REPORT NUMBER: NCAP-MGA-2013-039

NEW CAR ASSESSMENT PROGRAM (NCAP)
Frontal Barrier Impact Test

FORD MOTOR CO.
2013 Ford C-MAX Hybrid SE 5-Dr Hatchback
NHTSA No.: MD0205

MGA RESEARCH CORPORATION
5000 Warren Road
Burlington, WI 53105

Test Date: December 5, 2012

Final Report Date: January 17, 2013

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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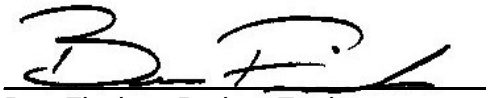
Approved by: 
Ben Fischer, Project Engineer

Approval Date: January 17, 2013

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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9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105		*10. Work Unit No.* *11. Contract or Grant No.* DTNH22-12-D-00258
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards (NVS-111) 1200 New Jersey Ave, SE, Room W43-410 Washington, D.C. 20590		*13. Type of Report and Period Covered* Final Test Report December 5 to January 17, 2013 *14. Sponsoring Agency Code* NVS-111
15. Supplementary Notes		

16. Abstract

A 56.3 km/h NCAP Frontal Impact Test was conducted on a 2013 Ford C-MAX Hybrid SE 5-Dr Hatchback in accordance with the specifications of the Office of Crashworthiness Standards Frontal NCAP Laboratory Test Procedure. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and foot well intrusion performance. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on December 5, 2012.

The impact velocity was 56.4 km/h and the ambient temperature at the barrier face at the time of impact was 21.5°C. The target vehicle post-test maximum crush was 461 mm located at the vehicle's centerline. The test vehicle's performance was as follows:

Measurement Description	Units	Threshold		Driver ATD	Passenger ATD
		50th	5th		
Head Injury Criteria (HIC_{15})	N/A	700	700	184	308
Maximum Chest Compression	mm	63	52	18	10
Nij	N/A	1	1	0.49	0.53
Neck Tension	N	4170	2620	1726	809
Neck Compression	N	4000	2520	83	314
Left Femur Force	N	10008	6805	1461	2291
Right Femur Force	N	10008	6805	1406	1200

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 2013 Ford C-MAX Hybrid SE 5-Dr Hatchback at a velocity of 56.4 km/h. The test was performed at MGA Research Corporation on December 5, 2012. 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 and 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. 138) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C of this report.

The 234 channels of data were recorded on an on-board data acquisition system. Appendix B contains the vehicle, load cell barrier, and dummy response data traces.

There was 100 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 461 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 glove box.

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})	184	0.49	1726	83	42	18	1461	1406
Passenger (5^{th})	308	0.53	809	314	46	10	2291	1200

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

TEST NOTES

Top of Engine X has no valid data after 55ms.
Bottom of Engine X has no valid data after 35ms.
Barrier K-03 has questionable data.
Barrier E-10 has questionable data.
Driver and passenger shoulder belt load cells were not installed.

SECTION 2
OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2013 Ford C-MAX Hybrid SE 5-Dr Hatchback NHTSA No.: MD0205
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/05/2012

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	MD0205	Traction Control System (TCS)	Yes
Model Year	2013	Power Steering	Yes
Make	Ford	Power Window Auto-Reverse	Yes
Model	C-MAX Hybrid	Driver Frontal Airbag	Yes
Body Style	Hatchback	Driver Curtain Airbag	Yes
VIN	1FADP5AU0DL508183	Driver Head/Torso Airbag	No
Body Color	Ruby Red Metallic	Driver Torso Airbag	No
Odometer (km/mi)	235 / 146	Driver Torso/Pelvis Airbag	Yes
Engine Displacement (L)	2.0	Driver Pelvis Airbag	No
Type/No. Cylinders	4	Driver Knee Airbag	Yes
Engine Placement	Lateral	Front Pass. Frontal Airbag	Yes
Transmission Type	CVT	Front Pass. Curtain Airbag	Yes
Transmission Speeds	N/A	Front Pass. Head/Torso Airbag	No
Overdrive	N/A	Front Pass. Torso Airbag	No
Final Drive	Front Wheel Drive	Front Pass. Torso/Pelvis Airbag	Yes
Roof Rack	No	Front Pass. Pelvis Airbag	No
Sunroof/T-Top	No	Front Pass. Knee Airbag	No
Running Boards	No	Driver Pretensioner	Yes
Tilt Steering Wheel	Yes	Driver Load Limiter	Yes
Power Seats	No	Front Pass. Pretensioner	Yes
Anti-Lock Brakes (ABS)	Yes	Front Pass. Load Limiter	Yes
Automatic Door Locks (ADLs)	Yes	Other	N/A

Does owner's manual provide instructions to turn off automatic door locks?	Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	FORD MOTOR CO.
Date of Manufacture	10/12

GVWR (kg)	2105
GAWR Front (kg)	1095
GAWR Rear (kg)	1010

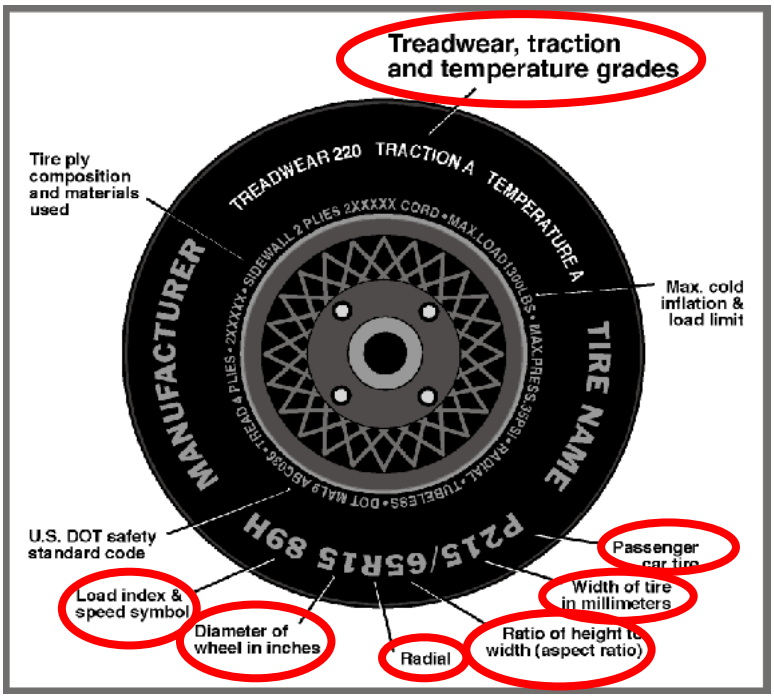
VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench		
Designated Seating Capacity (DSC)	2	3		5
Capacity Weight (VCW) (kg)				374
Cargo Weight (RCLW) (kg)				34

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

Test Vehicle: 2013 Ford C-MAX Hybrid SE 5-Dr Hatchback NHTSA No.: MD0205
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/05/2012

VEHICLE TIRE INFORMATION



Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	260	260
Recommended Tire Size	P225/50R17	P225/50R17
Tire Size on Vehicle	P225/50R17	P225/50R17
Tire Manufacturer	Michelin	Michelin
Tire Model	Energy	Energy
Treadwear	480	480
Traction	A	A
Temperature Grade	A	A
Tire Plies Sidewall	1	1
Tire Plies Body	4	4
Load Index/Speed Symbol	93V	93V
Tire Material	Rubber	Rubber
DOT Safety Code Left	B90A00NX3012	B90A00NX3012
DOT Safety Code Right	B90A00NX3012	B90A00NX3012

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

Test Vehicle: 2013 Ford C-MAX Hybrid SE 5-Dr Hatchback NHTSA No.: MD0205
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/05/2012

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	482.2	354.7		513.5	413.7	
Right	kg	460.0	355.6		488.1	405.0	
Ratio	%	57.0	43.0		55.0	45.0	
Totals	kg	942.2	710.3	1652.5	1001.6	818.7	1820.3

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1652.5
Weight of 1 P572E ATD & 1 P572O ATD	kg	140.6
Rated Cargo/Luggage Weight (RCLW)	kg	34
Calculated Vehicle Target Weight (TVTW)	kg	1827.1

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	684	687	682	686	1139
As Tested	mm	671	679	664	672	1192
Post Test	mm	698	719	660	668	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2650
Total Vehicle Length at Left Side	mm	4172
Total Vehicle Length at Centerline	mm	4418
Total Vehicle Length at Right Side	mm	4172
Weight of Ballast in Cargo Area	kg	8.2
Weight of Vehicle Components Removed	kg	11.8
Amount of Stoddard Solvent in Fuel Tank	L	47.5

List of components removed to meet test weight: Right taillight, trunk carpet, trunk cover, and front splash guard.

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

Test Vehicle: 2013 Ford C-MAX Hybrid SE 5-Dr Hatchback NHTSA No.: MD0205
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/05/2012

TARGET VEHICLE STRUCTURAL MEASUREMENT

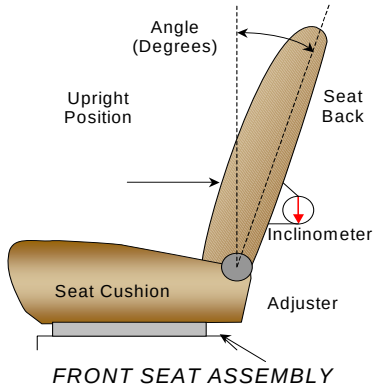
	Elements	Pre-Test (mm)
1	Total Length	4418
2	Total Width	1772
3	Bumper Top Height	542
4	Bumper Bottom Height	422
5	Longitudinal Member Top Height	568
6	Distance between Longitudinal Members	894
7	Longitudinal Member Width	65
8	Engine Top Height	788
9	Engine Bottom Height	202
10	Engine and Gearbox Width	884
11	Front Bumper-Engine Distance	227
12	Front Shock Absorber Fixing Height	843
13	Bonnet Leading Edge Height	793
14	Front Shock Absorber Fixing Width	1111
15	Front Bumper – Front Axle Distance	910
16	Front Axle – A-Pillar Distance	415
17	A-Pillar – B-Pillar Distance	1135
18	B-Pillar – Rear Axle Distance	1100
19	B-Pillar – C-Pillar Distance	634
20	Roof Sill Bottom Height	1438
21	Roof Sill Top Height	1555
22	Floor Sill Bottom Height	168
23	Floor Sill Top Height	397

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

Test Vehicle: 2013 Ford C-MAX Hybrid SE 5-Dr Hatchback NHTSA No.: MD0205
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/05/2012

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 September 2012.



FRONT SEAT ASSEMBLY

	Degrees
Driver Seat Back Angle	4.0° on headrest post
Passenger Seat Back Angle	0.4° on headrest post

SEAT FORE/AFT POSITIONS

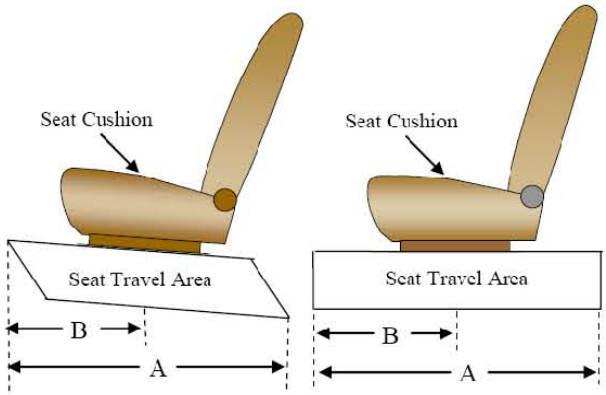
The driver and passenger seat fore/aft positions are adjusted following Appendix F, "Driver & Passenger Dummy Seating & Positioning Procedures" in the NCAP Test Procedure dated September 2012.

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	310 mm, 37 Detents (1st as 0)	15th Detent (foremost as 0)
Passenger Seat	270 mm, 39 Detents (1st as 0)	0 Detent (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 (uppermost as 0)
Passenger Seat	4 (1st as 1)	0 (uppermost as 0)



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

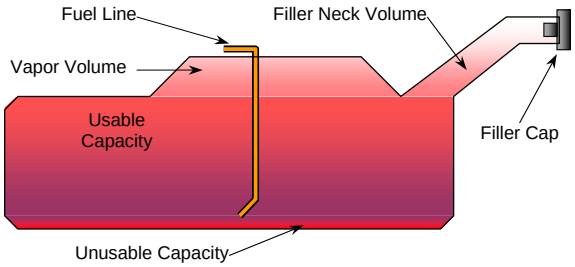
Test Vehicle: 2013 Ford C-MAX Hybrid SE 5-Dr Hatchback NHTSA No.: MD0205
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/05/2012

FUEL TANK CAPACITY DATA

	Liters
Usable Capacity of "Standard Tank"	51.1
Usable Capacity of "Optional Tank"	
92-94% of Usable Capacity	47.0 to 48.0
Actual Amount of Solvent used	47.5
1/3 of Usable Capacity	17.0

FUEL PUMP

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

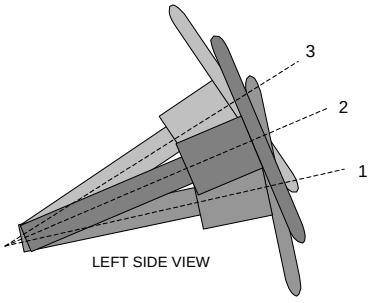


VEHICLE FUEL TANK ASSEMBLY

The vehicle is equipped with an electric fuel pump. The electric fuel pump operates for a prescribed amount of time to pressurize the fuel system following the actuation of the ignition. If no attempt has been made to start the engine within 450ms following ignition operation, the fuel pump will shut off. The fuel pump operates continuously while the engine is running. If the engine stalls, the fuel pump is deactivated. Also, fuel pump shut-off is provided, which is designed to stop the fuel flow to the engine if the vehicle sustains an impact above a certain magnitude. The fuel pipe is on the right side.

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

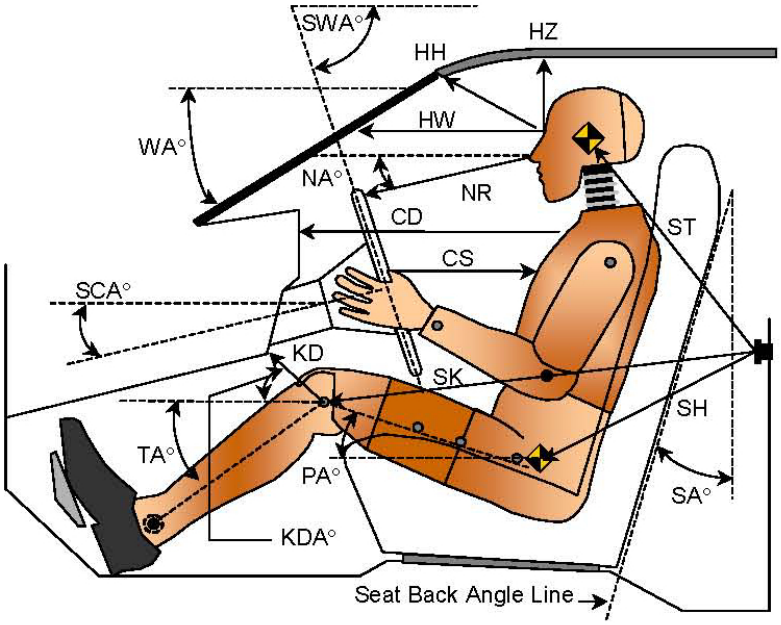
STEERING COLUMN POSITION

	Degrees	Fore/Aft Position (mm)
Lowermost Position 1	65.6	154
Geometric Center Position 2	62.6	129
Uppermost Position 3	59.6	104
Telescoping Steering Wheel Travel		50
Test Position	62.6	129

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2013 Ford C-MAX Hybrid SE 5-Dr Hatchback
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0205
Test Date: 12/05/2012



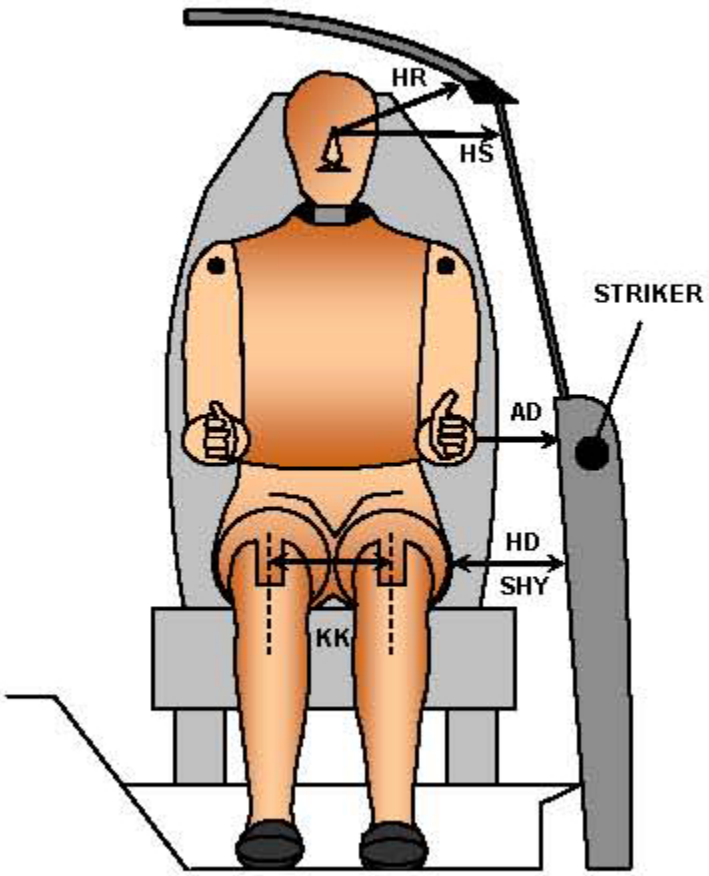
LEFT SIDE VIEW

Code	Measurement Description	Driver S/N 351		Passenger S/N 138	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		22.7		
SWA°	Steering Wheel Angle		62.6		
SCA°	Steering Column Angle		27.4		
SA°	Seat Back Angle (on headrest post)		4.0		0.4
HZ	Head to Roof (Z)	262	90	248	90
HH	Head to Header	352	21.0	266	50.5
HW	Head to Windshield	788	0	746	0
NR	Nose to Rim	432	12.2		
CD	Chest to Dash	555		410	
CS	Chest to Steering Hub	353	1.0		
RA	Rim to Abdomen	218	0		
KDL	Left Knee to Dash	160	22.5	93	24.7
KDR	Right Knee to Dash	165	24.1	108	25.2
PA°	Pelvic Angle		24.4		19.9
TA°	Tibia Angle		58.1		66.4
SK	Striker to Knee	569	85.7	644	93.3
ST	Striker to Head	543	8.2	557	23.2
SH	Striker to H-Point	213	115.1	345	98.6

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2013 Ford C-MAX Hybrid SE 5-Dr Hatchback
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0205
Test Date: 12/05/2012



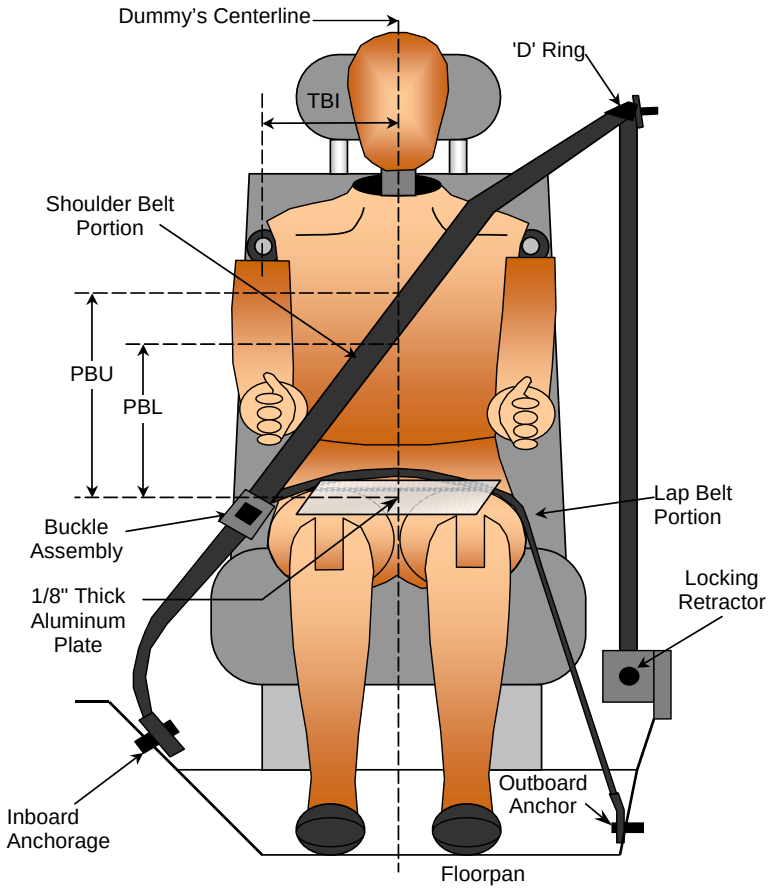
FRONT VIEW OF DUMMY

Code	Measurement Description	Driver S/N 351	Passenger S/N 138
		Length (mm)	
AD	Arm to Door	102	85
HD	H-Point to Door	133	186
HR	Head to Side Header	263	291
HS	Head to Side Window	356	378
KK	Knee to Knee	259	240
SHY	Striker to H-Point (Y Direction)	278	300
AA	Ankle to Ankle	318	168

DATA SHEET NO. 5
SEAT BELT POSITIONING DATA

Test Vehicle: 2013 Ford C-MAX Hybrid SE 5-Dr Hatchback
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0205
Test Date: 12/05/2012



FRONT VIEW OF DUMMY

SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU - Top surface of reference to belt upper edge	mm	350	330
PBL - Top surface of reference to belt lower edge	mm	275	240

BELT LENGTH DATA

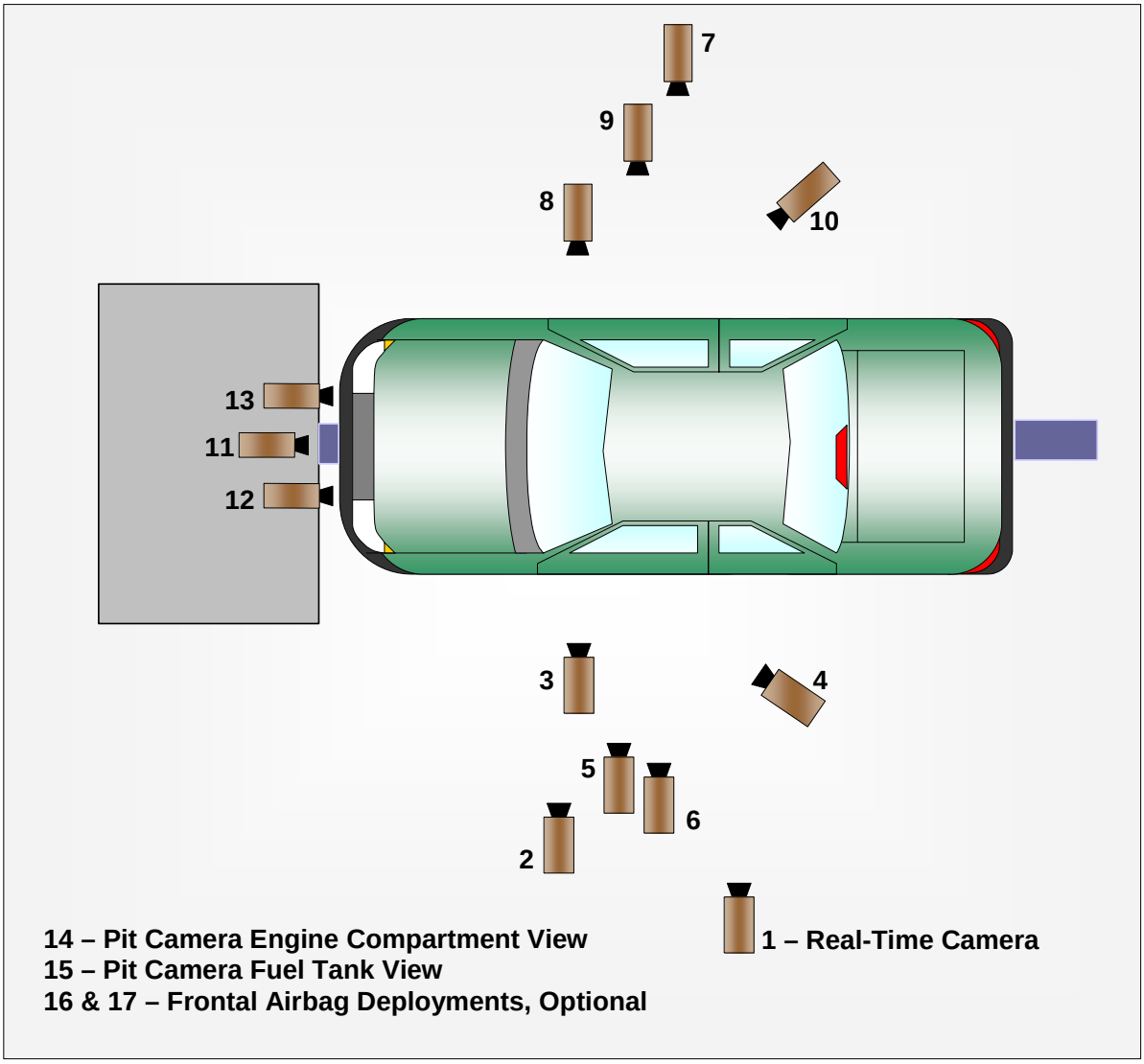
Measurement Description	Units	Driver	Passenger
Shoulder Belt Length as measured on ATD	mm	850	910
Lap Belt Length as measured on ATD	mm	770	870
Remainder of belt on reel	mm	860	700
Total Belt Length for Continuous Webbing Systems	mm	2480	2480

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

Test Vehicle: 2013 Ford C-MAX Hybrid SE 5-Dr Hatchback
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0205
Test Date: 12/05/2012

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: 2013 Ford C-MAX Hybrid SE 5-Dr Hatchback
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0205
Test Date: 12/05/2012

CAMERA LOCATIONS

No.	Camera View	Coordinates (mm)			Lens (mm)	Speed (fps)
		X*	Y*	Z*		
1	Real-Time Left Overall					30
2	Driver Close-Up	1580	-6350	-1920	35	1000
3	Left Front Half	1090	-4980	-1210	24	1000
4	Left Angle	5640	-4930	-2000	50	1000
5	Steering Column - Top	500	-5030	-1230	24	1000
6	Steering Column - Bottom	480	-5040	-850	24	1000
7	Right Overall	1980	6490	-1240	20	1000
8	Passenger Close-Up	1510	6860	-1880	35	1000
9	Right Front Half	1200	5100	-1170	24	1000
10	Right Angle	5790	4780	-1970	50	1000
11	Windshield	-260	0	-2860	20	1000
12	Driver Windshield	-30	-360	-2270	8.5	1000
13	Passenger Windshield	-30	360	-2270	8.5	1000
14	Pit Front	1040	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:

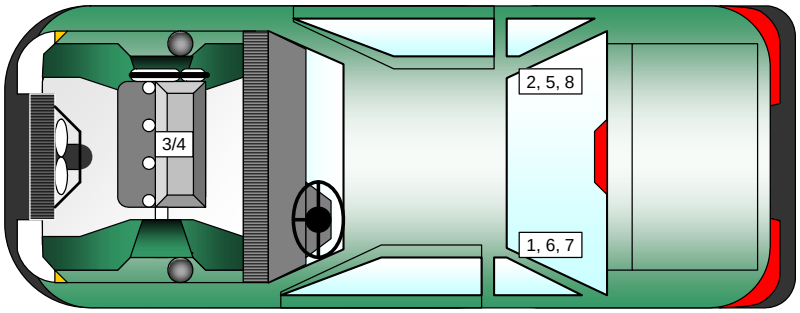
+X = forward of impact plane
+Y = right of monorail centerline
+Z = below ground level

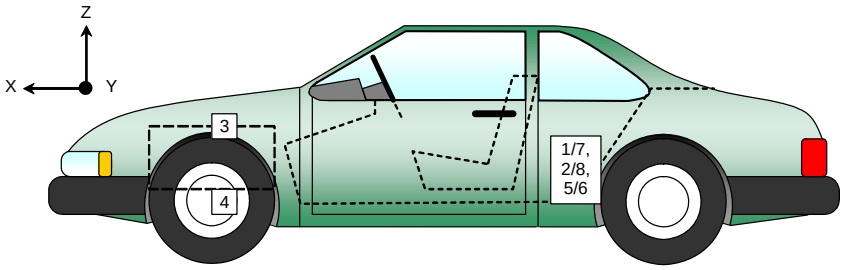
Cameras 16 & 17 were not used for this test.

DATA SHEET NO. 7
VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2013 Ford C-MAX Hybrid SE 5-Dr Hatchback
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0205
Test Date: 12/05/2012





VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Crossmember Accelerometer – X Direction	1816	-470	-202
2	Right Rear Crossmember Accelerometer – X Direction	1816	470	-202
3	Engine Top X	3744	0	-788
4	Engine Bottom X	3853	0	-202
5	Left Rear Crossmember Accelerometer – Z Direction	1816	-470	-202
6	Right Rear Crossmember Accelerometer – Z Direction	1816	470	-202
7	Left Rear Crossmember Accelerometer Redundant – X Direction	1816	-470	-202
8	Right Rear Crossmember Accelerometer Redundant – X Direction	1816	470	-202

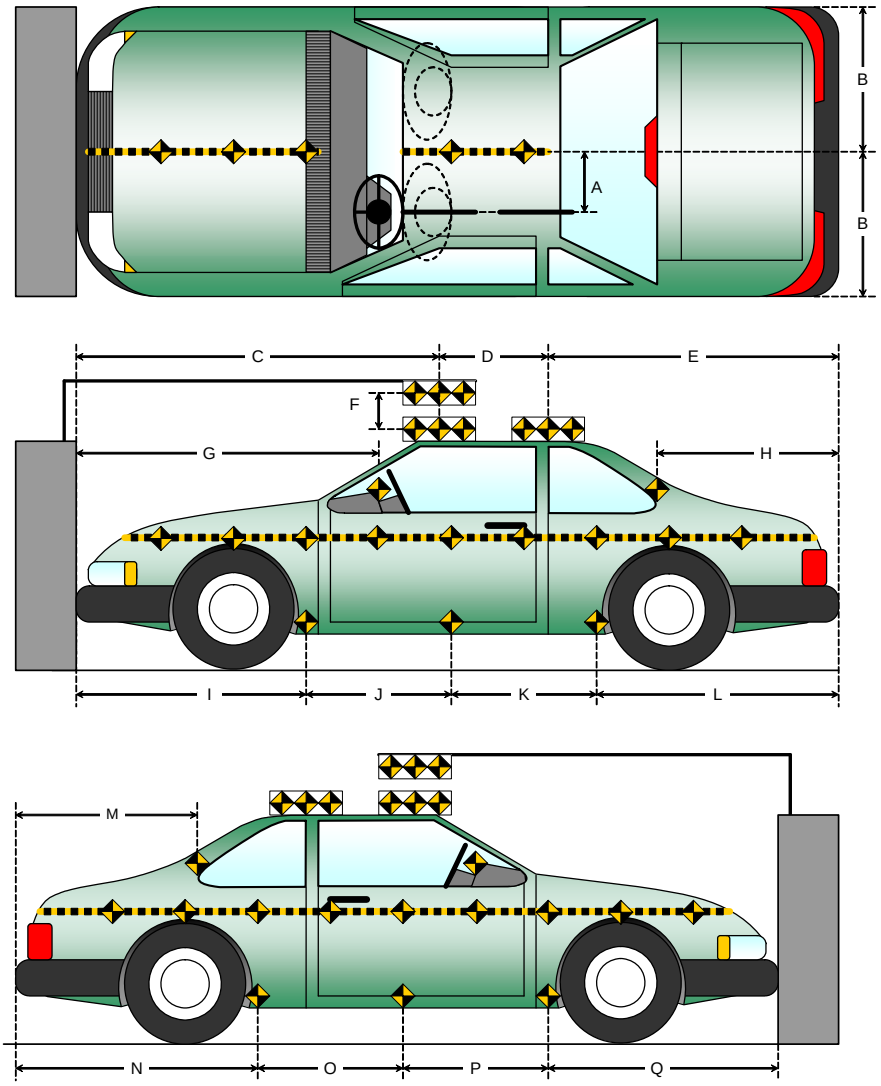
Reference Points: X - Rear Surface of Vehicle (+ forward)
Y - Vehicle Centerline (+ to right)
Z - Ground Plane (+ down)

DATA SHEET NO. 8
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2013 Ford C-MAX Hybrid SE 5-Dr Hatchback
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0205
Test Date: 12/05/2012

Item	Value (mm)
A	357
B	886
C	2320
D	668
E	1430
F	32
G	
H	1110
I	1340
J	882
K	882
L	1314
M	1110
N	1314
O	882
P	882
Q	1340



DATA SHEET NO. 9
LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2013 Ford C-MAX Hybrid SE 5-Dr Hatchback
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0205
Test Date: 12/05/2012

Advanced Research Load Cell Barrier

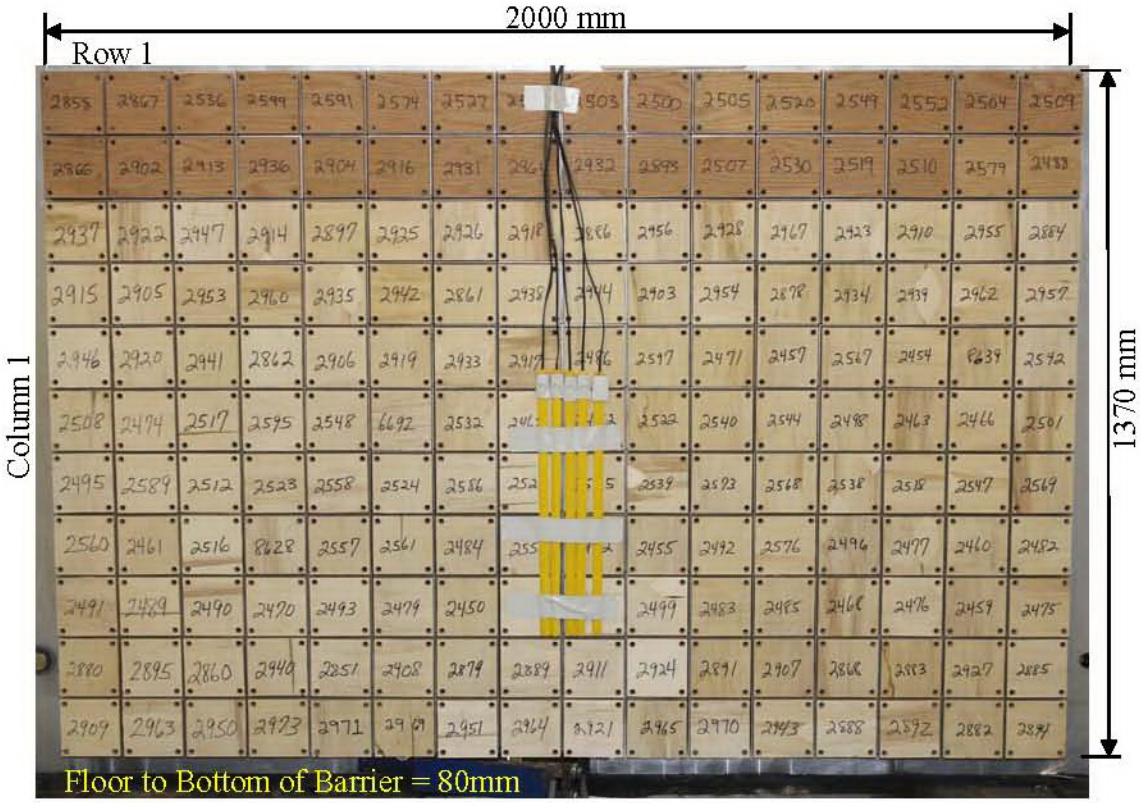


Photo for Reference Only

Centerline

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

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: 2013 Ford C-MAX Hybrid SE 5-Dr Hatchback
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0205
Test Date: 12/05/2012

INSTRUMENTATION

Driver Dummy Data Channels	52
Passenger Dummy Data Channels	46
Vehicle Structure Accelerometers	8
Barrier Channels	128
Total	234

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: 2013 Ford C-MAX Hybrid SE 5-Dr Hatchback
Test Program: NCAP Frontal Barrier Impact Test
NHTSA No.: MD0205
Test Date: 12/05/2012

TEST DUMMY INFORMATION AND CONTACT LOCATIONS

Description	Driver	Passenger
Dummy Type / Serial No.	HIII 50% / 351	HIII 5% / 138
Head Contact	Airbag, Headrest	Airbag, Headrest
Upper Torso Contact	Airbag	Airbag
Lower Torso Contact	None	None
Left Knee Contact	Knee Airbag	Glove Box
Right Knee Contact	Knee Airbag	Glove Box

DOOR OPENING AND SEAT TRACK INFORMATION

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

POST TEST STRUCTURAL OBSERVATIONS

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

VEHICLE REBOUND FROM BARRIER

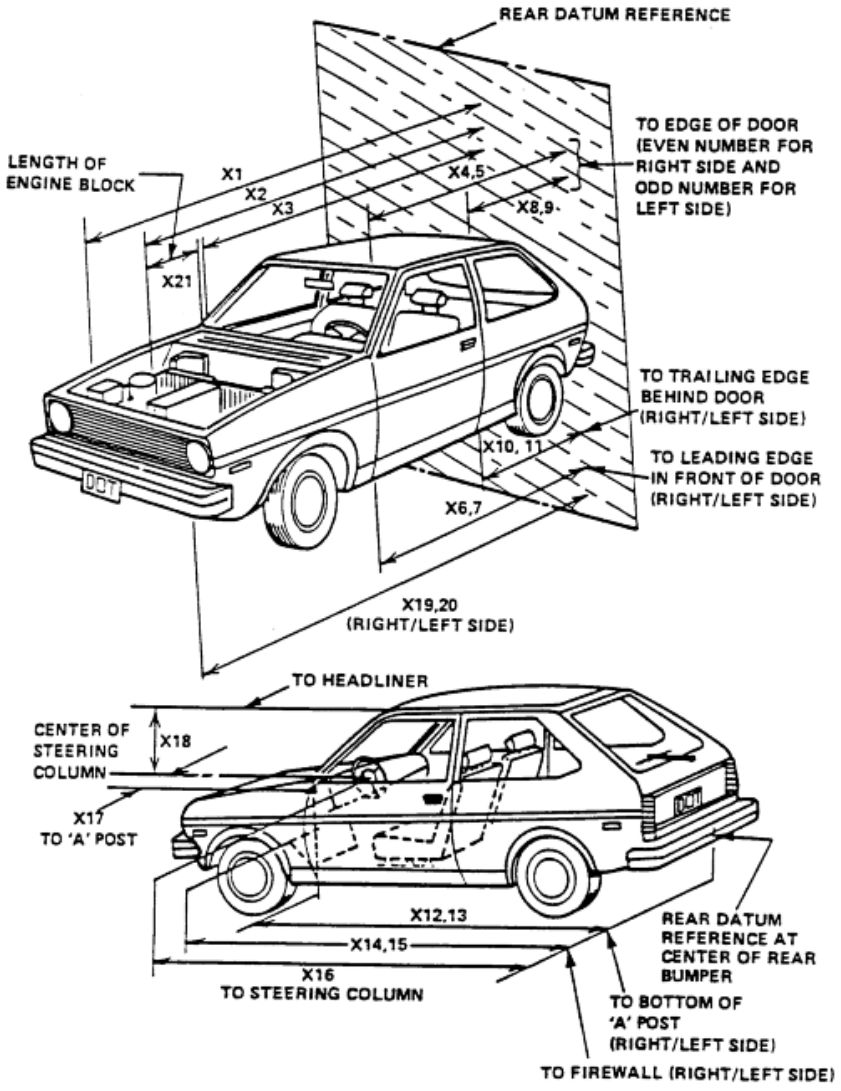
Measured Parameter	Units	Value
Left Side	mm	1212
Center	mm	1159
Right Side	mm	1178
Average	mm	1183

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Left Front (Driver) P1		Right Front (Passenger) P2	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	Yes	Yes	Yes
Curtain Side Airbag	Yes	No	Yes	No
Torso/Pelvis Side Airbag	Yes	No	Yes	No
Knee Airbag	Yes	Yes	No	
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes		Yes	
Other	No		No	

DATA SHEET NO. 12
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2013 Ford C-MAX Hybrid SE 5-Dr Hatchback NHTSA No.: MD0205
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/05/2012



DATA SHEET NO. 12 (CONTINUED)
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2013 Ford C-MAX Hybrid SE 5-Dr Hatchback NHTSA No.: MD0205
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/05/2012

RSOV (Rear Surface of Vehicle)

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	mm	4418	3957	461
2	RSOV to Front of Engine	mm	4017	3685	332
3	RSOV to Firewall	mm	3648	3669	-21
4	RSOV to Upper Leading Edge of Right Door	mm	2999	3003	-4
5	RSOV to Upper Leading Edge of Left Door	mm	2999	2994	5
6	RSOV to Lower Leading Edge of Right Door	mm	2968	2974	-6
7	RSOV to Lower Leading Edge of Left Door	mm	2968	2968	0
8	RSOV to Upper Trailing Edge of Right Door	mm	1925	1928	-3
9	RSOV to Upper Trailing Edge of Left Door	mm	1925	1922	3
10	RSOV to Lower Trailing Edge of Right Door	mm	1928	1930	-2
11	RSOV to Lower Trailing Edge of Left Door	mm	1928	1923	5
12	RSOV to Bottom of “A” Post of Right Side	mm	3035	3010	25
13	RSOV to Bottom of “A” Post of Left Side	mm	3035	3002	33
14	RSOV to Firewall, Right Side	mm	3347	3354	-7
15	RSOV to Firewall, Left Side	mm	3347	3357	-10
16	RSOV to Steering Column	mm	2566	2625	-59
17	Center of Steering Column to “A” Post	mm	420	389	31
18	Center of Steering Column to Headliner	mm	461	472	-11
19	RSOV to Right Side of Front Bumper	mm	4172	3924	248
20	RSOV to Left Side of Front Bumper	mm	4172	3906	266
21	Length of Engine Block	mm	525	525	0
RD	RSOV to Right Side of Dash Panel	mm	2742	2736	6
CD	RSOV to Center of Dash Panel	mm	2630	2619	11
LD	RSOV to Left Side of Dash Panel	mm	2728	2722	6

DATA SHEET NO. 13
ACCIDENT INVESTIGATION DIVISION DATA

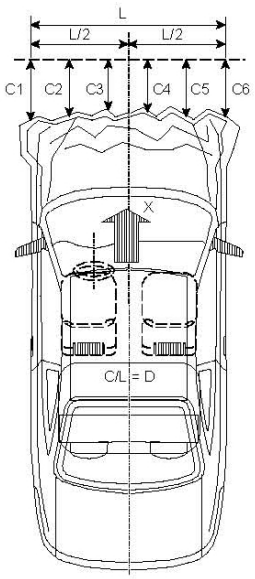
Test Vehicle: 2013 Ford C-MAX Hybrid SE 5-Dr Hatchback NHTSA No.: MD0205
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/05/2012

VEHICLE INFORMATION

VIN: 1FADP5AU0DL508183 Wheelbase (mm): 2650
Vehicle Size Category: Passenger Test Weight (kg): 1820.3

ACCELEROMETER DATA

Accelerometer Locations: As per measurements on Page 15
Cal. Procedure/Interval: MGA procedure / 6 month
Integration Algorithm: Trapezoidal
Linearity: > 99%
Impact Velocity (km/h): 56.4
Velocity Change (km/h): 64.4
Time of Separation (msec): 85.4



CRUSH PROFILE

Collision Deformation Classification: Frontal
Midpoint of Damage: Centerline
Damage Region Length (mm): 1500
Impact Mode: Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	4172	3906	266
C2	Crush zone 2 at left side	mm	4301	3883	418
C3	Crush zone 3 at left side	mm	4368	3926	442
C4	Crush zone 4 at right side	mm	4368	3952	416
C5	Crush zone 5 at right side	mm	4301	3912	389
C6	Crush zone 6 at right side	mm	4172	3924	248
L	C1 TO C6	mm	1500	1474	26

DATA SHEET NO. 14
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2013 Ford C-MAX Hybrid SE 5-Dr Hatchback
Test Program: NCAP Frontal Barrier Impact Test

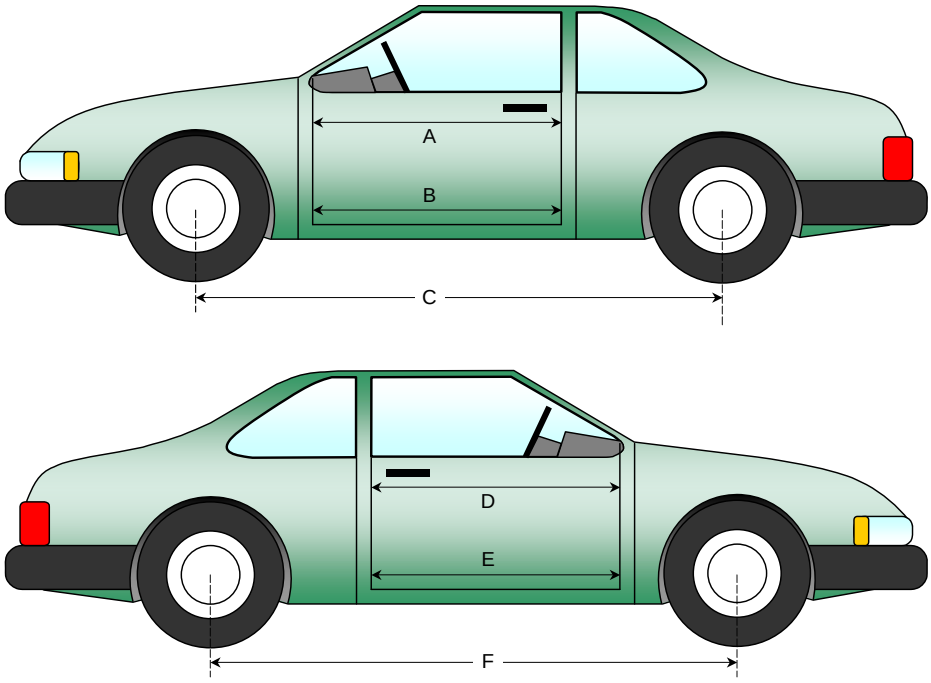
NHTSA No.: MD0205
Test Date: 12/05/2012

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	958	962	-4
B	Left Side Lower	mm	954	955	-1
D	Right Side Upper	mm	958	957	1
E	Right Side Lower	mm	954	954	0

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2650	2585	65
F	Right Side Wheelbase	mm	2650	2565	85



DATA SHEET NO. 14 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

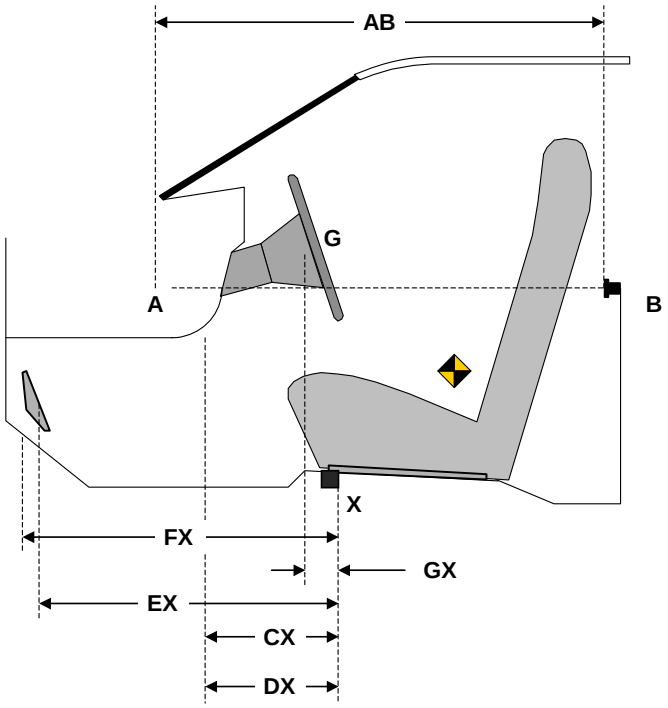
Test Vehicle: 2013 Ford C-MAX Hybrid SE 5-Dr Hatchback
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0205
Test Date: 12/05/2012

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	832	832	0
CX	Left Knee Bolster to X	mm	228	234	-6
DX	Right Knee Bolster to X	mm	243	253	-10
EX	Brake Pedal to X	mm	461	500	-39
FX	Foot Rest to X	mm	578	530	48
GX	Center of Steering Column Wheel Hub to X	mm	43	151	-108

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: 2013 Ford C-MAX Hybrid SE 5-Dr Hatchback NHTSA No.: MD0205
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/05/2012

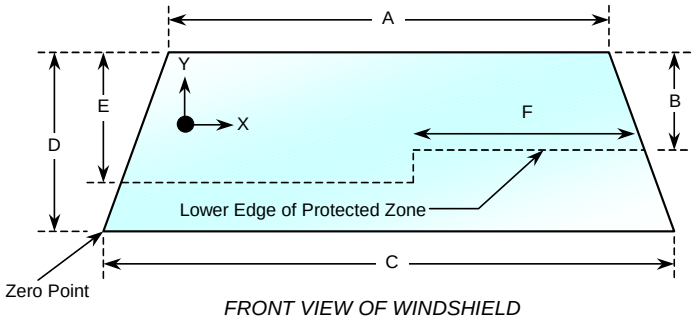
Windshield Mounting Details:
Windshield glass is secured to the vehicle frame with a rubber trim and glue.

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: 21.5°C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% of Retention
Left Side	2363	2363	100
Right Side	2363	2363	100
Total	4726	4726	100



FRONT VIEW OF WINDSHIELD

Item	Units	Value
A	mm	1268
B	mm	667
C	mm	1398
D	mm	1030
E	mm	668
F	mm	530

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: 2013 Ford C-MAX Hybrid SE 5-Dr Hatchback NHTSA No.: MD0205
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/05/2012

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

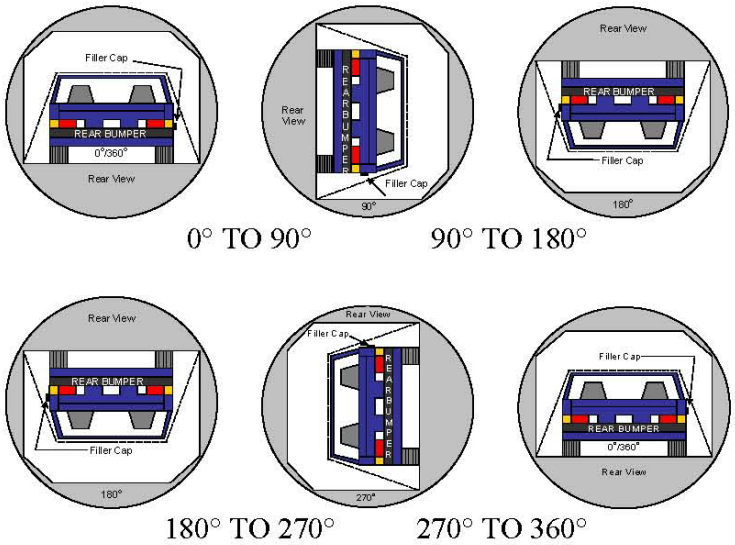
Temperature at Time of Impact: 21.5°C Test Time: 4:31 p.m.

