

REPORT NUMBER: NCAP-MGA-20-002

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

**KIA MOTORS MANUFACTURING GEORGIA, INC.
2020 Kia Telluride LX AWD 5-Door SUV
NHTSA No.: M20204218**

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



Test Date: November 7, 2019

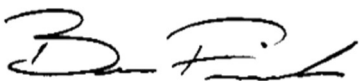
Final Report Date: December 30, 2019

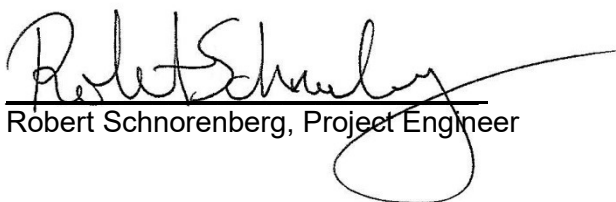
FINAL REPORT

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

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Approval Date: December 30, 2019

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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15. Supplementary Notes																																																									
16. Abstract A 56.3 km/h NCAP Frontal Rigid Barrier Impact Test was conducted on a 2020 Kia Telluride LX AWD 5-Door SUV in accordance with the specifications of the Office of Crashworthiness Standards Laboratory Procedure for NCAP Full Frontal Rigid Barrier Impact Testing. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), and 301 performance. The test was conducted at MGA Research Corporation in Burlington, Wisconsin on November 7, 2019. The impact velocity of the vehicle was 56.10 km/h and the ambient temperature at the barrier face at the time of impact was 21.5°C. The target vehicle post-test maximum crush was 436 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>281</td> <td>700</td> <td>378</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>23</td> <td>52</td> <td>9</td> </tr> <tr> <td>Nij</td> <td></td> <td>1</td> <td>0.27</td> <td>1</td> <td>0.36</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>4170</td> <td>1225</td> <td>2620</td> <td>584</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>4000</td> <td>142</td> <td>2520</td> <td>405</td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>10008</td> <td>728</td> <td>6805</td> <td>1561</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>10008</td> <td>4438</td> <td>6805</td> <td>1640</td> </tr> </tbody> </table>						Measurement Description	Units	Driver ATD		Passenger ATD		Threshold	Result	Threshold	Result	Head Injury Criteria (HIC ₁₅)		700	281	700	378	Maximum Chest Compression	mm	63	23	52	9	Nij		1	0.27	1	0.36	Neck Tension	N	4170	1225	2620	584	Neck Compression	N	4000	142	2520	405	Left Femur Force	N	10008	728	6805	1561	Right Femur Force	N	10008	4438	6805	1640
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17. Key Words 35 mph Frontal Barrier Impact Test New Car Assessment Program (NCAP)			18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division, NPO-411 1200 New Jersey Ave, SE Washington, DC 20590																																																						
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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 2020 Kia Telluride LX AWD 5-Door SUV at a velocity of 56.10 km/h. The test was performed at MGA Research Corporation on November 7, 2019. 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. DH1659) 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 436 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 bolster.

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

The occupant data is summarized below:

ATD position	HIC ₁₅	Nij	Neck Tension (N)	Neck Comp. (N)	3ms Chest Clip (g)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver (50 th)	281	0.27	1225	142	41	23	728	4438
Passenger (5 th)	378	0.36	584	405	45	9	1561	1640

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

TEST NOTES

Driver Shoulder Belt load cell was not installed.

Passenger Shoulder Belt load cell was not installed.

Barrier C-01 Fx recorded no valid data.

Barrier C-02 Fx recorded no valid data.

Barrier K-03 Fx recorded questionable data.

Barrier K-15 My recorded no valid data.

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

SECTION 2
OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2020 Kia Telluride LX AWD 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20204218
 Test Date: 11/7/2019

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20204218	Traction Control System (TCS)	Yes
Model Year	2020	Power Steering	Yes
Make	Kia	Power Window Auto-Reverse	Yes
Model	Telluride LX AWD	Driver Frontal Airbag	Yes
Body Style	5-Door SUV	Driver Curtain Airbag	Yes
VIN	5XYP2DHC9LG048982	Driver Head/Torso Airbag	No
Body Color	Gravity Grey	Driver Torso Airbag	No
Odometer (km/mi)	35 km / 22 mi	Driver Torso/Pelvis Airbag	Yes
Engine Displacement (L)	3.8 L	Driver Pelvis Airbag	No
Type/No. Cylinders	V6	Driver Knee Airbag	Yes
Engine Placement	Lateral	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	AWD	Front Pass. Torso/Pelvis Airbag	Yes
Roof Rack	No	Front Pass. Pelvis Airbag	No
Sunroof/T-Top	Yes	Front Pass. Knee Airbag	No
Running Boards	No	Driver Pretensioner	Yes
Tilt Steering Wheel	Yes	Driver Load Limiter	Yes
Power Seats	No	Front Pass. Pretensioner	Yes
Anti-Lock Brakes (ABS)	Yes	Front Pass. Load Limiter	Yes
Automatic Door Locks (ADLs)	Yes	Other	N/A

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

Manufactured By	KIA MOTORS MANUFACTURING GEORGIA, INC.	GVWR (kg)	2685
Date of Manufacture	SEP/25/19	GAWR Front (kg)	1340
		GAWR Rear (kg)	1450

VEHICLE SEATING AND WEIGHT CAPACITY DATA

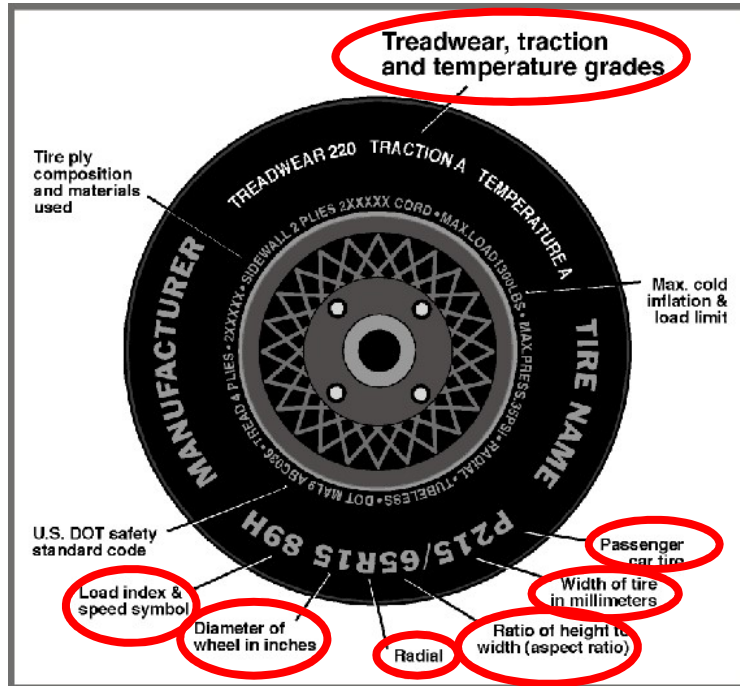
Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Split Bench	Split Bench	
Designated Seating Capacity (DSC)	2	3	3	8
Capacity Weight (VCW) (kg)				600
Cargo Weight (RCLW) (kg)				56

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

Test Vehicle: 2020 Kia Telluride LX AWD 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20204218
 Test Date: 11/7/2019

VEHICLE TIRE INFORMATION



Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	240	240
Recommended Tire Size	245/60R18	245/60R18
Tire Size on Vehicle	245/60R18	245/60R18
Tire Manufacturer	Michelin	Michelin
Tire Model	Primacy Tour	Primacy Tour
Treadwear	540	540
Traction	A	A
Temperature Grade	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel, 1 Polyamide	2 Polyester, 2 Steel, 1 Polyamide
Load Index/Speed Symbol	105H	105H
Tire Material	Rubber	Rubber
DOT Safety Code Left	M34A 01FX 3419	M34A 01FX 3419
DOT Safety Code Right	M34A 01FX 3419	M34A 01FX 3419

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

Test Vehicle: 2020 Kia Telluride LX AWD 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20204218
 Test Date: 11/7/2019

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	546.0	431.5		591.0	497.0	
Right	kg	548.5	408.5		559.5	475.0	
Ratio	%	56.6%	43.4%		54.2%	45.8%	
Totals	kg	1094.5	840.0	1934.5	1150.5	972.0	2122.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1934.5
Weight of 1 P572E ATD & 1 P572O ATD	kg	141
Rated Cargo/Luggage Weight (RCLW)	kg	56
Calculated Test Vehicle Target Weight (TVTW)	kg	2131.5

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	809	817	827	828	1259
As Tested	mm	802	805	803	813	1328
Post Test	mm			802	804	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2900
Total Vehicle Length at Left Side	mm	4880
Total Vehicle Length at Centerline	mm	4980
Total Vehicle Length at Right Side	mm	4880
Weight of Ballast in Cargo Area	kg	0
Weight of Vehicle Components Removed	kg	7
Amount of Stoddard Solvent in Fuel Tank	L	65.9

List of components removed to meet test weight: None.

List of components removed for instrumentation, data box, and equipment installation: Cargo area cover/divider/carpet, jack and tools, RR tail light.

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

Test Vehicle: 2020 Kia Telluride LX AWD 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20204218
 Test Date: 11/7/2019

TARGET VEHICLE STRUCTURAL MEASUREMENT

	Elements	Pre-Test (mm)
1	Total Length	4980
2	Total Width	1990
3	Bumper Top Height	579
4	Bumper Bottom Height	470
5	Longitudinal Member Top Height	592
6	Distance between Longitudinal Members	1025
7	Longitudinal Member Width	60
8	Engine Top Height	991
9	Engine Bottom Height	239
10	Engine and Gearbox Width	850
11	Front Bumper-Engine Distance	N/A
12	Front Shock Absorber Fixing Height	995
13	Bonnet Leading Edge Height	998
14	Front Shock Absorber Fixing Width	80
15	Front Bumper – Front Axle Distance	955
16	Front Axle – A-Pillar Distance	442
17	A-Pillar – B-Pillar Distance	1144
18	B-Pillar – Rear Axle Distance	1320
19	B-Pillar – C-Pillar Distance	802
20	Roof Sill Bottom Height	1635
21	Roof Sill Top Height	1711
22	Floor Sill Bottom Height	285
23	Floor Sill Top Height	424

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

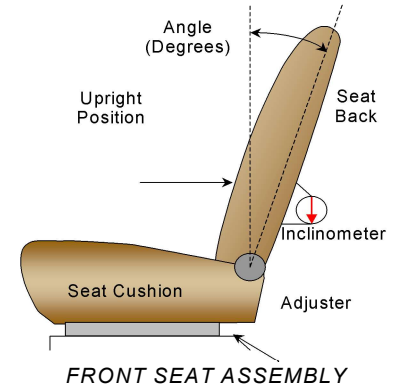
Test Vehicle: 2020 Kia Telluride LX AWD 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20204218
 Test Date: 11/7/2019

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	0.8° on outboard headrest post
Passenger Seat Back Angle	1.2° on outboard headrest post



SEAT FORE/AFT POSITIONS

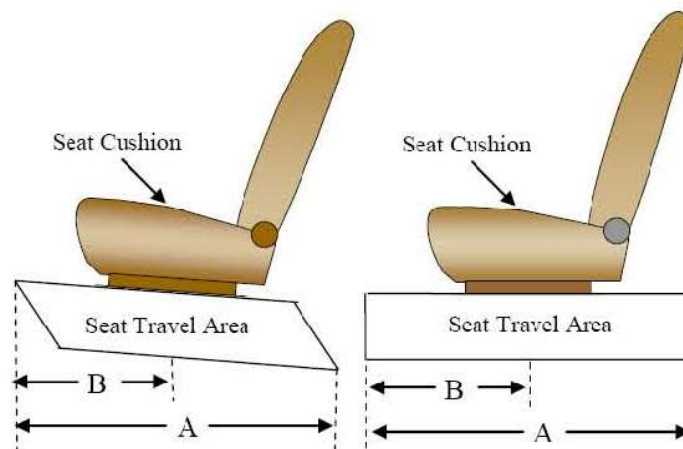
The driver and passenger seat fore/aft positions are adjusted following Appendix F, "Driver & Passenger Dummy Seating & Positioning Procedures" in the NCAP Test Procedure dated May 2018.

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	298 mm / 38 detents (1 st as 1)	149 mm / 14 th detent (1 st as 0)
Passenger Seat	241 mm / 38 detents (1 st as 1)	0 mm / 0 th detent (1 st as 0)

SEAT BELT UPPER ANCHORAGES

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

	Total # of Positions	Placed in Position #
Driver Seat	4 (1 st as 1)	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: 2020 Kia Telluride LX AWD 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

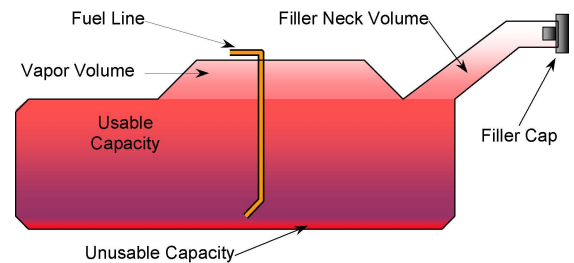
NHTSA No.: M20204218
 Test Date: 11/7/2019

FUEL TANK CAPACITY DATA

	Liters
Usable Capacity of "Standard Tank"	71.0
Usable Capacity of "Optional Tank"	
92-94% of Usable Capacity	65.3 to 66.7
Actual Amount of Solvent used	65.9
1/3 of Usable Capacity	23.7

FUEL PUMP

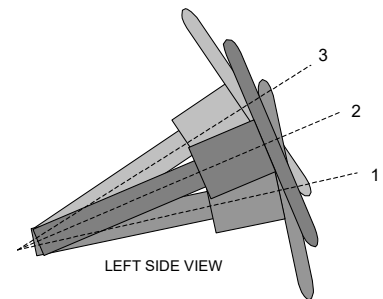
The vehicle is equipped with an electronic fuel pump. The filler neck is located on the driver's side.



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

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



STEERING COLUMN ASSEMBLY

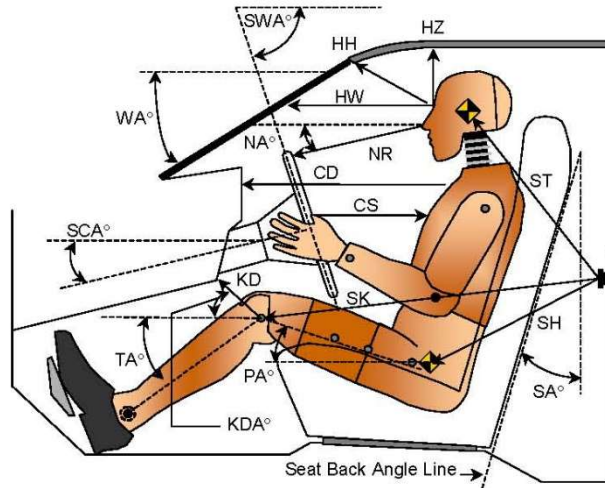
STEERING COLUMN POSITION

	Degrees	Fore/Aft Position (mm)
Lowermost Position 1	67.3	
Geometric Center Position 2	64.7	
Uppermost Position 3	62.1	
Telescoping Steering Wheel Travel		50
Test Position	64.7	25

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2020 Kia Telluride LX AWD 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20204218
 Test Date: 11/7/2019



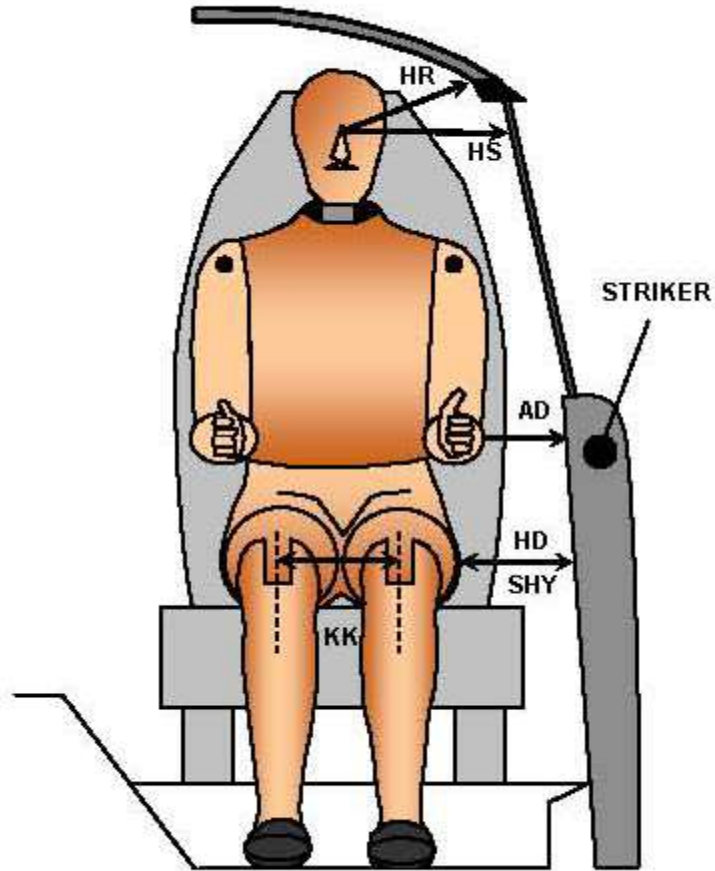
LEFT SIDE VIEW

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		27.4		
SWA°	Steering Wheel Angle		64.7		
SCA°	Steering Column Angle		25.3		
SA°	Seat Back Angle		0.8		1.2
HZ	Head to Roof (Z)	198	90	244	90
HH	Head to Header	331	33.7	322	42.1
HW	Head to Windshield	601	0	600	0
NR	Nose to Rim	368	13.8		
CD	Chest to Dash	500		381	
CS	Chest to Steering Hub	280	1.0		
RA	Rim to Abdomen	157	0		
KDL	Left Knee to Dash	166	24.3	90	28.7
KDR	Right Knee to Dash	144	28.0	95	24.2
PA°	Pelvic Angle		23.8		21.7
TA°	Tibia Angle		51.6		51.2
SK	Striker to Knee	610	95.9	732	102.8
ST	Striker to Head	479	19.9	442	33.4
SH	Striker to H-Point	321	134.3	429	113.2

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2020 Kia Telluride LX AWD 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20204218
 Test Date: 11/7/2019



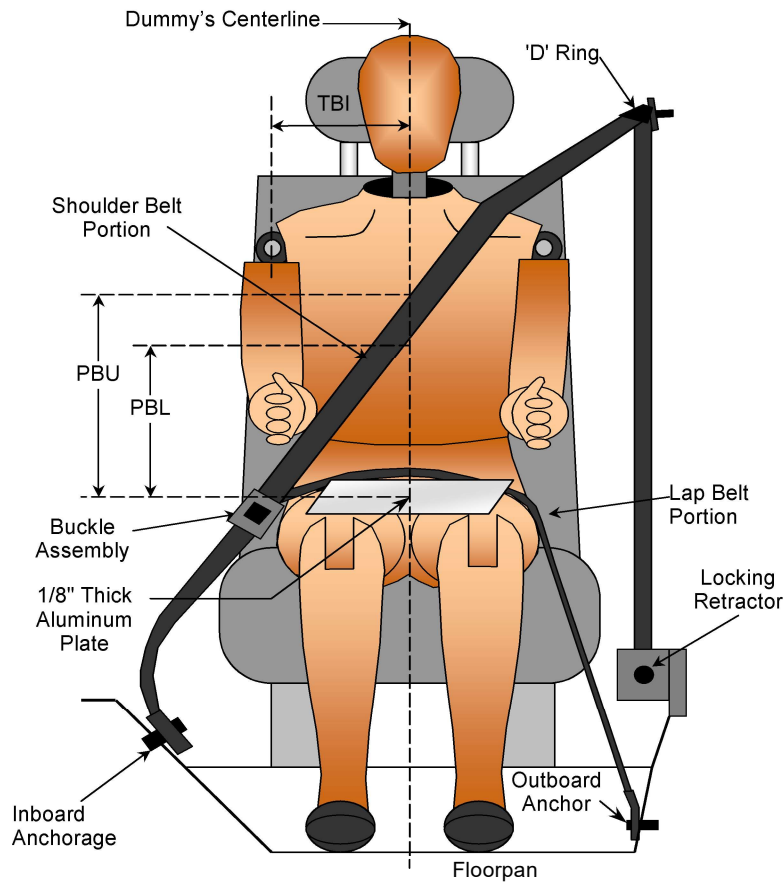
FRONT VIEW OF DUMMY

Code	Measurement Description	Driver	Passenger
		Length (mm)	
AD	Arm to Door	166	96
HD	H-Point to Door	179	192
HR	Head to Side Header	247	296
HS	Head to Side Window	378	382
KK	Knee to Knee	366	231
SHY	Striker to H-Point (Y Direction)	325	332
AA	Ankle to Ankle	341	172

DATA SHEET NO. 5 SEAT BELT POSITIONING DATA

Test Vehicle: 2020 Kia Telluride LX AWD 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20204218
Test Date: 11/7/2019



FRONT VIEW OF DUMMY

SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU - Top surface of reference to belt upper edge	mm	335	350
PBL - Top surface of reference to belt lower edge	mm	250	260

BELT LENGTH DATA

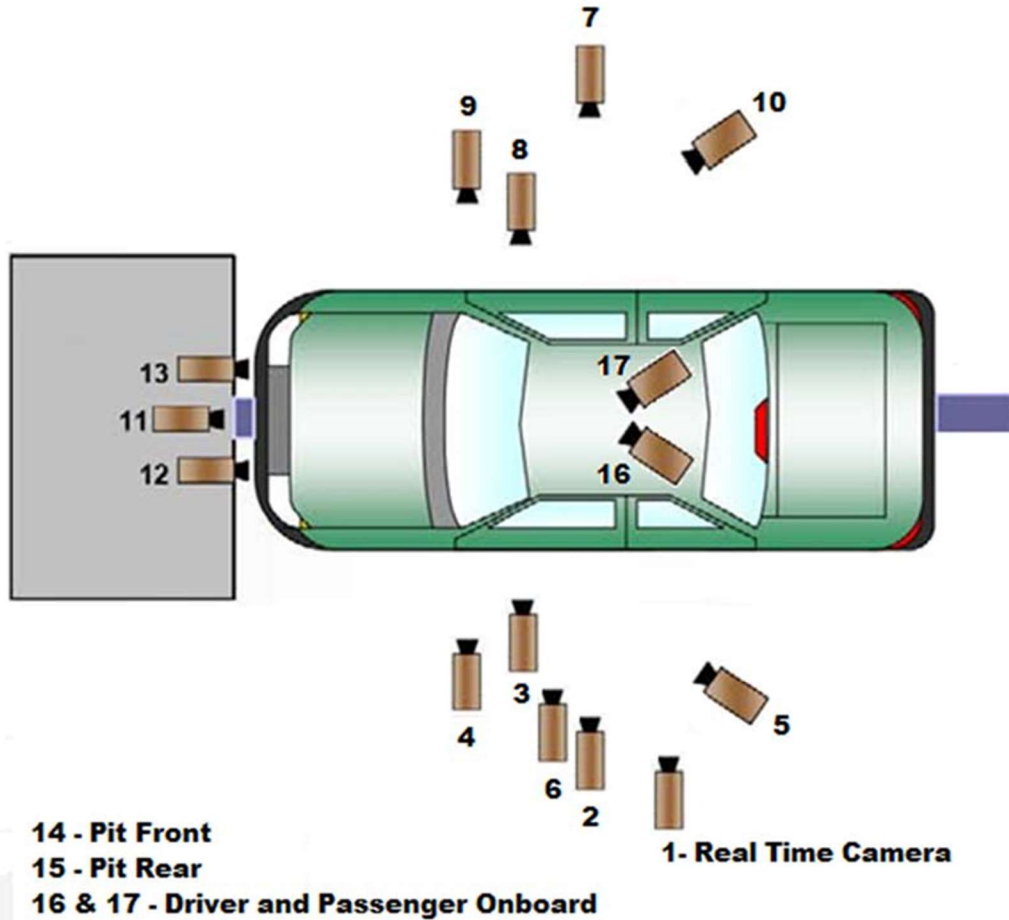
Measurement Description	Units	Driver	Passenger
Shoulder Belt Length as measured on ATD	mm	965	985
Lap Belt Length as measured on ATD	mm	810	920
Remainder of belt on reel	mm	395	265
Total Belt Length for Continuous Webbing Systems	mm	2770	2770

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

Test Vehicle: 2020 Kia Telluride LX AWD 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20204218
Test Date: 11/7/2019

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: 2020 Kia Telluride LX AWD 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20204218
 Test Date: 11/7/2019

CAMERA LOCATIONS

No.	Camera View	Coordinates* (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall					30
2	Left Overall	-2200	-6010	-1230	12	1000
3	Driver Close-Up	-1840	-6630	-1890	50	1000
4	Left Front Half	-1300	-5840	-1280	24	1000
5	Left Angle	-7330	-5780	-1900	75	1000
6	Steering Column	-1080	-5790	-1250	50	1000
7	Right Overall	-2130	-5100	-1360	12	1000
8	Passenger Close-Up	-1080	-5690	-1980	50	1000
9	Right Front Half	-1890	-6520	-1270	24	1000
10	Right Angle	-7370	-5520	-2000	75	1000
11	Windshield	-80	0	-2310	12	1000
12	Driver Windshield	-150	-370	-2230	25	1000
13	Passenger Windshield	-150	-370	-2230	25	1000
14	Pit Front	-1170	0	-3340	24	1000
15	Pit Rear	-3160	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

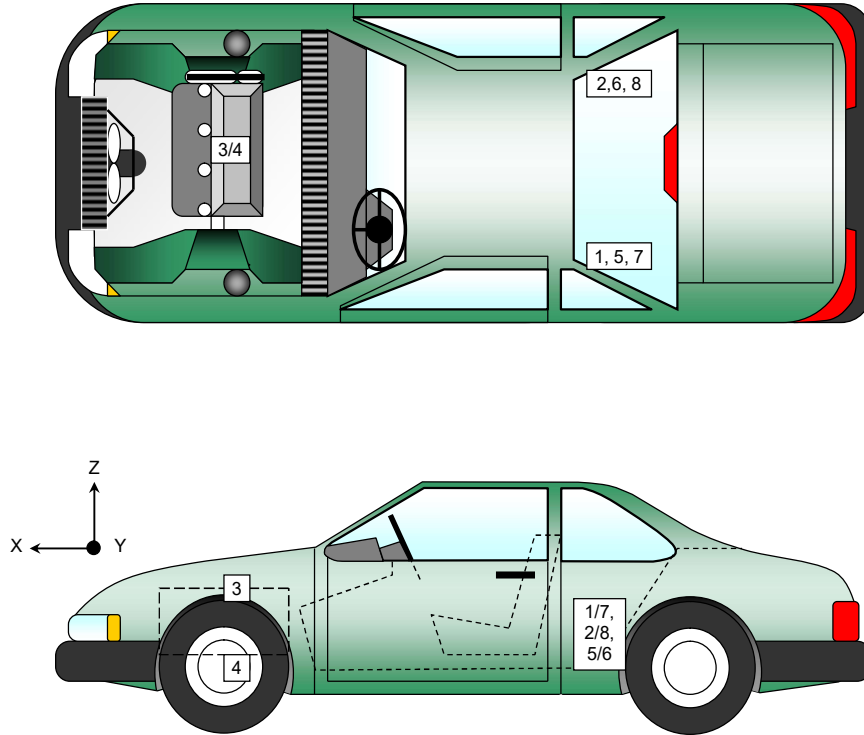
+Y = right of monorail centerline

+Z = below ground level

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

Test Vehicle: 2020 Kia Telluride LX AWD 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20204218
Test Date: 11/7/2019



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Crossmember Accelerometer – X Direction	2108	-420	-372
2	Right Rear Crossmember Accelerometer – X Direction	2108	420	-375
3	Engine Top X	4140	0	-971
4	Engine Bottom X	4210	0	-275
5	Left Rear Crossmember Accelerometer – Z Direction	2108	-420	-372
6	Right Rear Crossmember Accelerometer – Z Direction	2108	420	-375
7	Left Rear Crossmember Accelerometer Redundant – X Direction	2108	-390	-372
8	Right Rear Crossmember Accelerometer Redundant – X Direction	2108	390	-375

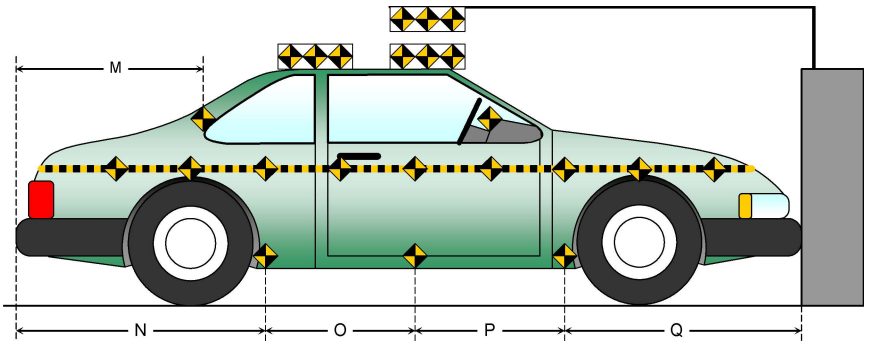
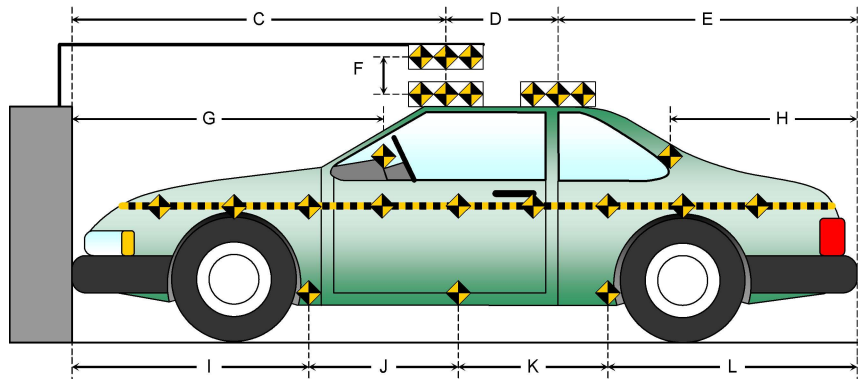
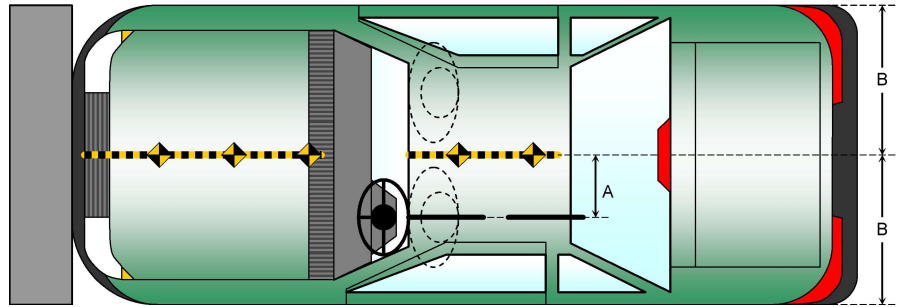
Reference Points: X - Rear Surface of Vehicle (+ forward)
Y - Vehicle Centerline (+ to right)
Z - Ground Plane (+ down)

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

Test Vehicle: 2020 Kia Telluride LX AWD 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20204218
 Test Date: 11/7/2019

Item	Value (mm)
A	400
B	995
C	2310
D	610
E	2060
F	70
G	
H	1514
I	1478
J	920
K	920
L	1662
M	1514
N	1662
O	920
P	920
Q	1478



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

Test Vehicle: 2020 Kia Telluride LX AWD 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20204218
 Test Date: 11/7/2019

ADVANCED RESEARCH LOAD CELL BARRIER

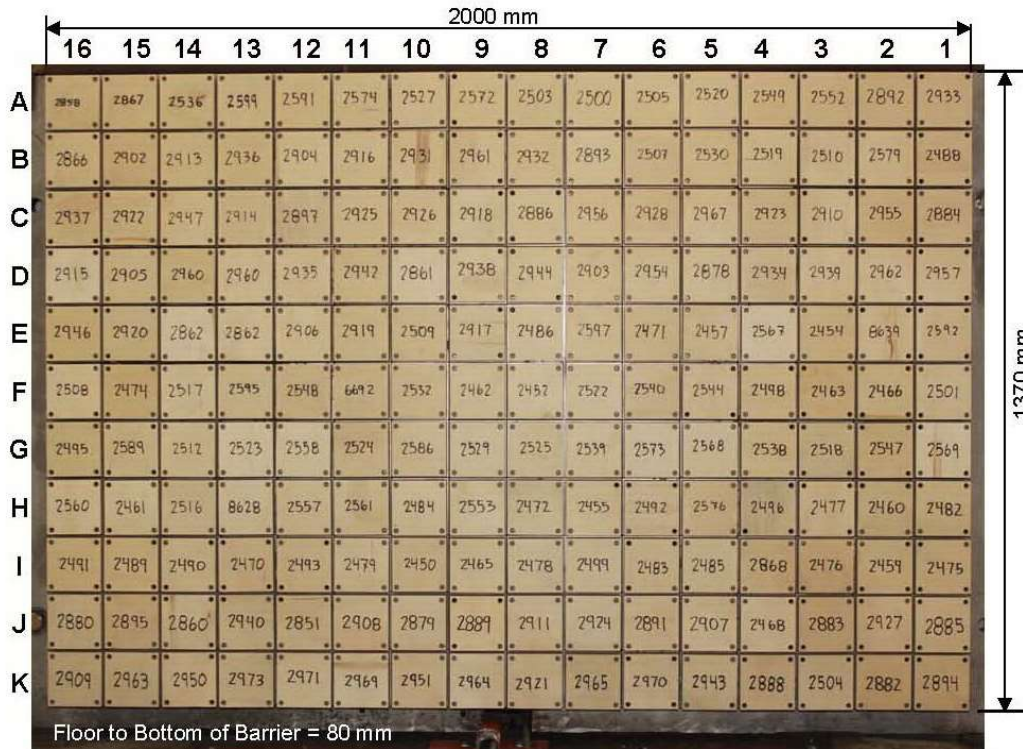


Photo for Reference Only

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: 2020 Kia Telluride LX AWD 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20204218
Test Date: 11/7/2019

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: 2020 Kia Telluride LX AWD 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20204218
Test Date: 11/7/2019

TEST DUMMY INFORMATION AND CONTACT LOCATIONS

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

DOOR OPENING, TRUNK OPENING, AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Locked/Unlocked Doors	Doors were locked	Doors were locked
Front Door Opening	Remained closed and 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	Cracked
Window Damage	None
Other Notable Effects	Driver seatbelt adjustable anchor moved from the upper-most adjustment position to the lower-most position during the impact event

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	1475
Center	mm	1470
Right Side	mm	1465
Average	mm	1470

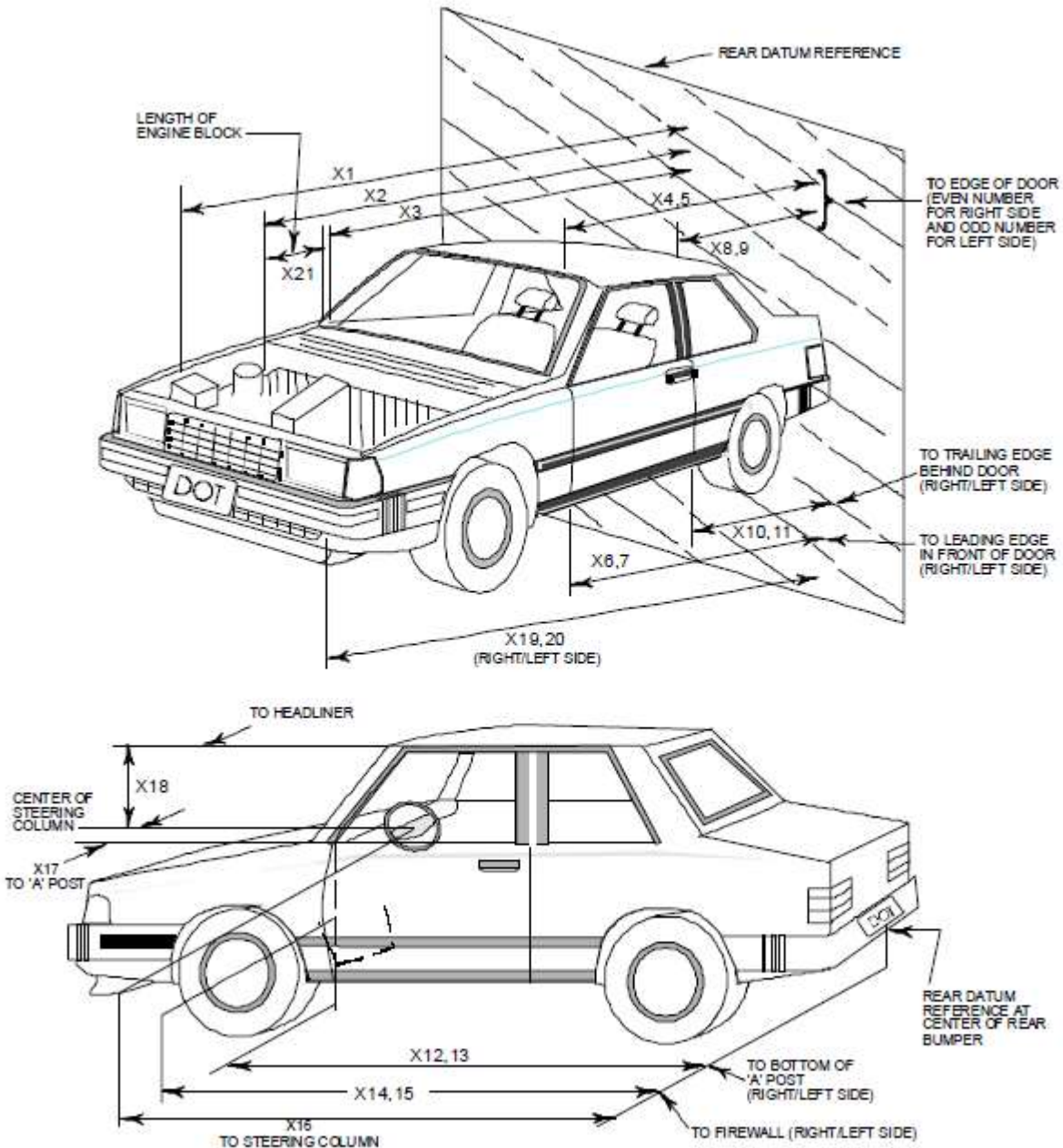
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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	No	
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes		Yes	

DATA SHEET NO. 12
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2020 Kia Telluride LX AWD 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20204218
Test Date: 11/7/2019



DATA SHEET NO. 12 (CONTINUED)
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2020 Kia Telluride LX AWD 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20204218
Test Date: 11/7/2019

No.	Measurement Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	4980	4570	410
2	RSOV to Front of Engine	4530	4294	236
3	RSOV to Firewall	3928	3885	43
4	RSOV to Upper Leading Edge of Right Door	3474	3462	12
5	RSOV to Upper Leading Edge of Left Door	3474	3460	14
6	RSOV to Lower Leading Edge of Right Door	3498	3482	16
7	RSOV to Lower Leading Edge of Left Door	3498	3477	21
8	RSOV to Upper Trailing Edge of Right Door	2402	2400	2
9	RSOV to Upper Trailing Edge of Left Door	2402	2395	7
10	RSOV to Lower Trailing Edge of Right Door	2445	2442	3
11	RSOV to Lower Trailing Edge of Left Door	2445	2433	12
12	RSOV to Bottom of "A" Post of Right Side	3480	3479	1
13	RSOV to Bottom of "A" Post of Left Side	3480	3475	5
14	RSOV to Firewall, Right Side	4015	3923	92
15	RSOV to Firewall, Left Side	4010	3917	93
16	RSOV to Steering Column	3049	3102	-53
17	Center of Steering Column to "A" Post	374	368	6
18	Center of Steering Column to Headliner	432	457	-25
19	RSOV to Right Side of Front Bumper	4880	4565	315
20	RSOV to Left Side of Front Bumper	4880	4480	400
21	Length of Engine Block	609	609	0
RD	RSOV to Right Side of Dash Panel	3372	3357	15
CD	RSOV to Center of Dash Panel	3295	3265	30
LD	RSOV to Left Side of Dash Panel	3378	3335	43

All Dimensions in mm

DATA SHEET NO. 13
ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2020 Kia Telluride LX AWD 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20204218
Test Date: 11/7/2019

VEHICLE INFORMATION

VIN: 5XYP2DHC9LG048982
Vehicle Size Category: MPV

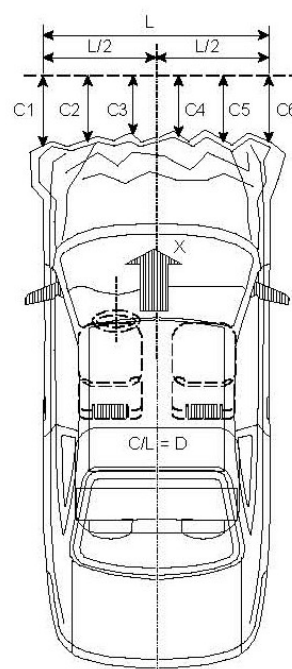
Wheelbase (mm): 2900
Test Weight (kg): 2122.5

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): 56.10
Velocity Change (km/h): 66.3
Time of Separation (msec): 104

CRUSH PROFILE

Collision Deformation Classification: 12FDEW2
Midpoint of Damage: Centerline
Damage Region Length (mm): 1280
Impact Mode: Frontal



No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	4880	4480	400
C2	Crush zone 2 at left side	mm	4932	4516	416
C3	Crush zone 3 at left side	mm	4965	4529	436
C4	Crush zone 4 at right side	mm	4965	4540	425
C5	Crush zone 5 at right side	mm	4932	4564	368
C6	Crush zone 6 at right side	mm	4880	4565	315
L	C1 TO C6	mm	1280	1280	0

DATA SHEET NO. 14
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2020 Kia Telluride LX AWD 5-Door SUV
Test Program: NCAP Frontal Barrier Impact Test

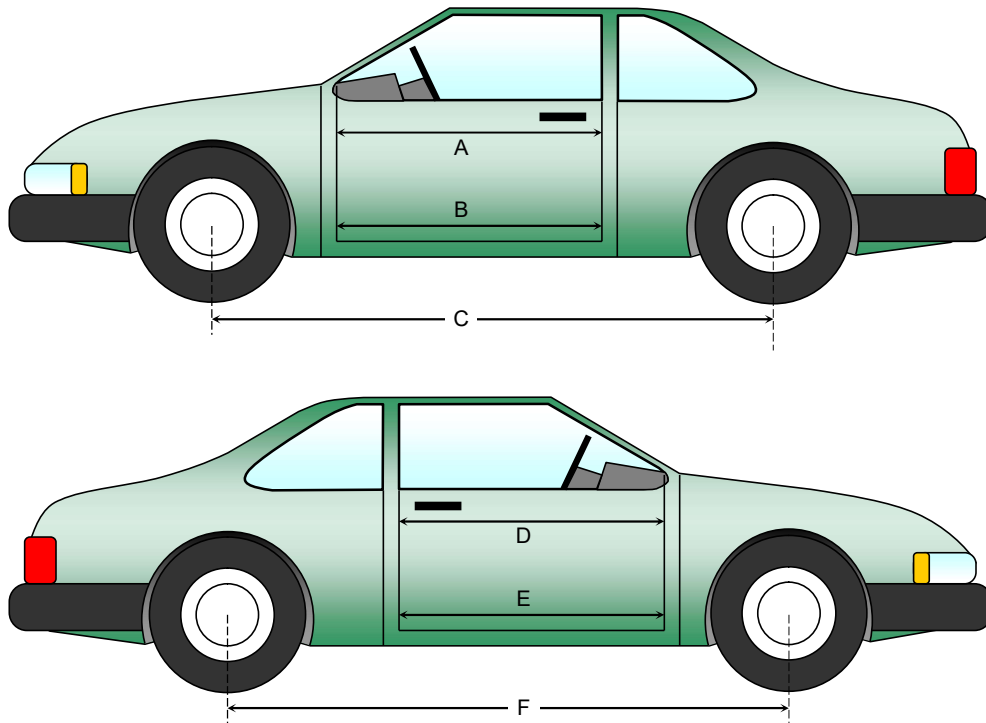
NHTSA No.: M20204218
Test Date: 11/7/2019

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	978	978	0
B	Left Side Lower	mm	866	866	0
D	Right Side Upper	mm	978	978	0
E	Right Side Lower	mm	880	880	0

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2900	2886	14
F	Right Side Wheelbase	mm	2900	2875	25



DATA SHEET NO. 14 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

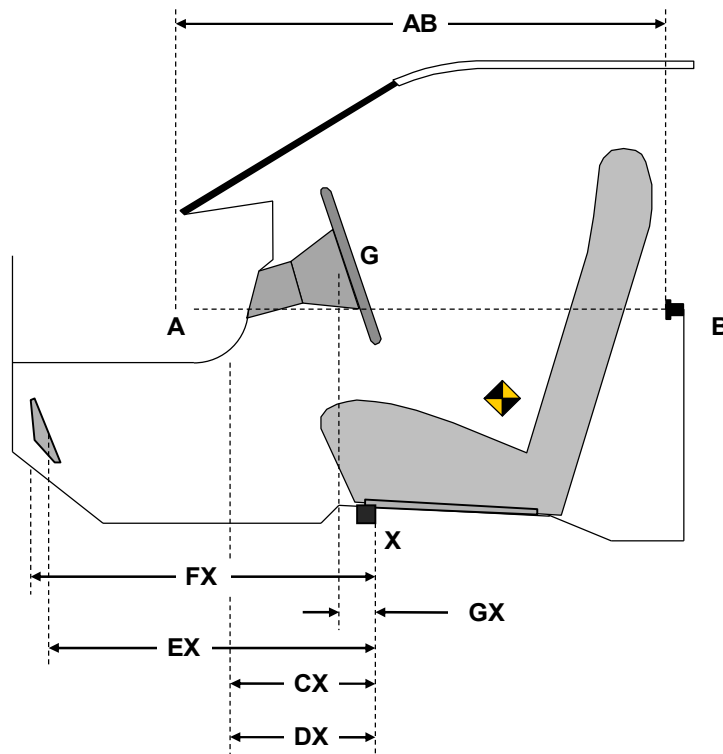
Test Vehicle: 2020 Kia Telluride LX AWD 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20204218
 Test Date: 11/7/2019

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	802	802	0
CX	Left Knee Bolster to X	mm	321	329	-8
DX	Right Knee Bolster to X	mm	323	326	-3
EX	Brake Pedal to X	mm	525	497	28
FX	Foot Rest to X	mm	534	527	7
GX	Center of Steering Column Wheel Hub to X	mm	41	100	-59

X = Front of Seat Track (stationary)



DRIVER COMPARTMENT

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

Test Vehicle: 2020 Kia Telluride LX AWD 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20204218
 Test Date: 11/7/2019

WINDSHIELD MOUNTING DETAILS

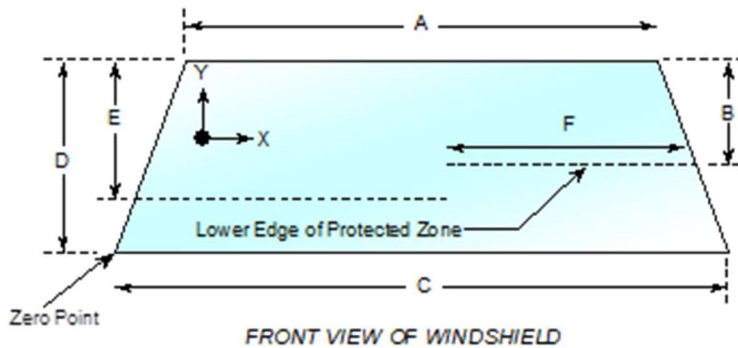
Windshield glass is secured to the vehicle frame with a rubber trim and glue.

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

Temperature of windshield molding during test: 21.5°C.

