

REPORT NUMBER: NCAP-MGA-21-030

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

**FORD MOTOR CO.
2021 Ford F-150 4x4 SuperCab
NHTSA No.: M20210204**

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



Test Date: March 17, 2021

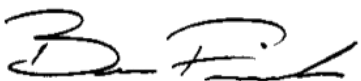
Final Report Date: August 24, 2021

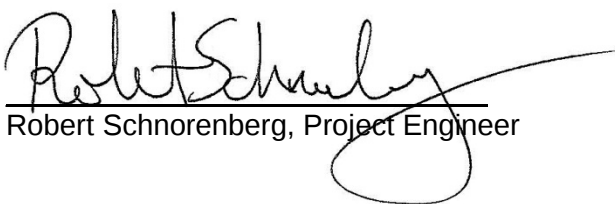
FINAL REPORT

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

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Prepared by: 
Ben Fischer, Program Manager

Approved by: 
Robert Schnorenberg, Project Engineer

Approval Date: August 24, 2021

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: _____

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16. Abstract A 56.3 km/h NCAP Frontal Rigid Barrier Impact Test was conducted on a 2021 Ford F-150 SuperCab 4x4 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 March 17, 2021. The impact velocity of the vehicle was 55.96 km/h and the ambient temperature at the barrier face at the time of impact was 21.2°C. The target vehicle post-test maximum crush was 674 mm located at the vehicle centerline. The test vehicle's performance was as follows: <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th rowspan="2">Units</th> <th colspan="2">Driver ATD</th> <th colspan="2">Passenger ATD</th> </tr> <tr> <th>Threshold</th> <th>Result</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₁₅)</td> <td></td> <td>700</td> <td>337</td> <td>700</td> <td>360</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>22</td> <td>52</td> <td>9</td> </tr> <tr> <td>Nij</td> <td></td> <td>1</td> <td>0.30</td> <td>1</td> <td>0.28</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>4170</td> <td>1335</td> <td>2620</td> <td>677</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>4000</td> <td>122</td> <td>2520</td> <td>288</td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>10008</td> <td>110</td> <td>6805</td> <td>463</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>10008</td> <td>205</td> <td>6805</td> <td>157</td> </tr> </tbody> </table>						Measurement Description	Units	Driver ATD		Passenger ATD		Threshold	Result	Threshold	Result	Head Injury Criteria (HIC ₁₅)		700	337	700	360	Maximum Chest Compression	mm	63	22	52	9	Nij		1	0.30	1	0.28	Neck Tension	N	4170	1335	2620	677	Neck Compression	N	4000	122	2520	288	Left Femur Force	N	10008	110	6805	463	Right Femur Force	N	10008	205	6805	157
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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 2021 Ford F-150 SuperCab 4x4 at a velocity of 55.96 km/h. The test was performed at MGA Research Corporation on March 17, 2021. 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 50th percentile male anthropomorphic test device (ATD), was placed in the driver seating position and one Part 572O 5th percentile female test device (ATD) was placed in the right-front passenger seating position according to dummy placement instructions specified in the 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. DH1659) 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 leakage after the event or during any phase of the static rollover.

The maximum static crush of the vehicle was 674 mm located at 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 bolster.

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 knees contacted the glove box.

The occupant data is summarized below:

ATD position	HIC ₁₅	Nij	Neck Tension (N)	Neck Comp. (N)	3ms Chest Clip (g)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver (50 th)	337	0.30	1335	122	38.0	22	110	205
Passenger (5 th)	360	0.28	677	288	42.5	9	463	157

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

TEST NOTES

Driver Shoulder Belt was not installed.

Driver Lap Belt load cell was not installed.

Passenger Shoulder Belt was not installed.

Passenger Lap Belt was not installed.

Camera No. 6 – Steering Column recorded no video for this test.

Low-level cyclical noise observed throughout many of the data channels.

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: 2021 Ford F-150 SuperCab 4x4
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20210204
 Test Date: 3/17/2021

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20210204	Traction Control System (TCS)	Yes
Model Year	2021	Power Steering	Yes
Make	Ford	Power Window Auto-Reverse	Yes
Model	F-150 SuperCab 4x4	Driver Frontal Airbag	Yes
Body Style	Extended Cab Pickup	Driver Curtain Airbag	Yes
VIN	1FTFX1E59MKD16393	Driver Head/Torso Airbag	No
Body Color	Carbonized Gray	Driver Torso Airbag	No
Odometer (km/mi)	137 km / 85 mi	Driver Torso/Pelvis Airbag	Yes
Engine Displacement (L)	5.0 L	Driver Pelvis Airbag	No
Type/No. Cylinders	V8	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	AWD	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	No	Driver Pretensioner	Yes
Tilt Steering Wheel	Yes	Driver Load Limiter	Yes
Power Seats	No	Front Pass. Pretensioner	Yes
Anti-Lock Brakes (ABS)	Yes	Front Pass. Load Limiter	Yes
Automatic Door Locks (ADLs)	Yes	Other	N/A

Does owner's manual provide instructions to turn off automatic door locks?	No
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DATA FROM CERTIFICATION LABEL

Manufactured By	FORD MOTOR CO.	GVWR (kg)	3243
Date of Manufacture	12/20	GAWR Front (kg)	1599
		GAWR Rear (kg)	1724

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Split Bench		
Designated Seating Capacity (DSC)	3	3		6
Capacity Weight (VCW) (kg)				953
Cargo Weight (RCLW) (kg)				136

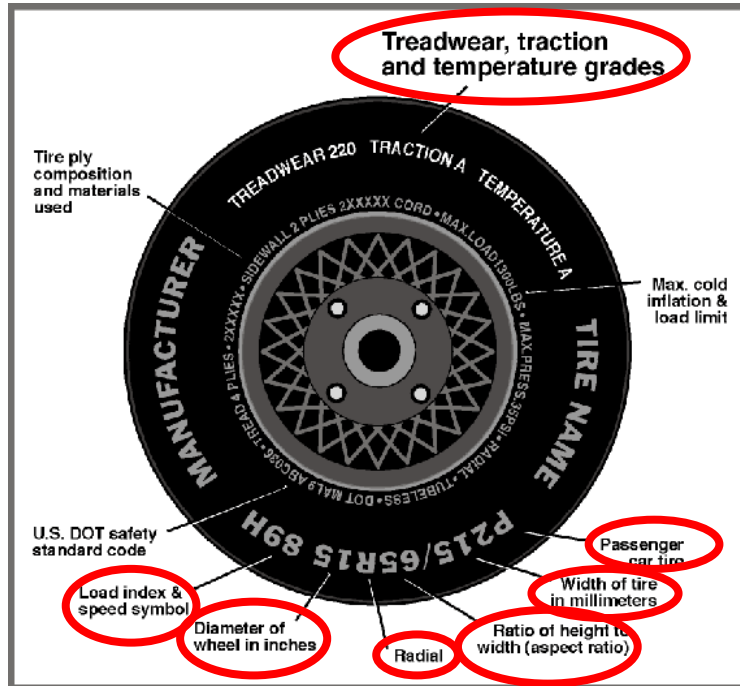
* Rated Cargo and Luggage Weight (RCLW) limited to maximum of 300 lbs (136 kg).

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

Test Vehicle: 2021 Ford F-150 SuperCab 4x4
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20210204
 Test Date: 3/17/2021

VEHICLE TIRE INFORMATION



Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	240	240
Recommended Tire Size	265/70R17	265/70R17
Tire Size on Vehicle	265/70R17	265/70R17
Tire Manufacturer	Pirelli	Pirelli
Tire Model	Scorpion ATR	Scorpion ATR
Treadwear	520	520
Traction	A	A
Temperature Grade	B	B
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel, 1 Nylon	2 Polyester, 2 Steel, 1 Nylon
Load Index/Speed Symbol	115T	115T
Tire Material	Rubber	Rubber
DOT Safety Code Left	XLE6 865F 3420	XLE6 865F 3520
DOT Safety Code Right	XLE6 865F 3520	XLE6 865F 3520

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

Test Vehicle: 2021 Ford F-150 SuperCab 4x4
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20210204
 Test Date: 3/17/2021

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	711.5	457.0		758.5	543.5	
Right	kg	696.5	444.5		752.0	526.0	
Ratio	%	61.0%	39.0%		58.5%	41.5%	
Totals	kg	1408.0	901.5	2309.5	1510.5	1069.5	2580.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	2309.5
Weight of 1 P572E ATD & 1 P572O ATD	kg	141
Rated Cargo/Luggage Weight (RCLW)	kg	136
Calculated Test Vehicle Target Weight (TVTW)	kg	2586.5

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	927	936	1028	1025	1632
As Tested	mm	920	923	1001	1007	1734
Post Test	mm	877	969	972	1045	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	4182
Total Vehicle Length at Left Side	mm	5847
Total Vehicle Length at Centerline	mm	6357
Total Vehicle Length at Right Side	mm	5847
Weight of Ballast in Cargo Area	kg	59
Weight of Vehicle Components Removed	kg	0
Amount of Stoddard Solvent in Fuel Tank	L	130.6

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: 2021 Ford F-150 SuperCab 4x4
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20210204
 Test Date: 3/17/2021

TARGET VEHICLE STRUCTURAL MEASUREMENT

	Elements	Pre-Test (mm)
1	Total Length	6357
2	Total Width	2025
3	Bumper Top Height	628
4	Bumper Bottom Height	410
5	Longitudinal Member Top Height	600
6	Distance between Longitudinal Members	757
7	Longitudinal Member Width	98
8	Engine Top Height	1138
9	Engine Bottom Height	354
10	Engine and Gearbox Width	1220
11	Front Bumper-Engine Distance	700
12	Front Shock Absorber Fixing Height	840
13	Bonnet Leading Edge Height	1118
14	Front Shock Absorber Fixing Width	990
15	Front Bumper – Front Axle Distance	950
16	Front Axle – A-Pillar Distance	530
17	A-Pillar – B-Pillar Distance	1331
18	B-Pillar – Rear Axle Distance	2320
19	B-Pillar – C-Pillar Distance	708
20	Roof Sill Bottom Height	1725
21	Roof Sill Top Height	1840
22	Floor Sill Bottom Height	382
23	Floor Sill Top Height	558

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

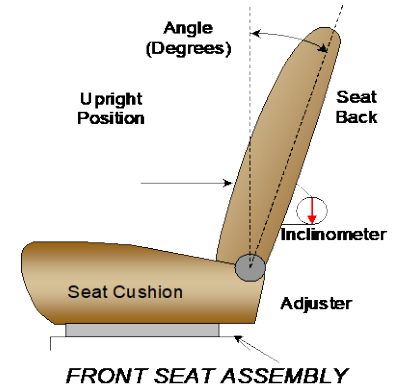
Test Vehicle: 2021 Ford F-150 SuperCab 4x4
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20210204
 Test Date: 3/17/2021

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	3.2° on outboard headrest post
Passenger Seat Back Angle	-1.8° on outboard headrest post



SEAT FORE/AFT POSITIONS

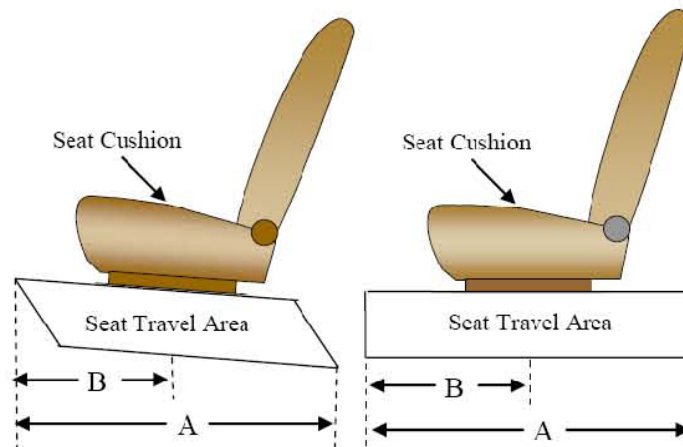
The driver and passenger seat fore/aft positions are adjusted following Appendix F, "Driver & Passenger Dummy Seating & Positioning Procedures" in the NCAP Test Procedure dated May 2018.

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	256 mm / 38 detents (1 st as 1)	130 mm / 19 th detent (1 st as 0)
Passenger Seat	240 mm / 36 detents (1 st as 1)	0 mm / 0 th detent (1 st as 0)

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 st as 1)	1 (1 st as 0)
Passenger Seat	4 (1 st as 1)	0 (1 st as 0)



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

Test Vehicle: 2021 Ford F-150 SuperCab 4x4
 Test Program: NCAP Frontal Barrier Impact Test

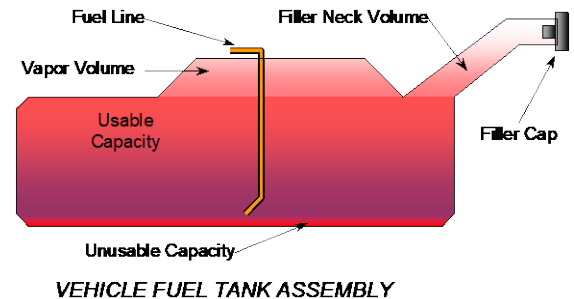
NHTSA No.: M20210204
 Test Date: 3/17/2021

FUEL TANK CAPACITY DATA

	Liters
Usable Capacity of "Standard Tank"	140.4
Usable Capacity of "Optional Tank"	
92-94% of Usable Capacity	129.2 to 132.0
Actual Amount of Solvent used	130.6
1/3 of Usable Capacity	46.8

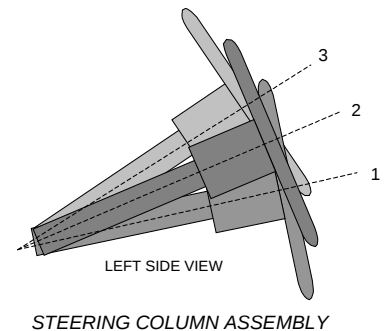
FUEL PUMP

The vehicle is equipped with an electronic fuel pump. The electric fuel pump operates for 3 seconds to pressurize the fuel system following the actuation of the ignition. If no attempt has been made to start the engine within 3 seconds following 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. Also, 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.



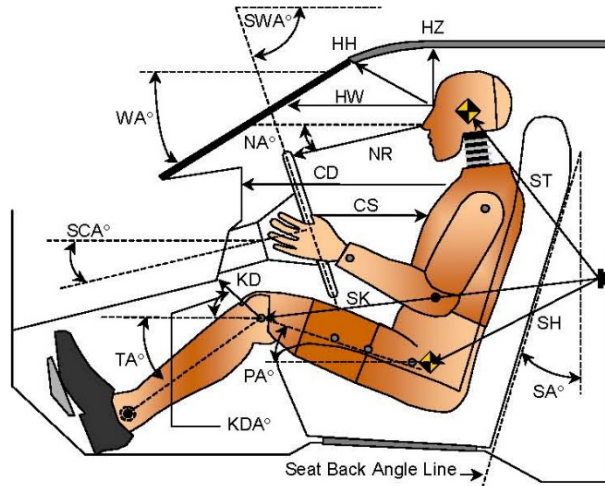
STEERING COLUMN POSITION

	Degrees	Fore/Aft Position (mm)
Lowermost Position 1	71.4	
Geometric Center Position 2	68.7	
Uppermost Position 3	66.0	
Telescoping Steering Wheel Travel		53
Test Position	68.7	26

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2021 Ford F-150 SuperCab 4x4
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20210204
 Test Date: 3/17/2021



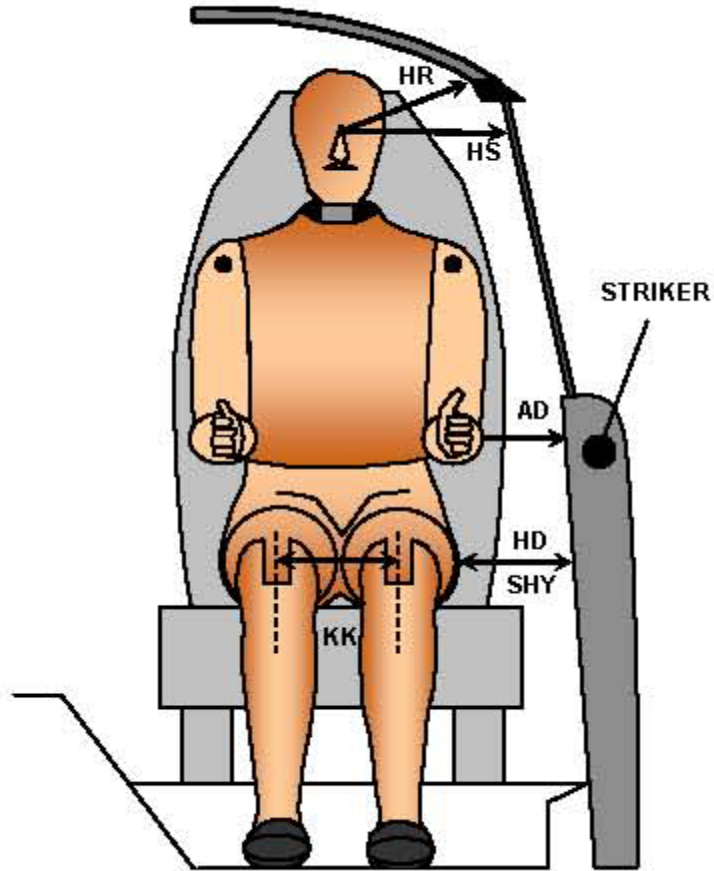
LEFT SIDE VIEW

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		31.2		
SWA°	Steering Wheel Angle		68.7		
SCA°	Steering Column Angle		21.3		
SA°	Seat Back Angle		3.2		-1.8
HZ	Head to Roof (Z)	231	90	272	90
HH	Head to Header	461	17.4	410	37.5
HW	Head to Windshield	716	0	747	0
NR	Nose to Rim	411	12.7		
CD	Chest to Dash	578		451	
CS	Chest to Steering Hub	351	9.4		
RA	Rim to Abdomen	215	0		
KDL	Left Knee to Dash	230	29.1	121	31.0
KDR	Right Knee to Dash	220	30.5	122	31.5
PA°	Pelvic Angle		23.7		22.1
TA°	Tibia Angle		59.1		76.5
SK	Striker to Knee	675	95.1	779	93.3
ST	Striker to Head	651	23.1	606	31.7
SH	Striker to H-Point	313	102.6	442	96.7

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2021 Ford F-150 SuperCab 4x4
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20210204
 Test Date: 3/17/2021



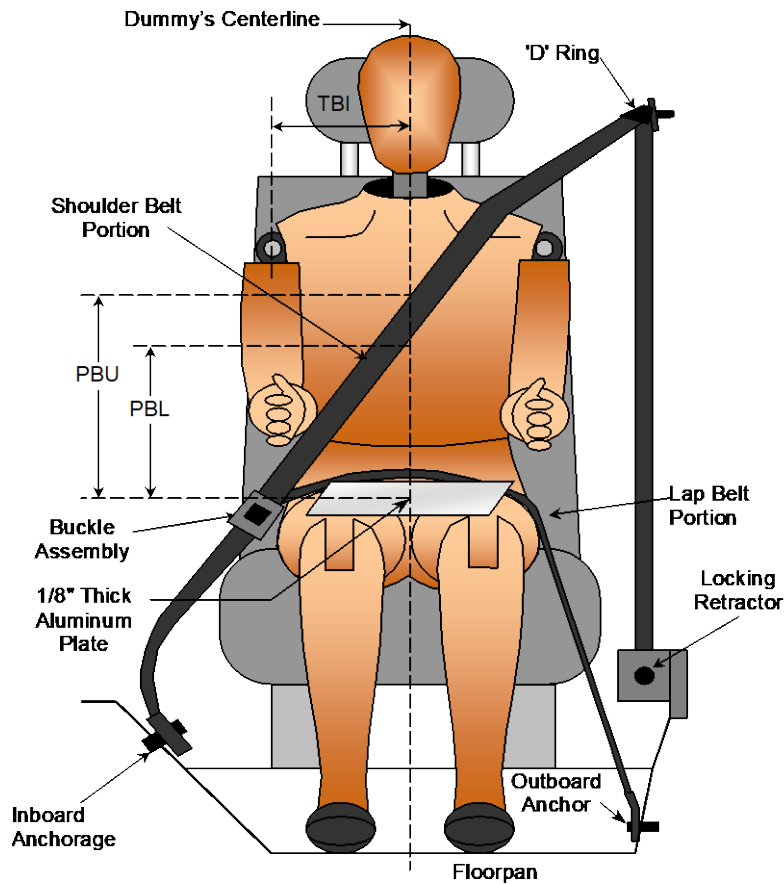
FRONT VIEW OF DUMMY

Code	Measurement Description	Driver	Passenger
		Length (mm)	
AD	Arm to Door	139	87
HD	H-Point to Door	154	184
HR	Head to Side Header	227	279
HS	Head to Side Window	361	377
KK	Knee to Knee	354	228
SHY	Striker to H-Point (Y Direction)	279	311
AA	Ankle to Ankle	330	165

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

Test Vehicle: 2021 Ford F-150 SuperCab 4x4
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20210204
Test Date: 3/17/2021



FRONT VIEW OF DUMMY

SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU - Top surface of reference to belt upper edge	mm	350	310
PBL - Top surface of reference to belt lower edge	mm	265	220

BELT LENGTH DATA

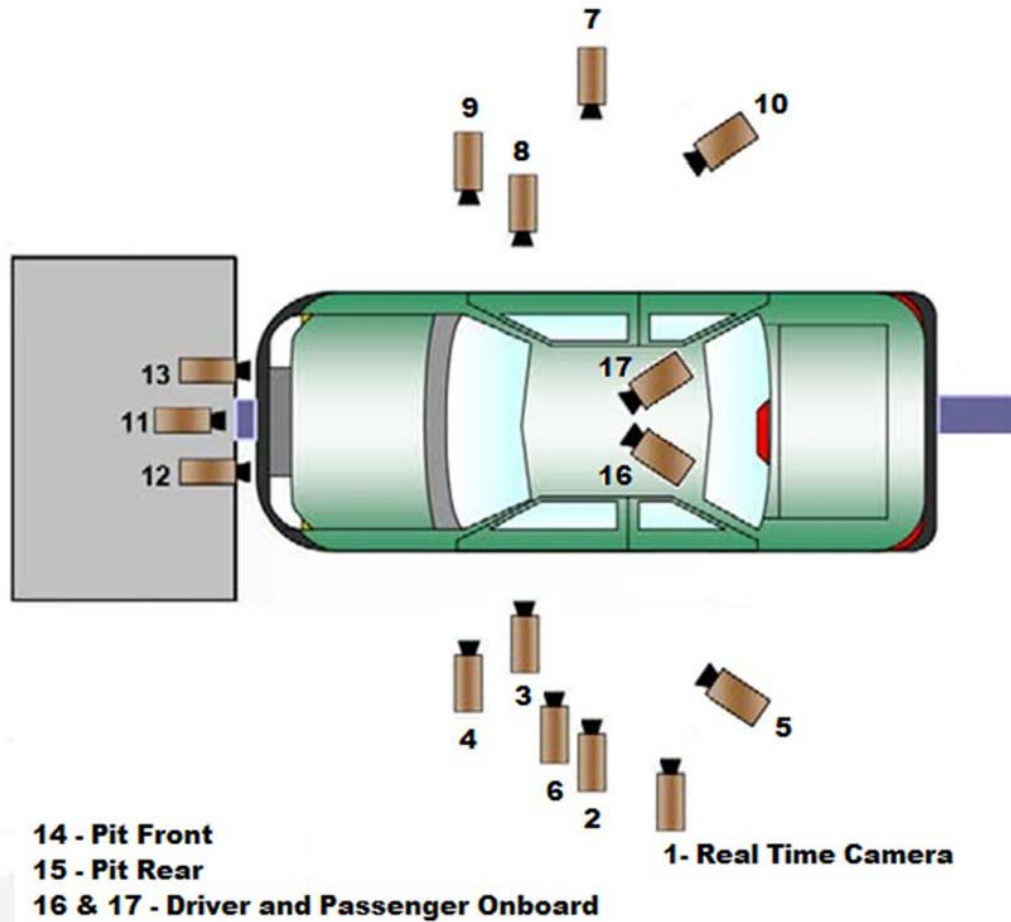
Measurement Description	Units	Driver	Passenger
Shoulder Belt Length as measured on ATD	mm	910	905
Lap Belt Length as measured on ATD	mm	700	725
Remainder of belt on reel	mm	890	870
Total Belt Length for Continuous Webbing Systems	mm	3000	3000

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

Test Vehicle: 2021 Ford F-150 SuperCab 4x4
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20210204
Test Date: 3/17/2021

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: 2021 Ford F-150 SuperCab 4x4
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20210204
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CAMERA LOCATIONS

No.	Camera View	Coordinates* (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall					30
2	Left Overall	-3130	-6020	-1310	12	1000
3	Driver Close-Up	-2050	-6810	-1760	50	1000
4	Left Front Half	-1460	-5980	-1310	24	1000
5	Left Angle	-7520	-6020	-1810	75	1000
6	Steering Column					
7	Right Overall	-3030	6350	-1350	12	1000
8	Passenger Close-Up	-1830	6760	-1840	50	1000
9	Right Front Half	-1360	6010	-1450	24	1000
10	Right Angle	-7670	5480	-1810	75	1000
11	Windshield	80	0	-2310	12	1000
12	Driver Windshield	60	-370	-2230	25	1000
13	Passenger Windshield	60	370	-2230	25	1000
14	Pit Front	-980	0	3340	24	1000
15	Pit Rear	-2970	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

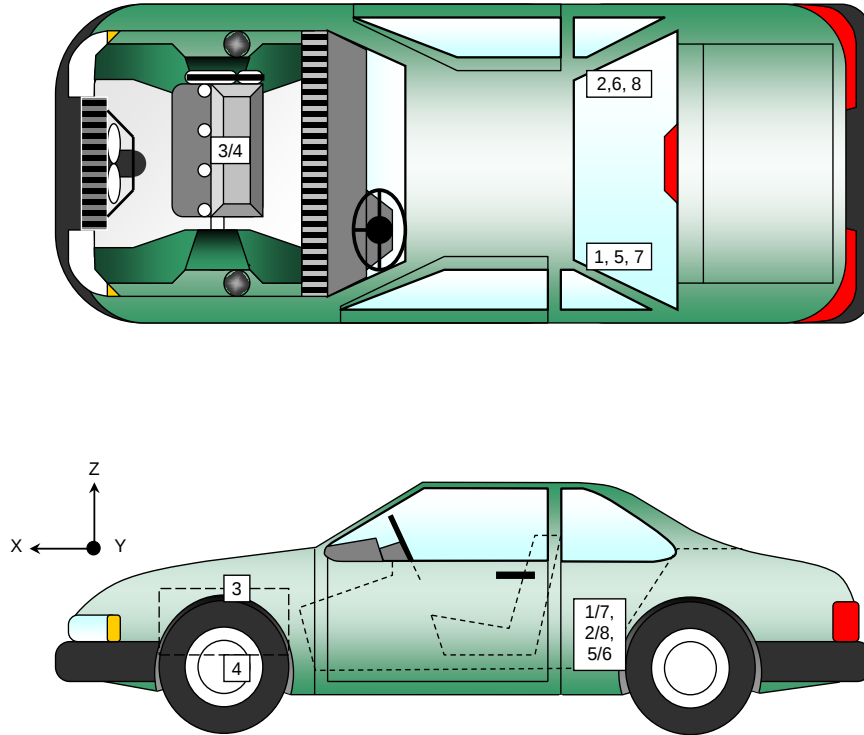
+Z = below ground level

*Camera No. 6 – Steering Column recorded no video for this test.

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

Test Vehicle: 2021 Ford F-150 SuperCab 4x4
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20210204
 Test Date: 3/17/2021



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Crossmember Accelerometer – X Direction	3189	-435	-630
2	Right Rear Crossmember Accelerometer – X Direction	3189	435	-630
3	Engine Top X	5309	32	-1138
4	Engine Bottom X	5217	-45	-394
5	Left Rear Crossmember Accelerometer – Z Direction	3189	-435	-630
6	Right Rear Crossmember Accelerometer – Z Direction	3189	435	-630
7	Left Rear Crossmember Accelerometer Redundant – X Direction	3189	-465	-630
8	Right Rear Crossmember Accelerometer Redundant – X Direction	3189	465	-630

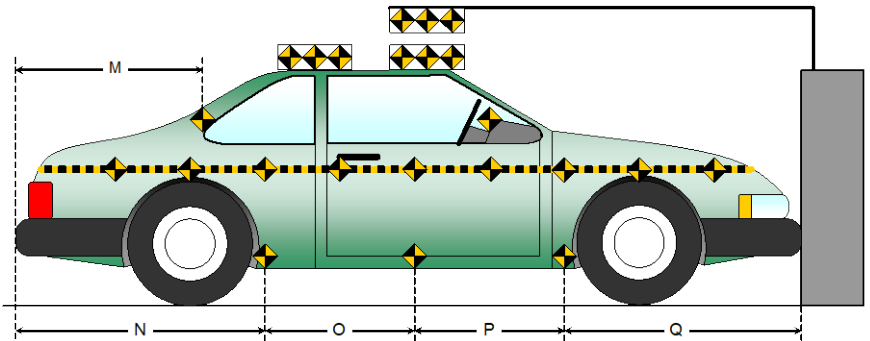
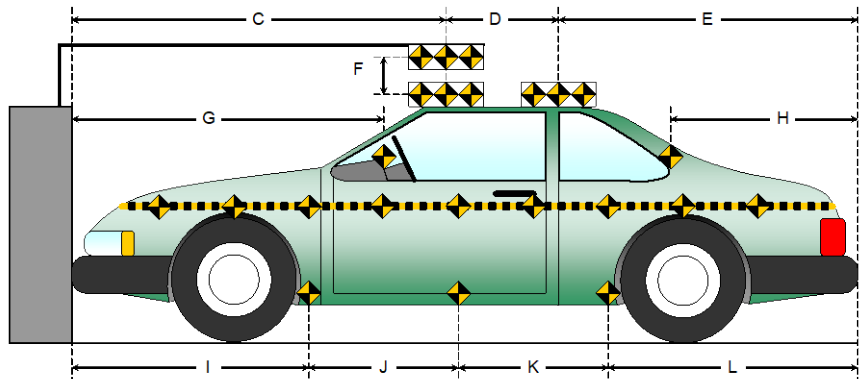
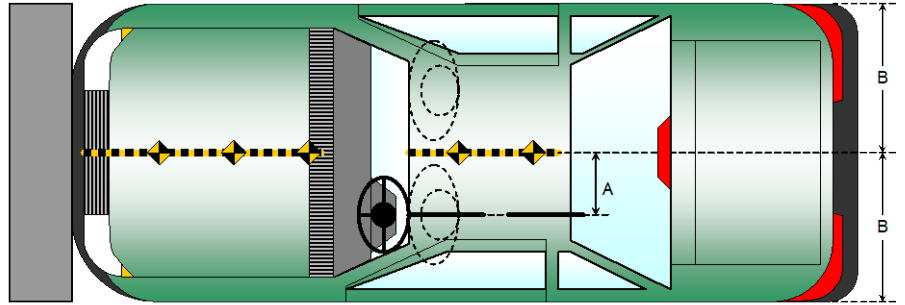
Reference Points: X - Rear Surface of Vehicle (+ forward)
 Y - Vehicle Centerline (+ to right)
 Z - Ground Plane (+ down)

DATA SHEET NO. 8
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2021 Ford F-150 SuperCab 4x4
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20210204
 Test Date: 3/17/2021

Item	Value (mm)
A	475
B	1,013
C	2505
D	610
E	3242
F	15
G	
H	2880
I	1483
J	1024
K	1024
L	2826
M	2880
N	2826
O	1024
P	1024
Q	1483



DATA SHEET NO. 9
LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2021 Ford F-150 SuperCab 4x4
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20210204
 Test Date: 3/17/2021

ADVANCED RESEARCH LOAD CELL BARRIER

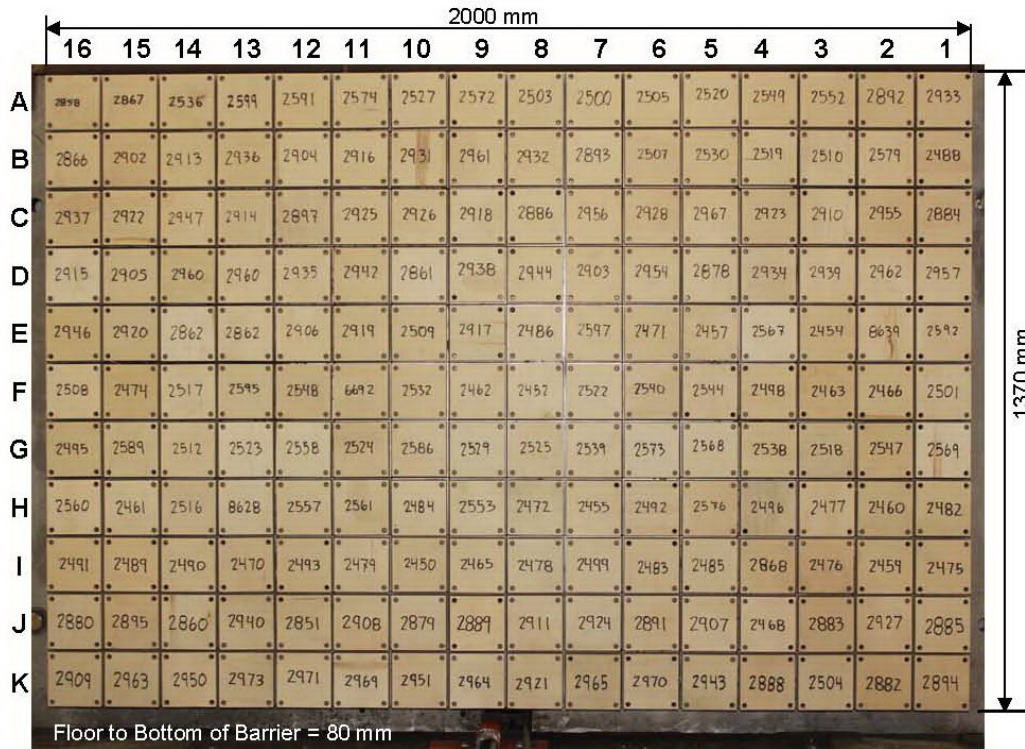


Photo for Reference Only

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

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: 2021 Ford F-150 SuperCab 4x4
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20210204
Test Date: 3/17/2021

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: 2021 Ford F-150 SuperCab 4x4
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20210204
Test Date: 3/17/2021

TEST DUMMY INFORMATION AND CONTACT LOCATIONS

Description	Driver	Passenger
Dummy Type / Serial No.	HIII 50% / 351	HIII 5% / DH1659
Head Contact	Frontal Airbag, Headrest	Frontal Airbag, Headrest
Upper Torso Contact	Frontal Airbag	Frontal Airbag
Lower Torso Contact	None	None
Left Knee Contact	None	Glove Box
Right Knee Contact	Knee Bolster	Glove Box

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	None
Window Damage	None
Other Notable Effects	None

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	410
Center	mm	430
Right Side	mm	400
Average	mm	413

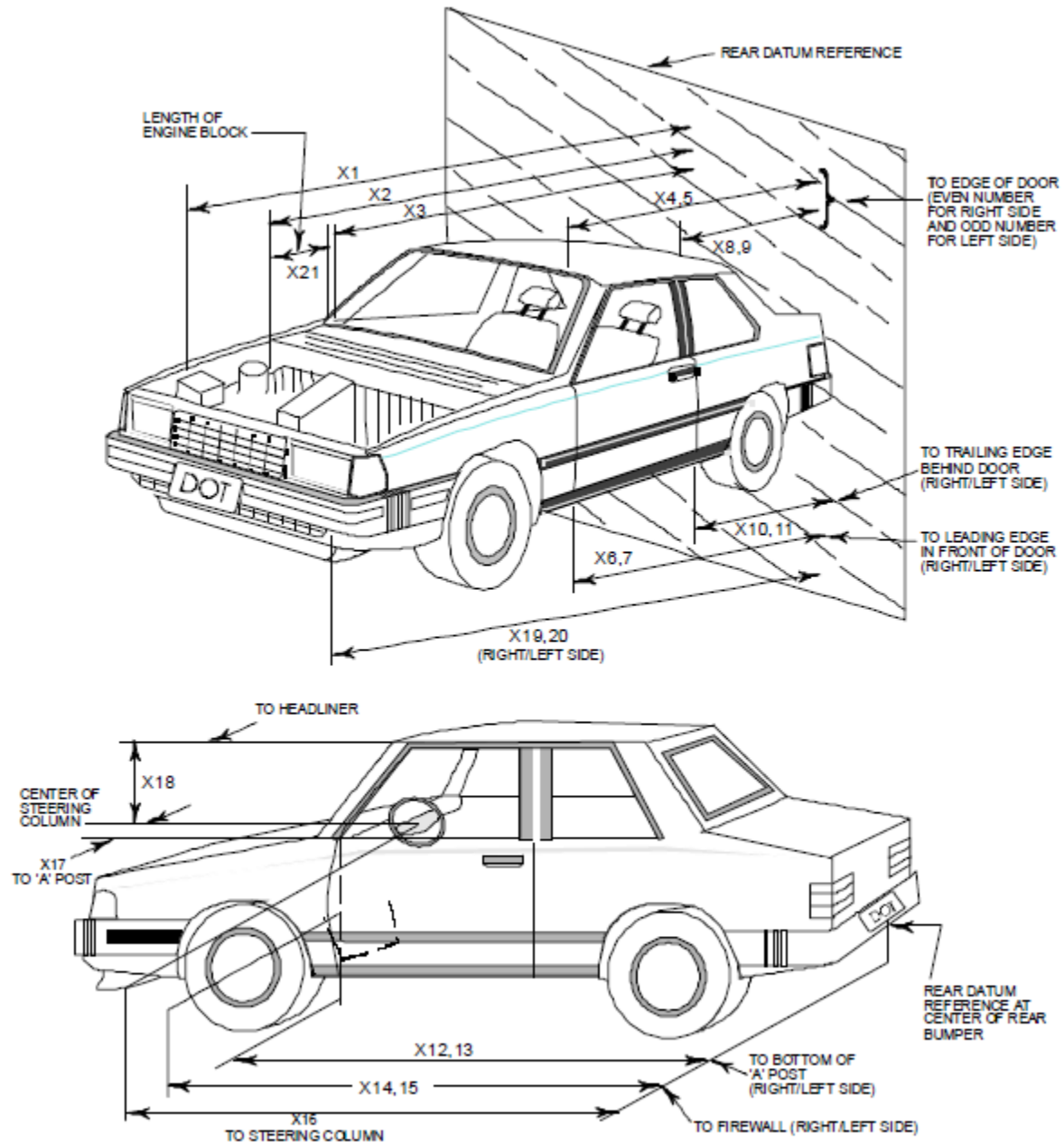
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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: 2021 Ford F-150 SuperCab 4x4
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20210204
 Test Date: 3/17/2021



DATA SHEET NO. 12 (CONTINUED)
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2021 Ford F-150 SuperCab 4x4
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20210204
Test Date: 3/17/2021

No.	Measurement Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	6357	5683	674
2	RSOV to Front of Engine	5581	5417	164
3	RSOV to Firewall	5238	5181	57
4	RSOV to Upper Leading Edge of Right Door	4761	4761	0
5	RSOV to Upper Leading Edge of Left Door	4761	4762	-1
6	RSOV to Lower Leading Edge of Right Door	4735	4734	1
7	RSOV to Lower Leading Edge of Left Door	4735	4733	2
8	RSOV to Upper Trailing Edge of Right Door	3543	3543	0
9	RSOV to Upper Trailing Edge of Left Door	3543	3544	-1
10	RSOV to Lower Trailing Edge of Right Door	3536	3535	1
11	RSOV to Lower Trailing Edge of Left Door	3536	3534	2
12	RSOV to Bottom of "A" Post of Right Side	4724	4724	0
13	RSOV to Bottom of "A" Post of Left Side	4724	4724	0
14	RSOV to Firewall, Right Side	5194	5185	9
15	RSOV to Firewall, Left Side	5211	5183	28
16	RSOV to Steering Column	4281	4304	-23
17	Center of Steering Column to "A" Post	382	375	7
18	Center of Steering Column to Headliner	450	442	8
19	RSOV to Right Side of Front Bumper	5847	5481	366
20	RSOV to Left Side of Front Bumper	5847	5479	368
21	Length of Engine Block	423	423	0
RD	RSOV to Right Side of Dash Panel	4552	4546	6
CD	RSOV to Center of Dash Panel	4582	4574	8
LD	RSOV to Left Side of Dash Panel	4552	4548	4

All Dimensions in mm

DATA SHEET NO. 13
ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2021 Ford F-150 SuperCab 4x4
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20210204
Test Date: 3/17/2021

VEHICLE INFORMATION

VIN: 1FTFX1E59MKD16393
Vehicle Size Category: Truck

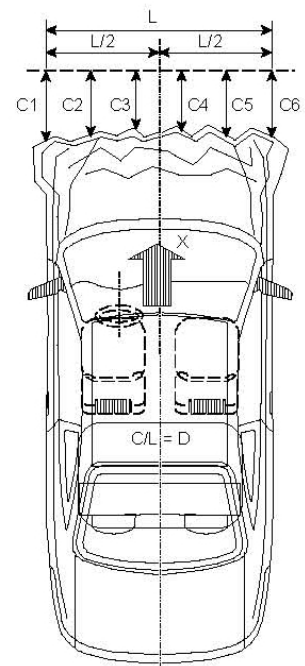
Wheelbase (mm): 4182
Test Weight (kg): 2580.0

ACCELEROMETER DATA

Accelerometer Locations: As per Data Sheet No. 7
Cal. Procedure/Interval: MGA Procedure / 6 month
Integration Algorithm: Trapezoidal
Linearity: > 99%
Impact Velocity (km/h): 55.96
Velocity Change (km/h): 64.6
Time of Separation (msec) 110

CRUSH PROFILE

Collision Deformation Classification: 12FDEW4
Midpoint of Damage: Centerline
Damage Region Length (mm): 2412
Impact Mode: Frontal



No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	5847	5479	368
C2	Crush zone 2 at left side	mm	6220	5728	492
C3	Crush zone 3 at left side	mm	6346	5723	623
C4	Crush zone 4 at right side	mm	6346	5730	616
C5	Crush zone 5 at right side	mm	6220	5739	481
C6	Crush zone 6 at right side	mm	5847	5481	366
L	C1 TO C6	mm	2412	2400	12

DATA SHEET NO. 14
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2021 Ford F-150 SuperCab 4x4
Test Program: NCAP Frontal Barrier Impact Test

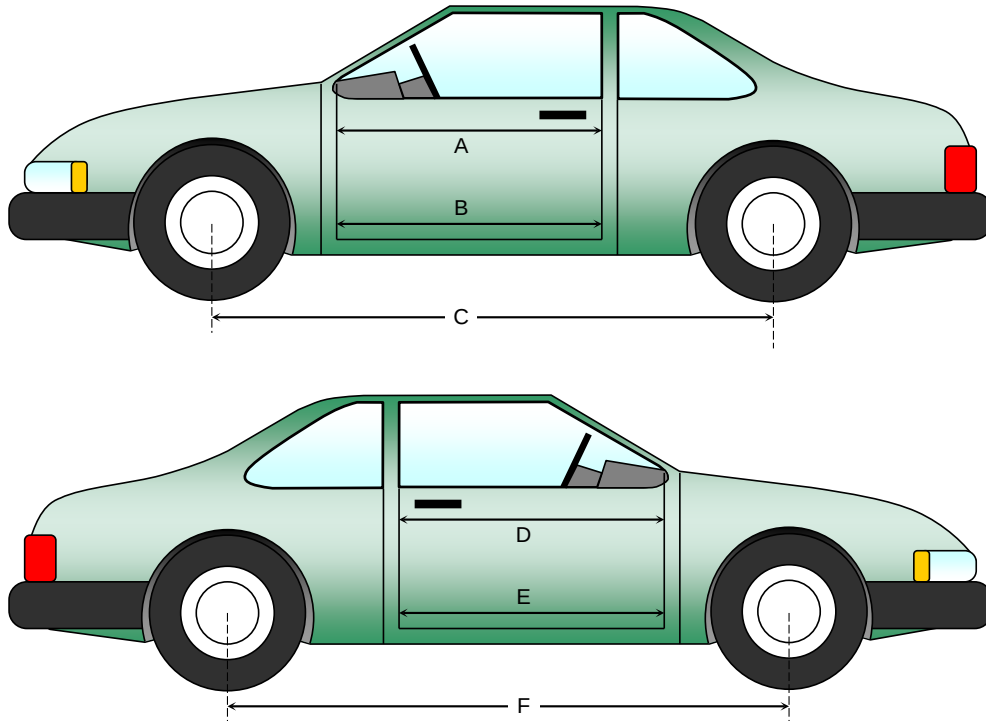
NHTSA No.: M20210204
Test Date: 3/17/2021

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	1100	1100	0
B	Left Side Lower	mm	1084	1084	0
D	Right Side Upper	mm	1100	1100	0
E	Right Side Lower	mm	1088	1088	0

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	4182	4060	122
F	Right Side Wheelbase	mm	4182	4018	164



DATA SHEET NO. 14 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

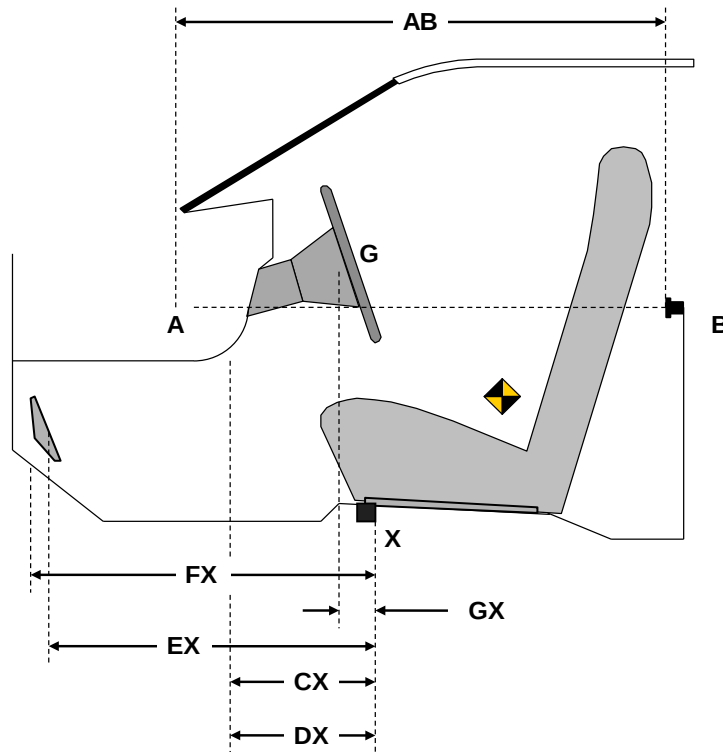
Test Vehicle: 2021 Ford F-150 SuperCab 4x4
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20210204
 Test Date: 3/17/2021

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	856	856	0
CX	Left Knee Bolster to X	mm	370	365	5
DX	Right Knee Bolster to X	mm	371	365	6
EX	Brake Pedal to X	mm	555	558	-3
FX	Foot Rest to X	mm	571	570	1
GX	Center of Steering Column Wheel Hub to X	mm	97	110	-13

X = Front of Seat Track (stationary)



DRIVER COMPARTMENT

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

Test Vehicle: 2021 Ford F-150 SuperCab 4x4
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20210204
 Test Date: 3/17/2021

WINDSHIELD MOUNTING DETAILS

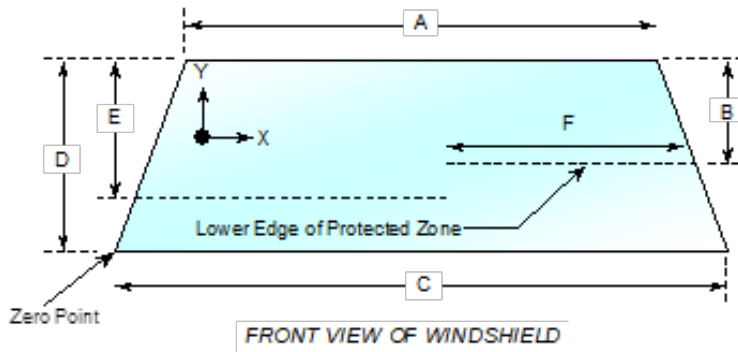
Windshield glass is secured to the vehicle frame with a rubber trim and glue.

