

REPORT NUMBER: SideNCAPMDB-MGA-21-021

**NEW CAR ASSESSMENT PROGRAM (NCAP) Moving
Deformable Barrier Side Impact Test**

**TOYOTA MOTOR CORPORATION
2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
NHTSA No.: O20215107**

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



Test Date: February 17, 2021

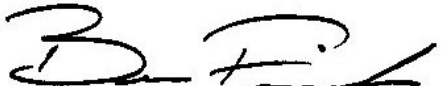
Final Report Date: June 22, 2021

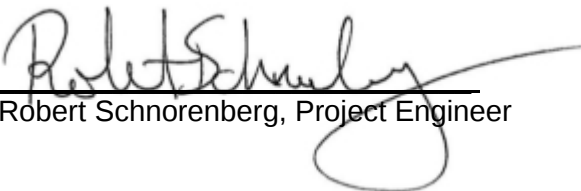
FINAL REPORT

**U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Office of Crashworthiness Standards
Mail Code: NRM-100
1200 New Jersey Ave, SE
Room W43-410
Washington, DC 20590**

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Prepared by: 
Ben Fischer, Program Manager

Approved by: 
Robert Schnorenberg, Project Engineer

Approval Date: June 22, 2021

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

Date: _____

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16. Abstract A 55/28 km/h 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2021 Toyota Prius Prime LE 5-Door Hatchback in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP MDB Test Procedure for the generation of consumer information on vehicle side crash protection. The test was conducted at the MGA Research Corporation facility in Burlington, Wisconsin on February 17, 2021. The impact velocity of the Moving Deformable Barrier (MDB) was 62.23 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 22.0°C. The target vehicle post-test maximum crush was 197 mm at level 2. The test vehicle's performance was as follows: <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th rowspan="2">Units</th> <th colspan="2">Driver ATD (ES-2re)</th> </tr> <tr> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td></td> <td>1000</td> <td>139</td> </tr> <tr> <td>Maximum Thorax Rib Deflection</td> <td>mm</td> <td>44</td> <td>21</td> </tr> <tr> <td>Total Abdominal Force</td> <td>N</td> <td>2500</td> <td>702</td> </tr> <tr> <td>Pubic Symphysis Force</td> <td>N</td> <td>6000</td> <td>1273</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td>g</td> <td>82*</td> <td>27</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th rowspan="2">Units</th> <th colspan="2">Passenger ATD (SID-IIs)</th> </tr> <tr> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td></td> <td>1000</td> <td>176</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td>g</td> <td>82</td> <td>46</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td>N</td> <td>5525</td> <td>1620</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38*</td> <td>18</td> </tr> <tr> <td>Maximum Abdomen Rib Deflection</td> <td>mm</td> <td>45*</td> <td>11</td> </tr> </tbody> </table> *Proposed IARV The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite door(s) did not open during the side impact event.				Measurement Description	Units	Driver ATD (ES-2re)		Threshold	Result	Head Injury Criteria (HIC ₃₆)		1000	139	Maximum Thorax Rib Deflection	mm	44	21	Total Abdominal Force	N	2500	702	Pubic Symphysis Force	N	6000	1273	Resultant Lower Spine Acceleration	g	82*	27	Measurement Description	Units	Passenger ATD (SID-IIs)		Threshold	Result	Head Injury Criteria (HIC ₃₆)		1000	176	Resultant Lower Spine Acceleration	g	82	46	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	1620	Maximum Thoracic Rib Deflection	mm	38*	18	Maximum Abdomen Rib Deflection	mm	45*	11
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SECTION 1

PURPOSE AND SUMMARY OF TEST

PURPOSE

This moving deformable barrier side impact test is part of the MY 2021 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-14-D-00353. The purpose of this test is to generate comparative side impact performance in a 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Laboratory Test Procedure dated March 2020.

SUMMARY

A 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 62.23 km/h. The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by MGA Research Corporation in Burlington, Wisconsin on February 17, 2021. Pre-test and post-test photographs of the test vehicle, the MDB, and the dummies (ES-2re and SID-IIs) are included in this report.

Dummies were placed in the driver and left rear designated seating positions according to instructions specified in the OCWS NCAP Side Laboratory Test Procedure dated March 2020. The side impact event was documented by eleven (11) cameras. Camera locations are included in this report.

The dummies were instrumented in the following manner:

DRIVER ATD (ES-2re)

- Primary and Redundant Head CG Triaxial Accelerometers
- Chest Upper Rib, Middle Rib, and Lower Rib Y-Axis Displacement Potentiometers
- Abdomen Forward, Middle, and Rear Y-Axis Load Cells
- Lower Spine (T12) Triaxial Accelerometers
- Pubic Symphysis Y-Axis Load Cell

PASSENGER ATD (SID-IIs)

- Primary and Redundant Head CG Triaxial Accelerometers
- Head Triaxial Angular Rate Sensors
- Chest Upper Rib, Middle Rib, and Lower Rib Y-Axis Displacement Potentiometers
- Abdomen Upper Rib and Lower Rib Y-Axis Displacement Potentiometers
- Lower Spine (T12) Triaxial Accelerometers
- Acetabulum and Iliac Wing Y-Axis Load Cells

Appendix B contains the dummy response data. Dummy configuration and performance verification data can be found in Appendix C of this report. Appendix D contains the test equipment and instrumentation calibration data.

Dummy Injury readings were recorded as follows:

DUMMY INJURY VALUES

Measurement Description	Units	Driver ATD (ES-2re)	
		Threshold	Result
Head Injury Criteria (HIC ₃₆)		1000	139
Maximum Thorax Rib Deflection	mm	44	21
Total Abdominal Force	N	2500	702
Pubic Symphysis Force	N	6000	1273
Resultant Lower Spine Acceleration	g	82*	27

Measurement Description	Units	Passenger ATD (SID-ILs)	
		Threshold	Result
Head Injury Criteria (HIC ₃₆)		1000	176
Resultant Lower Spine Acceleration	g	82	46
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	1620
Maximum Thoracic Rib Deflection	mm	38*	18
Maximum Abdomen Rib Deflection	mm	45*	11

*Proposed IARV

Supplemental restraint information is given below:

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	Yes	No		
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	Yes	Yes
Side Airbag (Other)				
Seat Belt Pretensioner	Yes	Yes	No	
Seat Belt Load Limiter	Yes		No	
Other:	No		No	

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

GENERAL COMMENTS

Left Lower A-Post Y recorded no valid data after 19 ms.

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

SECTION 2
OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20215107
 Test Date: 2/17/2021

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	O20215107	Traction Control System (TCS)	Yes
Model Year	2021	Auto-Leveling System	No
Make	Toyota	Automatic Door Locks (ADL)	Yes
Model	Prius Prime Hybrid LE	Power Window Auto-Reverse	Yes
Body Style	5-Door Hatchback	Other Optional Feature	No
VIN	JTDKAMFP5M3167685	Driver Front Airbag	Yes
Body Color	Titanium Glow	Driver Curtain Airbag	Yes
Odometer Reading (km/mi)	21 km / 13 mi	Driver Head/Torso Airbag	No
Engine Displacement (L)	1.8 L	Driver Torso Airbag	No
Type/No. Cylinders	Inline 4	Driver Torso/Pelvis Airbag	Yes
Engine Placement	Lateral	Driver Pelvis Airbag	No
Transmission Type	Automatic	Driver Knee Airbag	Yes
Transmission Speeds	CVT	Rear Pass. Curtain Airbag	Yes
Overdrive	Yes	Rear Pass. Head/Torso Airbag	No
Final Drive	FWD	Rear Pass. Torso Airbag	No
Roof Rack	No	Rear Pass. Torso/Pelvis Airbag	Yes
Sunroof/T-Top	No	Rear Pass. Pelvis Airbag	No
Running Boards	No	Driver Seat Belt Pretensioner	Yes
Tilt Steering Wheel	Yes	Rear Pass. Seat Belt Pretensioner	No
Power Seats	No	Driver Load Limiter	Yes
Anti-Lock Brakes (ABS)	Yes	Rear Pass. Load Limiter	No
		Other Safety Restraint	N/A

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

Manufactured By	TOYOTA MOTOR CORPORATION	GVWR (kg)	1930
Date of Manufacture	09/20	GAWR Front (kg)	1057
Vehicle Type	Passenger Car	GAWR Rear (kg)	1016

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3		5	
Capacity Weight (VCW) (kg)				385	(A)
DSC x 68.04 kg				340	(B)
Rated Cargo and Luggage Weight (RCLW) (kg)				38	(A-B)

* Rated Cargo and Luggage Weight (RCLW) reduced by 7 kg to account for Load Carrying Capacity Reduction Label.

VEHICLE SEAT TYPE

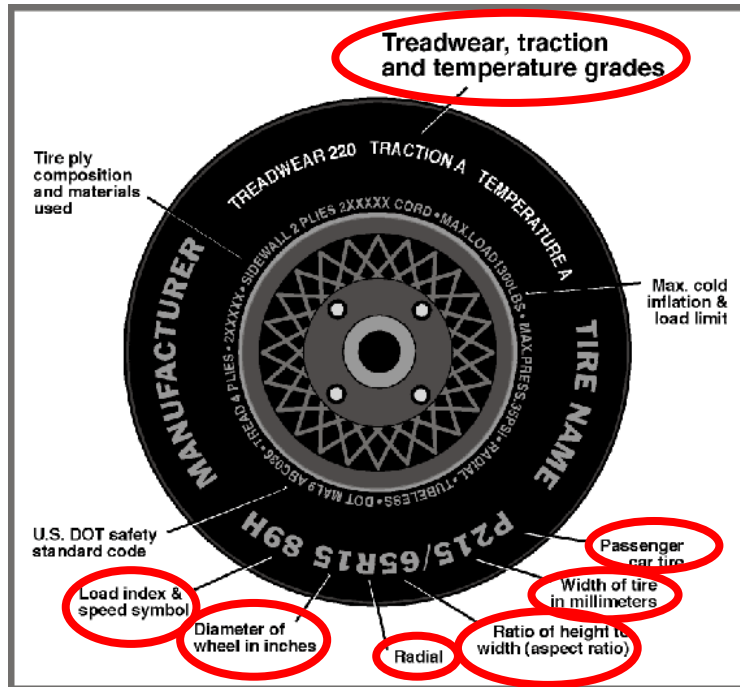
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						w/ Lever	w/ Knob
Front Seat	X					X	
Rear or Second Row				X	X		
Third Row Seat							

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

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20215107
 Test Date: 2/17/2021

VEHICLE TIRE INFORMATION



Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	250	240
Recommended Tire Size	195/65R15	195/65R15
Tire Size on Vehicle	195/65R15	195/65R15
Tire Manufacturer	Toyo	Toyo
Tire Model	NanoEnergy A41	NanoEnergy A41
Treadwear	300	300
Traction	B	B
Temperature Grade	B	B
Tire Plies Sidewall	1 Polyester	1 Polyester
Tire Plies Body	2 Steel, 1 Polyester, 1 Nylon	2 Steel, 1 Polyester, 1 Nylon
Load Index/Speed Symbol	91S	91S
Tire Material	Rubber	Rubber
DOT Safety Code Left	N39 6H3 3120	N39 6H3 3120
DOT Safety Code Right	N39 6H3 3120	N39 6H3 3120

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

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
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TEST VEHICLE TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	240	235	240	235
Tire Placard	kPa	250	250	240	240
Owner's Manual	kPa	250	250	240	240
As Tested	kPa	250	250	240	240

MDB TIRE SPECIFICATIONS

	Requirement	Units	LF	RF	LR	RR
Tire Size	P205/75R15	N/A	P205/75R15	P205/75R15	P205/75R15	P205/75R15
Tire Pressure	200 $\pm$ 21	kPa	200	200	200	200

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	437.0	348.5		482.0	406.0		477.0	423.0	
Right	kg	423.5	325.5		430.0	375.0		428.0	373.0	
Ratio	%	56.1%	43.9%		53.9%	46.1%		53.2%	46.8%	
Totals	kg	860.5	674.0	1534.5	912.0	781.0	1693.0	905.0	796.0	1701.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1534.5	(A)
Sum of Actual Weight of 2 P572 ATDs Used	kg	129	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	38	(C)
Calculated Test Vehicle Target Weight (TVTW)	kg	1701.5	(A+B+C)

Does the measured As Tested Vehicle Weight lie within the required weight range
 (i.e. Calculated Test Vehicle Target Weight – 4.5 kg to 9 kg)? **YES**

TEST VEHICLE ATTITUDES AND CG

	Units	Fully Loaded	As Tested	Meets Requirement*
Left Front	mm	661	666	Yes
Right Front	mm	678	672	Yes
Right Rear	mm	649	659	Yes
Left Rear	mm	640	631	Yes
Vehicle CG (Aft of Front Axle)	mm	1263	1246	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	45	38	

* ND=Nose Down (-), NU=Nose Up (+) ** LD=Left Down (-), LU=Left Up (+)

*** The "As Tested" vehicle attitude measurements must be equal to or within $\pm$ 10 mm of the "Fully Loaded" vehicle attitude measurements at each wheel well.

Test height adjustable suspension setting, if applicable:	Not Applicable
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DATA SHEET NO. 1 (CONTINUED)
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
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WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Units	Weight
Weight of Ballast Added	kg	
Components Removed: RF/RR door panel, RF/RR headrest, RF side mirror, LR/RR taillight, RR underbody plastic, RF/RR window glass/motor/track, rear bumper fascia	kg	15

TEST SURFACE MARKINGS

	Units	Distance from 63° Impact Angle Line
Fore 25 mm Target	mm	880
Aft 25 mm Target	mm	878
Pre-Impact Angle Line	mm	100

Parallel Track Target	Units	X Location	Y Location
A	mm	0	0
B	mm		
C	mm		
D	mm		

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

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
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SEAT POSITIONING

The driver's seat, front center seat (if applicable), and right front passenger's seat should be set to the mid-track, lowest, mid-angle position. The struck-side rear passenger's seat, rear center seat, and non-struck side rear passenger's seats should be set to the rear-most, lowest, mid-angle position.

SCRL ANGLE RANGE

Seat	SCRL (°)		
	Max	Min	Mid
Driver Seat	19.7	14.9	17.3
Front Passenger Seat	Fixed	Fixed	Fixed
Front Center Seat			
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed

SEAT HEIGHT AND ANGLE

Seat	As-Tested SCRL Angle (Mid) (°)	As-Tested SCR Height (mm)	SCR Height Position	SCR Height (mm)		
				Rear-Most	Mid	Forward-Most
Driver Seat	17.3	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Front Passenger Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Front Center Seat			Max			
			Mid			
			Min			
Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed

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

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
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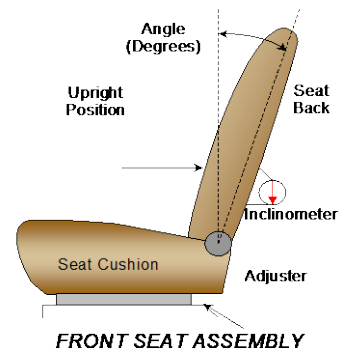
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SEAT FORE/AFT POSITIONS

Seat	Total Fore/Aft Travel		Test Position from Forward-Most Position	
	mm	Detents (1 st as 1)	mm	Detent (1 st as 0)
Driver Seat	260	27	130	13
Front Passenger Seat	260	27	130	13
Front Center Seat				
Struck Side Rear Seat	Fixed		Fixed	
Non-Struck Side Rear Seat	Fixed		Fixed	
Rear Center Seat	Fixed		Fixed	

SEAT BACK ANGLE ADJUSTMENT

The driver's seat back is positioned to the manufacturer's designated design angle. The front center and front passenger's seat backs are positioned in a similar manner as the driver's seat back. The struck side rear seat back is positioned such that the dummy's head is level. The rear center and non-struck side rear outboard seat backs are positioned in a similar manner as the struck-side rear seat back.



Seat	Total Seat Back Angle Range		Test Position from Vertical	
	Degrees	Detents (1 st as 1)	Degrees	Detent (1 st as 0)
Driver Seat	64.0	33	3.3	5
Front Passenger Seat	63.9	33	2.9	5
Front Center Seat				
Struck Side Rear Seat	Fixed		-5.7	
Non-Struck Side Rear Seat	Fixed		-5.7	
Rear Center Seat	Fixed		-5.7	

Seat back angles measured on outboard headrest post.

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

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SEAT BELT ANCHORAGE ADJUSTMENT

Seat belt anchorages are adjusted in accordance with the information provided by the manufacturer on S1 - Vehicle Setup Information.

	Total # of Positions	Placed in Position #
Driver Seat	4	0 (Uppermost as 0)
Rear Seat	Fixed	

HEAD RESTRAINT ADJUSTMENT

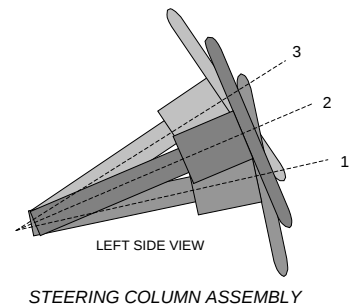
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

	Total # of Positions	Placed in Position #
Driver Seat	3	2 (Lowest as 0) / Fixed Fore-Aft
Rear Seat	Fixed	

STEERING COLUMN ADJUSTMENT

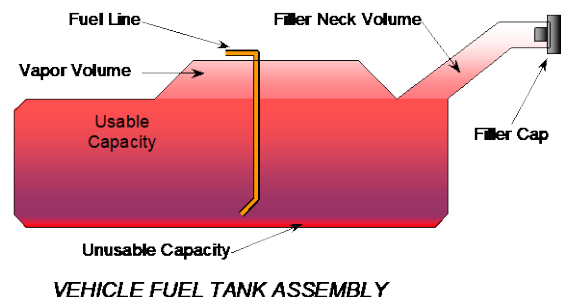
Steering wheel and column adjustments are made so that the steering wheel hub is at the center of its geometric locus it describes when it moves through its full range of motion.

	Wheel Angle (°)	Fore/Aft Position (mm)
Lowermost, Position 1	70.9	
Geometric Center, Position 2	69.0	
Uppermost, Position 3	67.0	
Telescoping Steering Wheel Travel		38
Test Position	69.0	19



FUEL PUMP

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



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

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20215107
 Test Date: 2/17/2021

FUEL TANK CAPACITY DATA

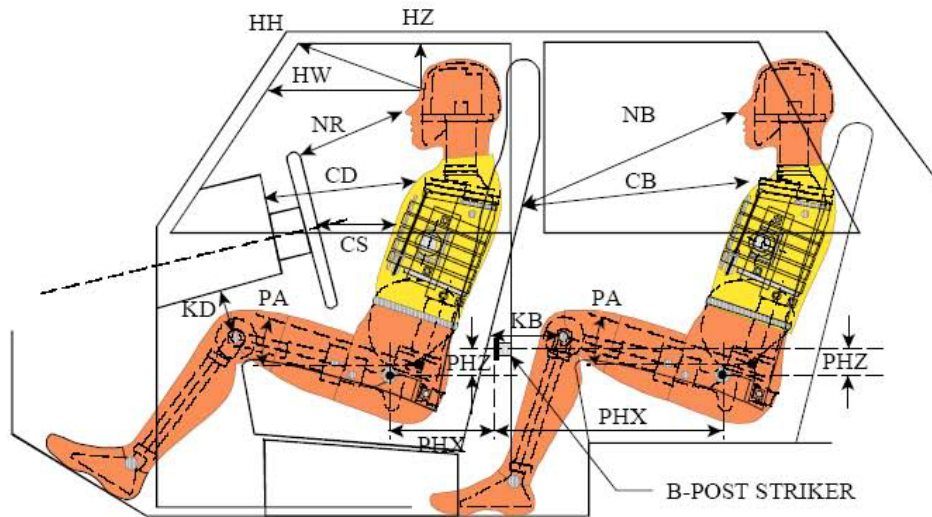
	Liters
Usable Capacity of Standard Tank (see S1 - Vehicle Setup Information)	43.0
Usable Capacity of Optional Tank (see S1 - Vehicle Setup Information)	
Usable Capacity of Standard Tank as Specified in Owner's Manual	43.2
Usable Capacity of Optional Tank as Specified in Owner's Manual	
93% of Usable Capacity	40.0
Actual Amount of Solvent Used	40.1
1/3 of Usable Capacity	14.3

Is the actual amount of solvent used in the test equal to $93\% \pm 1\%$
 of the Usable Capacity stated in S1 - Vehicle Setup Information? **YES**

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20215107
 Test Date: 2/17/2021



LEFT SIDE VIEW

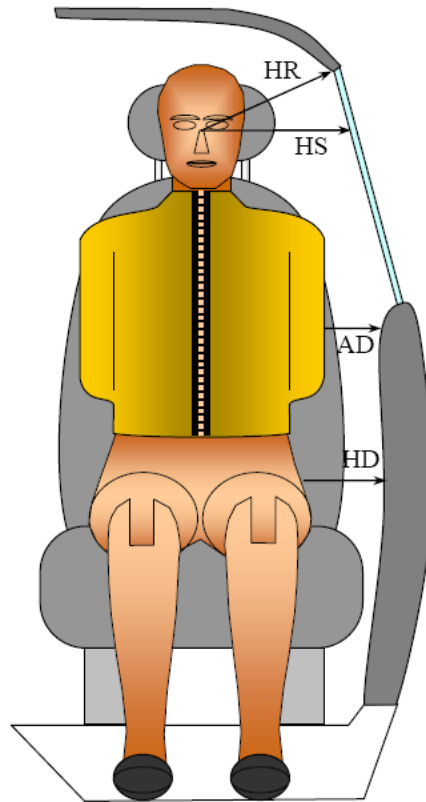
NOTE: 2-DOOR VEHICLE SHOWN.
 REAR DUMMY PHX & PHZ
 MEASUREMENTS FOR A 4-DOOR
 VEHICLE WOULD USE THE C-POST
 STRIKER AS A REFERENCE POINT

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length (mm)	Angle (°)	Length (mm)	Angle (°)
HH		Head to Header	447	14.8		
HW		Head to Windshield	698	0		
HZ	HZ	Head to Roof Liner	173	90	240	90
NR	NB	Nose to Rim/Seat Back	425	19.6	599	11.2
CD	CB	Chest to Dashboard/Seat Back	566	2.4	571	6.0
CS		Chest to Steering Wheel	356	11.1		
KDL	KBL	Left Knee to Dash/Seat Back	156	40.1	286	17.5
KDR	KBR	Right Knee to Dash/Seat Back	128	33.4	284	17.5
PAX	PAX	Pelvic Tilt Angle X		18.0		28.7
PAY	PAY	Pelvic Tilt Angle Y		-1.3		-1.6
PHX	PHX	Hip Point to Striker (X-Axis)	204		301	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	211		327	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20215107
 Test Date: 2/17/2021

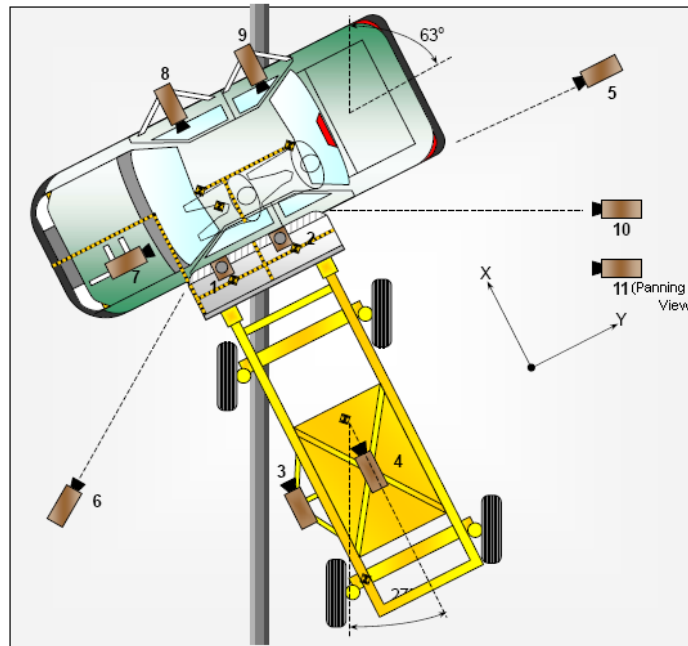


Code	Measurement Description	Driver	Passenger
		Length (mm)	
HR	Head to Side Header	199	235
HS	Head to Side Window	319	360
AD	Arm to Door	89	162
HD	Hip Point to Door	154	170

DATA SHEET NO. 5 CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20215107
Test Date: 2/17/2021



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates* (mm)			Lens (mm)	Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	605	520	-4995	8.5	1000
2	Overhead Close-Up	0	0	-4895	20	1000
3	Left Impact Point (MDB)				50	1000
4	Side Overall (MDB)				16	1000
5	Rear	-45	7195	-1555	24	1000
6	Left Front	-1520	-5160	-1545	24	1000
7	Driver Front (OB)				16	1000
8	Driver Side (OB)				8	1000
9	Passenger Side (OB)				8	1000
10	Real Time Left Rear					30
11	Real Time Inrun					30

Reference: Impact Point projected to Ground; +X = To Front of MDB, + Y = To Right of MDB, +Z = Down

*All measurements accurate to ± 6 mm

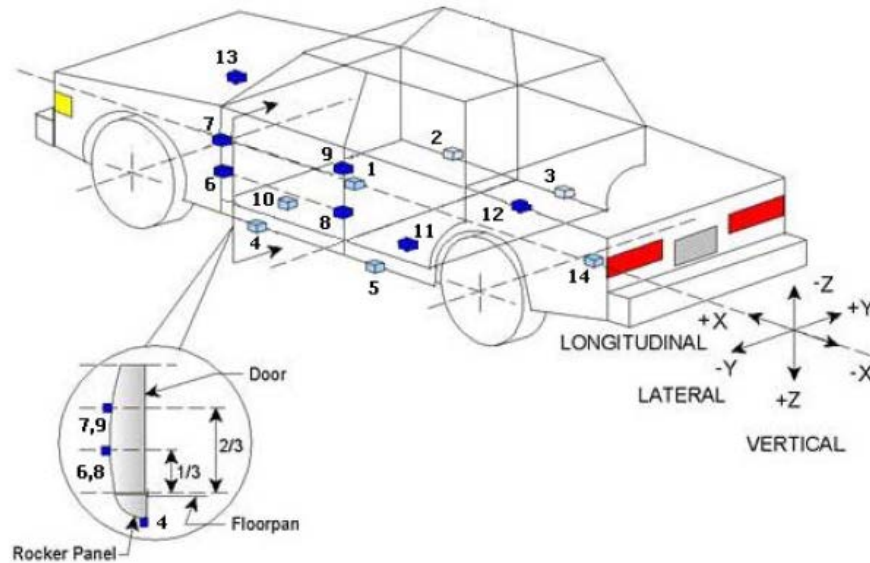
INSTRUMENTATION

	Number of Channels
Driver Dummy	16
Passenger Dummy	19
Vehicle Structure	23
MDB Accelerometers	5
Total	63

DATA SHEET NO. 6
TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20215107
Test Date: 2/17/2021



TEST VEHICLE ACCELEROMETER LOCATIONS

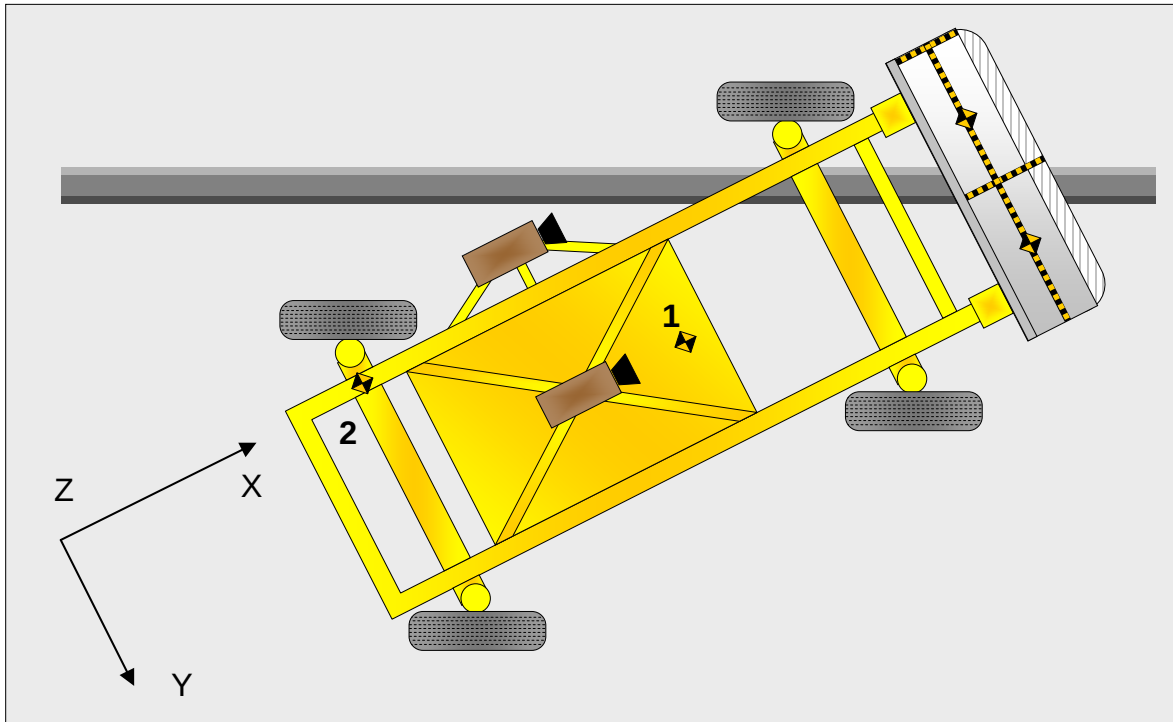
No.	ID	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2434	160	-219
2	Right Sill at Front Seat	2242	715	-179
3	Right Sill at Rear Seat	1338	715	-179
4	Left Sill at Front Door	2596	-715	-176
5	Left Sill at Rear Door	1516	-715	-185
6	Left Lower A-Post	3110	-832	-594
7	Left Middle A-Post	3110	-818	-771
8	Left Lower B-Post	2019	-734	-535
9	Left Middle B-Post	2017	-712	-752
10	Front Seat Track	2158	-392	-217
11	Rear Seat Structure	1746	-352	-219
12	Rt. Rear Occ. Compartment	1776	315	-219
13	Engine Block	3738	-25	-800
14	Rear Above Axle	962	25	-742

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

DATA SHEET NO. 7
MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20215107
 Test Date: 2/17/2021



MDB ACCELEROMETER LOCATIONS

No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	MDB CG	-1105	0	-330
2	MDB Rear	-2580	-650	-625

Reference: X – MDB Face (+ forward)
 Y – MDB Centerline (+ to right)
 Z – Ground Plane (+ down)

Width between left and right MDB contact switches	mm	1402
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DATA SHEET NO. 8
POST-TEST OBSERVATIONS

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20215107
Test Date: 2/17/2021

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Front Seat Dummy (ES-2re)	Rear Seat Dummy (SID-IIs)
Face	Curtain Airbag	Curtain Airbag
Top of Head	Curtain Airbag, Headliner	Curtain Airbag
Left Side of Head	Curtain Airbag, Headliner	Curtain Airbag
Back of Head	Curtain Airbag, Headliner, Headrest	Headrest
Left Shoulder	None	Side Torso/Pelvis Airbag
Upper Torso	Side Torso/Pelvis Airbag, Seatback	Seatback
Lower Torso	Side Torso/Pelvis Airbag, Seatback	Side Torso/Pelvis Airbag, Seatback
Left Hip	Side Torso/Pelvis Airbag	Side Torso/Pelvis Airbag
Left Knee	Door Panel	Door Panel

POST-TEST DOOR PERFORMANCE

Description	Struck Side		Non-Struck Side		Rear Hatch
	Front	Rear	Front	Rear	
Remained Closed and Operational	No	No	Yes	Yes	Yes
Total Separation from Vehicle at Hinges or Latches	No	No	No	No	No
Latch or Hinge Systems Pulled Out of Their Anchorages	No	No	No	No	No
Disengaged from Latched Position	No	No	No	No	No
Latch Separated from Striker	No	No	No	No	No
Jammed Shut	Yes	Yes	No	No	No
If Door Opened at Striker, Record Width of Opening at Striker (mm)					

POST-TEST SEAT PERFORMANCE

Description	Struck Side		Non-Struck Side	
	Front	Rear	Front	Rear
Seat Movement Along Seat Track	No	No	No	No
Seat Disengagement from Floor Pan	No	No	No	No
Seat Back Movement from Initial Position	No	No	No	No
Seat Back Collapse	No	No	No	No

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No Separation
Sill Separation	None
Windshield Damage	LF, LR window broken
Side Window Damage	None
Other Notable Effects	None

DATA SHEET NO. 8 (CONTINUED)
POST-TEST OBSERVATIONS

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20215107
Test Date: 2/17/2021

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Driver		Struck Side Left Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	Yes	No		
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	Yes	Yes
Side Airbag (Other)				
Seat Belt Pretensioner	Yes	Yes	No	
Seat Belt Load Limiter	Yes		No	
Other:	No		No	

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheelbase	mm		2700
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		410
Actual Impact Point (Aft of Front Axle)	mm		413
Horizontal Offset (+forward / -rearward)	mm	+/- 50 of intended impact point	-3
Vertical Offset (+down / -up)	mm	+/- 20 of intended impact point	-8

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20215107
Test Date: 2/17/2021

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1250
Overall Length Including Honeycomb Face	4119
Wheelbase of Framework Carriage	2591
CG Location aft of Front Axle	1127

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	368.2	320.6	
Right	kg	400.7	271.4	
Ratio	%	56.5	43.5	
Totals	kg	768.9	592.0	1360.9

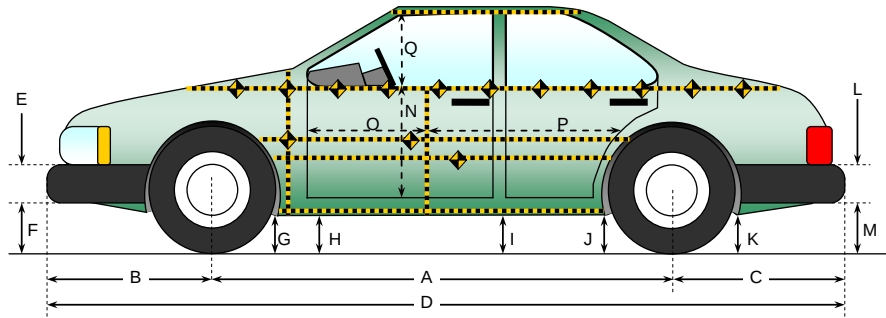
SPEED AND ANGLE AT IMPACT DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.23
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.99
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90.7
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	63.0
MDB Crabbed Angle to MDB Forward Line of Motion	degrees	26 to 28	27.1

DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20215107
Test Date: 2/17/2021



All measurements in (mm) with tolerance of ± 3 mm

LEFT SIDE VIEW

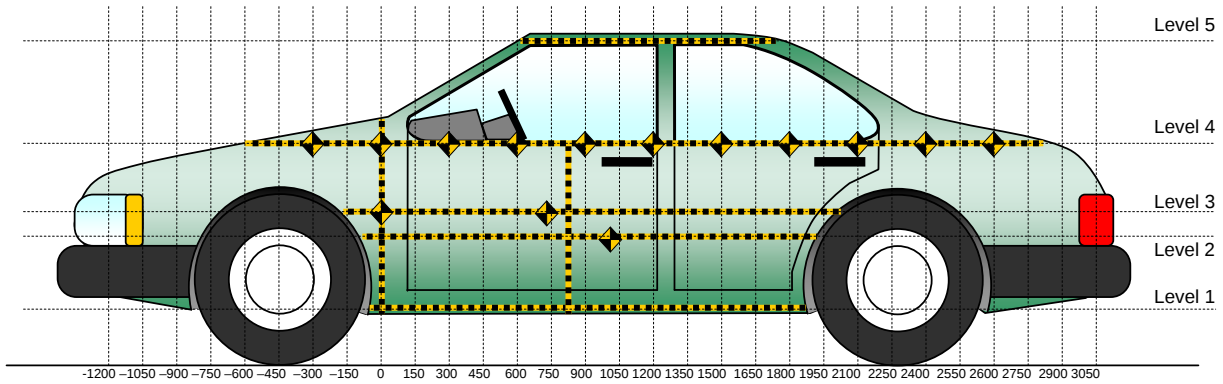
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2700	2697	3
B	Front Axle to FSOV	969	964	5
C	Rear Axle to RSOV	955	955	0
D	Total Length at Centerline	4624	4616	8
E	Front Bumper Thickness	112	112	0
F	Front Bumper Bottom to Ground	218	224	-6
G	Sill Height at Front Wheel Well	154	155	-1
H	Sill Height at Front Door Leading Edge	150	153	-3
I	Sill Height at B Pillar	150	156	-6
J1	Sill Height at Rear Wheel Well	152	148	4
J2	Pinch Weld Height at Rear Wheel Well	150	145	5
K	Sill Height Aft of Rear Wheel Well	390	396	-6
L	Rear Bumper Thickness	162	162	0
M	Rear Bumper Bottom to Ground	375	385	-10
N	Sill Height to Window Bottom Sill	711	606	105
O	Front Door Leading Edge to Impact CL	764	750	14
P	Rear Door Trailing Edge to Impact CL	1145	1093	52
Q	Front Window Opening	483	511	-28
R	Right Side Length	3726	3713	13
S	Left Side Length	3726	3711	15
T	Vehicle Width at B Post	1753	1667	86
U	Front Wheel Track Width	1530		
V	Rear Wheel Track Width	1532		

DATA SHEET NO. 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20215107
 Test Date: 2/17/2021



All Measurements Shown in mm

LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEAUREMENTS

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	282	56	600
2	Occupant H-Point	544	197	900
3	Mid Door	566	193	600
4	Window Sill	835	175	1500
5	Window Top	1395	20	1800

Note: The measurements are taken along the vertical impact reference line. Vehicle measurements forward of the vertical impact reference line are negative.

DATA SHEET NO. 11 (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20215107
 Test Date: 2/17/2021

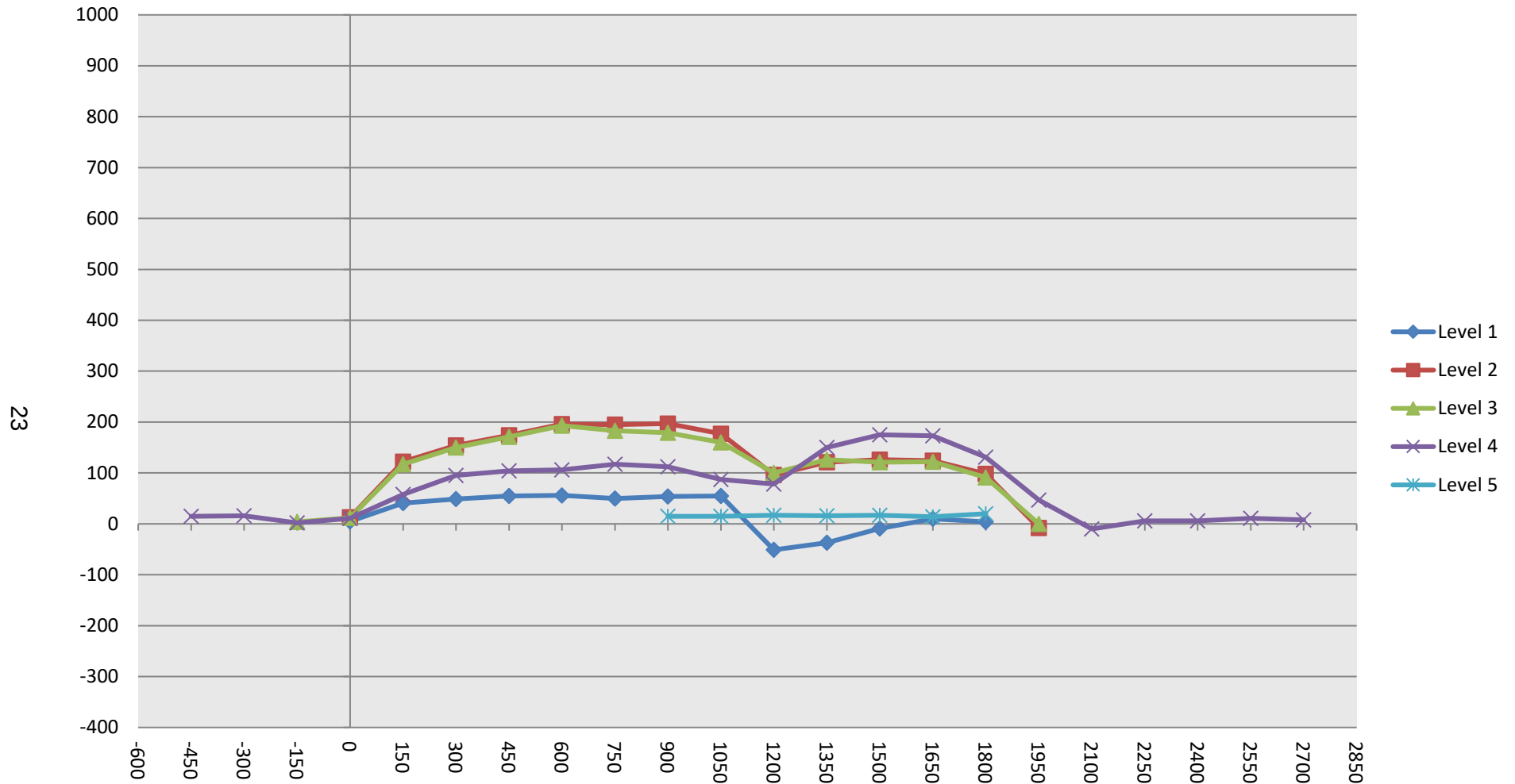
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-2100															
-1950															
-1800															
-1650															
-1500															
-1350															
-1200															
-1050															
-900															
-750															
-600															
-450				310					325					15	
-300				292					308					16	
-150			218	284				222	286				4	2	
0	234	218	220	279		239	231	232	290		5	13	12	11	
150	236	221	222	274		277	343	339	332		41	122	117	58	
300	243	222	222	266		292	376	372	361		49	154	150	95	
450	246	223	224	260		301	397	395	364		55	174	171	104	
600	248	224	226	256		304	420	419	362		56	196	193	106	
750	252	226	227	248		302	421	410	365		50	195	183	117	
900	255	227	228	248	507	309	424	407	360	522	54	197	179	112	15
1050	256	229	231	251	501	311	406	391	338	516	55	177	160	87	15
1200	255	231	232	247	499	204	327	332	325	516	-51	96	100	78	17
1350	249	233	234	245	502	212	354	360	395	518	-37	121	126	150	16
1500	235	234	233	242	512	226	360	354	417	529	-9	126	121	175	17
1650	234	232	236	243	538	244	356	358	416	552	10	124	122	173	14
1800	232	227	231	245	576	236	325	322	376	596	4	98	91	131	20
1950		220	224	250			212	224	297			-8	0	47	
2100				256					246					-10	
2250				265					271					6	
2400				270					276					6	
2550				275					286					11	
2700				289					297					8	
2850															
3000															
3150															
3300															
3450															
3600															
3750															
3900															

NOTE: Pre-test measurements are taken when the vehicle is in the "As Tested" weight condition. Vehicle measurements forward of the vertical impact reference line are negative. The crush profile grid is established prior to the test based on an estimated impact point.

DATA SHEET NO. 11 (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
Test Program: NCAP Side MDB Impact Test

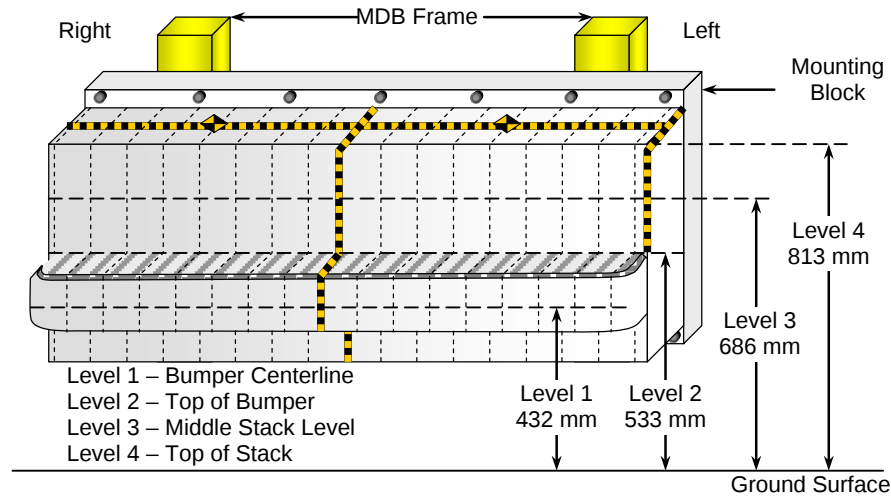
NHTSA No.: O20215107
Test Date: 2/17/2021



DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20215107
 Test Date: 2/17/2021



FRONT VIEW

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush (mm)
Row	Description	Height (mm)	Distance (mm)	Direction	
A	Center of Bumper	432	800	Left	212
B	Top of Bumper	533	800	Left	133
C	Mid-Level	686	800	Left	141
D	Top of Stack	813	200	Right	128

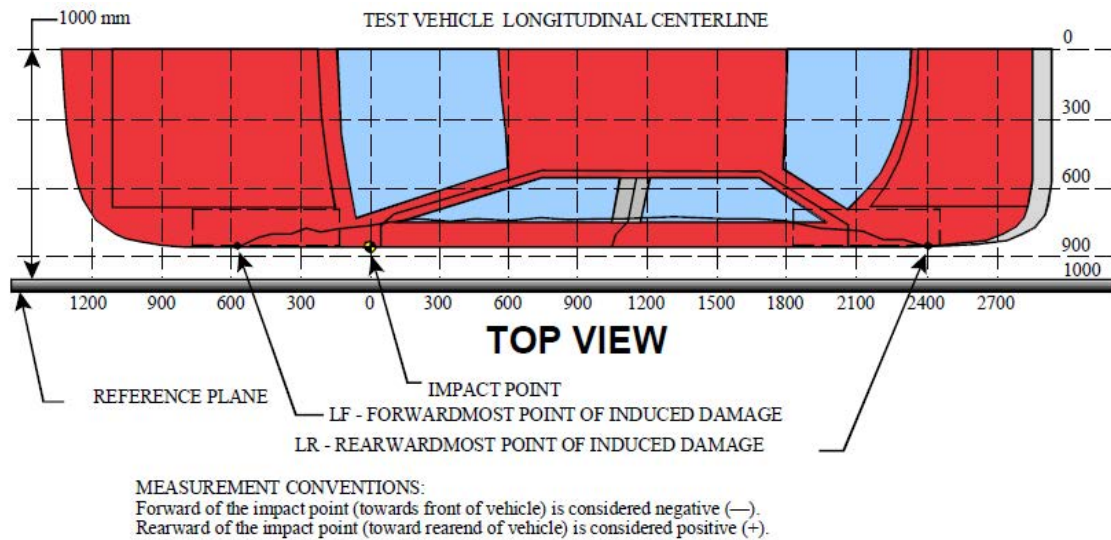
DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center (mm)								C _L	Distance Left of Center (mm)							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
4	68	39	28	44	57	107	128	112	79	75	80	90	90	88	97	111	128
3	86	56	45	39	42	68	87	73	50	37	30	29	35	47	61	80	141
2	89	85	88	90	95	93	82	89	87	95	93	94	99	103	107	119	133
1	161	152	149	154	158	163	167	171	166	162	157	161	164	169	180	209	212

DATA SHEET NO. 13
VEHICLE AND MDB DAMAGE PROFILE DISTANCES

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20215107
 Test Date: 2/17/2021



VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance from Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Max. Static Crush (mm)
1	1980	3	202	234	-32
2	1598	3	358	235	123
3	1216	3	339	232	107
4	834	3	413	228	185
5	452	3	394	224	170
6	70	3	317	221	96

MDB DAMAGE PROFILE DISTANCES

DPD	Distance from Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Max. Static Crush (mm)
1	800 mm right of center	1	637	476	161
2	480 mm right of center	1	624	463	161
3	160 mm right of center	1	627	463	164
4	160 mm left of center	1	615	463	152
5	480 mm left of center	1	644	463	181
6	800 mm left of center	1	688	476	212

DATA SHEET NO. 14
FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

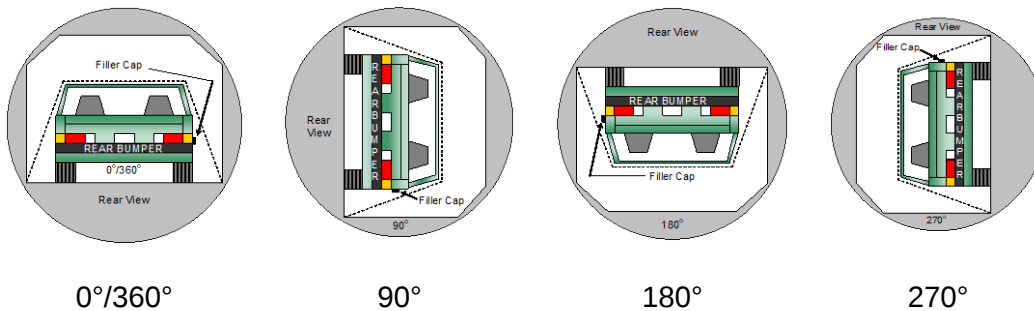
NHTSA No.: O20215107
 Test Date: 2/17/2021

Test Time: 12:23 pm

Temperature: 22.0°C

- 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 DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	117	300	417
90° to 180°	114	300	414
180° to 270°	109	300	409
270° to 360°	116	300	416

FMVSS 301 ROLLOVER SPILLAGE TABLE (UNITS IN OUNCES)

Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° to 90°	0.0	0.0	0.0	
90° to 180°	0.0	0.0	0.0	
180° to 270°	0.0	0.0	0.0	
270° to 360°	0.0	0.0	0.0	

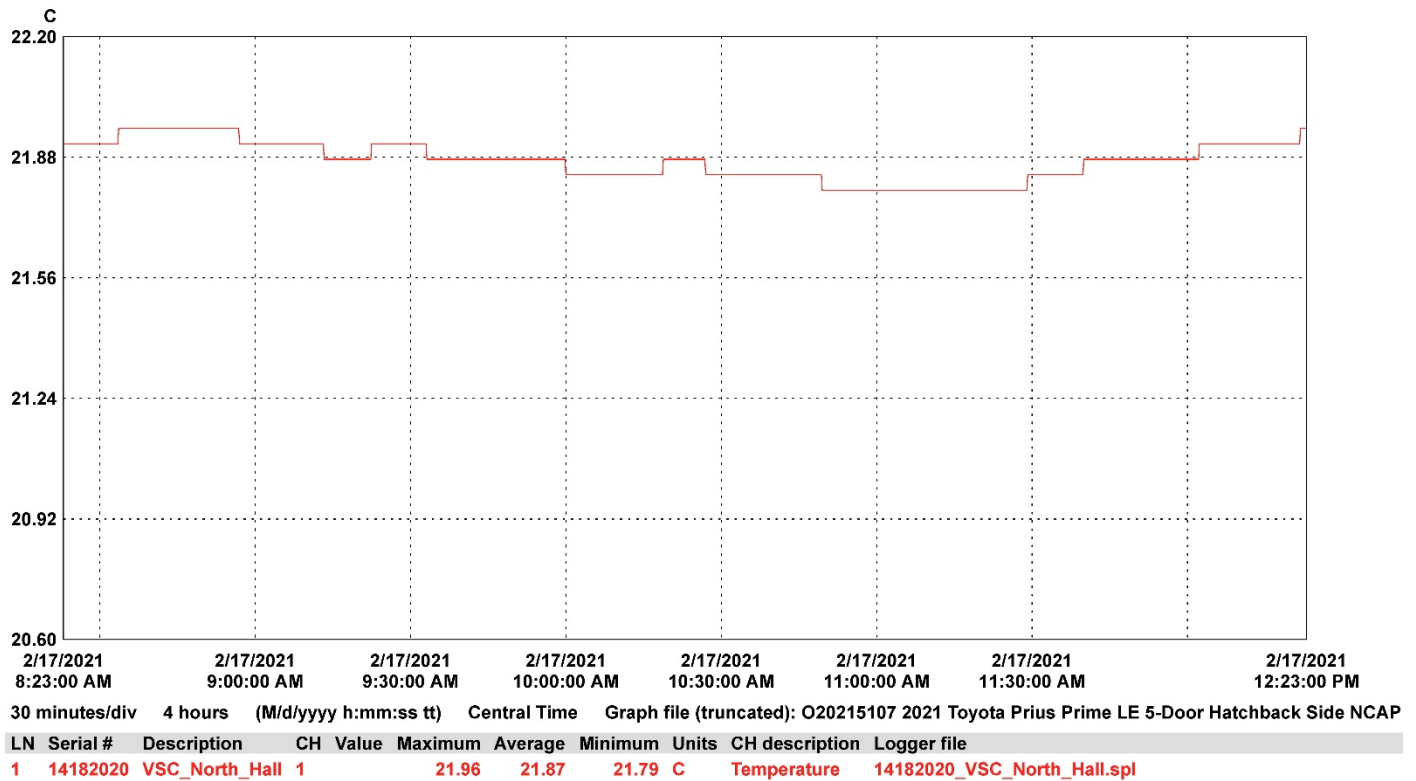
ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0° to 90°	
90° to 180°	
180° to 270°	
270° to 360°	

DATA SHEET NO. 15 **DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA**

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20215107
 Test Date: 2/17/2021



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

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20215107
 Test Date: 2/17/2021

ELECTRIC VEHICLE PROPULSION SYSTEM

	Units	Observations and Conclusions
Type of Electric Vehicle		Gas-Electric Hybrid
Propulsion Battery Type		Li-ion
Nominal Voltage	V	351.5
Physical Location of Automatic Propulsion Battery Disconnect		Physically contained within the Hybrid Battery system
Auxiliary Battery Type		Lead-acid Battery

PROPULSION BATTERY SYSTEM DATA

	Units	Observations and Conclusions
Electrolyte Fluid Type		Organic Electrolyte
Electrolyte Fluid Specific Gravity	g/L	1.22
Electrolyte Fluid Kinematic Viscosity	cSt	3.4
Electrolyte Fluid Color		Clear
Propulsion Battery Coolant Type, Color, Specific Gravity (if applicable)		Air-Cooled
Location of Battery Modules		X Inside Passenger Compartment
		Outside Passenger Compartment
		The high-voltage battery is located below the cargo area floor.

PROPULSION BATTERY STATE OF CHARGE

<i>For all battery types:</i>	
Voltage range corresponding to useable energy of the battery:	
Minimum State of Charge	
Maximum State of Charge	
95% of Maximum State of Charge	
Test Voltage - No less than 95% of maximum State of Charge	371.0
<i>For batteries that are rechargeable ONLY by an energy source on the vehicle:</i>	
Voltage range corresponding to useable energy of the battery:	
Minimum State of Charge	
Maximum State of Charge	
Test Voltage – Maximum practicable State of Charge within Normal Operating Range	

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

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20215107
Test Date: 2/17/2021

VEHICLE CHASSIS GROUND POINT(S) LOCATION(S)

Details of Vehicle Chassis Ground Point(s) & Location(s)	Right rear body (fender)
---	--------------------------

PROPULSION BATTERY SYSTEM

Details of Electric Energy Storage/Conversion System Test Points	Connected at + and – terminal ends of propulsion system
Additional Comments	None

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

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20215107
 Test Date: 2/17/2021

VOLTMETER INFORMATION

	Units	Observations and Conclusions
Make		Fluke
Model		289
Serial Number		32910090
Internal Impedance Value	MΩ	> 10 MΩ < 100 pF
Resolution	V	0.001
Last Calibration Date		11/19/2020

PROPULSION BATTERY VOLTAGE

Measurement shall be made with Energy Storage/Conversion System connected to the vehicle propulsion system, and the vehicle in the "ready-to-drive" (propulsion system energized) position.
NOTE: If voltage measurement is not at the voltage or within the normal operating voltage range specified by the manufacturer, the battery must be charged.

Vb	V	371.0
----	---	-------

ELECTRIC ISOLATION MEASUREMENTS
PROPULSION BATTERY TO VEHICLE CHASSIS

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

V1	V	171.0
V2	V	190.0

PROPULSION BATTERY TO VEHICLE CHASSIS ACROSS RESISTOR

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

Ro	Ω	180,700
----	---	---------

V1' Pre-Impact	V	30.8
V2' Pre-Impact	V	30.8

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

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20215107
 Test Date: 2/17/2021

ELECTRICAL ISOLATION CALCULATIONS

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

$R_{i1} = R_o (1 + V_2/V_1) [(V_1 - V_1')/V_1']$		
Ri1 Pre-Impact	Ω	1,736,467
$R_{i2} = R_o (1 + V_1/V_2) [(V_2 - V_2')/V_2']$		
Ri2 Pre-Impact	Ω	1,774,615
$R_i = \text{The lesser of } R_{i1} \text{ and } R_{i2}$		
Ri Pre-Impact	Ω	1,736,615
$R_i / V_b = \text{Electrical Isolation Value} / \text{Nominal Battery Voltage}$		
Ri / Vb Pre-Impact	Ω	4,681

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

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

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

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20215107
Test Date: 2/17/2021

VOLTMETER INFORMATION

	Units	Observations and Conclusions
Make		Fluke
Model		289
Serial Number		32910090
Internal Impedance Value	MΩ	> 10 MΩ < 100 pF
Resolution	V	0.001
Last Calibration Date		11/19/2020

ELECTRICAL ISOLATION MEASUREMENTS

Vb Post-Impact	V	0.1
----------------	---	-----

V1 Post-Impact	V	2.5	Impact Time	0	Minutes	53	Seconds
V2 Post-Impact	V	2.6		0	Minutes	56	Seconds
V1' Post-Impact	V	0.2		1	Minutes	2	Seconds
V2' Post-Impact	V	0.2		0	Minutes	59	Seconds

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

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20215107
 Test Date: 2/17/2021

ELECTRICAL ISOLATION CALCULATIONS

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

$R_{i1} = R_o (1 + V_2/V_1) [(V_1 - V_1')/V_1']$							
Ri1 Post-Impact	Ω	4,239,222	Impact Time	0	Minutes	56	Seconds
$R_{i2} = R_o (1 + V_1/V_2) [(V_2 - V_2')/V_2']$							
Ri2 Post-Impact	Ω	4,253,400	Impact Time	0	Minutes	53	Seconds
$R_i = \text{The lesser of } R_{i1} \text{ and } R_{i2}$							
Ri Post-Impact	Ω	4,239,222	Impact Time	0	Minutes	56	Seconds
$R_i / V_b = \text{Electrical Isolation Value} / \text{Nominal Battery Voltage}$							
Ri / Vb Post-Impact	Ω	42,392,220	Impact Time	1	Minutes	2	Seconds

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

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

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

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20215107
 Test Date: 2/17/2021

PROPULSION BATTERY SYSTEM COMPONENTS

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

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

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

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

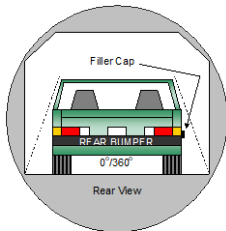
	Yes (Fail)	No
Is the Propulsion Battery Electrolyte Spillage visible in the passenger compartment?		X

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

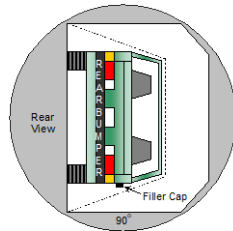
Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20215107
 Test Date: 2/17/2021

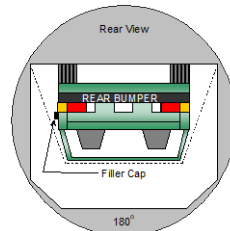
PROPULSION BATTERY SYSTEM COMPONENTS



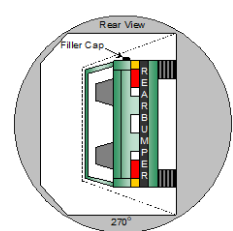
0°/360°



90°



180°



270°

PROPULSION BATTERY ELECTROLYTE COLLECTION TIME PERIOD

Test Phase	Rotation Time (spec. 1-3 min)				FMVSS 301 Hold Time		Total Time				Next Whole Minute Interval	
0° - 90°	1	min	57	sec	5	min	6	min	57	sec	7	min
90° - 180°	1	min	54	sec	5	min	6	min	54	sec	7	min
180° - 270°	1	min	49	sec	5	min	6	min	49	sec	7	min
270° - 360°	1	min	56	sec	5	min	6	min	56	sec	7	min

TEST VEHICLE PROPULSION BATTERY ELECTROLYTE SPILLAGE

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

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

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

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

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20215107
 Test Date: 2/17/2021

VOLTMETER INFORMATION

	Units	Observations and Conclusions
Make		Fluke
Model		289
Serial Number		32910090
Internal Impedance Value	MΩ	> 10 MΩ < 100 pF
Resolution	V	0.001
Last Calibration Date		11/19/2020

ELECTRICAL ISOLATION MEASUREMENTS

Vb Post-Impact	V	0.1
----------------	---	-----

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

	Voltage	Units	Test Phase	Time			
V1	0.0	V	0°	min		sec	
	0.0		90°		3		21
	0.0		180°		3		29
	0.0		270°		3		39
	0.0		360°		3		37
V2	0.0	V	0°	min		sec	
	0.0		90°		2		24
	0.0		180°		2		32
	0.0		270°		2		42
	0.0		360°		2		40
V1'	0.0	V	0°	min		sec	
	0.0		90°		2		31
	0.0		180°		2		39
	0.0		270°		2		49
	0.0		360°		2		48
V2'	0.0	V	0°	min		sec	
	0.0		90°		2		27
	0.0		180°		2		35
	0.0		270°		2		45
	0.0		360°		2		44

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

Test Vehicle: 2021 Toyota Prius Prime Hybrid LE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: O20215107
 Test Date: 2/17/2021

ELECTRICAL ISOLATION CALCULATIONS

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

	Voltage	Units	Test Phase	Time			
Ri1 = Ro (1 + V2/V1) [(V1-V1')/V1']							
Ri1	Zero Volts	Ω	0°		min		sec
	Zero Volts		90°	2		24	
	Zero Volts		180°	2		32	
	Zero Volts		270°	2		42	
	Zero Volts		360°	2		40	
Ri2 = Ro (1 + V1/V2) [(V2-V2')/V2']							
Ri2	Zero Volts	Ω	0°		min		sec
	Zero Volts		90°	3		21	
	Zero Volts		180°	3		29	
	Zero Volts		270°	3		39	
	Zero Volts		360°	3		37	
Ri = The lesser of Ri1 and Ri2							
Ri	Zero Volts	Ω	0°		min		sec
	Zero Volts		90°	2		24	
	Zero Volts		180°	2		32	
	Zero Volts		270°	2		42	
	Zero Volts		360°	2		40	
Ri / Vb = Electrical Isolation Value / Nominal Battery Voltage							
Ri / Vb	Zero Volts	Ω/V	0°		min		sec
	Zero Volts		90°	2		24	
	Zero Volts		180°	2		32	
	Zero Volts		270°	2		42	
	Zero Volts		360°	2		40	

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

	Yes	No (Fail)
Is the measured Electrical Isolation Value $\geq 500 \Omega/V$?	X	
Additional Comments	None	

APPENDIX A
PHOTOGRAPHS

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Photo No. 001 - As Delivered Right Front Three-Quarter View of Test Vehicle



