

REPORT NUMBER: NCAP-MGA-23-033

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

**FCA USA LLC
2023 Jeep Wagoneer 4x4 5-Door SUV
NHTSA No.: M20230305**

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



Test Date: August 9, 2023

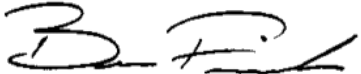
Final Report Date: February 6, 2024

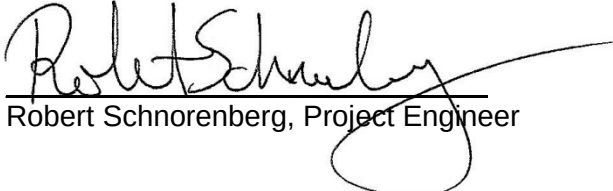
FINAL REPORT

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

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Robert Schnorenberg, Project Engineer

Approval Date: February 6, 2024

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 2023 Jeep Wagoneer 4x4 5-Door SUV in accordance with the specifications of the Office of Crashworthiness Standards Laboratory Procedure for NCAP Full Frontal Rigid Barrier Impact Testing. The test was conducted at MGA Research Corporation in Burlington, Wisconsin on August 9, 2023. The impact velocity of the vehicle was 56.29 km/h and the ambient temperature at the barrier face at the time of impact was 21.1°C. The target vehicle post-test maximum crush was 621 mm located to the left of the vehicle centerline. The test vehicle's performance was as follows: <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <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>124.711</td> <td>700</td> <td>219.335</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>23.027</td> <td>52</td> <td>9.634</td> </tr> <tr> <td>Nij</td> <td></td> <td>1</td> <td>0.321</td> <td>1</td> <td>0.439</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>4170</td> <td>865.180</td> <td>2620</td> <td>508.881</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>4000</td> <td>375.481</td> <td>2520</td> <td>273.861</td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>10008</td> <td>1233.440</td> <td>6805</td> <td>1586.366</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>10008</td> <td>1464.123</td> <td>6805</td> <td>1335.489</td> </tr> </tbody> </table>						Measurement Description	Units	Driver ATD		Passenger ATD		Threshold	Result	Threshold	Result	Head Injury Criteria (HIC ₁₅)		700	124.711	700	219.335	Maximum Chest Compression	mm	63	23.027	52	9.634	Nij		1	0.321	1	0.439	Neck Tension	N	4170	865.180	2620	508.881	Neck Compression	N	4000	375.481	2520	273.861	Left Femur Force	N	10008	1233.440	6805	1586.366	Right Femur Force	N	10008	1464.123	6805	1335.489
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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 2023 Jeep Wagoneer 4x4 5-Door SUV at a velocity of 56.29 km/h. The test was performed at MGA Research Corporation on August 9, 2023. 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. Seat belt load cells were installed on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading.

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

The 634 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 621 mm located to the left of the vehicle centerline and both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

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

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

The occupant data is summarized below:

ATD position	HIC ₁₅	Nij	Neck Tension (N)	Neck Comp. (N)	3ms Chest Clip (g)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver (50 th)	124.711	0.321	865.180	375.481	34.146	23.027	1233.440	1464.123
Passenger (5 th)	219.335	0.439	508.881	273.861	30.655	9.634	1586.866	1335.489

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

TEST NOTES

None.

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: 2023 Jeep Wagoneer 4x4 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20230305
 Test Date: 8/9/2023

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20230305	Traction Control System (TCS)	Yes
Model Year	2023	Power Steering	Yes
Make	Jeep	Power Window Auto-Reverse	Yes
Model	Wagoneer 4x4	Driver Frontal Airbag	Yes
Body Style	5-Door SUV	Driver Curtain Airbag	Yes
VIN	1C4SJVATXPS507255	Driver Head/Torso Airbag	No
Body Color	Diamond Black Crystal Pearl	Driver Torso Airbag	No
Odometer (km/mi)	80 km / 50 mi	Driver Torso/Pelvis Airbag	Yes
Engine Displacement (L)	5.7 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	8	Front Pass. Head/Torso Airbag	No
Overdrive	Yes	Front Pass. Torso Airbag	No
Final Drive	4WD	Front Pass. Torso/Pelvis Airbag	Yes
Roof Rack	No	Front Pass. Pelvis Airbag	No
Sunroof/T-Top	No	Front Pass. Knee Airbag	Yes
Running Boards	Yes	Driver Pretensioner	Yes
Tilt Steering Wheel	Yes	Driver Load Limiter	Yes
Power Seats	Yes	Front Pass. Pretensioner	Yes
Anti-Lock Brakes (ABS)	Yes	Front Pass. Load Limiter	Yes
Automatic Door Locks (ADLs)	Yes	Other	N/A

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

Manufactured By	FCA USA LLC	GVWR (kg)	3470
Date of Manufacture	12-22	GAWR Front (kg)	1770
		GAWR Rear (kg)	2087

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Split Bench	Split Bench	
Designated Seating Capacity (DSC)	2	3	3	8
Capacity Weight (VCW) (kg)				730
Cargo Weight (RCLW) (kg)				136

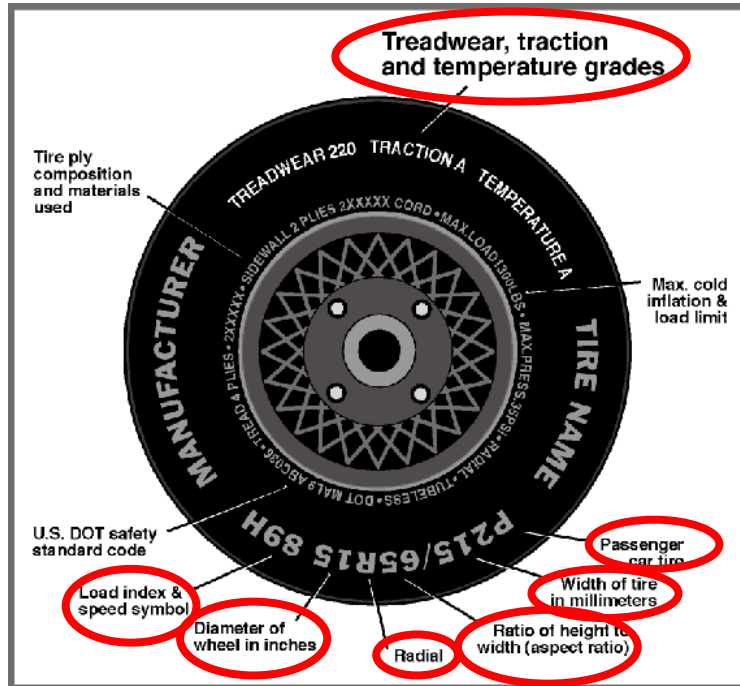
* Rated Cargo and Luggage Weight (RCLW) limited to maximum of 300 lbs (136 kg).

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

Test Vehicle: 2023 Jeep Wagoneer 4x4 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20230305
 Test Date: 8/9/2023

VEHICLE TIRE INFORMATION



Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	260	260
Recommended Tire Size	275/65R18	275/65R18
Tire Size on Vehicle	275/65R18	275/65R18
Tire Manufacturer	Bridgestone	Bridgestone
Tire Model	Dueler H/T	Dueler H/T
Treadwear	520	520
Traction	A	A
Temperature Grade	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel, 1 Nylon	2 Polyester, 2 Steel, 1 Nylon
Load Index/Speed Symbol	116T	116T
Tire Material	Rubber	Rubber
DOT Safety Code Left	1VN YJD HT4 3622	1VN YJD HT4 3622
DOT Safety Code Right	1VN YJD HT4 3622	1VN YJD HT4 3622

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

Test Vehicle: 2023 Jeep Wagoneer 4x4 5-Door SUV
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TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	704.5	689.0		724.0	812.0	
Right	kg	713.5	643.5		724.5	759.0	
Ratio	%	51.6%	48.4%		48.0%	52.0%	
Totals	kg	1418.0	1332.5	2750.5	1448.5	1571.0	3019.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	2750.5
Weight of 1 P572E ATD & 1 P572O ATD	kg	141
Rated Cargo/Luggage Weight (RCLW)	kg	136
Calculated Test Vehicle Target Weight (TVTW)	kg	3027.5

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	908	909	916	929	1520
As Tested	mm	890	892	883	896	1633
Post Test	mm	899	902	903	910	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	3138
Total Vehicle Length at Left Side	mm	5386
Total Vehicle Length at Centerline	mm	5457
Total Vehicle Length at Right Side	mm	5386
Weight of Ballast in Cargo Area	kg	92
Weight of Vehicle Components Removed	kg	19
Amount of Stoddard Solvent in Fuel Tank	L	93.5

List of components removed to meet test weight: None.

List of components removed for instrumentation, data box, and equipment installation: Cargo area carpet/trim/divider, jack and tools, spare tire cover.

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

Test Vehicle: 2023 Jeep Wagoneer 4x4 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20230305
 Test Date: 8/9/2023

TARGET VEHICLE STRUCTURAL MEASUREMENT

	Elements	Pre-Test (mm)
1	Total Length	5457
2	Total Width	2072
3	Bumper Top Height	622
4	Bumper Bottom Height	479
5	Longitudinal Member Top Height	619
6	Distance between Longitudinal Members	853
7	Longitudinal Member Width	77
8	Engine Top Height	1077
9	Engine Bottom Height	376
10	Engine and Gearbox Width	1191
11	Front Bumper-Engine Distance	653
12	Front Shock Absorber Fixing Height	708
13	Bonnet Leading Edge Height	1122
14	Front Shock Absorber Fixing Width	1295
15	Front Bumper – Front Axle Distance	894
16	Front Axle – A-Pillar Distance	578
17	A-Pillar – B-Pillar Distance	1125
18	B-Pillar – Rear Axle Distance	1417
19	B-Pillar – C-Pillar Distance	1141
20	Roof Sill Bottom Height	1769
21	Roof Sill Top Height	1824
22	Floor Sill Bottom Height	317
23	Floor Sill Top Height	477

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

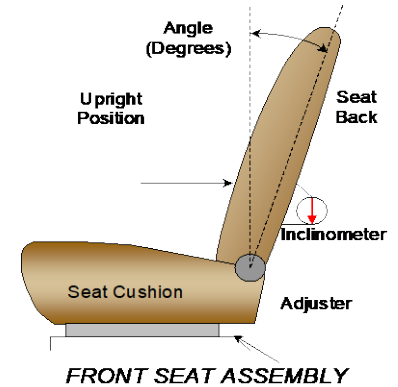
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NHTSA No.: M20230305
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NOMINAL DESIGN RIDING POSITION

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	0.2° on outboard headrest post
Passenger Seat Back Angle	-2.7° on outboard headrest post



SEAT FORE/AFT POSITIONS

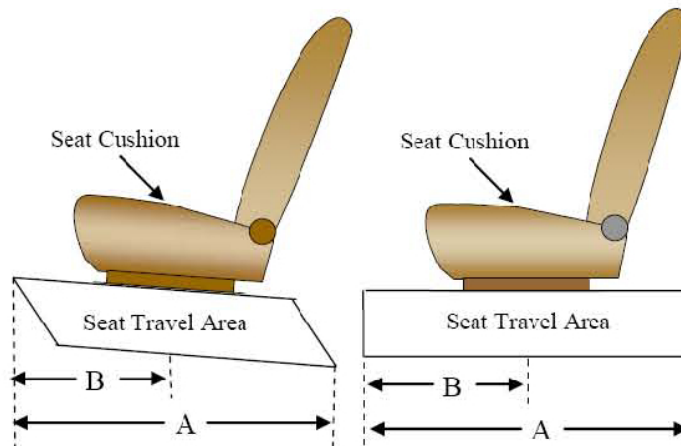
The driver and passenger seat fore/aft positions are adjusted following Appendix F, "Driver & Passenger Dummy Seating & Positioning Procedures" in the NCAP Test Procedure dated May 2018.

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	263 mm	132 mm
Passenger Seat	195 mm	0 mm

SEAT BELT UPPER ANCHORAGES

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

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



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

Test Vehicle: 2023 Jeep Wagoneer 4x4 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

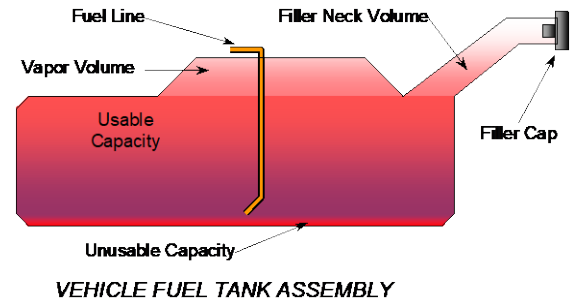
NHTSA No.: M20230305
 Test Date: 8/9/2023

FUEL TANK CAPACITY DATA

	Liters
Usable Capacity of "Standard Tank"	100.3
Usable Capacity of "Optional Tank"	
92-94% of Usable Capacity	92.3 to 94.3
Actual Amount of Solvent used	93.5
1/3 of Usable Capacity	33.4

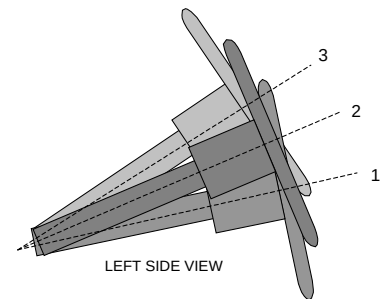
FUEL PUMP

The vehicle is equipped with an electronic fuel pump. The fuel pump will run when ignition key in and turned to the run position. 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.



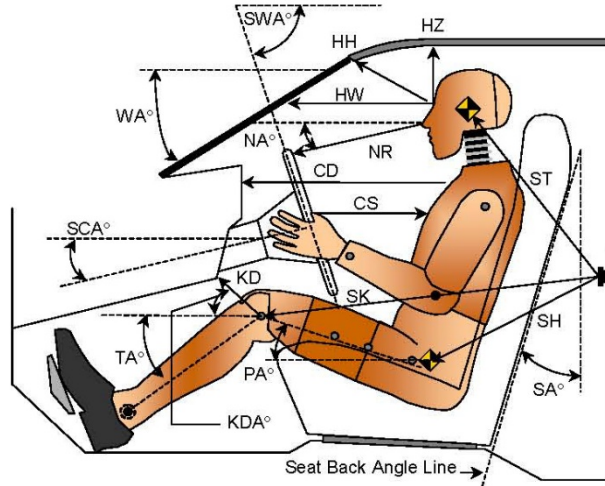
STEERING COLUMN POSITION

	Degrees	Fore/Aft Position (mm)
Lowermost Position 1	70.5	
Geometric Center Position 2	68.1	
Uppermost Position 3	65.7	
Telescoping Steering Wheel Travel		60
Test Position	68.1	30

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2023 Jeep Wagoneer 4x4 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20230305
Test Date: 8/9/2023



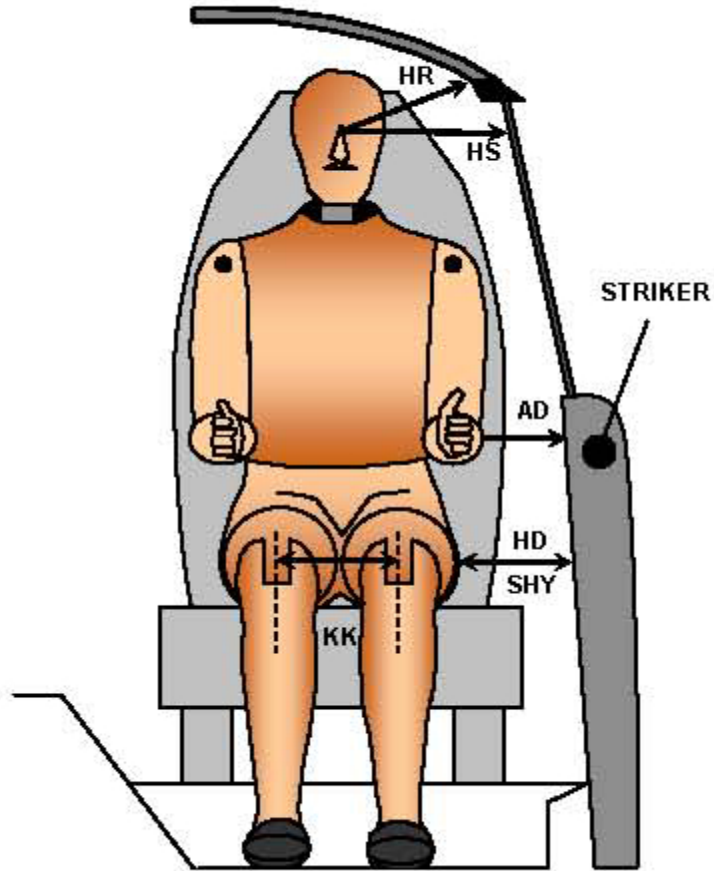
LEFT SIDE VIEW

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		27.7		
SWA°	Steering Wheel Angle		68.1		
SCA°	Steering Column Angle		21.9		
SA°	Seat Back Angle		0.2		-2.7
HZ	Head to Roof (Z)	250	90	264	90
HH	Head to Header	467	21.2	416	27.3
HW	Head to Windshield	765	0	795	0
NR	Nose to Rim	408	8.3		
CD	Chest to Dash	570		447	
CS	Chest to Steering Hub	327	5.4		
RA	Rim to Abdomen	216	0		
KDL	Left Knee to Dash	218	24.5	138	36.1
KDR	Right Knee to Dash	198	24.0	143	35.0
PA°	Pelvic Angle		22.6		20.6
TA°	Tibia Angle		49.7		66.8
SK	Striker to Knee	553	93.9	649	84.4
ST	Striker to Head	606	5.6	542	21.8
SH	Striker to H-Point	193	68.7	340	87.0

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2023 Jeep Wagoneer 4x4 5-Door SUV
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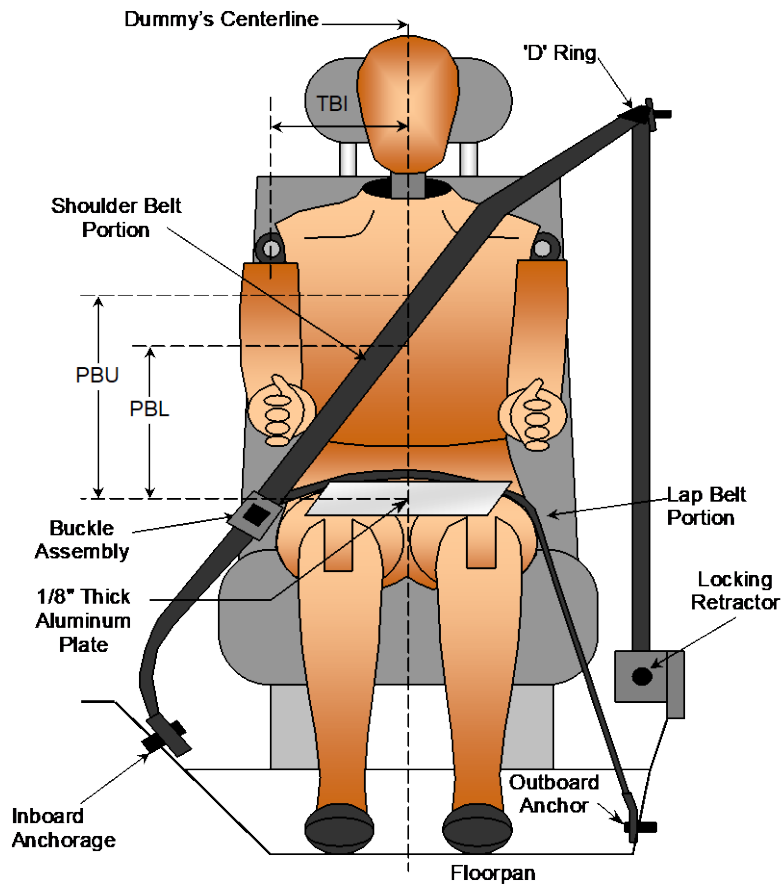
FRONT VIEW OF DUMMY

Code	Measurement Description	Driver	Passenger
		Length (mm)	
AD	Arm to Door	112	81
HD	H-Point to Door	138	161
HR	Head to Side Header	236	267
HS	Head to Side Window	313	345
KK	Knee to Knee	352	230
SHY	Striker to H-Point (Y Direction)	348	300
AA	Ankle to Ankle	360	200

DATA SHEET NO. 5
SEAT BELT POSITIONING DATA

Test Vehicle: 2023 Jeep Wagoneer 4x4 5-Door SUV
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Test Date: 8/9/2023



FRONT VIEW OF DUMMY

SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU - Top surface of reference to belt upper edge	mm	375	335
PBL - Top surface of reference to belt lower edge	mm	290	245

BELT LENGTH DATA

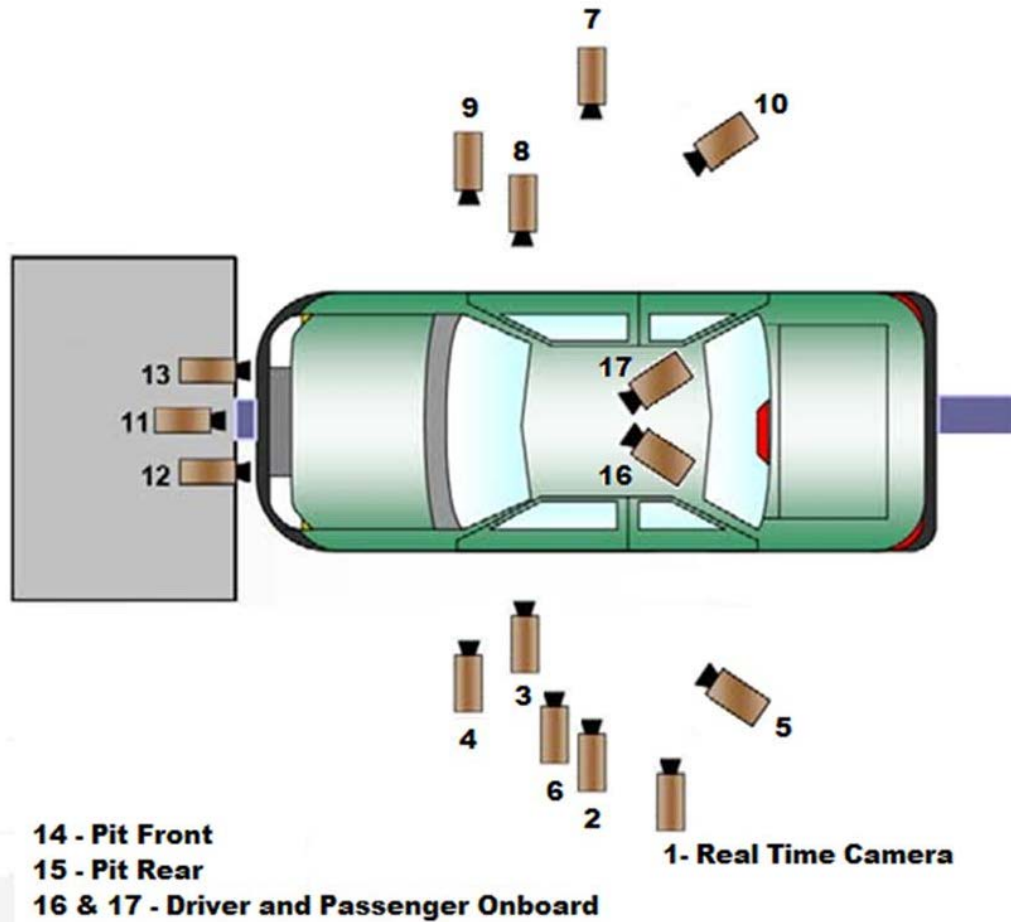
Measurement Description	Units	Driver	Passenger
Shoulder Belt Length as measured on ATD	mm	820	865
Lap Belt Length as measured on ATD	mm	640	715
Remainder of belt on reel	mm	455	350
Total Belt Length for Continuous Webbing Systems	mm	2550	2550

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

Test Vehicle: 2023 Jeep Wagoneer 4x4 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20230305
Test Date: 8/9/2023

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: 2023 Jeep Wagoneer 4x4 5-Door SUV
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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	-2580	-6230	-1520	12	1000
3	Driver Close-Up	-1620	-6960	-1940	50	1000
4	Left Front Half	-1310	-6010	-1460	24	1000
5	Left Angle	-7340	-5730	-1990	75	1000
6	Steering Column	-990	-5550	-1240	50	1000
7	Right Overall	-2590	6630	-1540	12	1000
8	Passenger Close-Up	-1660	7000	-1970	50	1000
9	Right Front Half	-1260	5950	-1570	24	1000
10	Right Angle	-7390	5490	-2070	75	1000
11	Windshield	130	0	-2310	12	1000
12	Driver Windshield	180	-370	-2230	25	1000
13	Passenger Windshield	180	370	-2230	25	1000
14	Pit Front	-960	0	3340	24	1000
15	Pit Rear	-3090	0	3340	24	1000
16	Driver Onboard				12	1000
17	Passenger Onboard				12	1000
18	Real-Time Pan View					30

*COORDINATES:

+X = forward of impact plane

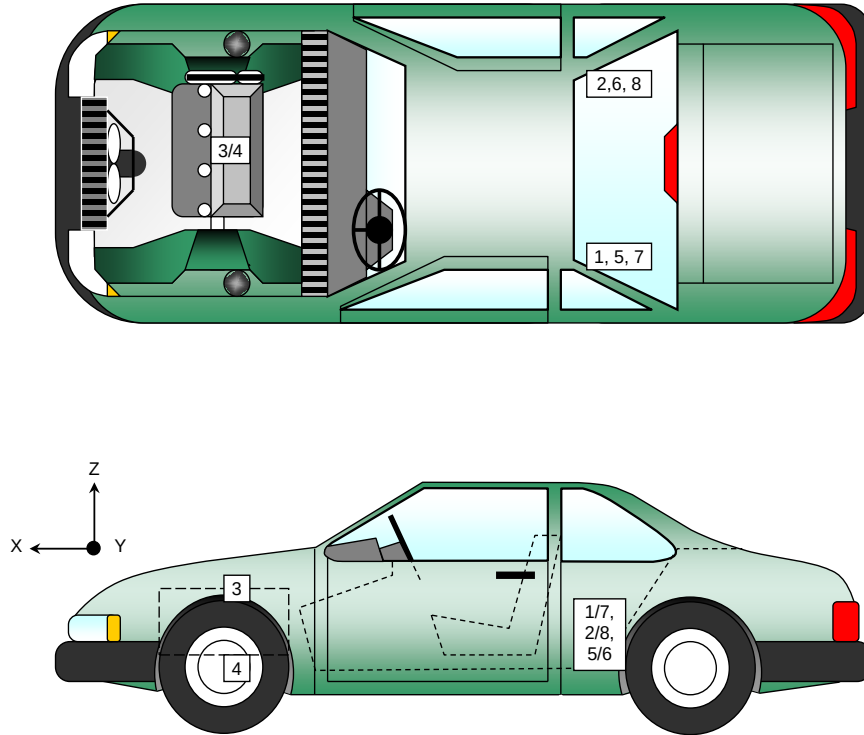
+Y = right of monorail centerline

+Z = below ground level

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

Test Vehicle: 2023 Jeep Wagoneer 4x4 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20230305
Test Date: 8/9/2023



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Crossmember Accelerometer – X Direction	2132	-514	-585
2	Right Rear Crossmember Accelerometer – X Direction	2132	514	-585
3	Engine Top X	4331	0	-1077
4	Engine Bottom X	4228	0	-376
5	Left Rear Crossmember Accelerometer – Z Direction	2132	-514	-585
6	Right Rear Crossmember Accelerometer – Z Direction	2132	514	-585
7	Left Rear Crossmember Accelerometer Redundant – X Direction	2132	-452	-585
8	Right Rear Crossmember Accelerometer Redundant – X Direction	2132	452	-585

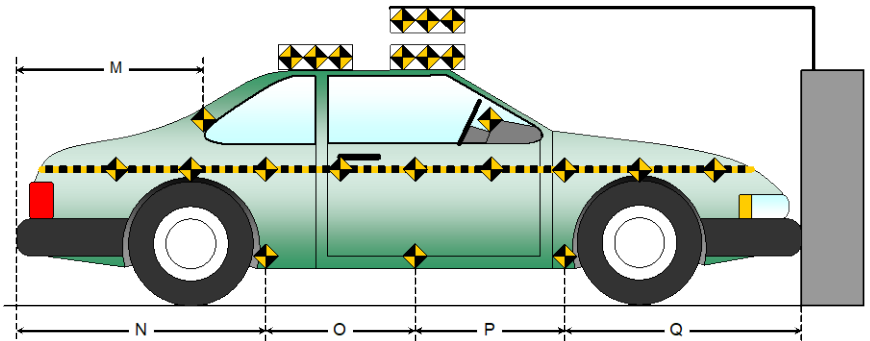
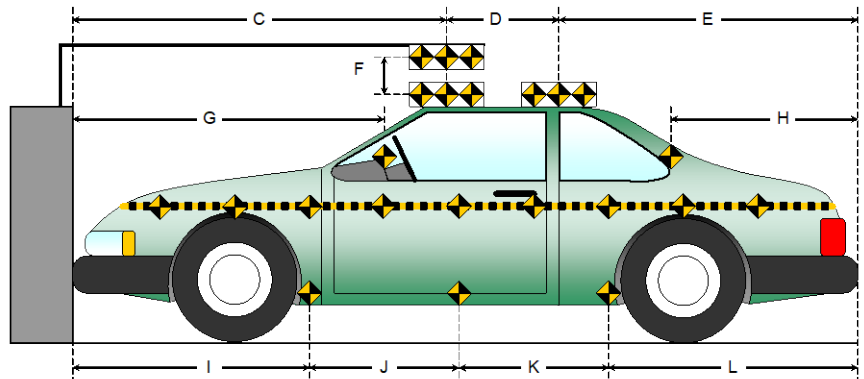
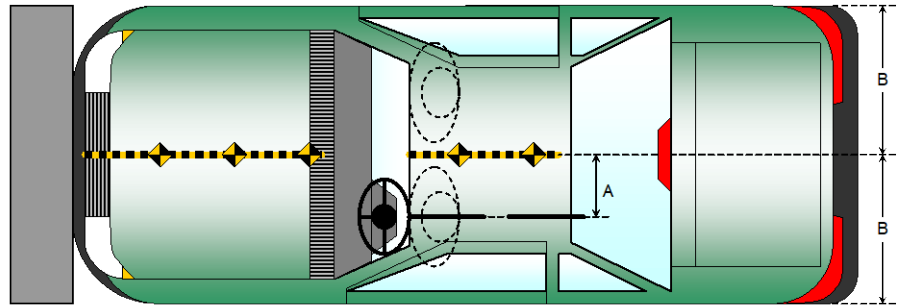
Reference Points: X - Rear Surface of Vehicle (+ forward)
Y - Vehicle Centerline (+ to right)
Z - Ground Plane (+ down)

DATA SHEET NO. 8
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2023 Jeep Wagoneer 4x4 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20230305
 Test Date: 8/9/2023

Item	Value (mm)
A	465
B	1036
C	2630
D	610
E	2217
F	70
G	
H	1531
I	1673
J	994
K	994
L	1796
M	1531
N	1796
O	994
P	994
Q	1673



DATA SHEET NO. 9
LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2023 Jeep Wagoneer 4x4 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20230305
Test Date: 8/9/2023

ADVANCED RESEARCH LOAD CELL BARRIER

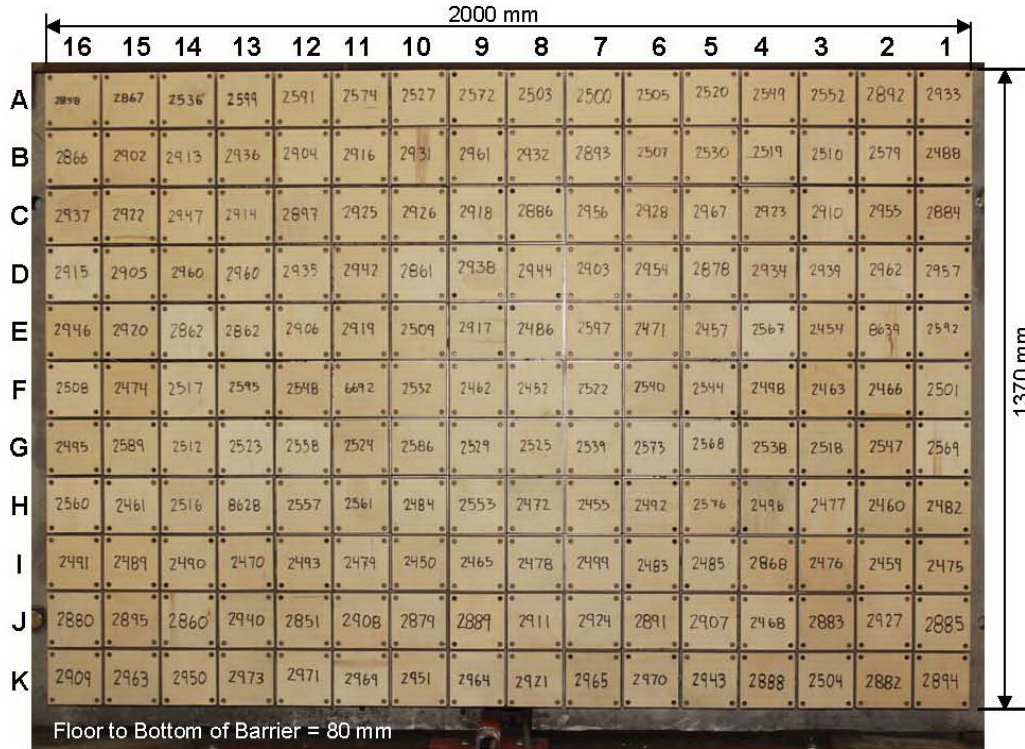


Photo for Reference Only

Centerline

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

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

DATA SHEET NO. 10
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2023 Jeep Wagoneer 4x4 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20230305
Test Date: 8/9/2023

INSTRUMENTATION

Instrumentation	Number of Channels Collected
Driver Dummy Data Channels	49
Passenger Dummy Data Channels	49
Vehicle Structure Accelerometers	8
Barrier Channels	528
Total	634

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: 2023 Jeep Wagoneer 4x4 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20230305
Test Date: 8/9/2023

TEST DUMMY INFORMATION AND CONTACT LOCATIONS

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

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 locked; opened without tools	Remained closed and locked; opened without tools
Rear Door Opening	Remained closed and locked; opened without tools	Remained closed and locked; 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	445
Center	mm	380
Right Side	mm	465
Average	mm	430

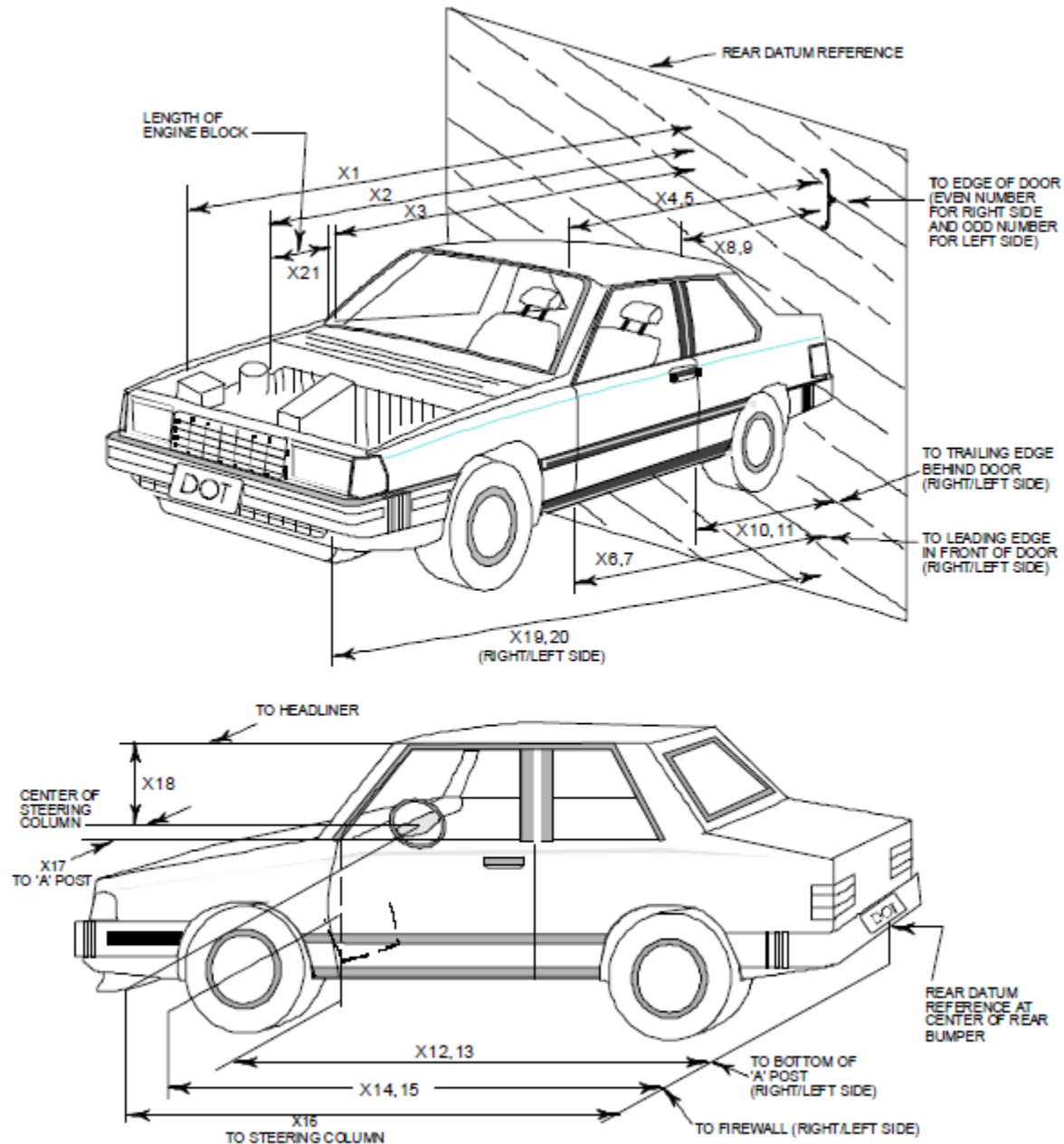
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

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

Test Vehicle: 2023 Jeep Wagoneer 4x4 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20230305
 Test Date: 8/9/2023



DATA SHEET NO. 12 (CONTINUED)
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2023 Jeep Wagoneer 4x4 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20230305
Test Date: 8/9/2023

No.	Measurement Description	Pre-Test	Post-Test	Change
1	Total Length of Vehicle at Centerline	5457	4850	-607
2	RSOV to Front of Engine	4558	4441	-117
3	RSOV to Firewall	4267	4270	3
4	RSOV to Upper Leading Edge of Right Door	3801	3806	5
5	RSOV to Upper Leading Edge of Left Door	3791	3800	9
6	RSOV to Lower Leading Edge of Right Door	3765	3765	0
7	RSOV to Lower Leading Edge of Left Door	3764	3766	2
8	RSOV to Upper Trailing Edge of Right Door	2668	2687	19
9	RSOV to Upper Trailing Edge of Left Door	2674	2685	11
10	RSOV to Lower Trailing Edge of Right Door	2668	2674	6
11	RSOV to Lower Trailing Edge of Left Door	2683	2676	-7
12	RSOV to Bottom of "A" Post of Right Side	3765	3760	-5
13	RSOV to Bottom of "A" Post of Left Side	3774	3757	-17
14	RSOV to Firewall, Right Side	4221	4230	9
15	RSOV to Firewall, Left Side	4213	4204	-9
16	RSOV to Steering Column	3261	3330	69
17	Center of Steering Column to "A" Post	427	438	11
18	Center of Steering Column to Headliner	468	500	32
19	RSOV to Right Side of Front Bumper	5386	4783	-603
20	RSOV to Left Side of Front Bumper	5386	4799	-587
21	Length of Engine Block	544	544	0
RD	RSOV to Right Side of Dash Panel	3762	3800	38
CD	RSOV to Center of Dash Panel	3791	3766	-25
LD	RSOV to Left Side of Dash Panel	3756	3773	17

All dimensions in mm

DATA SHEET NO. 13
ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2023 Jeep Wagoneer 4x4 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20230305
Test Date: 8/9/2023

VEHICLE INFORMATION

VIN: 1C4SJVATXPS507255
Vehicle Size Category: MPV

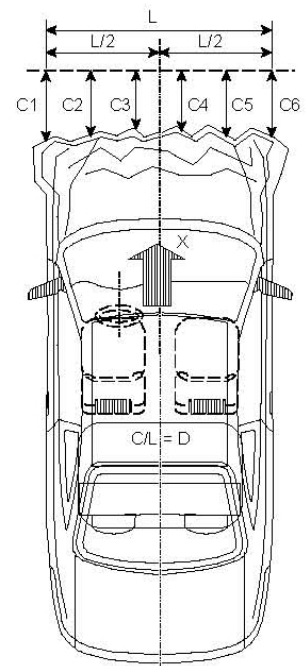
Wheelbase (mm): 3138
Test Weight (kg): 3019.5

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): 56.29
Velocity Change (km/h): 64.1
Time of Separation (msec) 114

CRUSH PROFILE

Collision Deformation Classification: 12FDEW3
Midpoint of Damage: Centerline
Damage Region Length (mm): 1326
Impact Mode: Frontal



No.	Measurement Description	Units	Pre-Test	Post-Test	Exterior Crush
C1	Crush zone 1 at left side	mm	5386	4799	587
C2	Crush zone 2 at left side	mm	5434	4813	621
C3	Crush zone 3 at left side	mm	5453	4845	608
C4	Crush zone 4 at right side	mm	5453	4842	611
C5	Crush zone 5 at right side	mm	5434	4830	604
C6	Crush zone 6 at right side	mm	5386	4783	603
L	C1 TO C6	mm	1326	1330	-4

DATA SHEET NO. 14
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2023 Jeep Wagoneer 4x4 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

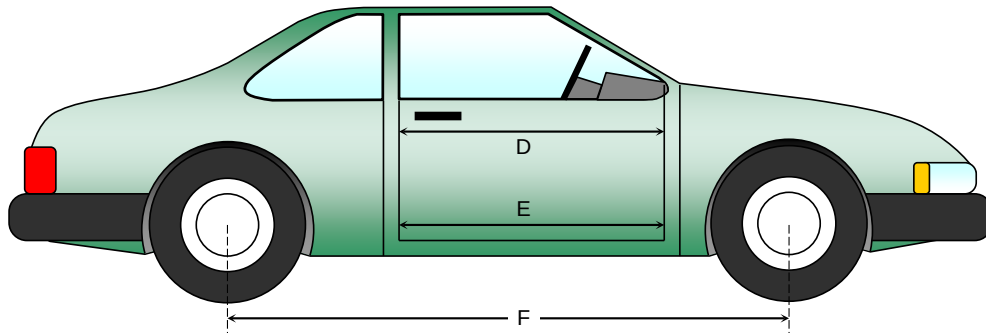
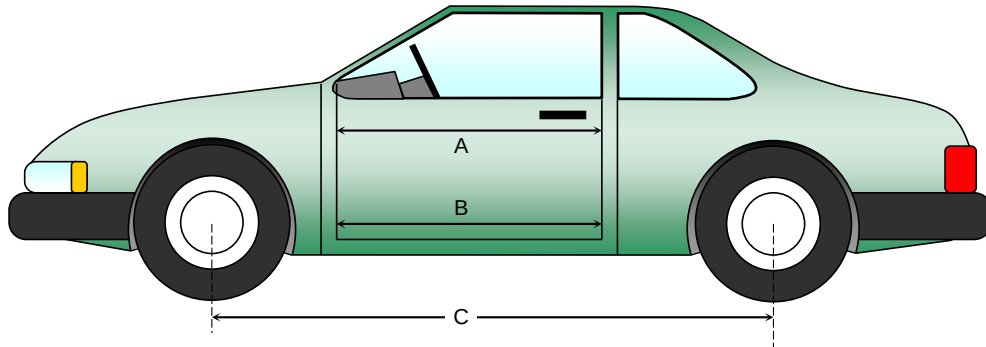
NHTSA No.: M20230305
Test Date: 8/9/2023

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Change
A	Left Side Upper	mm	1002	1002	0
B	Left Side Lower	mm	960	960	0
D	Right Side Upper	mm	1004	1004	0
E	Right Side Lower	mm	963	963	0

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Change
C	Left Side Wheelbase	mm	3138	2520	-618
F	Right Side Wheelbase	mm	3138	2560	-578



DATA SHEET NO. 14 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

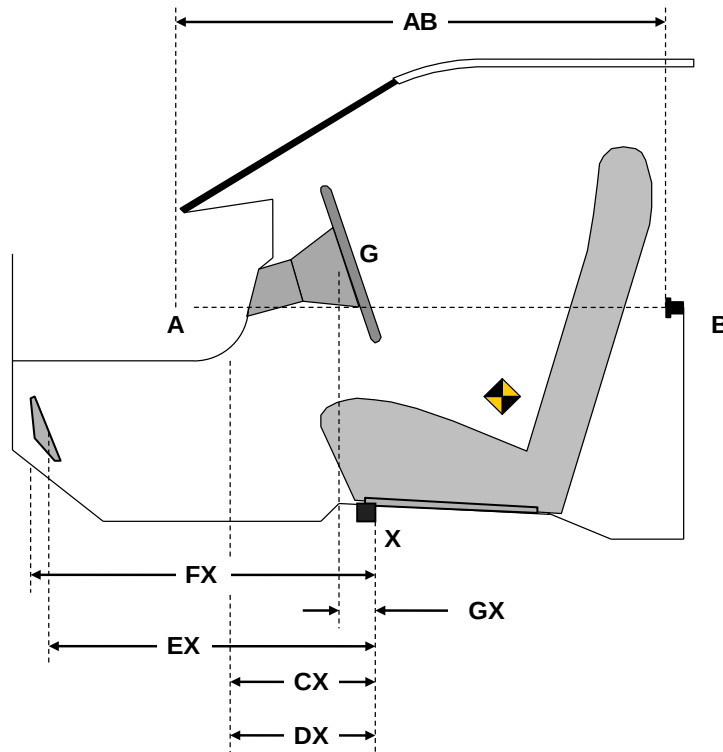
Test Vehicle: 2023 Jeep Wagoneer 4x4 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20230305
 Test Date: 8/9/2023

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Change
AB	Door Opening (Inside Window Jam)	mm	766	766	0
CX	Left Knee Bolster to X	mm	291	291	0
DX	Right Knee Bolster to X	mm	288	288	0
EX	Brake Pedal to X	mm	533	597	64
FX	Foot Rest to X	mm	556	556	0
GX	Center of Steering Column Wheel Hub to X	mm	38	120	82

X = Front of Seat Track (stationary)



DRIVER COMPARTMENT

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

Test Vehicle: 2023 Jeep Wagoneer 4x4 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20230305
 Test Date: 8/9/2023

WINDSHIELD MOUNTING DETAILS

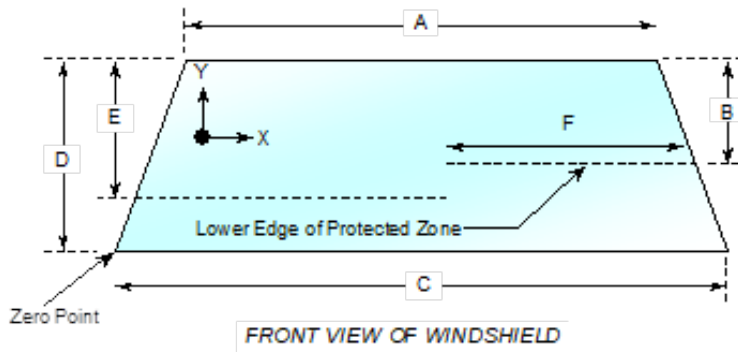
Windshield glass is secured to the vehicle frame with a rubber trim and glue.

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

Temperature of windshield molding during test: 21.1°C.