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: 21.2°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	1466
B	mm	477
C	mm	1786
D	mm	748
E	mm	494
F	mm	500

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: 2021 Ford F-150 SuperCab 4x4
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20210204
 Test Date: 3/17/2021

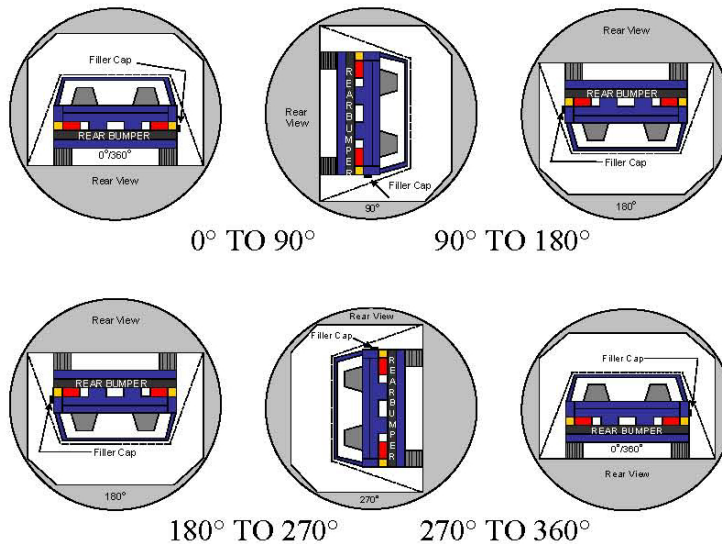
FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 21.2°C

Test Time: 11:40 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°	93	300	393
90° to 180°	90	300	390
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: 2021 Ford F-150 SuperCab 4x4
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20210204
 Test Date: 3/17/2021

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	

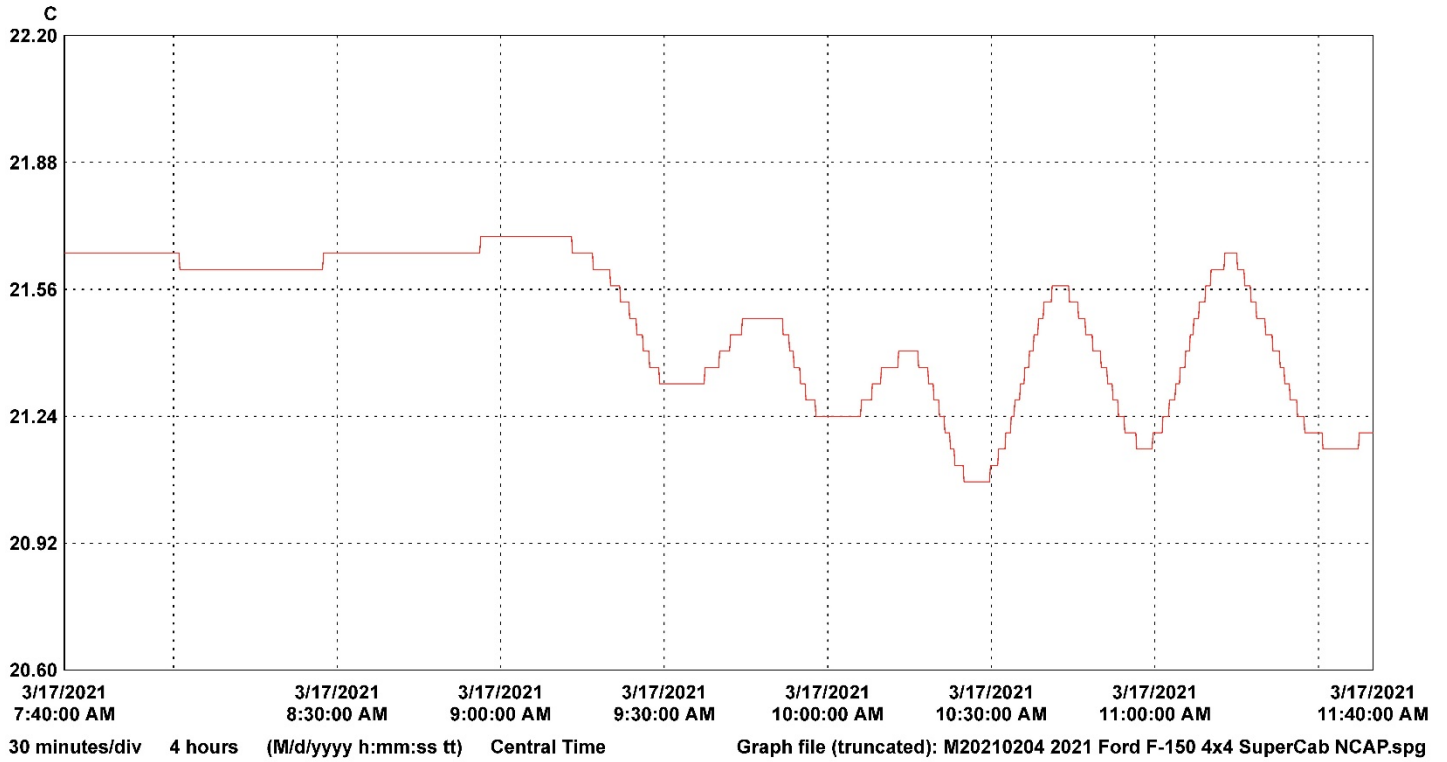
SOLVENT SPILLAGE LOCATION TABLE

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: 2021 Ford F-150 SuperCab 4x4
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20210204
 Test Date: 3/17/2021



LN	Serial #	Description	CH	Value	Maximum	Average	Minimum	Units	CH description	Logger file
1	18352041	VSC_Prep_Room	1		21.69	21.47	21.07	C	Temperature	18352041_VSC_Prep_Room.spl

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PHOTOGRAPHS**

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PHOTOGRAPH NOT APPLICABLE

Photo No. 001 - Load Cell Location

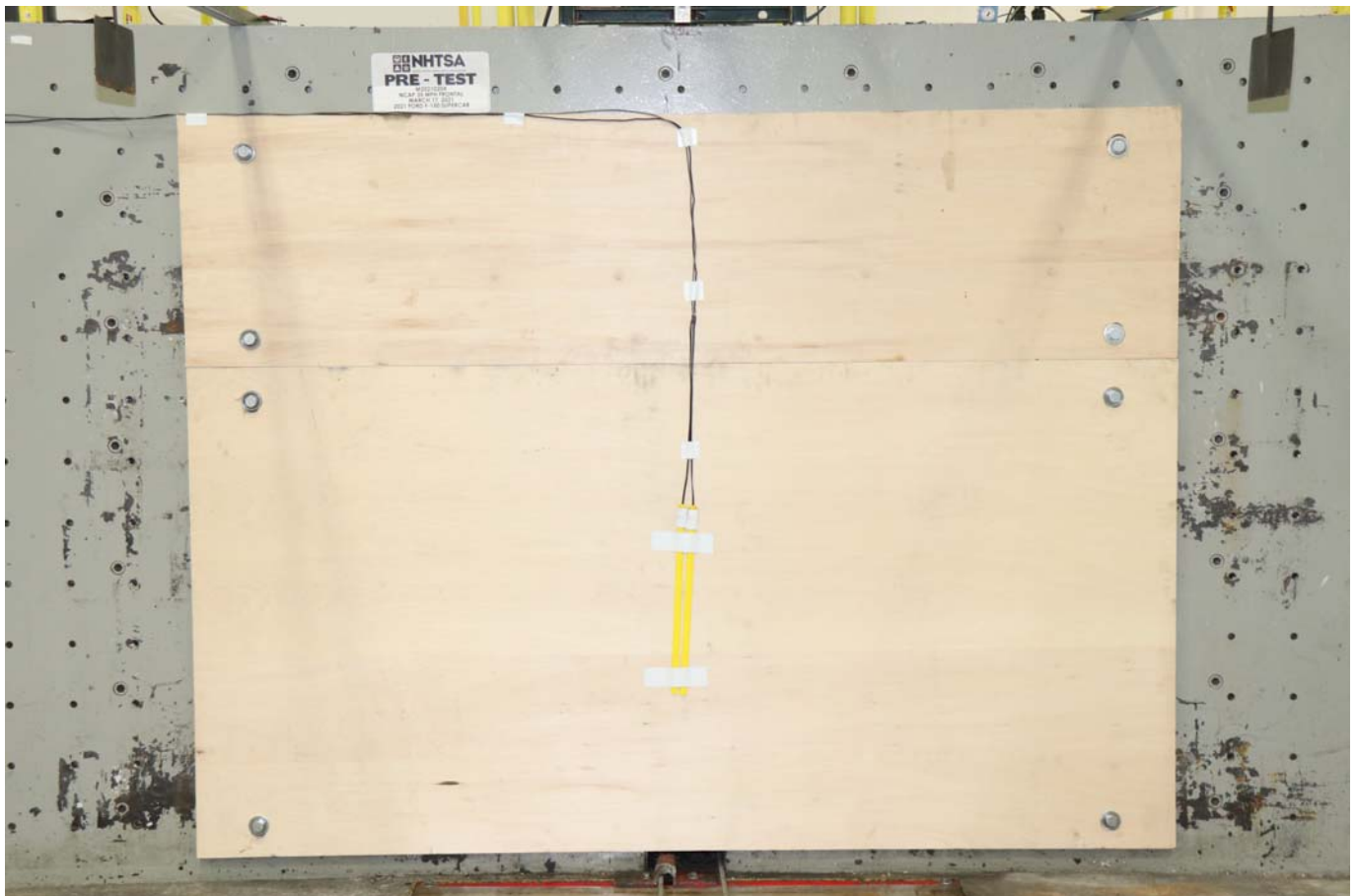


Photo No. 002 - Pre-Test Load Cell Wall



Photo No. 003 - Post-Test Load Cell Wall



Photo No. 004 - Manufacturer Label



Photo No. 005 - Tire Placard



Photo No. 006 - 2021 Ford F-150 4x4 SuperCab Frontal As Delivered



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



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

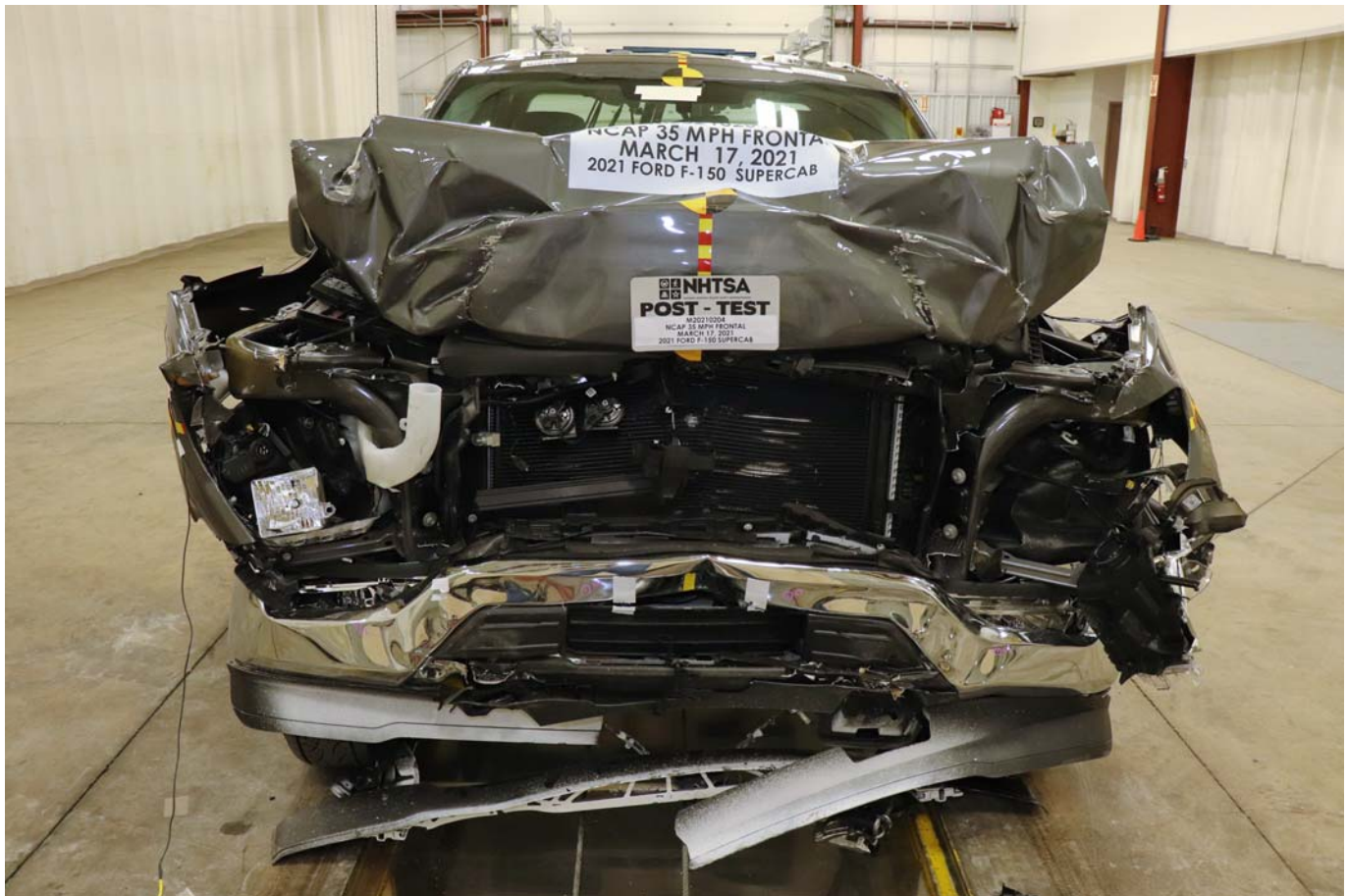


Photo No. 009 - Post-Test Front View of Test Vehicle



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

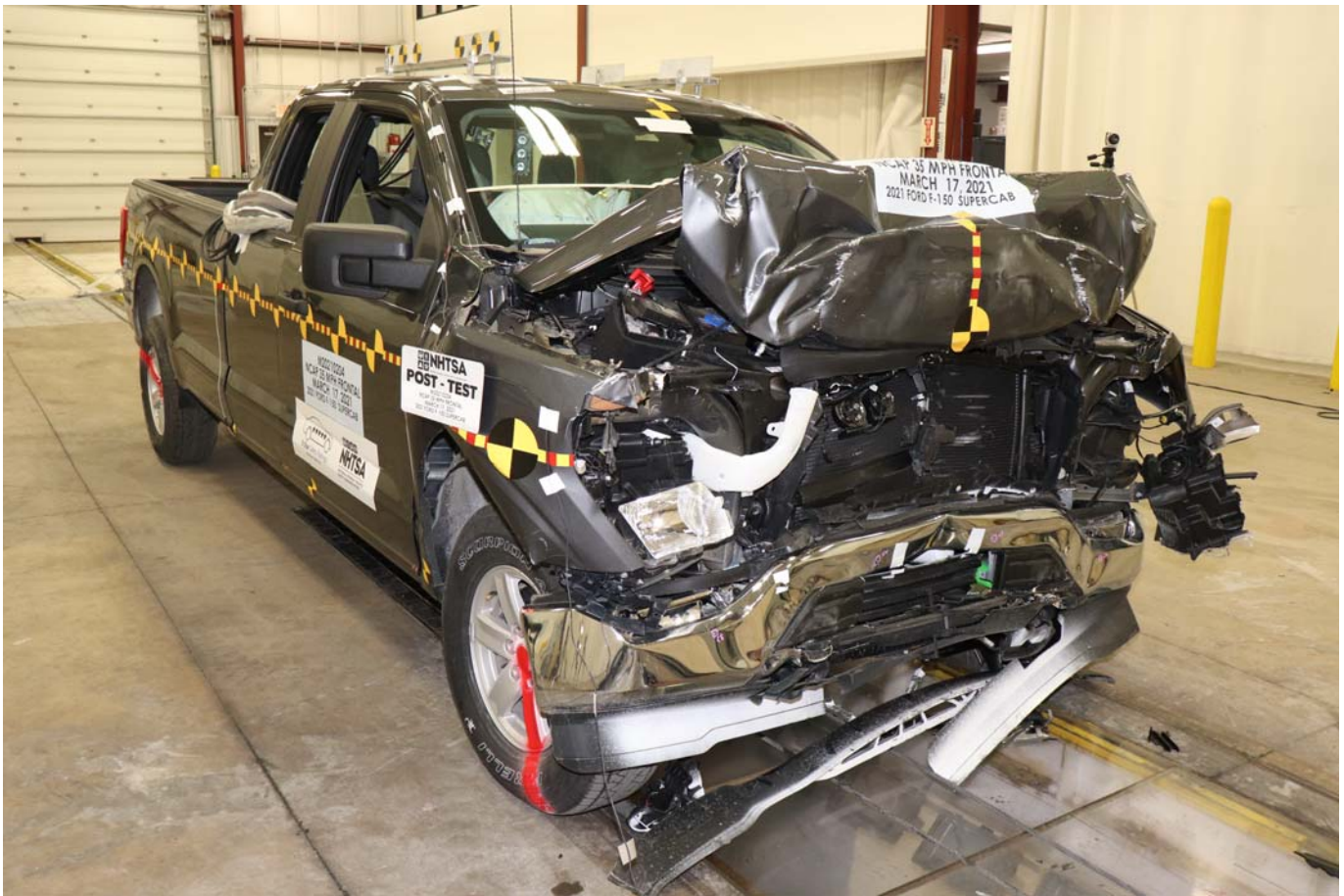


Photo No. 015 - Post-Test Right Front 3-4 View



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

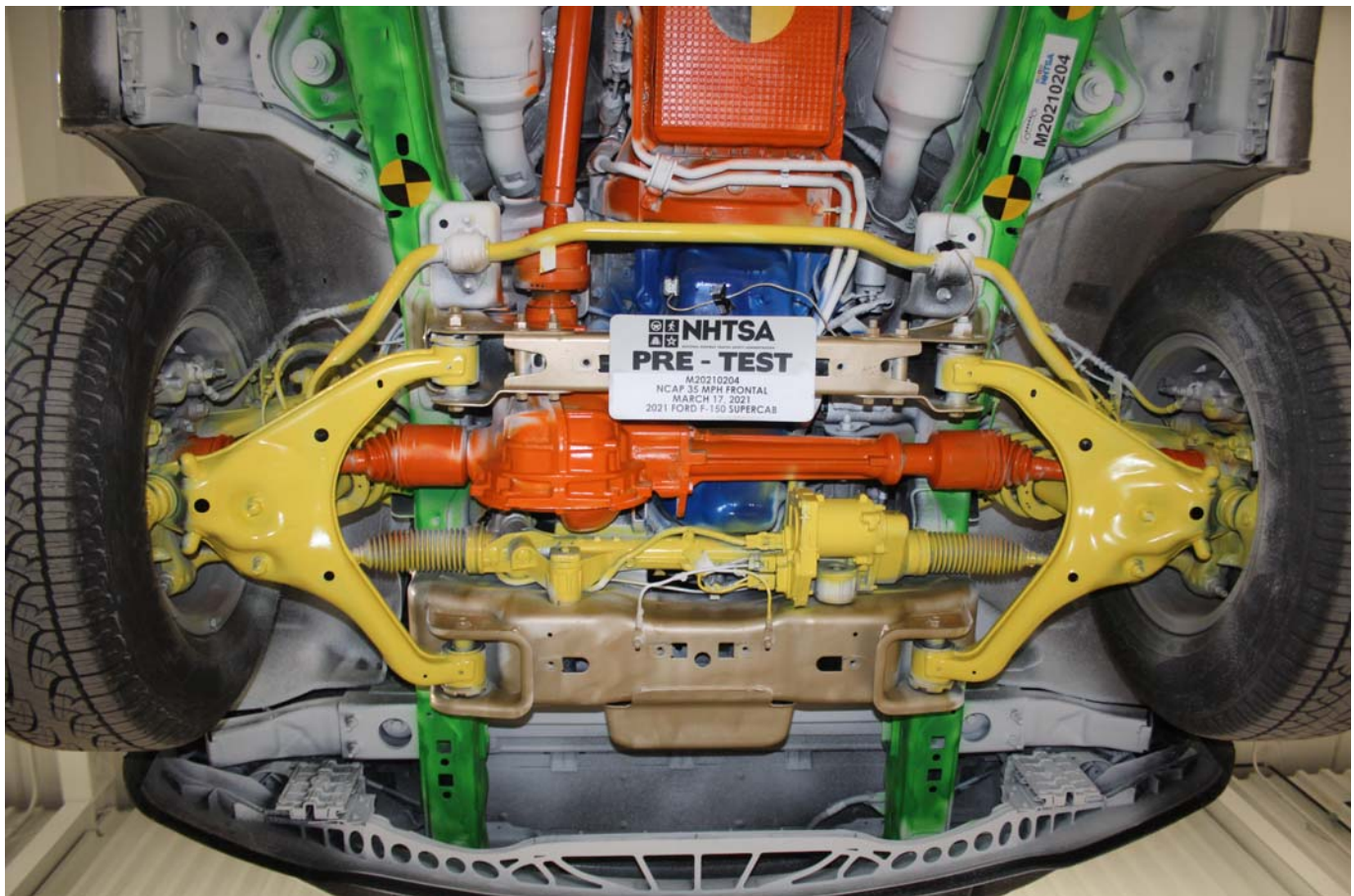


Photo No. 024 - Pre-Test Front Underbody View

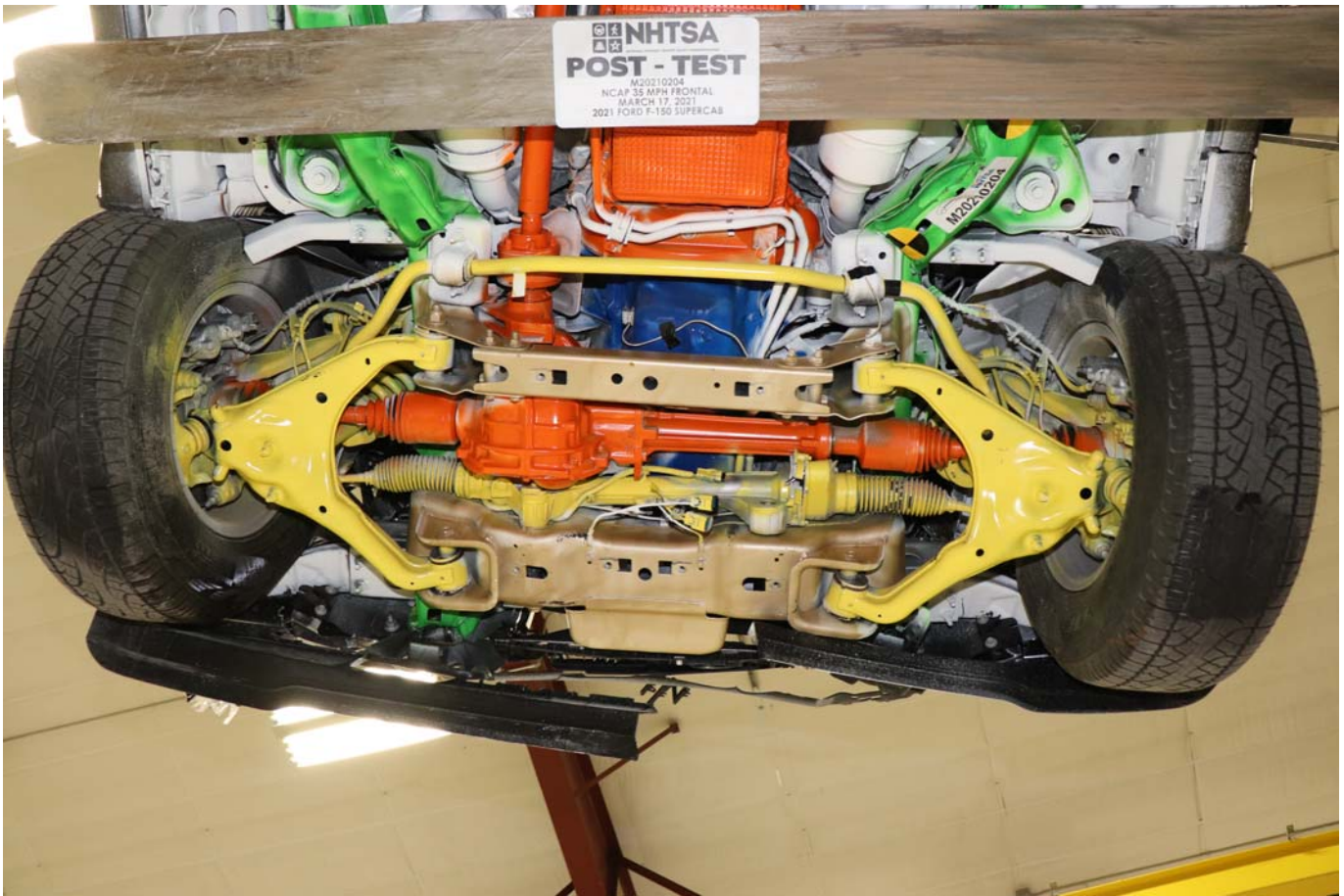


Photo No. 025 - Post-Test Front Underbody View

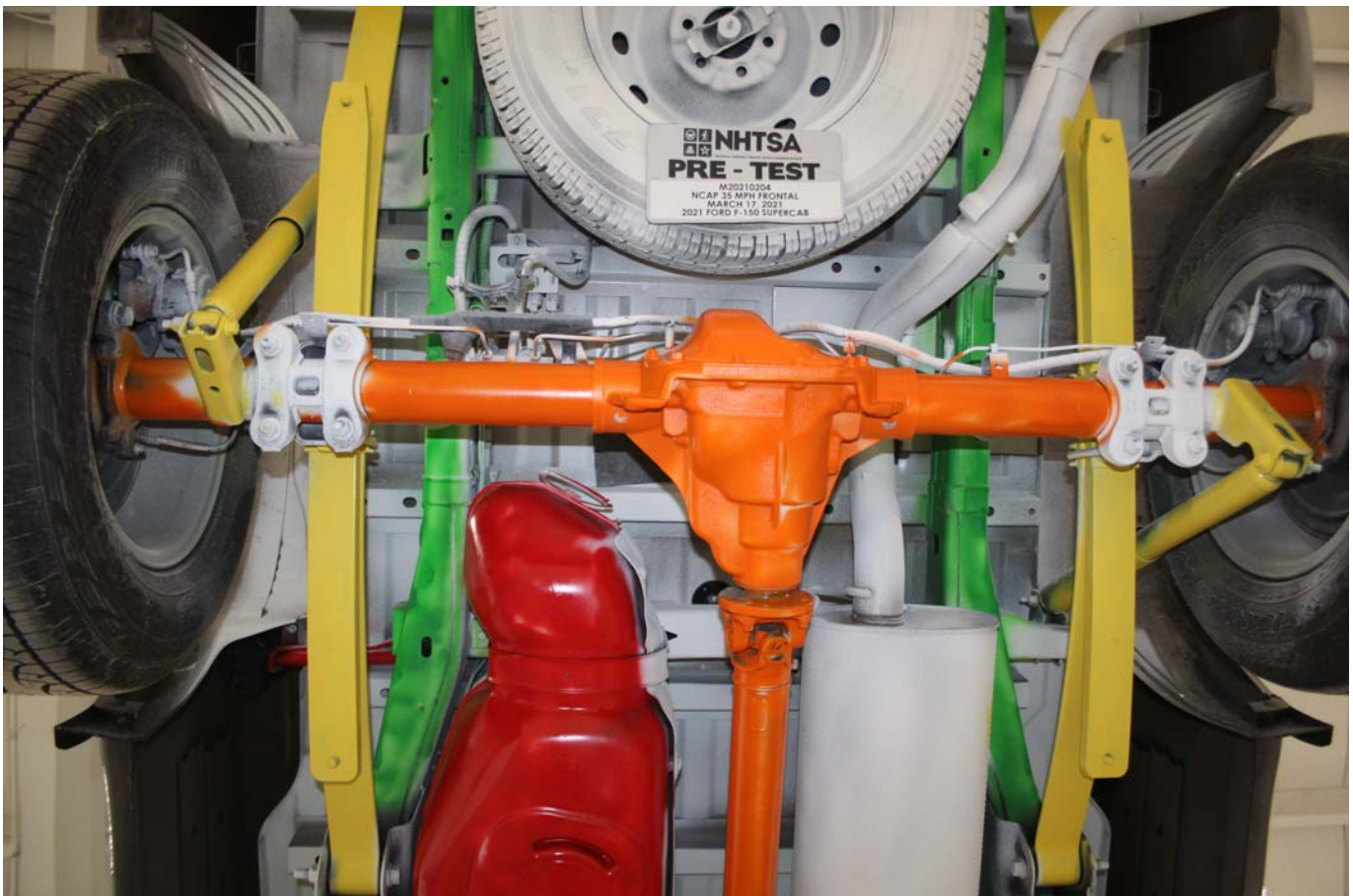


Photo No. 026 - Pre-Test Rear Underbody View

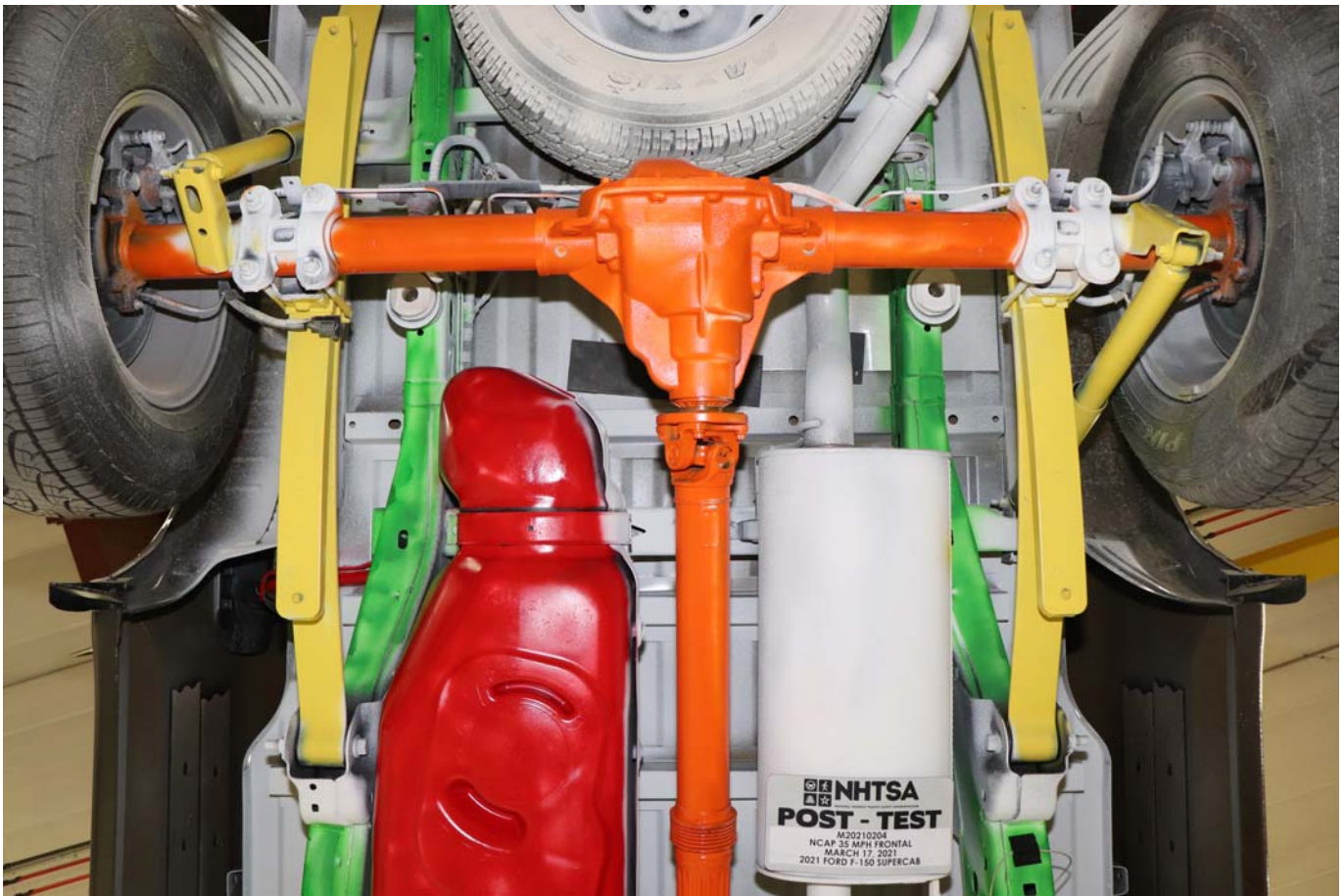


Photo No. 027 - Post-Test Rear Underbody View



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



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



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



Photo No. 037 - Post-Test Driver 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

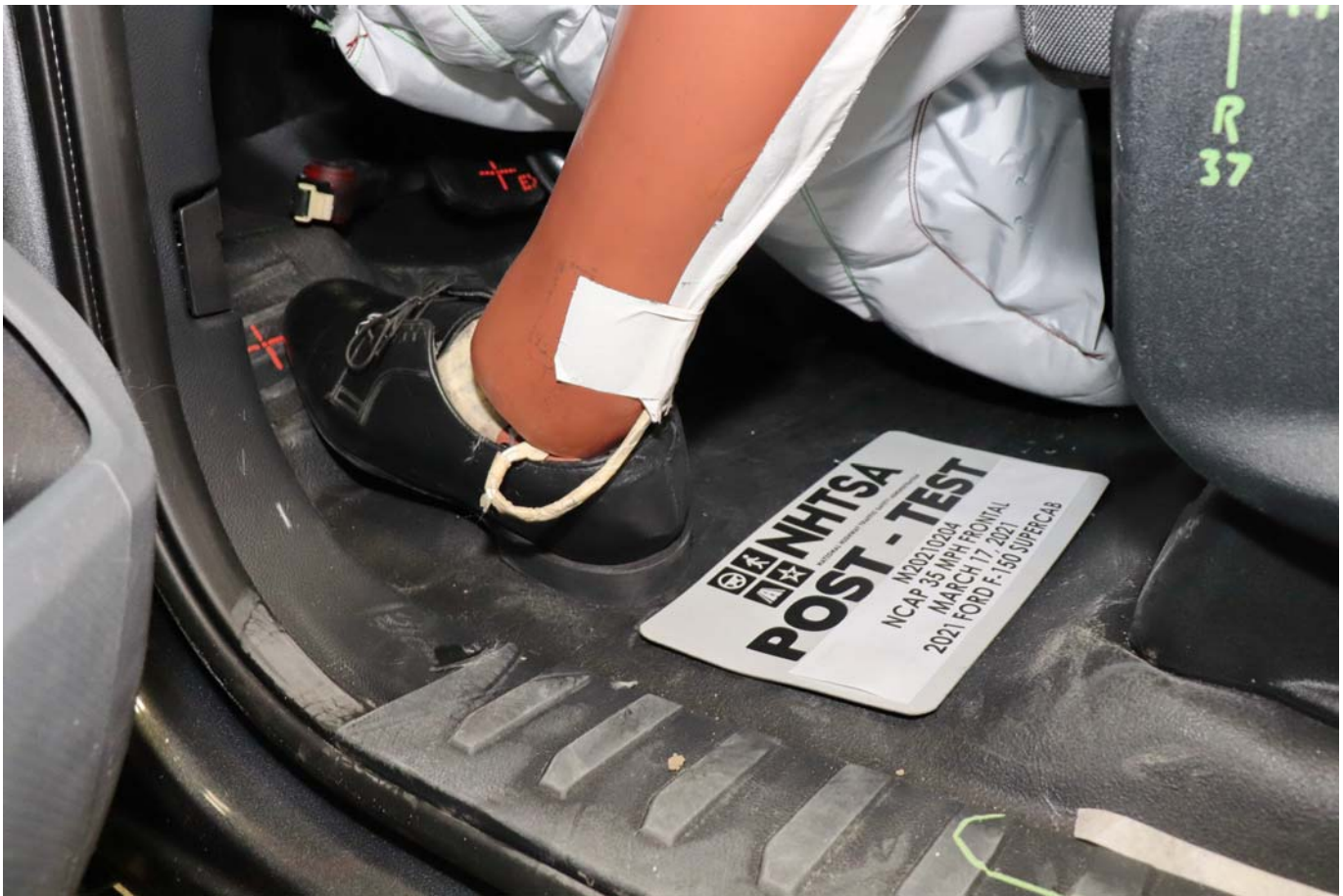


Photo No. 043 - Post-Test Driver Dummy Feet



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



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



Photo No. 046 - Pre-Test Driver Side Floorpan



Photo No. 047 - Post-Test Driver 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. 057 - Pre-Test Passenger Dummy and Vehicle Interior



Photo No. 058 - Post-Test Passenger Dummy and Vehicle Interior



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



Photo No. 060 - Post-Test Passenger 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 Side Knee Bolster



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



Photo No. 069 - Pre-Test Passenger Side Floorpan



Photo No. 070 - Post-Test Passenger 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 - 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 - 2021 Ford F-150 4x4 SuperCab Frontal Impact Event

 VEHICLE DESCRIPTION F-150 2021 F-150 4X4 SUPERCAB 163.7" WHEELBASE 5.0L V8 ENGINE ELEC TEN-SPEED AUTO W/TOW M		MK D16393 EXTERIOR CARBONIZED GRAY INTERIOR DARK SLATE CLOTH 40/20/40	
STANDARD EQUIPMENT INCLUDED AT NO EXTRA CHARGE			
EXTERIOR • DAYTIME RUNNING LAMPS • EASY FUEL CAPLESS FILLER • FULLY BOXED STEEL FRAME • HALOGEN HEADLAMPS • HEADLAMPS - AUTO HIGH BEAM • HEADLAMPS - AUTOLAMP (ON/OFF) • LOCKING REMOVABLE TAILGATE • PICKUP BOX TIE DOWN HOOKS • REAR, 170-DEGREE DOOR • TRAILER SWAY CONTROL • WIPERS - INTERMITTENT	INTERIOR • 4" PRODUCTIVITY SCREEN • 60/40 FOLD-UP REAR BENCH SEAT • DUAL SUNVISORS • MESSAGE CTR: OUTSIDE TEMP, COMPASS, TRIP COMPUTER • POWERPOINTS - 12V • TILT/TELESCOPE STR COLUMN	FUNCTIONAL • AUTO HOLD • AUTO START STOP TECH • CURVE CONTROL • DYNAMIC HITCH ASSIST • ELECT 4X4 SHIFT-ON-FLY • FAIL-SAFE COOLING SYSTEM • FORDPASS CONNECT™ 4G • HOTSPOT TELEMATICS MODEM • GAS-CHARGED SHOCKS • OUTBOARD MNTD REAR SHOCKS • PRE-COLLISION ASSIST W/AEB • PWR RACK AND PINION STEER • REAR VIEW CAMERA • SELECTSHIFT®	SAFETY/SECURITY • ADVANCETRAC® WITH RSC® • AIRBAGS - FRONT SEAT • MOUNTED SIDE IMPACT • AIRBAGS - SAFETY CANOPY® • CTR HIGH MOUNT STOP LAMP • SECURILOCK® ANTI-THEFT SYS • SOS POST-CRASH ALERT SYS™ • TIRE PRESSURE MONIT SYS
INCLUDED ON THIS VEHICLE EQUIPMENT GROUP 101A • XL SERIES • XL POWER EQUIPMENT GROUP • CRUISE CONTROL • REVERSE SENSING SYSTEM 5.0L V8 ENGINE .265/70R 17 OWL ALL-TERRAIN 3.31 ELECTRONIC LOCK RR AXLE 7150W GVWR PACKAGE FRONT LICENSE PLATE BRACKET 50 STATE EMISSIONS ONBOARD 400W OUTLET INTERIOR WORK SURFACE TRAILER TOW PACKAGE INTEGRATED TRAILER BRAKE CONT EXTENDED RANGE 36GAL FUEL TANK XL CHROME APPEARANCE PACKAGE .CHROME FRONT/REAR BUMPERS .FOG LAMPS .17" SILVER PAINTED ALUMINUM FLEX FUEL VEHICLE		(MSRP) 2,280.00 NO CHARGE 420.00 NO CHARGE NO CHARGE 290.00 165.00 1,090.00 445.00 775.00	PRICE INFORMATION BASE PRICE \$38,930.00 TOTAL OPTIONS/OTHER 5,465.00 TOTAL VEHICLE & OPTIONS/OTHER 44,395.00 DESTINATION & DELIVERY 1,695.00 TOTAL BEFORE DISCOUNTS 46,090.00 XL HIGH DISCOUNT - 750.00 XL HIGH DISCT CHROME - 500.00 TOTAL SAVINGS - 1,250.00
83.7 miles			
SOLD TO Marshall Ford Sales, Inc. 1075 West Terra Lane O'Fallon MO 63366		RAMP ONE CC15	FINAL ASSEMBLY PLANT KANSAS CITY METHOD OF TRANS. CONVOY ITEM # 53-Z800 O/T 2
SHIP TO (if OTHER THAN SOLD TO)		RAMP TWO	Whether you decide to lease or finance your vehicle, you'll find the choices that are right for you. See your dealer for details or visit www.ford.com/finance.
SHIP THROUGH		LM072 N RB 2X 125 001476 12 07 20	
TOTAL MSRP \$44,840.00			

VEHICLE DESCRIPTION
F-150
 2021 F-150 4X4 SUPERCAB
 163.7" WHEELBASE
 5.0L V8 ENGINE
 ELEC TEN-SPEED AUTO W/TOW M

EXTERIOR
 • DAYTIME RUNNING LAMPS
 • EASY FUEL CAPLESS FILLER
 • FULLY BOXED STEEL FRAME
 • HALOGEN HEADLAMPS
 • HEADLAMPS - AUTO HIGH BEAM
 • HEADLAMPS - AUTOLAMP (ON/OFF)
 • LOCKING REMOVABLE TAILGATE
 • PICKUP BOX TIE DOWN HOOKS
 • REAR, 170-DEGREE DOOR
 • TRAILER SWAY CONTROL
 • WIPERS - INTERMITTENT

INTERIOR
 • 4" PRODUCTIVITY SCREEN
 • 60/40 FOLD-UP REAR BENCH SEAT
 • DUAL SUNVISORS
 • MESSAGE CTR: OUTSIDE TEMP, COMPASS, TRIP COMPUTER
 • POWERPOINTS - 12V
 • TILT/TELESCOPE STR COLUMN

FUNCTIONAL
 • AUTO HOLD
 • AUTO START STOP TECH
 • CURVE CONTROL
 • DYNAMIC HITCH ASSIST
 • ELECT 4X4 SHIFT-ON-FLY
 • FAIL-SAFE COOLING SYSTEM
 • FORDPASS CONNECT™ 4G
 • HOTSPOT TELEMATICS MODEM
 • GAS-CHARGED SHOCKS
 • OUTBOARD MNTD REAR SHOCKS
 • PRE-COLLISION ASSIST W/AEB
 • PWR RACK AND PINION STEER
 • REAR VIEW CAMERA
 • SELECTSHIFT®

SAFETY/SECURITY
 • ADVANCETRAC® WITH RSC®
 • AIRBAGS - FRONT SEAT
 • MOUNTED SIDE IMPACT
 • AIRBAGS - SAFETY CANOPY®
 • CTR HIGH MOUNT STOP LAMP
 • SECURILOCK® ANTI-THEFT SYS
 • SOS POST-CRASH ALERT SYS™
 • TIRE PRESSURE MONIT SYS

INCLUDED ON THIS VEHICLE
EQUIPMENT GROUP 101A
 • XL SERIES
 • XL POWER EQUIPMENT GROUP
 • CRUISE CONTROL
 • REVERSE SENSING SYSTEM
 5.0L V8 ENGINE
 .265/70R 17 OWL ALL-TERRAIN
 3.31 ELECTRONIC LOCK RR AXLE
 7150W GVWR PACKAGE
 FRONT LICENSE PLATE BRACKET
 50 STATE EMISSIONS
 ONBOARD 400W OUTLET
 INTERIOR WORK SURFACE
 TRAILER TOW PACKAGE
 INTEGRATED TRAILER BRAKE CONT
 EXTENDED RANGE 36GAL FUEL TANK
 XL CHROME APPEARANCE PACKAGE
 .CHROME FRONT/REAR BUMPERS
 .FOG LAMPS
 .17" SILVER PAINTED ALUMINUM
 FLEX FUEL VEHICLE

PRICE INFORMATION
 BASE PRICE \$38,930.00
 TOTAL OPTIONS/OTHER 5,465.00
 TOTAL VEHICLE & OPTIONS/OTHER 44,395.00
 DESTINATION & DELIVERY 1,695.00
 TOTAL BEFORE DISCOUNTS 46,090.00
 XL HIGH DISCOUNT - 750.00
 XL HIGH DISCT CHROME - 500.00
 TOTAL SAVINGS - 1,250.00

Photo No. 083 - Monroney Label Photograph

APPENDIX B
DUMMY RESPONSE DATA TRACES

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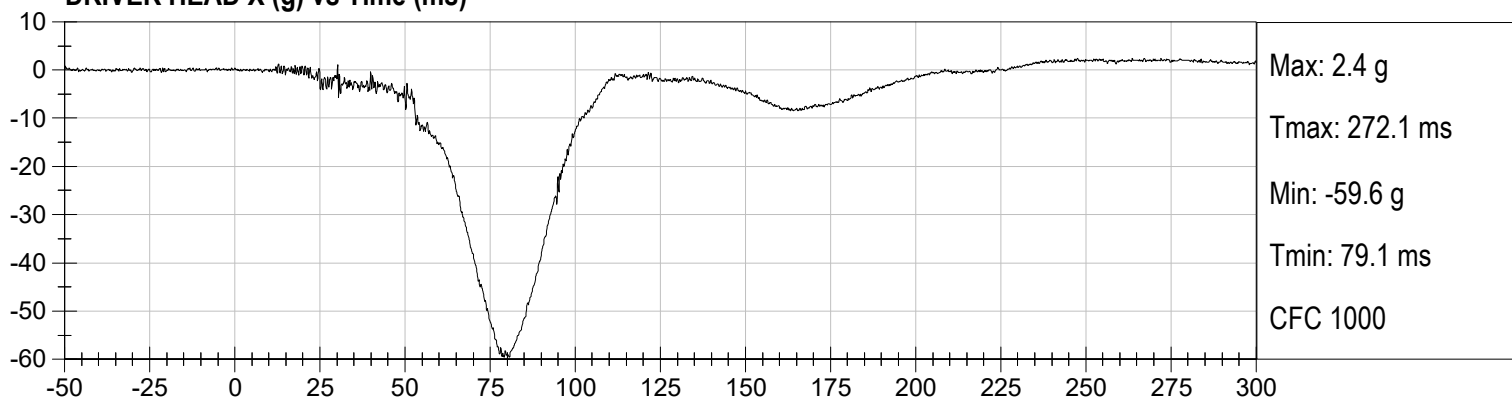
The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at www.nhtsa.gov

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

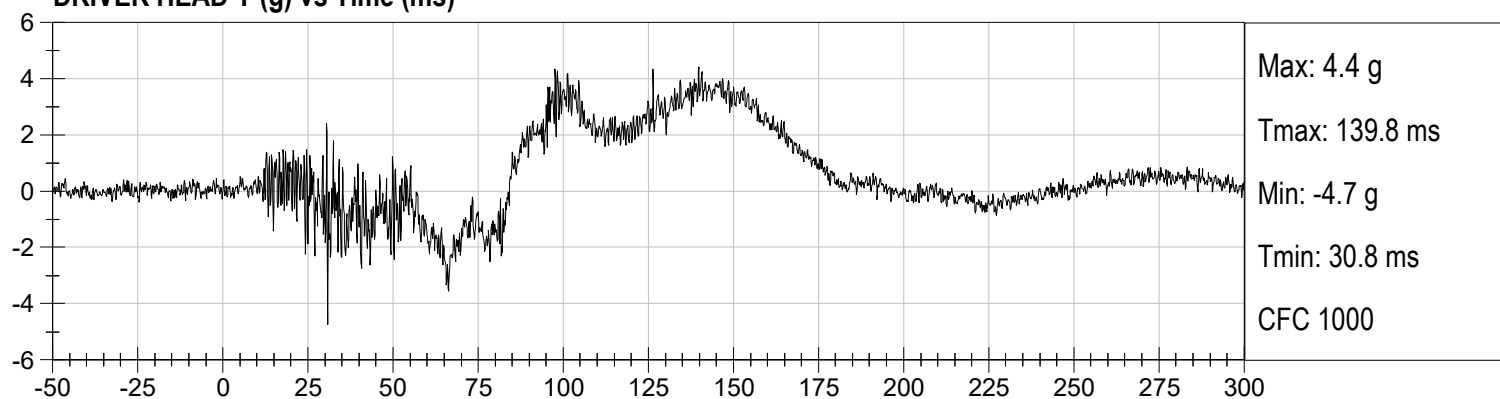
Driver Left Upper Tibia Force Z
Driver Left Lower Tibia Moment X
Driver Left Lower Tibia Moment Y
Driver Left Lower Tibia Force Z
Driver Right Upper Tibia Moment X
Driver Right Upper Tibia Moment Y
Driver Right Upper Tibia Force Z
Driver Right Lower Tibia Moment X
Driver Right Lower Tibia Moment Y
Driver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

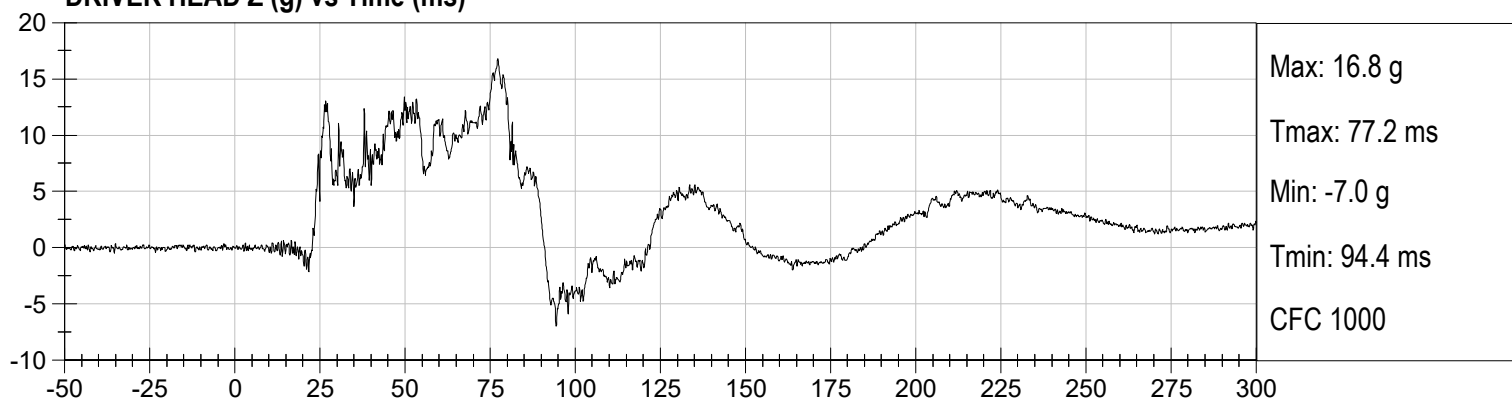
DRIVER HEAD X (g) vs Time (ms)