Photo No. 002 - As Delivered Left Rear Three-Quarter View of Test Vehicle



Photo No. 003 - Pre-Test Frontal View of Test Vehicle

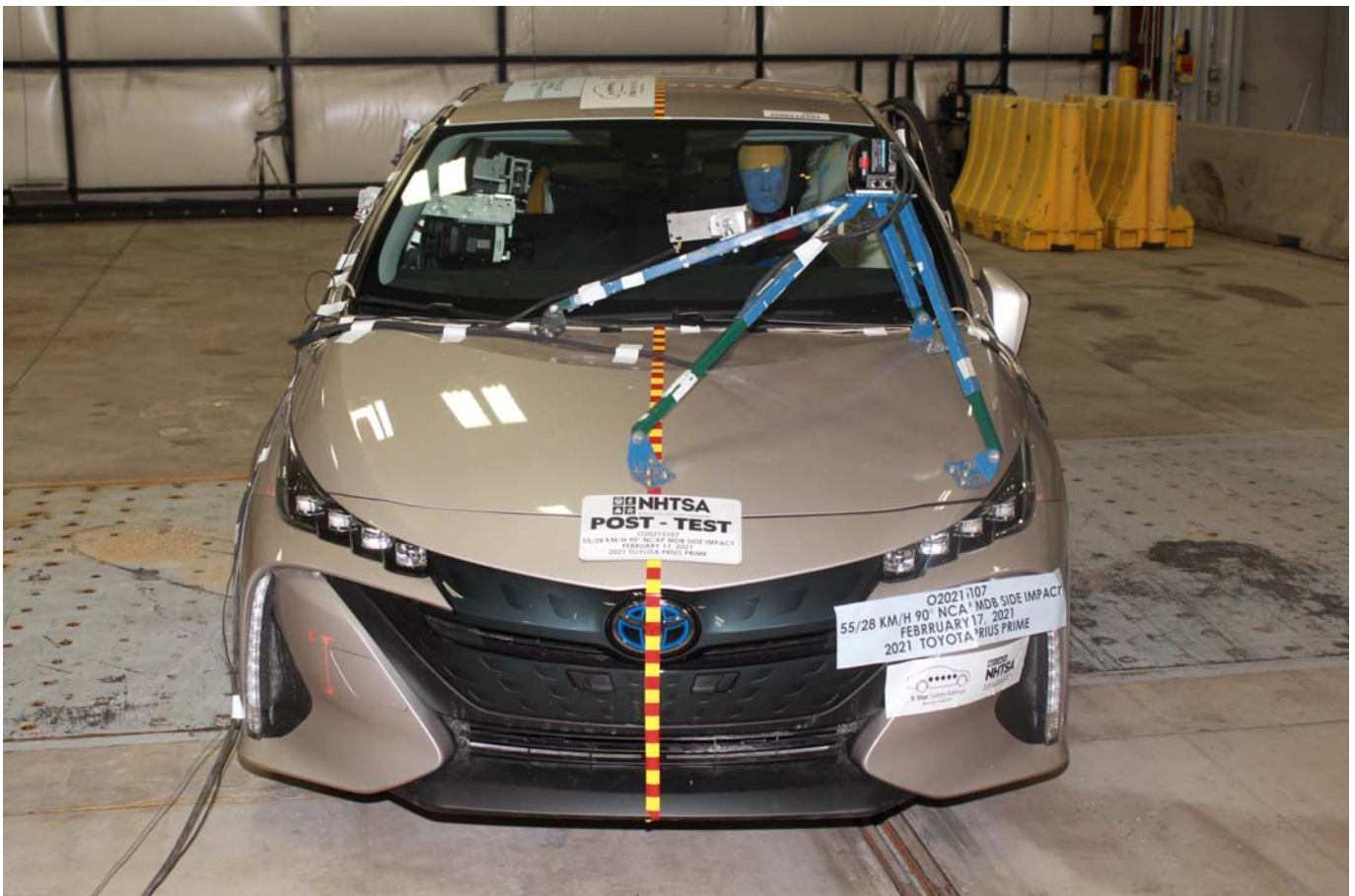


Photo No. 004 - Post-Test Frontal View of Test Vehicle



Photo No. 005 - Pre-Test Left Front Three-Quarter View of Test Vehicle



Photo No. 006 - Post-Test Left Front Three-Quarter View of Test Vehicle



Photo No. 007 - Pre-Test Left Side View of Test Vehicle



Photo No. 008 - Post-Test Left Side View of Test Vehicle



Photo No. 009 - Pre-Test Left Three-Quarter Rear View of Test Vehicle



Photo No. 010 - Post-Test Left Three-Quarter Rear View of Test Vehicle



Photo No. 011 - Pre-Test Rear View of Test Vehicle



Photo No. 012 - Post-Test Rear View of Test Vehicle



Photo No. 013 - Pre-Test Right Side View of Test Vehicle



Photo No. 014 - Post-Test Right Side View of Test Vehicle



Photo No. 015 - Pre-Test Overhead View of Test Area

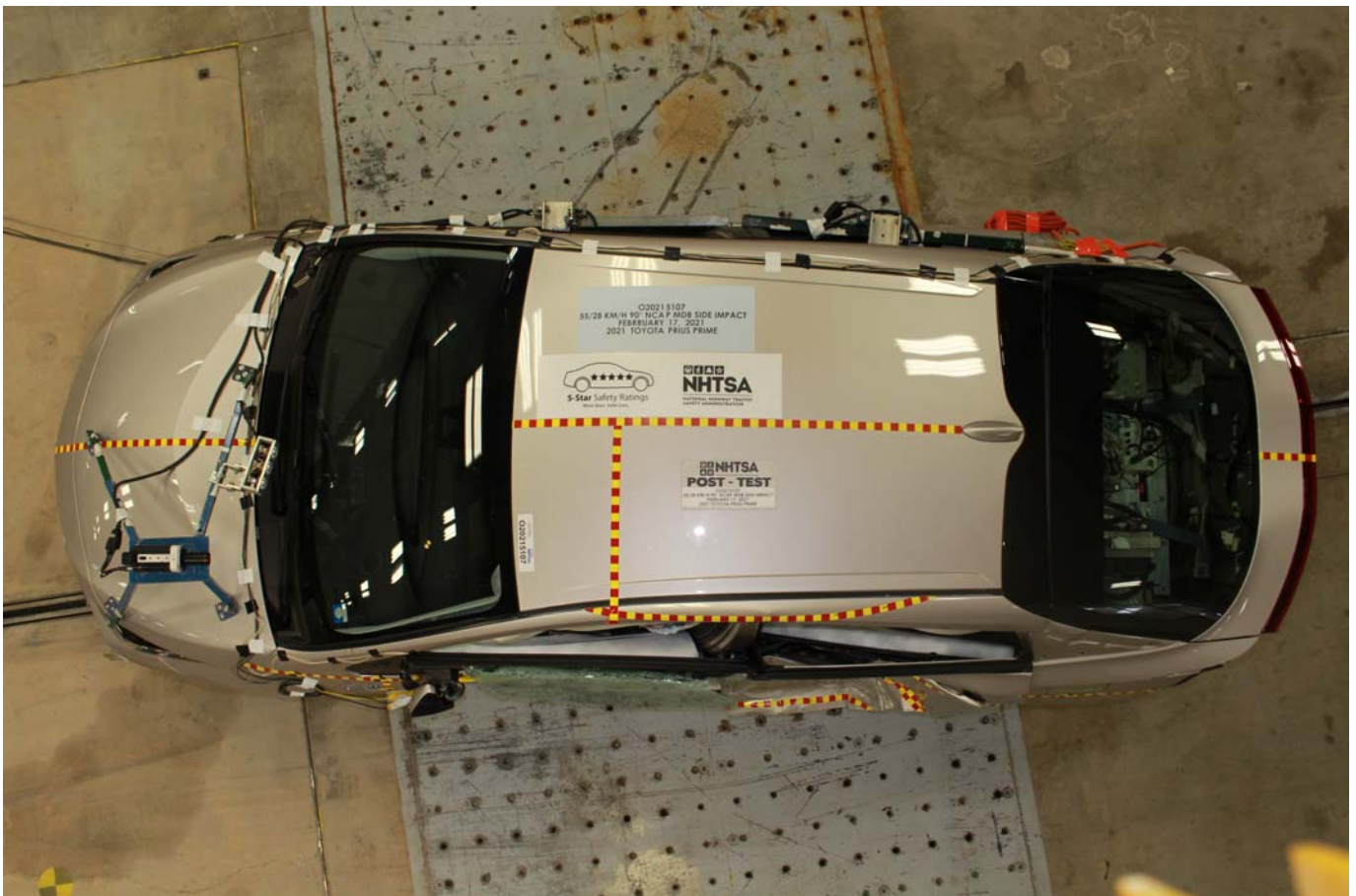


Photo No. 016 - Post-Test Overhead View of Test Area



Photo No. 017 - Pre-Test Left Side View of MDB Positioned Against Side of Test Vehicle



Photo No. 018 - Pre-Test Right Side View of MDB Positioned Against Side of Test Vehicle

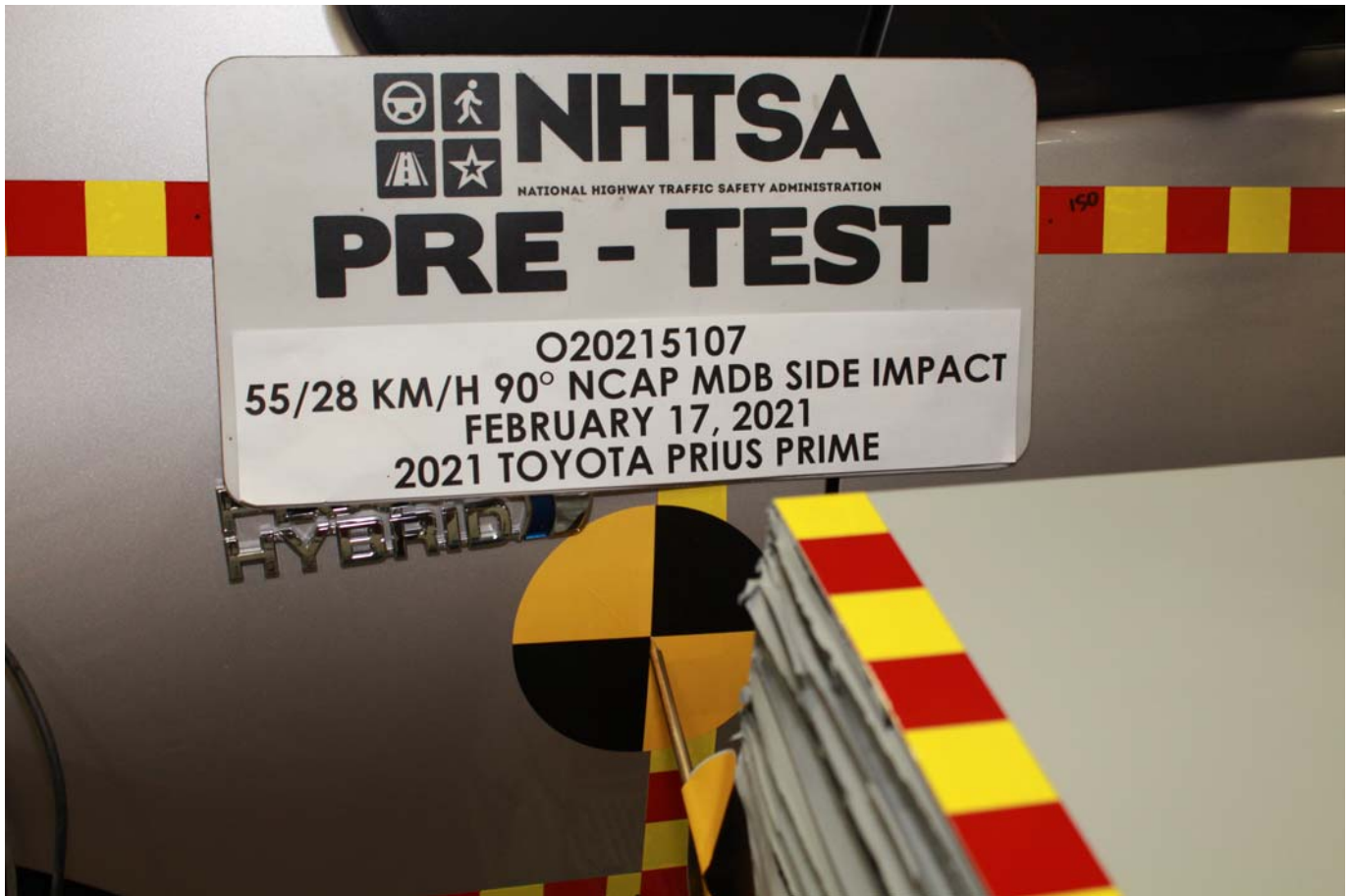


Photo No. 019 - Pre-Test Close-Up View of Impact Point Target

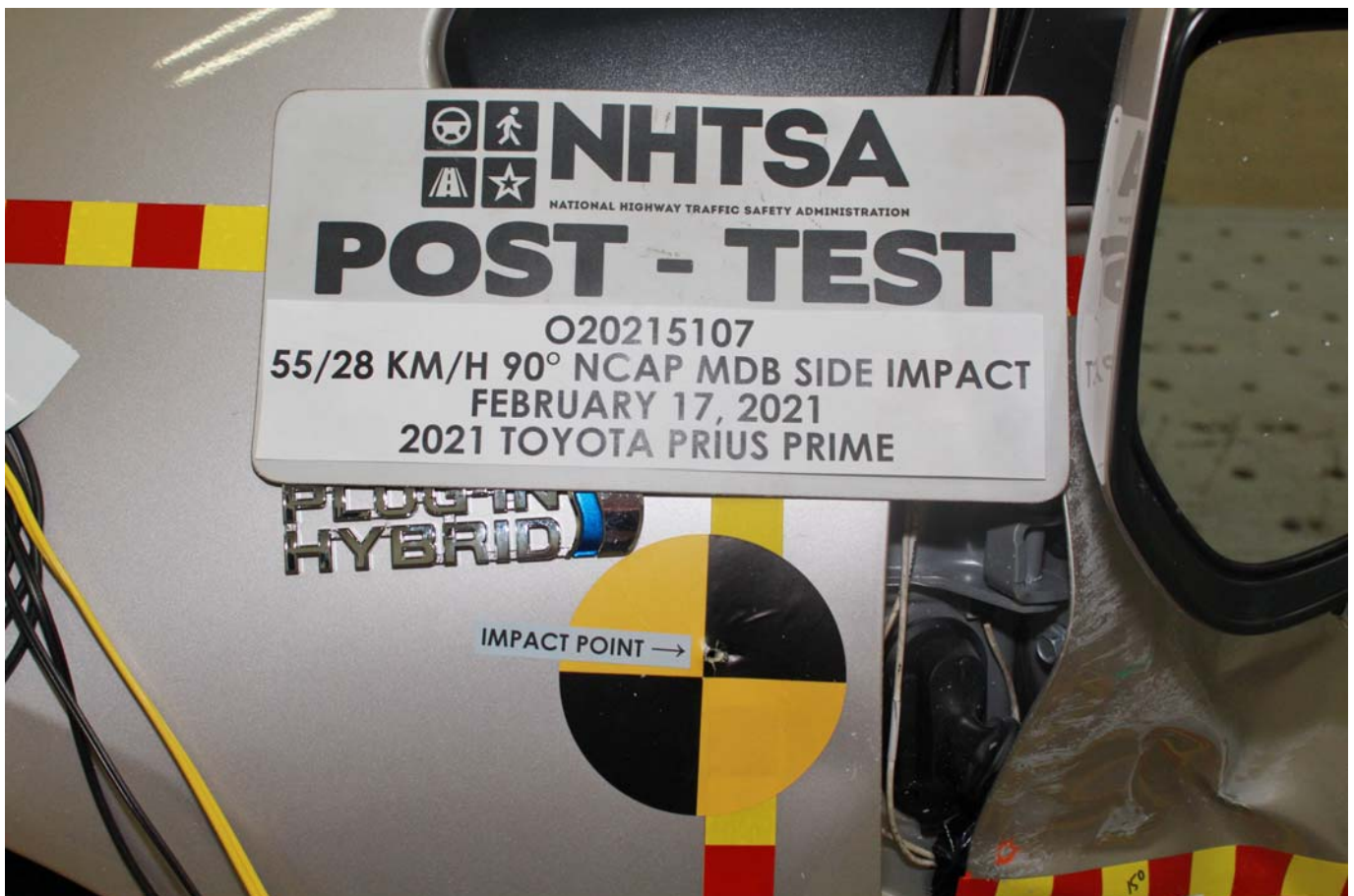


Photo No. 020 - Post-Test Close-Up View of Impact Point Target



Photo No. 021 - Pre-Test Left Front Door Latch Close-Up



Photo No. 022 - Post-Test Left Front Door Latch Close-Up



Photo No. 023 - Pre-Test Left Rear Door Latch Close-Up



Photo No. 024 - Post-Test Left Rear Door Latch Close-Up



Photo No. 025 - Pre-Test Front Close-Up View of Driver Dummy



Photo No. 026 - Post-Test Front Close-Up View of Driver Dummy



Photo No. 027 - Pre-Test Left Side View of Driver Dummy Showing Belt and Chalking



Photo No. 028 - Pre-Test Left Side View of Driver Dummy Shoulder and Door Top View



Photo No. 029 - Post-Test Left Side View of Driver Dummy Shoulder and Door Top View



Photo No. 030 - Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning

PHOTOGRAPH NOT AVAILABLE

Photo No. 031 - Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint



Photo No. 032 - Pre-Test Frontal View of Driver Seat Pan Prior to Dummy Positioning



Photo No. 033 - Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan



Photo No. 034 - Pre-Test Placement of Driver Dummy Feet



Photo No. 035 - Pre-Test View of Belt Anchorage for Driver Dummy



Photo No. 036 - Pre-Test Left Side View of Steering Wheel



Photo No. 037 - Pre-Test View of Disengaged Parking Brake

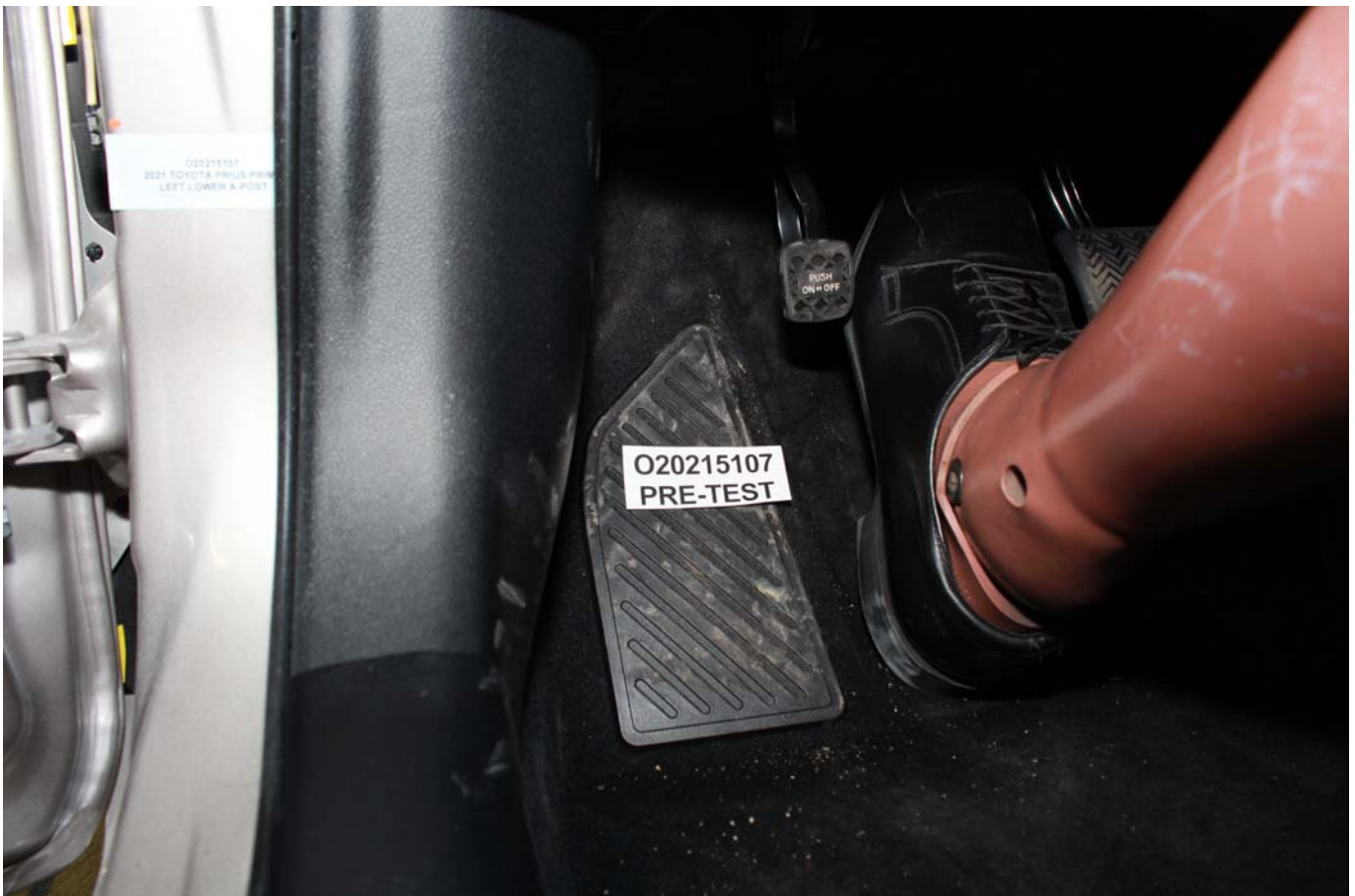


Photo No. 038 - Pre-Test View of Parking Brake



Photo No. 039 - Pre-Test Close-Up Left Side View of Driver Seat Track

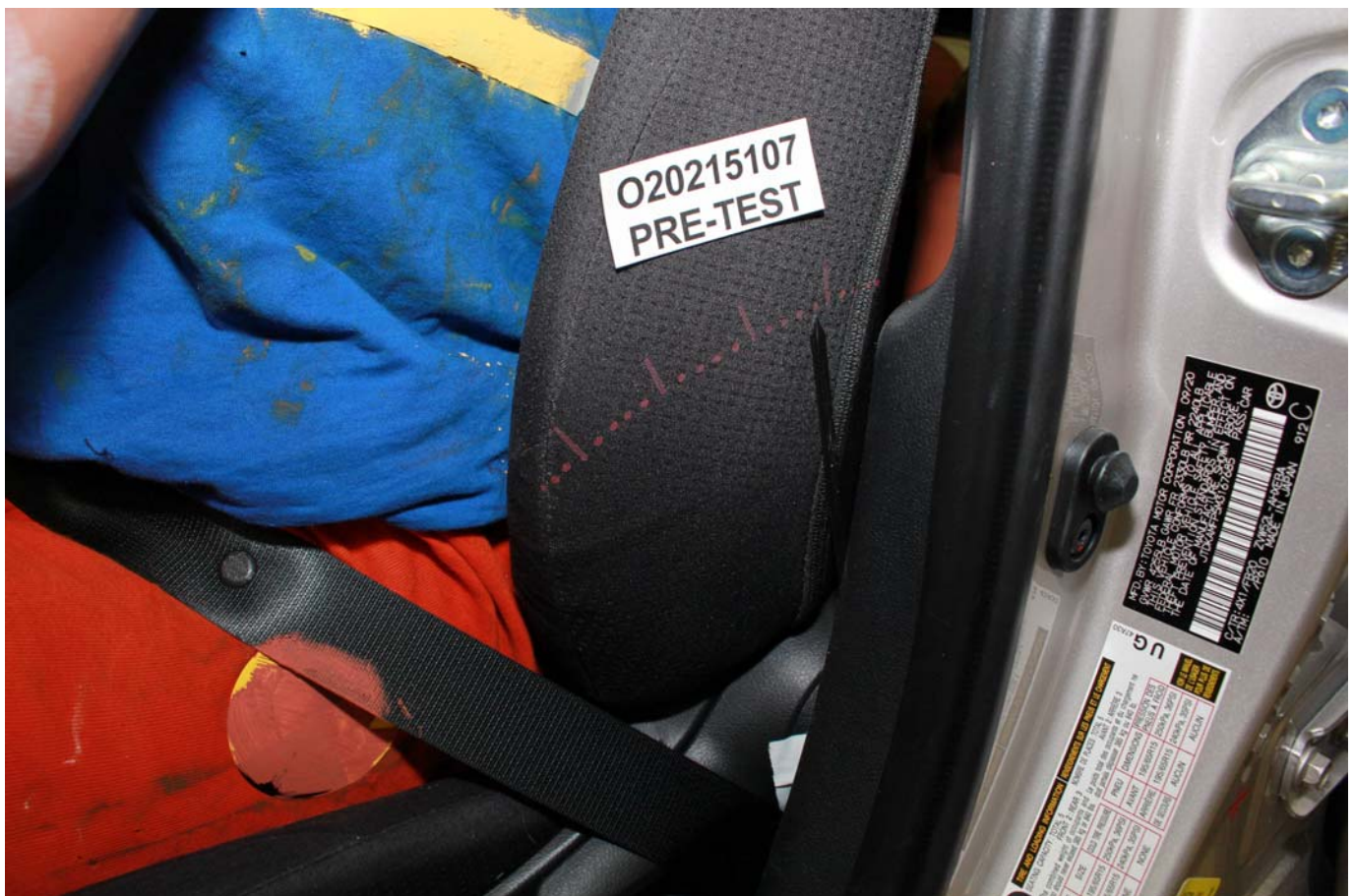


Photo No. 040 - Pre-Test Close-Up Left Side View of Driver Seat Back



Photo No. 041 - Pre-Test Close-Up View of Driver Seat Back or Head Restraint



Photo No. 042 - Pre-Test Driver Dummy and Door Clearance View



Photo No. 043 - Post-Test Driver Dummy and Door Clearance View



Photo No. 044 - Pre-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment



Photo No. 045 - Post-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment



Photo No. 046 - Pre-Test Driver Inner Door Panel View



Photo No. 047 - Post-Test Driver Inner Door Panel View



Photo No. 048 - Post-Test Driver Dummy Close-up Head Contact with Vehicle Interior View



Photo No. 049 - Post-Test Driver Dummy Close-up Head Contact with Side Airbag View



Photo No. 050 - Post-Test Driver Dummy Close-up Torso Contact with Vehicle Interior View



Photo No. 051 - Post-Test Driver Dummy Close-up Torso Contact with Side Airbag View

PHOTOGRAPH NOT APPLICABLE

Photo No. 052 - Post-Test Driver Dummy Close-up Pelvis Contact with Vehicle Interior View



Photo No. 053 - Post-Test Driver Dummy Close-up Pelvis Contact with Side Airbag View



Photo No. 054 - Post-Test Driver Dummy Close-up Knee Contact View



Photo No. 055 - Pre-Test Left Side View of Rear Passenger Dummy Showing Belt and Chalking



Photo No. 056 - Pre-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View



Photo No. 057 - Post-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View



Photo No. 058 - Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning



Photo No. 059 - Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint



Photo No. 060 - Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning



Photo No. 061 - Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan



Photo No. 062 - Pre-Test View of Rear Passenger Dummy Neck Showing Position of Adjustable Neck Bracket



Photo No. 063 - Pre-Test View of Rear Passenger Dummy Head Showing Dummy Head is Level



Photo No. 064 - Pre-Test Placement of Rear Passenger Dummy Feet



Photo No. 065 - Pre-Test View of Belt Anchorage for Rear Passenger Dummy



Photo No. 066 - Pre-Test Close-Up Left Side View of Rear Passenger Seat Track



Photo No. 067 - Pre-Test Close-Up Left Side View of Rear Passenger Seat Back



Photo No. 068 - Pre-Test Close-up View of Rear Passenger Seat Back or Head Restraint



Photo No. 069 - Pre-Test Rear Passenger Dummy and Door Clearance View



Photo No. 070 - Post-Test Rear Passenger Dummy and Door Clearance View



Photo No. 071 - Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



Photo No. 072 - Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



Photo No. 073 - Pre-Test Rear Passenger Inner Door Panel View



Photo No. 074 - Post-Test Rear Passenger Inner Door Panel View



Photo No. 075 - Post-Test Rear Passenger Dummy Close-up Head Contact with Vehicle Interior View



Photo No. 076 - Post-Test Rear Passenger Dummy Close-up Head Contact with Side Airbag View



Photo No. 077 - Post-Test Rear Passenger Dummy Close-up Torso Contact with Vehicle Interior View



Photo No. 078 - Post-Test Rear Passenger Dummy Close-up Torso Contact with Side Airbag View

PHOTOGRAPH NOT APPLICABLE

Photo No. 079 - Post-Test Rear Passenger Dummy Close-up Pelvis Contact with Vehicle Interior View



Photo No. 080 - Post-Test Rear Passenger Dummy Close-up Pelvis Contact with Side Airbag View

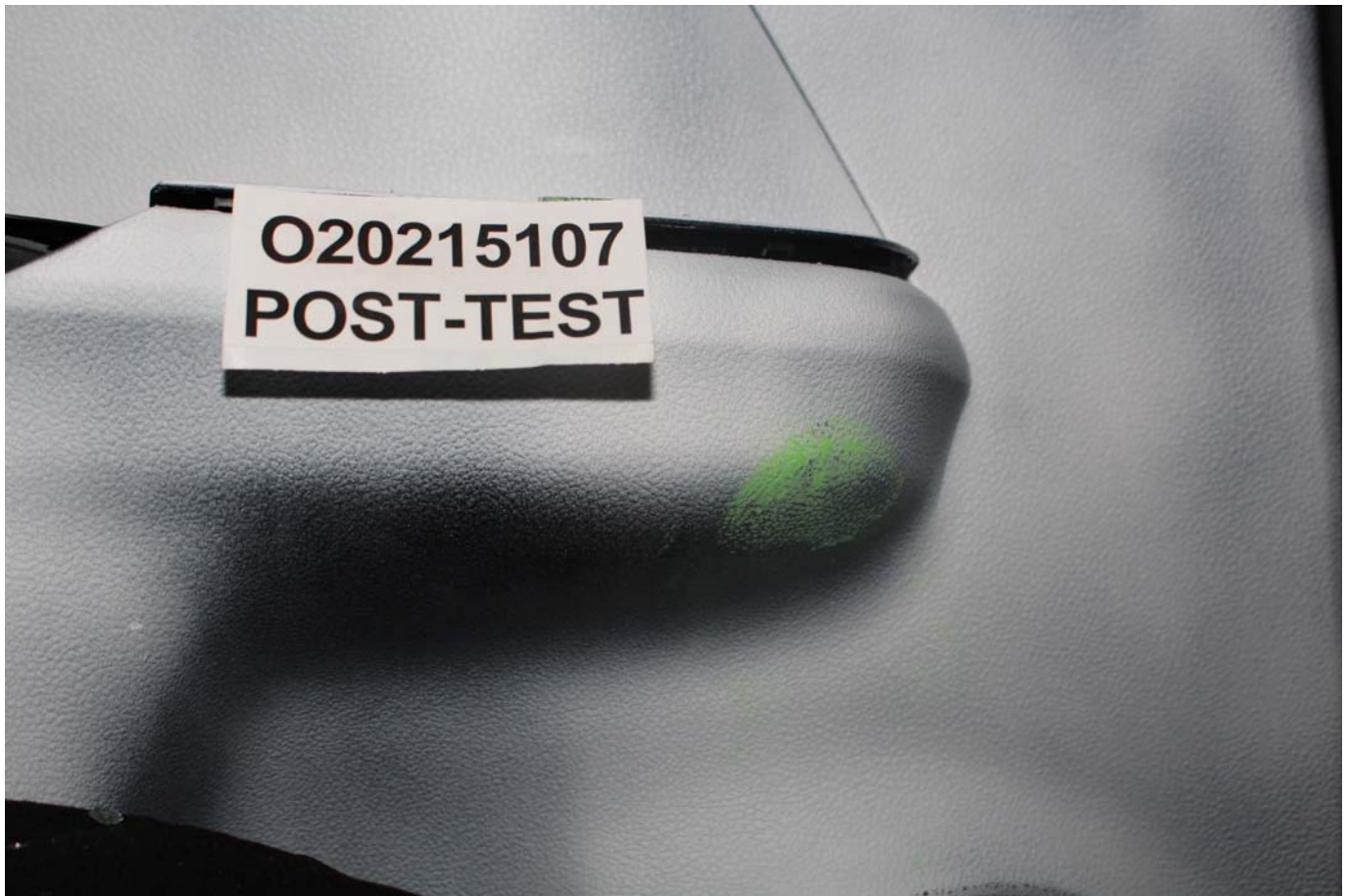


Photo No. 081 - Post-Test Rear Passenger Dummy Close-up Knee Contact View



Photo No. 082 - Pre-Test View of Fuel Filler Cap or Fuel Filler Neck

PHOTOGRAPH NOT AVAILABLE

Photo No. 083 - Post-Test View of Fuel Filler Cap or Fuel Filler Neck



Photo No. 084 - Pre-Test Front View of MDB Impactor Face

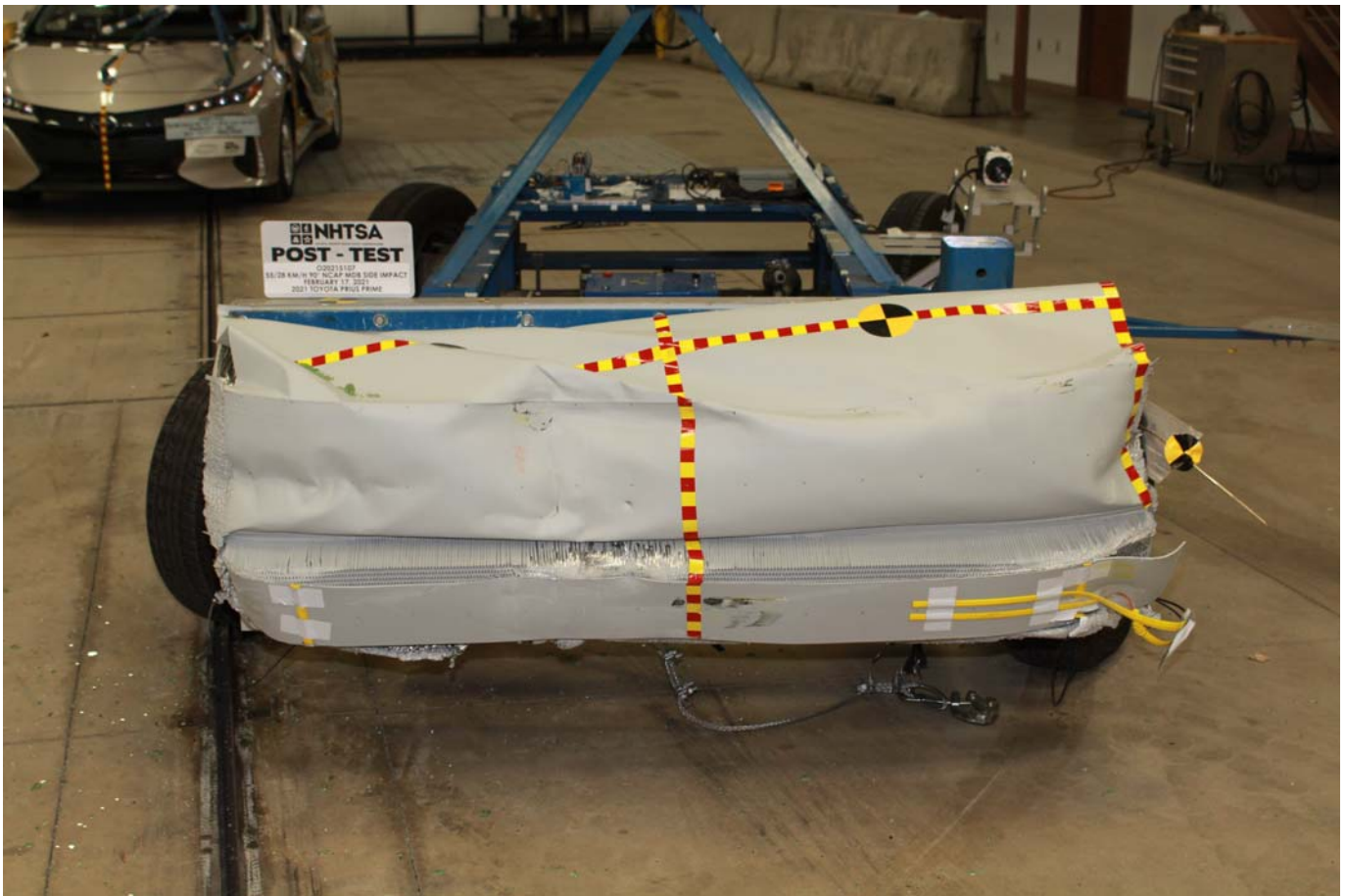


Photo No. 085 - Post-Test Front View of MDB Impactor Face



Photo No. 086 - Pre-Test Top View of MDB Impactor Face

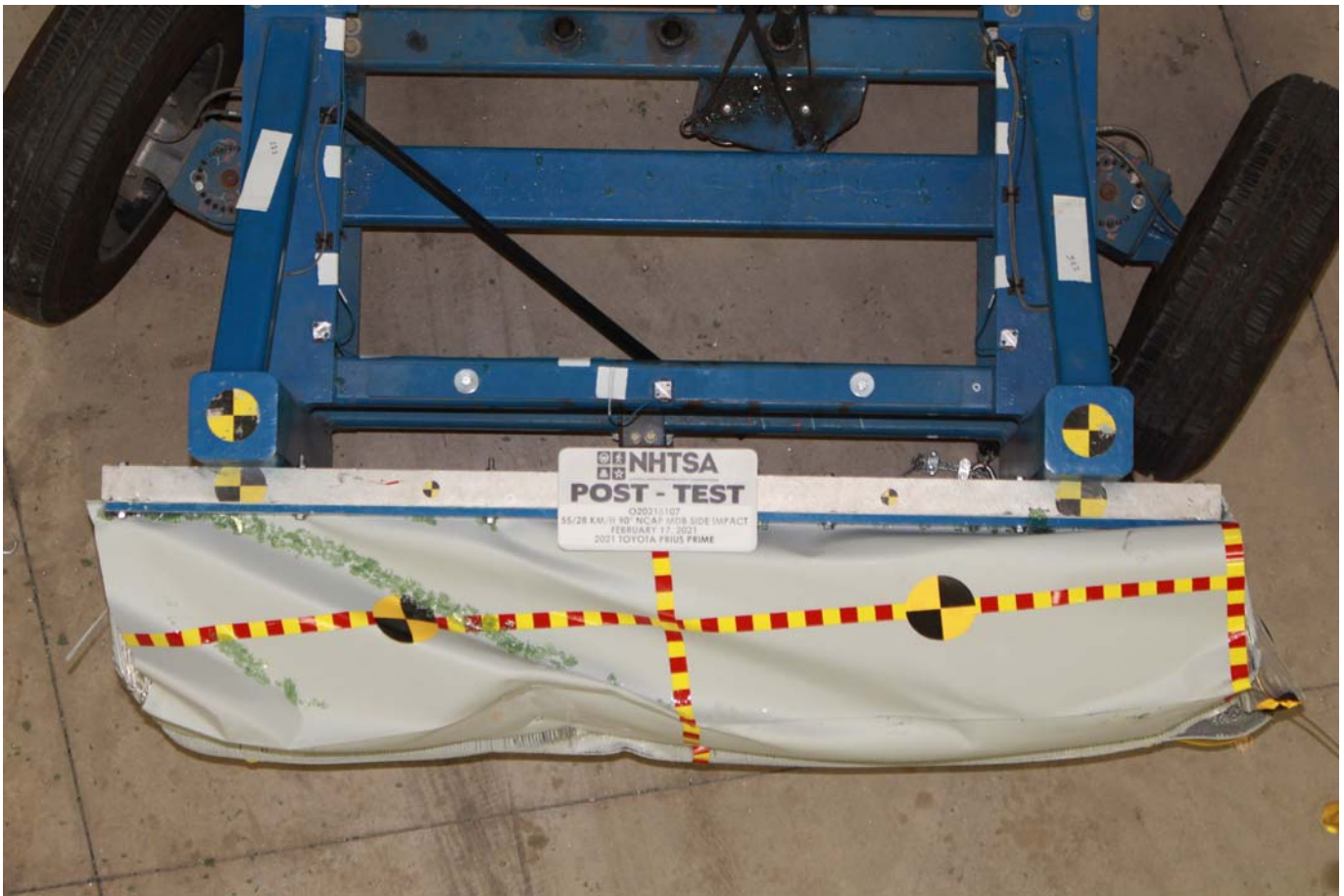


Photo No. 087 - Post-Test Top View of MDB Impactor Face



Photo No. 088 - Pre-Test Left Side View of MDB Impactor Face



Photo No. 089 - Post-Test Left Side View of MDB Impactor Face

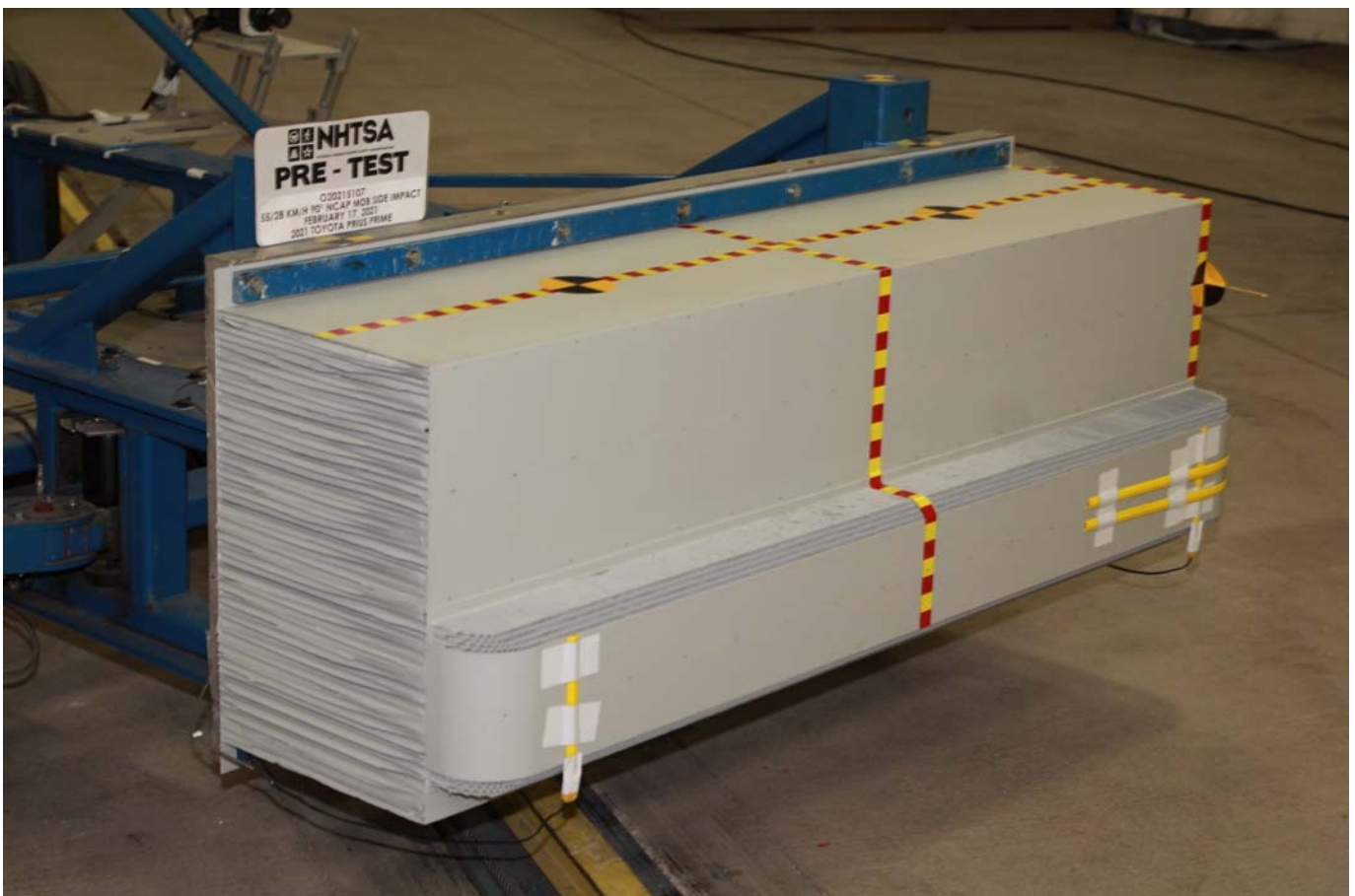


Photo No. 090 - Pre-Test Right Side View of MDB Impactor Face



Photo No. 091 - Post-Test Right Side View of MDB Impactor Face



Photo No. 092 - Close-Up View of Vehicle Certification Label



Photo No. 093 - Close-Up View of Vehicle Tire Information Placard or Label

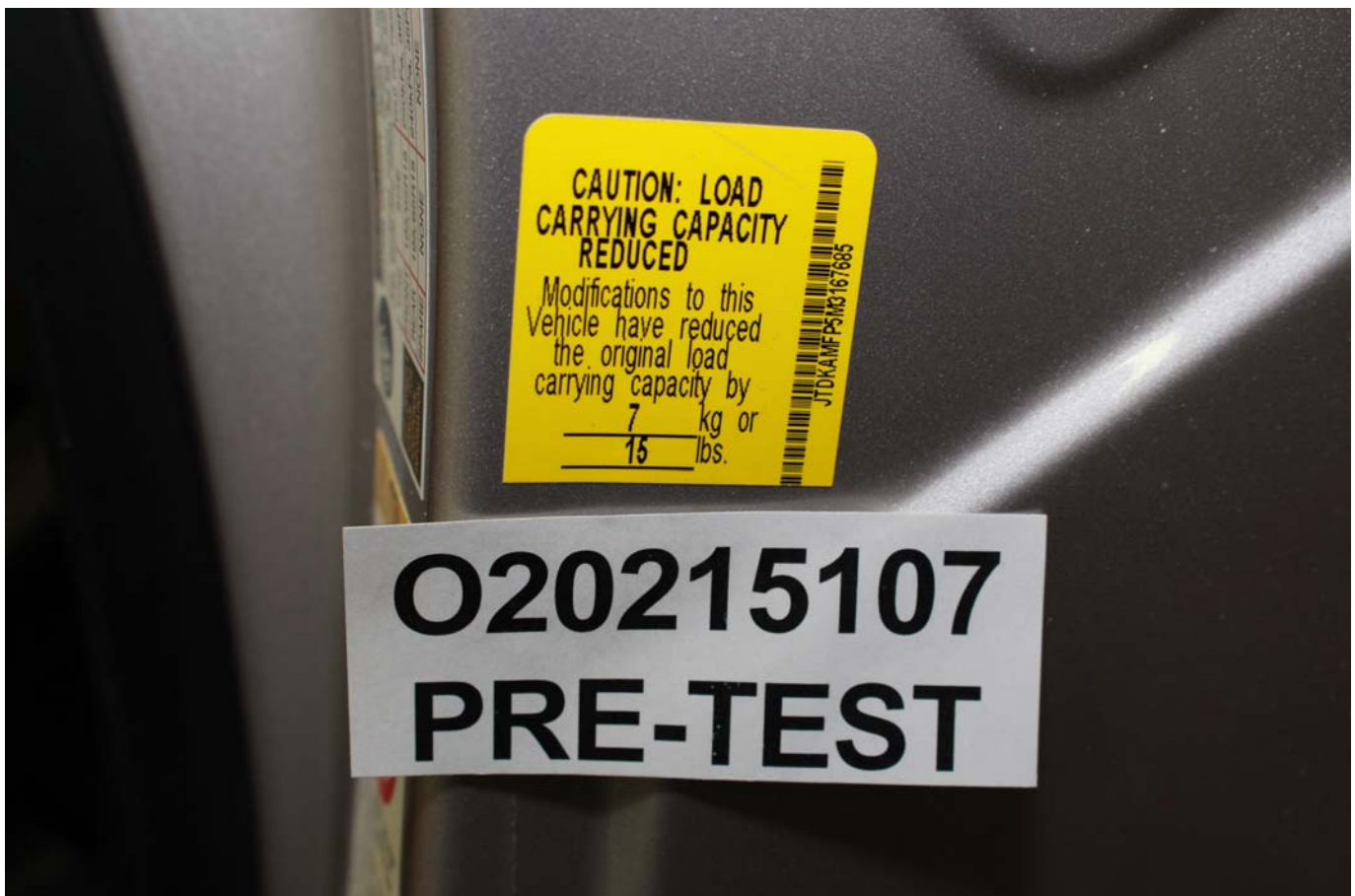


Photo No. 093a - Close-Up View of Vehicle Load Carrying Capacity Reduction Label

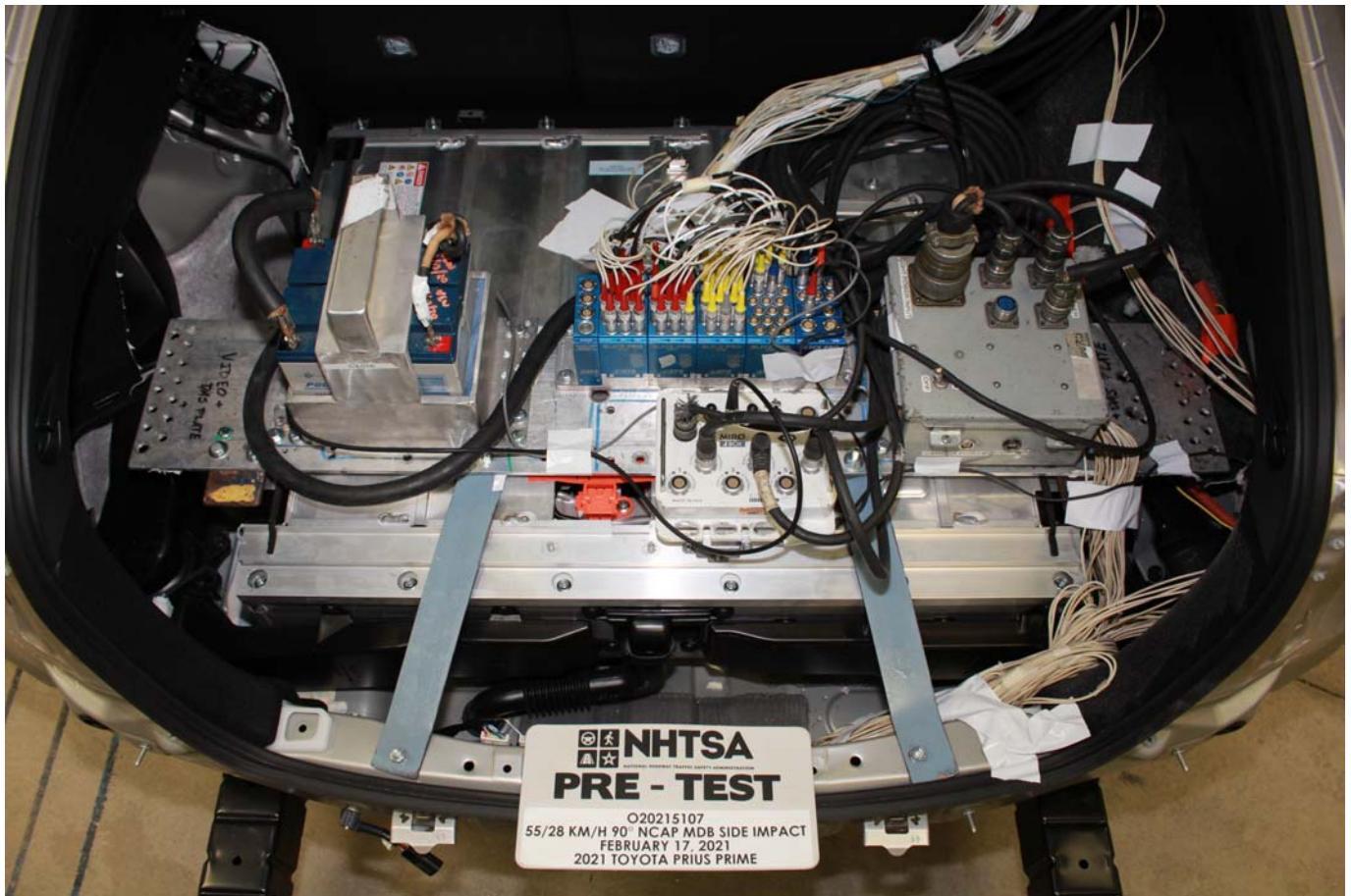


Photo No. 094 - Pre-Test Ballast View

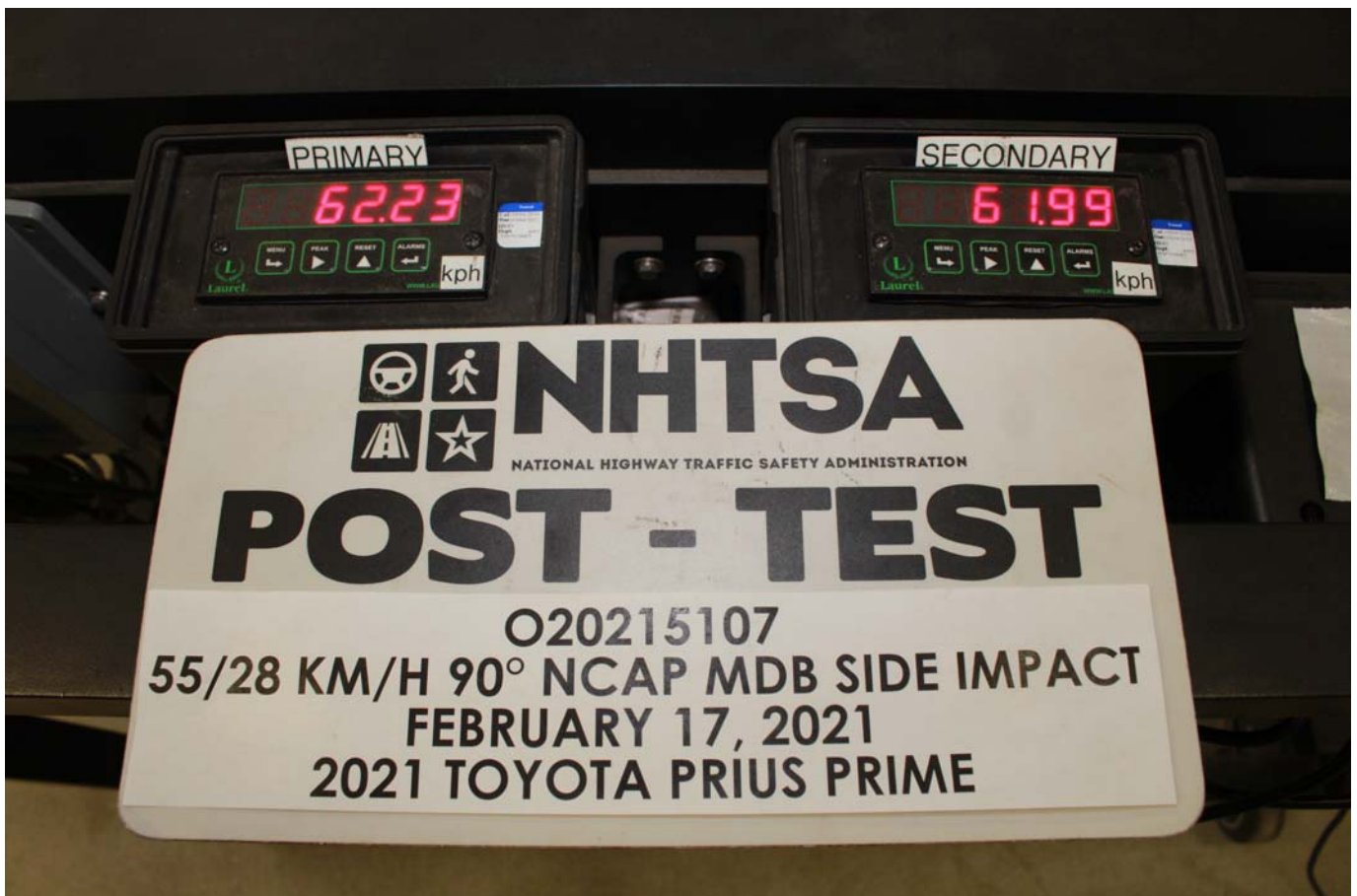


Photo No. 095 - Post-Test Primary and Redundant Speed Trap Read-Out



Photo No. 096 - FMVSS Photo No. 301 Static Rollover 0 Degrees

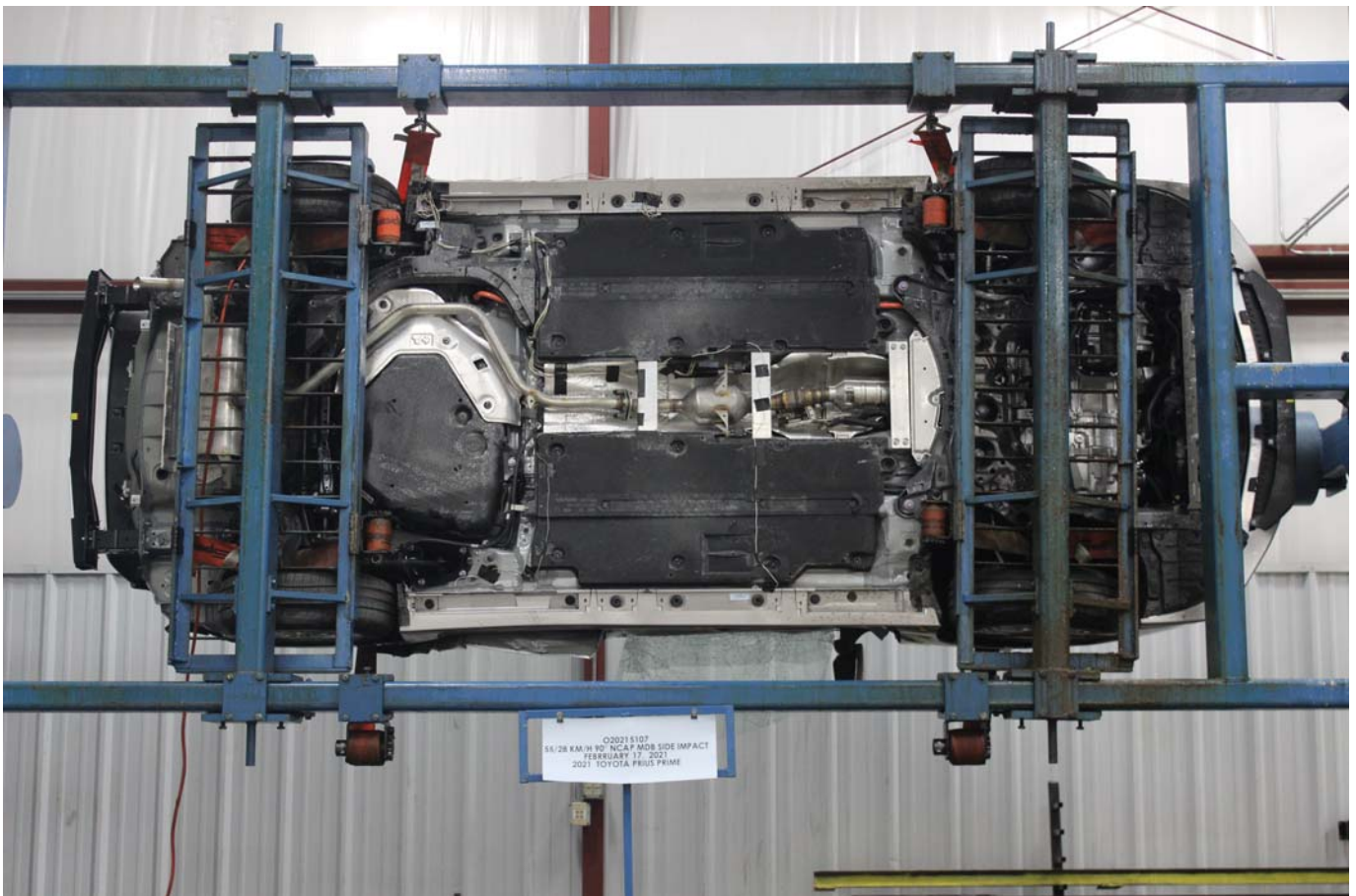


Photo No. 097 - FMVSS Photo No. 301 Static Rollover 90 Degrees



Photo No. 098 - FMVSS Photo No. 301 Static Rollover 180 Degrees



Photo No. 099 - FMVSS Photo No. 301 Static Rollover 270 Degrees



Photo No. 100 - FMVSS Photo No. 301 Static Rollover 360 Degrees

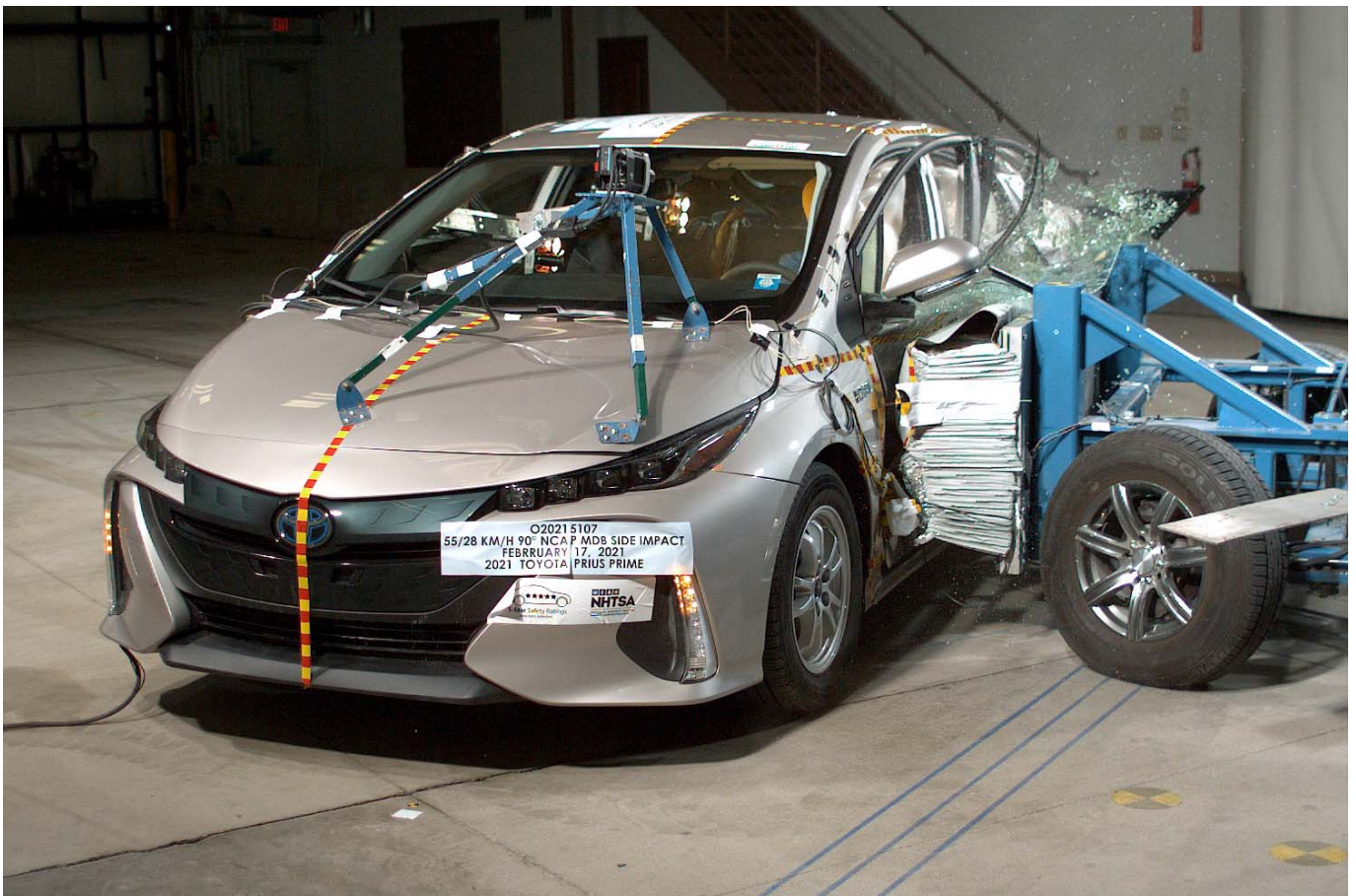


Photo No. 101 - Impact Event

TOYOTA
Let's Go Places

DESC.: **PRIUS PRIME** LE

VIN: **JTDKAMFP5M3167685**

YR/MDL: 2021/1235A

CLR: **TITANIUM GLOW/FB20** (04X1/20)

FINAL ASSEMBLY POINT: **TOYOTA, AICHI, JAPAN**

GOVERNMENT 5-STAR SAFETY RATINGS

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

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

STANDARD EQUIPMENT

MECHANICAL & PERFORMANCE

- Hybrid Synergy Drive System, TZE
- 1.8L DCHC 16V VVT-i 4-Cylinder Engine
- EV, EV Auto, IV Modes
- 15-in Alloy Wheels with Covers
- Eco-Park Steering (EPS) 4-Wheel Disc Brakes

SAFETY & CONVENIENCE

- 10 Airbags; Star Safety System
- Toyota Safety Sense 2.0: Pre-Collision Sys w/Pedestrian Detection, Dynamic Radar Cruise Control, Lane Departure Alert w/Steering Assist, Automatic High Beams, Road Sign Assist
- Eng Immobilizer, Tire Pressure Monitor Sys
- Integrated Backup Camera
- Smart Key System w/ Push Button Start
- Safety Connect w/ 1-Year Trial

EXTERIOR

- Quad-LED Headlights w/Auto-Off
- Heated Power Outside Mirrors

INTERIOR

- Audio Plus - 7-in. Touchscreen
- HandsFree Bluetooth Phone/Music, USB Media Port, 2 USB Charge-Ports, SiriusXM w/3-Month All Access Trial
- Android Auto & Apple CarPlay Compatible
- Smart-Flow Climate Control System
- Fabric-Trimmed Heated Fr Seats, 5 Pass. Seating w/80/40 Split Rear Seats
- Dual Sunvisors w/Extenders
- Cargo Area Tonneau Cover
- Tire Repair Kit
- ***Full Tank of Gas***

MANUFACTURER'S SUGGESTED RETAIL PRICE \$28,220.00

OPTIONAL EQUIPMENT

FE	50 State Emissions	
ZT	All Weather Floor Liners/Cargo Liner	259.00
DK	Preferred Owner's Portfolio	
EF	Rear Bumper Applique	79.00

EPA DOT Fuel Economy and Environment

Fuel Economy Midsize Cars range from 14 to 341 MPGe. The best vehicle rates 341 MPGe.

Electricity + Gasoline Charge Time: 2.0 hours (240V)

133 MPGe 0.0 mpg city/hwy

Gasoline Only 54 MPG 1.9 mpg city/hwy

You save \$4,500 in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost \$600

Fuel Economy & Greenhouse Gas Rating (tailpipe only)

Smog Rating (tailpipe only)

1 **10** **10** **10**

The vehicle emits 29 grams CO2 per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel and electricity also create emissions, some from fossil fuels.

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 27 MPGe and costs \$7,500 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$2.75 per gallon and \$0.13 per kWh. This is a dual-fueled automobile. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fuel economy.gov
Calculate personalized estimates and compare vehicles

Plug-In Hybrid Vehicle Electricity-Gasoline

DELIVERY PROCESSING AND HANDLING FEE 995.00

TOTAL \$29,553.00

The New Vehicle Limited Warranty provides 3-year/50,000-mile basic coverage, 5-year/100,000-mile powertrain coverage, 5-year/unlimited-mile corrosion perforation coverage, 8-year/100,000-mile coverage for specific hybrid components and 10-year/150,000-mile coverage for the hybrid battery. Some components may have longer coverage under California emissions warranty (applicable in CA, CT, DE, HI, IL, IN, MD, MA, MI, MN, NY, OH, PA, RI, VT, WA, WI, WY, and DC). See Warranty and Maintenance Guide for details. No scheduled service contract may be available for the vehicle. Ask dealer for details. Manufacturer's suggested retail includes manufacturer's recommended pre-delivery service. Gasoline, license and title fees, applicable federal, state and local taxes and dealer and distributor ToyotaCare, which covers normal factory scheduled maintenance for two years or 25,000 miles, whichever occurs first, is included as part of the sales price of the vehicle for qualifying buyers. See participating dealer for eligibility and coverage details.

Delivered by Truck to: 31177
MAGUIRE TOYOTA
370 ELMIRA ROAD
ITHACA NY 14850

Photo No. 102 - Monroney Label

4-3. Adjusting the seats **305**

Head restraints

Head restraints are provided for all seats.

Front seats

① Up
Pull the head restraints up.

② Down
Push the head restraint down while pressing the lock release button.

Rear seats

Rear outboard seats

① To fold
Pull the head restraint up while pressing the lock release button.

② To use
Lift up and push down the head restraint to the lowest lock position.

Rear center seat

① Up
Pull the head restraints up.

② Down
Push the head restraint down while pressing the lock release button.

4

Operation of each component

306 4-3. Adjusting the seats

Removing the head restraints

► Front and rear center seats
Pull the head restraint up while pressing the lock release button.

► Rear outboard seats

① Pull the seatback lock release lever and fold down the seatback until it reaches the position where the head restraints can be removed.

② Pull the head restraint up while pressing the lock release buttons.

Installing the head restraints

► Front and rear center seats
Align the head restraint with the installation holes and push it down to the lock position.
Press and hold the lock release button when lowering the head restraint.

PRIUS PRIME_OM_OM47D71U_(U)

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Photo No. 103 - Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

■ Removing the head restraints

► Front and rear center seats

Pull the head restraint up while pressing the lock release button.

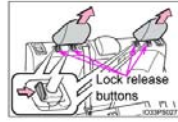


► Rear outboard seats

- 1 Pull the seatback lock release lever and fold down the seatback until it reaches the position where the head restraints can be removed.



- 2 Pull the head restraint up while pressing the lock release buttons.



■ Installing the head restraints

► Front and rear center seats

Align the head restraint with the installation holes and push it down to the lock position.

Press and hold the lock release button when lowering the head restraint.



PRIUS PRIME_OM_OM47D71U_(U)

► Rear outboard seats

- 1 Pull the seatback lock release lever and fold down the seatback until it reaches the position where the head restraints can be installed.



- 2 Align the head restraint with the installation holes and push it down to the lowest lock position.



■ Adjusting the height of the head restraints (front seats)

Make sure that the head restraints are adjusted so that the center of the head restraint is closest to the top of your ears.



■ Adjusting the rear center seat head restraint

Always raise the head restraint one level from the stowed position when using.

⚠ WARNING

■ Head restraint precautions

Observe the following precautions regarding the head restraints. Failure to do so may result in death or serious injury.

- Use the head restraints designed for each respective seat.
- Adjust the head restraints to the correct position at all times.
- After adjusting the head restraints, push down on them and make sure they are locked in position.
- Do not drive with the head restraints removed.

