

**REPORT NUMBER: NCAP-MGA-22-029**

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

**FORD MOTOR CO.  
2022 Ford F-150 XLT 4x4 SuperCrew HEV  
NHTSA No.: M20220216**

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



**Test Date: August 22, 2022**

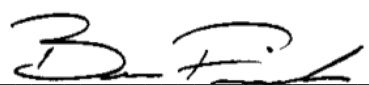
**Final Report Date: December 21, 2023**

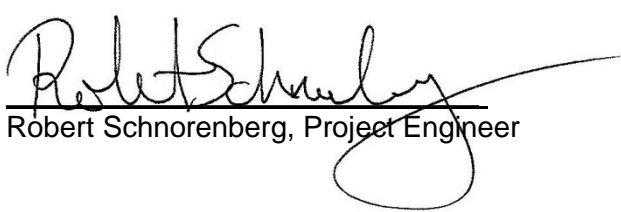
**FINAL REPORT**

**U.S. DEPARTMENT OF TRANSPORTATION  
National Highway Traffic Safety Administration  
Office of Crashworthiness Standards  
1200 New Jersey Ave, SE  
Washington, DC 20590**

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Approval Date: December 21, 2023

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: \_\_\_\_\_

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

Date: \_\_\_\_\_

## TECHNICAL REPORT DOCUMENTATION PAGE

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<b>4. Title and Subtitle</b> Final Report of New Car Assessment Program Frontal Impact Testing and FMVSS No. 305 Indicant Testing of a 2022 Ford F-150 XLT 4x4 SuperCrew HEV, NHTSA No.: M20220216		<b>5. Report Date</b> December 21, 2023																																																							
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<b>9. Performing Organization Name and Address</b> MGA Research Corporation 5000 Warren Road Burlington, WI 53105		<b>8. Performing Organization Report No.</b> NCAP-MGA-22-029																																																							
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<b>16. Abstract</b> A 56.3 km/h NCAP Frontal Rigid Barrier Impact Test was conducted on a 2022 Ford F-150 XLT 4x4 SuperCrew HEV in accordance with the specifications of the Office of Crashworthiness Standards Laboratory Procedure for NCAP Full Frontal Rigid Barrier Impact Testing. The test was conducted at MGA Research Corporation in Burlington, Wisconsin on August 22, 2022.  The impact velocity of the vehicle was 57.02 km/h and the ambient temperature at the barrier face at the time of impact was 21.4°C. The target vehicle post-test maximum crush was 661 mm located to the left of the vehicle centerline. The test vehicle's performance was as follows:																																																									
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th rowspan="2">Units</th> <th colspan="2">Driver ATD</th> <th colspan="2">Passenger ATD</th> </tr> <tr> <th>Threshold</th> <th>Result</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC<sub>15</sub>)</td> <td></td> <td>700</td> <td>367.096</td> <td>700</td> <td>314.864</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>20.451</td> <td>52</td> <td>8.500</td> </tr> <tr> <td>Nij</td> <td></td> <td>1</td> <td>0.278</td> <td>1</td> <td>0.381</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>4170</td> <td>974.617</td> <td>2620</td> <td>707.210</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>4000</td> <td>816.016</td> <td>2520</td> <td>492.763</td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>10008</td> <td>644.441</td> <td>6805</td> <td>139.681</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>10008</td> <td>544.012</td> <td>6805</td> <td>108.568</td> </tr> </tbody> </table>						Measurement Description	Units	Driver ATD		Passenger ATD		Threshold	Result	Threshold	Result	Head Injury Criteria (HIC <sub>15</sub> )		700	367.096	700	314.864	Maximum Chest Compression	mm	63	20.451	52	8.500	Nij		1	0.278	1	0.381	Neck Tension	N	4170	974.617	2620	707.210	Neck Compression	N	4000	816.016	2520	492.763	Left Femur Force	N	10008	644.441	6805	139.681	Right Femur Force	N	10008	544.012	6805	108.568
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<b>17. Key Words</b>  56.3 km/h (35 mph) Full Frontal Rigid Barrier Impact Test New Car Assessment Program (NCAP)			<b>18. Distribution Statement</b> Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division 1200 New Jersey Ave, SE Washington, DC 20590																																																						
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## **SECTION 1 PURPOSE AND SUMMARY OF TEST**

### **PURPOSE**

This 56.3 km/h frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under contract number 693JJ919D000006. 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 Laboratory Procedure for NCAP Full Frontal Rigid Barrier Impact Testing.

### **SUMMARY**

A load cell barrier consisting of 176 load cells was impacted by a 2022 Ford F-150 XLT 4x4 SuperCrew HEV at a velocity of 57.02 km/h. The test was performed at MGA Research Corporation on August 22, 2022. Pre-test and post-test photographs of the vehicle and dummies can be found in Appendix A.

Two (2) real-time cameras and sixteen (16) 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 50<sup>th</sup> percentile male anthropomorphic test device (ATD), was placed in the driver seating position and one Part 572O 5<sup>th</sup> percentile female test device (ATD) was placed in the right-front passenger seating position according to dummy placement instructions specified in the Laboratory Procedure for NCAP Full Frontal Rigid Barrier Impact Testing.

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.

The driver (position 1) ATD (Serial No. 351) and the right-front passenger (position 2) ATD (Serial No. 142) were qualified previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C of this report.

The 102 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 or battery electrolyte leakage and no loss of high-voltage battery isolation after the event or during any phase of the static rollover.

The maximum static crush of the vehicle was 661 mm located to the left of the vehicle centerline 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 contacted the airbag. The driver's head also contacted the headrest. The driver's knees contacted the knee airbag.  
 The passenger's visible contact points were as follows: The passenger's head contacted the airbag. The passenger's head also contacted the headrest. The passenger's left knee contacted the glove box.

The occupant data is summarized below:

ATD position	HIC <sub>15</sub>	Nij	Neck Tension (N)	Neck Comp. (N)	3ms Chest Clip (g)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver (50 <sup>th</sup> )	367.096	0.278	974.617	816.016	42.431	20.451	644.441	544.012
Passenger (5 <sup>th</sup> )	314.864	0.381	707.210	492.763	46.760	8.500	139.681	108.568

The test data can be found on the NHTSA website at [www.nhtsa.gov](http://www.nhtsa.gov)

### TEST NOTES

Driver Shoulder Belt load cell was not installed.  
 Driver Lap Belt load cell was not installed.  
 Passenger Shoulder Belt load cell was not installed.  
 Passenger Lap Belt load cell was not installed.

38mm flat plywood over steel plate was used in place of the load cell barrier.

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: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20220216  
 Test Date: 8/22/2022

**TEST VEHICLE INFORMATION AND OPTIONS**

NHTSA No.	M20220216	Traction Control System (TCS)	Yes
Model Year	2022	Power Steering	Yes
Make	Ford	Power Window Auto-Reverse	Yes
Model	F-150 XLT 4x4 SuperCrew HEV	Driver Frontal Airbag	Yes
Body Style	4-Door Pickup Truck	Driver Curtain Airbag	Yes
VIN	1FTFW1ED8NFA71235	Driver Head/Torso Airbag	No
Body Color	Iconic Silver Metallic	Driver Torso Airbag	No
Odometer (km/mi)	602 km / 374 mi	Driver Torso/Pelvis Airbag	Yes
Engine Displacement (L)	3.5 L	Driver Pelvis Airbag	No
Type/No. Cylinders	V6	Driver Knee Airbag	Yes
Engine Placement	Longitudinal	Front Pass. Frontal Airbag	Yes
Transmission Type	Automatic	Front Pass. Curtain Airbag	Yes
Transmission Speeds	10	Front Pass. Head/Torso Airbag	No
Overdrive	Yes	Front Pass. Torso Airbag	No
Final Drive	4WD	Front Pass. Torso/Pelvis Airbag	Yes
Roof Rack	No	Front Pass. Pelvis Airbag	No
Sunroof/T-Top	No	Front Pass. Knee Airbag	Yes
Running Boards	Yes	Driver Pretensioner	Yes
Tilt Steering Wheel	Yes	Driver Load Limiter	Yes
Power Seats	Yes	Front Pass. Pretensioner	Yes
Anti-Lock Brakes (ABS)	Yes	Front Pass. Load Limiter	Yes
Automatic Door Locks (ADLs)	Yes	Other	N/A

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

**DATA FROM CERTIFICATION LABEL**

Manufactured By	FORD MOTOR CO.	GVWR (kg)	3334
Date of Manufacture	02/22	GAWR Front (kg)	1769
		GAWR Rear (kg)	1882

**VEHICLE SEATING AND WEIGHT CAPACITY DATA**

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Split Bench		
Designated Seating Capacity (DSC)	2	3		5
Capacity Weight (VCW) (kg)				728
Cargo Weight (RCLW) (kg)				136*

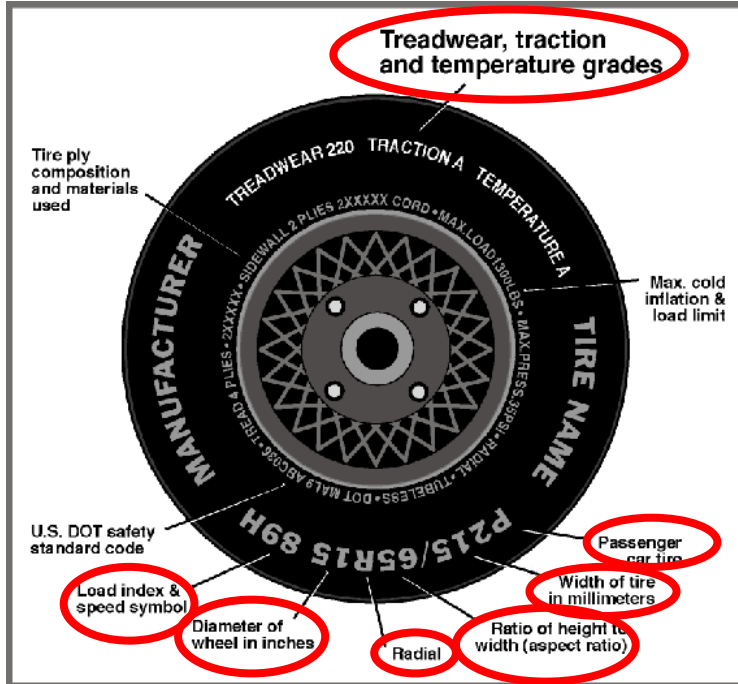
\* Rated Cargo and Luggage Weight (RCLW) limited to maximum of 300 lbs (136 kg).

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

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20220216  
 Test Date: 8/22/2022

**VEHICLE TIRE INFORMATION**



Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	240	240
Recommended Tire Size	275/65R18	275/65R18
Tire Size on Vehicle	275/65R18	275/65R18
Tire Manufacturer	Goodyear	Goodyear
Tire Model	Wrangler Territory	Wrangler Territory
Treadwear	580	580
Traction	B	B
Temperature Grade	B	B
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel, 1 Polyamide	2 Polyester, 2 Steel, 1 Polyamide
Load Index/Speed Symbol	116T	116T
Tire Material	Rubber	Rubber
DOT Safety Code Left	14BYJ JX1R 0422	14BYJ JX1R 0422
DOT Safety Code Right	14BYJ JX1R 0422	14BYJ JX1R 0422

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

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20220216  
 Test Date: 8/22/2022

**TEST VEHICLE WEIGHTS**

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	765.0	535.0		798.0	647.5	
Right	kg	757.0	544.5		772.0	652.0	
Ratio	%	58.5%	41.5%		54.7%	45.3%	
Totals	kg	1522.0	1079.5	2601.5	1570.0	1299.5	2869.5

**TARGET TEST WEIGHT CALCULATION**

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	2601.5
Weight of 1 P572E ATD & 1 P572O ATD	kg	141
Rated Cargo/Luggage Weight (RCLW)	kg	136
Calculated Test Vehicle Target Weight (TVTW)	kg	2878.5

**TEST VEHICLE ATTITUDES AND CG**

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	952	955	1039	1042	1671
As Tested	mm	930	934	1015	1025	1823
Post Test	mm	891	898	1018	1026	

**GENERAL TEST VEHICLE DATA**

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	4026
Total Vehicle Length at Left Side	mm	6026
Total Vehicle Length at Centerline	mm	6185
Total Vehicle Length at Right Side	mm	6026
Weight of Ballast in Cargo Area	kg	48
Weight of Vehicle Components Removed	kg	0
Amount of Stoddard Solvent in Fuel Tank	L	114.7

List of components removed to meet test weight: None.

List of components removed for instrumentation, data box, and equipment installation: None.

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

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20220216  
 Test Date: 8/22/2022

**TARGET VEHICLE STRUCTURAL MEASUREMENT**

	<b>Elements</b>	<b>Pre-Test (mm)</b>
1	Total Length	6185
2	Total Width	2034
3	Bumper Top Height	626
4	Bumper Bottom Height	455
5	Longitudinal Member Top Height	664
6	Distance between Longitudinal Members	760
7	Longitudinal Member Width	96
8	Engine Top Height	1103
9	Engine Bottom Height	372
10	Engine and Gearbox Width	1335
11	Front Bumper-Engine Distance	512
12	Front Shock Absorber Fixing Height	784
13	Bonnet Leading Edge Height	1136
14	Front Shock Absorber Fixing Width	215
15	Front Bumper – Front Axle Distance	868
16	Front Axle – A-Pillar Distance	590
17	A-Pillar – B-Pillar Distance	1280
18	B-Pillar – Rear Axle Distance	2149
19	B-Pillar – C-Pillar Distance	998
20	Roof Sill Bottom Height	1852
21	Roof Sill Top Height	1892
22	Floor Sill Bottom Height	401
23	Floor Sill Top Height	526

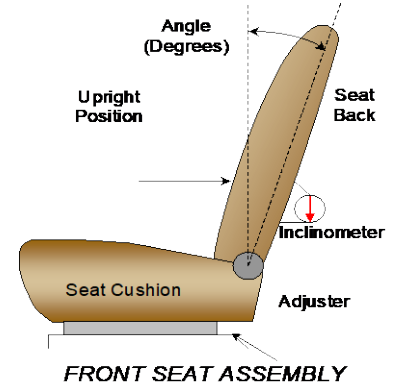
**DATA SHEET NO. 2  
SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA**

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20220216  
 Test Date: 8/22/2022

**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 May 2018.



	Degrees
Driver Seat Back Angle	2.5° on outboard headrest post
Passenger Seat Back Angle	-0.9° on outboard headrest post

**SEAT FORE/AFT POSITIONS**

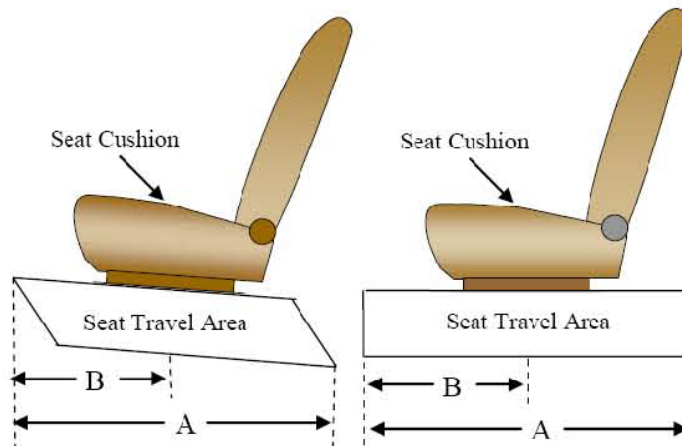
The driver and passenger seat fore/aft positions are adjusted following Appendix F, "Driver & Passenger Dummy Seating & Positioning Procedures" in the NCAP Test Procedure dated May 2018.

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	315 mm	158 mm
Passenger Seat	236 mm	0 mm

**SEAT BELT UPPER ANCHORAGES**

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

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



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

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
 Test Program: NCAP Frontal Barrier Impact Test

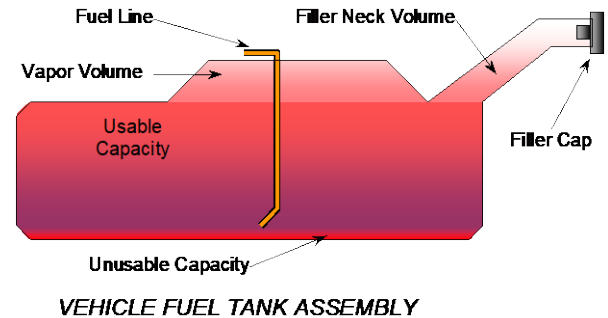
NHTSA No.: M20220216  
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**FUEL TANK CAPACITY DATA**

	<b>Liters</b>
Usable Capacity of "Standard Tank"	123.4
Usable Capacity of "Optional Tank"	
92-94% of Usable Capacity	113.5 to 116.0
Actual Amount of Solvent used	114.7
1/3 of Usable Capacity	41.1

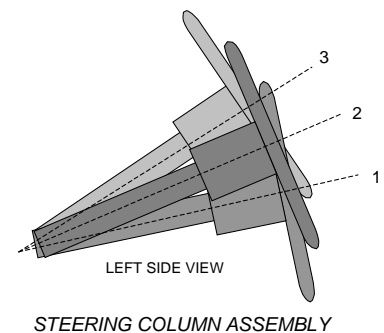
**FUEL PUMP**

The vehicle is equipped with an electronic fuel pump. The electric fuel pump operates for about 1 second to pressurize the fuel system following the actuation of the ignition. It also turns on with the power up of the PCM. If no attempt has been made to start the engine within 1 second following the ignition actuation, the fuel pump will shut off. The fuel pump operates continuously while the engine is running. If the engine stalls, the fuel pump is deactivated. Additionally, the fuel pump is shut off by the restraint control module to stop fuel flow to the engine if the vehicle sustains an impact above a certain magnitude. The filler neck is located on the driver's side.



**STEERING COLUMN ADJUSTMENT**

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



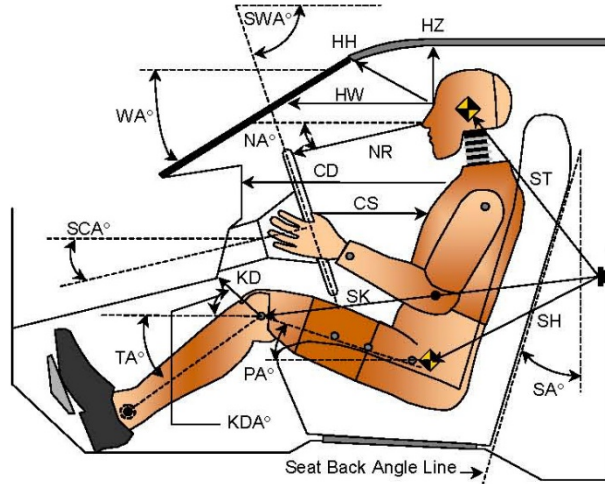
**STEERING COLUMN POSITION**

	<b>Degrees</b>	<b>Fore/Aft Position (mm)</b>
Lowermost Position 1	70.0	
Geometric Center Position 2	67.2	
Uppermost Position 3	64.3	
Telescoping Steering Wheel Travel		63
Test Position	67.2	32

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

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
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NHTSA No.: M20220216  
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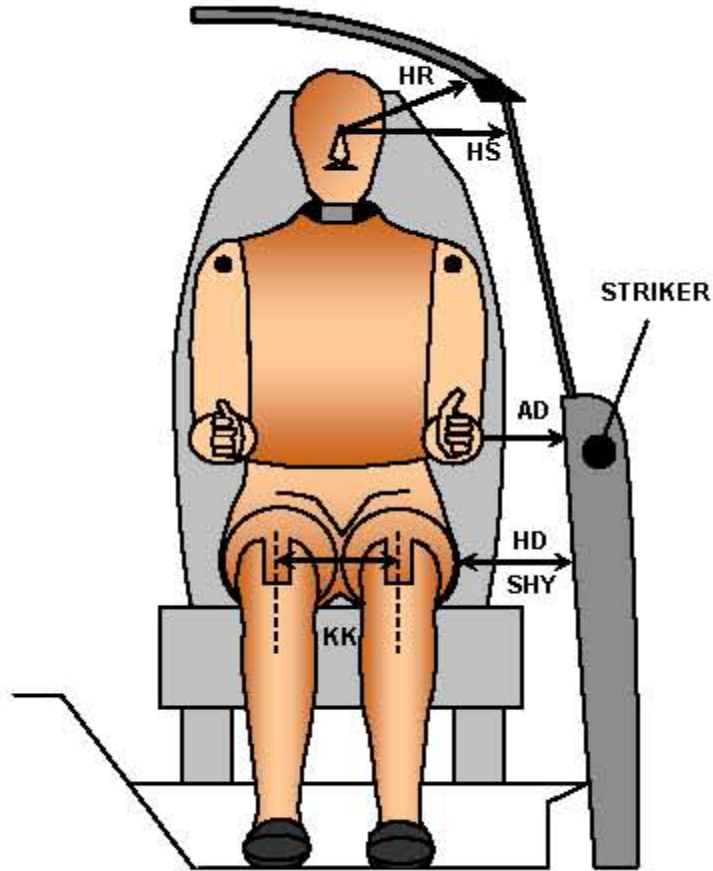
**LEFT SIDE VIEW**

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		32.0		
SWA°	Steering Wheel Angle		67.2		
SCA°	Steering Column Angle		22.8		
SA°	Seat Back Angle		2.5		-0.9
HZ	Head to Roof (Z)	254	90	313	90
HH	Head to Header	478	19.5	432	26.9
HW	Head to Windshield	766	0	770	0
NR	Nose to Rim	411	10.0		
CD	Chest to Dash	587		456	
CS	Chest to Steering Hub	335	6.3		
RA	Rim to Abdomen	210	0		
KDL	Left Knee to Dash	224	27.9	137	35.5
KDR	Right Knee to Dash	226	28.1	134	35.3
PA°	Pelvic Angle		23.3		22.0
TA°	Tibia Angle		54.2		73.9
SK	Striker to Knee	675	88.1	668	89.1
ST	Striker to Head	592	22.0	581	33.4
SH	Striker to H-Point	311	104.2	473	101.8

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

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
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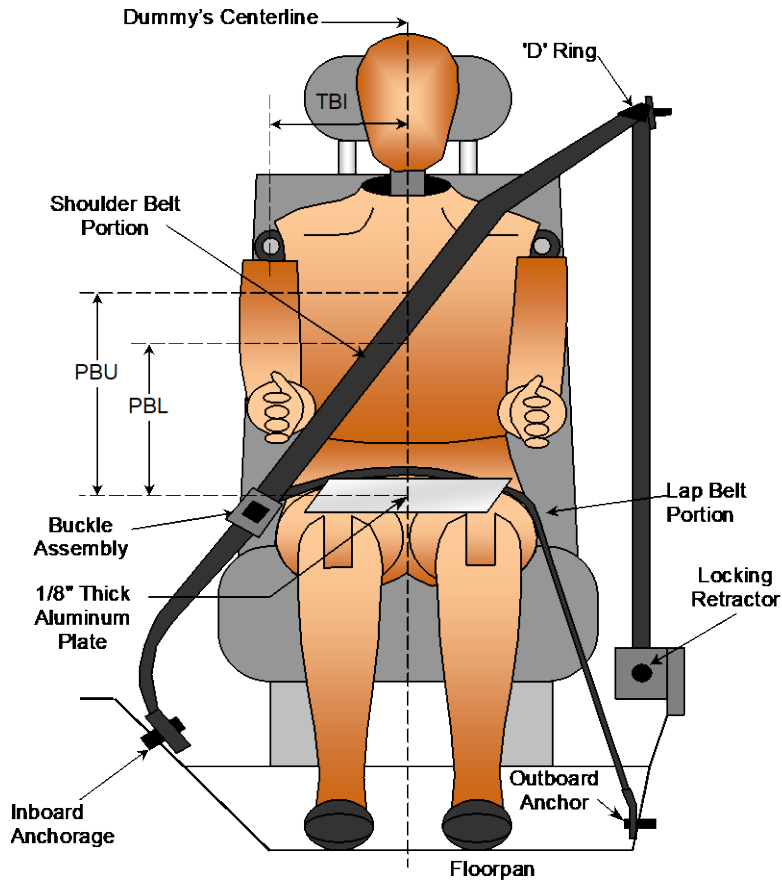
**FRONT VIEW OF DUMMY**

Code	Measurement Description	Driver	Passenger
		Length (mm)	
AD	Arm to Door	125	92
HD	H-Point to Door	157	194
HR	Head to Side Header	236	287
HS	Head to Side Window	350	370
KK	Knee to Knee	344	230
SHY	Striker to H-Point (Y Direction)	320	311
AA	Ankle to Ankle	340	176

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

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20220216  
 Test Date: 8/22/2022



**FRONT VIEW OF DUMMY**

**SEAT BELT POSITIONING MEASUREMENTS**

Measurement Description	Units	Driver	Passenger
PBU - Top surface of reference to belt upper edge	mm	360	300
PBL - Top surface of reference to belt lower edge	mm	275	205

**BELT LENGTH DATA**

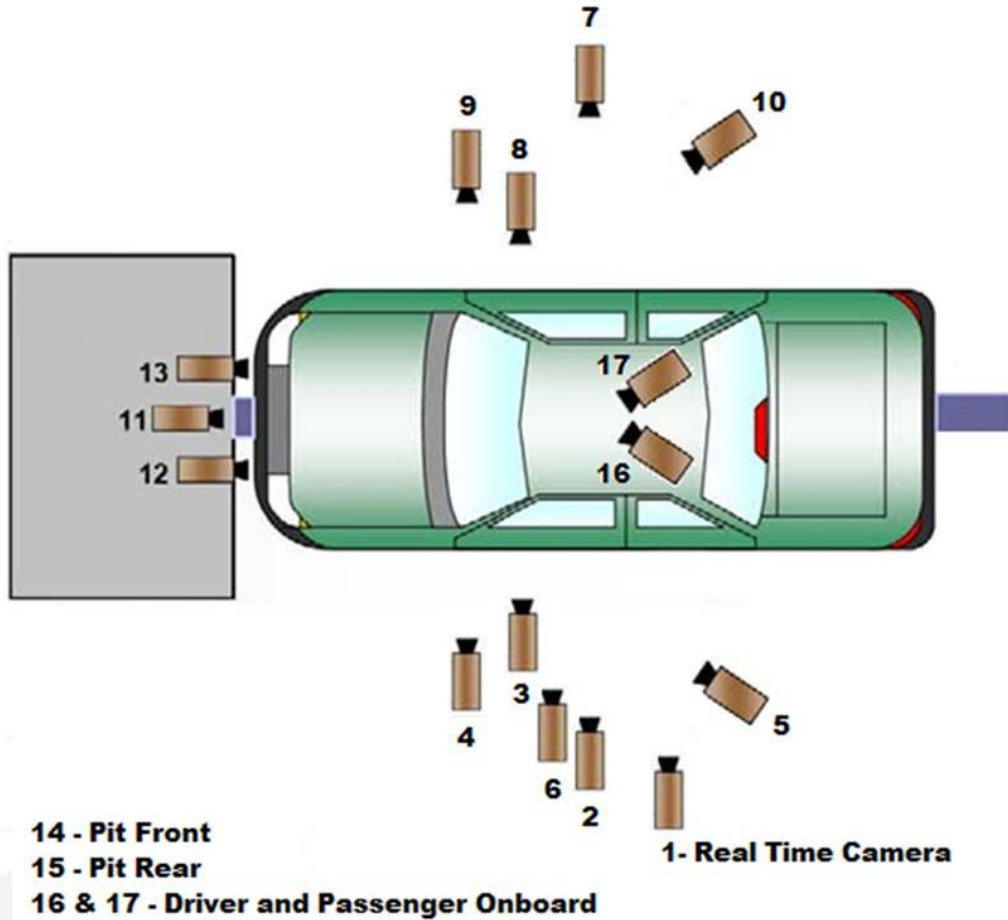
Measurement Description	Units	Driver	Passenger
Shoulder Belt Length as measured on ATD	mm	900	935
Lap Belt Length as measured on ATD	mm	660	690
Remainder of belt on reel	mm	890	875
Total Belt Length for Continuous Webbing Systems	mm	3200	3200

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

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20220216  
Test Date: 8/22/2022

**CAMERA POSITIONS FOR FRONTAL IMPACTS**



*\*\*Camera locations are approximate and not to scale*

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

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20220216  
Test Date: 8/22/2022

**CAMERA LOCATIONS**

No.	Camera View	Coordinates* (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall					30
2	Left Overall	-2950	-6050	-1310	12	1000
3	Driver Close-Up	-2150	-7270	-1960	50	1000
4	Left Front Half	-1430	-6060	-1290	24	1000
5	Left Angle	-7410	-5760	-1990	75	1000
6	Steering Column	-1020	-5700	-1230	50	1000
7	Right Overall	-2940	6020	-1250	12	1000
8	Passenger Close-Up	-2000	6720	-1970	50	1000
9	Right Front Half	-1450	5920	-1300	24	1000
10	Right Angle	-7590	5500	-1910	75	1000
11	Windshield	-110	0	-2310	12	1000
12	Driver Windshield	-40	-370	-2230	25	1000
13	Passenger Windshield	-40	370	-2230	25	1000
14	Pit Front	-950	0	3340	24	1000
15	Pit Rear	-3260	0	3340	24	1000
16	Driver Onboard				12	1000
17	Passenger Onboard				12	1000
18	Real-Time Pan View					30

\*COORDINATES:

+X = forward of impact plane

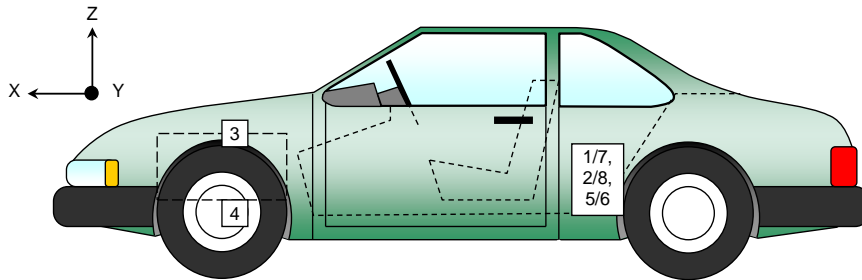
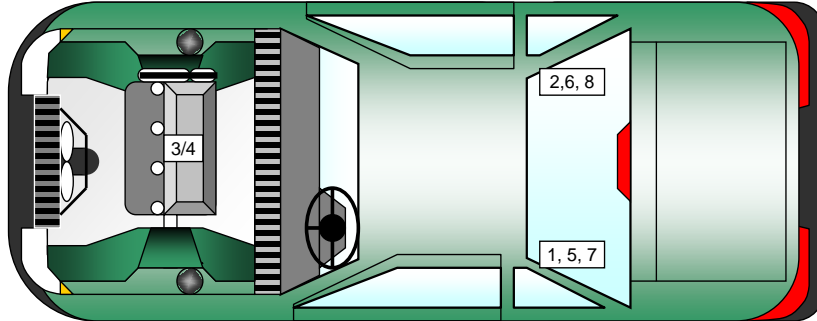
+Y = right of monorail centerline

+Z = below ground level

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

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20220216  
Test Date: 8/22/2022



**VEHICLE ACCELEROMETER PRE-TEST LOCATIONS**

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Crossmember Accelerometer – X Direction	2720	-362	-660
2	Right Rear Crossmember Accelerometer – X Direction	2720	362	-660
3	Engine Top X	5201	-65	-1103
4	Engine Bottom X	4905	0	-372
5	Left Rear Crossmember Accelerometer – Z Direction	2720	-362	-660
6	Right Rear Crossmember Accelerometer – Z Direction	2720	362	-660
7	Left Rear Crossmember Accelerometer Redundant – X Direction	2720	-445	-660
8	Right Rear Crossmember Accelerometer Redundant – X Direction	2720	445	-660

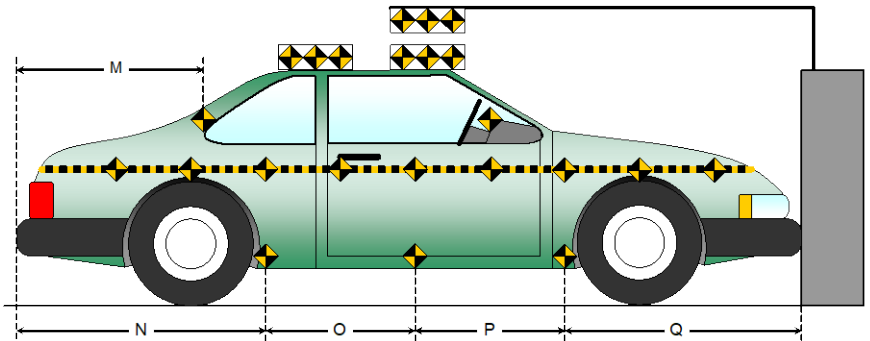
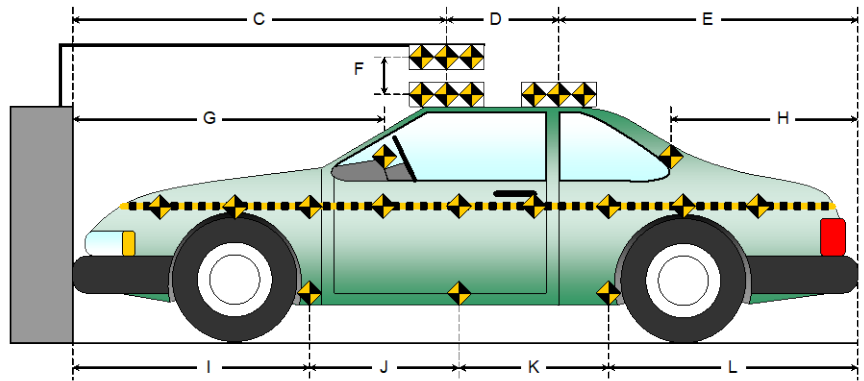
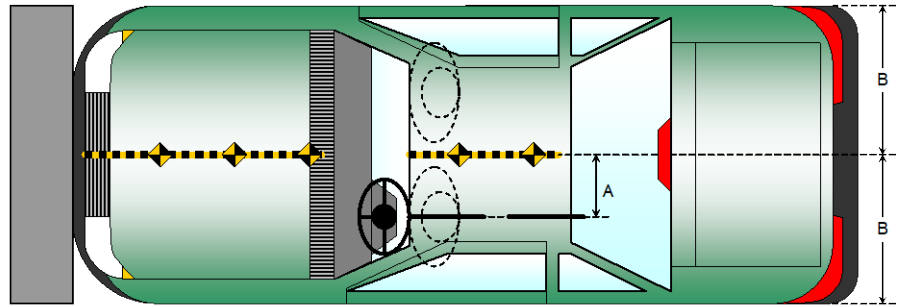
Reference Points: X - Rear Surface of Vehicle (+ forward)  
Y - Vehicle Centerline (+ to right)  
Z - Ground Plane (+ down)

**DATA SHEET NO. 8**  
**PHOTOGRAPHIC REFERENCE TARGET LOCATIONS**

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20220216  
 Test Date: 8/22/2022

Item	Value (mm)
A	435
B	1017
C	2465
D	610
E	3110
F	30
G	
H	2349
I	1493
J	1172
K	1172
L	2348
M	2349
N	2348
O	1172
P	1172
Q	1493



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

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20220216  
 Test Date: 8/22/2022

**ADVANCED RESEARCH LOAD CELL BARRIER**

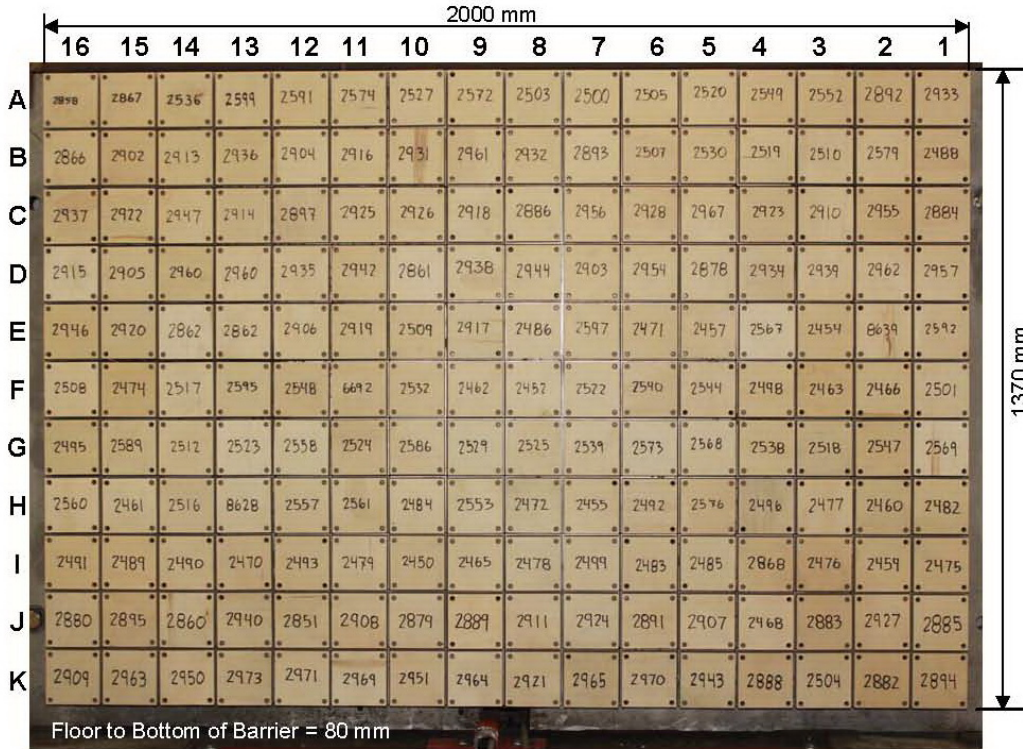


Photo for Reference Only

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: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20220216  
 Test Date: 8/22/2022

**INSTRUMENTATION**

Instrumentation	Number of Channels Collected
Driver Dummy Data Channels	47
Passenger Dummy Data Channels	47
Vehicle Structure Accelerometers	8
Barrier Channels	0
Total	102

**CAMERA COVERAGE**

Type of Camera	Number Used in this Test
High-Speed Vehicle Onboard	2
High-Speed Offboard	14
Real-Time	2
Total	18

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

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20220216  
 Test Date: 8/22/2022

**TEST DUMMY INFORMATION AND CONTACT LOCATIONS**

Description	Driver	Passenger
Dummy Type / Serial No.	HIII 50% / 351	HIII 5% / 142
Head Contact	Frontal Airbag, Headrest	Frontal Airbag, Headrest
Upper Torso Contact	Frontal Airbag	Frontal Airbag
Lower Torso Contact	None	None
Left Knee Contact	Knee Airbag	Glove Box
Right Knee Contact	Knee Airbag	None

**DOOR OPENING, TRUNK OPENING, AND SEAT TRACK INFORMATION**

Description	Driver	Passenger
Locked/Unlocked Doors	Doors were locked	Doors were locked
Front Door Opening	Remained closed and unlocked; opened without tools	Remained closed and unlocked; opened without tools
Rear Door Opening	Remained closed and unlocked; opened without tools	Remained closed and unlocked; opened without tools
Trunk/Hatch/Tailgate Opening	Remained closed; opened without tools	
Seat Track Shift (mm)	0	0
Seat Back Movement	None	None

**OTHER VEHICLE POST-TEST OBSERVATIONS**

Critical Areas of Performance	Observations and Conclusions
Windshield Damage	Minor cracks at lower edge
Window Damage	None
Other Notable Effects	Rear glass shattered

**VEHICLE REBOUND FROM BARRIER**

Measured Parameter	Units	Value
Left Side	mm	475
Center	mm	480
Right Side	mm	475
Average	mm	477

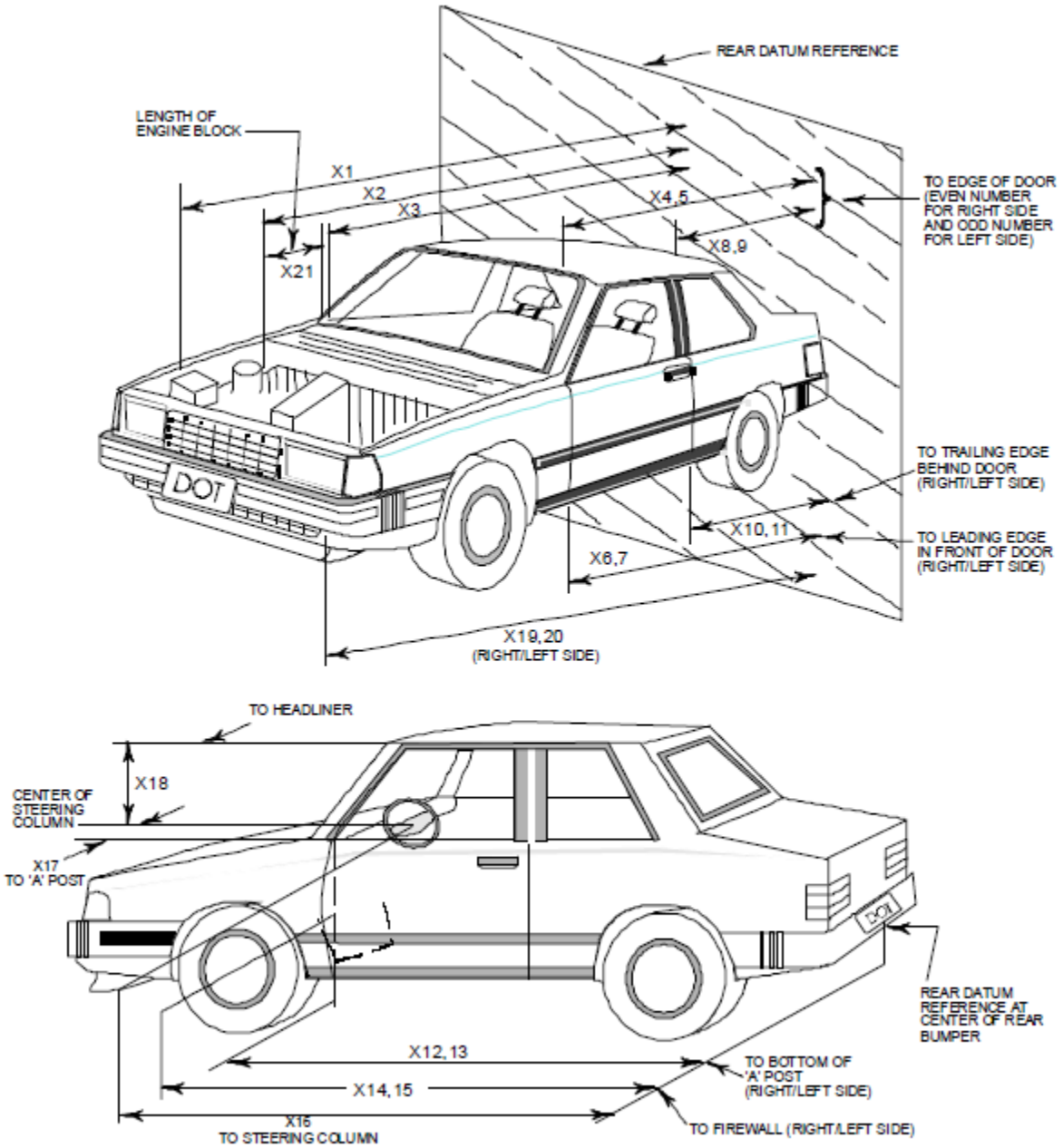
**SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION**

Restraint Type	Driver		Passenger	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	Yes	Yes	Yes
Curtain Side Airbag	Yes	No	Yes	No
Torso/Pelvis Side Airbag	Yes	No	Yes	No
Knee Airbag	Yes	Yes	Yes	No
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes		Yes	
Other				

**DATA SHEET NO. 12**  
**VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20220216  
 Test Date: 8/22/2022



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

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20220216  
 Test Date: 8/22/2022

No.	Measurement Description	Pre-Test	Post-Test	Change
1	Total Length of Vehicle at Centerline	6185	5592	-593
2	RSOV to Front of Engine	5338	5184	-154
3	RSOV to Firewall	5048	5033	-15
4	RSOV to Upper Leading Edge of Right Door	4617	4597	-20
5	RSOV to Upper Leading Edge of Left Door	4601	4590	-11
6	RSOV to Lower Leading Edge of Right Door	4548	4529	-19
7	RSOV to Lower Leading Edge of Left Door	4542	4525	-17
8	RSOV to Upper Trailing Edge of Right Door	3389	3366	-23
9	RSOV to Upper Trailing Edge of Left Door	3362	3361	-1
10	RSOV to Lower Trailing Edge of Right Door	3360	3342	-18
11	RSOV to Lower Trailing Edge of Left Door	3356	3335	-21
12	RSOV to Bottom of "A" Post of Right Side	4574	4580	6
13	RSOV to Bottom of "A" Post of Left Side	4566	4590	24
14	RSOV to Firewall, Right Side	5059	5034	-25
15	RSOV to Firewall, Left Side	5053	5034	-19
16	RSOV to Steering Column	4091	4126	35
17	Center of Steering Column to "A" Post	395	380	-15
18	Center of Steering Column to Headliner	462	455	-7
19	RSOV to Right Side of Front Bumper	6026	5560	-466
20	RSOV to Left Side of Front Bumper	6026	5547	-479
21	Length of Engine Block	452	452	0
RD	RSOV to Right Side of Dash Panel	4341	4332	-9
CD	RSOV to Center of Dash Panel	4281	4362	81
LD	RSOV to Left Side of Dash Panel	4338	4302	-36

All dimensions in mm

**DATA SHEET NO. 13**  
**ACCIDENT INVESTIGATION DIVISION DATA**

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
Test Program: NCAP Frontal Barrier Impact Test

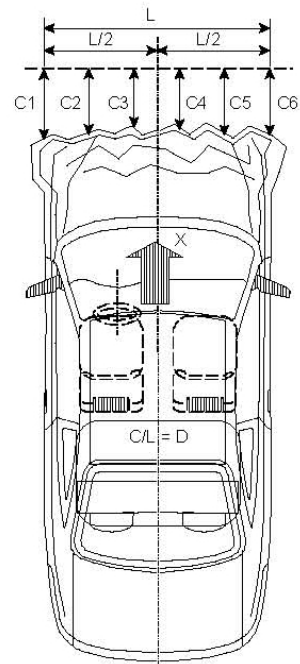
NHTSA No.: M20220216  
Test Date: 8/22/2022

**VEHICLE INFORMATION**

VIN:	<u>1FTFW1ED8NFA71235</u>	Wheelbase (mm):	<u>4026</u>
Vehicle Size Category:	<u>Truck</u>	Test Weight (kg):	<u>2869.5</u>

**ACCELEROMETER DATA**

Accelerometer Locations:	<u>As per Data Sheet No. 7</u>
Cal. Procedure/Interval:	<u>MGA Procedure / 6 month</u>
Integration Algorithm:	<u>Trapezoidal</u>
Linearity:	<u>&gt; 99%</u>
Impact Velocity (km/h):	<u>57.02</u>
Velocity Change (km/h):	<u>66.1</u>
Time of Separation (msec)	<u>110</u>



**CRUSH PROFILE**

Collision Deformation Classification:	<u>12FDEW3</u>
Midpoint of Damage:	<u>Centerline</u>
Damage Region Length (mm):	<u>1500</u>
Impact Mode:	<u>Frontal</u>

No.	Measurement Description	Units	Pre-Test	Post-Test	Exterior Crush
C1	Crush zone 1 at left side	mm	6026	5547	479
C2	Crush zone 2 at left side	mm	6154	5589	565
C3	Crush zone 3 at left side	mm	6182	5581	601
C4	Crush zone 4 at right side	mm	6182	5606	576
C5	Crush zone 5 at right side	mm	6154	5585	569
C6	Crush zone 6 at right side	mm	6026	5560	466
L	C1 TO C6	mm	1500	1473	27

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

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
 Test Program: NCAP Frontal Barrier Impact Test

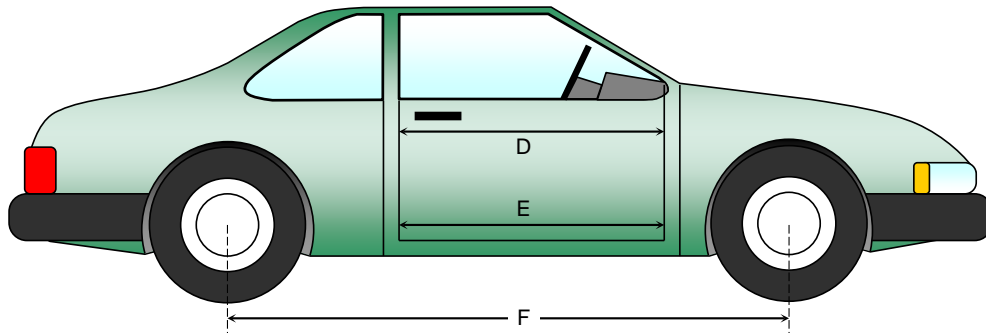
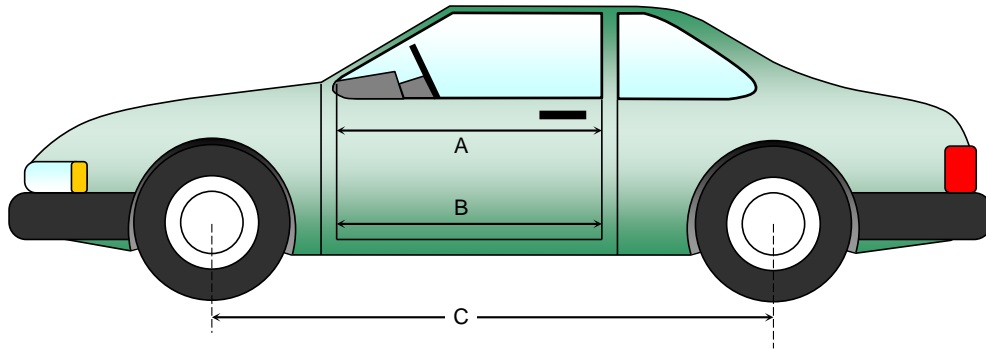
NHTSA No.: M20220216  
 Test Date: 8/22/2022

**DOOR OPENING WIDTH**

Item	Description	Units	Pre-Test	Post-Test	Change
A	Left Side Upper	mm	1097	1093	-4
B	Left Side Lower	mm	1030	1032	2
D	Right Side Upper	mm	1095	1095	0
E	Right Side Lower	mm	1030	1032	2

**WHEELBASE MEASUREMENTS**

Item	Description	Units	Pre-Test	Post-Test	Change
C	Left Side Wheelbase	mm	4026	3840	-186
F	Right Side Wheelbase	mm	4026	3865	-161



**DATA SHEET NO. 14 (CONTINUED)  
VEHICLE INTRUSION MEASUREMENTS**

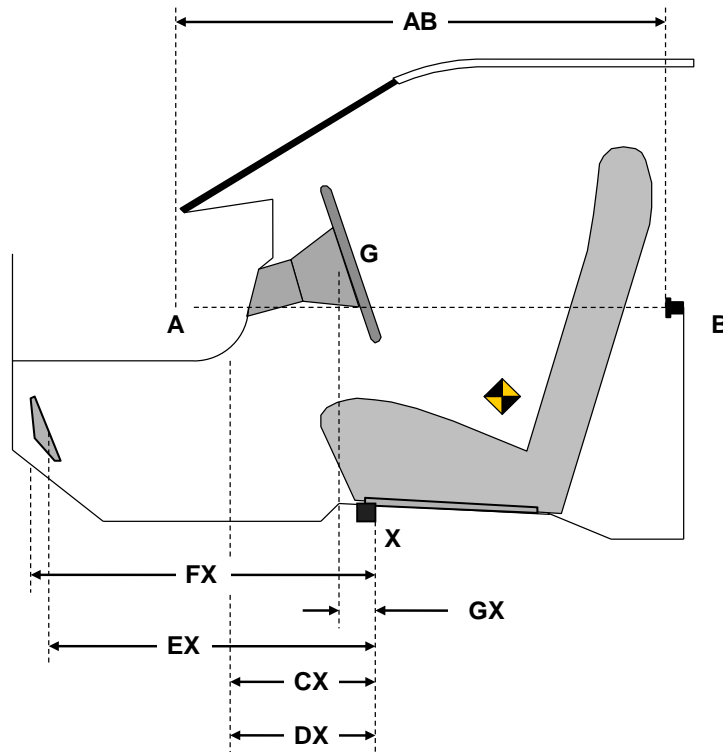
Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20220216  
 Test Date: 8/22/2022

**DRIVER COMPARTMENT INTRUSION**

Item	Description	Units	Pre-Test	Post-Test	Change
AB	Door Opening (Inside Window Jam)	mm	846	846	0
CX	Left Knee Bolster to X	mm	361	359	-2
DX	Right Knee Bolster to X	mm	362	360	-2
EX	Brake Pedal to X	mm	509	520	11
FX	Foot Rest to X	mm	532	531	-1
GX	Center of Steering Column Wheel Hub to X	mm	45	49	4

X = Front of Seat Track (stationary)



**DRIVER COMPARTMENT**

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

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20220216  
 Test Date: 8/22/2022

**WINDSHIELD MOUNTING DETAILS**

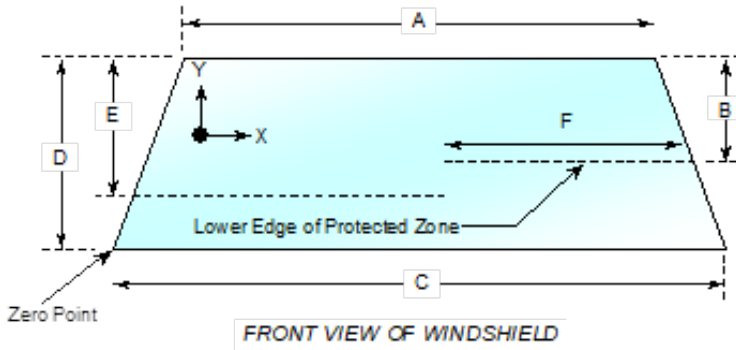
Windshield glass is secured to the vehicle frame with a rubber trim and glue.

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: 21.4°C.

**WINDSHIELD PERIPHERY MEASUREMENTS**

Measurement	Pre-Test (mm)	Post-Test (mm)	% of Retention
Left Side	2374	2374	100
Right Side	2374	2374	100
Total	4748	4748	100



Item	Units	Value
A	mm	1474
B	mm	472
C	mm	1794
D	mm	740
E	mm	474
F	mm	510

**AREA OF PROTECTED ZONE FAILURES**

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. 16**  
**FMVSS 301 BARRIER IMPACT AND STATIC ROLLOVER**

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20220216  
 Test Date: 8/22/2022

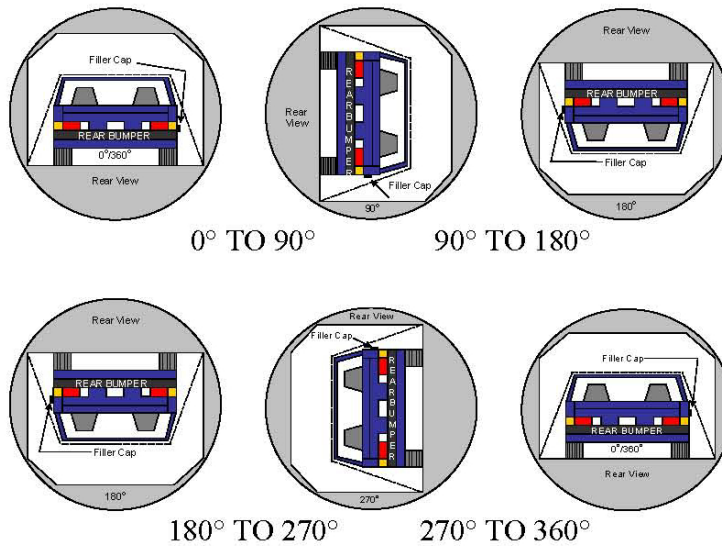
**FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA**

Temperature at Time of Impact: 21.4°C

Test Time: 10:58 a.m.

- A. From impact until vehicle motion ceases: (Maximum Allowable = 1 ounce) 0.0 oz.  
 B. For the 5 minute period after motion ceases: (Maximum Allowable = 5 ounces) 0.0 oz.  
 C. For the following 25 minutes: (Maximum Allowable = 1 ounce / minute) None  
 D. Spillage Details: None

**FMVSS 301 STATIC ROLLOVER RESULTS**



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°	90	300	390
90° to 180°	91	300	391
180° to 270°	81	300	381
270° to 360°	88	300	388

**DATA SHEET NO. 16 (CONTINUED)**  
**FMVSS 301 BARRIER IMPACT AND STATIC ROLLOVER**

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20220216  
 Test Date: 8/22/2022

**FMVSS 301 SPILLAGE TABLE (UNITS IN OUNCES)**

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

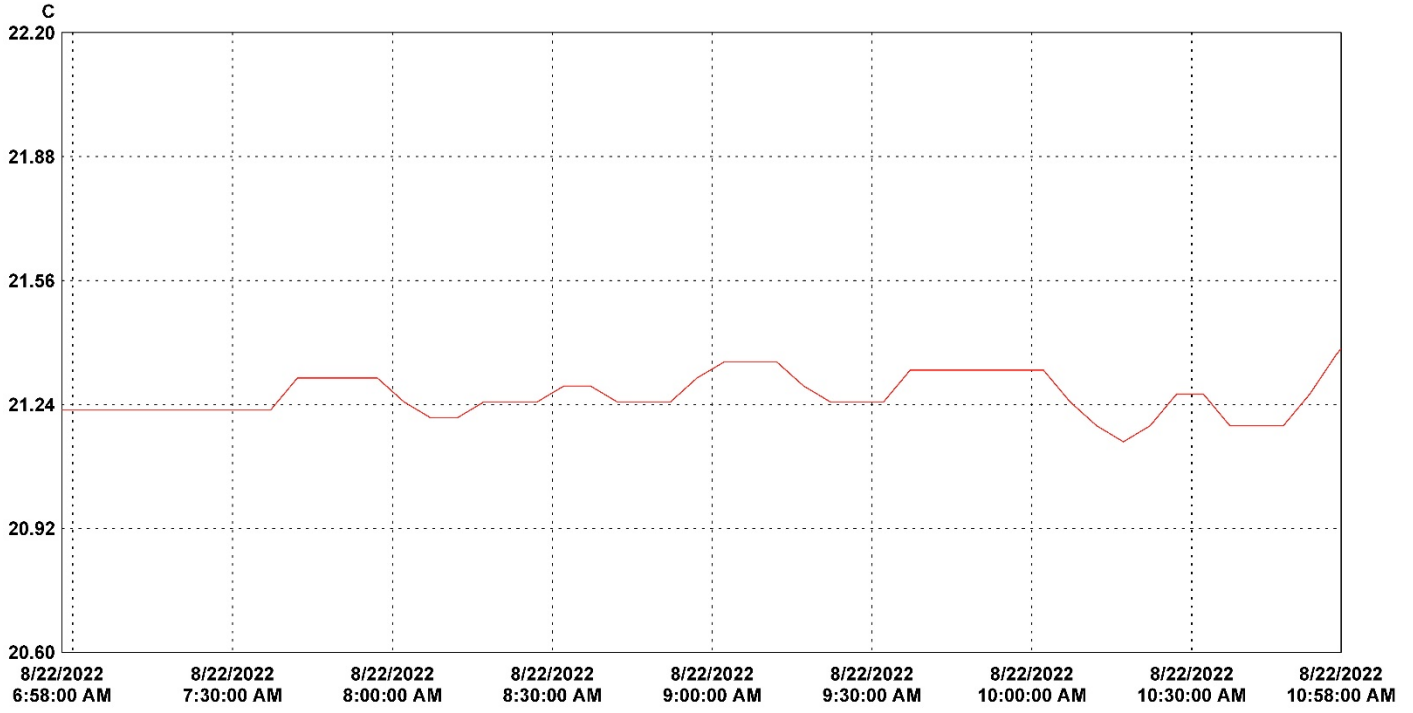
**SOLVENT SPILLAGE LOCATION TABLE**

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: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20220216  
 Test Date: 8/22/2022



30 minutes/div 4 hours (M/d/yyyy h:mm:ss tt) Central Time Graph file (truncated): M20220216 2022 Ford F-150 XLT 4x4 SuperCrew HEV NCAP.spg

LN	Serial #	Description	CH	Value	Maximum	Average	Minimum	Units	CH description	Logger file
1	18352040	VSC_Prep_Room	1		21.37	21.26	21.14	C	Temperature	18352040_VSC_Prep_Room.spl

**DATA SHEET NO. 305-1  
GENERAL TEST AND VEHICLE PARAMETER DATA  
FOR INDICANT FMVSS NO. 305 TESTING**

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20220216  
 Test Date: 8/22/2022

**ELECTRIC VEHICLE PROPULSION SYSTEM**

	Units	Observations and Conclusions
Type of Electric Vehicle		Gasoline-Electric Hybrid
Propulsion Battery Type		Lithium-Ion
Nominal Voltage	V	300 V
Physical Location of Automatic Propulsion Battery Disconnect		Inside Battery Container
Auxiliary Battery Type		12 V Lead-Acid Under Hood and Under LR Pass. Seat

**PROPULSION BATTERY SYSTEM DATA**

	Units	Observations and Conclusions
Electrolyte Fluid Type		Organic Solution
Electrolyte Fluid Specific Gravity	g/L	1.25
Electrolyte Fluid Kinematic Viscosity	cSt	3.4
Electrolyte Fluid Color		Colorless
Propulsion Battery Coolant Type, Color, Specific Gravity (if applicable)		Air-Cooled
Location of Battery Modules		Inside Passenger Compartment
		X Outside Passenger Compartment
		The high-voltage battery is located below the occupant compartment.