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% of Retention
Left Side	2331	2331	100
Right Side	2331	2331	100
Total	4662	4662	100



Item	Units	Value
A	mm	1344
B	mm	476
C	mm	1490
D	mm	914
E	mm	545
F	mm	552

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: 2020 Kia Telluride LX AWD 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20204218
 Test Date: 11/7/2019

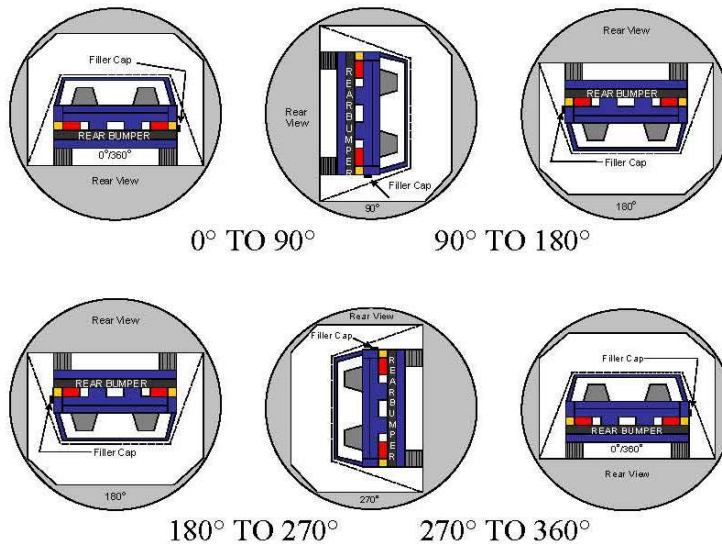
FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 21.5°C

Test Time: 15:56 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°	113	300	413
90° to 180°	113	300	413
180° to 270°	113	300	413
270° to 360°	114	300	414

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

Test Vehicle: 2020 Kia Telluride LX AWD 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20204218
 Test Date: 11/7/2019

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	

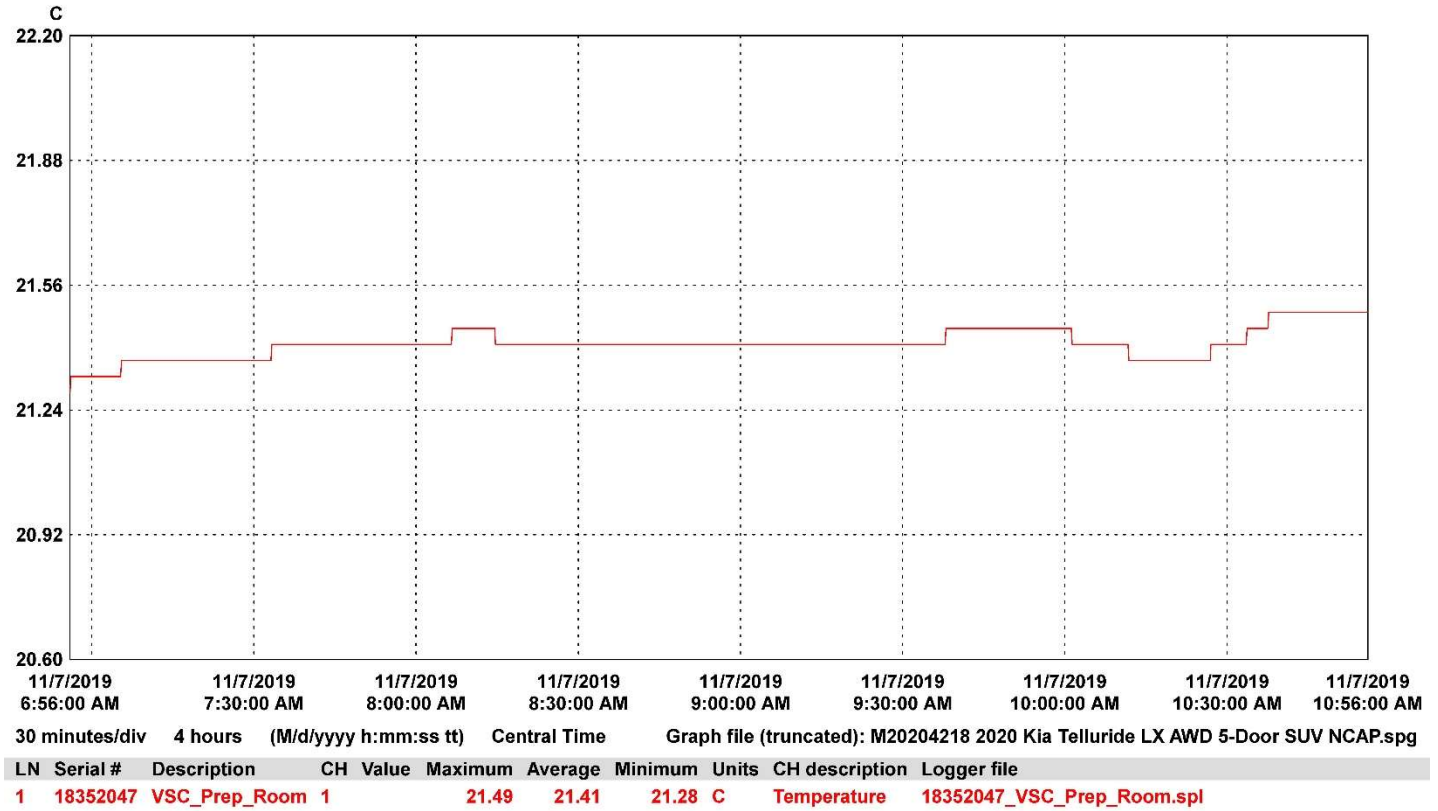
SOLVENT SPILLAGE LOCATION TABLE

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: 2020 Kia Telluride LX AWD 5-Door SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20204218
 Test Date: 11/7/2019



**APPENDIX A
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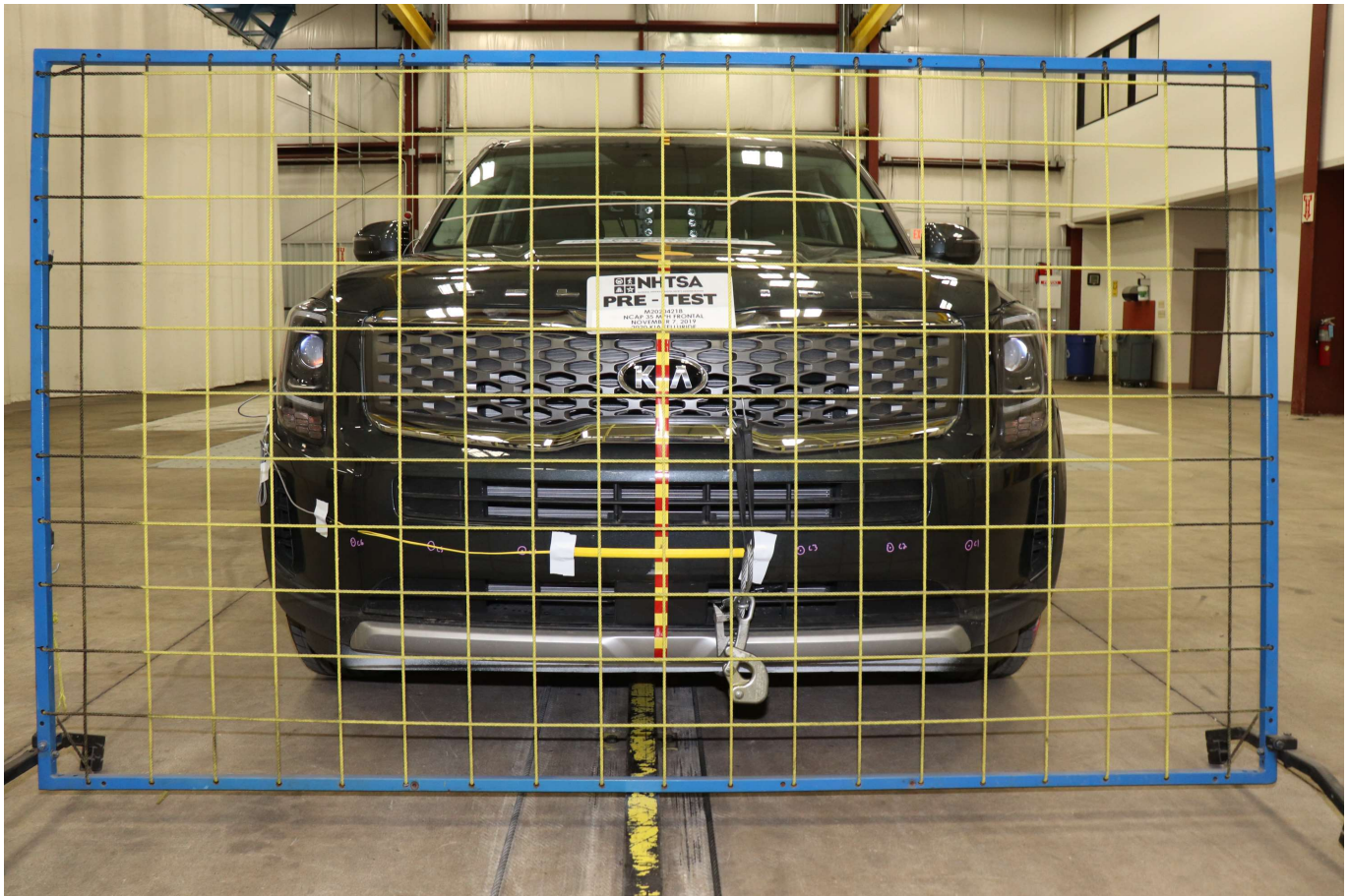


Photo No. 001 - Load Cell Location



Photo No. 002 - Pre-Test Load Cell Wall



Photo No. 003 - Post-Test Load Cell Wall



Photo No. 004 - Manufacturer Label



Photo No. 005 - Tire Placard



Photo No. 006 - 2020 Kia Telluride LX AWD 5-Door SUV Frontal As Delivered



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

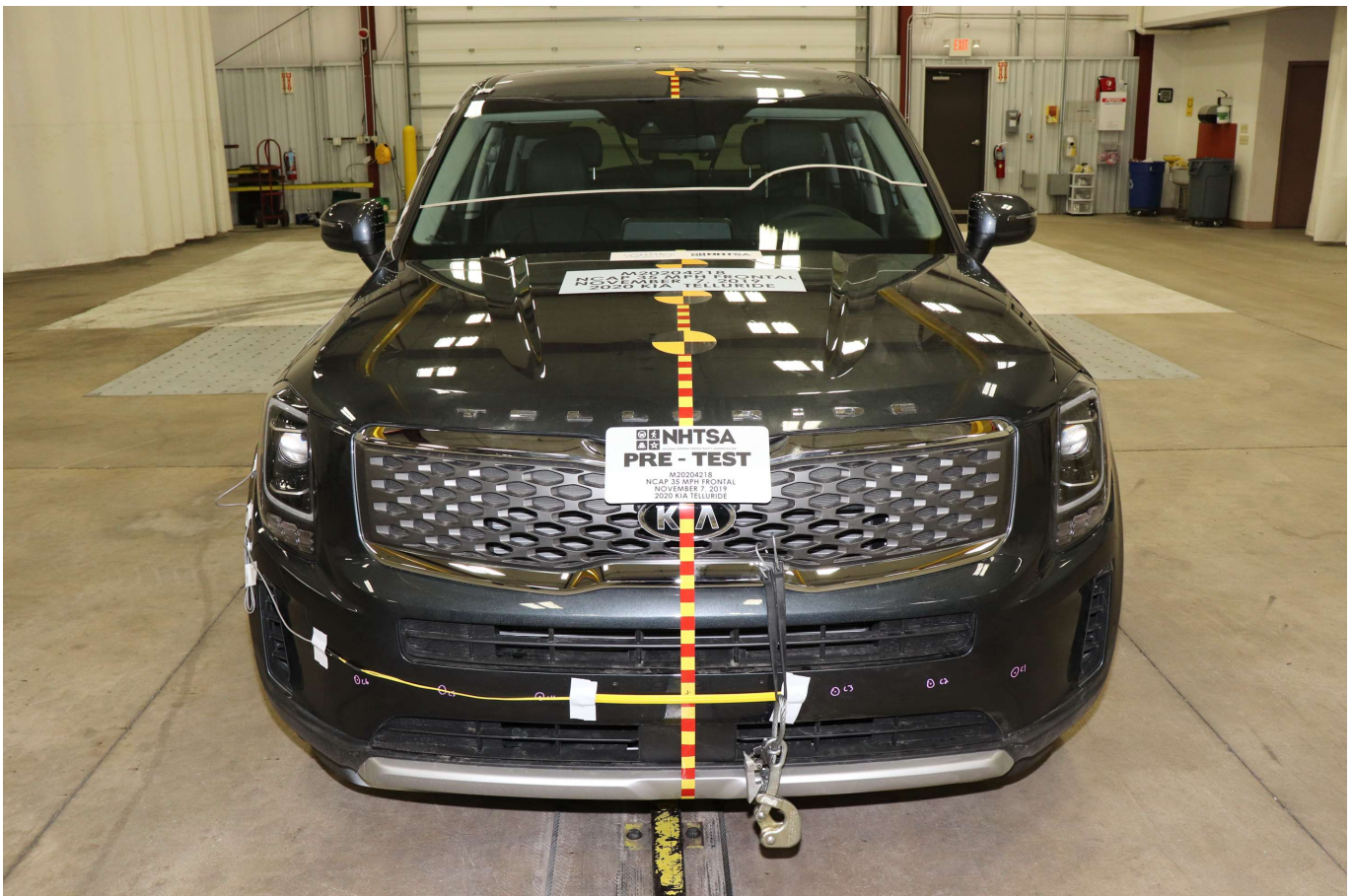


Photo No. 008 - Pre-Test Front View of Test Vehicle



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



Photo No. 021 - Post-Test Engine Compartment View



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



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

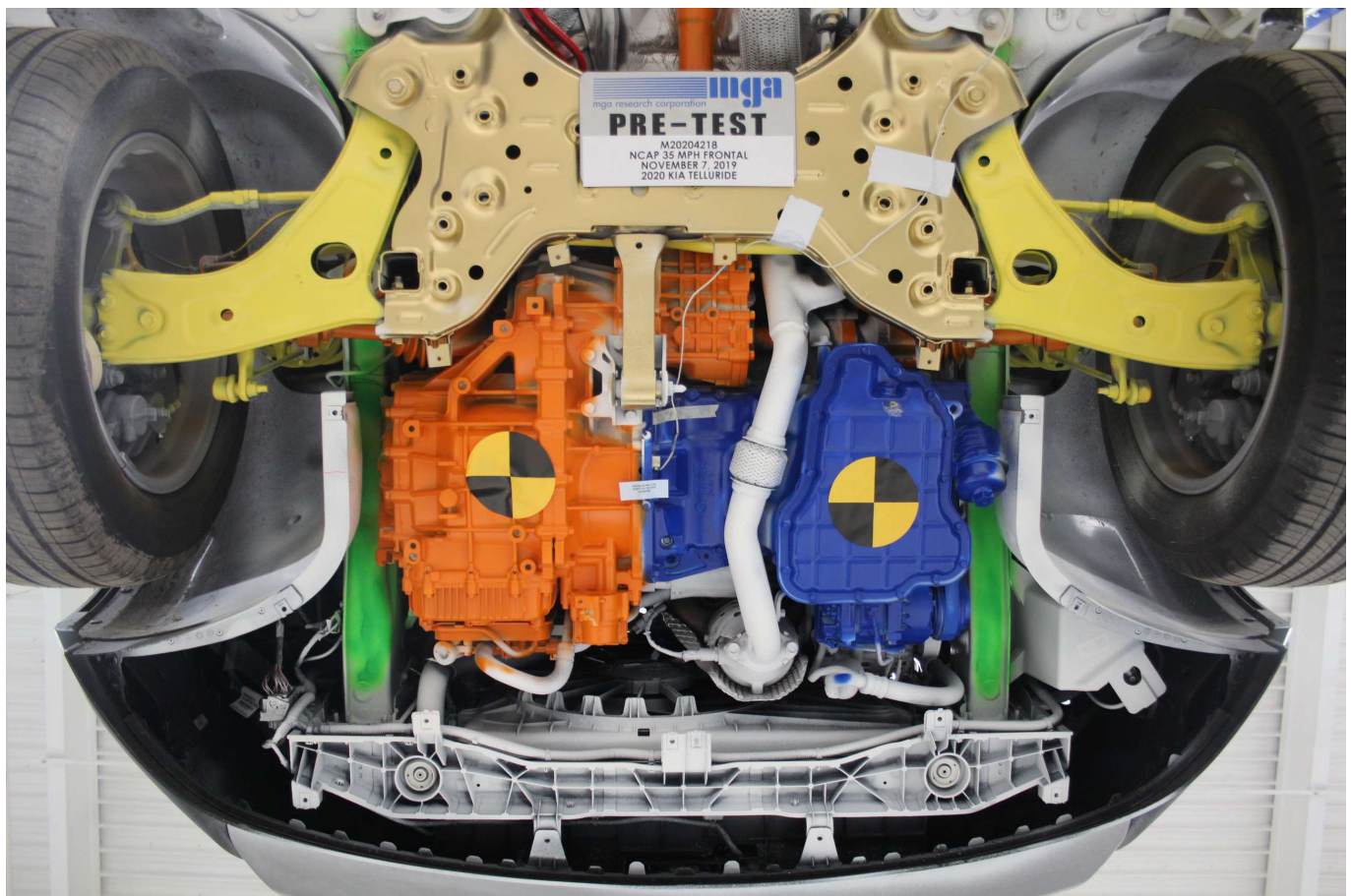


Photo No. 024 - Pre-Test Front Underbody View

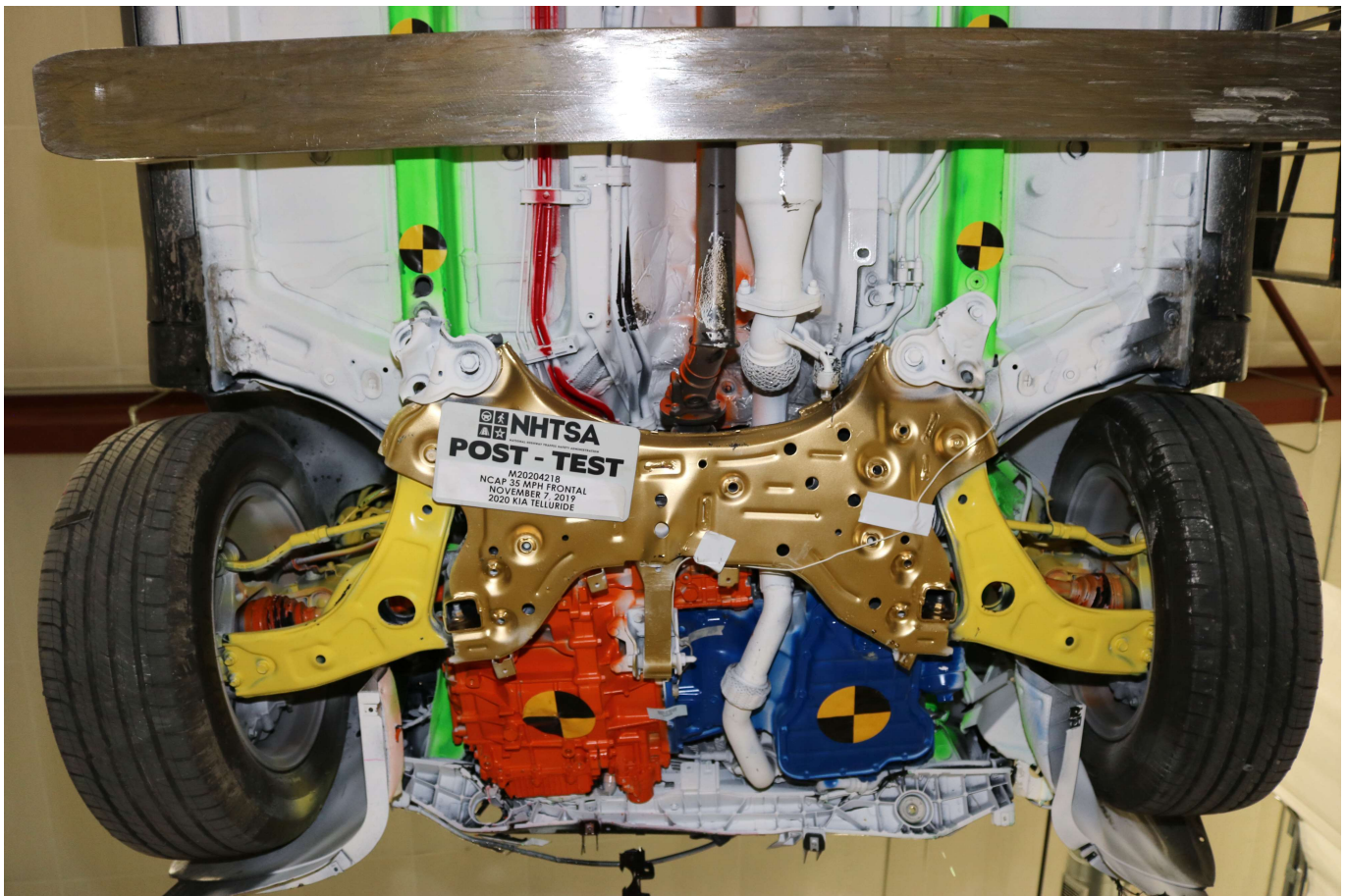


Photo No. 025 - Post-Test Front Underbody View



Photo No. 026 - Pre-Test Rear Underbody View



Photo No. 027 - Post-Test Rear Underbody View



Photo No. 028 - Pre-Test Dummy Cable Routing



Photo No. 029 - Post-Test Dummy Cable Routing



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



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



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



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



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



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



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



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



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



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



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



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



Photo No. 042 - Pre-Test Driver Dummy Feet



Photo No. 043 - Post-Test Driver Dummy Feet



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



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



Photo No. 046 - Pre-Test Driver Side Floorpan



Photo No. 047 - Post-Test Driver Side Floorpan



Photo No. 048 - Post-Test Driver Dummy Face



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



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

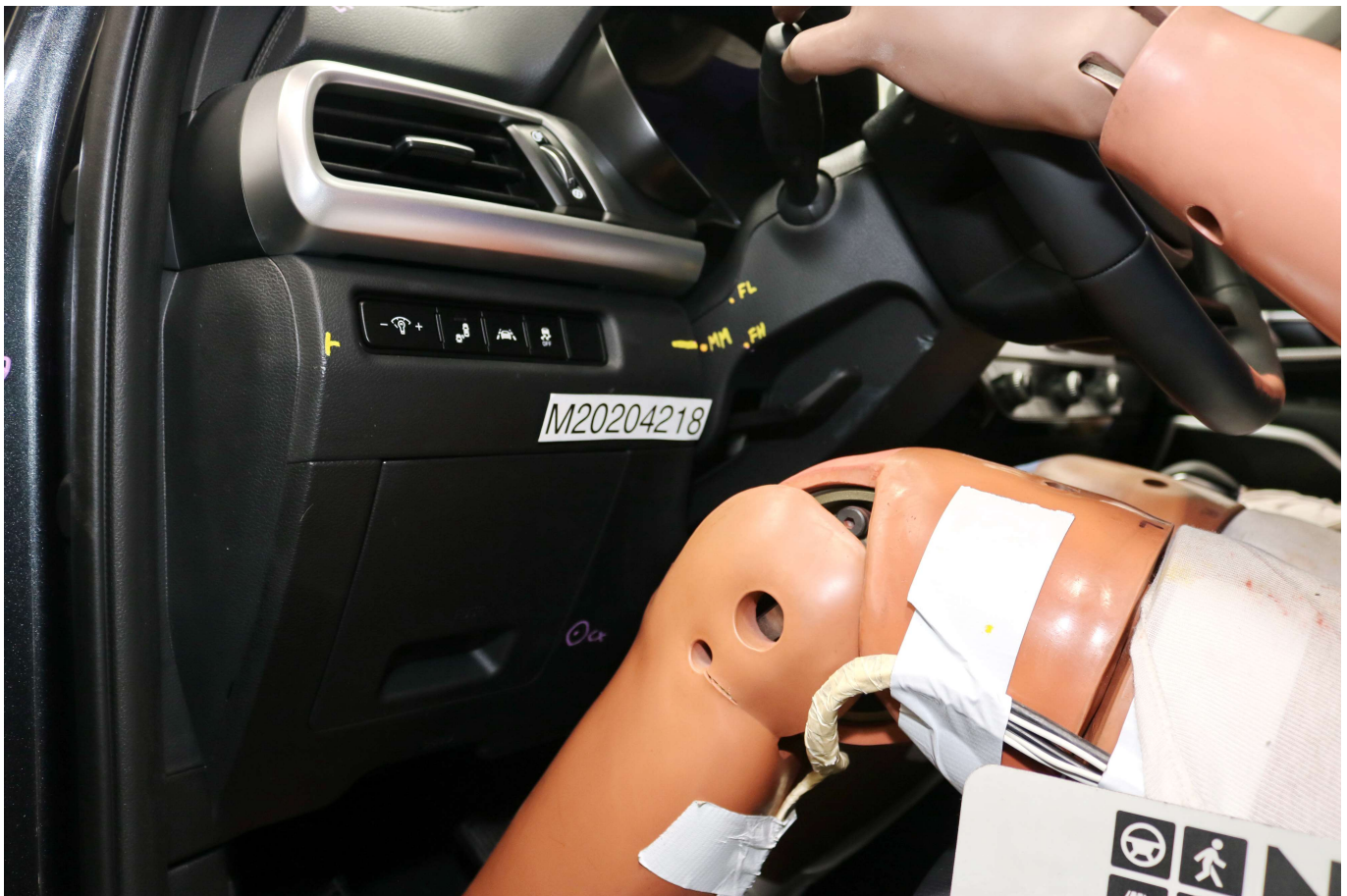


Photo No. 051 - Pre-Test View of the Steering Wheel



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



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



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



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



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



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



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



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



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



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



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



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



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



Photo No. 065 - Pre-Test Passenger Dummy Feet



Photo No. 066 - Post-Test Passenger Dummy Feet



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



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



Photo No. 069 - Pre-Test Passenger Side Floorpan



Photo No. 070 - Post-Test Passenger Side Floorpan



Photo No. 071 - Post-Test Passenger Dummy Face



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



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



Photo No. 074 - Ballast Installed in Vehicle

PHOTOGRAPH NOT APPLICABLE

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



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



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

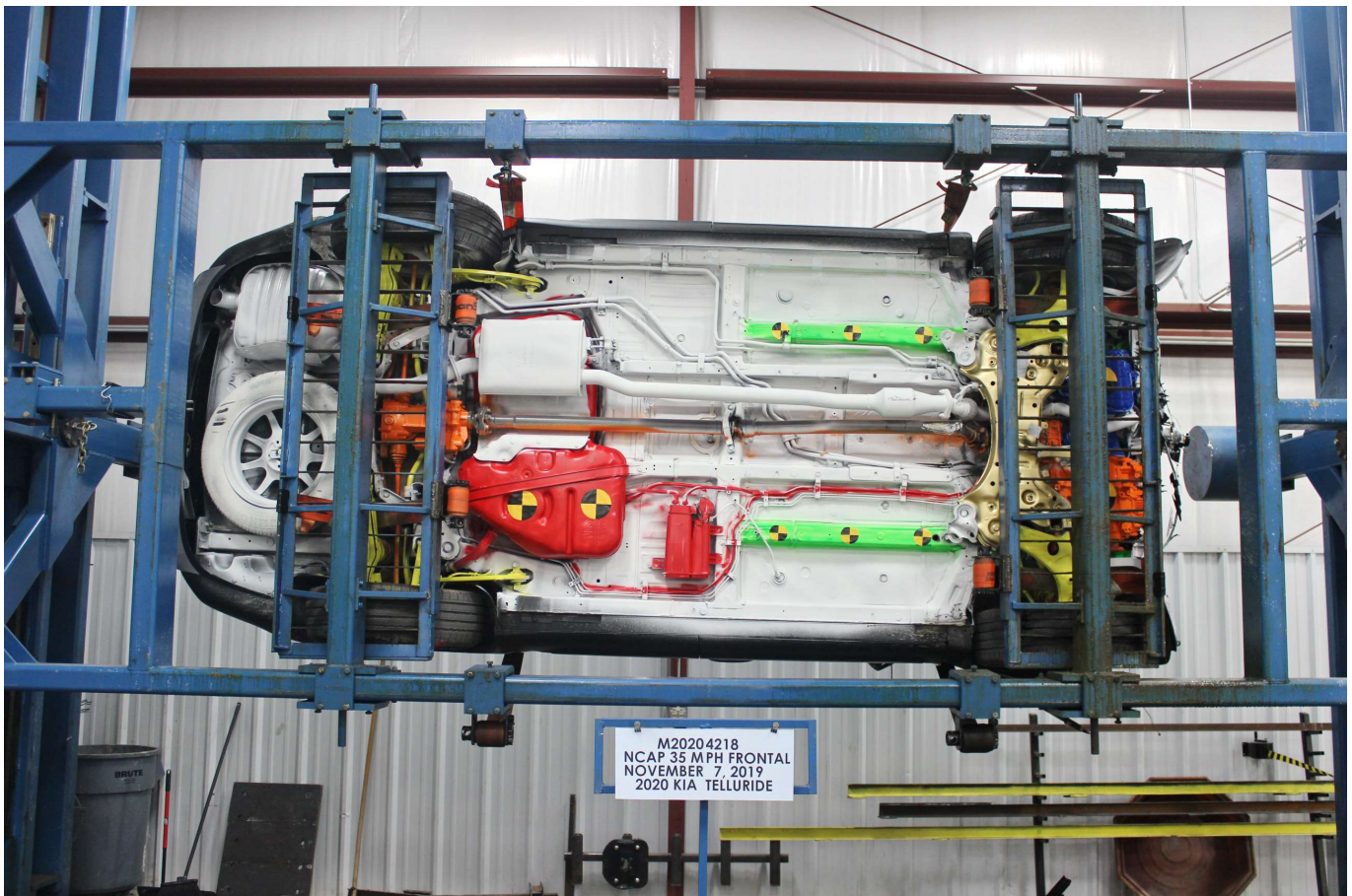


Photo No. 078 - Vehicle at 90 Degrees on Static Rollover Device



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



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



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



Photo No. 082 - 2020 Kia Telluride LX AWD 5-Door SUV Frontal Impact Event

2020 TELLURIDE LX V6 AWD MODEL/OPT.CODE: J4422 / 010 EXTERIOR COLOR: GRAVITY GREY INTERIOR COLOR: BLACK VEHICLE ID NUMBER: 5XYP2DHC9LG048982 PORT OF ENTRY: WEST POINT		Sold To: NY096 Maguire Kia 370 ELMIRA ROAD ITHACA NY 14850 Ship To: NY096																											
STANDARD FEATURES MECHANICAL 3.8L Gas Direct Injection (GDI) 6-Cyl Engine 8-Speed Automatic Transmission Active On-Demand All Wheel Drive 18" Alloy Wheels SAFETY Dual Front Advanced Airbags Dual Front Seat-Mounted Side & Full-Length Curtain Airbags Electronic Stability Control (ESC) Vehicle Stability Management (VSM) Tire Pressure Monitoring System (TPMS) INTERIOR, COMFORT & CONVENIENCE SOFINO Leatherette Seat Trim Blind-Spot Collision-Avoidance Assist-Rear (BCA-R) Rear Cross-Traffic Collision-Avoidance Assist (RCCA) Forward Collision Avoidance Assist (FCA) Lane Keeping Assist (LKA) Parking Distance Warning-Reverse (PDW-R) Smart Cruise Control w/ Stop & Go (SCC w/ S&G) Rear Occupant Alert w/ Ultrasonic Sensors (ROA) Safe Exit Assist (SEA) Smart Key with Push Button Start UVO link [^] [^] Includes 1 year service; see owners.kia.com for details - IMPORTANT No Support for Remote Climate Control AM/FM w/ 8" Touchscreen & Rearview Camera Android Auto & Apple CarPlay Smartphone Integration SIRIUSXM [®] w/free 3-mo. subscription* 1 USB Input Jack and 5 USB Charging Ports Bluetooth [®] Wireless Technology 60/40 Split-Folding 2nd Row Seats, which includes: - One-Touch Slide & Fold 2nd Row Seats 60/40 Split-Folding 3rd Row Seats Leather-Wrapped Steering Wheel w/ Remote Controls EXTERIOR Acoustic Front Windshield Heated Outside Mirrors w/ Turn Signal Indicators Rear Privacy Glass WARRANTY 10 Year/100,000 Mile Limited Powertrain Warranty 5 Year/60,000 Mile Limited Basic Warranty 5 Year/60,000 Mile Roadside Assistance *Ask dealer for details		MANUFACTURER'S SUGGESTED RETAIL PRICE ▶ \$ 33,690.00 ADDITIONAL INSTALLED EQUIPMENT: (In addition to or in place of standard features) Carpeted Floor Mats Cargo Tray \$210.00 \$115.00		EPA DOT Fuel Economy and Environment Gasoline Vehicle Fuel Economy  Annual fuel cost \$1,950 Fuel Economy & Greenhouse Gas Rating (tailpipe only) Smog Rating (tailpipe only)  Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 27 MPG and costs \$7,500 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$ 2.70 per gallon. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog. fueleconomy.gov Calculate personalized estimates and compare vehicles 																									
MSRP INCLUDING OPTIONS \$ 34,015.00 INLAND FREIGHT AND HANDLING \$ 1,095.00 TOTAL MANUFACTURER'S SUGGESTED RETAIL PRICE ▶ \$ 35,110.00		GOVERNMENT 5-STAR SAFETY RATINGS Overall Vehicle Score Not Rated Based on the combined rating of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight. <table border="1"> <tr> <td>Frontal</td> <td>Driver</td> <td>Not Rated</td> </tr> <tr> <td>Crash</td> <td>Passenger</td> <td>Not Rated</td> </tr> <tr> <td colspan="3">Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.</td> </tr> <tr> <td>Side</td> <td>Front seat</td> <td>Not Rated</td> </tr> <tr> <td>Crash</td> <td>Rear seat</td> <td>Not Rated</td> </tr> <tr> <td colspan="3">Star ratings based on the risk of injury in a side impact.</td> </tr> <tr> <td>Rollover</td> <td></td> <td>Not Rated</td> </tr> <tr> <td colspan="3">Star ratings based on the risk of rollover in a single-vehicle crash.</td> </tr> </table> Star ratings range from 1 to 5 stars (★★★★★) with 5 being the highest. Source: National Highway Traffic Safety Administration (NHTSA). www.safercar.gov or 1-888-327-4236 Manufacturer's suggested retail price includes Manufacturer's recommended pre-delivery service. License and title fees, state and local taxes and other dealer installed options and accessories are not included in the manufacturer's suggested retail price.		Frontal	Driver	Not Rated	Crash	Passenger	Not Rated	Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.			Side	Front seat	Not Rated	Crash	Rear seat	Not Rated	Star ratings based on the risk of injury in a side impact.			Rollover		Not Rated	Star ratings based on the risk of rollover in a single-vehicle crash.			PARTS CONTENT INFORMATION FOR VEHICLES IN THIS CAR LINE U.S./CANADIAN PARTS CONTENT: 51 % MAJOR SOURCES OF FOREIGN PARTS: KOREA: 49% NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS. FOR THIS VEHICLE FINAL ASSEMBLY POINT: WEST POINT, GA, USA COUNTRY OF ORIGIN ENGINE: KOREA TRANSMISSION: USA	
Frontal	Driver	Not Rated																											
Crash	Passenger	Not Rated																											
Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.																													
Side	Front seat	Not Rated																											
Crash	Rear seat	Not Rated																											
Star ratings based on the risk of injury in a side impact.																													
Rollover		Not Rated																											
Star ratings based on the risk of rollover in a single-vehicle crash.																													
TOTAL ADDITIONAL WEIGHT: 16.9																													

Photo No. 083 - Monroney Label Photograph

APPENDIX B
DUMMY RESPONSE DATA TRACES

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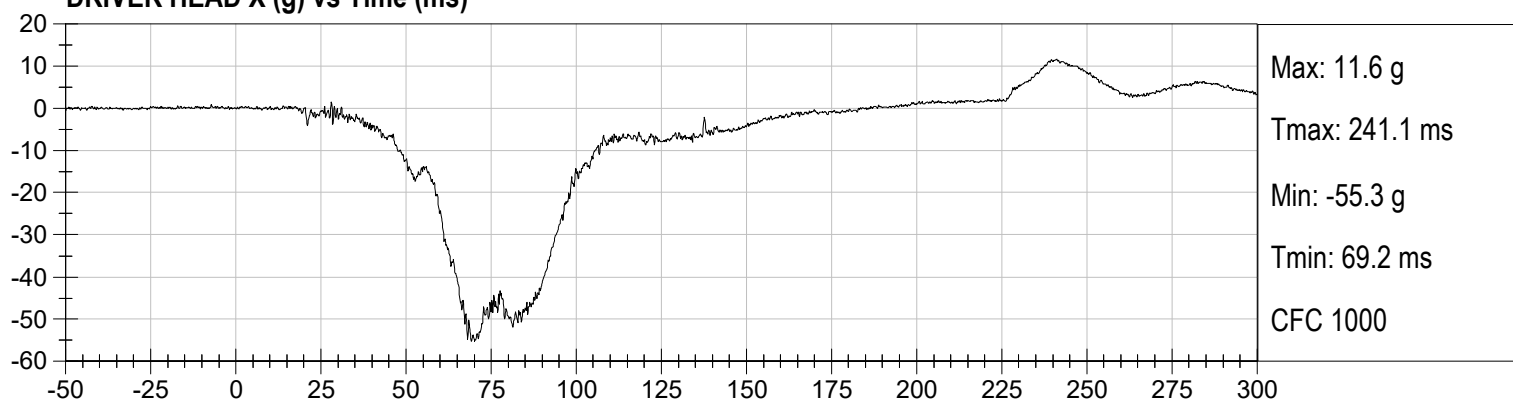
The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at www.nhtsa.gov

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

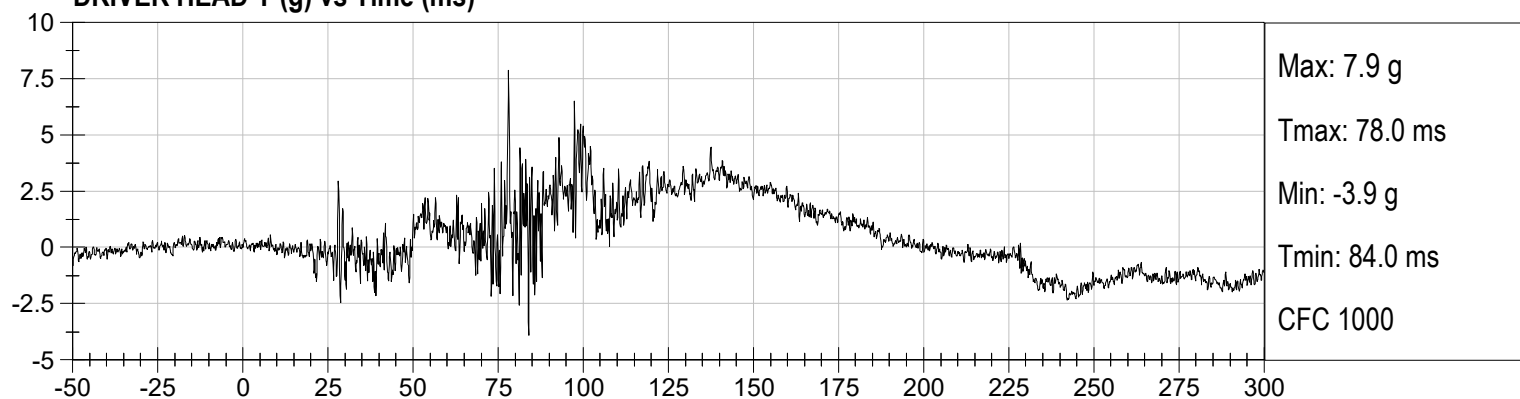
Driver Left Upper Tibia Force Z
Driver Left Lower Tibia Moment X
Driver Left Lower Tibia Moment Y
Driver Left Lower Tibia Force Z
Driver Right Upper Tibia Moment X
Driver Right Upper Tibia Moment Y
Driver Right Upper Tibia Force Z
Driver Right Lower Tibia Moment X
Driver Right Lower Tibia Moment Y
Driver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

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

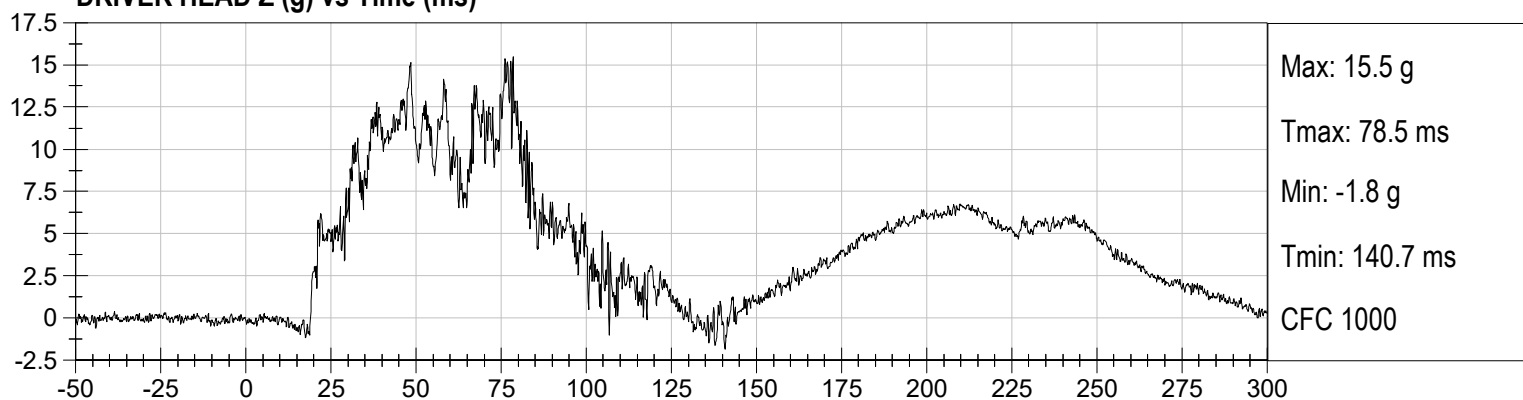
DRIVER HEAD X (g) vs Time (ms)



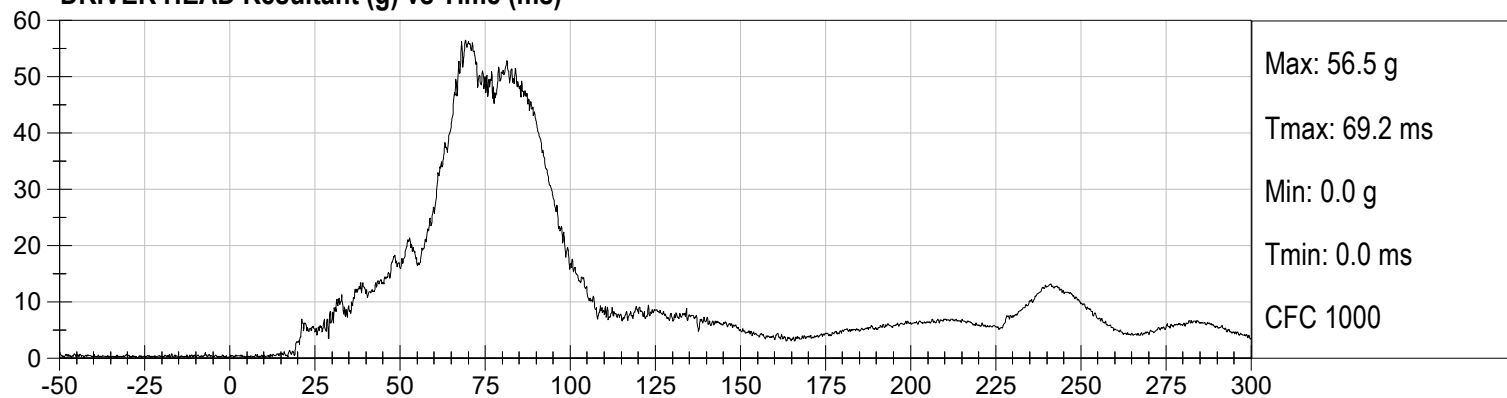
DRIVER HEAD Y (g) vs Time (ms)

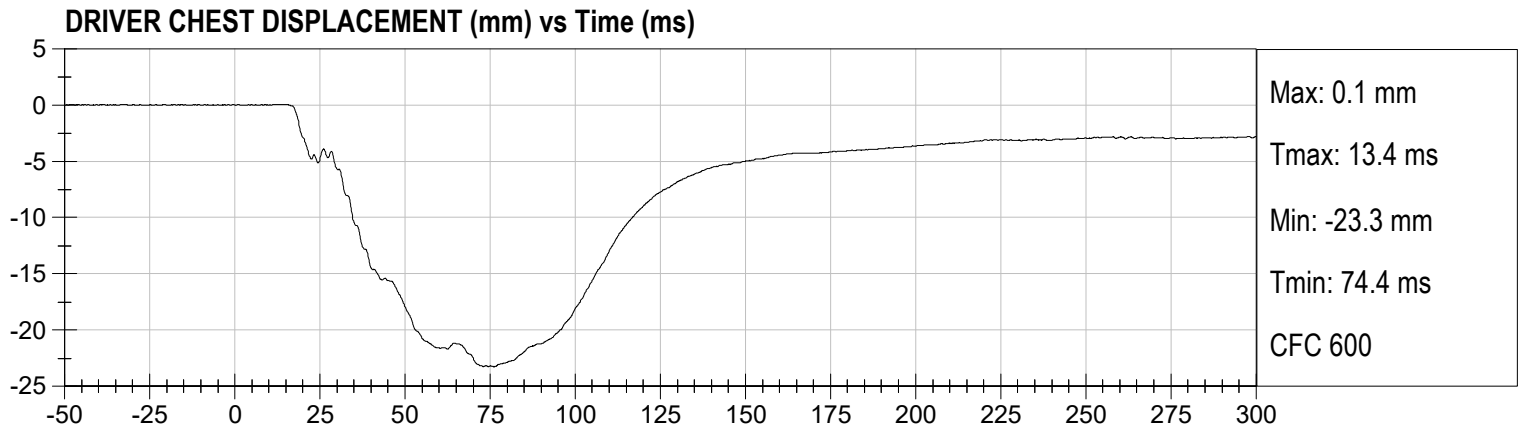


DRIVER HEAD Z (g) vs Time (ms)

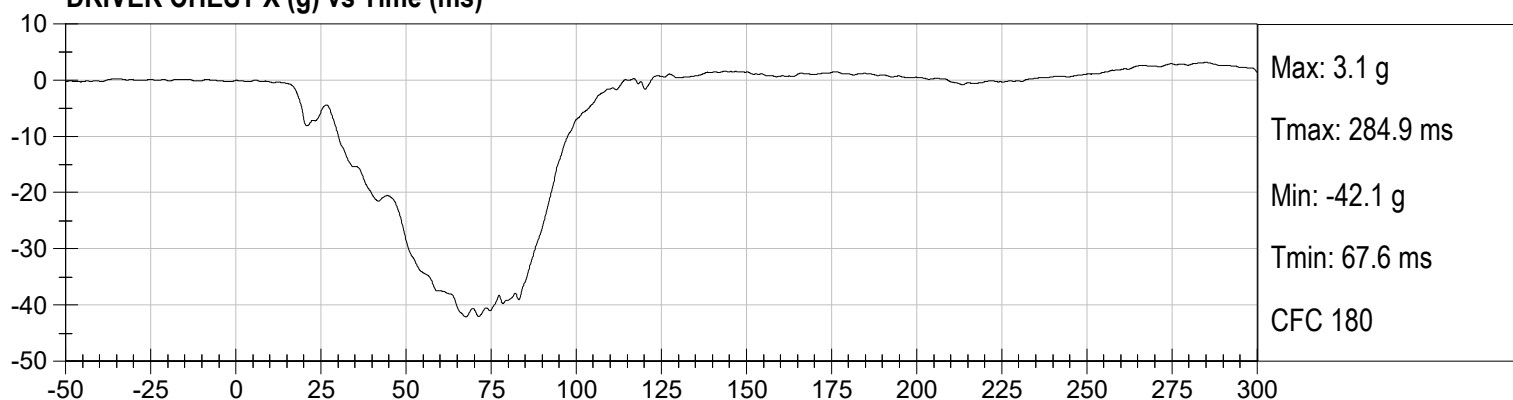


DRIVER HEAD Resultant (g) vs Time (ms)

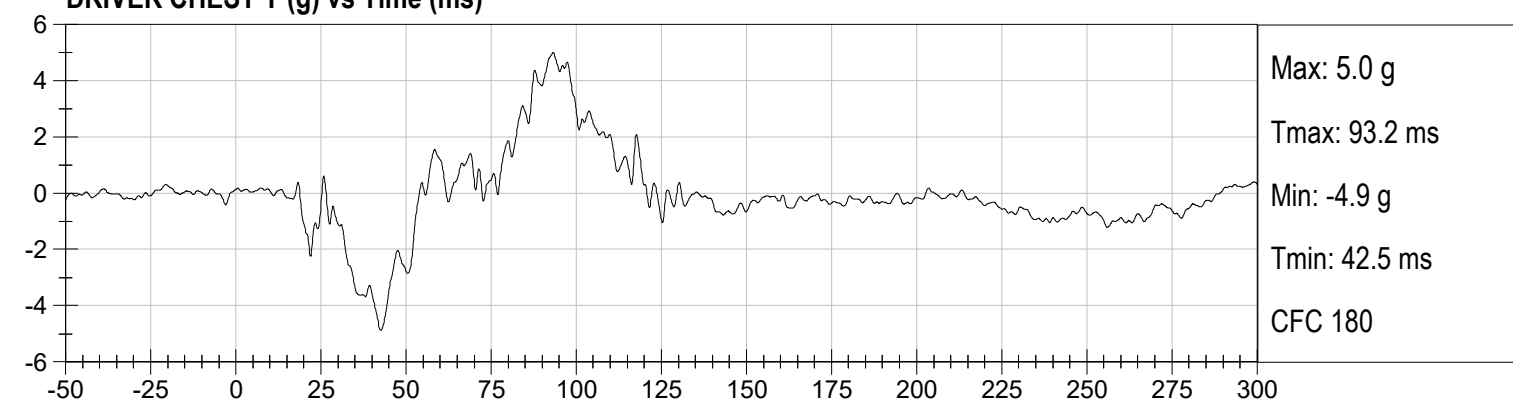




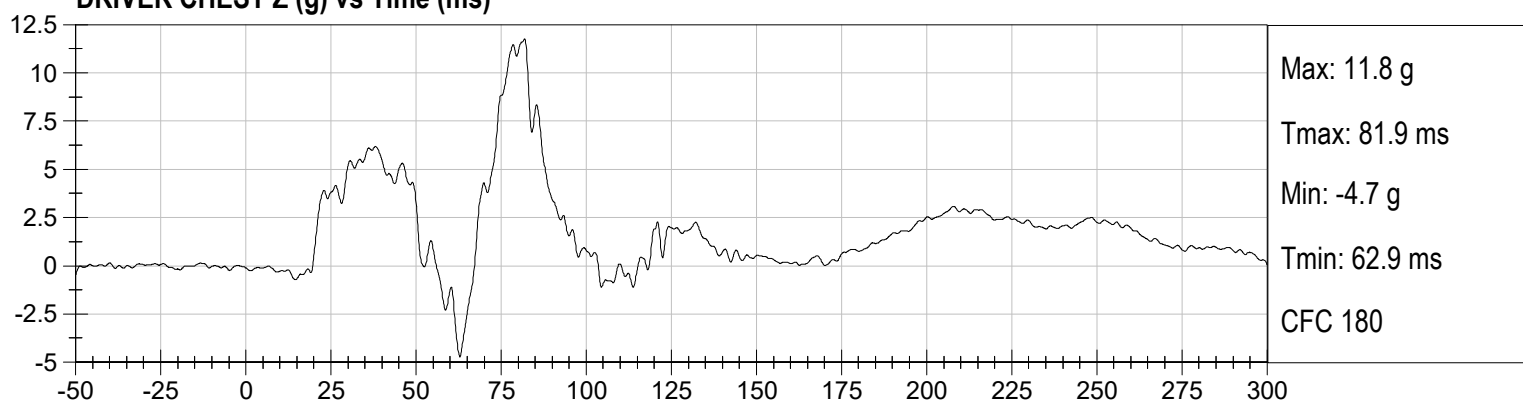
DRIVER CHEST X (g) vs Time (ms)



