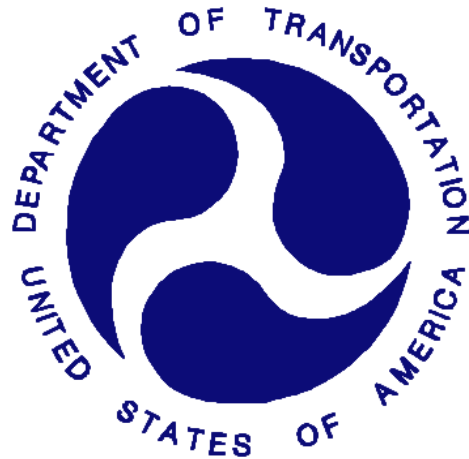


REPORT NUMBER: NCAP-MGA-2016-001

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

**MAZDA MOTOR CORPORATION
2016 Mazda CX-5 Sport AWD 5-Dr SUV
NHTSA No.: O20165401**

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



Test Date: March 17, 2015

Final Report Date: April 23, 2015

FINAL REPORT

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

This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared by: Nicholas Abels
Nicholas Abels, Project Engineer

Approved by: Ben Fischer
Ben Fischer, Project Engineer

Approval Date: April 23, 2015

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

Date: _____

Technical Report Documentation Page

1. Report No. NCAP-MGA-2016-001	2. Government Accession No.	3. Recipient's Catalog No.																																																					
4. Title and Subtitle Final Report of New Car Assessment Program Frontal Impact Testing of a 2016 Mazda CX-5 Sport AWD 5-Dr SUV, NHTSA No.: O20165401		5. Report Date April 23, 2015																																																					
		6. Performing Organization Code MGA																																																					
7. Author(s) Ben Fischer, Project Engineer		8. Performing Organization Report No. NCAP-MGA-2016-001																																																					
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 March 17, 2015 to April 23, 2015																																																					
		14. Sponsoring Agency Code NVS-111																																																					
15. Supplementary Notes																																																							
16. Abstract A 56.3 km/h NCAP Frontal Impact Test was conducted on a 2016 Mazda CX-5 Sport AWD 5-Dr SUV in accordance with the specifications of the Office of Crashworthiness Standards Frontal NCAP Laboratory Test Procedure. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), and 301 performance. The test was conducted at MGA Research Corporation in Burlington, Wisconsin on March 17, 2015. The impact velocity of the vehicle was 56.5 km/h and the ambient temperature at the barrier face at the time of impact was 21.1°C. The target vehicle post-test maximum crush was 453 located at the vehicle's centerline. The test vehicle's performance was as follows: <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th rowspan="2">Units</th> <th colspan="2">Driver ATD</th> <th colspan="2">Passenger ATD</th> </tr> <tr> <th>Threshold</th> <th>Result</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₁₅)</td> <td>N/A</td> <td>700</td> <td>137</td> <td>700</td> <td>174</td> </tr> <tr> <td>Maximum Chest</td> <td>mm</td> <td>63</td> <td>20</td> <td>52</td> <td>8</td> </tr> <tr> <td>Nij</td> <td>N/A</td> <td>1</td> <td>0.18</td> <td>1</td> <td>0.77</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>4170</td> <td>1034</td> <td>2620</td> <td>1157</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>4000</td> <td>209</td> <td>2520</td> <td>289</td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>10008</td> <td>1402</td> <td>6805</td> <td>1809</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>10008</td> <td>559</td> <td>6805</td> <td>1304</td> </tr> </tbody> </table>				Measurement Description	Units	Driver ATD		Passenger ATD		Threshold	Result	Threshold	Result	Head Injury Criteria (HIC ₁₅)	N/A	700	137	700	174	Maximum Chest	mm	63	20	52	8	Nij	N/A	1	0.18	1	0.77	Neck Tension	N	4170	1034	2620	1157	Neck Compression	N	4000	209	2520	289	Left Femur Force	N	10008	1402	6805	1809	Right Femur Force	N	10008	559	6805	1304
Measurement Description	Units	Driver ATD				Passenger ATD																																																	
		Threshold	Result	Threshold	Result																																																		
Head Injury Criteria (HIC ₁₅)	N/A	700	137	700	174																																																		
Maximum Chest	mm	63	20	52	8																																																		
Nij	N/A	1	0.18	1	0.77																																																		
Neck Tension	N	4170	1034	2620	1157																																																		
Neck Compression	N	4000	209	2520	289																																																		
Left Femur Force	N	10008	1402	6805	1809																																																		
Right Femur Force	N	10008	559	6805	1304																																																		
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																																																					
19. Security Classification of Report Unclassified	20. Security Classification of Page Unclassified	21. No. of Pages 168	22. Price																																																				

TABLE OF CONTENTS

<u>Section</u>		<u>Page No.</u>
1	Purpose and Summary of Test	1
2	Occupant and Vehicle Information / Data Sheets	3

<u>Data Sheet No.</u>		<u>Page No.</u>
1	General Test and Vehicle Parameter Data	4
2	Seat Adjustment, Fuel System, and Steering Wheel Data	8
3	Dummy Longitudinal Clearance Dimensions	10
4	Dummy Lateral Clearance Dimensions	11
5	Seat Belt Positioning Data	12
6	High-Speed Camera Locations and Data	13
7	Vehicle Accelerometer Locations	15
8	Photographic Reference Target Locations	16
9	Load Cell Locations on Fixed Barrier	17
10	Test Vehicle Summary of Results	18
11	Post-Test Observations	19
12	Vehicle Profile Measurements	20
13	Accident Investigation Division Data	22
14	Vehicle Intrusion Measurements	23
15	Summary of FMVSS 212, FMVSS 219 (Partial) Data, and 301 Data	25
16	FMVSS 301 Static Rollover Results	27
17	Dummy/Vehicle Temperature Stabilization Data	28

<u>Appendix</u>		
A	Photographs	A
B	Dummy Response Data Traces	B
C	Dummy Calibration and Performance Verification Data	C

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 2016 Mazda CX-5 Sport AWD 5-Dr SUV at a velocity of 56.5 km/h. The test was performed at MGA Research Corporation on March 17, 2015. Pre-test and post-test photographs of the vehicle and dummies can be found in Appendix A.

Two (2) real-time cameras and fourteen (14) high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in this report.

One Part 572E 50th percentile male anthropomorphic test device (ATD), was placed in the driver seating position and one Part 572O 5th percentile female test device (ATD) was placed in the right-front passenger seating position according to dummy placement instructions specified in the Frontal NCAP Laboratory Test Procedure.

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

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

The 631 channels of data were recorded on a data acquisition system. Appendix B contains the dummy response data traces.

There was 100 percent windshield retention and no intrusion into the protected zone of the windshield during the event. There was no Stoddard Solvent leakage after the event or during any phase of the static rollover.

The maximum static crush of the vehicle was 453 mm and both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

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

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)	137	0.18	1034	209	36	20	1402	559
Passenger (5 th)	174	0.77	1157	289	41	8	1809	1304

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

TEST NOTES

Driver Chest Yr has no valid data after 25 ms.
 Barrier K-16 MY has no valid data.
 Barrier F-01 MZ has questionable data.

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

SECTION 2
OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2016 Mazda CX-5 Sport AWD 5-Dr SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20165401
 Test Date: 3/17/2015

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	O20165401	Traction Control System (TCS)	Yes
Model Year	2016	Power Steering	Yes
Make	Mazda	Power Window Auto-Reverse	Yes
Model	CX-5 Sport	Driver Frontal Airbag	Yes
Body Style	5-Dr SUV	Driver Curtain Airbag	Yes
VIN	JM3KE4BY7G0611147	Driver Head/Torso Airbag	No
Body Color	Sonic Silver Metallic	Driver Torso Airbag	No
Odometer (km/mi)	61 / 38	Driver Torso/Pelvis Airbag	Yes
Engine Displacement (L)	2.5	Driver Pelvis Airbag	No
Type/No. Cylinders	4	Driver Knee Airbag	No
Engine Placement	Lateral	Front Pass. Frontal Airbag	Yes
Transmission Type	Automatic	Front Pass. Curtain Airbag	Yes
Transmission Speeds	6	Front Pass. Head/Torso Airbag	No
Overdrive	Yes	Front Pass. Torso Airbag	No
Final Drive	AWD	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	Mazda Motor Corporation	GVWR (kg)	2071
Date of Manufacture	12/14	GAWR Front (kg)	1056
		GAWR Rear (kg)	1018

VEHICLE SEATING AND WEIGHT CAPACITY DATA

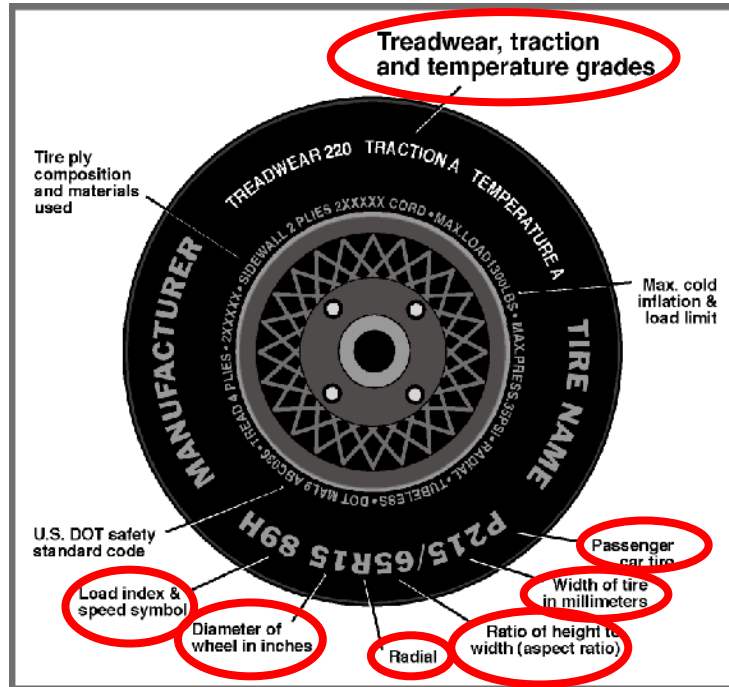
Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench		
Designated Seating Capacity (DSC)	2	3		5
Capacity Weight (VCW) (kg)				385
Cargo Weight (RCLW) (kg)				45

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

Test Vehicle: 2016 Mazda CX-5 Sport AWD 5-Dr SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20165401
 Test Date: 3/17/2015

VEHICLE TIRE INFORMATION



Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	238	238
Recommended Tire Size	225/65/R17	225/65/R17
Tire Size on Vehicle	225/65/R17	225/65/R17
Tire Manufacturer	Yokohama	Yokohama
Tire Model	Geolander	Geolander
Treadwear	280	280
Traction	B	B
Temperature Grade	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel, 1 Nylon	2 Polyester, 2 Steel, 1 Nylon
Load Index/Speed Symbol	100H	100H
Tire Material	Rubber	Rubber
DOT Safety Code Left	FDF5 PC5 5014	FDF5 PC5 5014
DOT Safety Code Right	FDF5 PC5 5014	FDF5 PC5 5014

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

Test Vehicle: 2016 Mazda CX-5 Sport AWD 5-Dr SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20165401
 Test Date: 3/17/2015

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	448.0	334.0		480.5	406.5	
Right	kg	441.5	326.0		457.0	385.5	
Ratio	%	57.4	42.6		54.2	45.8	
Totals	kg	889.5	660.0	1549.5	937.5	792.0	1729.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1549.5
Weight of 1 P572E ATD & 1 P572O ATD	kg	141
Rated Cargo/Luggage Weight (RCLW)	kg	45
Calculated Test Vehicle Target Weight (TVTW)	kg	1735.5

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	811	811	822	828	1147
As Tested	mm	798	801	796	804	1233
Post Test	mm	790	780	780	776	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2692
Total Vehicle Length at Left Side	mm	4371
Total Vehicle Length at Centerline	mm	4545
Total Vehicle Length at Right Side	mm	4371
Weight of Ballast in Cargo Area	kg	0.0
Weight of Vehicle Components Removed	kg	47.2
Amount of Stoddard Solvent in Fuel Tank	L	53.7

List of components removed to meet test weight: Rear seats.

List of components removed for instrumentation, data box, and equipment installation:
Cargo area cover, cargo carpet, cargo divider/organizer, rear floor mats, jack/toolkit, spare tire, spare tire cover, right tail light, trunk/cargo net and left and right front underbody plastic.

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

Test Vehicle: 2016 Mazda CX-5 Sport AWD 5-Dr SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20165401
 Test Date: 3/17/2015

TARGET VEHICLE STRUCTURAL MEASUREMENT

	Elements	Pre-Test (mm)
1	Total Length	4545
2	Total Width	1840
3	Bumper Top Height	600
4	Bumper Bottom Height	480
5	Longitudinal Member Top Height	612
6	Distance between Longitudinal Members	880
7	Longitudinal Member Width	90
8	Engine Top Height	891
9	Engine Bottom Height	230
10	Engine and Gearbox Width	830
11	Front Bumper-Engine Distance	577
12	Front Shock Absorber Fixing Height	1004
13	Bonnet Leading Edge Height	875
14	Front Shock Absorber Fixing Width	1180
15	Front Bumper – Front Axle Distance	943
16	Front Axle – A-Pillar Distance	532
17	A-Pillar – B-Pillar Distance	1090
18	B-Pillar – Rear Axle Distance	1070
19	B-Pillar – C-Pillar Distance	767
20	Roof Sill Bottom Height	1525
21	Roof Sill Top Height	1642
22	Floor Sill Bottom Height	275
23	Floor Sill Top Height	435

DATA SHEET NO. 2

SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

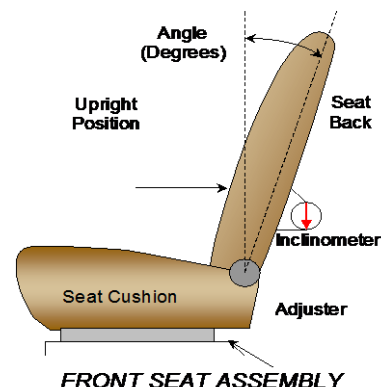
Test Vehicle: 2016 Mazda CX-5 Sport AWD 5-Dr SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20165401
 Test Date: 3/17/2015

NOMINAL DESIGN RIDING POSITION

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

	Degrees
Driver Seat Back Angle	7.8° on headrest post
Passenger Seat Back Angle	4.1° on headrest post



SEAT FORE/AFT POSITIONS

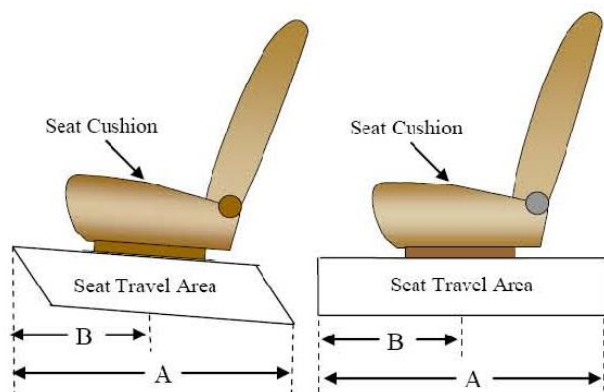
The driver and passenger seat fore/aft positions are adjusted following Appendix F, "Driver & Passenger Dummy Seating & Positioning Procedures" in the NCAP Test Procedure dated August 2013.

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	316 mm / 27 detents (1 st as 1)	158 mm / 10 th detent (1 st as 0)
Passenger Seat	260 mm / 27 detents (1 st as 1)	10 mm / 1 st detent (1 st as 0)

SEAT BELT UPPER ANCHORAGES

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

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



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

Test Vehicle: 2016 Mazda CX-5 Sport AWD 5-Dr SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20165401
 Test Date: 3/17/2015

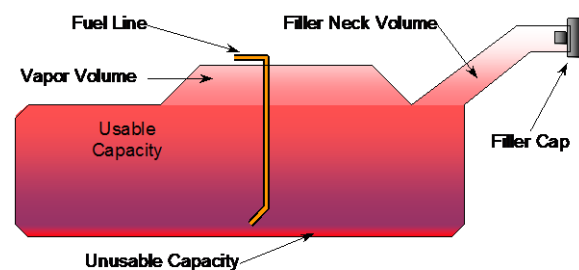
FUEL TANK CAPACITY DATA

	Liters
Usable Capacity of "Standard Tank"	57.9
Usable Capacity of "Optional Tank"	
92-94% of Usable Capacity	53.3 to 54.4
Actual Amount of Solvent used	53.7
1/3 of Usable Capacity	19.3

FUEL PUMP

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

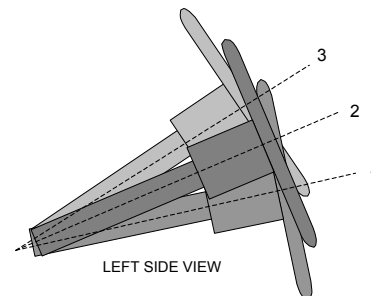
The electric fuel pump operates when starter or engine is activated.



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. An aluminum plate is placed across the rim of the steering wheel, an inclinometer is placed on the plate and the angle is measured.



STEERING COLUMN ASSEMBLY

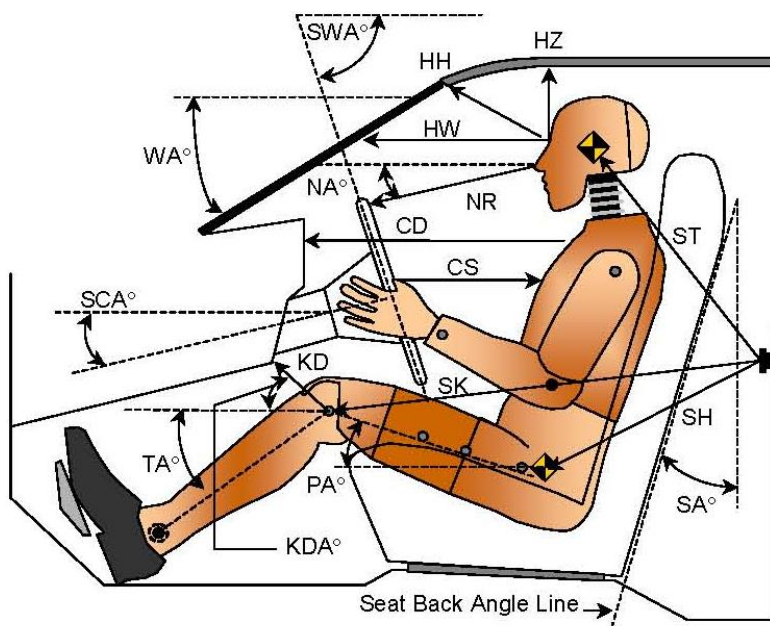
STEERING COLUMN POSITION

	Degrees	Fore/Aft Position (mm)
Lowermost Position 1	67.1	178
Geometric Center Position 2	64.8	208
Uppermost Position 3	62.4	238
Telescoping Steering Wheel Travel		60
Test Position	64.8	208

DATA SHEET NO. 3 DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2016 Mazda CX-5 Sport AWD 5-Dr SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20165401
Test Date: 3/17/2015



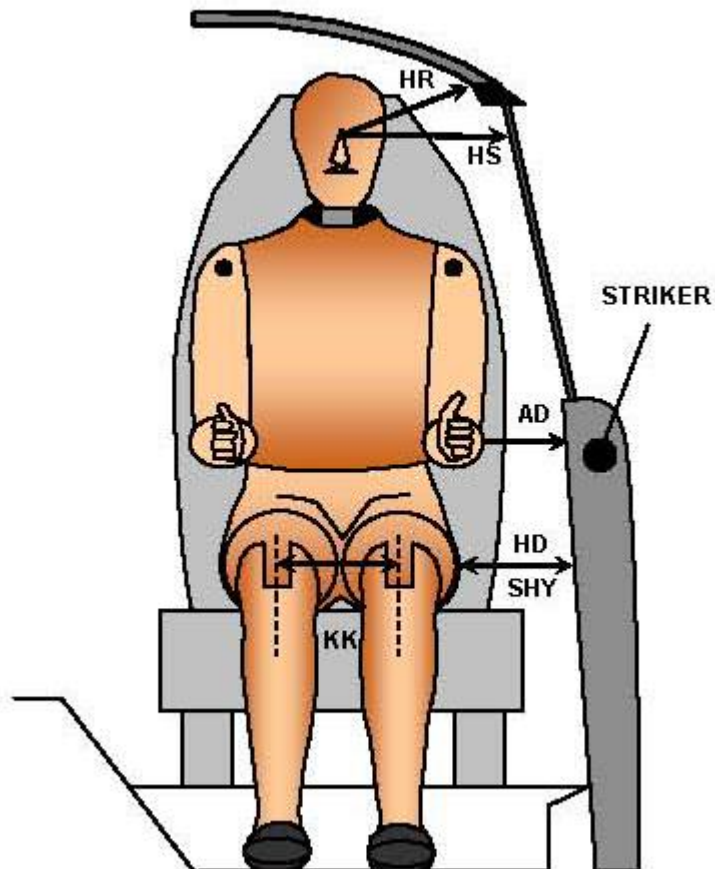
LEFT SIDE VIEW

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		26.3		
SWA°	Steering Wheel Angle		64.8		
SCA°	Steering Column Angle		25.2		
SA°	Seat Back Angle (on headrest post)		7.8		4.1
HZ	Head to Roof (Z)	231	90	235	90
HH	Head to Header	355	28.9	296	45.6
HW	Head to Windshield	650	0.0	625	0.0
NR	Nose to Rim	397	10.4		
CD	Chest to Dash	525		359	
CS	Chest to Steering Hub	291	9.1		
RA	Rim to Abdomen	184	0.0		
KDL	Left Knee to Dash	136	25.2	55	33.0
KDR	Right Knee to Dash	125	26.4	72	29.4
PA°	Pelvic Angle		24.1		20.9
TA°	Tibia Angle		55.0		61.6
SK	Striker to Knee	589	97.4	721	97.7
ST	Striker to Head	510	12.5	484	32.3
SH	Striker to H-Point	304	129.5	399	107.3

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2016 Mazda CX-5 Sport AWD 5-Dr SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20165401
 Test Date: 3/17/2015



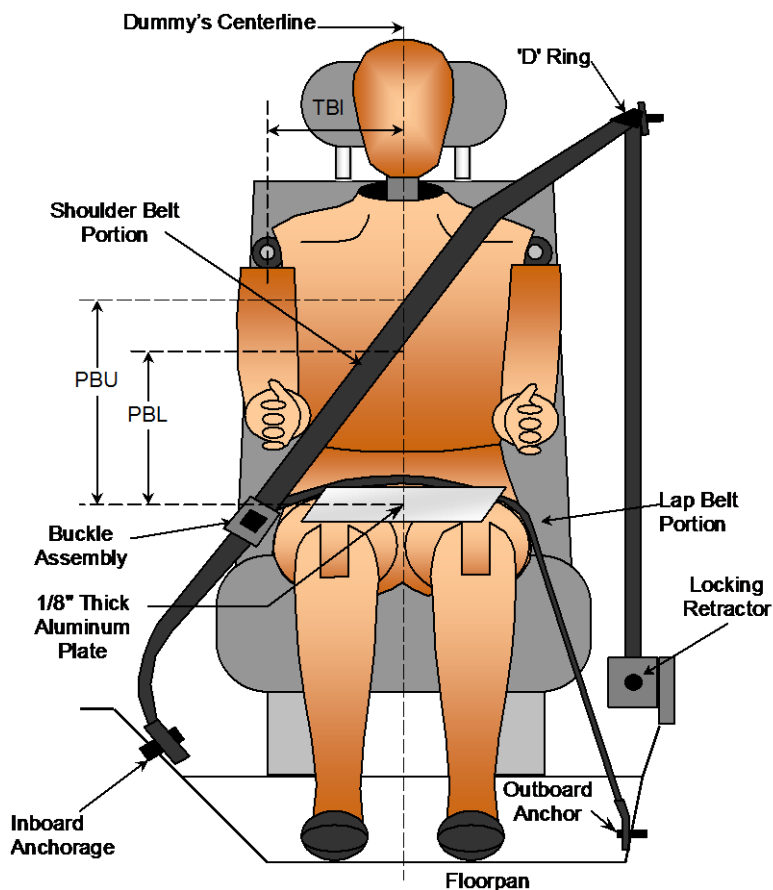
FRONT VIEW OF DUMMY

Code	Measurement Description	Driver	Passenger
		Length (mm)	
AD	Arm to Door	150	103
HD	H-Point to Door	203	248
HR	Head to Side Header	254	267
HS	Head to Side Window	334	360
KK	Knee to Knee	345	226
SHY	Striker to H-Point (Y Direction)	277	314
AA	Ankle to Ankle	322	182

DATA SHEET NO. 5 SEAT BELT POSITIONING DATA

Test Vehicle: 2016 Mazda CX-5 Sport AWD 5-Dr SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20165401
Test Date: 3/17/2015



FRONT VIEW OF DUMMY

SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU - Top surface of reference to belt upper edge	mm	400	370
PBL - Top surface of reference to belt lower edge	mm	330	280

BELT LENGTH DATA

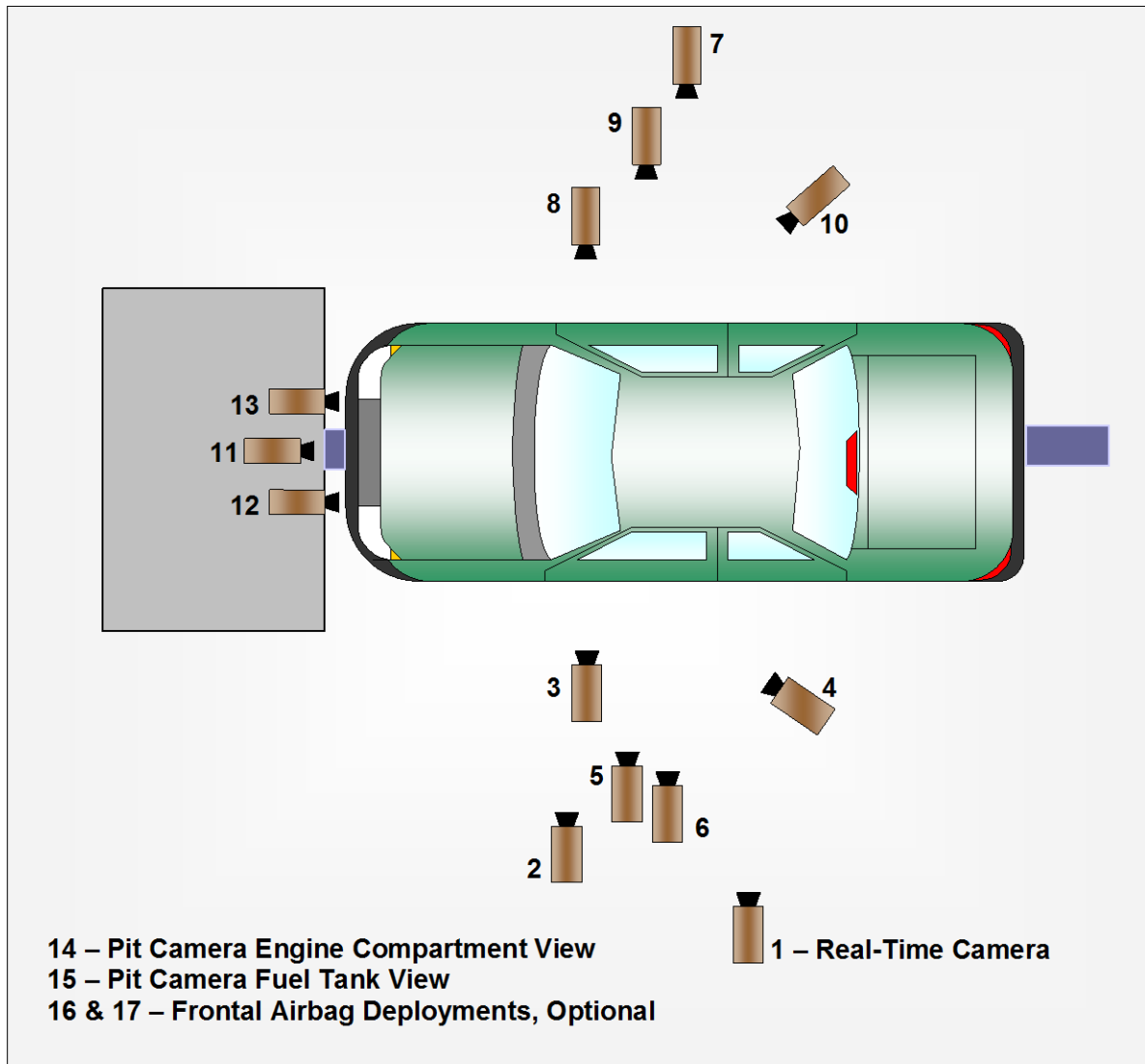
Measurement Description	Units	Driver	Passenger
Shoulder Belt Length as measured on ATD	mm	890	965
Lap Belt Length as measured on ATD	mm	760	855
Remainder of belt on reel	mm	985	815
Total Belt Length for Continuous Webbing Systems	mm	3385	3385

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

Test Vehicle: 2016 Mazda CX-5 Sport AWD 5-Dr SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20165401
Test Date: 3/17/2015

CAMERA POSITIONS FOR FRONTAL IMPACTS



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

Test Vehicle: 2016 Mazda CX-5 Sport AWD 5-Dr SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20165401
 Test Date: 3/17/2015

CAMERA LOCATIONS

No.	Camera View	Coordinates (mm)			Lens (mm)	Speed (fps)
		X*	Y*	Z*		
1	Real-Time Left Overall					30
2	Driver Close-Up	-1420	-6670	-1850	35	1000
3	Left Front Half	-1210	-5480	-1180	24	1000
4	Left Angle	-5540	-5070	-1960	50	1000
5	Steering Column - Top					
6	Steering Column - Bottom					
7	Right Overall	-1900	6490	-1300	20	1000
8	Passenger Close-Up	-1440	6680	-1860	35	1000
9	Right Front Half	-1180	5700	-1190	24	1000
10	Right Angle	-5530	5070	-1920	50	1000
11	Windshield	430	0	-2810	20	1000
12	Driver Windshield	-30	-450	-2030	8.5	1000
13	Passenger Windshield	-40	450	-2030	8.5	1000
14	Pit Front	-1190	0	3150	24	1000
15	Pit Rear	-3190	0	3150	24	1000
16	Onboard Driver Side				12	1000
17	Onboard Passenger Side				12	1000
18	Real-Time Pan View					30

***COORDINATES:**

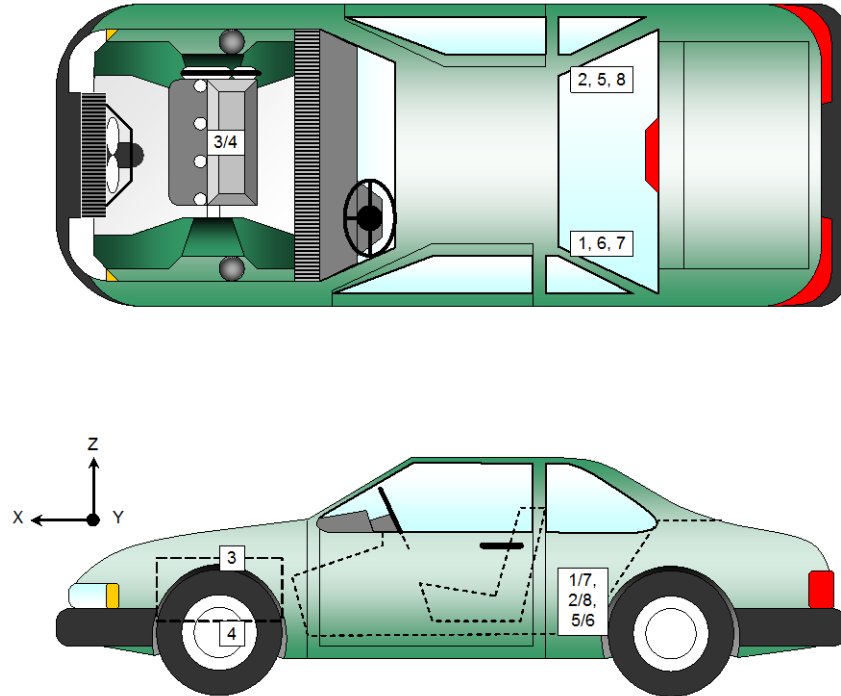
+X = forward of impact plane
 +Y = right of monorail centerline
 +Z = below ground level

Cameras 5 & 6 were not used for this test.

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

Test Vehicle: 2016 Mazda CX-5 Sport AWD 5-Dr SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20165401
 Test Date: 3/17/2015



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Crossmember Accelerometer – X Direction	1692	-320	-359
2	Right Rear Crossmember Accelerometer – X Direction	1692	320	-370
3	Engine Top X	3794	-10	-874
4	Engine Bottom X	3800	185	-230
5	Left Rear Crossmember Accelerometer – Z Direction	1692	-350	-359
6	Right Rear Crossmember Accelerometer – Z Direction	1692	350	-370
7	Left Rear Crossmember Accelerometer Redundant – X Direction	1692	-350	-359
8	Right Rear Crossmember Accelerometer Redundant – X Direction	1692	350	-370

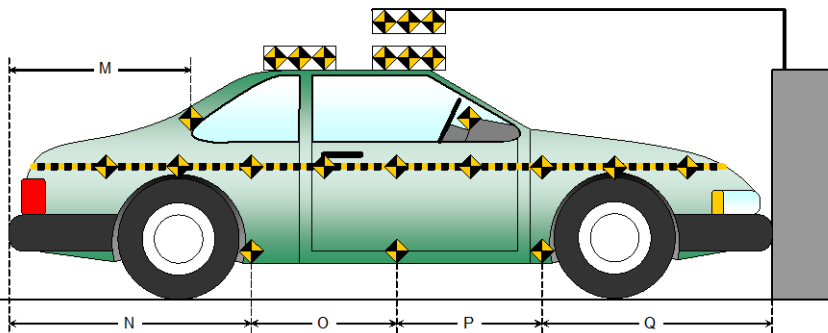
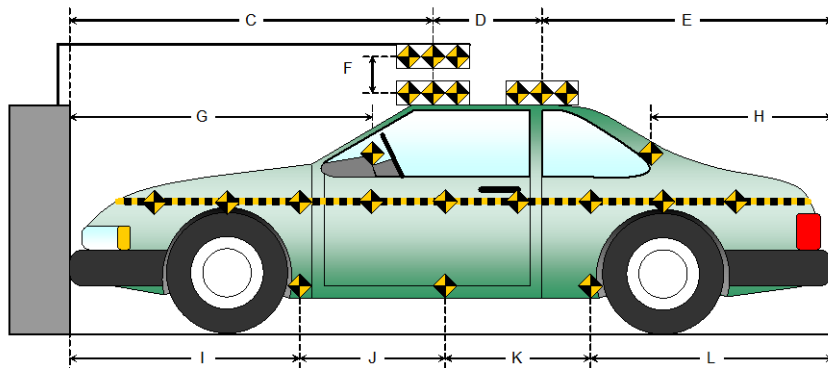
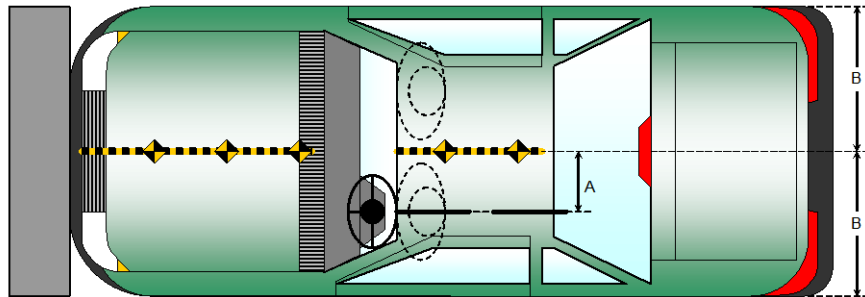
Reference Points: X - Rear Surface of Vehicle (+ forward)
 Y - Vehicle Centerline (+ to right)
 Z - Ground Plane (+ down)

DATA SHEET NO. 8
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2016 Mazda CX-5 Sport AWD 5-Dr SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20165401
 Test Date: 3/17/2015

Item	Value (mm)
A	382
B	920
C	2260
D	609
E	1676
F	80
G	
H	1213
I	1409
J	878
K	878
L	1380
M	1213
N	1380
O	878
P	878
Q	1409



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

Test Vehicle: 2016 Mazda CX-5 Sport AWD 5-Dr SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20165401
 Test Date: 3/17/2015

Advanced Research Load Cell Barrier

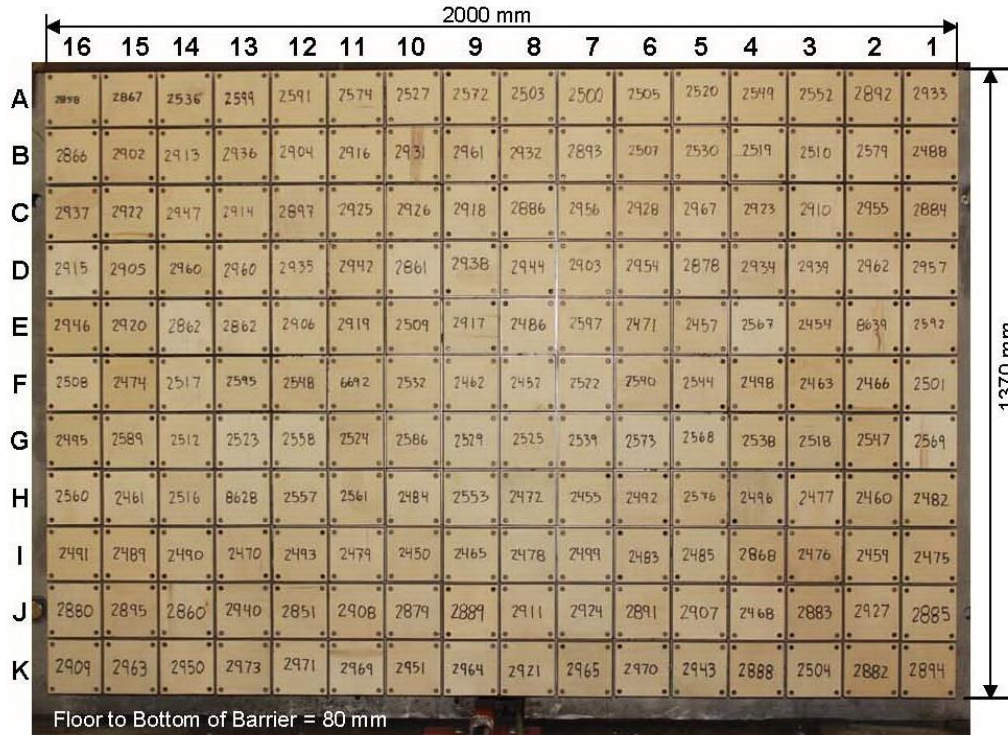


Photo for Reference Only

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

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

DATA SHEET NO. 10
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2016 Mazda CX-5 Sport AWD 5-Dr SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20165401
Test Date: 3/17/2015

INSTRUMENTATION

Driver Dummy Data Channels	46
Passenger Dummy Data Channels	49
Vehicle Structure Accelerometers	8
Barrier Channels	528
Total	631

CAMERA COVERAGE

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

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

Test Vehicle: 2016 Mazda CX-5 Sport AWD 5-Dr SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20165401
Test Date: 3/17/2015

TEST DUMMY INFORMATION AND CONTACT LOCATIONS

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

DOOR OPENING AND SEAT TRACK INFORMATION

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

POST TEST STRUCTURAL OBSERVATIONS

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

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	1755
Center	mm	1610
Right Side	mm	1605
Average	mm	1657

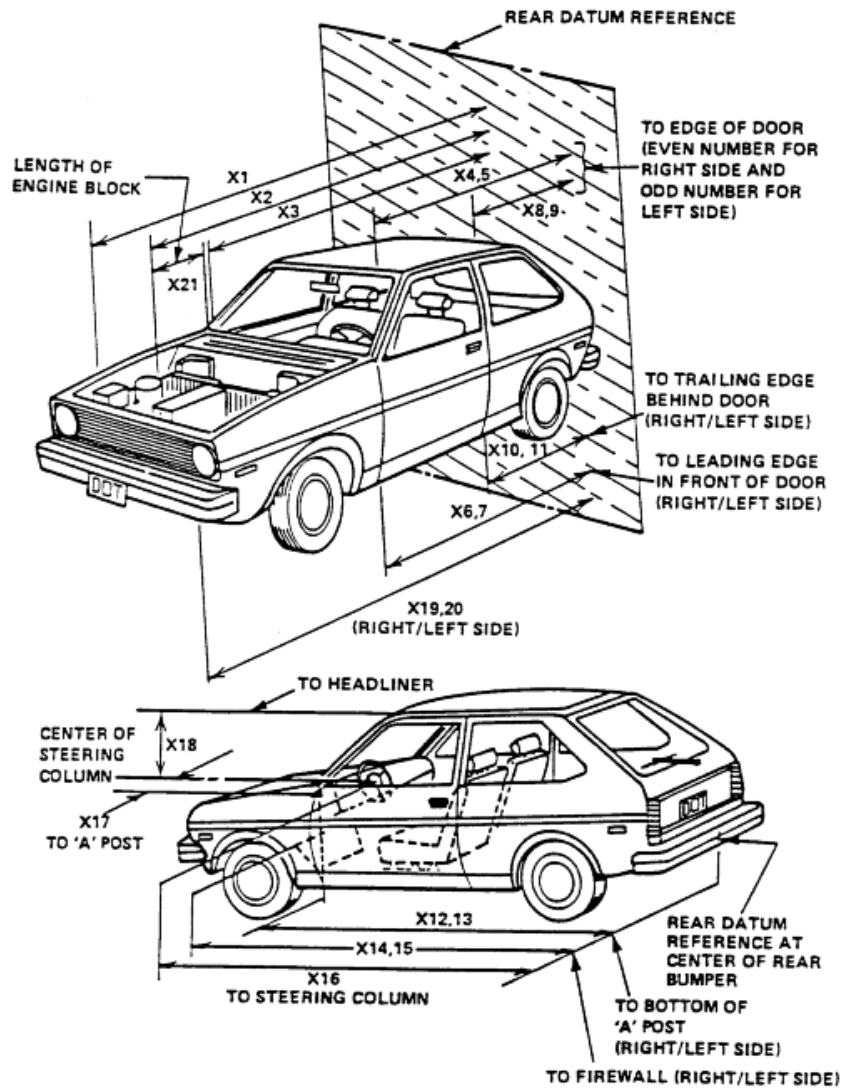
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

DATA SHEET NO. 12 VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2016 Mazda CX-5 Sport AWD 5-Dr SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20165401
Test Date: 3/17/2015



DATA SHEET NO. 12 (CONTINUED)
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2016 Mazda CX-5 Sport AWD 5-Dr SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20165401
 Test Date: 3/17/2015

RSOV (Rear Surface of Vehicle)

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	mm	4545	4092	453
2	RSOV to Front of Engine	mm	3918	3662	256
3	RSOV to Firewall	mm	3538	3482	56
4	RSOV to Upper Leading Edge of Right Door	mm	3017	3010	7
5	RSOV to Upper Leading Edge of Left Door	mm	3017	3016	1
6	RSOV to Lower Leading Edge of Right Door	mm	3020	3014	6
7	RSOV to Lower Leading Edge of Left Door	mm	3020	3016	4
8	RSOV to Upper Trailing Edge of Right Door	mm	1930	1924	6
9	RSOV to Upper Trailing Edge of Left Door	mm	1930	1929	1
10	RSOV to Lower Trailing Edge of Right Door	mm	1990	1982	8
11	RSOV to Lower Trailing Edge of Left Door	mm	1990	1989	1
12	RSOV to Bottom of "A" Post of Right Side	mm	3020	3020	0
13	RSOV to Bottom of "A" Post of Left Side	mm	3020	3020	0
14	RSOV to Firewall, Right Side	mm	3323	3294	29
15	RSOV to Firewall, Left Side	mm	3323	3305	18
16	RSOV to Steering Column	mm	2556	2655	-99
17	Center of Steering Column to "A" Post	mm	450	467	-17
18	Center of Steering Column to Headliner	mm	460	505	-45
19	RSOV to Right Side of Front Bumper	mm	4371	4007	364
20	RSOV to Left Side of Front Bumper	mm	4371	3964	407
21	Length of Engine Block	mm	390	390	0
RD	RSOV to Right Side of Dash Panel	mm	2860	2860	0
CD	RSOV to Center of Dash Panel	mm	2816	2816	0
LD	RSOV to Left Side of Dash Panel	mm	2864	2864	0

DATA SHEET NO. 13
ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2016 Mazda CX-5 Sport AWD 5-Dr SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20165401
Test Date: 3/17/2015

VEHICLE INFORMATION

VIN: JM3KE4BY7G0611147 Wheelbase (mm): 2692
Vehicle Size Category: Passenger Car Test Weight (kg): 1729.5

ACCELEROMETER DATA

Accelerometer Locations: As per measurements on Page 15

Cal. Procedure/Interval: MGA procedure / 6 month

Integration Algorithm: Trapezoidal

Linearity: > 99%

Impact Velocity (km/h): 56.5

Velocity Change (km/h): 64.4

Time of Separation (msec): 116.0

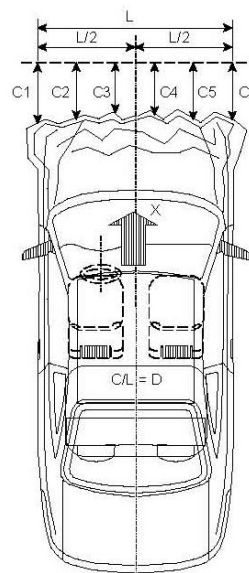
CRUSH PROFILE

Collision Deformation Classification: Frontal

Midpoint of Damage: Centerline

Damage Region Length (mm): 1140

Impact Mode: Frontal



No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	4371	3964	407
C2	Crush zone 2 at left side	mm	4435	3996	439
C3	Crush zone 3 at left side	mm	4470	4038	432
C4	Crush zone 4 at right side	mm	4470	4046	424
C5	Crush zone 5 at right side	mm	4435	4036	399
C6	Crush zone 6 at right side	mm	4371	4007	364
L	C1 TO C6	mm	1140	1148	-8

DATA SHEET NO. 14
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2016 Mazda CX-5 Sport AWD 5-Dr SUV
 Test Program: NCAP Frontal Barrier Impact Test

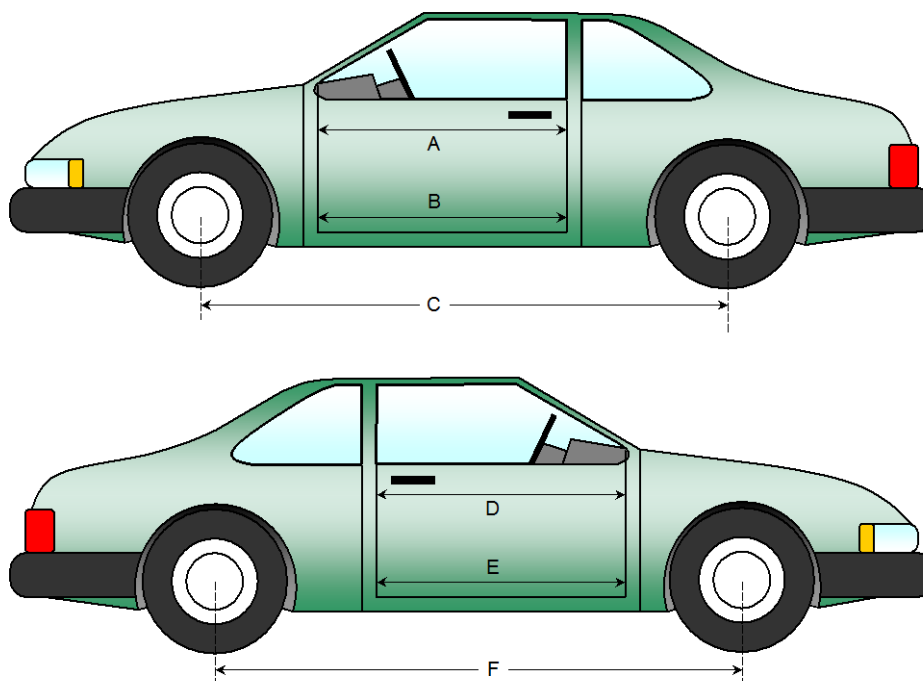
NHTSA No.: O20165401
 Test Date: 3/17/2015

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	990	990	0
B	Left Side Lower	mm	822	822	0
D	Right Side Upper	mm	990	990	0
E	Right Side Lower	mm	822	822	0

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2692	2632	60
F	Right Side Wheelbase	mm	2692	2625	67



DATA SHEET NO. 14 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

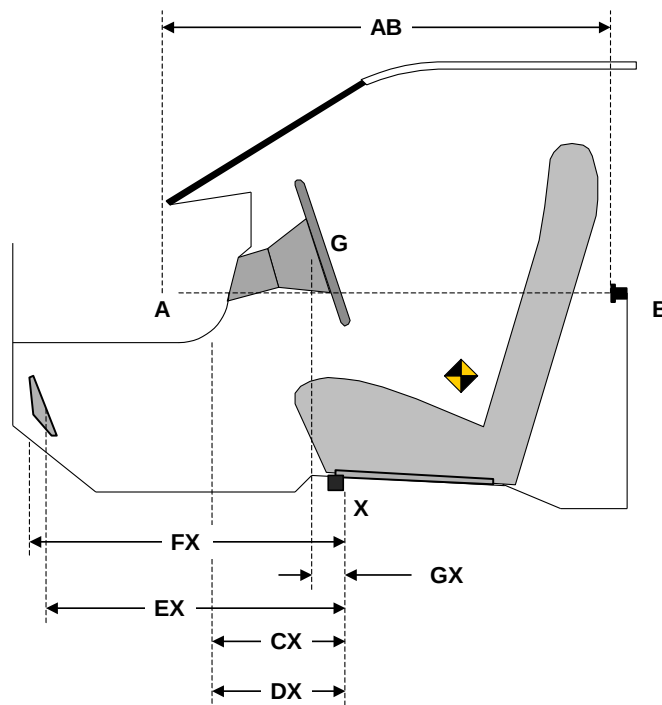
Test Vehicle: 2016 Mazda CX-5 Sport AWD 5-Dr SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20165401
 Test Date: 3/17/2015

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	784	784	0
CX	Left Knee Bolster to X	mm	248	250	-2
DX	Right Knee Bolster to X	mm	226	245	-19
EX	Brake Pedal to X	mm	530	507	23
FX	Foot Rest to X	mm	544	550	-6
GX	Center of Steering Column Wheel Hub to X	mm	50	127	-77

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: 2016 Mazda CX-5 Sport AWD 5-Dr SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20165401
 Test Date: 3/17/2015

Windshield Mounting Details:

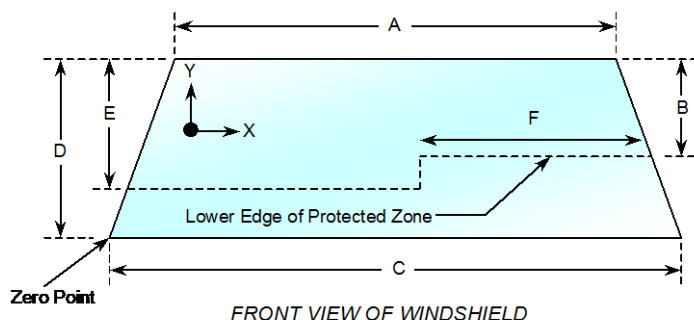
Windshield glass is secured to the vehicle frame with a rubber trim and glue.