4 Operation of each component

PRIUS PRIME_OM_OM47D71U_(U)

Photo No. 104 - Left Rear Passenger Head Restraint Use and Adjustment Information from Vehicle Owner's Manual



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



Photo No. 305-02 - Power Inverter Warning Label



Photo No. 305-03 - First Responder Warning Label





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

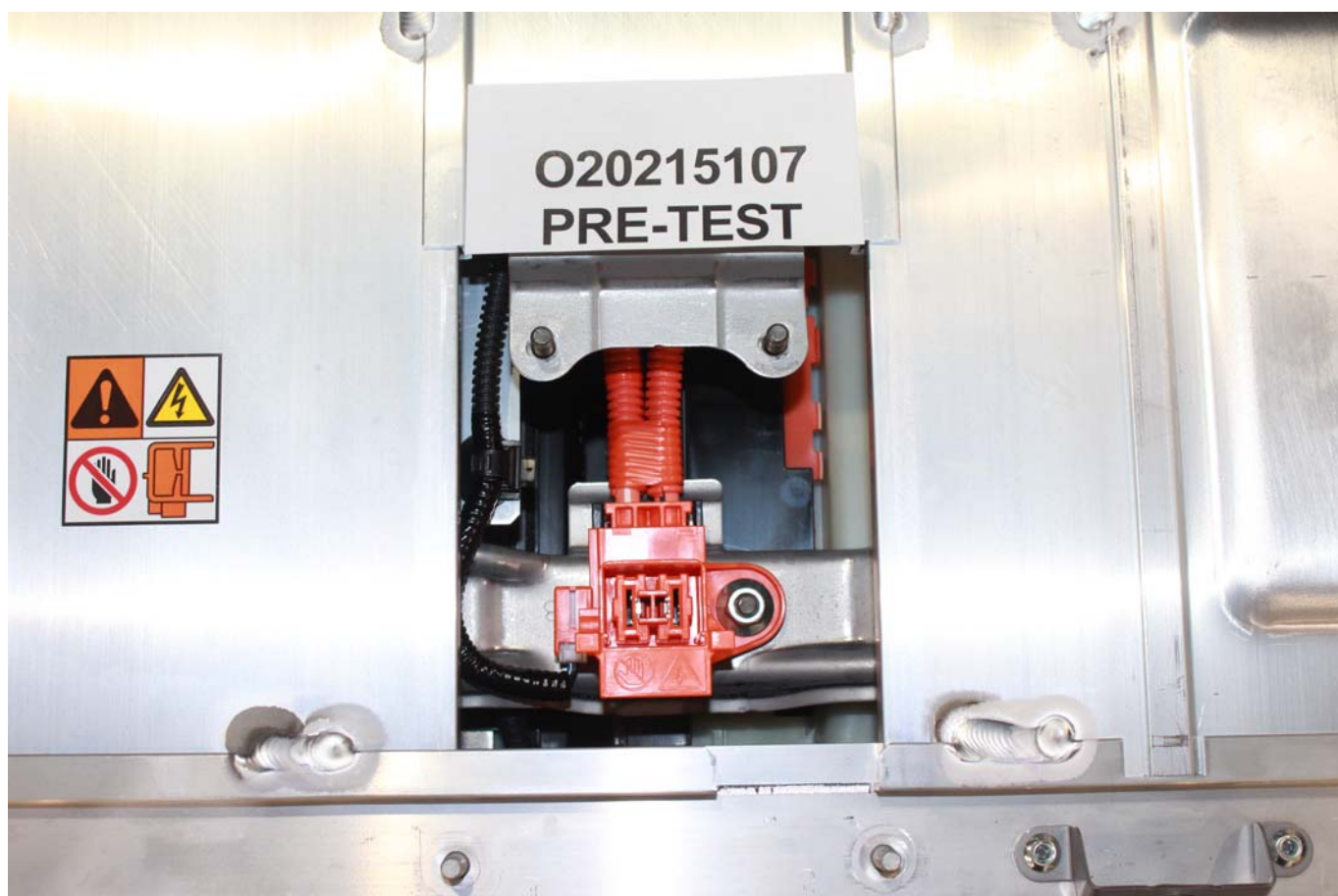


Photo No. 305-07 - Manual High Voltage Service Disconnect Removed



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



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



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

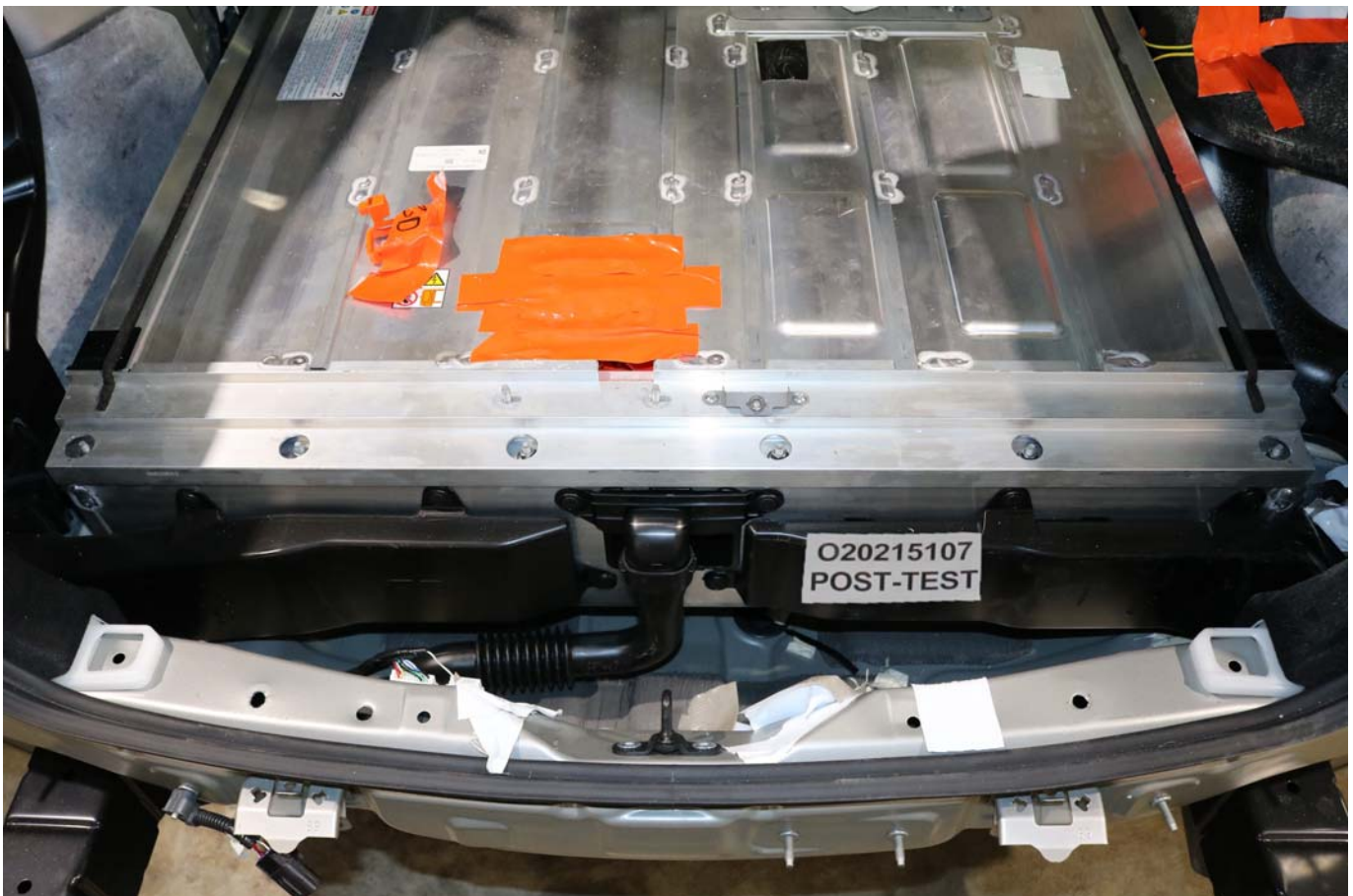


Photo No. 305-11 - Post-Impact Rear View of Propulsion Battery

PHOTOGRAPH NOT APPLICABLE

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

PHOTOGRAPH NOT APPLICABLE

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

PHOTOGRAPH NOT APPLICABLE

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

PHOTOGRAPH NOT APPLICABLE

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

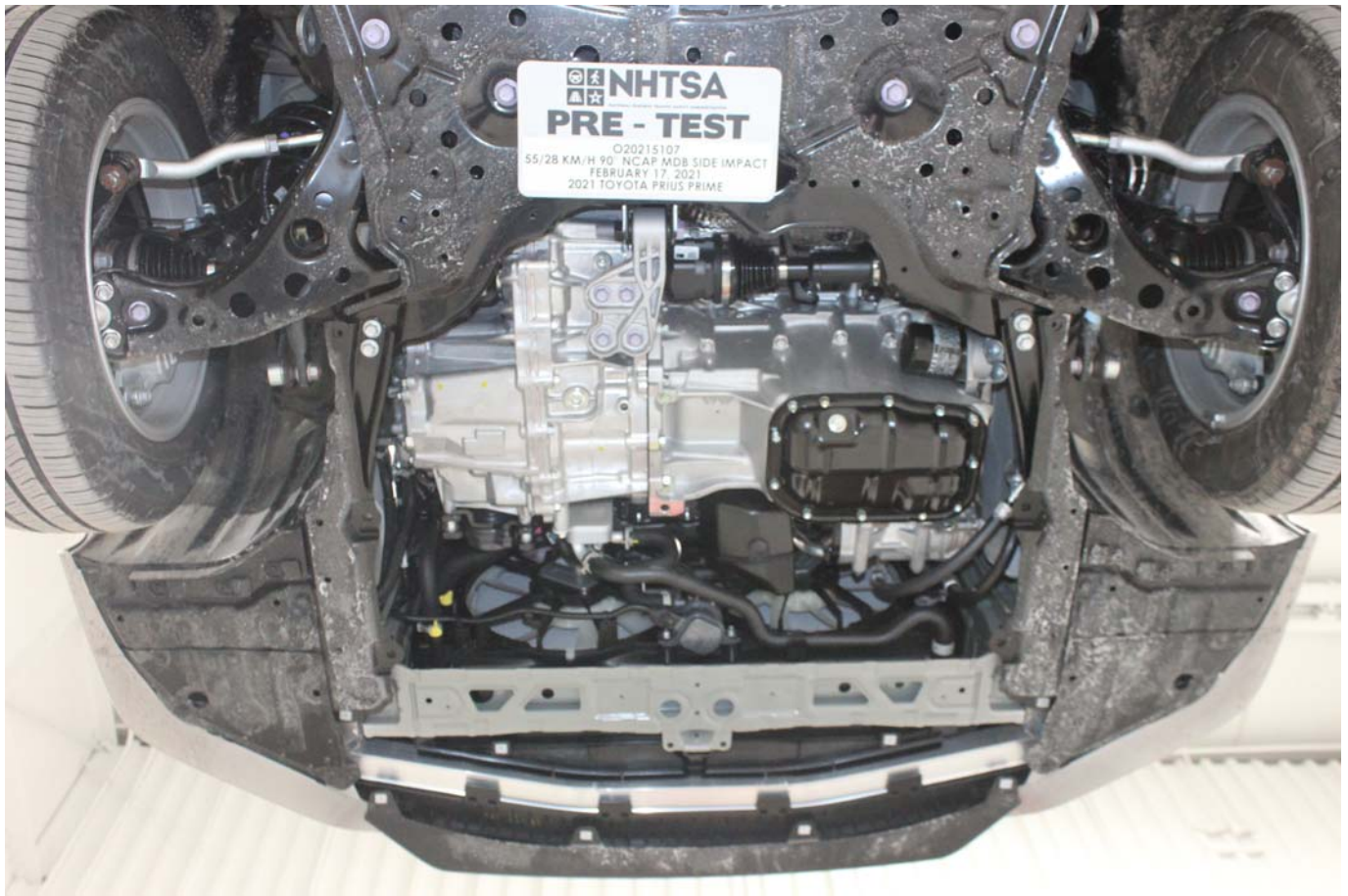


Photo No. 305-16 - Pre-Impact View of Electric Propulsion Drive

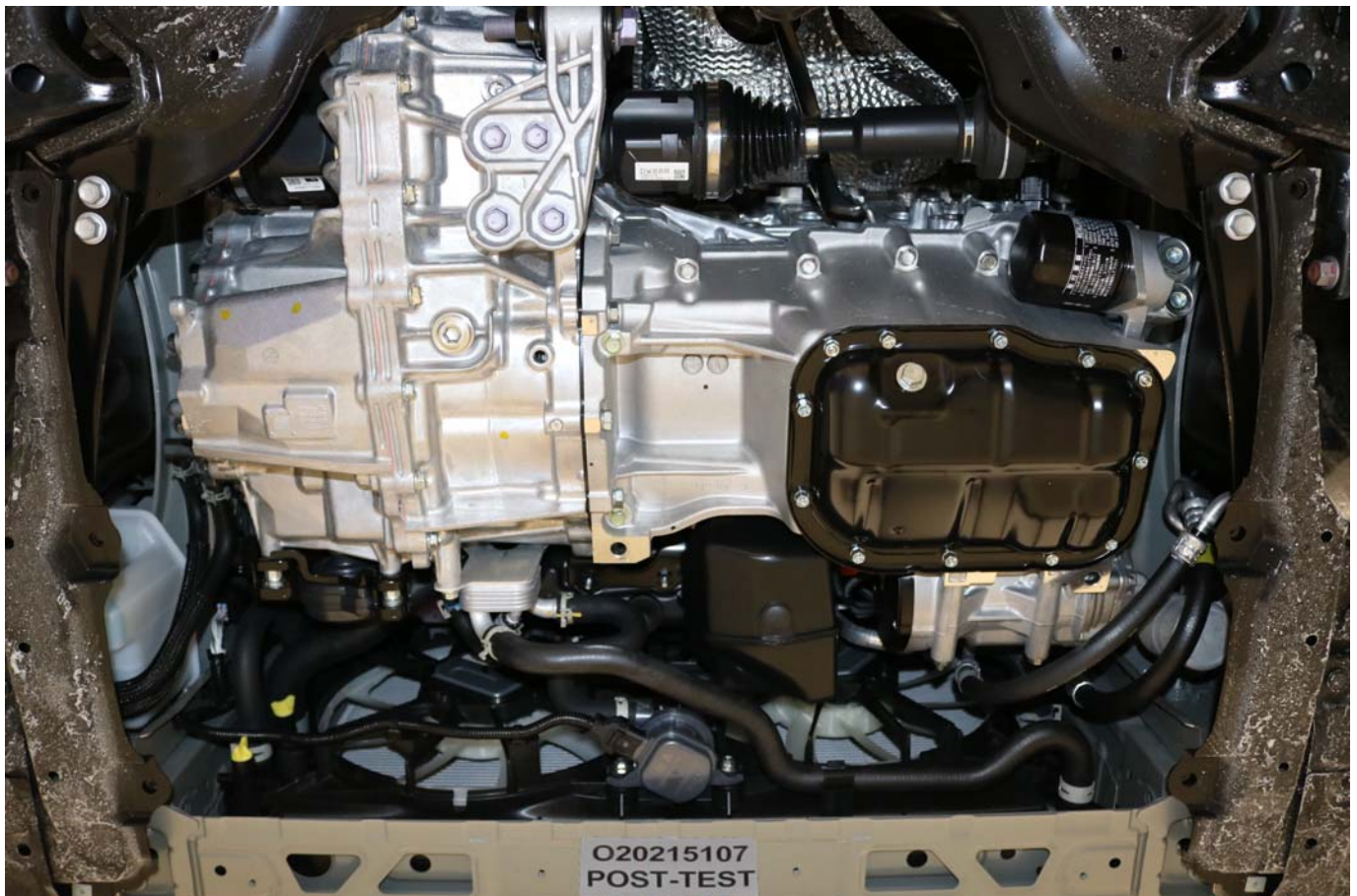


Photo No. 305-17 - Post-Impact View of Electric Propulsion Drive



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



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



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



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

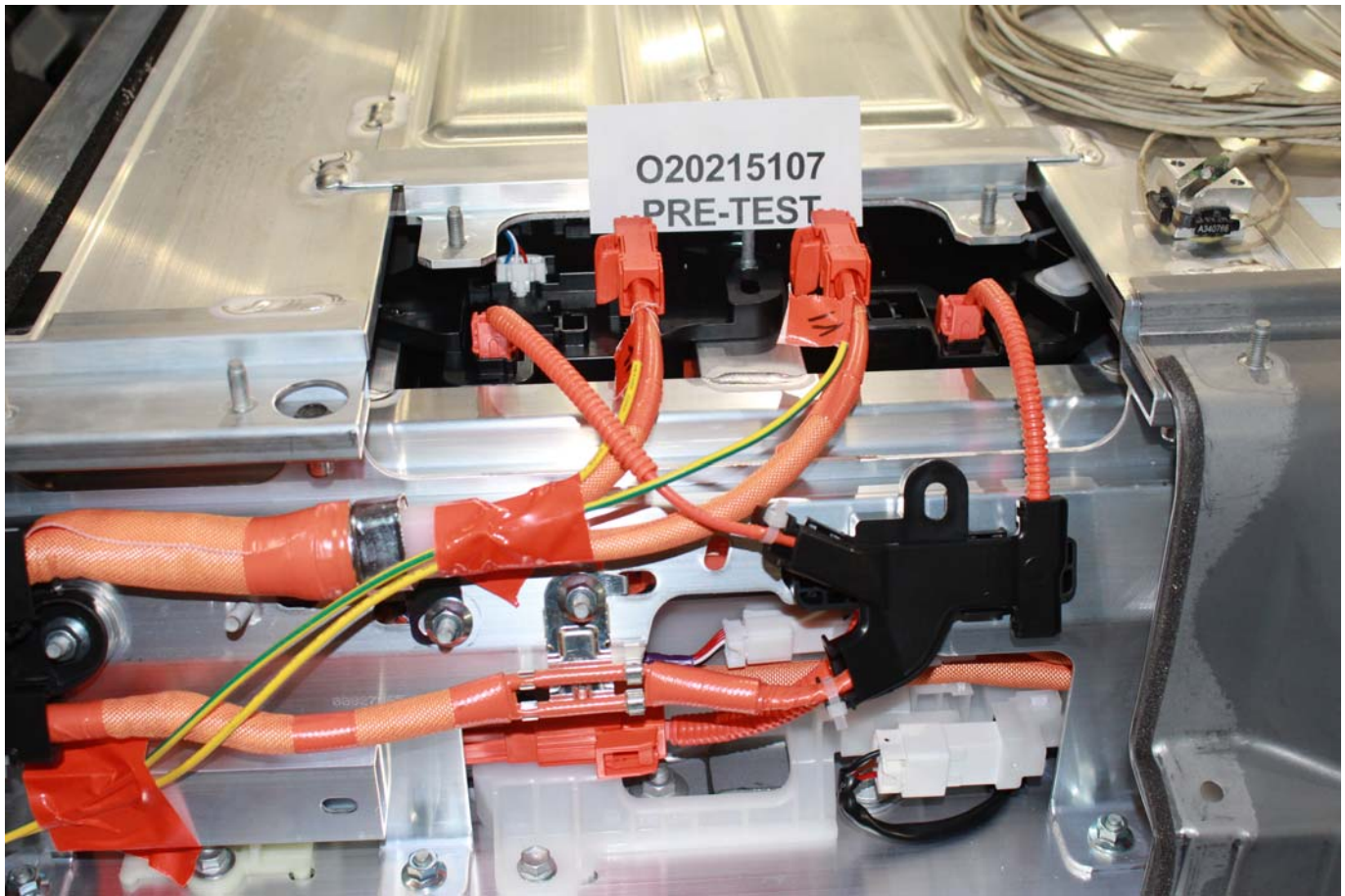


Photo No. 305-22 - Pre-Impact View of High Voltage Leads Attached

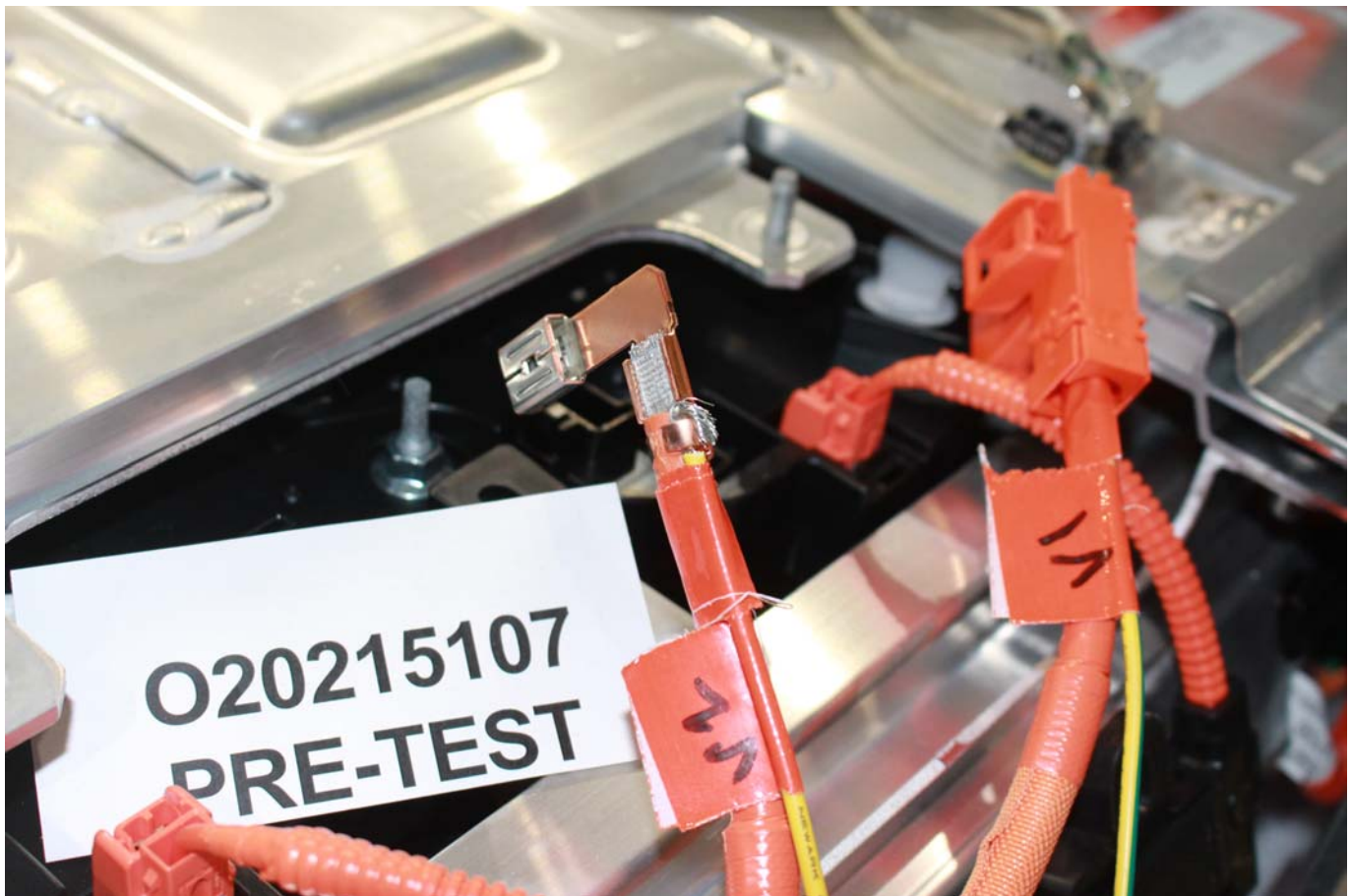


Photo No. 305-23 - Pre-Impact Close-Up View of High Voltage Leads Attached



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



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



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

PHOTOGRAPH NOT APPLICABLE

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

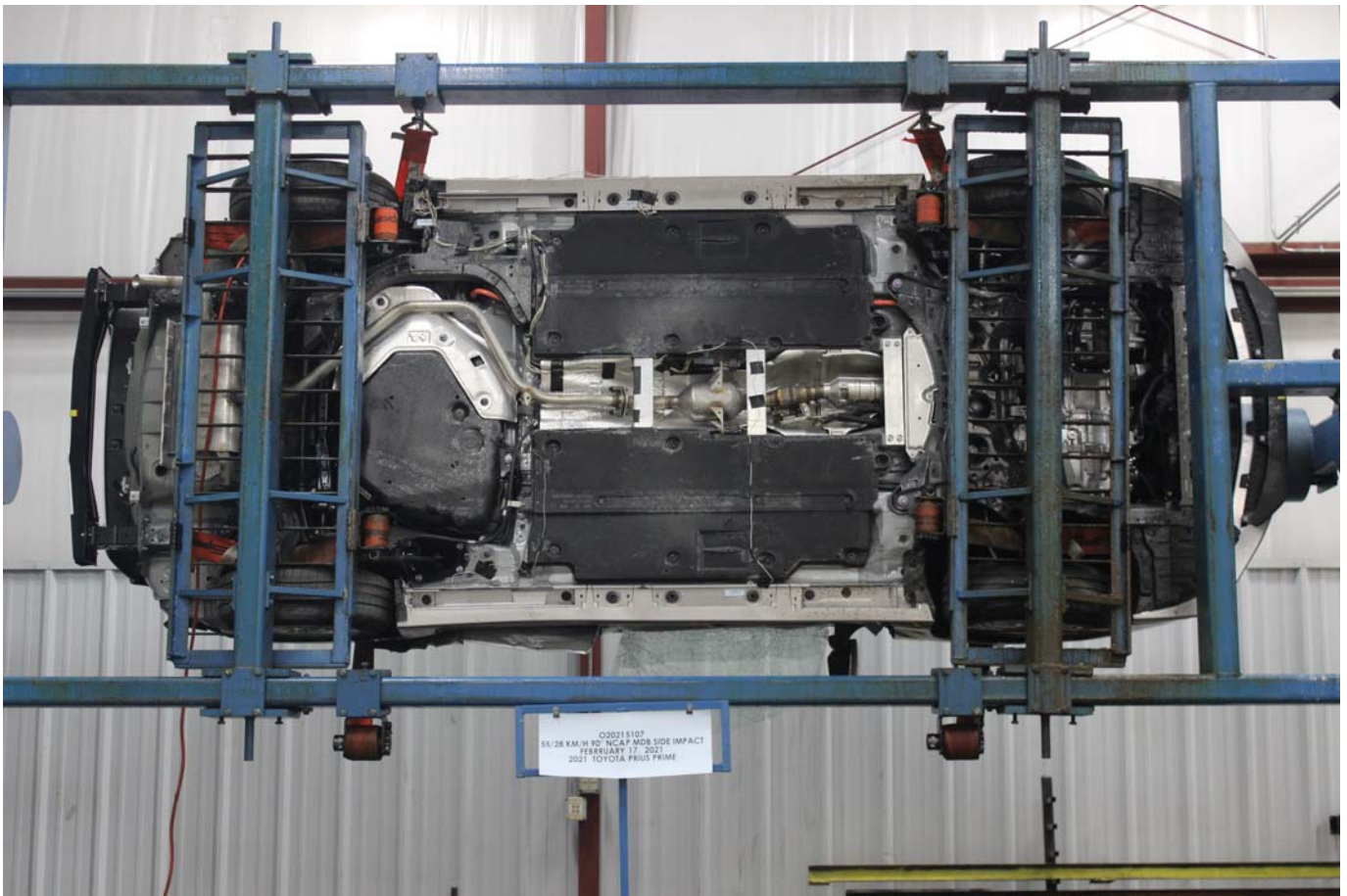


Photo No. 305-28 - FMVSS No. 305 Static Rollover at 90 Degrees



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



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



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



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



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

PHOTOGRAPH NOT APPLICABLE

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

PHOTOGRAPH NOT APPLICABLE

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

PHOTOGRAPH NOT APPLICABLE

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

PHOTOGRAPH NOT APPLICABLE

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

PHOTOGRAPH NOT APPLICABLE

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

APPENDIX B
DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS
Driver Dummy Instrumentation Plots

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Figure No. 4.	Driver Head Resultant Acceleration Primary vs. Time	B-1
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Figure No. 6.	Driver Middle Thorax Rib Deflection (Y) vs. Time	B-2
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Figure No. 18.	Passenger Lower Spine T12 Acceleration (X) vs. Time	B-6
Figure No. 19.	Passenger Lower Spine T12 Acceleration (Y) vs. Time	B-6
Figure No. 20.	Passenger Lower Spine T12 Acceleration (Z) vs. Time	B-6
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Figure No. 24.	Passenger Total Pelvic Force on Impact Side (Y) vs. Time	B-7

The following additional data for this test can be obtained from the Research and Development section of the NHTSA website. The website can be found at www.nhtsa.gov

Additional Driver & Passenger Dummy Instrumentation Data

Passenger Head Angular Velocity (X)
Passenger Head Angular Velocity (Y)
Passenger Head Angular Velocity (Z)
Driver Lower Spine T12 Acceleration (X)
Driver Lower Spine T12 Acceleration (Y)
Driver Lower Spine T12 Acceleration (Z)
Passenger Upper Thorax Rib Deflection (Y)
Passenger Middle Thorax Rib Deflection (Y)
Passenger Lower Thorax Rib Deflection (Y)
Passenger Upper Abdomen Rib Deflection (Y)
Passenger Lower Abdomen Rib Deflection (Y)
Driver Head Acceleration Redundant (X)
Driver Head Acceleration Redundant (Y)
Driver Head Acceleration Redundant (Z)
Passenger Head Acceleration Redundant (X)
Passenger Head Acceleration Redundant (Y)
Passenger Head Acceleration Redundant (Z)

Vehicle Instrumentation Data

Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Right Side Sill at Front Seat Acceleration (X)
Right Side Sill at Front Seat Acceleration (Y)
Right Side Sill at Front Seat Acceleration (Z)
Right Side Sill at Rear Seat Acceleration (X)
Right Side Sill at Rear Seat Acceleration (Y)
Right Side Sill at Rear Seat Acceleration (Z)
Left Side Sill at Front Seat Acceleration (Y)
Left Side Sill at Rear Seat Acceleration (Y)
Lower A-Post Acceleration (Y)
Middle A-Post Acceleration (Y)
Lower B-Post Acceleration (Y)
Middle B-Post Acceleration (Y)
Front Seat Track Acceleration (Y)
Rear Seat Track Acceleration (Y)
Right Rear Occupant Compartment Acceleration (Y)
Engine Block (X)
Engine Block (Y)
Rear Floorpan Above Axle Acceleration (X)
Rear Floorpan Above Axle Acceleration (Y)
Rear Floorpan Above Axle Acceleration (Z)

MDB Instrumentation Data

MDB Center of Gravity Acceleration (X)

MDB Center of Gravity Acceleration (Y)

MDB Center of Gravity Acceleration (Z)

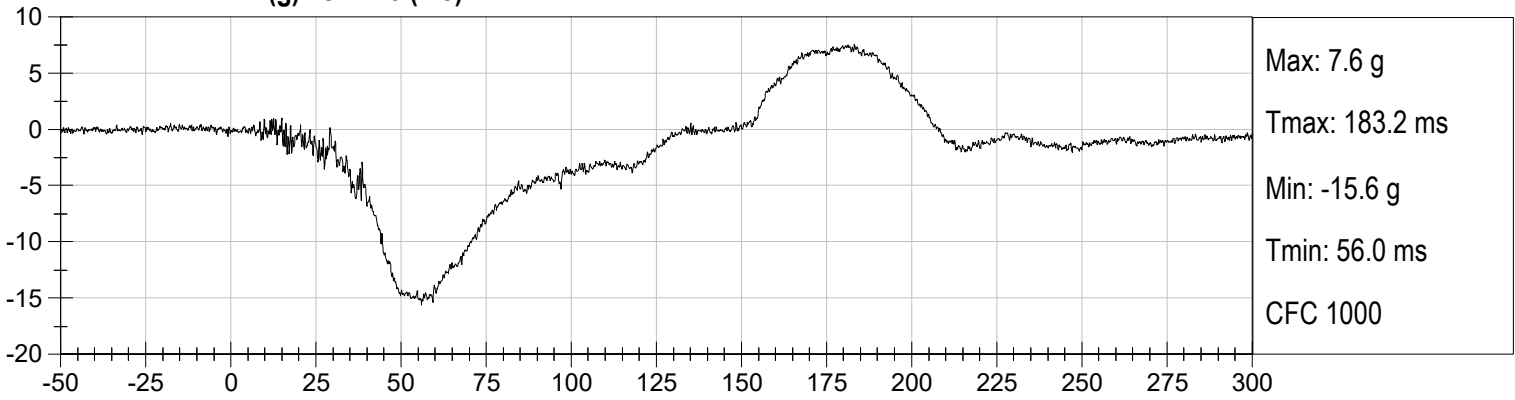
MDB Rear Acceleration (X)

MDB Rear Acceleration (Y)

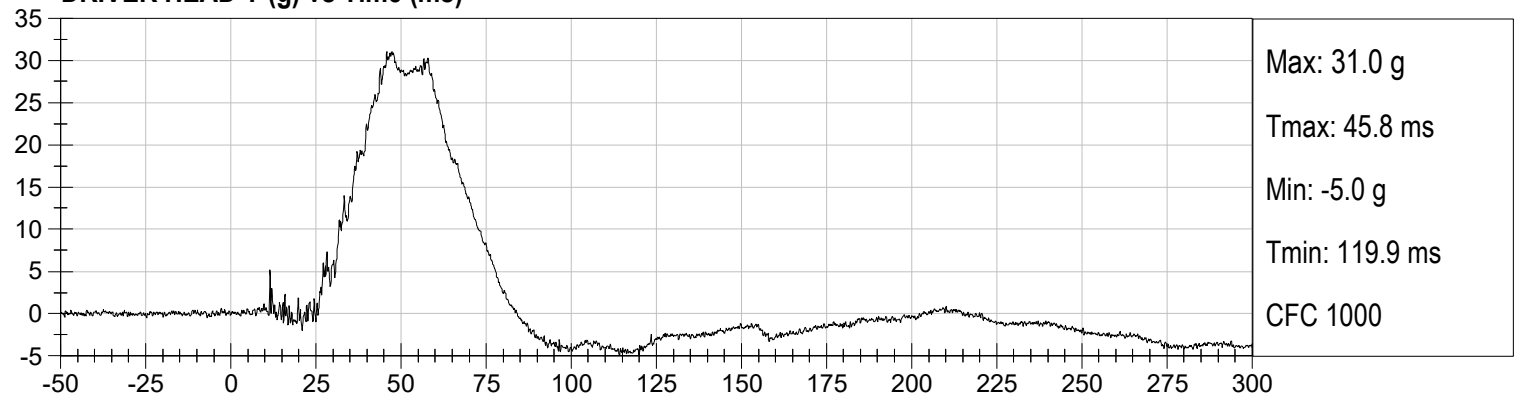
Left MDB Contact Switch

Right MDB Contact Switch

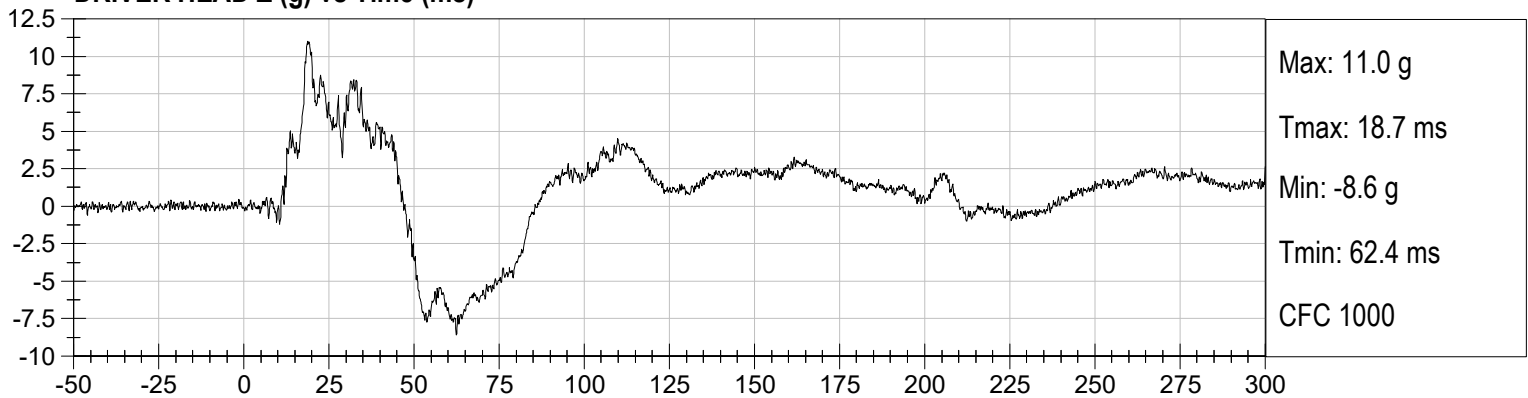
DRIVER HEAD X (g) vs Time (ms)



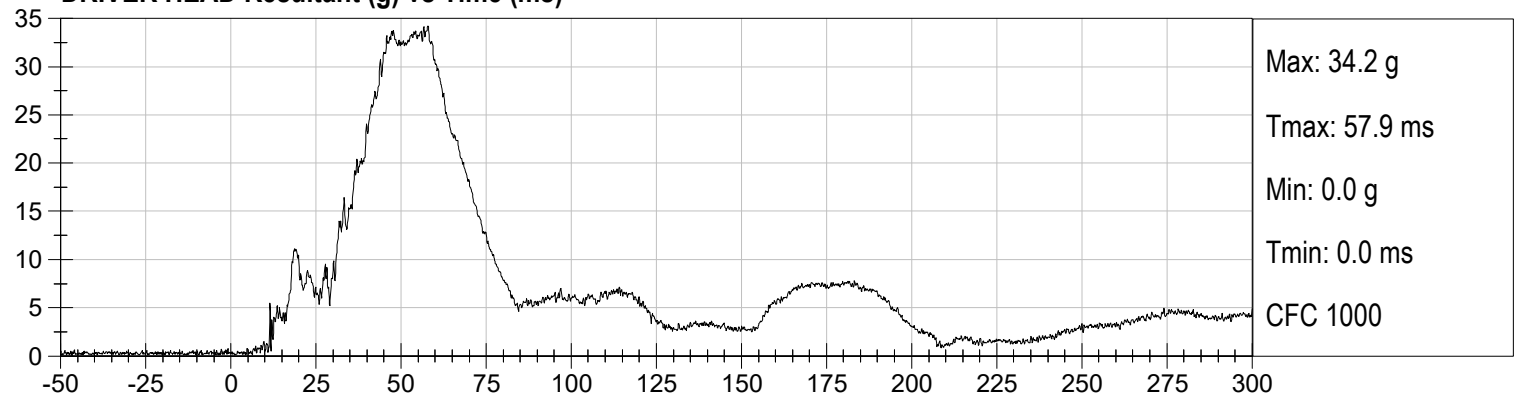
DRIVER HEAD Y (g) vs Time (ms)



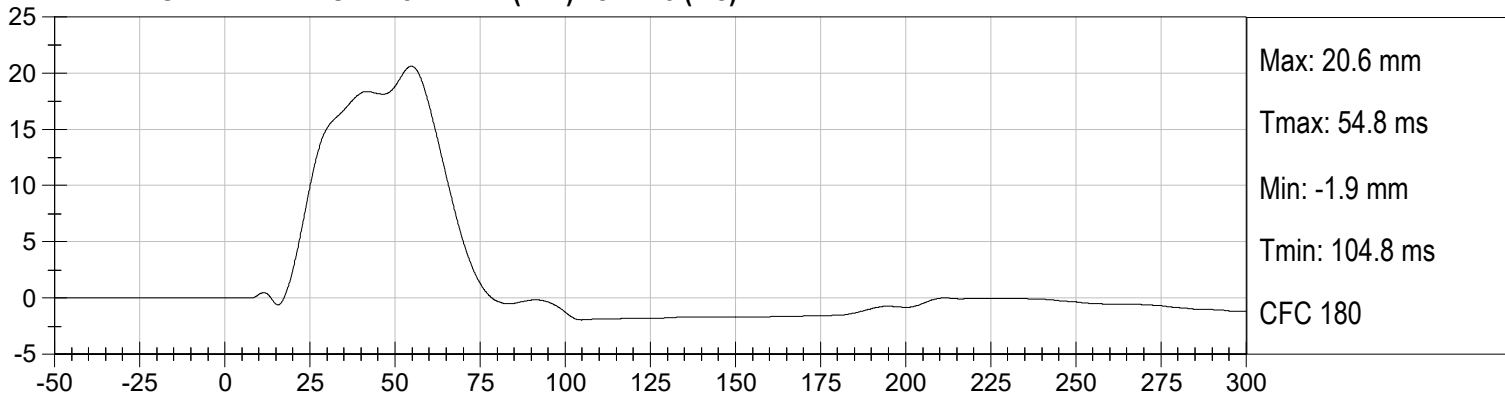
DRIVER HEAD Z (g) vs Time (ms)



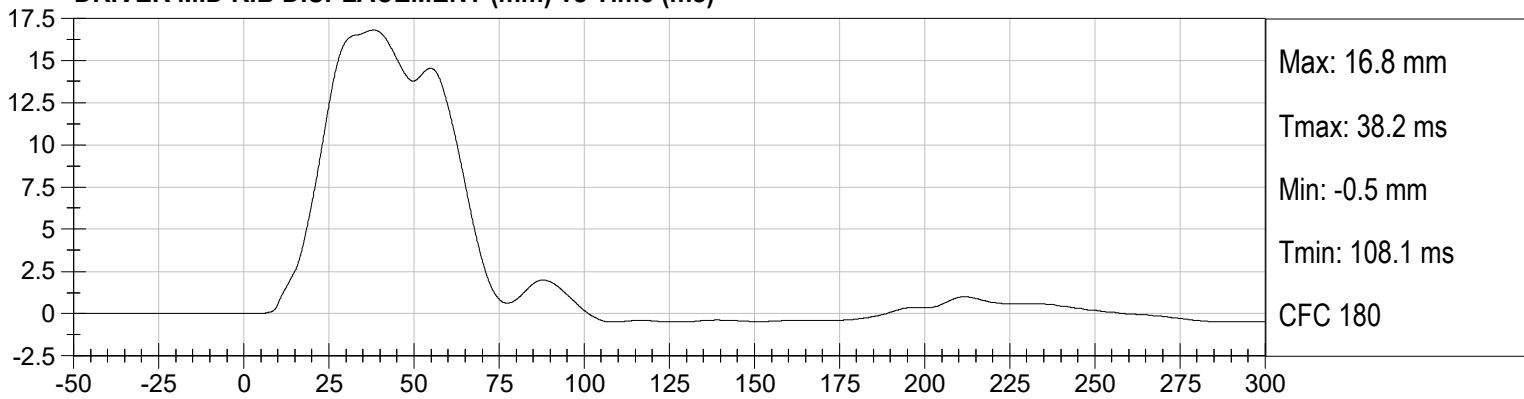
DRIVER HEAD Resultant (g) vs Time (ms)



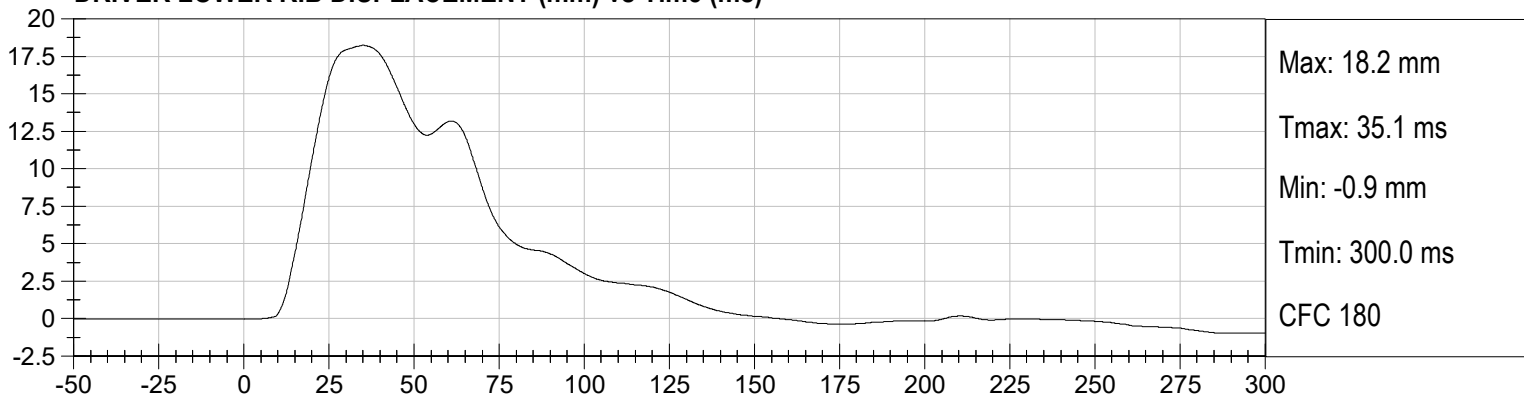
DRIVER UPPER RIB DISPLACEMENT (mm) vs Time (ms)



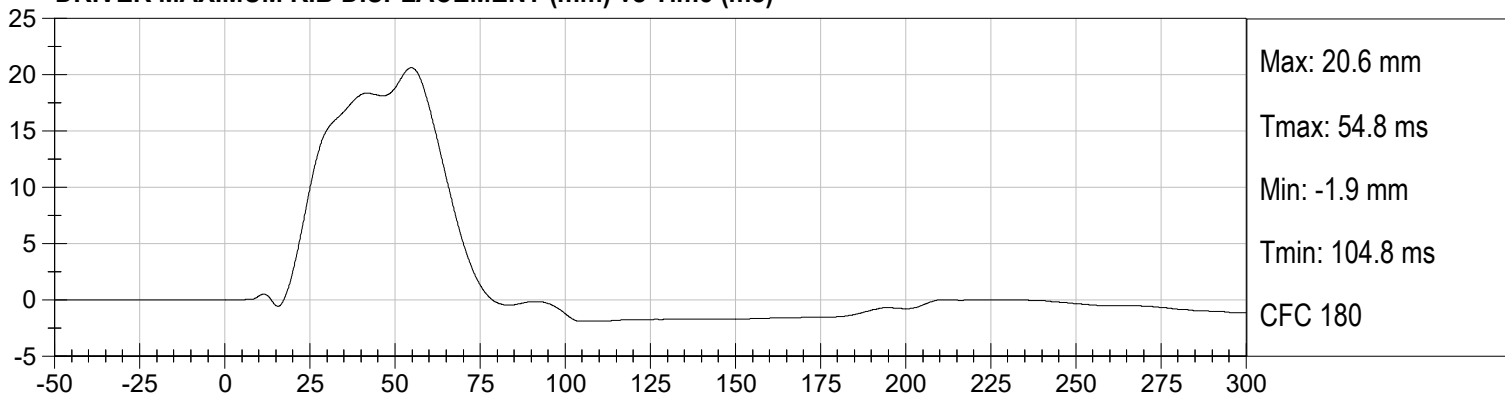
DRIVER MID RIB DISPLACEMENT (mm) vs Time (ms)



DRIVER LOWER RIB DISPLACEMENT (mm) vs Time (ms)



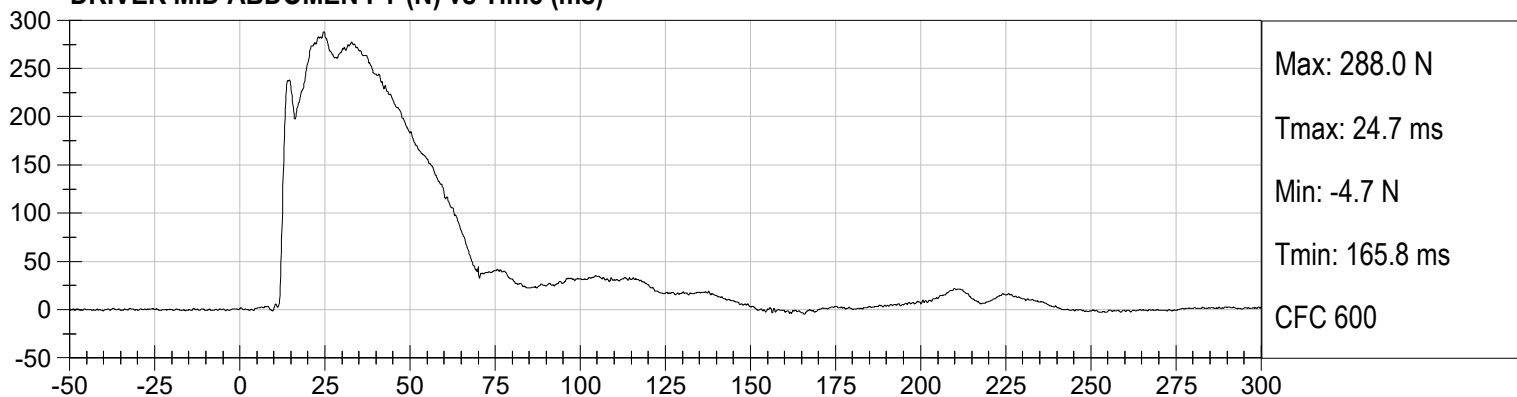
DRIVER MAXIMUM RIB DISPLACEMENT (mm) vs Time (ms)



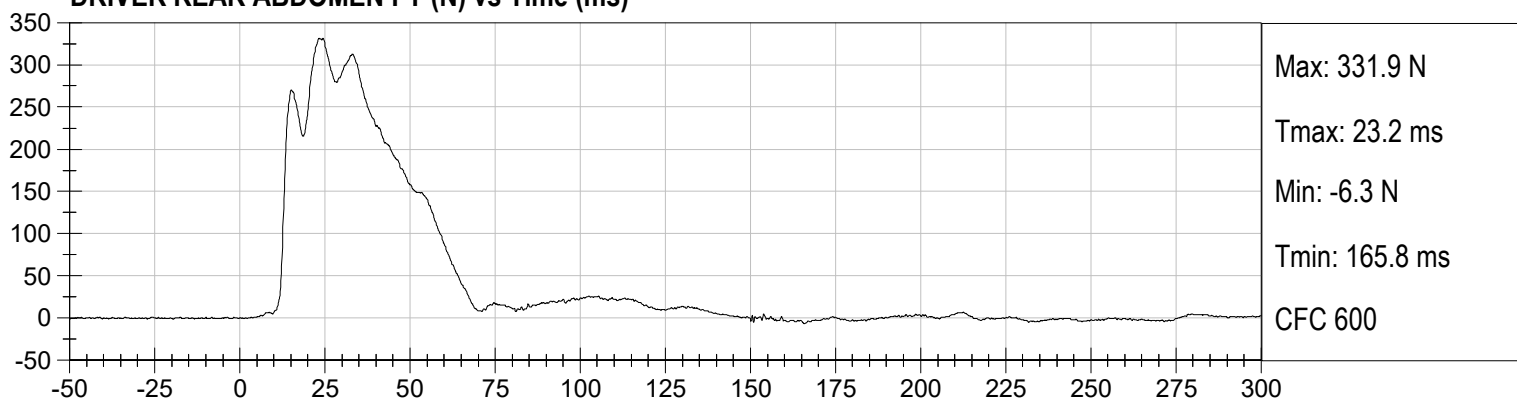
DRIVER FRONT ABDOMEN FY (N) vs Time (ms)



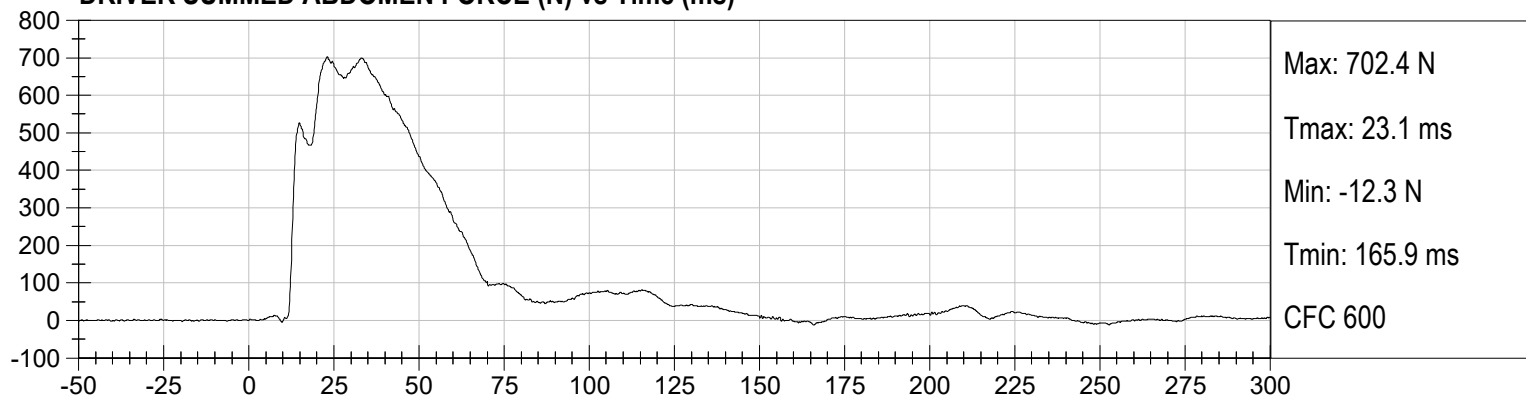
DRIVER MID ABDOMEN FY (N) vs Time (ms)

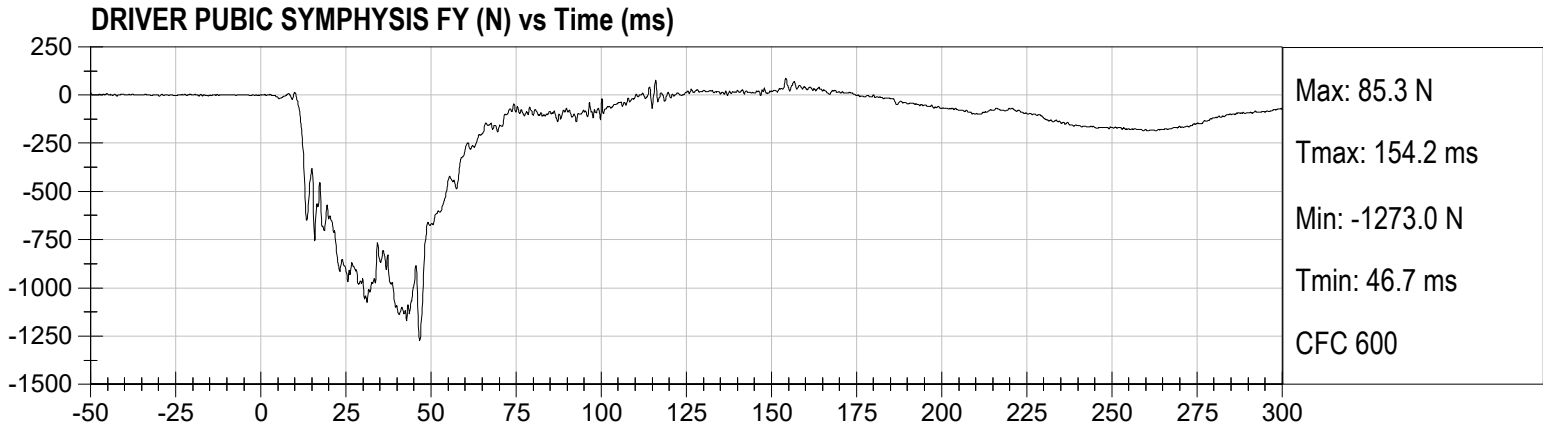


DRIVER REAR ABDOMEN FY (N) vs Time (ms)

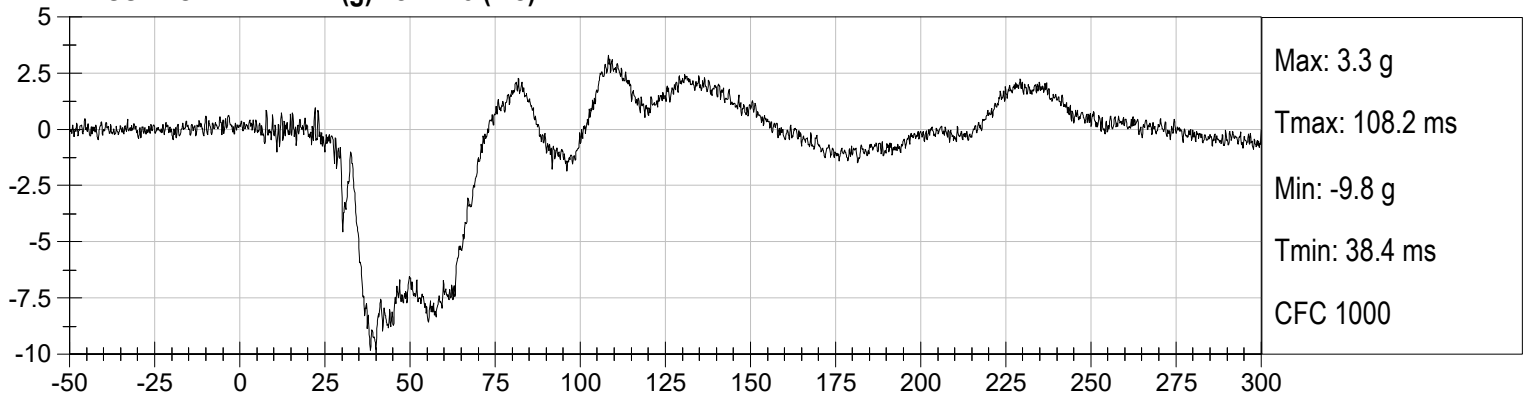


DRIVER SUMMED ABDOMEN FORCE (N) vs Time (ms)

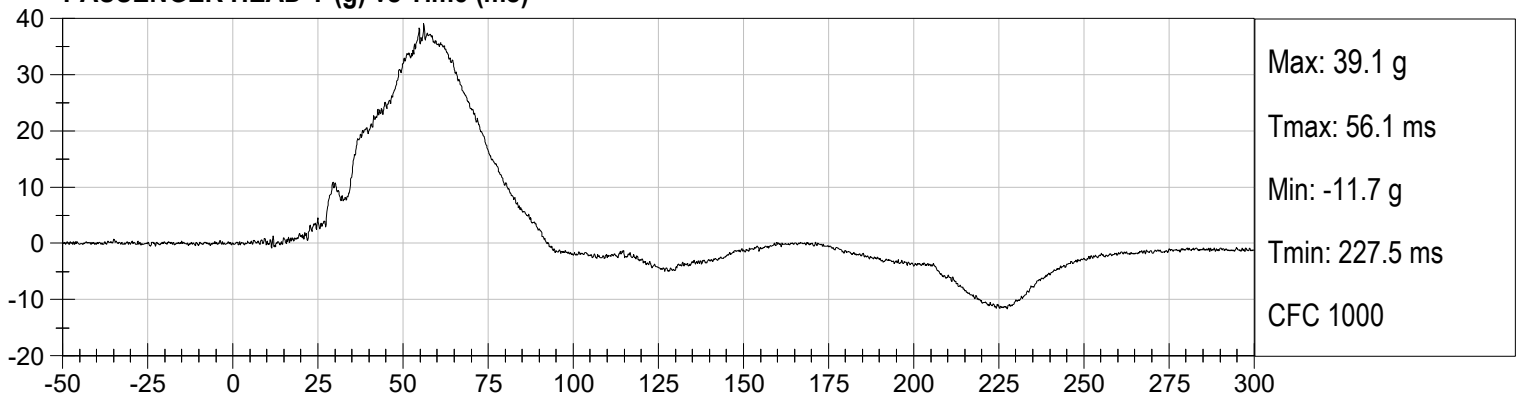




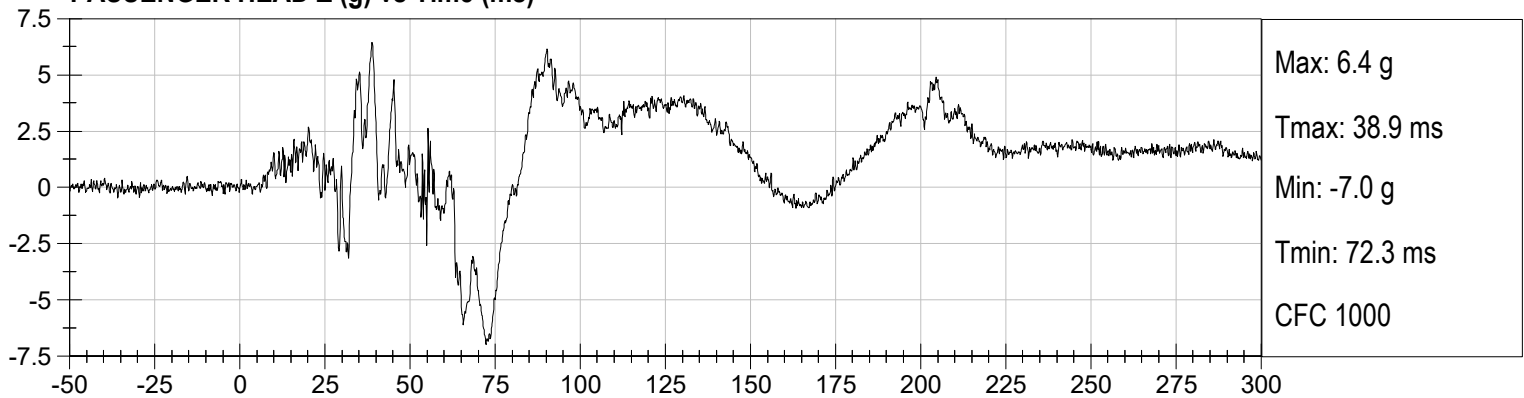
PASSENGER HEAD X (g) vs Time (ms)



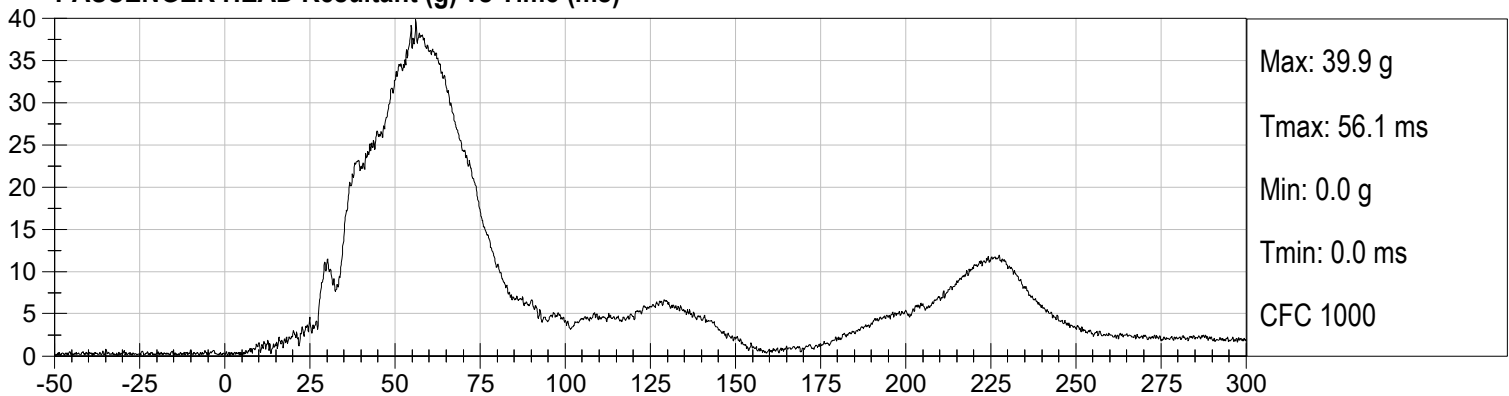
PASSENGER HEAD Y (g) vs Time (ms)



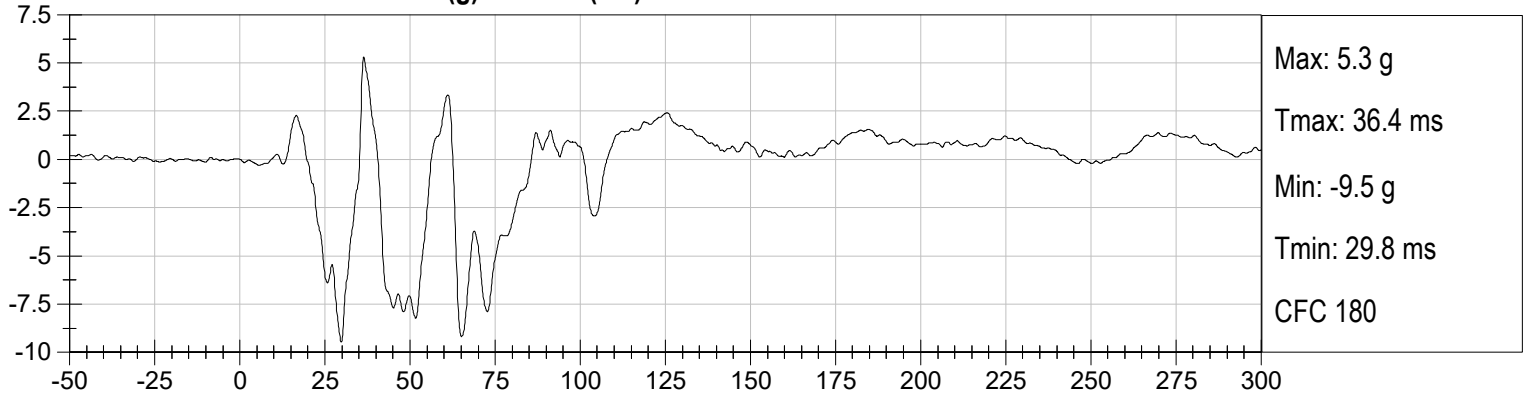
PASSENGER HEAD Z (g) vs Time (ms)



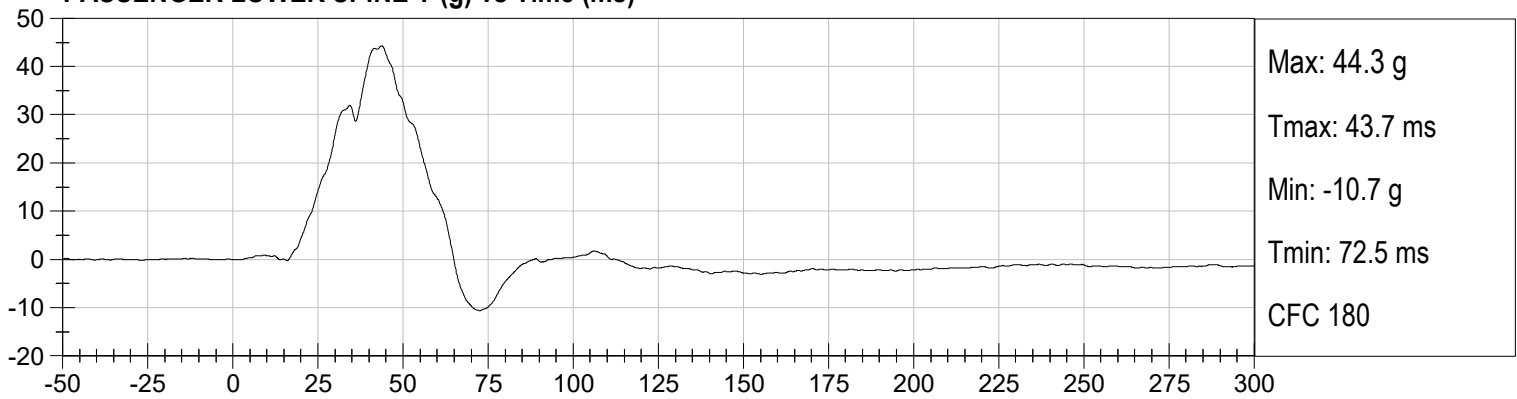
PASSENGER HEAD Resultant (g) vs Time (ms)



