamide
Load Index/Speed Symbol	100H	100H
Tire Material	Rubber	Rubber
DOT Safety Code Left	AF00 NXH6 4113	AF00 NXH6 4113
DOT Safety Code Right	AF00 NXH6 4013	AF00 NXH6 4013

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

Test Vehicle: 2014 Audi A6 AWD 4-Dr Sedan NHTSA No.: O20145802
Test Program: NCAP Frontal Barrier Impact Test Test Date: 1/27/2014

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	485.4	410.1		516.2	518.0	
Right	kg	479.4	420.9		494.0	561.5	
Ratio	%	53.7	46.3		48.3	51.7	
Totals	kg	964.8	831.0	1795.8	1010.2	1079.5	2089.7

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1795.8
Weight of 1 P572E ATD & 1 P572O ATD	kg	140.6
Rated Cargo/Luggage Weight (RCLW)	kg	160
Calculated Test Vehicle Target Weight (TVTW)	kg	2096.4

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	730	728	729	730	1349
As Tested	mm	733	728	692	692	1506
Post Test	mm	724	722	690	686	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2916
Total Vehicle Length at Left Side	mm	4744
Total Vehicle Length at Centerline	mm	4926
Total Vehicle Length at Right Side	mm	4744
Weight of Ballast in Cargo Area	kg	143.8
Weight of Vehicle Components Removed	kg	29.5
Amount of Stoddard Solvent in Fuel Tank	L	69.6

List of components removed to meet test weight: Spare tire and cover, jack & tools, right taillight, rear floor mats, front underbody plastic.

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

Test Vehicle: 2014 Audi A6 AWD 4-Dr Sedan NHTSA No.: O20145802
Test Program: NCAP Frontal Barrier Impact Test Test Date: 1/27/2014

TARGET VEHICLE STRUCTURAL MEASUREMENT

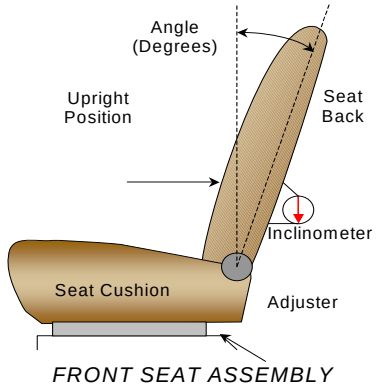
	Elements	Pre-Test (mm)
1	Total Length	4926
2	Total Width	1868
3	Bumper Top Height	570
4	Bumper Bottom Height	450
5	Longitudinal Member Top Height	568
6	Distance between Longitudinal Members	810
7	Longitudinal Member Width	90
8	Engine Top Height	892
9	Engine Bottom Height	225
10	Engine and Gearbox Width	1023
11	Front Bumper-Engine Distance	310
12	Front Shock Absorber Fixing Height	915
13	Bonnet Leading Edge Height	752
14	Front Shock Absorber Fixing Width	923
15	Front Bumper – Front Axle Distance	921
16	Front Axle – A-Pillar Distance	445
17	A-Pillar – B-Pillar Distance	1239
18	B-Pillar – Rear Axle Distance	1232
19	B-Pillar – C-Pillar Distance	785
20	Roof Sill Bottom Height	1298
21	Roof Sill Top Height	1424
22	Floor Sill Bottom Height	158
23	Floor Sill Top Height	362

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

Test Vehicle: 2014 Audi A6 AWD 4-Dr Sedan NHTSA No.: O20145802
Test Program: NCAP Frontal Barrier Impact Test Test Date: 1/27/2014

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	19.1° on seatback
Passenger Seat Back Angle	19.6° on seatback

SEAT FORE/AFT POSITIONS

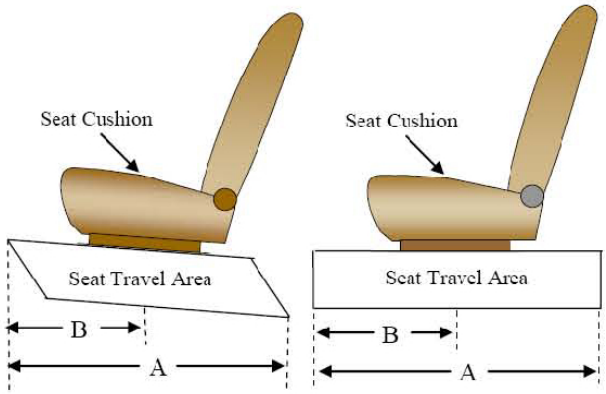
The driver and passenger seat fore/aft positions are adjusted following Appendix F, "Driver & Passenger Dummy Seating & Positioning Procedures" in the NCAP Test Procedure dated August 2013.

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	305 mm (1st as 0)	153 mm (foremost as 0)
Passenger Seat	248 mm (1st as 0)	0 mm (foremost as 0)

SEAT BELT UPPER ANCHORAGES

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

	Total # of Positions	Placed in Position #
Driver Seat	4 (1st as 1)	0 (1st as 0)
Passenger Seat	4 (1st as 1)	1 (1st as 0)



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

Test Vehicle: 2014 Audi A6 AWD 4-Dr Sedan NHTSA No.: O20145802
Test Program: NCAP Frontal Barrier Impact Test Test Date: 1/27/2014

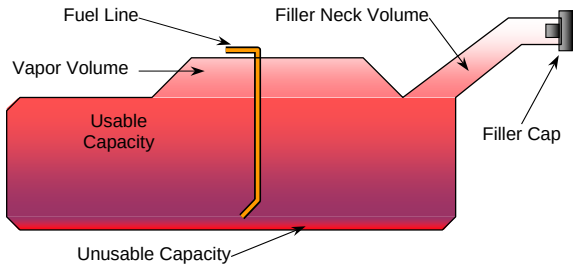
FUEL TANK CAPACITY DATA

	Liters
Usable Capacity of "Standard Tank"	75.0
Usable Capacity of "Optional Tank"	
92-94% of Usable Capacity	69.0 to 70.5
Actual Amount of Solvent used	69.6
1/3 of Usable Capacity	25.0

FUEL PUMP

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

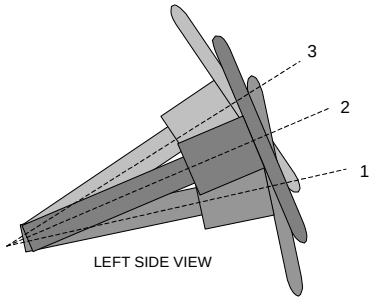
The vehicle is equipped with an electric fuel pump. The fuel pipe is on the right side.



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.



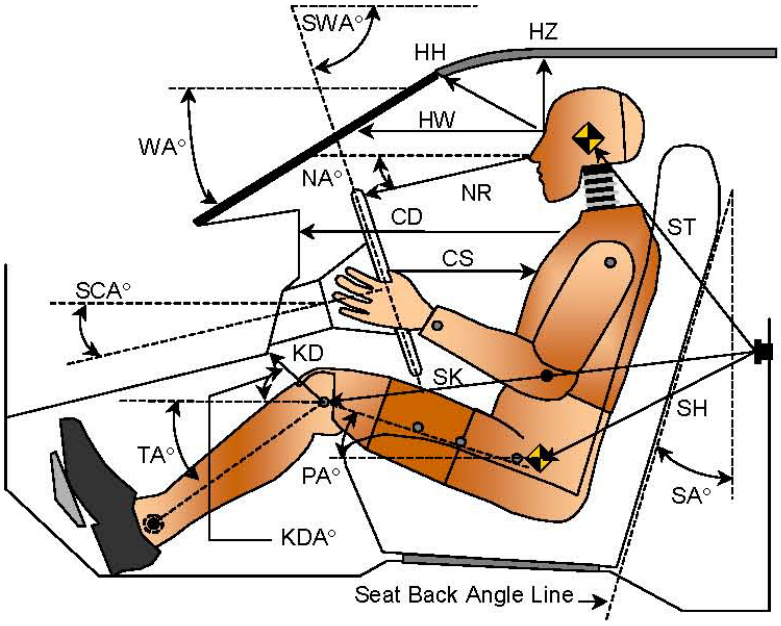
STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITION

	Degrees	Fore/Aft Position (mm)
Lowermost Position 1	71.4	194
Geometric Center Position 2	68.8	164
Uppermost Position 3	66.2	134
Telescoping Steering Wheel Travel		60
Test Position	68.8	164

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2014 Audi A6 AWD 4-Dr Sedan NHTSA No.: O20145802
Test Program: NCAP Frontal Barrier Impact Test Test Date: 1/27/2014

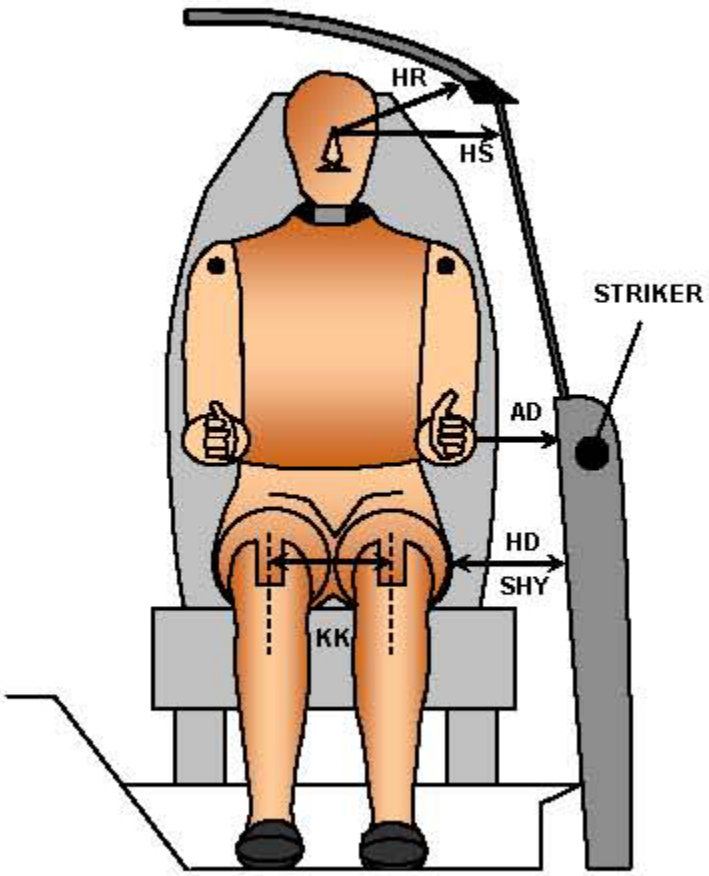


LEFT SIDE VIEW

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		23.6		
SWA°	Steering Wheel Angle		68.8		
SCA°	Steering Column Angle		21.2		
SA°	Seat Back Angle (on headrest post)		19.1		19.6
HZ	Head to Roof (Z)	180	90.0	192	90.0
HH	Head to Header	321	27.1	272	42.5
HW	Head to Windshield	628	0.0	619	0.0
NR	Nose to Rim	376	6.2		
CD	Chest to Dash	521		370	
CS	Chest to Steering Hub	316	0.4		
RA	Rim to Abdomen	201	0.0		
KDL	Left Knee to Dash	219	28.5	121	39.6
KDR	Right Knee to Dash	217	32.4	122	43.7
PA°	Pelvic Angle		24.1		21.0
TA°	Tibia Angle		35.9		47.4
SK	Striker to Knee	553	104.4	648	96.3
ST	Striker to Head	444	10.0	416	23.6
SH	Striker to H-Point	270	145.2	369	101.2

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2014 Audi A6 AWD 4-Dr Sedan
Test Program: NCAP Frontal Barrier Impact Test
NHTSA No.: O20145802
Test Date: 1/27/2014

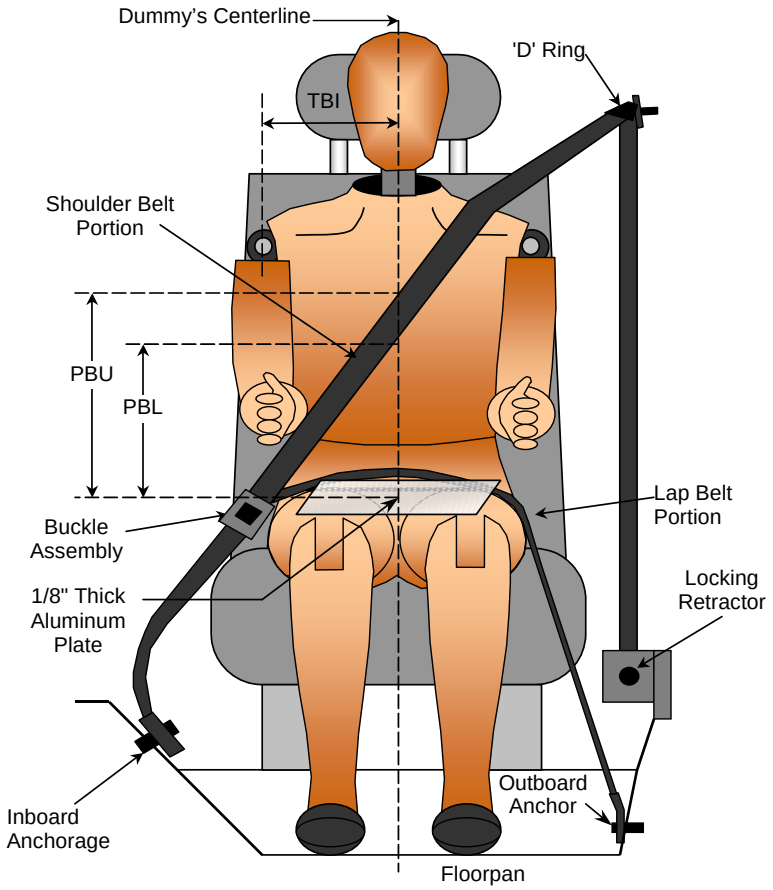


FRONT VIEW OF DUMMY

Code	Measurement Description	Driver	Passenger
		Length (mm)	
AD	Arm to Door	132	104
HD	H-Point to Door	240	264
HR	Head to Side Header	204	230
HS	Head to Side Window	316	355
KK	Knee to Knee	341	232
SHY	Striker to H-Point (Y Direction)	291	325
AA	Ankle to Ankle	332	163

DATA SHEET NO. 5
SEAT BELT POSITIONING DATA

Test Vehicle: 2014 Audi A6 AWD 4-Dr Sedan
Test Program: NCAP Frontal Barrier Impact Test
NHTSA No.: O20145802
Test Date: 1/27/2014



FRONT VIEW OF DUMMY

SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU - Top surface of reference to belt upper edge	mm	370	290
PBL - Top surface of reference to belt lower edge	mm	285	200

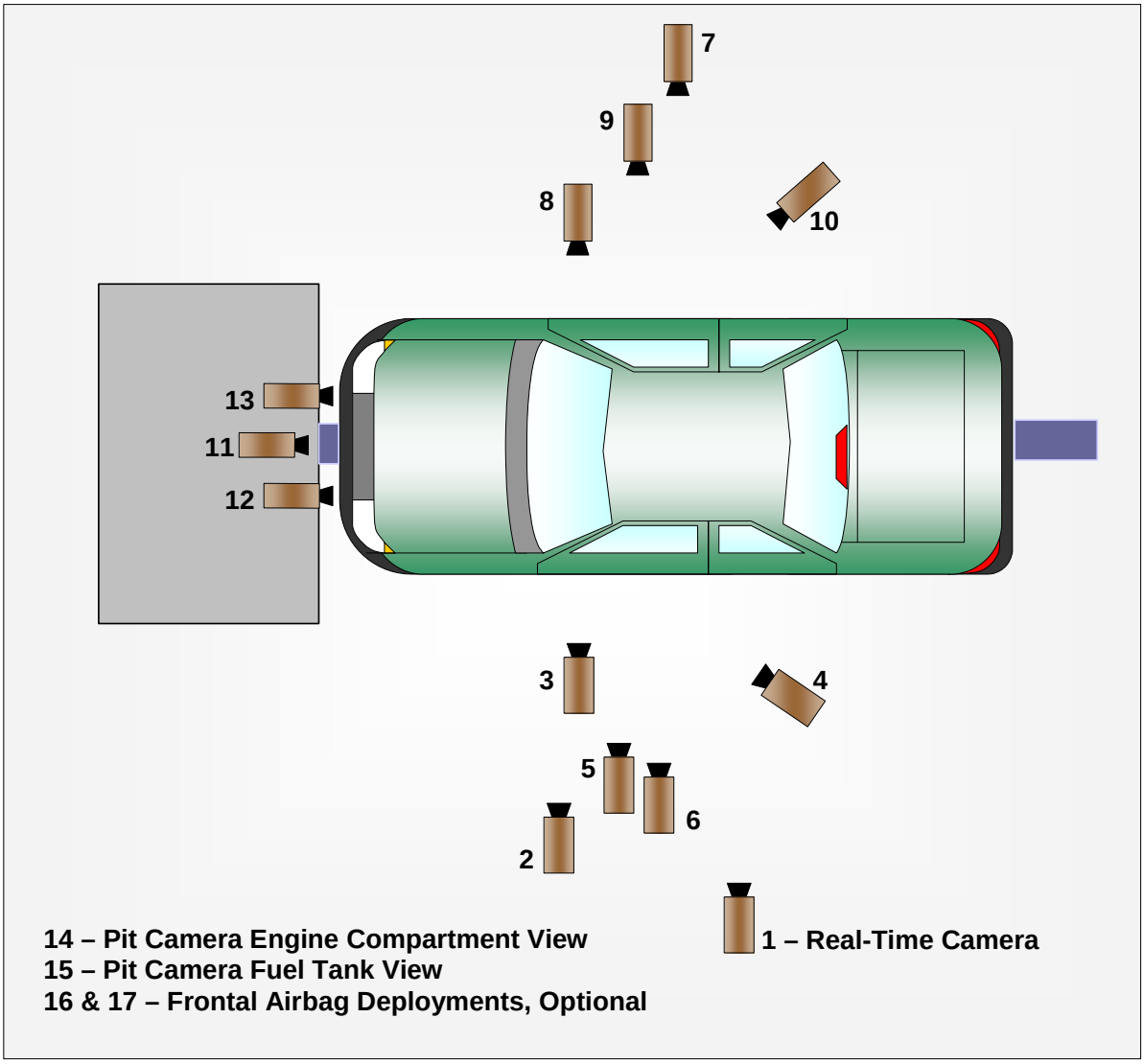
BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder Belt Length as measured on ATD	mm	860	925
Lap Belt Length as measured on ATD	mm	510	520
Remainder of belt on reel	mm	1580	1505
Total Belt Length for Continuous Webbing Systems	mm	2950	2950

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

Test Vehicle: 2014 Audi A6 AWD 4-Dr Sedan
Test Program: NCAP Frontal Barrier Impact Test
NHTSA No.: O20145802
Test Date: 1/27/2014

CAMERA POSITIONS FOR FRONTAL IMPACTS



14 – Pit Camera Engine Compartment View
15 – Pit Camera Fuel Tank View
16 & 17 – Frontal Airbag Deployments, Optional
1 – Real-Time Camera

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

Test Vehicle: 2014 Audi A6 AWD 4-Dr Sedan NHTSA No.: O20145802
Test Program: NCAP Frontal Barrier Impact Test Test Date: 1/27/2014

CAMERA LOCATIONS

No.	Camera View	Coordinates (mm)			Lens (mm)	Speed (fps)
		X*	Y*	Z*		
1	Real-Time Left Overall					30
2	Driver Close-Up	1550	-6620	-1860	35	1000
3	Left Front Half	1310	-5190	-1180	24	1000
4	Left Angle	5410	-5370	-1960	50	1000
5	Steering Column - Top	600	-5040	-1220	24	1000
6	Steering Column - Bottom	580	-5000	-810	24	1000
7	Right Overall	2030	6880	-1340	20	1000
8	Passenger Close-Up	1710	6730	-1770	35	1000
9	Right Front Half	1240	5110	-1280	24	1000
10	Right Angle	5500	5230	-1890	50	1000
11	Windshield	-90	0	-2830	20	1000
12	Driver Windshield	200	-400	-2030	8.5	1000
13	Passenger Windshield	200	420	-2010	8.5	1000
14	Pit Front	1080	0	3150	24	1000
15	Pit Rear	3090	0	3150	24	1000
16	Onboard Driver Side (optional)					
17	Onboard Passenger Side (optional)					
18	Real-Time Pan View					30

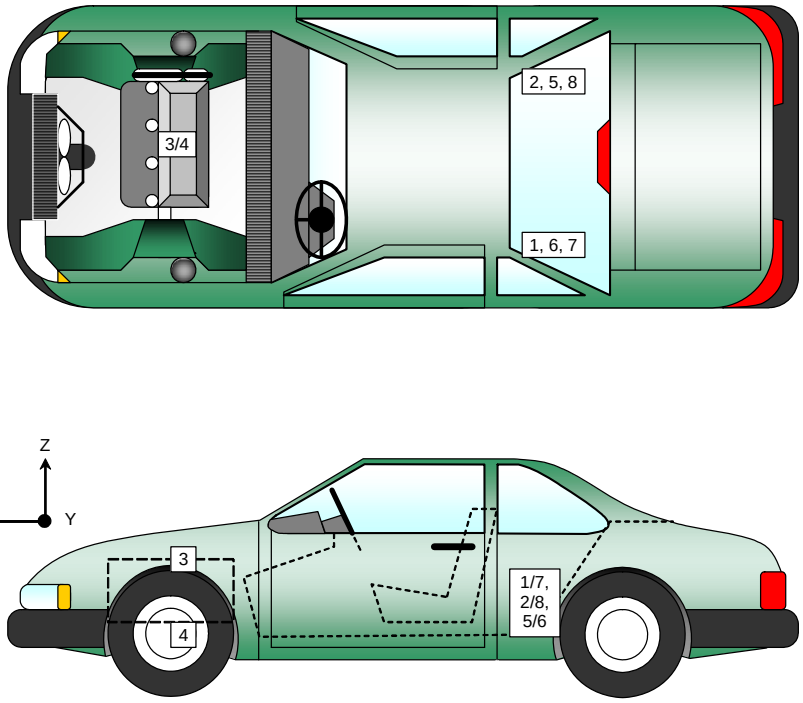
*COORDINATES:

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

Cameras 16 & 17 were not used for this test.

DATA SHEET NO. 7
VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2014 Audi A6 AWD 4-Dr Sedan
Test Program: NCAP Frontal Barrier Impact Test
NHTSA No.: O20145802
Test Date: 1/27/2014



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Crossmember Accelerometer – X Direction	2028	-635	-218
2	Right Rear Crossmember Accelerometer – X Direction	2028	630	-217
3	Engine Top X	4192	50	-842
4	Engine Bottom X	4387	0	-218
5	Left Rear Crossmember Accelerometer – Z Direction	2028	-635	-218
6	Right Rear Crossmember Accelerometer – Z Direction	2028	630	-217
7	Left Rear Crossmember Accelerometer Redundant – X Direction	2028	-635	-218
8	Right Rear Crossmember Accelerometer Redundant – X Direction	2028	630	-217

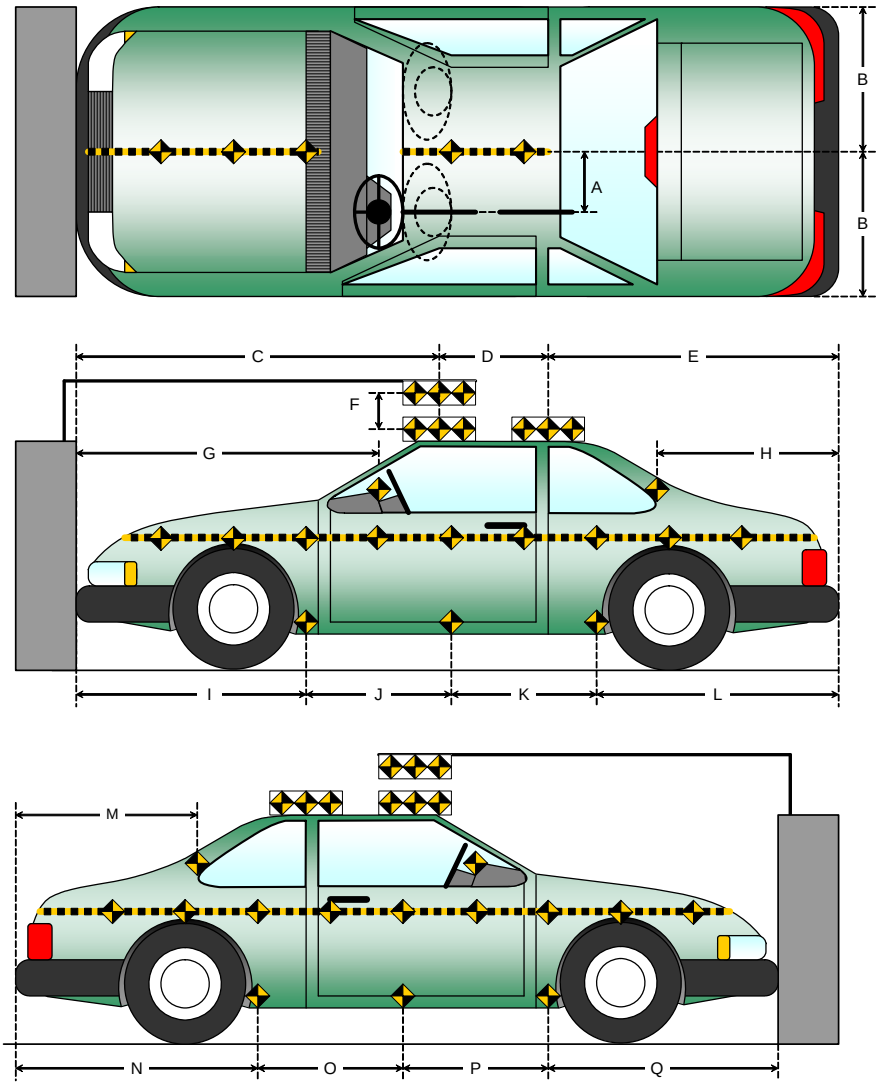
Reference Points: X - Rear Surface of Vehicle (+ forward)
Y - Vehicle Centerline (+ to right)
Z - Ground Plane (+ down)

DATA SHEET NO. 8
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2014 Audi A6 AWD 4-Dr Sedan
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20145802
Test Date: 1/27/2014

Item	Value (mm)
A	399
B	934
C	2418
D	661
E	1847
F	158
G	
H	1489
I	1366
J	1008
K	1008
L	1544
M	1489
N	1544
O	1008
P	1008
Q	1366



DATA SHEET NO. 9
LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2014 Audi A6 AWD 4-Dr Sedan NHTSA No.: O20145802
Test Program: NCAP Frontal Barrier Impact Test Test Date: 1/27/2014

Advanced Research Load Cell Barrier

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: 2014 Audi A6 AWD 4-Dr Sedan NHTSA No.: O20145802
Test Program: NCAP Frontal Barrier Impact Test Test Date: 1/27/2014

INSTRUMENTATION

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

CAMERA COVERAGE

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

DATA SHEET NO. 11
POST-TEST OBSERVATIONS

Test Vehicle: 2014 Audi A6 AWD 4-Dr Sedan NHTSA No.: O20145802
Test Program: NCAP Frontal Barrier Impact Test Test Date: 1/27/2014

TEST DUMMY INFORMATION AND CONTACT LOCATIONS

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

DOOR OPENING AND SEAT TRACK INFORMATION

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

POST TEST STRUCTURAL OBSERVATIONS

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

VEHICLE REBOUND FROM BARRIER

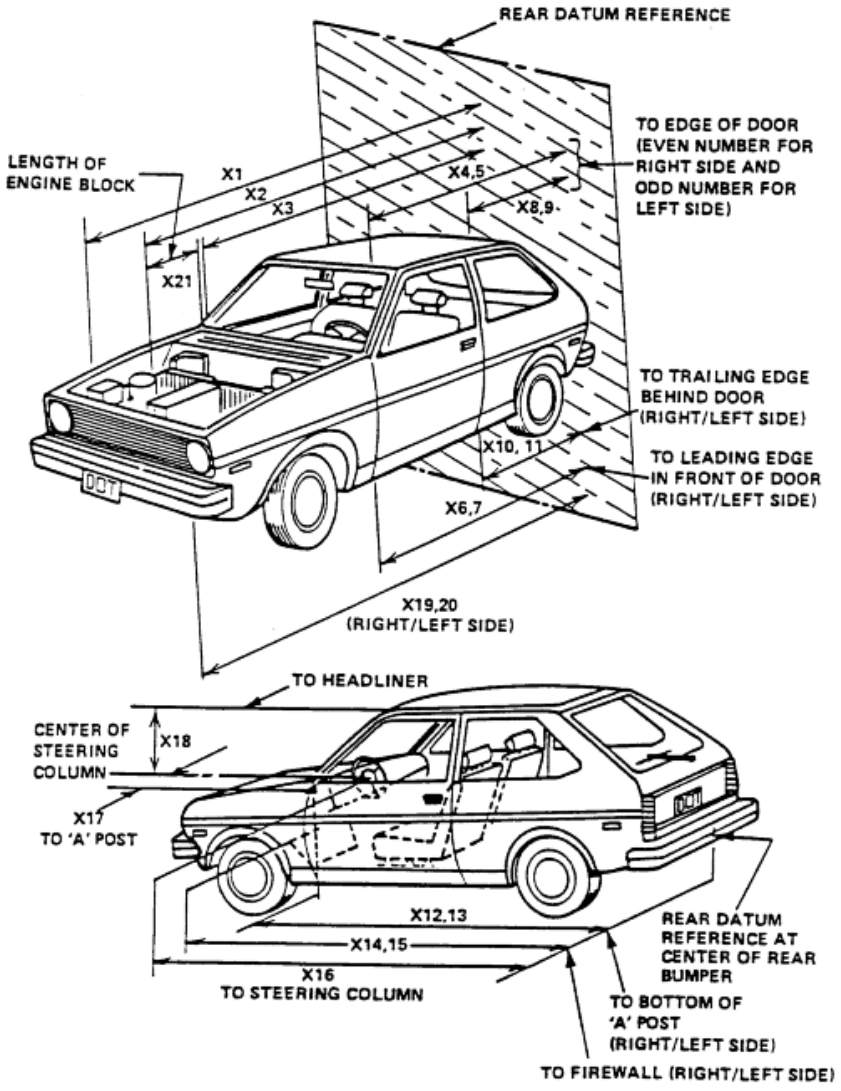
Measured Parameter	Units	Value
Left Side	mm	3275
Center	mm	3325
Right Side	mm	3315
Average	mm	3305

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	Yes	Yes
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes		Yes	

DATA SHEET NO. 12
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2014 Audi A6 AWD 4-Dr Sedan NHTSA No.: O20145802
Test Program: NCAP Frontal Barrier Impact Test Test Date: 1/27/2014



DATA SHEET NO. 12 (CONTINUED)
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2014 Audi A6 AWD 4-Dr Sedan NHTSA No.: O20145802
Test Program: NCAP Frontal Barrier Impact Test Test Date: 1/27/2014

RSOV (Rear Surface of Vehicle)

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	mm	4926	4326	600
2	RSOV to Front of Engine	mm	4380	4131	249
3	RSOV to Firewall	mm	3879	3648	231
4	RSOV to Upper Leading Edge of Right Door	mm	3337	3335	2
5	RSOV to Upper Leading Edge of Left Door	mm	3337	3335	2
6	RSOV to Lower Leading Edge of Right Door	mm	3376	3373	3
7	RSOV to Lower Leading Edge of Left Door	mm	3376	3374	2
8	RSOV to Upper Trailing Edge of Right Door	mm	2223	2223	0
9	RSOV to Upper Trailing Edge of Left Door	mm	2223	2223	0
10	RSOV to Lower Trailing Edge of Right Door	mm	2277	2275	2
11	RSOV to Lower Trailing Edge of Left Door	mm	2277	2276	1
12	RSOV to Bottom of “A” Post of Right Side	mm	3402	3402	0
13	RSOV to Bottom of “A” Post of Left Side	mm	3398	3398	0
14	RSOV to Firewall, Right Side	mm	3439	3432	7
15	RSOV to Firewall, Left Side	mm	3437	3432	5
16	RSOV to Steering Column	mm	2882	2902	-20
17	Center of Steering Column to “A” Post	mm	342	342	0
18	Center of Steering Column to Headliner	mm	392	425	-33
19	RSOV to Right Side of Front Bumper	mm	4744	4386	358
20	RSOV to Left Side of Front Bumper	mm	4744	4395	349
21	Length of Engine Block	mm	537	537	0
RD	RSOV to Right Side of Dash Panel	mm	3048	3047	1
CD	RSOV to Center of Dash Panel	mm	3147	3143	4
LD	RSOV to Left Side of Dash Panel	mm	3044	3044	0

DATA SHEET NO. 13
ACCIDENT INVESTIGATION DIVISION DATA

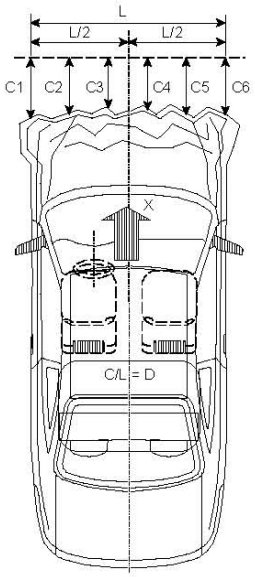
Test Vehicle: 2014 Audi A6 AWD 4-Dr Sedan NHTSA No.: O20145802
Test Program: NCAP Frontal Barrier Impact Test Test Date: 1/27/2014

VEHICLE INFORMATION

VIN: WAUGFBFC2EN072898 Wheelbase (mm): 2916
Vehicle Size Category: Passenger Car Test Weight (kg): 2089.7

ACCELEROMETER DATA

Accelerometer Locations: As per measurements on Page 15
Cal. Procedure/Interval: MGA procedure / 6 month
Integration Algorithm: Trapezoidal
Linearity: > 99%
Impact Velocity (km/h): 56.1
Velocity Change (km/h): 63.8
Time of Separation (msec): 120.5



CRUSH PROFILE

Collision Deformation Classification: Frontal
Midpoint of Damage: Centerline
Damage Region Length (mm): 1310
Impact Mode: Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	4744	4395	349
C2	Crush zone 2 at left side	mm	4828	4356	472
C3	Crush zone 3 at left side	mm	4866	4318	548
C4	Crush zone 4 at right side	mm	4866	4309	557
C5	Crush zone 5 at right side	mm	4828	4330	498
C6	Crush zone 6 at right side	mm	4744	4386	358
L	C1 TO C6	mm	1310	1263	47

DATA SHEET NO. 14
VEHICLE INTRUSION MEASUREMENTS

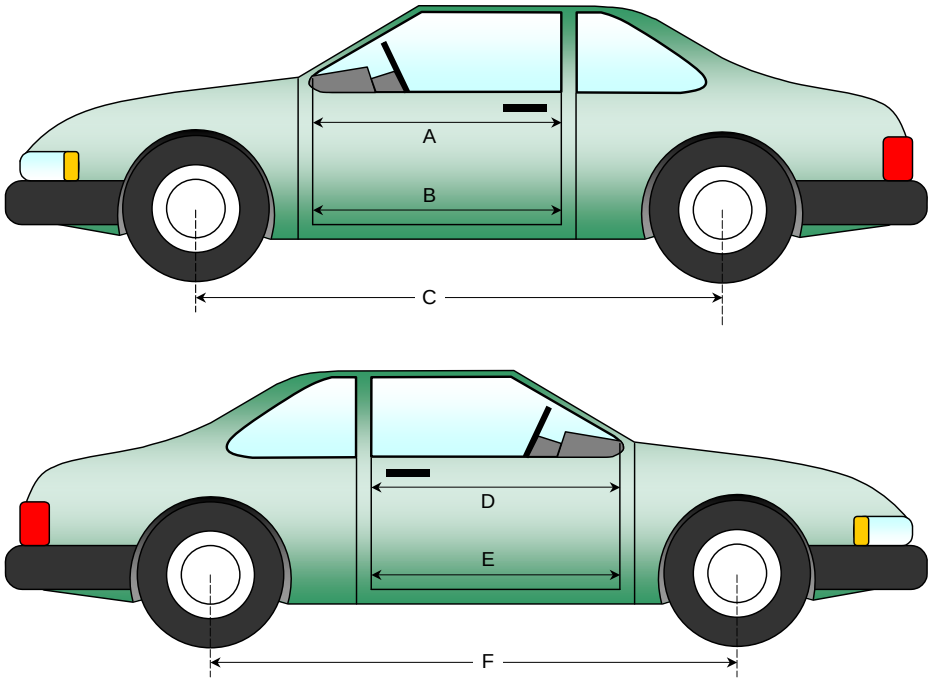
Test Vehicle: 2014 Audi A6 AWD 4-Dr Sedan
Test Program: NCAP Frontal Barrier Impact Test
NHTSA No.: O20145802
Test Date: 1/27/2014

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	975	973	2
B	Left Side Lower	mm	812	811	1
D	Right Side Upper	mm	975	974	1
E	Right Side Lower	mm	812	811	1

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2916	2855	61
F	Right Side Wheelbase	mm	2916	2881	35



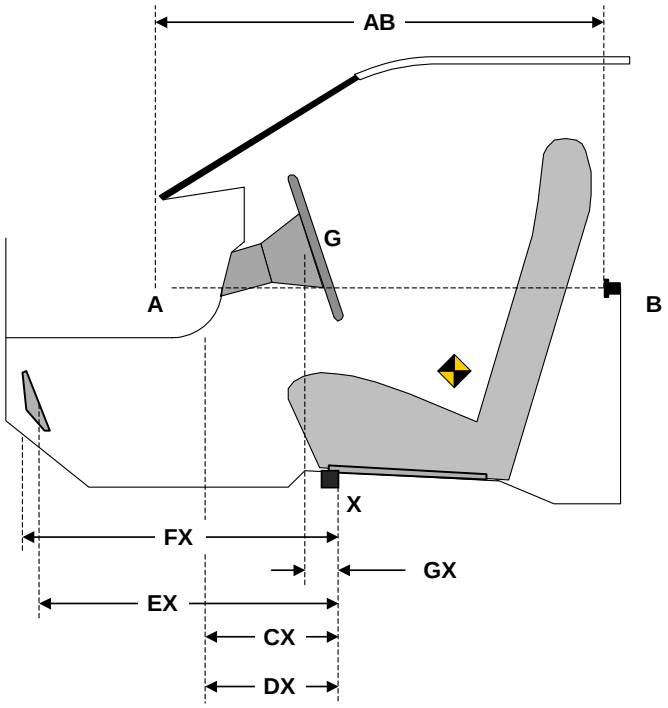
DATA SHEET NO. 14 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2014 Audi A6 AWD 4-Dr Sedan NHTSA No.: O20145802
Test Program: NCAP Frontal Barrier Impact Test Test Date: 1/27/2014

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	777	777	0
CX	Left Knee Bolster to X	mm	283	268	15
DX	Right Knee Bolster to X	mm	274	265	9
EX	Brake Pedal to X	mm	574	545	29
FX	Foot Rest to X	mm	677	648	29
GX	Center of Steering Column Wheel Hub to X	mm	54	105	-51

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: 2014 Audi A6 AWD 4-Dr Sedan NHTSA No.: O20145802
Test Program: NCAP Frontal Barrier Impact Test Test Date: 1/27/2014

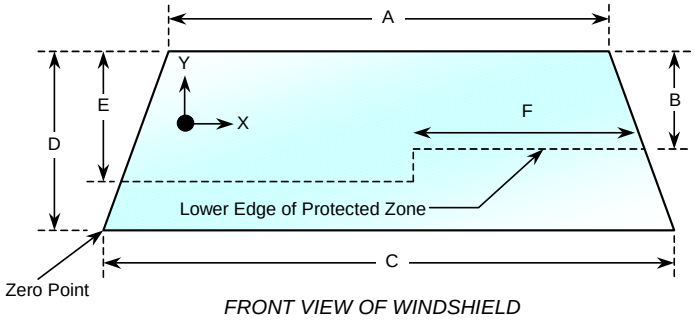
Windshield Mounting Details:
Windshield glass is secured to the vehicle frame with a rubber trim and glue.

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

Temperature of windshield molding during test: 21.8° C.

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% of Retention
Left Side	2133	2133	100
Right Side	2133	2133	100
Total	4266	4266	100



FRONT VIEW OF WINDSHIELD

Item	Units	Value
A	mm	1202
B	mm	392
C	mm	1560
D	mm	752
E	mm	482
F	mm	490

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: 2014 Audi A6 AWD 4-Dr Sedan NHTSA No.: O20145802
Test Program: NCAP Frontal Barrier Impact Test Test Date: 1/27/2014

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

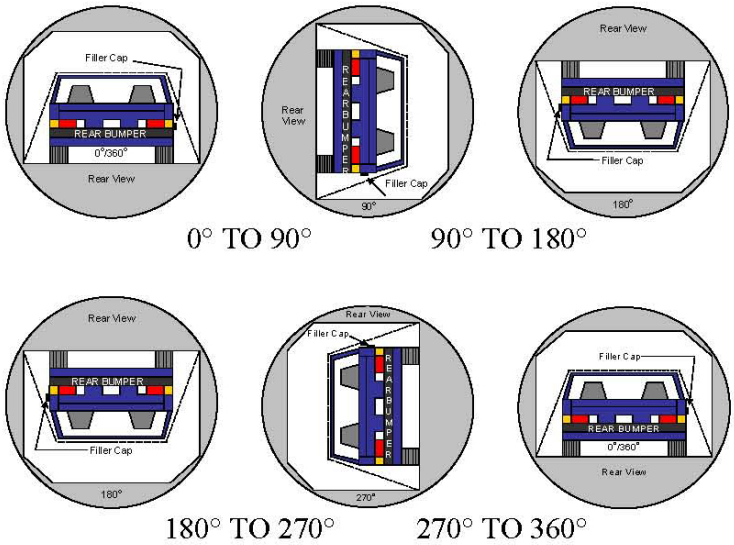
Temperature at Time of Impact: 21.8°C Test Time: 3:46 p.m.