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: 21.1° C.

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% of Retention
Left Side	2241	2241	100
Right Side	2241	2241	100
Total	4482	4482	100



Item	Units	Value
A	mm	1242
B	mm	532
C	mm	1508
D	mm	866
E	mm	560
F	mm	485

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: 2016 Mazda CX-5 Sport AWD 5-Dr SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20165401
Test Date: 3/17/2015

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 21.1°C Test Time: 10:31 a.m.

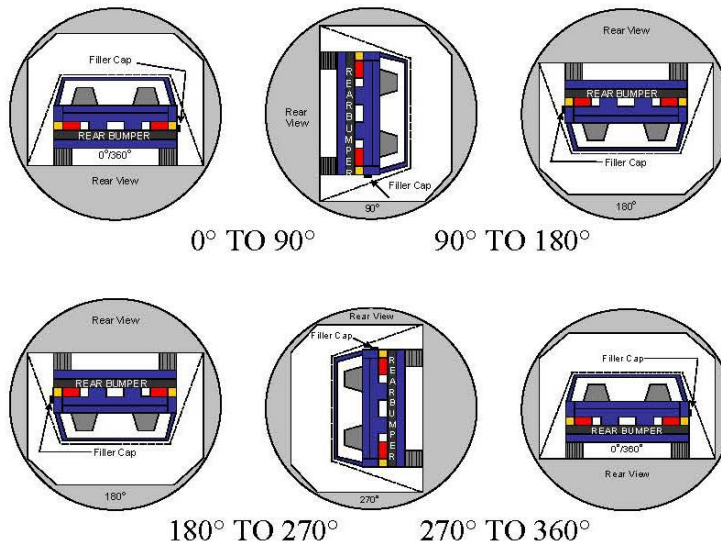
- A. From impact until vehicle motion ceases: 0 oz.
(Maximum allowable = 1 oz.)
- B. For the 5 minute period after motion ceases: 0 oz.
(Maximum allowable = 5 oz.)
- C. For the following 25 minutes: 0 oz.
(Maximum allowable = 1 oz./minute)
- D. Spillage: None

DATA SHEET NO. 16
FMVSS 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2016 Mazda CX-5 Sport AWD 5-Dr SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20165401
 Test Date: 3/17/2015

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



SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	113	300	413
90° to 180°	108	300	408
180° to 270°	108	300	408
270° to 360°	112	300	412

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

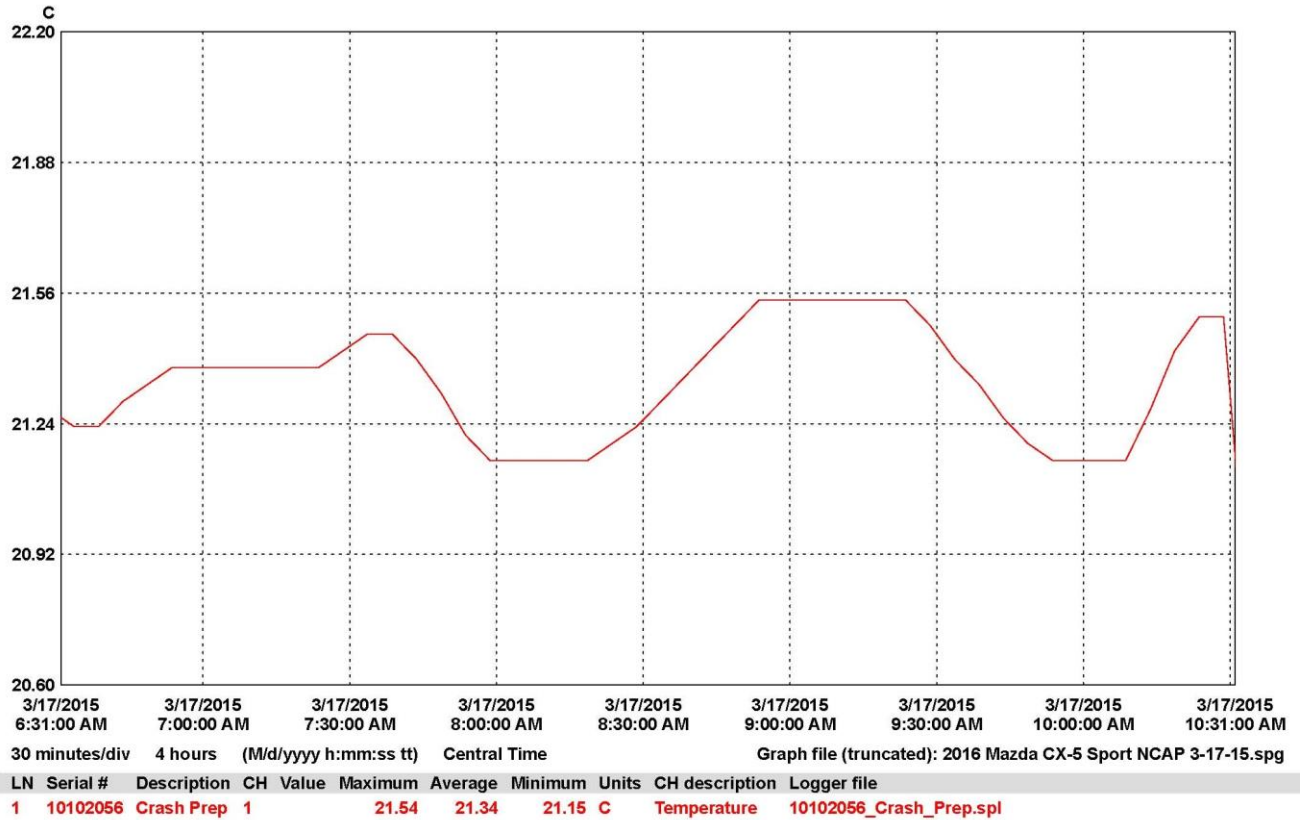
SOLVENT SPILLAGE LOCATION TABLE

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: 2016 Mazda CX-5 Sport AWD 5-Dr SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: O20165401
 Test Date: 3/17/2015



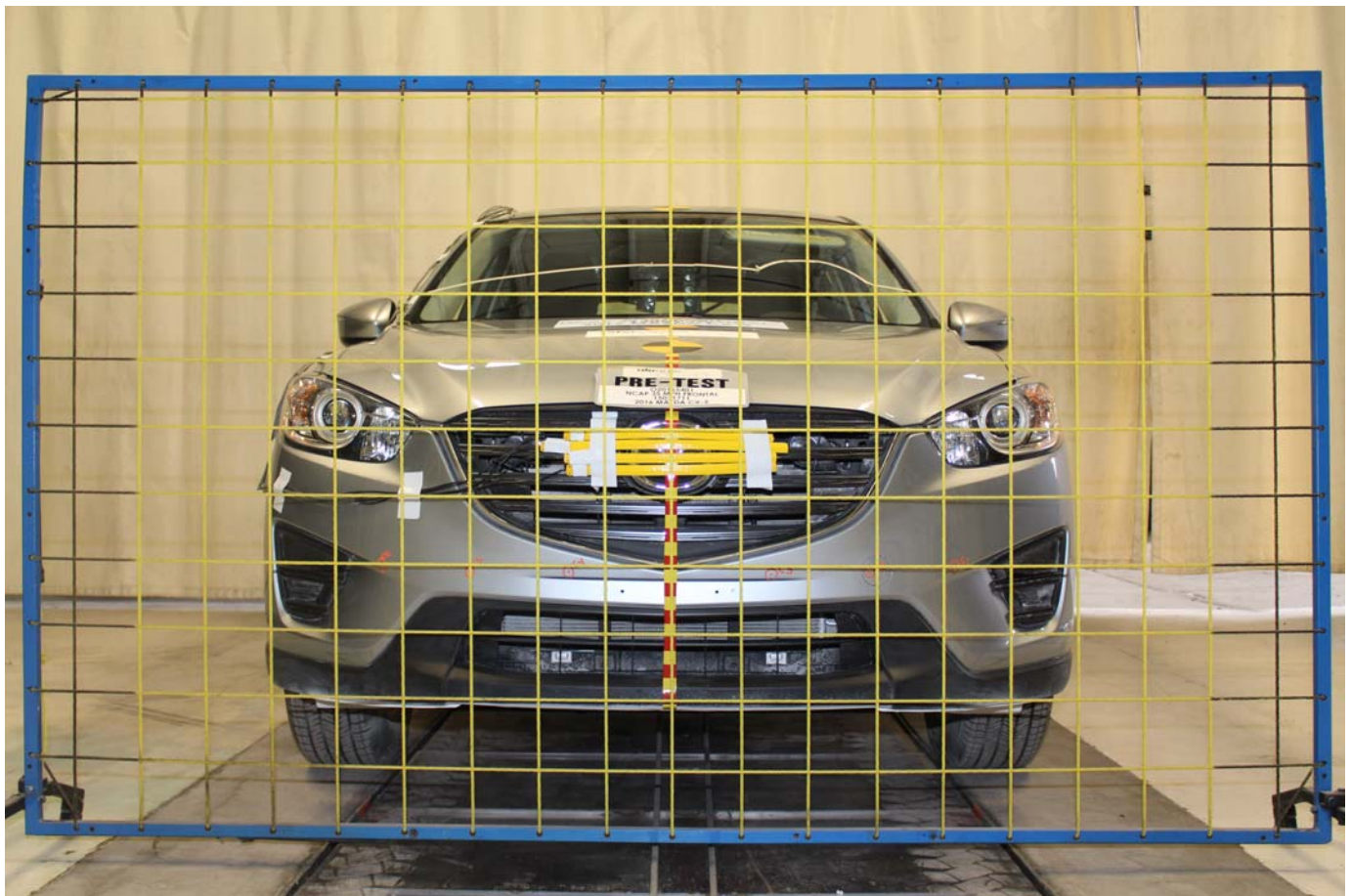
**APPENDIX A
PHOTOGRAPHS**

TABLE OF PHOTOGRAPHS

		<u>Page No.</u>
Photo No. 1.	Load Cell Location	A-1
Photo No. 2.	Load Cell Wall	A-1
Photo No. 3.	Manufacturer's Label	A-2
Photo No. 4.	Tire Placard	A-2
Photo No. 5.	2016 Mazda CX-5 Sport AWD Frontal As Delivered	A-3
Photo No. 6.	Left Rear 3-4 View, As Received	A-3
Photo No. 7.	Pre-Test Front View of Test Vehicle	A-4
Photo No. 8.	Post-Test Front View of Test Vehicle	A-4
Photo No. 9.	Pre-Test Left View of Test Vehicle	A-5
Photo No. 10.	Post-Test Left View of Test Vehicle	A-5
Photo No. 11.	Pre-Test Right View of Test Vehicle	A-6
Photo No. 12.	Post-Test Right View of Test Vehicle	A-6
Photo No. 13.	Pre-Test Right Front 3-4 View	A-7
Photo No. 14.	Post-Test Right Front 3-4 View	A-7
Photo No. 15.	Pre-Test Left Rear 3-4 View	A-8
Photo No. 16.	Post-Test Left Rear 3-4 View	A-8
Photo No. 17.	Pre-Test Windshield View	A-9
Photo No. 18.	Post-Test Windshield View	A-9
Photo No. 19.	Pre-Test Engine Compartment View	A-10
Photo No. 20.	Post-Test Engine Compartment View	A-10
Photo No. 21.	Pre-Test Fuel Filler Cap View	A-11
Photo No. 22.	Post-Test Fuel Filler Cap View	A-11
Photo No. 23.	Pre-Test Front Underbody View	A-12
Photo No. 24.	Post-Test Front Underbody View	A-12
Photo No. 25.	Pre-Test Mid Front Underbody View	A-13
Photo No. 26.	Post-Test Mid Front Underbody View	A-13
Photo No. 27.	Pre-Test Mid Rear Underbody View	A-14
Photo No. 28.	Post-Test Mid Rear Underbody View	A-14
Photo No. 29.	Pre-Test Rear Underbody View	A-15
Photo No. 30.	Post-Test Rear Underbody View	A-15

		<u>Page No.</u>
Photo No. 31.	Pre-Test Dummy Cable Routing	A-16
Photo No. 32.	Post-Test Dummy Cable Routing	A-16
Photo No. 33.	Pre-Test Driver Dummy Front View	A-17
Photo No. 34.	Post-Test Driver Dummy Front View	A-17
Photo No. 35.	Pre-Test Driver Dummy Window View	A-18
Photo No. 36.	Post-Test Driver Dummy Window View	A-18
Photo No. 37.	Pre-Test Driver Dummy and Vehicle Interior (Door Open)	A-19
Photo No. 38.	Post-Test Driver Dummy and Vehicle Interior (Door Open)	A-19
Photo No. 39.	Pre-Test Driver's Seat Fore-Aft Markings	A-20
Photo No. 40.	Post-Test Driver's Seat Fore-Aft Markings	A-20
Photo No. 41.	Pre-Test View of Belt Anchorage for Driver Dummy	A-21
Photo No. 42.	Post-Test View of Belt Anchorage for Driver Dummy	A-21
Photo No. 43.	Pre-Test Driver Dummy Feet	A-22
Photo No. 44.	Post-Test Driver Dummy Feet	A-22
Photo No. 45.	Pre-Test Driver's Side Knee Bolster (without dummy)	A-23
Photo No. 46.	Post-Test Driver's Side Knee Bolster (without dummy)	A-23
Photo No. 47.	Pre-Test Driver's Side Floorpan	A-24
Photo No. 48.	Post-Test Driver's Side Floorpan	A-24
Photo No. 49.	Post-Test Driver Dummy Face	A-25
Photo No. 50.	Post-Test Driver Dummy Contact with Airbag	A-25
Photo No. 51.	Post-Test Driver Dummy Contact with Headrest	A-26
Photo No. 52.	Post-Test Driver Dummy Contact with Knee Bolster	A-26
Photo No. 53.	Pre-Test View of the Steering Wheel	A-27
Photo No. 54.	Post-Test View of the Steering Wheel	A-27
Photo No. 55.	Pre-Test Passenger Dummy Front View	A-28
Photo No. 56.	Post-Test Passenger Dummy Front View	A-28
Photo No. 57.	Pre-Test Passenger Dummy Window View	A-29
Photo No. 58.	Post-Test Passenger Dummy Window View	A-29
Photo No. 59.	Pre-Test Passenger Dummy and Vehicle Interior (Door Open)	A-30
Photo No. 60.	Post-Test Passenger Dummy and Vehicle Interior (Door Open)	A-30

		<u>Page No.</u>
Photo No. 61.	Pre-Test Passenger's Seat Fore-Aft Markings	A-31
Photo No. 62.	Post-Test Passenger's Seat Fore-Aft Markings	A-31
Photo No. 63.	Pre-Test View of Belt Anchorage for Passenger Dummy	A-32
Photo No. 64.	Post-Test View of Belt Anchorage for Passenger Dummy	A-32
Photo No. 65.	Pre-Test Passenger Dummy Feet	A-33
Photo No. 66.	Post-Test Passenger Dummy Feet	A-33
Photo No. 67.	Pre-Test Passenger's Side Knee Bolster (without dummy)	A-34
Photo No. 68.	Post-Test Passenger's Side Knee Bolster (without dummy)	A-34
Photo No. 69.	Pre-Test Passenger's Side Floorpan	A-35
Photo No. 70.	Post-Test Passenger's Side Floorpan	A-35
Photo No. 71.	Post-Test Passenger Dummy Face	A-36
Photo No. 72.	Post-Test Passenger Dummy Contact with Airbag	A-36
Photo No. 73.	Post-Test Passenger Dummy Contact with Headrest	A-37
Photo No. 74.	Post-Test Passenger Dummy Contact with Glovebox	A-37
Photo No. 75.	Ballast Installed in Vehicle	A-38
Photo No. 76.	Post-Test Stoddard Solvent Spillage Location View	A-38
Photo No. 77.	Post-Test Speed Trap Read-Out	A-39
Photo No. 78.	Vehicle at 0 Degree on Static Rollover Device	A-39
Photo No. 79.	Vehicle at 90 Degrees on Static Rollover Device	A-40
Photo No. 80.	Vehicle at 180 Degrees on Static Rollover Device	A-40
Photo No. 81.	Vehicle at 270 Degrees on Static Rollover Device	A-41
Photo No. 82.	Vehicle at 360 Degrees on Static Rollover Device	A-41
Photo No. 83.	2016 Mazda CX-5 Sport AWD Frontal Impact Event	A-42
Photo No. 84.	Monroney Label Photograph	A-42



No. 001 Load Cell Location

PHOTOGRAPH NOT AVAILABLE

No. 002 Load Cell Wall



No. 003 Manufacturer's Label



No. 004 Tire Placard



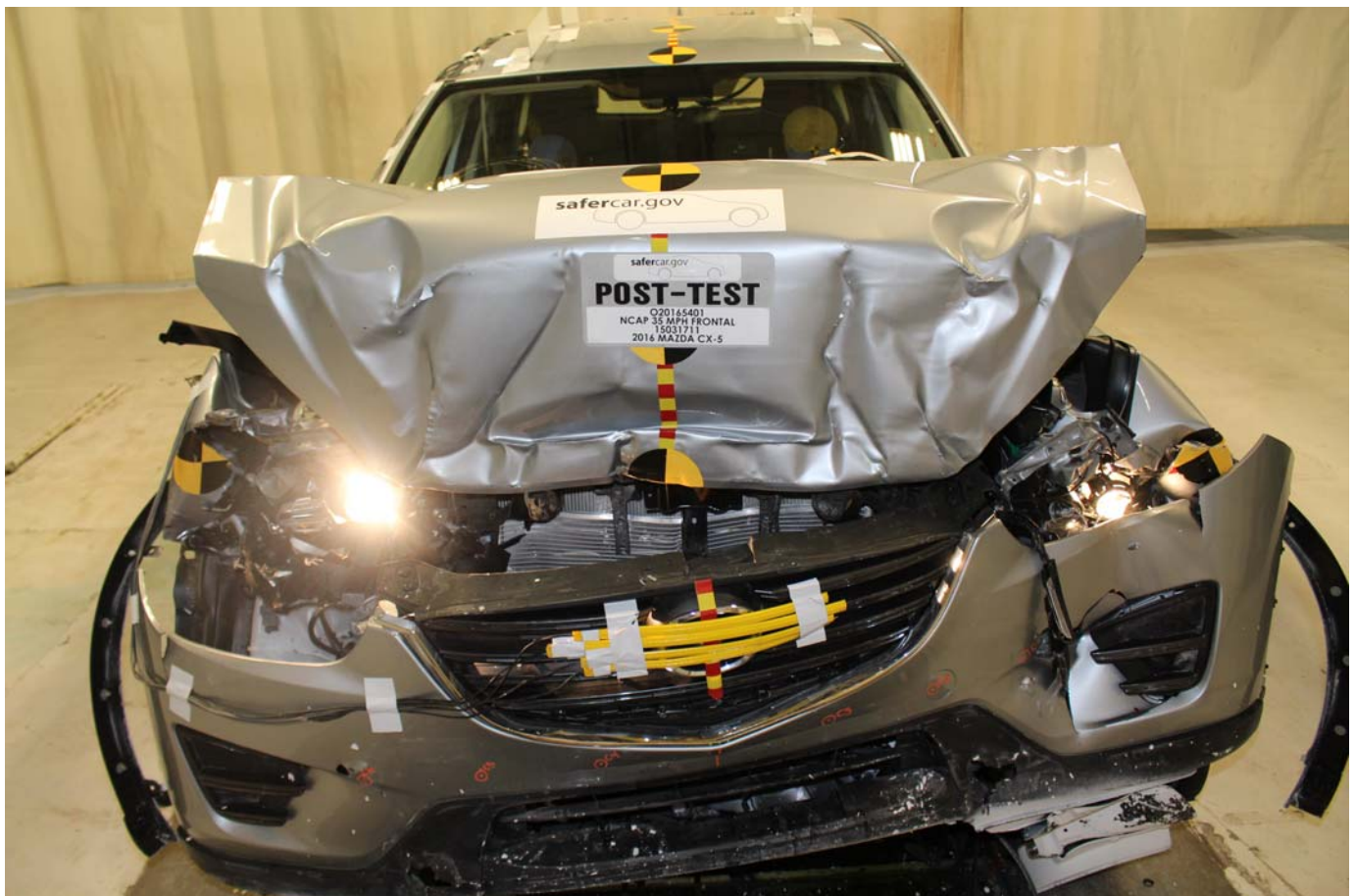
No. 005 2016 Mazda CX-5 Sport AWD Frontal As Delivered



No. 006 Left Rear 3-4 View, As Received



No. 007 Pre-Test Front View of Test Vehicle



No. 008 Post-Test Front View of Test Vehicle



No. 009 Pre-Test Left View of Test Vehicle



No. 010 Post-Test Left View of Test Vehicle



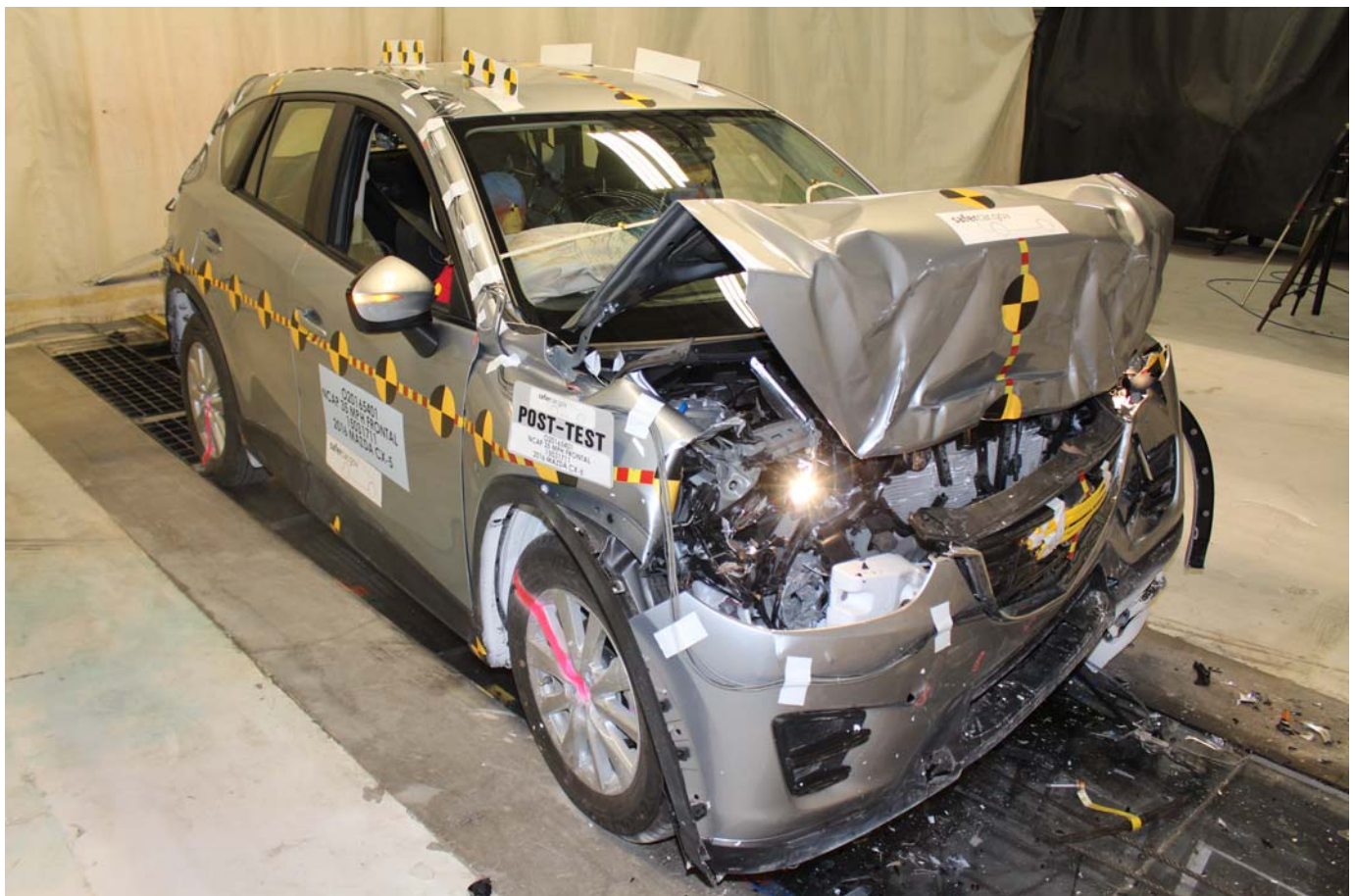
No. 011 Pre-Test Right View of Test Vehicle



No. 012 Post-Test Right View of Test Vehicle



No. 013 Pre-Test Right Front 3-4 View



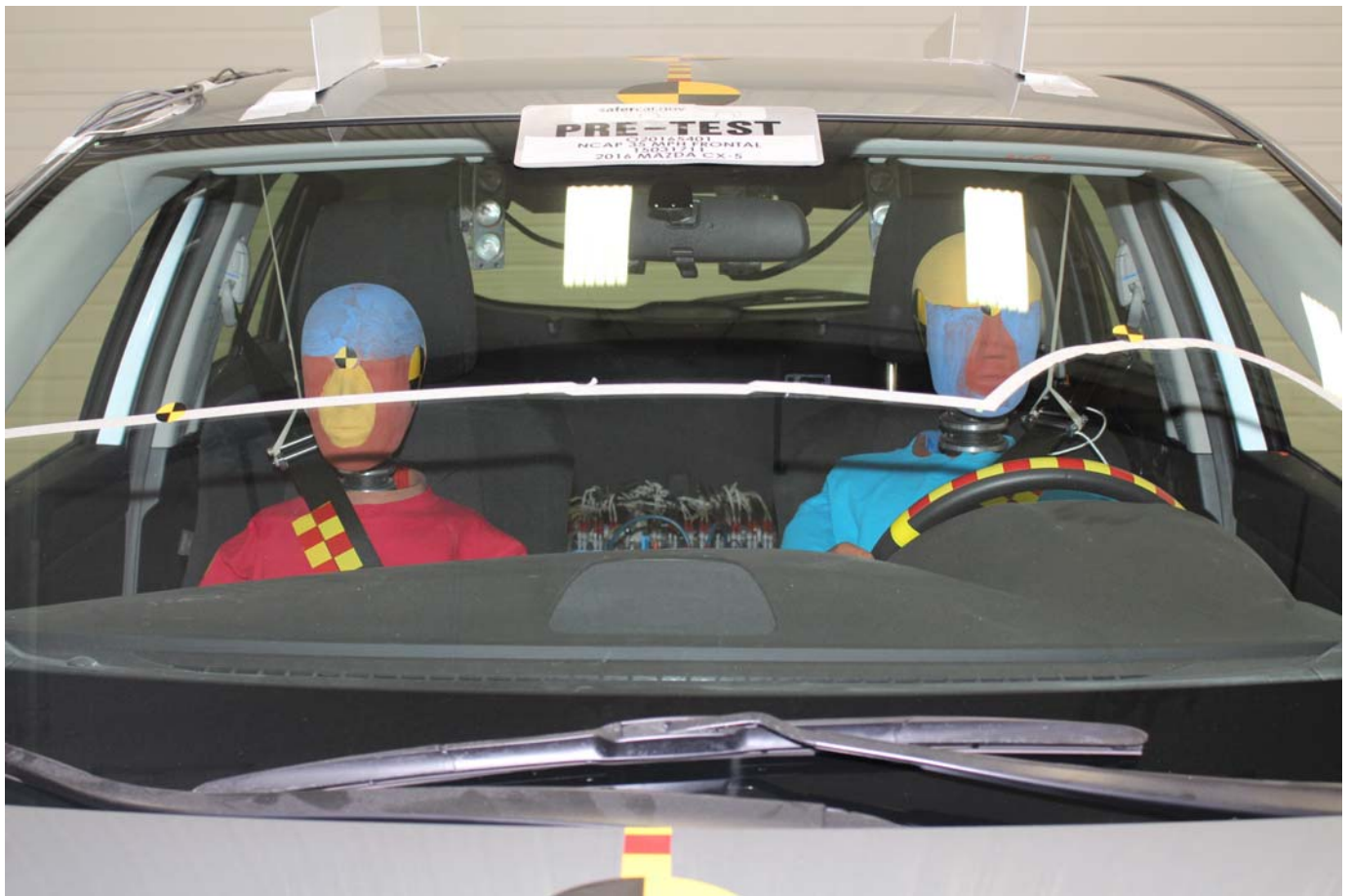
No. 014 Post-Test Right Front 3-4 View



No. 015 Pre-Test Left Rear 3-4 View



No. 016 Post-Test Left Rear 3-4 View



No. 017 Pre-Test Windshield View



No. 018 Post-Test Windshield View



No. 019 Pre-Test Engine Compartment View



No. 020 Post-Test Engine Compartment View



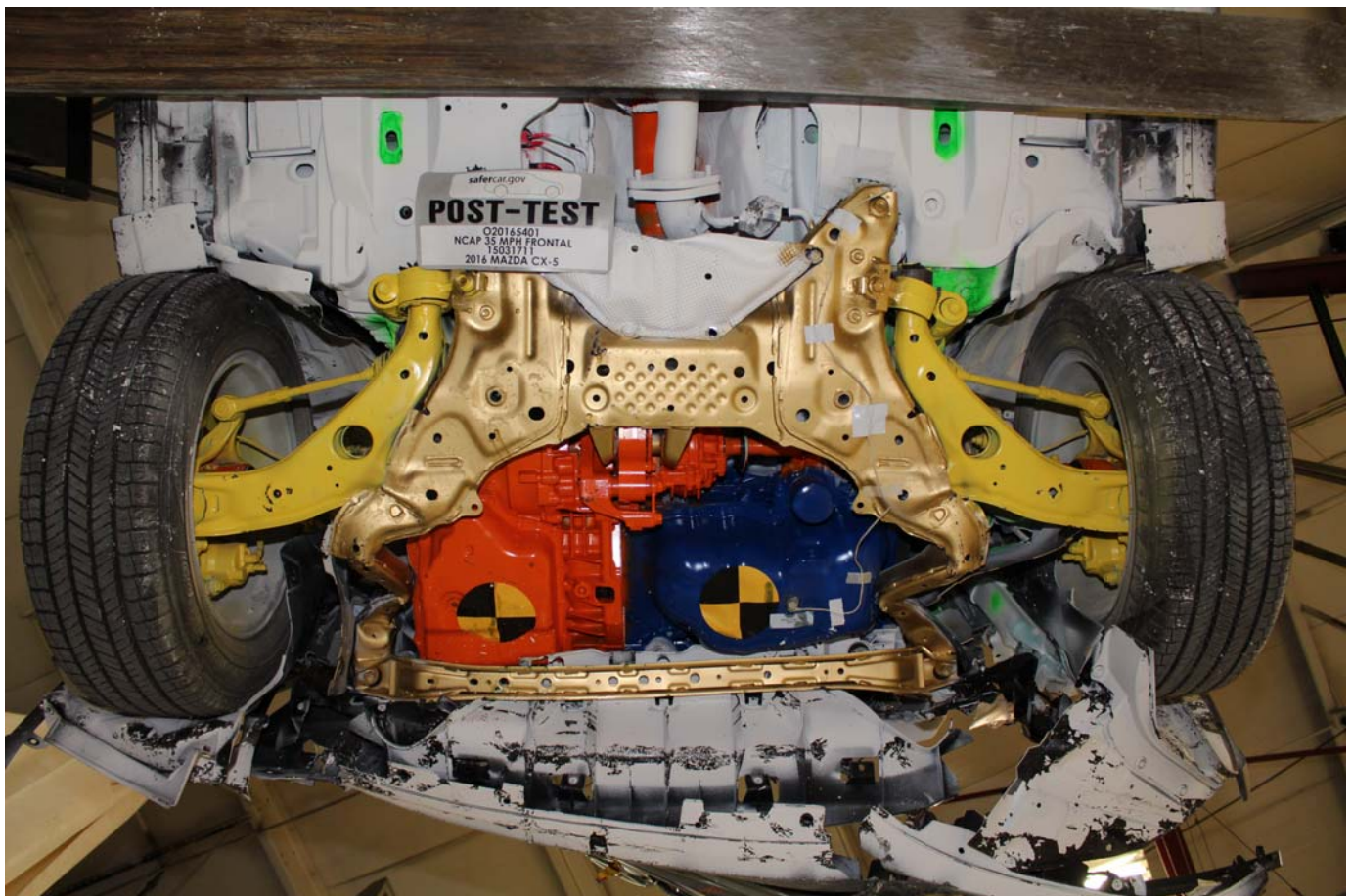
No. 021 Pre-Test Fuel Filler Cap View



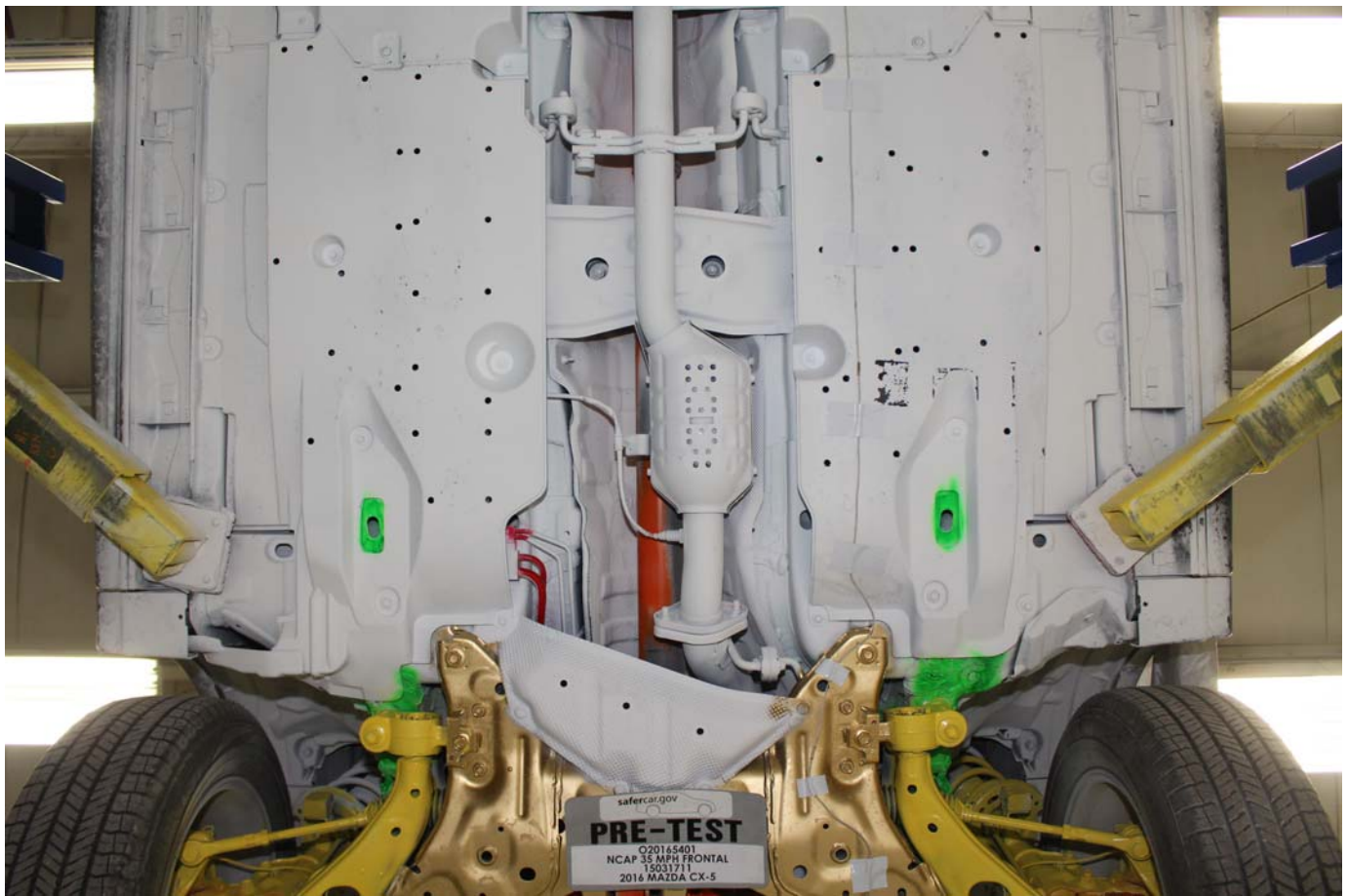
No. 022 Post-Test Fuel Filler Cap View



No. 023 Pre-Test Front Underbody View



No. 024 Post-Test Front Underbody View



No. 025 Pre-Test Mid Front Underbody View



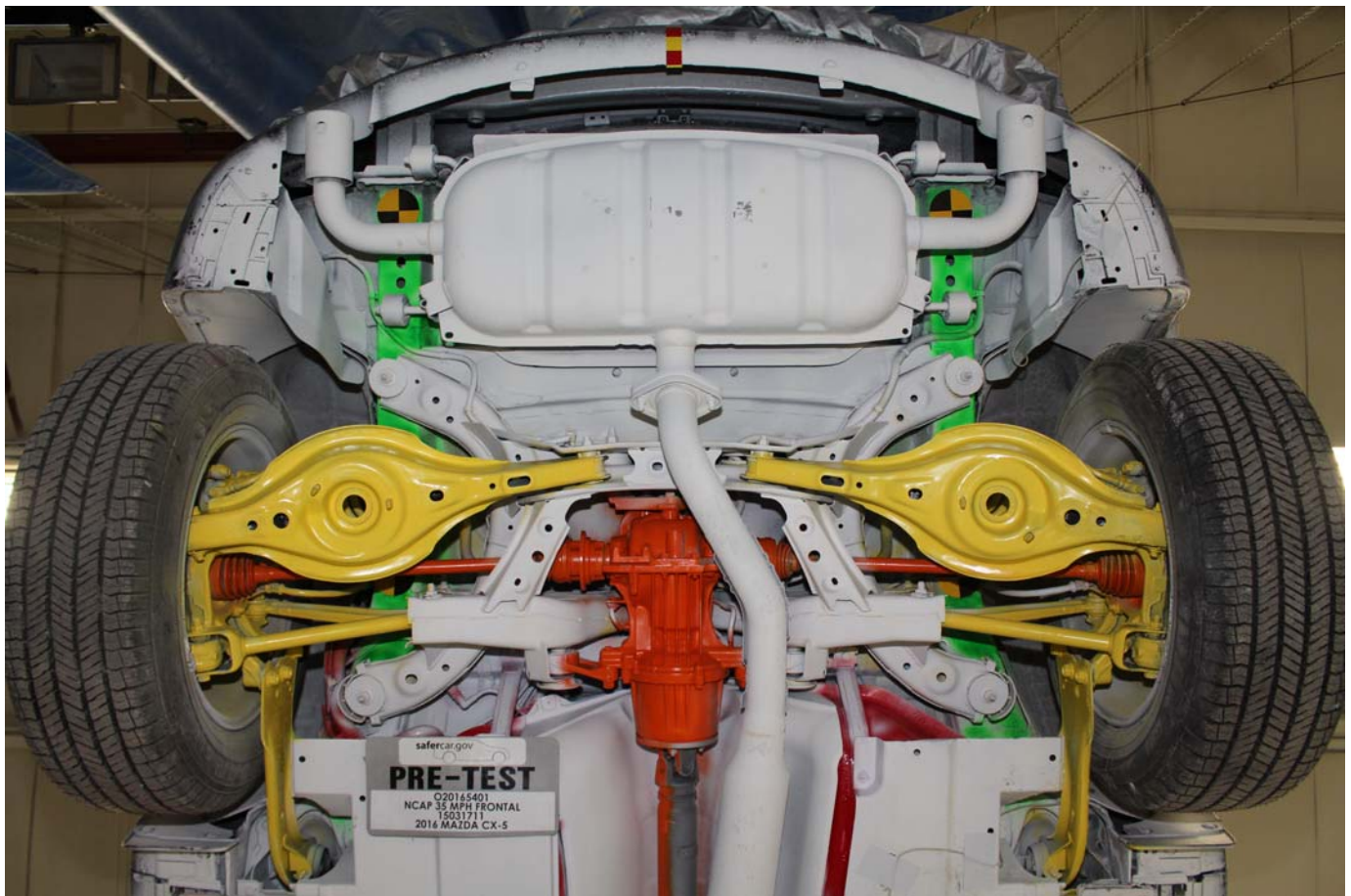
No. 026 Post-Test Mid Front Underbody View



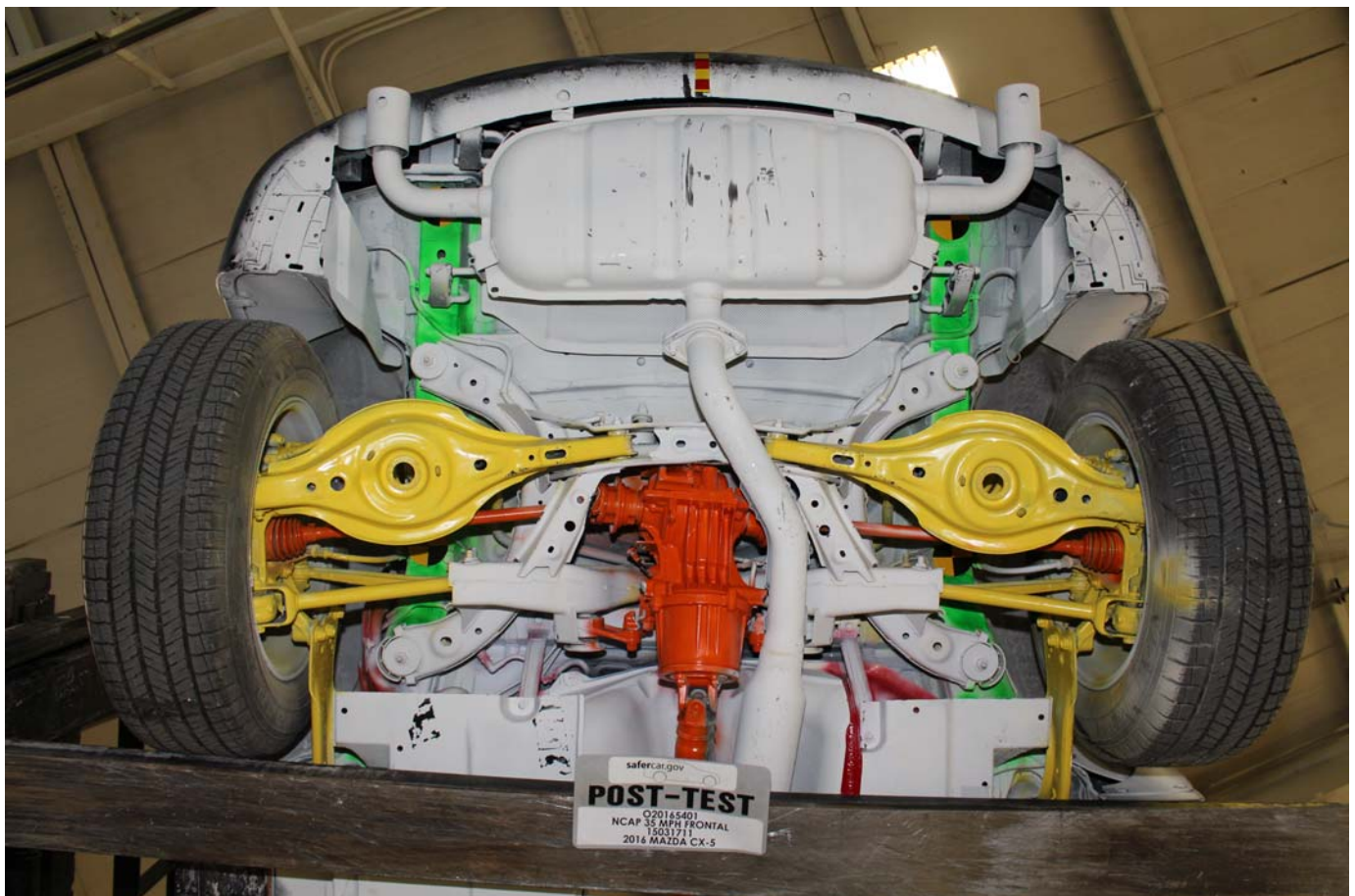
No. 027 Pre-Test Mid Rear Underbody View



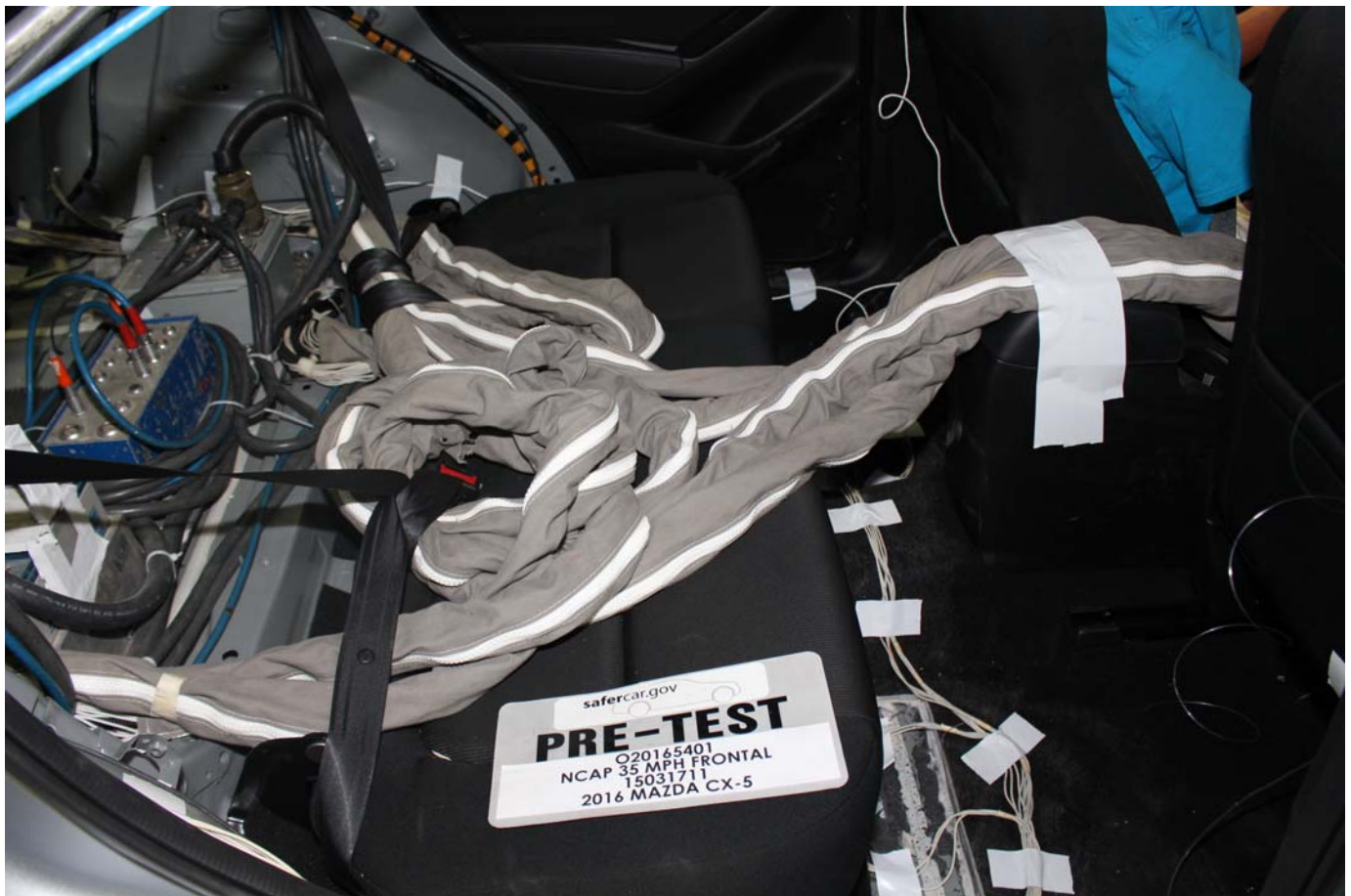
No. 028 Post-Test Mid Rear Underbody View



No. 029 Pre-Test Rear Underbody View



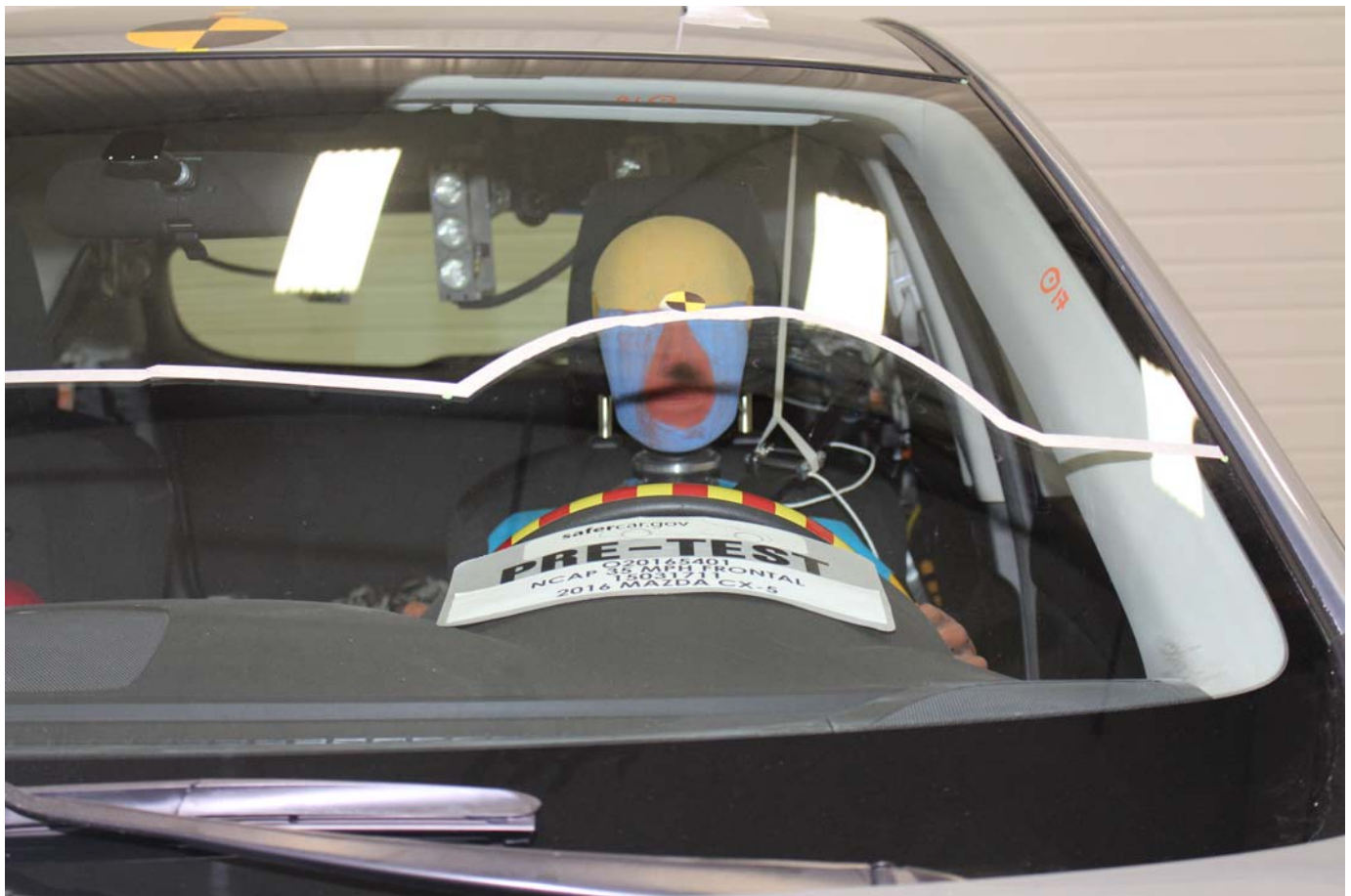
No. 030 Post-Test Rear Underbody View



No. 031 Pre-Test Dummy Cable Routing



No. 032 Post-Test Dummy Cable Routing



No. 033 Pre-Test Driver Dummy Front View



No. 034 Post-Test Driver Dummy Front View



No. 035 Pre-Test Driver Dummy Window View



No. 036 Post-Test Driver Dummy Window View



No. 037 Pre-Test Driver Dummy and Vehicle Interior (Door Open)