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% of Retention
Left Side	2356	2356	100
Right Side	2356	2356	100
Total	4712	4712	100



Item	Units	Value
A	mm	1412
B	mm	437
C	mm	1540
D	mm	880
E	mm	495
F	mm	576

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: 2023 Jeep Wagoneer 4x4 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20230305
 Test Date: 8/9/2023

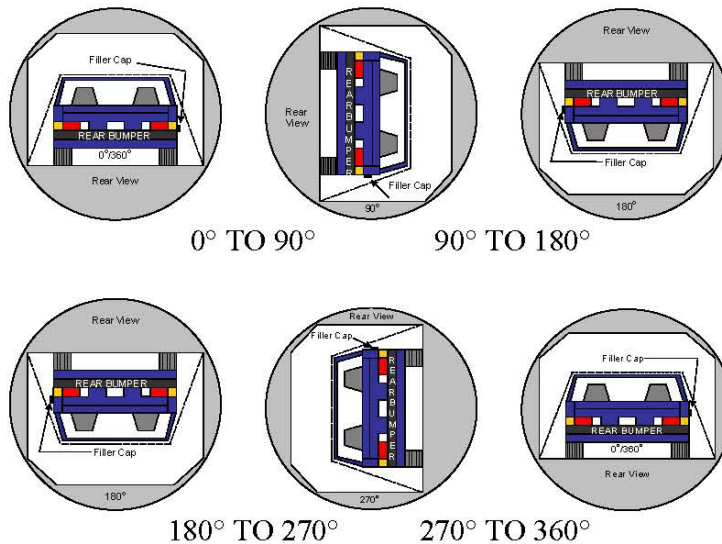
FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 21.1°C

Test Time: 11:49 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°	111	300	411
90° to 180°	112	300	412
180° to 270°	110	300	410
270° to 360°	110	300	410

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

Test Vehicle: 2023 Jeep Wagoneer 4x4 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20230305
 Test Date: 8/9/2023

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	

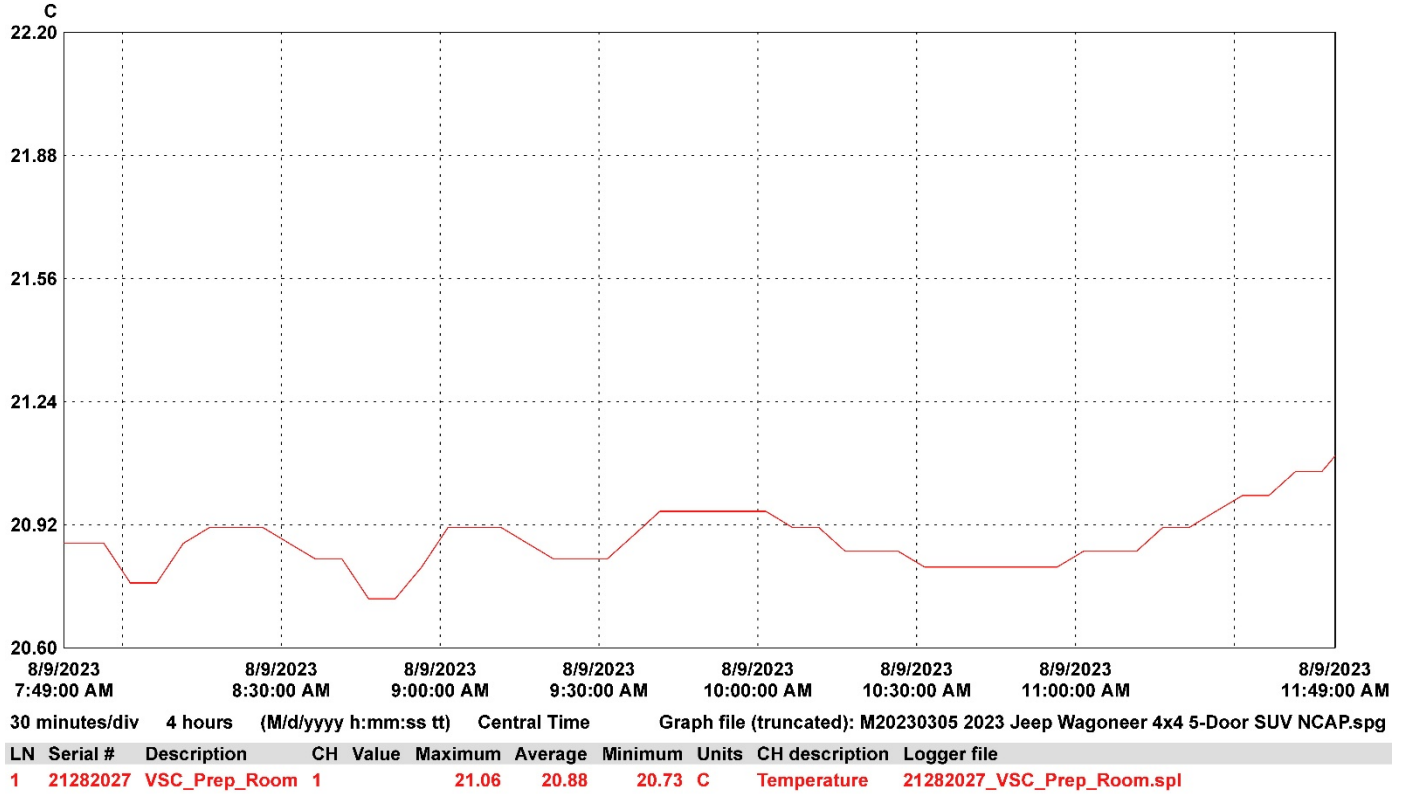
SOLVENT SPILLAGE LOCATION TABLE

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: 2023 Jeep Wagoneer 4x4 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20230305
 Test Date: 8/9/2023



**APPENDIX A
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Photo No. 001 - Load Cell Location



Photo No. 002 - Pre-Test Load Cell Wall



Photo No. 003 - Post-Test Load Cell Wall



Photo No. 004 - Manufacturer's Label

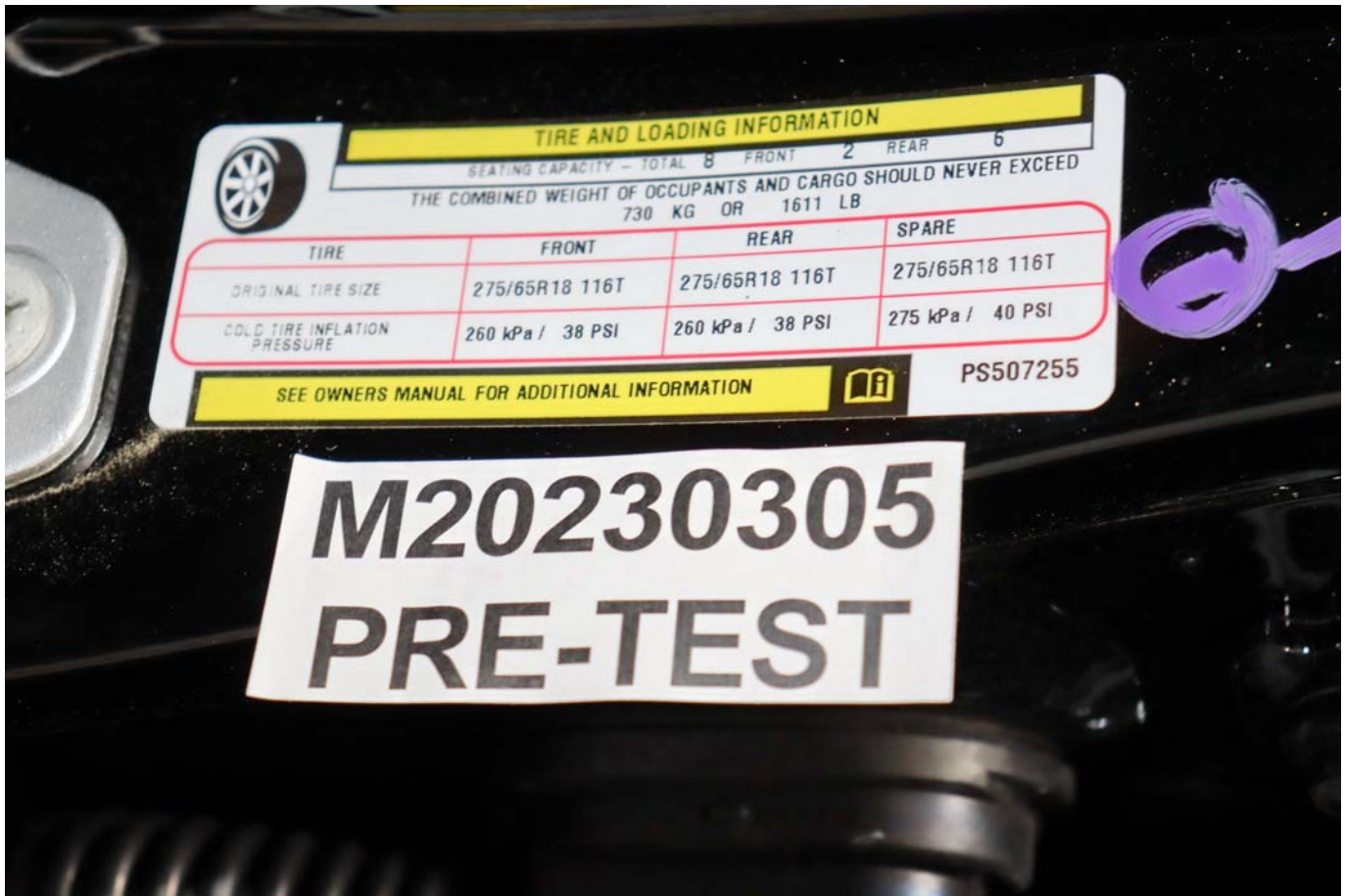


Photo No. 005 - Tire Placard



Photo No. 006 - 2023 Jeep Wagoneer 4x4 5-Door SUV Frontal As Delivered



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

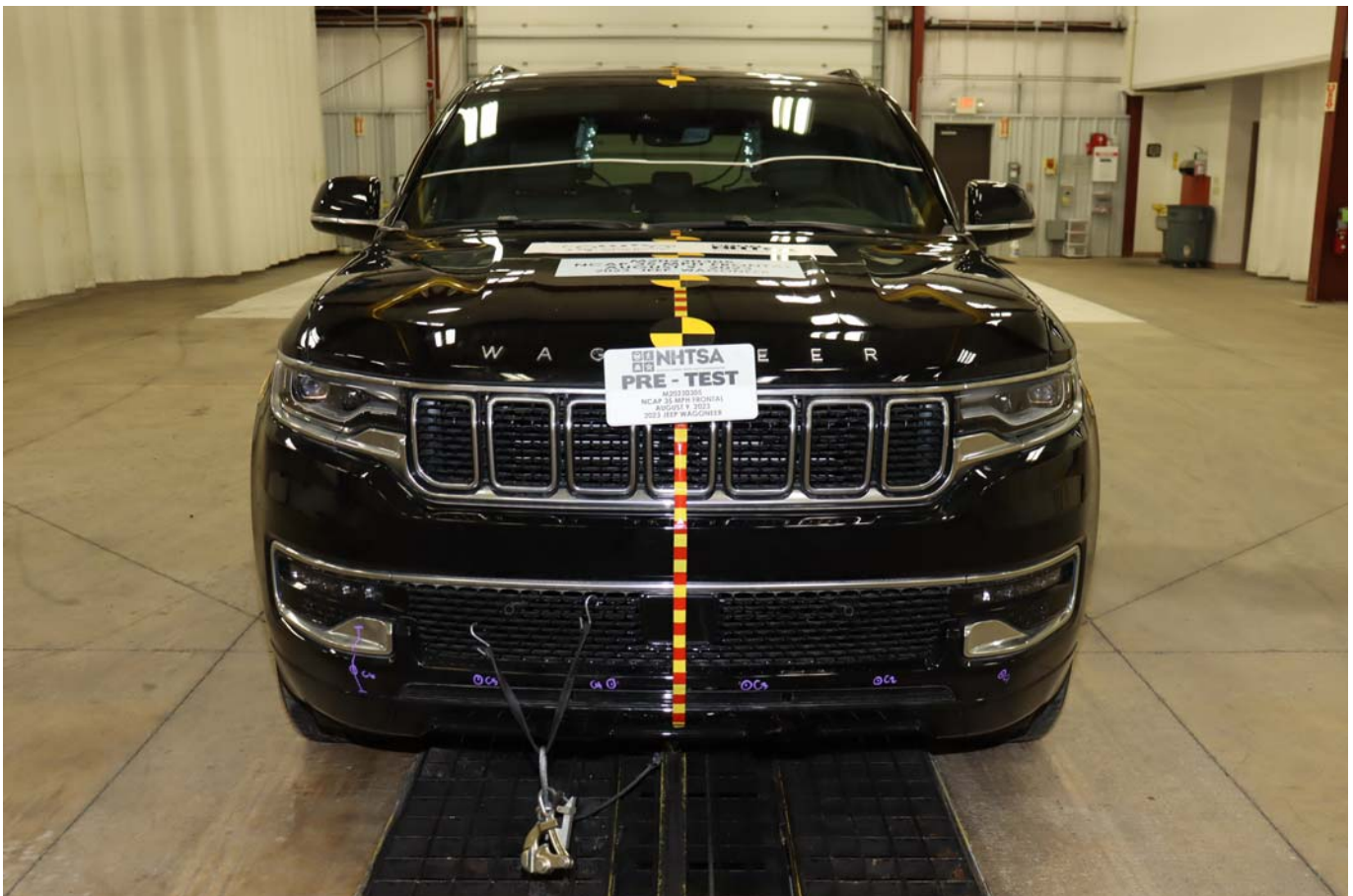


Photo No. 008 - Pre-Test Front View of Test Vehicle



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

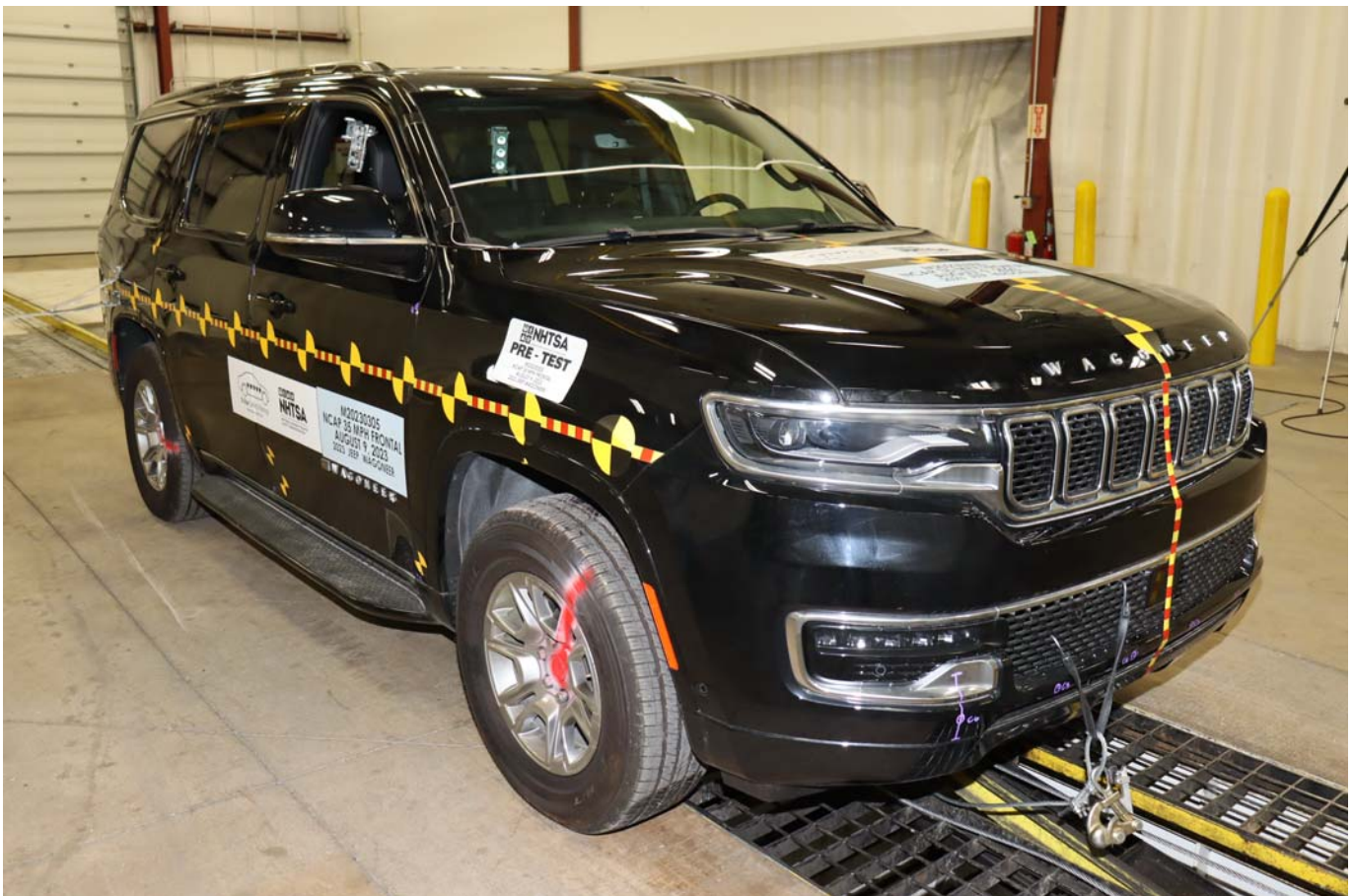


Photo No. 014 - Pre-Test Right Front 3-4 View



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

PHOTOGRAPH NOT AVAILABLE

Photo No. 021 - Post-Test Engine Compartment View



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



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



Photo No. 024 - Pre-Test Front Underbody View

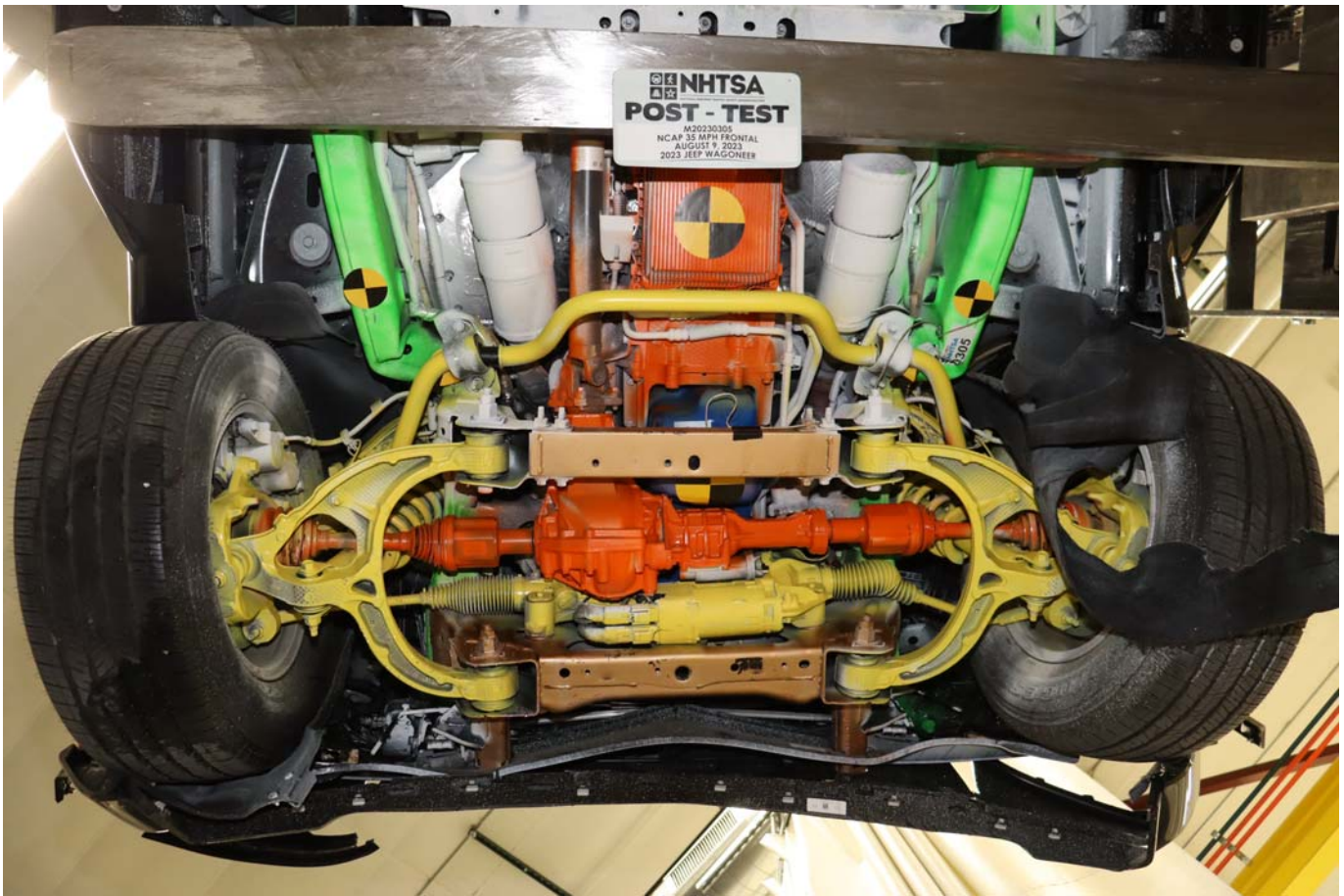


Photo No. 025 - Post-Test Front Underbody View

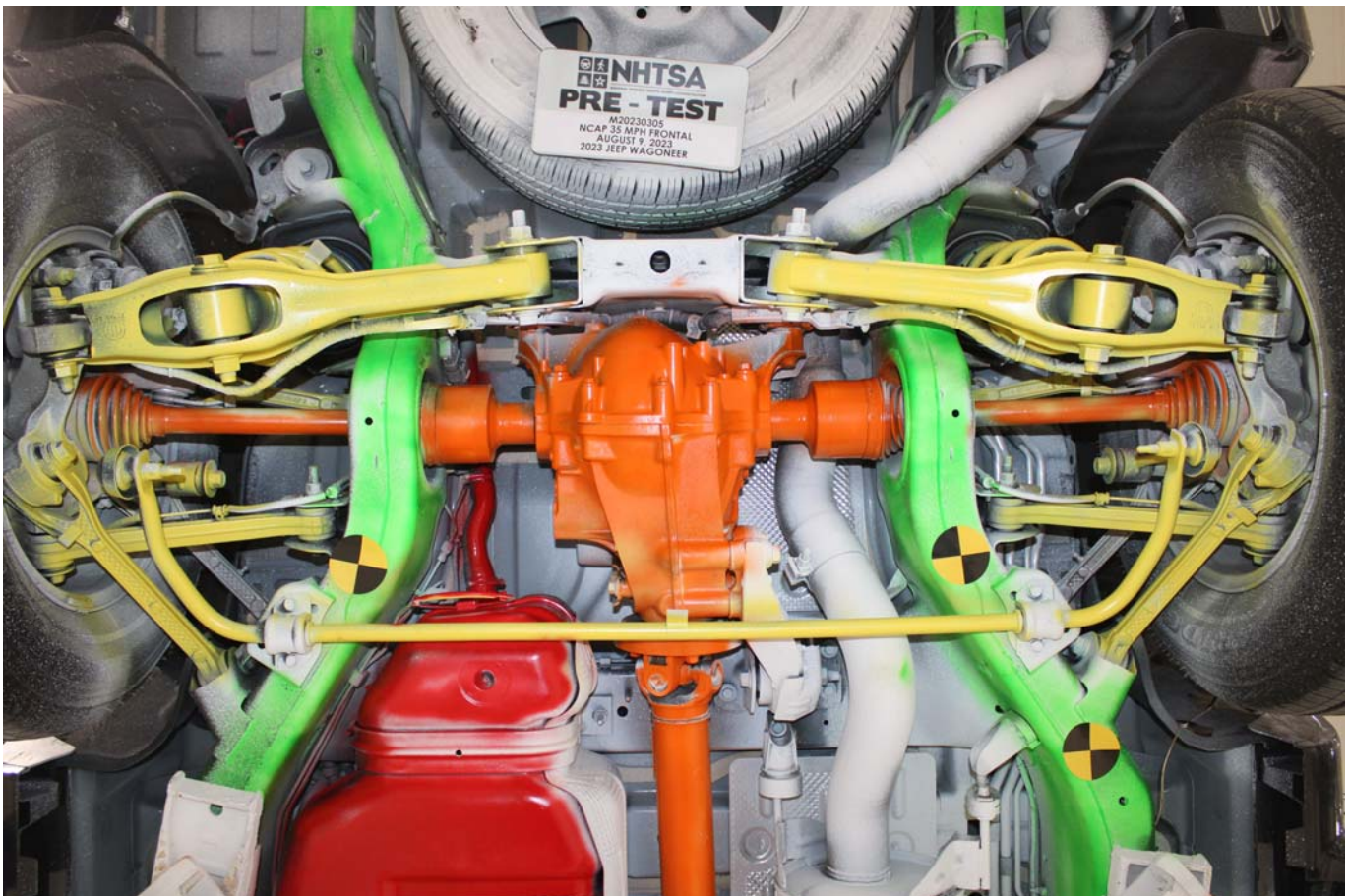


Photo No. 026 - Pre-Test Rear Underbody View

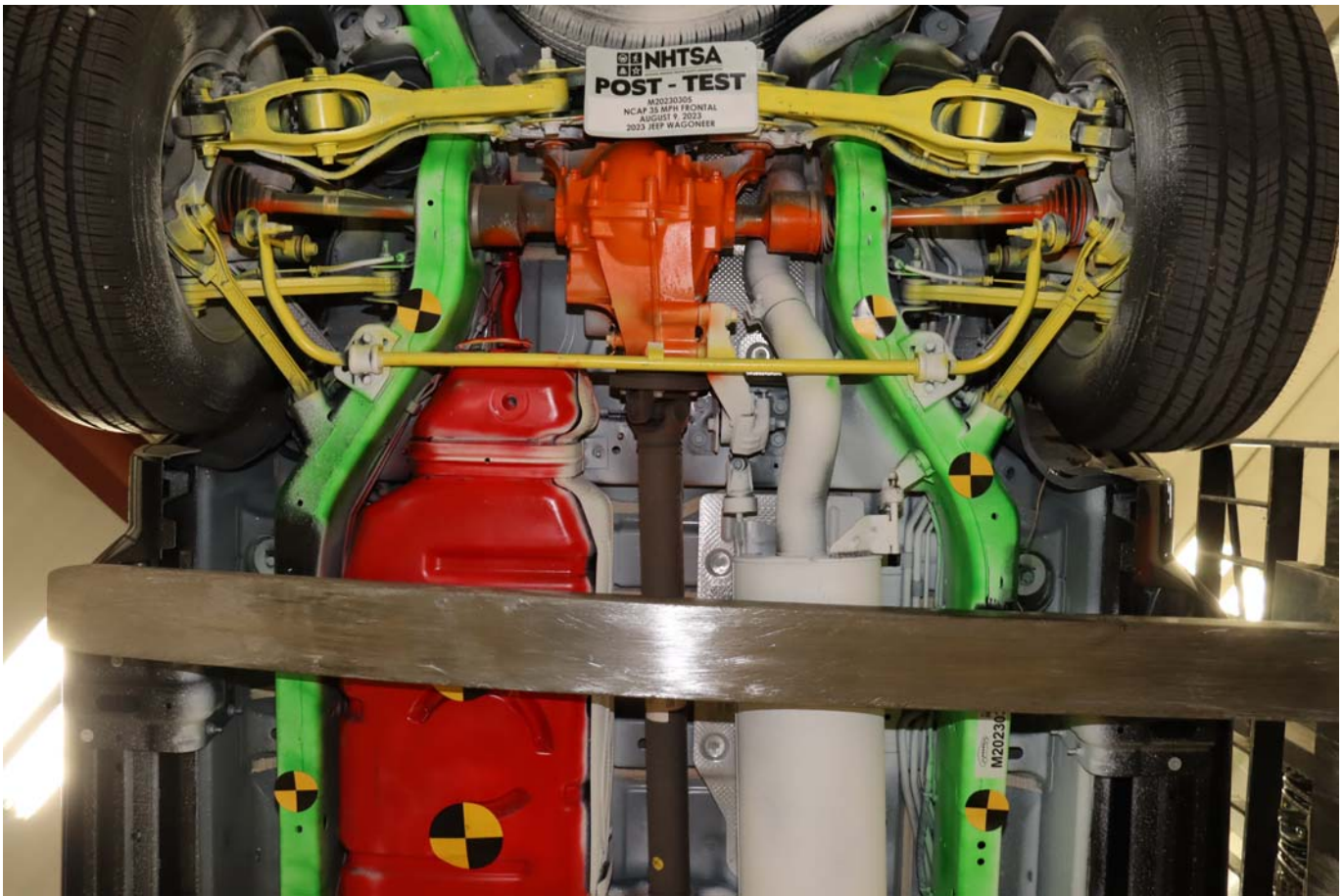


Photo No. 027 - Post-Test Rear Underbody View



Photo No. 028 - Pre-Test Dummy Cable Routing



Photo No. 029 - Post-Test Dummy Cable Routing



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



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



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



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



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



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



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



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



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



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



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



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



Photo No. 042 - Pre-Test Driver Dummy Feet



Photo No. 043 - Post-Test Driver Dummy Feet



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



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



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

PHOTOGRAPH NOT AVAILABLE

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



Photo No. 048 - Post-Test Driver Dummy Face



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



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



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



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



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



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



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



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



Photo No. 057 - Pre-Test Passenger Dummy and Vehicle Interior View



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



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

PHOTOGRAPH NOT AVAILABLE

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



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



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



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



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



Photo No. 065 - Pre-Test Passenger Dummy Feet



Photo No. 066 - Post-Test Passenger Dummy Feet



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



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

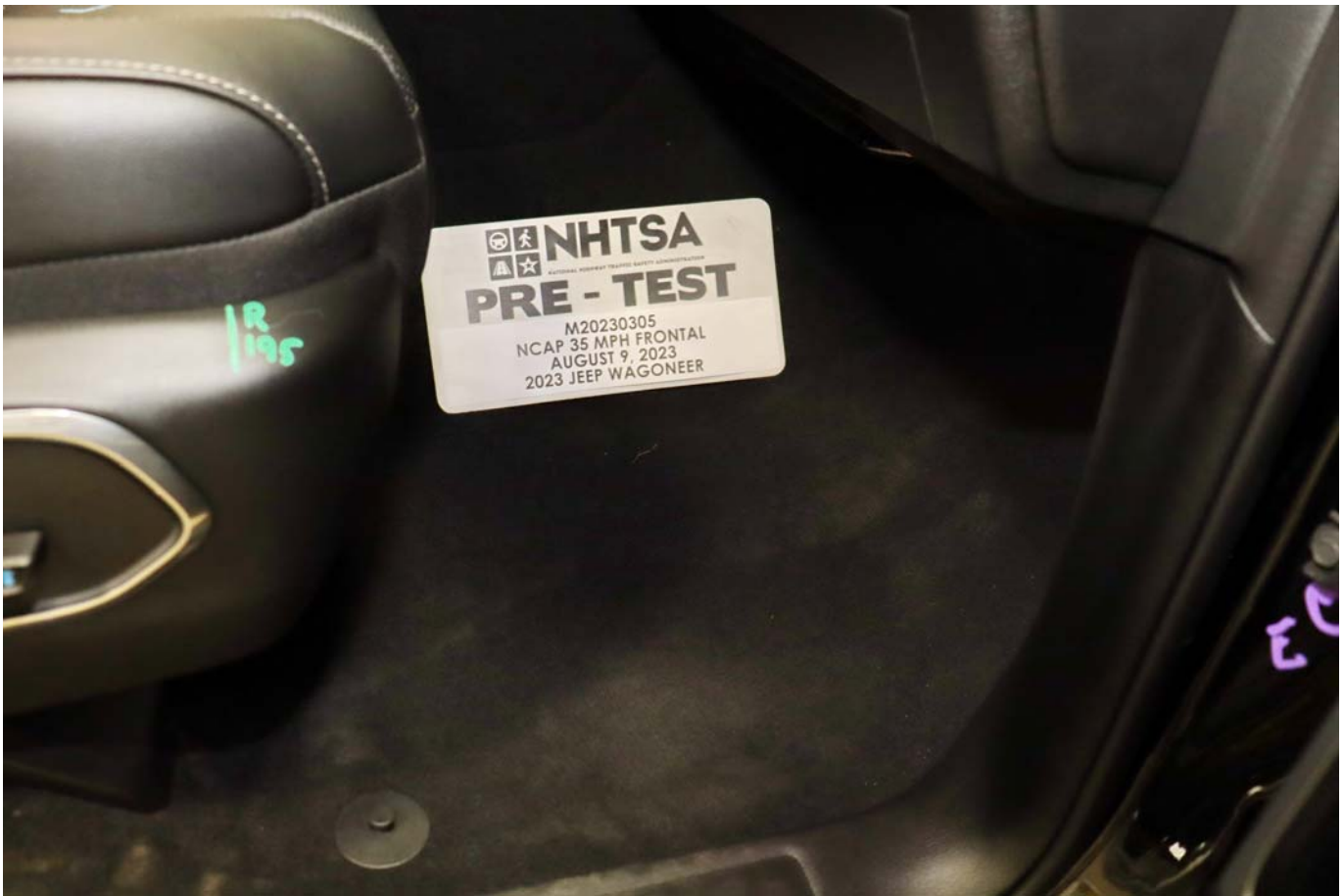


Photo No. 069 - Pre-Test Passenger's Side Floorpan

PHOTOGRAPH NOT AVAILABLE

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



Photo No. 071 - Post-Test Passenger Dummy Face



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



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

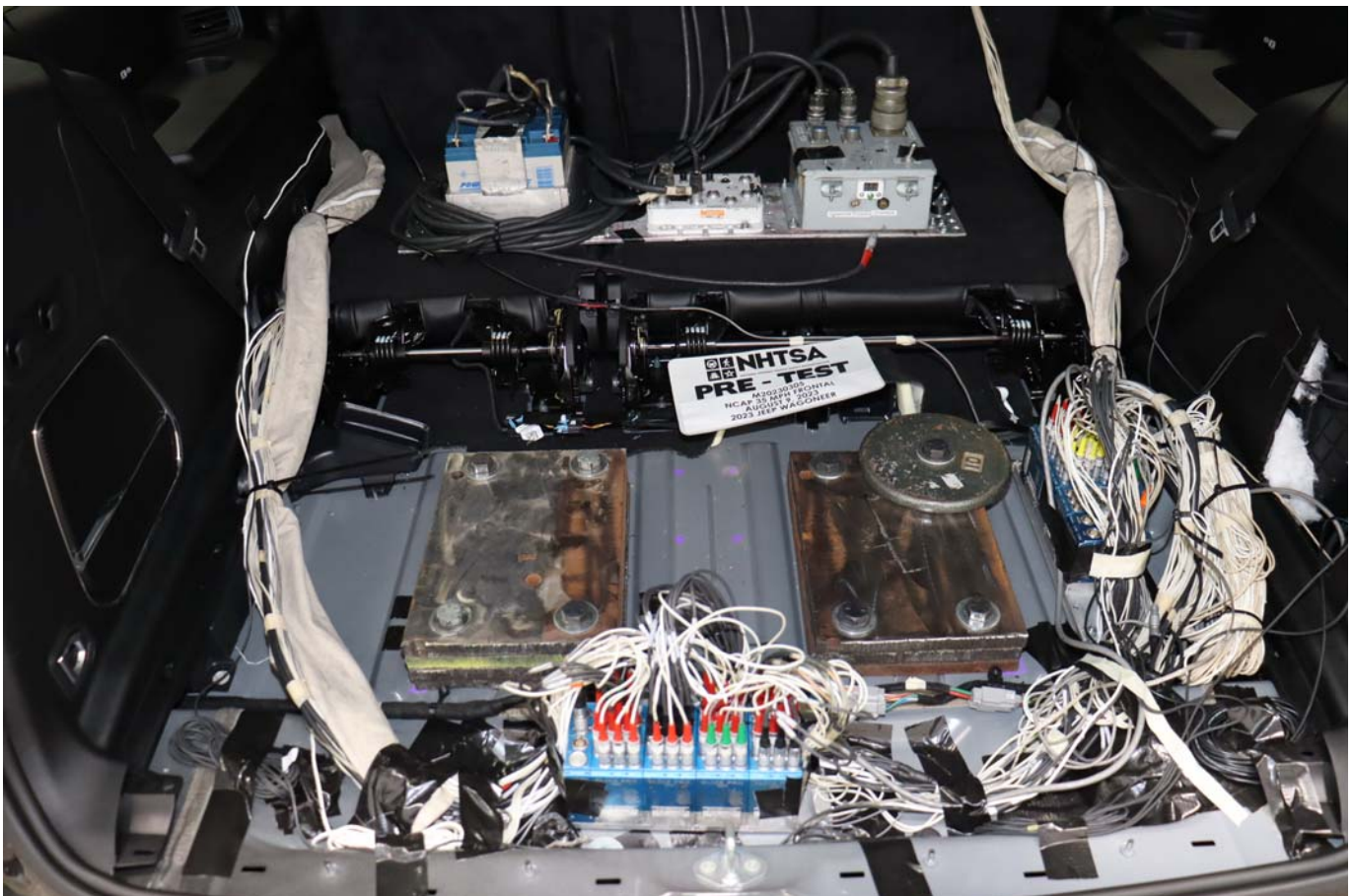


Photo No. 074 - Photograph of Ballast Installed in Vehicle

PHOTOGRAPH NOT APPLICABLE

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



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



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



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



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



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



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



Photo No. 082 - 2023 Jeep Wagoneer 4x4 5-Door SUV Frontal Impact Event

2023 MODEL YEAR WAGONEER 4X4

THIS VEHICLE IS MANUFACTURED TO MEET SPECIFIC UNITED STATES REQUIREMENTS. THIS VEHICLE IS NOT MANUFACTURED FOR SALE OR REGISTRATION OUTSIDE OF THE UNITED STATES.

MANUFACTURER'S SUGGESTED RETAIL PRICE OF THIS MODEL INCLUDING DEALER PREPARATION

Base Price: \$61,995

JEEP WAGONEER 4X4
Exterior Color: Diamond Black Crystal Pearl-Coat Exterior Paint
Interior Color: Global Black Interior Color
Interior: Capt'n Leather-Trimmed Seats
Engine: 5.7L V8 Engine with eTorque including Stop/Start
Transmission: 8-Speed Automatic 8HP75 Transmission with ERS
STANDARD EQUIPMENT (UNLESS REPLACED BY OPTIONAL EQUIPMENT)

FUNCTIONAL/SAFETY FEATURES

Wagoneer Client Services
 Single-Speed On-Demand Transfer Case
 Selec-Terrain® System
 Differential Front-Axle with Disconnect
 Trac-Lok® Anti-Spin Rear Differential
 Anti-Lock 4-Wheel Disc Brakes
 Remote-Start System
 Full-Speed Forward-Collision Warning Plus
 ParkView® Rear Back-Up Camera
 ParkSense® Front and Rear Park-Assist with Stop
 Blind-Spot and Rear Cross-Path Detection
 Pedestrian Emergency-Braking
 Electronic Stability Control
 Hill-Start Assist
 Selectable Tire Fill Alert
 Tire Pressure Monitoring Display
 Security Alarm
 Power-Adjustable Pedals with Memory
 Sentry Key® Theft-Deterrent System
INTERIOR FEATURES

Uconnect® 5 Nav with 10.1-Inch Touch Screen Display
 10.25-Inch Cluster Display
 Apple CarPlay®
 Google Android Auto™
 4G LTE Wi-Fi Hot Spot with Trial Included
 GPS Navigation
 Map-in-Cluster Display
 SiriusXM® 360L with 6-Month Sub Call 800-643-2112
 Wagoneer Connect (Connected Services) with Trial
 Alpine 9-Speaker System with Subwoofer
 Air Conditioning with 3-Zone Automatic Temp Control

Assembly Point/Port of Entry: WARREN, MICHIGAN, U.S.A.
 VIN: 1C4SJVATXPS-507255 L4V0N: 3052 12164

Heated Steering Wheel
 Heated Front Seats
 Ventilated Front Seats
 8-Way Power Adjustable Driver Seat
 8-Way Power Adjustable Front Passenger Seat
 3rd-Row Seat with 60/40 Manual Fold/Recline
 8-Passenger Seating

EXTERIOR FEATURES

LED Headlamps
 LED Tail Lamps
 Automatic Headlamps
 Heated Exterior Mirrors
 Heated Side-Steps
 Hands-Free Power Liftgate
 7-and 4-Pin Wiring Harness
 Class IV Receiver-Hitch
 18-Inch Fully-Painted Satin Carbon Aluminum Wheels

OPTIONAL EQUIPMENT (May Replace Standard Equipment)

Diamond Black Crystal Pearl-Coat Exterior Paint \$545
 Customer Preferred Package 22E

DESTINATION CHARGE \$2,000

TOTAL PRICE: * \$64,640

WARRANTY COVERAGE

5-year or 60,000-mile Powertrain Limited Warranty.
 3-year or 36,000-mile Basic Limited Warranty.
 Ask Dealer for a copy of the limited warranties or see your owner's manual for details.

**5 YEAR / 60,000 MILE
POWERTRAIN WARRANTY**

SHIFT: 33069 21 SOLD TO: 35 33206
 DARGAS CHRYSLER DODGE JEEP RAM OF DARGAS CHRYSLER DODGE JEEP RAM OF
 8100 ANNAPOLIS ROAD 8100 ANNAPOLIS ROAD
 NEW CARROLLTON MD 20784-3010 NEW CARROLLTON MD 20784-3010
 THIS LABEL IS ADDED TO THIS VEHICLE TO COMPLY WITH FEDERAL LAW. THE LABEL CANNOT BE REMOVED
 OR ALTERED PRIOR TO DELIVERY TO THE ULTIMATE PURCHASER.
 * EXcludes AND/OR LOCAL TAXES IF ANY, LICENSE AND TITLE FEES AND DEALER SUPPLIED AND
 INSTALLED OPTIONS AND ACCESSORIES ARE NOT INCLUDED IN THIS PRICE. DISCOUNT, IF ANY,
 IS BASED ON PRICE OF OPTIONS IF PURCHASED SEPARATELY.

For more information visit: www.wagoneer.com
 or call 1-833-677-4825

FCA US LLC

EPA DOT Fuel Economy and Environment

Gasoline Vehicle

Fuel Economy These estimates reflect new EPA methods beginning with 2017 models.
17 MPG Standard SUV 4WD range from 14 to 102 MPG.
 combined city/hwy city highway
 5.9 gallons per 100 miles

**You spend
\$7,000**
 more in fuel costs
 over 5 years
 compared to the
 average new vehicle.

**Annual fuel cost
\$3,000**

Fuel Economy & Greenhouse Gas Rating (tailpipe only)



This vehicle emits 322 grams CO2 per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also creates emissions. Learn more at fuelconomy.gov

Smog Rating (tailpipe only)



This vehicle emits 322 grams CO2 per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also creates emissions. Learn more at fuelconomy.gov

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 28 MPG and cost \$8,000 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$3.40 per gallon. MPG is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fuelconomy.gov

Calculate personalized estimates and compare vehicles



GOVERNMENT 5-STAR SAFETY RATINGS

This vehicle has not been rated by the government for overall vehicle score, frontal crash, side crash, or rollover risk.