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: 2014 Audi A6 AWD 4-Dr Sedan
Test Program: NCAP Frontal Barrier Impact Test
NHTSA No.: O20145802
Test Date: 1/27/2014

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°	113	300	413
90° to 180°	108	300	408
180° to 270°	106	300	406
270° to 360°	113	300	413

FMVSS 301 SPILLAGE TABLE (units in ounces)

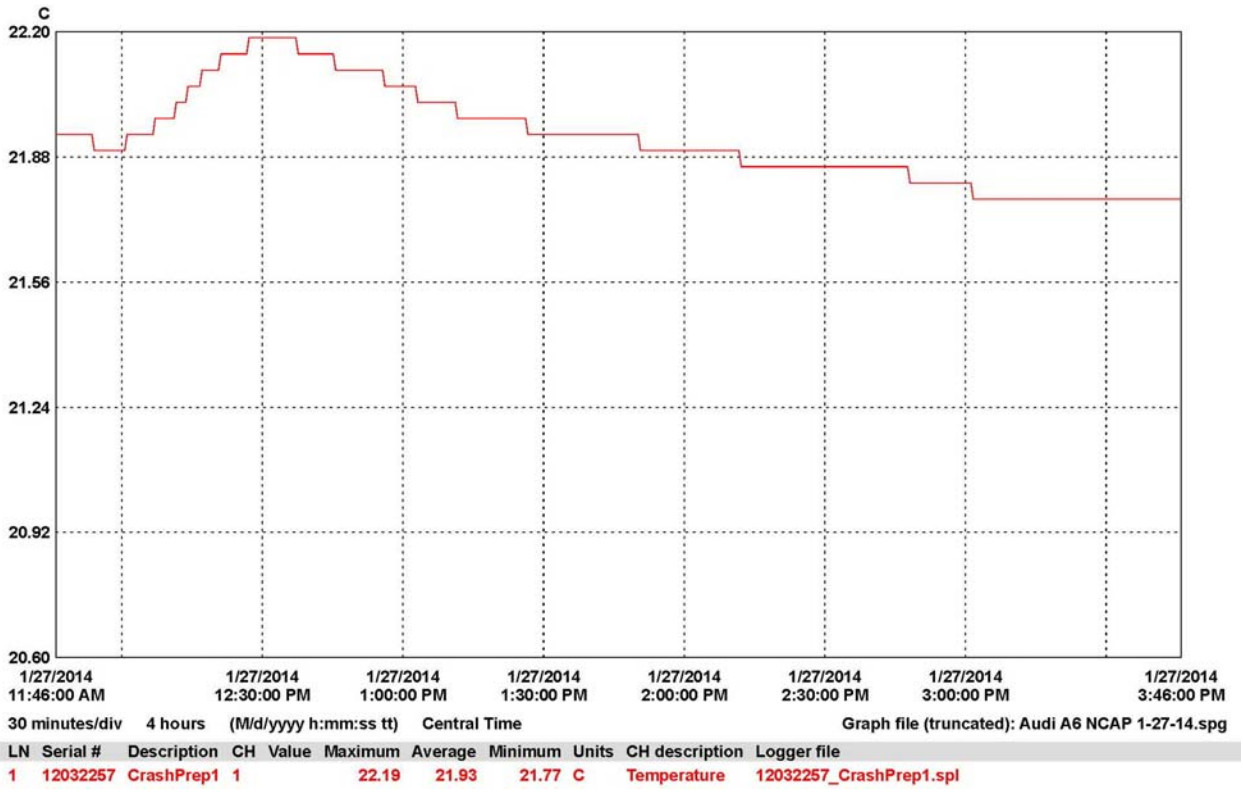
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eight Minute
0° to 90°	0	0	0	0
90° to 180°	0	0	0	0
180° to 270°	0	0	0	0
270° to 360°	0	0	0	0

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

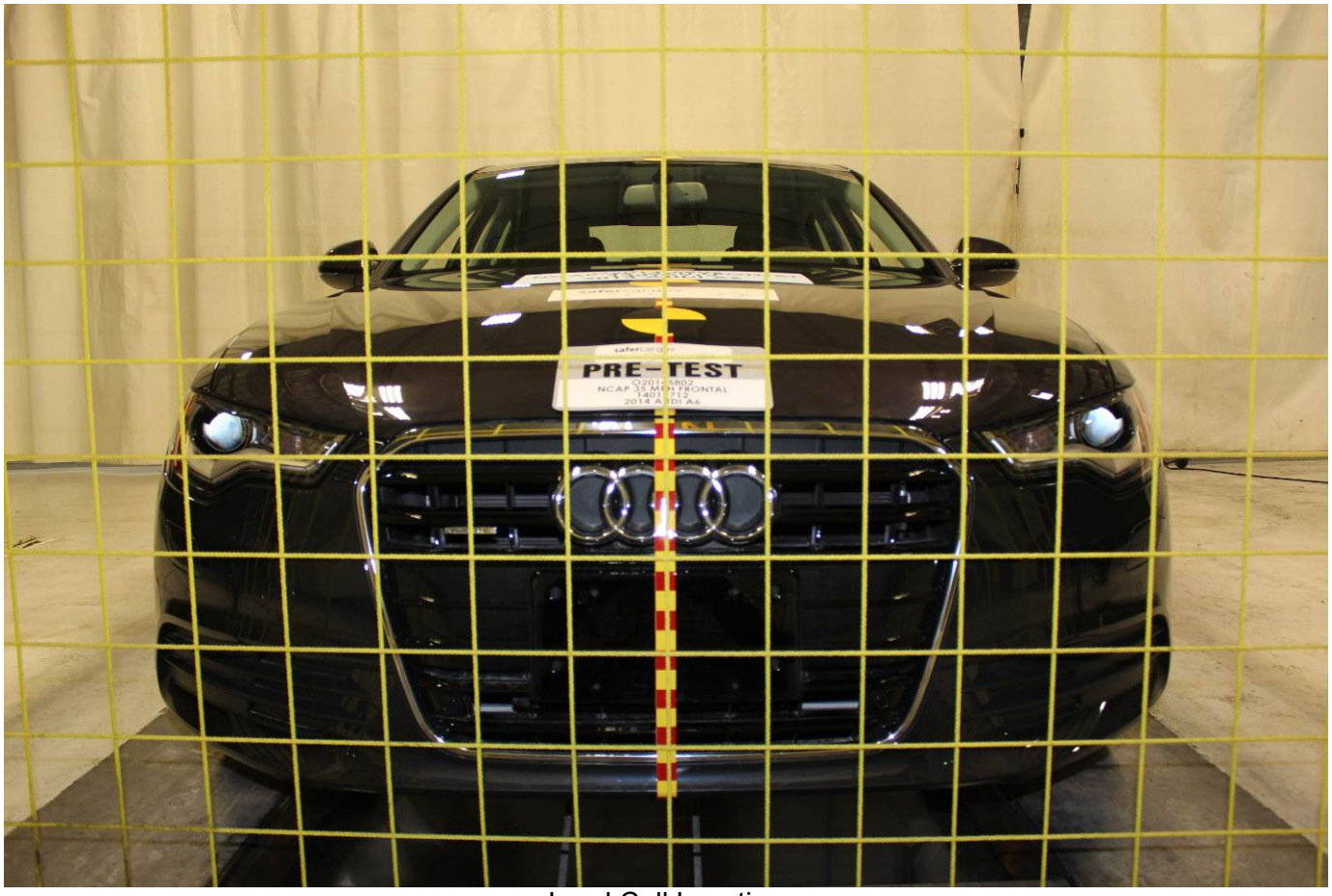
Test Vehicle: 2014 Audi A6 AWD 4-Dr Sedan NHTSA No.: O20145802
Test Program: NCAP Frontal Barrier Impact Test Test Date: 1/27/2014



LN	Serial #	Description	CH	Value	Maximum	Average	Minimum	Units	CH description	Logger file
1	12032257	CrashPrep1	1		22.19	21.93	21.77	C	Temperature	12032257_CrashPrep1.spl

APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS



Load Cell Location

Load Cell Wall

Manufacturer's Label

Tire Placard

2014 Audi A6 4-Dr Sedan Frontal As Delivered

Left Rear 3-4 View, As Received

Pre-Test Front View of Test Vehicle

Post-Test Front View of Test Vehicle

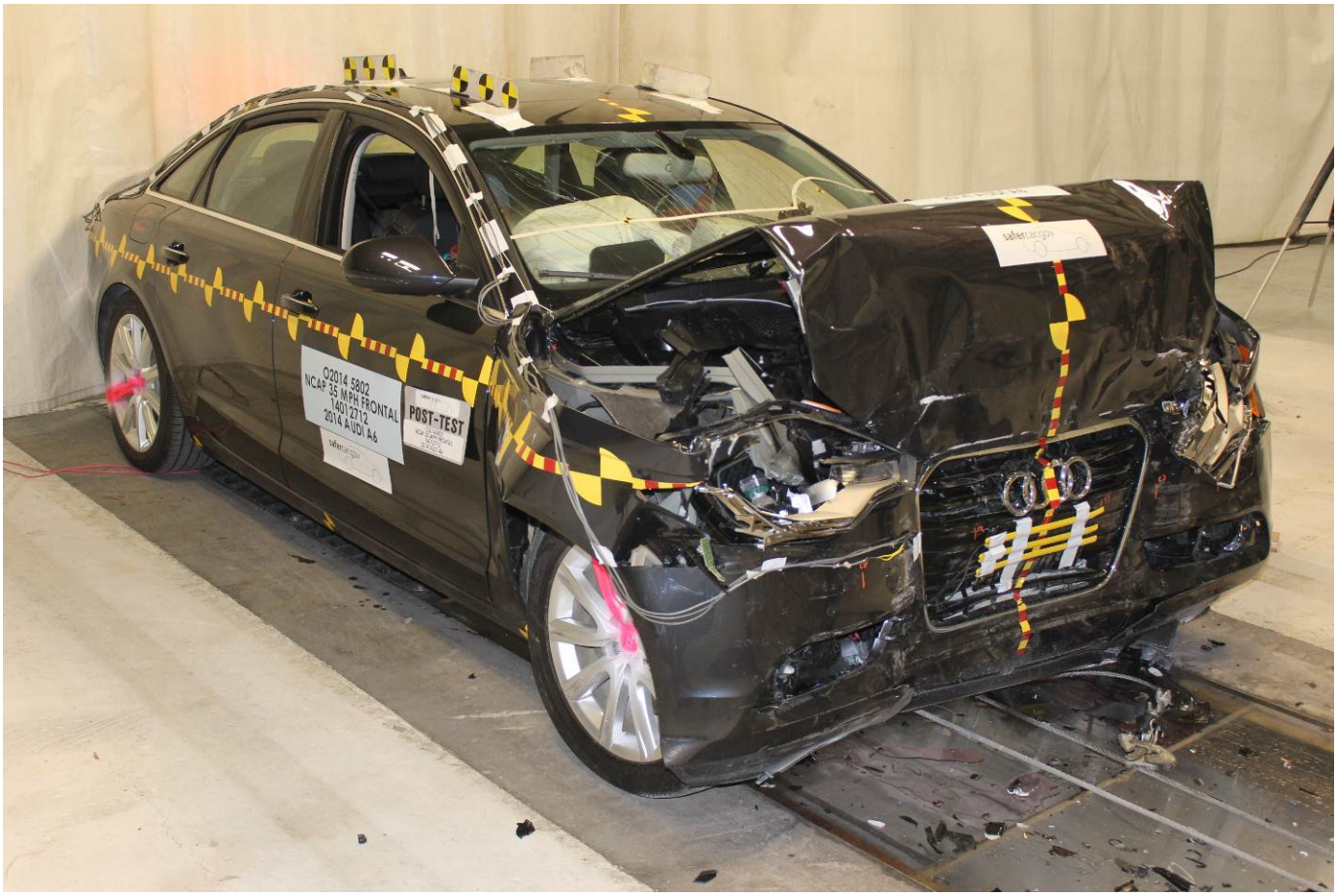
Pre-Test Left View of Test Vehicle

Post-Test Left View of Test Vehicle

Pre-Test Right View of Test Vehicle

Post-Test Right View of Test Vehicle

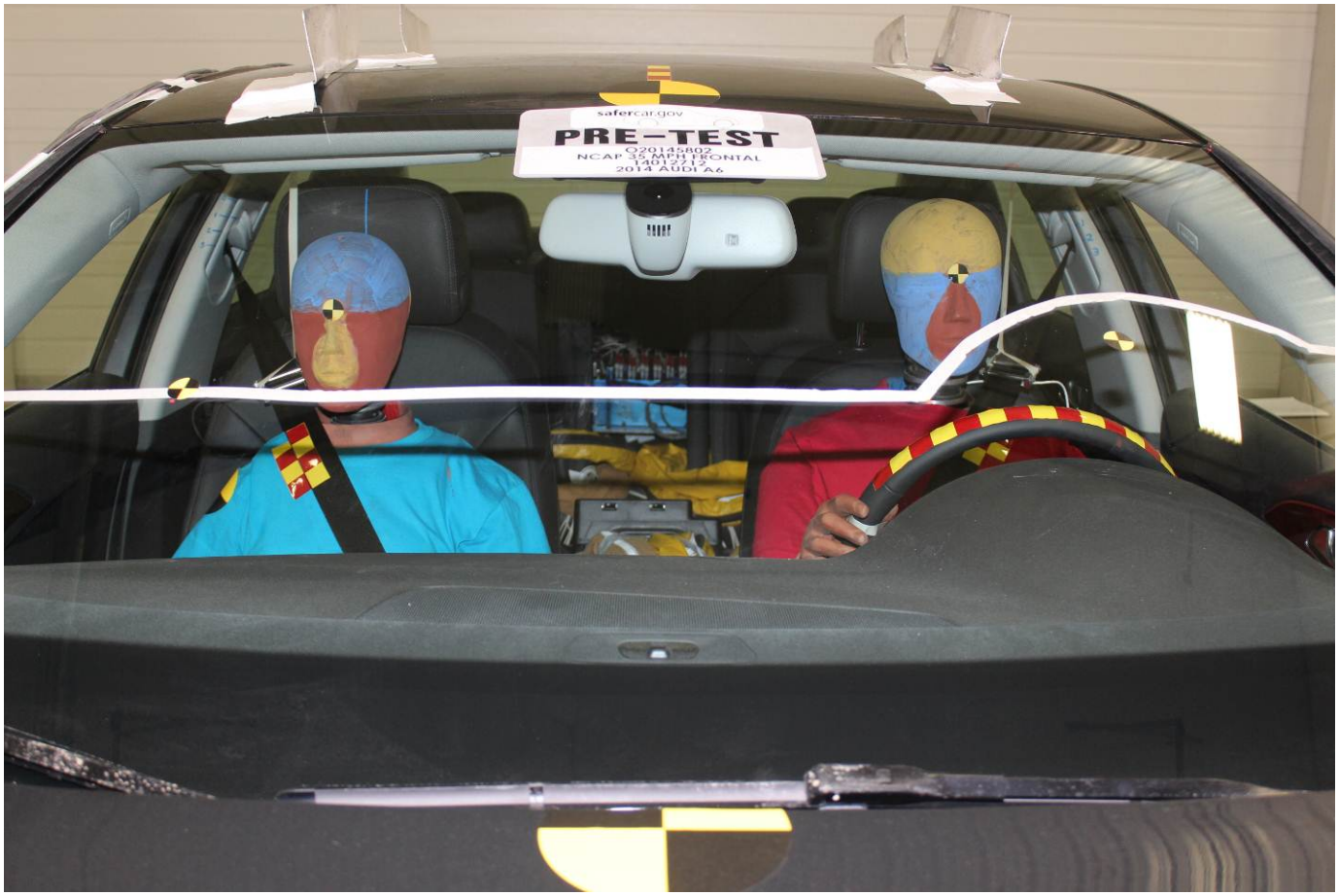
Pre-Test Right Front 3-4 View



Post-Test Right Front 3-4 View

Pre-Test Left Rear 3-4 View

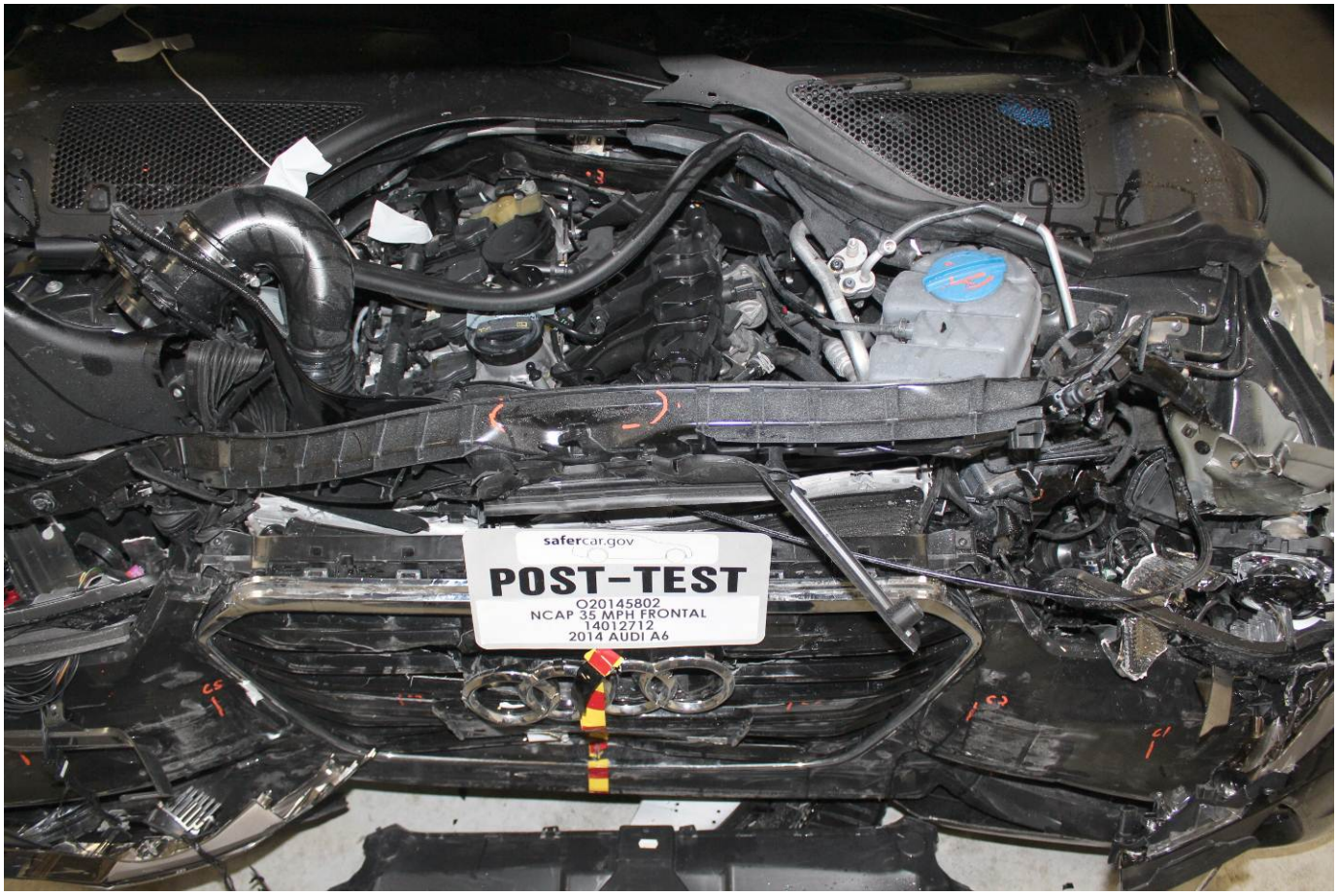
Post-Test Left Rear 3-4 View



Pre-Test Windshield View

Post-Test Windshield View

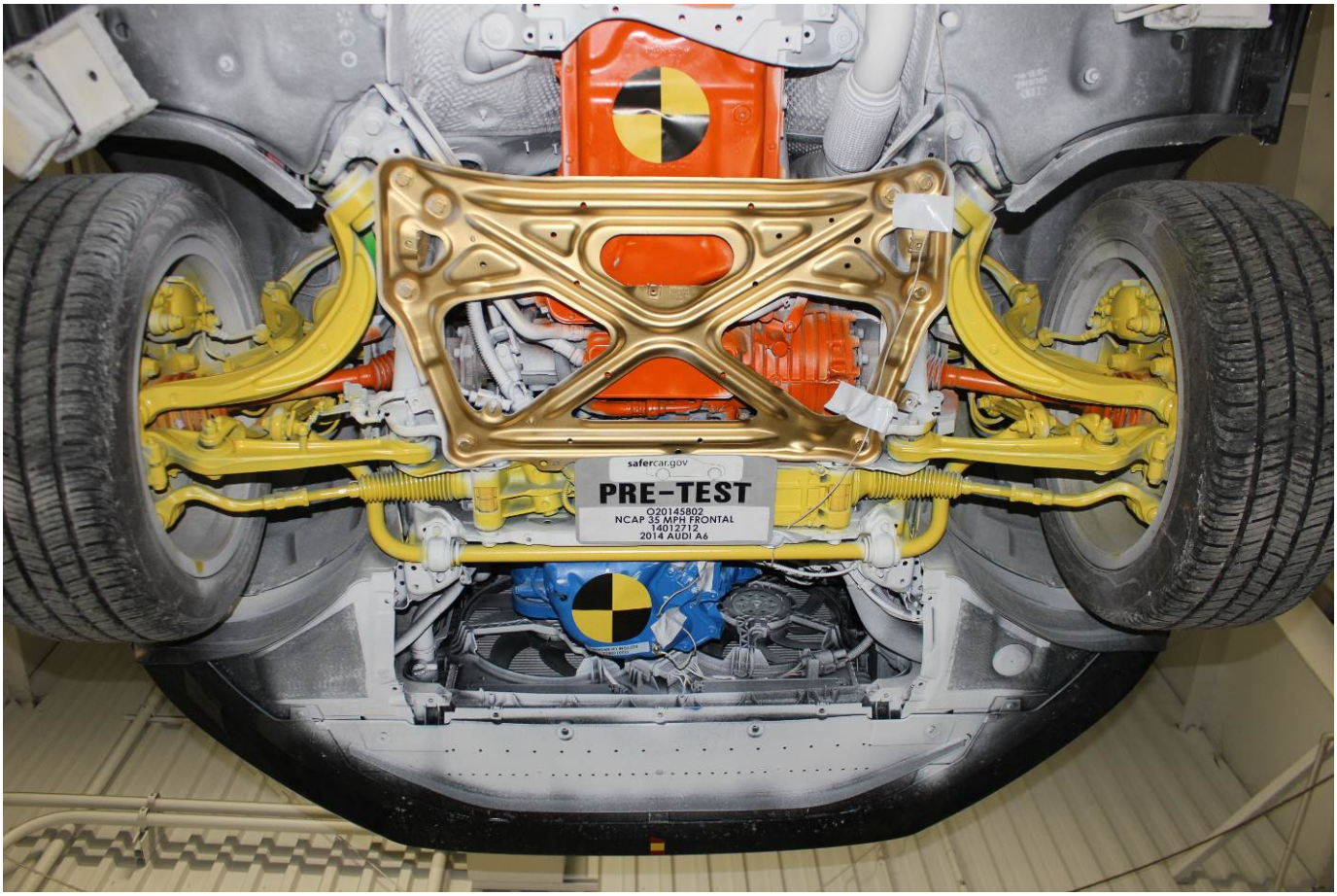
Pre-Test Engine Compartment View



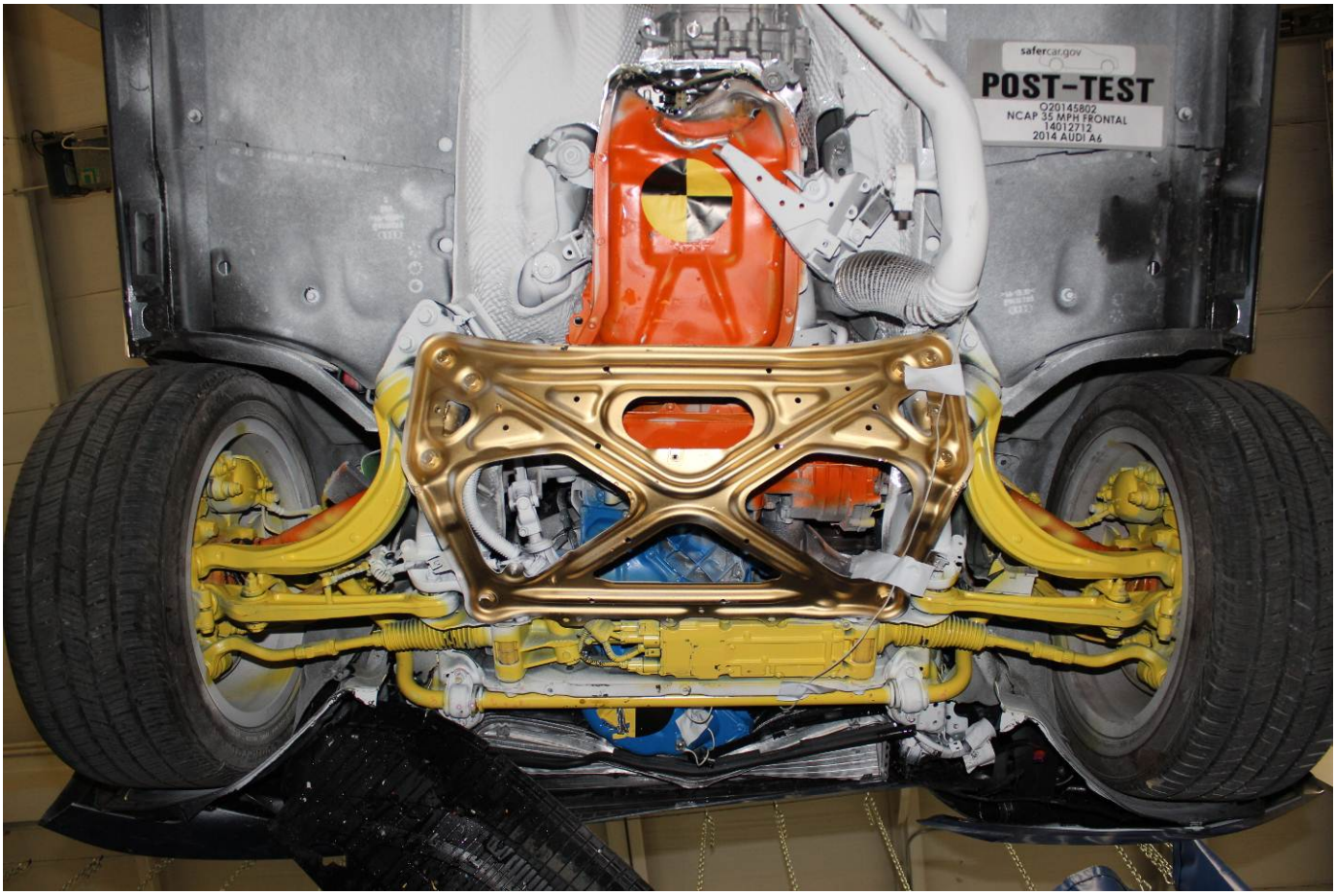
Post-Test Engine Compartment View

Pre-Test Fuel Filler Cap View

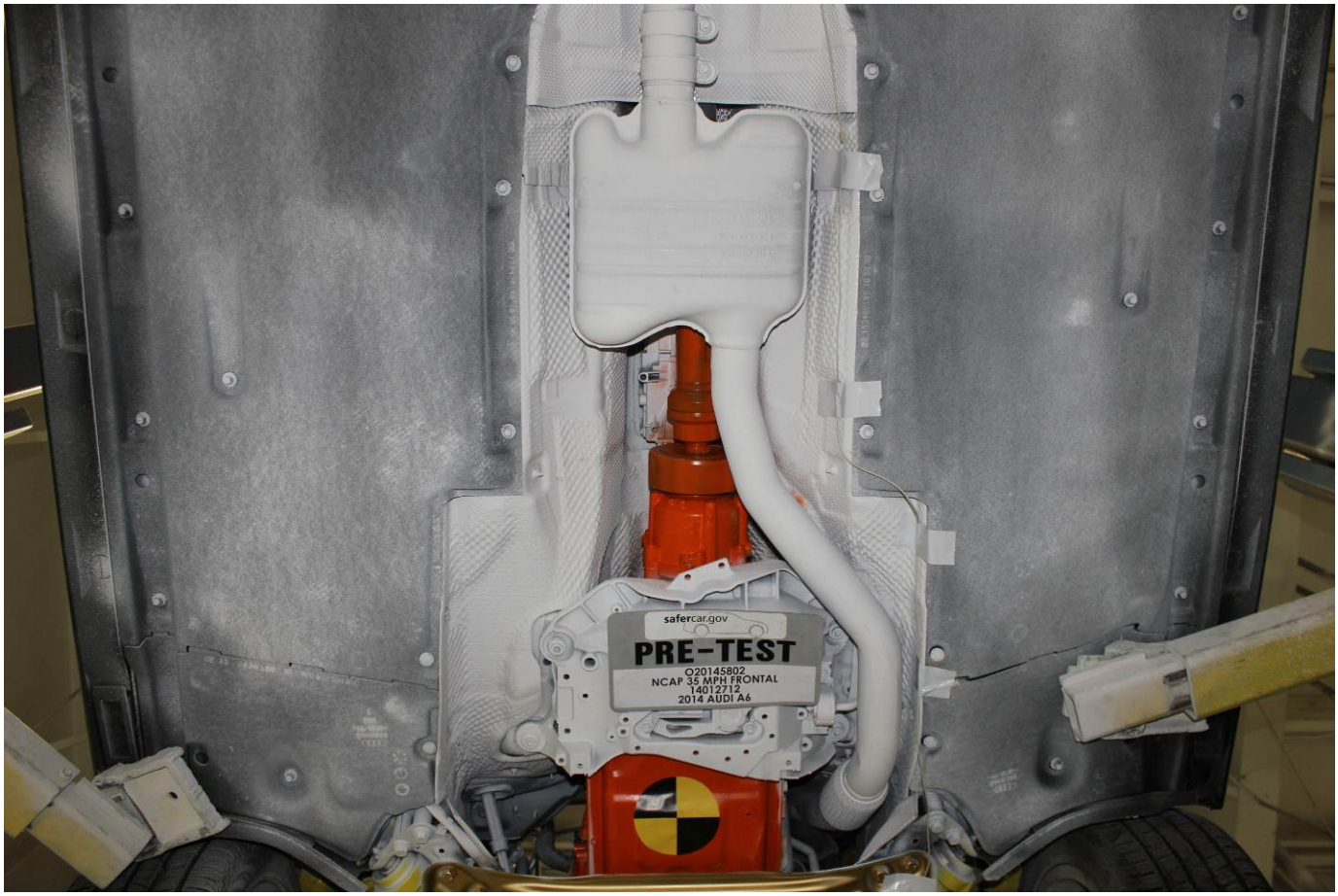
Post-Test Fuel Filler Cap View



Pre-Test Front Underbody View

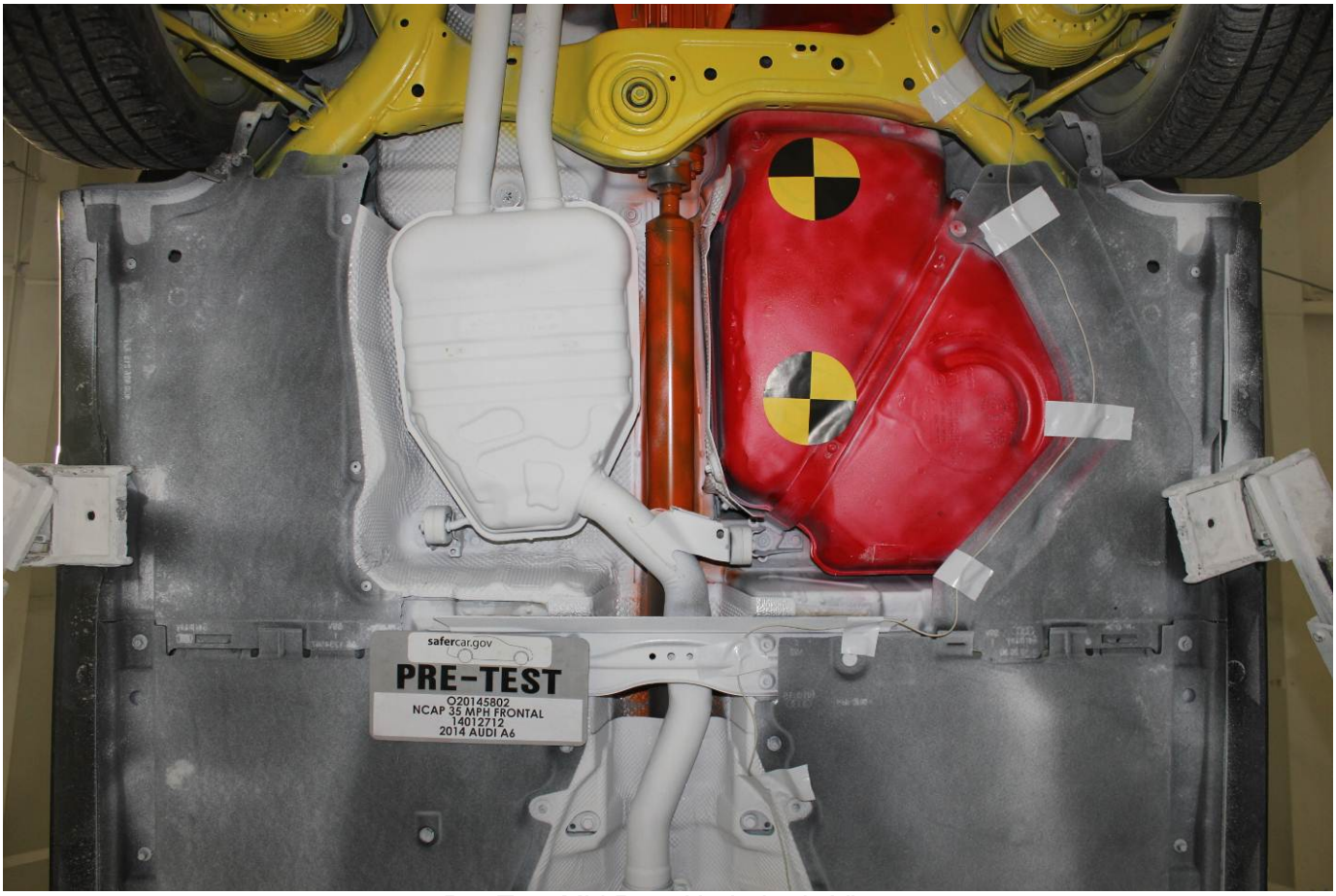


Post-Test Front Underbody View

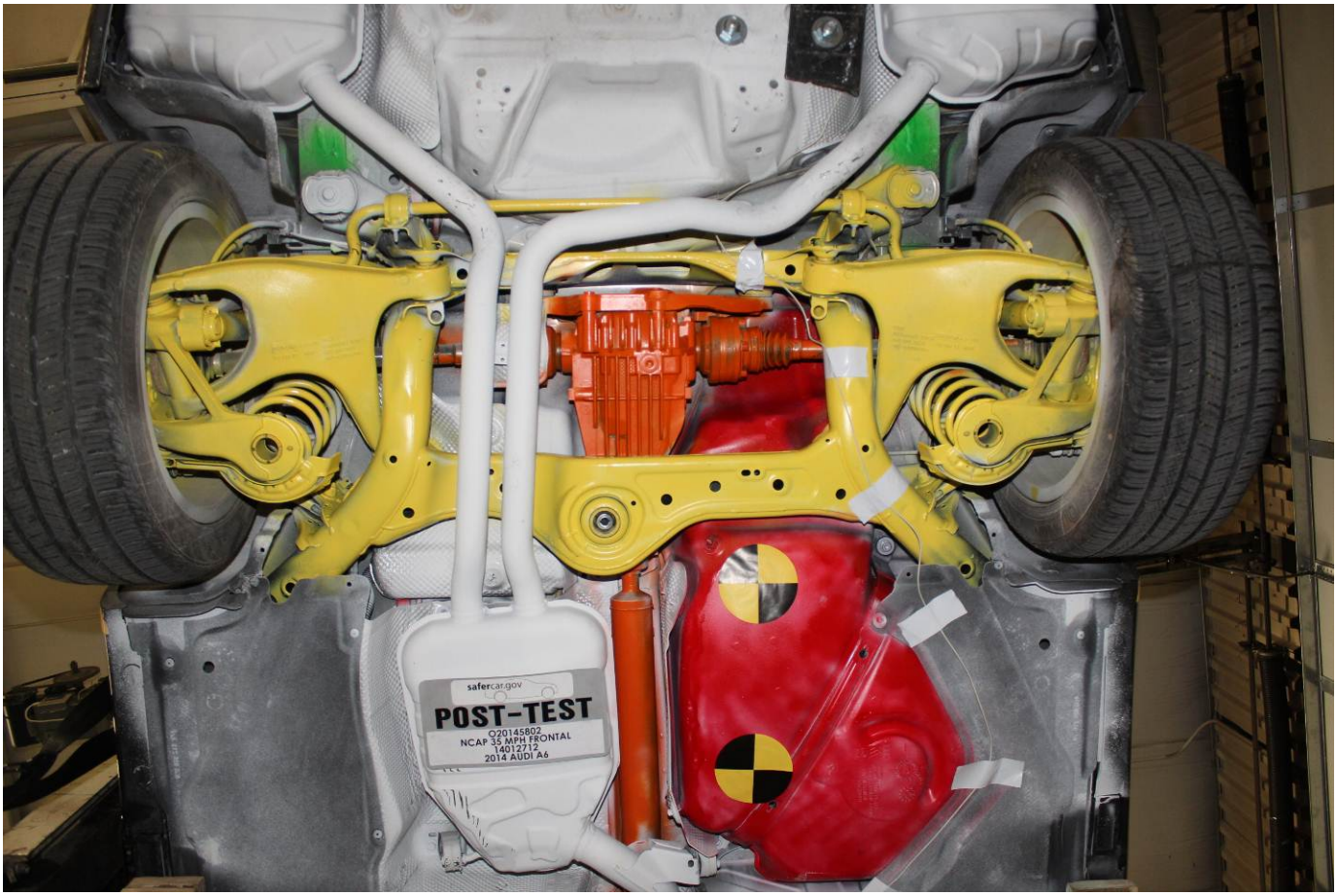


Pre-Test Mid Front Underbody View

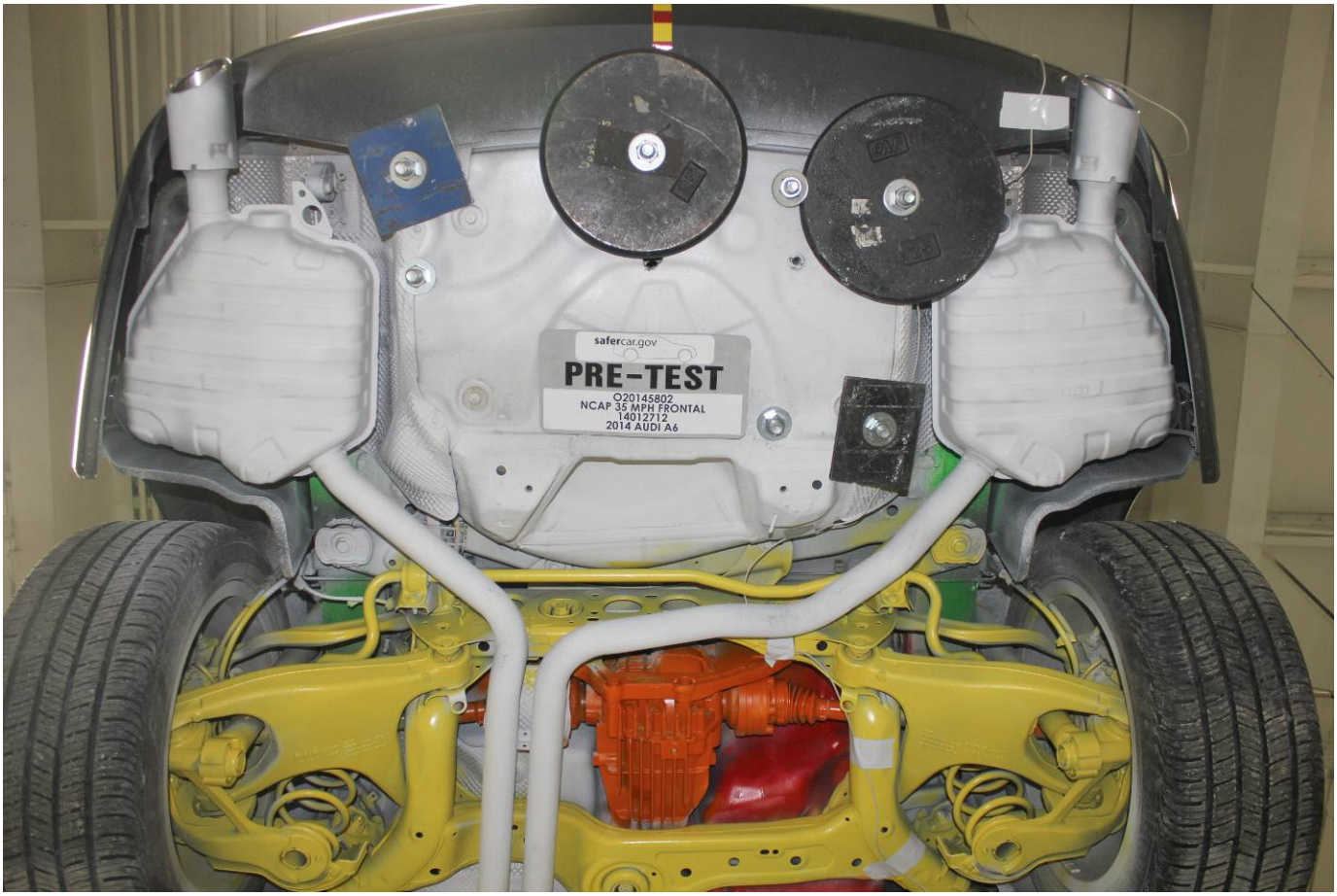
Post-Test Mid Front Underbody View



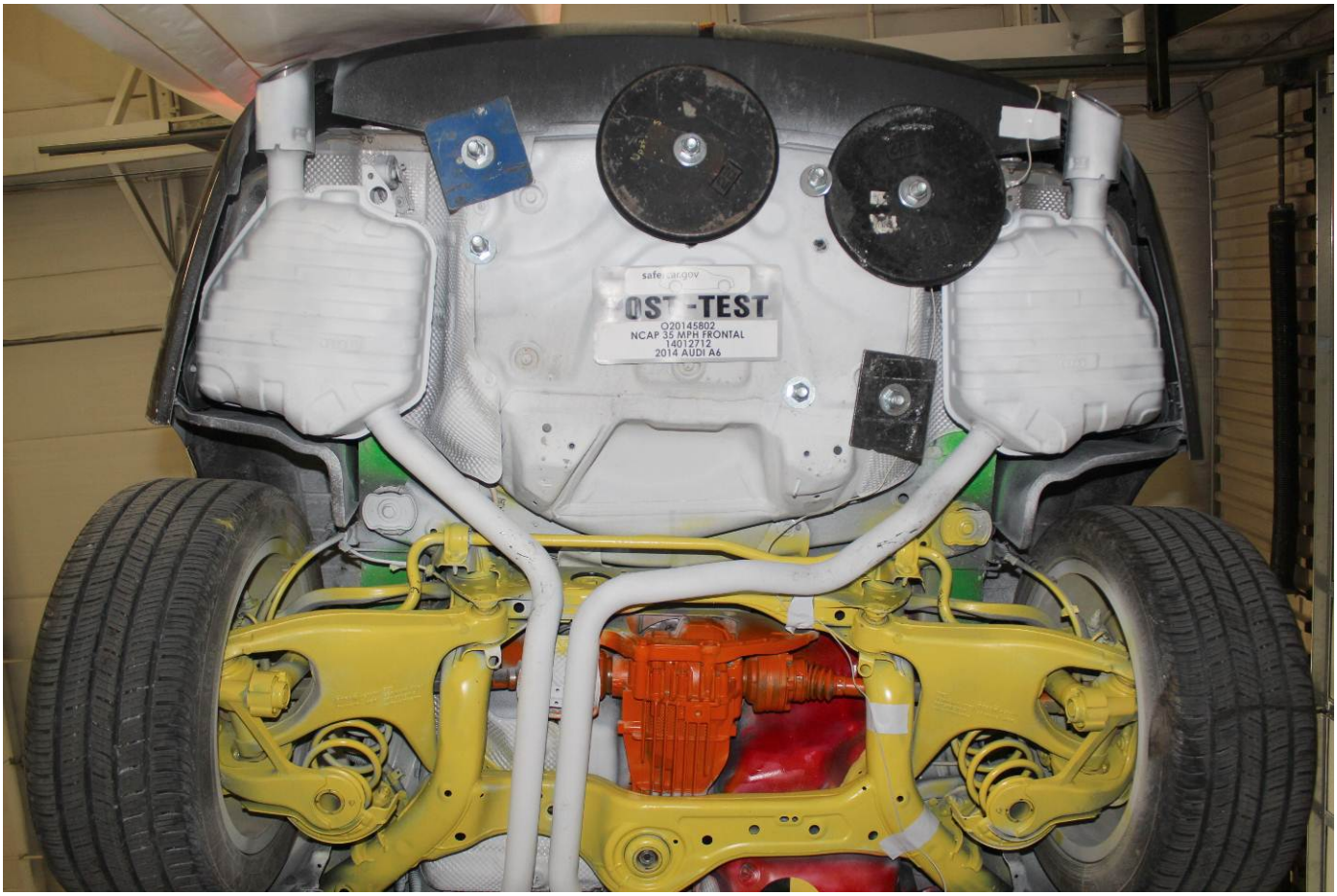
Pre-Test Mid Rear Underbody View



Post-Test Mid Rear Underbody View



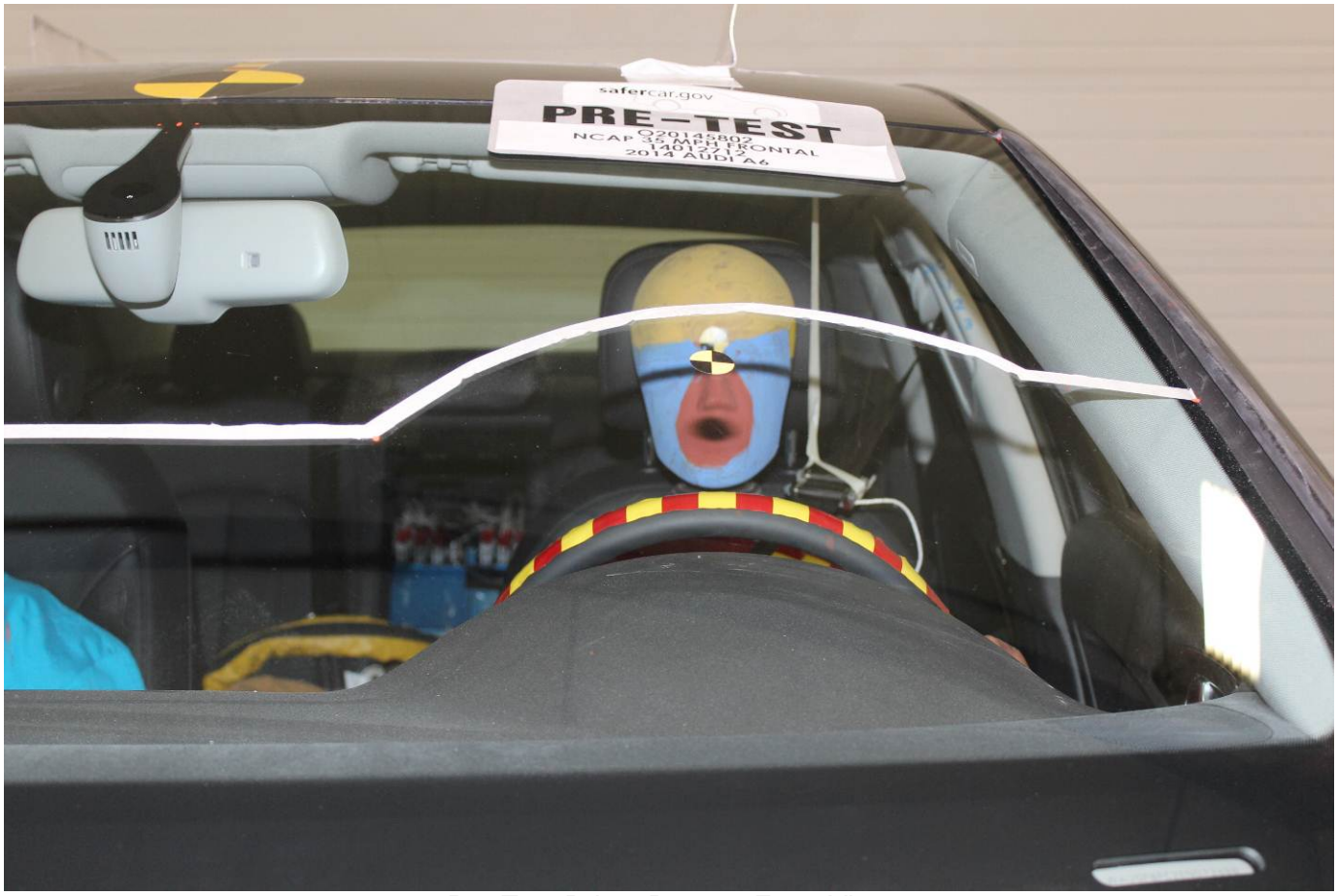
Pre-Test Rear Underbody View



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

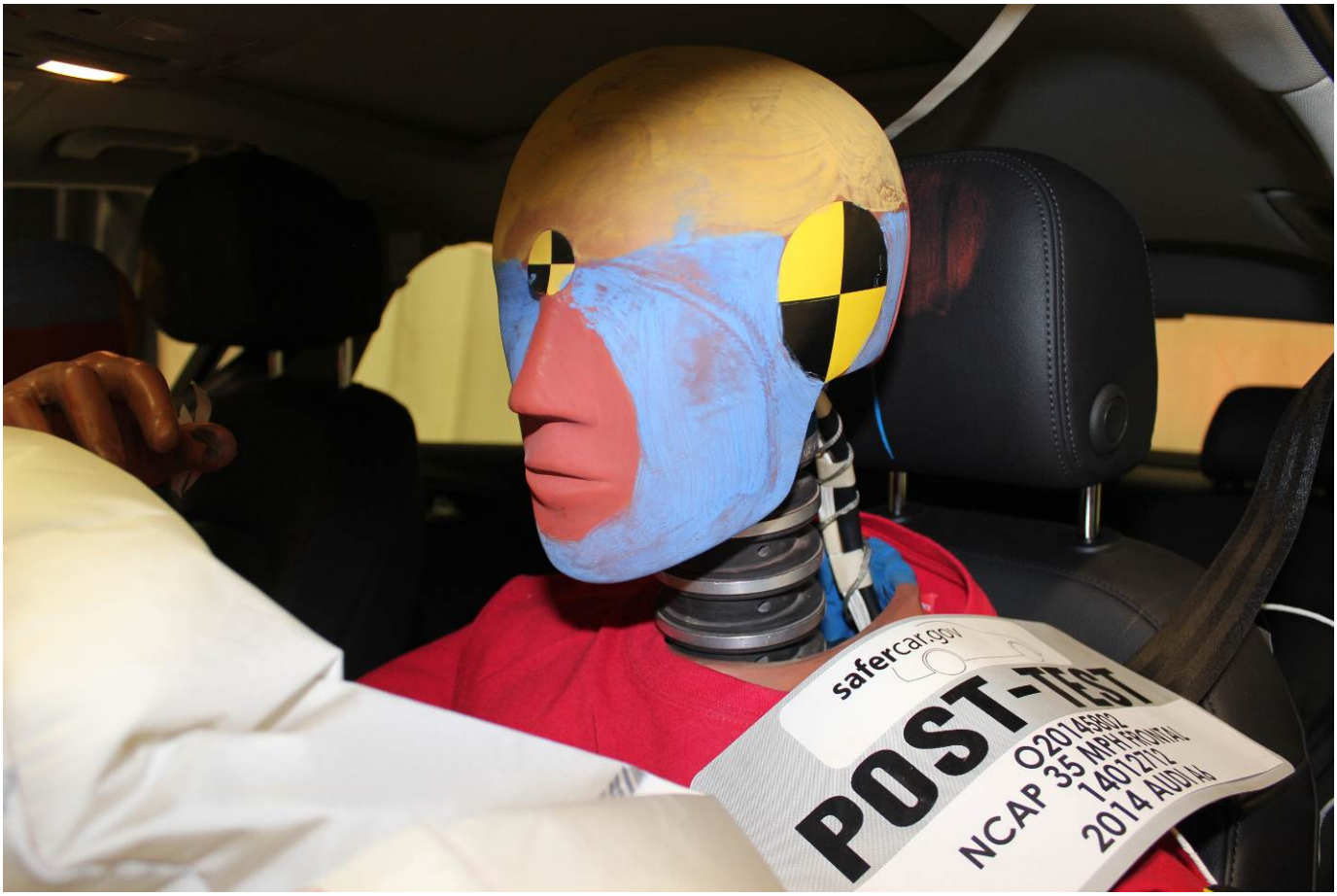
Post-Test Driver Dummy Feet

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

Pre-Test View of the Steering Wheel

Post-Test View of the Steering Wheel

Pre-Test Passenger Dummy Front View

Post-Test Passenger Dummy Front View

Pre-Test Passenger Dummy Window View

Post-Test Passenger Dummy Window View

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

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

Pre-Test Passenger's Seat Fore-Aft Markings

Post-Test Passenger's Seat Fore-Aft Markings

Pre-Test View of Belt Anchorage for Passenger Dummy

Post-Test View of Belt Anchorage for Passenger Dummy

Pre-Test Passenger Dummy Feet

Post-Test Passenger Dummy Feet

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

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

Pre-Test Passenger's Side Floorpan

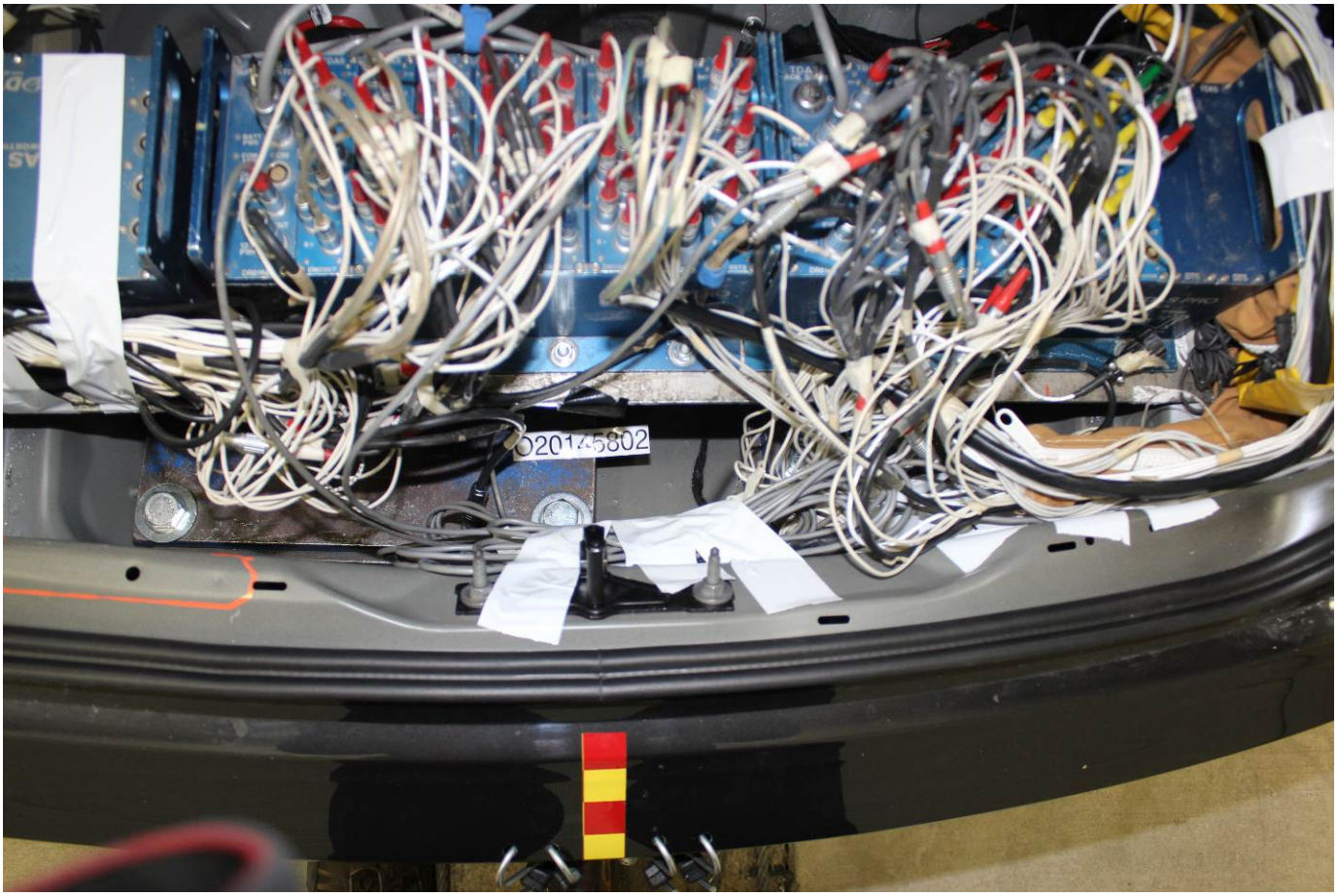
Post-Test Passenger's Side Floorpan

Post-Test Passenger Dummy Face

Post-Test Passenger Dummy Contact with Airbag

Post-Test Passenger Dummy Contact with Headrest

Post-Test Passenger Dummy Contact with Knee Airbag



Ballast Installed in Vehicle

PHOTOGRAPH NOT APPLICABLE

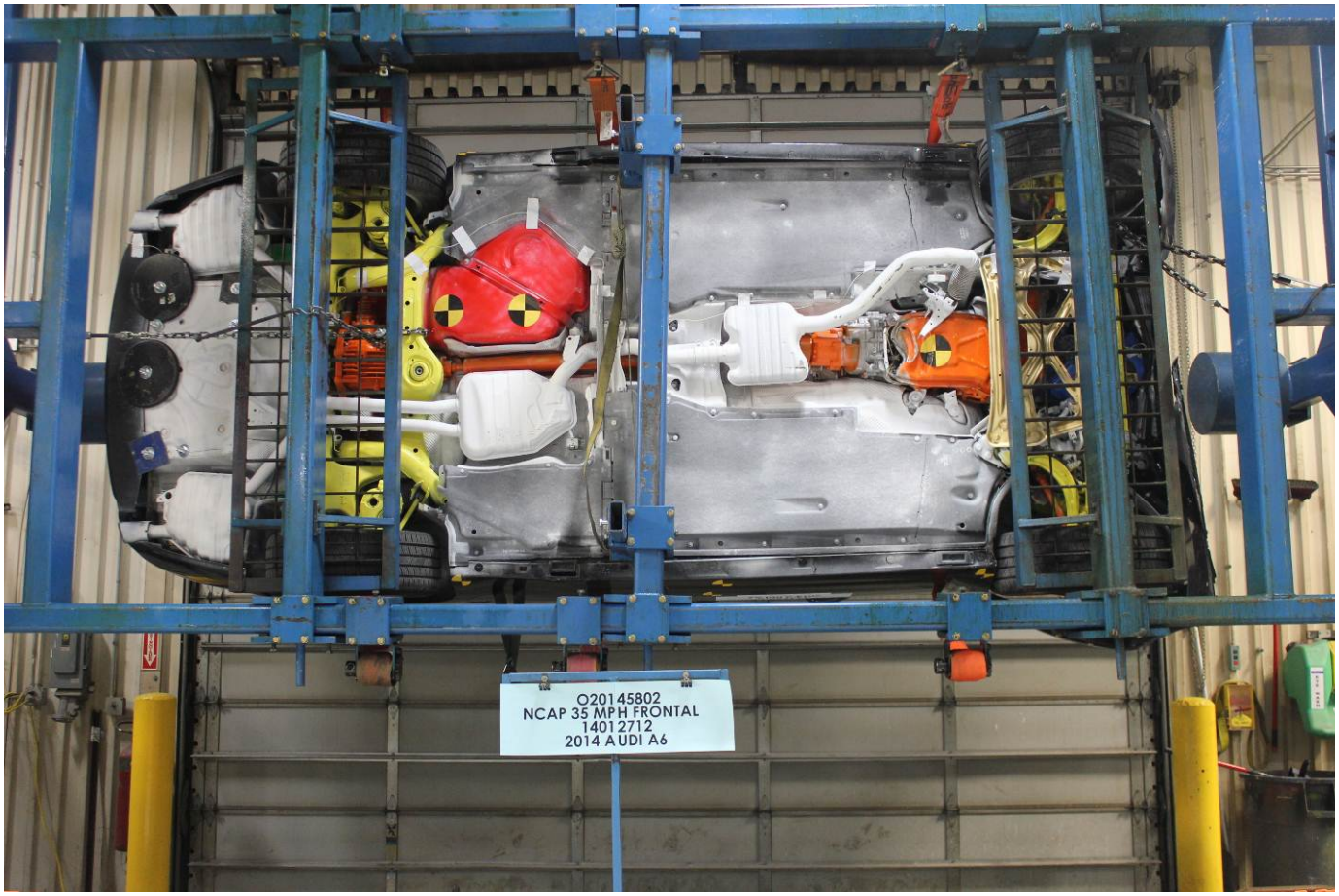
Post-Test Stoddard Solvent Spillage Location View