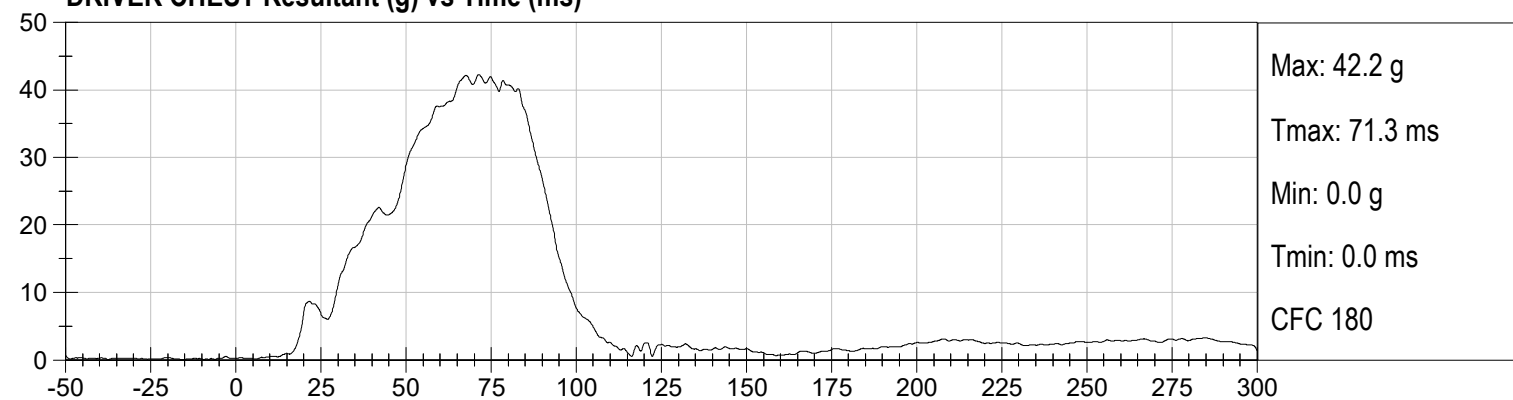
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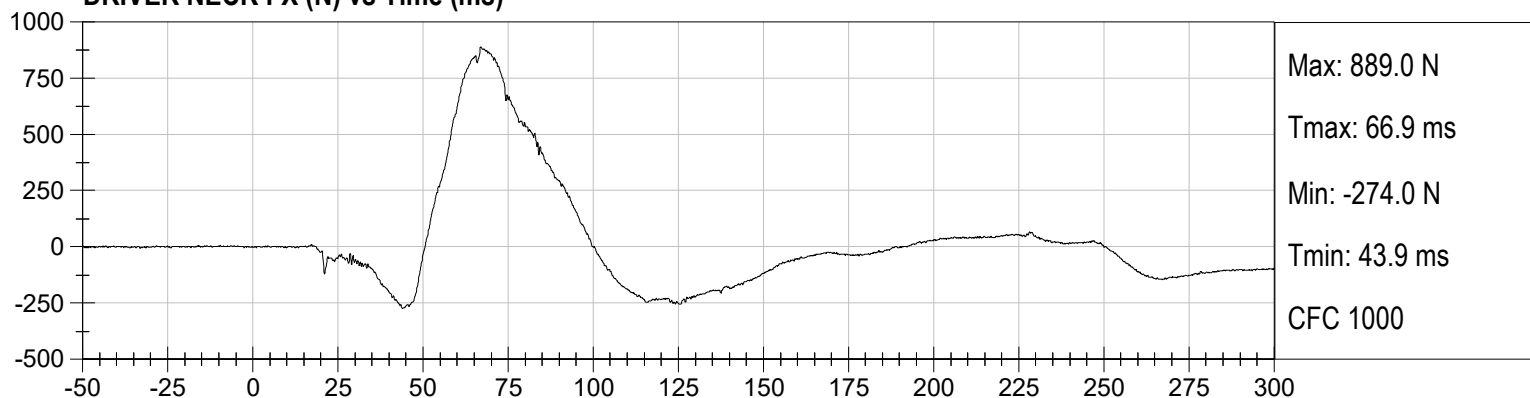
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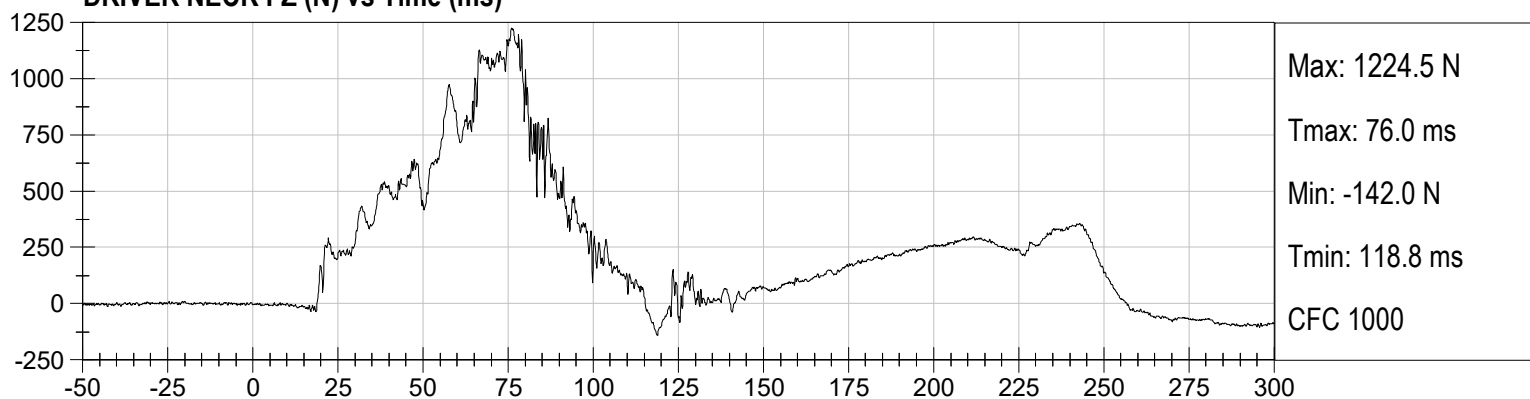
DRIVER CHEST Resultant (g) vs Time (ms)



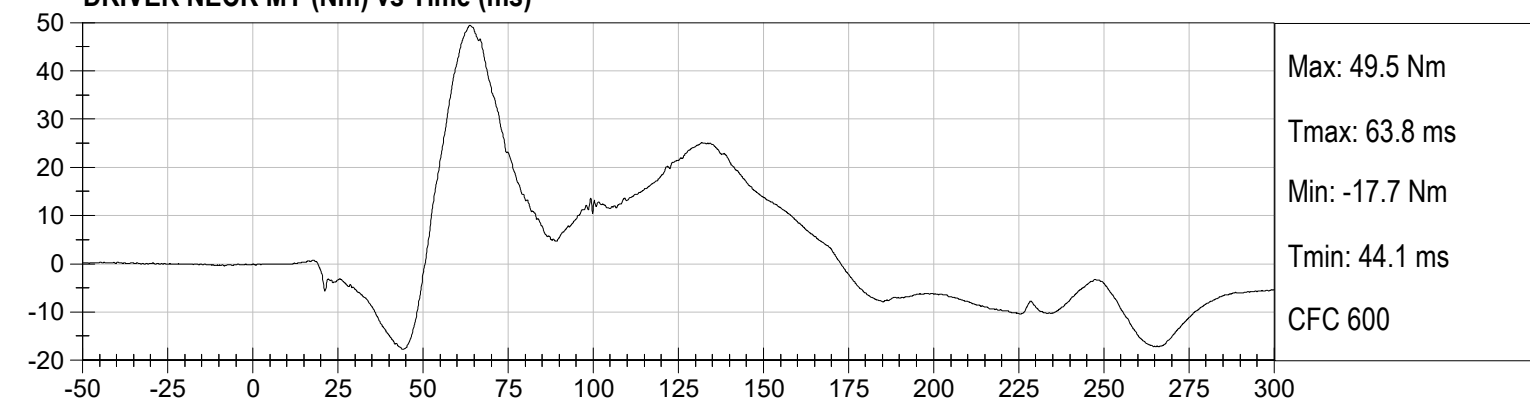
DRIVER NECK FX (N) vs Time (ms)



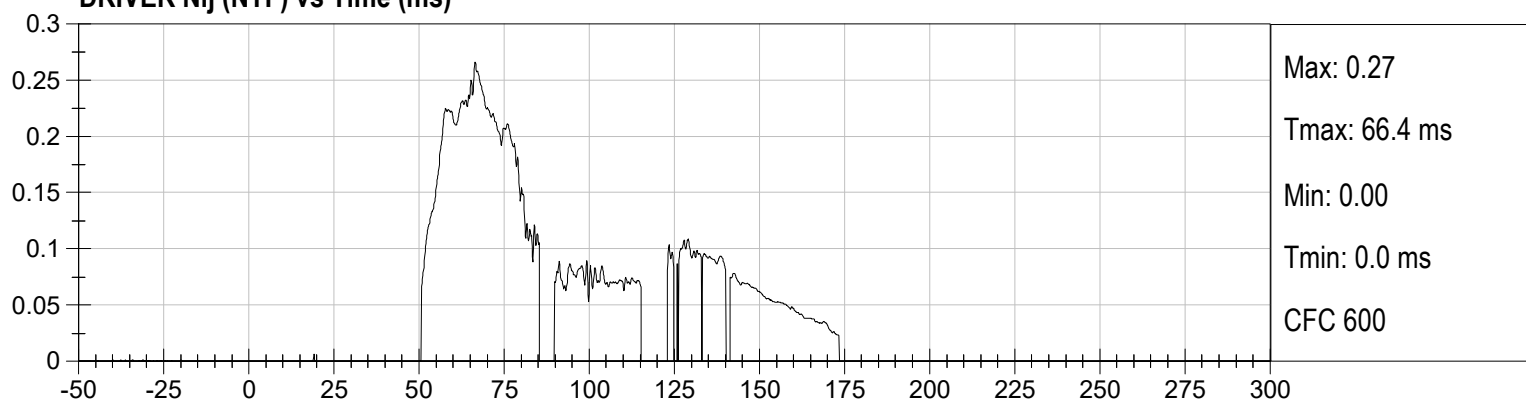
DRIVER NECK FZ (N) vs Time (ms)



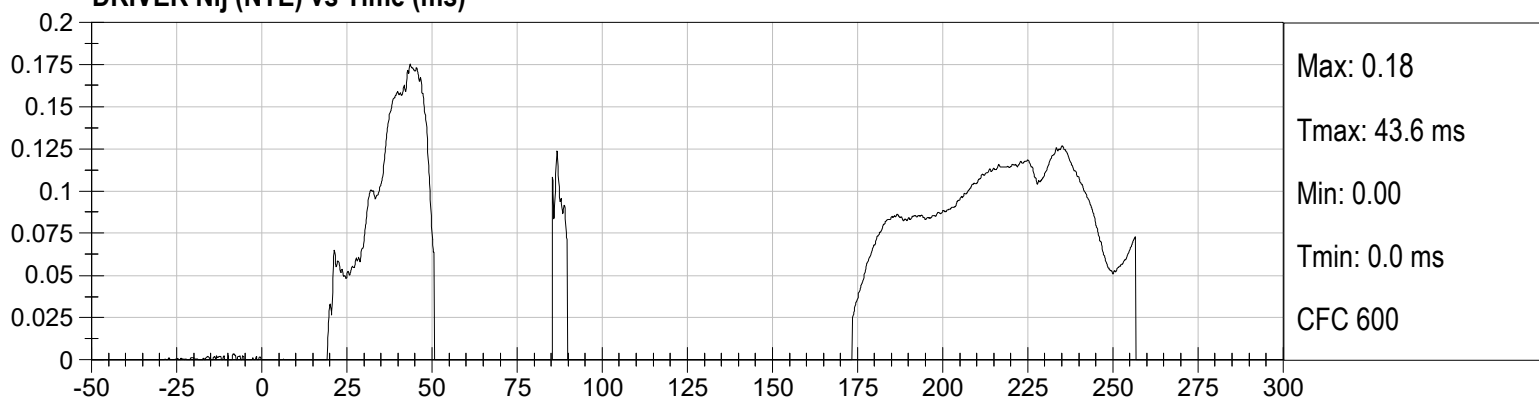
DRIVER NECK MY (Nm) vs Time (ms)



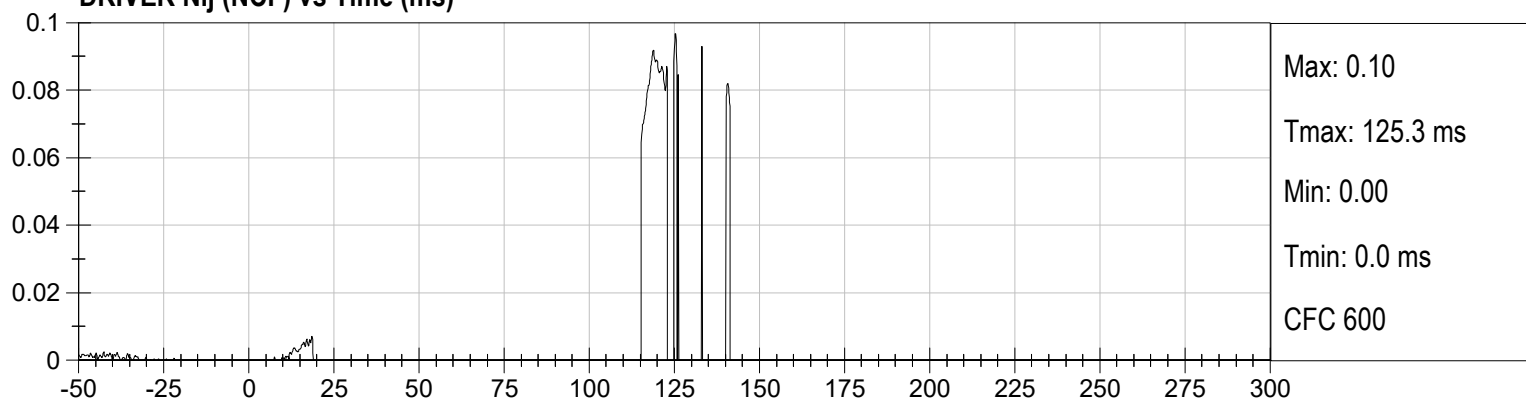
DRIVER Nij (NTF) vs Time (ms)



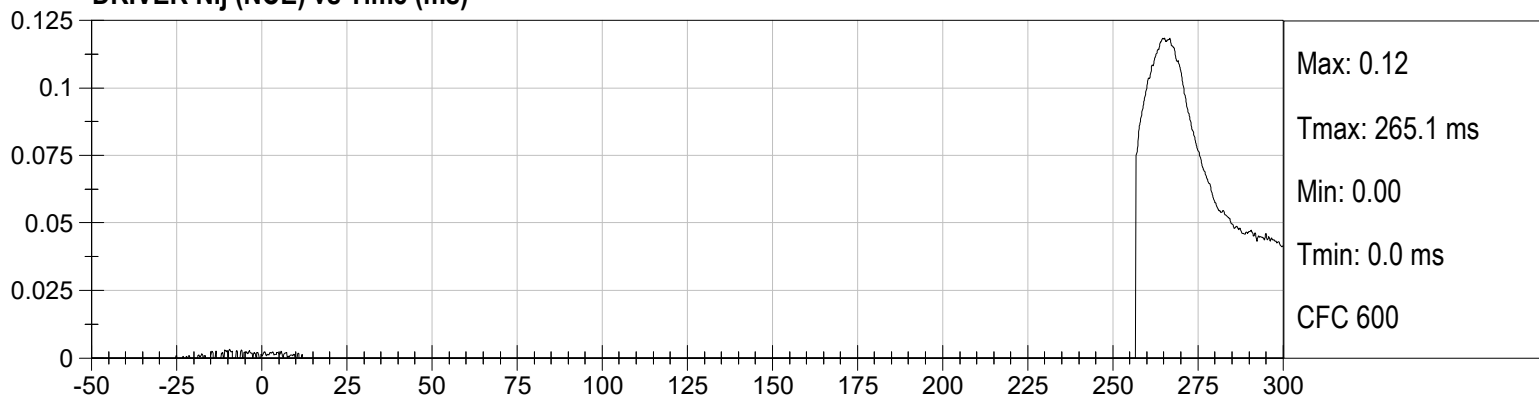
DRIVER Nij (NTE) vs Time (ms)



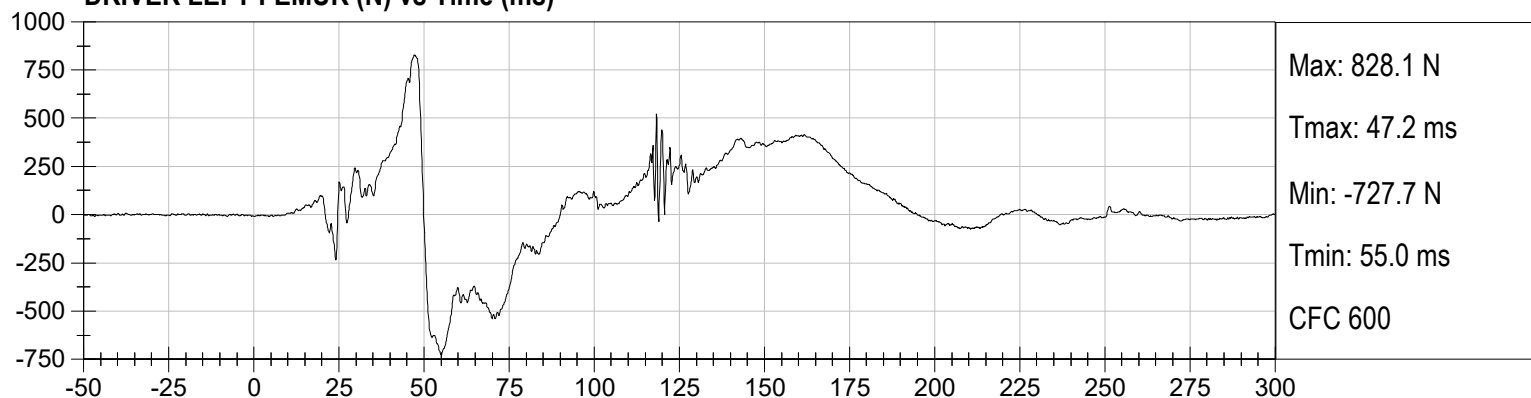
DRIVER Nij (NCF) vs Time (ms)



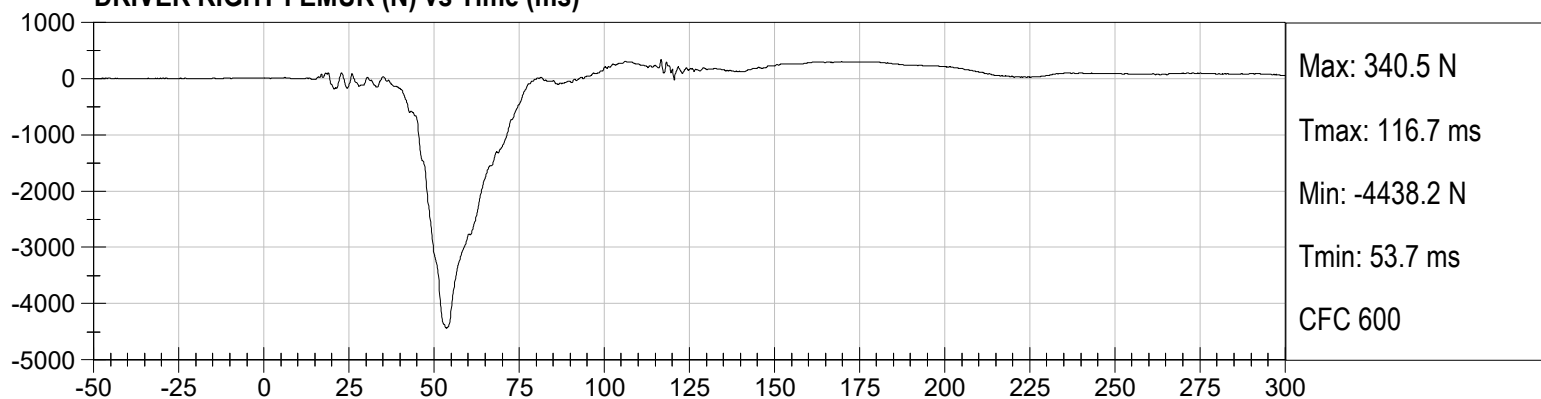
DRIVER Nij (NCE) vs Time (ms)



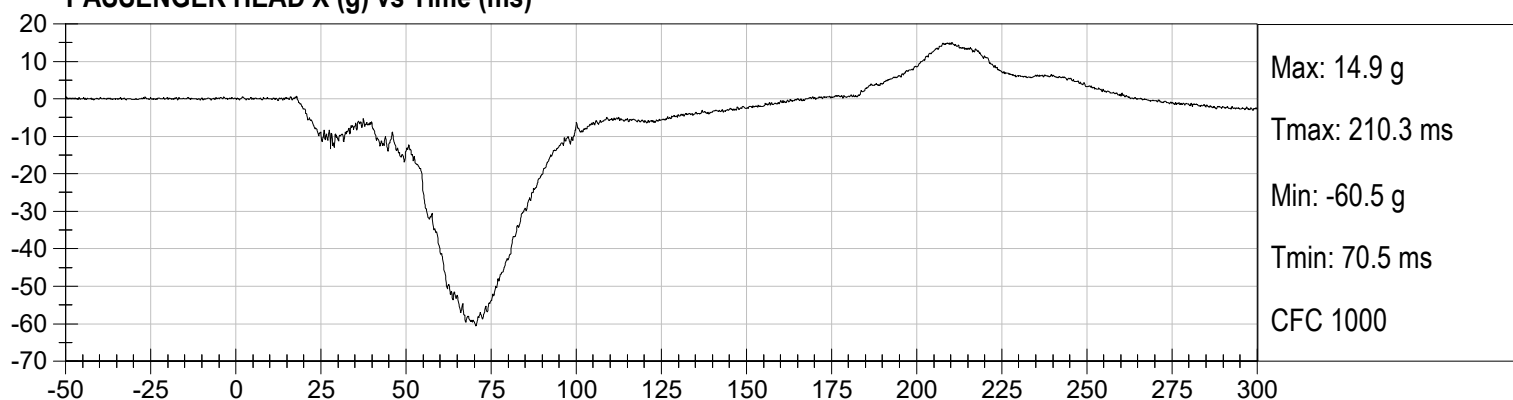
DRIVER LEFT FEMUR (N) vs Time (ms)



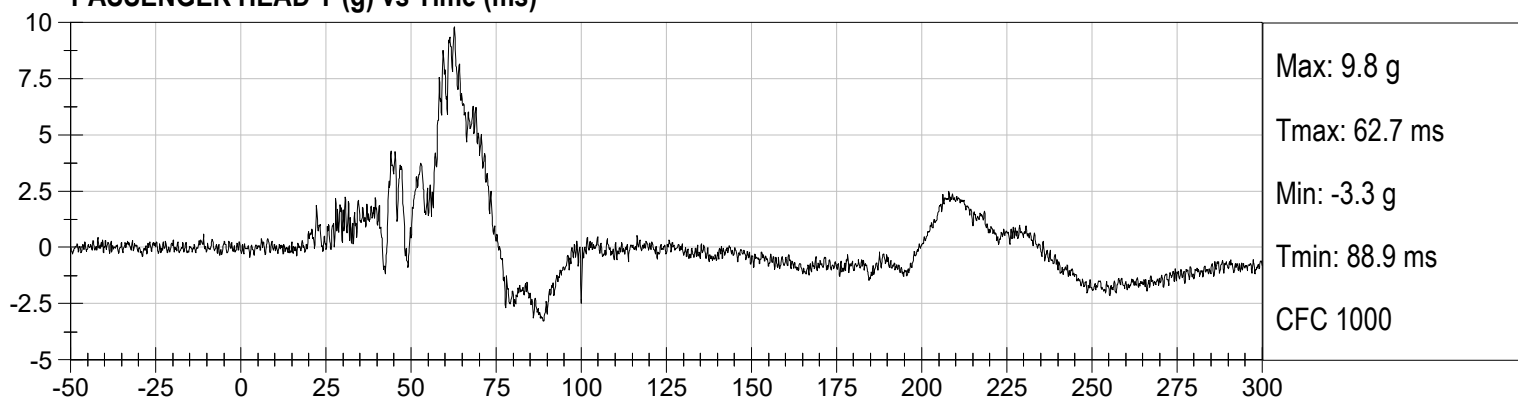
DRIVER RIGHT FEMUR (N) vs Time (ms)



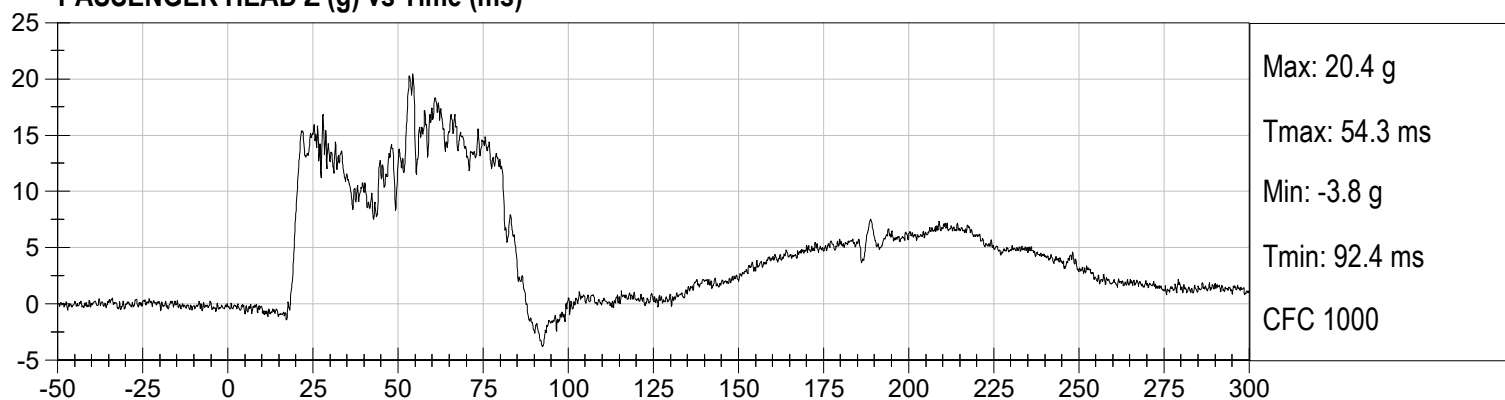
PASSENGER HEAD X (g) vs Time (ms)



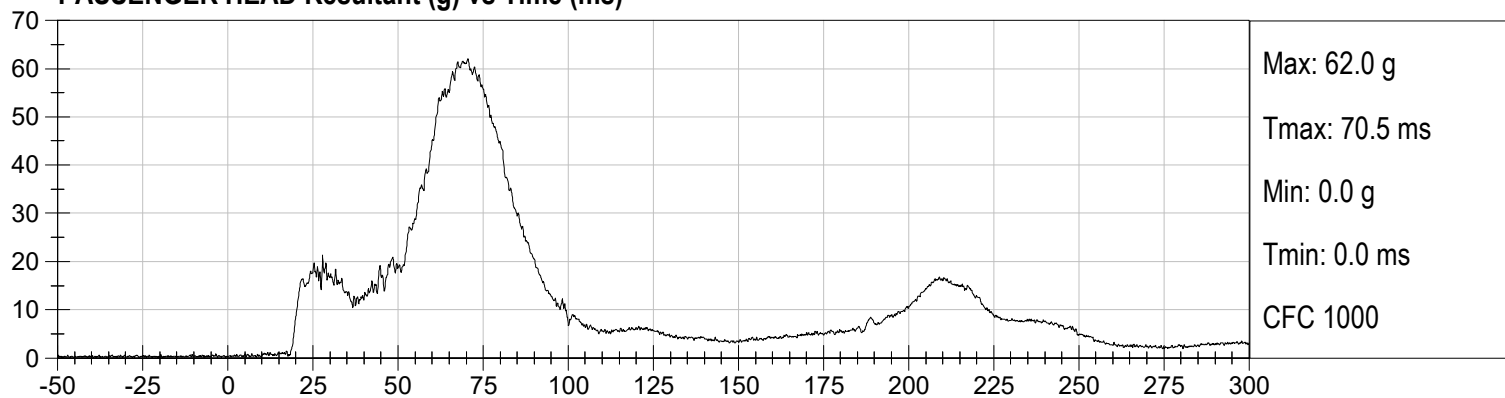
PASSENGER HEAD Y (g) vs Time (ms)

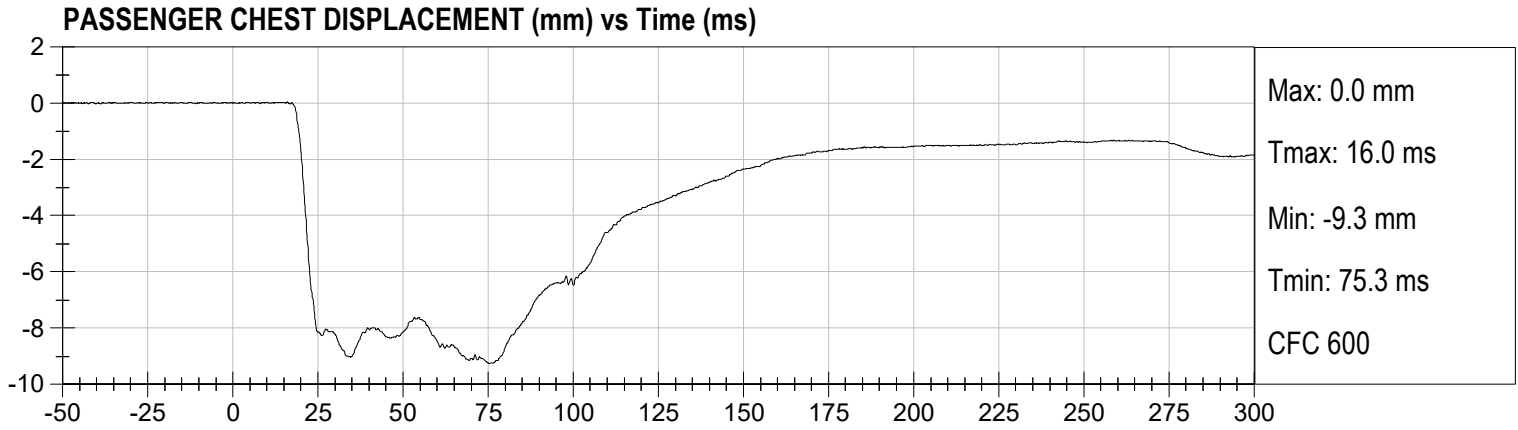


PASSENGER HEAD Z (g) vs Time (ms)

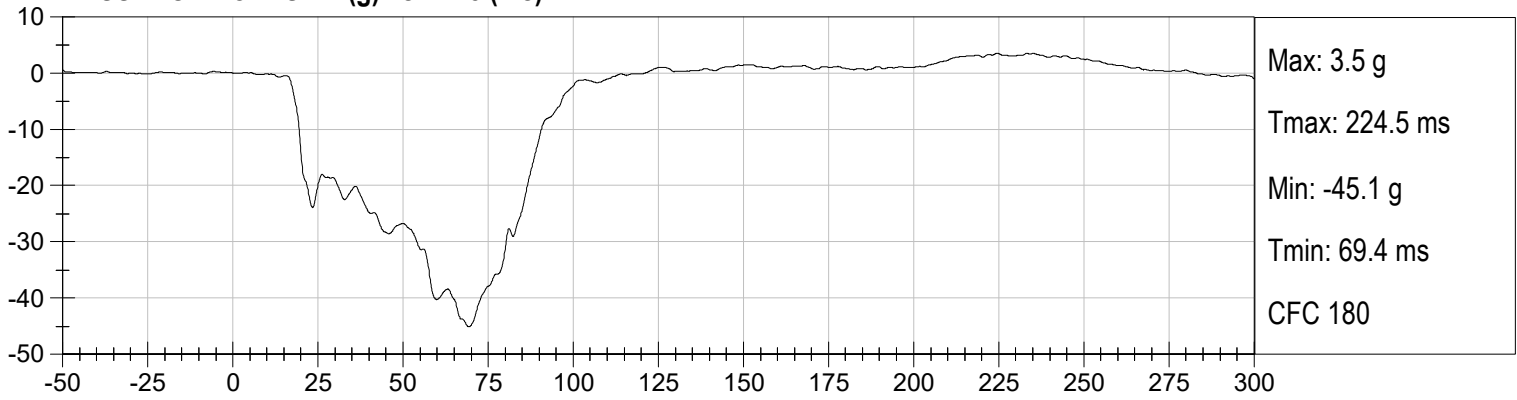


PASSENGER HEAD Resultant (g) vs Time (ms)

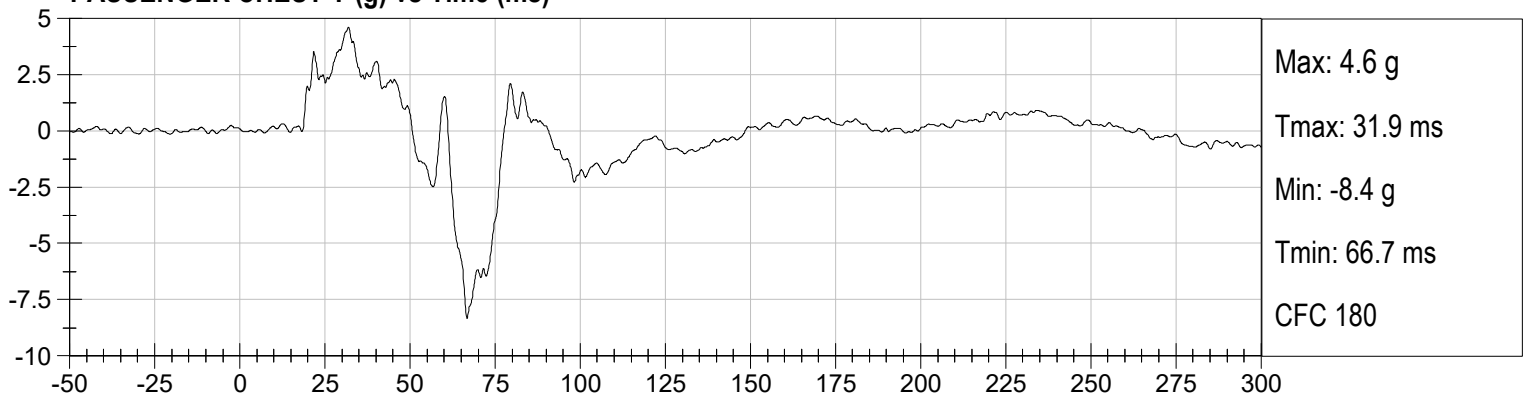




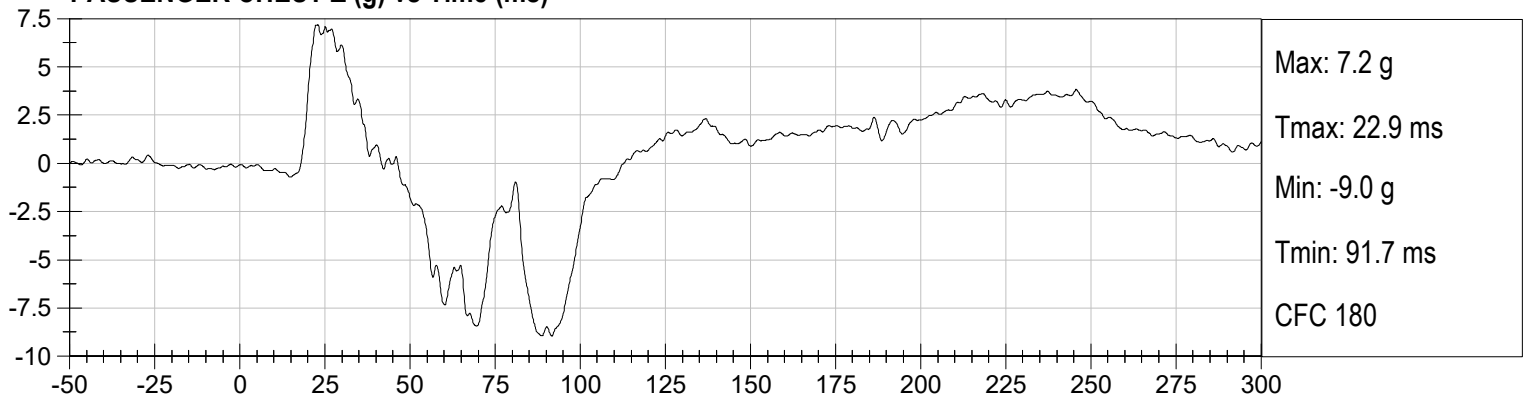
PASSENGER CHEST X (g) vs Time (ms)



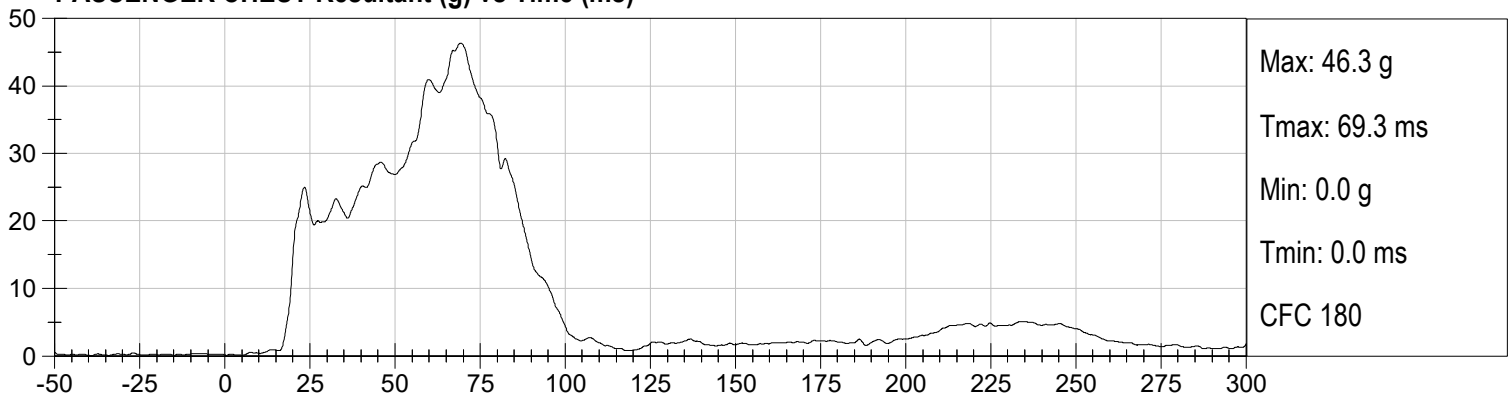
PASSENGER CHEST Y (g) vs Time (ms)



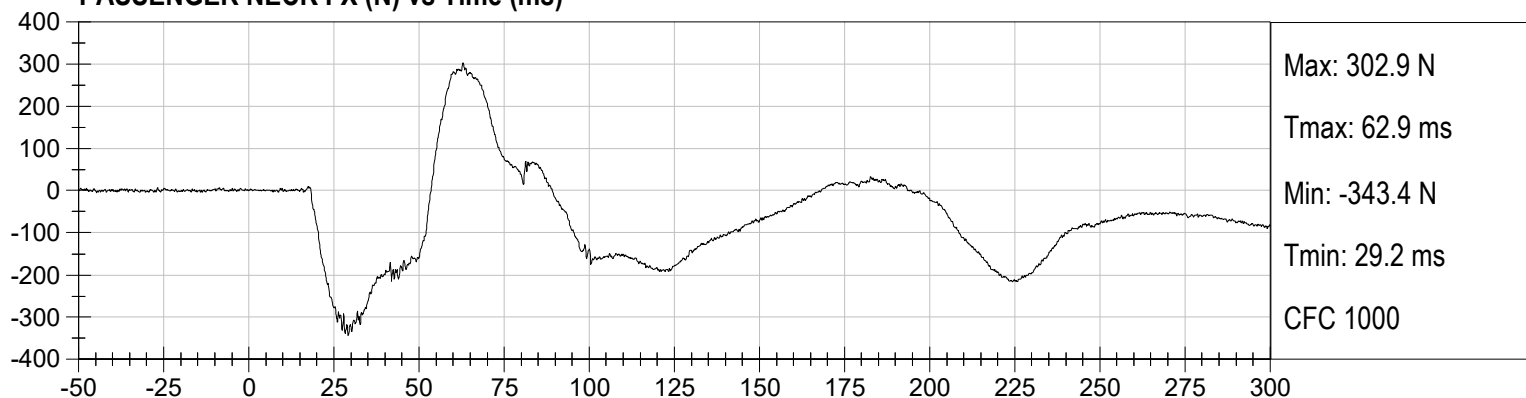
PASSENGER CHEST Z (g) vs Time (ms)



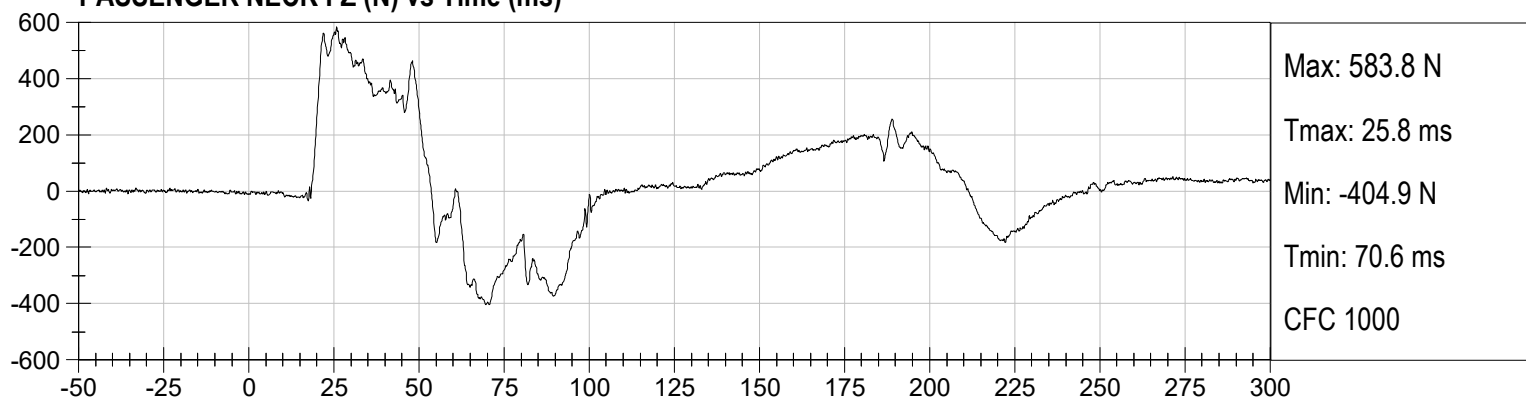
PASSENGER CHEST Resultant (g) vs Time (ms)



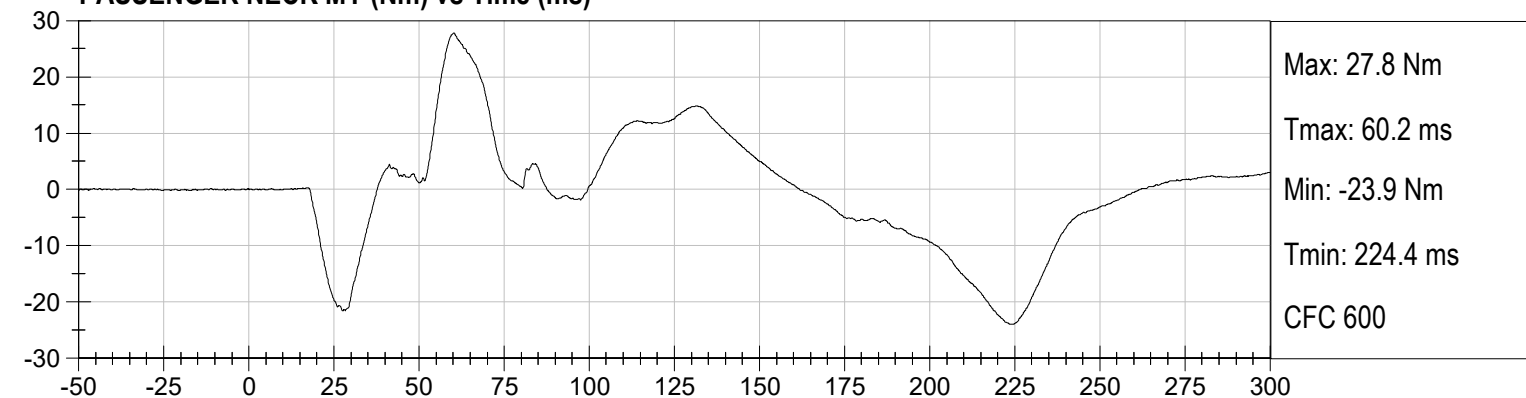
PASSENGER NECK FX (N) vs Time (ms)



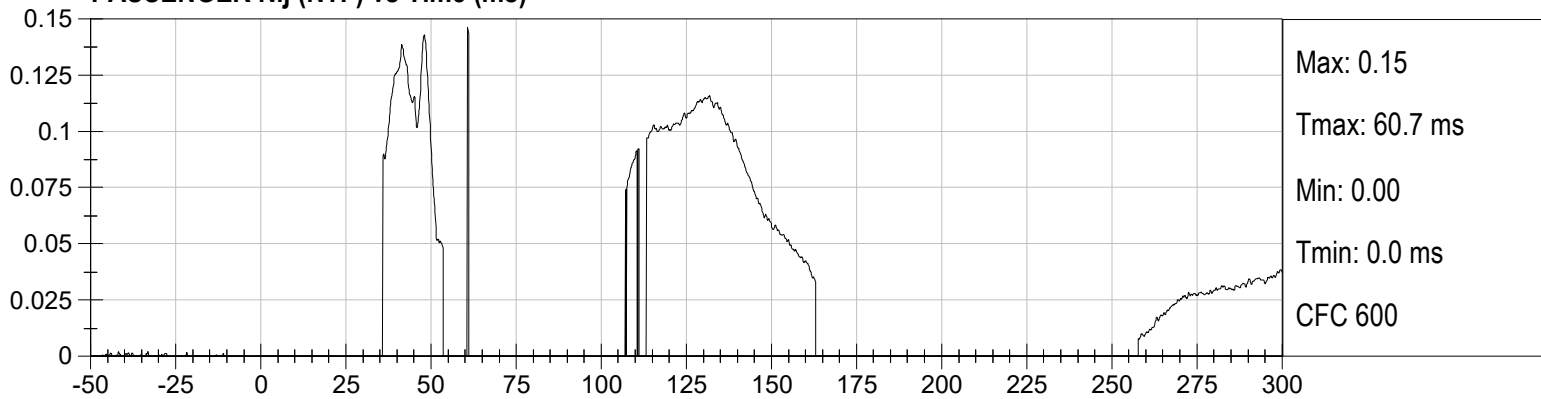
PASSENGER NECK FZ (N) vs Time (ms)



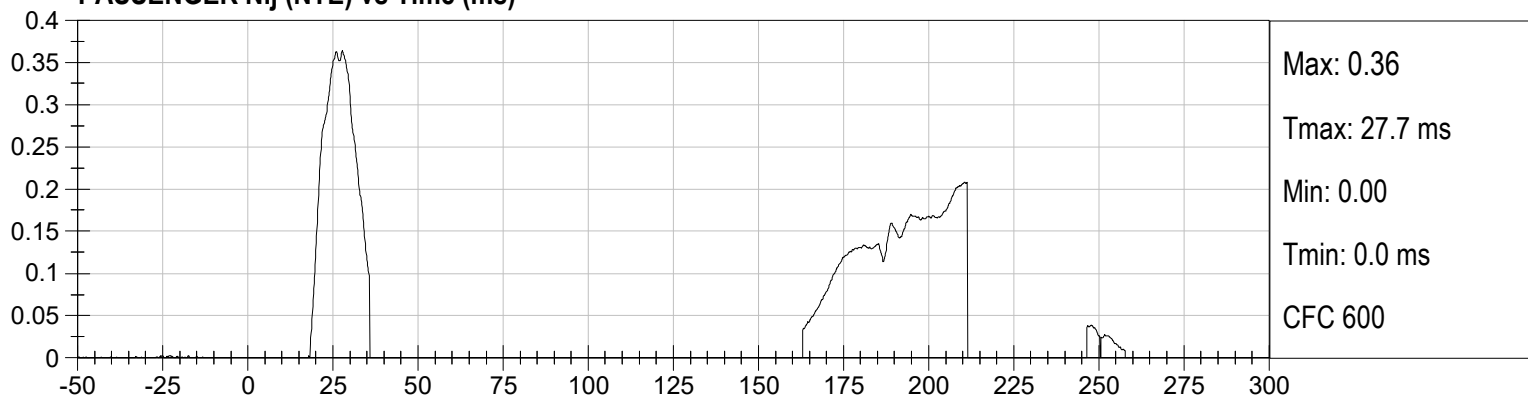
PASSENGER NECK MY (Nm) vs Time (ms)