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: 2013 Ford C-MAX Hybrid SE 5-Dr Hatchback
Test Program: NCAP Frontal Barrier Impact Test
NHTSA No.: MD0205
Test Date: 12/05/2012

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°	102	300	402
90° to 180°	109	300	409
180° to 270°	107	300	407
270° to 360°	110	300	410

FMVSS 301 SPILLAGE TABLE (units in ounces)

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

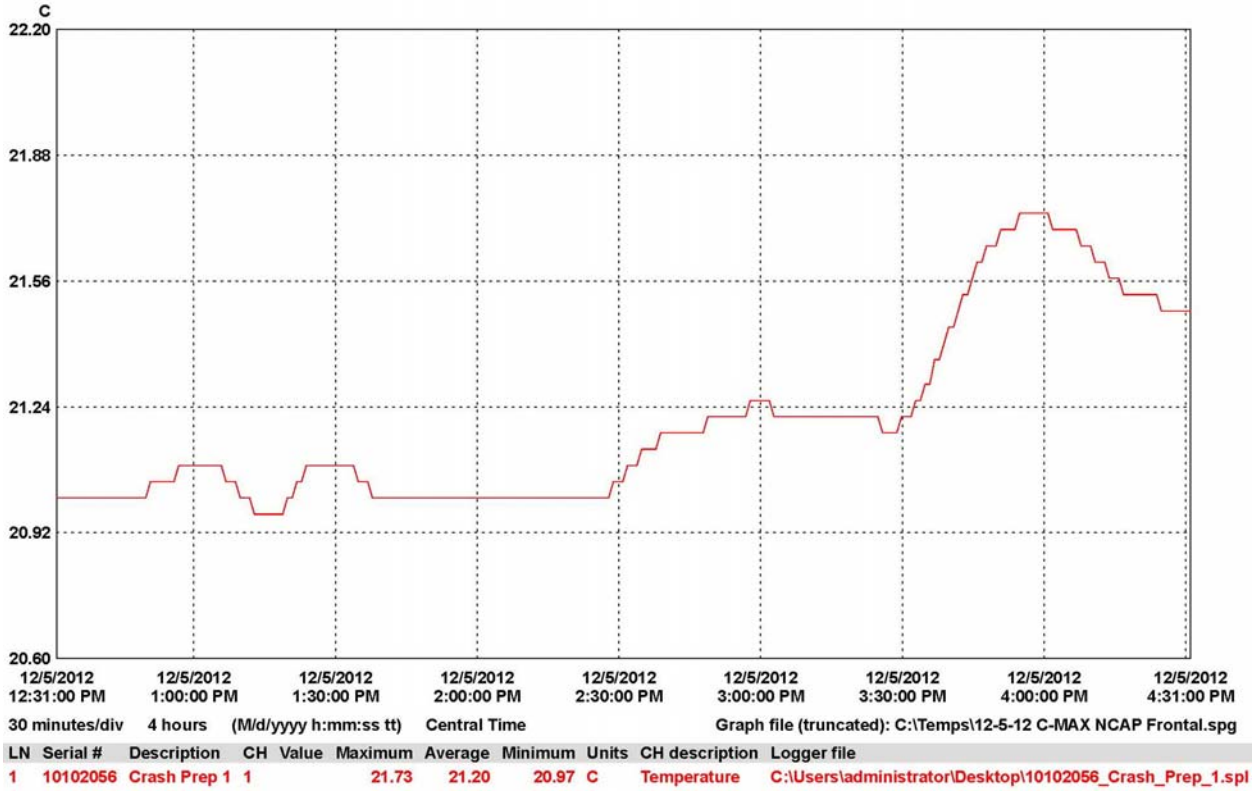
SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 17
DUMMY/VEHICLE TEMPERATURE STABILIZATION DATA

Test Vehicle: 2013 Ford C-MAX Hybrid SE 5-Dr Hatchback
Test Program: NCAP Frontal Barrier Impact Test

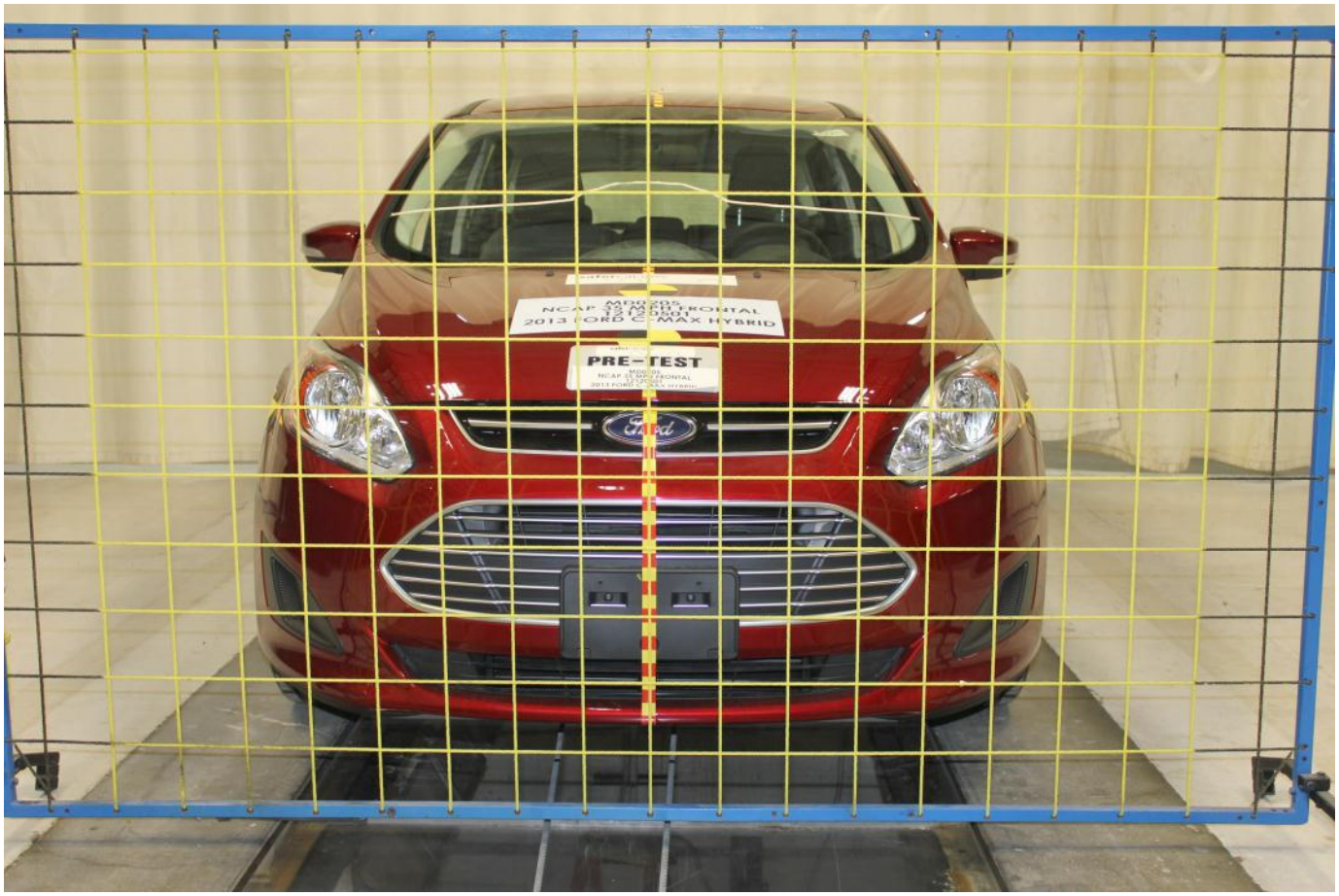
NHTSA No.: MD0205
Test Date: 12/05/2012



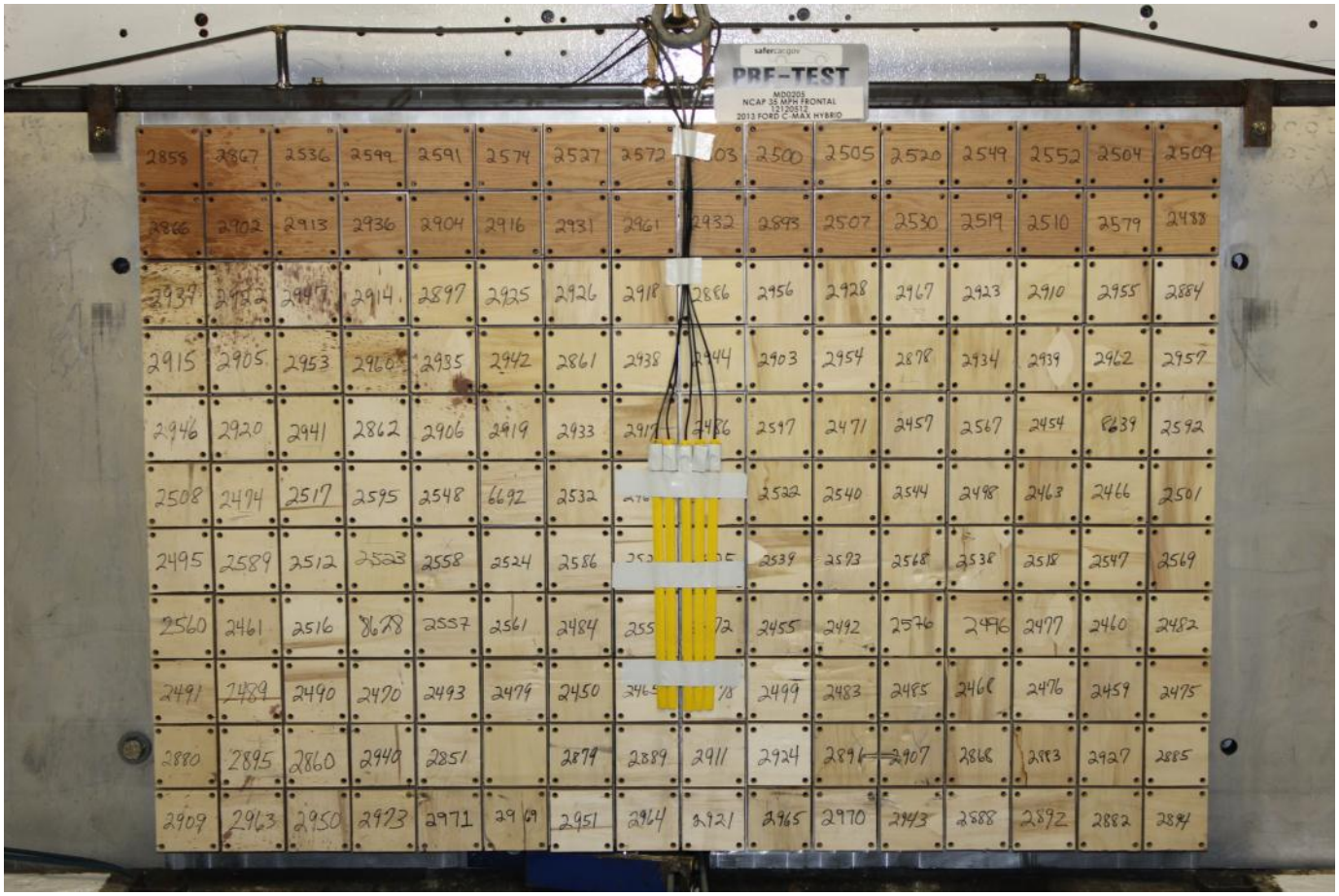
LN	Serial #	Description	CH	Value	Maximum	Average	Minimum	Units	CH description	Logger file
1	10102056	Crash Prep 1	1		21.73	21.20	20.97	C	Temperature	C:\Users\administrator\Desktop\10102056_Crash_Prep_1.spl

APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS



Load Cell Location



Load Cell Wall

Manufacturer's Label

Tire Placard

2013 Ford C-MAX Hybrid 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

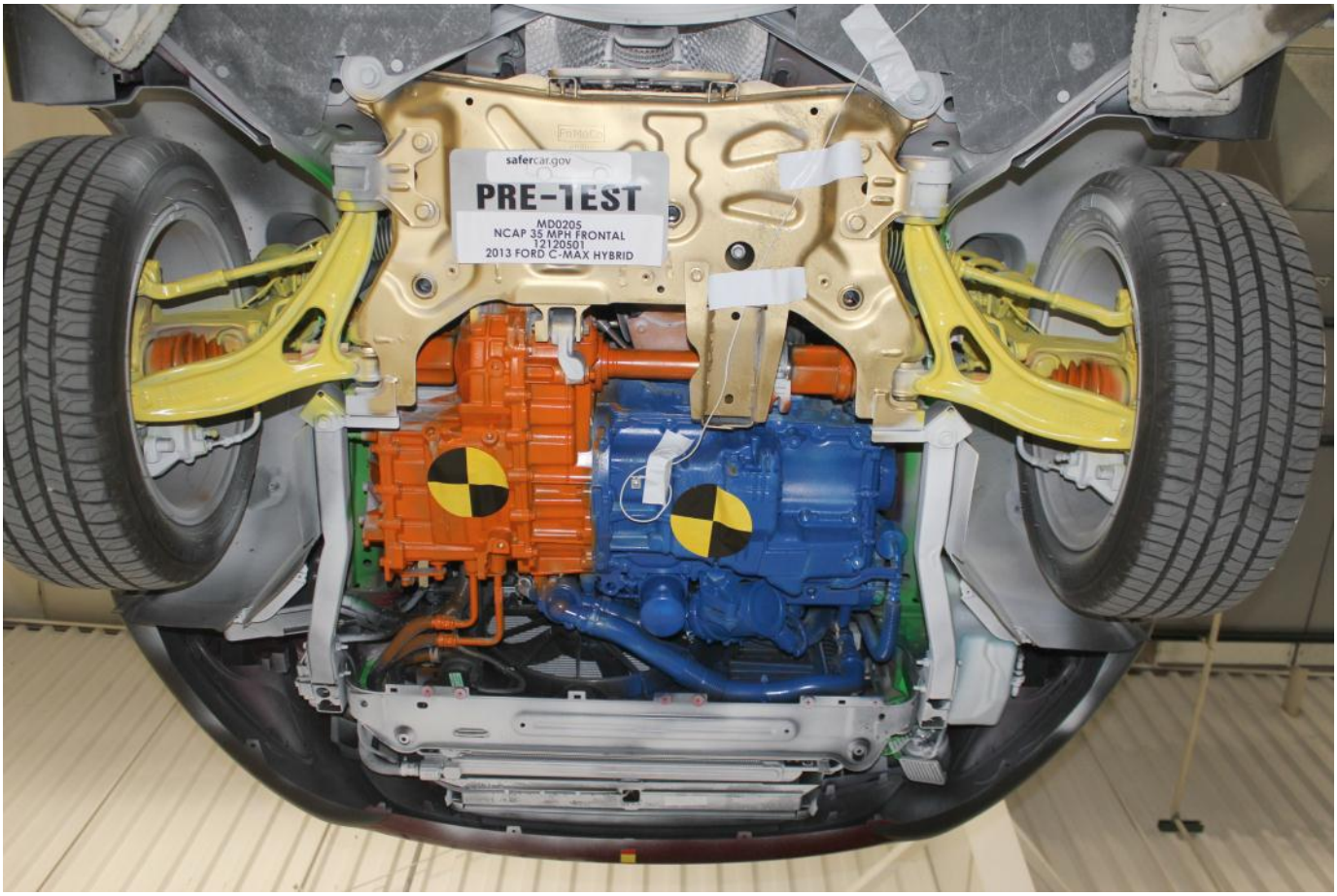
Post-Test Windshield View

Pre-Test Engine Compartment View

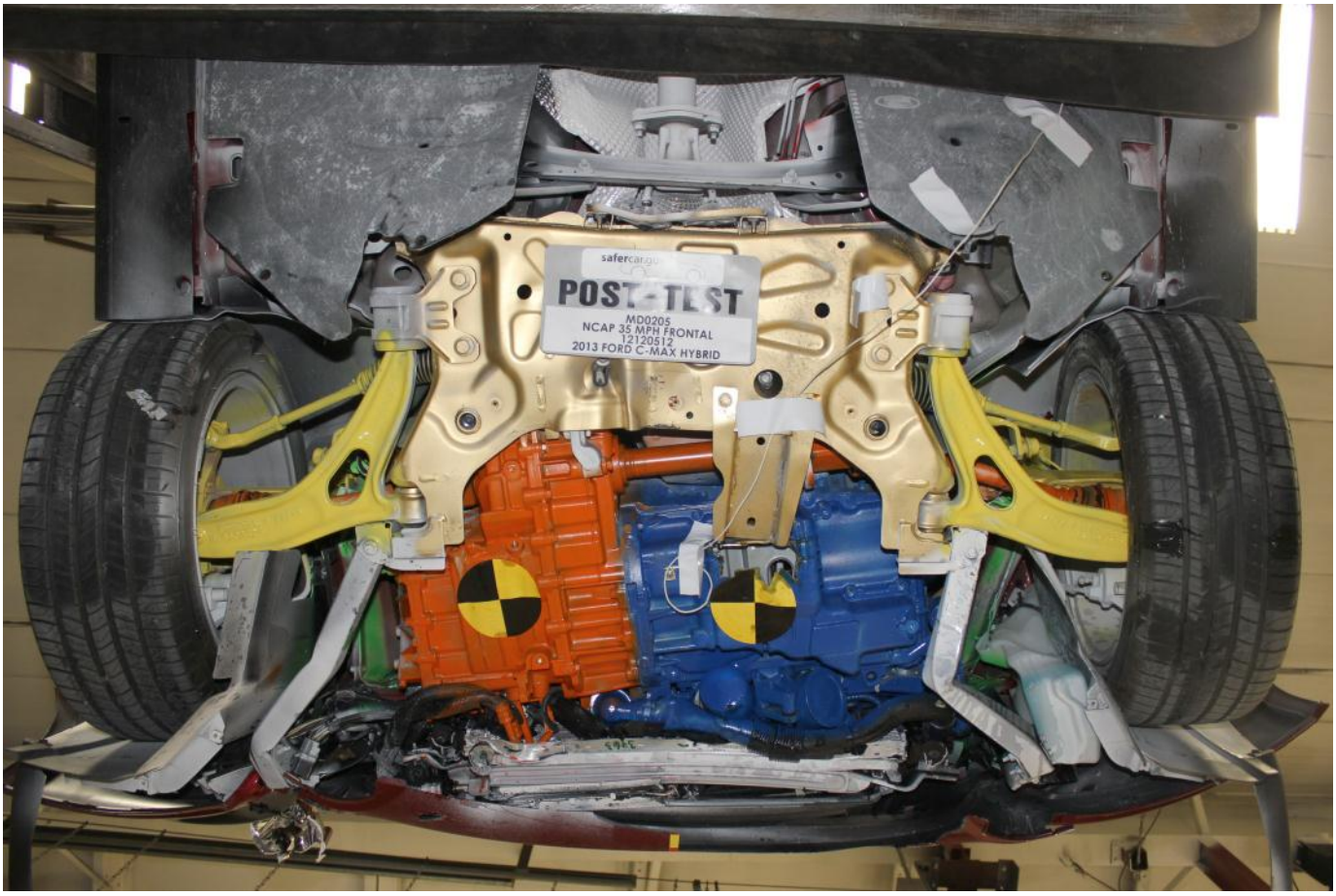
Post-Test Engine Compartment View

Pre-Test Fuel Filler Cap View

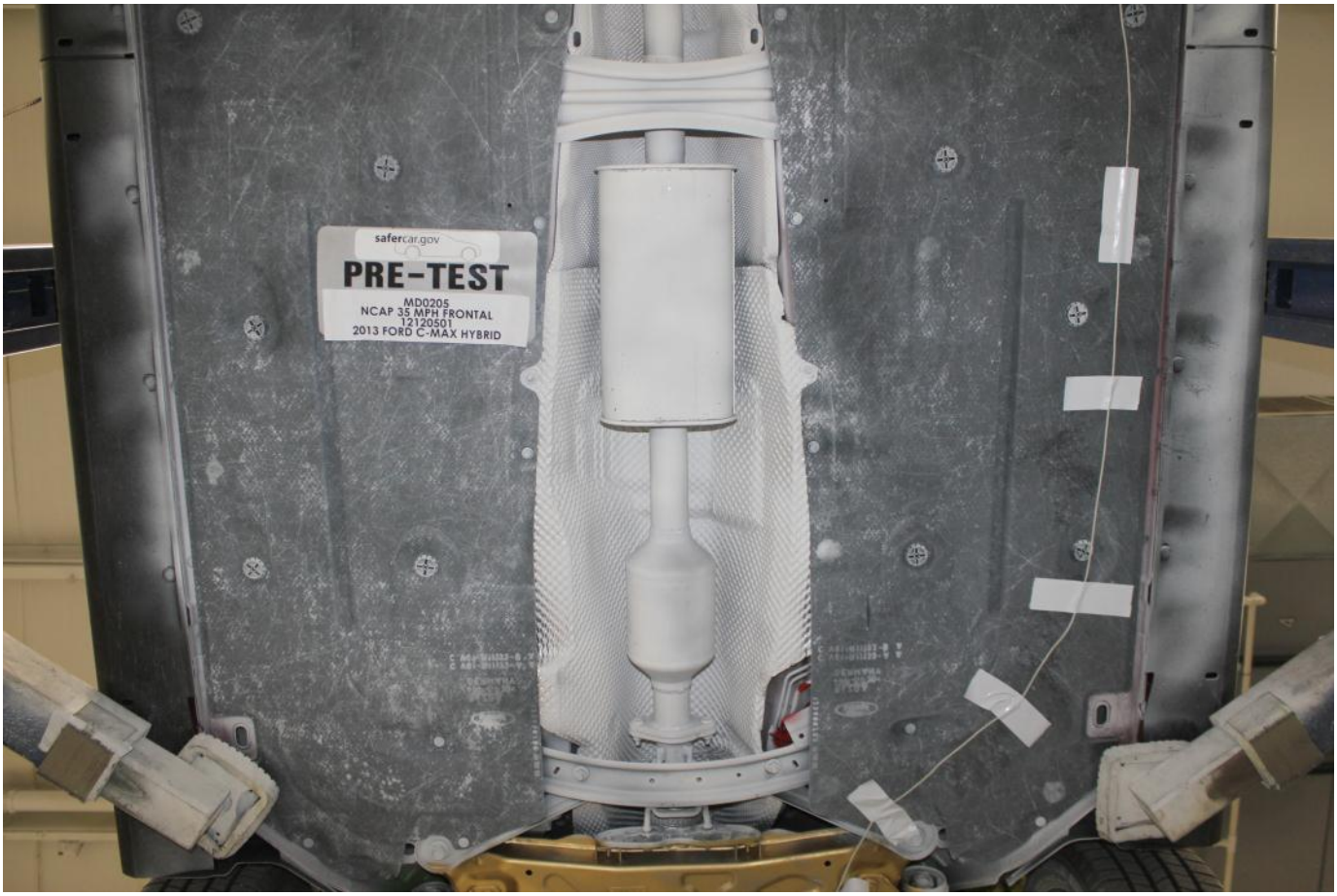
Post-Test Fuel Filler Cap View



Pre-Test Front Underbody View

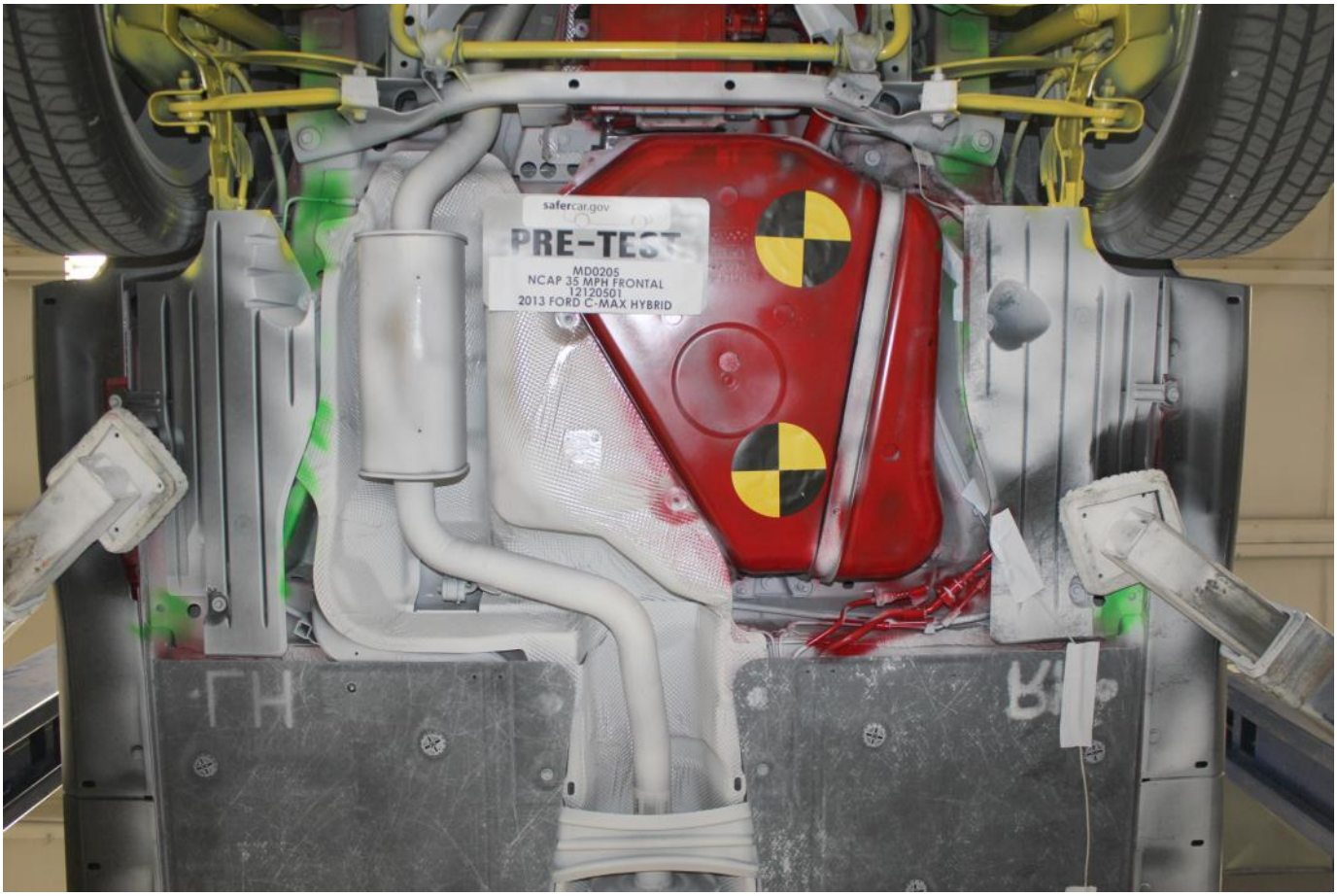


Post-Test Front Underbody View

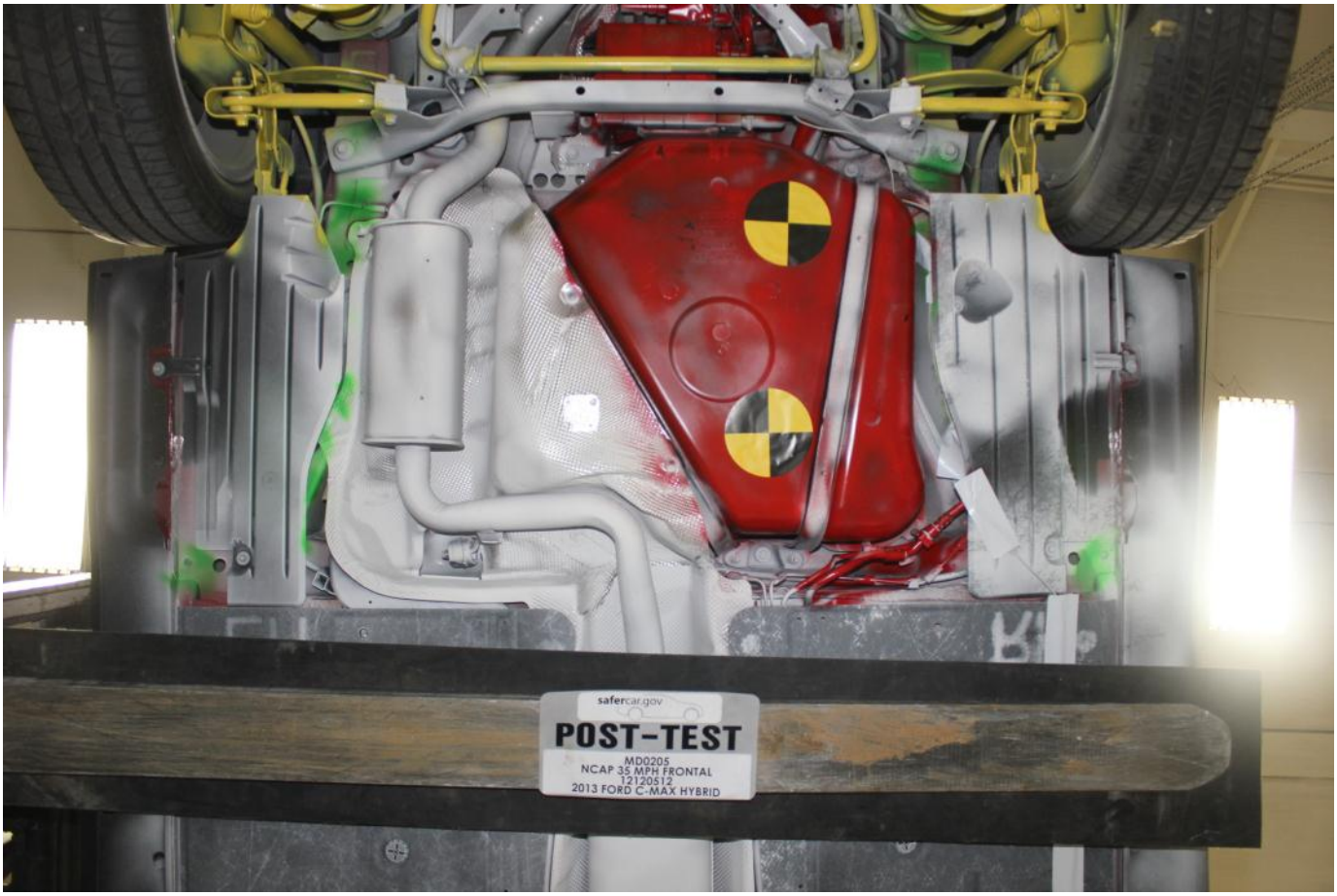


Pre-Test Mid Front Underbody View

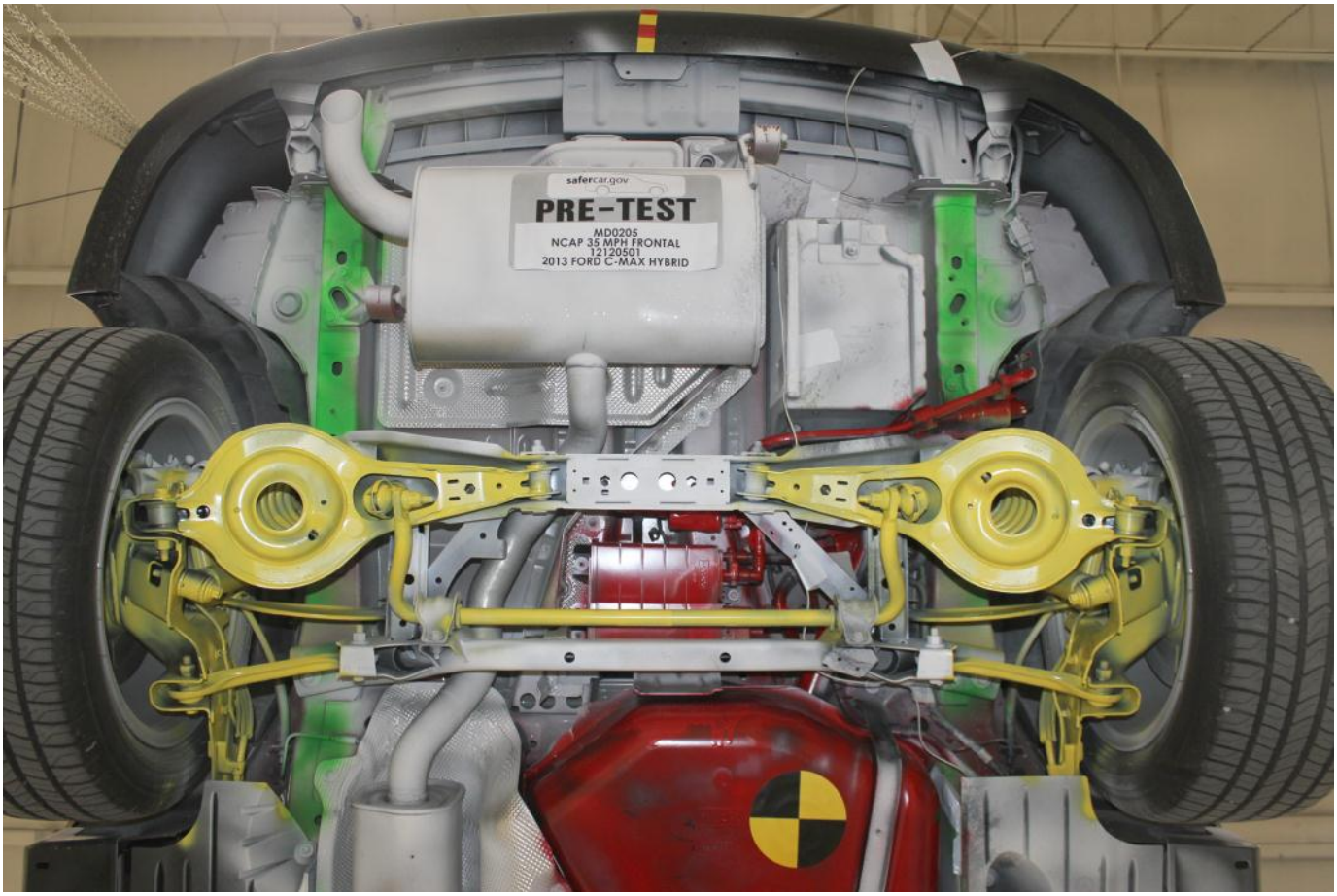
Post-Test Mid Front Underbody View



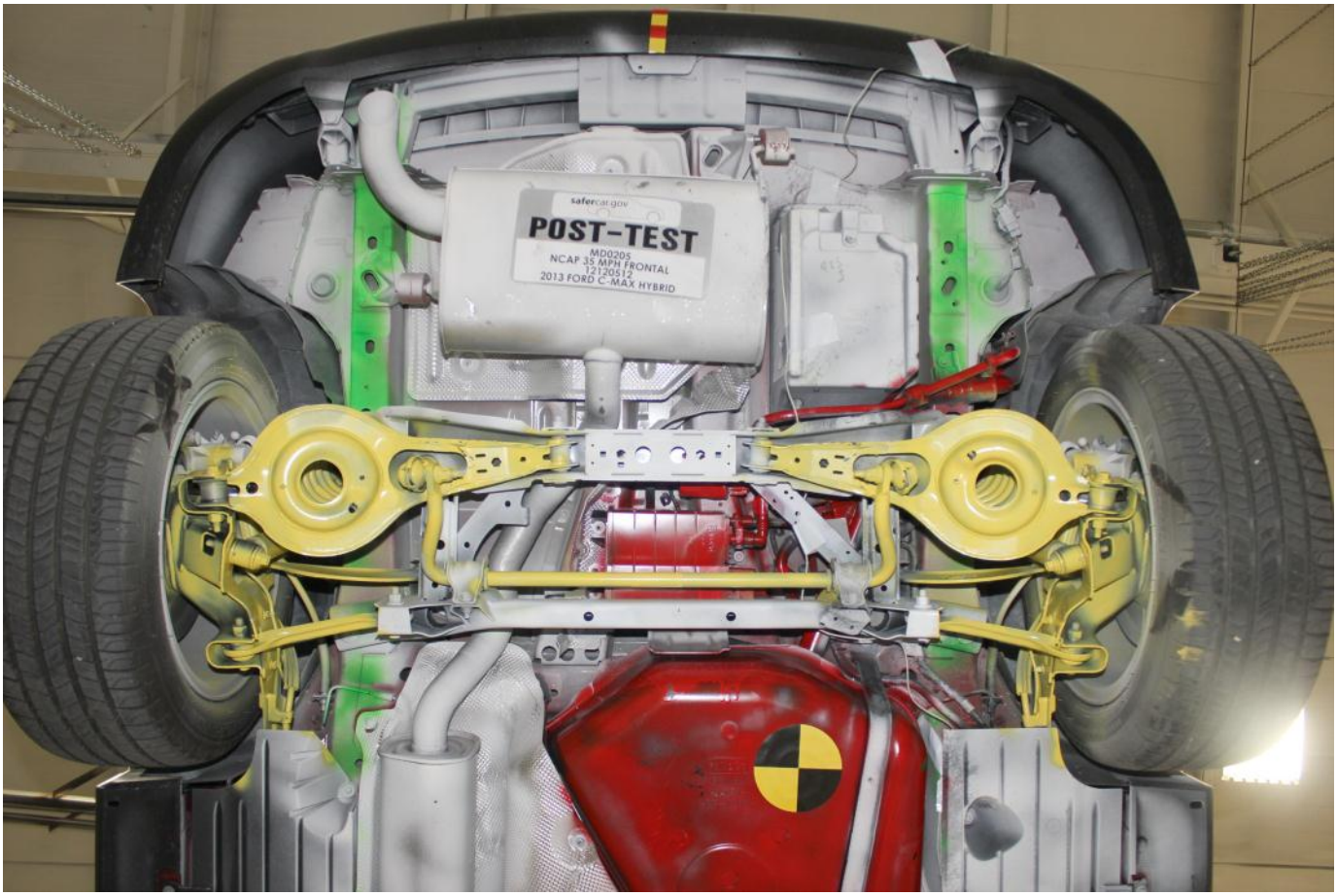
Pre-Test Mid Rear Underbody View



Post-Test Mid Rear Underbody View



Pre-Test Rear Underbody View



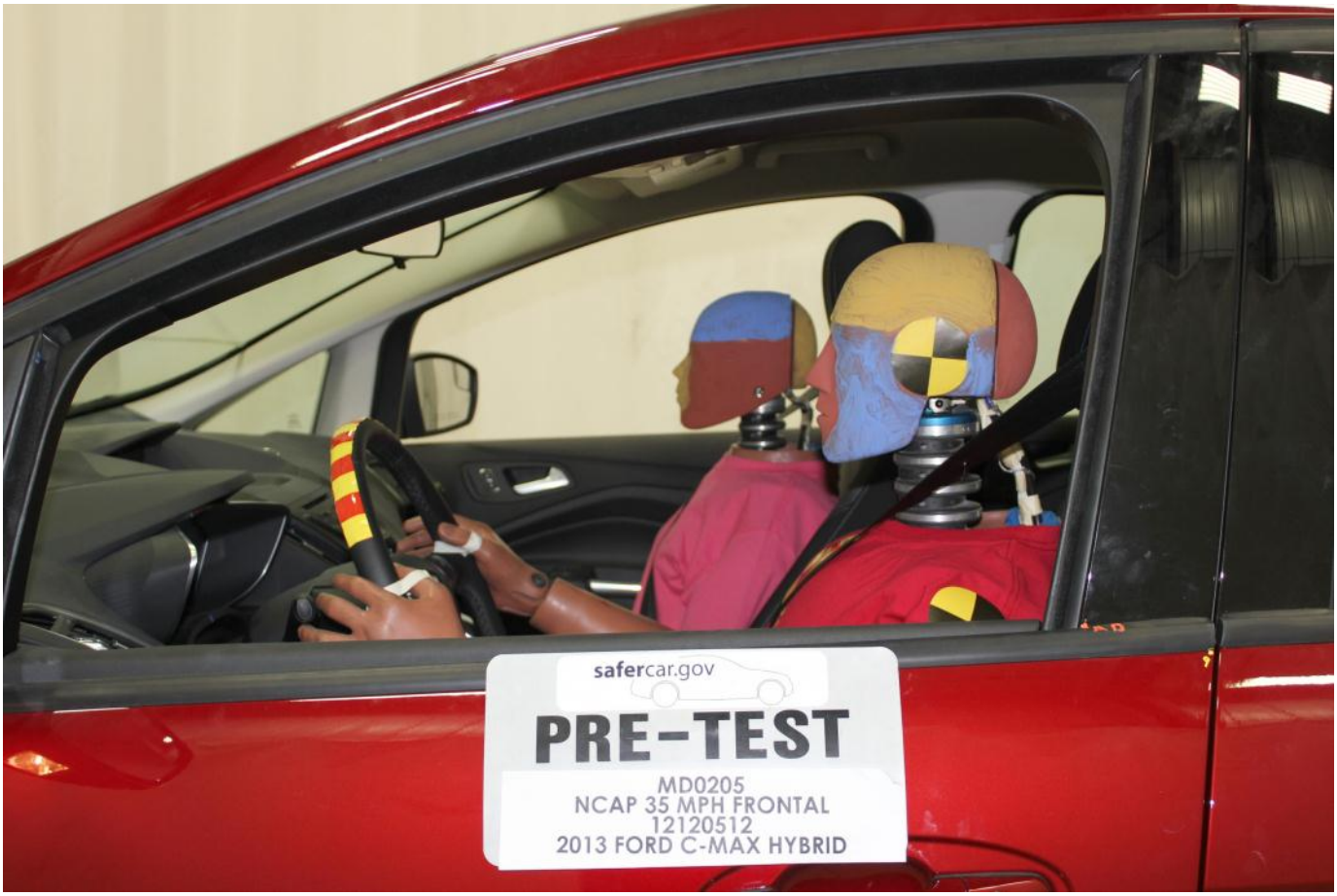
Post-Test Rear Underbody View

Pre-Test Dummy Cable Routing

Post-Test Dummy Cable Routing

Pre-Test Driver Dummy Front View

Post-Test Driver Dummy Front View

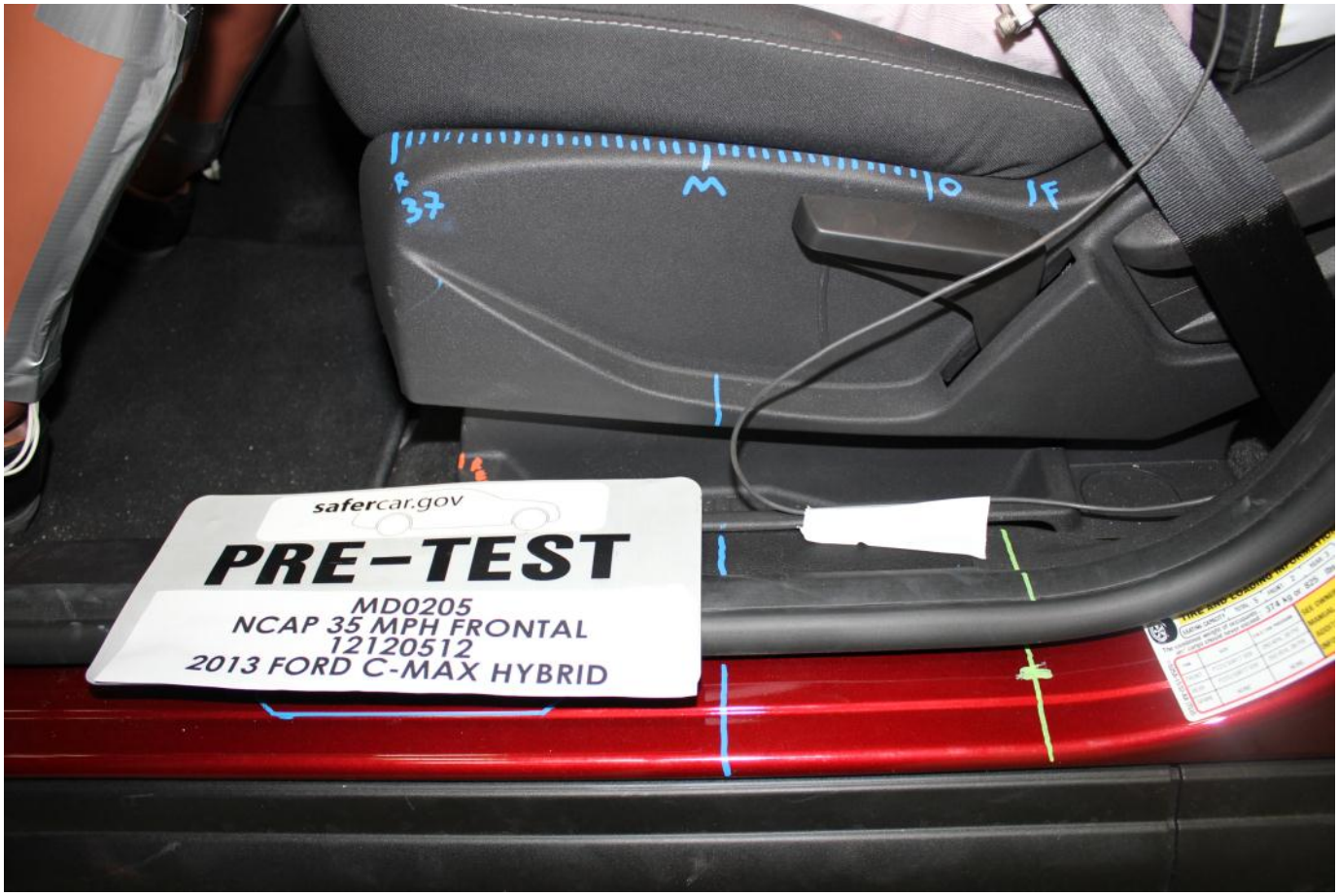


Pre-Test Driver Dummy Window View

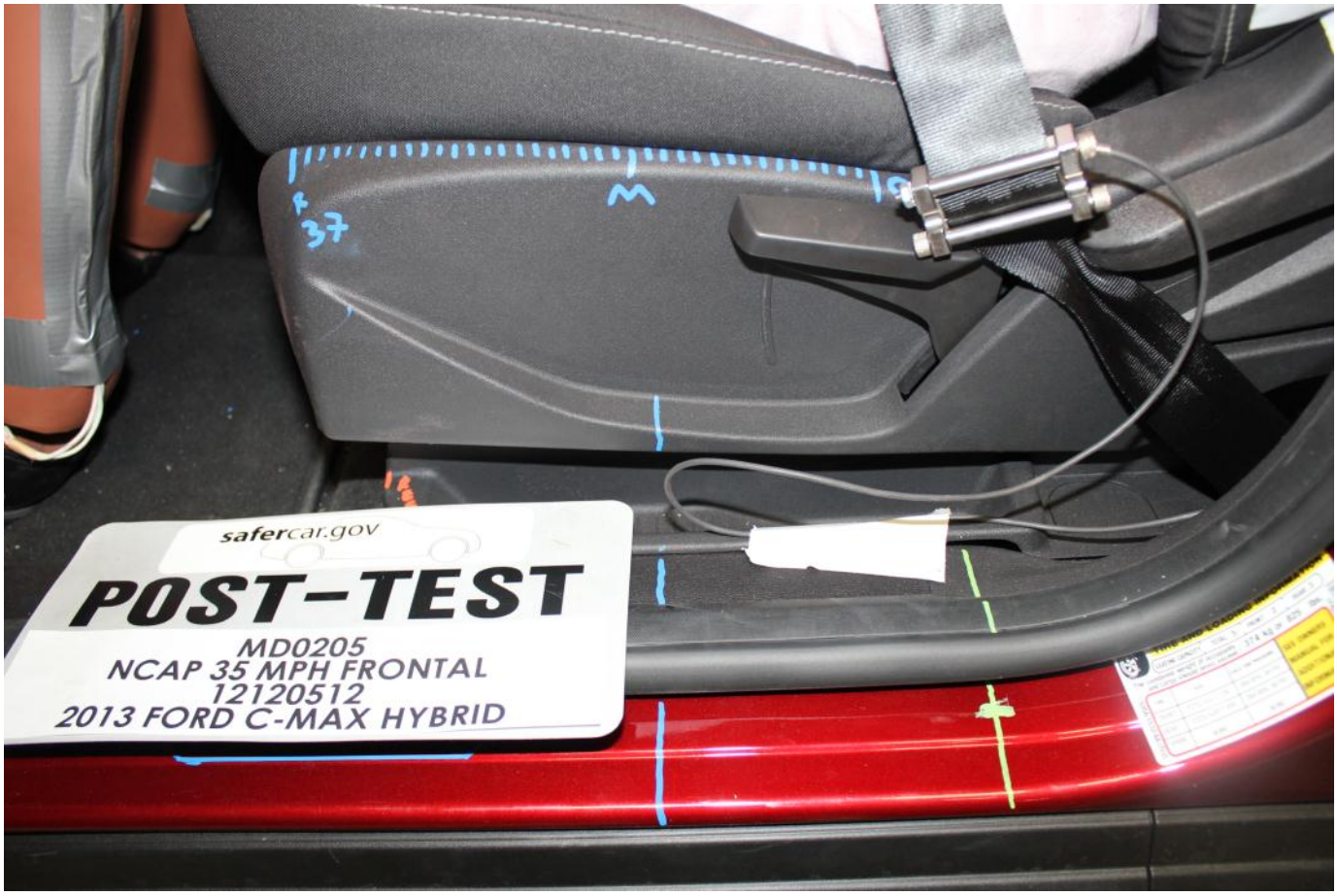
Post-Test Driver Dummy Window View

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

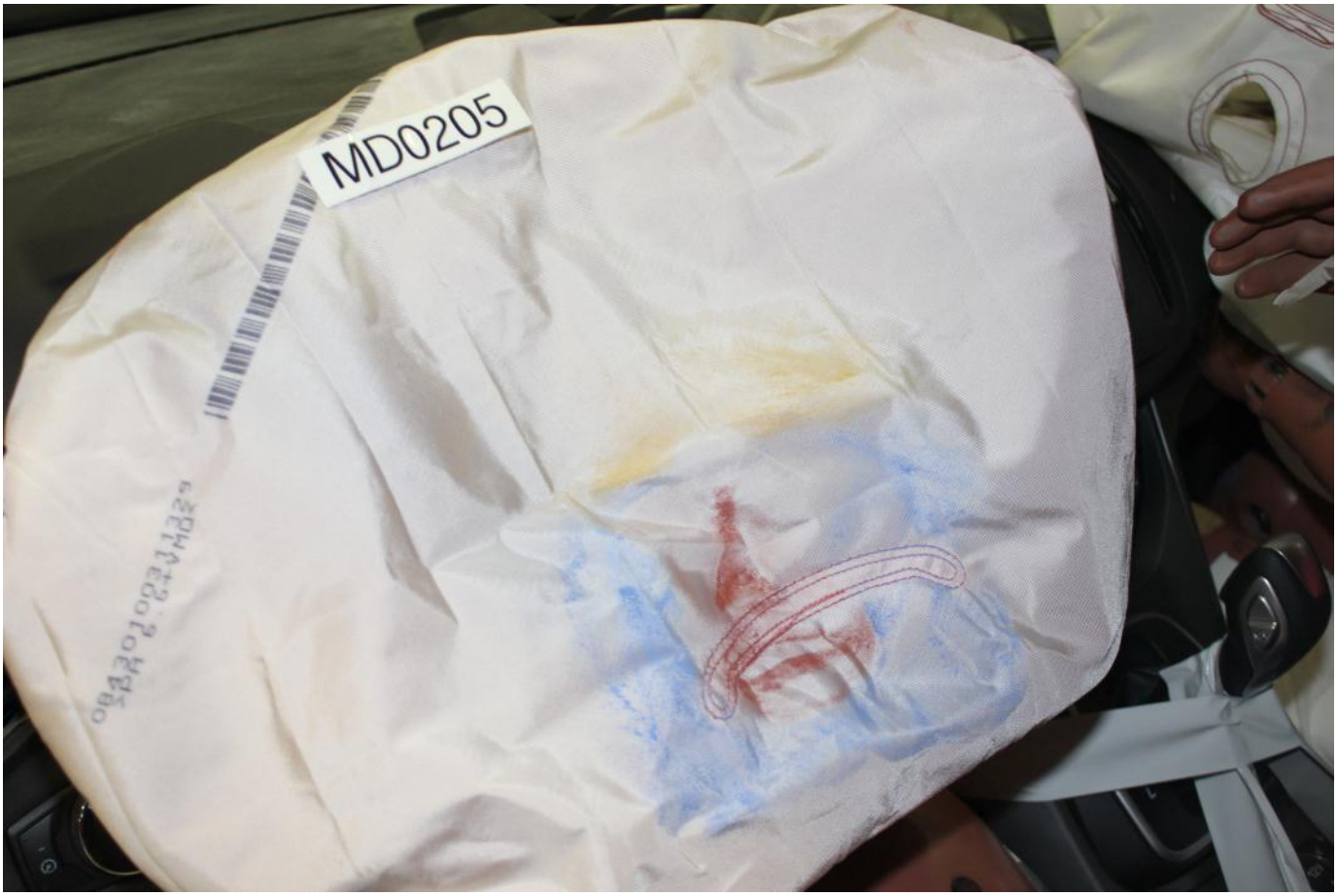
Pre-Test Driver's Side Knee Bolster (without dummy)

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)