Post-Test Speed Trap Read-Out

Vehicle at 0 Degree on Static Rollover Device

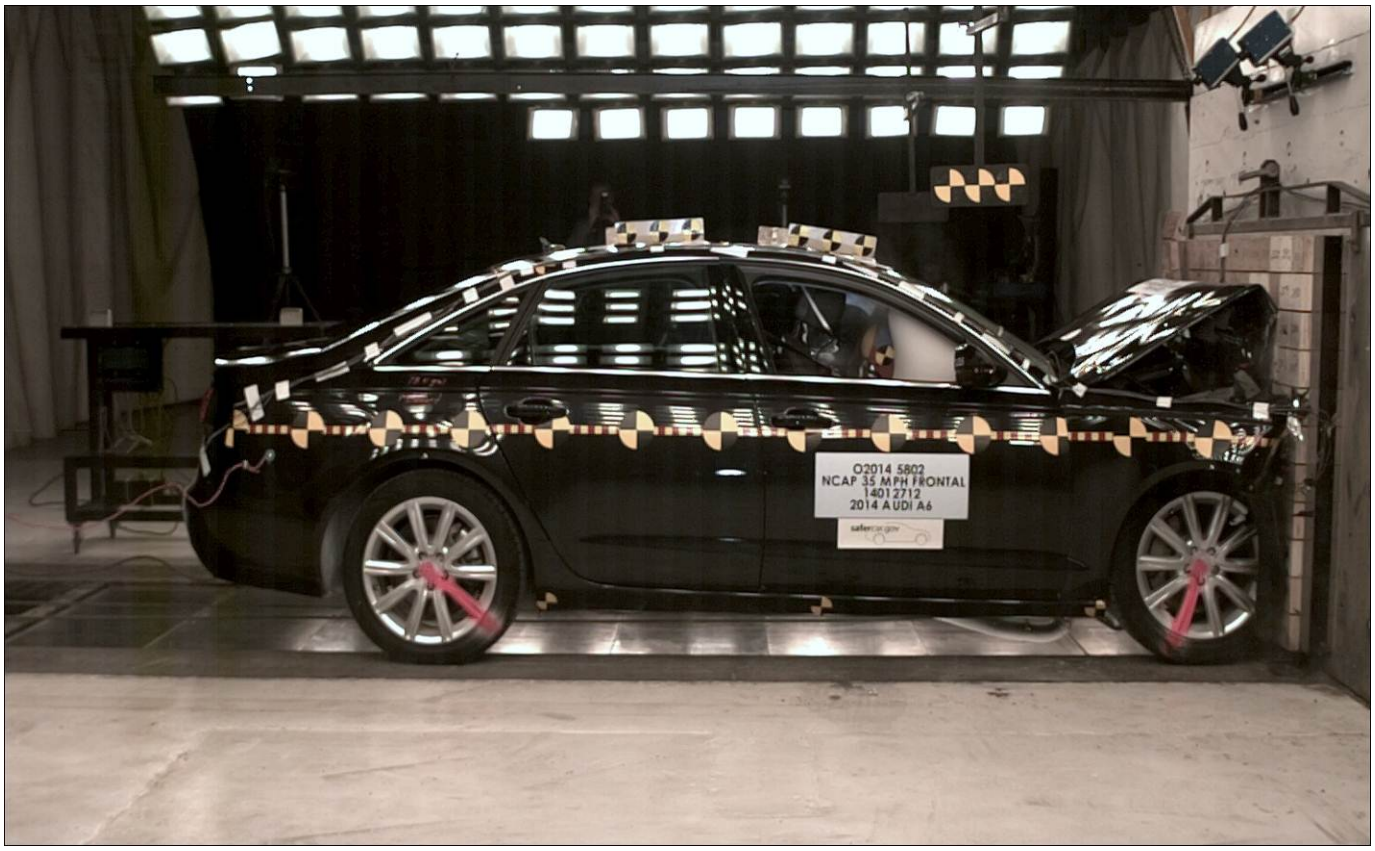
Vehicle at 90 Degrees on Static Rollover Device

Vehicle at 180 Degrees on Static Rollover Device



Vehicle at 270 Degrees on Static Rollover Device

Vehicle at 360 Degrees on Static Rollover Device



2014 Audi A6 4-Dr Sedan Frontal Impact Event

2014 Audi A6 2.0T quattro Tiptronic

Audi
Truth in Engineering

STANDARD EQUIPMENT (unless replaced by options)

TECHNICAL
- 2.0 TFSI 4-cylinder engine (220hp / 258lb-ft of torque)
- Eight-speed Tiptronic® automatic transmission
- quattro permanent all-wheel drive system
- 17" 10-spoke design wheels with 255/55 all-season tires
- ABS (Anti-lock brake system) with brake assist
- ESC (Electronic Stabilization Control)
- Audi drive select
- Electromechanical vehicle speed-sensitive power steering
- Tire pressure monitoring system (TPMS)
- Compact, space saving temporary spare tire

COMFORT/CONVENIENCE
- Power glass sunroof (tilt & slide)
- Rain and light sensor
- Electrically adjustable heated outside rear view mirrors
- Leather seating surfaces
- 8-way power heated front seats with driver lumbar support
- Split-folding rear seat
- Three-zone automatic climate control
- 4-spoke leather wrapped steering wheel with multifunction controls
- Tilt and telescopic adjustable steering column
- Auto-dimming interior mirror
- Driver information system - monochrome
- Keyless start
- Garage door opener (HomeLink®)
- Preparation for mobile phone (Bluetooth®)
- Audi music interface with iPod® cable
- SIRIUS® Satellite Radio (with 3-month complimentary subscription)

SAFETY/SECURITY
- Driver single adaptive frontal air bag and front passenger advanced two-stage frontal air bag supplemental restraint system
- Driver and front passenger seat mounted side airbag supplemental restraints
- Sideguard® curtain airbags
- Side impact protection, front and rear body crumple zones
- Anti-theft vehicle alarm system
- Front and rear 3-point safety belts with automatic pretensioning and force limiters
- Lower Anchors and Tethers for Children (LATCH)
- Audi pre-sense basic

WARRANTY / MAINTENANCE
- 4-Year/50,000 mile (whichever occurs first) new vehicle limited warranty*
- 12-Year limited warranty against corrosion perforation*
- 12-Month/5,000 mile (whichever occurs first) NO CHARGE first scheduled maintenance
- 4-Year Roadside Assistance coverageprovided by a third party supplier

*Please refer to the 2014 Audi Warranty Manual for complete coverage information

MANUFACTURER'S SUGGESTED RETAIL PRICE

2014 Audi A6 2.0T quattro Tiptronic	$45,200.00
PACKAGES / OPTIONS	
Oolong Gray metallic	$500.00
Black interior	Included
A6 Premium Plus model	$4,300.00
18" 5-V-spoke-design wheels, all-season tires	
Audi MMI Navigation plus w/ MMI touch	
7" color Driver Information System	
Audi parking system plus w/ rearview camera	
Audi connect® w/ online services (6-month subscription)	
Audi advanced key	
Auto-dimming, heated exterior mirrors w/ memory	
Audi xenon plus lights w/ LED DRL	
Cold Weather package	$500.00
Heated steering wheel & rear seats	
Rear side airbags	$350.00
Media cable package	$295.00
Front license plate holder	Included
Destination Charge	$895.00
Total Price:	**$52,040.00**

Fuel, license, title fees, taxes and dealer-installed accessories are not included.

MODEL: 4G25MA

VIN: WAUGFBFC2EN072898

DEALER: 402B11
AUDI QUAD CITIES
3602 N. HARRISON ST.
DAVENPORT, IA 52806
Port of Entry: HOUSTON

SHIP TO: 402B11
AUDI QUAD CITIES
3602 N. HARRISON ST.
DAVENPORT, IA 52806
COMM NUM: AV6236
Transportation Method: TRUCK

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score		**Not Rated**

Based on the combined ratings of frontal, side and rollover.
Should ONLY be compared to other vehicles of similar size and weight.

Frontal Crash	Driver	**Not Rated**
	Passenger	**Not Rated**

Based on the risk of injury in a frontal impact.
Should ONLY be compared to other vehicles of similar size and weight.

Side Crash	Front Seat	**Not Rated**
	Rear Seat	**Not Rated**

Based on the risk of injury in a side impact.

Rollover	**Not Rated**

Based on the risk of rollover in a single-vehicle crash.

Star ratings range from 1 to 5 stars (★★★★★) with 5 being the highest.
Source: National Highway Traffic Safety Administration (NHTSA).
www.safercar.gov or 1-888-327-4236

EPA DOT Fuel Economy and Environment — Gasoline Vehicle

Fuel Economy: **23** MPG combined city/hwy — 20 city, 29 highway
4.3 gallons per 100 miles

Mid-Size Cars range from 13 to 58 MPG.
The best vehicle rates 121 MPGe.

You spend **$750** more in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost **$2,450**

Fuel Economy & Greenhouse Gas Rating (tailpipe only): 6 (1 – 10 Best)
Smog Rating (tailpipe only): 5 (1 – 10 Best)

This vehicle emits 386 grams of CO_2 per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions; learn more at fueleconomy.gov.

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 23 MPG and costs $11,500 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at $3.75 per gallon. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fueleconomy.gov
Calculate personalized estimates and compare vehicles

Smartphone QR Code™

PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS CARLINE:	FOR THIS VEHICLE:
U.S./CANADIAN PARTS CONTENT:	1% FINAL ASSEMBLY POINT: NECKARSULM, GERMANY
MAJOR SOURCES OF FOREIGN PARTS CONTENT: GERMANY:	75% COUNTRY OF ORIGIN: ENGINE: HUNGARY TRANSMISSION: GERMANY

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

Monroney Label

APPENDIX B
DUMMY RESPONSE DATA TRACES

TABLE OF DATA PLOTS

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

Driver Head 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

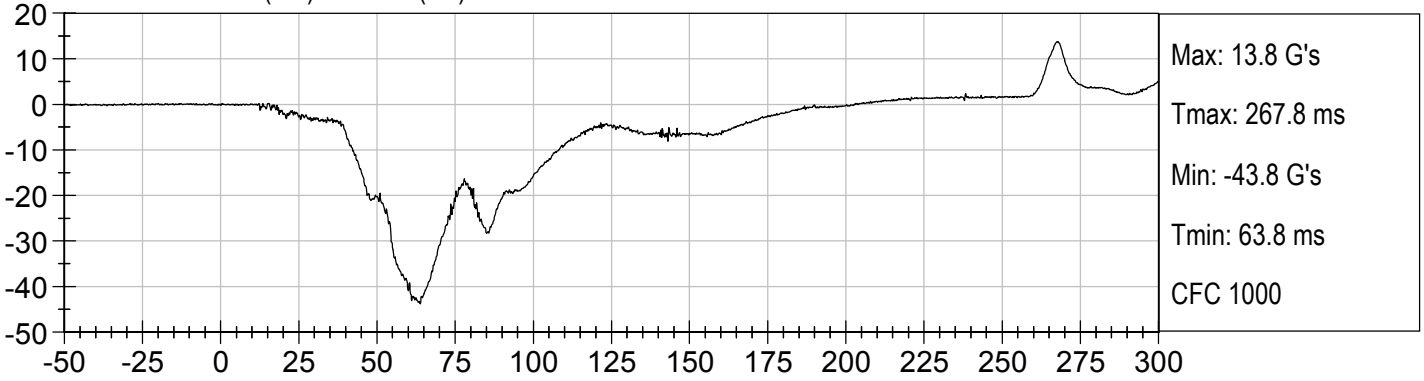
Right Rear Seat Crossmember Z

Left Rear Seat Crossmember Xr

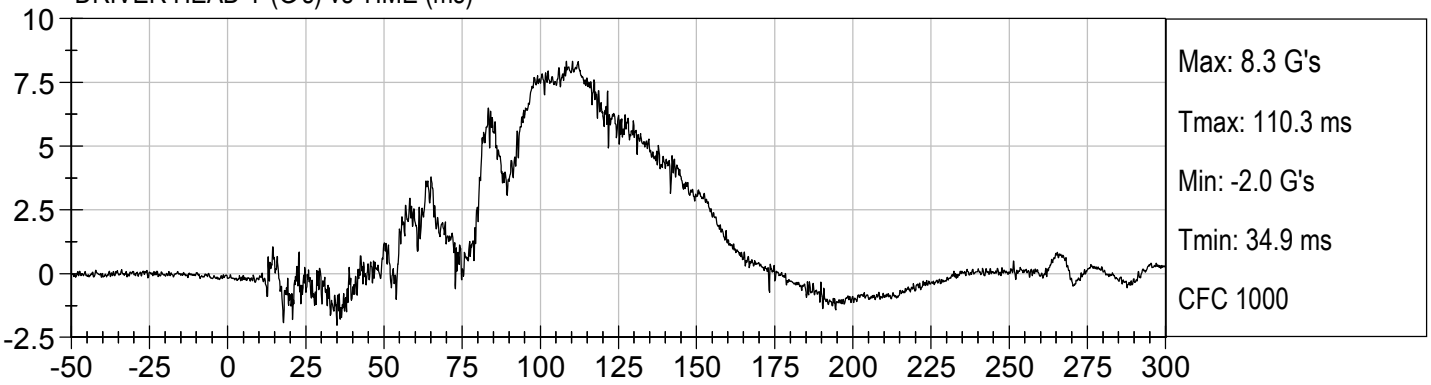
Right Rear Seat Crossmember Xr

Advanced Research Load Cell Barrier – 528 channels

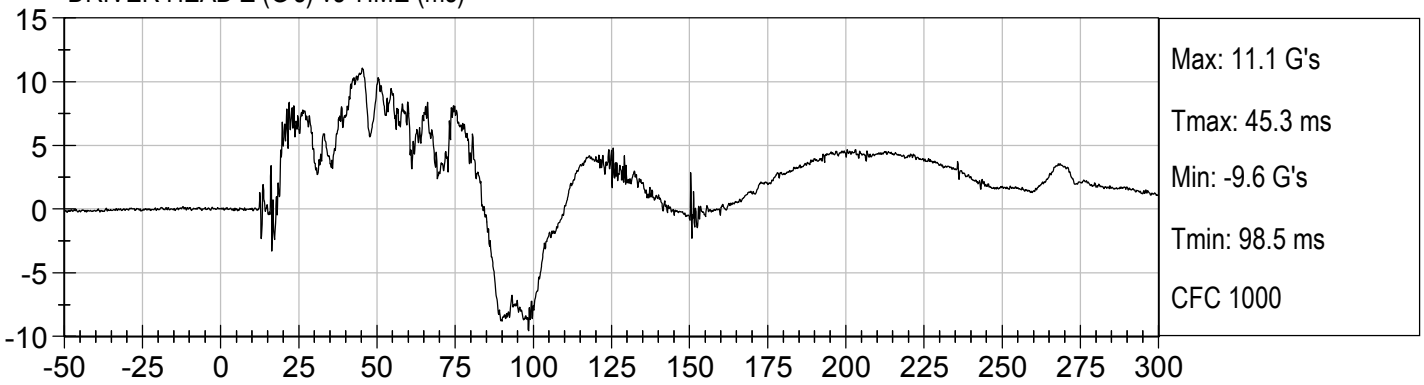
DRIVER HEAD X (G's) vs TIME (ms)



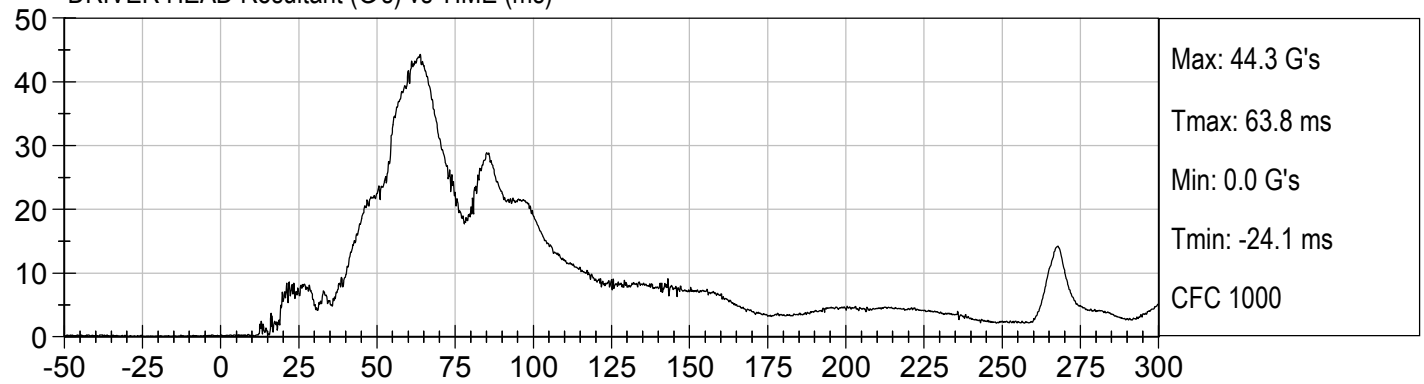
DRIVER HEAD Y (G's) vs TIME (ms)



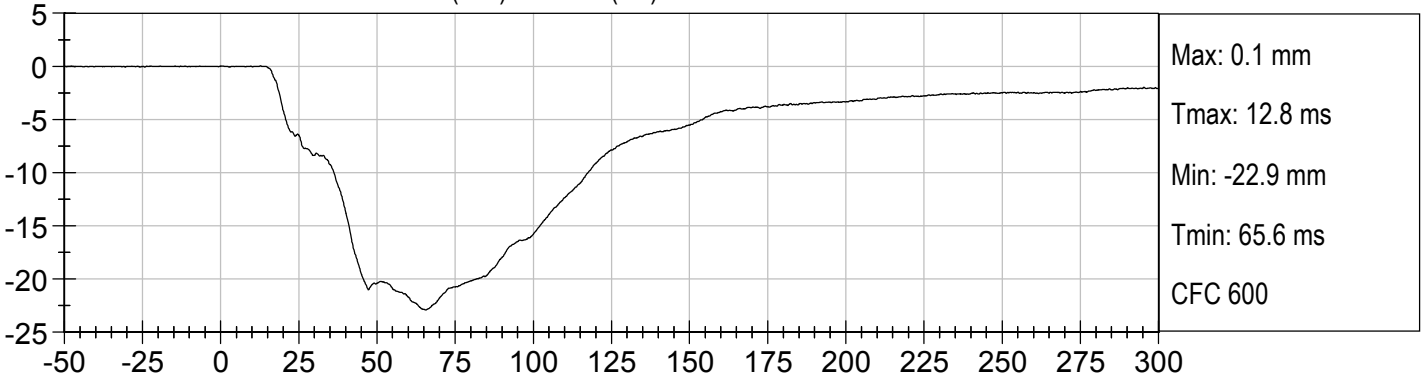
DRIVER HEAD Z (G's) vs TIME (ms)

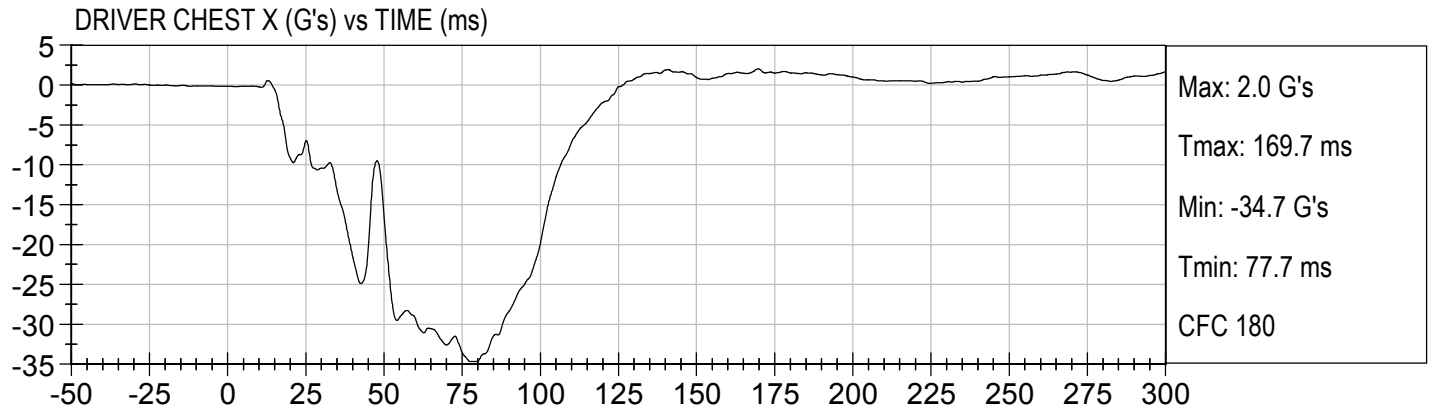


DRIVER HEAD Resultant (G's) vs TIME (ms)

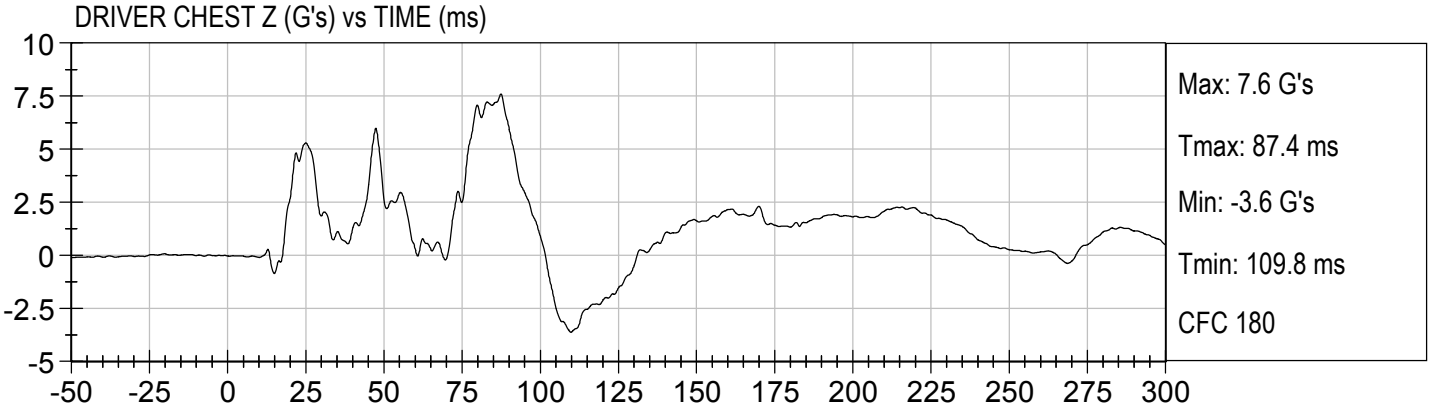


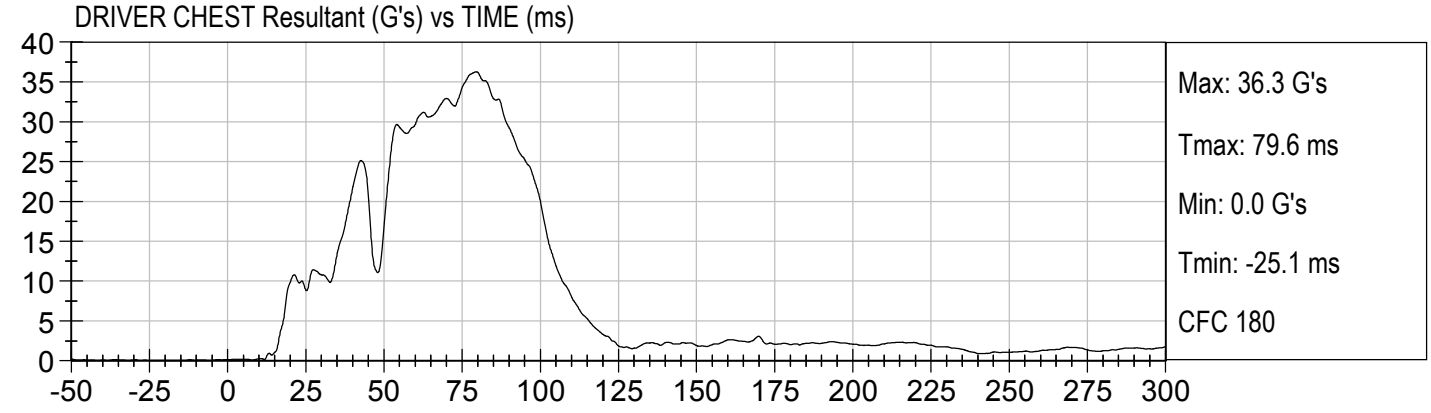
DRIVER CHEST DISPLACEMENT (mm) vs TIME (ms)



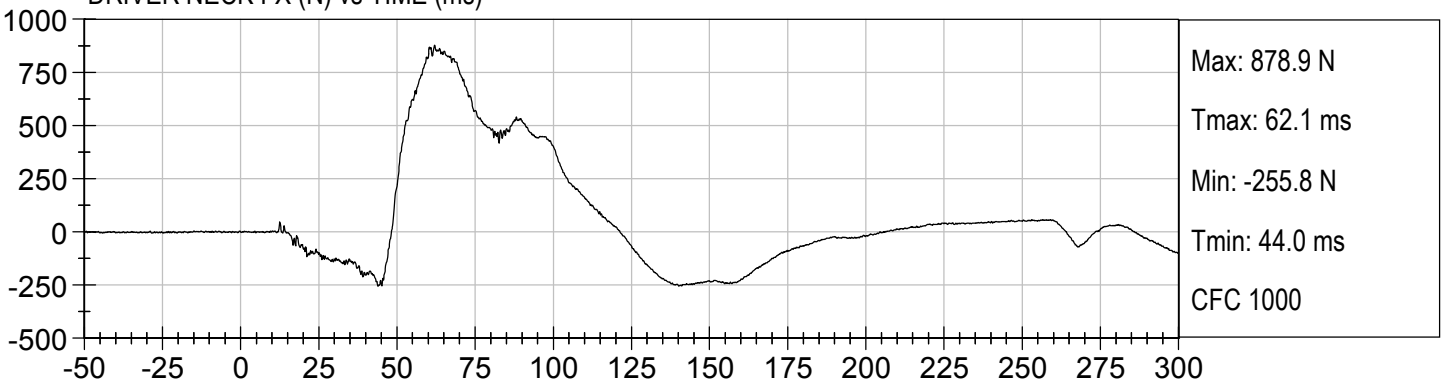

DRIVER CHEST X (G's) vs TIME (ms)
5
0
-5
-10
-15
-20
-25
-30
-35
-50 -25 0 25 50 75 100 125 150 175 200 225 250 275 300
Max: 2.0 G's
Tmax: 169.7 ms
Min: -34.7 G's
Tmin: 77.7 ms
CFC 180


DRIVER CHEST Y (G's) vs TIME (ms)
10
7.5
5
2.5
0
-2.5
-5
-50 -25 0 25 50 75 100 125 150 175 200 225 250 275 300
Max: 8.1 G's
Tmax: 78.8 ms
Min: -3.1 G's
Tmin: 43.4 ms
CFC 180

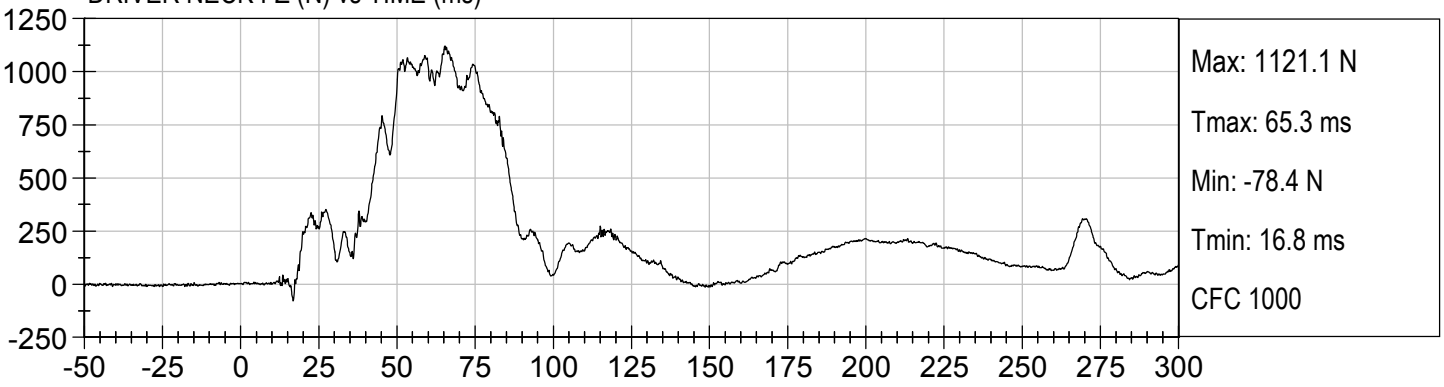

DRIVER CHEST Z (G's) vs TIME (ms)
10
7.5
5
2.5
0
-2.5
-5
-50 -25 0 25 50 75 100 125 150 175 200 225 250 275 300
Max: 7.6 G's
Tmax: 87.4 ms
Min: -3.6 G's
Tmin: 109.8 ms
CFC 180


DRIVER CHEST Resultant (G's) vs TIME (ms)
40
35
30
25
20
15
10
5
0
-50 -25 0 25 50 75 100 125 150 175 200 225 250 275 300
Max: 36.3 G's
Tmax: 79.6 ms
Min: 0.0 G's
Tmin: -25.1 ms
CFC 180

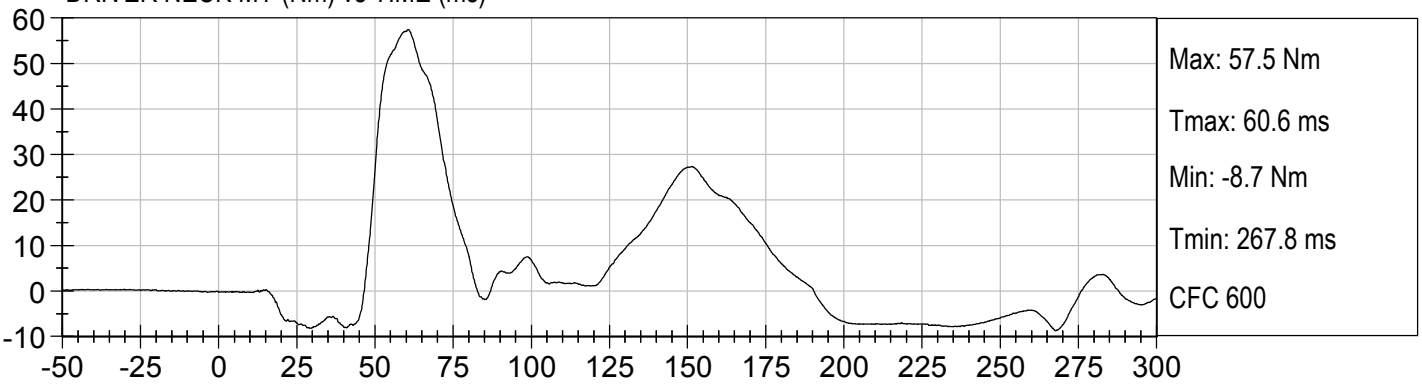
DRIVER NECK FX (N) vs TIME (ms)



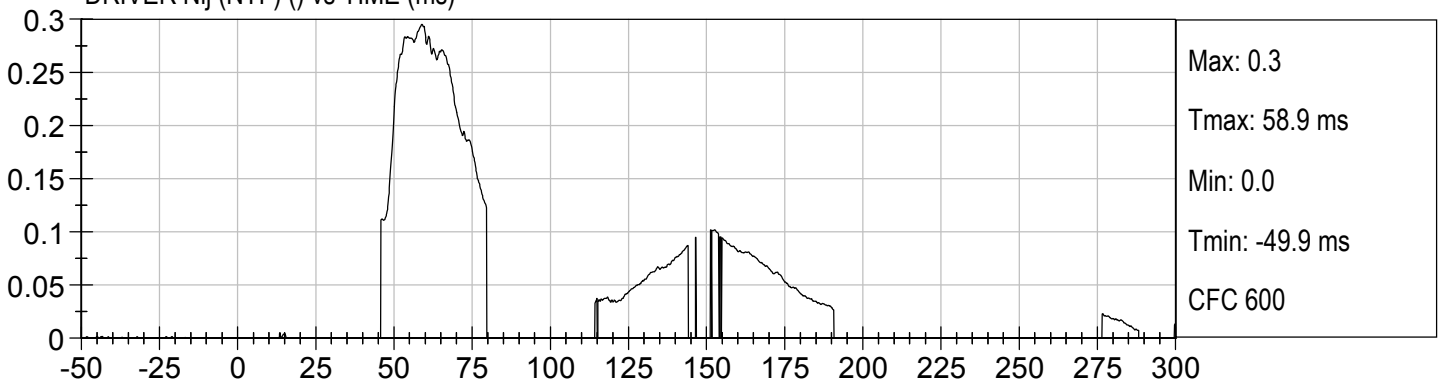
DRIVER NECK FZ (N) vs TIME (ms)



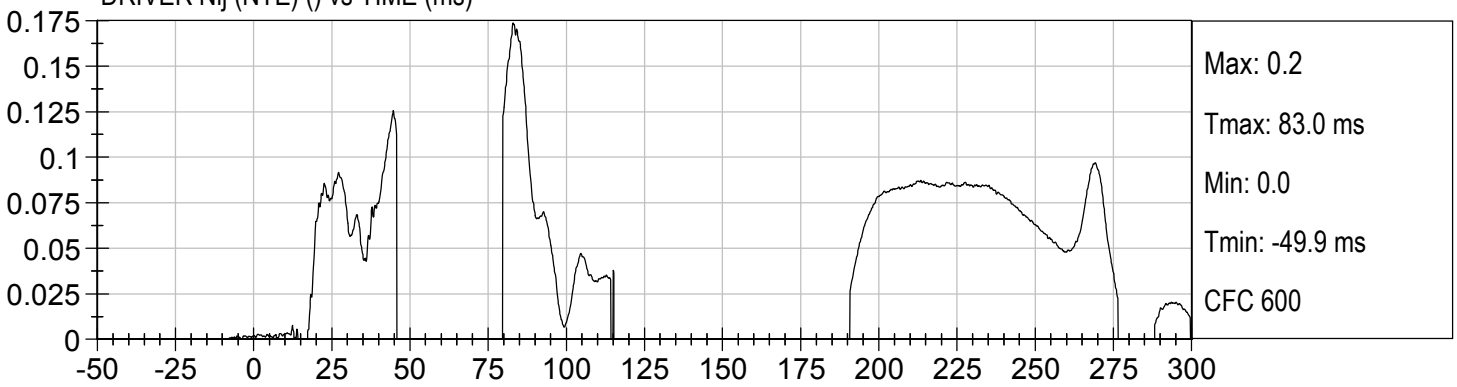
DRIVER NECK MY (Nm) vs TIME (ms)



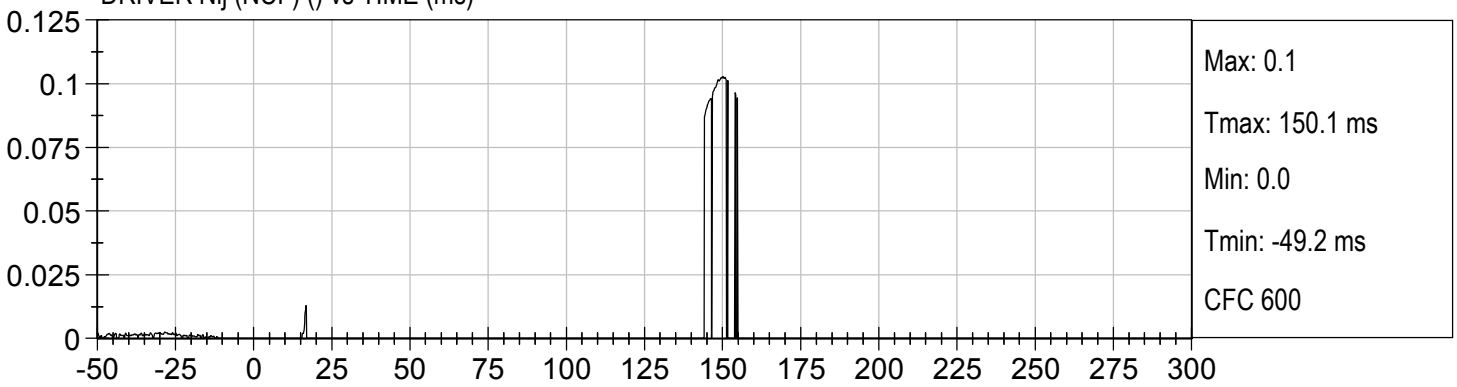
DRIVER Nij (NTF) () vs TIME (ms)



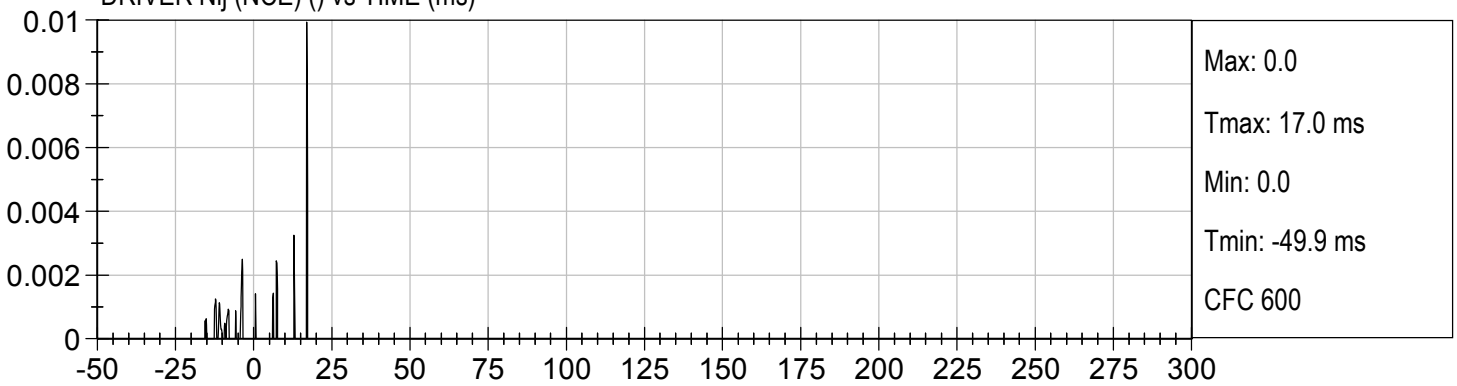
DRIVER Nij (NTE) () vs TIME (ms)



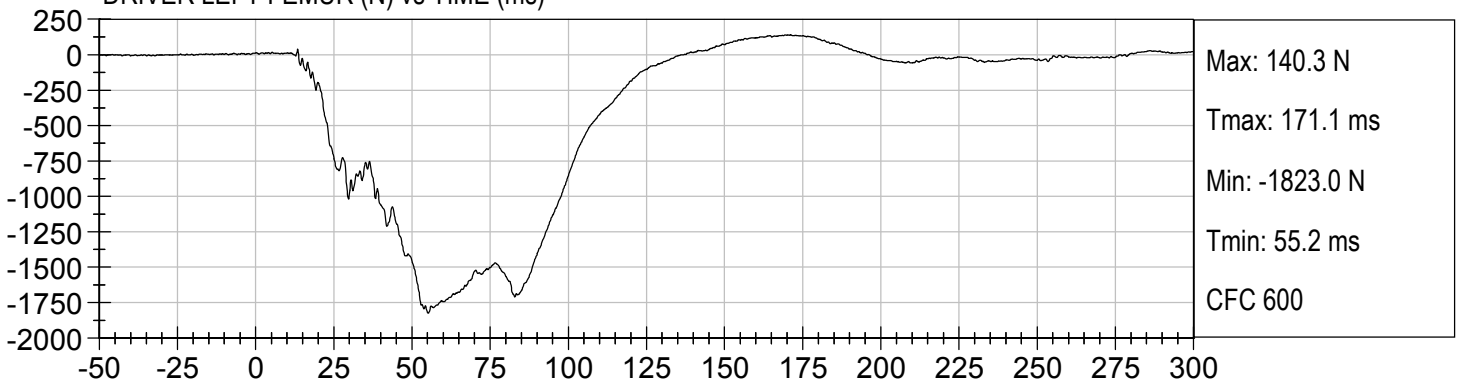
DRIVER Nij (NCF) () vs TIME (ms)



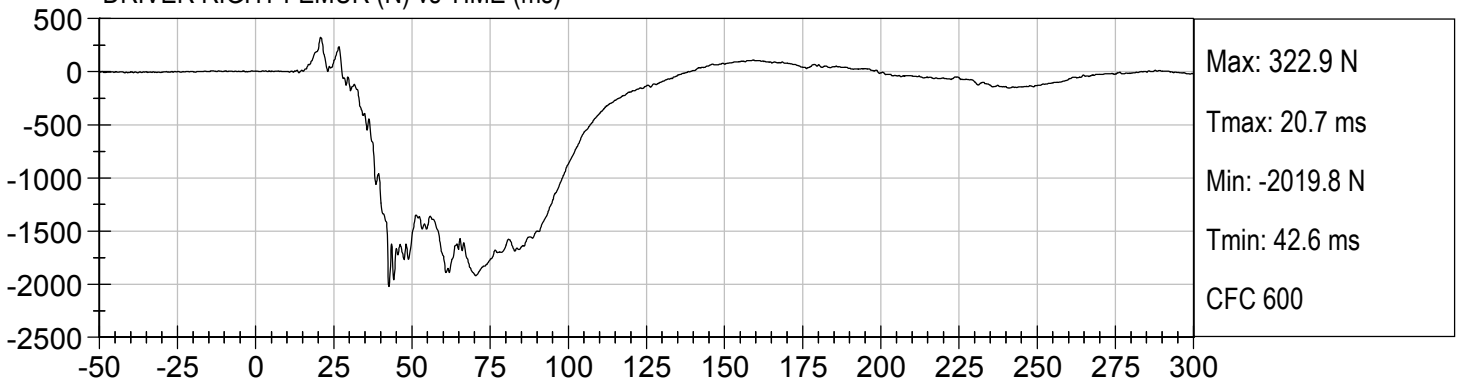
DRIVER Nij (NCE) () vs TIME (ms)