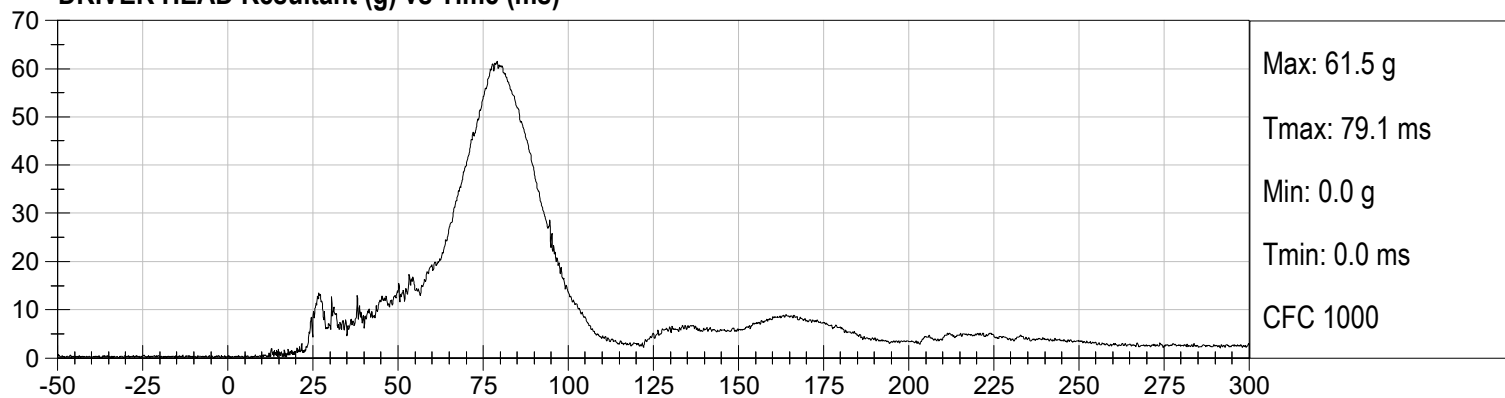
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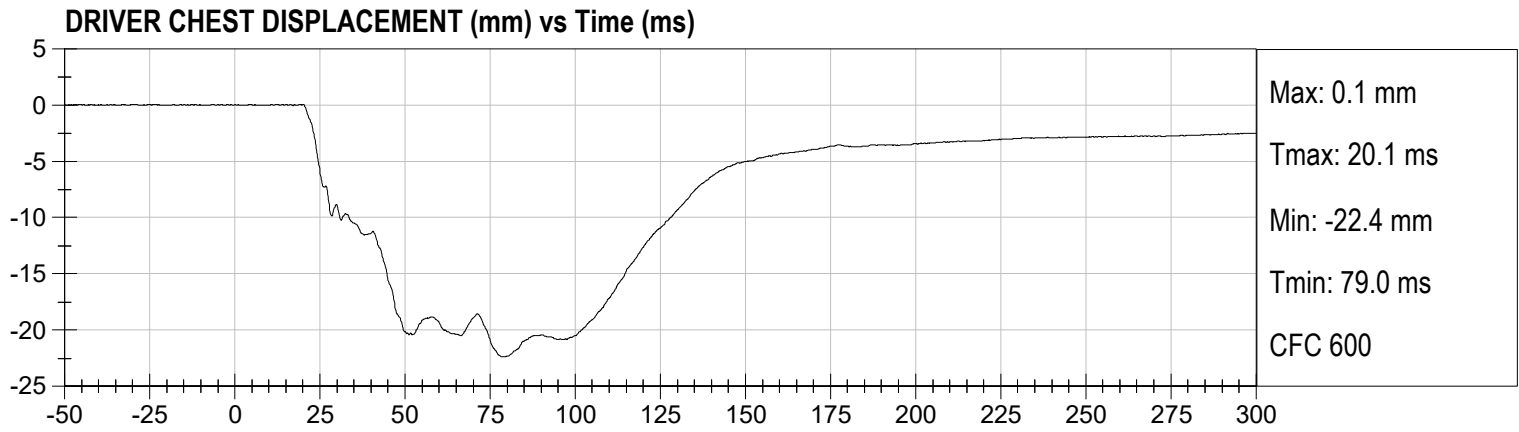


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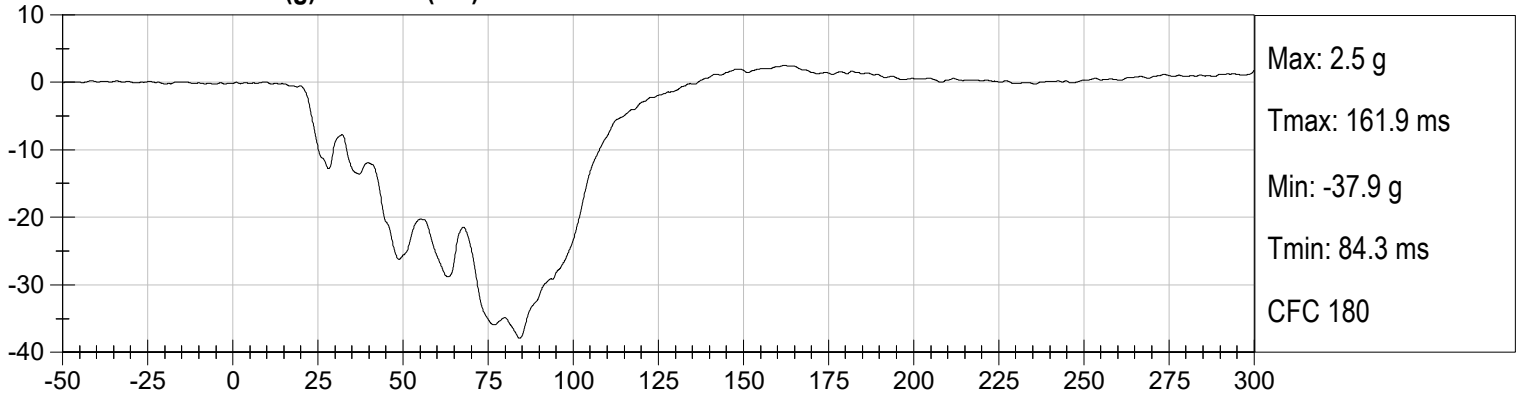


DRIVER HEAD Resultant (g) vs Time (ms)

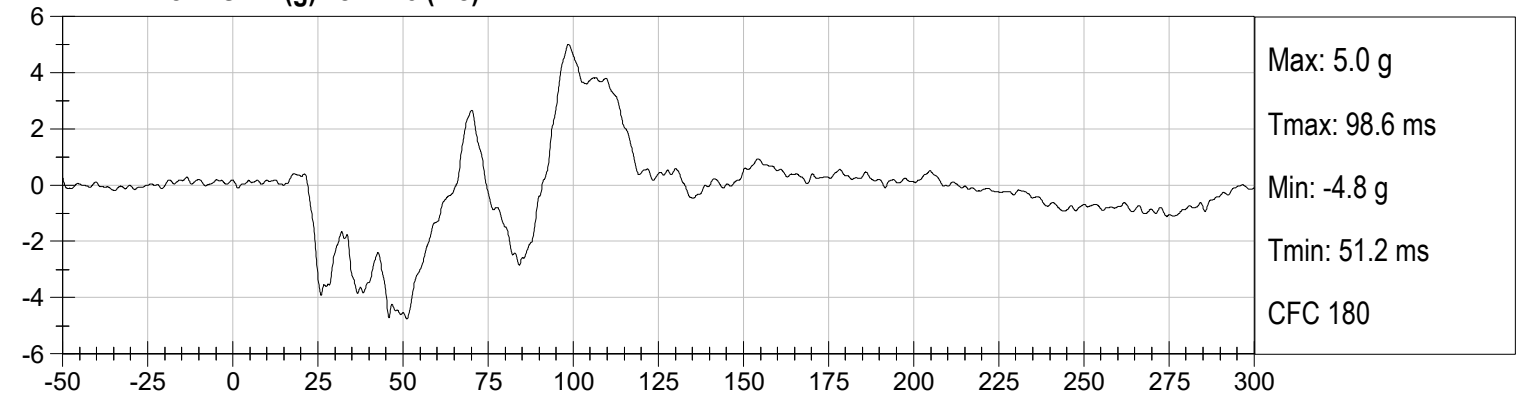




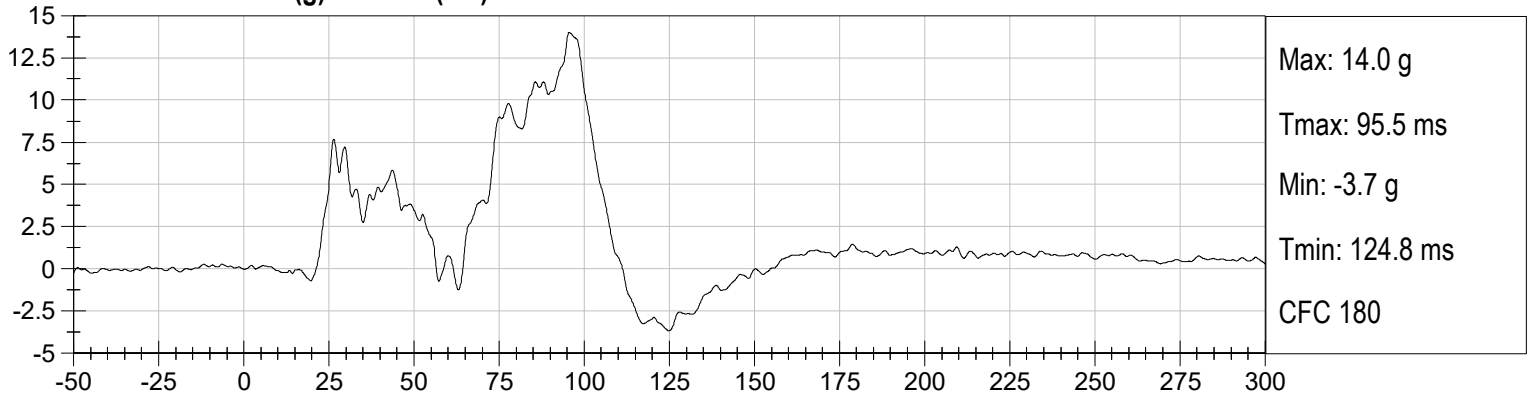
DRIVER CHEST X (g) vs Time (ms)



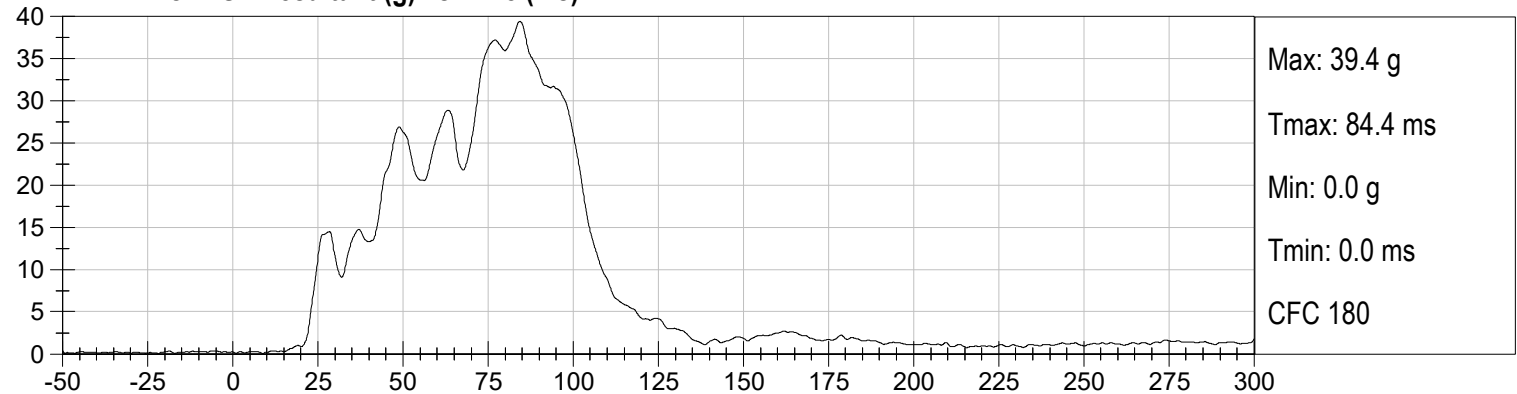
DRIVER CHEST Y (g) vs Time (ms)



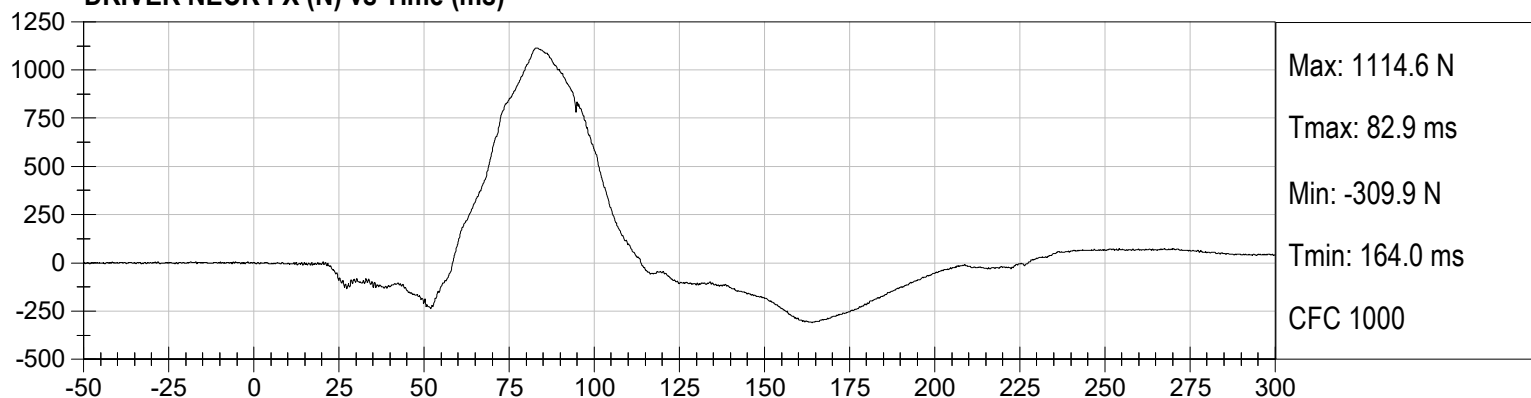
DRIVER CHEST Z (g) vs Time (ms)



DRIVER CHEST Resultant (g) vs Time (ms)



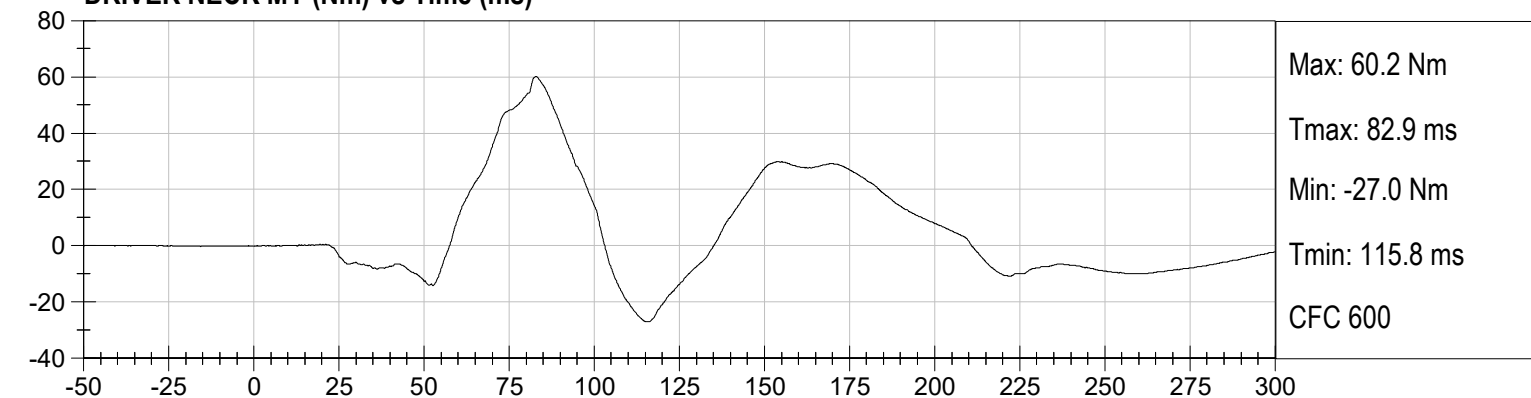
DRIVER NECK FX (N) vs Time (ms)



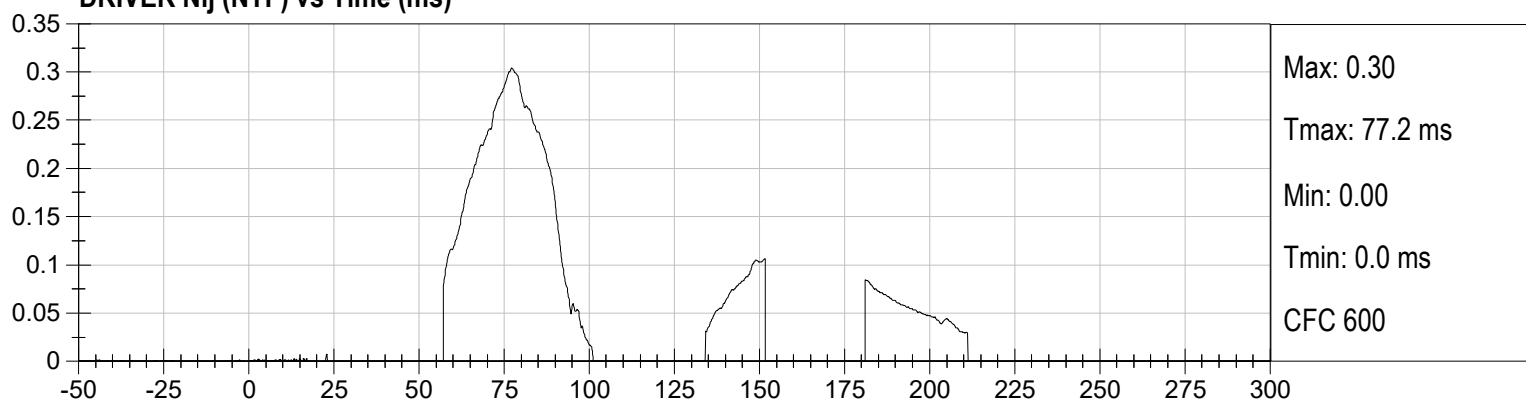
DRIVER NECK FZ (N) vs Time (ms)



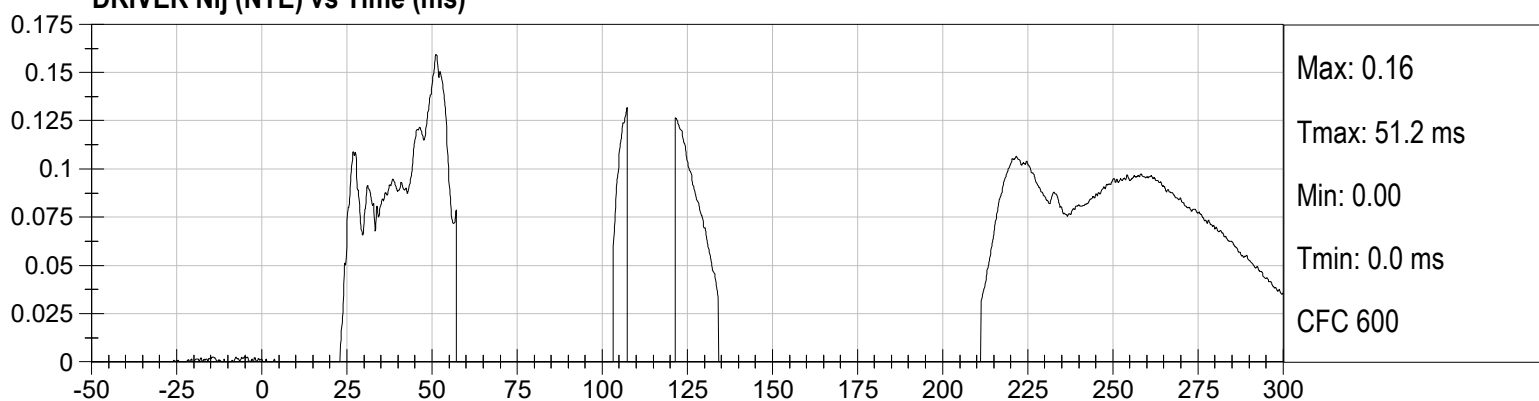
DRIVER NECK MY (Nm) vs Time (ms)



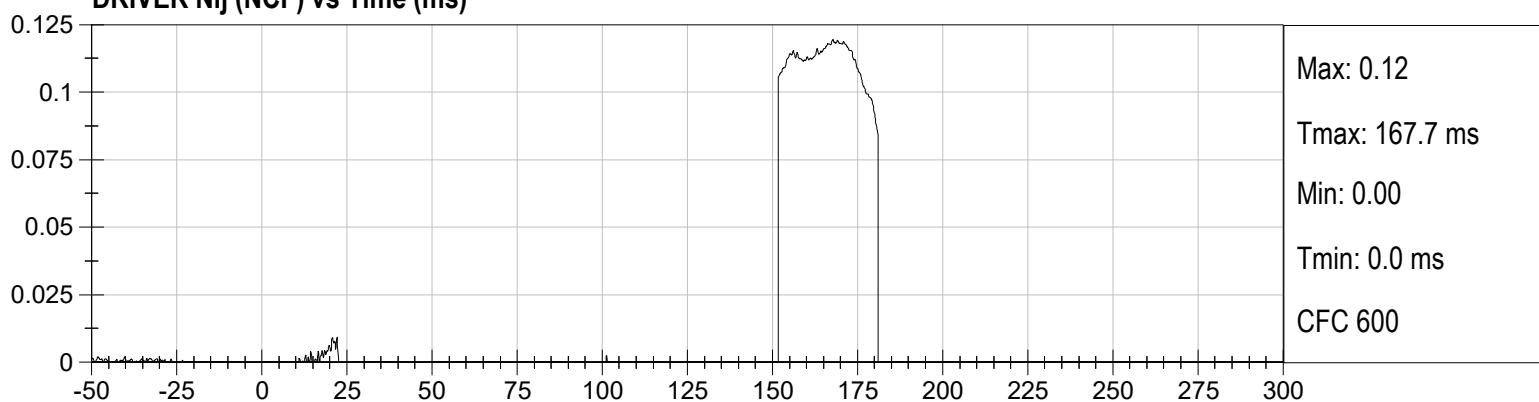
DRIVER Nij (NTF) vs Time (ms)



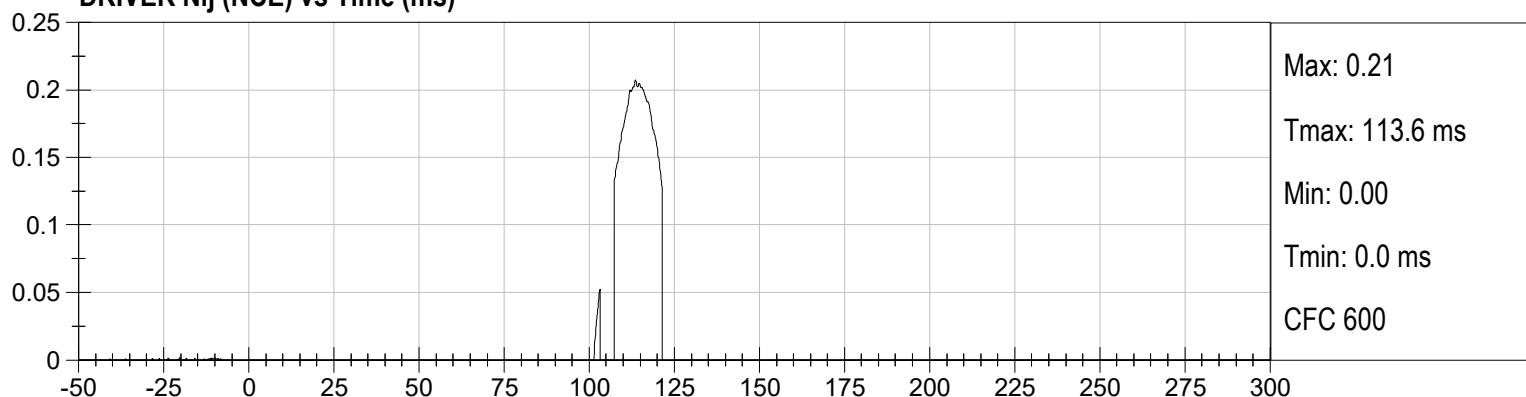
DRIVER Nij (NTE) vs Time (ms)



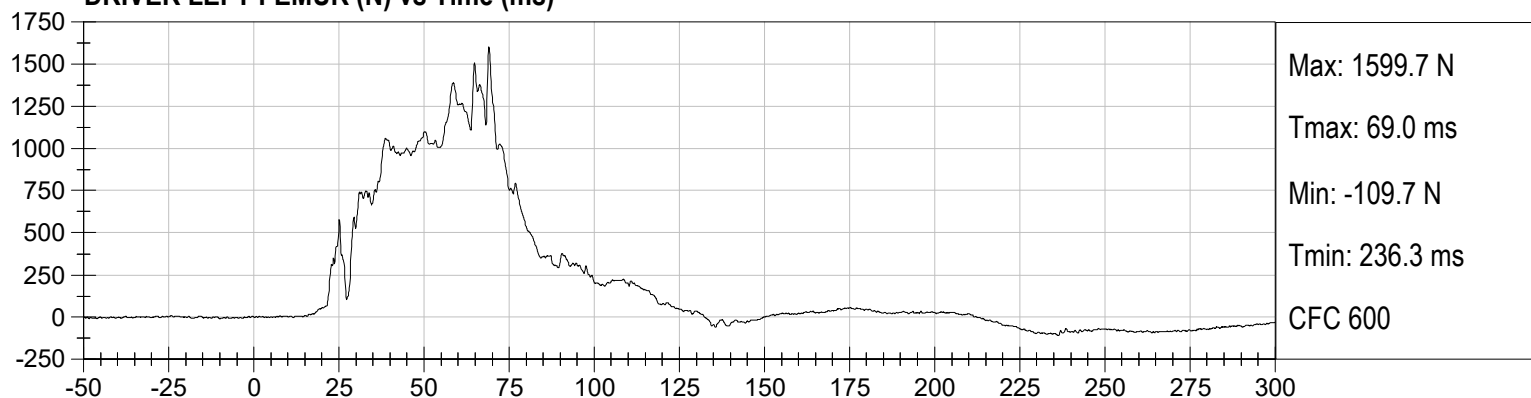
DRIVER Nij (NCF) vs Time (ms)



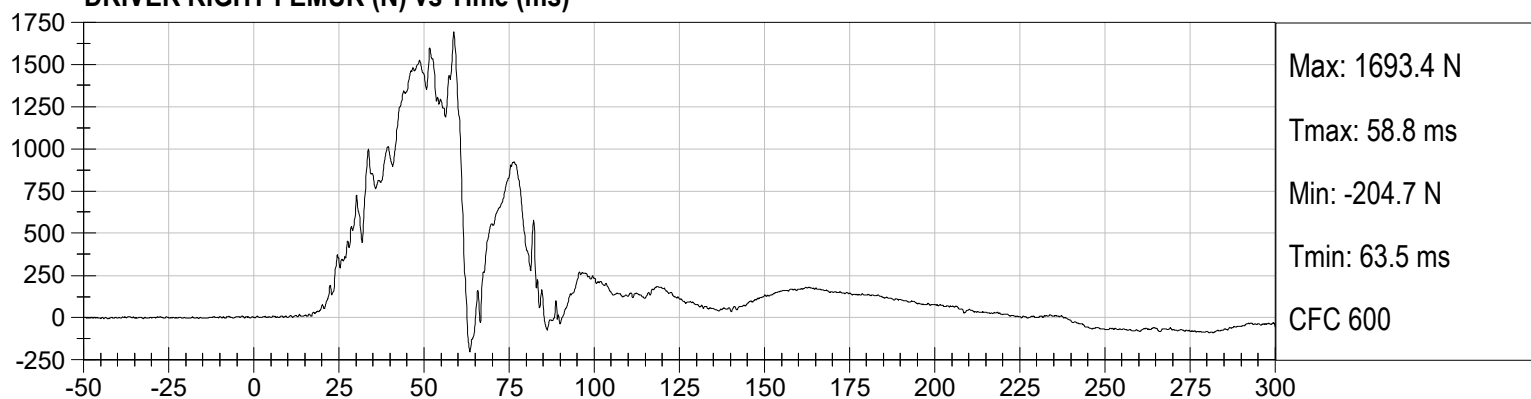
DRIVER Nij (NCE) vs Time (ms)



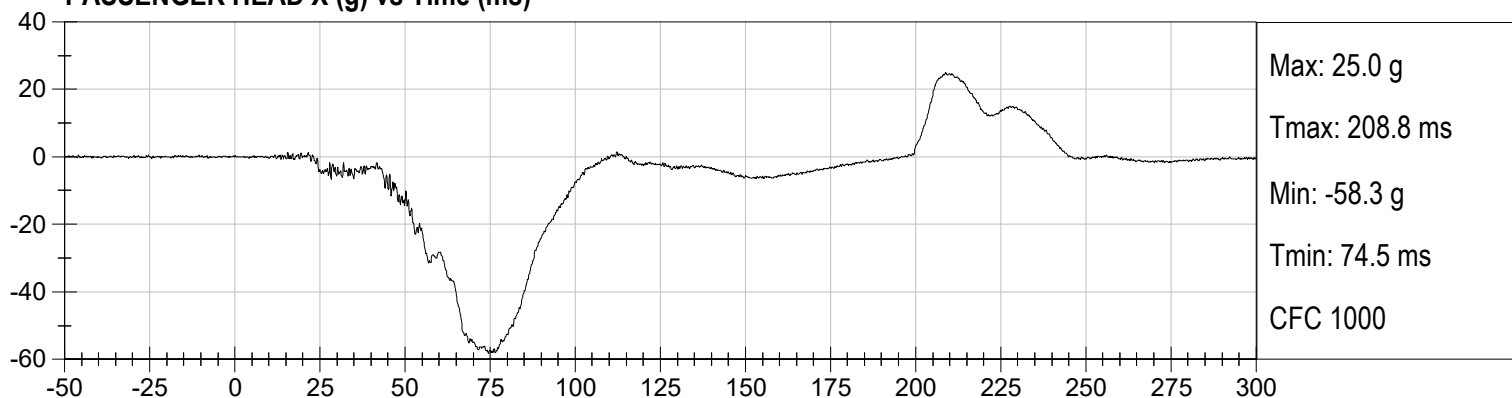
DRIVER LEFT FEMUR (N) vs Time (ms)



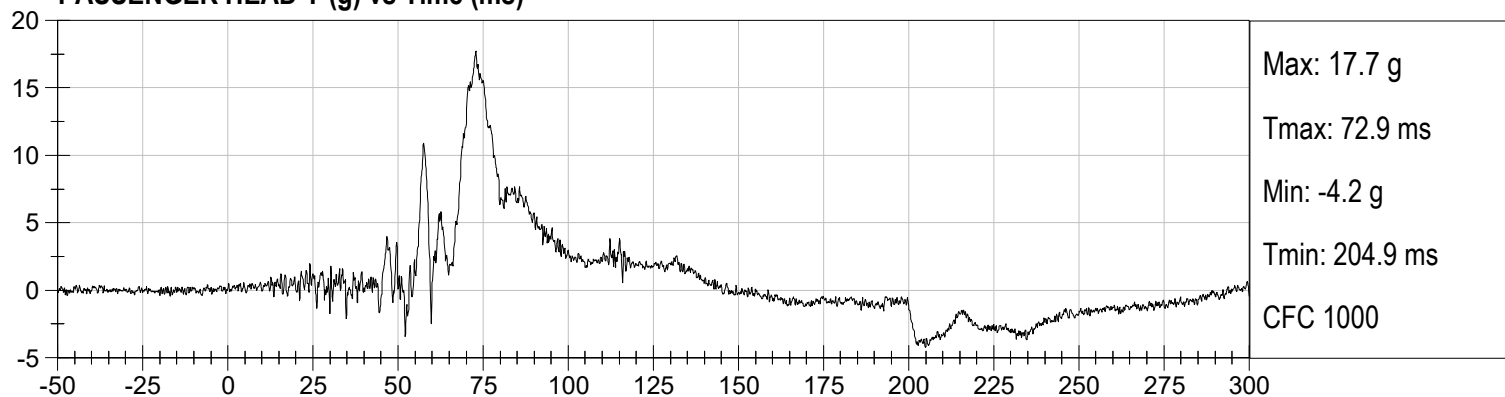
DRIVER RIGHT FEMUR (N) vs Time (ms)



PASSENGER HEAD X (g) vs Time (ms)



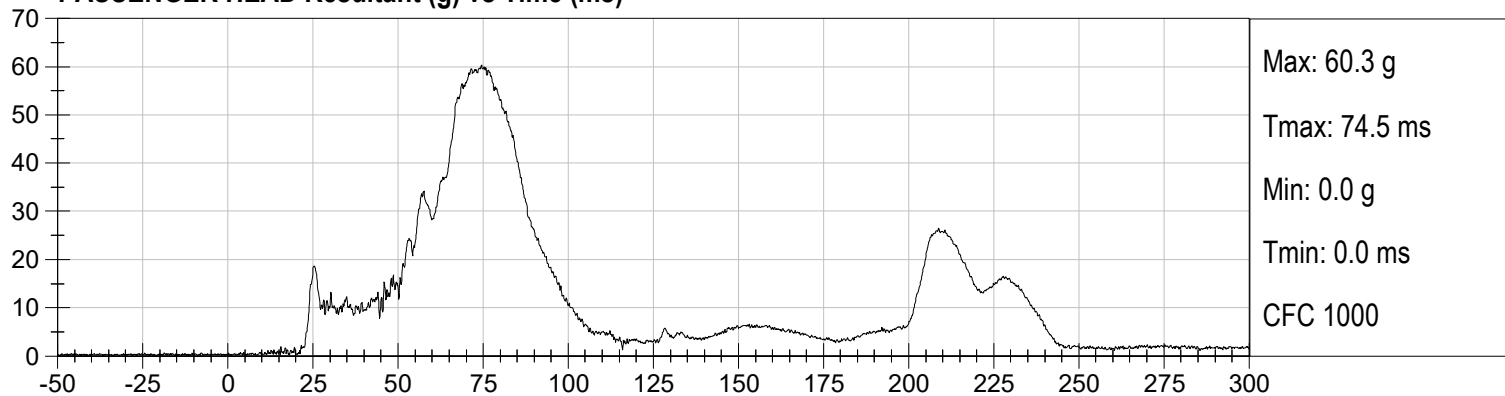
PASSENGER HEAD Y (g) vs Time (ms)

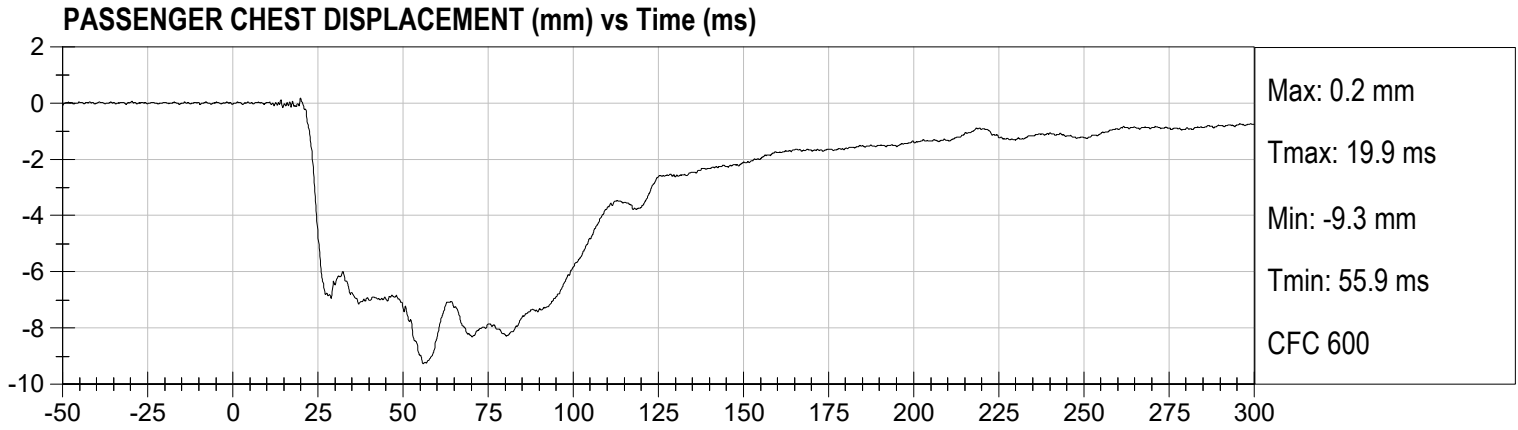


PASSENGER HEAD Z (g) vs Time (ms)

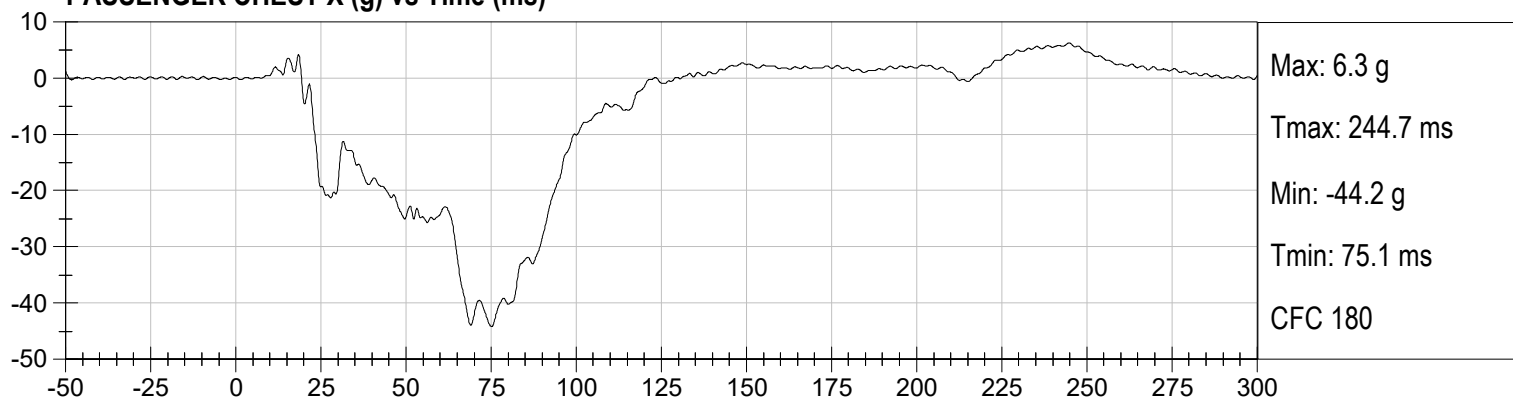


PASSENGER HEAD Resultant (g) vs Time (ms)

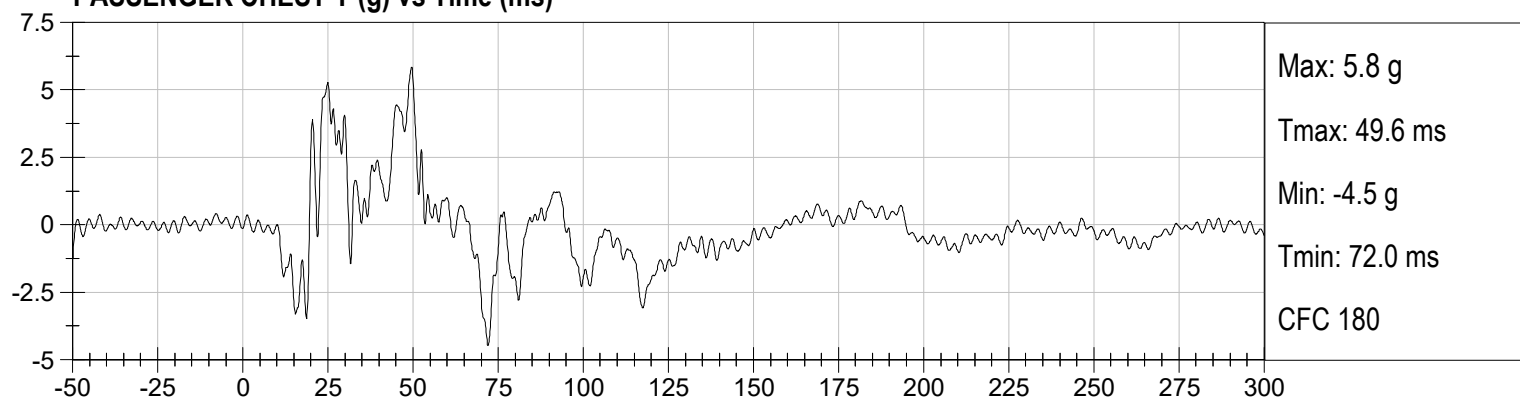




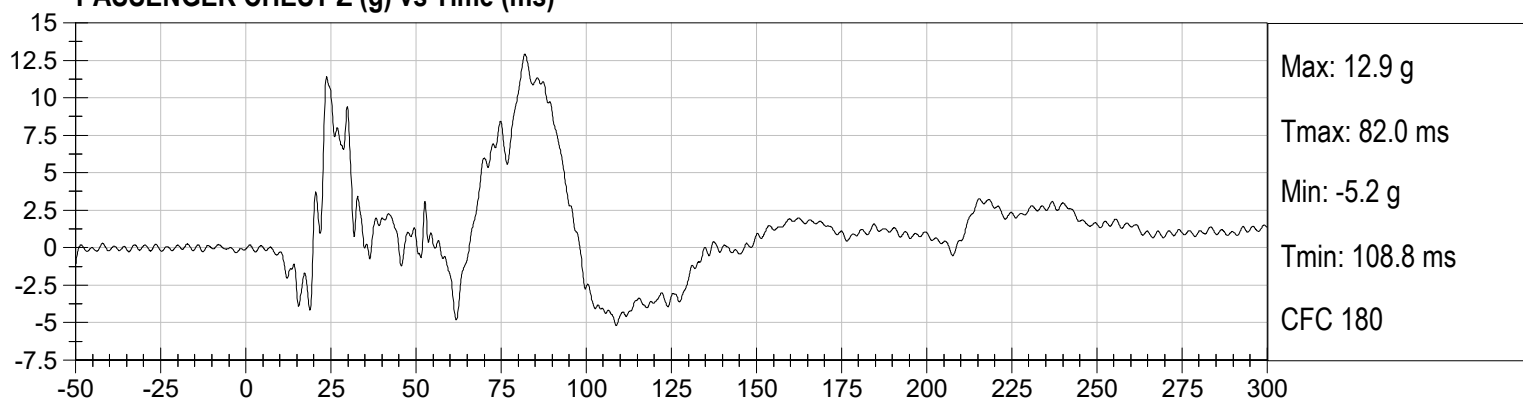
PASSENGER CHEST X (g) vs Time (ms)



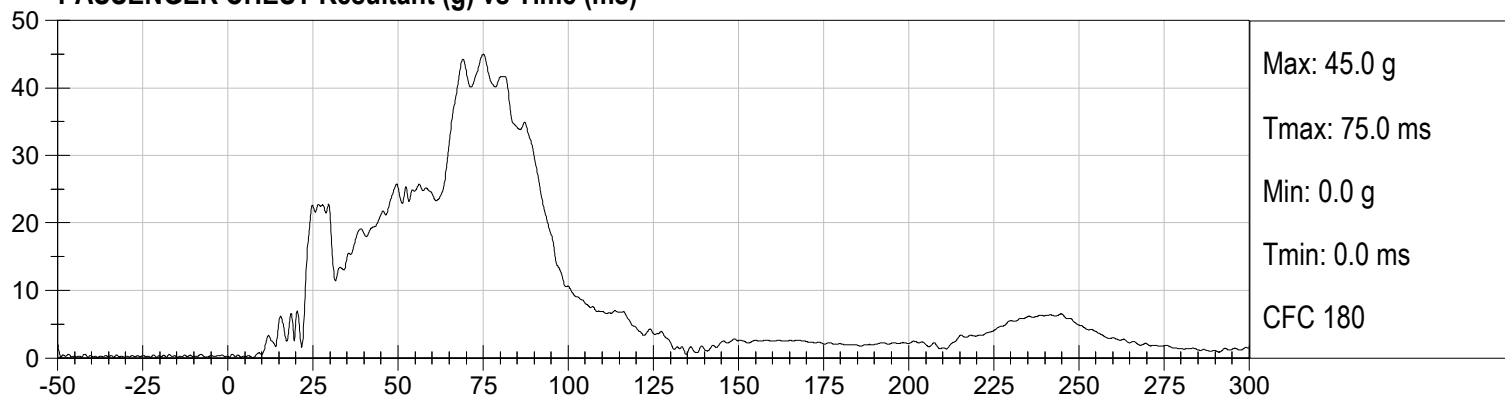
PASSENGER CHEST Y (g) vs Time (ms)



PASSENGER CHEST Z (g) vs Time (ms)



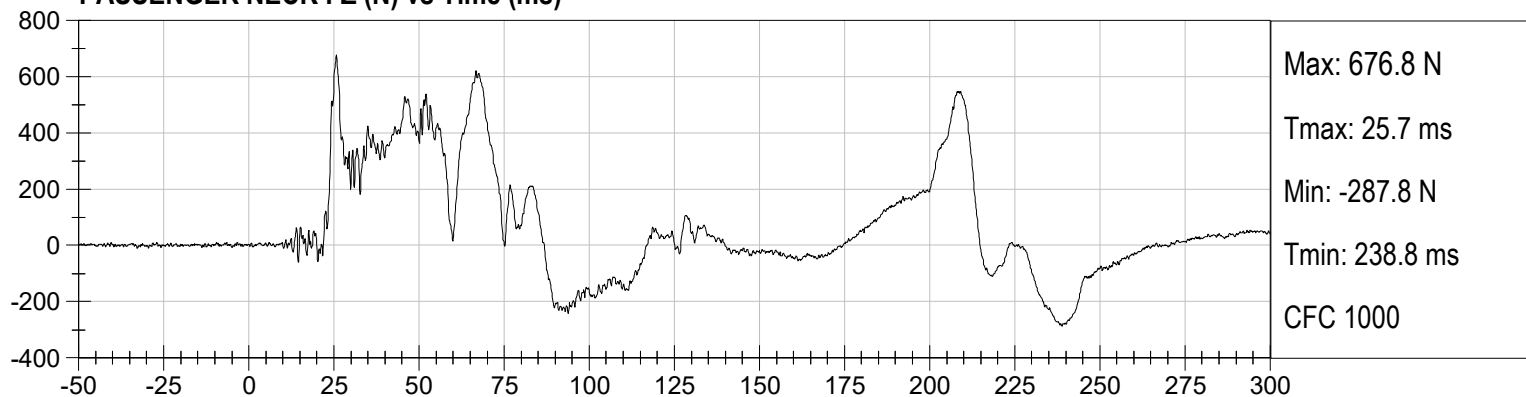
PASSENGER CHEST Resultant (g) vs Time (ms)



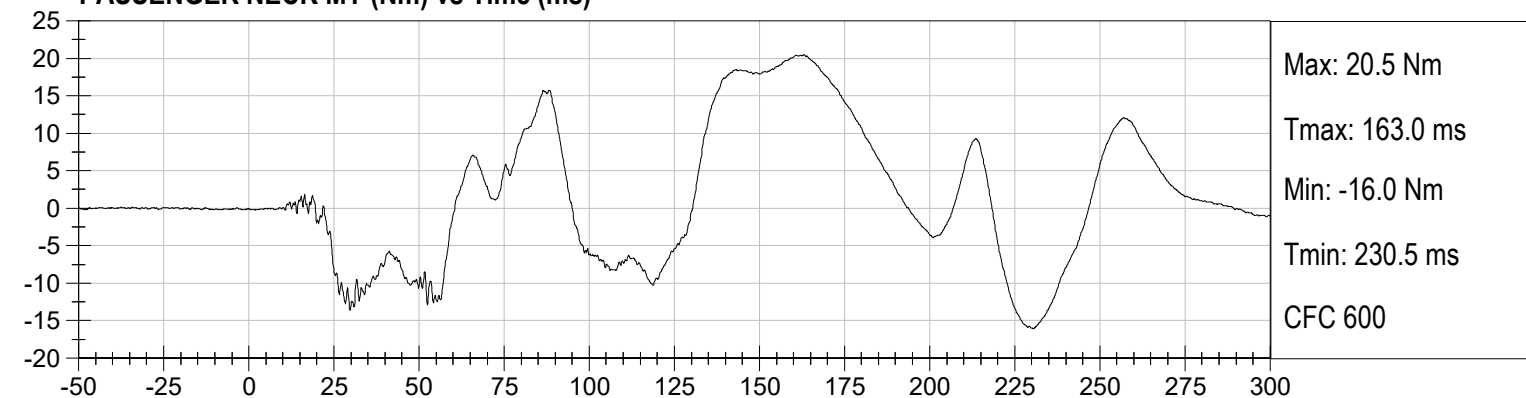
PASSENGER NECK FX (N) vs Time (ms)