**PROPULSION BATTERY STATE OF CHARGE**

<i>For all battery types:</i>	
Voltage range corresponding to <b>useable energy</b> of the battery:	
Minimum State of Charge	
Maximum State of Charge	
95% of Maximum State of Charge	
Test Voltage - No less than 95% of maximum State of Charge	
<i>For batteries that are rechargeable ONLY by an energy source on the vehicle:</i>	
Voltage range corresponding to <b>useable energy</b> of the battery:	
Minimum State of Charge	260 V
Maximum State of Charge	314 V
Test Voltage – Maximum practicable State of Charge within Normal Operating Range	281.2 V

**DATA SHEET NO. 305-2  
PRE-IMPACT DATA  
FOR INDICANT FMVSS NO. 305 TESTING**

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20220216  
 Test Date: 8/22/2022

**VEHICLE CHASSIS GROUND POINT(S) LOCATION(S)**

Details of Vehicle Chassis Ground Point(s) & Location(s)	Vehicle frame
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**PROPULSION BATTERY SYSTEM**

Details of Electric Energy Storage/Conversion System Test Points	Connected at + and – terminal ends of propulsion system
Additional Comments	Vehicle fuel tank, exhaust, and HV battery were removed during vehicle preparations to connect HV monitoring leads.

**DATA SHEET NO. 305-3**  
**PRE-IMPACT ELECTRICAL ISOLATION MEASUREMENTS AND CALCULATIONS**  
**FOR INDICANT FMVSS NO. 305 TESTING**

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20220216  
 Test Date: 8/22/2022

**VOLTMETER INFORMATION**

	Units	Observations and Conclusions
Make		Fluke
Model		189
Serial Number		93240010
Internal Impedance Value	MΩ	> 10 MΩ < 100 pF
Resolution	V	0.001
Last Calibration Date		5/23/2022

**PROPULSION BATTERY VOLTAGE**

Measurement shall be made with Energy Storage/Conversion System connected to the vehicle propulsion system, and the vehicle in the “ready-to-drive” (propulsion system energized) position.

NOTE: If voltage measurement is not at the voltage or within the normal operating voltage range specified by the manufacturer, the battery must be charged.

Vb	V	281.2
----	---	-------

**ELECTRIC ISOLATION MEASUREMENTS**  
**PROPULSION BATTERY TO VEHICLE CHASSIS**

Vehicle chassis point(s) determined and supplied to contractor by COTR.

V1	V	188.6
V2	V	171.2

**PROPULSION BATTERY TO VEHICLE CHASSIS ACROSS RESISTOR**

The known resistance  $R_o$  (in ohms) should be approximately 500 times the normal operating voltage of the vehicle (in volts) per SAE J1766.

$R_o$	Ω	146,000
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V1' Pre-Impact	V	9.0
V2' Pre-Impact	V	10.3

**DATA SHEET NO. 305-3 (CONTINUED)**  
**PRE-IMPACT ELECTRICAL ISOLATION MEASUREMENTS AND CALCULATIONS**  
**FOR INDICANT FMVSS NO. 305 TESTING**

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20220216  
 Test Date: 8/22/2022

**ELECTRICAL ISOLATION CALCULATIONS**

NOTE: If measured voltage is zero and results in a division by zero, record "Zero Volts".  
 This "zero voltage" condition is considered as being compliant.

$R_{i1} = R_o (1 + V_2/V_1) [(V_1 - V_1')/V_1']$		
Ri1 Pre-Impact	Ω	5,558,225
$R_{i2} = R_o (1 + V_1/V_2) [(V_2 - V_2')/V_2']$		
Ri2 Pre-Impact	Ω	4,793,239
Ri = The lesser of Ri1 and Ri2		
Ri Pre-Impact	Ω	4,793,239
$R_i / V_b = \text{Electrical Isolation Value} / \text{Nominal Battery Voltage}$		
Ri / Vb Pre-Impact	Ω	17,046

NOTE: The minimum Electrical Isolation Value is 500 Ω/V.

	Yes	No (Fail)
Is the measured Electrical Isolation Value ≥ 500 Ω/V?	X	
Additional Comments	None	

**DATA SHEET NO. 305-4  
POST-IMPACT DATA  
FOR INDICANT FMVSS NO. 305 TESTING**

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20220216  
 Test Date: 8/22/2022

**VOLTMETER INFORMATION**

	Units	Observations and Conclusions
Make		Fluke
Model		177
Serial Number		57580164
Internal Impedance Value	MΩ	> 10 MΩ < 100 pF
Resolution	V	0.001
Last Calibration Date		6/21/2022

**ELECTRICAL ISOLATION MEASUREMENTS**

Vb Post-Impact	V	3.4
----------------	---	-----

V1 Post-Impact	V	0.9	Impact Time	1	Minutes	11	Seconds
V2 Post-Impact	V	1.9		1	Minutes	15	Seconds
V1' Post-Impact	V	0.9		1	Minutes	30	Seconds
V2' Post-Impact	V	1.5		1	Minutes	23	Seconds

**DATA SHEET NO. 305-4 (CONTINUED)**  
**POST-IMPACT DATA**  
**FOR INDICANT FMVSS NO. 305 TESTING**

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20220216  
 Test Date: 8/22/2022

**ELECTRICAL ISOLATION CALCULATIONS**

NOTE: If measured voltage is zero and results in a division by zero, record "Zero Volts".  
 This "zero voltage" condition is considered as being compliant.

$R_{i1} = R_o (1 + V_2/V_1) [(V_1 - V_1')/V_1']$							
Ri1 Post-Impact	Ω	0	Impact Time	1	Minutes	30	Seconds
$R_{i2} = R_o (1 + V_1/V_2) [(V_2 - V_2')/V_2']$							
Ri2 Post-Impact	Ω	57,375	Impact Time	1	Minutes	23	Seconds
Ri = The lesser of Ri1 and Ri2							
Ri Post-Impact	Ω	0	Impact Time	1	Minutes	30	Seconds
$R_i / V_b = \text{Electrical Isolation Value} / \text{Nominal Battery Voltage}$							
Ri / Vb Post-Impact	Ω	Zero Volts	Impact Time	1	Minutes	30	Seconds

NOTE: The minimum Electrical Isolation Value is 500 Ω/V.

	Yes	No (Fail)
Is the measured Electrical Isolation Value ≥ 500 Ω/V?	X	
Additional Comments	None	

**DATA SHEET NO. 305-4 (CONTINUED)**  
**POST-IMPACT DATA**  
**FOR INDICANT FMVSS NO. 305 TESTING**

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20220216  
 Test Date: 8/22/2022

**PROPULSION BATTERY SYSTEM COMPONENTS**

Describe any Propulsion Battery Module movement within the passenger compartment [Supply photographs as appropriate]:
Not Applicable

	Yes (Fail)	No
Has the Propulsion Battery Module moved within the passenger compartment?		X

Describe intrusion of an outside Propulsion Battery Component into the passenger compartment [Supply photographs as appropriate]:
No Intrusion

	Yes (Fail)	No
Has an outside Propulsion Battery Component intruded into the passenger compartment?		X

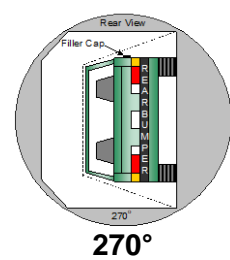
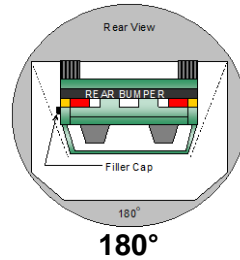
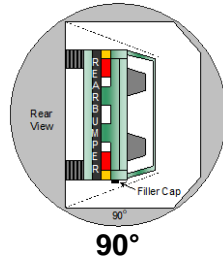
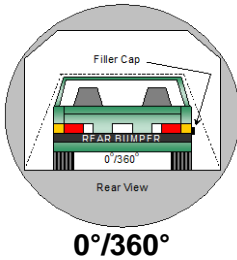
	Yes (Fail)	No
Is the Propulsion Battery Electrolyte Spillage visible in the passenger compartment?		X

**DATA SHEET NO. 305-5  
 STATIC ROLLOVER TEST DATA  
 FOR INDICANT FMVSS NO. 305 TESTING**

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20220216  
 Test Date: 8/22/2022

**PROPULSION BATTERY SYSTEM COMPONENTS**



**PROPULSION BATTERY ELECTROLYTE COLLECTION TIME PERIOD**

Test Phase	Rotation Time (spec. 1-3 min)				FMVSS 301 Hold Time		Total Time				Next Whole Minute Interval	
	min	sec	min	sec	min	sec	min	sec	min	sec	min	sec
0° - 90°	1	30	5	6	6	30	7	0	0	0	0	0
90° - 180°	1	31	5	6	6	31	7	0	0	0	0	0
180° - 270°	1	21	5	6	6	21	7	0	0	0	0	0
270° - 360°	1	28	5	6	6	28	7	0	0	0	0	0

**TEST VEHICLE PROPULSION BATTERY ELECTROLYTE SPILLAGE**

NOTE: The maximum allowable Propulsion Battery Electrolyte Spillage is 5.0 Liters.

Test Phase	Propulsion Battery Electrolyte Spillage (L)	Spillage Location
0° to 90°	0	Not Applicable
90° to 180°	0	Not Applicable
180° to 270°	0	Not Applicable
270° to 360°	0	Not Applicable
<b>Total Spillage</b>	<b>0</b>	

	Yes (Fail)	No
Is the total Propulsion Battery Electrolyte Spillage greater than 5.0 Liters?		X
Is the Propulsion Battery Electrolyte Spillage visible in the passenger compartment?		X

**DATA SHEET NO. 305-5 (CONTINUED)**  
**STATIC ROLLOVER TEST DATA**  
**FOR INDICANT FMVSS NO. 305 TESTING**

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20220216  
 Test Date: 8/22/2022

**VOLTMETER INFORMATION**

	Units	Observations and Conclusions
Make		Fluke
Model		177
Serial Number		57580164
Internal Impedance Value	MΩ	> 10 MΩ < 100 pF
Resolution	V	0.001
Last Calibration Date		6/21/2022

**ELECTRICAL ISOLATION MEASUREMENTS**

Vb Post-Impact	V	3.4
----------------	---	-----

Record V1, V2, V1', V2' voltage measurements at the start of each successive increment of 90°, 180°, 270°, and 360° of the static rollover test.

	Voltage	Units	Test Phase	Time			
V1	0.0	V	0°				
	0.0		90°	2	min	20	sec
	0.0		180°	2		30	
	0.0		270°	2		21	
	0.0		360°	2		16	
V2	0.0	V	0°				
	0.0		90°	2	min	24	sec
	0.0		180°	2		33	
	0.0		270°	2		25	
	0.0		360°	2		20	
V1'	0.0	V	0°				
	0.0		90°	2	min	33	sec
	0.0		180°	2		42	
	0.0		270°	2		34	
	0.0		360°	2		29	
V2'	0.0	V	0°				
	0.0		90°	2	min	28	sec
	0.0		180°	2		38	
	0.0		270°	2		29	
	0.0		360°	2		24	

**DATA SHEET NO. 305-5 (CONTINUED)**  
**STATIC ROLLOVER TEST DATA**  
**FOR INDICANT FMVSS NO. 305 TESTING**

Test Vehicle: 2022 Ford F-150 XLT 4x4 SuperCrew HEV  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20220216  
 Test Date: 8/22/2022

**ELECTRICAL ISOLATION CALCULATIONS**

NOTE: If measured voltage is zero and results in a division by zero, record "Zero Volts".  
 This "zero voltage" condition is considered as being compliant.

	Voltage	Units	Test Phase	Time			
$Ri1 = Ro (1 + V2/V1) [(V1-V1')/V1']$							
Ri1	Zero Volts	Ω	0°		min		sec
	Zero Volts		90°	2		33	
	Zero Volts		180°	2		42	
	Zero Volts		270°	2		34	
	Zero Volts		360°	2		29	
$Ri2 = Ro (1 + V1/V2) [(V2-V2')/V2']$							
Ri2	Zero Volts	Ω	0°		min		sec
	Zero Volts		90°	2		28	
	Zero Volts		180°	2		38	
	Zero Volts		270°	2		29	
	Zero Volts		360°	2		24	
Ri = The lesser of Ri1 and Ri2							
Ri	Zero Volts	Ω	0°		min		sec
	Zero Volts		90°	2		33	
	Zero Volts		180°	2		42	
	Zero Volts		270°	2		34	
	Zero Volts		360°	2		29	
$Ri / Vb = \text{Electrical Isolation Value} / \text{Nominal Battery Voltage}$							
Ri / Vb	Zero Volts	Ω/V	0°		min		sec
	Zero Volts		90°	2		33	
	Zero Volts		180°	2		42	
	Zero Volts		270°	2		34	
	Zero Volts		360°	2		29	

NOTE: The minimum Electrical Isolation Value is 500 Ω/V.

	Yes	No (Fail)
Is the measured Electrical Isolation Value ≥ 500 Ω/V?	X	
Additional Comments	None	

**APPENDIX A  
PHOTOGRAPHS**

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**PHOTOGRAPH NOT APPLICABLE**

Photo No. 001 - Load Cell Location

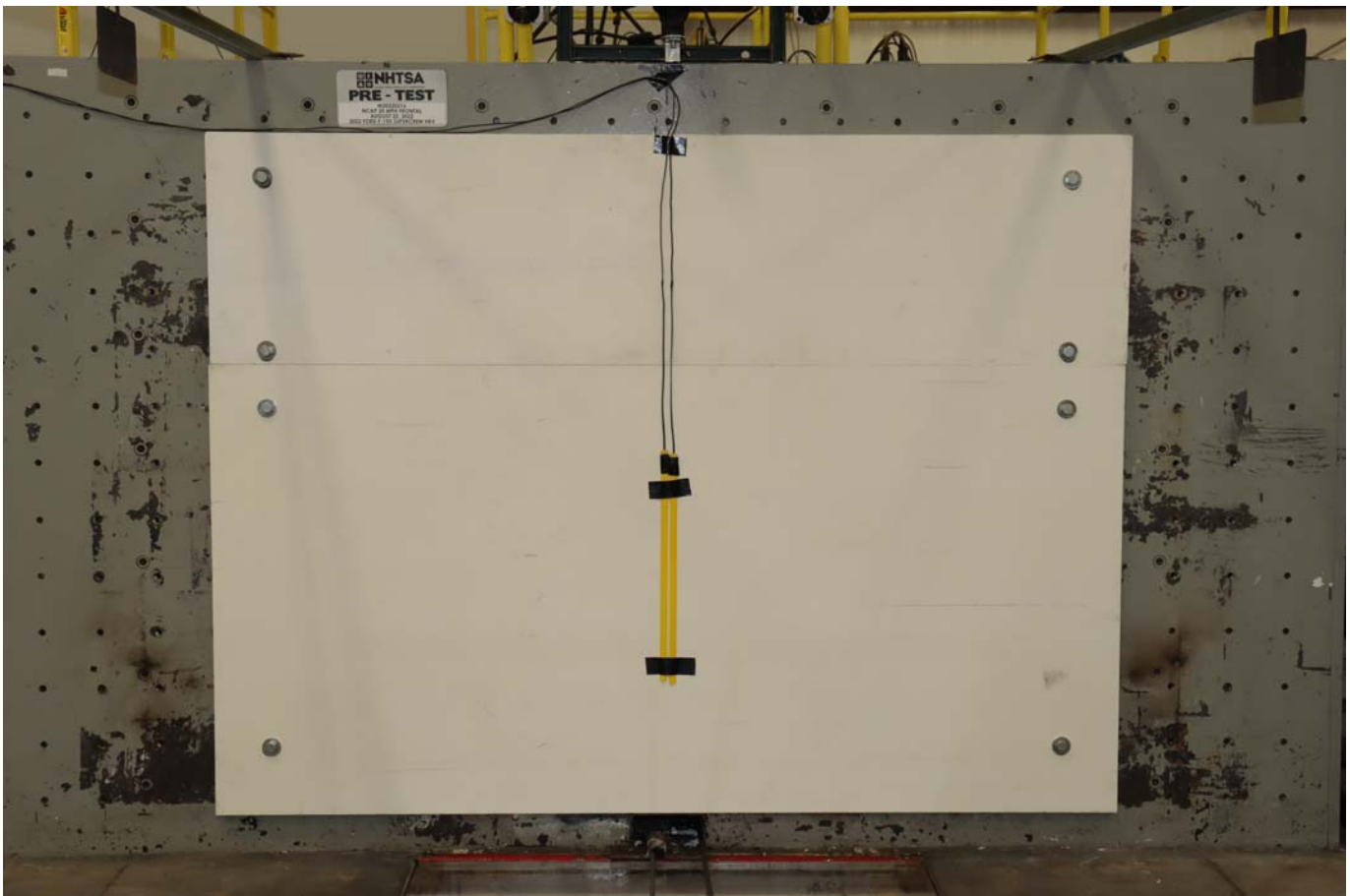


Photo No. 002 - Pre-Test Load Cell Wall



Photo No. 003 - Post-Test Load Cell Wall

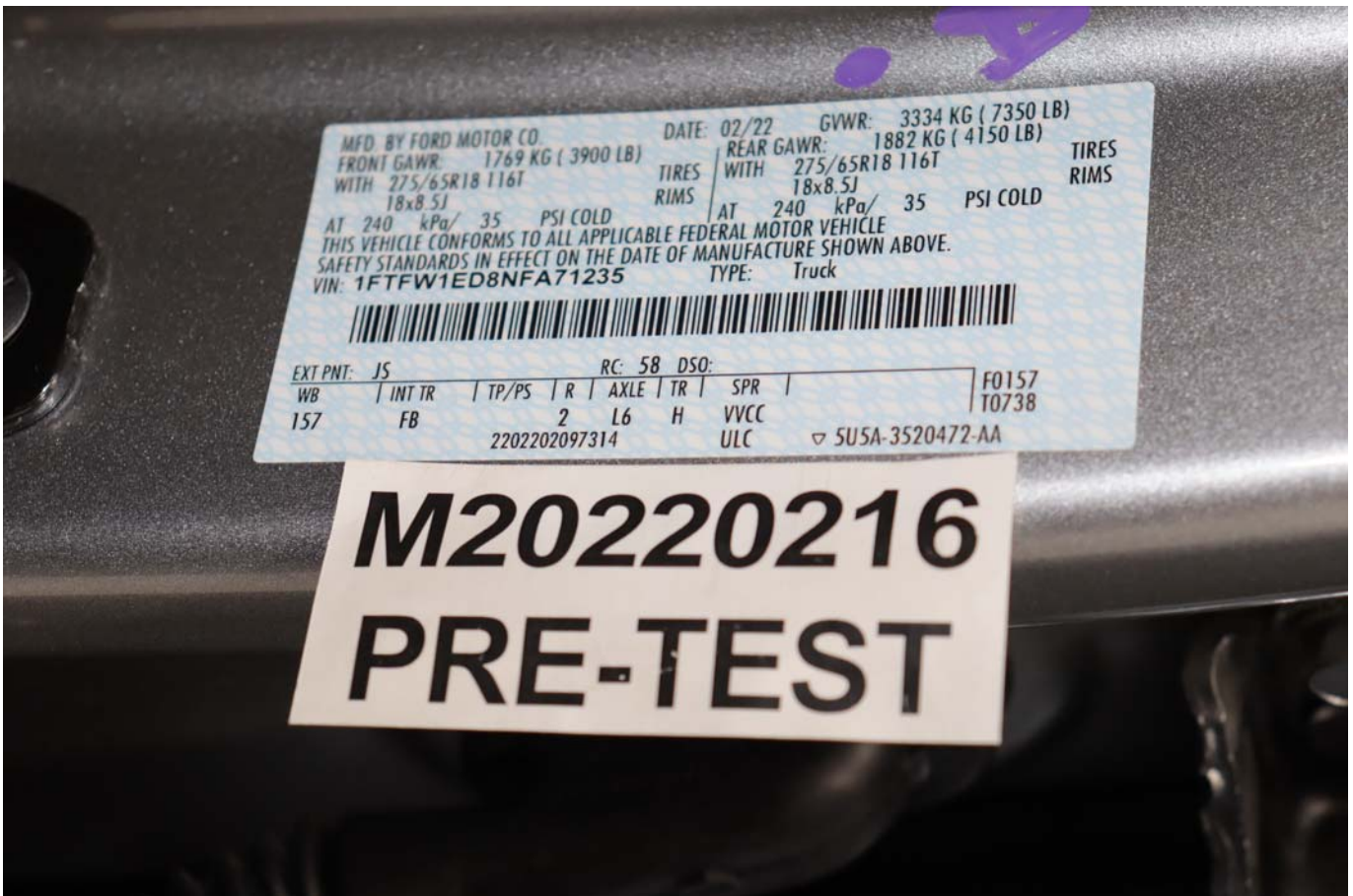


Photo No. 004 - Manufacturer's Label

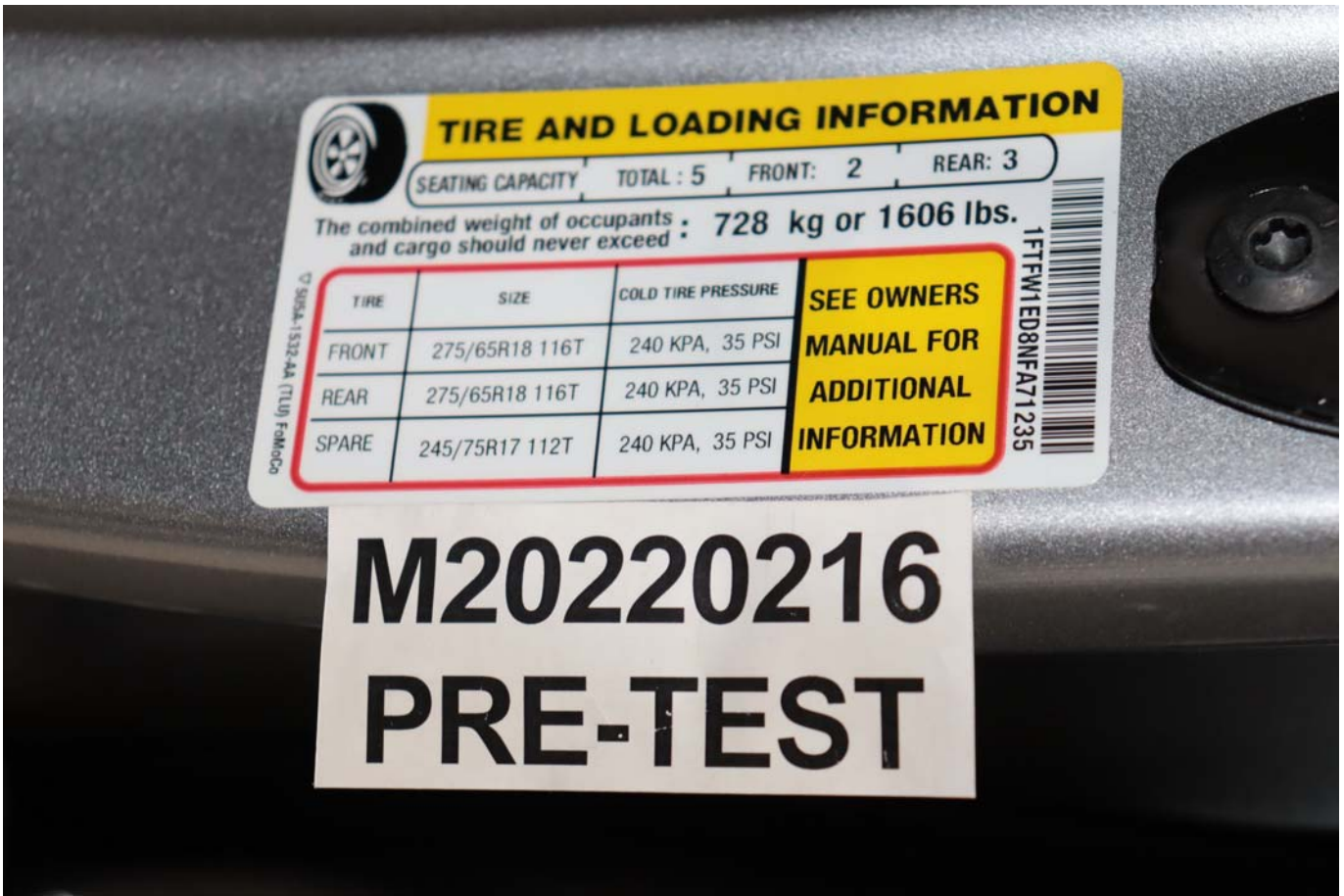


Photo No. 005 - Tire Placard



Photo No. 006 - 2022 Ford F-150 XLT 4x4 SuperCrew HEV Pickup Truck Frontal As Delivered



Photo No. 007 - Left Rear 3-4 View, As Received



Photo No. 008 - Pre-Test Front View of Test Vehicle



Photo No. 009 - Post-Test Front View of Test Vehicle



Photo No. 010 - Pre-Test Left View of Test Vehicle



Photo No. 011 - Post-Test Left View of Test Vehicle



Photo No. 012 - Pre-Test Right View of Test Vehicle



Photo No. 013 - Post-Test Right View of Test Vehicle



Photo No. 014 - Pre-Test Right Front 3-4 View

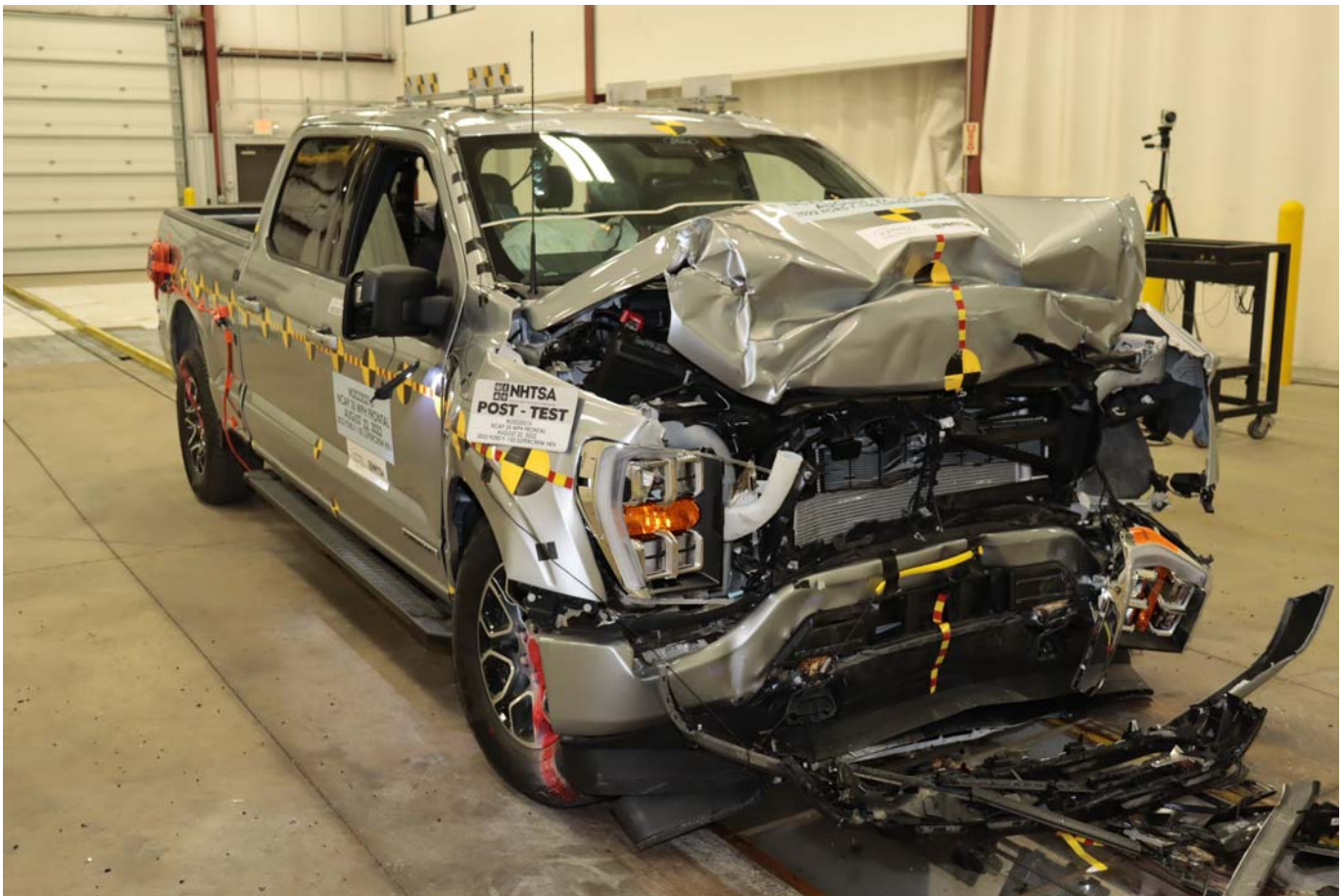


Photo No. 015 - Post-Test Right Front 3-4 View



Photo No. 016 - Pre-Test Left Rear 3-4 View



Photo No. 017 - Post-Test Left Rear 3-4 View



Photo No. 018 - Pre-Test Windshield View



Photo No. 019 - Post-Test Windshield View



Photo No. 020 - Pre-Test Engine Compartment View



Photo No. 021 - Post-Test Engine Compartment View



Photo No. 022 - Pre-Test Fuel Filler Cap View



Photo No. 023 - Post-Test Fuel Filler Cap View

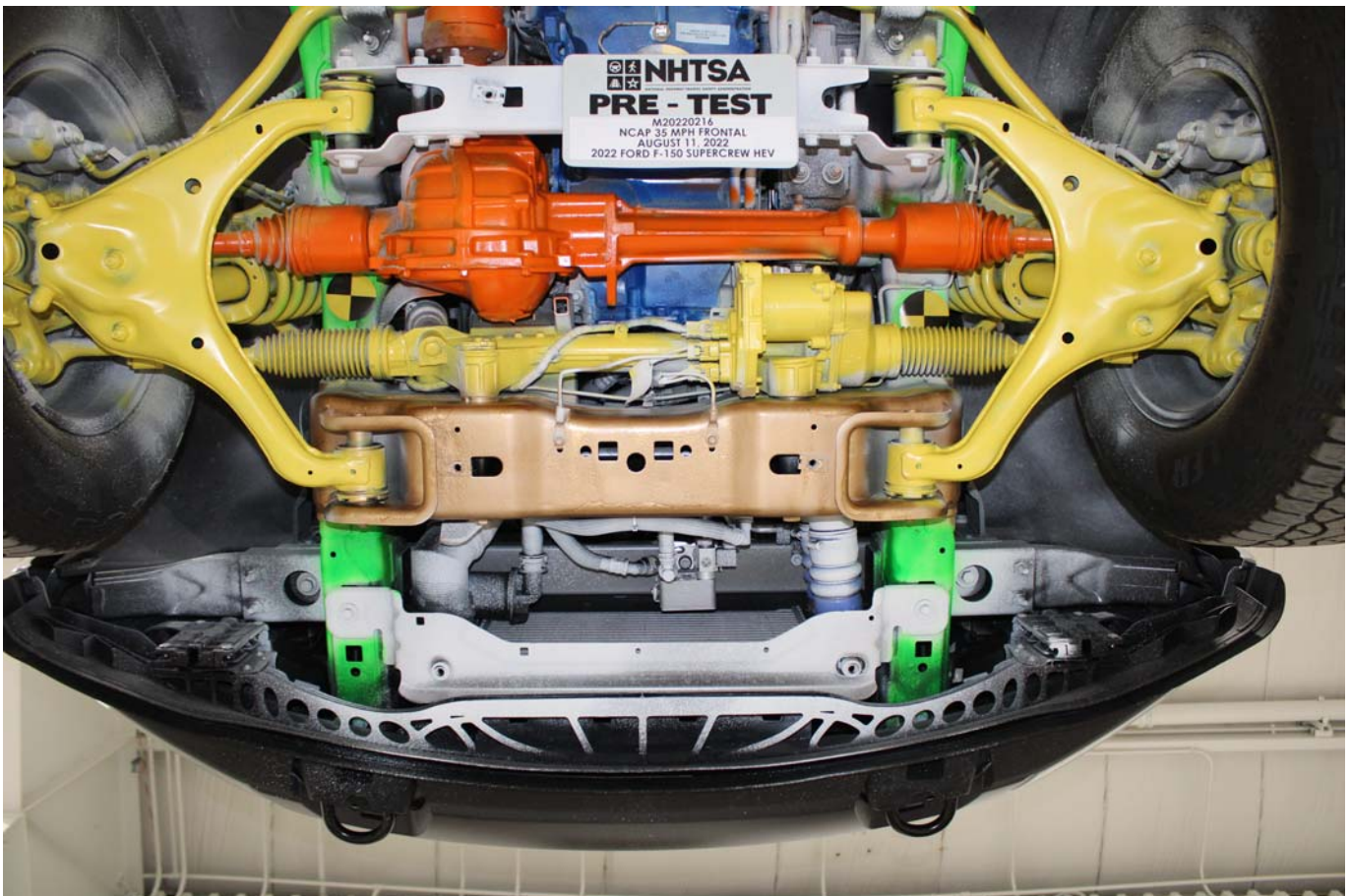


Photo No. 024 - Pre-Test Front Underbody View

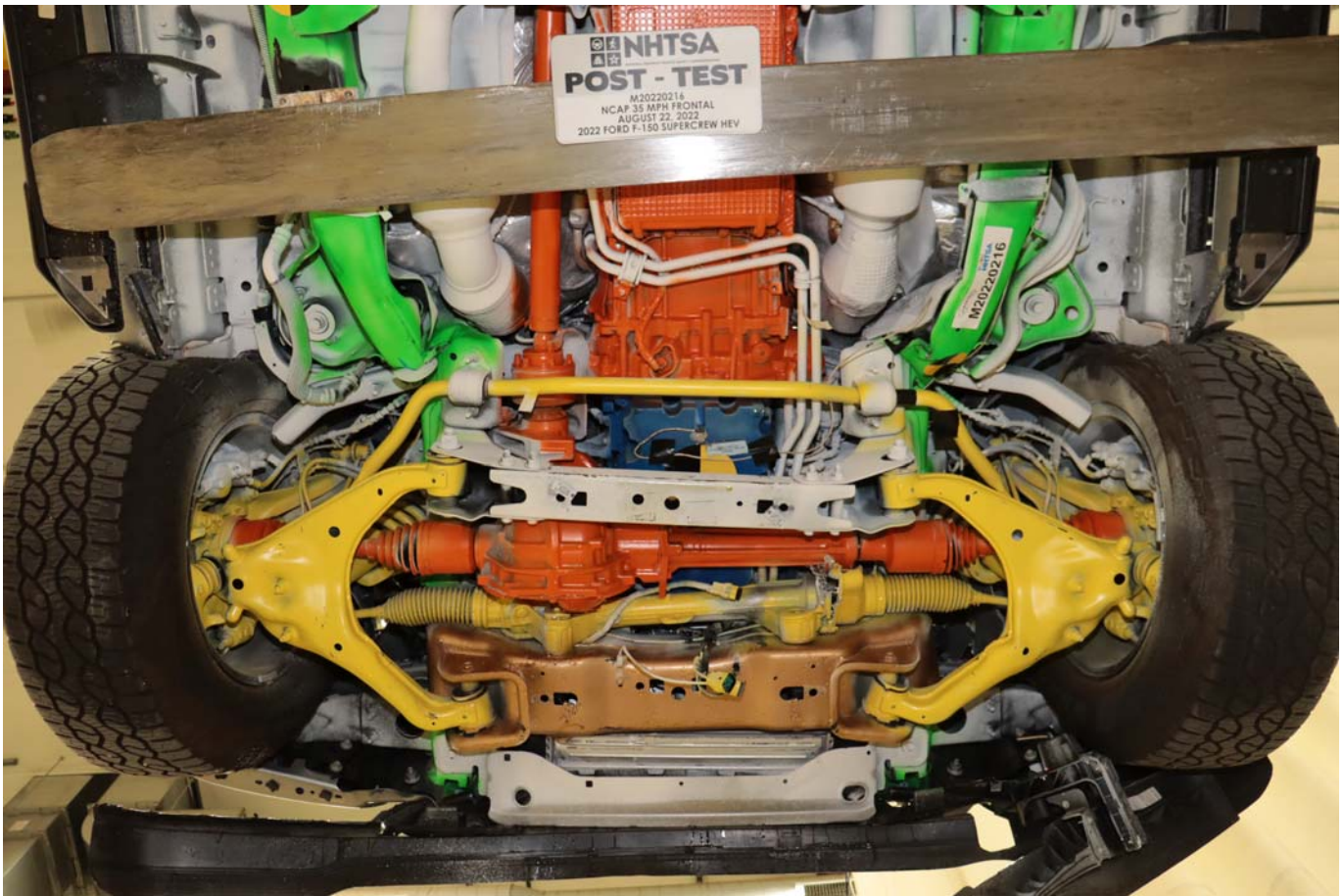


Photo No. 025 - Post-Test Front Underbody View

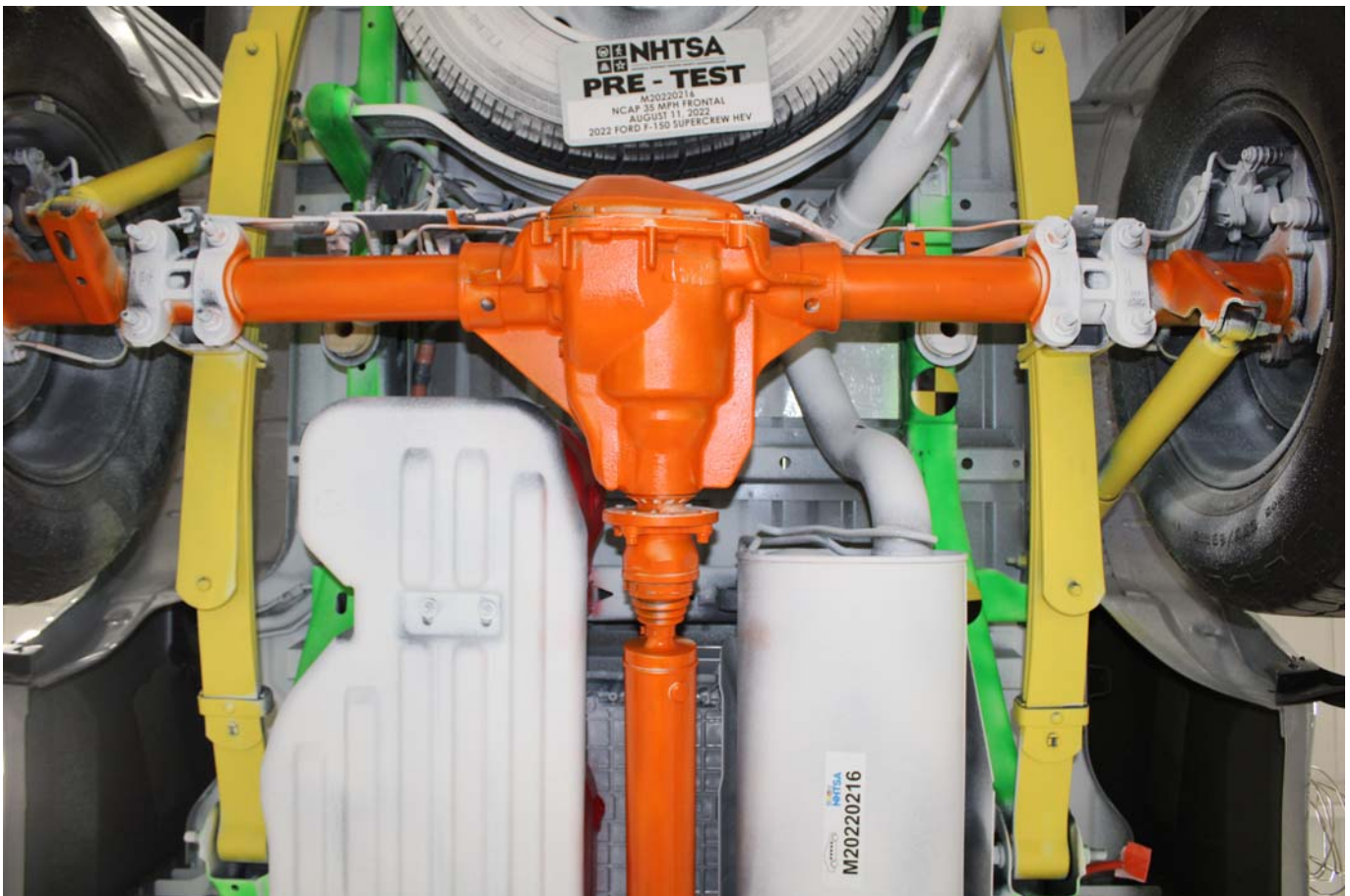


Photo No. 026 - Pre-Test Rear Underbody View

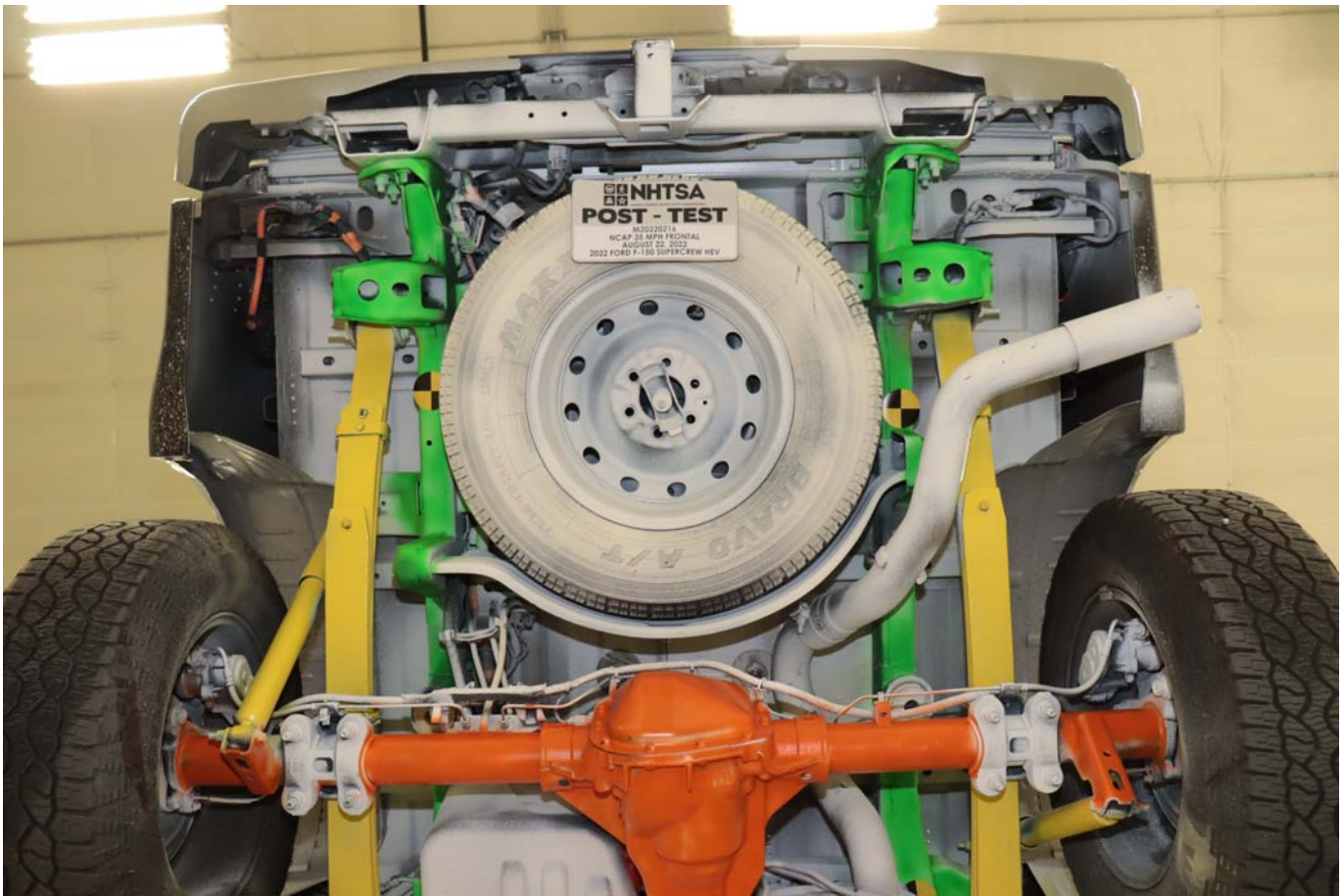


Photo No. 027 - Post-Test Rear Underbody View



Photo No. 028 - Pre-Test Dummy Cable Routing



Photo No. 029 - Post-Test Dummy Cable Routing



Photo No. 030 - Pre-Test Driver Dummy Front View



Photo No. 031 - Post-Test Driver Dummy Front View



Photo No. 032 - Pre-Test Driver Dummy Window View



Photo No. 033 - Post-Test Driver Dummy Window View



Photo No. 034 - Pre-Test Driver Dummy and Vehicle Interior View



Photo No. 035 - Post-Test Driver Dummy and Vehicle Interior View



Photo No. 036 - Pre-Test Driver's Seat Fore-Aft Markings



Photo No. 037 - Post-Test Driver's Seat Fore-Aft Markings



Photo No. 038 - Pre-Test View of Belt Anchorage for Driver Dummy



Photo No. 039 - Post-Test View of Belt Anchorage for Driver Dummy



Photo No. 040 - Pre-Test View of Belt Buckle and Latch Plate for Driver Dummy

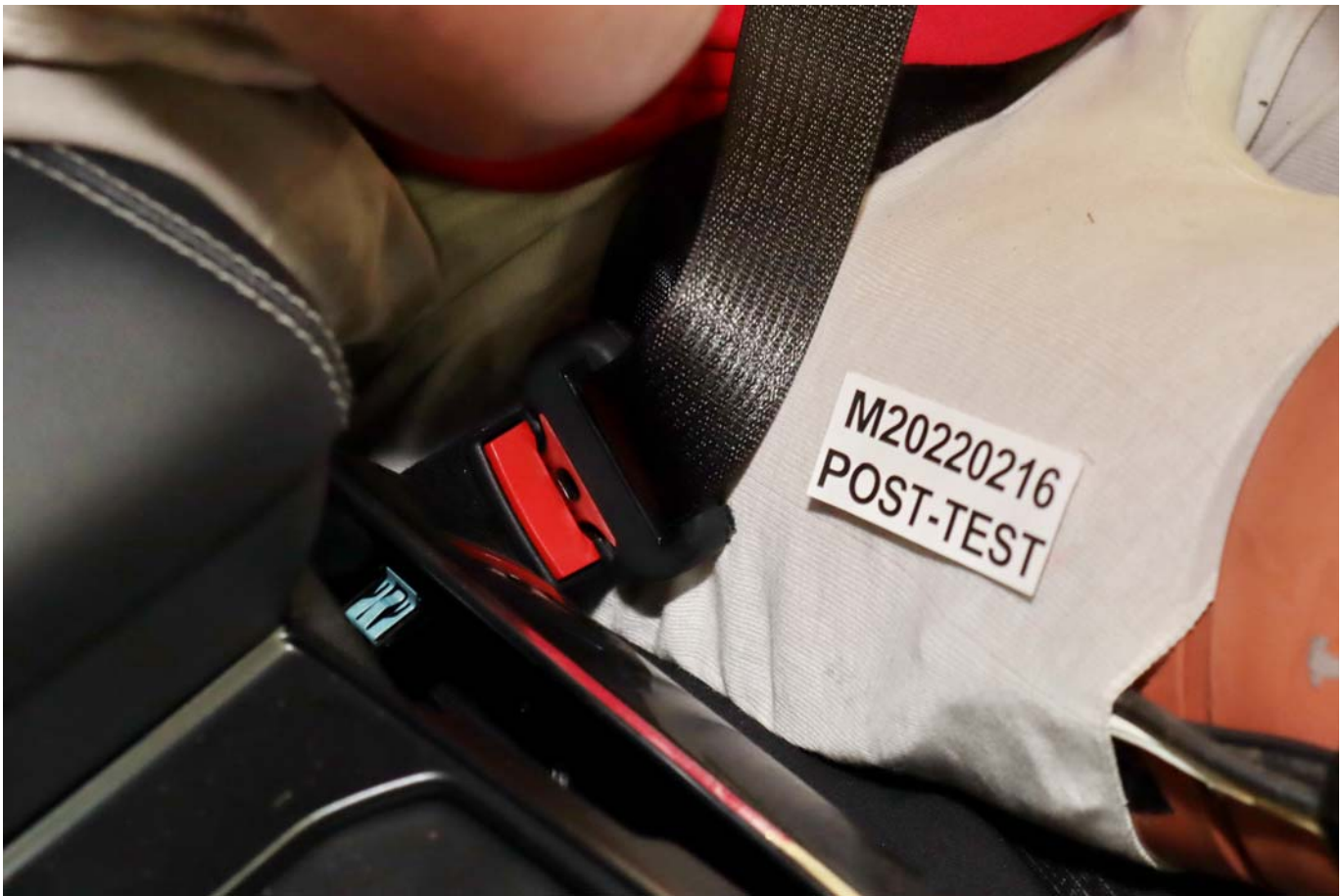


Photo No. 041 - Post-Test View of Belt Buckle and Latch Plate for Driver Dummy



Photo No. 042 - Pre-Test Driver Dummy Feet



Photo No. 043 - Post-Test Driver Dummy Feet



Photo No. 044 - Pre-Test Driver's Side Knee Bolster



Photo No. 045 - Post-Test Driver's Side Knee Bolster



Photo No. 046 - Pre-Test Driver's Side Floorpan



Photo No. 047 - Post-Test Driver's Side Floorpan



Photo No. 048 - Post-Test Driver Dummy Face



Photo No. 049 - Post-Test Driver Dummy Contact with Airbag



Photo No. 050 - Post-Test Driver Dummy Contact with Headrest



Photo No. 051 - Pre-Test View of the Steering Wheel



Photo No. 052 - Post-Test View of the Steering Wheel

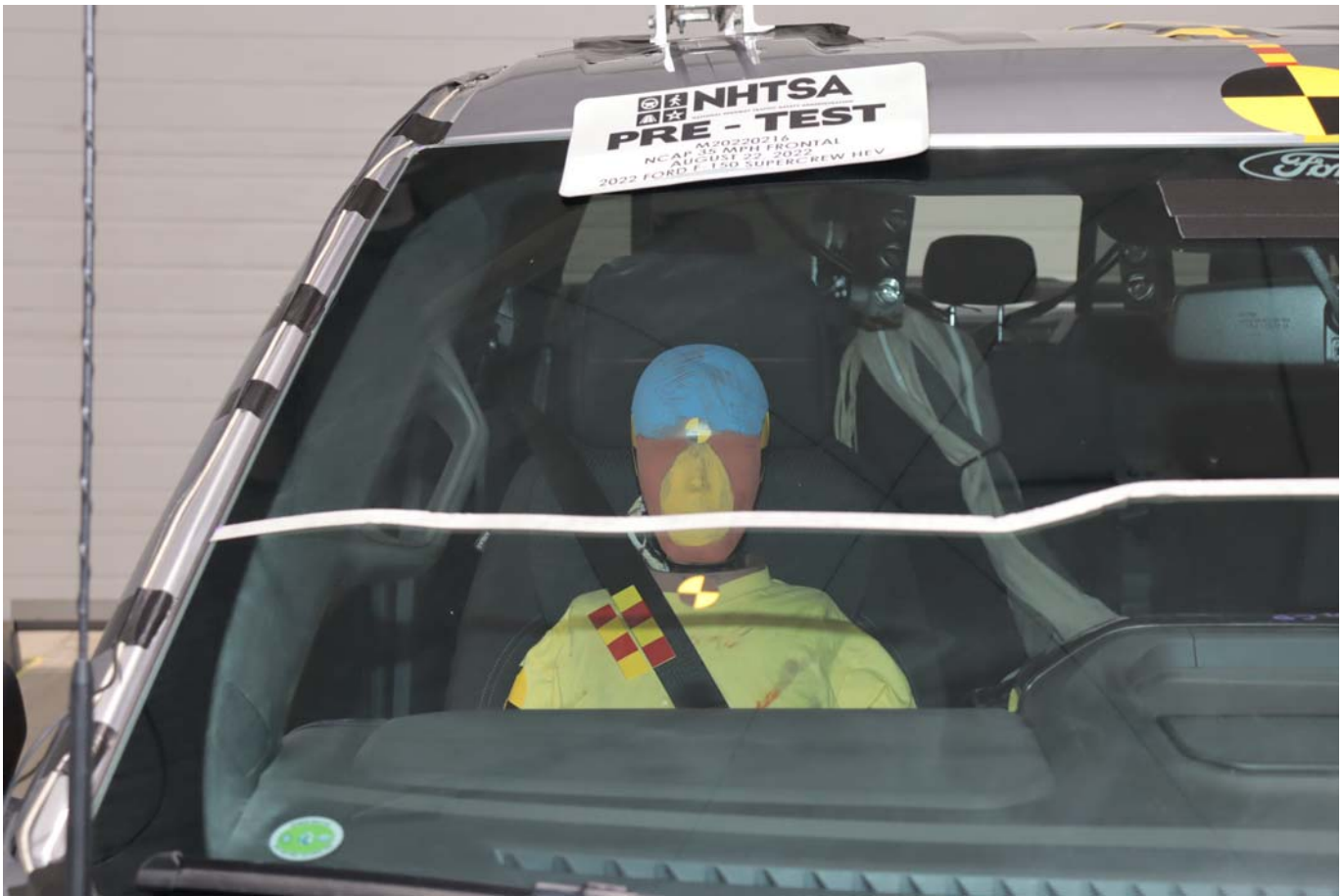


Photo No. 053 - Pre-Test Passenger Dummy Front View



Photo No. 054 - Post-Test Passenger Dummy Front View



Photo No. 055 - Pre-Test Passenger Dummy Window View



Photo No. 056 - Post-Test Passenger Dummy Window View





Photo No. 059 - Pre-Test Passenger's Seat Fore-Aft Markings



Photo No. 060 - Post-Test Passenger's Seat Fore-Aft Markings



Photo No. 061 - Pre-Test View of Belt Anchorage for Passenger Dummy



Photo No. 062 - Post-Test View of Belt Anchorage for Passenger Dummy



Photo No. 063 - Pre-Test View of Belt Buckle and Latch Plate for Passenger Dummy



Photo No. 064 - Post-Test View of Belt Buckle and Latch Plate for Passenger Dummy