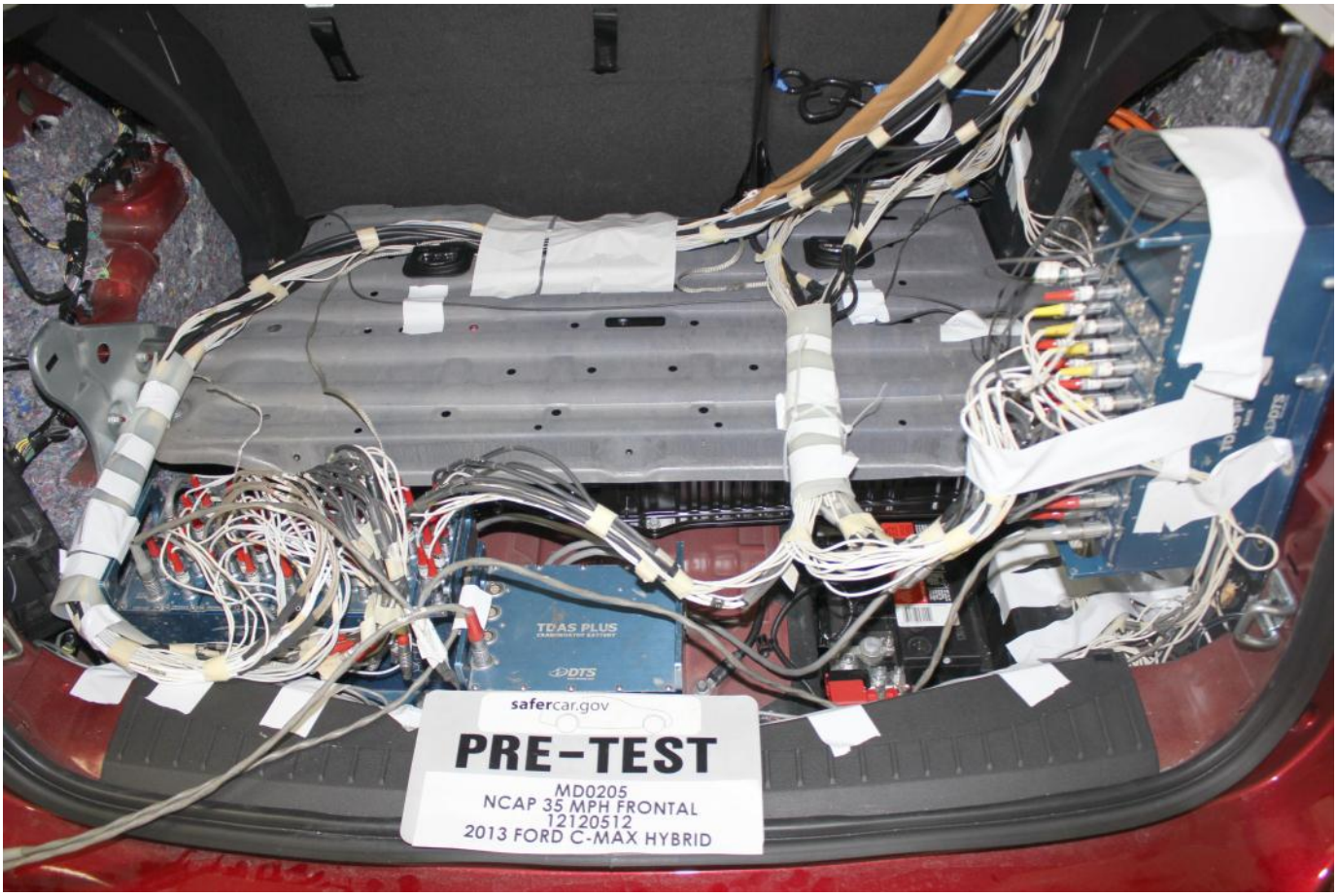
Pre-Test Passenger's Side Floorpan

Post-Test Passenger's Side Floorpan

Post-Test Passenger Dummy Contact with Airbag

Post-Test Passenger Dummy Contact with Headrest

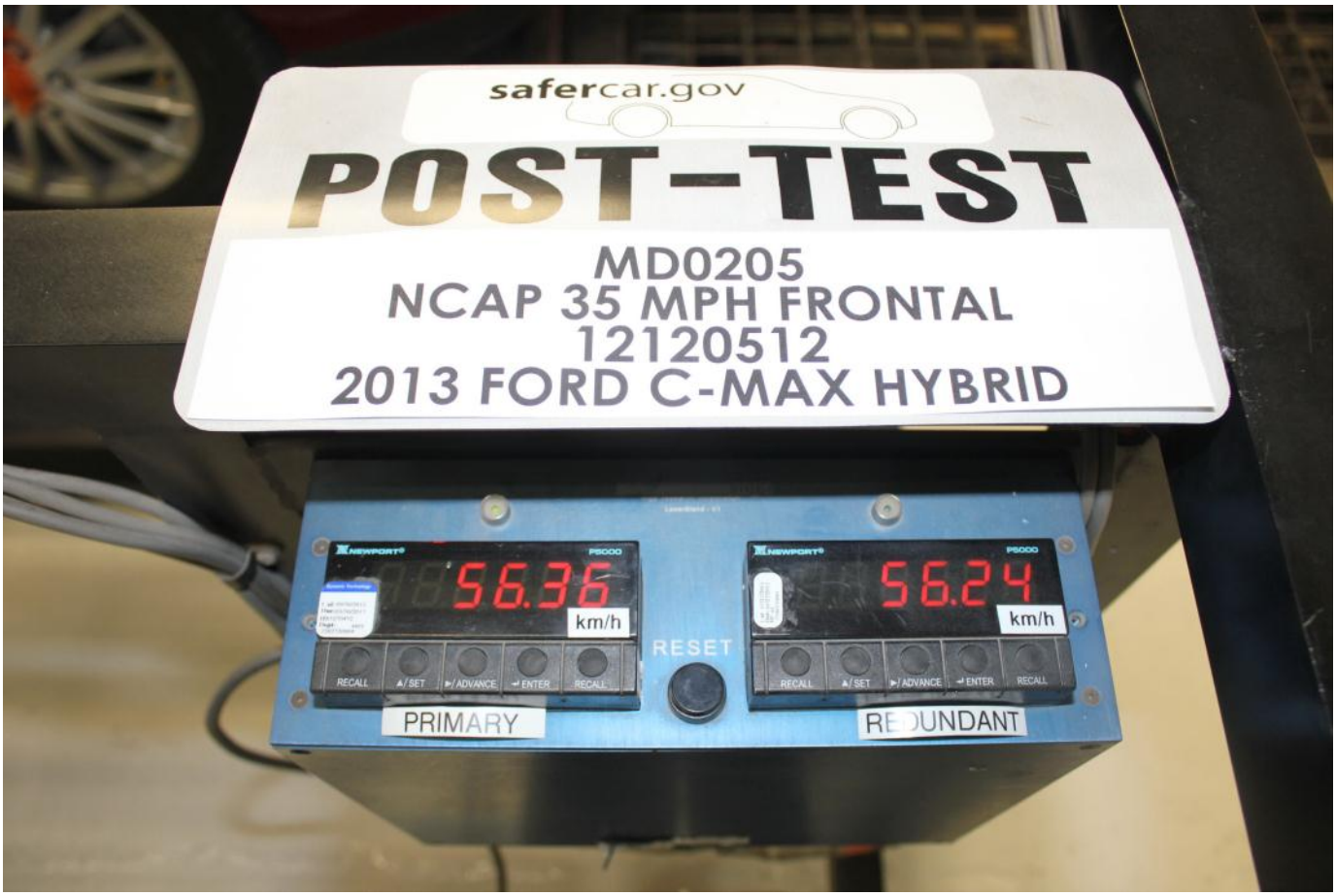
Post-Test Passenger Dummy Contact with Glove Box



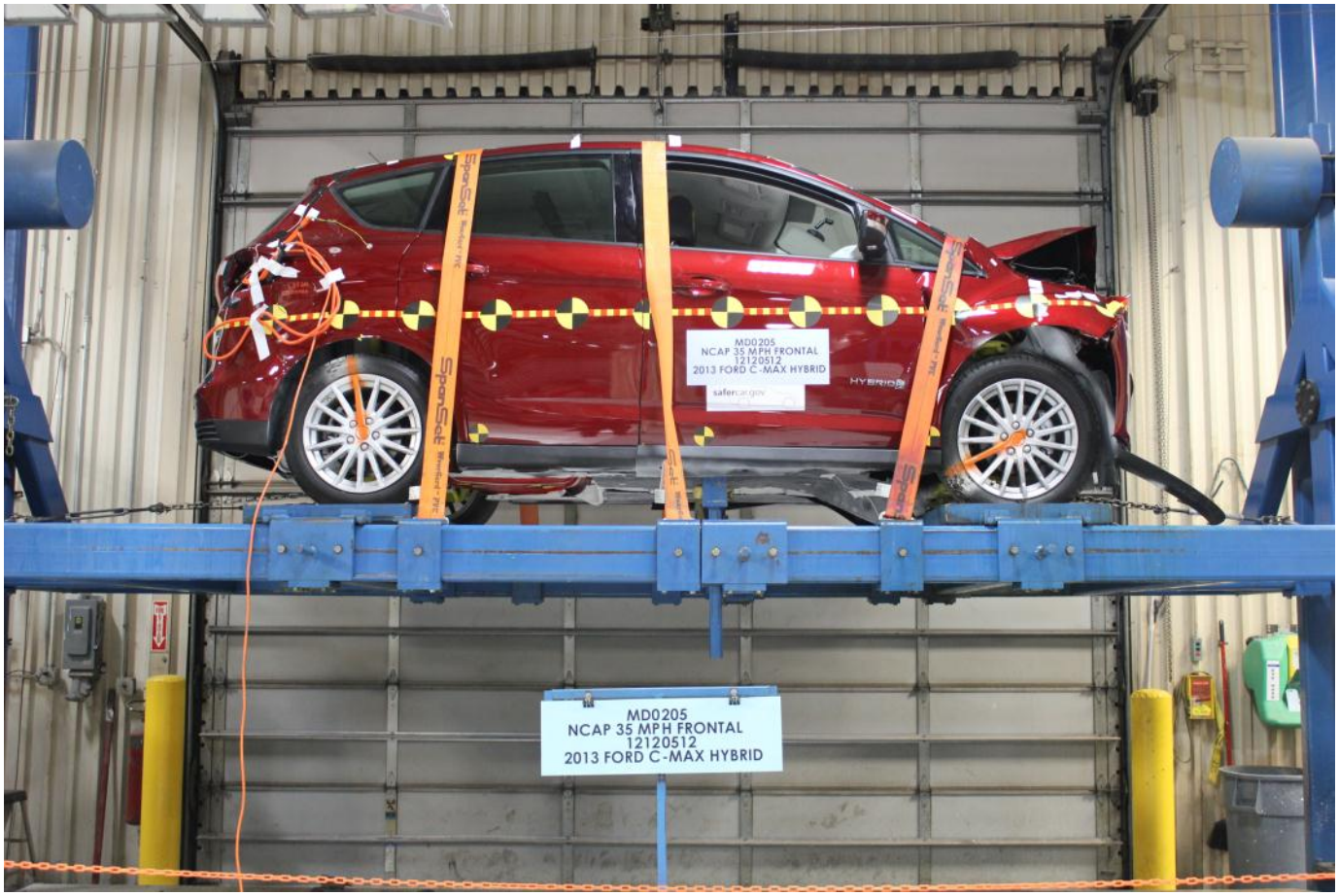
Ballast Installed in Vehicle

PHOTOGRAPH NOT APPLICABLE

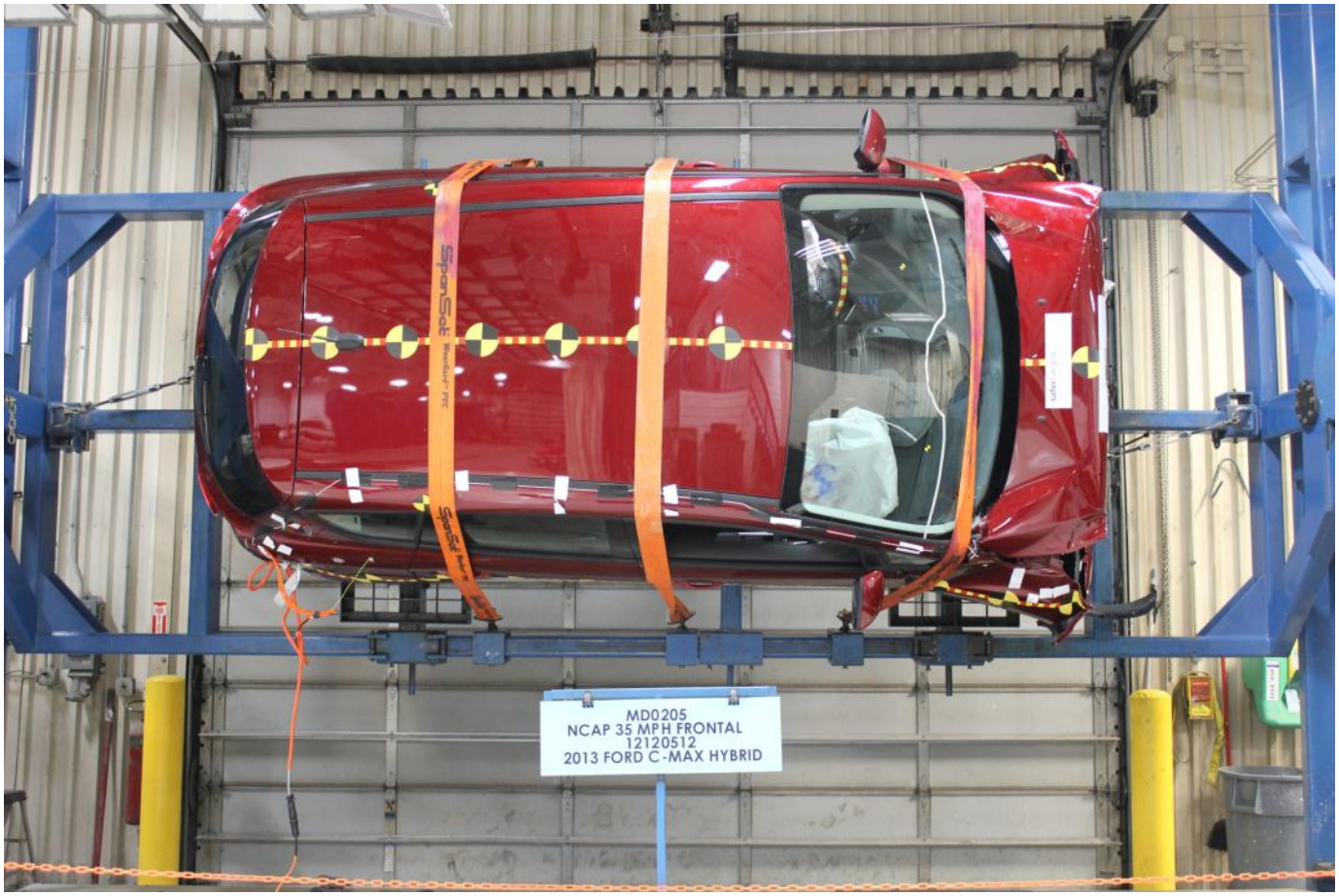
Post-Test Stoddard Solvent Spillage Location View



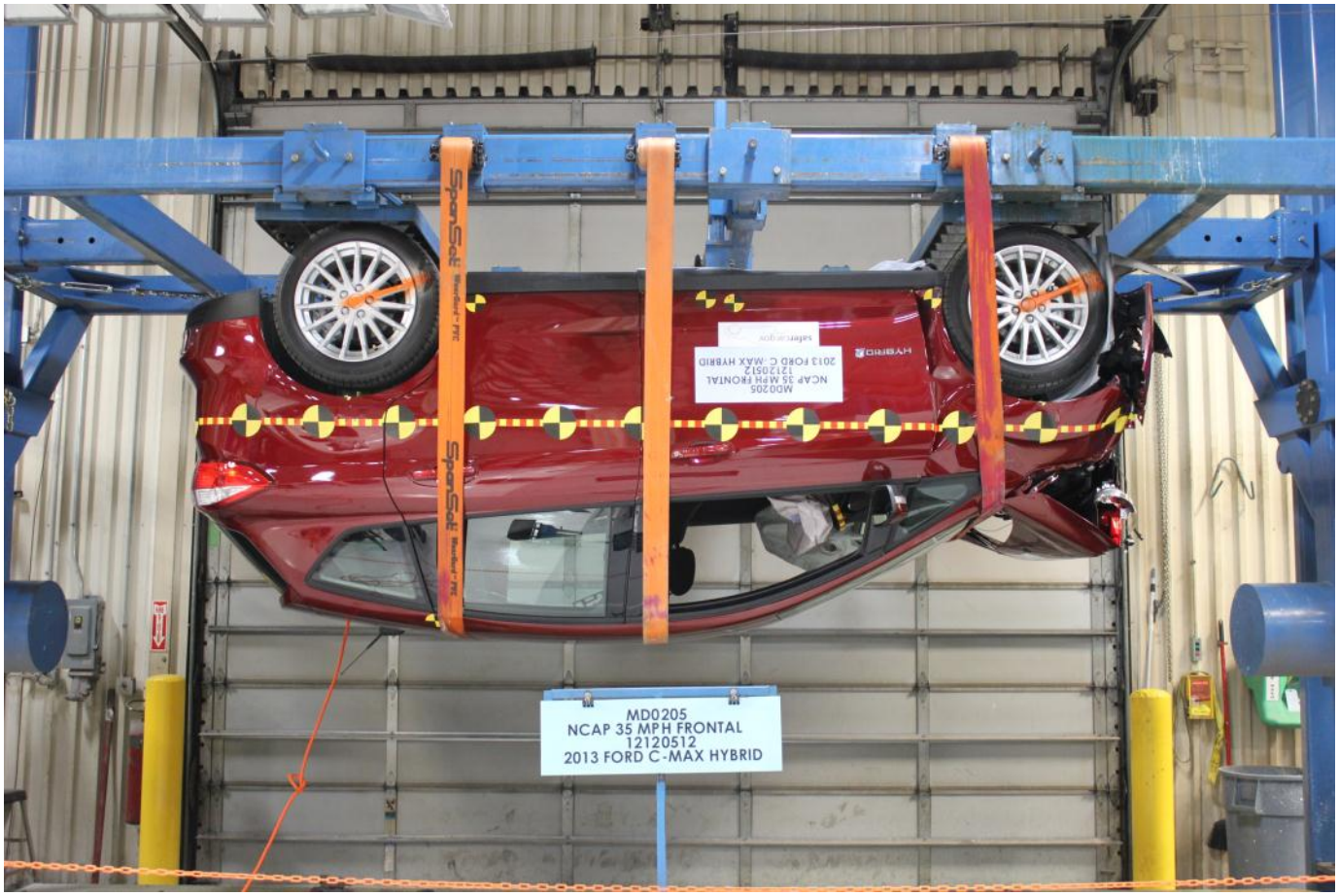
Post-Test Speed Trap Read-Out



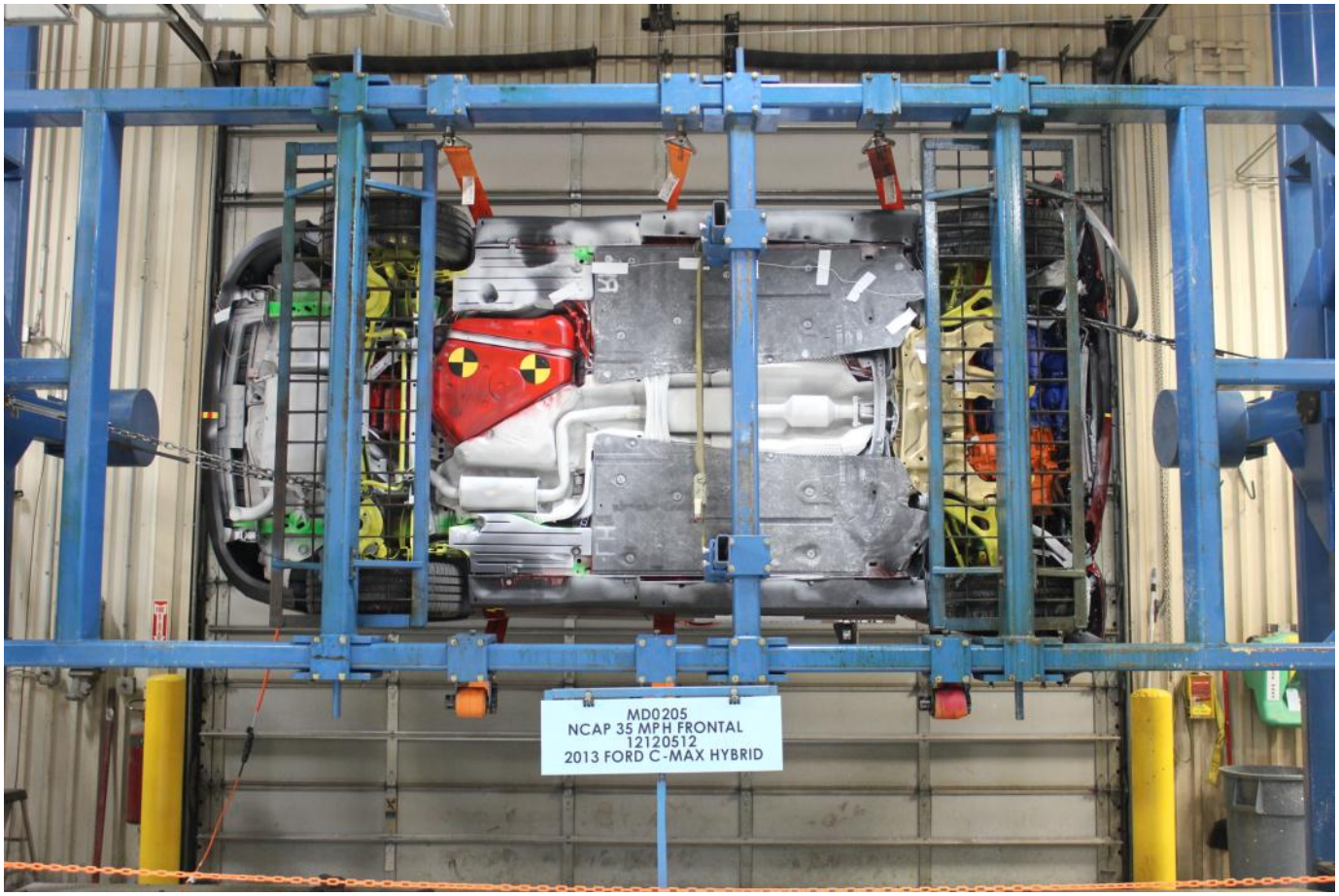
Vehicle at 0° on Static Rollover Device



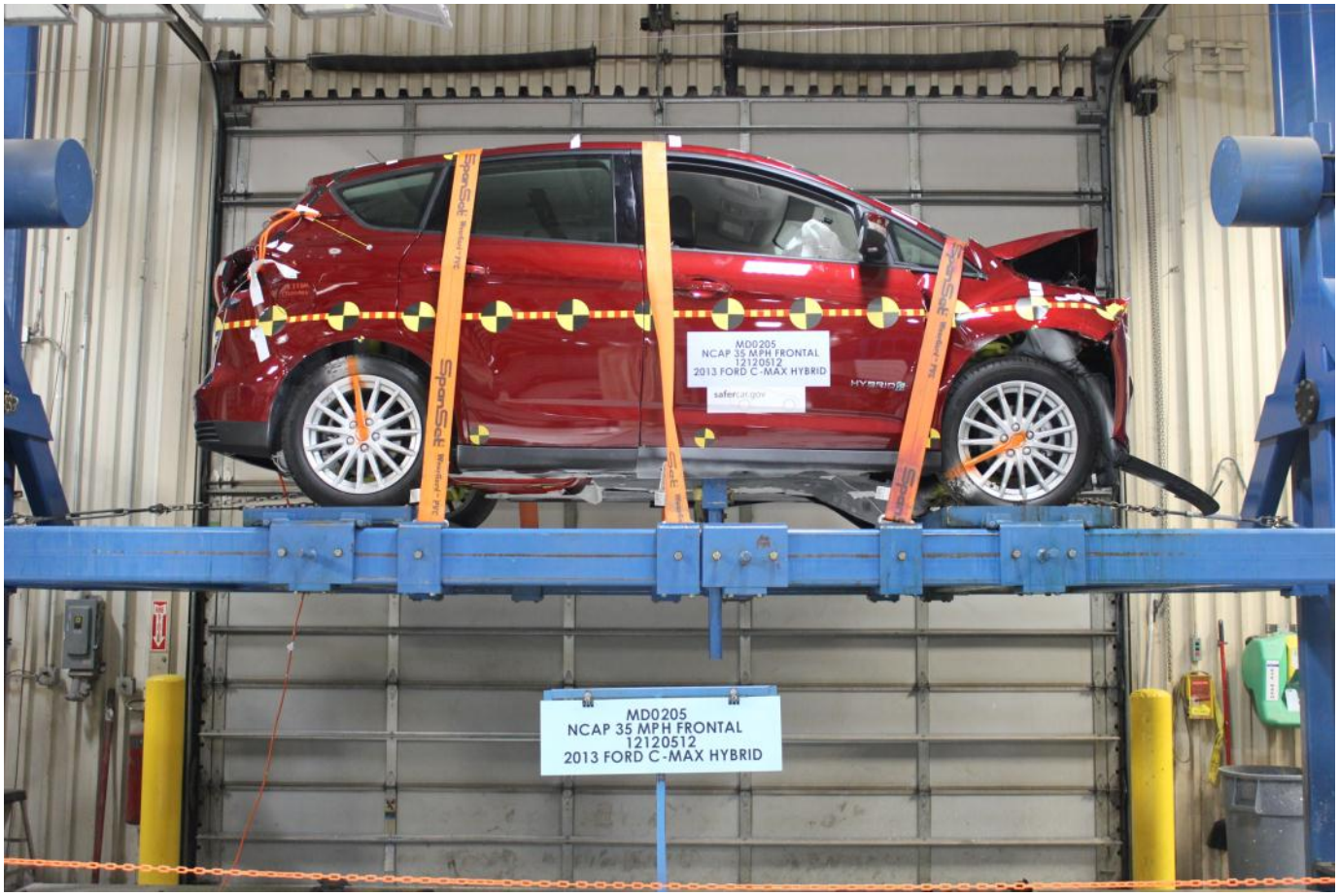
Vehicle at 90° on Static Rollover Device



Vehicle at 180° on Static Rollover Device

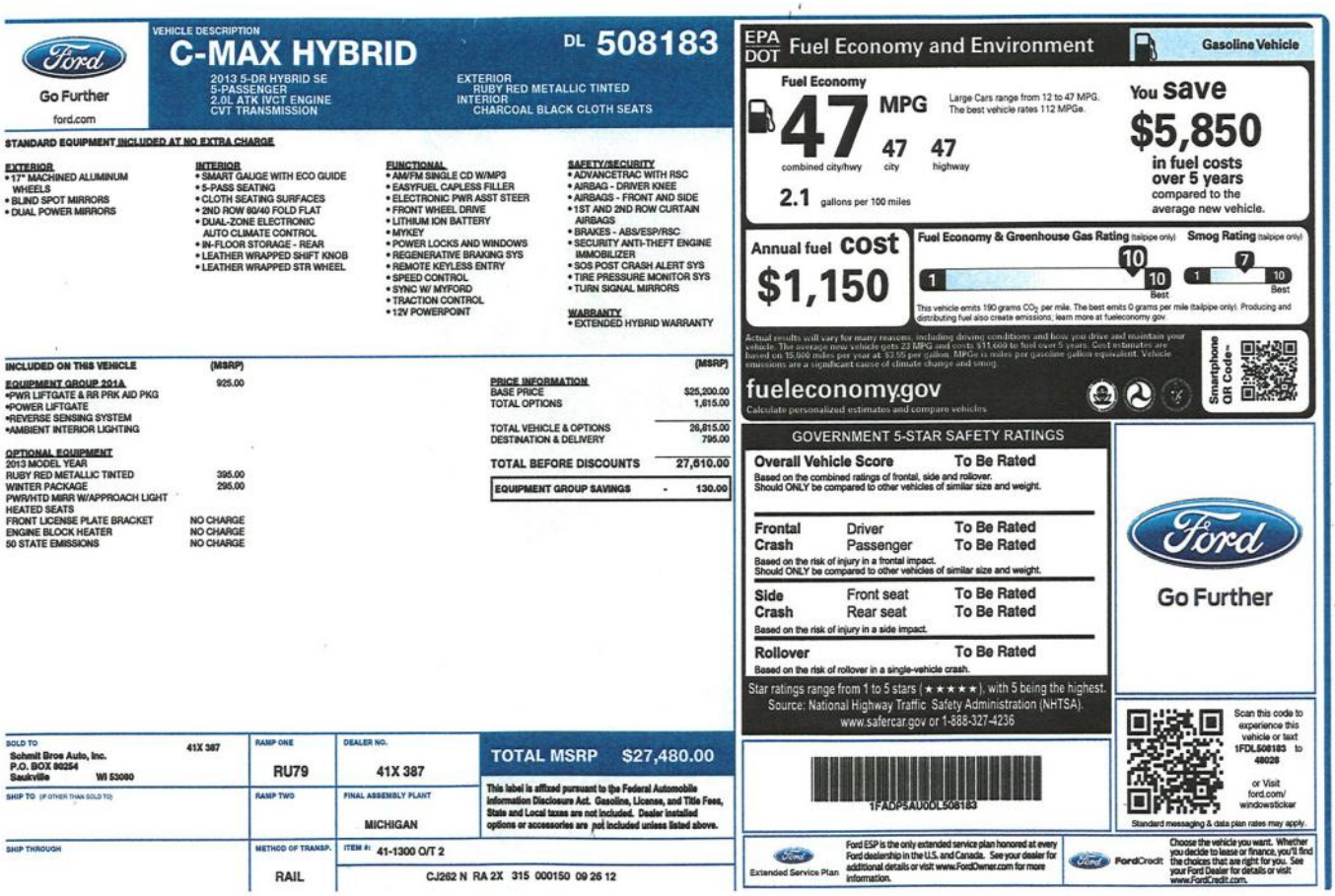


Vehicle at 270° on Static Rollover Device



Vehicle at 360° on Static Rollover Device

2013 Ford C-MAX Hybrid Frontal Impact Event



VEHICLE DESCRIPTION

C-MAX HYBRID

DL 508183

2013 5-DR HYBRID SE
5-PASSENGER
2.0L ATK IVCT ENGINE
CVT TRANSMISSION

EXTERIOR
RUBY RED METALLIC TINTED
INTERIOR
CHARCOAL BLACK CLOTH SEATS

Ford
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ford.com

STANDARD EQUIPMENT INCLUDED AT NO EXTRA CHARGE

EXTERIOR
- 17" MACHINED ALUMINUM WHEELS
- BLIND SPOT MIRRORS
- DUAL POWER MIRRORS

INTERIOR
- SMART GAUGE WITH ECO GUIDE
- 5-PASS SEATING
- CLOTH SEATING SURFACES
- 2ND ROW 60/40 FOLD FLAT
- DUAL-ZONE ELECTRONIC AUTO CLIMATE CONTROL
- IN-FLOOR STORAGE - REAR
- LEATHER WRAPPED SHIFT KNOB
- LEATHER WRAPPED STR WHEEL

FUNCTIONAL
- AM/FM SINGLE CD W/MP3
- EASYFUEL CAPLESS FILLER
- ELECTRONIC PWR ASST STEER
- FRONT WHEEL DRIVE
- LITHIUM ION BATTERY
- MYKEY
- POWER LOCKS AND WINDOWS
- REGENERATIVE BRAKING SYS
- REMOTE KEYLESS ENTRY
- SPEED CONTROL
- SYNC W/ MYFORD
- TRACTION CONTROL
- 12V POWERPOINT

SAFETY/SECURITY
- ADVANCETRAC WITH RSC
- AIRBAG - DRIVER KNEE
- AIRBAGS - FRONT AND SIDE
- 1ST AND 2ND ROW CURTAIN AIRBAGS
- BRAKES - ABS/ESP/RSC
- SECURITY ANTI-THEFT ENGINE IMMOBILIZER
- SOS POST CRASH ALERT SYS
- TIRE PRESSURE MONITOR SYS
- TURN SIGNAL MIRRORS

WARRANTY
- EXTENDED HYBRID WARRANTY

INCLUDED ON THIS VEHICLE	(MSRP)
EQUIPMENT GROUP 201A	925.00
•PWR LIFTGATE & RR PRK AID PKG	
•POWER LIFTGATE	
•REVERSE SENSING SYSTEM	
•AMBIENT INTERIOR LIGHTING	
OPTIONAL EQUIPMENT	
2013 MODEL YEAR	
RUBY RED METALLIC TINTED	395.00
WINTER PACKAGE	295.00
PWR/HTD MIRR W/APPROACH LIGHT	
HEATED SEATS	
FRONT LICENSE PLATE BRACKET	NO CHARGE
ENGINE BLOCK HEATER	NO CHARGE
50 STATE EMISSIONS	NO CHARGE

PRICE INFORMATION	(MSRP)
BASE PRICE	$25,200.00
TOTAL OPTIONS	1,615.00
TOTAL VEHICLE & OPTIONS	26,815.00
DESTINATION & DELIVERY	795.00
TOTAL BEFORE DISCOUNTS	27,610.00
EQUIPMENT GROUP SAVINGS	- 130.00

SOLD TO		RAMP ONE	DEALER NO.	TOTAL MSRP $27,480.00
Schmit Bros Auto, Inc. P.O. BOX 80254 Saukville WI 53080	41X 387	RU79	41X 387	This label is affixed pursuant to the Federal Automobile Information Disclosure Act. Gasoline, License, and Title Fees, State and Local taxes are not included. Dealer installed options or accessories are not included unless listed above.
SHIP TO (IF OTHER THAN SOLD TO)		RAMP TWO	FINAL ASSEMBLY PLANT	
			MICHIGAN	
SHIP THROUGH		METHOD OF TRANSP.	ITEM #: 41-1300 O/T 2	
		RAIL	CJ262 N RA 2X 315 000150 09 26 12	

EPA DOT **Fuel Economy and Environment**

Gasoline Vehicle

Fuel Economy

47 MPG combined city/hwy

47 city 47 highway

Large Cars range from 12 to 47 MPG. The best vehicle rates 112 MPGe.

2.1 gallons per 100 miles

You **save** **$5,850** in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost **$1,150**

Fuel Economy & Greenhouse Gas Rating (tailpipe only) 10 (1 – 10 Best)

Smog Rating (tailpipe only) 7 (1 – 10 Best)

This vehicle emits 190 grams 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 $11,600 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at $3.50 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

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score — **To Be 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: **To Be Rated**; Passenger: **To Be 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: **To Be Rated**; Rear seat: **To Be Rated**
Based on the risk of injury in a side impact.

Rollover — **To Be 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

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or Visit ford.com/windowsticker

Standard messaging & data plan rates may apply.

Ford Extended Service Plan — Ford ESP is the only extended service plan honored at every Ford dealership in the U.S. and Canada. See your dealer for additional details or visit www.FordOwner.com for more information.

FordCredit — Choose the vehicle you want. Whether you decide to lease or finance, you'll find the choices that are right for you. See your Ford Dealer for details or visit www.FordCredit.com.

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 CG X Redundant

Driver Head CG Y Redundant

Driver Head CG Z Redundant

Driver 9 Axis Head X Arm Y

Driver 9 Axis Head X Arm Z

Driver 9 Axis Head Y Arm X

Driver 9 Axis Head Y Arm Z

Driver 9 Axis Head Z Arm X

Driver 9 Axis Head Z Arm Y

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 – Not Installed

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 – Not Installed

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

Left Rear Seat Crossmember X

Right Rear Seat Crossmember X

Vehicle Engine Top X

Vehicle Engine Bottom X

Left Rear Seat Crossmember Z

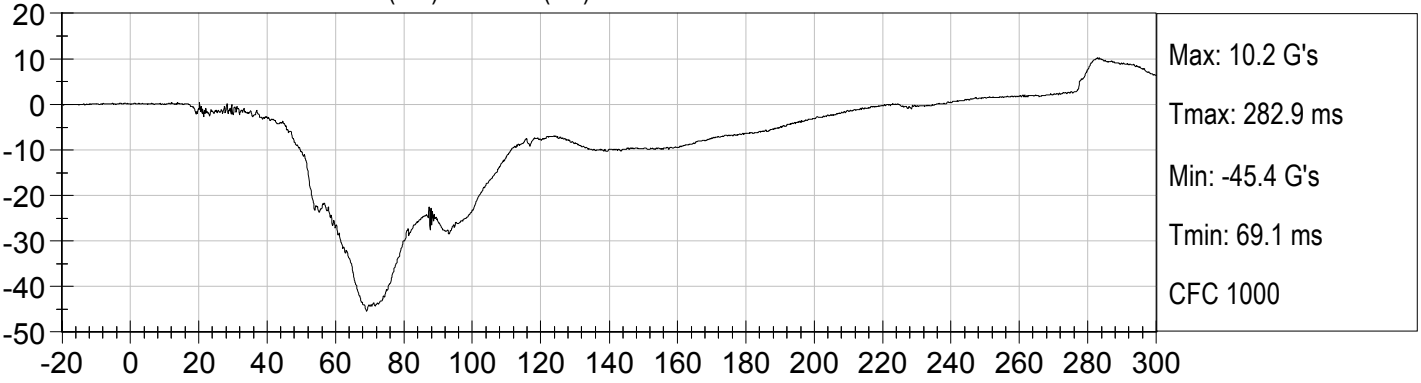
Right Rear Seat Crossmember Z

Left Rear Seat Crossmember Xr

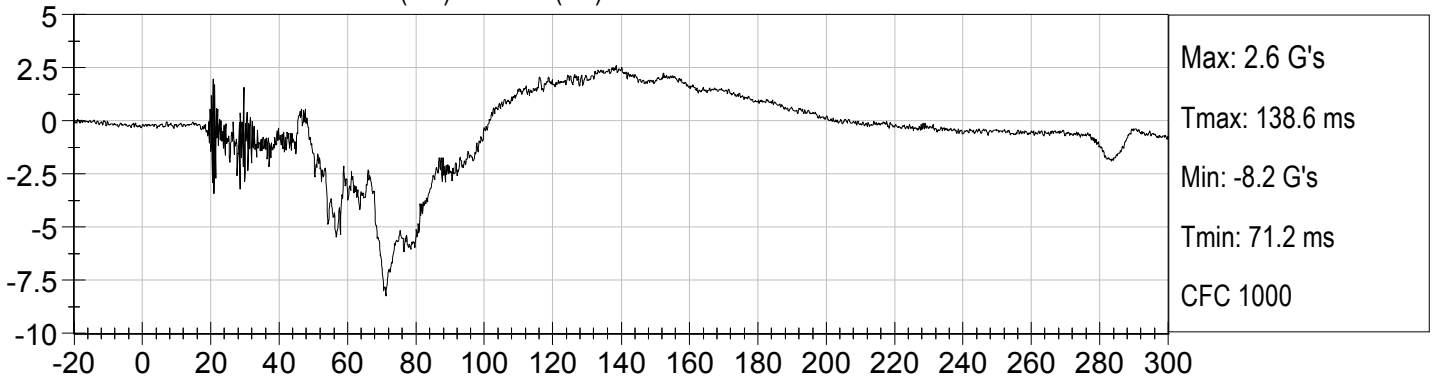
Right Rear Seat Crossmember Xr

Advanced Research Load Cell Barrier – 128 channels

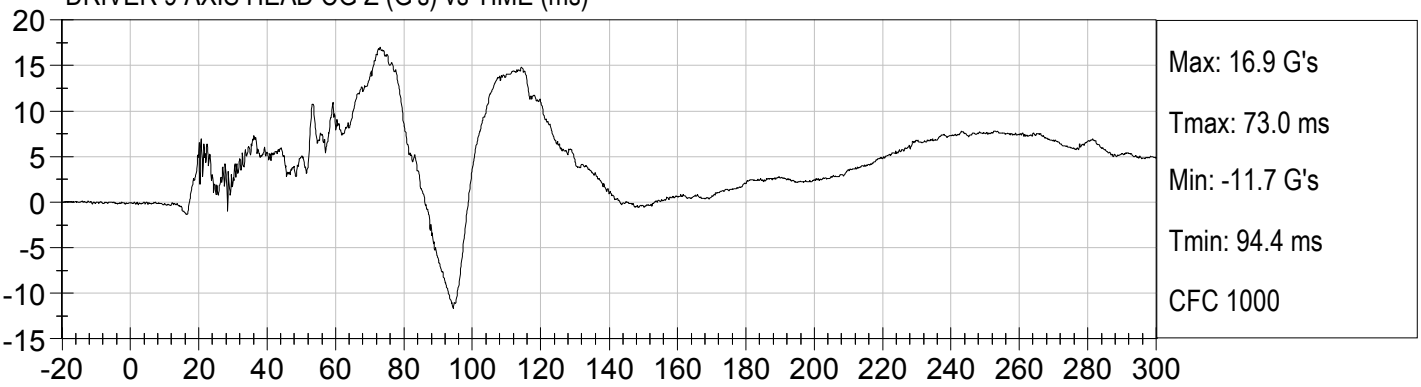
DRIVER 9 AXIS HEAD CG X (G's) vs TIME (ms)



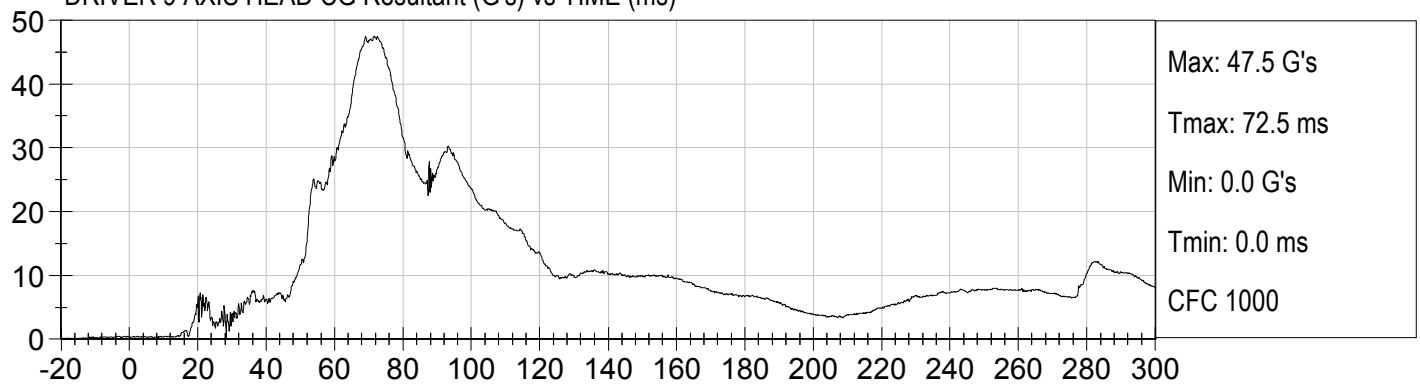
DRIVER 9 AXIS HEAD CG Y (G's) vs TIME (ms)



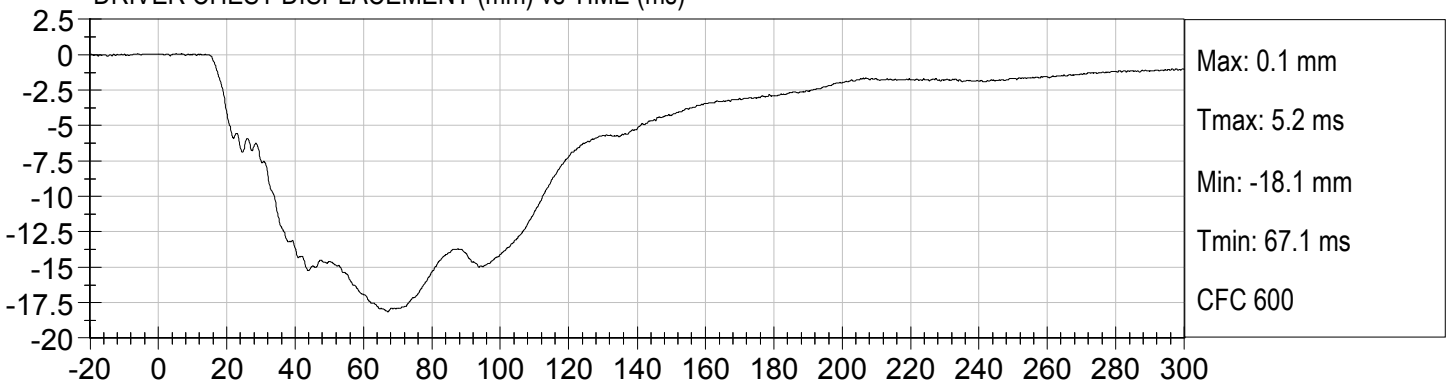
DRIVER 9 AXIS HEAD CG Z (G's) vs TIME (ms)



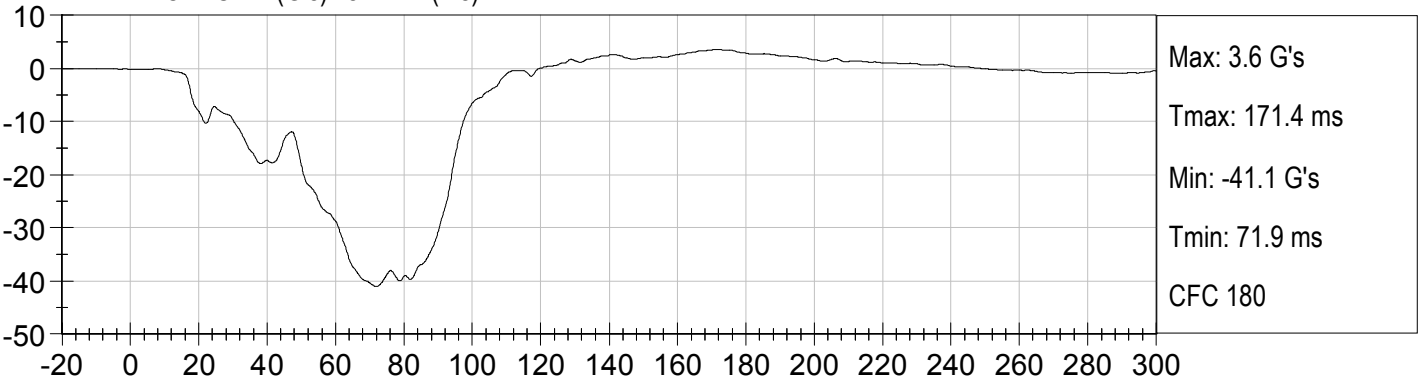
DRIVER 9 AXIS HEAD CG Resultant (G's) vs TIME (ms)



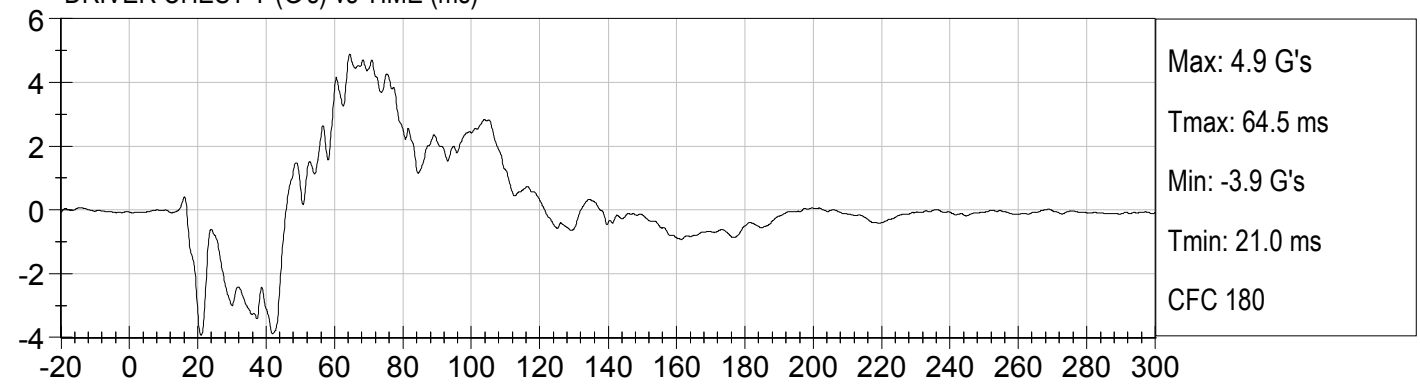
DRIVER CHEST DISPLACEMENT (mm) vs TIME (ms)



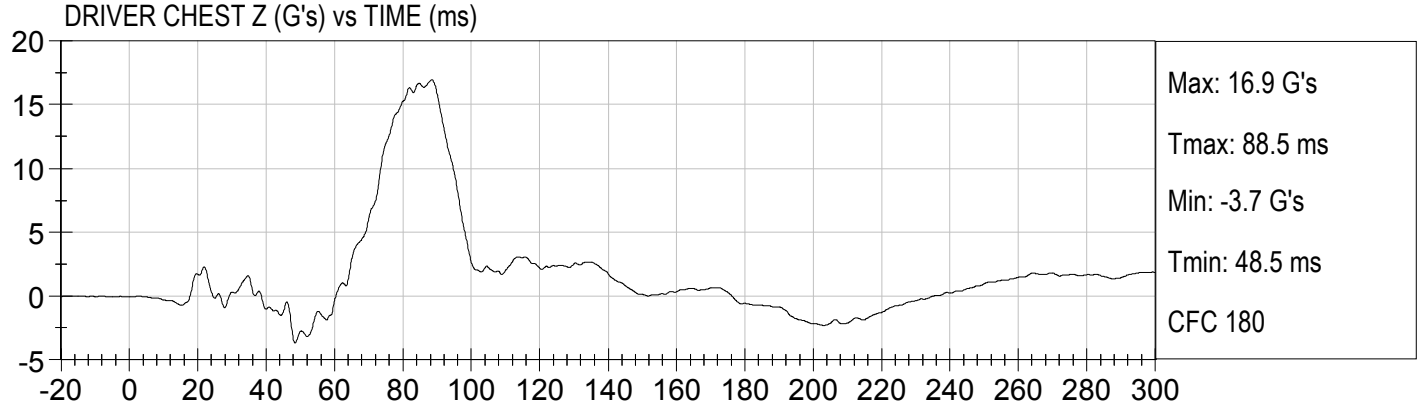
DRIVER CHEST X (G's) vs TIME (ms)



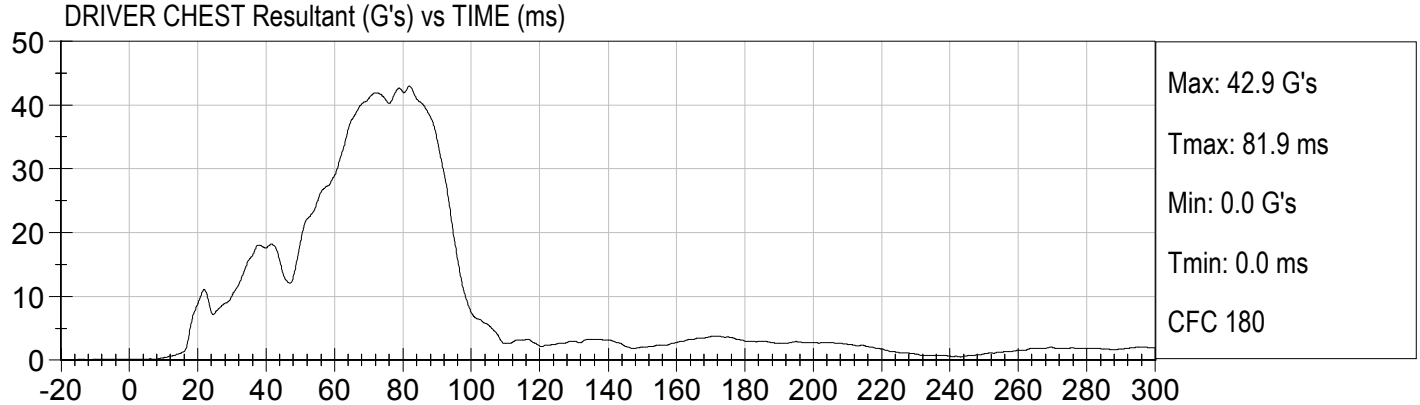
DRIVER CHEST Y (G's) vs TIME (ms)



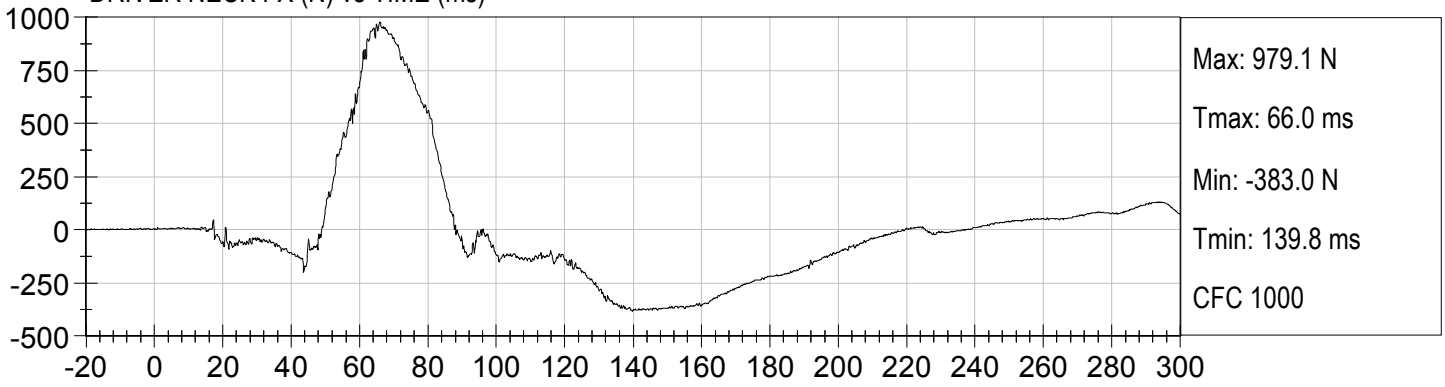
DRIVER CHEST Z (G's) vs TIME (ms)