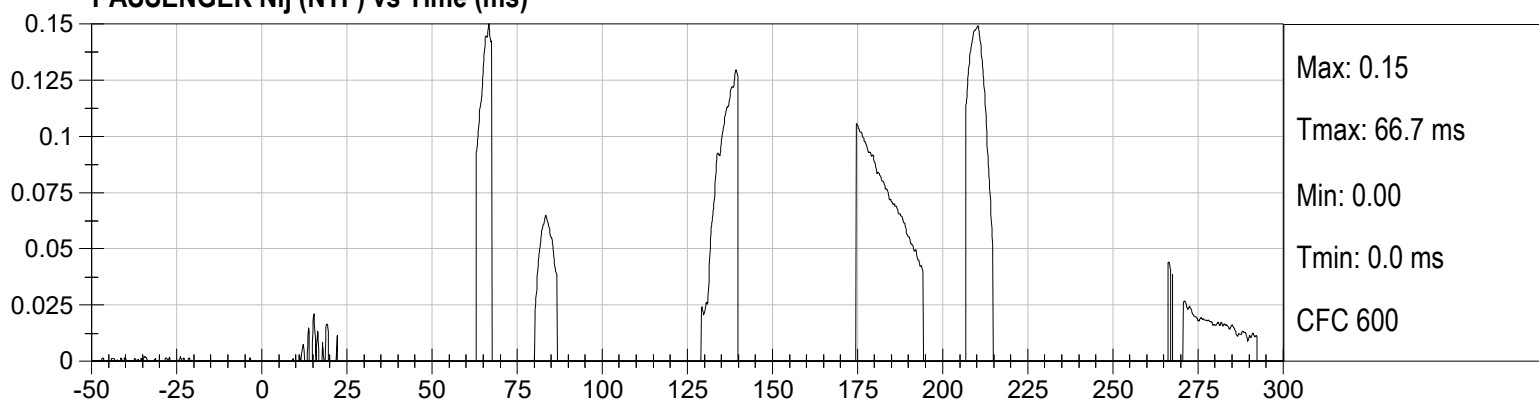
PASSENGER NECK FZ (N) vs Time (ms)



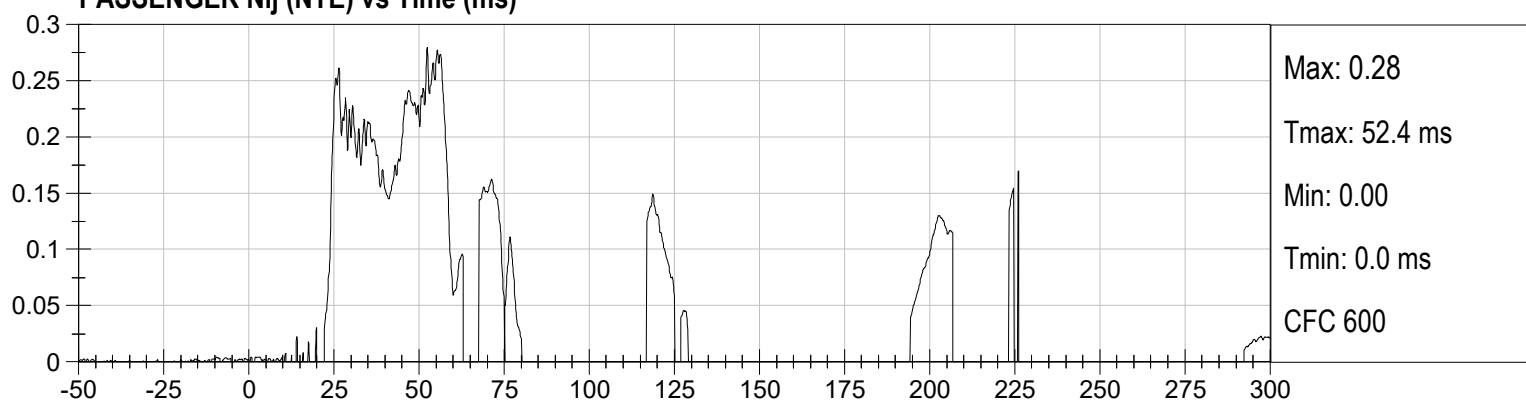
PASSENGER NECK MY (Nm) vs Time (ms)



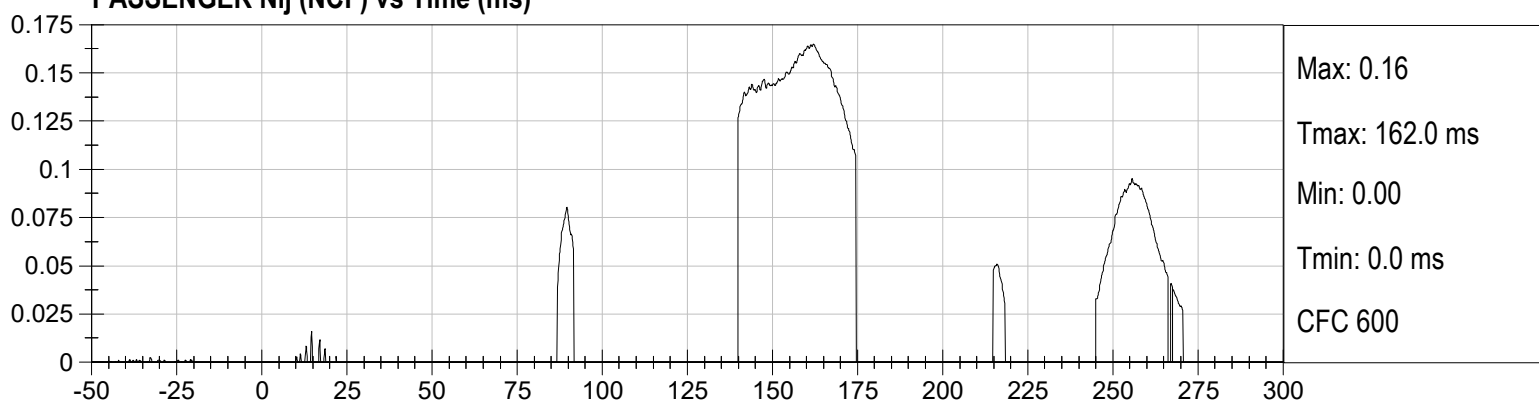
PASSENGER Nij (NTF) vs Time (ms)



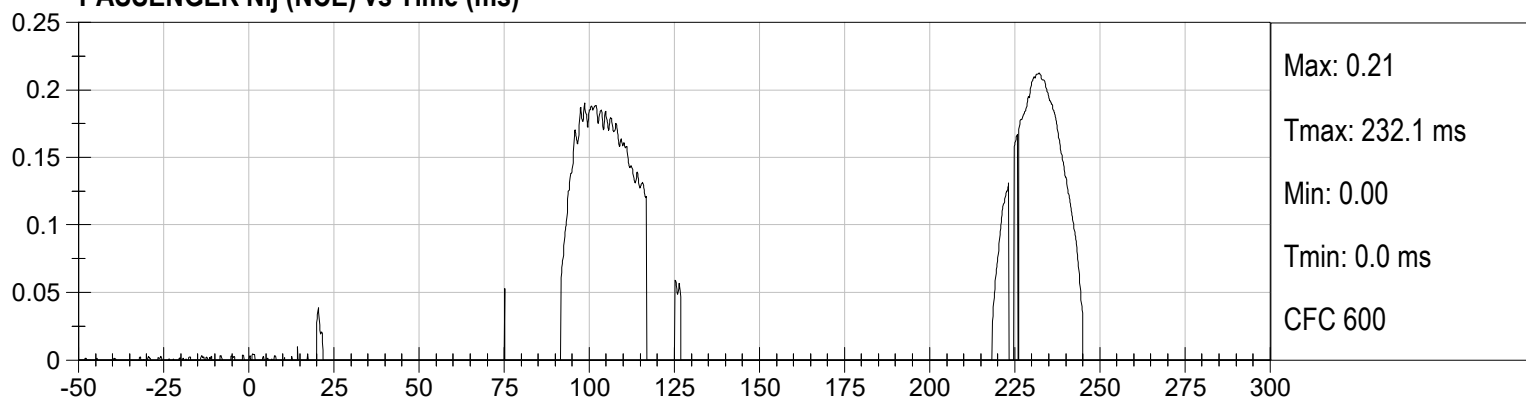
PASSENGER Nij (NTE) vs Time (ms)



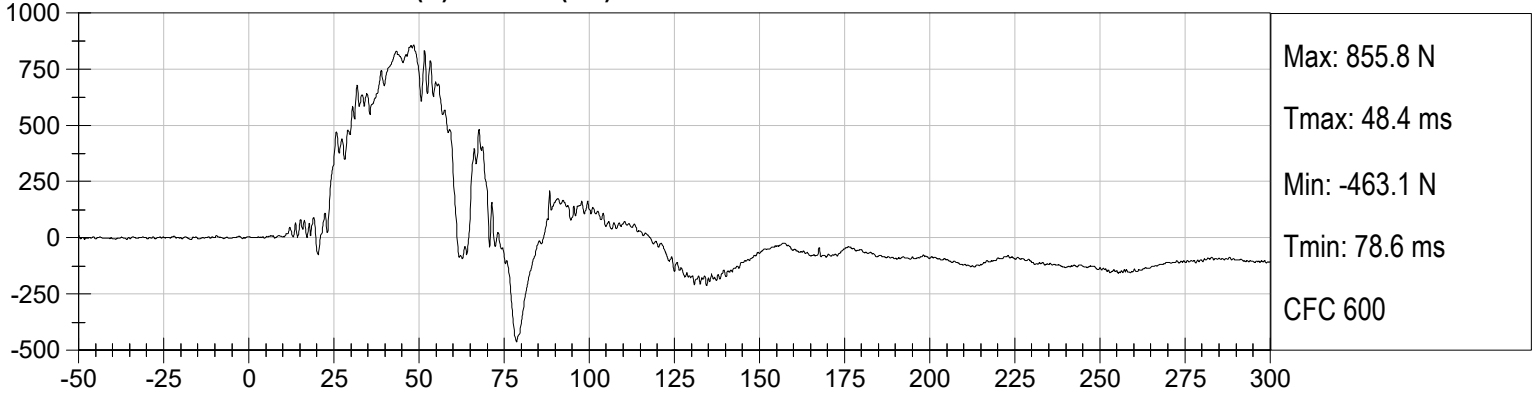
PASSENGER Nij (NCF) vs Time (ms)



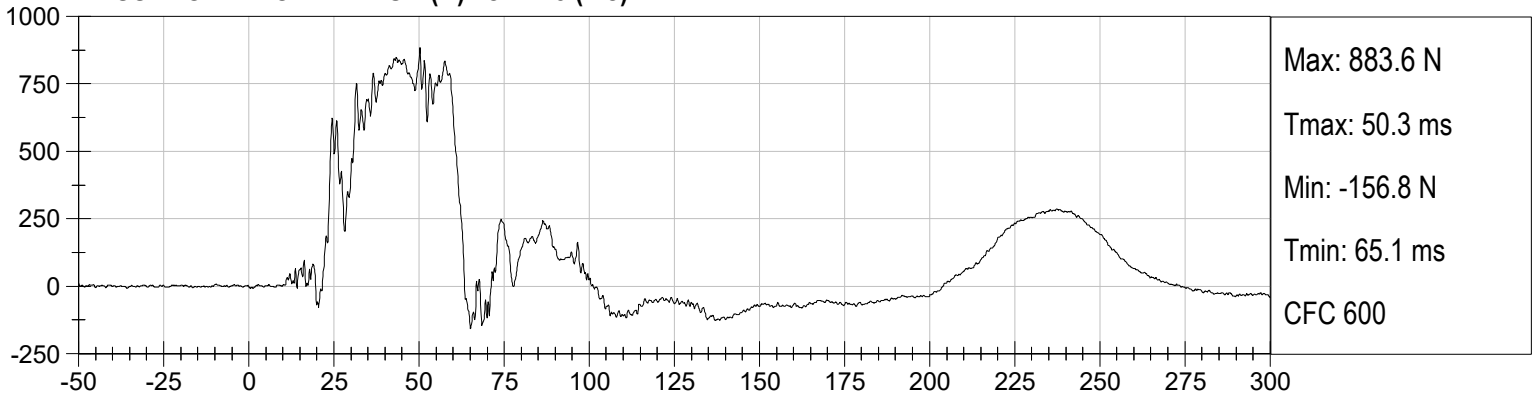
PASSENGER Nij (NCE) vs Time (ms)



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 50TH 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

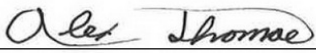
NOTE: THE H-POINT IS LOCATED 1.83 INCHES FORWARD AND 2.57 INCHES DOWN FROM THE CENTER OF THE PELVIS ANGLE REFERENCE HOLE.

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

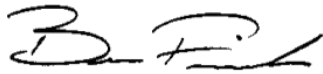
ATD Serial No: 351

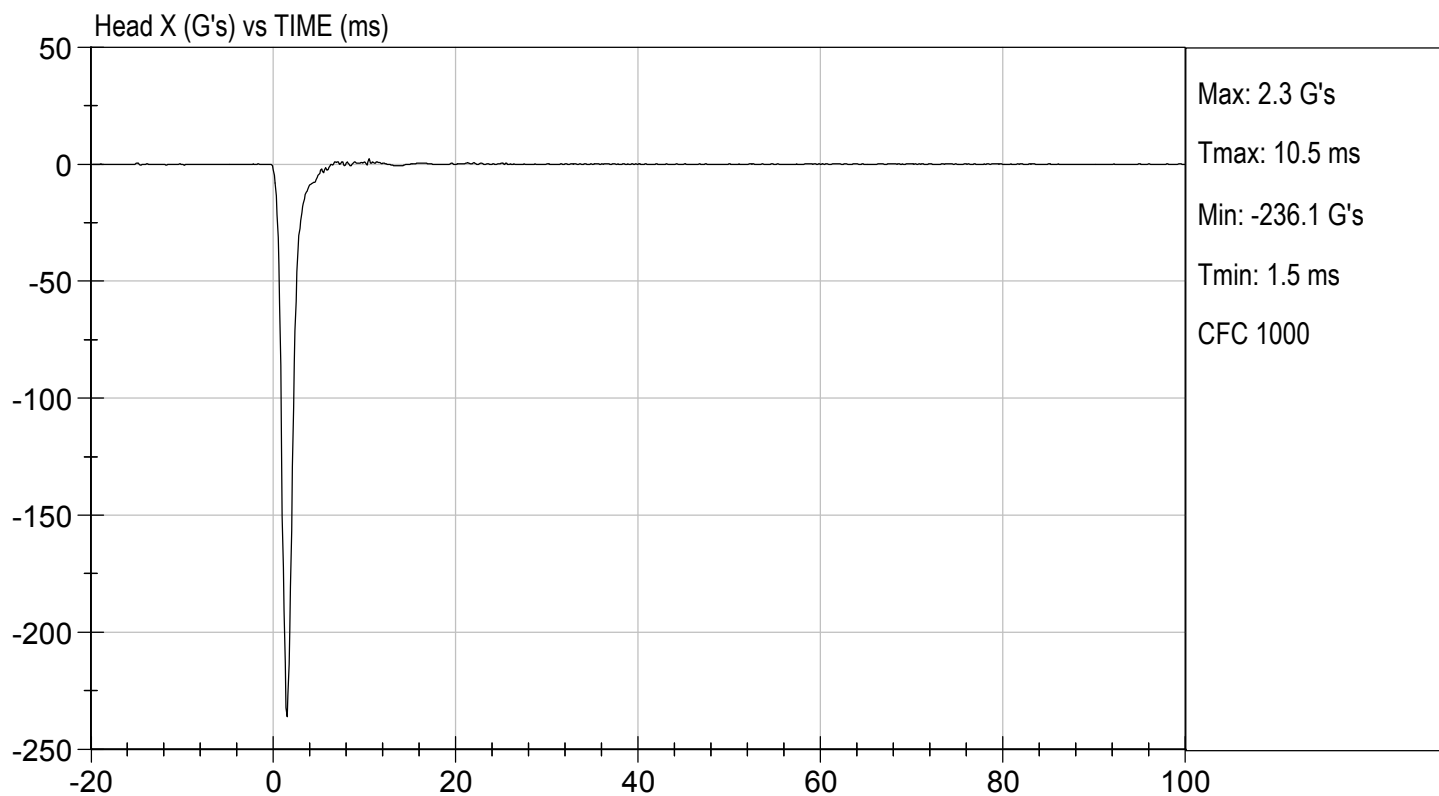
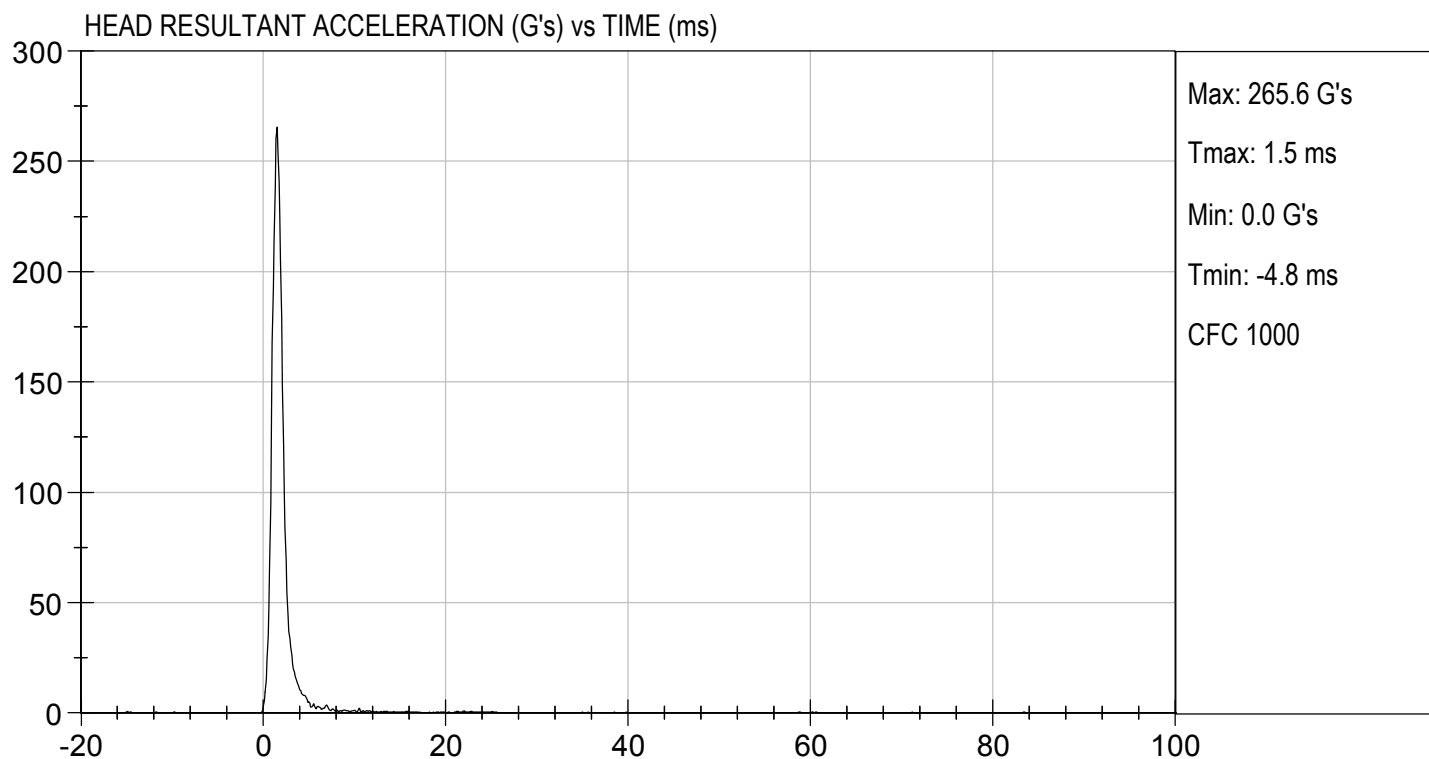
Test ID: D210801

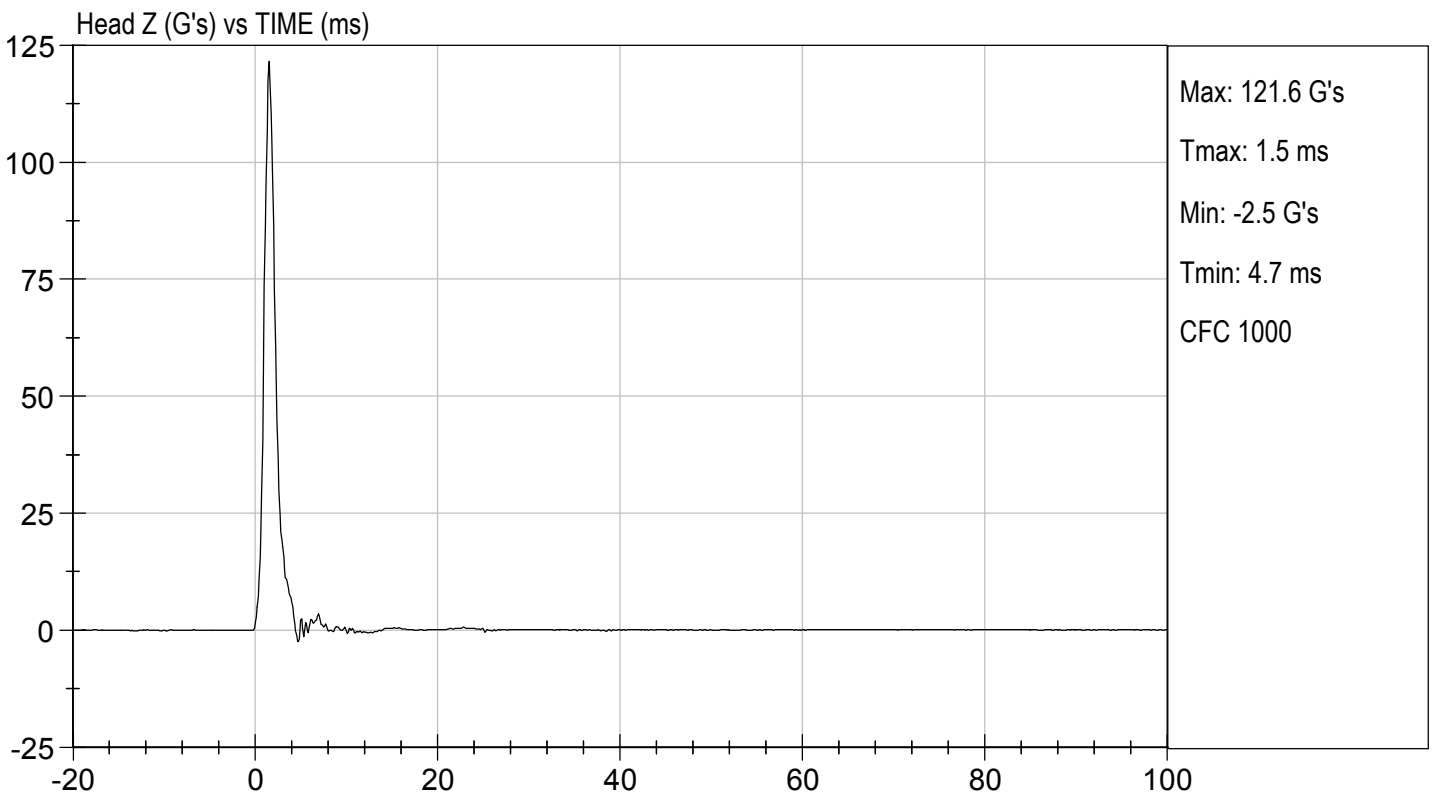
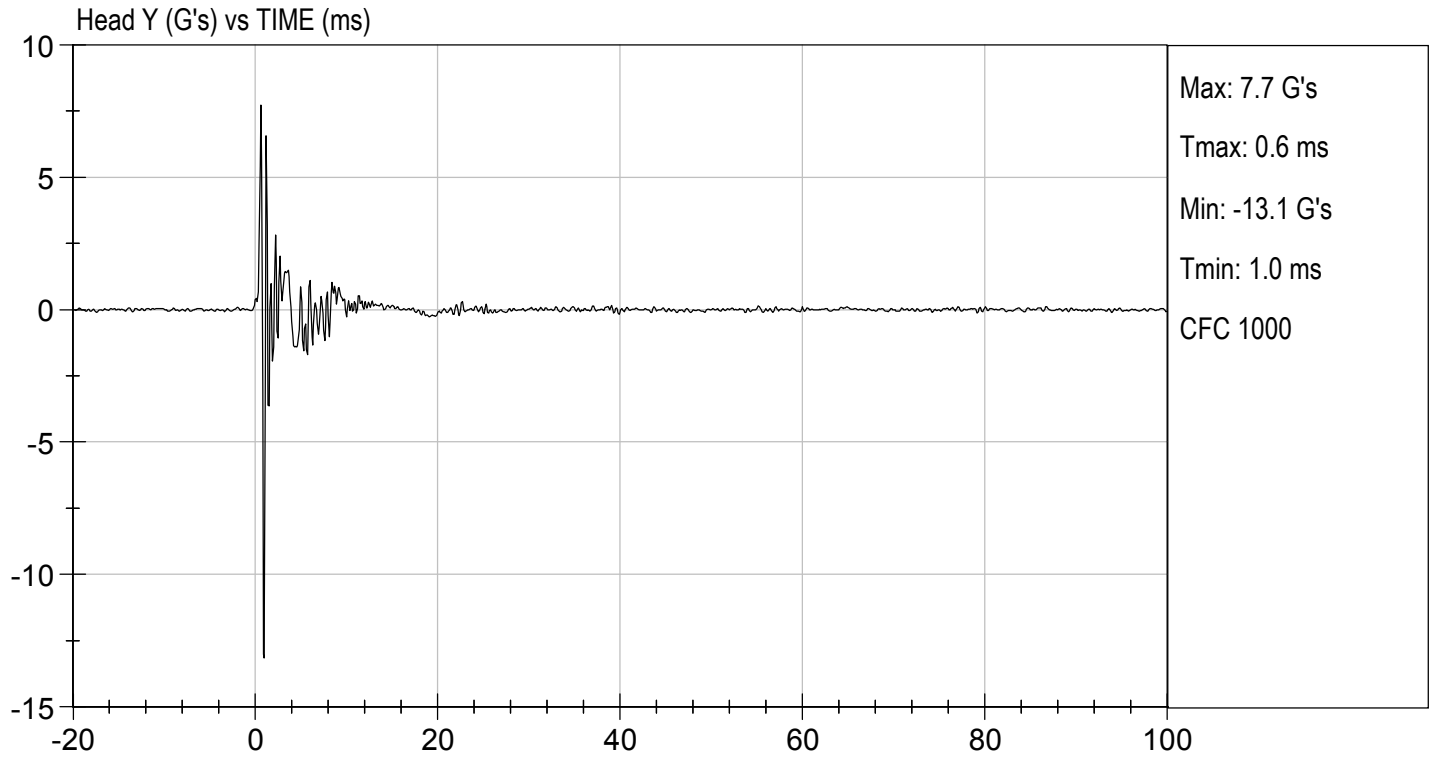
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	39	Pass
Peak Resultant Acceleration	G's	225 to 275	266	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	-13.1	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
Overall Test Results				Pass


Laboratory Technician

03/11/2021
Test Date


Approved By





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

ATD Serial No: 351

Test I.D: D210802

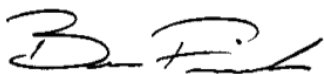
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity		%	10 to 70	27	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.06	Pass
Pendulum Deceleration	10 ms	G's	22.50 to 27.50	23.05	Pass
	20 ms	G's	17.60 to 22.60	20.81	Pass
	30 ms	G's	12.50 to 18.50	15.55	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 29.0	15.5	Pass
Deceleration Decay Time to Cross 5 G's		ms	34.0 to 42.0	37.3	Pass
Maximum "D" Plane Rotation	Maximum	Deg	64.0 to 78.0	72.0	Pass
	Time	ms	57.0 to 64.0	61.1	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	113.0 to 128.0	119.2	Pass
Moment About Occipital Condyle	Maximum	Nm	88.1 to 108.5	89.1	Pass
	Time	ms	47.0 to 58.0	47.8	Pass
Positive Moment Decay Time To Zero Crossing		ms	97.0 to 107.0	102.1	Pass
Overall Test Results					Pass



Laboratory Technician

03/12/2021

Test Date

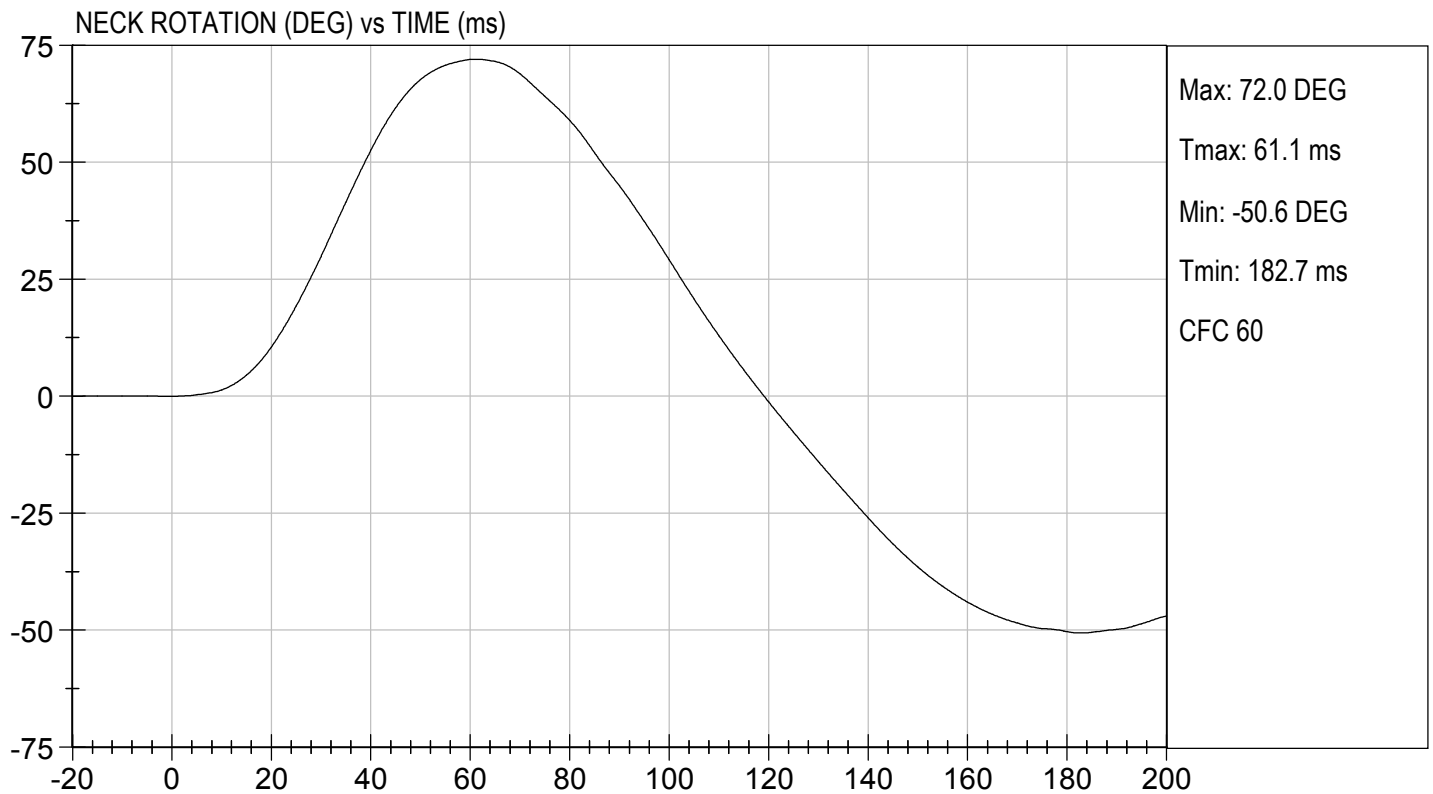
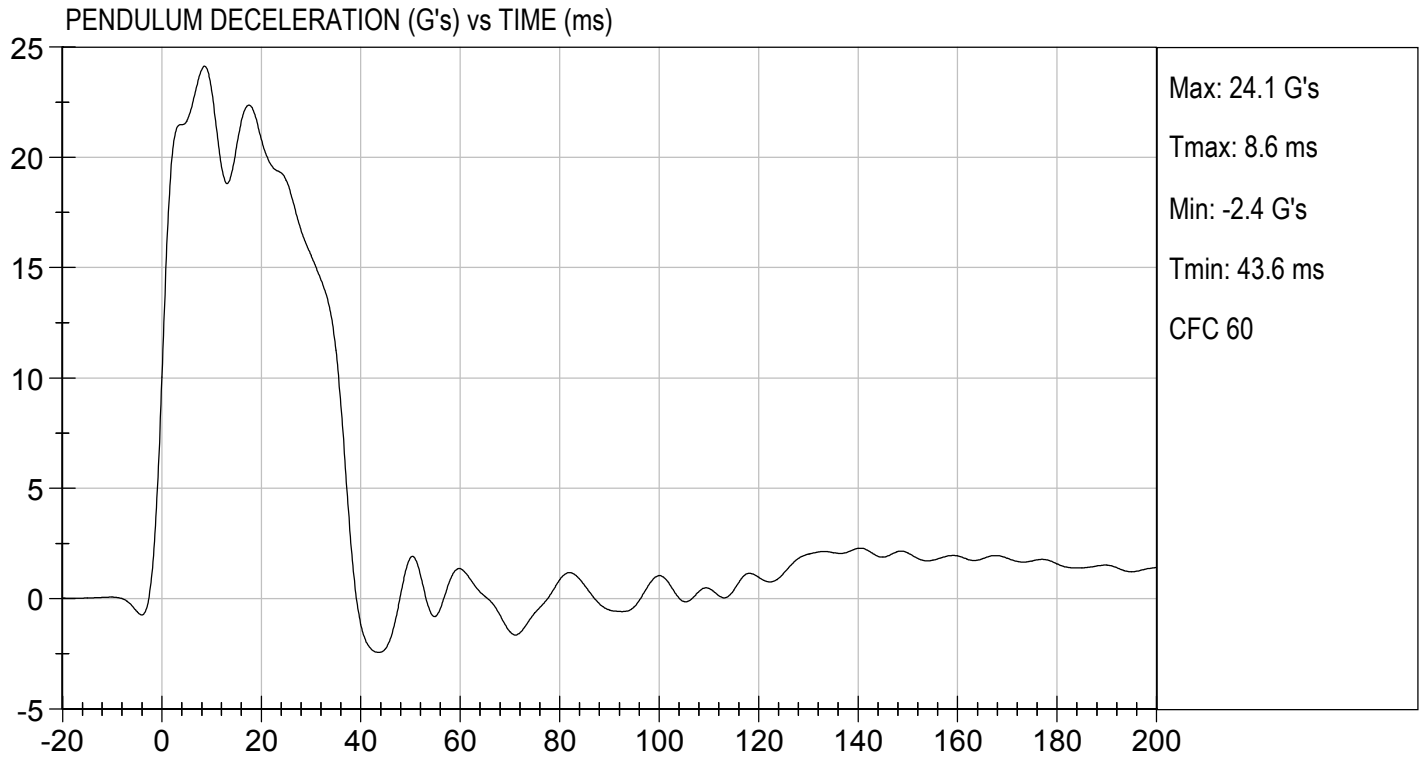


Approved By



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

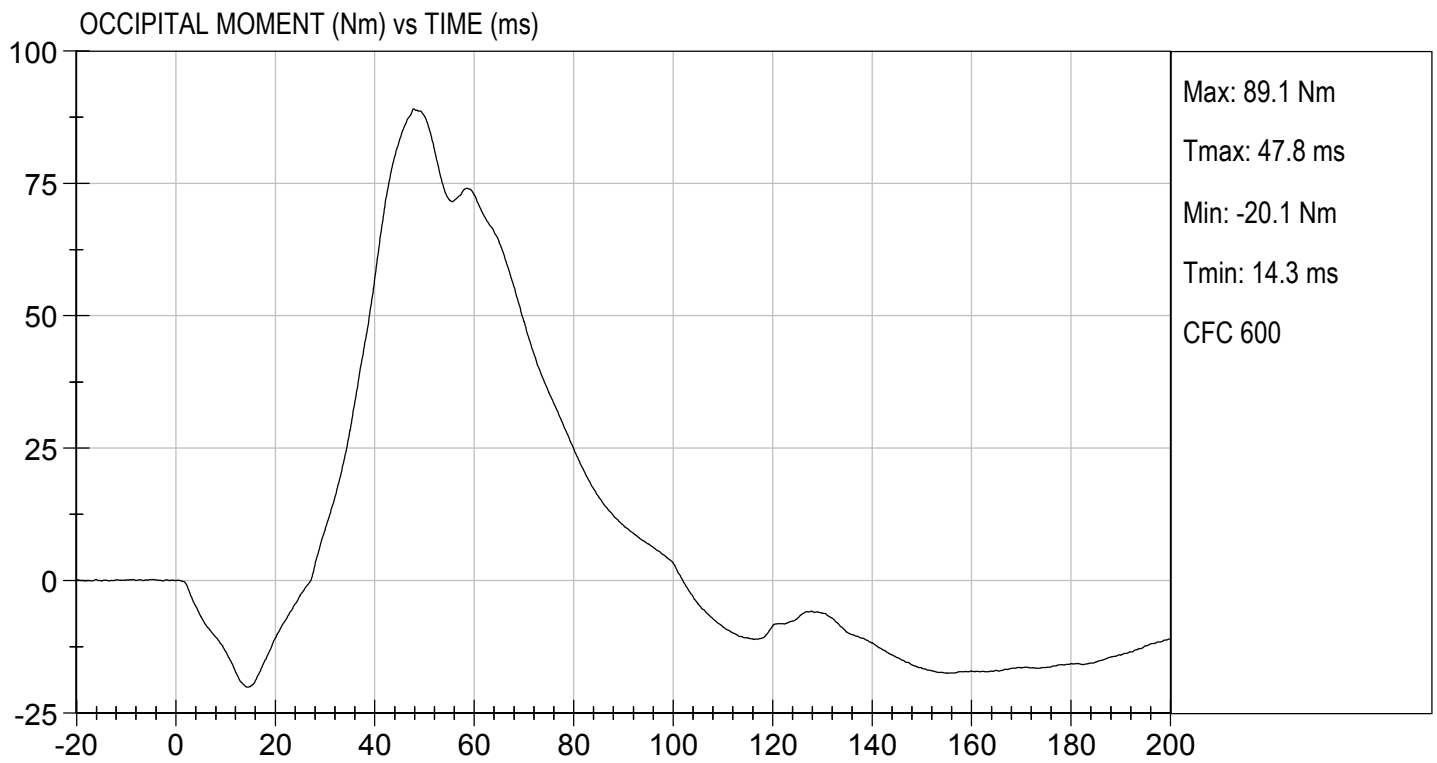
TEST DATE: 03/12/2021
TEST #: D210802





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

TEST DATE: 03/12/2021
TEST #: D210802



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

ATD Serial No: 351

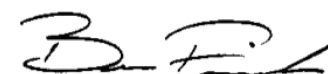
Test I.D: D210803

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity		%	10 to 70	27	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.12	Pass
Pendulum Deceleration	10 ms	G's	17.20 to 21.20	17.72	Pass
	20 ms	G's	14.00 to 19.00	15.06	Pass
	30 ms	G's	11.00 to 16.00	12.98	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	41.6	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	94.1	Pass
	Time	ms	72.0 to 82.0	80.8	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	147.0 to 174.0	159.7	Pass
Moment About Occipital Condyle	Maximum	Nm	-52.9 to -79.9	-63.8	Pass
	Time	ms	65.0 to 79.0	72.6	Pass
Negative Moment Decay Time To Zero Crossing		ms	120.0 to 148.0	143.8	Pass
Overall Test Results					Pass


 Laboratory Technician

03/12/2021

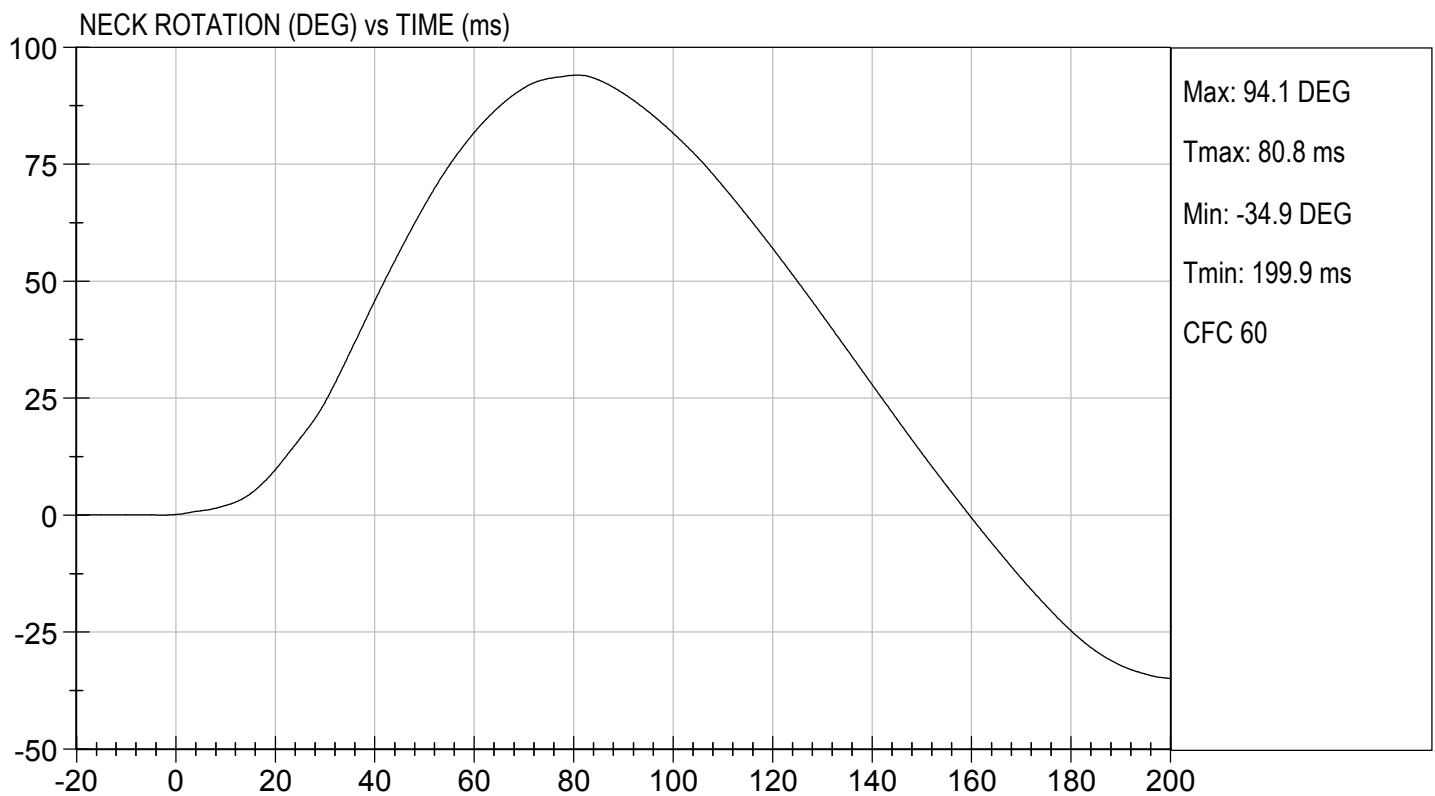
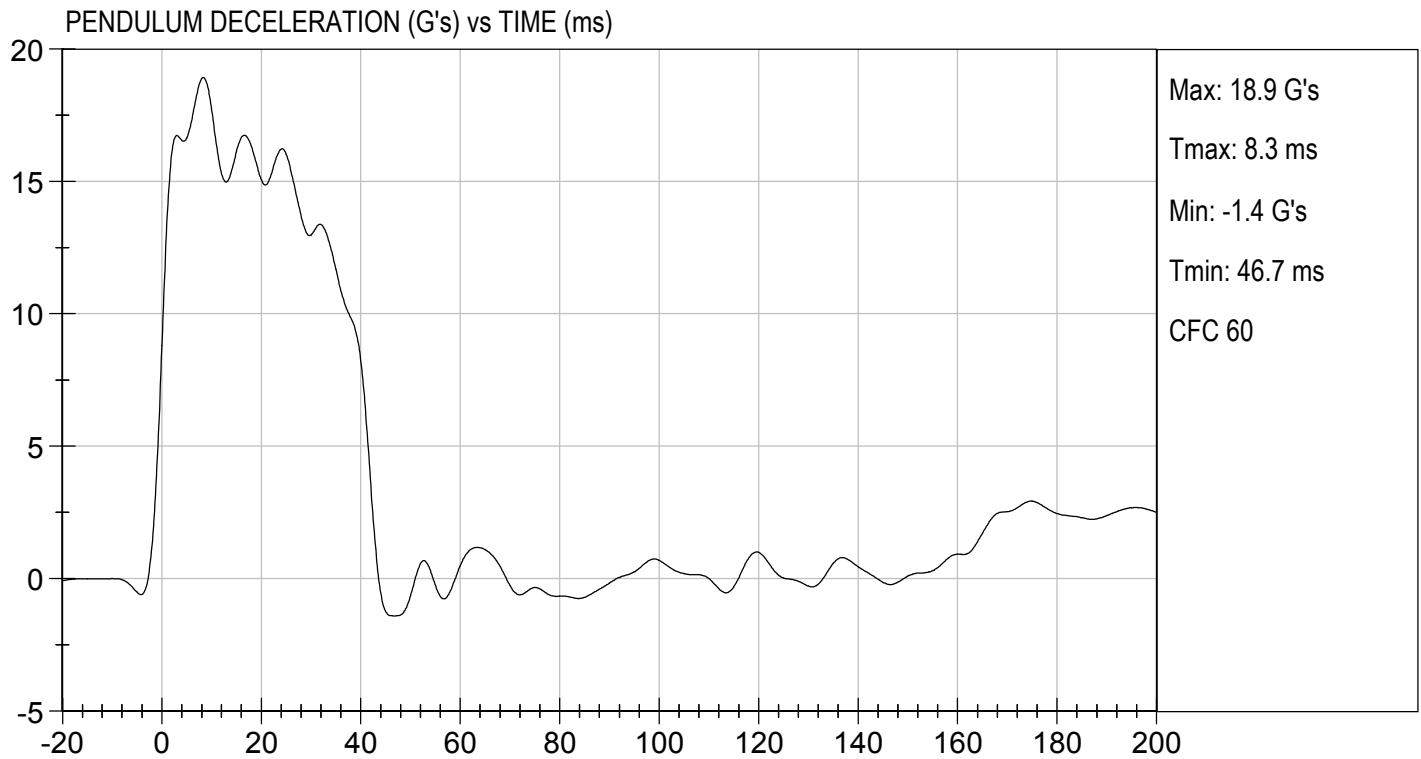
Test Date


 Approved By



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

TEST DATE: 03/12/2021
TEST #: D210803





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

TEST DATE: 03/12/2021
TEST #: D210803



MGA RESEARCH CORPORATION
THORAX IMPACT
HYBRID III 50TH PERCENTILE MALE

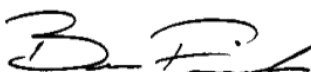
ATD Serial No: 351

Test I.D: D210804

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Probe Velocity	m/s	6.58 to 6.82	6.60	Pass
Peak Probe Force	N	5159 to 5893	5,358	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.81	Pass
Internal Hysteresis	%	69 to 85	72	Pass
			Overall Test Results	Pass


Laboratory Technician

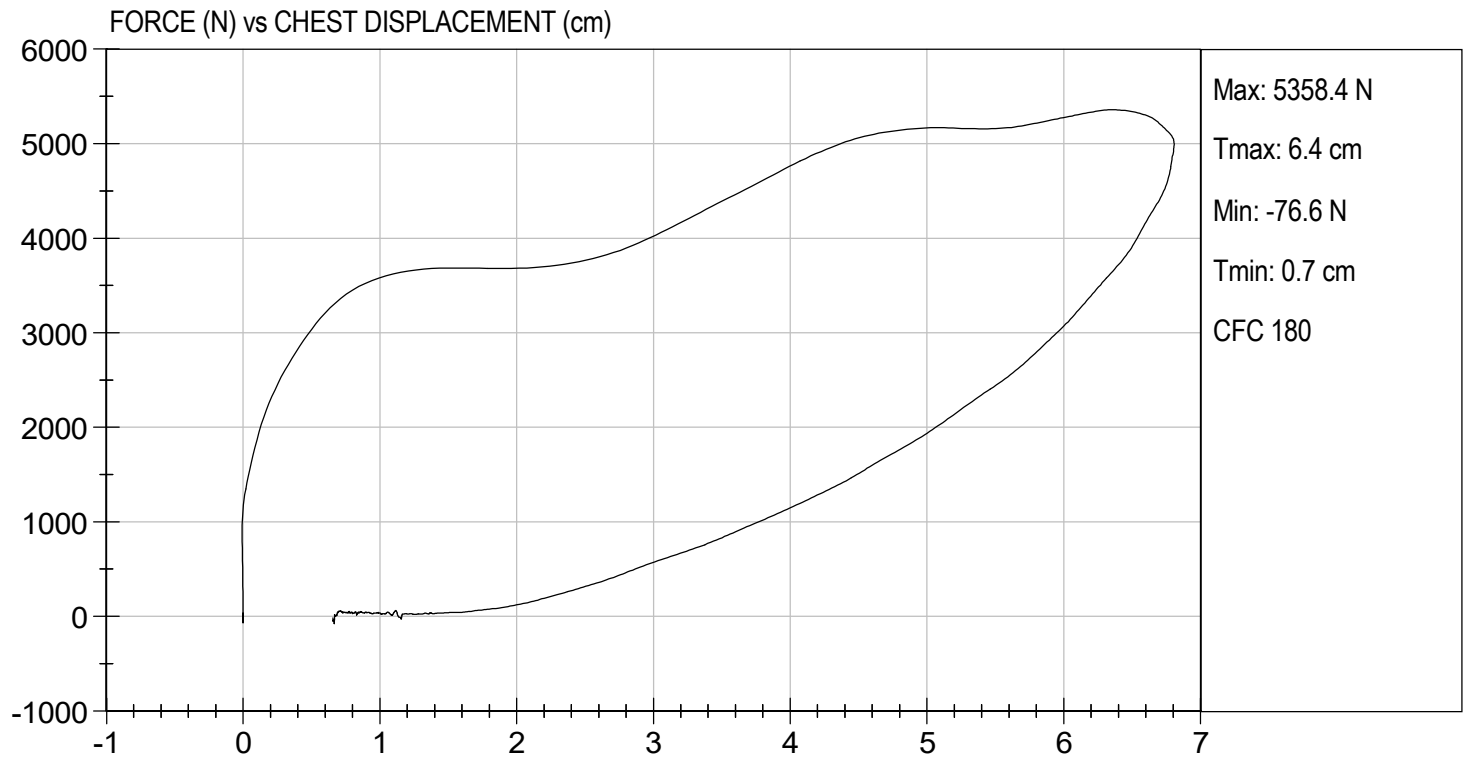
03/15/2021
Test Date


Approved By



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

TEST DATE: 03/15/2021
TEST #: D210804



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

ATD Serial No: 351

Test I.D: D210805

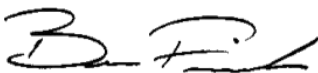
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	38	Pass
Probe Velocity	m/s	2.07 to 2.13	2.11	Pass
Peak Probe Force	N	4715 to 5782	5,470	Pass
Overall Test Results				Pass