Photo No. 065 - Pre-Test Passenger Dummy Feet

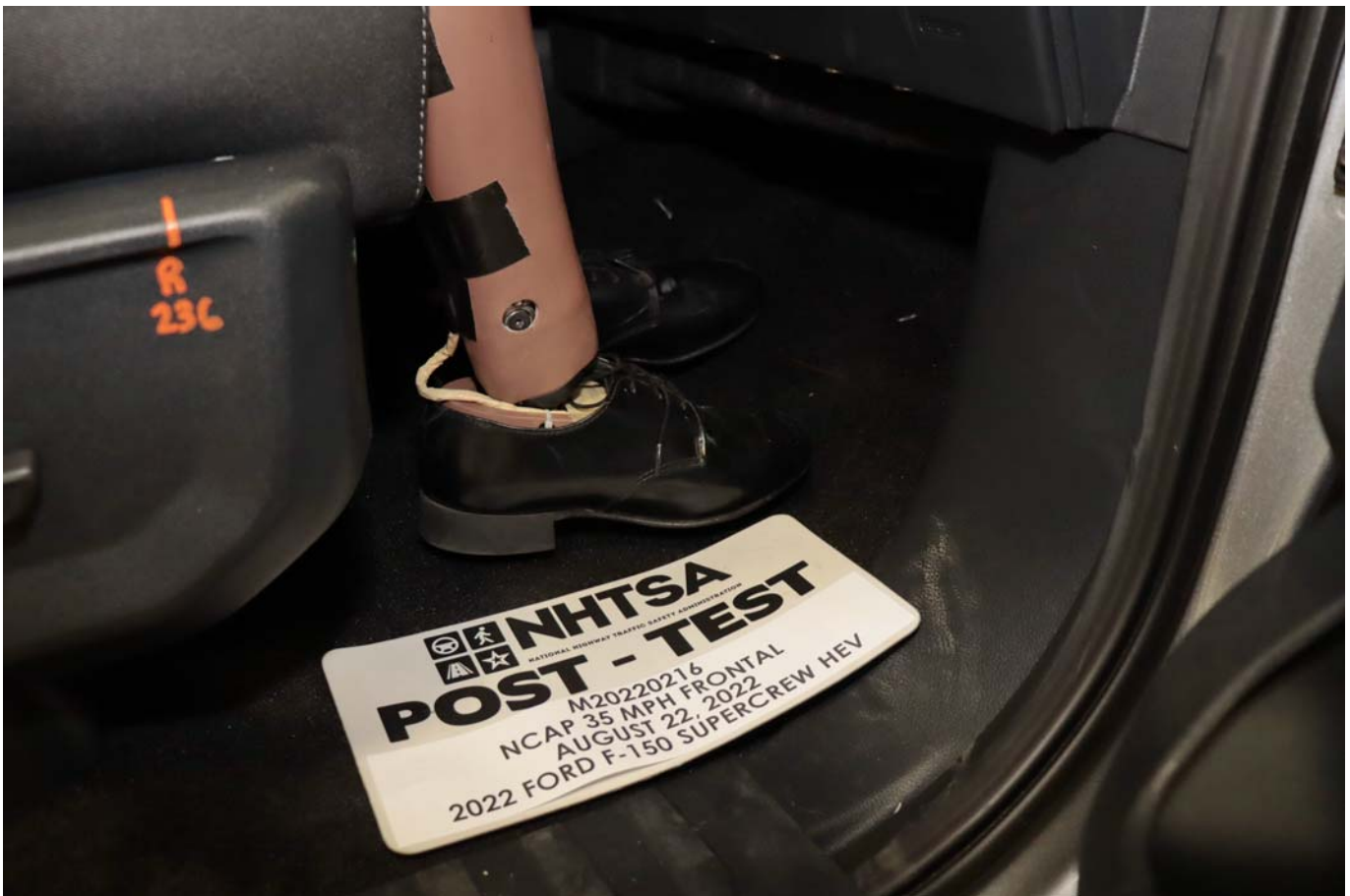


Photo No. 066 - Post-Test Passenger Dummy Feet



Photo No. 067 - Pre-Test Passenger's Side Knee Bolster



Photo No. 068 - Post-Test Passenger's Side Knee Bolster



Photo No. 069 - Pre-Test Passenger's Side Floorpan



Photo No. 070 - Post-Test Passenger's Side Floorpan

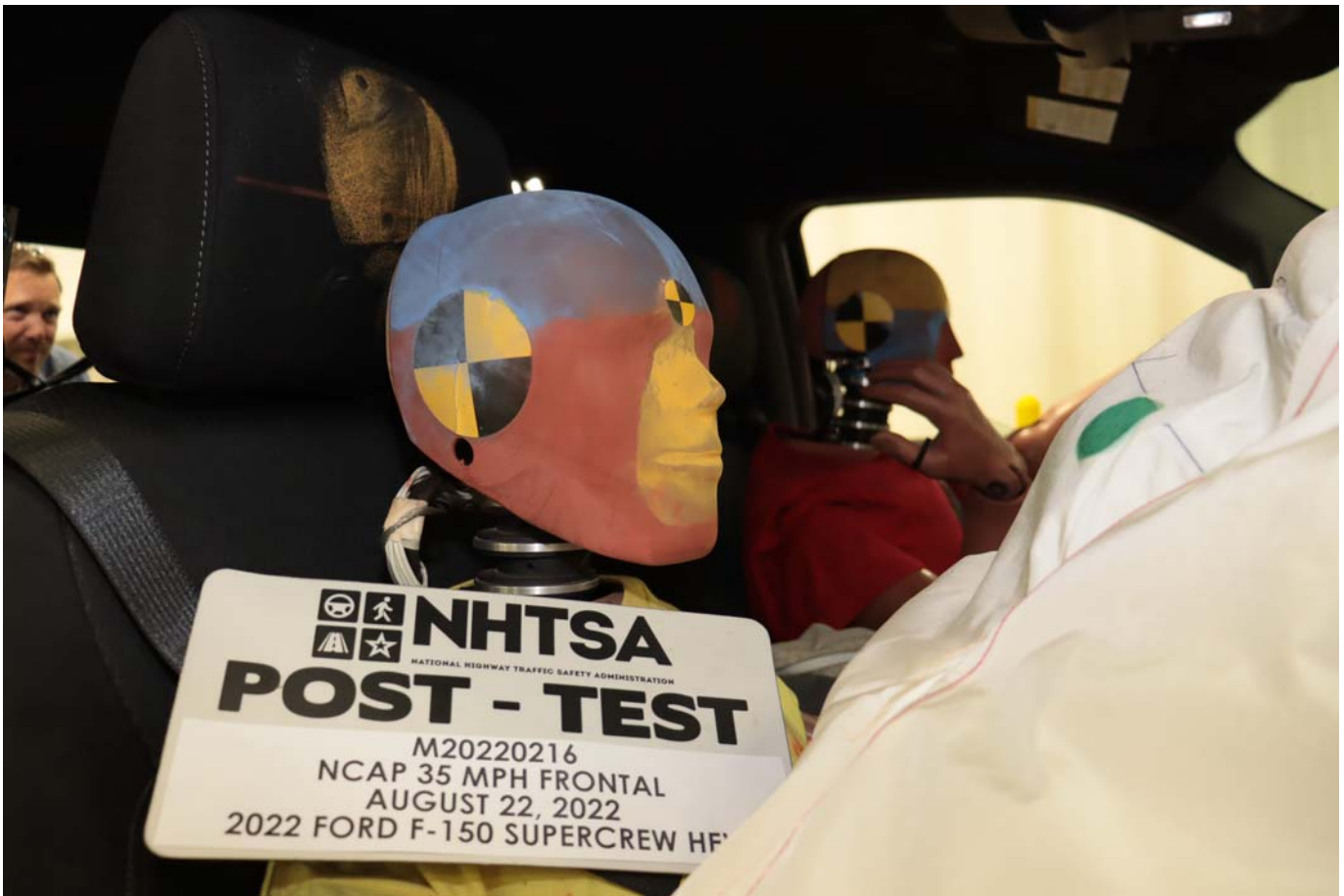


Photo No. 071 - Post-Test Passenger Dummy Face



Photo No. 072 - Post-Test Passenger Dummy Contact with Airbag



Photo No. 073 - Post-Test Passenger Dummy Contact with Headrest



Photo No. 074 - Photograph of Ballast Installed in Vehicle

# PHOTOGRAPH NOT APPLICABLE

Photo No. 075 - Post-Test Stoddard Solvent Spillage Location View



Photo No. 076 - Post-Test Speed Trap Read-Out

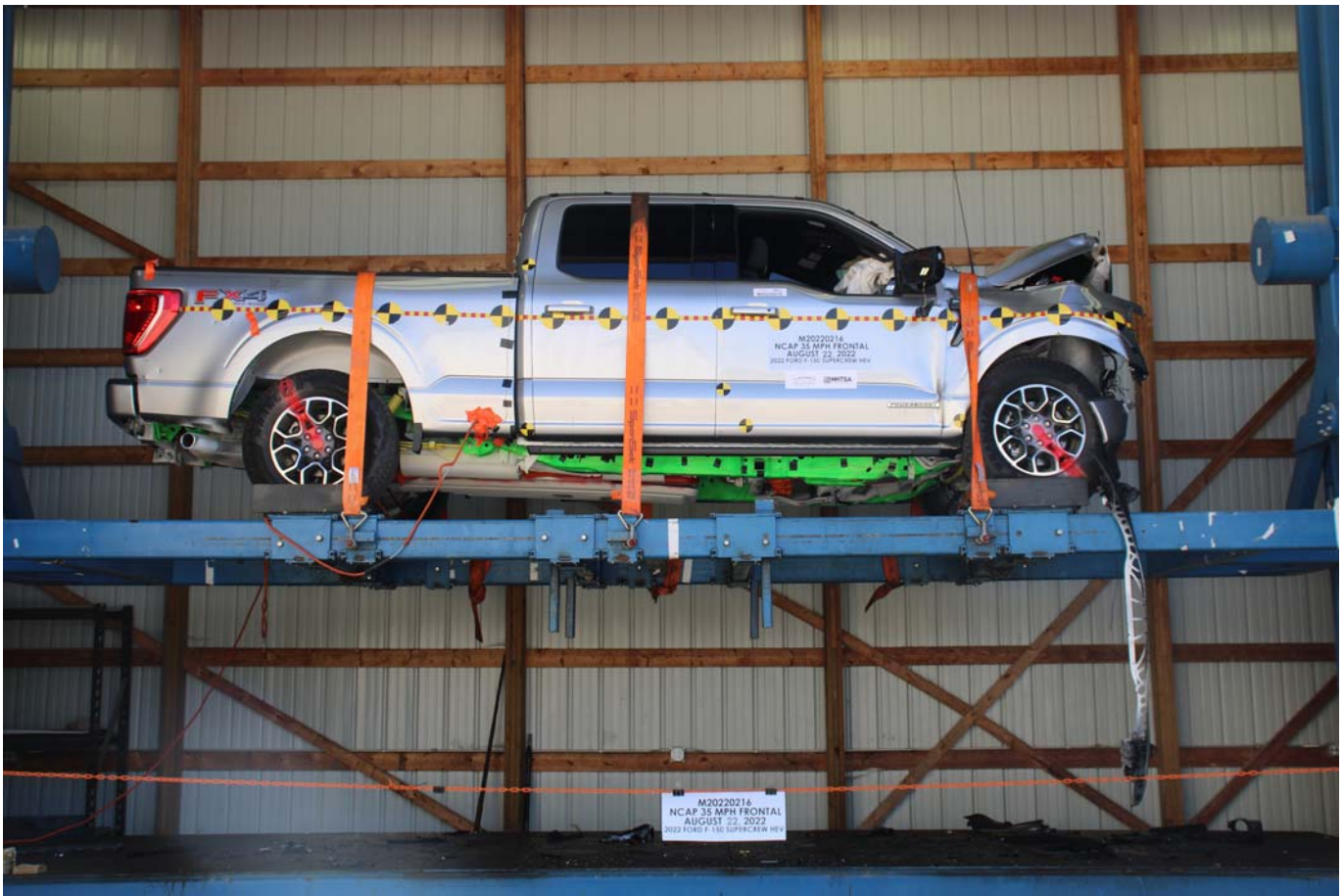


Photo No. 077 - Vehicle at 0 Degrees on Static Rollover Device

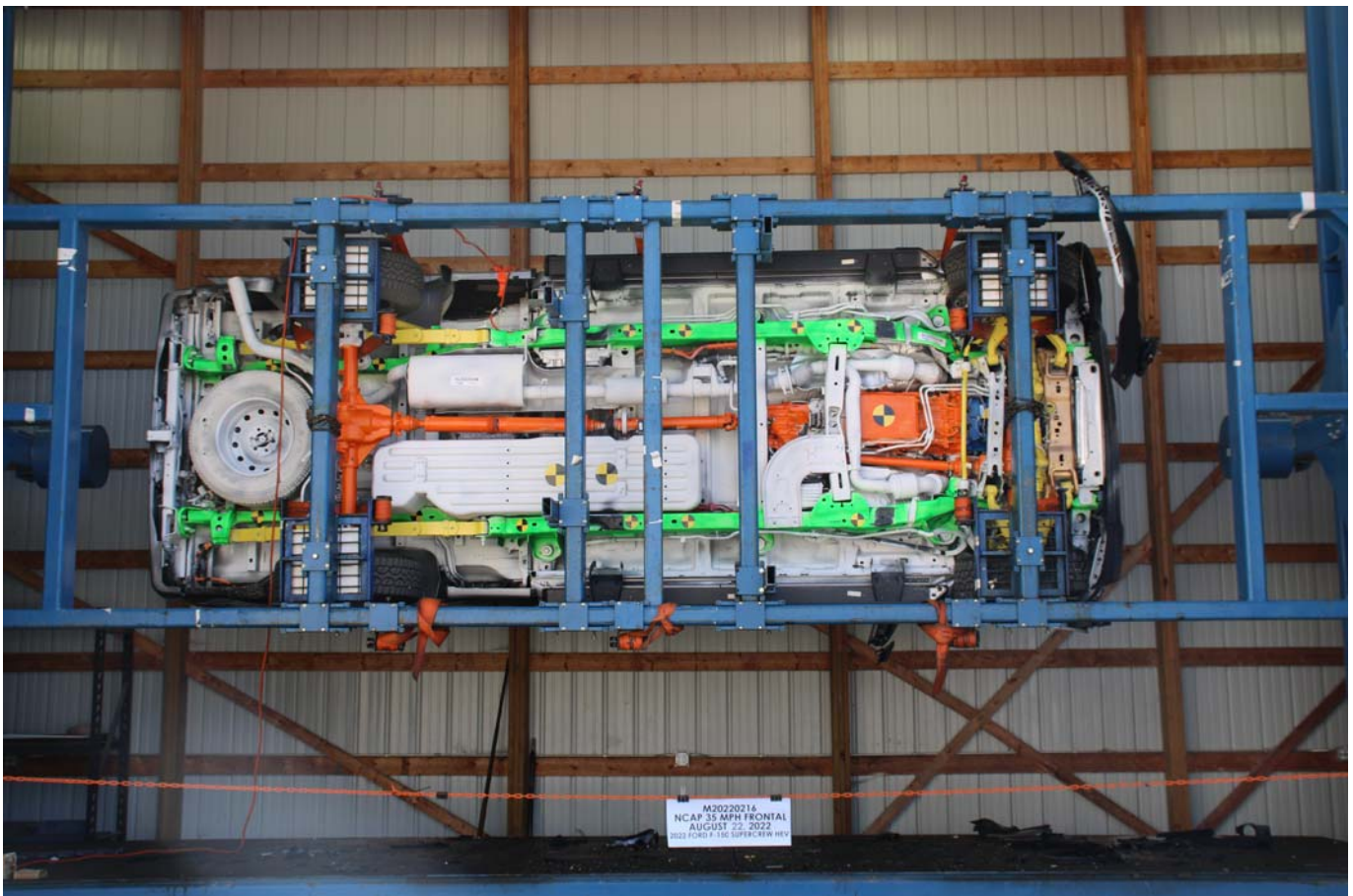


Photo No. 078 - Vehicle at 90 Degrees on Static Rollover Device



Photo No. 079 - Vehicle at 180 Degrees on Static Rollover Device



Photo No. 080 - Vehicle at 270 Degrees on Static Rollover Device

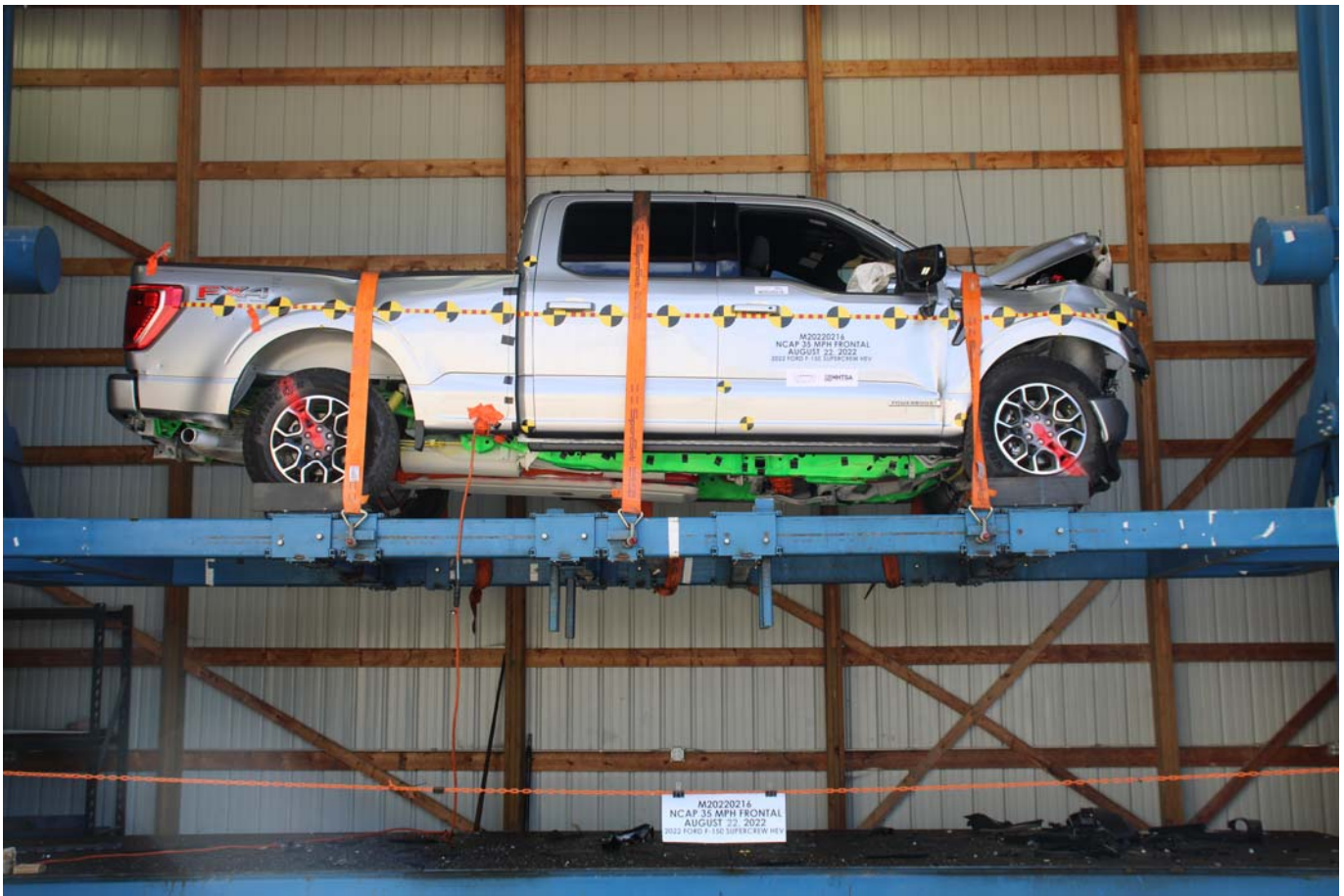


Photo No. 081 - Vehicle at 360 Degrees on Static Rollover Device

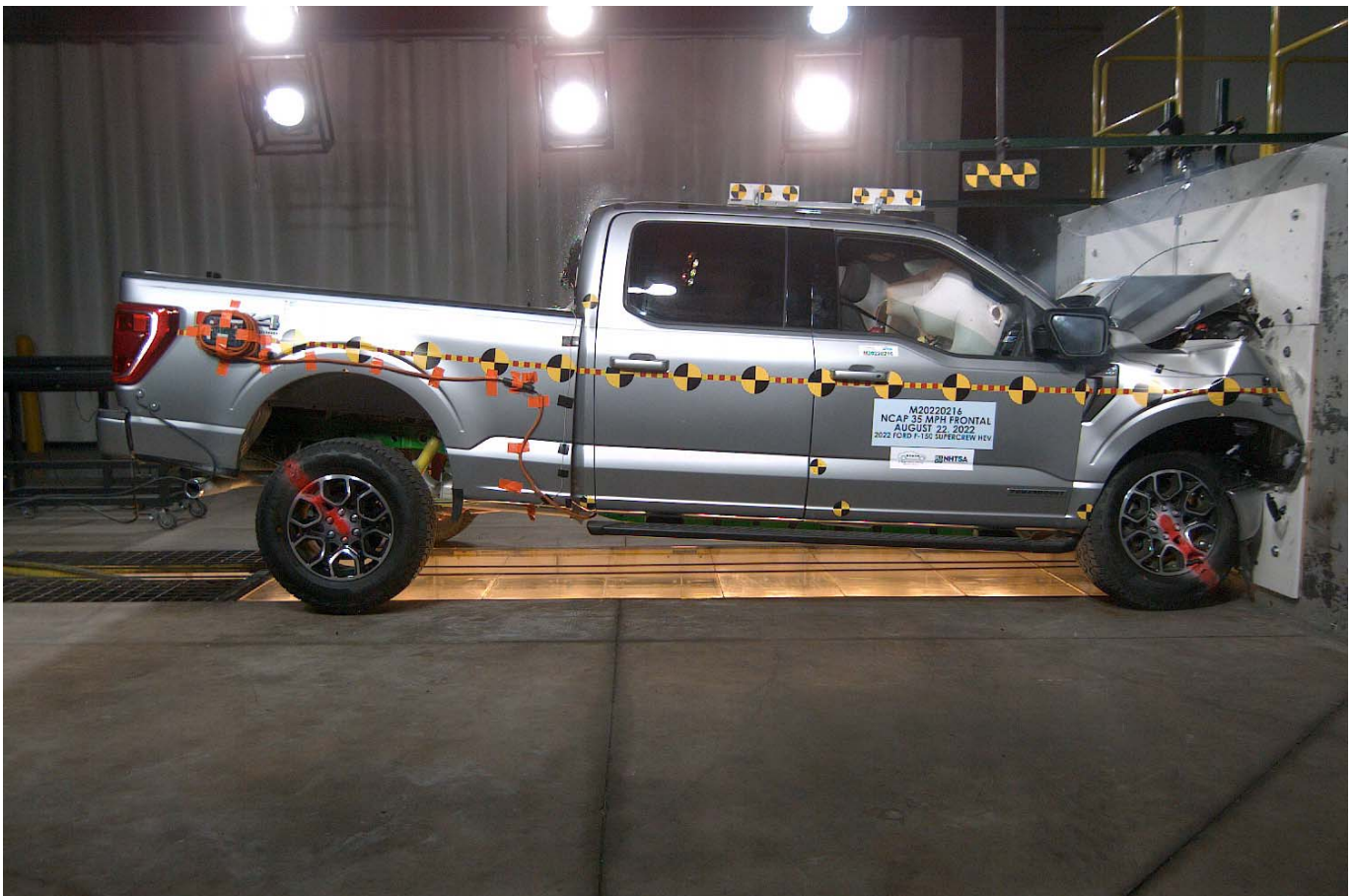


Photo No. 082 - 2022 Ford F-150 XLT 4x4 SuperCrew HEV Pickup Truck Frontal Impact Event


 <b>Go Further</b> ford.com		<b>VEHICLE DESCRIPTION</b> <b>F-150</b> 2022 F-150 4X4 SUPERCREW 157" WHEELBASE 3.5L POWERBOOST FULL HYBRID HYBRID ELEC 10-SPD AUTO TRA		<b>NF A71235</b>		<b>EPA DOT Fuel Economy and Environment</b> <b>Gasoline Vehicle</b>										
<b>STANDARD EQUIPMENT INCLUDED AT NO EXTRA CHARGE</b>		<b>EXTERIOR</b> <ul style="list-style-type: none"> <li>DAYTIME RUNNING LAMPS</li> <li>EASY FUEL CAPLESS FILLER</li> <li>FOG LAMPS</li> <li>FULLY BOXED STEEL FRAME</li> <li>HEADLAMPS - AUTO HIGH BEAM</li> <li>HEADLAMPS - AUTOLAMP (ON/OFF)</li> <li>MANUAL FOLD POWER MIRRORS</li> <li>PICKUP BOX TIE DOWN HOOKS</li> <li>POWER TAILGATE LOCK</li> <li>REAR PRIVACY GLASS</li> <li>TRAILER SWAY CONTROL</li> </ul>		<b>INTERIOR</b> <ul style="list-style-type: none"> <li>TOUCH UP/DOWN DR/PASS WIN</li> <li>60/40 FOLD-UP REAR BENCH SEAT</li> <li>DOOR LOCKS - POWER</li> <li>DUAL VISOR VANITY MIRRORS</li> <li>ILLUMINATED ENTRY</li> <li>MESSAGE CTR: OUTSIDE TEMP, COMPASS, TRIP COMPUTER</li> <li>POWERPOINTS - 12V</li> <li>TILT/TELESCOPE STR COLUMN</li> </ul>		<b>FUNCTIONAL</b> <ul style="list-style-type: none"> <li>AUTO HOLD</li> <li>BUS W/CROSS-TRAFFIC ALERT</li> <li>DYNAMIC HITCH ASSIST</li> <li>ELECT 4X4 SHIFT-ON-FLY</li> <li>FORDPASS CONNECT™ 4G</li> <li>HOTSPOT TELEMATICS MODEM</li> <li>GAS-CHARGED SHOCKS</li> <li>LANE-KEEPING SYSTEM</li> <li>POST-COLLISION BRAKING</li> <li>PRE-COLLISION ASSIST W/AEB</li> <li>REVERSE BRAKE ASSIST</li> <li>REVERSE SENSING AND REAR VIEW CAMERA</li> <li>SELECTSHIFT®</li> </ul>		<b>SAFETY/SECURITY</b> <ul style="list-style-type: none"> <li>ADVANCETRAC™ WITH RSC®</li> <li>AIRBAGS - FRONT SEAT MOUNTED SIDE IMPACT</li> <li>AIRBAGS - SAFETY CANOPY®</li> <li>CTR HIGH MOUNT STOP LAMP</li> <li>PERIMETER ALARM</li> <li>SOS POST-CRASH ALERT SYS™</li> <li>TIRE PRESSURE MONIT SYS™</li> </ul>								
<b>INCLUDED ON THIS VEHICLE</b>		<b>OPTIONAL EQUIPMENT/OTHER</b>		<b>PRICE INFORMATION</b>		<b>WARRANTY</b> <ul style="list-style-type: none"> <li>3YR/36,000 BUMPER / BUMPER</li> <li>5YR/60,000 POWERTRAIN</li> <li>5YR/60,000 ROADSIDE ASSIST</li> <li>8YR/100,000 HYBRID BATTERY</li> </ul>										
<b>EQUIPMENT GROUP 302A</b> -XLT SERIES -ELECTRONIC AUTO TEMP CONTROL -SIRIUS XM W/ 360L -SYNC 4 W/ENHANCED VOICE RECOG -LED SIDE-MIRROR SPOTLIGHTS -REMOTE START SYSTEM		(MSRP) 5,675.00 .275/65R 18 BSW ALL-TERRAIN .16" 6-SPOKE GLOSS BLACK WHEEL		(MSRP) 59,365.00 1,695.00 <b>61,060.00</b>		(MSRP) \$47,870.00 11,495.00 <b>59,365.00</b> <b>2,000.00</b> <b>2,000.00</b>										
<b>OPTIONAL EQUIPMENT/OTHER</b> <ul style="list-style-type: none"> <li>3.5L POWERBOOST FULL HYBRID HYBRID ELEC 10-SPD AUTO TRANS 2,500.00</li> <li>3.73 ELECTRONIC LOCK RR AXLE NO CHARGE</li> <li>7350# GVWR PACKAGE NO CHARGE</li> <li>FRONT LICENSE PLATE BRACKET NO CHARGE</li> <li>TOW TECHNOLOGY PACKAGE 880.00</li> <li>INTEGRATED TRAILER BRAKE CONT NO CHARGE</li> <li>360-DEGREE CAMERA PACKAGE 90.00</li> <li>ENGINE BLOCK HEATER NO CHARGE</li> <li>50 STATE EMISSIONS 350.00</li> <li>POWER-SLIDING REAR WINDOW NO CHARGE</li> <li>LINER-TRAY STYLE-NO CARPET MAT NO CHARGE</li> <li>AUTO START-STOP REMOVAL NO CHARGE</li> <li>CLASS IV TRAILER HITCH</li> <li>MIRROR MAN FOLD W/POWER GLASS</li> <li>FX4 OFF-ROAD PACKAGE 1,005.00</li> <li>SKID PLATES</li> <li>BED UTILITY PACKAGE 695.00</li> <li>.BOXLINK</li> <li>.TAILGATE STEP</li> <li>LED BOX LIGHTING</li> <li>XLT SPORT APPEARANCE PACKAGE 300.00</li> </ul>		<b>TOTAL VEHICLE &amp; OPTIONS/OTHER DESTINATION &amp; DELIVERY</b> <b>TOTAL BEFORE DISCOUNTS</b> <b>XLT HIGH CHRM OR SPRT</b> <b>TOTAL SAVINGS</b>		<b>BASE PRICE</b> <b>TOTAL OPTIONS/OTHER</b> <b>TOTAL VEHICLE &amp; OPTIONS/OTHER DESTINATION &amp; DELIVERY</b> <b>TOTAL BEFORE DISCOUNTS</b> <b>XLT HIGH CHRM OR SPRT</b> <b>TOTAL SAVINGS</b>		<b>GOVERNMENT 5-STAR SAFETY RATINGS</b> <b>Overall Vehicle Score</b> Not Rated Based on the combined ratings of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight. <table border="1"> <tr> <td>Frontal Crash</td> <td>Driver Passenger</td> <td>Not Rated</td> </tr> <tr> <td>Side Crash</td> <td>Front seat Rear seat</td> <td>Not Rated</td> </tr> <tr> <td>Rollover</td> <td></td> <td>Not Rated</td> </tr> </table> 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		Frontal Crash	Driver Passenger	Not Rated	Side Crash	Front seat Rear seat	Not Rated	Rollover		Not Rated
Frontal Crash	Driver Passenger	Not Rated														
Side Crash	Front seat Rear seat	Not Rated														
Rollover		Not Rated														
<b>SOLD TO</b> Sugar Loaf Ford, Inc. 1222 W. Service Drive Winona MN 55987		<b>RAMP ONE</b> <b>RA2P</b>		<b>FINAL ASSEMBLY PLANT</b> <b>DEARBORN</b>		<b>TOTAL MSRP \$59,060.00</b>										
<b>SHIP TO (IF OTHER THAN SOLD TO)</b>		<b>RAMP TWO</b>		<b>METHOD OF TRANSFER</b> <b>RAIL</b>		<b>ITEM #:</b> 58-A00S OIT 2										
<b>SHIP THROUGH</b>		This label is affixed pursuant to the Federal Automobile Information Disclosure Act. Gasoline, License, and Title Fees, State and Local taxes are not included. Dealer installed options or accessories are not included unless listed above.		<b>FORD CREDIT</b>		NB011 N RB 2X 230 004610 02 01 22										

Photo No. 083 - Monroney Label Photograph



Photo No. 305-01 - Auxiliary Power Module Warning Label



Photo No. 305-02 - Power Inverter Warning Label

**PHOTOGRAPH NOT APPLICABLE**

Photo No. 305-03 - First Responder Warning Label

# PHOTOGRAPH NOT APPLICABLE

Photo No. 305-04 - First Responder Warning Location

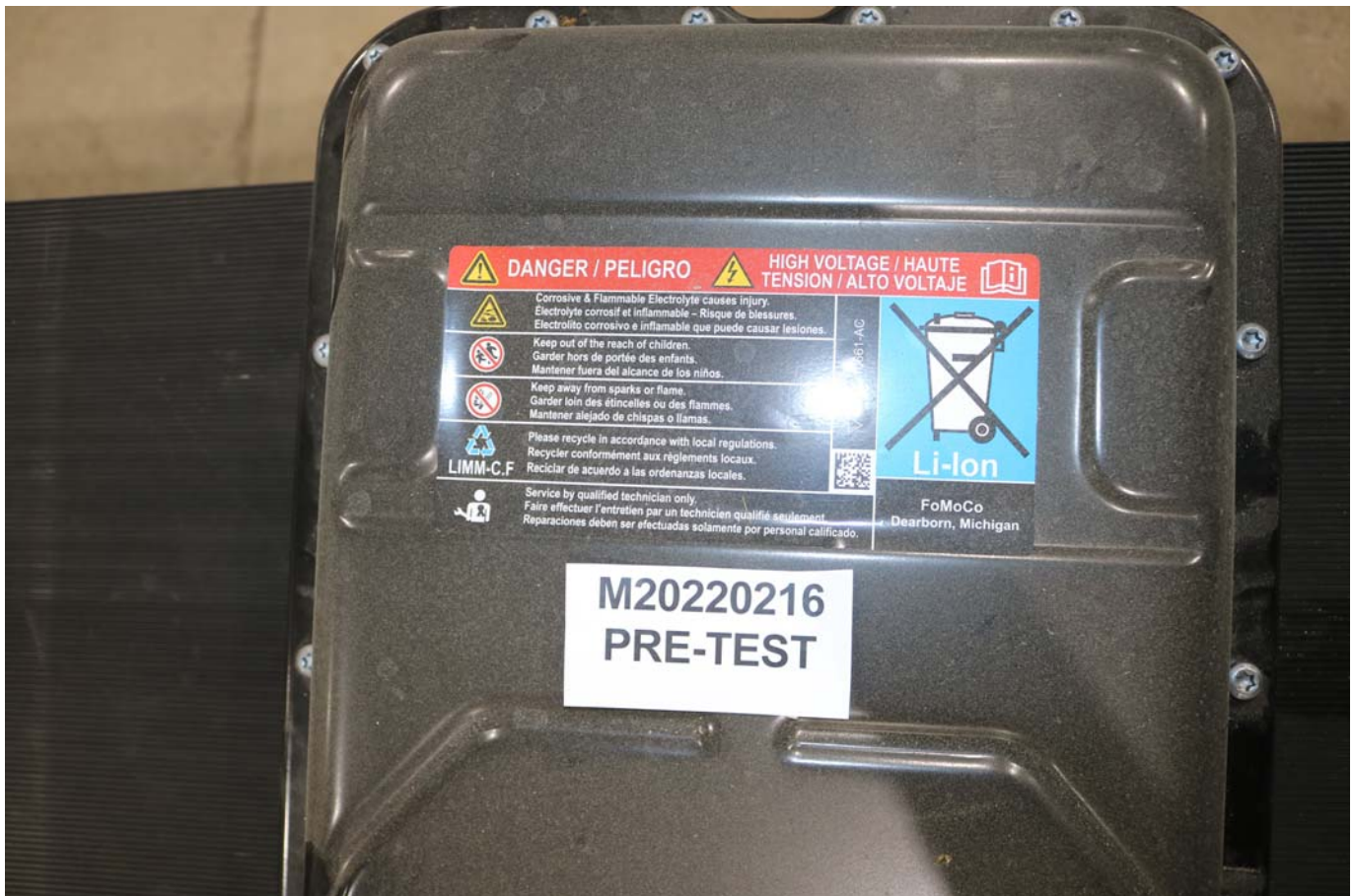


Photo No. 305-05 - Other Vehicle Label(s) Related to Electrical Propulsion System



Photo No. 305-06 - Manual High Voltage Service Disconnect in Place

**PHOTOGRAPH NOT APPLICABLE**

Photo No. 305-07 - Manual High Voltage Service Disconnect Removed

# PHOTOGRAPH NOT APPLICABLE

Photo No. 305-08 - Manual High Voltage Service Disconnect Removed



Photo No. 305-09 - Pre-Impact View of Propulsion Battery

**PHOTOGRAPH NOT APPLICABLE**

Photo No. 305-10 - Post-Impact Front View of Propulsion Battery

**PHOTOGRAPH NOT APPLICABLE**

Photo No. 305-11 - Post-Impact Rear View of Propulsion Battery



Photo No. 305-12 - Pre-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules

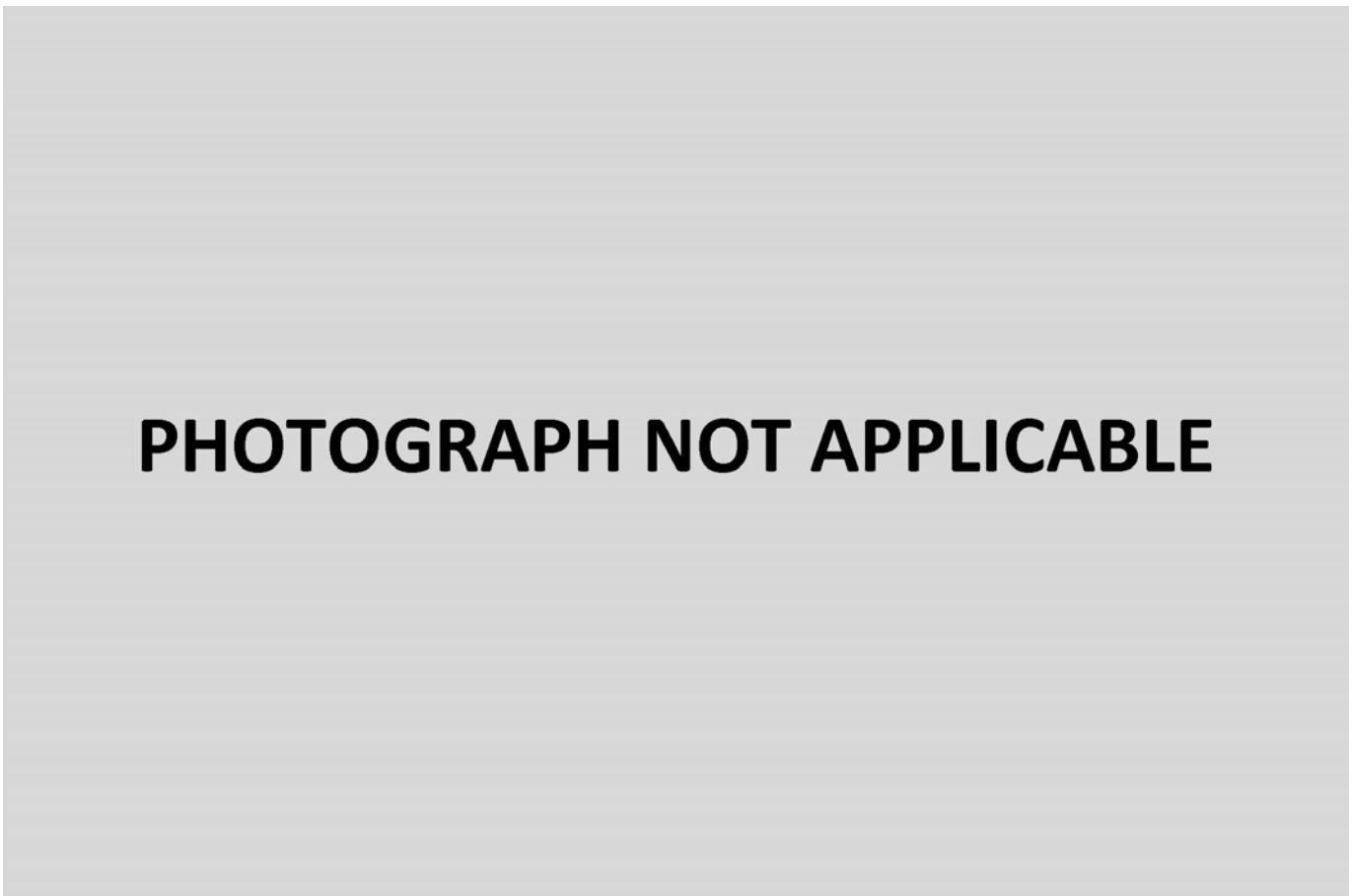


Photo No. 305-13 - Post-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules

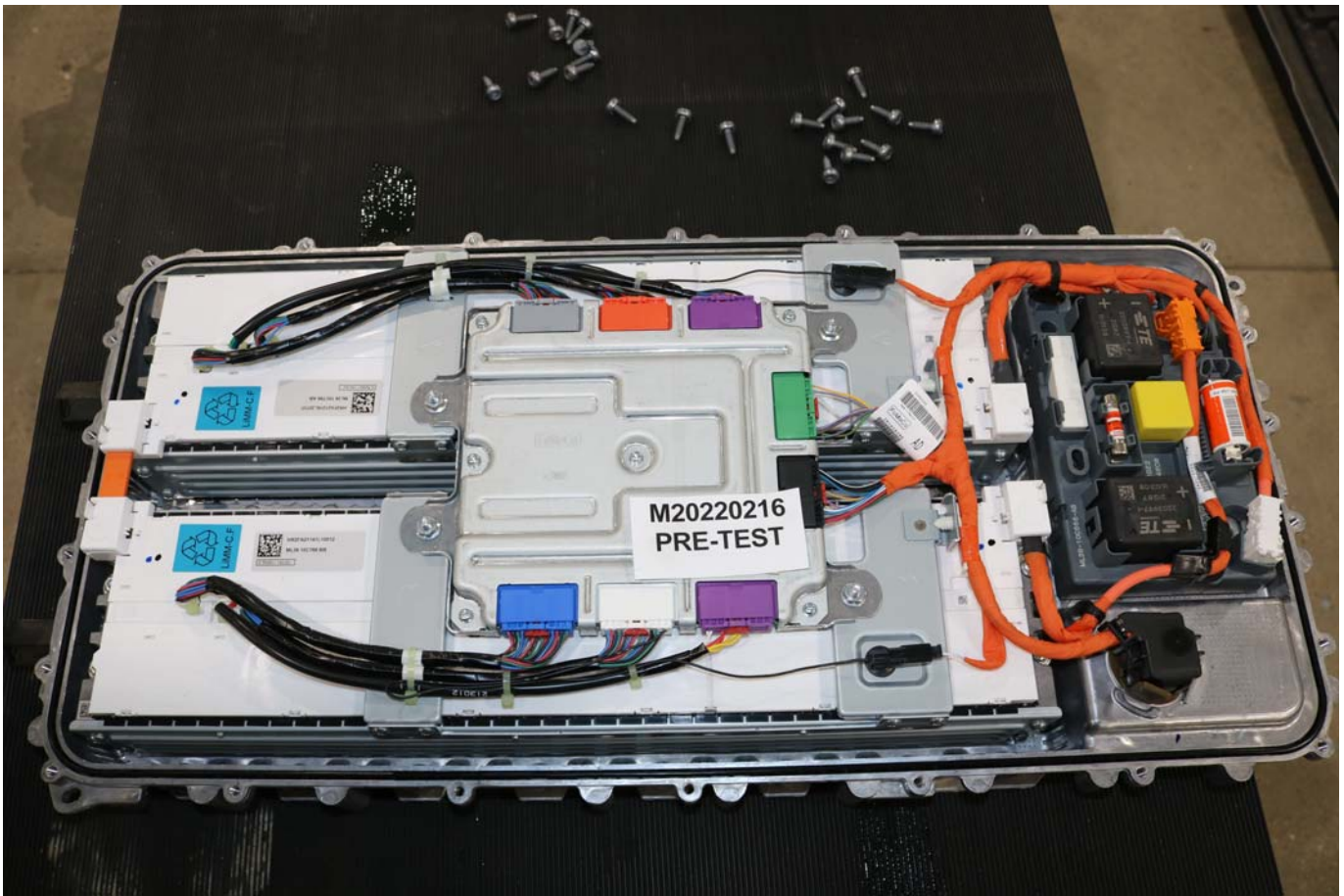


Photo No. 305-14 - Pre-Impact View of Propulsion Battery Module(s)

**PHOTOGRAPH NOT APPLICABLE**

Photo No. 305-15 - Post-Impact View of Propulsion Battery Module(s)

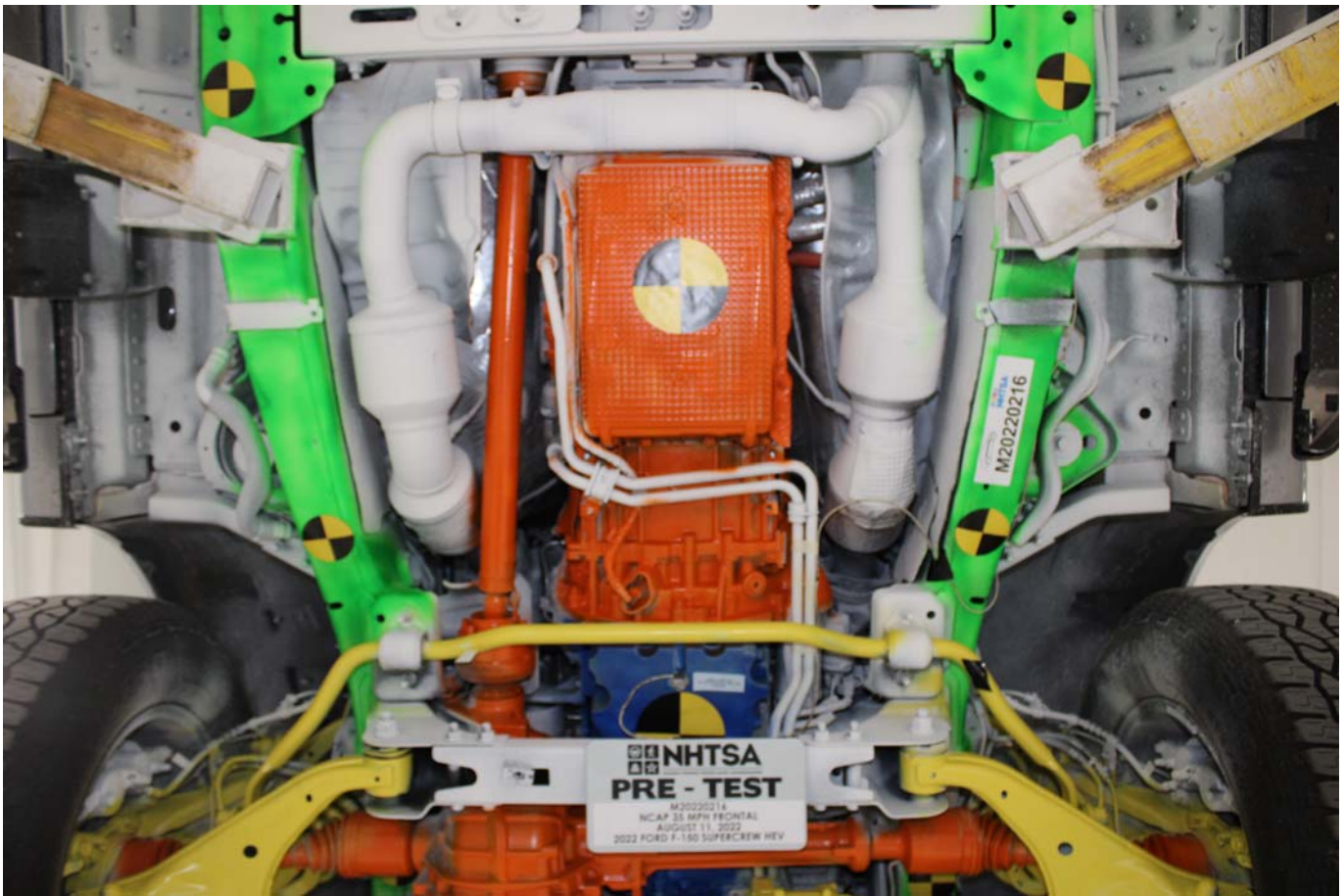


Photo No. 305-16 - Pre-Impact View of Electric Propulsion Drive

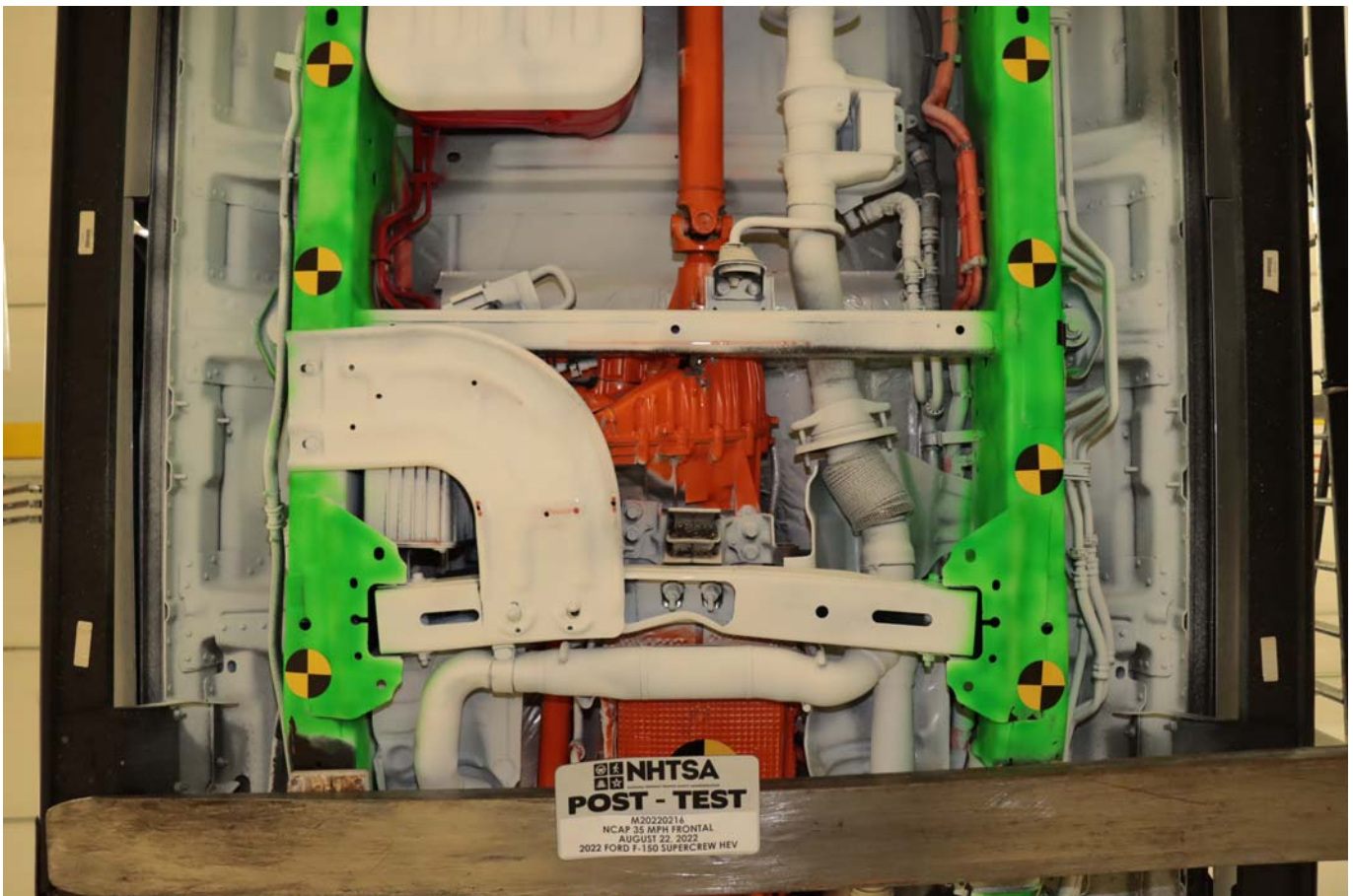


Photo No. 305-17 - Post-Impact View of Electric Propulsion Drive



Photo No. 305-18 - Pre-Impact View of High Voltage Interconnect(s)

**PHOTOGRAPH NOT APPLICABLE**

Photo No. 305-19 - Pre-Impact View Propulsion Battery Venting System(s)

**PHOTOGRAPH NOT APPLICABLE**

Photo No. 305-20 - Pre-Impact View of Other Visible Electric Propulsion Components



Photo No. 305-21 - Pre-Impact View of Ground Lead Attached

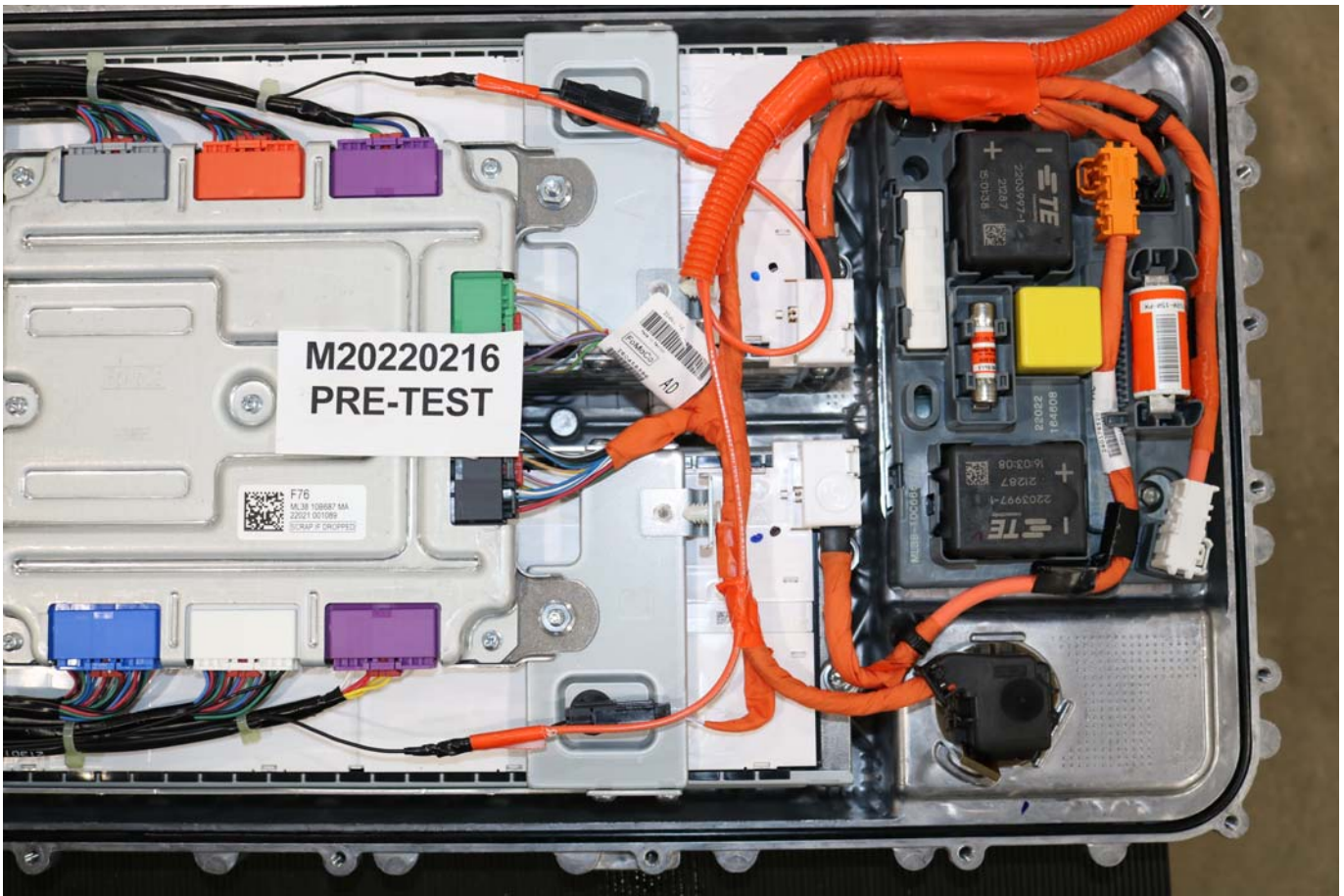


Photo No. 305-22 - Pre-Impact View of High Voltage Leads Attached

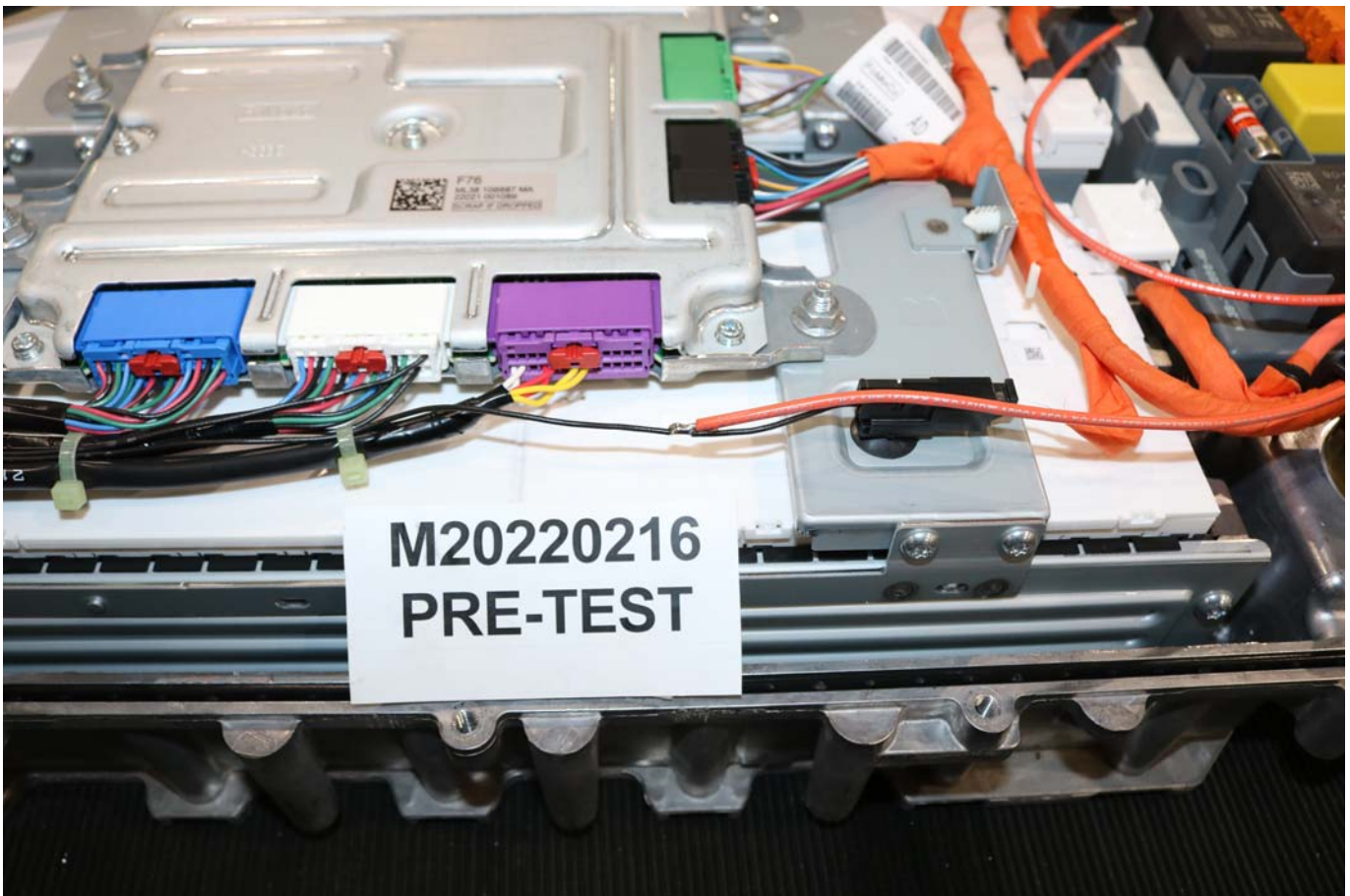


Photo No. 305-23 - Pre-Impact Close-Up View of High Voltage Leads Attached



Photo No. 305-24 - Pre-Impact View of Installed Test Interface Port



Photo No. 305-25 - Post-Impact View of Installed Test Interface Port



Photo No. 305-26 - Pre-Impact View of Other Test Devices

**PHOTOGRAPH NOT AVAILABLE**

Photo No. 305-27 - Post-Impact View of Other Test Devices

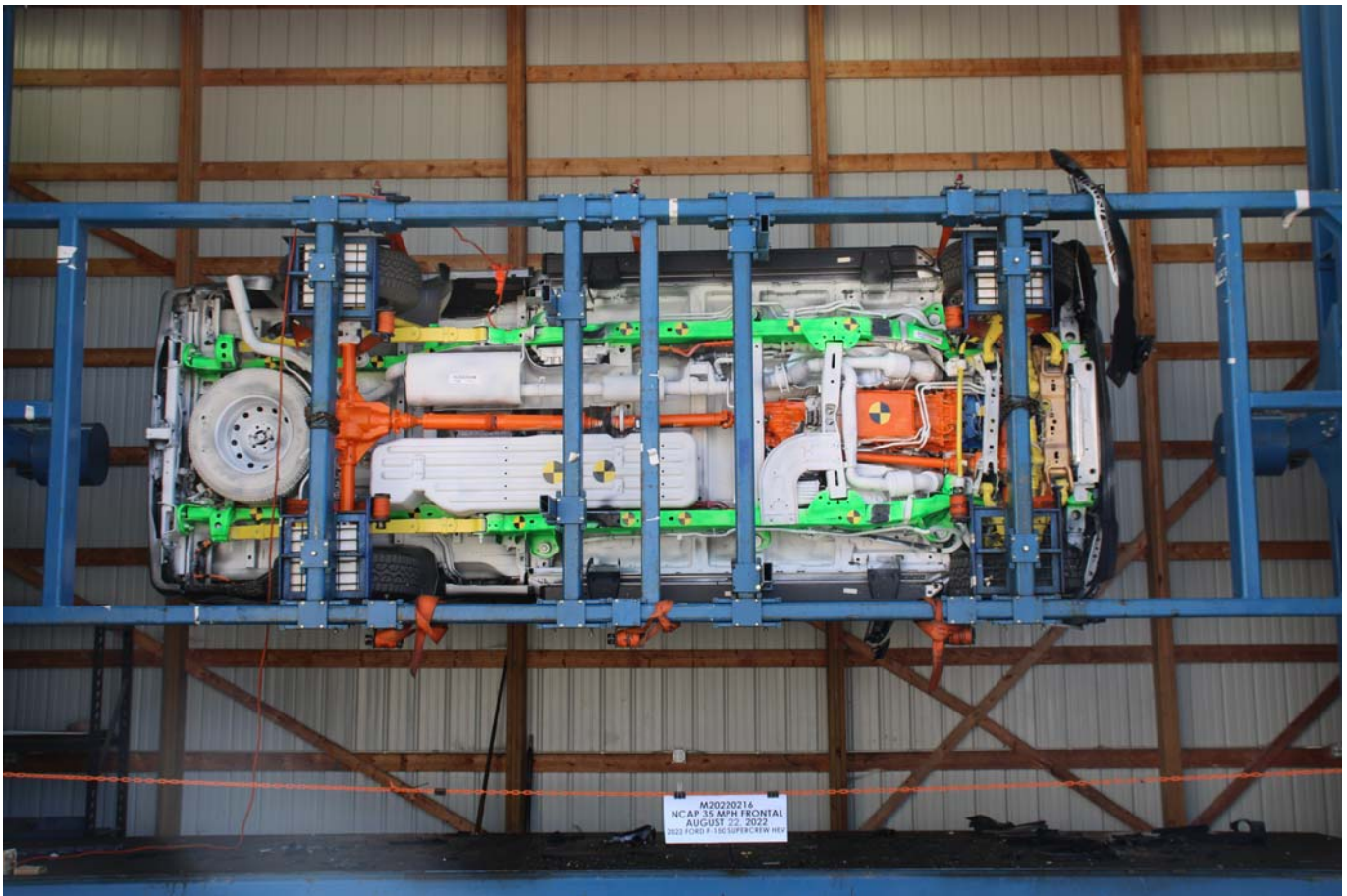


Photo No. 305-28 - FMVSS No. 305 Static Rollover at 90 Degrees



Photo No. 305-29 - FMVSS No. 305 Static Rollover at 180 Degrees



Photo No. 305-30 - FMVSS No. 305 Static Rollover at 270 Degrees

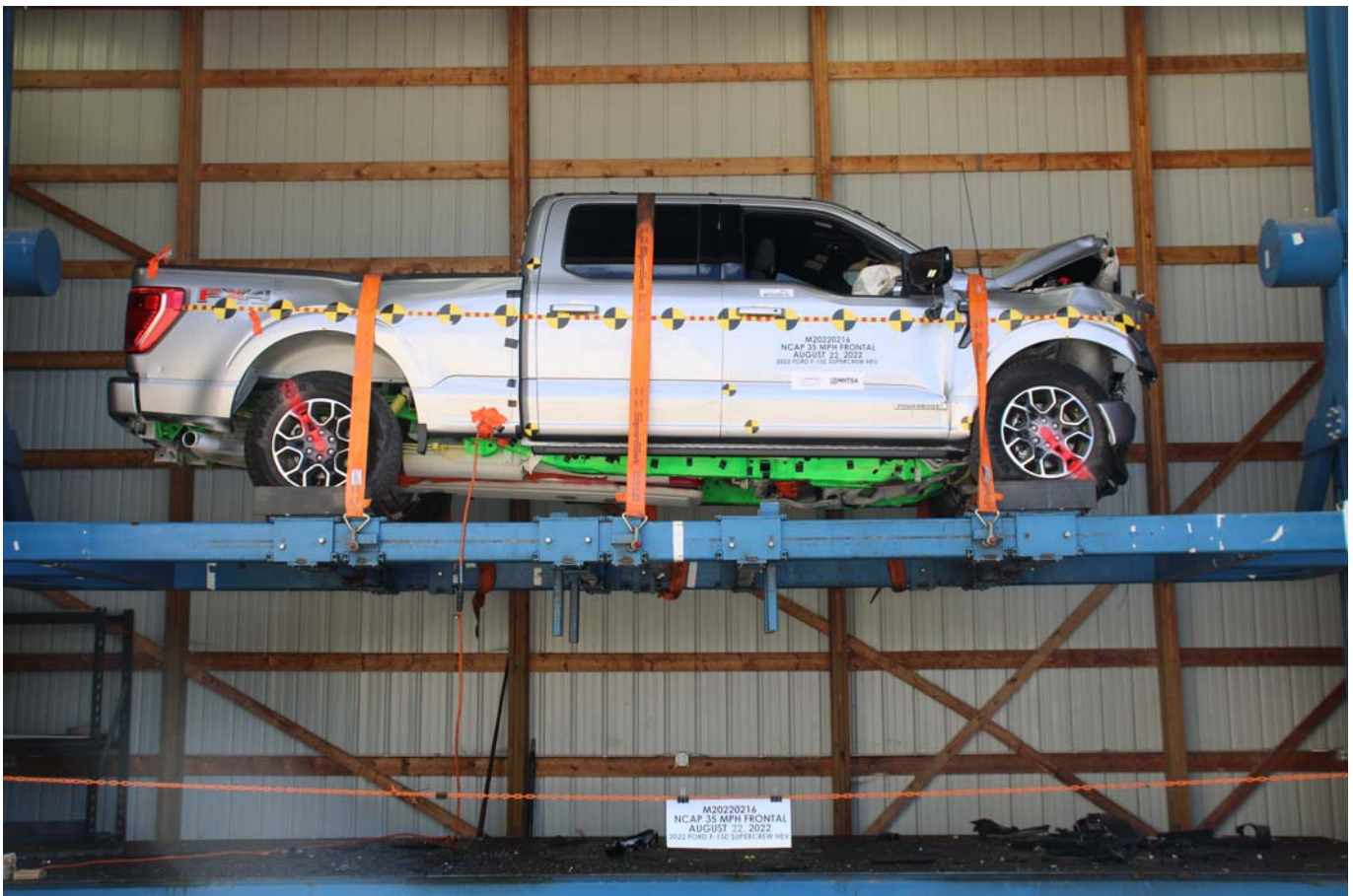


Photo No. 305-31 - FMVSS No. 305 Static Rollover at 360 Degrees



Photo No. 305-32 - Pre-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery



Photo No. 305-33 - Post-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery

**PHOTOGRAPH NOT APPLICABLE**

Photo No. 305-34 - Post-Impact Propulsion Battery System Mounting and-or Intrusion Failure(s)