Source: National Highway Traffic Safety Administration (NHTSA)
www.safercar.gov or 1-888-327-4236

PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS CARLINE:
U.S./CANADIAN PARTS CONTENT: 60%
MAJOR SOURCES OF FOREIGN PARTS CONTENT:
MEXICO: 33%
 NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.
FOR THIS VEHICLE:
FINAL ASSEMBLY POINT:
 WARREN, MICHIGAN, U.S.A.
COUNTRY OF ORIGIN:
 ENGINE: MEXICO
 TRANSMISSION: UNITED STATES



Photo No. 083 - Monroney Label Photograph

APPENDIX B
DUMMY RESPONSE DATA TRACES

TABLE OF DATA PLOTS

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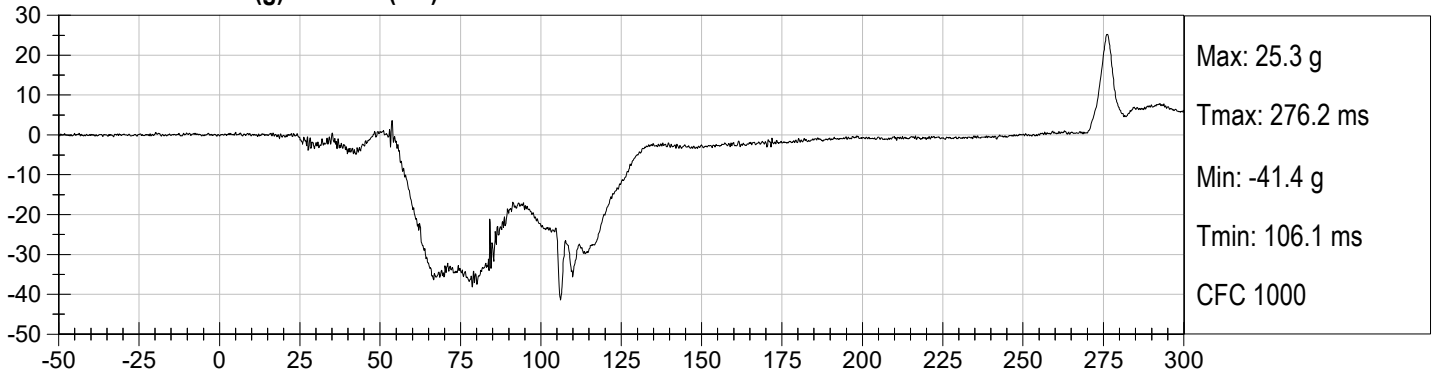
The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at www.nhtsa.gov

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

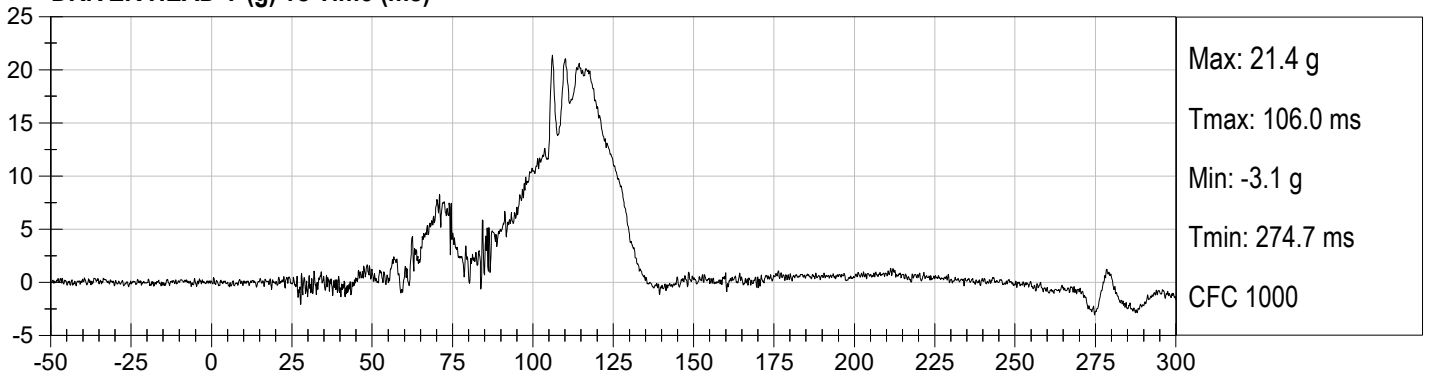
Driver Left Upper Tibia Force Z
Driver Left Lower Tibia Moment X
Driver Left Lower Tibia Moment Y
Driver Left Lower Tibia Force Z
Driver Right Upper Tibia Moment X
Driver Right Upper Tibia Moment Y
Driver Right Upper Tibia Force Z
Driver Right Lower Tibia Moment X
Driver Right Lower Tibia Moment Y
Driver 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

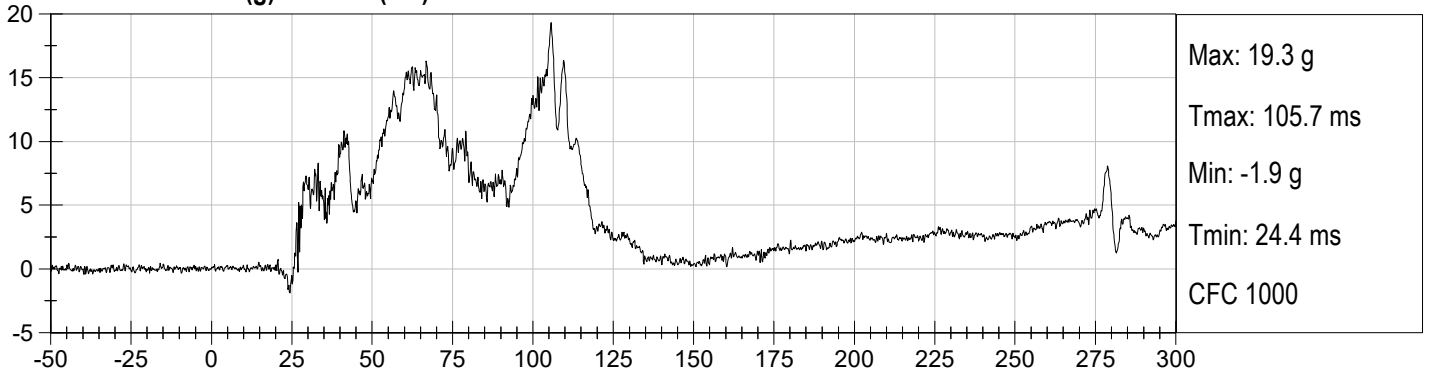
DRIVER HEAD X (g) vs Time (ms)



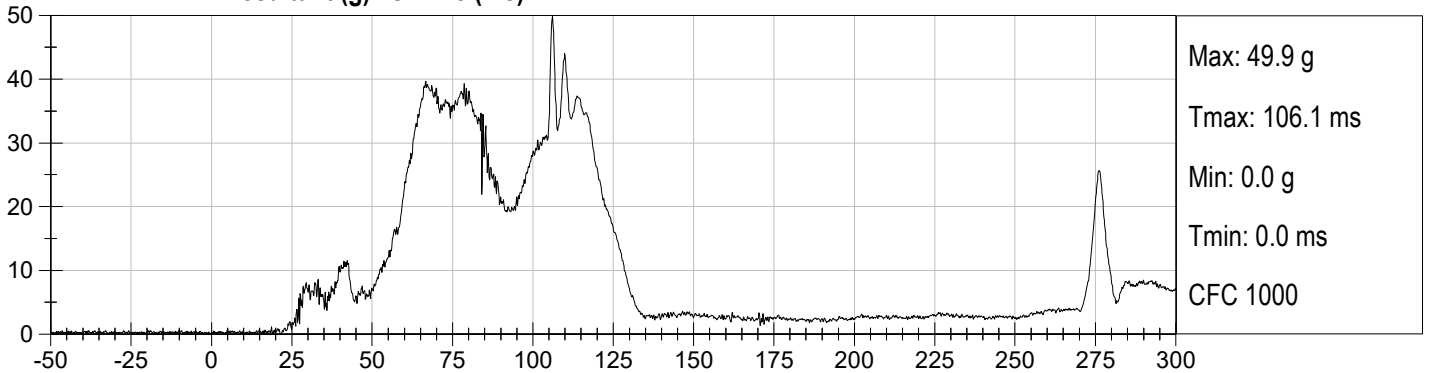
DRIVER HEAD Y (g) vs Time (ms)

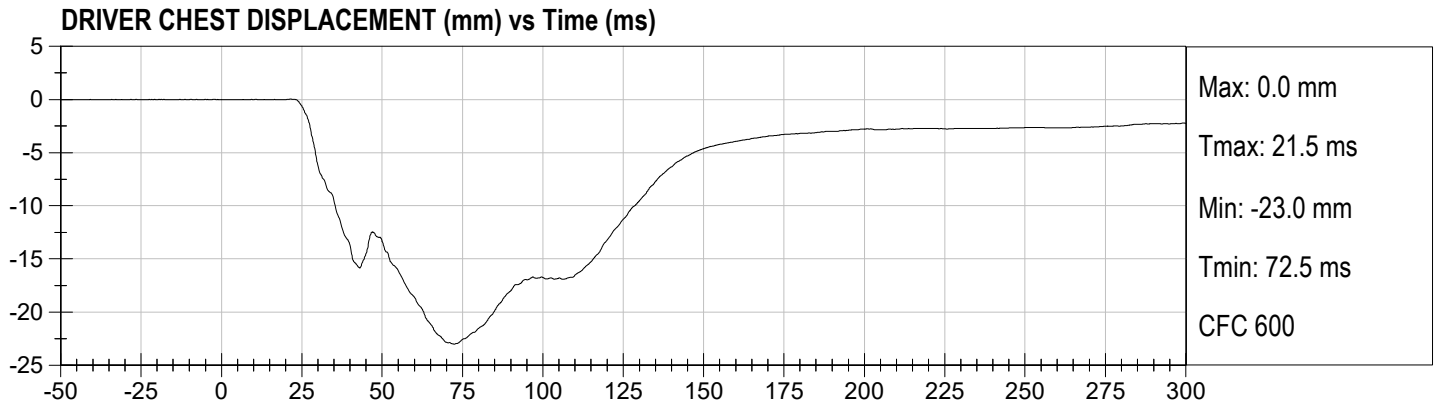


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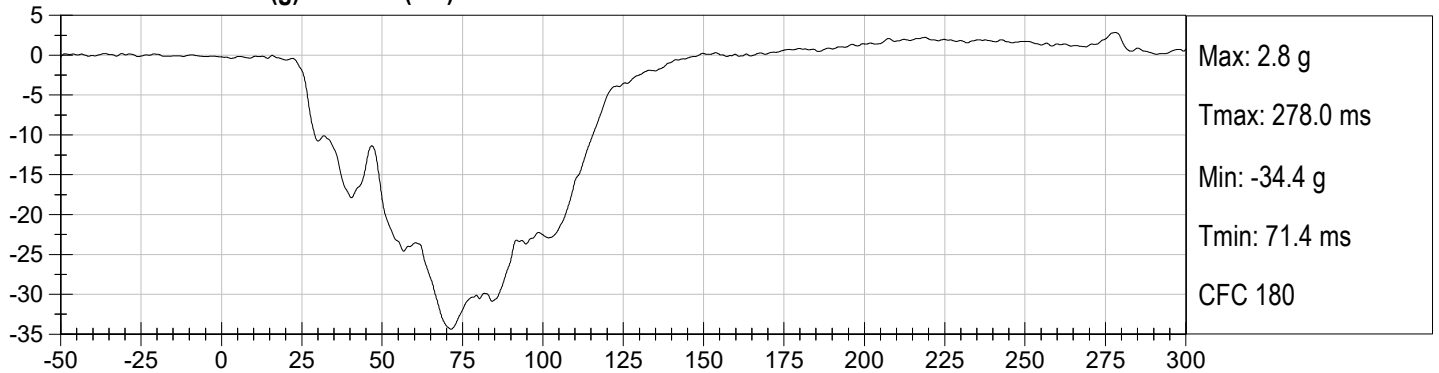


DRIVER HEAD Resultant (g) vs Time (ms)

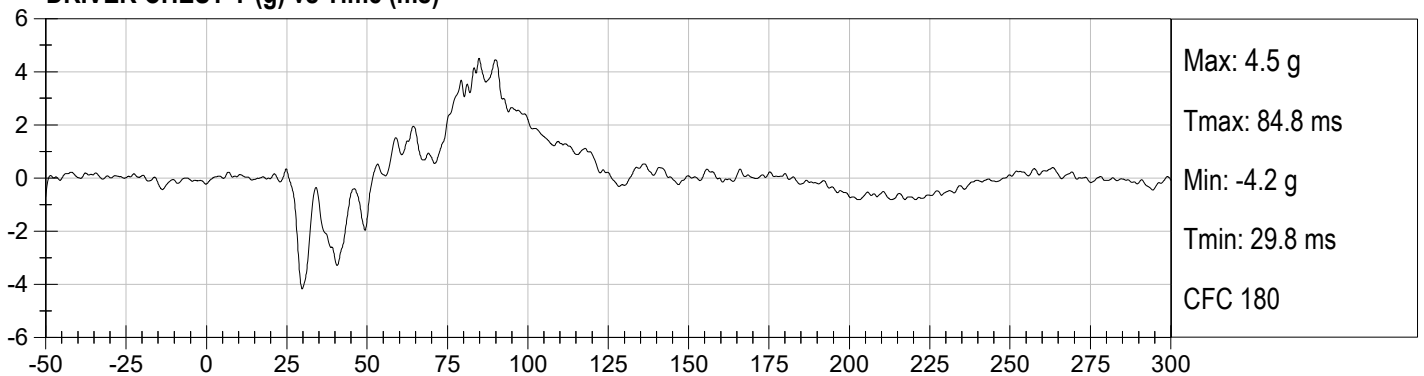




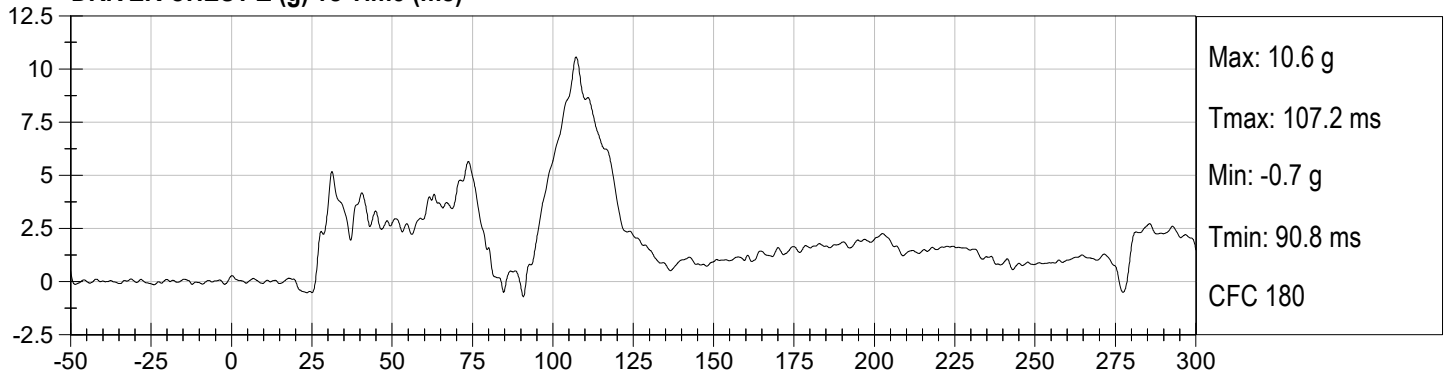
DRIVER CHEST X (g) vs Time (ms)



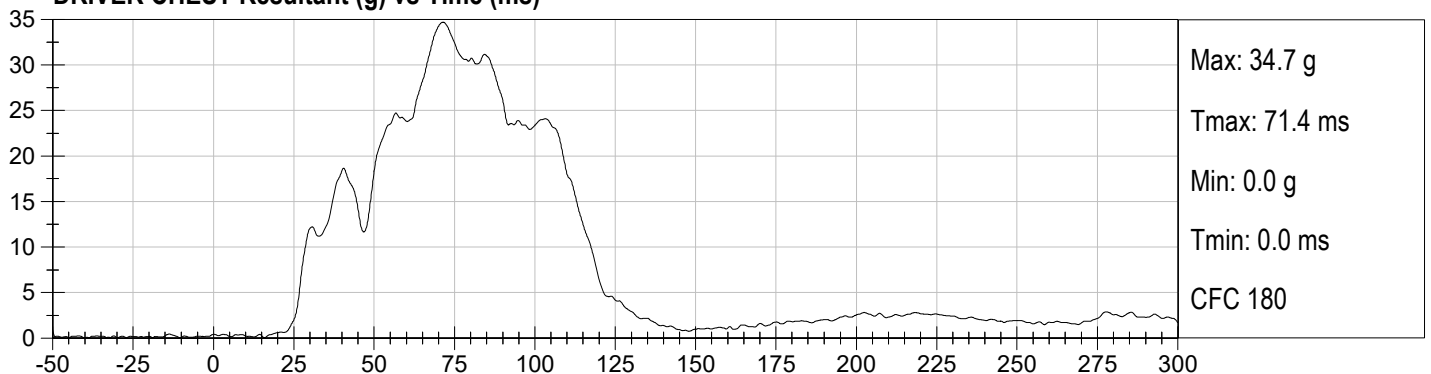
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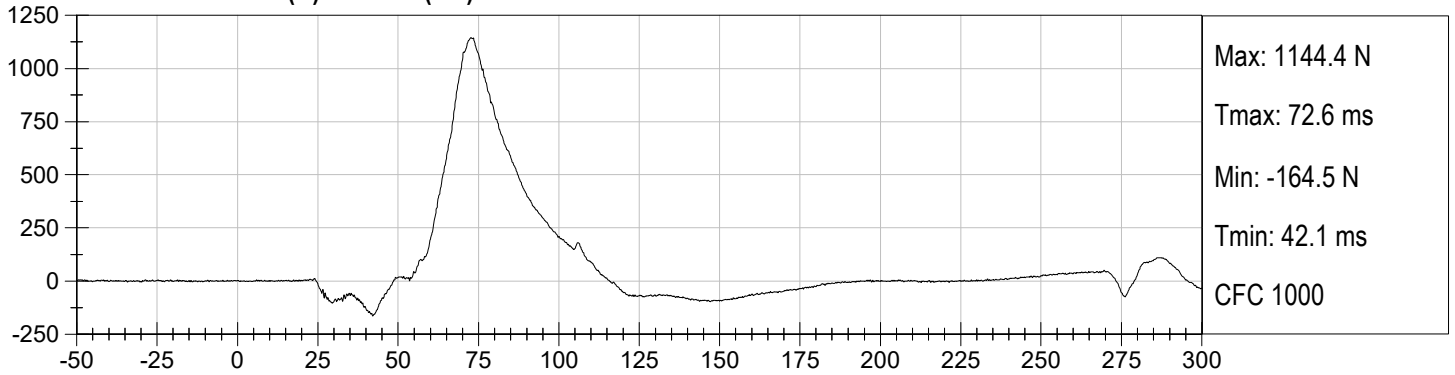
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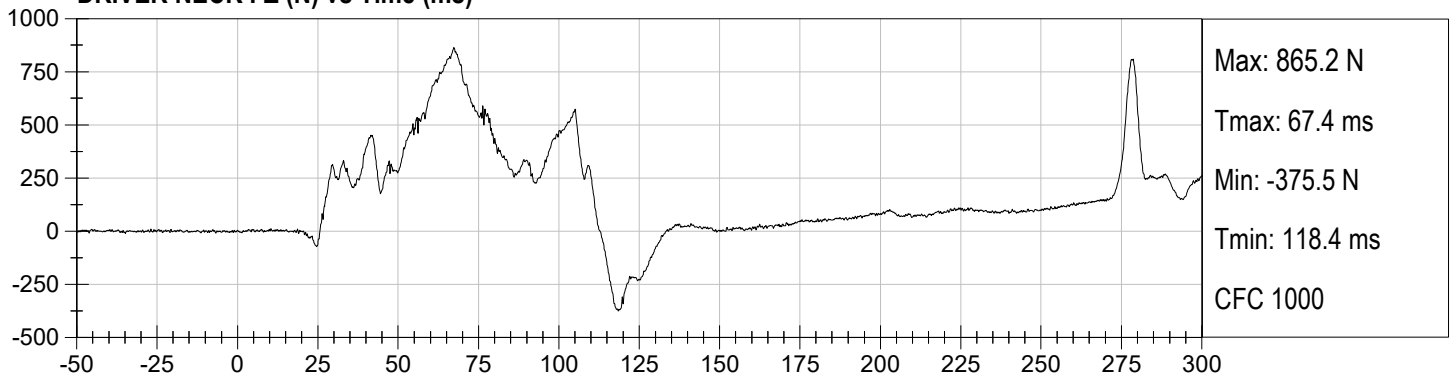
DRIVER CHEST Resultant (g) vs Time (ms)



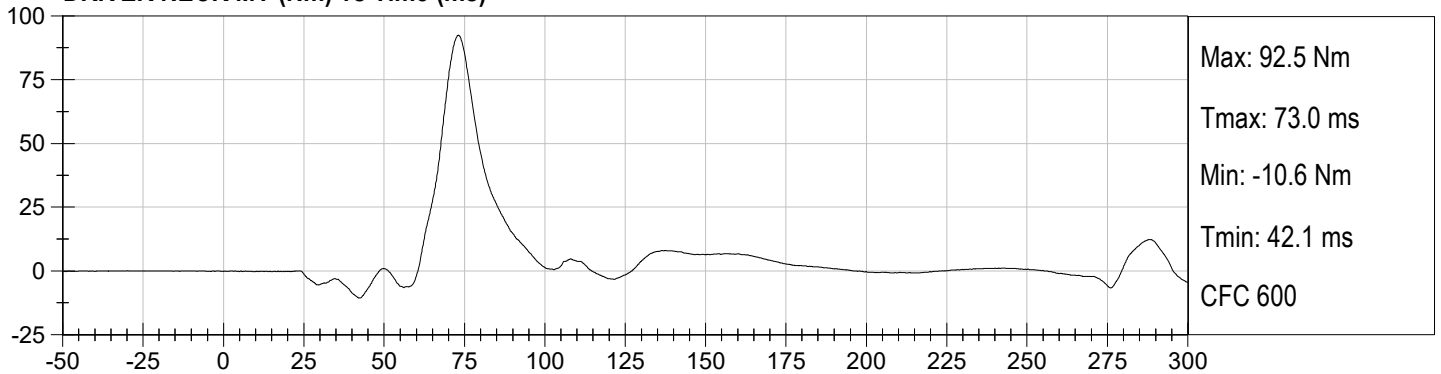
DRIVER NECK FX (N) vs Time (ms)



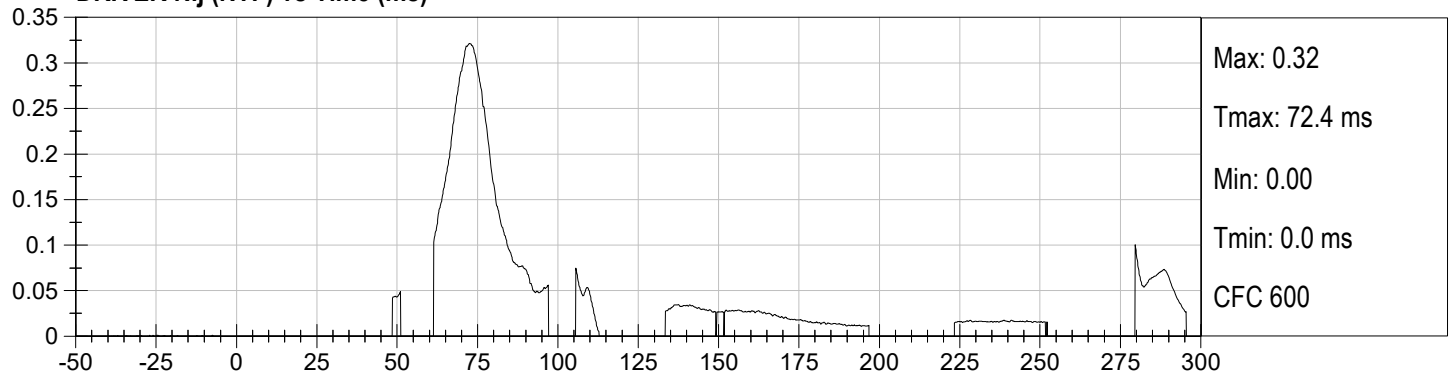
DRIVER NECK FZ (N) vs Time (ms)



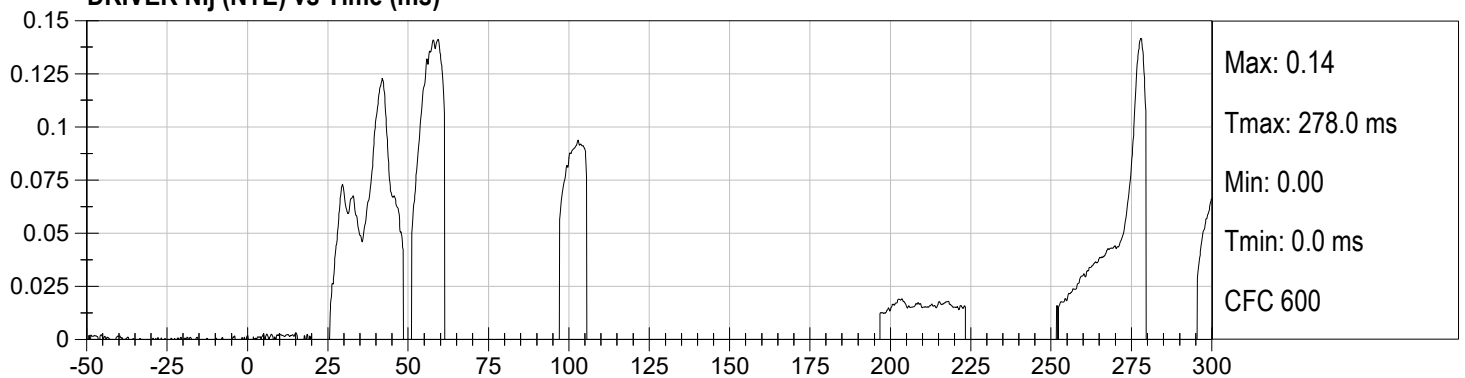
DRIVER NECK MY (Nm) vs Time (ms)



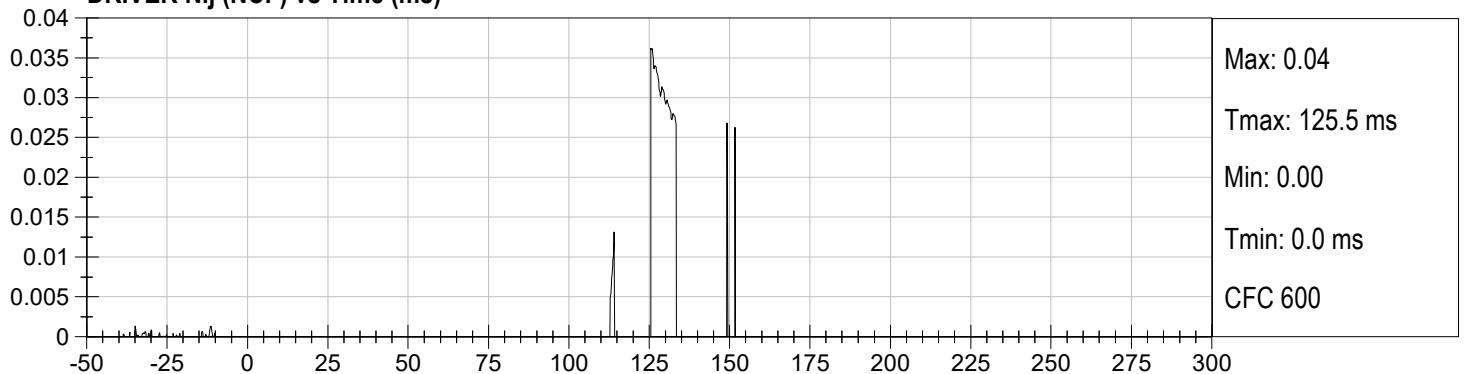
DRIVER Nij (NTF) vs Time (ms)



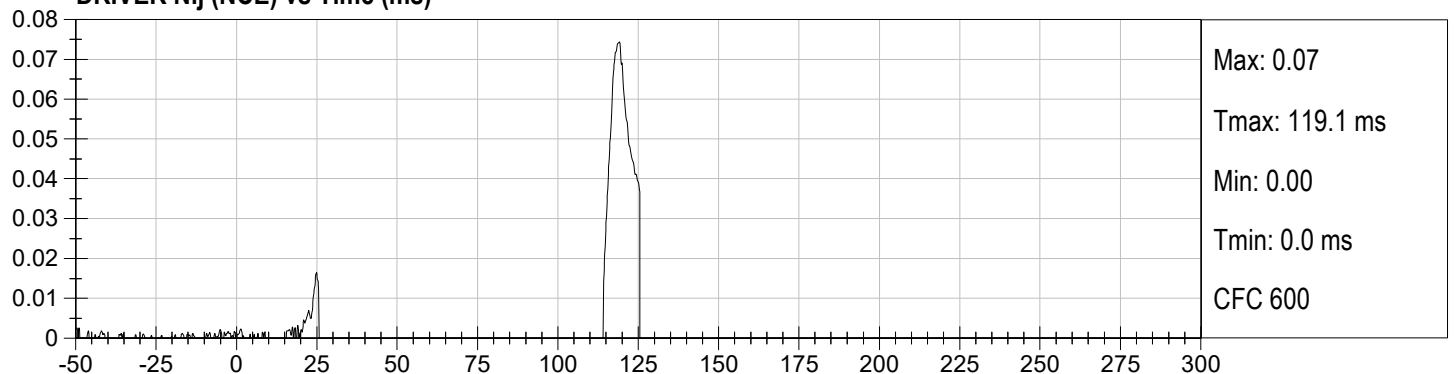
DRIVER Nij (NTE) vs Time (ms)



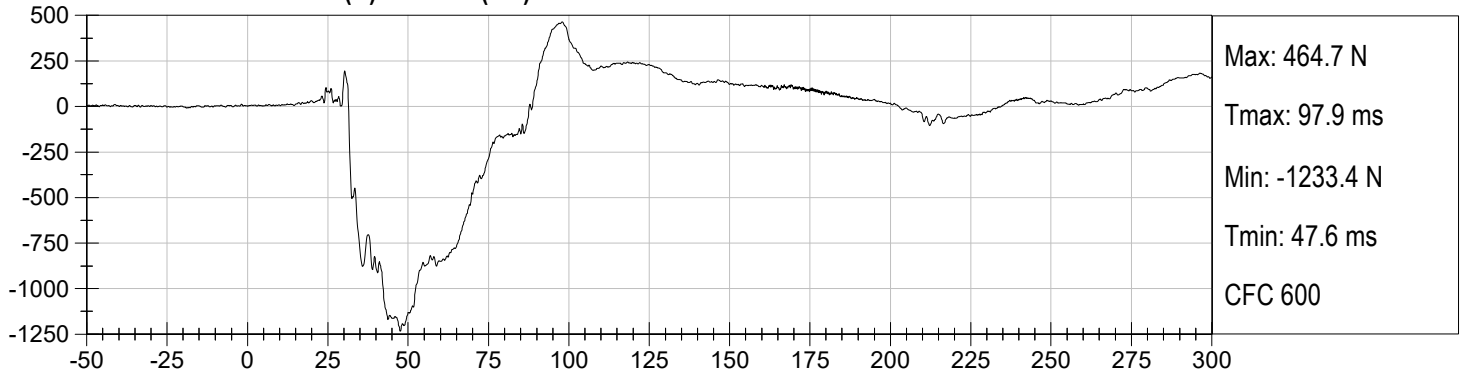
DRIVER Nij (NCF) vs Time (ms)



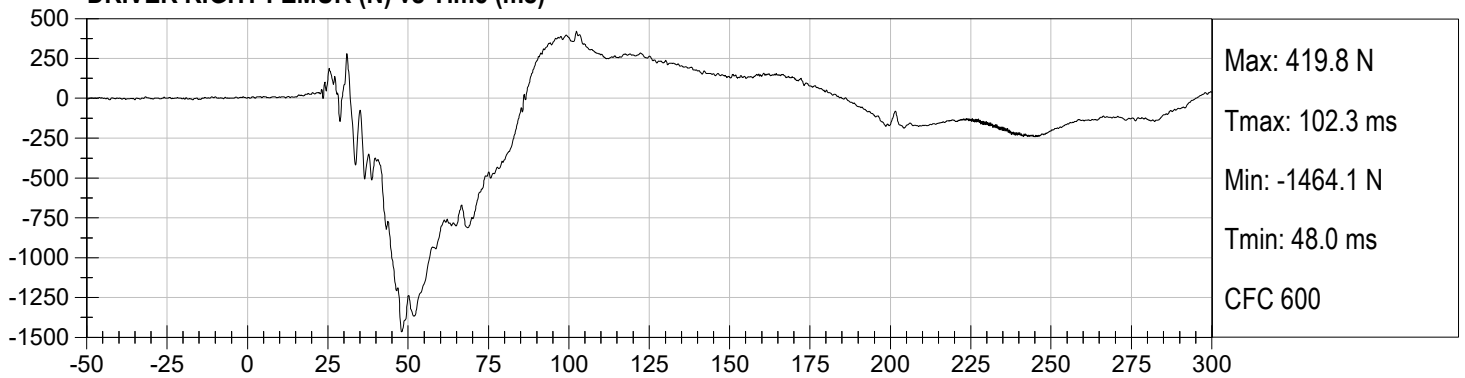
DRIVER Nij (NCE) vs Time (ms)



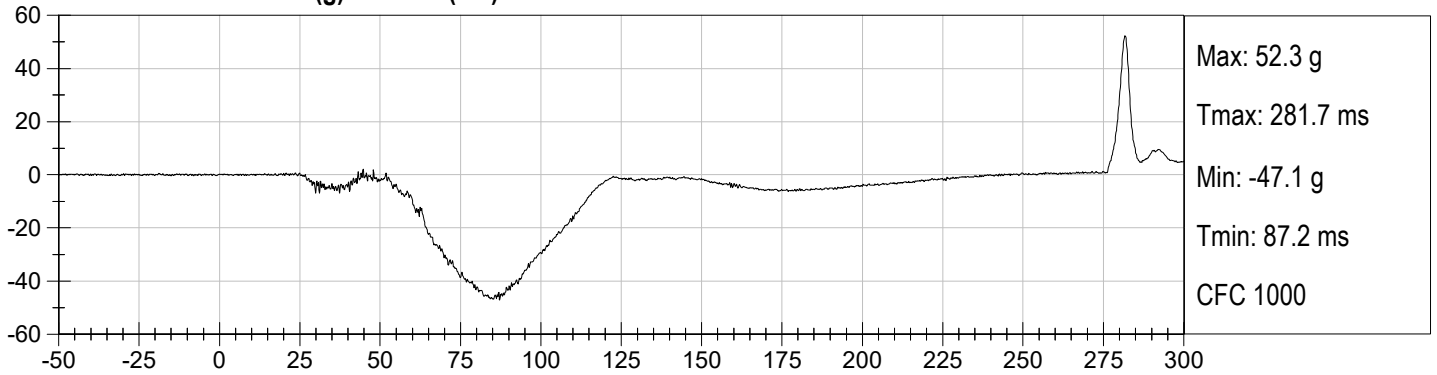
DRIVER LEFT FEMUR (N) vs Time (ms)



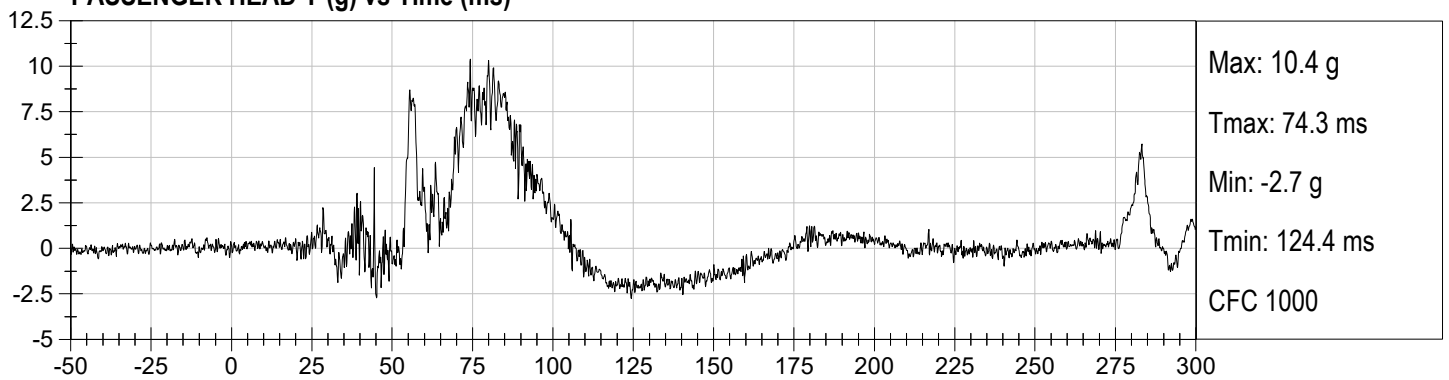
DRIVER RIGHT FEMUR (N) vs Time (ms)



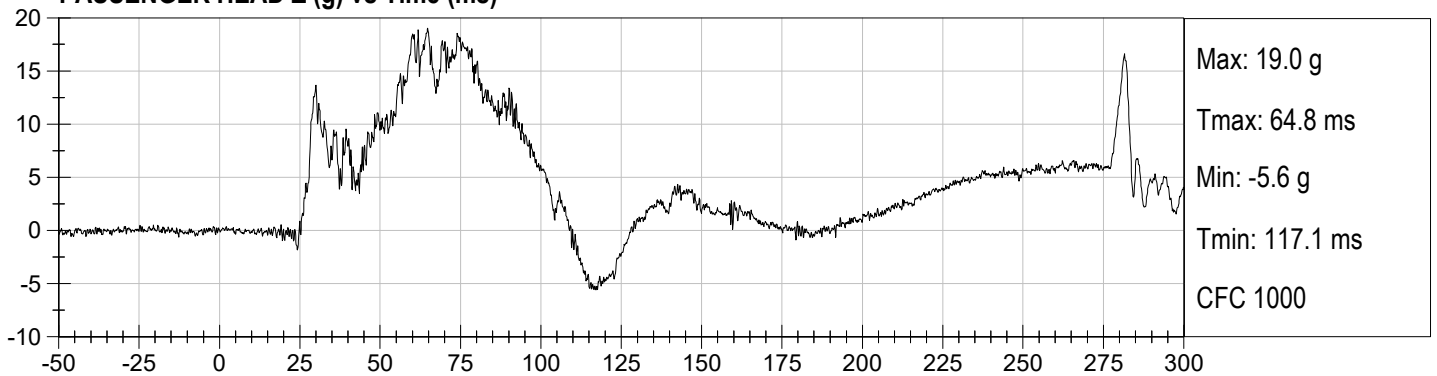
PASSENGER HEAD X (g) vs Time (ms)



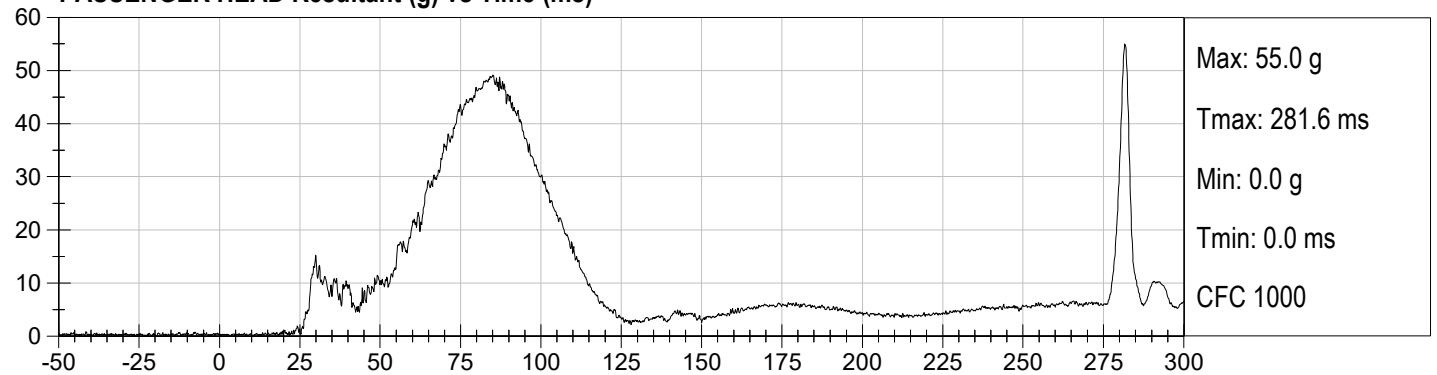
PASSENGER HEAD Y (g) vs Time (ms)

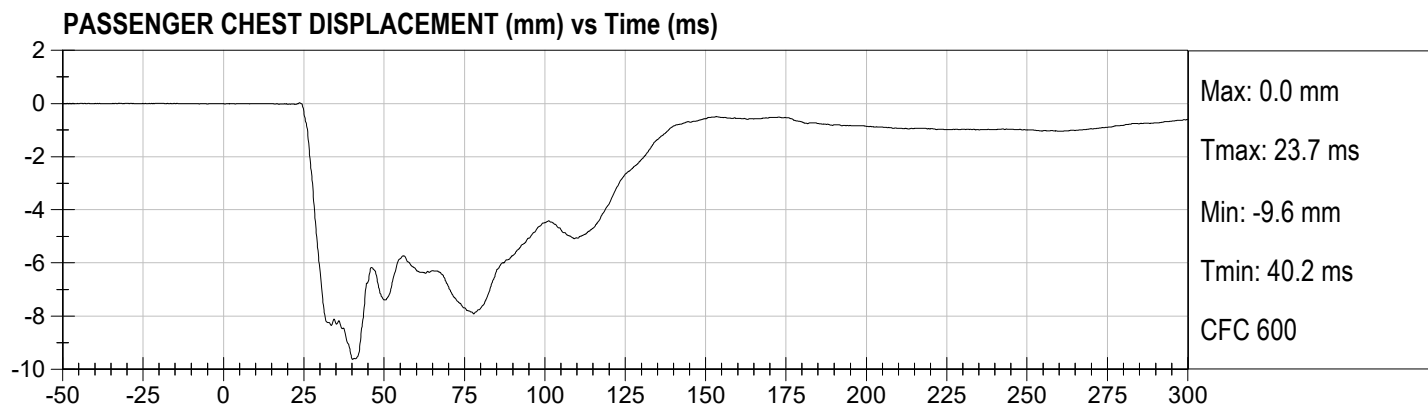


PASSENGER HEAD Z (g) vs Time (ms)

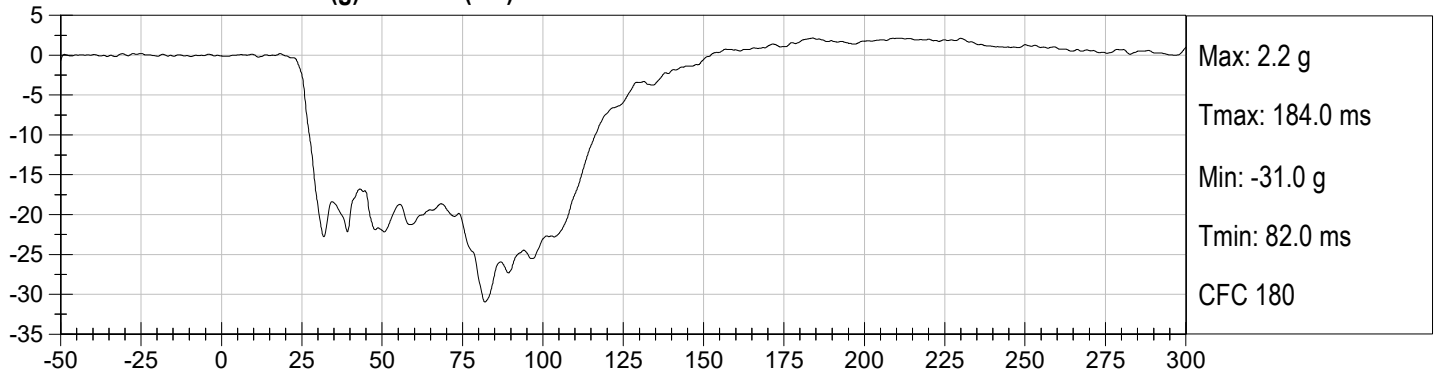


PASSENGER HEAD Resultant (g) vs Time (ms)





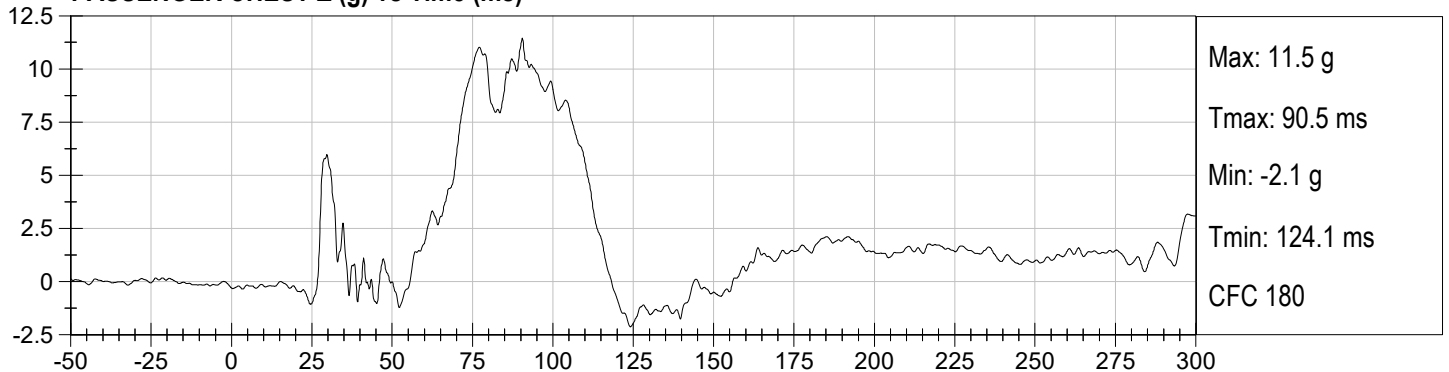
PASSENGER CHEST X (g) vs Time (ms)



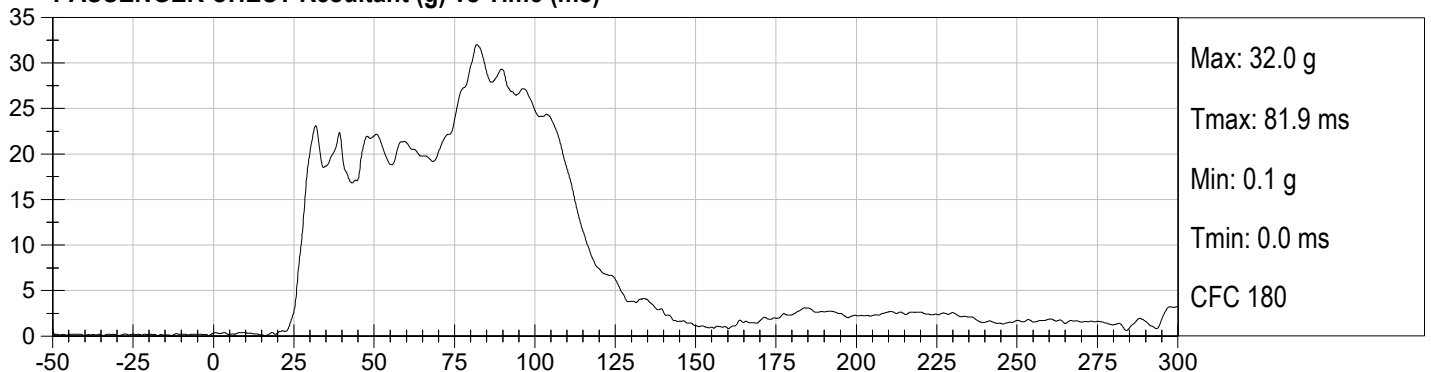
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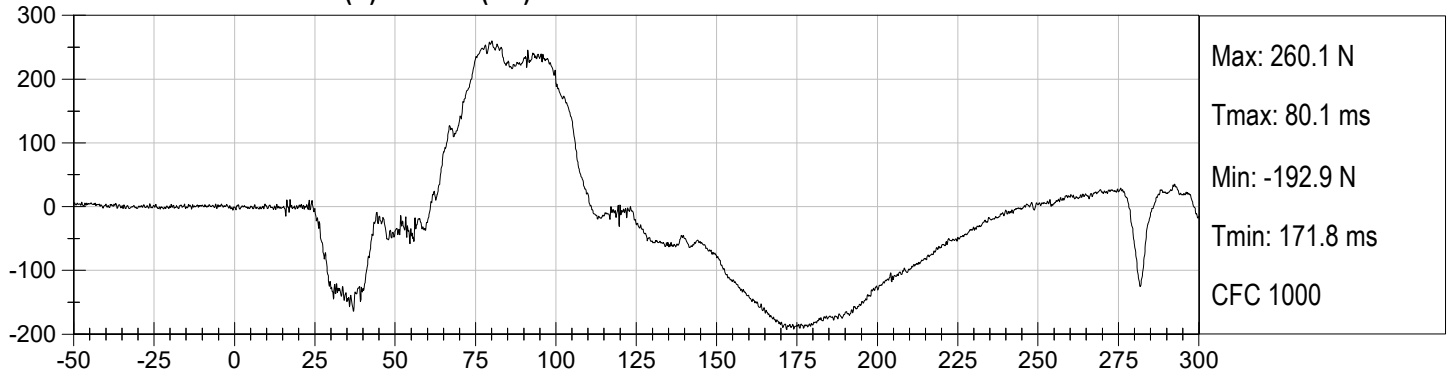
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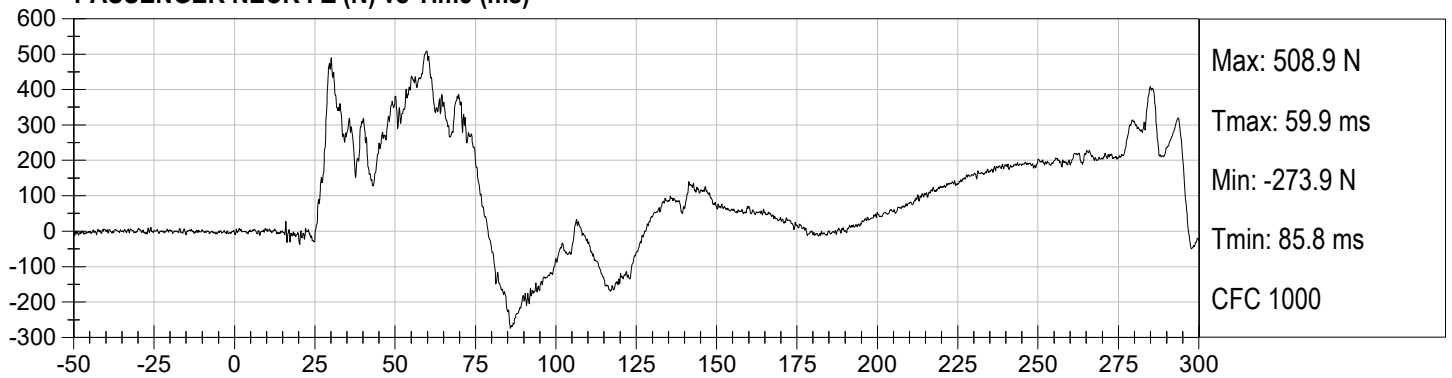
PASSENGER CHEST Resultant (g) vs Time (ms)



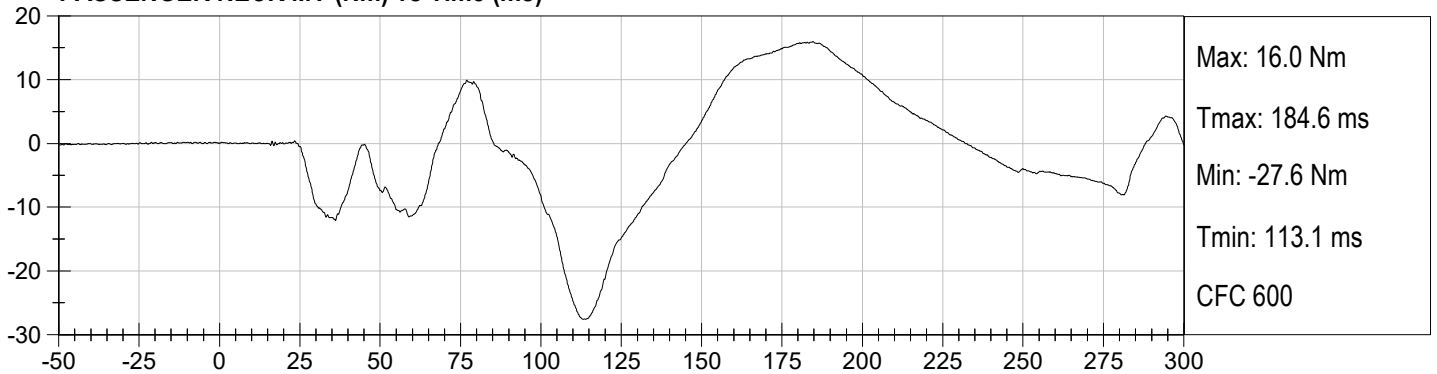
PASSENGER NECK FX (N) vs Time (ms)



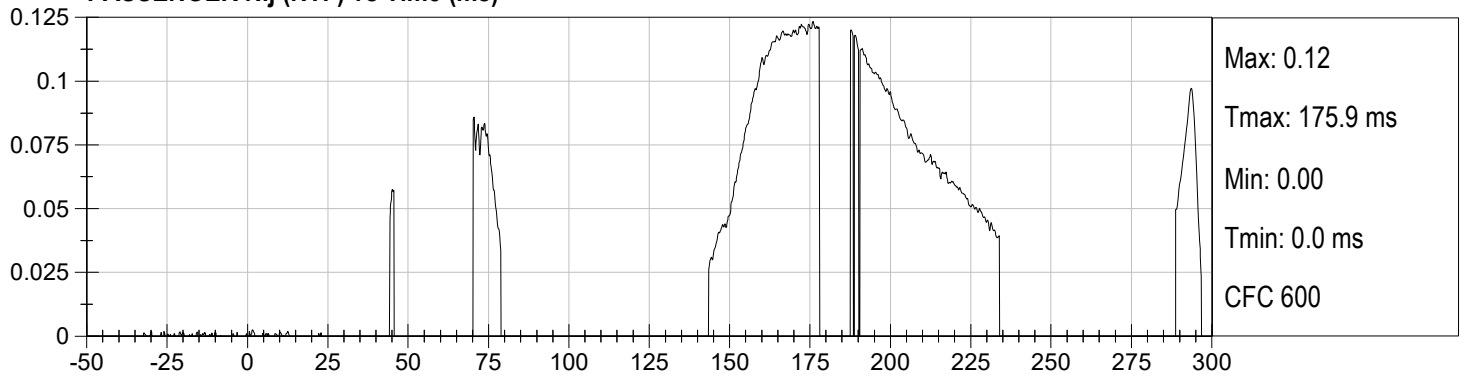
PASSENGER NECK FZ (N) vs Time (ms)