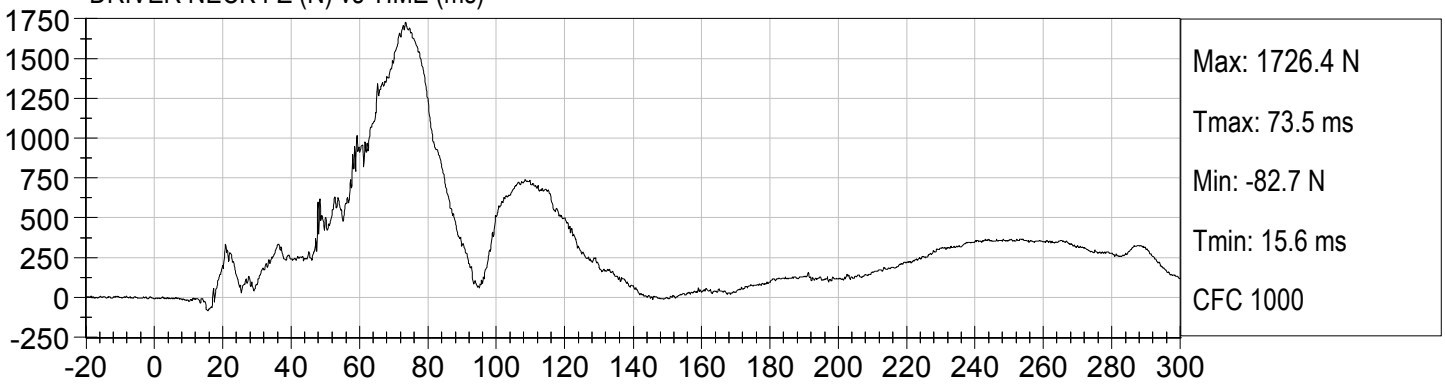
DRIVER CHEST Resultant (G's) vs TIME (ms)



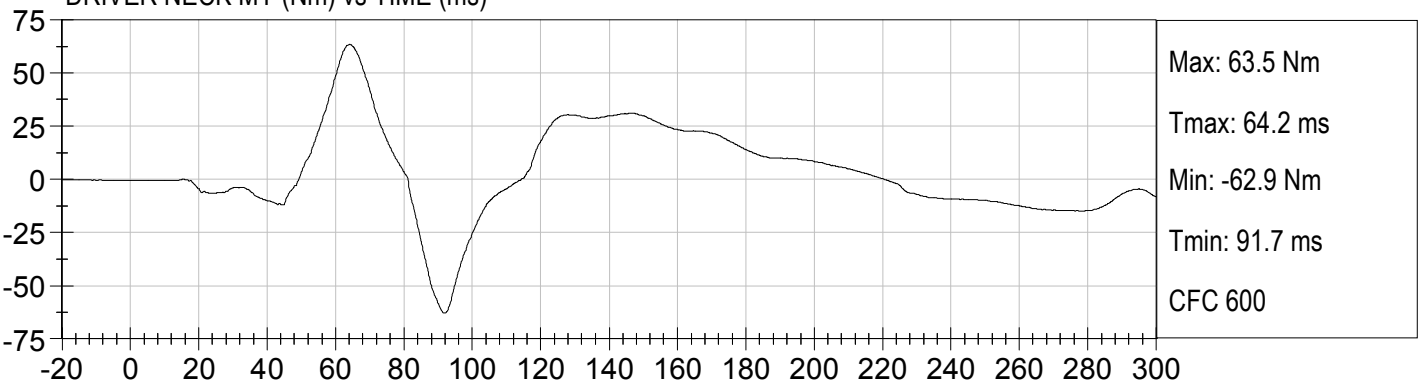
DRIVER NECK FX (N) vs TIME (ms)



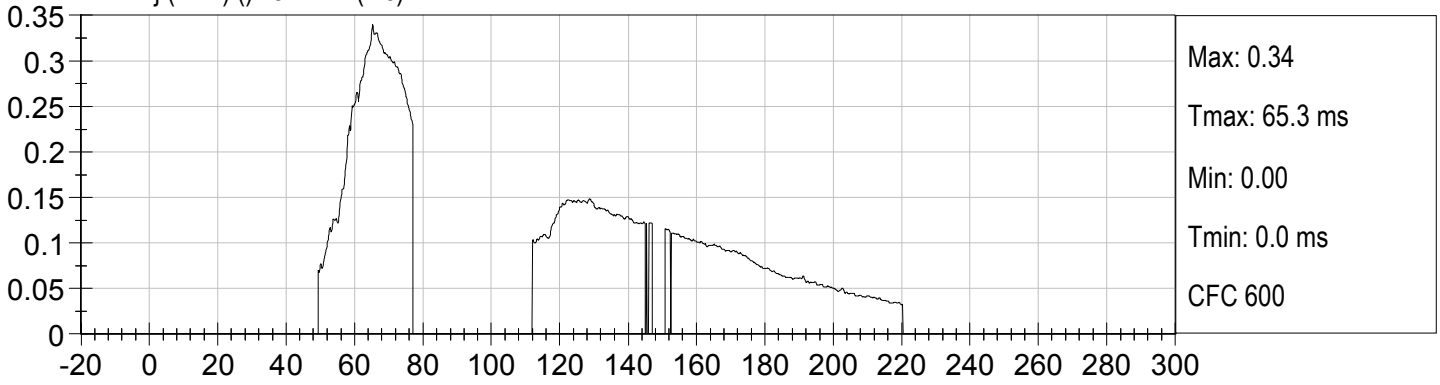
DRIVER NECK FZ (N) vs TIME (ms)



DRIVER NECK MY (Nm) vs TIME (ms)



Drv. nij (NTF) () vs TIME (ms)



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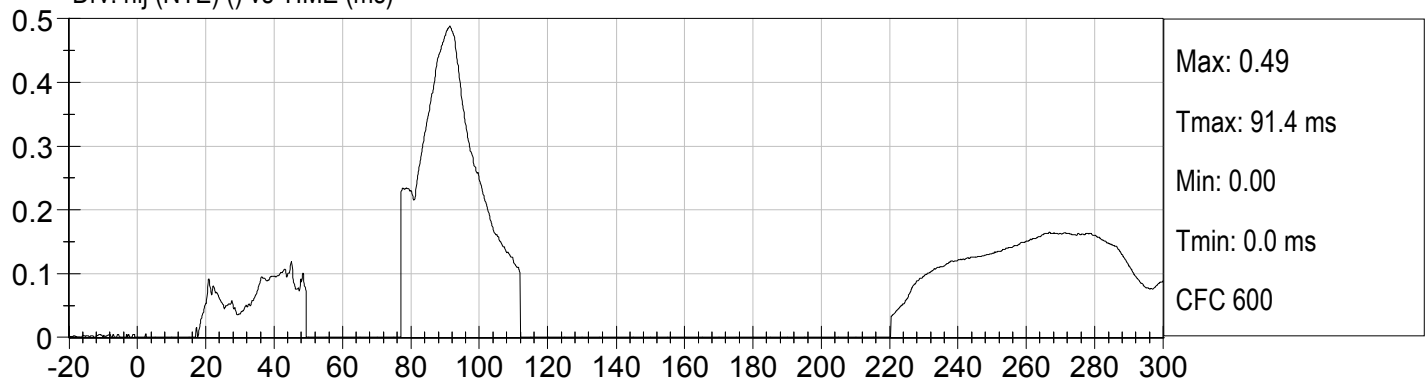
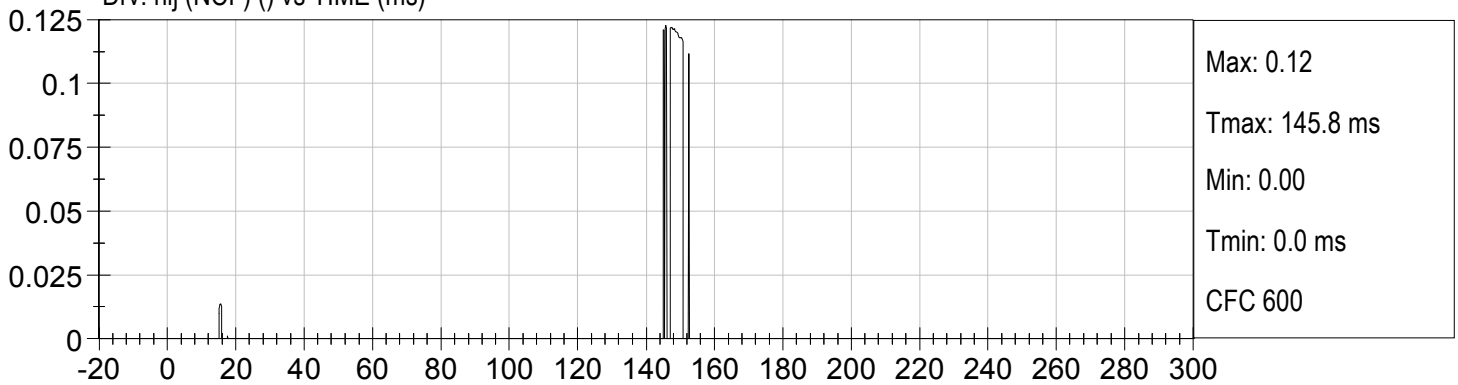
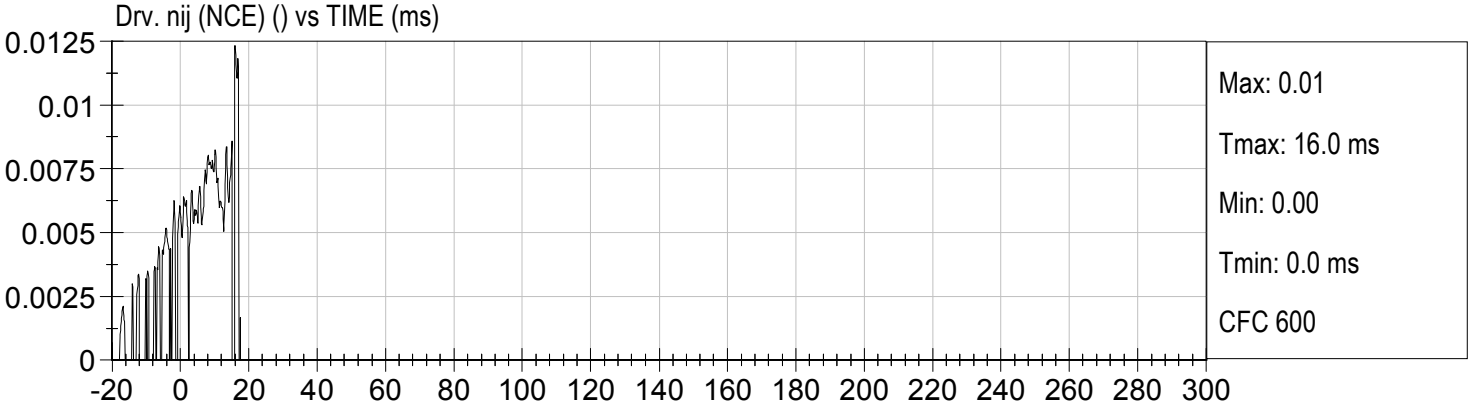


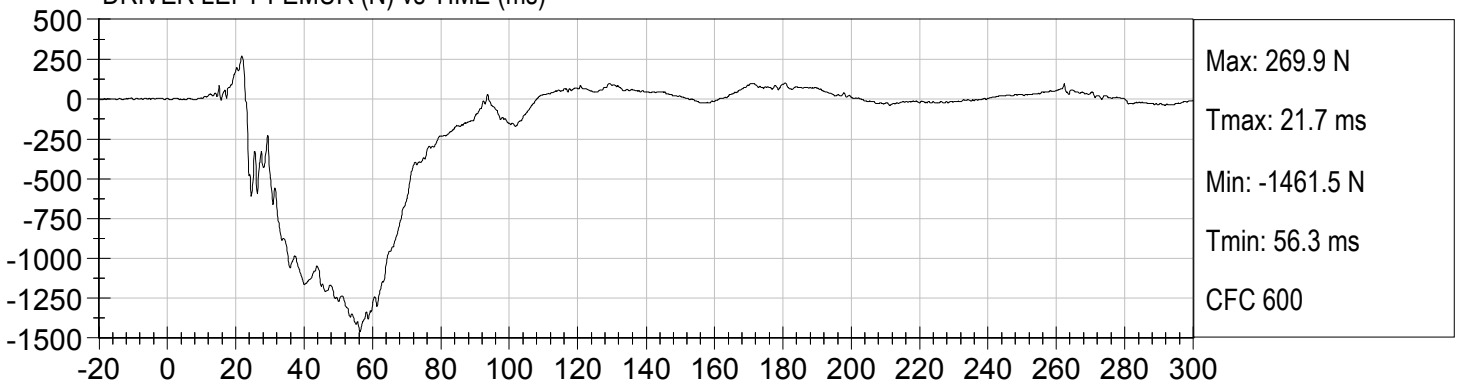
Drv. nij (NCF) () vs TIME (ms)



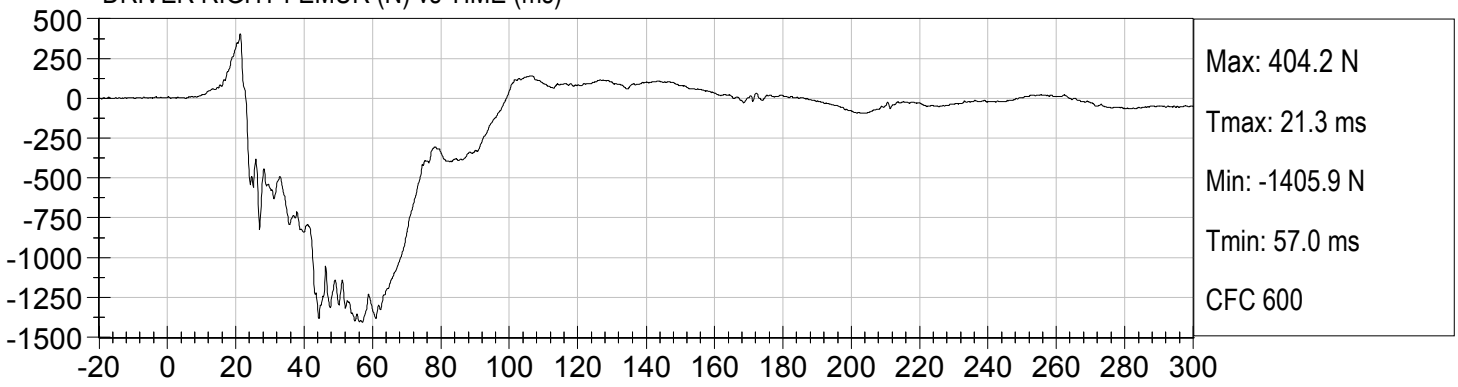
Drv. nij (NCE) () vs TIME (ms)



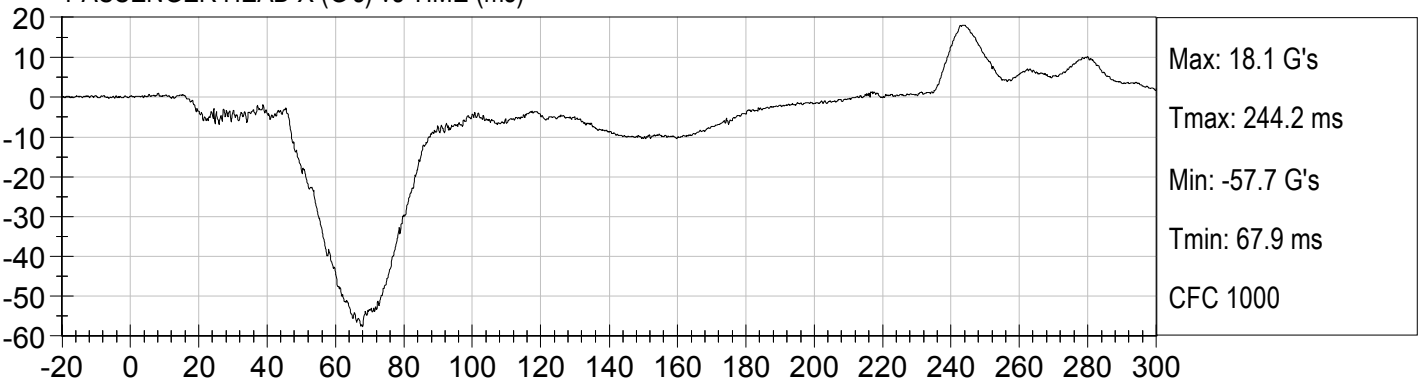
DRIVER LEFT FEMUR (N) vs TIME (ms)



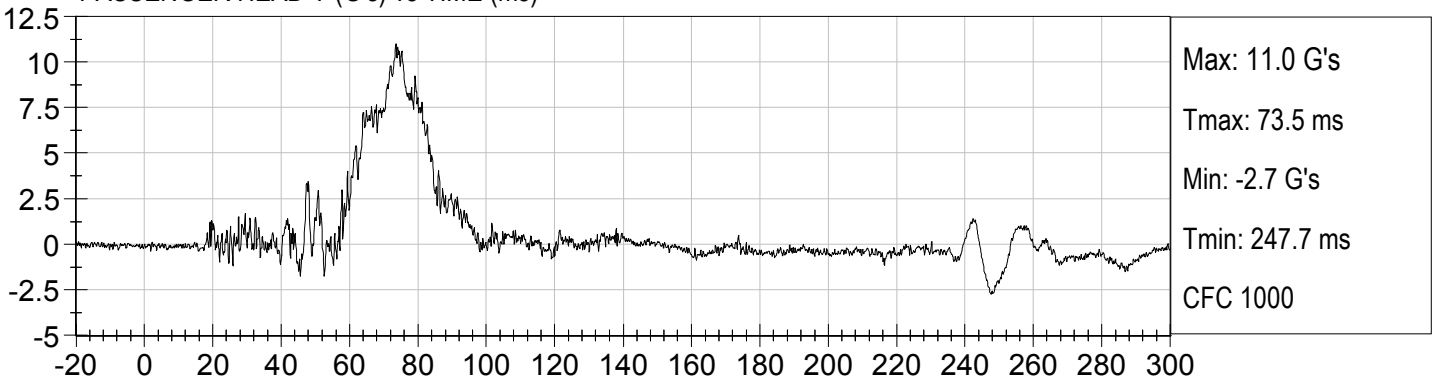
DRIVER RIGHT FEMUR (N) vs TIME (ms)



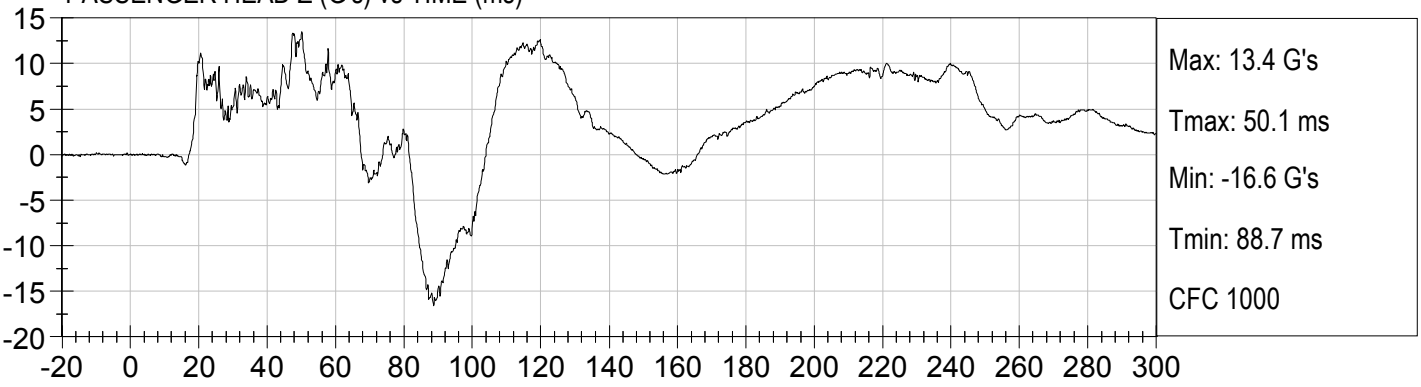
PASSENGER HEAD X (G's) vs TIME (ms)



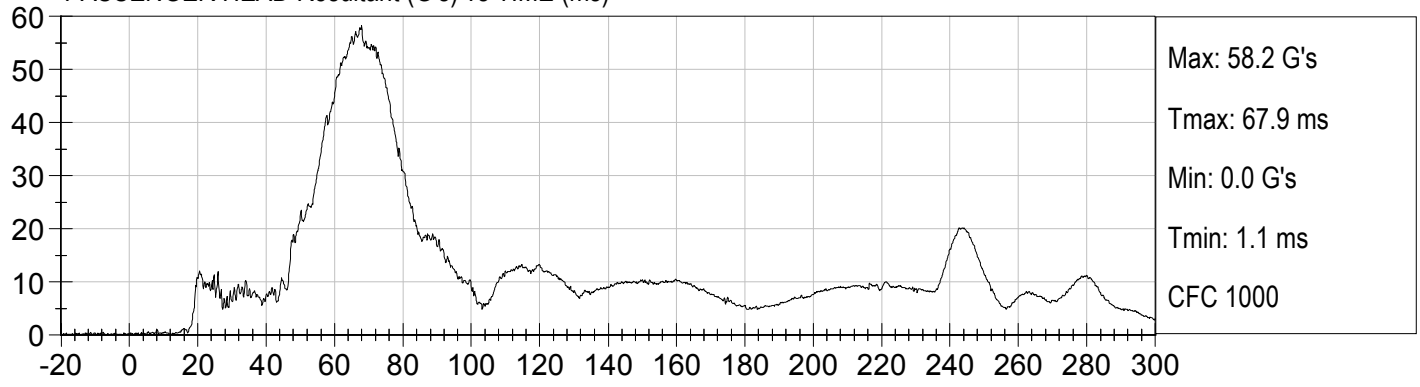
PASSENGER HEAD Y (G's) vs TIME (ms)



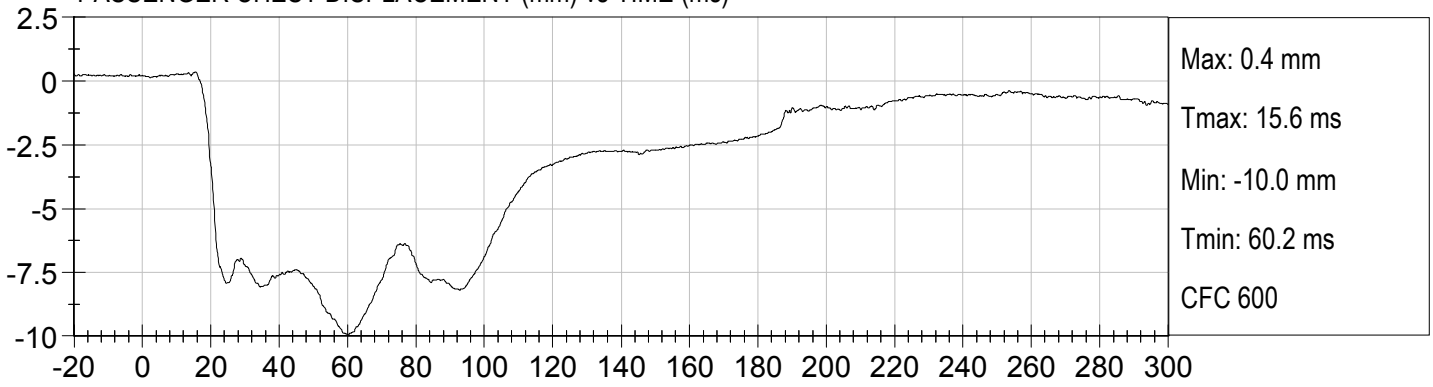
PASSENGER HEAD Z (G's) vs TIME (ms)



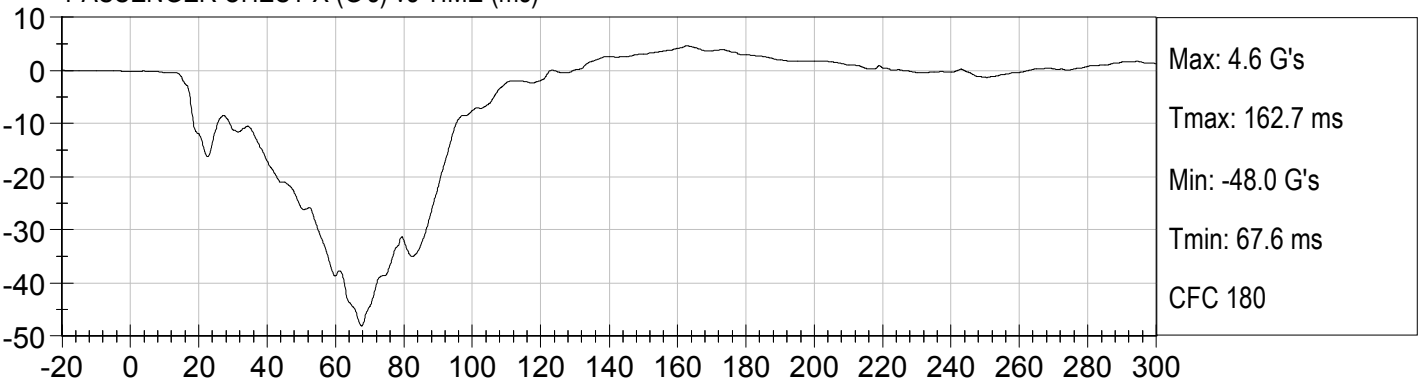
PASSENGER HEAD Resultant (G's) vs TIME (ms)



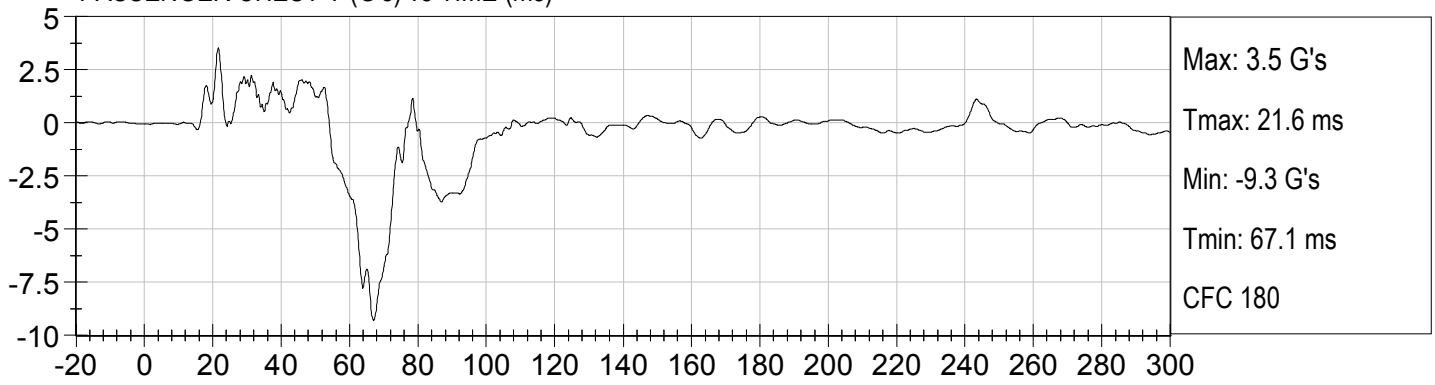
PASSENGER CHEST DISPLACEMENT (mm) vs TIME (ms)



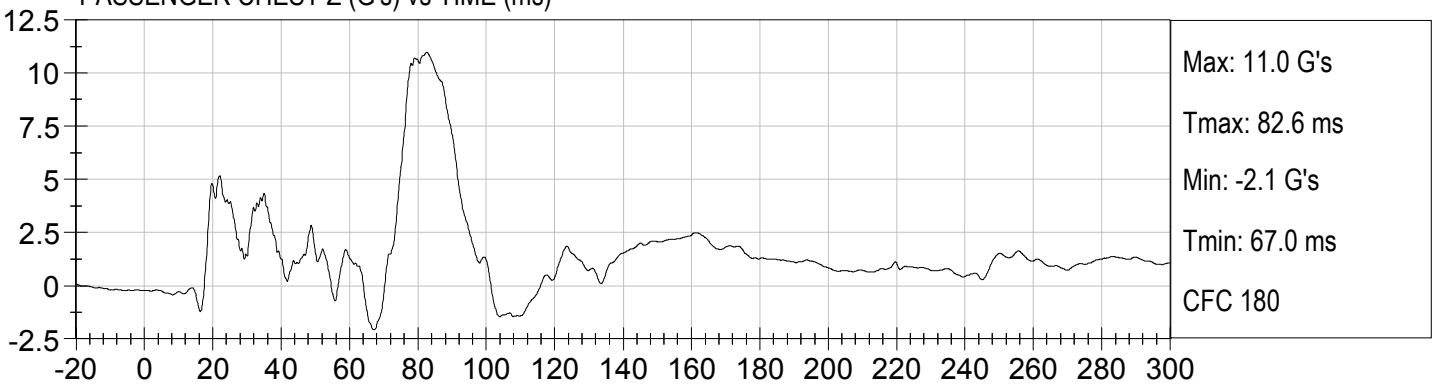
PASSENGER CHEST X (G's) vs TIME (ms)



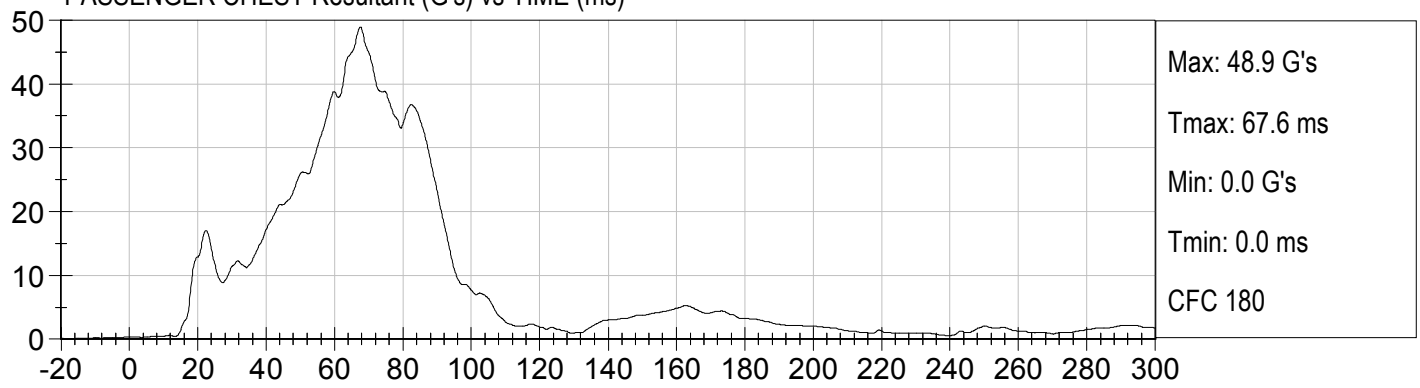
PASSENGER CHEST Y (G's) vs TIME (ms)



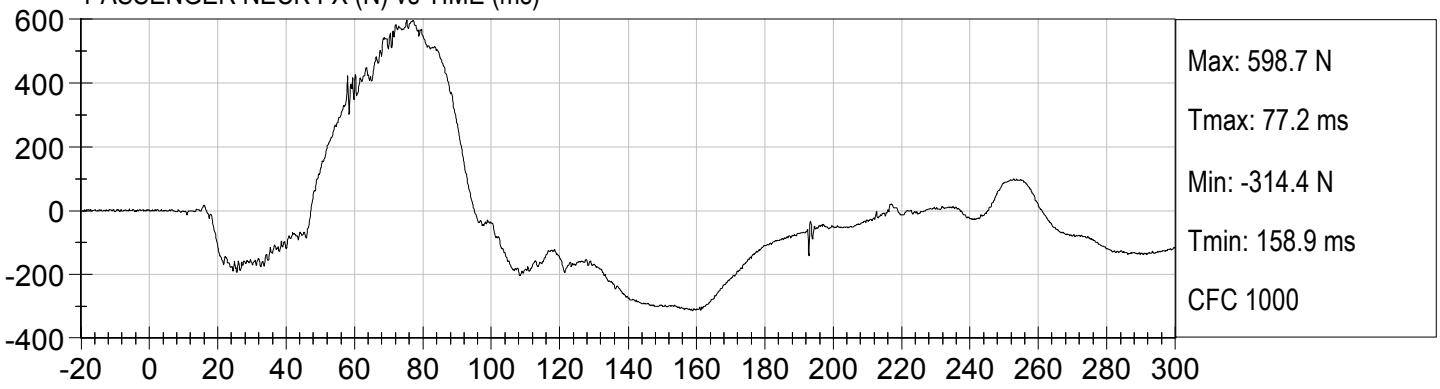
PASSENGER CHEST Z (G's) vs TIME (ms)



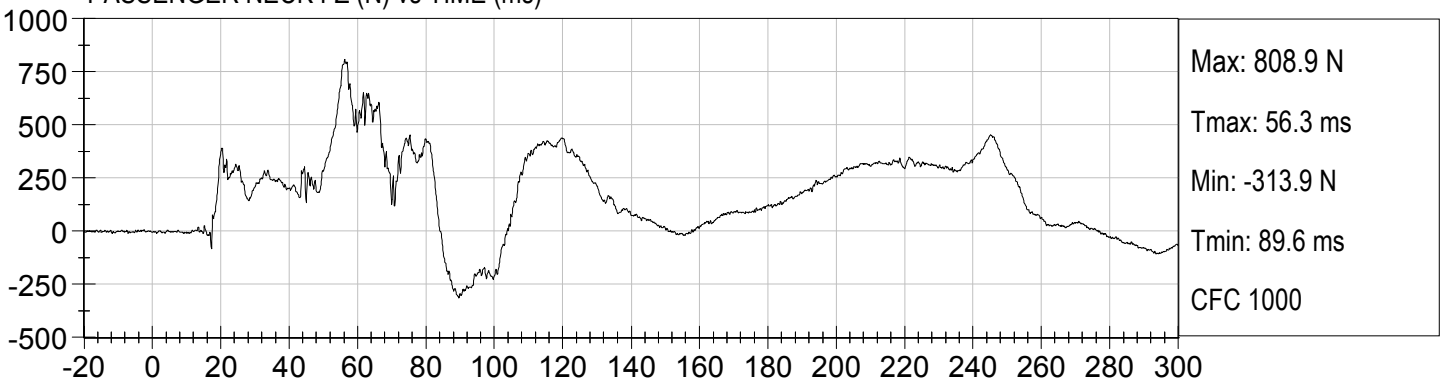
PASSENGER CHEST Resultant (G's) vs TIME (ms)



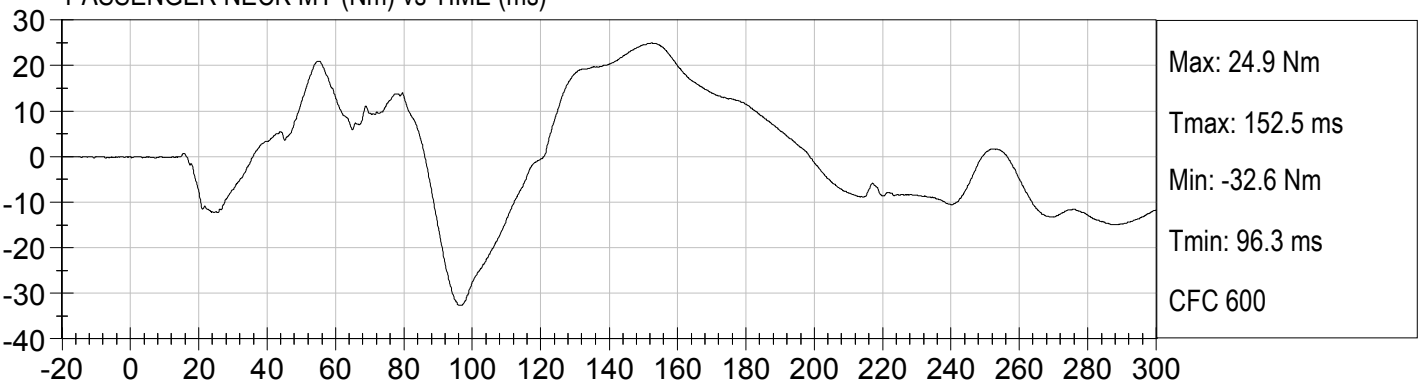
PASSENGER NECK FX (N) vs TIME (ms)

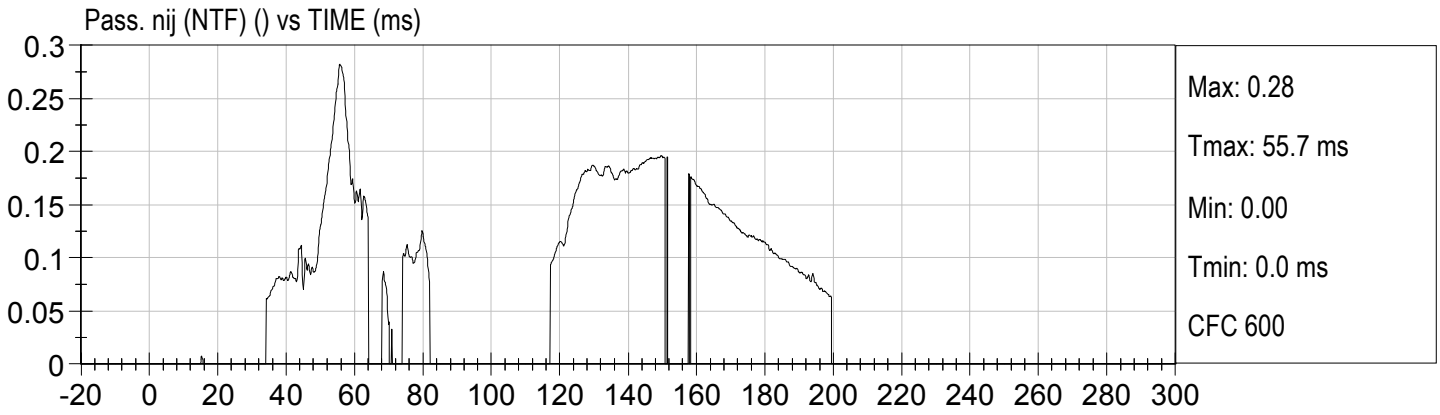


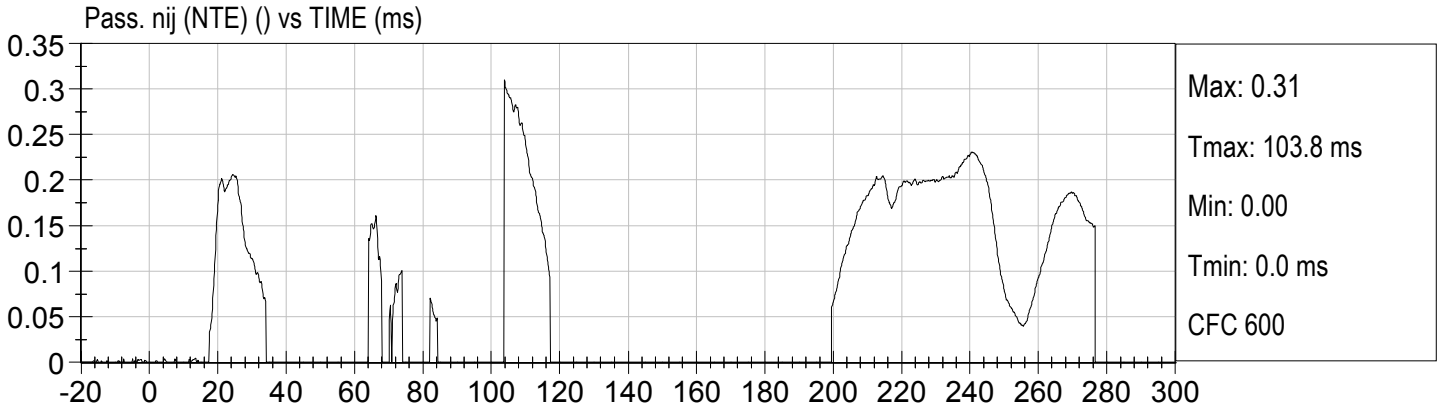
PASSENGER NECK FZ (N) vs TIME (ms)

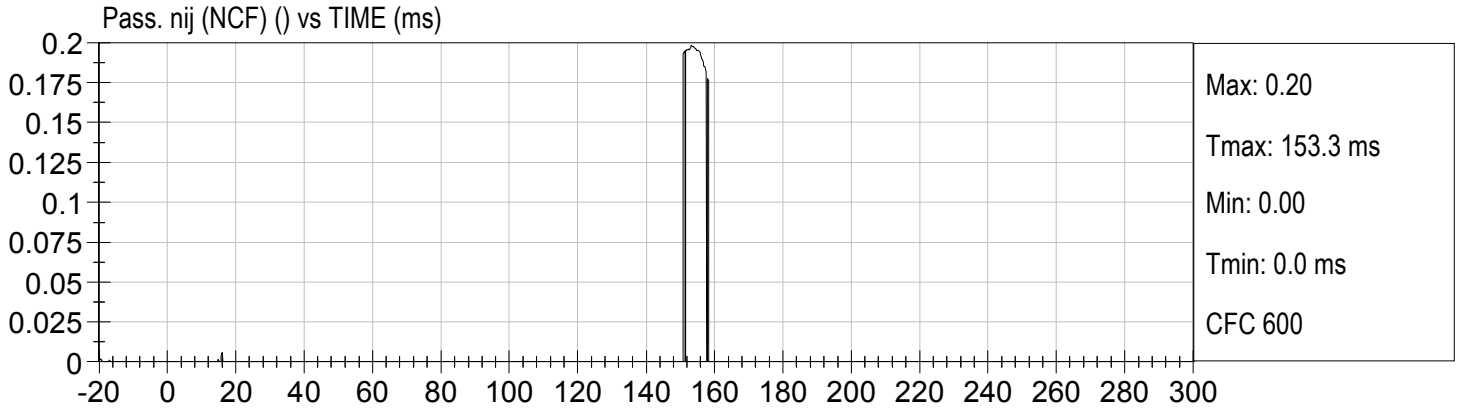


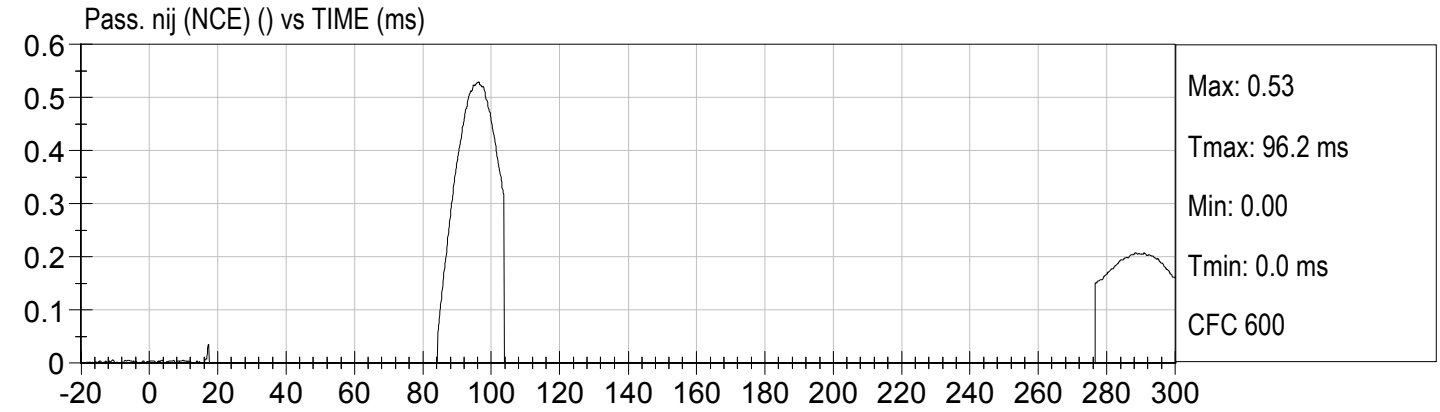
PASSENGER NECK MY (Nm) vs TIME (ms)



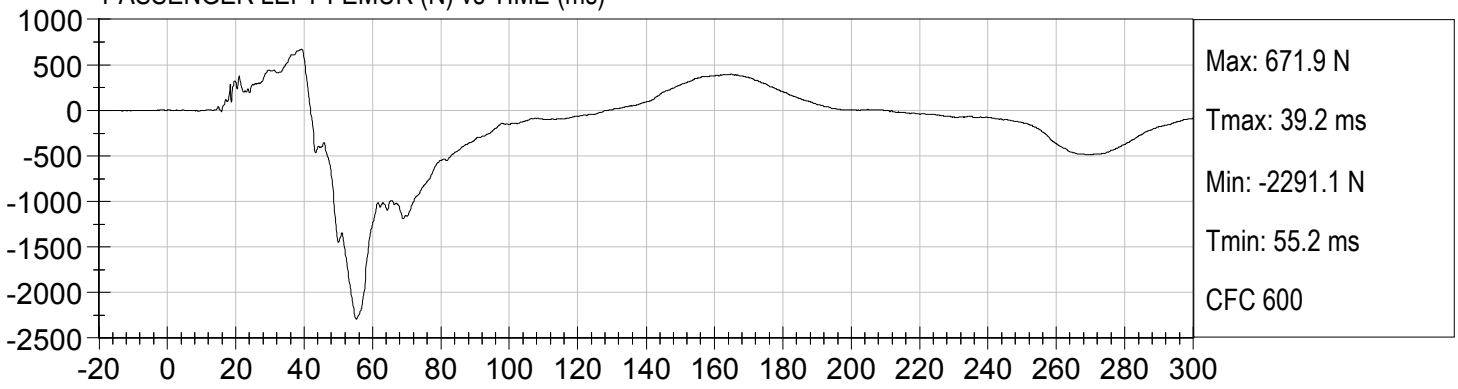

Pass. nij (NTF) () vs TIME (ms)
Max: 0.28
Tmax: 55.7 ms
Min: 0.00
Tmin: 0.0 ms
CFC 600


Pass. nij (NTE) () vs TIME (ms)
Max: 0.31
Tmax: 103.8 ms
Min: 0.00
Tmin: 0.0 ms
CFC 600

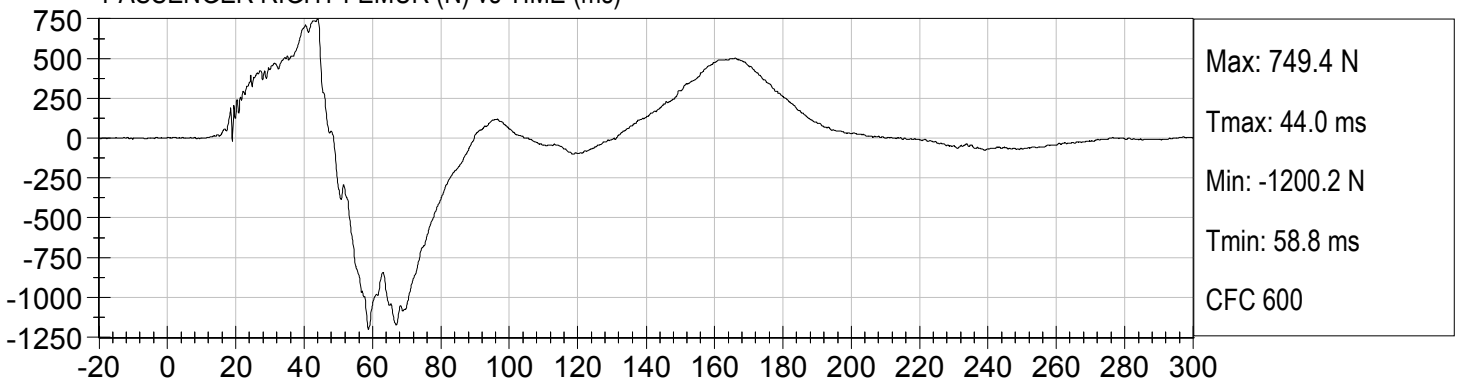

Pass. nij (NCF) () vs TIME (ms)
Max: 0.20
Tmax: 153.3 ms
Min: 0.00
Tmin: 0.0 ms
CFC 600


Pass. nij (NCE) () vs TIME (ms)
Max: 0.53
Tmax: 96.2 ms
Min: 0.00
Tmin: 0.0 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:** D124491

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	22.0	Pass
Peak Resultant Acceleration	G's	225 to 275	247	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	5.1	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