**PHOTOGRAPH NOT APPLICABLE**

Photo No. 305-35 - Post-Impact View of Battery Component Intrusion

**PHOTOGRAPH NOT APPLICABLE**

Photo No. 305-36 - Post-Impact View of Battery Module Movement or Retention Loss

**PHOTOGRAPH NOT APPLICABLE**

Photo No. 305-37 - Post-Impact View of Propulsion Battery Electrolyte Spillage Location

**PHOTOGRAPH NOT APPLICABLE**

Photo No. 305-38 - Post-Test View of Propulsion Battery Electrolyte Spillage Location

**APPENDIX B**  
**DUMMY RESPONSE DATA TRACES**

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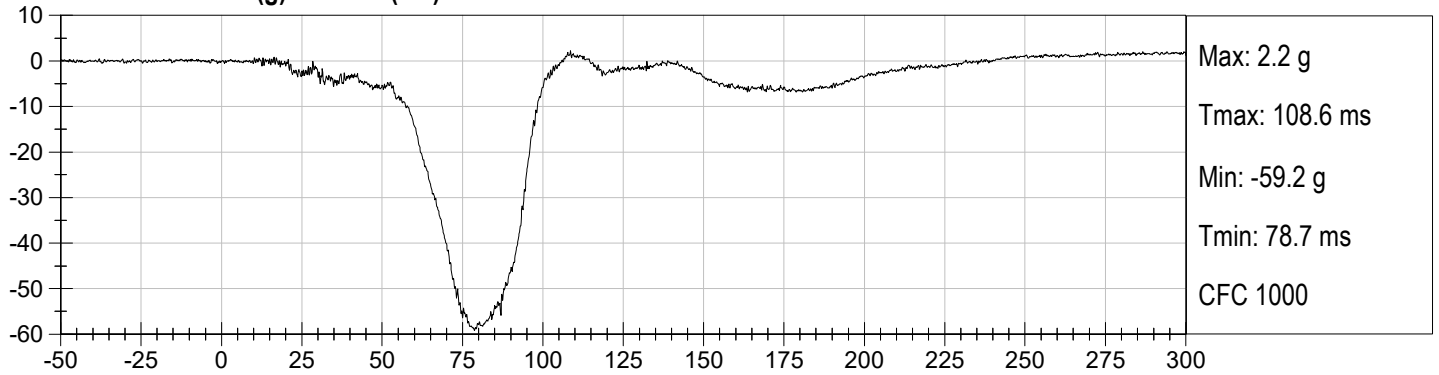
**The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at [www.nhtsa.gov](http://www.nhtsa.gov)**

Driver Head X Redundant  
 Driver Head Y Redundant  
 Driver Head Z Redundant  
 Driver Head Angular Velocity X  
 Driver Head Angular Velocity Y  
 Driver Head Angular Velocity Z  
 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

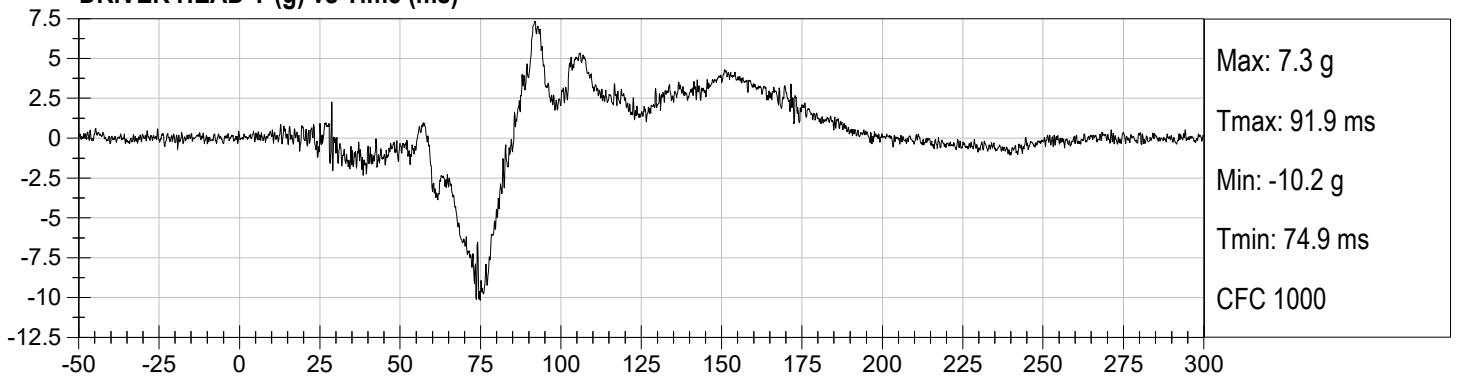
Driver Left Upper Tibia Force Z  
Driver Left Lower Tibia Moment X  
Driver Left Lower Tibia Moment Y  
Driver Left Lower Tibia Force Z  
Driver Right Upper Tibia Moment X  
Driver Right Upper Tibia Moment Y  
Driver Right Upper Tibia Force Z  
Driver Right Lower Tibia Moment X  
Driver Right Lower Tibia 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  
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Right Rear Seat Crossmember Z  
Left Rear Seat Crossmember Xr  
Right Rear Seat Crossmember Xr  
Advanced Research Load Cell Barrier – 528 channels

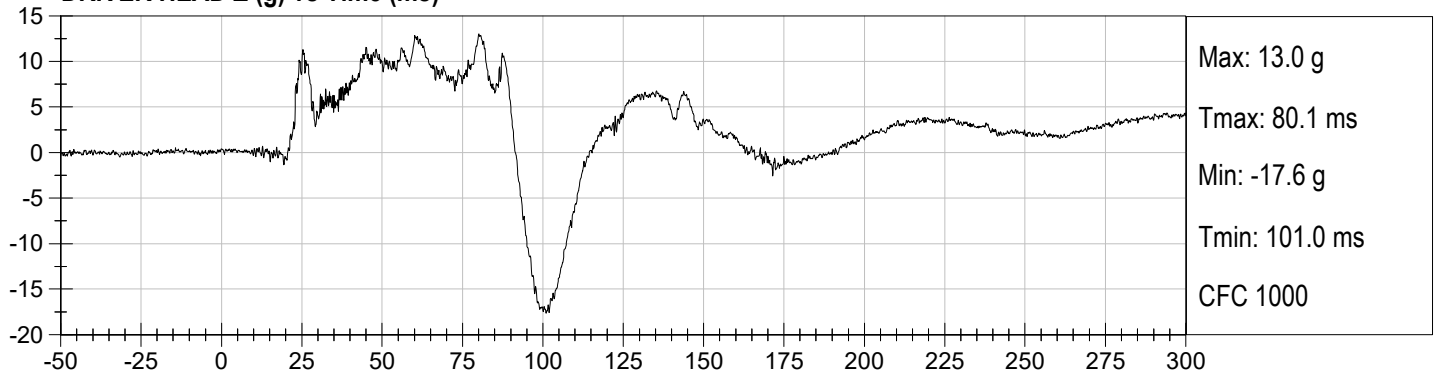
**DRIVER HEAD X (g) vs Time (ms)**



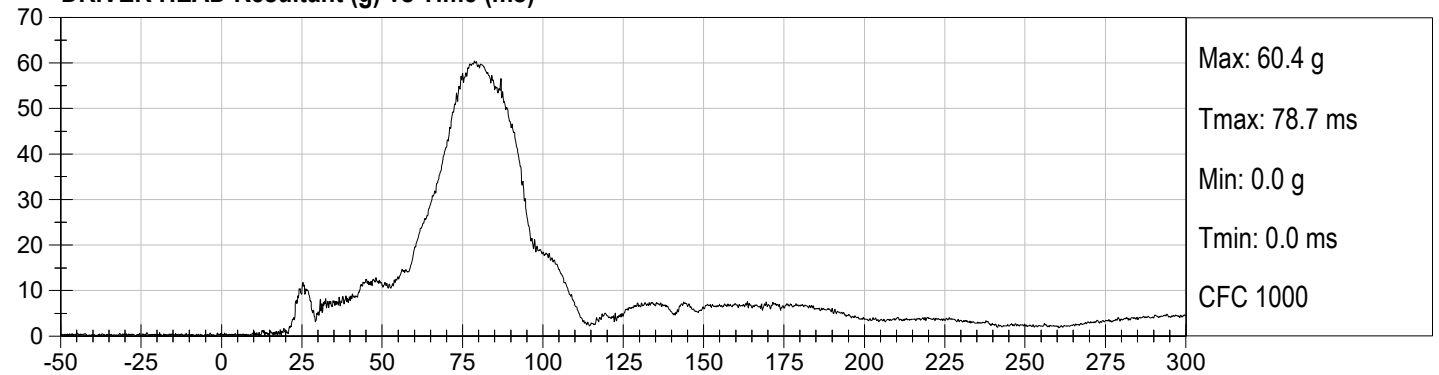
**DRIVER HEAD Y (g) vs Time (ms)**

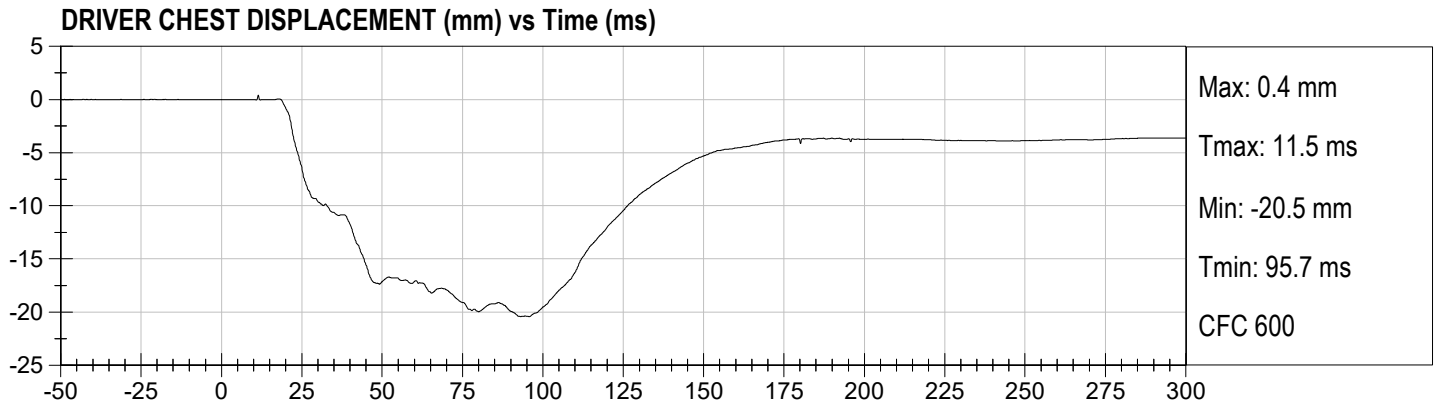


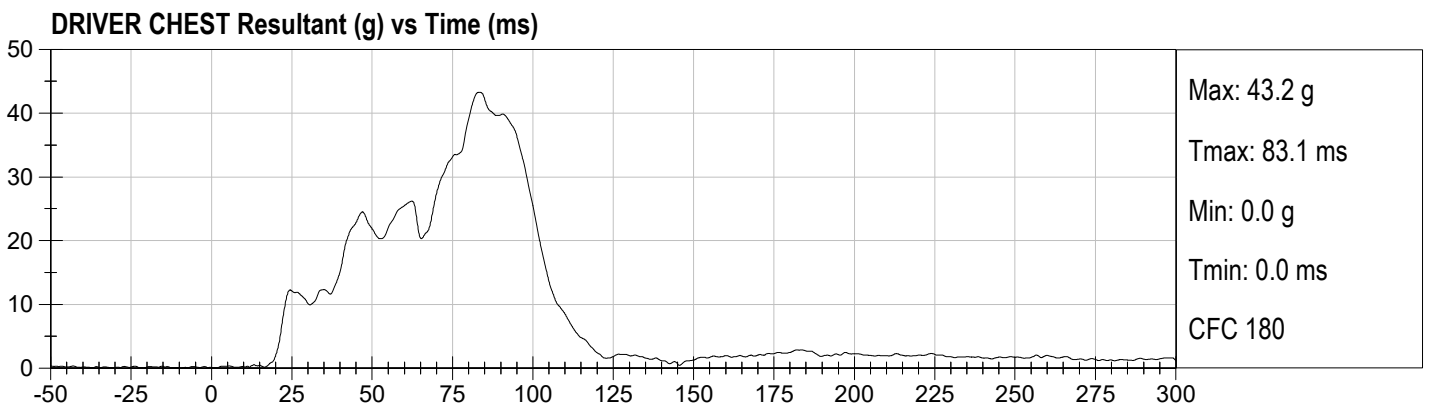
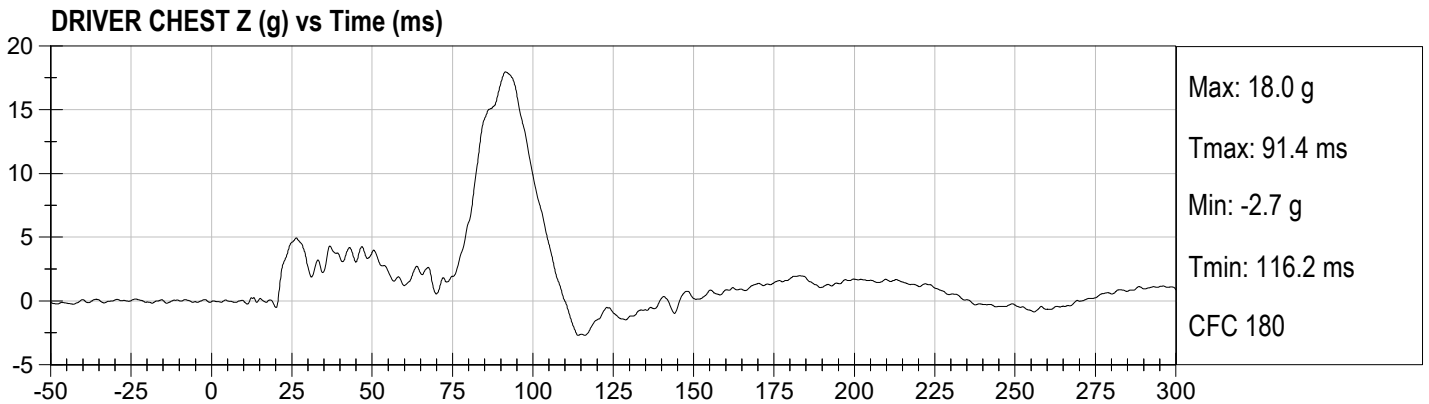
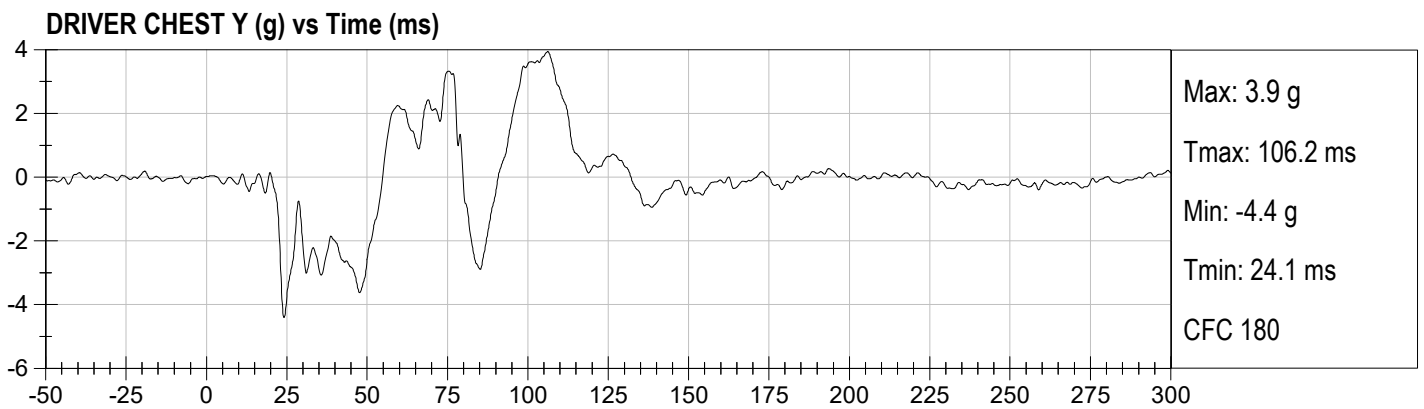
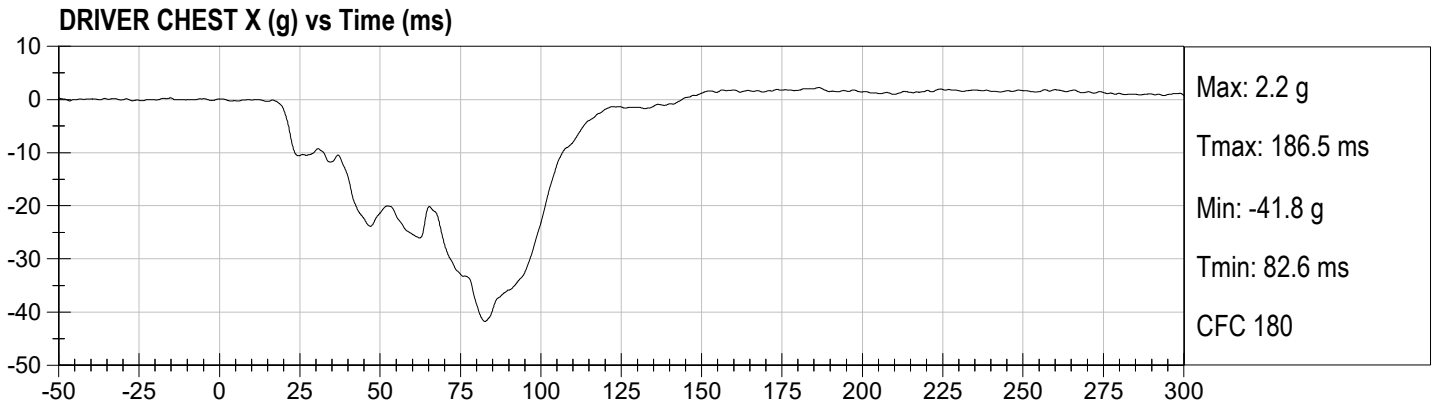
**DRIVER HEAD Z (g) vs Time (ms)**

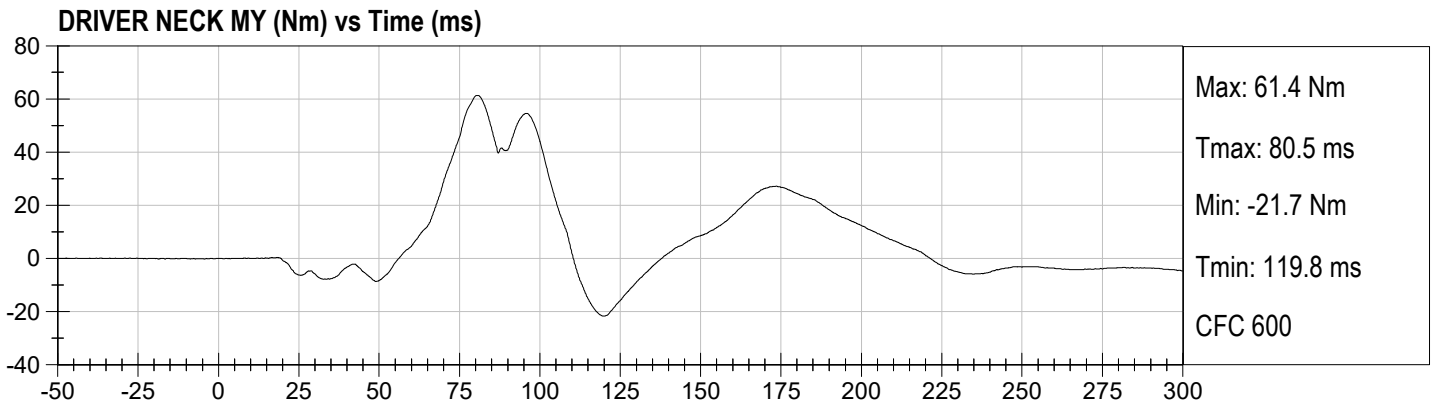
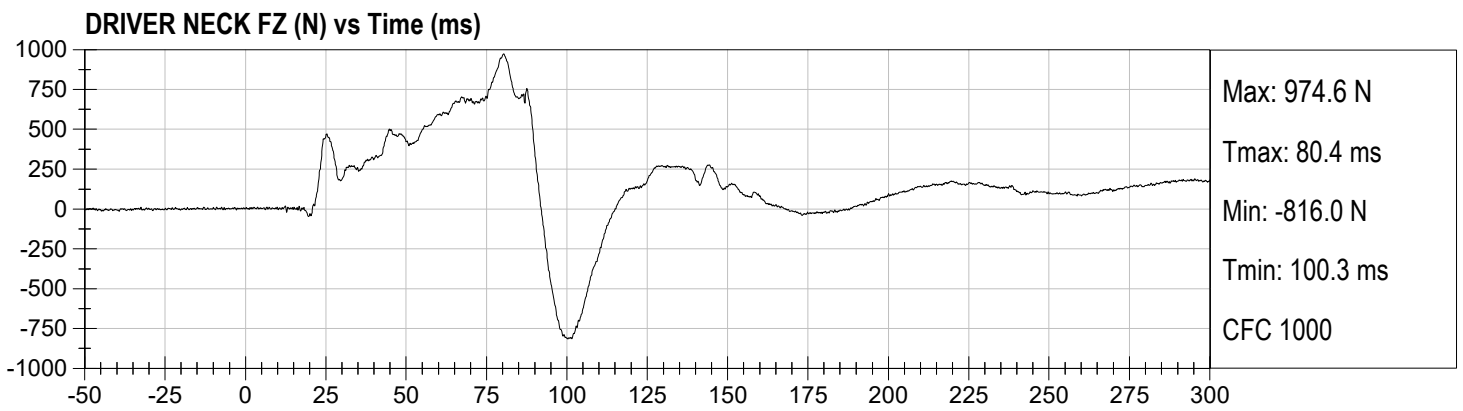
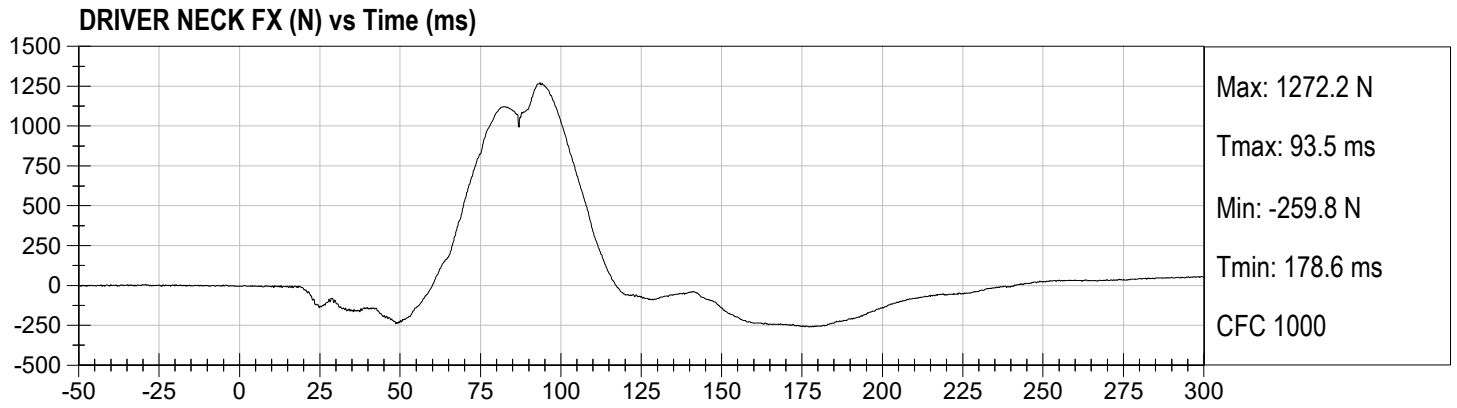


**DRIVER HEAD Resultant (g) vs Time (ms)**

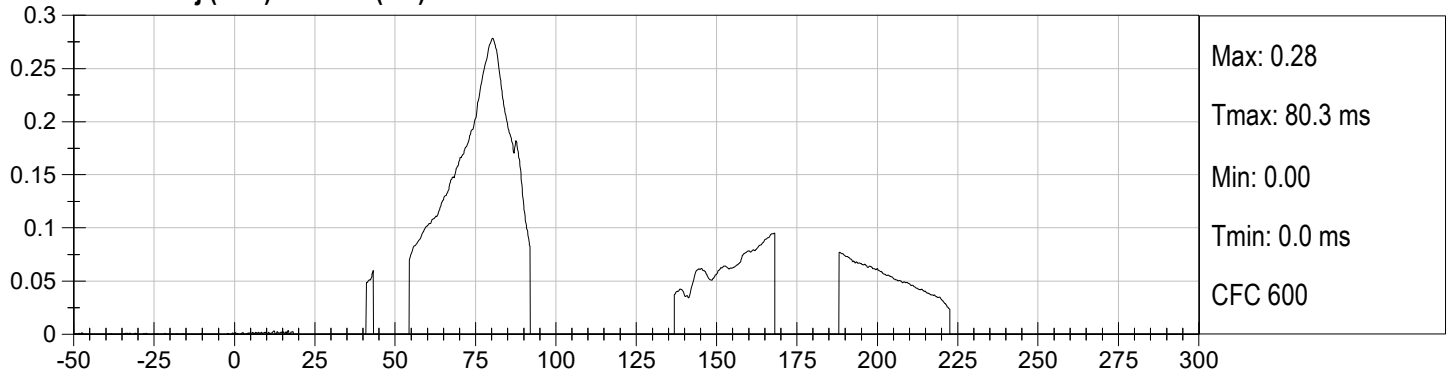




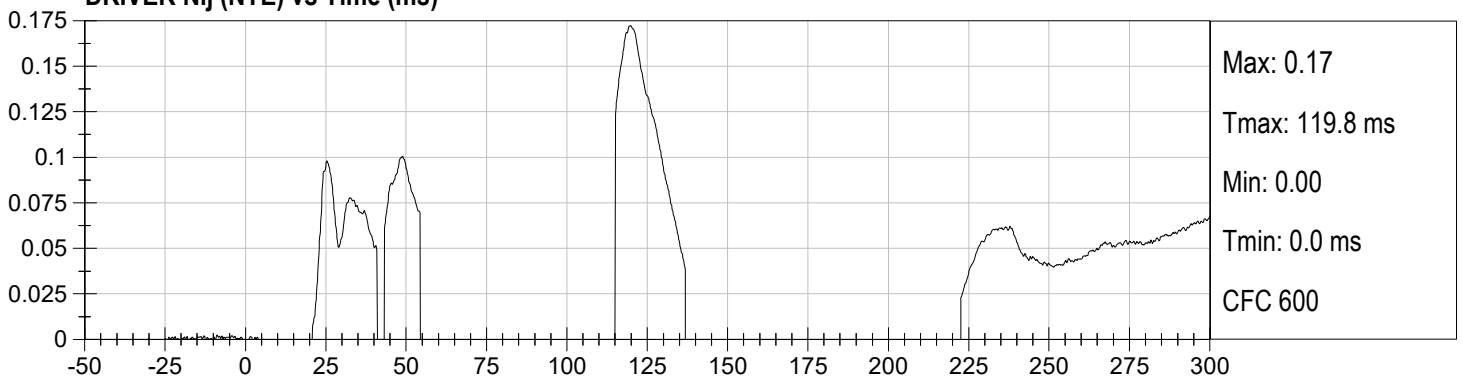




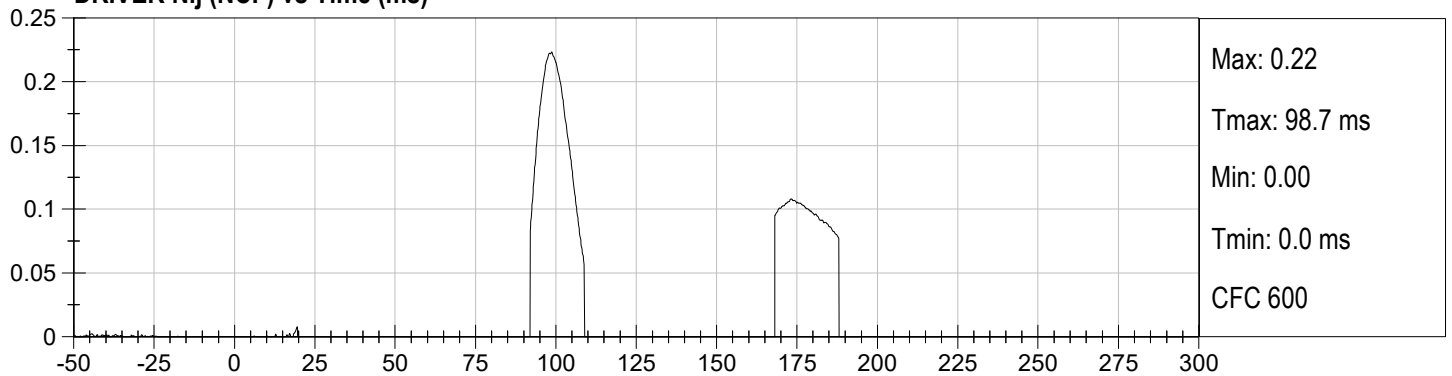
DRIVER Nij (NTF) vs Time (ms)



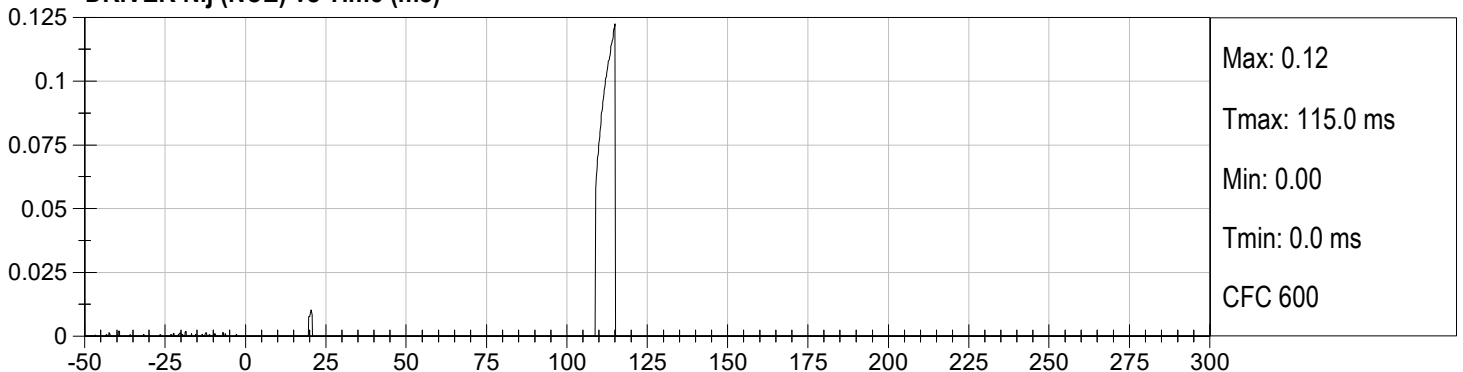
DRIVER Nij (NTE) vs Time (ms)



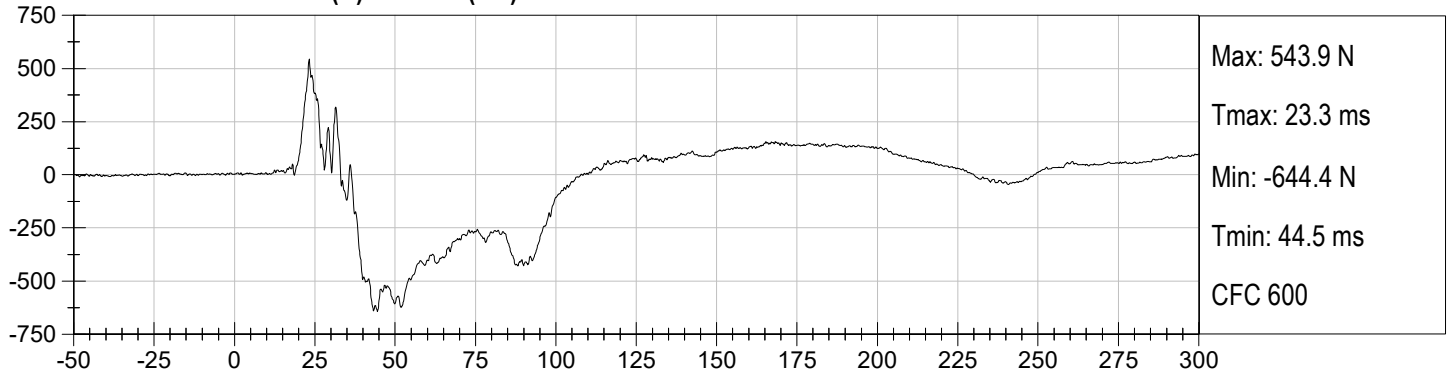
DRIVER Nij (NCF) vs Time (ms)



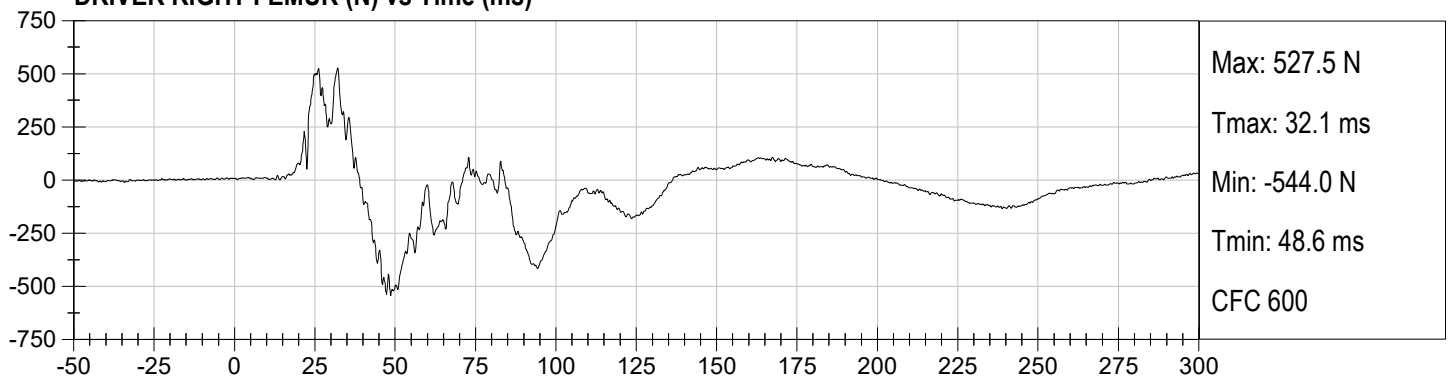
DRIVER Nij (NCE) vs Time (ms)

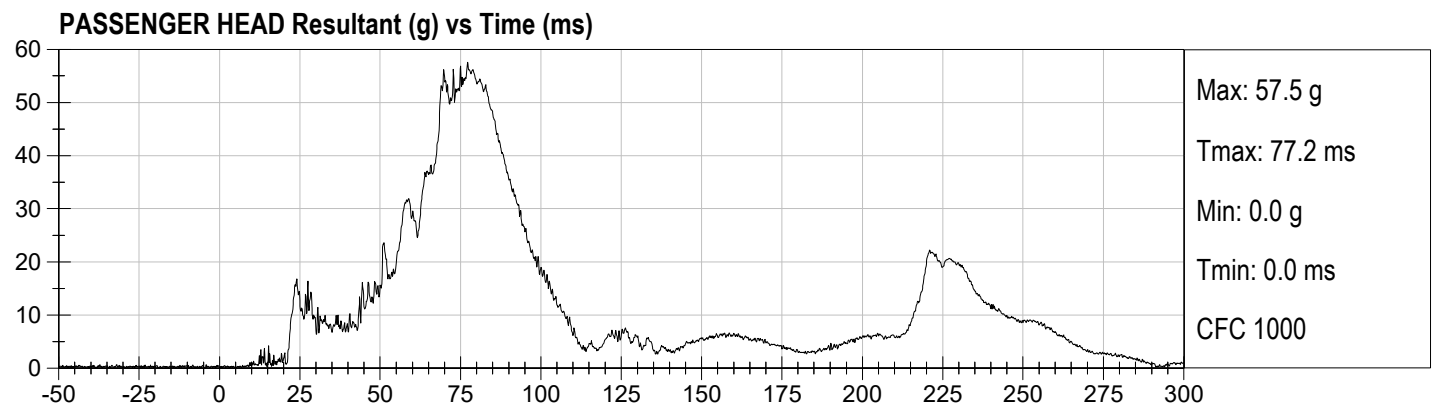
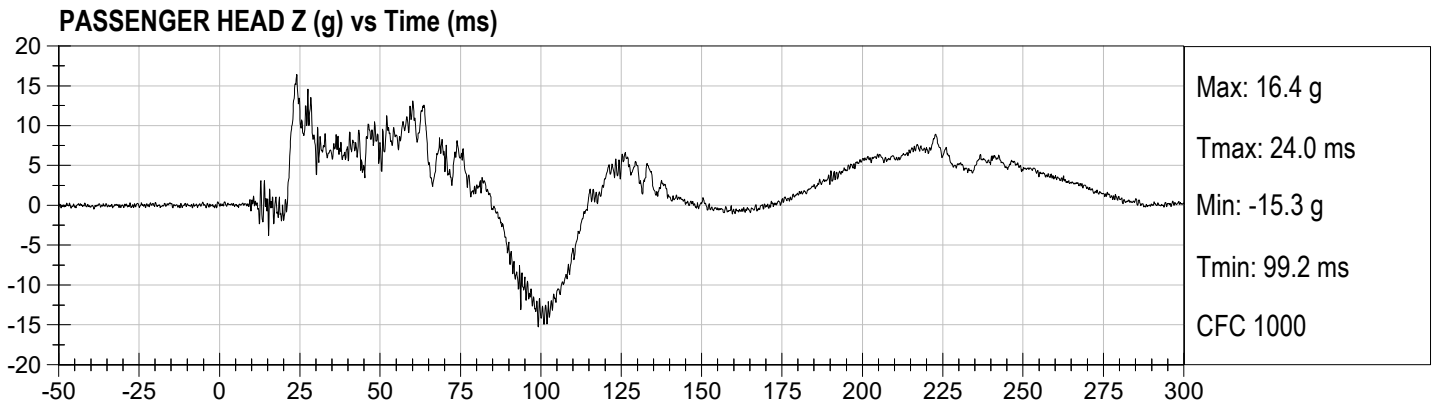
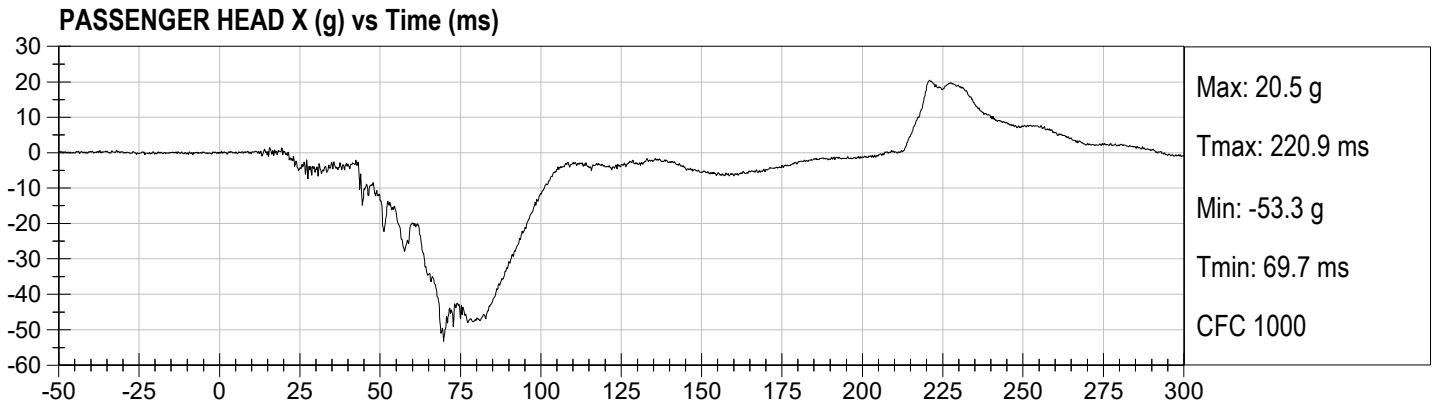


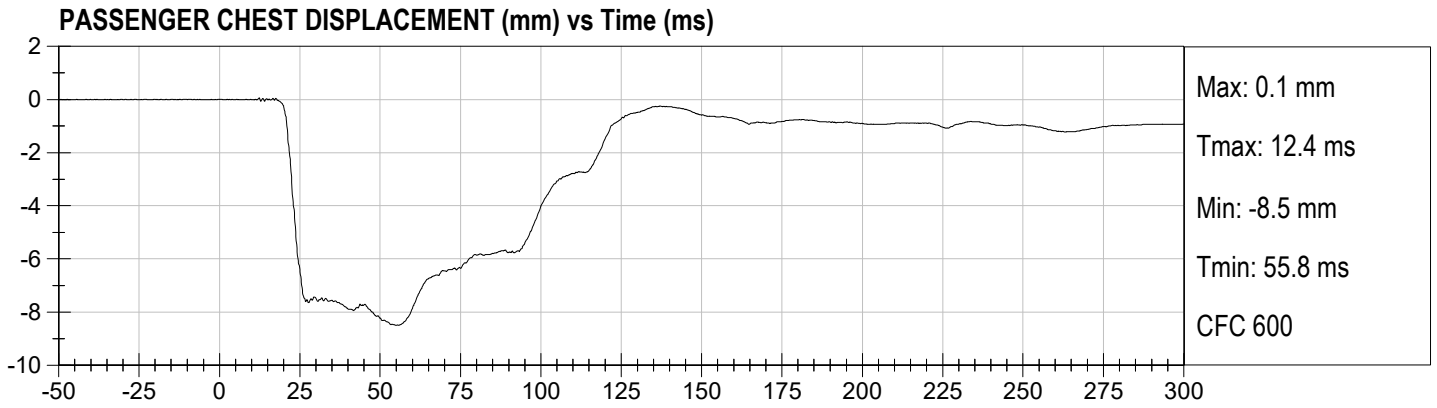
**DRIVER LEFT FEMUR (N) vs Time (ms)**



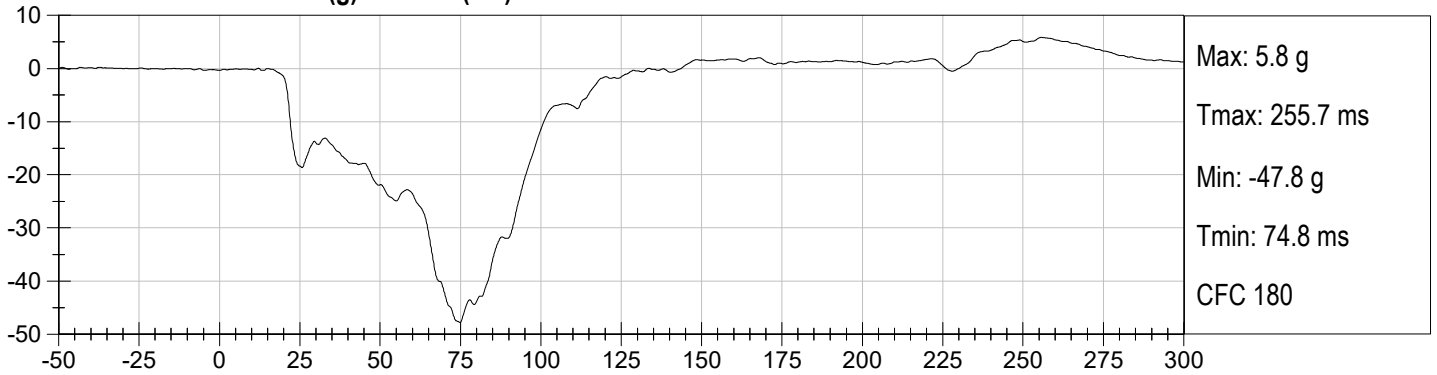
**DRIVER RIGHT FEMUR (N) vs Time (ms)**



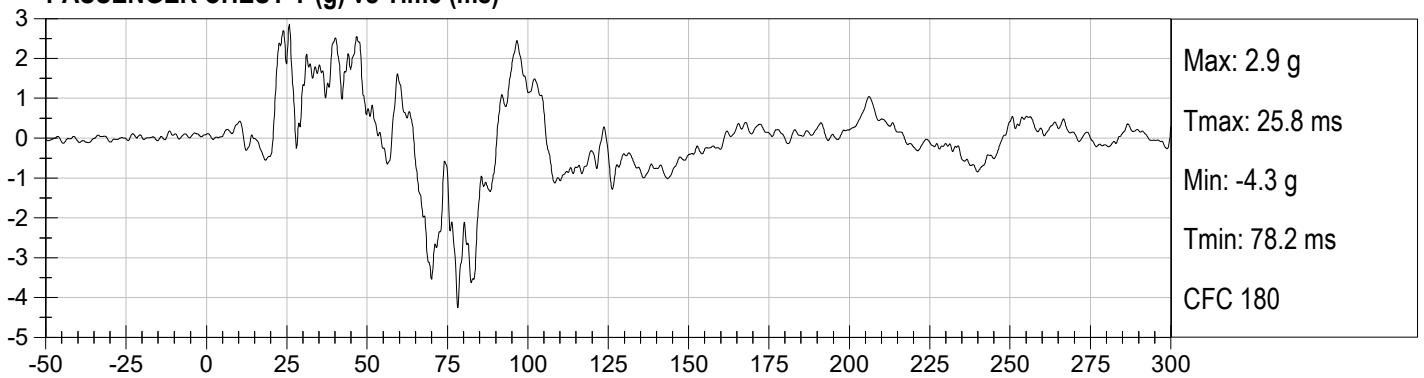




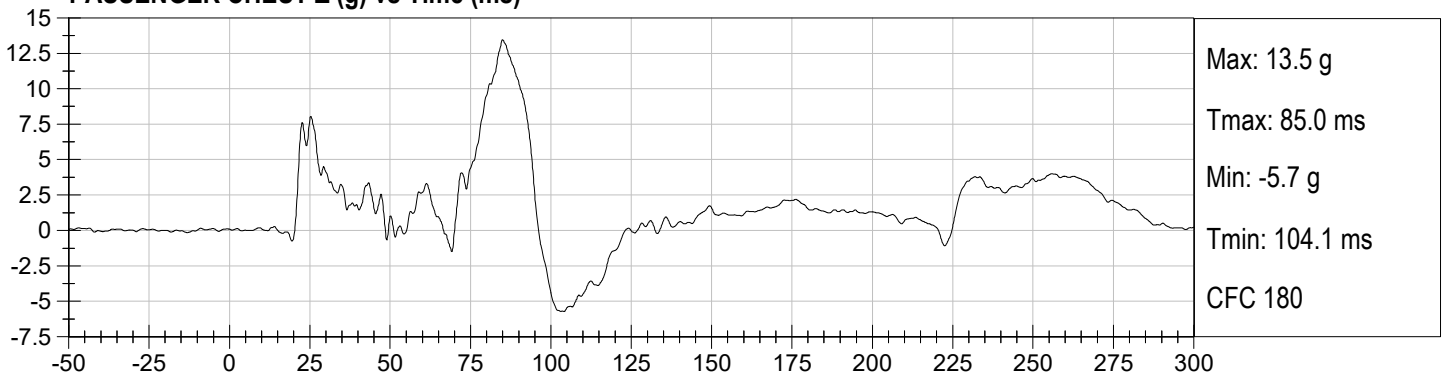
**PASSENGER CHEST X (g) vs Time (ms)**



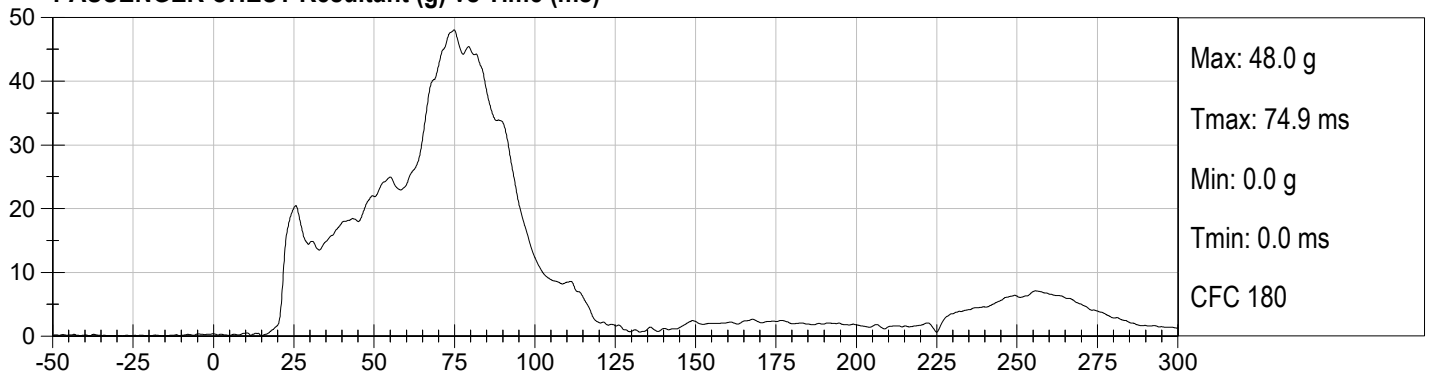
**PASSENGER CHEST Y (g) vs Time (ms)**

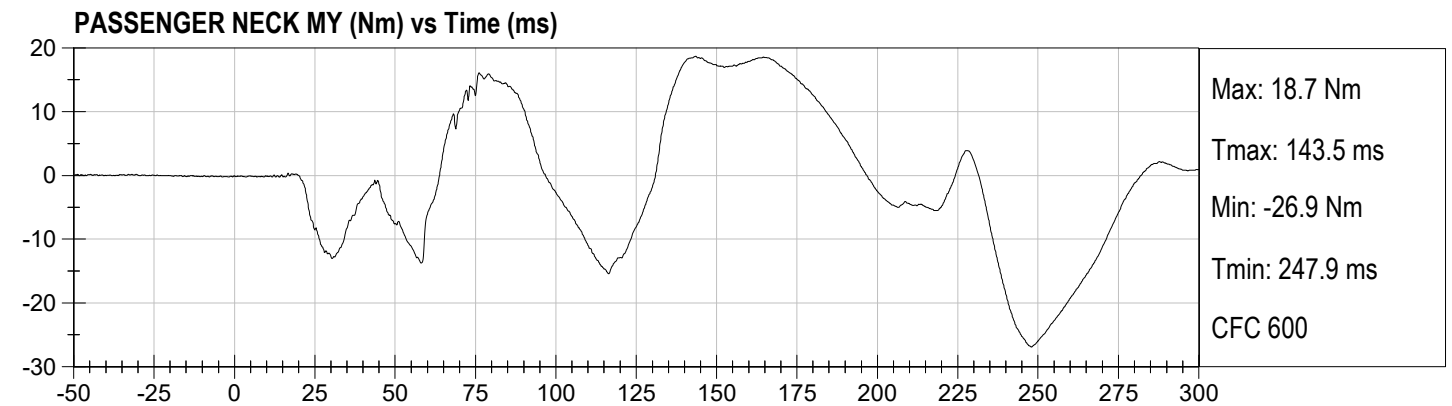
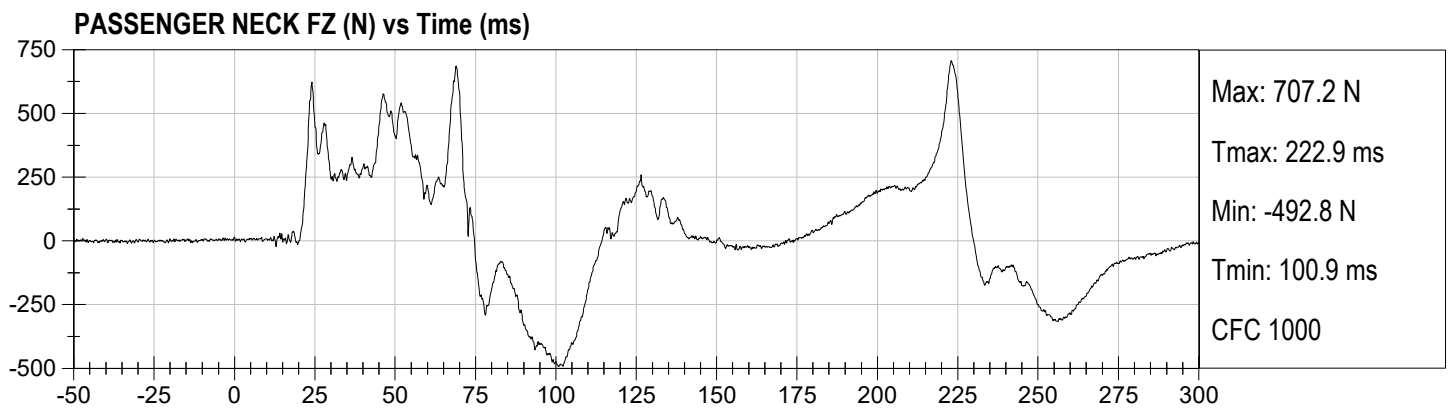
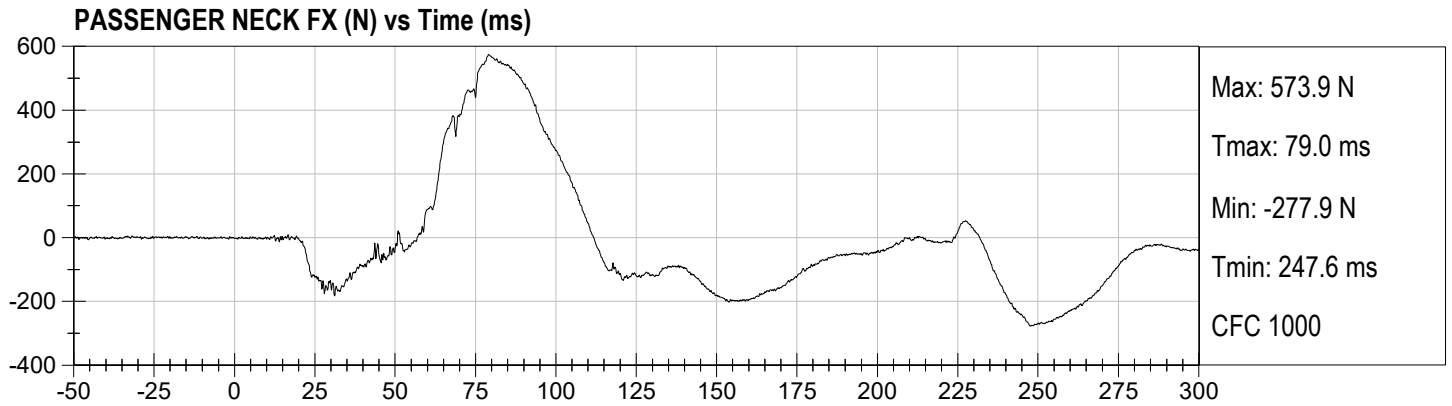


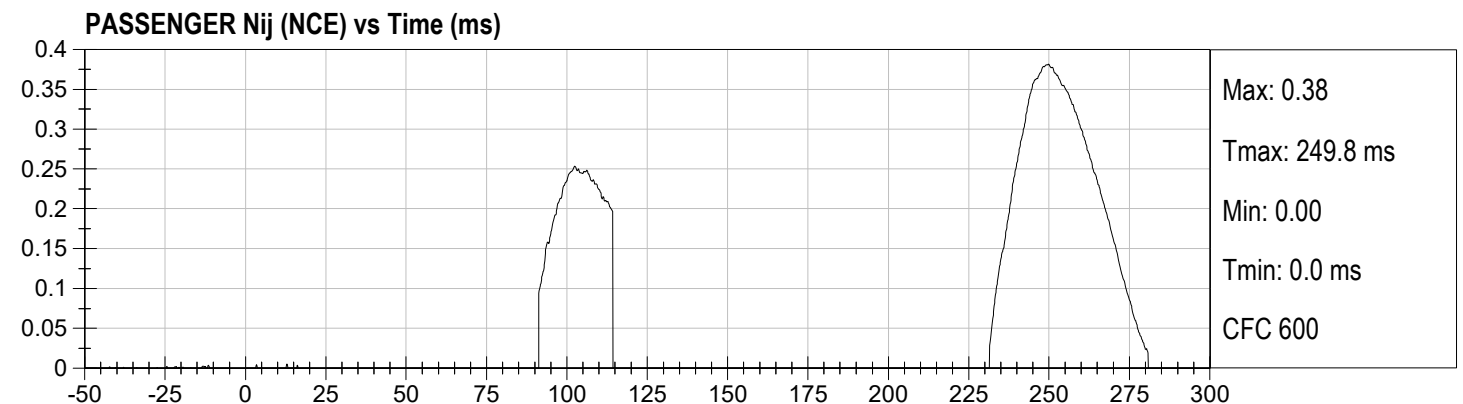
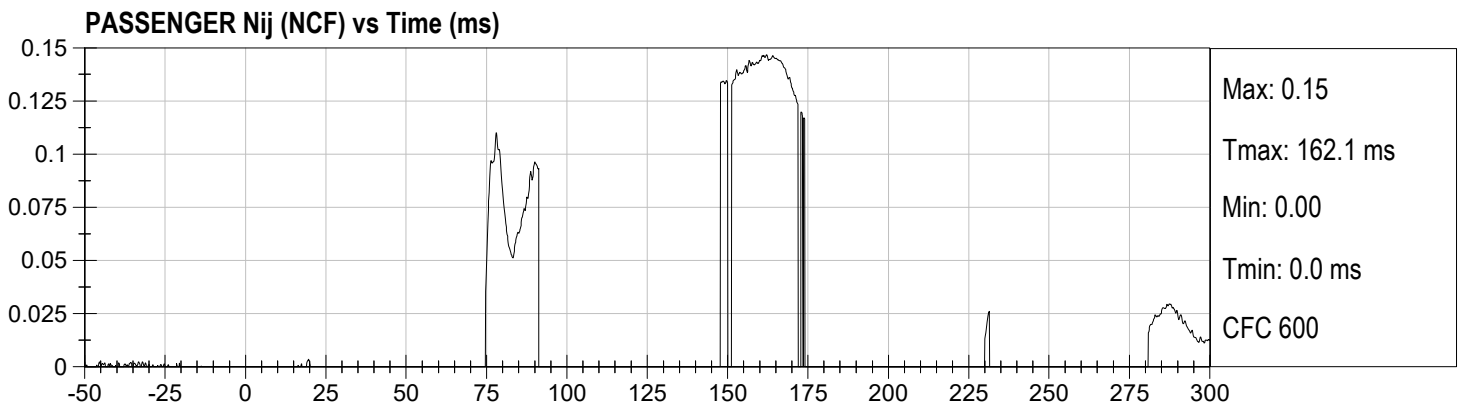
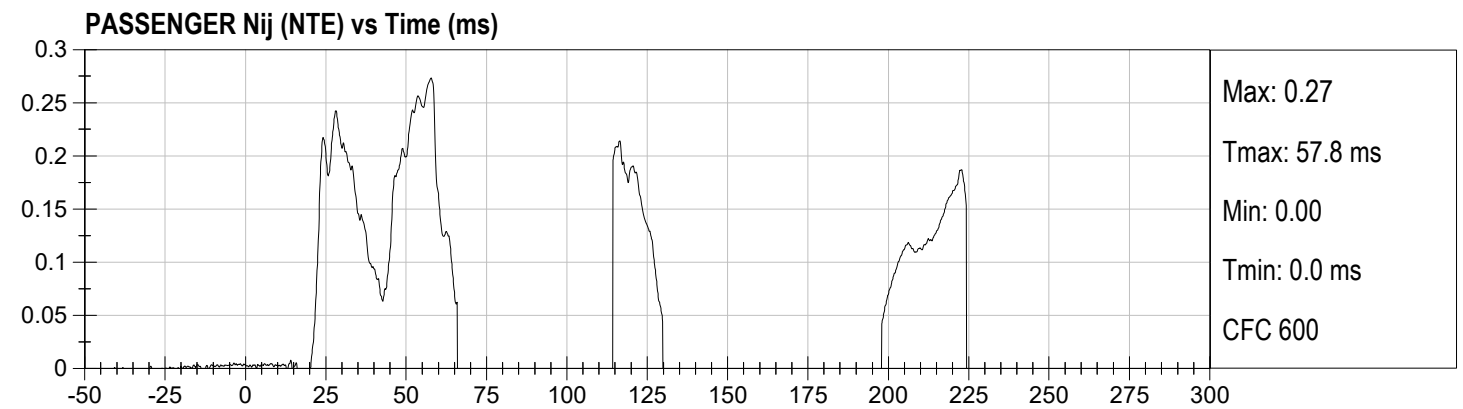
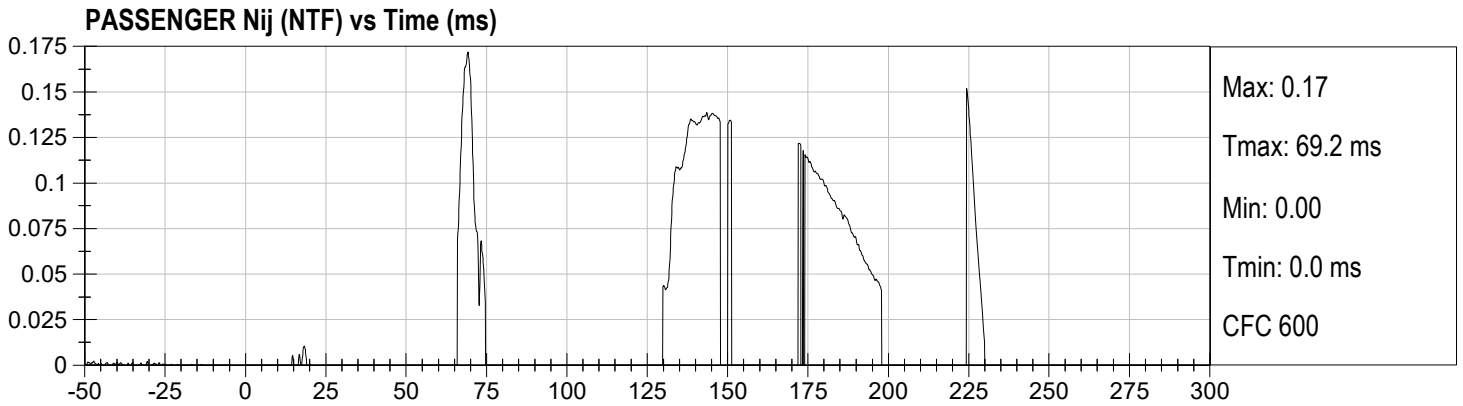
**PASSENGER CHEST Z (g) vs Time (ms)**