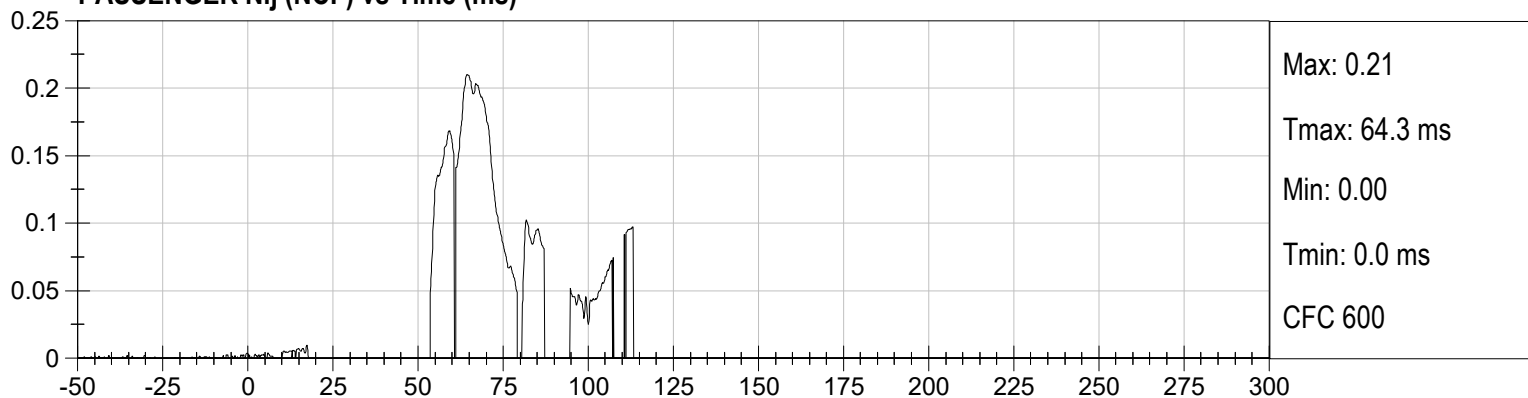
PASSENGER Nij (NTF) vs Time (ms)



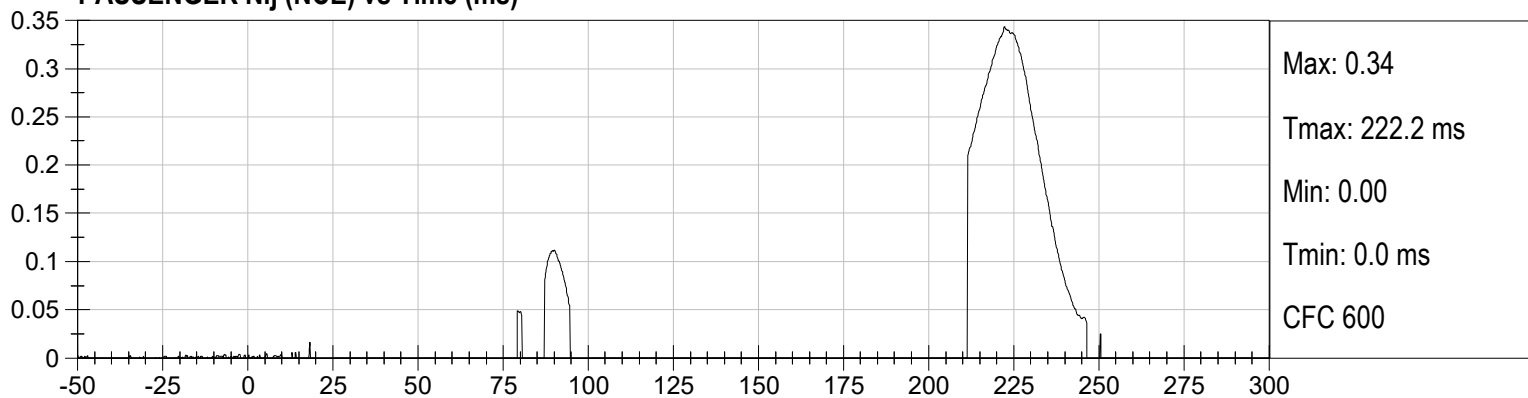
PASSENGER Nij (NTE) vs Time (ms)



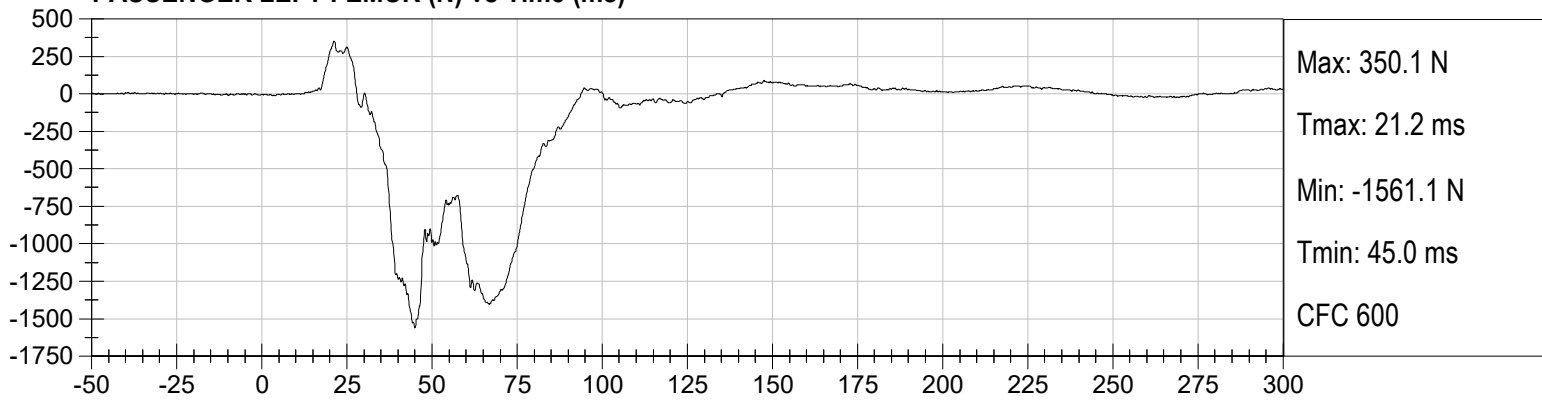
PASSENGER Nij (NCF) vs Time (ms)



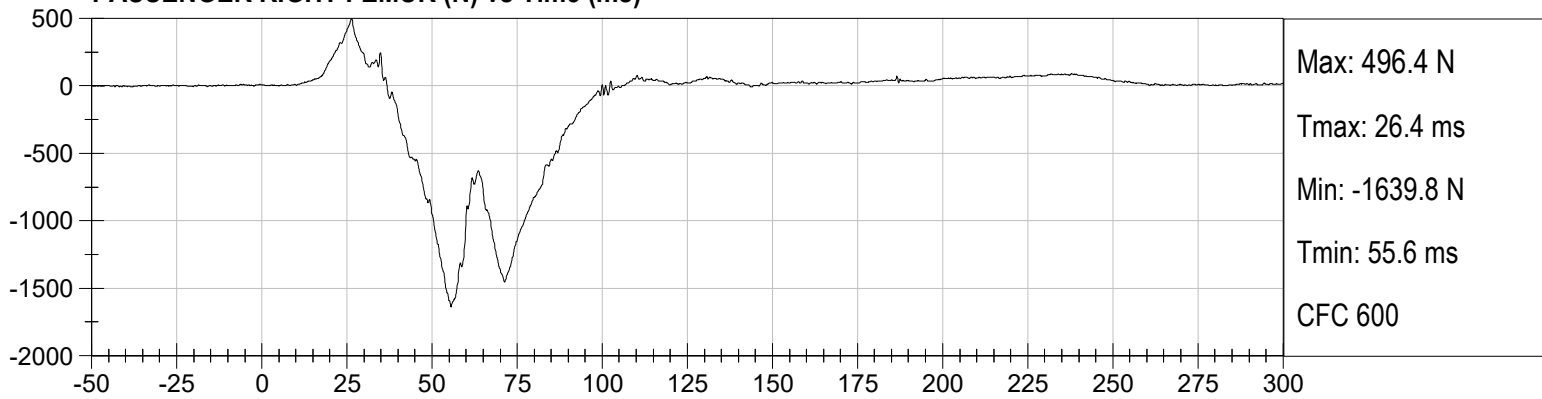
PASSENGER Nij (NCE) vs Time (ms)



PASSENGER LEFT FEMUR (N) vs Time (ms)



PASSENGER RIGHT FEMUR (N) vs Time (ms)



APPENDIX C
DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

HYBRID III 50TH PERCENTILE MALE - DRIVER ATD

**Hybrid III, 50th External Measurements
SN: 351**

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

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

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

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

ATD Serial No: 351

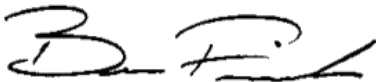
Test ID: D193241

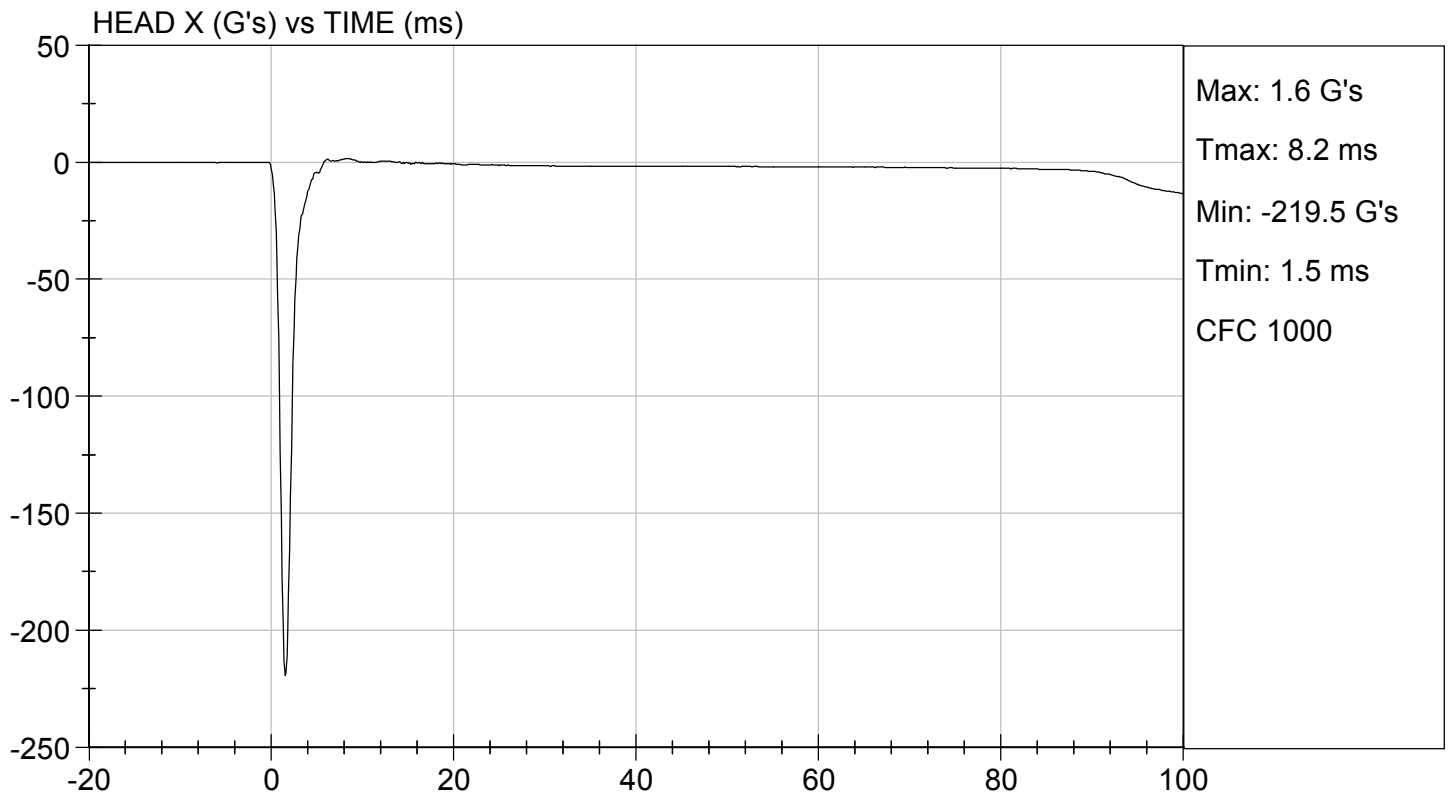
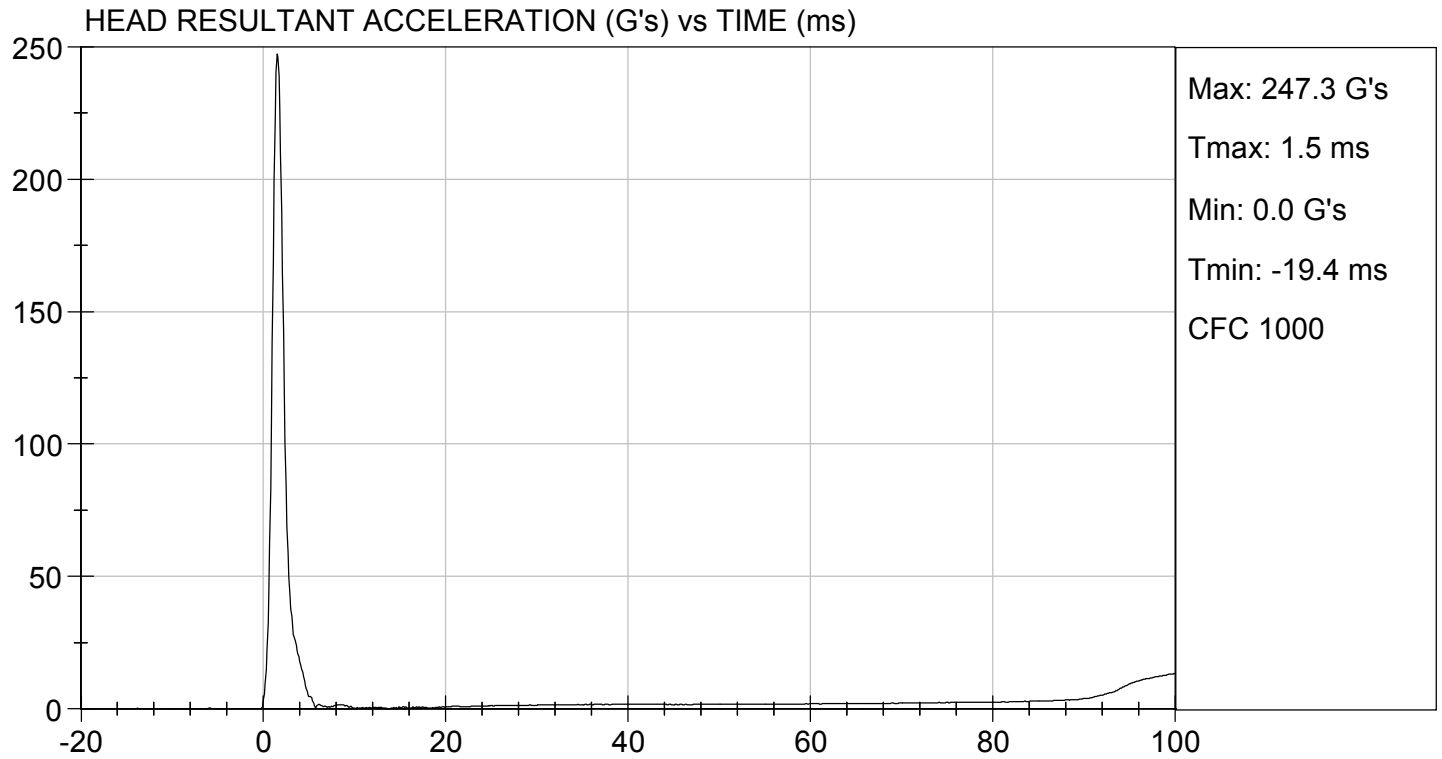
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Peak Resultant Acceleration	G's	225 to 275	247	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	2.9	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
Overall Test Results				Pass

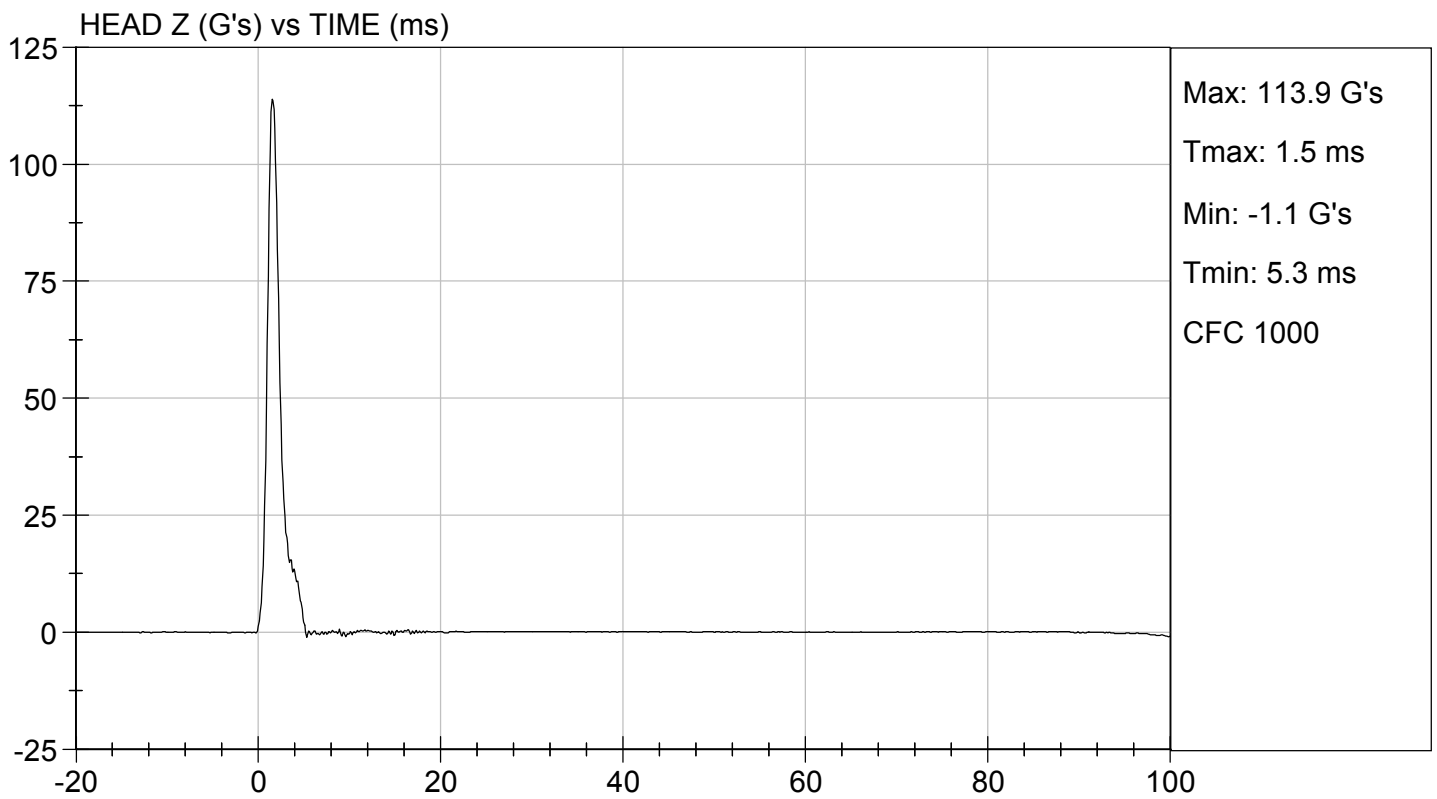
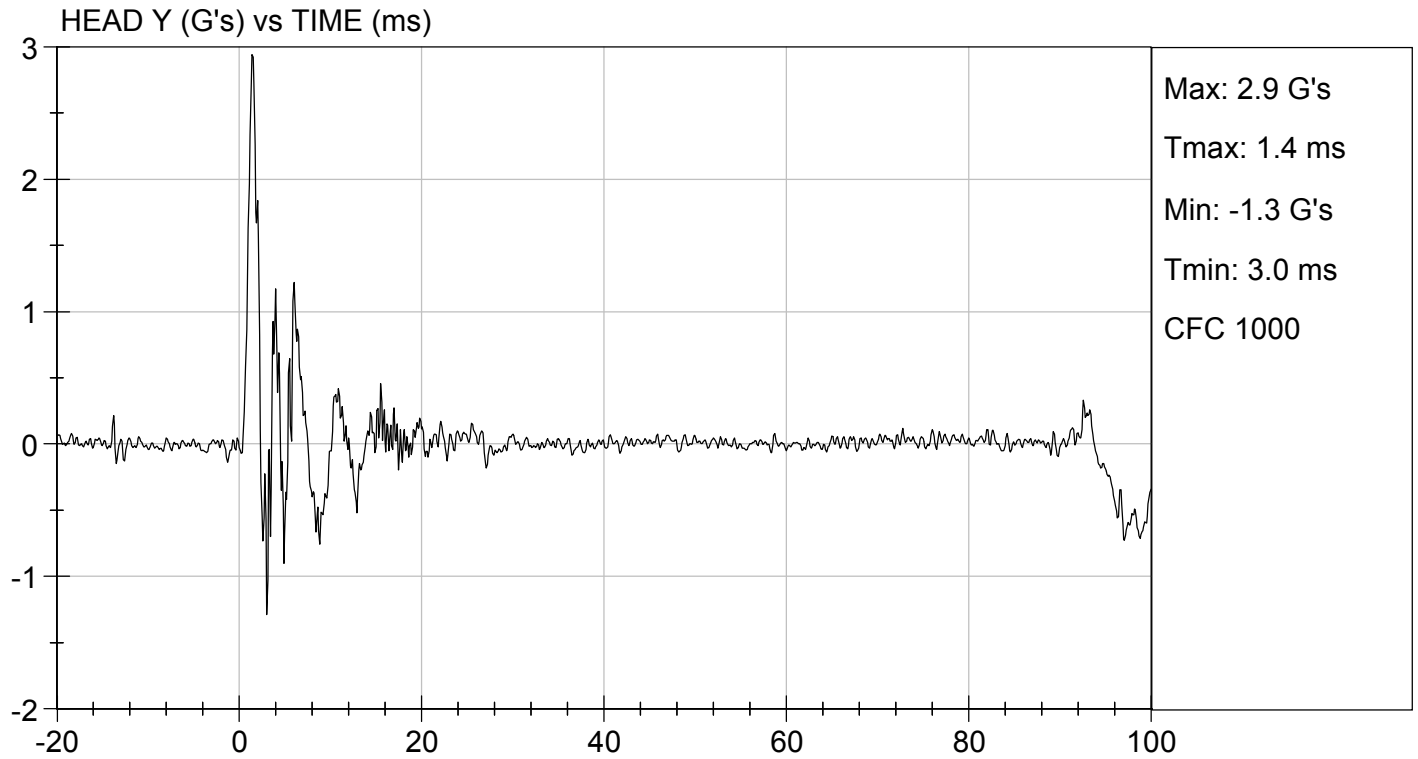

Laboratory Technician

10/16/2019

Test Date


Approved By





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

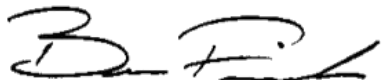
ATD Serial No: 351

Test I.D: D193242

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21	Pass
Laboratory Relative Humidity		%	10 to 70	36	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.06	Pass
Pendulum Deceleration	10 ms	G's	22.50 to 27.50	23.52	Pass
	20 ms	G's	17.60 to 22.60	21.01	Pass
	30 ms	G's	12.50 to 18.50	15.43	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 29.0	15.4	Pass
Deceleration Decay Time to Cross 5 G's		ms	34.0 to 42.0	35.9	Pass
Maximum "D" Plane Rotation	Maximum	Deg	64.0 to 78.0	69.9	Pass
	Time	ms	57.0 to 64.0	59.1	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	113.0 to 128.0	116.7	Pass
Moment About Occipital Condyle	Maximum	Nm	88.1 to 108.5	92.9	Pass
	Time	ms	47.0 to 58.0	47.3	Pass
Positive Moment Decay Time To Zero Crossing		ms	97.0 to 107.0	99.3	Pass
Overall Test Results					Pass


 Laboratory Technician

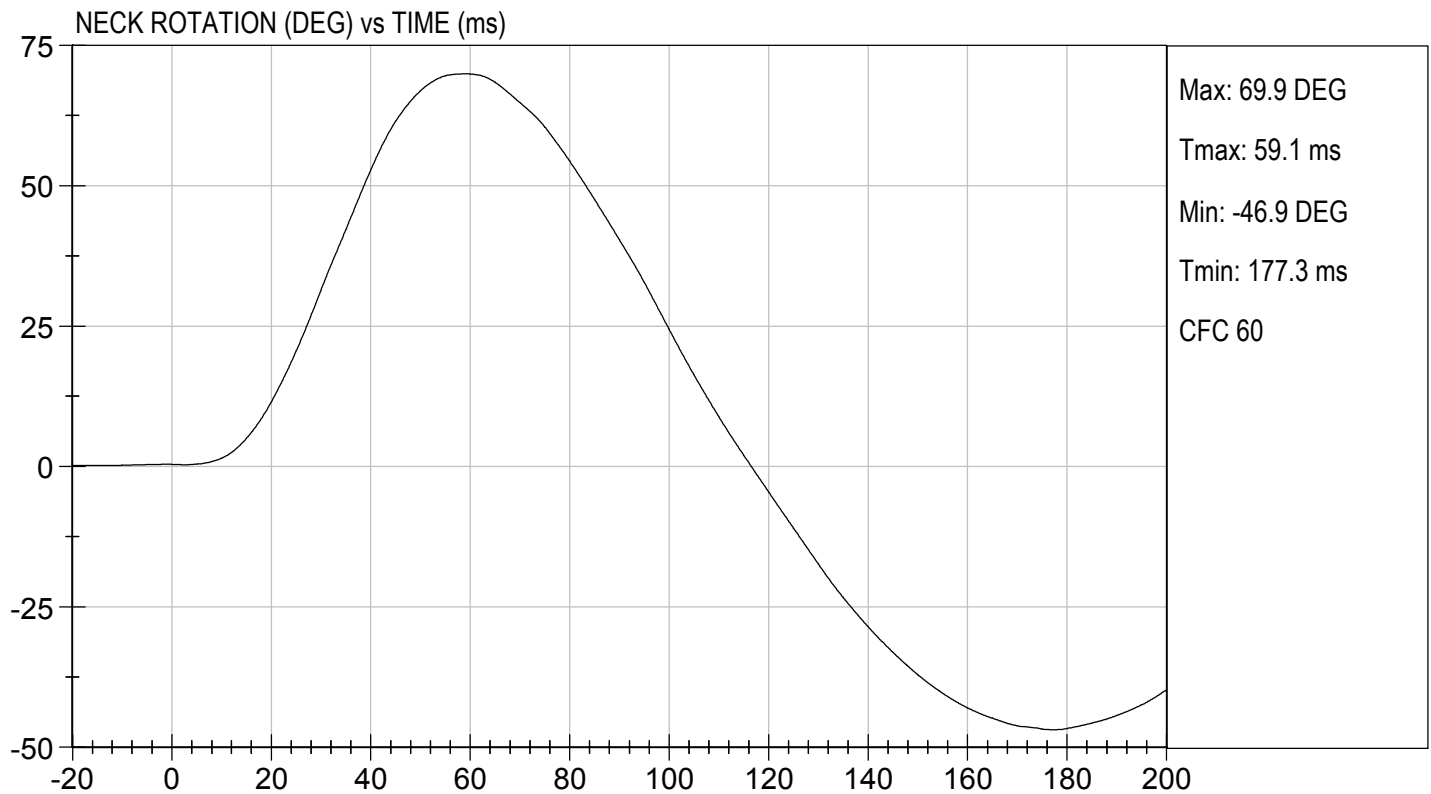
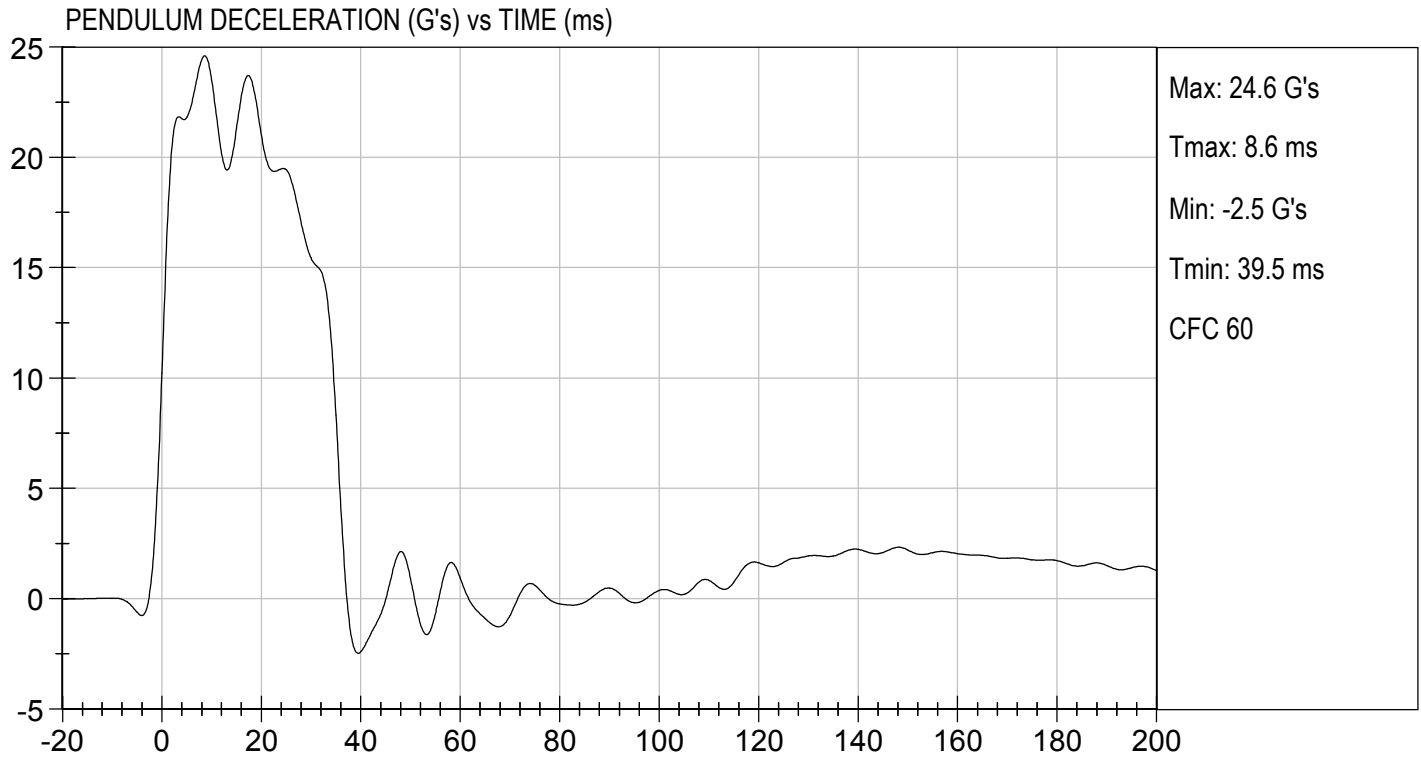
10/17/2019
 Test Date


 Approved By



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

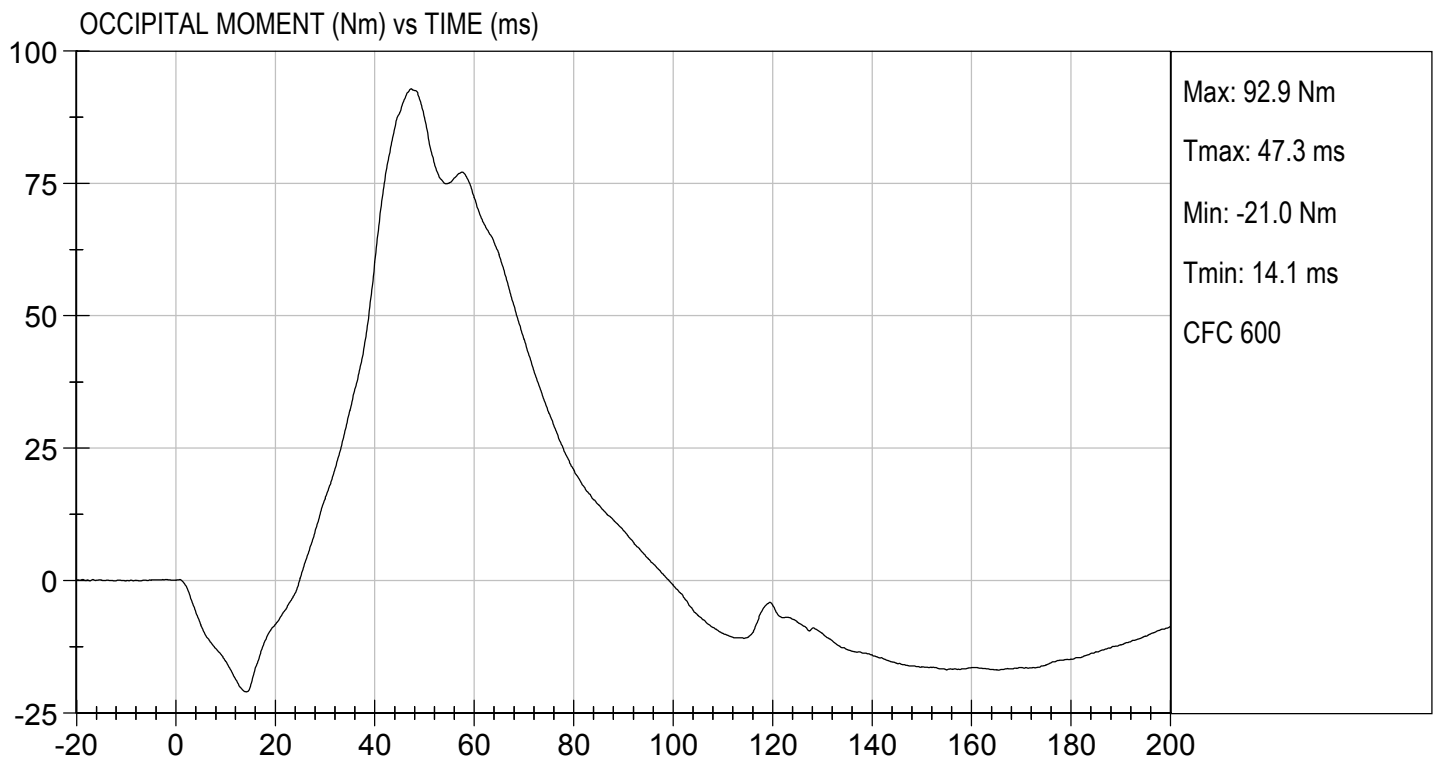
TEST DATE: 10/17/2019
TEST #: D193242





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

TEST DATE: 10/17/2019
TEST #: D193242



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

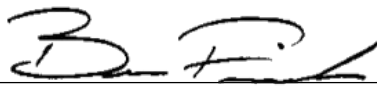
ATD Serial No: 351

Test I.D: D193243

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21	Pass
Laboratory Relative Humidity		%	10 to 70	36	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.12	Pass
Pendulum Deceleration	10 ms	G's	17.20 to 21.20	18.88	Pass
	20 ms	G's	14.00 to 19.00	16.39	Pass
	30 ms	G's	11.00 to 16.00	12.44	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 22.0	13.7	Pass
Deceleration Decay Time to Cross 5 G's		ms	38.0 to 46.0	39.1	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	98.1	Pass
	Time	ms	72.0 to 82.0	75.6	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	147.0 to 174.0	160.4	Pass
Moment About Occipital Condyle	Maximum	Nm	-52.9 to -79.9	-60.8	Pass
	Time	ms	65.0 to 79.0	71.5	Pass
Negative Moment Decay Time To Zero Crossing		ms	120.0 to 148.0	140.7	Pass
Overall Test Results					Pass


 Laboratory Technician

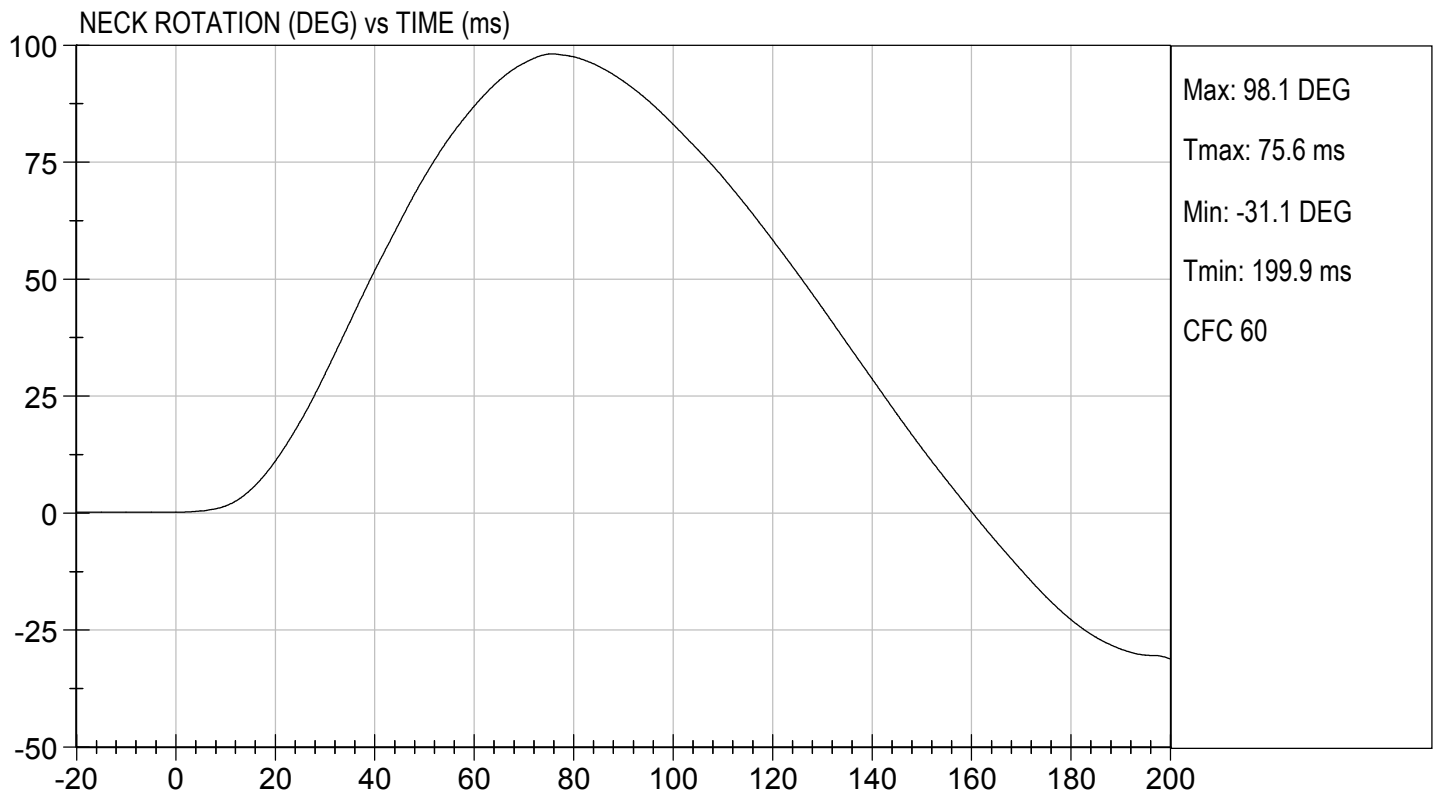
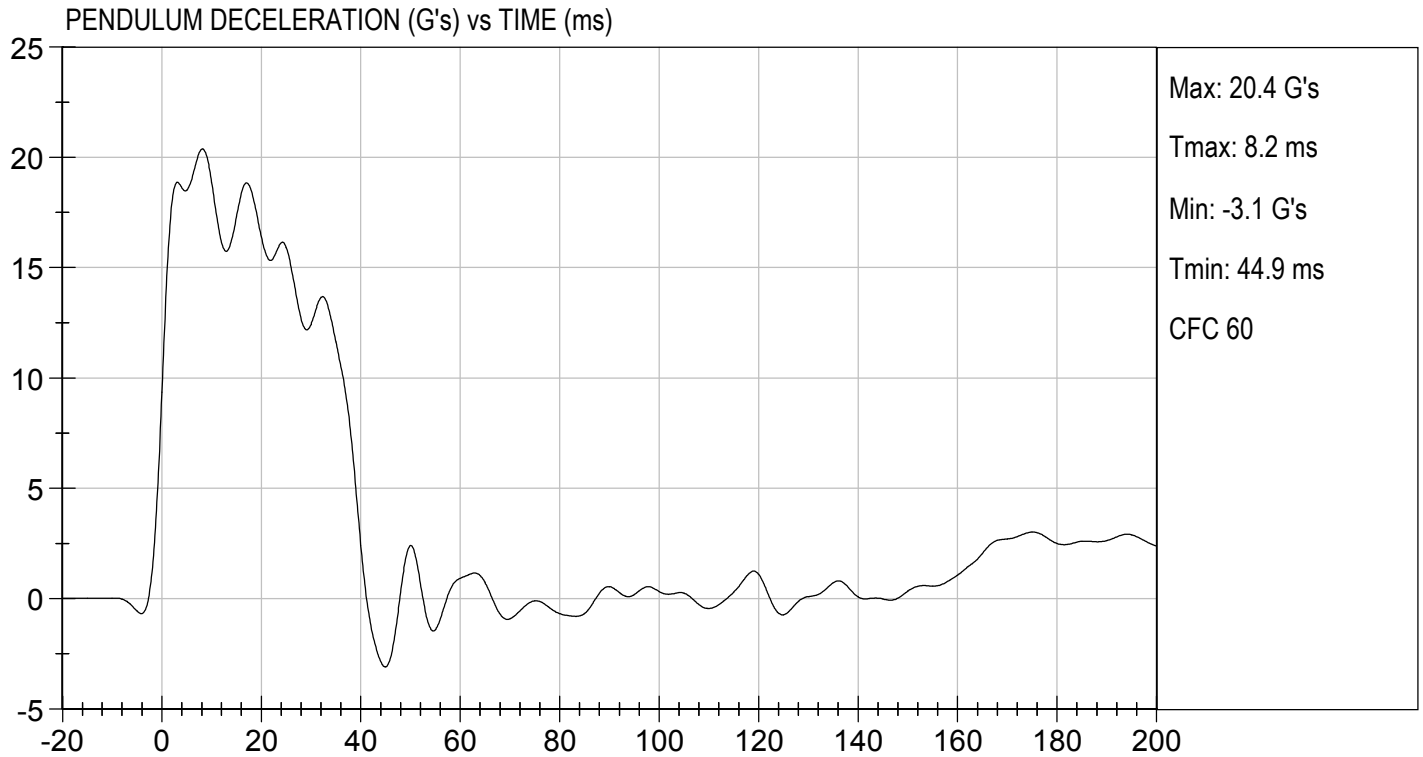
10/17/2019
 Test Date


 Approved By



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

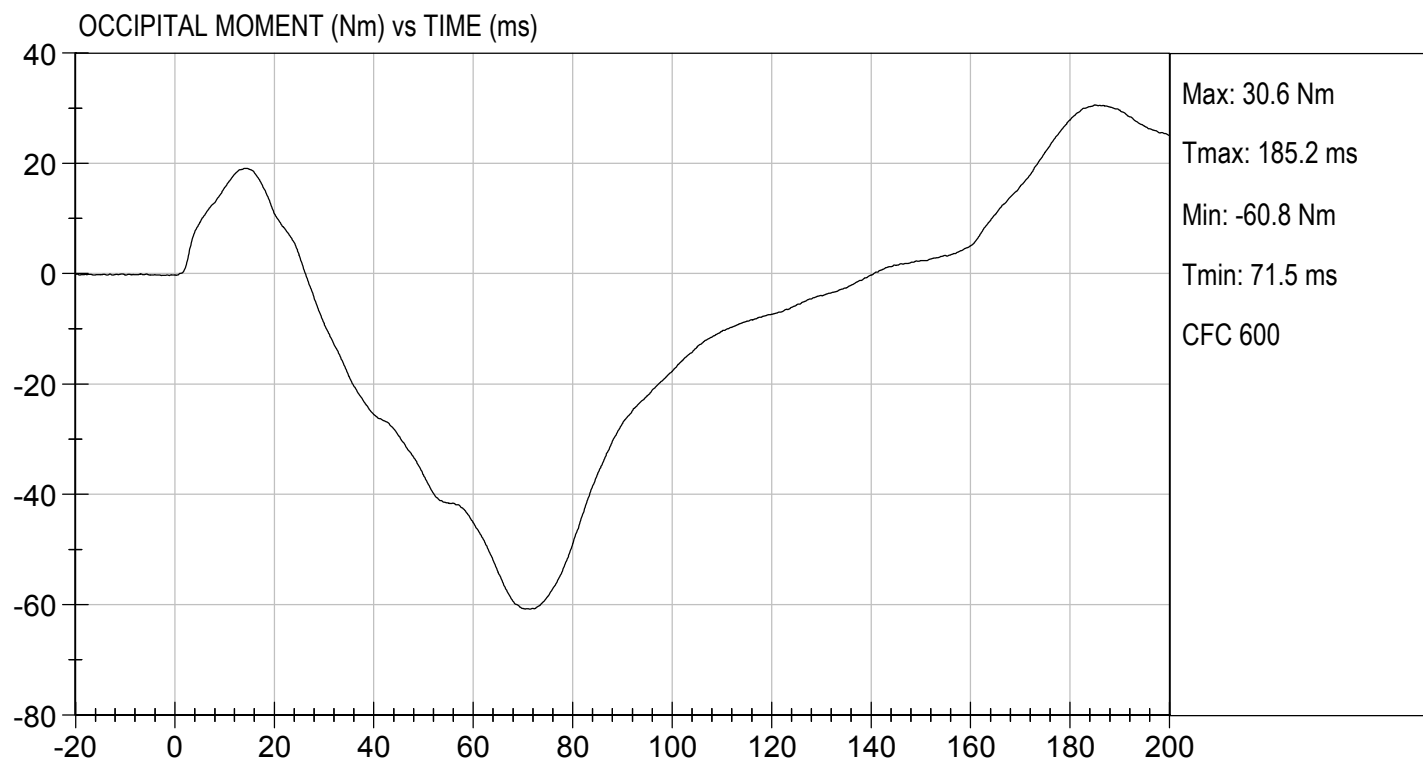
TEST DATE: 10/17/2019
TEST #: D193243





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

TEST DATE: 10/17/2019
TEST #: D193243

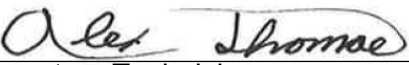


MGA RESEARCH CORPORATION
THORAX IMPACT
HYBRID III 50TH PERCENTILE MALE

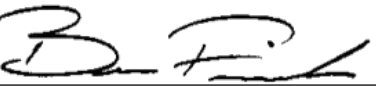
ATD Serial No: 351

Test I.D: D193244

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	20.6	Pass
Laboratory Relative Humidity	%	10 to 70	38	Pass
Probe Velocity	m/s	6.58 to 6.82	6.61	Pass
Peak Probe Force	N	5159 to 5893	5,549	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.93	Pass
Internal Hysteresis	%	69 to 85	69	Pass
			Overall Test Results	Pass