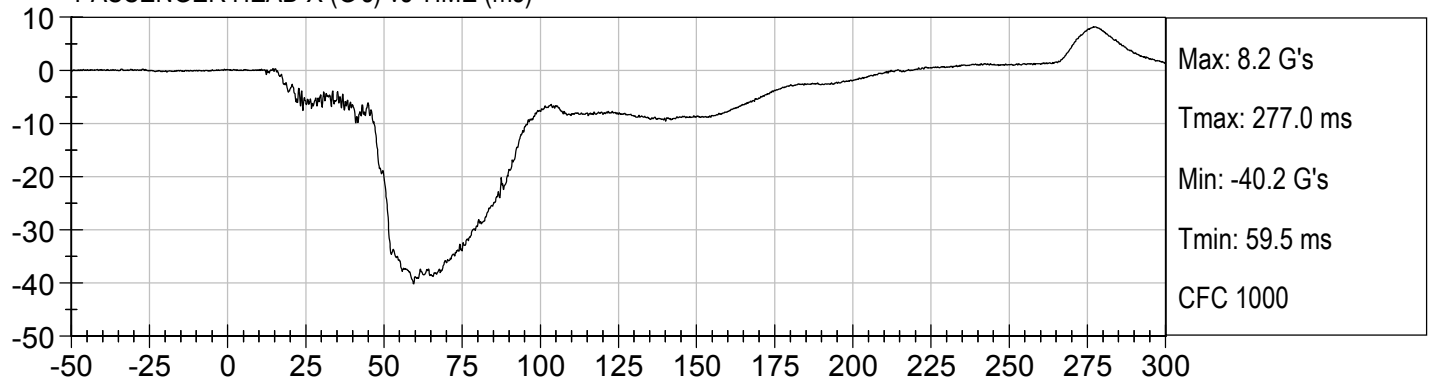
DRIVER LEFT FEMUR (N) vs TIME (ms)



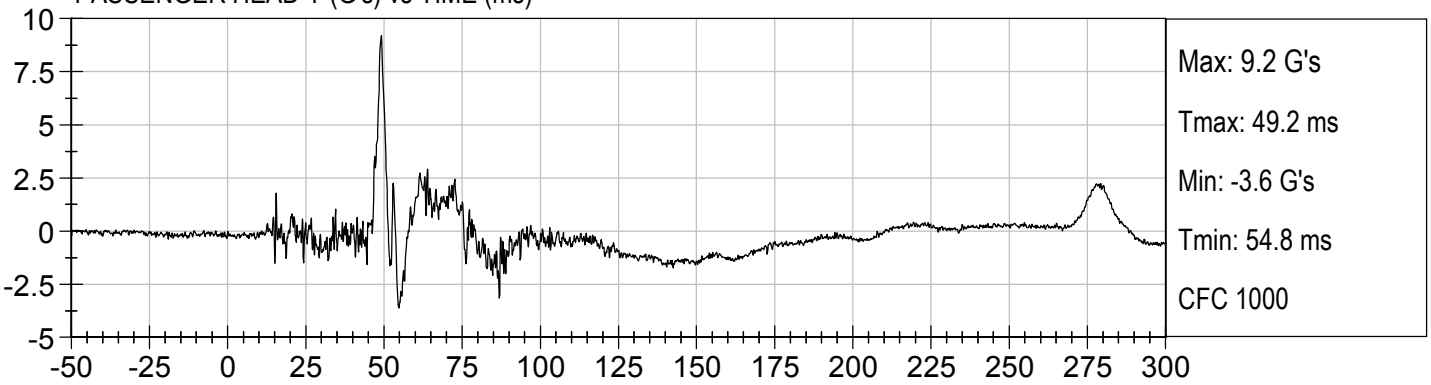
DRIVER RIGHT FEMUR (N) vs TIME (ms)



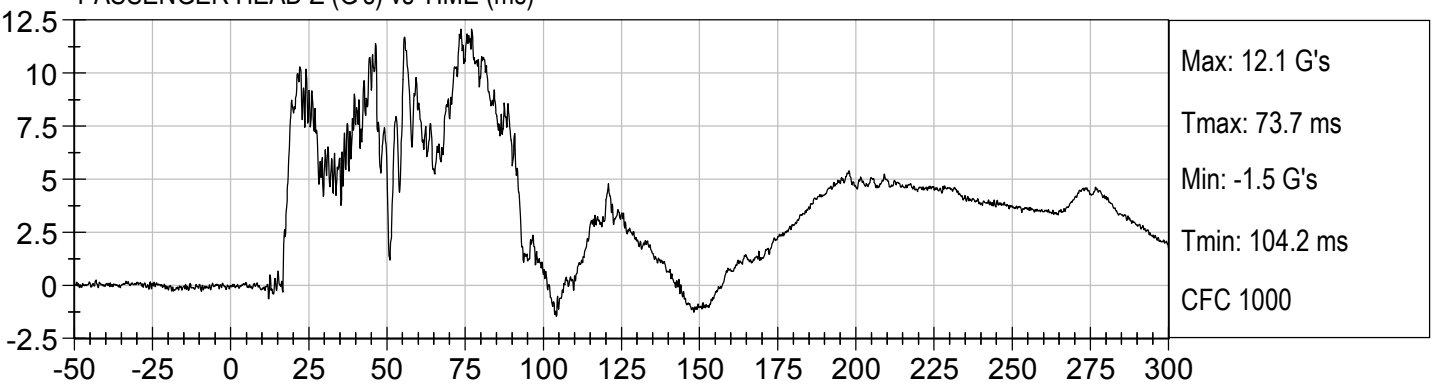
PASSENGER HEAD X (G's) vs TIME (ms)



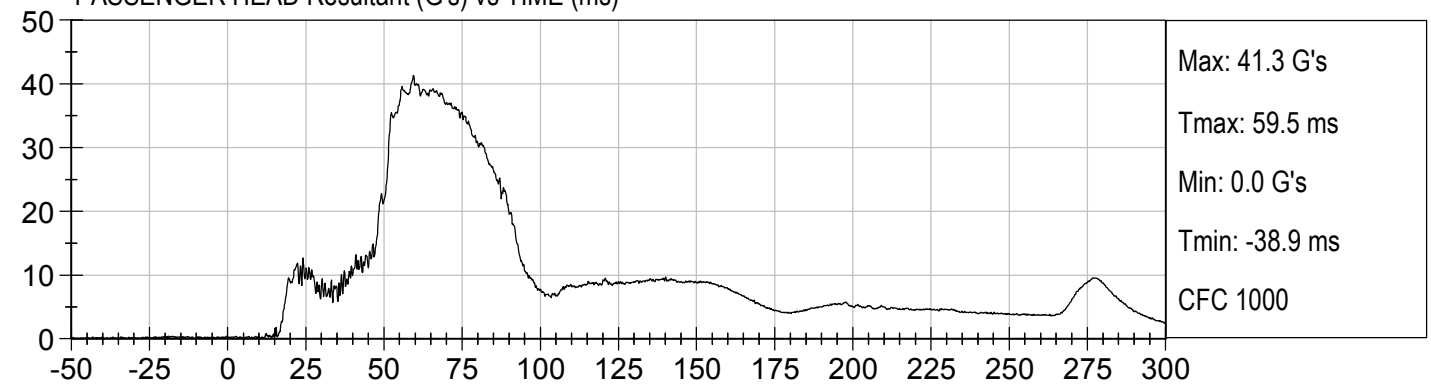
PASSENGER HEAD Y (G's) vs TIME (ms)



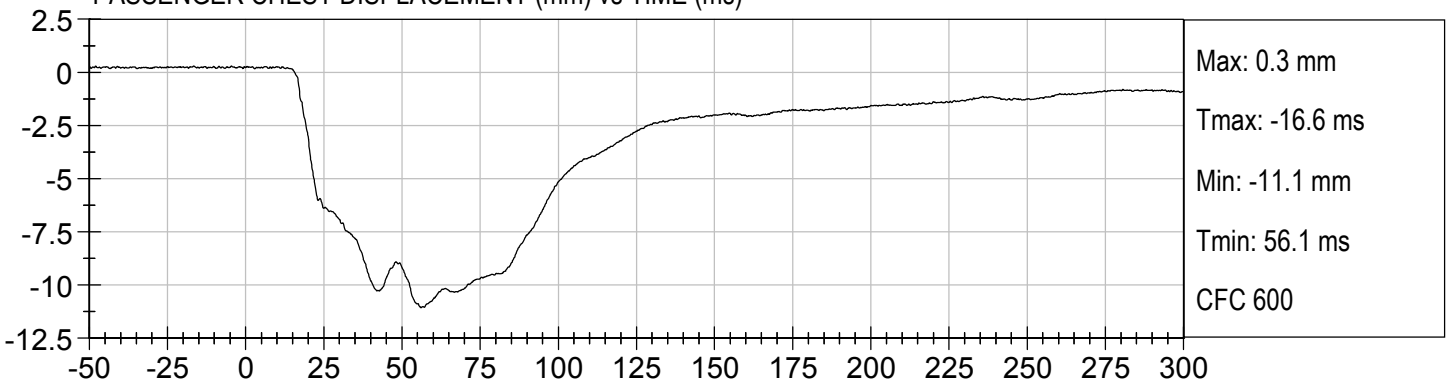
PASSENGER HEAD Z (G's) vs TIME (ms)



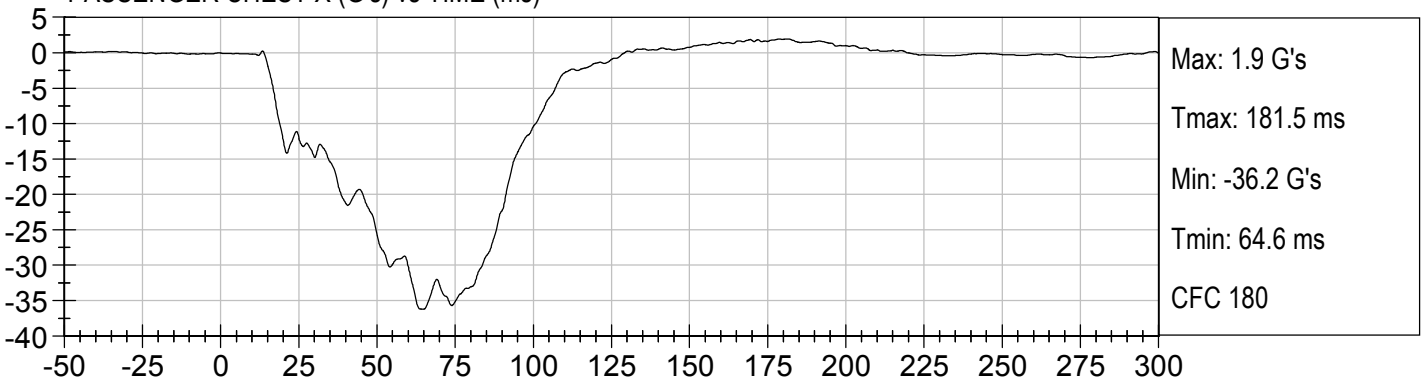
PASSENGER HEAD Resultant (G's) vs TIME (ms)



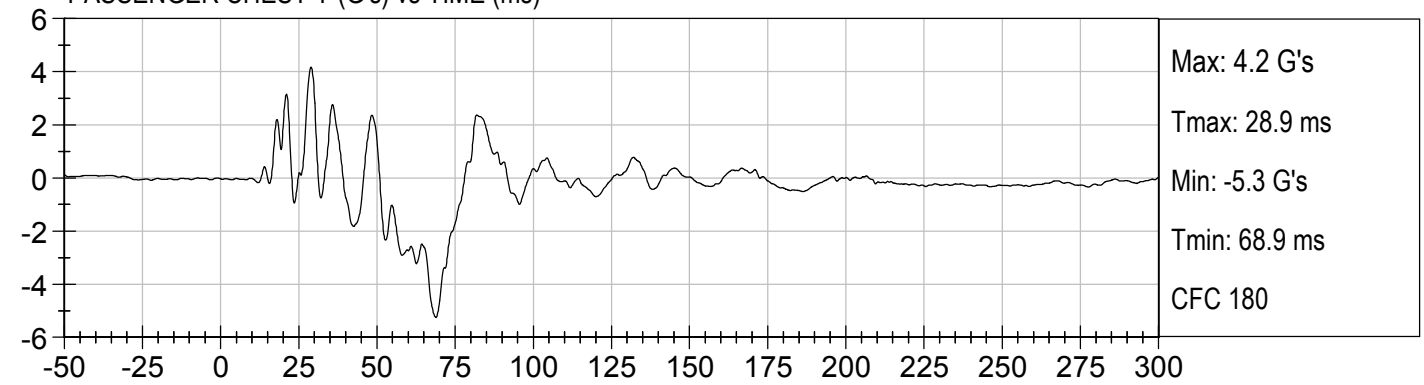
PASSENGER CHEST DISPLACEMENT (mm) vs TIME (ms)



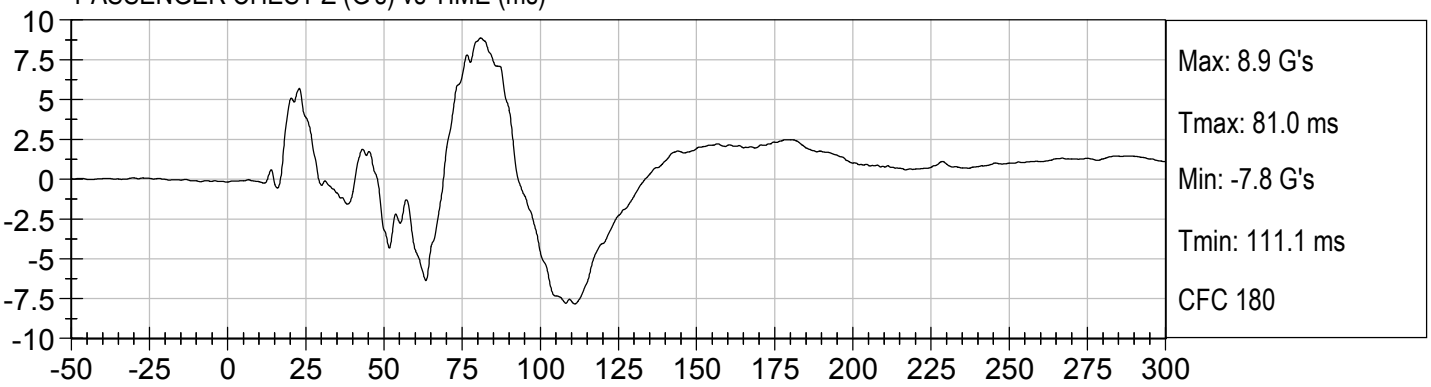
PASSENGER CHEST X (G's) vs TIME (ms)



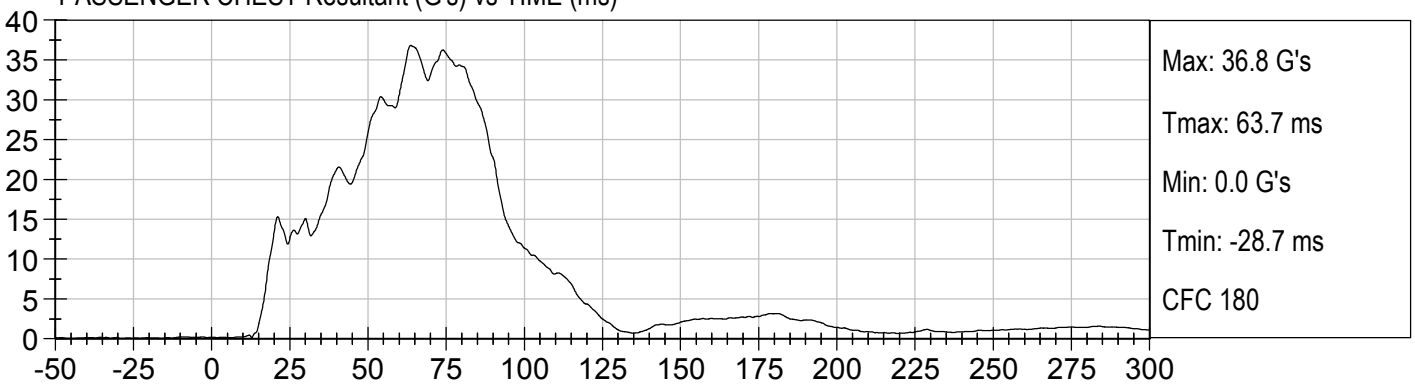
PASSENGER CHEST Y (G's) vs TIME (ms)



PASSENGER CHEST Z (G's) vs TIME (ms)



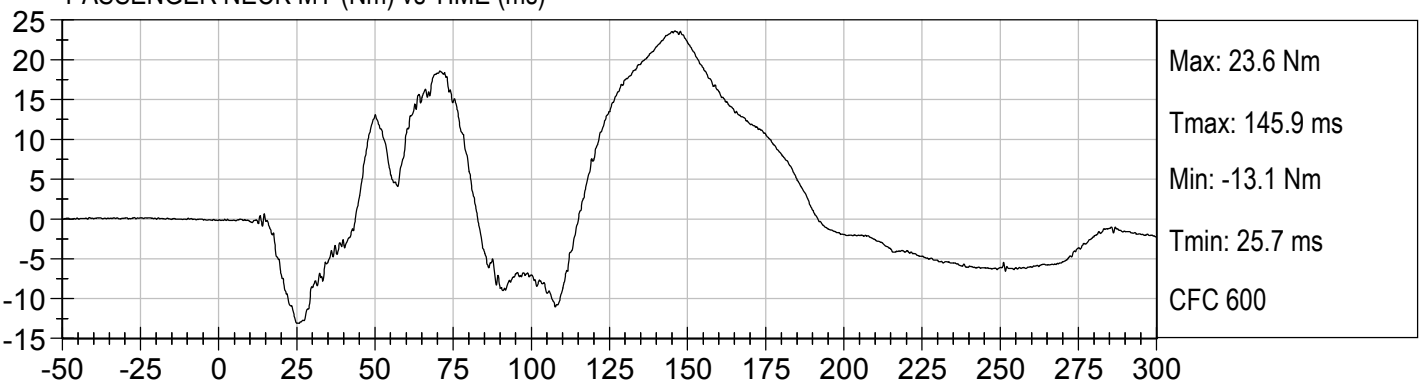
PASSENGER CHEST Resultant (G's) vs TIME (ms)

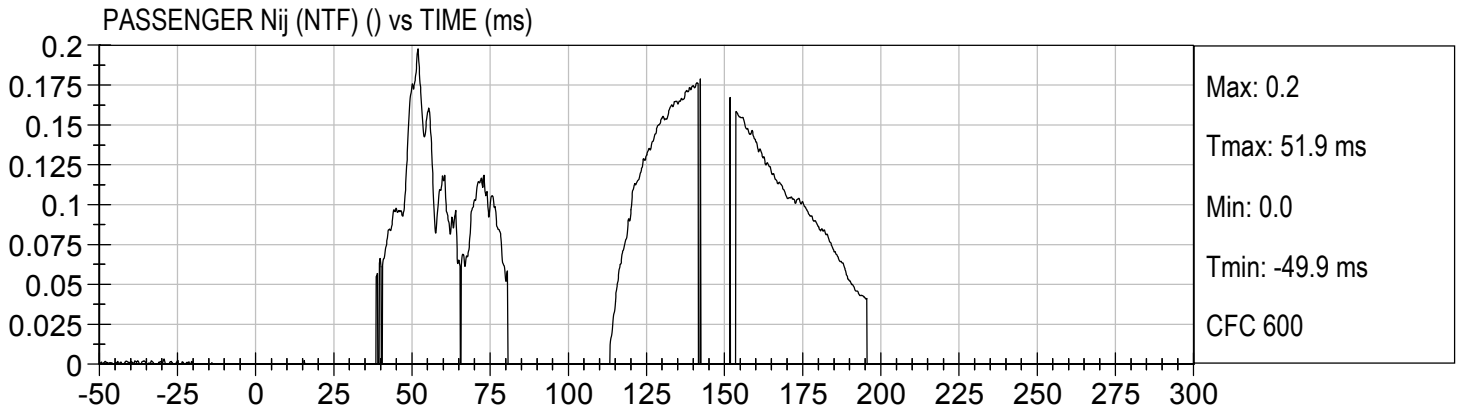


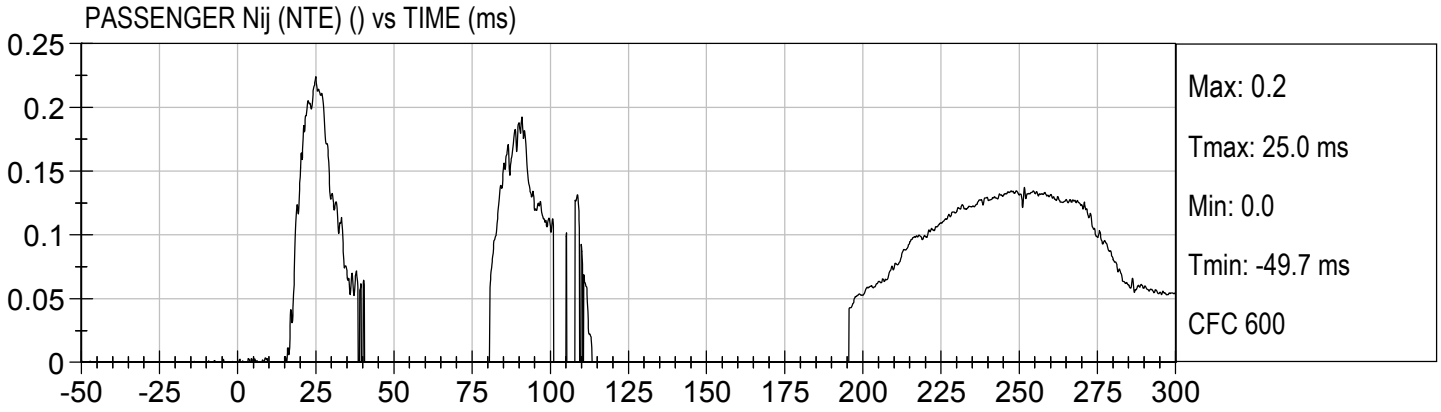
PASSENGER NECK FX (N) vs TIME (ms)

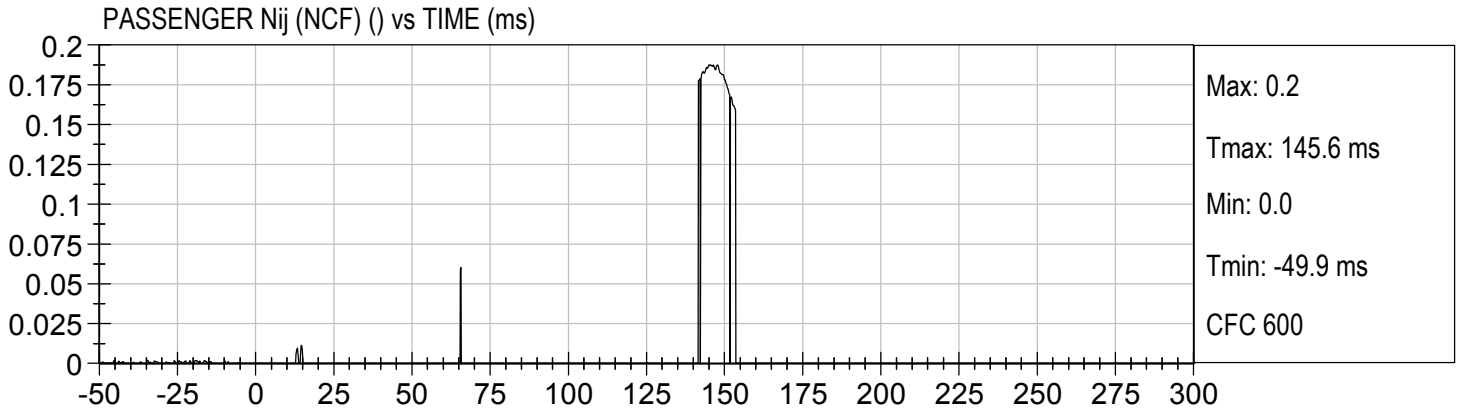
PASSENGER NECK FZ (N) vs TIME (ms)

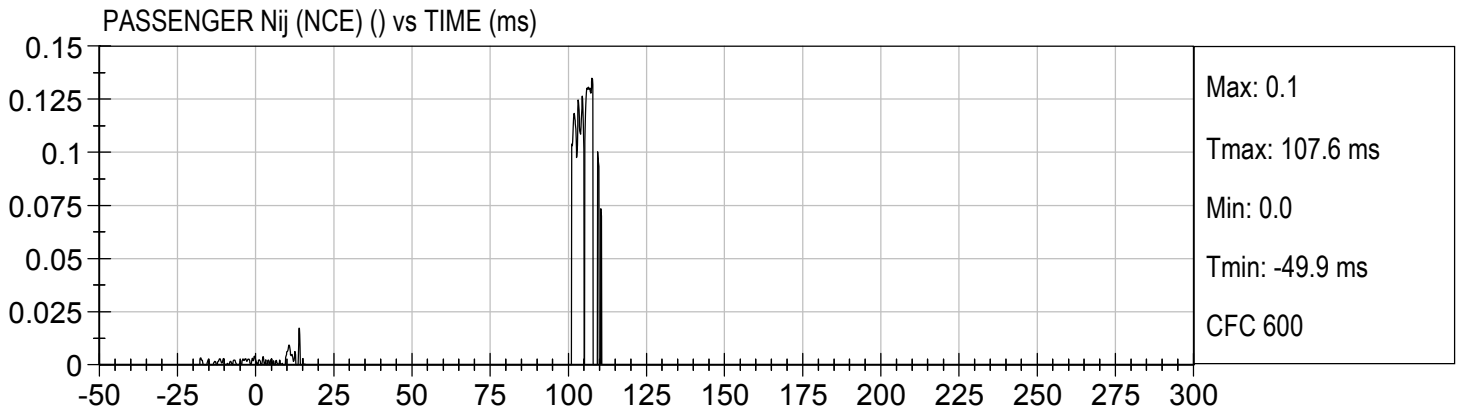
PASSENGER NECK MY (Nm) vs TIME (ms)



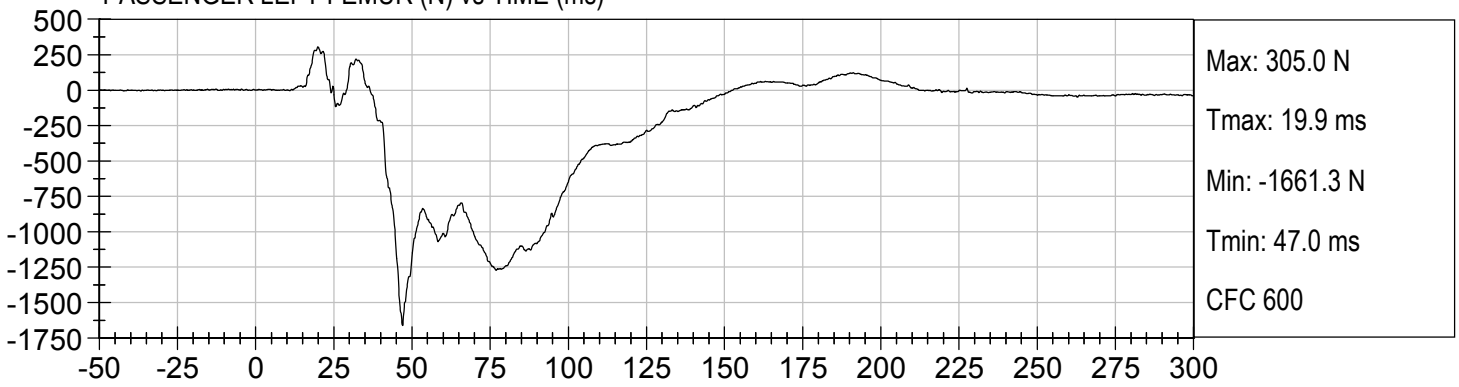

PASSENGER Nij (NTF) () vs TIME (ms)
0.2
0.175
0.15
0.125
0.1
0.075
0.05
0.025
0
-50 -25 0 25 50 75 100 125 150 175 200 225 250 275 300
Max: 0.2
Tmax: 51.9 ms
Min: 0.0
Tmin: -49.9 ms
CFC 600


PASSENGER Nij (NTE) () vs TIME (ms)
0.25
0.2
0.15
0.1
0.05
0
-50 -25 0 25 50 75 100 125 150 175 200 225 250 275 300
Max: 0.2
Tmax: 25.0 ms
Min: 0.0
Tmin: -49.7 ms
CFC 600

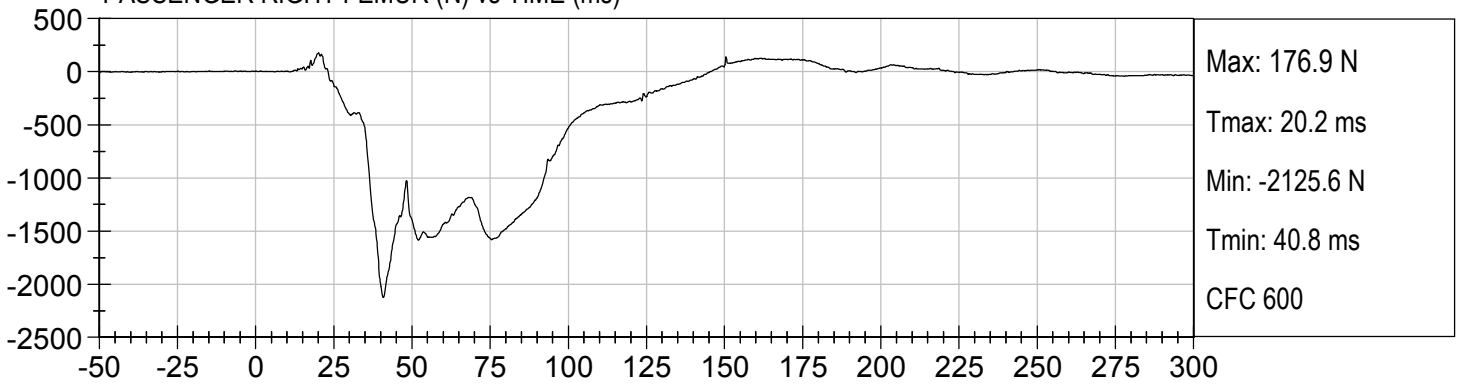

PASSENGER Nij (NCF) () vs TIME (ms)
0.2
0.175
0.15
0.125
0.1
0.075
0.05
0.025
0
-50 -25 0 25 50 75 100 125 150 175 200 225 250 275 300
Max: 0.2
Tmax: 145.6 ms
Min: 0.0
Tmin: -49.9 ms
CFC 600


PASSENGER Nij (NCE) () vs TIME (ms)
0.15
0.125
0.1
0.075
0.05
0.025
0
-50 -25 0 25 50 75 100 125 150 175 200 225 250 275 300
Max: 0.1
Tmax: 107.6 ms
Min: 0.0
Tmin: -49.9 ms
CFC 600

PASSENGER LEFT FEMUR (N) vs TIME (ms)



PASSENGER RIGHT FEMUR (N) vs TIME (ms)



APPENDIX C
DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA

Hybrid III, 50th External Measurements
SN: 351

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

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

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

MGA RESEARCH CORPORATION

HEAD DROP TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test ID:** D14171

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	18	Pass
Peak Resultant Acceleration	G's	225 to 275	243	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	-7.1	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

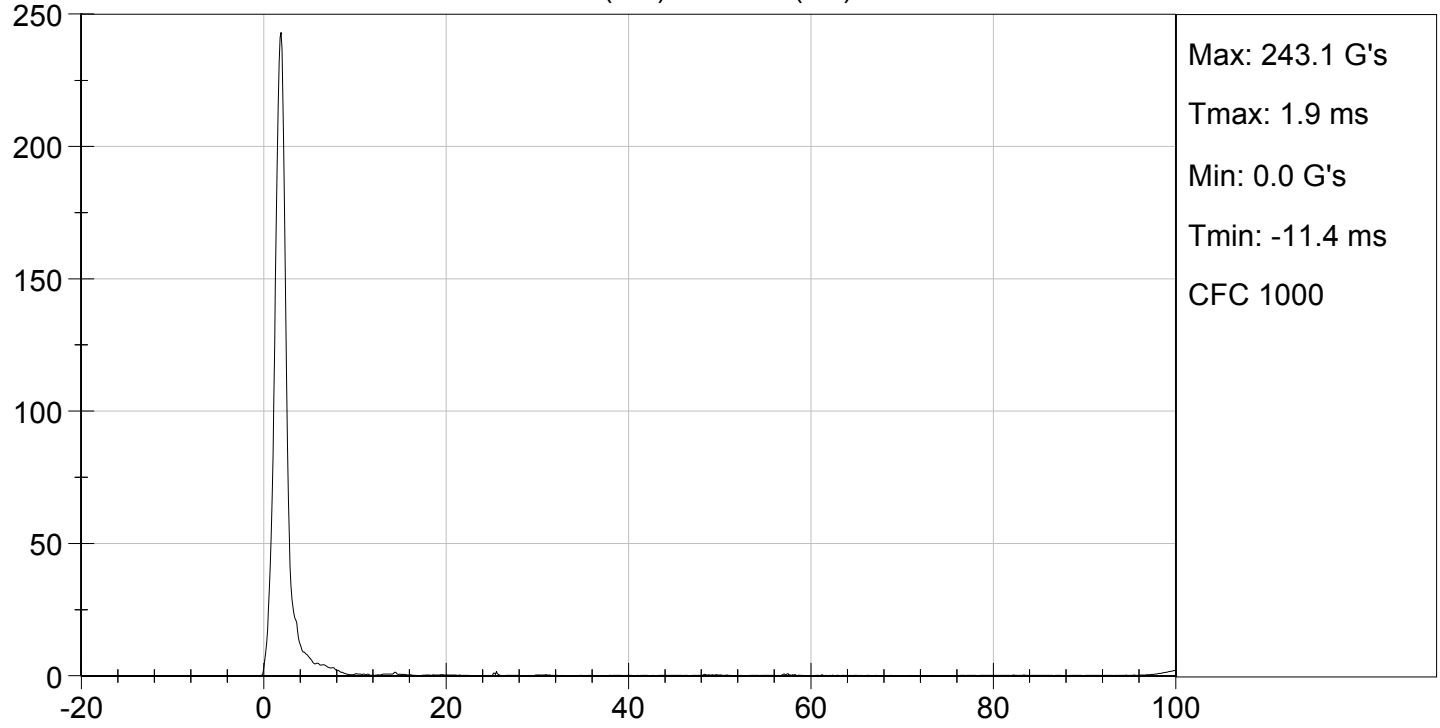
01/17/2014
Test Date

David Winkelbauer
Approved By

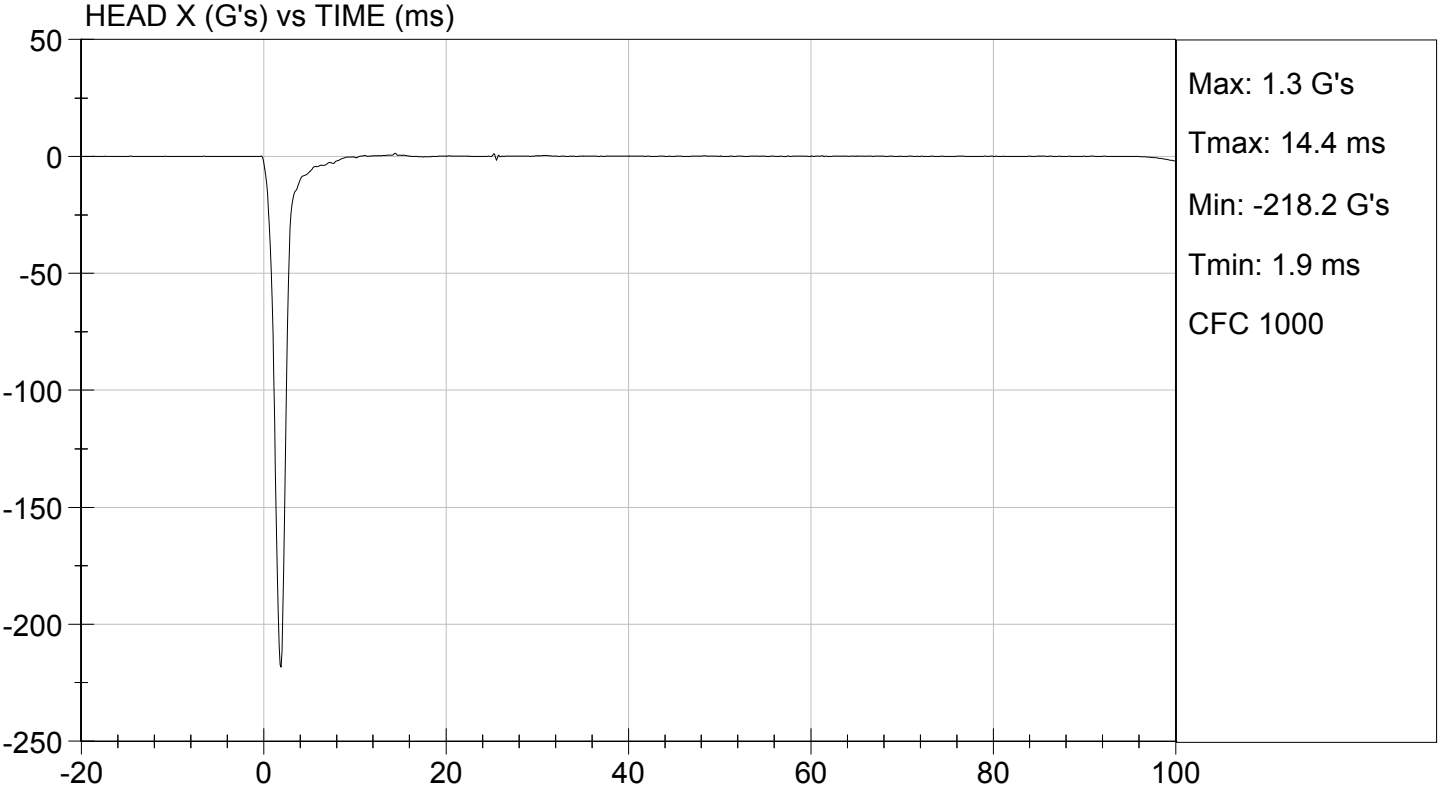
TEST DESC: HEAD DROP

TEST DATE: 01/17/2014
TEST #: D14171

HEAD RESULTANT ACCELERATION (G's) vs TIME (ms)



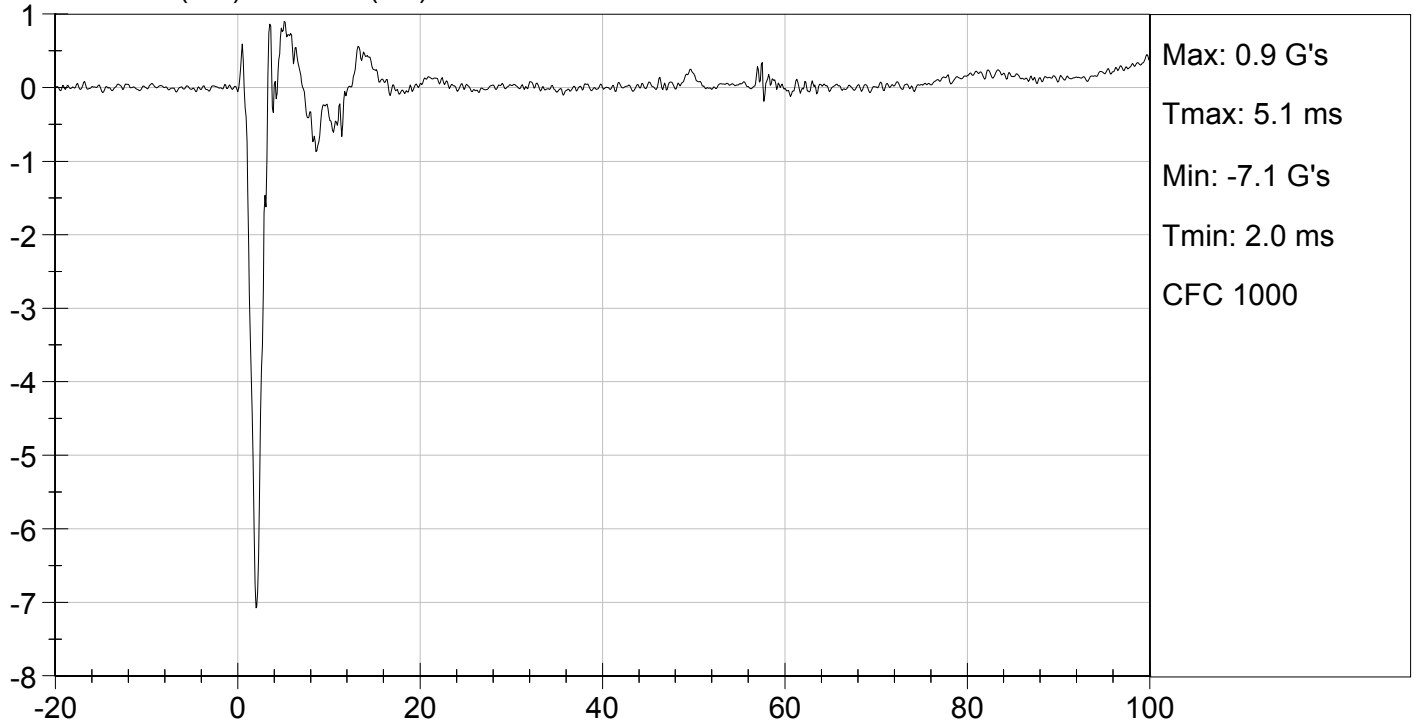
HEAD X (G's) vs TIME (ms)



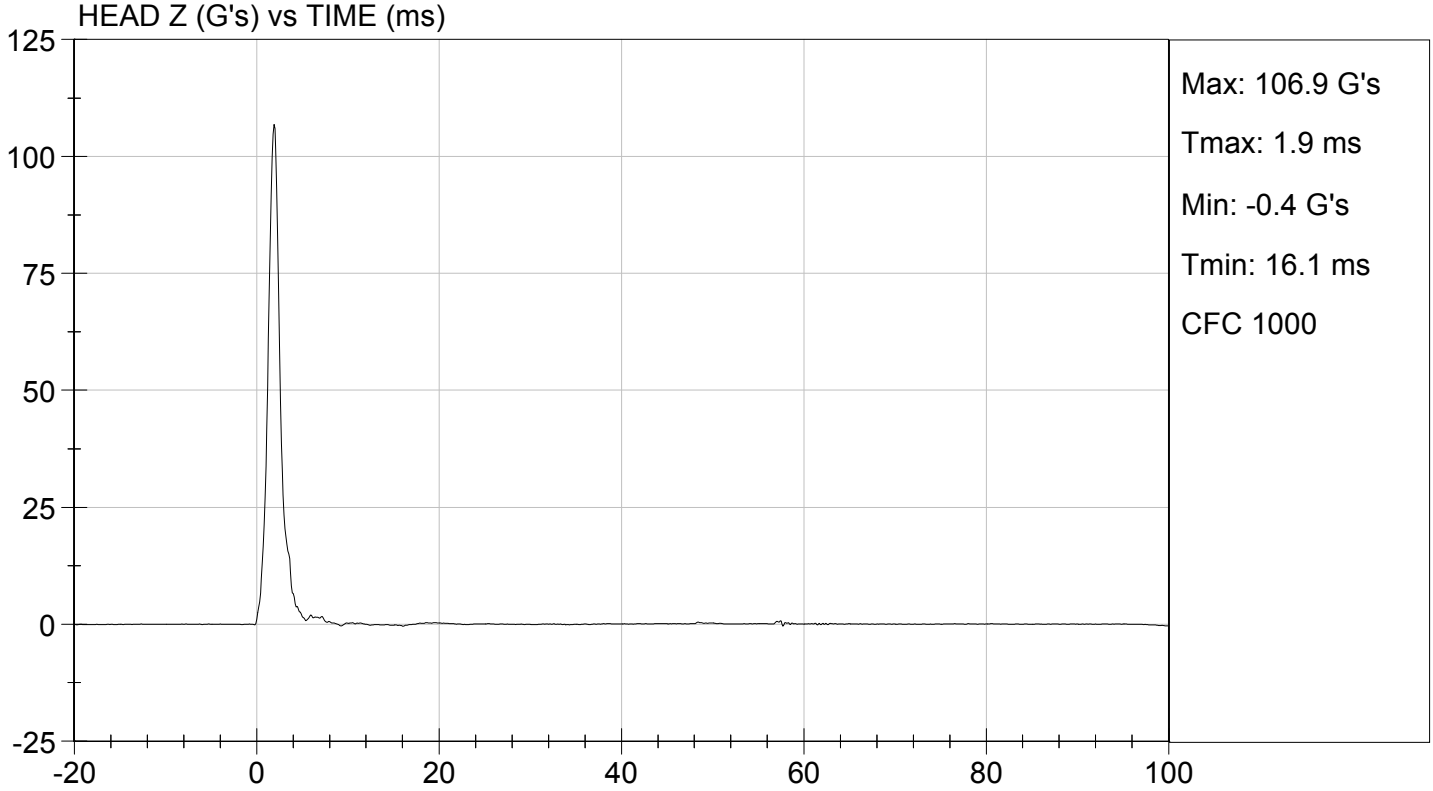
TEST DESC: HEAD DROP

TEST DATE: 01/17/2014
TEST #: D14171

HEAD Y (G's) vs TIME (ms)



HEAD Z (G's) vs TIME (ms)



MGA RESEARCH CORPORATION

NECK FLEXION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D14172

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity		%	10 to 70	17	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.05	Pass
Pendulum Deceleration	10 ms	G's	22.50 to 27.50	23.32	Pass
	20 ms	G's	17.60 to 22.60	20.75	Pass
	30 ms	G's	12.50 to 18.50	15.42	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 29.0	15.4	Pass
Deceleration Decay Time to Cross 5 G's		ms	34.0 to 42.0	35.1	Pass
Maximum "D" Plane Rotation	Maximum	Deg	64.0 to 78.0	70.5	Pass
	Time	ms	57.0 to 64.0	59.7	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	113.0 to 128.0	113.4	Pass
Moment About Occipital Condyle	Maximum	Nm	88.1 to 108.5	92.8	Pass
	Time	ms	47.0 to 58.0	49.3	Pass
Positive Moment Decay Time To Zero Crossing		ms	97.0 to 107.0	101.4	Pass
			Overall Test Results		Pass