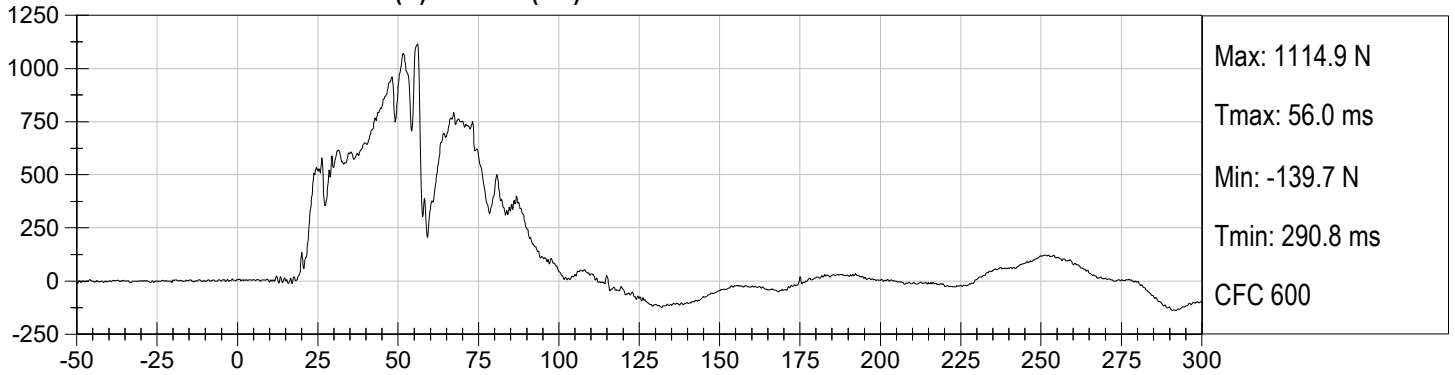
**PASSENGER CHEST Resultant (g) vs Time (ms)**







**PASSENGER LEFT FEMUR (N) vs Time (ms)**



**PASSENGER RIGHT FEMUR (N) vs Time (ms)**



**APPENDIX C**  
**DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA**

**CALIBRATION TEST RESULTS**

**PRE-TEST**

**HYBRID III 50<sup>TH</sup> PERCENTILE MALE - DRIVER ATD**

**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**

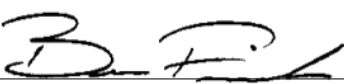
ATD Serial No: 351

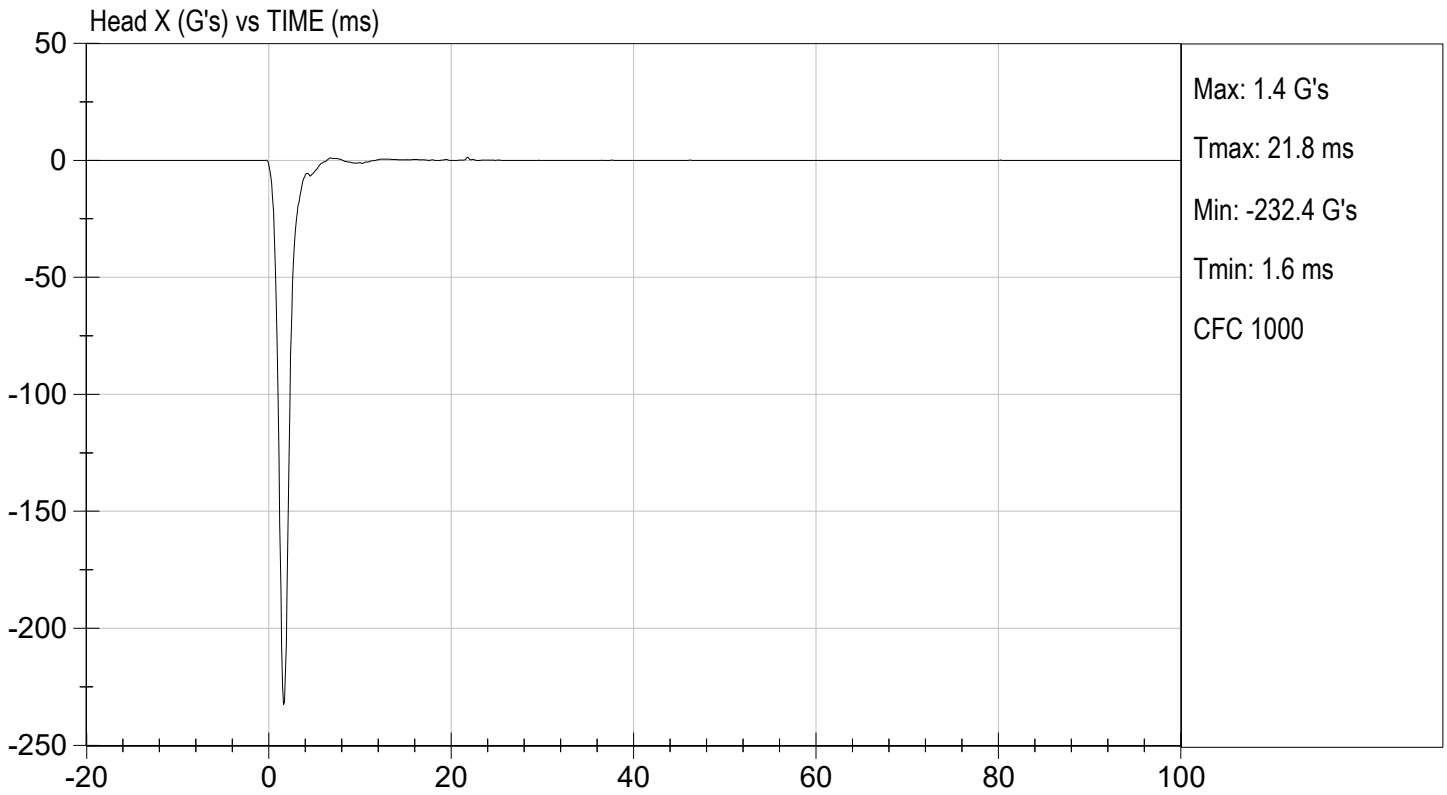
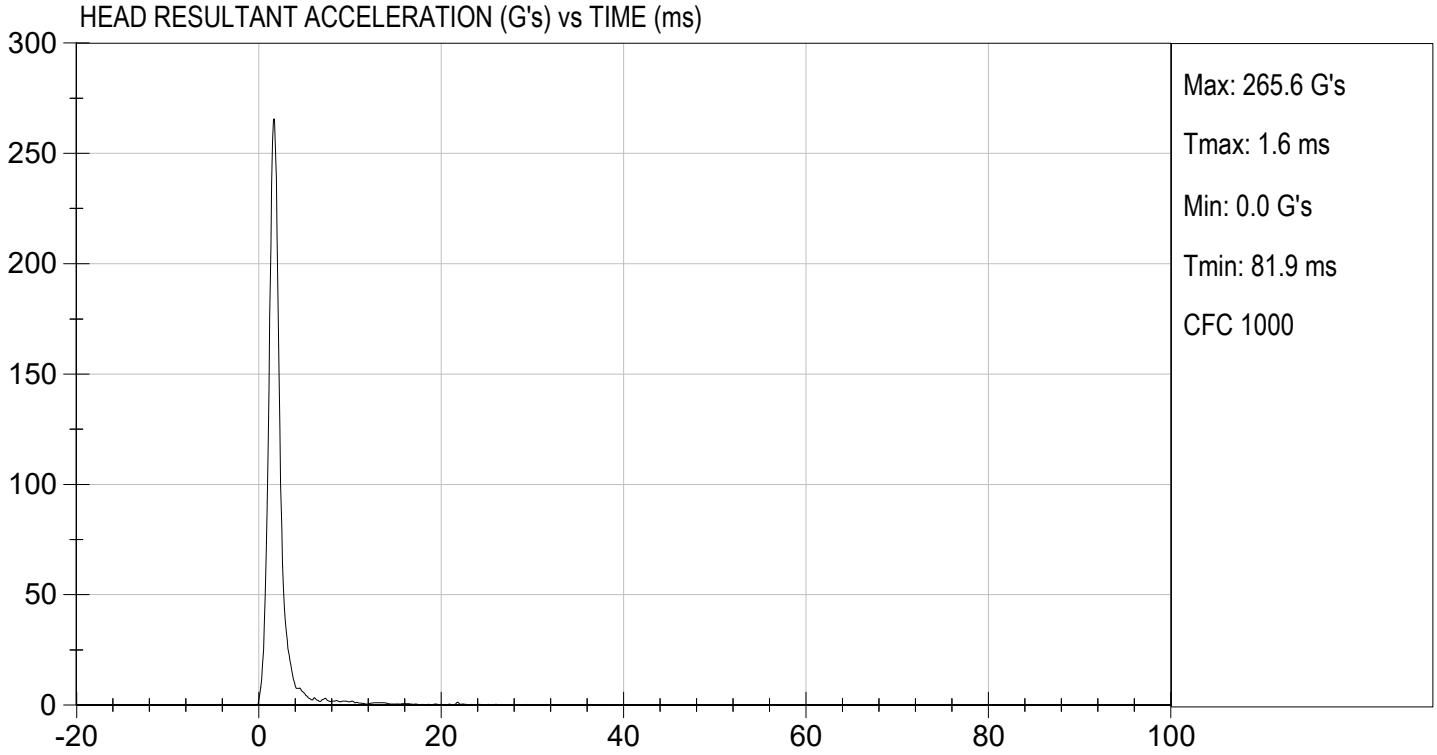
Test ID: D221561

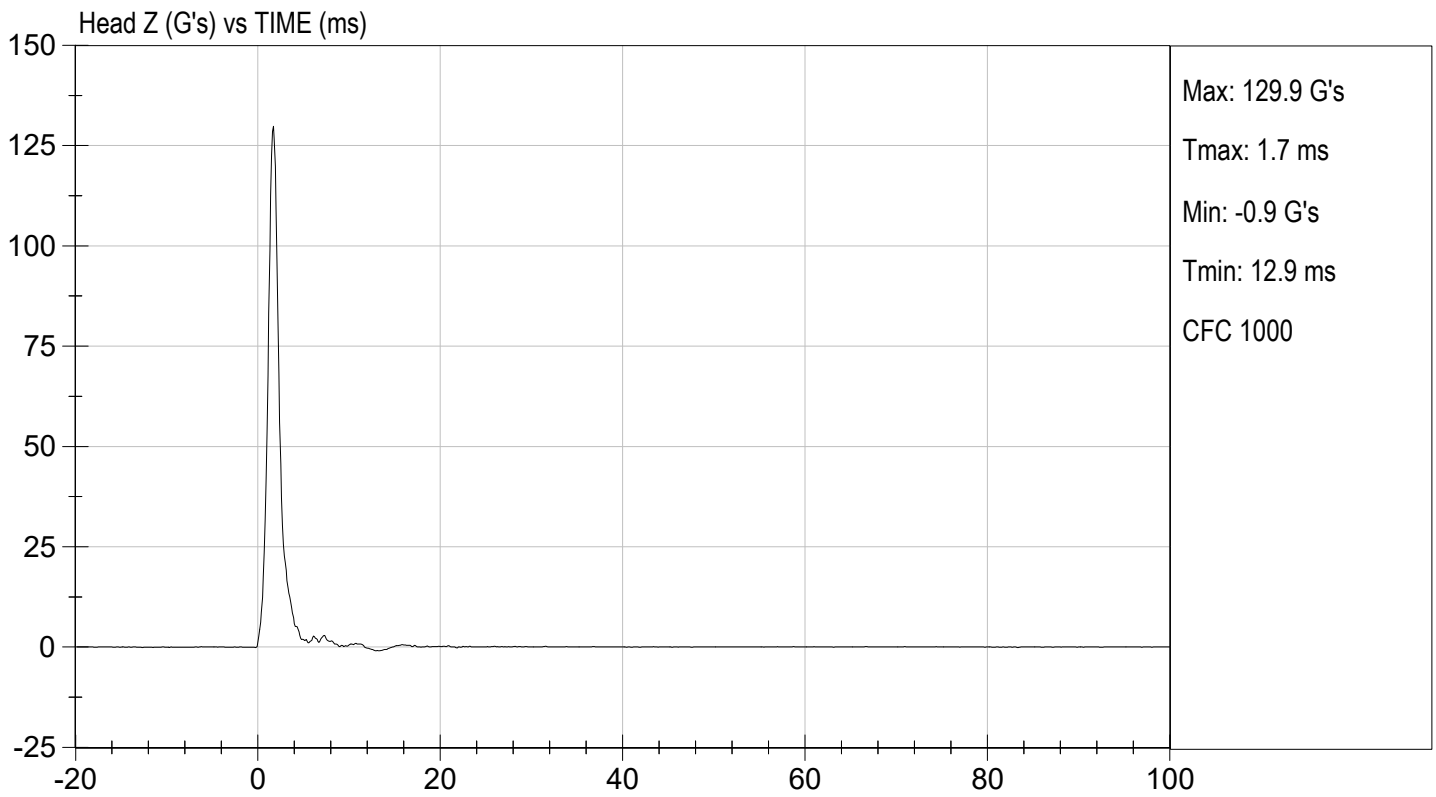
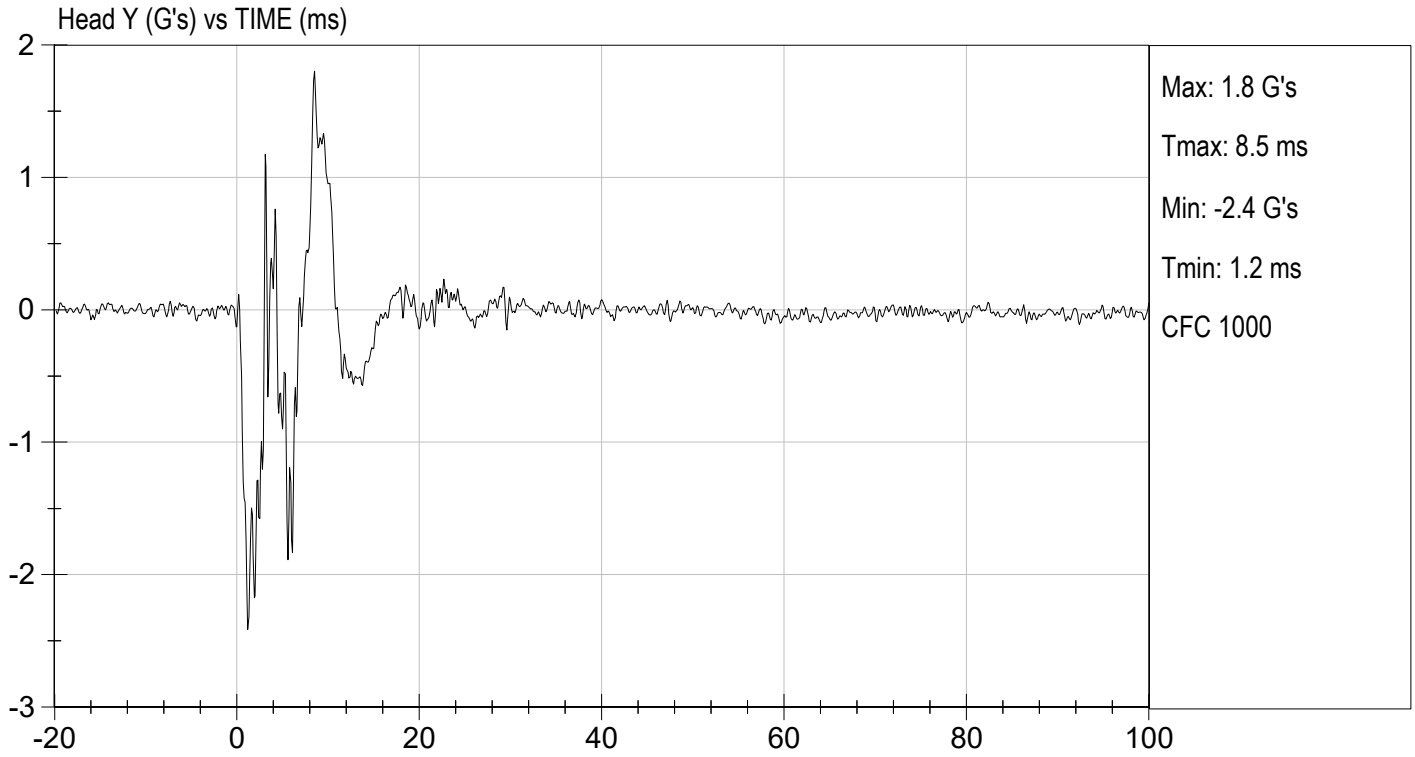
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	45	Pass
Peak Resultant Acceleration	G's	225 to 275	266	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	-2.4	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
Overall Test Results				Pass

  
 Laboratory Technician

06/29/2022  
 Test Date

  
 Approved By





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

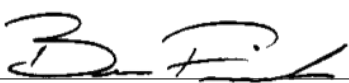
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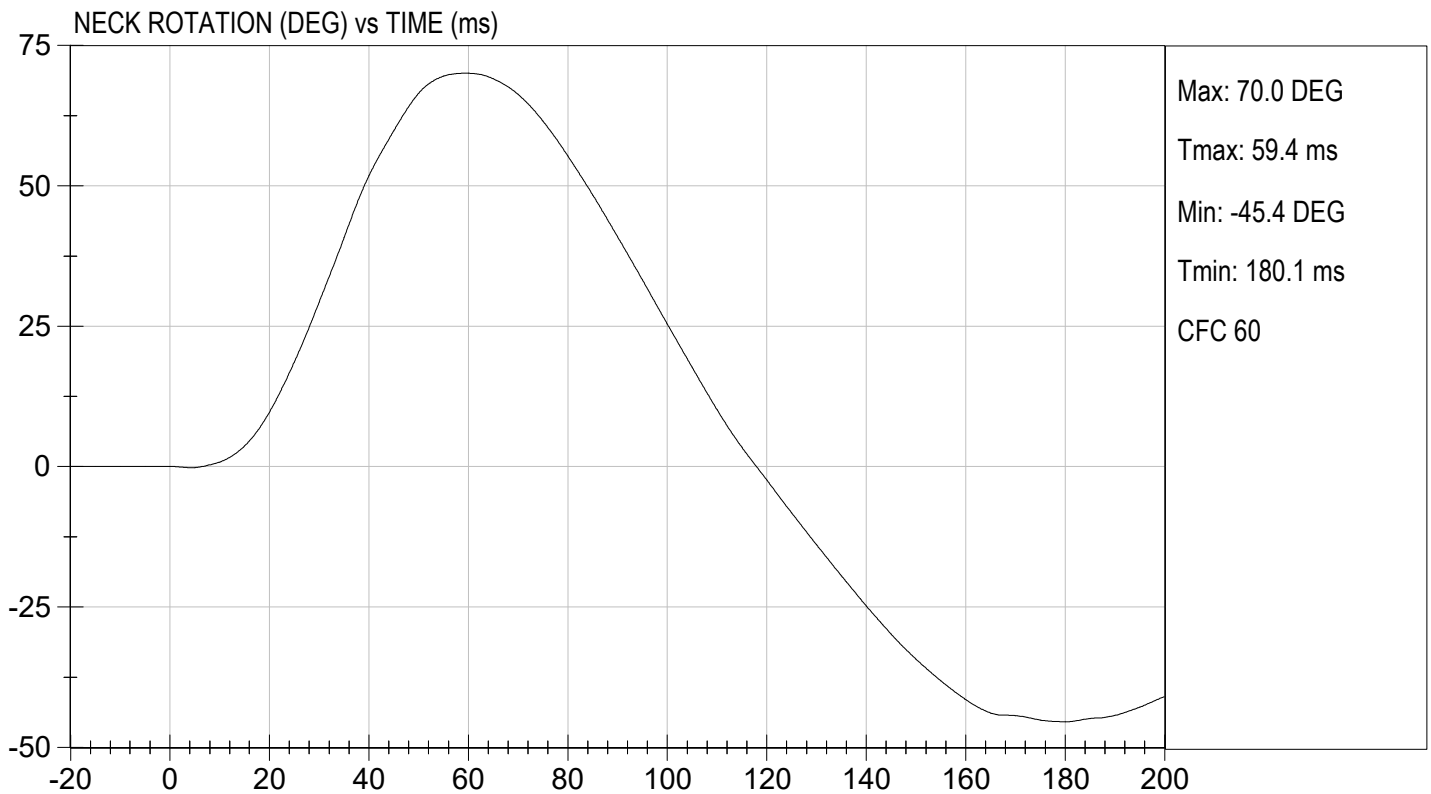
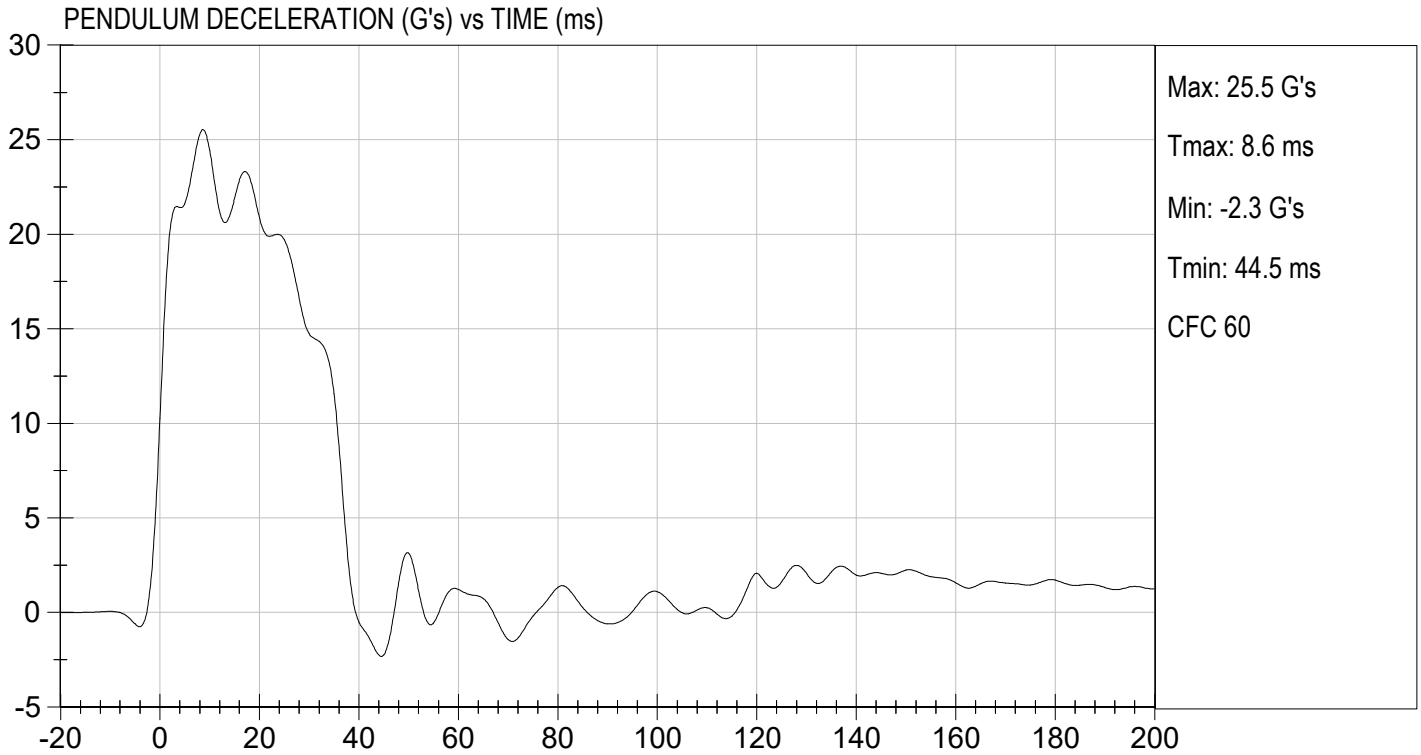
Test I.D.: D221562

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity		%	10 to 70	40	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.96	Pass
Pendulum Deceleration	10 ms	G's	22.50 to 27.50	24.42	Pass
	20 ms	G's	17.60 to 22.60	20.87	Pass
	30 ms	G's	12.50 to 18.50	14.73	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 29.0	14.7	Pass
Deceleration Decay Time to Cross 5 G's		ms	34.0 to 42.0	37.2	Pass
Maximum "D" Plane Rotation	Maximum	Deg	64.0 to 78.0	70.0	Pass
	Time	ms	57.0 to 64.0	59.4	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	113.0 to 128.0	118.1	Pass
Moment About Occipital Condyle	Maximum	Nm	88.1 to 108.5	91.5	Pass
	Time	ms	47.0 to 58.0	49.1	Pass
Positive Moment Decay Time To Zero Crossing		ms	97.0 to 107.0	100.3	Pass
Overall Test Results					Pass

  
 Laboratory Technician

06/29/2022  
 Test Date

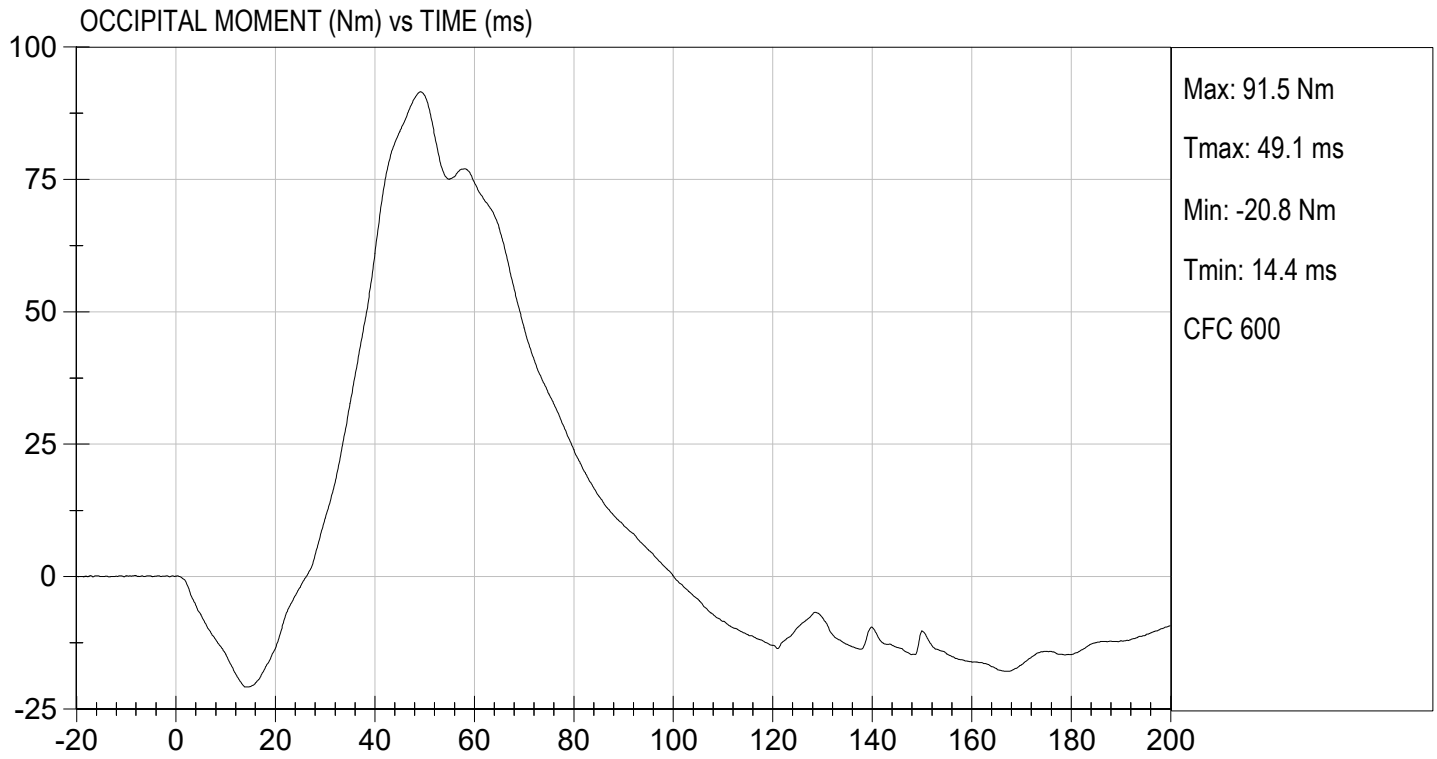
  
 Approved By





TEST DESC: NECK FLEXION  
VELOCITY: 22.83 ft/s, 6.96 m/s

TEST DATE: 06/29/2022  
TEST #: D221562



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

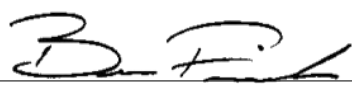
ATD Serial No: 351

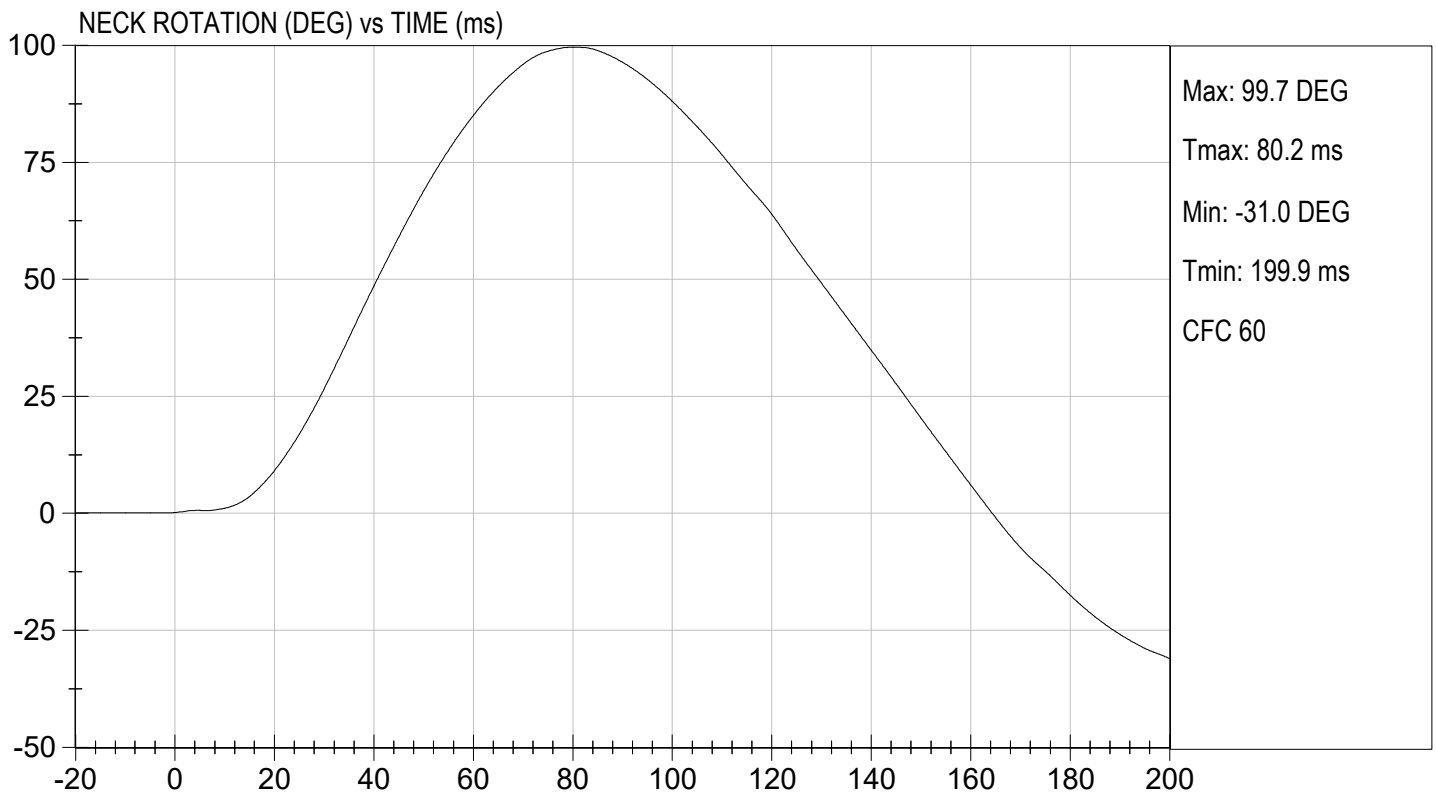
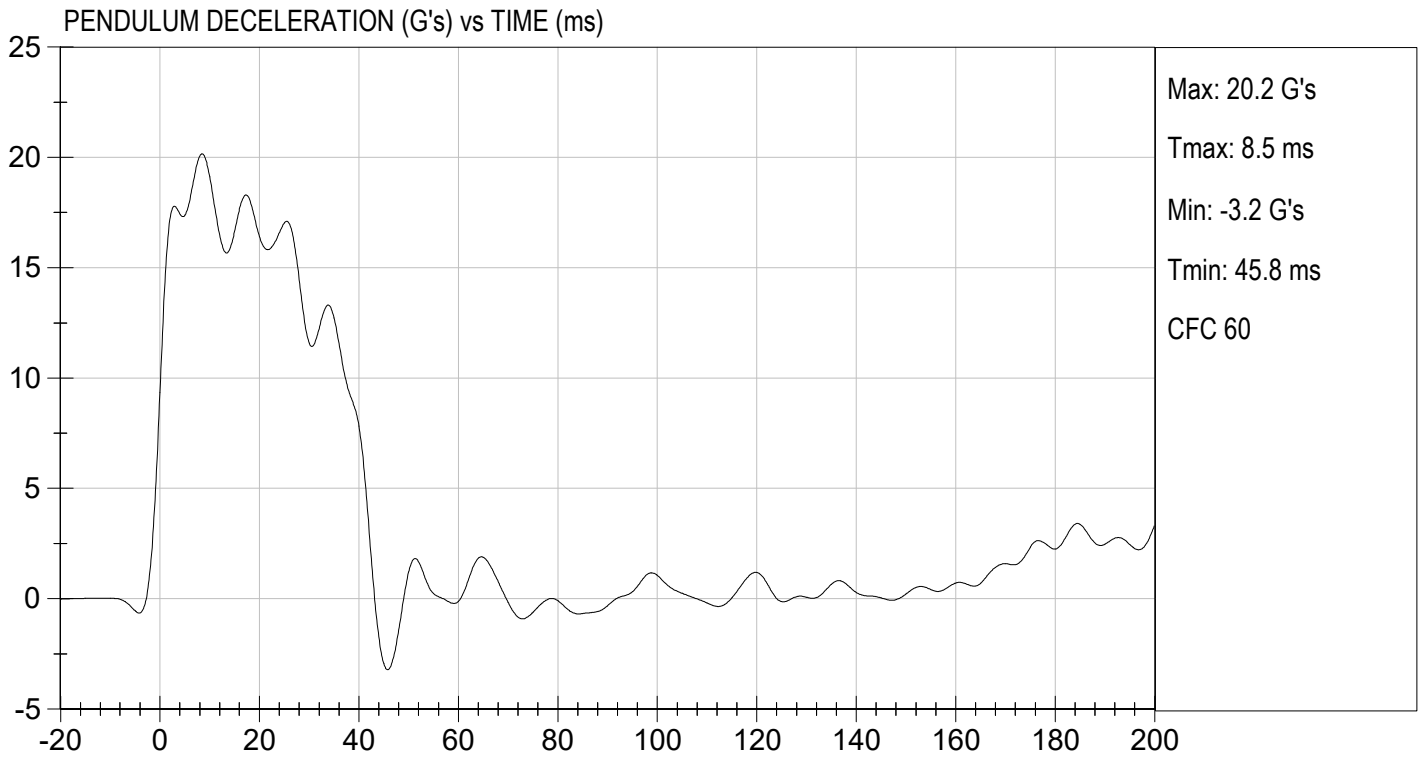
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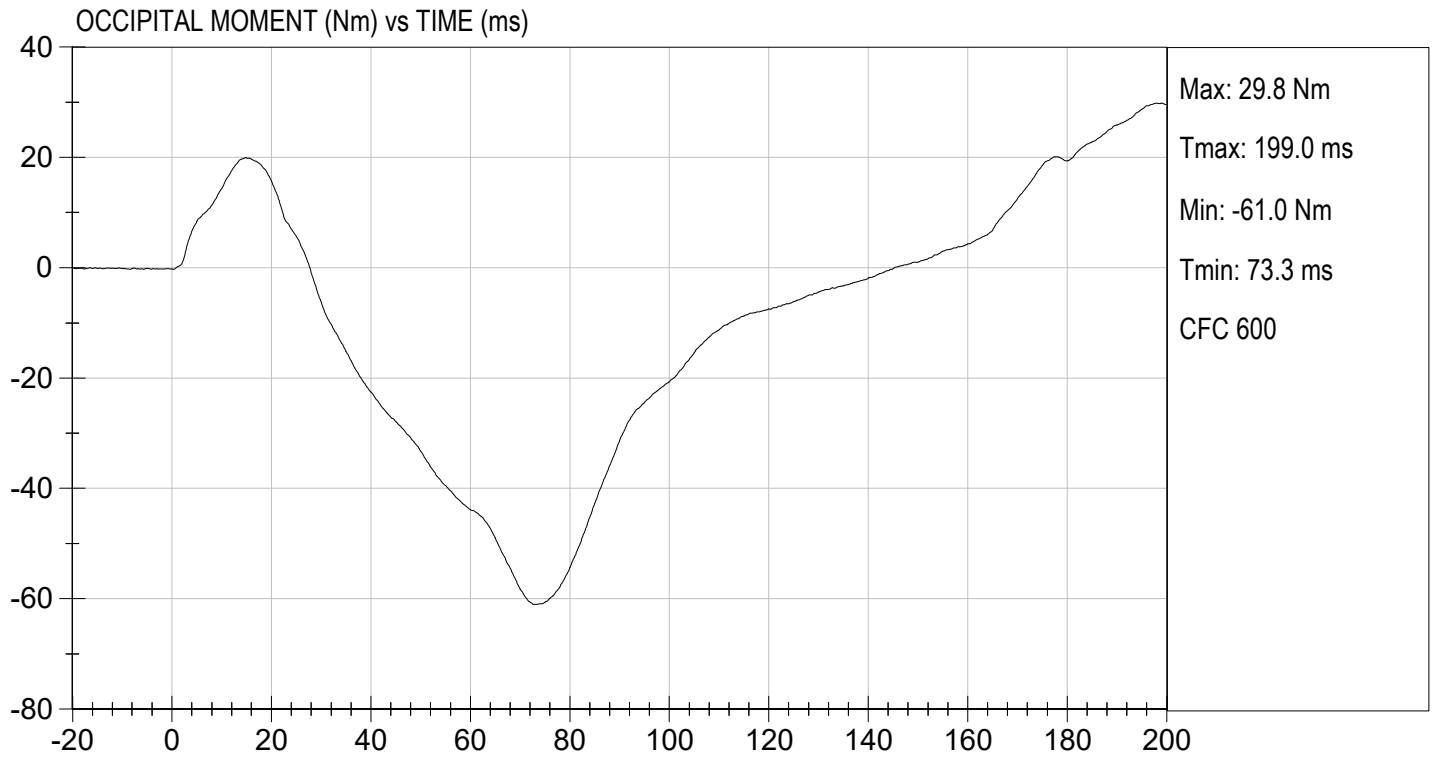
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity		%	10 to 70	40	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.05	Pass
Pendulum Deceleration	10 ms	G's	17.20 to 21.20	19.11	Pass
	20 ms	G's	14.00 to 19.00	16.41	Pass
	30 ms	G's	11.00 to 16.00	11.59	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 22.0	13.3	Pass
Deceleration Decay Time to Cross 5 G's		ms	38.0 to 46.0	41.5	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	99.7	Pass
	Time	ms	72.0 to 82.0	80.2	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	147.0 to 174.0	164.5	Pass
Moment About Occipital Condyle	Maximum	Nm	-52.9 to -79.9	-61.0	Pass
	Time	ms	65.0 to 79.0	73.3	Pass
Negative Moment Decay Time To Zero Crossing		ms	120.0 to 148.0	145.4	Pass
Overall Test Results					Pass

  
 Laboratory Technician

06/29/2022  
 Test Date

  
 Approved By





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

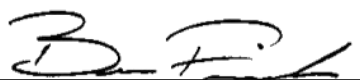
**ATD Serial No:** 351

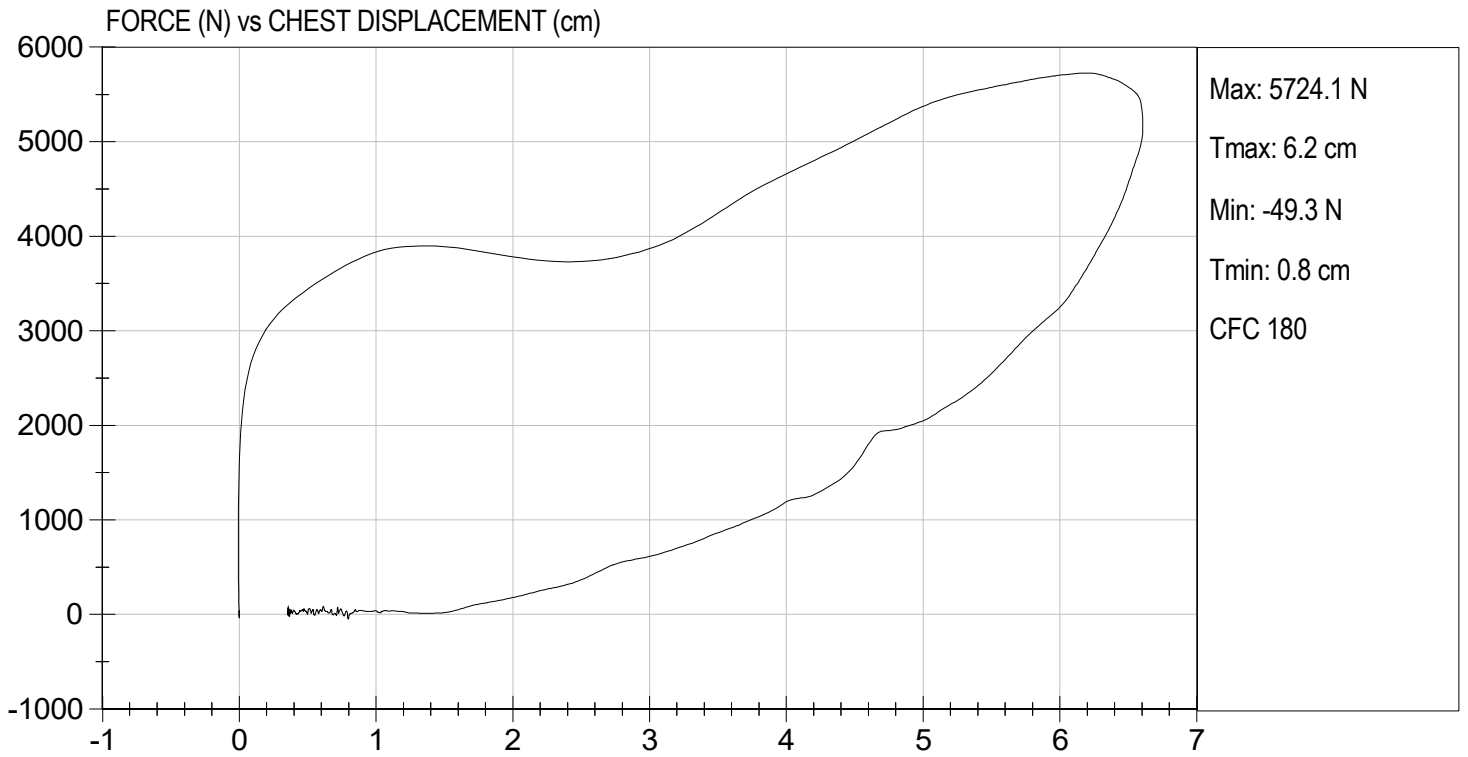
**Test I.D:** D221564

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	41	Pass
Probe Velocity	m/s	6.58 to 6.82	6.68	Pass
Peak Probe Force	N	5159 to 5893	5,724	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.61	Pass
Internal Hysteresis	%	69 to 85	73	Pass
<b>Overall Test Results</b>				<b>Pass</b>

  
 \_\_\_\_\_  
 Laboratory Technician

06/28/2022  
 \_\_\_\_\_  
 Test Date

  
 \_\_\_\_\_  
 Approved By



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

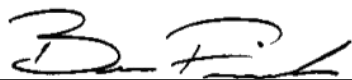
**ATD Serial No:** 351

**Test I.D:** D221565

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	42	Pass
Probe Velocity	m/s	2.07 to 2.13	2.11	Pass
Peak Probe Force	N	4715 to 5782	5,053	Pass
<b>Overall Test Results</b>				<b>Pass</b>

  
 Laboratory Technician

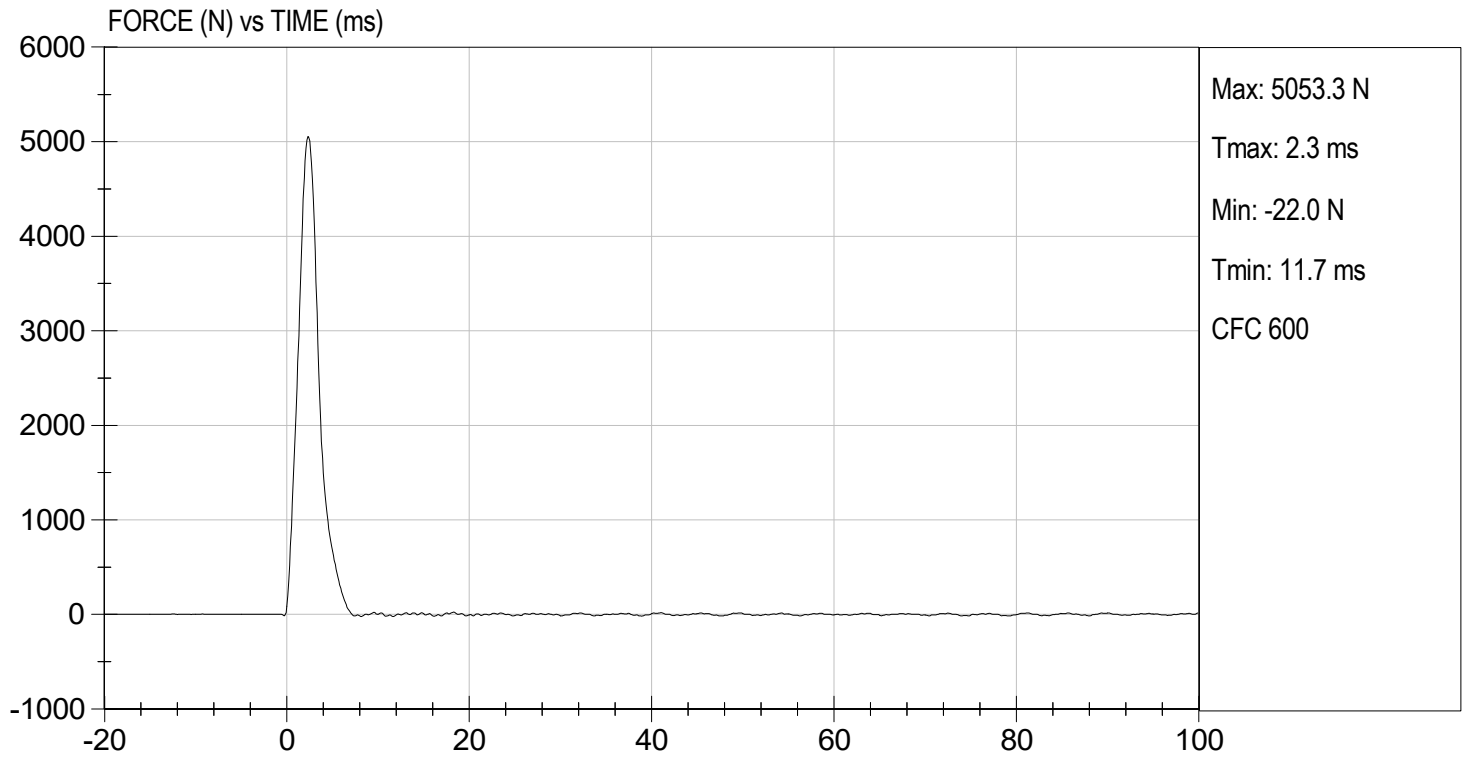
06/29/2022  
 Test Date

  
 Approved By



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

TEST DATE: 06/29/2022  
TEST #: D221565



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

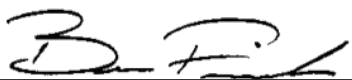
**ATD Serial No:** 351

**Test I.D:** D221566

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	42	Pass
Probe Velocity	m/s	2.07 to 2.13	2.10	Pass
Peak Probe Force	N	4715 to 5782	5,536	Pass
<b>Overall Test Results</b>				<b>Pass</b>

  
 \_\_\_\_\_  
 Laboratory Technician

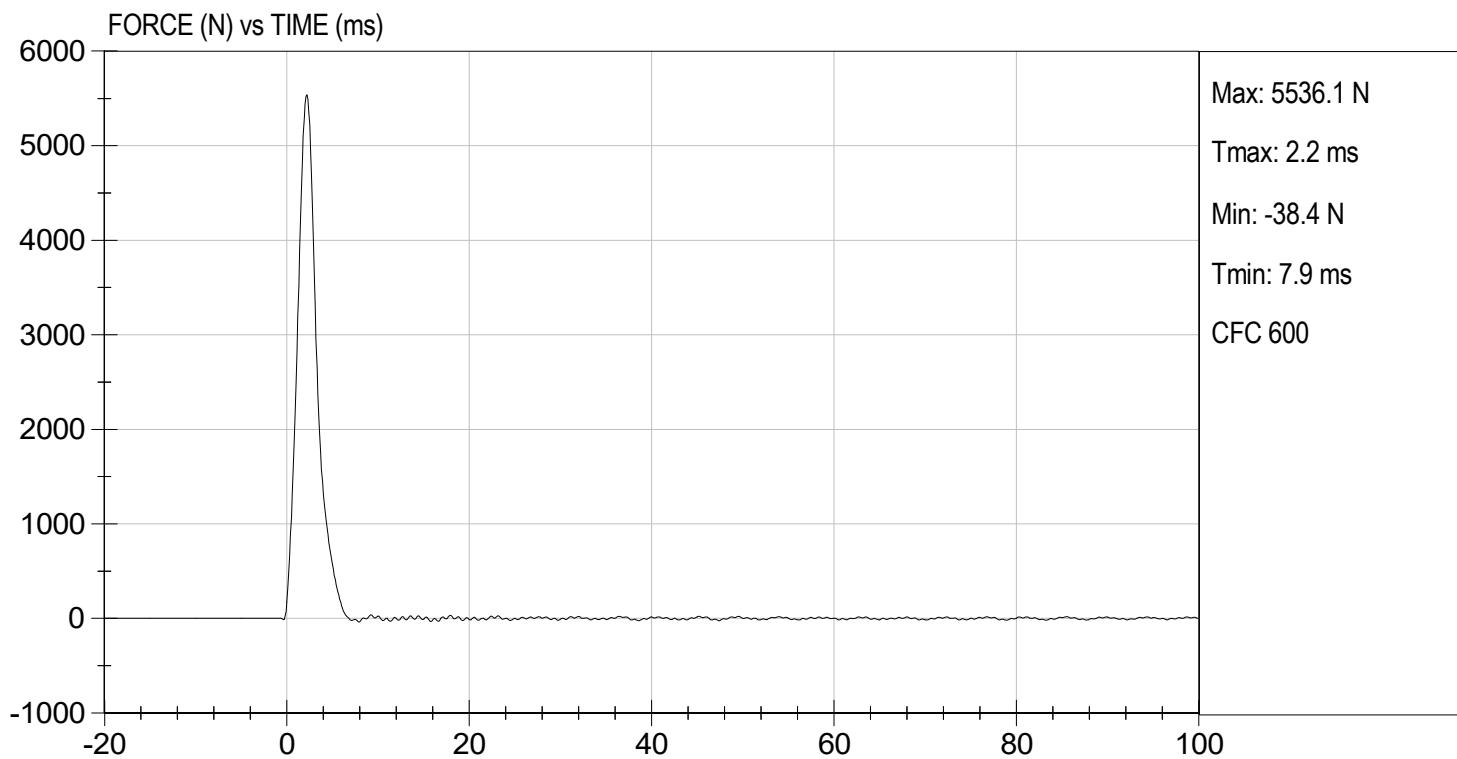
06/29/2022  
 \_\_\_\_\_  
 Test Date

  
 \_\_\_\_\_  
 Approved By



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

TEST DATE: 06/29/2022  
TEST #: D221566



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

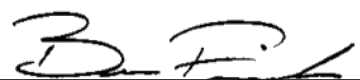
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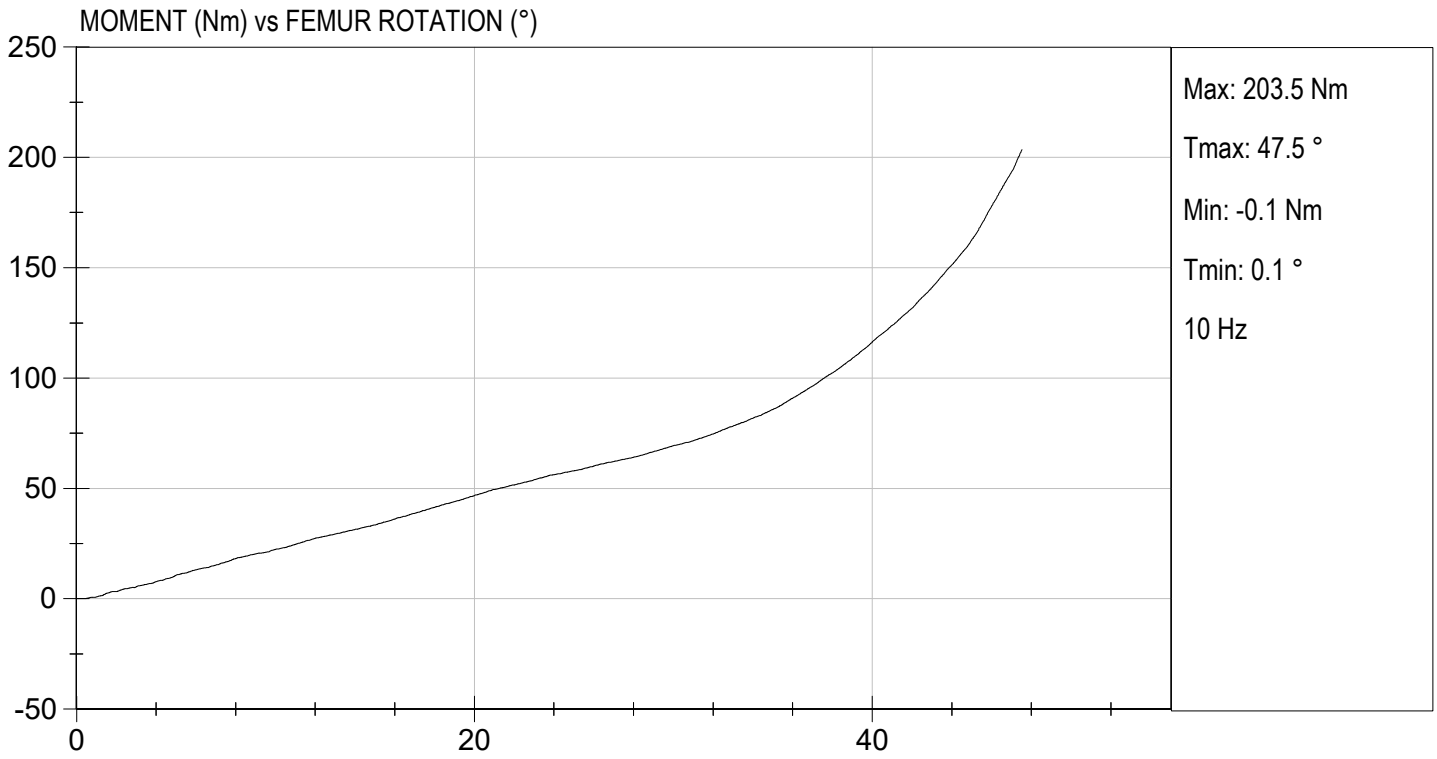
**Test I.D:** D221560

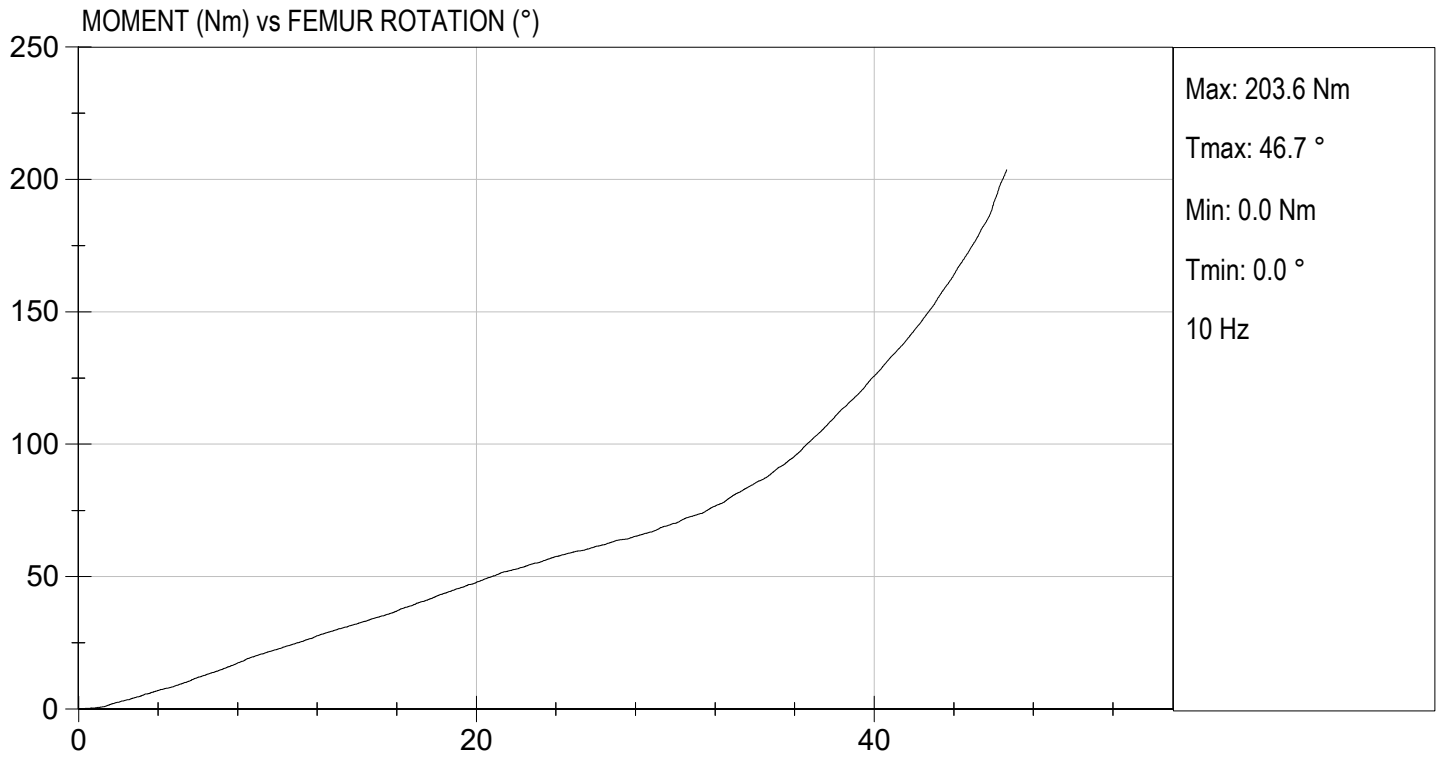
Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	21.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	38	38	Pass
Rotation Rate	deg/s	5.0 to 10.0	6.5	6.4	Pass
30 Degrees	Nm	94.9 Nm Max	69.3	70.2	Pass
150 ft-lbf / 203.4 Nm	Deg	40.0 to 50.0 Degree Max Rotation	47.5	46.7	Pass
Overall Test Results					Pass