Laboratory Technician

03/11/2021

Test Date

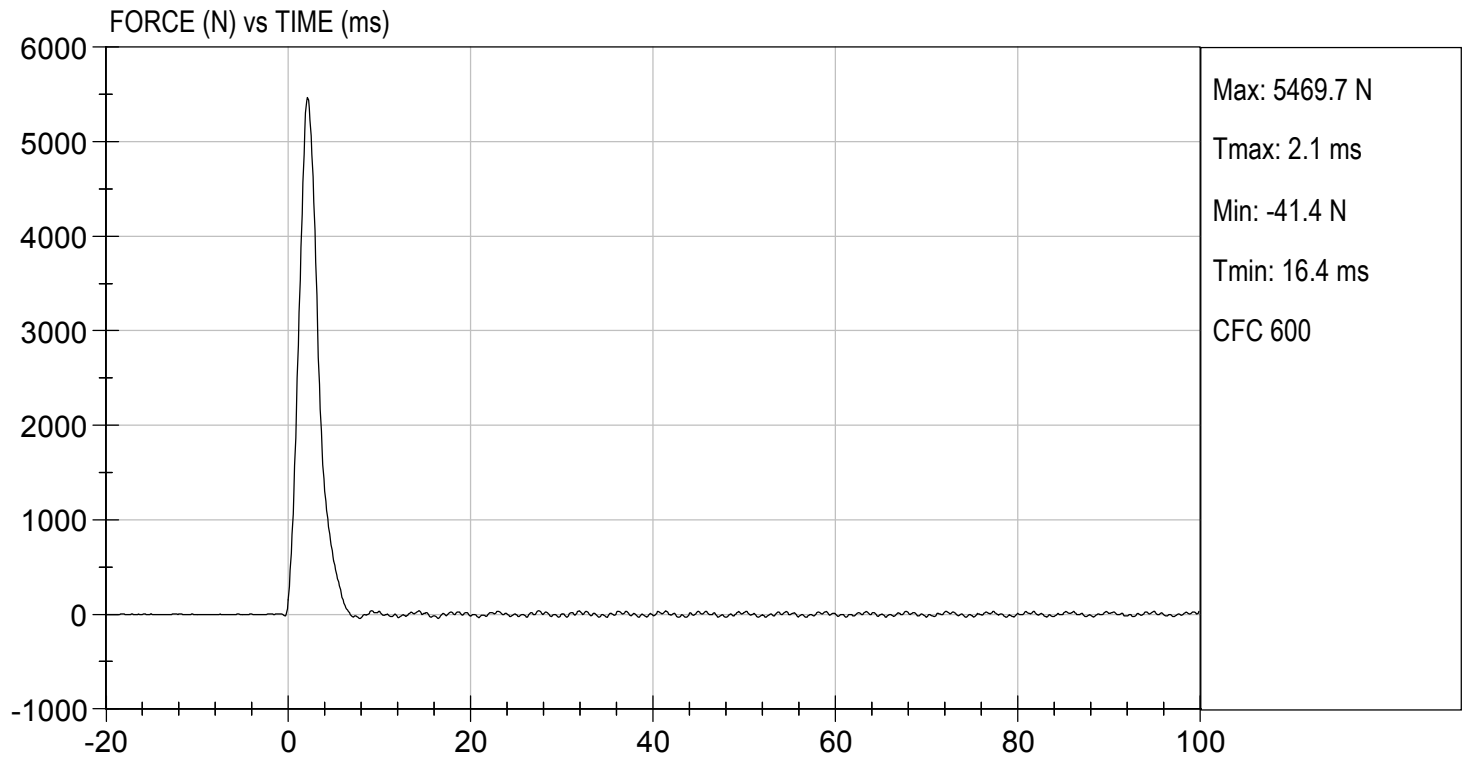


Approved By



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

TEST DATE: 03/11/2021
TEST #: D210805



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

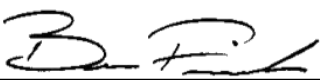
ATD Serial No: 351

Test I.D: D210806

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	38	Pass
Probe Velocity	m/s	2.07 to 2.13	2.12	Pass
Peak Probe Force	N	4715 to 5782	5,662	Pass
Overall Test Results				Pass


Laboratory Technician

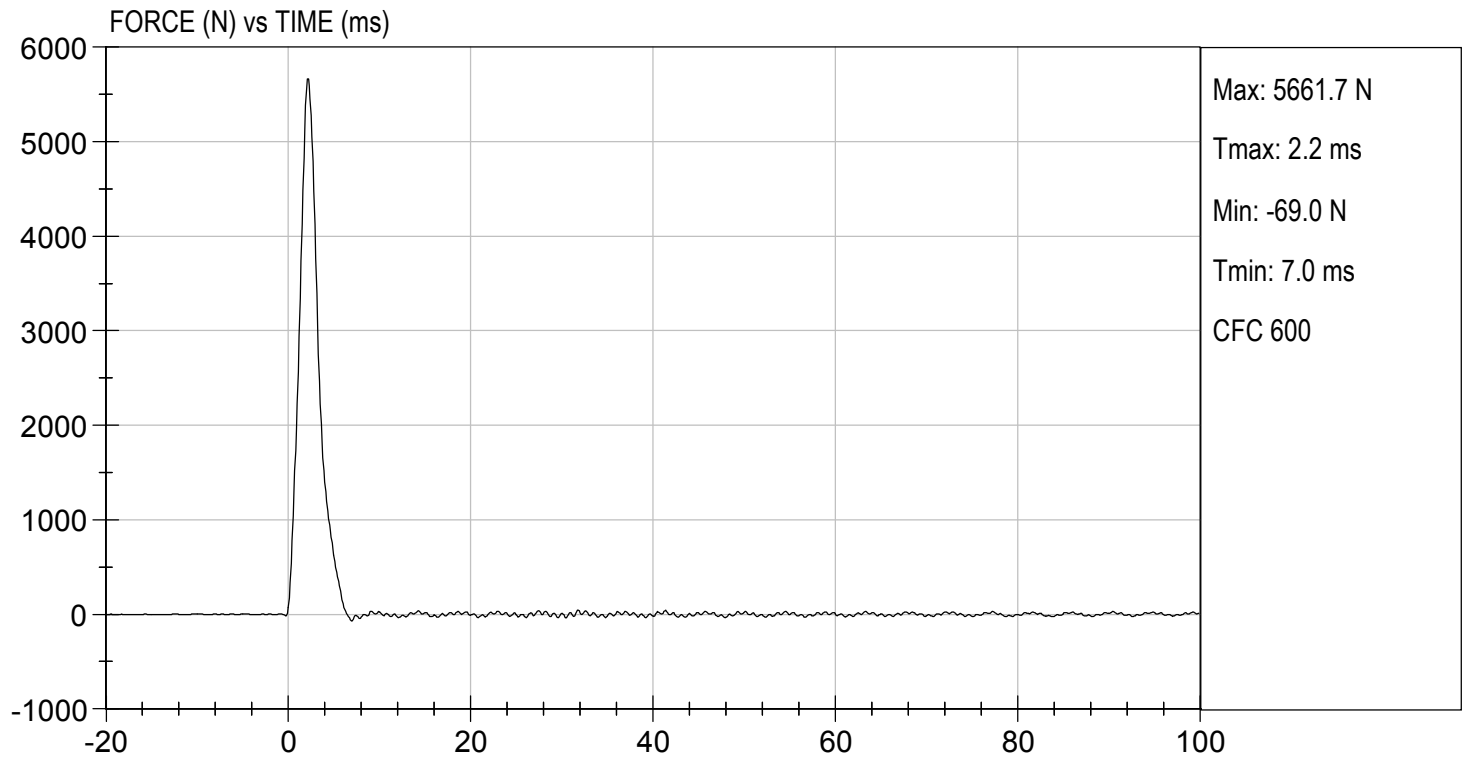
03/11/2021
Test Date


Approved By



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

TEST DATE: 03/11/2021
TEST #: D210806



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

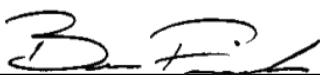
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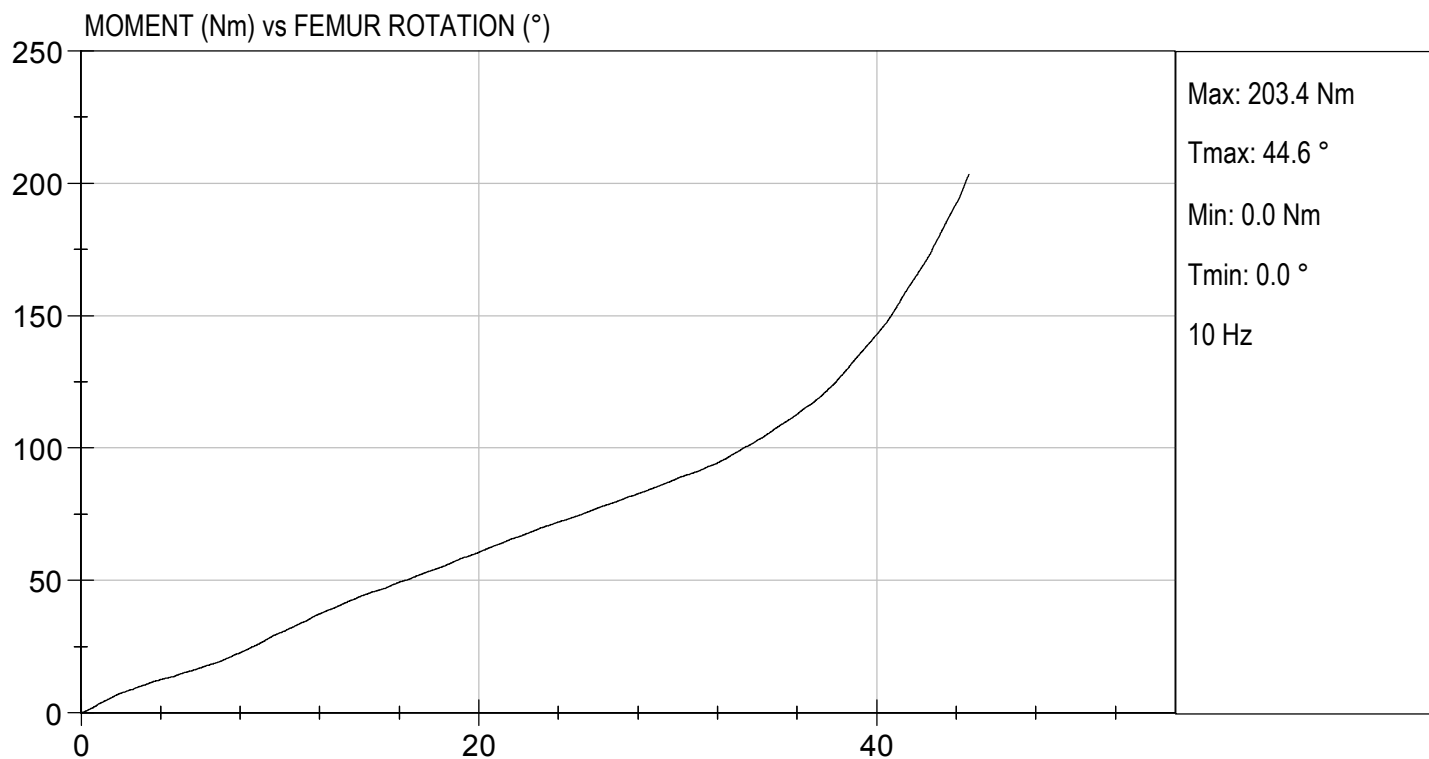
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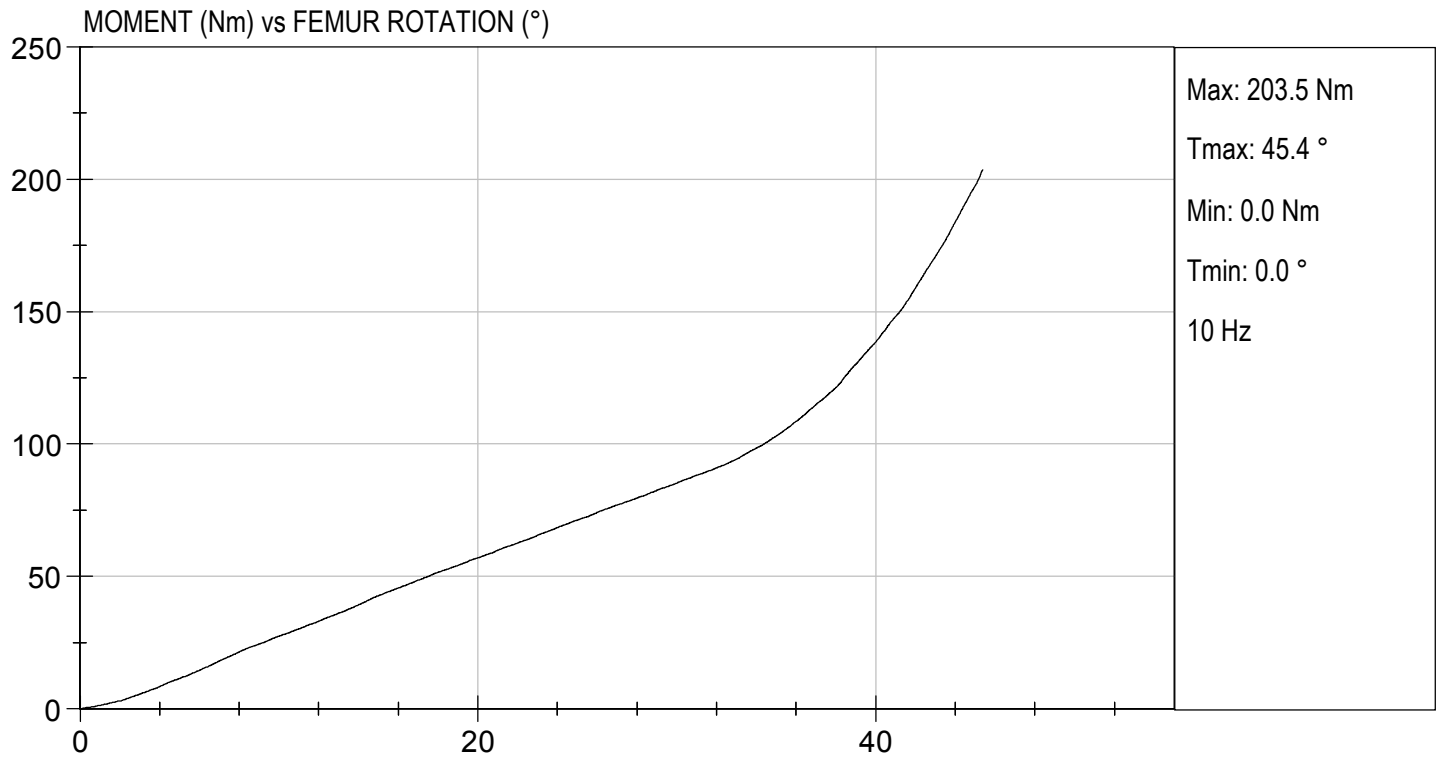
Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	21.7	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	39	39	Pass
Rotation Rate	deg/s	5.0 to 10.0	6.4	6.4	Pass
30 Degrees	Nm	94.9 Nm Max	88.7	85.2	Pass
150 ft-lbf / 203.4 Nm	Deg	40.0 to 50.0 Degree Max Rotation	44.6	45.4	Pass
Overall Test Results					Pass


 Laboratory Technician

03/11/2021
 Test Date


 Approved By





CALIBRATION TEST RESULTS

POST-TEST

HYBRID III 50TH PERCENTILE MALE - DRIVER ATD

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

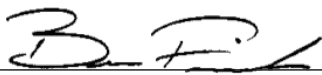
ATD Serial No: 351

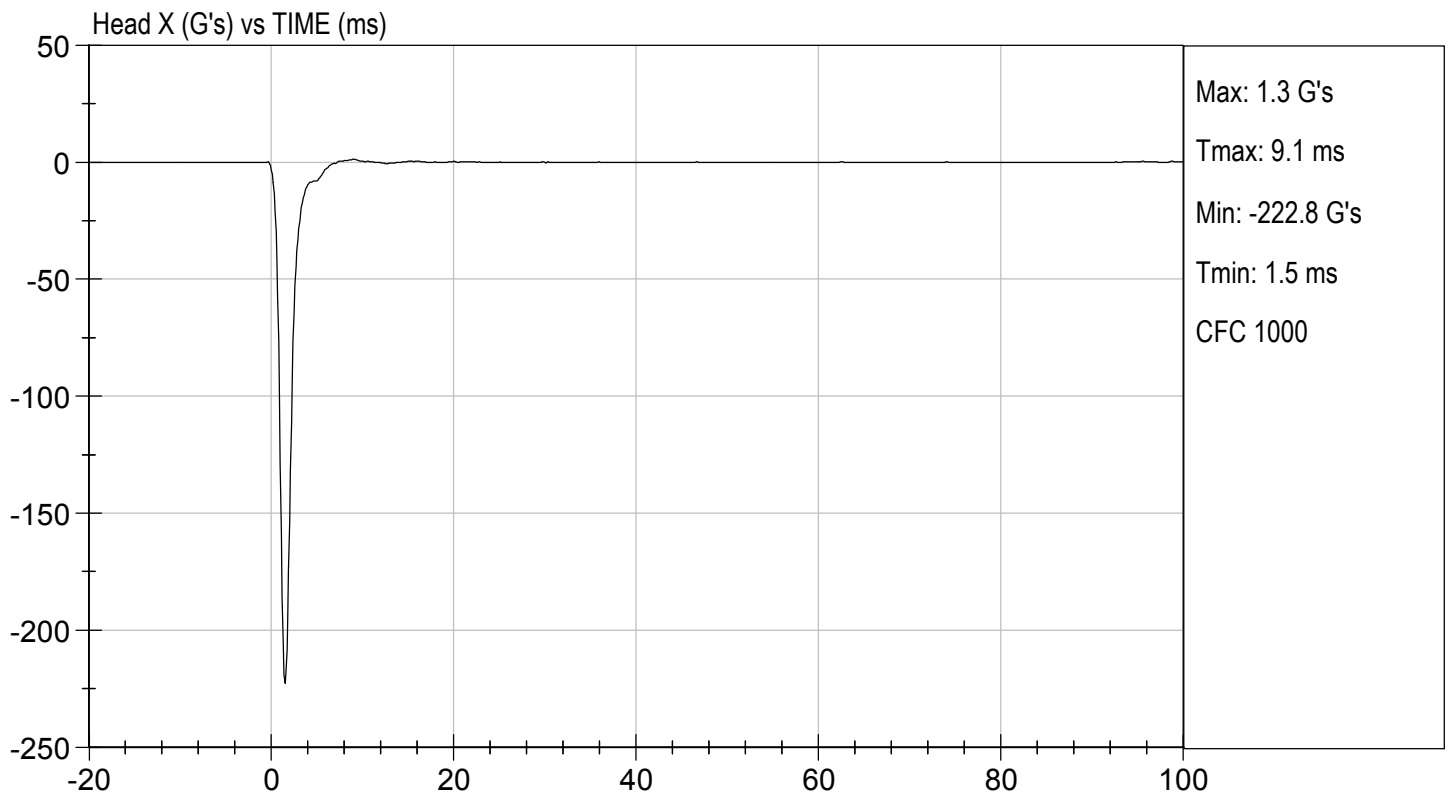
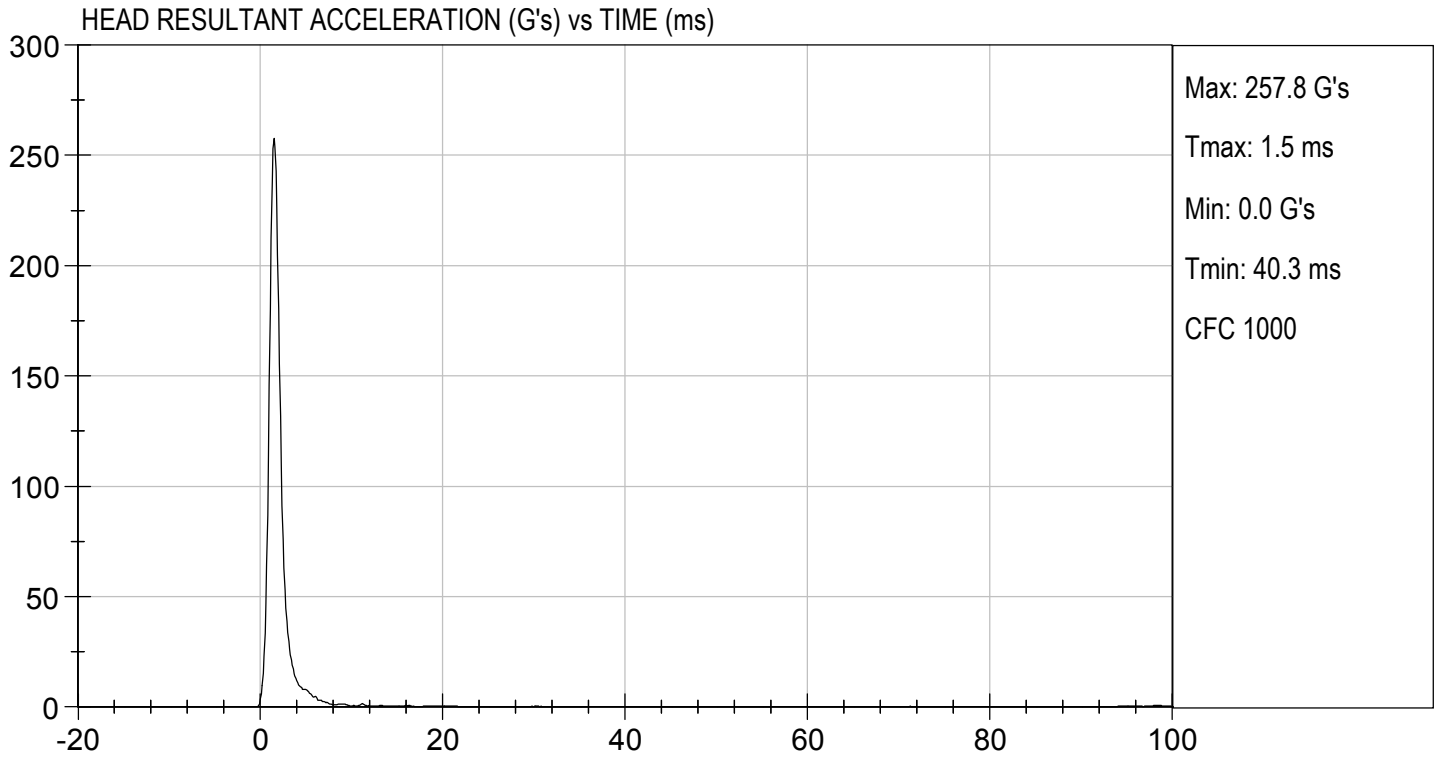
Test ID: D210941

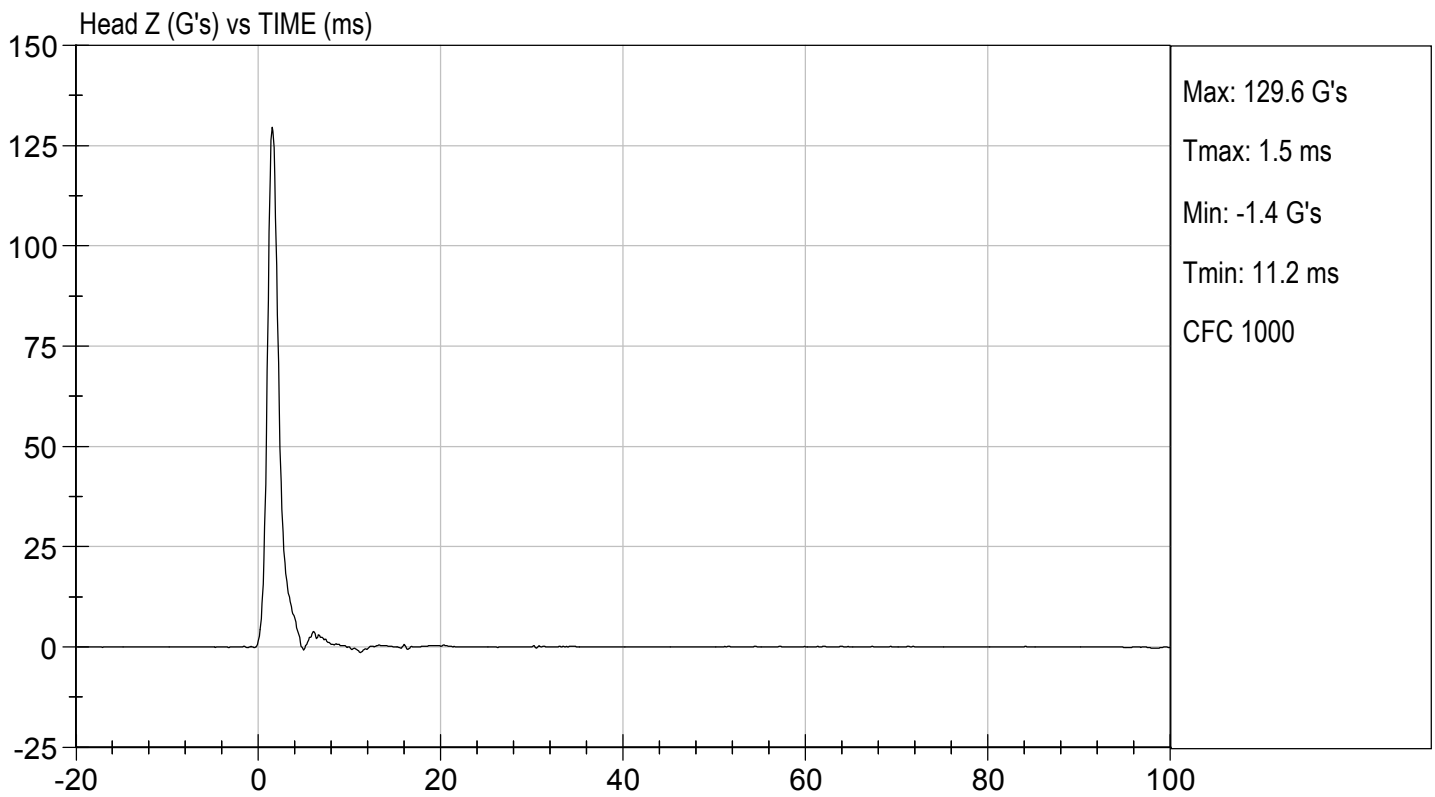
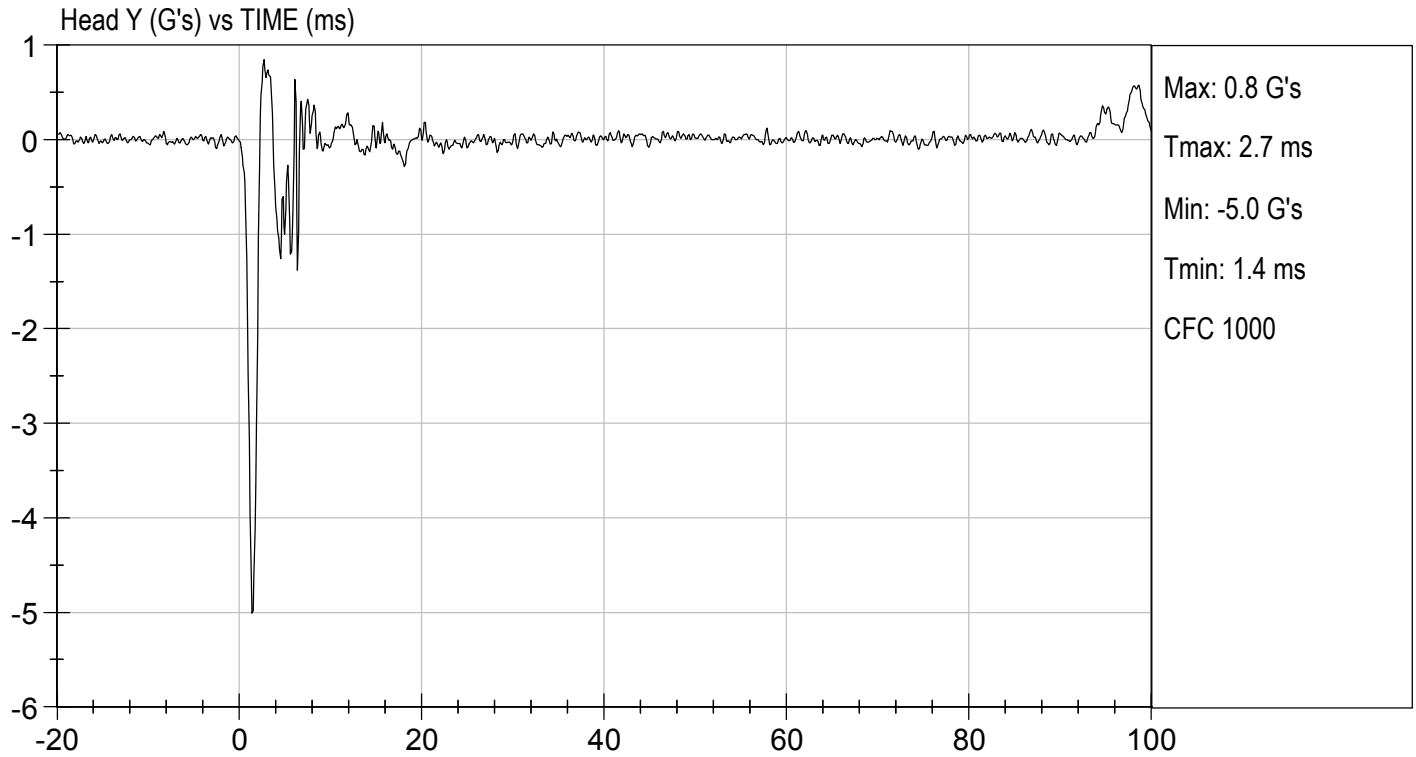
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	26.3	Pass
Peak Resultant Acceleration	G's	225 to 275	258	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	-5.0	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
Overall Test Results				Pass


Laboratory Technician

03/18/2021
Test Date


Approved By



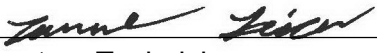


MGA RESEARCH CORPORATION
NECK FLEXION TEST
HYBRID III 50TH PERCENTILE MALE

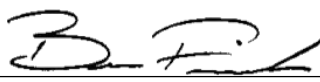
ATD Serial No: 351

Test I.D: D210942

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity		%	10 to 70	27	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.96	Pass
Pendulum Deceleration	10 ms	G's	22.50 to 27.50	22.68	Pass
	20 ms	G's	17.60 to 22.60	19.76	Pass
	30 ms	G's	12.50 to 18.50	14.79	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 29.0	14.8	Pass
Deceleration Decay Time to Cross 5 G's		ms	34.0 to 42.0	37.7	Pass
Maximum "D" Plane Rotation	Maximum	Deg	64.0 to 78.0	68.8	Pass
	Time	ms	57.0 to 64.0	62.4	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	113.0 to 128.0	117.9	Pass
Moment About Occipital Condyle	Maximum	Nm	88.1 to 108.5	89.9	Pass
	Time	ms	47.0 to 58.0	49.7	Pass
Positive Moment Decay Time To Zero Crossing		ms	97.0 to 107.0	101.7	Pass
Overall Test Results					Pass


 Laboratory Technician

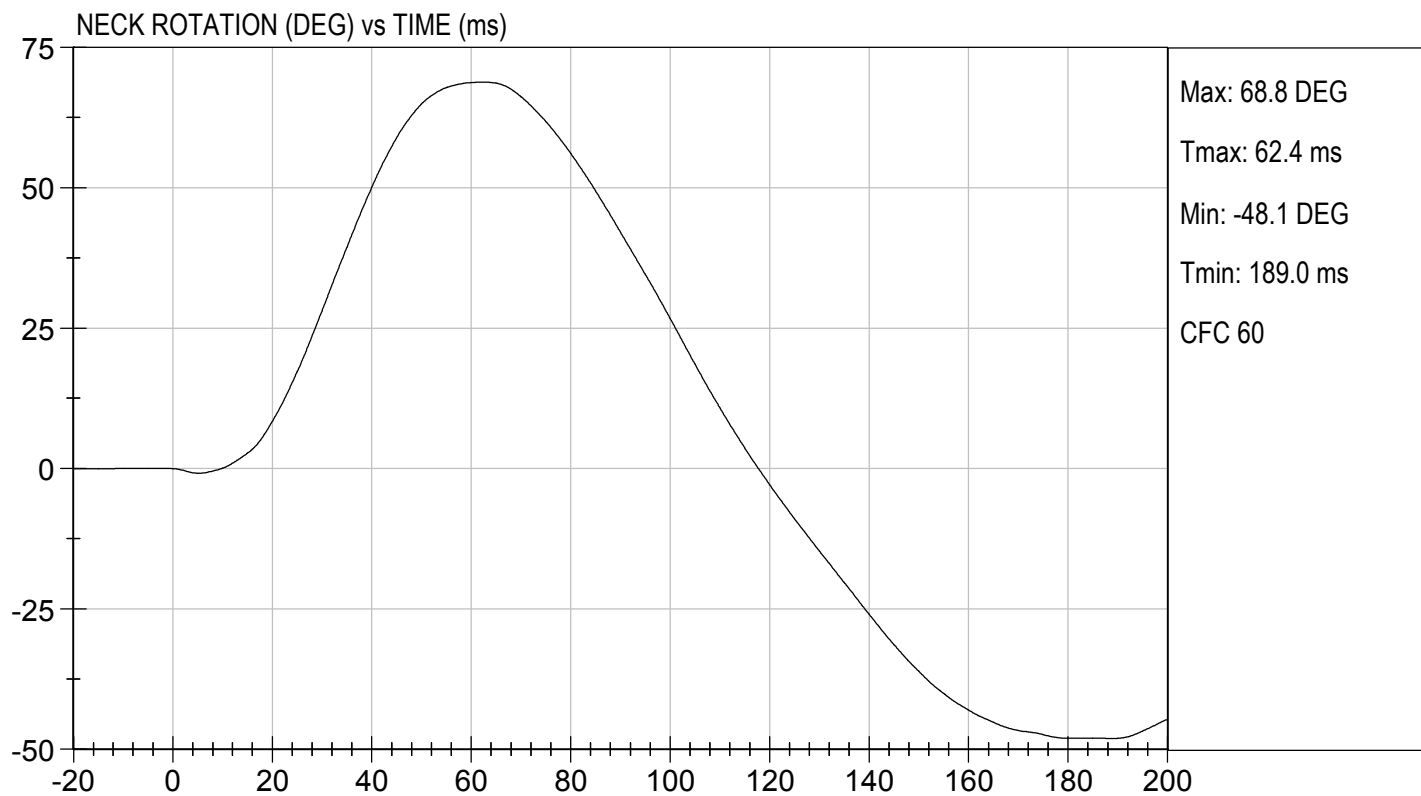
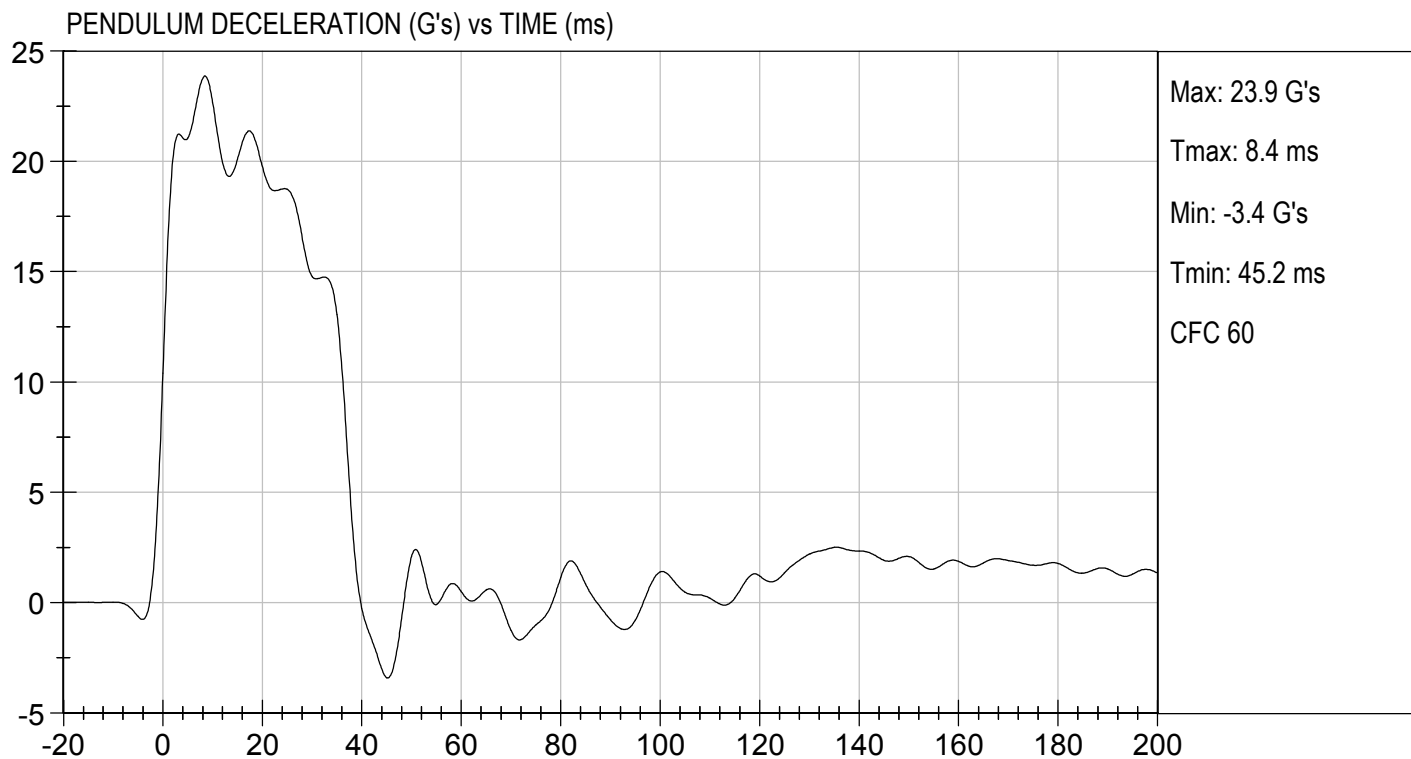
03/18/2021
 Test Date


 Approved By



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

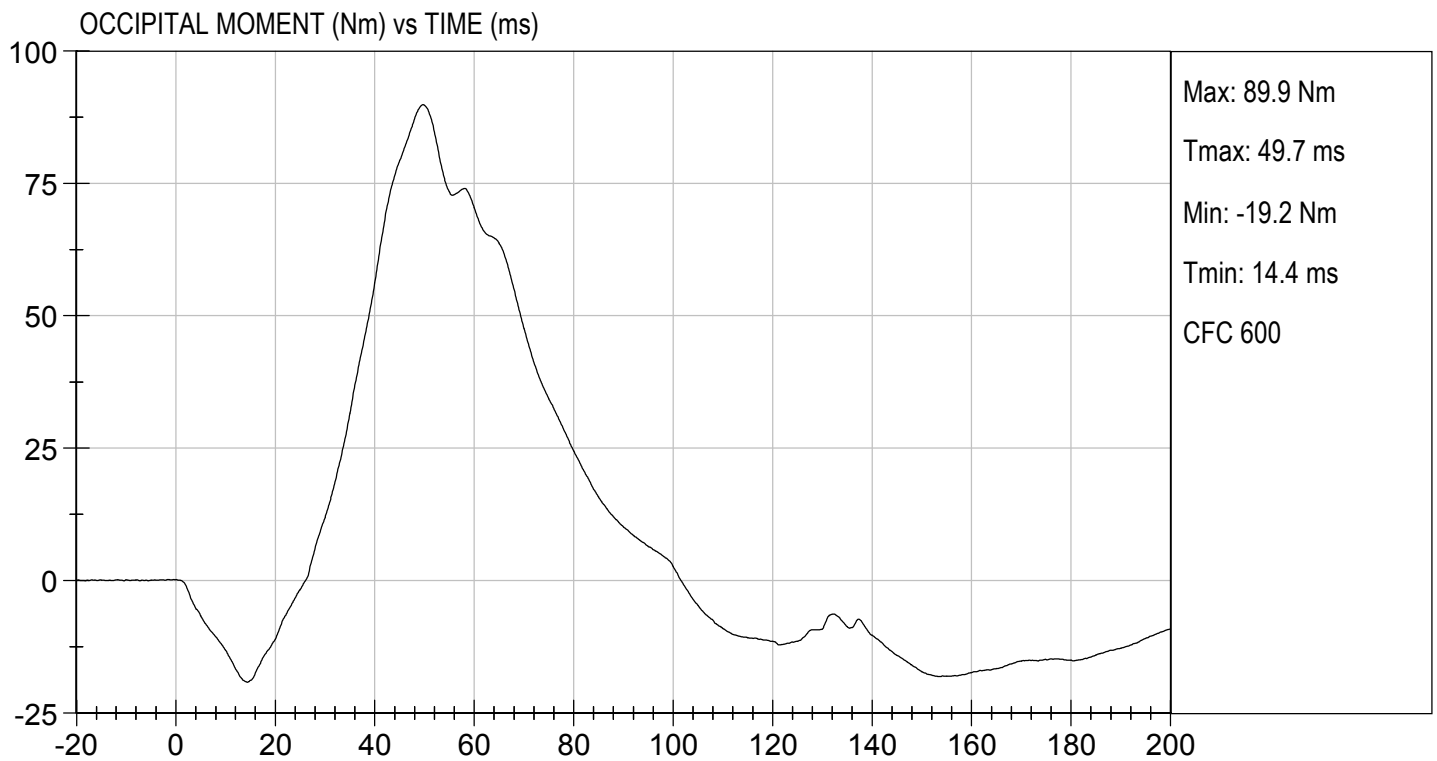
TEST DATE: 03/18/2021
TEST #: D210942





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

TEST DATE: 03/18/2021
TEST #: D210942



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

ATD Serial No: 351

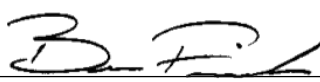
Test I.D: D210943

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity		%	10 to 70	27	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.12	Pass
Pendulum Deceleration	10 ms	G's	17.20 to 21.20	17.90	Pass
	20 ms	G's	14.00 to 19.00	14.84	Pass
	30 ms	G's	11.00 to 16.00	13.07	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 22.0	13.5	Pass
Deceleration Decay Time to Cross 5 G's		ms	38.0 to 46.0	41.9	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	98.2	Pass
	Time	ms	72.0 to 82.0	81.9	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	147.0 to 174.0	163.3	Pass
Moment About Occipital Condyle	Maximum	Nm	-52.9 to -79.9	-61.3	Pass
	Time	ms	65.0 to 79.0	72.3	Pass
Negative Moment Decay Time To Zero Crossing		ms	120.0 to 148.0	144.9	Pass
Overall Test Results					Pass


 Laboratory Technician

03/18/2021

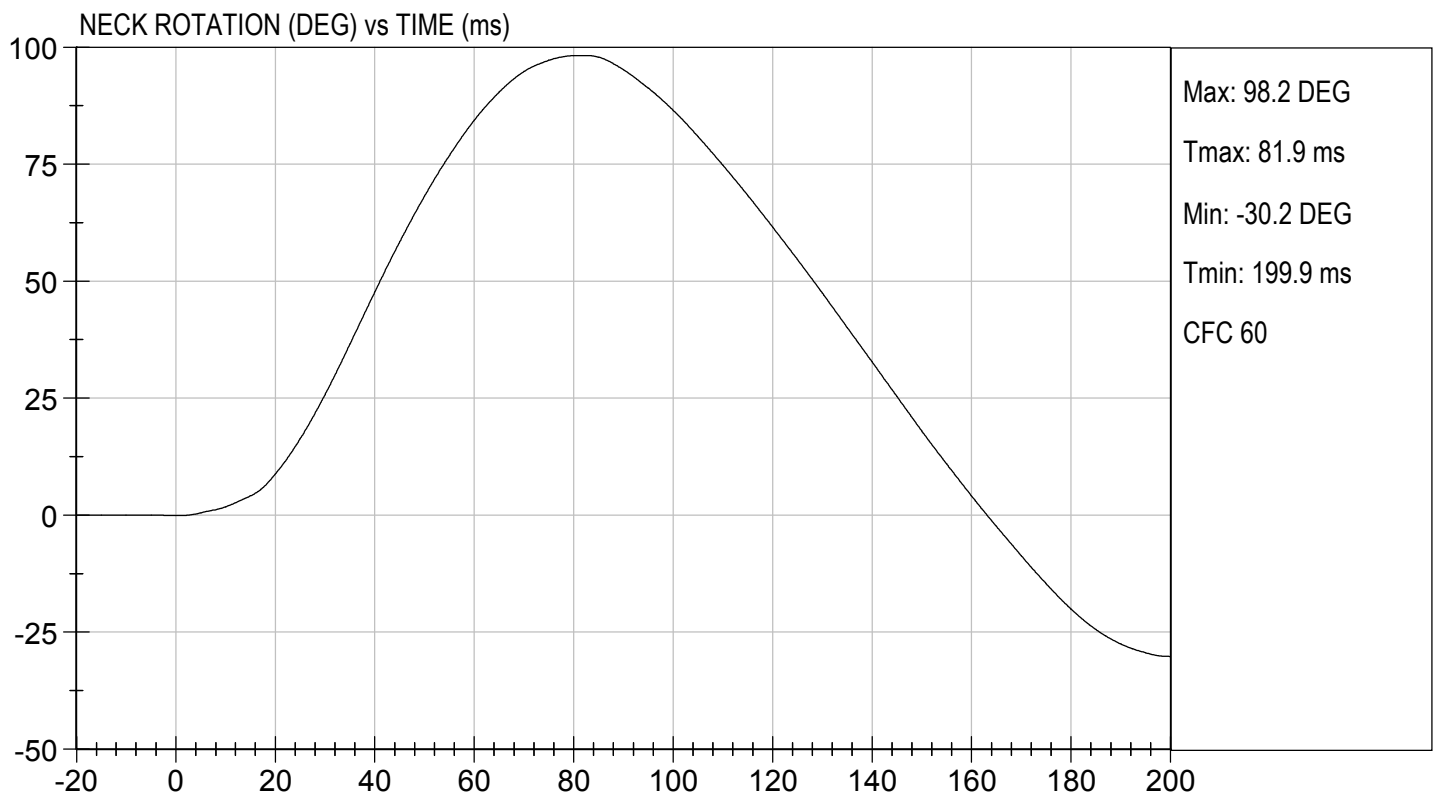
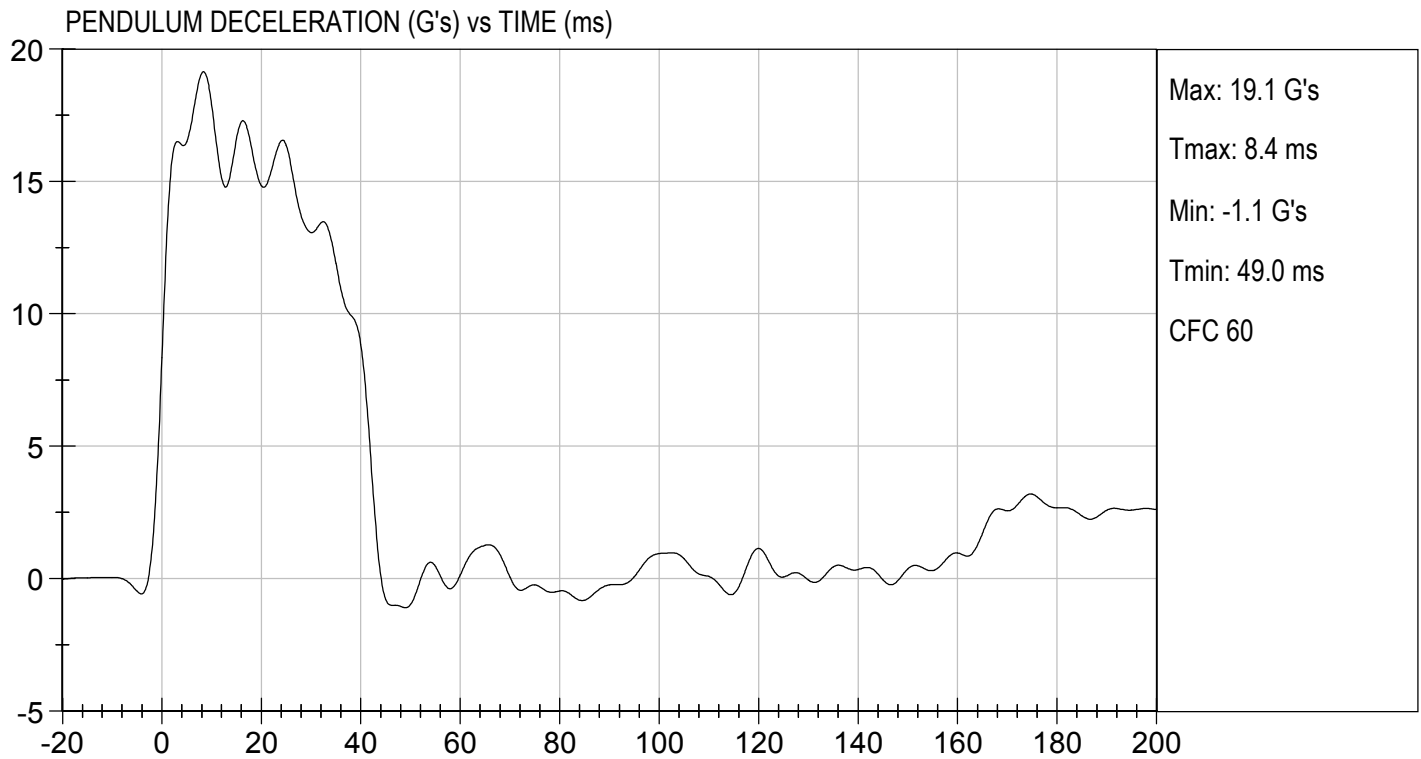
Test Date