Jessica Hall
Laboratory Technician

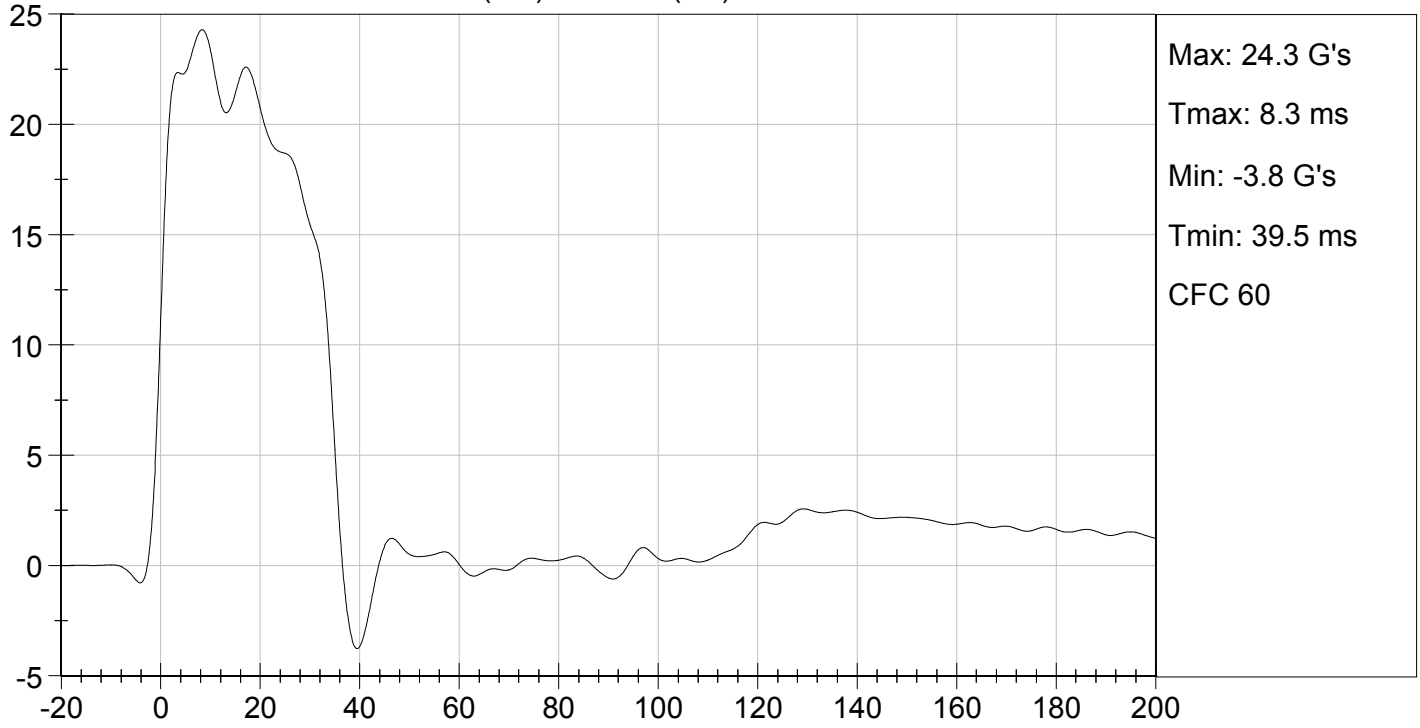
01/17/2014
Test Date

David Winkelbauer
Approved By

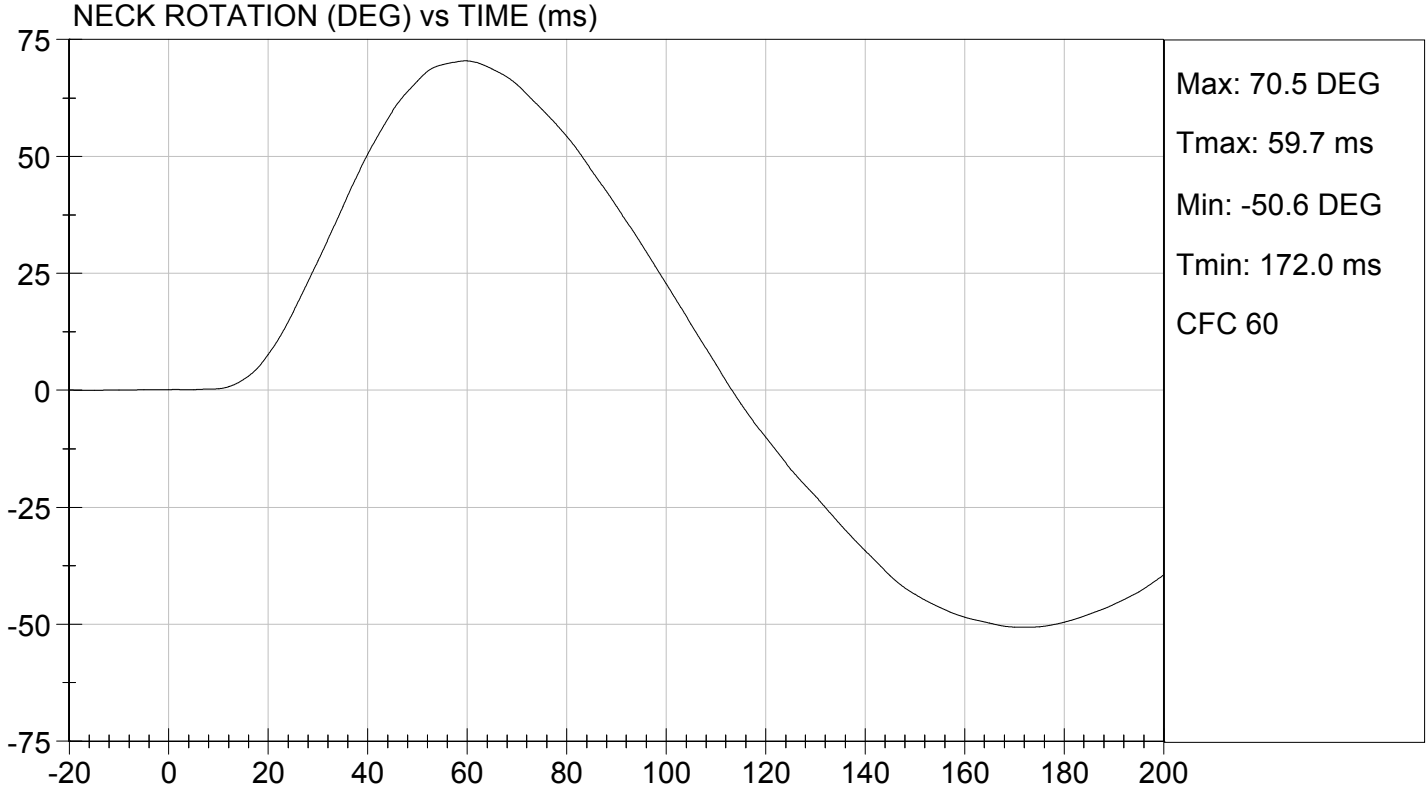
TEST DESC: NECK FLEXION
VELOCITY: 23.14 ft/s, 7.05 m/s

TEST DATE: 01/17/2014
TEST #: D14172

PENDULUM DECELERATION (G's) vs TIME (ms)



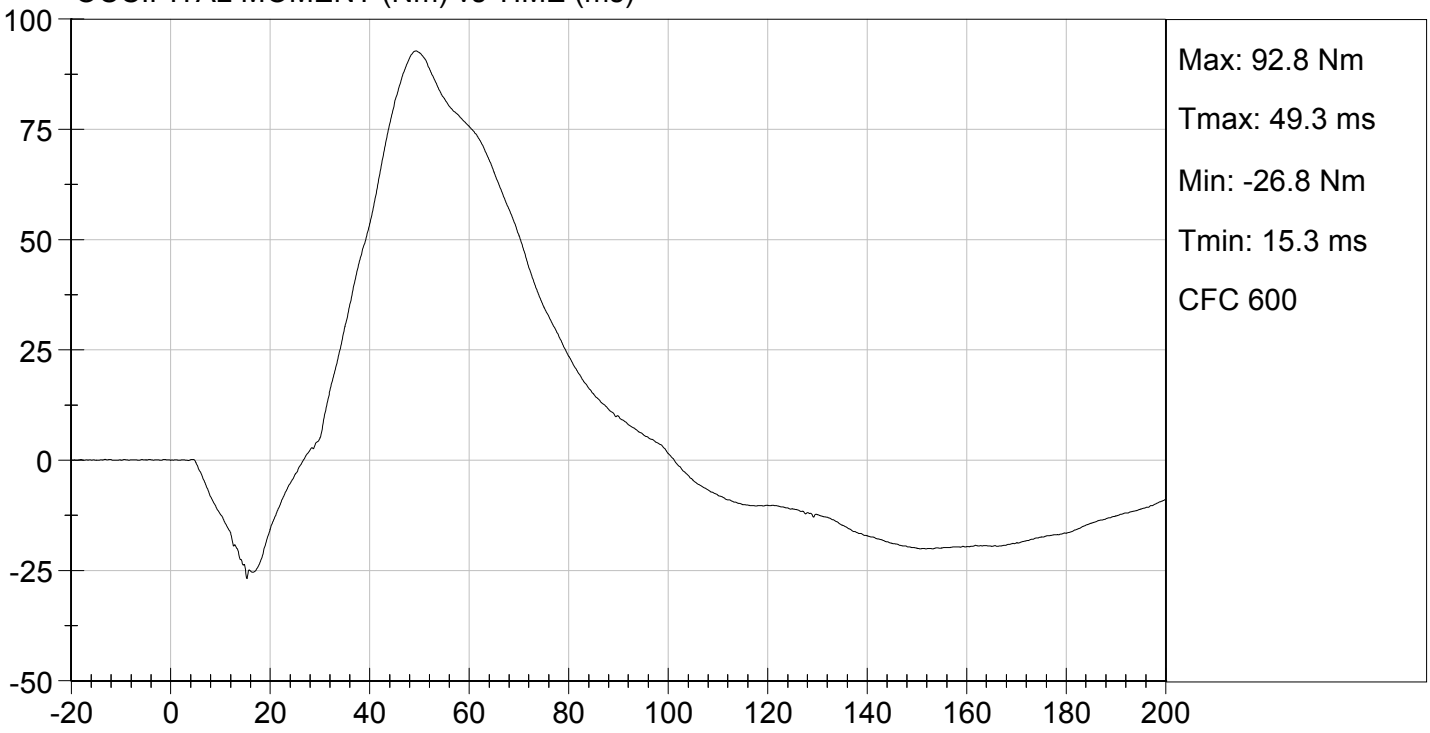
NECK ROTATION (DEG) vs TIME (ms)



TEST DESC: NECK FLEXION
VELOCITY: 23.14 ft/s, 7.05 m/s

TEST DATE: 01/17/2014
TEST #: D14172

OCCIPITAL MOMENT (Nm) vs TIME (ms)



MGA RESEARCH CORPORATION

NECK EXTENSION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D14173

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity		%	10 to 70	17	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.12	Pass
Pendulum Deceleration	10 ms	G's	17.20 to 21.20	17.46	Pass
	20 ms	G's	14.00 to 19.00	16.16	Pass
	30 ms	G's	11.00 to 16.00	12.14	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 22.0	12.3	Pass
Deceleration Decay Time to Cross 5 G's		ms	38.0 to 46.0	43.0	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	93.1	Pass
	Time	ms	72.0 to 82.0	77.2	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	147.0 to 174.0	155.7	Pass
Moment About Occipital Condyle	Maximum	Nm	-52.9 to -79.9	-57.4	Pass
	Time	ms	65.0 to 79.0	71.5	Pass
Negative Moment Decay Time To Zero Crossing		ms	120.0 to 148.0	143.9	Pass
			Overall Test Results		Pass

Jessica Hall
Laboratory Technician

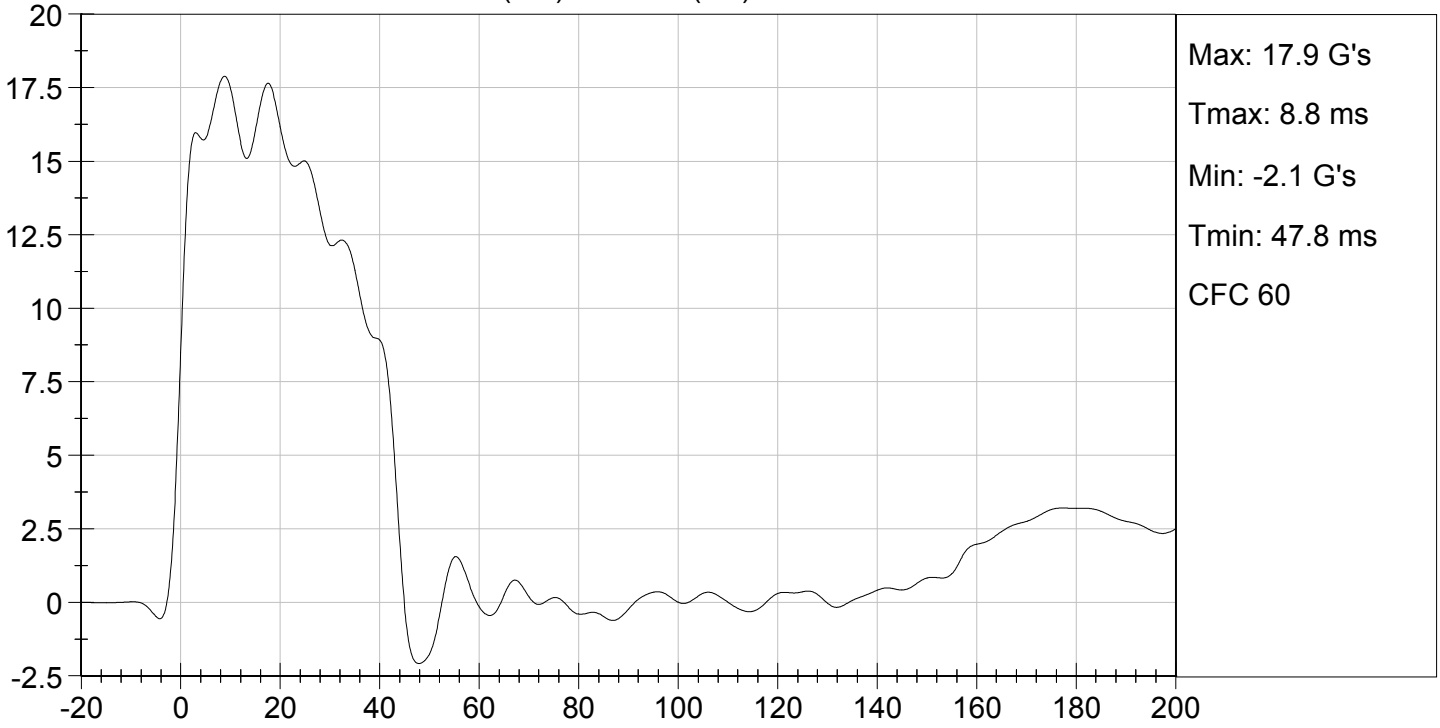
01/17/2014
Test Date

David Winkelbauer
Approved By

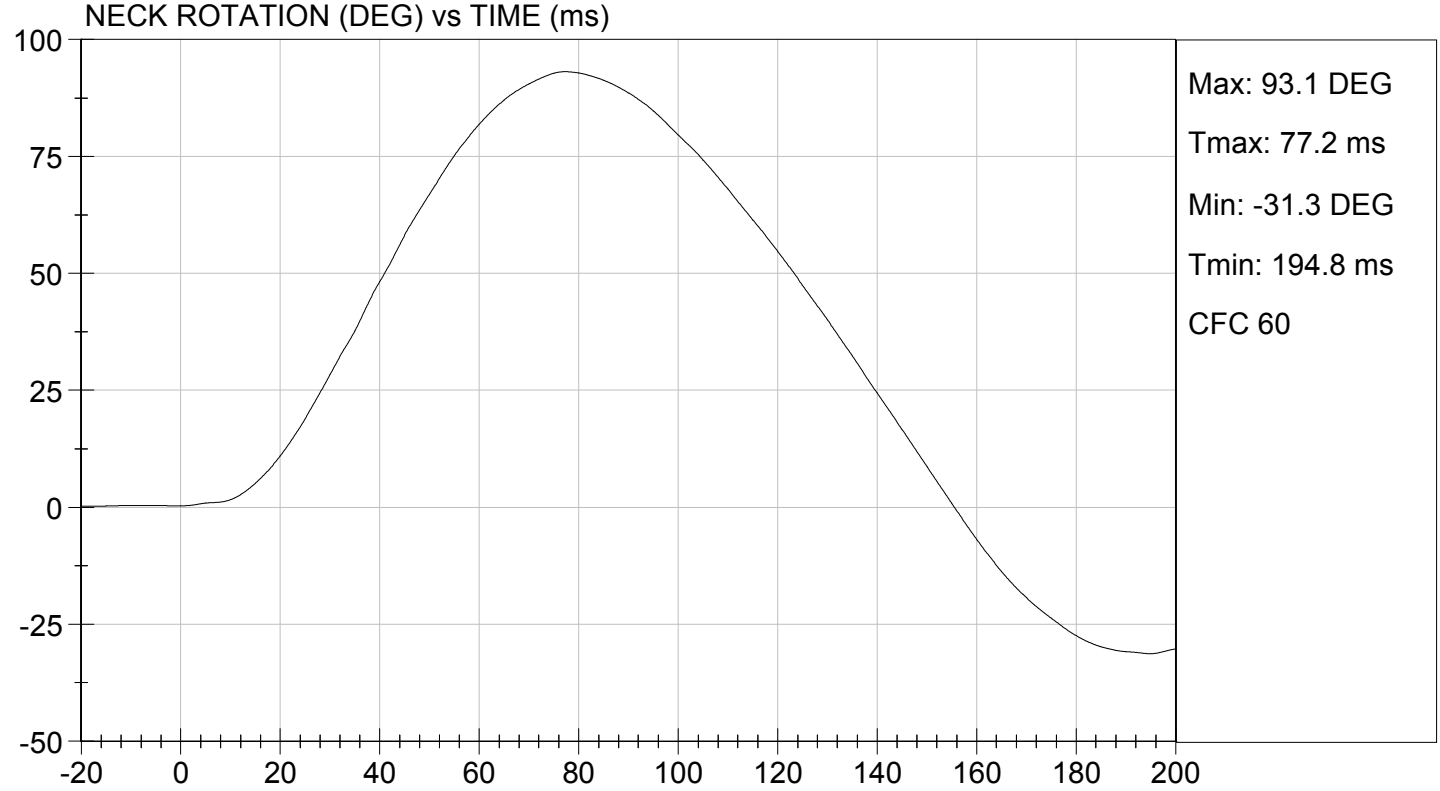
TEST DESC: NECK EXTENSION
VELOCITY: 20.08 ft/s, 6.12 m/s

TEST DATE: 01/17/2014
TEST #: D14173

PENDULUM DECELERATION (G's) vs TIME (ms)

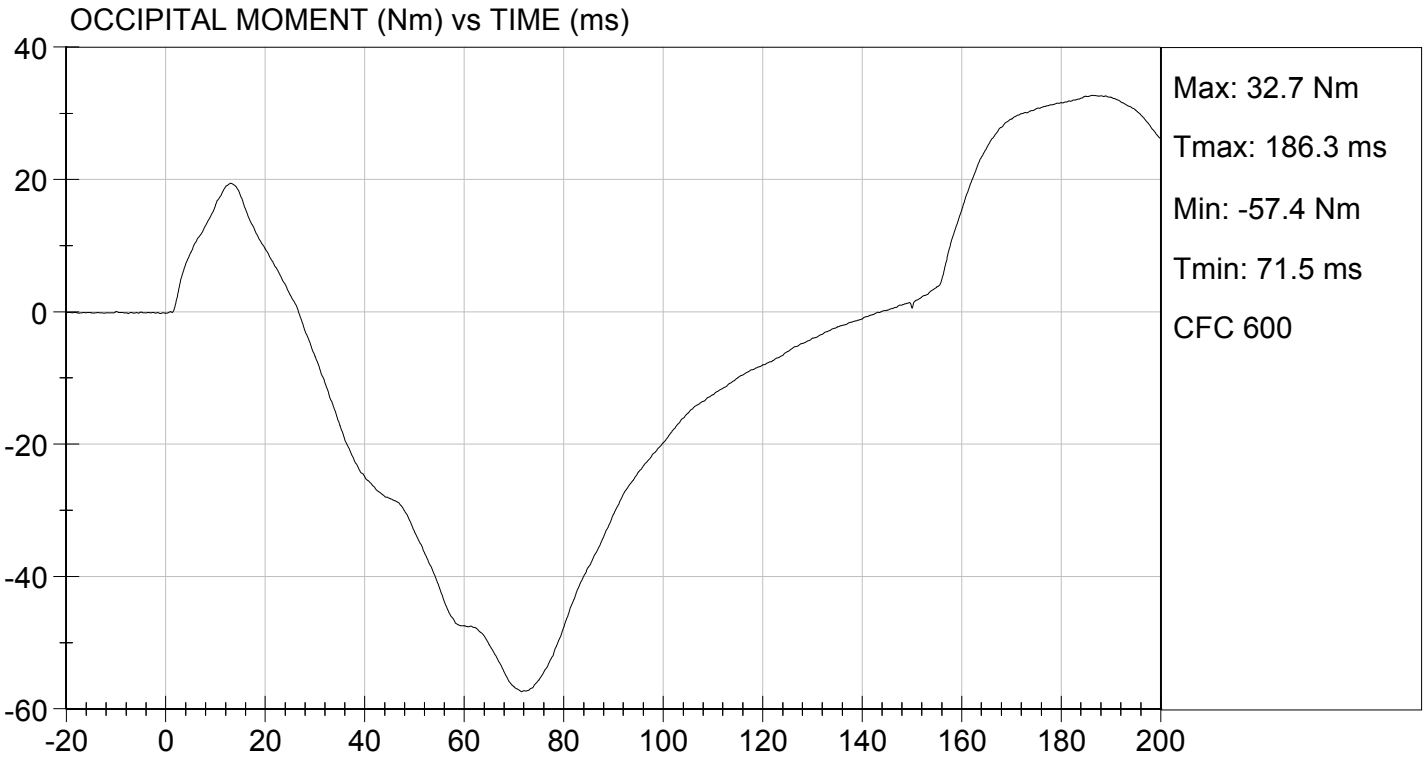


NECK ROTATION (DEG) vs TIME (ms)



TEST DESC: NECK EXTENSION
VELOCITY: 20.08 ft/s, 6.12 m/s

TEST DATE: 01/17/2014
TEST #: D14173



MGA RESEARCH CORPORATION

THORAX IMPACT

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D14174

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	16	Pass
Probe Velocity	m/s	6.58 to 6.82	6.68	Pass
Peak Probe Force	N	5159 to 5893	5,480	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.40	Pass
Internal Hysteresis	%	69 to 85	71	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

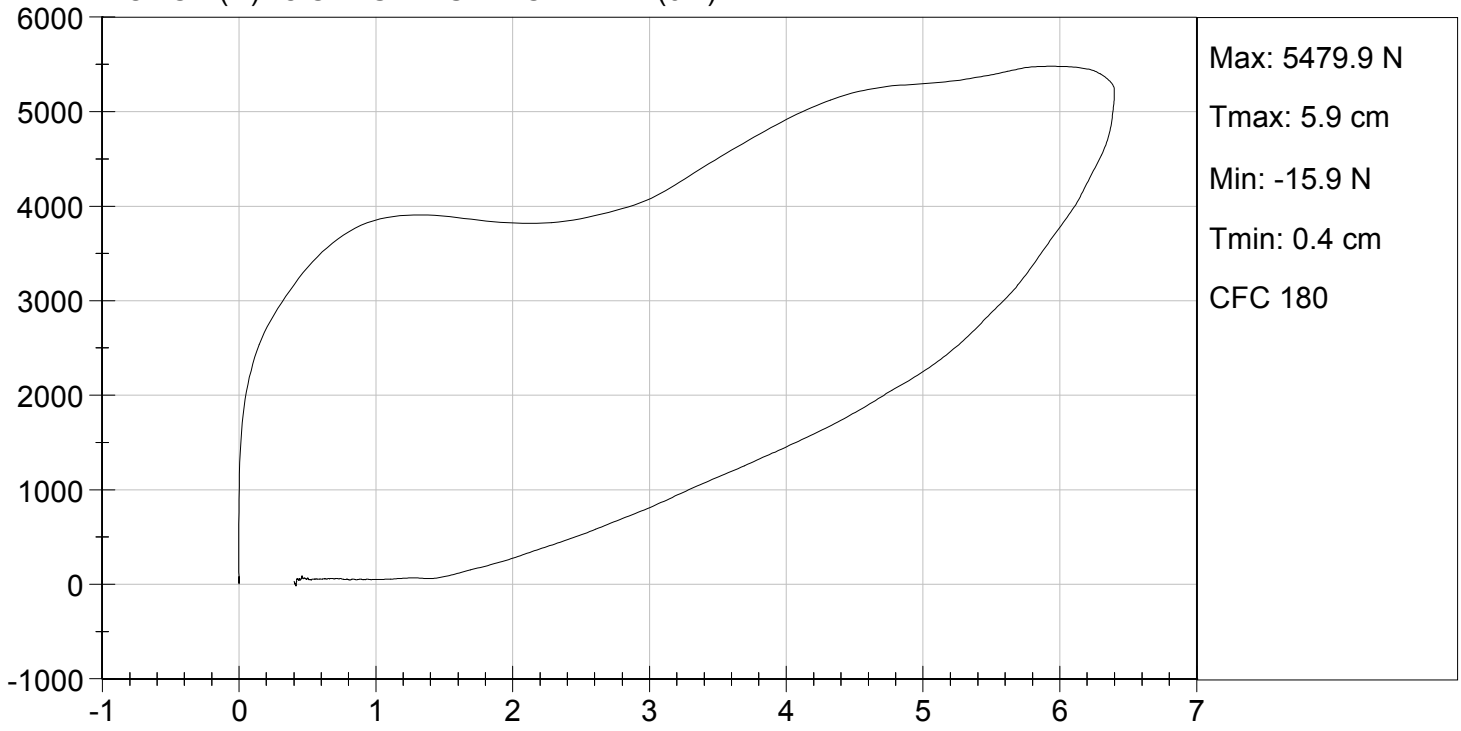
01/17/2014
Test Date

David Winkelbauer
Approved By

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

TEST DATE: 01/17/2014
TEST #: D14174

FORCE (N) vs CHEST DISPLACEMENT (cm)



MGA RESEARCH CORPORATION

RIGHT KNEE IMPACT TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D14175

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	17	Pass
Probe Velocity	m/s	2.07 to 2.13	2.12	Pass
Peak Probe Force	N	4715 to 5782	5,201	Pass
		Overall Test Results		Pass

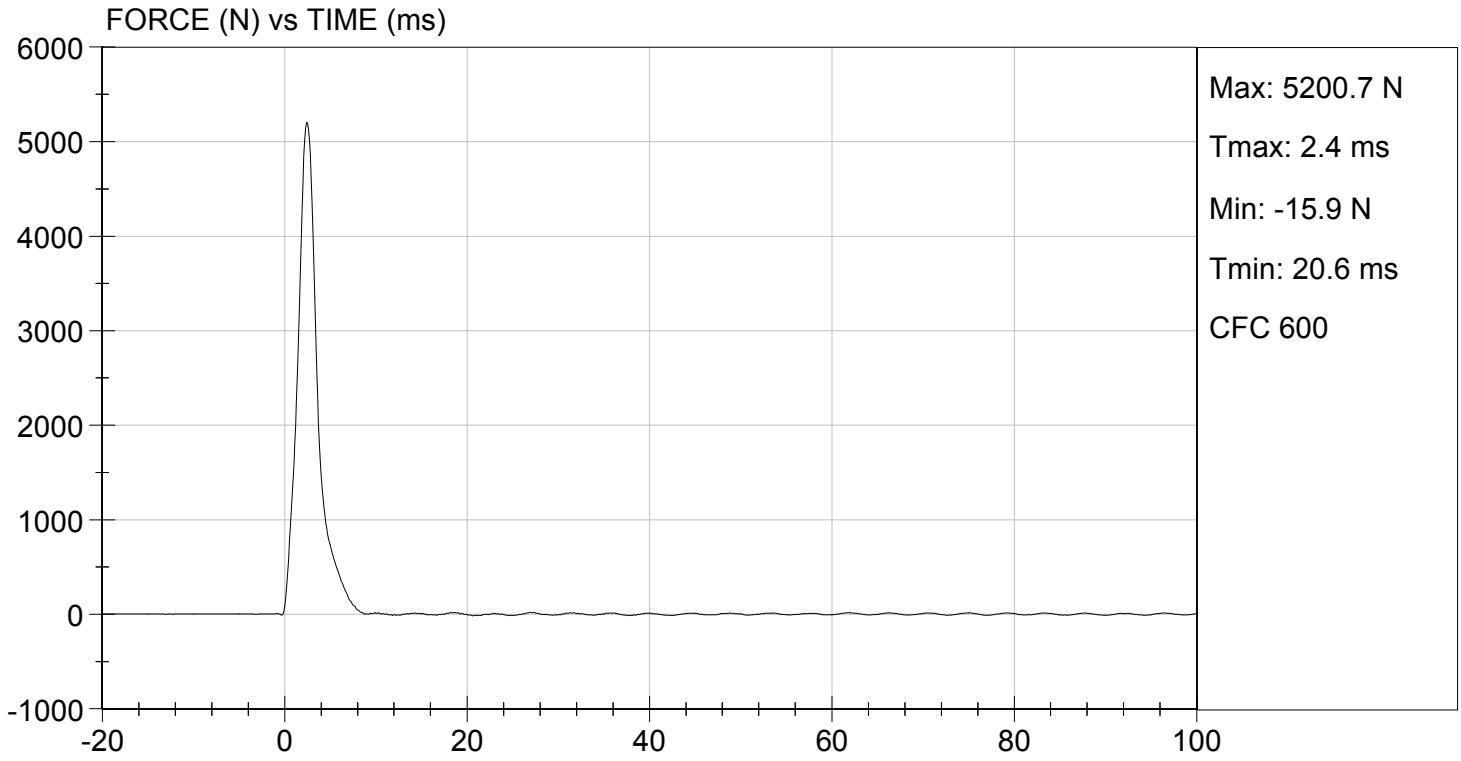
Jessica Hall
Laboratory Technician

01/17/2014
Test Date

David Winkelbauer
Approved By

TEST DESC: RIGHT KNEE
VELOCITY: 6.94 ft/s, 2.12 m/s

TEST DATE: 01/17/2014
TEST #: D14175



MGA RESEARCH CORPORATION

LEFT KNEE IMPACT TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D14176

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	17	Pass
Probe Velocity	m/s	2.07 to 2.13	2.12	Pass
Peak Probe Force	N	4715 to 5782	5,259	Pass
		Overall Test Results		Pass

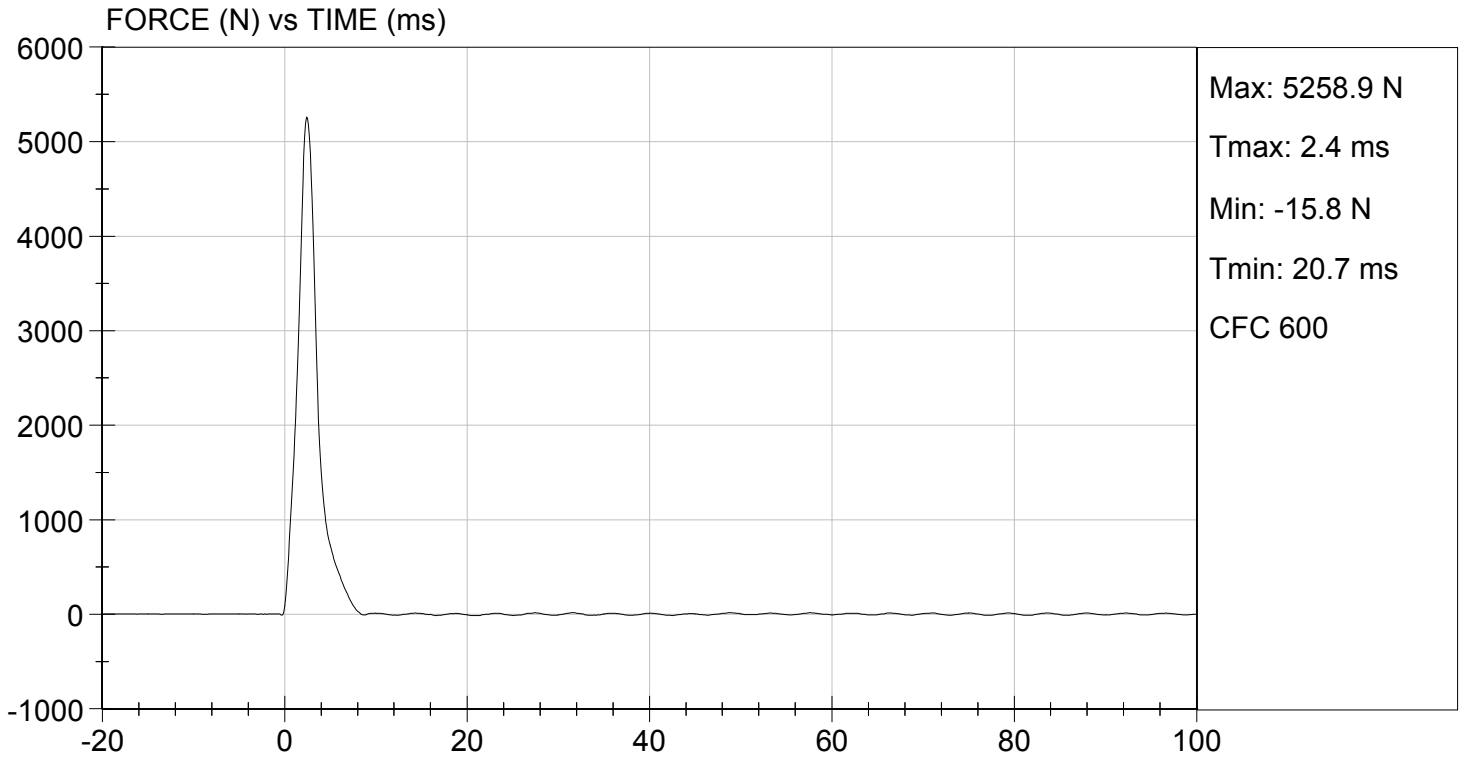
Jessica Gall
Laboratory Technician

01/17/2014
Test Date

David Winkelbauer
Approved By

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

TEST DATE: 01/17/2014
TEST #: D14176



MGA RESEARCH CORPORATION

HIP-FEMUR FLEXION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D14170

Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	21.4	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	19	19	Pass
Rotation Rate	deg/s	5.0 to 10.0	6.1	6.1	Pass
30 Degrees	Nm	94.9 Nm Max	53.5	69.7	Pass
150 ft-lbf / 203.4 Nm	Deg	40.0 to 50.0 Degree Max Rotation	47.7	44.8	Pass
		Overall Test Results			Pass

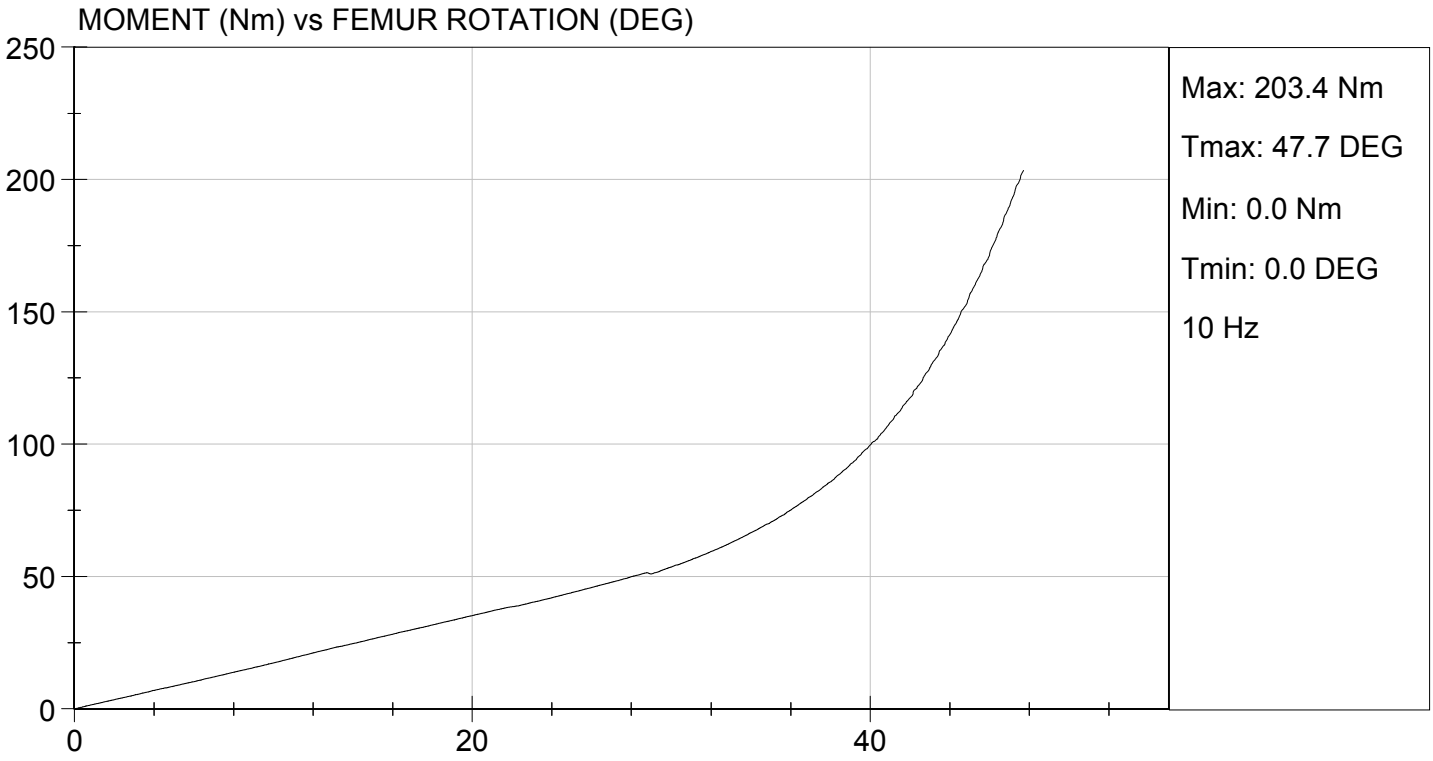
Jessica Gall
Laboratory Technician

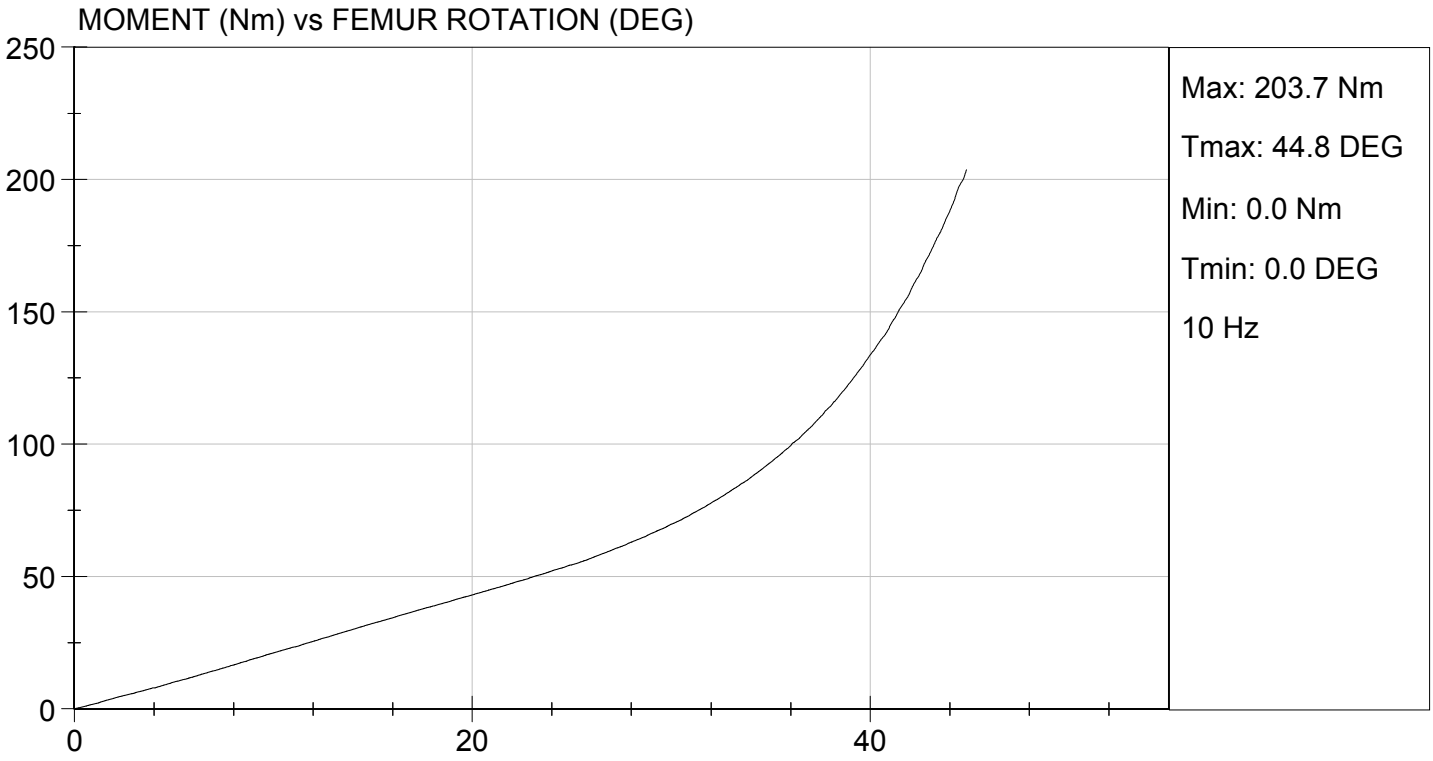
01/17/2014
Test Date

David Winkelbauer
Approved By

TEST DESC: RIGHT HIP FEMUR FLEXION

TEST DATE: 01/17/2014
TEST #: D14179




MOMENT (Nm) vs FEMUR ROTATION (DEG)
250
200
150
100
50
0
0
20
40
Max: 203.7 Nm
Tmax: 44.8 DEG
Min: 0.0 Nm
Tmin: 0.0 DEG
10 Hz

MGA RESEARCH CORPORATION

HEAD DROP TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test ID:** D14261

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	10	Pass
Peak Resultant Acceleration	G's	225 to 275	252	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	-5.6	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
		Overall Test Results		Pass

Jessica Gall
Laboratory Technician

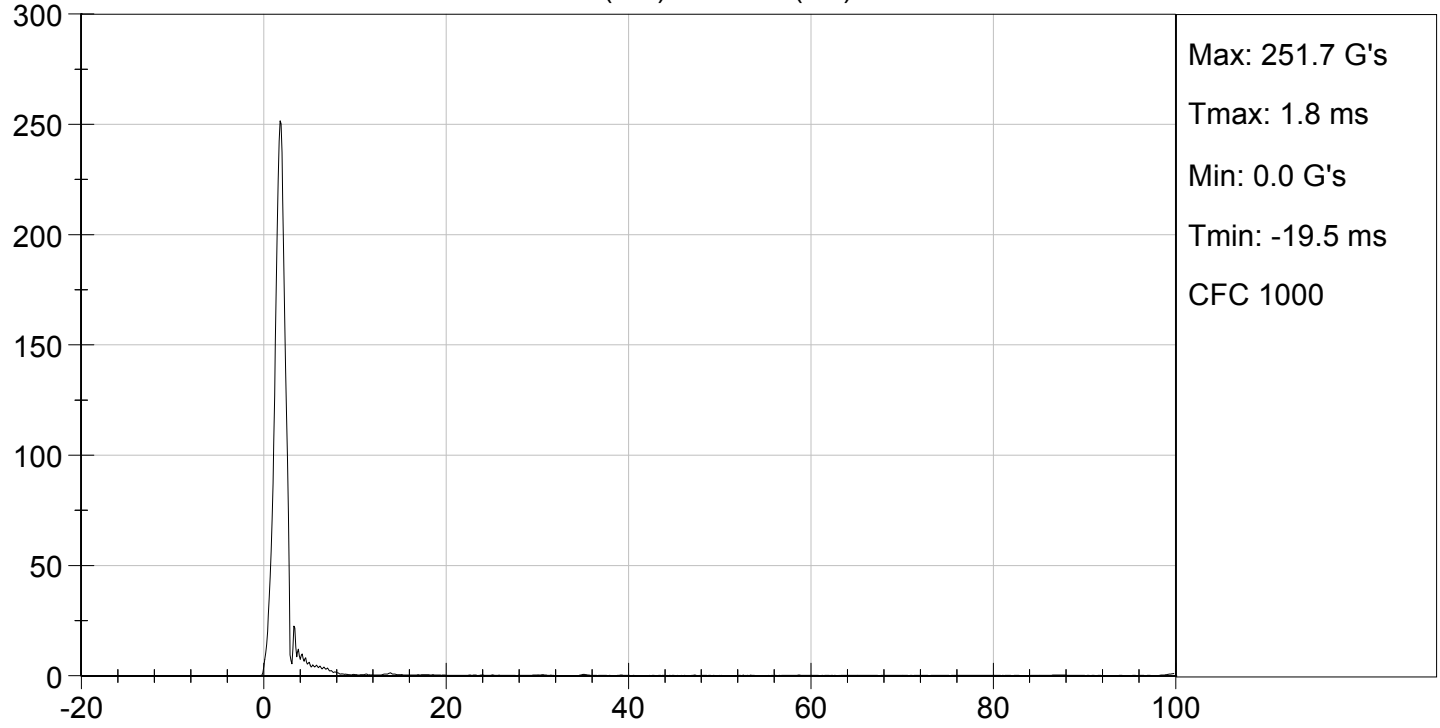
01/28/2014
Test Date

David Winkelbauer
Approved By

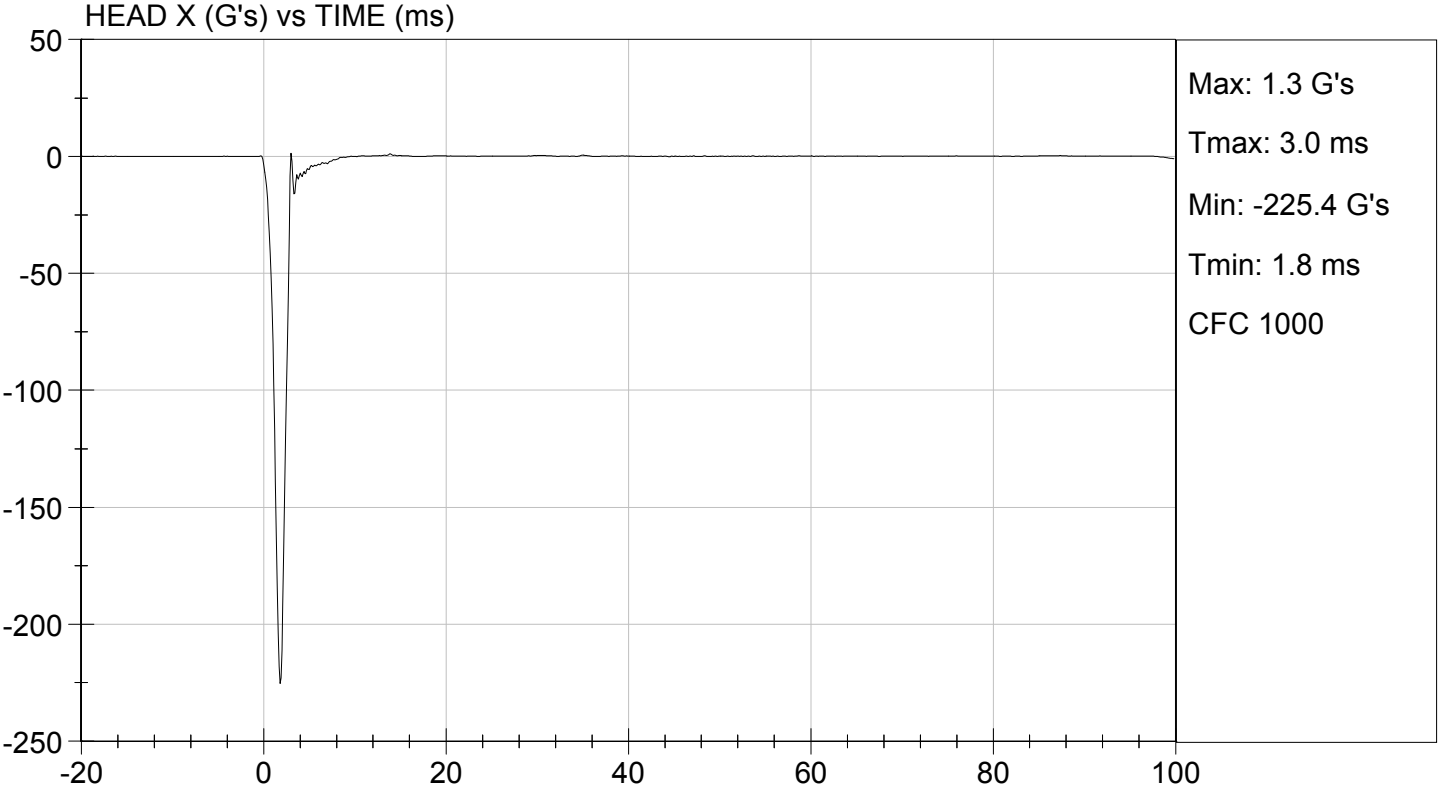
TEST DESC: HEAD DROP

TEST DATE: 01/28/2014
TEST #: D14261

HEAD RESULTANT ACCELERATION (G's) vs TIME (ms)



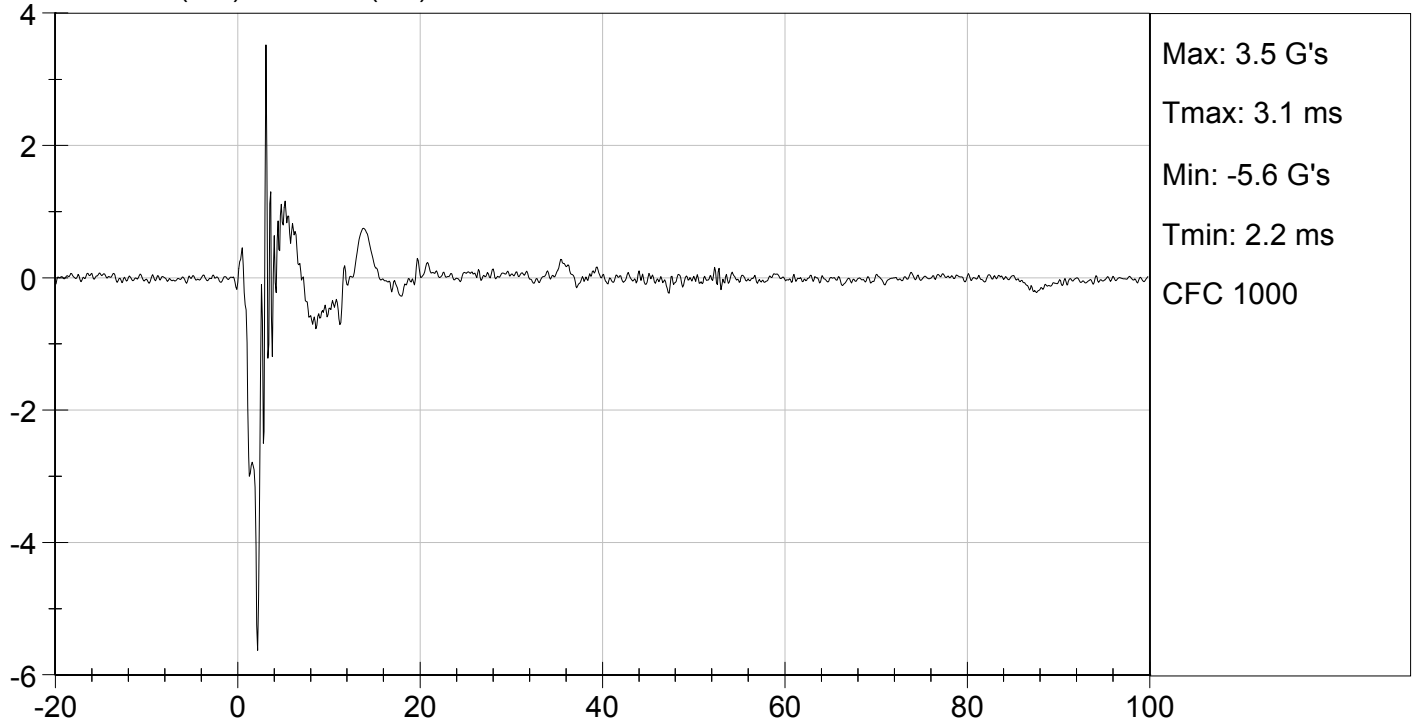
HEAD X (G's) vs TIME (ms)