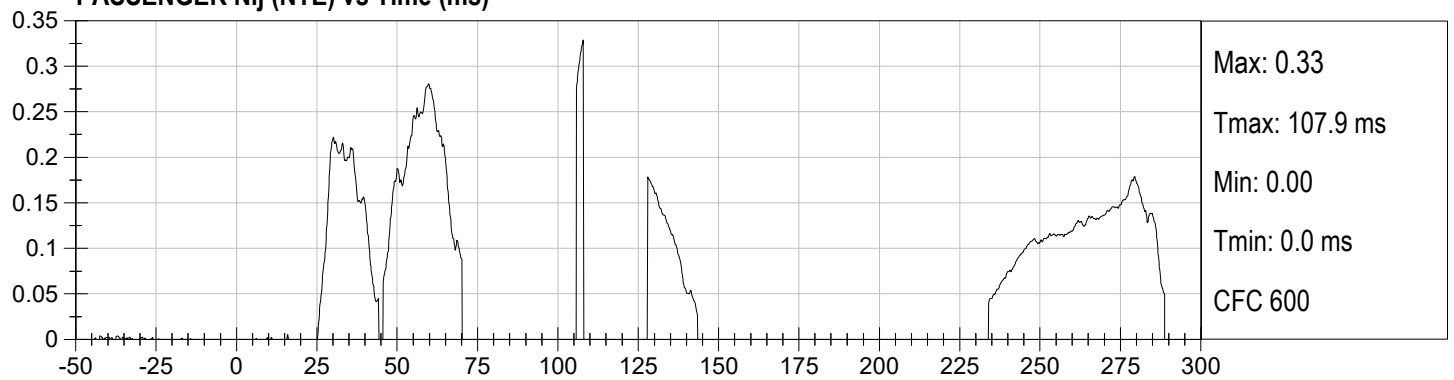
PASSENGER NECK MY (Nm) vs Time (ms)



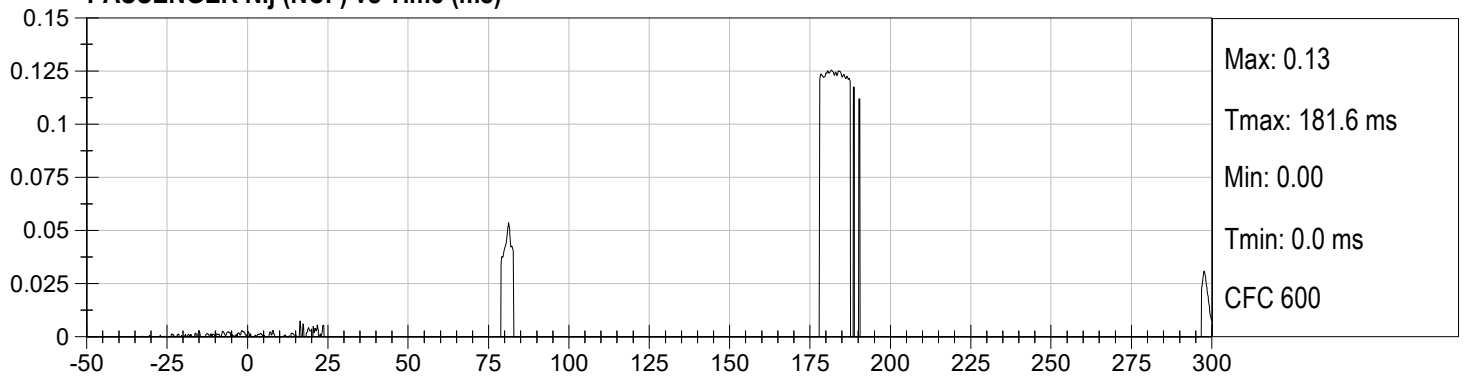
PASSENGER Nij (NTF) vs Time (ms)



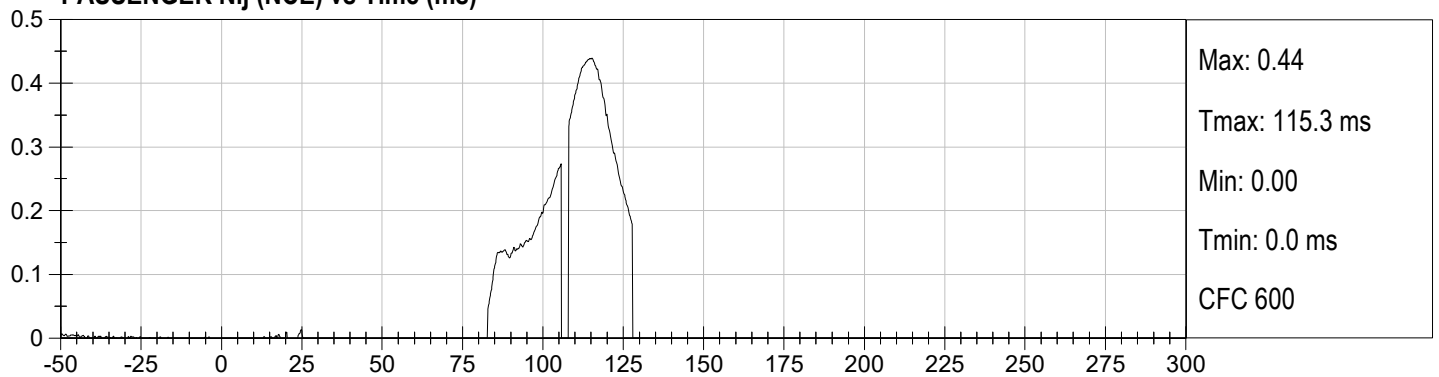
PASSENGER Nij (NTE) vs Time (ms)



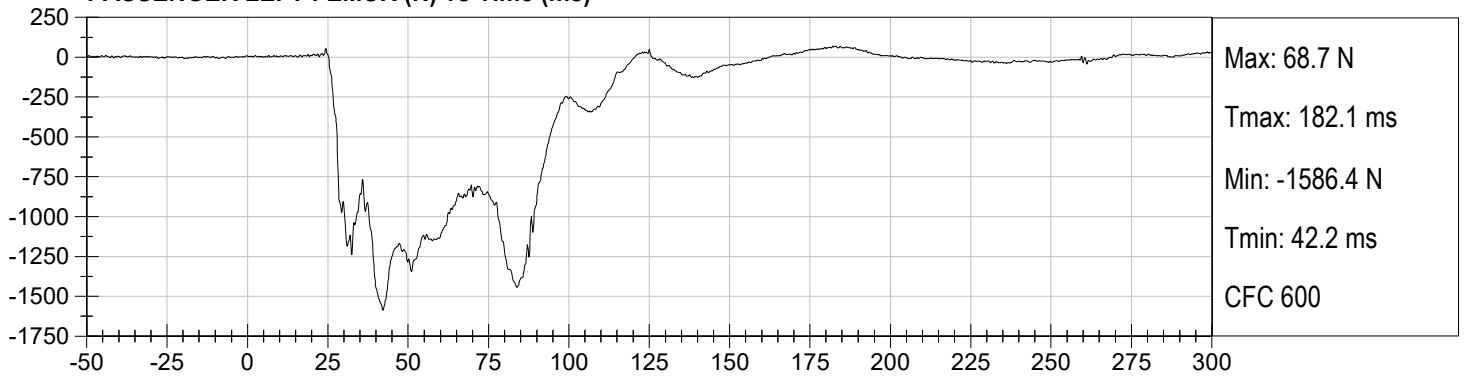
PASSENGER Nij (NCF) vs Time (ms)



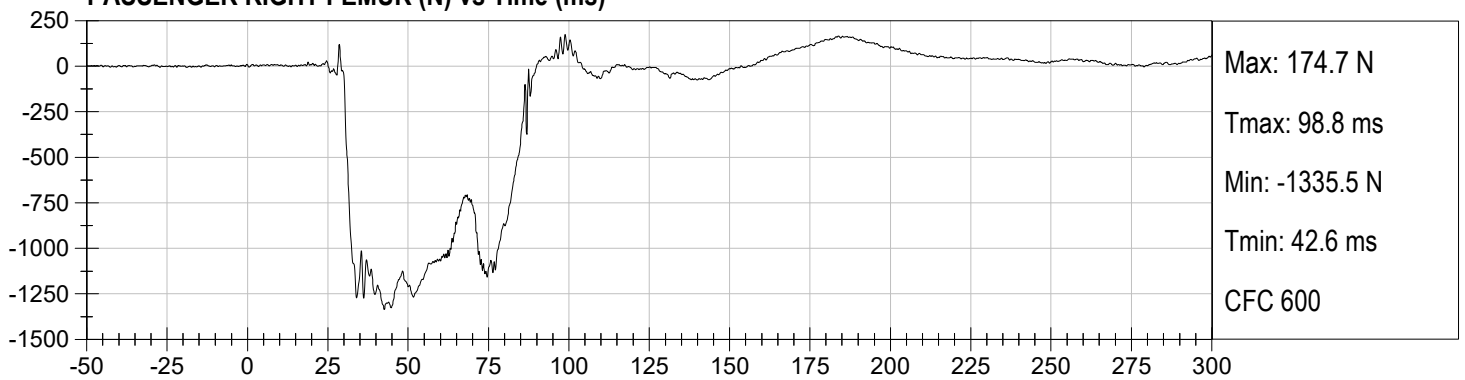
PASSENGER Nij (NCE) vs Time (ms)



PASSENGER LEFT FEMUR (N) vs Time (ms)



PASSENGER RIGHT FEMUR (N) vs Time (ms)



APPENDIX C
DUMMY QUALIFICATION AND PERFORMANCE VERIFICATION

QUALIFICATION 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

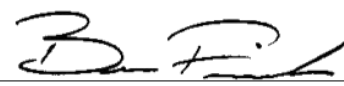
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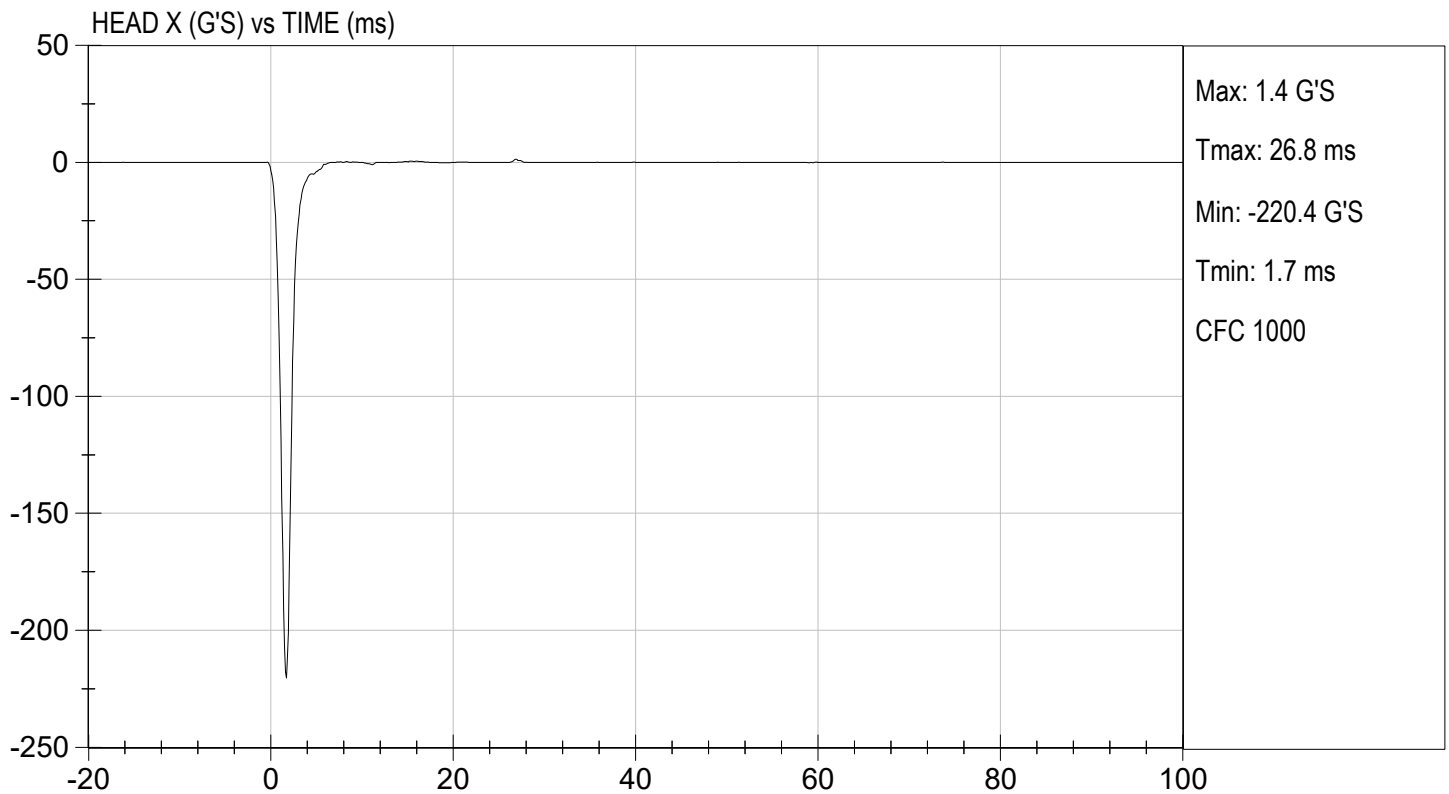
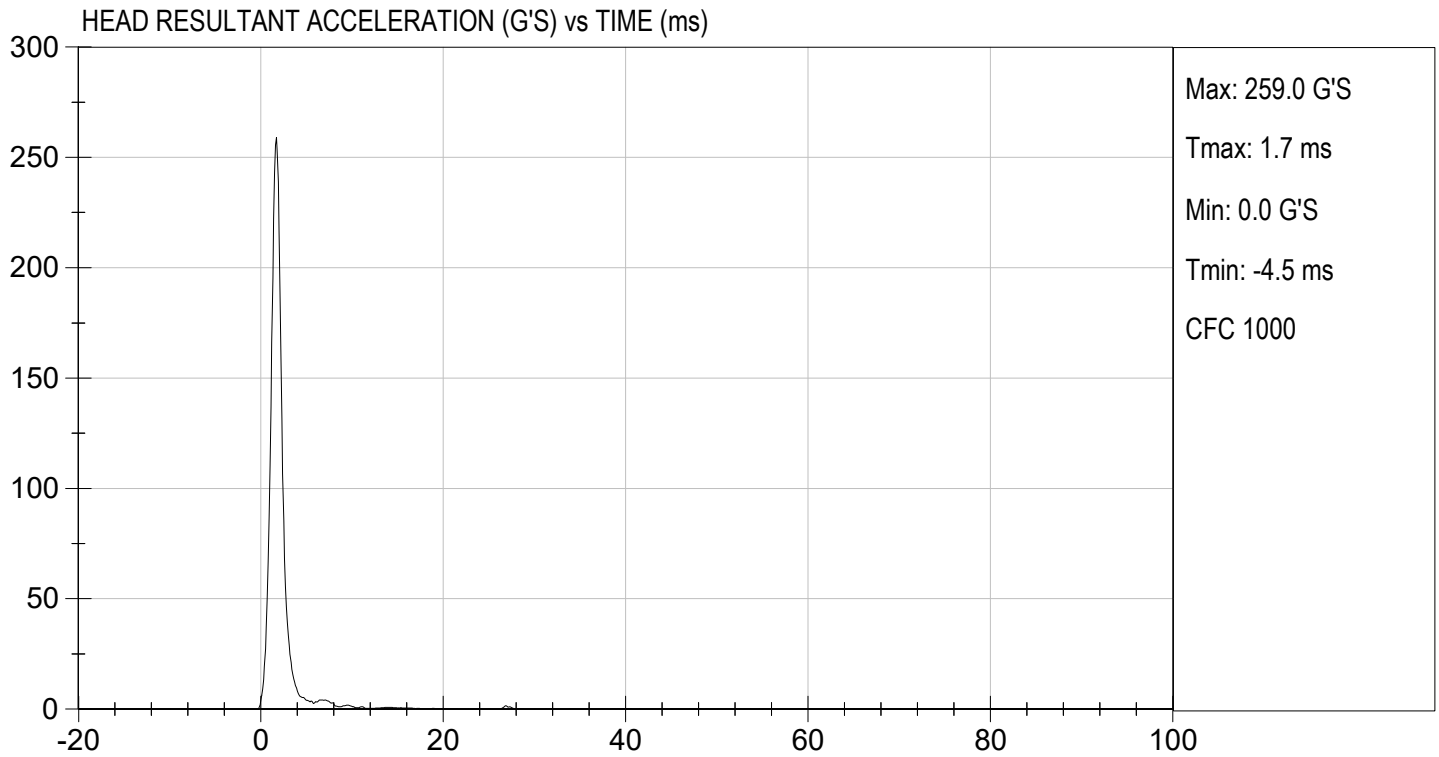
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	45	Pass
Peak Resultant Acceleration	G's	225 to 275	259	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	3.7	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
Overall Test Results			Pass	

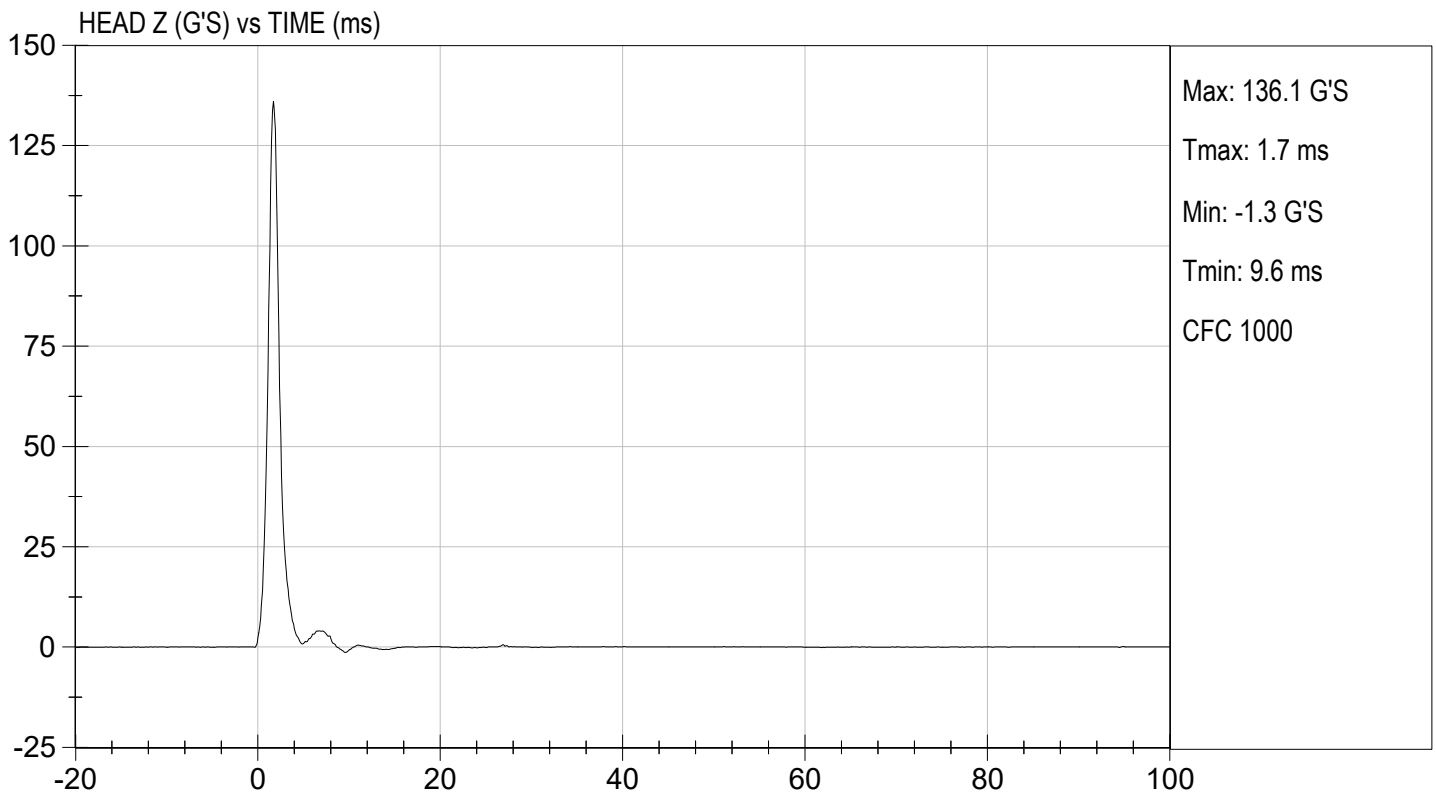
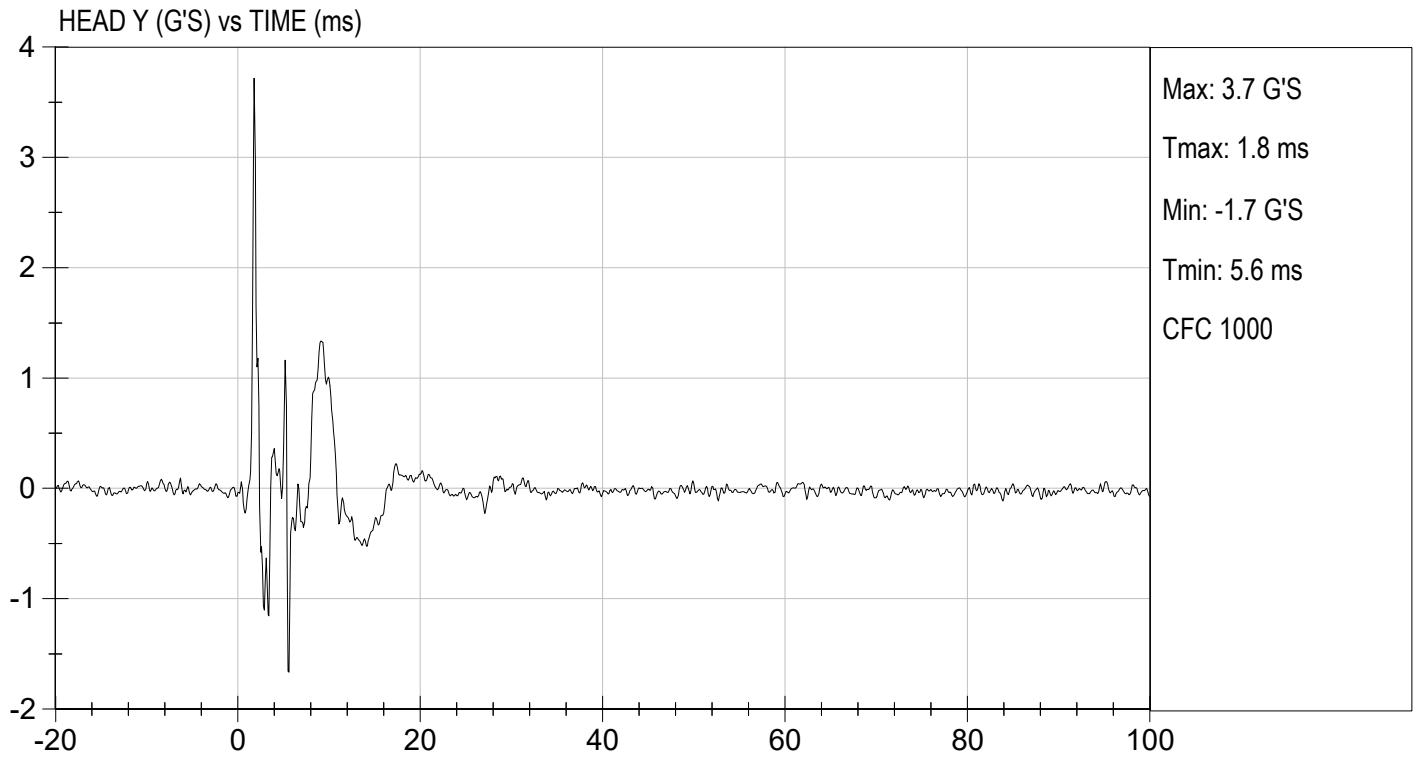

Laboratory Technician

07/27/2023

Test Date


Approved By





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

ATD Serial No: 351

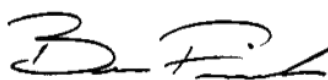
Test I.D: D231942

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity		%	10 to 70	45	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.96	Pass
Pendulum Deceleration	10 ms	G's	22.50 to 27.50	23.76	Pass
	20 ms	G's	17.60 to 22.60	19.48	Pass
	30 ms	G's	12.50 to 18.50	16.25	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 29.0	16.2	Pass
Deceleration Decay Time to Cross 5 G's		ms	34.0 to 42.0	37.6	Pass
Maximum "D" Plane Rotation	Maximum	Deg	64.0 to 78.0	68.6	Pass
	Time	ms	57.0 to 64.0	58.0	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	113.0 to 128.0	113.8	Pass
Moment About Occipital Condyle	Maximum	Nm	88.1 to 108.5	98.9	Pass
	Time	ms	47.0 to 58.0	49.2	Pass
Positive Moment Decay Time To Zero Crossing		ms	97.0 to 107.0	97.1	Pass
Overall Test Results					Pass


 Laboratory Technician

07/27/2023

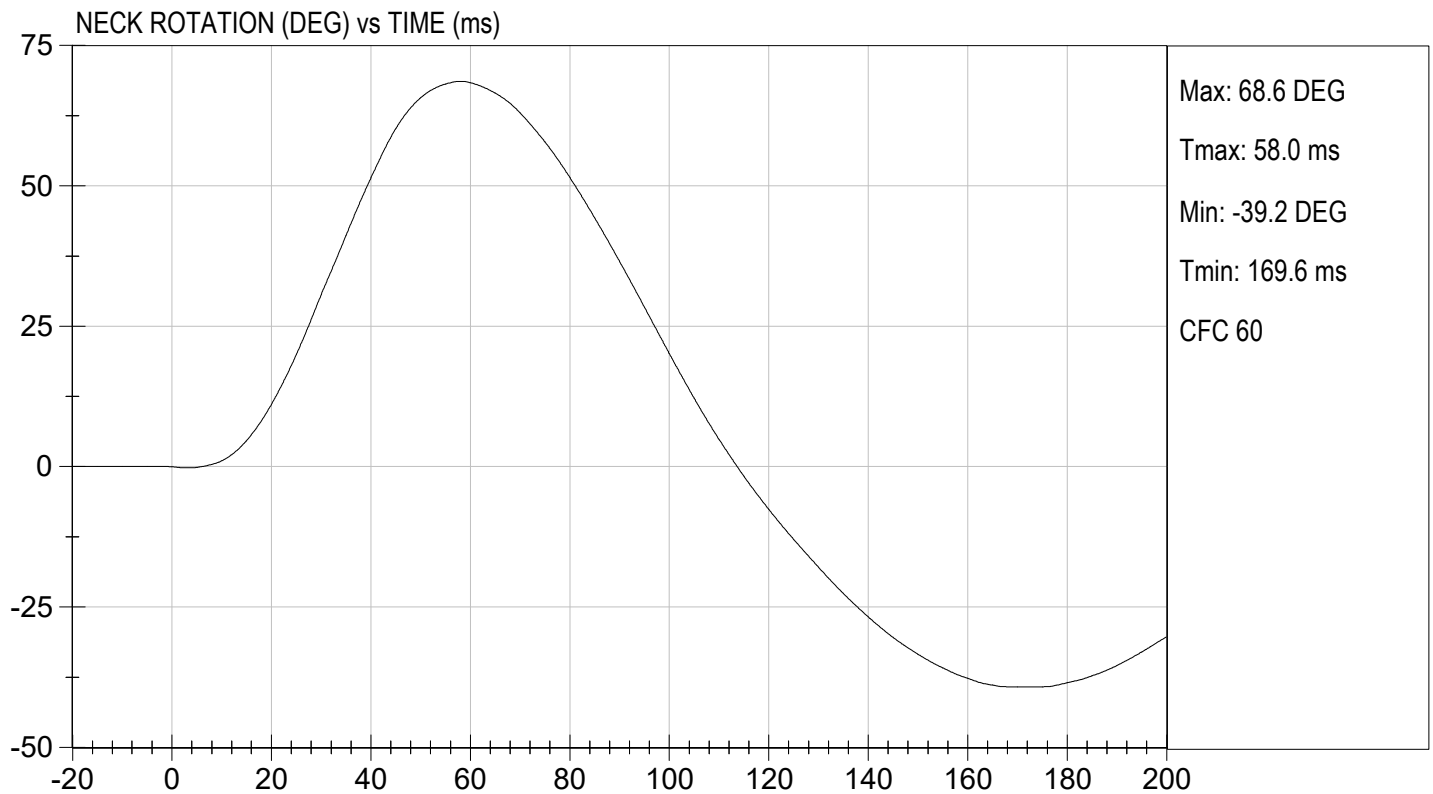
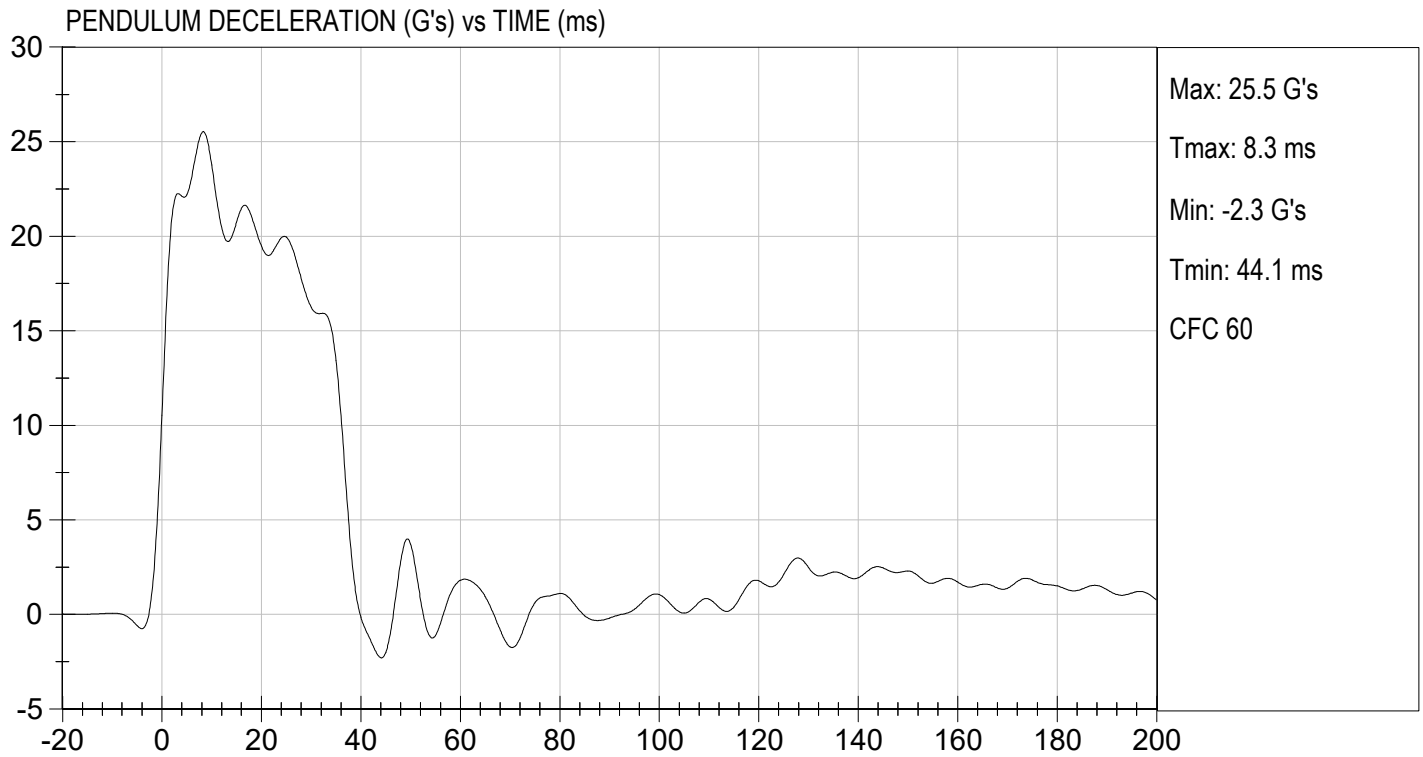
Test Date


 Approved By



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

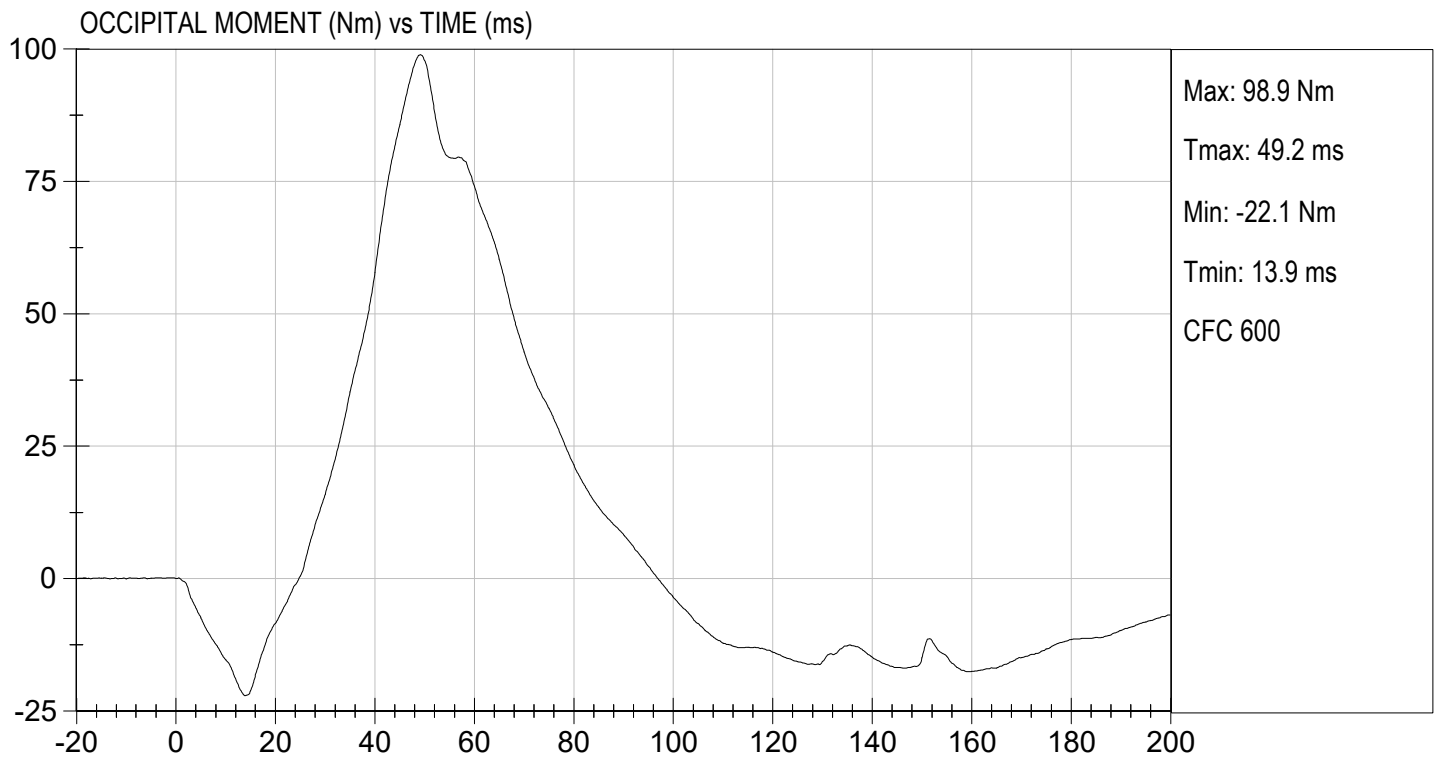
TEST DATE: 07/27/2023
TEST #: D231942





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

TEST DATE: 07/27/2023
TEST #: D231942



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

ATD Serial No: 351

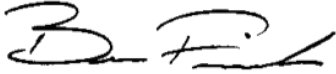
Test I.D: D231943

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity		%	10 to 70	45	Pass
Pendulum Velocity		m/s	5.95 to 6.19	5.98	Pass
Pendulum Deceleration	10 ms	G's	17.20 to 21.20	19.94	Pass
	20 ms	G's	14.00 to 19.00	16.34	Pass
	30 ms	G's	11.00 to 16.00	11.01	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 22.0	11.9	Pass
Deceleration Decay Time to Cross 5 G's		ms	38.0 to 46.0	42.1	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	95.4	Pass
	Time	ms	72.0 to 82.0	77.3	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	147.0 to 174.0	158.1	Pass
Moment About Occipital Condyle	Maximum	Nm	-52.9 to -79.9	-60.5	Pass
	Time	ms	65.0 to 79.0	70.7	Pass
Negative Moment Decay Time To Zero Crossing		ms	120.0 to 148.0	140.5	Pass
Overall Test Results					Pass


 Laboratory Technician

07/27/2023

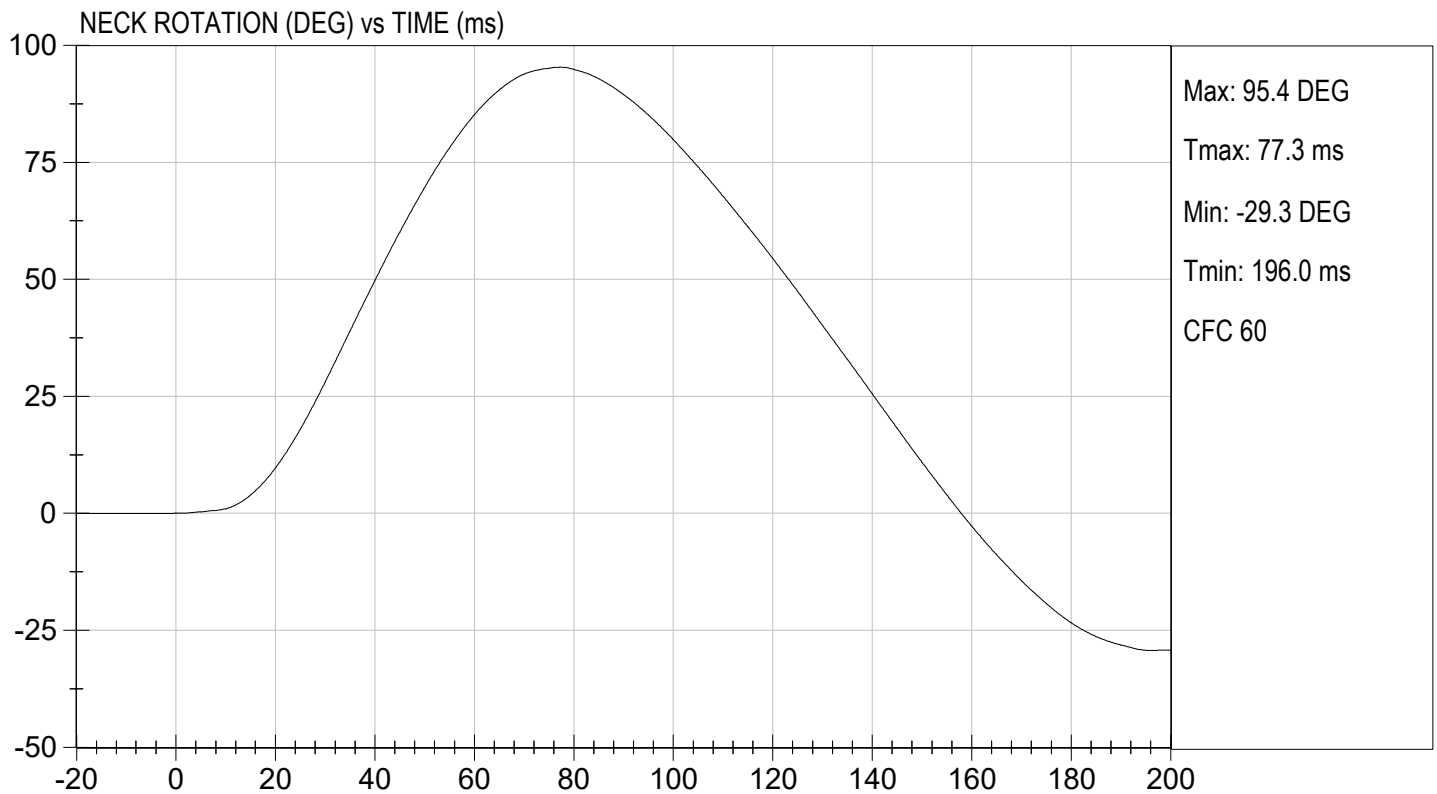
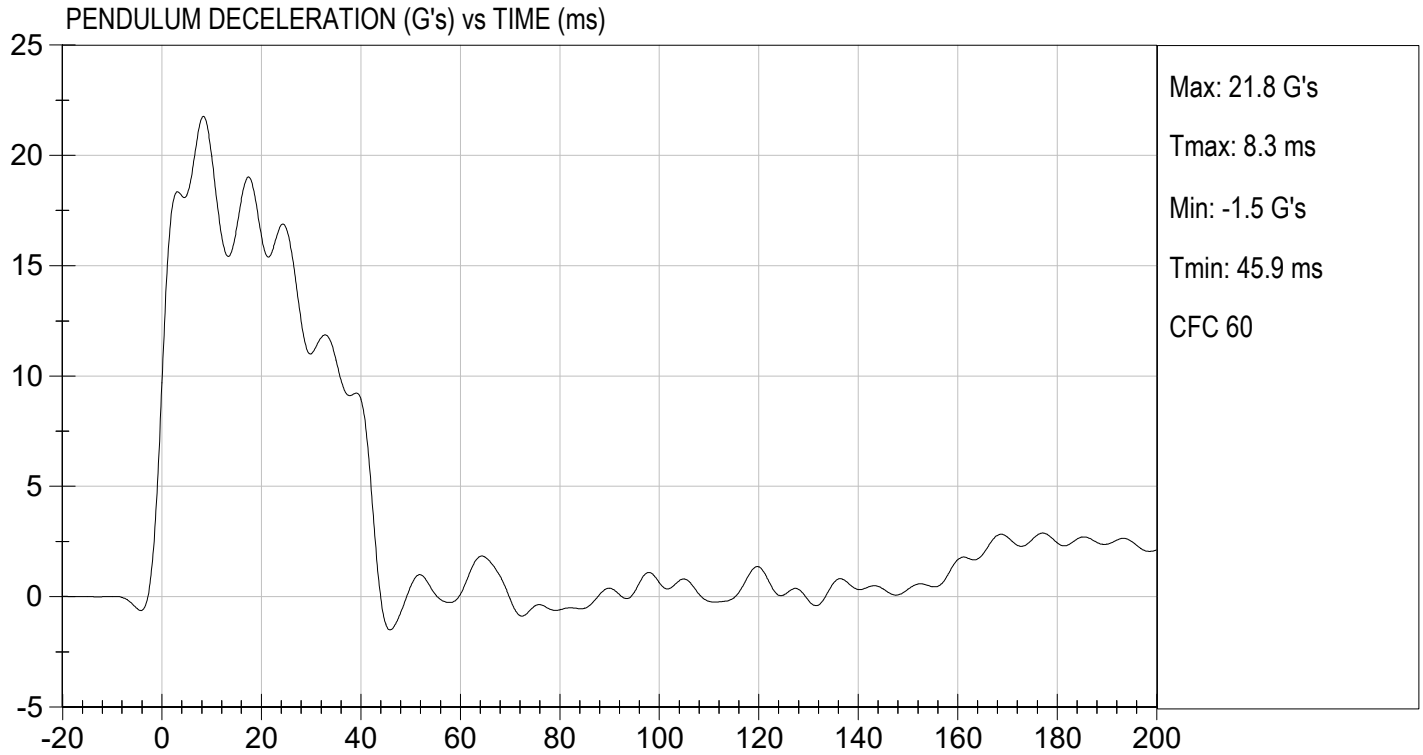
Test Date


 Approved By



TEST DESC: NECK EXTENSION
VELOCITY: 19.61 ft/s, 5.98 m/s

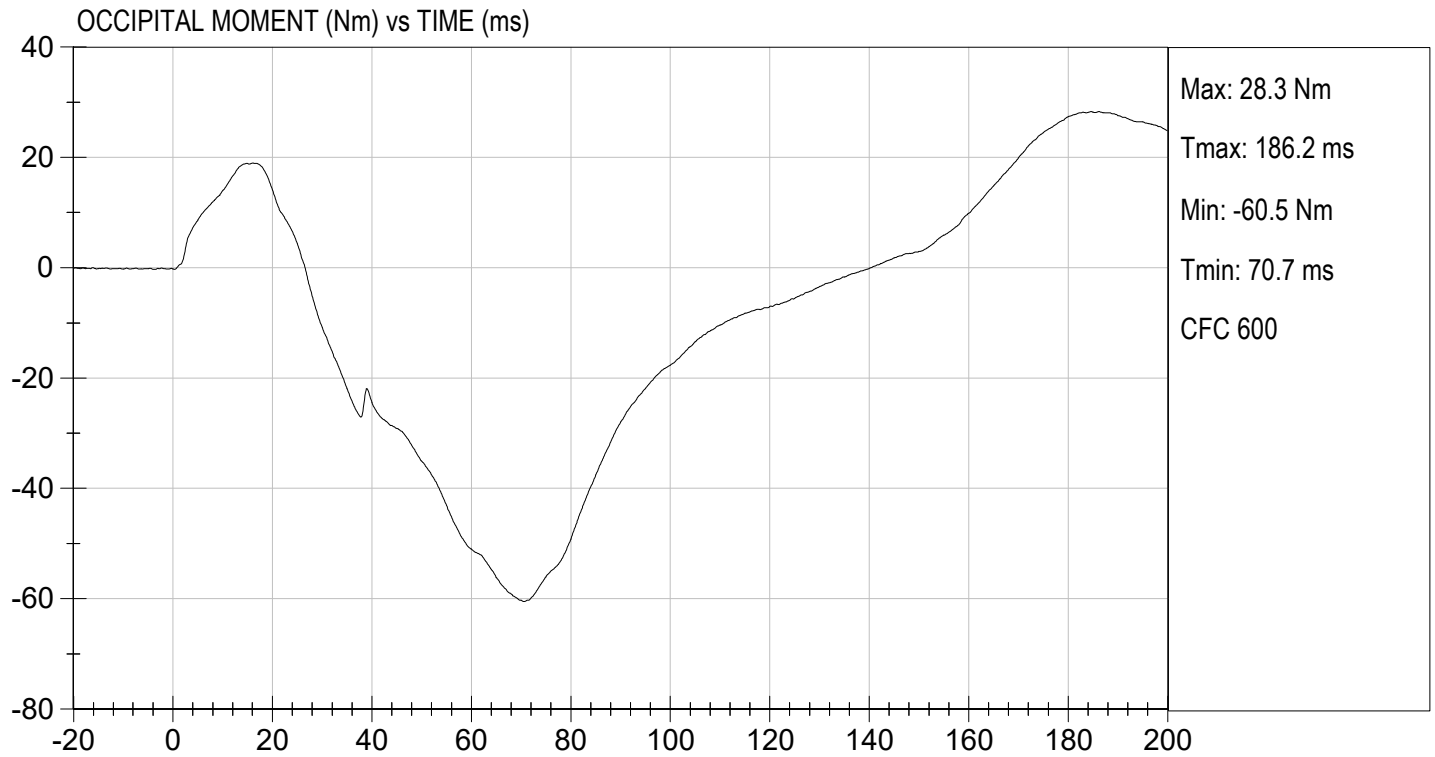
TEST DATE: 07/27/2023
TEST #: D231943





TEST DESC: NECK EXTENSION
VELOCITY: 19.61 ft/s, 5.98 m/s

TEST DATE: 07/27/2023
TEST #: D231943



MGA RESEARCH CORPORATION
THORAX IMPACT
HYBRID III 50TH PERCENTILE MALE

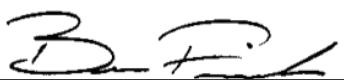
ATD Serial No: 351

Test I.D: D231944

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	46	Pass
Probe Velocity	m/s	6.58 to 6.82	6.77	Pass
Peak Probe Force	N	5159 to 5893	5,562	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.88	Pass
Internal Hysteresis	%	69 to 85	71	Pass
Overall Test Results			Pass	