 Approved By



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

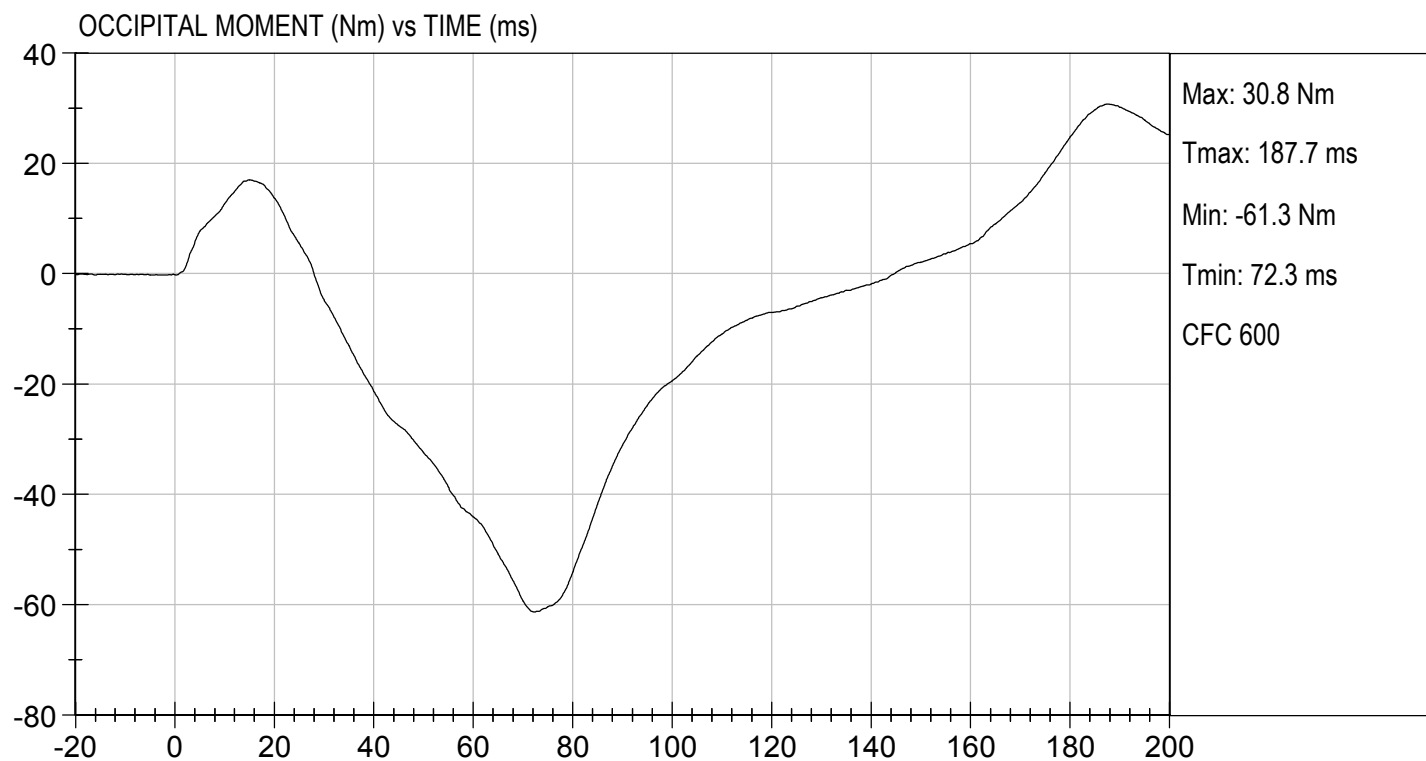
TEST DATE: 03/18/2021
TEST #: D210943





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

TEST DATE: 03/18/2021
TEST #: D210943

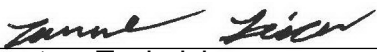


MGA RESEARCH CORPORATION
THORAX IMPACT
HYBRID III 50TH PERCENTILE MALE

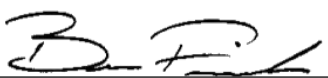
ATD Serial No: 351

Test I.D: D210944

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	21	Pass
Probe Velocity	m/s	6.58 to 6.82	6.68	Pass
Peak Probe Force	N	5159 to 5893	5,306	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.90	Pass
Internal Hysteresis	%	69 to 85	71	Pass
			Overall Test Results	Pass


Laboratory Technician

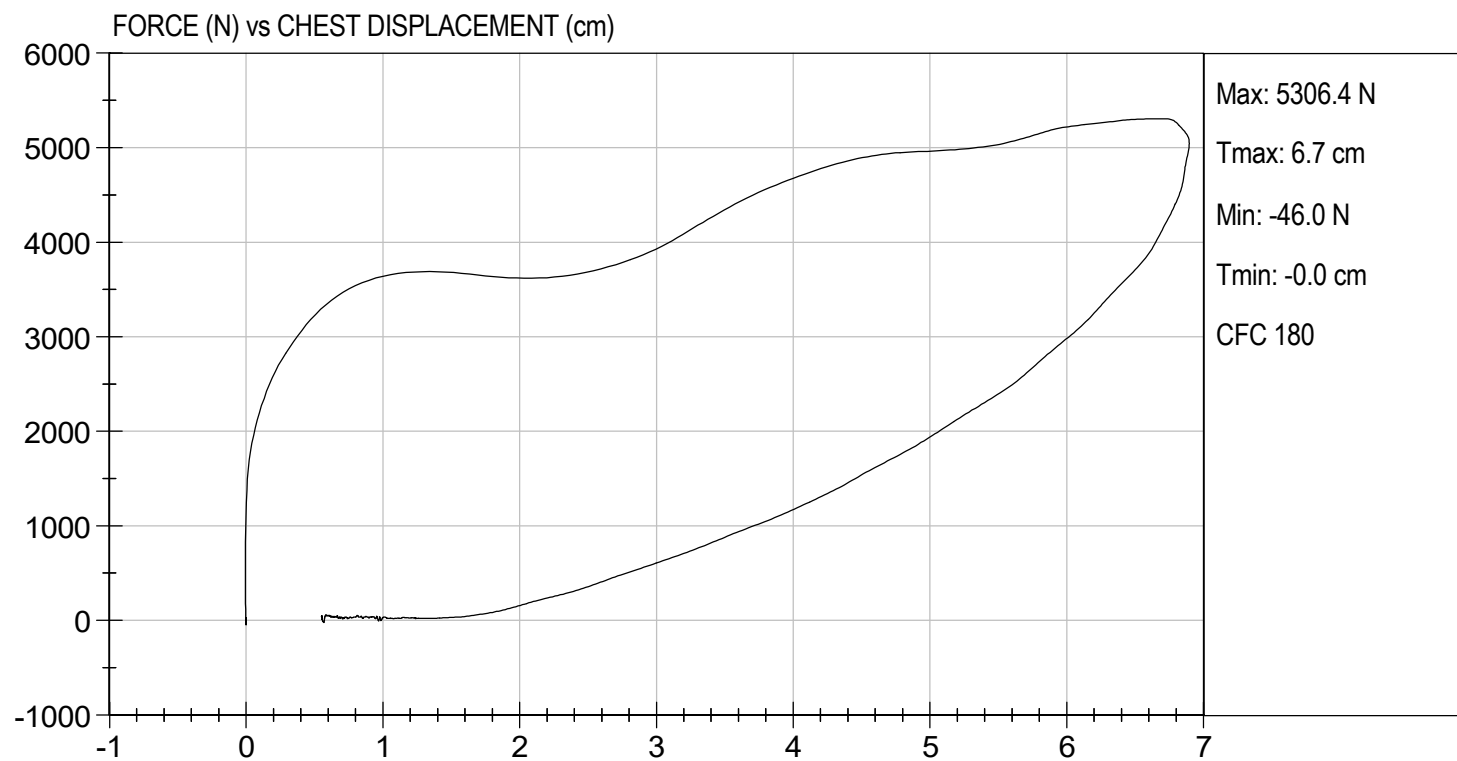
03/19/2021
Test Date


Approved By



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

TEST DATE: 03/19/2021
TEST #: D210944



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

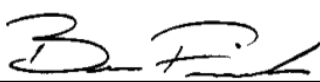
ATD Serial No: 351

Test I.D: D210945

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	26	Pass
Probe Velocity	m/s	2.07 to 2.13	2.08	Pass
Peak Probe Force	N	4715 to 5782	5,416	Pass
Overall Test Results				Pass


Laboratory Technician

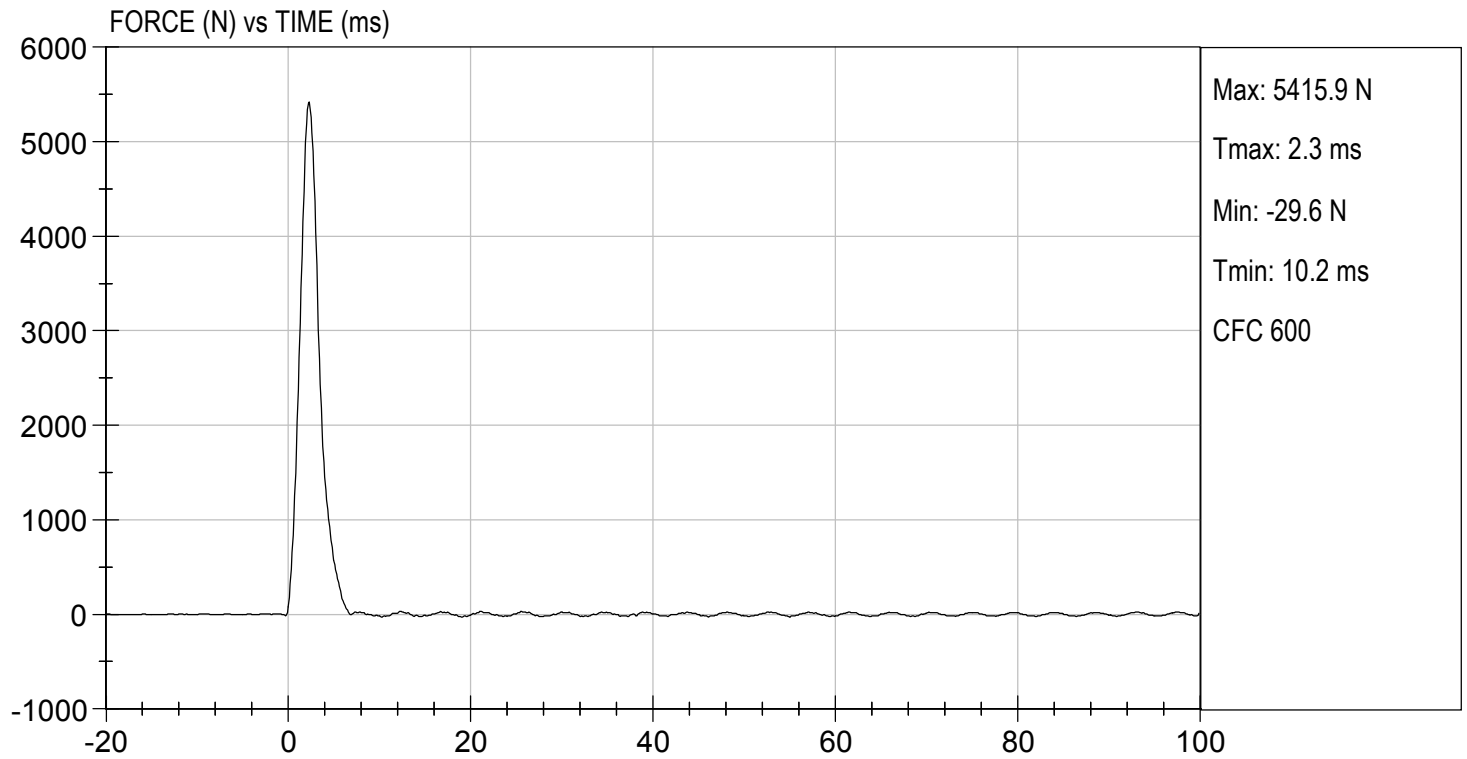
03/18/2021
Test Date


Approved By



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

TEST DATE: 03/18/2021
TEST #: D210945



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

ATD Serial No: 351

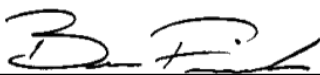
Test I.D: D210946

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	26	Pass
Probe Velocity	m/s	2.07 to 2.13	2.09	Pass
Peak Probe Force	N	4715 to 5782	4,838	Pass
Overall Test Results				Pass



Laboratory Technician

03/18/2021
Test Date

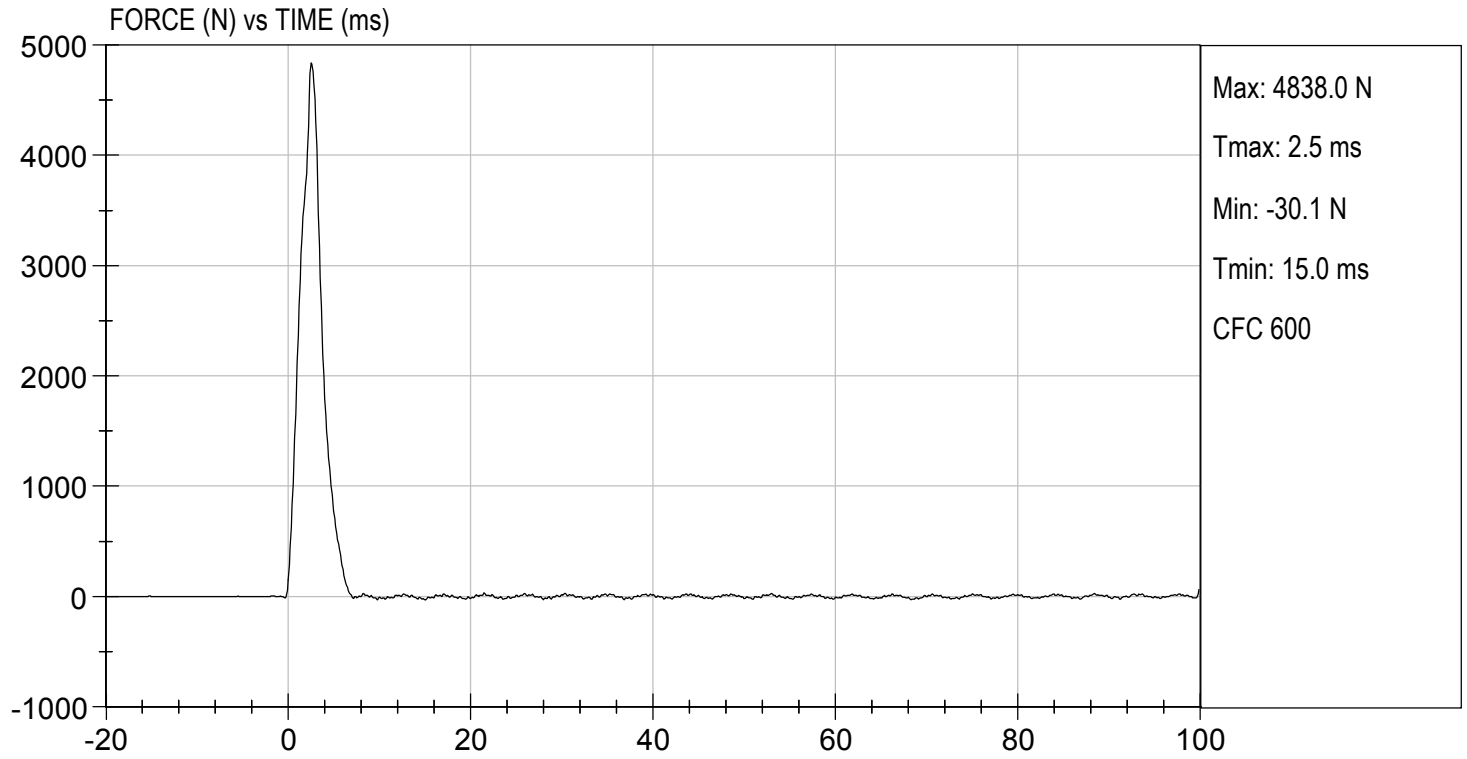


Approved By



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

TEST DATE: 03/18/2021
TEST #: D210946



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

ATD Serial No: 351

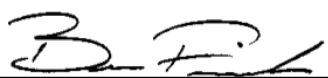
Test I.D: D210940

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	26.3	26.3	Pass
Rotation Rate	deg/s	5.0 to 10.0	6.4	6.4	Pass
30 Degrees	Nm	94.9 Nm Max	89.6	91.4	Pass
150 ft-lbf / 203.4 Nm	Deg	40.0 to 50.0 Degree Max Rotation	43.7	44.4	Pass
Overall Test Results					Pass

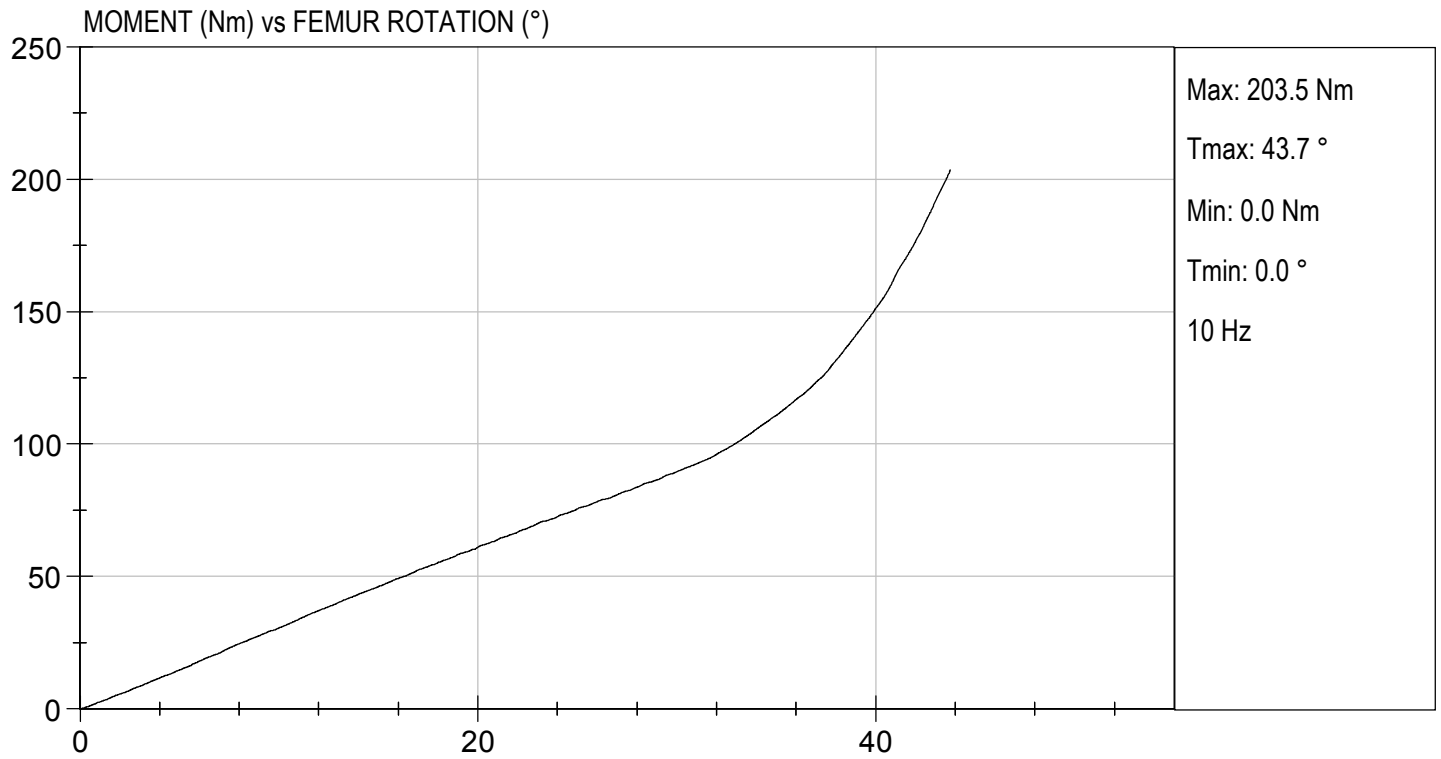


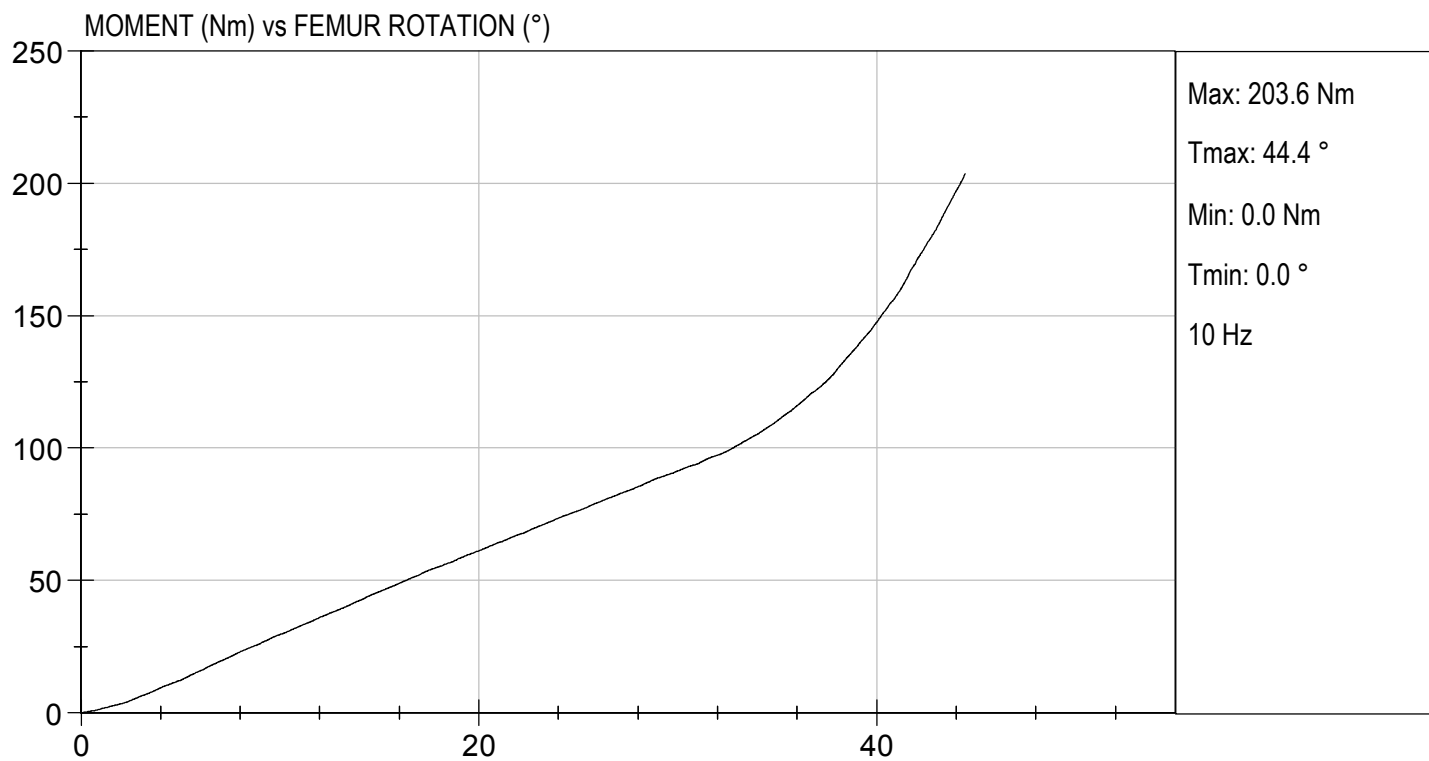
Laboratory Technician

03/18/2021
Test Date



Approved By





CALIBRATION TEST RESULTS

PRE-TEST

HYBRID III 5TH PERCENTILE FEMALE - PASSENGER ATD

Hybrid III, 5th External Measurements
SN: DH1659

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	778
B	SHOULDER PIVOT HEIGHT	Centerline of shoulder pivot bolt to the seat surface.	431.8-457.2	440
C	H-POINT HEIGHT	Reference	81.3-86.3	85
D	H-POINT LOCATION FROM BACKLINE	Reference	144.8-149.8	147
E	SHOULDER PIVOT FROM BACKLINE	Center of the shoulder clevis to the rear vertical surface of the fixture.	68.6-83.8	82
F	THIGH CLEARANCE	Measured at the highest point on the upper femur segment.	119.4-134.6	130
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	251
H	HEAD BACK TO BACKLINE	Back of Skull cap skin to seat rear vertical surface (Reference)	43.2-48.2	45
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	285
J	ELBOW REST HEIGHT	Measure from the flesh below the elbow pivot bolt to the seat surface.	182.8-203.2	189
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	543
L	POPLITEAL HEIGHT	Seat surface to the plane of the horizontal plane of the bottom of the feet.	355.6-376	357
M	KNEE PIVOT HEIGHT	Centerline of knee pivot bolt to the horizontal plane of the bottom of the feet.	393.7-419.1	398
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

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	182
P	FOOT LENGTH	Tip of toe to rear of heel	218.5-233.7	221
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	469
S	HEAD BREADTH	The widest part of the head	137.1-147.3	141
T	HEAD DEPTH	Back of the head to the forehead	177.8-188	182
U	HIP BREADTH	The widest part of the hip	299.7-314.9	306
V	SHOULDER BREADTH	Outside edges of right and left shoulder clevises	350.5-365.7	357
W	FOOT BREADTH	The widest part of the foot	78.8-94	83
X	HEAD CIRCUMFERENCE	Measured at the point as in dim. "T"	528.3-548.7	542
Y	CHEST CIRCUMFERENCE (WITH CHEST JACKET)	Measured 345.4 ± 12.7 mm above seat surface	850.9-881.3	865
Z	WAIST CIRCUMFERENCE	Measured 165.1 ± 5.1 mm above seat surface	759.5-789.9	785
AA	REFERENCE LOCATION FOR MEASUREMENT OF CHEST CIRCUMFERENCE	Reference	332.7-358.1	345
BB	REFERENCE LOCATION FOR MEASUREMENT OF WAIST CIRCUMFERENCE	Reference	160.1-170.2	165

MGA RESEARCH CORPORATION
HEAD DROP TEST
HYBRID III 5TH PERCENTILE

ATD Serial No: DH1659

Test ID: D210811

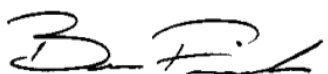
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	39	Pass
Peak Resultant Acceleration	G's	250 to 300	256	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	-11.4	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
Overall Test Results				Pass



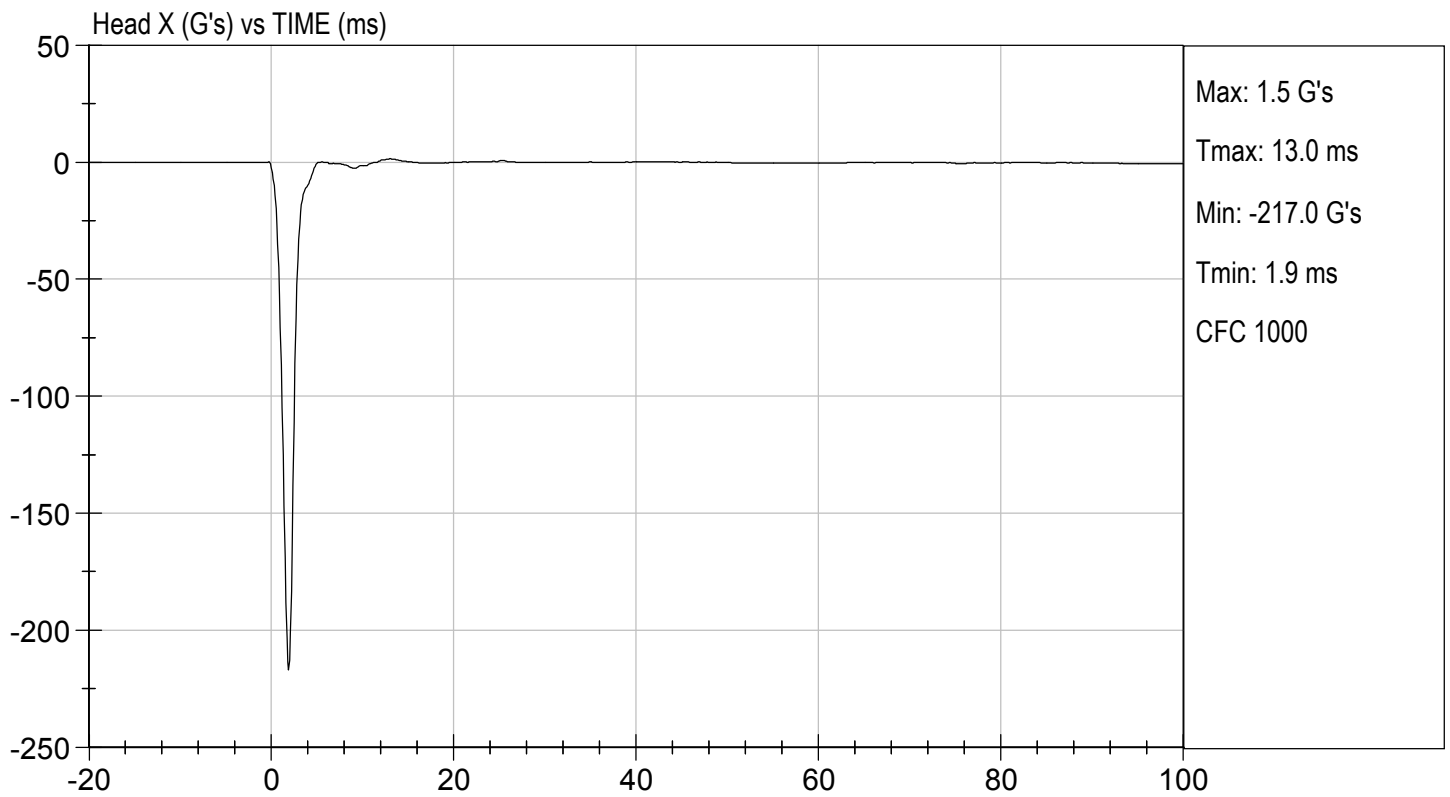
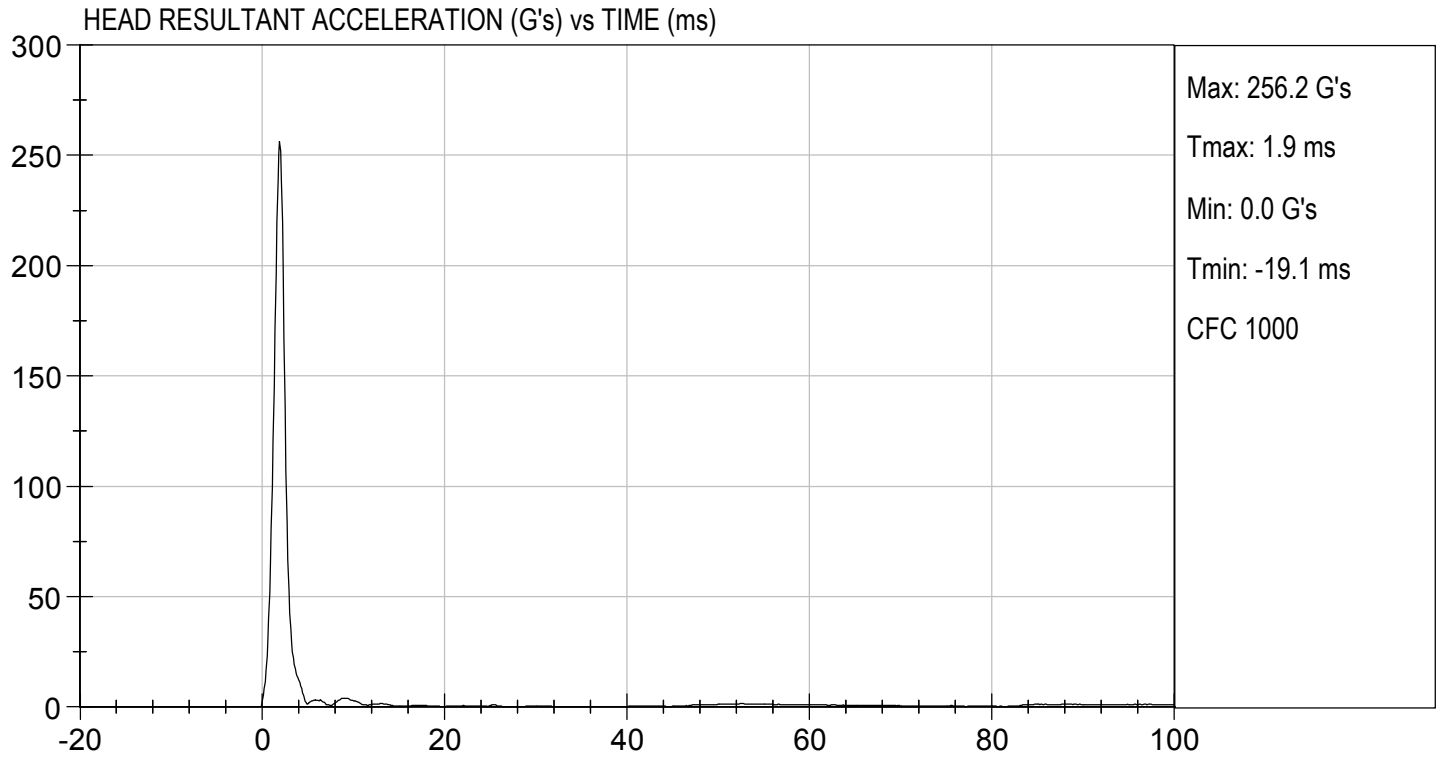
Laboratory Technician

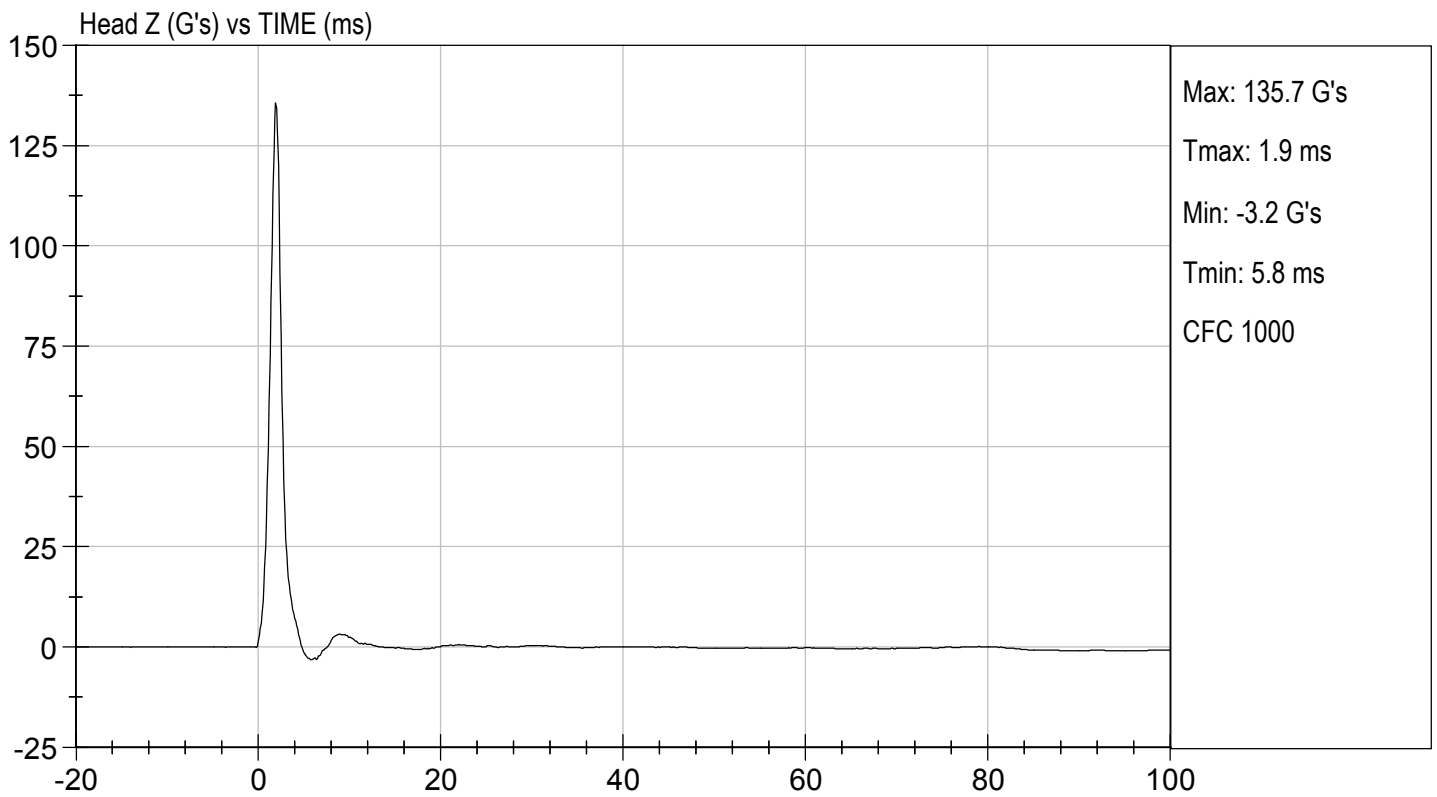
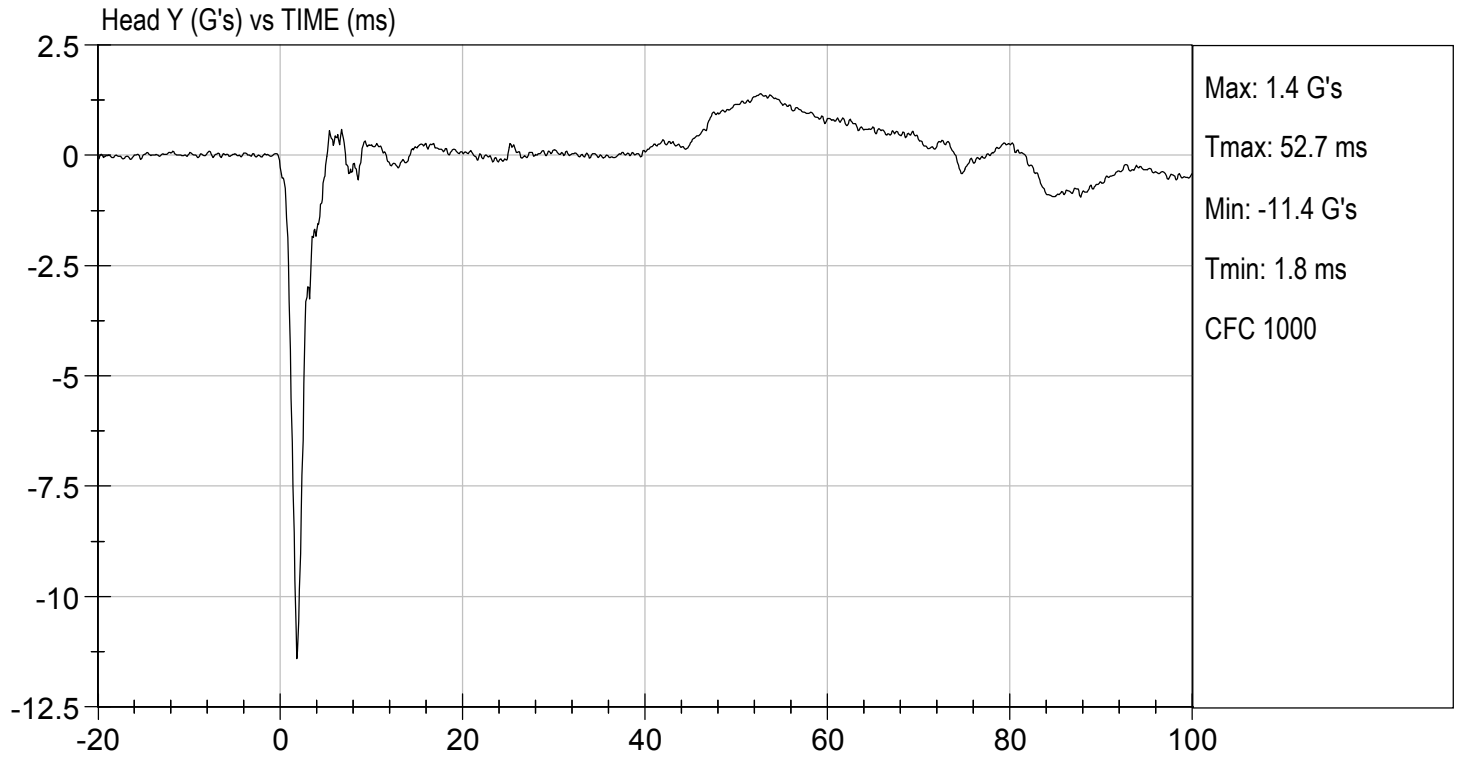
03/11/2021

Test Date



Approved By





MGA RESEARCH CORPORATION

NECK FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: DH1659Test I.D: D210812

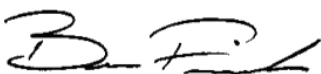
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity		%	10 to 70	39	Pass
Pendulum Speed		m/s	6.89 to 7.13	7.13	Pass
Pendulum Velocity	10 ms	m/s	2.1 to 2.5	2.4	Pass
	20 ms	m/s	4.0 to 5.0	4.7	Pass
	30 ms	m/s	5.8 to 7.0	7.0	Pass
D Plane Rotation	Max	deg	77 to 91	81	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

03/11/2021

Test Date

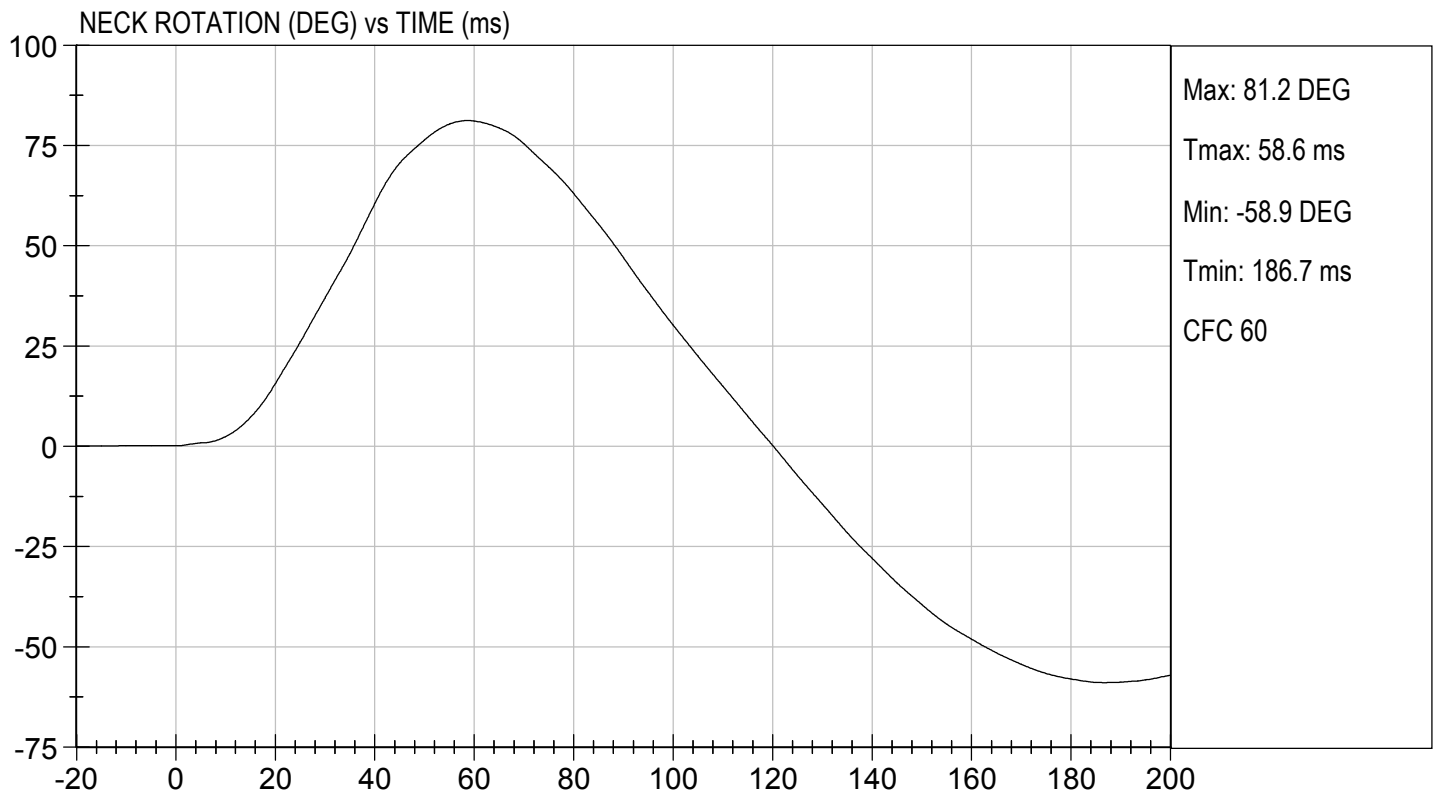
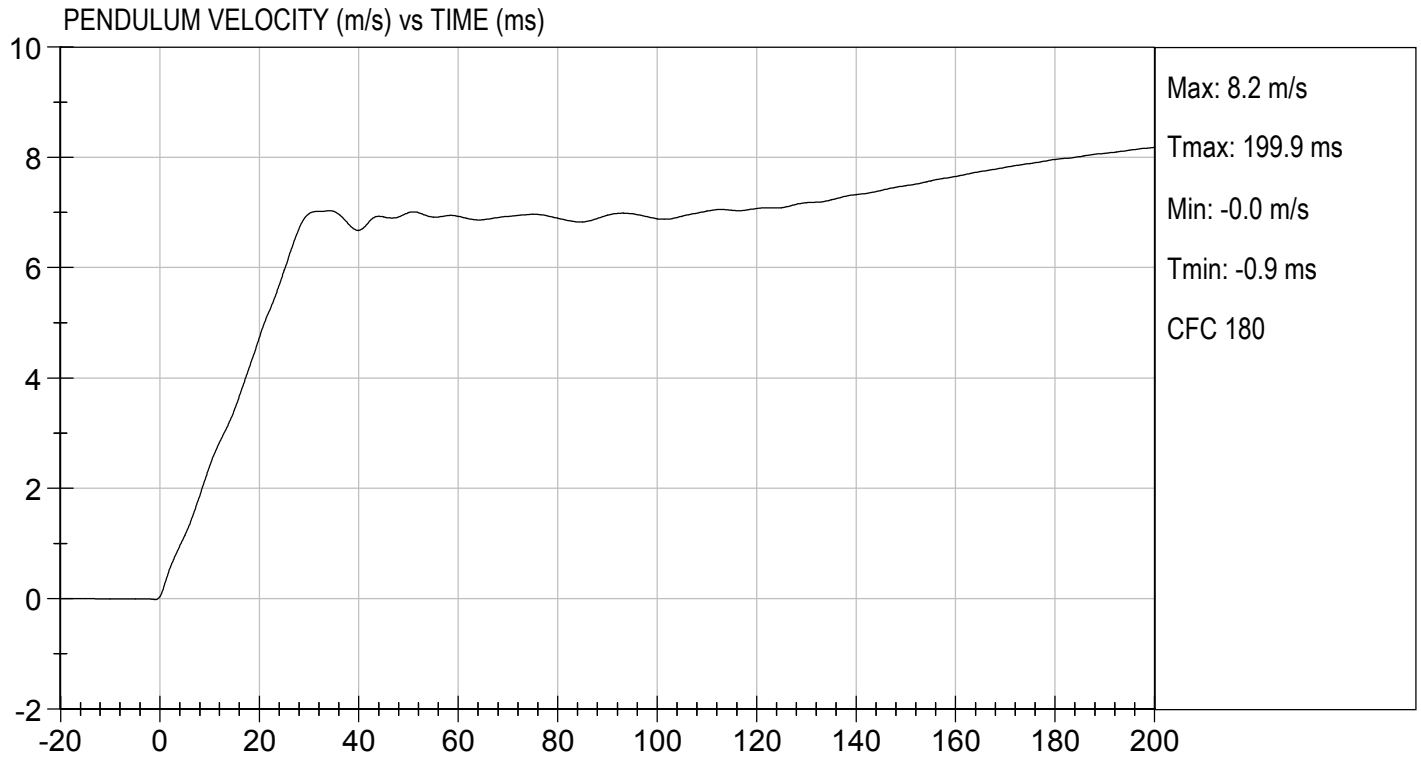