Laboratory Technician

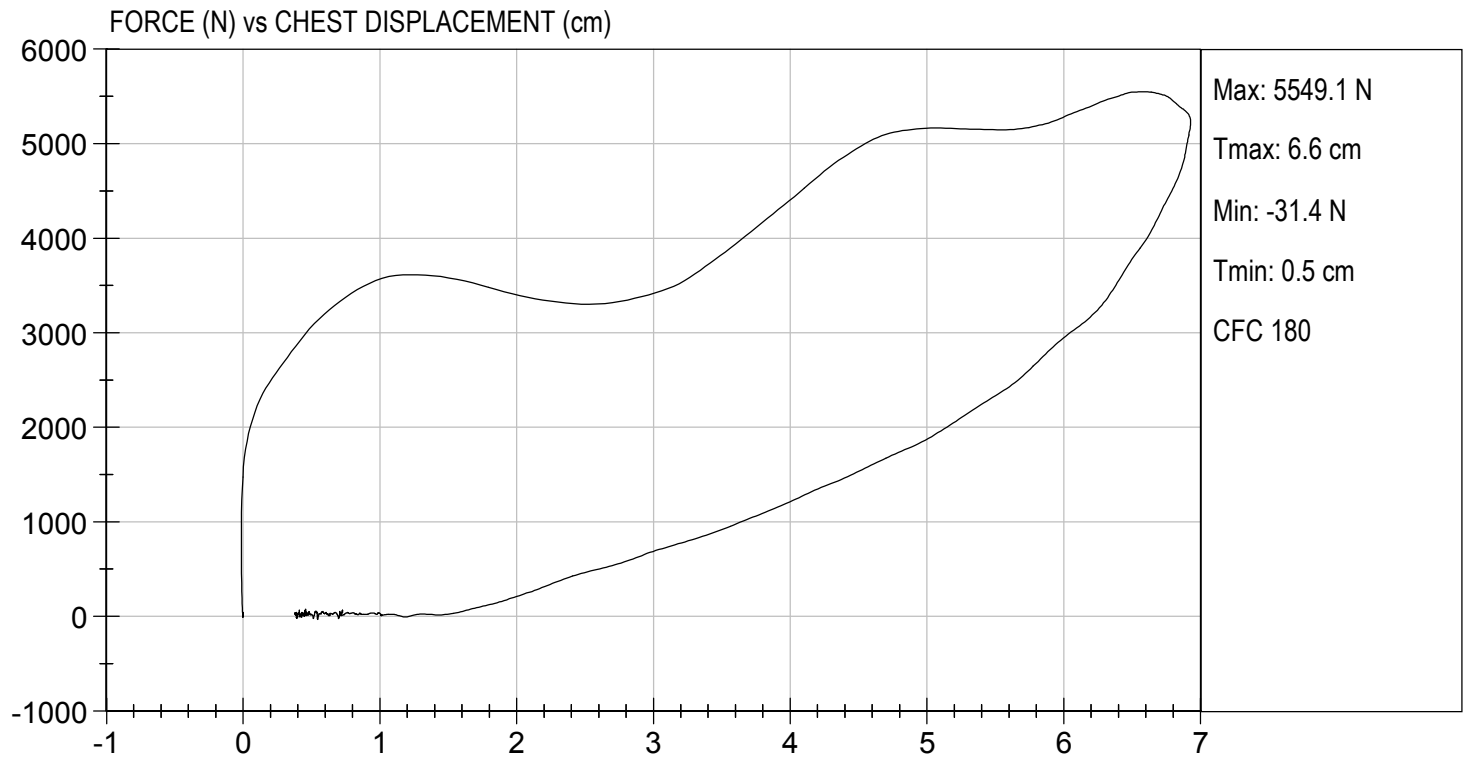
10/18/2019
Test Date


Approved By



TEST DESC: THORAX IMPACT
VELOCITY: 21.67 ft/s, 6.61 m/s

TEST DATE: 10/18/2019
TEST #: D193244I



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

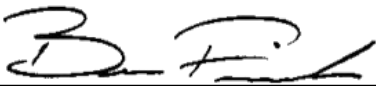
ATD Serial No: 351

Test I.D: D193245

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Probe Velocity	m/s	2.07 to 2.13	2.12	Pass
Peak Probe Force	N	4715 to 5782	4,801	Pass
Overall Test Results				Pass


Laboratory Technician

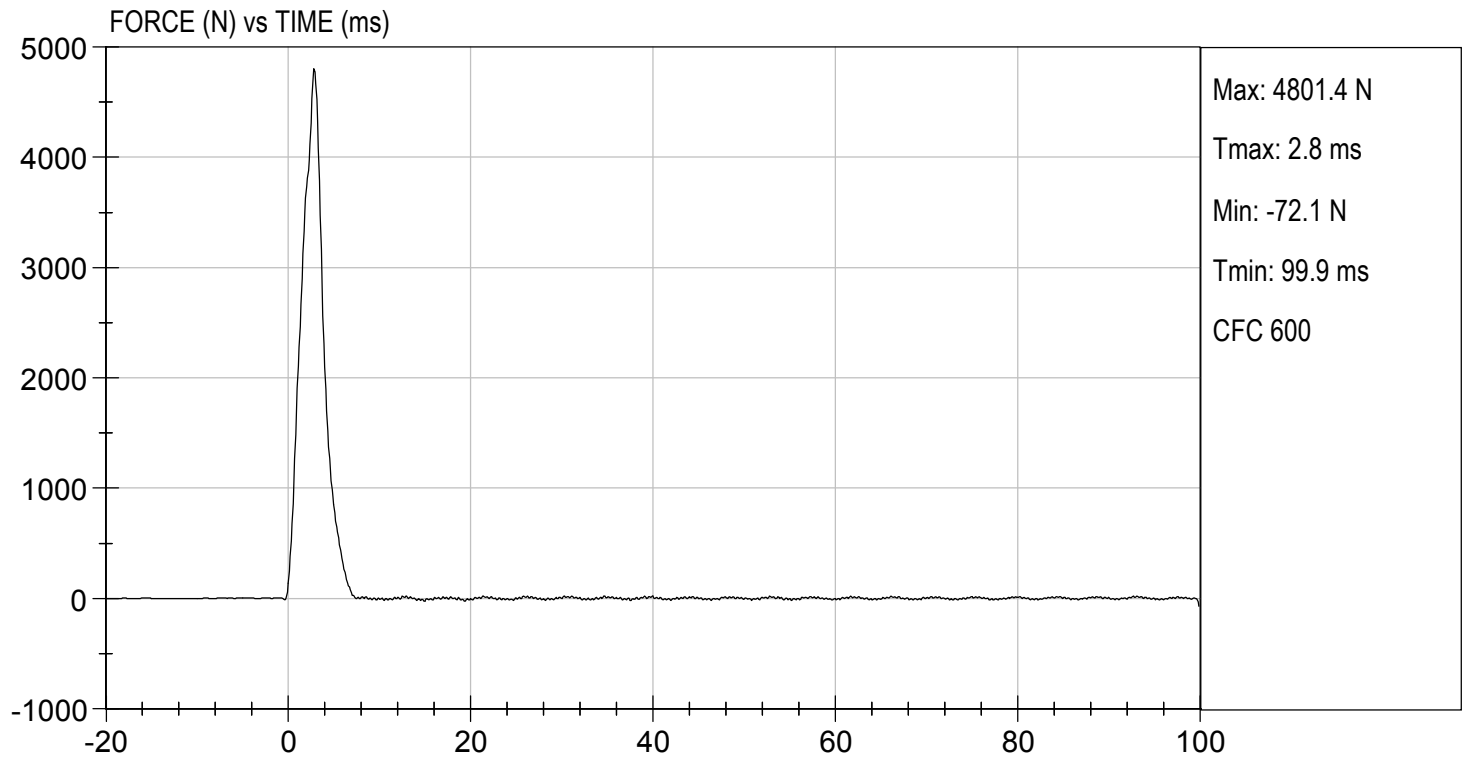
10/16/2019
Test Date


Approved By



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

TEST DATE: 10/16/2019
TEST #: D193245



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

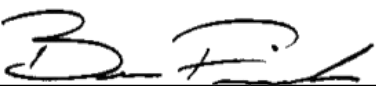
ATD Serial No: 351

Test I.D: D193246

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Probe Velocity	m/s	2.07 to 2.13	2.10	Pass
Peak Probe Force	N	4715 to 5782	5,710	Pass
Overall Test Results				Pass


Laboratory Technician

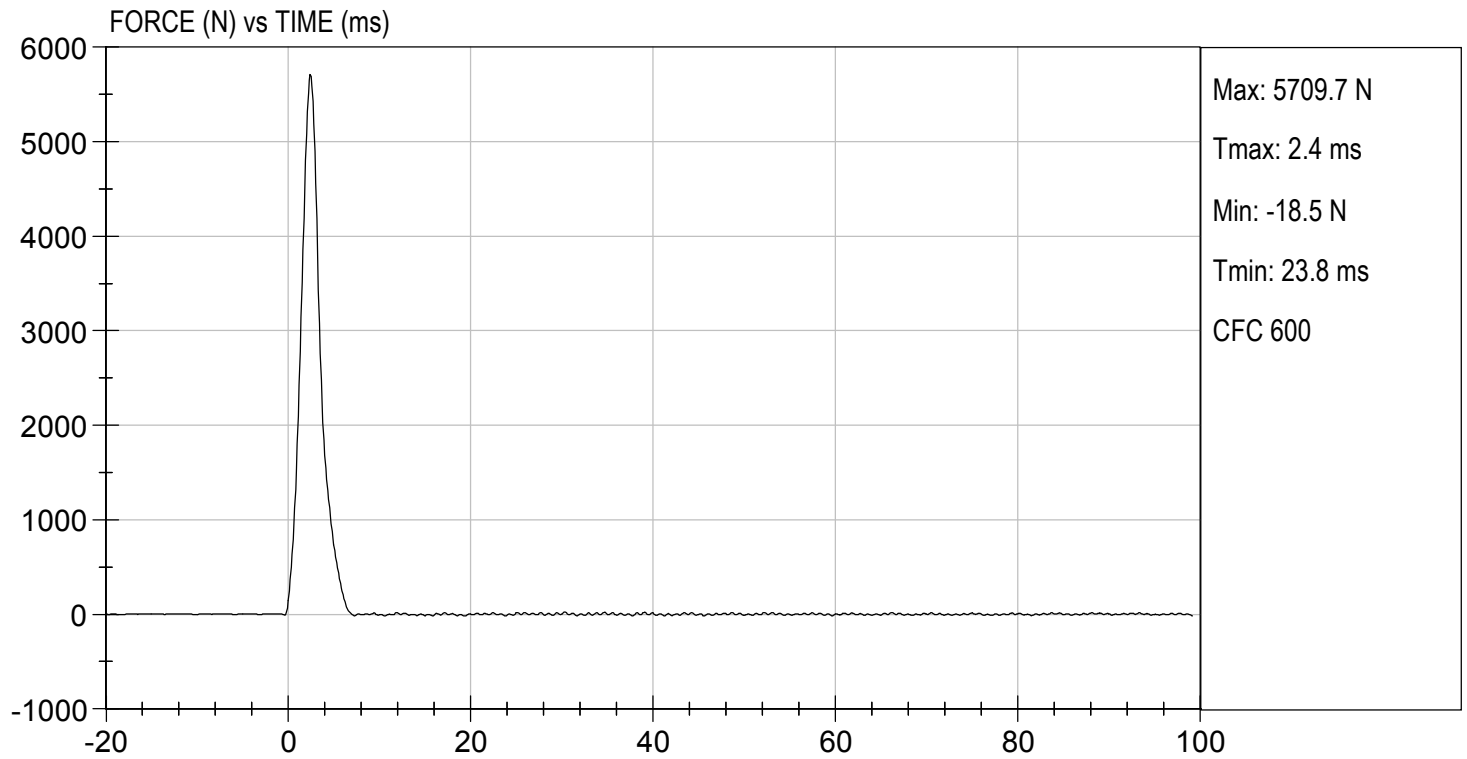
10/16/2019
Test Date


Approved By



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

TEST DATE: 10/16/2019
TEST #: D193246



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

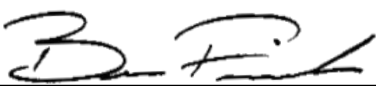
ATD Serial No: 351

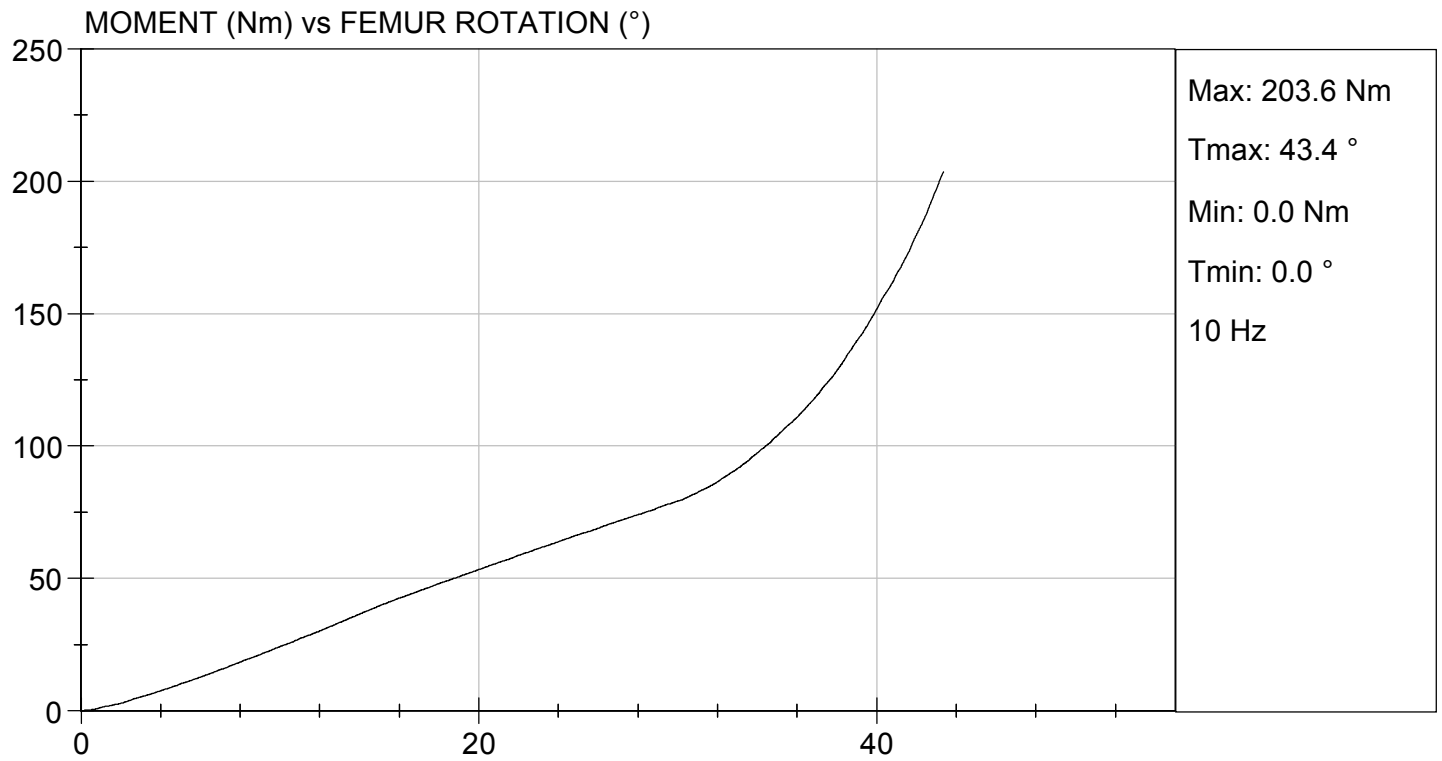
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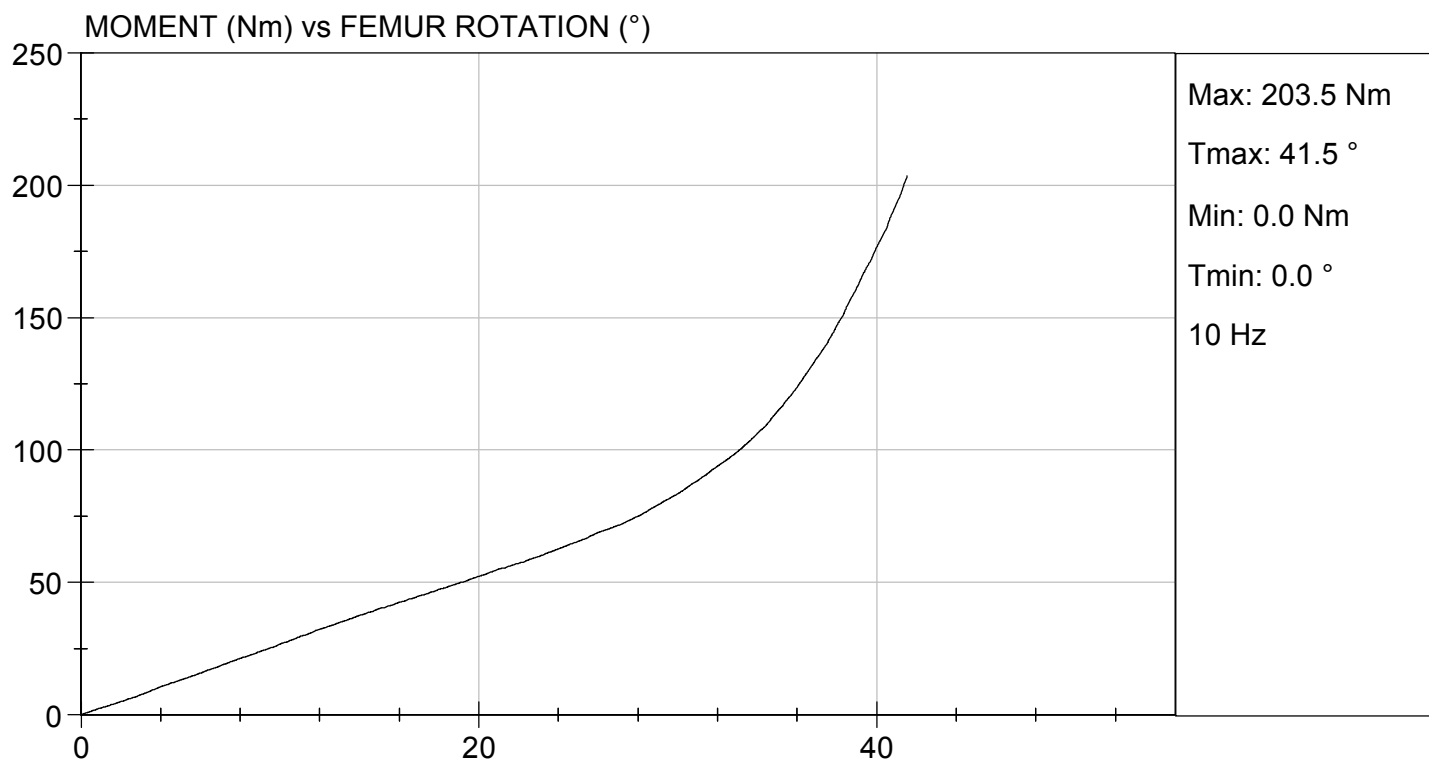
Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	21.6	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	29	29	Pass
Rotation Rate	deg/s	5.0 to 10.0	6.4	6.4	Pass
30 Degrees	Nm	94.9 Nm Max	83.6	79.3	Pass
150 ft-lbf / 203.4 Nm	Deg	40.0 to 50.0 Degree Max Rotation	41.5	43.4	Pass
Overall Test Results					Pass


 Laboratory Technician

10/16/2019
 Test Date


 Approved By





CALIBRATION TEST RESULTS

POST-TEST

HYBRID III 50TH PERCENTILE MALE - DRIVER ATD

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

ATD Serial No: 351

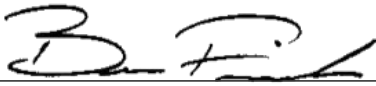
Test ID: D193491

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	23	Pass
Peak Resultant Acceleration	G's	225 to 275	249	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

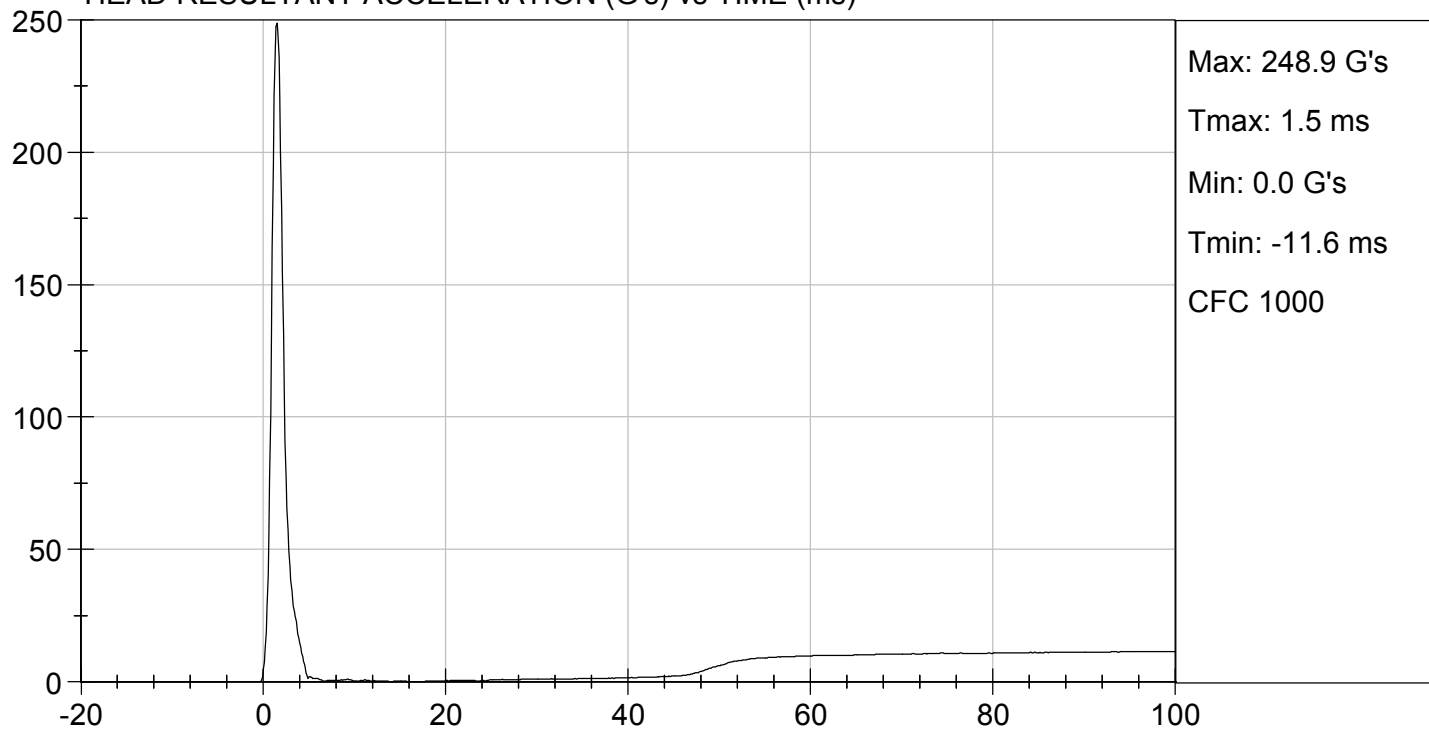
11/08/2019

Test Date

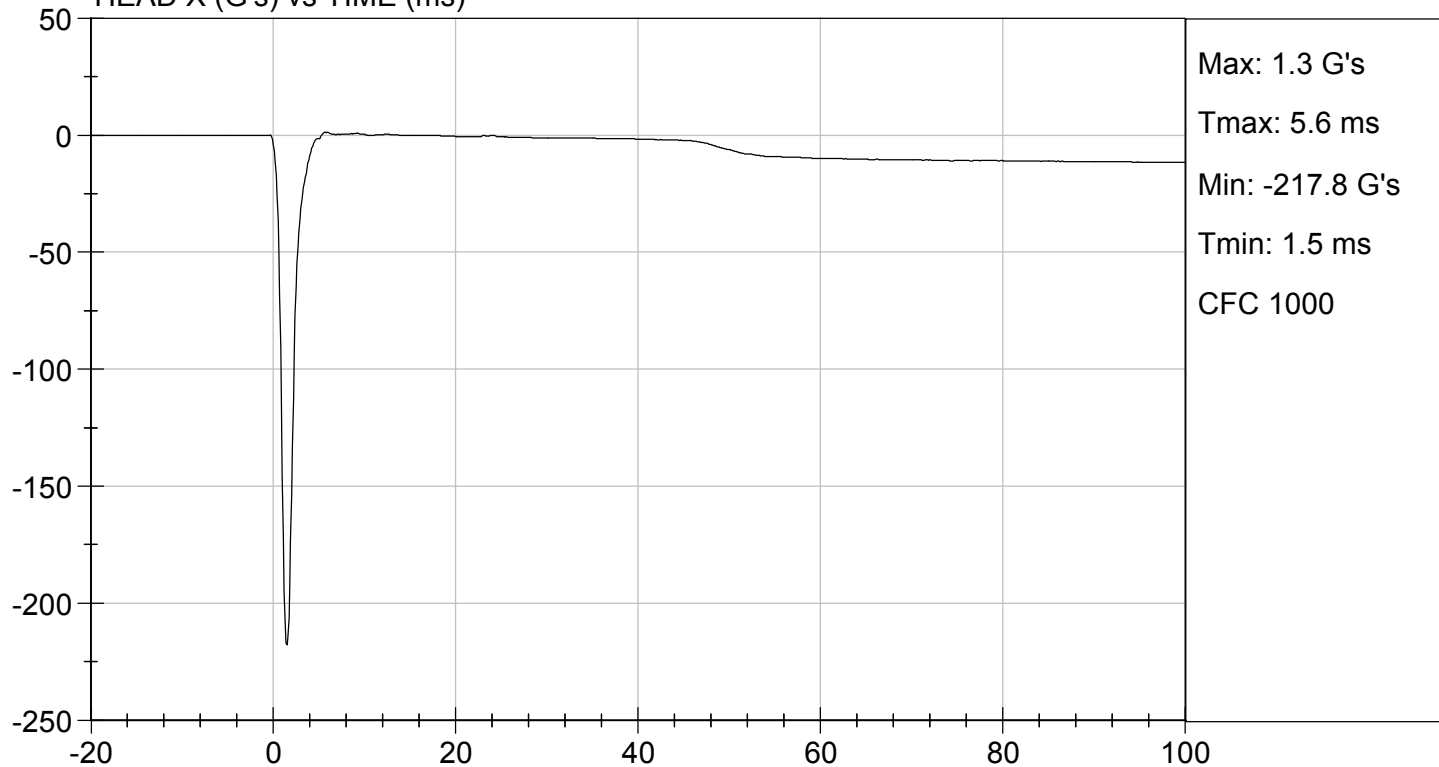

Approved By

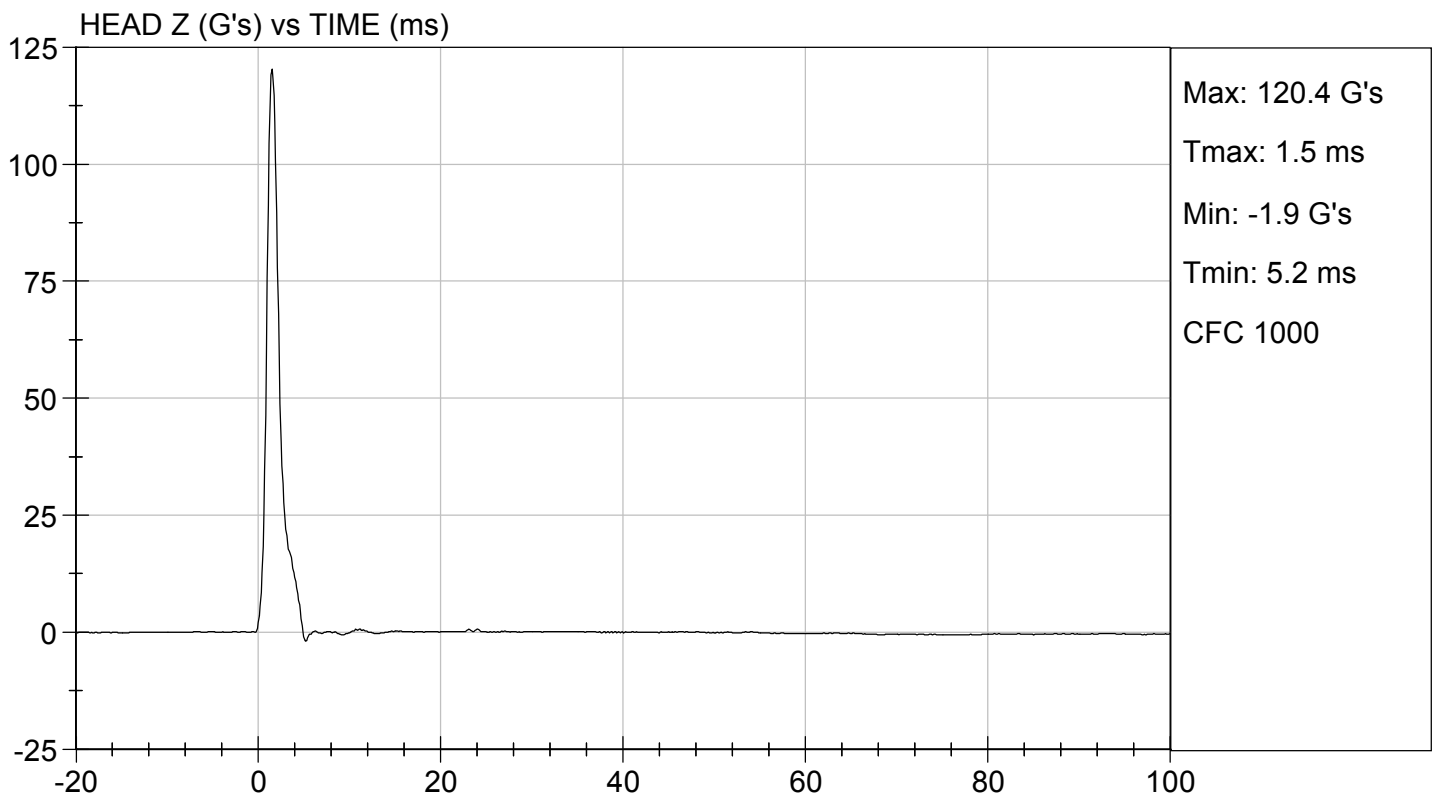
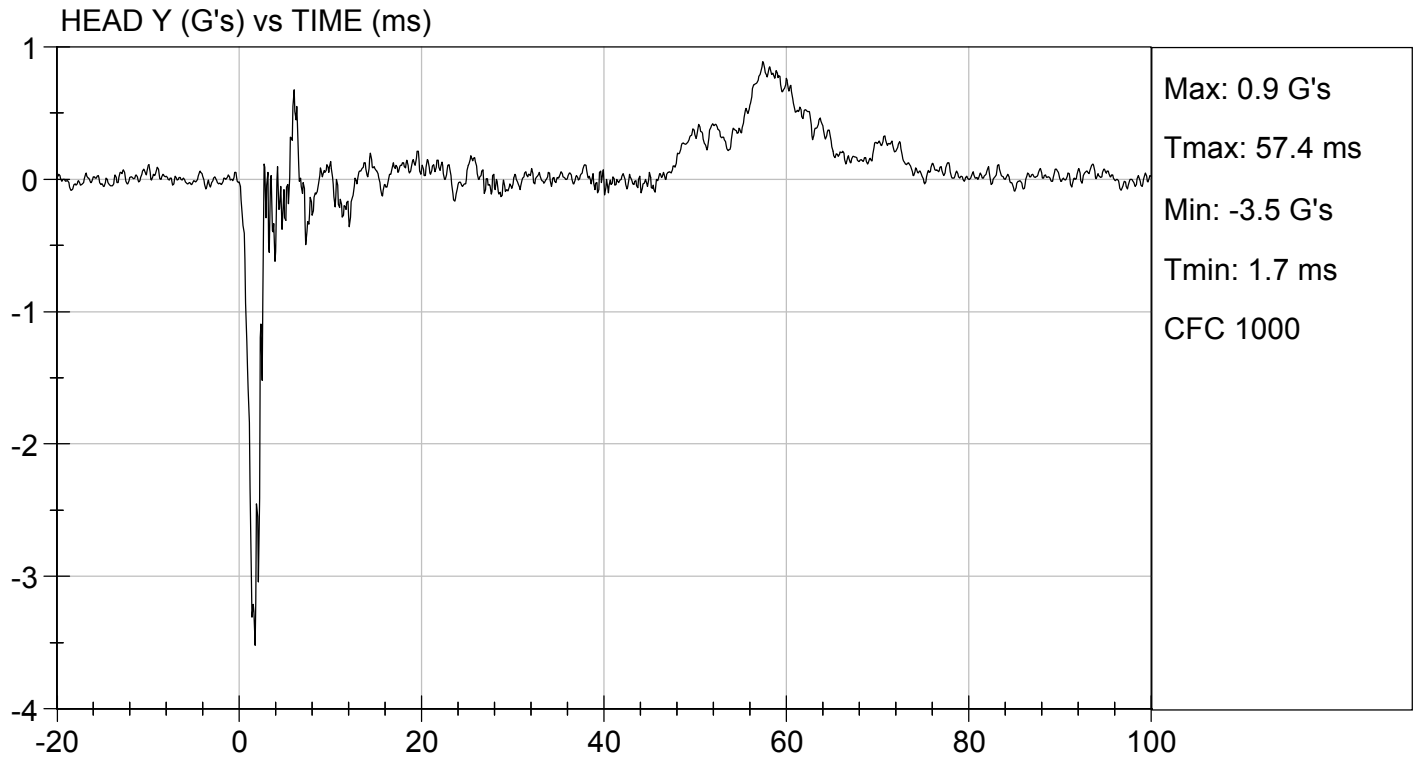


HEAD RESULTANT ACCELERATION (G's) vs TIME (ms)



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





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

ATD Serial No: 351

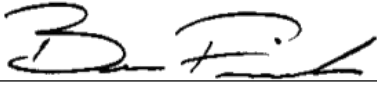
Test I.D: D193492

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	24	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.96	Pass
Pendulum Deceleration	10 ms	G's	22.50 to 27.50	24.05	Pass
	20 ms	G's	17.60 to 22.60	19.34	Pass
	30 ms	G's	12.50 to 18.50	12.50	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 29.0	12.7	Pass
Deceleration Decay Time to Cross 5 G's		ms	34.0 to 42.0	39.8	Pass
Maximum "D" Plane Rotation	Maximum	Deg	64.0 to 78.0	72.1	Pass
	Time	ms	57.0 to 64.0	60.4	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	113.0 to 128.0	118.6	Pass
Moment About Occipital Condyle	Maximum	Nm	88.1 to 108.5	88.3	Pass
	Time	ms	47.0 to 58.0	52.1	Pass
Positive Moment Decay Time To Zero Crossing		ms	97.0 to 107.0	100.2	Pass
Overall Test Results					Pass


Laboratory Technician

11/08/2019

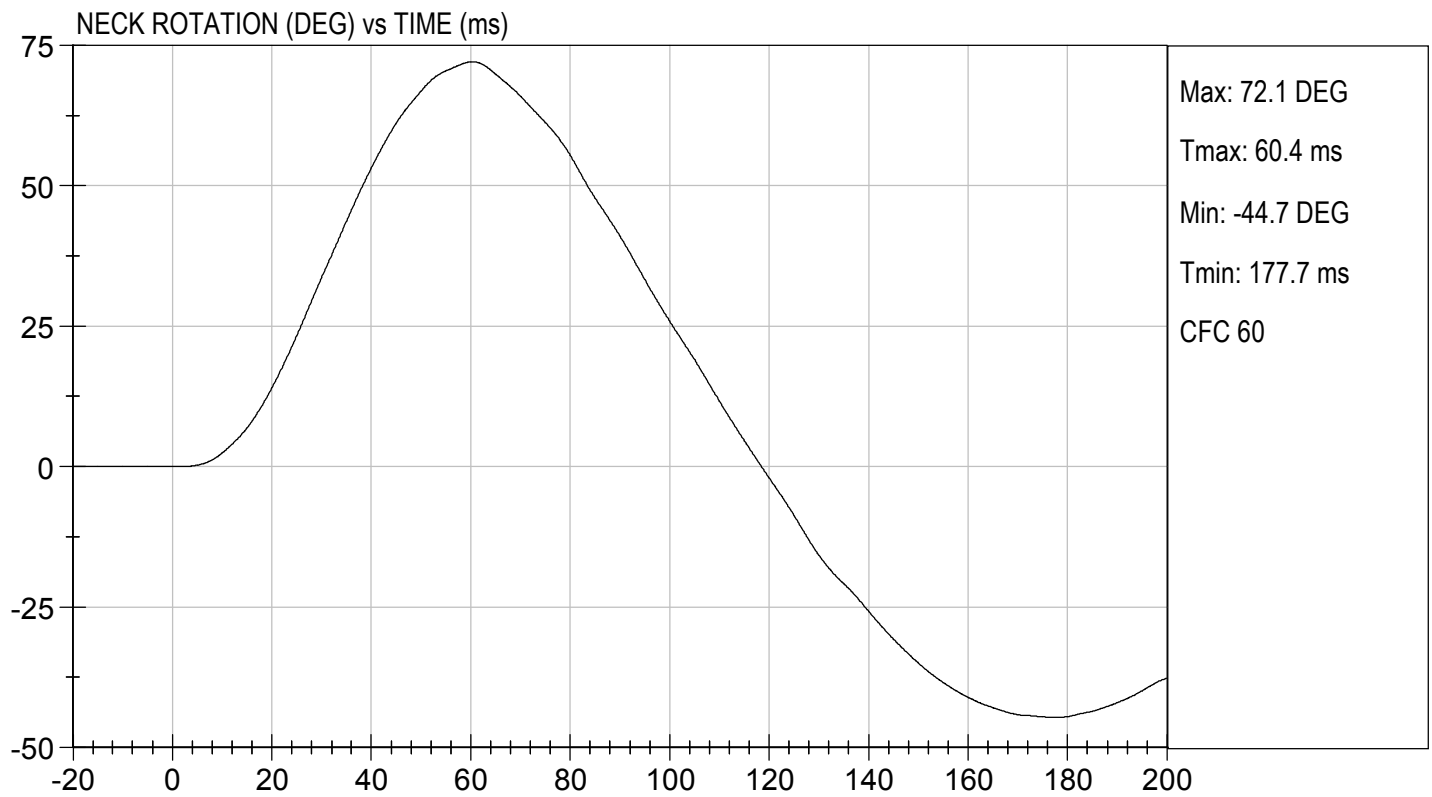
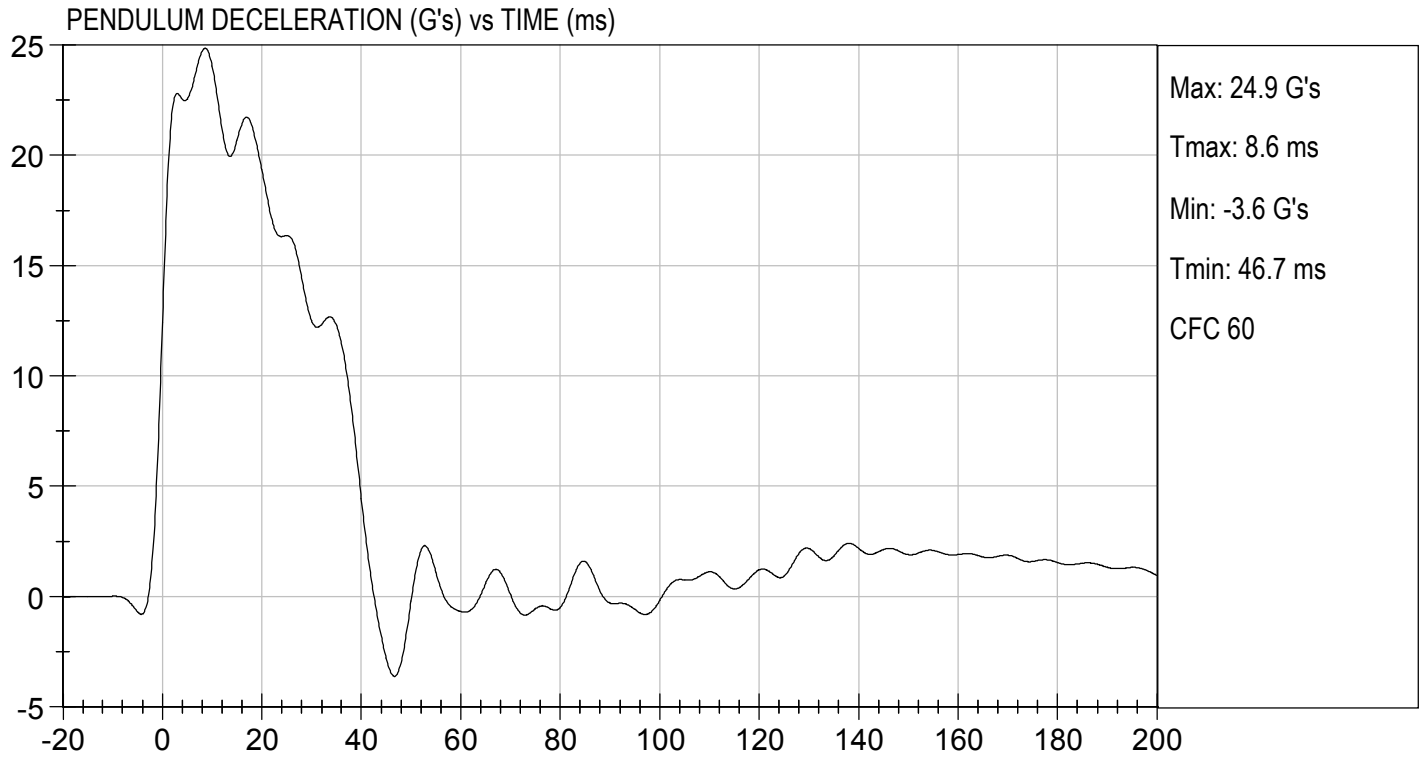
Test Date


Approved By



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

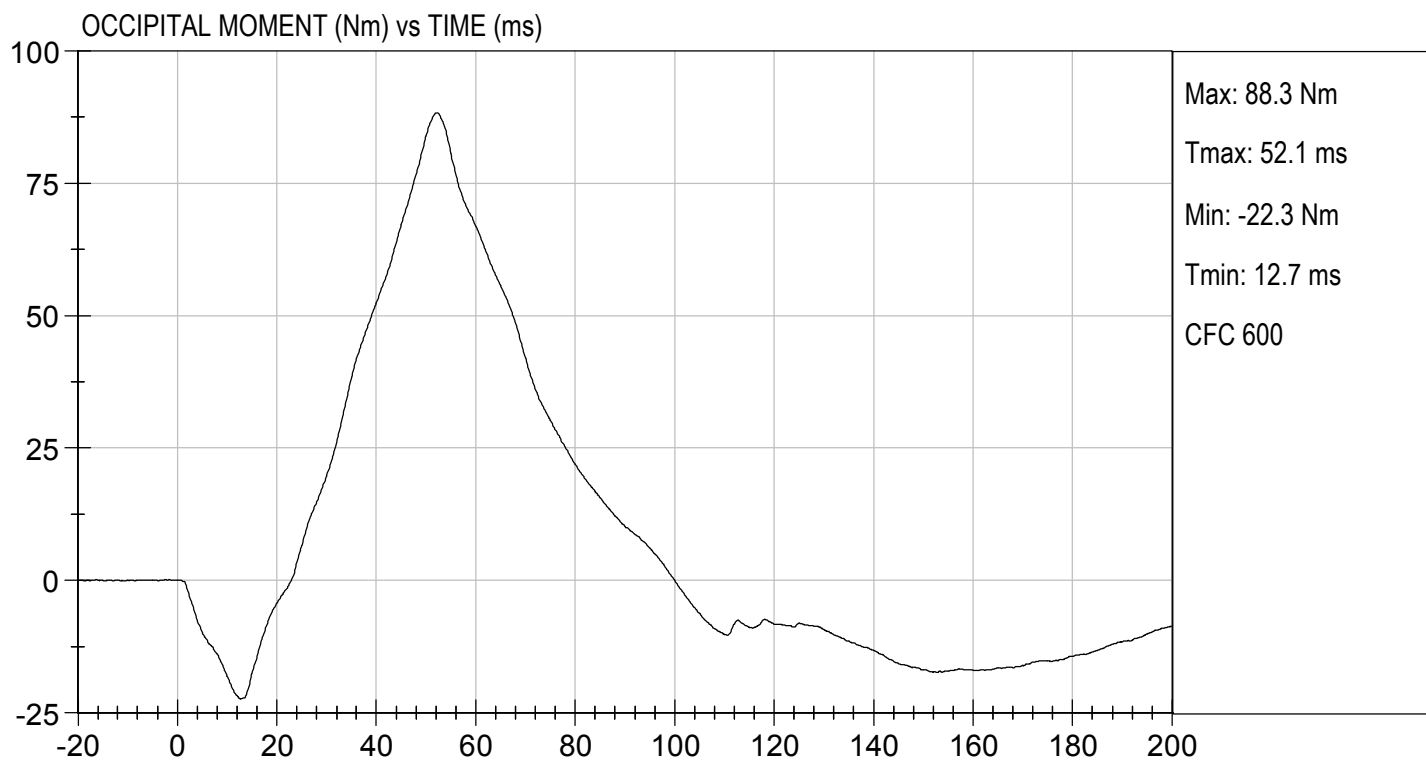
TEST DATE: 11/08/2019
TEST #: D193492





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

TEST DATE: 11/08/2019
TEST #: D193492

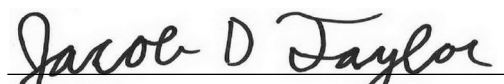


MGA RESEARCH CORPORATION
NECK EXTENSION TEST
HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351

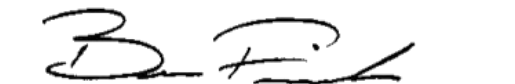
Test I.D: D193493

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	24	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.12	Pass
Pendulum Deceleration	10 ms	G's	17.20 to 21.20	18.56	Pass
	20 ms	G's	14.00 to 19.00	17.02	Pass
	30 ms	G's	11.00 to 16.00	13.58	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 22.0	14.5	Pass
Deceleration Decay Time to Cross 5 G's		ms	38.0 to 46.0	40.0	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	96.8	Pass
	Time	ms	72.0 to 82.0	77.4	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	147.0 to 174.0	161.0	Pass
Moment About Occipital Condyle	Maximum	Nm	-52.9 to -79.9	-61.6	Pass
	Time	ms	65.0 to 79.0	71.7	Pass
Negative Moment Decay Time To Zero Crossing		ms	120.0 to 148.0	144.2	Pass
Overall Test Results					Pass


Laboratory Technician

11/08/2019

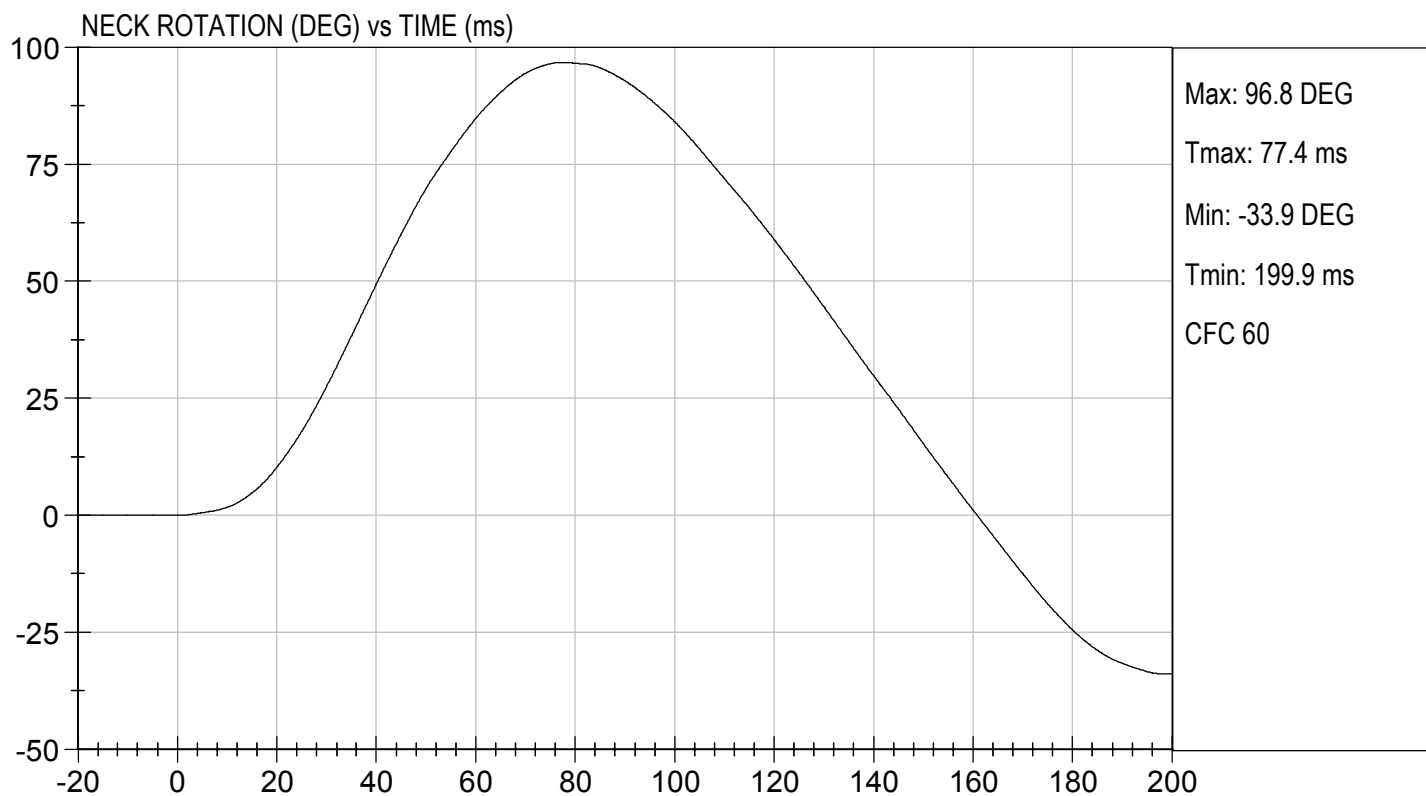
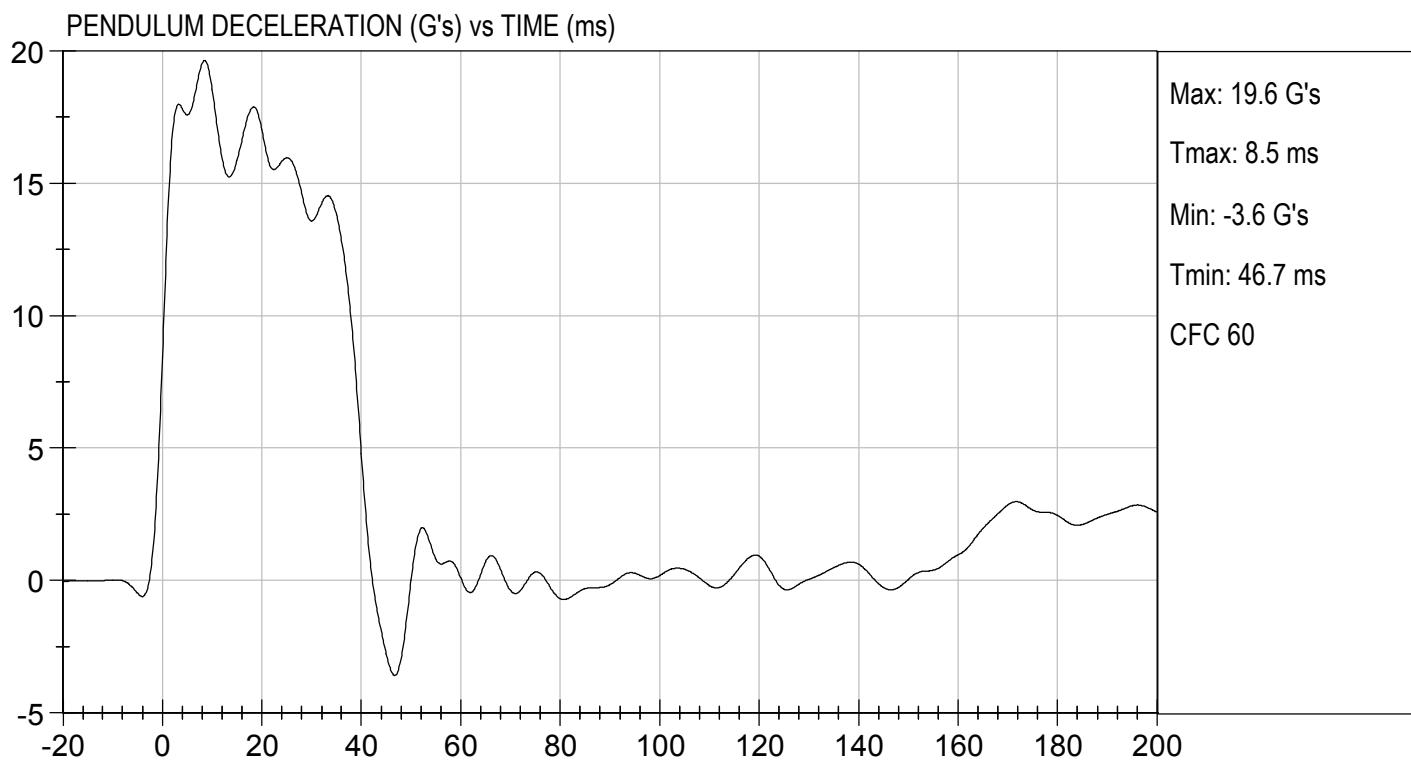
Test Date