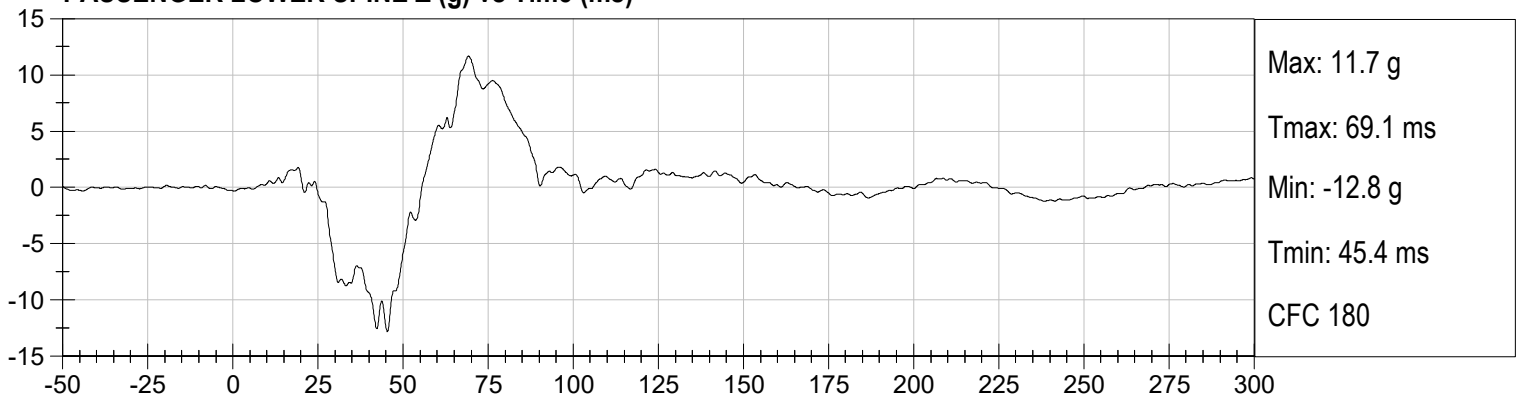
PASSENGER LOWER SPINE X (g) vs Time (ms)



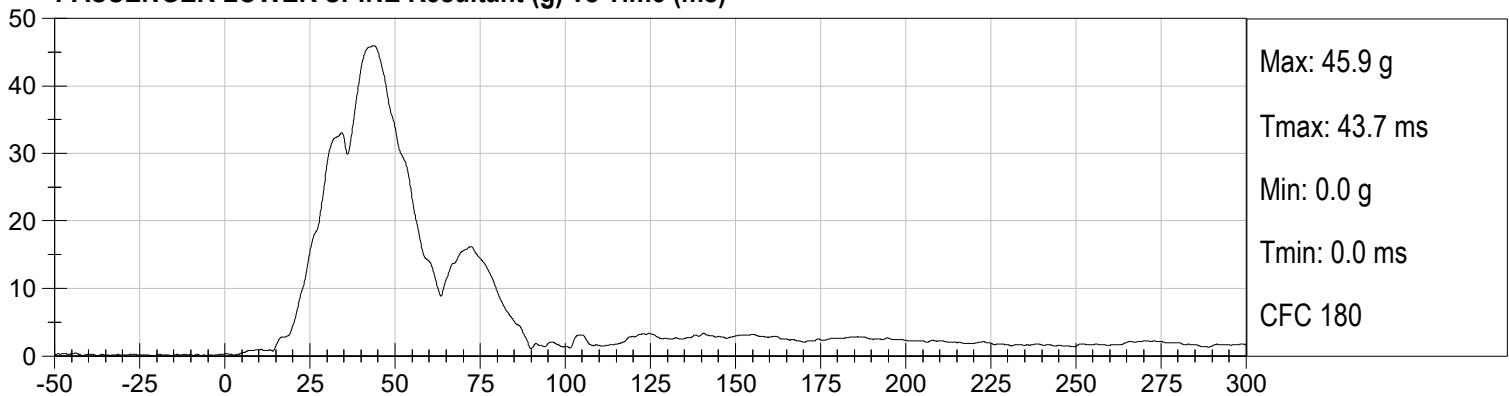
PASSENGER LOWER SPINE Y (g) vs Time (ms)



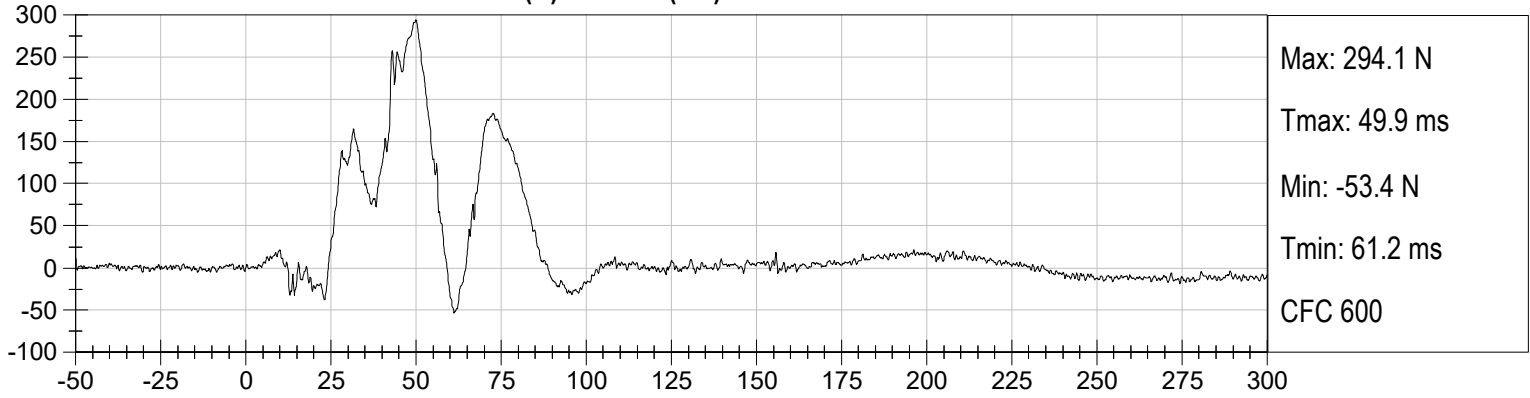
PASSENGER LOWER SPINE Z (g) vs Time (ms)



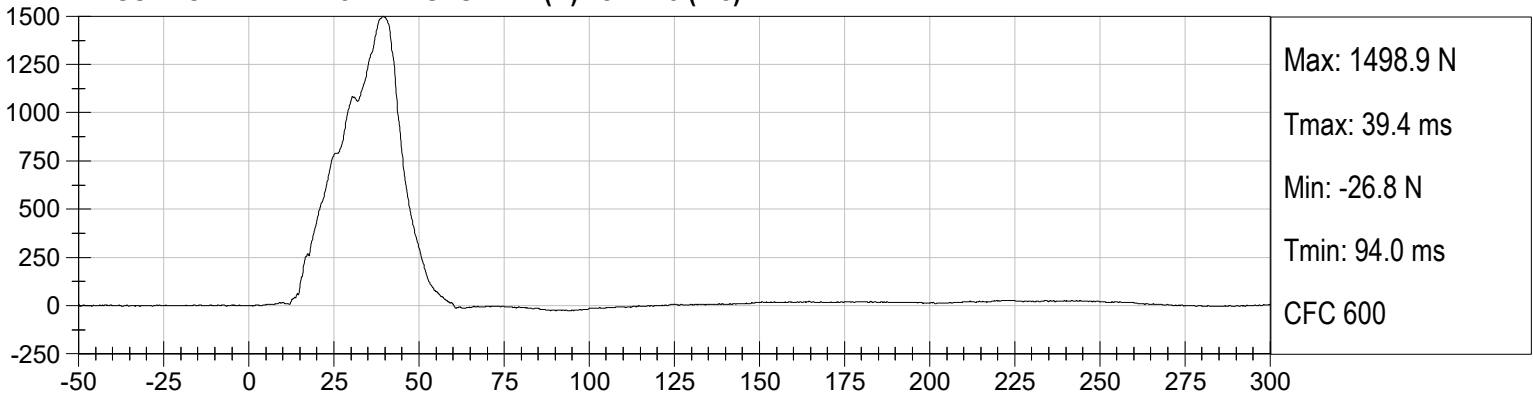
PASSENGER LOWER SPINE Resultant (g) vs Time (ms)



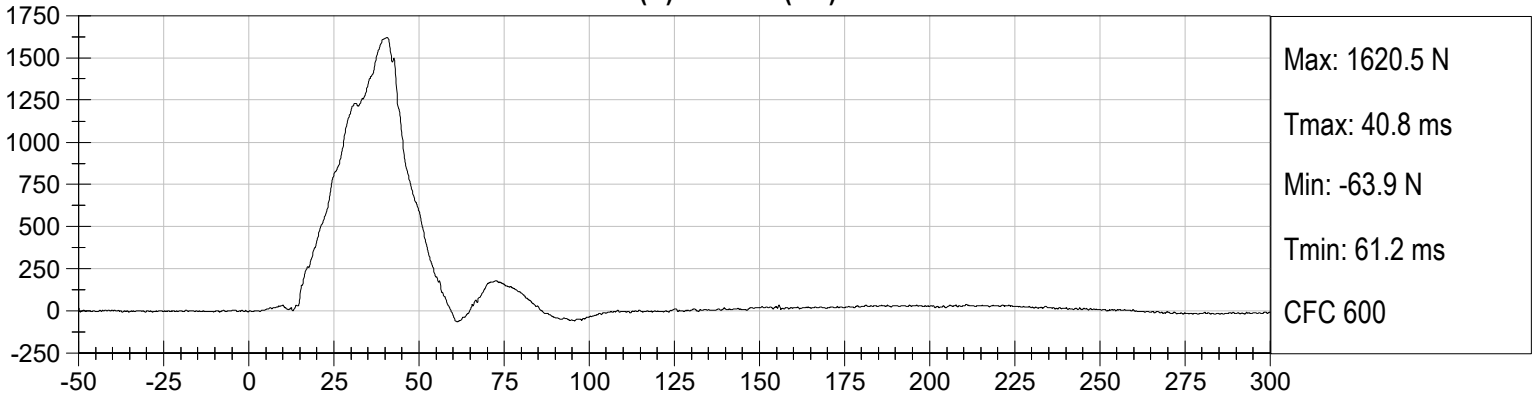
PASSENGER LEFT ILIUM CREST FY (N) vs Time (ms)



PASSENGER LEFT ACETABULUM FY (N) vs Time (ms)



PASSENGER LEFT LATERAL PELVIC FORCE (N) vs Time (ms)



APPENDIX C
DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

EUROSID 2 (ES-2RE) MALE – DRIVER ATD

ES-2re External Measurements
SN: F032

No.	Name	Spec. (mm)	Result	Pass/Fail
1	Sitting Height	900 - 918	915	Pass
2	Seat to Shoulder Joint	558 - 572	568	Pass
3	Seat to Lower Face of Thoracic Spine Box	346 - 356	355	Pass
4	Seat to Hip Joint (center of bolt)	97 - 103	98	Pass
5	Sole to Seat, Sitting	333 - 451	440	Pass
6	Head Width	152 - 158	157	Pass
7	Shoulder/Arm Width	461 - 479	464	Pass
8	Thorax Width	322 - 332	323	Pass
9	Abdomen Width	273 - 287	281	Pass
10	Pelvis Lap Width	359 - 373	370	Pass
11	Head Depth	196 - 206	203	Pass
12	Thorax Depth	262 - 272	264	Pass
13	Abdomen Depth	194 - 204	196	Pass
14	Pelvis Depth	235 - 245	236	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150 - 160	151	Pass
16	Back of Buttocks to Front Knee	597 - 615	607	Pass

MGA RESEARCH CORPORATION
HEAD DROP TEST
ES-2re DUMMY

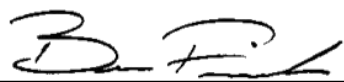
ATD Serial No: F032

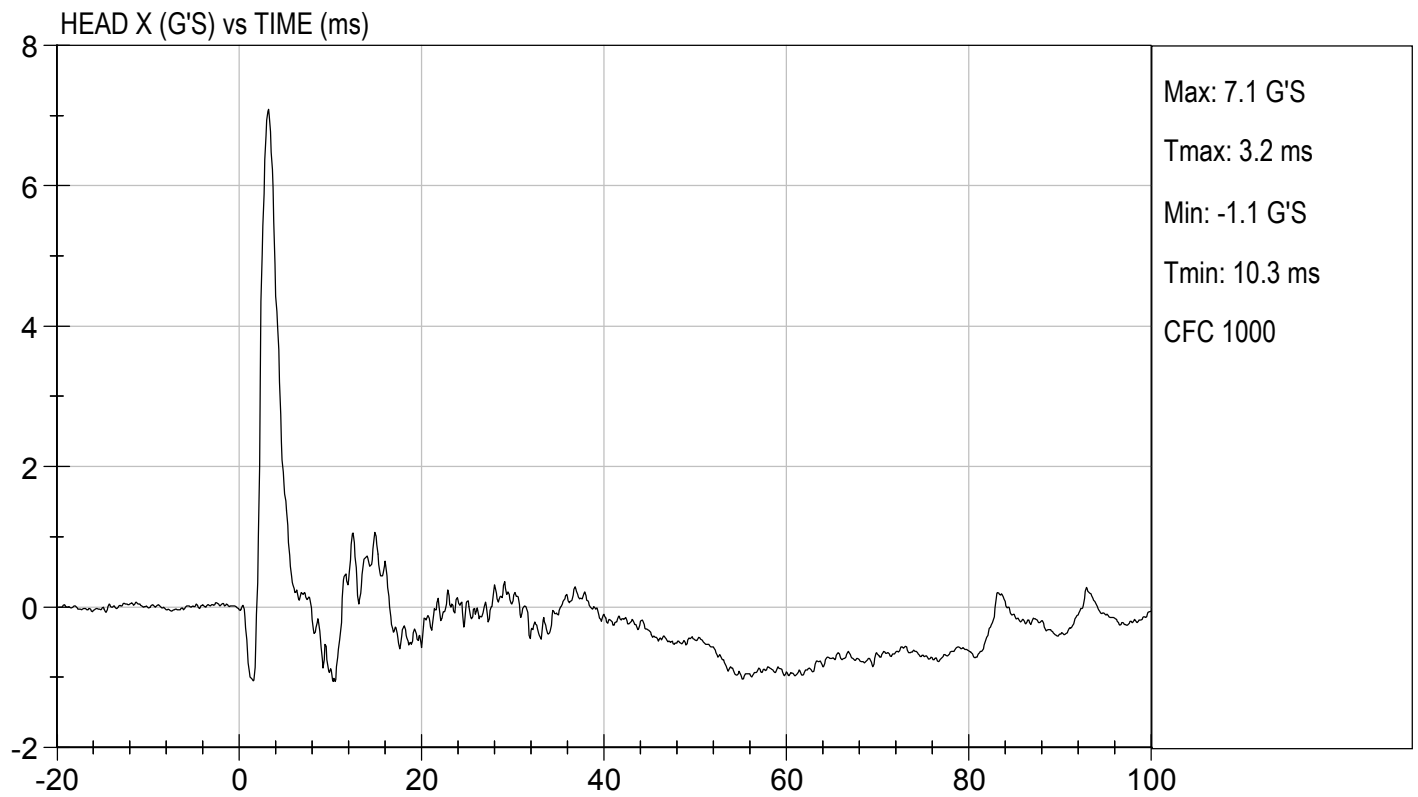
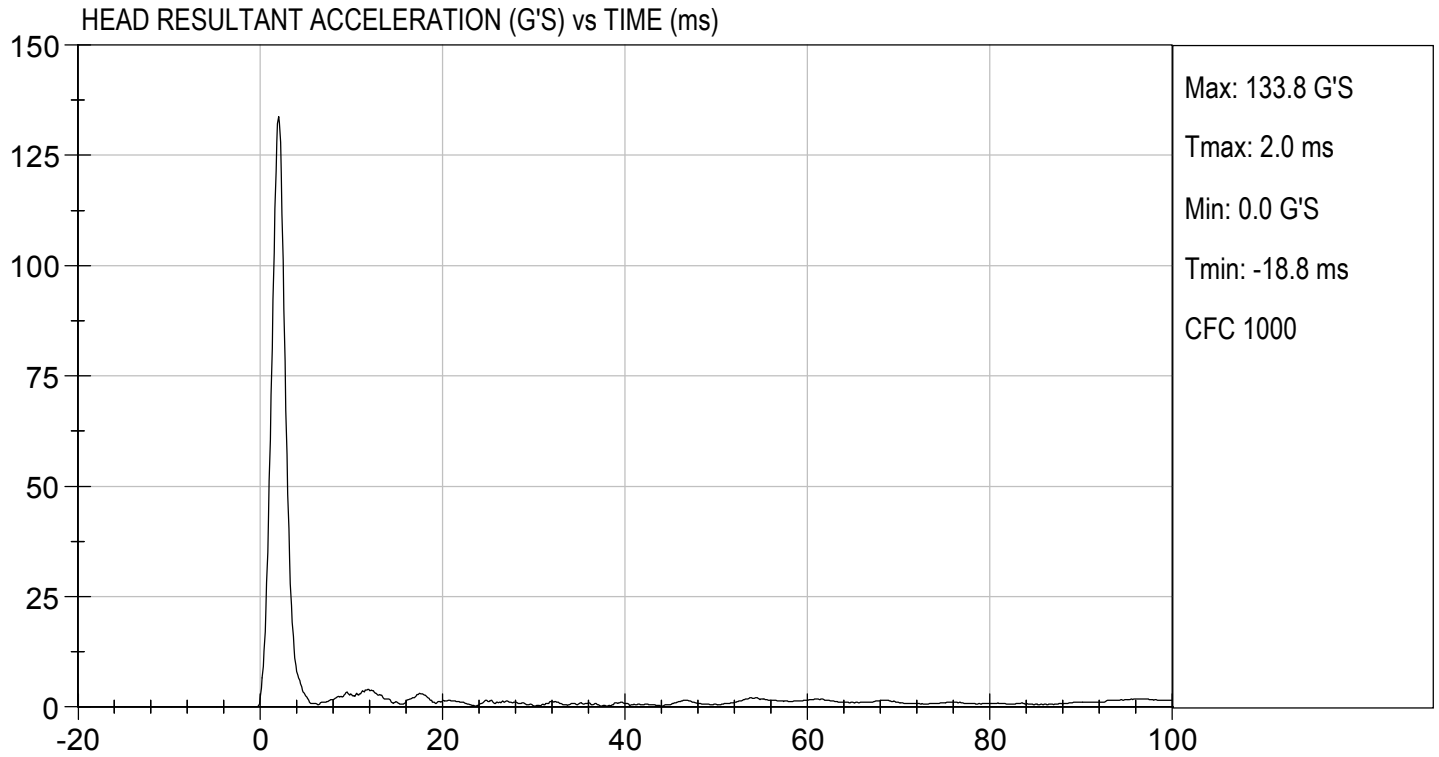
Test ID: D210301

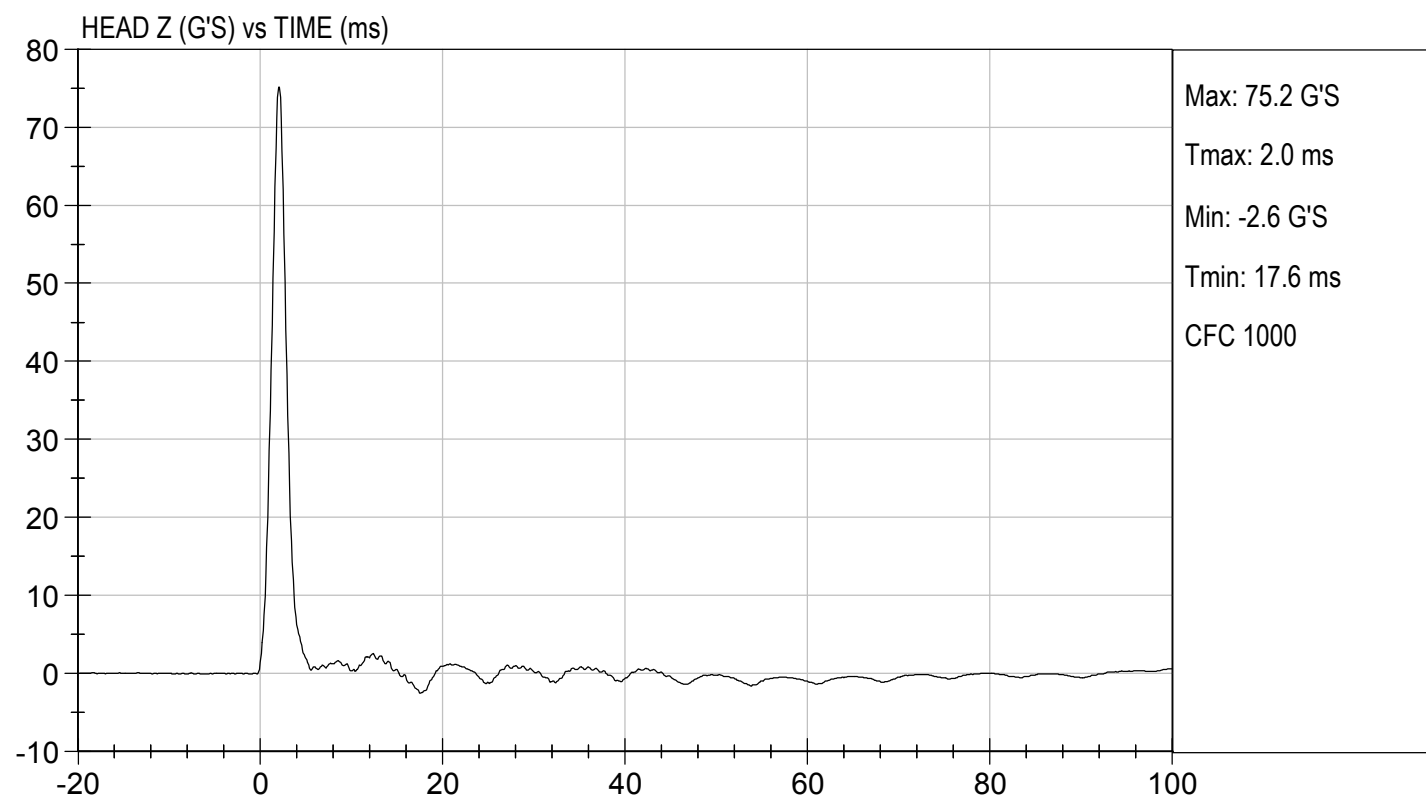
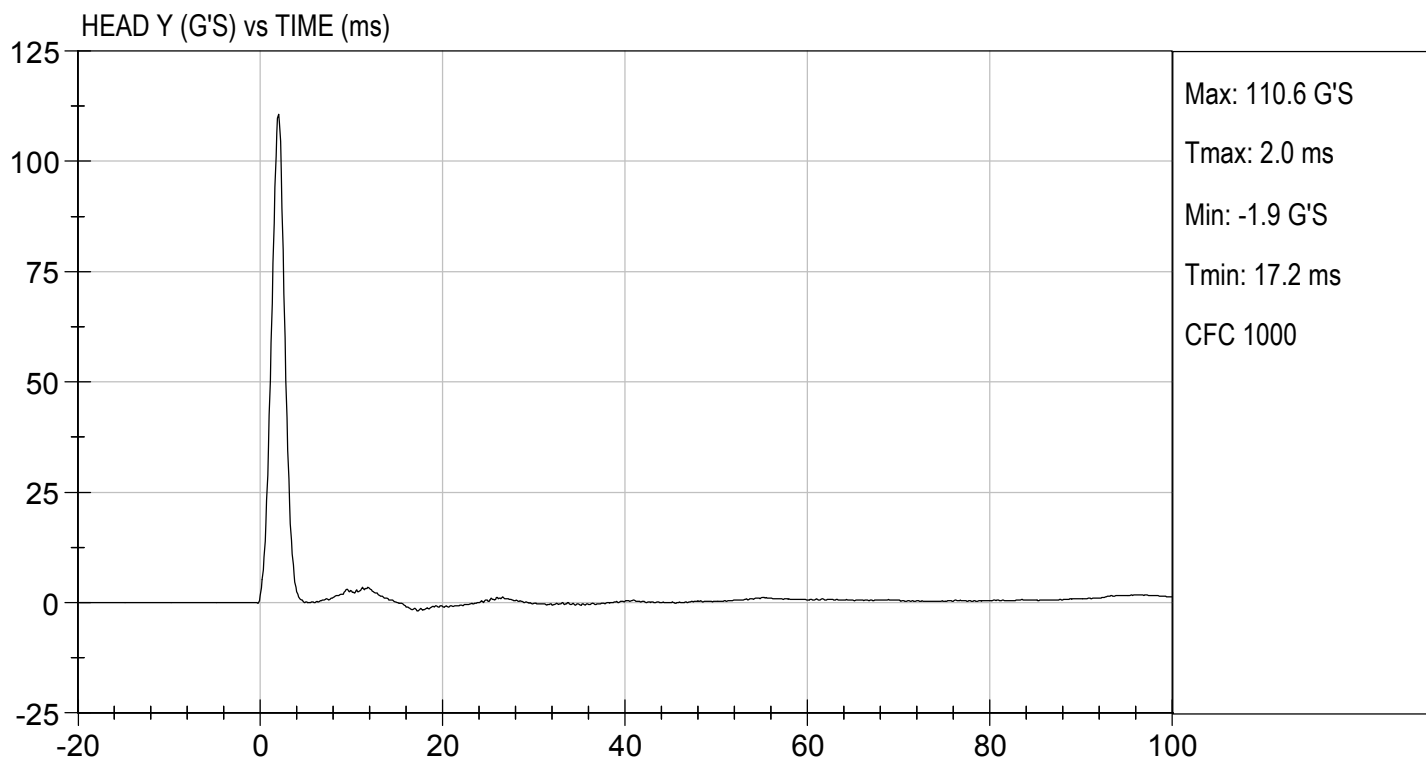
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	17	Pass
Peak Resultant Acceleration	G's	125 to 155	134	Pass
Peak Longitudinal Acceleration	G's	<= +/- 15.0	7.1	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 15% of peak	Yes	Pass
			Overall Test Results	Pass


Laboratory Technician

02/09/2021
Test Date


Approved By





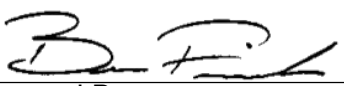
MGA RESEARCH CORPORATION
NECK PENDULUM TEST
ES-2re DUMMY

ATD Serial No: F032

Test I.D: D210302

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity		%	10 to 70	17	Pass
Pendulum Speed		m/s	3.30 to 3.50	3.50	Pass
Pendulum Velocity	1 ms	m/s	-0.05 to 0.00	-0.01	Pass
	3 ms	m/s	-0.25 to -0.375	-0.33	Pass
	14 ms	m/s	-3.20 to -3.70	-3.51	Pass
	17 ms	m/s	>= -3.70	-3.57	Pass
Maximum Flexion Angle		deg	49.0 to 59.0	49.8	Pass
Time of Maximum Flexion Angle		ms	54.0 to 66.0	55.0	Pass
Head Rotation Decay Time to 0 Degree		ms	53.0 to 88.0	59.9	Pass
Overall Results					Pass


 Laboratory Technician

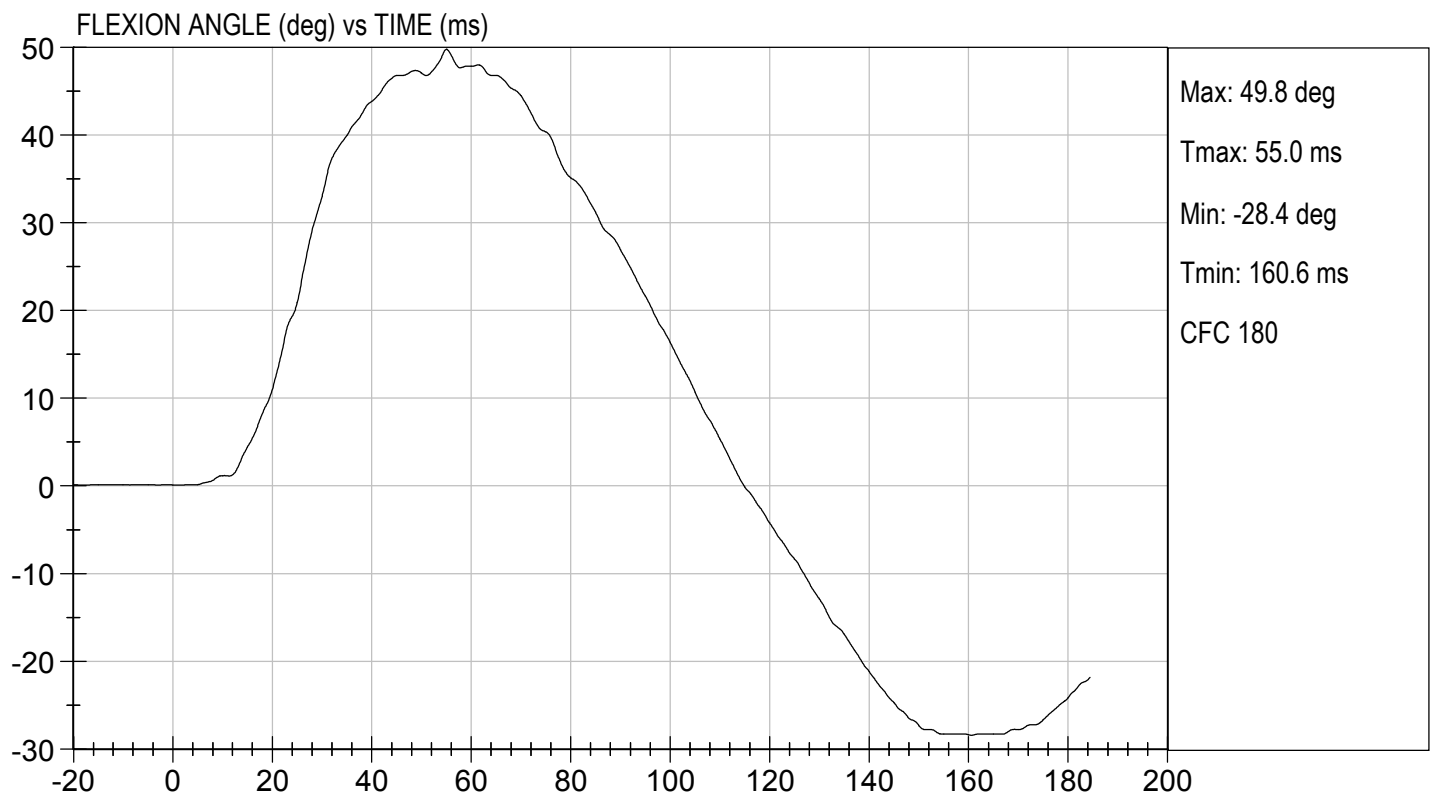
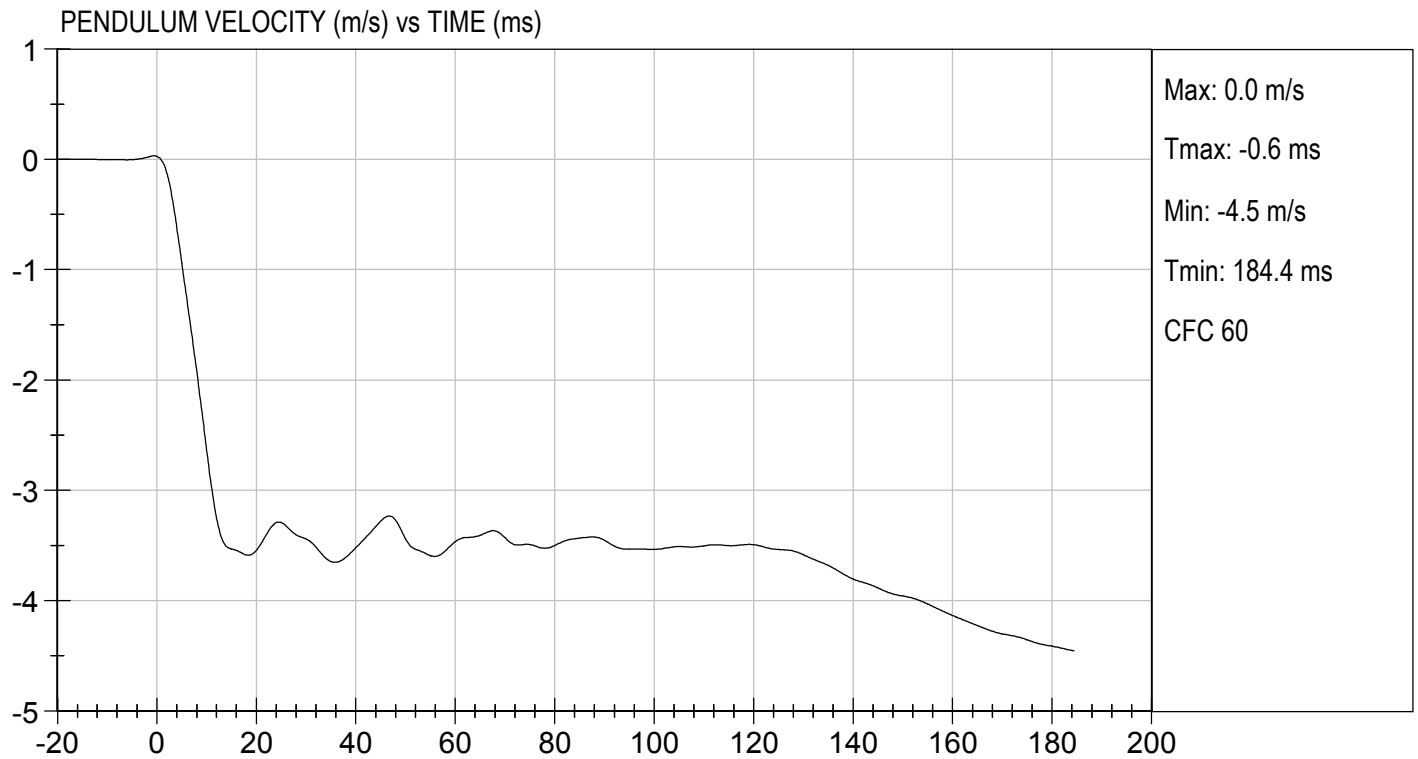

 Approved By

02/09/2021
 Test Date



TEST DESC: NECK BENDING
VELOCITY: 11.49 ft/s, 3.50 m/s

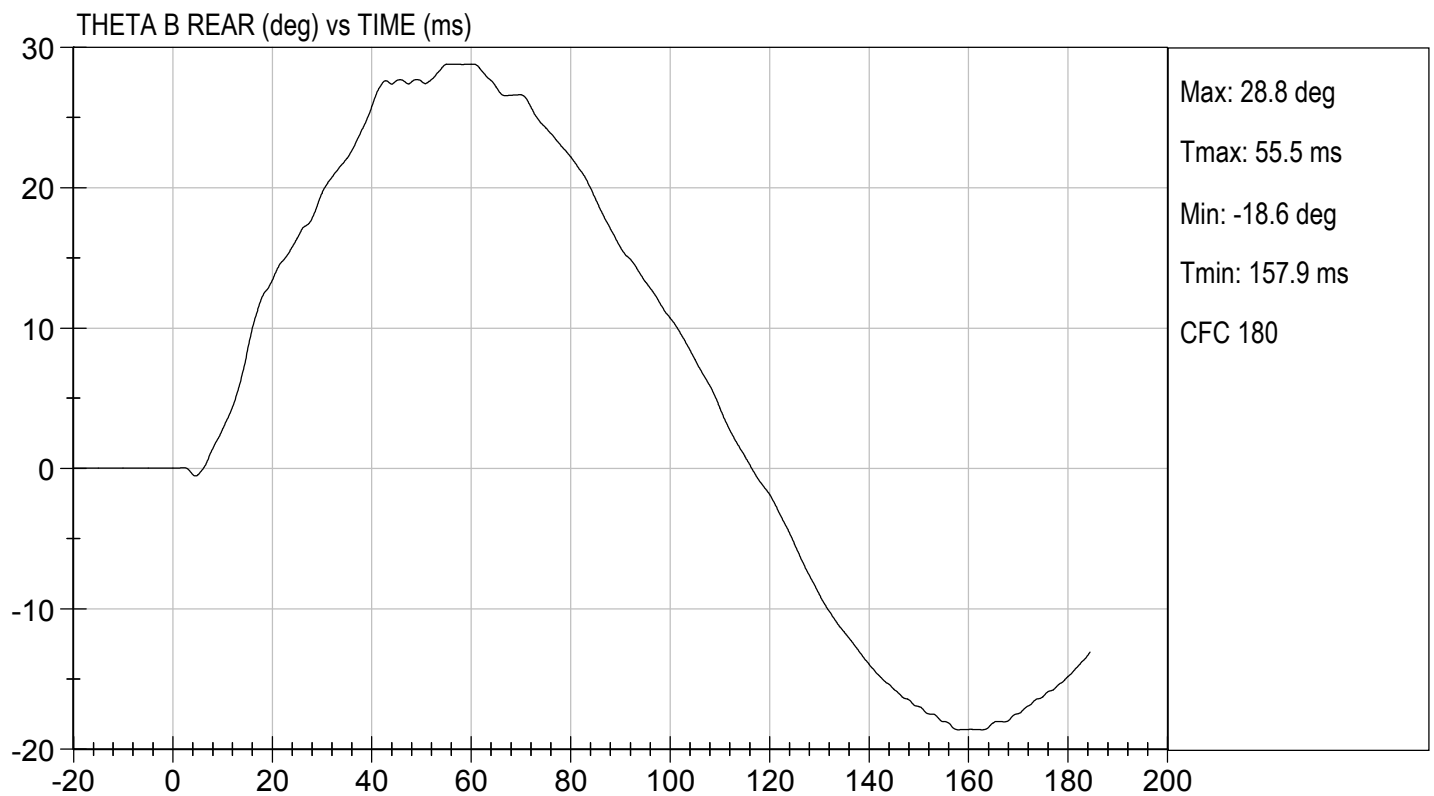
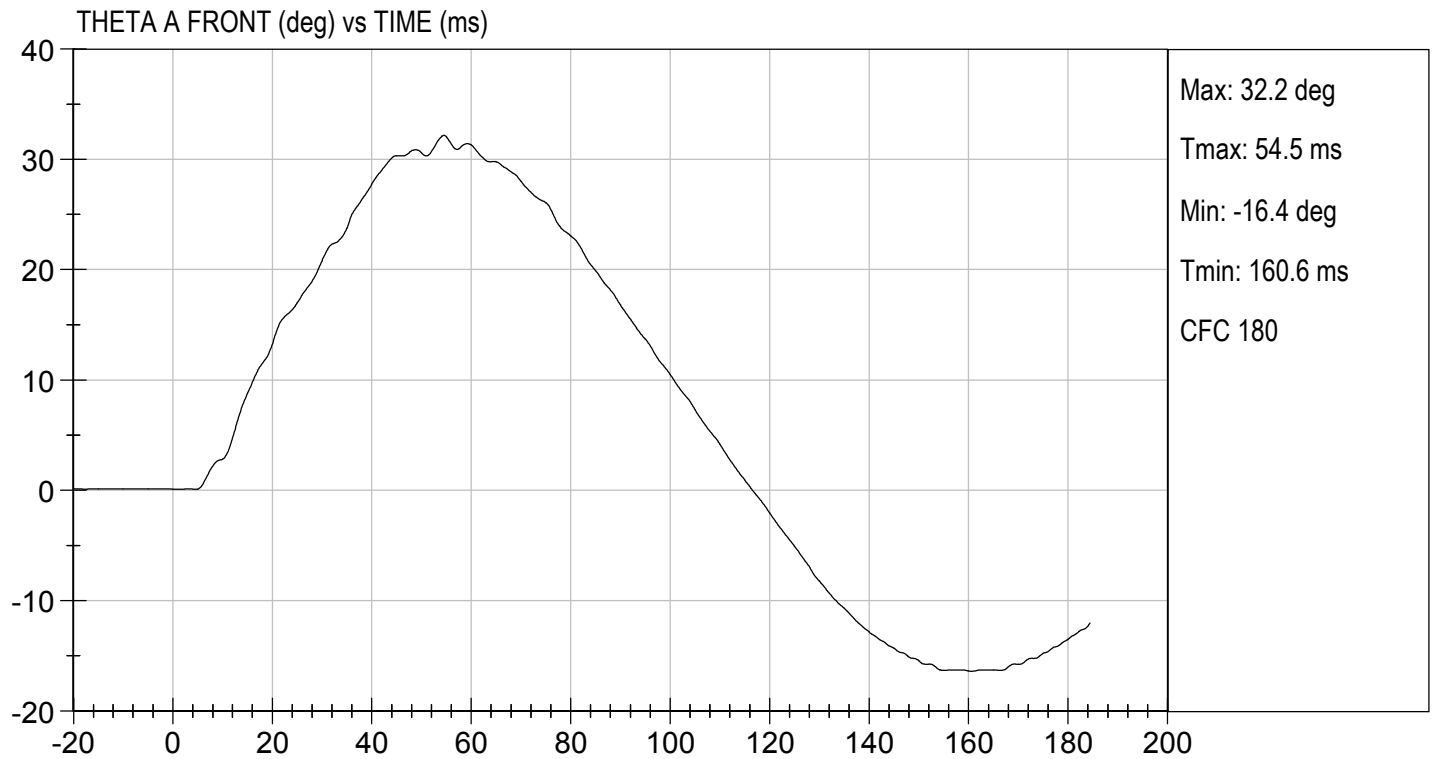
TEST DATE: 02/09/2021
TEST #: D210302





TEST DESC: NECK BENDING
VELOCITY: 11.49 ft/s, 3.50 m/s

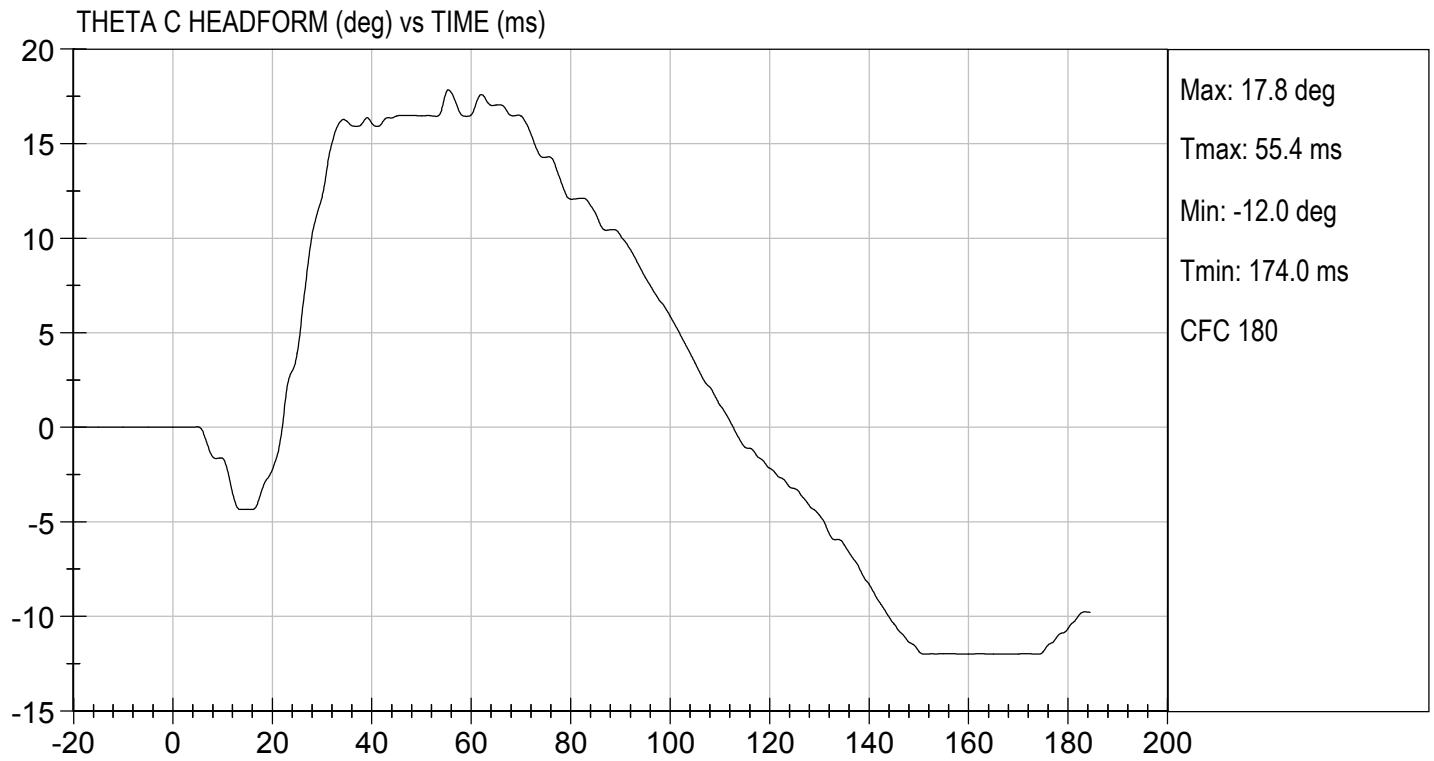
TEST DATE: 02/09/2021
TEST #: D210302





TEST DESC: NECK BENDING
VELOCITY: 11.49 ft/s, 3.50 m/s

TEST DATE: 02/09/2021
TEST #: D210302



MGA RESEARCH CORPORATION

SHOULDER IMPACT TEST

ES-2re DUMMY

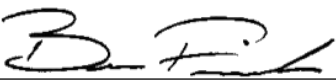
ATD Serial No: F032

Test I.D: D210303

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Pendulum Speed	m/s	4.20 to 4.40	4.21	Pass
Peak Impactor Acceleration	G's	7.5 to 10.5	8.9	Pass
Overall Test Results				Pass


Laboratory Technician

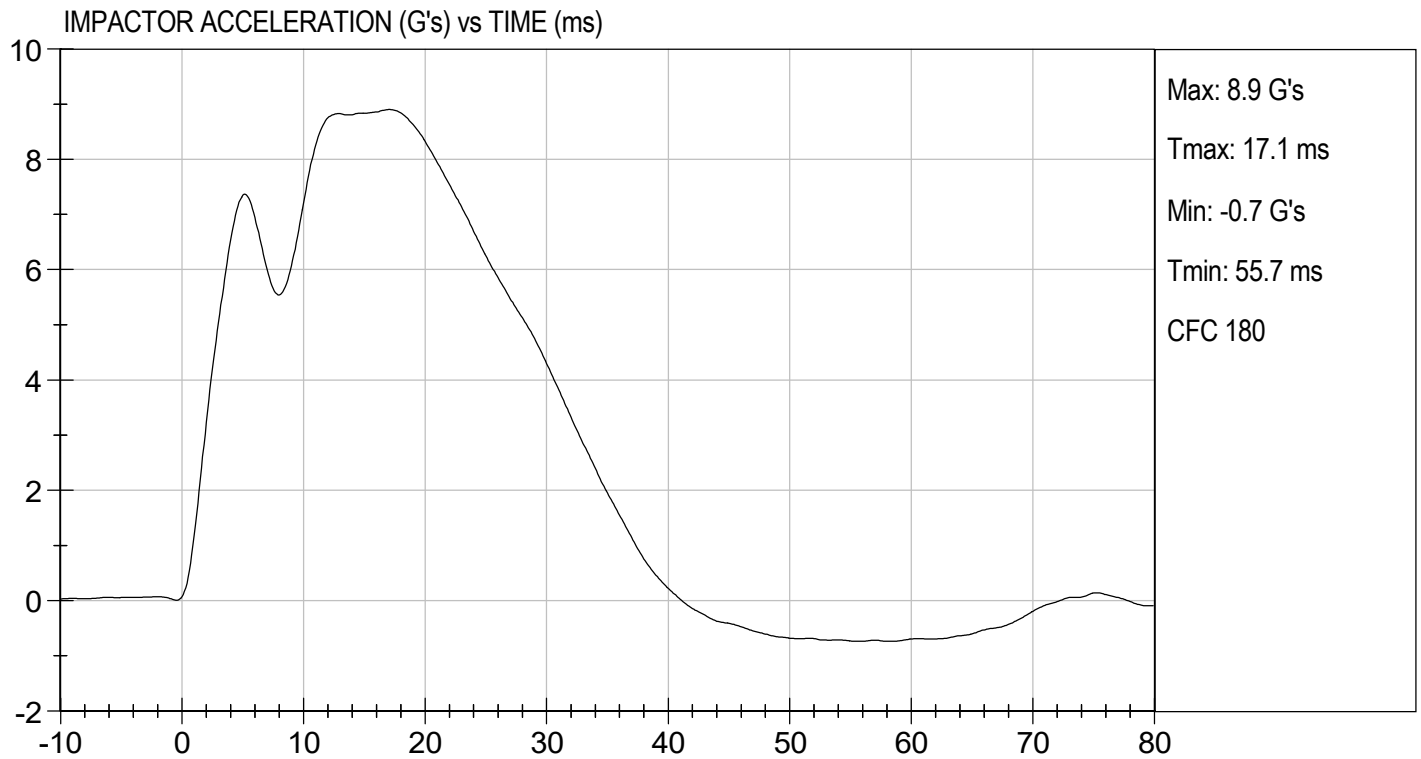
02/08/2021
Test Date


Approved By



TEST DESC: SHOULDER IMPACT
VELOCITY: 13.80 ft/s, 4.21 m/s

TEST DATE: 02/08/2021
TEST #: D210303



MGA RESEARCH CORPORATION

UPPER RIB TEST

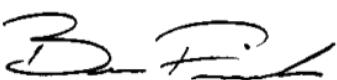
ES-2re DUMMY

ATD Serial No: F032

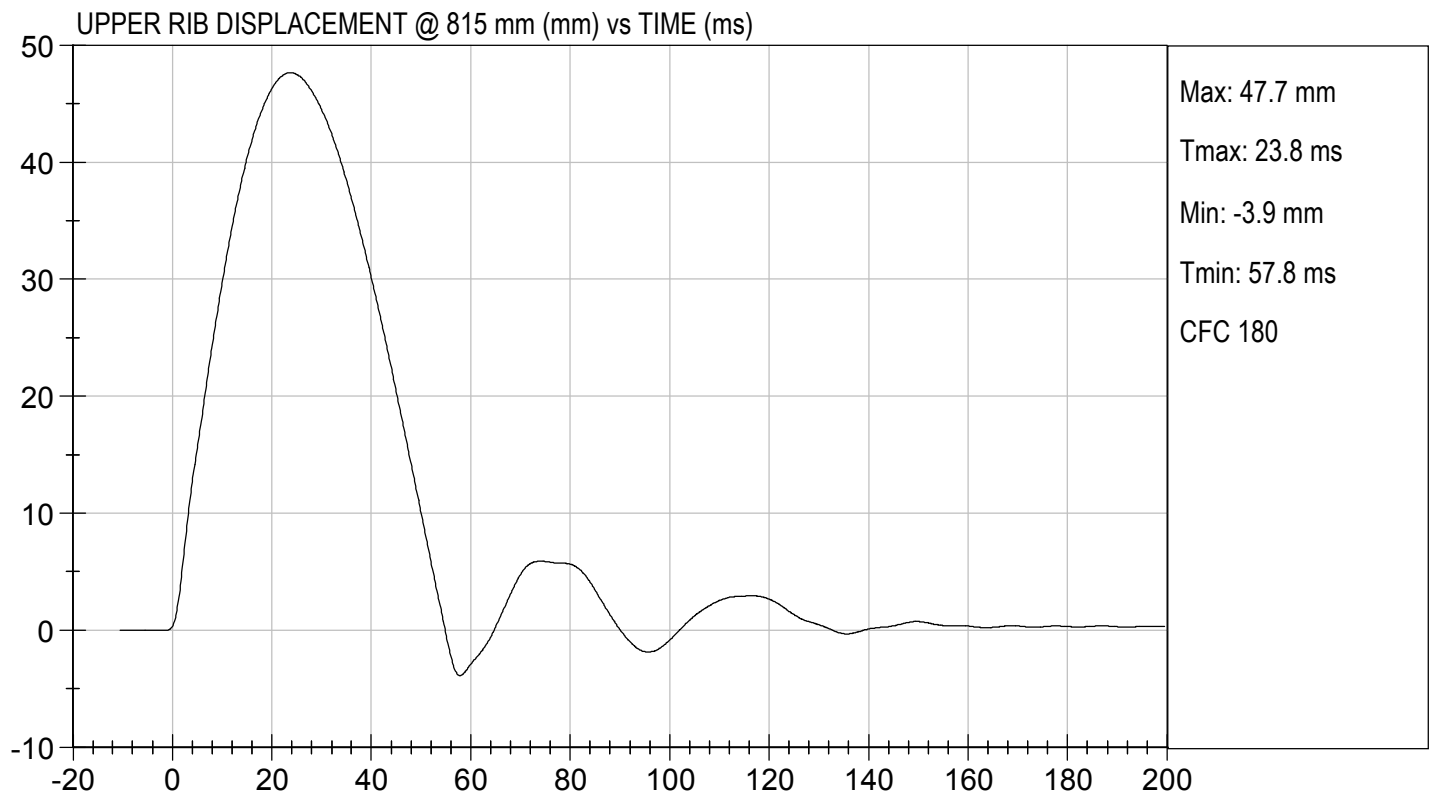
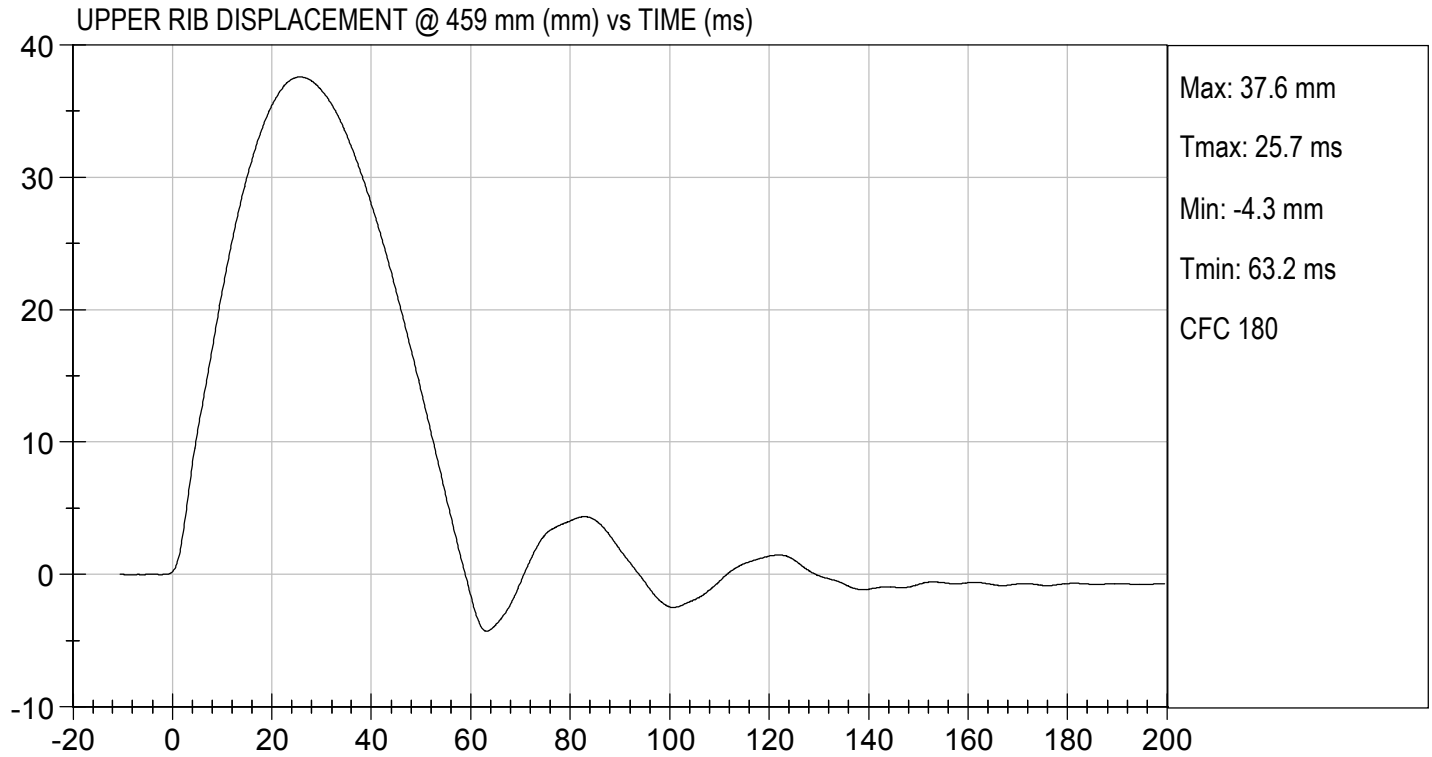
Test I.D: D210304

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	17	Pass
Displacement at 459 mm	mm	36.0 to 40.0	37.6	Pass
Displacement at 815 mm	mm	46.0 to 51.0	47.7	Pass
Overall Test Results				Pass


Laboratory Technician


Approved By

02/09/2021
Test Date



MGA RESEARCH CORPORATION

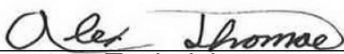
MID RIB TEST

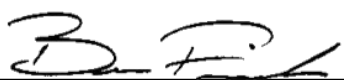
ES-2re DUMMY

ATD Serial No: F032

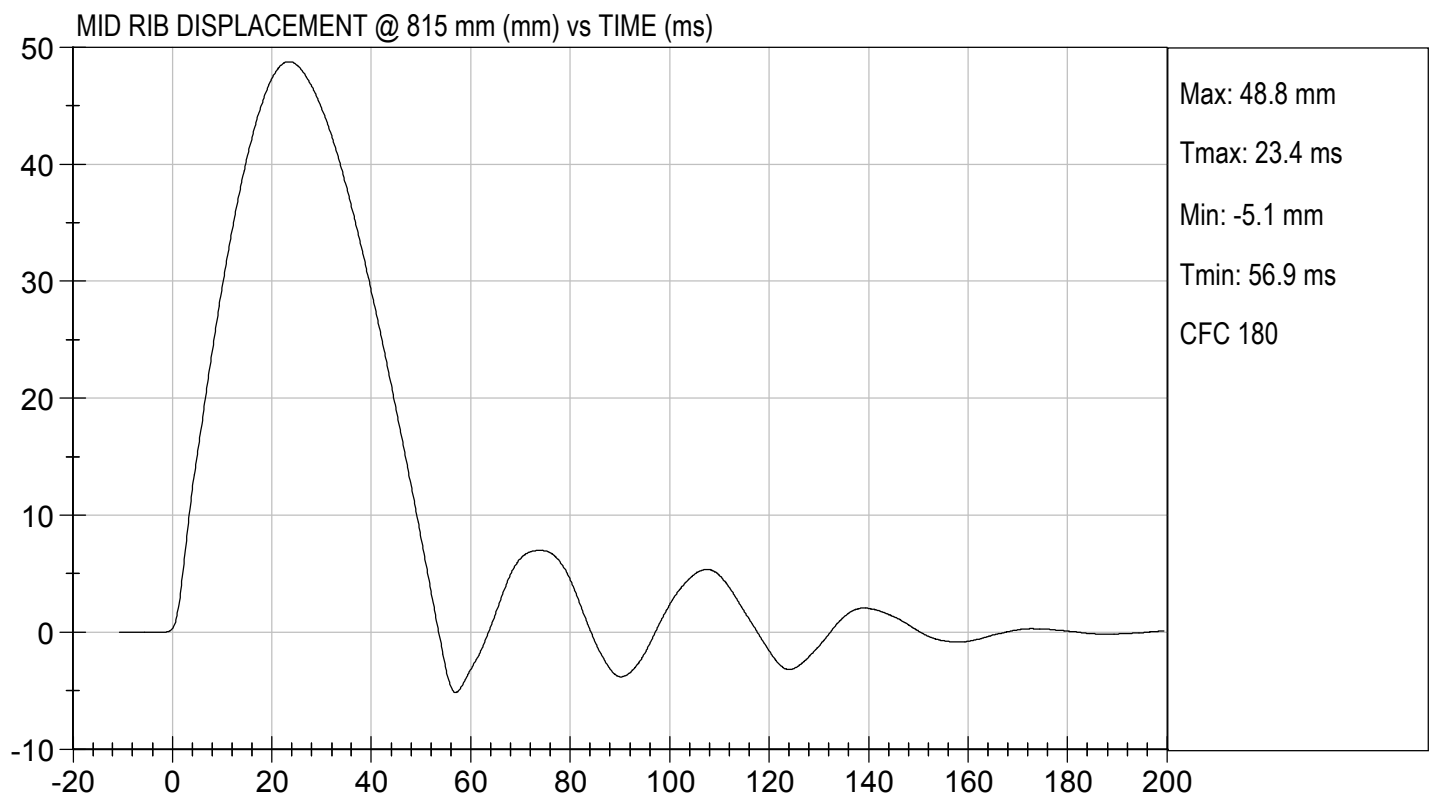
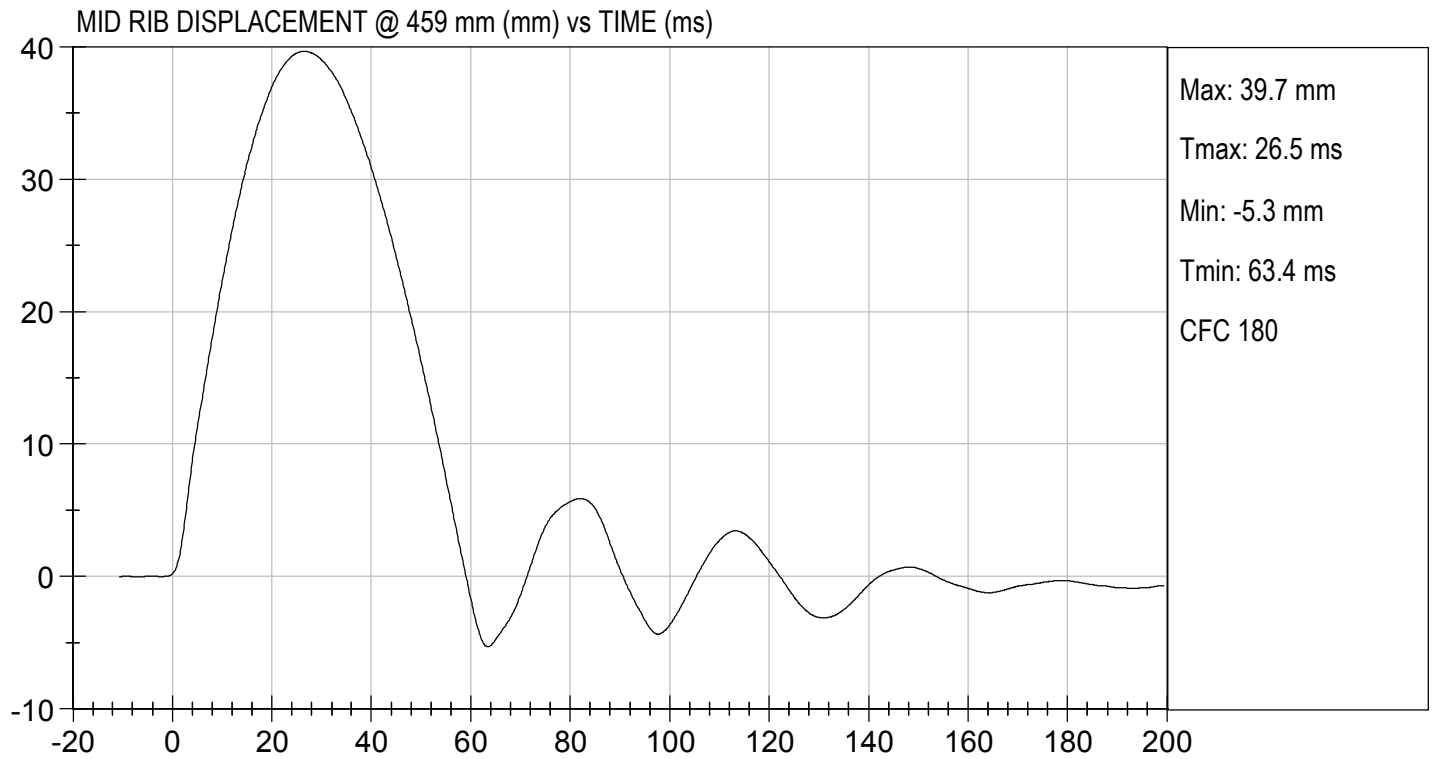
Test I.D: D210305

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	17	Pass
Displacement at 459 mm	mm	36.0 to 40.0	39.7	Pass
Displacement at 815 mm	mm	46.0 to 51.0	48.8	Pass
Overall Test Results				Pass