No. 038 Post-Test Driver Dummy and Vehicle Interior (Door Open)



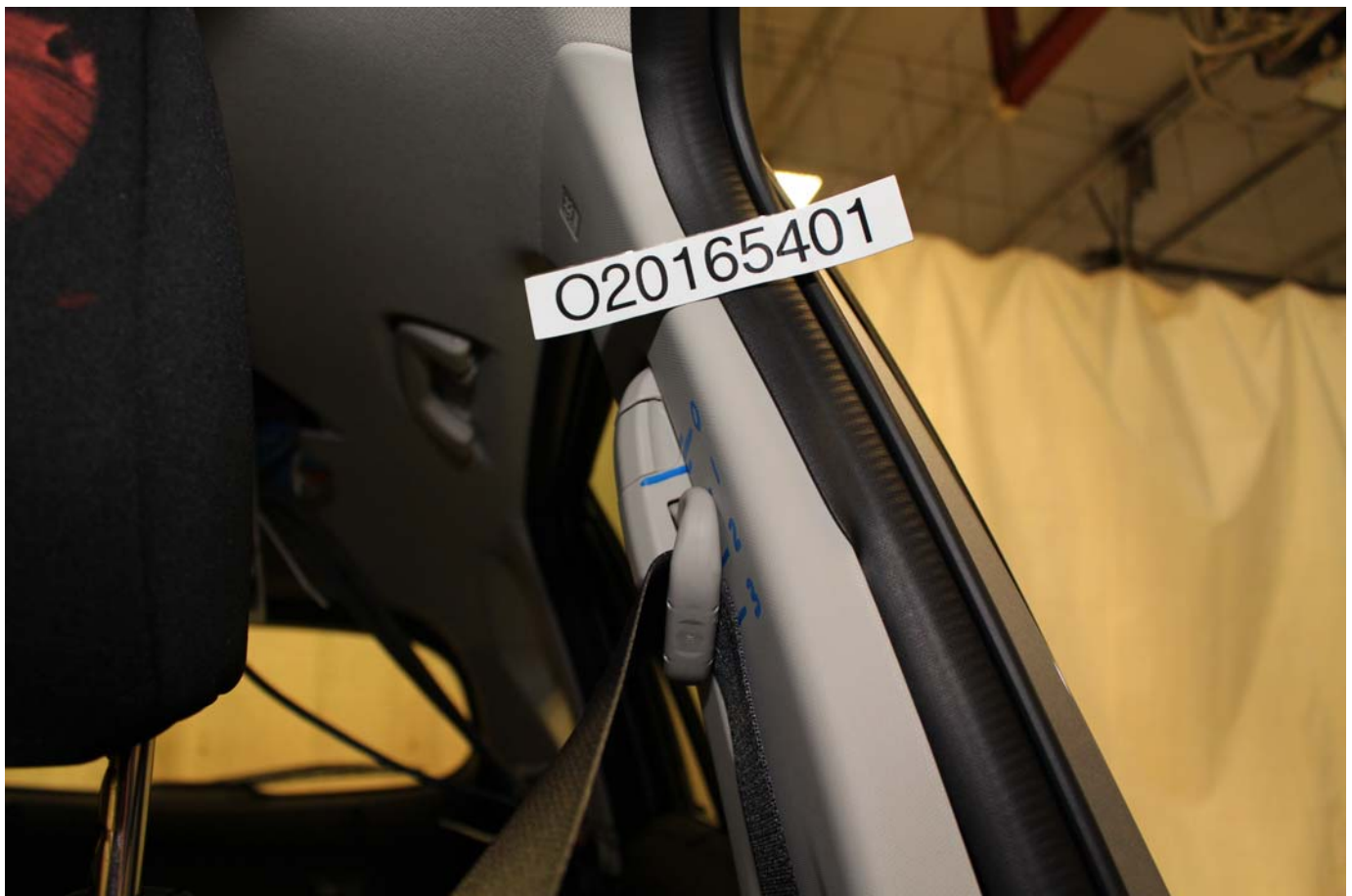
No. 039 Pre-Test Driver's Seat Fore-Aft Markings



No. 040 Post-Test Driver's Seat Fore-Aft Markings



No. 041 Pre-Test View of Belt Anchorage for Driver Dummy



No. 042 Post-Test View of Belt Anchorage for Driver Dummy



No. 043 Pre-Test Driver Dummy Feet



No. 044 Post-Test Driver Dummy Feet



No. 045 Pre-Test Driver's Side Knee Bolster (without dummy)



No. 046 Post-Test Driver's Side Knee Bolster (without dummy)



No. 047 Pre-Test Driver's Side Floorpan



No. 048 Post-Test Driver's Side Floorpan



No. 049 Post-Test Driver Dummy Face



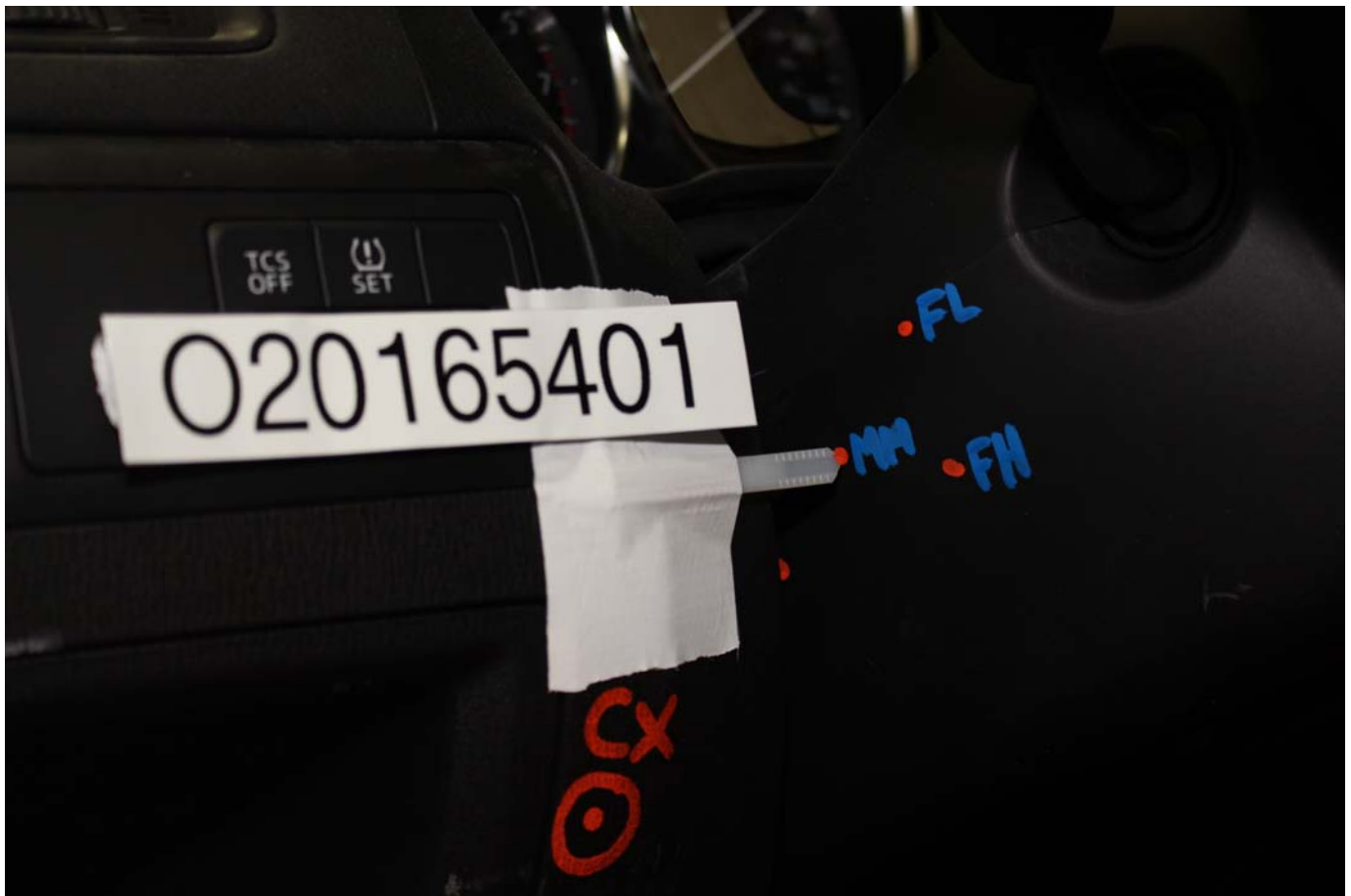
No. 050 Post-Test Driver Dummy Contact with Airbag



No. 051 Post-Test Driver Dummy Contact with Headrest



No. 052 Post-Test Driver Dummy Contact with Knee Bolster



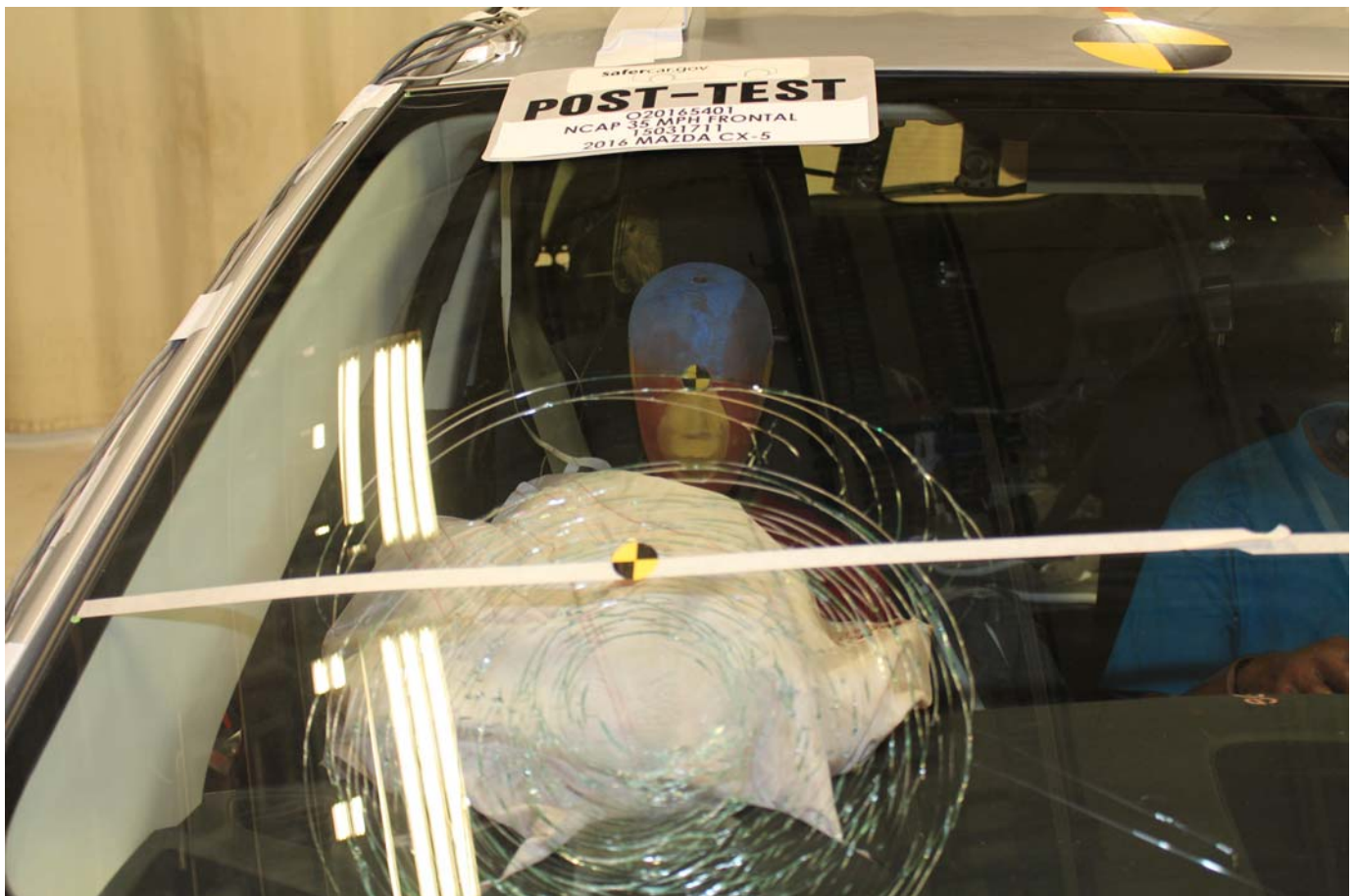
No. 053 Pre-Test View of the Steering Wheel



No. 054 Post-Test View of the Steering Wheel



No. 055 Pre-Test Passenger Dummy Front View



No. 056 Post-Test Passenger Dummy Front View



No. 057 Pre-Test Passenger Dummy Window View



No. 058 Post-Test Passenger Dummy Window View



No. 059 Pre-Test Passenger Dummy and Vehicle Interior (Door Open)



No. 060 Post-Test Passenger Dummy and Vehicle Interior (Door Open)



No. 061 Pre-Test Passenger's Seat Fore-Aft Markings



No. 062 Post-Test Passenger's Seat Fore-Aft Markings



No. 063 Pre-Test View of Belt Anchorage for Passenger Dummy



No. 064 Post-Test View of Belt Anchorage for Passenger Dummy



No. 065 Pre-Test Passenger Dummy Feet



No. 066 Post-Test Passenger Dummy Feet



No. 067 Pre-Test Passenger's Side Knee Bolster (without dummy)



No. 068 Post-Test Passenger's Side Knee Bolster (without dummy)



No. 069 Pre-Test Passenger's Side Floorpan



No. 070 Post-Test Passenger's Side Floorpan

PHOTOGRAPH NOT AVAILABLE

No. 071 Post-Test Passenger Dummy Face



No. 072 Post-Test Passenger Dummy Contact with Airbag



No. 073 Post-Test Passenger Dummy Contact with Headrest



No. 074 Post-Test Passenger Dummy Contact with Glovebox

PHOTOGRAPH NOT APPLICABLE

No. 075 Ballast Installed in Vehicle

PHOTOGRAPH NOT APPLICABLE

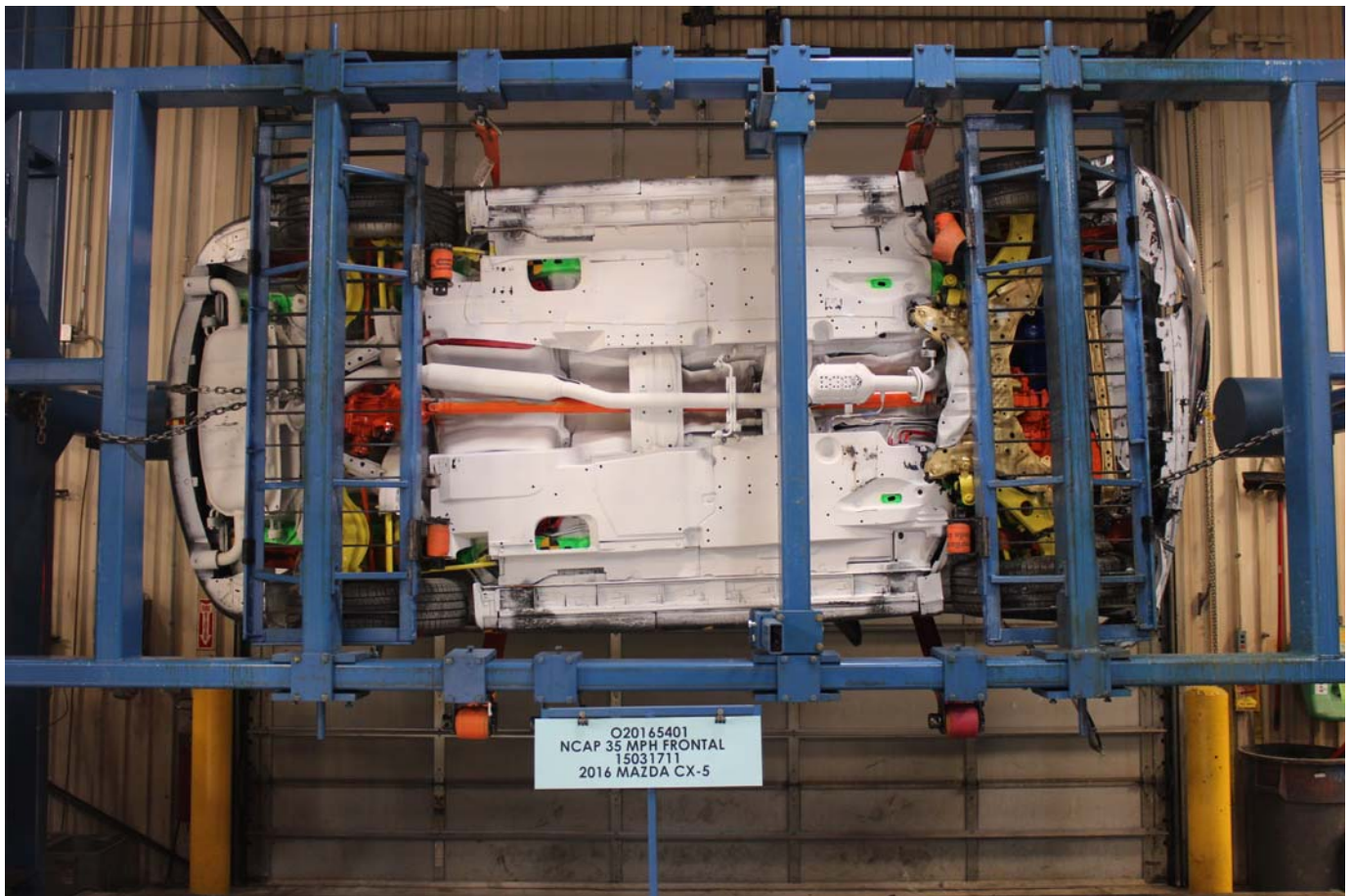
No. 076 Post-Test Stoddard Solvent Spillage Location View



No. 077 Post-Test Speed Trap Read-Out



No. 078 Vehicle at 0 Degree on Static Rollover Device



No. 079 Vehicle at 90 Degrees on Static Rollover Device



No. 080 Vehicle at 180 Degrees on Static Rollover Device



No. 081 Vehicle at 270 Degrees on Static Rollover Device



No. 082 Vehicle at 360 Degrees on Static Rollover Device



No. 083 2016 Mazda CX-5 Sport AWD Frontal Impact Event



2016 CX-5

Model: 2016 CX-5 SPORT ALL WHEEL DRIVE
Exterior Color: SONIC SILVER METALIC
Interior Color: BLACK



EPA DOT Fuel Economy and Environment

Fuel Economy

26 MPG combined city/hwy
24 city
30 highway
3.8 gallons per 100 miles

You save \$250 in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost \$1,750

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

6 (Best) **5** (Best)

This vehicle emits 337 grams CO₂ per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions. Learn more at fuelconomy.gov

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 26 MPG and costs \$9,800. In fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$3.00 per gallon. MSRP is miles per gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score Not Rated
Based on the combined ratings of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight.

Frontal Crash	Driver Passenger	Not Rated
Side Crash	Front seat	★★★★★
	Rear seat	★★★★★
Rollover		★★★★★

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

PARTS CONTENT INFORMATION:

FOR VEHICLES IN THIS CARLINE: U.S./CANADIAN PARTS CONTENT: 0%
MAJOR SOURCES OF FOREIGN PARTS CONTENT: JAPAN 95%

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

FOR THIS VEHICLE: FINAL ASSEMBLY POINT: HIROSHIMA, JAPAN
COUNTRY OF ORIGIN: JAPAN
TRANSMISSION: JAPAN

STANDARD EQUIPMENT

ENGINE/MECHANICAL FEATURES

- SKYACTIV-G 2.5L ENGINE
- SKYACTIV-DRIVE 6SPD SPORT MODE AT
- 184 HORSEPOWER, 185 LB-FT TORQUE
- ALL-WHEEL DRIVE

EXTERIOR FEATURES

- 17-INCH ALLOY WHEELS
- P225/65 R17 ALL-SEASON TIRES
- VARIABLE INTERMITTENT WIPERS
- FIXED-INTERMITTENT REAR WIPER
- POWER MIRRORS WITH TURN LAMPS

INTERIOR FEATURES

- 5-PASSENGER SEATING
- TILT & TELESCOPIC STEERING COLUMN
- STEERING WHEEL W/ AUDIO/CRUISE CONTROLS
- POWER AUTOMATIC DOOR LOCKS
- POWER WINDOWS W/ DRIVER ONE-TOUCH
- CLOTH TRIMMED SPORT SEATS
- 6-WAY MANUAL DRIVER'S SEAT
- MID W/ TRIP COMPUTER
- ELECTRONIC PARKING BRAKE

SAFETY AND SECURITY FEATURES

- 36-MONTH/50,000 MILE "BUMPER-TO-BUMPER" WARRANTY
- 60 MONTH/100,000 MILE POWERTRAIN WARRANTY
- 24-HOUR ROADSIDE ASSISTANCE
- 5-PASSENGER 3-POINT SAFETY BELTS
- LATCH CHILD SAFETY SEAT ANCHORS
- ANTI-THEFT ENGINE IMMOBILIZER
- TIRE PRESSURE MONITORING SYSTEM

OPTIONAL EQUIPMENT

CGN	CARGO NET	\$50
RCC	RETRACTABLE CARGO COVER	\$300
WLK	WHEEL LOCKS	\$50

Total Vehicle and Options
Delivery, Processing and Handling Fee

Total MSRP \$25,570

MSRP \$24,445

37 miles

SOLD TO: 61449
FRANK BOUCHER MAZDA RACINE
9601 WASHINGTON AVENUE
RACINE, WI 53406

SHIP TO: 61449
FRANK BOUCHER MAZDA RACINE
9601 WASHINGTON AVENUE
RACINE, WI 53406

DY JM3KE4BY7G0611147

CX5-SP-3A-KAMPAD-TA-TA-20150203

MAZDAUSA.COM

No. 084 Monroney Label Photograph

APPENDIX B
DUMMY RESPONSE DATA TRACES

TABLE OF DATA PLOTS

Page No.

List of Data Plots Provided in the Test Report

Figure No. 1.	Driver Head X Acceleration vs. Time	B-1
Figure No. 2.	Driver Head Y Acceleration vs. Time	B-1
Figure No. 3.	Driver Head Z Acceleration vs. Time	B-1
Figure No. 4.	Driver Head Resultant Acceleration vs. Time	B-1
Figure No. 5.	Driver Chest Displacement vs. Time	B-2
Figure No. 6.	Driver Chest X Acceleration vs. Time	B-3
Figure No. 7.	Driver Chest Y Acceleration vs. Time	B-3
Figure No. 8.	Driver Chest Z Acceleration vs. Time	B-3
Figure No. 9.	Driver Chest Resultant Acceleration vs. Time	B-3
Figure No. 10.	Driver Neck Force X vs. Time	B-4
Figure No. 11.	Driver Neck Force Z vs. Time	B-4
Figure No. 12.	Driver Neck Moment Y vs. Time	B-4
Figure No. 13.	Driver Nij (NTF) vs. Time	B-5
Figure No. 14.	Driver Nij (NTE) vs. Time	B-5
Figure No. 15.	Driver Nij (NCF) vs. Time	B-5
Figure No. 16.	Driver Nij (NCE) vs. Time	B-5
Figure No. 17.	Driver Left Femur Force vs. Time	B-6
Figure No. 18.	Driver Right Femur Force vs. Time	B-6
Figure No. 19.	Passenger Head X Acceleration vs. Time	B-7
Figure No. 20.	Passenger Head Y Acceleration vs. Time	B-7
Figure No. 21.	Passenger Head Z Acceleration vs. Time	B-7
Figure No. 22.	Passenger Head Resultant Acceleration vs. Time	B-7
Figure No. 23.	Passenger Chest Displacement vs. Time	B-8
Figure No. 24.	Passenger Chest X Acceleration vs. Time	B-9
Figure No. 25.	Passenger Chest Y Acceleration vs. Time	B-9
Figure No. 26.	Passenger Chest Z Acceleration vs. Time	B-9
Figure No. 27.	Passenger Chest Resultant Z Acceleration vs. Time	B-9

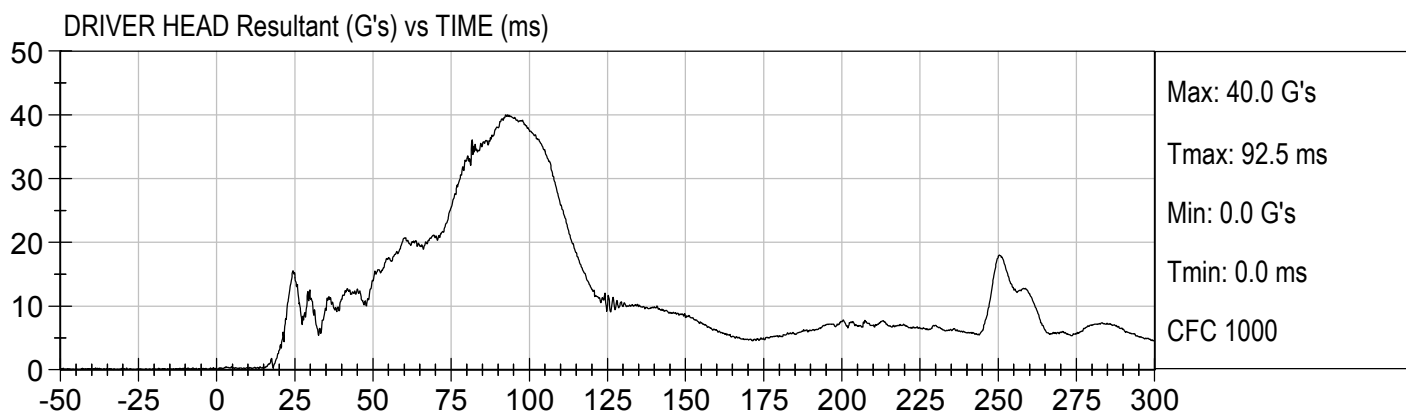
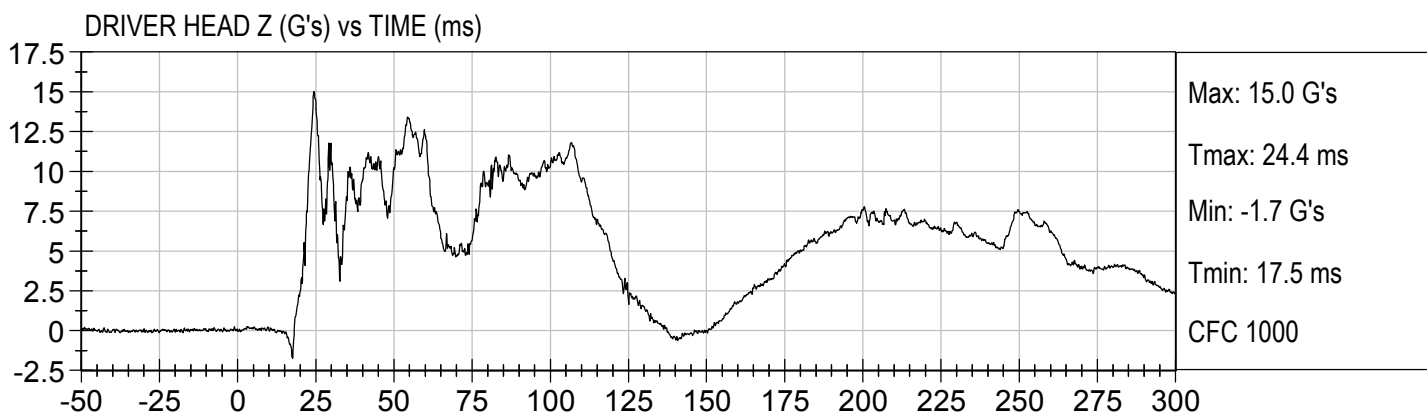
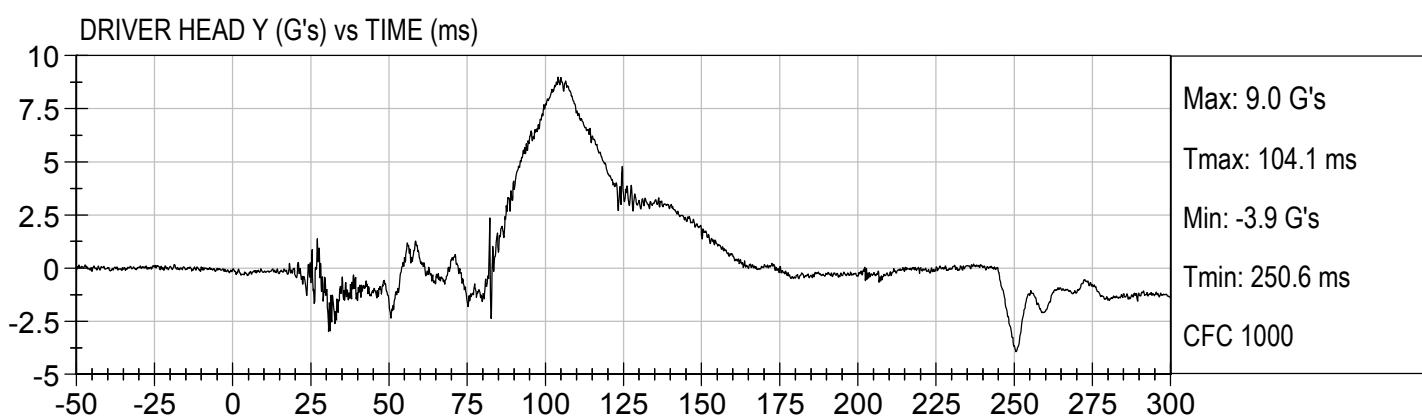
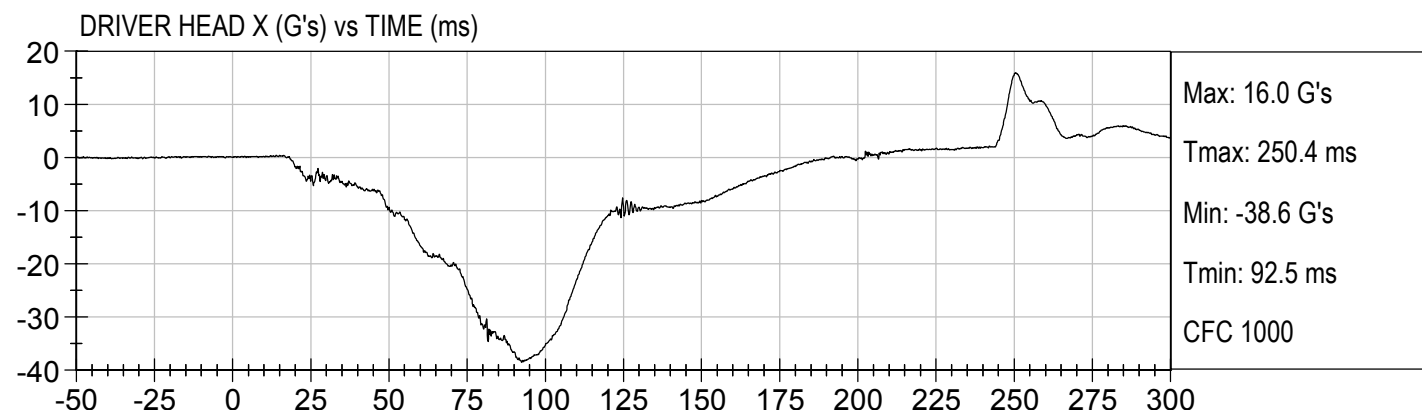
	<u>Page No.</u>
Figure No. 28. Passenger Neck Force X vs. Time	B-10
Figure No. 29. Passenger Neck Force Z vs. Time	B-10
Figure No. 30. Passenger Neck Moment Y vs. Time	B-10
Figure No. 31. Passenger Nij (NTF) vs. Time	B-11
Figure No. 32. Passenger Nij (NTE) vs. Time	B-11
Figure No. 33. Passenger Nij (NCF) vs. Time	B-11
Figure No. 34. Passenger Nij (NCE) vs. Time	B-11
Figure No. 35. Passenger Left Femur Force vs. Time	B-12
Figure No. 36. Passenger Right Femur Force vs. Time	B-12

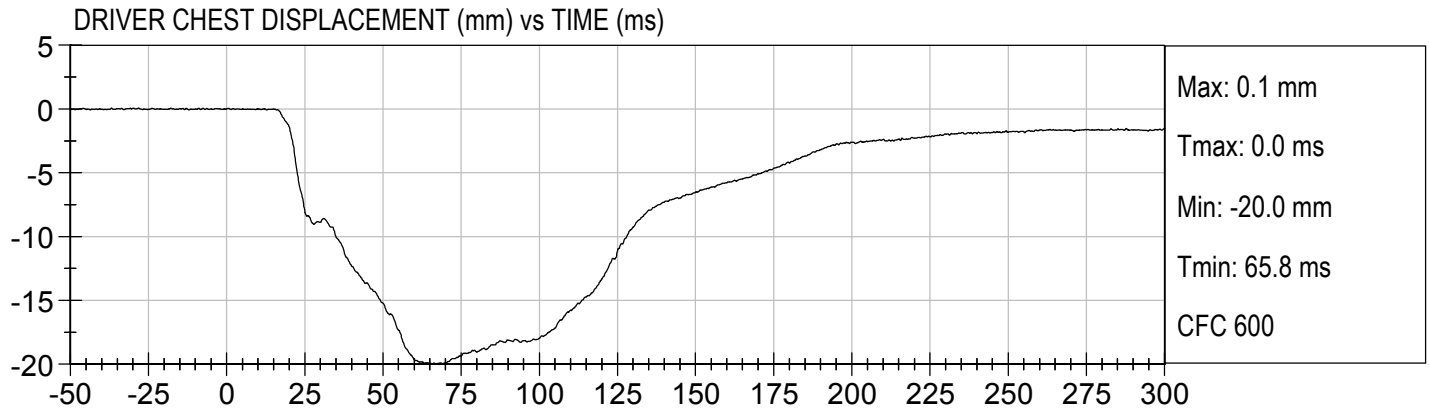
The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at www.nhtsa.dot.gov

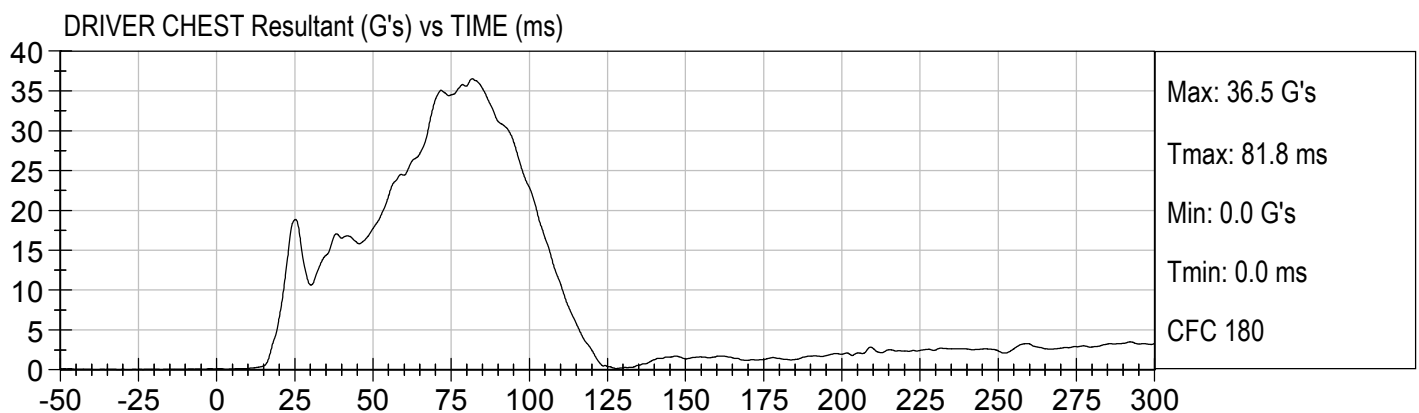
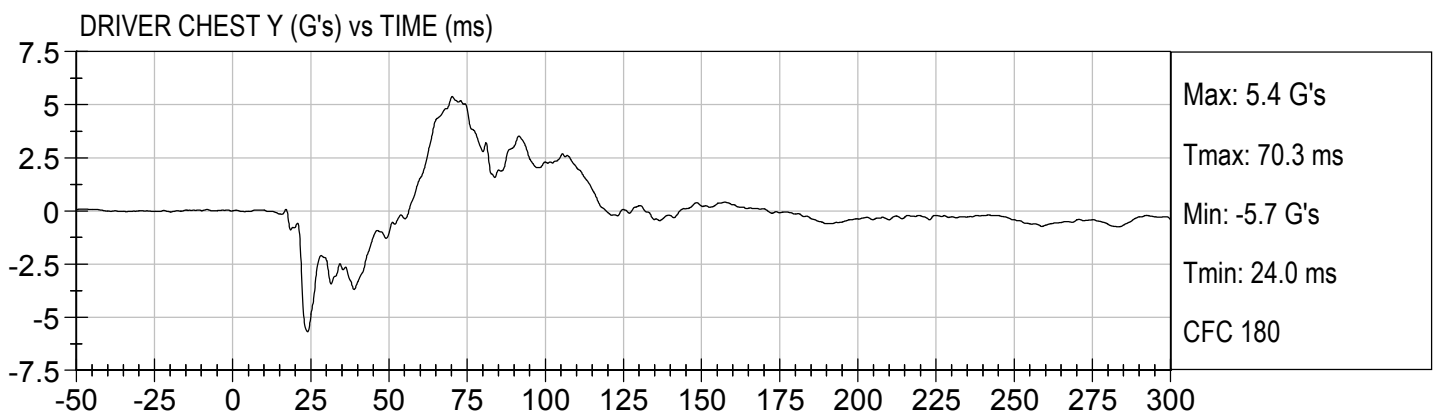
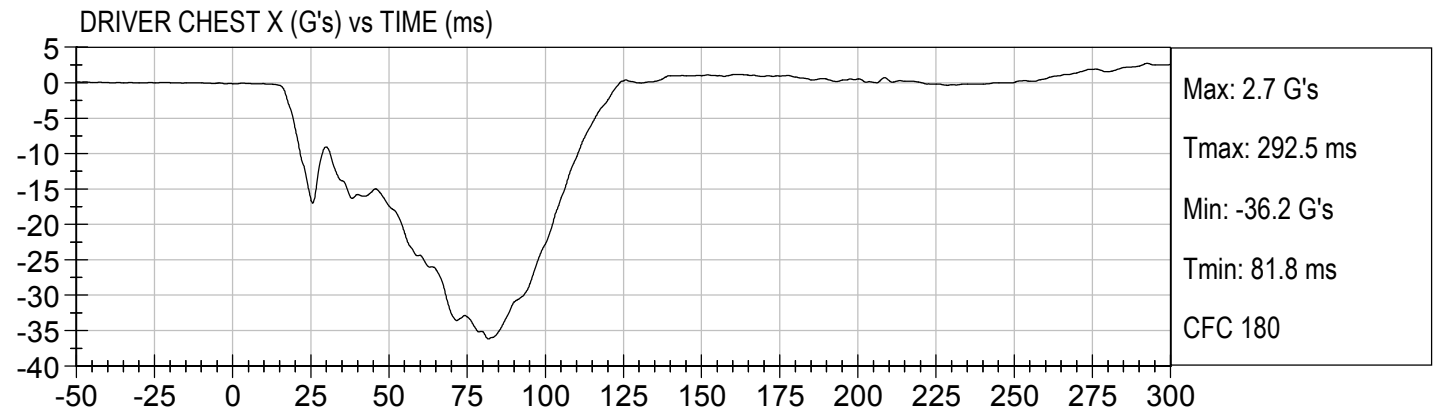
Driver Head X Redundant
 Driver Head Y Redundant
 Driver Head Z Redundant
 Driver Upper Neck Force Y
 Driver Upper Neck Moment X
 Driver Upper Neck Moment Z
 Driver Chest X Redundant
 Driver Chest Y Redundant
 Driver Chest Z Redundant
 Driver Pelvis X
 Driver Pelvis Y
 Driver Pelvis Z
 Driver Left Femur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

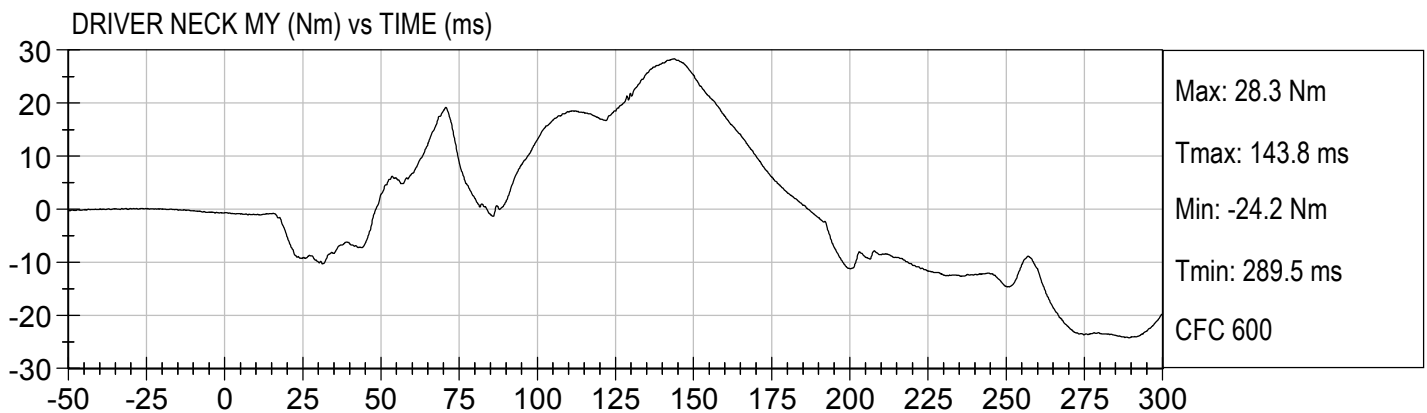
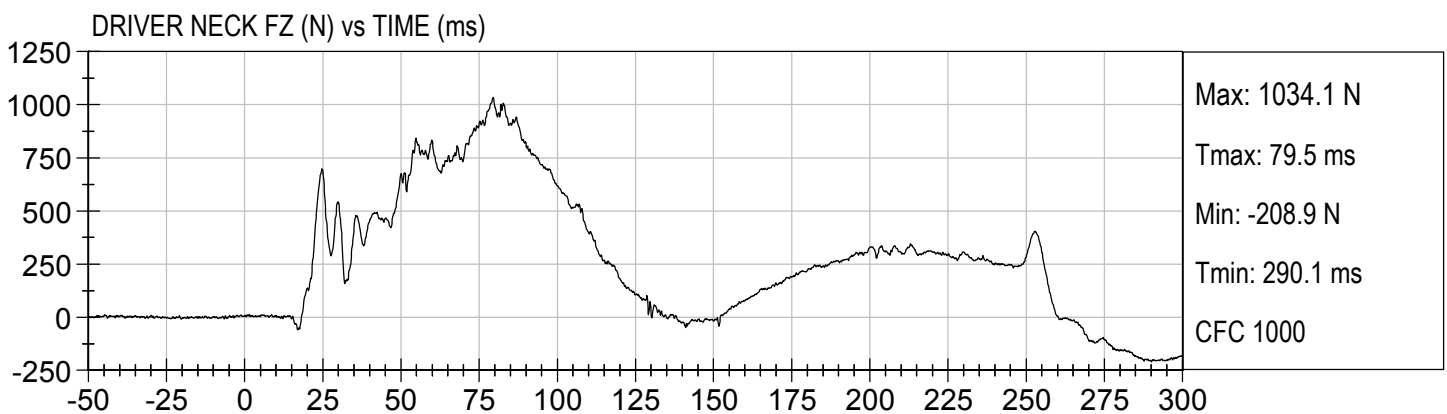
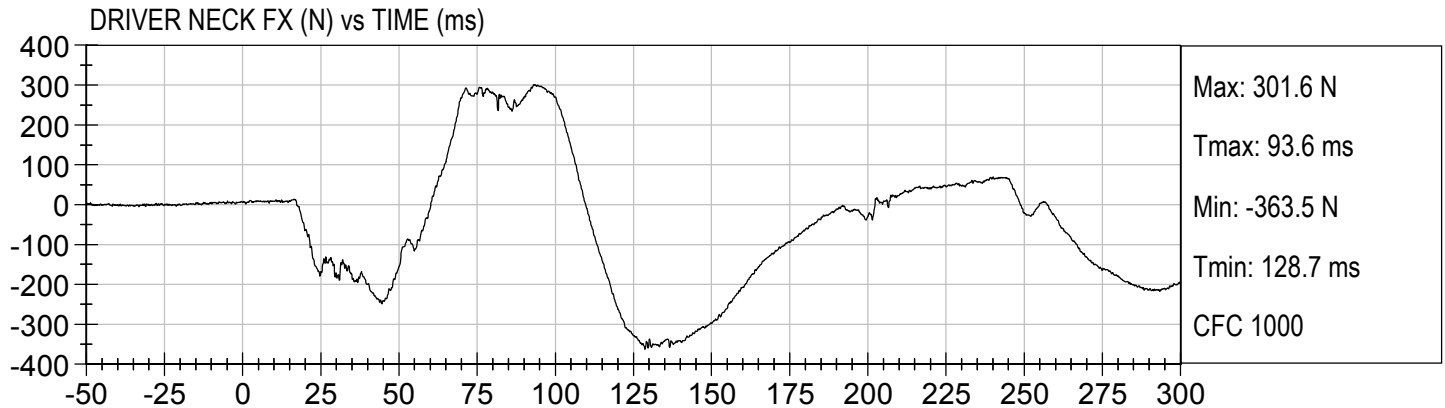
Driver Left Lower Tibia Moment X
Driver Left Lower Tibia Moment Y
Driver Left Lower Tibia Force Z
Driver Right Upper Tibia Moment X
Driver Right Upper Tibia Moment Y
Driver Right Upper Tibia Force Z
Driver Right Lower Tibia Moment X
Driver Right Lower Tibia Moment Y
Driver Right Lower Tibia Force Z
Driver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

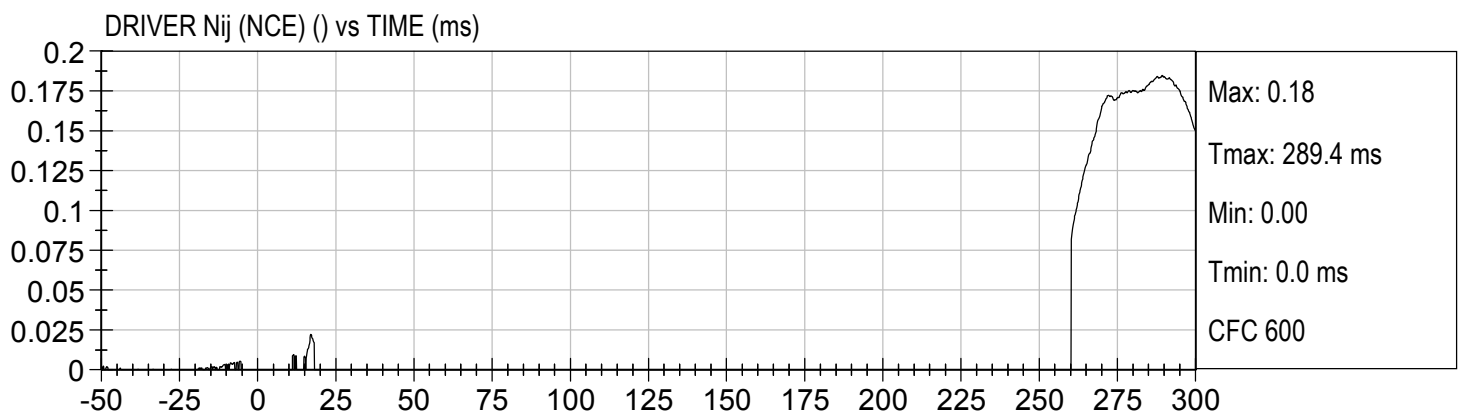
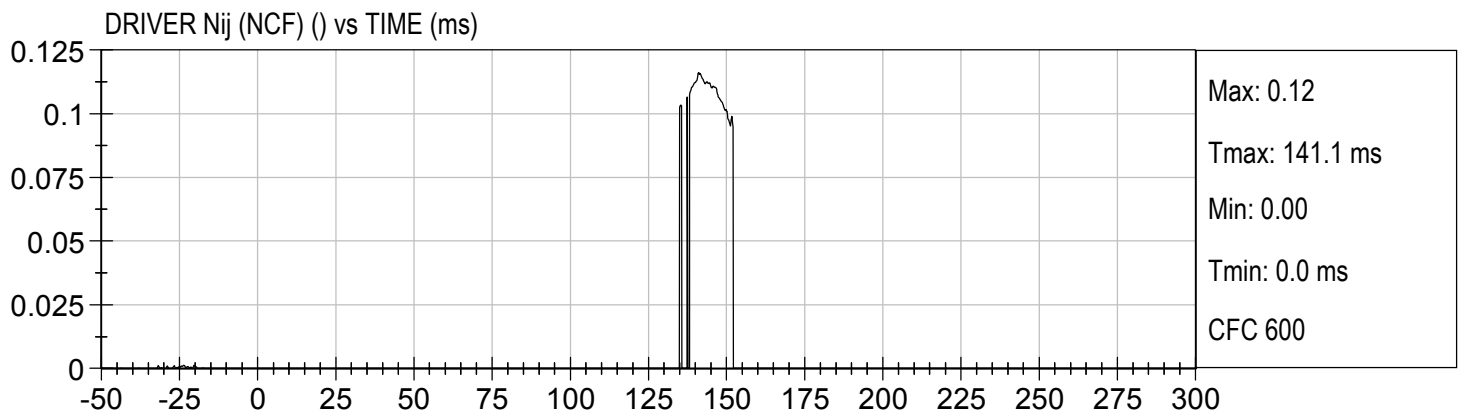
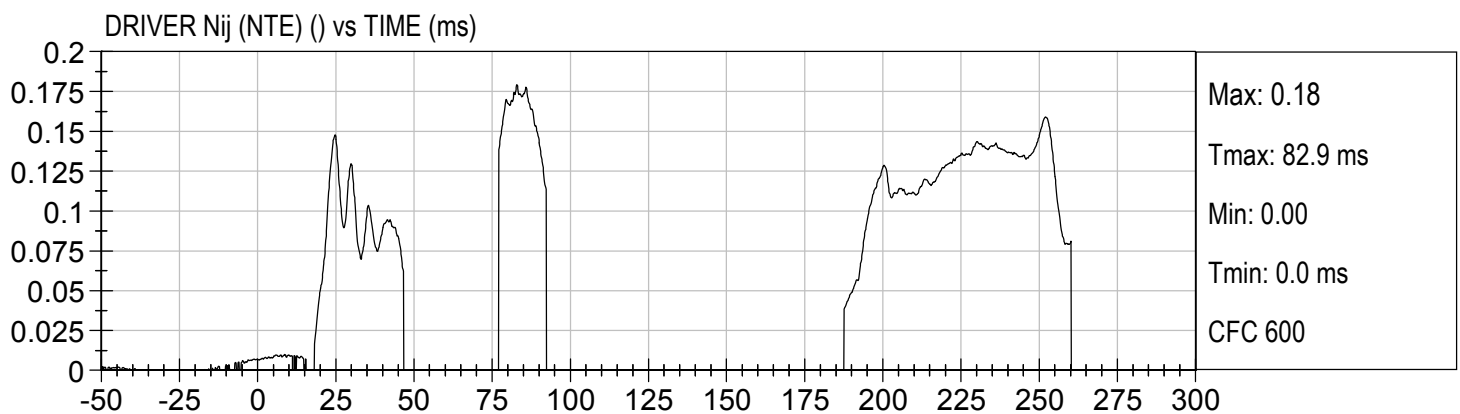
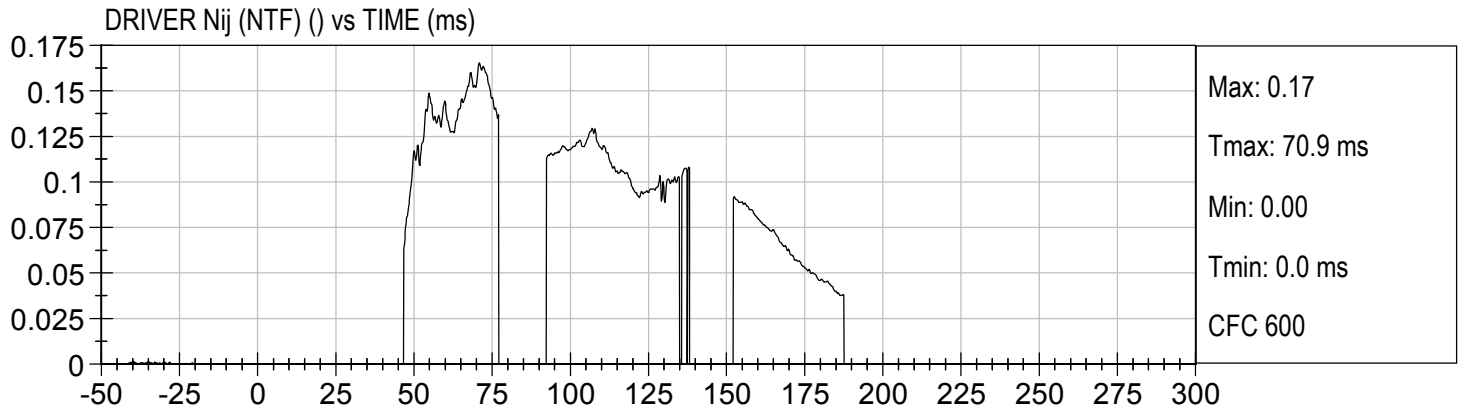
Passenger Left Femur Redundant
Passenger Right Femur Redundant
Passenger Left Upper Tibia Moment X
Passenger Left Upper Tibia Moment Y
Passenger Left Upper Tibia Force Z
Passenger Left Lower Tibia Moment X
Passenger Left Lower Tibia Moment Y
Passenger Left Lower Tibia Force Z
Passenger Right Upper Tibia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