Approved By



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

TEST DATE: 11/08/2019
TEST #: D193493





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

TEST DATE: 11/08/2019
TEST #: D193493



MGA RESEARCH CORPORATION
THORAX IMPACT
HYBRID III 50TH PERCENTILE MALE

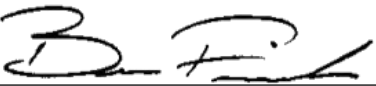
ATD Serial No: 351

Test I.D: D193494

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	18	Pass
Probe Velocity	m/s	6.58 to 6.82	6.68	Pass
Peak Probe Force	N	5159 to 5893	5,406	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.76	Pass
Internal Hysteresis	%	69 to 85	73	Pass
			Overall Test Results	Pass


Laboratory Technician

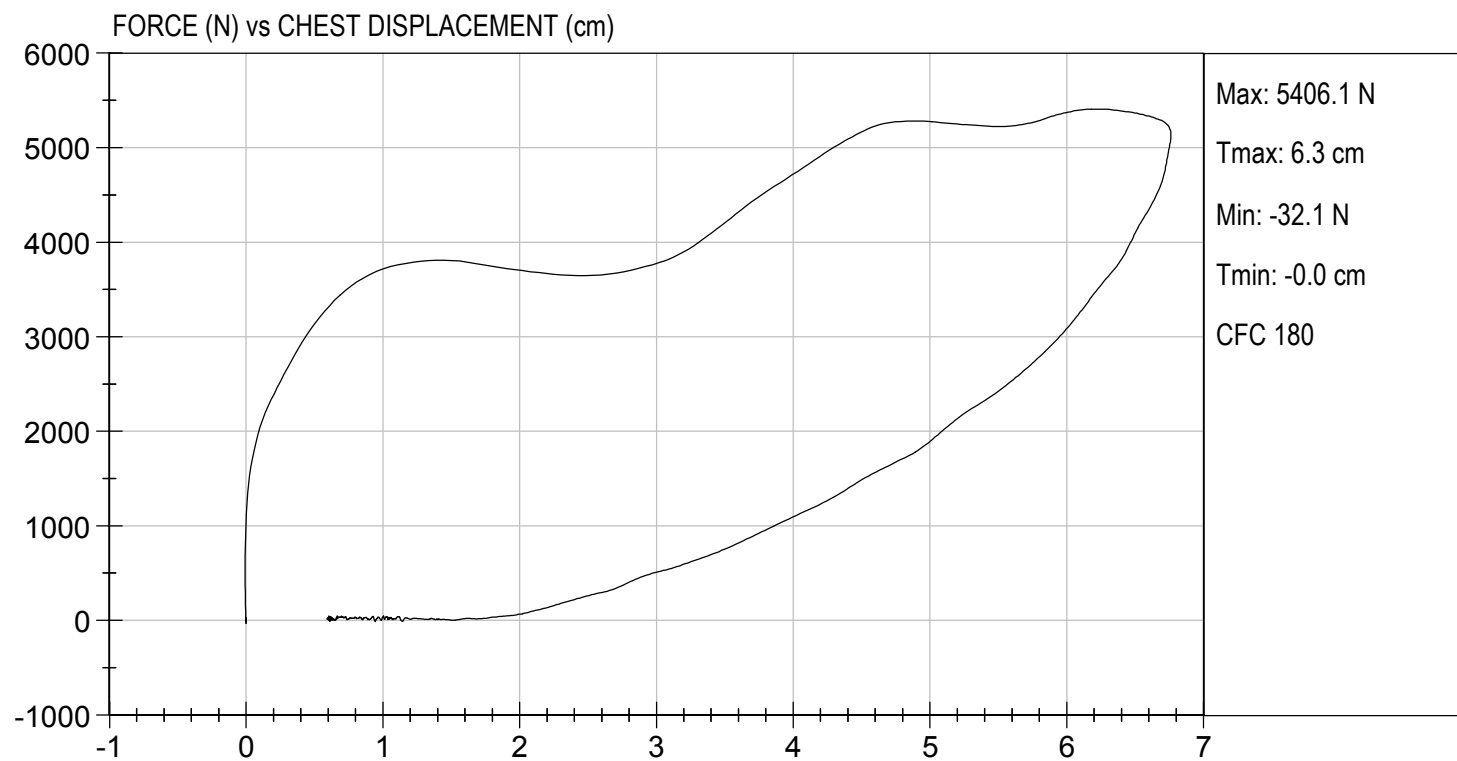
11/07/2019
Test Date


Approved By



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

TEST DATE: 11/07/2019
TEST #: D193494



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

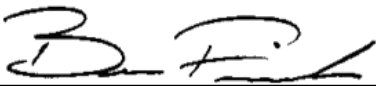
ATD Serial No: 351

Test I.D: D193495

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	18	Pass
Probe Velocity	m/s	2.07 to 2.13	2.11	Pass
Peak Probe Force	N	4715 to 5782	5,366	Pass
Overall Test Results				Pass


Laboratory Technician

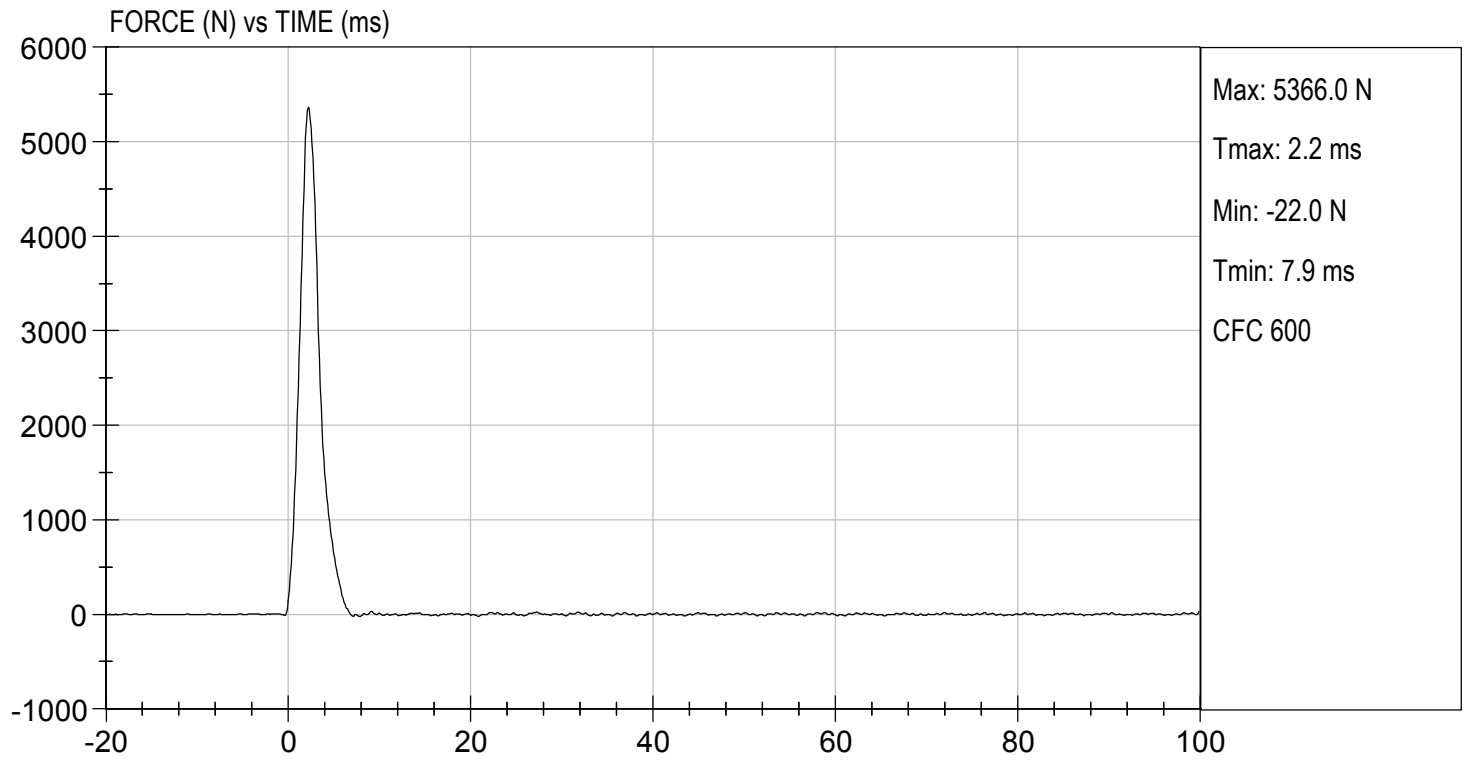
11/07/2019
Test Date


Approved By



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

TEST DATE: 11/07/2019
TEST #: D193495



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

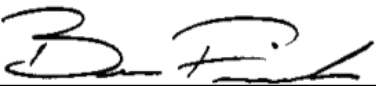
ATD Serial No: 351

Test I.D: D193496

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	18	Pass
Probe Velocity	m/s	2.07 to 2.13	2.11	Pass
Peak Probe Force	N	4715 to 5782	5,603	Pass
Overall Test Results				Pass


Laboratory Technician

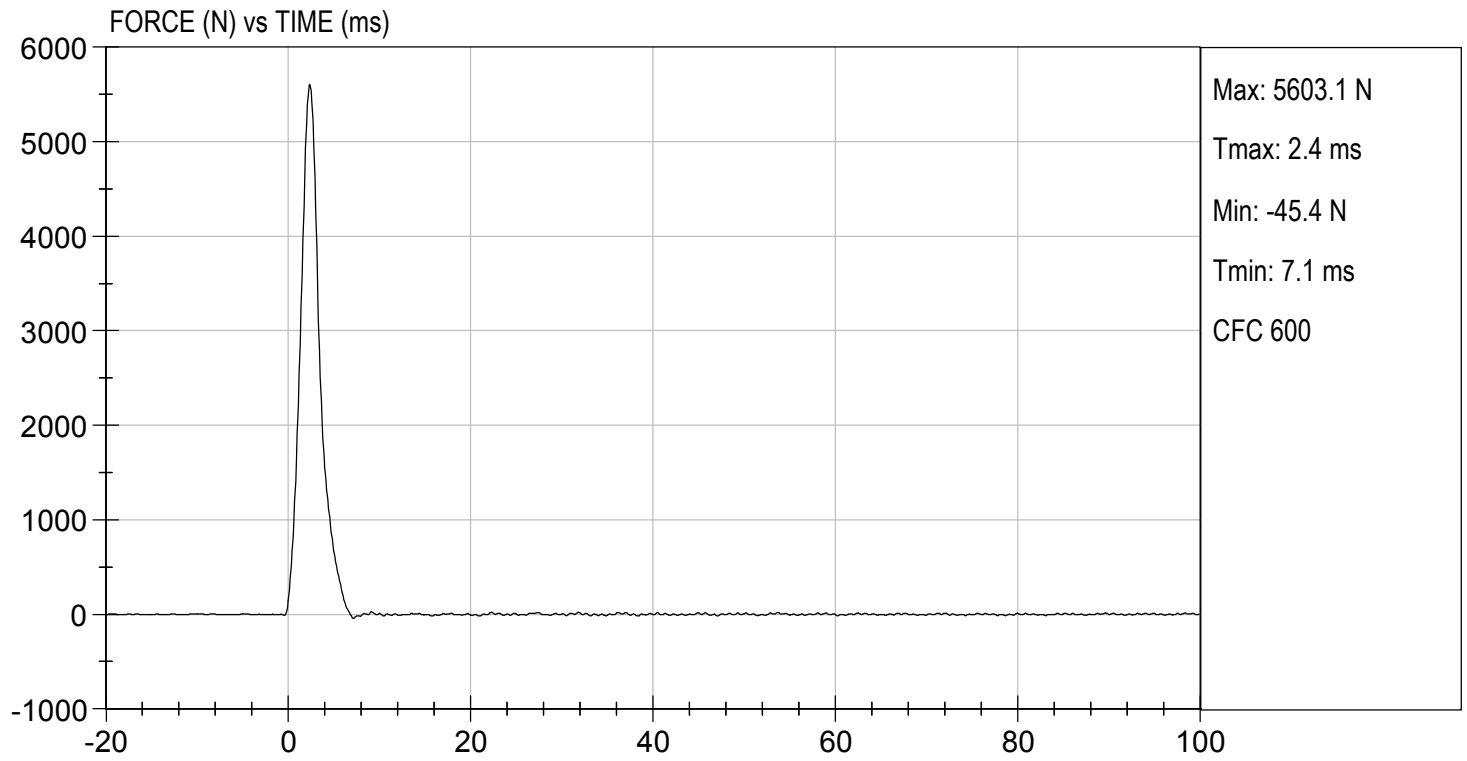
11/07/2019
Test Date


Approved By



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

TEST DATE: 11/07/2019
TEST #: D193496



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

ATD Serial No: 351

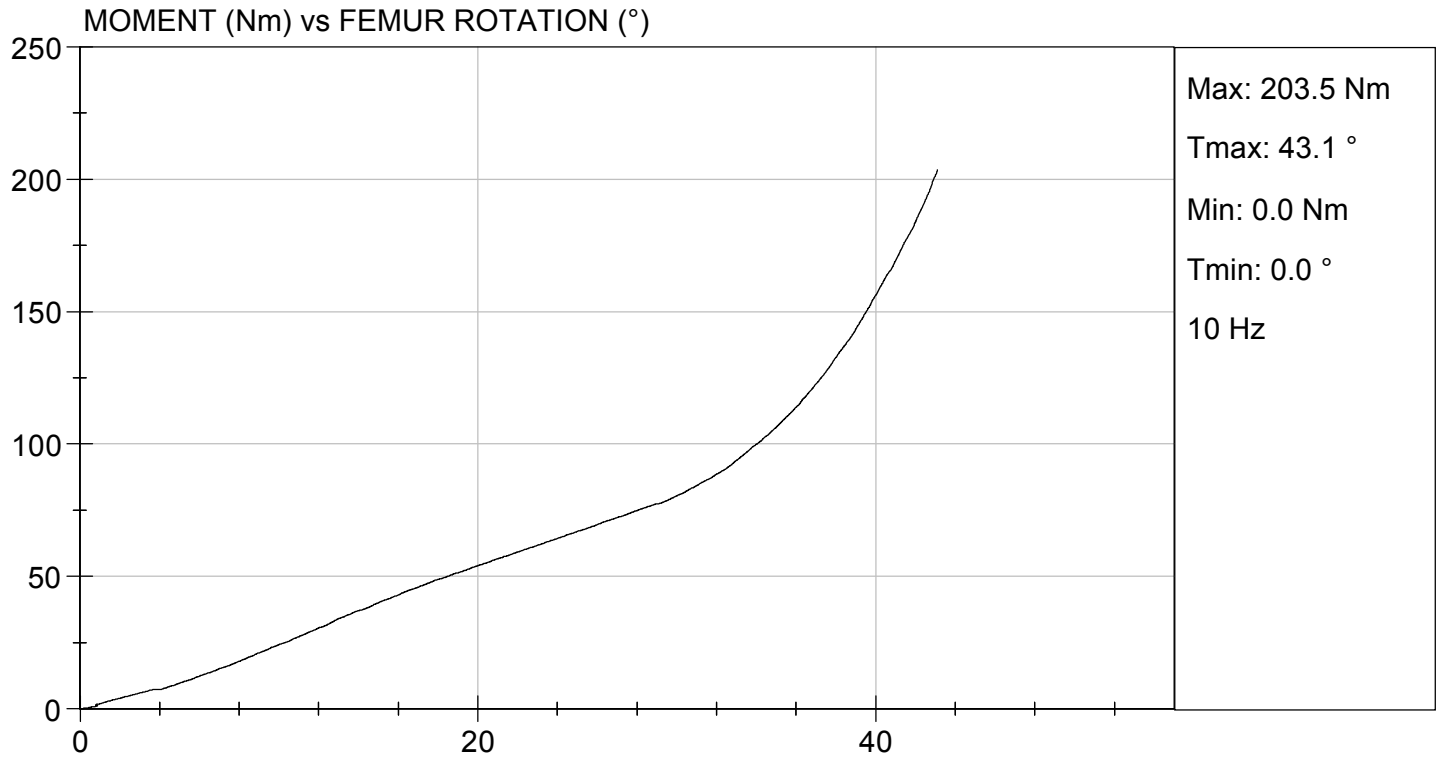
Test I.D: D193490

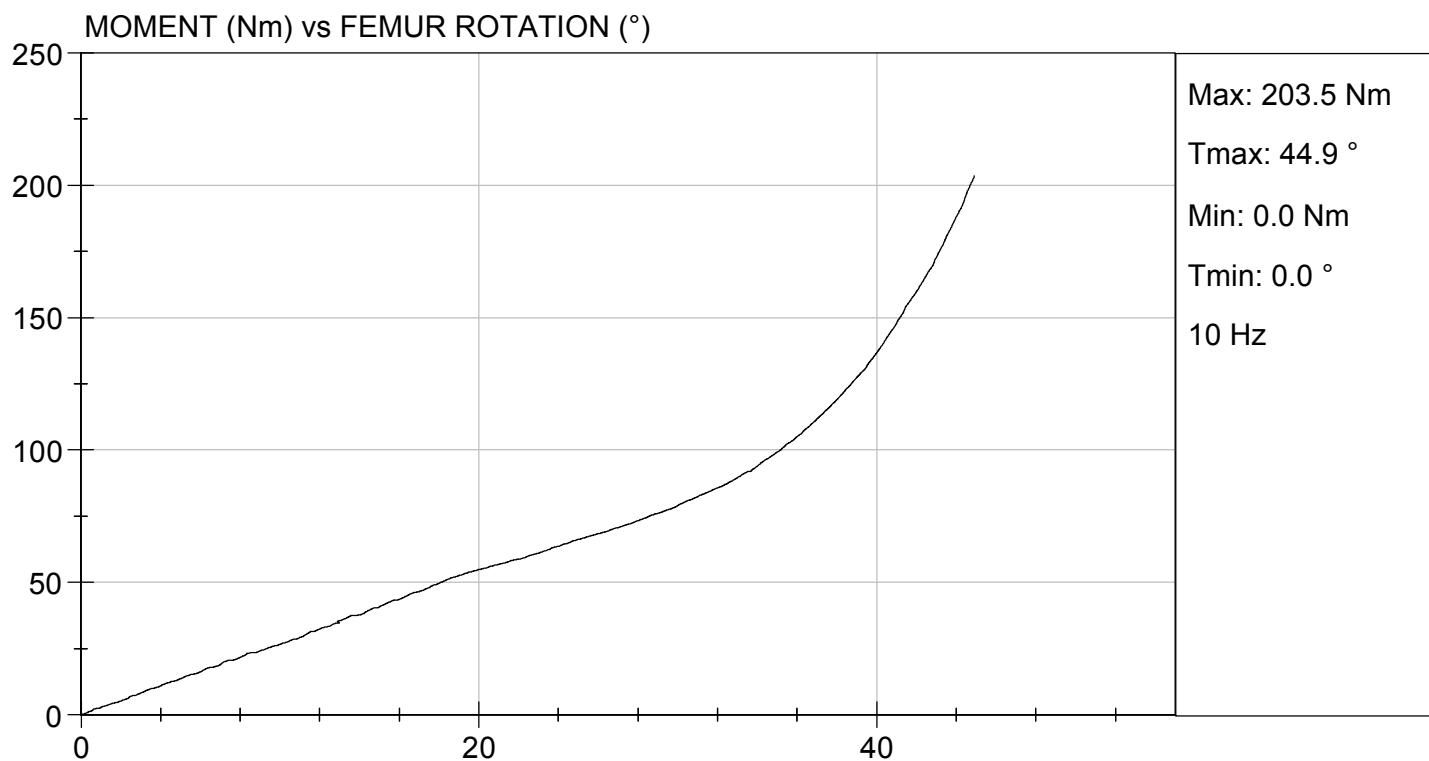
Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	21.3	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	18	18	Pass
Rotation Rate	deg/s	5.0 to 10.0	6.4	6.4	Pass
30 Degrees	Nm	94.9 Nm Max	79.1	80.5	Pass
150 ft-lbf / 203.4 Nm	Deg	40.0 to 50.0 Degree Max Rotation	44.9	43.1	Pass
Overall Test Results					Pass


 Laboratory Technician

11/07/2019
 Test Date


 Approved By





CALIBRATION TEST RESULTS

PRE-TEST

HYBRID III 5TH PERCENTILE FEMALE - PASSENGER ATD

Hybrid III, 5th External Measurements
SN: DH1659

HYBRID III, PART 572, SUBPART O EXTERNAL DIMENSIONS				
DIMENSION	DESCRIPTION	DETAILS	ASSEMBLY DIMENSION (mm)	ACTUAL MEASUREMENT
A	TOTAL SITTING HEIGHT	Seat surface to highest point on top of the head.	774.7-800.1	778
B	SHOULDER PIVOT HEIGHT	Centerline of shoulder pivot bolt to the seat surface.	431.8-457.2	440
C	H-POINT HEIGHT	Reference	81.3-86.3	85
D	H-POINT LOCATION FROM BACKLINE	Reference	144.8-149.8	147
E	SHOULDER PIVOT FROM BACKLINE	Center of the shoulder clevis to the rear vertical surface of the fixture.	68.6-83.8	82
F	THIGH CLEARANCE	Measured at the highest point on the upper femur segment.	119.4-134.6	130
G	BACK OF ELBOW TO WRIST PIVOT	back of the elbow flesh to the wrist pivot in line with the elbow and wrist pivots	243.9-259.1	251
H	HEAD BACK TO BACKLINE	Back of Skull cap skin to seat rear vertical surface (Reference)	43.2-48.2	45
I	SHOULDER TO- ELBOW LENGTH	Measure from the highest point on top of the shoulder clevis to the lowest part of the flesh on the elbow in line with the elbow pivot bolt.	276.8-297.2	285
J	ELBOW REST HEIGHT	Measure from the flesh below the elbow pivot bolt to the seat surface.	182.8-203.2	189
K	BUTTOCK TO KNEE LENGTH	The forward most part of the knee flesh to the rear vertical surface of the fixture.	520.7-546.1	543
L	POPLITEAL HEIGHT	Seat surface to the plane of the horizontal plane of the bottom of the feet.	355.6-376	357
M	KNEE PIVOT HEIGHT	Centerline of knee pivot bolt to the horizontal plane of the bottom of the feet.	393.7-419.1	398

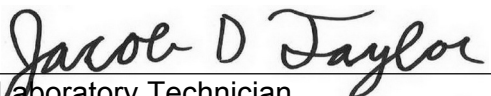
N	BUTTOCK POPLITEAL LENGTH	The rearmost surface of the lower leg to the same point on the rear surface of the buttocks used for dim. "K".	414-439.4	435
HYBRID III, SUBPART O EXTERNAL DIMENSIONS, continued				
DIMENSION	DESCRIPTION	DETAILS	ASSEMBLY DIMENSION (mm)	ACTUAL MEASUREMENT
O	CHEST DEPTH WITHOUT JACKET	Measured 304.8 ± 5.1 mm above seat surface	175.3-190.5	182
P	FOOT LENGTH	Tip of toe to rear of heel	218.5-233.7	221
Q	STANDING HEIGHT	(THEORETICAL)	1501.1	N/A
R	BUTTOCK TO KNEE PIVOT LENGTH	The rear surface of the buttocks to the knee pivot bolt	457.2-482.6	469
S	HEAD BREADTH	The widest part of the head	137.1-147.3	141
T	HEAD DEPTH	Back of the head to the forehead	177.8-188	182
U	HIP BREADTH	The widest part of the hip	299.7-314.9	306
V	SHOULDER BREADTH	Outside edges of right and left shoulder clevises	350.5-365.7	357
W	FOOT BREADTH	The widest part of the foot	78.8-94	83
X	HEAD CIRCUMFERENCE	Measured at the point as in dim. "T"	528.3-548.7	542
Y	CHEST CIRCUMFERENCE (WITH CHEST JACKET)	Measured 345.4 ± 12.7 mm above seat surface	850.9-881.3	865
Z	WAIST CIRCUMFERENCE	Measured 165.1 ± 5.1 mm above seat surface	759.5-789.9	785
AA	REFERENCE LOCATION FOR MEASUREMENT OF CHEST CIRCUMFERENCE	Reference	332.7-358.1	345
BB	REFERENCE LOCATION FOR MEASUREMENT OF WAIST CIRCUMFERENCE	Reference	160.1-170.2	165

MGA RESEARCH CORPORATION
HEAD DROP TEST
HYBRID III 5TH PERCENTILE

ATD Serial No: DH1659

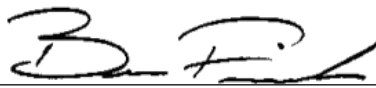
Test ID: D193251

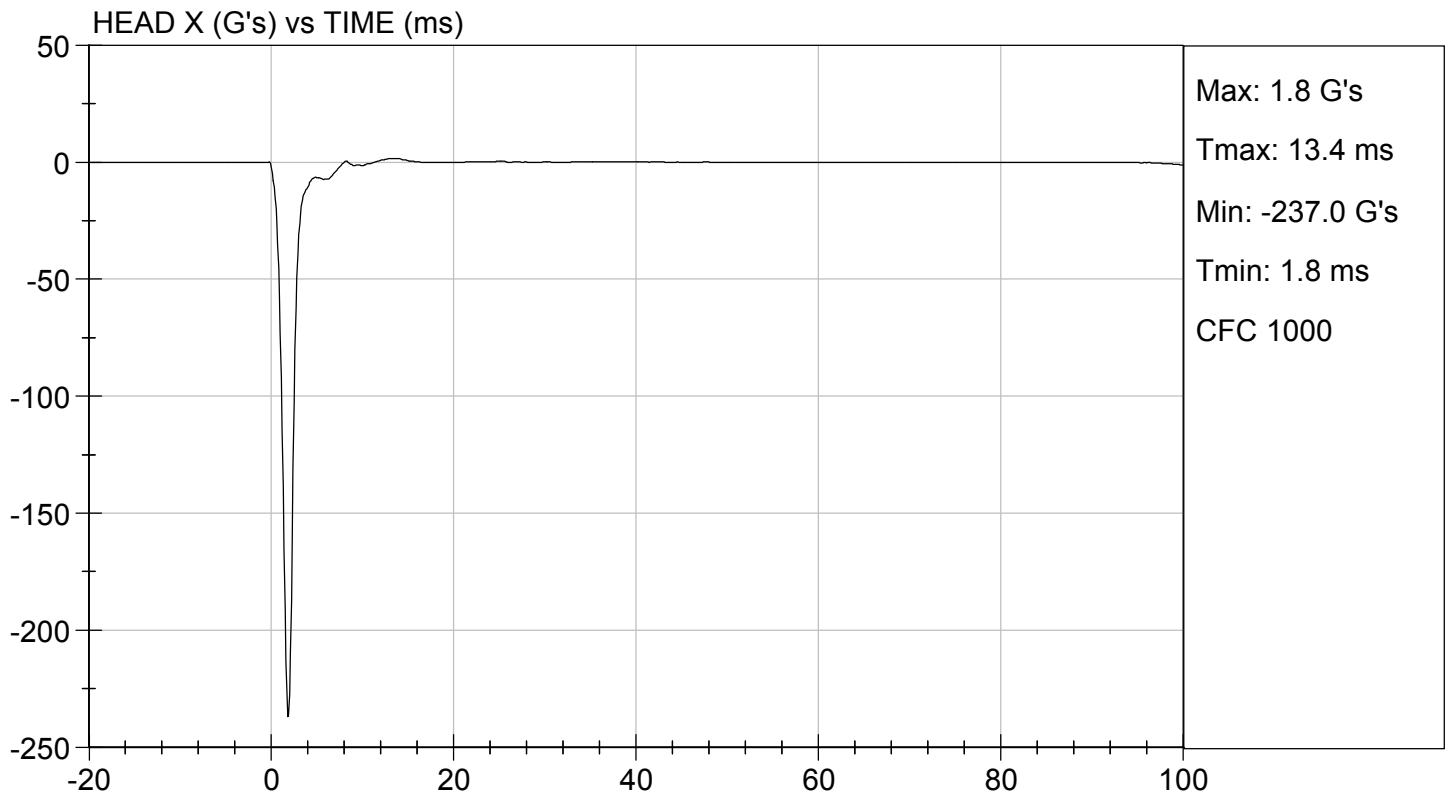
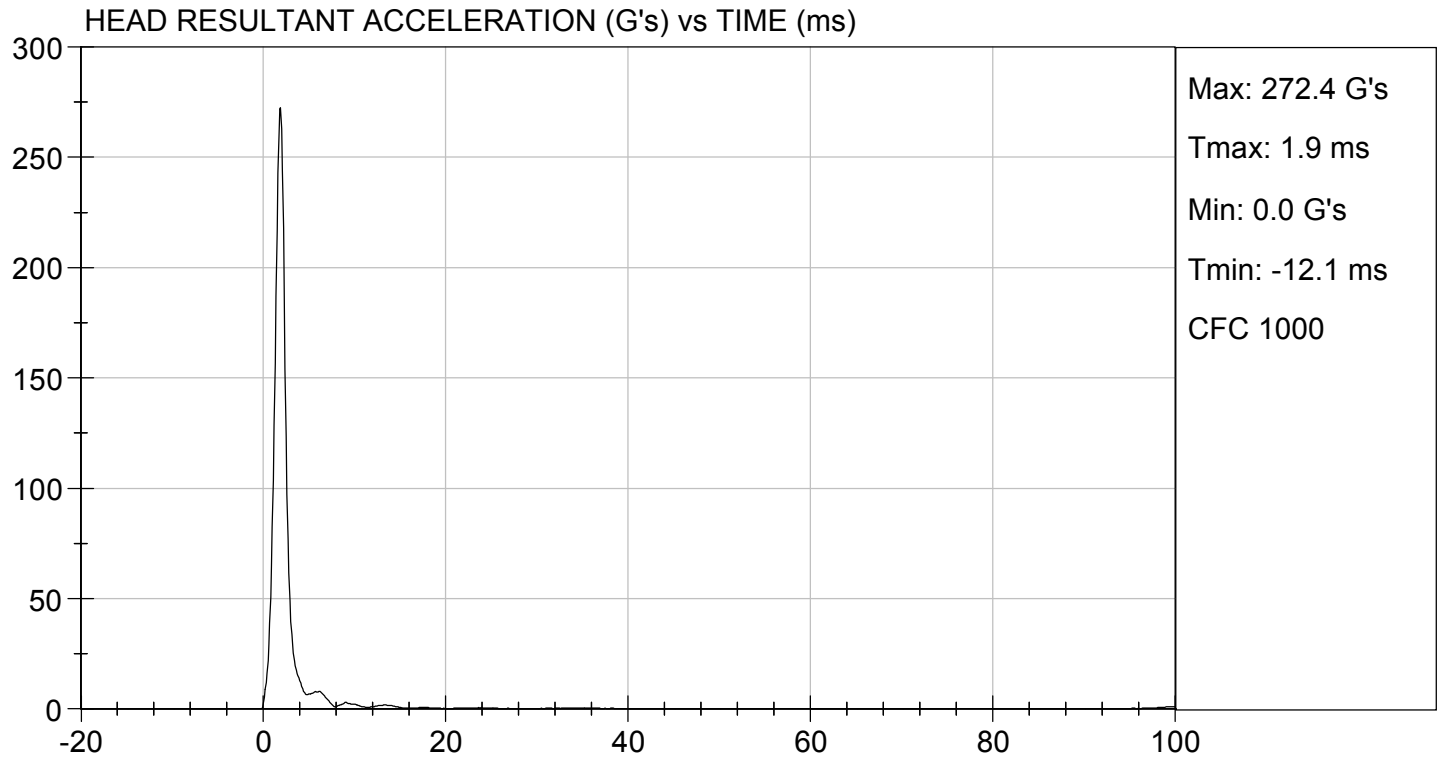
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21	Pass
Laboratory Relative Humidity	%	10 to 70	36	Pass
Peak Resultant Acceleration	G's	250 to 300	272	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	4.9	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
Overall Test Results				Pass

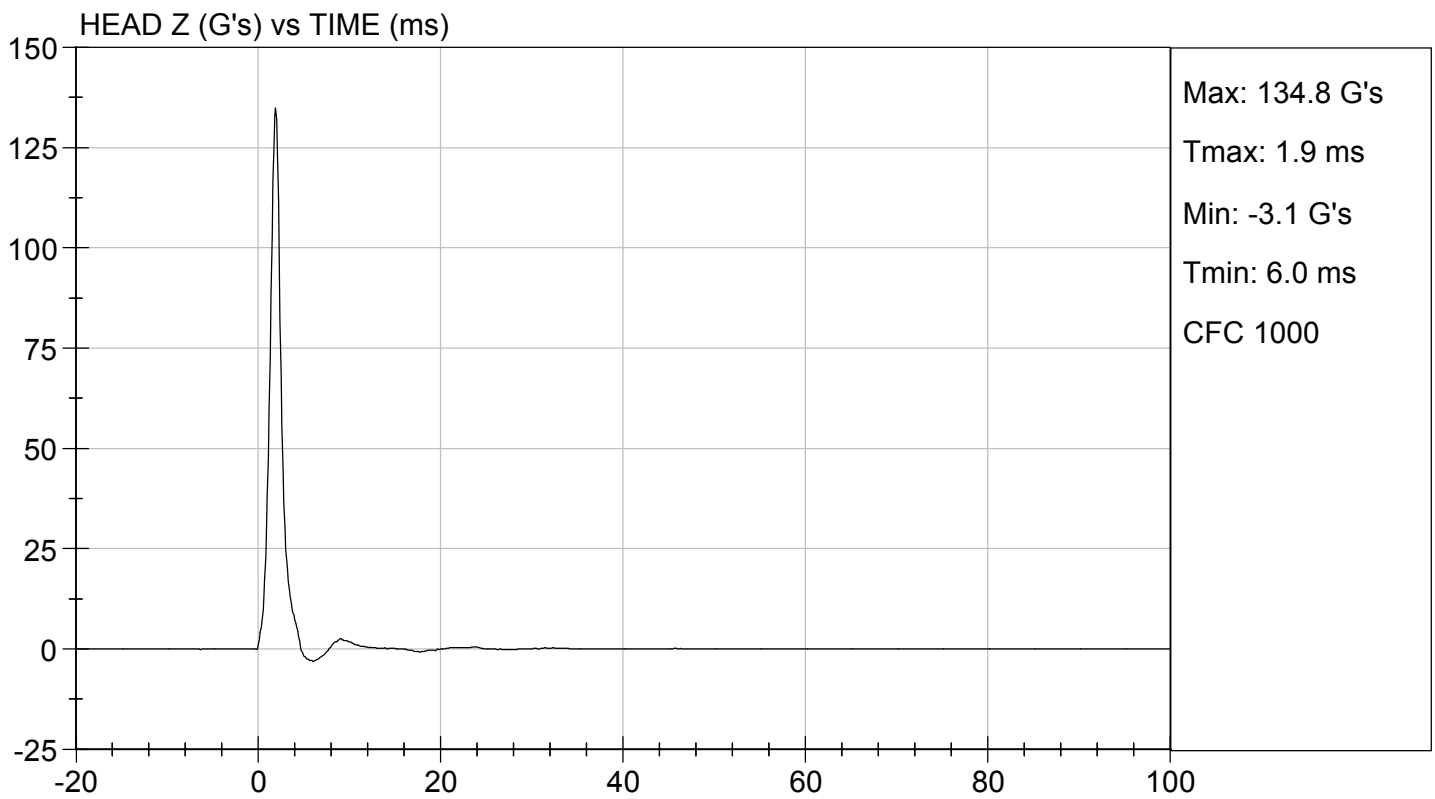
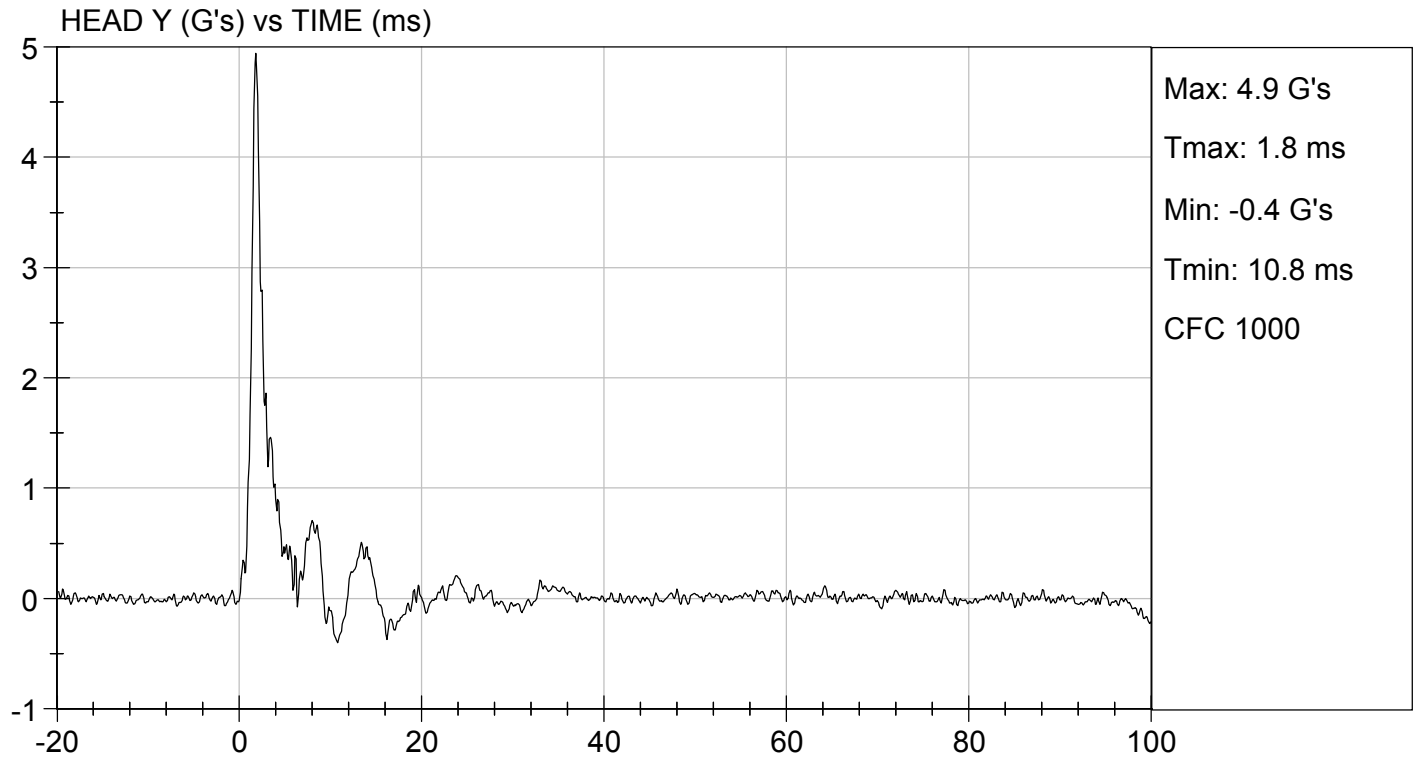

Laboratory Technician

10/17/2019

Test Date


Approved By





MGA RESEARCH CORPORATION

NECK FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: DH1659Test I.D: D193252

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity		%	10 to 70	29	Pass
Pendulum Speed		m/s	6.89 to 7.13	7.13	Pass
Pendulum Velocity	10 ms	m/s	2.1 to 2.5	2.1	Pass
	20 ms	m/s	4.0 to 5.0	4.2	Pass
	30 ms	m/s	5.8 to 7.0	6.1	Pass
D Plane Rotation	Max	deg	77 to 91	80	Pass
Occipital Condyle Moment within Rotation Corridor		Nm	69 to 83	69	Pass
Positive Moment Time Curve Decay to 10 Nm		ms	80 to 100	89	Pass
Overall Results					Pass

Jacob D Taylor
Laboratory Technician

10/16/2019

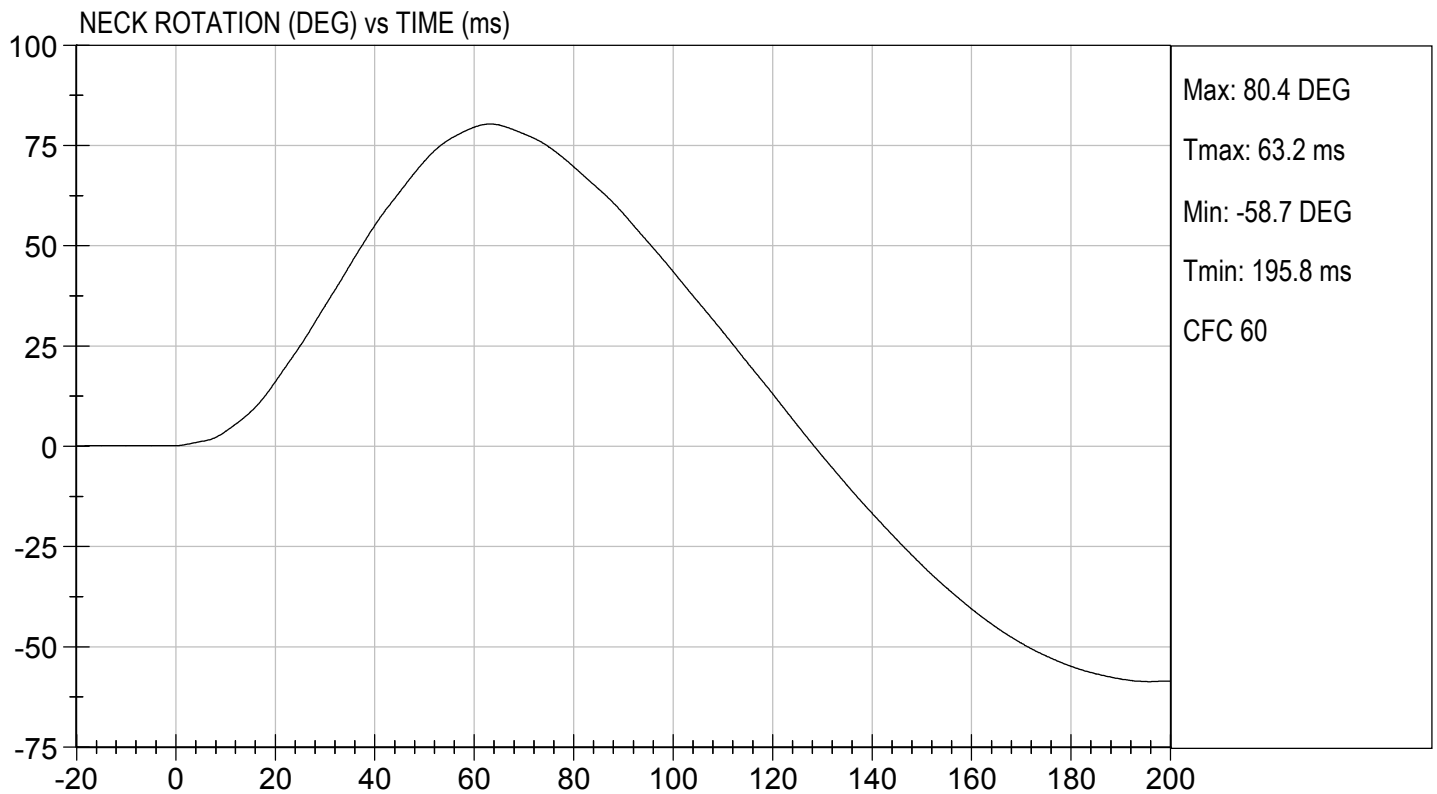
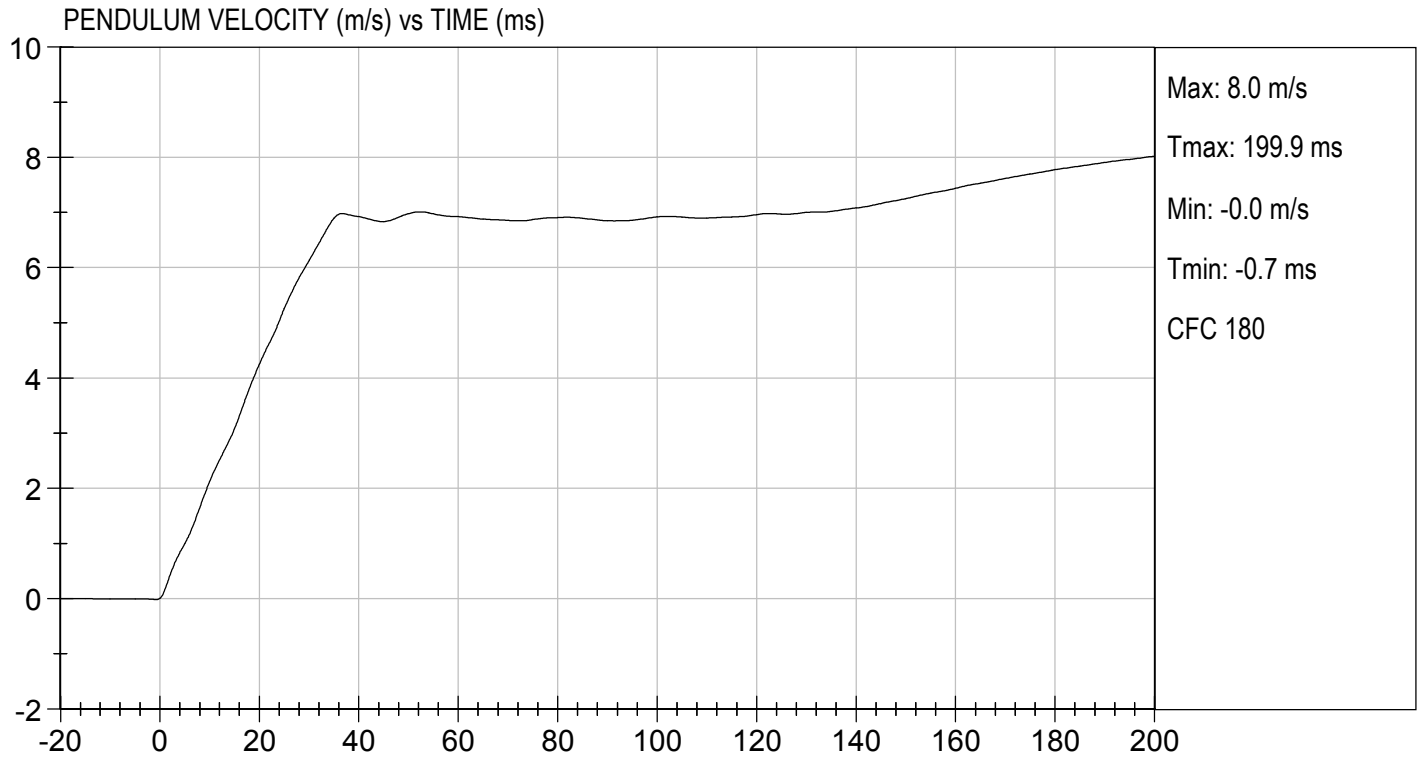
Test Date