Laboratory Technician

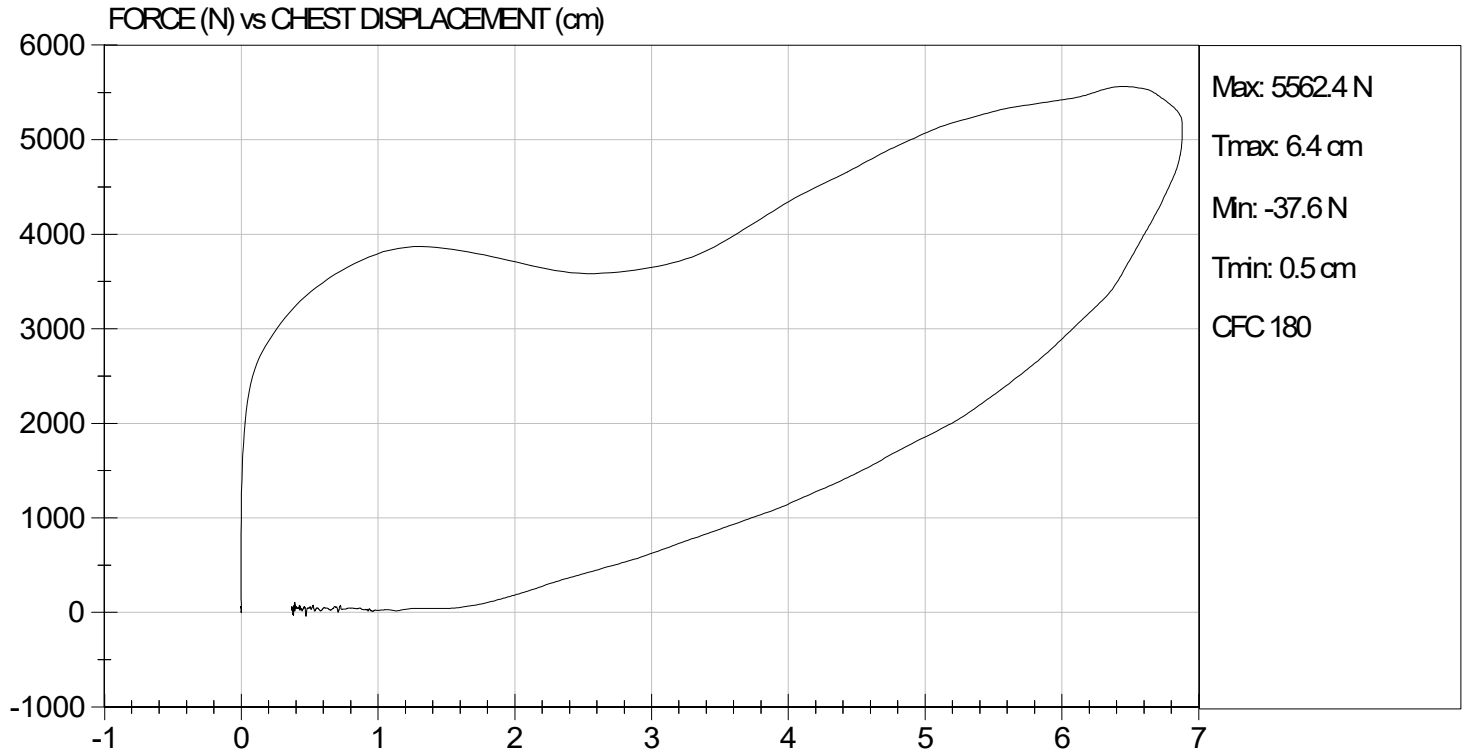
07/27/2023
Test Date


Approved By



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

TEST DATE: 07/27/2023
TEST #: D231944



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

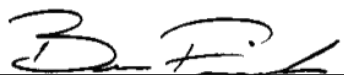
ATD Serial No: 351

Test I.D: D231945

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	45	Pass
Probe Velocity	m/s	2.07 to 2.13	2.10	Pass
Peak Probe Force	N	4715 to 5782	5,100	Pass
Overall Test Results				Pass


Laboratory Technician

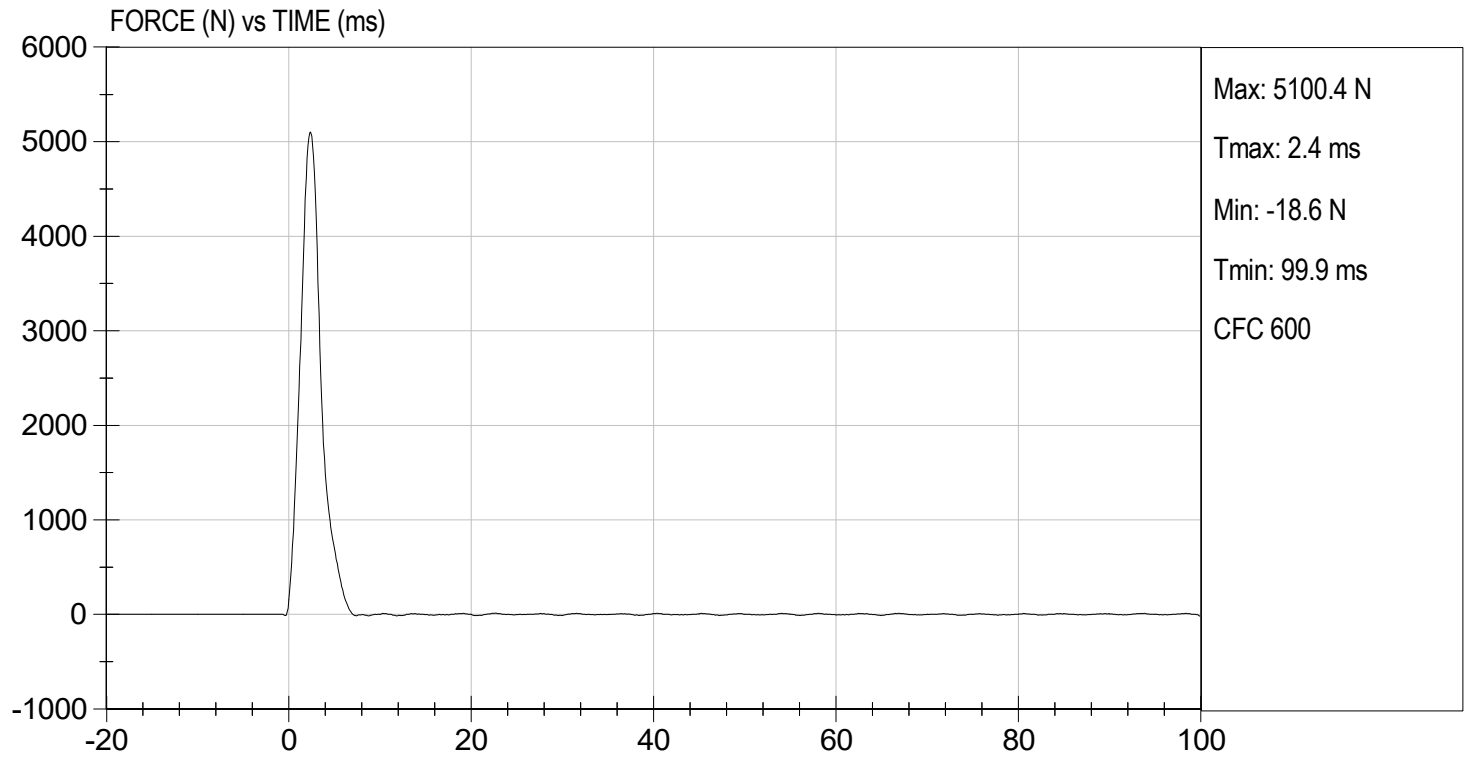
07/27/2023
Test Date


Approved By



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

TEST DATE: 07/27/2023
TEST #: D231945



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

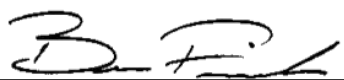
ATD Serial No: 351

Test I.D: D231946

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	45	Pass
Probe Velocity	m/s	2.07 to 2.13	2.10	Pass
Peak Probe Force	N	4715 to 5782	5,368	Pass
Overall Test Results				Pass


Laboratory Technician

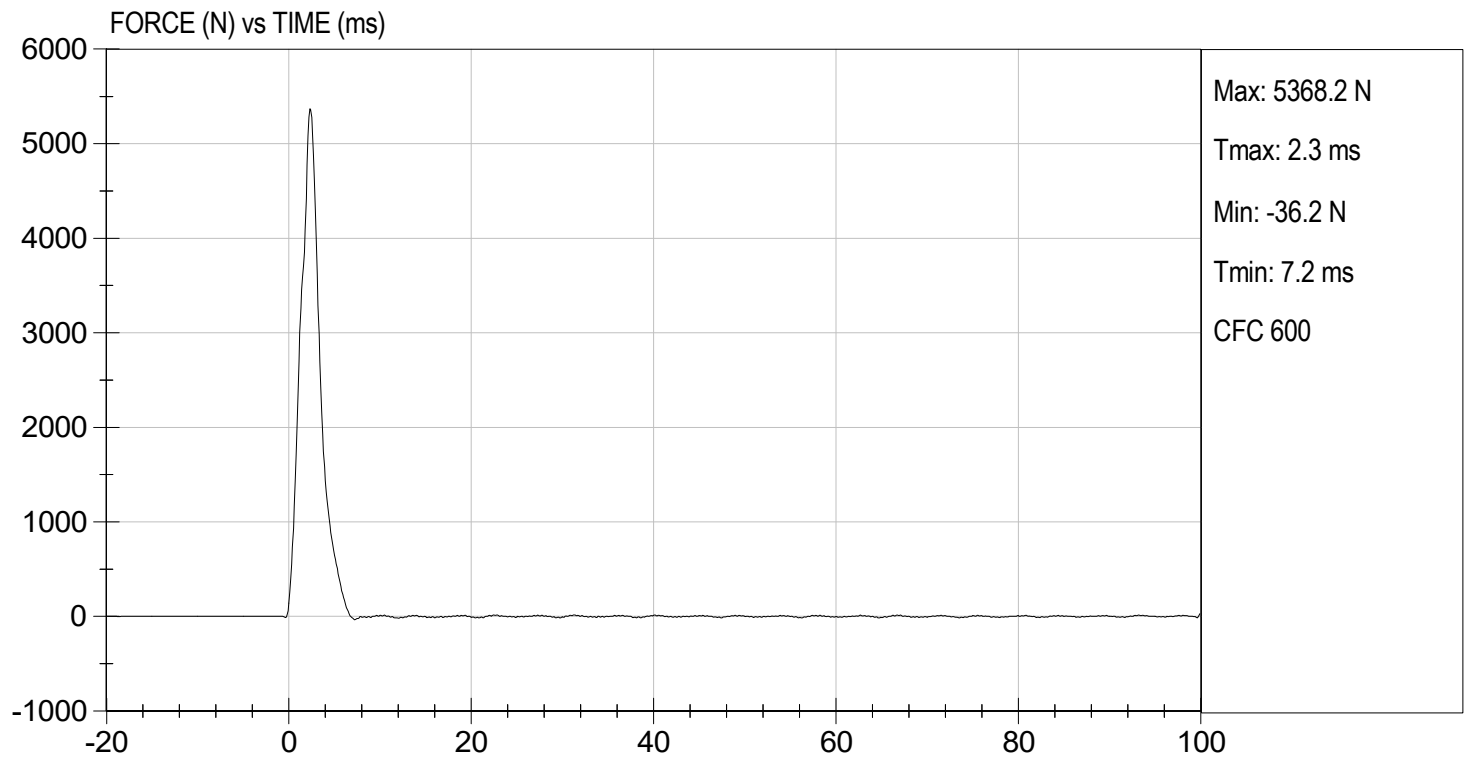
07/27/2023
Test Date


Approved By



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

TEST DATE: 07/27/2023
TEST #: D231946



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

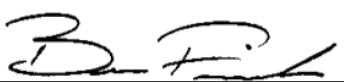
ATD Serial No: 351

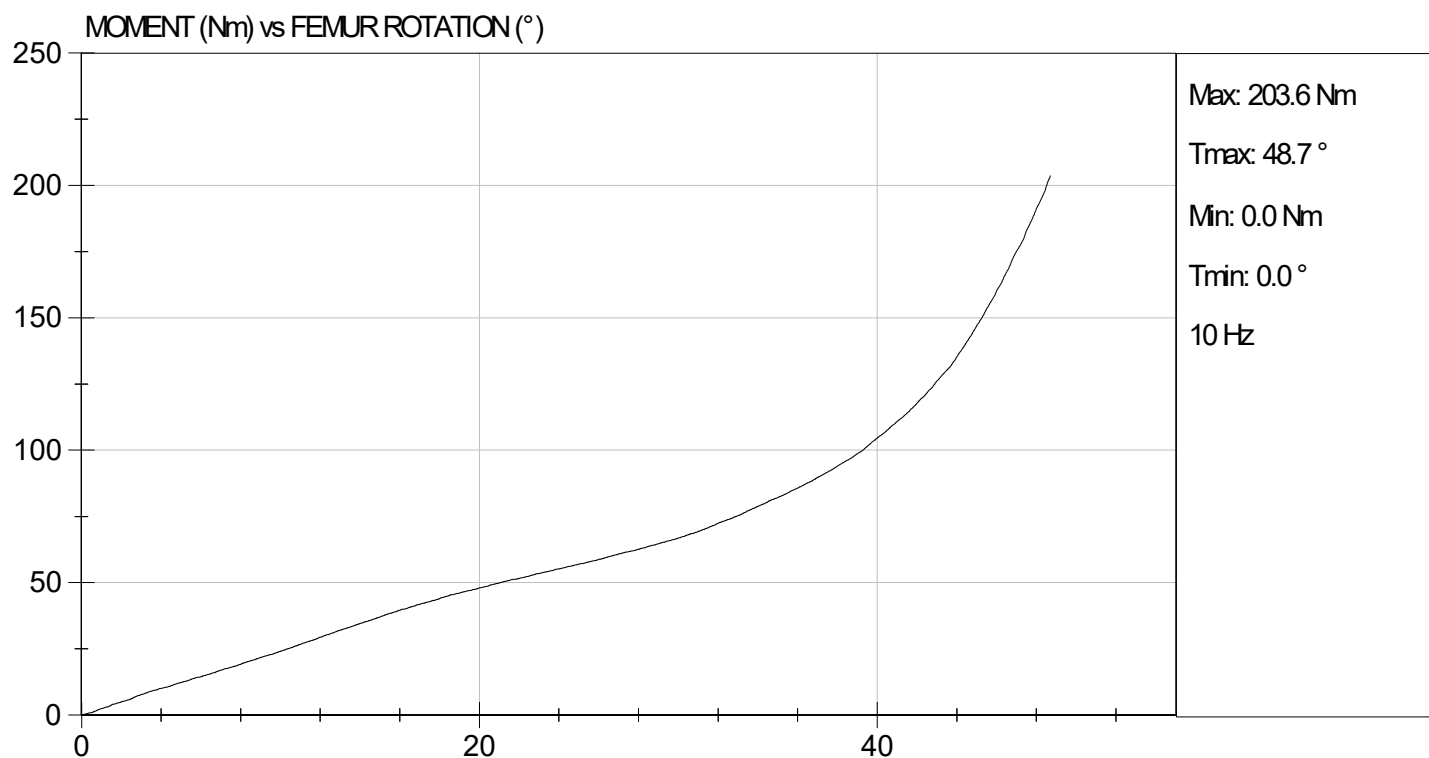
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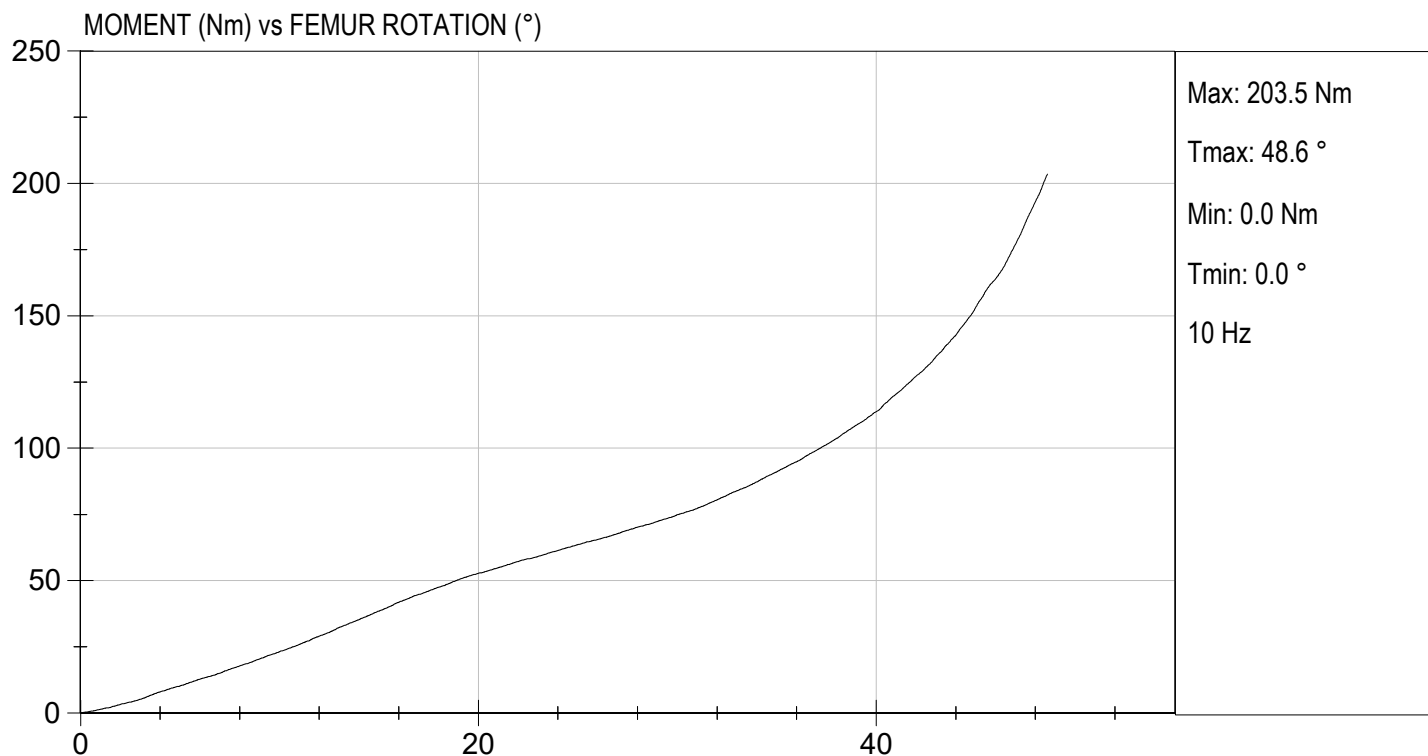
Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	21.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	44	44	Pass
Rotation Rate	deg/s	5.0 to 10.0	6.5	6.4	Pass
30 Degrees	Nm	94.9 Nm Max	66.8	74.9	Pass
150 ft-lbf / 203.4 Nm	Deg	40.0 to 50.0 Degree Max Rotation	48.7	48.6	Pass
Overall Test Results					Pass


 Laboratory Technician

07/27/2023
 Test Date


 Approved By





QUALIFICATION TEST RESULTS

POST-TEST

HYBRID III 50TH PERCENTILE MALE - DRIVER ATD

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

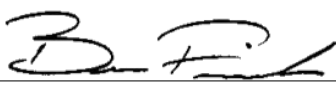
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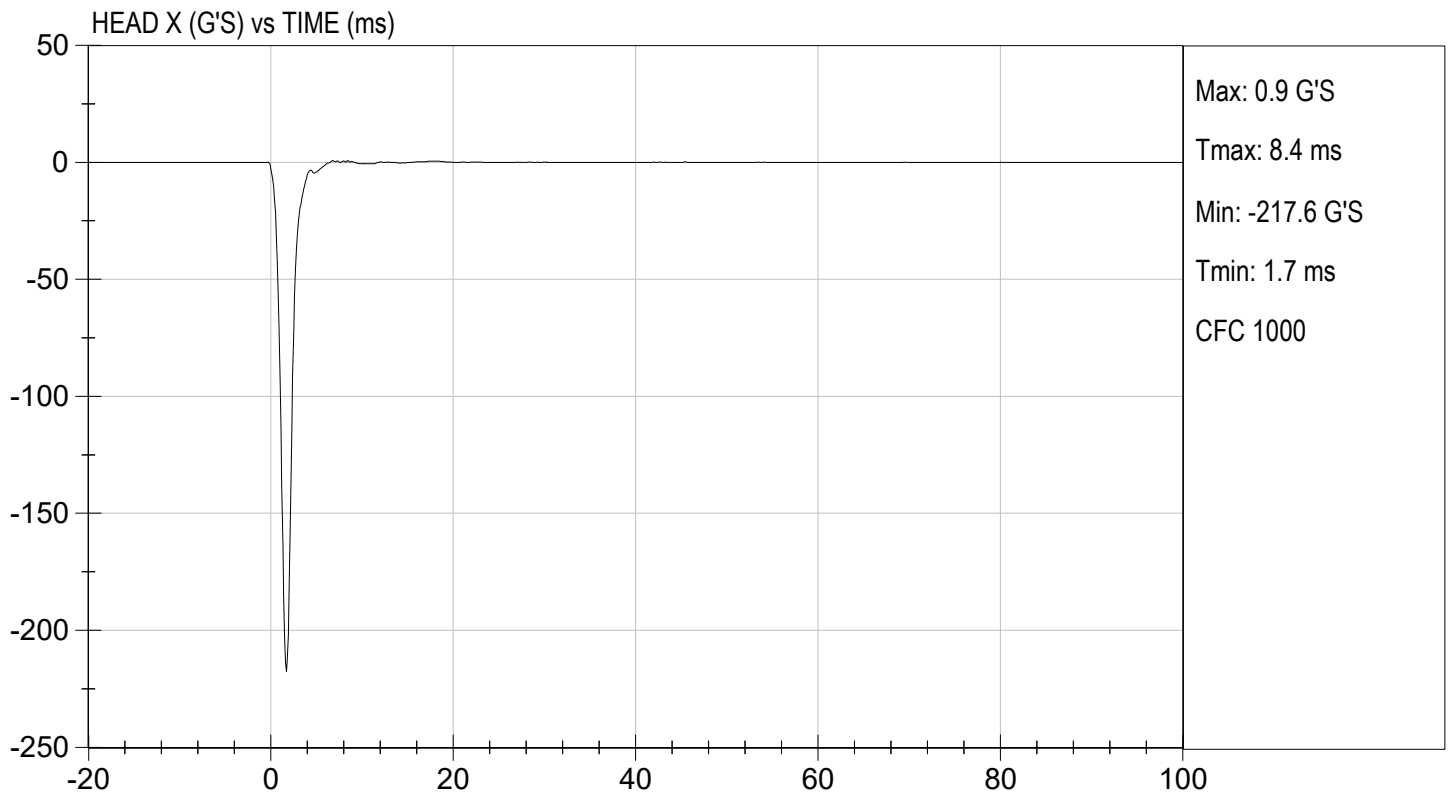
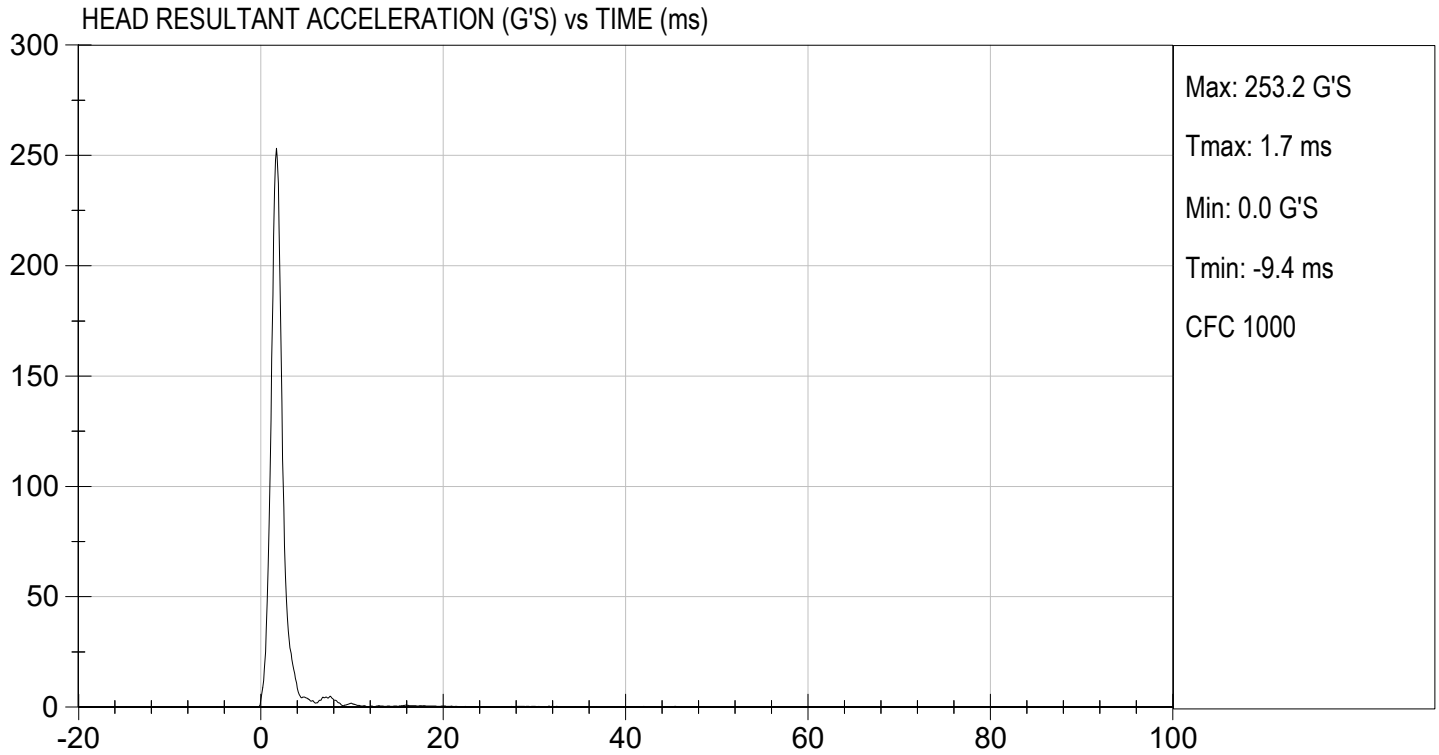
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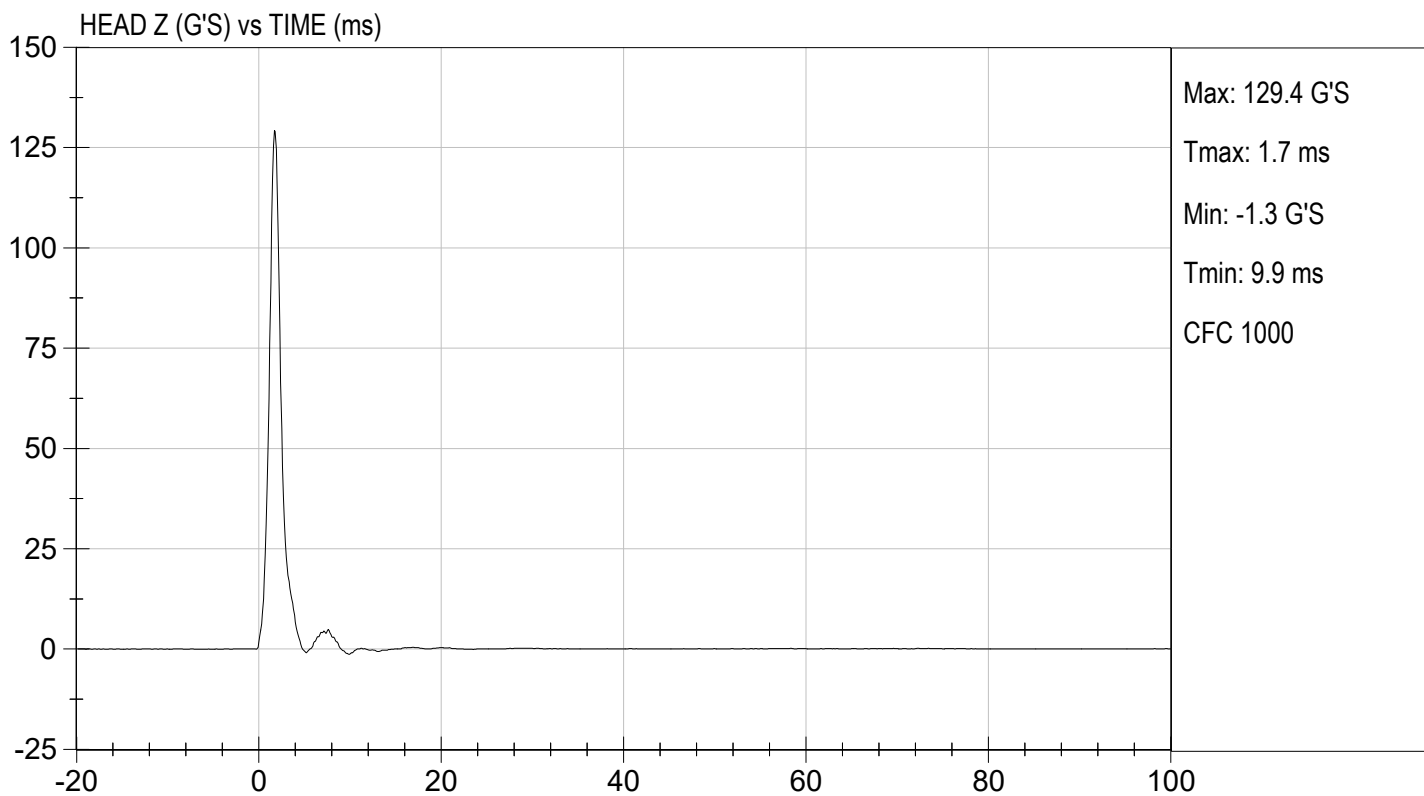
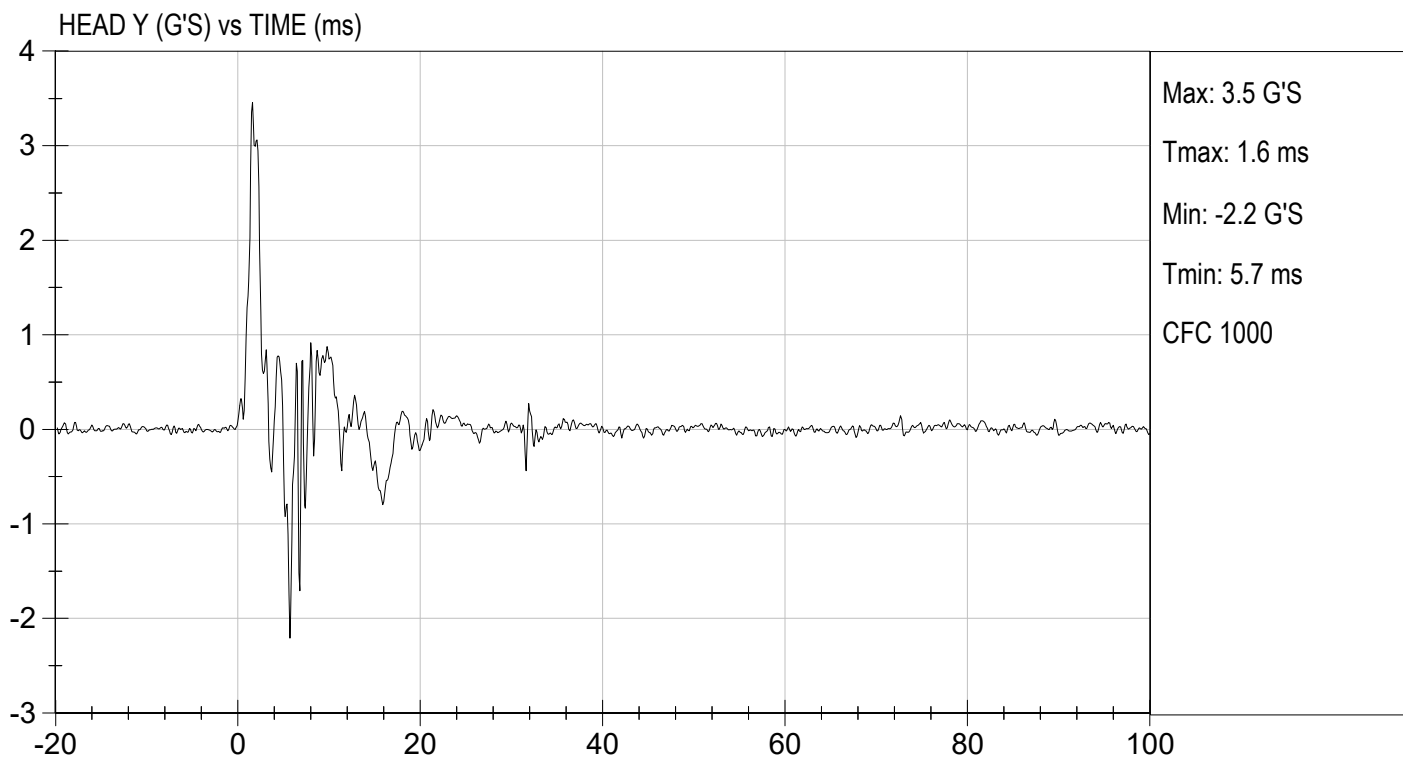
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	45	Pass
Peak Resultant Acceleration	G's	225 to 275	253	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	3.5	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
Overall Test Results			Pass	


Laboratory Technician

08/10/2023
Test Date


Approved By





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

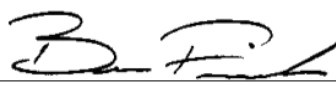
ATD Serial No: 351

Test I.D: D232162

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity		%	10 to 70	44	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.96	Pass
Pendulum Deceleration	10 ms	G's	22.50 to 27.50	23.75	Pass
	20 ms	G's	17.60 to 22.60	20.99	Pass
	30 ms	G's	12.50 to 18.50	17.34	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 29.0	17.2	Pass
Deceleration Decay Time to Cross 5 G's		ms	34.0 to 42.0	37.6	Pass
Maximum "D" Plane Rotation	Maximum	Deg	64.0 to 78.0	70.4	Pass
	Time	ms	57.0 to 64.0	58.4	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	113.0 to 128.0	114.3	Pass
Moment About Occipital Condyle	Maximum	Nm	88.1 to 108.5	96.6	Pass
	Time	ms	47.0 to 58.0	49.7	Pass
Positive Moment Decay Time To Zero Crossing		ms	97.0 to 107.0	98.0	Pass
Overall Test Results					Pass


 Laboratory Technician

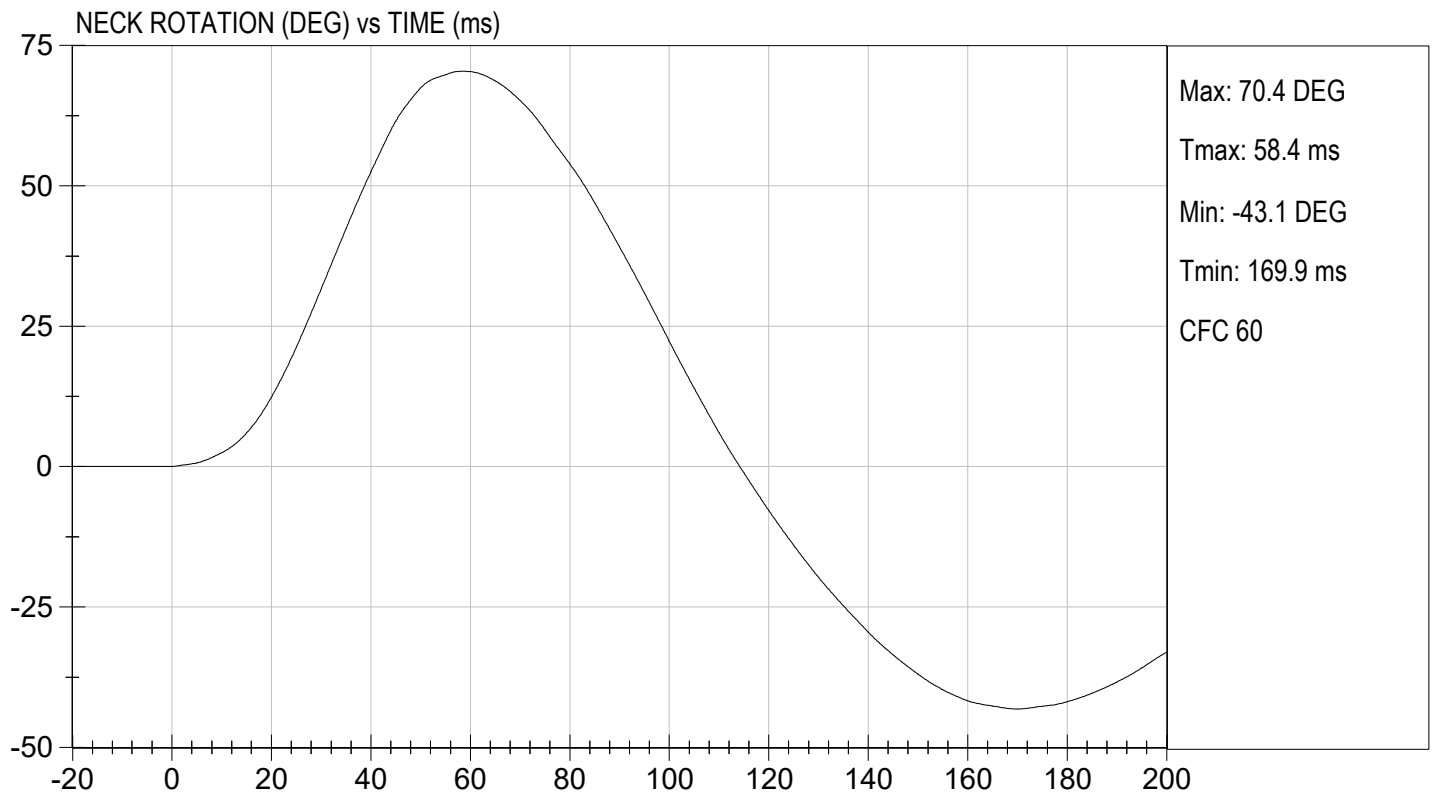
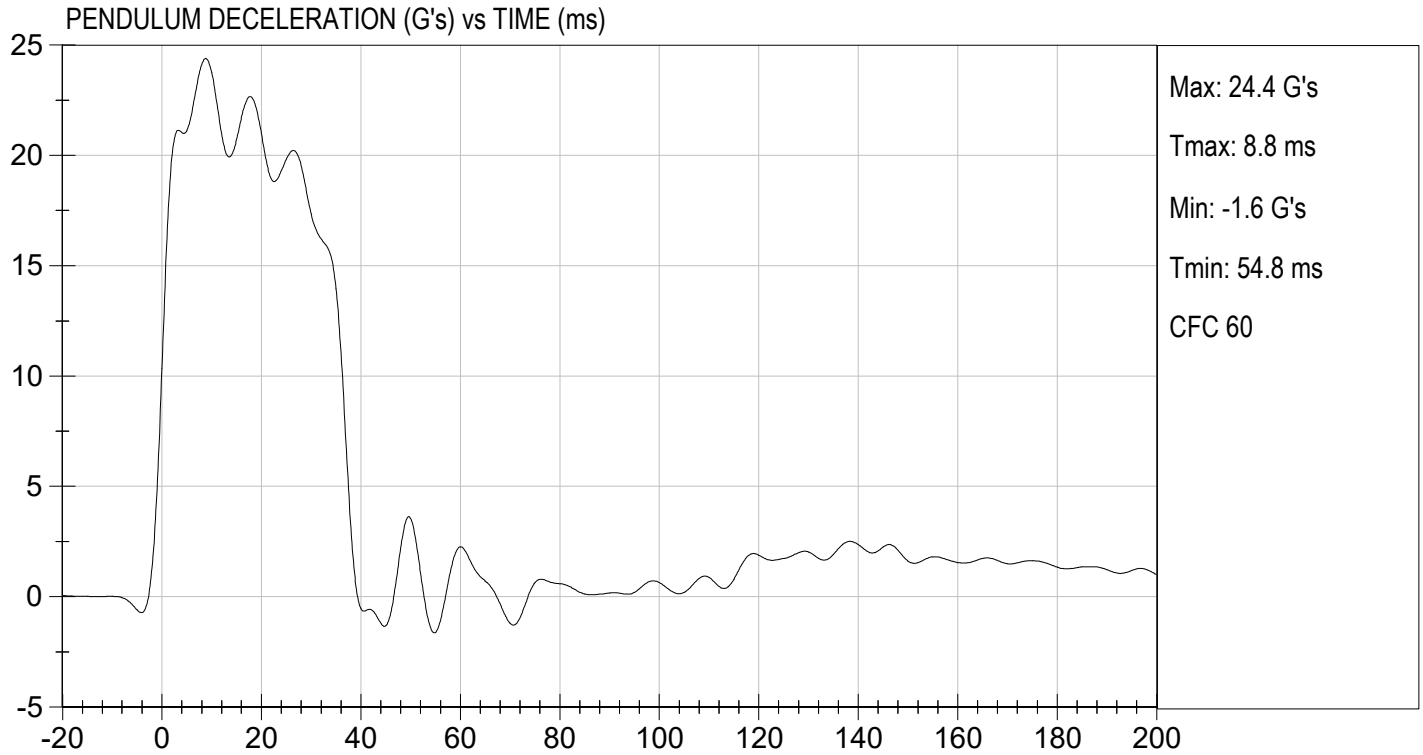
08/10/2023
 Test Date


 Approved By



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

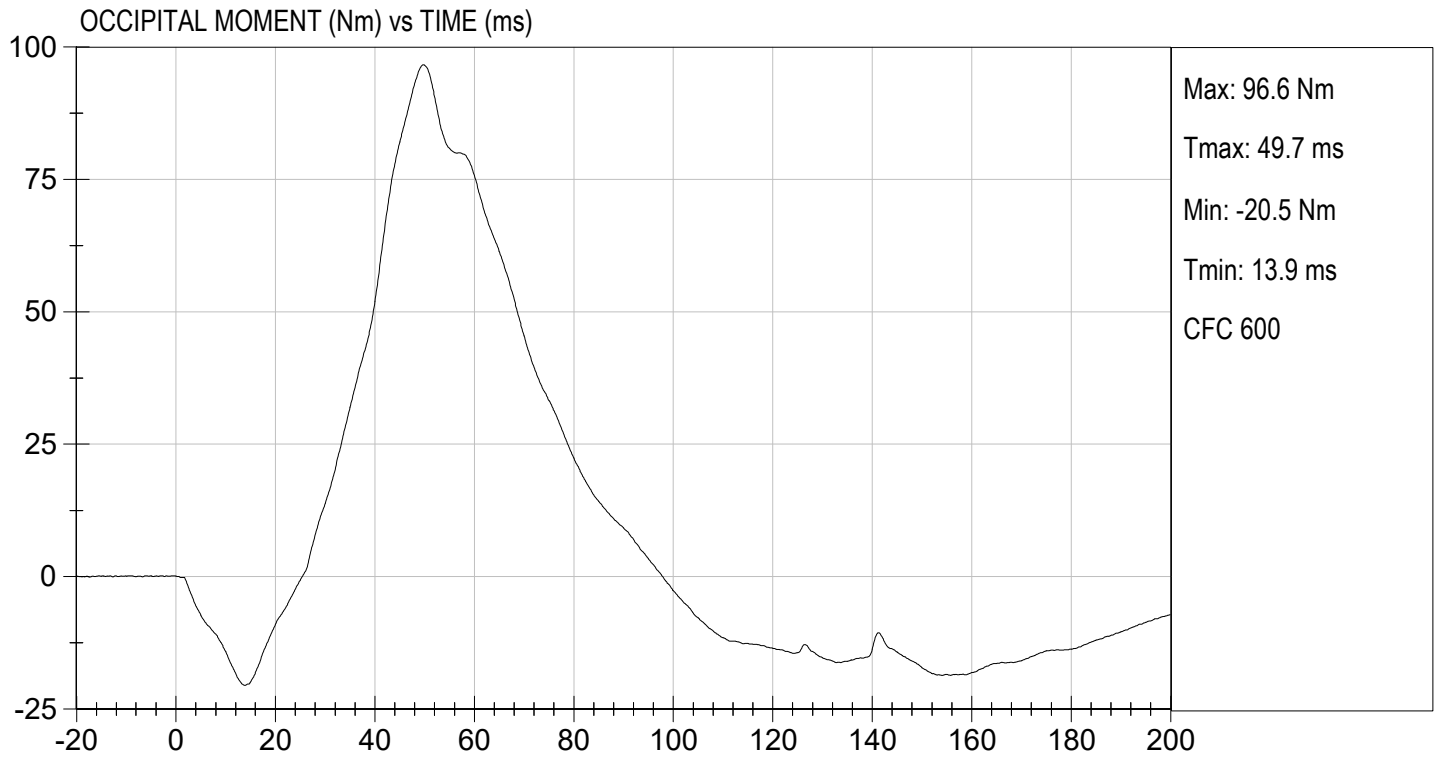
TEST DATE: 08/10/2023
TEST #: D232162





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

TEST DATE: 08/10/2023
TEST #: D232162



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

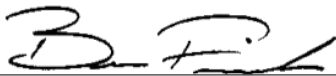
ATD Serial No: 351

Test I.D: D232163

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity		%	10 to 70	43	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.05	Pass
Pendulum Deceleration	10 ms	G's	17.20 to 21.20	18.51	Pass
	20 ms	G's	14.00 to 19.00	16.25	Pass
	30 ms	G's	11.00 to 16.00	12.04	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 22.0	12.4	Pass
Deceleration Decay Time to Cross 5 G's		ms	38.0 to 46.0	43.6	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	95.5	Pass
	Time	ms	72.0 to 82.0	78.6	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	147.0 to 174.0	158.9	Pass
Moment About Occipital Condyle	Maximum	Nm	-52.9 to -79.9	-57.4	Pass
	Time	ms	65.0 to 79.0	71.3	Pass
Negative Moment Decay Time To Zero Crossing		ms	120.0 to 148.0	142.6	Pass
Overall Test Results					Pass


 Laboratory Technician

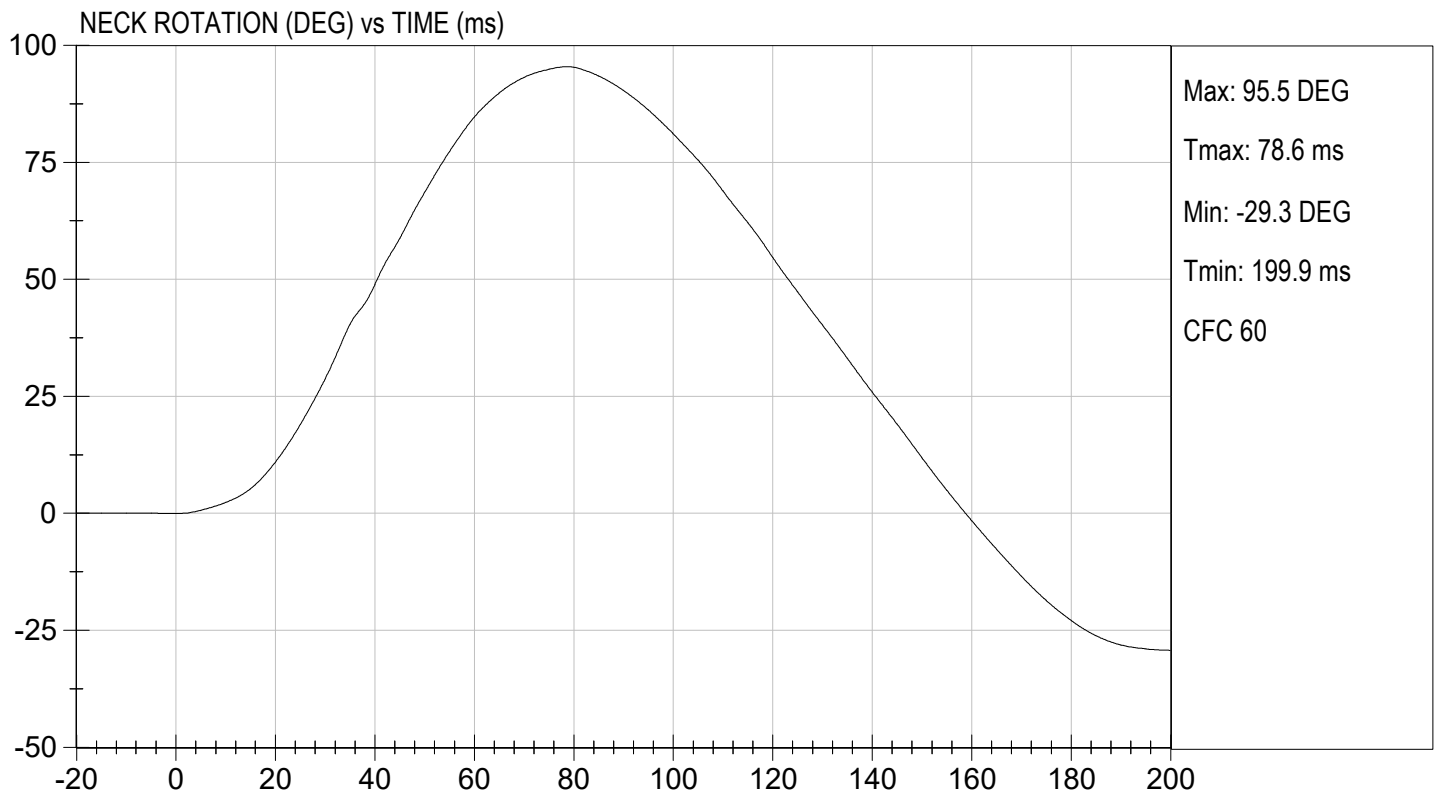
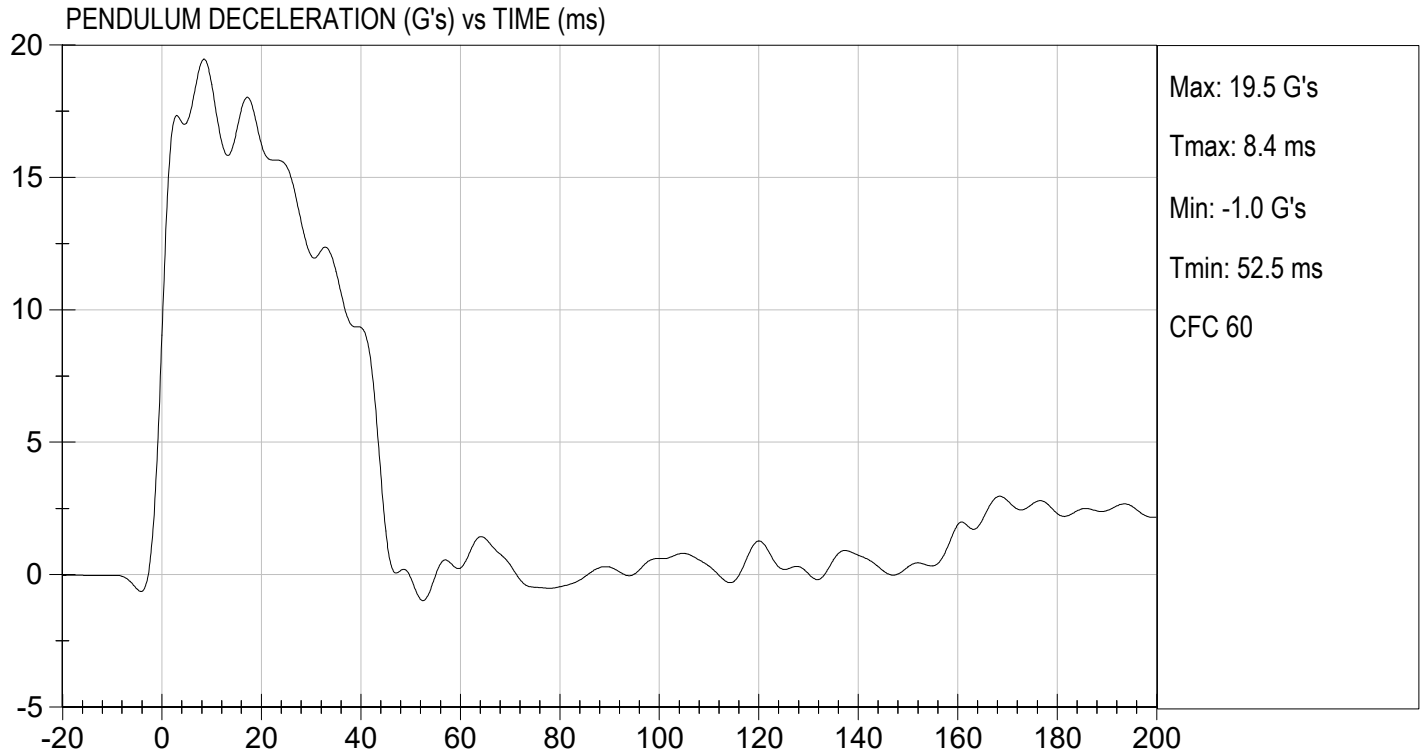
08/10/2023
 Test Date