Laboratory Technician


Approved By

02/09/2021
Test Date



MGA RESEARCH CORPORATION

LOWER RIB TEST

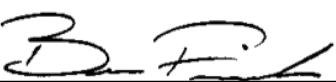
ES-2re DUMMY

ATD Serial No: F032

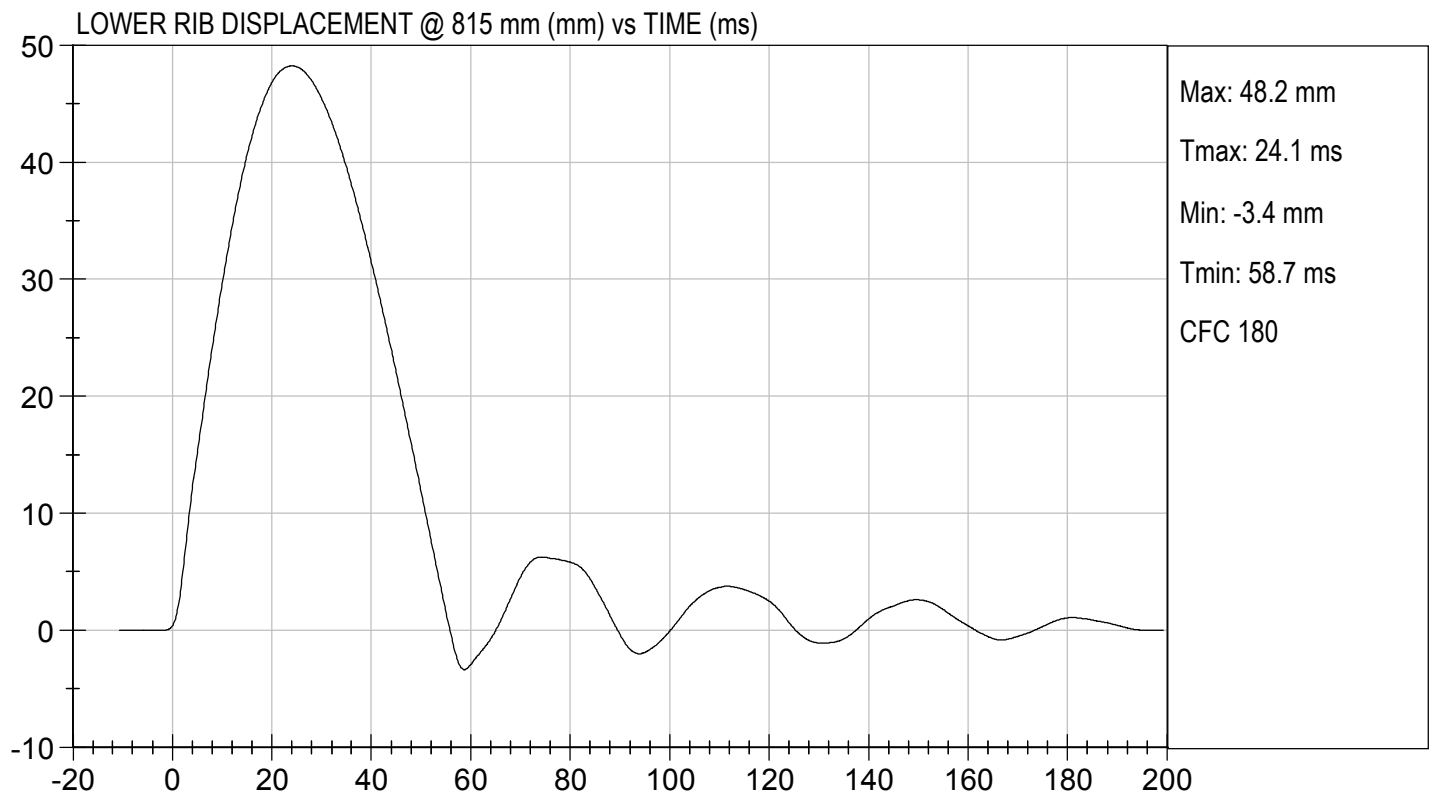
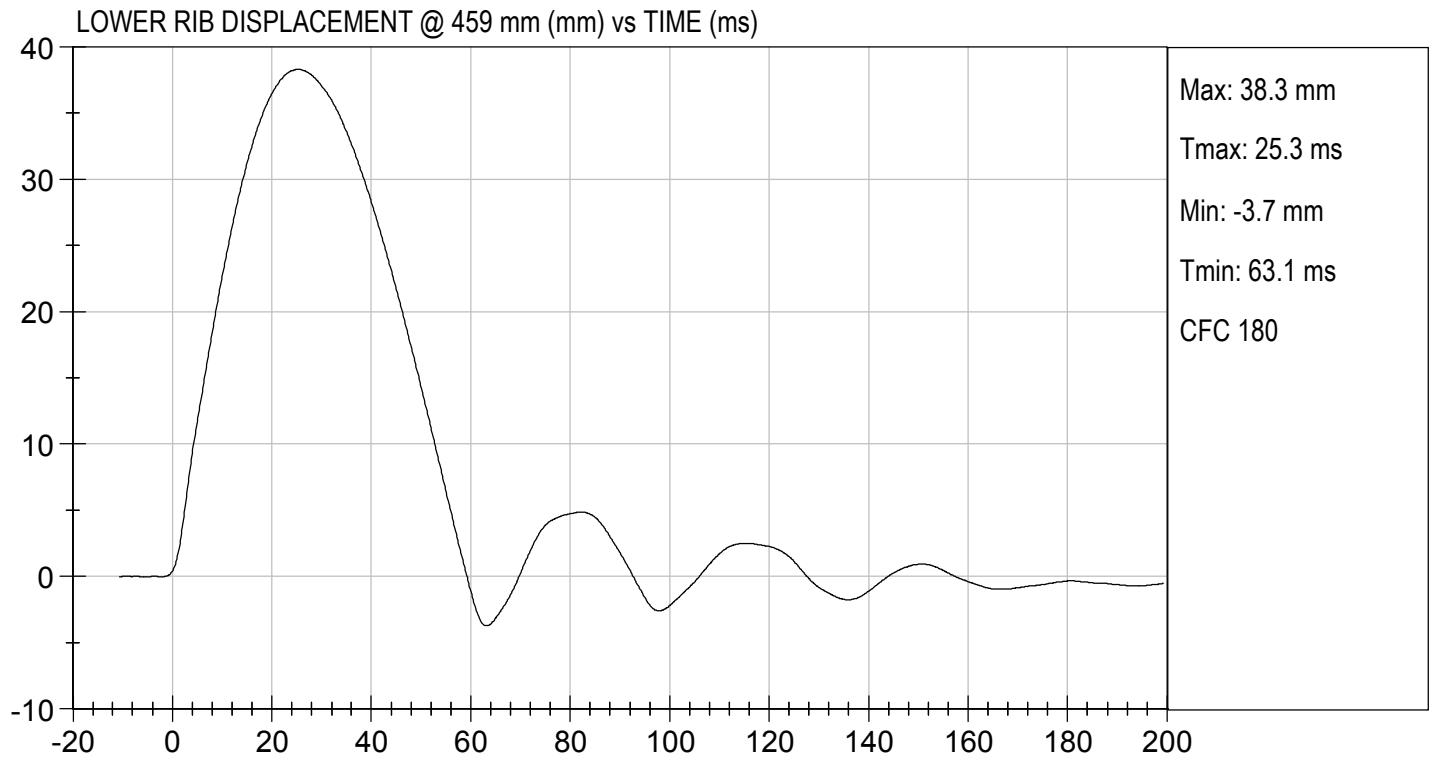
Test I.D: D210306

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	17	Pass
Displacement at 459 mm	mm	36.0 to 40.0	38.3	Pass
Displacement at 815 mm	mm	46.0 to 51.0	48.2	Pass
Overall Test Results				Pass


Laboratory Technician

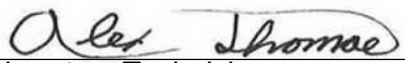

Approved By

02/09/2021
Test Date

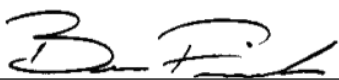


MGA RESEARCH CORPORATION**ABDOMEN TEST****ES-2re DUMMY****ATD Serial No:** F032**Test I.D:** D210307

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	13	Pass
Probe Speed	m/s	3.90 to 4.10	4.06	Pass
Maximum Impactor Force	N	4000 to 4800	4193	Pass
Time of Maximum Impactor Force	ms	10.6 to 13.0	10.8	Pass
Maximum Total Abdomen Force	N	2200 to 2700	2299	Pass
Time of Maximum Abdomen Force	ms	10.0 to 12.3	10.6	Pass
Overall Test Results				Pass


Laboratory Technician

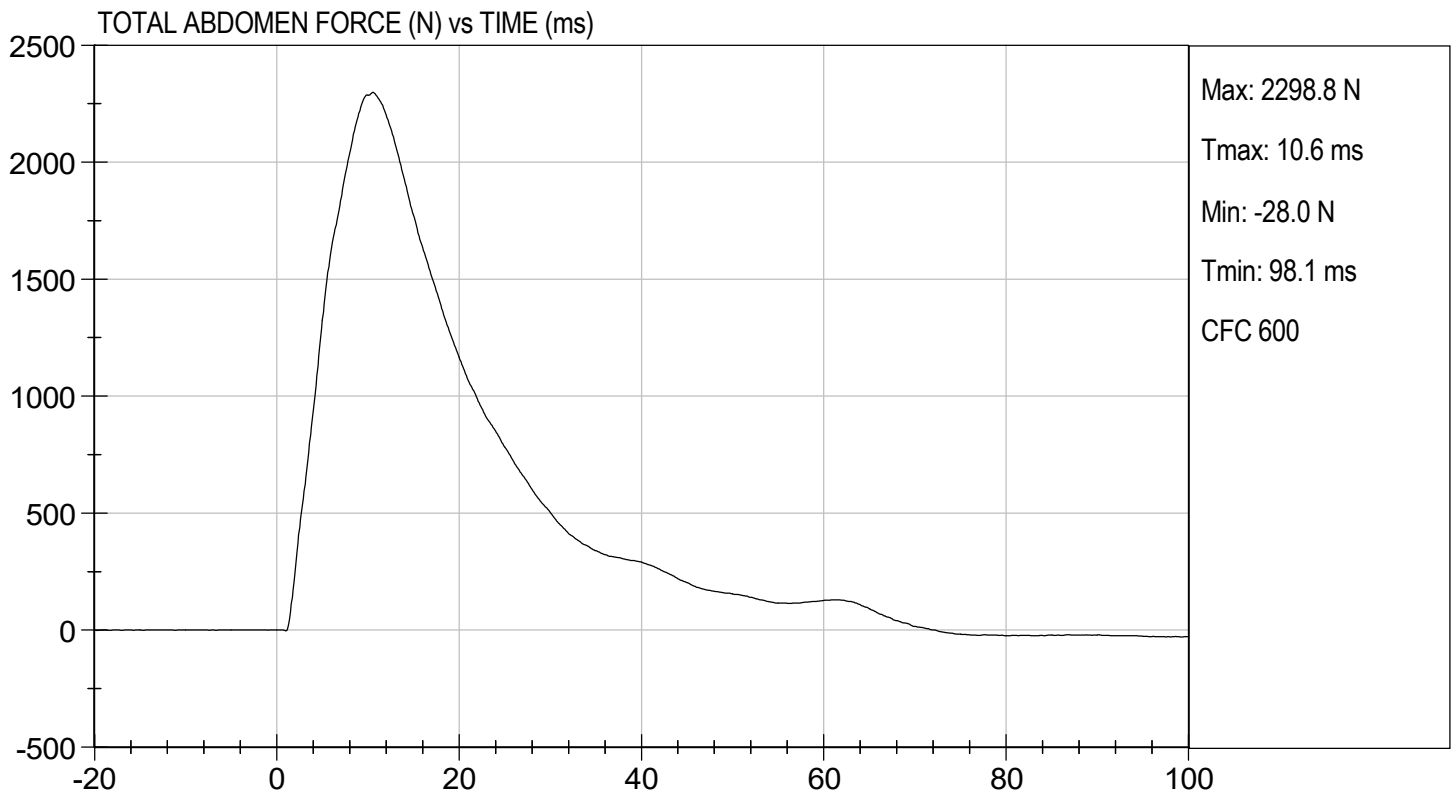
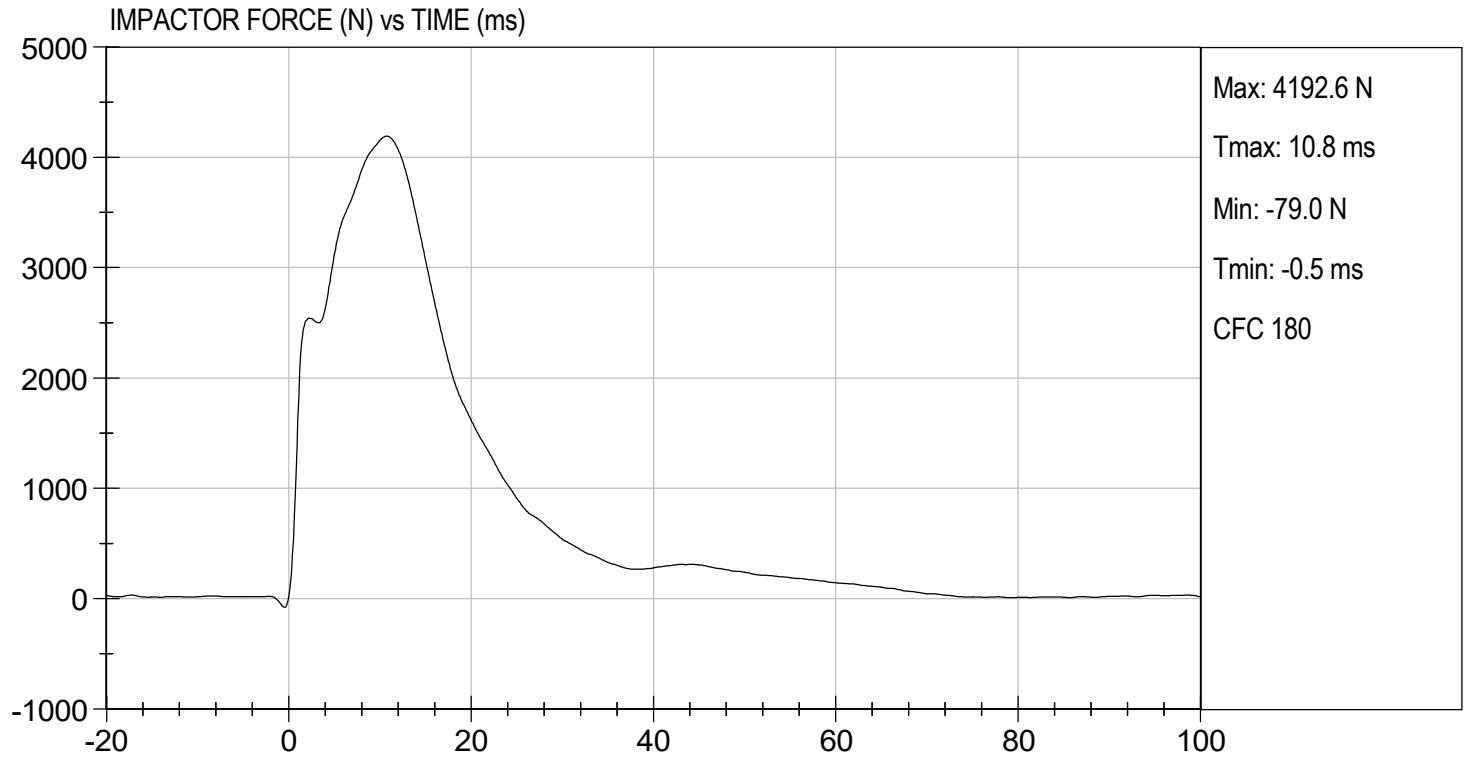
02/08/2021
Test Date


Approved By



TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.33 ft/s, 4.06 m/s

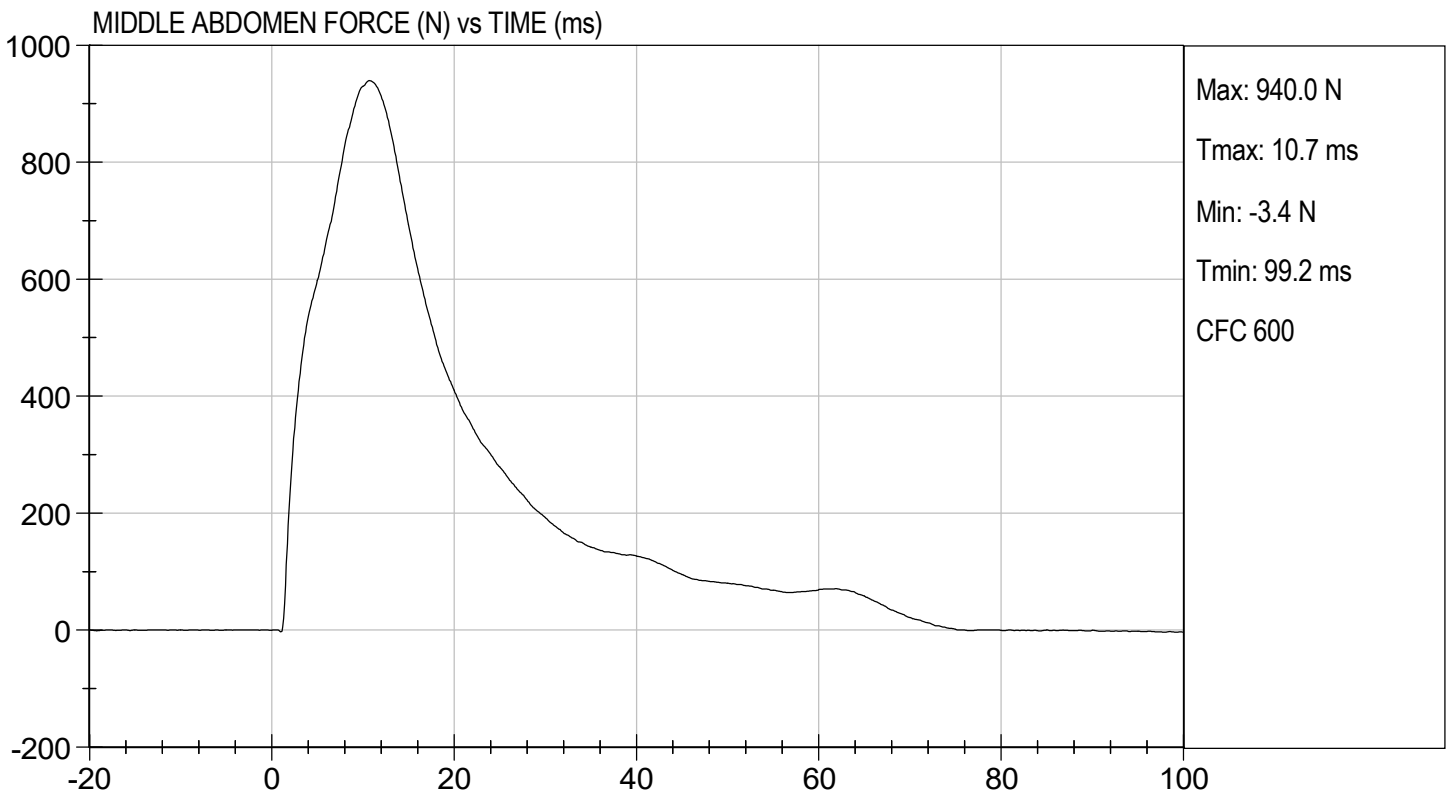
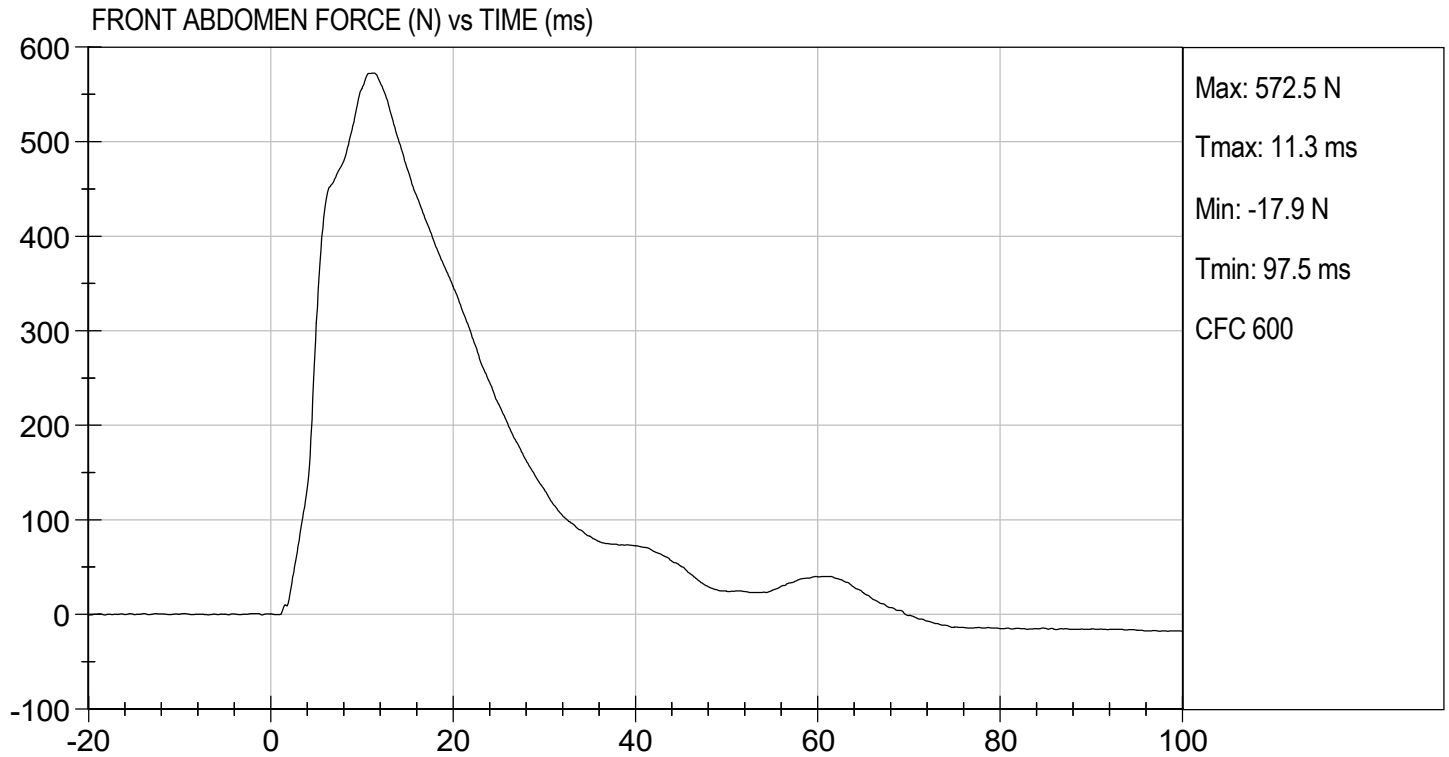
TEST DATE: 02/08/2021
TEST #: D210307





TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.33 ft/s, 4.06 m/s

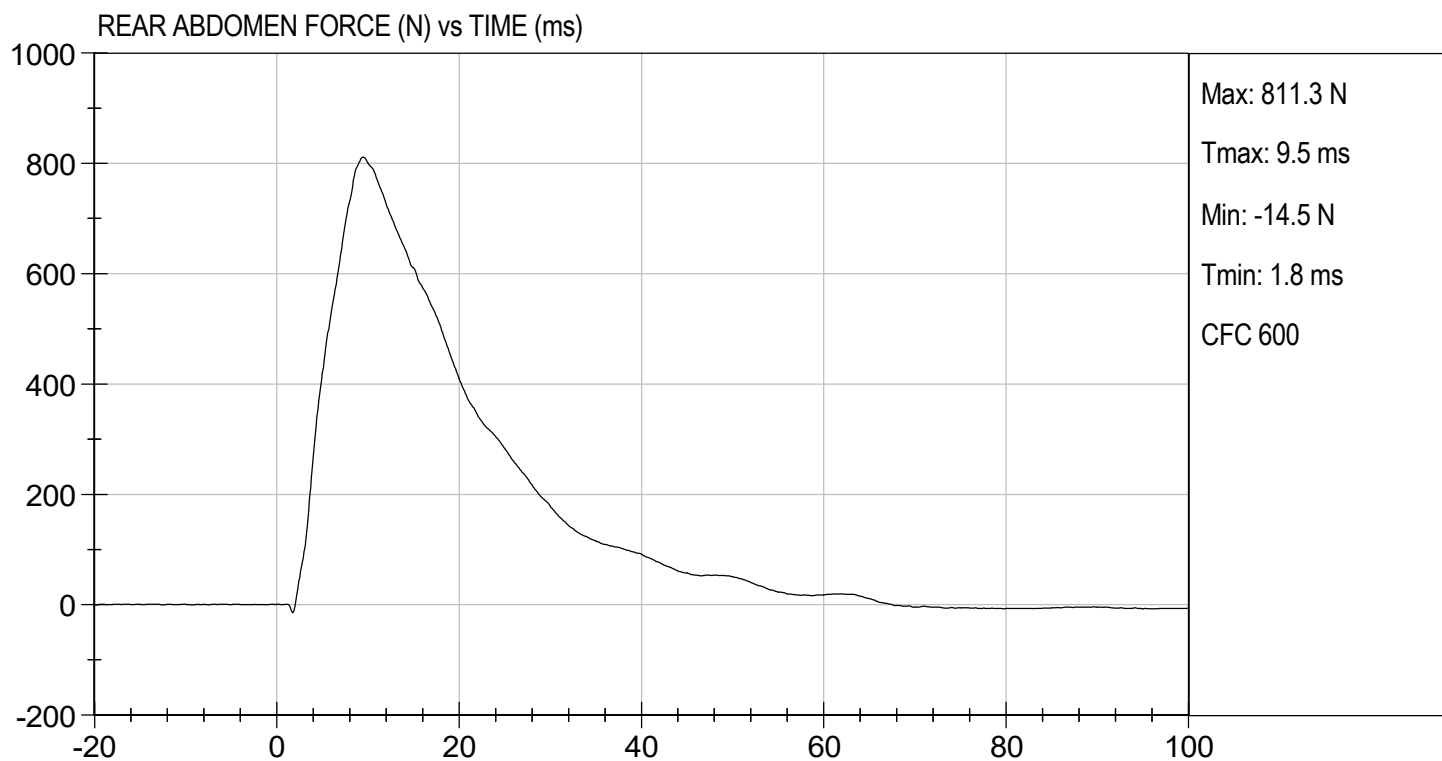
TEST DATE: 02/08/2021
TEST #: D210307





TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.33 ft/s, 4.06 m/s

TEST DATE: 02/08/2021
TEST #: D210307



MGA RESEARCH CORPORATION
LUMBAR SPINE TEST
ES-2re DUMMY

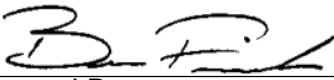
ATD Serial No: F032

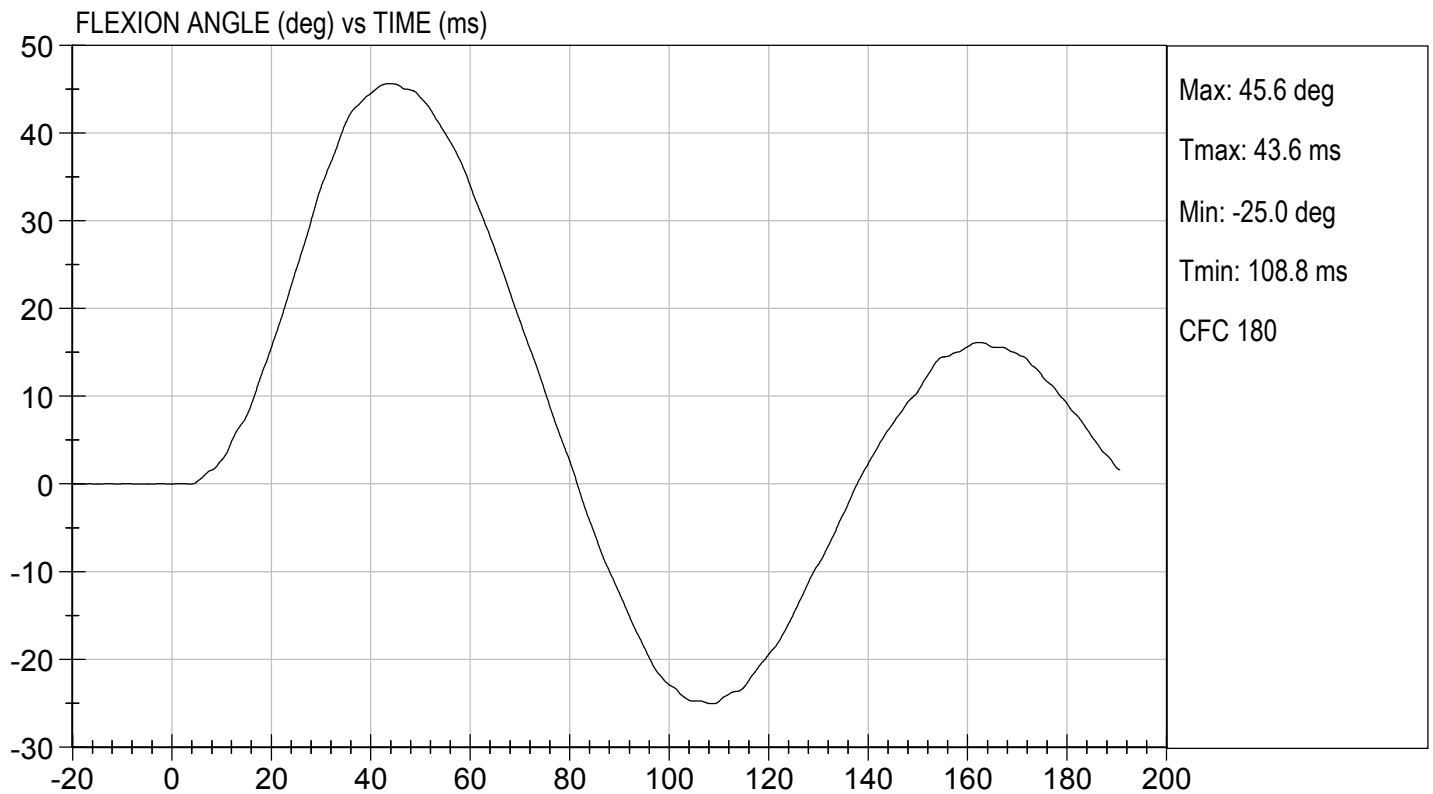
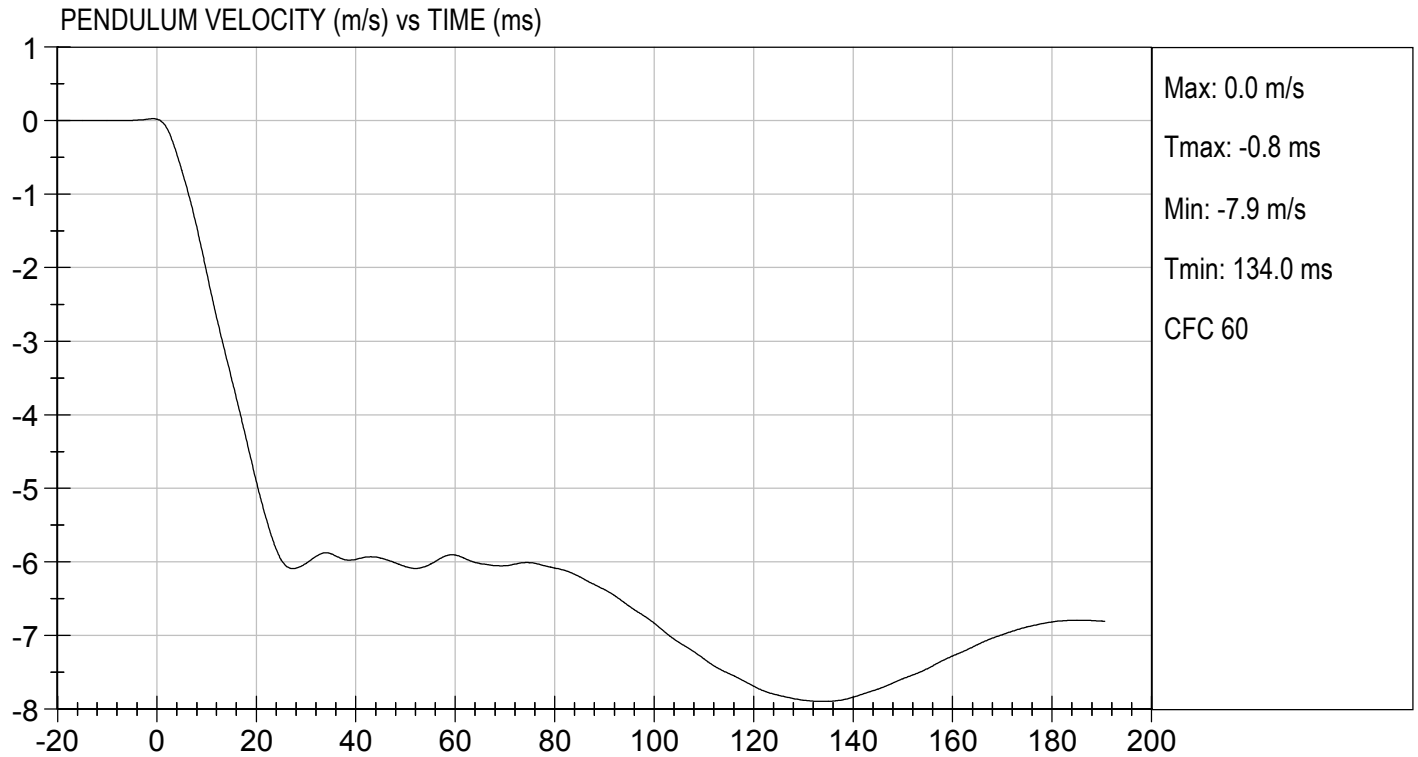
Test I.D: D210308

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity		%	10 to 70	17	Pass
Pendulum Speed		m/s	5.95 to 6.15	6.12	Pass
Pendulum Velocity	1 ms	m/s	-0.05 to 0.00	-0.02	Pass
	3.7 ms	m/s	-0.425 to -0.24	-0.391	Pass
	27 ms	m/s	-6.50 to -5.80	-6.09	Pass
	30 ms	m/s	>= -6.50	-6.02	Pass
Maximum Flexion Angle		deg	45.0 to 55.0	45.6	Pass
Time of Maximum Flexion Angle		ms	39.0 to 53.0	43.6	Pass
Headform Rotation Decay to Initial Position		ms	37 to 57	38	Pass
Overall Results				Pass	


 Laboratory Technician

02/09/2021
 Test Date

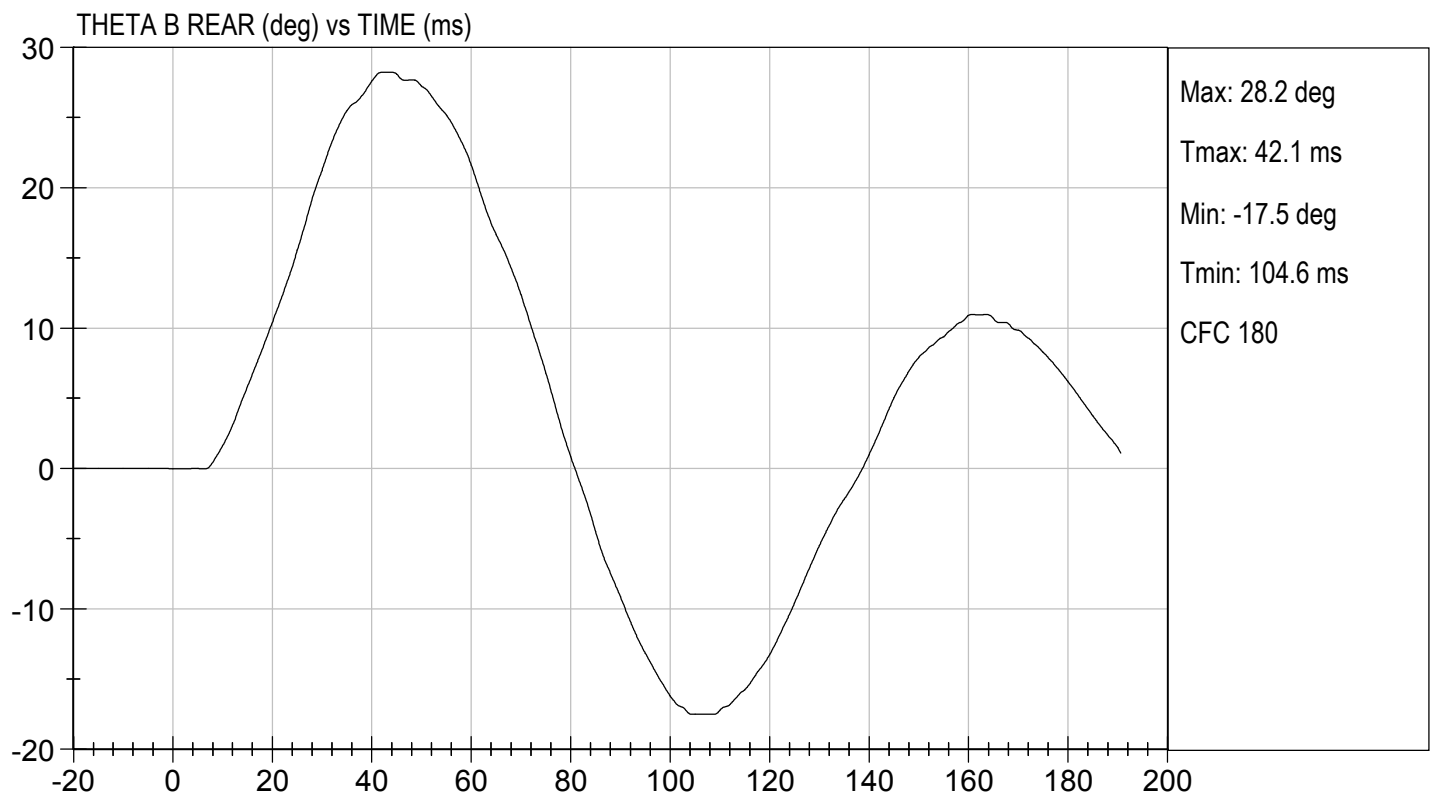
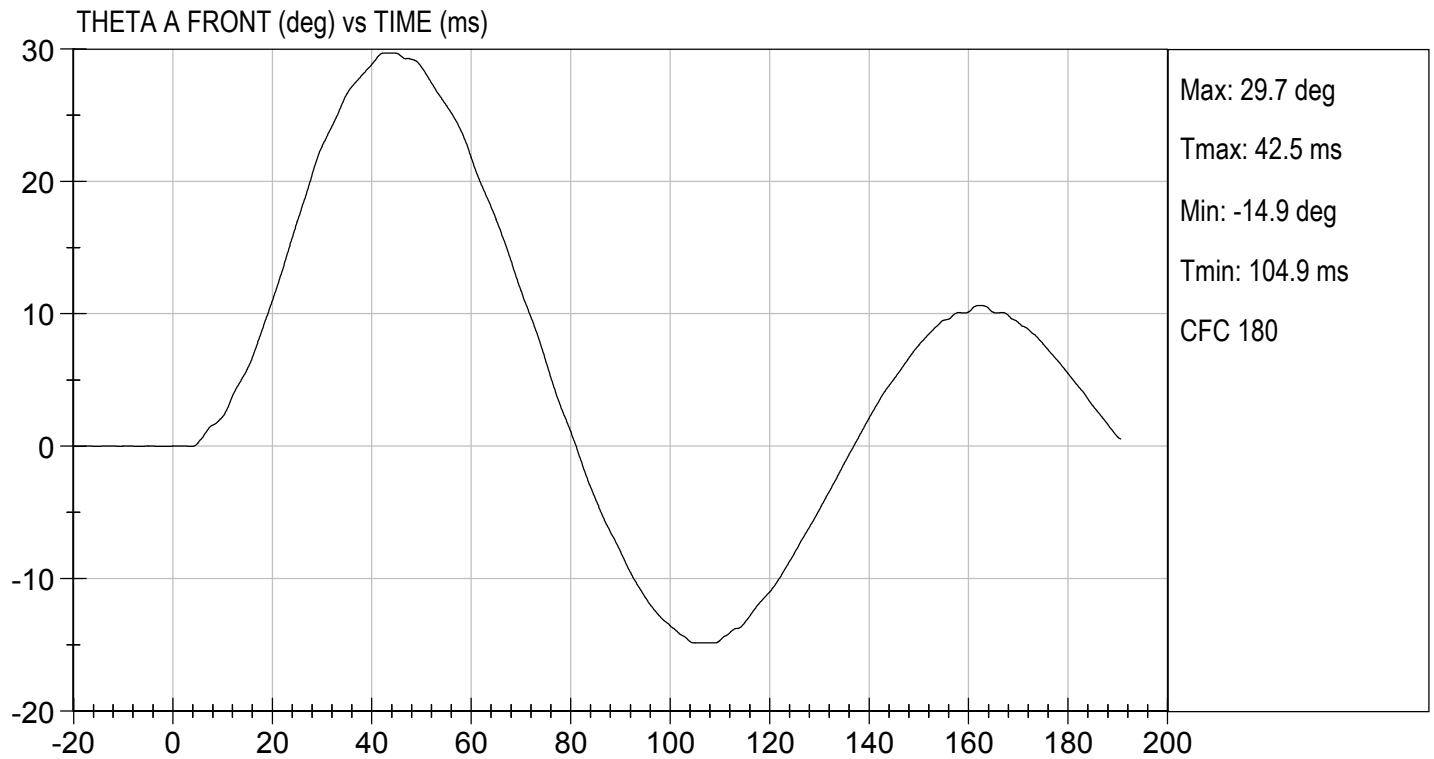

 Approved By





TEST DESC: LUMBAR BENDING
VELOCITY: 20.08 ft/s, 6.12 m/s

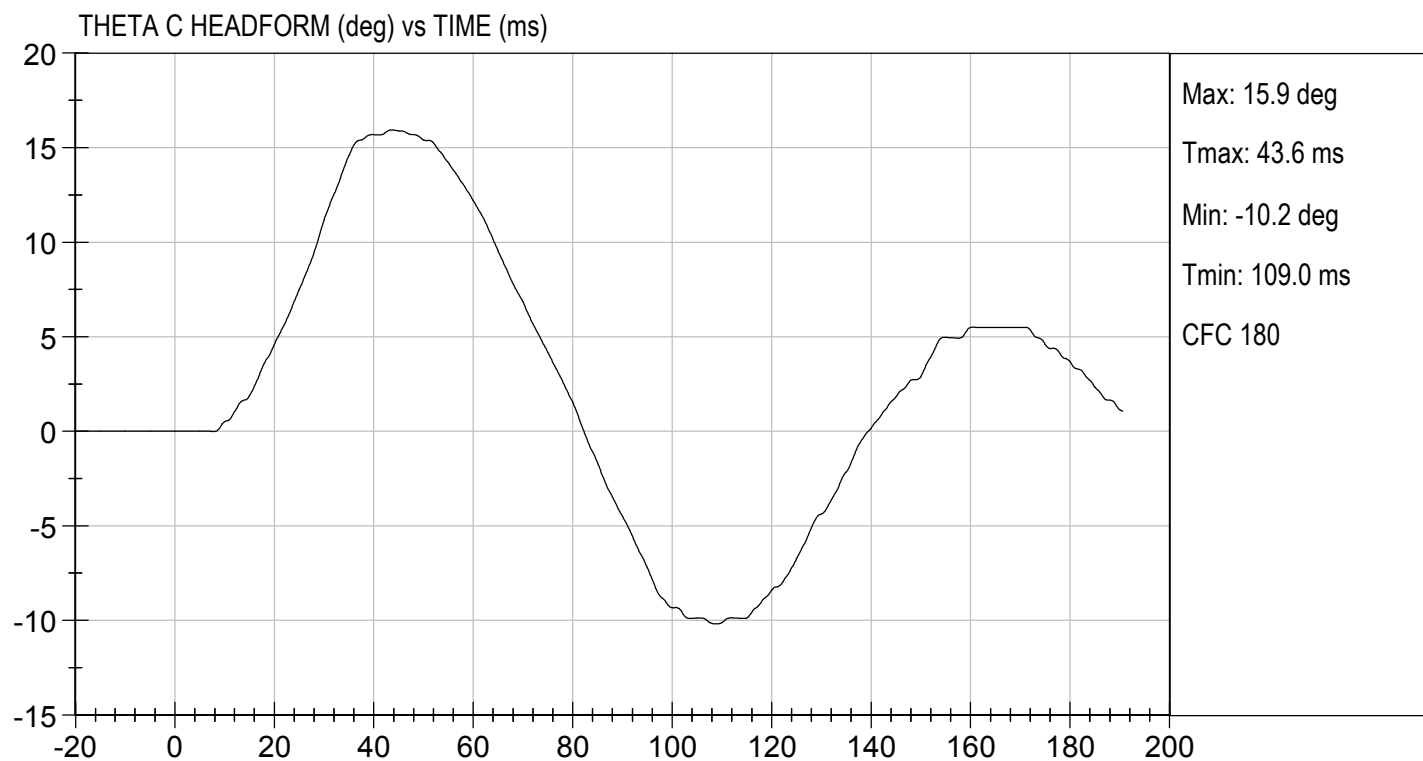
TEST DATE: 02/09/2021
TEST #: D210308





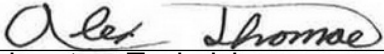
TEST DESC: LUMBAR BENDING
VELOCITY: 20.08 ft/s, 6.12 m/s

TEST DATE: 02/09/2021
TEST #: D210308

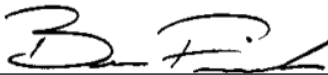


MGA RESEARCH CORPORATION**PELVIS TEST
ES-2re DUMMY****ATD Serial No:** F032**Test I.D:** D210309

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Probe Speed	m/s	4.20 to 4.40	4.23	Pass
Maximum Impactor Force	N	4700 to 5400	4997	Pass
Time of Maximum Impactor Force	ms	11.8 to 16.1	13.2	Pass
Maximum Pubic Force	N	1230 to 1590	1342	Pass
Time of Maximum Pubic Force	ms	12.2 to 17.0	12.6	Pass
Overall Test Results				Pass


Laboratory Technician

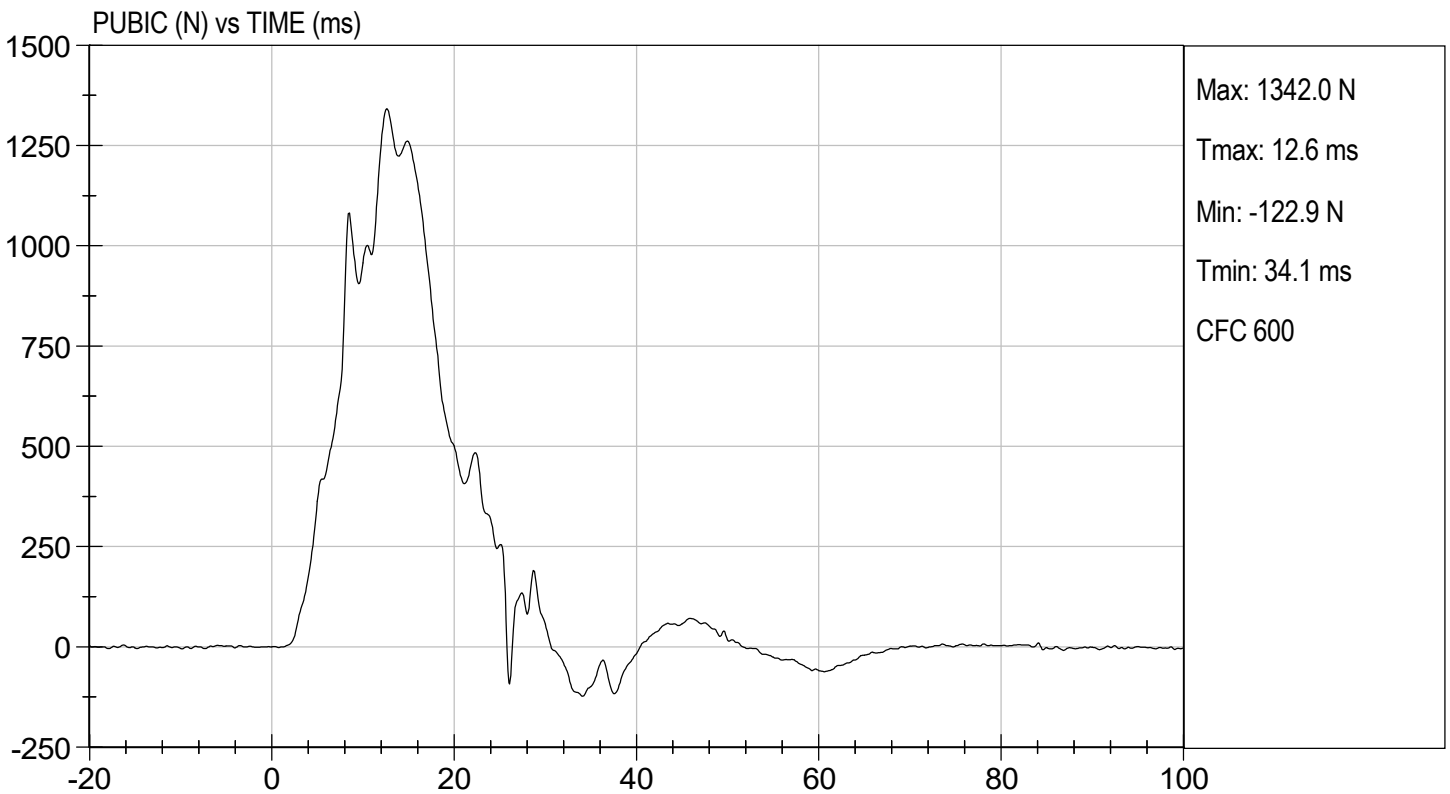
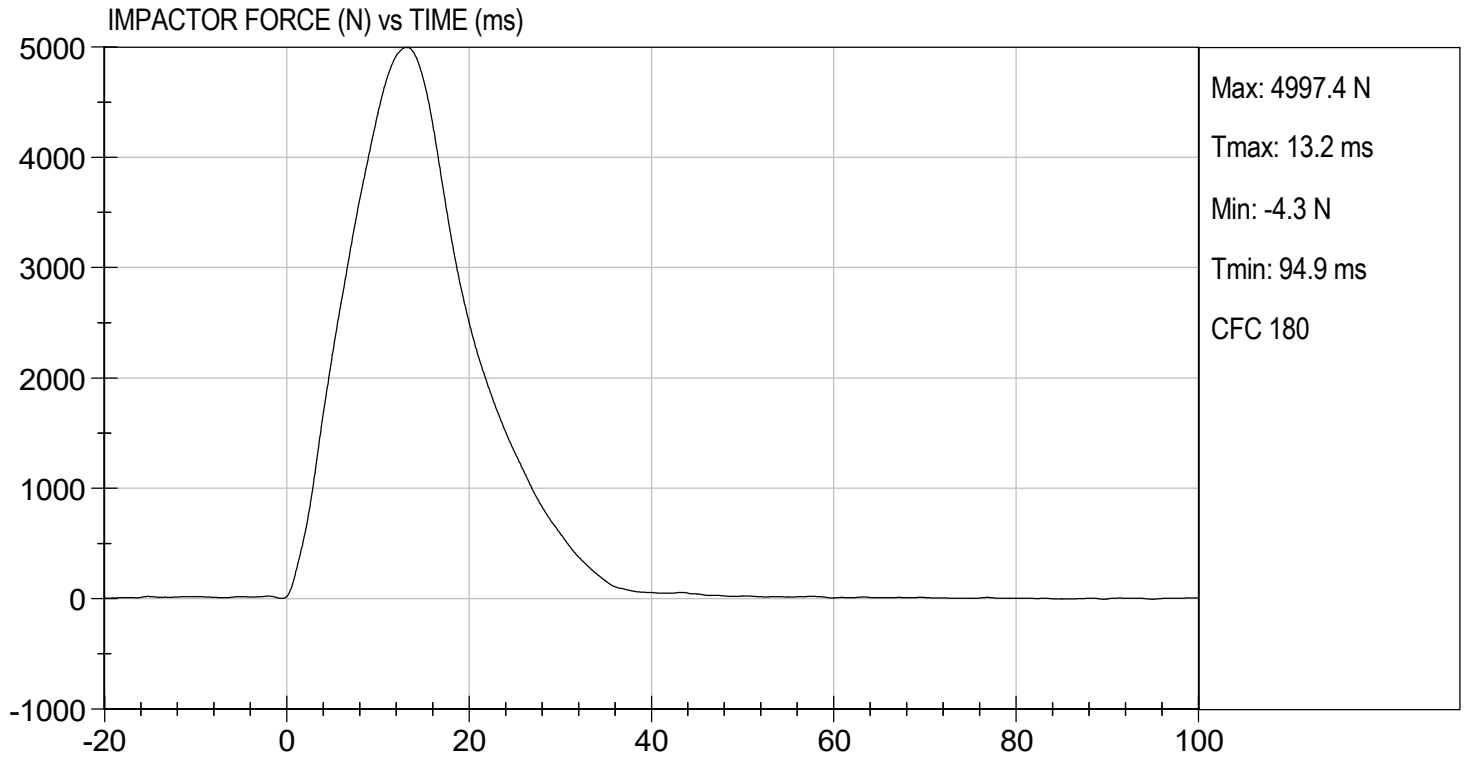
02/05/2021
Test Date


Approved By



TEST DESC: PELVIS IMPACT
VELOCITY: 13.89 ft/s, 4.23 m/s

TEST DATE: 02/05/2021
TEST #: D210309

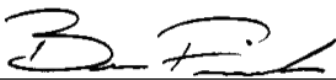


MGA RESEARCH CORPORATION**THORAX IMPACT TEST****ES-2re DUMMY**ATD Serial No: F032Test I.D: D210300

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.0	Pass
Humidity	%	10 to 70	13	Pass
Probe Speed	m/s	5.40 to 5.60	5.46	Pass
Maximum Impactor Force (after 6 ms)	N	5100 to 6200	6020	Pass
Upper Rib Displacement	mm	34.0 to 41.0	38.6	Pass
Middle Rib Displacement	mm	37.0 to 45.0	40.7	Pass
Lower Rib Displacement	mm	37.0 to 44.0	41.0	Pass
Overall Test Results				Pass


Laboratory Technician

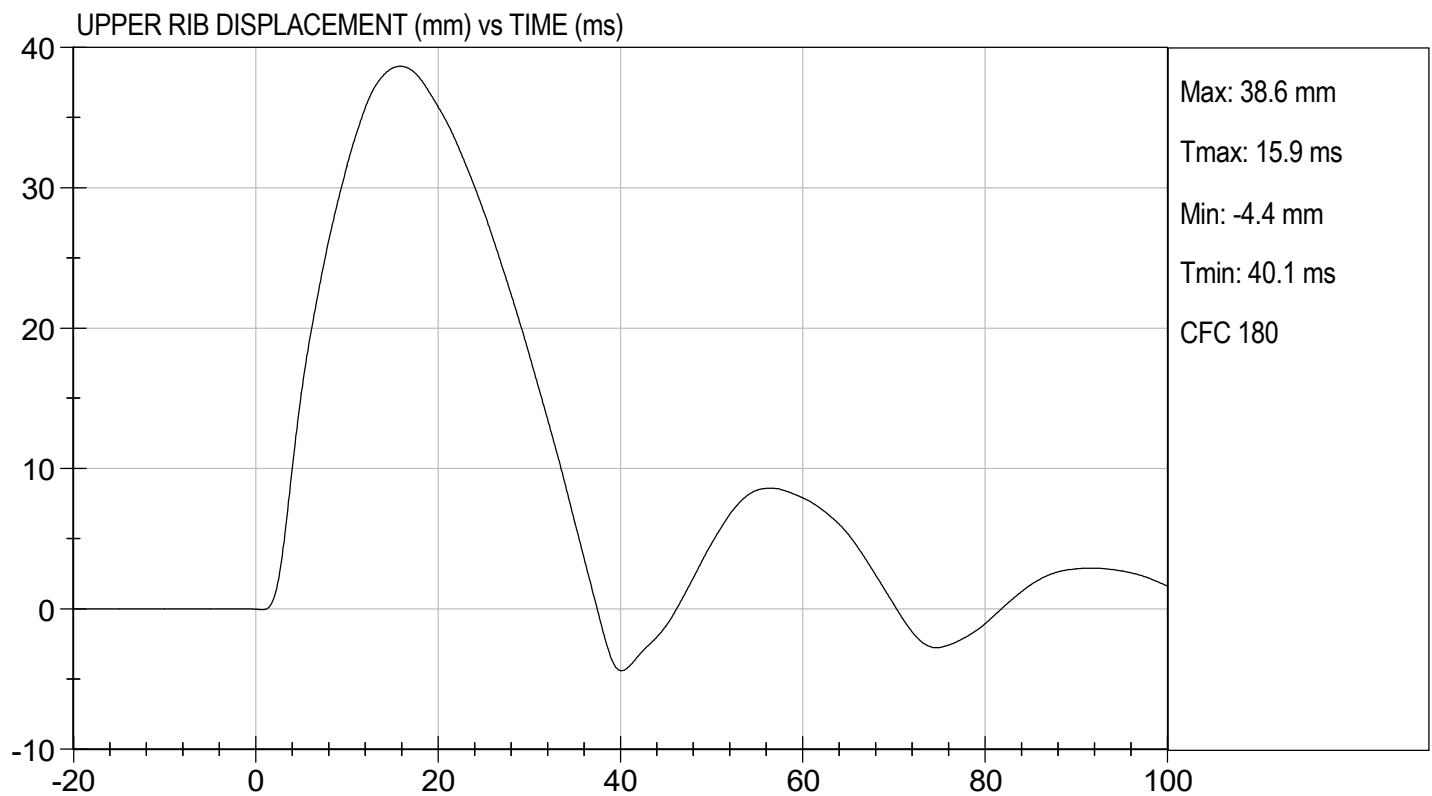
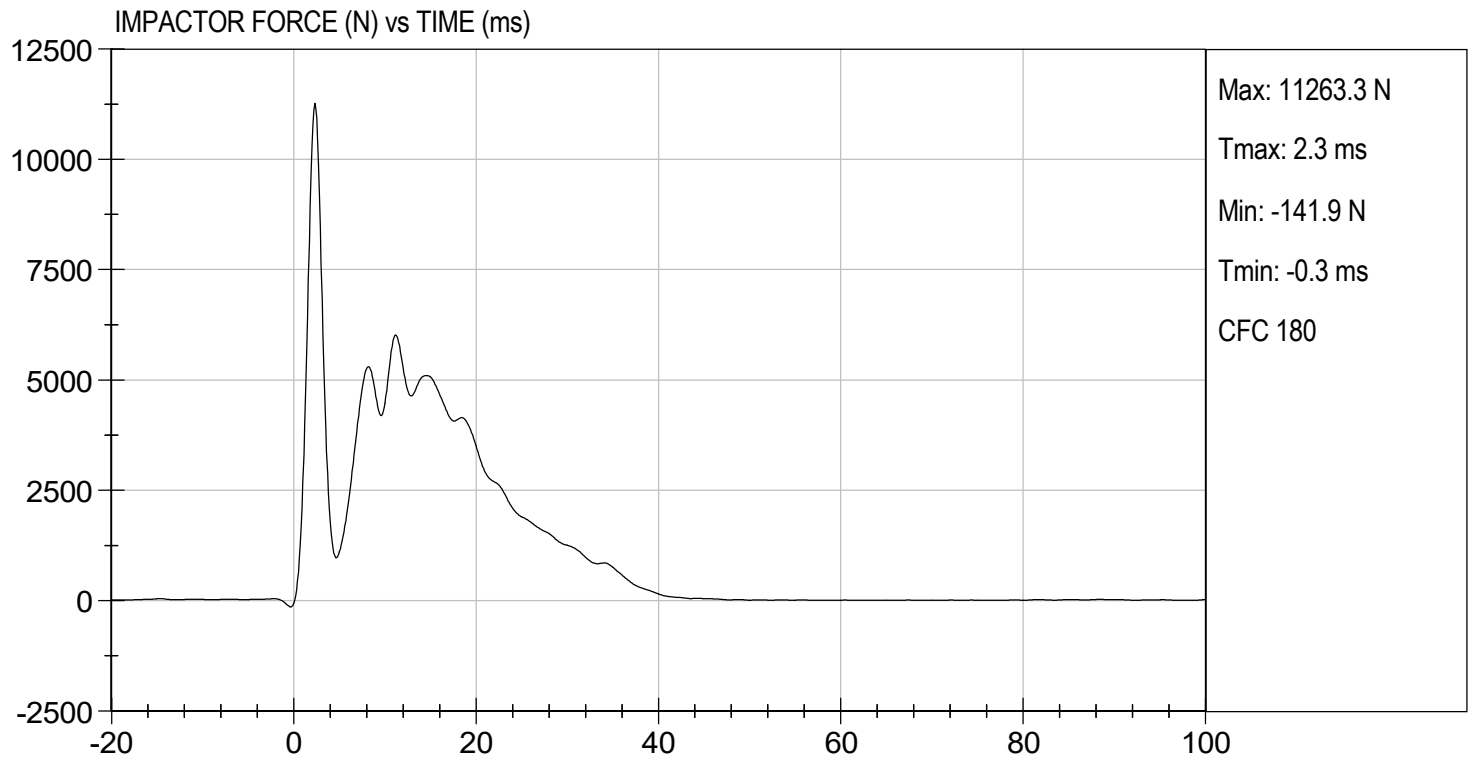
02/08/2021
Test Date


Approved By



TEST DESC: THORAX IMPACT
VELOCITY: 17.92 ft/s, 5.46 m/s

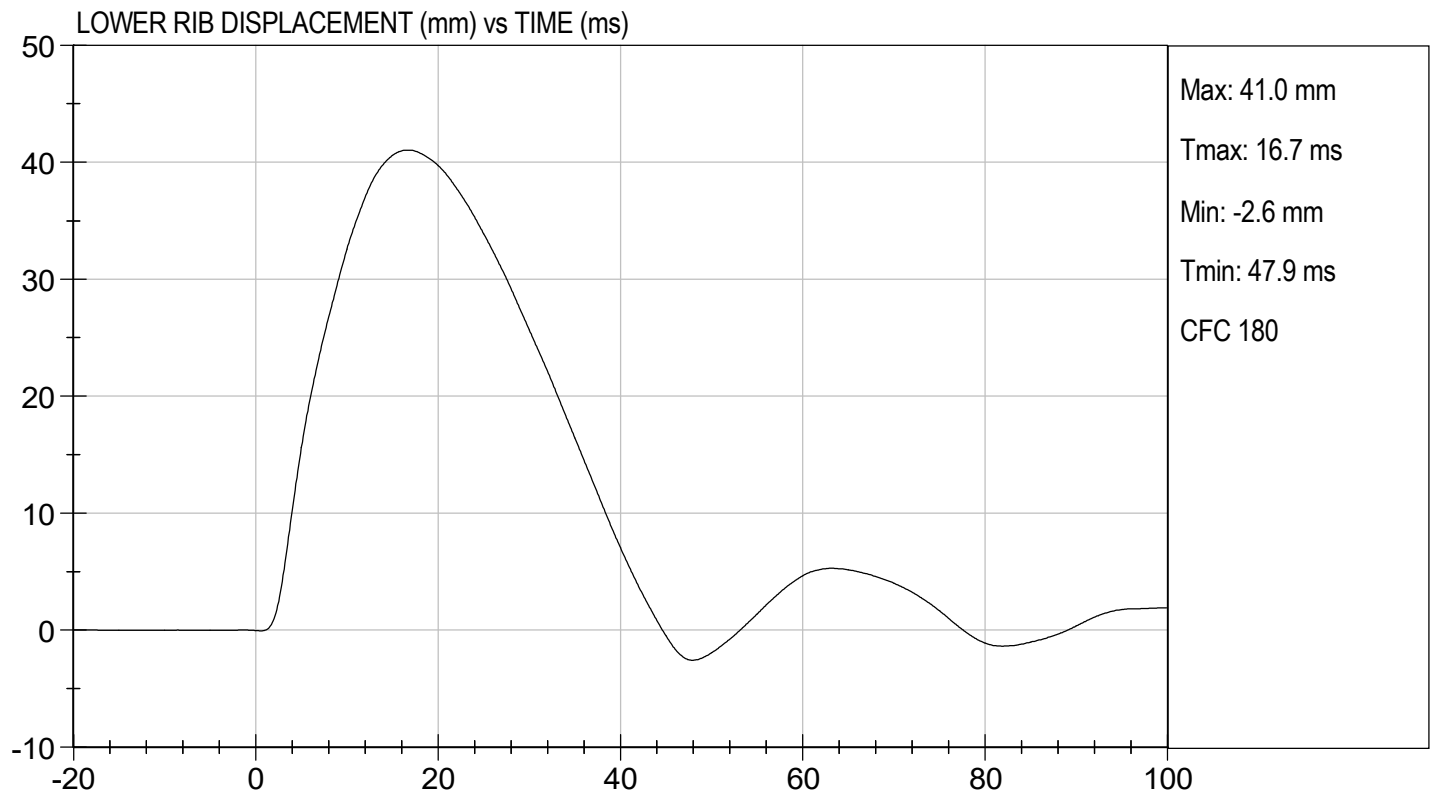
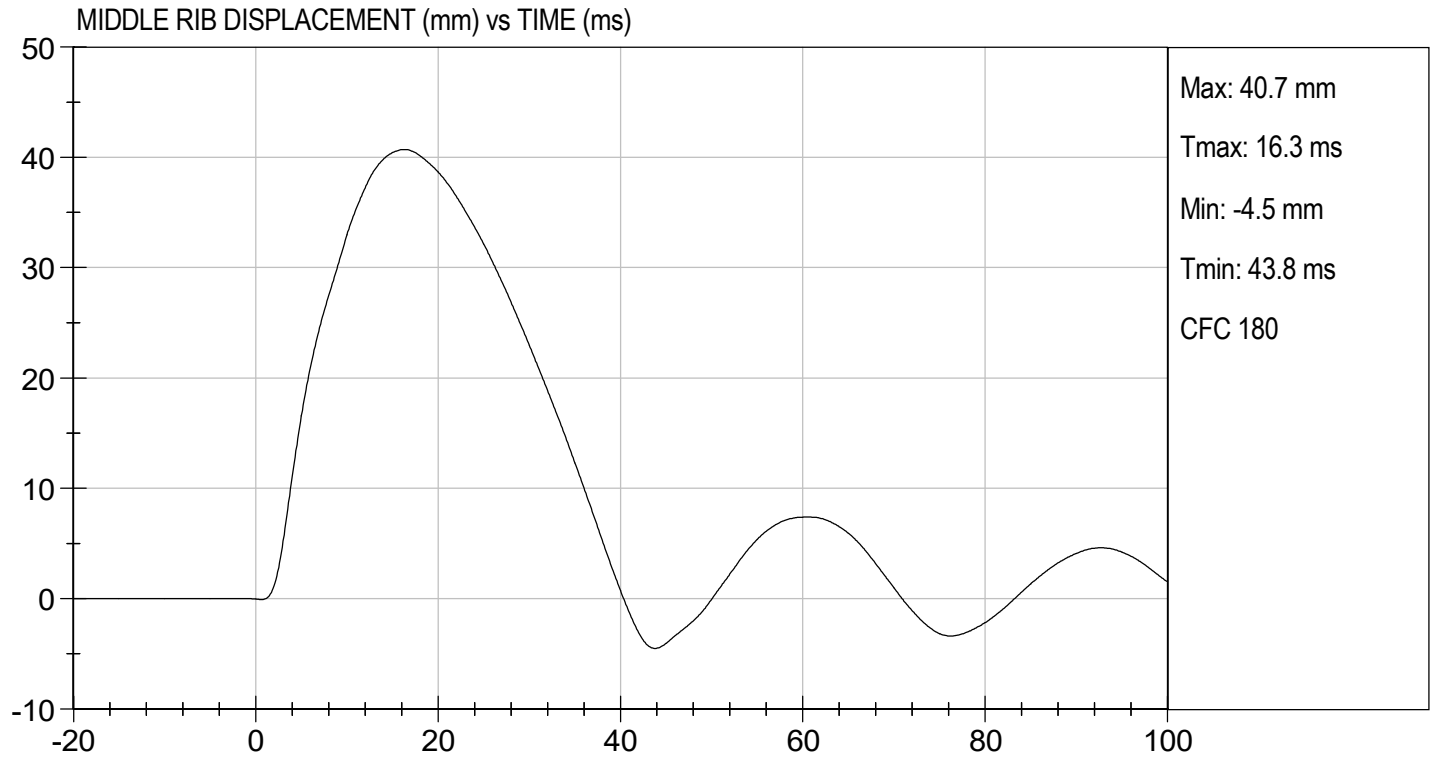
TEST DATE: 02/08/2021
TEST #: D210300





TEST DESC: THORAX IMPACT
VELOCITY: 17.92 ft/s, 5.46 m/s

TEST DATE: 02/08/2021
TEST #: D210300



CALIBRATION TEST RESULTS

POST-TEST

EUROSID 2 (ES-2RE) MALE – DRIVER ATD

ES-2re External Measurements
SN: F032

No.	Name	Spec. (mm)	Result	Pass/Fail
1	Sitting Height	900 - 918	915	Pass
2	Seat to Shoulder Joint	558 - 572	568	Pass
3	Seat to Lower Face of Thoracic Spine Box	346 - 356	355	Pass
4	Seat to Hip Joint (center of bolt)	97 - 103	98	Pass
5	Sole to Seat, Sitting	333 - 451	440	Pass
6	Head Width	152 - 158	157	Pass
7	Shoulder/Arm Width	461 - 479	464	Pass
8	Thorax Width	322 - 332	323	Pass
9	Abdomen Width	273 - 287	281	Pass
10	Pelvis Lap Width	359 - 373	370	Pass
11	Head Depth	196 - 206	203	Pass
12	Thorax Depth	262 - 272	264	Pass
13	Abdomen Depth	194 - 204	196	Pass
14	Pelvis Depth	235 - 245	236	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150 - 160	151	Pass
16	Back of Buttocks to Front Knee	597 - 615	607	Pass