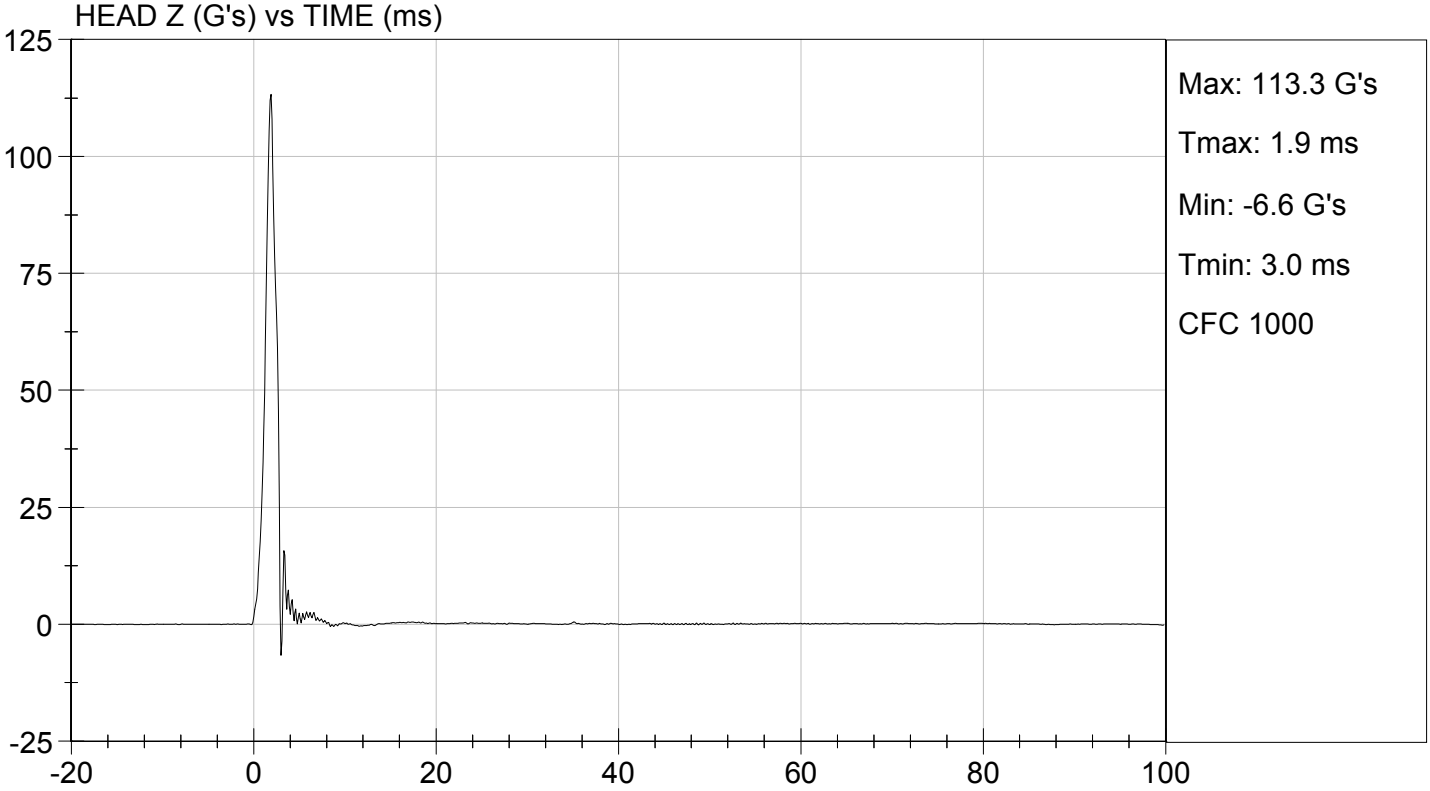
TEST DESC: HEAD DROP

TEST DATE: 01/28/2014
TEST #: D14261

HEAD Y (G's) vs TIME (ms)



HEAD Z (G's) vs TIME (ms)



MGA RESEARCH CORPORATION

NECK FLEXION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D14262

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	10	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.13	Pass
Pendulum Deceleration	10 ms	G's	22.50 to 27.50	22.94	Pass
	20 ms	G's	17.60 to 22.60	19.27	Pass
	30 ms	G's	12.50 to 18.50	15.23	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 29.0	15.2	Pass
Deceleration Decay Time to Cross 5 G's		ms	34.0 to 42.0	36.5	Pass
Maximum "D" Plane Rotation	Maximum	Deg	64.0 to 78.0	70.6	Pass
	Time	ms	57.0 to 64.0	60.5	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	113.0 to 128.0	114.2	Pass
Moment About Occipital Condyle	Maximum	Nm	88.1 to 108.5	93.9	Pass
	Time	ms	47.0 to 58.0	48.5	Pass
Positive Moment Decay Time To Zero Crossing		ms	97.0 to 107.0	98.4	Pass
			Overall Test Results		Pass

Jessica Hall
Laboratory Technician

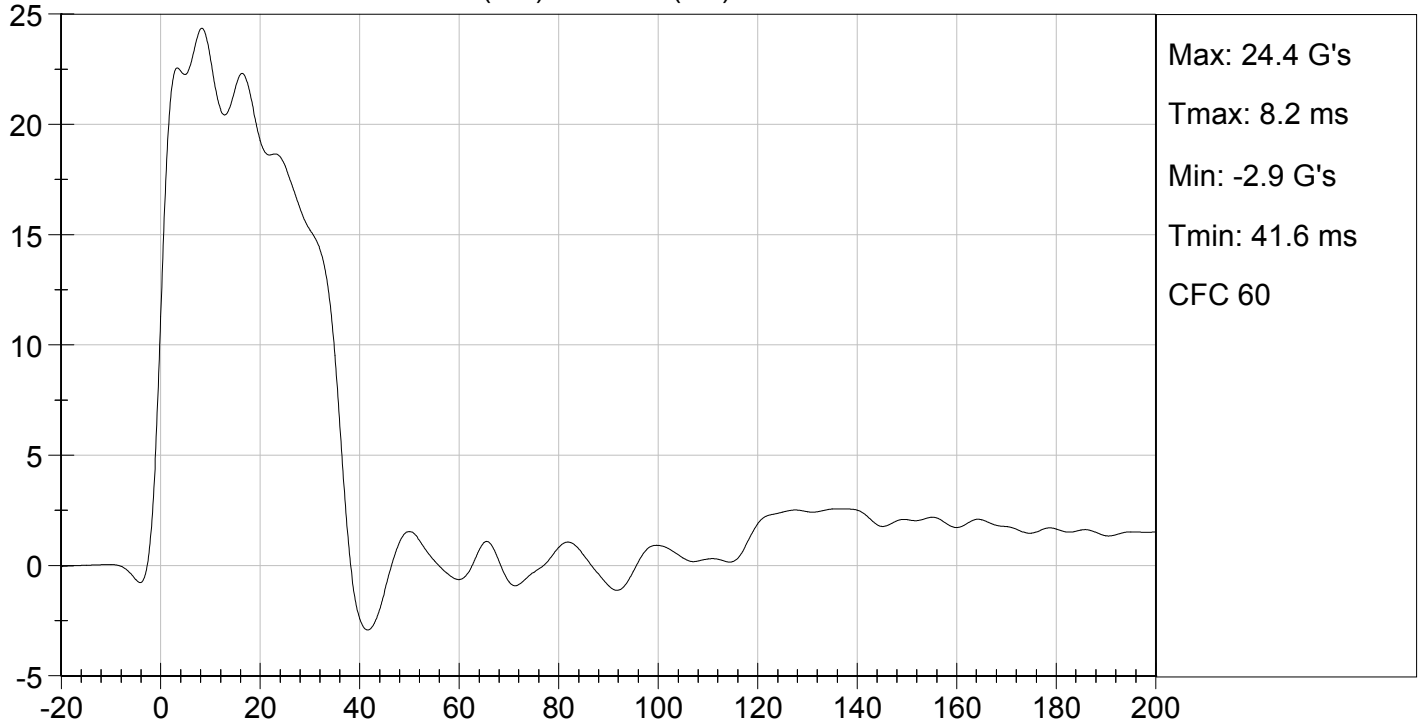
01/28/2014
Test Date

David Winkelbauer
Approved By

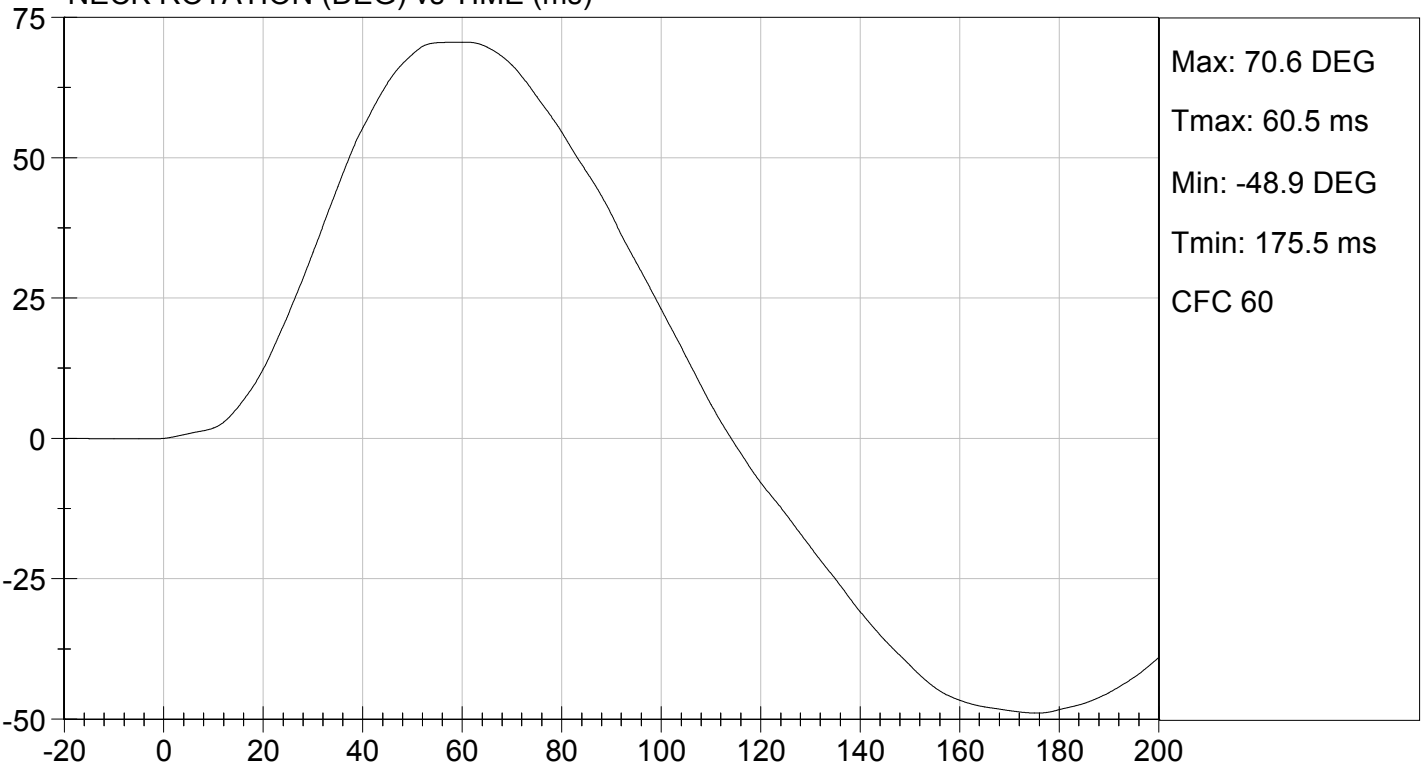
TEST DESC: NECK FLEXION
VELOCITY: 23.40 ft/s, 7.13 m/s

TEST DATE: 01/28/2014
TEST #: D14262

PENDULUM DECELERATION (G's) vs TIME (ms)



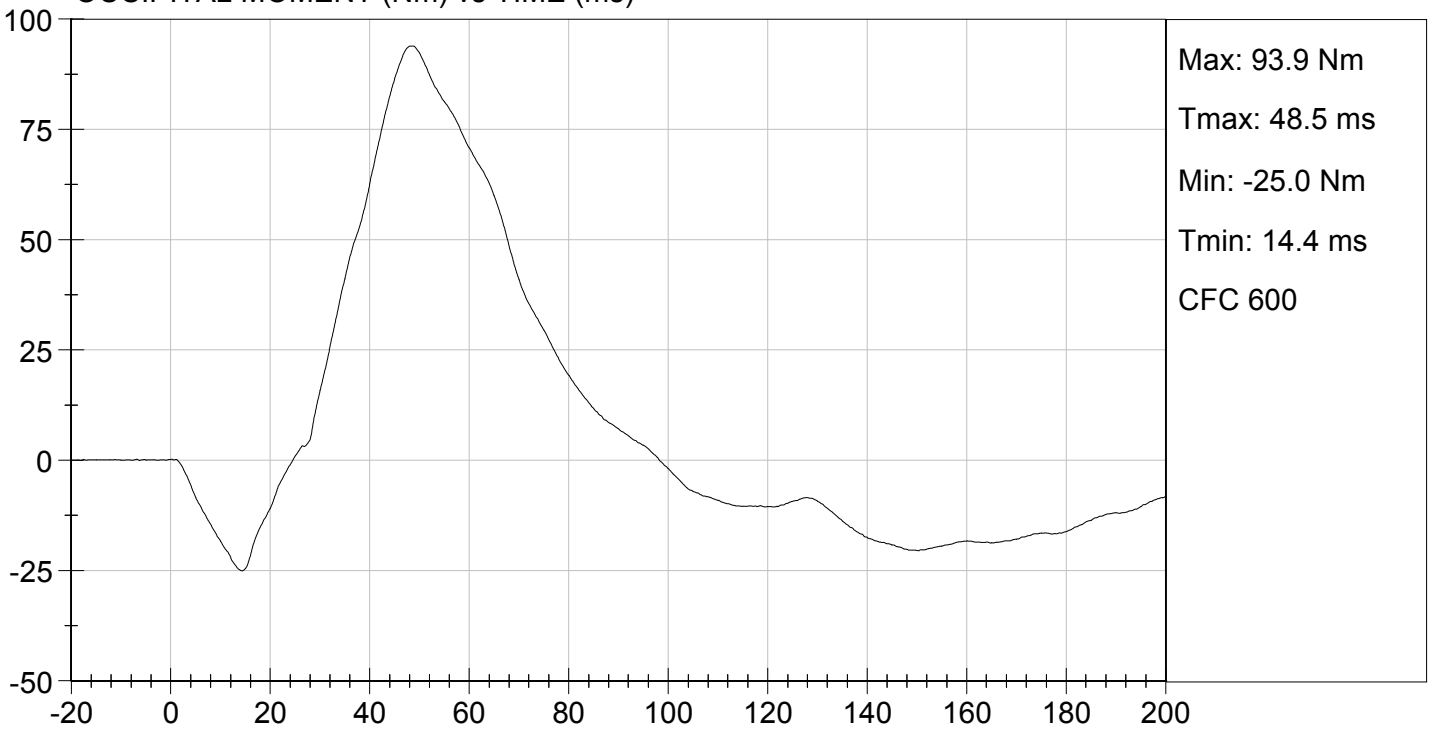
NECK ROTATION (DEG) vs TIME (ms)



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

TEST DATE: 01/28/2014
TEST #: D14262

OCCIPITAL MOMENT (Nm) vs TIME (ms)



MGA RESEARCH CORPORATION

NECK EXTENSION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D14263

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	10	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.19	Pass
Pendulum Deceleration	10 ms	G's	17.20 to 21.20	17.28	Pass
	20 ms	G's	14.00 to 19.00	14.84	Pass
	30 ms	G's	11.00 to 16.00	11.24	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	43.4	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	92.8	Pass
	Time	ms	72.0 to 82.0	77.7	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	147.0 to 174.0	156.9	Pass
Moment About Occipital Condyle	Maximum	Nm	-52.9 to -79.9	-55.4	Pass
	Time	ms	65.0 to 79.0	73.0	Pass
Negative Moment Decay Time To Zero Crossing		ms	120.0 to 148.0	145.3	Pass
			Overall Test Results		Pass

Jessica Gall
Laboratory Technician

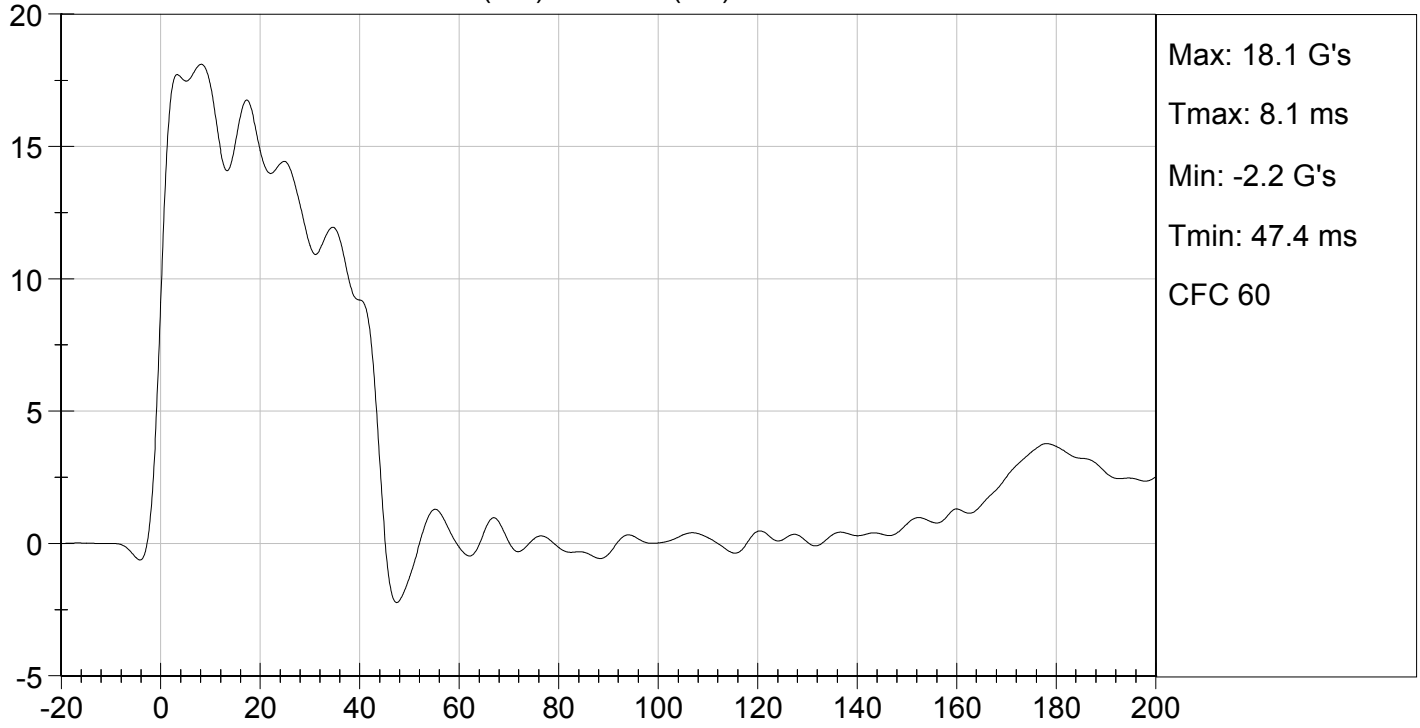
01/28/2014
Test Date

David Winkelbauer
Approved By

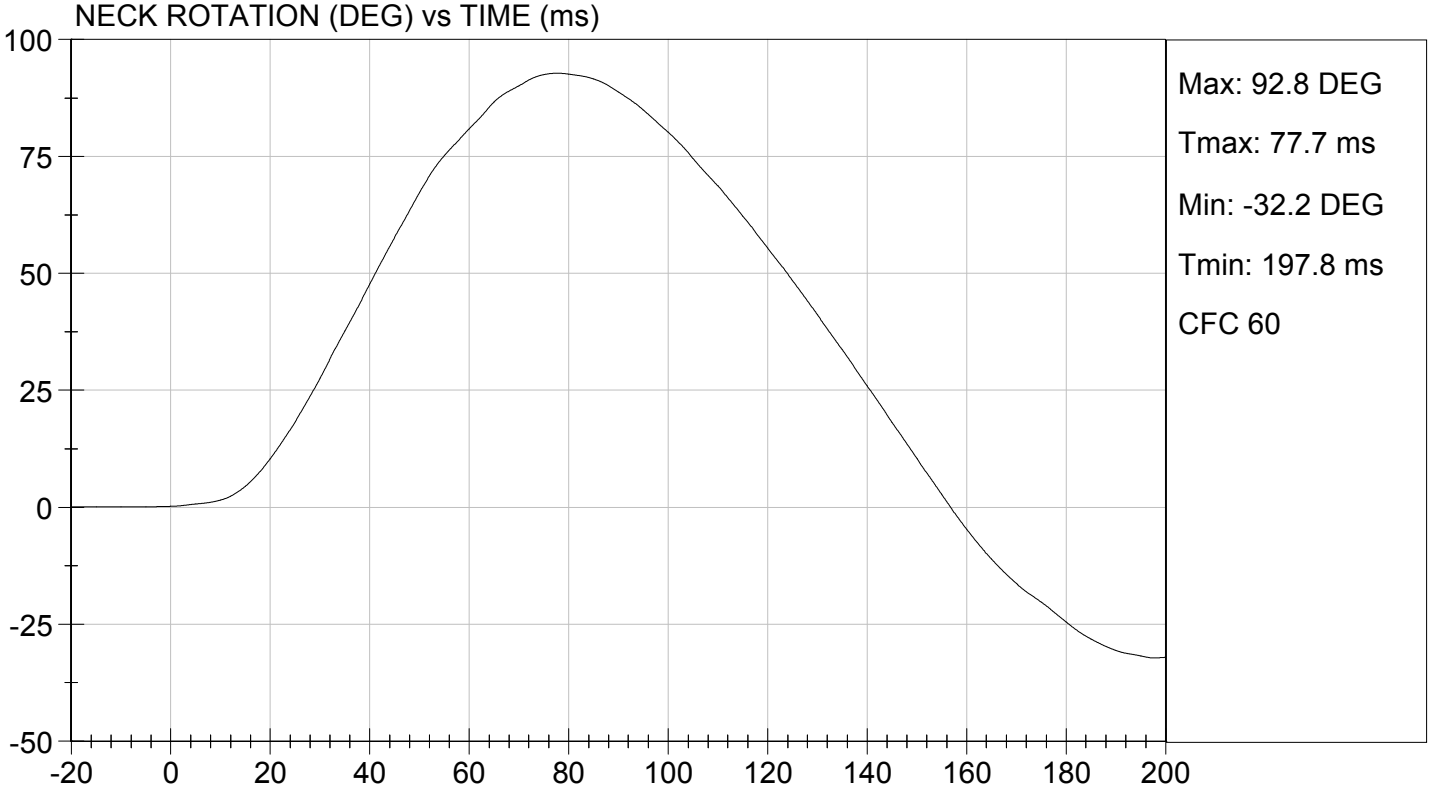
TEST DESC: NECK EXTENSION
VELOCITY: 20.30 ft/s, 6.19 m/s

TEST DATE: 01/28/2014
TEST #: D14263

PENDULUM DECELERATION (G's) vs TIME (ms)

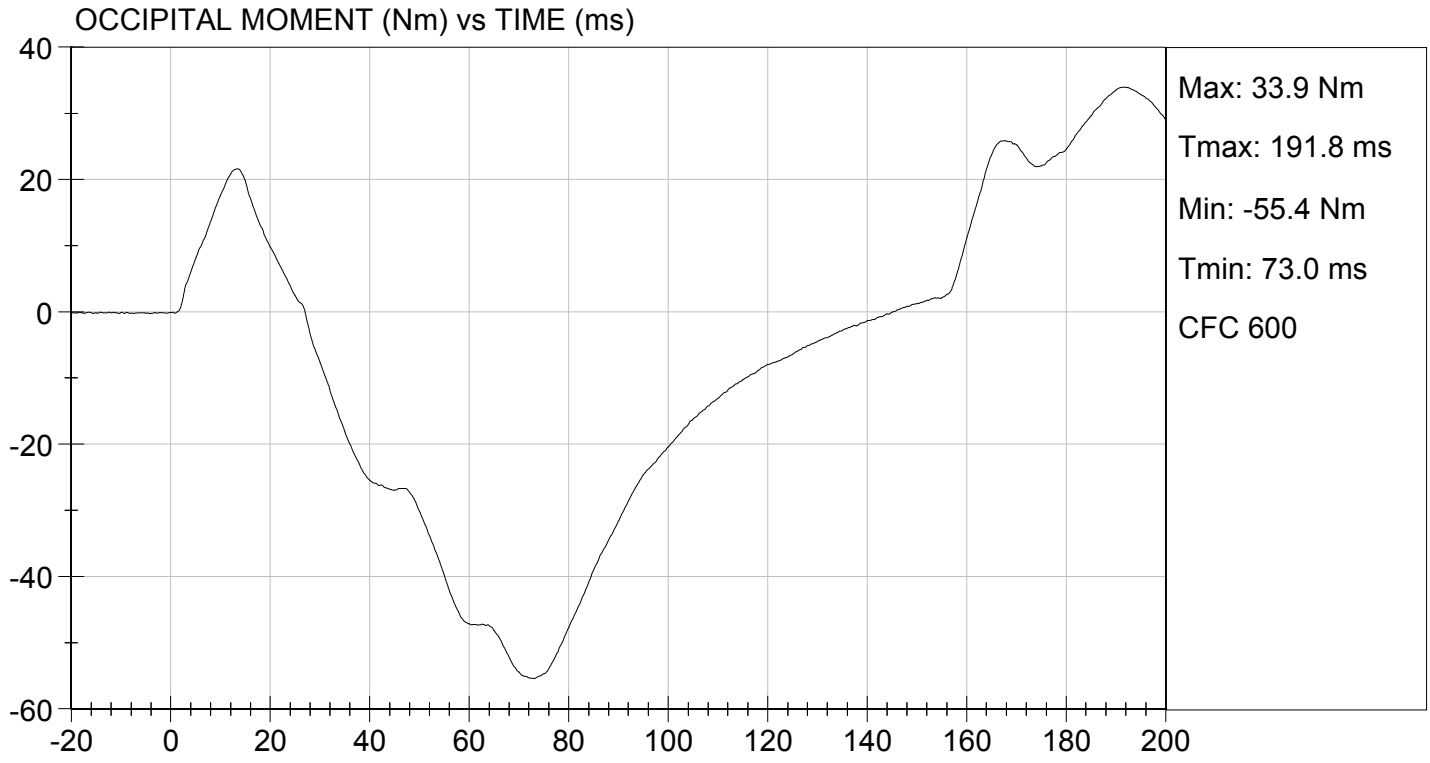


NECK ROTATION (DEG) vs TIME (ms)



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

TEST DATE: 01/28/2014
TEST #: D14263



MGA RESEARCH CORPORATION

THORAX IMPACT

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D14264

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	10	Pass
Probe Velocity	m/s	6.58 to 6.82	6.68	Pass
Peak Probe Force	N	5159 to 5893	5,359	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.49	Pass
Internal Hysteresis	%	69 to 85	70	Pass
		Overall Test Results		Pass

Jessica Gall
Laboratory Technician

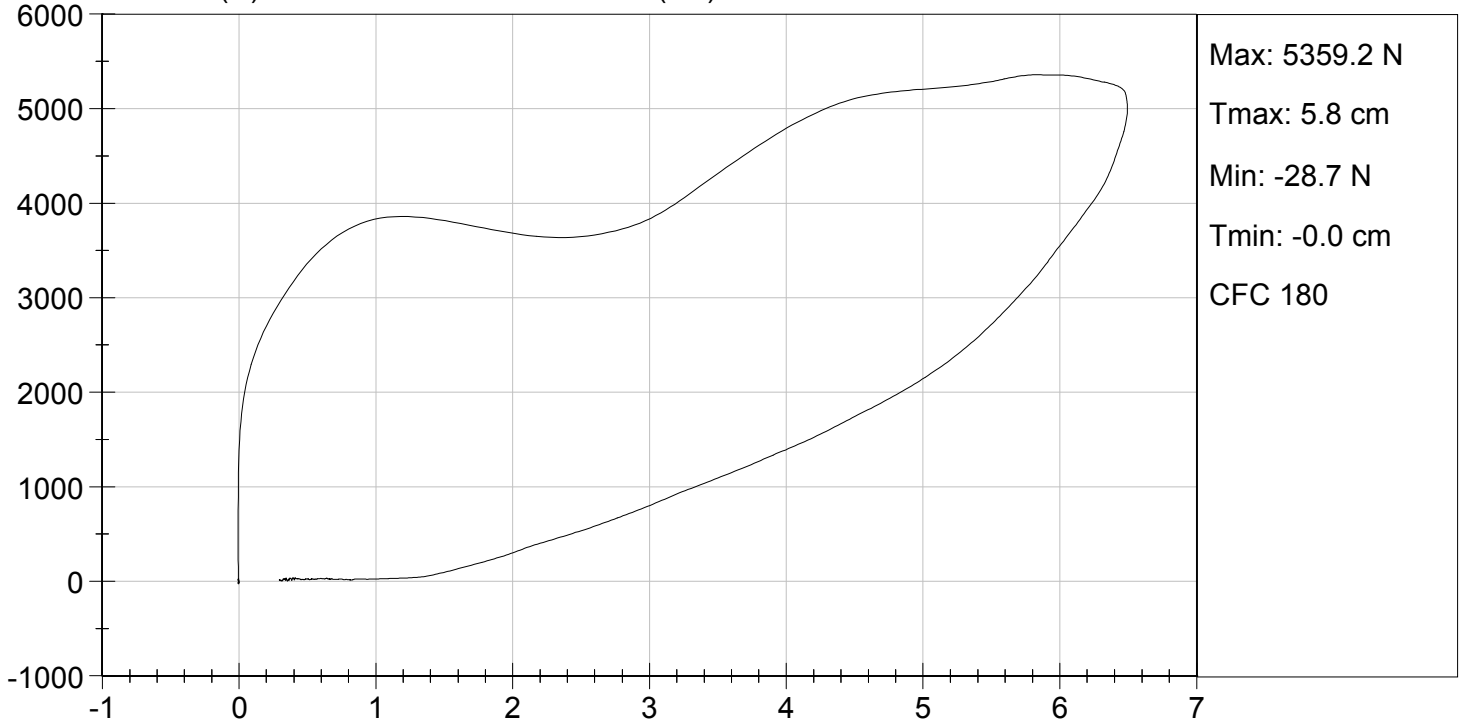
01/28/2014
Test Date

David Winkelbauer
Approved By

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

TEST DATE: 01/28/2014
TEST #: D14264

FORCE (N) vs CHEST DISPLACEMENT (cm)



MGA RESEARCH CORPORATION

RIGHT KNEE IMPACT TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D14265

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	11	Pass
Probe Velocity	m/s	2.07 to 2.13	2.09	Pass
Peak Probe Force	N	4715 to 5782	5,135	Pass
		Overall Test Results		Pass

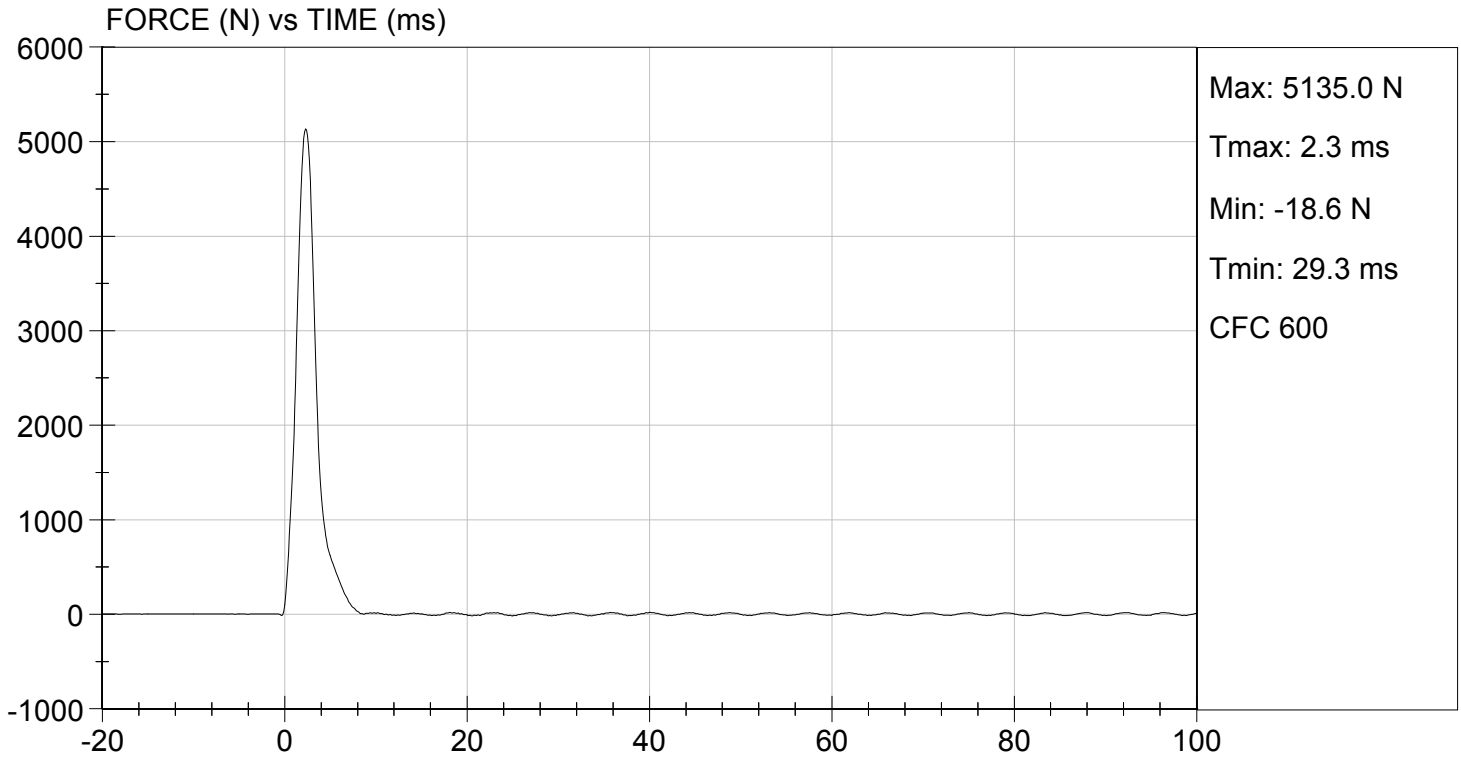
Jessica Hall
Laboratory Technician

01/28/2014
Test Date

David Winkelbauer
Approved By

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

TEST DATE: 01/28/2014
TEST #: D14265



MGA RESEARCH CORPORATION

LEFT KNEE IMPACT TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D14266

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	11	Pass
Probe Velocity	m/s	2.07 to 2.13	2.09	Pass
Peak Probe Force	N	4715 to 5782	5,289	Pass
		Overall Test Results		Pass

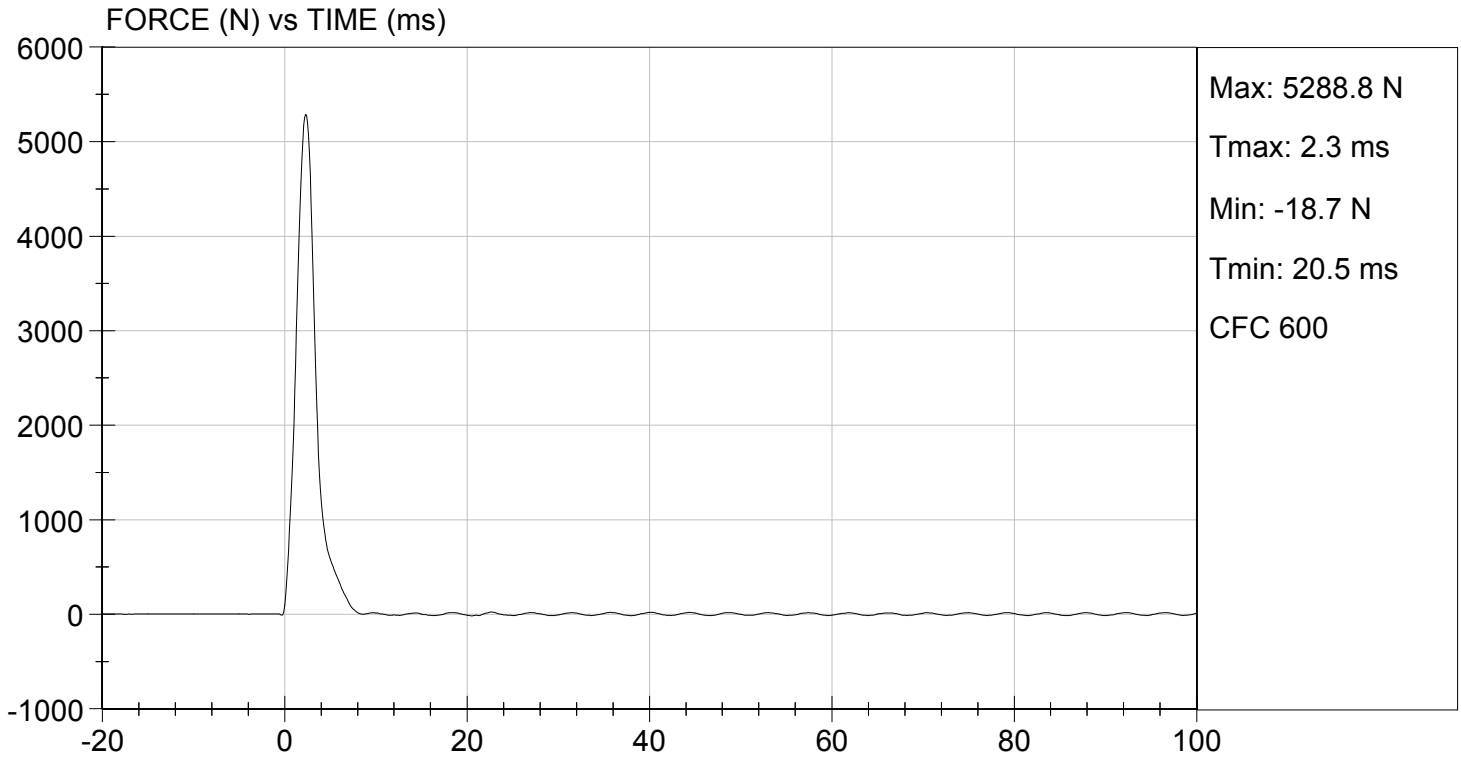
Jessica Hall
Laboratory Technician

01/28/2014
Test Date

David Winkelbauer
Approved By

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

TEST DATE: 01/28/2014
TEST #: D14266



MGA RESEARCH CORPORATION

HIP-FEMUR FLEXION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D14260

Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	21.4	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	10	10	Pass
Rotation Rate	deg/s	5.0 to 10.0	5.9	6.0	Pass
30 Degrees	Nm	94.9 Nm Max	65.4	69.7	Pass
150 ft-lbf / 203.4 Nm	Deg	40.0 to 50.0 Degree Max Rotation	42.1	44.8	Pass
		Overall Test Results			Pass

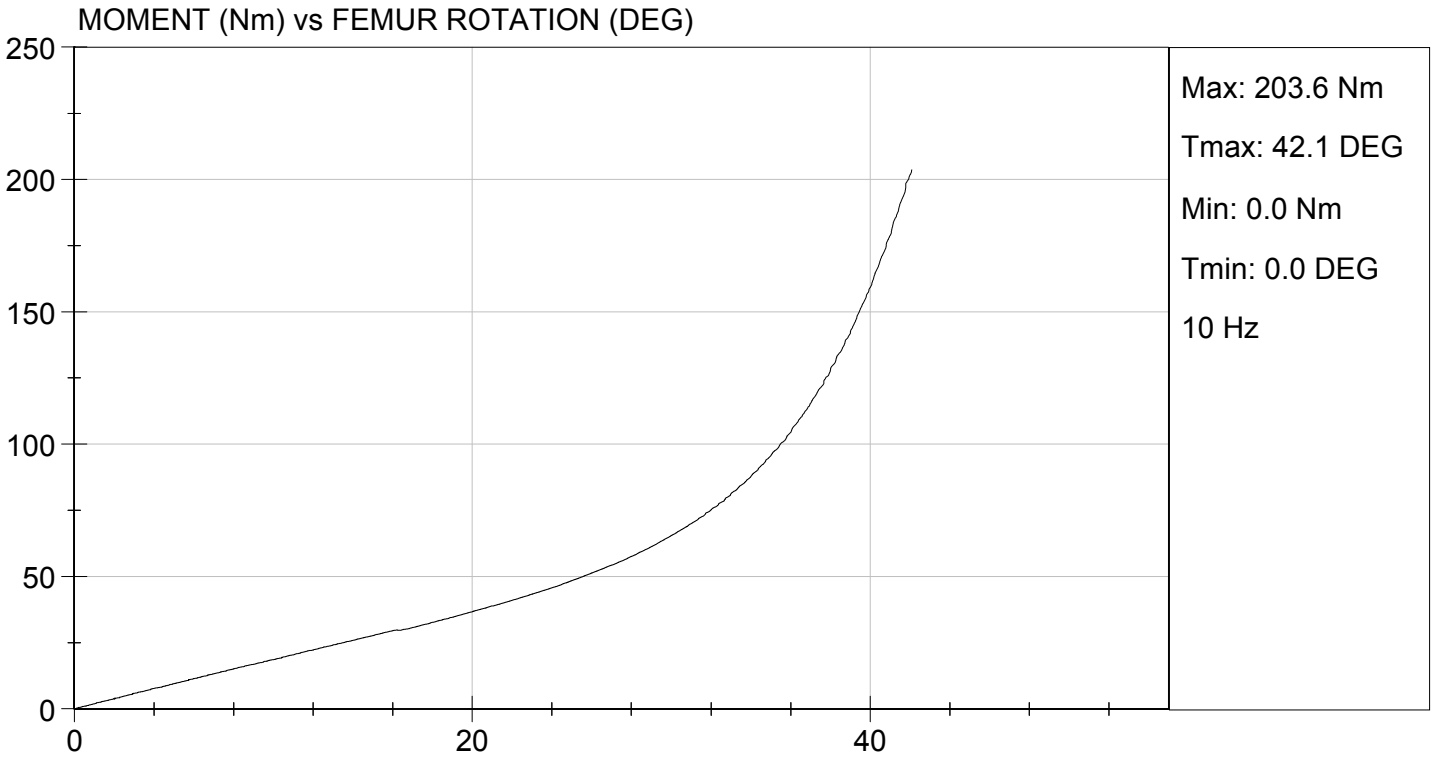
Jessica Gall
Laboratory Technician

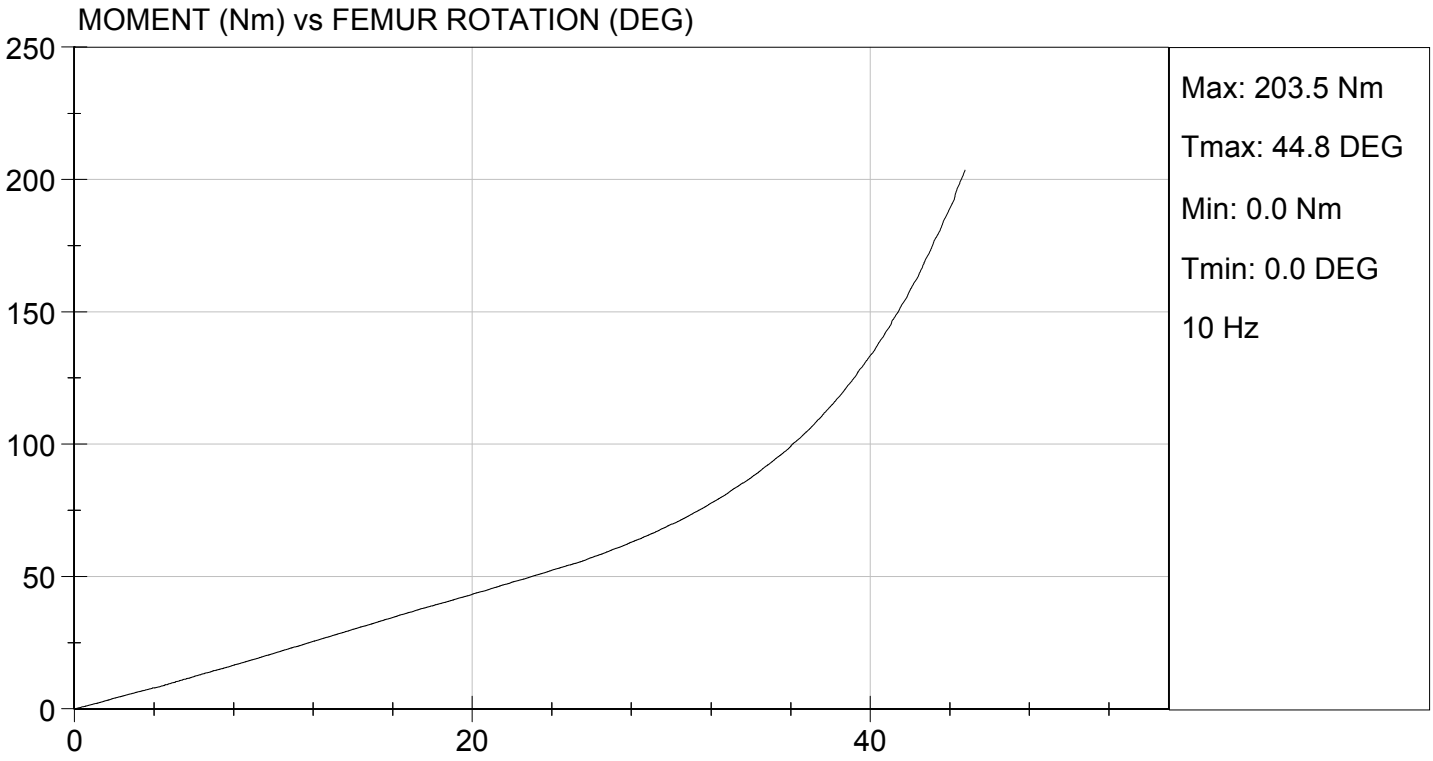
01/28/2014
Test Date

David Winkelbauer
Approved By

TEST DESC: RIGHT HIP FEMUR FLEXION

TEST DATE: 01/28/2014
TEST #: D14269




MOMENT (Nm) vs FEMUR ROTATION (DEG)
250
200
150
100
50
0
0
20
40
Max: 203.5 Nm
Tmax: 44.8 DEG
Min: 0.0 Nm
Tmin: 0.0 DEG
10 Hz

Hybrid III, 5th External Measurements
SN: 634

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

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

MGA RESEARCH CORPORATION

HEAD DROP TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test ID:** D134341

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
Peak Resultant Acceleration	G's	250 to 300	268	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	-8.2	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
		Overall Test Results		Pass