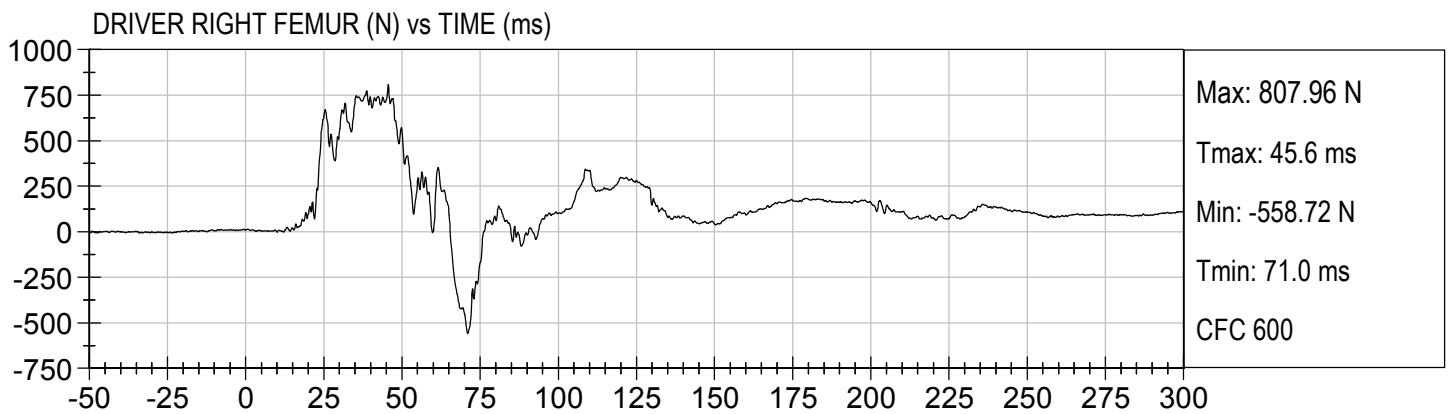
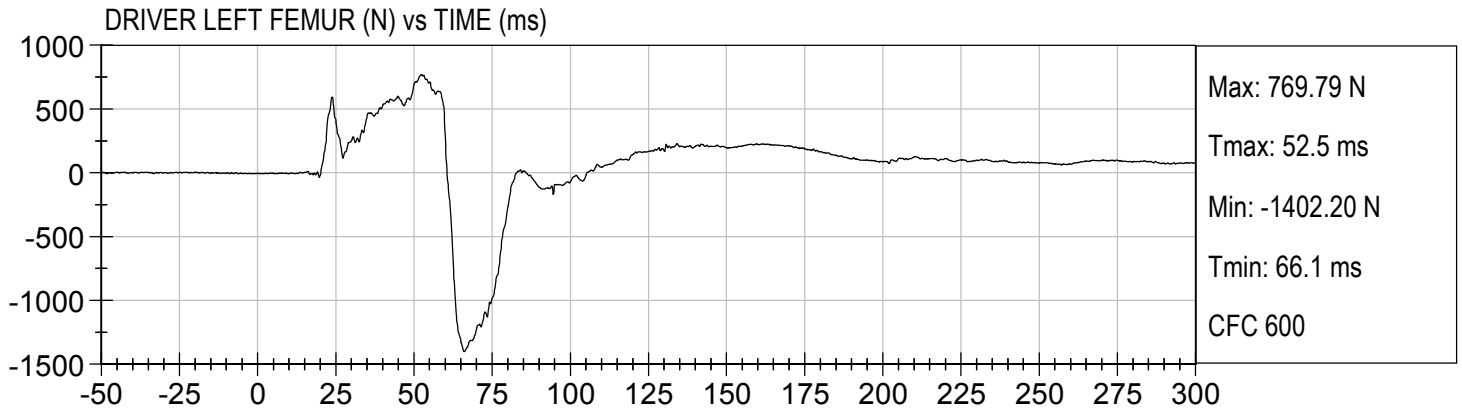


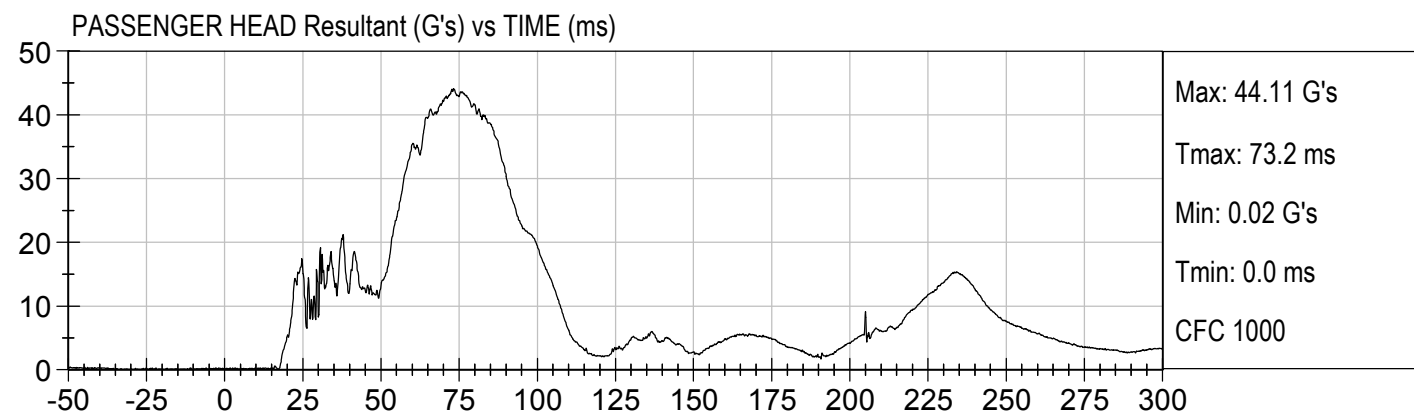
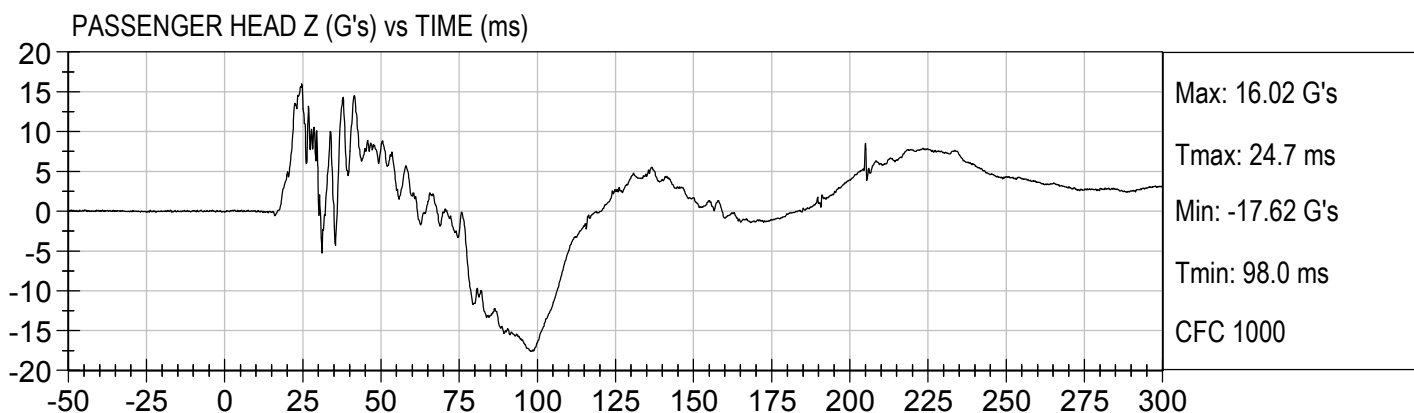
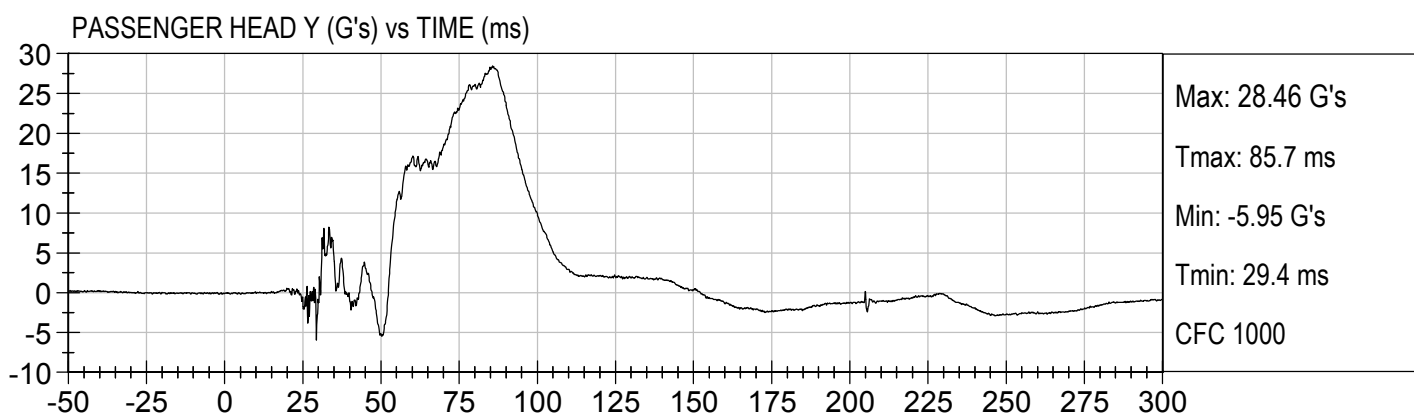
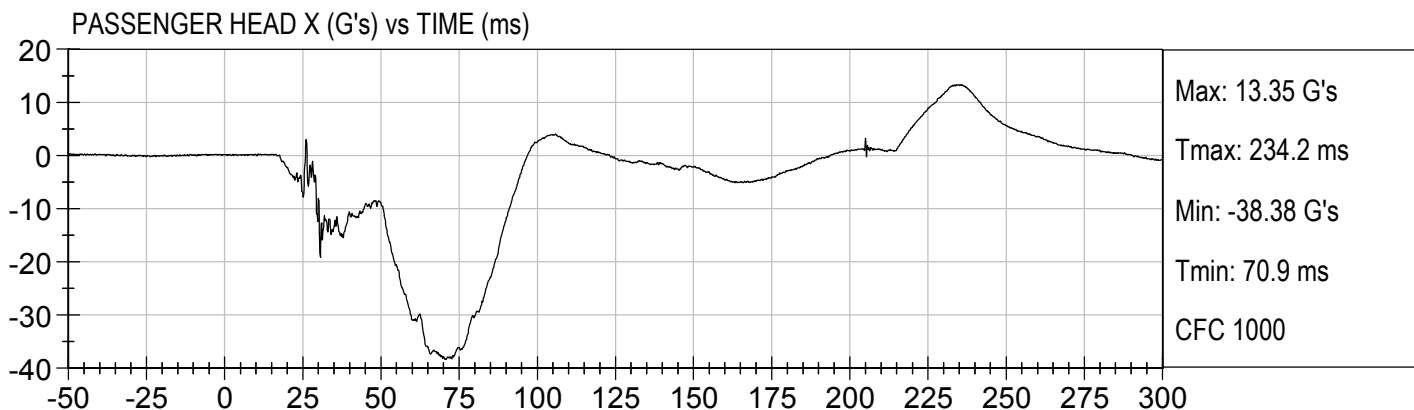


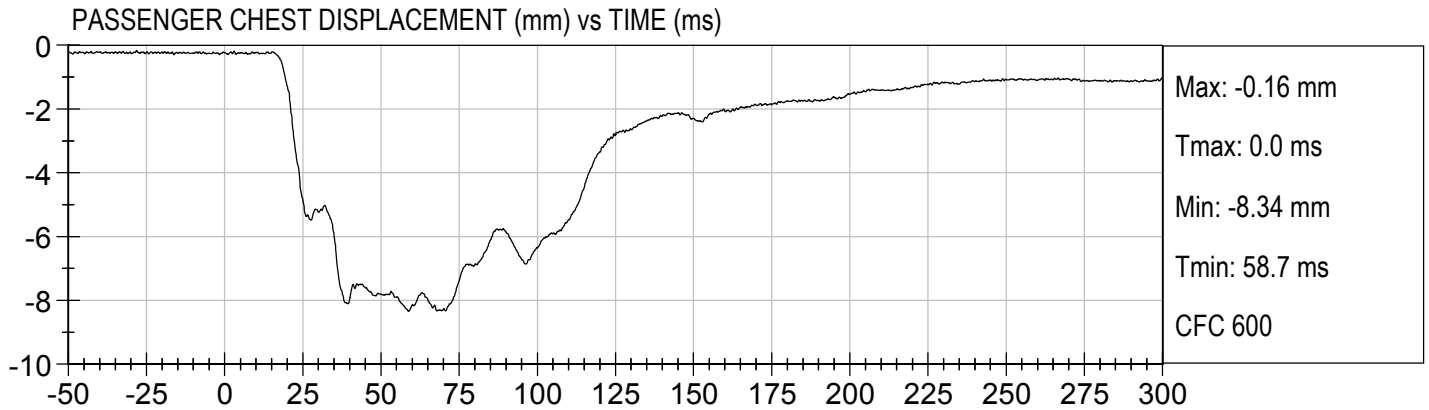


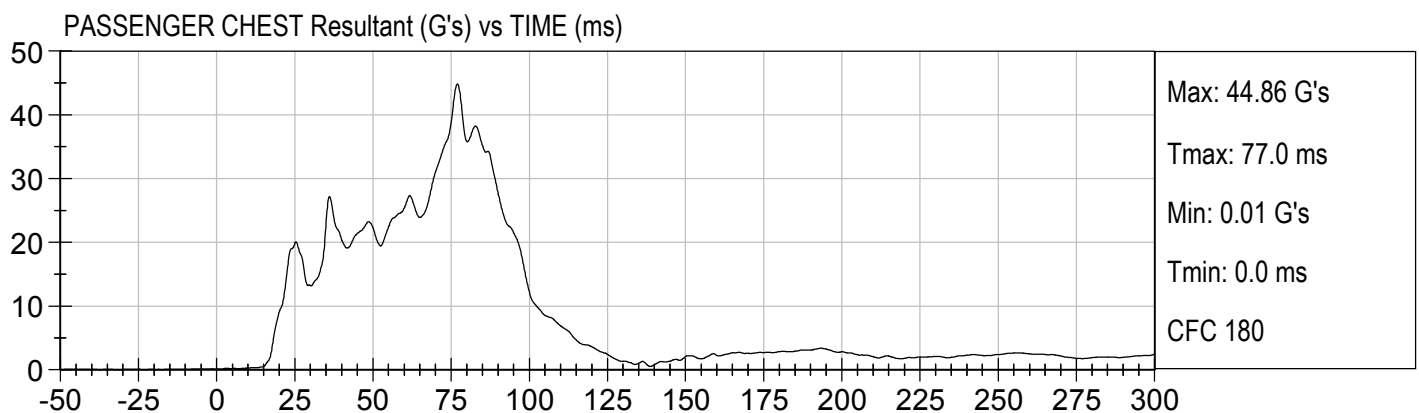
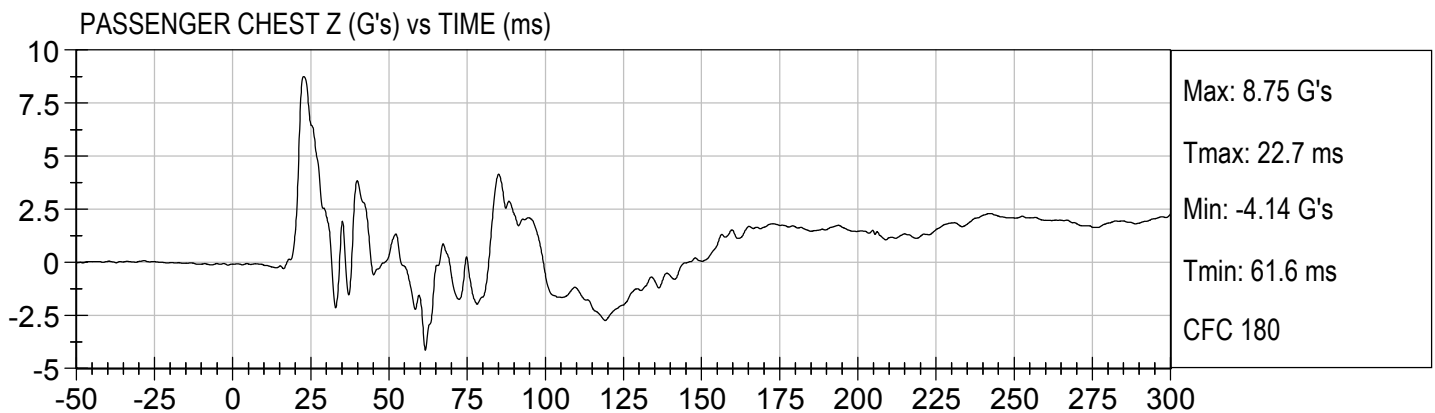
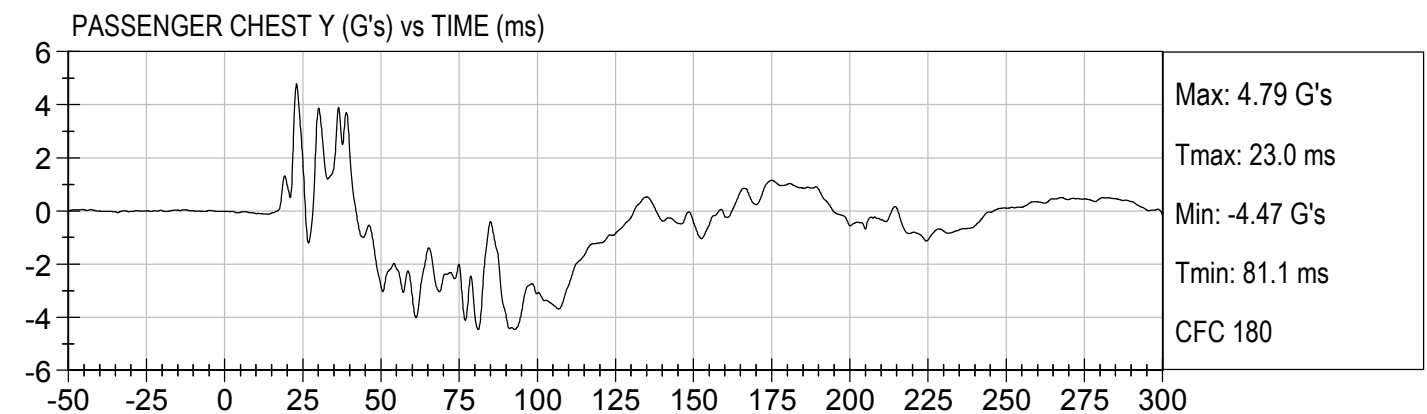
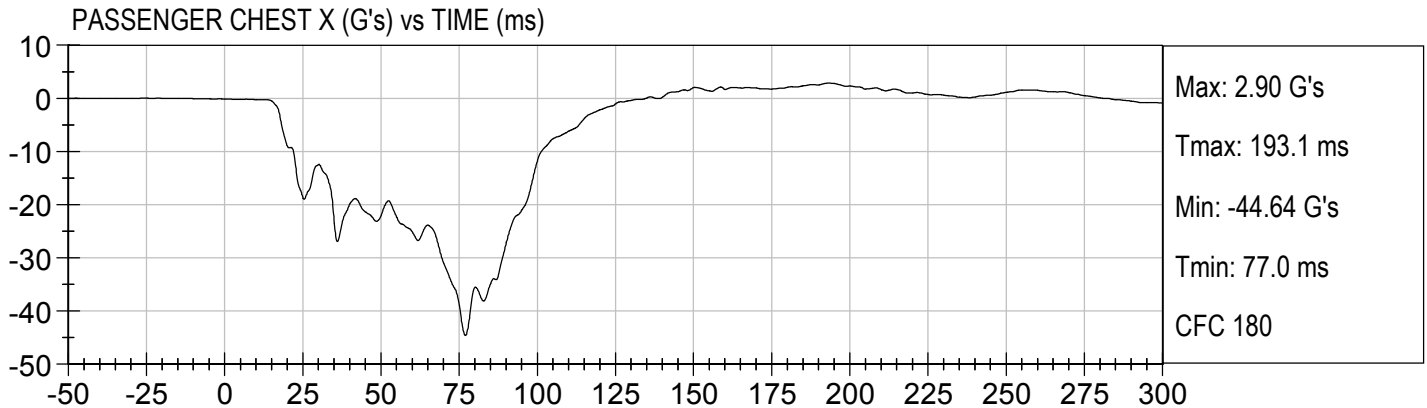


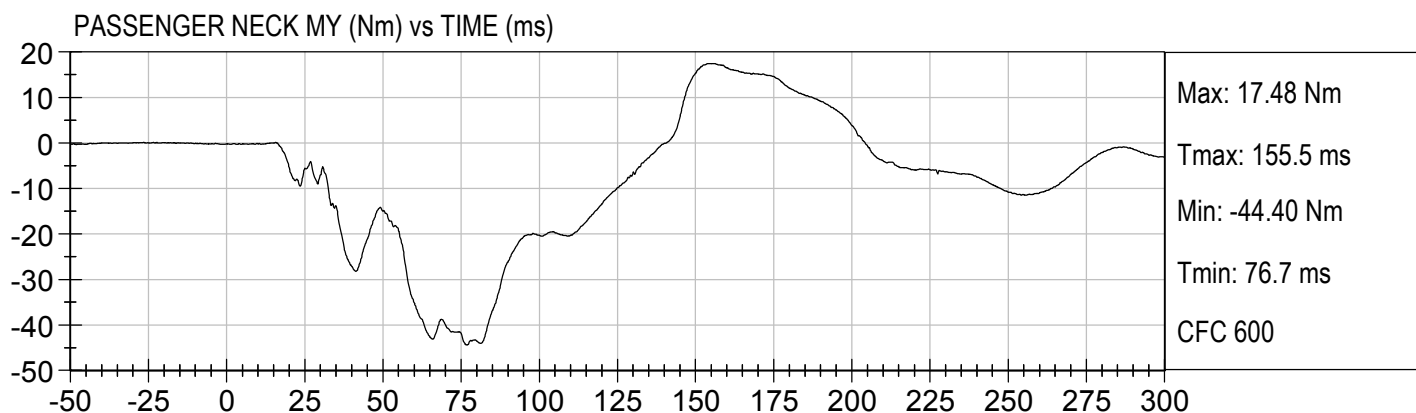
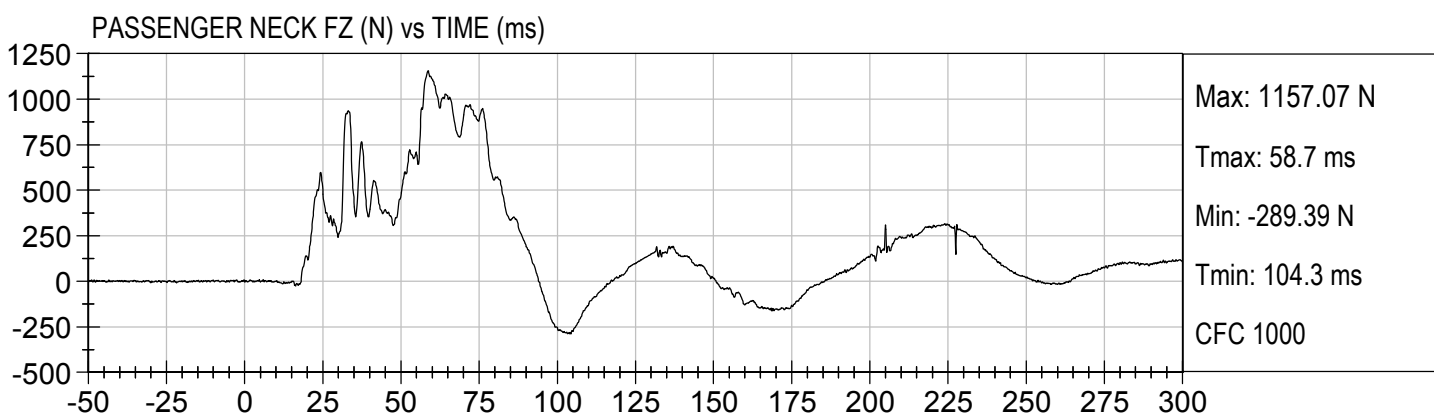
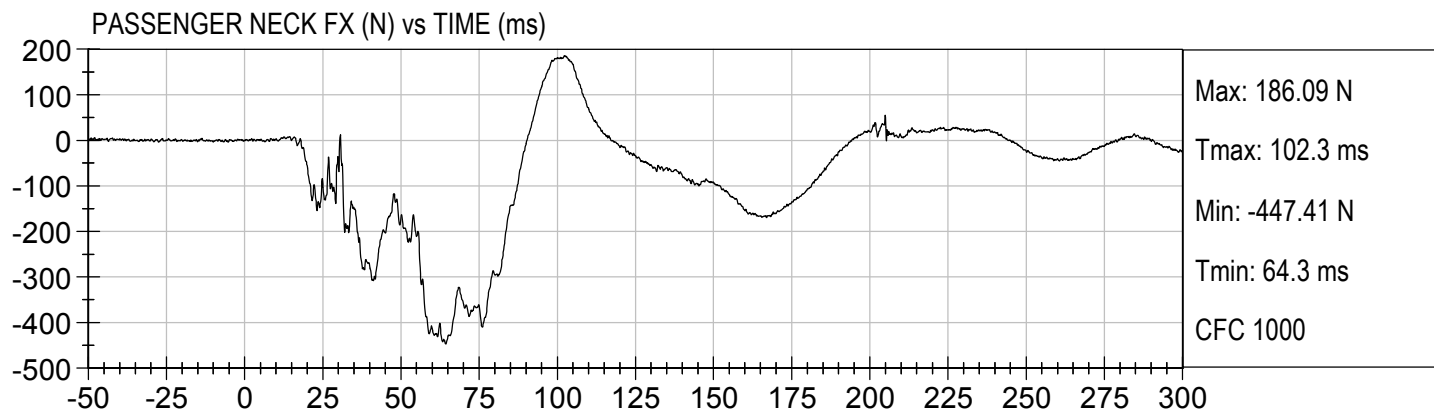


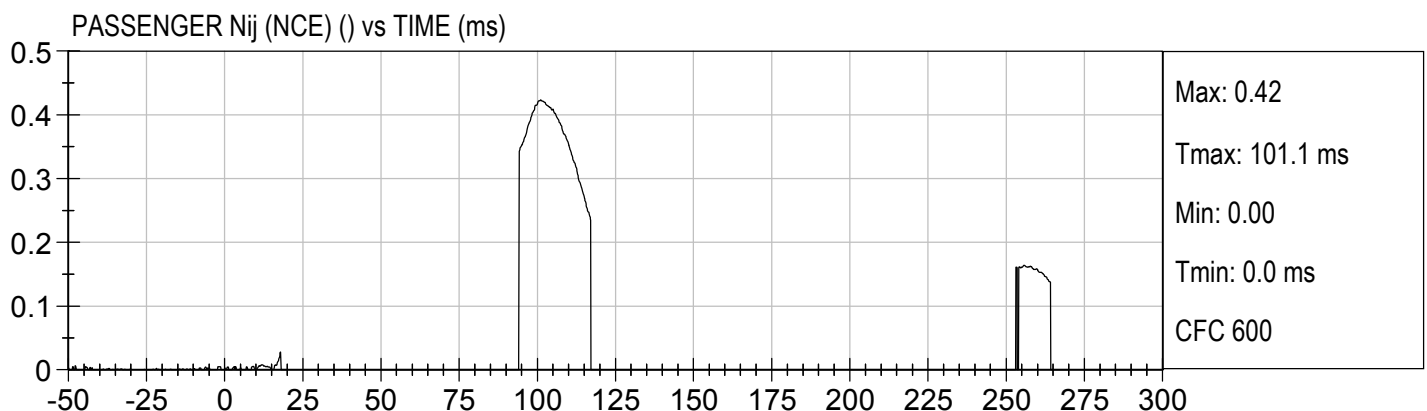
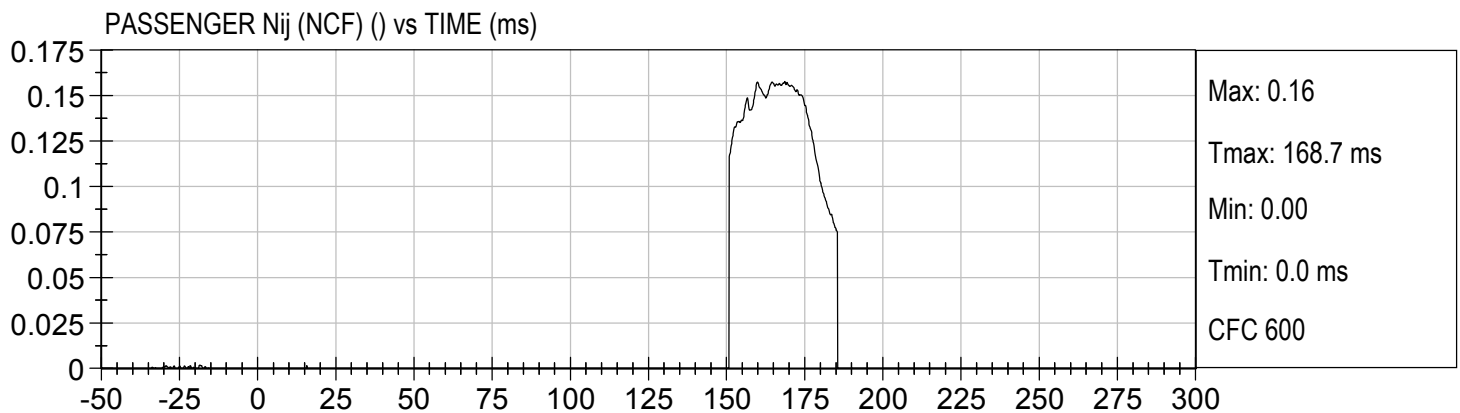
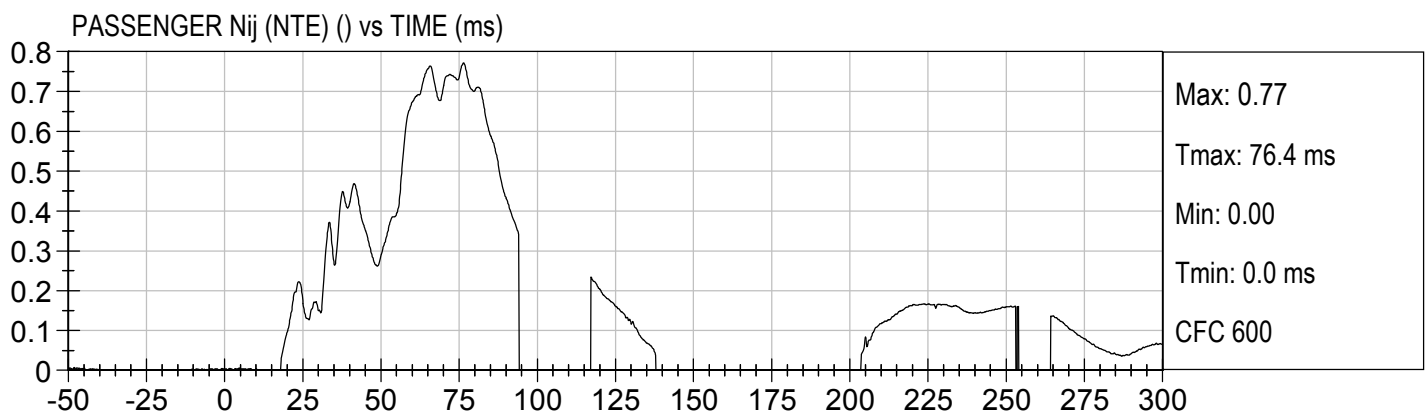
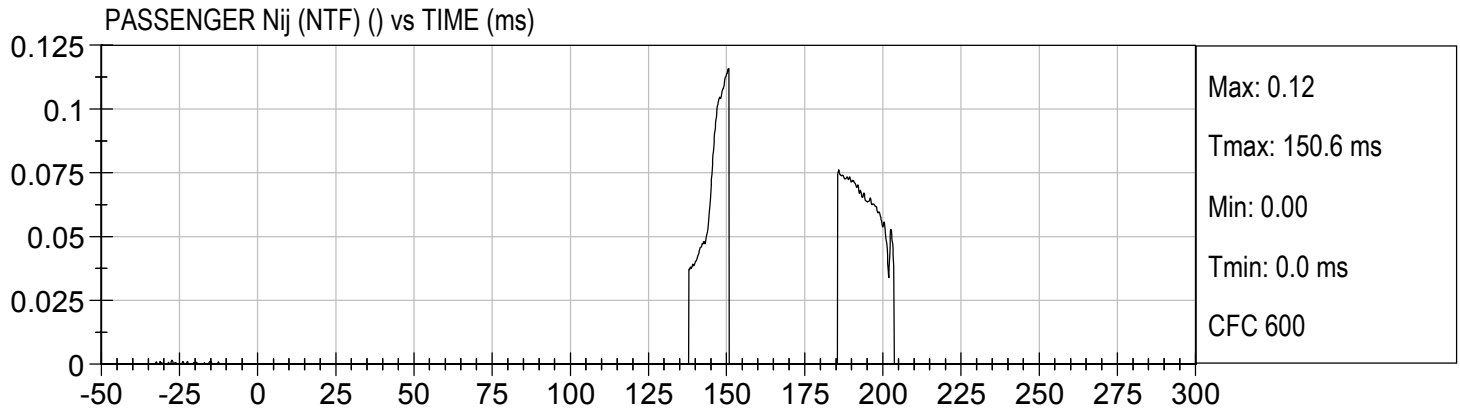


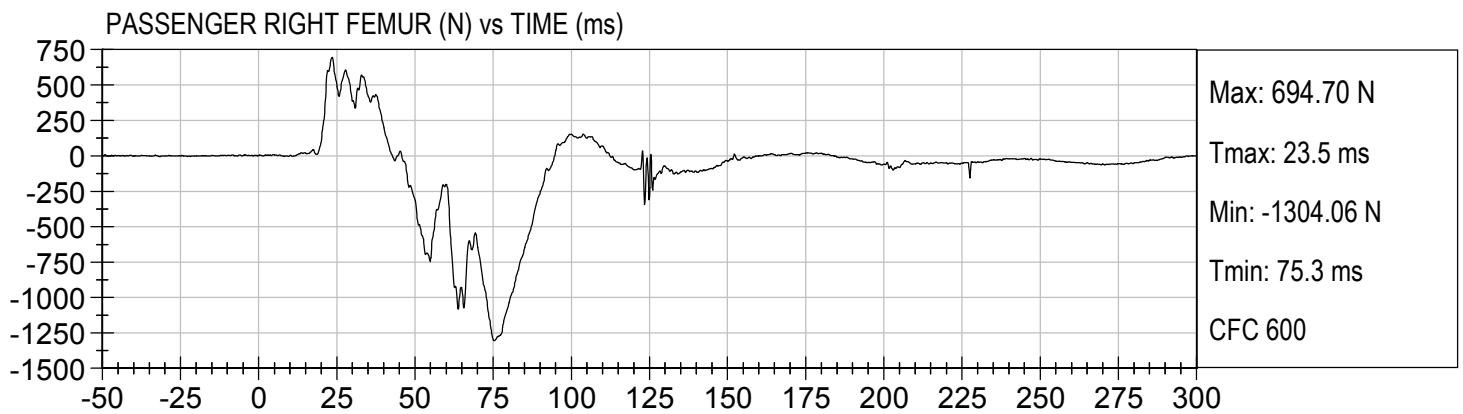
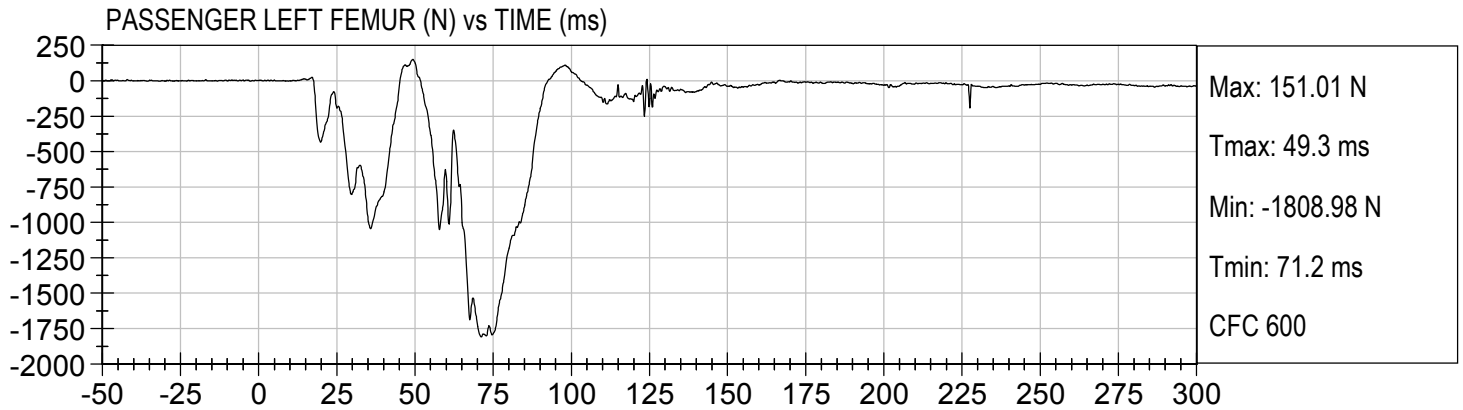












APPENDIX C
DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA

Hybrid III, 50th External Measurements
SN: 351

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

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

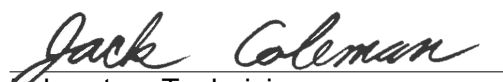
NOTE: THE H-POINT IS LOCATED 1.83 INCHES FORWARD AND 2.57 INCHES DOWN FROM THE CENTER OF THE PELVIS ANGLE REFERENCE HOLE.

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

ATD Serial No: 351

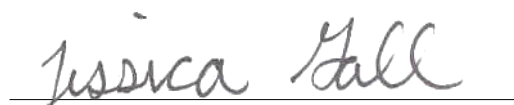
Test ID: D15591

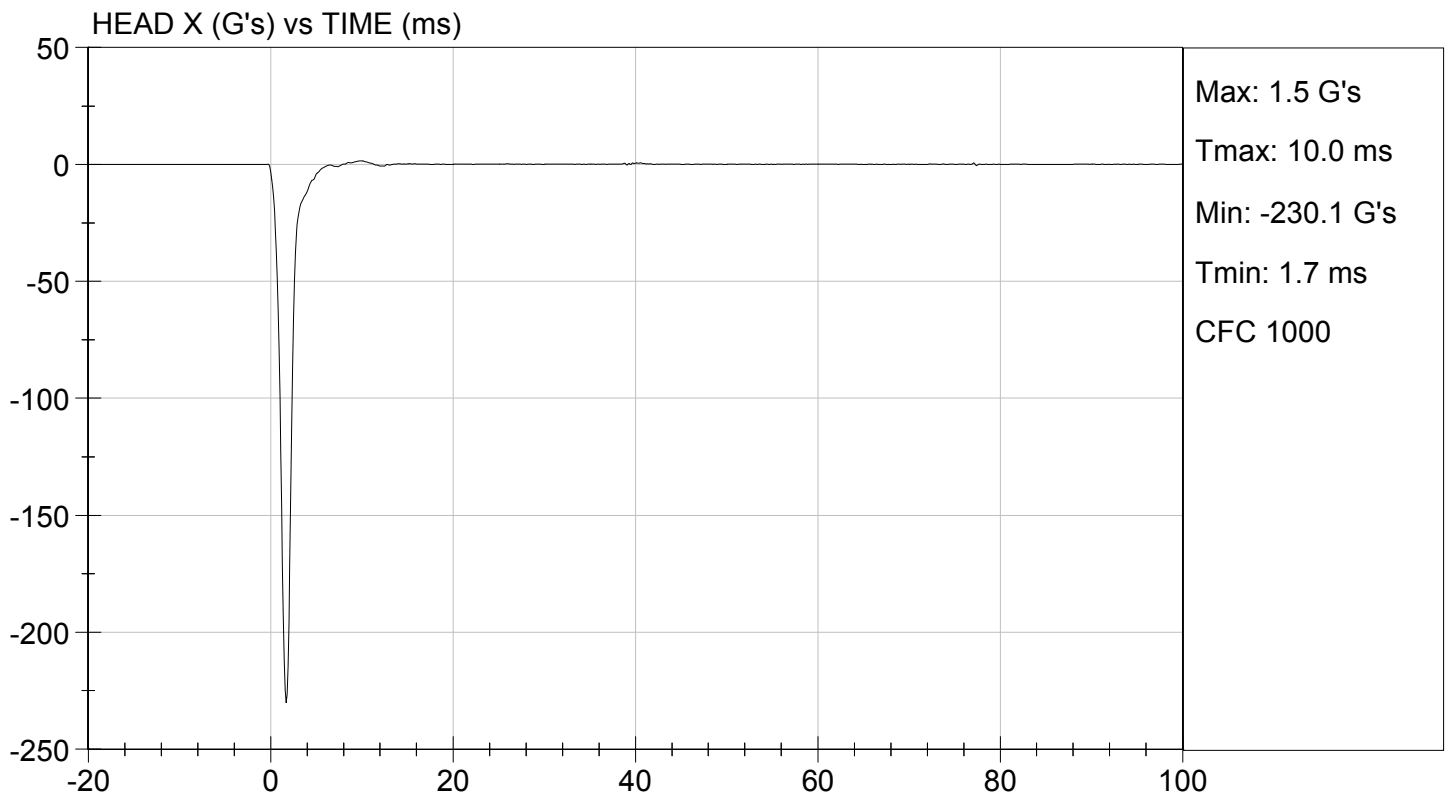
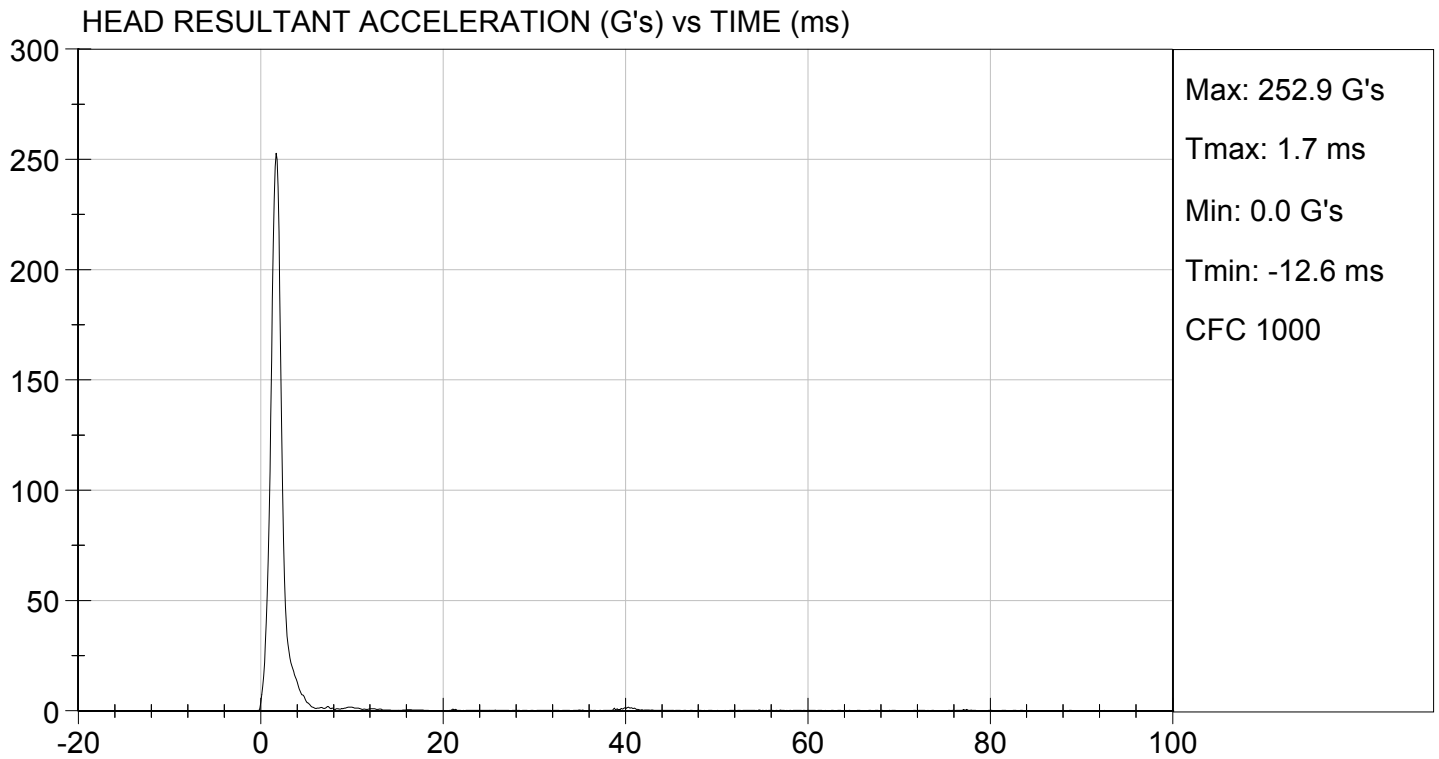
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Peak Resultant Acceleration	G's	225 to 275	253	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	12.7	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
Overall Test Results				Pass