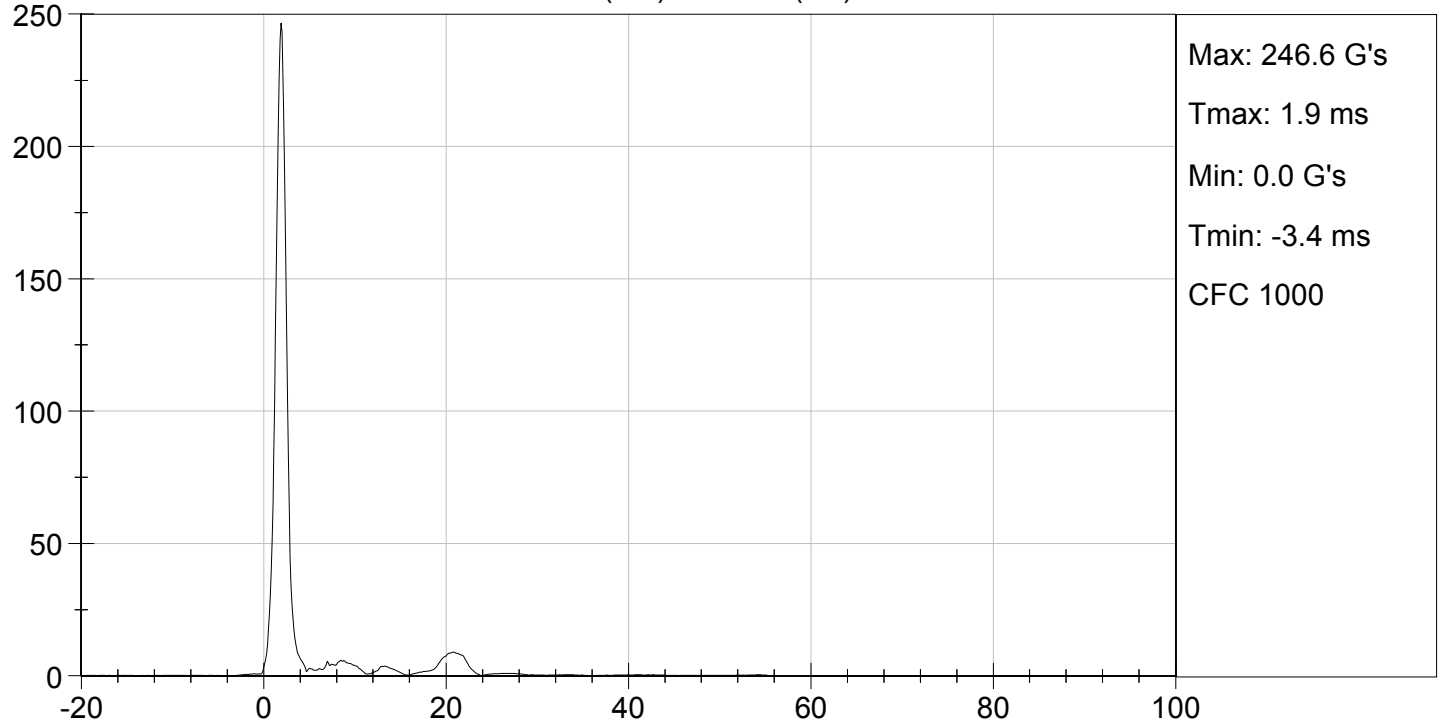
11/29/2012
Test Date

David Winkelbauer
Approved By

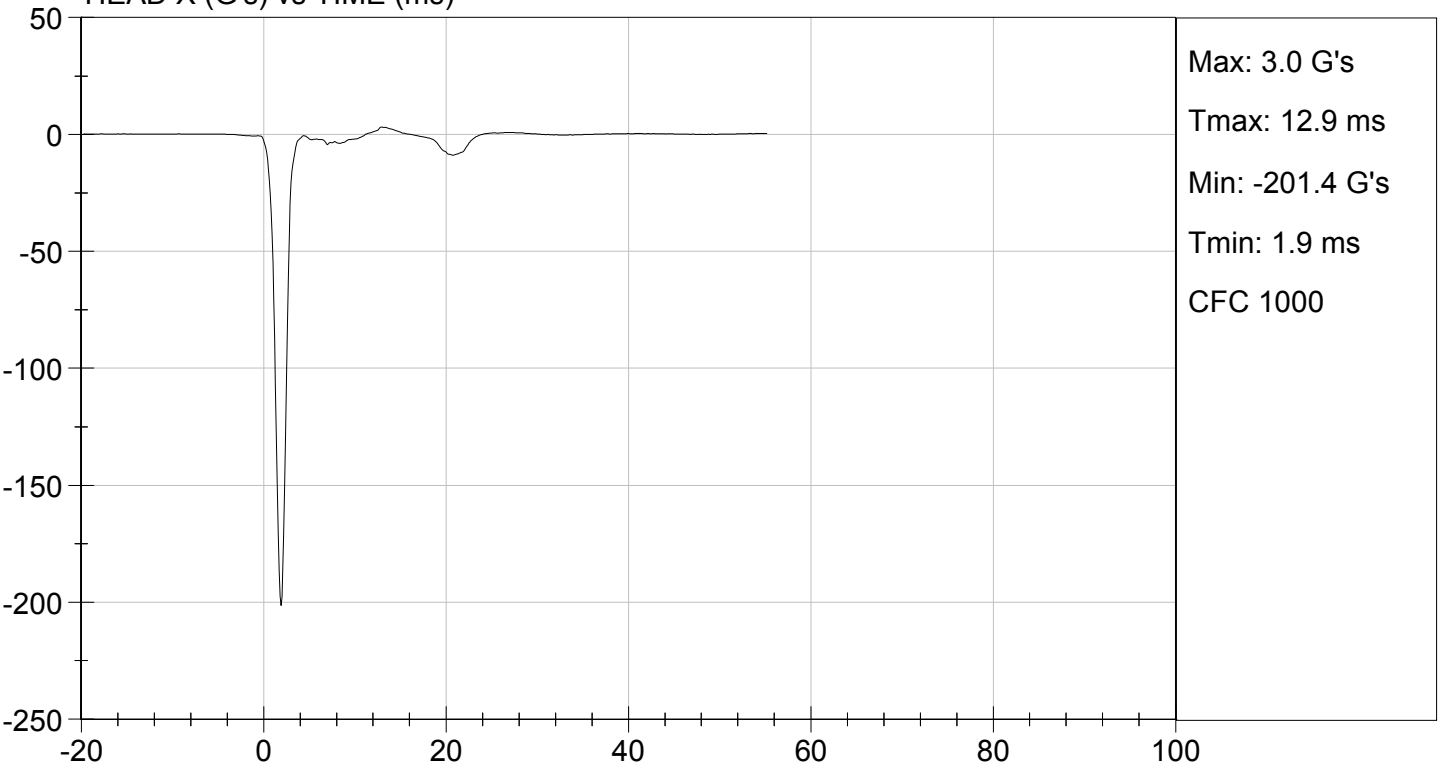
TEST DESC: HEAD DROP

TEST DATE: 11/29/2012
TEST #: D124491

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



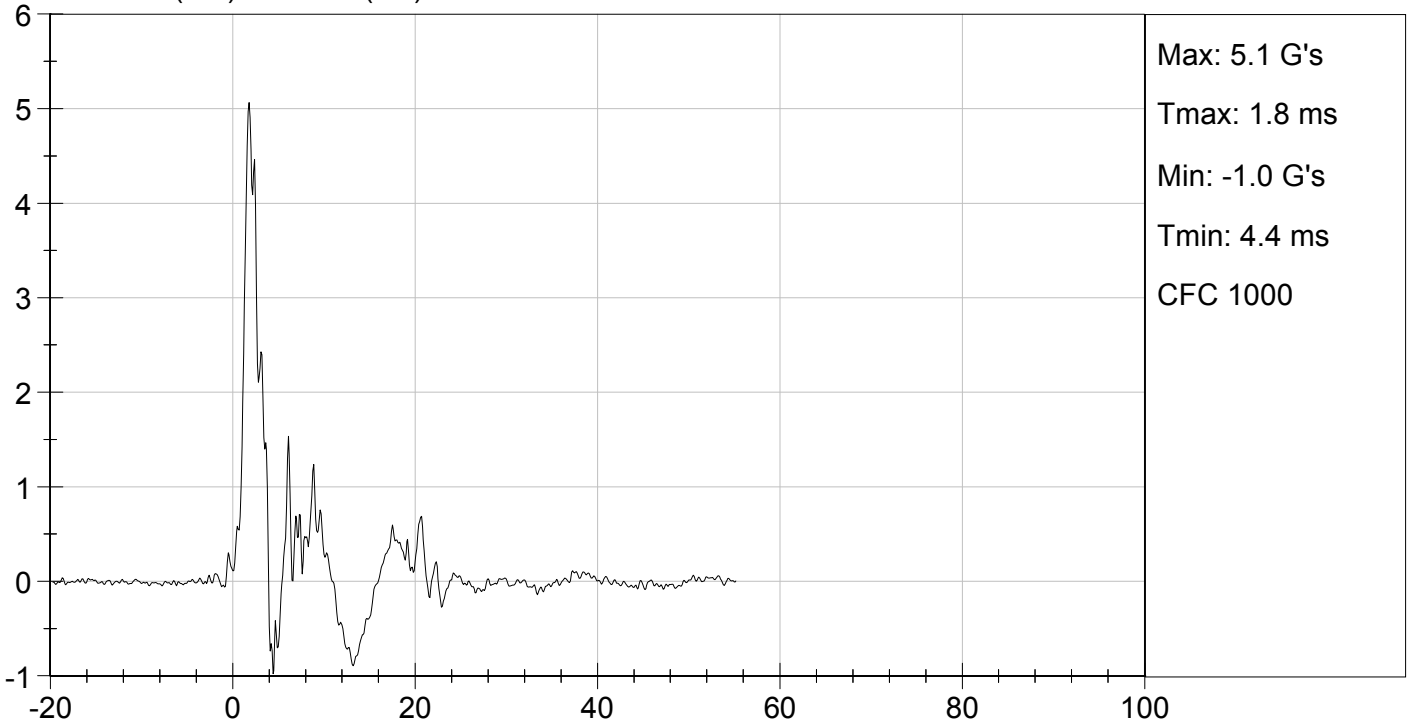
HEAD X (G's) vs TIME (ms)



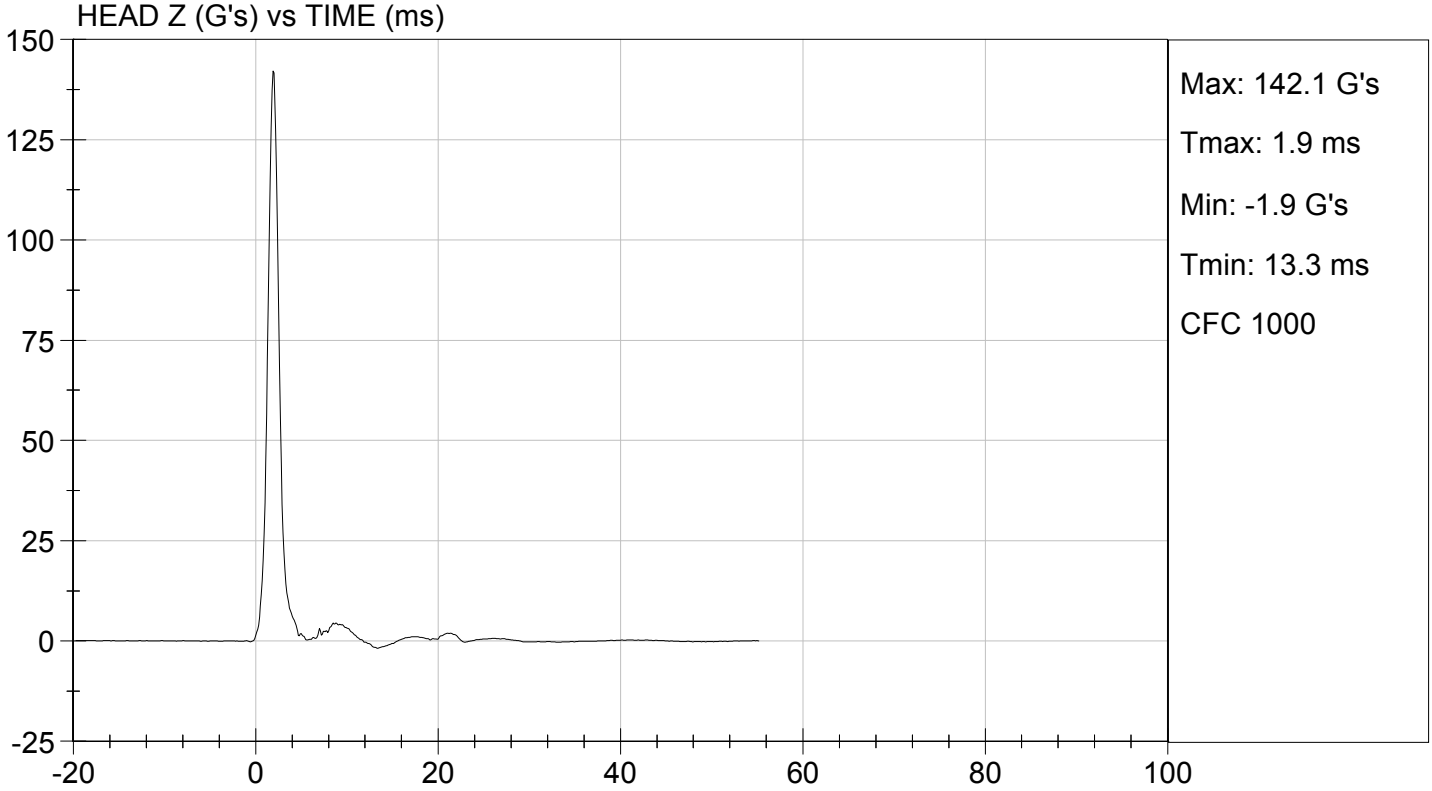
TEST DESC: HEAD DROP

TEST DATE: 11/29/2012
TEST #: D124491

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:** D124492

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	19	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.06	Pass
Pendulum Deceleration	10 ms	G's	22.50 to 27.50	25.00	Pass
	20 ms	G's	17.60 to 22.60	18.70	Pass
	30 ms	G's	12.50 to 18.50	16.23	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 29.0	16.1	Pass
Deceleration Decay Time to Cross 5 G's		ms	34.0 to 42.0	34.3	Pass
Maximum "D" Plane Rotation	Maximum	Deg	64.0 to 78.0	65.9	Pass
	Time	ms	57.0 to 64.0	57.1	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	113.0 to 128.0	113.0	Pass
Moment About Occipital Condyle	Maximum	Nm	88.1 to 108.5	99.1	Pass
	Time	ms	47.0 to 58.0	47.4	Pass
Positive Moment Decay Time To Zero Crossing		ms	97.0 to 107.0	103.0	Pass
			Overall Test Results		Pass

Jessica Hall
Laboratory Technician

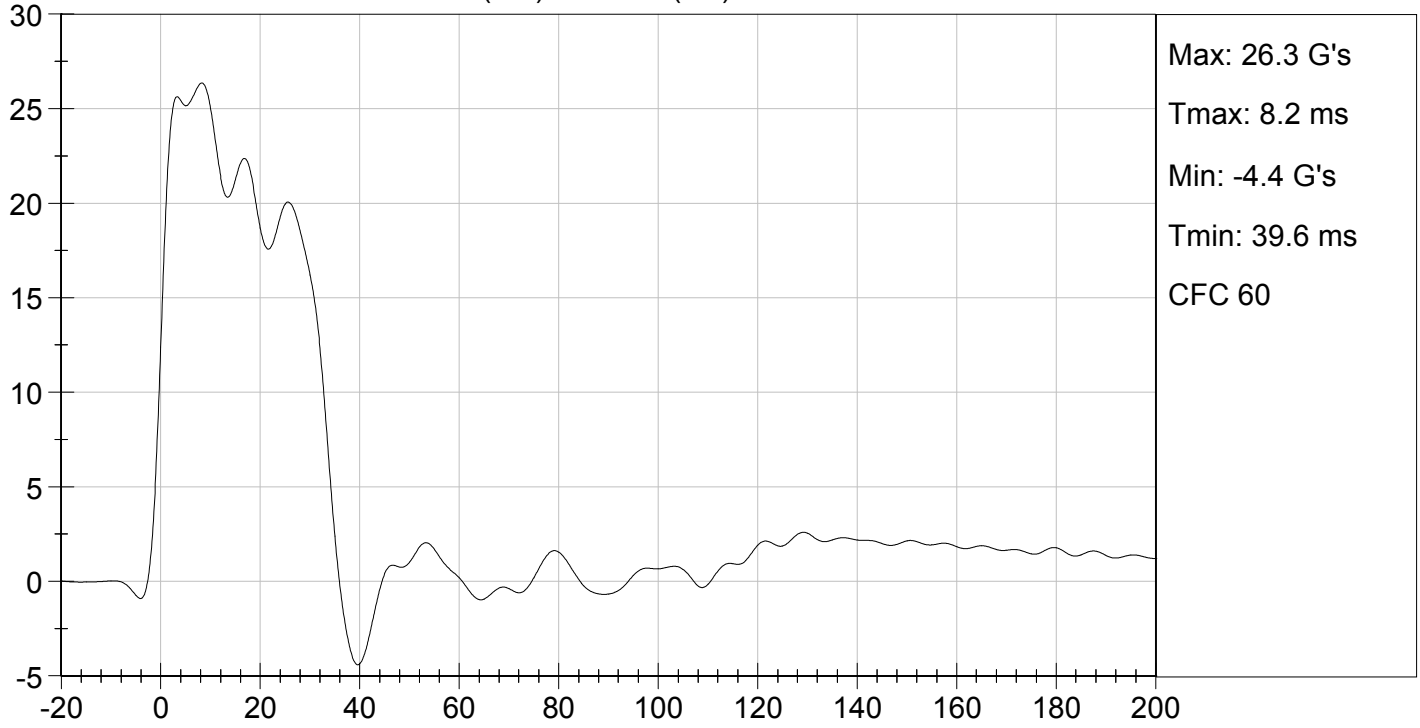
11/26/2012
Test Date

David Winkelbauer
Approved By

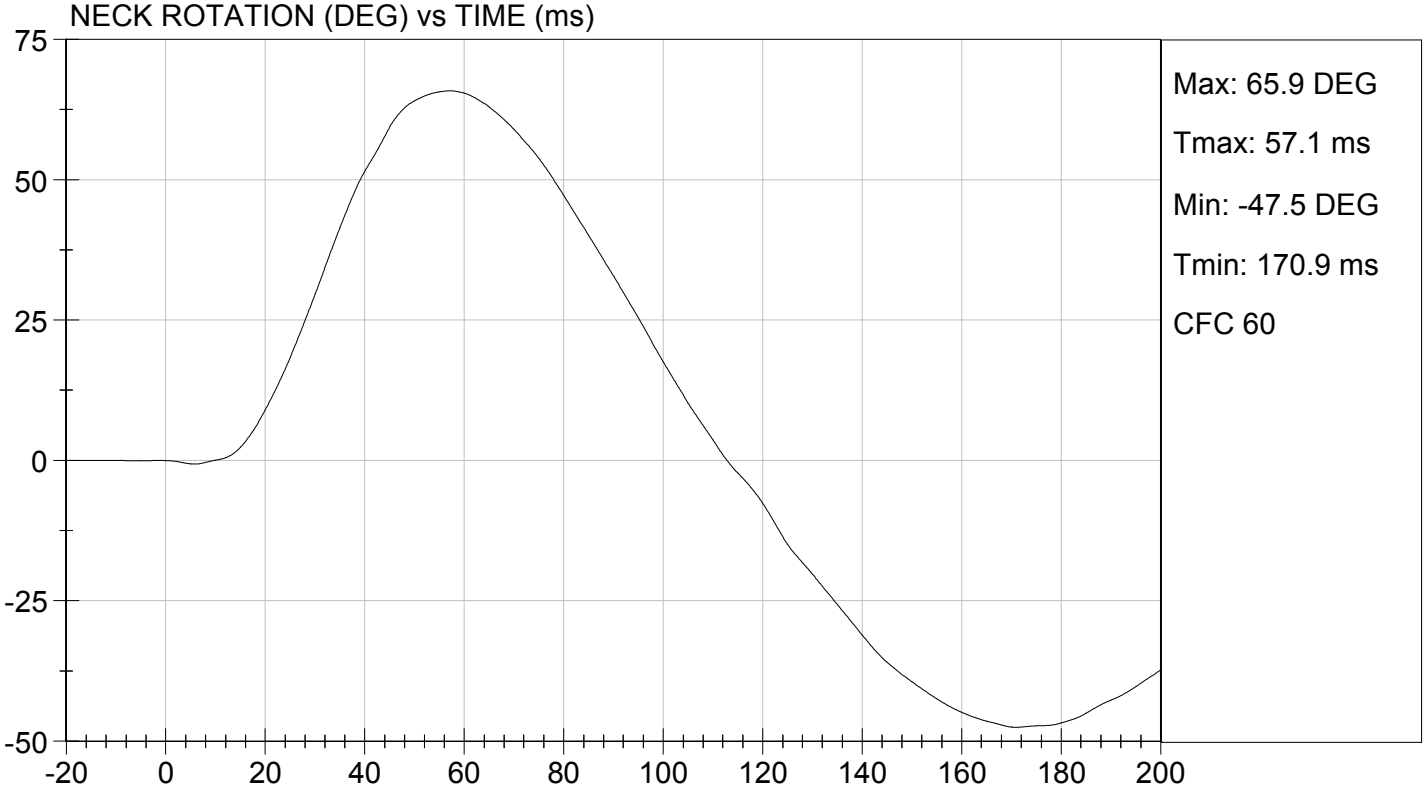
TEST DESC: NECK FLEXION
VELOCITY: 23.15 ft/s, 7.06 m/s

TEST DATE: 11/26/2012
TEST #: D124492

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

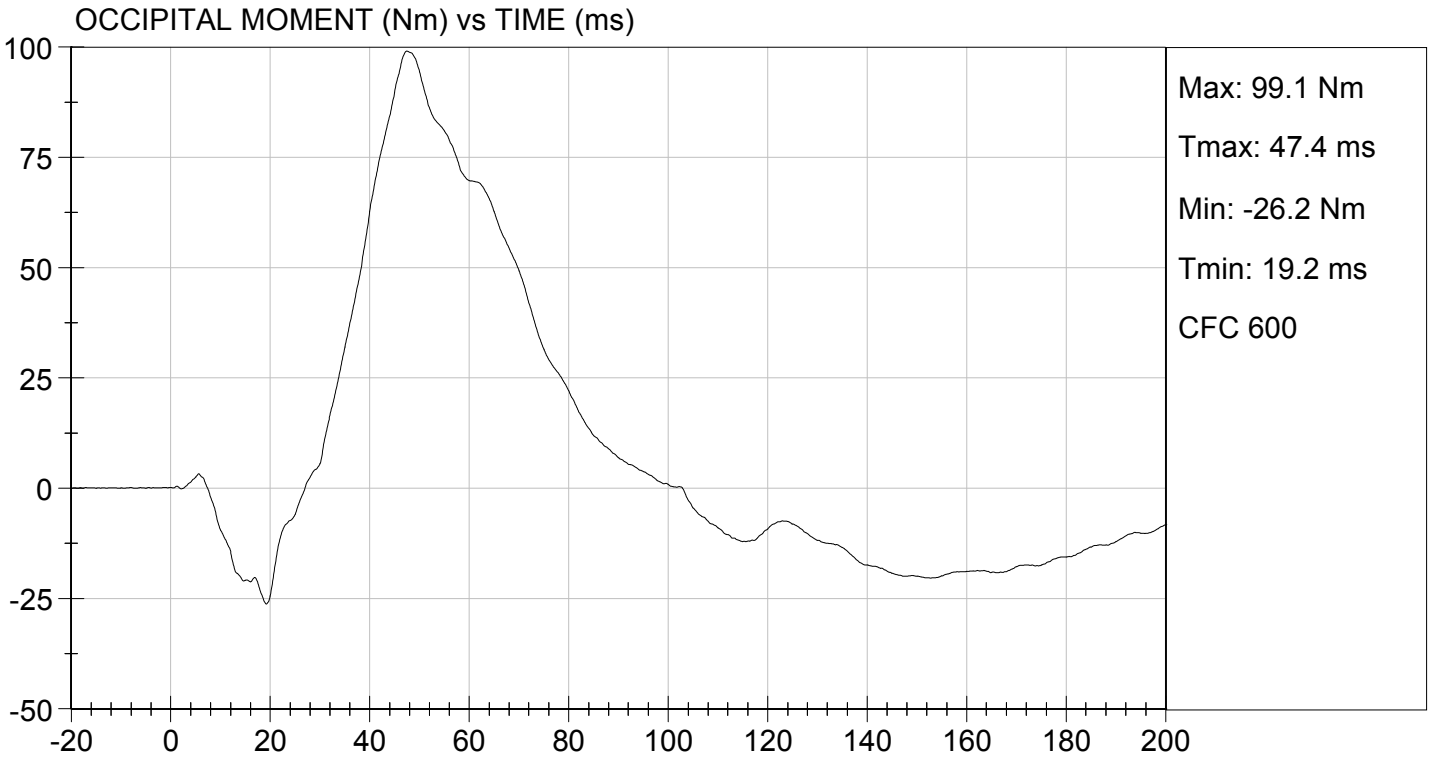


NECK ROTATION (DEG) vs TIME (ms)



TEST DESC: NECK FLEXION
VELOCITY: 23.15 ft/s, 7.06 m/s

TEST DATE: 11/26/2012
TEST #: D124492



MGA RESEARCH CORPORATION

NECK EXTENSION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D124493

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	19	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.12	Pass
Pendulum Deceleration	10 ms	G's	17.20 to 21.20	19.43	Pass
	20 ms	G's	14.00 to 19.00	16.23	Pass
	30 ms	G's	11.00 to 16.00	11.05	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	38.9	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	91.9	Pass
	Time	ms	72.0 to 82.0	74.9	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	147.0 to 174.0	153.1	Pass
Moment About Occipital Condyle	Maximum	Nm	-52.9 to -79.9	-59.6	Pass
	Time	ms	65.0 to 79.0	70.2	Pass
Negative Moment Decay Time To Zero Crossing		ms	120.0 to 148.0	138.5	Pass
			Overall Test Results		Pass

Jessica Hall
Laboratory Technician

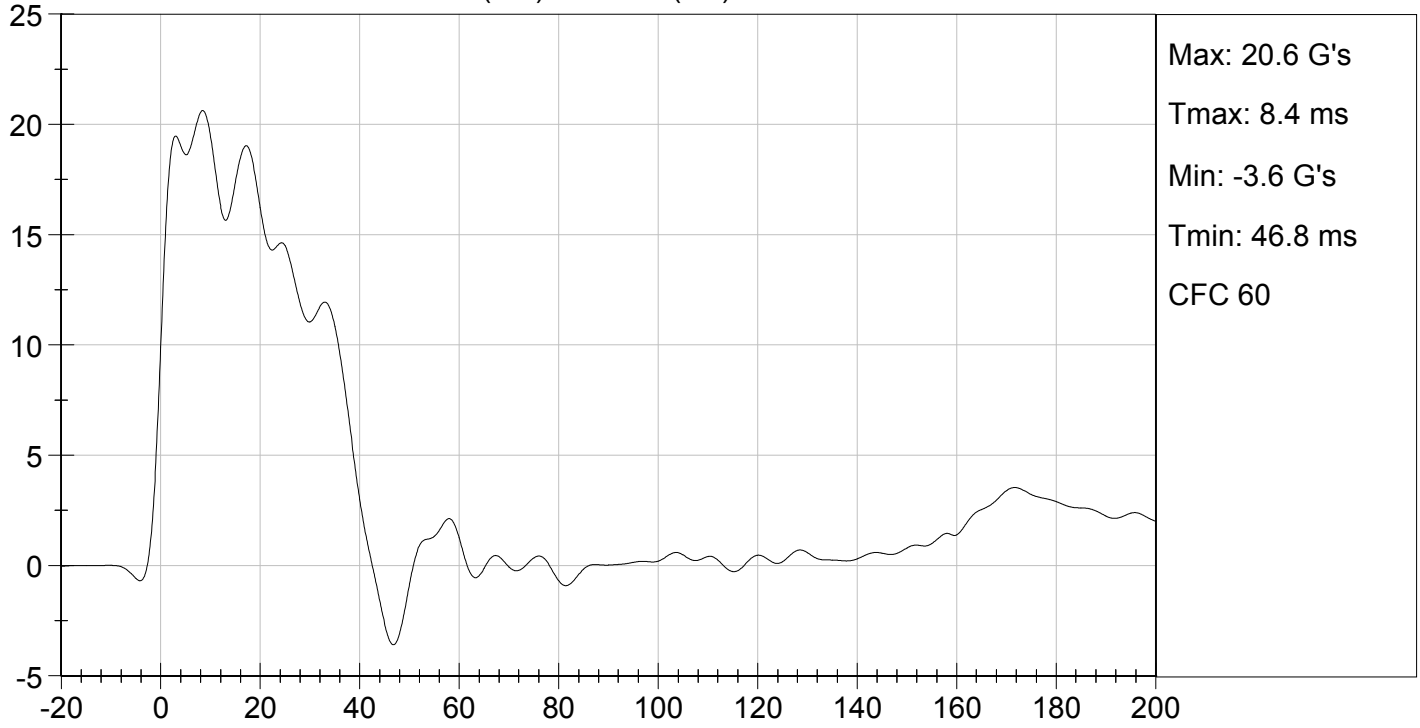
11/26/2012
Test Date

David Winkelbauer
Approved By

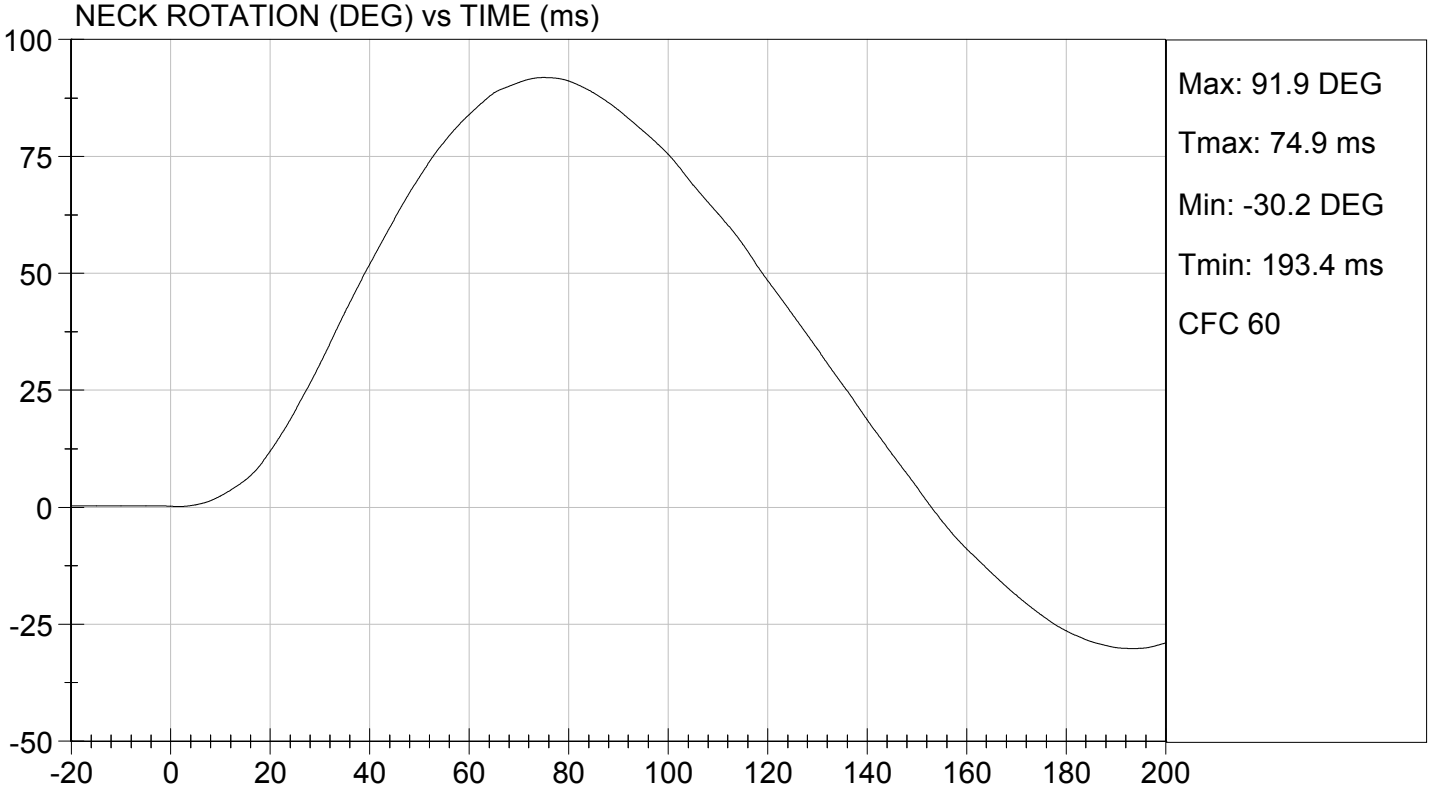
TEST DESC: NECK EXTENSION
VELOCITY: 20.08 ft/s, 6.12 m/s

TEST DATE: 11/26/2012
TEST #: D124493

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

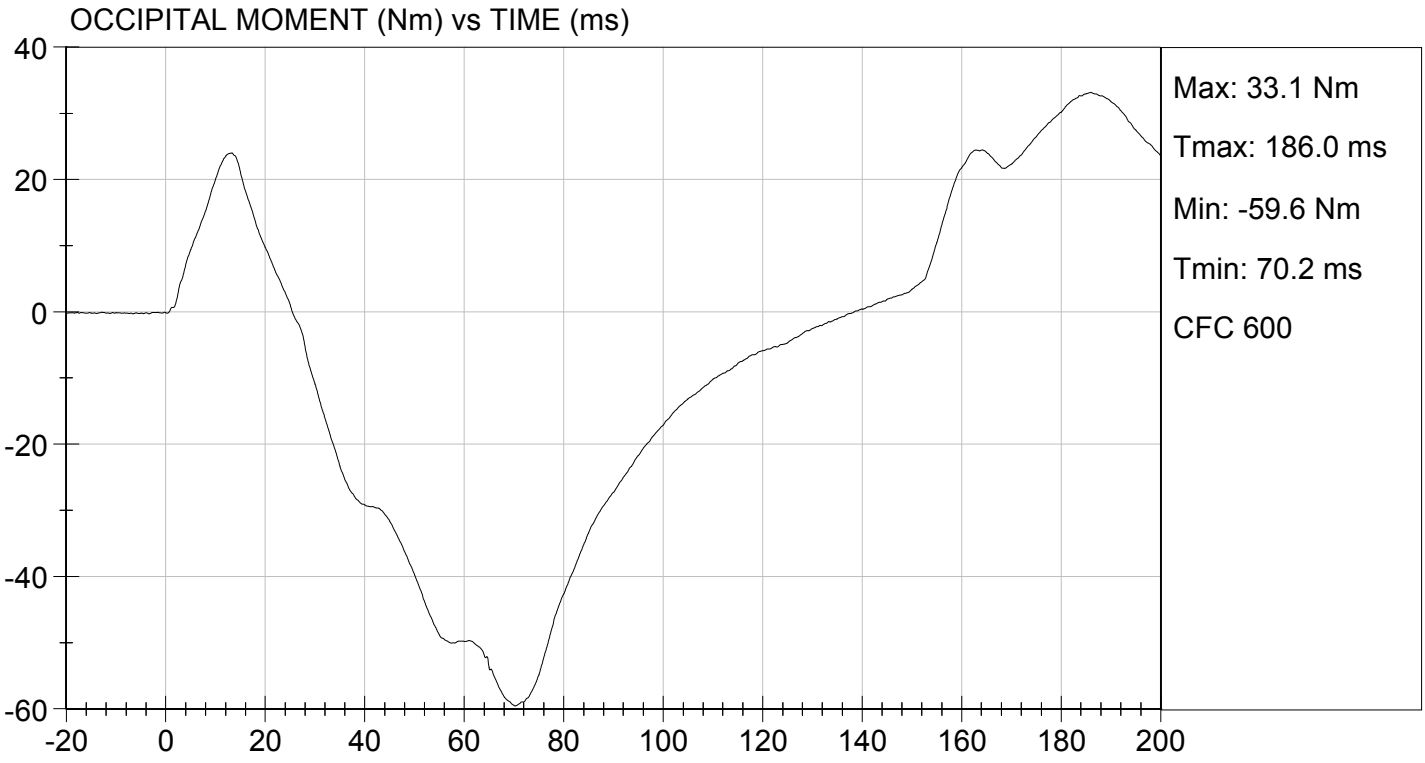


NECK ROTATION (DEG) vs TIME (ms)



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

TEST DATE: 11/26/2012
TEST #: D124493



MGA RESEARCH CORPORATION

THORAX IMPACT

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D124494

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	16	Pass
Probe Velocity	m/s	6.58 to 6.82	6.77	Pass
Peak Probe Force	N	5159 to 5893	5,274	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

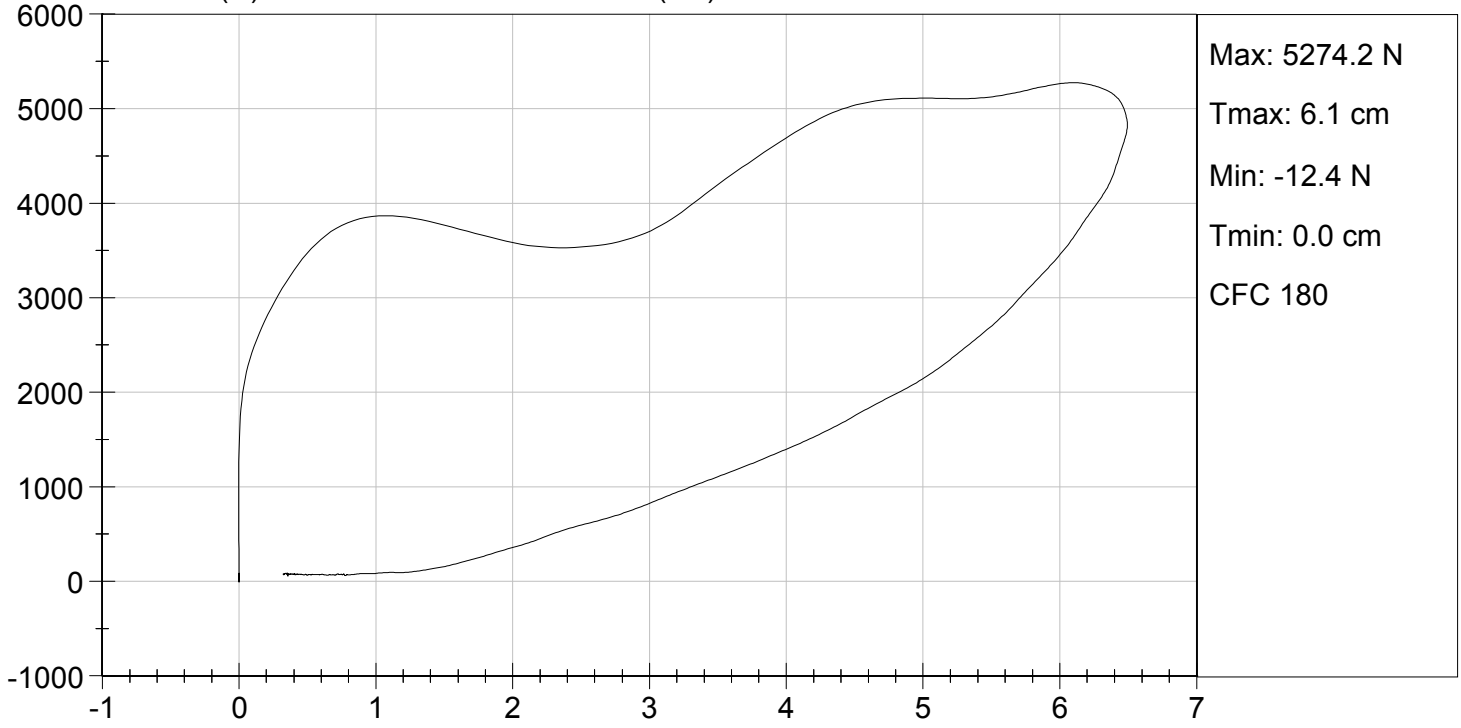
11/27/2012
Test Date

David Winkelbauer
Approved By

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

TEST DATE: 11/27/2012
TEST #: D124494

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:** D124495

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Probe Velocity	m/s	2.07 to 2.13	2.10	Pass
Peak Probe Force	N	4715 to 5782	4,859	Pass
		Overall Test Results		Pass

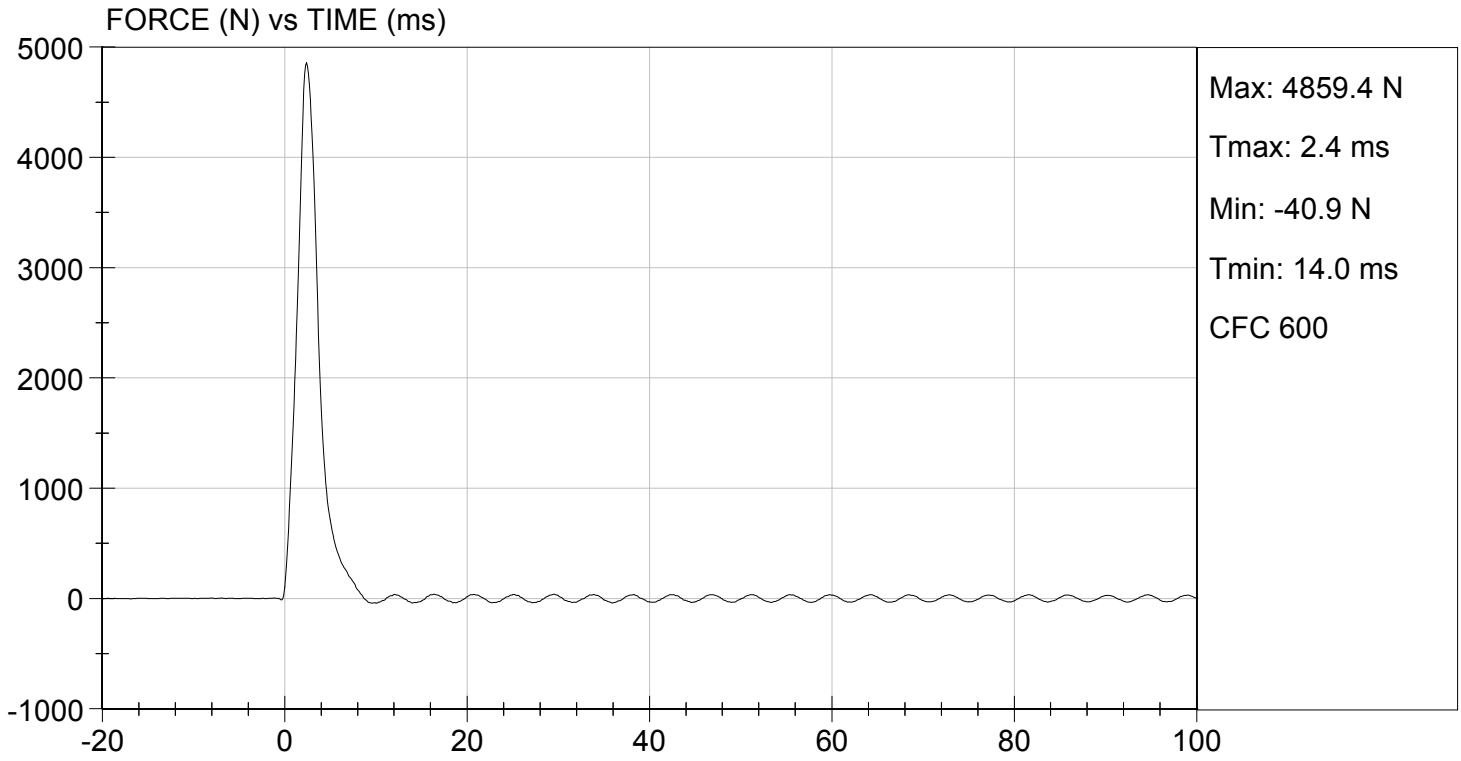
Jessica Gall
Laboratory Technician

11/26/2012
Test Date

David Winkelbauer
Approved By

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

TEST DATE: 11/26/2012
TEST #: D124495



MGA RESEARCH CORPORATION

LEFT KNEE IMPACT TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D124496

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Probe Velocity	m/s	2.07 to 2.13	2.11	Pass
Peak Probe Force	N	4715 to 5782	5,103	Pass
		Overall Test Results		Pass

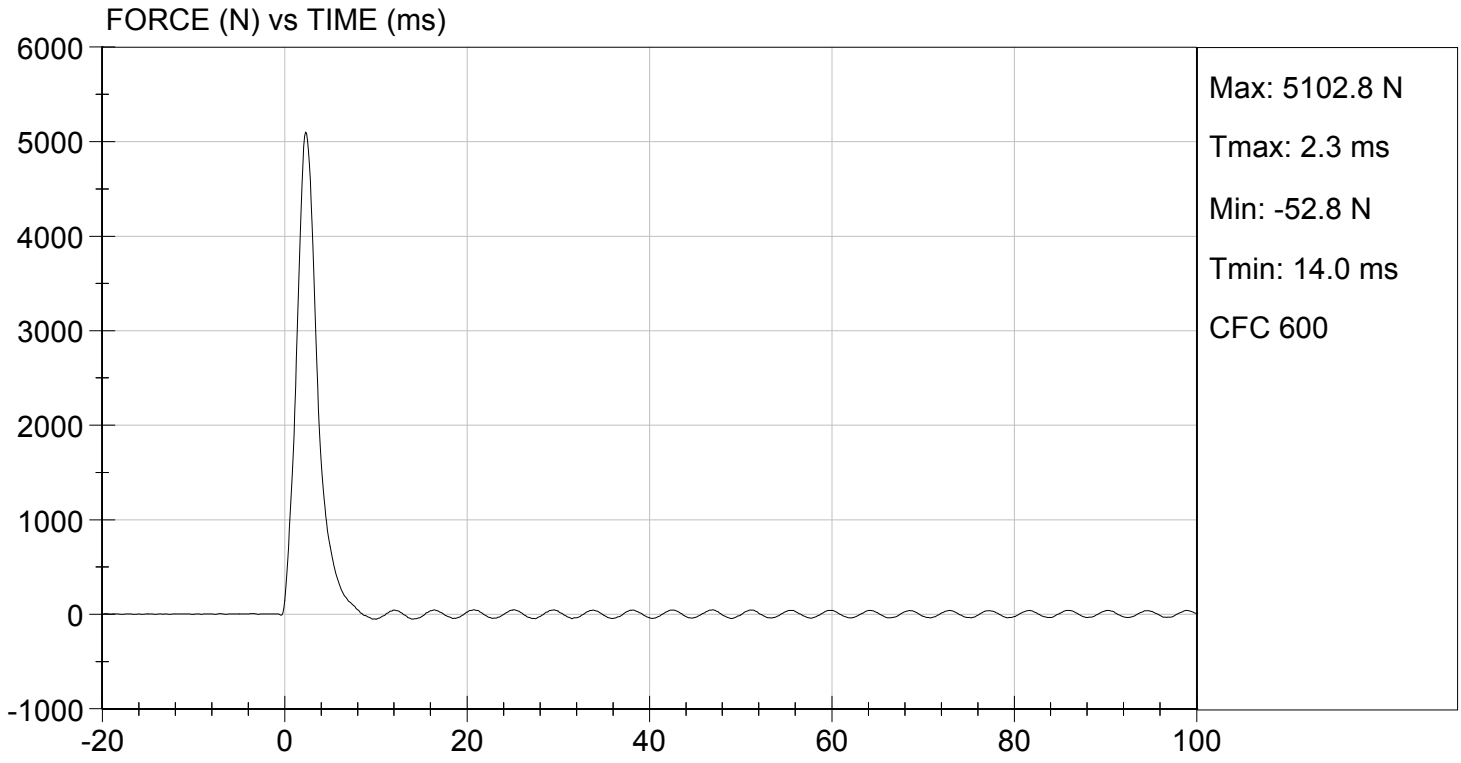
Jessica Gall
Laboratory Technician

11/26/2012
Test Date

David Winkelbauer
Approved By

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

TEST DATE: 11/26/2012
TEST #: D124496



MGA RESEARCH CORPORATION

HIP-FEMUR FLEXION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D124490

Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	21.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	25	25	Pass
Rotation Rate	deg/s	5.0 to 10.0	6.3	6.3	Pass
30 Degrees	Nm	94.9 Nm Max	63.6	63.9	Pass
150 ft-lbf / 203.4 Nm	Deg	40.0 to 50.0 Degree Max Rotation	48.0	46.5	Pass
		Overall Test Results			Pass

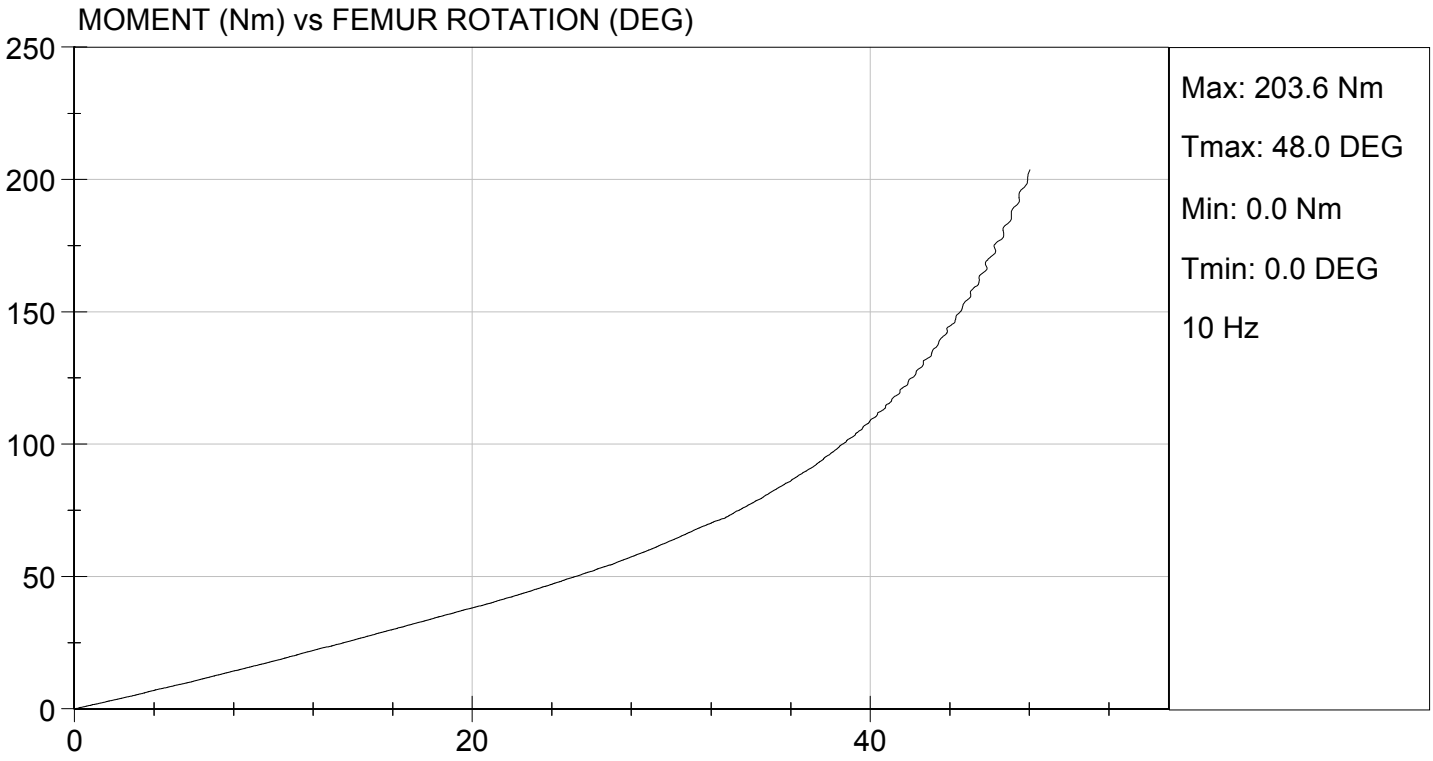
Jessica Gall
Laboratory Technician

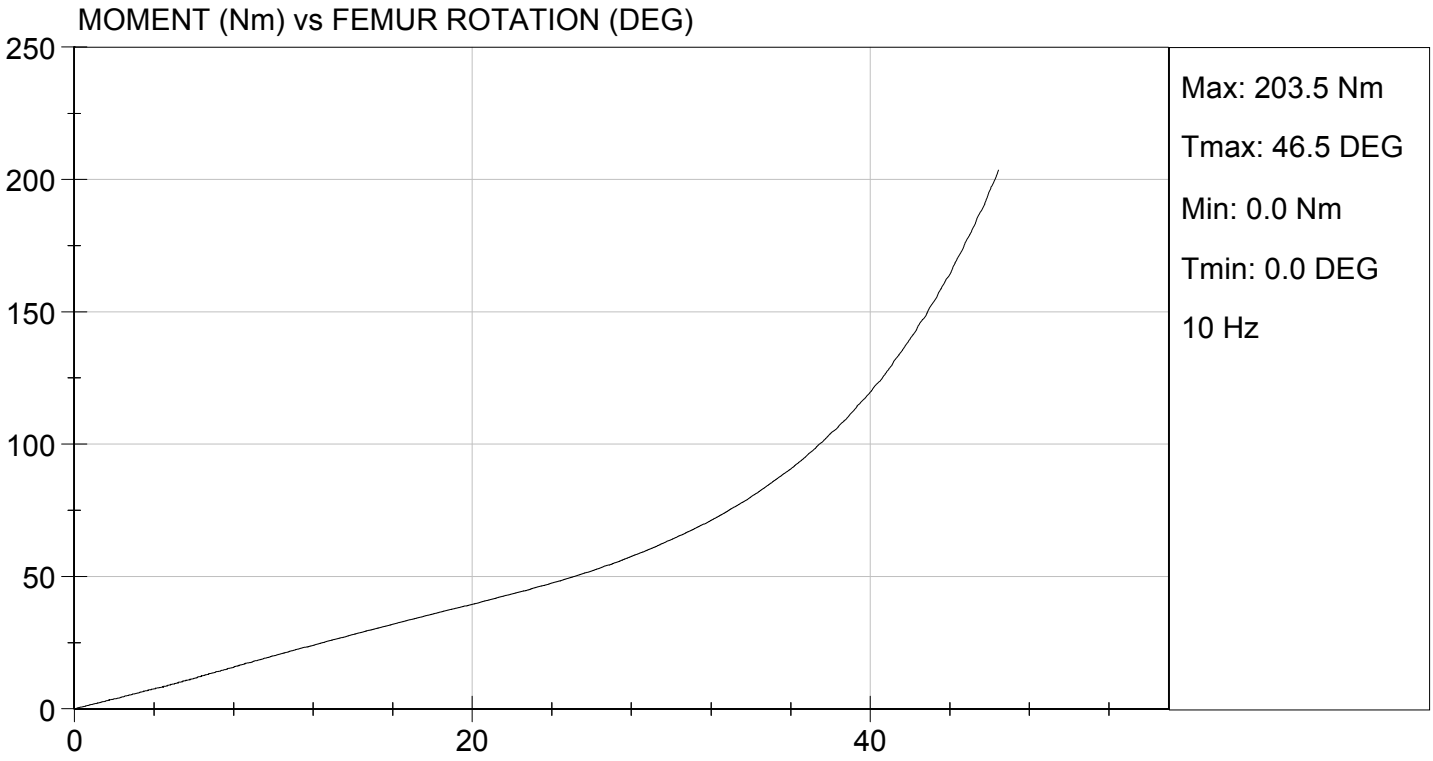
11/26/2012
Test Date

David Winkelbauer
Approved By

TEST DESC: RIGHT HIP FEMUR FLEXION

TEST DATE: 11/26/2012
TEST #: D124499




MOMENT (Nm) vs FEMUR ROTATION (DEG)
250
200
150
100
50
0
0
20
40
Max: 203.5 Nm
Tmax: 46.5 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:** D124641

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	27	Pass
Peak Resultant Acceleration	G's	225 to 275	258	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	1.8	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