Approved By



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

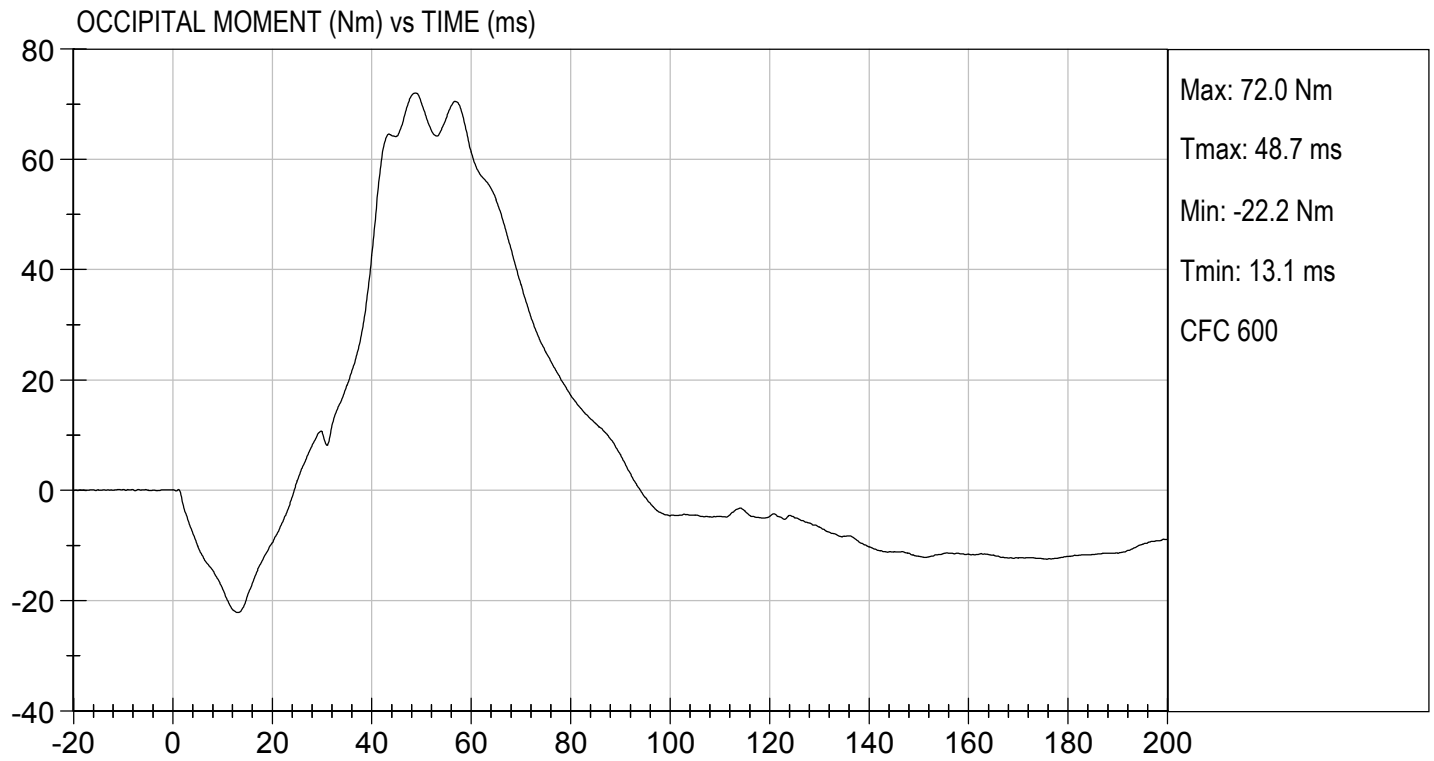
TEST DATE: 03/11/2021
TEST #: D210812





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

TEST DATE: 03/11/2021
TEST #: D210812



MGA RESEARCH CORPORATION
NECK EXTENSION TEST
HYBRID III 5TH PERCENTILE

ATD Serial No: DH1659

Test I.D: D210813

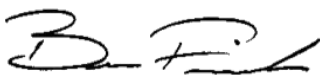
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity		%	10 to 70	39	Pass
Pendulum Speed		m/s	5.95 to 6.19	6.19	Pass
Pendulum Velocity	10 ms	m/s	1.5 to 1.9	1.8	Pass
	20 ms	m/s	3.1 to 3.9	3.6	Pass
	30 ms	m/s	4.6 to 5.6	5.2	Pass
D Plane Rotation	Max	deg	99 to 114	111	Pass
Occipital Condyle Moment within Rotation Corridor		Nm	-65 to -53	-53	Pass
Negative Moment Time Curve Decay to -10 Nm		ms	94 to 114	107	Pass
Overall Results					Pass



Laboratory Technician

03/11/2021

Test Date

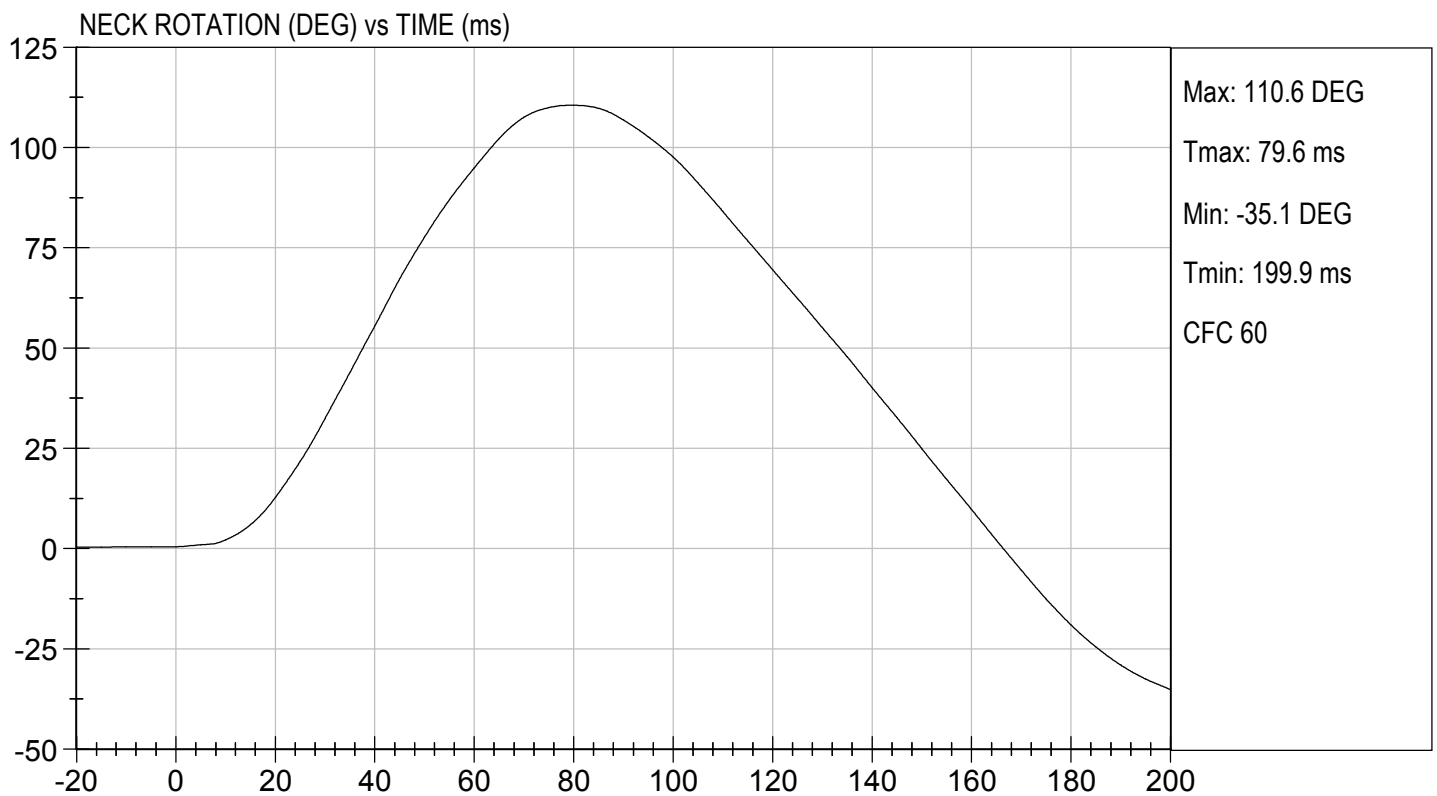
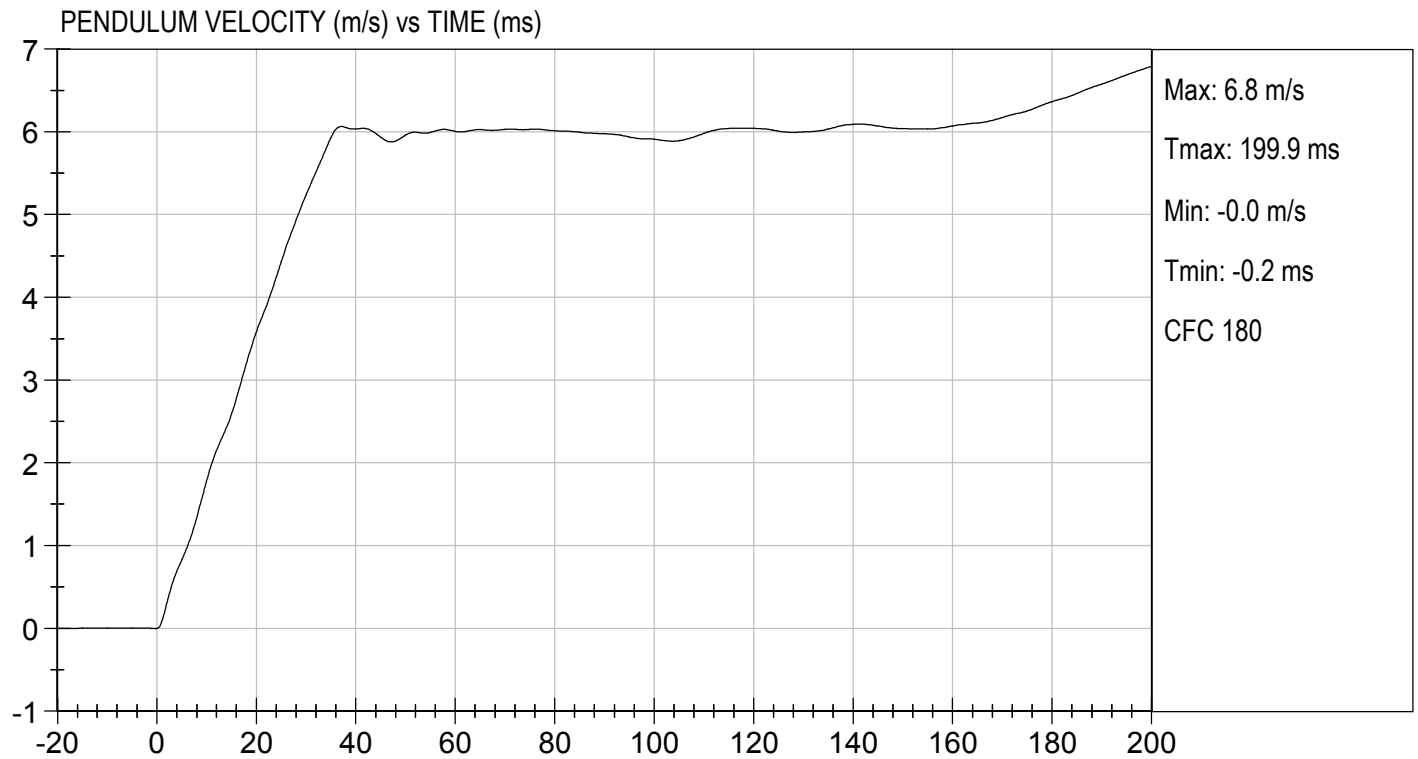


Approved By



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

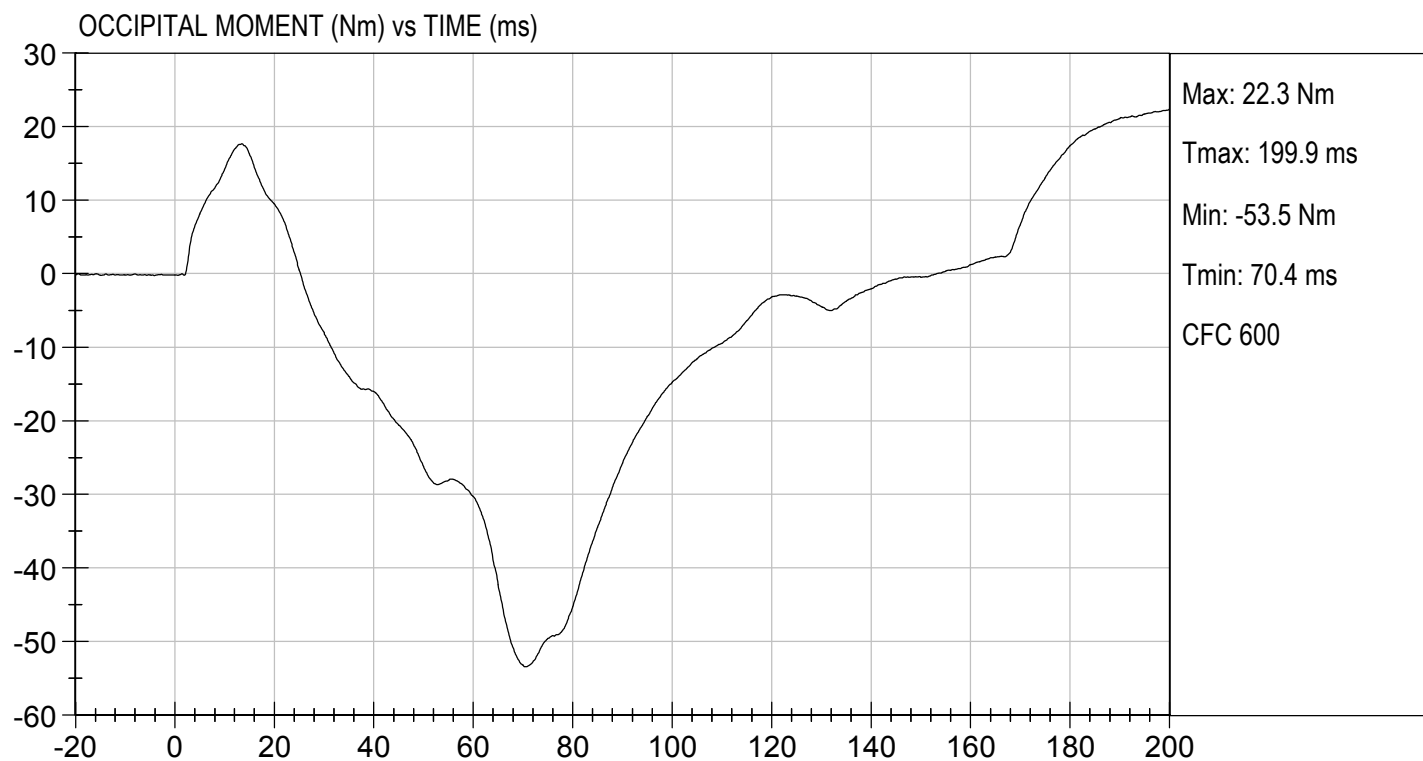
TEST DATE: 03/11/2021
TEST #: D210813





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

TEST DATE: 03/11/2021
TEST #: D210813



MGA RESEARCH CORPORATION
THORAX IMPACT
HYBRID III 5TH PERCENTILE

ATD Serial No: DH1659

Test I.D: D210814

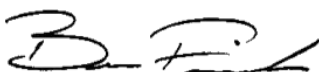
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.6	Pass
Relative Humidity	%	10 to 70	27	Pass
Probe Speed	m/s	6.59 to 6.83	6.68	Pass
Peak Deflection	mm	50 to 58	50	Pass
Peak Resistive Force w/in Deflection Corridor	N	3900 to 4400	4179	Pass
Internal Hysteresis	%	69 to 85	75	Pass
Peak Force 18 mm - 50 mm	N	<= 4600	4518	Pass
Overall Test Results				Pass



Laboratory Technician

03/12/2021

Test Date

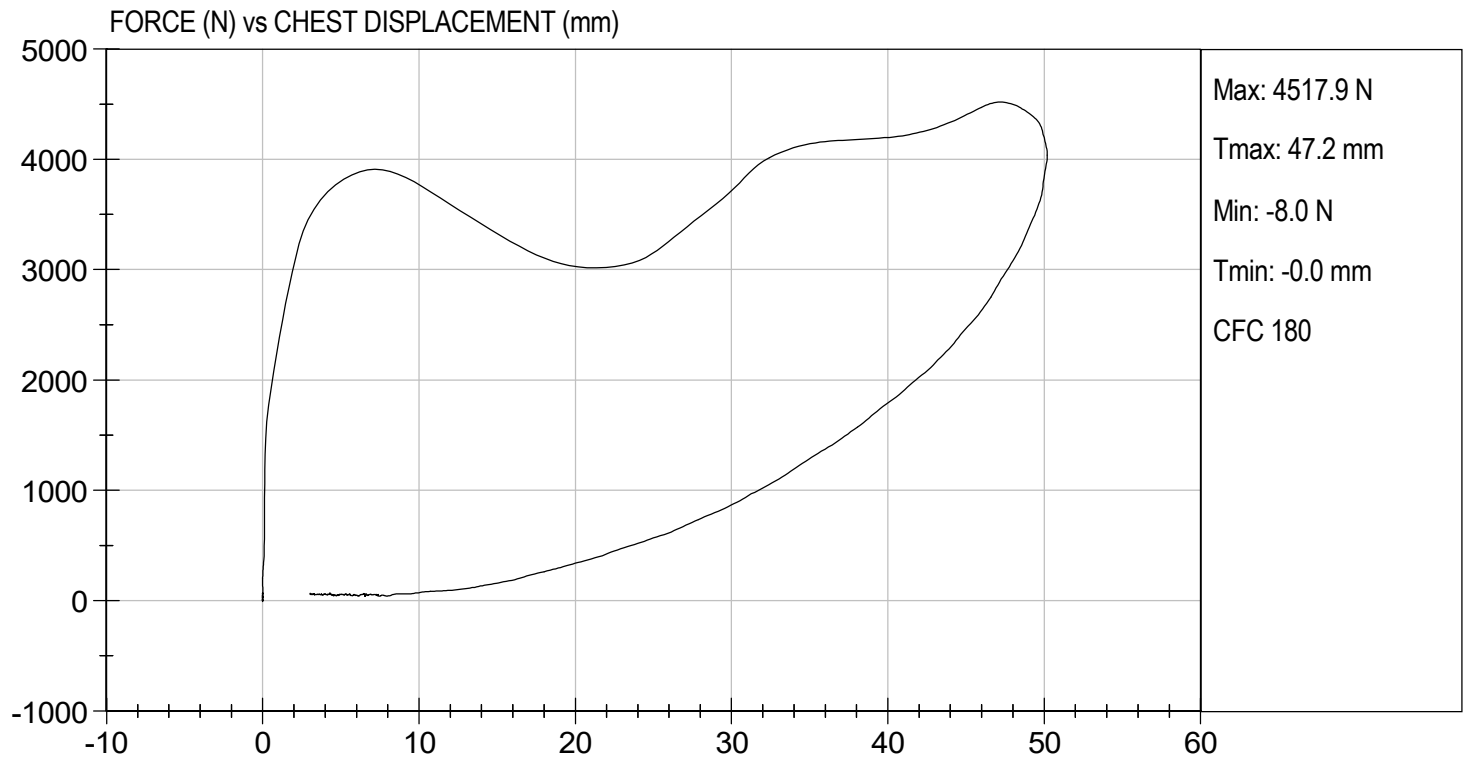


Approved By



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

TEST DATE: 03/12/2021
TEST #: D210814



MGA RESEARCH CORPORATION

RIGHT KNEE IMPACT TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: DH1659

Test I.D: D210815

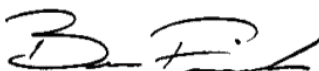
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	38	Pass
Probe Speed	m/s	2.07 to 2.13	2.10	Pass
Maximum Force	N	3450 to 4060	3836	Pass
Overall Test Results				Pass



Laboratory Technician

03/11/2021

Test Date

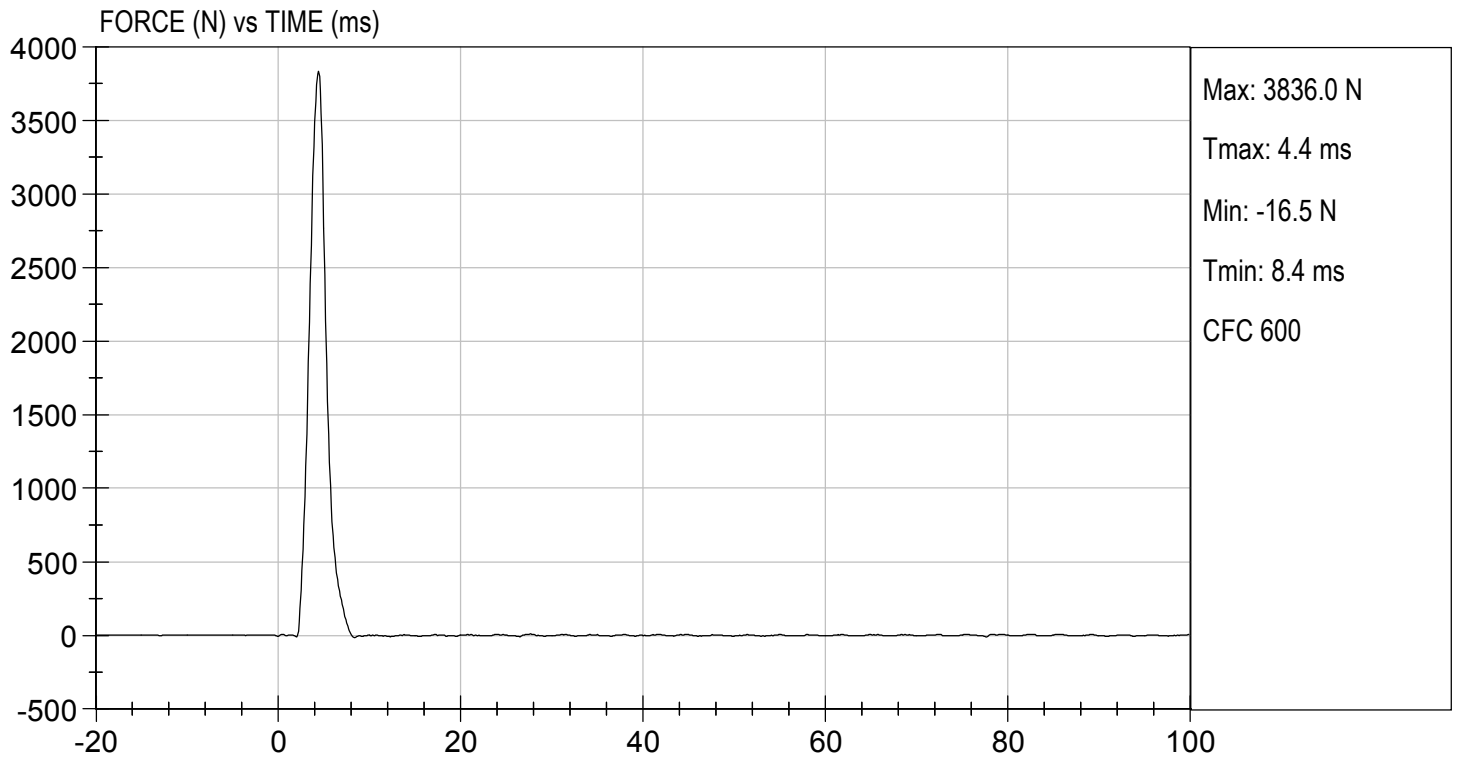


Approved By



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

TEST DATE: 03/11/2021
TEST #: D210815



MGA RESEARCH CORPORATION

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

ATD Serial No: DH1659

Test I.D: D210816

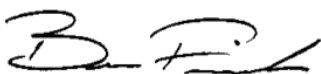
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	38	Pass
Probe Speed	m/s	2.07 to 2.13	2.11	Pass
Maximum Force	N	3450 to 4060	3719	Pass
Overall Test Results				Pass



Laboratory Technician

03/11/2021

Test Date

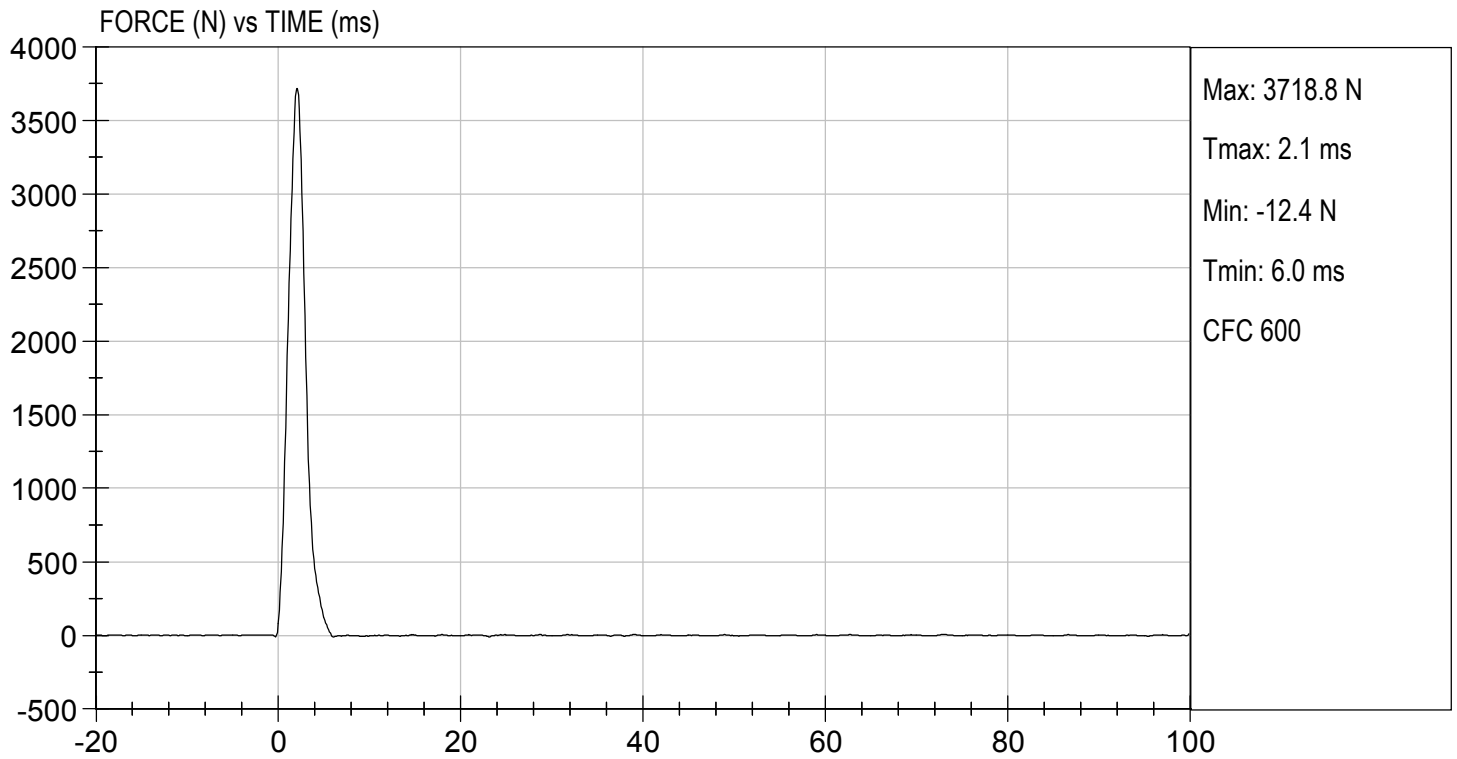


Approved By



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

TEST DATE: 03/11/2021
TEST #: D210816



MGA RESEARCH CORPORATION

TORSO FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: DH1659

Test I.D: D210817

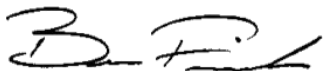
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	39	Pass
Initial Angle	deg	0 to 20	19	Pass
Return Angle	deg	+/- 8	2	Pass
Force at 45 deg	N	320 to 390	378	Pass
Upper Torso Deflection Rate	deg/s	0.5 to 1.5	0.8	Pass
Overall Result				Pass



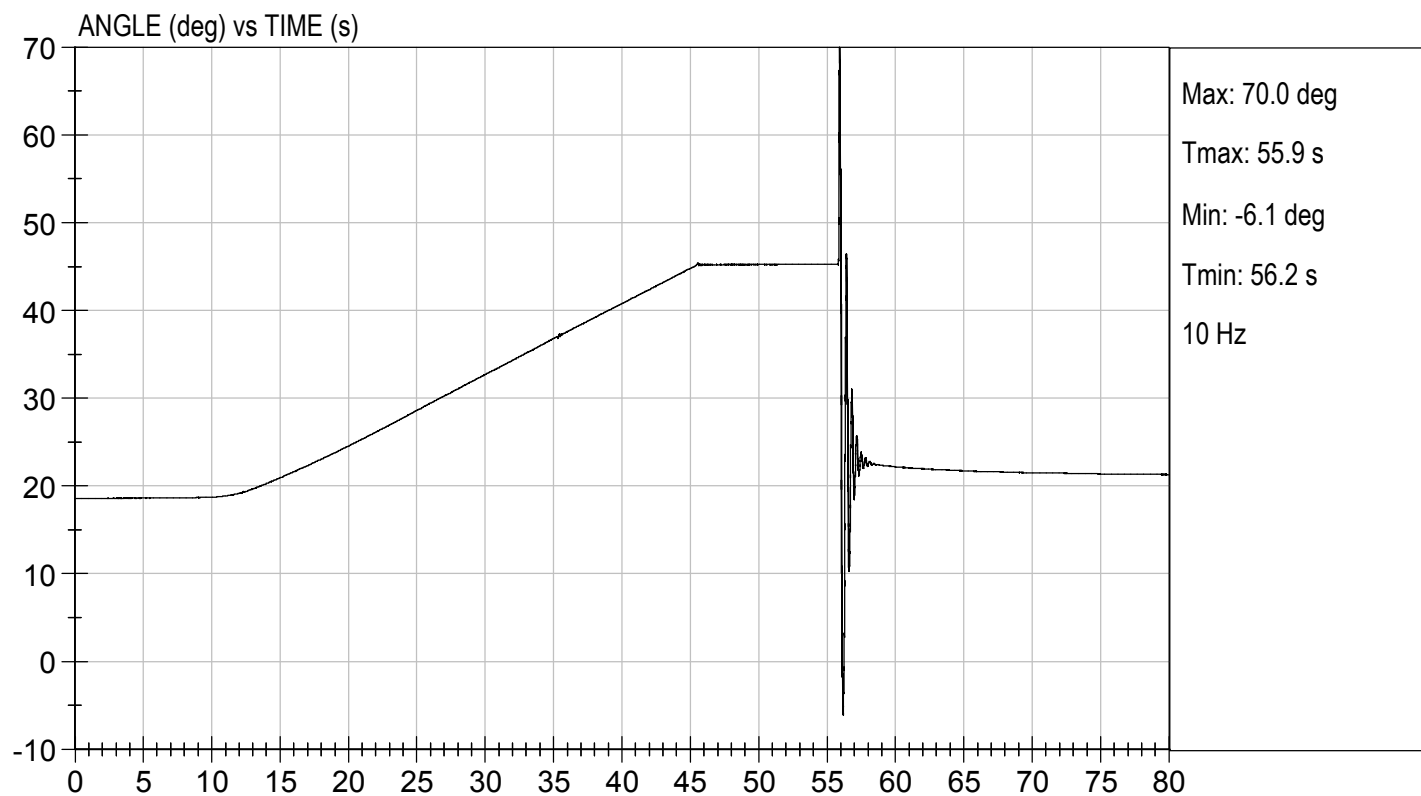
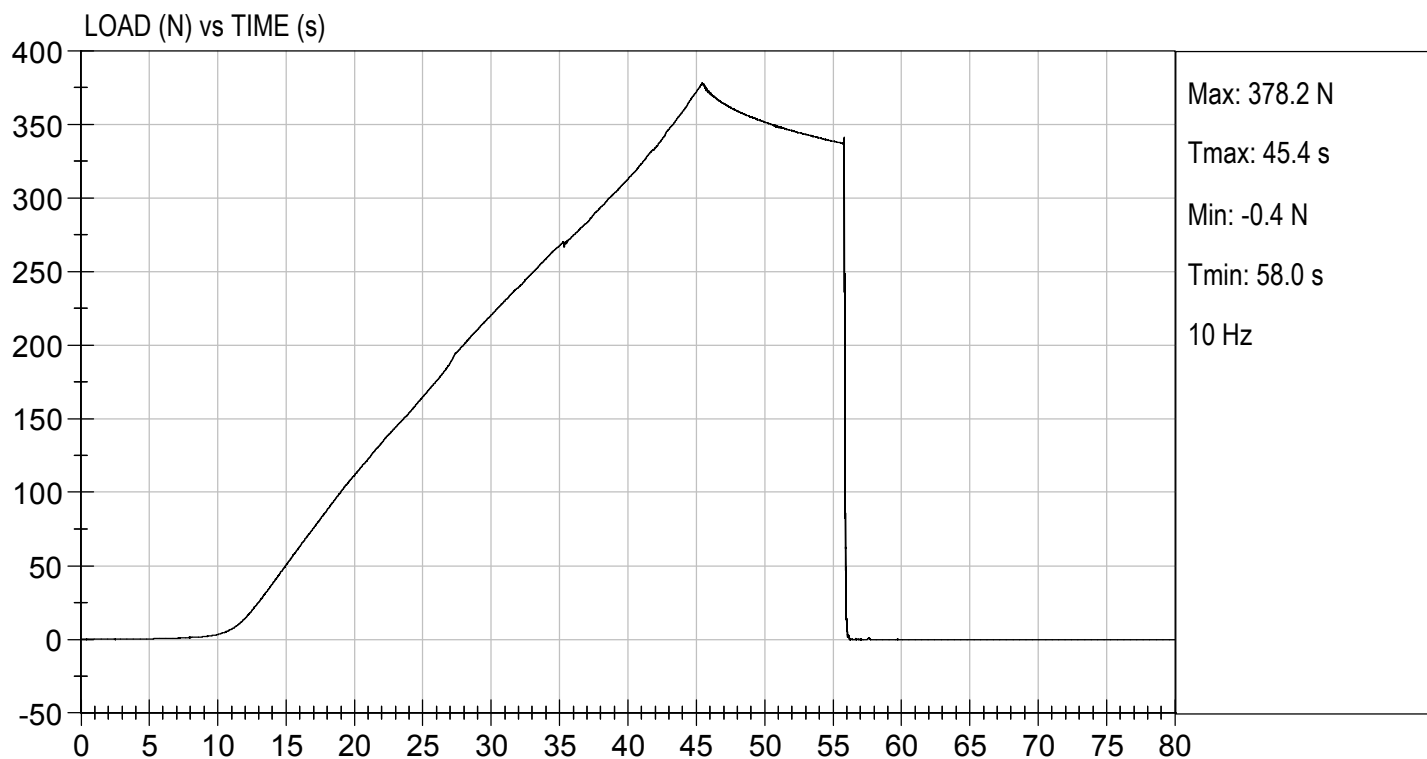
Laboratory Technician

03/11/2021

Test Date



Approved By



CALIBRATION TEST RESULTS

POST-TEST

HYBRID III 5TH PERCENTILE FEMALE - PASSENGER ATD

MGA RESEARCH CORPORATION
HEAD DROP TEST
HYBRID III 5TH PERCENTILE

ATD Serial No: DH1659

Test ID: D210951

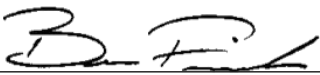
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	26.3	Pass
Peak Resultant Acceleration	G's	250 to 300	292	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	-3.3	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
Overall Test Results				Pass



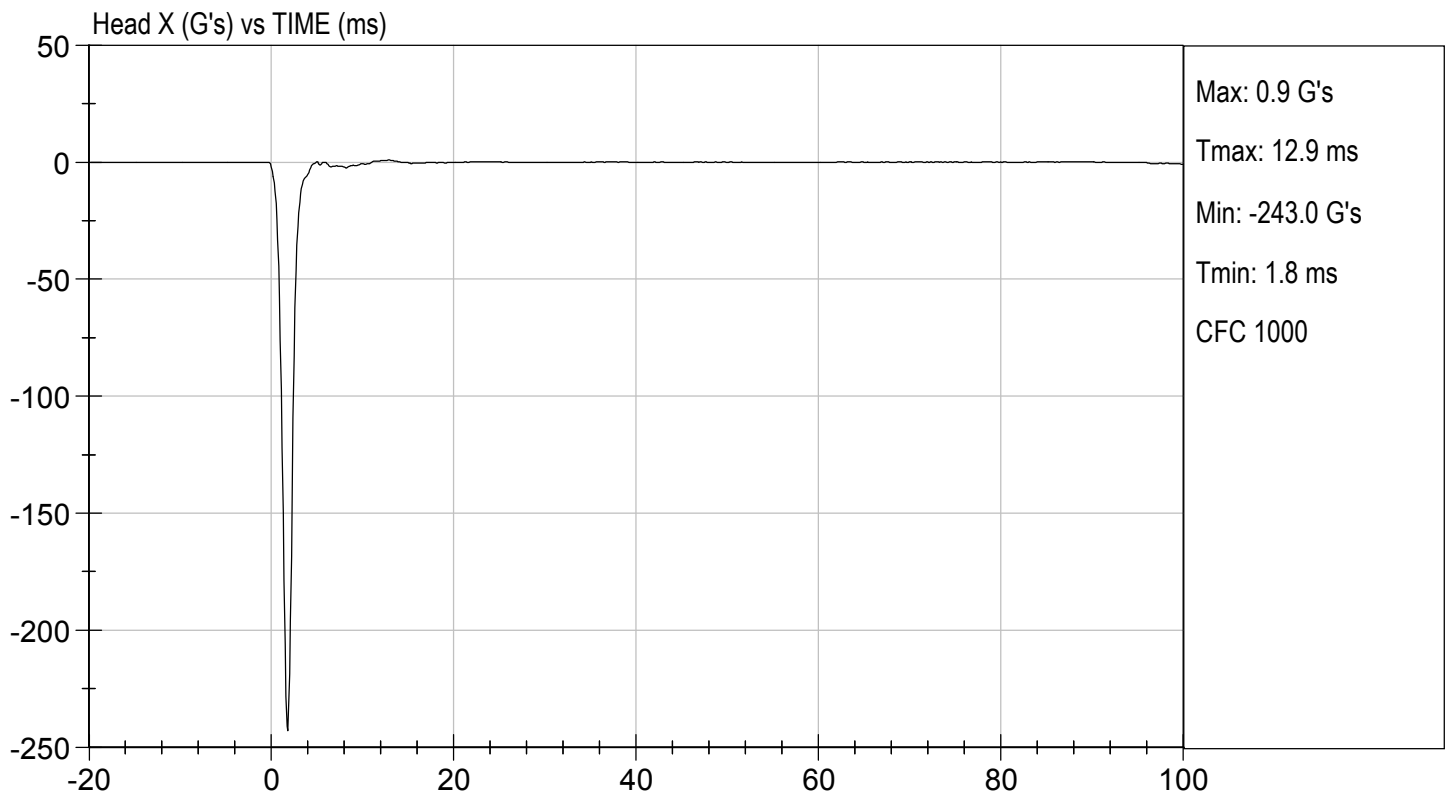
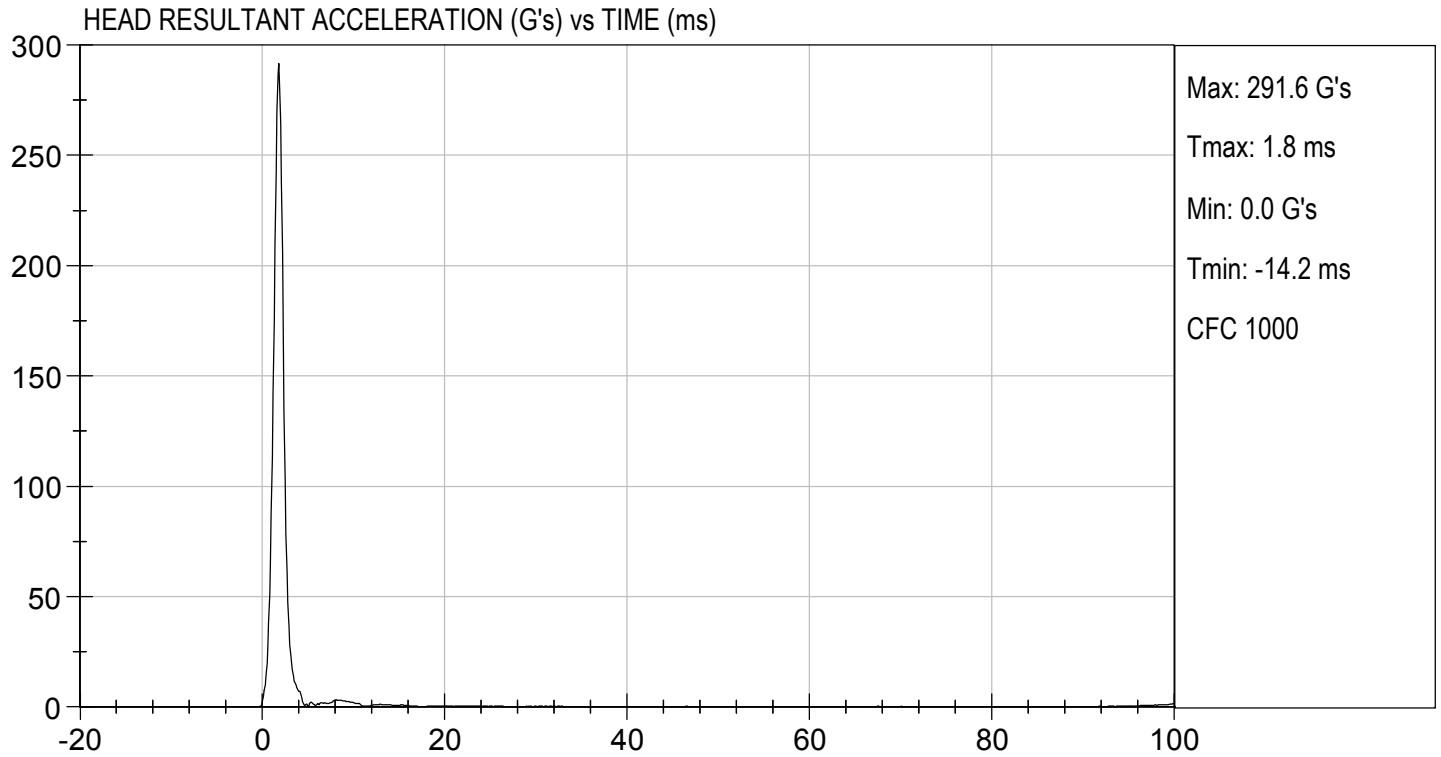
Laboratory Technician

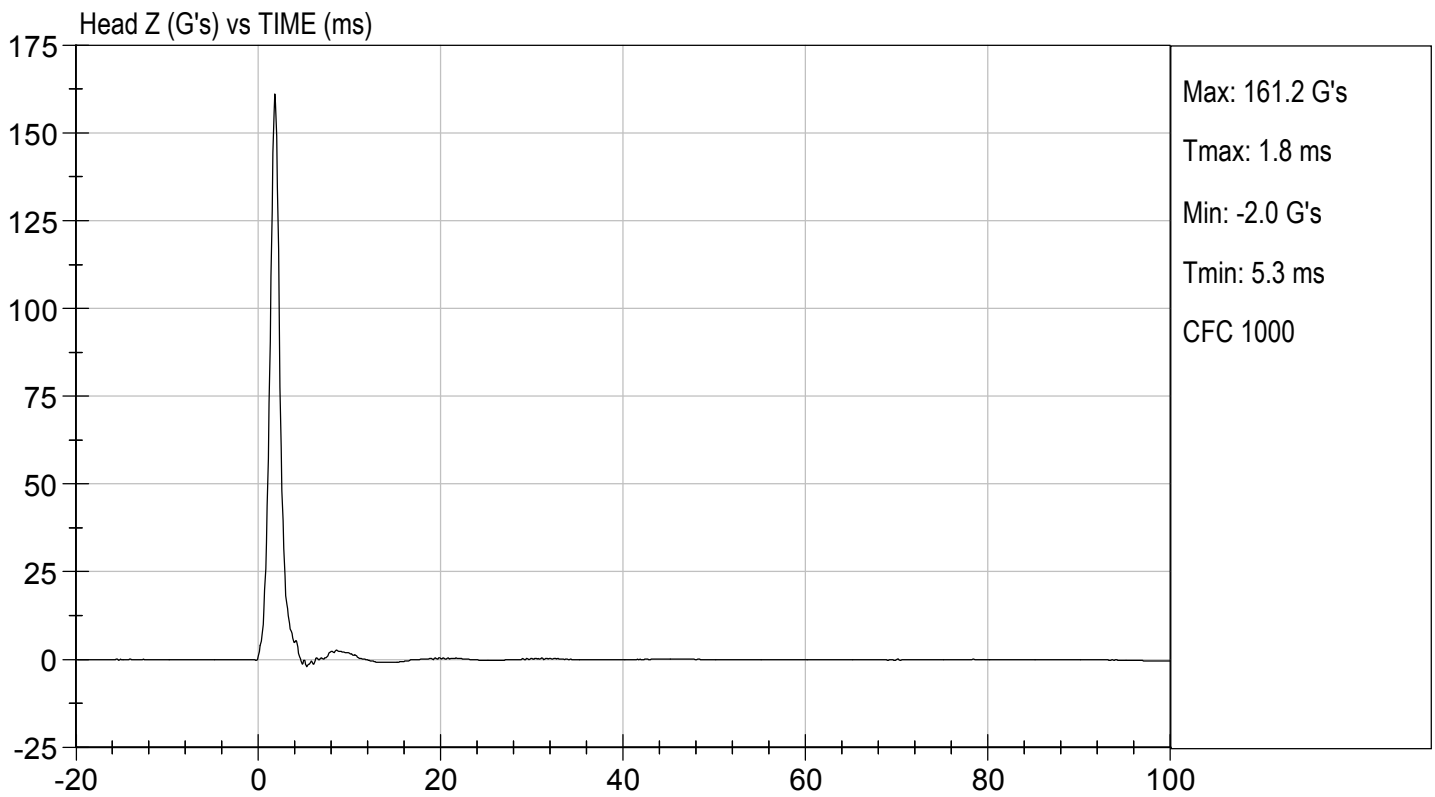
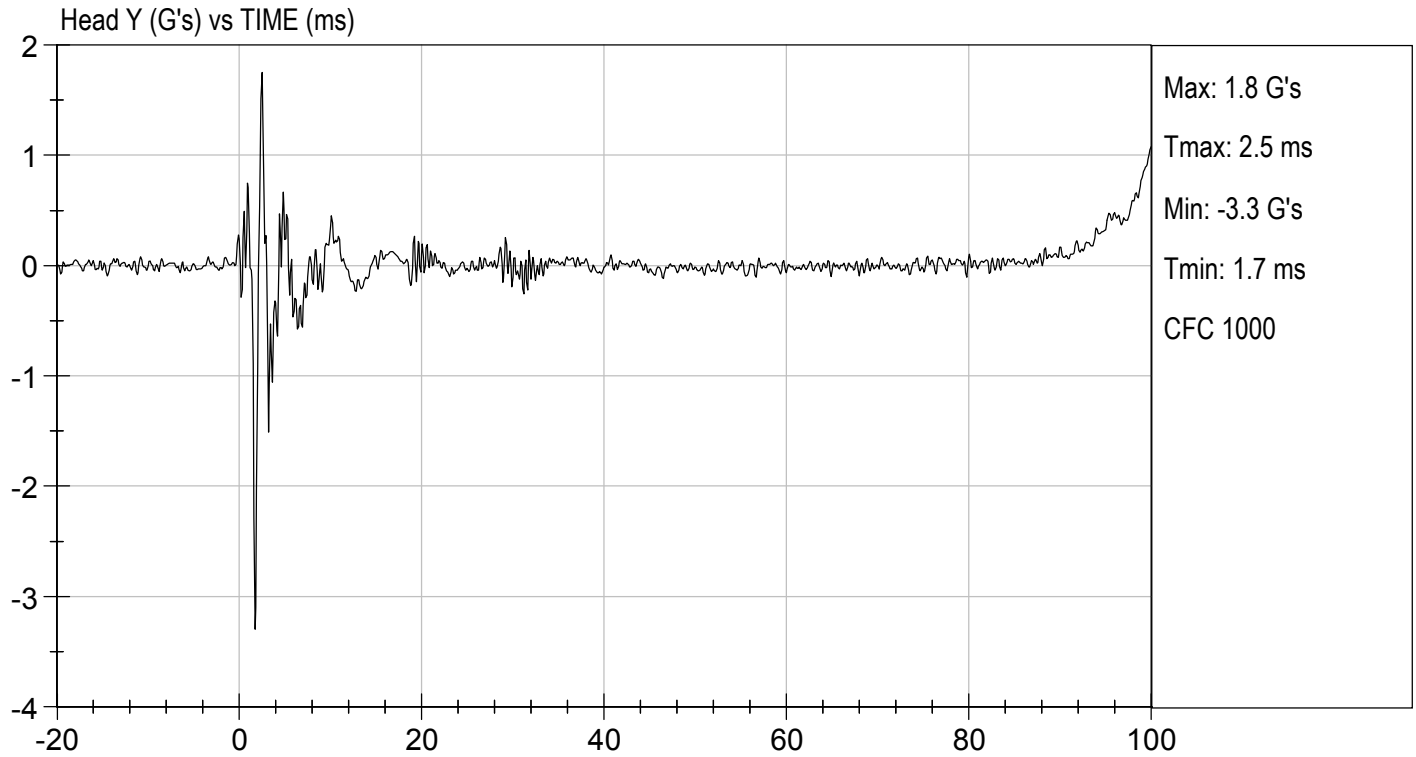
03/18/2021