MGA RESEARCH CORPORATION
HEAD DROP TEST
ES-2re DUMMY

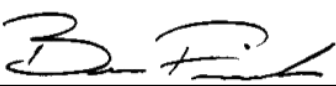
ATD Serial No: F032

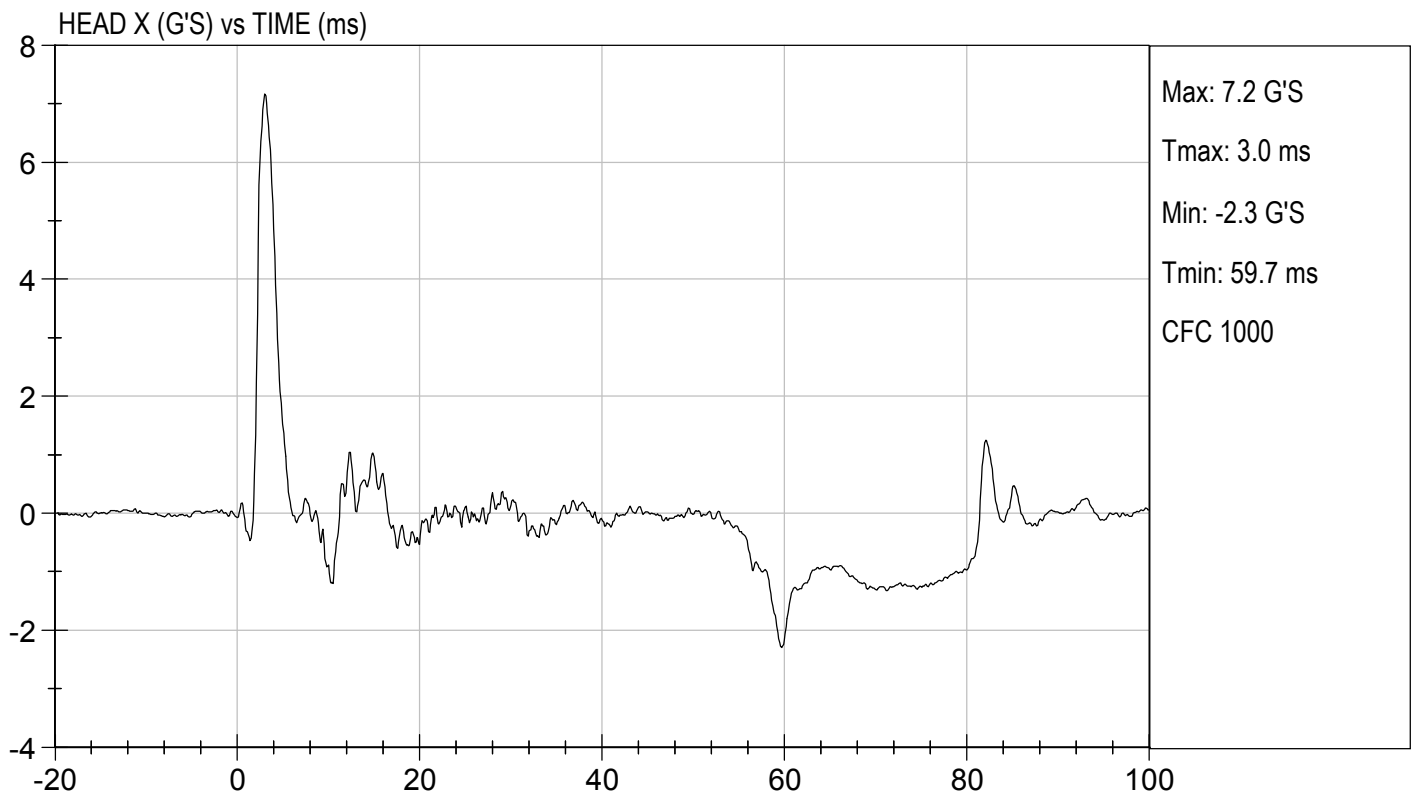
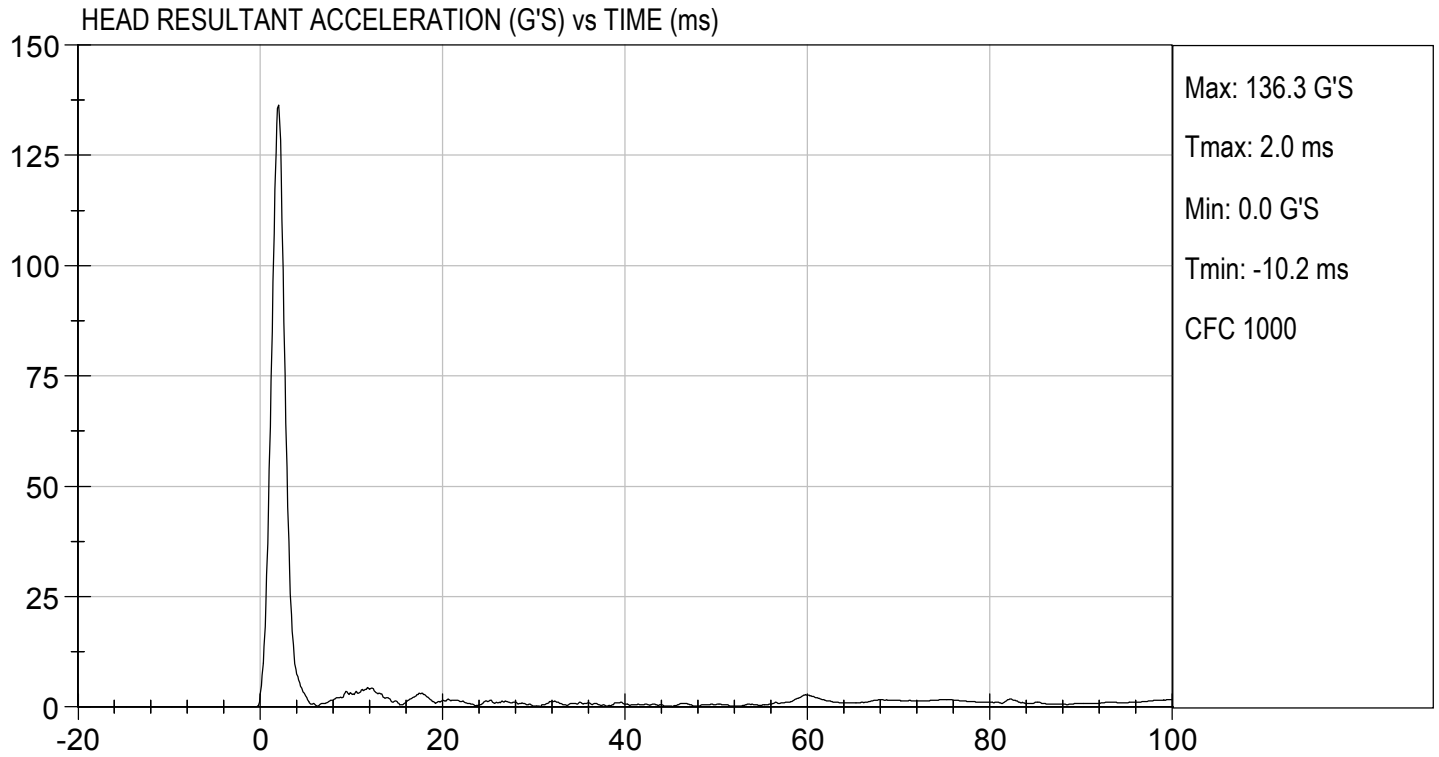
Test ID: D210501

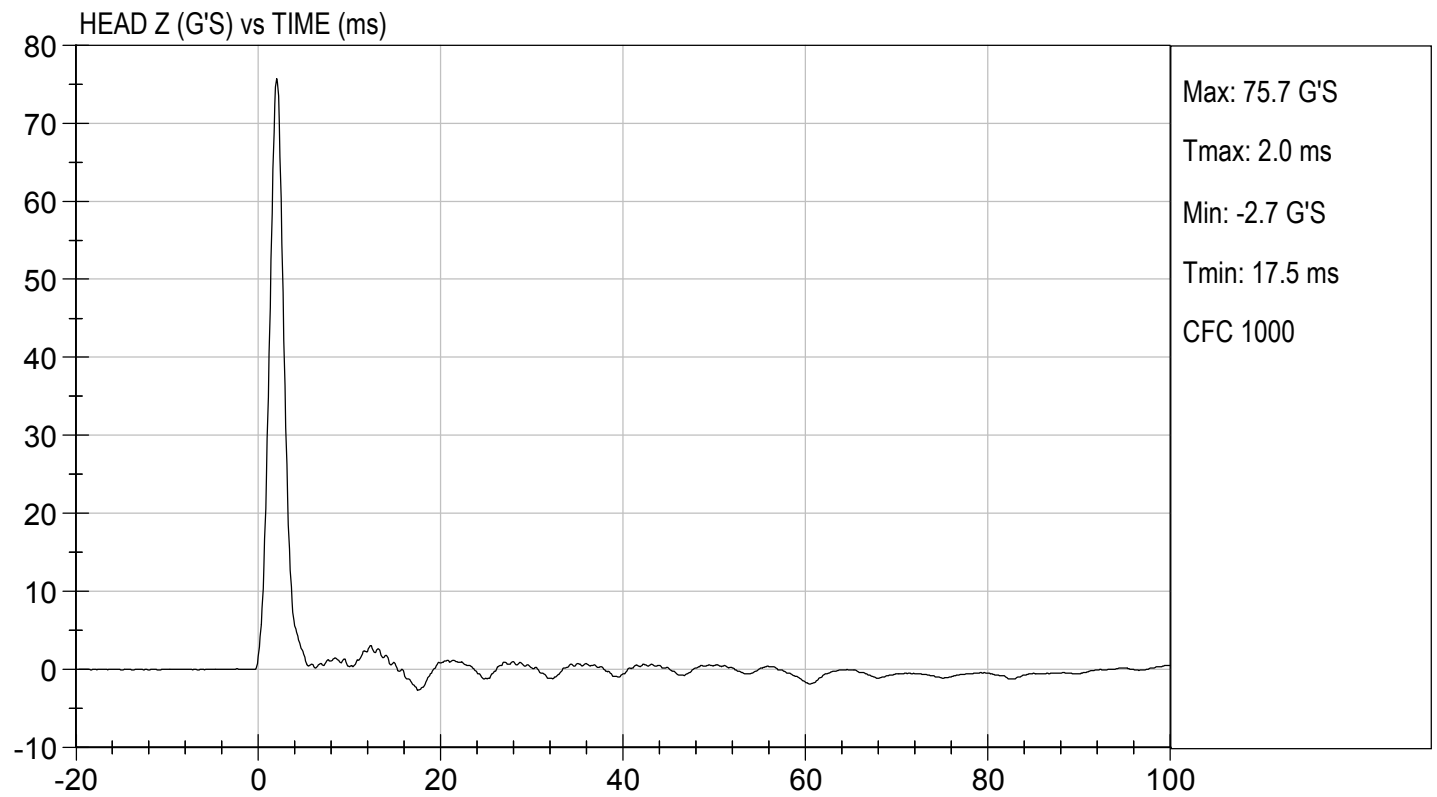
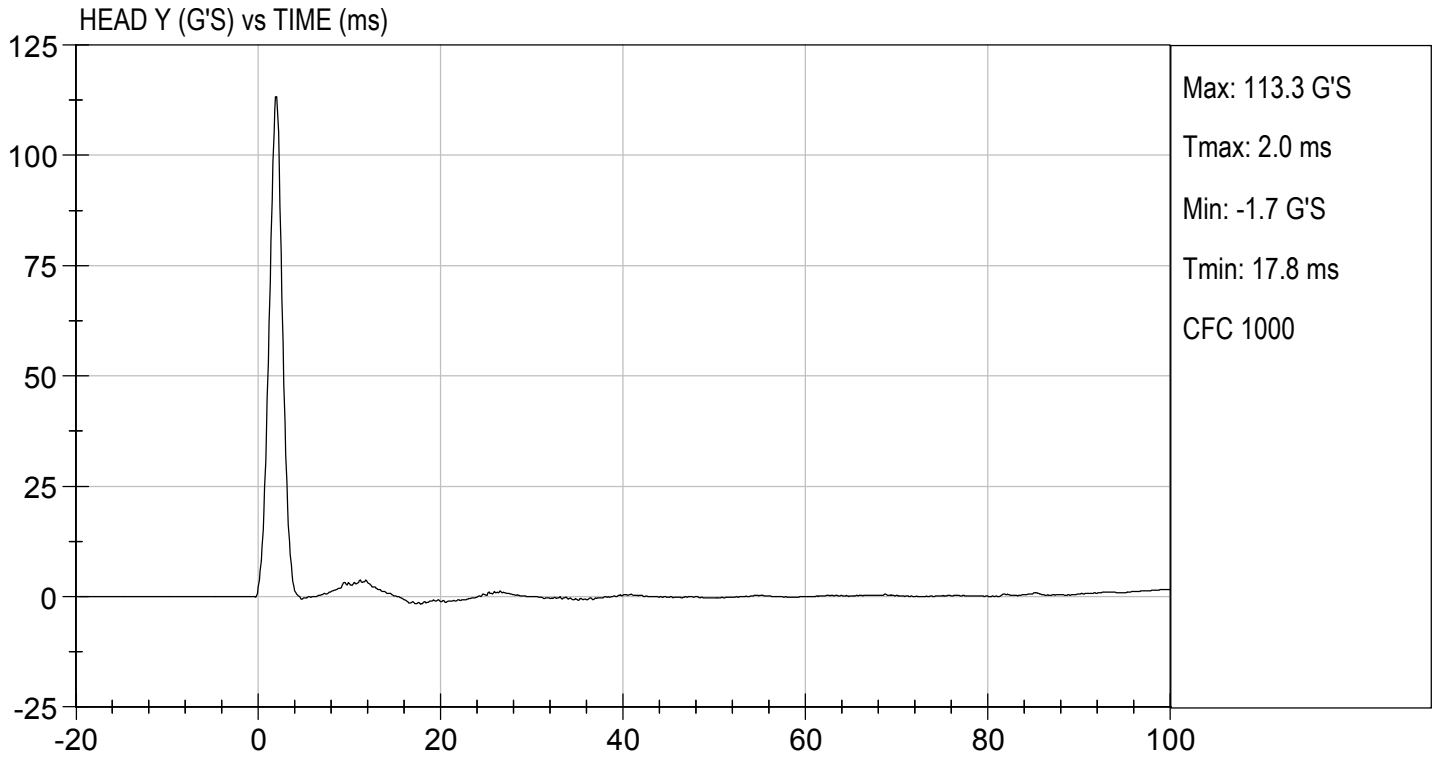
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	21	Pass
Peak Resultant Acceleration	G's	125 to 155	136	Pass
Peak Longitudinal Acceleration	G's	<= +/- 15.0	7.2	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 15% of peak	Yes	Pass
Overall Test Results			Pass	


Laboratory Technician

02/19/2021
Test Date


Approved By





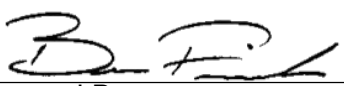
MGA RESEARCH CORPORATION
NECK PENDULUM TEST
ES-2re DUMMY

ATD Serial No: F032

Test I.D: D210502

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity		%	10 to 70	20	Pass
Pendulum Speed		m/s	3.30 to 3.50	3.50	Pass
Pendulum Velocity	1 ms	m/s	-0.05 to 0.00	-0.01	Pass
	3 ms	m/s	-0.25 to -0.375	-0.33	Pass
	14 ms	m/s	-3.20 to -3.70	-3.52	Pass
	17 ms	m/s	>= -3.70	-3.56	Pass
Maximum Flexion Angle		deg	49.0 to 59.0	50.0	Pass
Time of Maximum Flexion Angle		ms	54.0 to 66.0	54.7	Pass
Head Rotation Decay Time to 0 Degree		ms	53.0 to 88.0	61.7	Pass
Overall Results					Pass


 Laboratory Technician

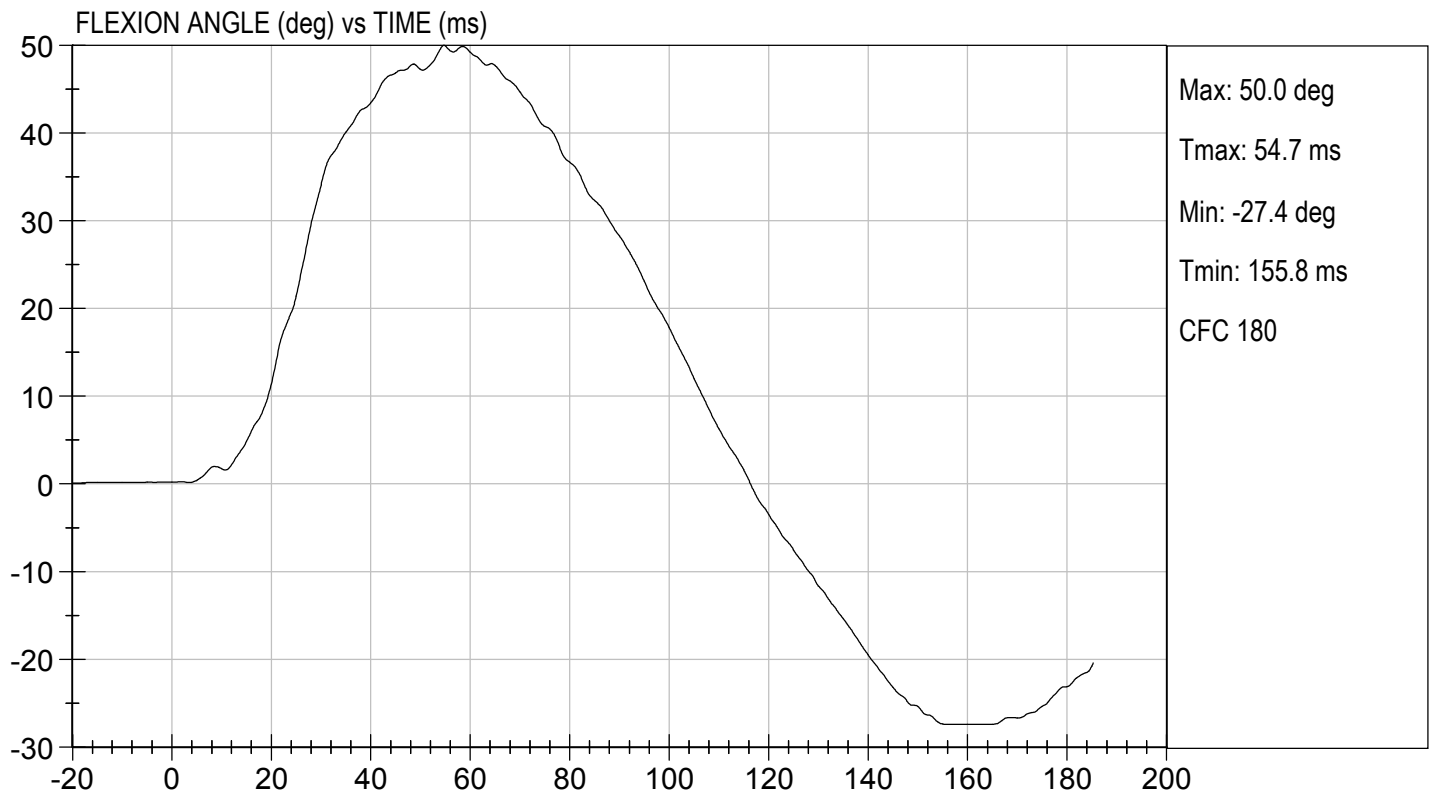
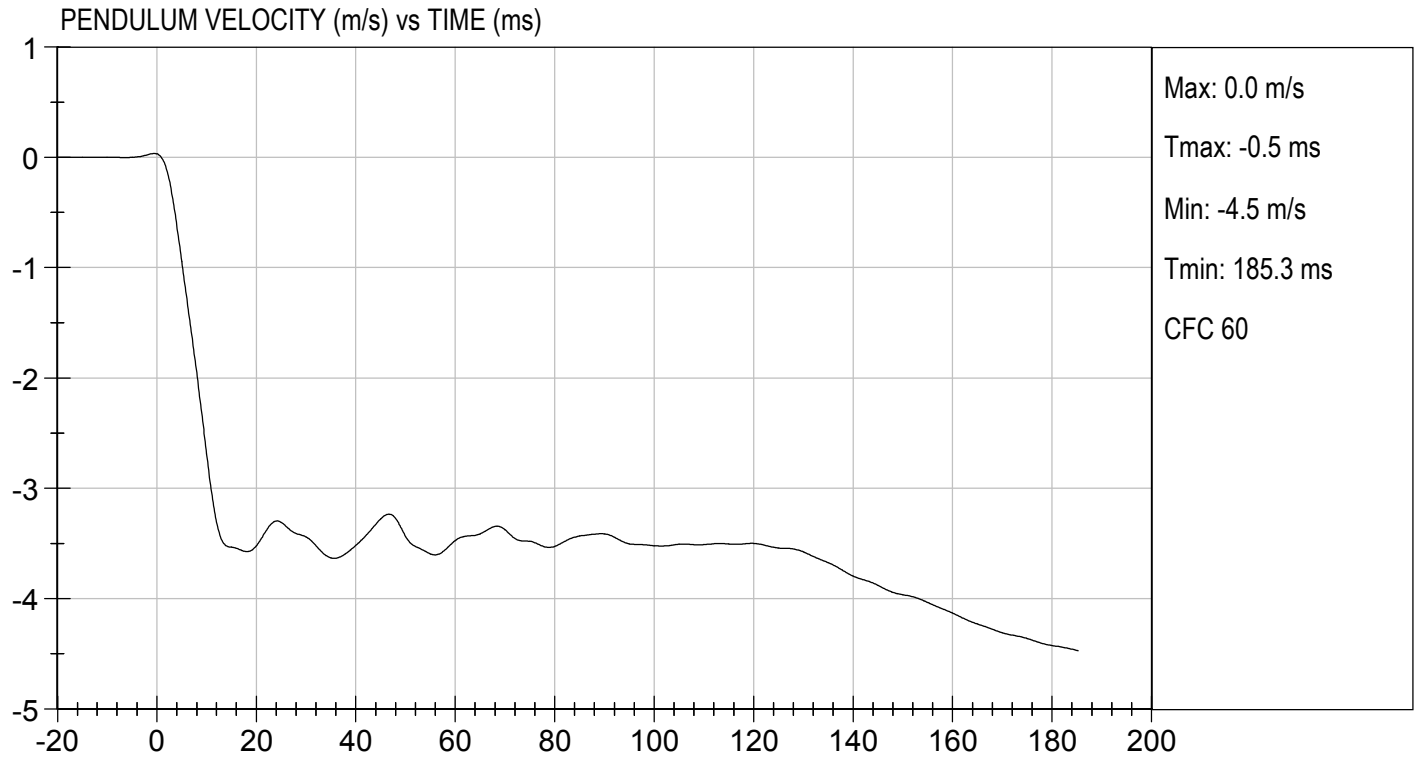

 Approved By

02/19/2021
 Test Date



TEST DESC: NECK BENDING
VELOCITY: 11.49 ft/s, 3.50 m/s

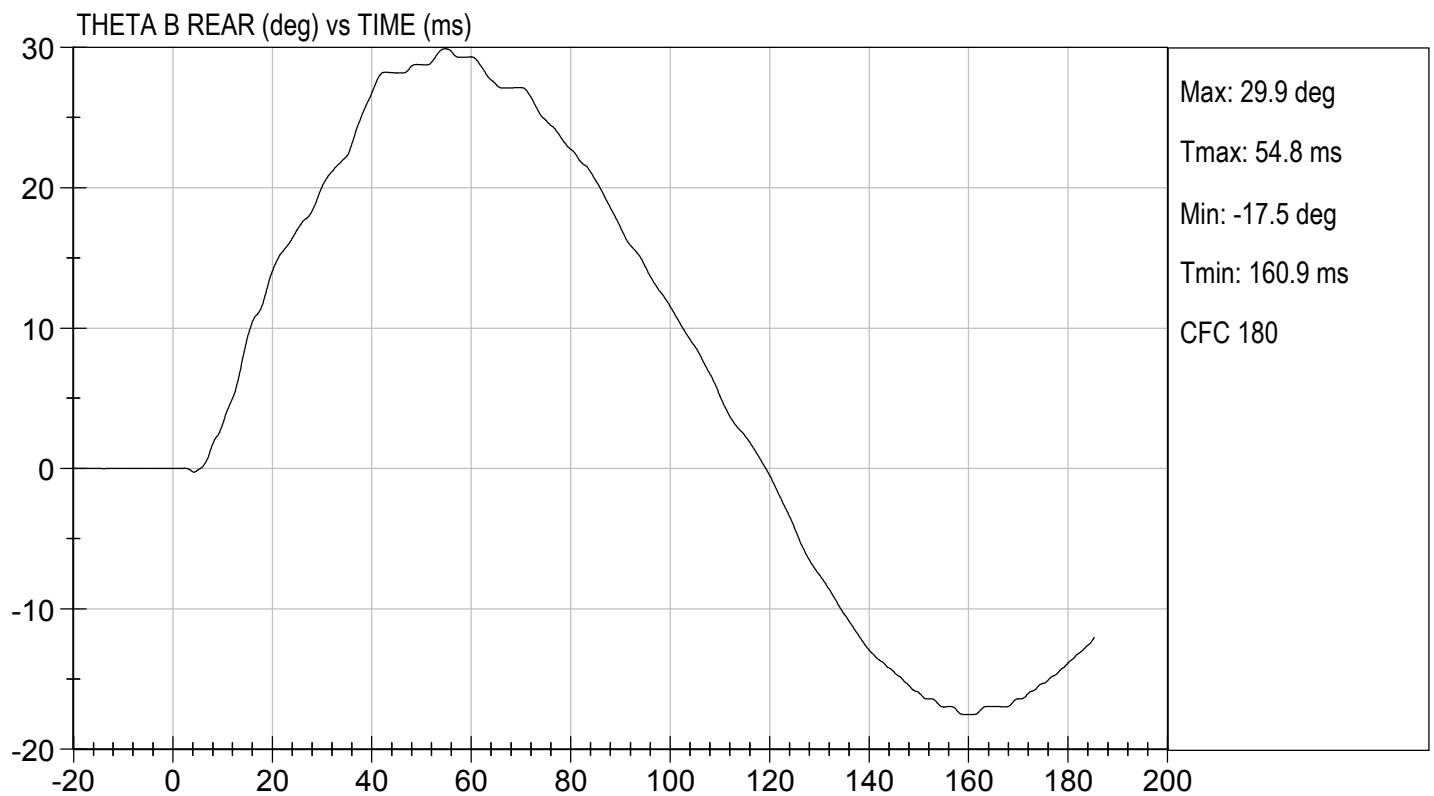
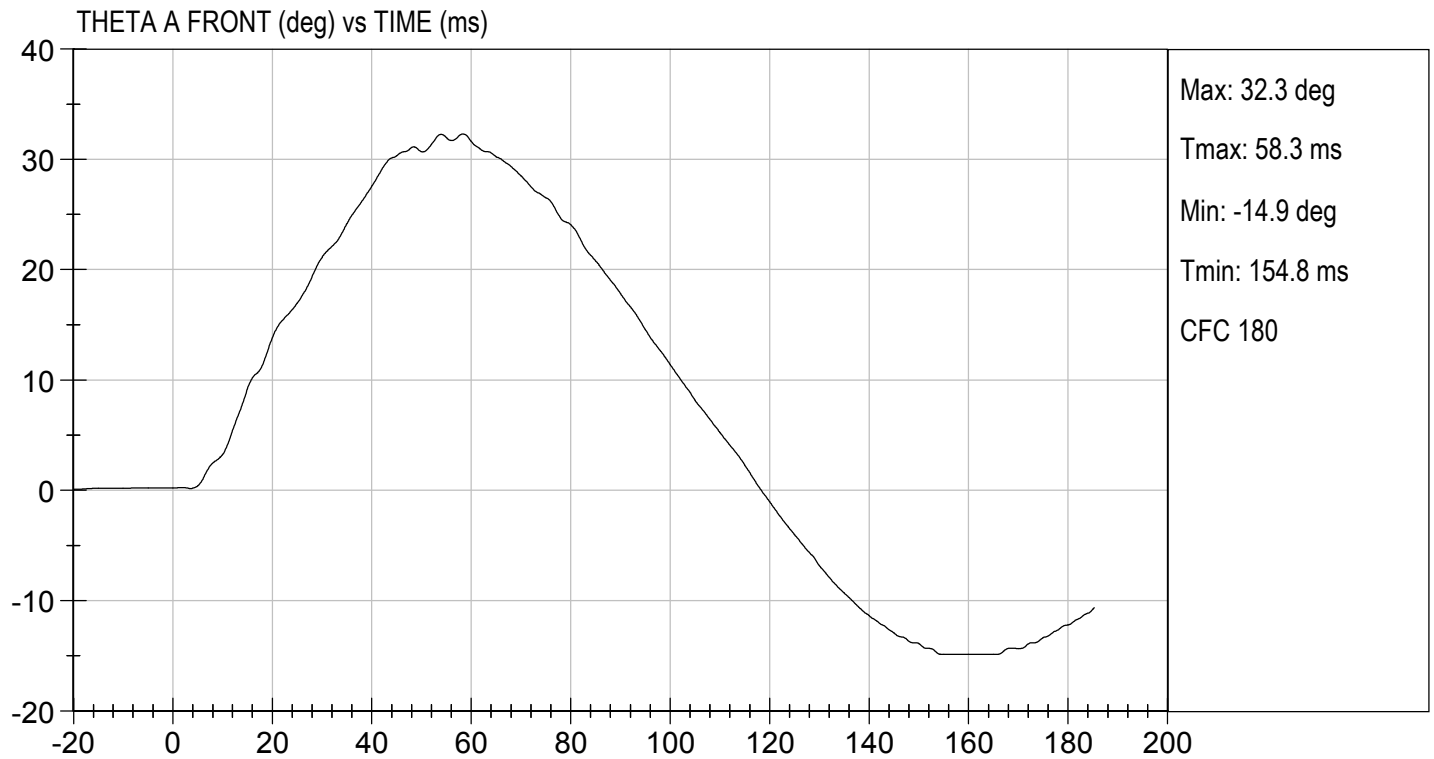
TEST DATE: 02/19/2021
TEST #: D210502





TEST DESC: NECK BENDING
VELOCITY: 11.49 ft/s, 3.50 m/s

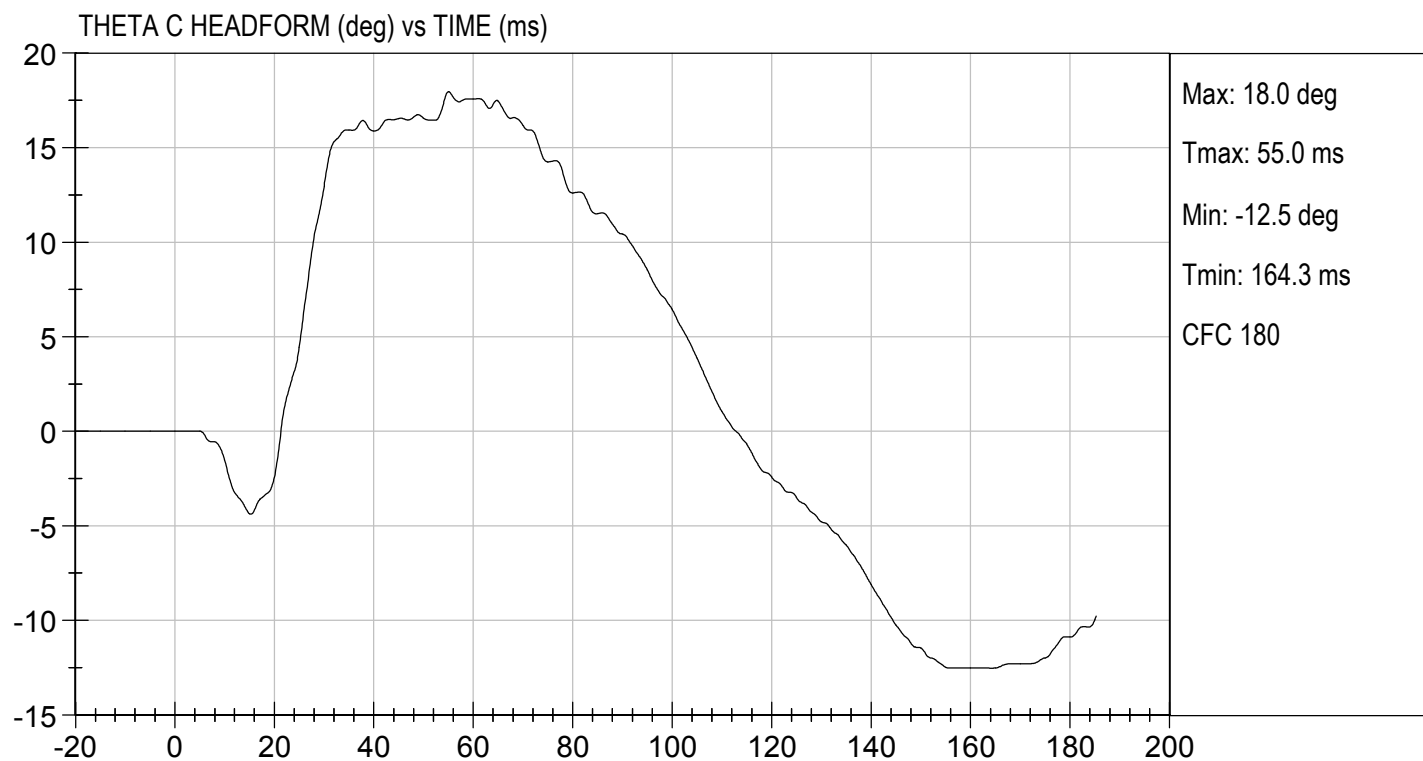
TEST DATE: 02/19/2021
TEST #: D210502





TEST DESC: NECK BENDING
VELOCITY: 11.49 ft/s, 3.50 m/s

TEST DATE: 02/19/2021
TEST #: D210502



MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
ES-2re DUMMY

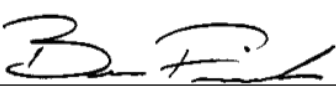
ATD Serial No: F032

Test I.D: D210503

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21	Pass
Laboratory Relative Humidity	%	10 to 70	15	Pass
Pendulum Speed	m/s	4.20 to 4.40	4.2	Pass
Peak Impactor Acceleration	G's	7.5 to 10.5	8.2	Pass
Overall Test Results				Pass


Laboratory Technician

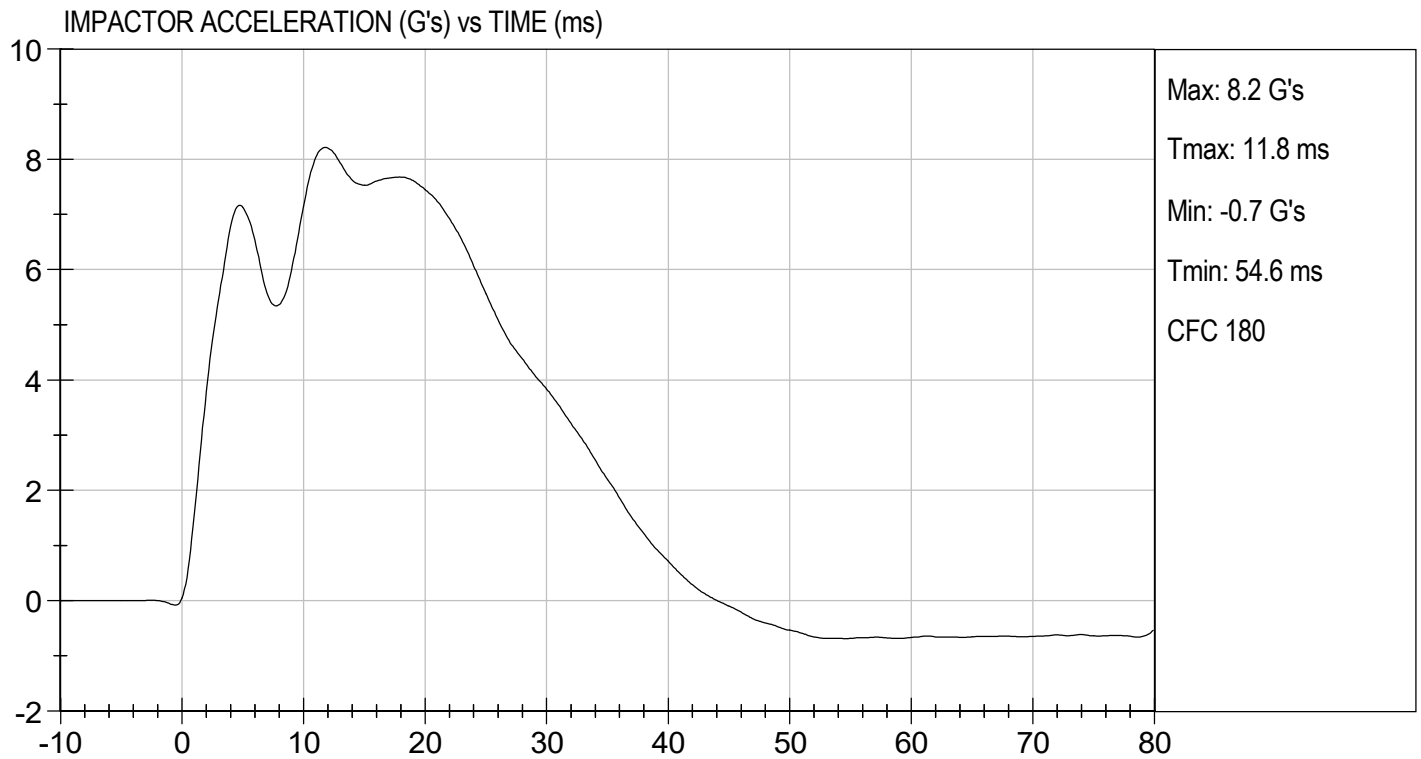
02/19/2021
Test Date


Approved By



TEST DESC: SHOULDER IMPACT
VELOCITY: 13.77 ft/s, 4.2 m/s

TEST DATE: 02/19/2021
TEST #: D210503



MGA RESEARCH CORPORATION

UPPER RIB TEST

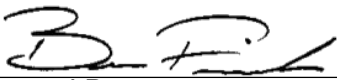
ES-2re DUMMY

ATD Serial No: F032

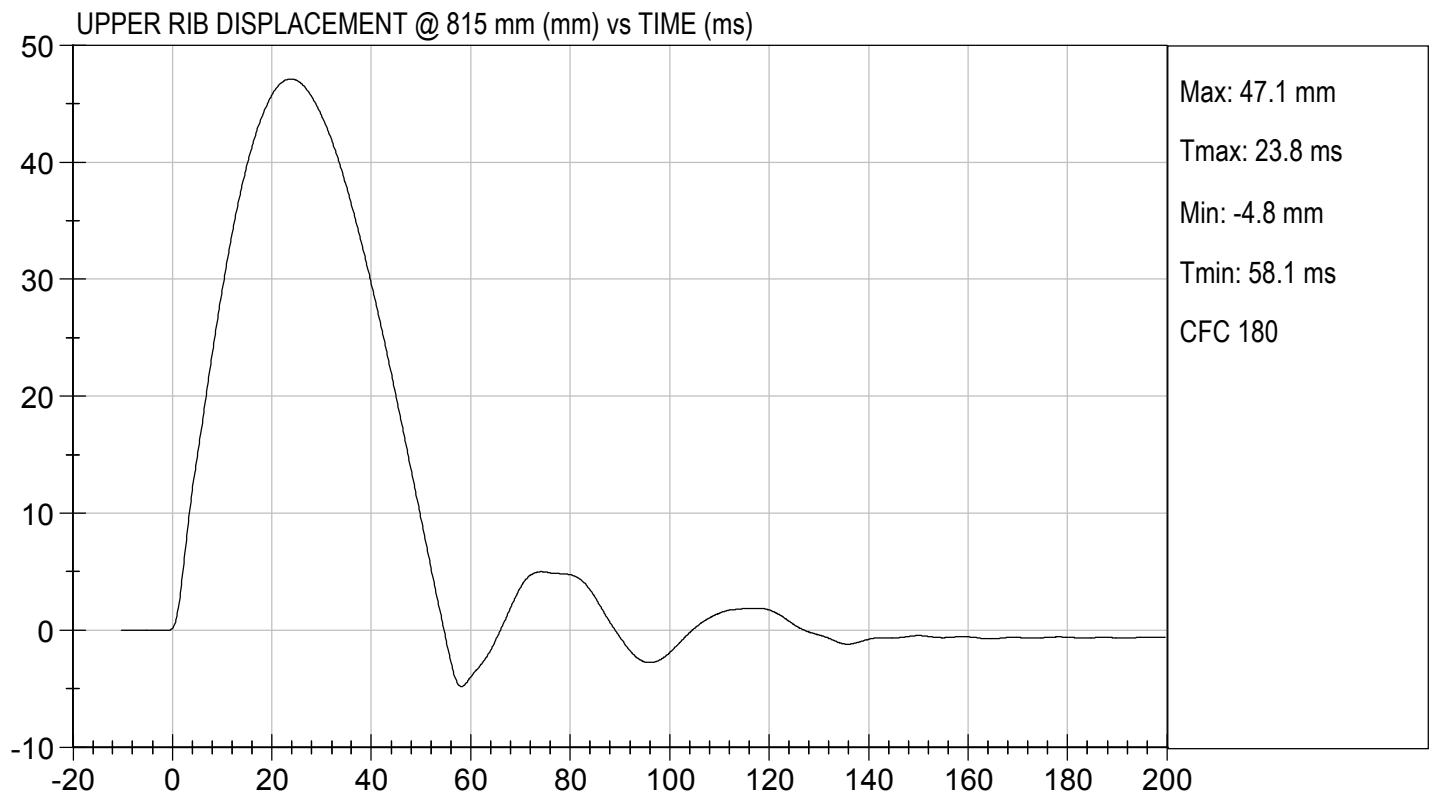
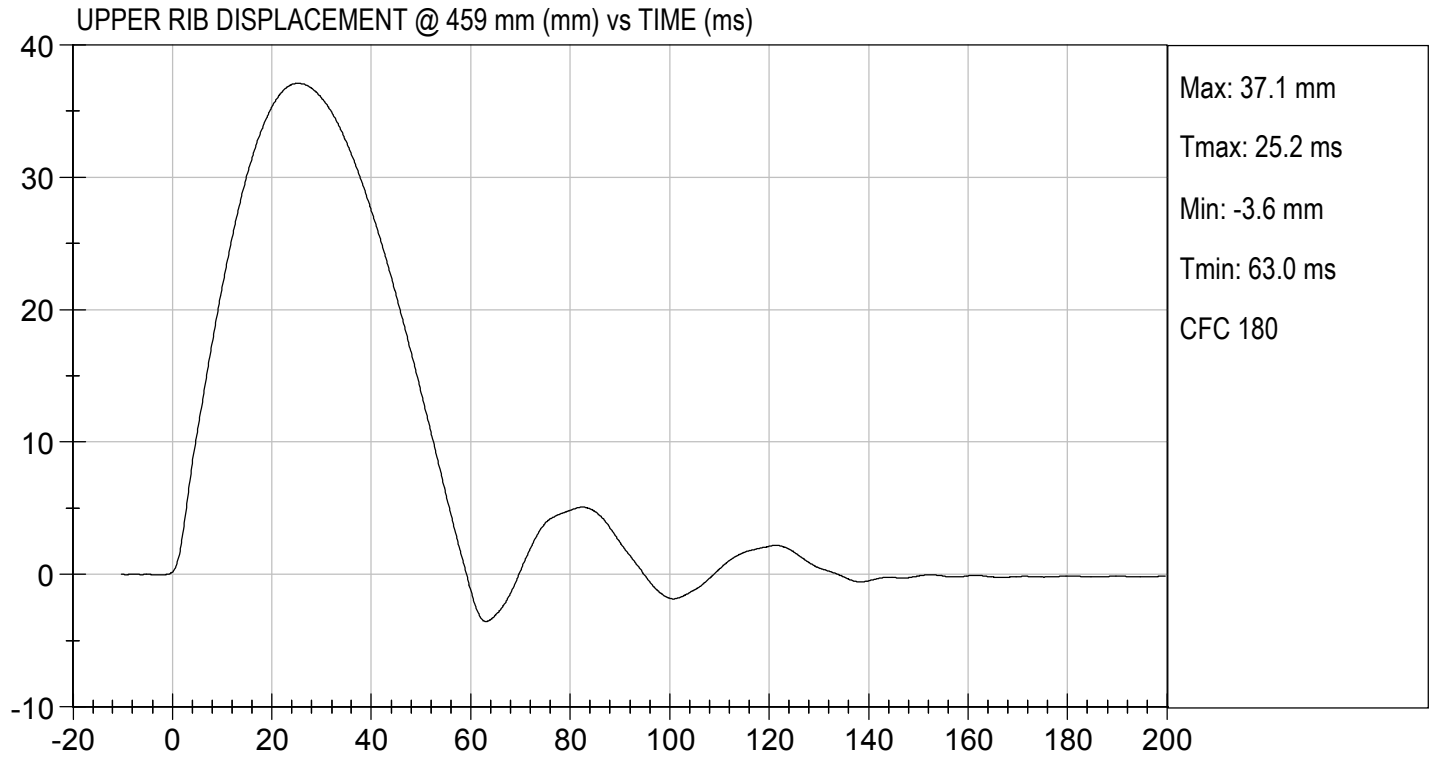
Test I.D: D210504

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	21	Pass
Displacement at 459 mm	mm	36.0 to 40.0	37.1	Pass
Displacement at 815 mm	mm	46.0 to 51.0	47.1	Pass
Overall Test Results			Pass	


Laboratory Technician


Approved By

02/19/2021
Test Date



MGA RESEARCH CORPORATION

MID RIB TEST

ES-2re DUMMY

ATD Serial No: F032

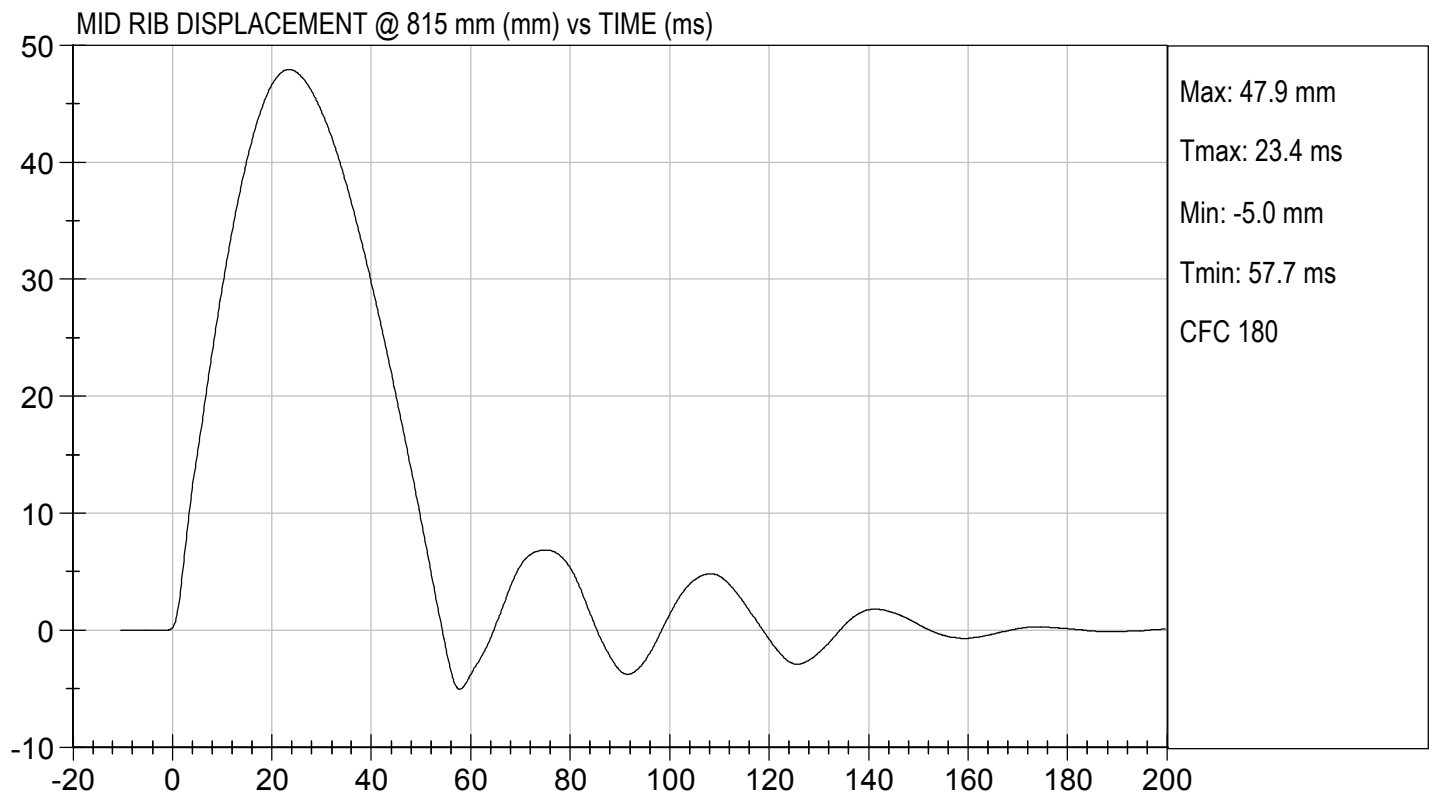
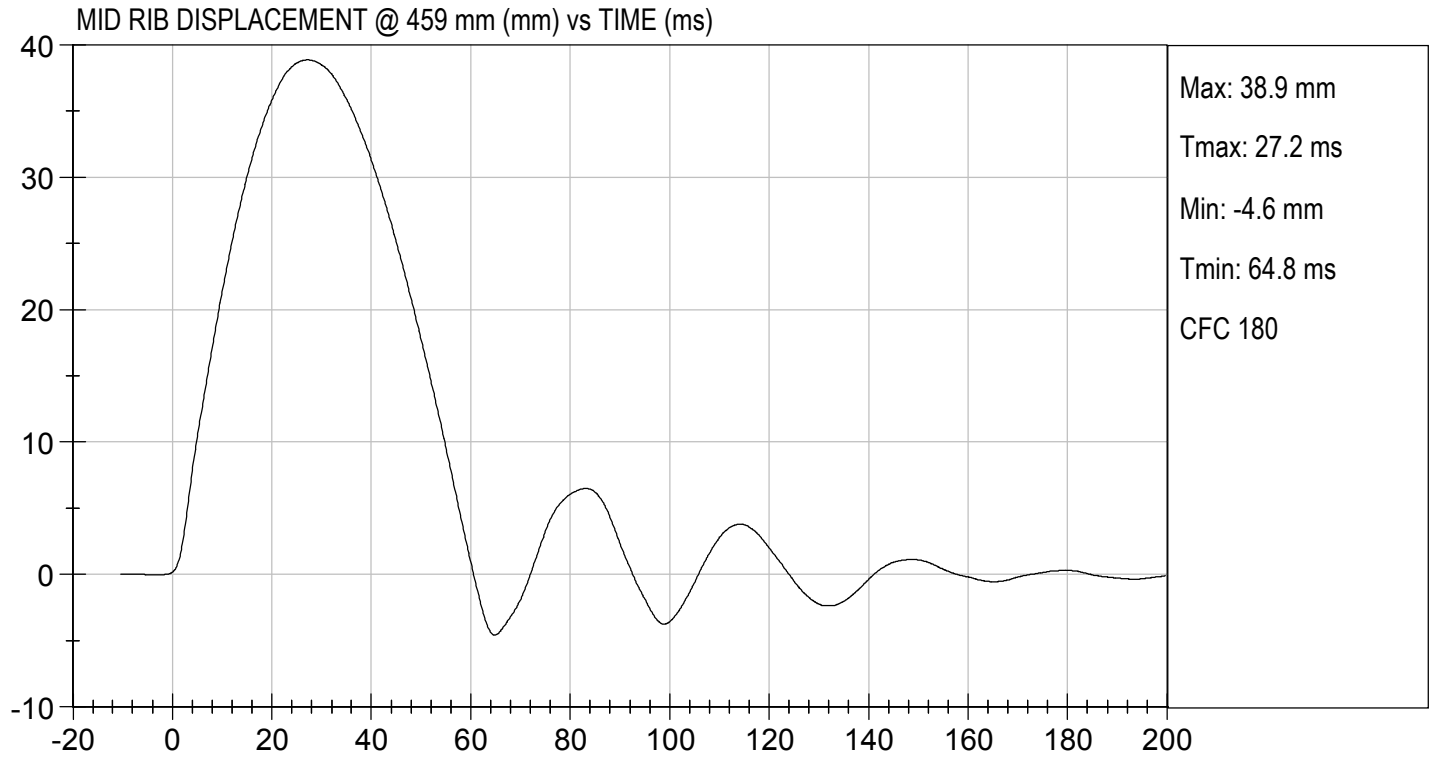
Test I.D: D210505

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	21	Pass
Displacement at 459 mm	mm	36.0 to 40.0	38.9	Pass
Displacement at 815 mm	mm	46.0 to 51.0	47.9	Pass
Overall Test Results				Pass


Laboratory Technician


Approved By

02/19/2021
Test Date



MGA RESEARCH CORPORATION

LOWER RIB TEST

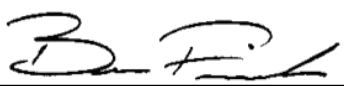
ES-2re DUMMY

ATD Serial No: F032

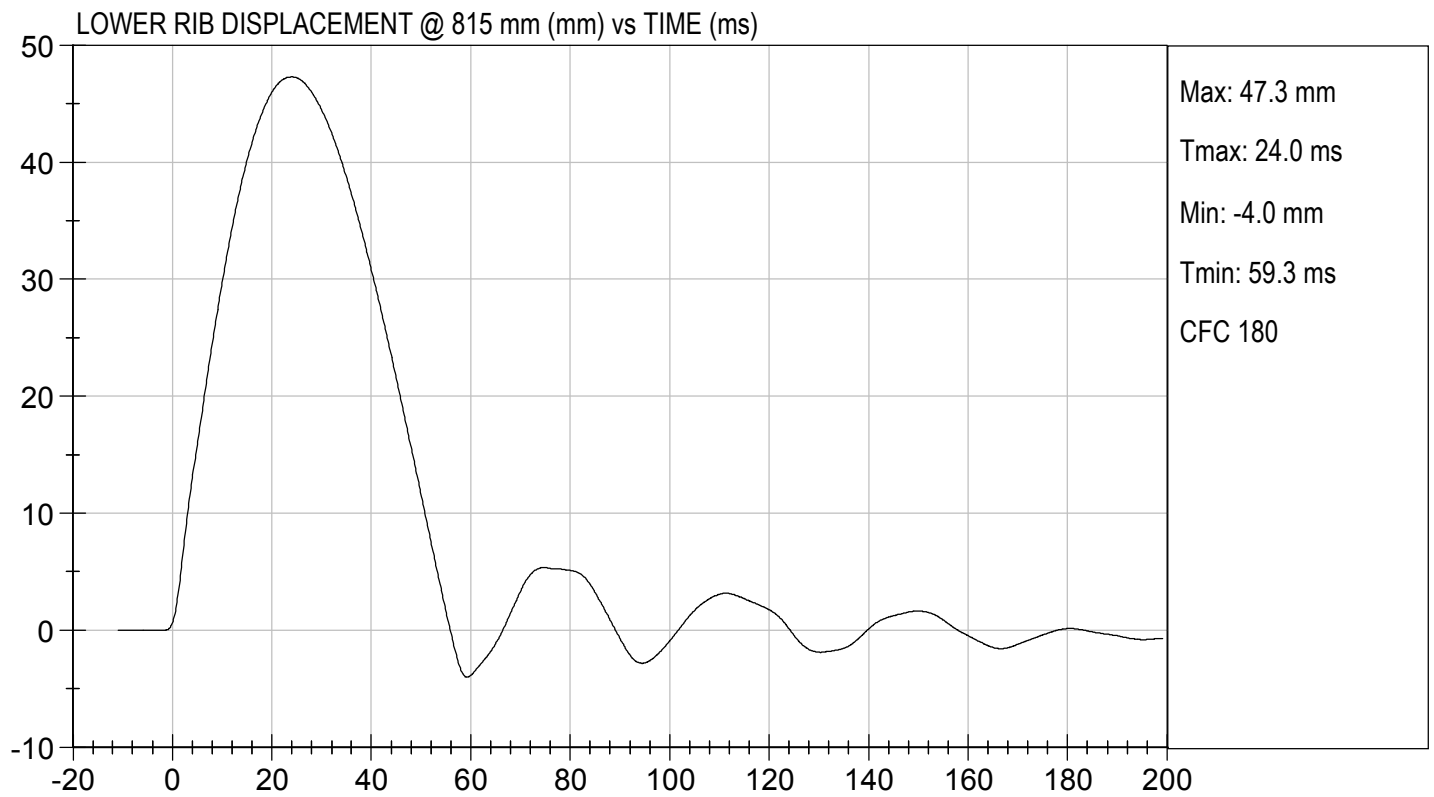
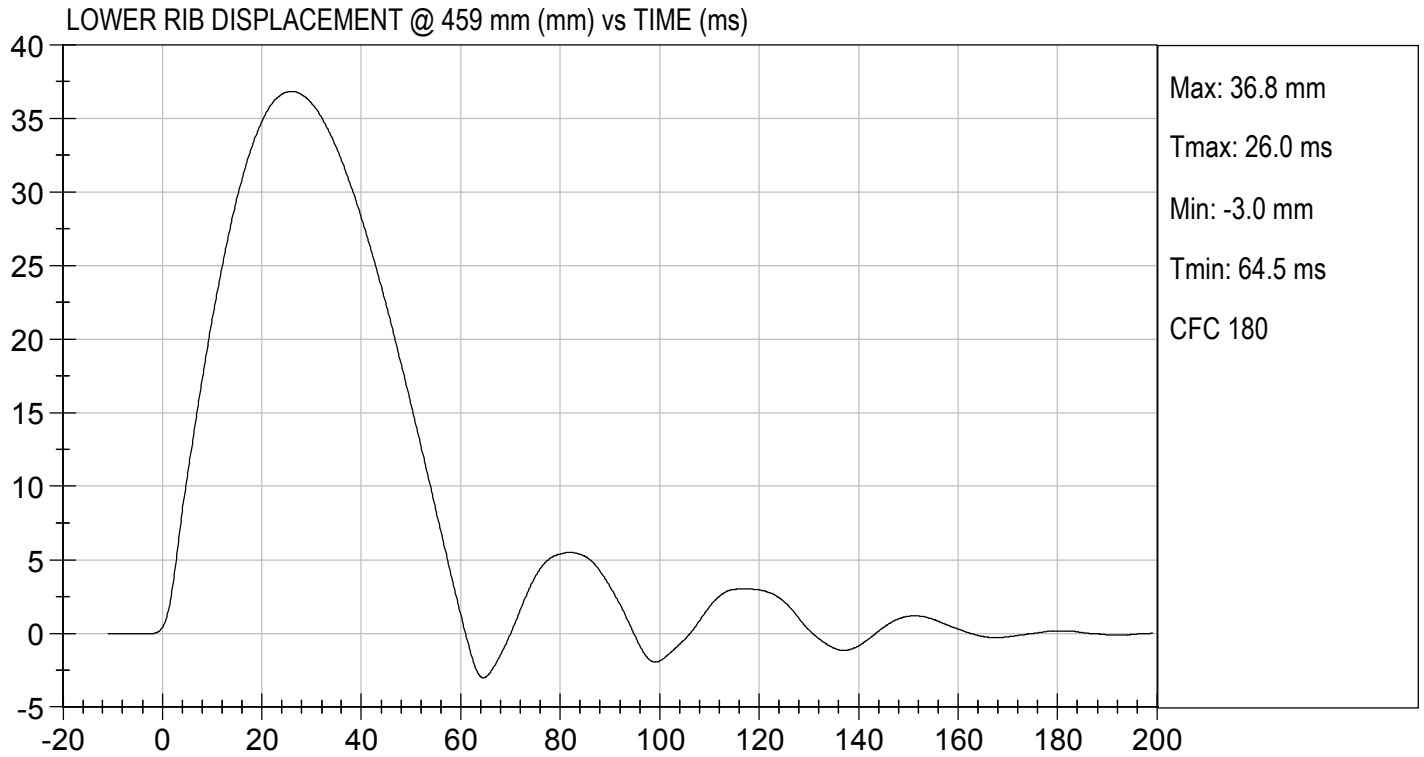
Test I.D: D210506

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	21	Pass
Displacement at 459 mm	mm	36.0 to 40.0	36.8	Pass
Displacement at 815 mm	mm	46.0 to 51.0	47.3	Pass
Overall Test Results			Pass	


Laboratory Technician


Approved By

02/19/2021
Test Date



MGA RESEARCH CORPORATION**ABDOMEN TEST****ES-2re DUMMY****ATD Serial No:** F032**Test I.D:** D210507

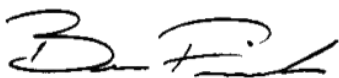
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21	Pass
Laboratory Relative Humidity	%	10 to 70	15	Pass
Probe Speed	m/s	3.90 to 4.10	4.03	Pass
Maximum Impactor Force	N	4000 to 4800	4256	Pass
Time of Maximum Impactor Force	ms	10.6 to 13.0	10.8	Pass
Maximum Total Abdomen Force	N	2200 to 2700	2296	Pass
Time of Maximum Abdomen Force	ms	10.0 to 12.3	10.3	Pass
Overall Test Results				Pass



Laboratory Technician

02/19/2021

Test Date

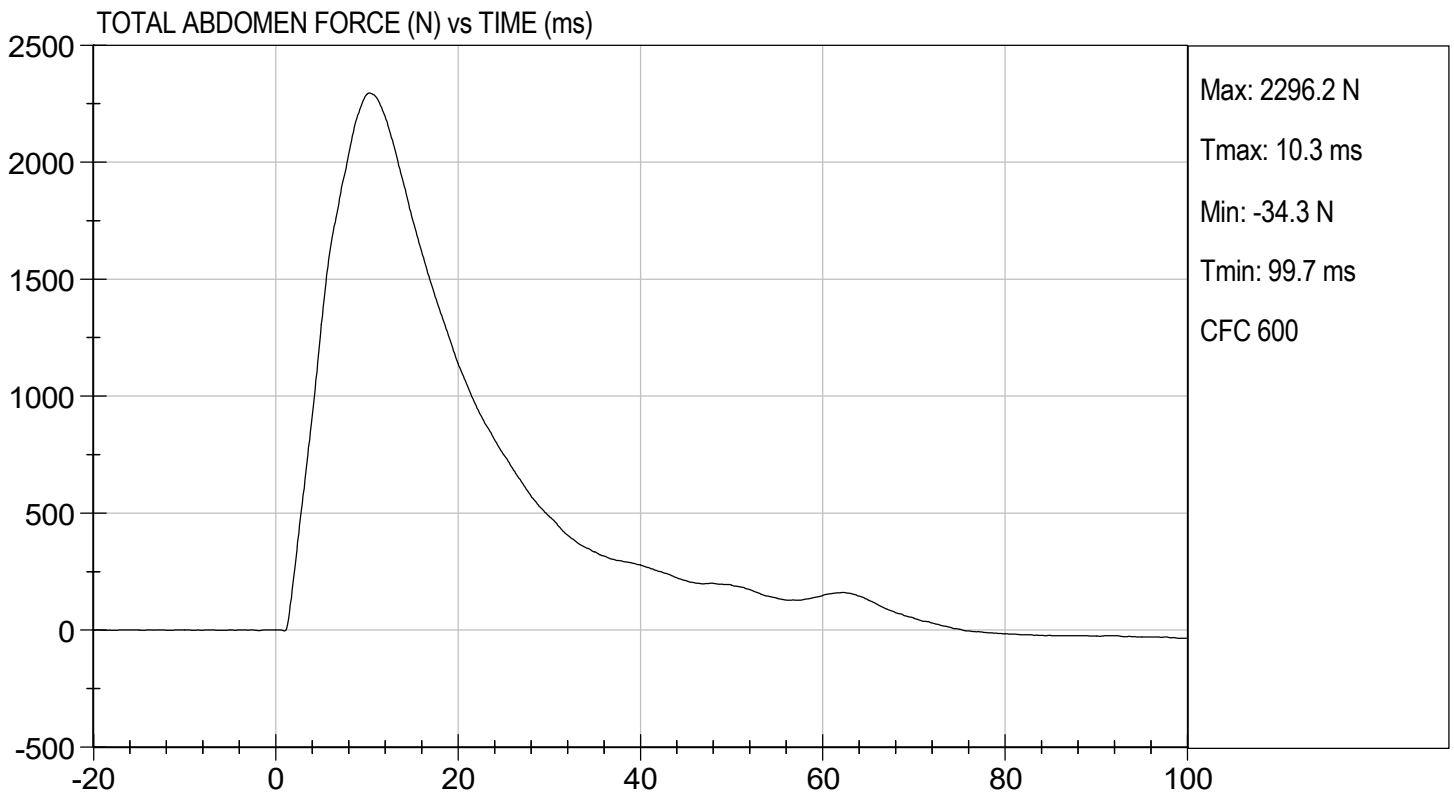
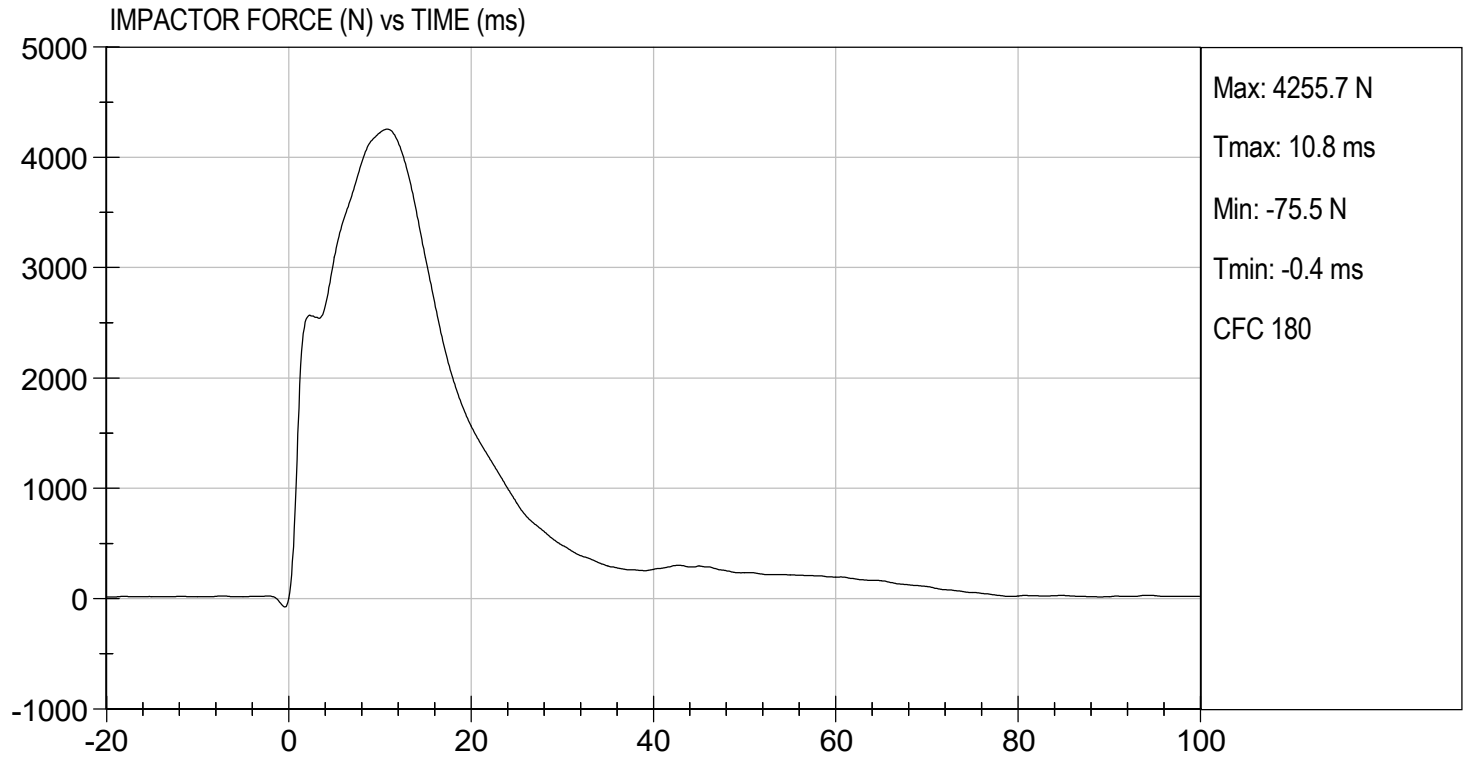