B. F. K.
Approved By



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

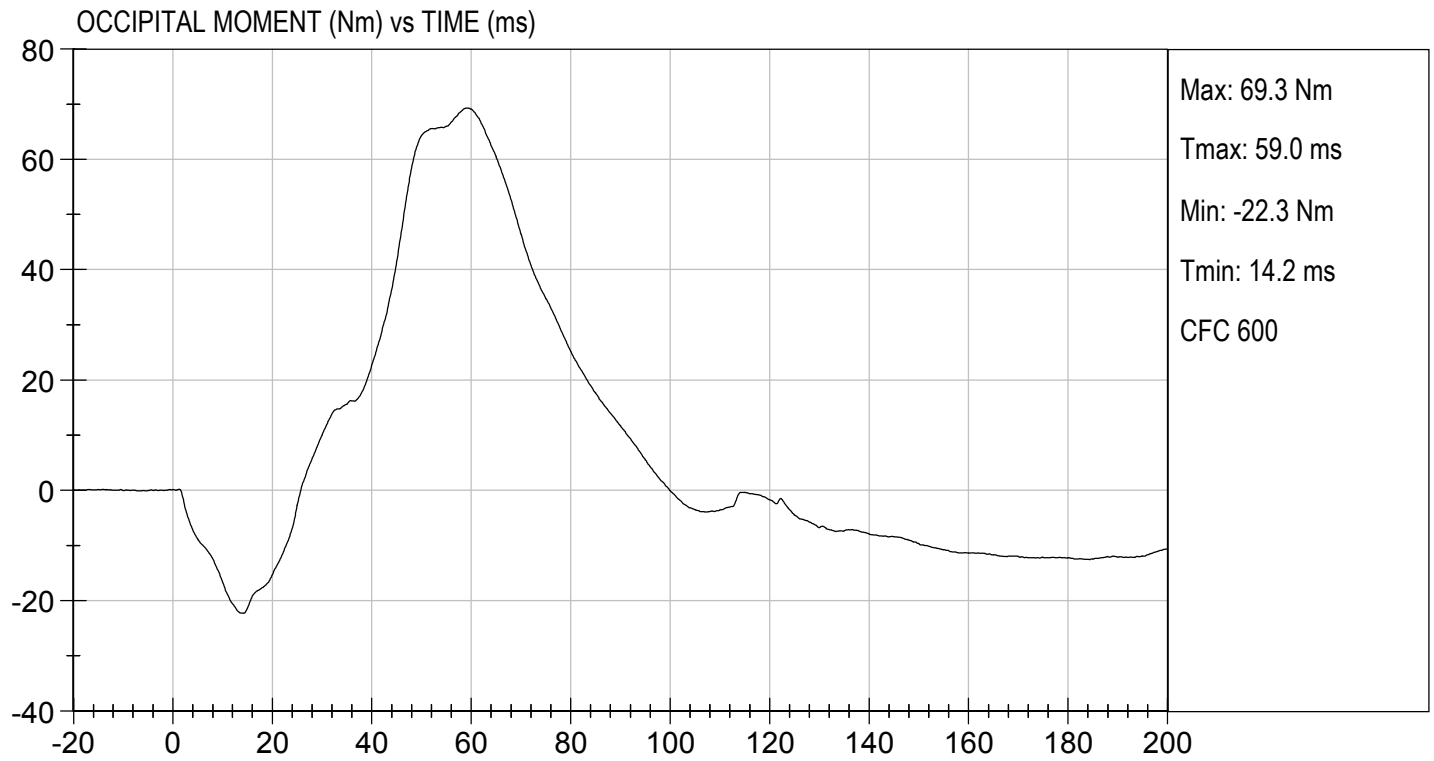
TEST DATE: 10/16/2019
TEST #: D193252





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

TEST DATE: 10/16/2019
TEST #: D193252



MGA RESEARCH CORPORATION
NECK EXTENSION TEST
HYBRID III 5TH PERCENTILE

ATD Serial No: DH1659

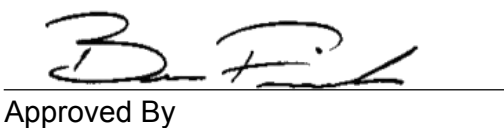
Test I.D: D193253

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity		%	10 to 70	29	Pass
Pendulum Speed		m/s	5.95 to 6.19	6.19	Pass
Pendulum Velocity	10 ms	m/s	1.5 to 1.9	1.7	Pass
	20 ms	m/s	3.1 to 3.9	3.5	Pass
	30 ms	m/s	4.6 to 5.6	5.1	Pass
D Plane Rotation	Max	deg	99 to 114	108	Pass
Occipital Condyle Moment within Rotation Corridor		Nm	-65 to -53	-57	Pass
Negative Moment Time Curve Decay to -10 Nm		ms	94 to 114	105	Pass
Overall Results					Pass


Laboratory Technician

10/16/2019

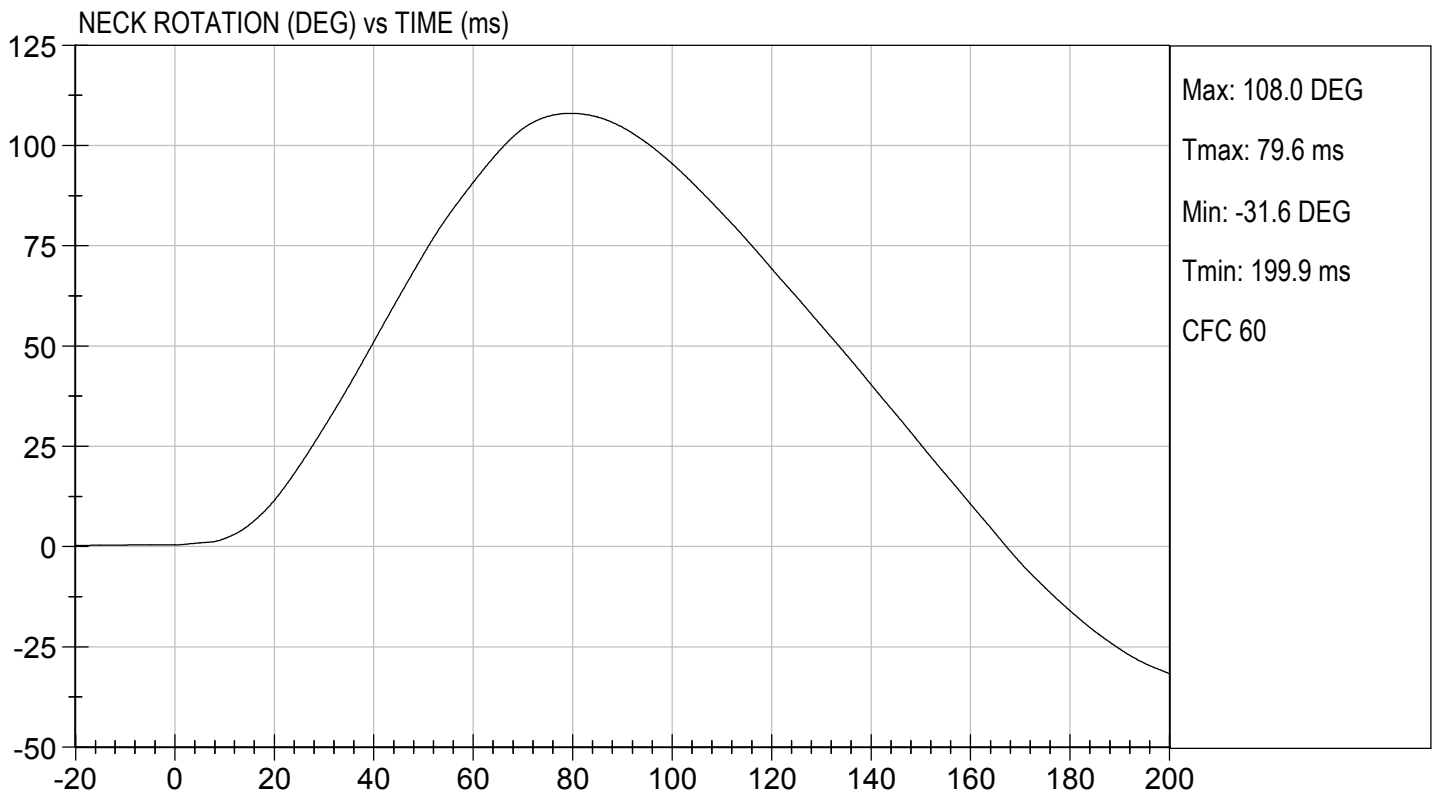
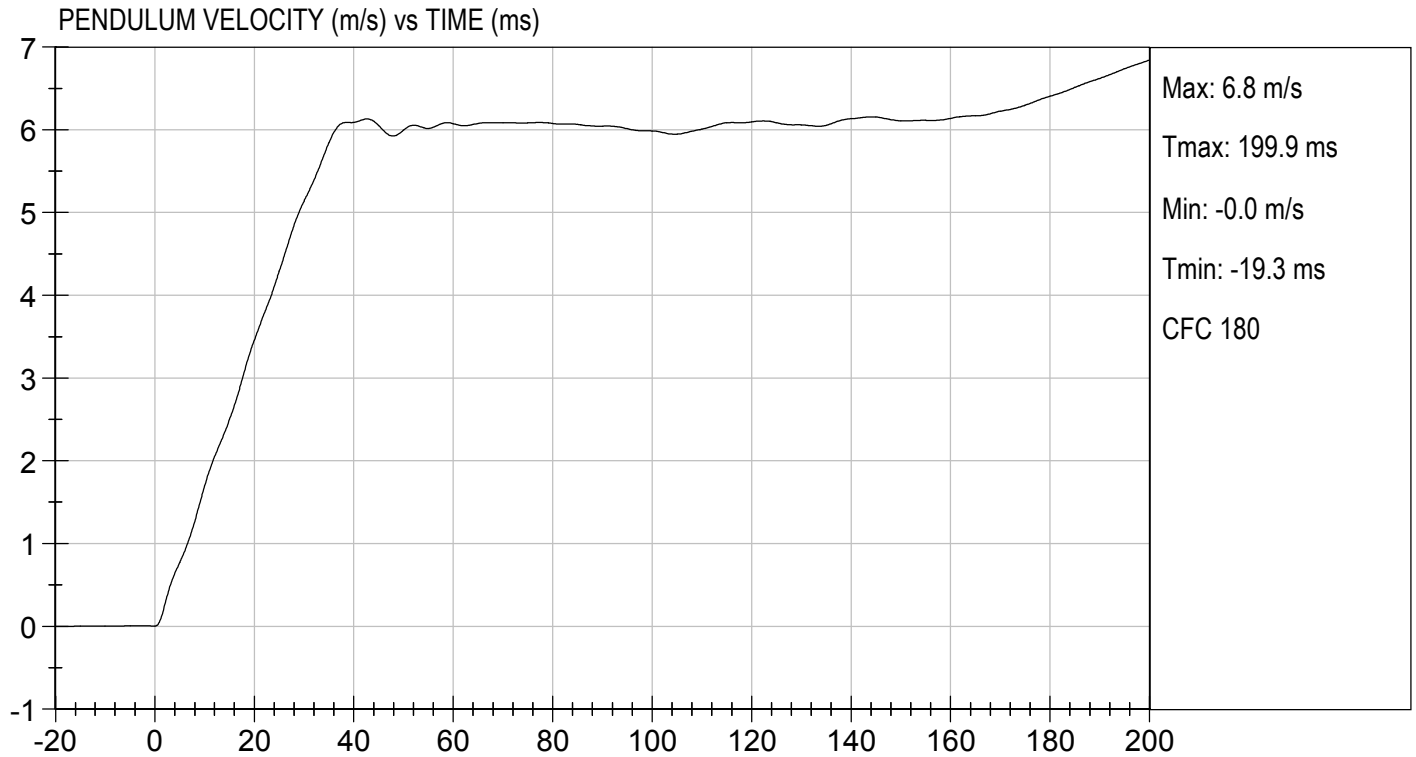
Test Date


Approved By



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

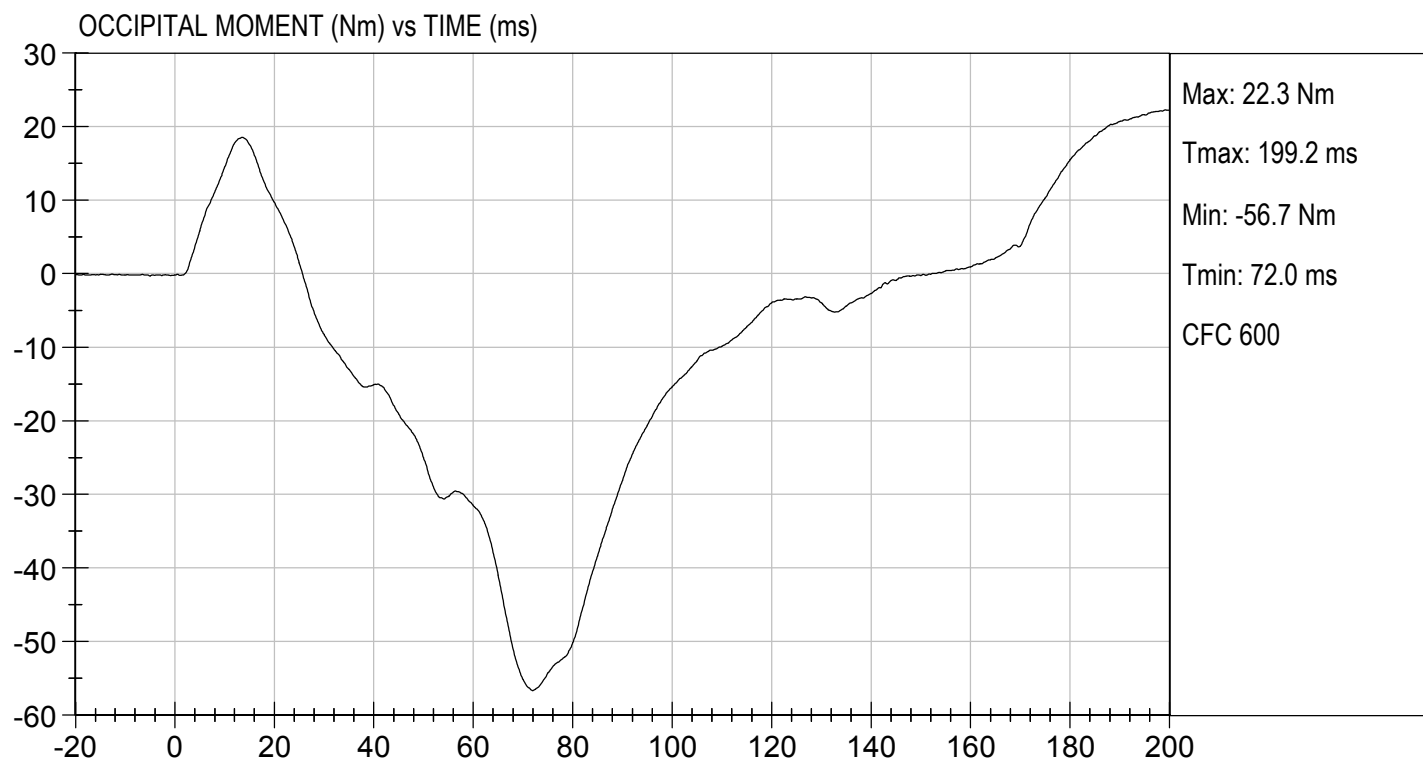
TEST DATE: 10/16/2019
TEST #: D193253





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

TEST DATE: 10/16/2019
TEST #: D193253

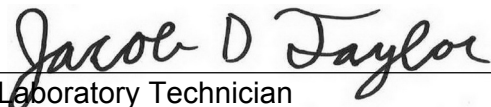


MGA RESEARCH CORPORATION
THORAX IMPACT
HYBRID III 5TH PERCENTILE

ATD Serial No: DH1659

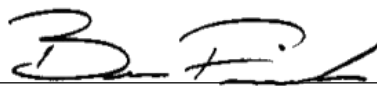
Test I.D: D193254

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.9	Pass
Relative Humidity	%	10 to 70	43	Pass
Probe Speed	m/s	6.59 to 6.83	6.77	Pass
Peak Deflection	mm	50 to 58	51	Pass
Peak Resistive Force w/in Deflection Corridor	N	3900 to 4400	4330	Pass
Internal Hysteresis	%	69 to 85	75	Pass
Peak Force 18 mm - 50 mm	N	<= 4600	4359	Pass
Overall Test Results				Pass


Laboratory Technician

10/21/2019

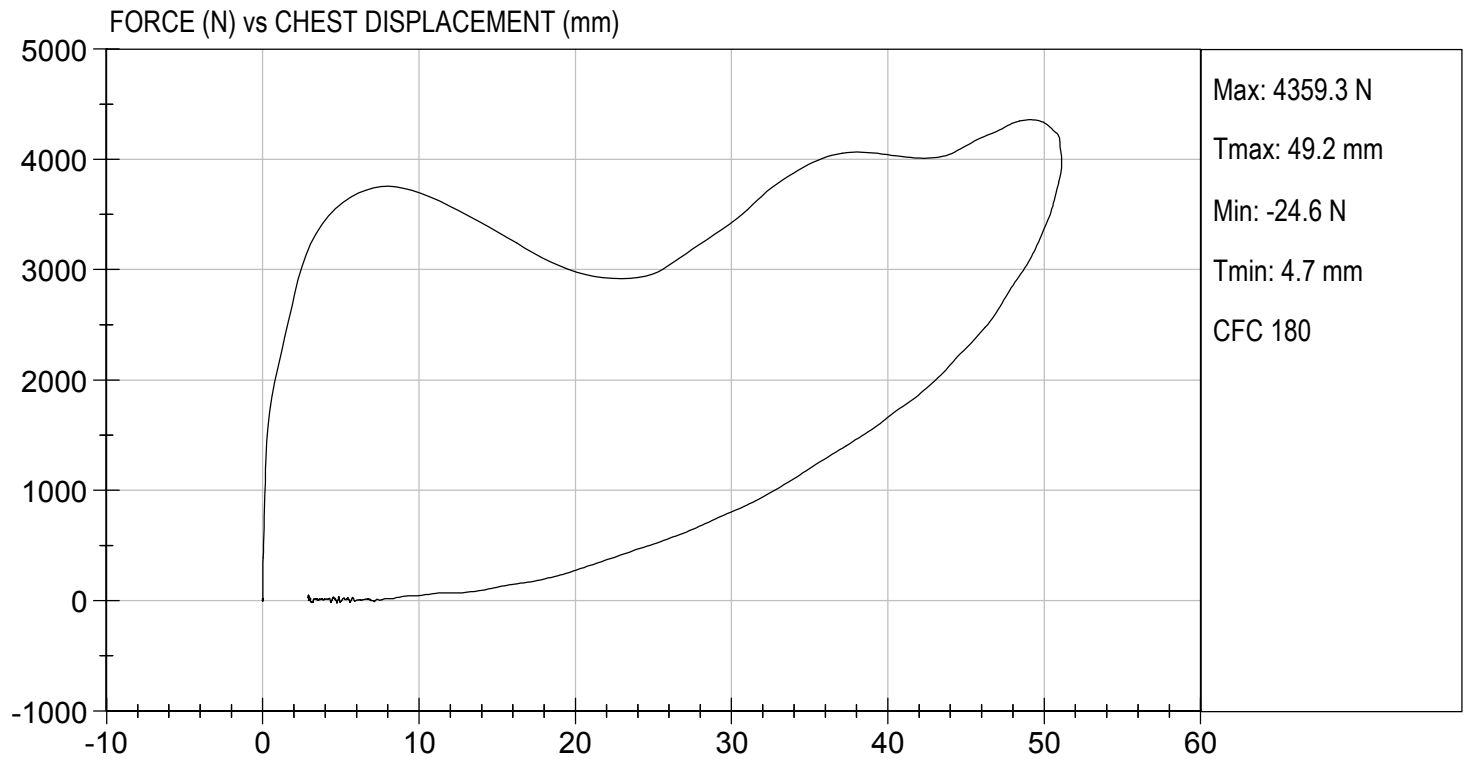
Test Date


Approved By



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

TEST DATE: 10/21/2019
TEST #: D193254



MGA RESEARCH CORPORATION

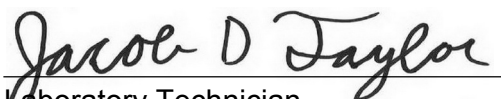
RIGHT KNEE IMPACT TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: DH1659

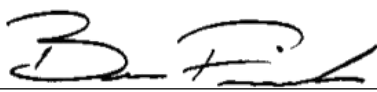
Test I.D: D193255

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Probe Speed	m/s	2.07 to 2.13	2.13	Pass
Maximum Force	N	3450 to 4060	3884	Pass
Overall Test Results				Pass


Laboratory Technician

10/17/2019

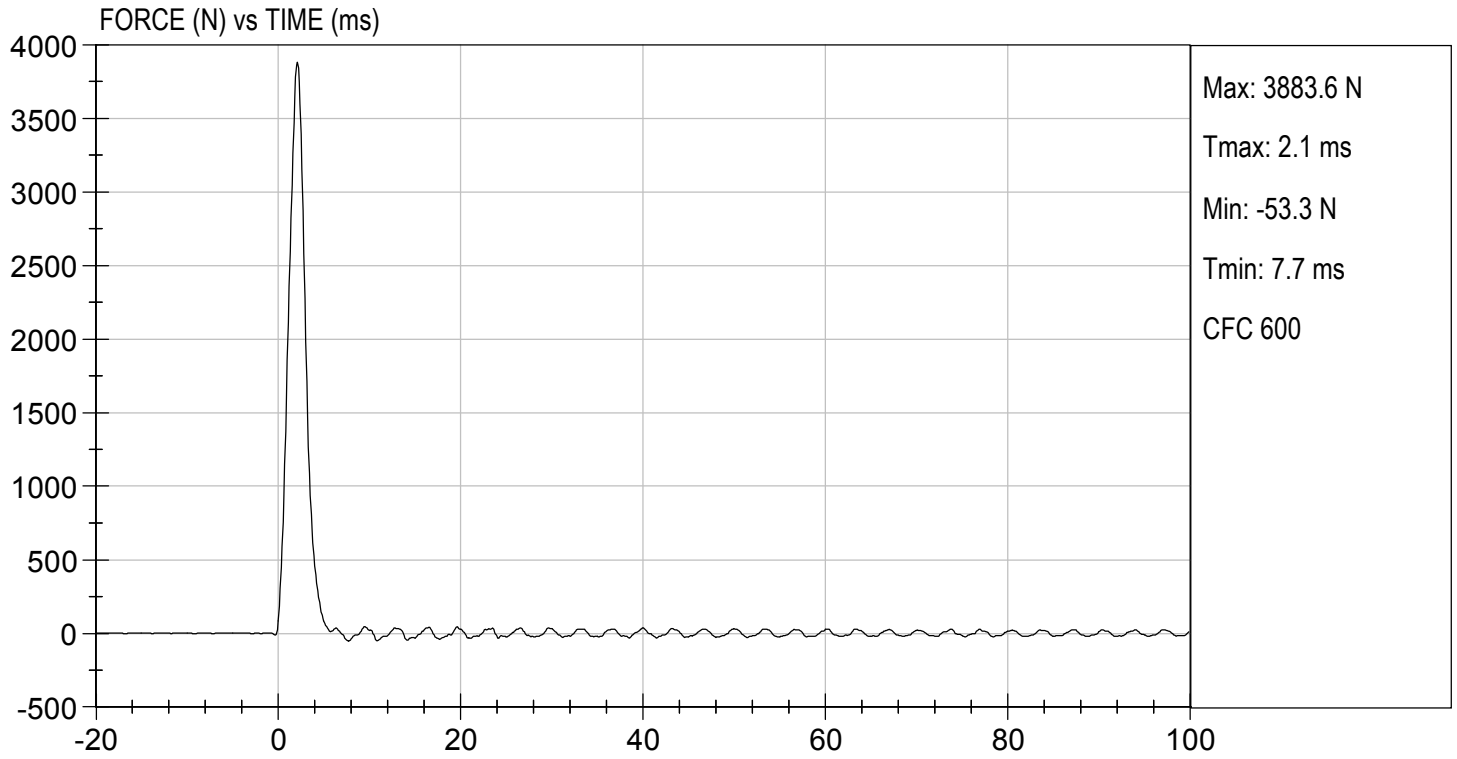
Test Date


Approved By



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

TEST DATE: 10/17/2019
TEST #: D193255



MGA RESEARCH CORPORATION

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

ATD Serial No: DH1659

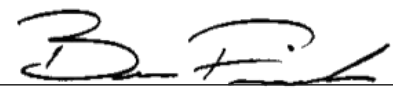
Test I.D: D193256

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Probe Speed	m/s	2.07 to 2.13	2.12	Pass
Maximum Force	N	3450 to 4060	3873	Pass
Overall Test Results				Pass


Laboratory Technician

10/17/2019

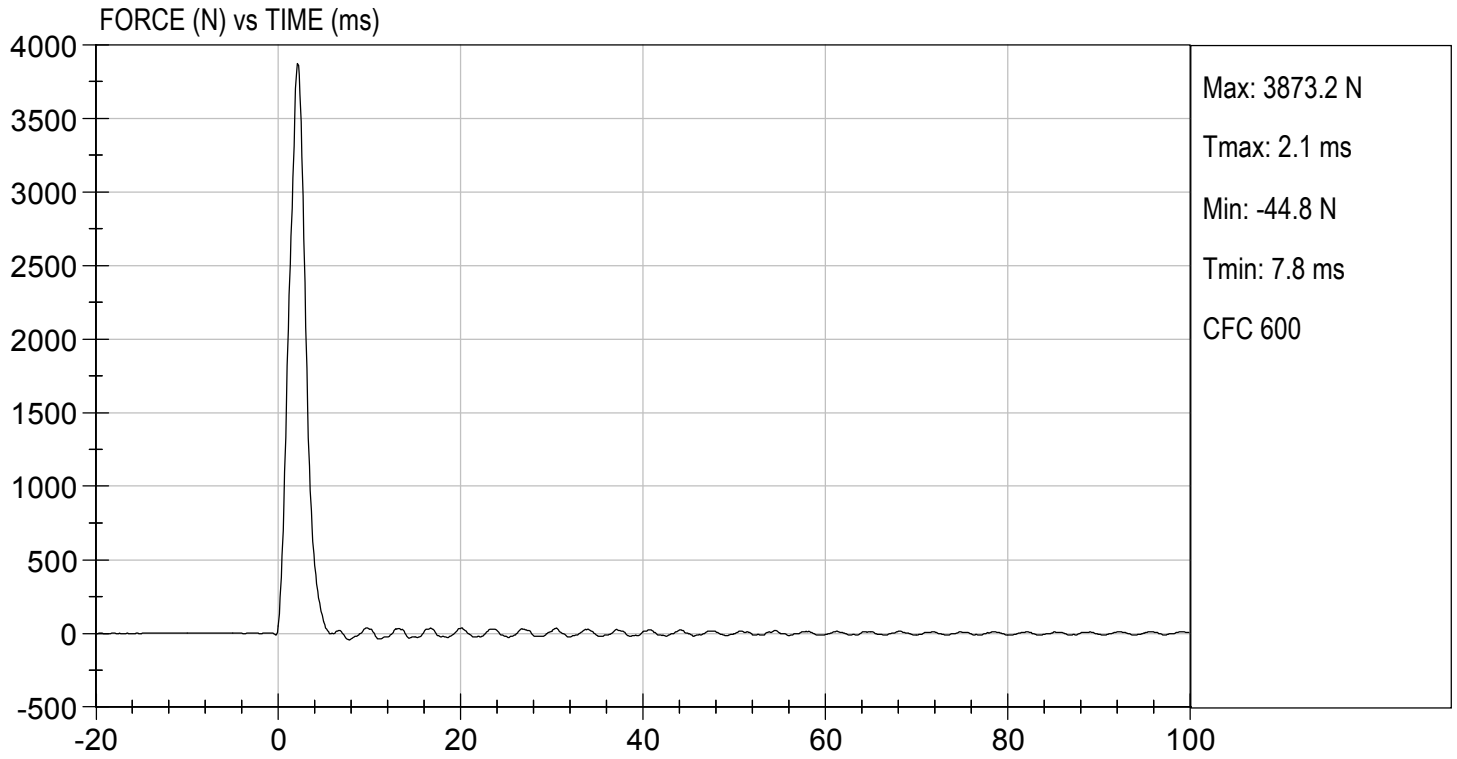
Test Date


Approved By



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

TEST DATE: 10/17/2019
TEST #: D193256



MGA RESEARCH CORPORATION

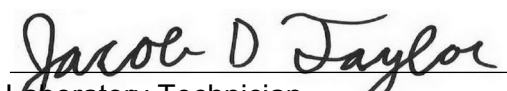
TORSO FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: DH1659

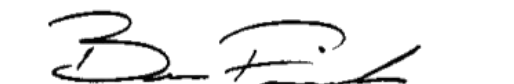
Test I.D: D193257

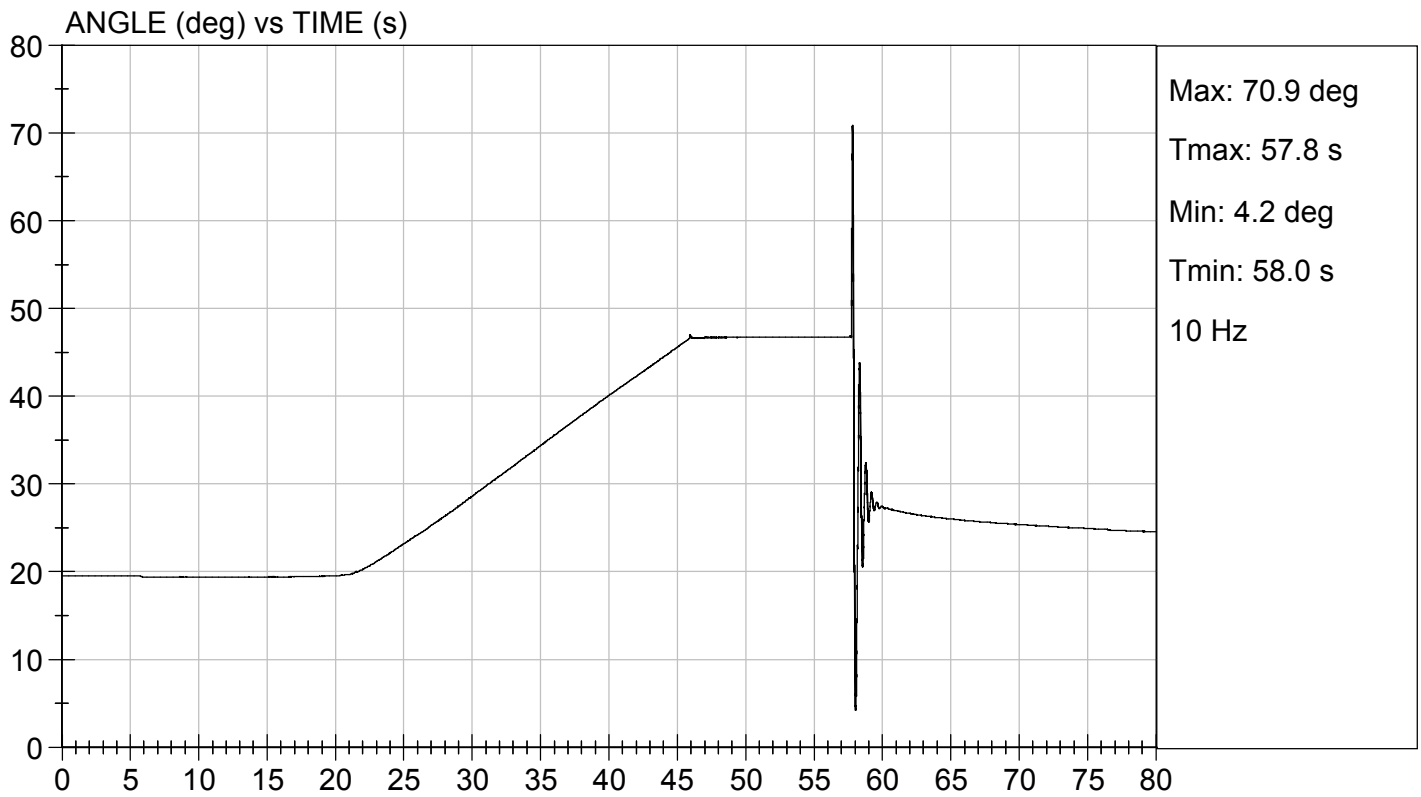
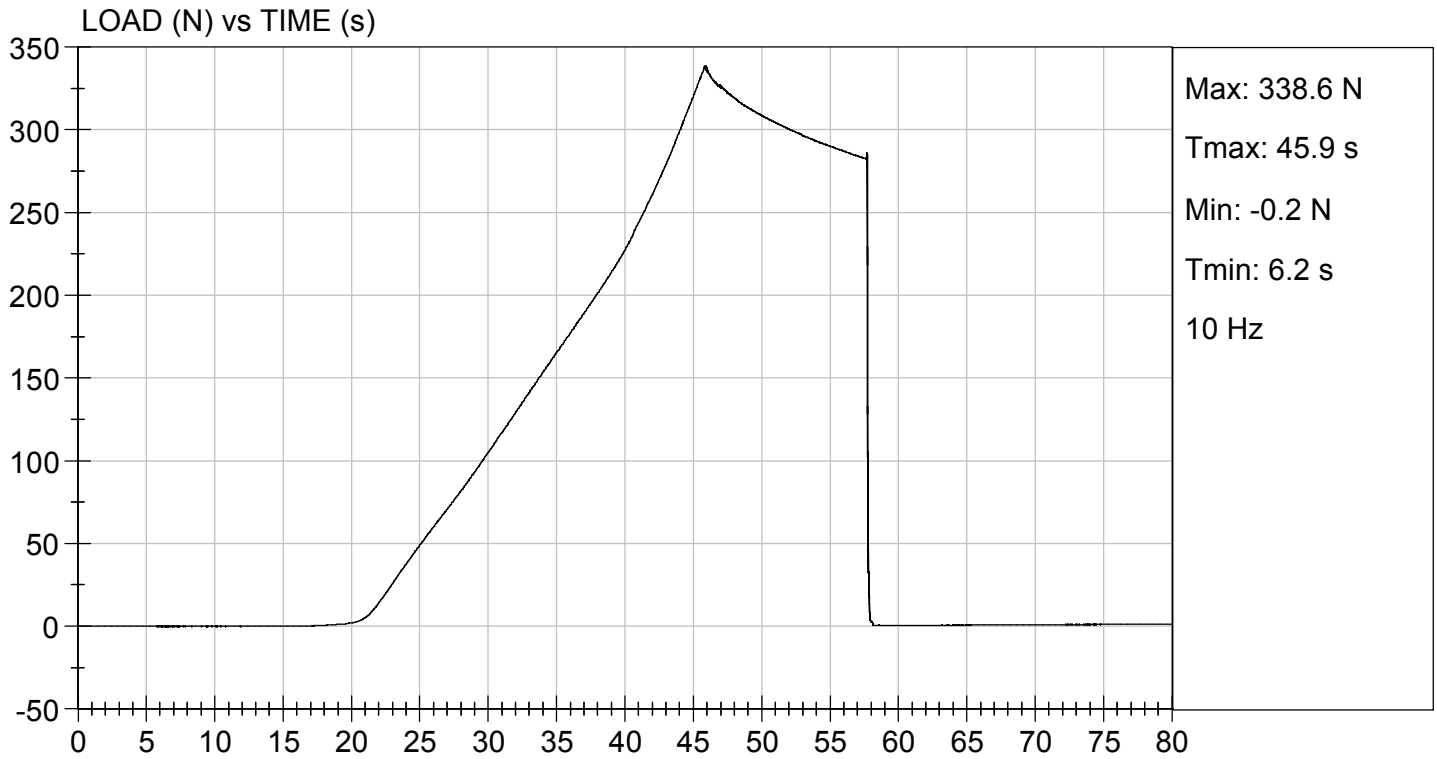
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21	Pass
Laboratory Relative Humidity	%	10 to 70	36	Pass
Initial Angle	deg	0 to 20	20	Pass
Return Angle	deg	+/- 8	4	Pass
Force at 45 deg	N	320 to 390	339	Pass
Upper Torso Deflection Rate	deg/s	0.5 to 1.5	1.1	Pass
Overall Result				Pass


Laboratory Technician

10/17/2019

Test Date


Approved By



CALIBRATION TEST RESULTS

POST-TEST

HYBRID III 5TH PERCENTILE FEMALE - PASSENGER ATD

MGA RESEARCH CORPORATION
HEAD DROP TEST
HYBRID III 5TH PERCENTILE

ATD Serial No: DH1659

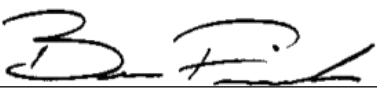
Test ID: D193501

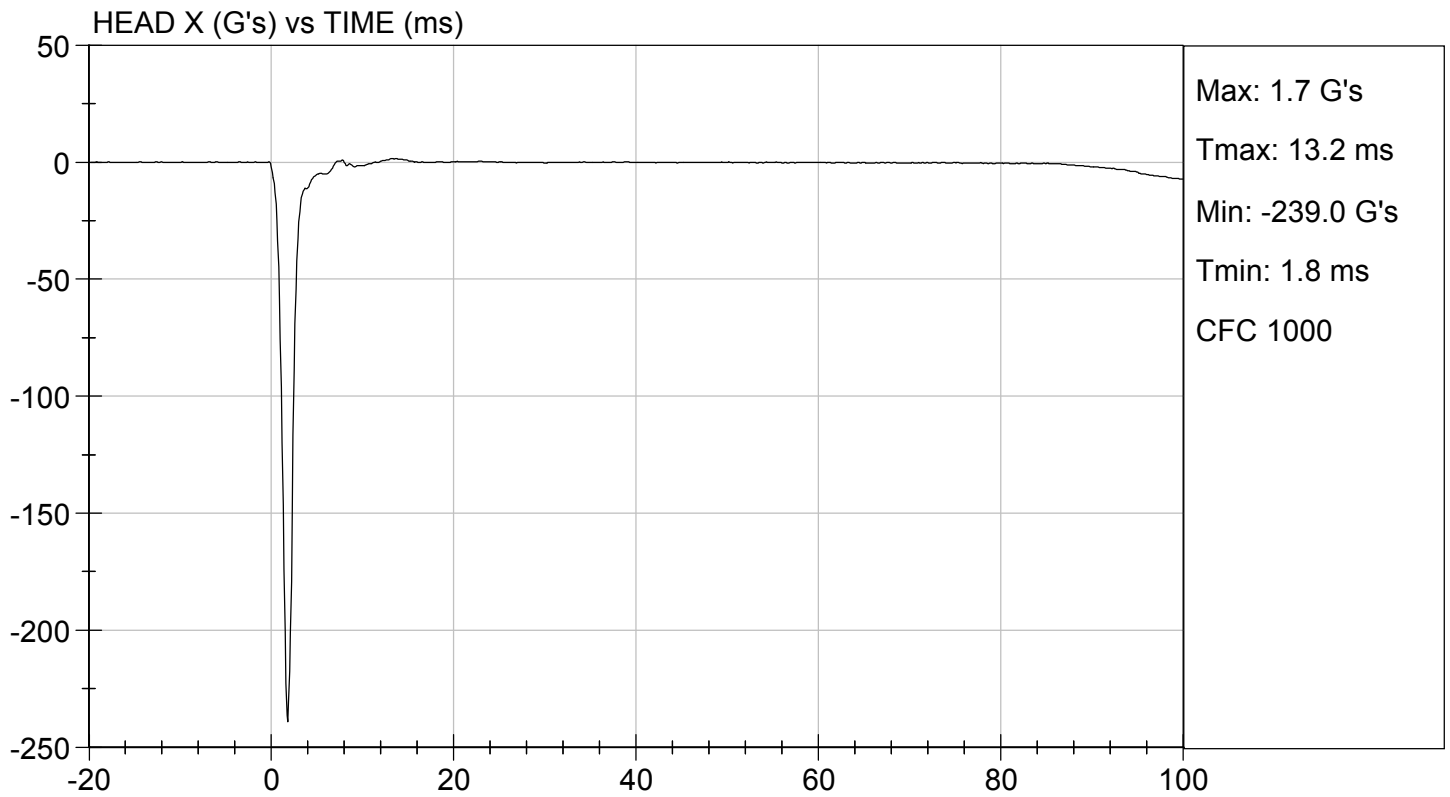
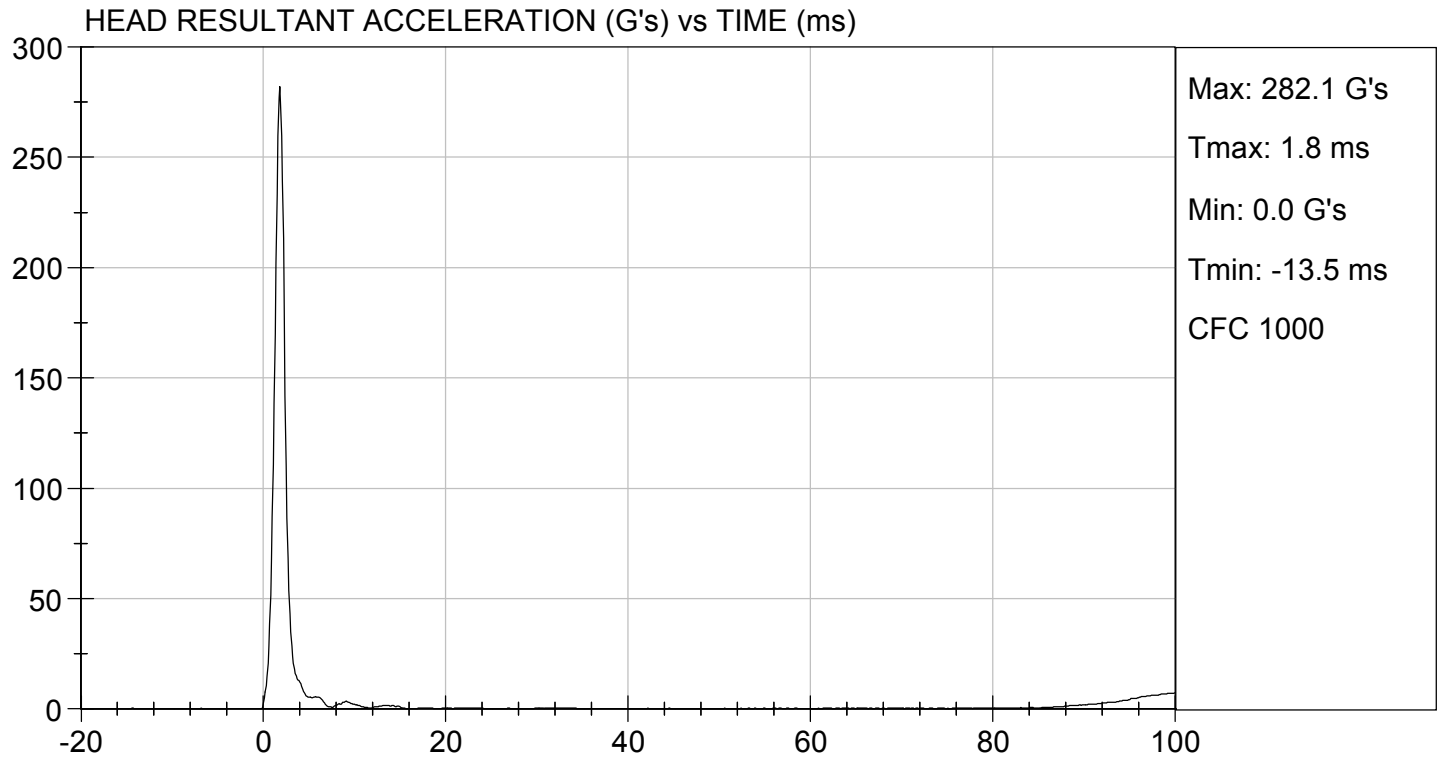
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	23	Pass
Peak Resultant Acceleration	G's	250 to 300	282	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	3.7	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
Overall Test Results				Pass

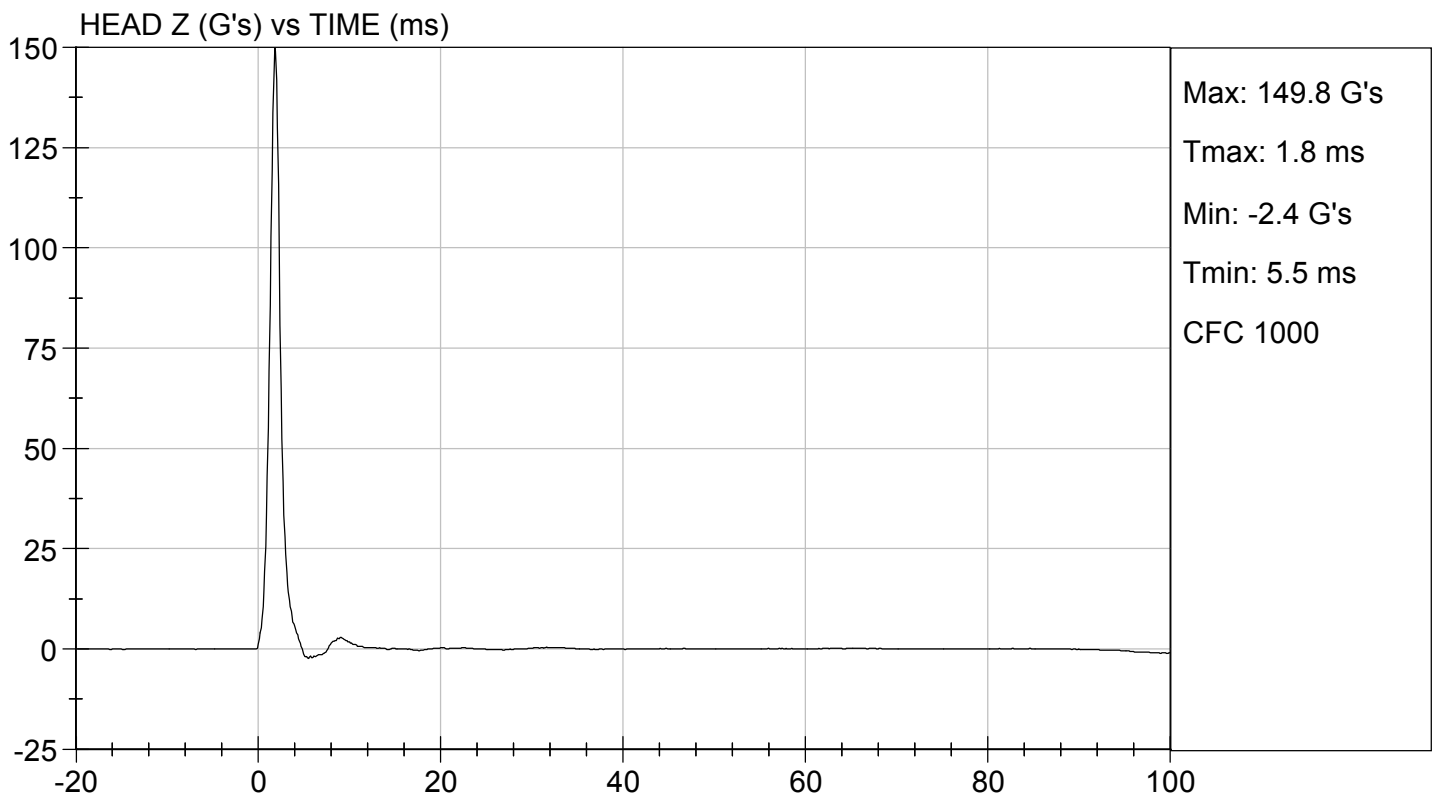
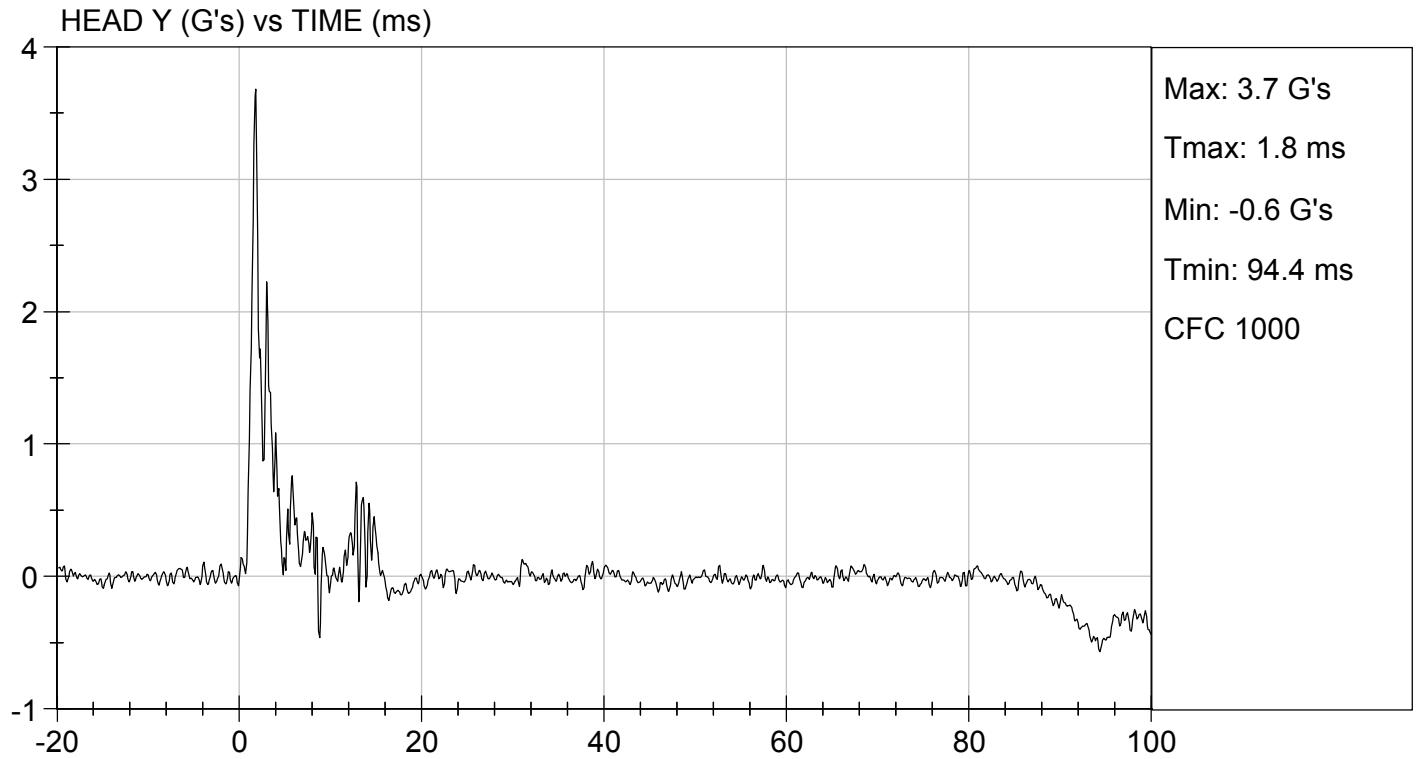