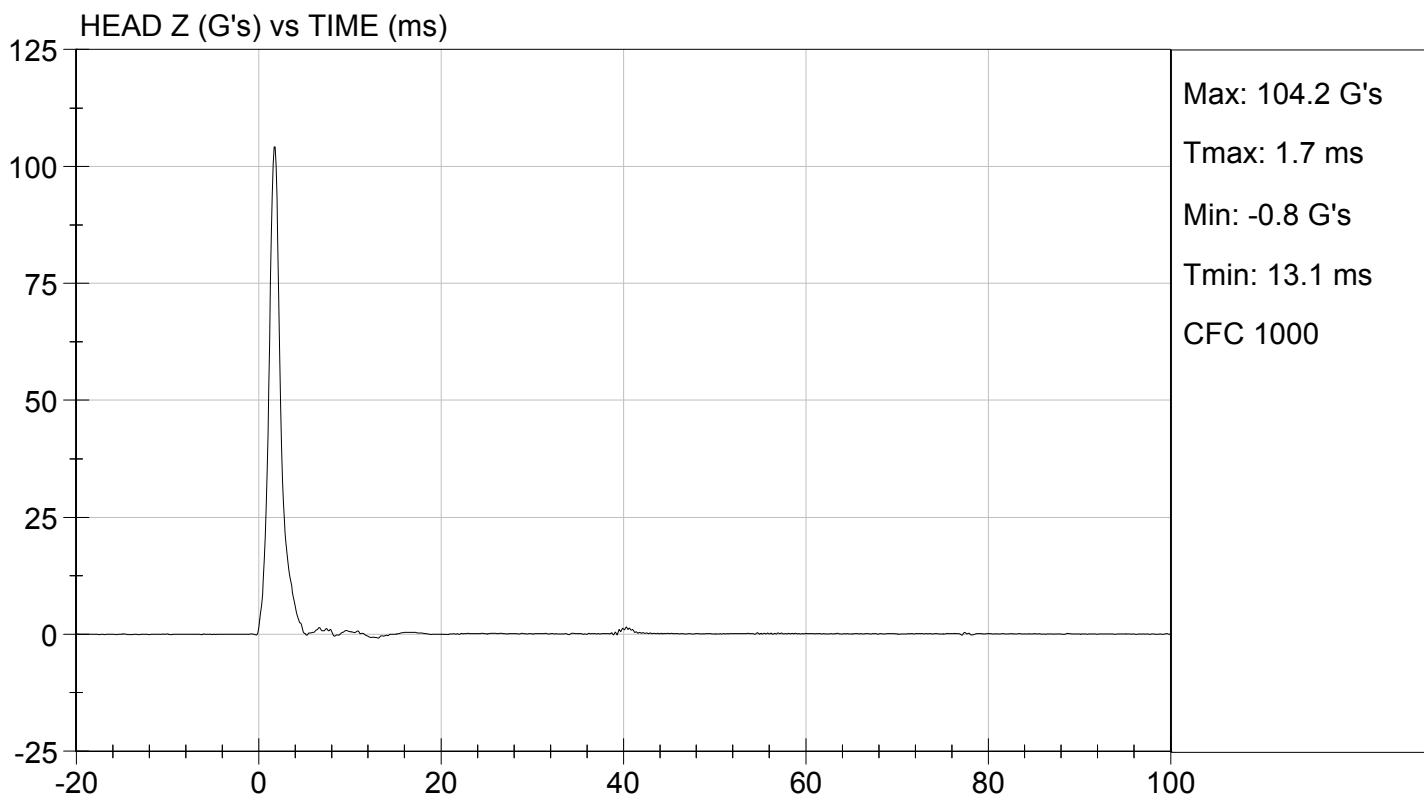
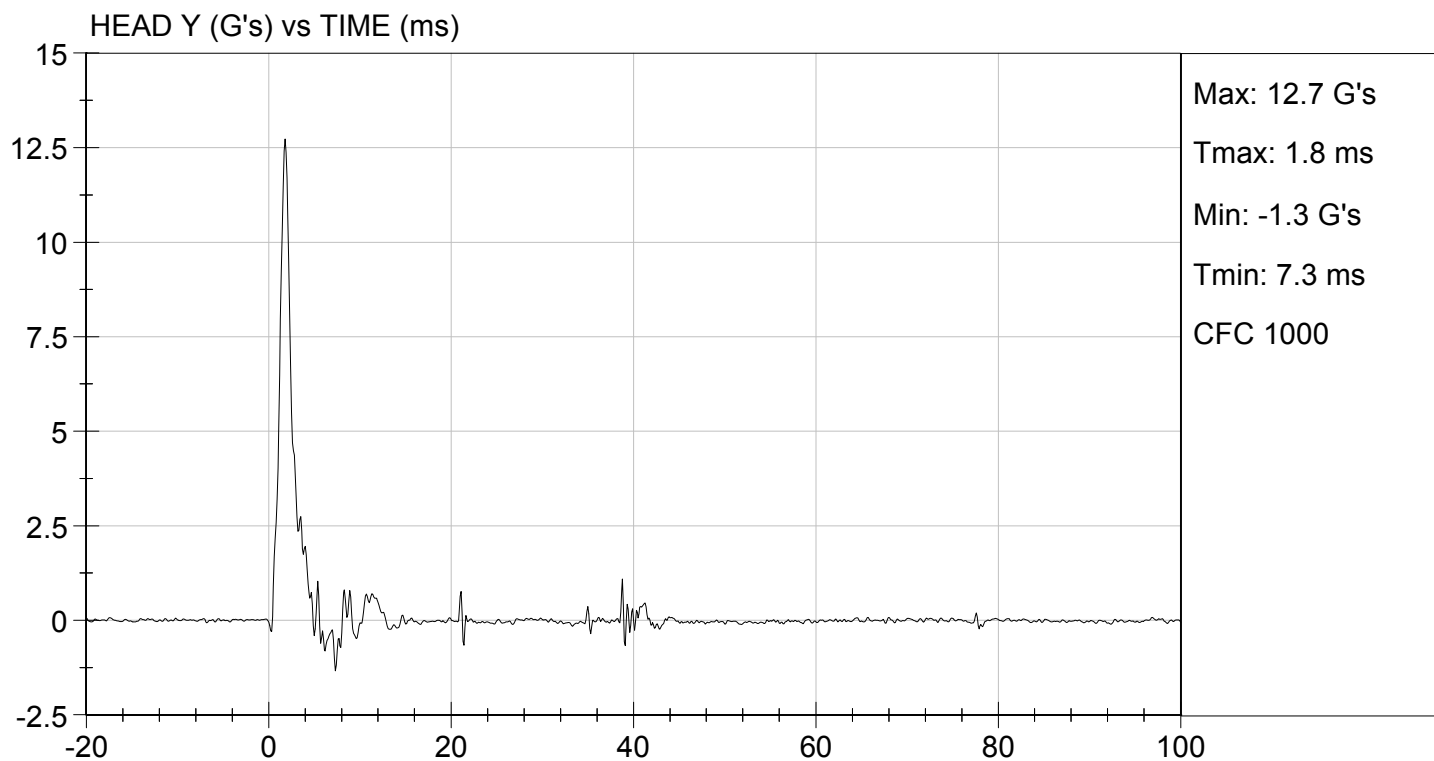

Laboratory Technician

02/27/2015

Test Date


Approved By





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

ATD Serial No: 351

Test I.D: D15592

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity		%	10 to 70	21	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.06	Pass
Pendulum Deceleration	10 ms	G's	22.50 to 27.50	23.29	Pass
	20 ms	G's	17.60 to 22.60	19.07	Pass
	30 ms	G's	12.50 to 18.50	13.83	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 29.0	15.0	Pass
Deceleration Decay Time to Cross 5 G's		ms	34.0 to 42.0	38.3	Pass
Maximum "D" Plane Rotation	Maximum	Deg	64.0 to 78.0	71.0	Pass
	Time	ms	57.0 to 64.0	60.2	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	113.0 to 128.0	118.5	Pass
Moment About Occipital Condyle	Maximum	Nm	88.1 to 108.5	89.1	Pass
	Time	ms	47.0 to 58.0	51.4	Pass
Positive Moment Decay Time To Zero Crossing		ms	97.0 to 107.0	102.9	Pass
Overall Test Results					Pass

David Schoedel
 Laboratory Technician

02/27/2015

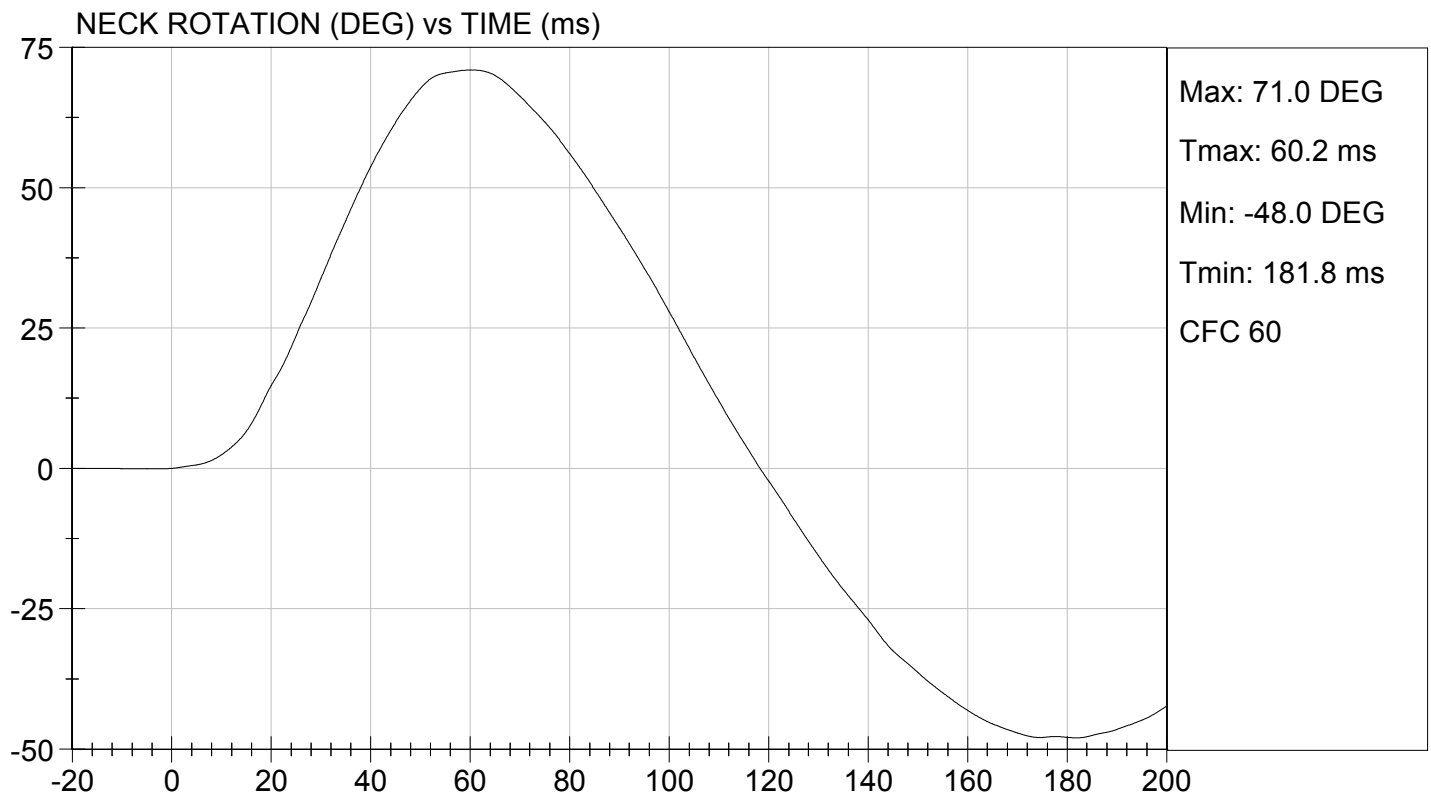
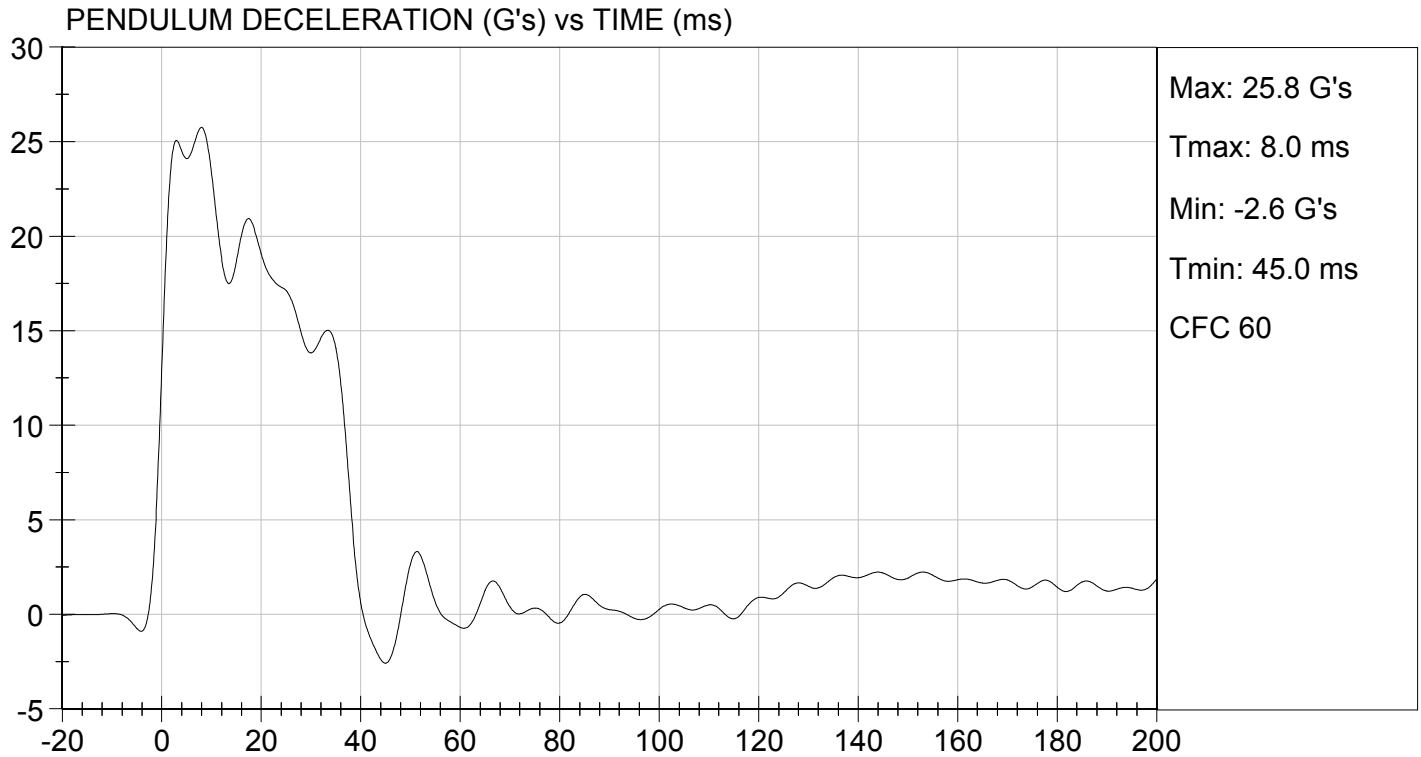
Test Date

Jessica Hall
 Approved By



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

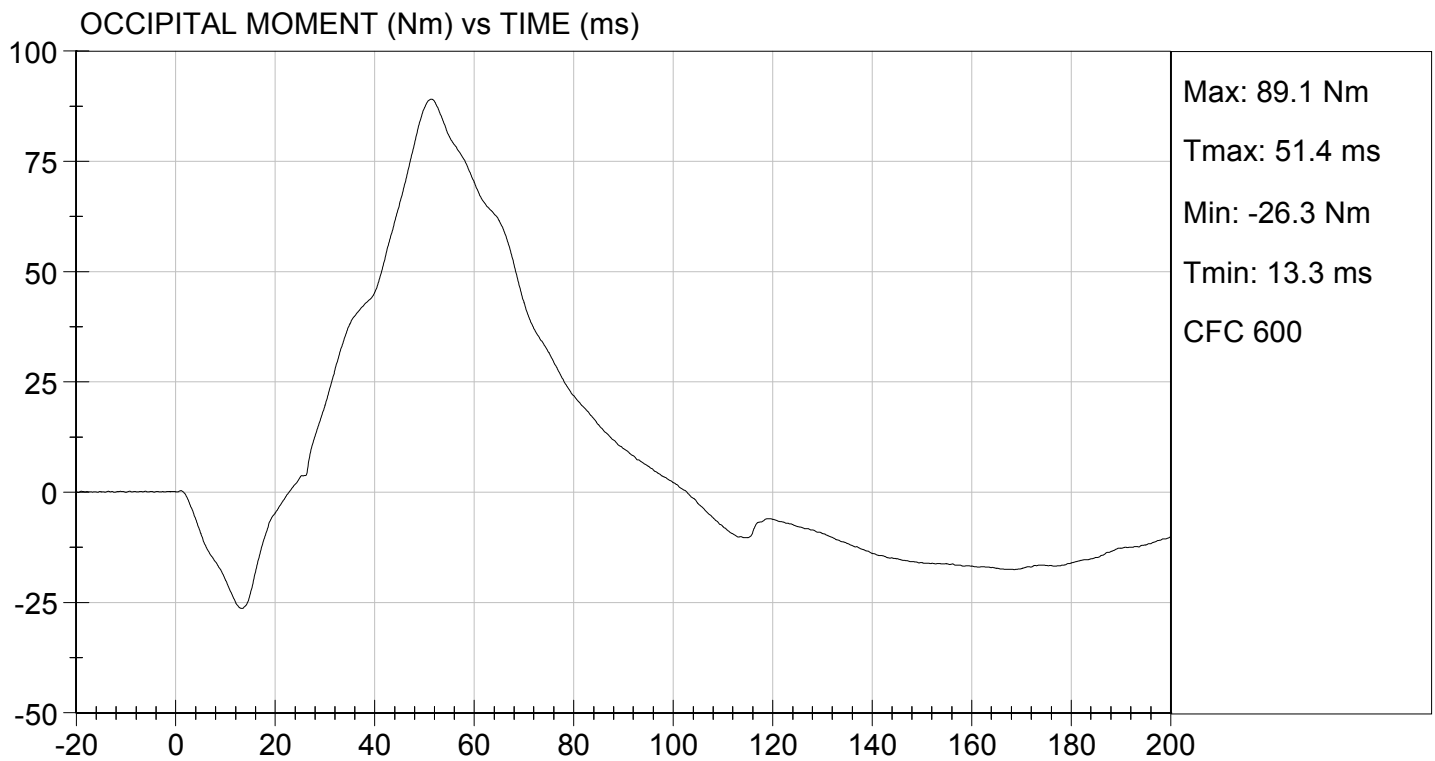
TEST DATE: 02/27/2015
TEST #: D15592





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

TEST DATE: 02/27/2015
TEST #: D15592



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

ATD Serial No: 351

Test I.D: D15593

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity		%	10 to 70	21	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.19	Pass
Pendulum Deceleration	10 ms	G's	17.20 to 21.20	18.63	Pass
	20 ms	G's	14.00 to 19.00	16.91	Pass
	30 ms	G's	11.00 to 16.00	12.25	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 22.0	14.2	Pass
Deceleration Decay Time to Cross 5 G's		ms	38.0 to 46.0	40.4	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	98.3	Pass
	Time	ms	72.0 to 82.0	78.9	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	147.0 to 174.0	162.7	Pass
Moment About Occipital Condyle	Maximum	Nm	-52.9 to -79.9	-61.6	Pass
	Time	ms	65.0 to 79.0	72.5	Pass
Negative Moment Decay Time To Zero Crossing		ms	120.0 to 148.0	146.8	Pass
Overall Test Results					Pass

David Schoedel
Laboratory Technician

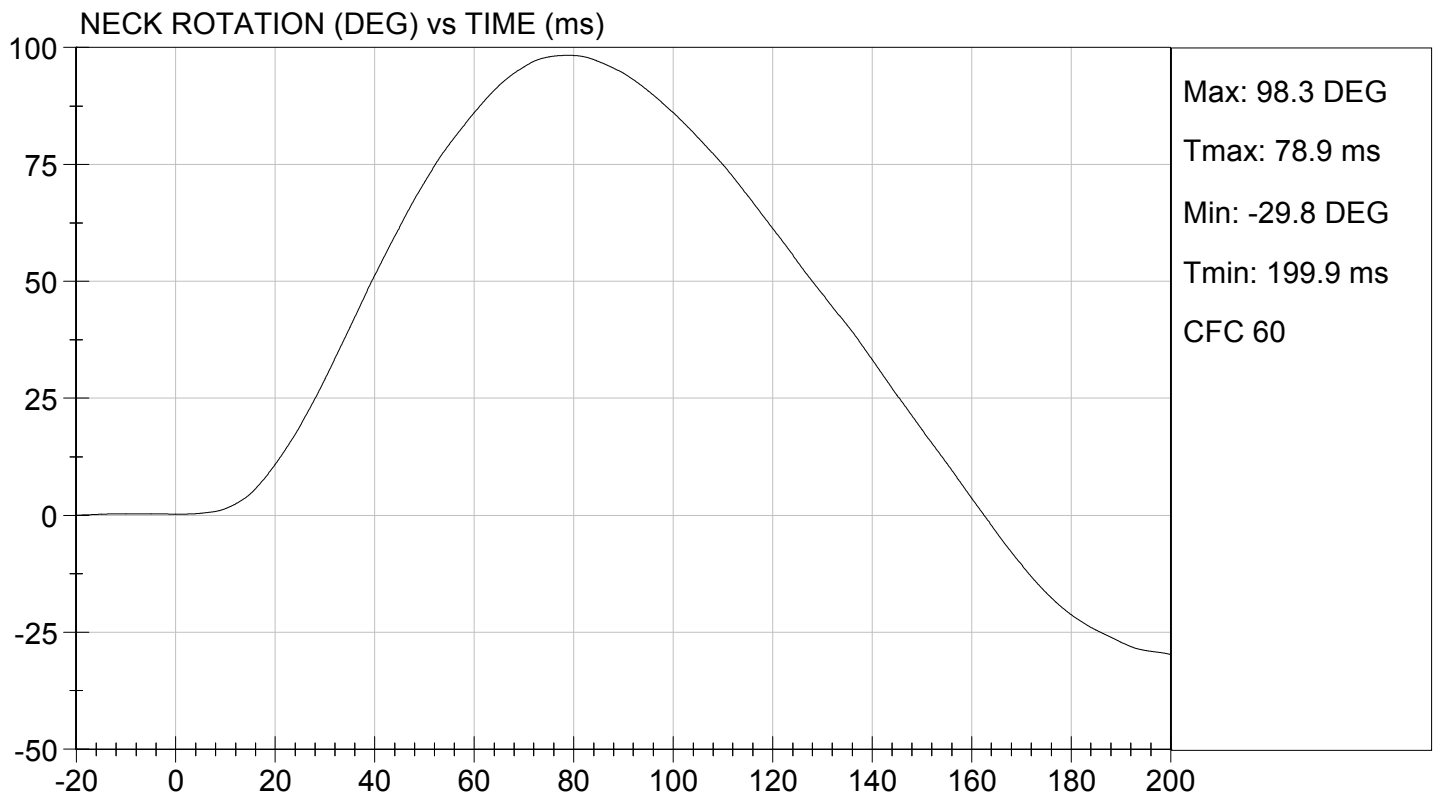
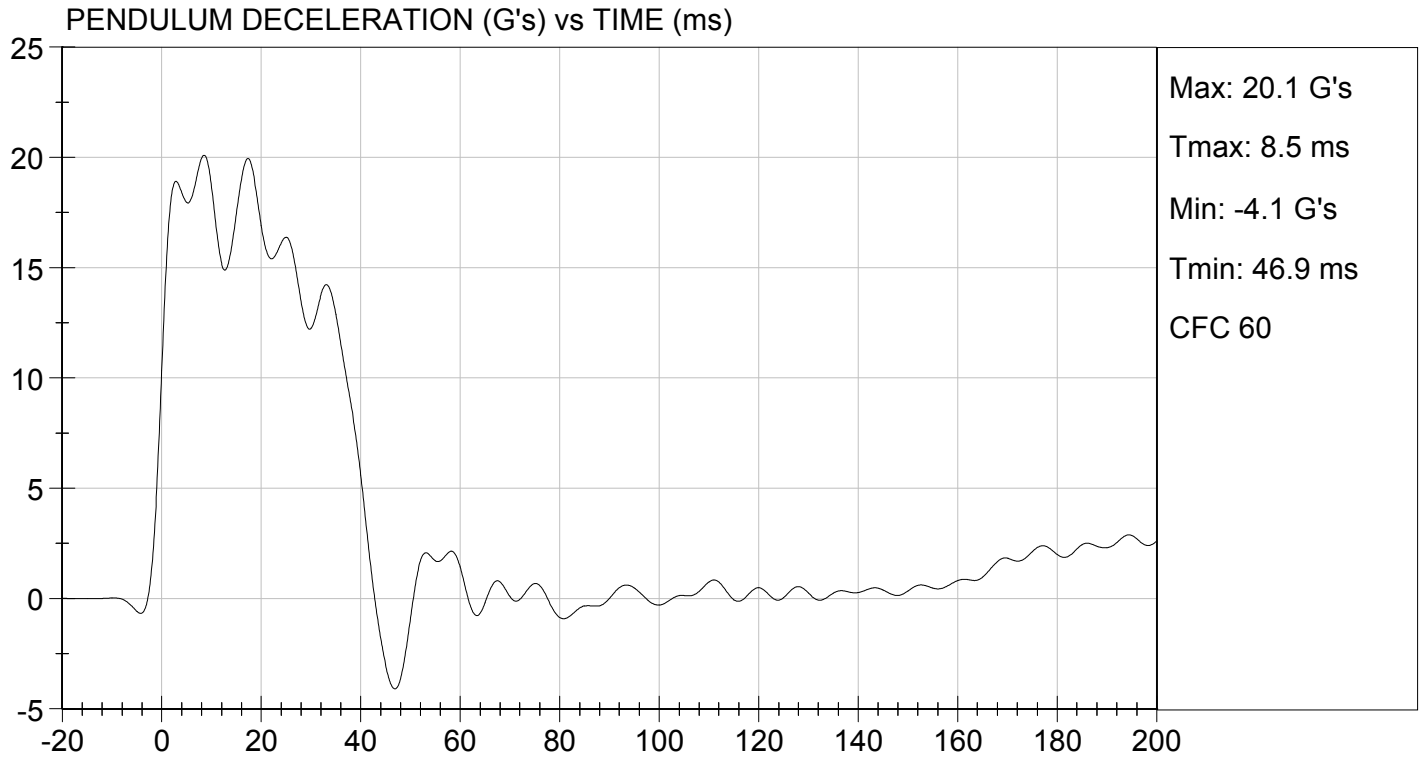
02/27/2015
Test Date

Jessica Hall
Approved By



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

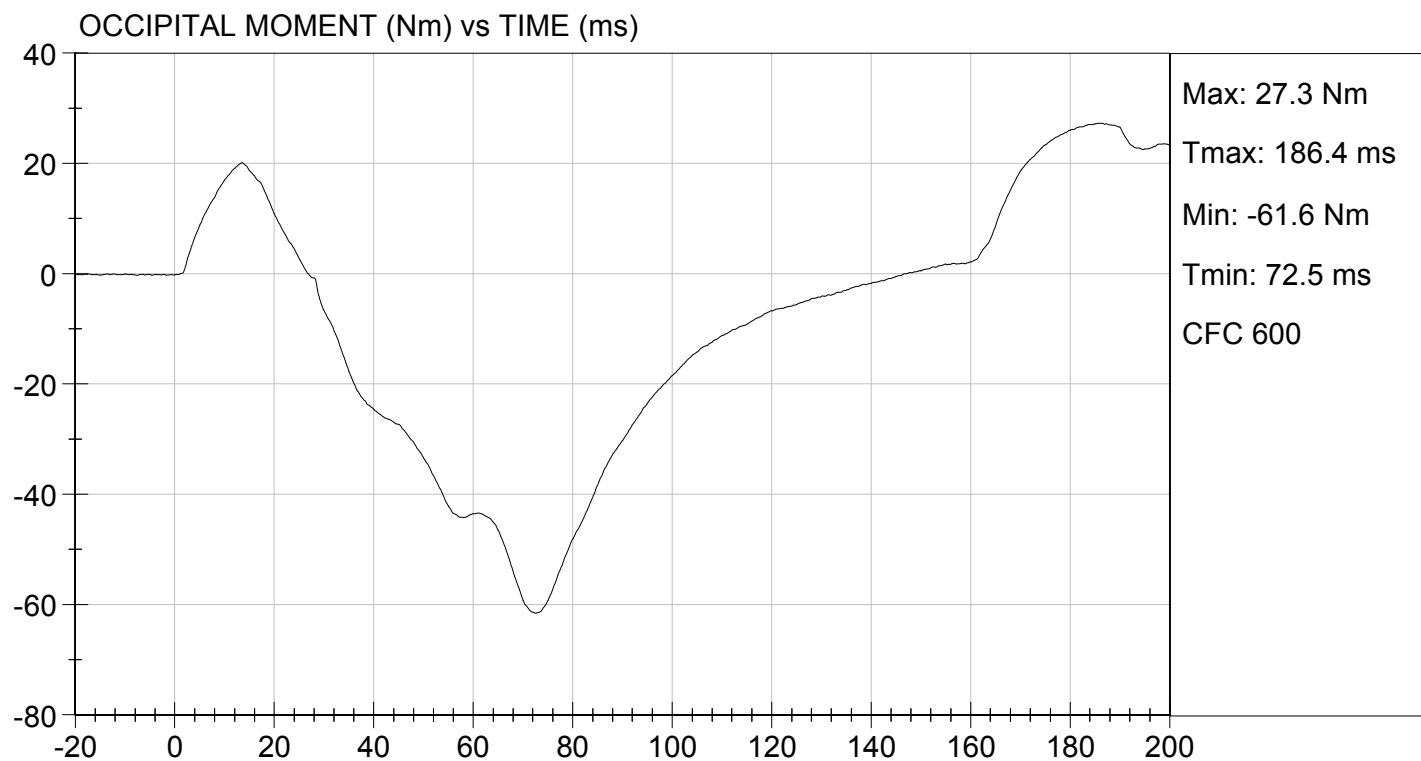
TEST DATE: 02/27/2015
TEST #: D15593





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

TEST DATE: 02/27/2015
TEST #: D15593



MGA RESEARCH CORPORATION
THORAX IMPACT
HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351

Test I.D: D15594

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	20.7	Pass
Laboratory Relative Humidity	%	10 to 70	18	Pass
Probe Velocity	m/s	6.58 to 6.82	6.60	Pass
Peak Probe Force	N	5159 to 5893	5,436	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.57	Pass
Internal Hysteresis	%	69 to 85	72	Pass
			Overall Test Results	Pass


Laboratory Technician

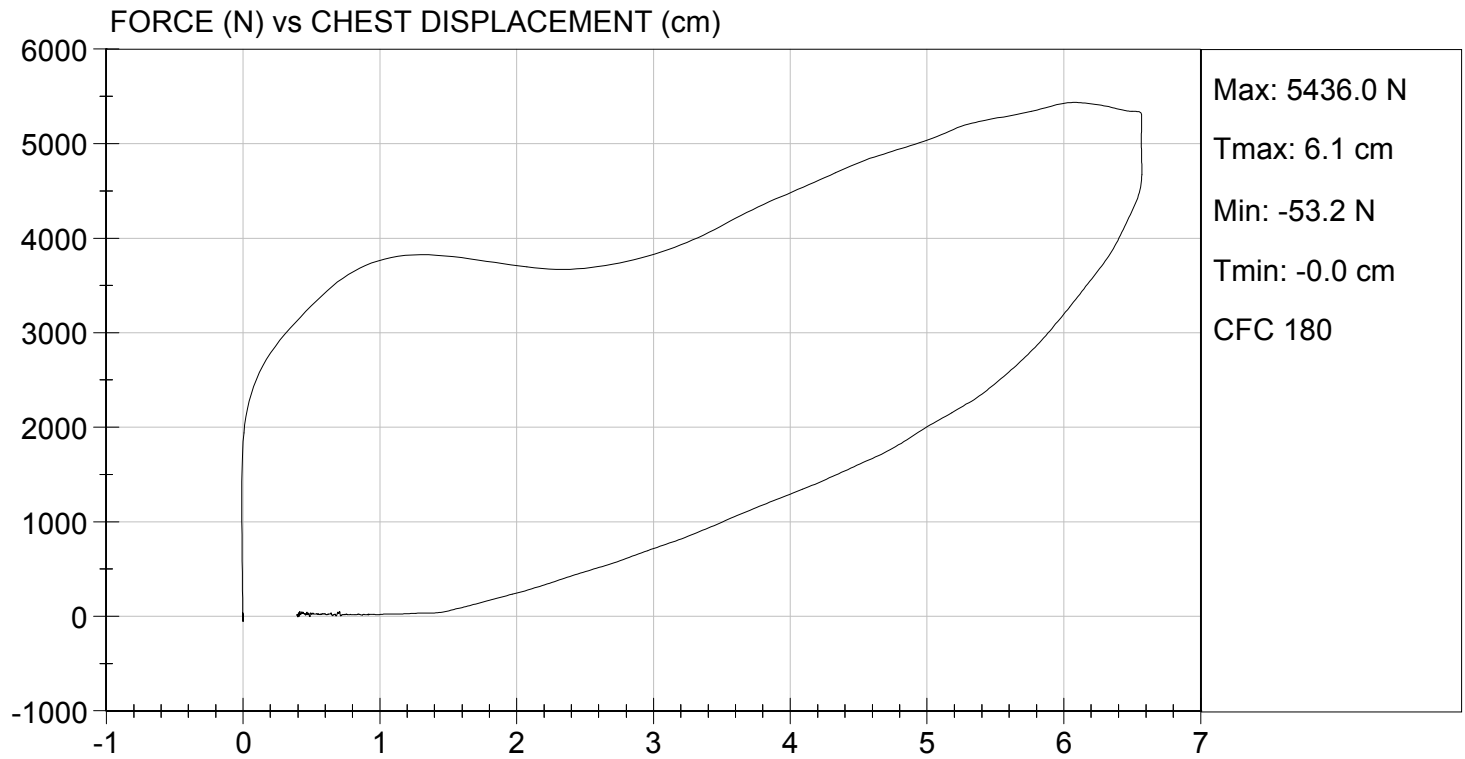
02/27/2015
Test Date


Approved By



TEST DESC: THORAX IMPACT
VELOCITY: 21.65 ft/s, 6.60 m/s

TEST DATE: 02/27/2015
TEST #: D15594



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

ATD Serial No: 351

Test I.D: D15595

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	21	Pass
Probe Velocity	m/s	2.07 to 2.13	2.12	Pass
Peak Probe Force	N	4715 to 5782	5,084	Pass
Overall Test Results				Pass


Laboratory Technician

02/27/2015

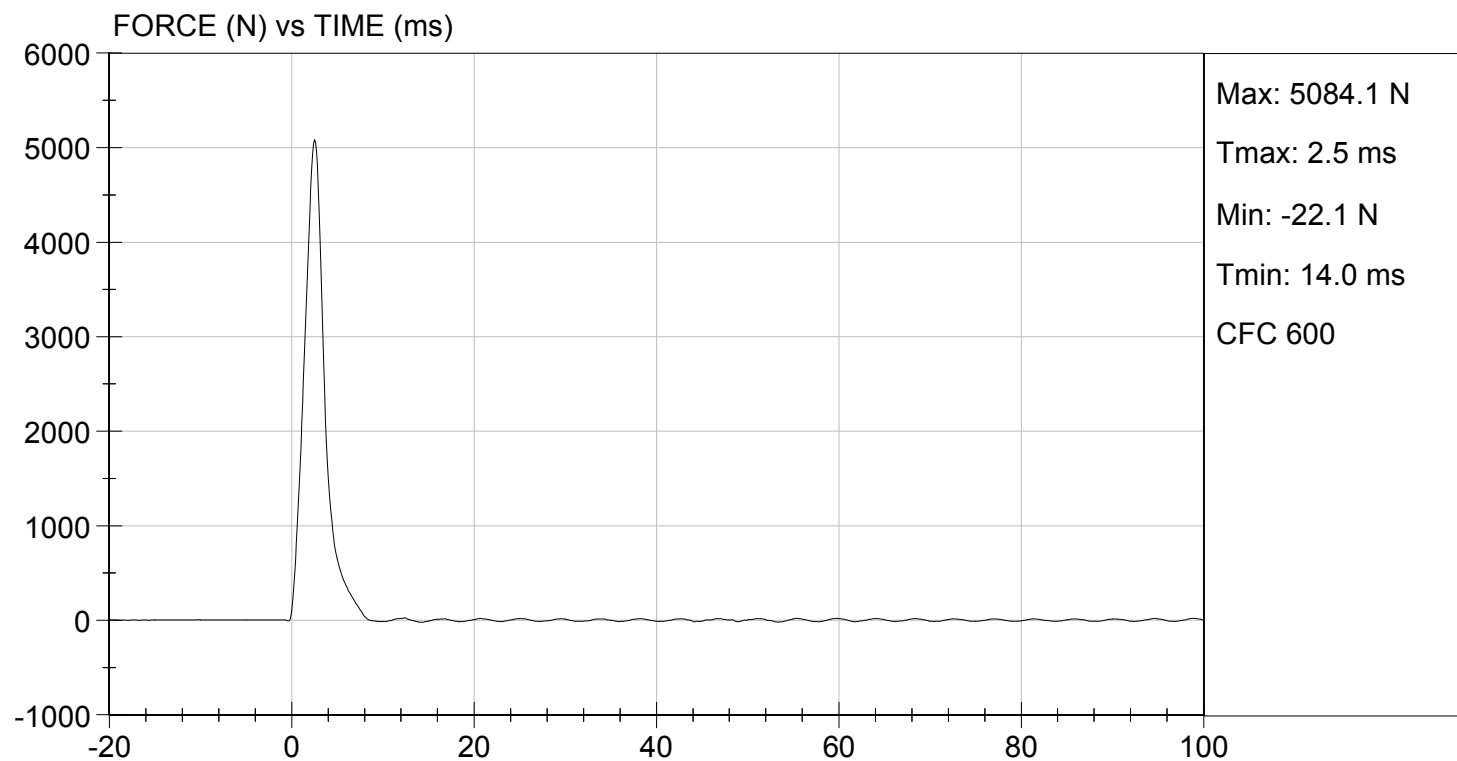
Test Date


Approved By



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

TEST DATE: 02/27/2015
TEST #: D15595



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

ATD Serial No: 351

Test I.D: D15596

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	21	Pass
Probe Velocity	m/s	2.07 to 2.13	2.12	Pass
Peak Probe Force	N	4715 to 5782	5,275	Pass
Overall Test Results				Pass


Laboratory Technician

02/27/2015

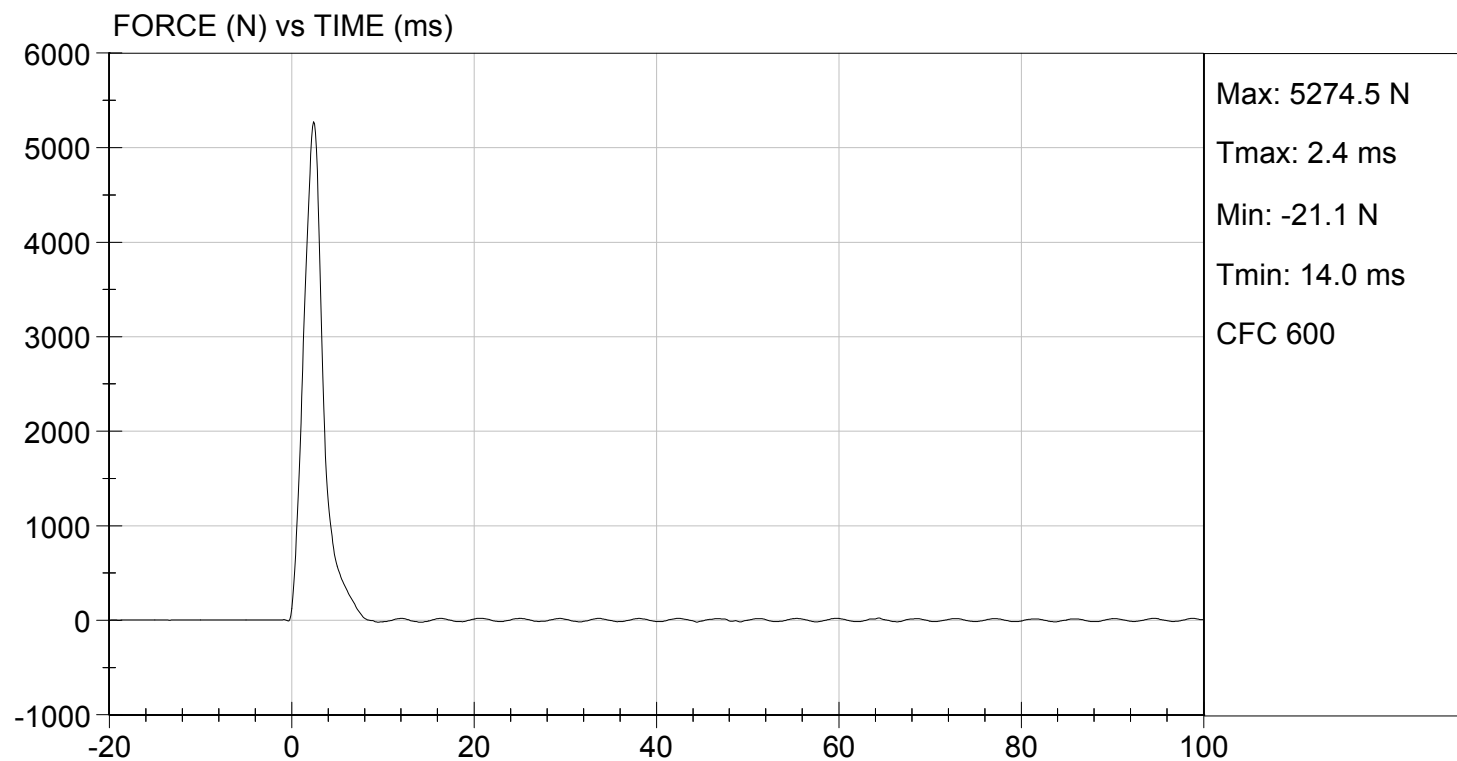
Test Date


Approved By



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

TEST DATE: 02/27/2015
TEST #: D15596



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

ATD Serial No: 351

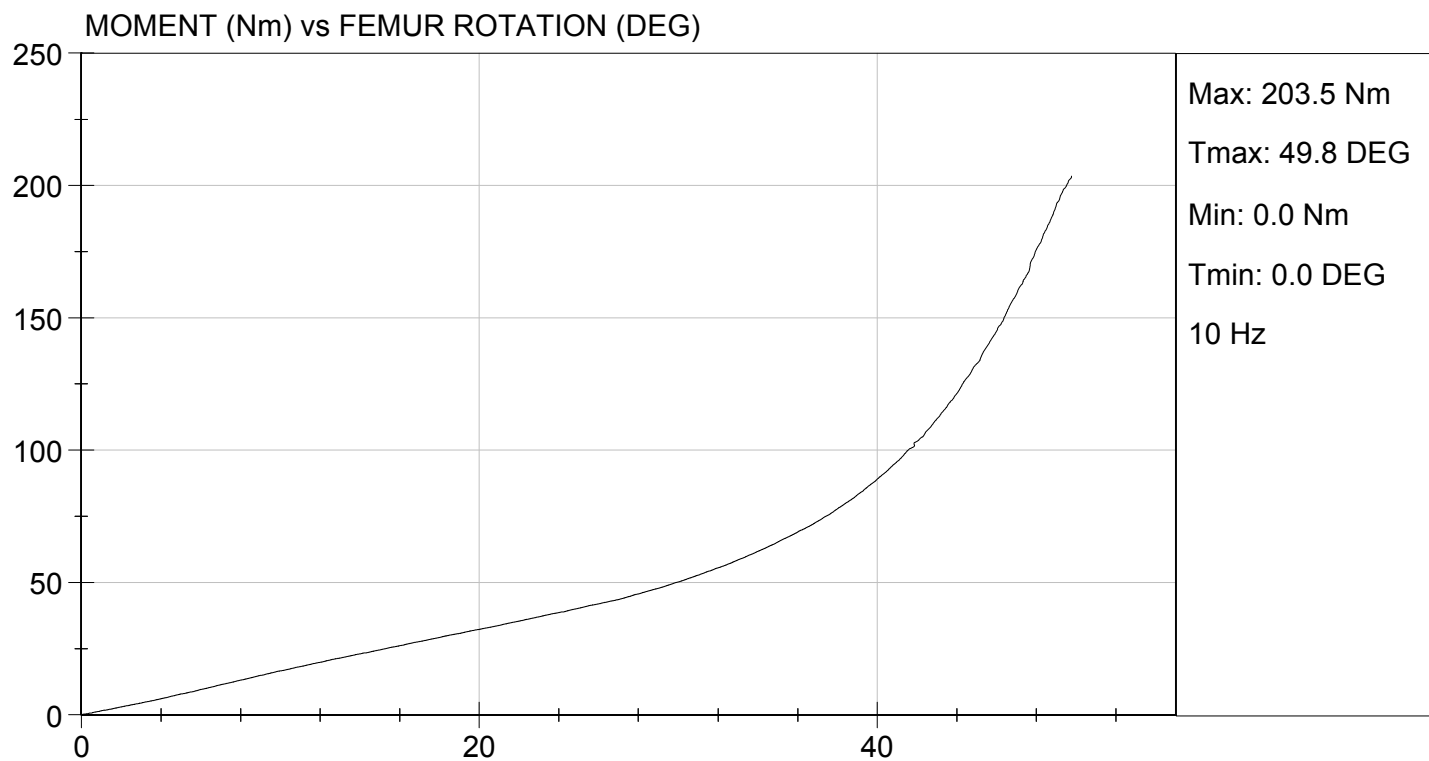
Test I.D: D15590

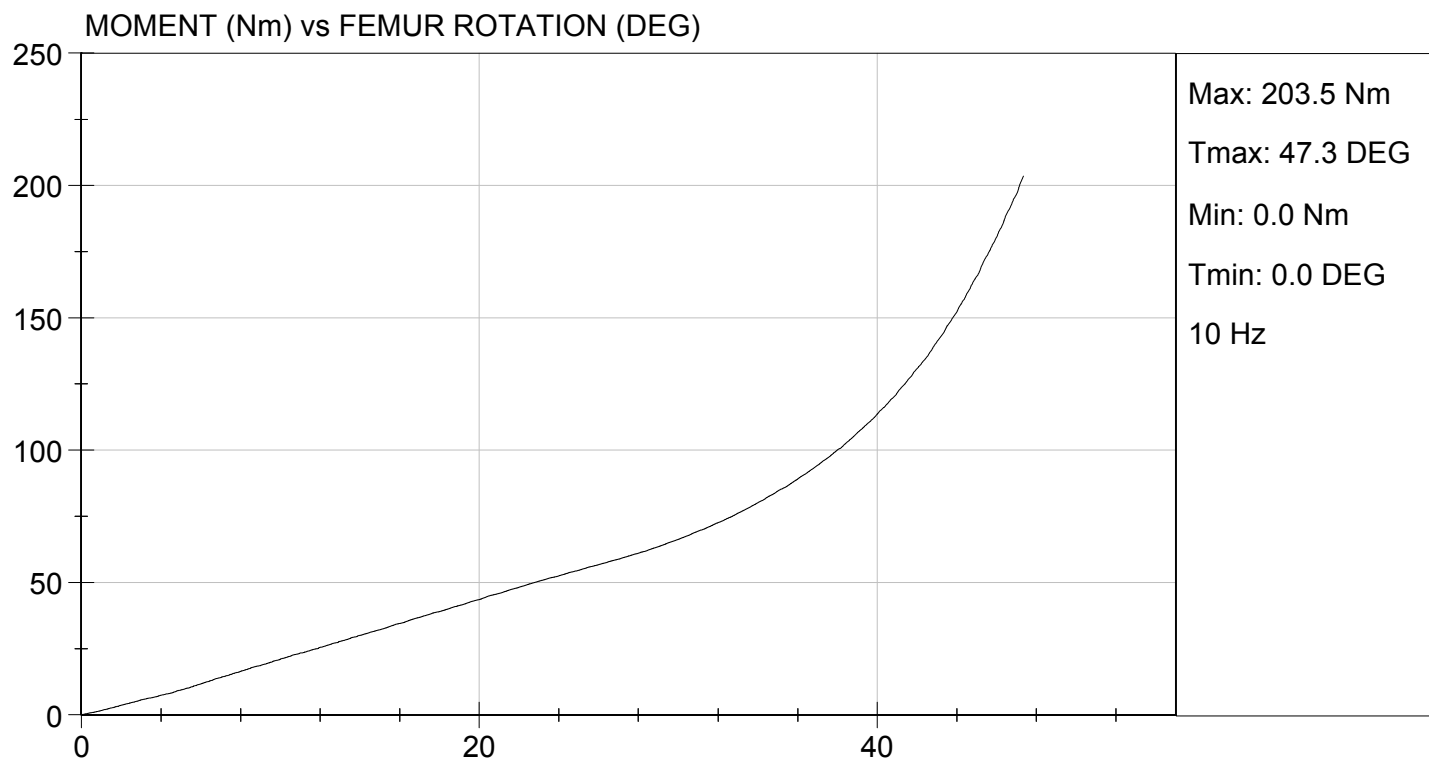
Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	22.0	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	19	19	Pass
Rotation Rate	deg/s	5.0 to 10.0	6.3	6.3	Pass
30 Degrees	Nm	94.9 Nm Max	50.2	66.3	Pass
150 ft-lbf / 203.4 Nm	Deg	40.0 to 50.0 Degree Max Rotation	49.8	47.3	Pass
Overall Test Results					Pass


 Laboratory Technician

02/27/2015
 Test Date


 Approved By





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

ATD Serial No: 351

Test ID: D15691

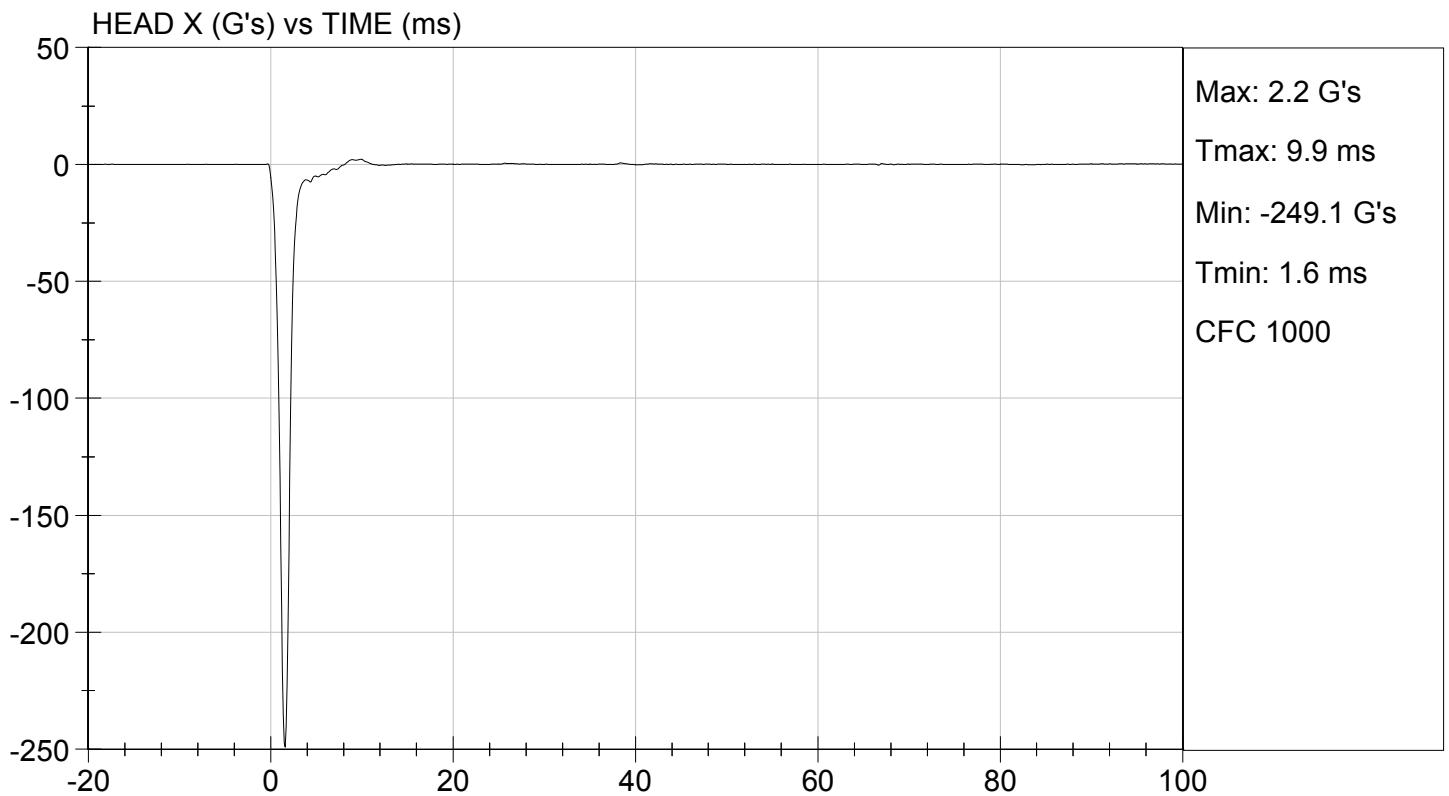
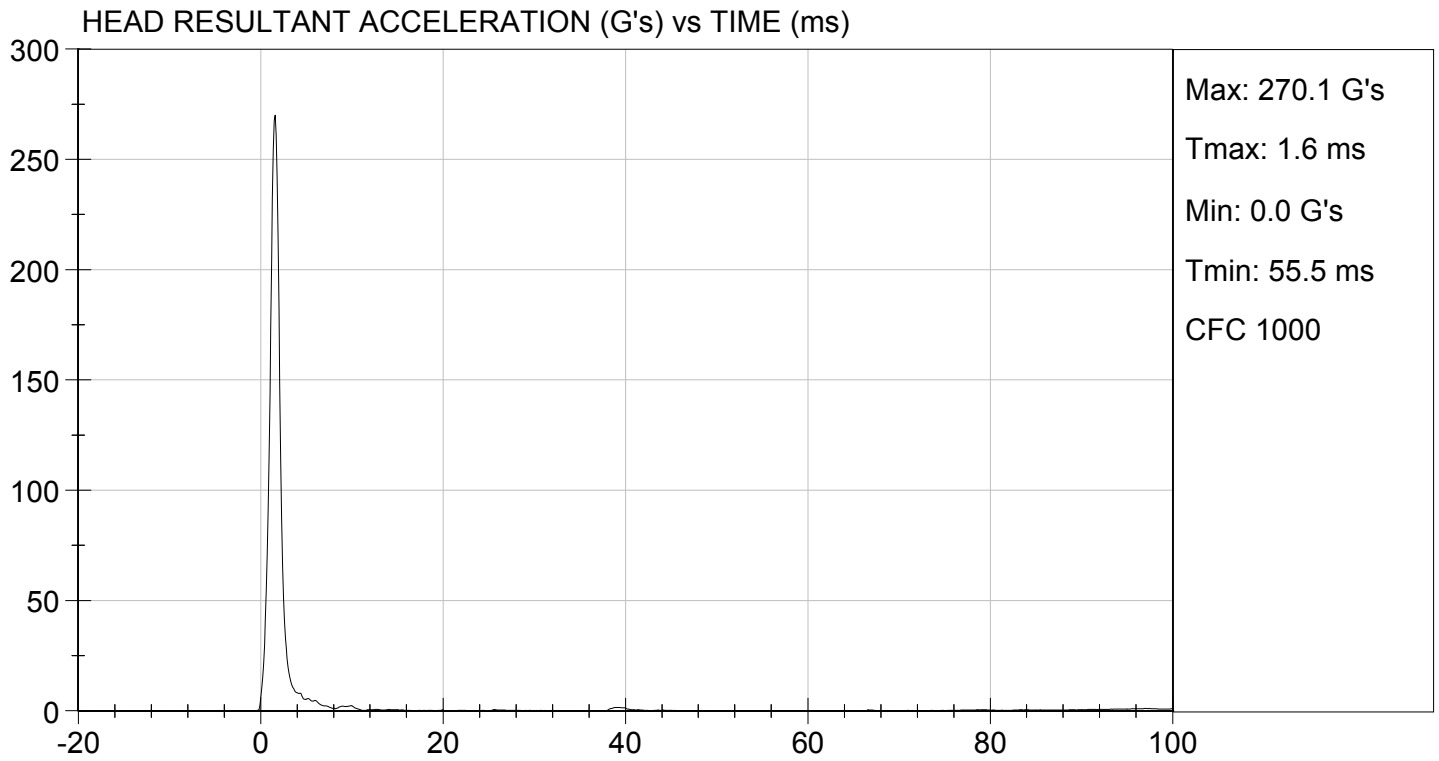
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Peak Resultant Acceleration	G's	225 to 275	270	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	-4.0	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
Overall Test Results				Pass