Approved By



TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.23 ft/s, 4.03 m/s

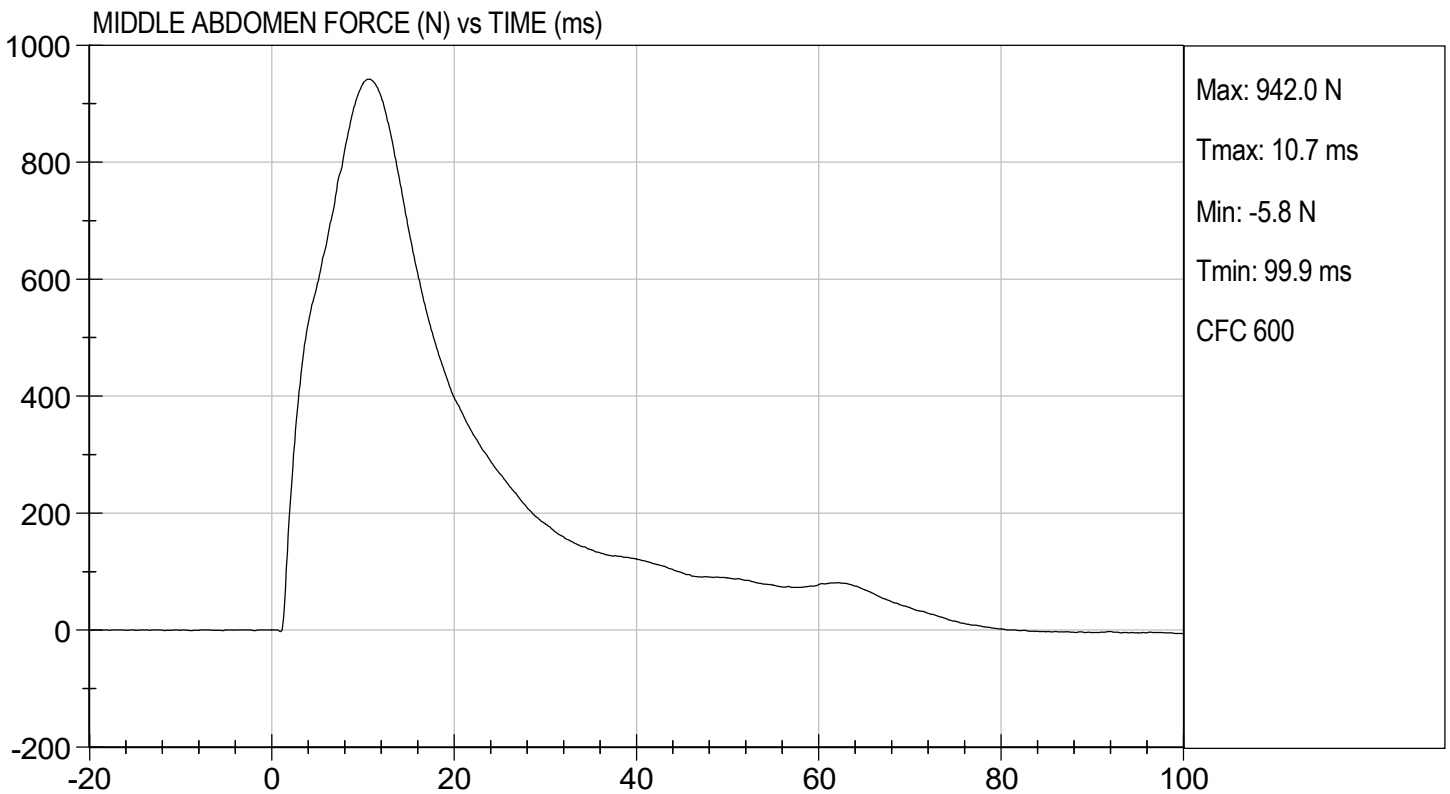
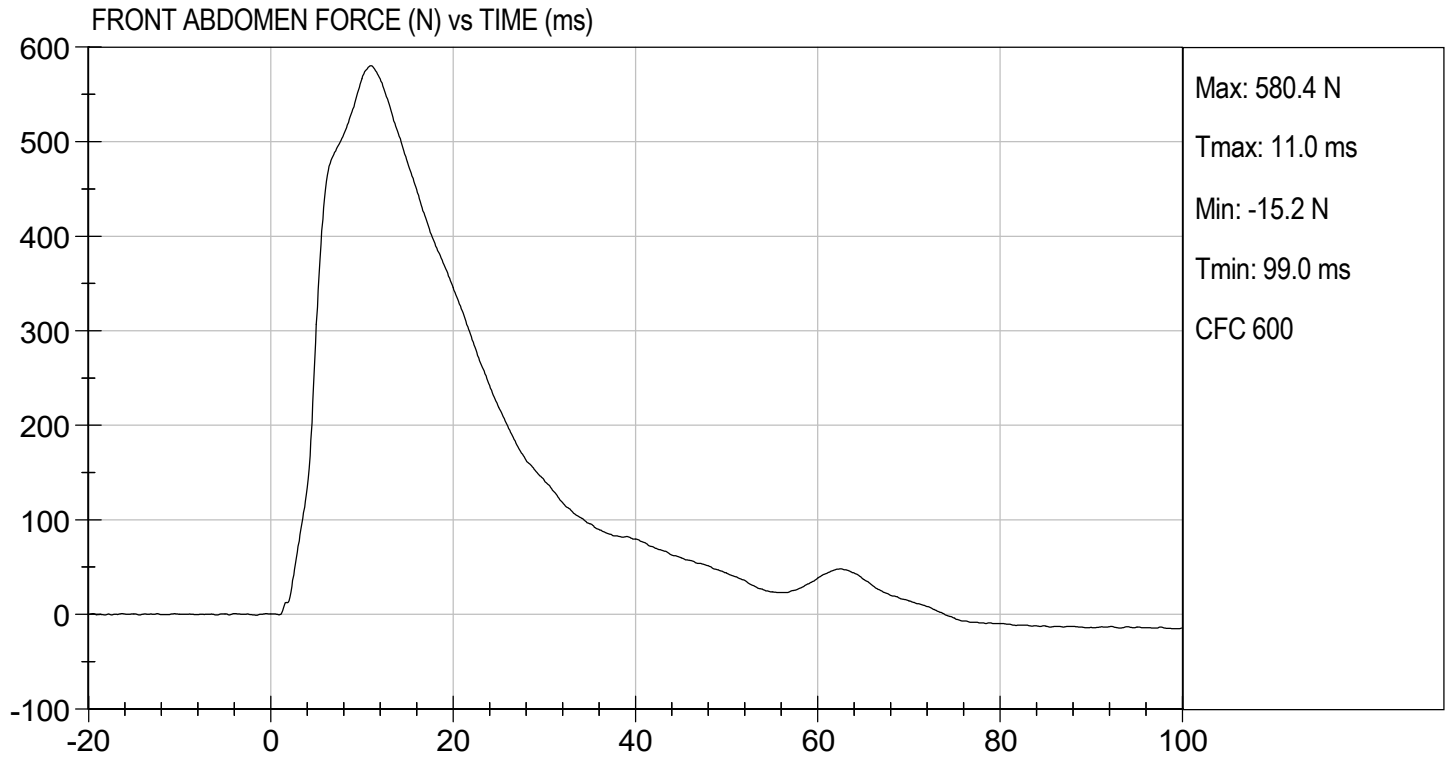
TEST DATE: 02/19/2021
TEST #: D210507





TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.23 ft/s, 4.03 m/s

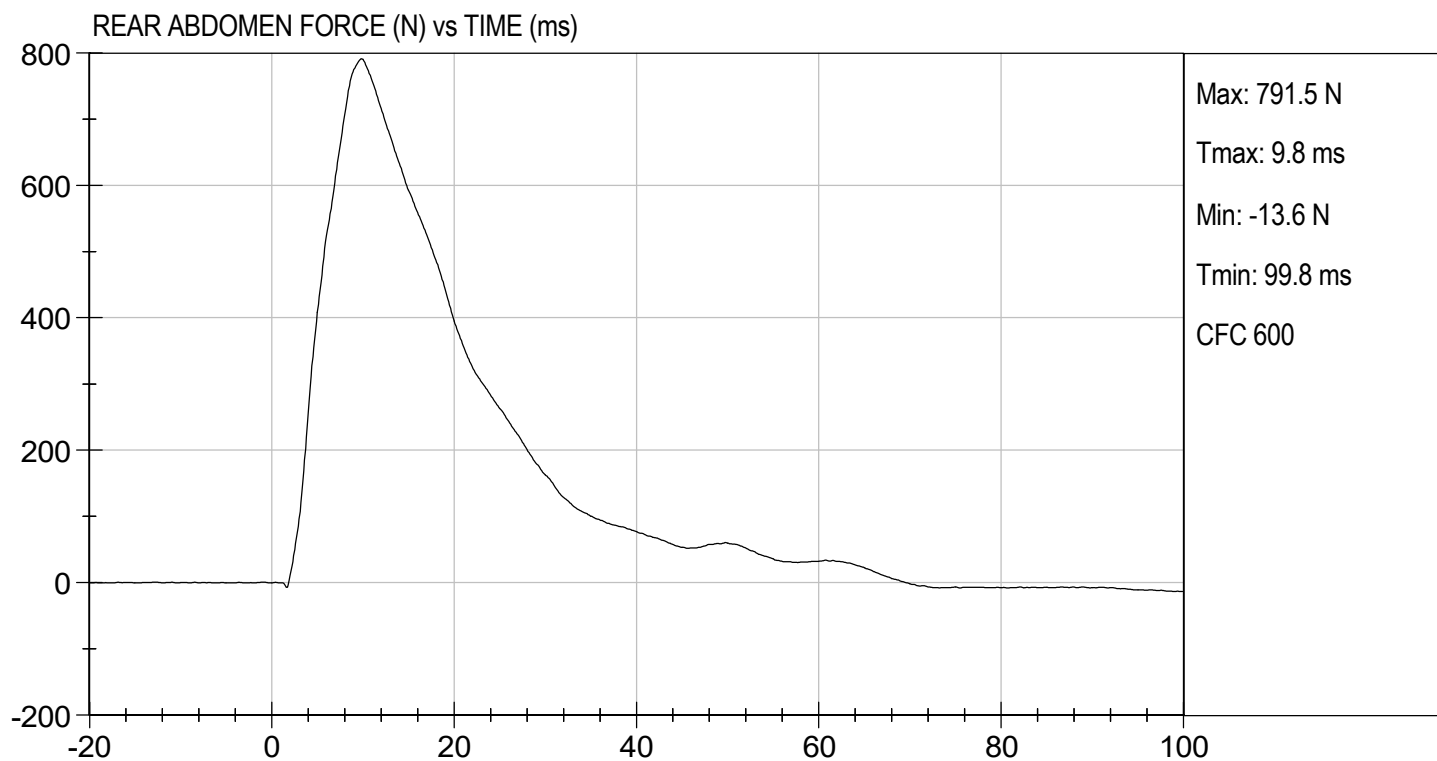
TEST DATE: 02/19/2021
TEST #: D210507





TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.23 ft/s, 4.03 m/s

TEST DATE: 02/19/2021
TEST #: D210507



MGA RESEARCH CORPORATION
LUMBAR SPINE TEST
ES-2re DUMMY

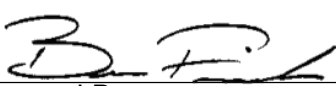
ATD Serial No: F032

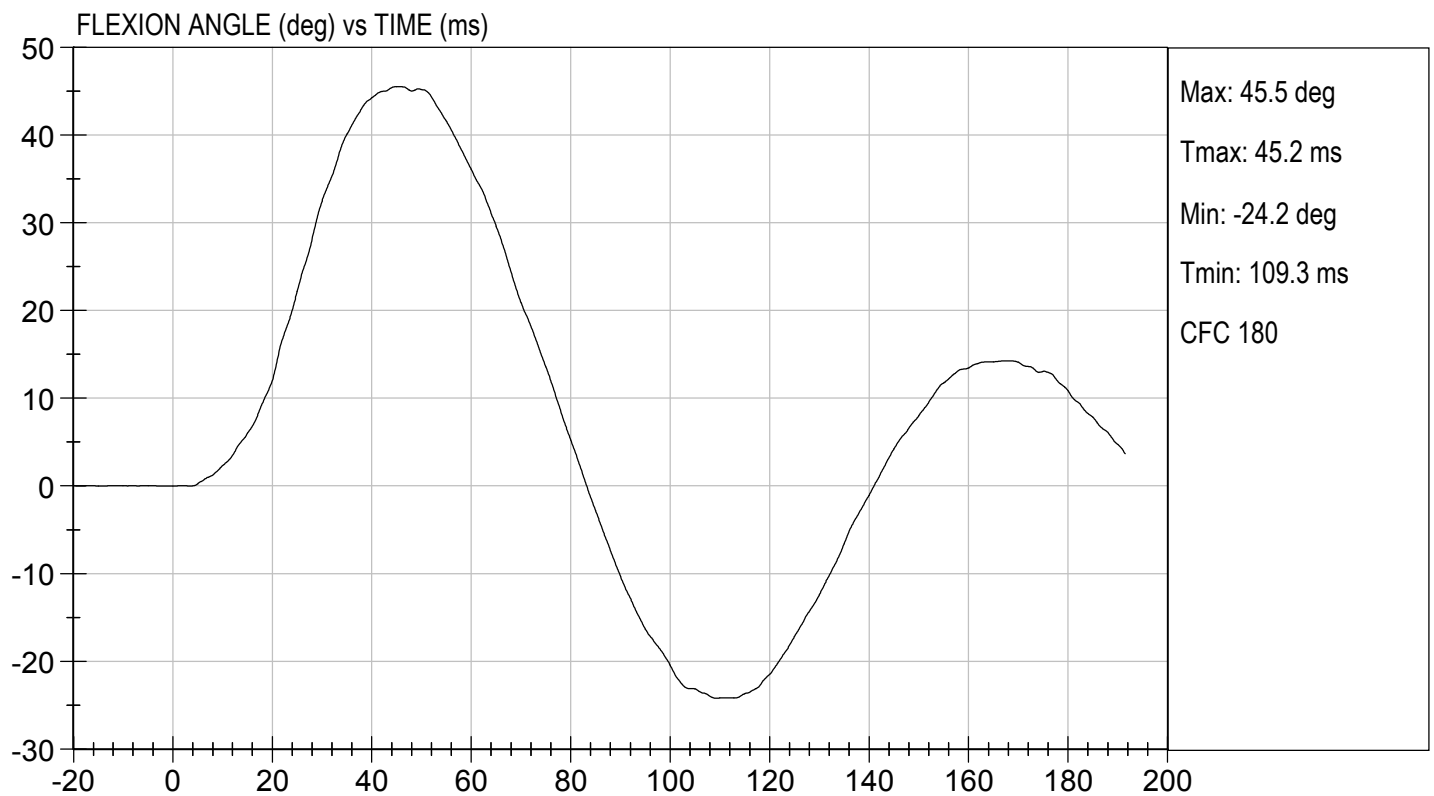
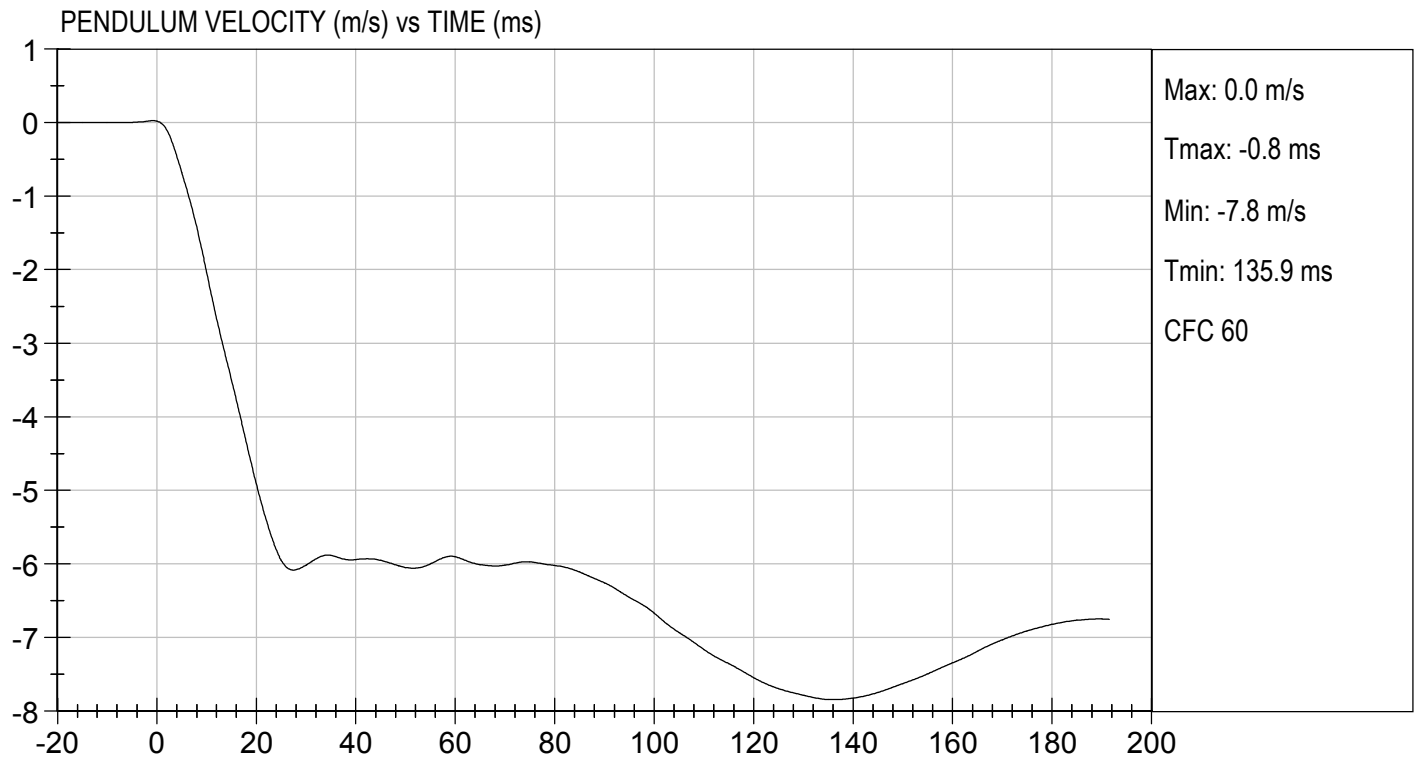
Test I.D: D210508

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity		%	10 to 70	20	Pass
Pendulum Speed		m/s	5.95 to 6.15	6.12	Pass
Pendulum Velocity	1 ms	m/s	-0.05 to 0.00	-0.02	Pass
	3.7 ms	m/s	-0.425 to -0.24	-0.392	Pass
	27 ms	m/s	-6.50 to -5.80	-6.08	Pass
	30 ms	m/s	>= -6.50	-6.02	Pass
Maximum Flexion Angle		deg	45.0 to 55.0	45.5	Pass
Time of Maximum Flexion Angle		ms	39.0 to 53.0	45.2	Pass
Headform Rotation Decay to Initial Position		ms	37 to 57	38	Pass
Overall Results					Pass


 Laboratory Technician

02/19/2021
 Test Date

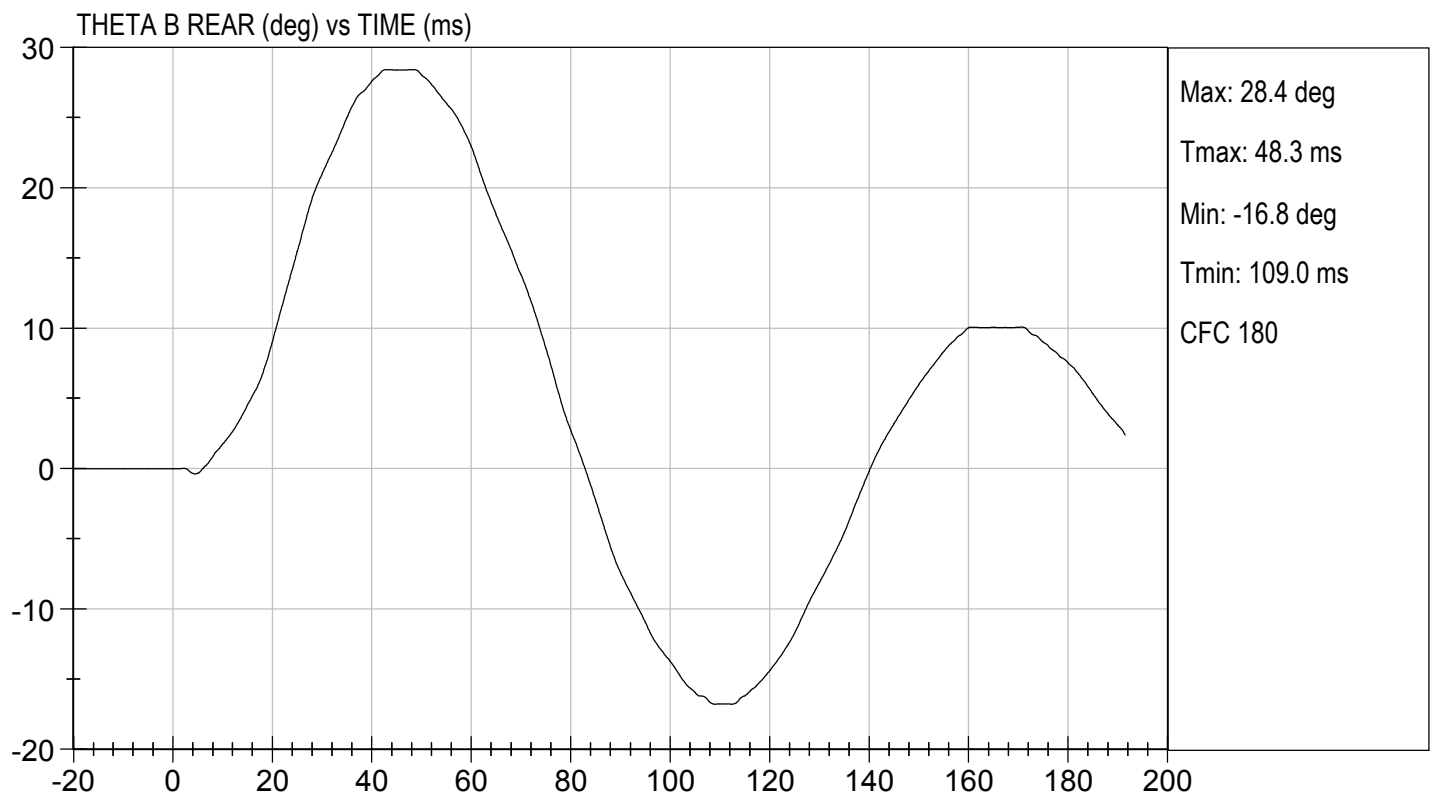
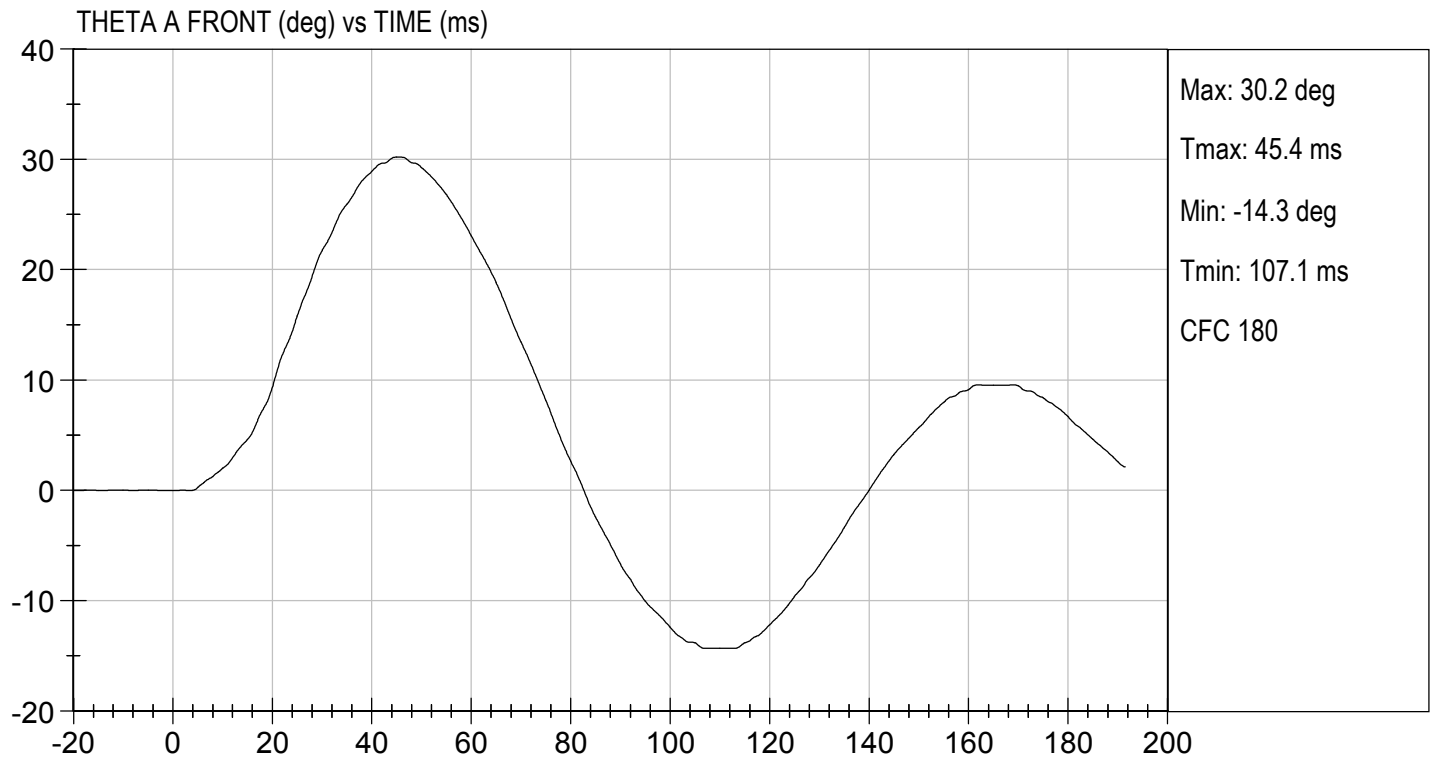

 Approved By





TEST DESC: LUMBAR BENDING
VELOCITY: 20.08 ft/s, 6.12 m/s

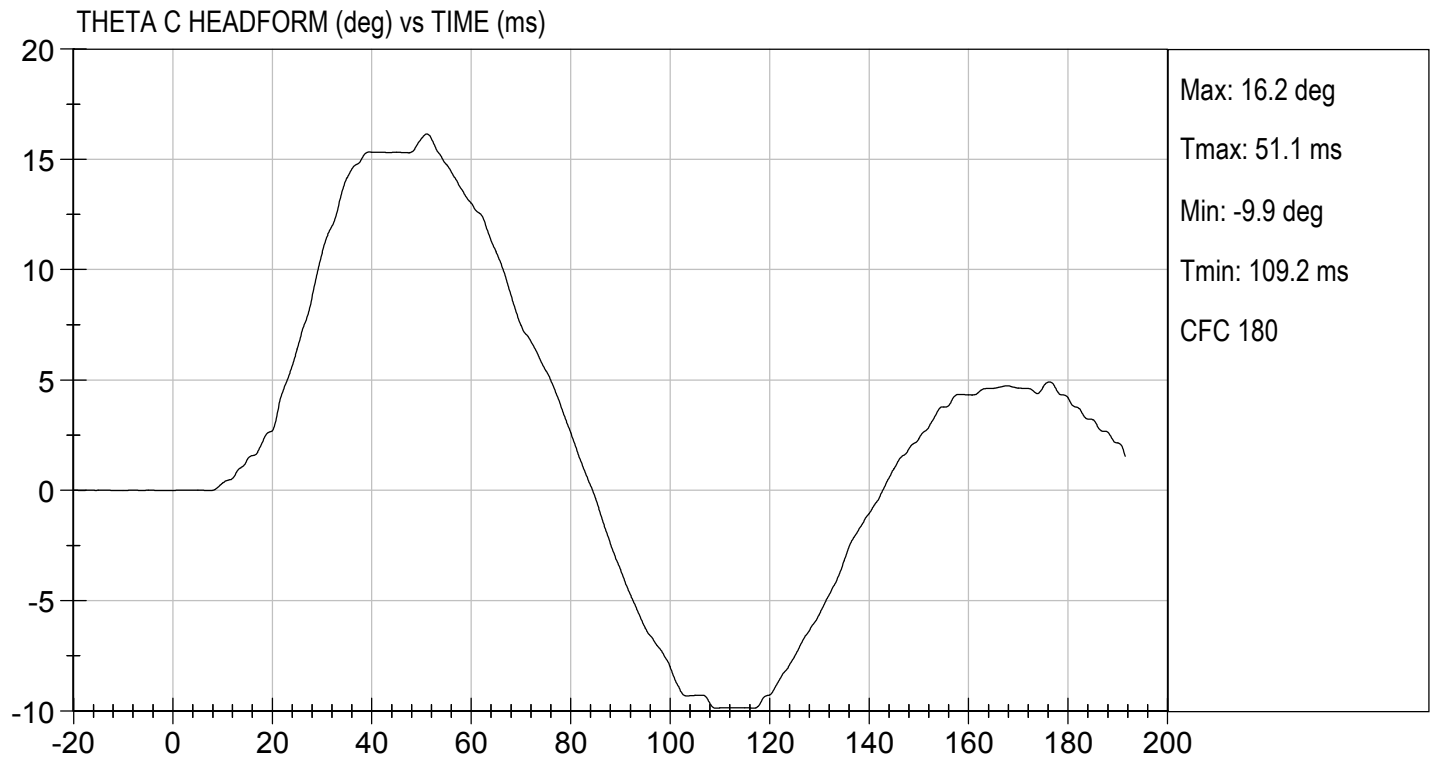
TEST DATE: 02/19/2021
TEST #: D210508





TEST DESC: LUMBAR BENDING
VELOCITY: 20.08 ft/s, 6.12 m/s

TEST DATE: 02/19/2021
TEST #: D210508

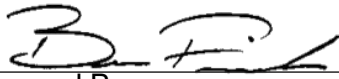


MGA RESEARCH CORPORATION**PELVIS TEST
ES-2re DUMMY****ATD Serial No:** F032**Test I.D:** D210509

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21	Pass
Laboratory Relative Humidity	%	10 to 70	15	Pass
Probe Speed	m/s	4.20 to 4.40	4.23	Pass
Maximum Impactor Force	N	4700 to 5400	5196	Pass
Time of Maximum Impactor Force	ms	11.8 to 16.1	12.8	Pass
Maximum Pubic Force	N	1230 to 1590	1449	Pass
Time of Maximum Pubic Force	ms	12.2 to 17.0	13.3	Pass
Overall Test Results				Pass


Laboratory Technician

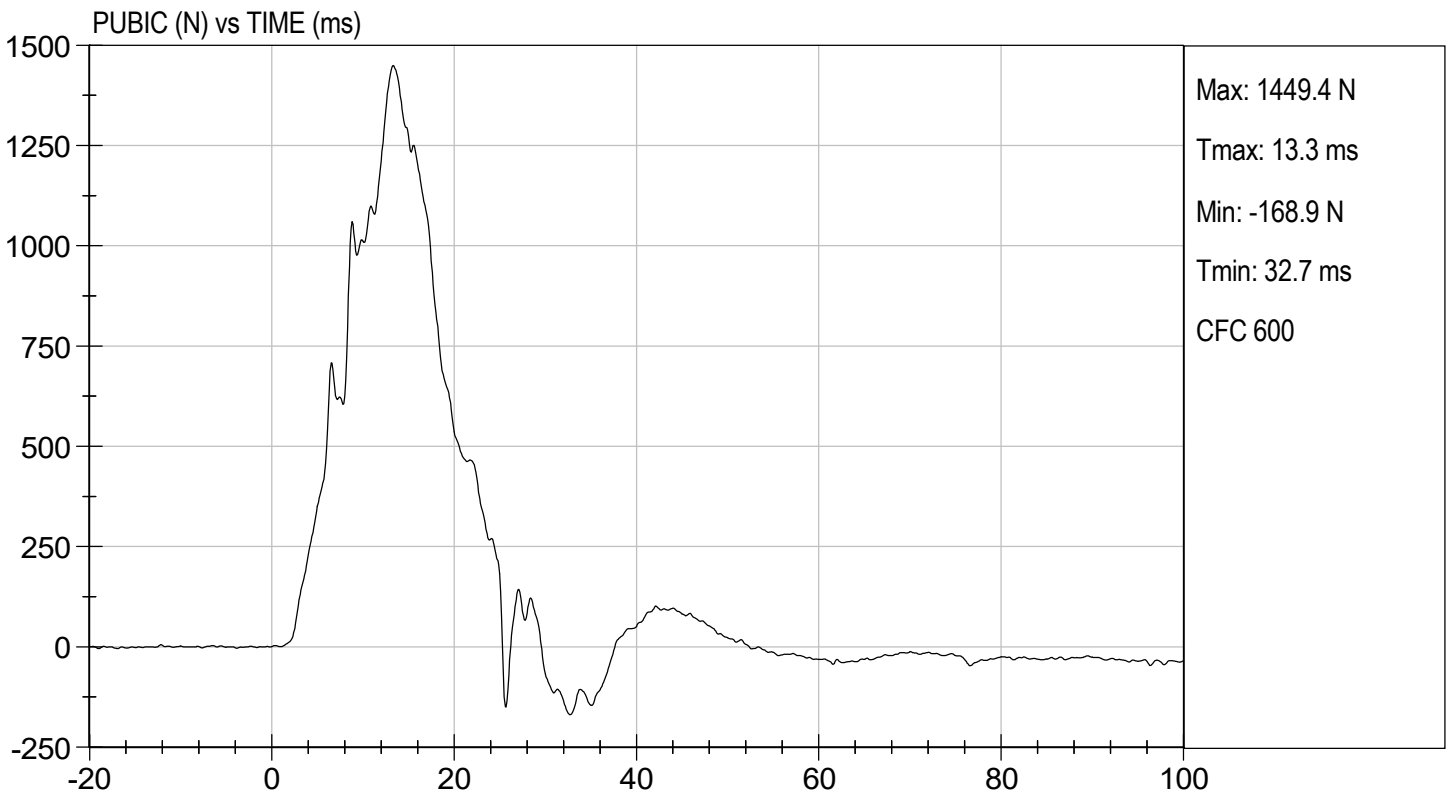
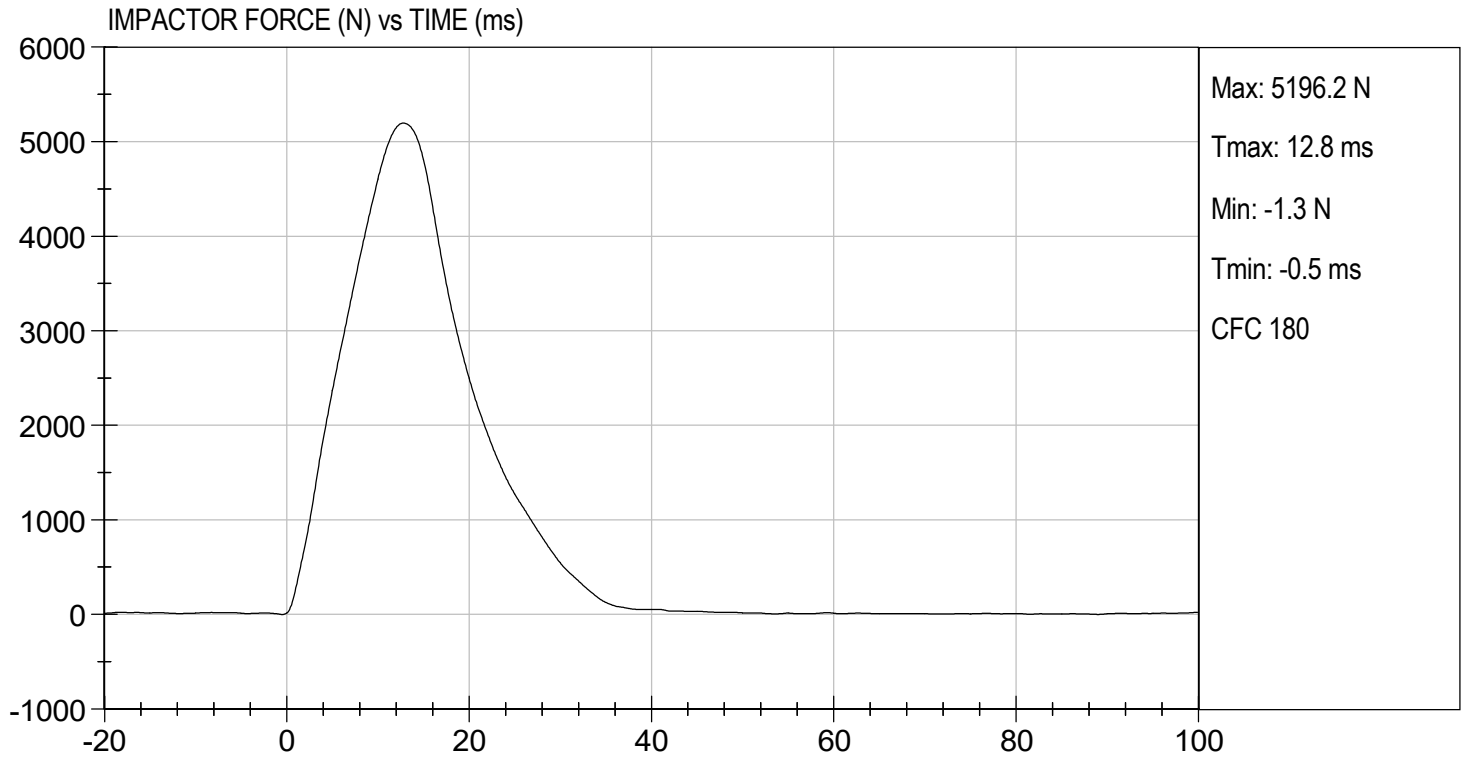
02/19/2021
Test Date


Approved By



TEST DESC: PELVIS IMPACT
VELOCITY: 13.89 ft/s, 4.23 m/s

TEST DATE: 02/19/2021
TEST #: D210509

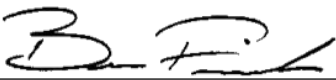


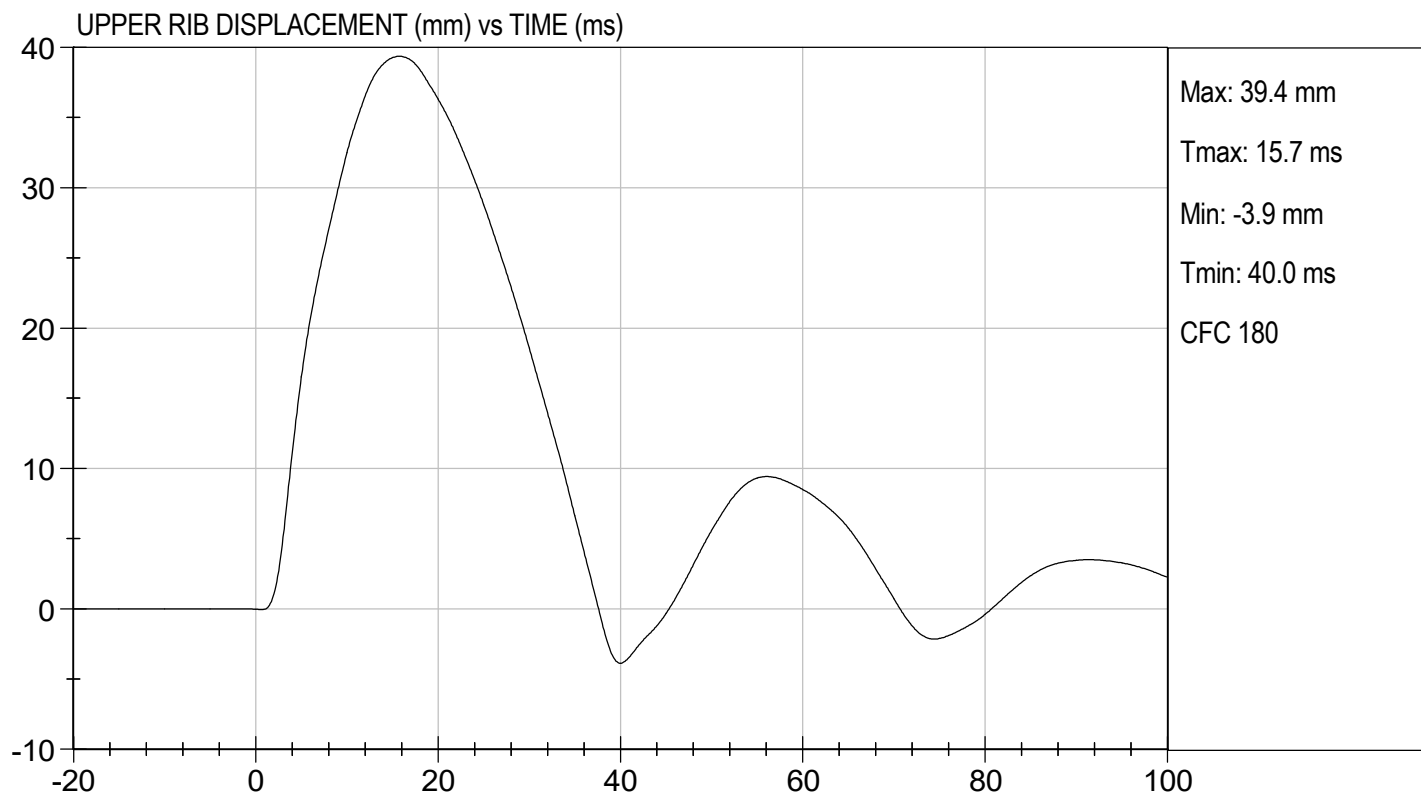
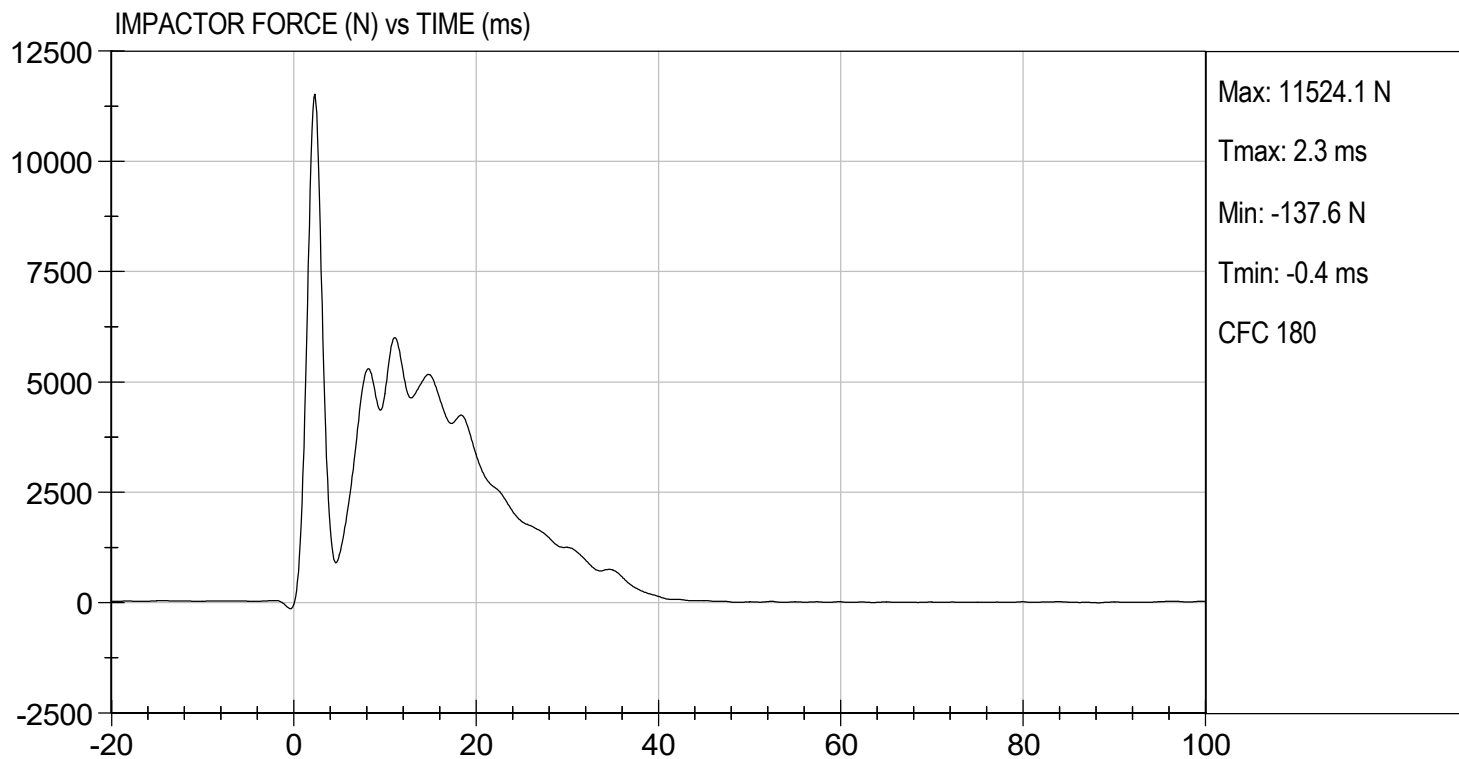
MGA RESEARCH CORPORATION**THORAX IMPACT TEST****ES-2re DUMMY****ATD Serial No:** F032**Test I.D:** D210500

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21	Pass
Humidity	%	10 to 70	15	Pass
Probe Speed	m/s	5.40 to 5.60	5.52	Pass
Maximum Impactor Force (after 6 ms)	N	5100 to 6200	6008	Pass
Upper Rib Displacement	mm	34.0 to 41.0	39.4	Pass
Middle Rib Displacement	mm	37.0 to 45.0	40.5	Pass
Lower Rib Displacement	mm	37.0 to 44.0	40.4	Pass
Overall Test Results			Pass	


Laboratory Technician

02/19/2021
Test Date

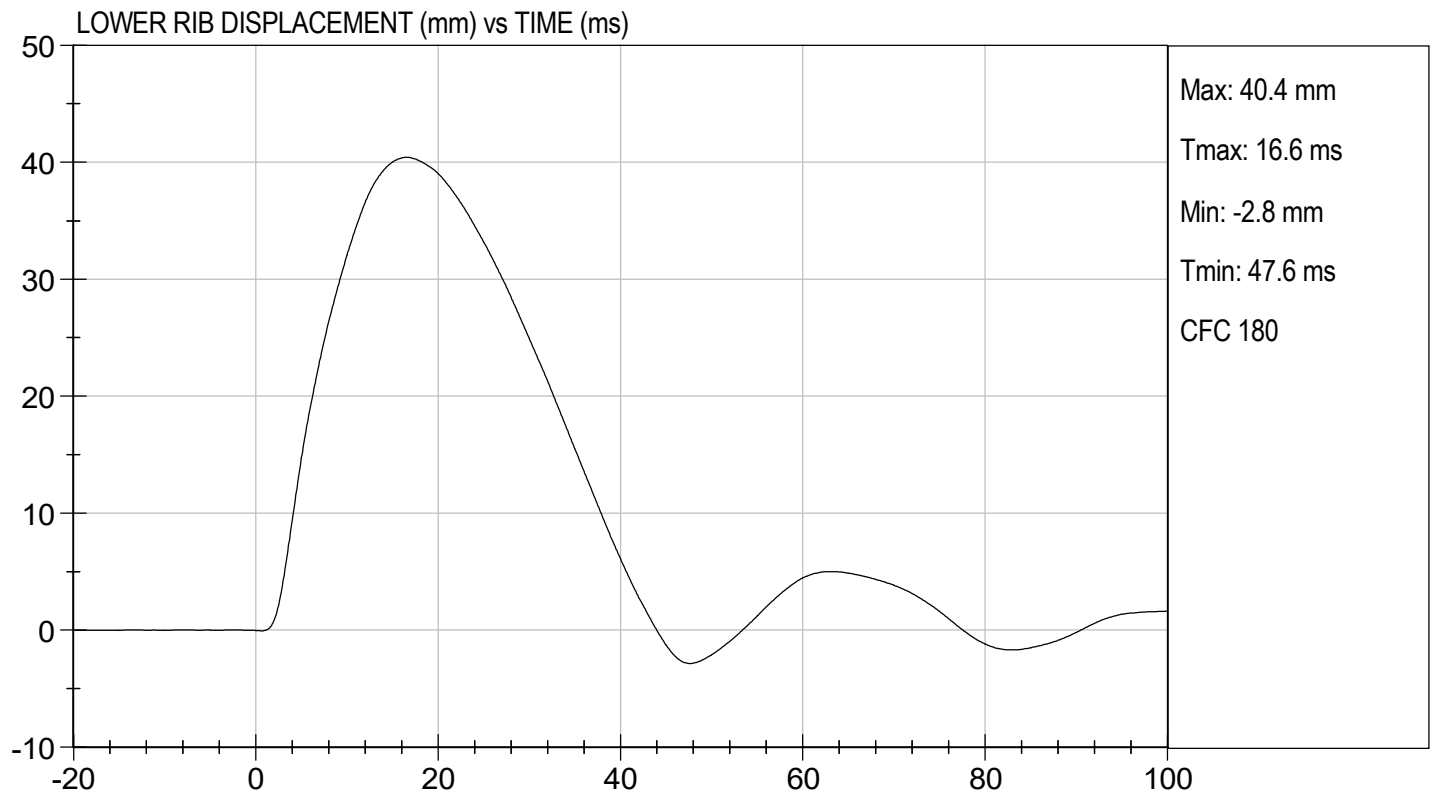
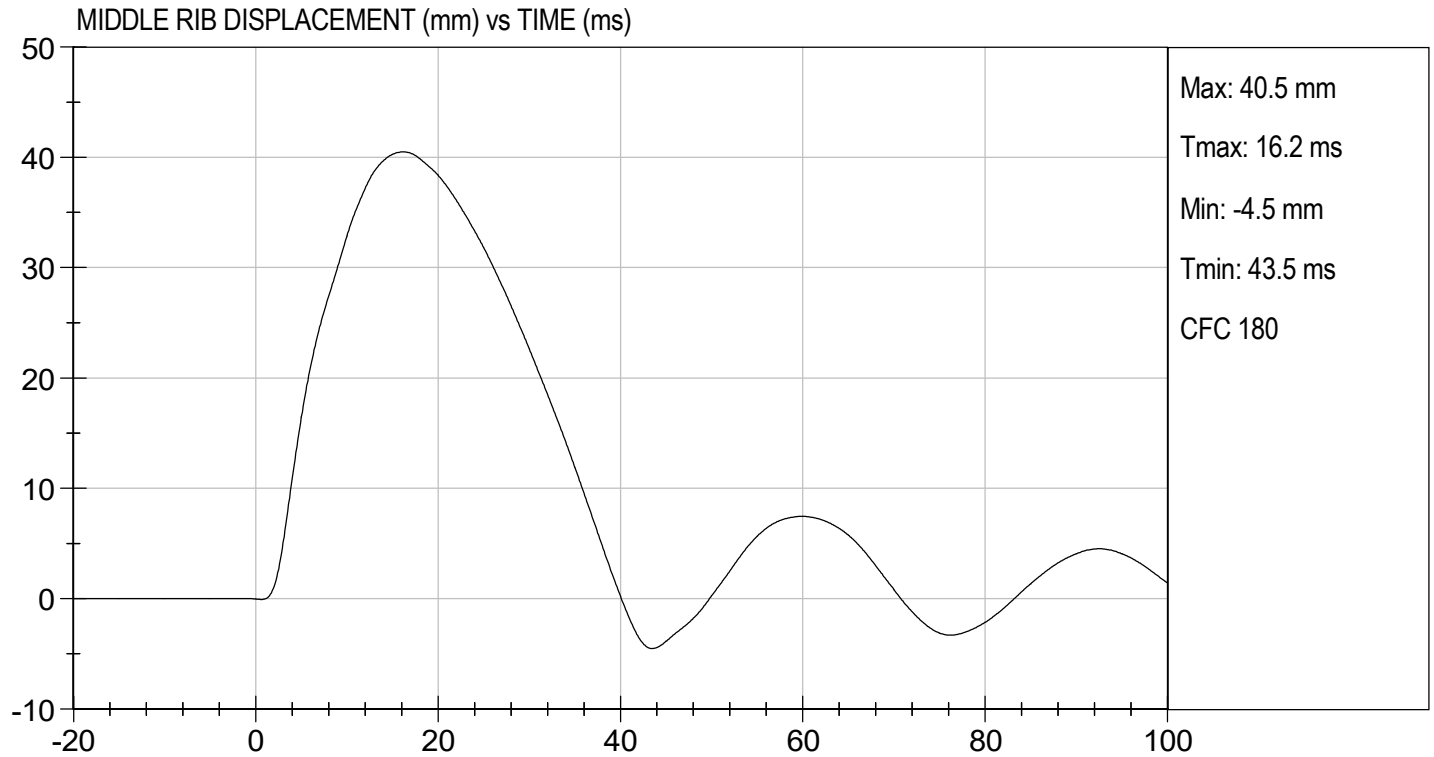

Approved By





TEST DESC: THORAX IMPACT
VELOCITY: 18.12 ft/s, 5.52 m/s

TEST DATE: 02/19/2021
TEST #: D210500



CALIBRATION TEST RESULTS

PRE-TEST

SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD

SID-IIsD External Measurements
SN: 306

No.	Name	Spec. (mm)	Result	Pass/Fail
A	Sitting Height	772 - 788	785	Pass
B	Shoulder Pivot Height	437 - 453	449	Pass
C	H-point Height	79 - 89	86	Pass
D	H-point from Seatback	141 - 151	147	Pass
E	Shoulder Pivot from Backline	97 - 107	99	Pass
F	Thigh Clearance	119 -135	120	Pass
G	Head Breadth	140 - 148	141	Pass
H	Head Back from Backline	40 - 46	45	Pass
I	Head Depth	178 - 188	182	Pass
J	Head Circumference	541 - 551	550	Pass
K	Buttock to Knee Length	514 - 540	538	Pass
L	Popliteal Height	343 - 369	349	Pass
M	Knee Pivot to Floor Height	392 - 409	394	Pass
N	Buttock Popliteal Length	416 - 442	435	Pass
O	Chest Depth w/o Jacket	195 - 211	198	Pass
P	Foot Length	216 - 232	222	Pass
Q	Hip Breadth (w/ pelvic plugs)	313 - 323	317	Pass
R	Arm Length	249 - 259	250	Pass
S	Knee Joint to Seatback	477 - 493	483	Pass
V	Shoulder Width	341 - 357	351	Pass
W	Foot Width	78 - 94	82	Pass
Y	Chest Circumference w/ jacket	851 - 881	863	Pass
Z	Waist Circumference	761 - 791	782	Pass

MGA RESEARCH CORPORATION
HEAD DROP TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

Test ID: D210321

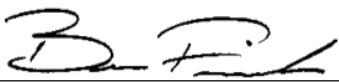
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	17	Pass
Peak Resultant Acceleration	G's	115 to 137	128	Pass
Peak Longitudinal Acceleration	G's	+/- 15	3.9	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	<15%	Yes	Pass
Overall Test Results			Pass	



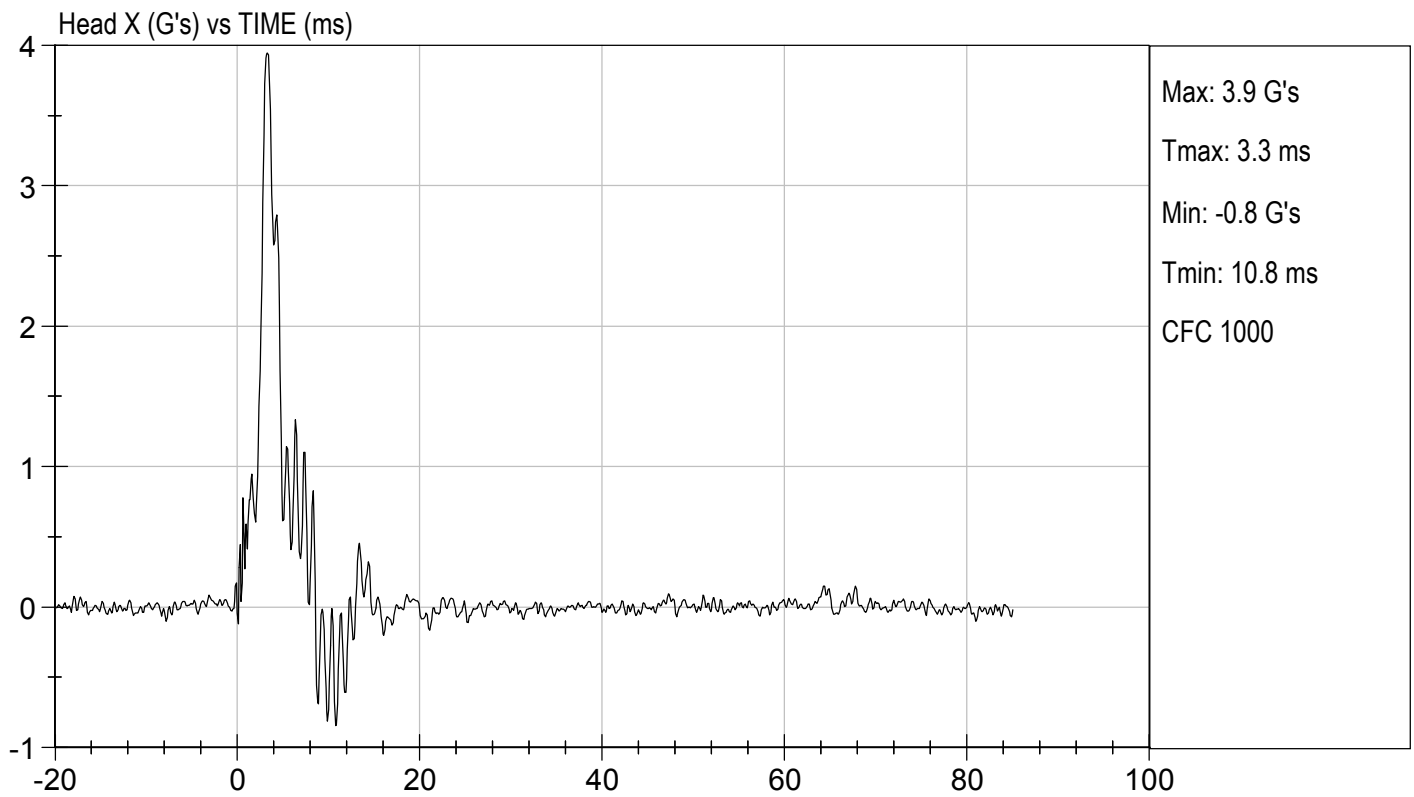
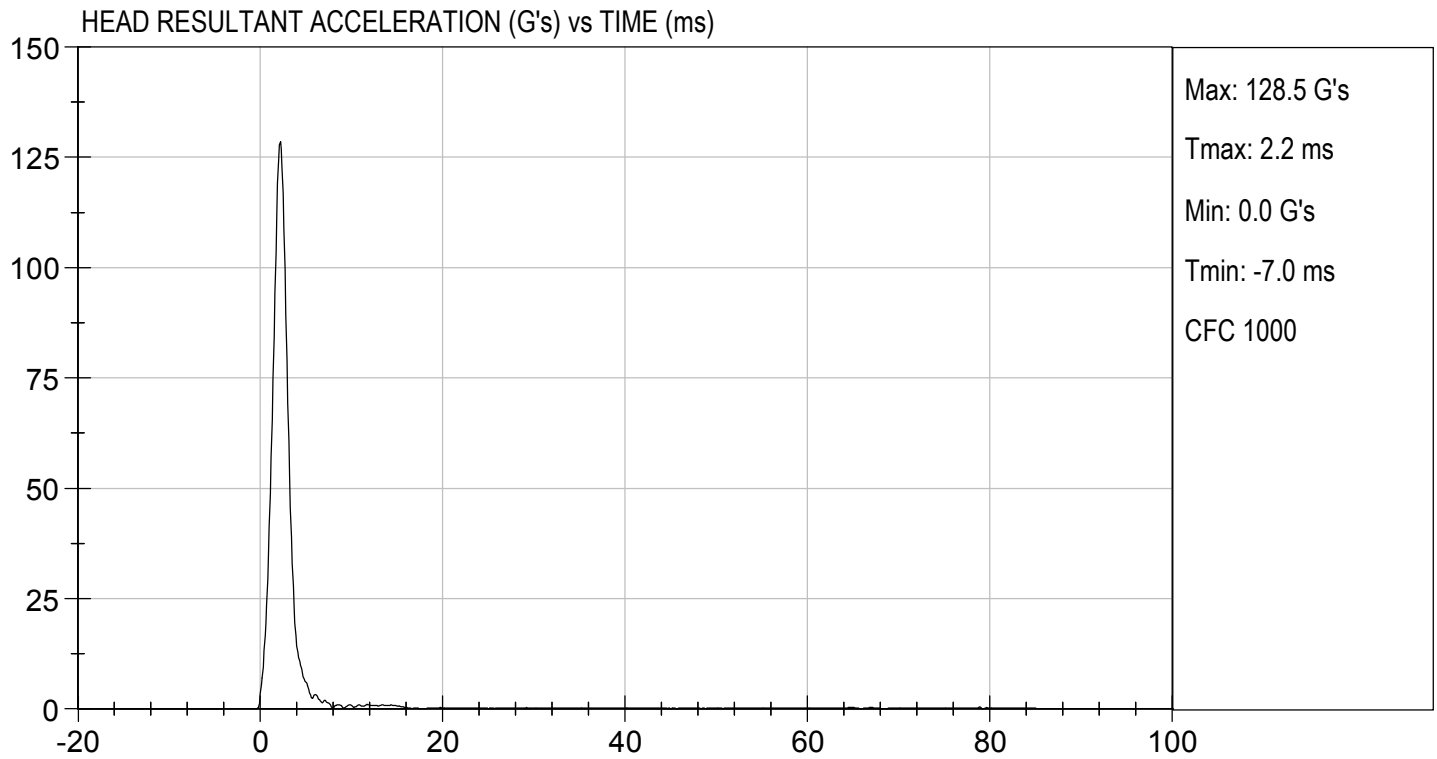
Laboratory Technician

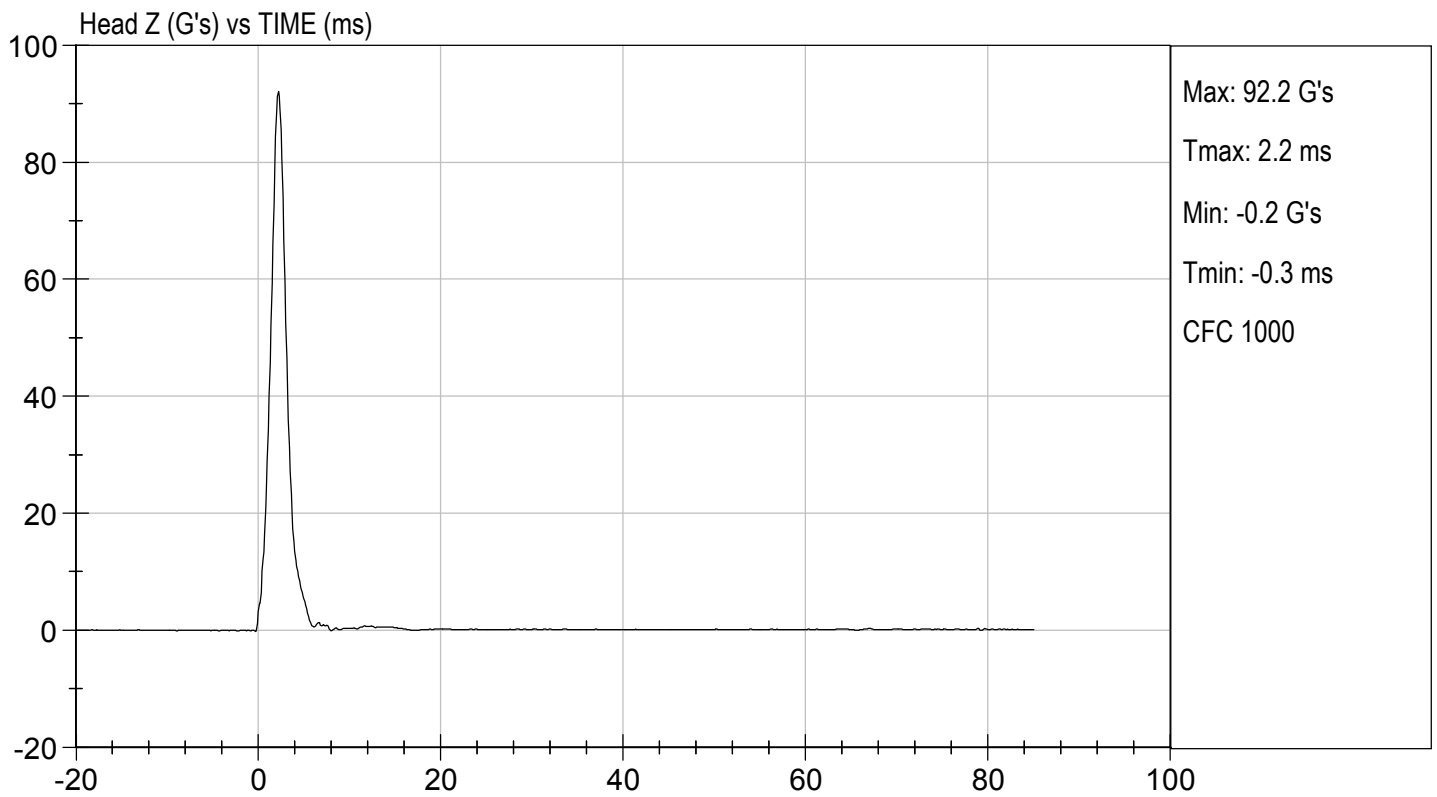
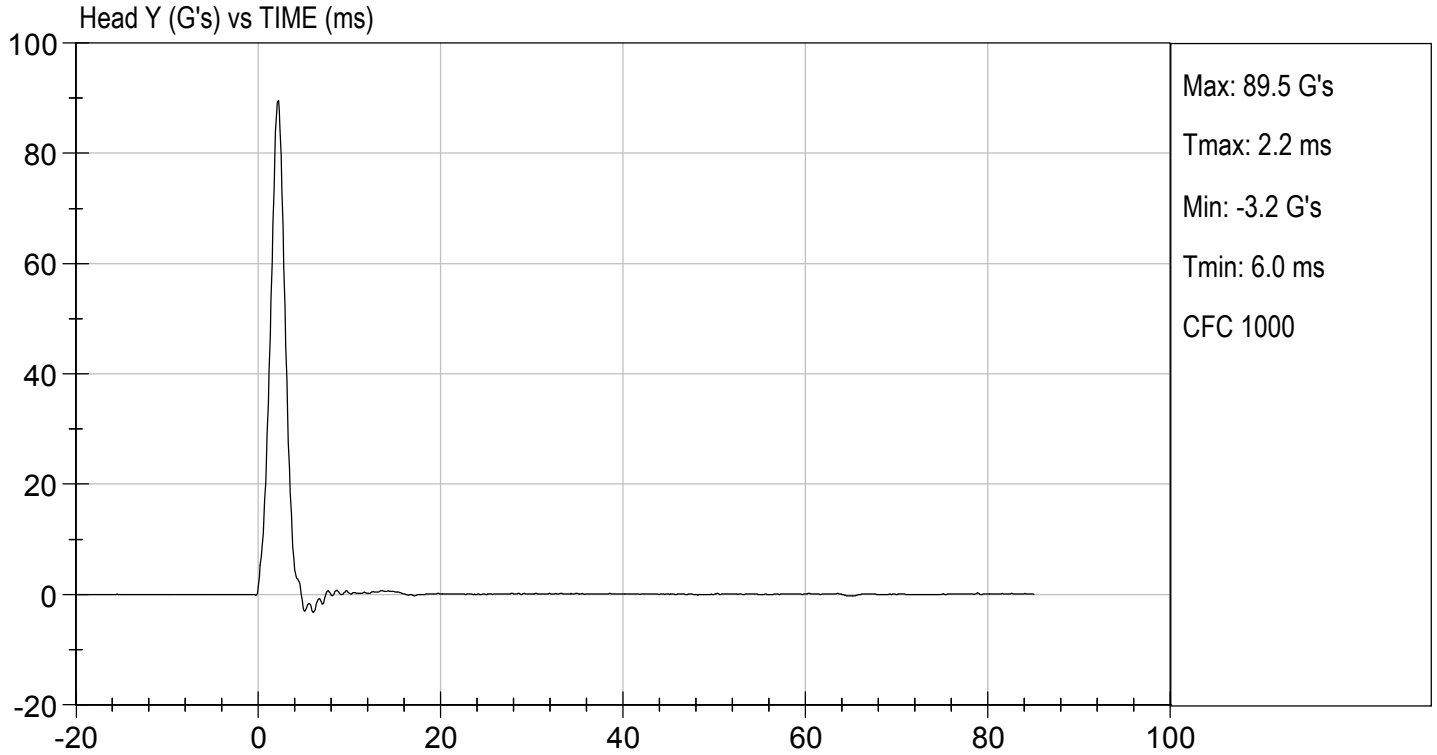
02/09/2021