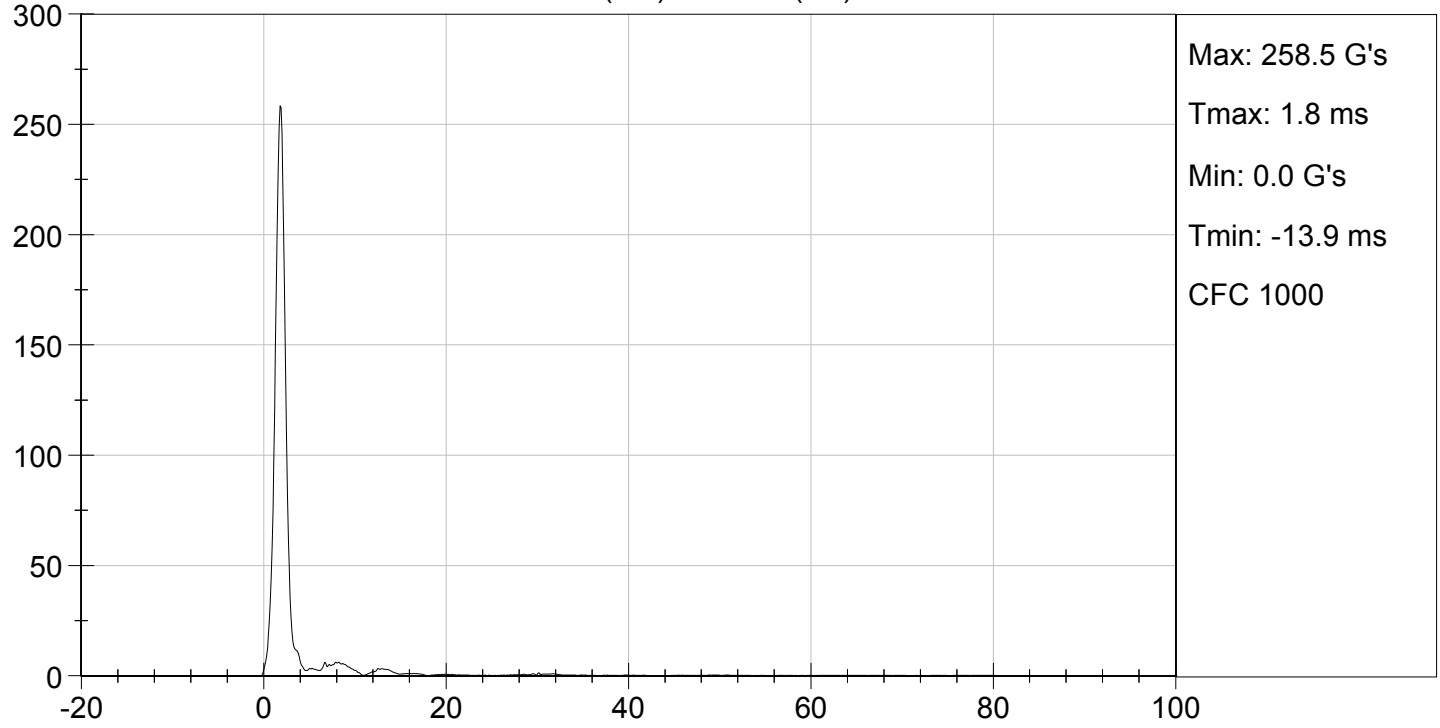
12/06/2012
Test Date

David Winkelbauer
Approved By

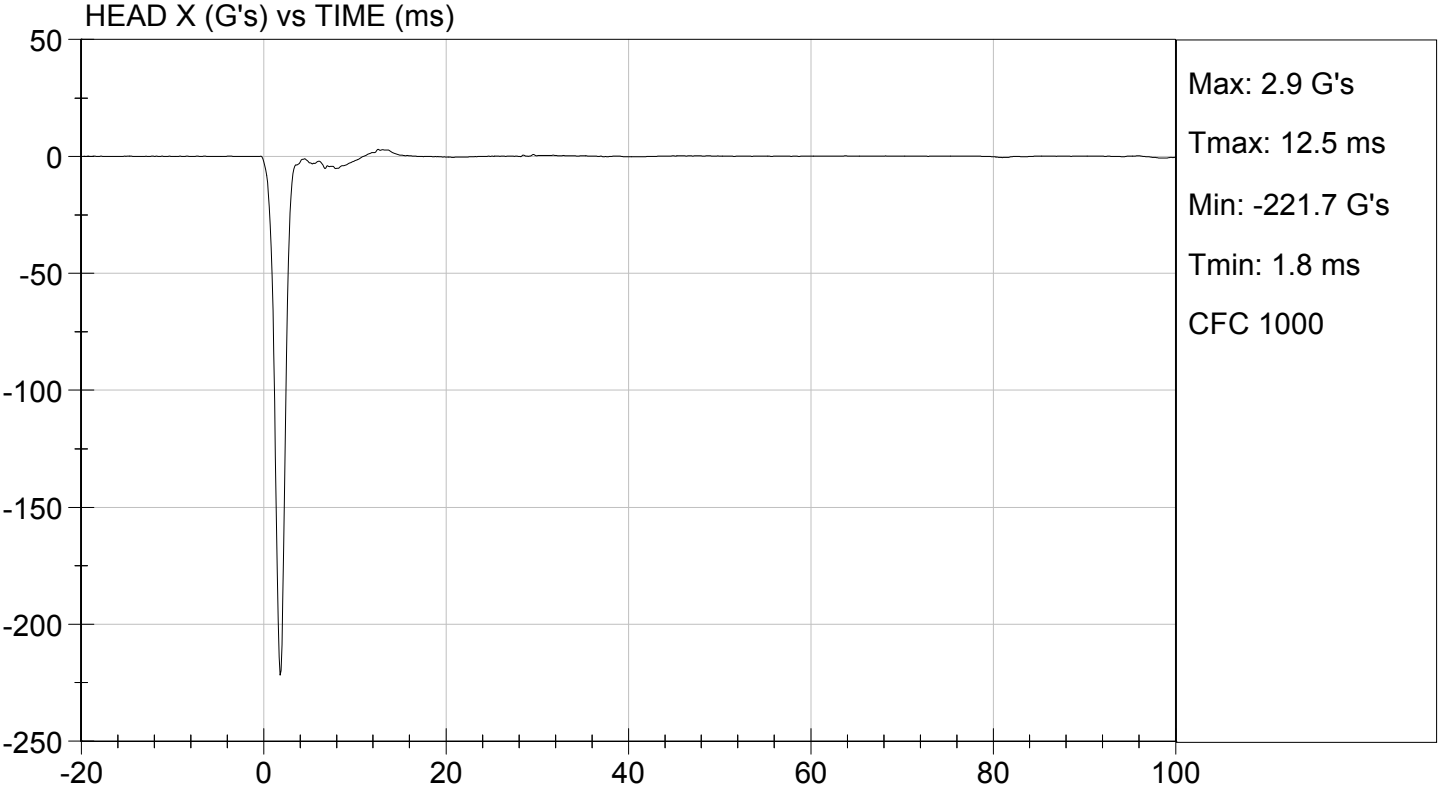
TEST DESC: HEAD DROP

TEST DATE: 12/06/2012
TEST #: D124641

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

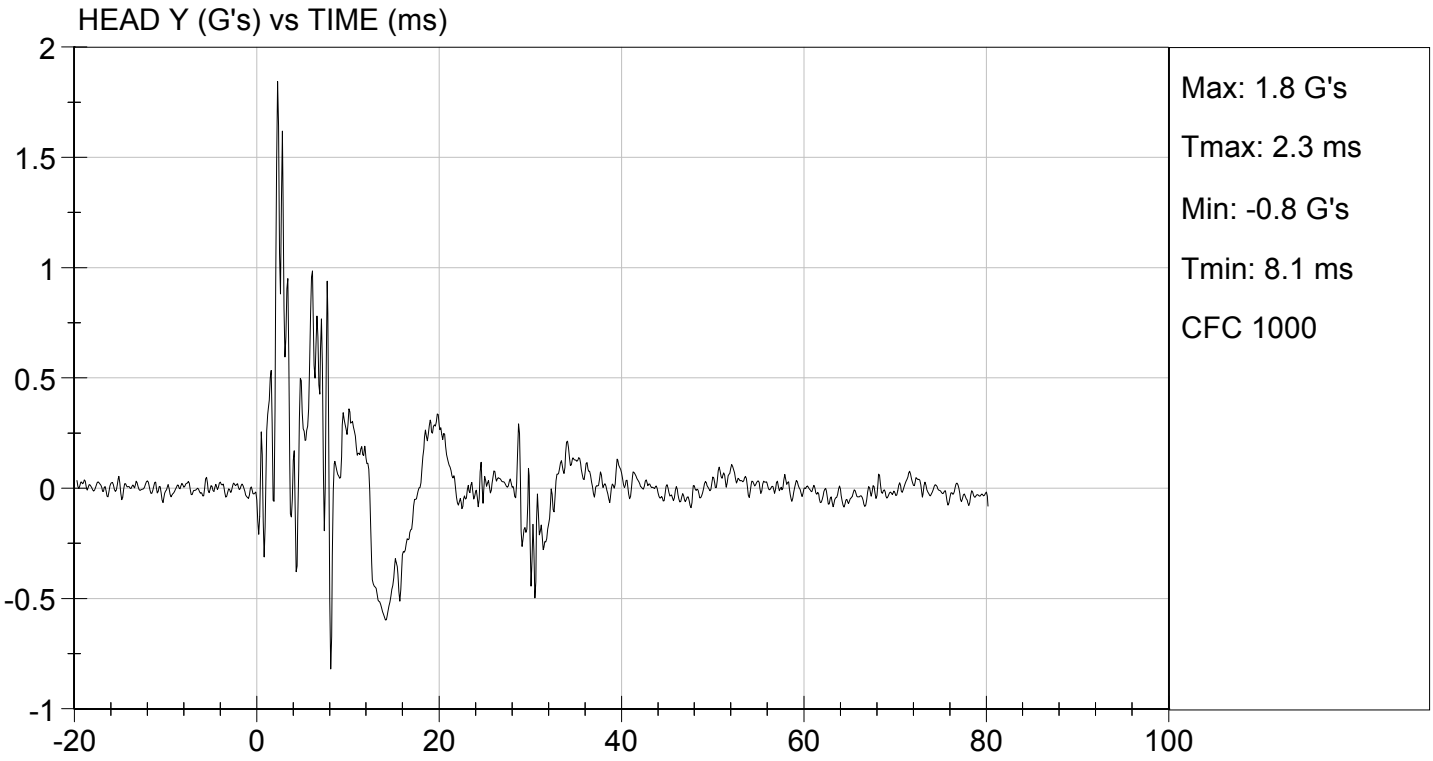


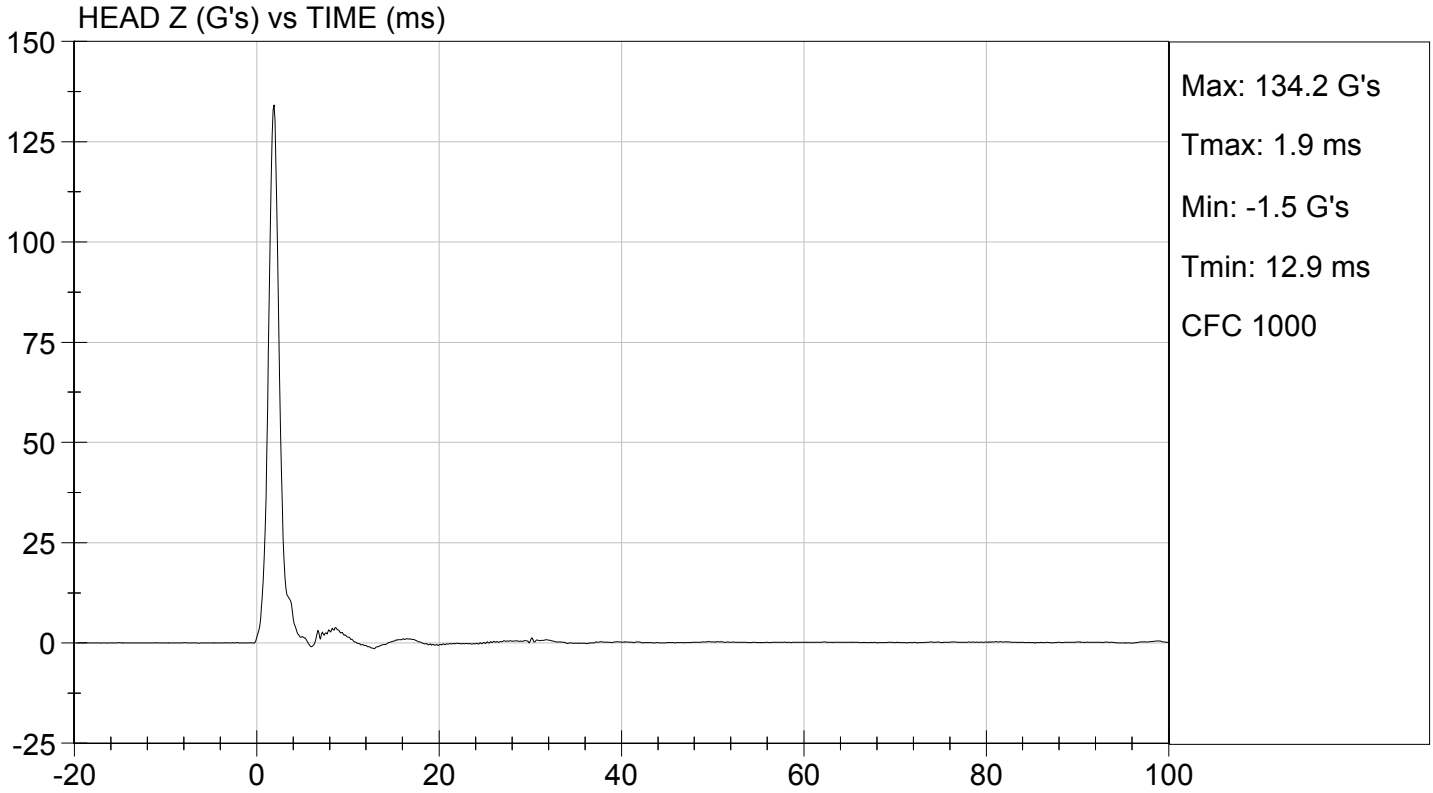
HEAD X (G's) vs TIME (ms)



TEST DESC: HEAD DROP

TEST DATE: 12/06/2012
TEST #: D124641





MGA RESEARCH CORPORATION

NECK FLEXION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D124642

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	20.9	Pass
Laboratory Relative Humidity		%	10 to 70	25	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.06	Pass
Pendulum Deceleration	10 ms	G's	22.50 to 27.50	23.24	Pass
	20 ms	G's	17.60 to 22.60	17.79	Pass
	30 ms	G's	12.50 to 18.50	14.31	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 29.0	14.7	Pass
Deceleration Decay Time to Cross 5 G's		ms	34.0 to 42.0	36.4	Pass
Maximum "D" Plane Rotation	Maximum	Deg	64.0 to 78.0	65.1	Pass
	Time	ms	57.0 to 64.0	57.3	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	113.0 to 128.0	114.2	Pass
Moment About Occipital Condyle	Maximum	Nm	88.1 to 108.5	95.6	Pass
	Time	ms	47.0 to 58.0	49.5	Pass
Positive Moment Decay Time To Zero Crossing		ms	97.0 to 107.0	97.5	Pass
			Overall Test Results		Pass

Jessica Hall
Laboratory Technician

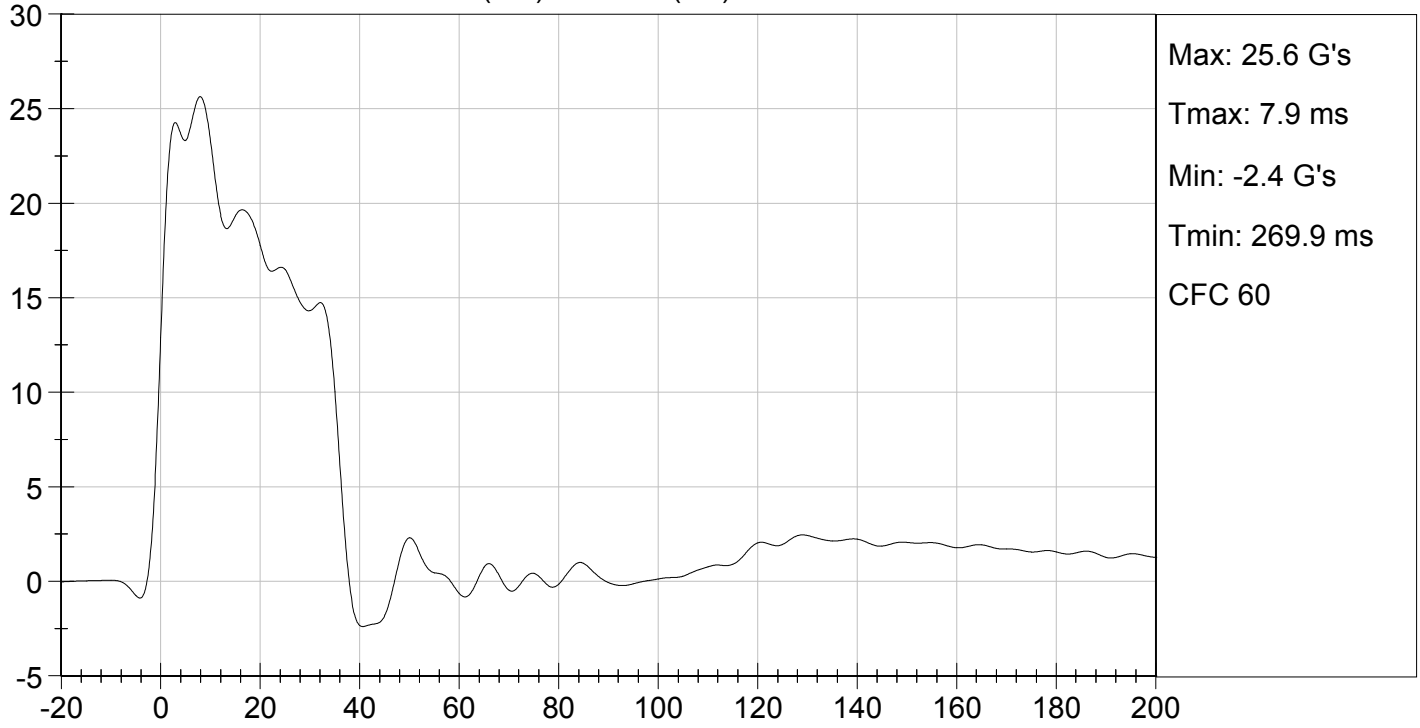
12/06/2012
Test Date

David Winkelbauer
Approved By

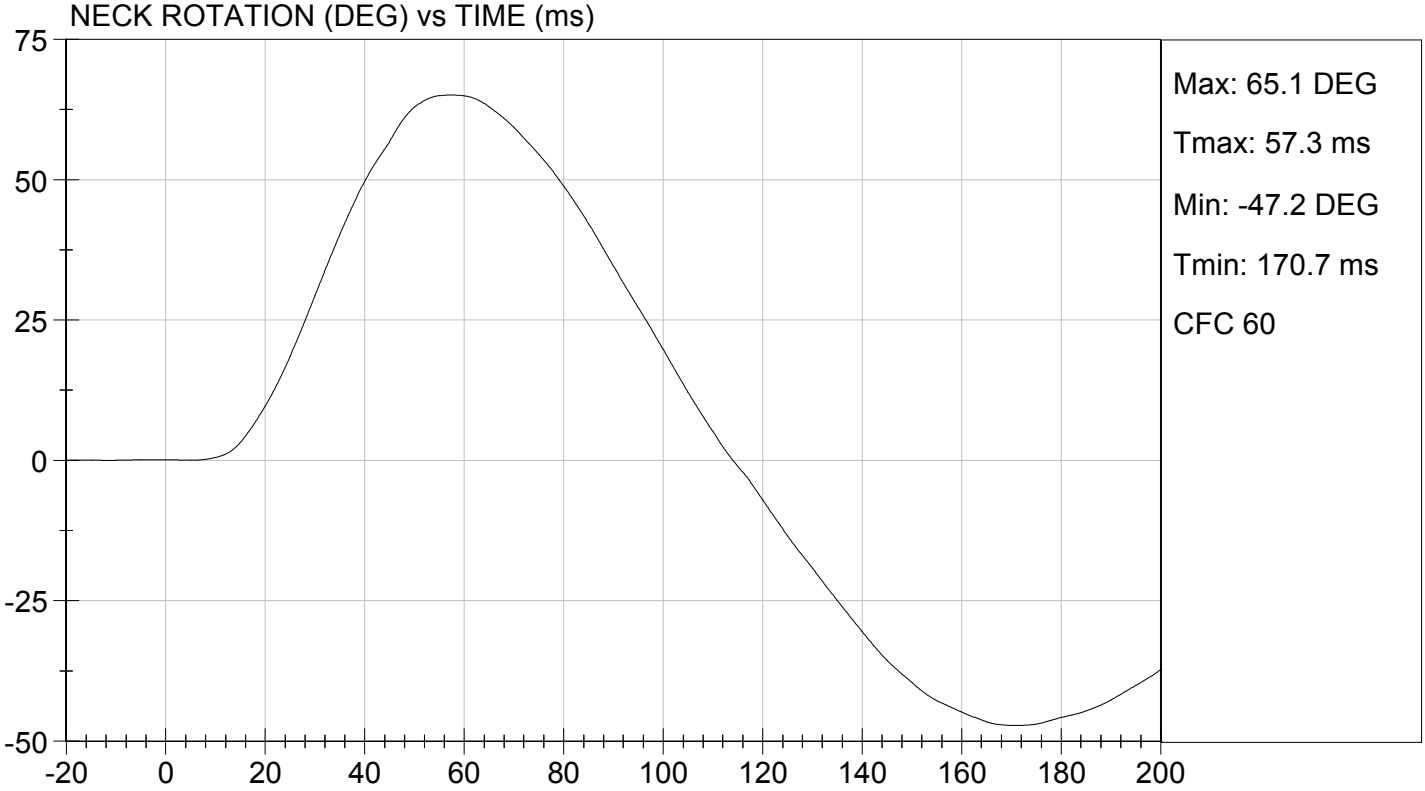
TEST DESC: NECK FLEXION
VELOCITY: 23.15 ft/s, 7.06 m/s

TEST DATE: 12/06/2012
TEST #: D124642

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

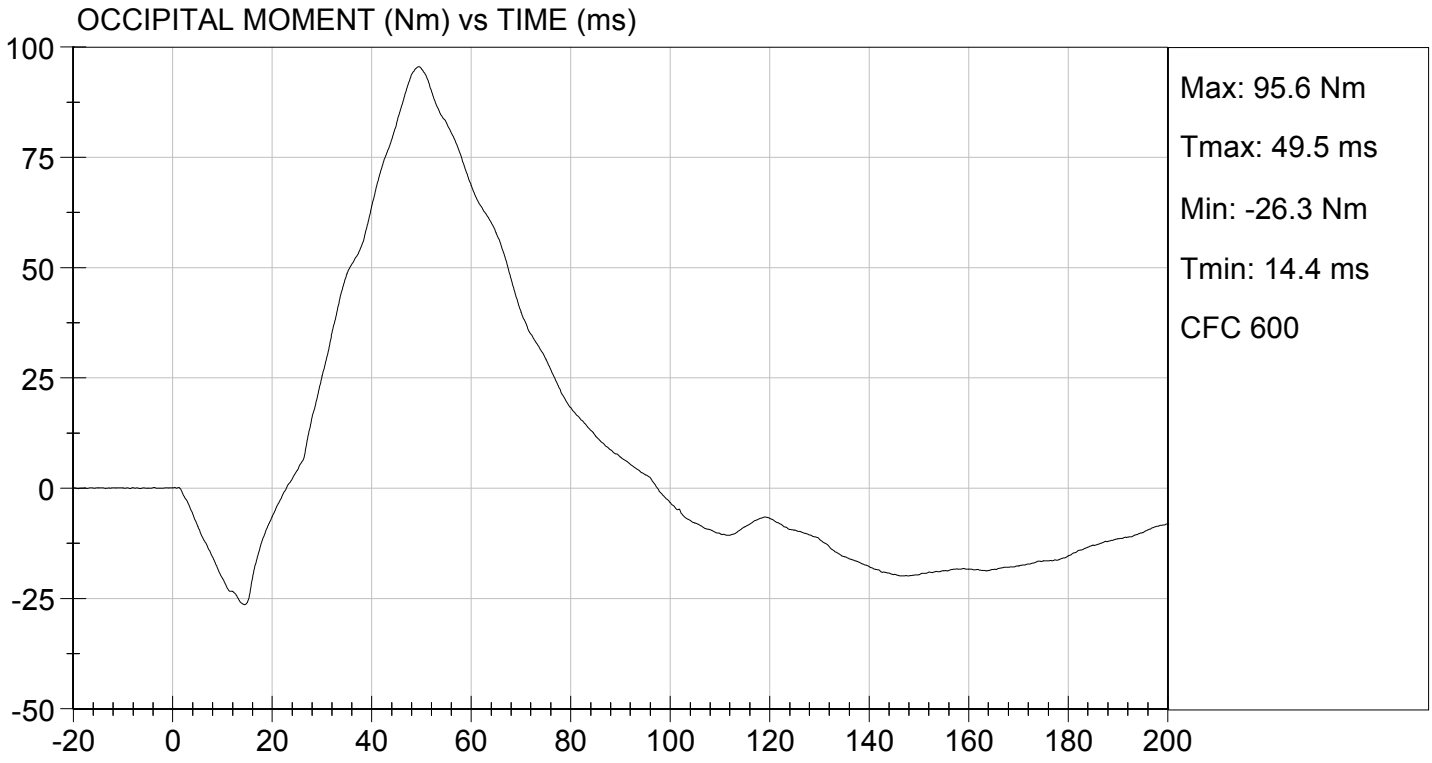


NECK ROTATION (DEG) vs TIME (ms)



TEST DESC: NECK FLEXION
VELOCITY: 23.15 ft/s, 7.06 m/s

TEST DATE: 12/06/2012
TEST #: D124642



MGA RESEARCH CORPORATION

NECK EXTENSION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D124643

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	27	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.12	Pass
Pendulum Deceleration	10 ms	G's	17.20 to 21.20	19.47	Pass
	20 ms	G's	14.00 to 19.00	18.40	Pass
	30 ms	G's	11.00 to 16.00	12.51	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 22.0	12.4	Pass
Deceleration Decay Time to Cross 5 G's		ms	38.0 to 46.0	38.4	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	93.6	Pass
	Time	ms	72.0 to 82.0	76.0	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	147.0 to 174.0	153.8	Pass
Moment About Occipital Condyle	Maximum	Nm	-52.9 to -79.9	-63.3	Pass
	Time	ms	65.0 to 79.0	70.0	Pass
Negative Moment Decay Time To Zero Crossing		ms	120.0 to 148.0	139.7	Pass
			Overall Test Results		Pass

Jessica Gall
Laboratory Technician

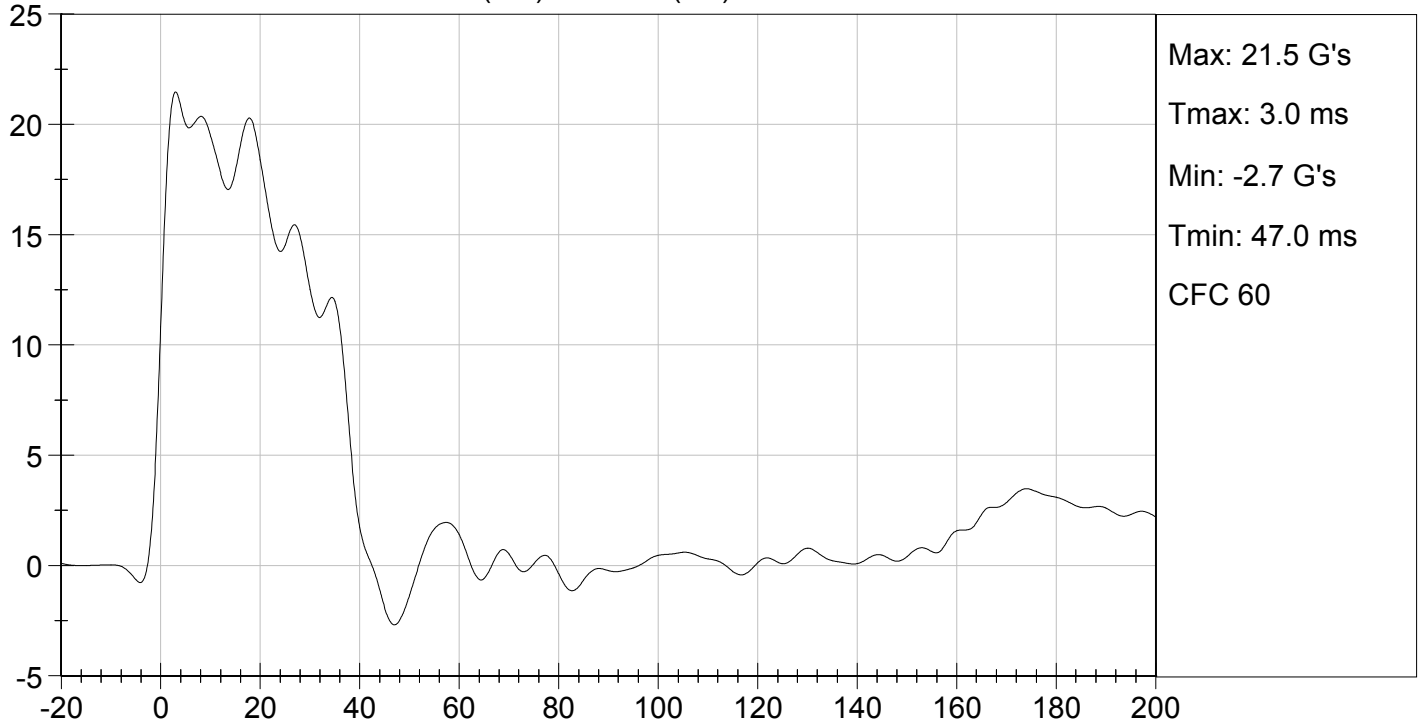
12/06/2012
Test Date

David Winkelbauer
Approved By

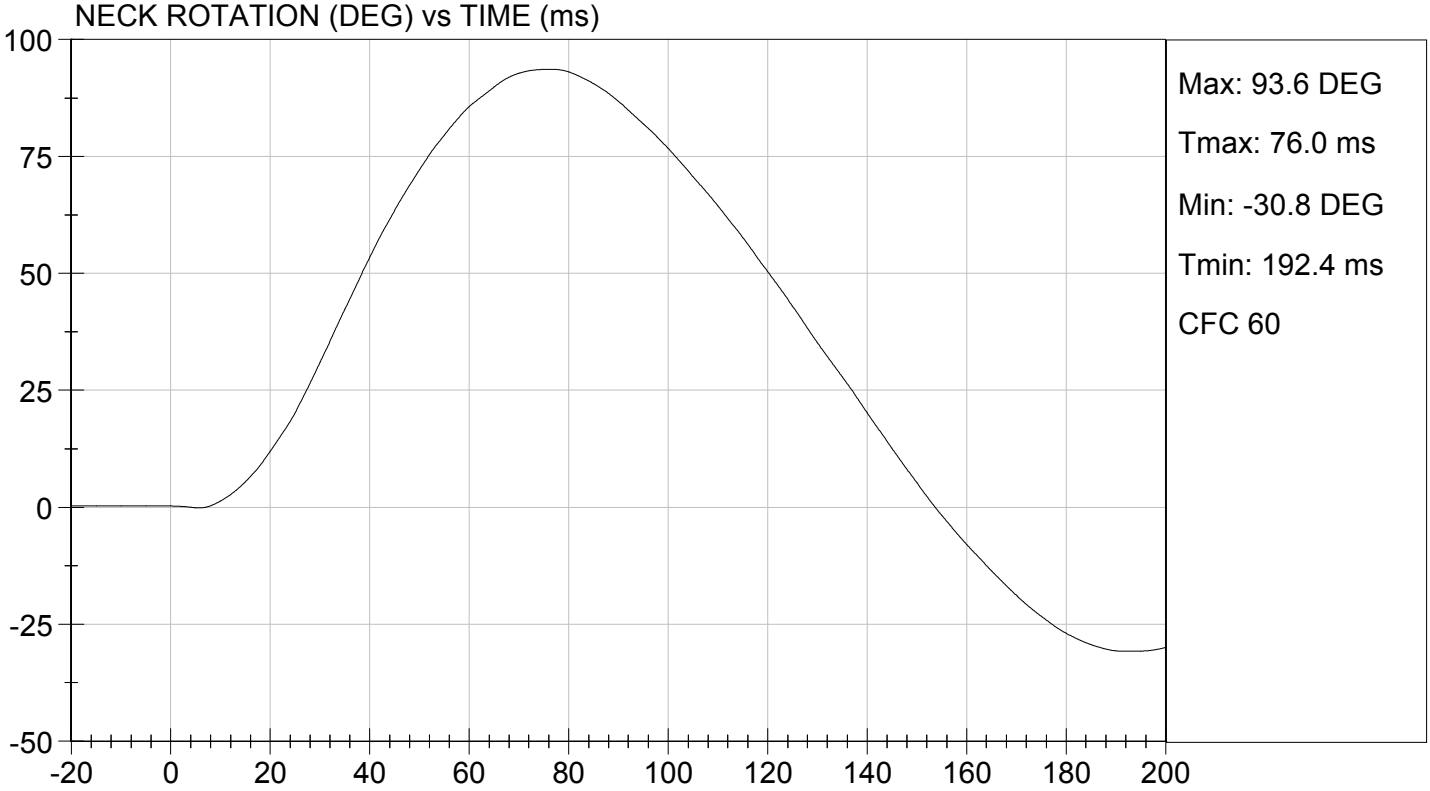
TEST DESC: NECK EXTENSION
VELOCITY: 20.08 ft/s, 6.12 m/s

TEST DATE: 12/06/2012
TEST #: D124643

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

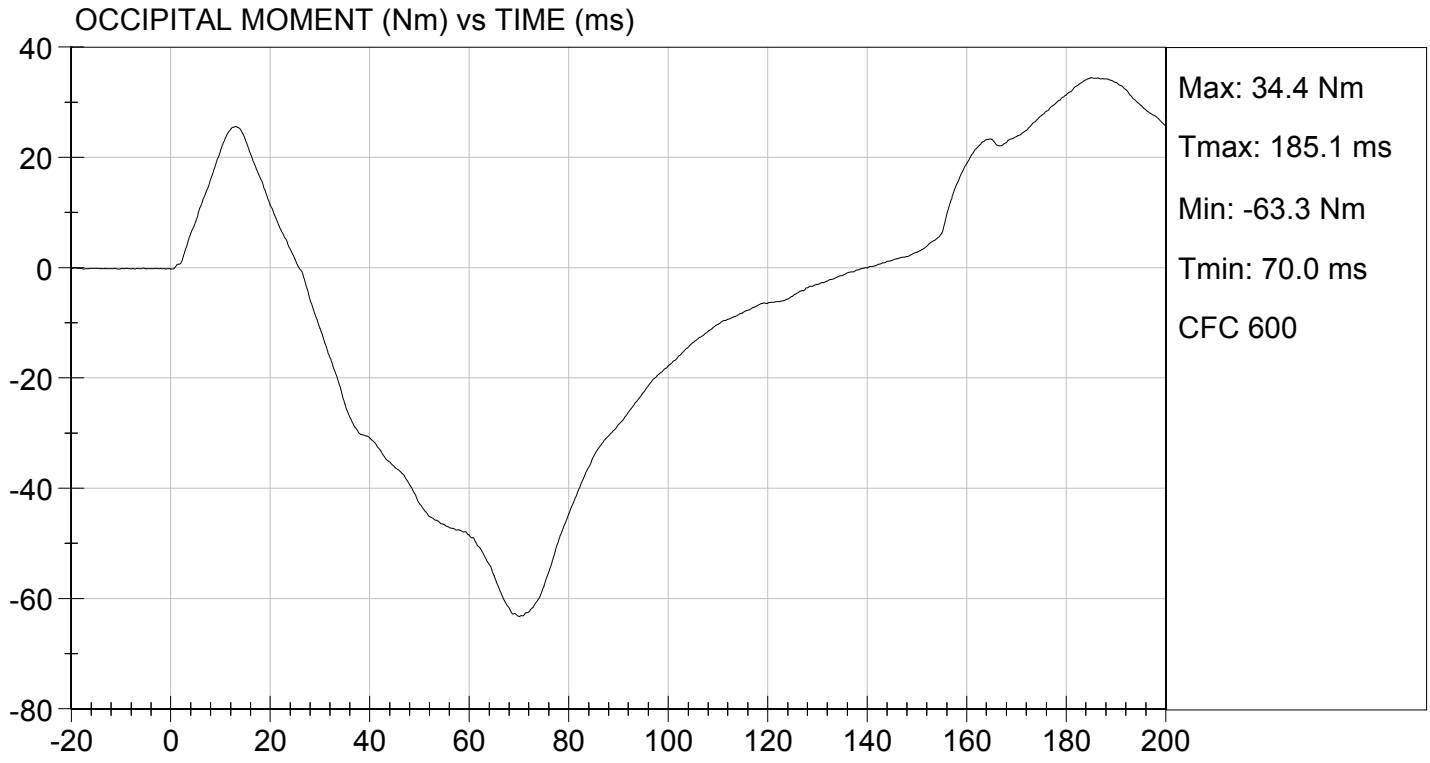


NECK ROTATION (DEG) vs TIME (ms)



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

TEST DATE: 12/06/2012
TEST #: D124643



MGA RESEARCH CORPORATION

THORAX IMPACT

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D124644

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	27	Pass
Probe Velocity	m/s	6.58 to 6.82	6.68	Pass
Peak Probe Force	N	5159 to 5893	5,206	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 Hall
Laboratory Technician

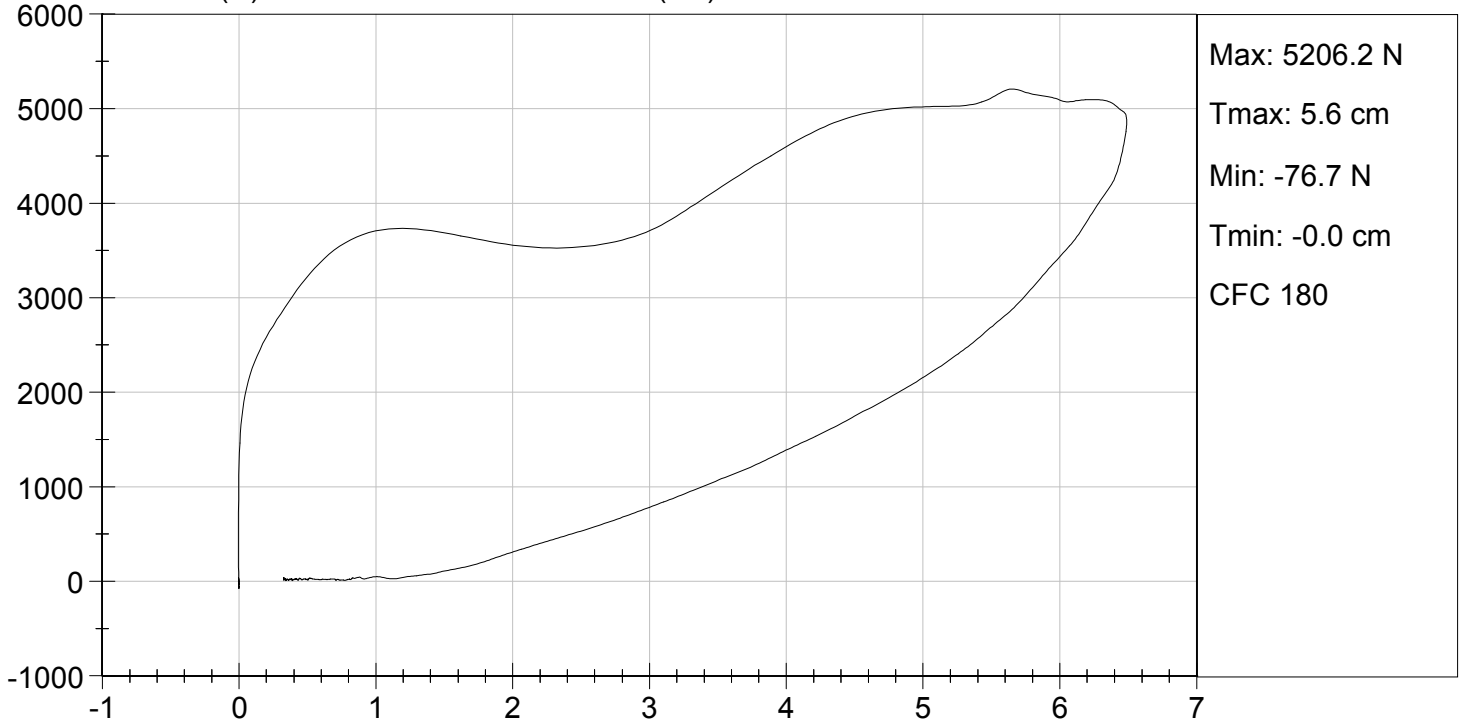
12/06/2012
Test Date

David Winkelbauer
Approved By

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

TEST DATE: 12/06/2012
TEST #: D124644

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:** D124645

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	25	Pass
Probe Velocity	m/s	2.07 to 2.13	2.12	Pass
Peak Probe Force	N	4715 to 5782	5,452	Pass
		Overall Test Results		Pass

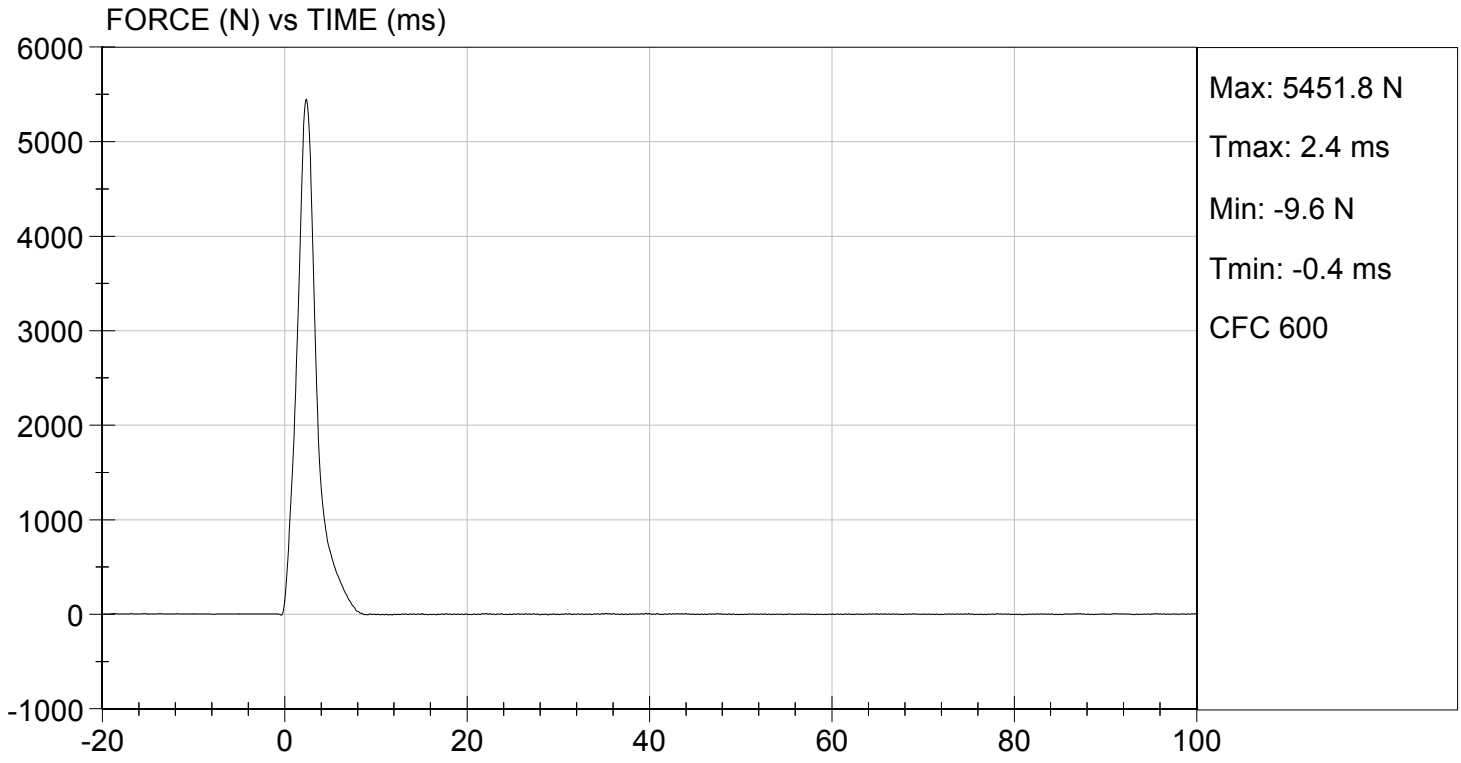
Jessica Gall
Laboratory Technician

12/06/2012
Test Date

David Winkelbauer
Approved By

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

TEST DATE: 12/06/2012
TEST #: D124645



MGA RESEARCH CORPORATION

LEFT KNEE IMPACT TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D124646

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	25	Pass
Probe Velocity	m/s	2.07 to 2.13	2.12	Pass
Peak Probe Force	N	4715 to 5782	5,080	Pass
		Overall Test Results		Pass

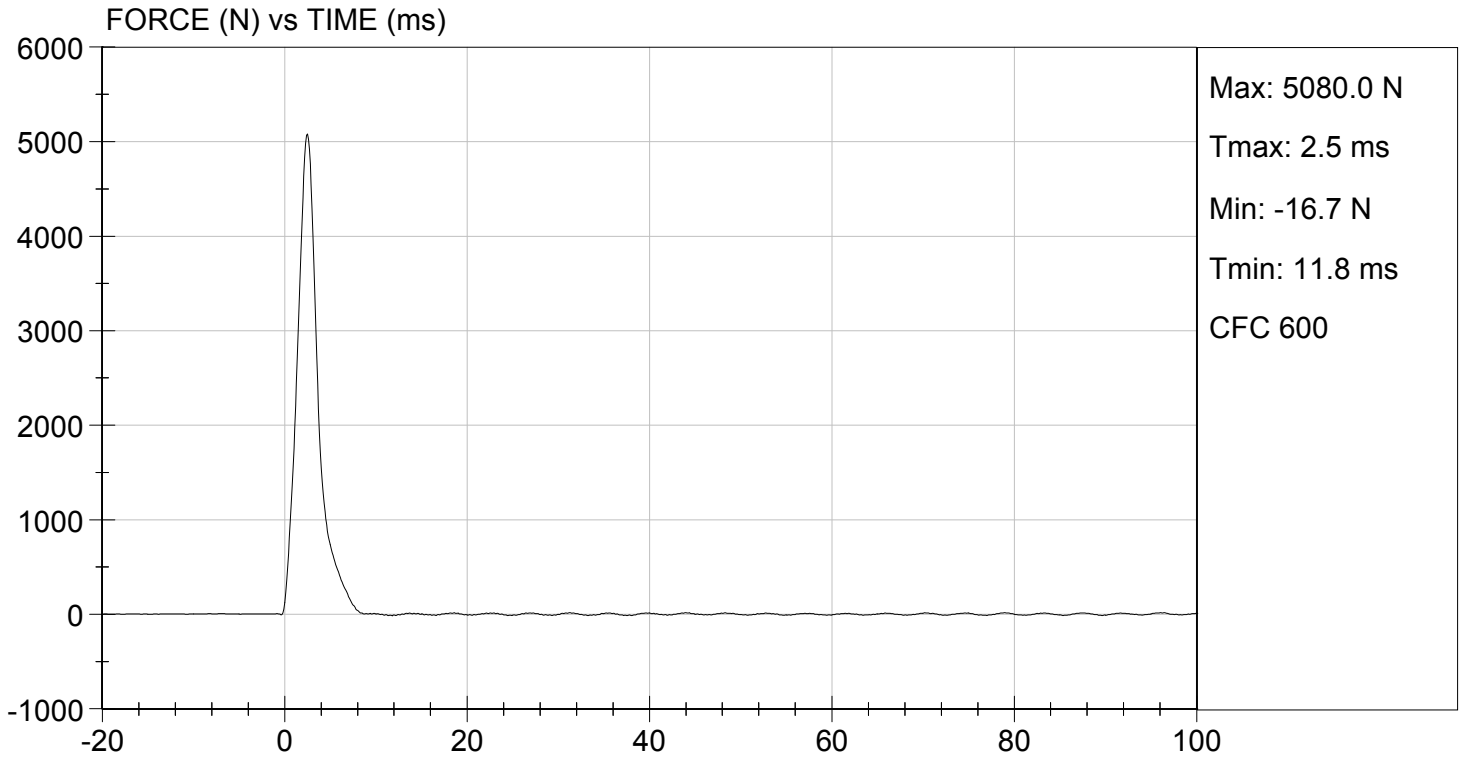
Jessica Gall
Laboratory Technician

12/06/2012
Test Date

David Winkelbauer
Approved By

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

TEST DATE: 12/06/2012
TEST #: D124646



MGA RESEARCH CORPORATION

HIP-FEMUR FLEXION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D124640

Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	20.9	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	27	27	Pass
Rotation Rate	deg/s	5.0 to 10.0	6.3	6.3	Pass
30 Degrees	Nm	94.9 Nm Max	63.2	63.8	Pass
150 ft-lbf / 203.4 Nm	Deg	40.0 to 50.0 Degree Max Rotation	48.4	46.4	Pass
		Overall Test Results			Pass