  
 Laboratory Technician

06/29/2022  
 Test Date

  
 Approved By





**CALIBRATION TEST RESULTS**

**POST-TEST**

**HYBRID III 50<sup>TH</sup> PERCENTILE MALE - DRIVER ATD**

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

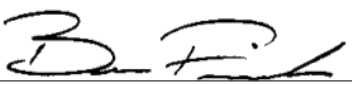
ATD Serial No: 351

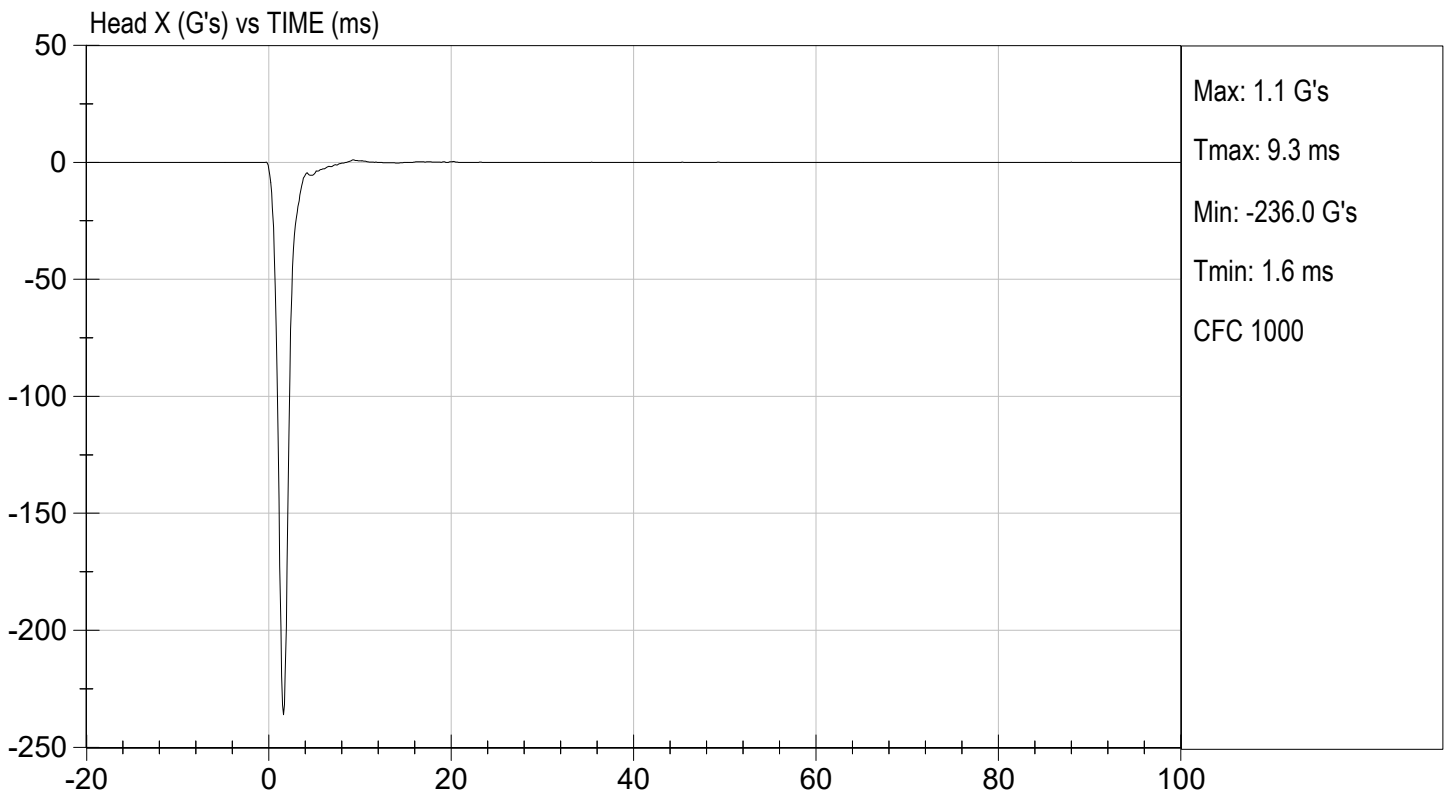
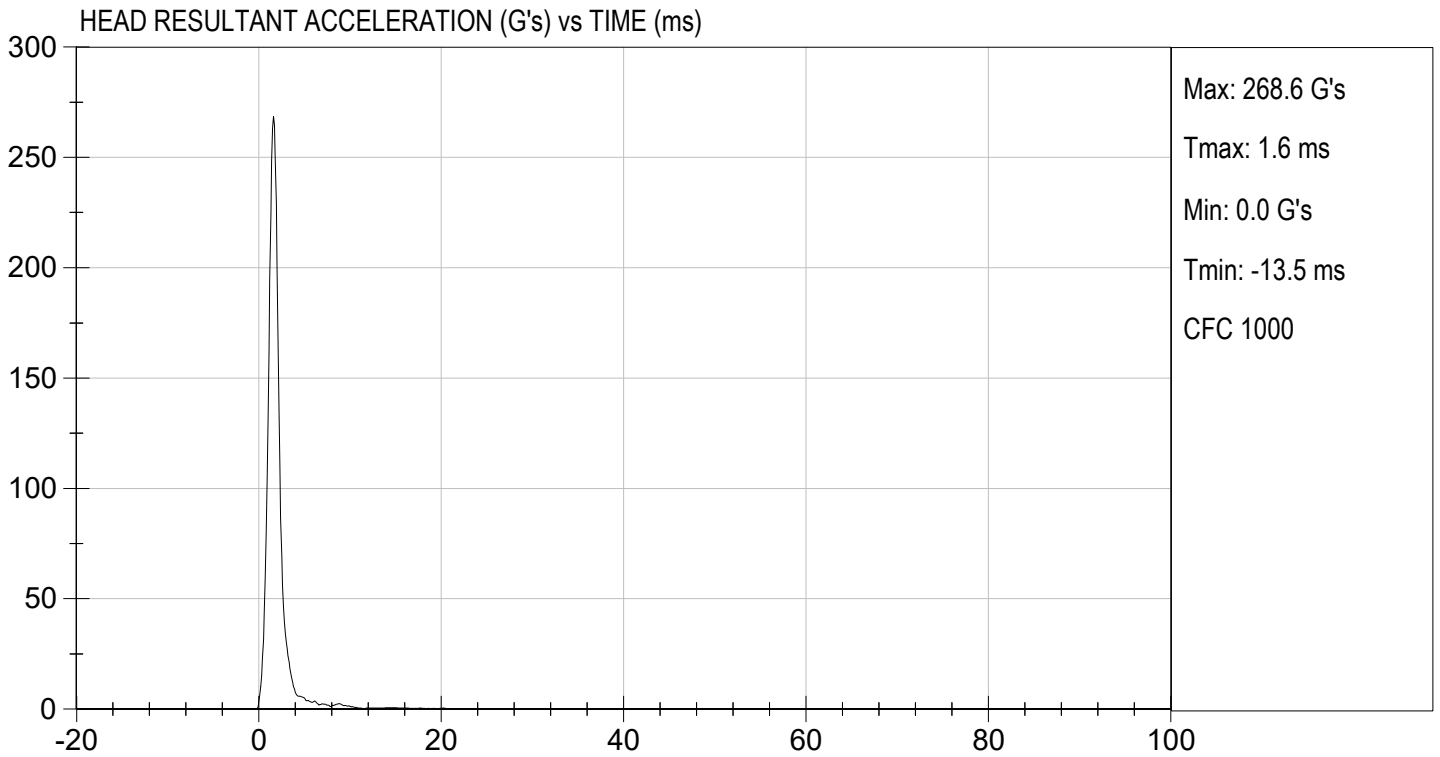
Test ID: D221911

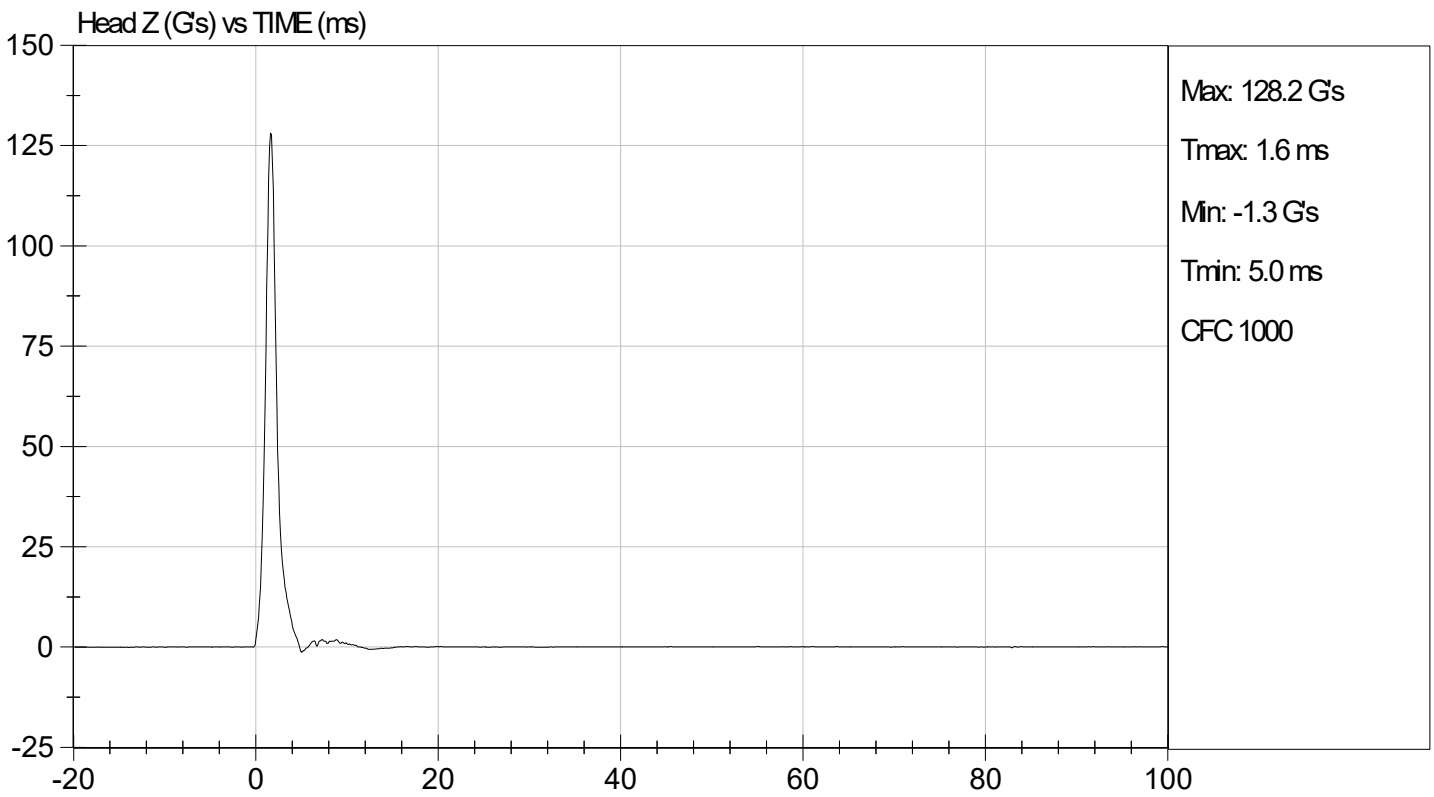
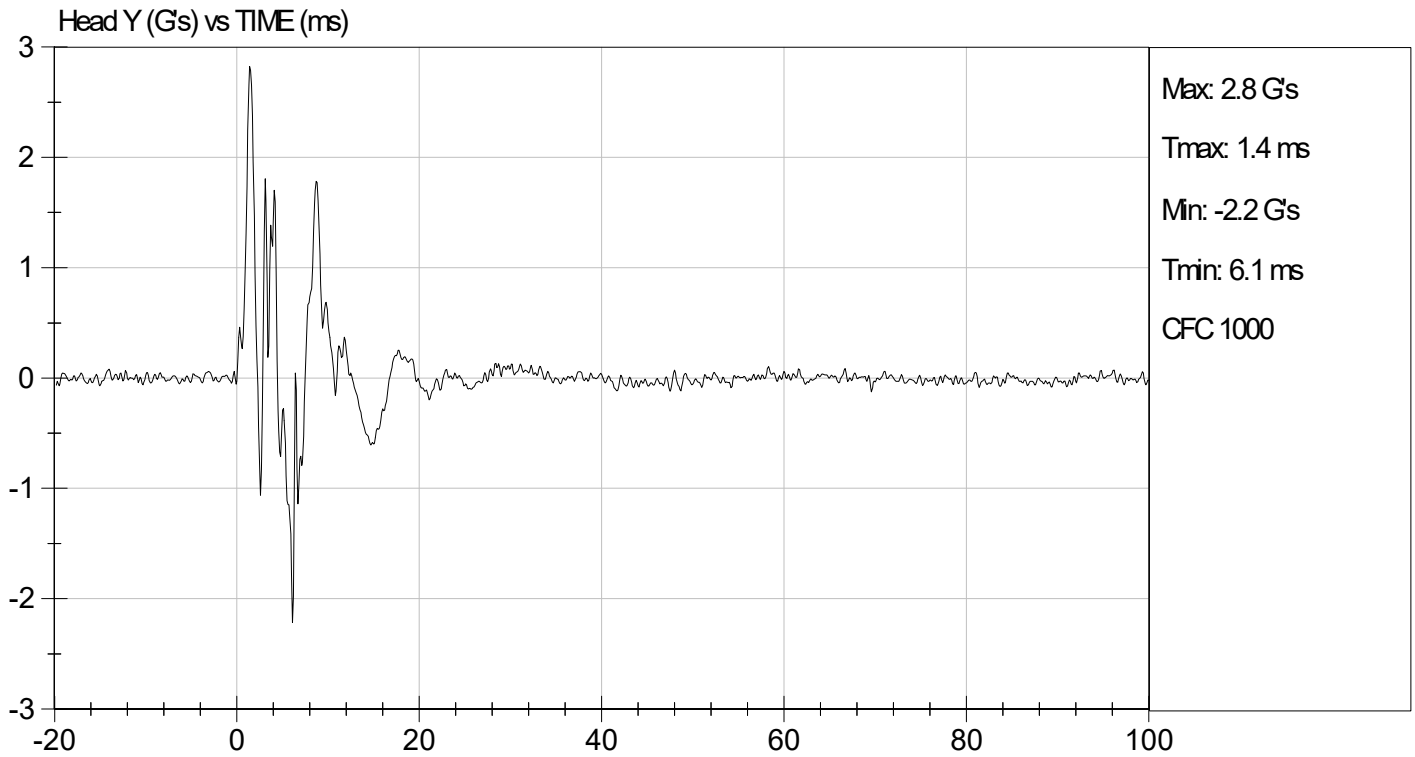
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	44	Pass
Peak Resultant Acceleration	G's	225 to 275	269	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	2.8	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
Overall Test Results				Pass

  
 Laboratory Technician

08/24/2022  
 Test Date

  
 Approved By





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

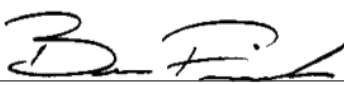
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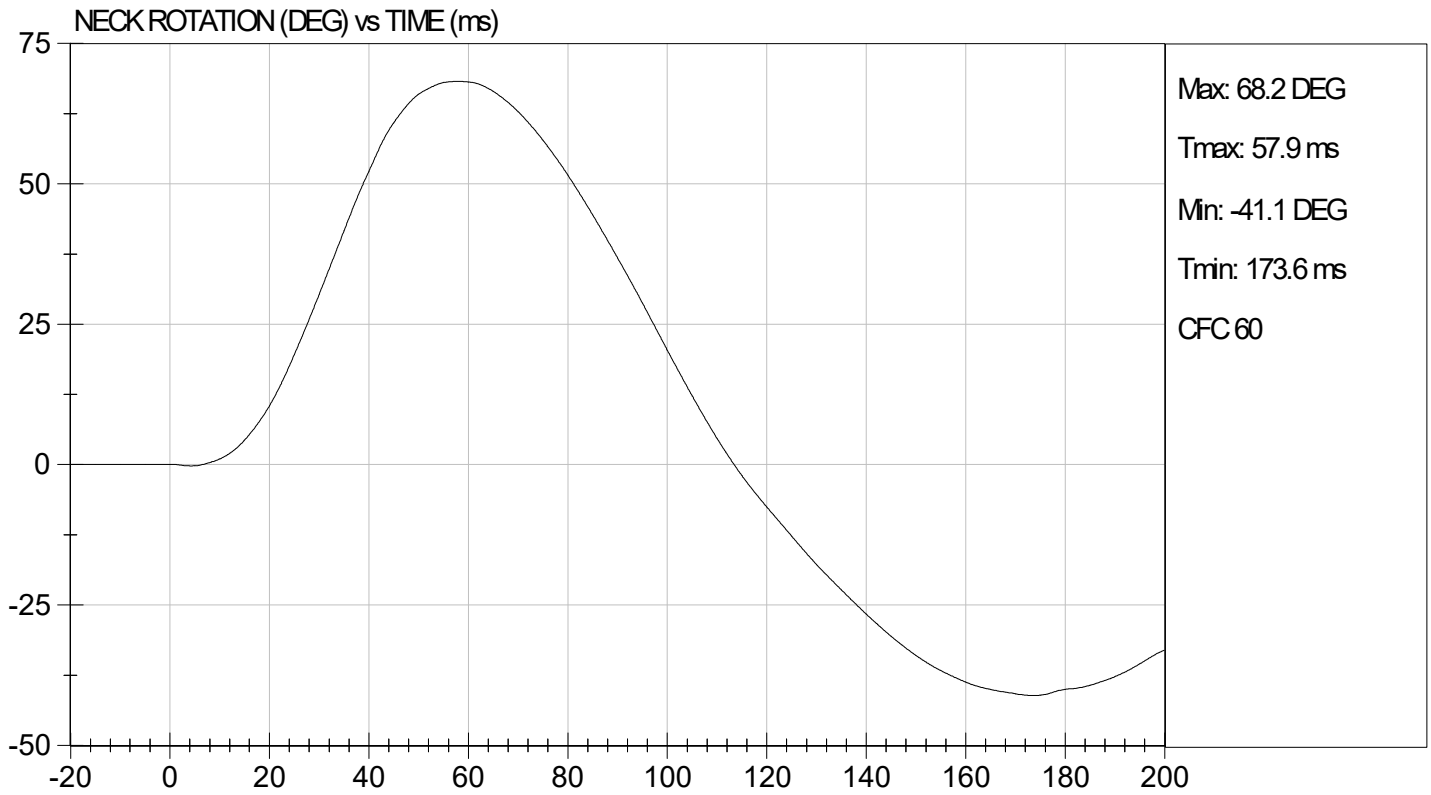
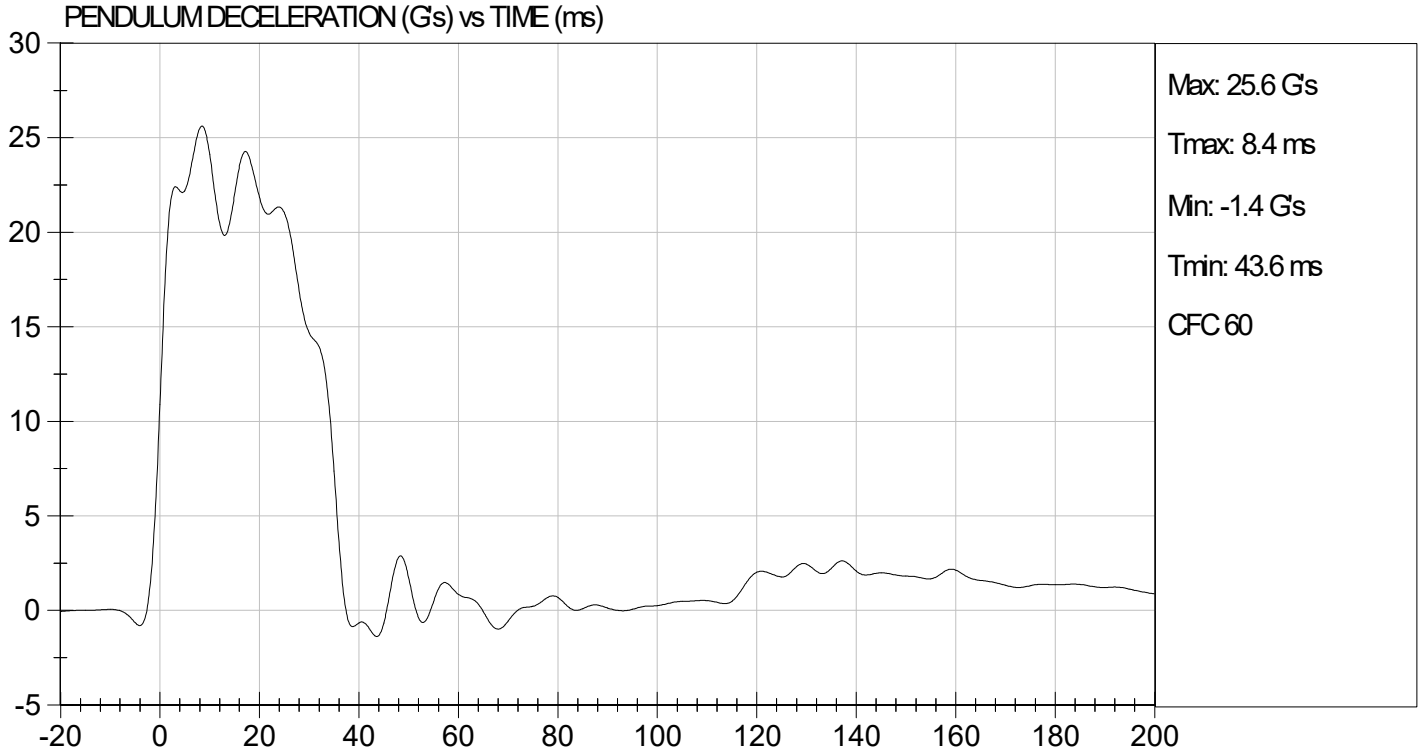
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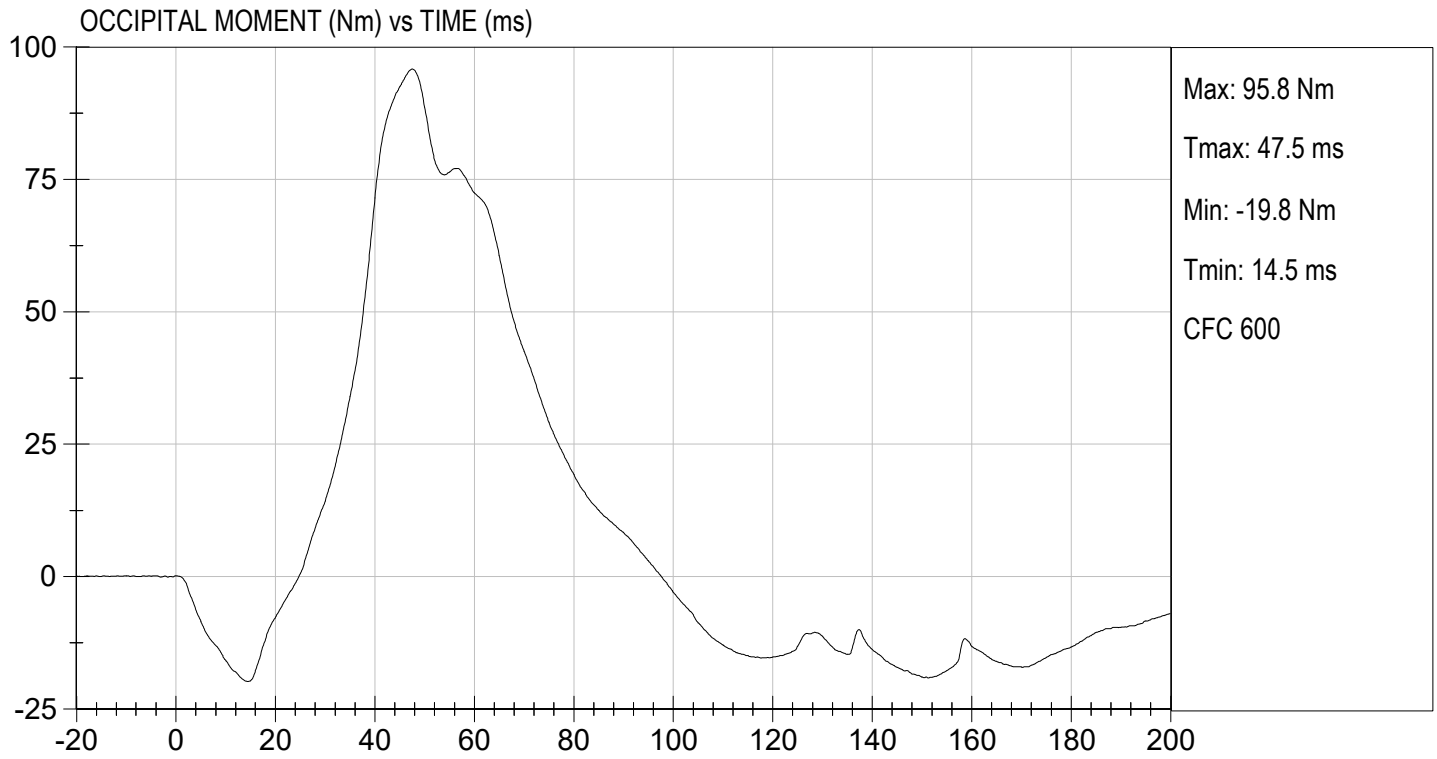
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity		%	10 to 70	44	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.96	Pass
Pendulum Deceleration	10 ms	G's	22.50 to 27.50	24.11	Pass
	20 ms	G's	17.60 to 22.60	21.86	Pass
	30 ms	G's	12.50 to 18.50	14.67	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 29.0	14.6	Pass
Deceleration Decay Time to Cross 5 G's		ms	34.0 to 42.0	35.7	Pass
Maximum "D" Plane Rotation	Maximum	Deg	64.0 to 78.0	68.2	Pass
	Time	ms	57.0 to 64.0	57.9	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	113.0 to 128.0	113.6	Pass
Moment About Occipital Condyle	Maximum	Nm	88.1 to 108.5	95.8	Pass
	Time	ms	47.0 to 58.0	47.5	Pass
Positive Moment Decay Time To Zero Crossing		ms	97.0 to 107.0	97.8	Pass
Overall Test Results					Pass

  
 Laboratory Technician

08/24/2022  
 Test Date

  
 Approved By





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

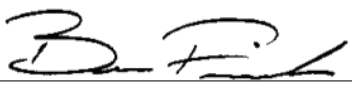
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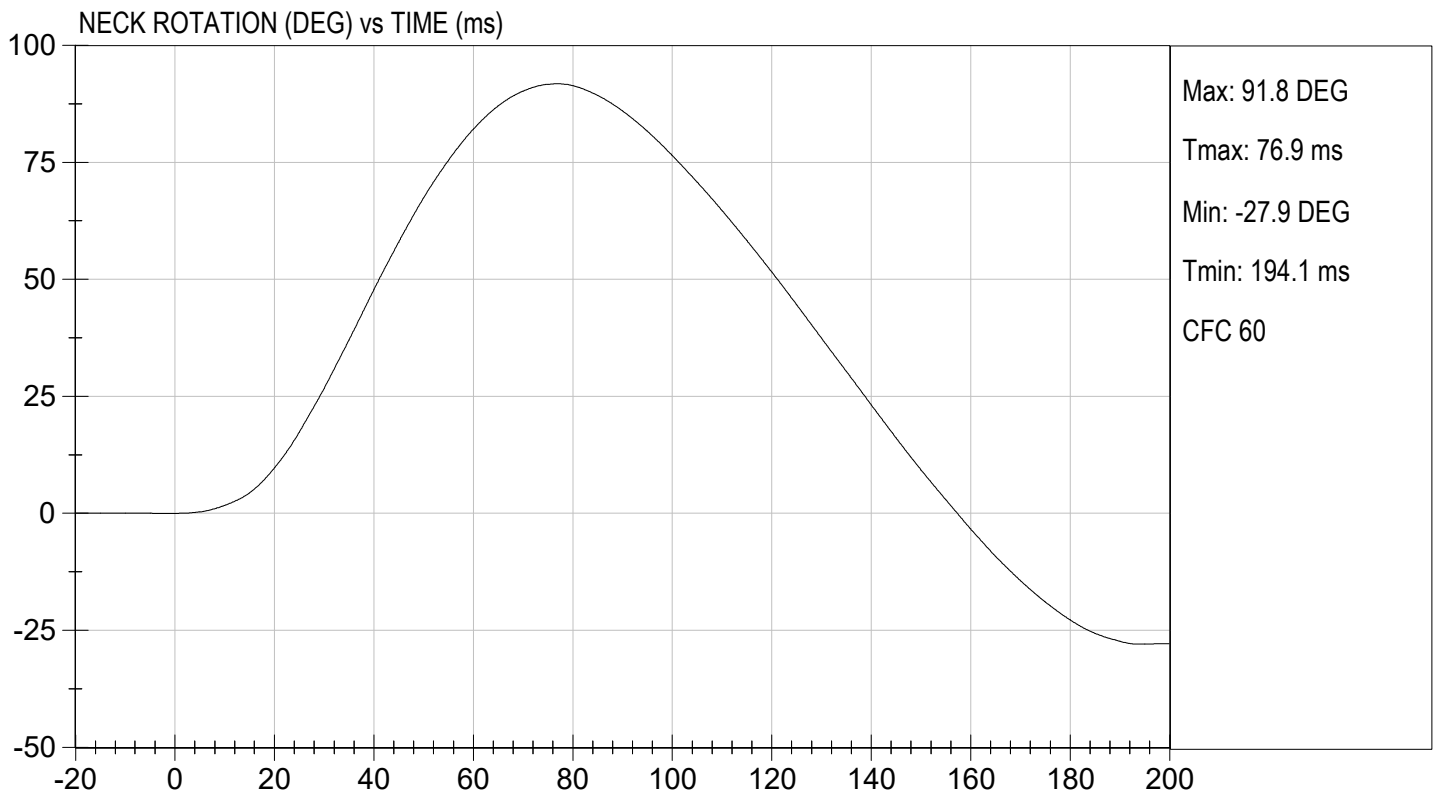
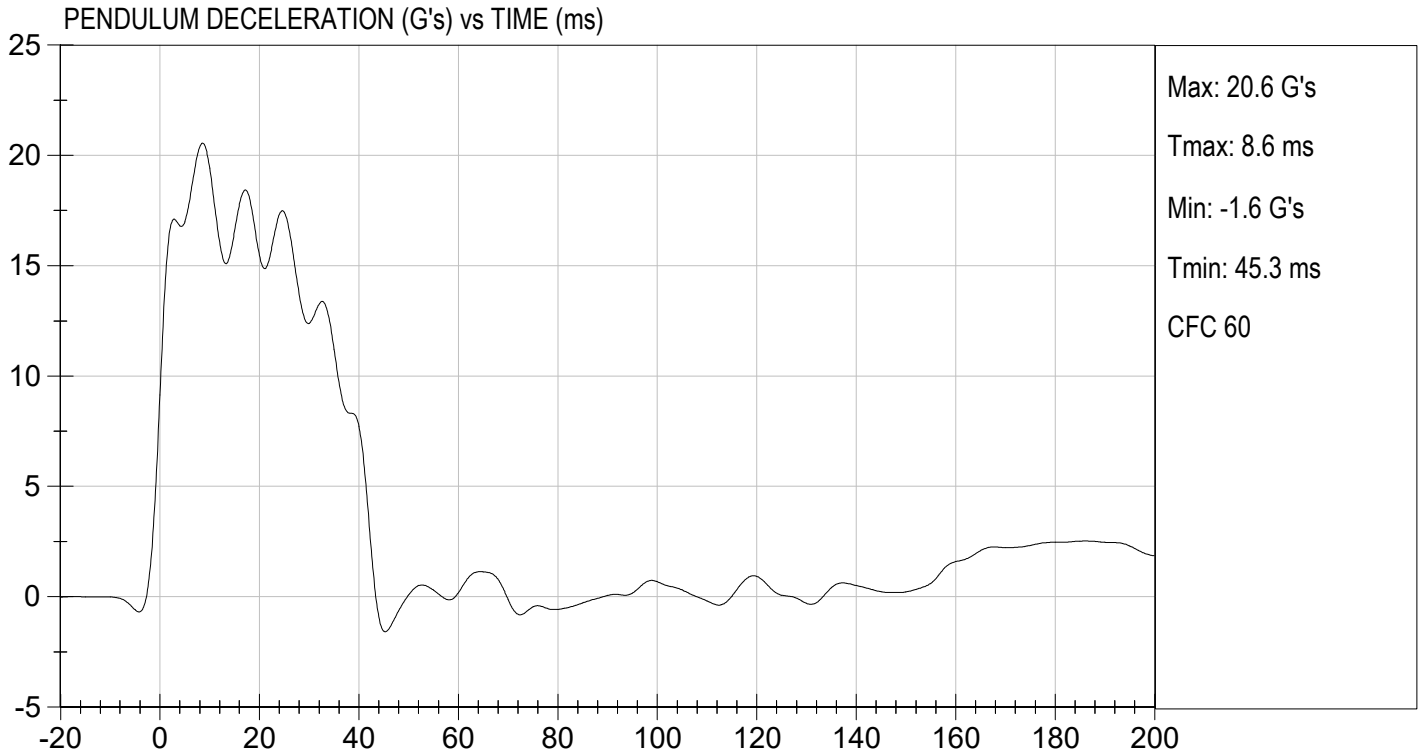
Test I.D.: D221913

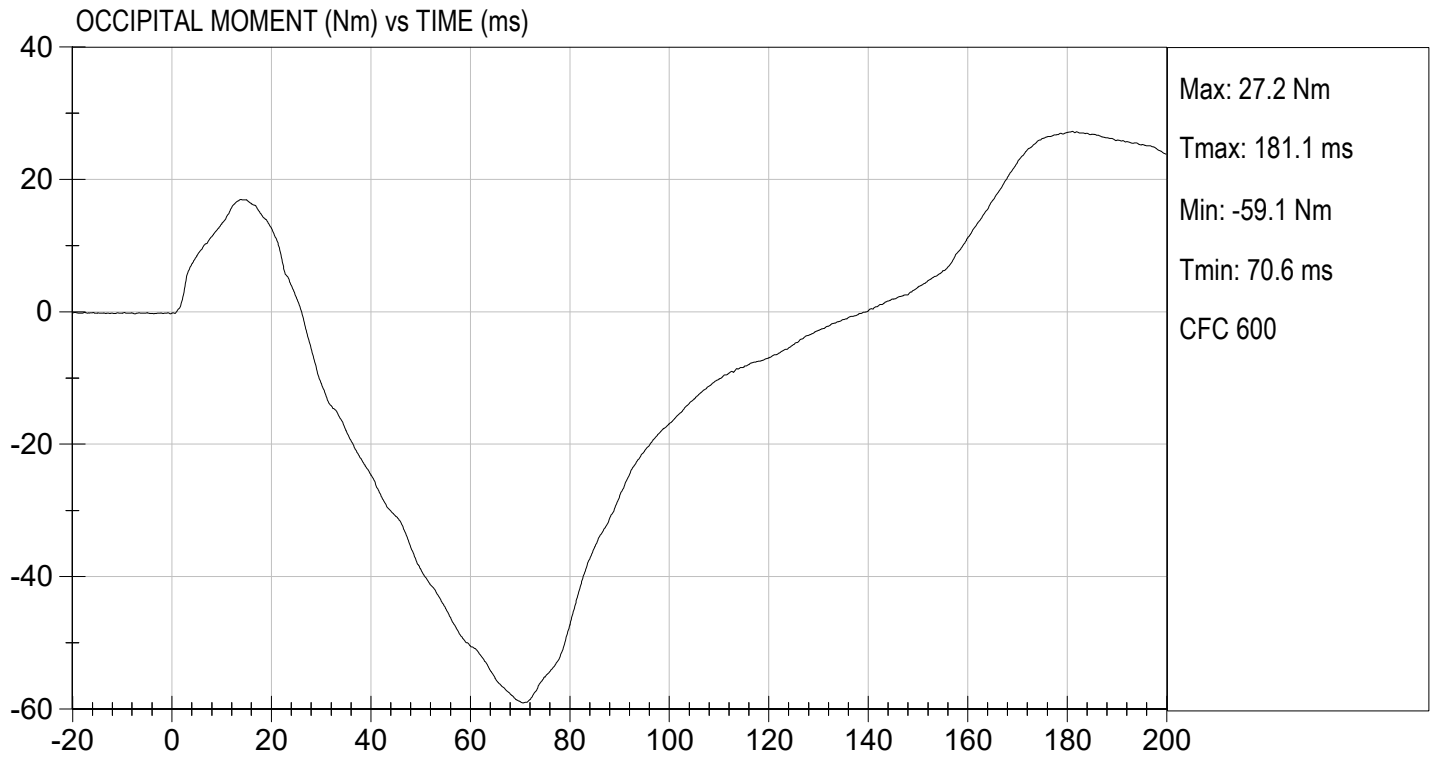
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity		%	10 to 70	44	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.05	Pass
Pendulum Deceleration	10 ms	G's	17.20 to 21.20	19.41	Pass
	20 ms	G's	14.00 to 19.00	15.47	Pass
	30 ms	G's	11.00 to 16.00	12.39	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 22.0	13.4	Pass
Deceleration Decay Time to Cross 5 G's		ms	38.0 to 46.0	41.5	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	91.8	Pass
	Time	ms	72.0 to 82.0	76.9	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	147.0 to 174.0	157.5	Pass
Moment About Occipital Condyle	Maximum	Nm	-52.9 to -79.9	-59.1	Pass
	Time	ms	65.0 to 79.0	70.6	Pass
Negative Moment Decay Time To Zero Crossing		ms	120.0 to 148.0	139.8	Pass
Overall Test Results					Pass

  
 Laboratory Technician

08/24/2022  
 Test Date

  
 Approved By





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

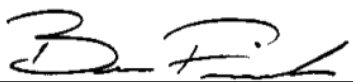
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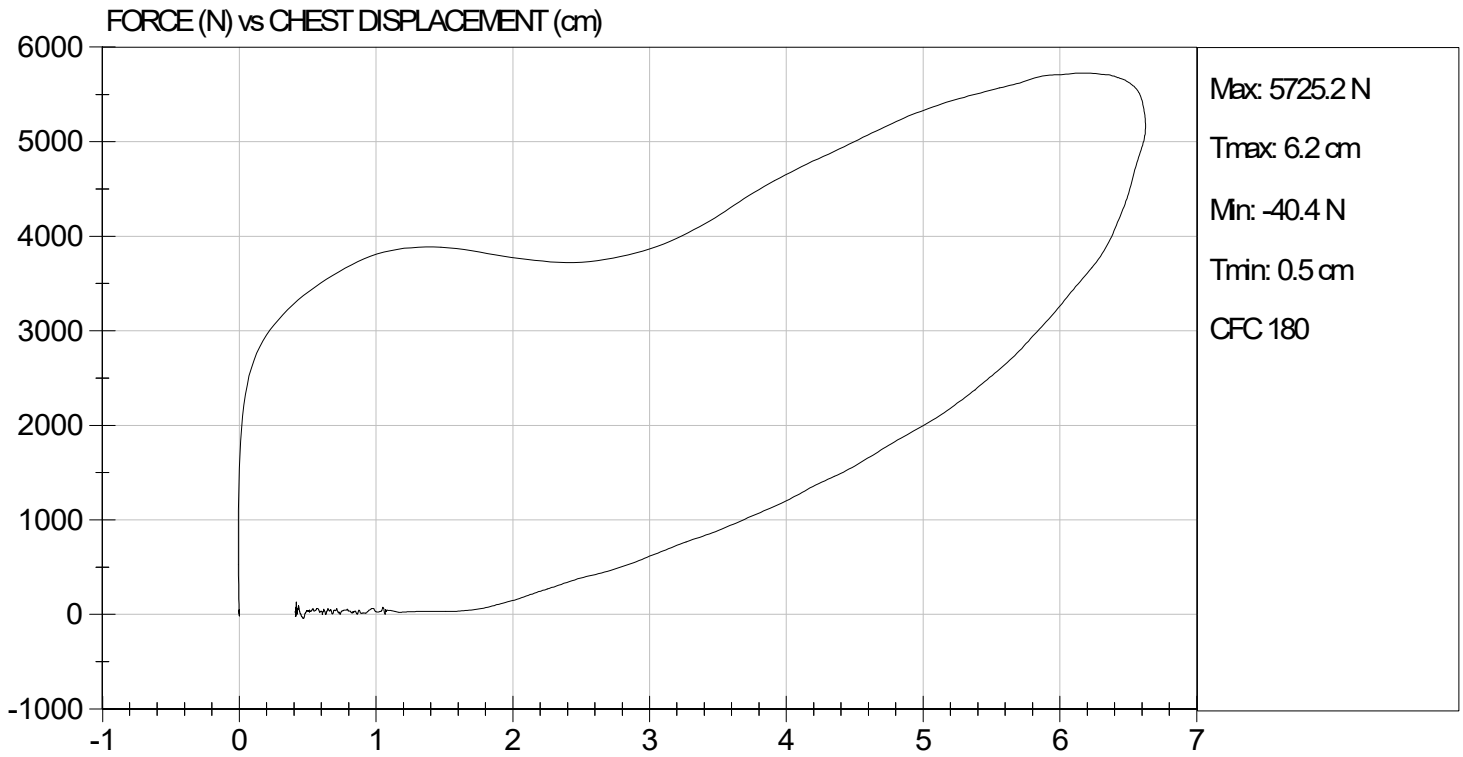
**Test I.D:** D221914

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	42	Pass
Probe Velocity	m/s	6.58 to 6.82	6.60	Pass
Peak Probe Force	N	5159 to 5893	5,725	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.63	Pass
Internal Hysteresis	%	69 to 85	73	Pass
<b>Overall Test Results</b>				<b>Pass</b>

  
 \_\_\_\_\_  
 Laboratory Technician

08/22/2022  
 \_\_\_\_\_  
 Test Date

  
 \_\_\_\_\_  
 Approved By



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

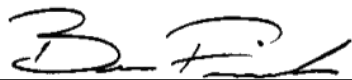
**ATD Serial No:** 351

**Test I.D:** D221915

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	37	Pass
Probe Velocity	m/s	2.07 to 2.13	2.07	Pass
Peak Probe Force	N	4715 to 5782	4,984	Pass
<b>Overall Test Results</b>				<b>Pass</b>

  
 \_\_\_\_\_  
 Laboratory Technician

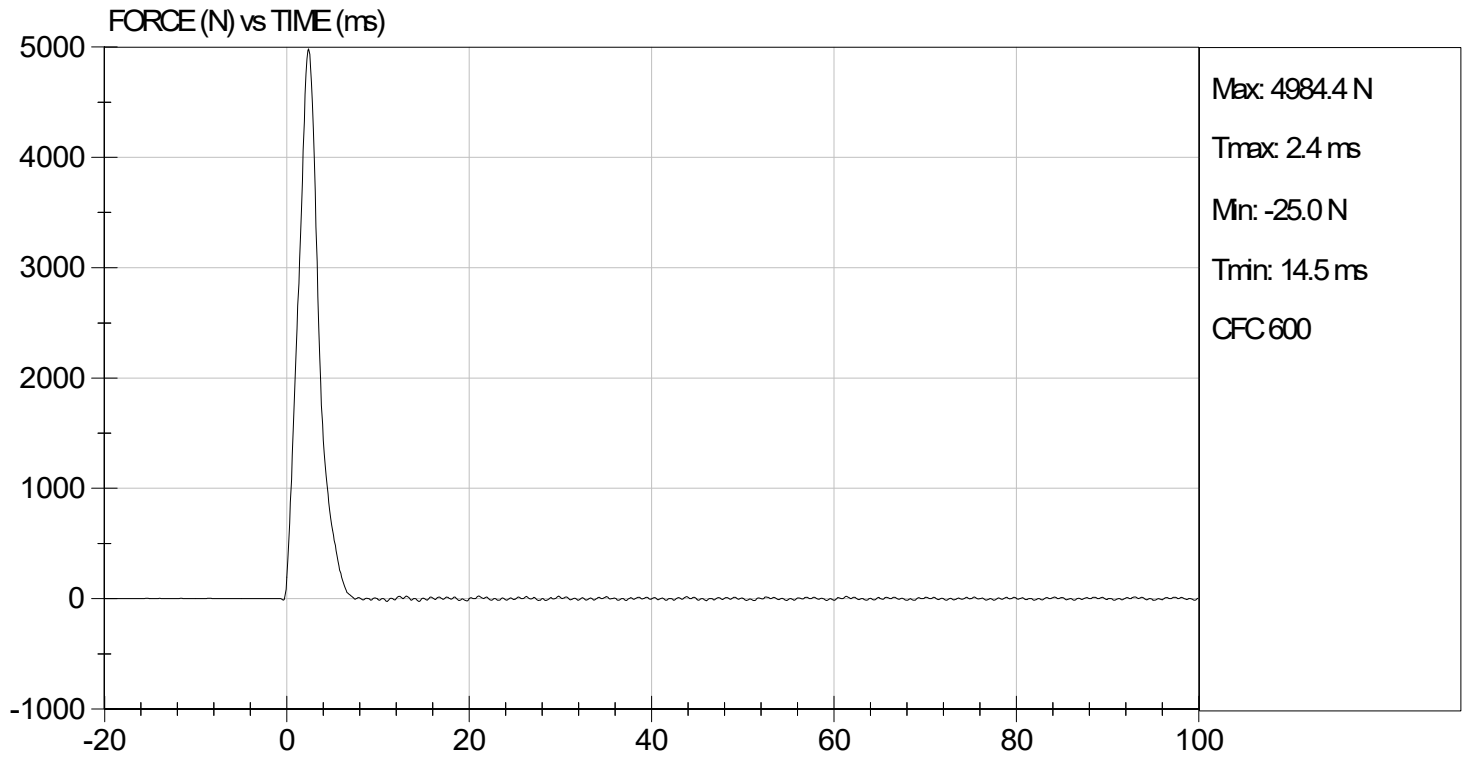
08/23/2022  
 \_\_\_\_\_  
 Test Date

  
 \_\_\_\_\_  
 Approved By



TEST DESC: RIGHT KNEE  
VELOCITY: 6.78 ft/s, 2.07 m/s

TEST DATE: 08/23/2022  
TEST #: D221915



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

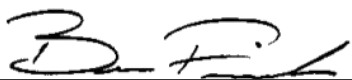
**ATD Serial No:** 351

**Test I.D:** D221916

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	37	Pass
Probe Velocity	m/s	2.07 to 2.13	2.10	Pass
Peak Probe Force	N	4715 to 5782	4,812	Pass
<b>Overall Test Results</b>				<b>Pass</b>

  
 Laboratory Technician

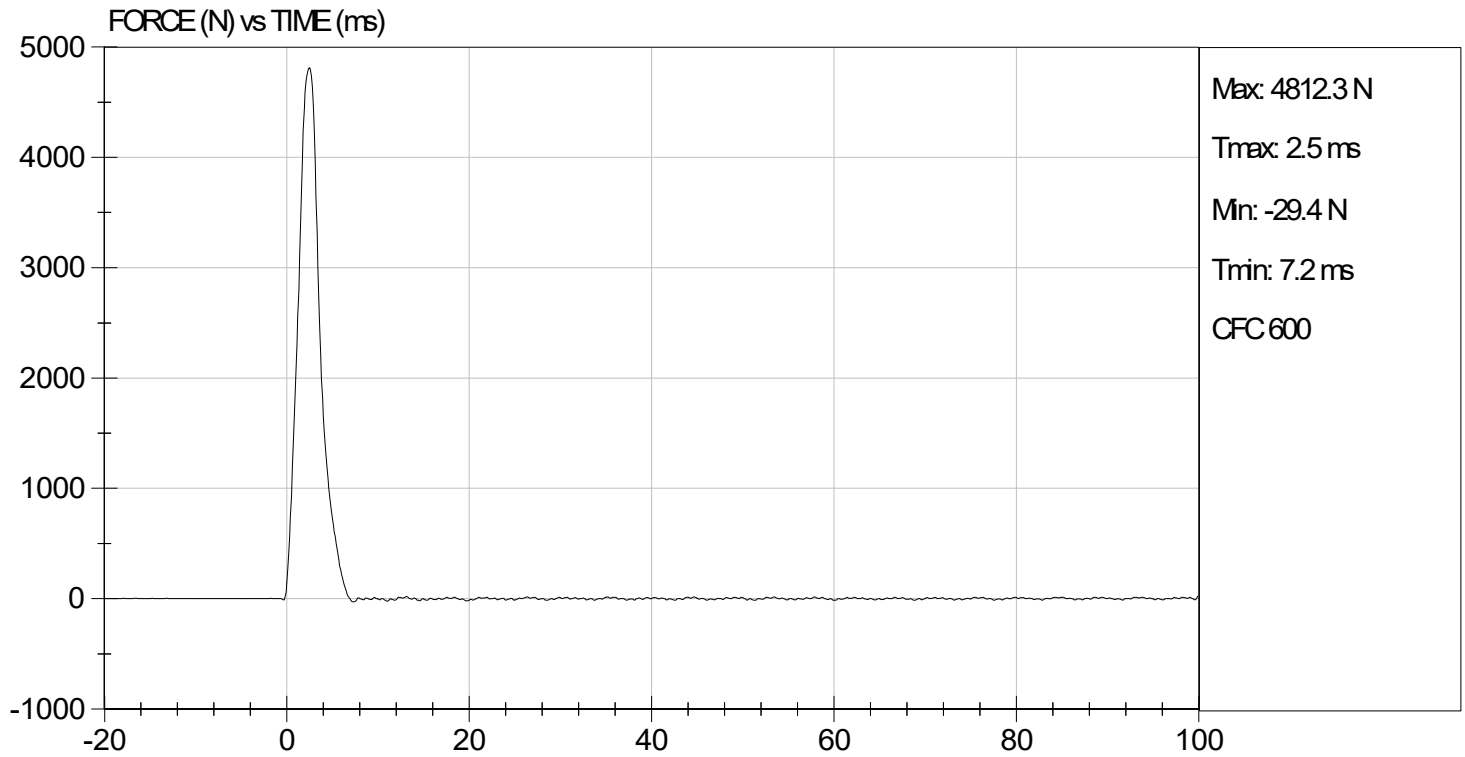
08/23/2022  
 Test Date

  
 Approved By



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

TEST DATE: 08/23/2022  
TEST #: D221916



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

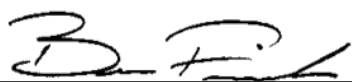
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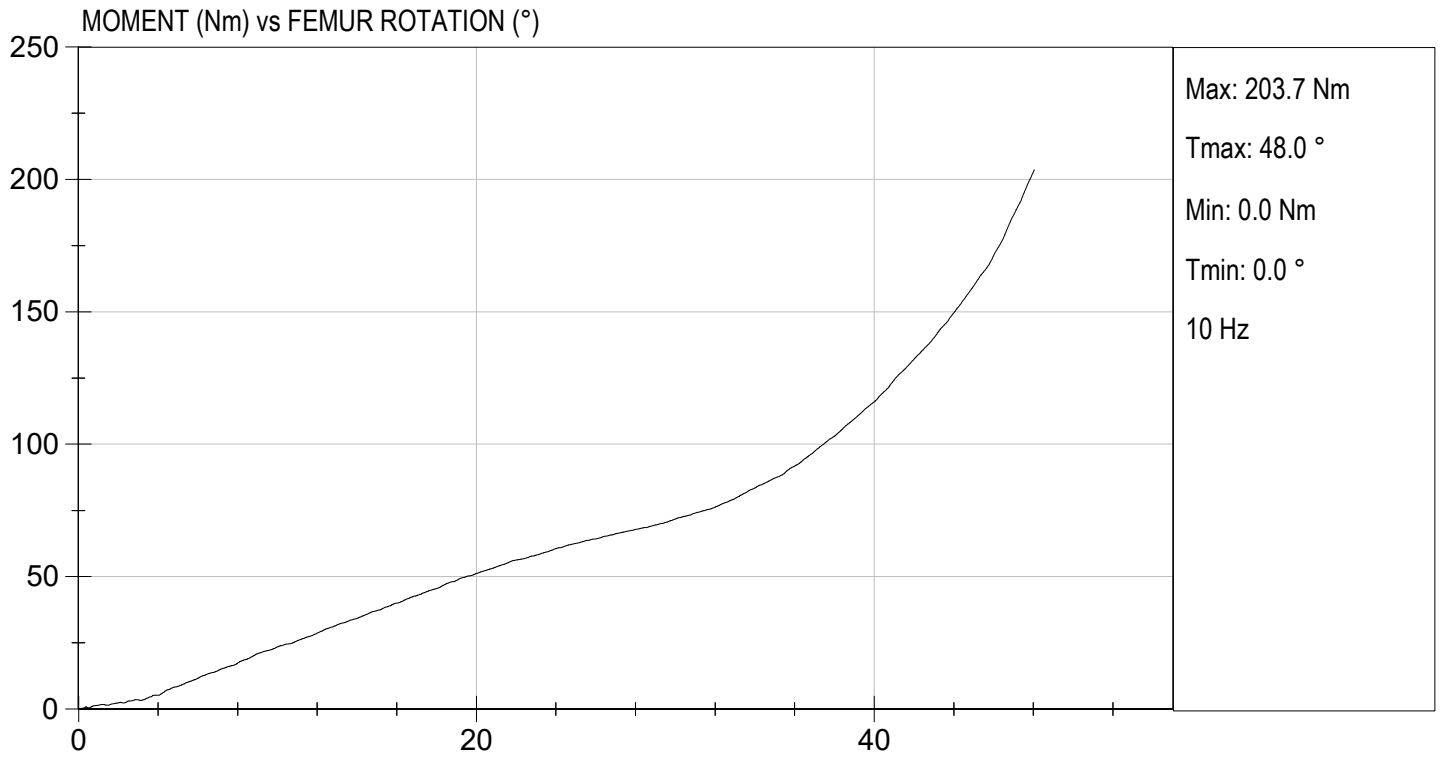
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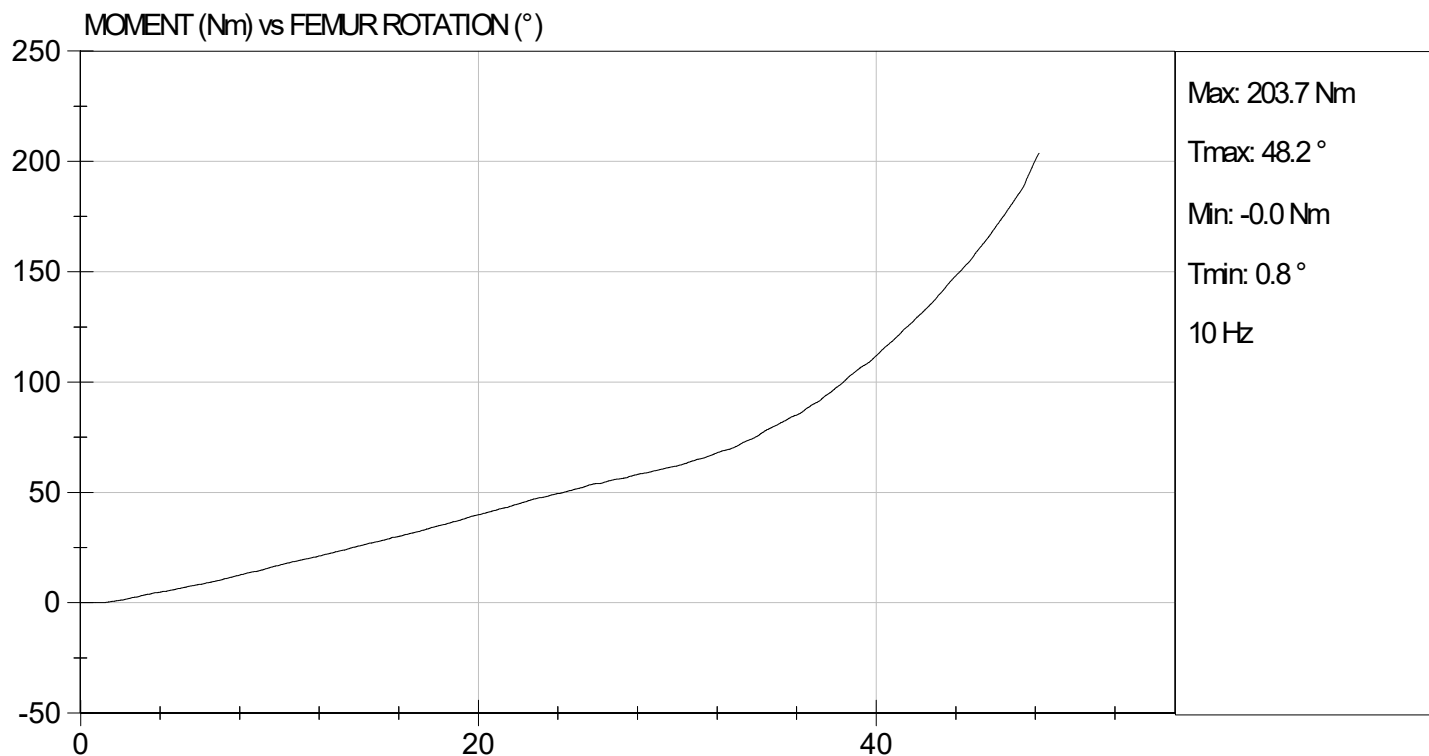
Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	21.4	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	42	42	Pass
Rotation Rate	deg/s	5.0 to 10.0	6.4	6.5	Pass
30 Degrees	Nm	94.9 Nm Max	71.8	62.0	Pass
150 ft-lbf / 203.4 Nm	Deg	40.0 to 50.0 Degree Max Rotation	48.0	48.2	Pass
Overall Test Results					Pass

  
 Laboratory Technician

08/23/2022  
 Test Date

  
 Approved By





**CALIBRATION TEST RESULTS**

**PRE-TEST**

**HYBRID III 5<sup>TH</sup> PERCENTILE FEMALE - PASSENGER ATD**

**Hybrid III, 5th External Measurements**  
**SN: 142**

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	775.0
B	SHOULDER PIVOT HEIGHT	Centerline of shoulder pivot bolt to the seat surface.	431.8-457.2	438.2
C	H-POINT HEIGHT	Reference	81.3-86.3	81.8
D	H-POINT LOCATION FROM BACKLINE	Reference	144.8-149.8	148.3
E	SHOULDER PIVOT FROM BACKLINE	Center of the shoulder clevis to the rear vertical surface of the fixture.	68.6-83.8	83.0
F	THIGH CLEARANCE	Measured at the highest point on the upper femur segment.	119.4-134.6	124.4
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	245.2
H	HEAD BACK TO BACKLINE	Back of Skull cap skin to seat rear vertical surface (Reference)	43.2-48.2	43.4
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	281.1
J	ELBOW REST HEIGHT	Measure from the flesh below the elbow pivot bolt to the seat surface.	182.8-203.2	197.2
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	537.2
L	POPLITEAL HEIGHT	Seat surface to the plane of the horizontal plane of the bottom of the feet.	355.6-376	358.8
M	KNEE PIVOT HEIGHT	Centerline of knee pivot bolt to the horizontal plane of the bottom of the feet.	393.7-419.1	403.1
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	435.2