Jessica Gall
Laboratory Technician

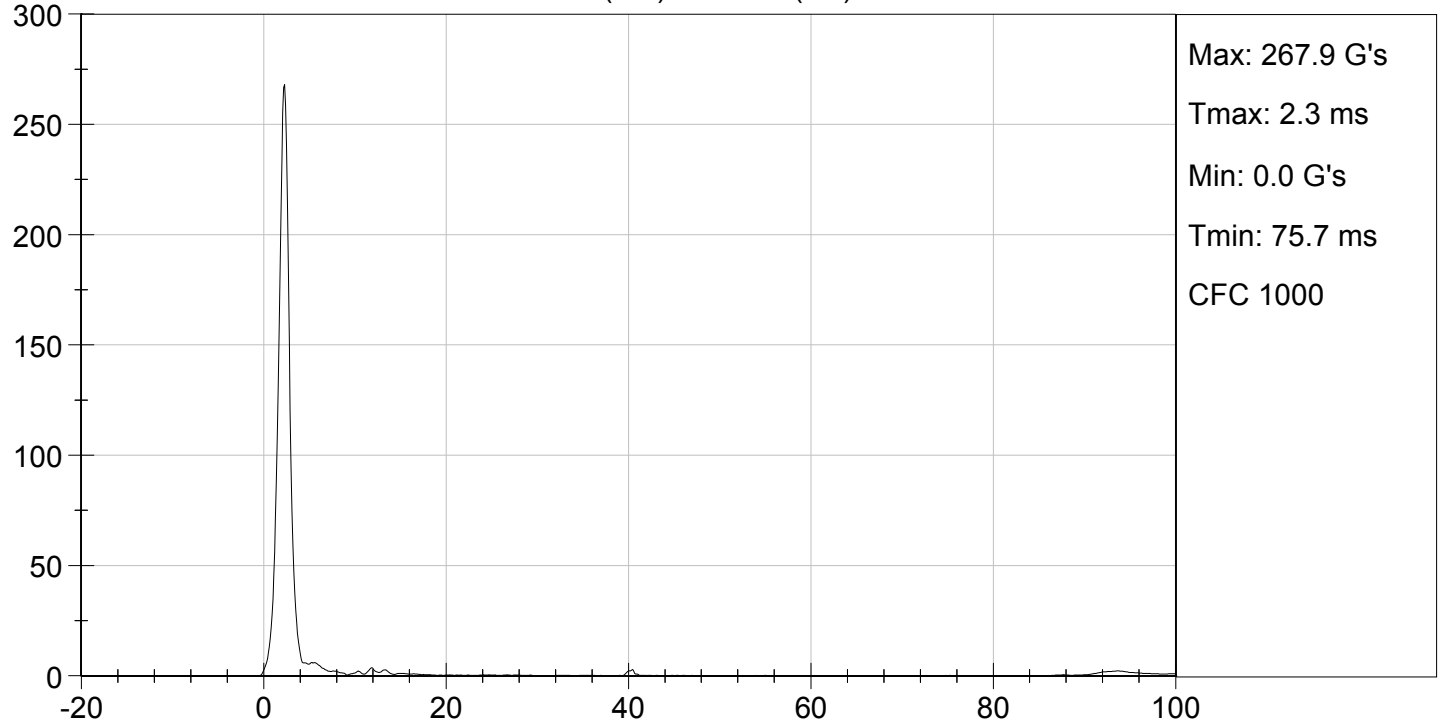
12/18/2013
Test Date

David Winkelbauer
Approved By

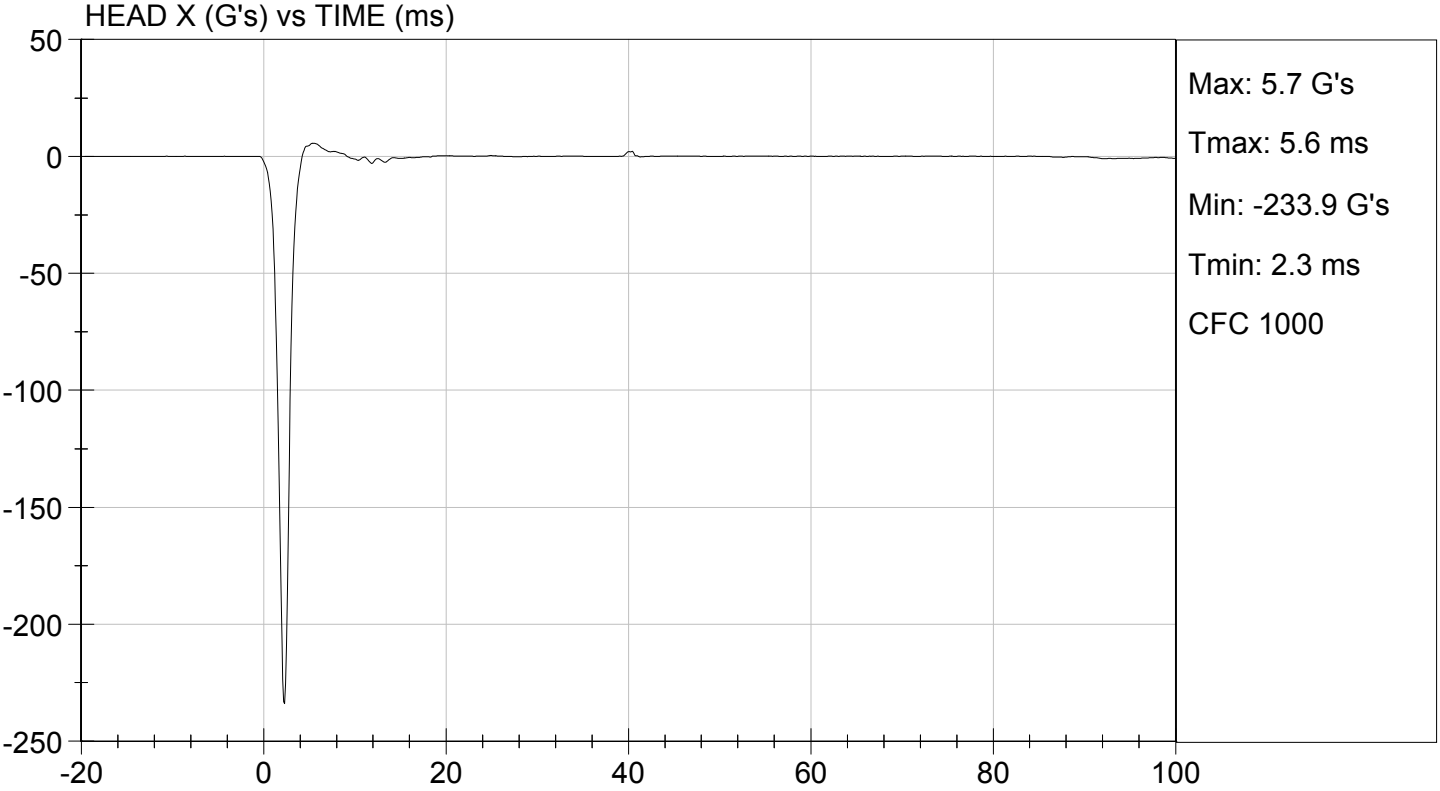
TEST DESC: HEAD DROP

TEST DATE: 12/18/2013
TEST #: D134341

HEAD RESULTANT ACCELERATION (G's) vs TIME (ms)

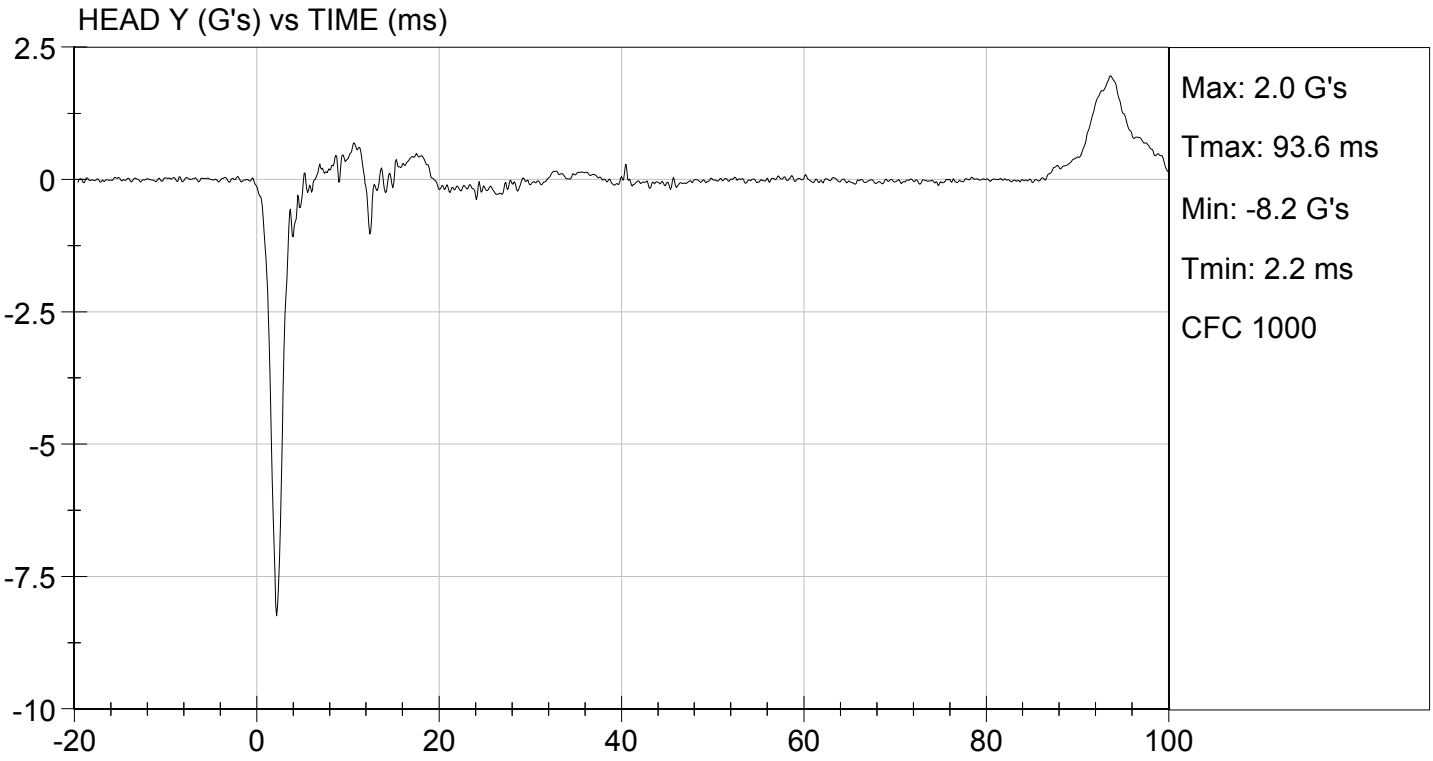


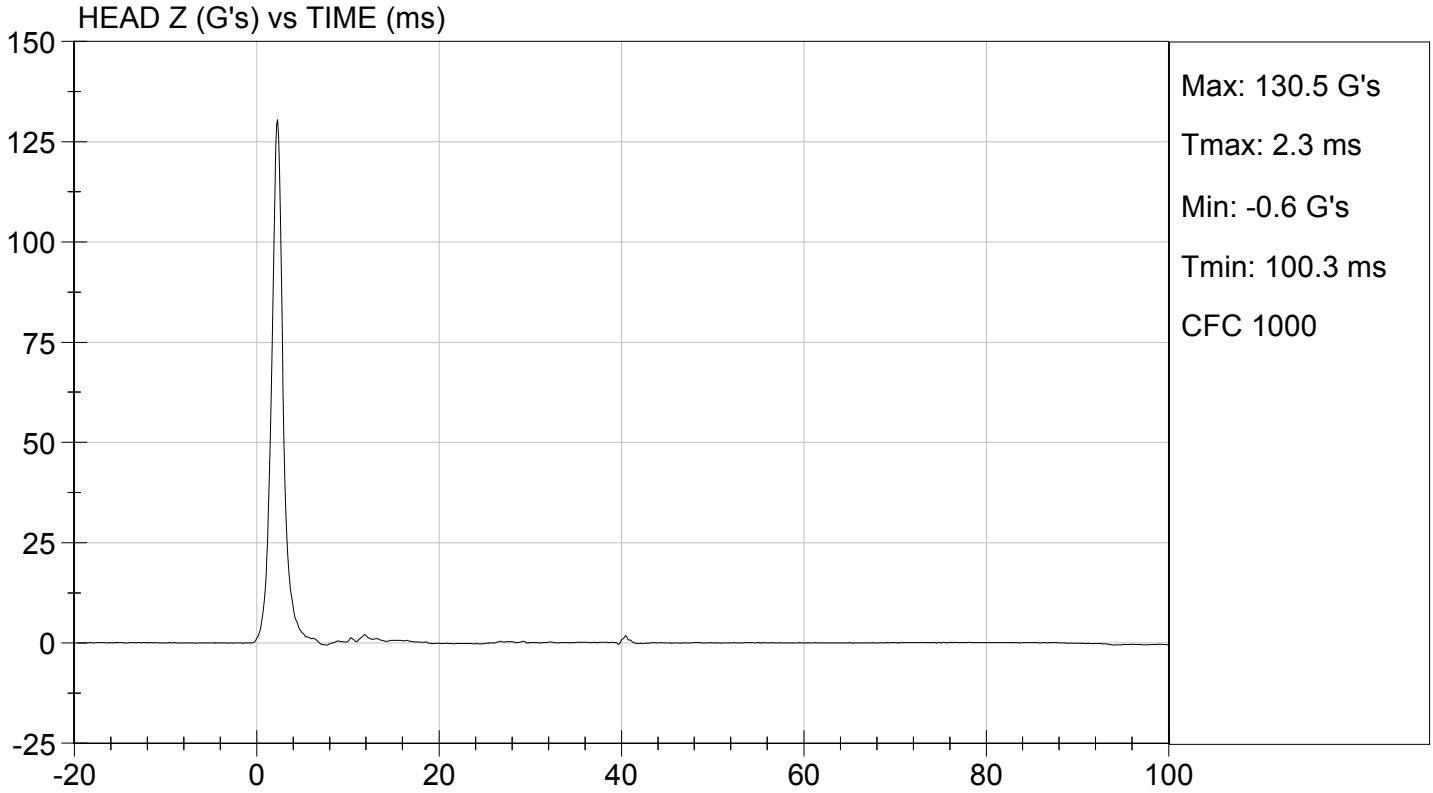
HEAD X (G's) vs TIME (ms)



TEST DESC: HEAD DROP

TEST DATE: 12/18/2013
TEST #: D134341





MGA RESEARCH CORPORATION

NECK FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D134342

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	18	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	6.5	Pass
D Plane Rotation	Max	deg	77 to 91	89	Pass
Occipital Condyle Moment within Rotation Corridor		Nm	69 to 83	73	Pass
Positive Moment Time Curve Decay to 10 Nm		ms	80 to 100	86	Pass
			Overall Results		Pass

Jessica Hall
Laboratory Technician

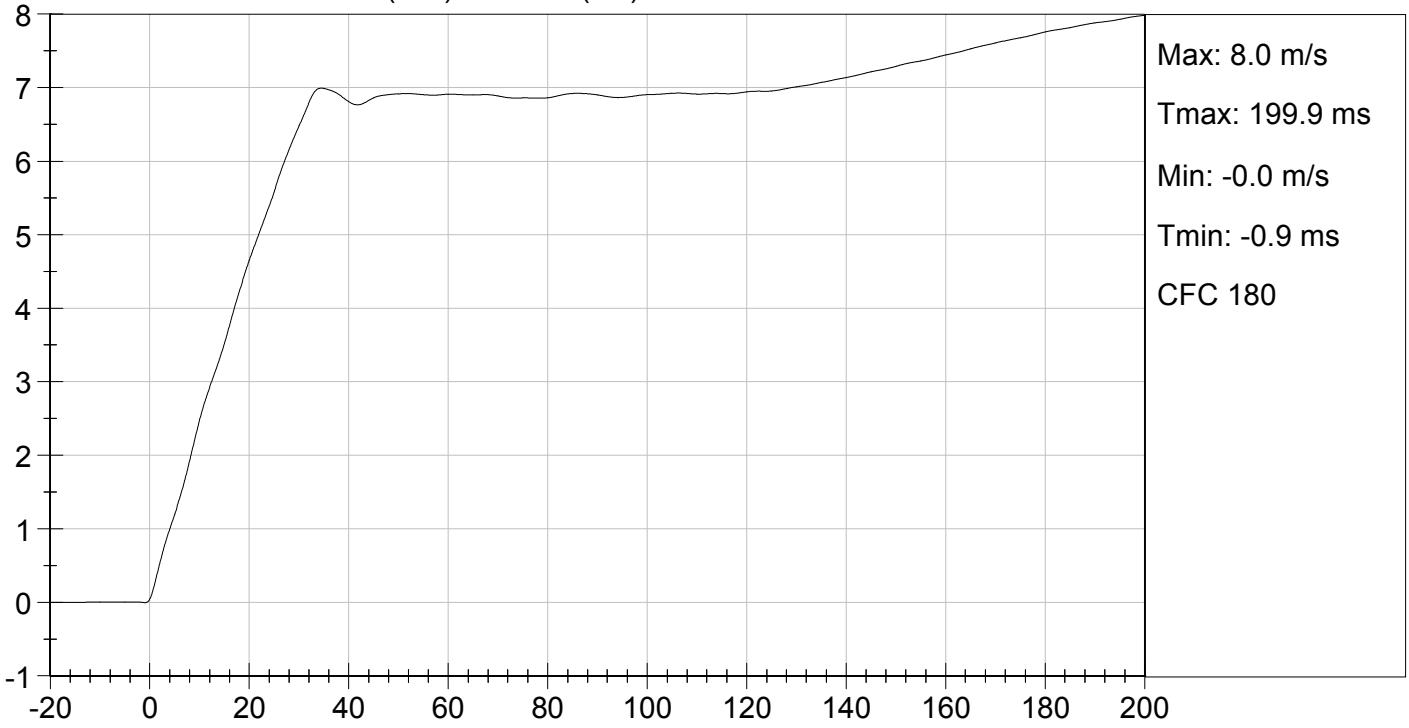
12/18/2013
Test Date

David Winkelbauer
Approved By

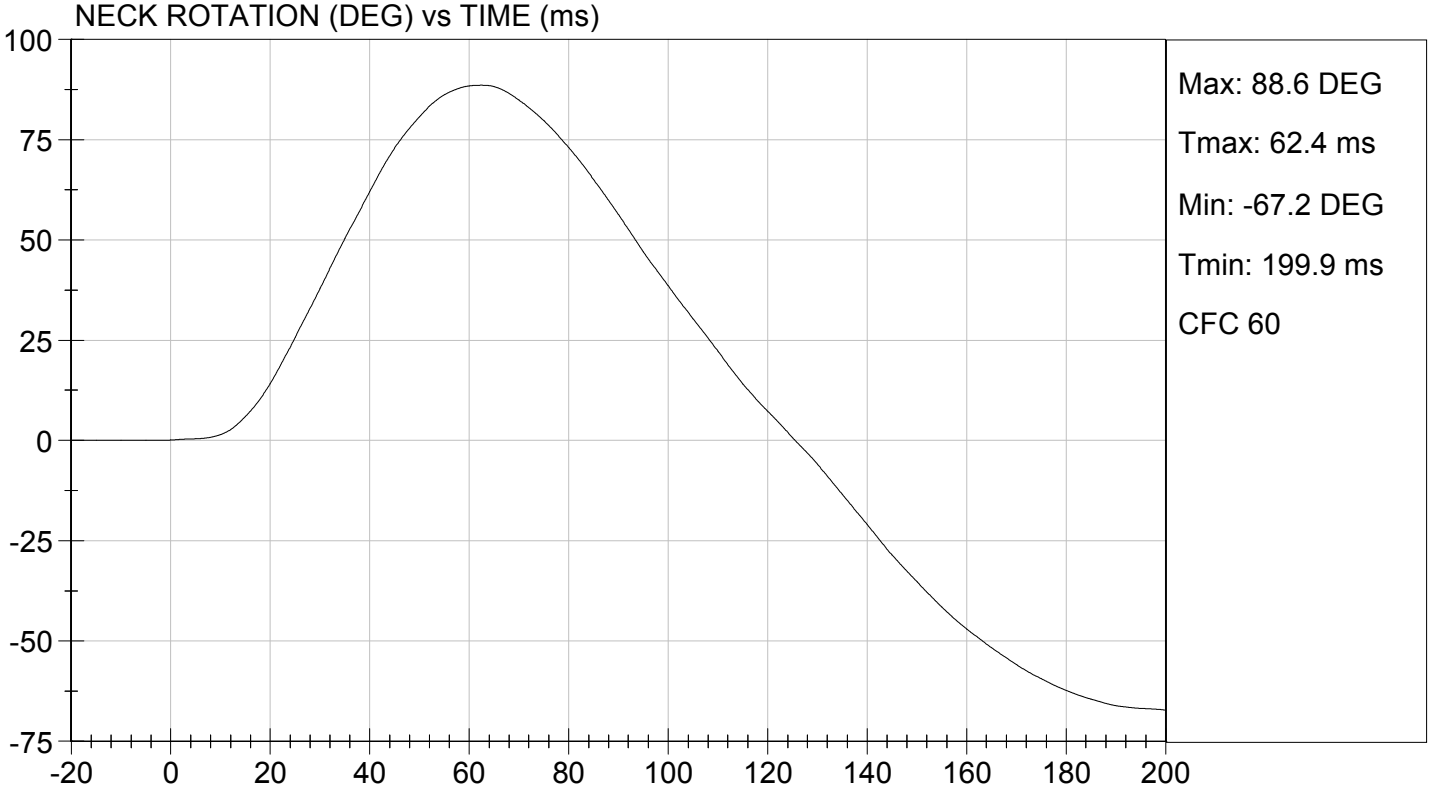
TEST DESC: NECK FLEXION
VELOCITY: 23.40 ft/s, 7.13 m/s

TEST DATE: 12/18/2013
TEST #: D134342

PENDULUM VELOCITY (m/s) vs TIME (ms)

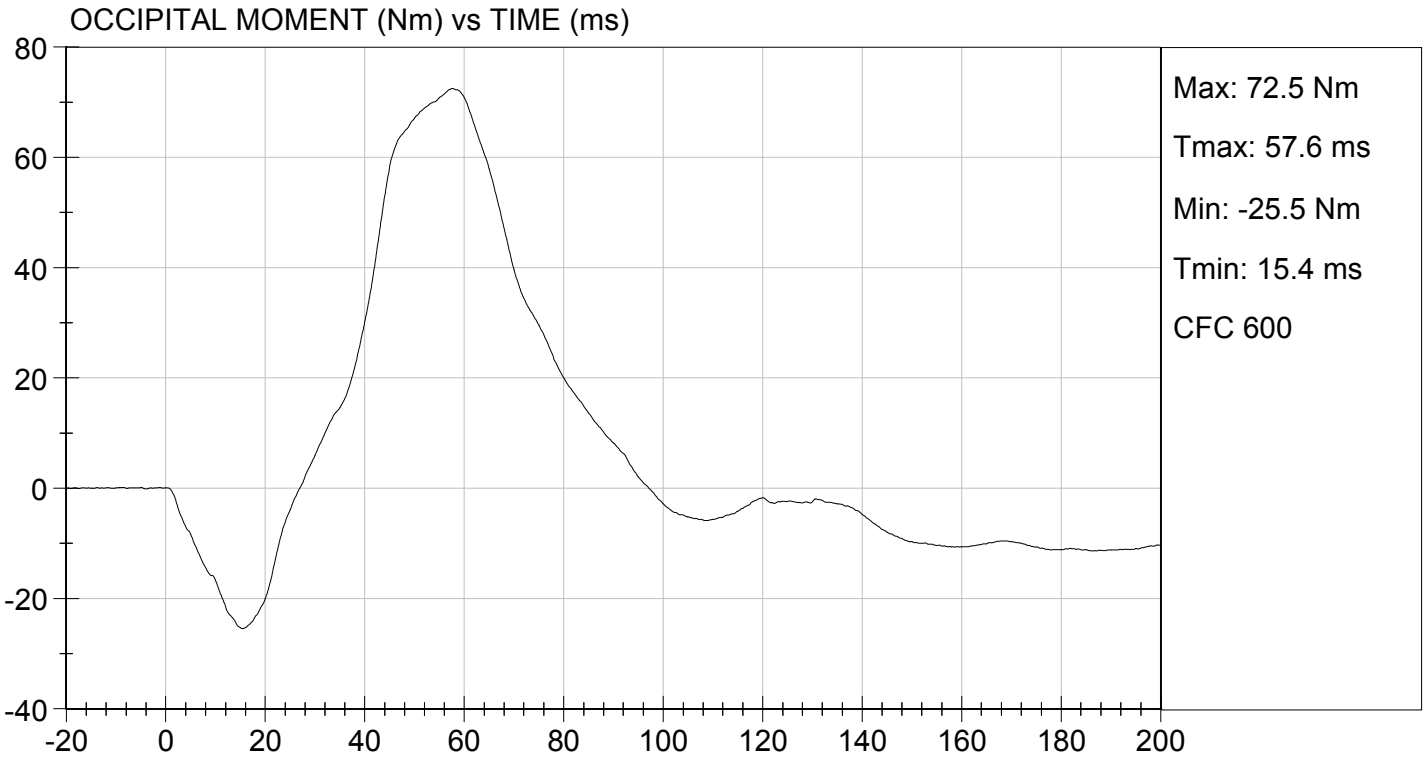


NECK ROTATION (DEG) vs TIME (ms)



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

TEST DATE: 12/18/2013
TEST #: D134342



MGA RESEARCH CORPORATION

NECK EXTENSION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D134343

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	18	Pass
Pendulum Speed		m/s	5.95 to 6.19	6.19	Pass
Pendulum Velocity	10 ms	m/s	1.5 to 1.9	1.8	Pass
	20 ms	m/s	3.1 to 3.9	3.6	Pass
	30 ms	m/s	4.6 to 5.6	5.3	Pass
D Plane Rotation	Max	deg	99 to 114	110	Pass
Occipital Condyle Moment within Rotation Corridor		Nm	-65 to -53	-57	Pass
Negative Moment Time Curve Decay to -10 Nm		ms	94 to 114	96	Pass
			Overall Results		Pass

Jessica Hall
Laboratory Technician

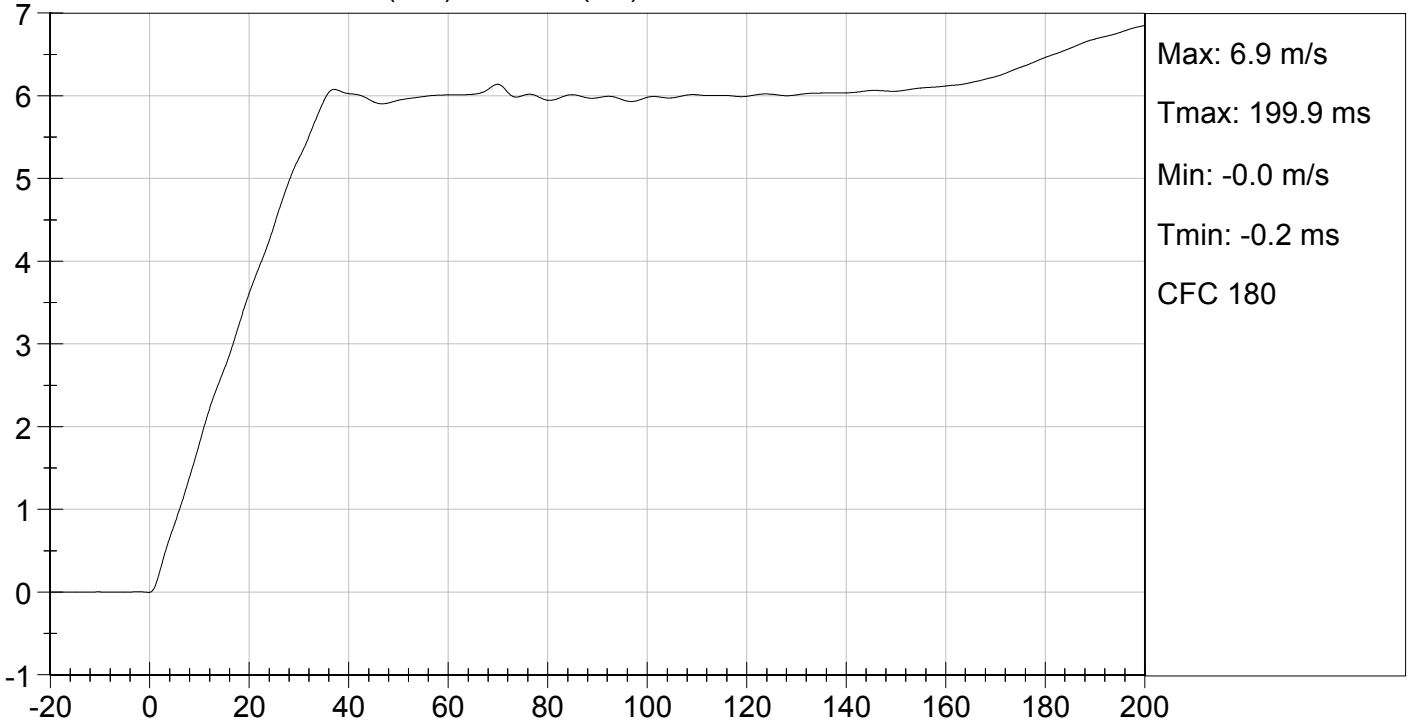
12/18/2013
Test Date

David Winkelbauer
Approved By

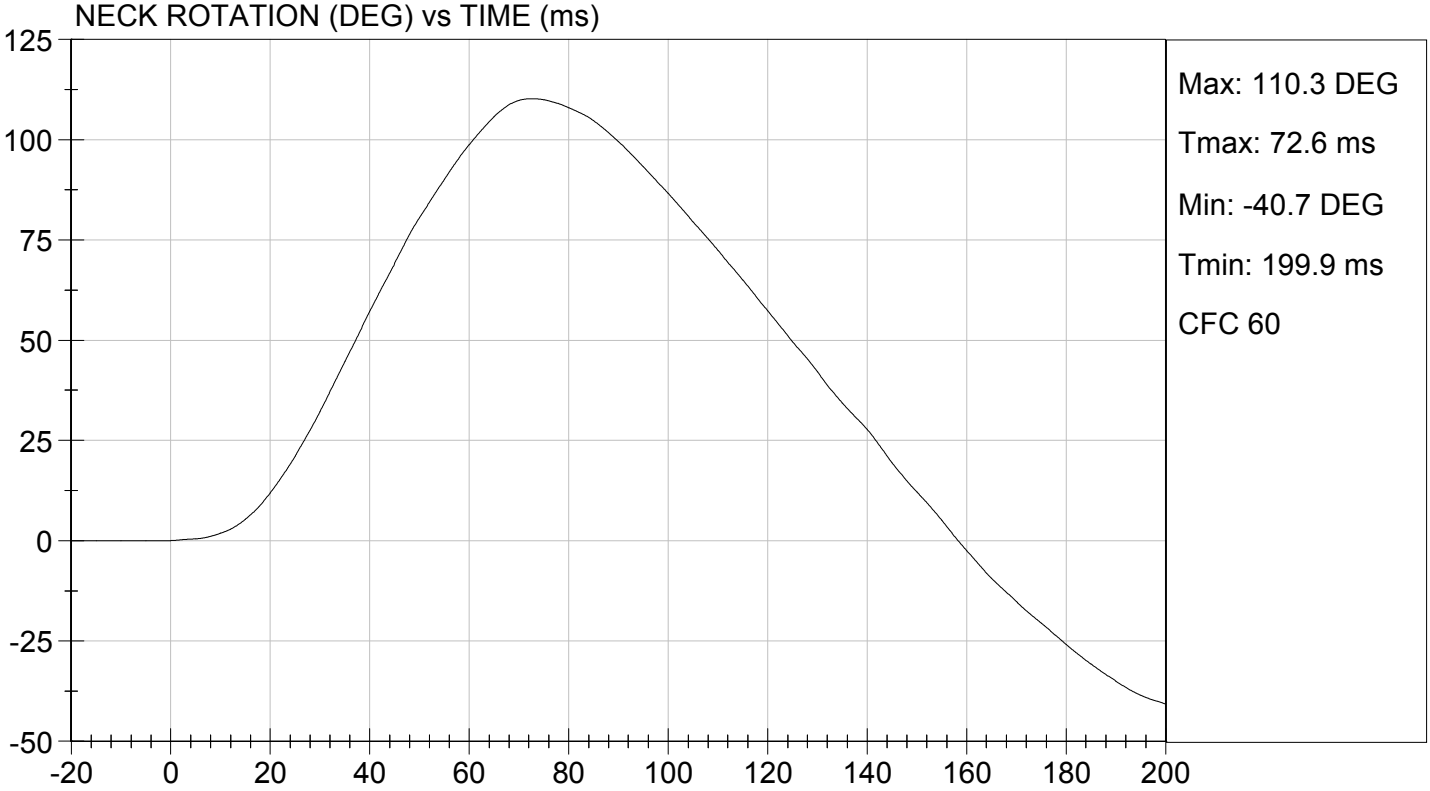
TEST DESC: NECK EXTENSION
VELOCITY: 20.30 ft/s, 6.19 m/s

TEST DATE: 12/18/2013
TEST #: D134343

PENDULUM VELOCITY (m/s) vs TIME (ms)

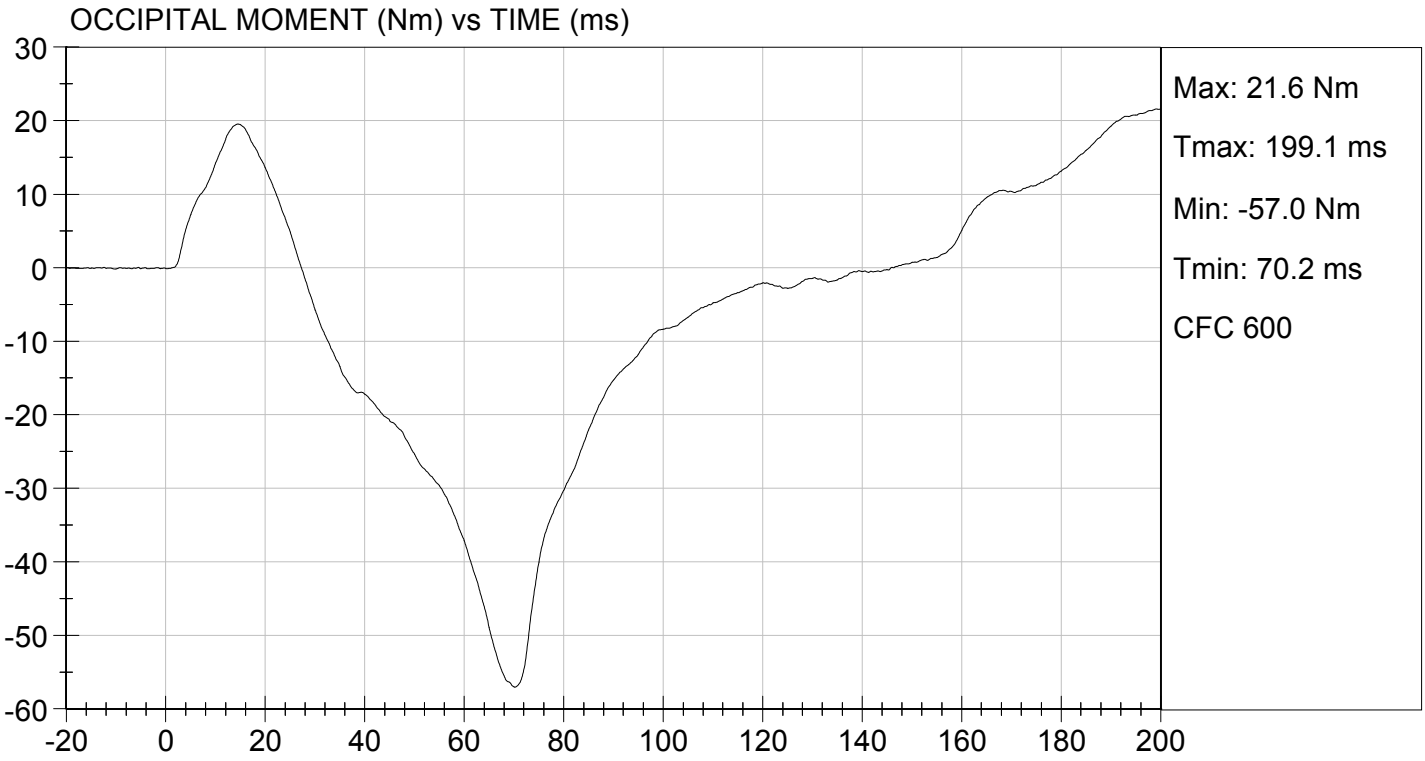


NECK ROTATION (DEG) vs TIME (ms)



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

TEST DATE: 12/18/2013
TEST #: D134343



MGA RESEARCH CORPORATION

THORAX IMPACT

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D134344

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.2	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	50	Pass
Peak Resistive Force w/in Deflection Corridor	N	3900 to 4400	4192	Pass
Internal Hysteresis	%	69 to 85	73	Pass
Peak Force 18 mm - 50 mm	N	<= 4600	4476	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

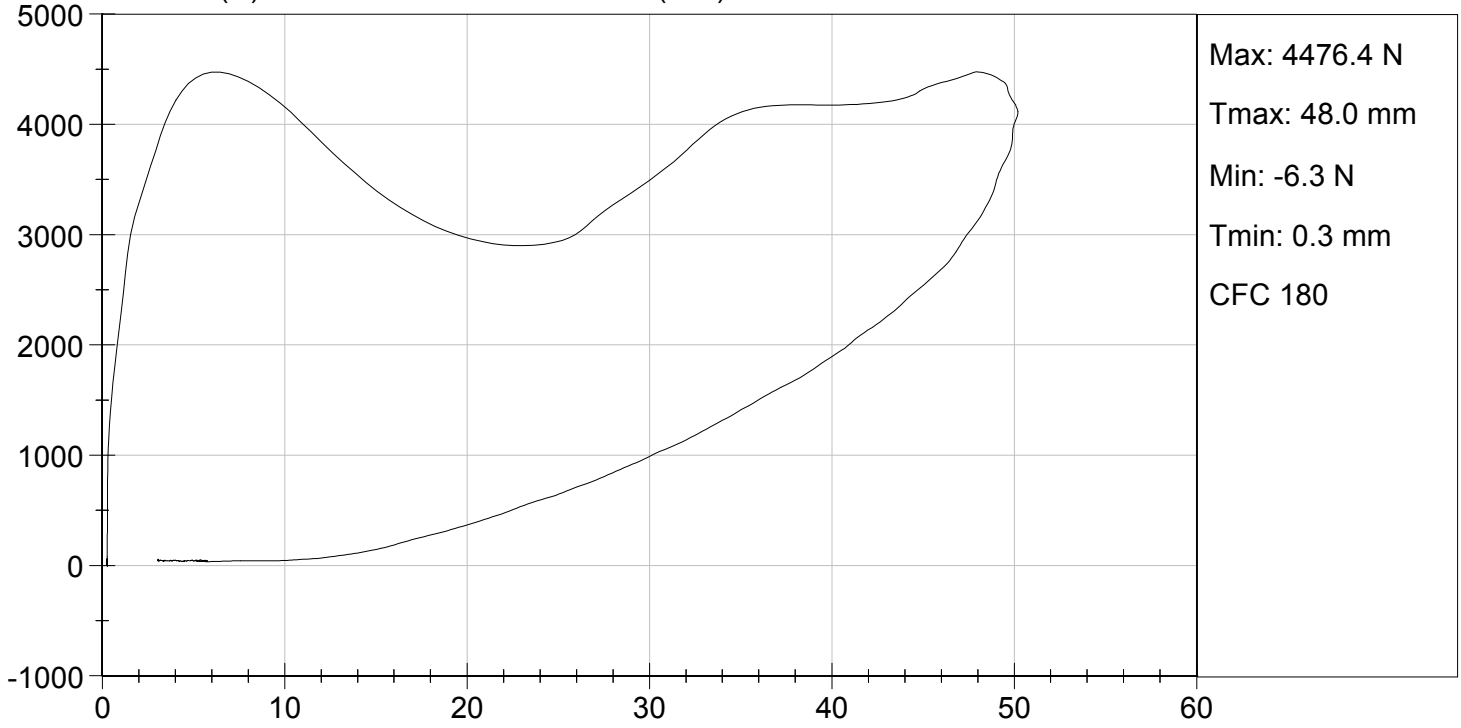
12/18/2013
Test Date

David Winkelbauer
Approved By

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

TEST DATE: 12/18/2013
TEST #: D134344

FORCE (N) vs CHEST DISPLACEMENT (mm)



MGA RESEARCH CORPORATION

RIGHT KNEE IMPACT TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D134345

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	18	Pass
Probe Speed	m/s	2.07 to 2.13	2.13	Pass
Maximum Force	N	3450 to 4060	3792	Pass
		Overall Test Results		Pass

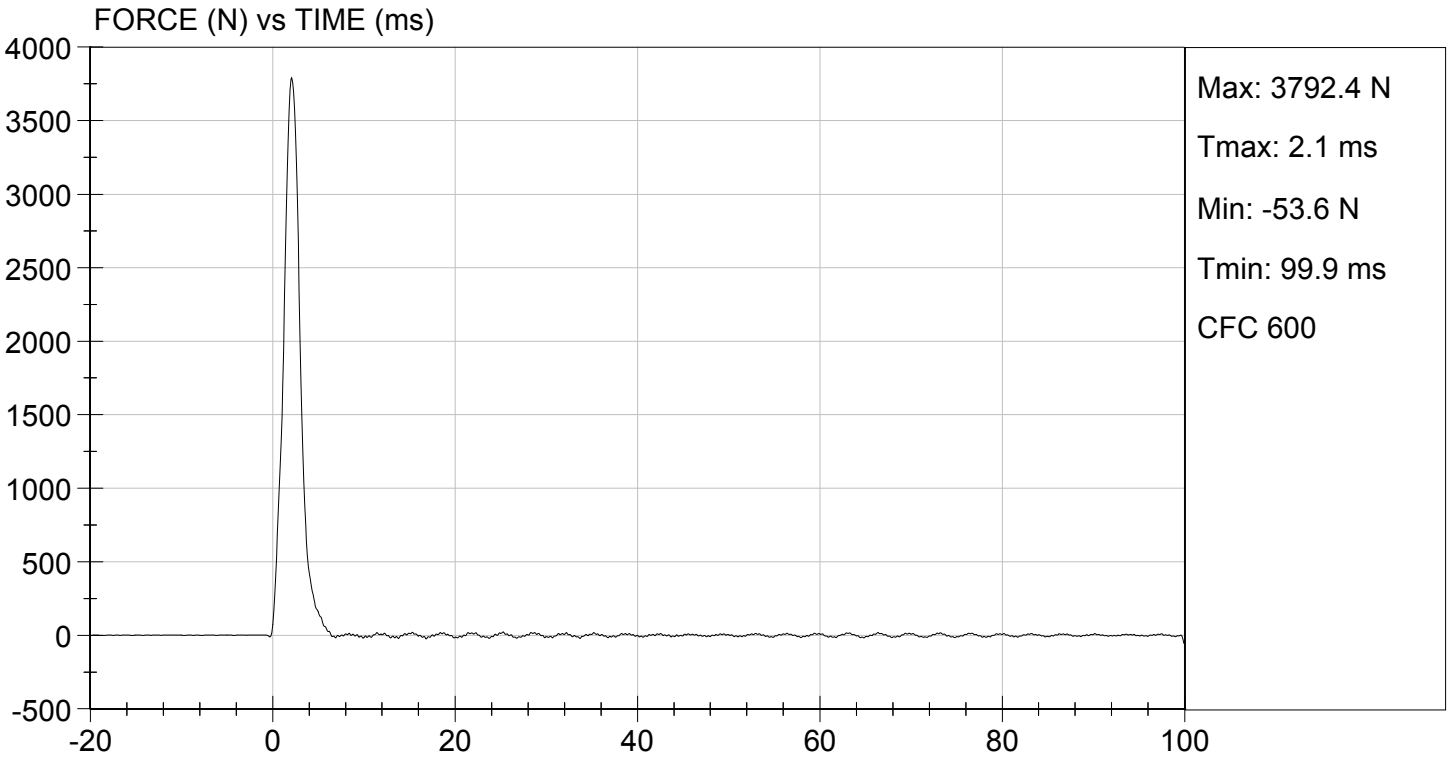
Jessica Hall
Laboratory Technician

12/18/2013
Test Date

David Winkelbauer
Approved By

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

TEST DATE: 12/18/2013
TEST #: D134345



MGA RESEARCH CORPORATION

LEFT KNEE IMPACT TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D134346

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	18	Pass
Probe Speed	m/s	2.07 to 2.13	2.12	Pass
Maximum Force	N	3450 to 4060	3516	Pass
		Overall Test Results		Pass

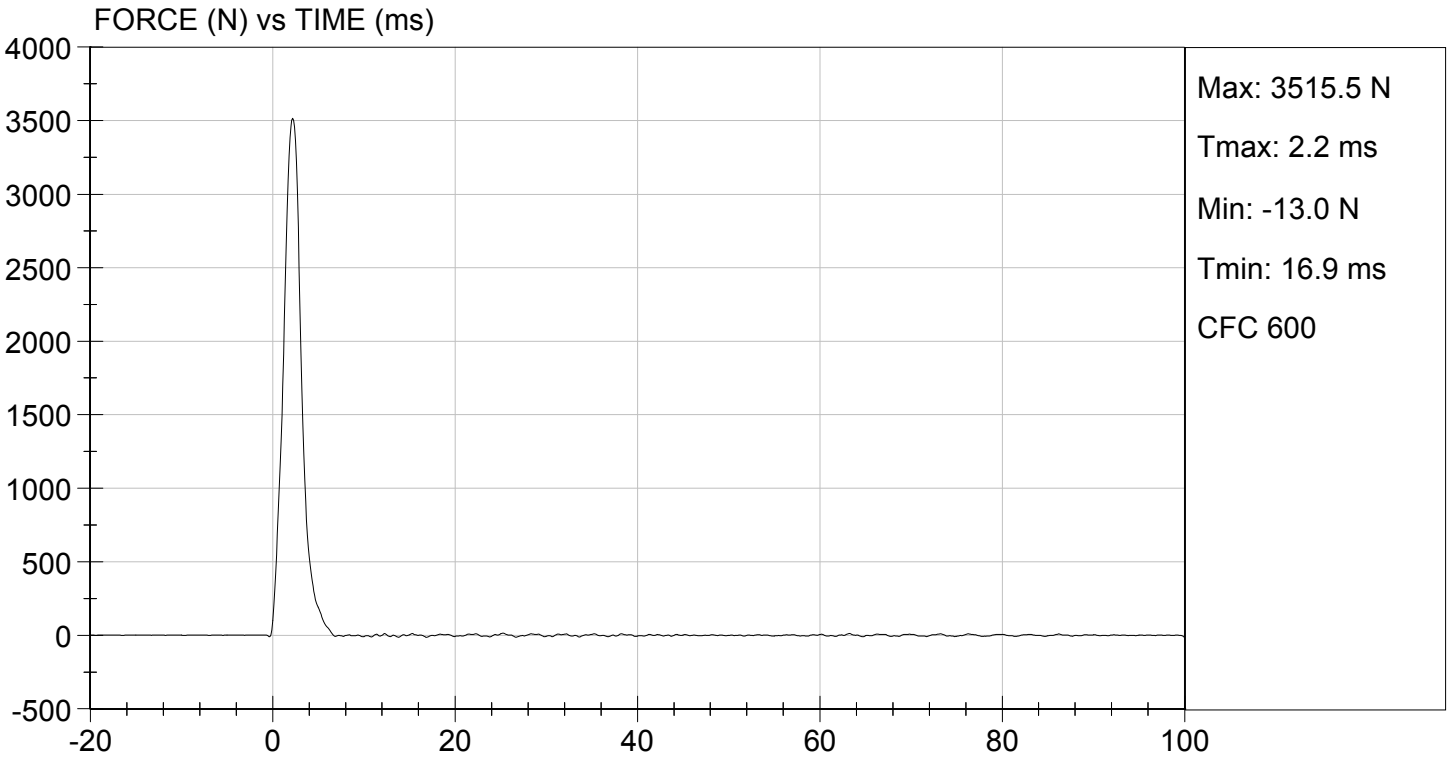
Jessica Hall
Laboratory Technician

12/18/2013
Test Date

David Winkelbauer
Approved By

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

TEST DATE: 12/18/2013
TEST #: D134346



MGA RESEARCH CORPORATION

TORSO FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D134347

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	16	Pass
Return Angle	deg	+/- 8	6	Pass
Force at 45 deg	N	320 to 390	355	Pass
Upper Torso Deflection Rate	deg/s	0.5 to 1.5	0.8	Pass
		Overall Result		Pass

Jessica Gall
Laboratory Technician

12/18/2013
Test Date

David Winkelbauer
Approved By

MGA RESEARCH CORPORATION

HEAD DROP TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test ID:** D14271

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	10	Pass
Peak Resultant Acceleration	G's	250 to 300	259	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	-10.4	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