 Approved By



TEST DESC: NECK EXTENSION
VELOCITY: 19.84 ft/s, 6.05 m/s

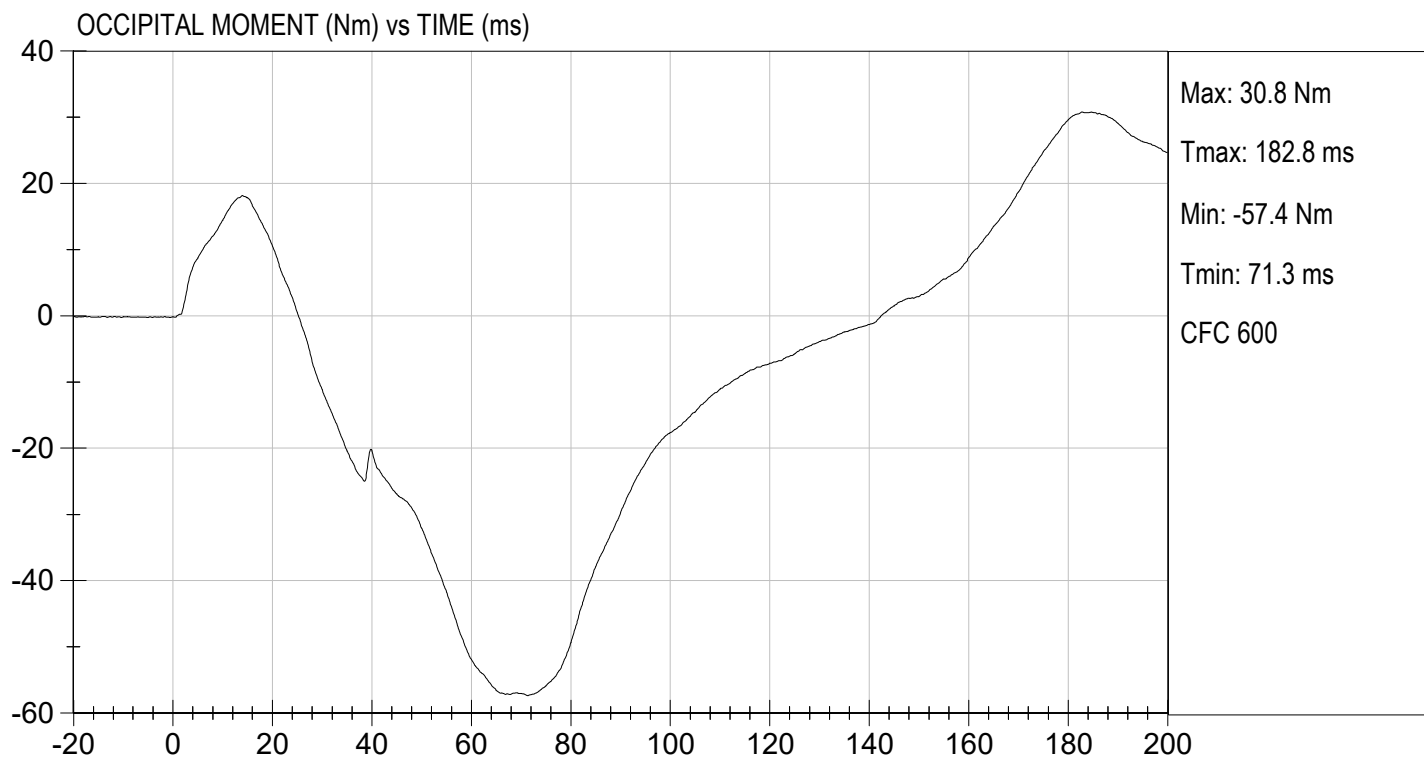
TEST DATE: 08/10/2023
TEST #: D232163





TEST DESC: NECK EXTENSION
VELOCITY: 19.84 ft/s, 6.05 m/s

TEST DATE: 08/10/2023
TEST #: D232163



MGA RESEARCH CORPORATION
THORAX IMPACT
HYBRID III 50TH PERCENTILE MALE

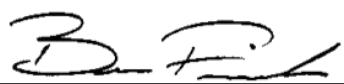
ATD Serial No: 351

Test I.D: D232164

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	20.8	Pass
Laboratory Relative Humidity	%	10 to 70	38	Pass
Probe Velocity	m/s	6.58 to 6.82	6.77	Pass
Peak Probe Force	N	5159 to 5893	5,780	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.77	Pass
Internal Hysteresis	%	69 to 85	72	Pass
Overall Test Results				Pass


Laboratory Technician

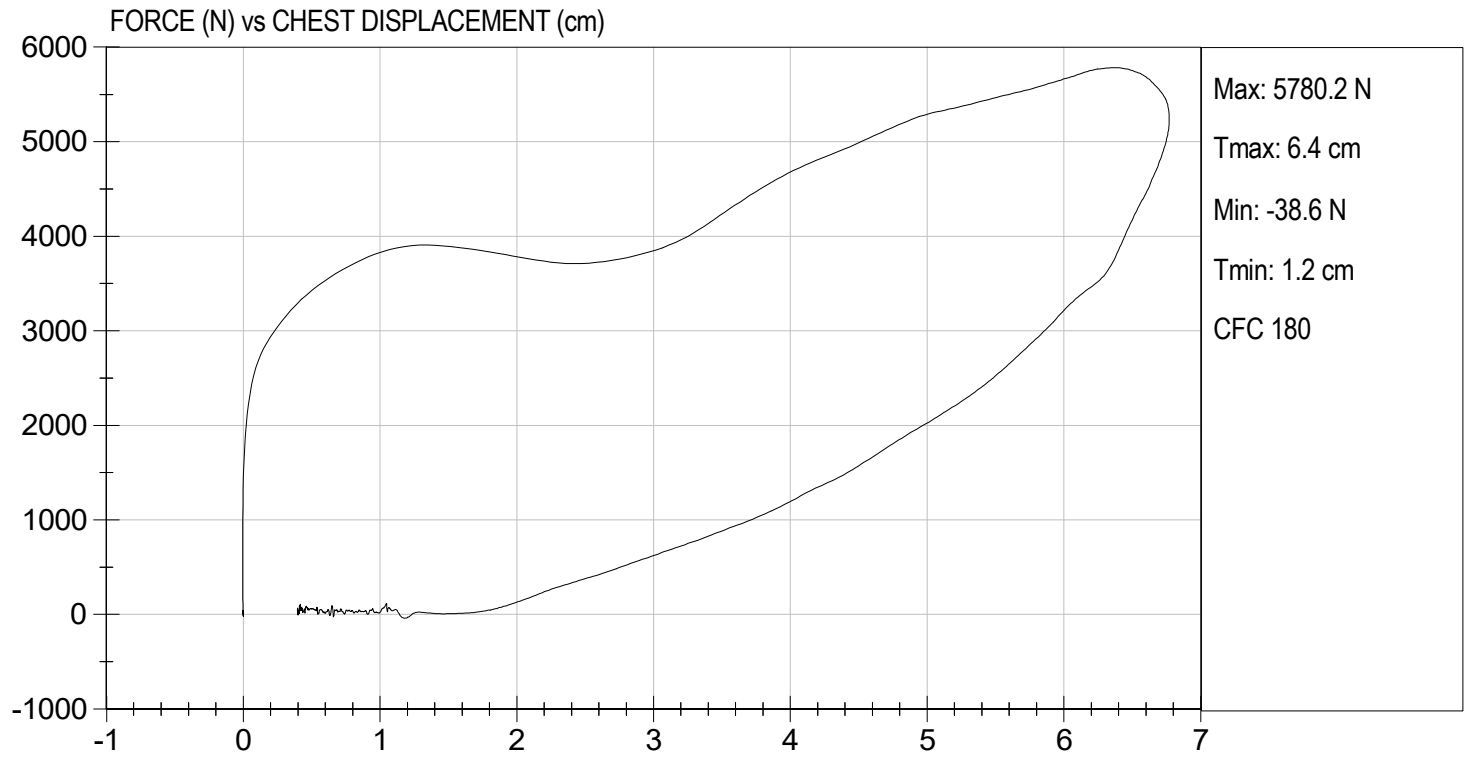
08/10/2023
Test Date


Approved By



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

TEST DATE: 08/10/2023
TEST #: D232164



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

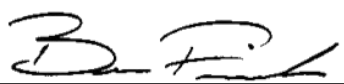
ATD Serial No: 351

Test I.D: D232165

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	42	Pass
Probe Velocity	m/s	2.07 to 2.13	2.11	Pass
Peak Probe Force	N	4715 to 5782	5,156	Pass
Overall Test Results			Pass	


Laboratory Technician

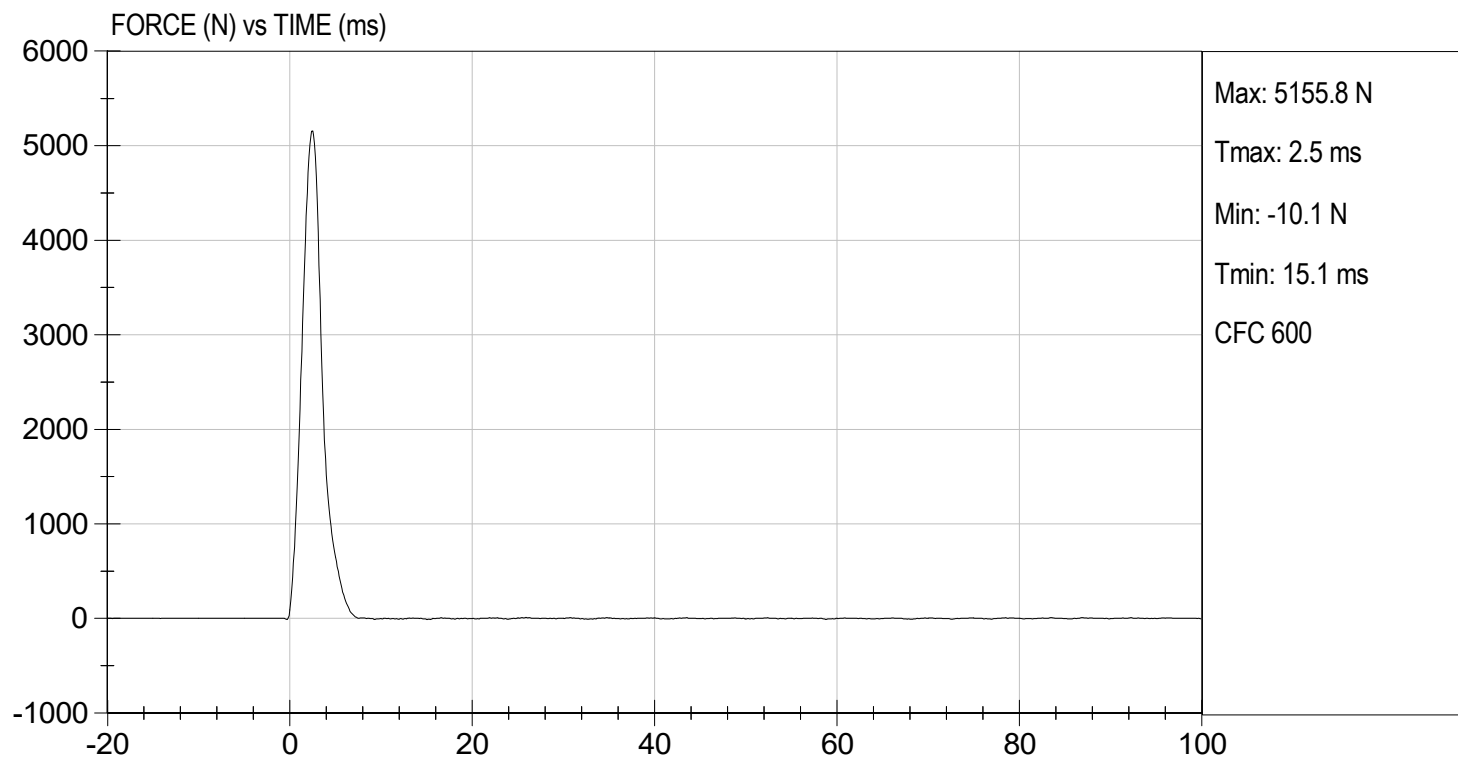
08/10/2023
Test Date


Approved By



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

TEST DATE: 08/10/2023
TEST #: D232165



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

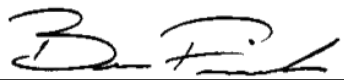
ATD Serial No: 351

Test I.D: D232166

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	42	Pass
Probe Velocity	m/s	2.07 to 2.13	2.12	Pass
Peak Probe Force	N	4715 to 5782	5,368	Pass
Overall Test Results				Pass


Laboratory Technician

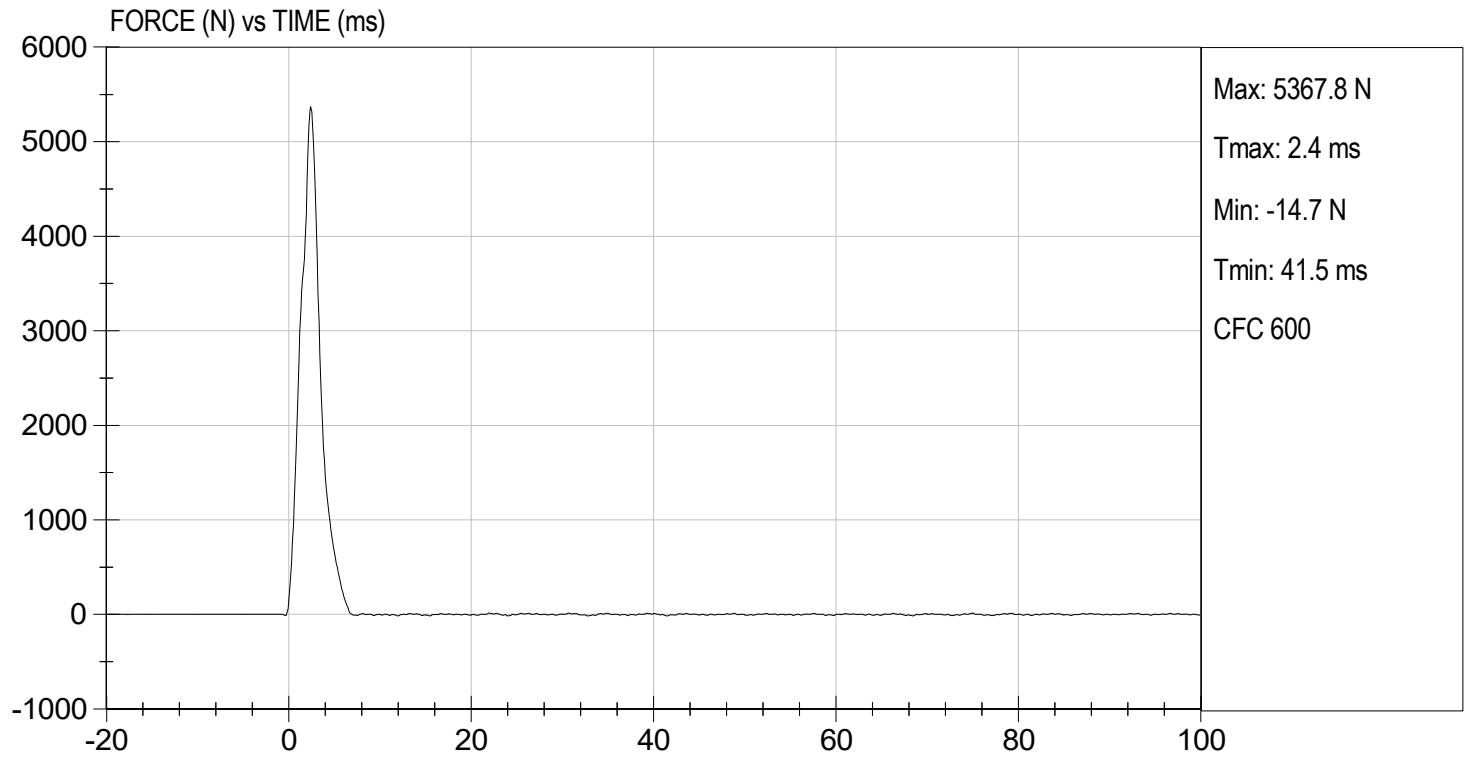
08/10/2023
Test Date


Approved By



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

TEST DATE: 08/10/2023
TEST #: D232166



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

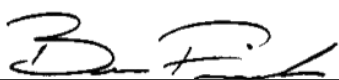
ATD Serial No: 351

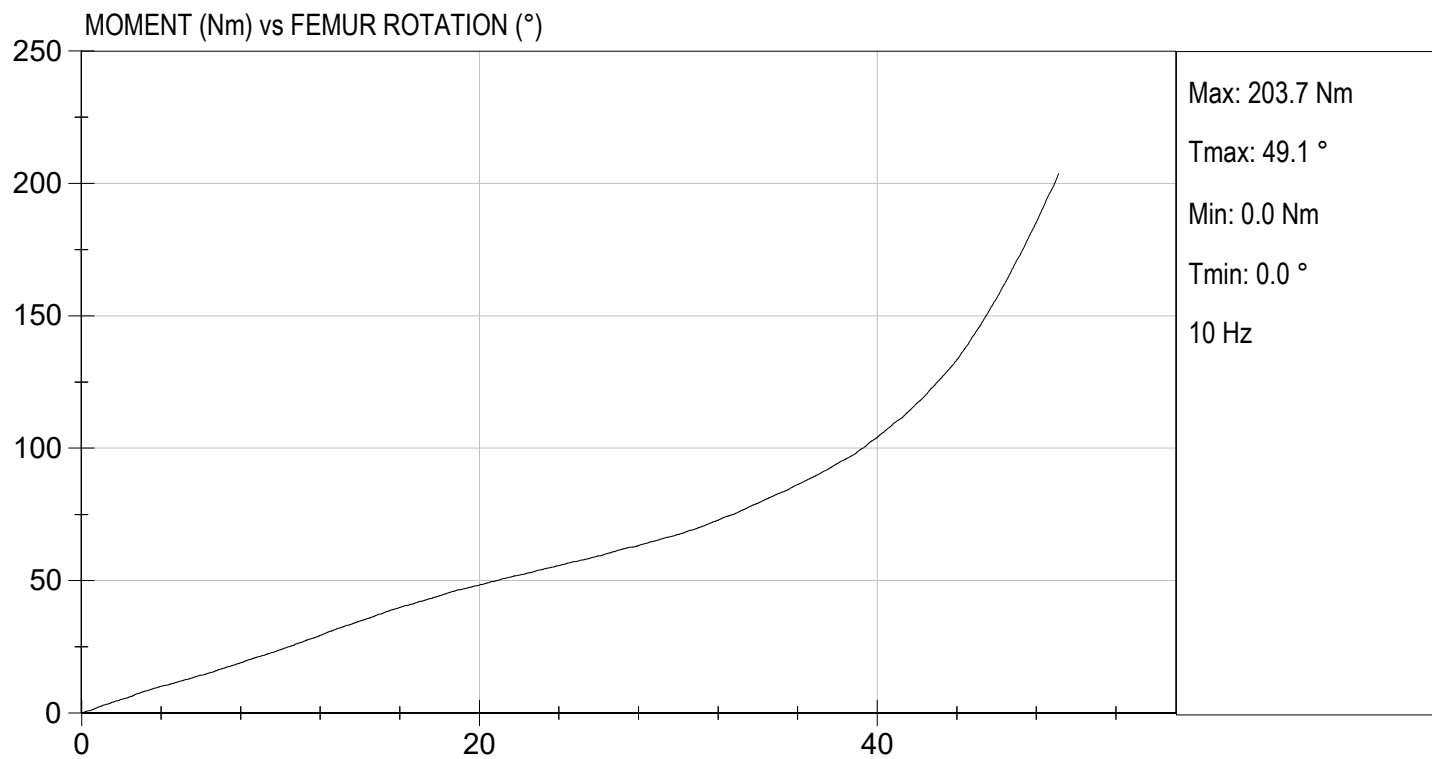
Test I.D: D232160

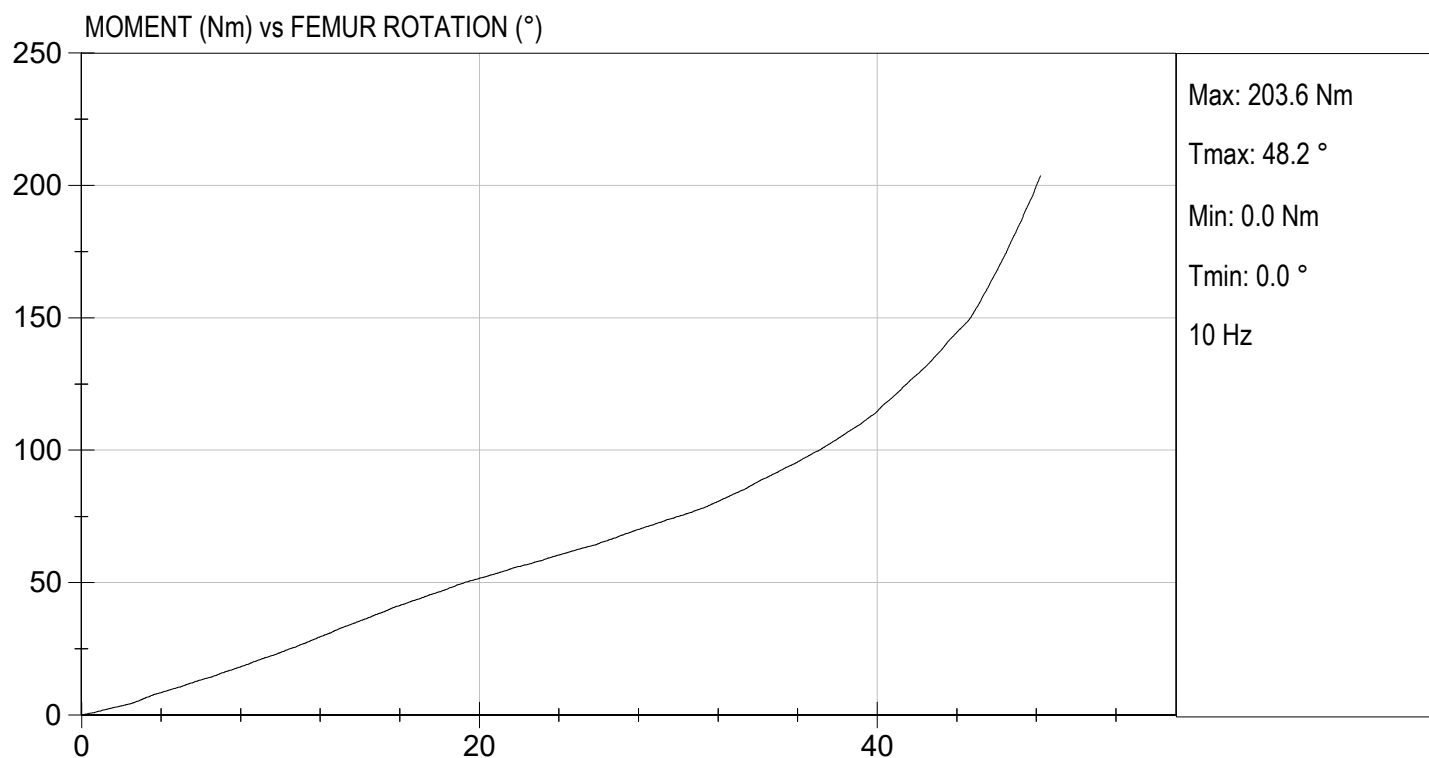
Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	21.3	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	43	43	Pass
Rotation Rate	deg/s	5.0 to 10.0	6.5	6.5	Pass
30 Degrees	Nm	94.9 Nm Max	67.5	75.0	Pass
150 ft-lbf / 203.4 Nm	Deg	40.0 to 50.0 Degree Max Rotation	49.1	48.2	Pass
Overall Test Results					Pass


 Laboratory Technician

08/10/2023
 Test Date


 Approved By





QUALIFICATION TEST RESULTS

PRE-TEST

HYBRID III 5TH PERCENTILE FEMALE - PASSENGER ATD

Hybrid III, 5th External Measurements
SN: 142

HYBRID III, PART 572, SUBPART O EXTERNAL DIMENSIONS				
DIMENSION	DESCRIPTION	DETAILS	ASSEMBLY DIMENSION (mm)	ACTUAL MEASUREMENT
A	TOTAL SITTING HEIGHT	Seat surface to highest point on top of the head.	774.7-800.1	775.0
B	SHOULDER PIVOT HEIGHT	Centerline of shoulder pivot bolt to the seat surface.	431.8-457.2	438.2
C	H-POINT HEIGHT	Reference	81.3-86.3	81.8
D	H-POINT LOCATION FROM BACKLINE	Reference	144.8-149.8	148.3
E	SHOULDER PIVOT FROM BACKLINE	Center of the shoulder clevis to the rear vertical surface of the fixture.	68.6-83.8	83.0
F	THIGH CLEARANCE	Measured at the highest point on the upper femur segment.	119.4-134.6	124.4
G	BACK OF ELBOW TO WRIST PIVOT	back of the elbow flesh to the wrist pivot in line with the elbow and wrist pivots	243.9-259.1	245.2
H	HEAD BACK TO BACKLINE	Back of Skull cap skin to seat rear vertical surface (Reference)	43.2-48.2	43.4
I	SHOULDER TO- ELBOW LENGTH	Measure from the highest point on top of the shoulder clevis to the lowest part of the flesh on the elbow in line with the elbow pivot bolt.	276.8-297.2	281.1
J	ELBOW REST HEIGHT	Measure from the flesh below the elbow pivot bolt to the seat surface.	182.8-203.2	197.2
K	BUTTOCK TO KNEE LENGTH	The forward most part of the knee flesh to the rear vertical surface of the fixture.	520.7-546.1	537.2
L	POPLITEAL HEIGHT	Seat surface to the plane of the horizontal plane of the bottom of the feet.	355.6-376	358.8
M	KNEE PIVOT HEIGHT	Centerline of knee pivot bolt to the horizontal plane of the bottom of the feet.	393.7-419.1	403.1
N	BUTTOCK POPLITEAL LENGTH	The rearmost surface of the lower leg to the same point on the rear surface of the buttocks used for dim. "K".	414-439.4	435.2

HYBRID III, SUBPART O EXTERNAL DIMENSIONS, continued				
DIMENSION	DESCRIPTION	DETAILS	ASSEMBLY DIMENSION (mm)	ACTUAL MEASUREMENT
O	CHEST DEPTH WITHOUT JACKET	Measured 304.8 ± 5.1 mm above seat surface	175.3-190.5	181.2
P	FOOT LENGTH	Tip of toe to rear of heal	218.5-233.7	227.3
Q	STANDING HEIGHT	(THEORETICAL)	1501.1	N/A
R	BUTTOCK TO KNEE PIVOT LENGTH	The rear surface of the buttocks to the knee pivot bolt	457.2-482.6	475.0
S	HEAD BREADTH	The widest part of the head	137.1-147.3	138.6
T	HEAD DEPTH	Back of the head to the forehead	177.8-188	181.0
U	HIP BREADTH	The widest part of the hip	299.7-314.9	308.4
V	SHOULDER BREADTH	Outside edges of right and left shoulder clevises	350.5-365.7	362.1
W	FOOT BREADTH	The widest part of the foot	78.8-94	82.8
X	HEAD CIRCUMFERENCE	Measured at the point as in dim. "T"	528.3-548.7	545.2
Y	CHEST CIRCUMFERENCE (WITH CHEST JACKET)	Measured 345.4 ± 12.7 mm above seat surface	850.9-881.3	870.7
Z	WAIST CIRCUMFERENCE	Measured 165.1 ± 5.1 mm above seat surface	759.5-789.9	779.9
AA	REFERENCE LOCATION FOR MEASUREMENT OF CHEST CIRCUMFERENCE	Reference	332.7-358.1	350.1
BB	REFERENCE LOCATION FOR MEASUREMENT OF WAIST CIRCUMFERENCE	Reference	160.1-170.2	170.0

MGA RESEARCH CORPORATION
HEAD DROP TEST
HYBRID III 5TH PERCENTILE

ATD Serial No: 142

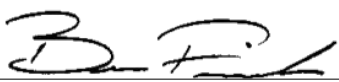
Test ID: D231931

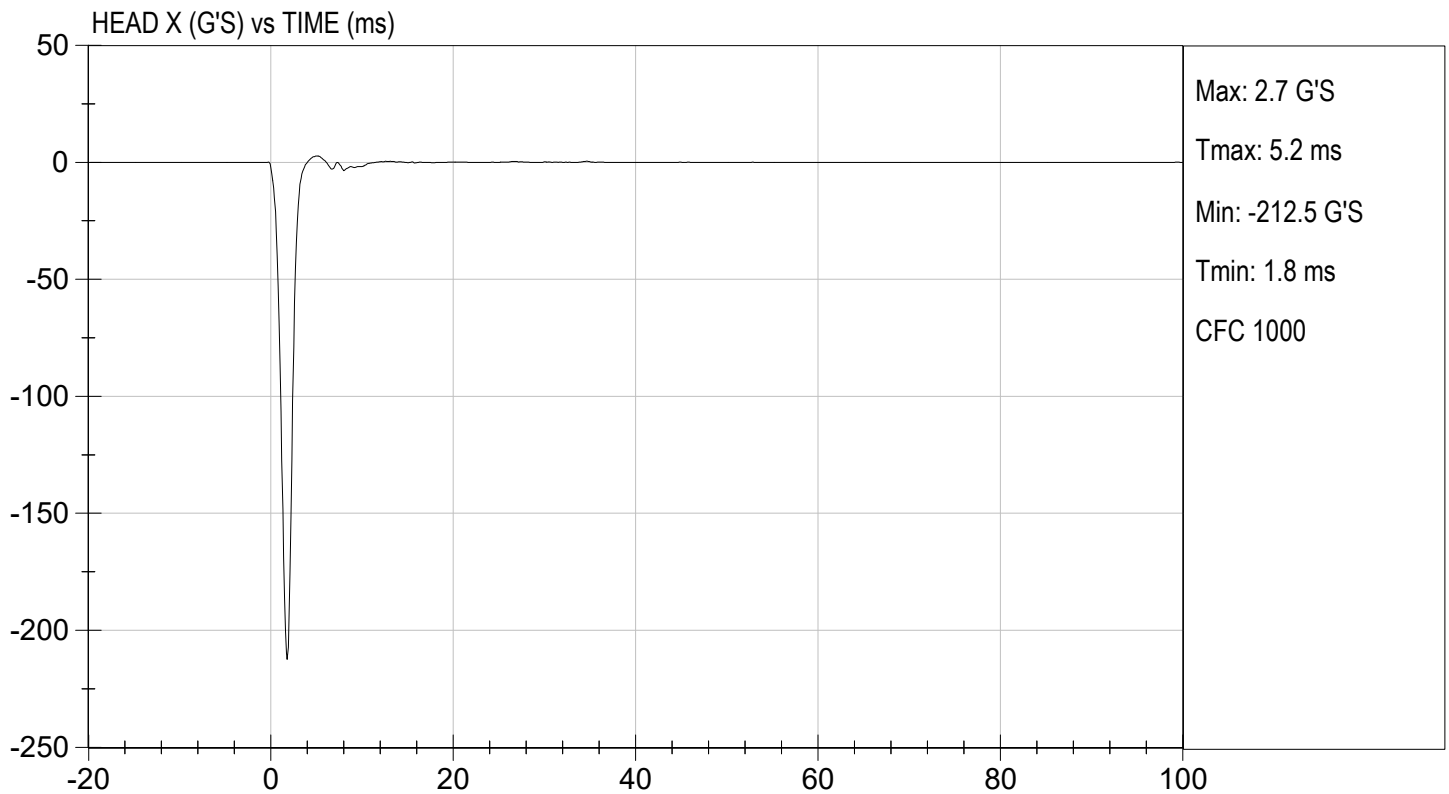
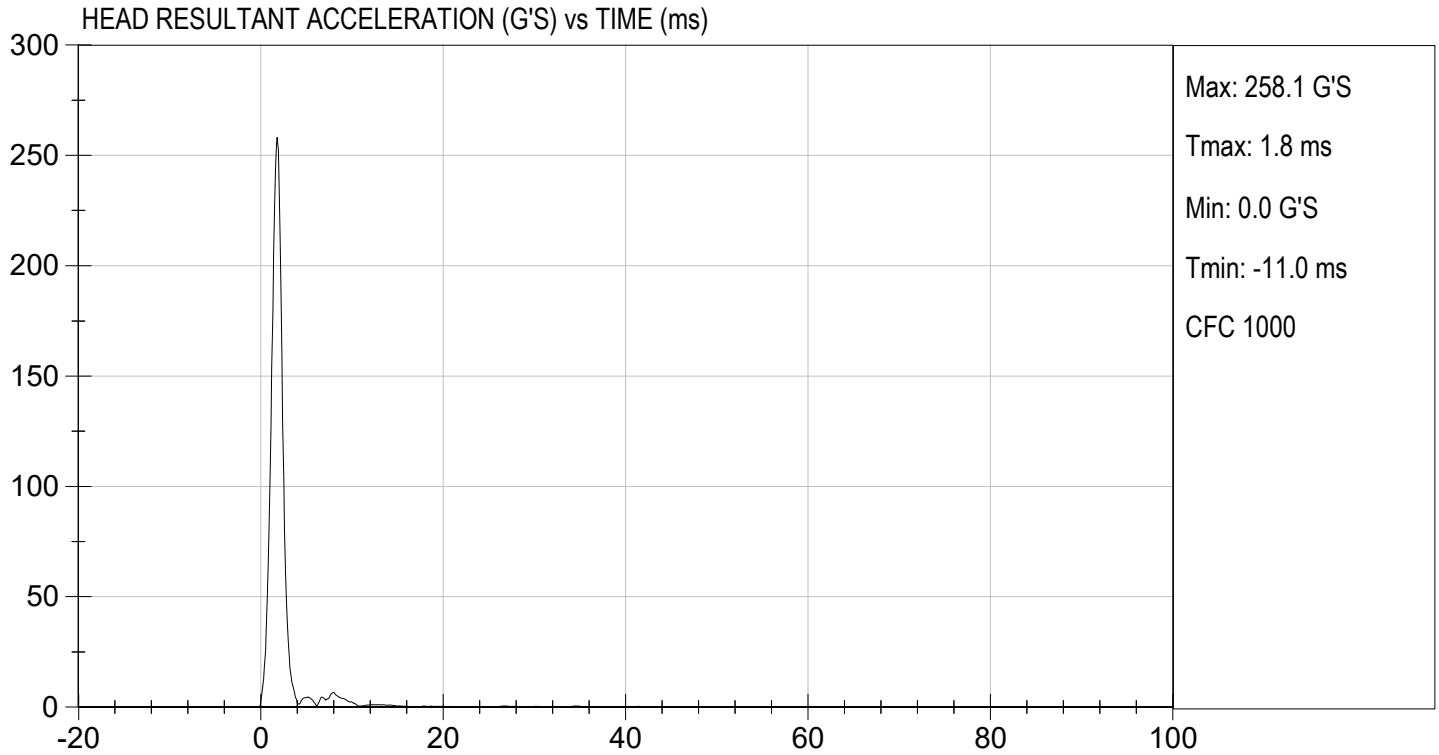
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	44	Pass
Peak Resultant Acceleration	G's	250 to 300	258	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	2.5	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
Overall Test Results			Pass	

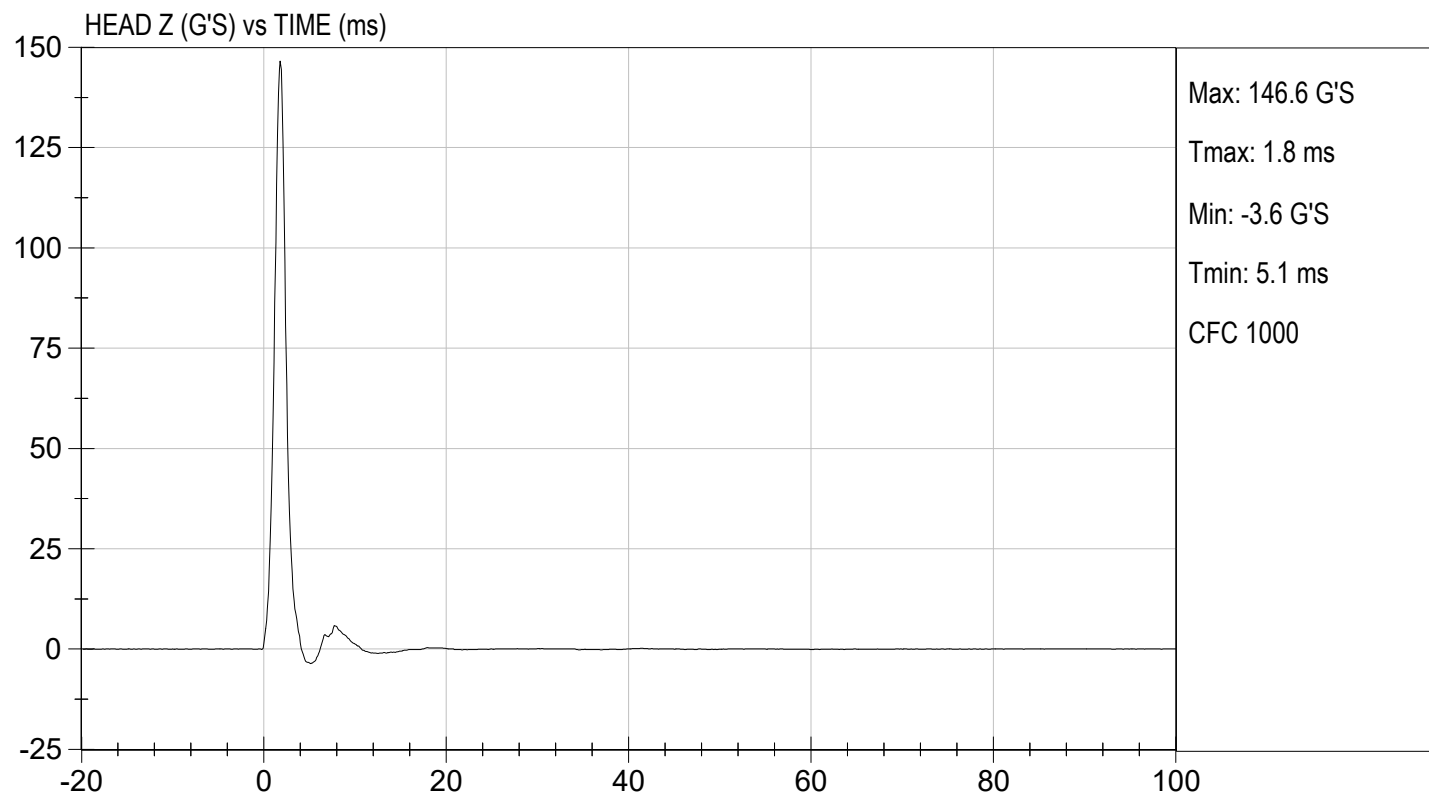
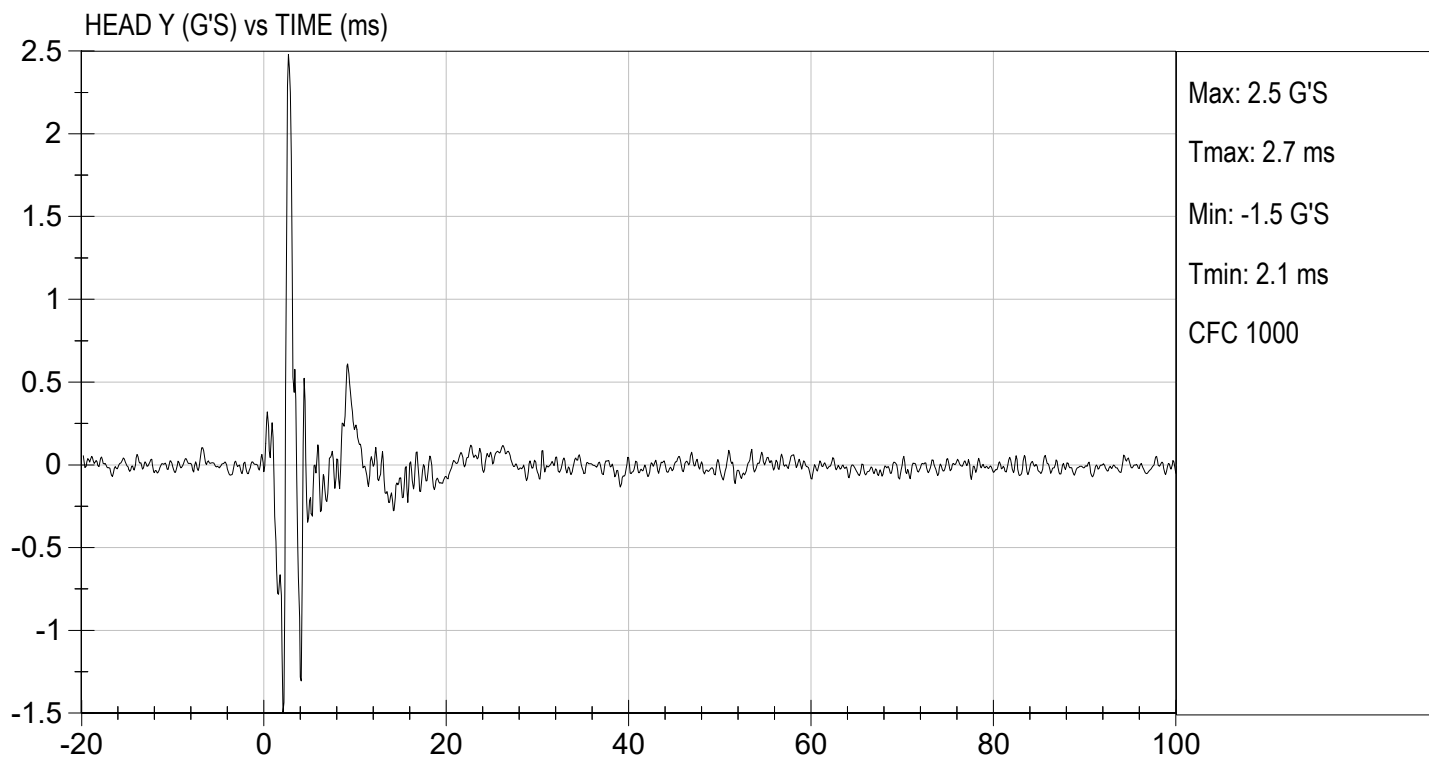

Laboratory Technician

07/27/2023

Test Date

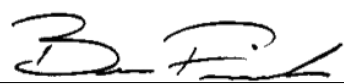

Approved By





MGA RESEARCH CORPORATION**NECK FLEXION TEST
HYBRID III 5TH PERCENTILE**ATD Serial No: 142Test I.D: D231932

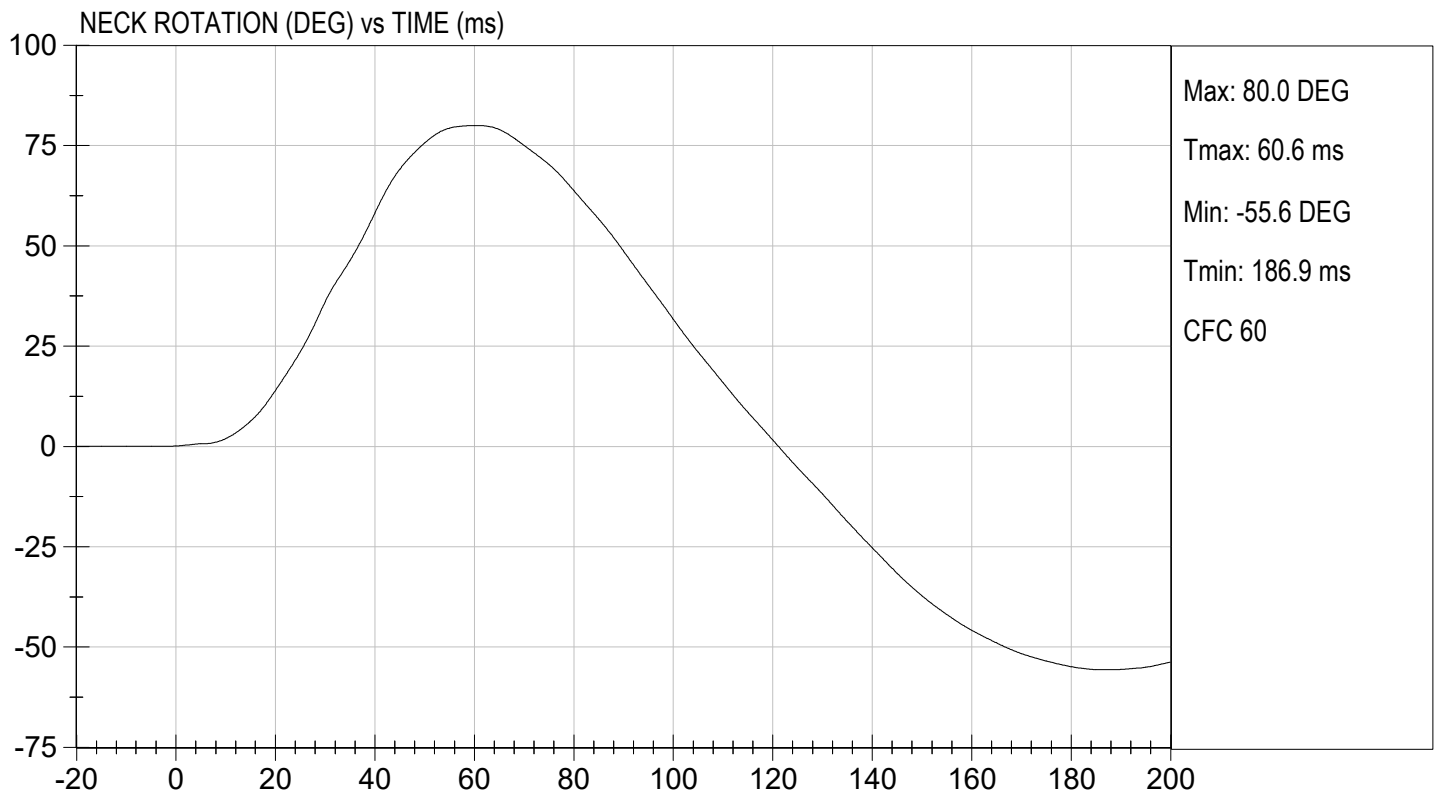
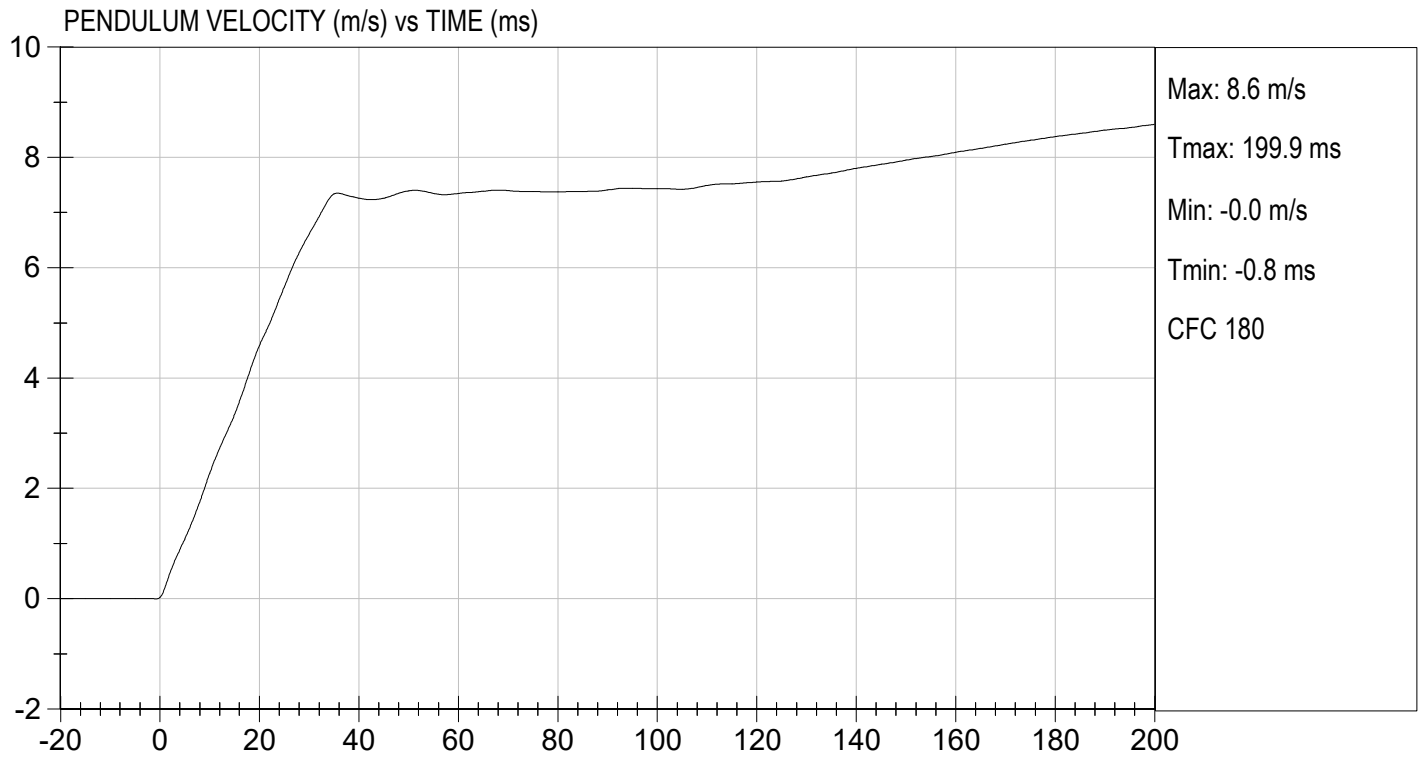
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity		%	10 to 70	44	Pass
Pendulum Speed		m/s	6.89 to 7.13	7.06	Pass
Pendulum Velocity	10 ms	m/s	2.1 to 2.5	2.3	Pass
	20 ms	m/s	4.0 to 5.0	4.6	Pass
	30 ms	m/s	5.8 to 7.0	6.6	Pass
D Plane Rotation	Max	deg	77 to 91	80	Pass
Occipital Condyle Moment within Rotation Corridor		Nm	69 to 83	70	Pass
Positive Moment Time Curve Decay to 10 Nm		ms	80 to 100	84	Pass
Overall Results				Pass	