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	181.2
P	FOOT LENGTH	Tip of toe to rear of heel	218.5-233.7	227.3
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	475.0
S	HEAD BREADTH	The widest part of the head	137.1-147.3	138.6
T	HEAD DEPTH	Back of the head to the forehead	177.8-188	181.0
U	HIP BREADTH	The widest part of the hip	299.7-314.9	308.4
V	SHOULDER BREADTH	Outside edges of right and left shoulder clevises	350.5-365.7	362.1
W	FOOT BREADTH	The widest part of the foot	78.8-94	82.8
X	HEAD CIRCUMFERENCE	Measured at the point as in dim. "T"	528.3-548.7	545.2
Y	CHEST CIRCUMFERENCE (WITH CHEST JACKET)	Measured 345.4 ± 12.7 mm above seat surface	850.9-881.3	870.7
Z	WAIST CIRCUMFERENCE	Measured 165.1 ± 5.1 mm above seat surface	759.5-789.9	779.9
AA	REFERENCE LOCATION FOR MEASUREMENT OF CHEST CIRCUMFERENCE	Reference	332.7-358.1	350.1
BB	REFERENCE LOCATION FOR MEASUREMENT OF WAIST CIRCUMFERENCE	Reference	160.1-170.2	170.0

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

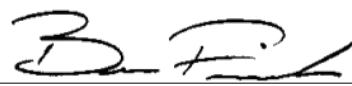
ATD Serial No: 142

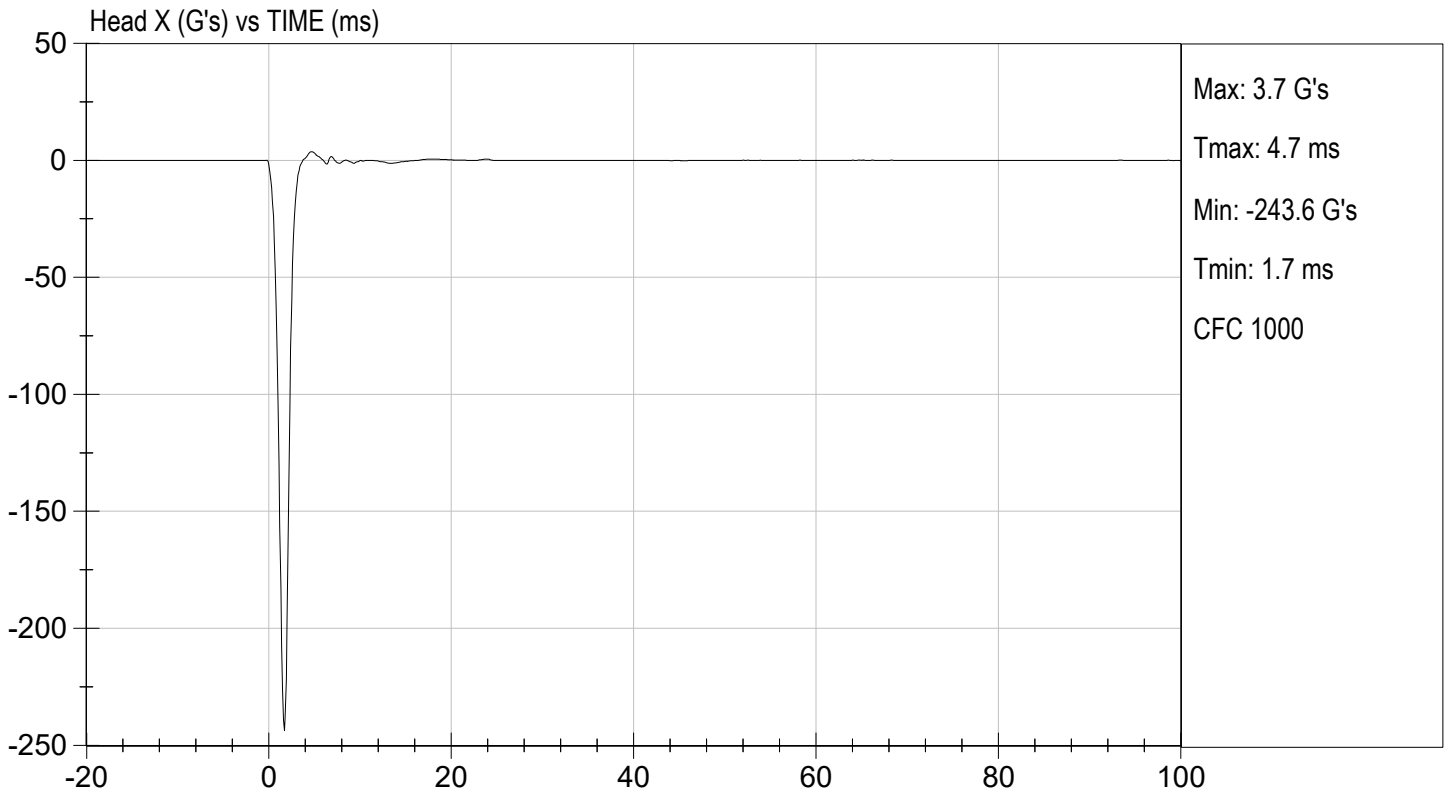
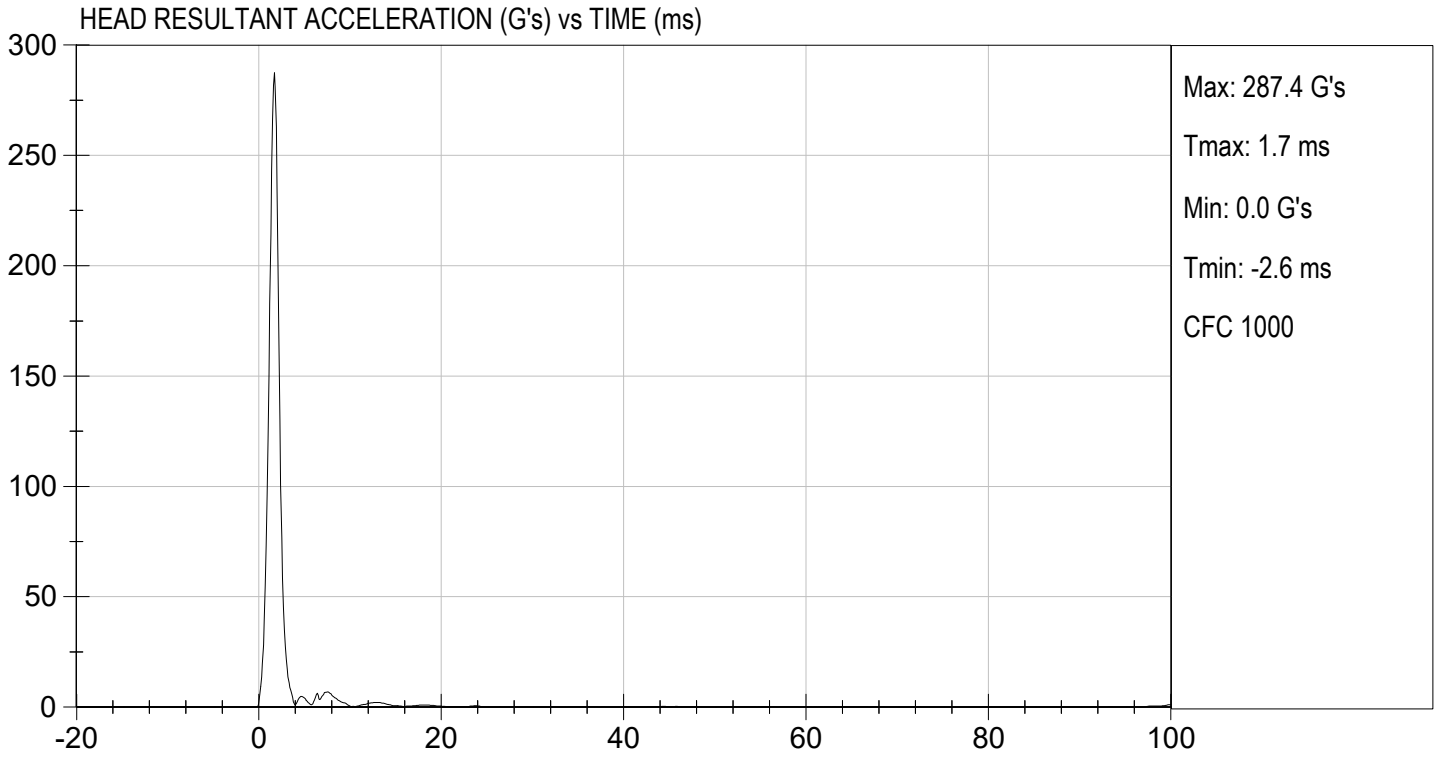
Test ID: D221551

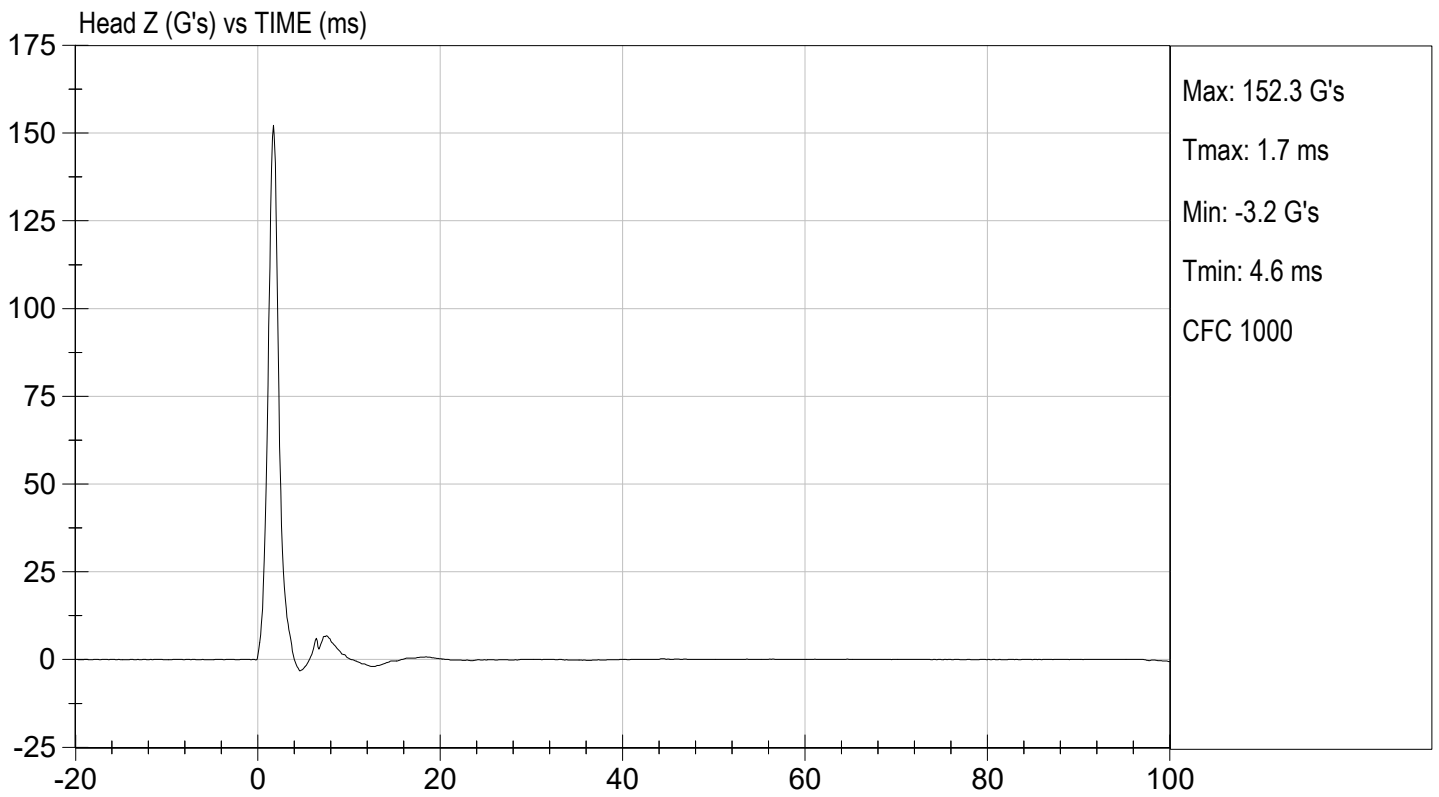
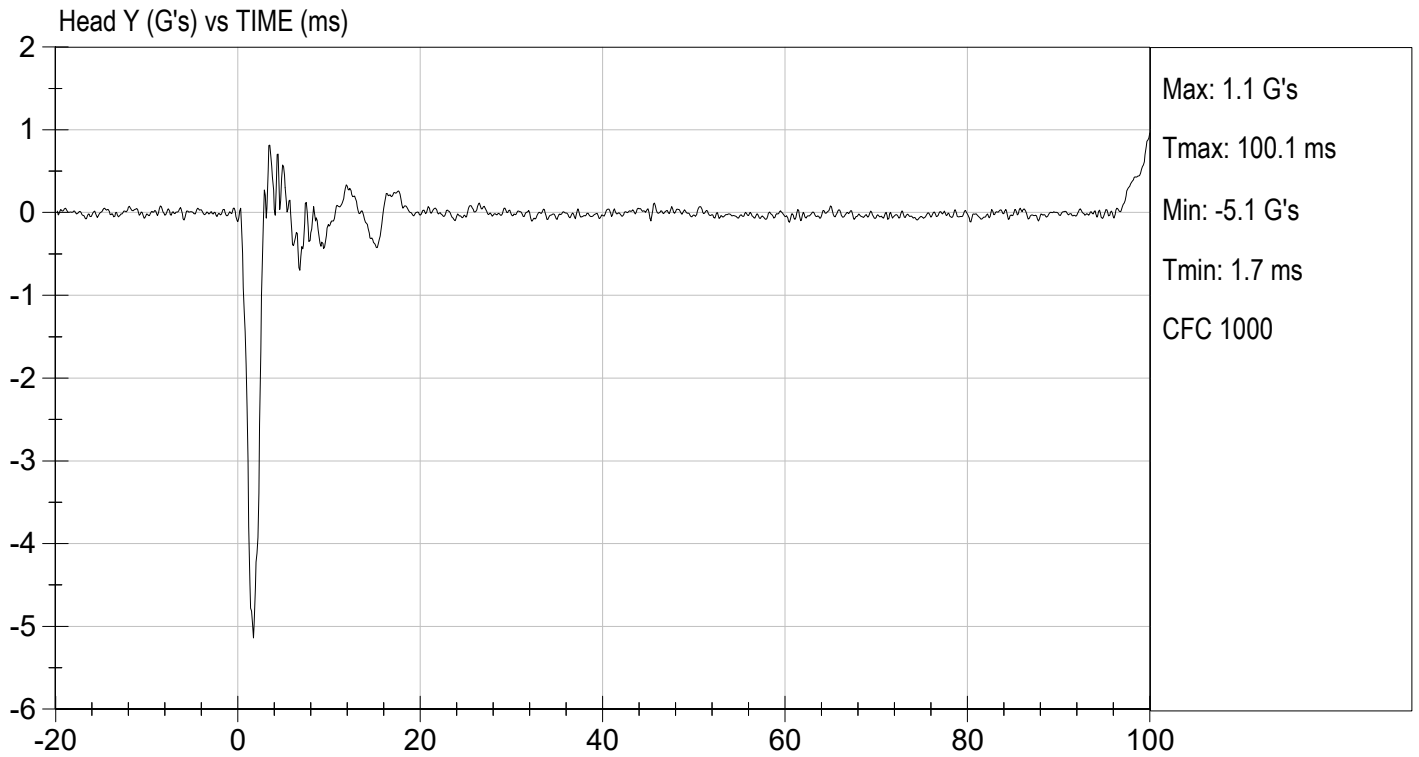
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	45	Pass
Peak Resultant Acceleration	G's	250 to 300	287	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	-5.1	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
Overall Test Results				Pass

  
 \_\_\_\_\_  
 Laboratory Technician

06/29/2022  
 \_\_\_\_\_  
 Test Date

  
 \_\_\_\_\_  
 Approved By





**MGA RESEARCH CORPORATION**  
**NECK FLEXION TEST**  
**HYBRID III 5TH PERCENTILE**

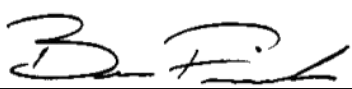
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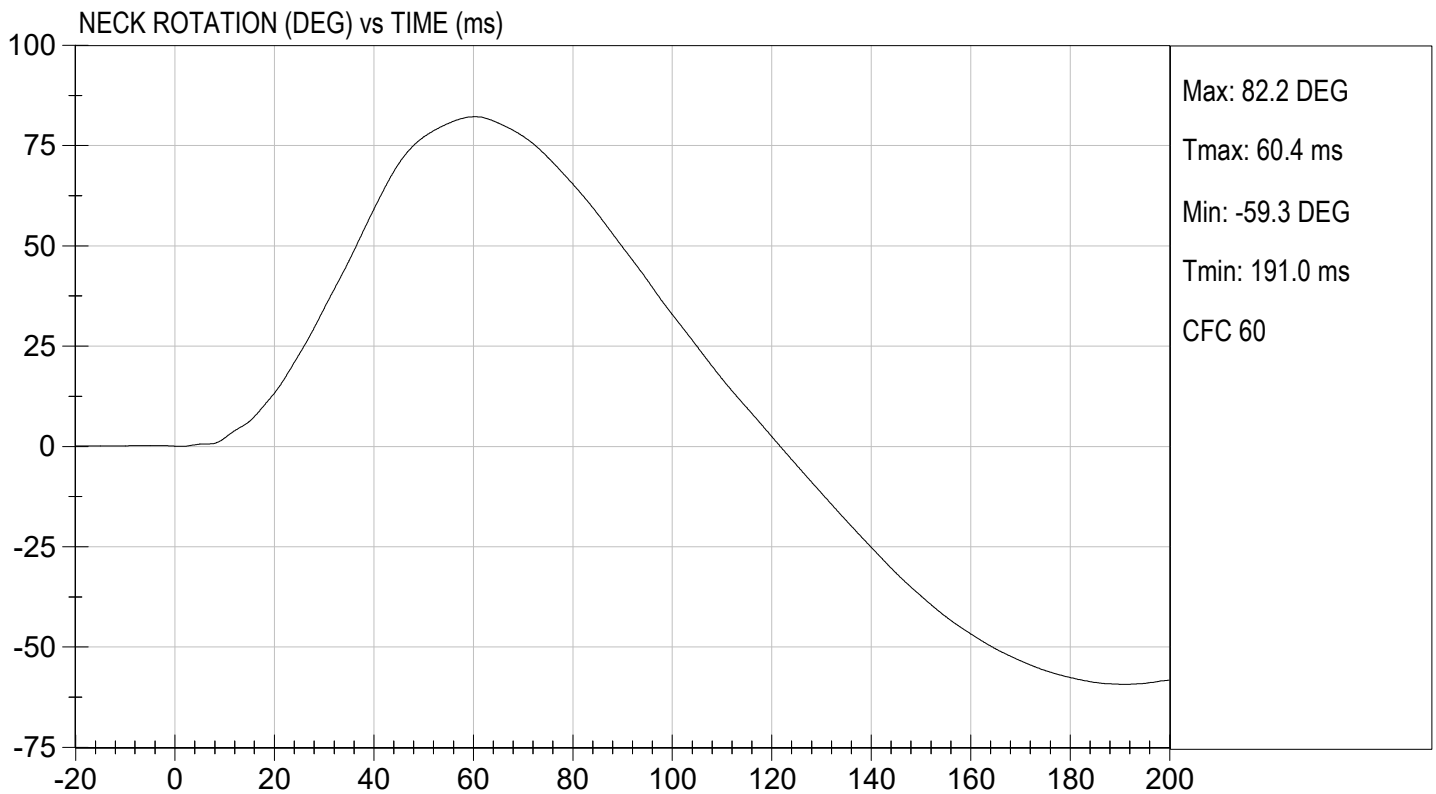
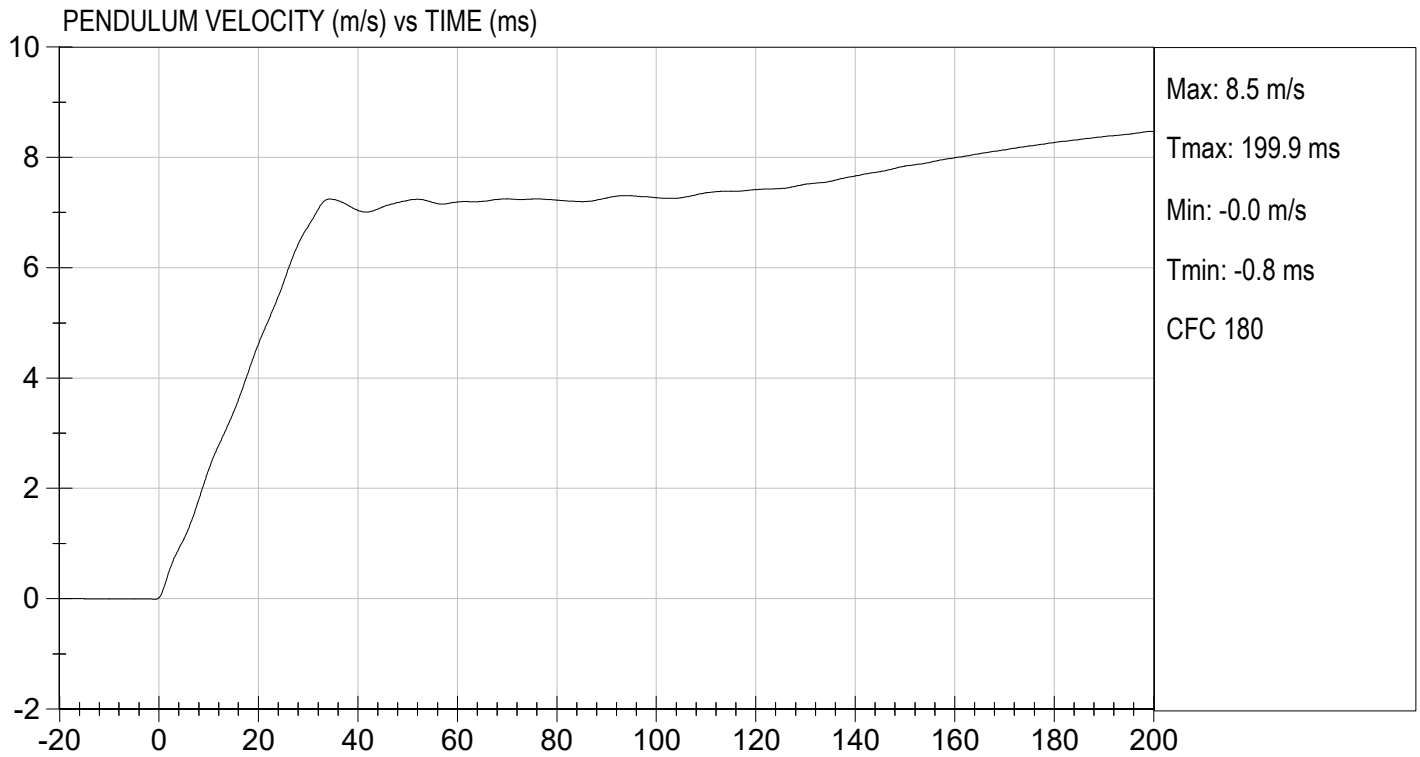
Test I.D: D221552

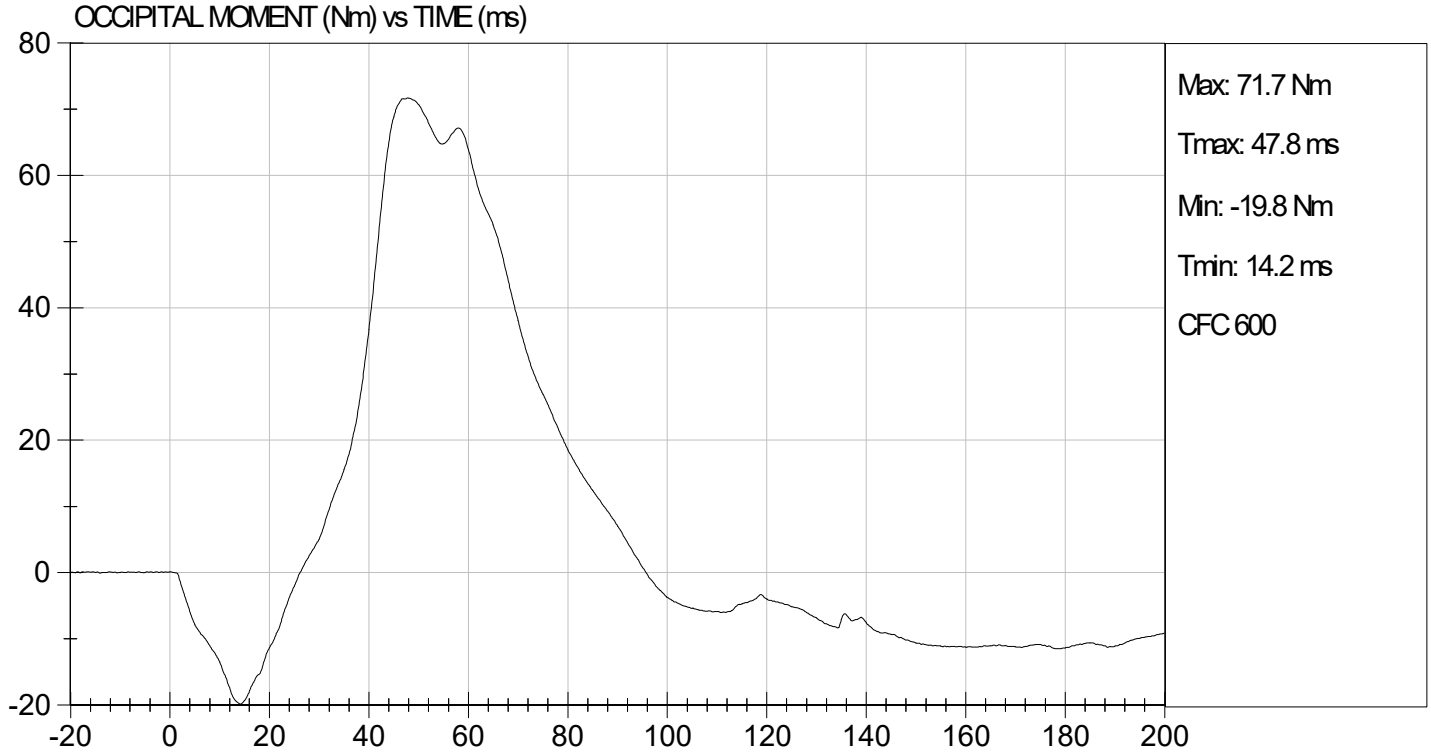
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity		%	10 to 70	47	Pass
Pendulum Speed		m/s	6.89 to 7.13	6.96	Pass
Pendulum Velocity	10 ms	m/s	2.1 to 2.5	2.3	Pass
	20 ms	m/s	4.0 to 5.0	4.6	Pass
	30 ms	m/s	5.8 to 7.0	6.8	Pass
D Plane Rotation	Max	deg	77 to 91	82	Pass
Occipital Condyle Moment within Rotation Corridor		Nm	69 to 83	71	Pass
Positive Moment Time Curve Decay to 10 Nm		ms	80 to 100	85	Pass
Overall Results					Pass

  
 Laboratory Technician

06/30/2022  
 Test Date

  
 Approved By





**MGA RESEARCH CORPORATION**  
**NECK EXTENSION TEST**  
**HYBRID III 5TH PERCENTILE**

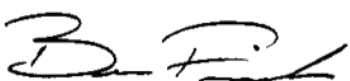
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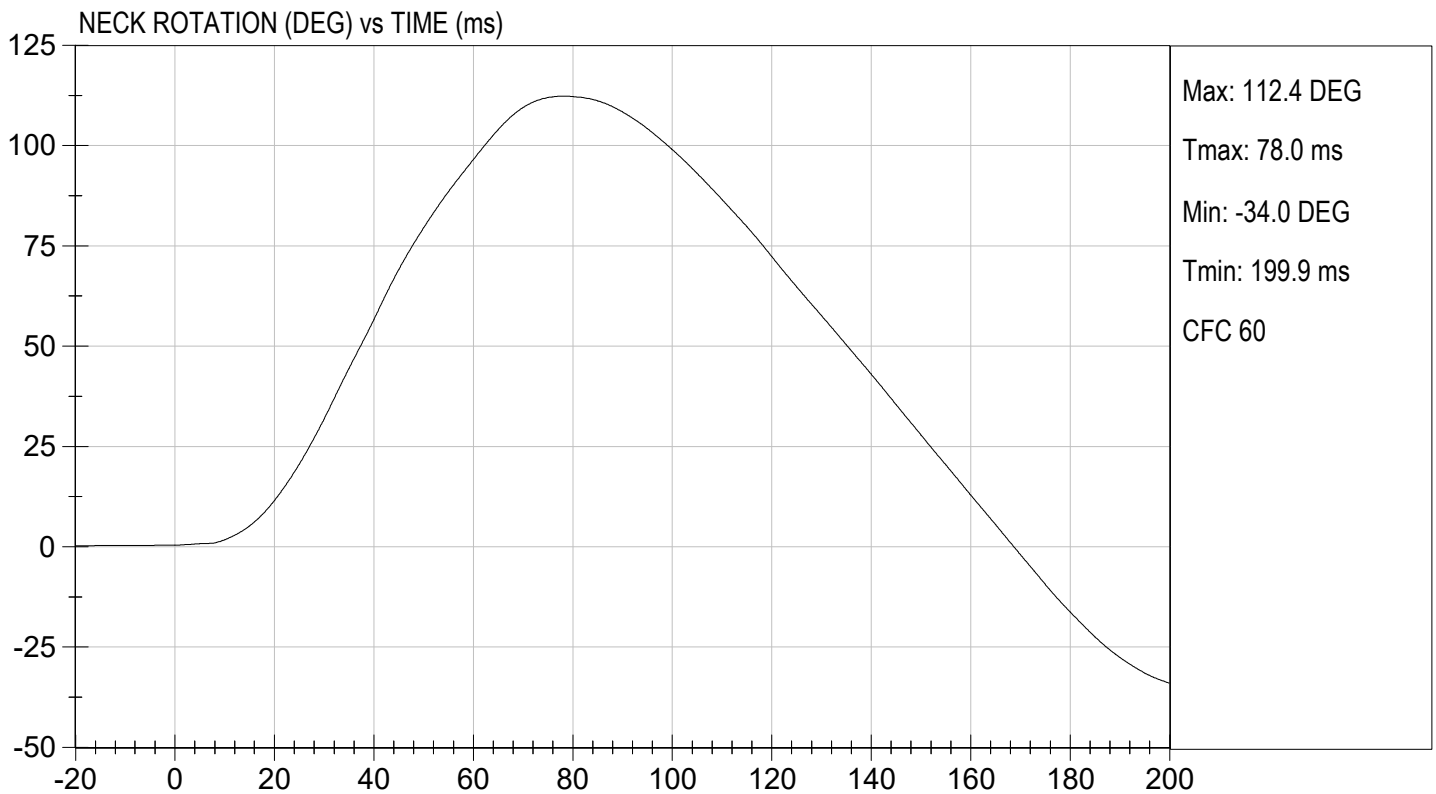
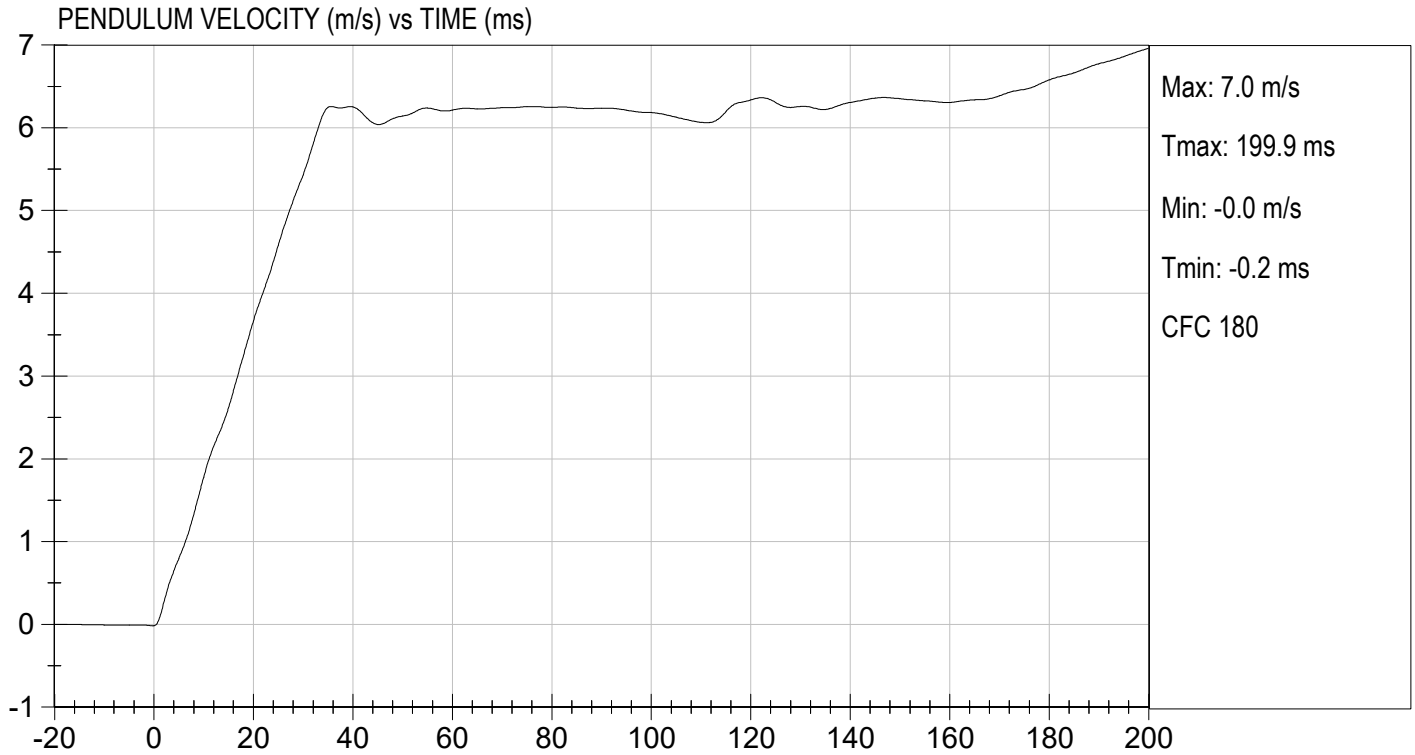
Test I.D.: D221553

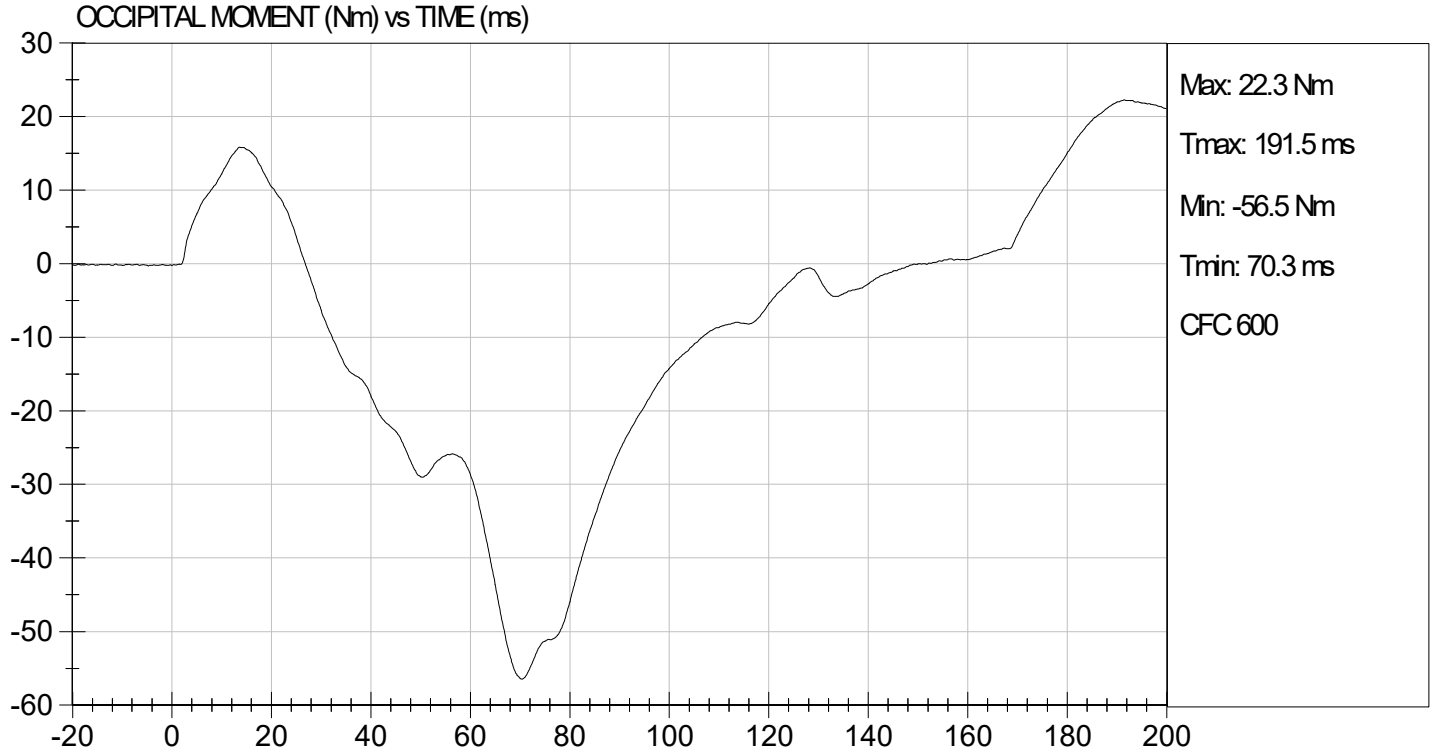
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity		%	10 to 70	47	Pass
Pendulum Speed		m/s	5.95 to 6.19	6.12	Pass
Pendulum Velocity	10 ms	m/s	1.5 to 1.9	1.8	Pass
	20 ms	m/s	3.1 to 3.9	3.7	Pass
	30 ms	m/s	4.6 to 5.6	5.4	Pass
D Plane Rotation	Max	deg	99 to 114	112	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	104	Pass
Overall Results					Pass

  
 Laboratory Technician

06/30/2022  
 Test Date

  
 Approved By





**MGA RESEARCH CORPORATION**  
**THORAX IMPACT**  
**HYBRID III 5TH PERCENTILE**

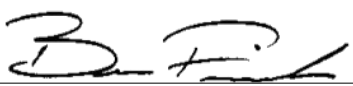
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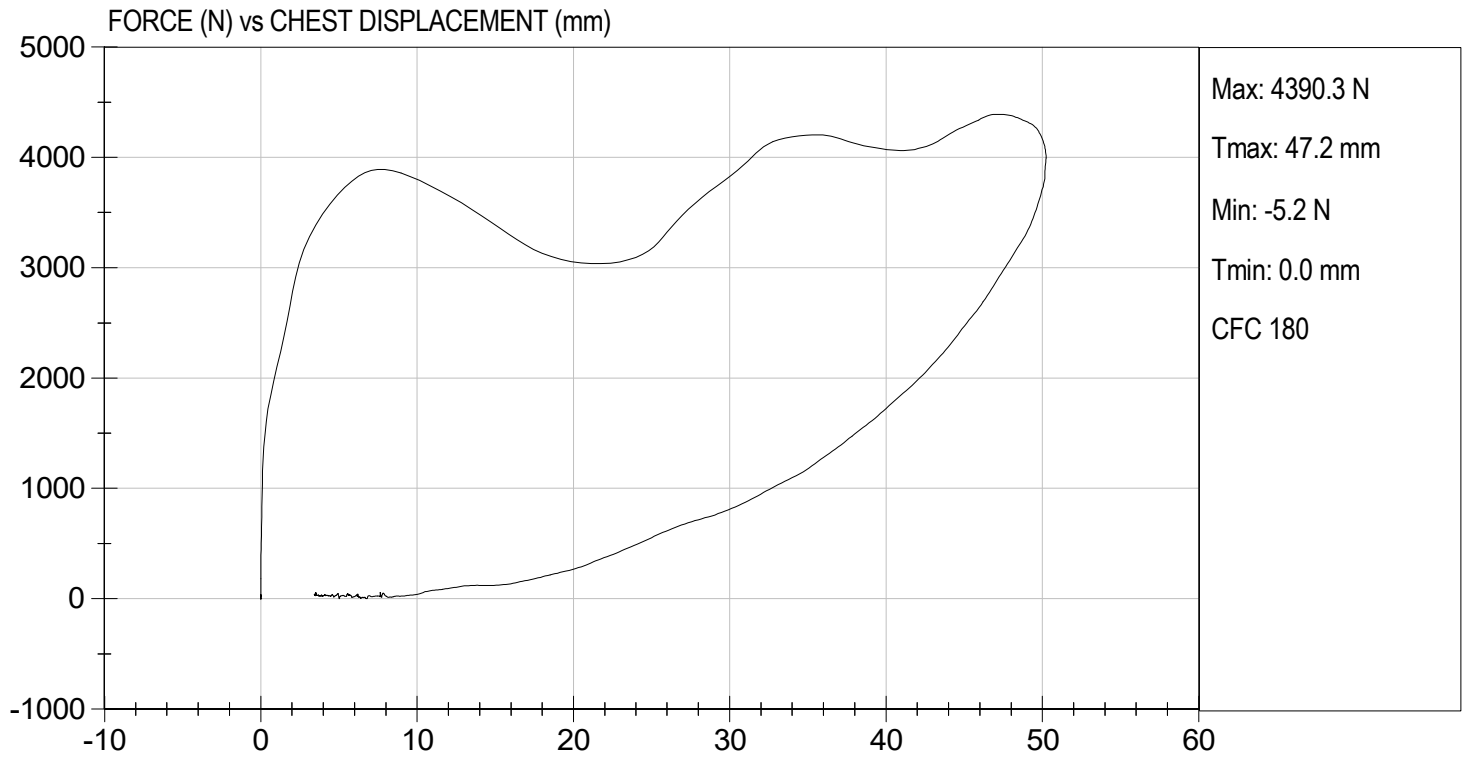
Test I.D: D221554

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Relative Humidity	%	10 to 70	41	Pass
Probe Speed	m/s	6.59 to 6.83	6.68	Pass
Peak Deflection	mm	50 to 58	50	Pass
Peak Resistive Force w/in Deflection Corridor	N	3900 to 4400	4161	Pass
Internal Hysteresis	%	69 to 85	75	Pass
Peak Force 18 mm - 50 mm	N	<= 4600	4390	Pass
Overall Test Results				Pass

  
 Laboratory Technician

06/28/2022  
 Test Date

  
 Approved By



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

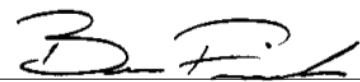
**ATD Serial No:** 142

**Test I.D:** D221555

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	41	Pass
Probe Speed	m/s	2.07 to 2.13	2.11	Pass
Maximum Force	N	3450 to 4060	3817	Pass
Overall Test Results				Pass

  
 \_\_\_\_\_  
 Laboratory Technician

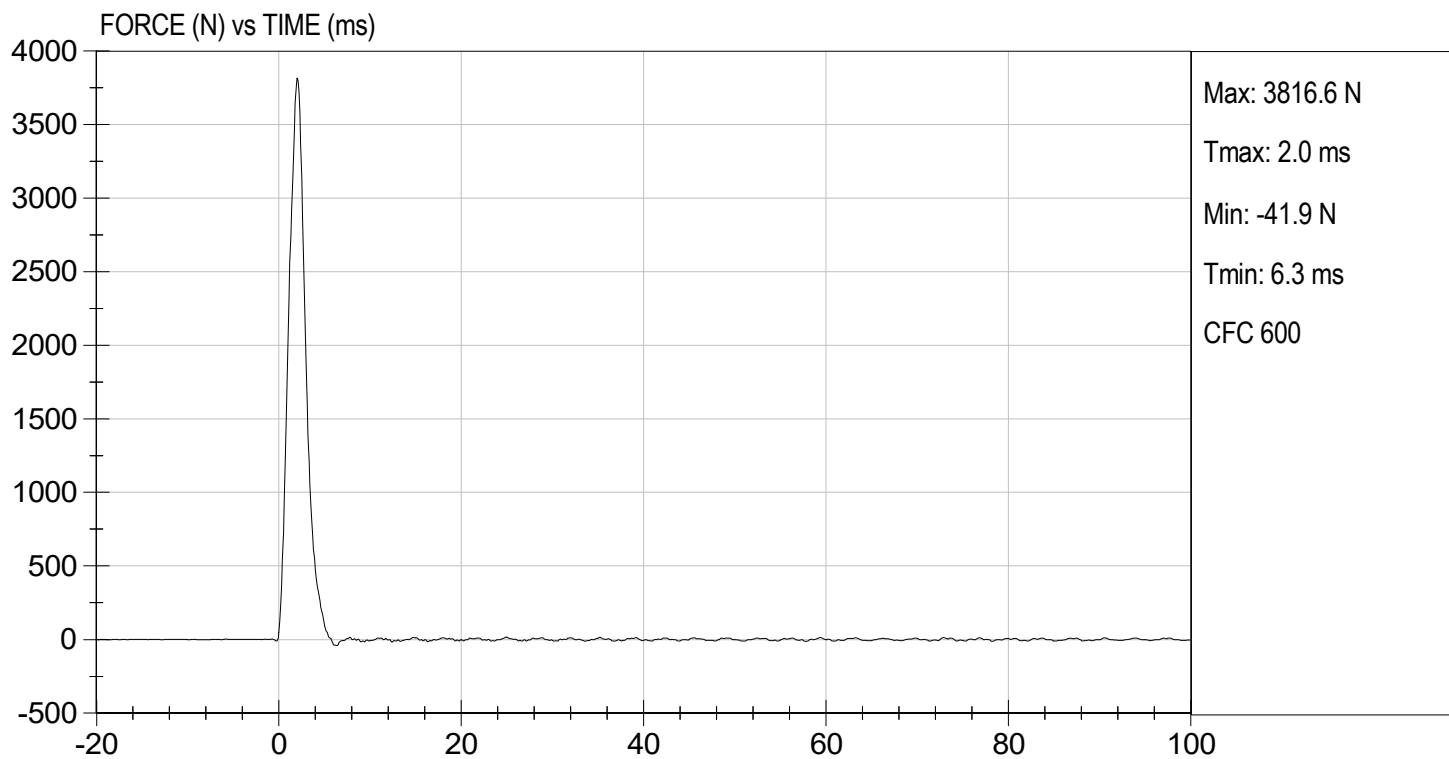
06/29/2022  
 \_\_\_\_\_  
 Test Date

  
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 Approved By



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

TEST DATE: 06/29/2022  
TEST #: D221555



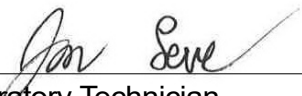
**MGA RESEARCH CORPORATION**

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

**ATD Serial No:** 142

**Test I.D.:** D221556

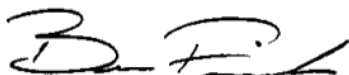
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	41	Pass
Probe Speed	m/s	2.07 to 2.13	2.08	Pass
Maximum Force	N	3450 to 4060	3647	Pass
Overall Test Results				Pass



Laboratory Technician

06/29/2022

Test Date

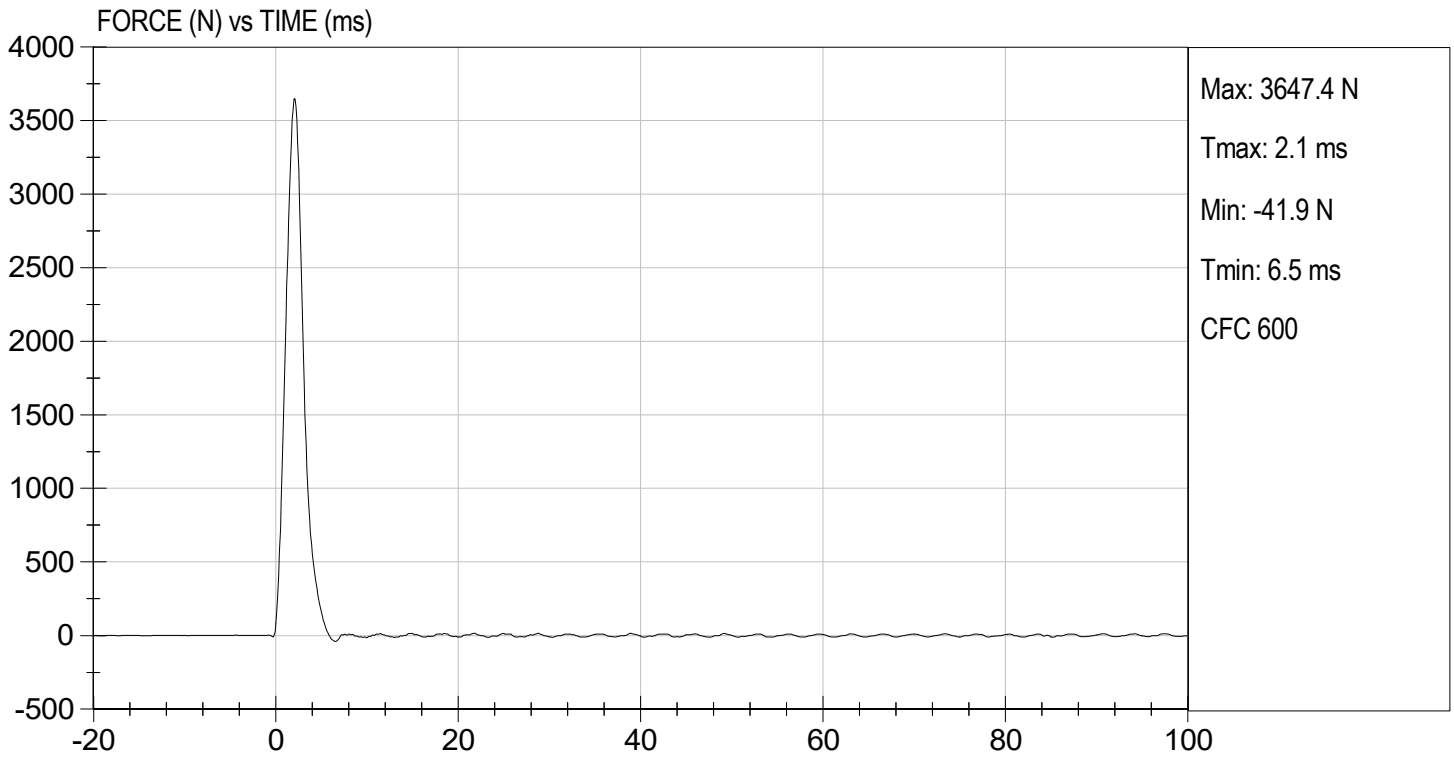


Approved By



TEST DESC: LEFT KNEE  
VELOCITY: 6.83 ft/s, 2.08 m/s

TEST DATE: 06/29/2022  
TEST #: D221556



**MGA RESEARCH CORPORATION**  
**TORSO FLEXION TEST**  
**HYBRID III 5TH PERCENTILE**

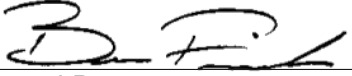
ATD Serial No: 142

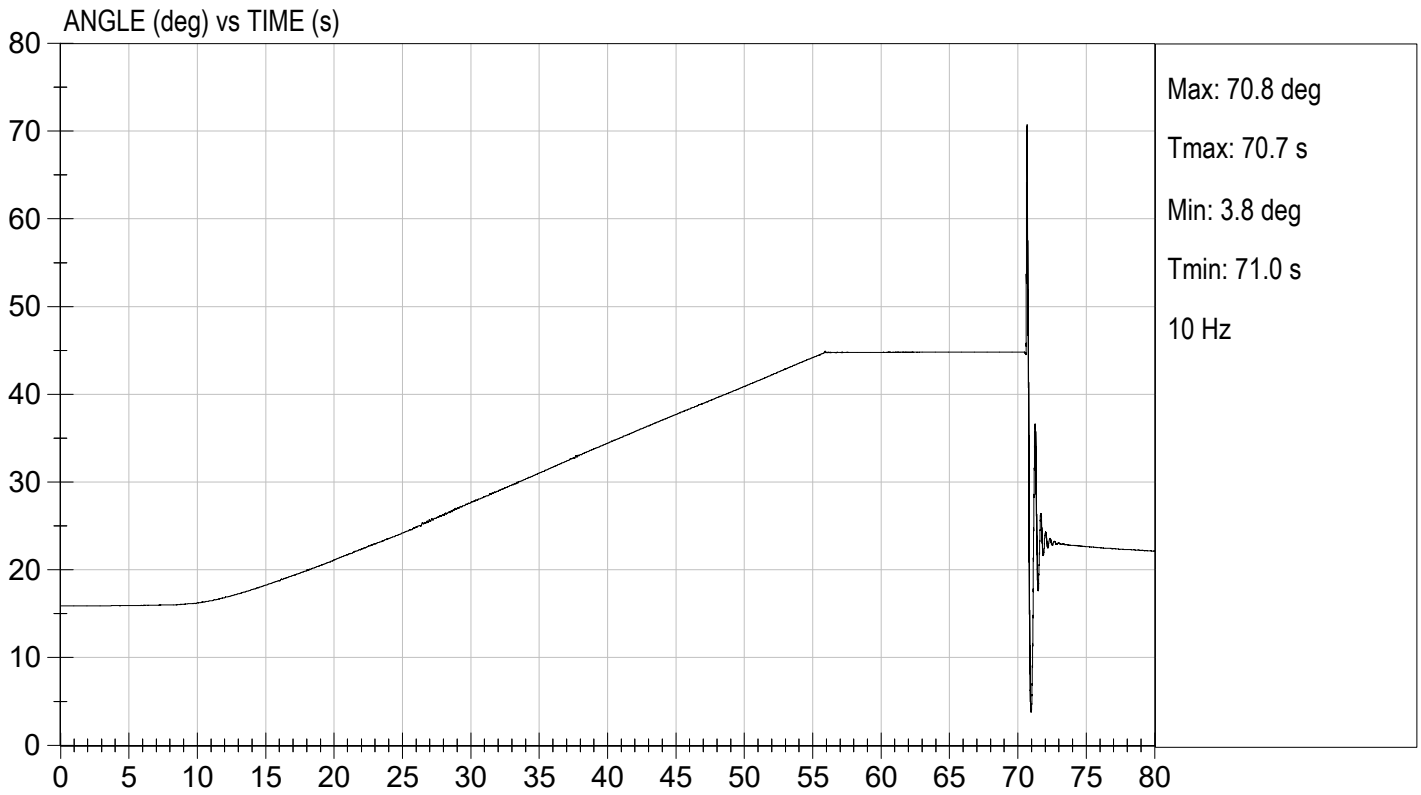
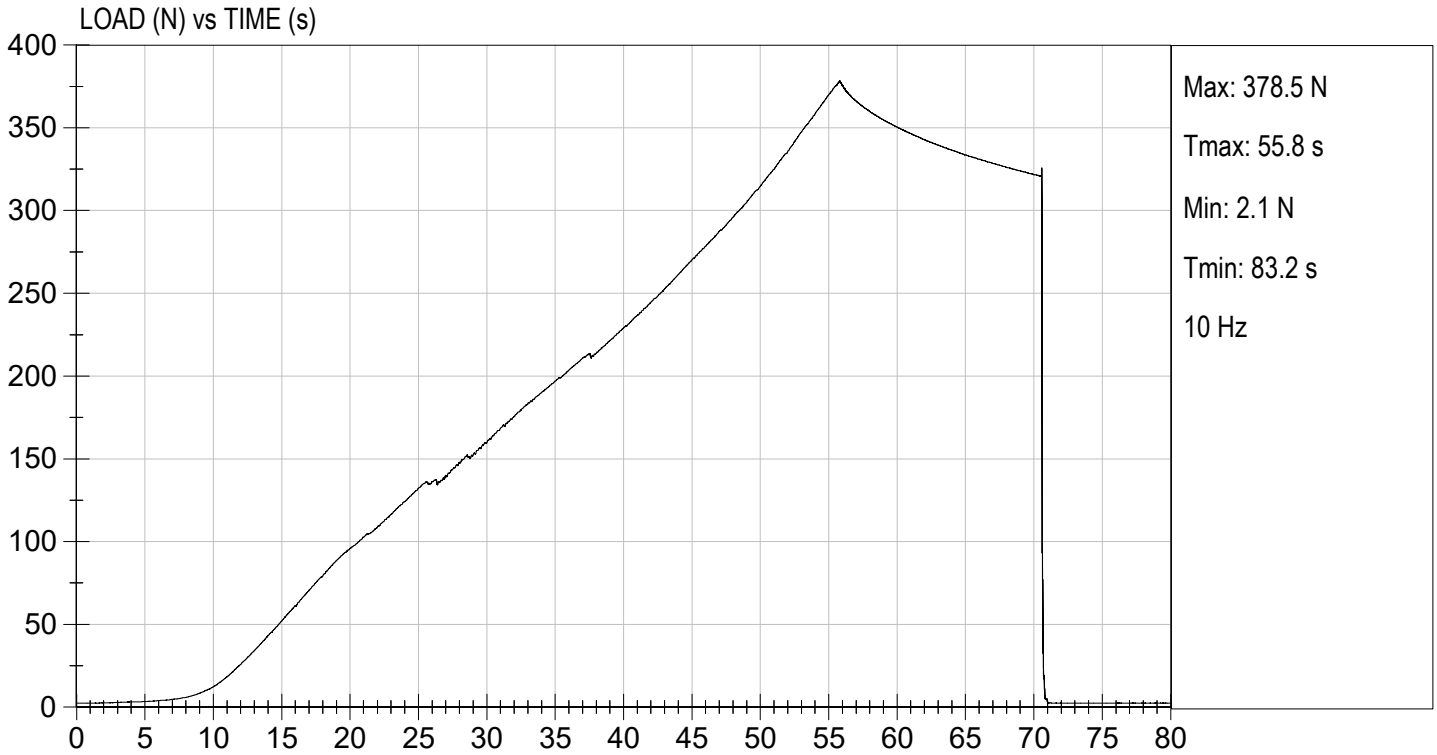
Test I.D: D221557

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	45	Pass
Initial Angle	deg	0 to 20	16	Pass
Return Angle	deg	+/- 8	6	Pass
Force at 45 deg	N	320 to 390	379	Pass
Upper Torso Deflection Rate	deg/s	0.5 to 1.5	0.6	Pass
<b>Overall Result</b>				<b>Pass</b>