Test Date



Approved By





MGA RESEARCH CORPORATION

NECK FLEXION TEST

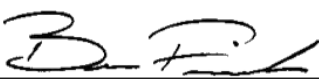
HYBRID III 5TH PERCENTILE

ATD Serial No: DH1659Test I.D: D210952

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity		%	10 to 70	21.2	Pass
Pendulum Speed		m/s	6.89 to 7.13	7.06	Pass
Pendulum Velocity	10 ms	m/s	2.1 to 2.5	2.3	Pass
	20 ms	m/s	4.0 to 5.0	4.7	Pass
	30 ms	m/s	5.8 to 7.0	7.0	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	84	Pass
Overall Results					Pass


 Laboratory Technician

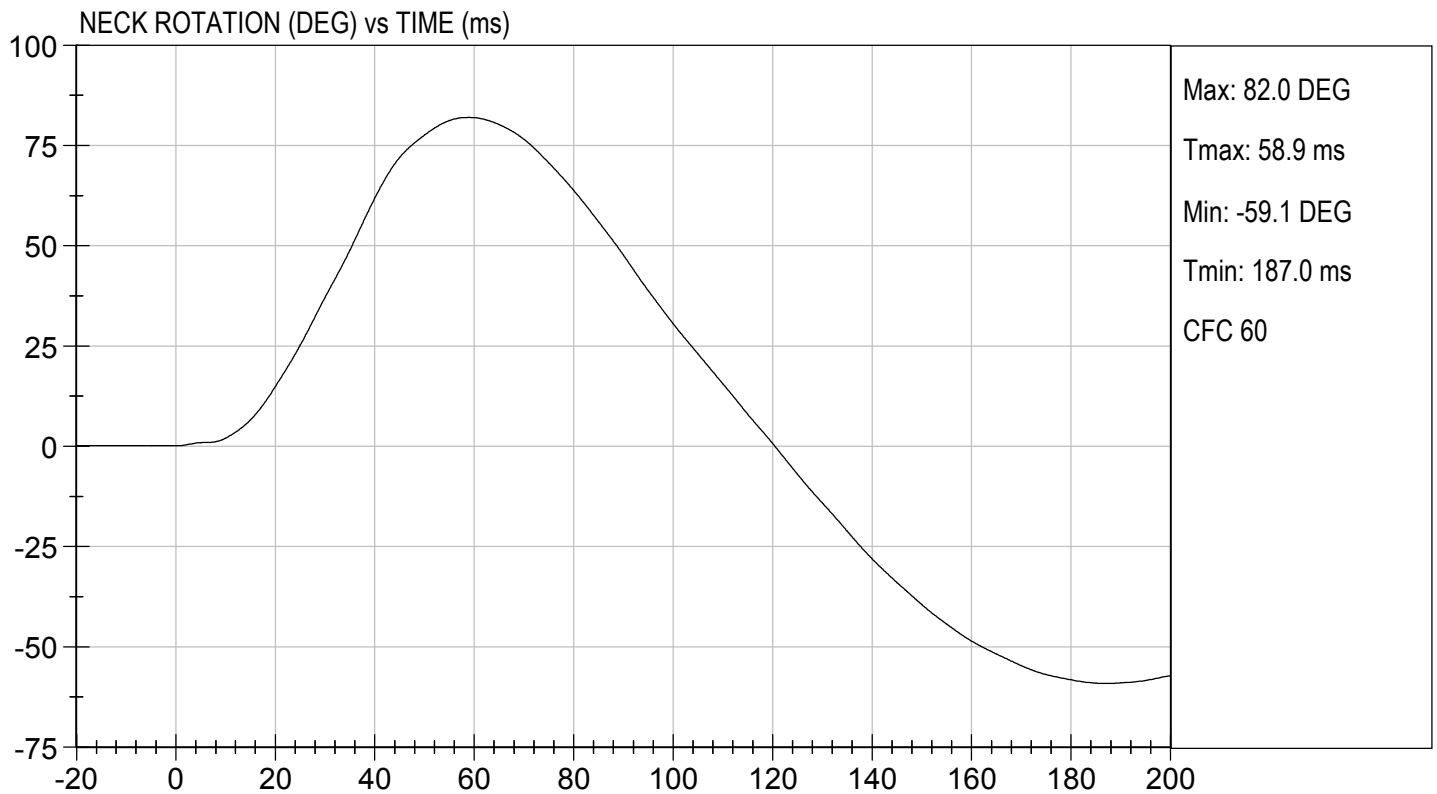
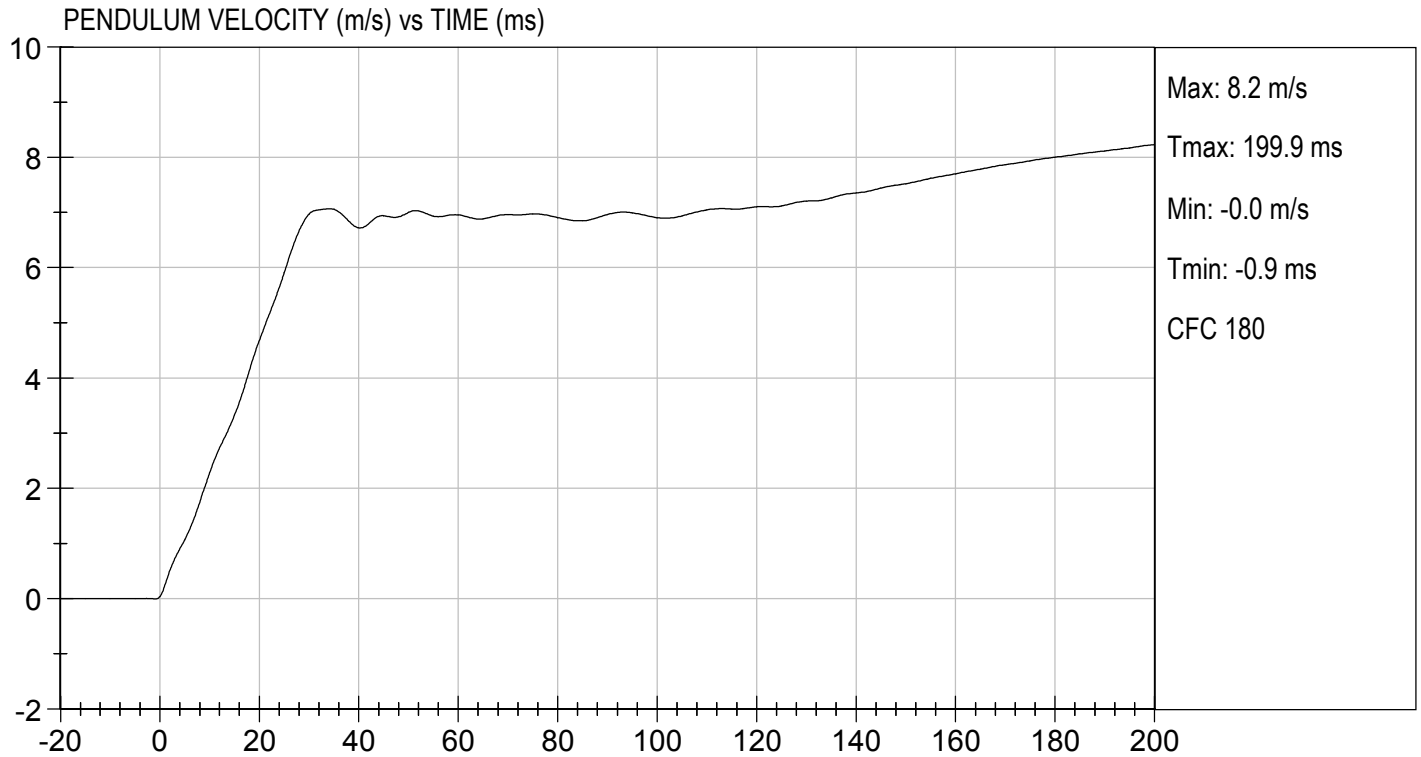
03/19/2021
 Test Date


 Approved By



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

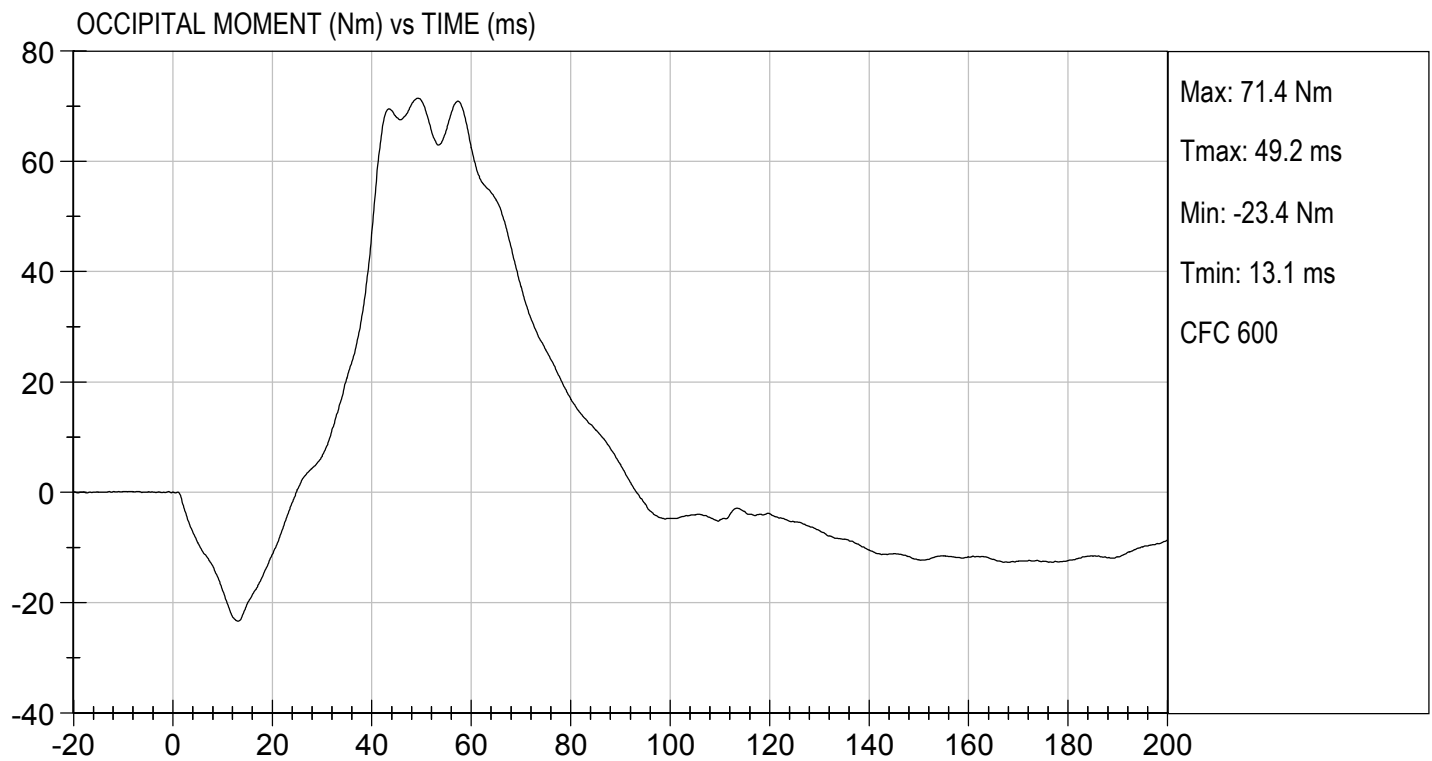
TEST DATE: 03/19/2021
TEST #: D210952





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

TEST DATE: 03/19/2021
TEST #: D210952



MGA RESEARCH CORPORATION
NECK EXTENSION TEST
HYBRID III 5TH PERCENTILE

ATD Serial No: DH1659

Test I.D: D210953

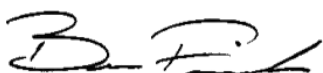
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity		%	10 to 70	21.2	Pass
Pendulum Speed		m/s	5.95 to 6.19	6.12	Pass
Pendulum Velocity	10 ms	m/s	1.5 to 1.9	1.7	Pass
	20 ms	m/s	3.1 to 3.9	3.5	Pass
	30 ms	m/s	4.6 to 5.6	5.2	Pass
D Plane Rotation	Max	deg	99 to 114	108	Pass
Occipital Condyle Moment within Rotation Corridor		Nm	-65 to -53	-55	Pass
Negative Moment Time Curve Decay to -10 Nm		ms	94 to 114	105	Pass
Overall Results					Pass



Laboratory Technician

03/19/2021

Test Date

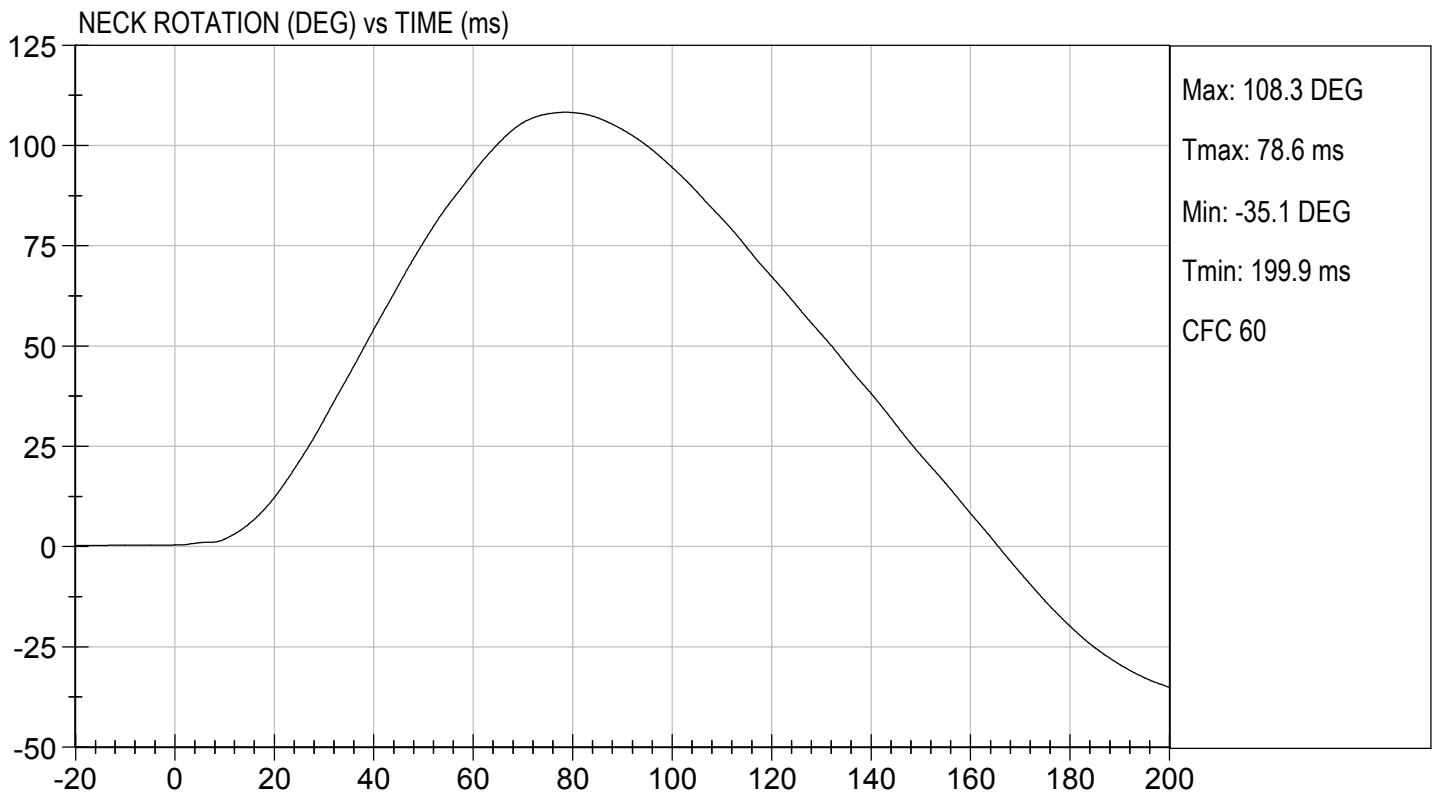
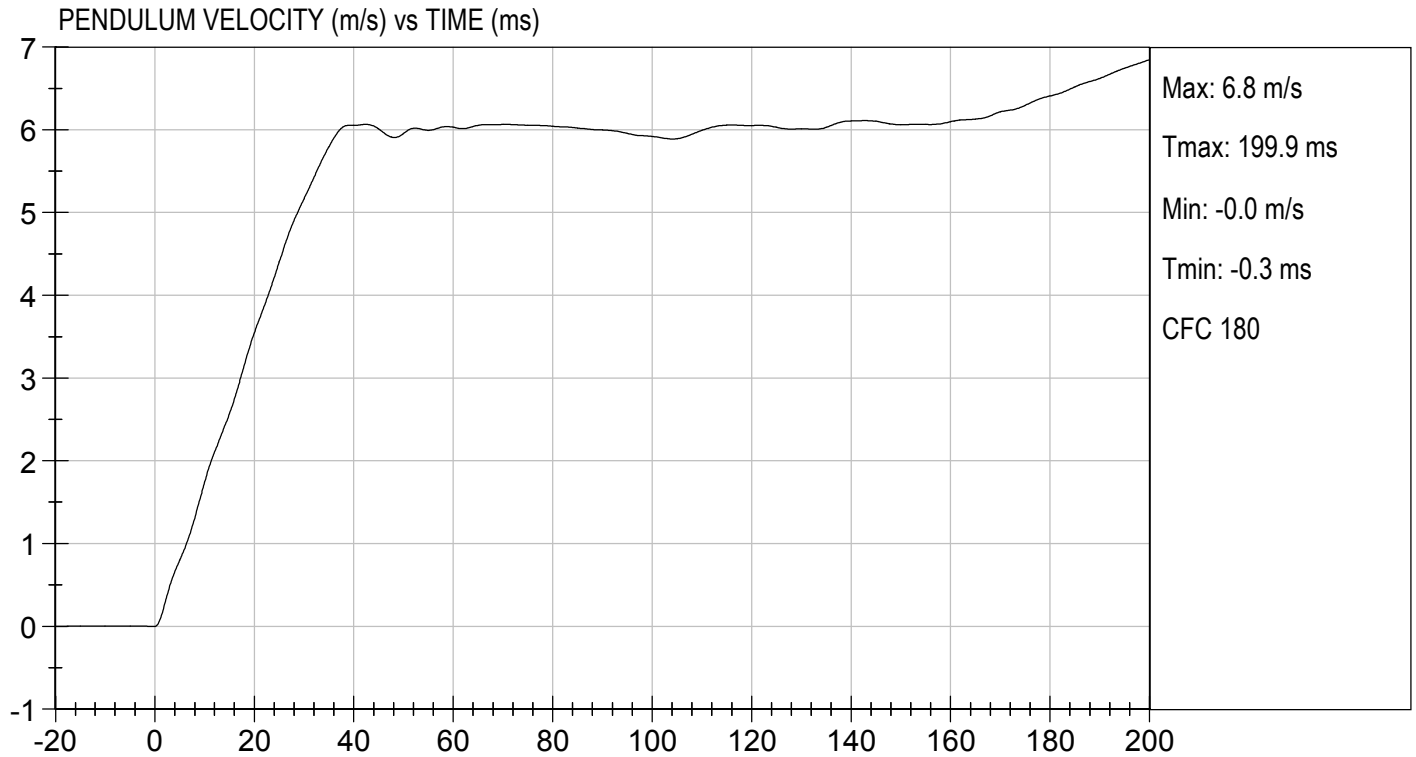


Approved By



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

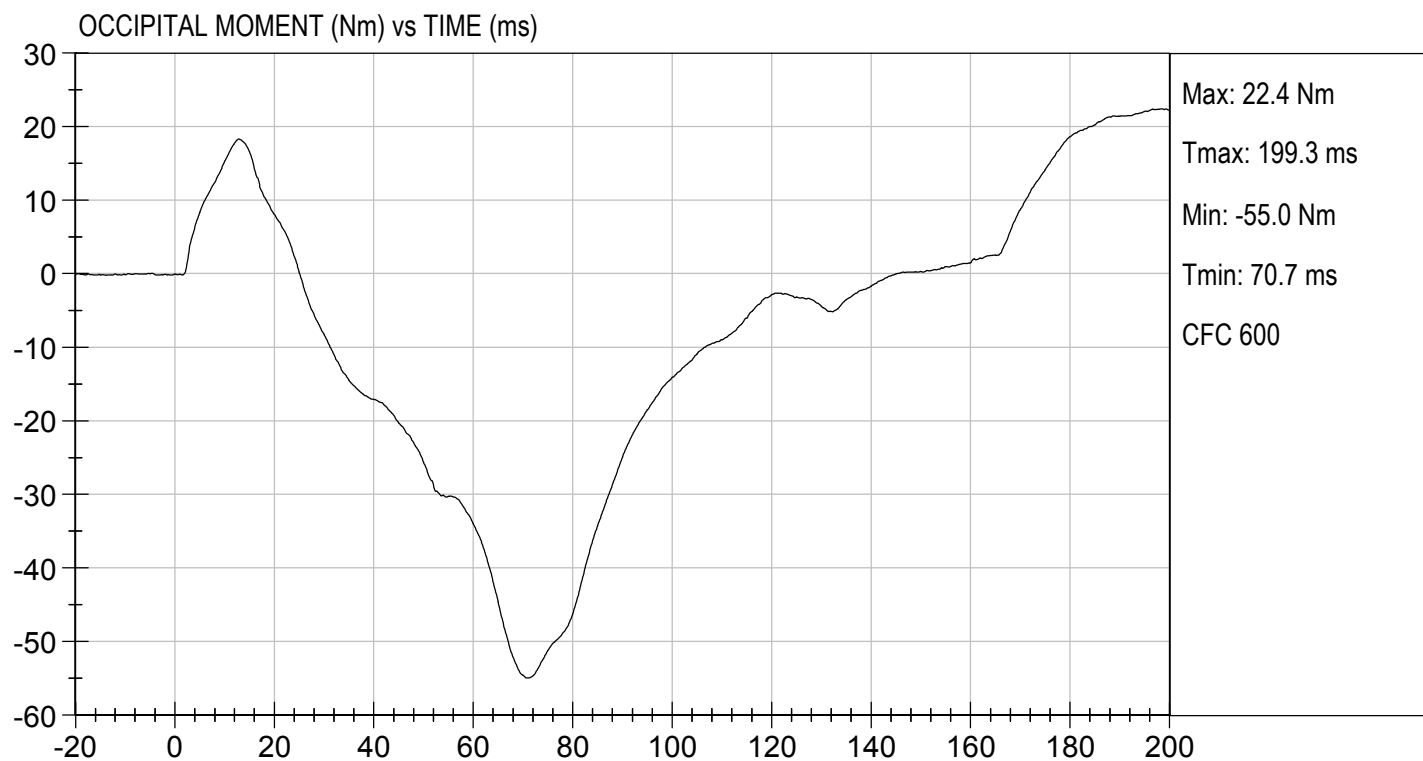
TEST DATE: 03/19/2021
TEST #: D210953





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

TEST DATE: 03/19/2021
TEST #: D210953



MGA RESEARCH CORPORATION
THORAX IMPACT
HYBRID III 5TH PERCENTILE

ATD Serial No: DH1659

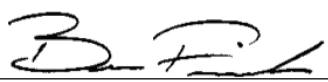
Test I.D: D210954

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.2	Pass
Relative Humidity	%	10 to 70	21	Pass
Probe Speed	m/s	6.59 to 6.83	6.68	Pass
Peak Deflection	mm	50 to 58	51	Pass
Peak Resistive Force w/in Deflection Corridor	N	3900 to 4400	4377	Pass
Internal Hysteresis	%	69 to 85	73	Pass
Peak Force 18 mm - 50 mm	N	<= 4600	4385	Pass
			Overall Test Results	Pass


Laboratory Technician

03/19/2021

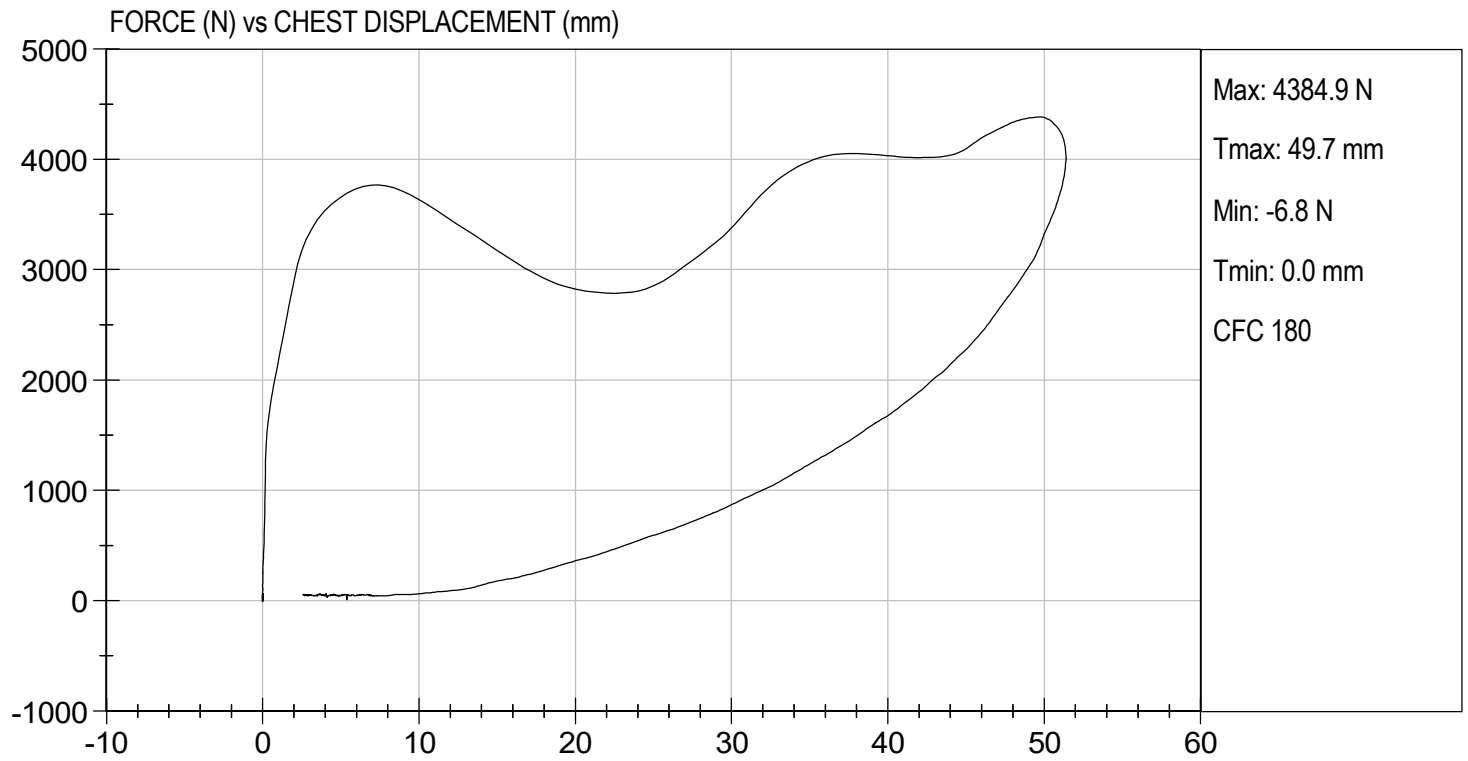
Test Date


Approved By



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

TEST DATE: 03/19/2021
TEST #: D210954



MGA RESEARCH CORPORATION

RIGHT KNEE IMPACT TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: DH1659

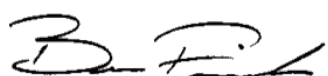
Test I.D: D210955

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	26	Pass
Probe Speed	m/s	2.07 to 2.13	2.12	Pass
Maximum Force	N	3450 to 4060	3566	Pass
Overall Test Results				Pass


Laboratory Technician

03/18/2021

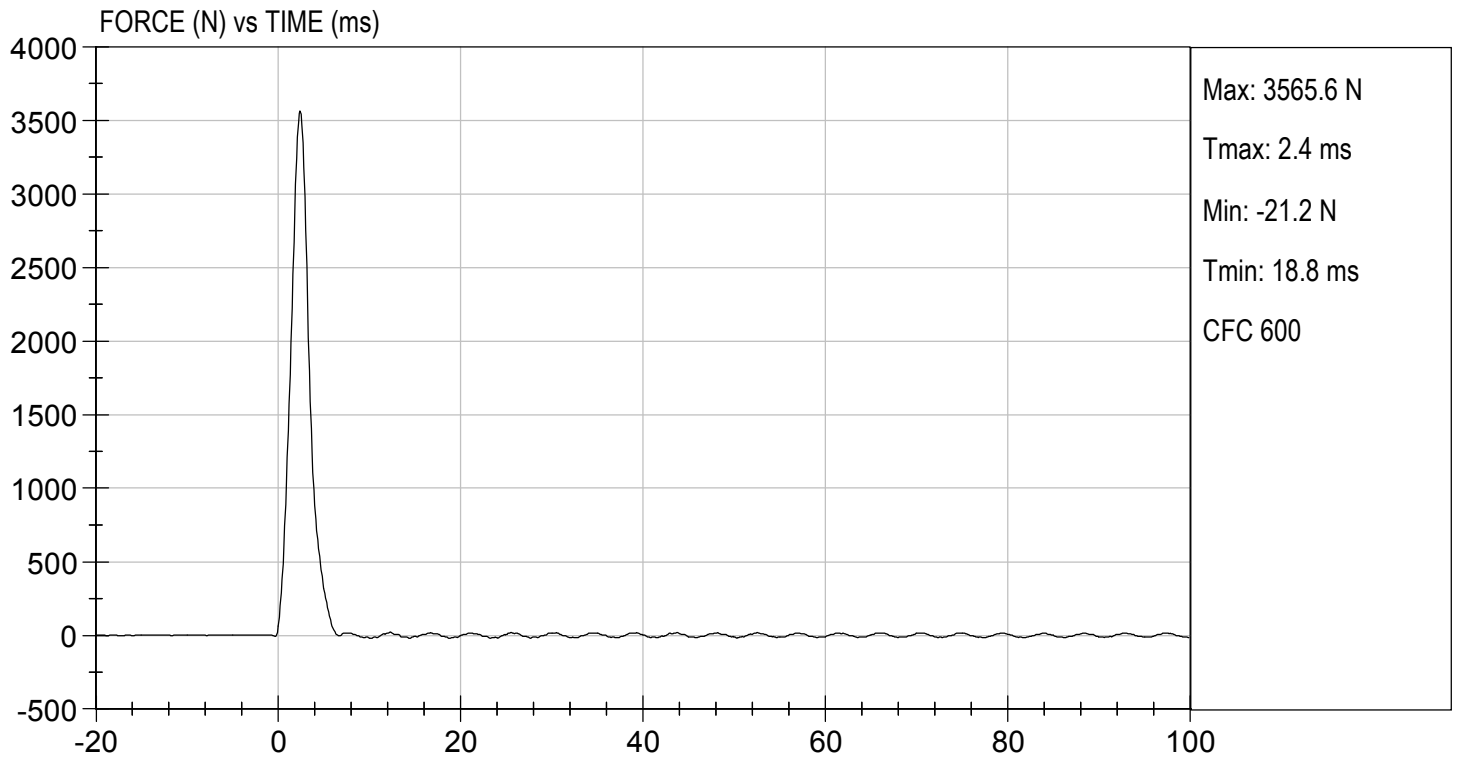
Test Date


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

TEST DATE: 03/18/2021
TEST #: D210955



MGA RESEARCH CORPORATION

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

ATD Serial No: DH1659

Test I.D: D210956

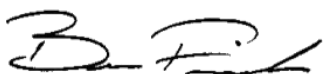
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	26	Pass
Probe Speed	m/s	2.07 to 2.13	2.12	Pass
Maximum Force	N	3450 to 4060	4013	Pass
Overall Test Results				Pass



Laboratory Technician

03/18/2021

Test Date

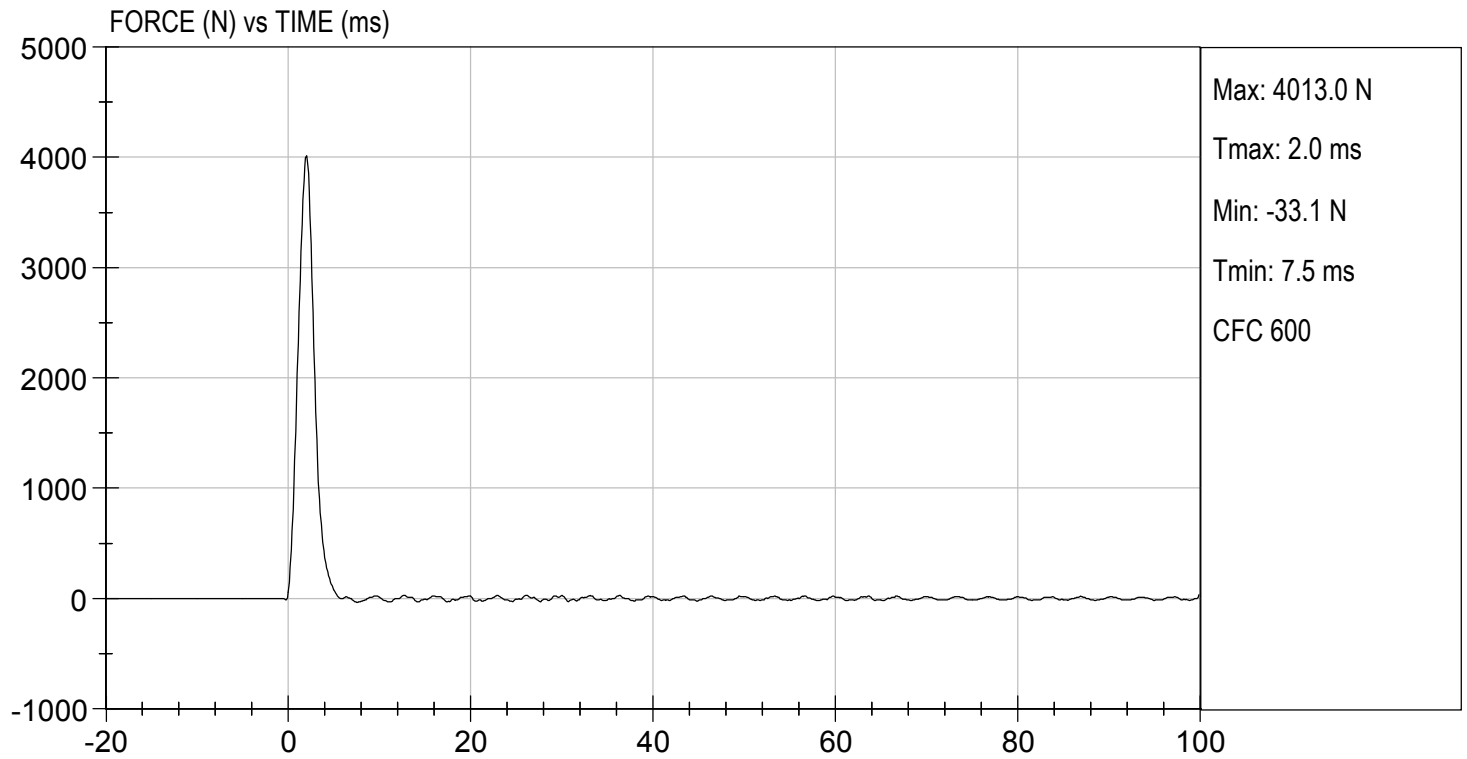


Approved By



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

TEST DATE: 03/18/2021
TEST #: D210956



MGA RESEARCH CORPORATION

TORSO FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: DH1659

Test I.D: D210957

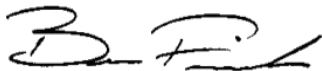
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	26.3	Pass
Initial Angle	deg	0 to 20	19	Pass
Return Angle	deg	+/- 8	2	Pass
Force at 45 deg	N	320 to 390	363	Pass
Upper Torso Deflection Rate	deg/s	0.5 to 1.5	0.7	Pass
Overall Result				Pass



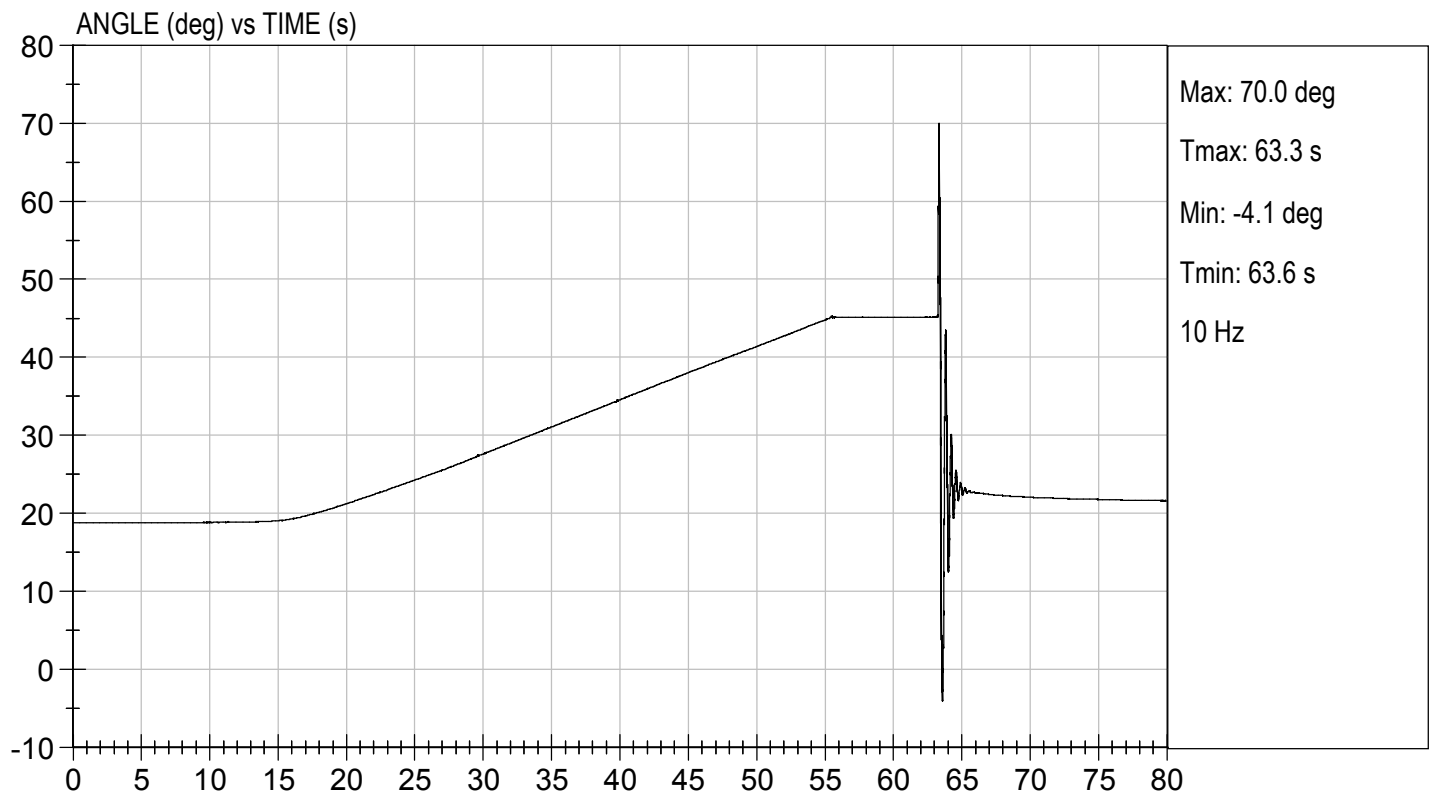
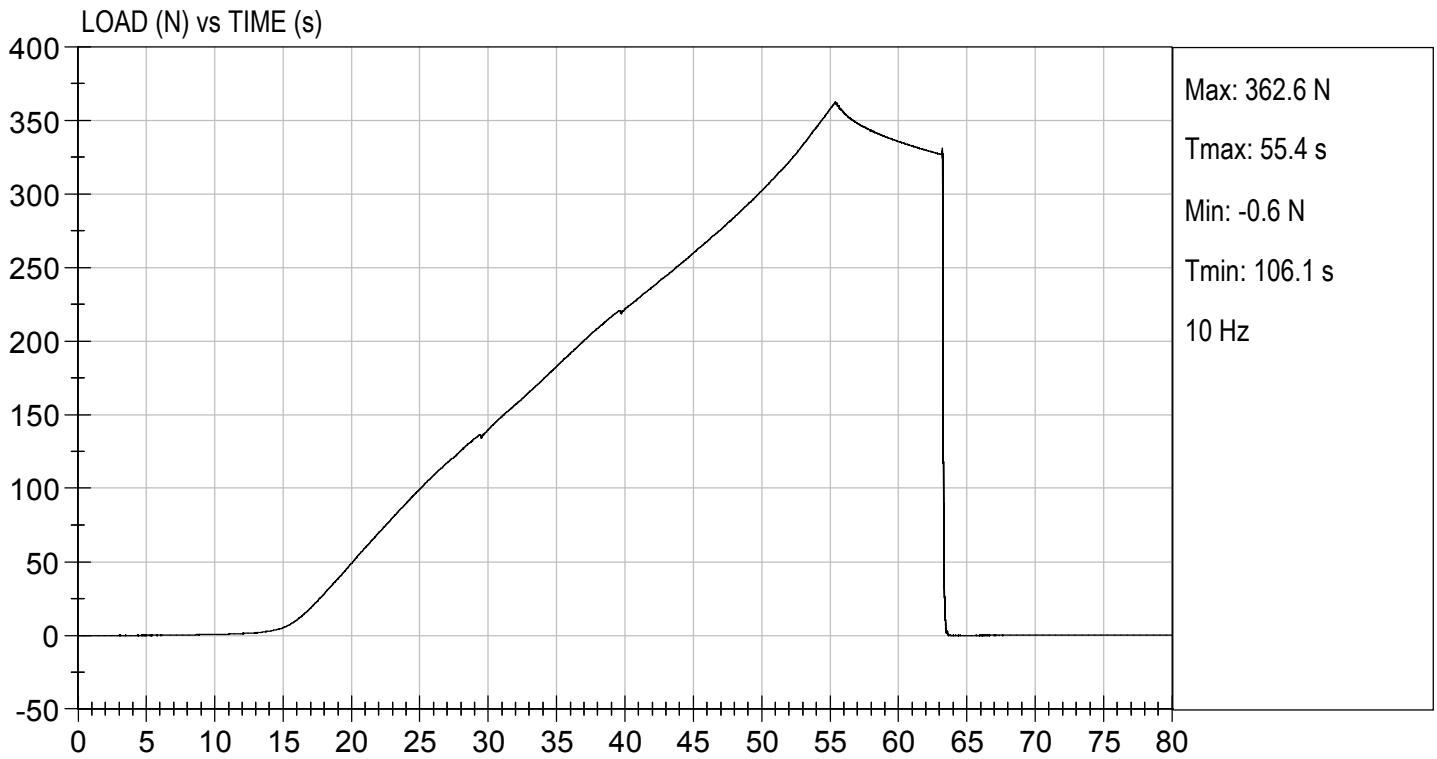
Laboratory Technician

03/18/2021

Test Date



Approved By



APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

TABLE 1 – DRIVER DUMMY INSTRUMENTATION

Instrument Location			Axis	Hybrid III 50 th S/N 351		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers	Primary		X	P79741	Endevco	03/01/2021
			Y	P79743	Endevco	03/01/2021
			Z	P79744	Endevco	03/01/2021
	Redundant		X	P94834	Endevco	03/01/2021
			Y	P94856	Endevco	03/01/2021
			Z	P97412	Endevco	03/01/2021
Head Angular Rate Sensors			X	ARS7402	DTS	08/04/2020
			Y	ARS7416	DTS	08/04/2020
			Z	ARS7366	DTS	08/04/2020
Upper Neck Load Cell		Fx, Fy, Fz Mx, My, Mz	NG2203	Denton	02/10/2021	
Chest Accelerometers	Primary		X	P86792	Endevco	03/01/2021
			Y	P86793	Endevco	03/01/2021
			Z	P88348	Endevco	03/01/2021
	Redundant		X	P88666	Endevco	03/01/2021
			Y	P88667	Endevco	03/01/2021
			Z	P94109	Endevco	03/01/2021
Chest Potentiometer		X	351	Servo	03/02/2021	
Pelvis Accelerometers			X	P95526	Endevco	03/01/2021
			Y	P96038	Endevco	03/01/2021
			Z	P97742	Endevco	03/01/2021
Femur Load Cells	Right	Primary	Z	FG121	Denton	03/02/2021
		Redundant	Z	FG121	Denton	03/02/2021
	Left	Primary	Z	FG122	Denton	03/02/2021
		Redundant	Z	FG122	Denton	03/02/2021
Tibia Load Cells	Right	Upper	Mx, My, Fz	TG408	Denton	02/09/2021
		Lower	Mx, My, Fz	AG116	Denton	02/09/2021
	Left	Upper	Mx, My, Fz	TG480	Denton	02/09/2021
		Lower	Mx, My, Fz	AG502	Denton	02/09/2021
Foot Accelerometers	Right	Rear	X	t22486	Endevco	03/01/2021
			Z	P97382	Endevco	03/01/2021
		Front	Z	P82120	Endevco	03/01/2021
	Left	Rear	X	T16468	Endevco	03/01/2021
			Z	T16496	Endevco	03/01/2021
		Front	Z	T16501	Endevco	03/01/2021
Seat Belt Load Cells		Lap				
		Shoulder				

TABLE 2 – FRONT PASSENGER DUMMY INSTRUMENTATION

Instrument Location			Axis	Hybrid III 5 th S/N DH1659		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers	Primary		X	P97377	Endevco	02/10/2021
			Y	P94800	Endevco	02/10/2021
			Z	P94802	Endevco	02/10/2021
	Redundant		X	P94799	Endevco	02/10/2021
			Y	P94801	Endevco	02/10/2021
			Z	P94803	Endevco	02/10/2021
Head Angular Rate Sensors			X	ARS7340	DTS	08/04/2020
			Y	ARS7357	DTS	08/04/2020
			Z	ARS7442	DTS	08/04/2020
Upper Neck Load Cell		Fx, Fy, Fz Mx, My, Mz	NG2256	Denton	05/04/2020	
Chest Accelerometers	Primary		X	P94793	Endevco	02/10/2021
			Y	P95322	Endevco	02/10/2021
			Z	P88719	Endevco	02/10/2021
	Redundant		X	P94794	Endevco	02/10/2021
			Y	P95370	Endevco	02/10/2021
			Z	P94785	Endevco	02/10/2021
Chest Potentiometer		X	DH1659	Servo	02/10/2021	
Pelvis Accelerometers			X	P94798	Endevco	02/10/2021
			Y	P97705	Endevco	02/10/2021
			Z	P82646	Endevco	02/10/2021
Femur Load Cells	Right	Primary	Z	FG126PFZ	Denton	02/10/2021
		Redundant	Z	FG126PFZ	Denton	02/10/2021
	Left	Primary	Z	FG127PFZ	Denton	02/10/2021
		Redundant	Z	FG127PFZ	Denton	02/10/2021
Tibia Load Cells	Right	Upper	Mx, My, Fz	TG467	Denton	05/04/2020
		Lower	Mx, My, Fz	AG491	Denton	05/04/2020
	Left	Upper	Mx, My, Fz	TG478	Denton	05/04/2020
		Lower	Mx, My, Fz	AG500	Denton	05/04/2020
Foot Accelerometers	Right	Rear	X	P94795	Endevco	02/10/2021
			Z	P94796	Endevco	02/10/2021
		Front	Z	P94797	Endevco	02/10/2021
	Left	Rear	X	P83167	Endevco	02/10/2021
			Z	P83168	Endevco	02/10/2021
		Front	Z	P83169	Endevco	02/10/2021
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	A377290	MSI	03/12/2021
			Z	A377300	MSI	03/12/2021
		Redundant	X	A377297	MSI	03/12/2021
	Right	Primary	X	A340711	MSI	09/23/2020
			Z	A340793	MSI	09/22/2020
		Redundant	X	A337157	MSI	11/03/2020
Engine Accelerometers		Top	X	A337211	MSI	09/21/2020
		Bottom	X	A356218	MSI	12/18/2020