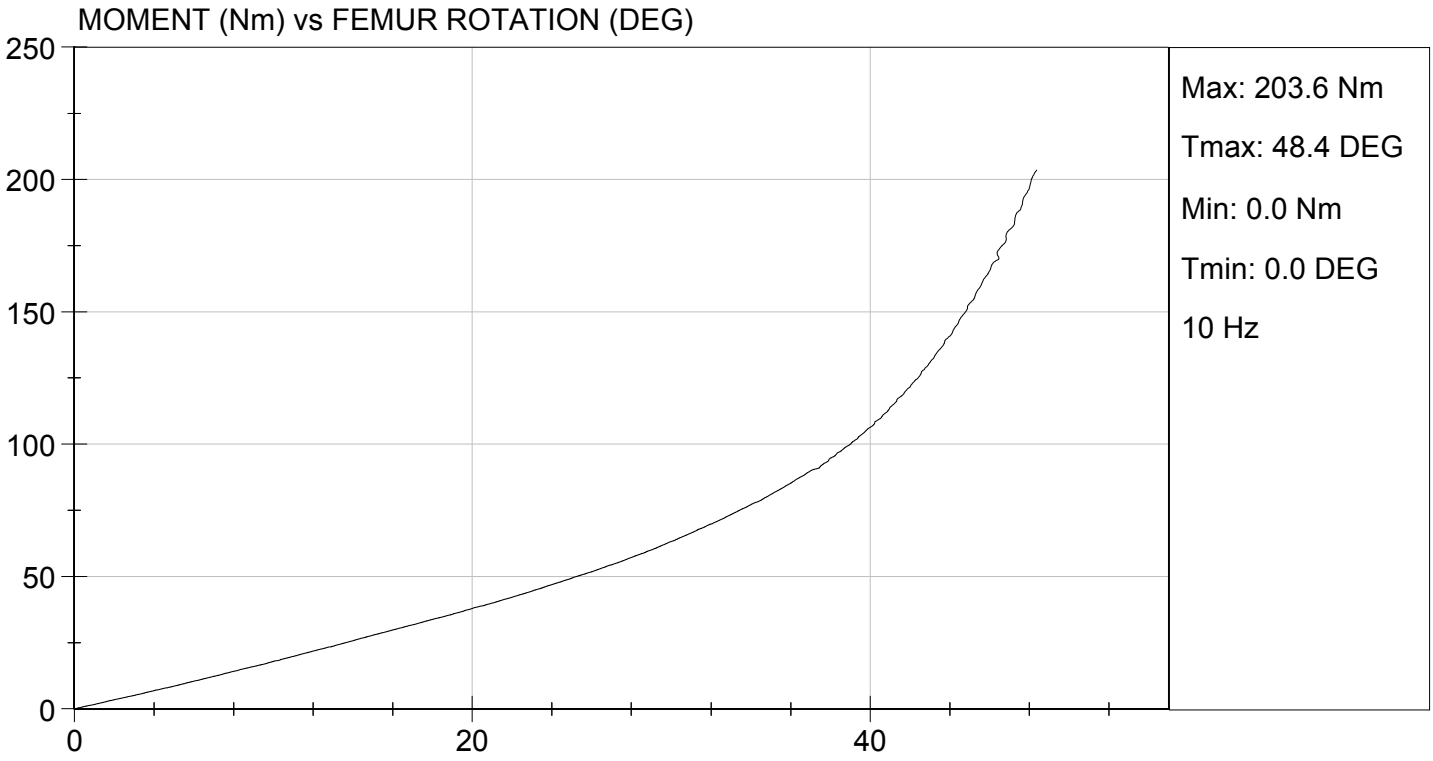
Jessica Gall
Laboratory Technician

12/06/2012
Test Date

David Winkelbauer
Approved By

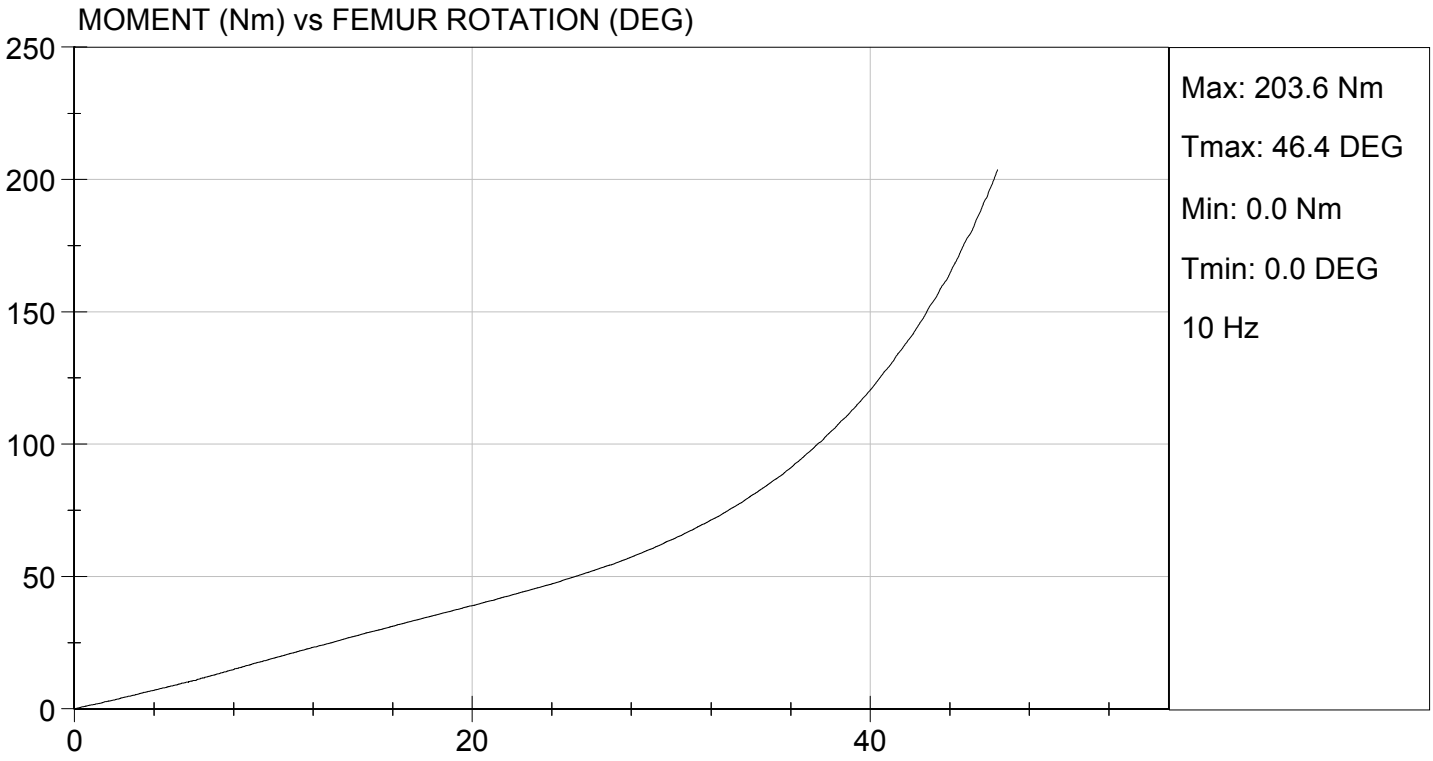
TEST DESC: RIGHT HIP FEMUR FLEXION

TEST DATE: 12/06/2012
TEST #: D124649



TEST DESC: LEFT HIP FEMUR FLEXION

TEST DATE: 12/06/2012
TEST #: D124640



Hybrid III, 5th External Measurements
SN: 138

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	785.1
B	SHOULDER PIVOT HEIGHT	Centerline of shoulder pivot bolt to the seat surface.	431.8-457.2	456.8
C	H-POINT HEIGHT	Reference	81.3-86.3	84.0
D	H-POINT LOCATION FROM BACKLINE	Reference	144.8-149.8	146.2
E	SHOULDER PIVOT FROM BACKLINE	Center of the shoulder clevis to the rear vertical surface of the fixture.	68.6-83.8	78.0
F	THIGH CLEARANCE	Measured at the highest point on the upper femur segment.	119.4-134.6	127.5
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	249.6
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	280.2
J	ELBOW REST HEIGHT	Measure from the flesh below the elbow pivot bolt to the seat surface.	182.8-203.2	201.9
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	526.7
L	POPLITEAL HEIGHT	Seat surface to the plane of the horizontal plane of the bottom of the feet.	355.6-376.0	362.3
M	KNEE PIVOT HEIGHT	Centerline of knee pivot bolt to the horizontal plane of the bottom of the feet.	393.7-419.1	398.0
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	430.5

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	184.6
P	FOOT LENGTH	Tip of toe to rear of heel	218.5-233.7	221.0
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	472.6
S	HEAD BREADTH	The widest part of the head	137.1-147.3	141.9
T	HEAD DEPTH	Back of the head to the forehead	177.8-188.0	184.2
U	HIP BREADTH	The widest part of the hip	299.7-314.9	307.4
V	SHOULDER BREADTH	Outside edges of right and left shoulder clevises	350.5-365.7	360.5
W	FOOT BREADTH	The widest part of the foot	78.8-94.0	85.0
X	HEAD CIRCUMFERENCE	Measured at the point as in dim. “T”	528.3-548.7	546.2
Y	CHEST CIRCUMFERENCE (WITH CHEST JACKET)	Measured 345.4 ± 12.7 mm above seat surface	850.9-881.3	875.1
Z	WAIST CIRCUMFERENCE	Measured 165.1 ± 5.1 mm above seat surface	759.5-789.9	785.4
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: 138 **Test ID:** D124441

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	32	Pass
Peak Resultant Acceleration	G's	250 to 300	260	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	-3.7	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

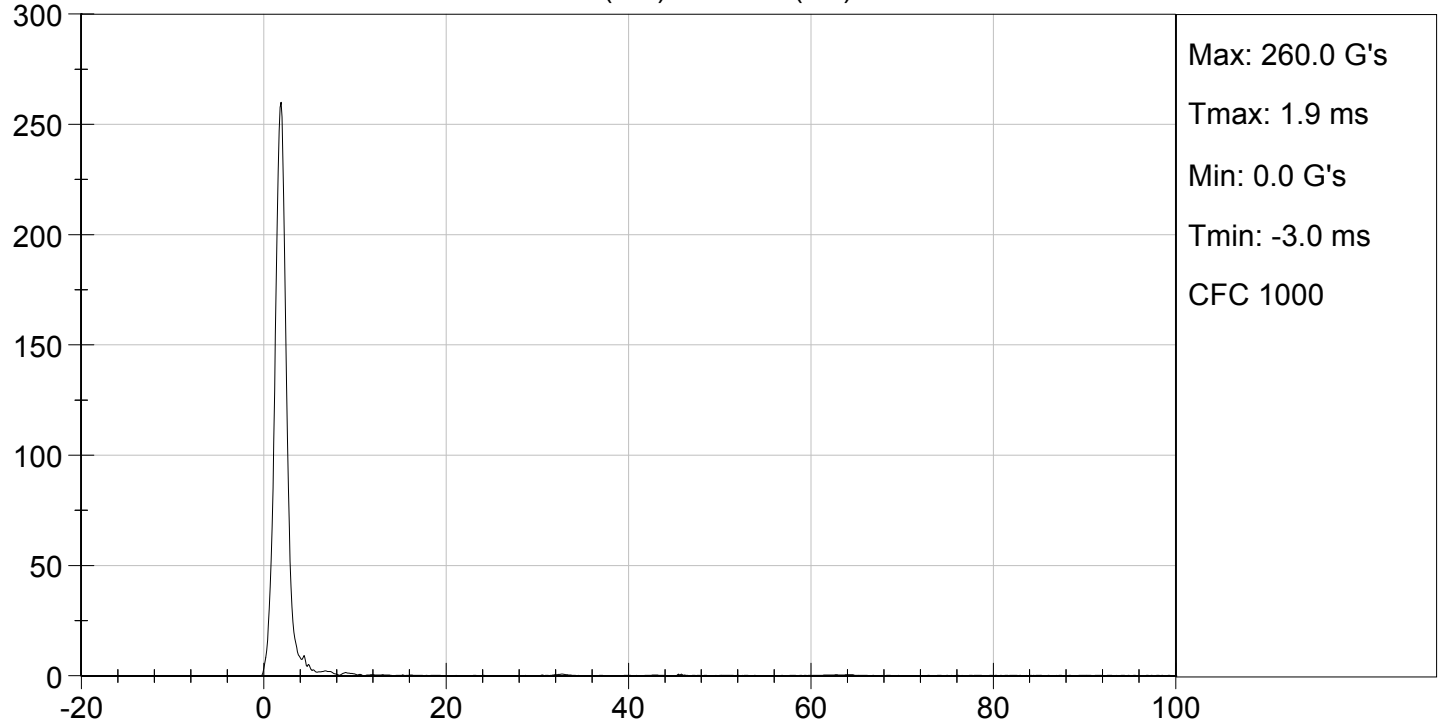
11/16/2012
Test Date

David Winkelbauer
Approved By

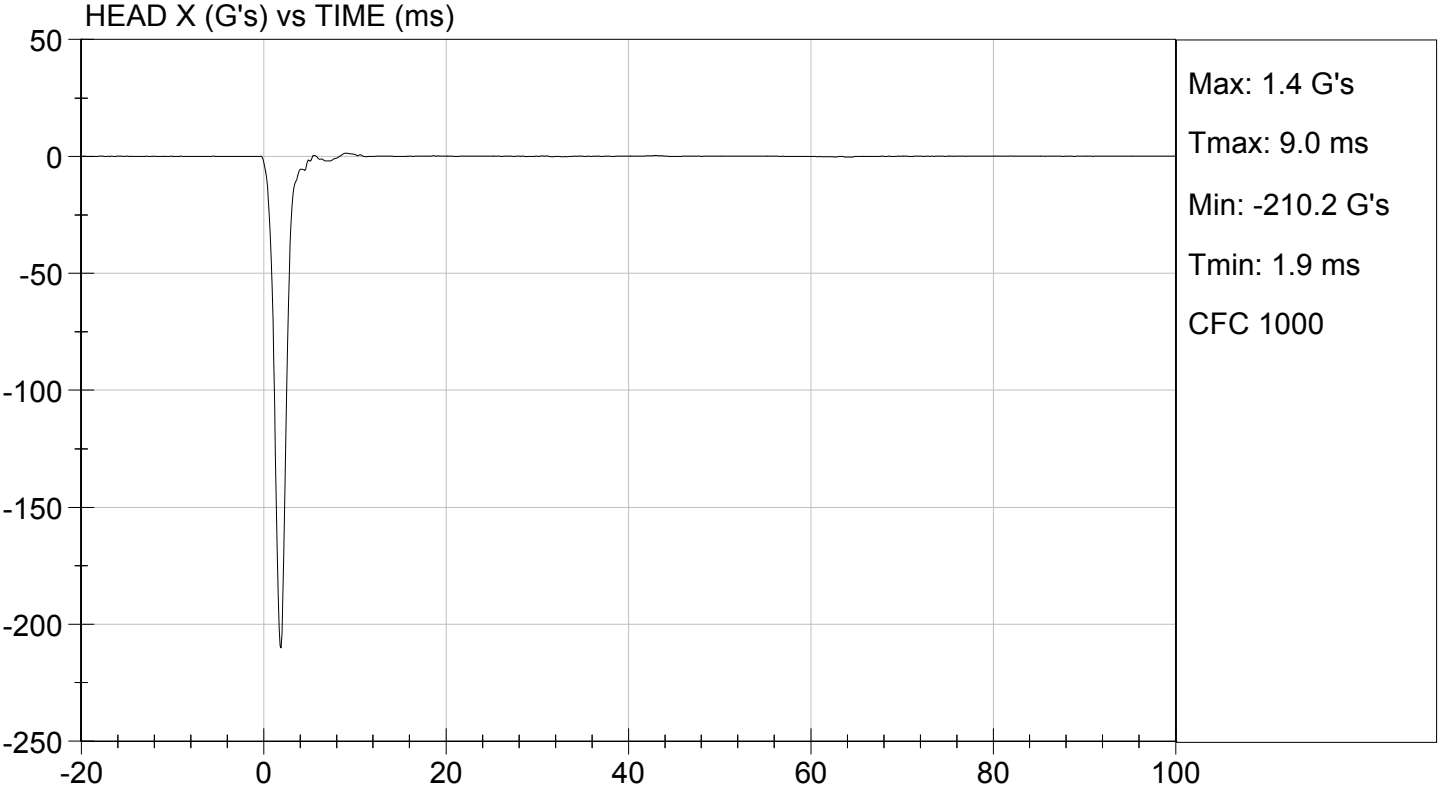
TEST DESC: HEAD DROP

TEST DATE: 11/16/2012
TEST #: D124441

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

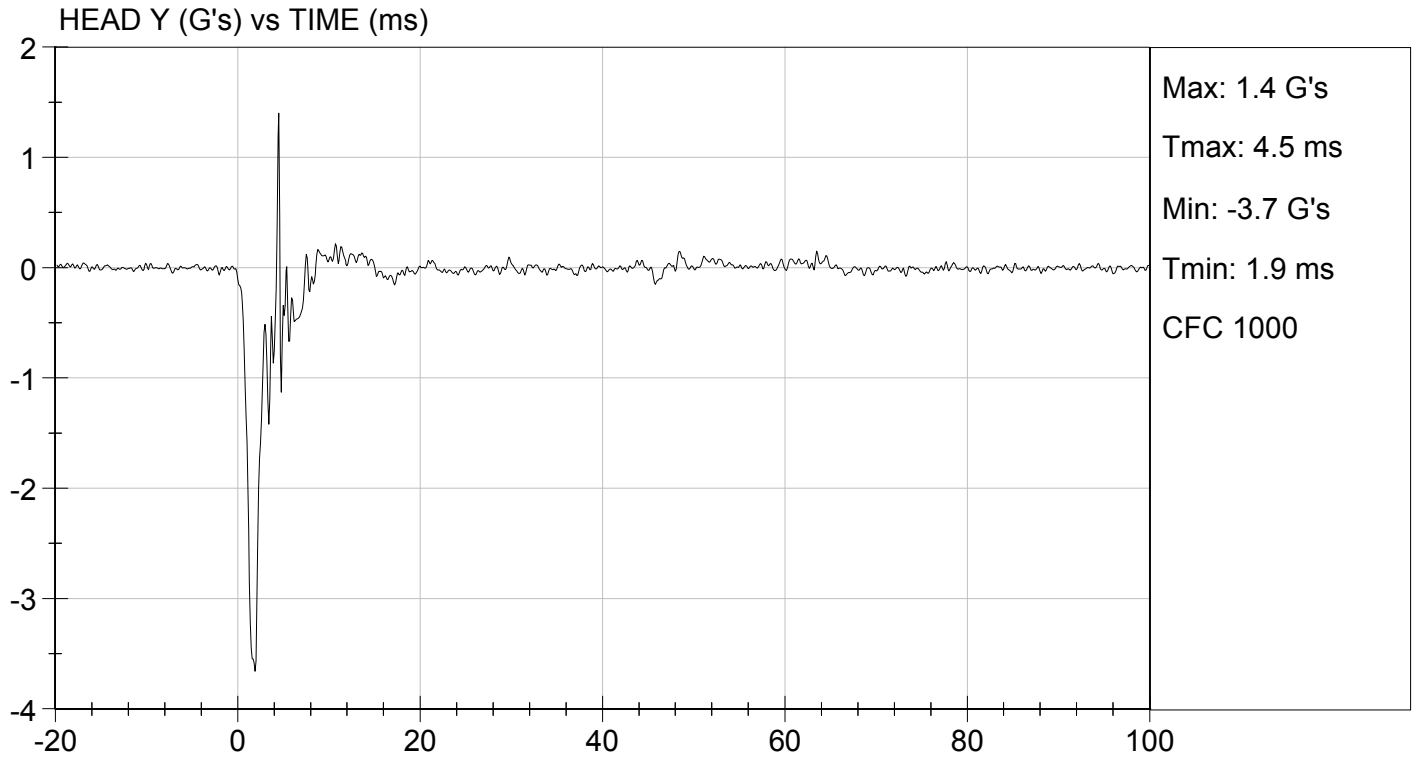


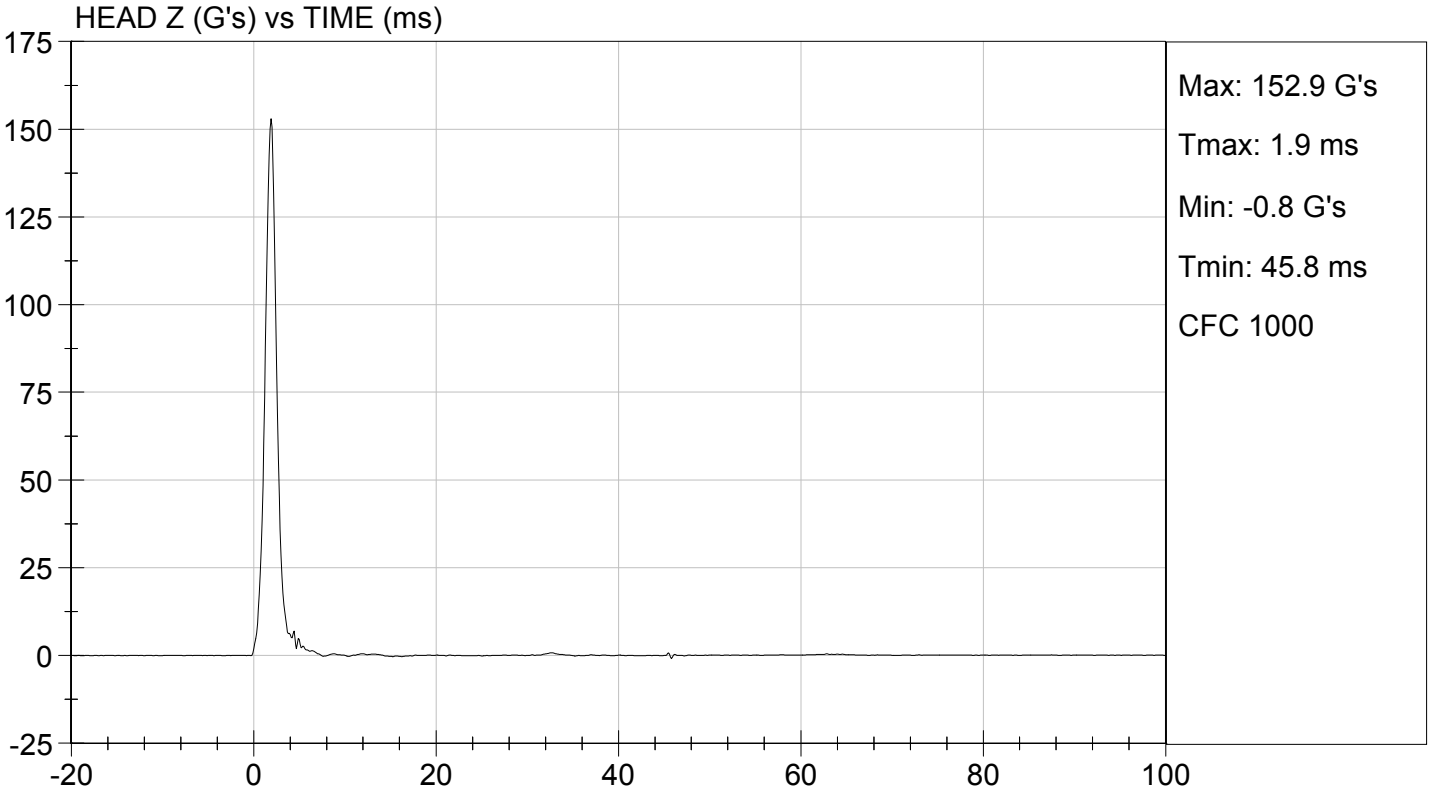
HEAD X (G's) vs TIME (ms)



TEST DESC: HEAD DROP

TEST DATE: 11/16/2012
TEST #: D124441





MGA RESEARCH CORPORATION

NECK FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 138 **Test I.D:** D124442

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity		%	10 to 70	32	Pass
Pendulum Speed		m/s	6.89 to 7.13	7.06	Pass
Pendulum Velocity	10 ms	m/s	2.1 to 2.5	2.4	Pass
	20 ms	m/s	4.0 to 5.0	4.4	Pass
	30 ms	m/s	5.8 to 7.0	6.2	Pass
D Plane Rotation	Max	deg	77 to 91	81	Pass
Occipital Condyle Moment within Rotation Corridor		Nm	69 to 83	69.2	Pass
Positive Moment Time Curve Decay to 10 Nm		ms	80 to 100	85	Pass
			Overall Results		Pass

Jessica Hall
Laboratory Technician

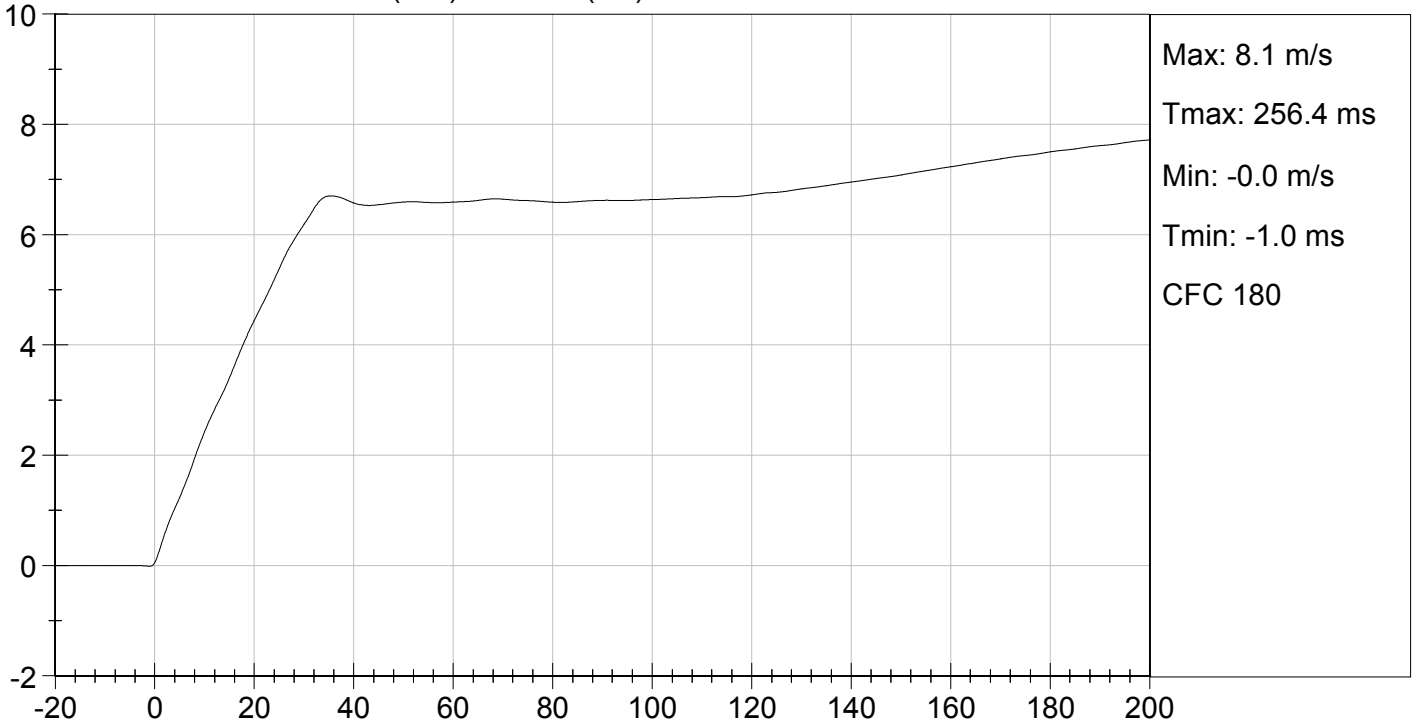
11/16/2012
Test Date

David Winkelbauer
Approved By

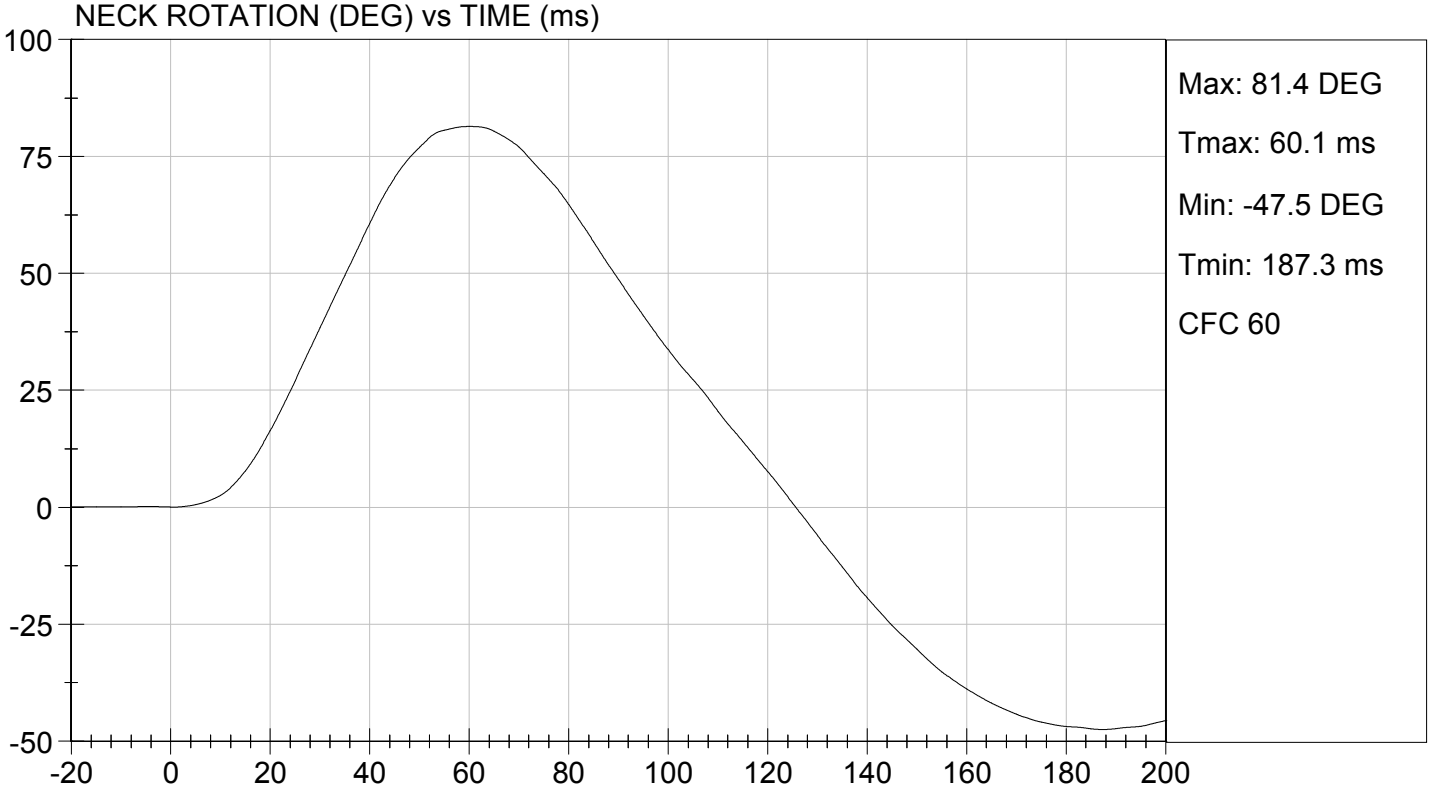
TEST DESC: NECK FLEXION
VELOCITY: 23.15 ft/s, 7.06 m/s

TEST DATE: 11/16/2012
TEST #: D124442

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

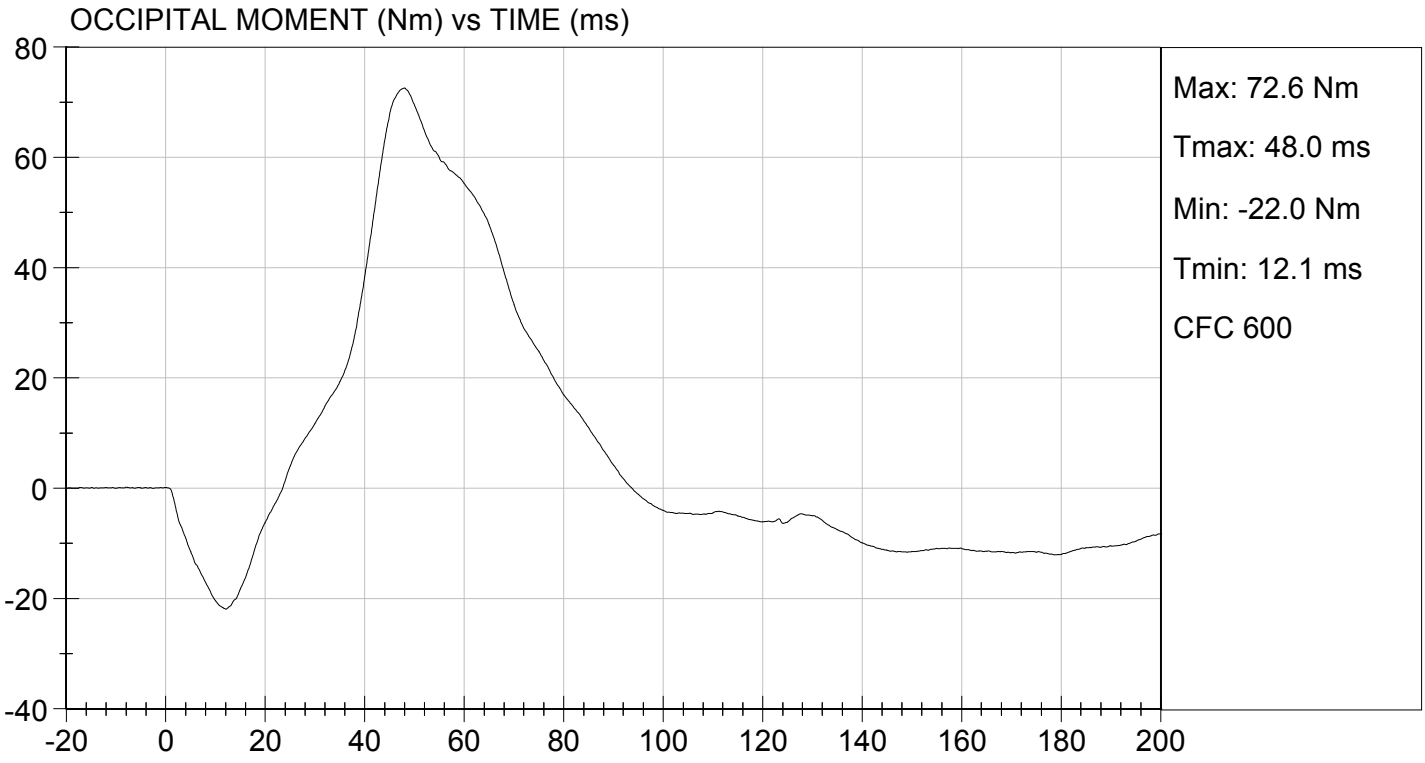


NECK ROTATION (DEG) vs TIME (ms)



TEST DESC: NECK FLEXION
VELOCITY: 23.15 ft/s, 7.06 m/s

TEST DATE: 11/16/2012
TEST #: D124442



MGA RESEARCH CORPORATION

NECK EXTENSION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 138 **Test I.D:** D124443

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity		%	10 to 70	32	Pass
Pendulum Speed		m/s	5.95 to 6.19	6.12	Pass
Pendulum Velocity	10 ms	m/s	1.5 to 1.9	1.7	Pass
	20 ms	m/s	3.1 to 3.9	3.5	Pass
	30 ms	m/s	4.6 to 5.6	5.2	Pass
D Plane Rotation	Max	deg	99 to 114	107	Pass
Occipital Condyle Moment within Rotation Corridor		Nm	-65 to -53	-59.4	Pass
Negative Moment Time Curve Decay to -10 Nm		ms	94 to 114	101	Pass
			Overall Results		Pass

Jessica Hall
Laboratory Technician

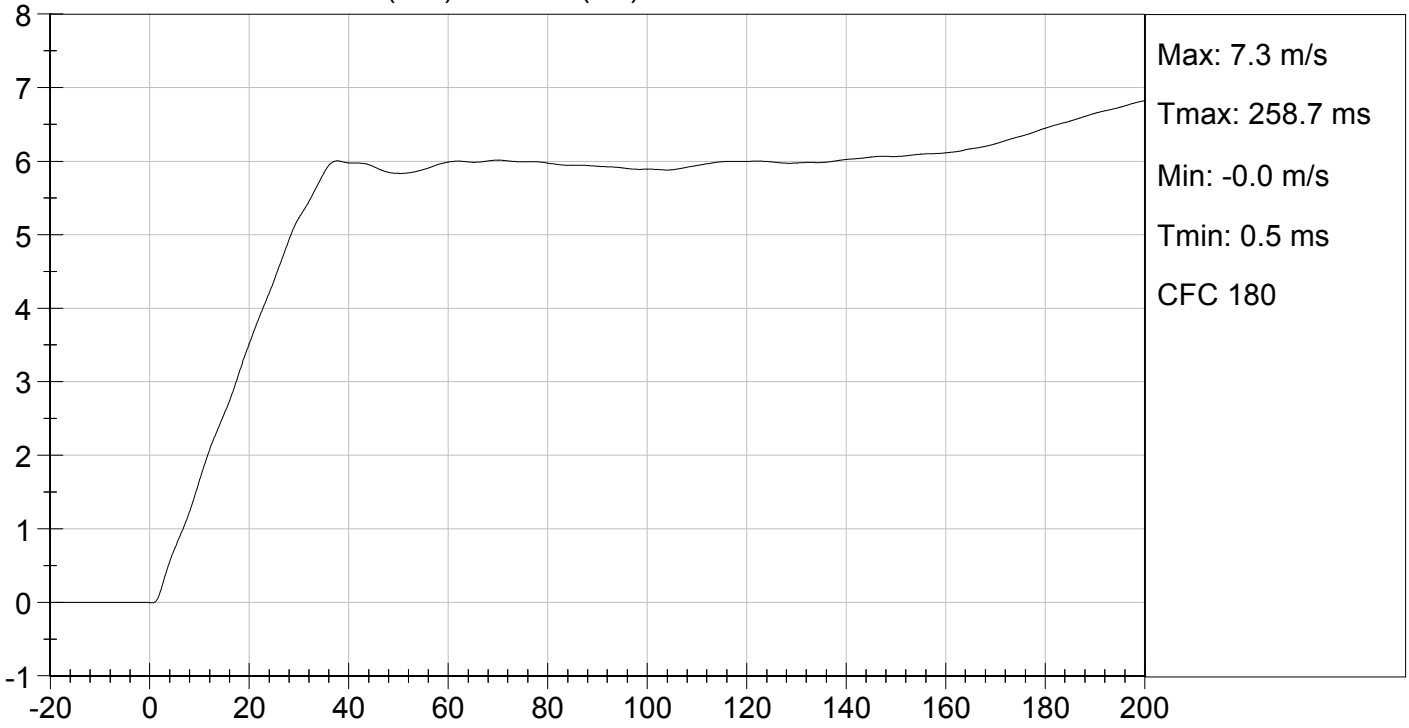
11/16/2012
Test Date

David Winkelbauer
Approved By

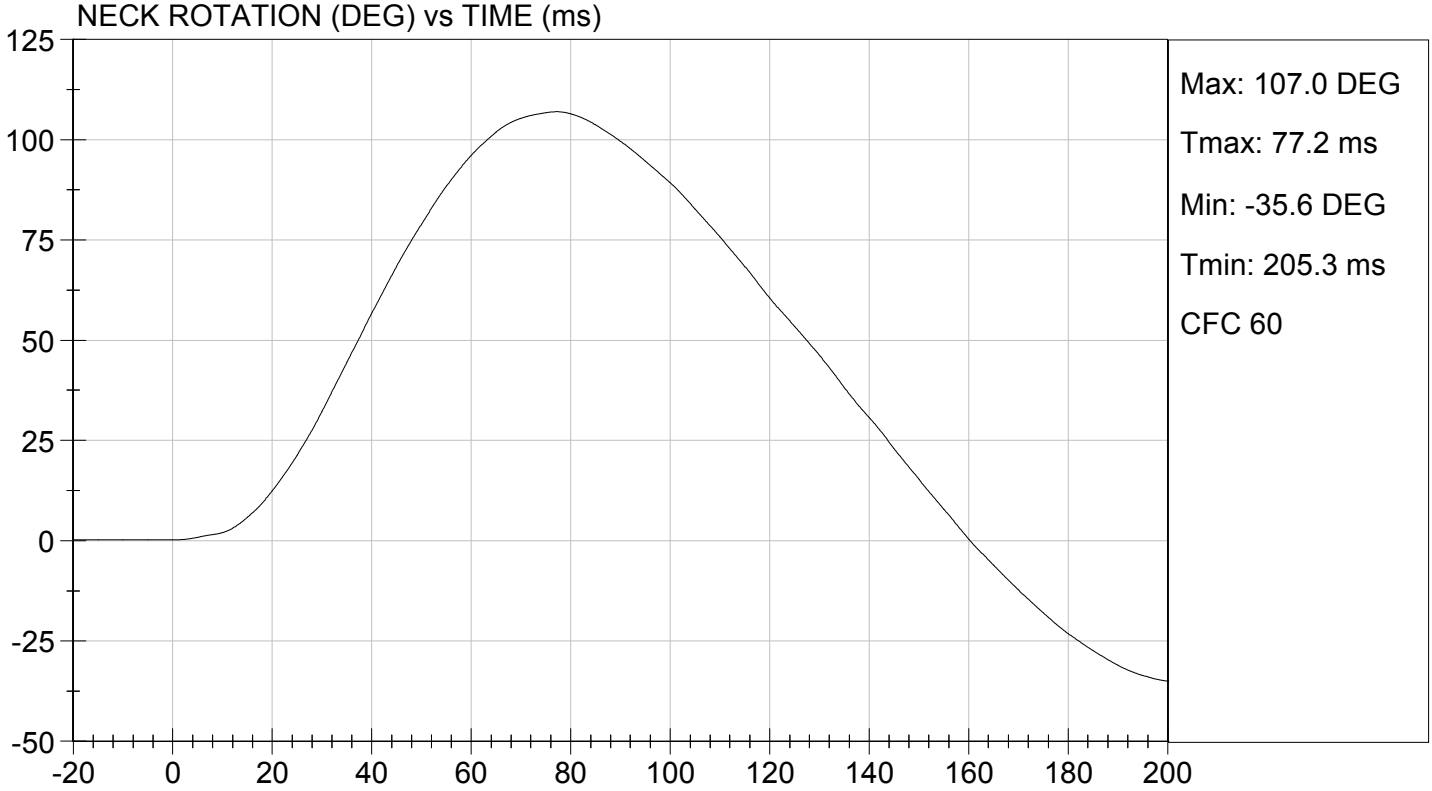
TEST DESC: NECK EXTENSION
VELOCITY: 20.08 ft/s, 6.12 m/s

TEST DATE: 11/16/2012
TEST #: D124443

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

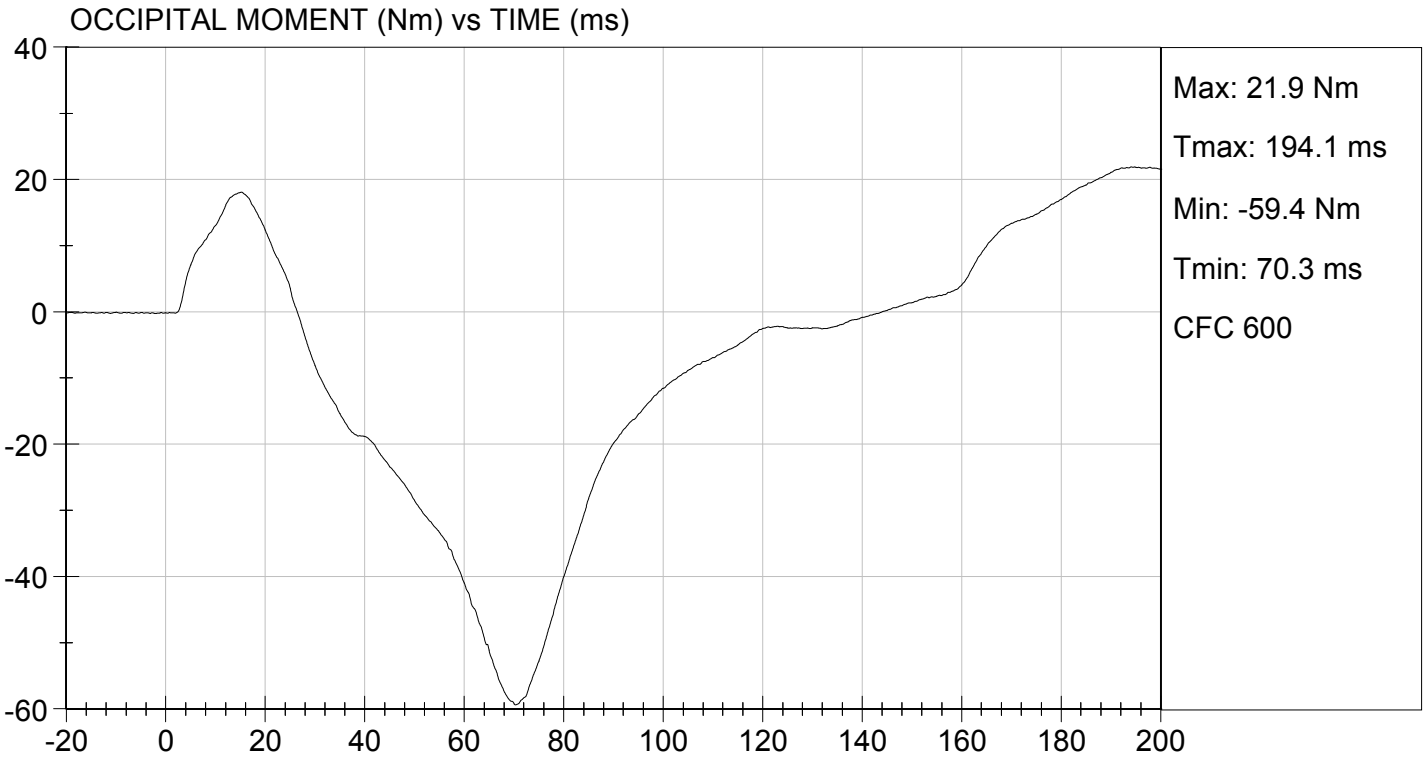


NECK ROTATION (DEG) vs TIME (ms)



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

TEST DATE: 11/16/2012
TEST #: D124443



MGA RESEARCH CORPORATION

THORAX IMPACT

HYBRID III 5TH PERCENTILE

ATD Serial No: 138 **Test I.D:** D124444

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	22.0	Pass
Relative Humidity	%	10 to 70	30	Pass
Probe Speed	m/s	6.59 to 6.83	6.68	Pass
Peak Deflection	mm	50 to 58	56	Pass
Peak Resistive Force w/in Deflection Corridor	N	3900 to 4400	4122	Pass
Internal Hysteresis	%	69 to 85	69	Pass
Peak Force 18 mm - 50 mm	N	<= 4600	4003	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

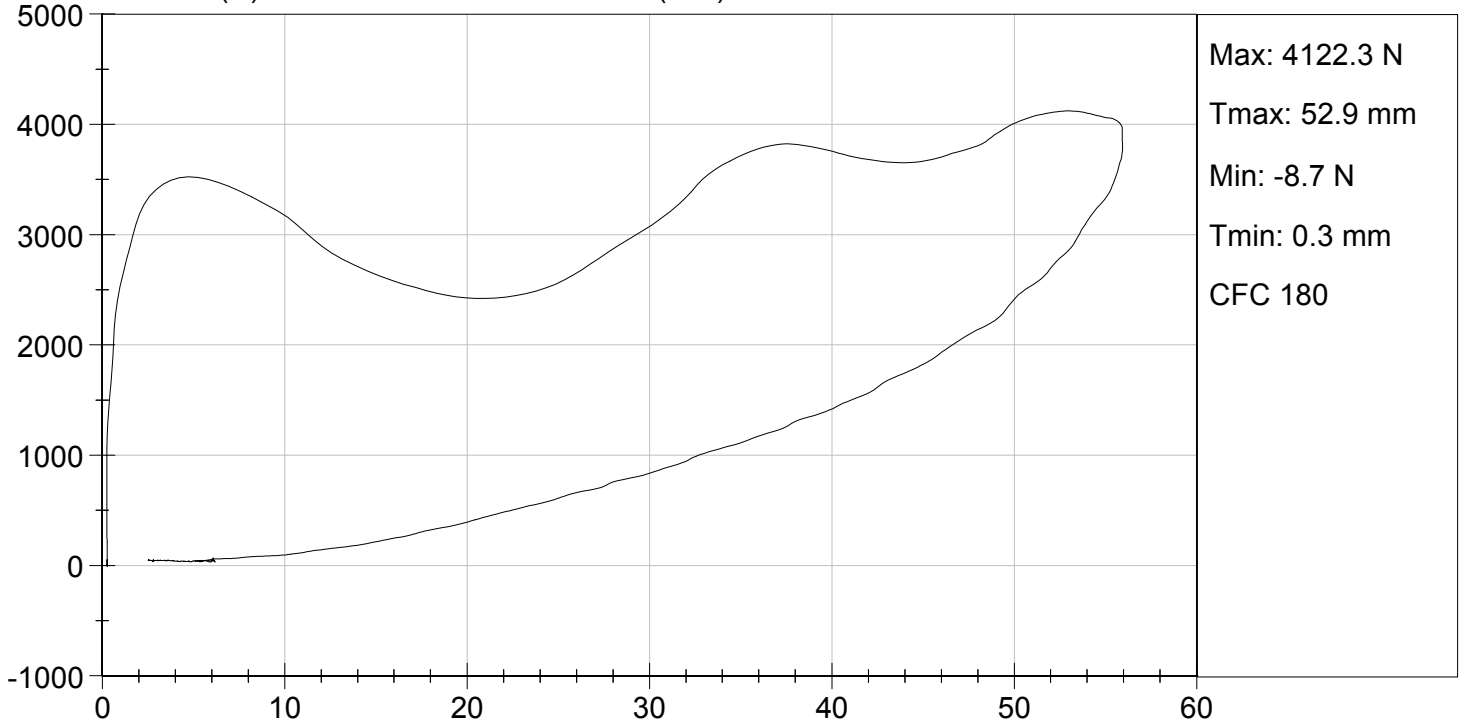
11/16/2012
Test Date

David Winkelbauer
Approved By

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

TEST DATE: 11/16/2012
TEST #: D124444

FORCE (N) vs CHEST DISPLACEMENT (mm)



MGA RESEARCH CORPORATION

RIGHT KNEE IMPACT TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 138 **Test I.D:** D124445

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	35	Pass
Probe Speed	m/s	2.07 to 2.13	2.12	Pass
Maximum Force	N	3450 to 4060	3533	Pass
		Overall Test Results		Pass

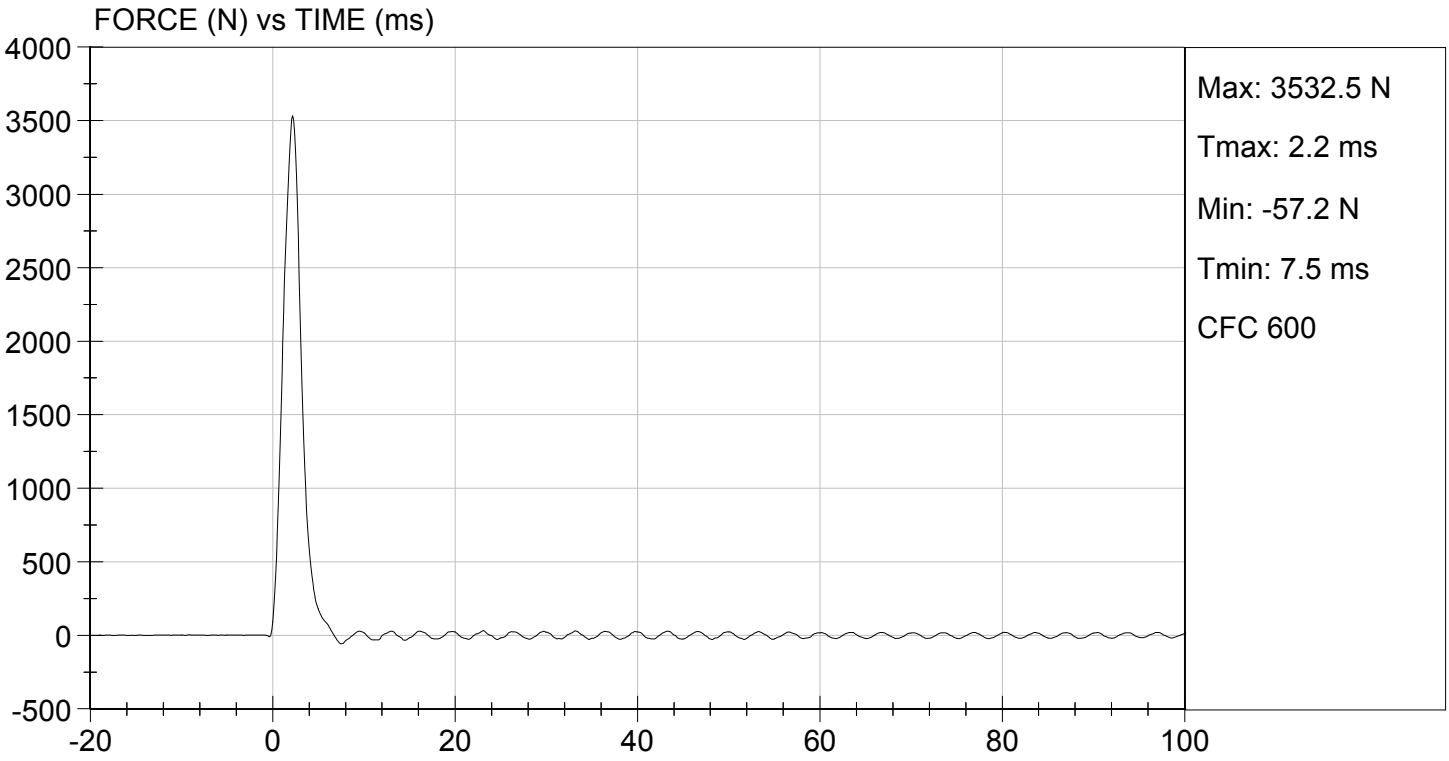
Jessica Hall
Laboratory Technician

11/16/2012
Test Date

David Winkelbauer
Approved By

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

TEST DATE: 11/16/2012
TEST #: D124445



MGA RESEARCH CORPORATION

LEFT KNEE IMPACT TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 138 **Test I.D:** D124446

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	35	Pass
Probe Speed	m/s	2.07 to 2.13	2.12	Pass
Maximum Force	N	3450 to 4060	3545	Pass
		Overall Test Results		Pass