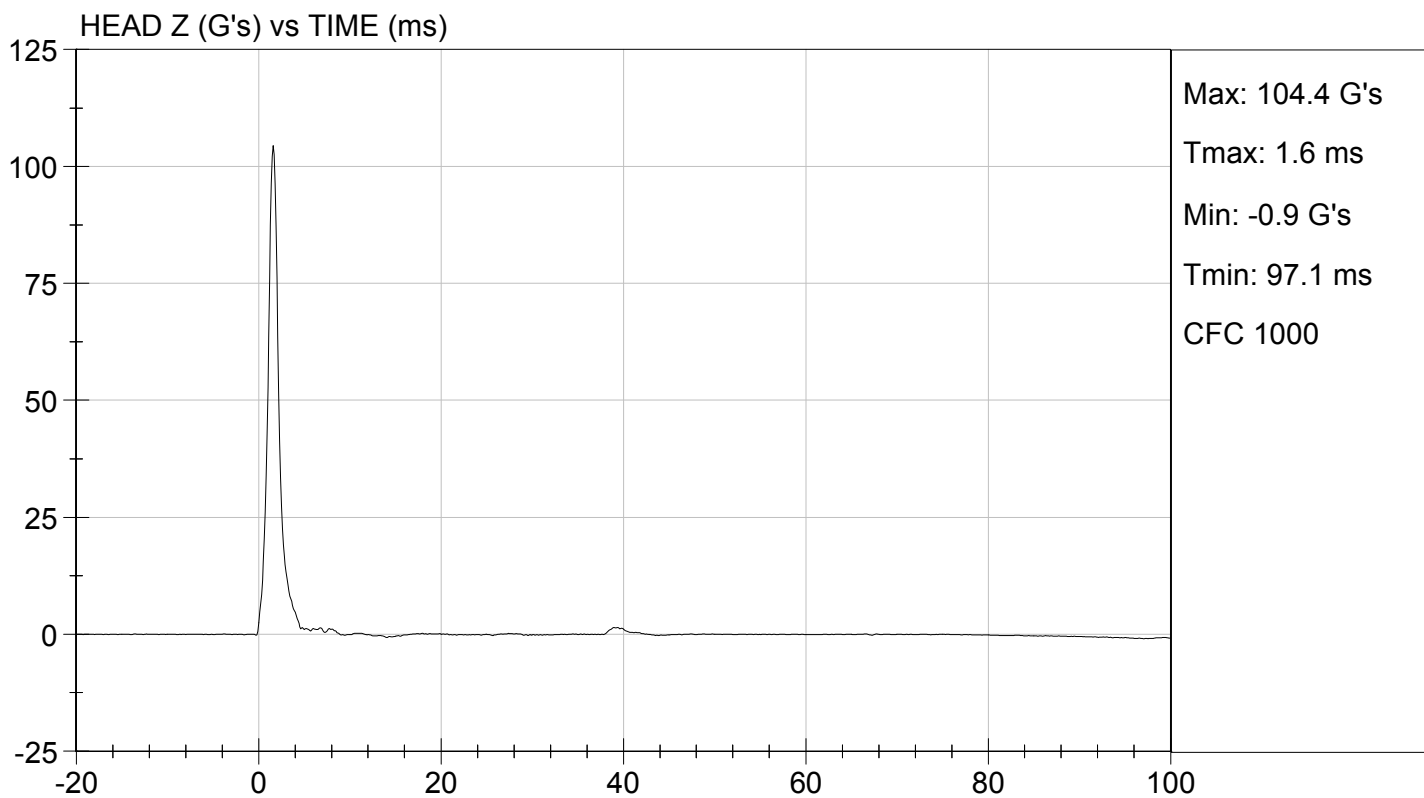
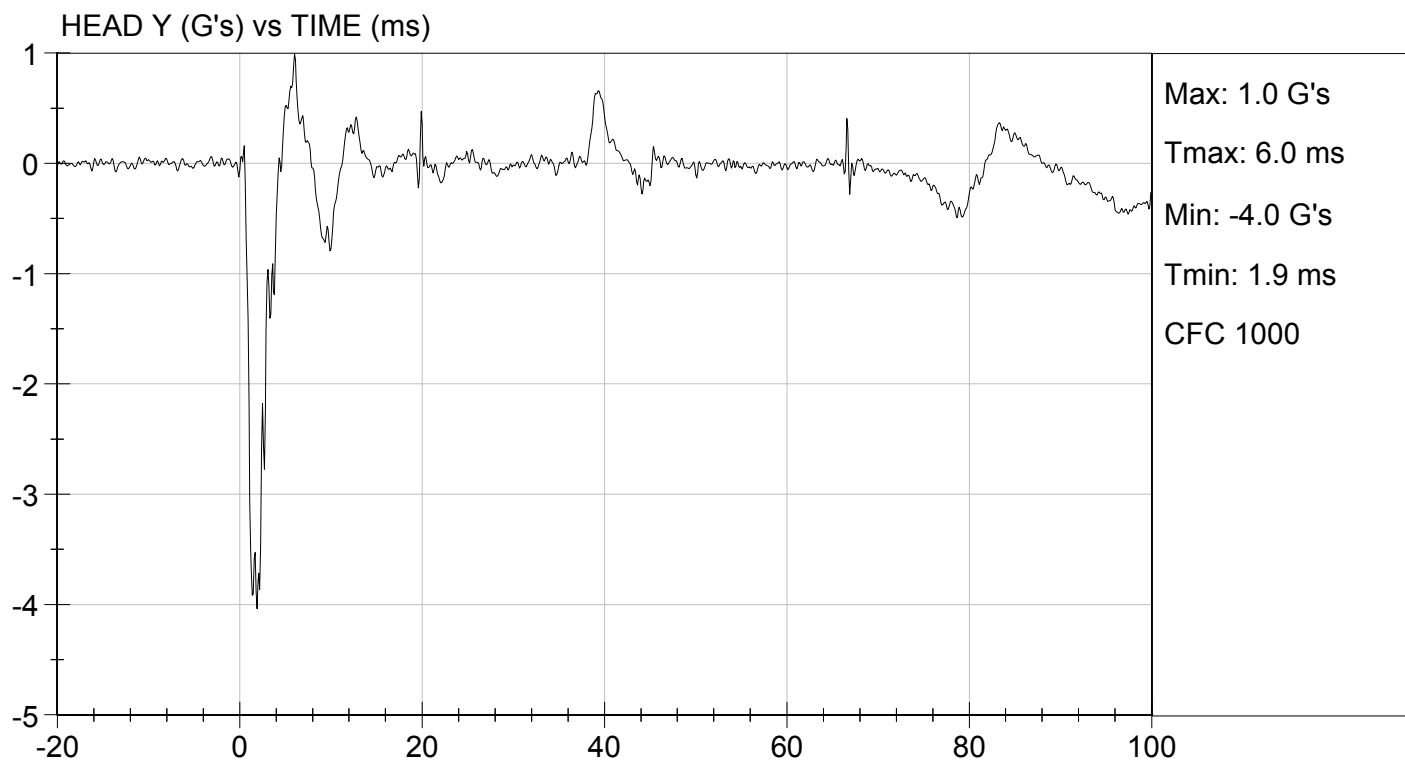
David Schoedel
Laboratory Technician

03/17/2015

Test Date

Jessica Hall
Approved By





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

ATD Serial No: 351

Test I.D: D15692

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity		%	10 to 70	22	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.06	Pass
Pendulum Deceleration	10 ms	G's	22.50 to 27.50	23.87	Pass
	20 ms	G's	17.60 to 22.60	19.27	Pass
	30 ms	G's	12.50 to 18.50	13.94	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 29.0	13.9	Pass
Deceleration Decay Time to Cross 5 G's		ms	34.0 to 42.0	38.6	Pass
Maximum "D" Plane Rotation	Maximum	Deg	64.0 to 78.0	74.5	Pass
	Time	ms	57.0 to 64.0	60.7	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	113.0 to 128.0	119.7	Pass
Moment About Occipital Condyle	Maximum	Nm	88.1 to 108.5	88.4	Pass
	Time	ms	47.0 to 58.0	52.4	Pass
Positive Moment Decay Time To Zero Crossing		ms	97.0 to 107.0	103.5	Pass
Overall Test Results					Pass

David Schoedel

Laboratory Technician

03/17/2015

Test Date

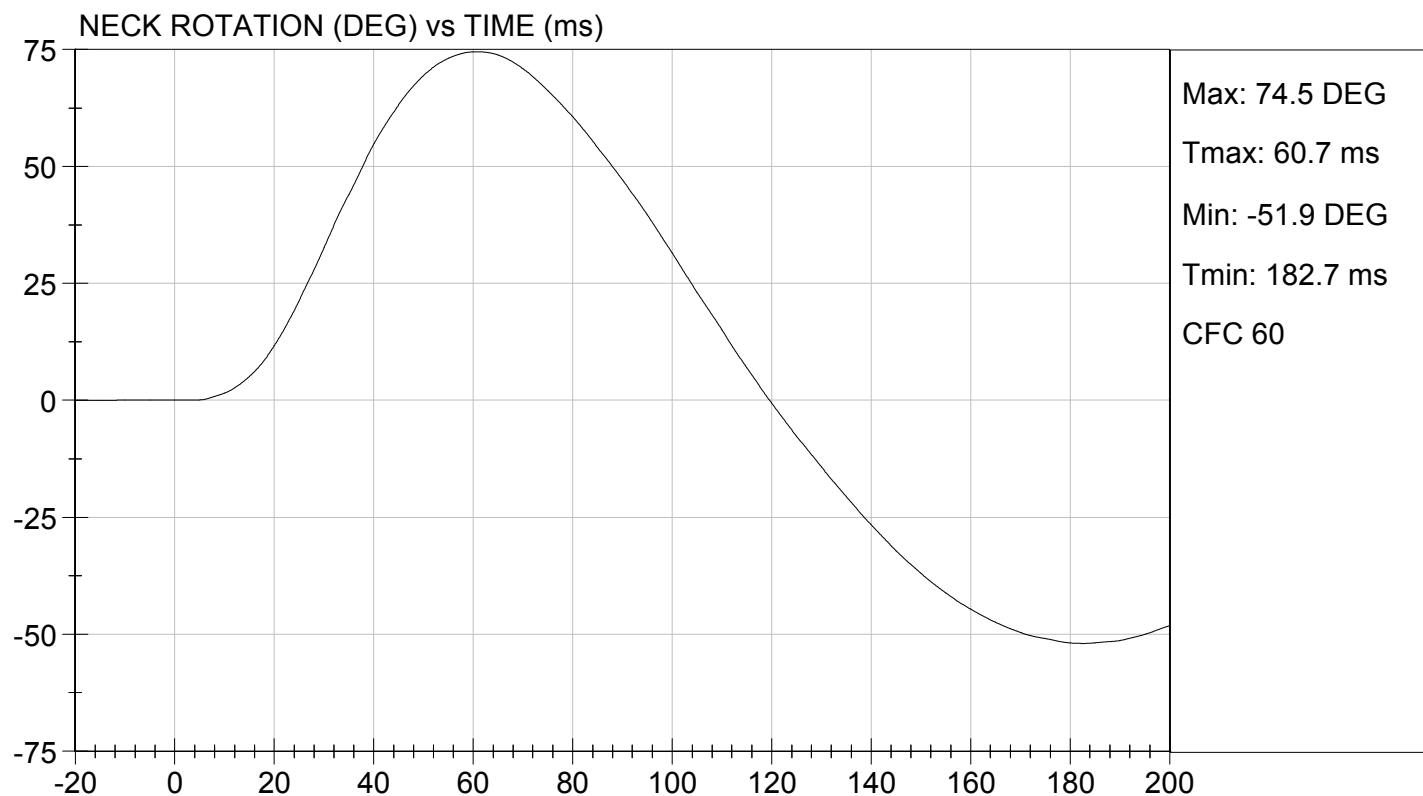
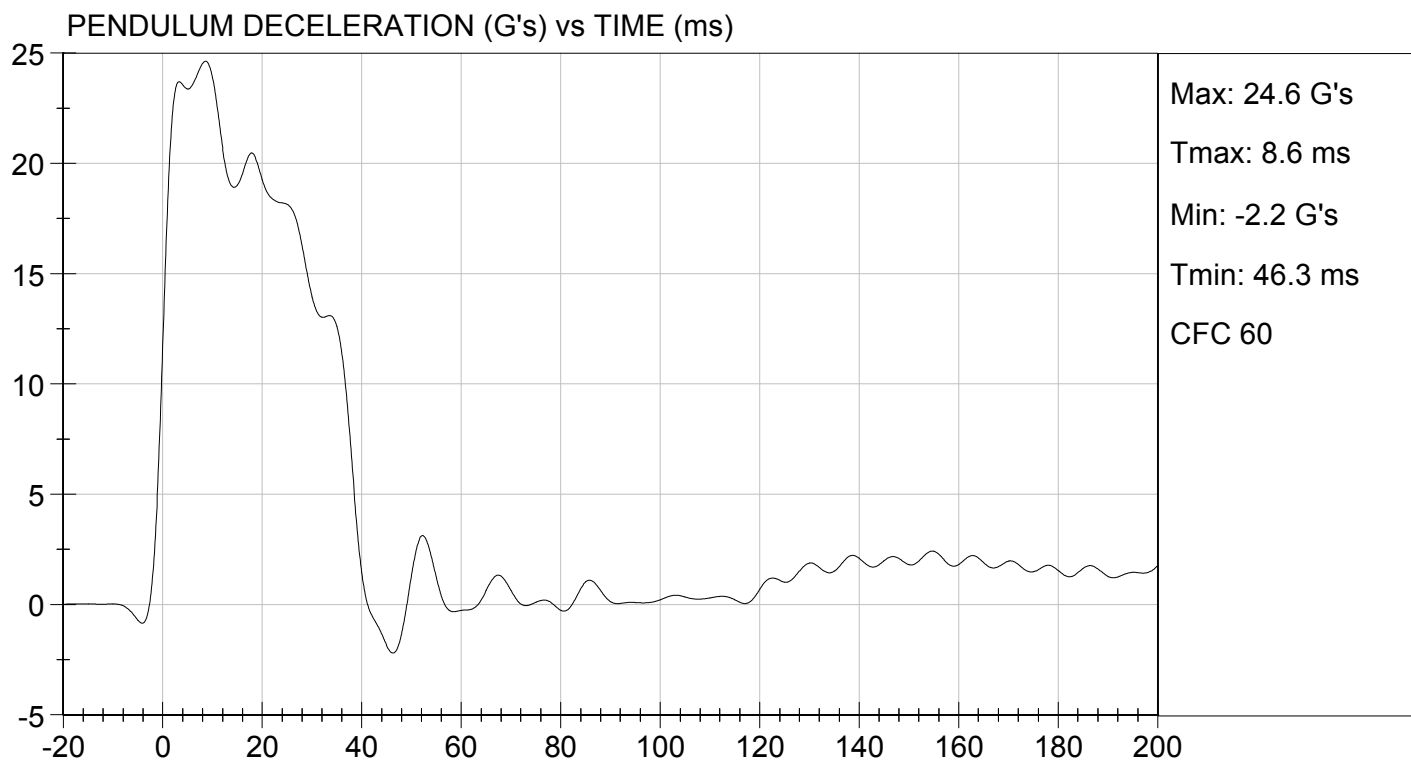
Jessica Hall

Approved By



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

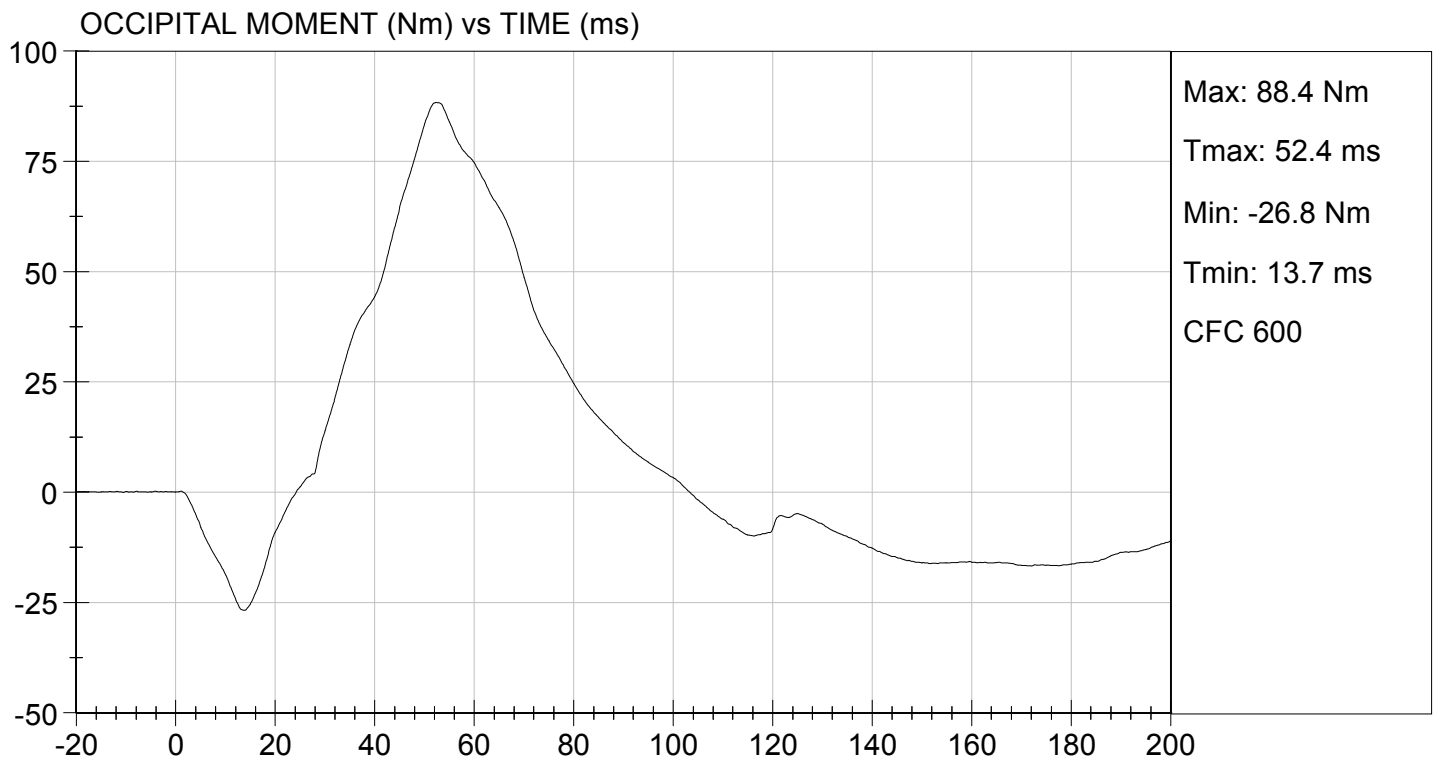
TEST DATE: 03/17/2015
TEST #: D15692





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

TEST DATE: 03/17/2015
TEST #: D15692



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

ATD Serial No: 351

Test I.D: D15693

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity		%	10 to 70	22	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.12	Pass
Pendulum Deceleration	10 ms	G's	17.20 to 21.20	20.91	Pass
	20 ms	G's	14.00 to 19.00	15.10	Pass
	30 ms	G's	11.00 to 16.00	13.70	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 22.0	13.7	Pass
Deceleration Decay Time to Cross 5 G's		ms	38.0 to 46.0	45.6	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	100.0	Pass
	Time	ms	72.0 to 82.0	82.0	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	147.0 to 174.0	167.2	Pass
Moment About Occipital Condyle	Maximum	Nm	-52.9 to -79.9	-56.1	Pass
	Time	ms	65.0 to 79.0	77.3	Pass
Negative Moment Decay Time To Zero Crossing		ms	120.0 to 148.0	145.2	Pass
Overall Test Results					Pass

David Schoedel

Laboratory Technician

03/17/2015

Test Date

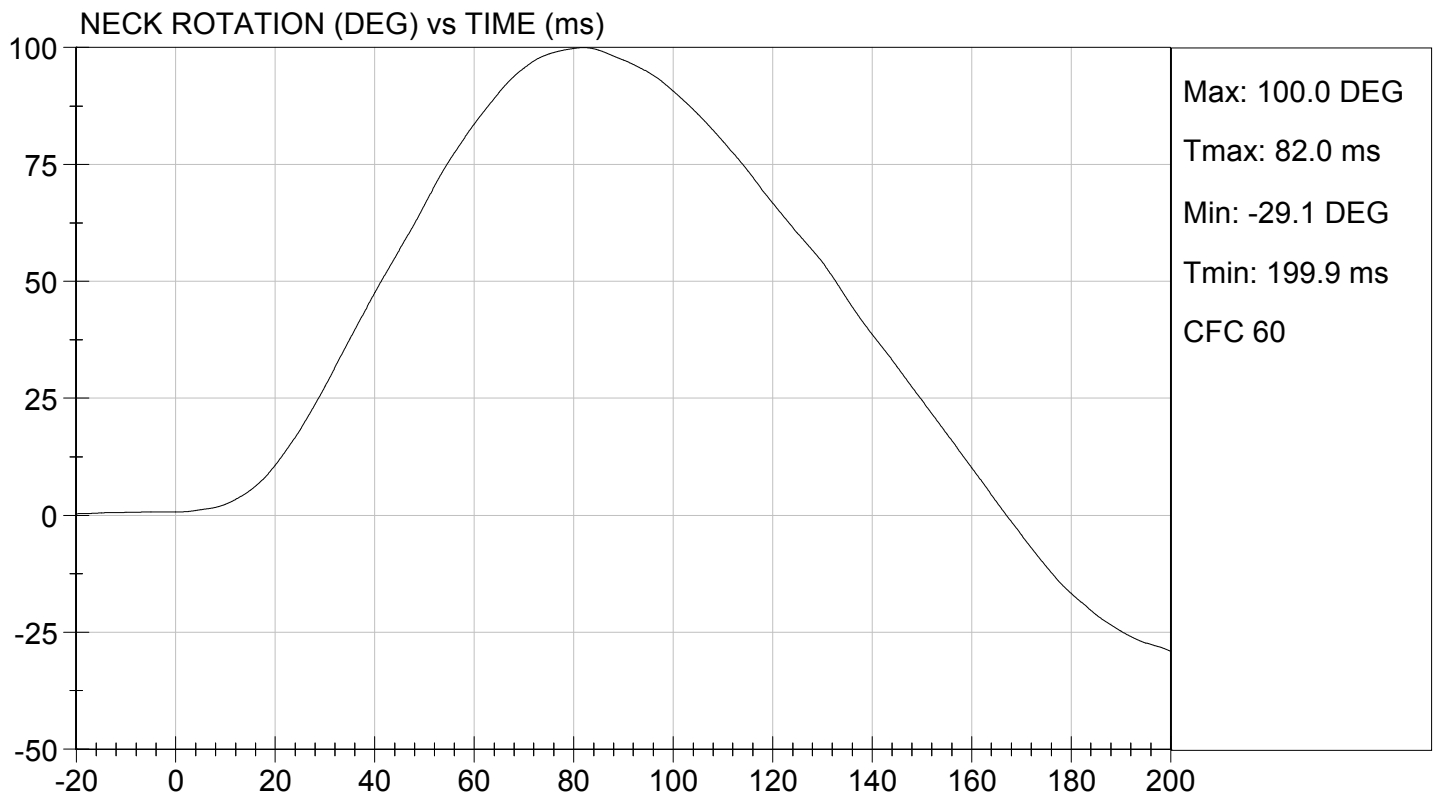
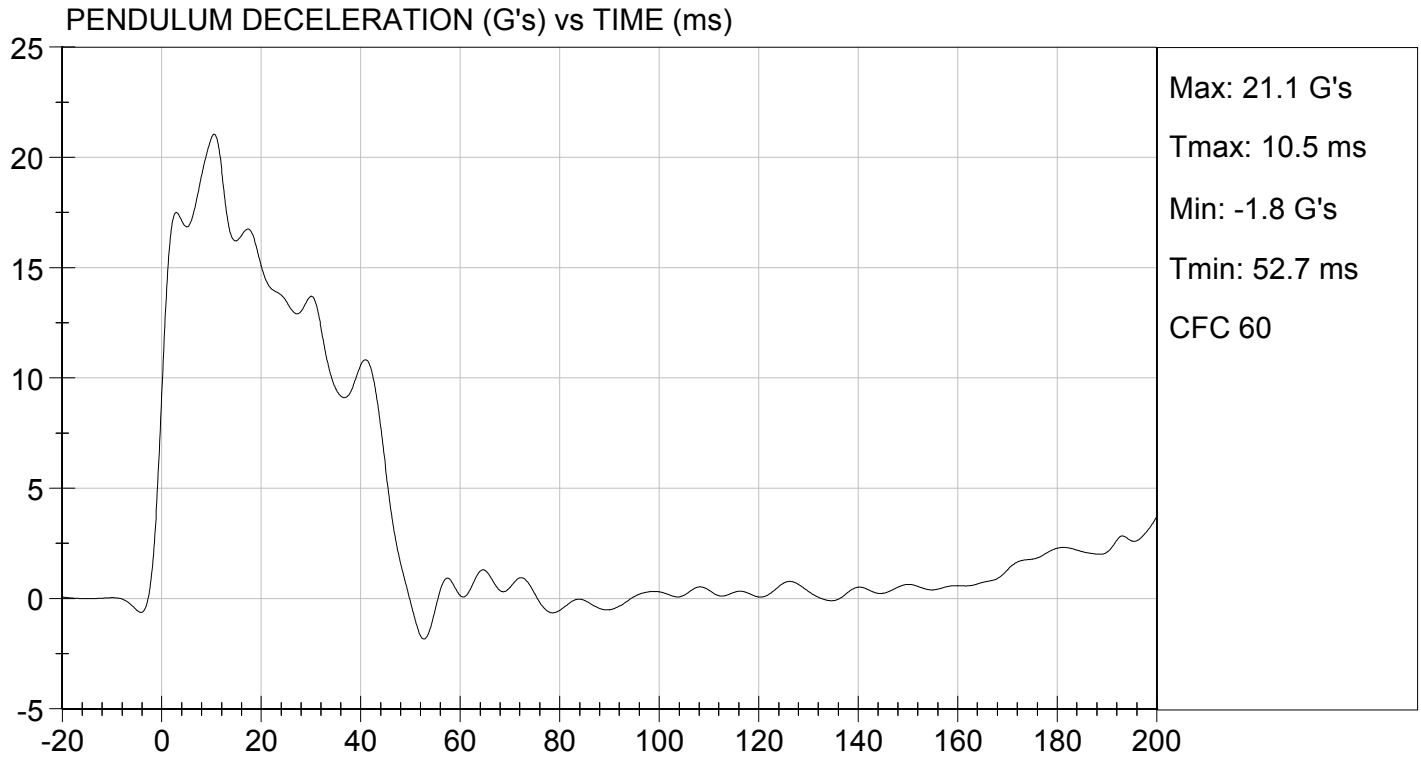
Jessica Hall

Approved By



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

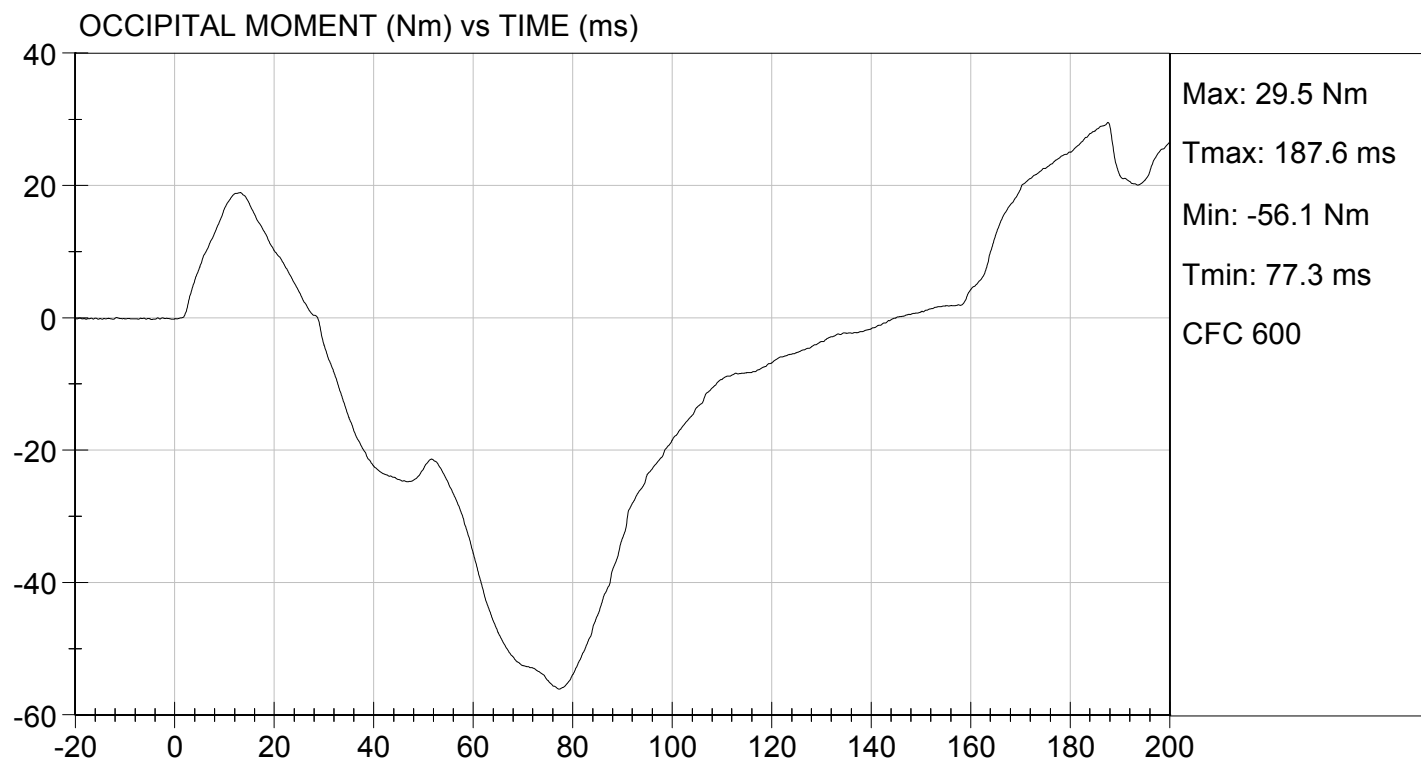
TEST DATE: 03/17/2015
TEST #: D15693





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

TEST DATE: 03/17/2015
TEST #: D15693



MGA RESEARCH CORPORATION
THORAX IMPACT
HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351

Test I.D: D15694

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	20	Pass
Probe Velocity	m/s	6.58 to 6.82	6.60	Pass
Peak Probe Force	N	5159 to 5893	5,282	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.76	Pass
Internal Hysteresis	%	69 to 85	69	Pass
Overall Test Results			Pass	

David Schoedel
Laboratory Technician

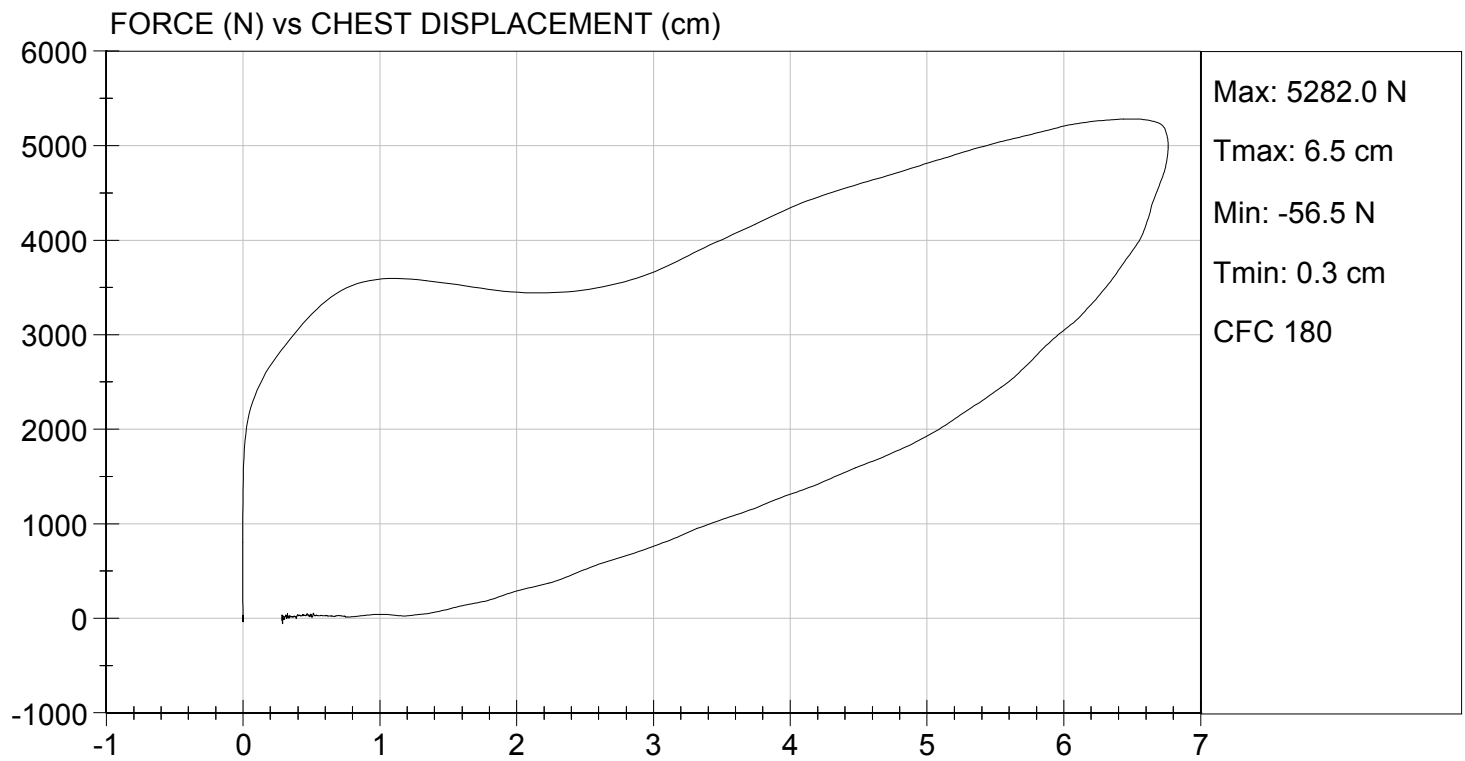
03/17/2015
Test Date

Jessica Hall
Approved By



TEST DESC: THORAX IMPACT
VELOCITY: 21.64 ft/s, 6.60 m/s

TEST DATE: 03/17/2015
TEST #: D15694



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

ATD Serial No: 351

Test I.D: D15695

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	22	Pass
Probe Velocity	m/s	2.07 to 2.13	2.12	Pass
Peak Probe Force	N	4715 to 5782	5,365	Pass
Overall Test Results				Pass

David Schoedel
Laboratory Technician

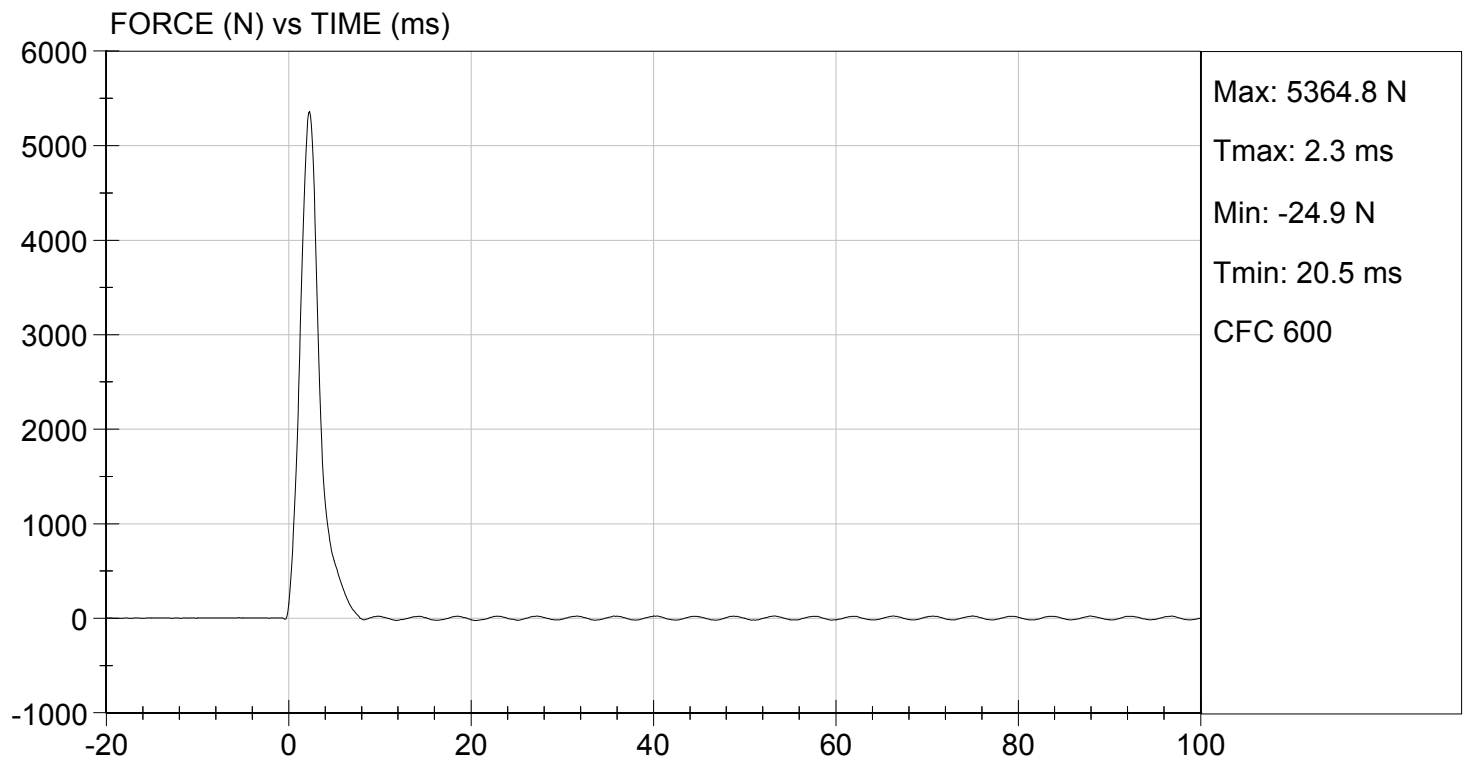
03/17/2015
Test Date

Jessica Hall
Approved By



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

TEST DATE: 03/17/2015
TEST #: D15695



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

ATD Serial No: 351

Test I.D: D15696

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	22	Pass
Probe Velocity	m/s	2.07 to 2.13	2.13	Pass
Peak Probe Force	N	4715 to 5782	4,759	Pass
Overall Test Results				Pass

David Schoedel
Laboratory Technician

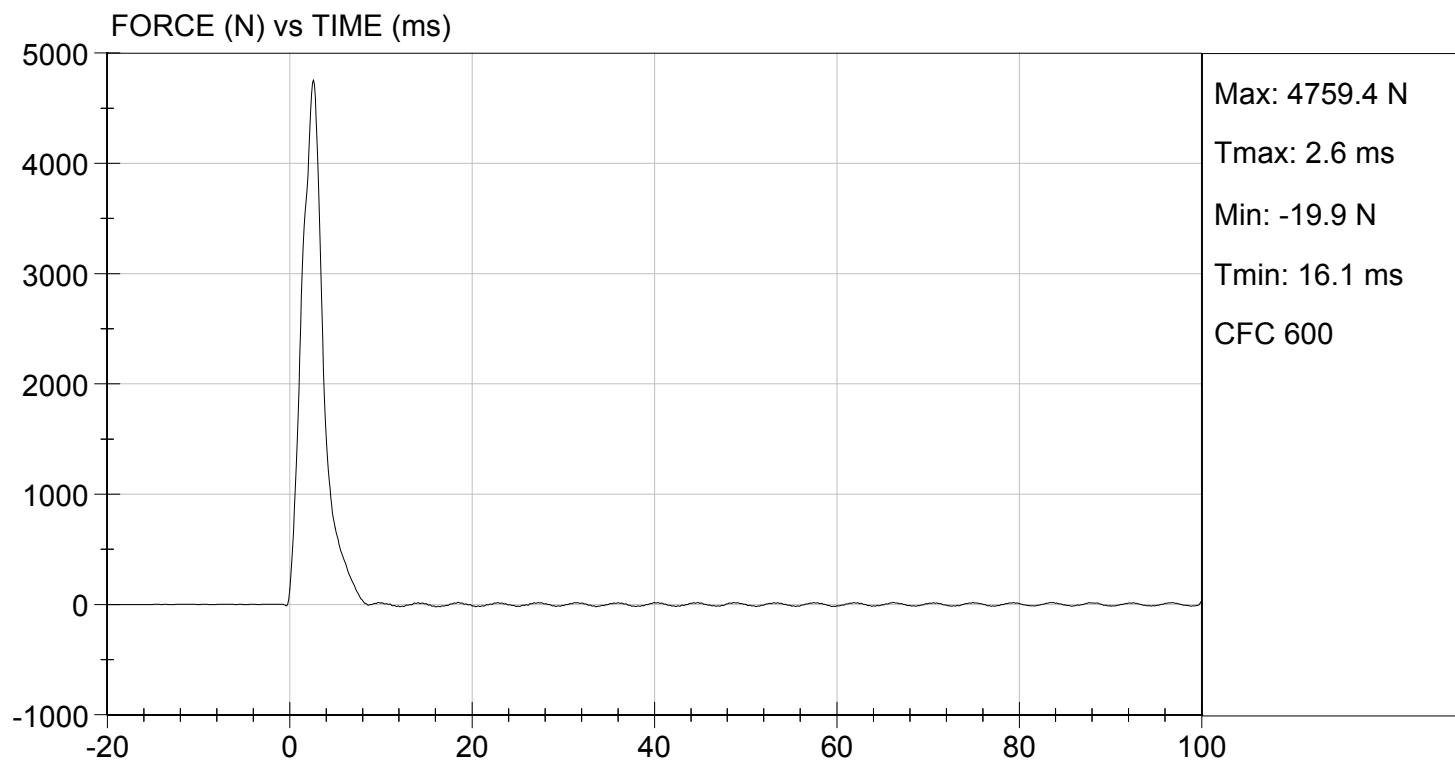
03/17/2015
Test Date

Jessica Hall
Approved By



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

TEST DATE: 03/17/2015
TEST #: D15696



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

ATD Serial No: 351

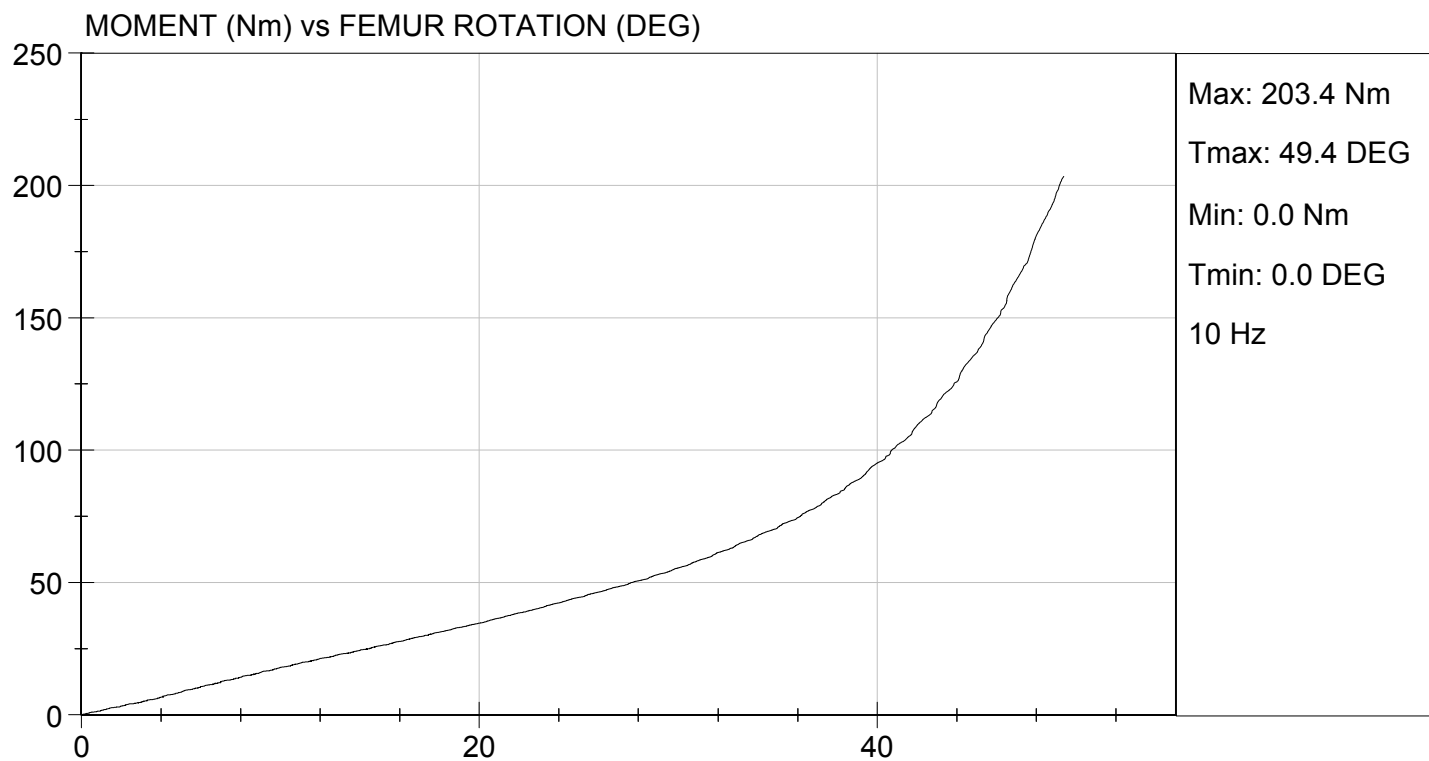
Test I.D: D15690

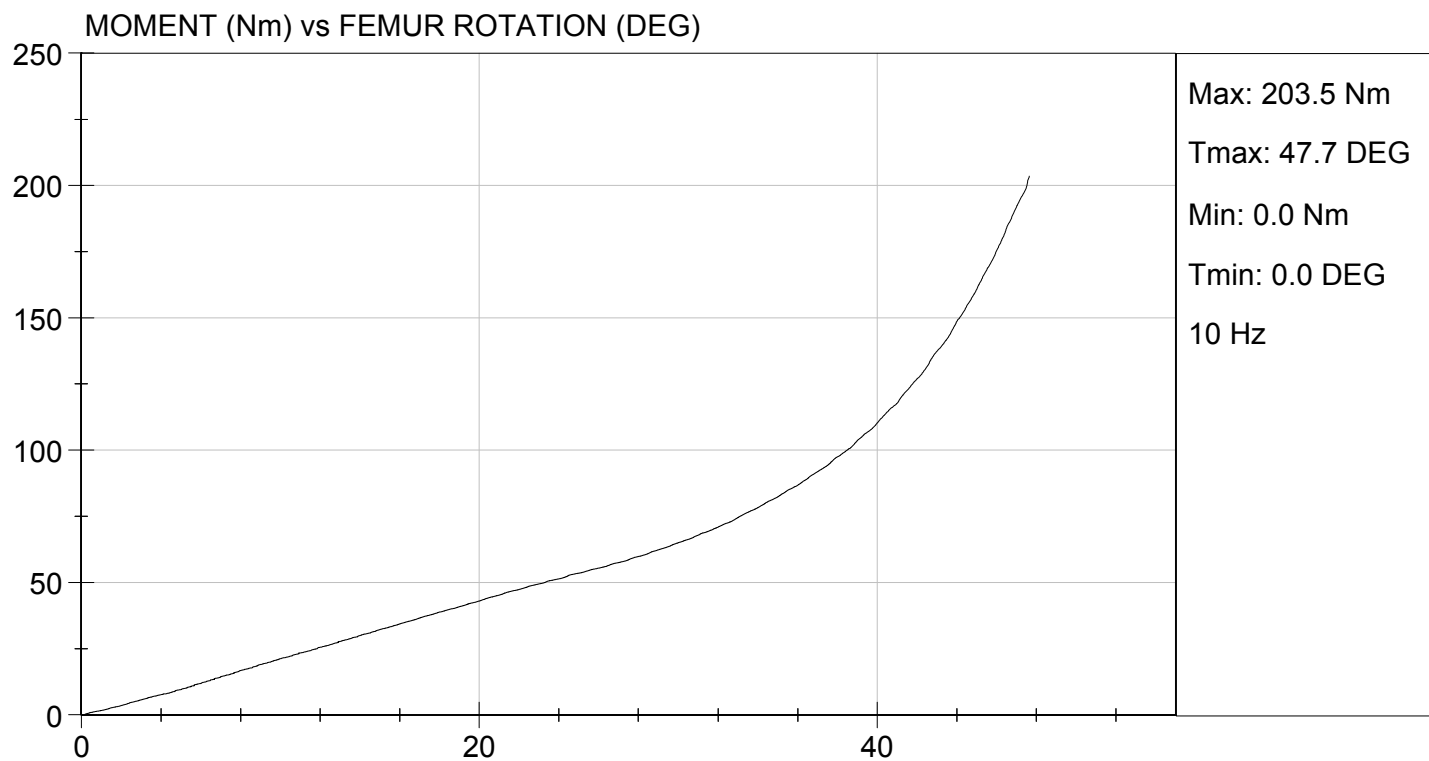
Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	21.6	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	20	20	Pass
Rotation Rate	deg/s	5.0 to 10.0	6.3	6.3	Pass
30 Degrees	Nm	94.9 Nm Max	55.6	65.0	Pass
150 ft-lbf / 203.4 Nm	Deg	40.0 to 50.0 Degree Max Rotation	49.4	47.7	Pass
Overall Test Results					Pass