  
 Laboratory Technician

06/30/2022  
 Test Date

  
 Approved By



**CALIBRATION TEST RESULTS**

**POST-TEST**

**HYBRID III 5<sup>TH</sup> PERCENTILE FEMALE - PASSENGER ATD**

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

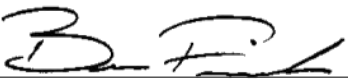
ATD Serial No: 142

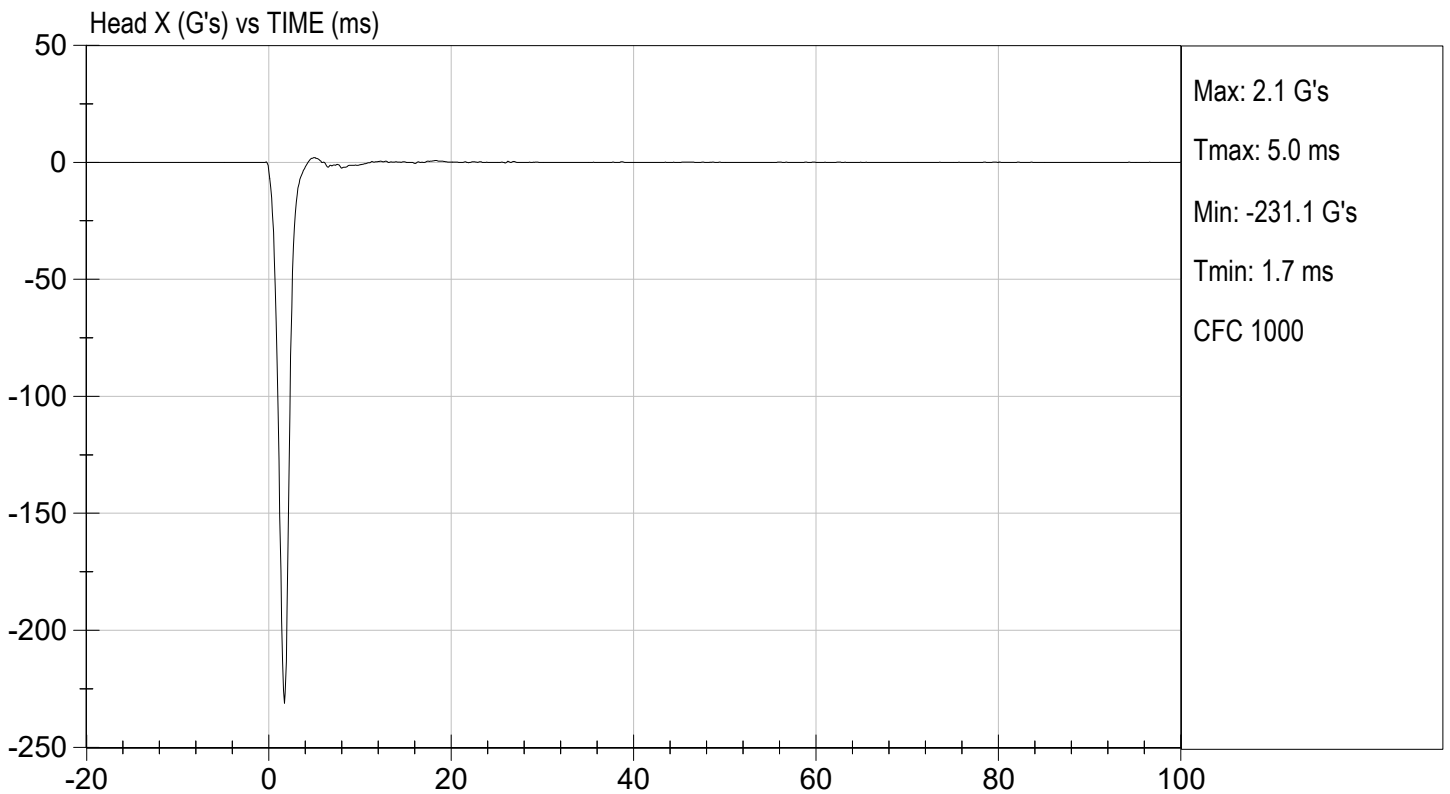
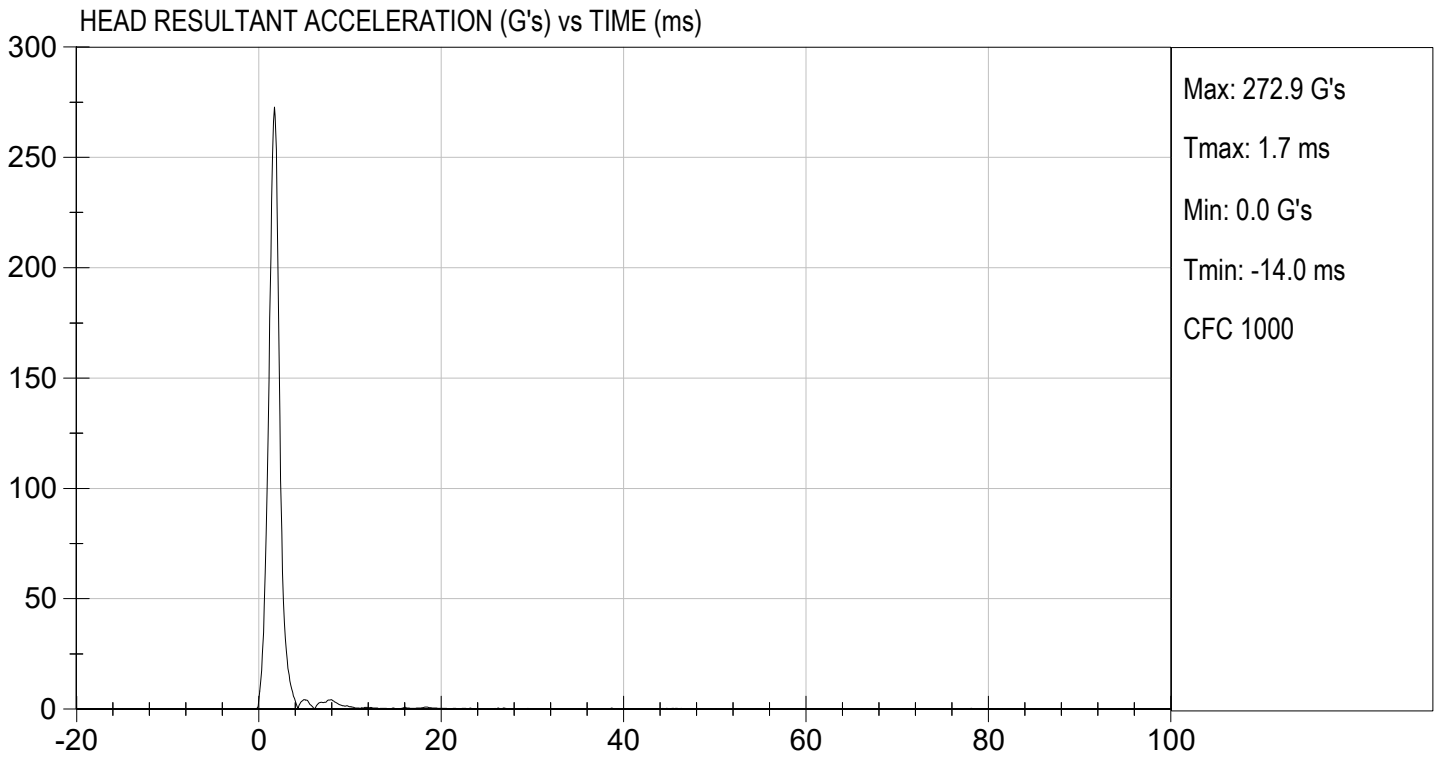
Test ID: D221901

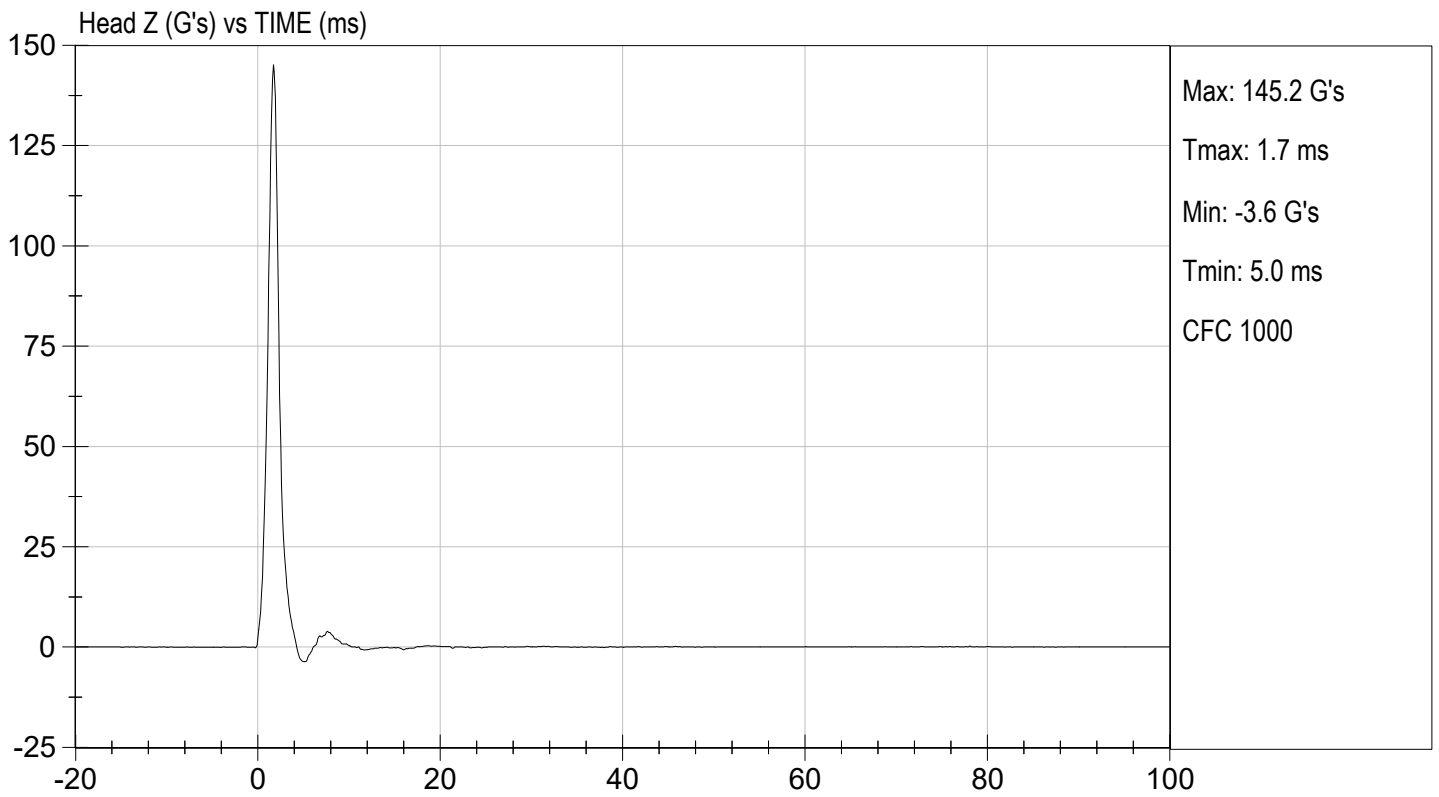
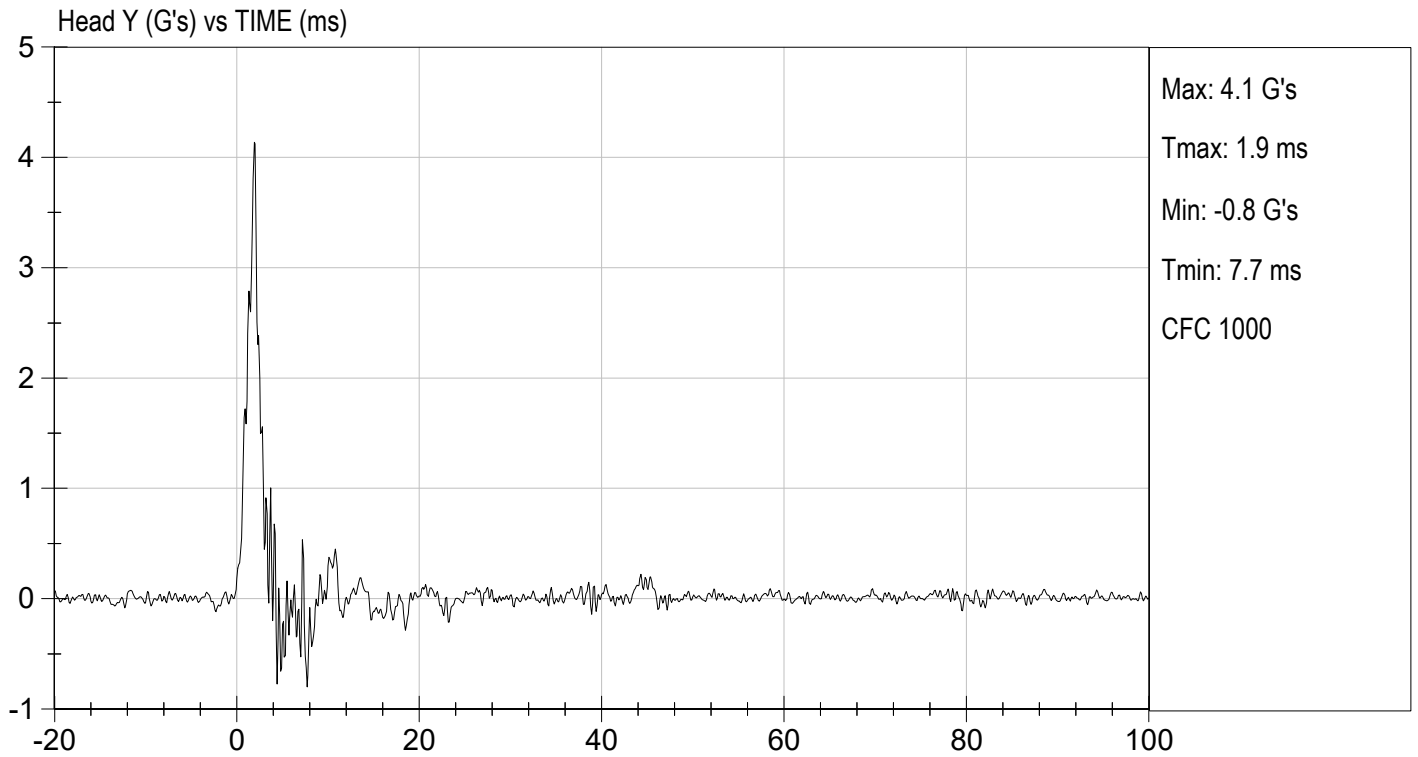
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	42	Pass
Peak Resultant Acceleration	G's	250 to 300	273	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	4.1	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
Overall Test Results				Pass

  
 Laboratory Technician

08/22/2022  
 Test Date

  
 Approved By





**MGA RESEARCH CORPORATION**  
**NECK FLEXION TEST**  
**HYBRID III 5TH PERCENTILE**

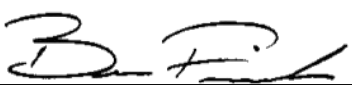
ATD Serial No: 142

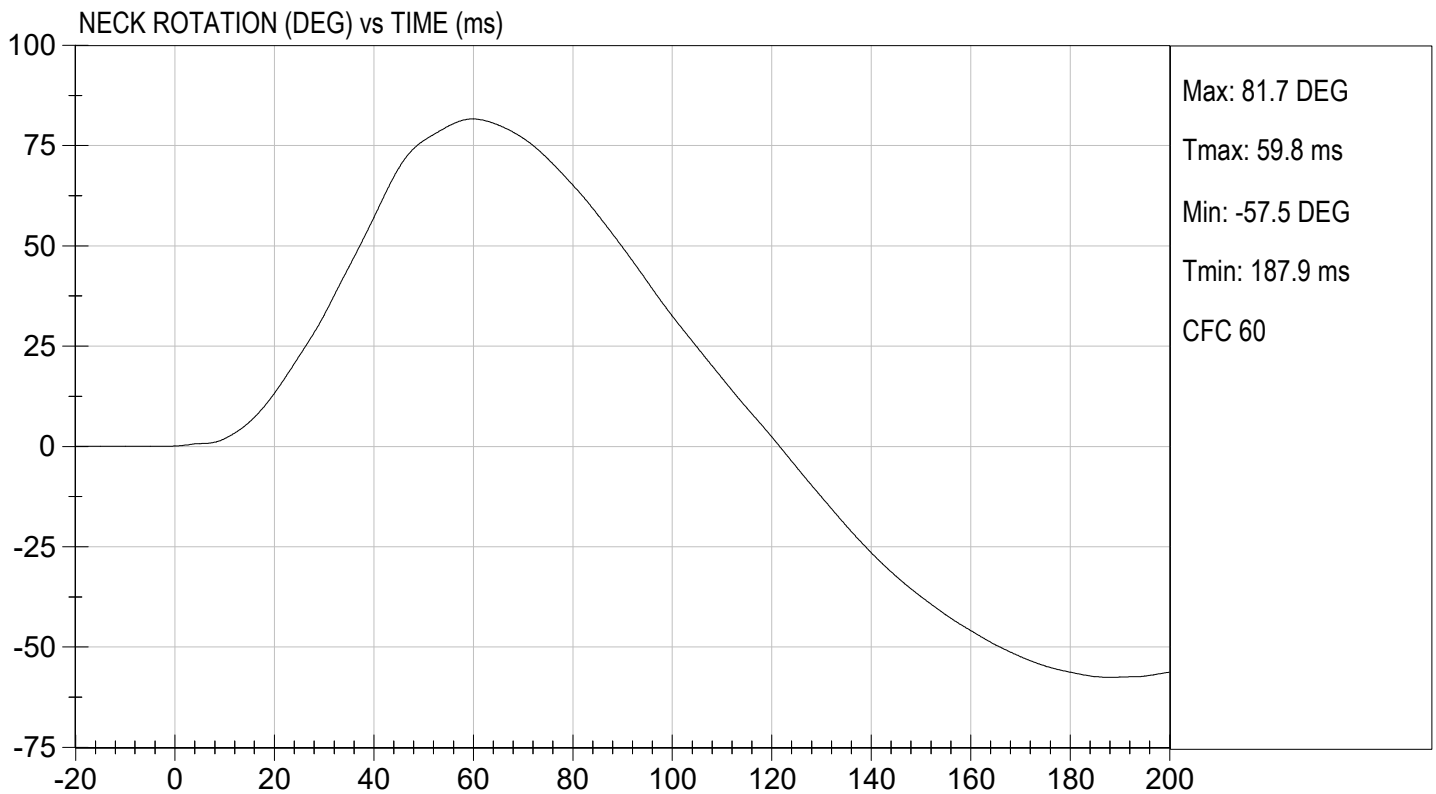
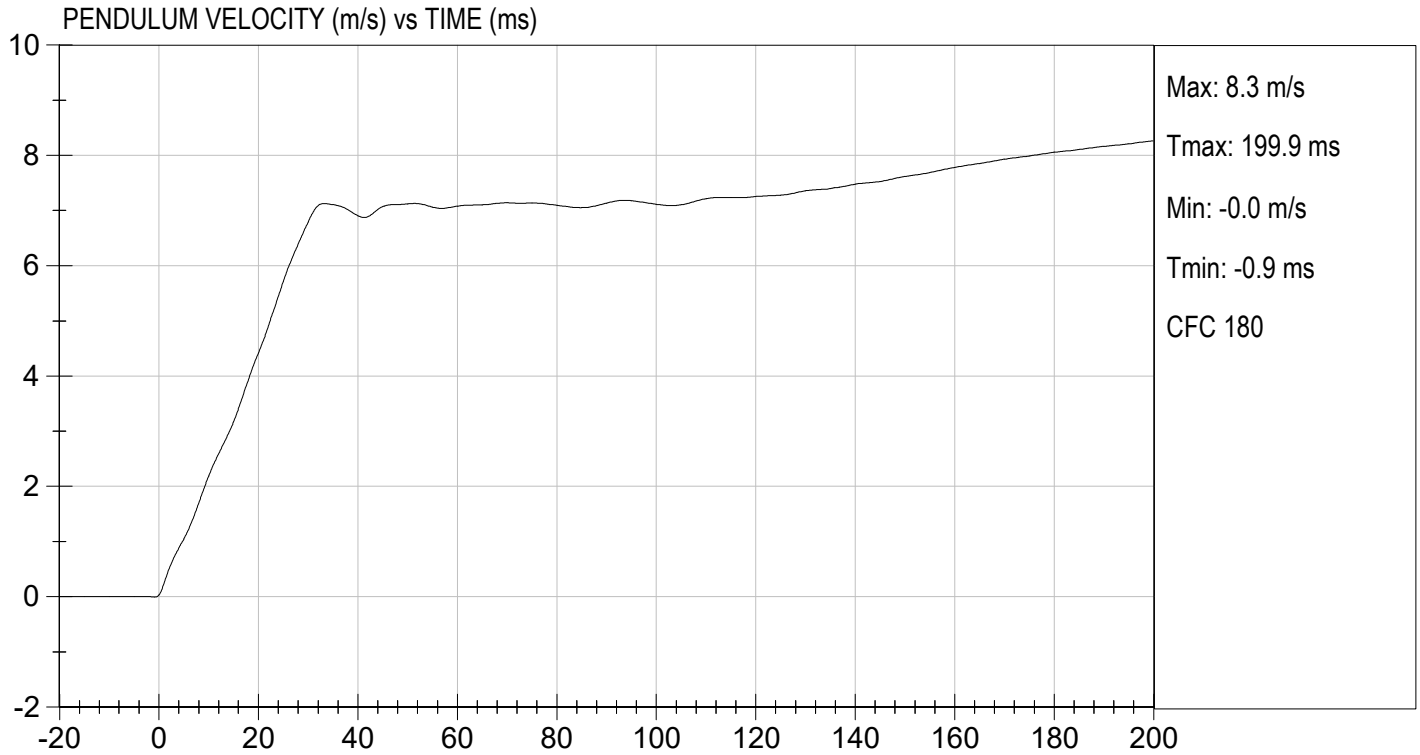
Test I.D: D221902

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity		%	10 to 70	42	Pass
Pendulum Speed		m/s	6.89 to 7.13	7.06	Pass
Pendulum Velocity	10 ms	m/s	2.1 to 2.5	2.2	Pass
	20 ms	m/s	4.0 to 5.0	4.4	Pass
	30 ms	m/s	5.8 to 7.0	6.8	Pass
D Plane Rotation	Max	deg	77 to 91	82	Pass
Occipital Condyle Moment within Rotation Corridor		Nm	69 to 83	70	Pass
Positive Moment Time Curve Decay to 10 Nm		ms	80 to 100	85	Pass
Overall Results					Pass

  
 \_\_\_\_\_  
 Laboratory Technician

08/23/2022  
 \_\_\_\_\_  
 Test Date

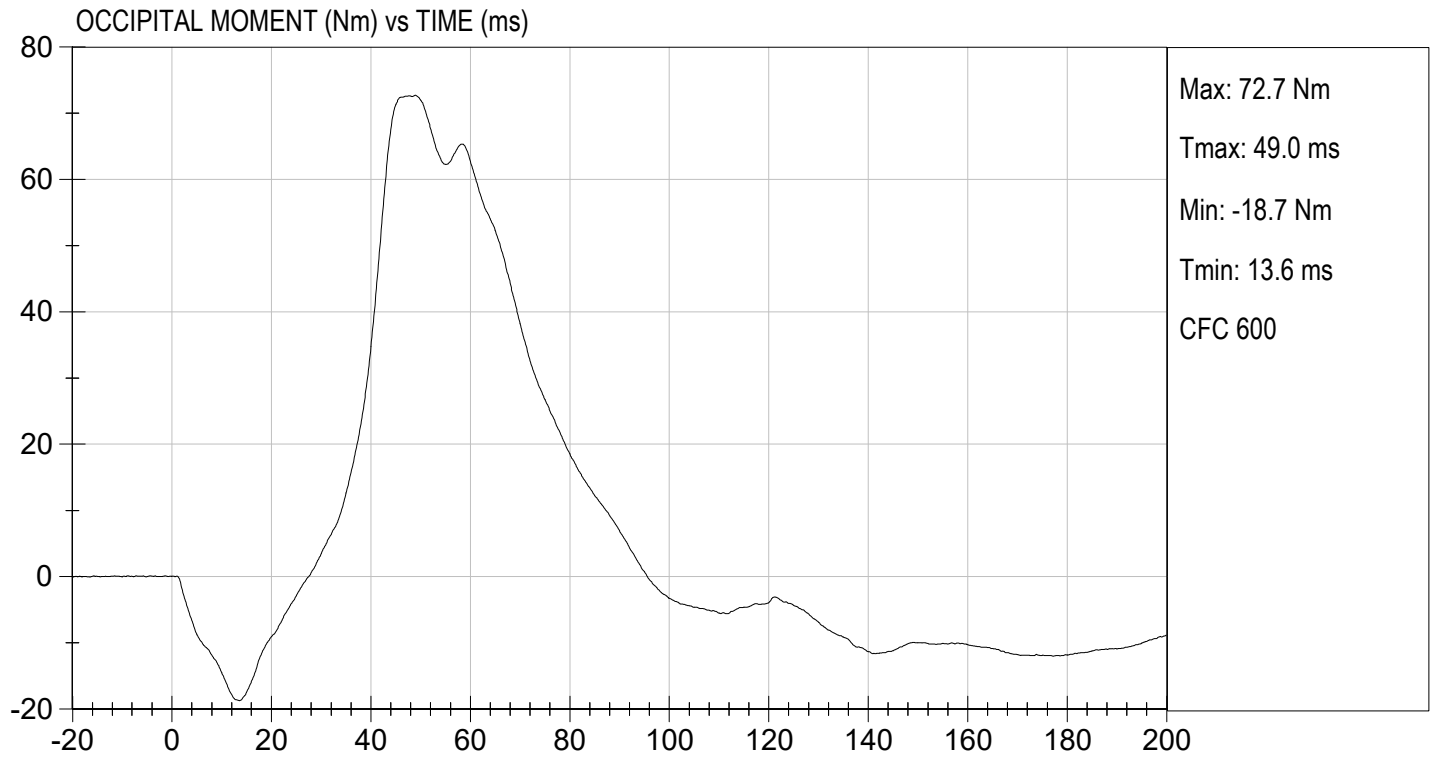
  
 \_\_\_\_\_  
 Approved By





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

TEST DATE: 08/23/2022  
TEST #: D221902



**MGA RESEARCH CORPORATION**  
**NECK EXTENSION TEST**  
**HYBRID III 5TH PERCENTILE**

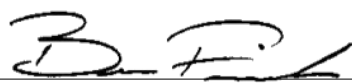
ATD Serial No: 142

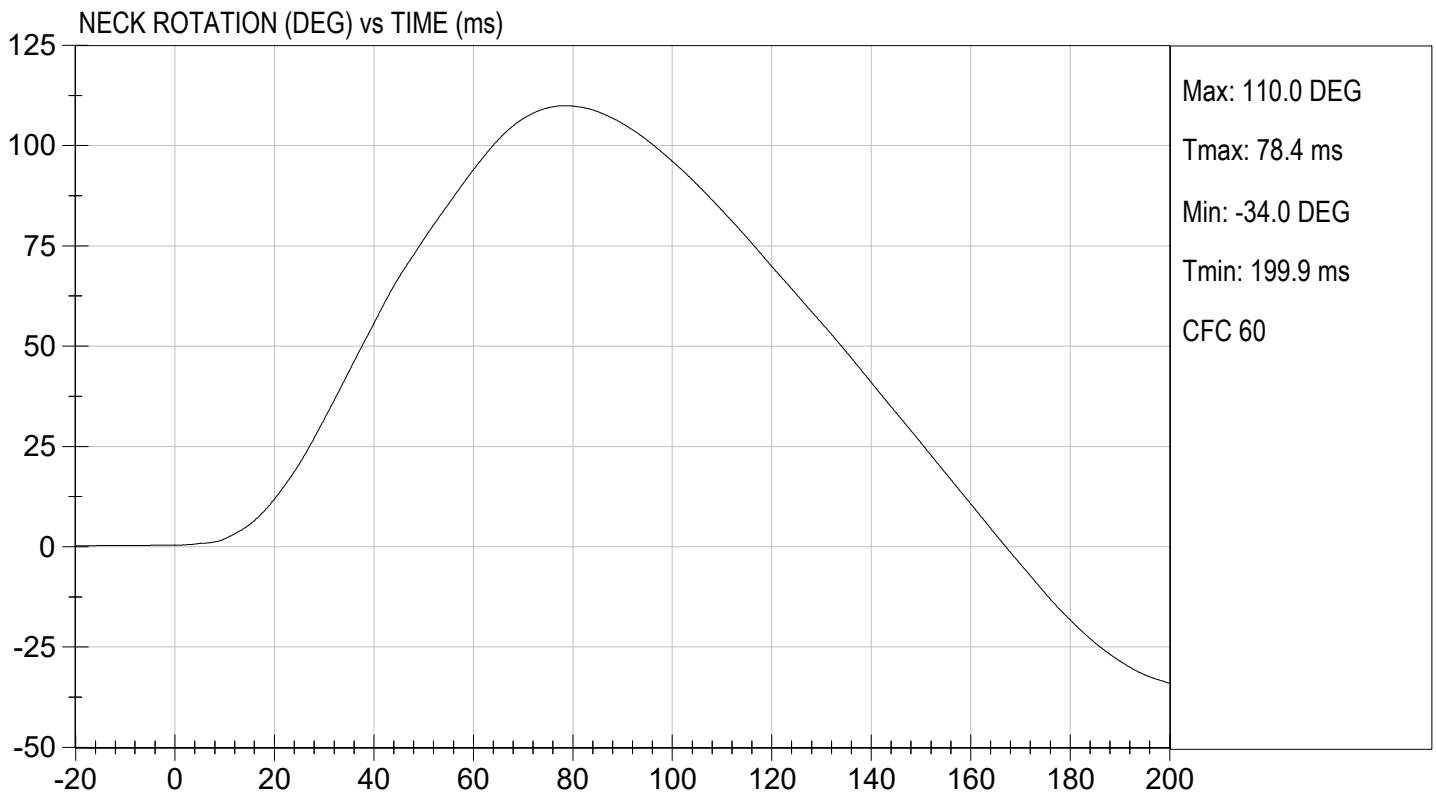
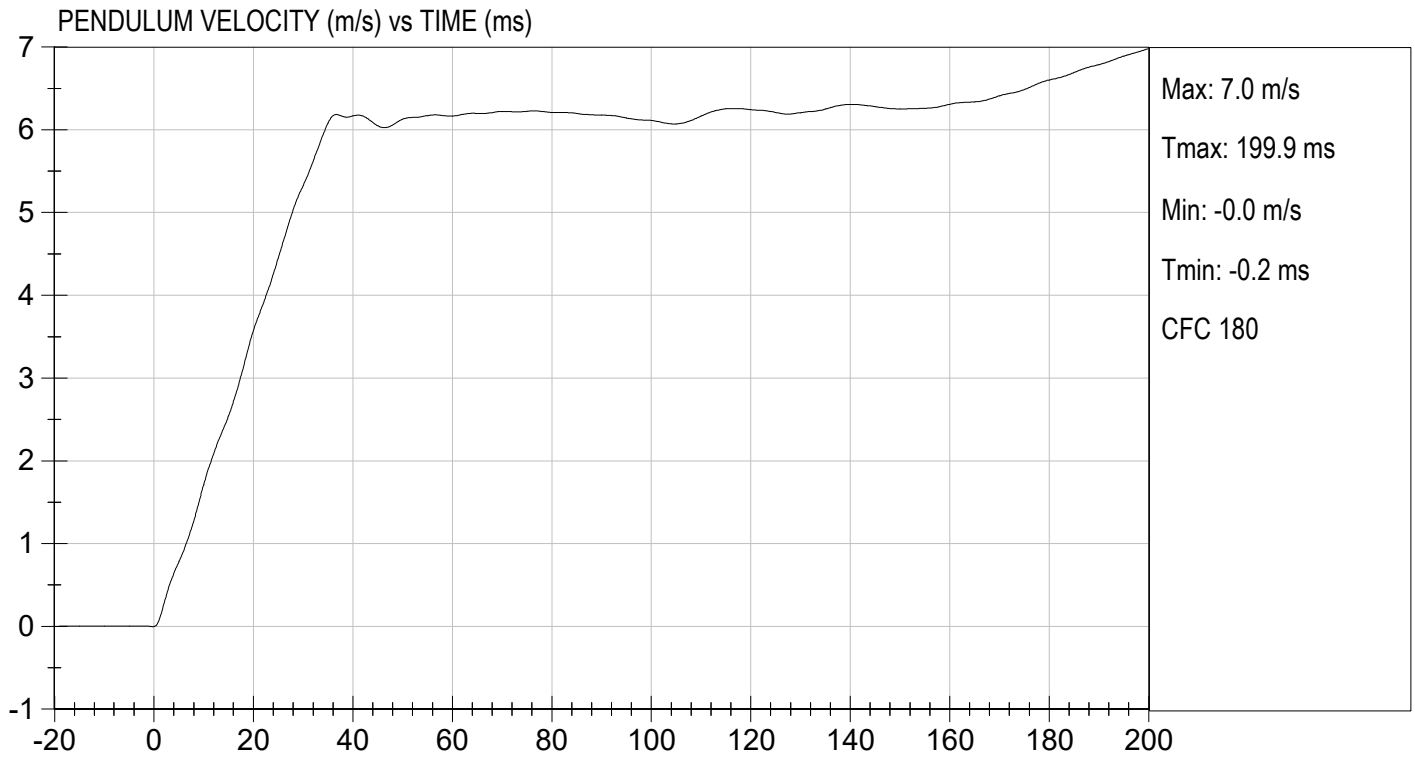
Test I.D.: D221903

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity		%	10 to 70	42	Pass
Pendulum Speed		m/s	5.95 to 6.19	6.12	Pass
Pendulum Velocity	10 ms	m/s	1.5 to 1.9	1.7	Pass
	20 ms	m/s	3.1 to 3.9	3.6	Pass
	30 ms	m/s	4.6 to 5.6	5.3	Pass
D Plane Rotation	Max	deg	99 to 114	110	Pass
Occipital Condyle Moment within Rotation Corridor		Nm	-65 to -53	-54	Pass
Negative Moment Time Curve Decay to -10 Nm		ms	94 to 114	104	Pass
Overall Results					Pass

  
 Laboratory Technician

08/23/2022  
 Test Date

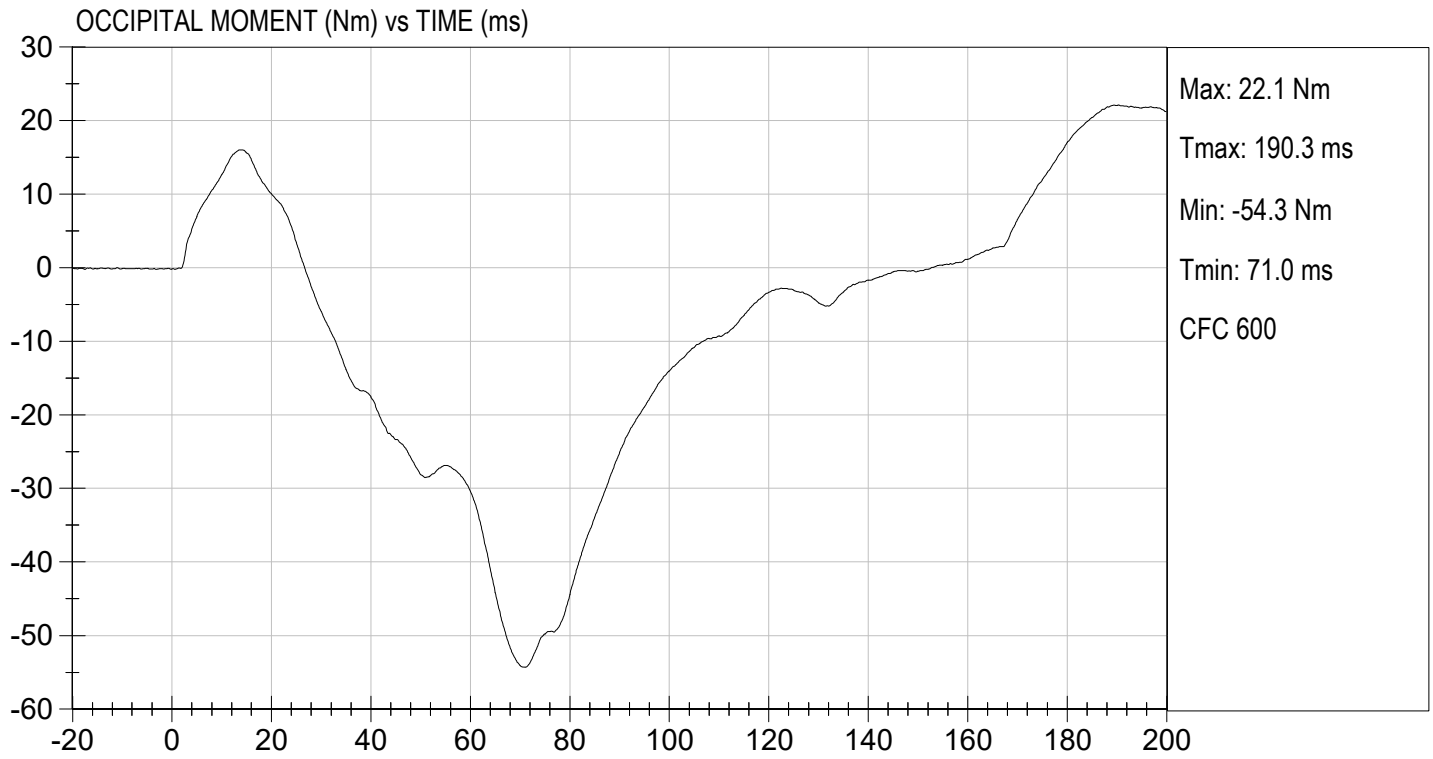
  
 Approved By





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

TEST DATE: 08/23/2022  
TEST #: D221903



**MGA RESEARCH CORPORATION**  
**THORAX IMPACT**  
**HYBRID III 5TH PERCENTILE**

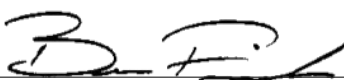
ATD Serial No: 142

Test I.D: D221904

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.4	Pass
Relative Humidity	%	10 to 70	44	Pass
Probe Speed	m/s	6.59 to 6.83	6.60	Pass
Peak Deflection	mm	50 to 58	51	Pass
Peak Resistive Force w/in Deflection Corridor	N	3900 to 4400	4249	Pass
Internal Hysteresis	%	69 to 85	75	Pass
Peak Force 18 mm - 50 mm	N	<= 4600	4309	Pass
Overall Test Results				Pass

  
 Laboratory Technician

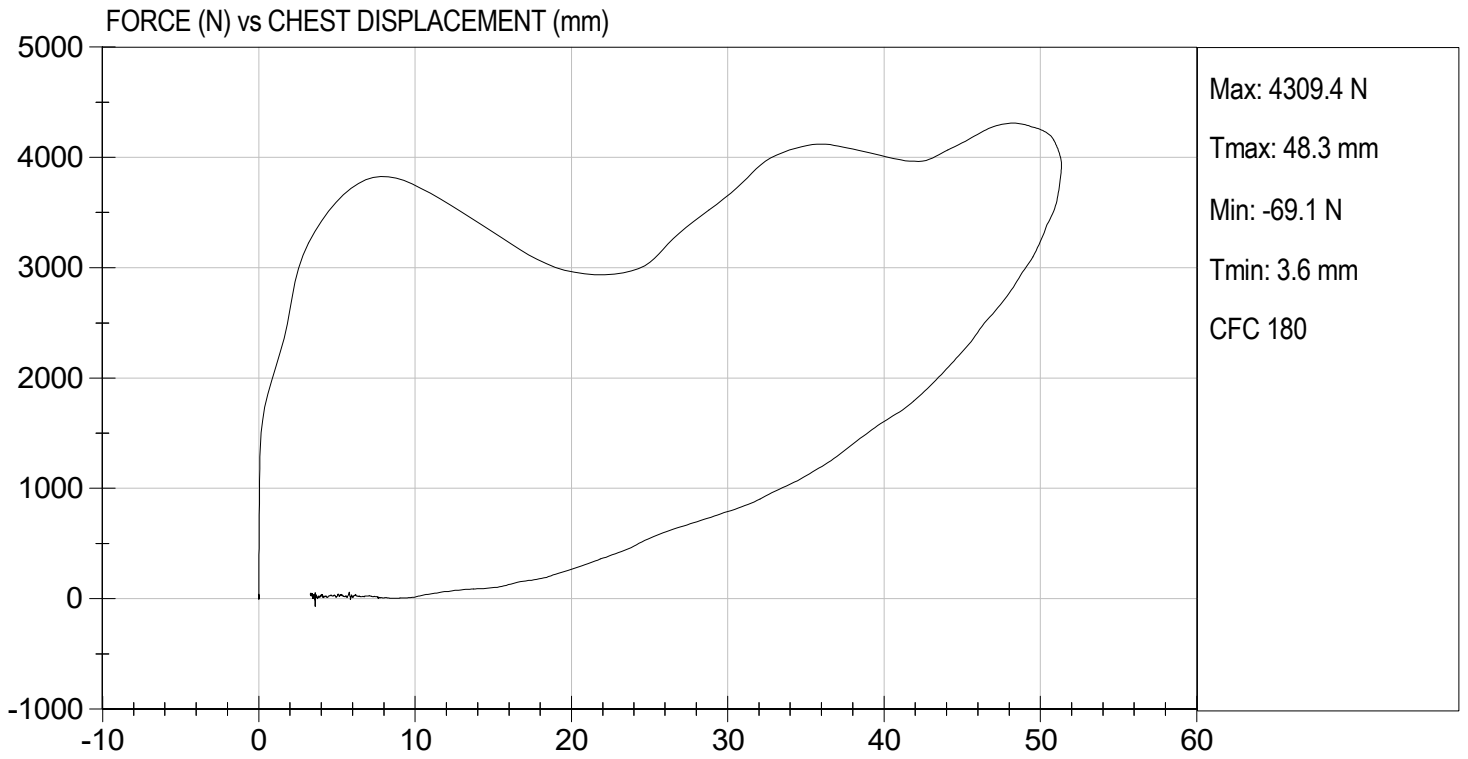
08/24/2022  
 Test Date

  
 Approved By



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

TEST DATE: 08/24/2022  
TEST #: D221904



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

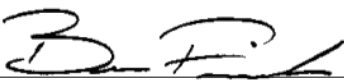
ATD Serial No: 142

Test I.D: D221905

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	42	Pass
Probe Speed	m/s	2.07 to 2.13	2.12	Pass
Maximum Force	N	3450 to 4060	3923	Pass
Overall Test Results				Pass

  
 Laboratory Technician

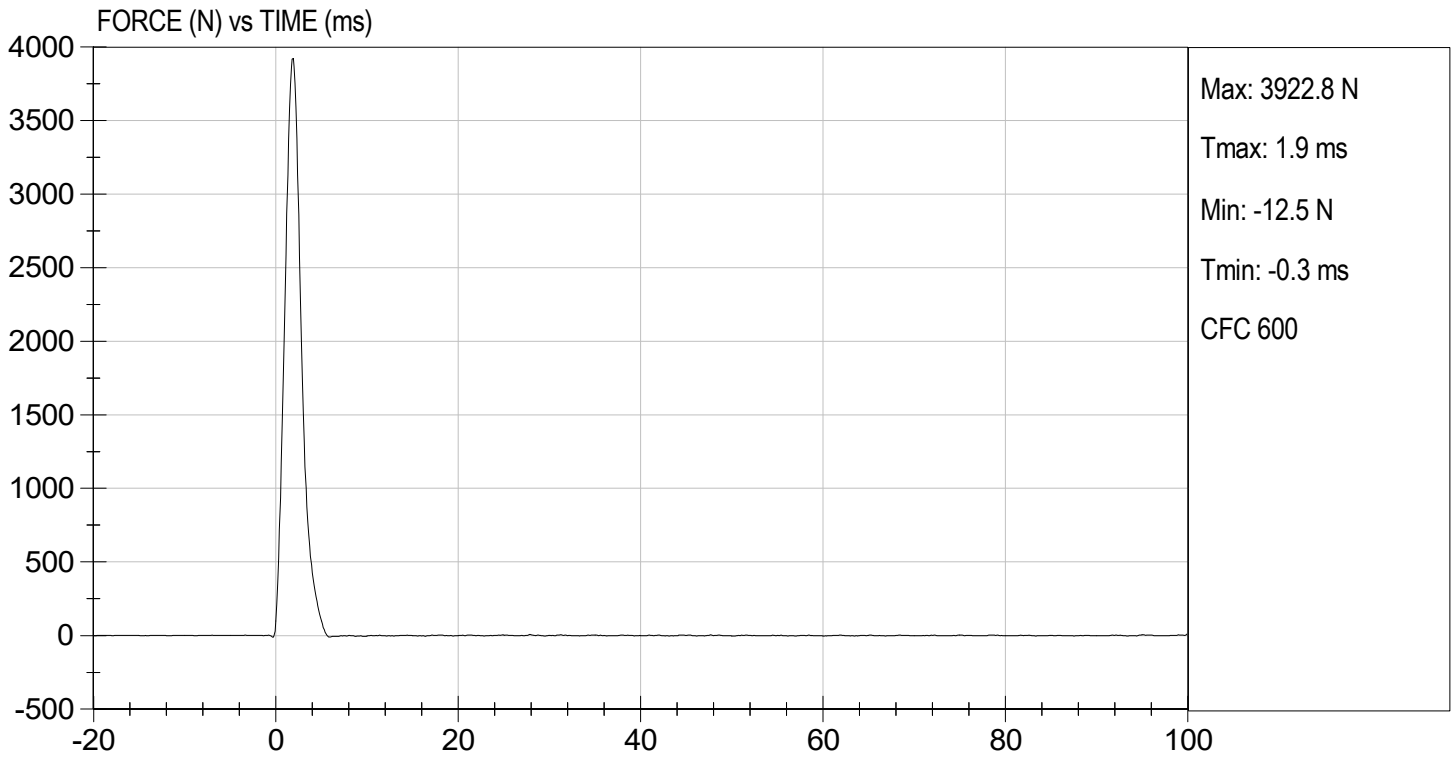
08/23/2022  
 Test Date

  
 Approved By



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

TEST DATE: 08/23/2022  
TEST #: D221905



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

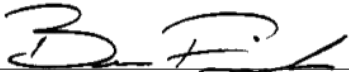
ATD Serial No: 142

Test I.D: D221906

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	42	Pass
Probe Speed	m/s	2.07 to 2.13	2.10	Pass
Maximum Force	N	3450 to 4060	3617	Pass
Overall Test Results				Pass

  
\_\_\_\_\_  
Laboratory Technician

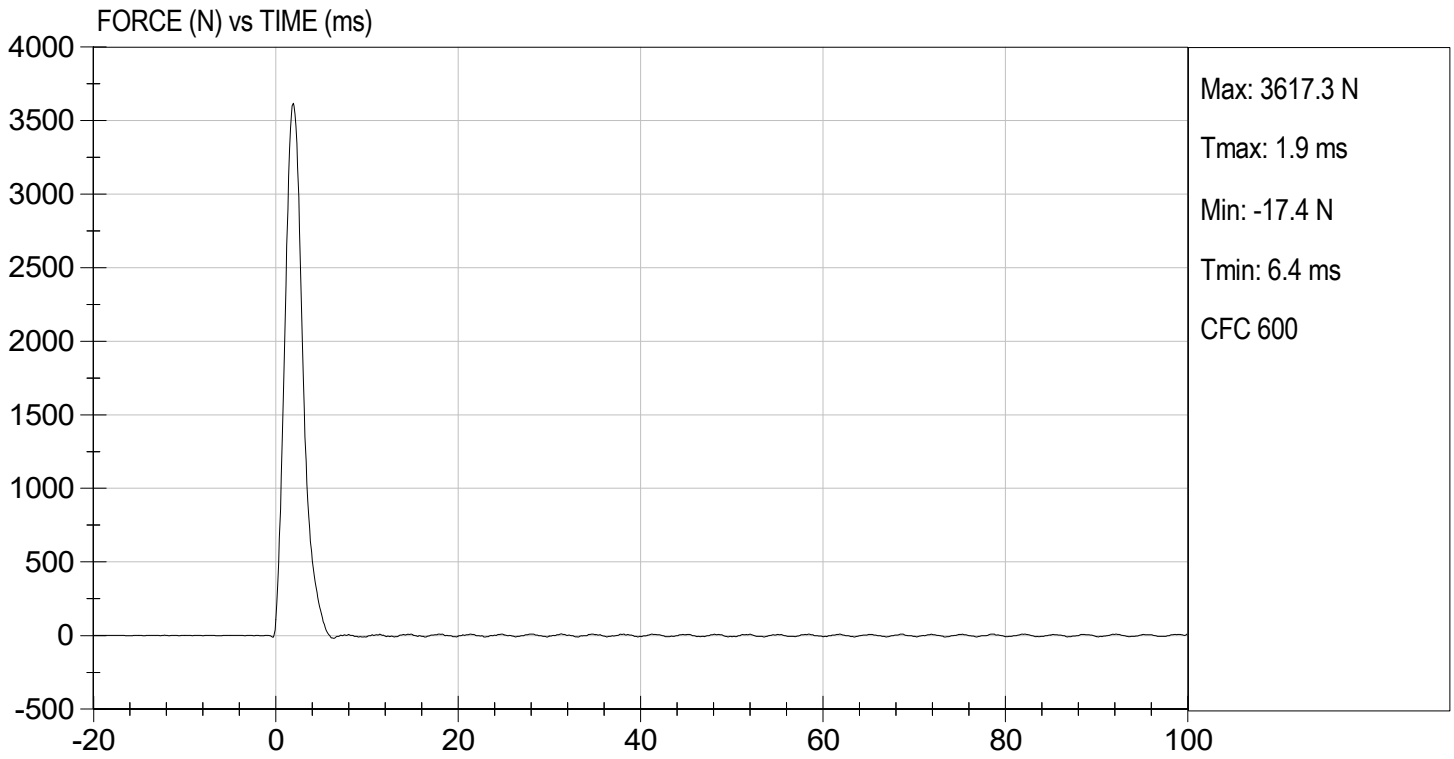
08/23/2022  
\_\_\_\_\_  
Test Date

  
\_\_\_\_\_  
Approved By



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

TEST DATE: 08/23/2022  
TEST #: D221906



**MGA RESEARCH CORPORATION**  
**TORSO FLEXION TEST**  
**HYBRID III 5TH PERCENTILE**

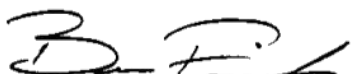
ATD Serial No: 142

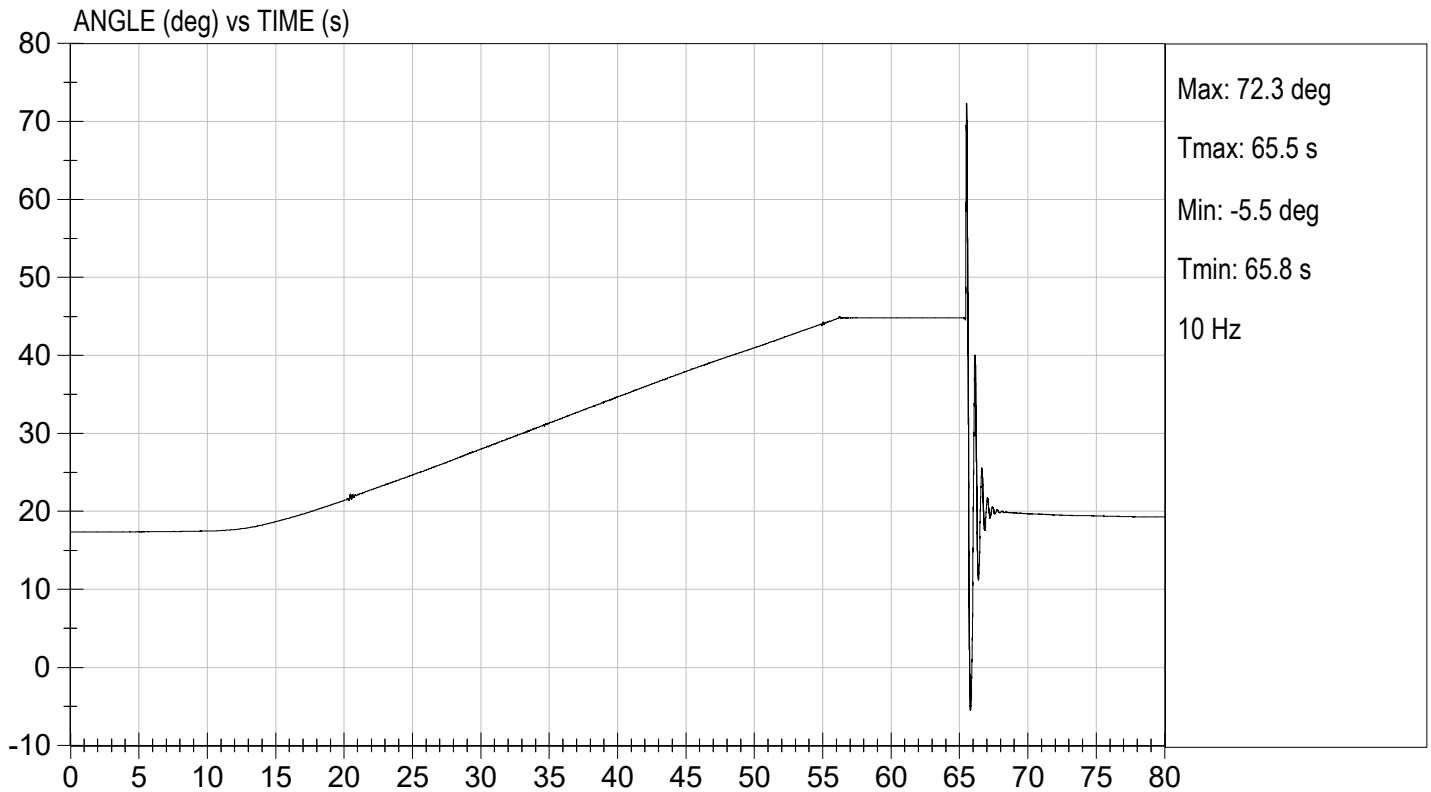
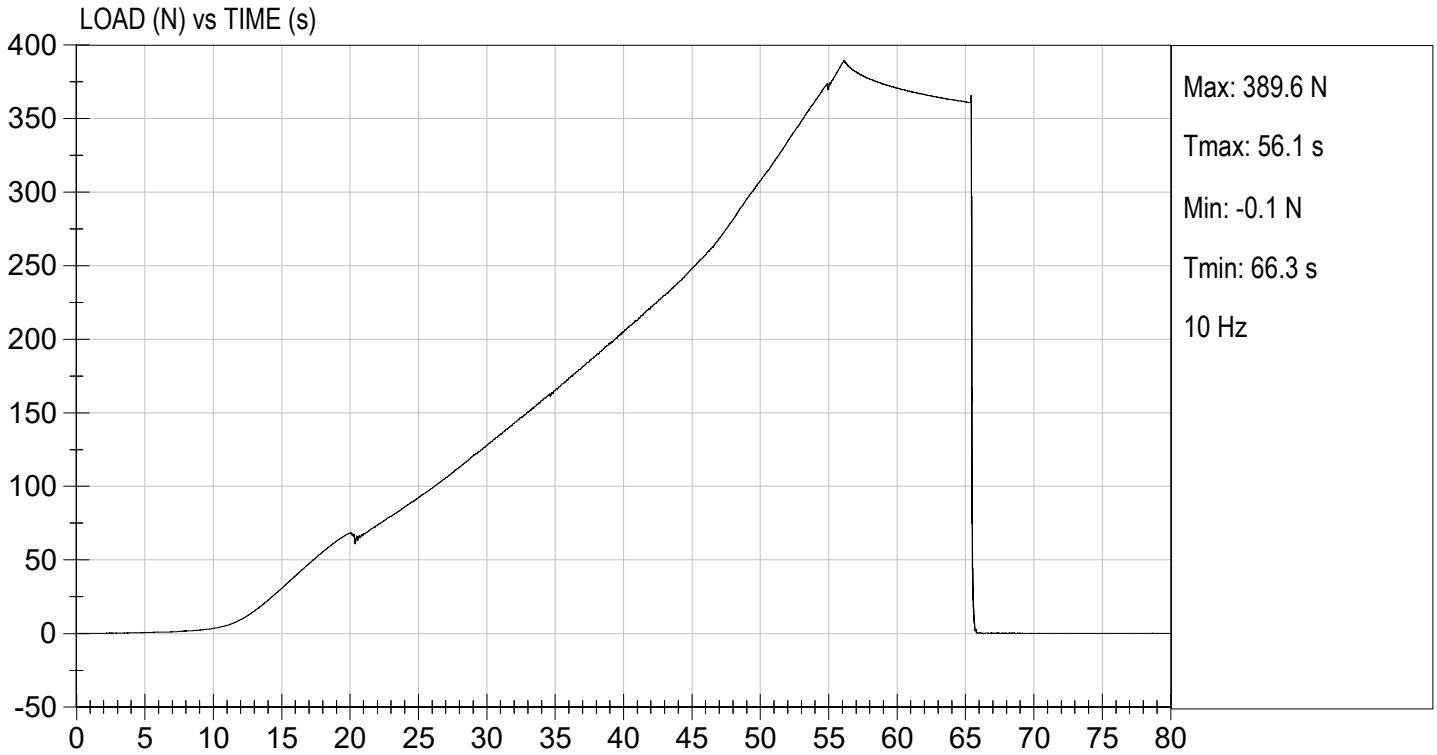
Test I.D: D221907

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	42	Pass
Initial Angle	deg	0 to 20	17	Pass
Return Angle	deg	+/- 8	2	Pass
Force at 45 deg	N	320 to 390	390	Pass
Upper Torso Deflection Rate	deg/s	0.5 to 1.5	0.6	Pass
<b>Overall Result</b>				<b>Pass</b>

  
 Laboratory Technician

08/22/2022  
 Test Date

  
 Approved By



**APPENDIX D**  
**TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA**

**TABLE 1 – DRIVER DUMMY INSTRUMENTATION**

Instrument Location			Axis	Hybrid III 50 <sup>th</sup> S/N 351		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers	Primary	X	P79741	Endevco	06/30/2022	
		Y	P79743	Endevco	06/30/2022	
		Z	P79744	Endevco	06/30/2022	
	Redundant	X	P94834	Endevco	06/30/2022	
		Y	P94856	Endevco	06/30/2022	
		Z	P97412	Endevco	06/30/2022	
Head Angular Rate Sensors			X	ARS15213	DTS	03/15/2022
			Y	ARS7421	DTS	03/15/2022
			Z	ARS7524	DTS	03/14/2022
Upper Neck Load Cell			Fx, Fy, Fz Mx, My, Mz	NG1915	Denton	01/18/2022
Chest Accelerometers	Primary	X	P86792	Endevco	06/30/2022	
		Y	P88348	Endevco	06/30/2022	
		Z	P86793	Endevco	06/30/2022	
	Redundant	X	P88666	Endevco	06/30/2022	
		Y	P94109	Endevco	06/30/2022	
		Z	P88667	Endevco	06/30/2022	
Chest Potentiometer			X	351	Humanetics	07/01/2022
Pelvis Accelerometers			X	P95526	Endevco	06/30/2022
			Y	P96038	Endevco	06/30/2022
			Z	P97742	Endevco	06/30/2022
Femur Load Cells	Right	Primary	Z	FG121P	Denton	07/01/2022
		Redundant	Z	FG121R	Denton	07/01/2022
	Left	Primary	Z	FG122P	Denton	07/01/2022
		Redundant	Z	FG122R	Denton	07/01/2022
Tibia Load Cells	Right	Upper	Mx, My, Fz	TG405	Denton	01/18/2022
		Lower	Mx, My, Fz	AG368	Denton	01/18/2022
	Left	Upper	Mx, My, Fz	TG475	Denton	01/18/2022
		Lower	Mx, My, Fz	AG504	Denton	01/18/2022
Foot Accelerometers	Right	Rear	X	T22486	Endevco	07/01/2022
			Z	P97382	Endevco	06/30/2022
		Front	Z	P82120	Endevco	07/01/2022
	Left	Rear	X	T16468	Endevco	07/01/2022
			Z	T16496	Endevco	07/01/2022
		Front	Z	T16501	Endevco	07/01/2022
Seat Belt Load Cells			Lap			
			Shoulder			

**TABLE 2 – FRONT PASSENGER DUMMY INSTRUMENTATION**

Instrument Location			Axis	Hybrid III 5 <sup>th</sup> S/N 142		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers	Primary	X		P94799	Endevco	03/31/2022
		Y		P94800	Endevco	03/31/2022
		Z		P94801	Endevco	03/31/2022
	Redundant	X		P94802	Endevco	03/31/2022
		Y		P94803	Endevco	03/31/2022
		Z		P97377	Endevco	03/31/2022
Head Angular Rate Sensors			X	ARS7413	DTS	03/14/2022
			Y	ARS7602	DTS	03/14/2022
			Z	ARS15229	DTS	03/15/2022
Upper Neck Load Cell			Fx, Fy, Fz Mx, My, Mz	NG2203	Denton	03/23/2022
Chest Accelerometers	Primary	X		P88719	Endevco	03/31/2022
		Y		P94785	Endevco	03/31/2022
		Z		P94793	Endevco	03/31/2022
	Redundant	X		P94794	Endevco	03/31/2022
		Y		P95322	Endevco	03/31/2022
		Z		P95370	Endevco	03/31/2022
Chest Potentiometer			X	142	Humanetics	03/31/2022
Pelvis Accelerometers			X	P82646	Endevco	03/31/2022
			Y	P94798	Endevco	03/31/2022
			Z	P97705	Endevco	03/31/2022
Femur Load Cells	Right	Primary	Z	FG126P	Denton	03/31/2022
		Redundant	Z	FG126R	Denton	03/31/2022
	Left	Primary	Z	FG127P	Denton	03/31/2022
		Redundant	Z	FG127R	Denton	03/31/2022
Tibia Load Cells	Right	Upper	Mx, My, Fz	TG408	Denton	03/23/2022
		Lower	Mx, My, Fz	AG116	Denton	03/23/2022
	Left	Upper	Mx, My, Fz	TG480	Denton	03/23/2022
		Lower	Mx, My, Fz	AG502	Denton	03/23/2022
Foot Accelerometers	Right	Rear	X	P94795	Endevco	03/31/2022
			Z	P94796	Endevco	03/31/2022
		Front	Z	P94797	Endevco	03/31/2022
	Left	Rear	X	P83167	Endevco	03/31/2022
			Z	P83168	Endevco	03/31/2022
		Front	Z	P83169	Endevco	03/31/2022
Seat Belt Load Cells			Lap			
			Shoulder			

**TABLE 3 – VEHICLE INSTRUMENTATION**

Instrument Location			Axis	Serial Number	Manufacturer	Calibration Date
Crossmember / Rear Seat Accelerometers	Left	Primary	X	A391147	MSI	08/03/2022
			Z	A370355	MSI	08/03/2022
		Redundant	X	A390877	MSI	08/03/2022
	Right	Primary	X	A385807	MSI	08/03/2022
			Z	A360944	MSI	08/03/2022
		Redundant	X	A383174	MSI	08/03/2022
Engine Accelerometers		Top	X	A382610	MSI	06/16/2022
		Bottom	X	A340185	MSI	05/04/2022