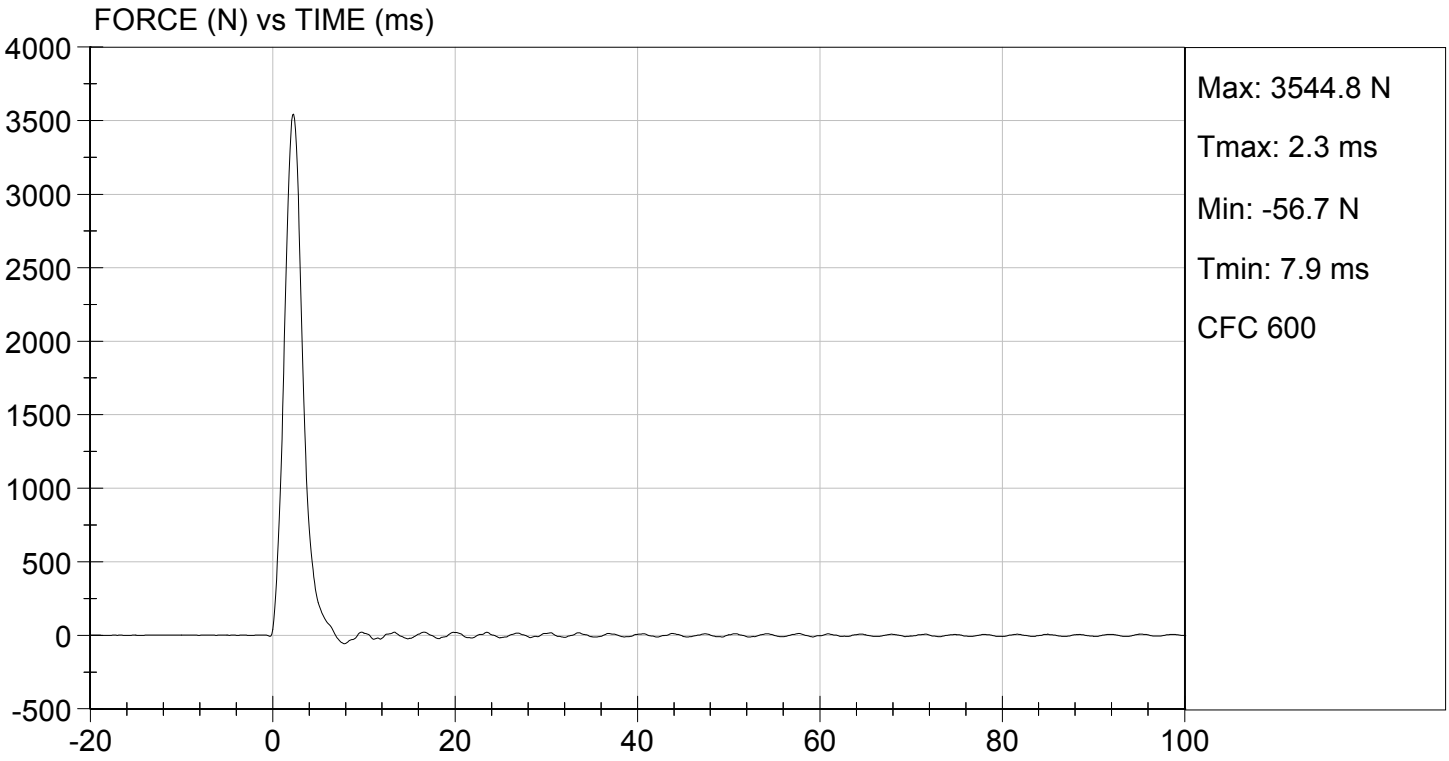
Jessica Hall
Laboratory Technician

11/16/2012
Test Date

David Winkelbauer
Approved By

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

TEST DATE: 11/16/2012
TEST #: D124446



MGA RESEARCH CORPORATION

TORSO FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 138 **Test I.D:** D124447

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	32	Pass
Initial Angle	deg	0 to 20	18	Pass
Return Angle	deg	+/- 8	2	Pass
Force at 45 deg	N	320 to 390	378	Pass
Upper Torso Deflection Rate	deg/s	0.5 to 1.5	0.9	Pass
		Overall Result		Pass

Jessica Hall
Laboratory Technician

11/16/2012
Test Date

David Winkelbauer
Approved By

MGA RESEARCH CORPORATION

HEAD DROP TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 138 **Test ID:** D124651

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	27	Pass
Peak Resultant Acceleration	G's	250 to 300	254	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	7.2	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

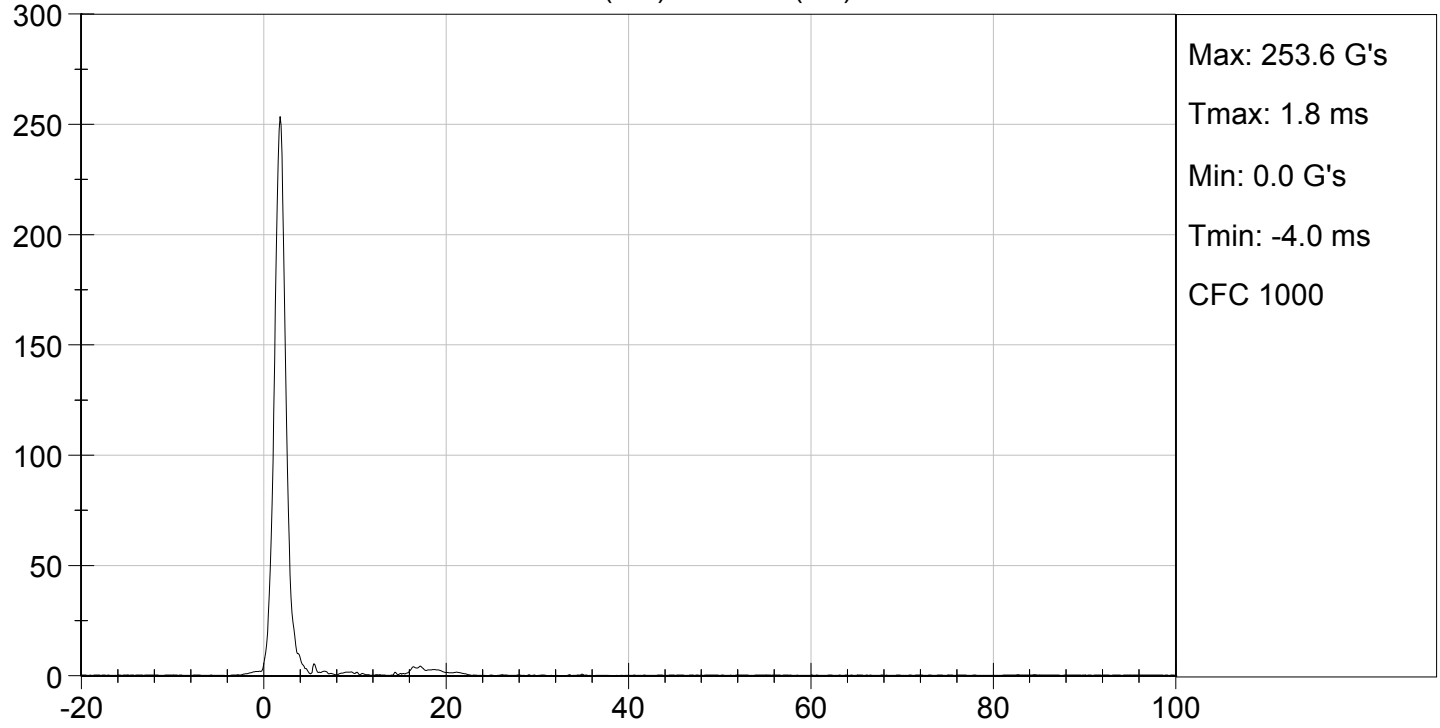
12/06/2012
Test Date

David Winkelbauer
Approved By

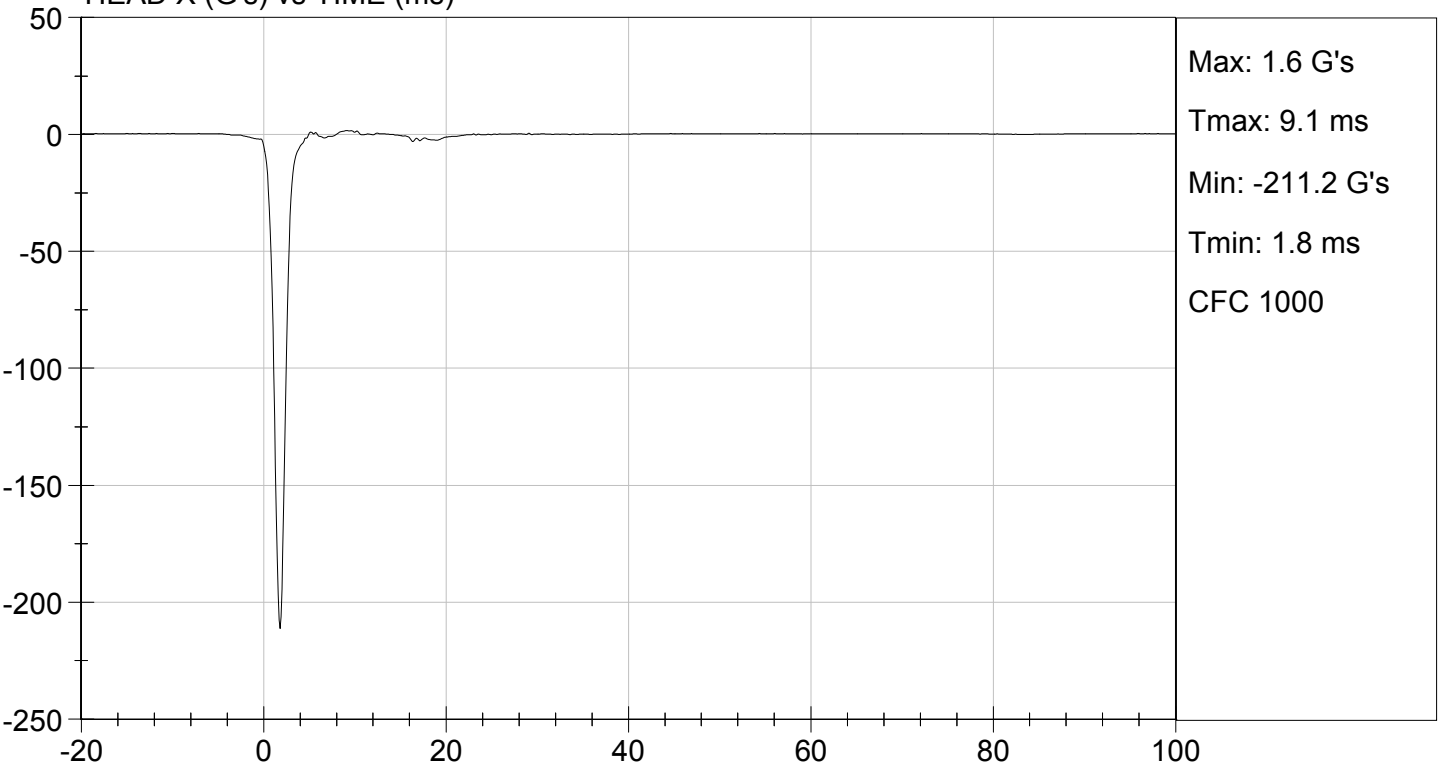
TEST DESC: HEAD DROP

TEST DATE: 12/06/2012
TEST #: D124651

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



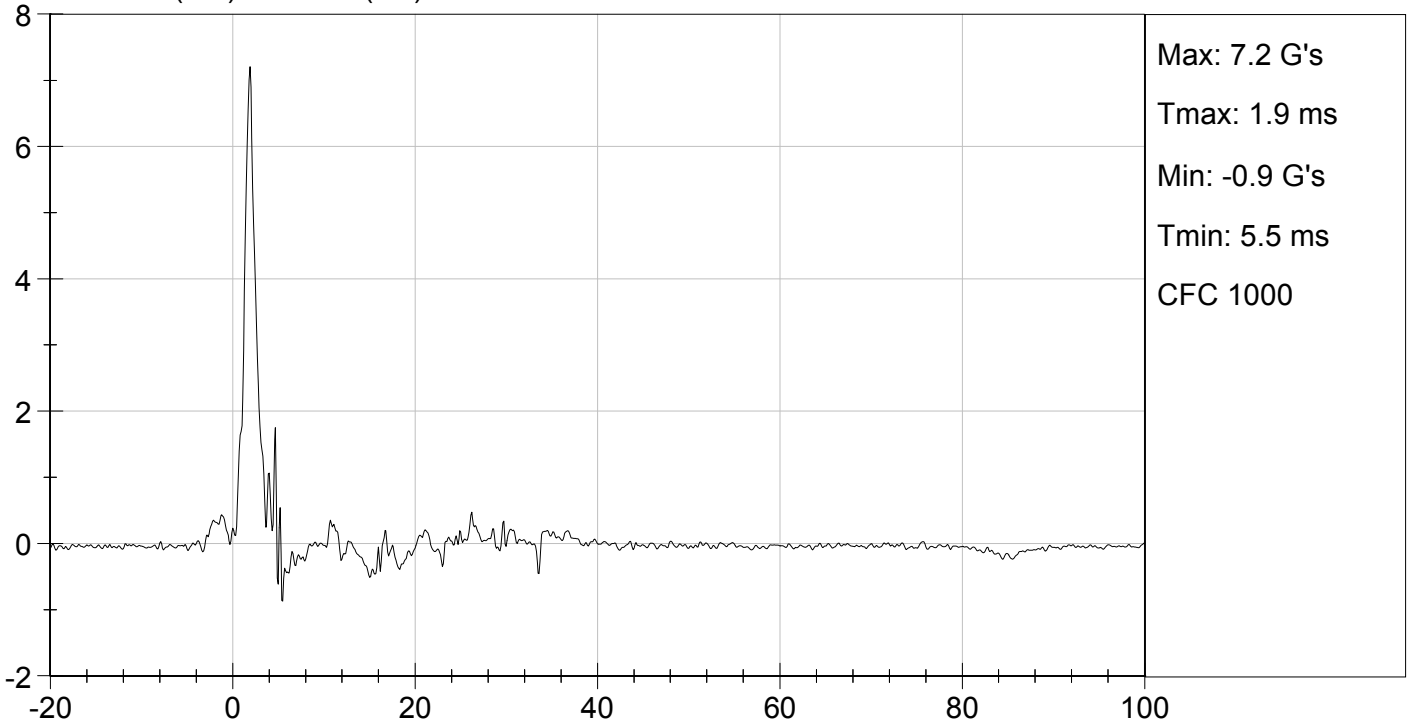
HEAD X (G's) vs TIME (ms)



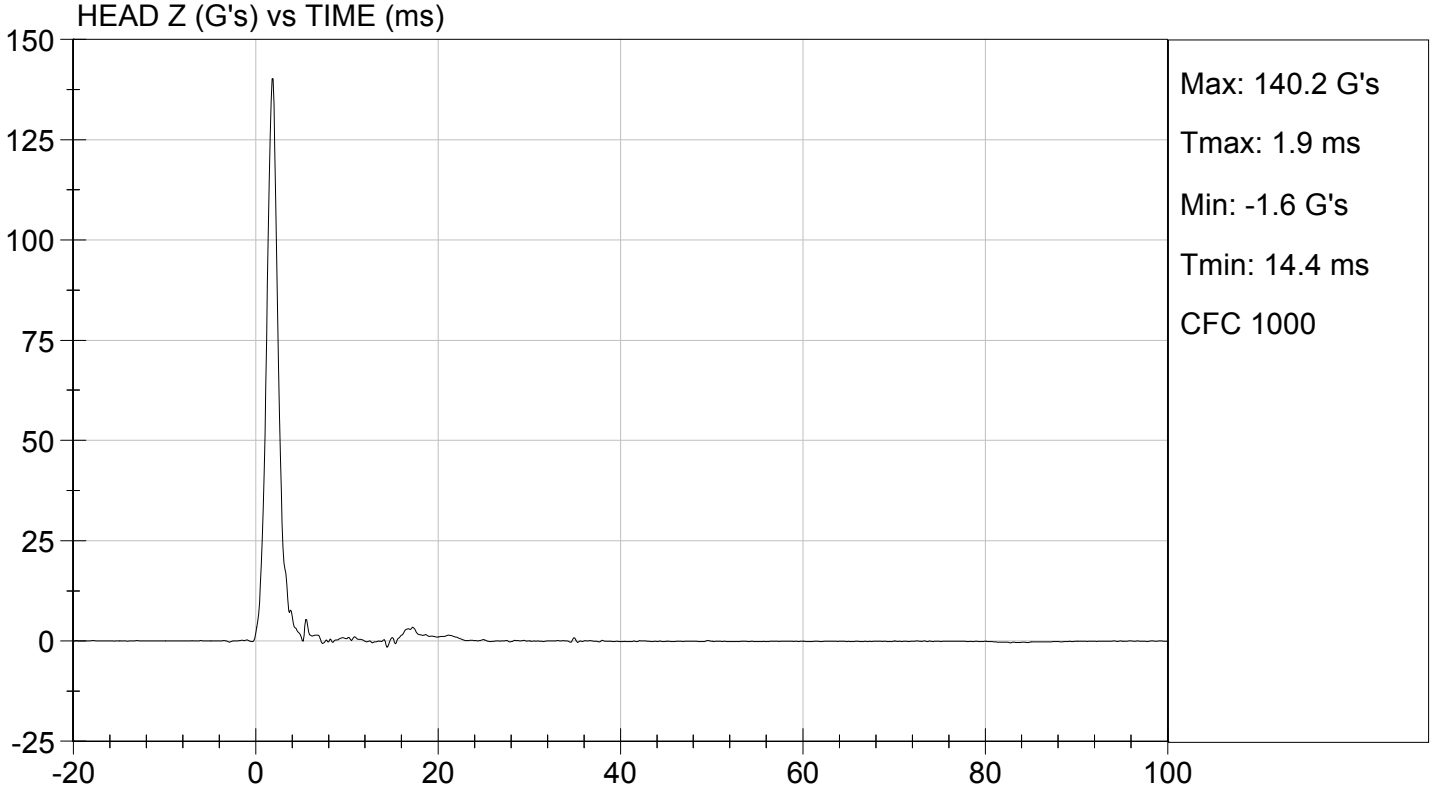
TEST DESC: HEAD DROP

TEST DATE: 12/06/2012
TEST #: D124651

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



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



MGA RESEARCH CORPORATION

NECK FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 138 **Test I.D:** D124652

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity		%	10 to 70	27	Pass
Pendulum Speed		m/s	6.89 to 7.13	7.06	Pass
Pendulum Velocity	10 ms	m/s	2.1 to 2.5	2.4	Pass
	20 ms	m/s	4.0 to 5.0	4.6	Pass
	30 ms	m/s	5.8 to 7.0	6.2	Pass
D Plane Rotation	Max	deg	77 to 91	81	Pass
Occipital Condyle Moment within Rotation Corridor		Nm	69 to 83	75	Pass
Positive Moment Time Curve Decay to 10 Nm		ms	80 to 100	89	Pass
			Overall Results		Pass

Jessica Hall
Laboratory Technician

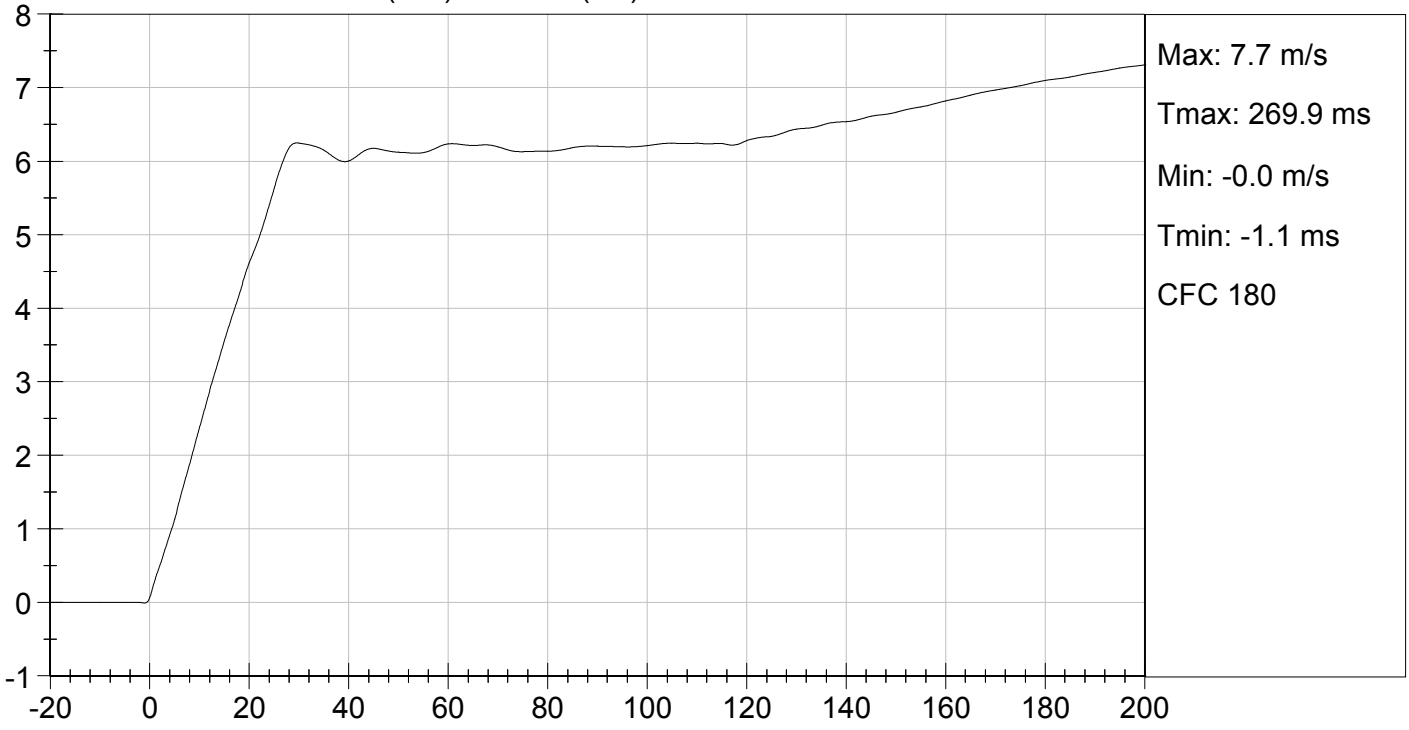
12/06/2012
Test Date

David Winkelbauer
Approved By

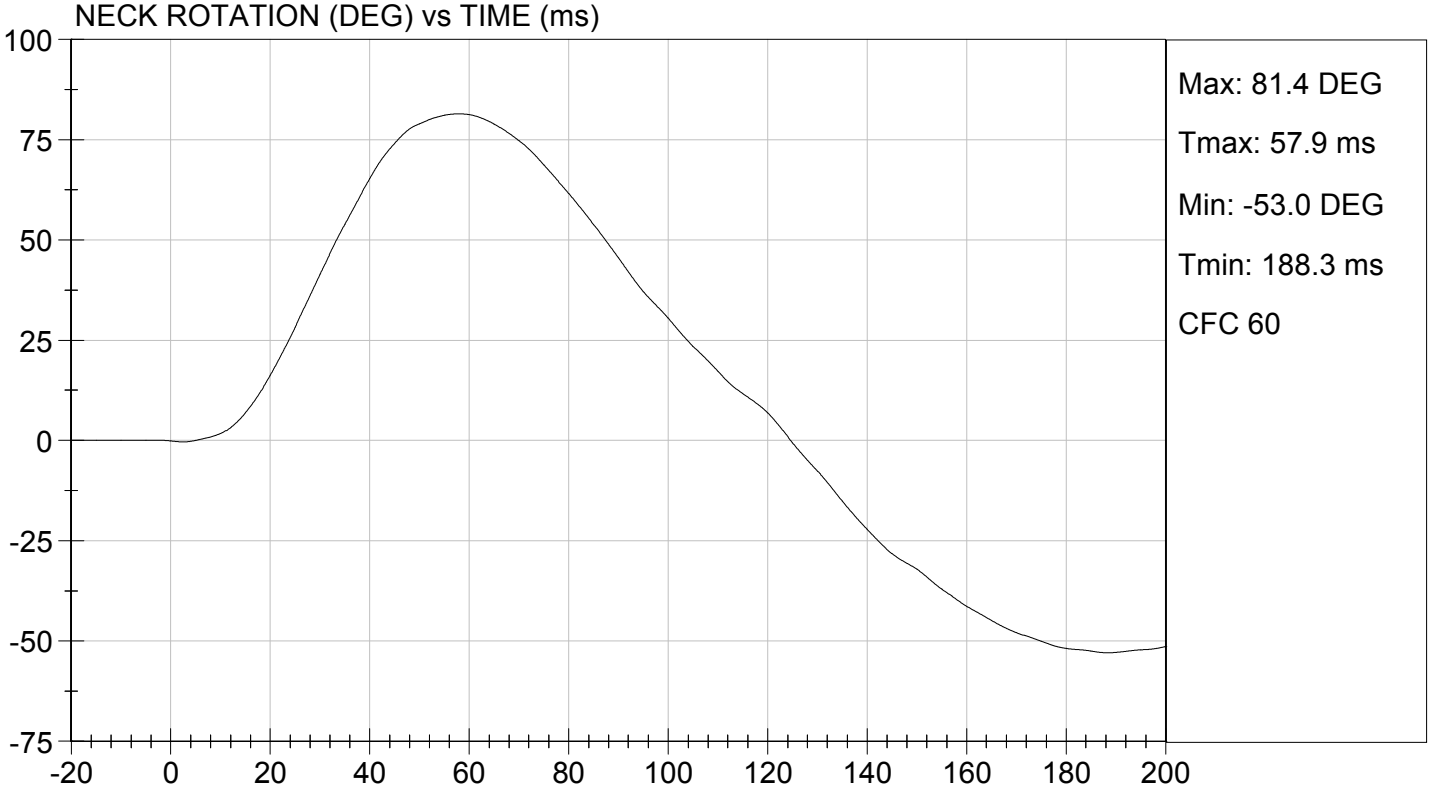
TEST DESC: NECK FLEXION
VELOCITY: 23.15 ft/s, 7.06 m/s

TEST DATE: 12/06/2012
TEST #: D124652

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

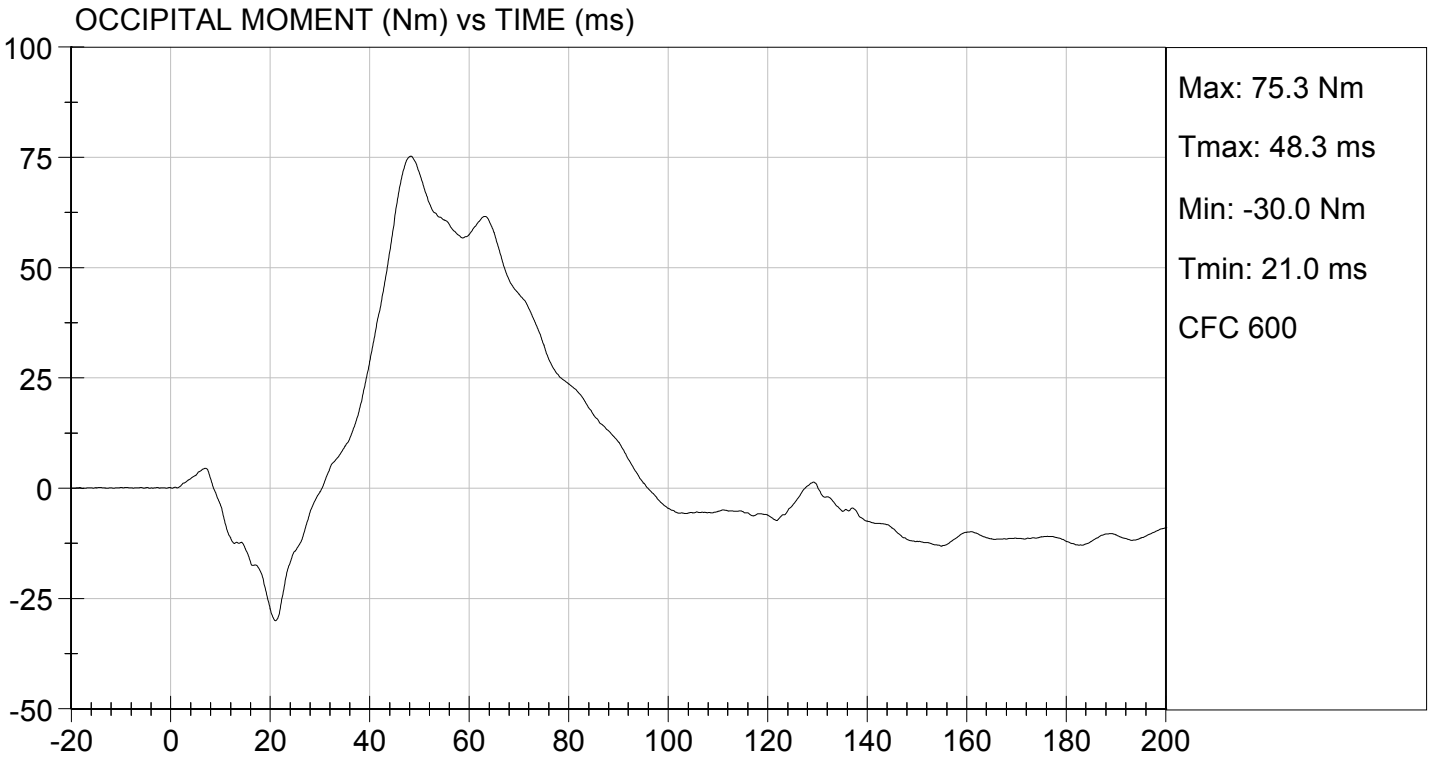


NECK ROTATION (DEG) vs TIME (ms)



TEST DESC: NECK FLEXION
VELOCITY: 23.15 ft/s, 7.06 m/s

TEST DATE: 12/06/2012
TEST #: D124652



MGA RESEARCH CORPORATION

NECK EXTENSION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 138 **Test I.D:** D124653

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity		%	10 to 70	27	Pass
Pendulum Speed		m/s	5.95 to 6.19	6.12	Pass
Pendulum Velocity	10 ms	m/s	1.5 to 1.9	1.7	Pass
	20 ms	m/s	3.1 to 3.9	3.4	Pass
	30 ms	m/s	4.6 to 5.6	5.0	Pass
D Plane Rotation	Max	deg	99 to 114	105	Pass
Occipital Condyle Moment within Rotation Corridor		Nm	-65 to -53	-55	Pass
Negative Moment Time Curve Decay to -10 Nm		ms	94 to 114	102	Pass
			Overall Results		Pass

Jessica Hall
Laboratory Technician

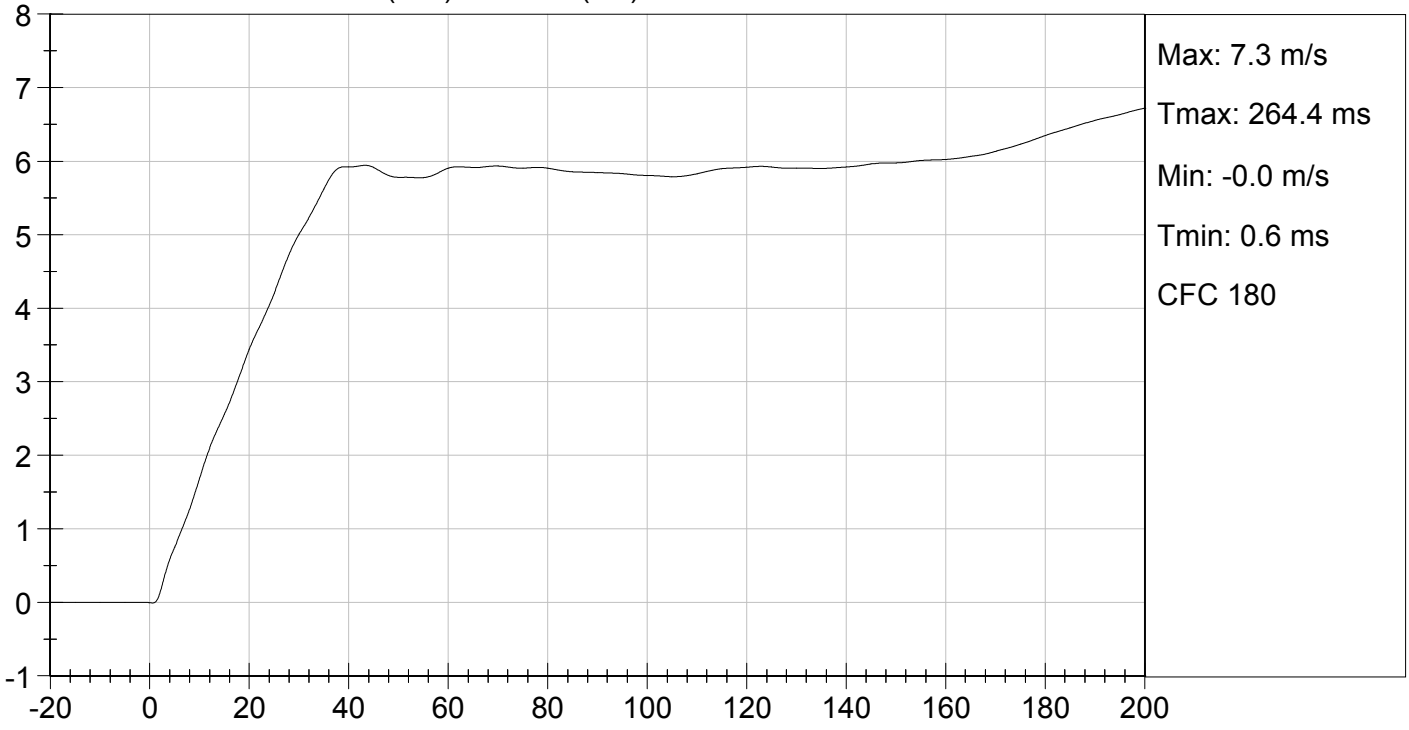
12/06/2012
Test Date

David Winkelbauer
Approved By

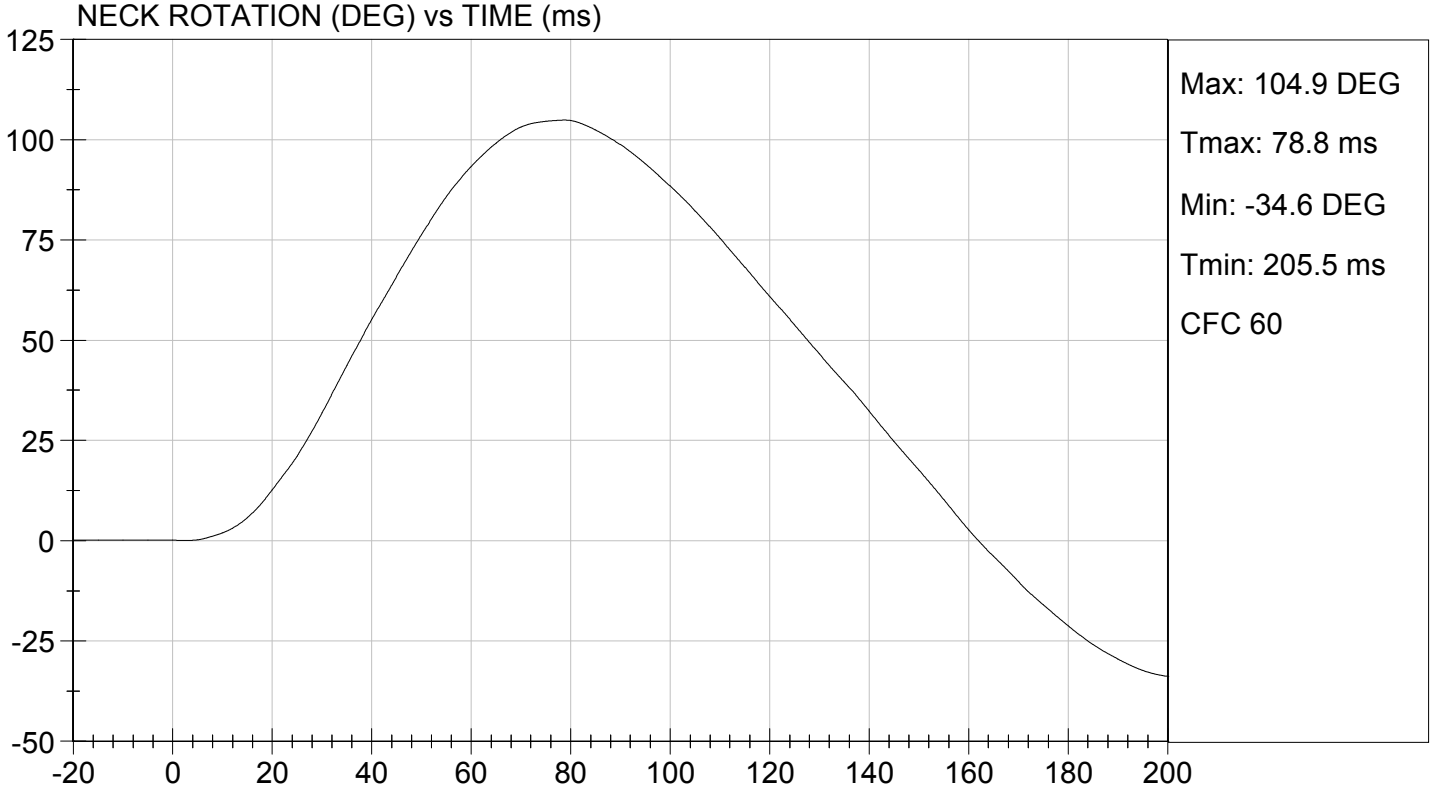
TEST DESC: NECK EXTENSION
VELOCITY: 20.08 ft/s, 6.12 m/s

TEST DATE: 12/06/2012
TEST #: D124653

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

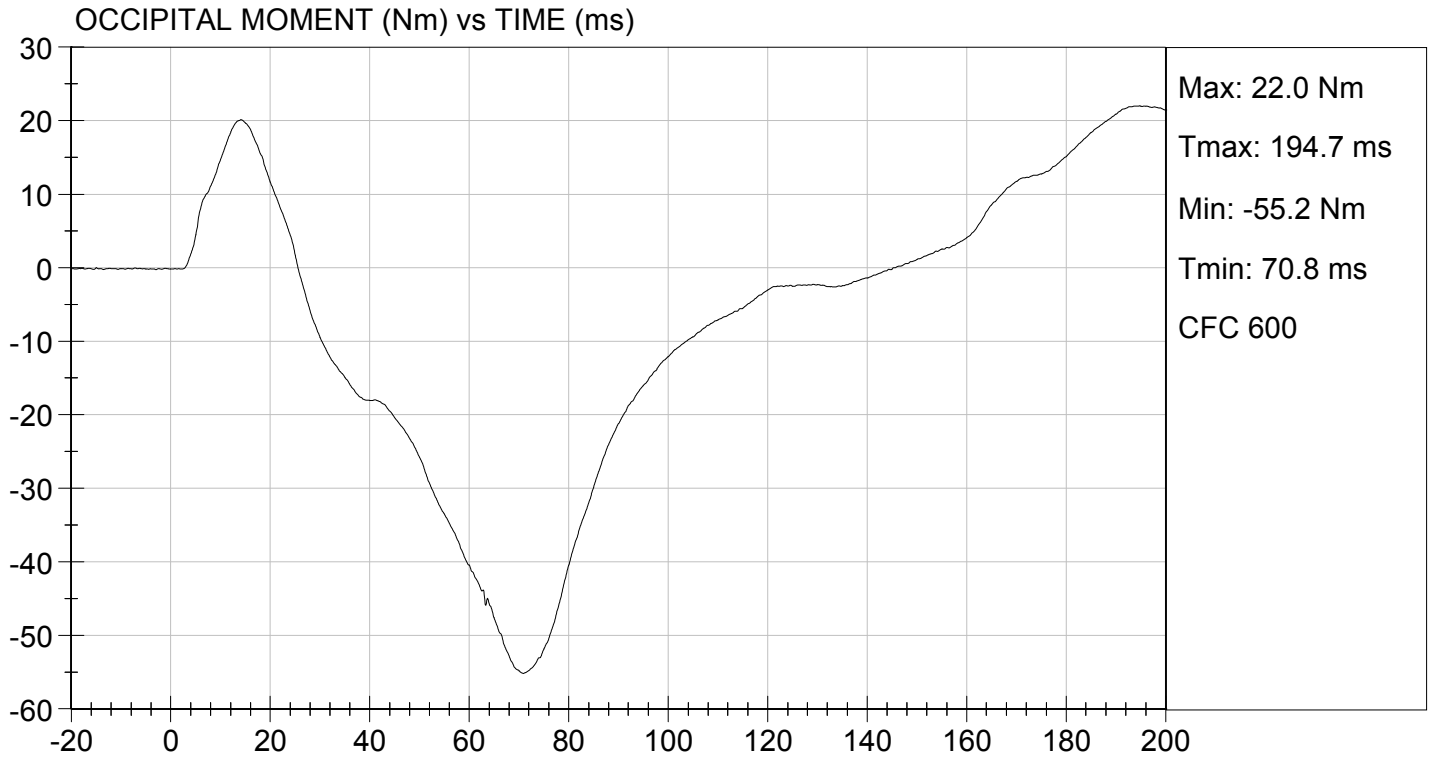


NECK ROTATION (DEG) vs TIME (ms)



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

TEST DATE: 12/06/2012
TEST #: D124653



MGA RESEARCH CORPORATION

THORAX IMPACT

HYBRID III 5TH PERCENTILE

ATD Serial No: 138 **Test I.D:** D124654

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.9	Pass
Relative Humidity	%	10 to 70	27	Pass
Probe Speed	m/s	6.59 to 6.83	6.77	Pass
Peak Deflection	mm	50 to 58	54	Pass
Peak Resistive Force w/in Deflection Corridor	N	3900 to 4400	4106	Pass
Internal Hysteresis	%	69 to 85	69	Pass
Peak Force 18 mm - 50 mm	N	<= 4600	4008	Pass
		Overall Test Results		Pass

Jessica Gall
Laboratory Technician

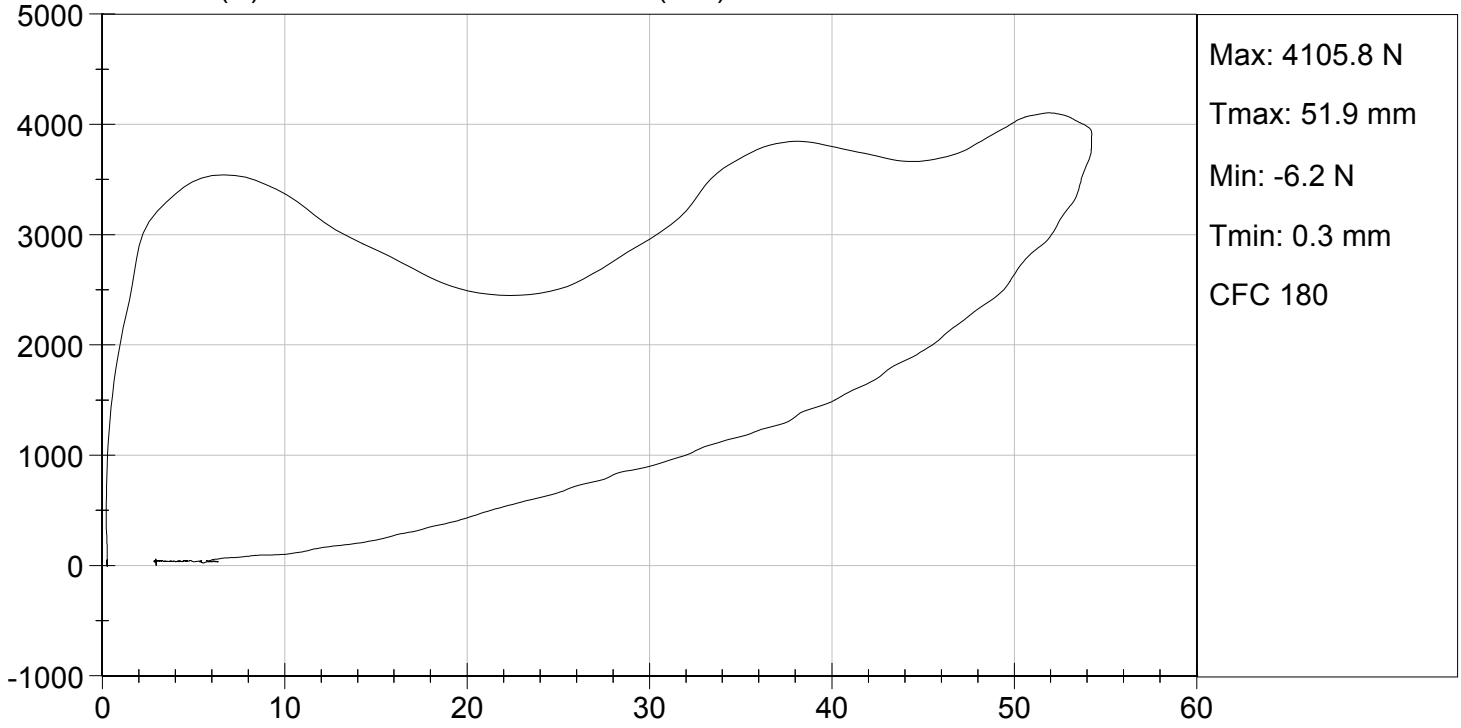
12/06/2012
Test Date

David Winkelbauer
Approved By

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

TEST DATE: 12/06/2012
TEST #: D124654

FORCE (N) vs CHEST DISPLACEMENT (mm)



MGA RESEARCH CORPORATION

RIGHT KNEE IMPACT TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 138 **Test I.D:** D124655

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	25	Pass
Probe Speed	m/s	2.07 to 2.13	2.12	Pass
Maximum Force	N	3450 to 4060	3593	Pass
		Overall Test Results		Pass

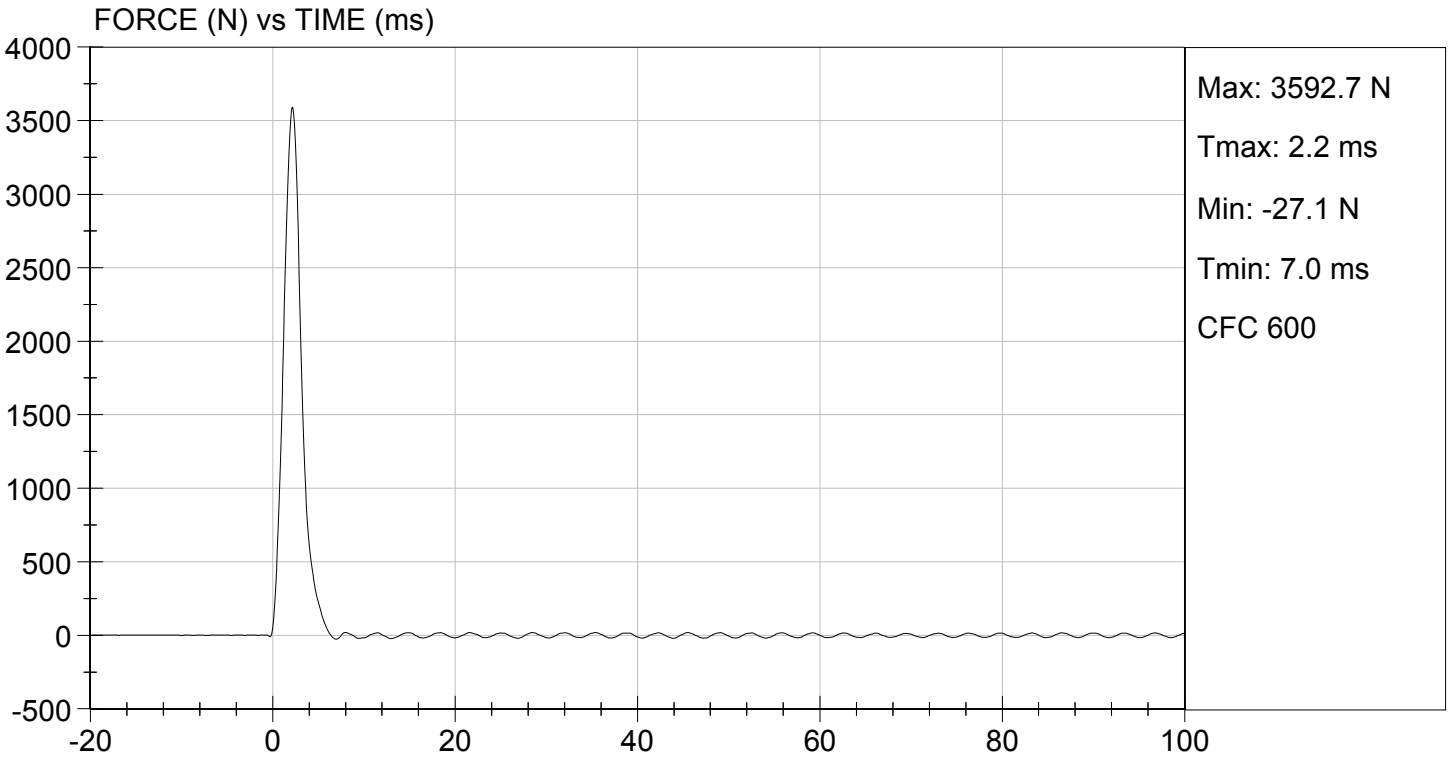
Jessica Hall
Laboratory Technician

12/06/2012
Test Date

David Winkelbauer
Approved By

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

TEST DATE: 12/06/2012
TEST #: D124655



MGA RESEARCH CORPORATION

LEFT KNEE IMPACT TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 138 **Test I.D:** D124656

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	25	Pass
Probe Speed	m/s	2.07 to 2.13	2.12	Pass
Maximum Force	N	3450 to 4060	3500	Pass
		Overall Test Results		Pass

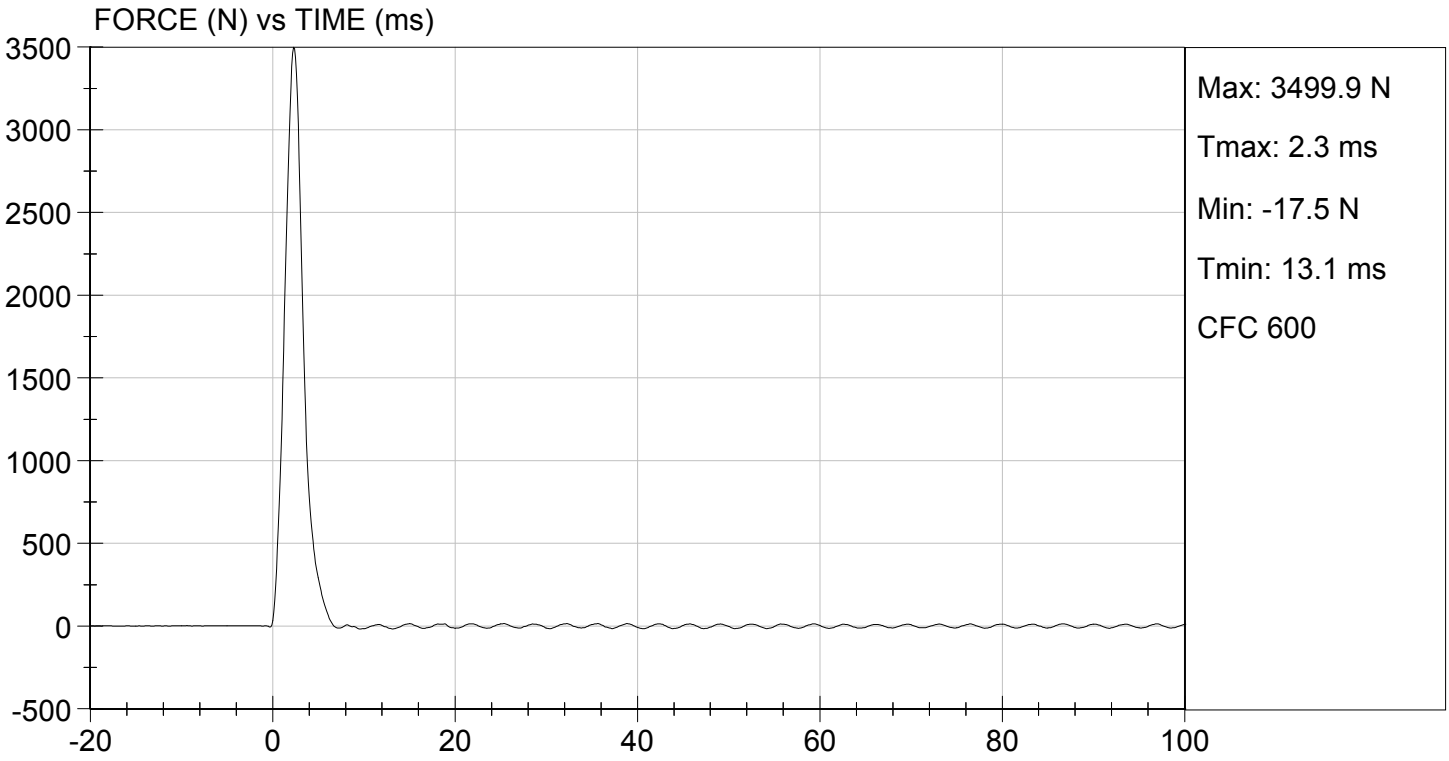
Jessica Hall
Laboratory Technician

12/06/2012
Test Date

David Winkelbauer
Approved By

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

TEST DATE: 12/06/2012
TEST #: D124656



MGA RESEARCH CORPORATION

TORSO FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 138 **Test I.D:** D124657

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	27	Pass
Initial Angle	deg	0 to 20	17	Pass
Return Angle	deg	+/- 8	3	Pass
Force at 45 deg	N	320 to 390	377	Pass
Upper Torso Deflection Rate	deg/s	0.5 to 1.5	0.8	Pass
		Overall Result		Pass

Jessica Hall
Laboratory Technician

12/06/2012
Test Date

David Winkelbauer
Approved By