Maxime Chamberland
Laboratory Technician

03/17/2015
Test Date

Jessica Hall
Approved By





Hybrid III, 5th External Measurements
SN: 634

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

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

MGA RESEARCH CORPORATION
HEAD DROP TEST
HYBRID III 5TH PERCENTILE

ATD Serial No: 634

Test ID: D15211

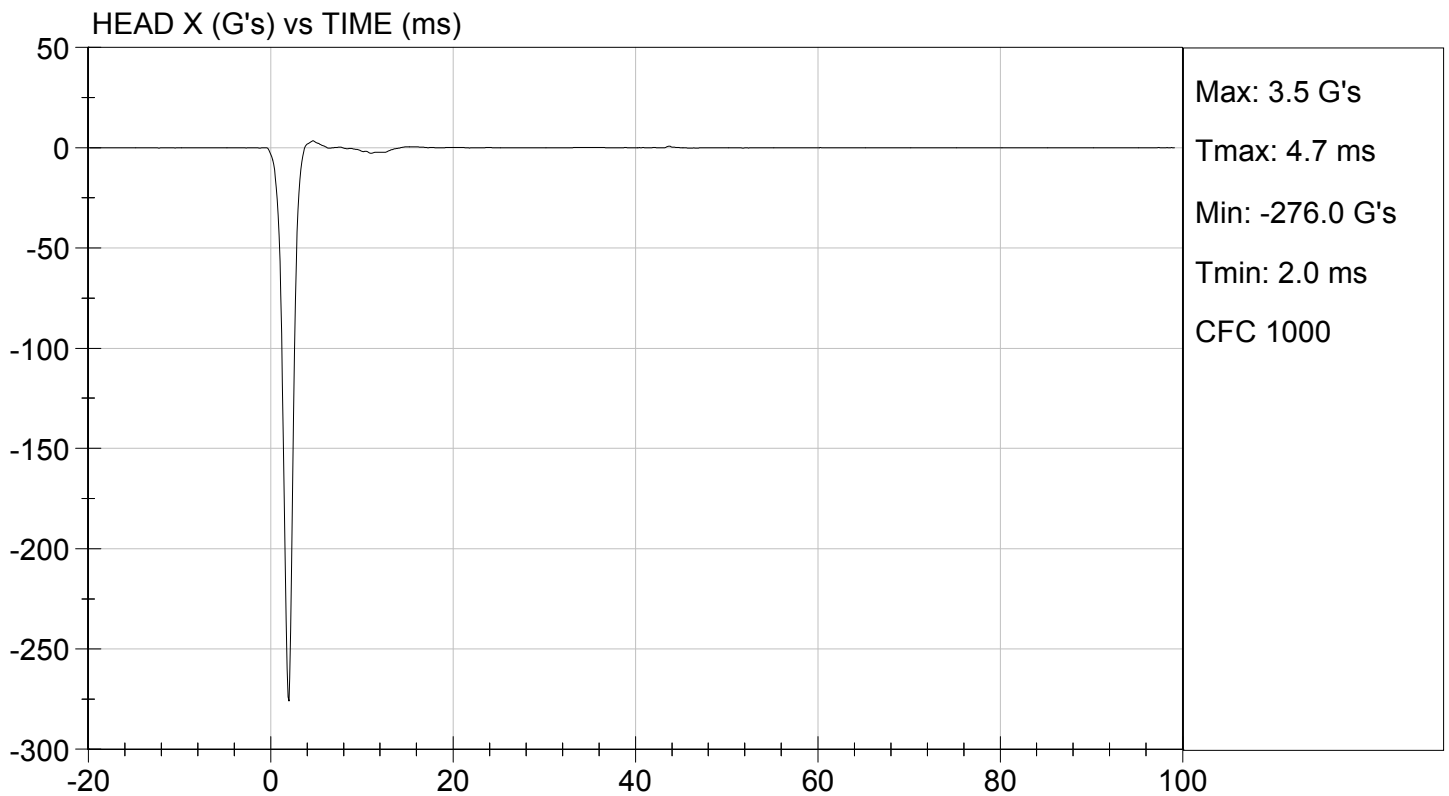
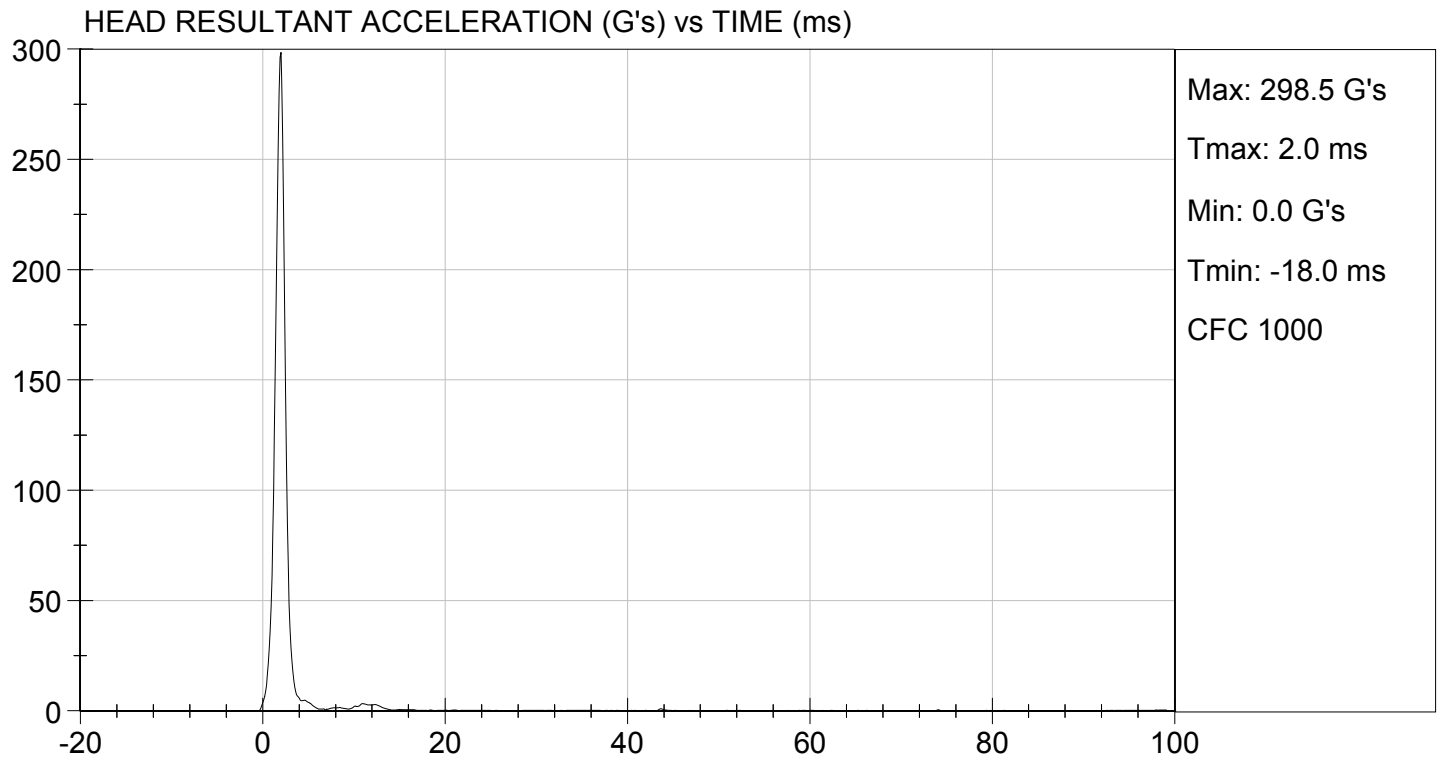
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Peak Resultant Acceleration	G's	250 to 300	299	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	-2.2	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
Overall Test Results				Pass

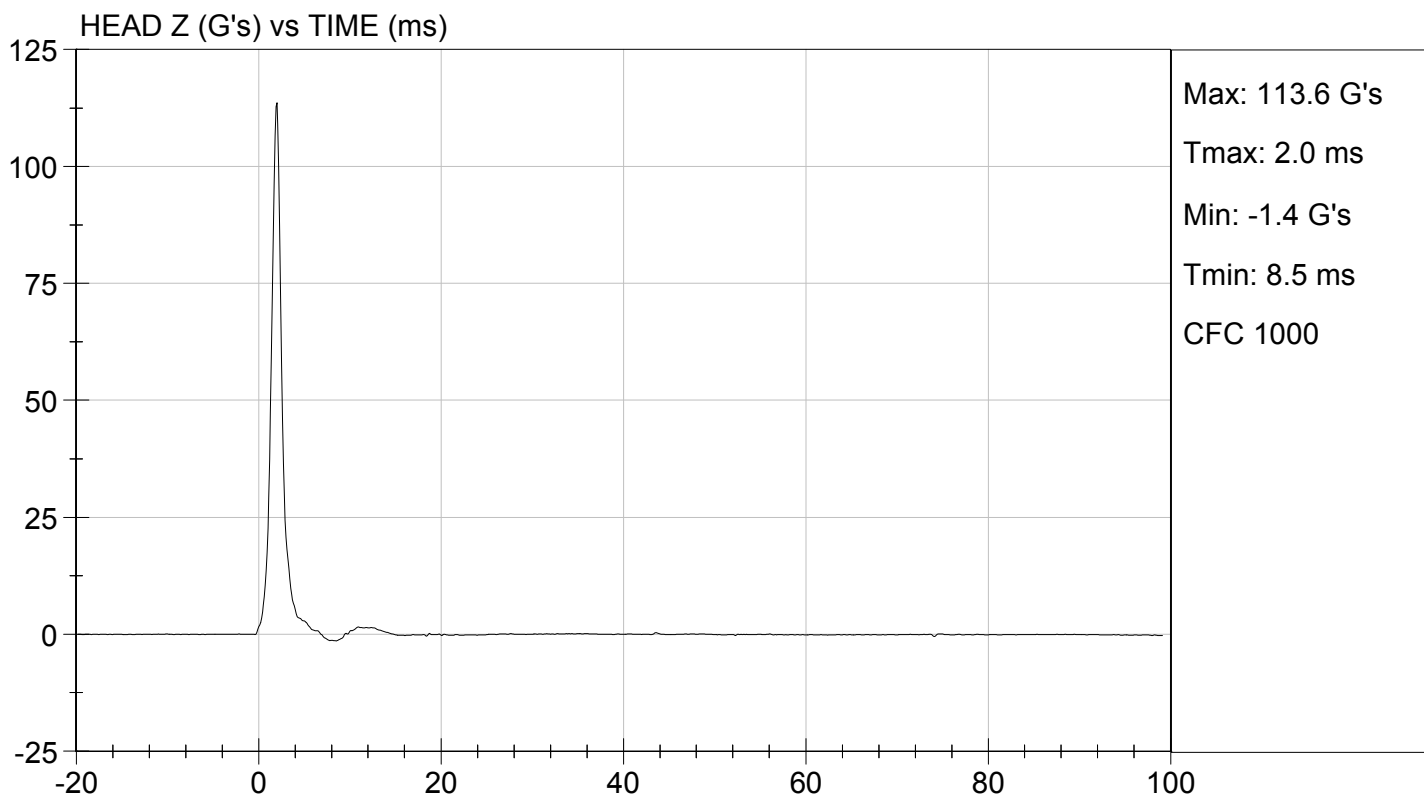
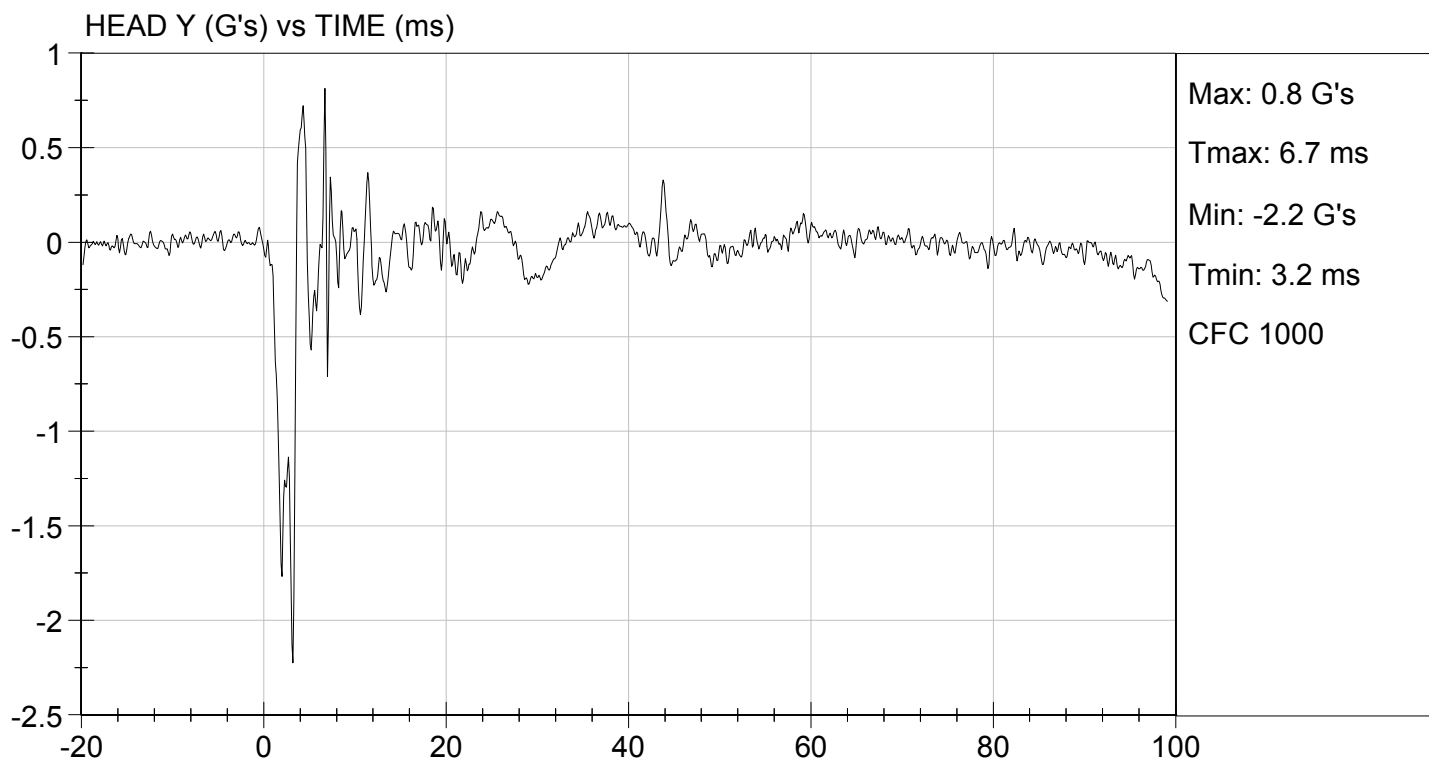
David Schoedel
Laboratory Technician

01/23/2015

Test Date

Jessica Hall
Approved By





MGA RESEARCH CORPORATION

NECK FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634

Test I.D: D15212

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.9	Pass
Laboratory Relative Humidity		%	10 to 70	22	Pass
Pendulum Speed		m/s	6.89 to 7.13	7.06	Pass
Pendulum Velocity	10 ms	m/s	2.1 to 2.5	2.5	Pass
	20 ms	m/s	4.0 to 5.0	4.6	Pass
	30 ms	m/s	5.8 to 7.0	6.4	Pass
D Plane Rotation	Max	deg	77 to 91	82	Pass
Occipital Condyle Moment within Rotation Corridor		Nm	69 to 83	72	Pass
Positive Moment Time Curve Decay to 10 Nm		ms	80 to 100	83	Pass
Overall Results				Pass	

David Schoedel
Laboratory Technician

01/23/2015

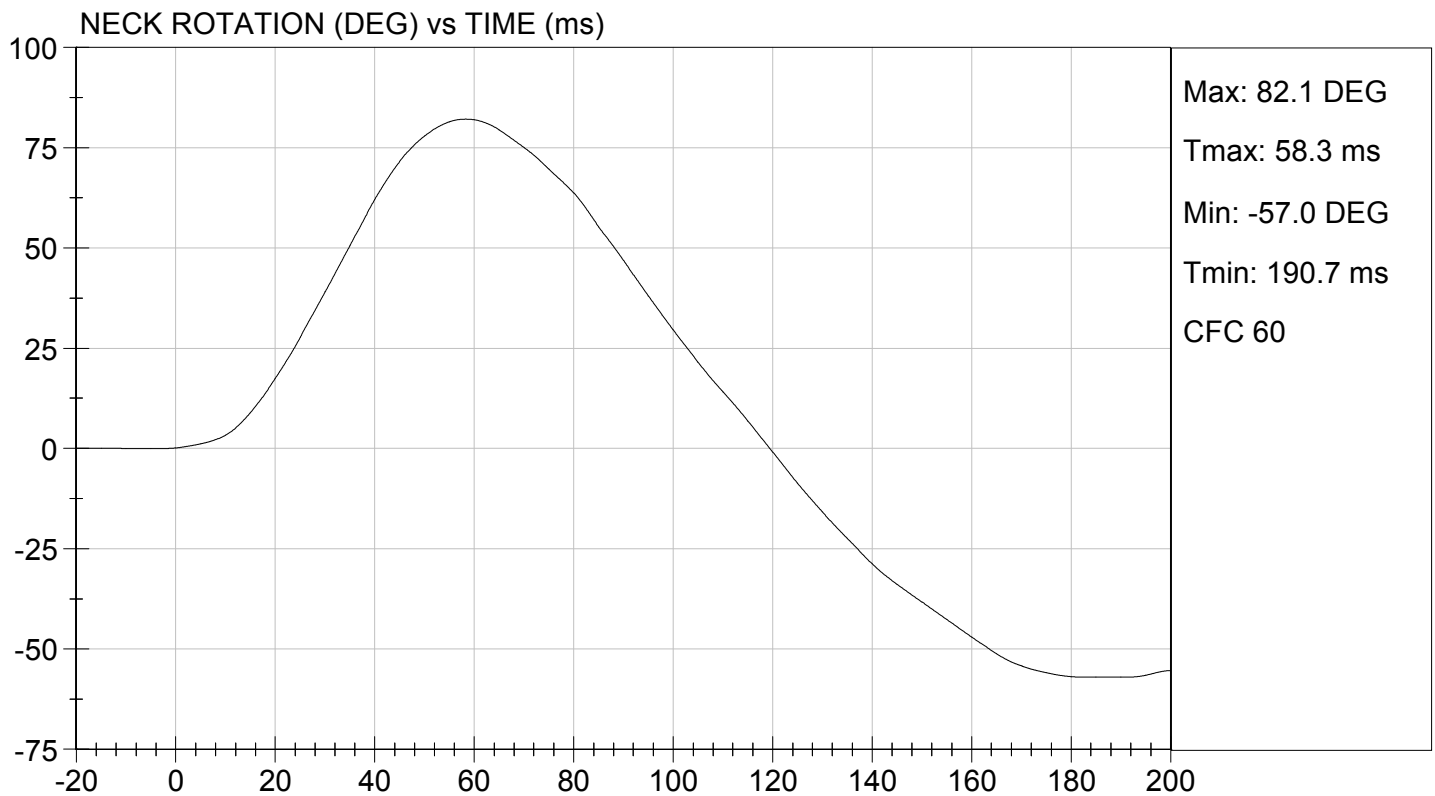
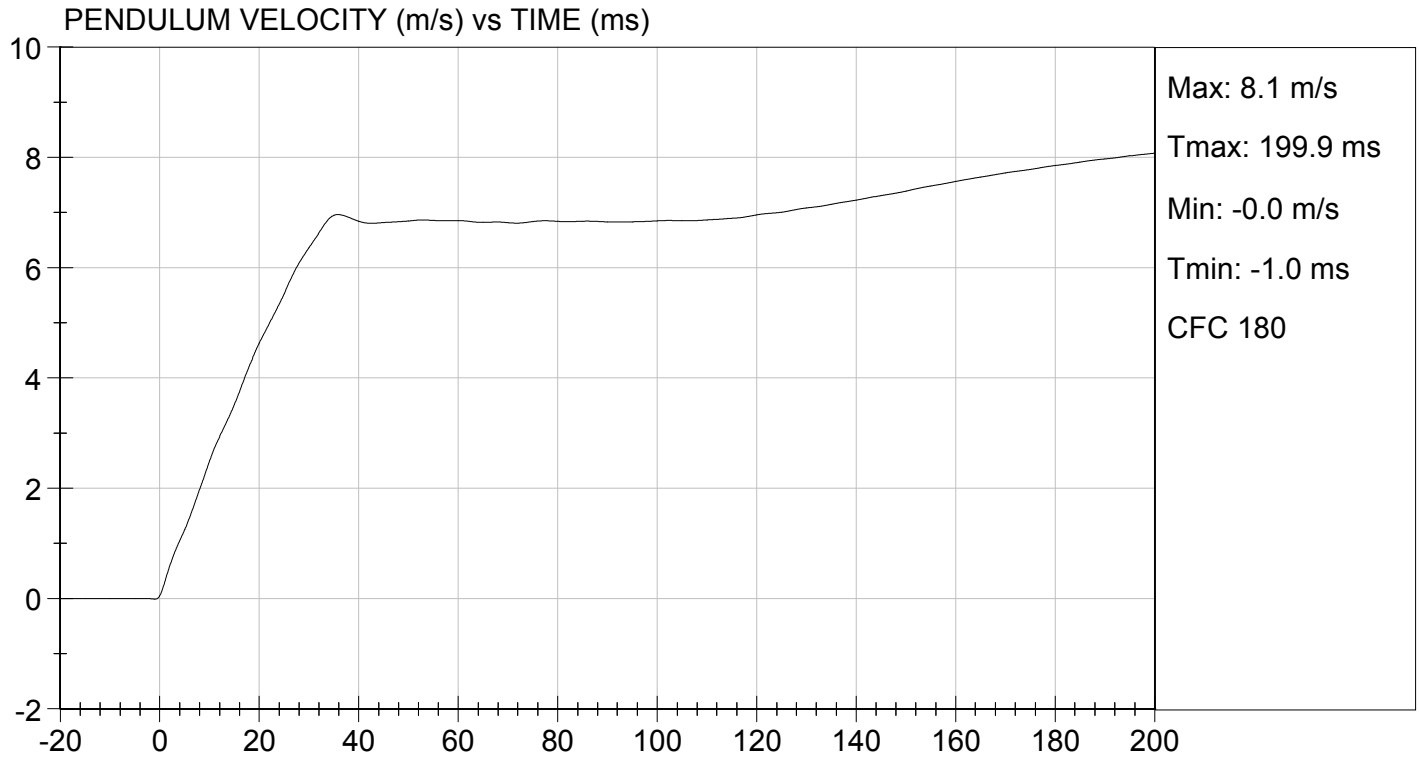
Test Date

Jessica Hall
Approved By



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

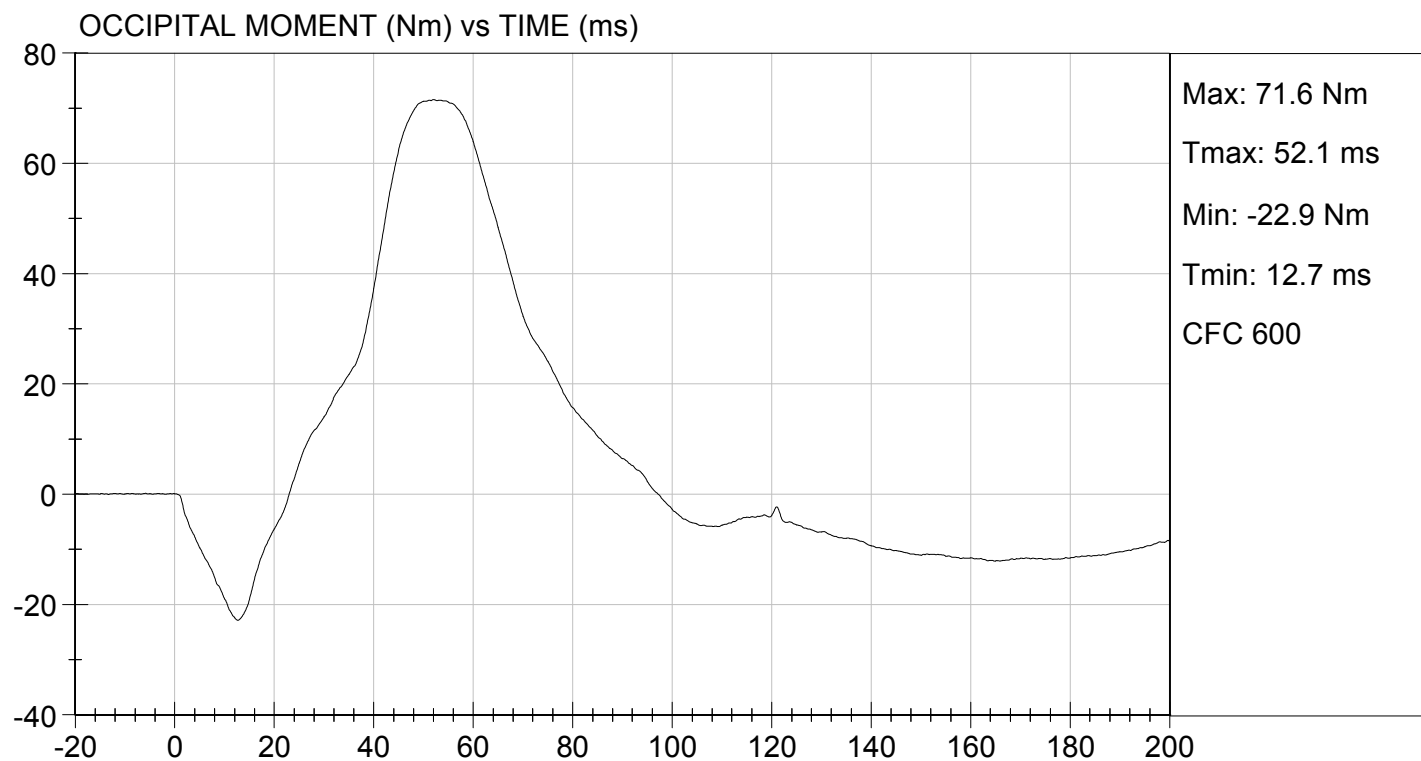
TEST DATE: 01/23/2015
TEST #: D15212





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

TEST DATE: 01/23/2015
TEST #: D15212



MGA RESEARCH CORPORATION
NECK EXTENSION TEST
HYBRID III 5TH PERCENTILE

ATD Serial No: 634

Test I.D: D15213

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.9	Pass
Laboratory Relative Humidity		%	10 to 70	22	Pass
Pendulum Speed		m/s	5.95 to 6.19	6.19	Pass
Pendulum Velocity	10 ms	m/s	1.5 to 1.9	1.9	Pass
	20 ms	m/s	3.1 to 3.9	3.6	Pass
	30 ms	m/s	4.6 to 5.6	4.8	Pass
D Plane Rotation	Max	deg	99 to 114	109	Pass
Occipital Condyle Moment within Rotation Corridor		Nm	-65 to -53	-56	Pass
Negative Moment Time Curve Decay to -10 Nm		ms	94 to 114	98	Pass
Overall Results					Pass

David Schoedel
Laboratory Technician

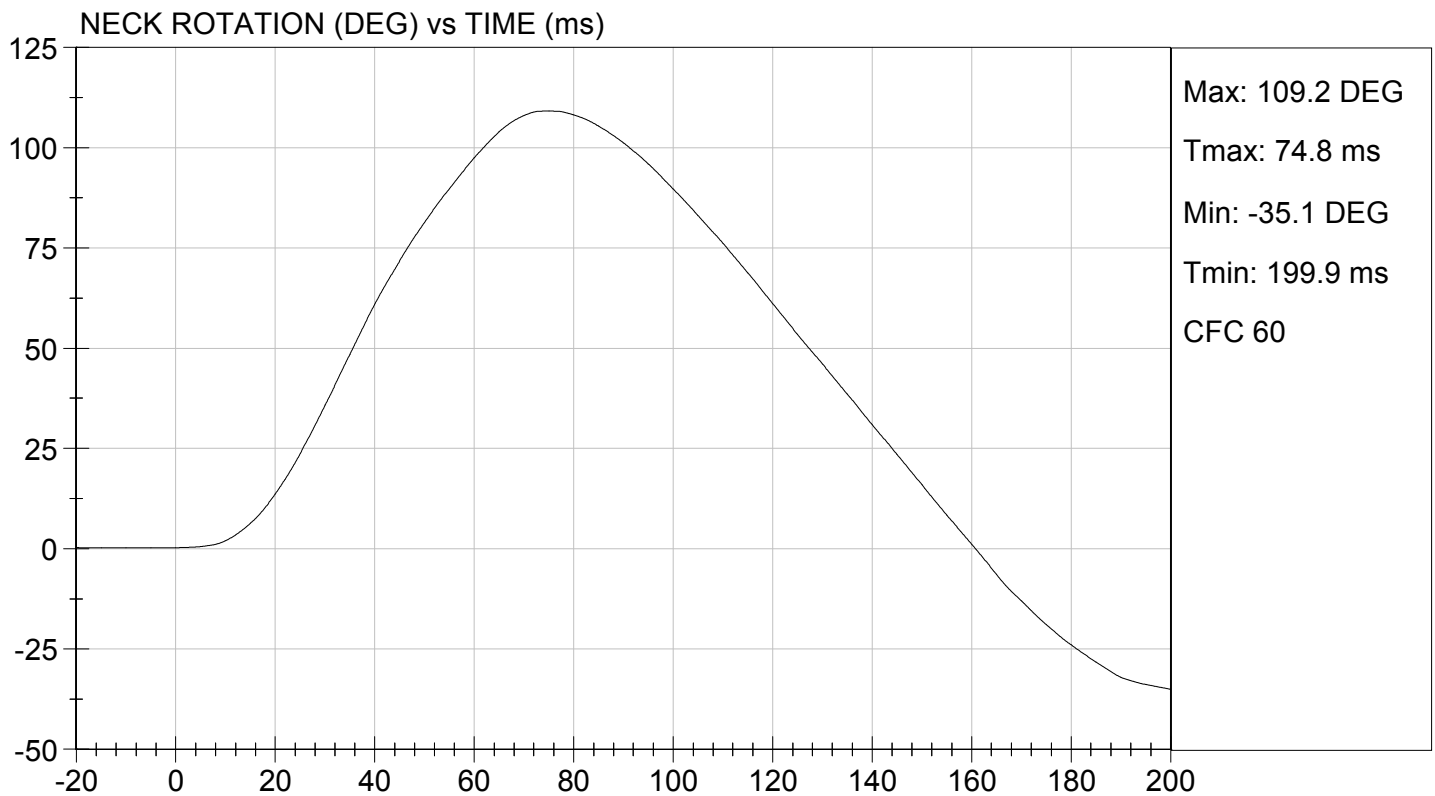
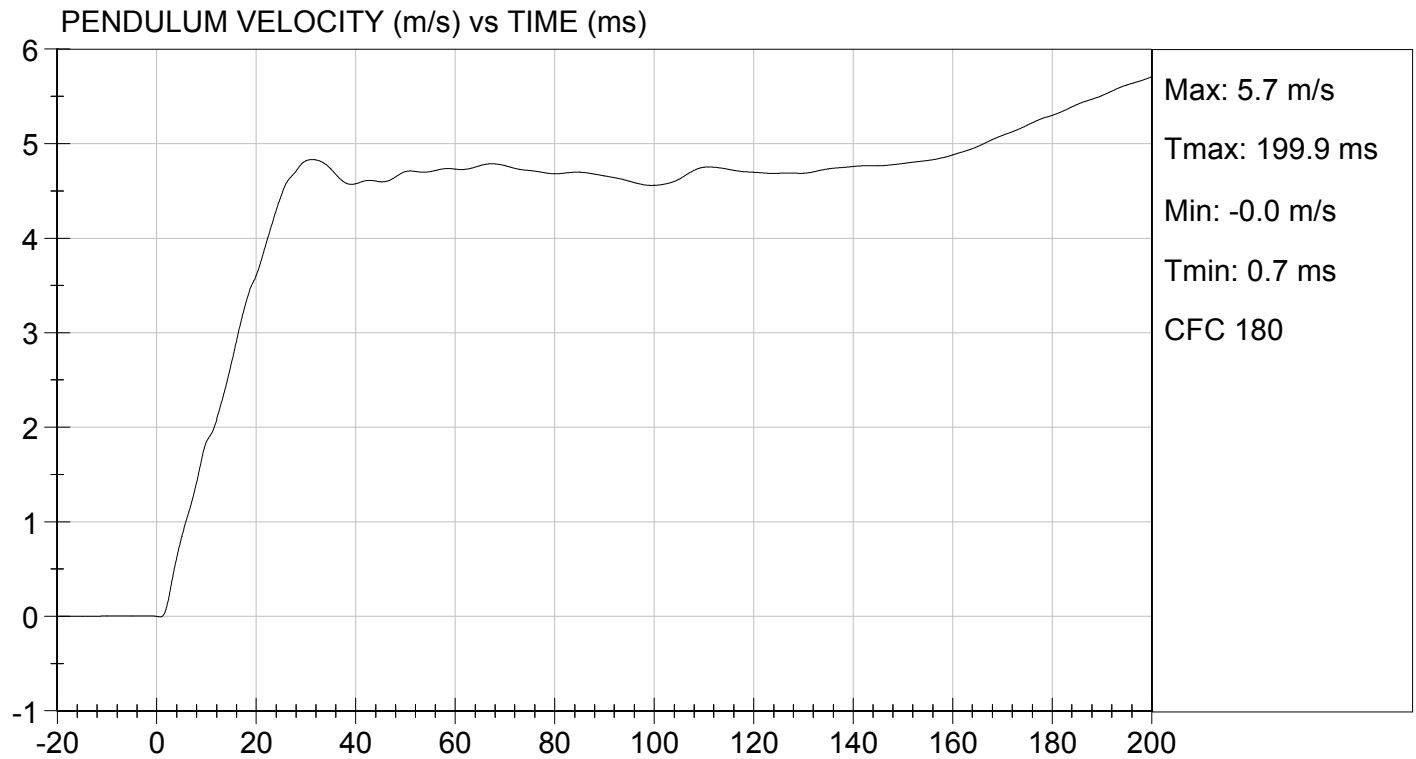
01/23/2015
Test Date

Jessica Hall
Approved By



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

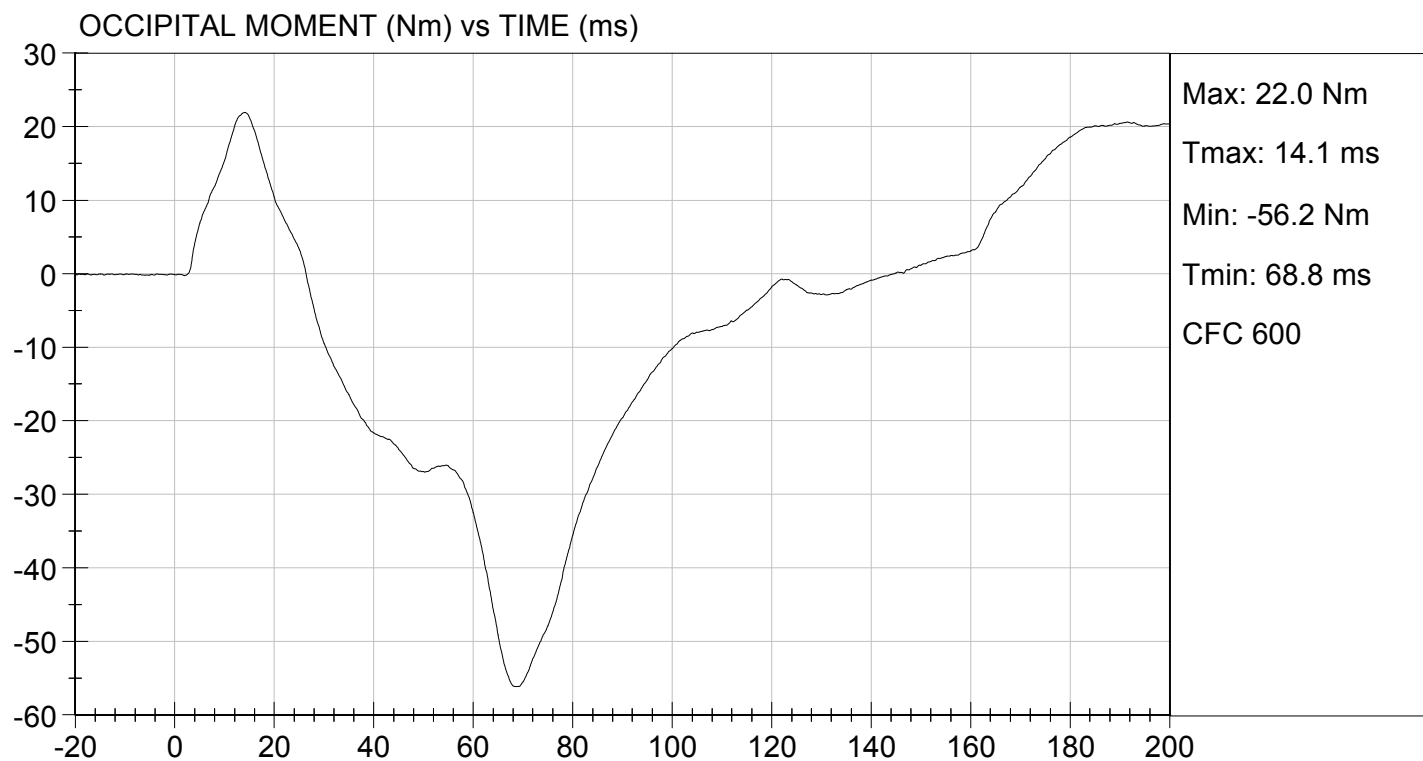
TEST DATE: 01/23/2015
TEST #: D15213





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

TEST DATE: 01/23/2015
TEST #: D15213



MGA RESEARCH CORPORATION
THORAX IMPACT
HYBRID III 5TH PERCENTILE

ATD Serial No: 634

Test I.D: D15214

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.7	Pass
Relative Humidity	%	10 to 70	16	Pass
Probe Speed	m/s	6.59 to 6.83	6.77	Pass
Peak Deflection	mm	50 to 58	50	Pass
Peak Resistive Force w/in Deflection Corridor	N	3900 to 4400	4074	Pass
Internal Hysteresis	%	69 to 85	71	Pass
Peak Force 18 mm - 50 mm	N	<= 4600	4307	Pass
Overall Test Results				Pass

Maxime Chamberland
Laboratory Technician

01/26/2015

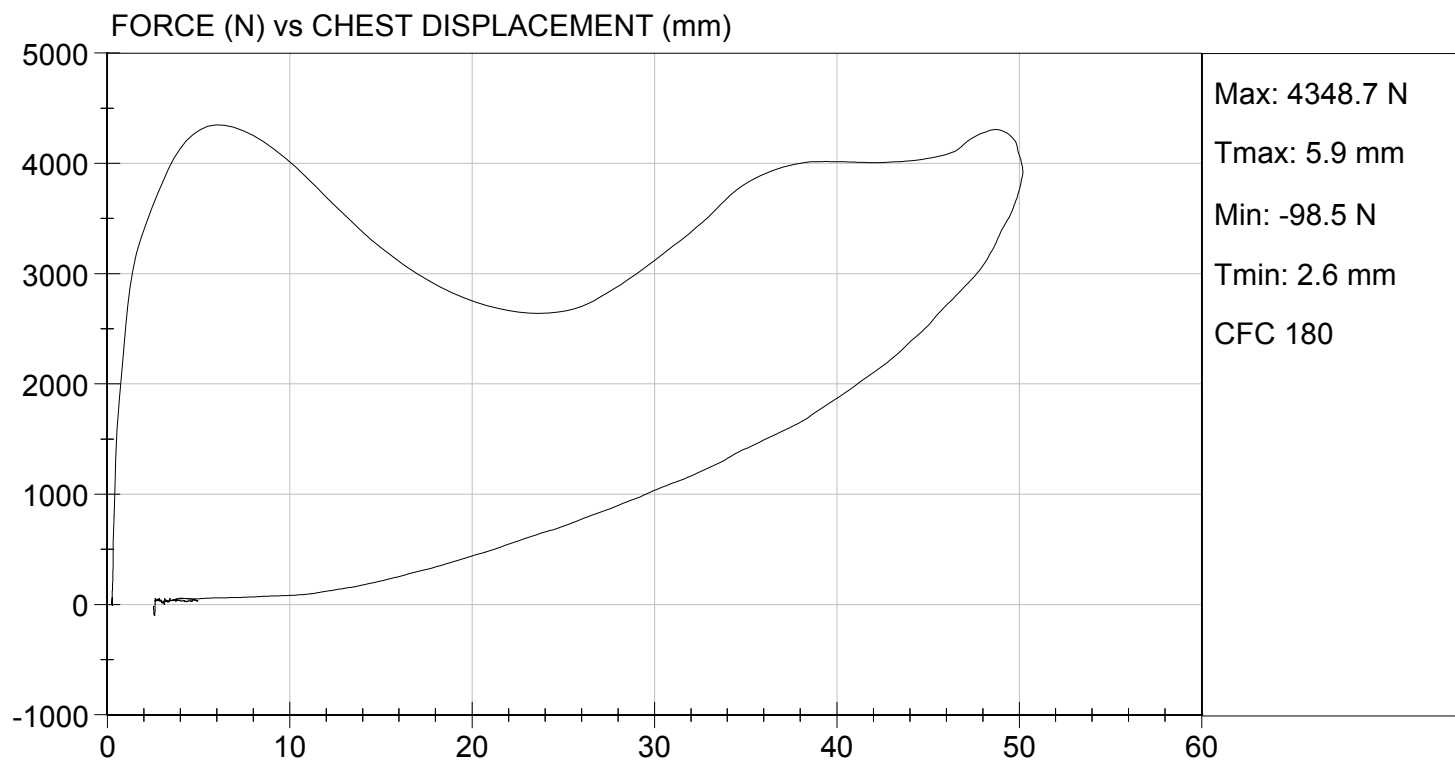
Test Date

Jessica Hall
Approved By



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

TEST DATE: 01/26/2015
TEST #: D15214



MGA RESEARCH CORPORATION

RIGHT KNEE IMPACT TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634

Test I.D: D15215

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	Pass
Probe Speed	m/s	2.07 to 2.13	2.12	Pass
Maximum Force	N	3450 to 4060	4047	Pass
Overall Test Results				Pass

David Schoedel
Laboratory Technician

01/23/2015

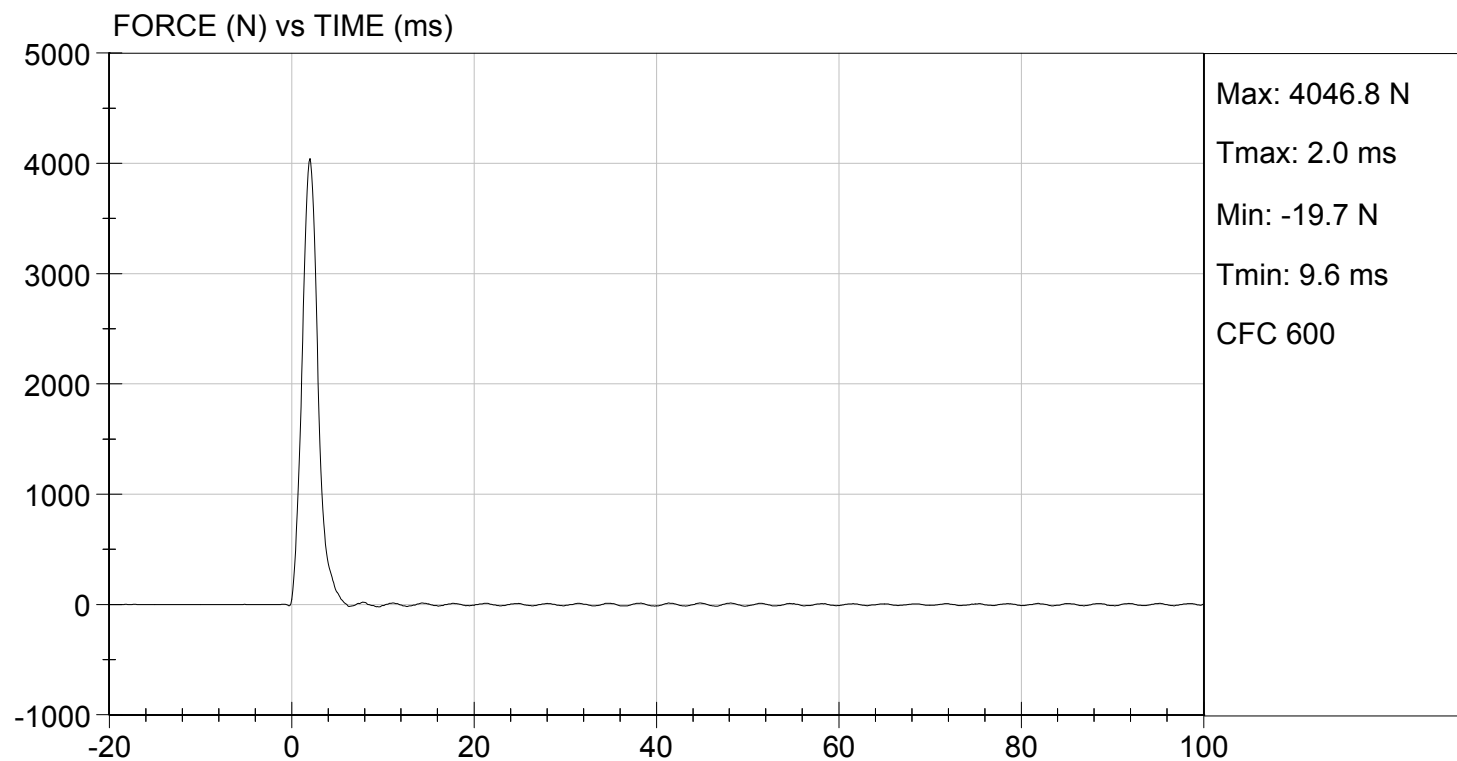
Test Date

Jessica Hall
Approved By



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

TEST DATE: 01/23/2015
TEST #: D15215



MGA RESEARCH CORPORATION

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

ATD Serial No: 634

Test I.D: D15216

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	Pass
Probe Speed	m/s	2.07 to 2.13	2.13	Pass
Maximum Force	N	3450 to 4060	3657	Pass
Overall Test Results				Pass

David Schoedel
Laboratory Technician

01/23/2015

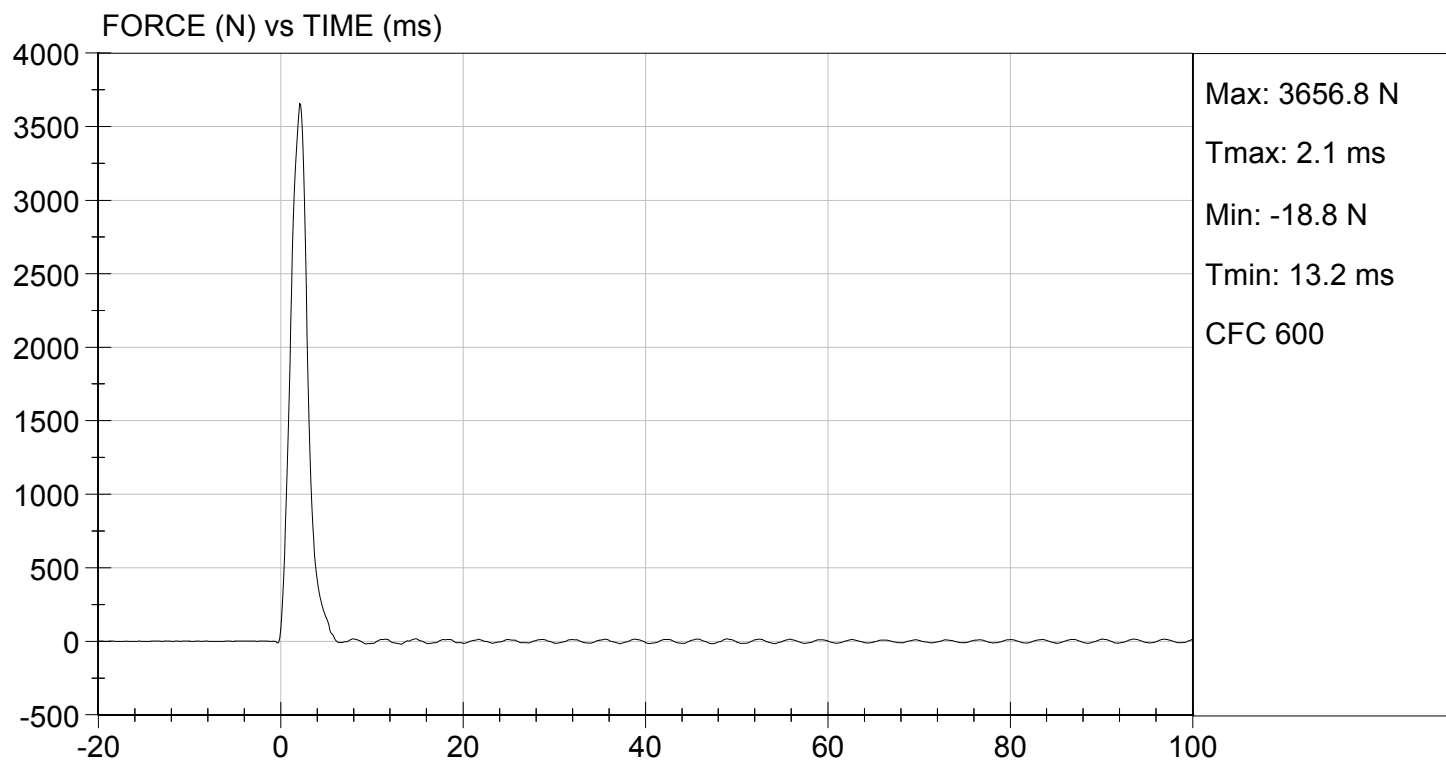
Test Date

Jessica Hall
Approved By



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

TEST DATE: 01/23/2015
TEST #: D15216



MGA RESEARCH CORPORATION

TORSO FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634

Test I.D: D15217

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	24	Pass
Initial Angle	deg	0 to 20	20	Pass
Return Angle	deg	+/- 8	7	Pass
Force at 45 deg	N	320 to 390	354	Pass
Upper Torso Deflection Rate	deg/s	0.5 to 1.5	0.6	Pass
Overall Result				Pass