Laboratory Technician07/27/2023
Test Date
Approved By



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

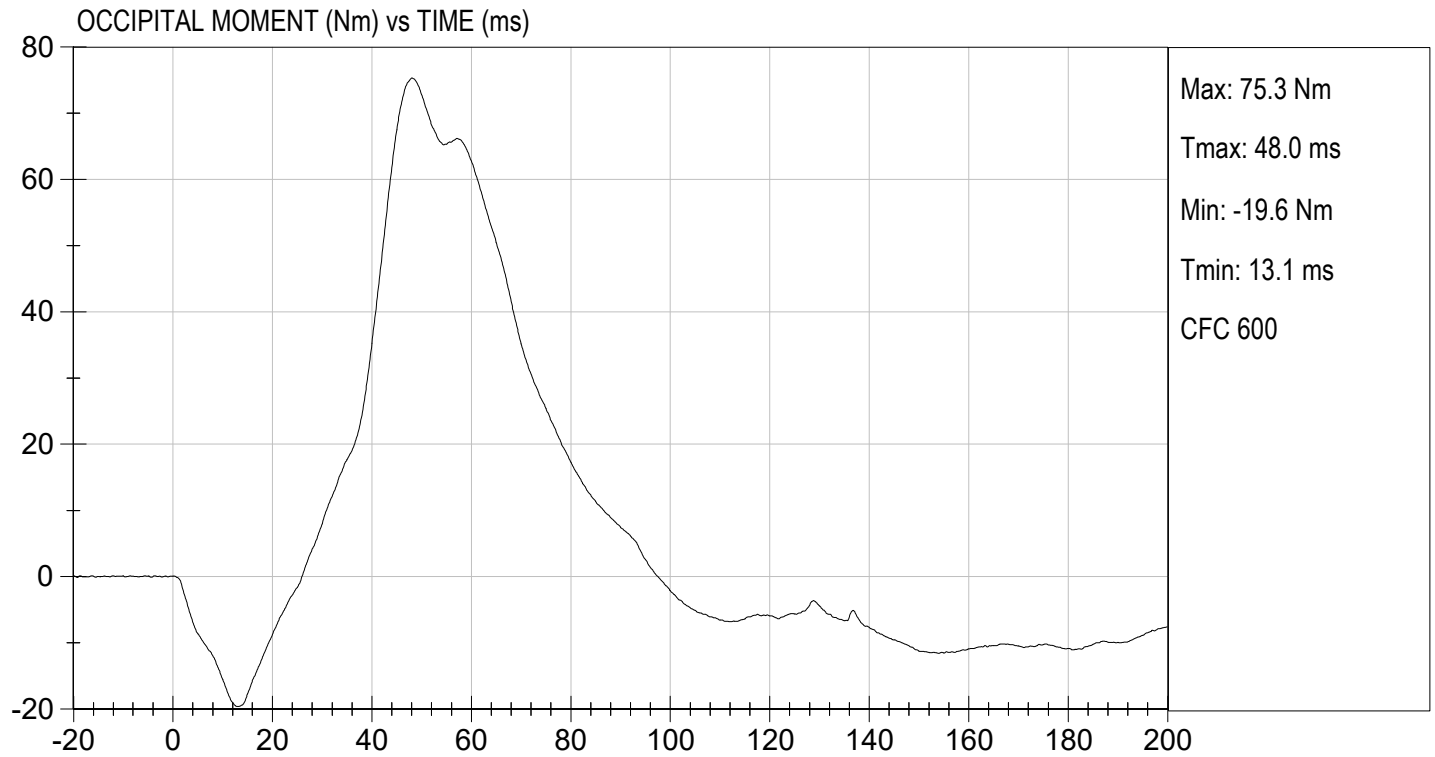
TEST DATE: 07/27/2023
TEST #: D231932





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

TEST DATE: 07/27/2023
TEST #: D231932



MGA RESEARCH CORPORATION
NECK EXTENSION TEST
HYBRID III 5TH PERCENTILE

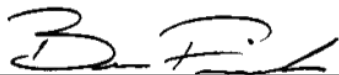
ATD Serial No: 142

Test I.D: D231933

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	39	Pass
Pendulum Speed		m/s	5.95 to 6.19	6.12	Pass
Pendulum Velocity	10 ms	m/s	1.5 to 1.9	1.7	Pass
	20 ms	m/s	3.1 to 3.9	3.6	Pass
	30 ms	m/s	4.6 to 5.6	5.3	Pass
D Plane Rotation	Max	deg	99 to 114	109	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	104	Pass
Overall Results					Pass


Laboratory Technician

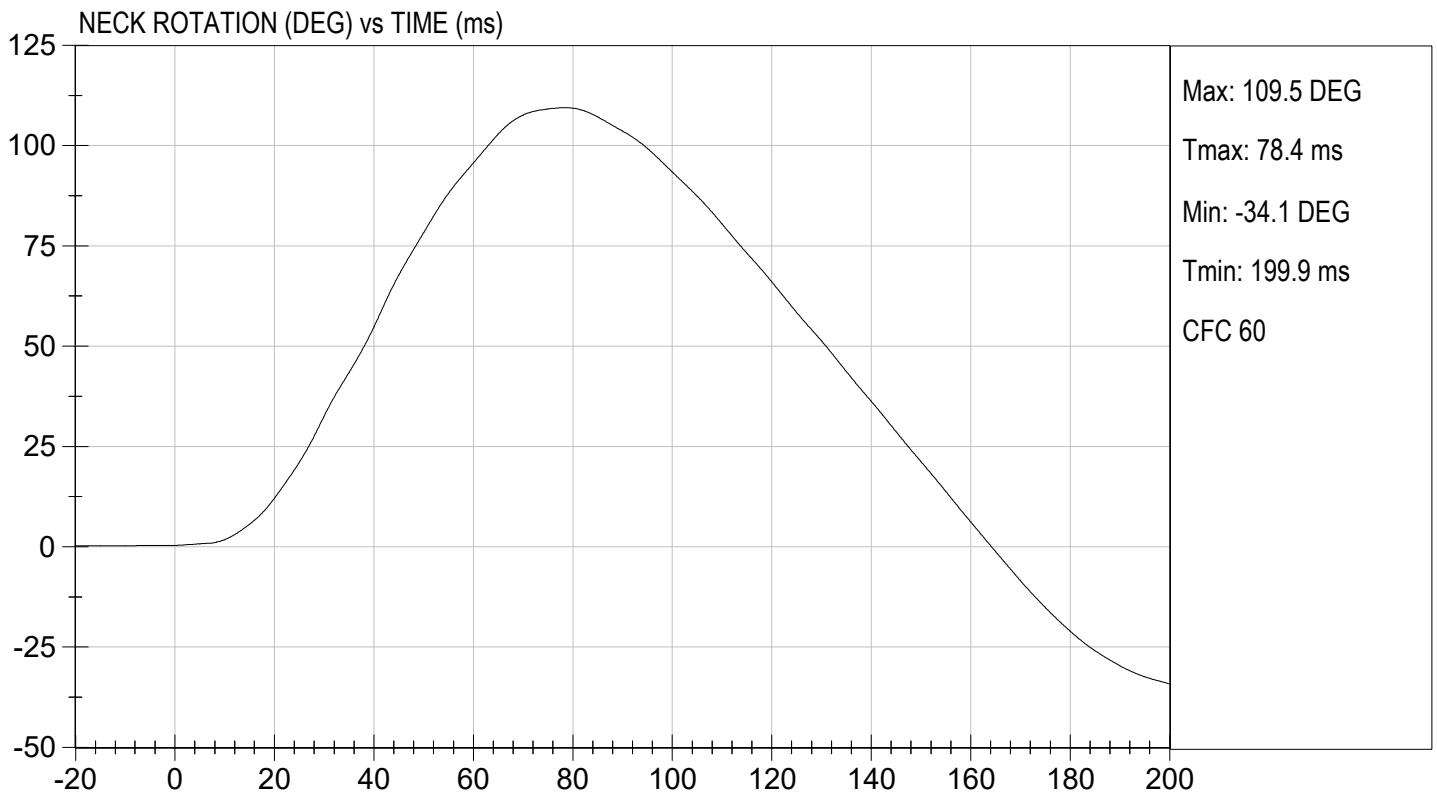
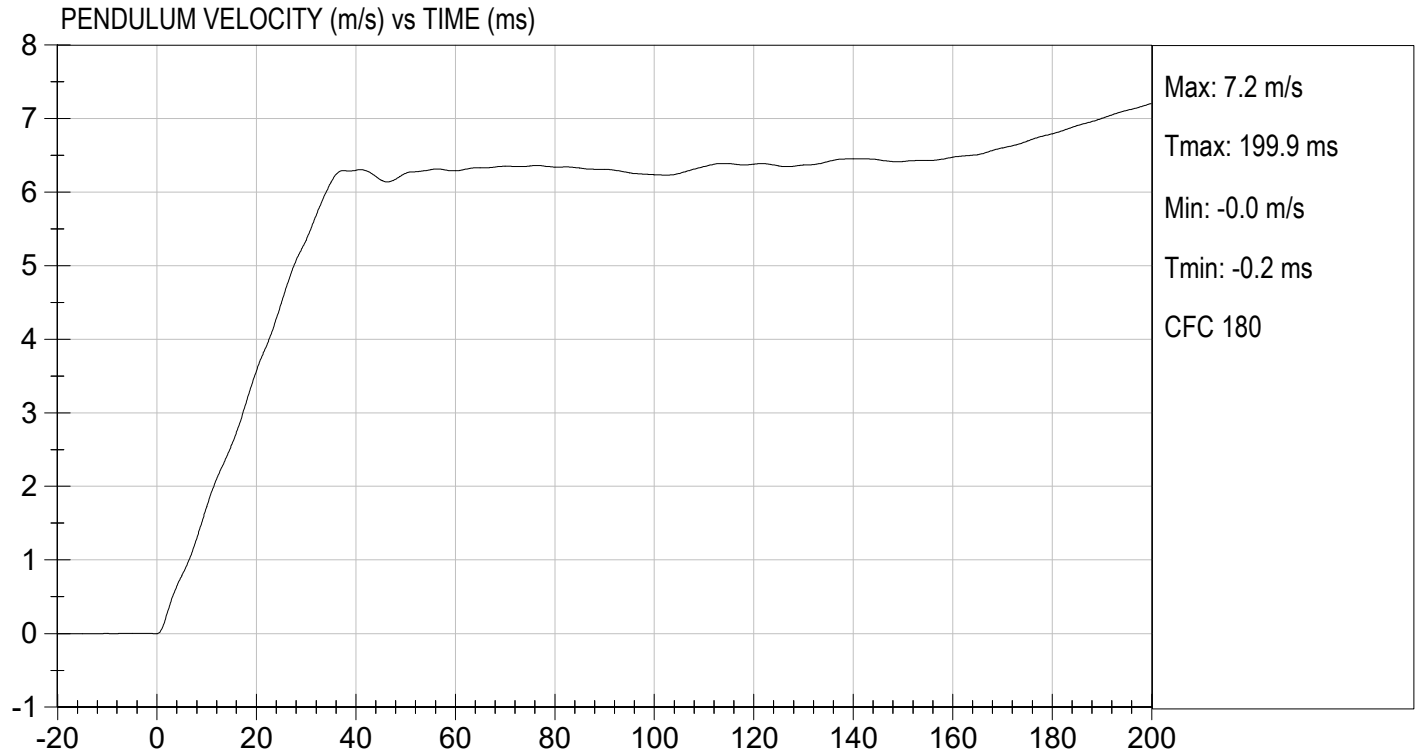
07/27/2023
Test Date


Approved By



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

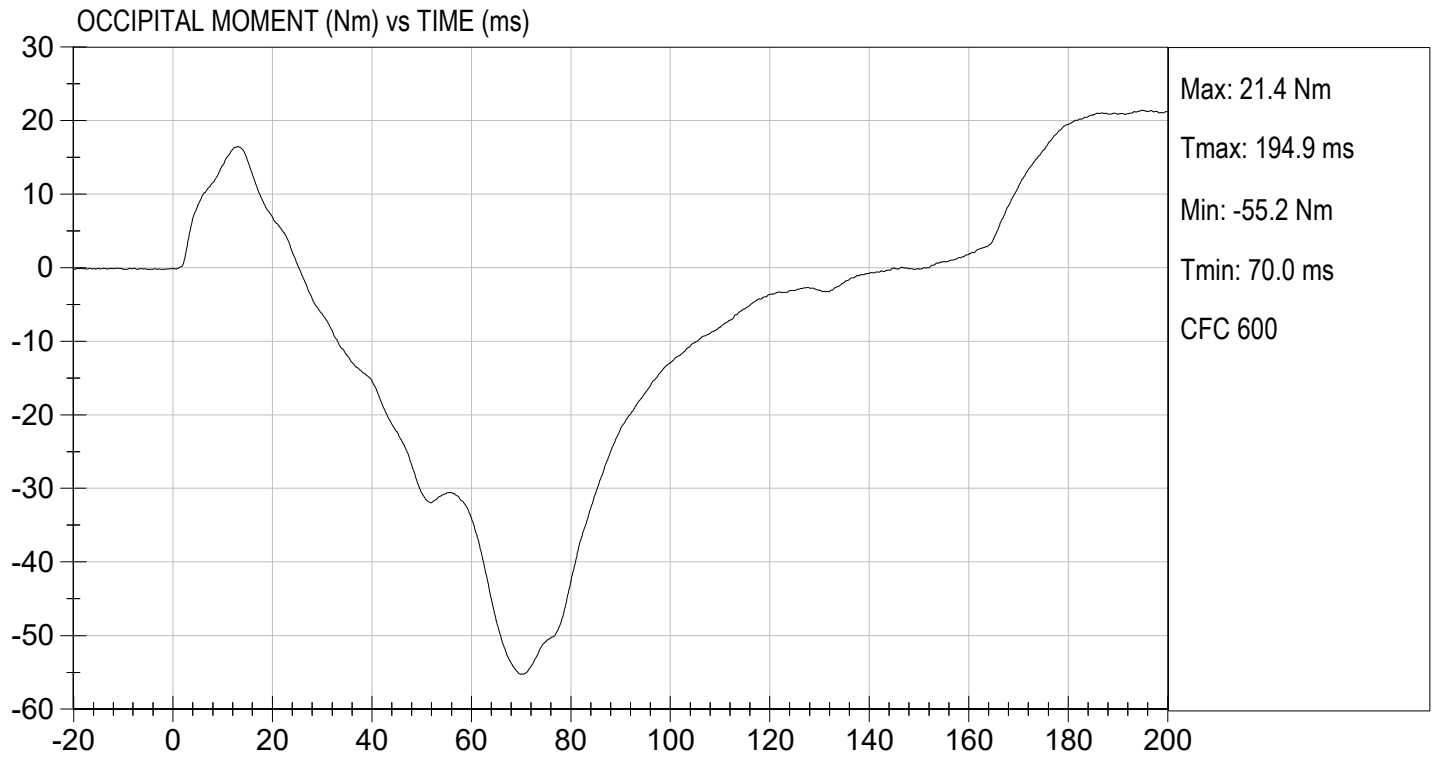
TEST DATE: 07/27/2023
TEST #: D231933





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

TEST DATE: 07/27/2023
TEST #: D231933



MGA RESEARCH CORPORATION
THORAX IMPACT
HYBRID III 5TH PERCENTILE

ATD Serial No: 142

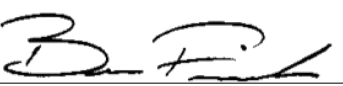
Test I.D: D231934

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Relative Humidity	%	10 to 70	44	Pass
Probe Speed	m/s	6.59 to 6.83	6.77	Pass
Peak Deflection	mm	50 to 58	52	Pass
Peak Resistive Force w/in Deflection Corridor	N	3900 to 4400	4303	Pass
Internal Hysteresis	%	69 to 85	74	Pass
Peak Force 18 mm - 50 mm	N	<= 4600	4303	Pass
			Overall Test Results	Pass


Laboratory Technician

07/27/2023

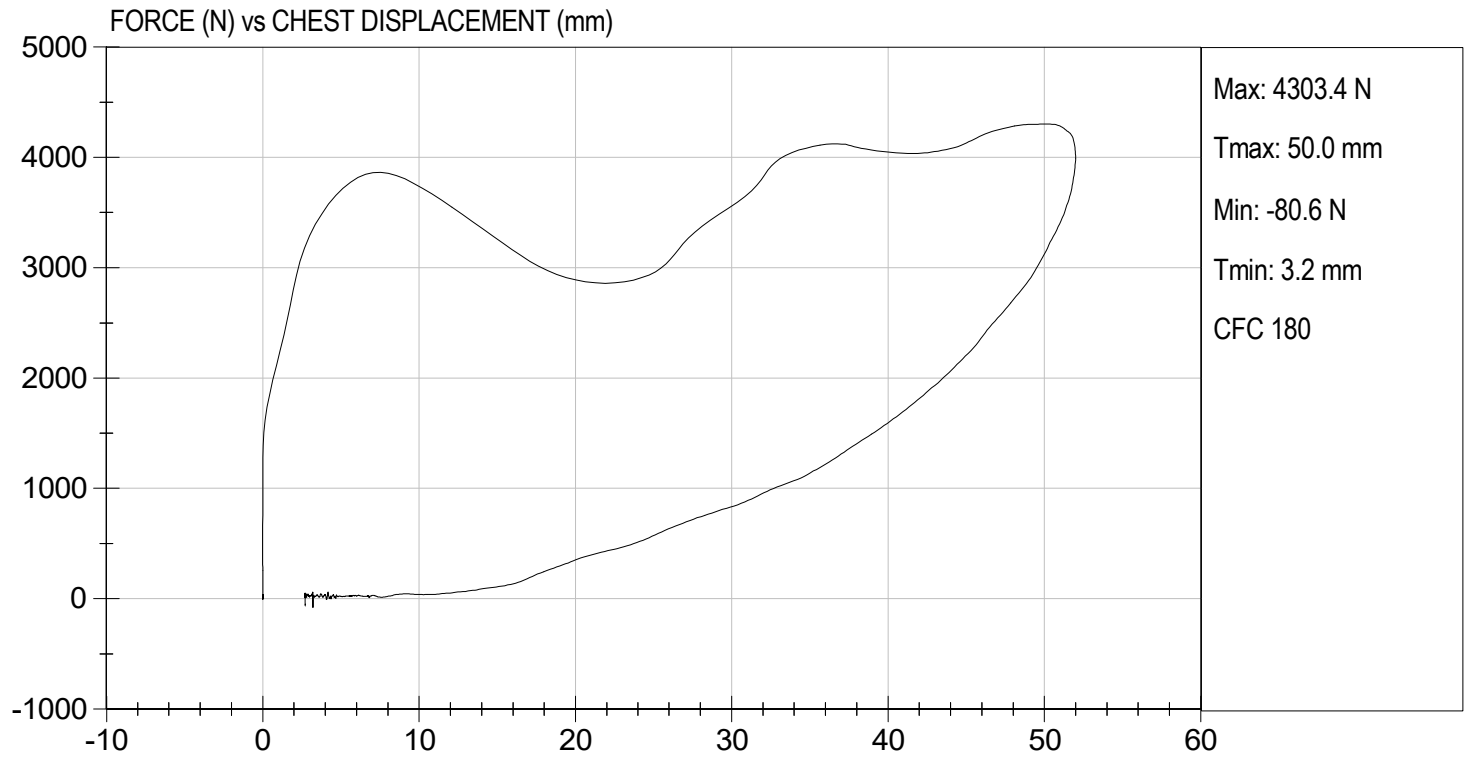
Test Date


Approved By



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

TEST DATE: 07/27/2023
TEST #: D231934



MGA RESEARCH CORPORATION

RIGHT KNEE IMPACT TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 142

Test I.D: D231935

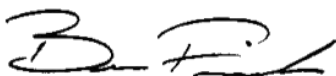
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	44	Pass
Probe Speed	m/s	2.07 to 2.13	2.12	Pass
Maximum Force	N	3450 to 4060	3963	Pass
Overall Test Results				Pass



Laboratory Technician

07/27/2023

Test Date

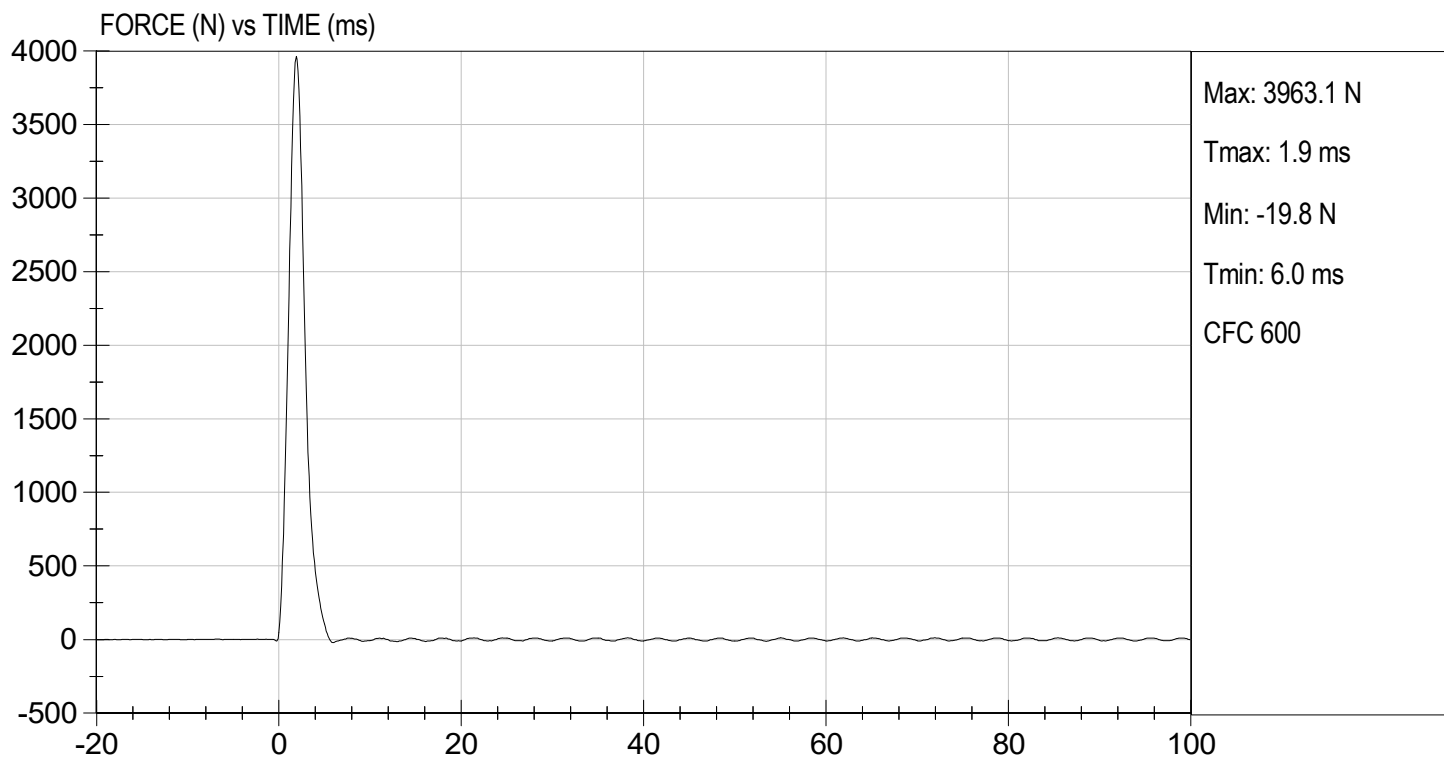


Approved By



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

TEST DATE: 07/27/2023
TEST #: D231935



MGA RESEARCH CORPORATION

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

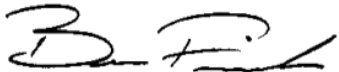
ATD Serial No: 142

Test I.D: D231936

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	43	Pass
Probe Speed	m/s	2.07 to 2.13	2.11	Pass
Maximum Force	N	3450 to 4060	3858	Pass
Overall Test Results				Pass


Laboratory Technician

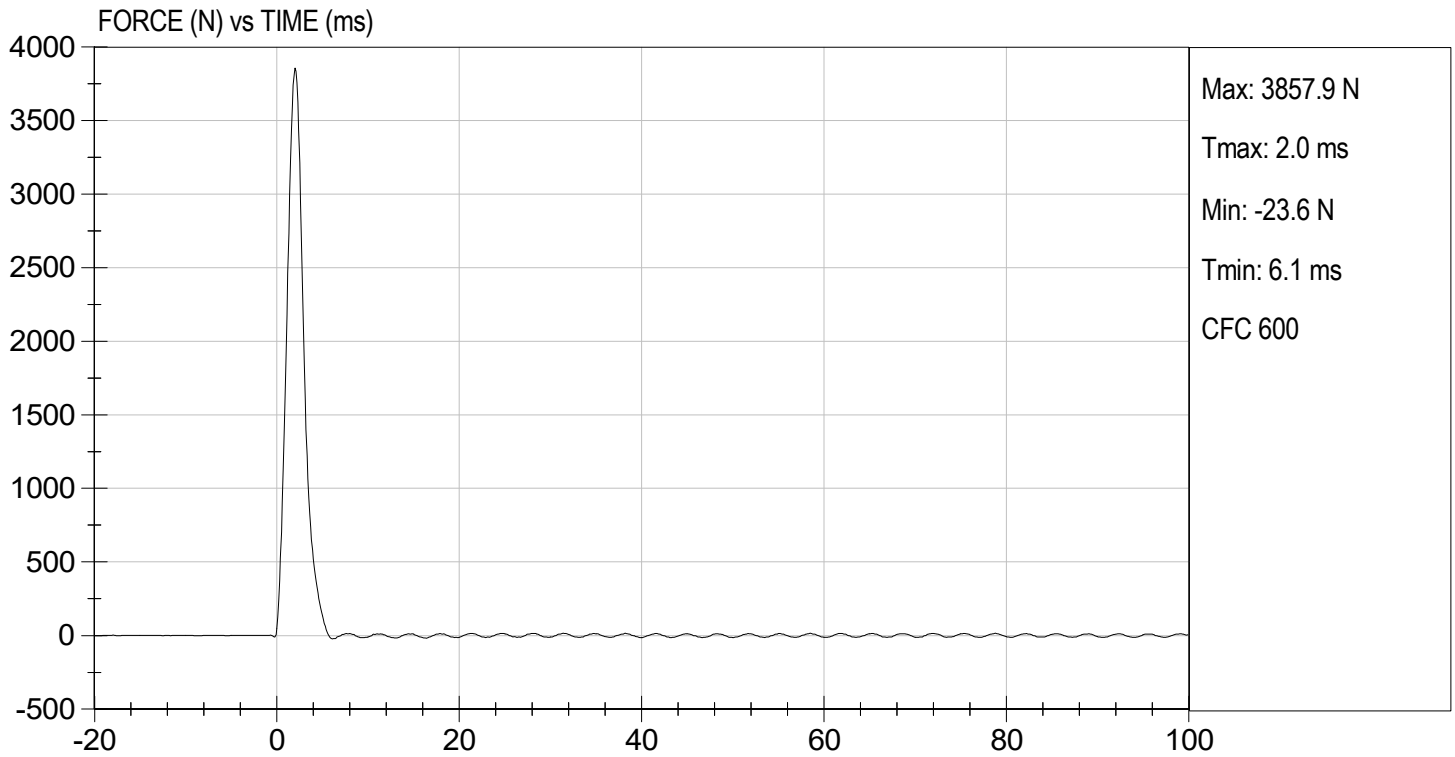
07/27/2023
Test Date


Approved By



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

TEST DATE: 07/27/2023
TEST #: D231936



MGA RESEARCH CORPORATION

TORSO FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 142

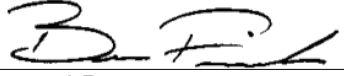
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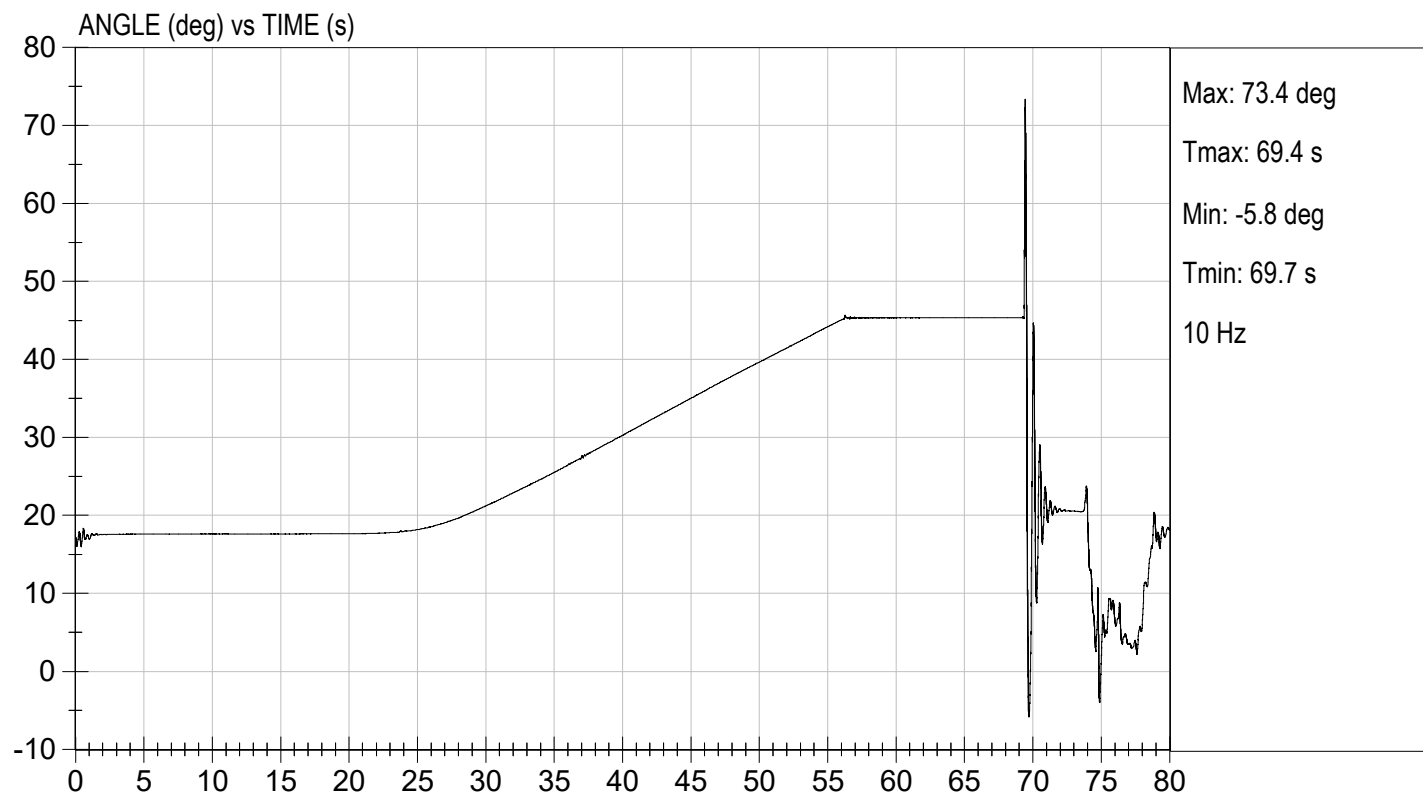
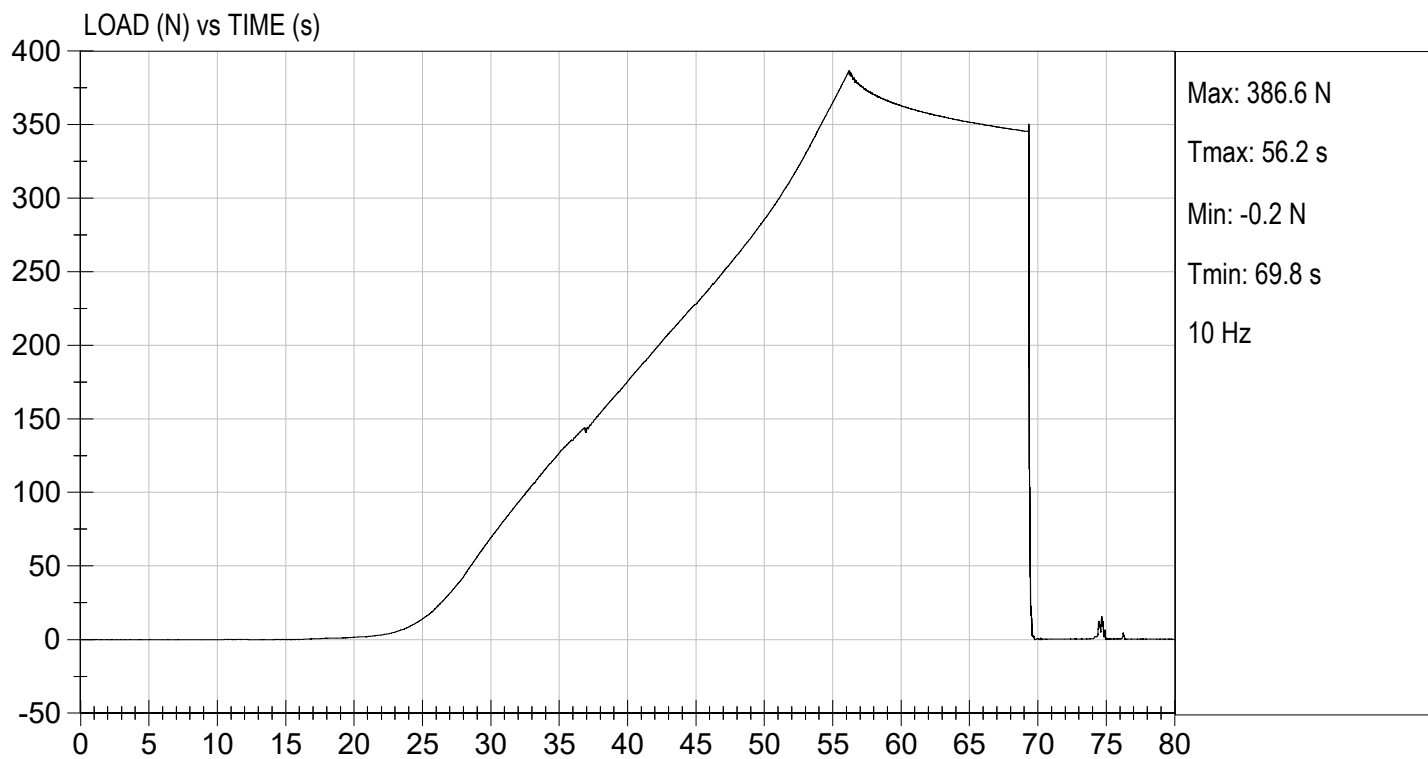
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	44	Pass
Initial Angle	deg	0 to 20	17	Pass
Return Angle	deg	+/- 8	1	Pass
Force at 45 deg	N	320 to 390	387	Pass
Upper Torso Deflection Rate	deg/s	0.5 to 1.5	0.9	Pass
Overall Result			Pass	


Laboratory Technician

07/27/2023

Test Date


Approved By



QUALIFICATION TEST RESULTS

POST-TEST

HYBRID III 5TH PERCENTILE FEMALE - PASSENGER ATD

MGA RESEARCH CORPORATION
HEAD DROP TEST
HYBRID III 5TH PERCENTILE

ATD Serial No: 142

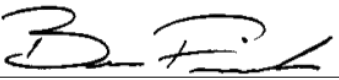
Test ID: D232151

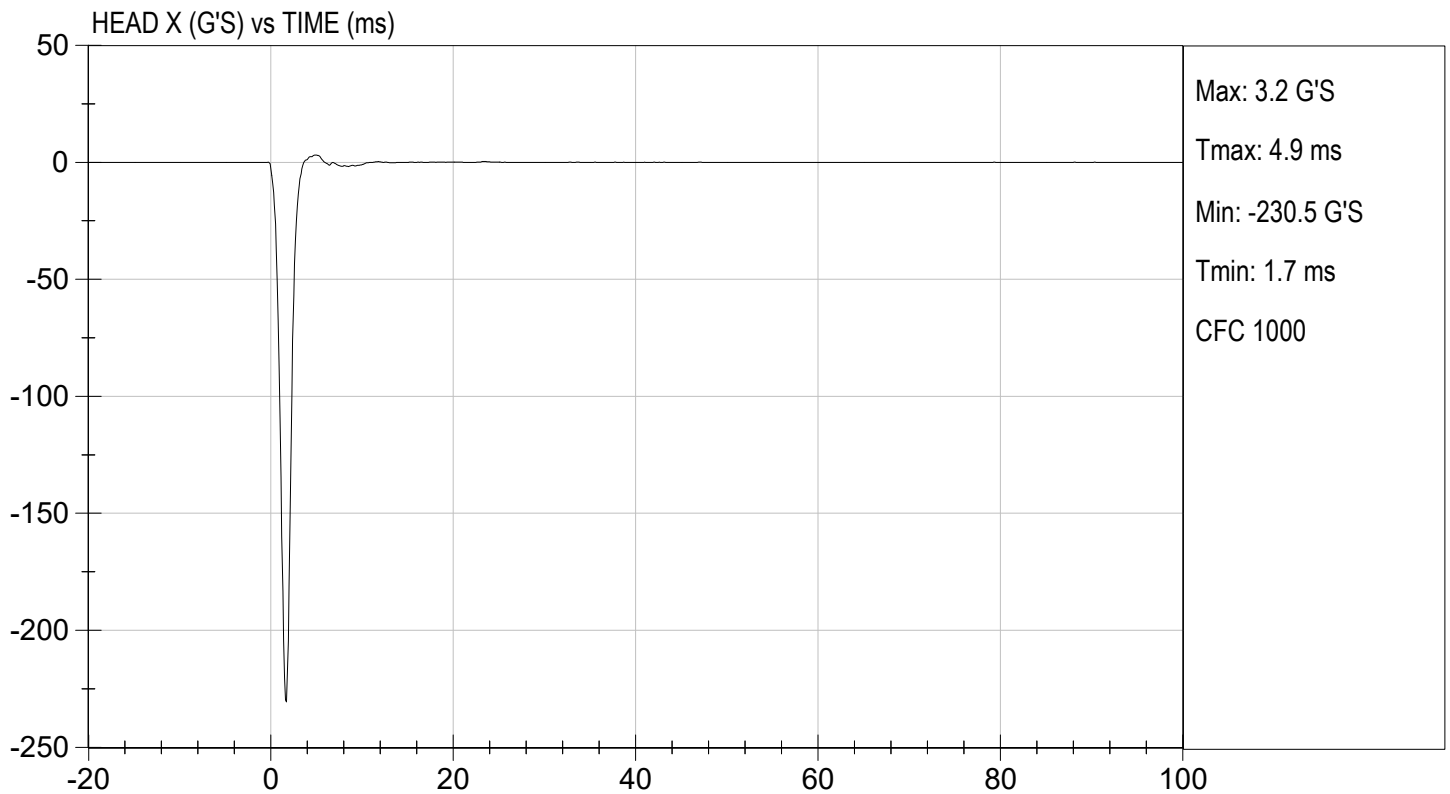
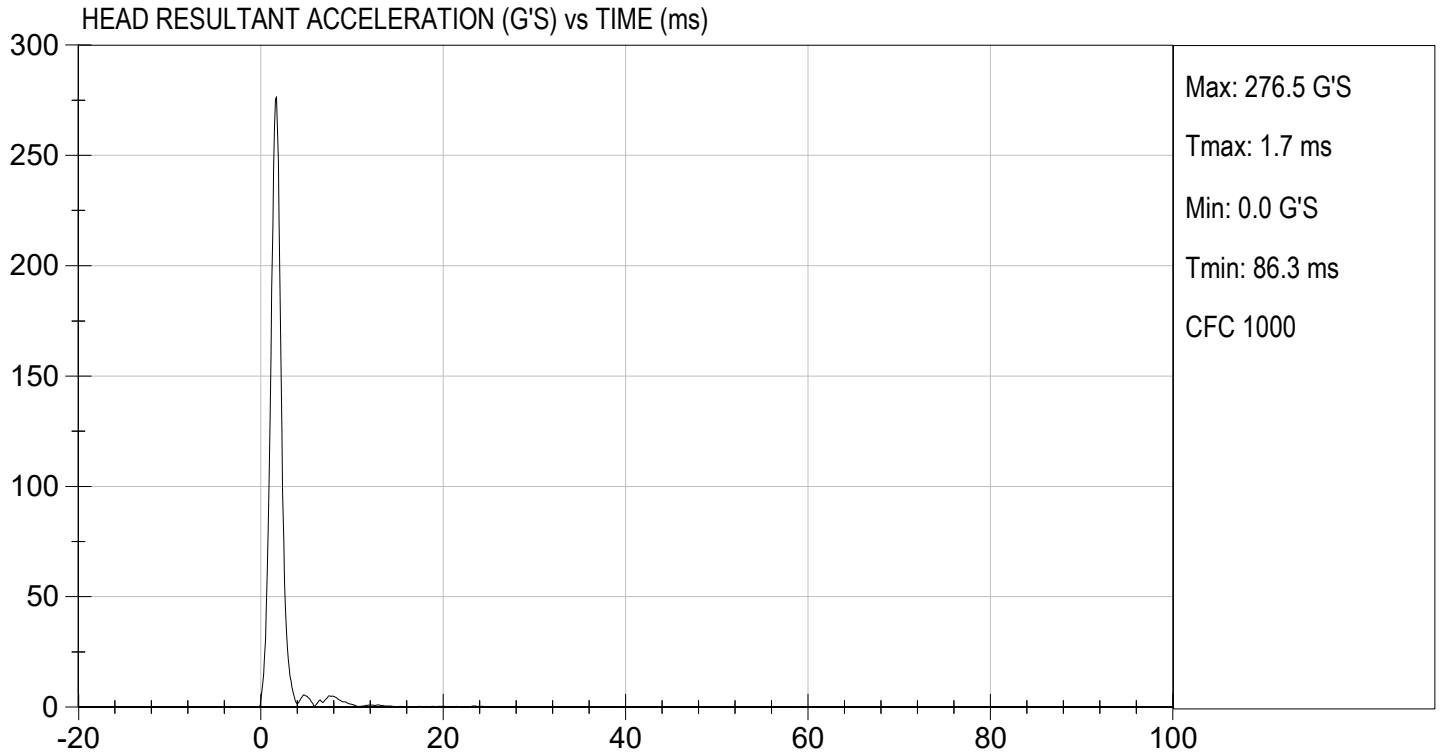
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	20.8	Pass
Laboratory Relative Humidity	%	10 to 70	38	Pass
Peak Resultant Acceleration	G's	250 to 300	277	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	5.8	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
			Overall Test Results	Pass