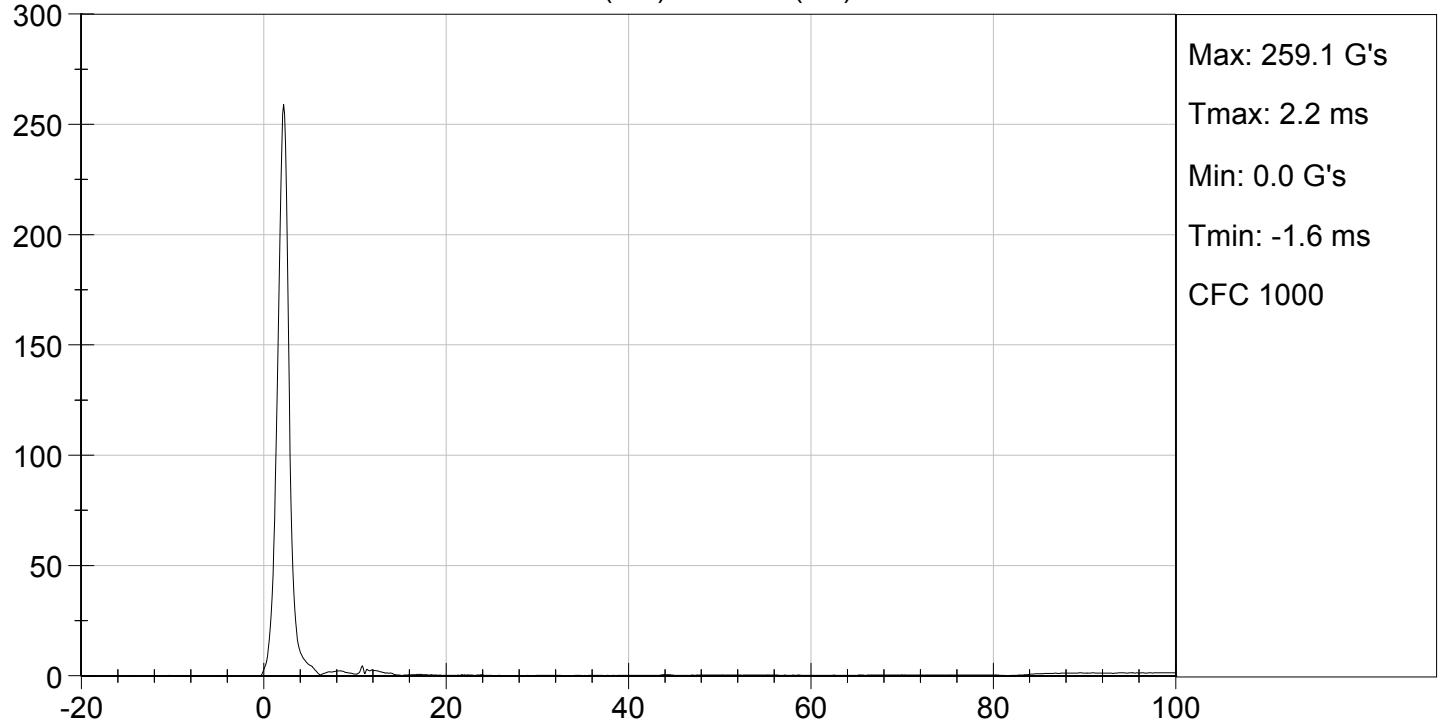
01/28/2014
Test Date

David Winkelbauer
Approved By

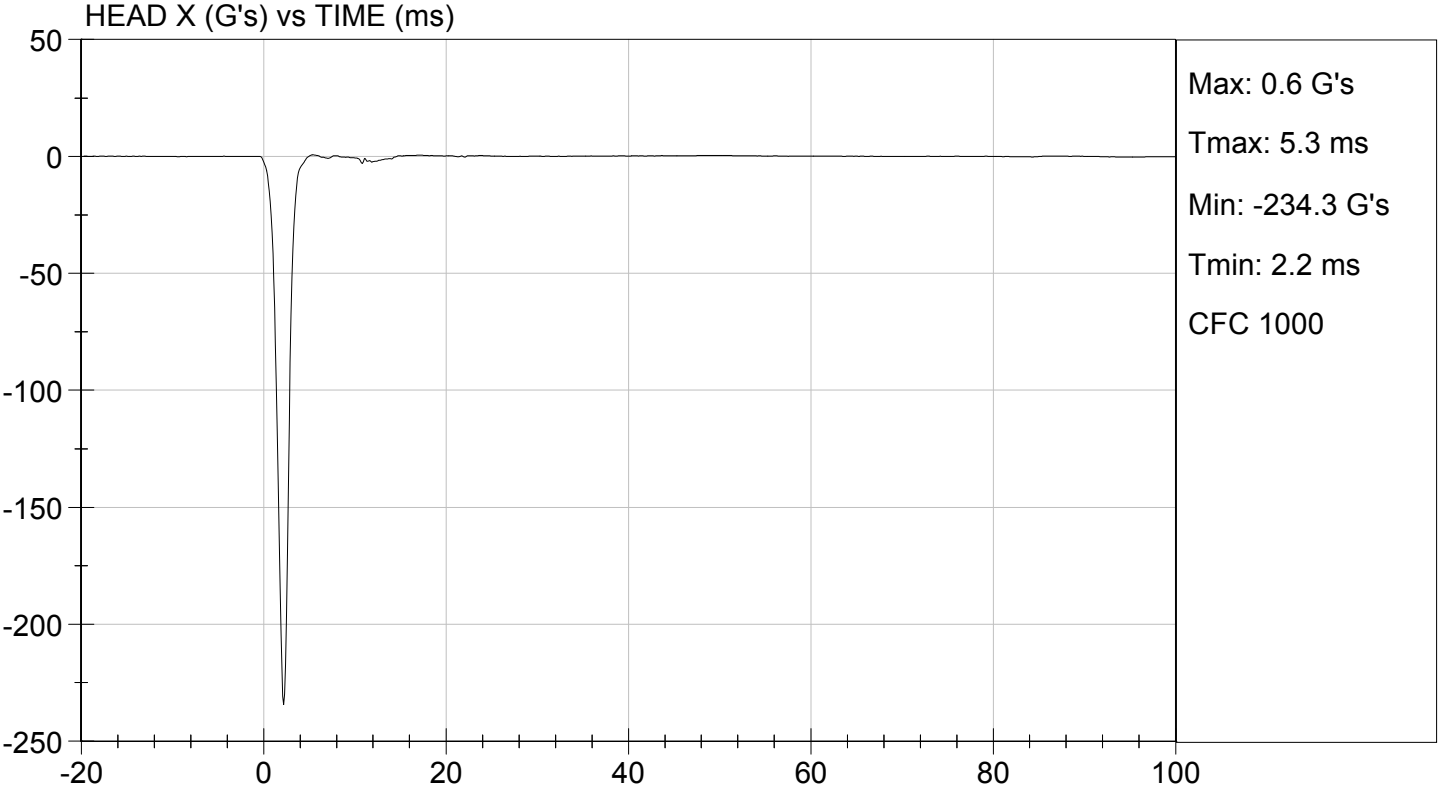
TEST DESC: HEAD DROP

TEST DATE: 01/28/2014
TEST #: D14271

HEAD RESULTANT ACCELERATION (G's) vs TIME (ms)

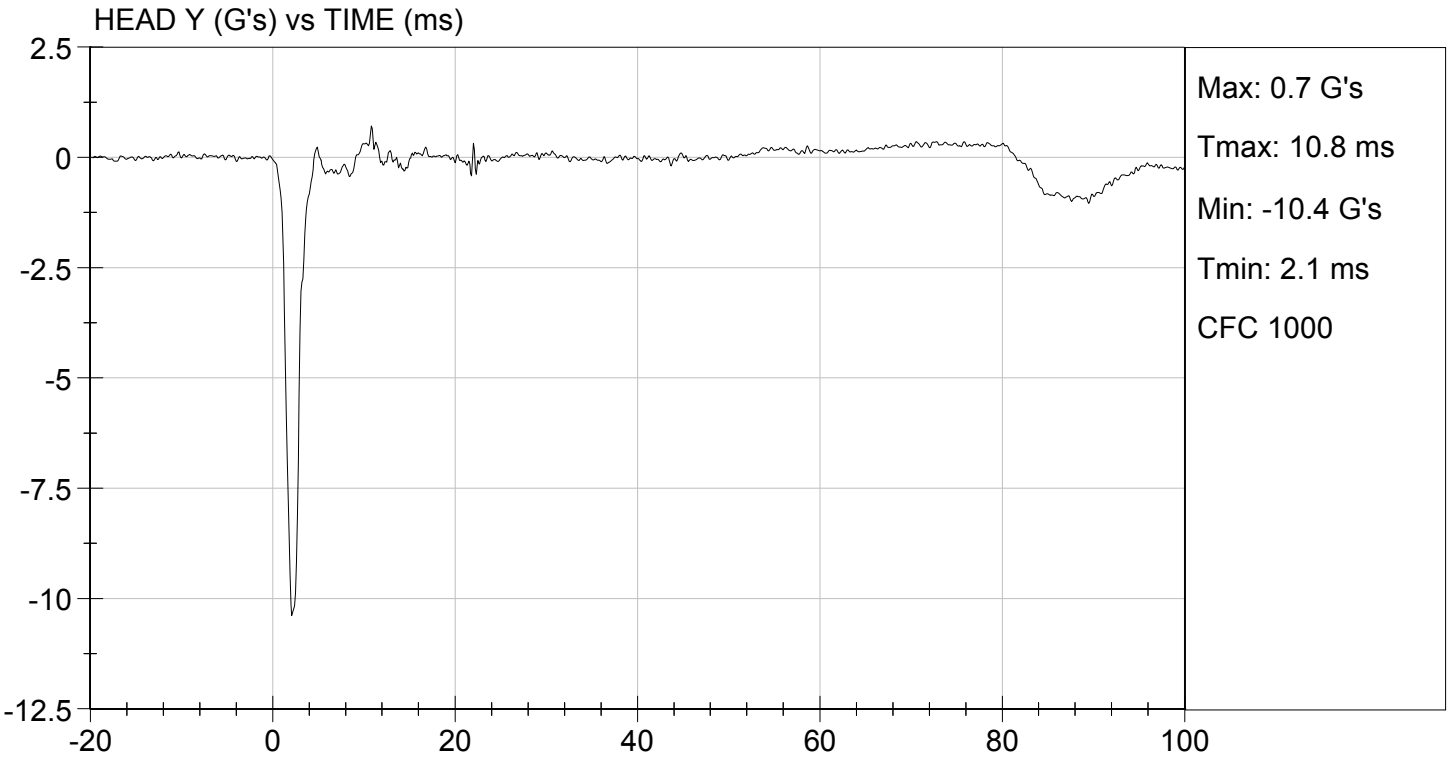


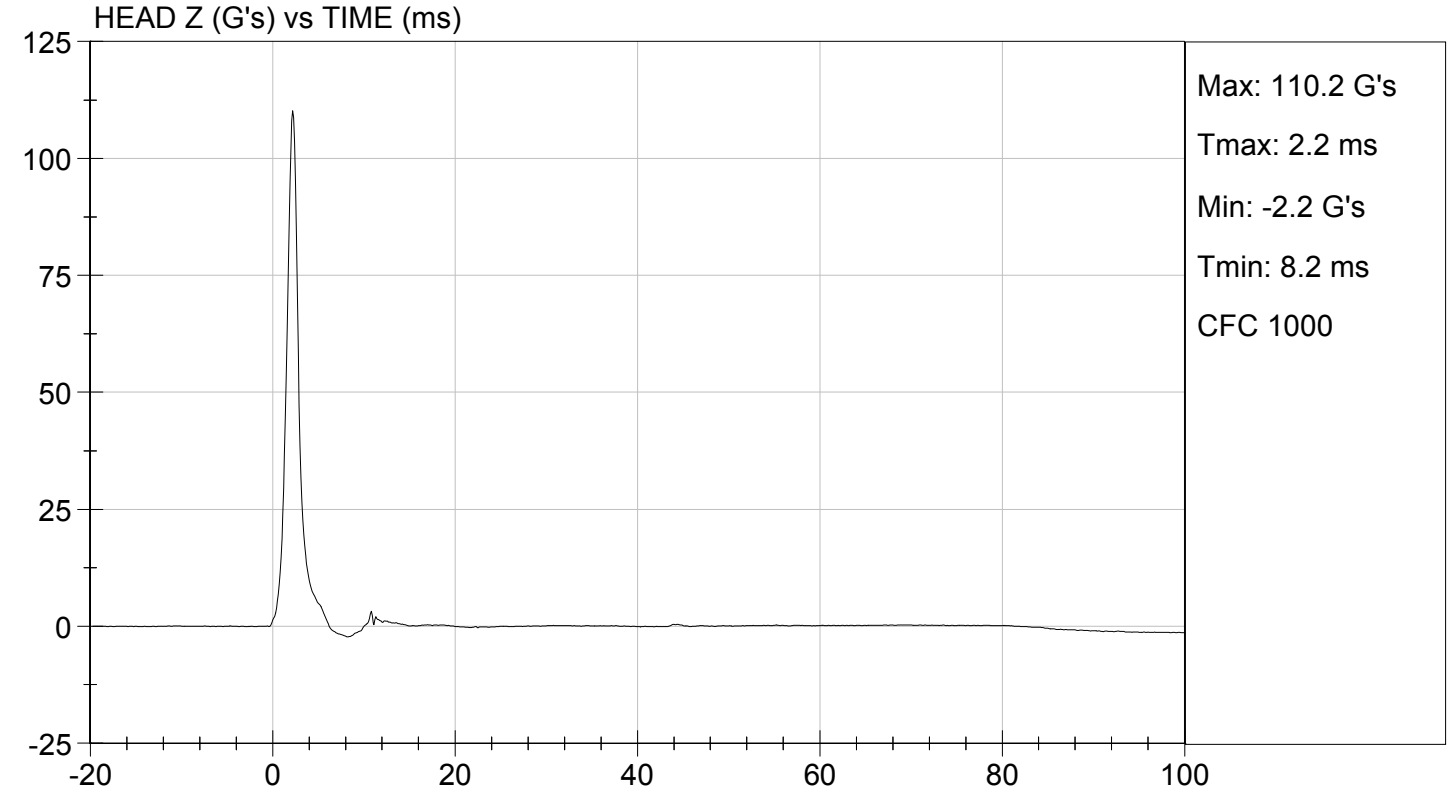
HEAD X (G's) vs TIME (ms)



TEST DESC: HEAD DROP

TEST DATE: 01/28/2014
TEST #: D14271





MGA RESEARCH CORPORATION

NECK FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D14272

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	10	Pass
Pendulum Speed		m/s	6.89 to 7.13	7.13	Pass
Pendulum Velocity	10 ms	m/s	2.1 to 2.5	2.4	Pass
	20 ms	m/s	4.0 to 5.0	4.7	Pass
	30 ms	m/s	5.8 to 7.0	6.5	Pass
D Plane Rotation	Max	deg	77 to 91	88	Pass
Occipital Condyle Moment within Rotation Corridor		Nm	69 to 83	74	Pass
Positive Moment Time Curve Decay to 10 Nm		ms	80 to 100	84	Pass
			Overall Results		Pass

Jessica Hall
Laboratory Technician

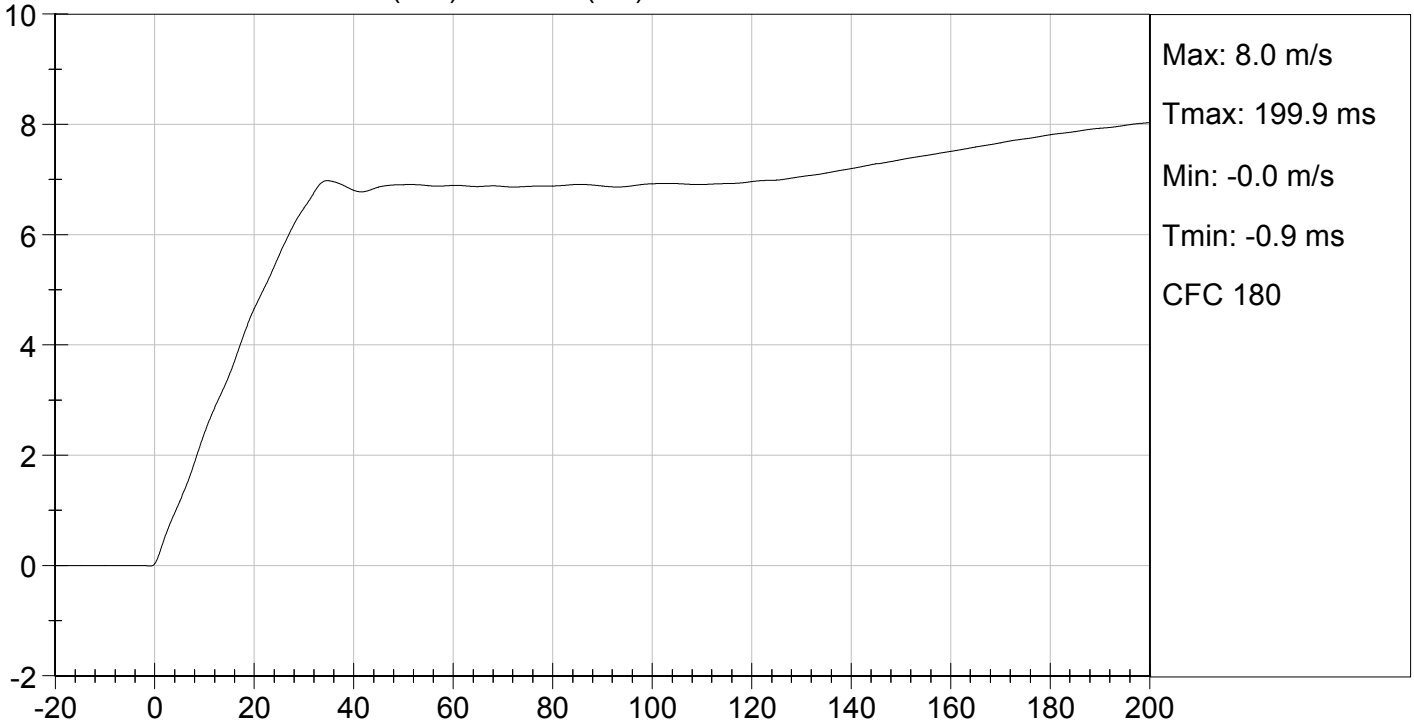
01/28/2014
Test Date

David Winkelbauer
Approved By

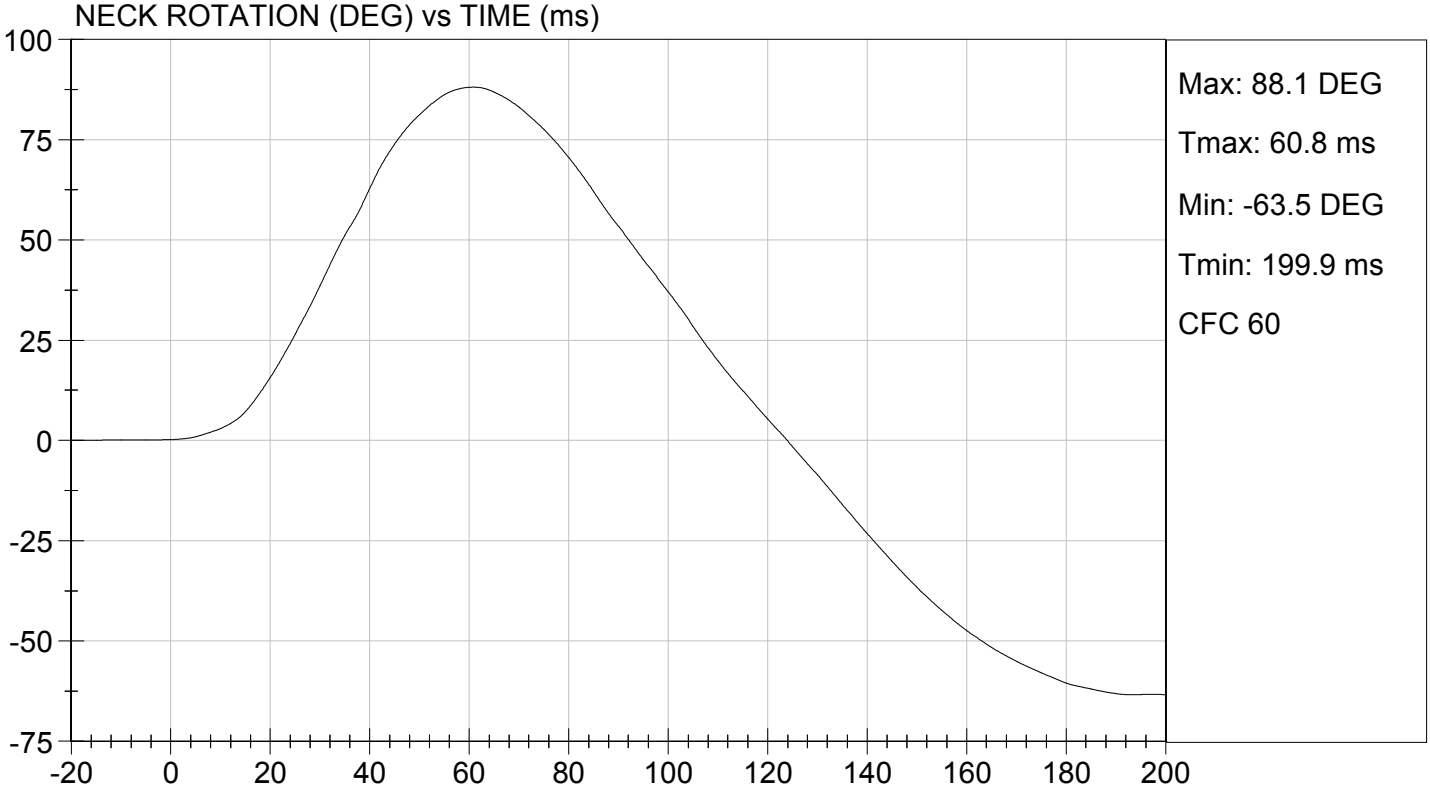
TEST DESC: NECK FLEXION
VELOCITY: 23.40 ft/s, 7.13 m/s

TEST DATE: 01/28/2014
TEST #: D14272

PENDULUM VELOCITY (m/s) vs TIME (ms)

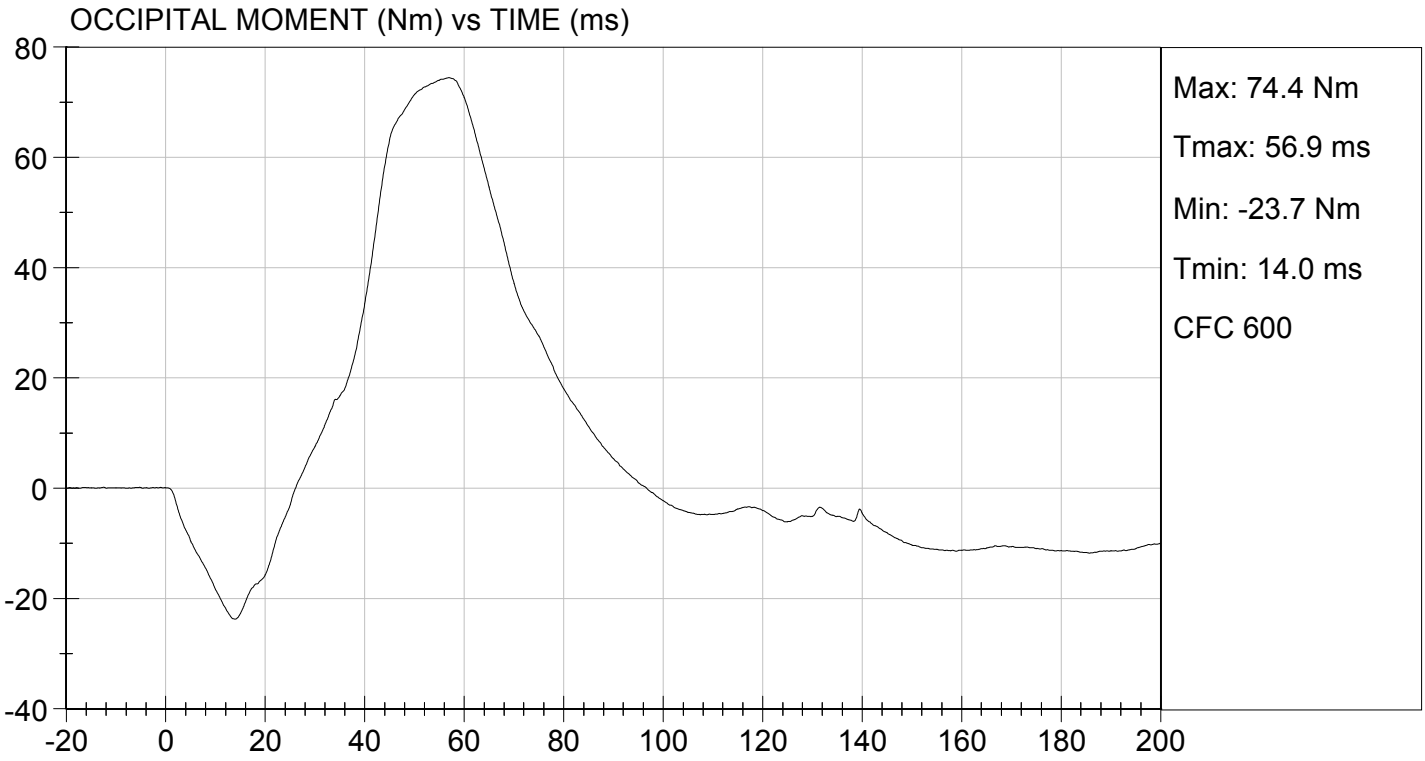


NECK ROTATION (DEG) vs TIME (ms)



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

TEST DATE: 01/28/2014
TEST #: D14272



MGA RESEARCH CORPORATION

NECK EXTENSION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D14273

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	10	Pass
Pendulum Speed		m/s	5.95 to 6.19	6.19	Pass
Pendulum Velocity	10 ms	m/s	1.5 to 1.9	1.7	Pass
	20 ms	m/s	3.1 to 3.9	3.5	Pass
	30 ms	m/s	4.6 to 5.6	5.1	Pass
D Plane Rotation	Max	deg	99 to 114	107	Pass
Occipital Condyle Moment within Rotation Corridor		Nm	-65 to -53	-56	Pass
Negative Moment Time Curve Decay to -10 Nm		ms	94 to 114	98	Pass
			Overall Results		Pass

Jessica Gall
Laboratory Technician

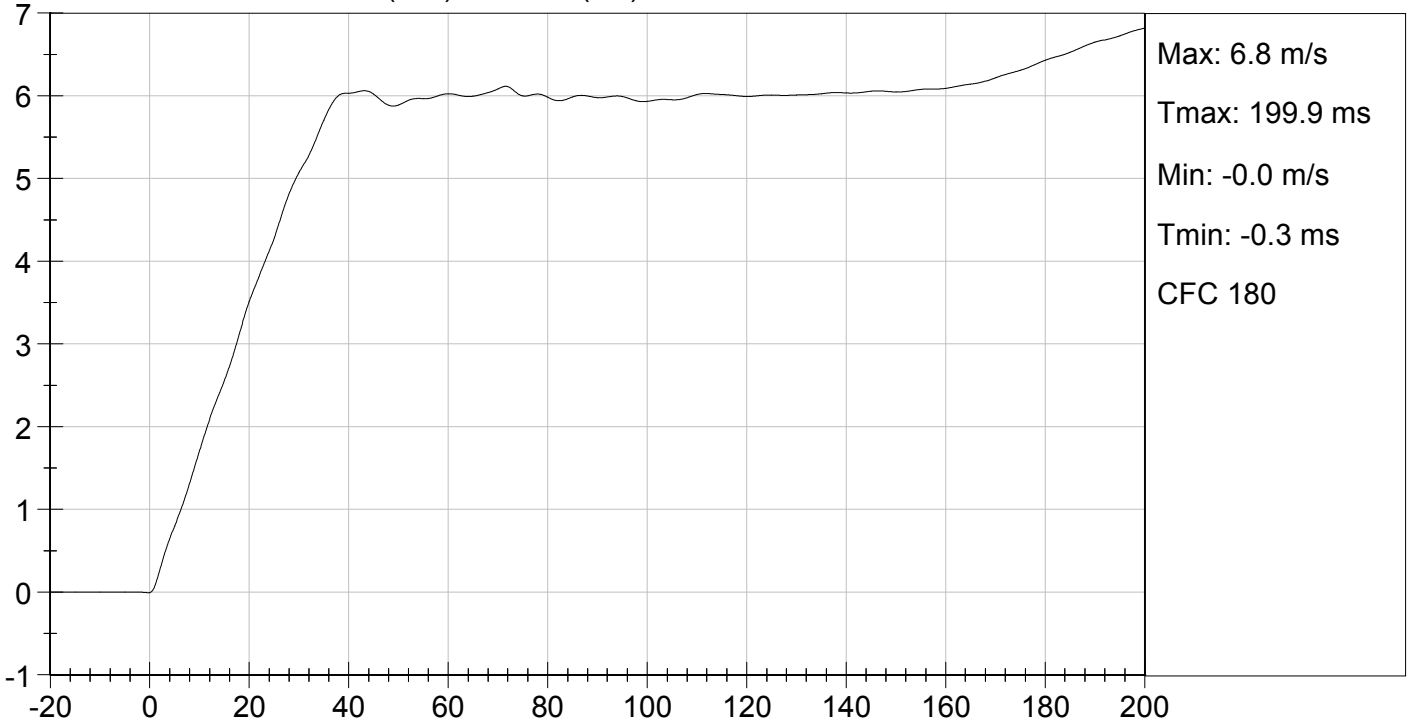
01/28/2014
Test Date

David Winkelbauer
Approved By

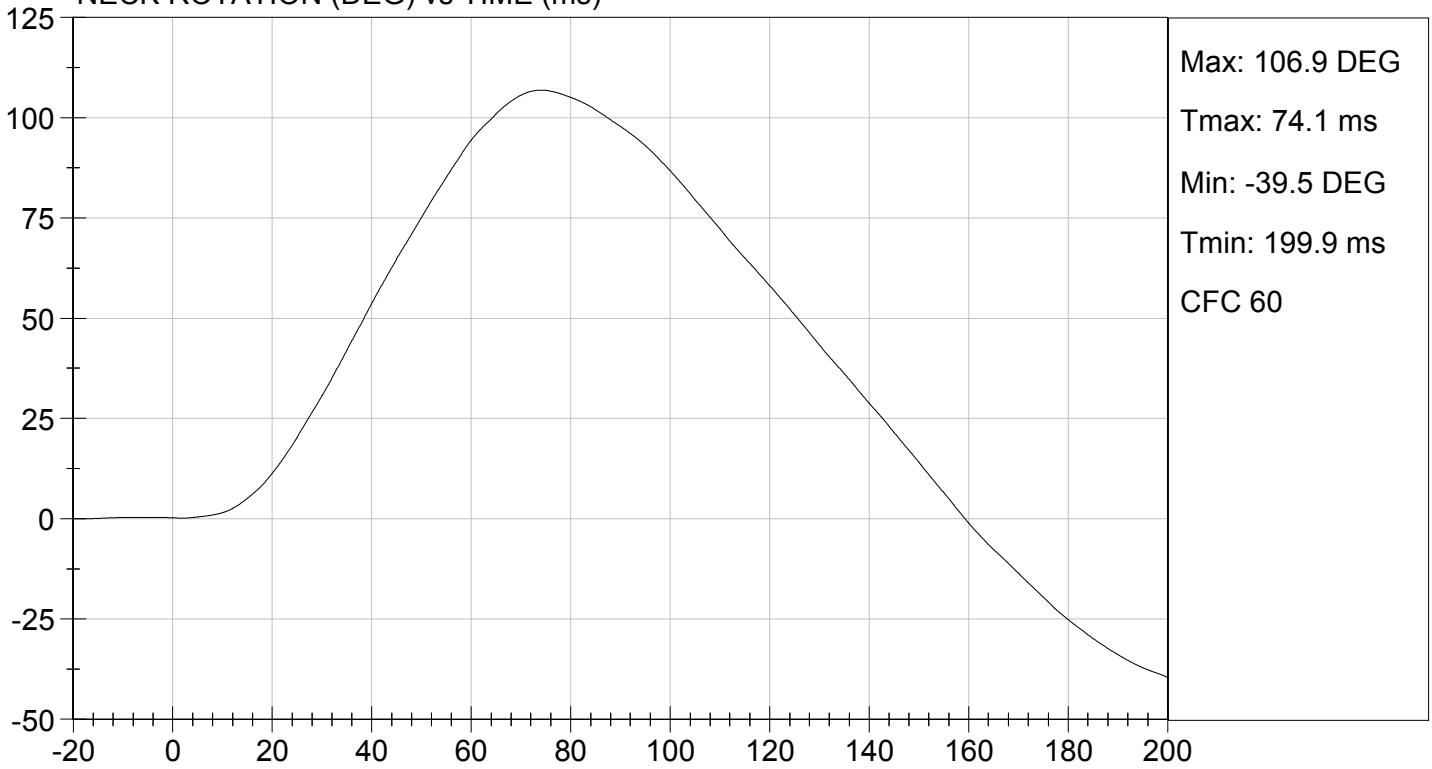
TEST DESC: NECK EXTENSION
VELOCITY: 20.30 ft/s, 6.19 m/s

TEST DATE: 01/28/2014
TEST #: D14273

PENDULUM VELOCITY (m/s) vs TIME (ms)

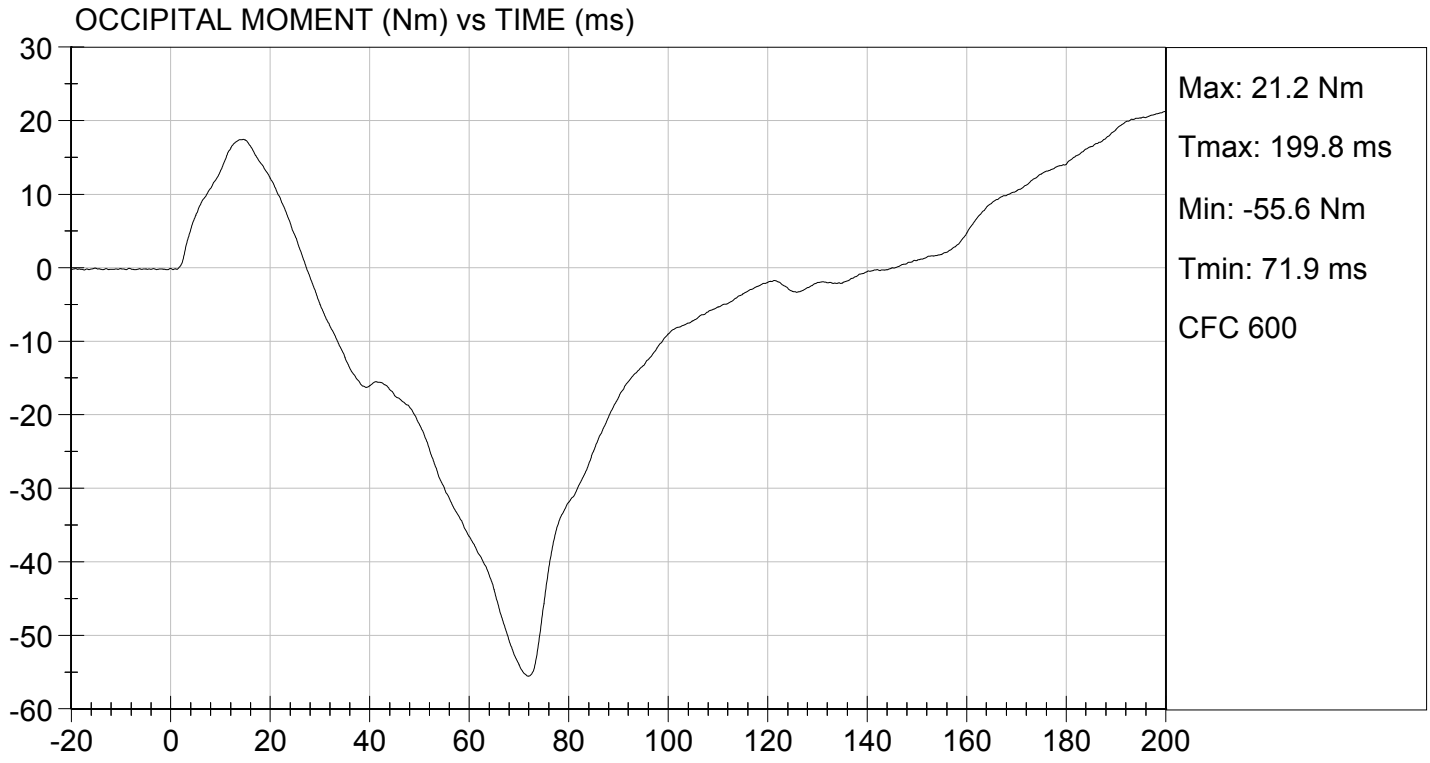


NECK ROTATION (DEG) vs TIME (ms)



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

TEST DATE: 01/28/2014
TEST #: D14273



MGA RESEARCH CORPORATION

THORAX IMPACT

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D14274

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.6	Pass
Relative Humidity	%	10 to 70	10	Pass
Probe Speed	m/s	6.59 to 6.83	6.77	Pass
Peak Deflection	mm	50 to 58	56	Pass
Peak Resistive Force w/in Deflection Corridor	N	3900 to 4400	4297	Pass
Internal Hysteresis	%	69 to 85	71	Pass
Peak Force 18 mm - 50 mm	N	<= 4600	4112	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

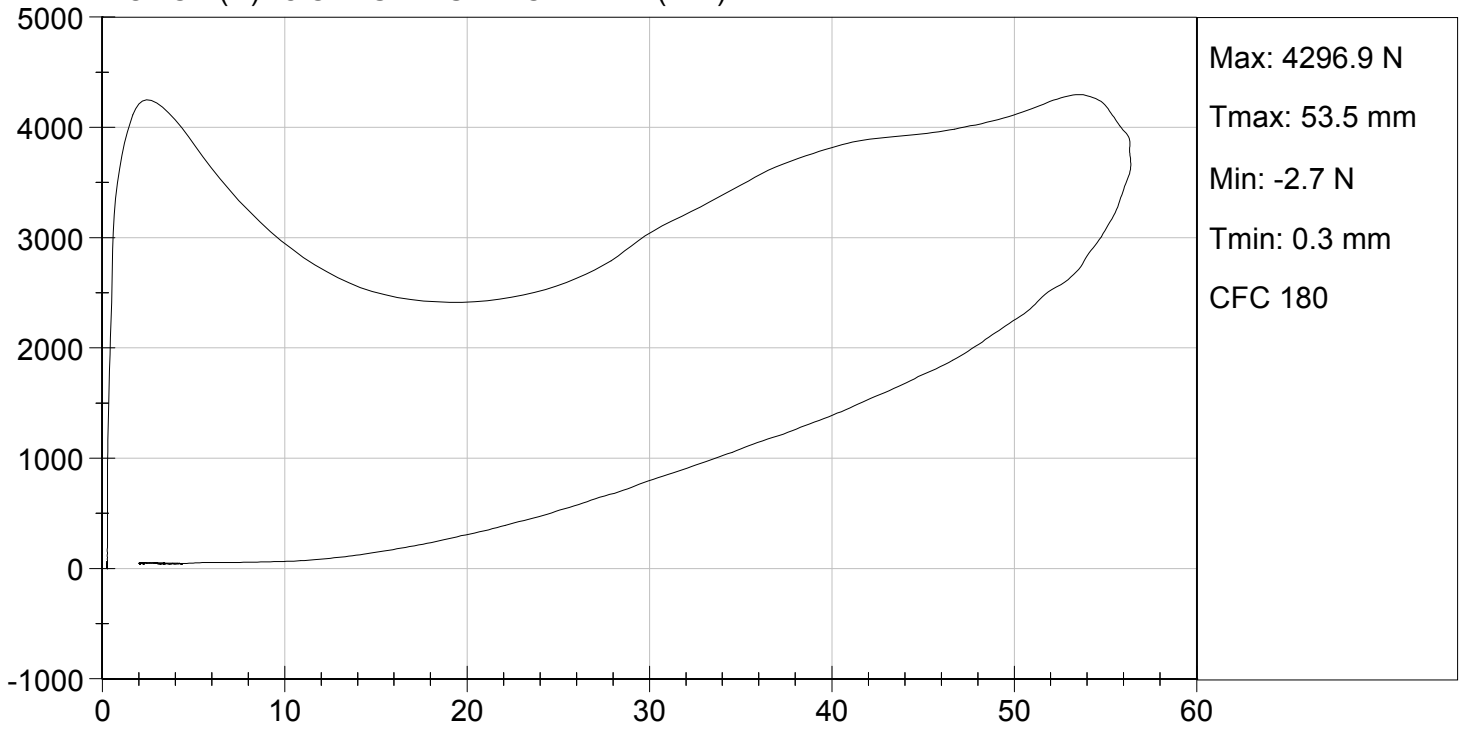
01/28/2014
Test Date

David Winkelbauer
Approved By

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

TEST DATE: 01/28/2014
TEST #: D14274

FORCE (N) vs CHEST DISPLACEMENT (mm)



MGA RESEARCH CORPORATION

RIGHT KNEE IMPACT TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D14275

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	10	Pass
Probe Speed	m/s	2.07 to 2.13	2.13	Pass
Maximum Force	N	3450 to 4060	3769	Pass
		Overall Test Results		Pass

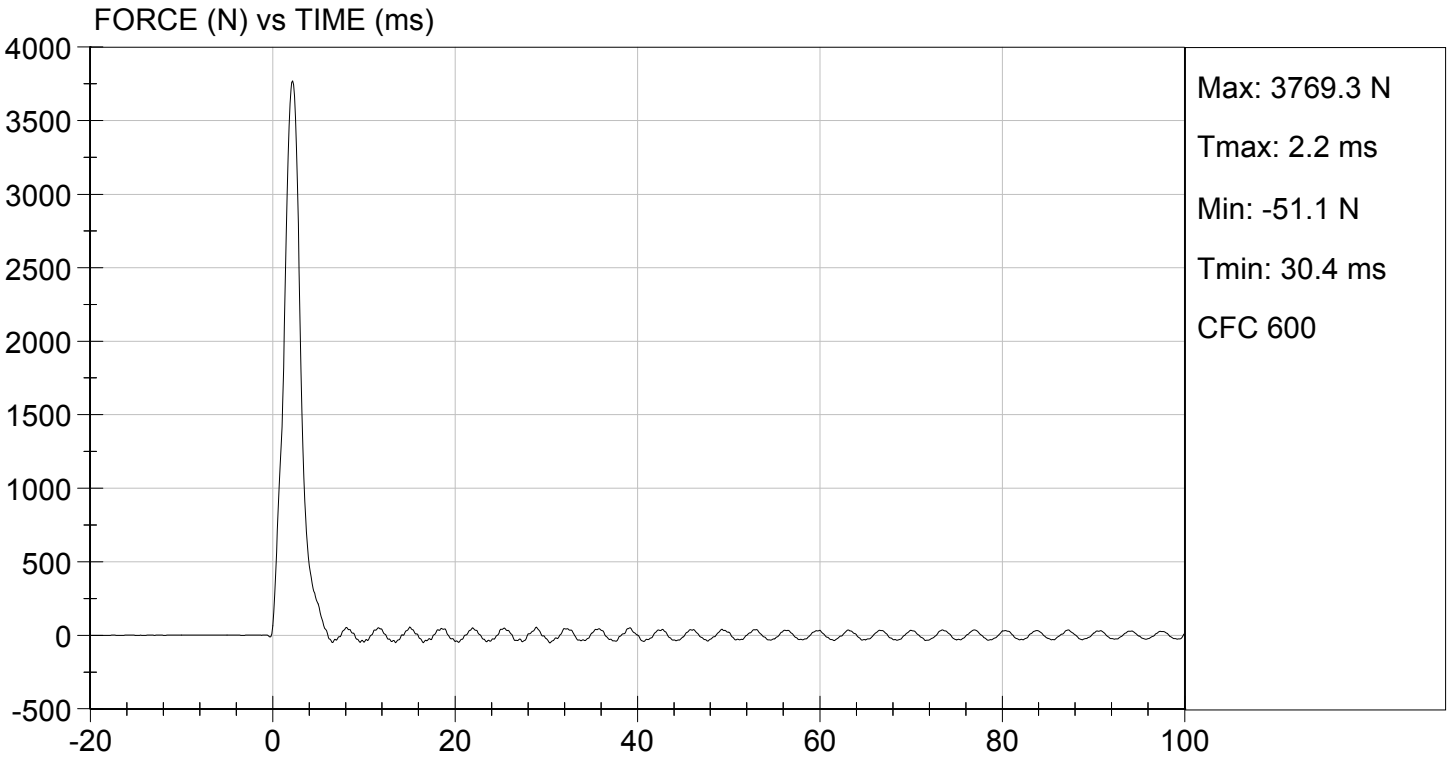
Jessica Hall
Laboratory Technician

01/28/2014
Test Date

David Winkelbauer
Approved By

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

TEST DATE: 01/28/2014
TEST #: D14275



MGA RESEARCH CORPORATION

LEFT KNEE IMPACT TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D14276

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	10	Pass
Probe Speed	m/s	2.07 to 2.13	2.12	Pass
Maximum Force	N	3450 to 4060	3588	Pass
		Overall Test Results		Pass

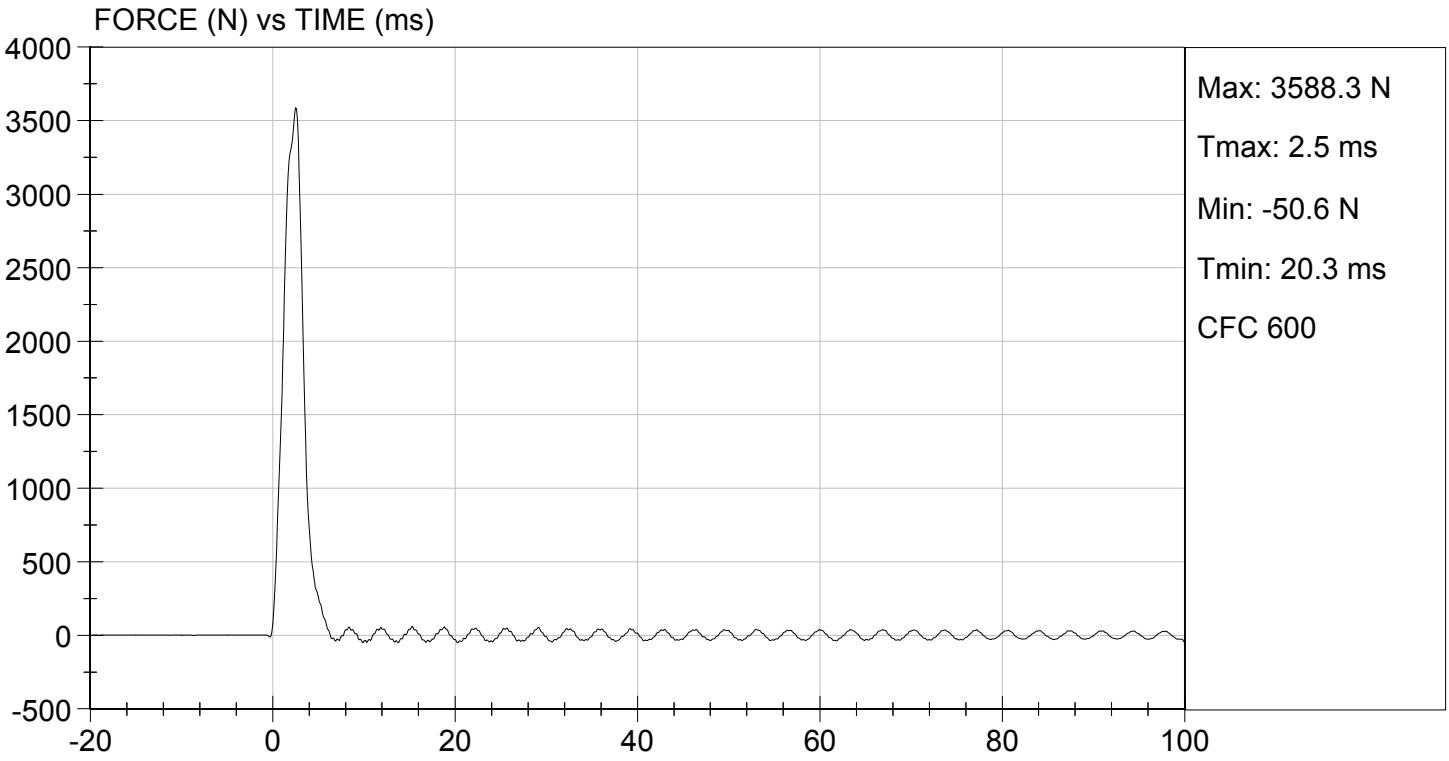
Jessica Hall
Laboratory Technician

01/28/2014
Test Date

David Winkelbauer
Approved By

TEST DESC: LEFT KNEE
VELOCITY: 6.94 ft/s, 2.12 m/s

TEST DATE: 01/28/2014
TEST #: D14276



MGA RESEARCH CORPORATION

TORSO FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D14277

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	10	Pass
Initial Angle	deg	0 to 20	19	Pass
Return Angle	deg	+/- 8	4	Pass
Force at 45 deg	N	320 to 390	371	Pass
Upper Torso Deflection Rate	deg/s	0.5 to 1.5	0.9	Pass
		Overall Result		Pass

Jessica Hall
Laboratory Technician

01/28/2014
Test Date

David Winkelbauer
Approved By