Maxime Chamberland
Laboratory Technician

01/23/2015

Test Date

Jessica Gall
Approved By

MGA RESEARCH CORPORATION
HEAD DROP TEST
HYBRID III 5TH PERCENTILE

ATD Serial No: 634

Test ID: D15701

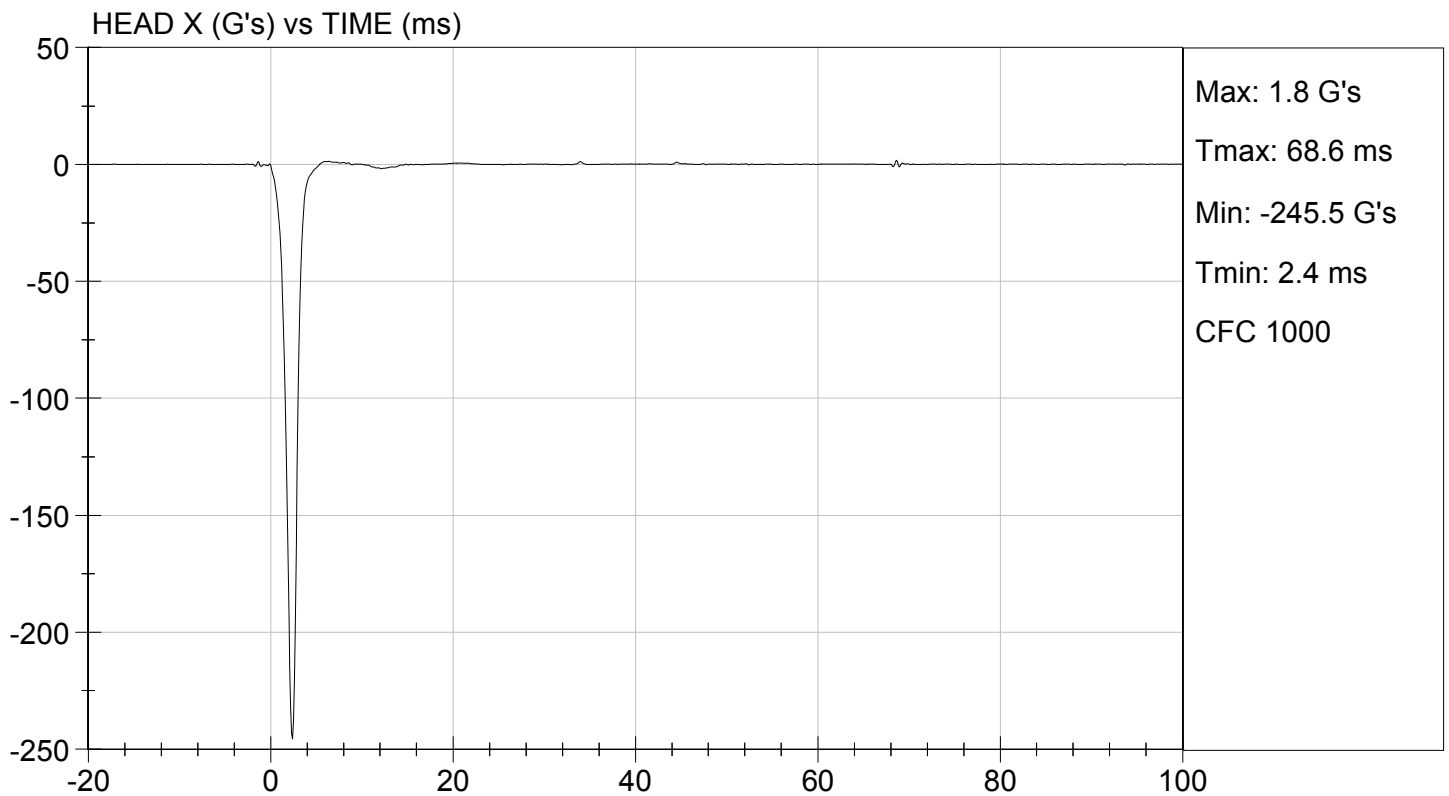
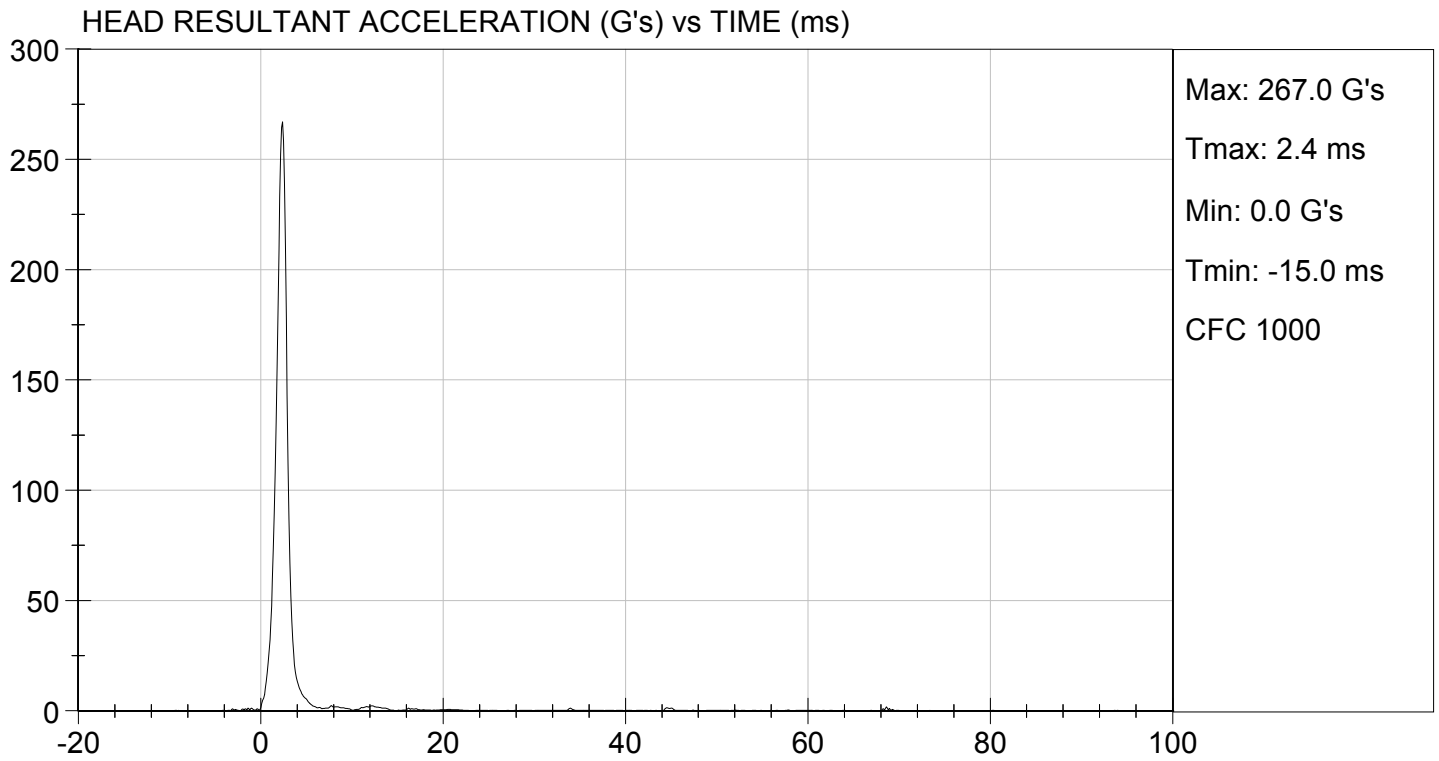
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Peak Resultant Acceleration	G's	250 to 300	267	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	-7.6	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
Overall Test Results				Pass

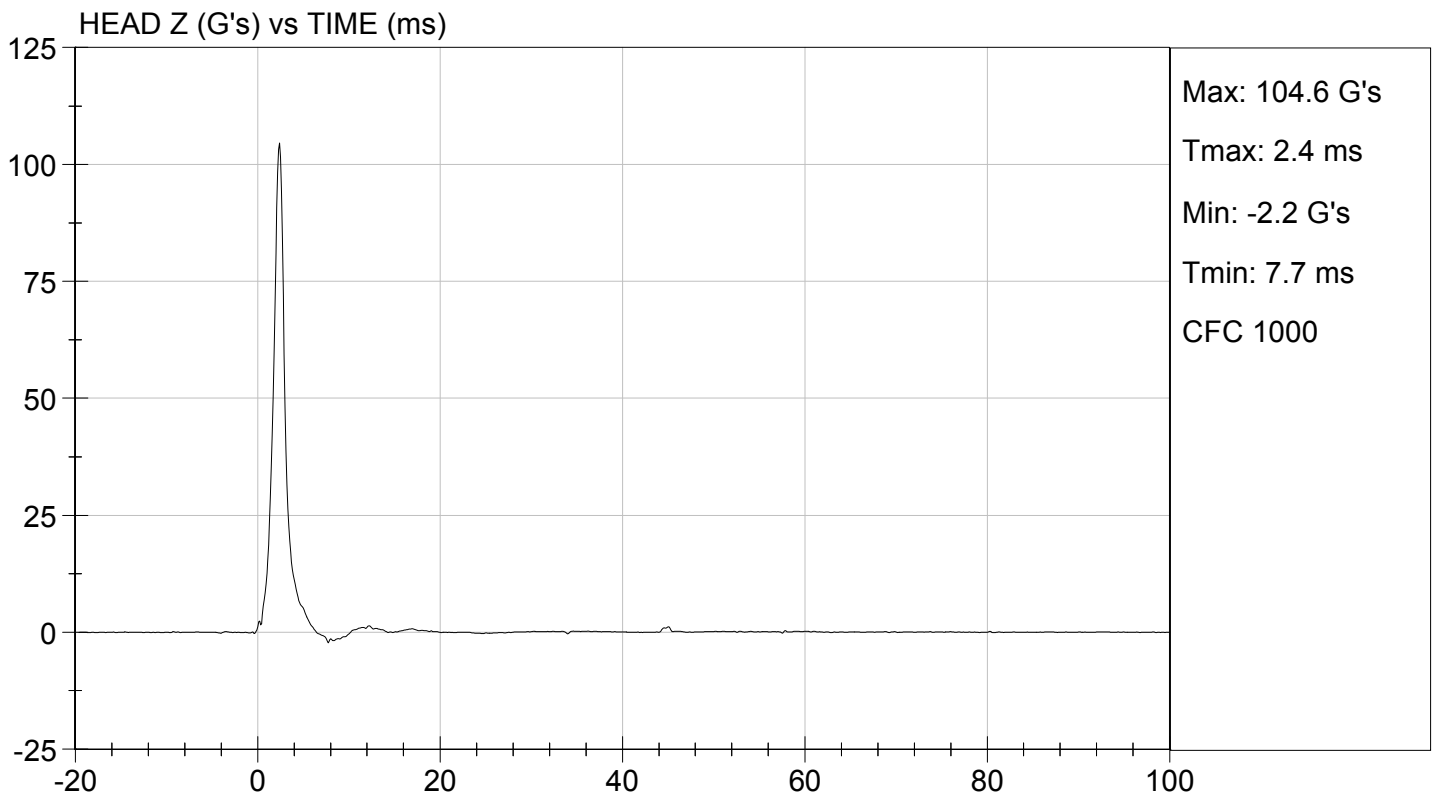
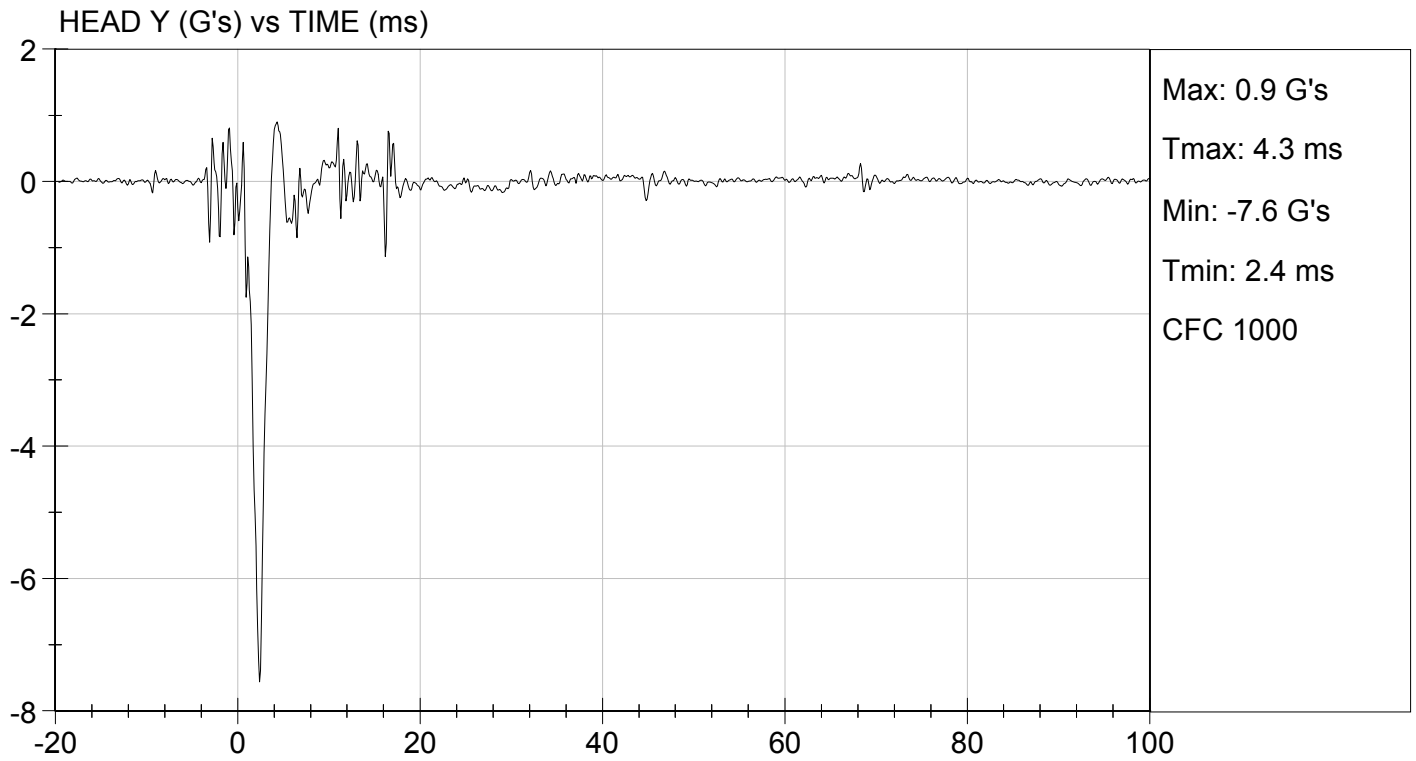

Laboratory Technician

03/17/2015

Test Date


Approved By





MGA RESEARCH CORPORATION**NECK FLEXION TEST****HYBRID III 5TH PERCENTILE**ATD Serial No: 634Test I.D.: D15702

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity		%	10 to 70	22	Pass
Pendulum Speed		m/s	6.89 to 7.13	7.06	Pass
Pendulum Velocity	10 ms	m/s	2.1 to 2.5	2.4	Pass
	20 ms	m/s	4.0 to 5.0	4.4	Pass
	30 ms	m/s	5.8 to 7.0	6.0	Pass
D Plane Rotation	Max	deg	77 to 91	82	Pass
Occipital Condyle Moment within Rotation Corridor		Nm	69 to 83	74	Pass
Positive Moment Time Curve Decay to 10 Nm		ms	80 to 100	86	Pass
Overall Results				Pass	



Laboratory Technician

03/17/2015

Test Date

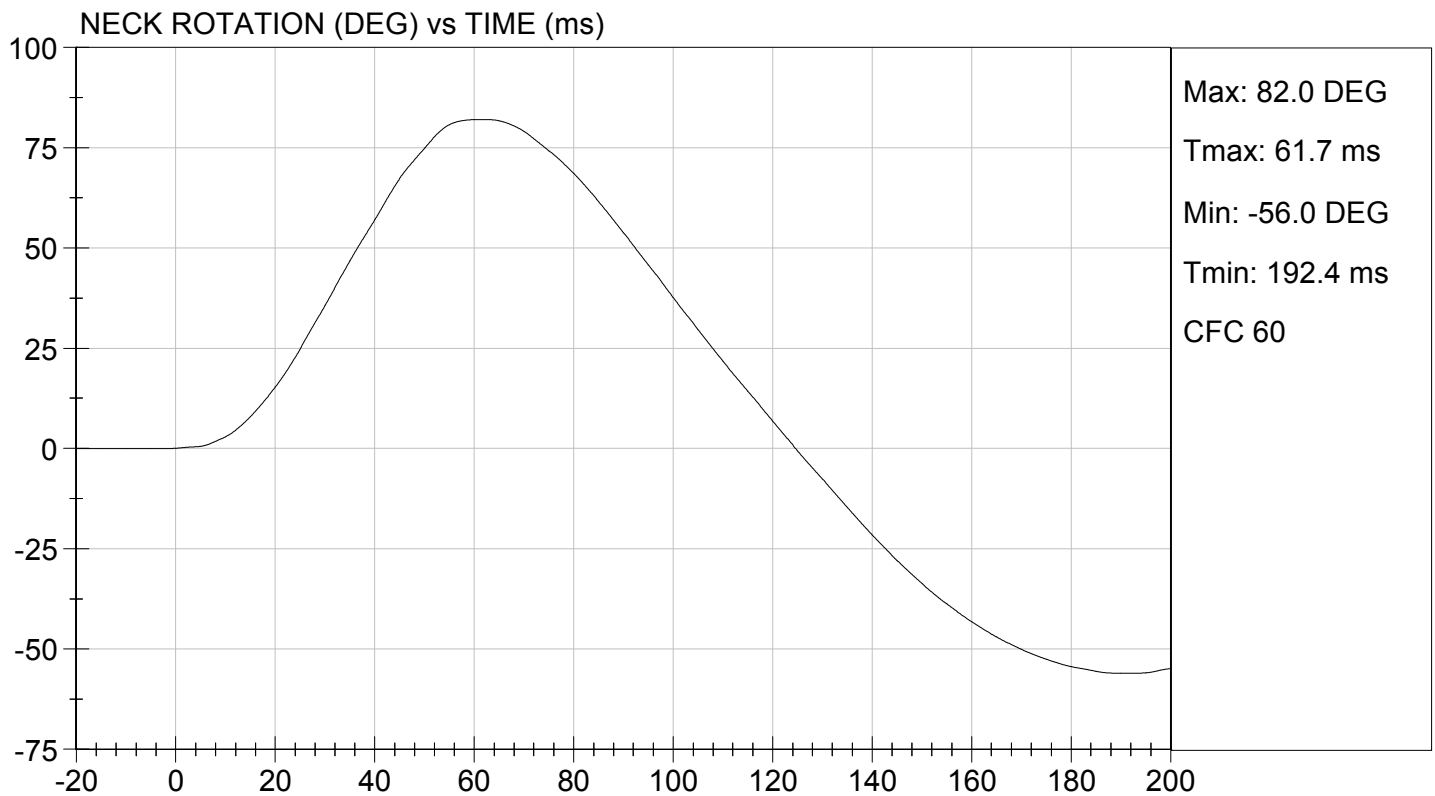
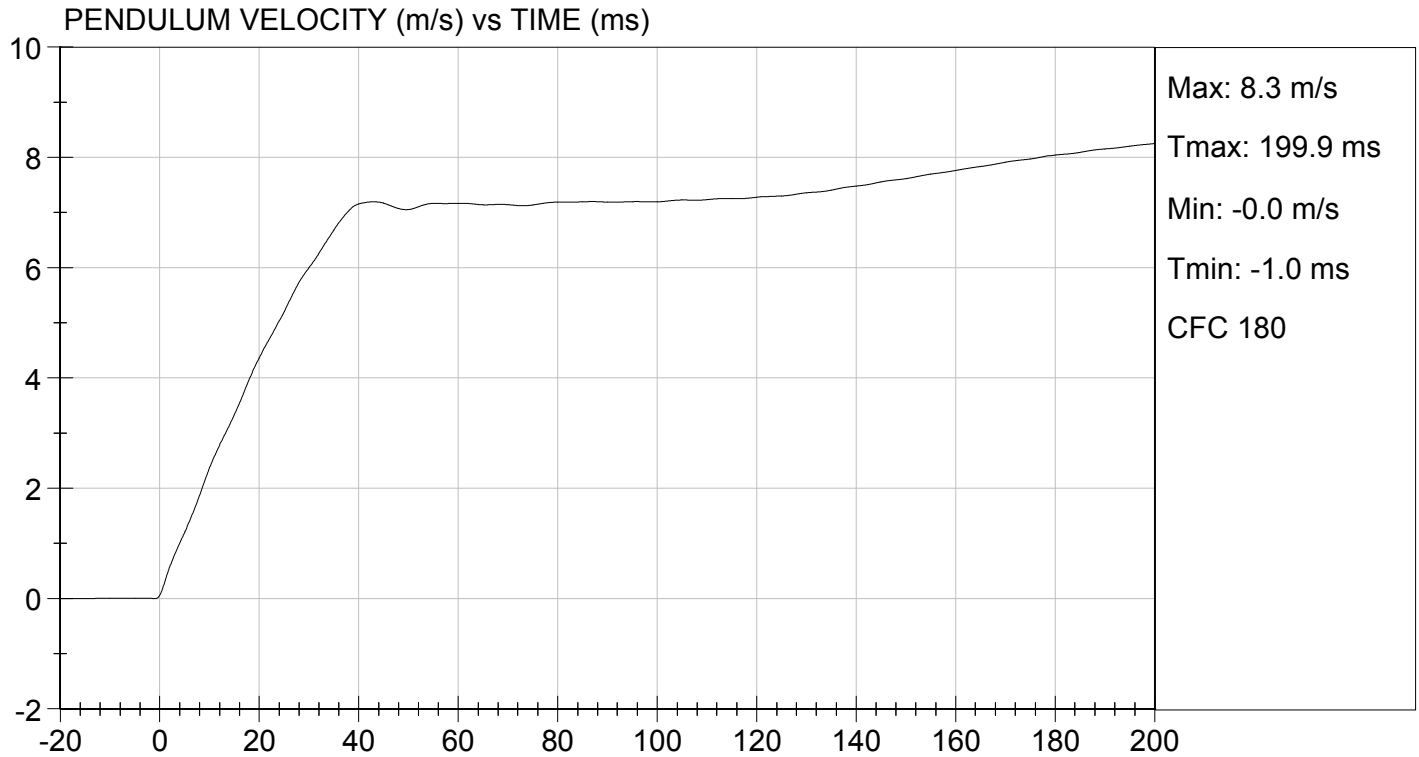


Approved By



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

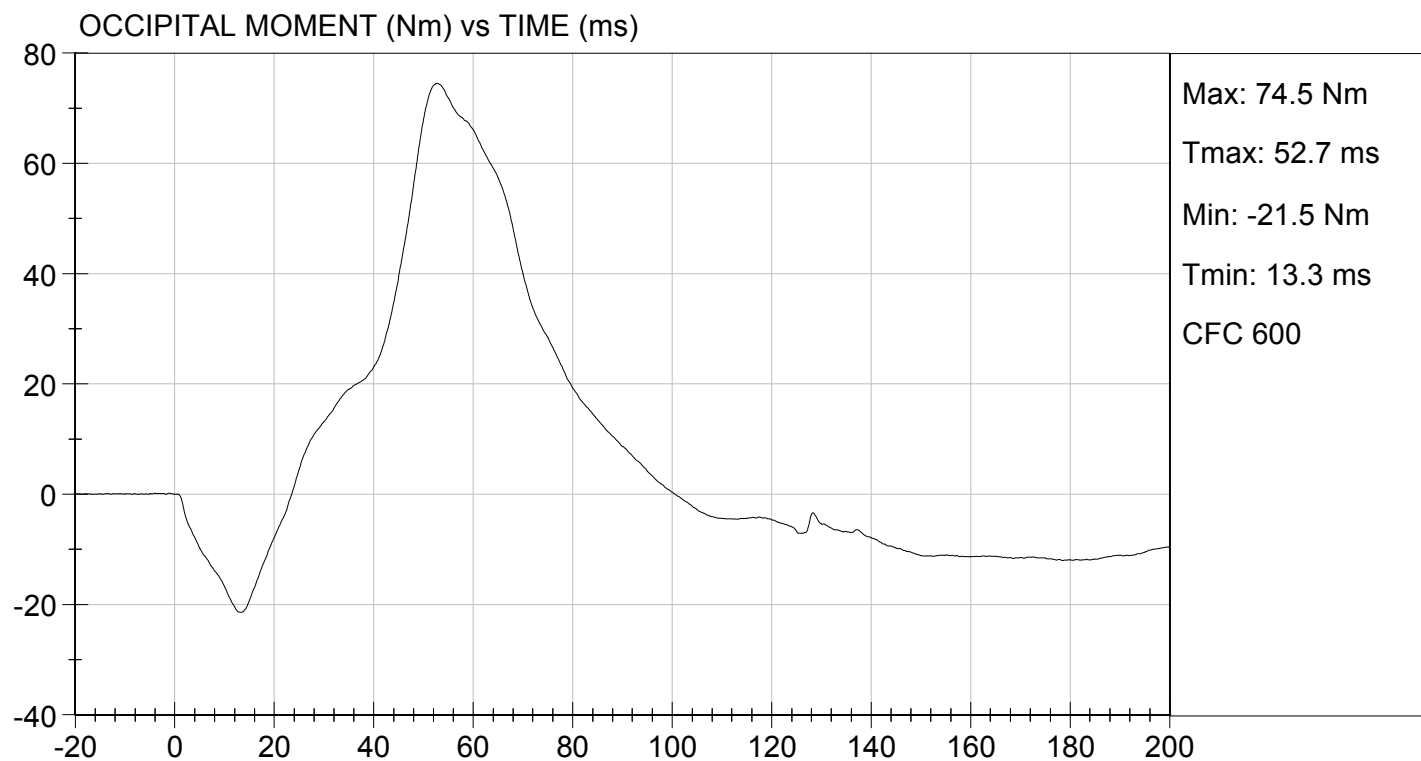
TEST DATE: 03/17/2015
TEST #: D15702





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

TEST DATE: 03/17/2015
TEST #: D15702



MGA RESEARCH CORPORATION
NECK EXTENSION TEST
HYBRID III 5TH PERCENTILE

ATD Serial No: 634

Test I.D: D15703

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity		%	10 to 70	22	Pass
Pendulum Speed		m/s	5.95 to 6.19	6.19	Pass
Pendulum Velocity	10 ms	m/s	1.5 to 1.9	1.6	Pass
	20 ms	m/s	3.1 to 3.9	3.4	Pass
	30 ms	m/s	4.6 to 5.6	4.9	Pass
D Plane Rotation	Max	deg	99 to 114	110	Pass
Occipital Condyle Moment within Rotation Corridor		Nm	-65 to -53	-56	Pass
Negative Moment Time Curve Decay to -10 Nm		ms	94 to 114	103	Pass
Overall Results					Pass


Laboratory Technician

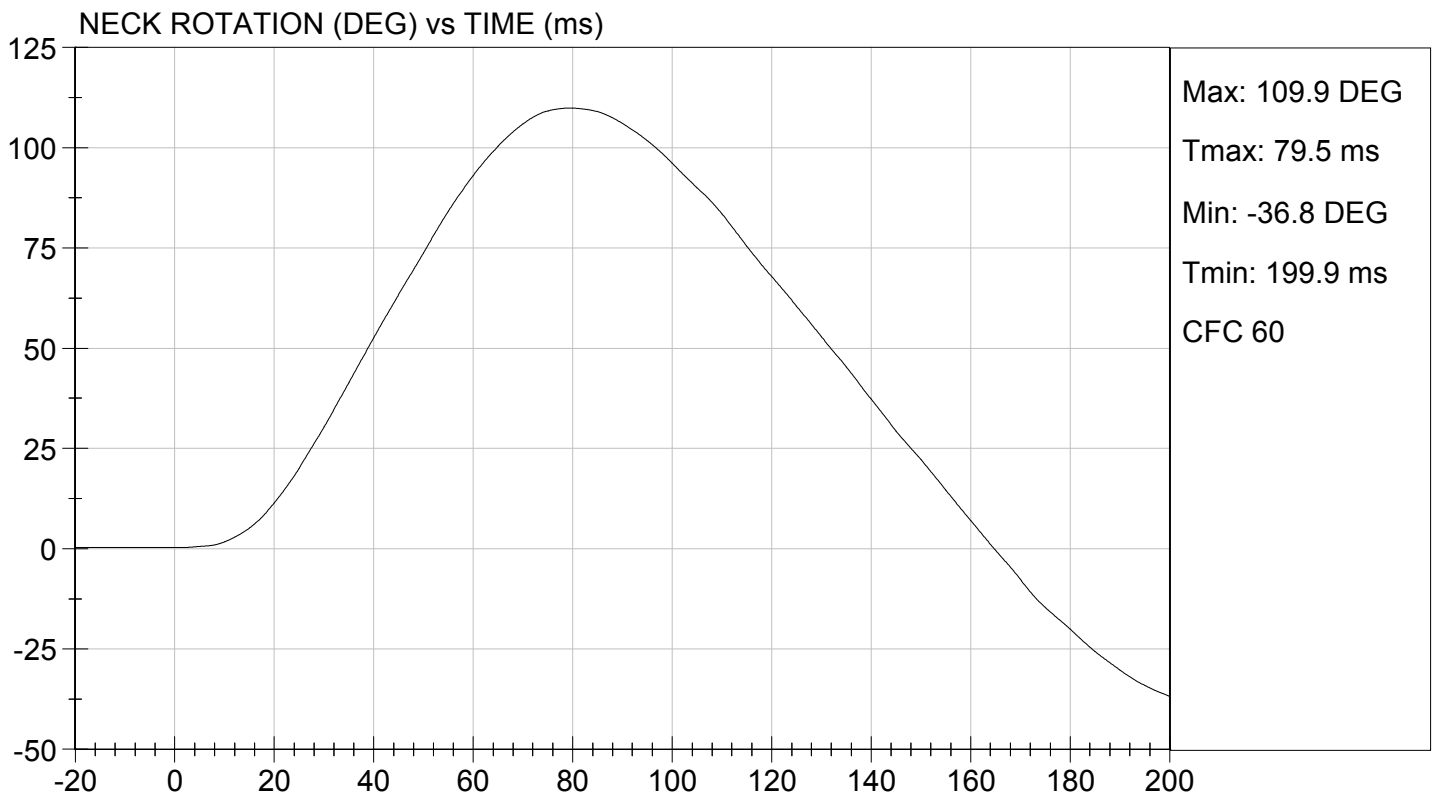
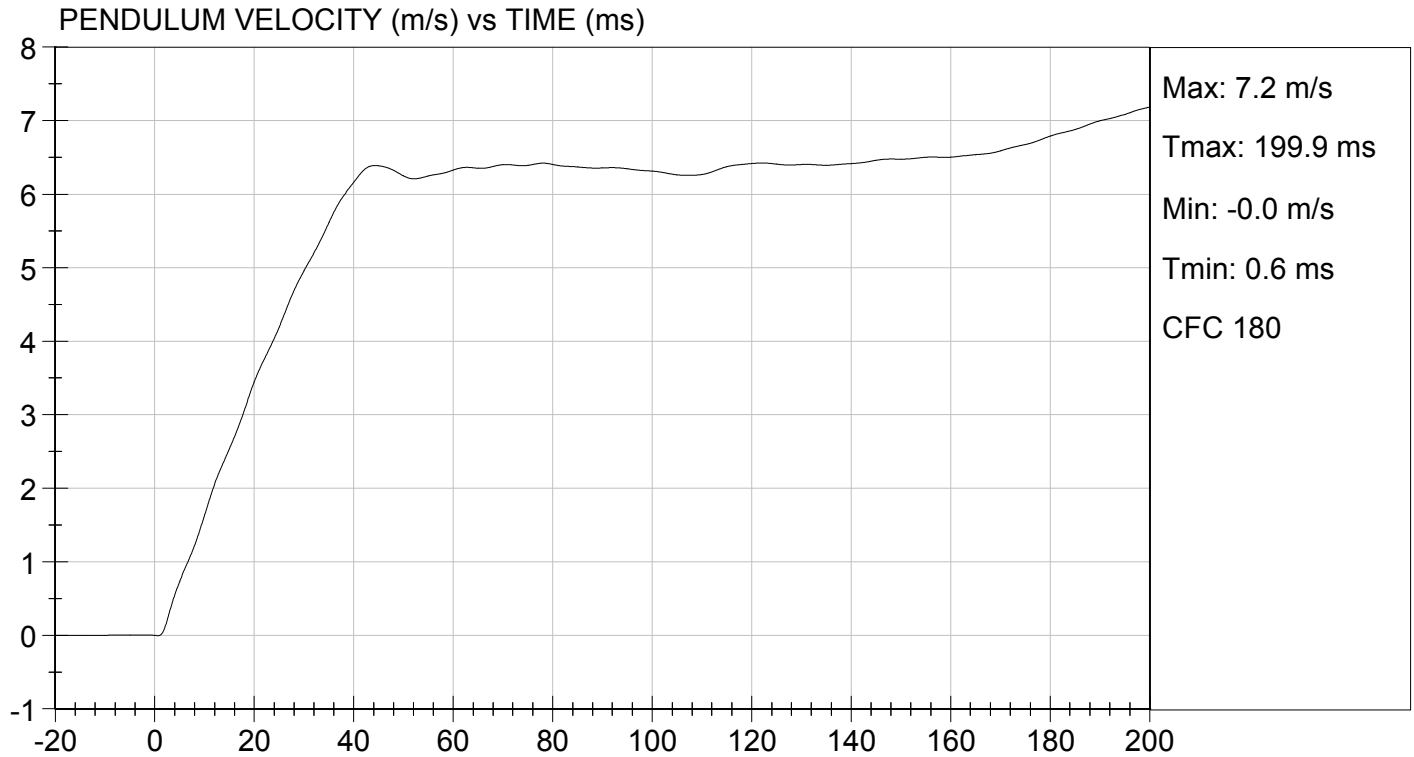

Approved By

03/17/2015
Test Date



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

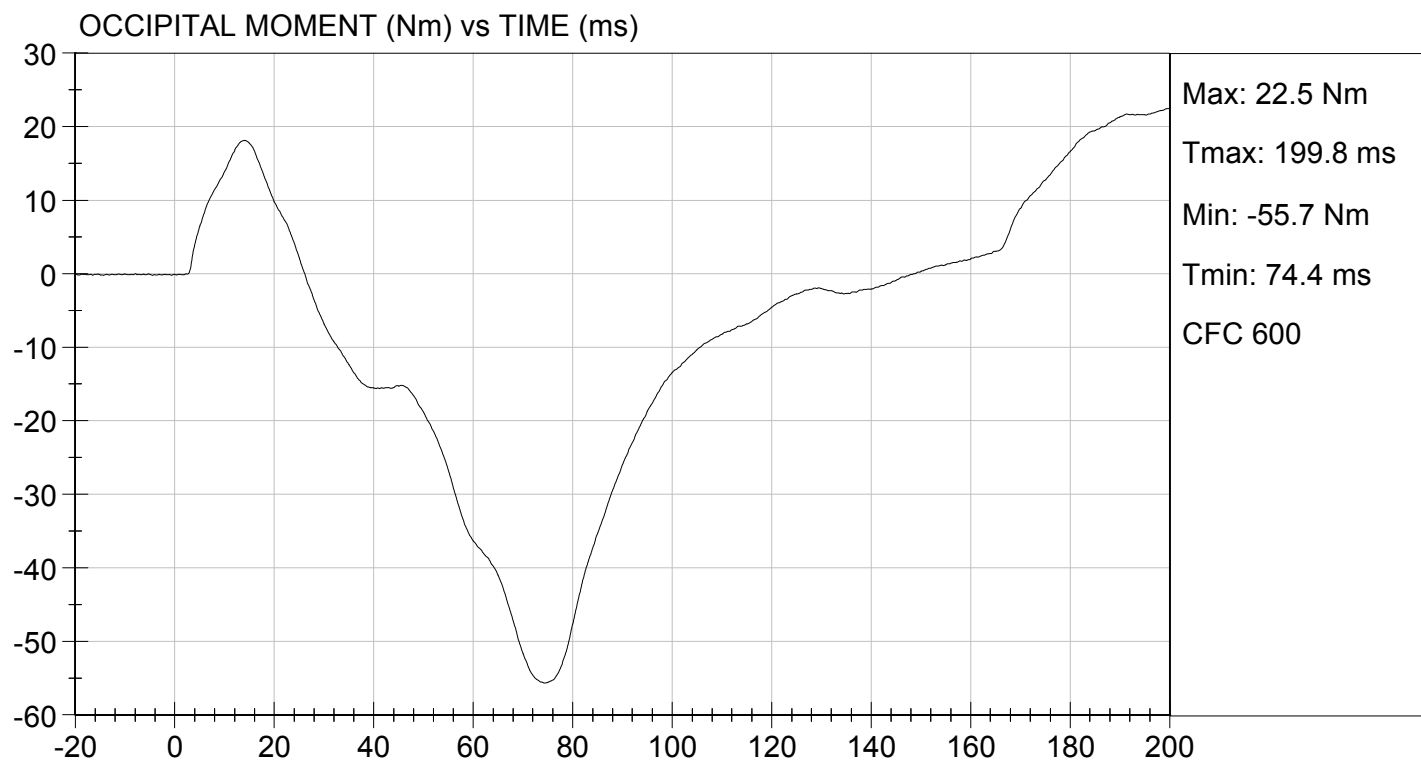
TEST DATE: 03/17/2015
TEST #: D15703





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

TEST DATE: 03/17/2015
TEST #: D15703



MGA RESEARCH CORPORATION
THORAX IMPACT
HYBRID III 5TH PERCENTILE

ATD Serial No: 634

Test I.D: D15704

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Relative Humidity	%	10 to 70	20	Pass
Probe Speed	m/s	6.59 to 6.83	6.77	Pass
Peak Deflection	mm	50 to 58	51	Pass
Peak Resistive Force w/in Deflection Corridor	N	3900 to 4400	4130	Pass
Internal Hysteresis	%	69 to 85	73	Pass
Peak Force 18 mm - 50 mm	N	<= 4600	4330	Pass
Overall Test Results				Pass


Laboratory Technician

03/17/2015

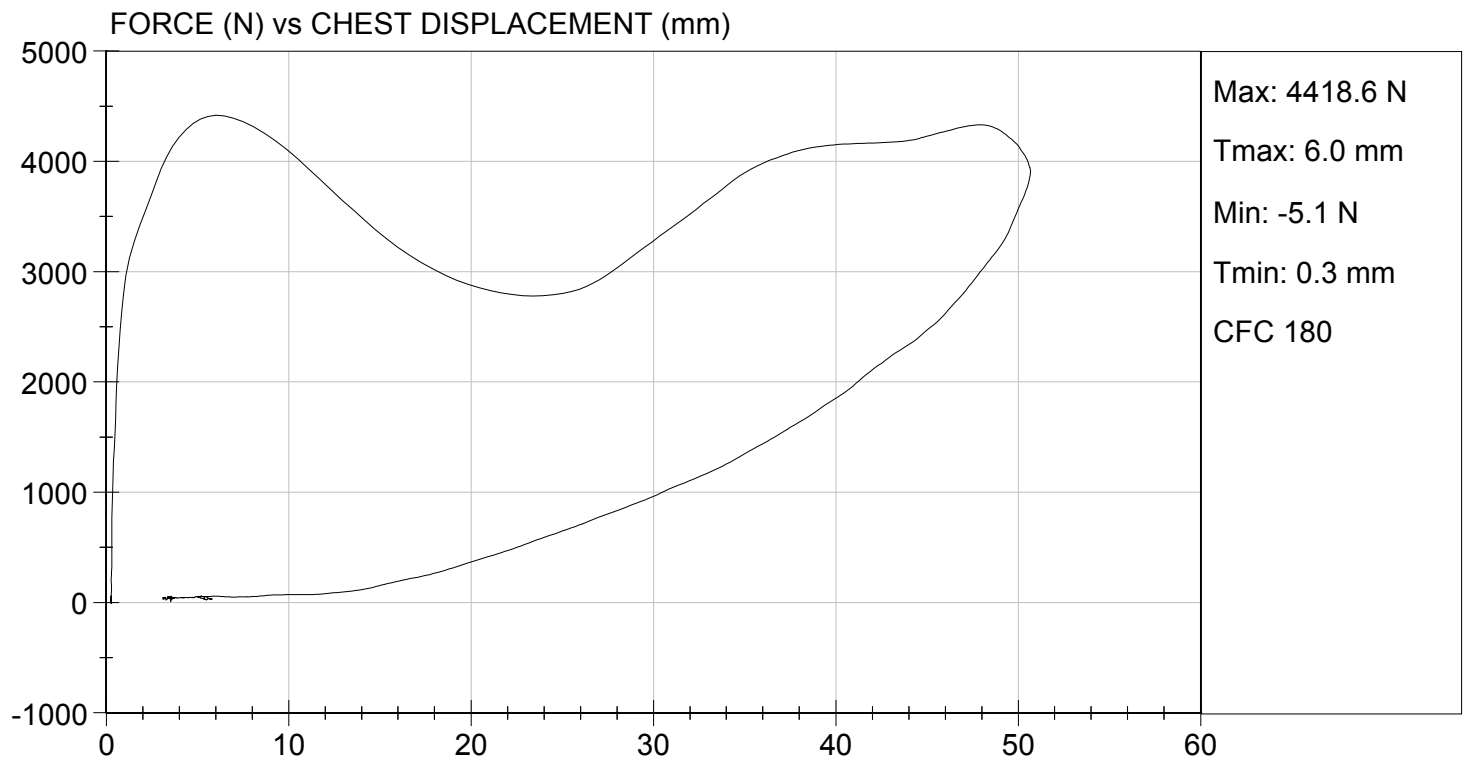
Test Date


Approved By



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

TEST DATE: 03/17/2015
TEST #: D15704



MGA RESEARCH CORPORATION

RIGHT KNEE IMPACT TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634

Test I.D: D15705

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	22	Pass
Probe Speed	m/s	2.07 to 2.13	2.12	Pass
Maximum Force	N	3450 to 4060	4005	Pass
Overall Test Results				Pass

Jack Coleman
Laboratory Technician

03/17/2015

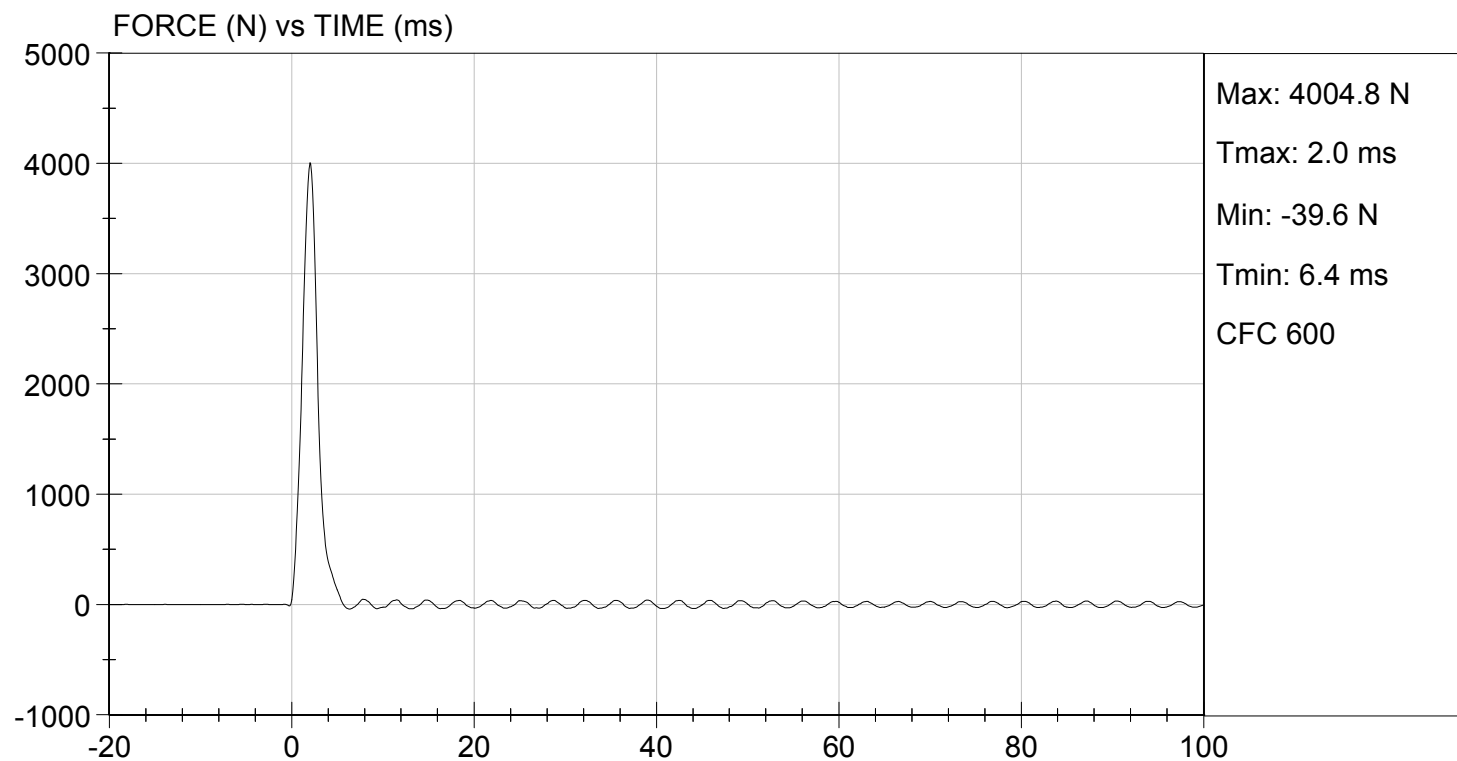
Test Date

Jessica Hall
Approved By



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

TEST DATE: 03/17/2015
TEST #: D15705



MGA RESEARCH CORPORATION

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

ATD Serial No: 634

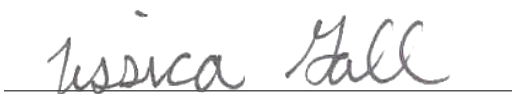
Test I.D: D15706

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	22	Pass
Probe Speed	m/s	2.07 to 2.13	2.12	Pass
Maximum Force	N	3450 to 4060	3741	Pass
Overall Test Results				Pass


Laboratory Technician

03/17/2015

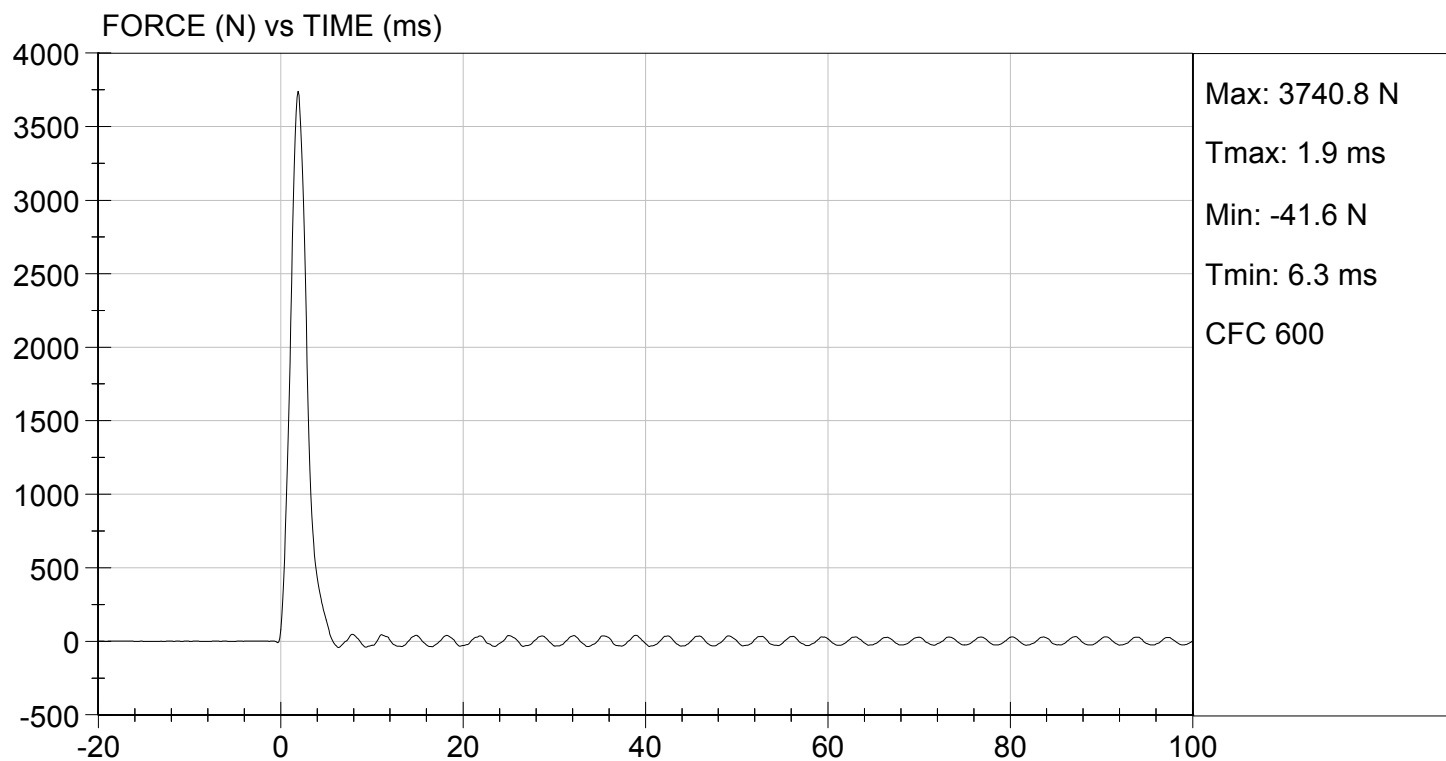
Test Date


Approved By



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

TEST DATE: 03/17/2015
TEST #: D15706



MGA RESEARCH CORPORATION

TORSO FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634

Test I.D: D15707

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	22	Pass
Initial Angle	deg	0 to 20	19	Pass
Return Angle	deg	+/- 8	8	Pass
Force at 45 deg	N	320 to 390	338	Pass
Upper Torso Deflection Rate	deg/s	0.5 to 1.5	0.8	Pass
Overall Result				Pass

David Schoedel

Laboratory Technician

03/17/2015

Test Date

Jessica Hall

Approved By