Laboratory Technician

11/08/2019

Test Date


Approved By





MGA RESEARCH CORPORATION

NECK FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: DH1659Test I.D: D193502

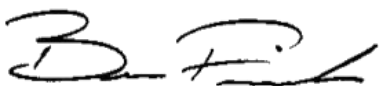
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity		%	10 to 70	18	Pass
Pendulum Speed		m/s	6.89 to 7.13	7.13	Pass
Pendulum Velocity	10 ms	m/s	2.1 to 2.5	2.4	Pass
	20 ms	m/s	4.0 to 5.0	4.8	Pass
	30 ms	m/s	5.8 to 7.0	6.5	Pass
D Plane Rotation	Max	deg	77 to 91	77	Pass
Occipital Condyle Moment within Rotation Corridor		Nm	69 to 83	74	Pass
Positive Moment Time Curve Decay to 10 Nm		ms	80 to 100	81	Pass
Overall Results					Pass



Laboratory Technician

11/08/2019

Test Date

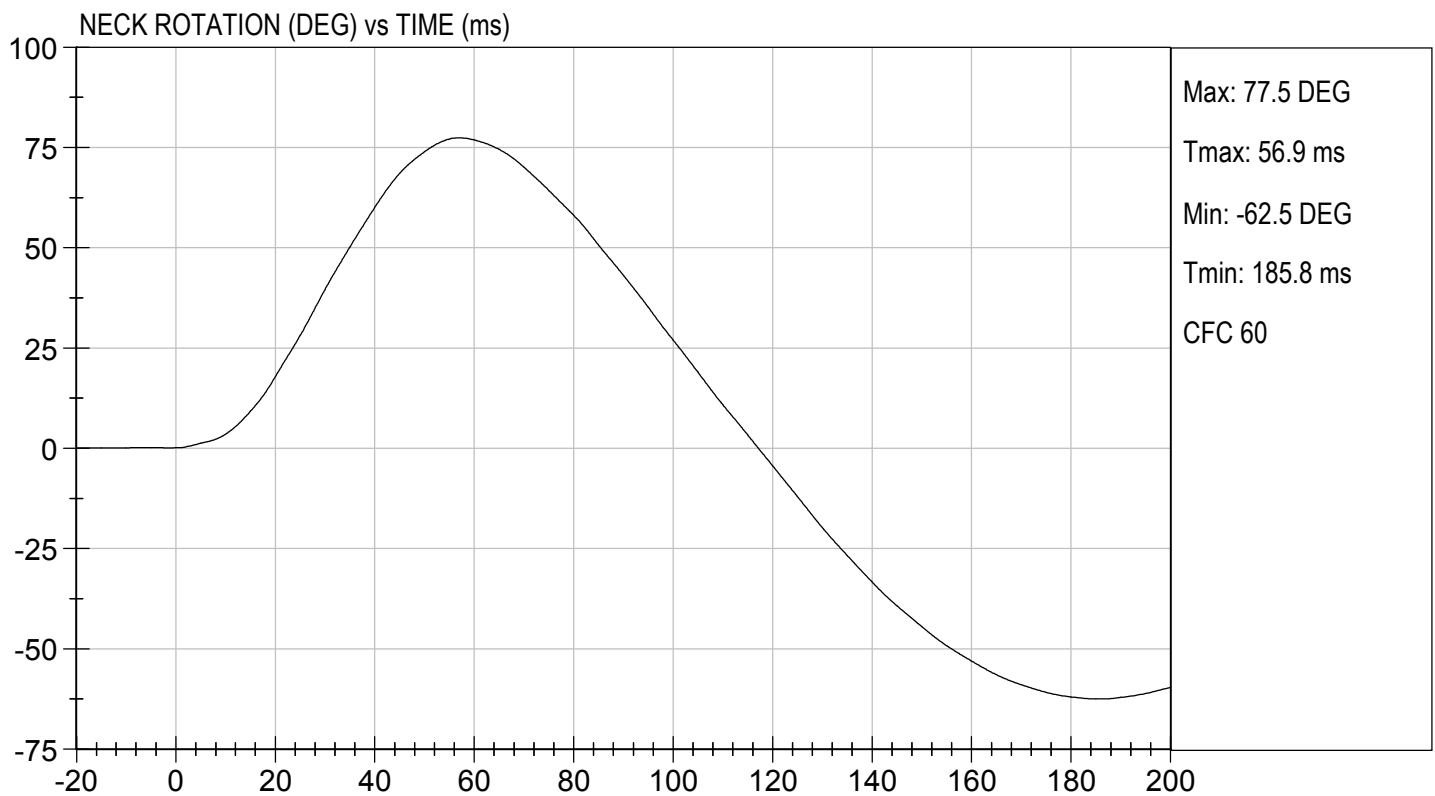
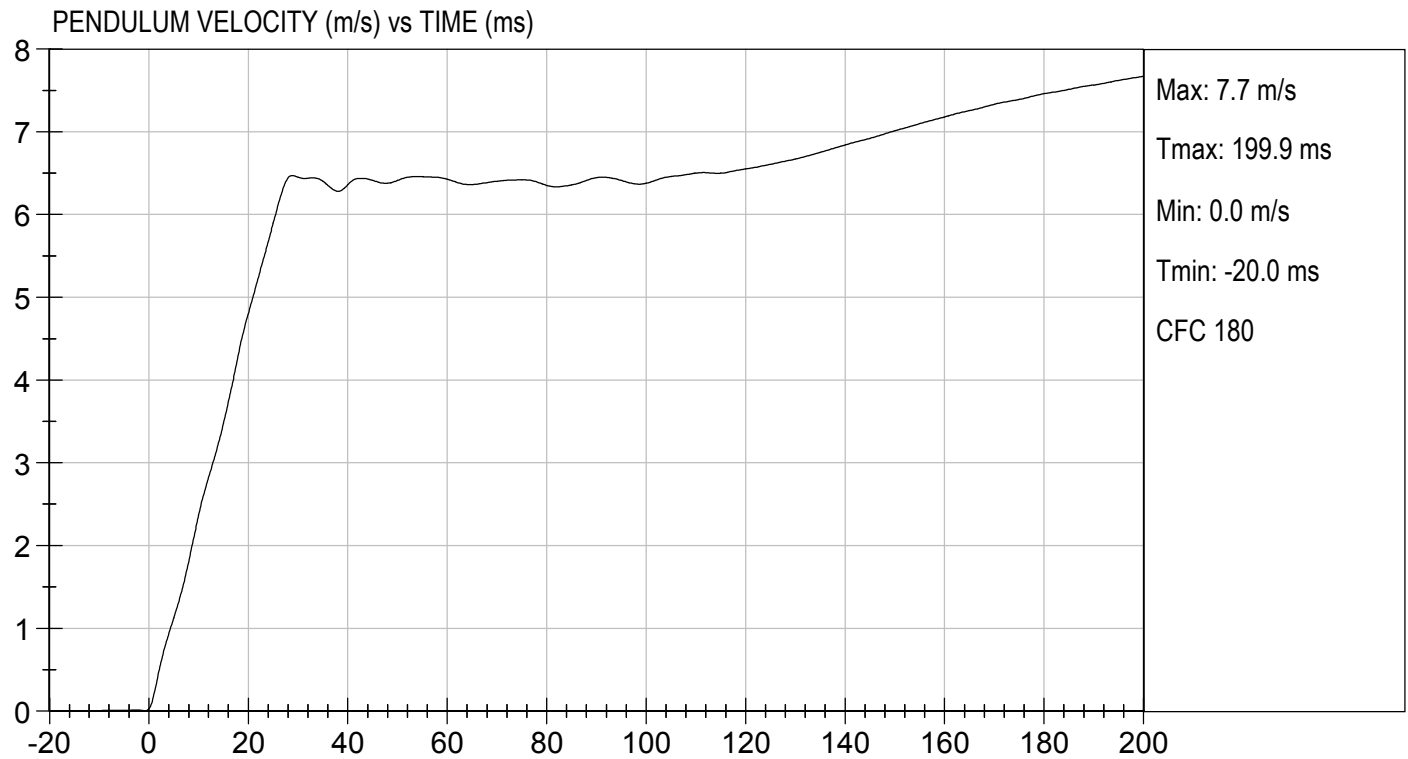


Approved By



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

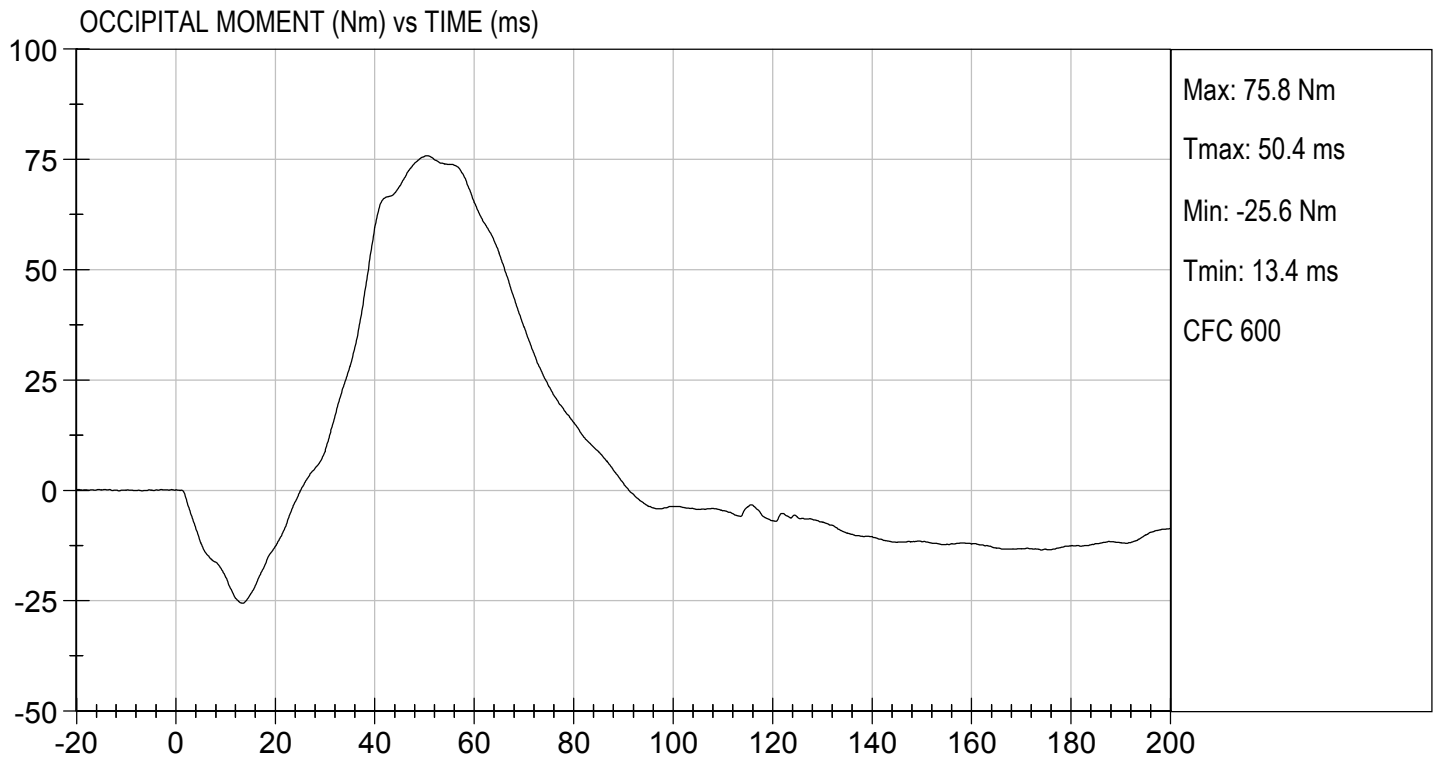
TEST DATE: 11/08/2019
TEST #: D193502





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

TEST DATE: 11/08/2019
TEST #: D193502



MGA RESEARCH CORPORATION
NECK EXTENSION TEST
HYBRID III 5TH PERCENTILE

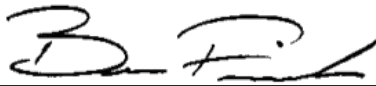
ATD Serial No: DH1659

Test I.D: D193503

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity		%	10 to 70	18	Pass
Pendulum Speed		m/s	5.95 to 6.19	6.19	Pass
Pendulum Velocity	10 ms	m/s	1.5 to 1.9	1.8	Pass
	20 ms	m/s	3.1 to 3.9	3.6	Pass
	30 ms	m/s	4.6 to 5.6	5.1	Pass
D Plane Rotation	Max	deg	99 to 114	104	Pass
Occipital Condyle Moment within Rotation Corridor		Nm	-65 to -53	-54	Pass
Negative Moment Time Curve Decay to -10 Nm		ms	94 to 114	106	Pass
Overall Results					Pass


Laboratory Technician

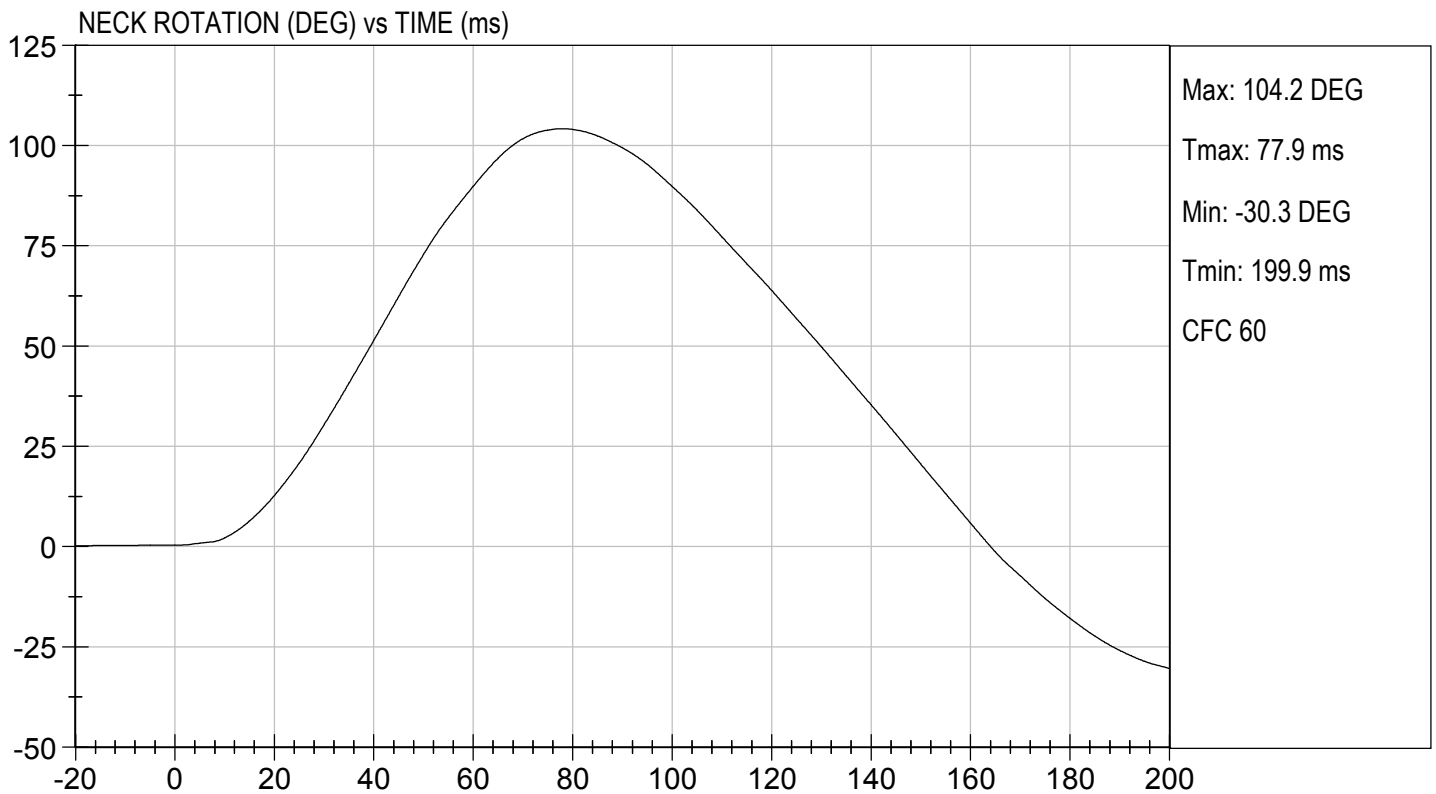
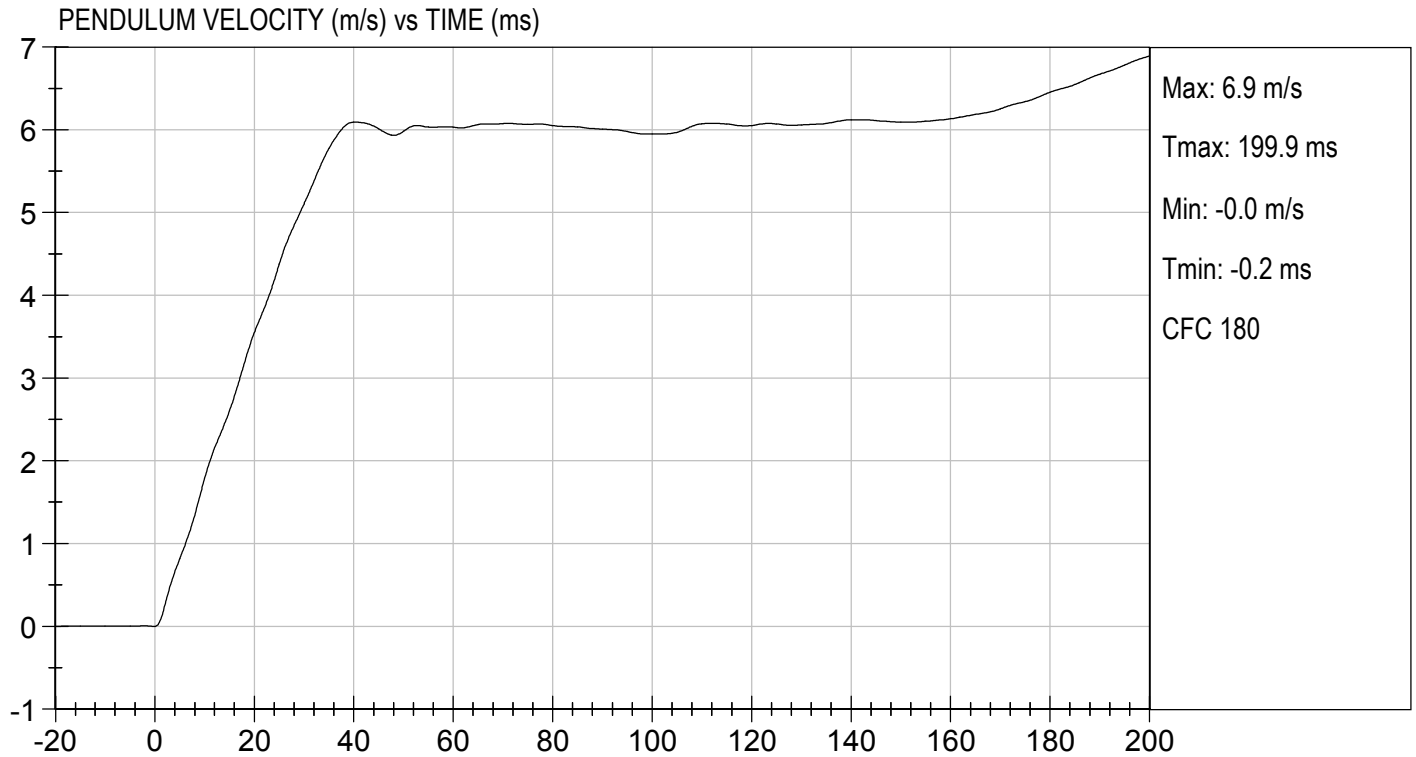
11/08/2019
Test Date


Approved By



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

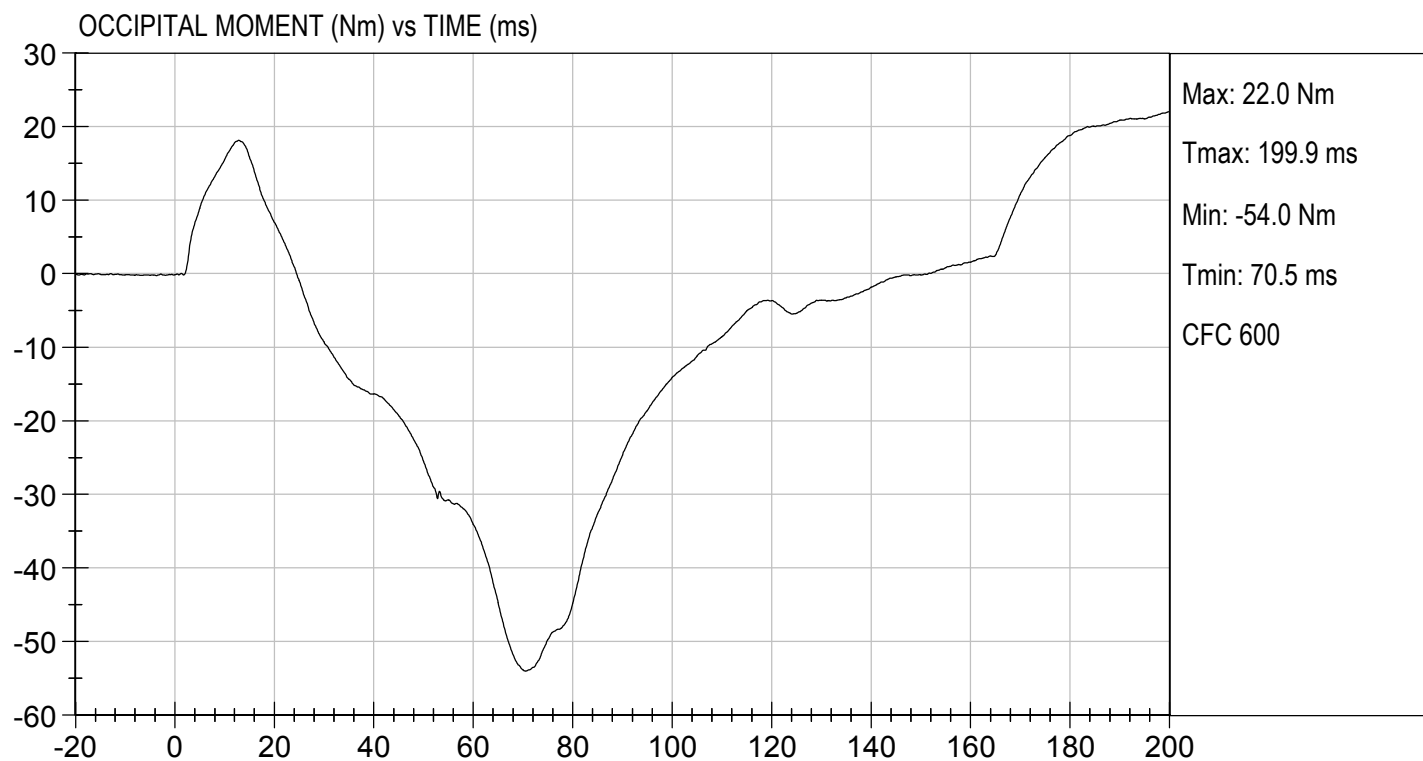
TEST DATE: 11/08/2019
TEST #: D193503





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

TEST DATE: 11/08/2019
TEST #: D193503



MGA RESEARCH CORPORATION
THORAX IMPACT
HYBRID III 5TH PERCENTILE

ATD Serial No: DH1659

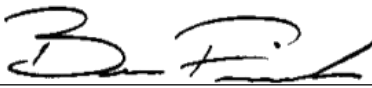
Test I.D: D193504

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Relative Humidity	%	10 to 70	18	Pass
Probe Speed	m/s	6.59 to 6.83	6.77	Pass
Peak Deflection	mm	50 to 58	50	Pass
Peak Resistive Force w/in Deflection Corridor	N	3900 to 4400	4126	Pass
Internal Hysteresis	%	69 to 85	76	Pass
Peak Force 18 mm - 50 mm	N	<= 4600	4384	Pass
			Overall Test Results	Pass


Laboratory Technician

11/07/2019

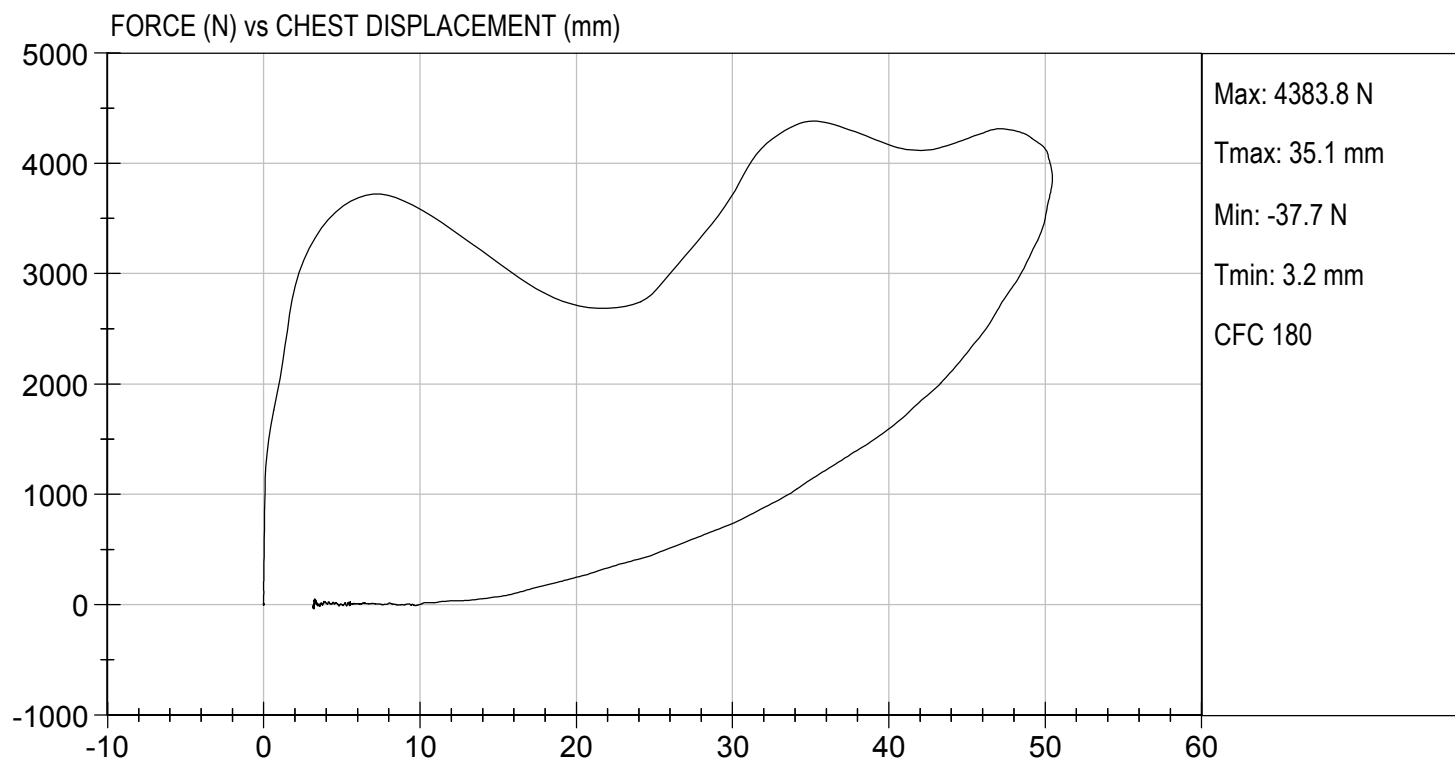
Test Date


Approved By



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

TEST DATE: 11/07/2019
TEST #: D193504



MGA RESEARCH CORPORATION

RIGHT KNEE IMPACT TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: DH1659

Test I.D: D193505

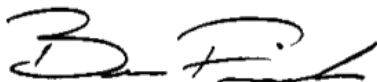
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	18	Pass
Probe Speed	m/s	2.07 to 2.13	2.12	Pass
Maximum Force	N	3450 to 4060	3749	Pass
Overall Test Results				Pass



Laboratory Technician

11/07/2019

Test Date

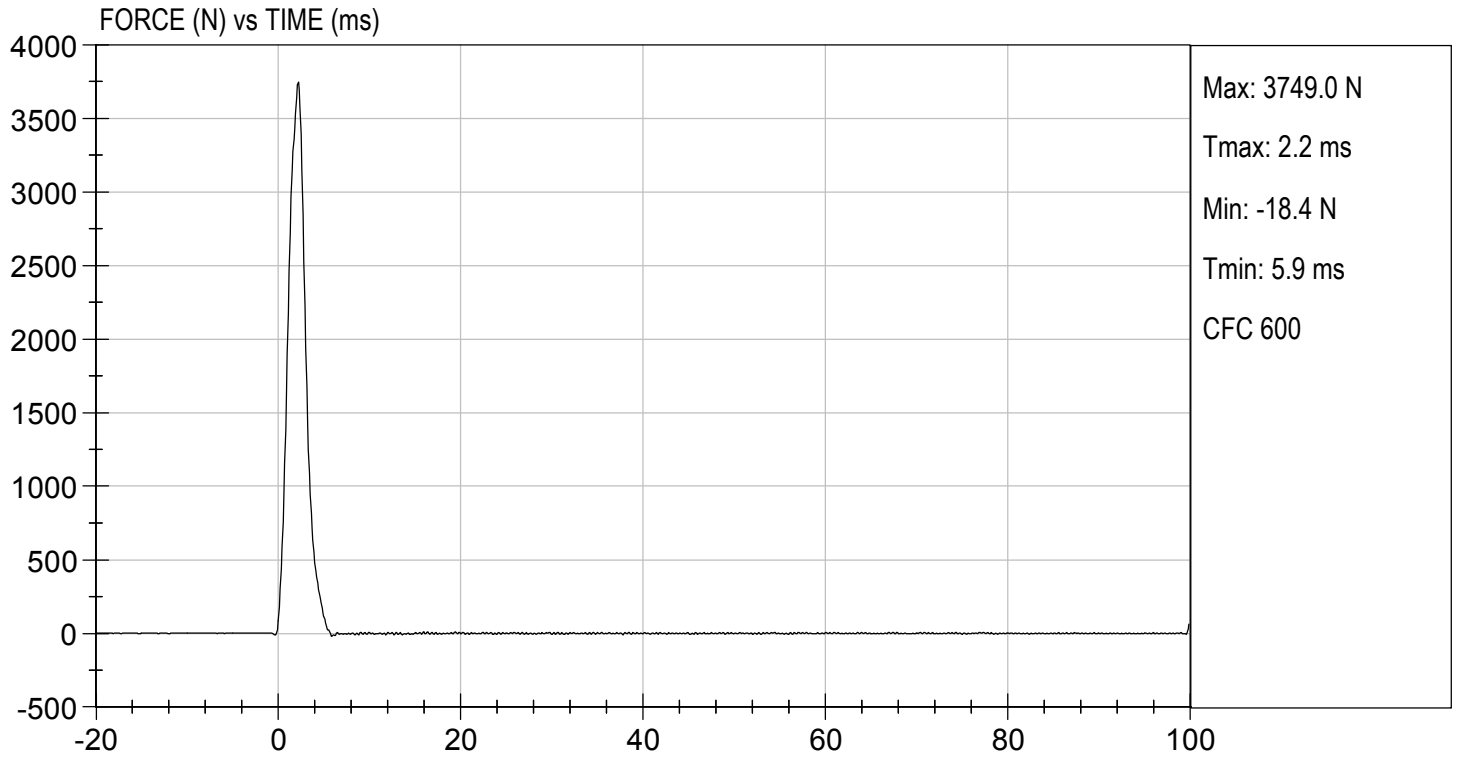


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TEST DESC: RIGHT KNEE
VELOCITY: 6.97 ft/s, 2.12 m/s

TEST DATE: 11/07/2019
TEST #: D193505



MGA RESEARCH CORPORATION

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

ATD Serial No: DH1659

Test I.D: D193506

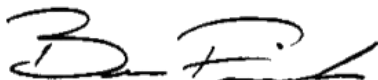
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	18	Pass
Probe Speed	m/s	2.07 to 2.13	2.12	Pass
Maximum Force	N	3450 to 4060	3788	Pass
Overall Test Results				Pass



Laboratory Technician

11/07/2019

Test Date

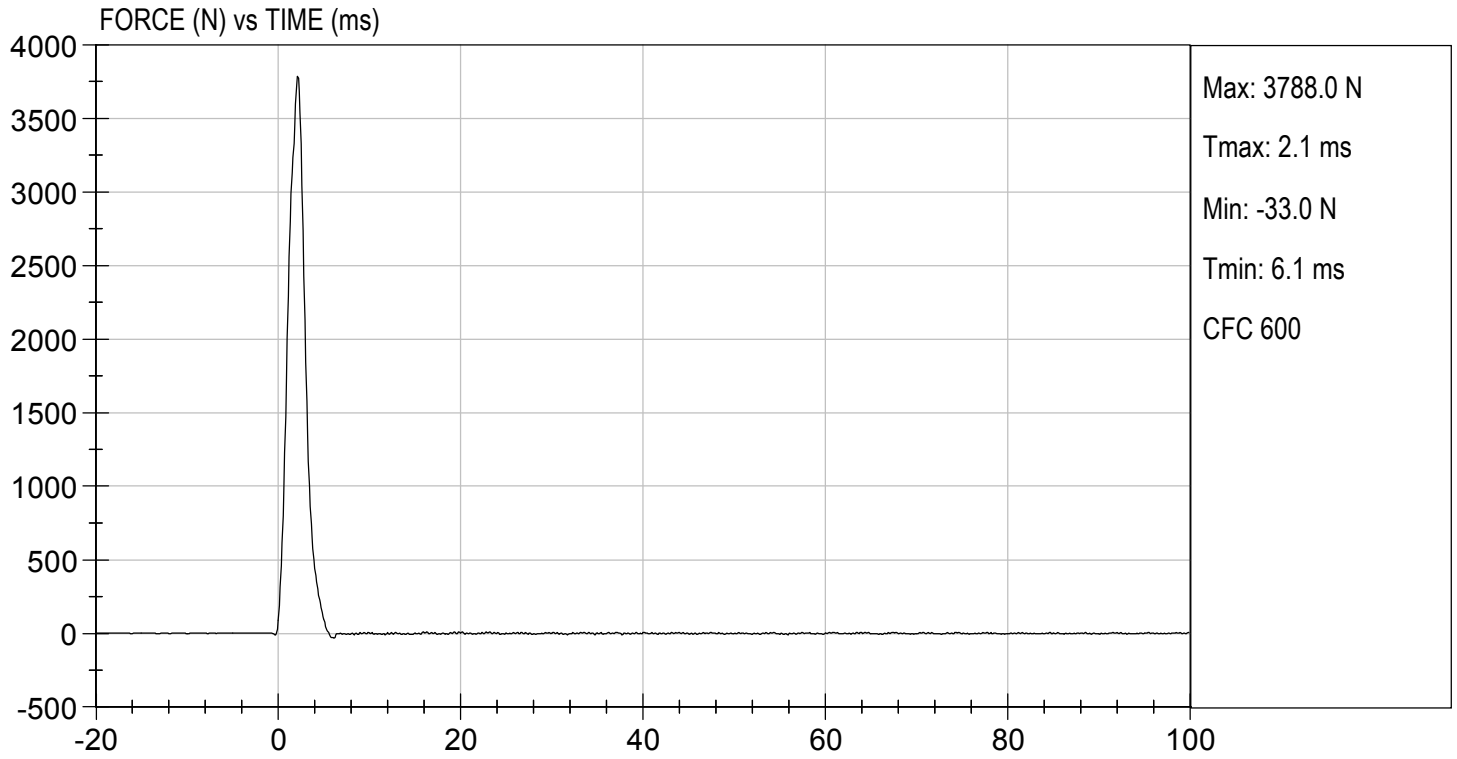


Approved By



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

TEST DATE: 11/07/2019
TEST #: D193506



MGA RESEARCH CORPORATION

TORSO FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: DH1659

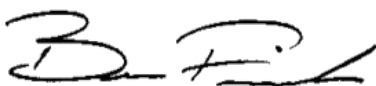
Test I.D: D193507

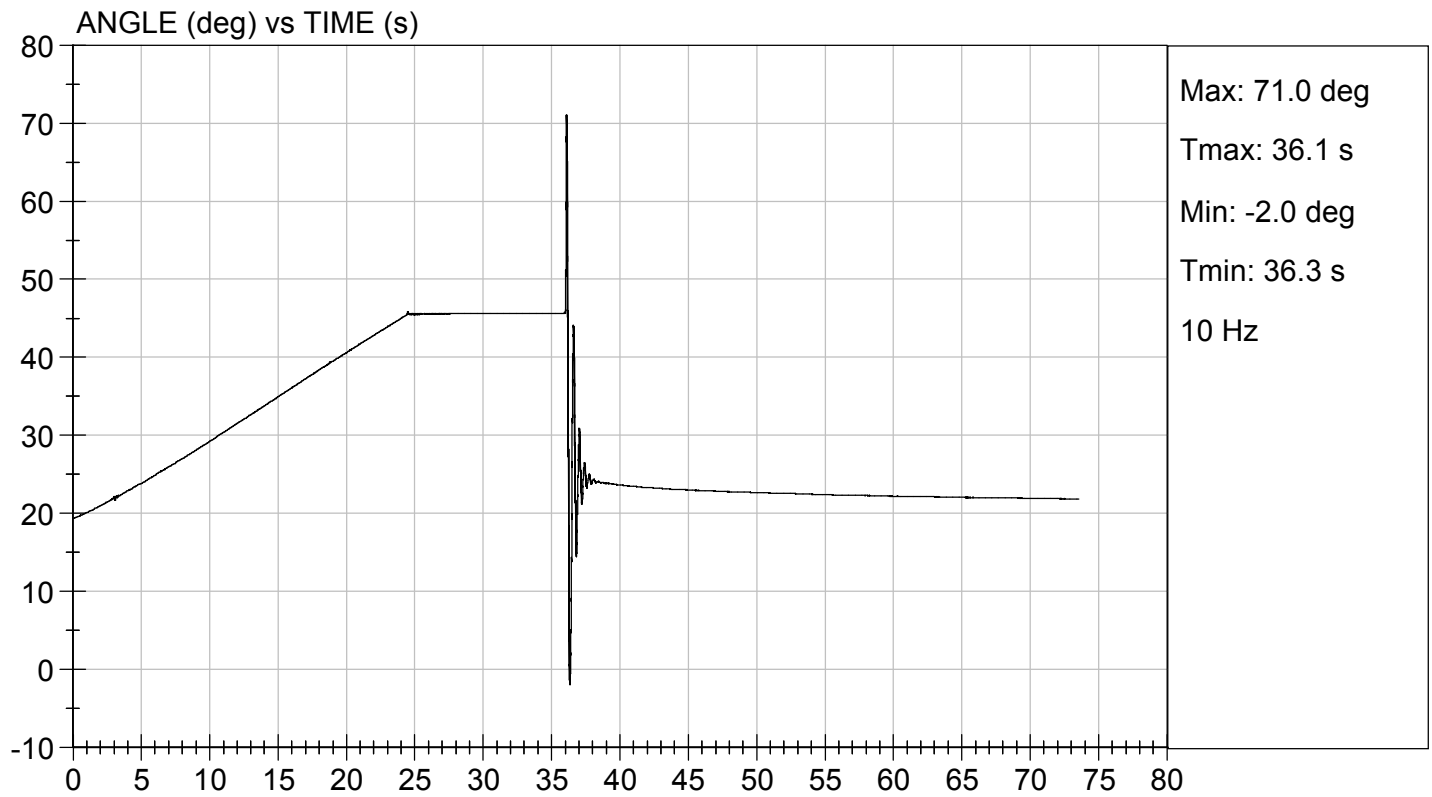
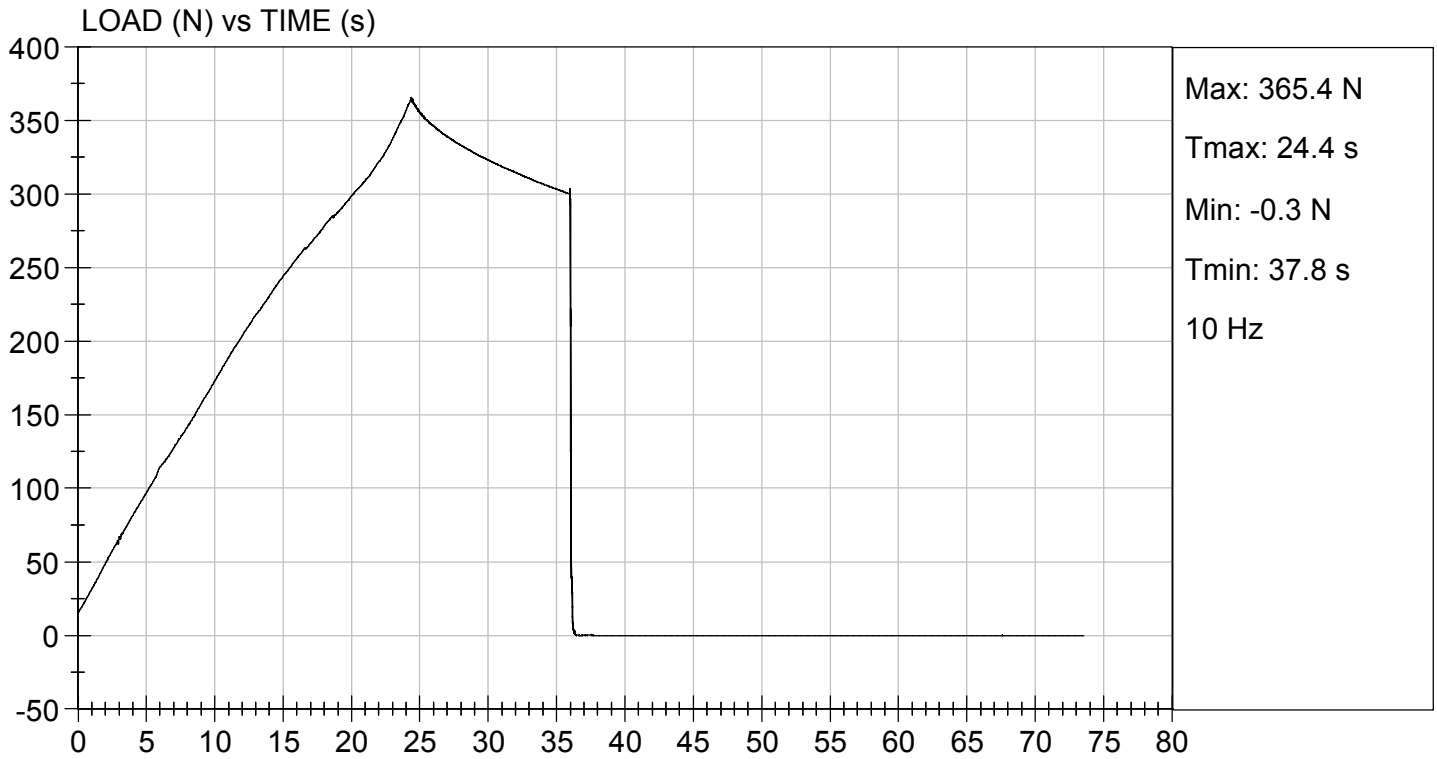
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	23	Pass
Initial Angle	deg	0 to 20	19	Pass
Return Angle	deg	+/- 8	3	Pass
Force at 45 deg	N	320 to 390	365	Pass
Upper Torso Deflection Rate	deg/s	0.5 to 1.5	1.1	Pass
Overall Result				Pass


Laboratory Technician

11/08/2019

Test Date


Approved By



APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

TABLE 1 – DRIVER DUMMY INSTRUMENTATION

Instrument Location			Axis	Hybrid III 50 th S/N 351		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers	Primary		X	P79741	Endevco	9/12/2019
			Y	P79743	Endevco	9/12/2019
			Z	P79744	Endevco	9/12/2019
	Redundant		X	P94834	Endevco	9/12/2019
			Y	P94856	Endevco	9/12/2019
			Z	P97412	Endevco	9/12/2019
Head Angular Rate Sensors			X	ARS7325	DTS	7/8/2019
			Y	ARS7371	DTS	7/8/2019
			Z	ARS7391	DTS	7/8/2019
Upper Neck Load Cell			Fx, Fy, Fz Mx, My, Mz	NG174	FTSS	3/18/2019
Chest Accelerometers	Primary		X	P86792	Endevco	9/13/2019
			Y	P86793	Endevco	9/13/2019
			Z	P88348	Endevco	9/13/2019
	Redundant		X	P88666	Endevco	9/13/2019
			Y	P88667	Endevco	9/13/2019
			Z	P94109	Endevco	9/13/2019
Chest Potentiometer			X	351	Servo	9/13/2019
Pelvis Accelerometers			X	P95526	Endevco	9/12/2019
			Y	P96038	Endevco	9/12/2019
			Z	P97742	Endevco	9/12/2019
Femur Load Cells	Right	Primary	Z	FG121P	Denton	9/13/2019
		Redundant	Z	FG121R	Denton	9/13/2019
	Left	Primary	Z	FG122P	Denton	9/13/2019
		Redundant	Z	FG122R	Denton	9/13/2019
Tibia Load Cells	Right	Upper	Mx, My, Fz	TG405	Denton	3/18/2019
		Lower	Mx, My, Fz	AG368	Denton	3/18/2019
	Left	Upper	Mx, My, Fz	TG475	Denton	3/18/2019
		Lower	Mx, My, Fz	AG504	Denton	3/18/2019
Foot Accelerometers	Right	Rear	X	P94812	Endevco	9/12/2019
			Z	T16447	Endevco	9/12/2019
		Front	Z	P82120	Endevco	9/12/2019
	Left	Rear	X	T16468	Endevco	9/12/2019
			Z	T16496	Endevco	9/12/2019
		Front	Z	T16501	Endevco	9/12/2019
Seat Belt Load Cells		Lap		SBG161	FTSS	8/8/2018
		Shoulder				

TABLE 2 – FRONT PASSENGER DUMMY INSTRUMENTATION

Instrument Location			Axis	Hybrid III 5 th S/N 1659		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers	Primary		X	P82304	Endevco	8/21/2019
			Y	P88172	Endevco	8/21/2019
			Z	T16400	Endevco	8/21/2019
	Redundant		X	T16403	Endevco	8/21/2019
			Y	T16406	Endevco	8/21/2019
			Z	T16413	Endevco	8/21/2019
Head Angular Rate Sensors			X	ARS7340	DTS	7/8/2019
			Y	ARS7354	DTS	7/8/2019
			Z	ARS7357	DTS	7/8/2019
Upper Neck Load Cell			Fx, Fy, Fz Mx, My, Mz	NG2256	Denton	4/19/2019
Chest Accelerometers	Primary		X	T16415	Endevco	8/21/2019
			Y	T16416	Endevco	8/21/2019
			Z	T16420	Endevco	8/21/2019
	Redundant		X	T16423	Endevco	8/21/2019
			Y	T16426	Endevco	8/21/2019
			Z	T16433	Endevco	8/21/2019
Chest Potentiometer			X	DH1659	Servo	8/21/2019
Pelvis Accelerometers			X	T16434	Endevco	8/21/2019
			Y	T16435	Endevco	8/21/2019
			Z	T16436	Endevco	8/21/2019
Femur Load Cells	Right	Primary	Z	FG126P	Denton	8/21/2019
		Redundant	Z	FG126R	Denton	8/21/2019
	Left	Primary	Z	FG127P	Denton	8/21/2019
		Redundant	Z	FG127R	Denton	8/21/2019
Tibia Load Cells	Right	Upper	Mx, My, Fz	TG467	Denton	5/9/2019
		Lower	Mx, My, Fz	AG491	Denton	5/9/2019
	Left	Upper	Mx, My, Fz	TG478	Denton	5/9/2019
		Lower	Mx, My, Fz	AG500	Denton	5/9/2019
Foot Accelerometers	Right	Rear	X	T16437	Endevco	8/20/2019
			Z	T16438	Endevco	8/20/2019
		Front	Z	T16439	Endevco	8/20/2019
	Left	Rear	X	T16441	Endevco	8/20/2019
			Z	T16444	Endevco	8/20/2019
		Front	Z	T16445	Endevco	8/20/2019
Seat Belt Load Cells		Lap		SBG273	FTSS	8/18/2018
		Shoulder				

TABLE 3 – VEHICLE INSTRUMENTATION

Instrument Location			Axis	Serial Number	Manufacturer	Calibration Date
Crossmember / Rear Seat Accelerometers	Left	Primary	X	PCB1314	PCB	7/17/2019
			Z	PCB1132	PCB	7/17/2019
		Redundant	X	PCB1244	PCB	7/17/2019
	Right	Primary	X	PCB1165	PCB	7/17/2019
			Z	PCB1377	PCB	9/18/2019
		Redundant	X	PCB1371	PCB	9/18/2019
Engine Accelerometers		Top	X	T16894	Endevco	6/12/2019
		Bottom	X	T21395	Endevco	9/13/2019