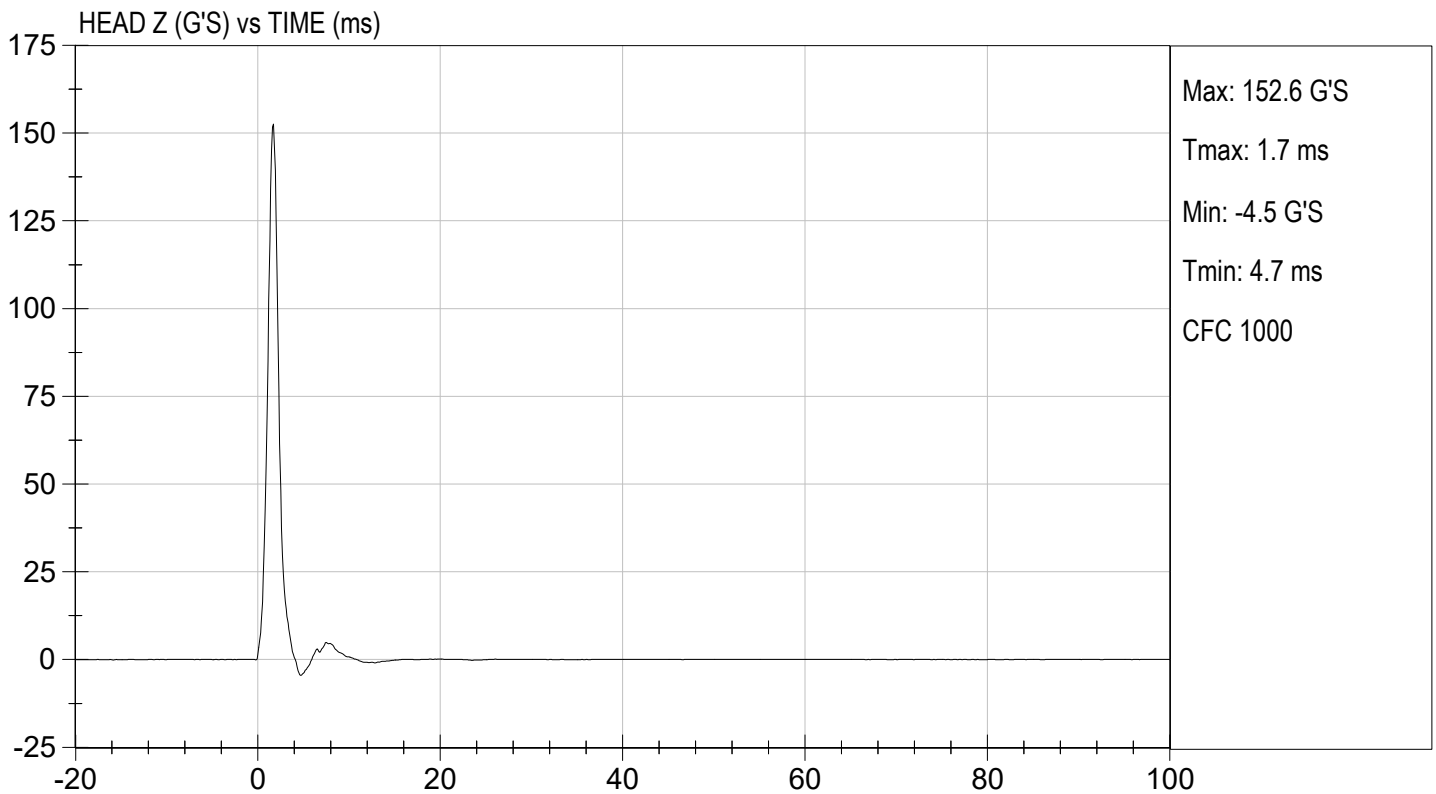
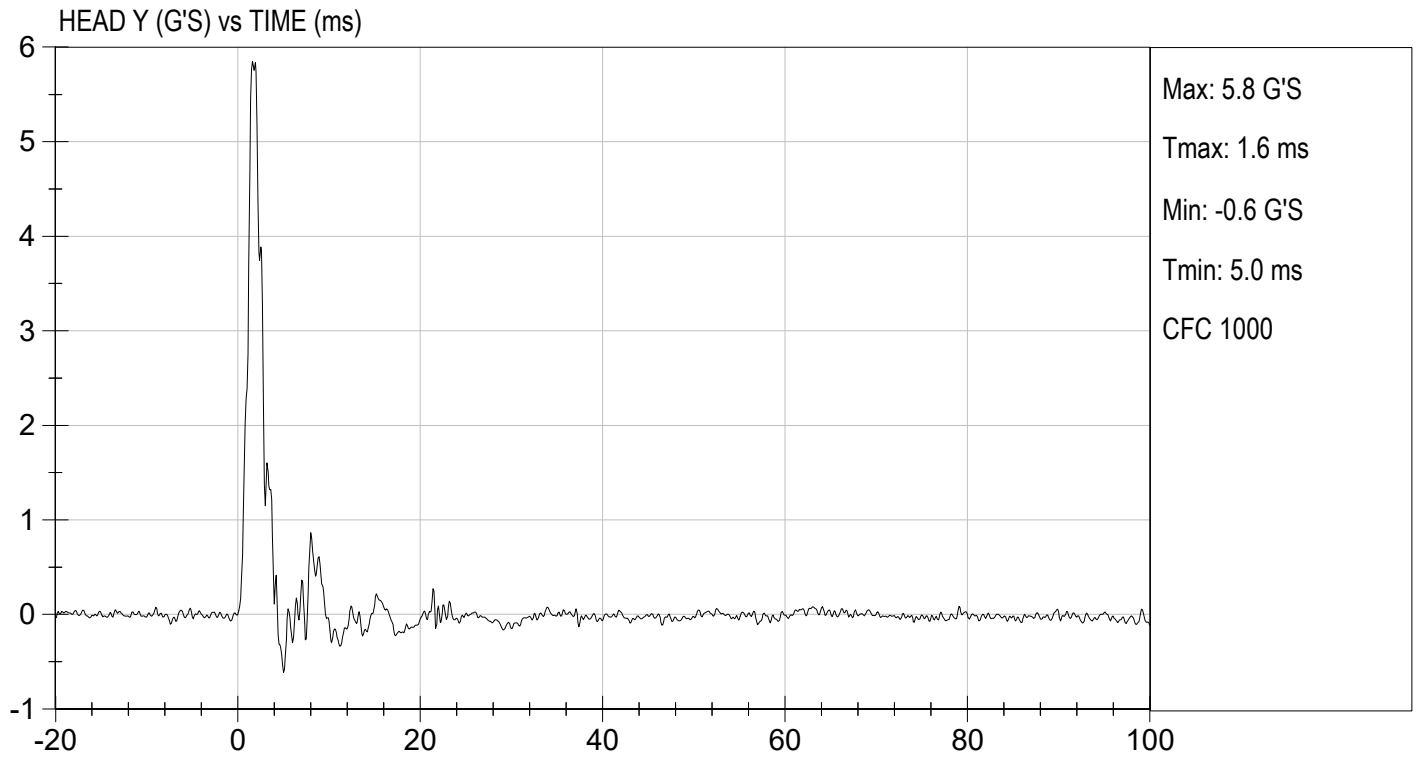

Laboratory Technician

08/10/2023

Test Date


Approved By





MGA RESEARCH CORPORATION

**NECK FLEXION TEST
HYBRID III 5TH PERCENTILE**

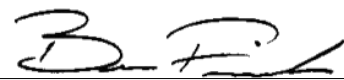
ATD Serial No: 142

Test I.D: D232152

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity		%	10 to 70	42	Pass
Pendulum Speed		m/s	6.89 to 7.13	7.06	Pass
Pendulum Velocity	10 ms	m/s	2.1 to 2.5	2.5	Pass
	20 ms	m/s	4.0 to 5.0	4.7	Pass
	30 ms	m/s	5.8 to 7.0	6.7	Pass
D Plane Rotation	Max	deg	77 to 91	83	Pass
Occipital Condyle Moment within Rotation Corridor		Nm	69 to 83	75	Pass
Positive Moment Time Curve Decay to 10 Nm		ms	80 to 100	83	Pass
Overall Results					Pass


Laboratory Technician

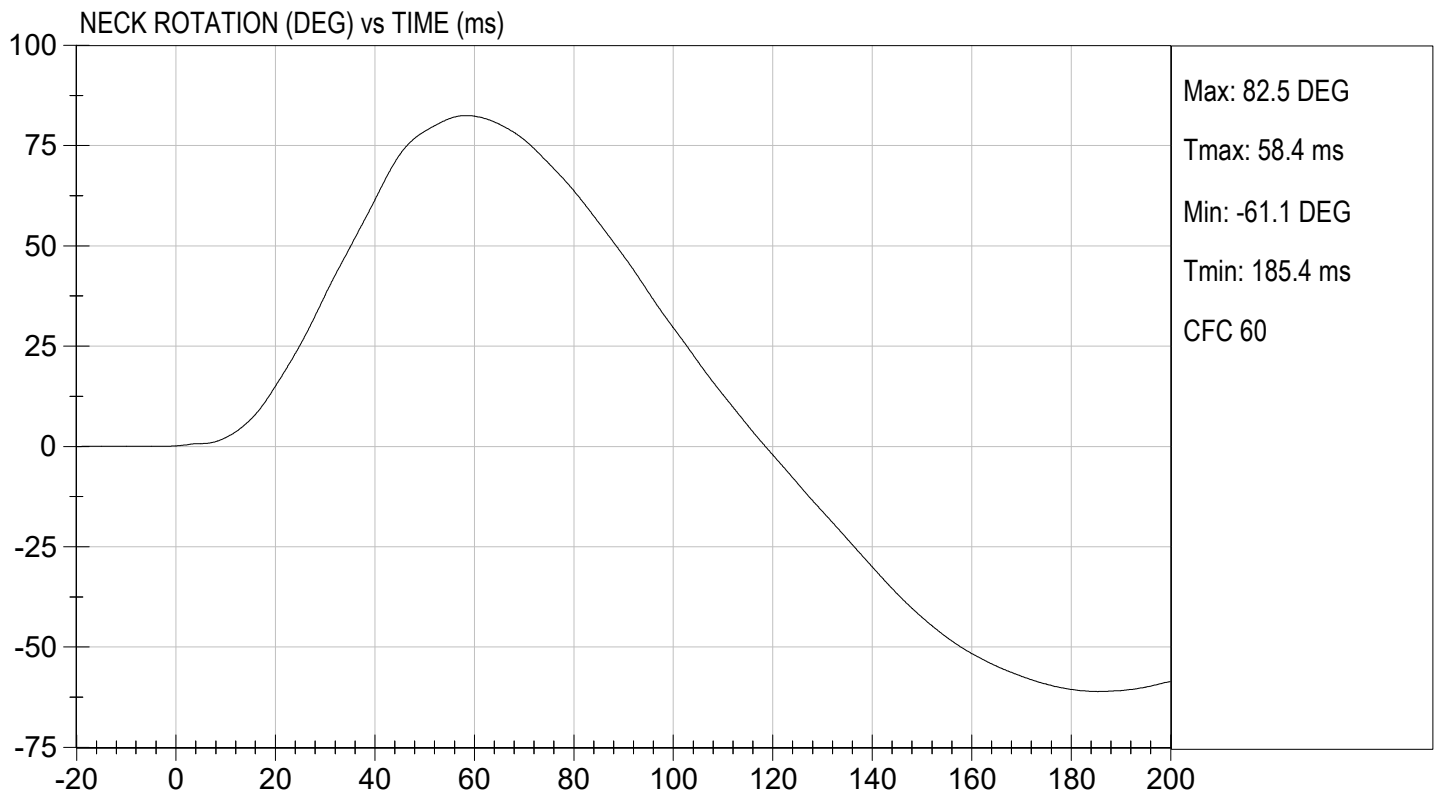
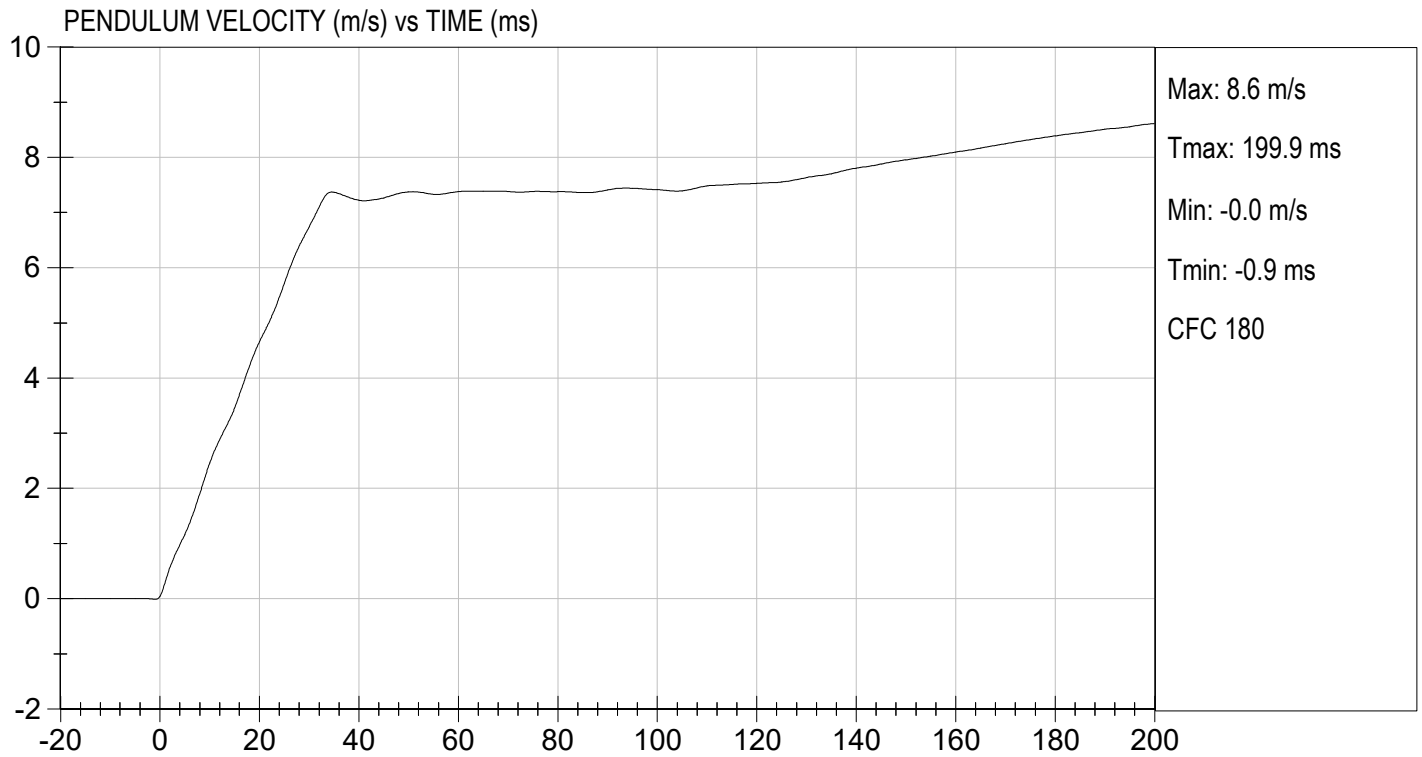
08/10/2023
Test Date


Approved By



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

TEST DATE: 08/10/2023
TEST #: D232152





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

TEST DATE: 08/10/2023
TEST #: D232152



MGA RESEARCH CORPORATION
NECK EXTENSION TEST
HYBRID III 5TH PERCENTILE

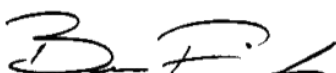
ATD Serial No: 142

Test I.D: D232153

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21	Pass
Laboratory Relative Humidity		%	10 to 70	38	Pass
Pendulum Speed		m/s	5.95 to 6.19	6.14	Pass
Pendulum Velocity	10 ms	m/s	1.5 to 1.9	1.8	Pass
	20 ms	m/s	3.1 to 3.9	3.7	Pass
	30 ms	m/s	4.6 to 5.6	5.4	Pass
D Plane Rotation	Max	deg	99 to 114	111	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	104	Pass
Overall Results					Pass


 Laboratory Technician

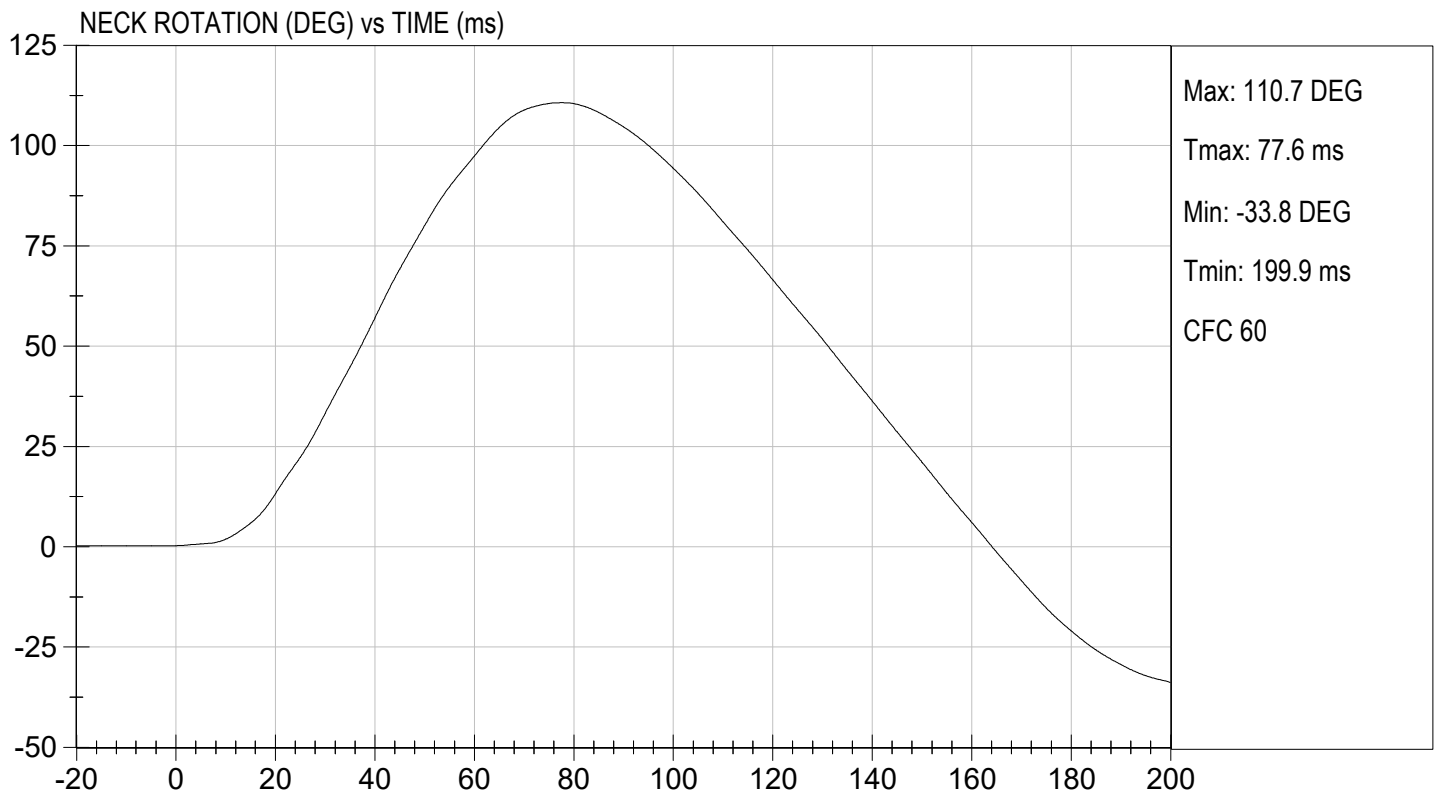
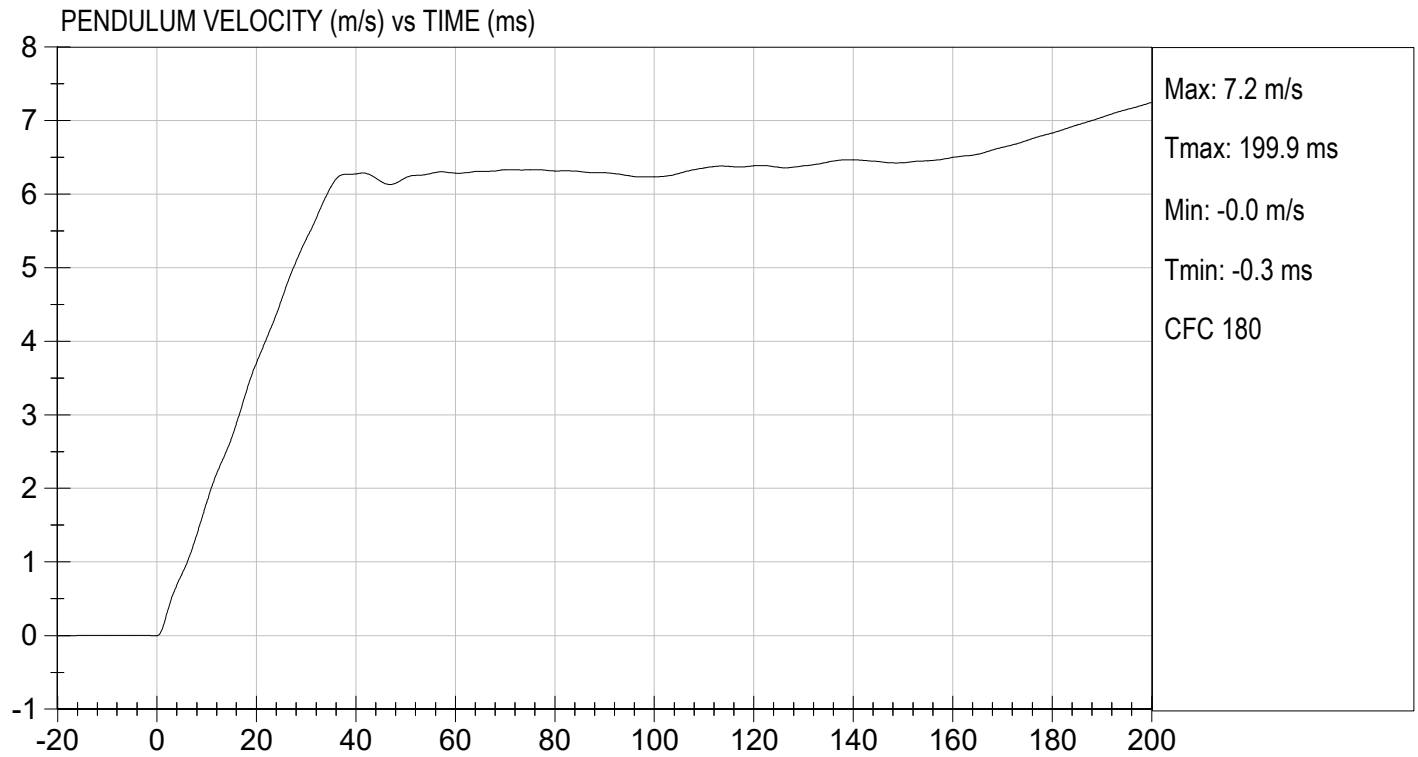
08/10/2023
 Test Date


 Approved By



TEST DESC: NECK EXTENSION
VELOCITY: 20.15 ft/s, 6.14 m/s

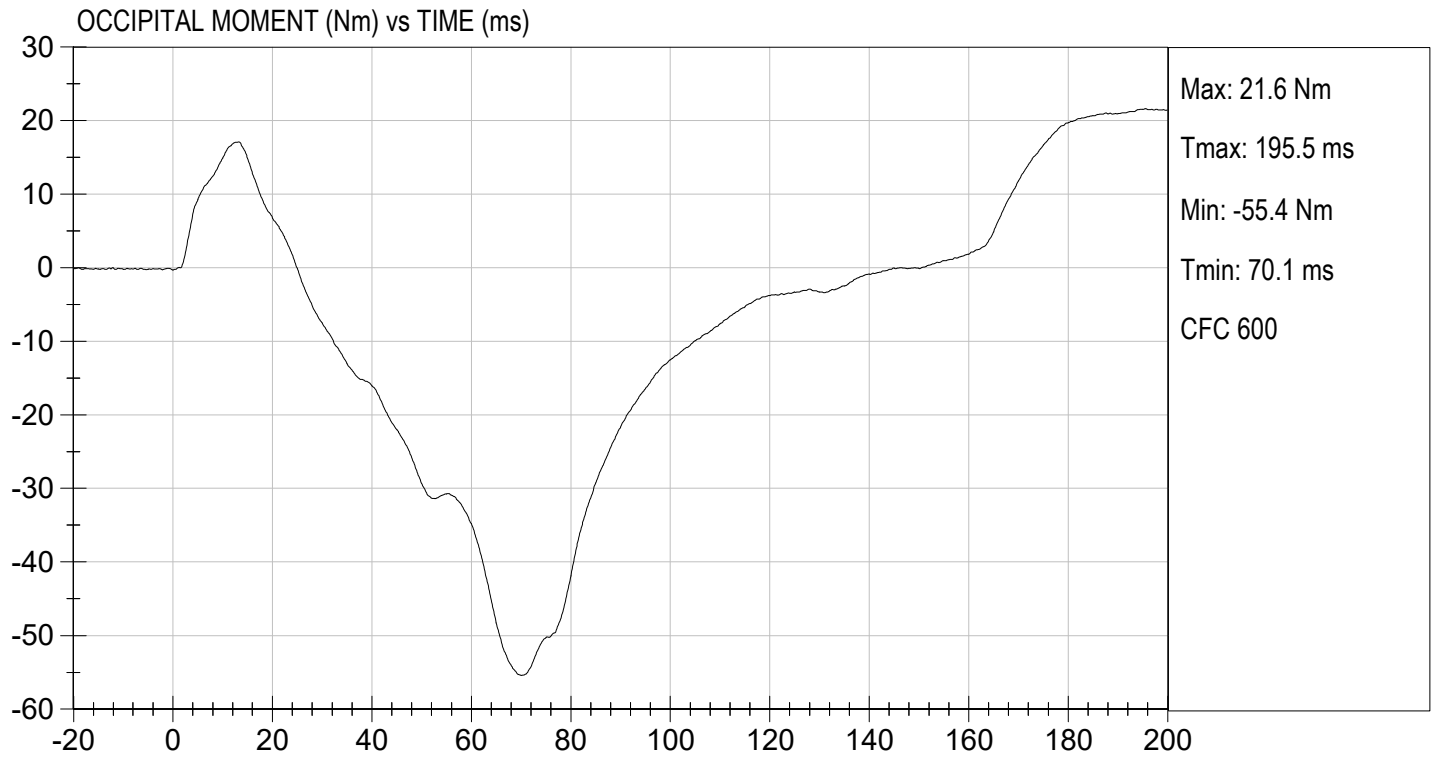
TEST DATE: 08/10/2023
TEST #: D232153





TEST DESC: NECK EXTENSION
VELOCITY: 20.15 ft/s, 6.14 m/s

TEST DATE: 08/10/2023
TEST #: D232153



MGA RESEARCH CORPORATION
THORAX IMPACT
HYBRID III 5TH PERCENTILE

ATD Serial No: 142

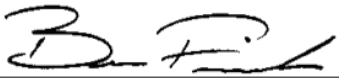
Test I.D: D232154

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.4	Pass
Relative Humidity	%	10 to 70	41	Pass
Probe Speed	m/s	6.59 to 6.83	6.77	Pass
Peak Deflection	mm	50 to 58	53	Pass
Peak Resistive Force w/in Deflection Corridor	N	3900 to 4400	4367	Pass
Internal Hysteresis	%	69 to 85	74	Pass
Peak Force 18 mm - 50 mm	N	<= 4600	4377	Pass
Overall Test Results				Pass


Laboratory Technician

08/10/2023

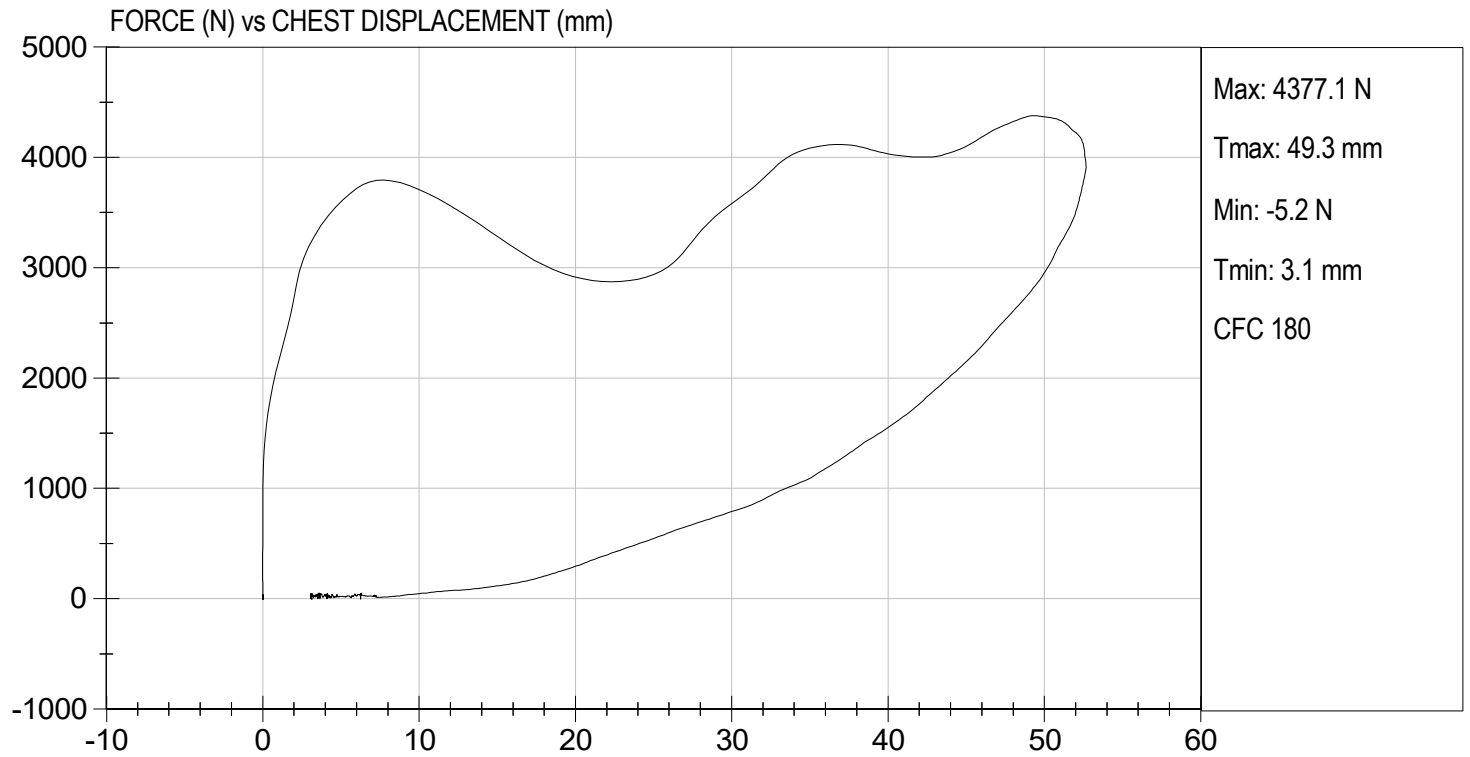
Test Date


Approved By



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

TEST DATE: 08/10/2023
TEST #: D232154



MGA RESEARCH CORPORATION

RIGHT KNEE IMPACT TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 142

Test I.D: D232155

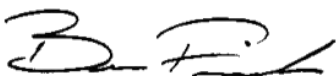
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	42	Pass
Probe Speed	m/s	2.07 to 2.13	2.11	Pass
Maximum Force	N	3450 to 4060	3728	Pass
Overall Test Results				Pass



Laboratory Technician

08/10/2023

Test Date

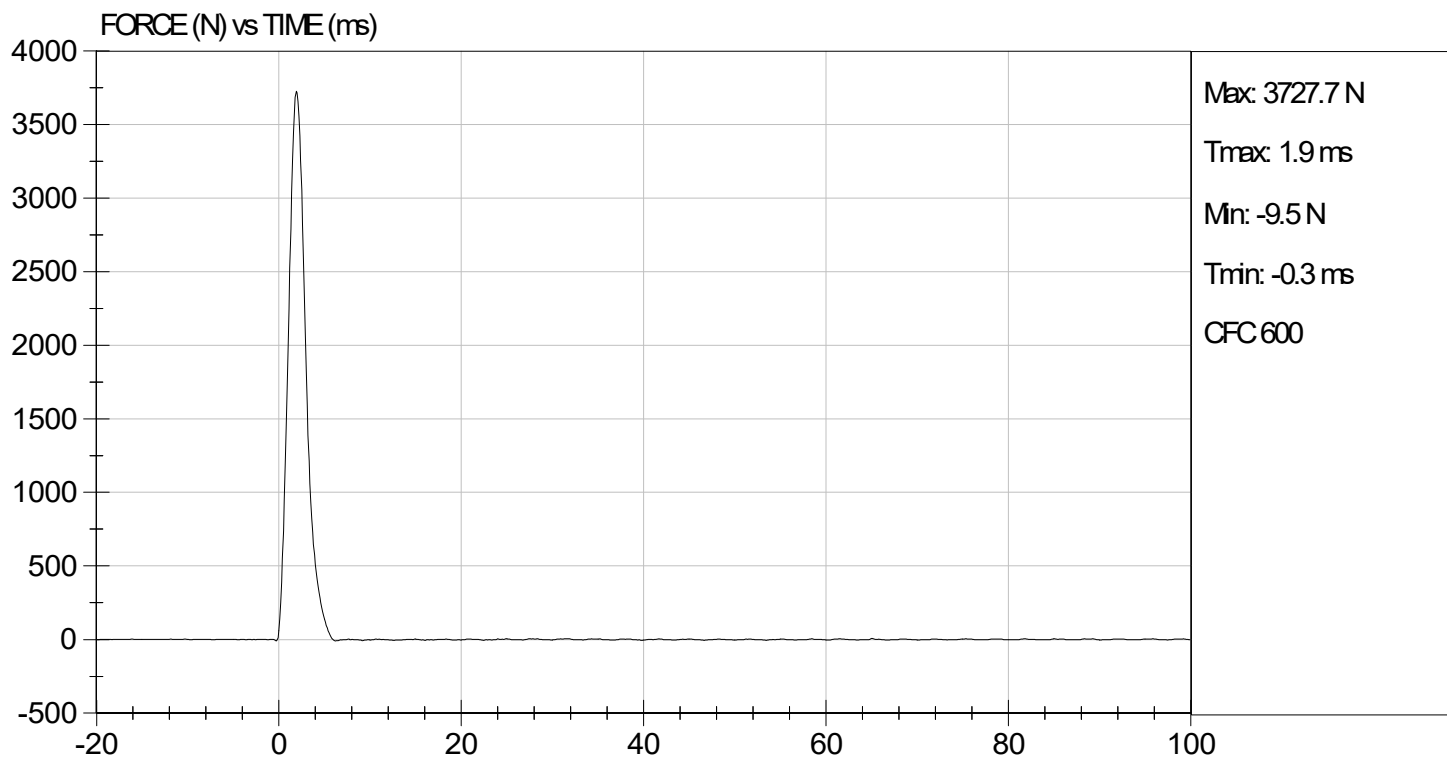


Approved By



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

TEST DATE: 08/10/2023
TEST #: D232155



MGA RESEARCH CORPORATION

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

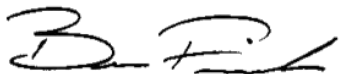
ATD Serial No: 142

Test I.D: D232156

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	42	Pass
Probe Speed	m/s	2.07 to 2.13	2.11	Pass
Maximum Force	N	3450 to 4060	3713	Pass
Overall Test Results				Pass


Laboratory Technician

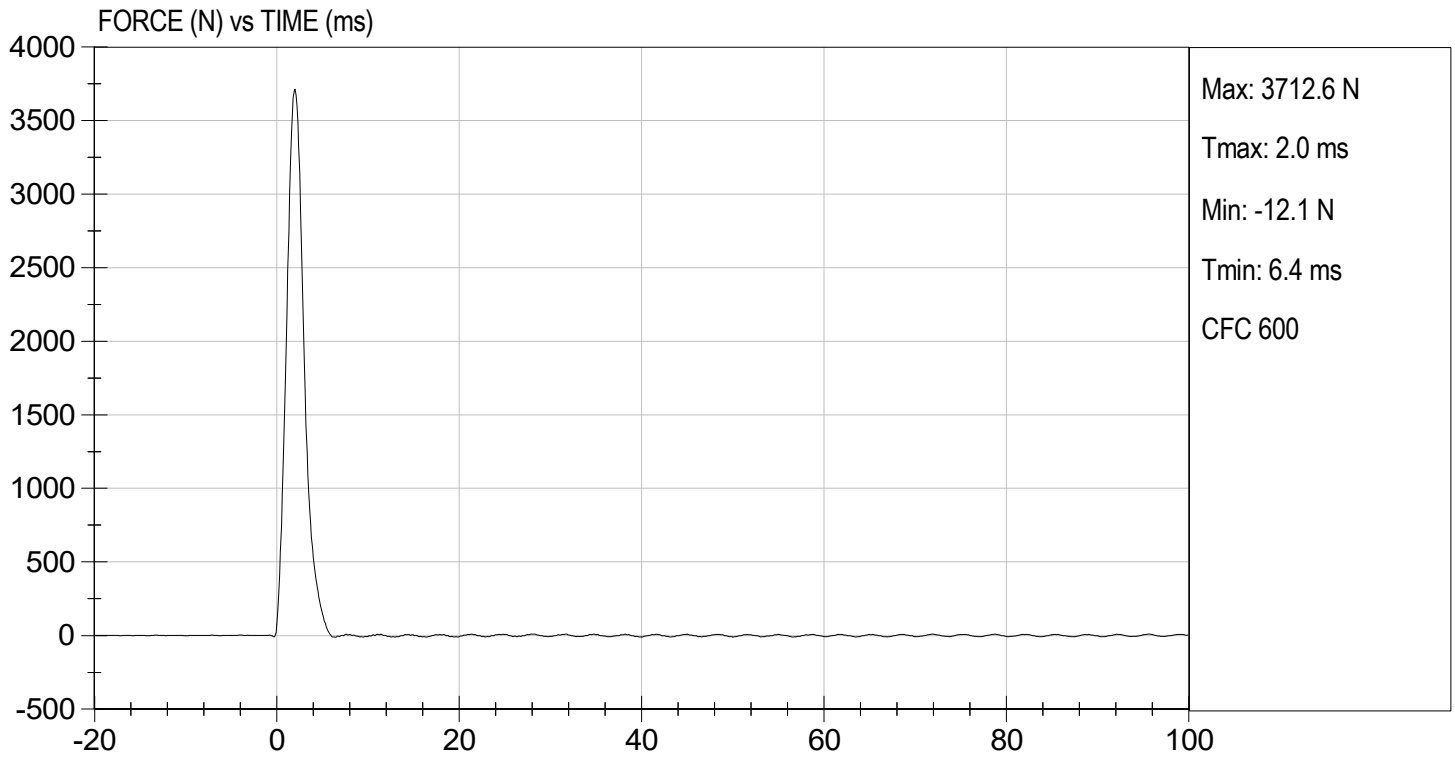
08/10/2023
Test Date


Approved By



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

TEST DATE: 08/10/2023
TEST #: D232156



MGA RESEARCH CORPORATION

TORSO FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 142

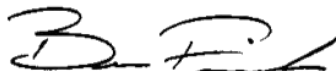
Test I.D: D232157

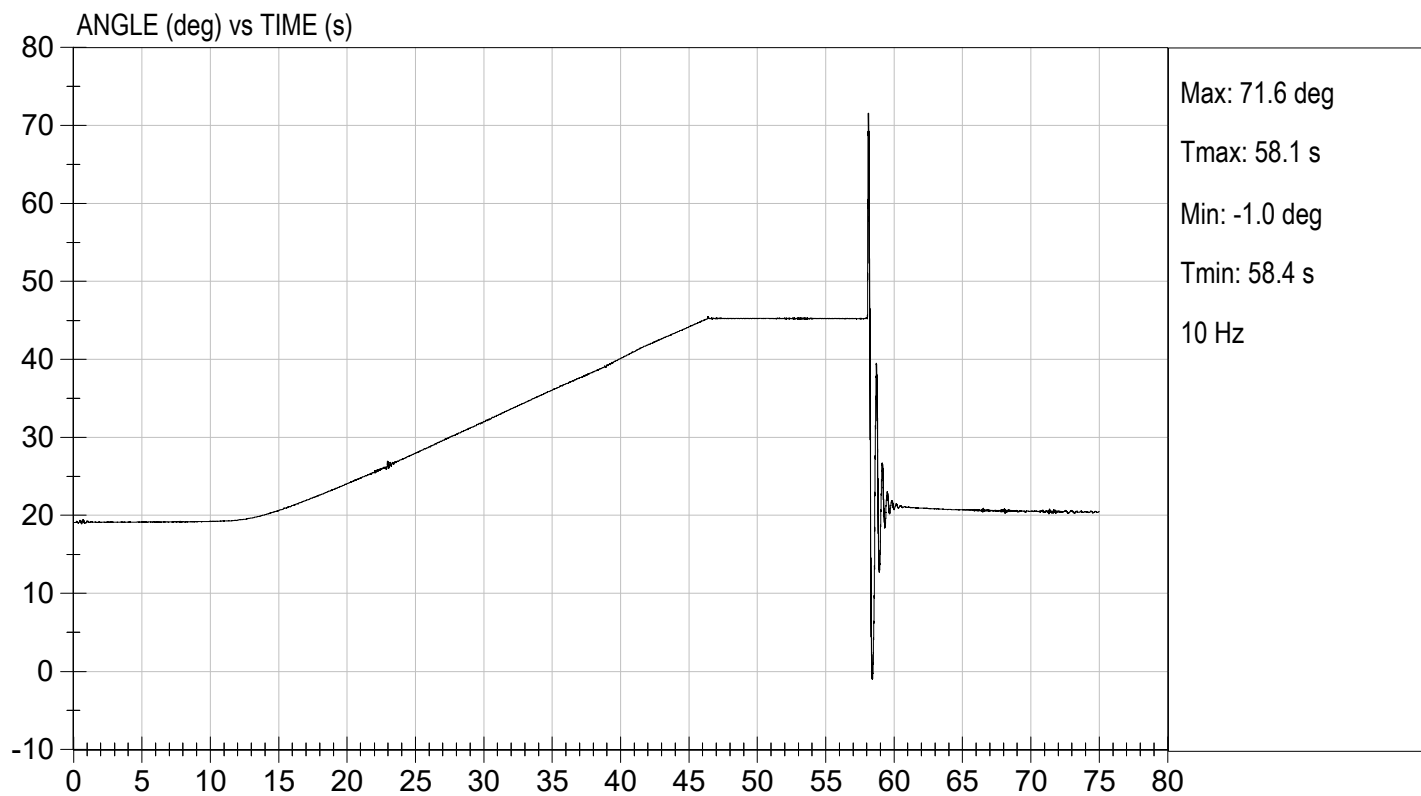
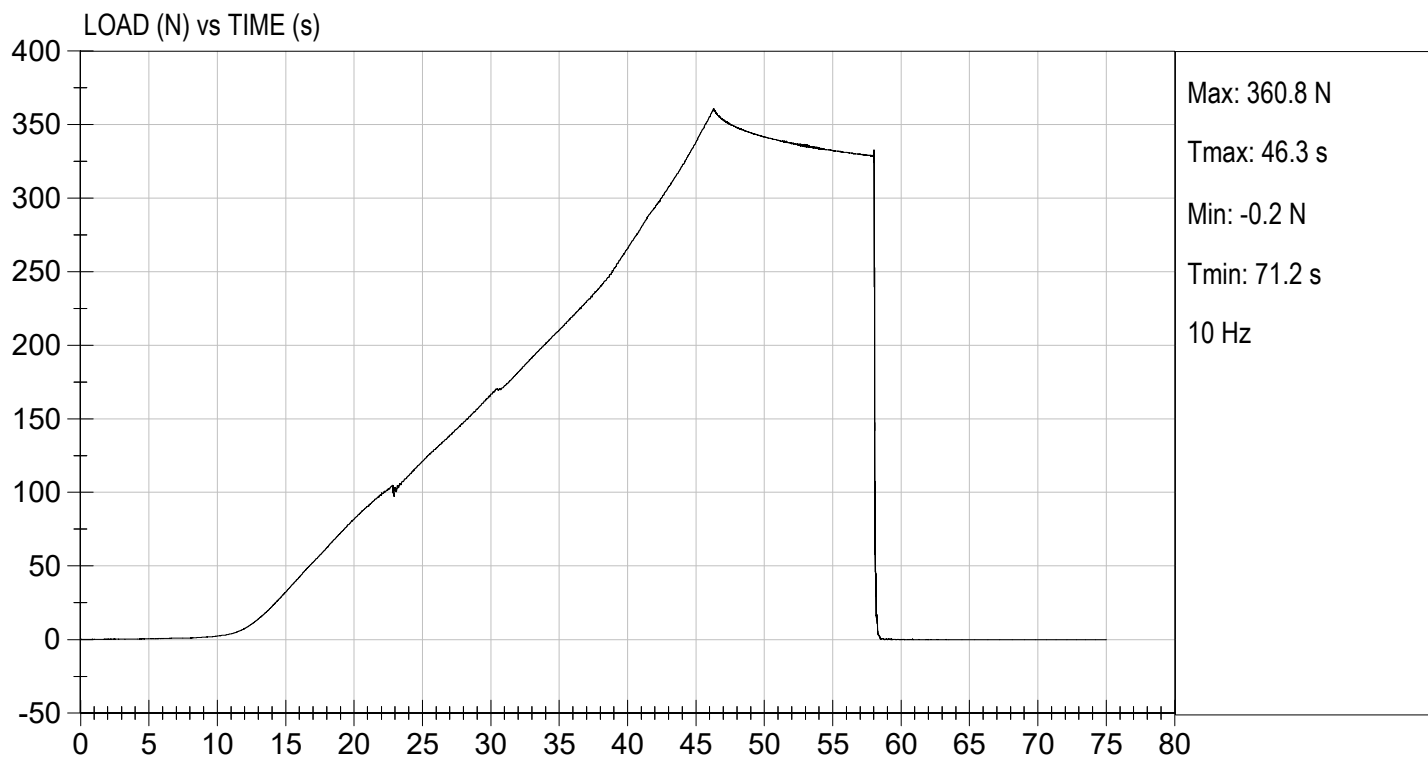
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	40	Pass
Initial Angle	deg	0 to 20	19	Pass
Return Angle	deg	+/- 8	1	Pass
Force at 45 deg	N	320 to 390	361	Pass
Upper Torso Deflection Rate	deg/s	0.5 to 1.5	0.8	Pass
Overall Result			Pass	


Laboratory Technician

08/10/2023

Test Date


Approved By



APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION

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	06/16/2023
			Y	P79743	Endevco	06/16/2023
			Z	P79744	Endevco	06/16/2023
	Redundant		X	P94834	Endevco	06/16/2023
			Y	P94856	Endevco	06/16/2023
			Z	P97412	Endevco	06/16/2023
Head Angular Rate Sensors			X	ARS7442	DTS	09/06/2022
			Y	ARS7475	DTS	09/06/2022
			Z	ARS7516	DTS	09/06/2022
Upper Neck Load Cell			Fx, Fy, Fz Mx, My, Mz	NG2022	Denton	06/16/2023
Chest Accelerometers	Primary		X	P86792	Endevco	06/16/2023
			Y	P88348	Endevco	06/16/2023
			Z	P86793	Endevco	06/16/2023
	Redundant		X	P88666	Endevco	06/16/2023
			Y	P94109	Endevco	06/16/2023
			Z	P88667	Endevco	06/16/2023
Chest Potentiometer			X	351	Humanetics	06/16/2023
Pelvis Accelerometers			X	P95526	Endevco	06/16/2023
			Y	P96038	Endevco	06/16/2023
			Z	P97742	Endevco	06/16/2023
Femur Load Cells	Right	Primary	Z	FG121P	Denton	06/19/2023
		Redundant	Z	FG121R	Denton	06/19/2023
	Left	Primary	Z	FG122P	Denton	06/19/2023
		Redundant	Z	FG122R	Denton	06/19/2023
Tibia Load Cells	Right	Upper	Mx, My, Fz	TG467	Denton	12/21/2022
		Lower	Mx, My, Fz	AG491	Denton	12/21/2022
	Left	Upper	Mx, My, Fz	TG478	Denton	12/21/2022
		Lower	Mx, My, Fz	AG500	Denton	12/21/2022
Foot Accelerometers	Right	Rear	X	T22486	Endevco	06/16/2023
			Z	P97382	Endevco	06/16/2023
		Front	Z	P82120	Endevco	06/16/2023
	Left	Rear	X	T16468	Endevco	06/16/2023
			Z	T32154	Endevco	06/16/2023
		Front	Z	T32190	Endevco	06/16/2023
Seat Belt Load Cells		Lap		SBG161	FTSS	11/13/2019
		Shoulder		SBG157	FTSS	11/13/2019

TABLE 2 – FRONT PASSENGER DUMMY INSTRUMENTATION

Instrument Location			Axis	Hybrid III 5 th S/N 634		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers	Primary		X	P94799	Endevco	04/26/2023
			Y	P94800	Endevco	04/26/2023
			Z	P94801	Endevco	04/26/2023
	Redundant		X	P94802	Endevco	04/26/2023
			Y	P94803	Endevco	04/26/2023
			Z	P97377	Endevco	04/26/2023
Head Angular Rate Sensors			X	ARS7325	DTS	09/06/2022
			Y	ARS7340	DTS	09/06/2022
			Z	ARS7354	DTS	09/06/2022
Upper Neck Load Cell		Fx, Fy, Fz Mx, My, Mz	NG1915	Denton	02/22/2023	
Chest Accelerometers	Primary		X	P88719	Endevco	04/26/2023
			Y	P94785	Endevco	04/26/2023
			Z	P94793	Endevco	04/26/2023
	Redundant		X	P95322	Endevco	04/26/2023
			Y	P95370	Endevco	04/26/2023
			Z	T30901	Endevco	04/26/2023
Chest Potentiometer		X	142	Humanetics	04/25/2023	
Pelvis Accelerometers			X	P82646	Endevco	04/25/2023
			Y	P94798	Endevco	04/25/2023
			Z	P97705	Endevco	04/25/2023
Femur Load Cells	Right	Primary	Z	FG126P	Denton	04/25/2023
		Redundant	Z	FG126R	Denton	04/25/2023
	Left	Primary	Z	FG127P	Denton	04/25/2023
		Redundant	Z	FG127R	Denton	04/25/2023
Tibia Load Cells	Right	Upper	Mx, My, Fz	TG405	Denton	02/22/2023
		Lower	Mx, My, Fz	AG368	Denton	02/22/2023
	Left	Upper	Mx, My, Fz	TG475	Denton	02/22/2023
		Lower	Mx, My, Fz	AG504	Denton	02/22/2023
Foot Accelerometers	Right	Rear	X	P94795	Endevco	04/25/2023
			Z	P94796	Endevco	04/25/2023
		Front	Z	P94797	Endevco	04/25/2023
	Left	Rear	X	P83167	Endevco	04/26/2023
			Z	P83168	Endevco	04/26/2023
		Front	Z	P83169	Endevco	04/26/2023
Seat Belt Load Cells		Lap		SBG273	FTSS	11/13/2019
		Shoulder		SBG272	FTSS	11/13/2019

TABLE 3 – VEHICLE INSTRUMENTATION

Instrument Location			Axis	Serial Number	Manufacturer	Calibration Date
Crossmember / Rear Seat Accelerometers	Left	Primary	X	T30594	Endevco	04/27/2023
			Z	A340617	MSI	04/27/2023
		Redundant	X	A383141	MSI	04/27/2023
	Right	Primary	X	A383492	MSI	06/07/2023
			Z	A383097	MSI	06/07/2023
		Redundant	X	A383420	MSI	06/07/2023
Engine Accelerometers		Top	X	A383117	MSI	05/15/2023
		Bottom	X	A360977	MSI	05/11/2023