Test Date



Approved By





MGA RESEARCH CORPORATION
LATERAL NECK PENDULUM TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

Test I.D: D210322

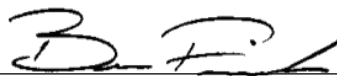
Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.0	Pass
Humidity		%	10 to 70	14	Pass
Impact Velocity		m/s	5.51 to 5.63	5.58	Pass
Pendulum Velocity	10 ms	m/s	2.20 to 2.80	2.75	Pass
	15 ms	m/s	3.30 to 4.10	3.93	Pass
	20 ms	m/s	4.40 to 5.40	5.25	Pass
	25 ms	m/s	5.40 to 6.10	5.75	Pass
	25-100 ms	m/s	5.50 to 6.20	5.77	Pass
Maximum D-Plane Rotation		deg	71 to 81	76	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	59	Pass
Maximum Occipital Condyle Moment		Nm	-44 to -36	-42	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	114	Pass
Overall Test Results					Pass



Laboratory Technician

02/08/2021

Test Date

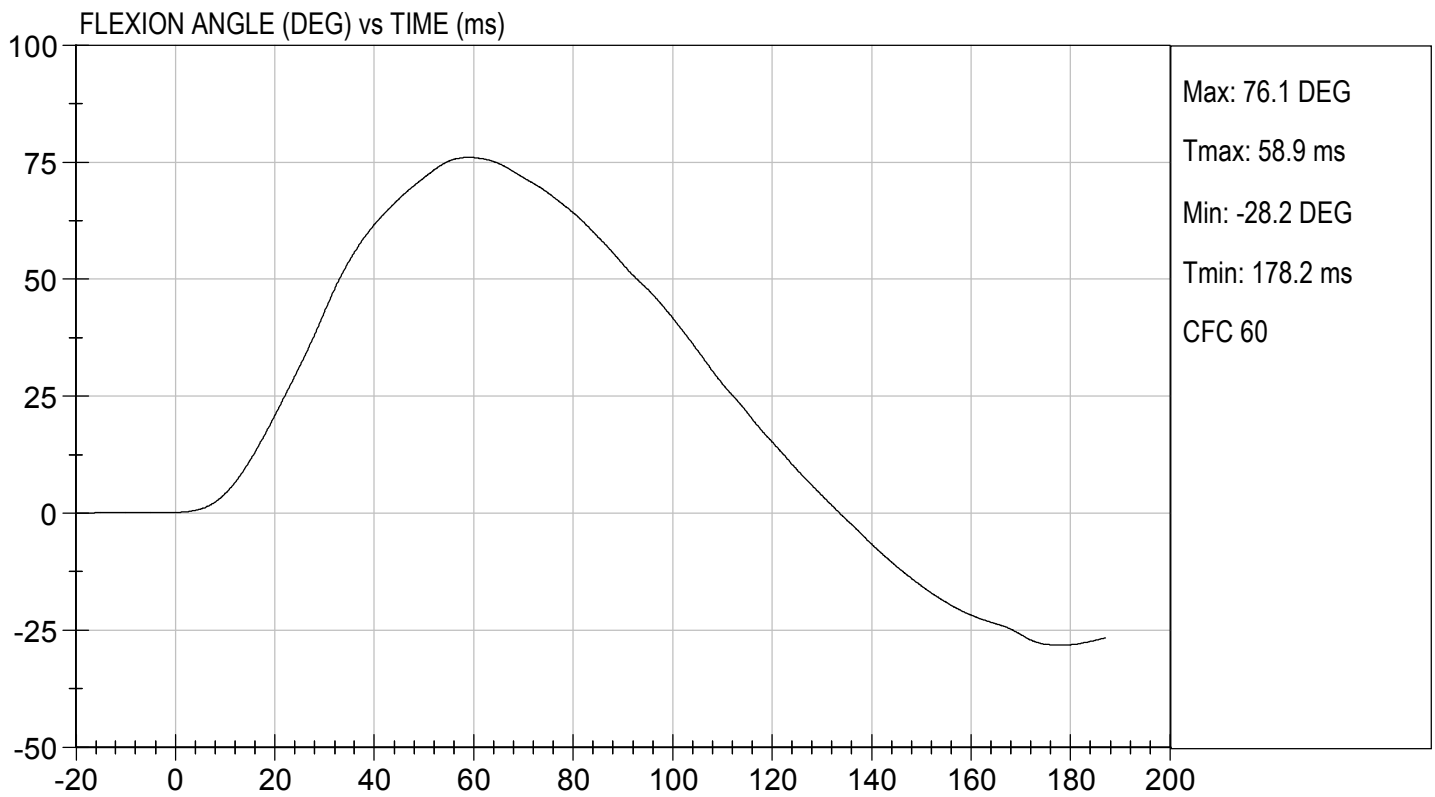
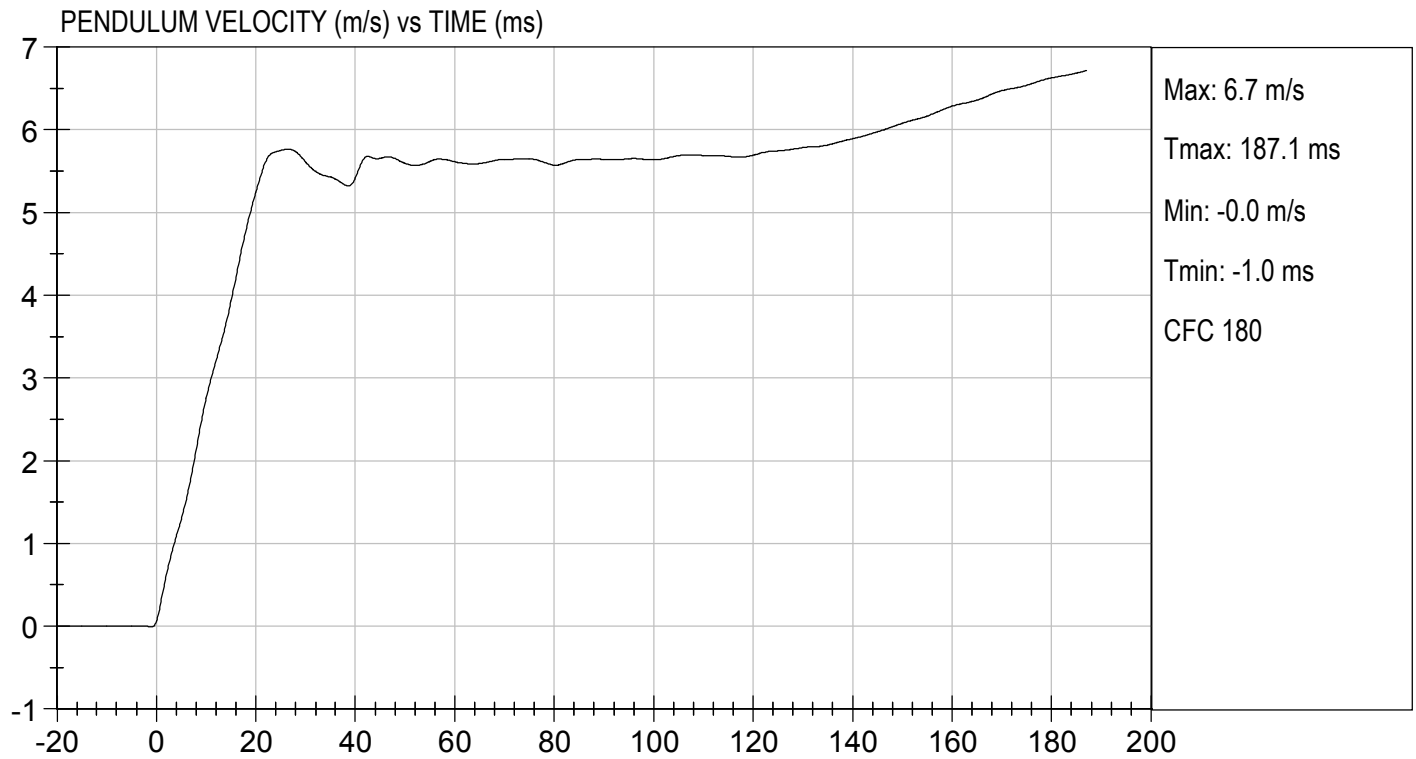


Approved By



TEST DESC: NECK BENDING
VELOCITY: 18.32 ft/s, 5.58 m/s

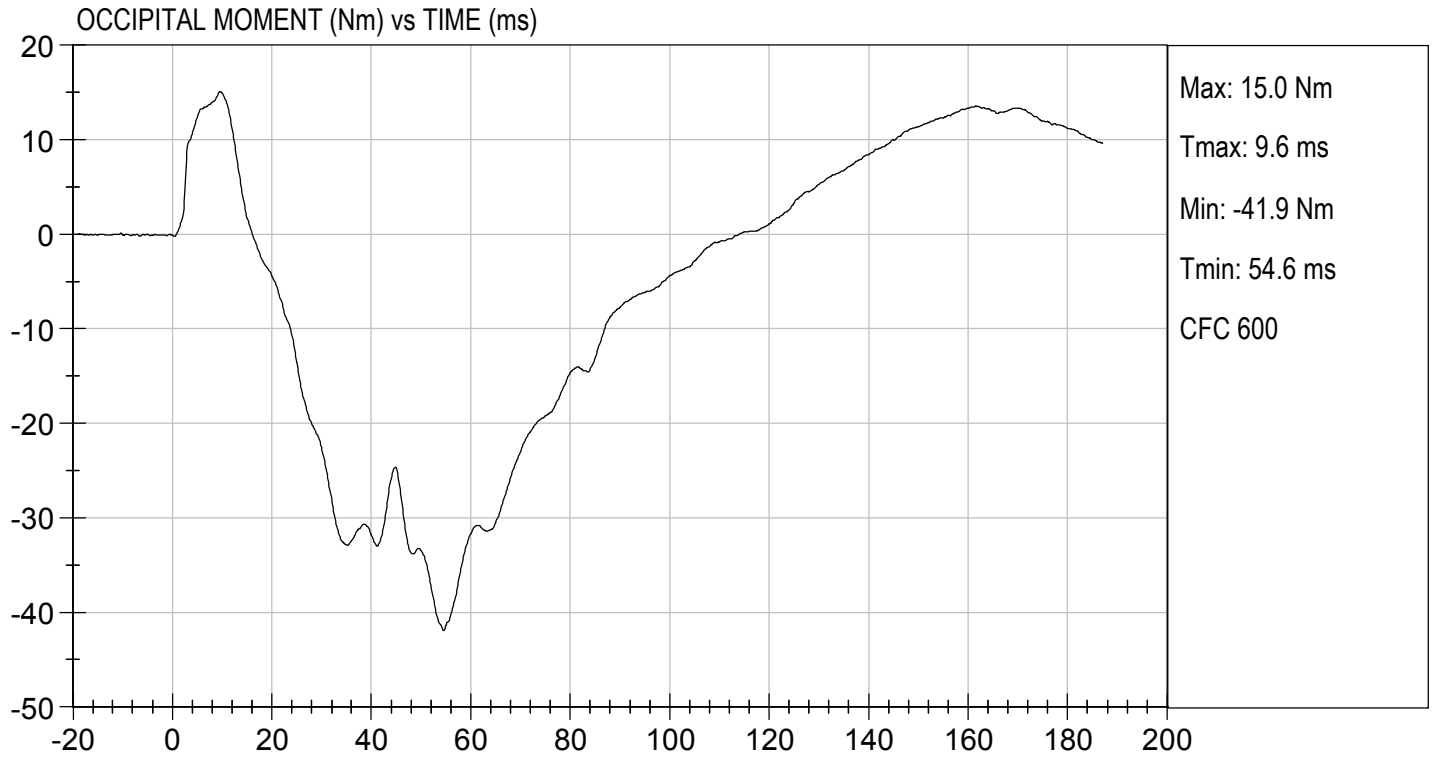
TEST DATE: 02/08/2021
TEST #: D210322





TEST DESC: NECK BENDING
VELOCITY: 18.32 ft/s, 5.58 m/s

TEST DATE: 02/08/2021
TEST #: D210322

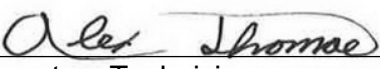


MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

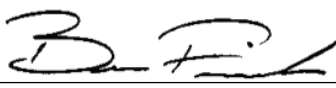
ATD Serial No: 306

Test ID: D210323

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	13	Pass
Impact Velocity	m/s	4.20 to 4.40	4.27	Pass
Maximum Probe Acceleration	G's	13 to 18	15	Pass
Shoulder Displacement	mm	28 to 37	30	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	18	Pass
Overall Test Results				Pass


Laboratory Technician

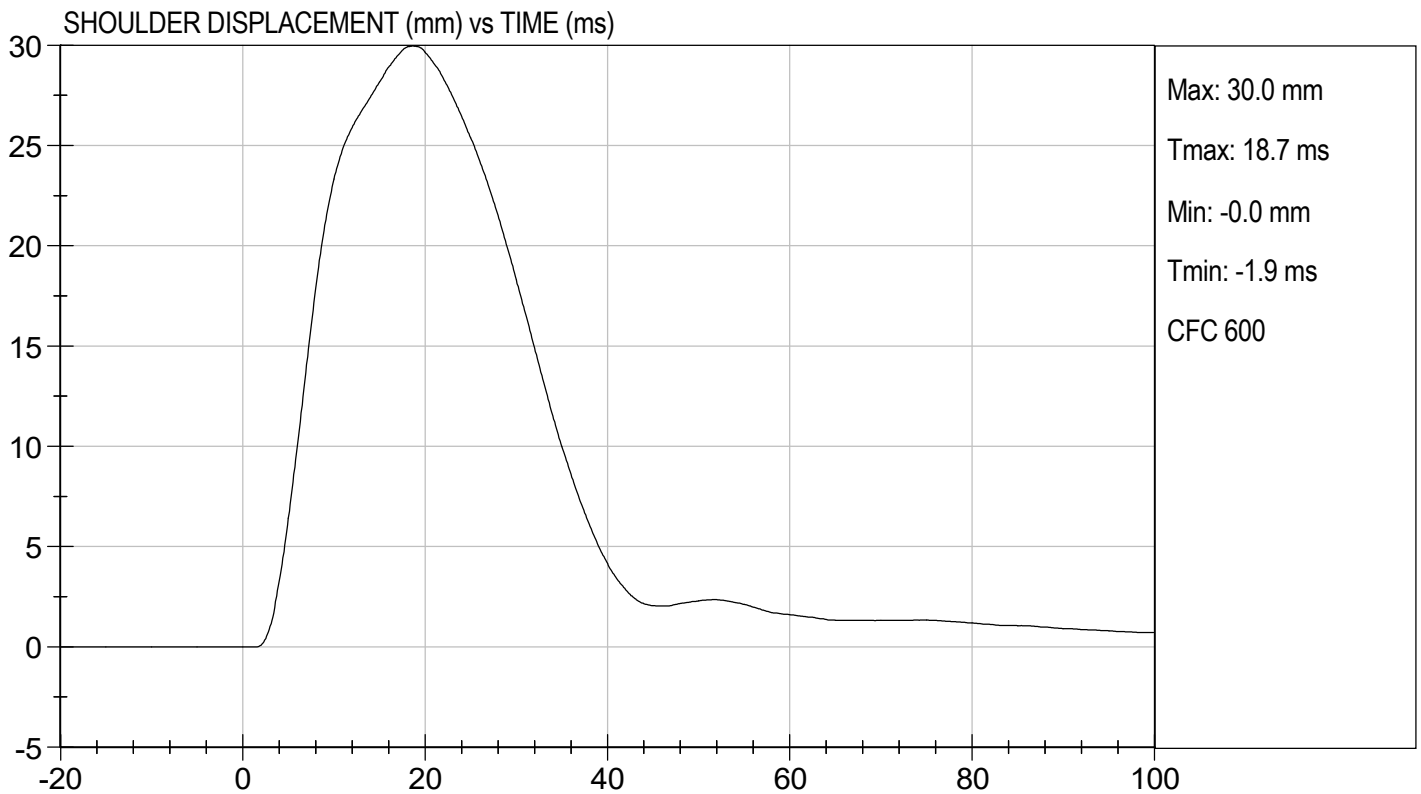
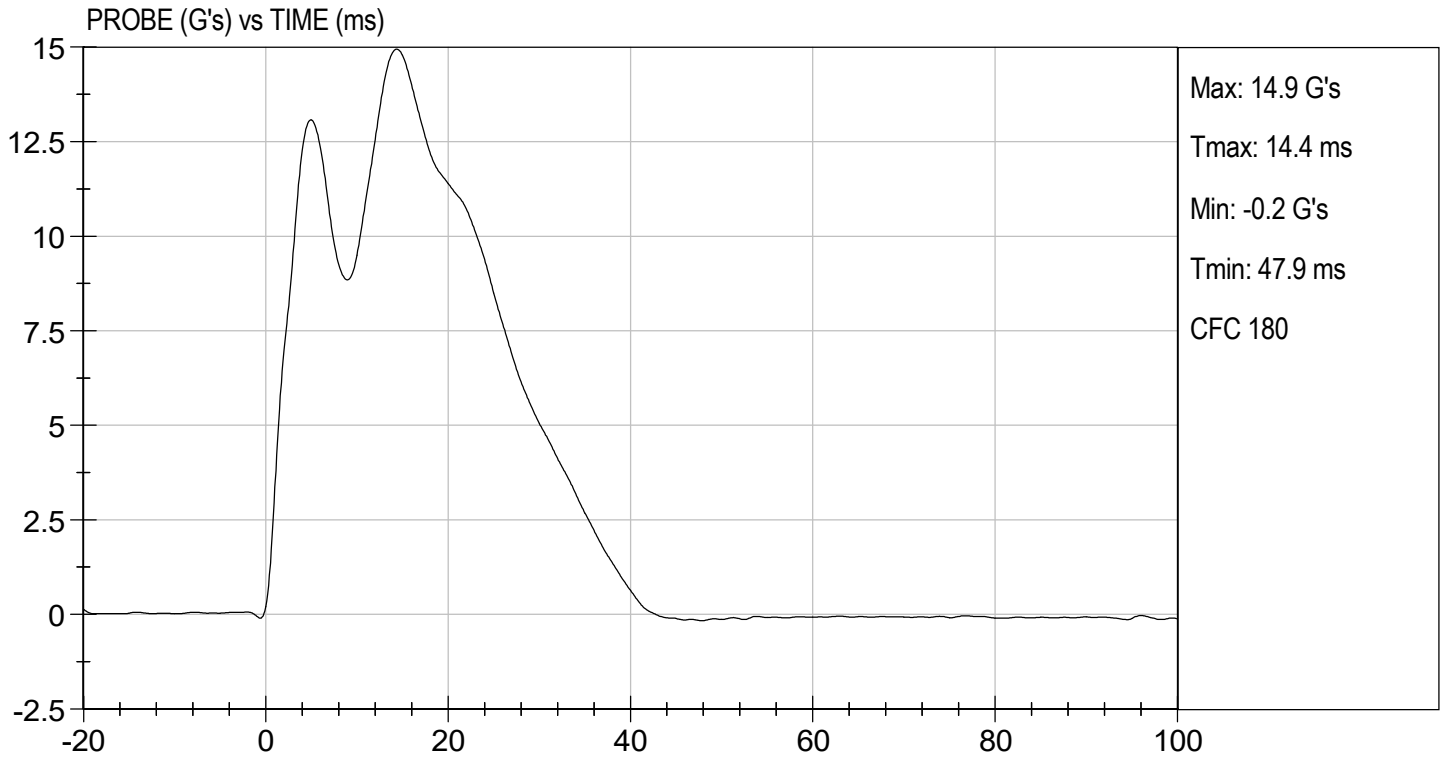
02/08/2021
Test Date


Approved By



TEST DESC: SHOULDER IMPACT
VELOCITY: 14.01 ft/s, 4.27 m/s

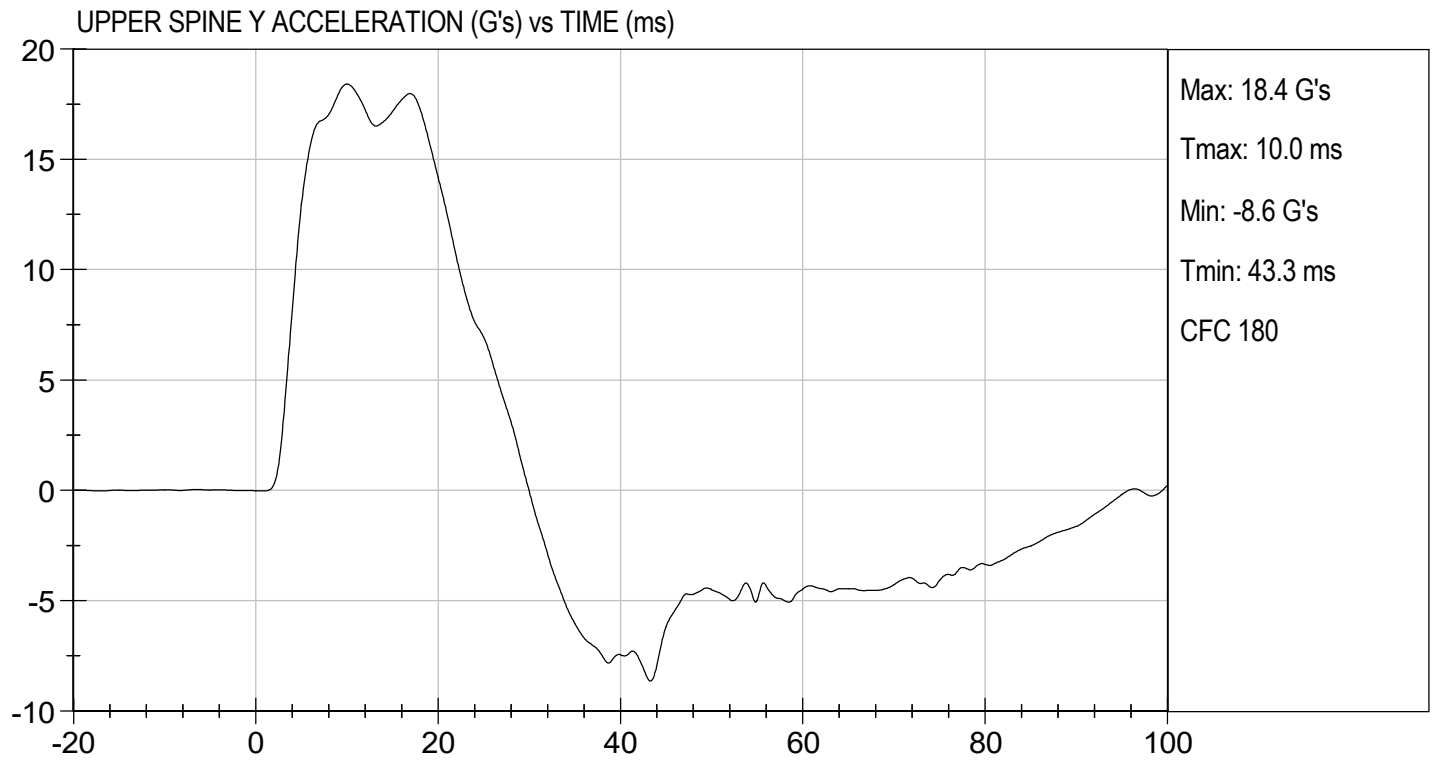
TEST DATE: 02/08/2021
TEST #: D210323





TEST DESC: SHOULDER IMPACT
VELOCITY: 14.01 ft/s, 4.27 m/s

TEST DATE: 02/08/2021
TEST #: D210323



MGA RESEARCH CORPORATION
THORAX (WITH ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

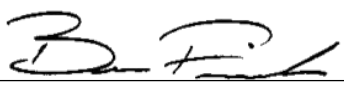
ATD Serial No: 306

Test I.D: D210324

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.0	Pass
Humidity	%	10 to 70	13	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Maximum Probe Acceleration	G's	30 to 36	34	Pass
Shoulder Displacement	mm	31 to 40	32	Pass
Upper Rib Displacement	mm	25 to 32	28	Pass
Middle Rib Displacement	mm	30 to 36	33	Pass
Lower Rib Displacement	mm	32 to 38	37	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	39	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	32	Pass
Overall Test Results				Pass


 Laboratory Technician

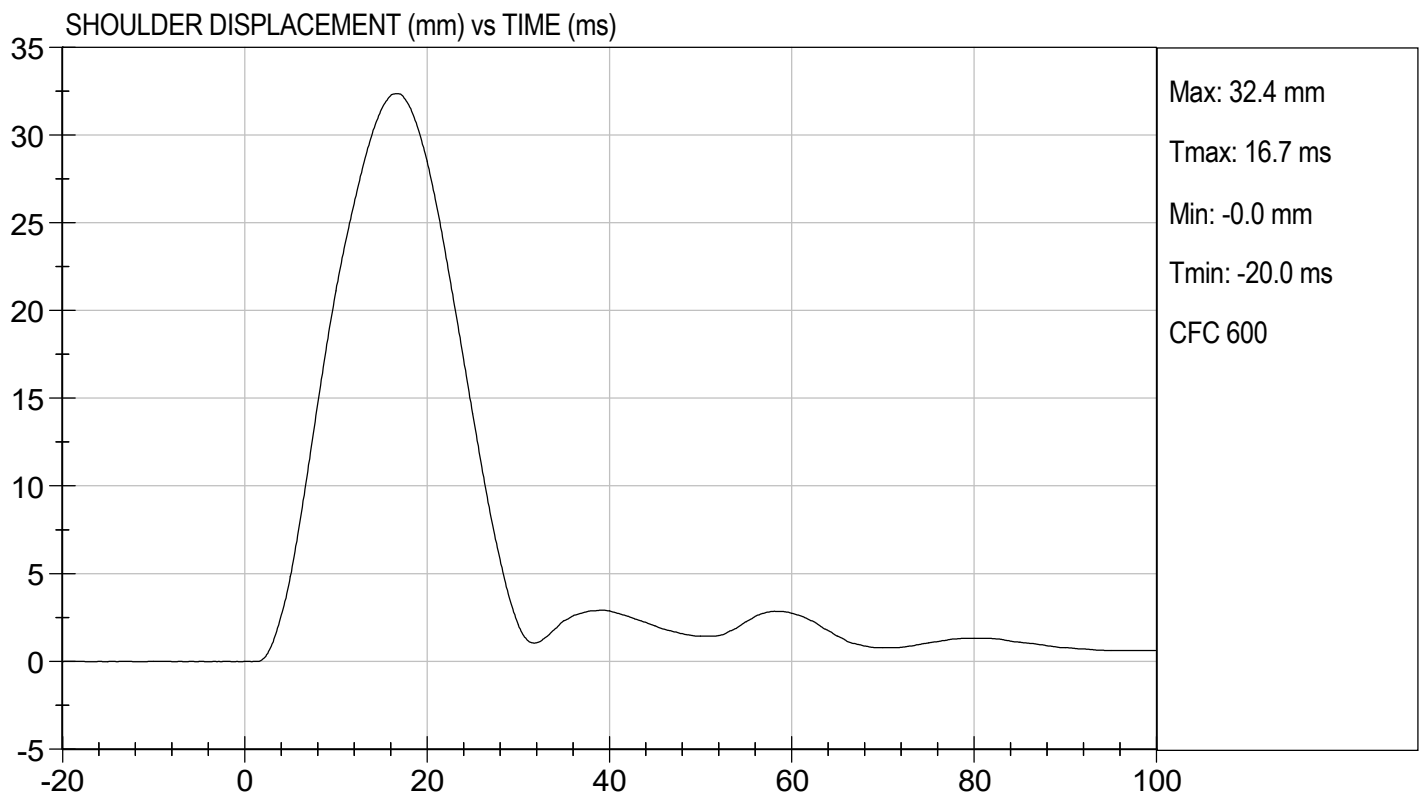
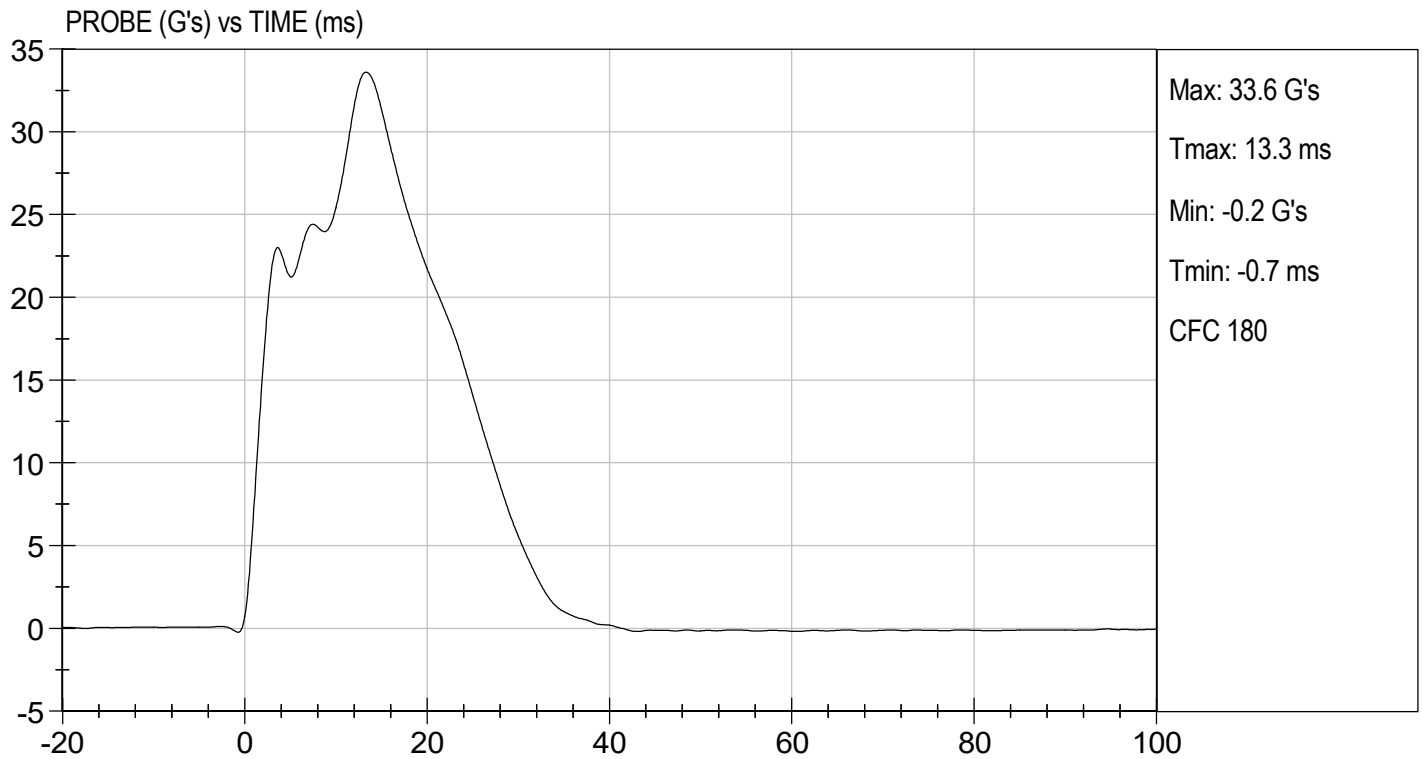
02/08/2021
 Test Date


 Approved By



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

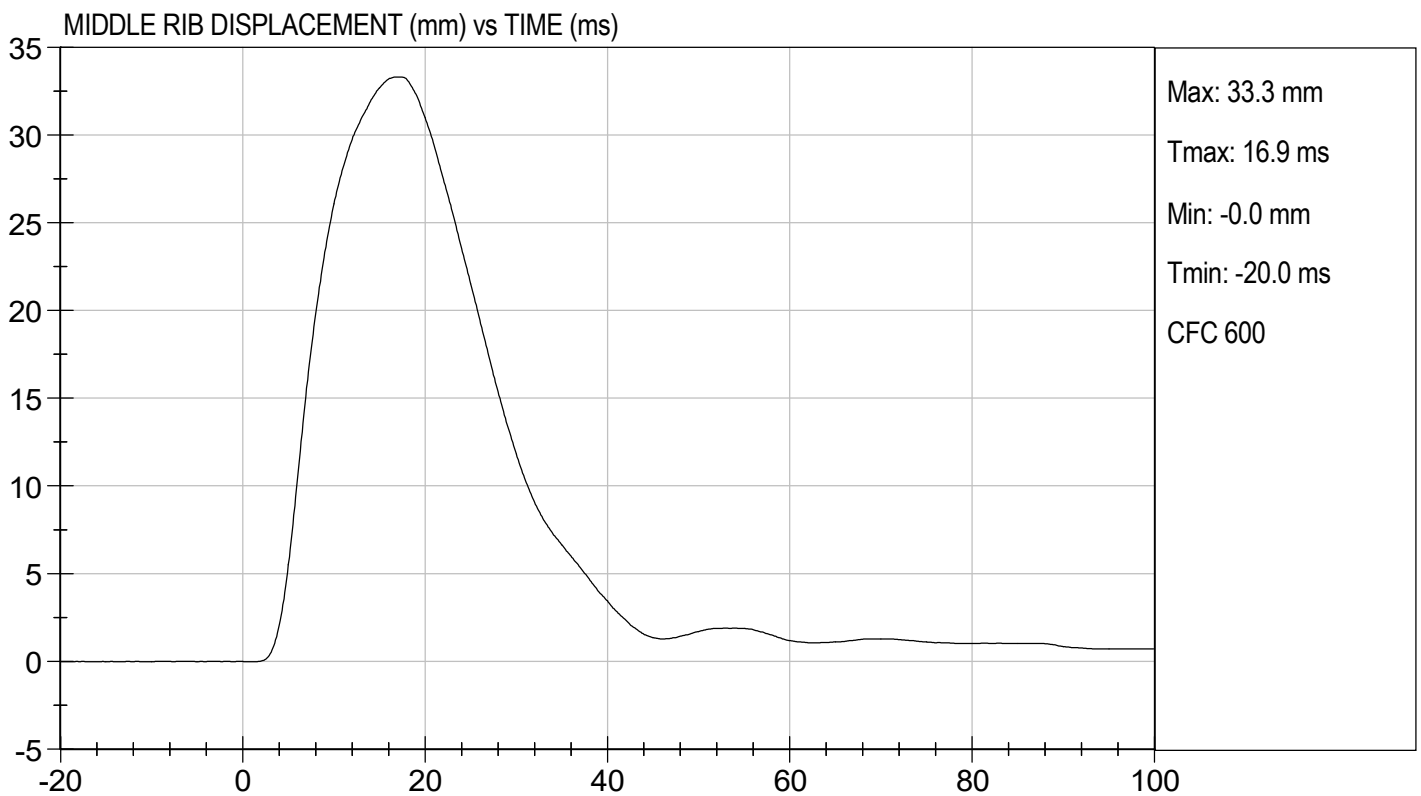
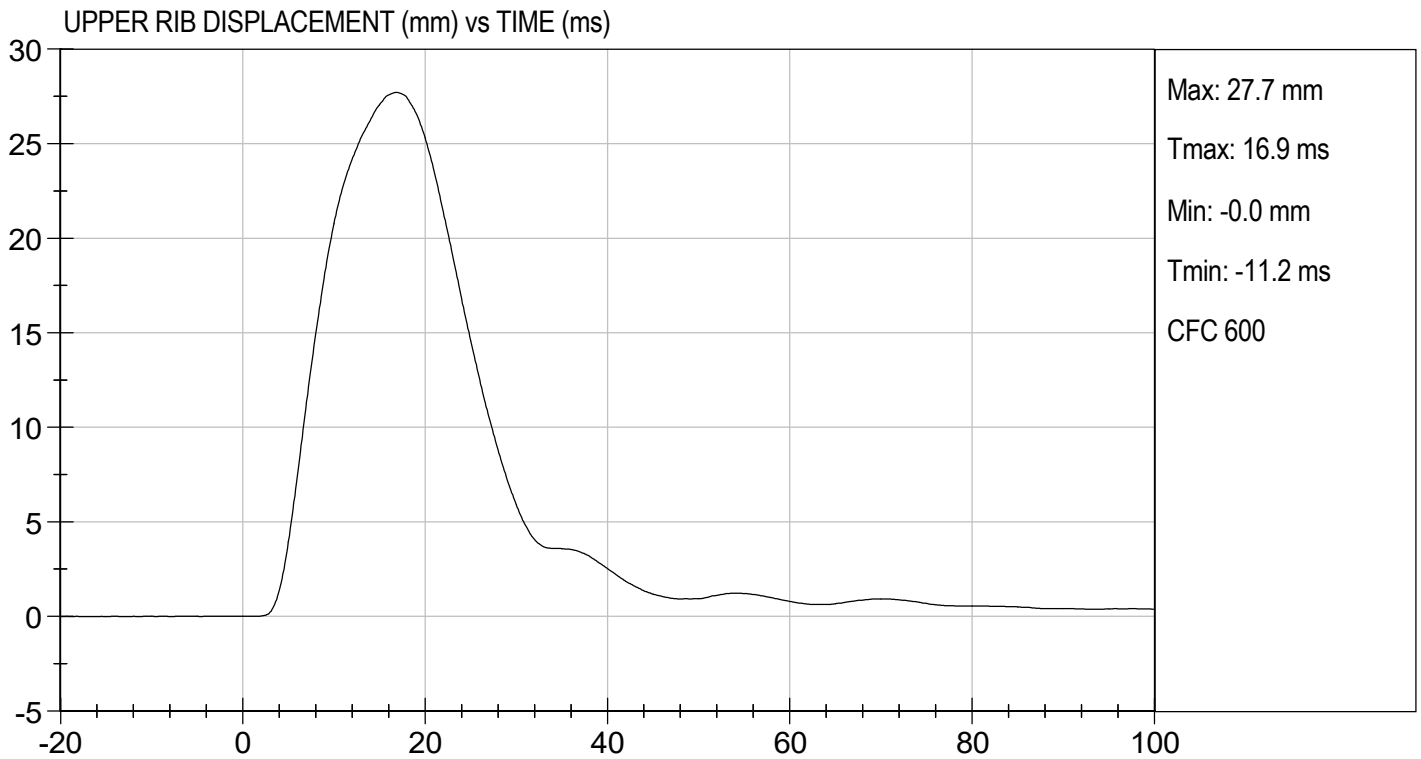
TEST DATE: 02/08/2021
TEST #: D210324





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

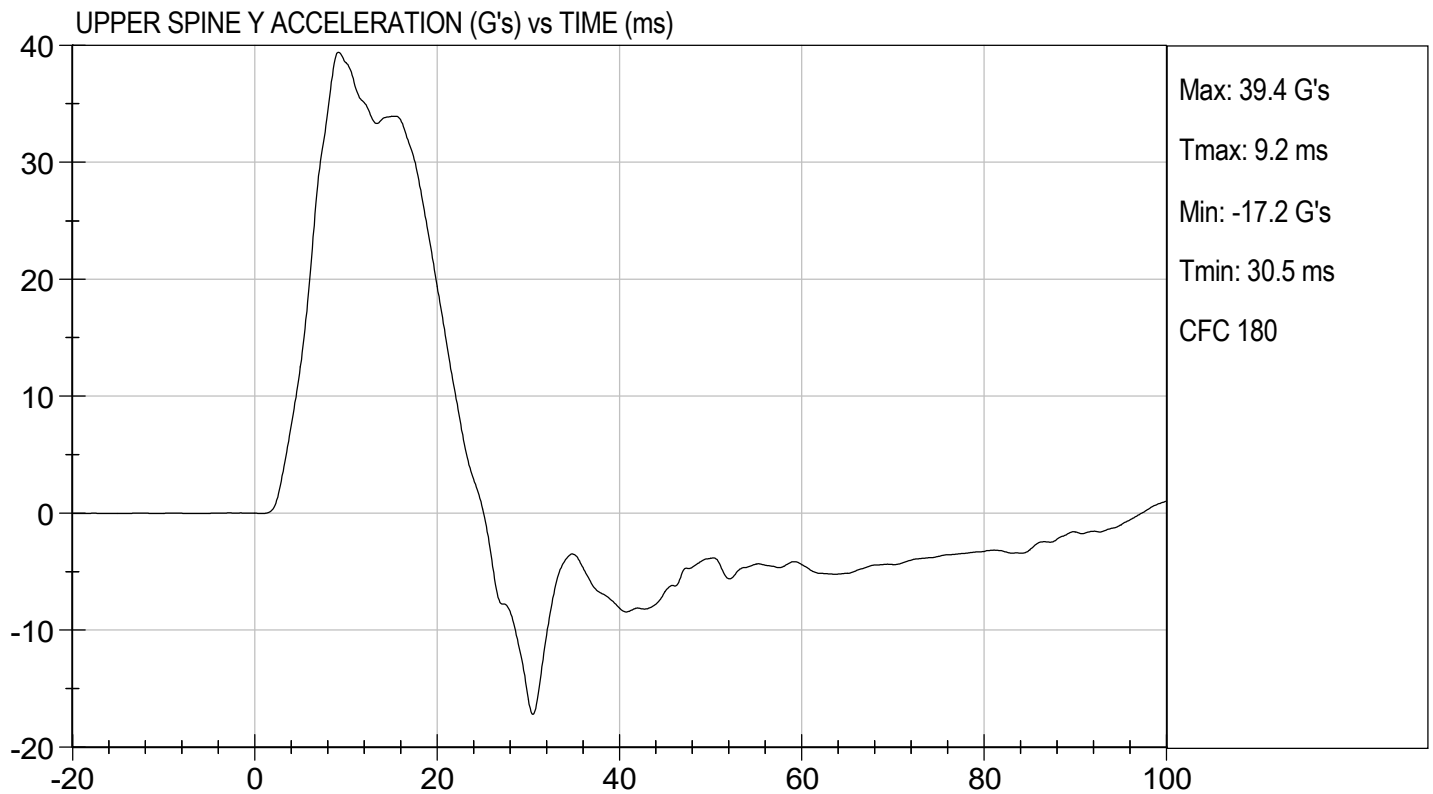
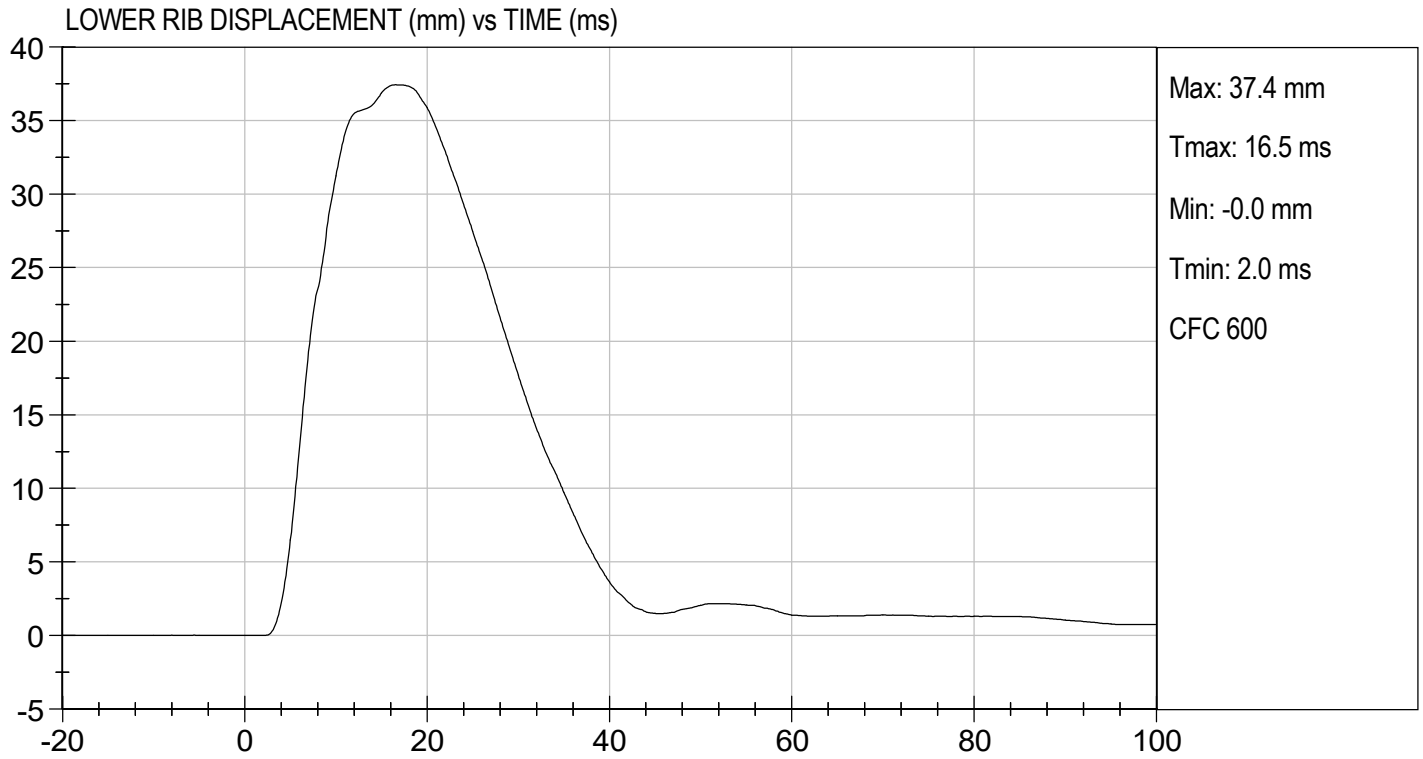
TEST DATE: 02/08/2021
TEST #: D210324





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

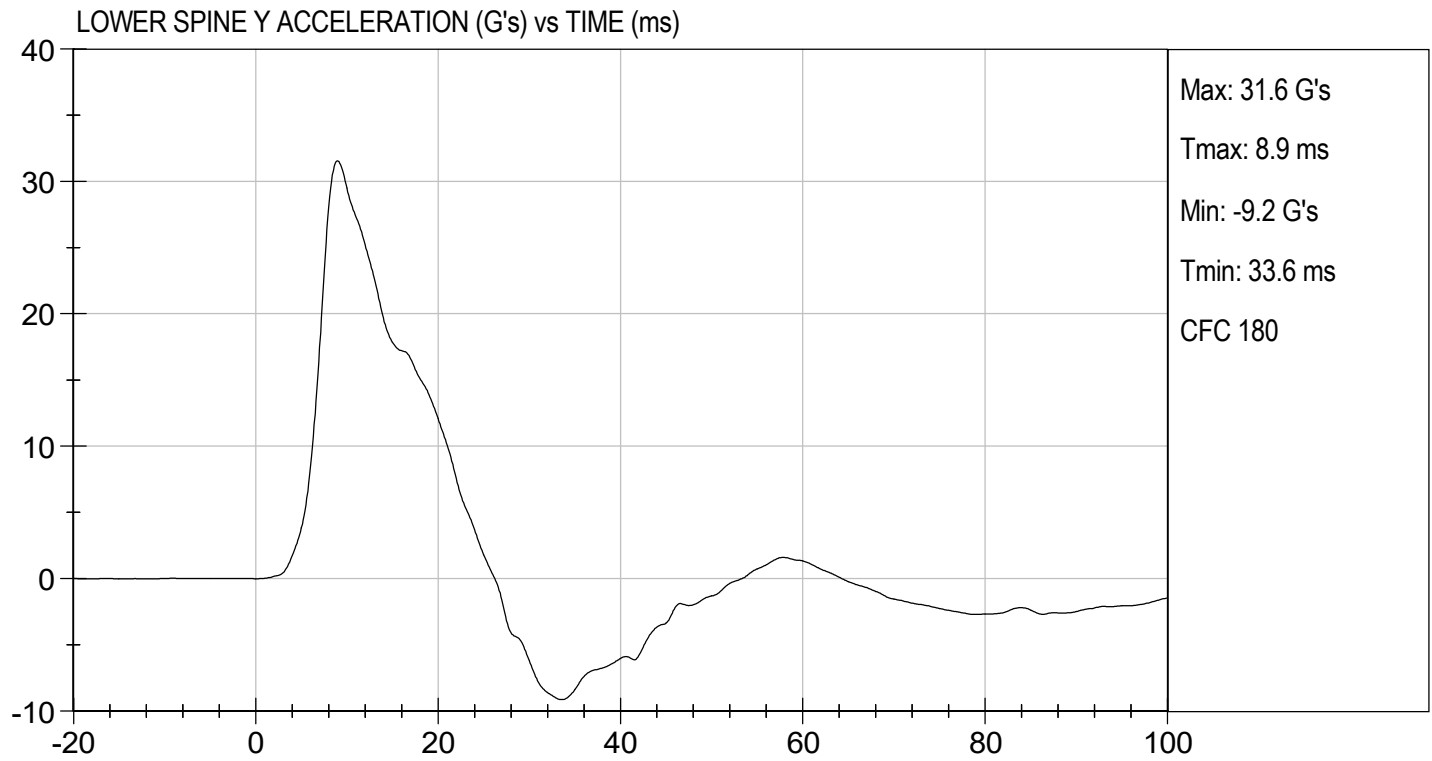
TEST DATE: 02/08/2021
TEST #: D210324





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

TEST DATE: 02/08/2021
TEST #: D210324



MGA RESEARCH CORPORATION
THORAX (WITHOUT ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

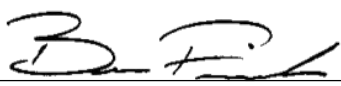
Test I.D: D210325

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.0	Pass
Humidity	%	10 to 70	13	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Maximum Probe Acceleration	G's	14 to 18	15	Pass
Upper Rib Displacement	mm	32 to 40	37	Pass
Middle Rib Displacement	mm	39 to 45	42	Pass
Lower Rib Displacement	mm	35 to 43	41	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	15	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	10	Pass
			Overall Test Results	Pass


Laboratory Technician

02/08/2021

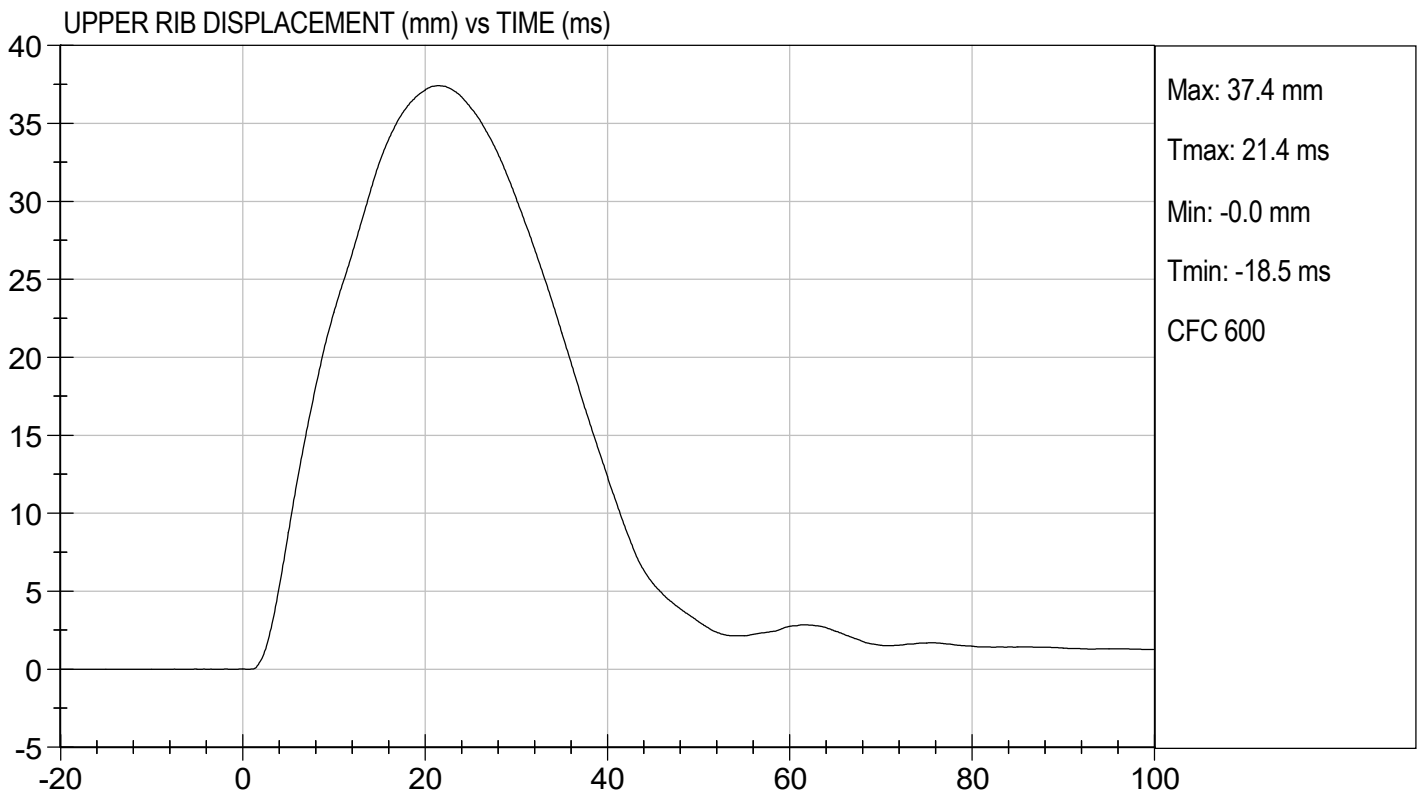
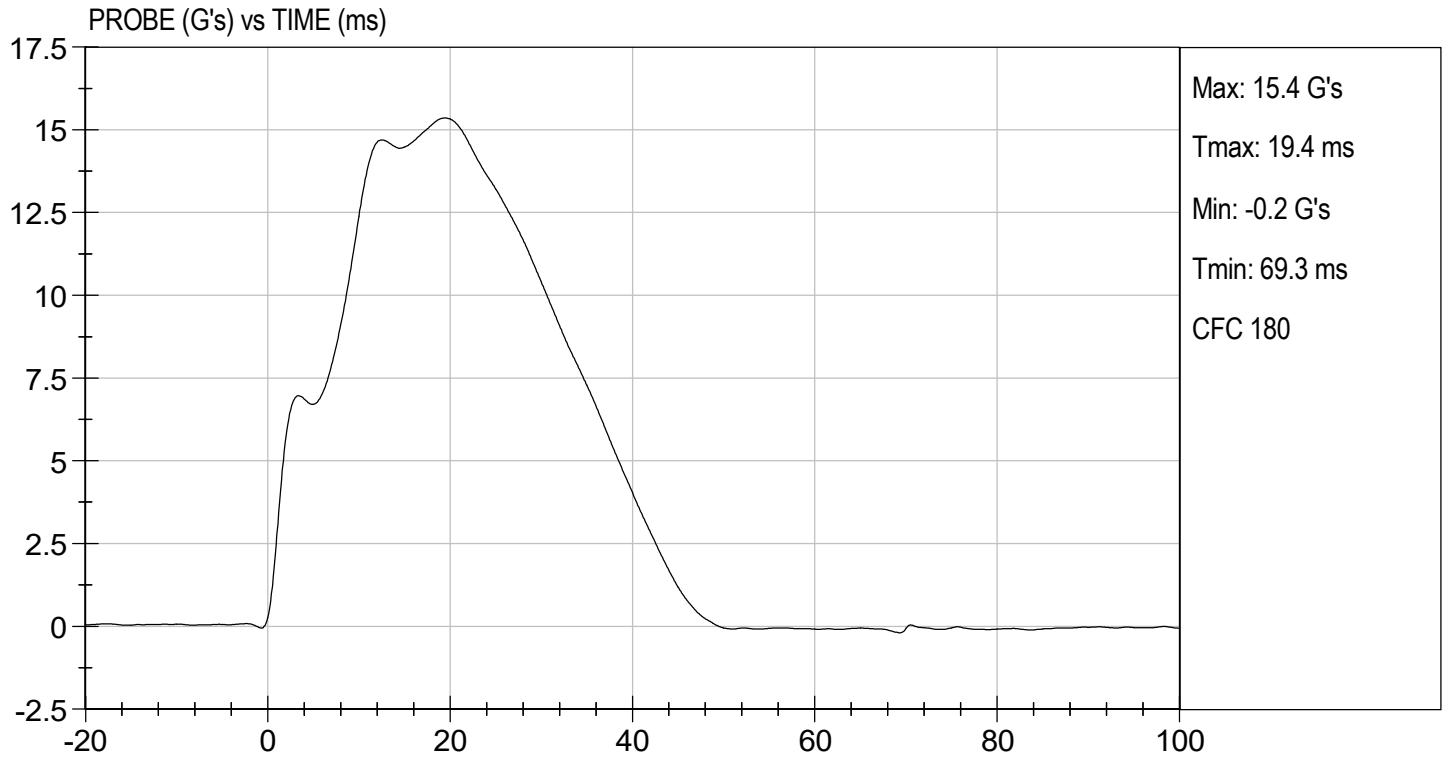
Test Date


Approved By



TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.12 ft/s, 4.30 m/s

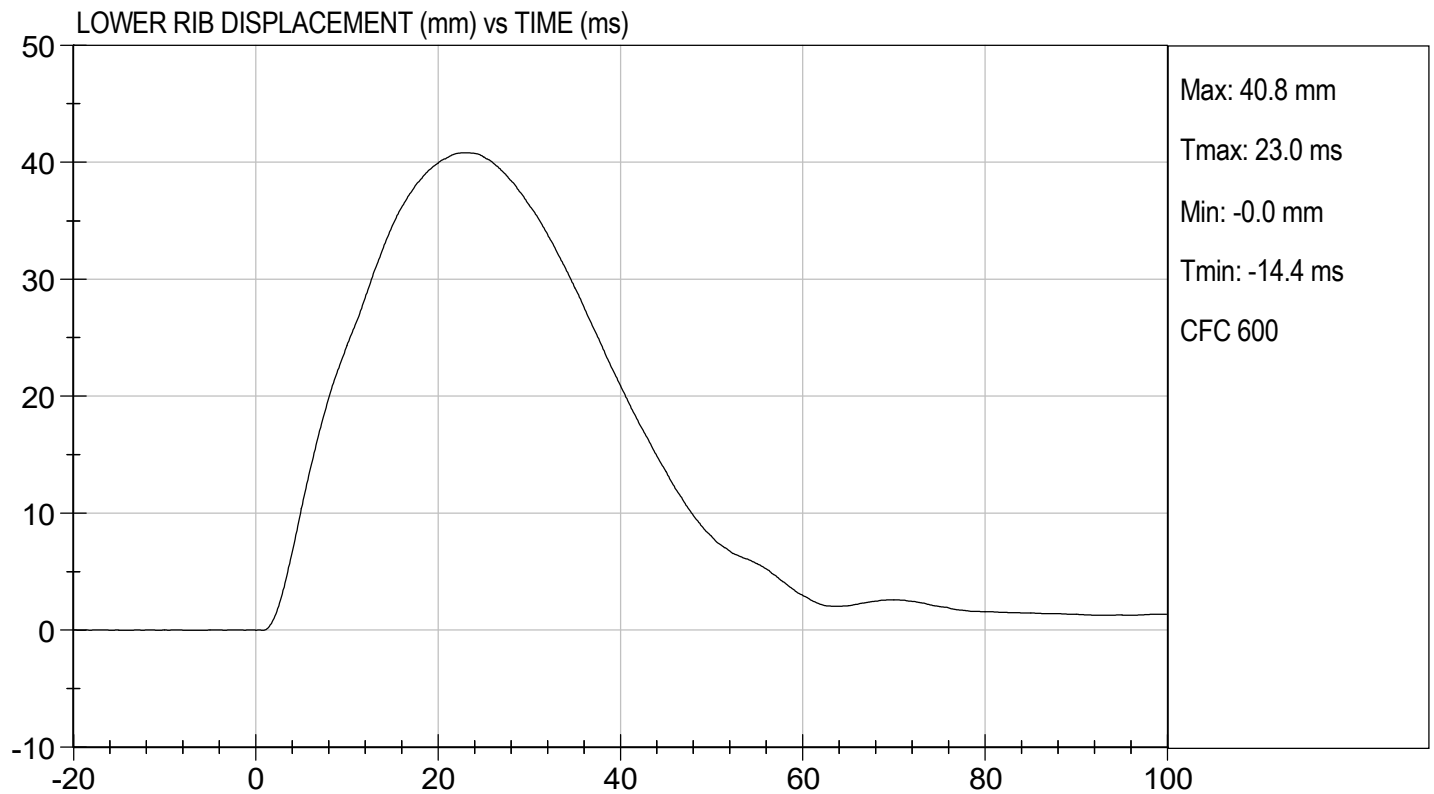
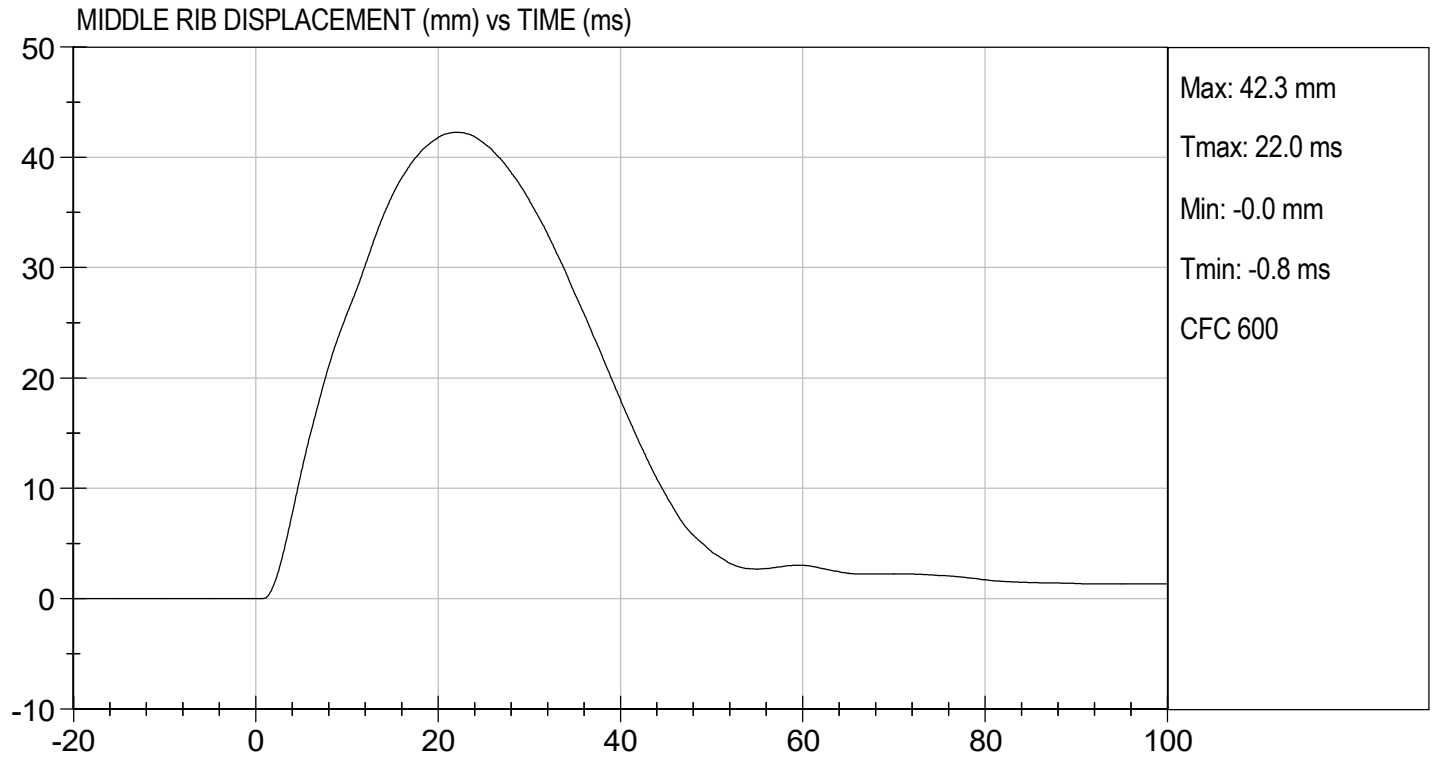
TEST DATE: 02/08/2021
TEST #: D210325





TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.12 ft/s, 4.30 m/s

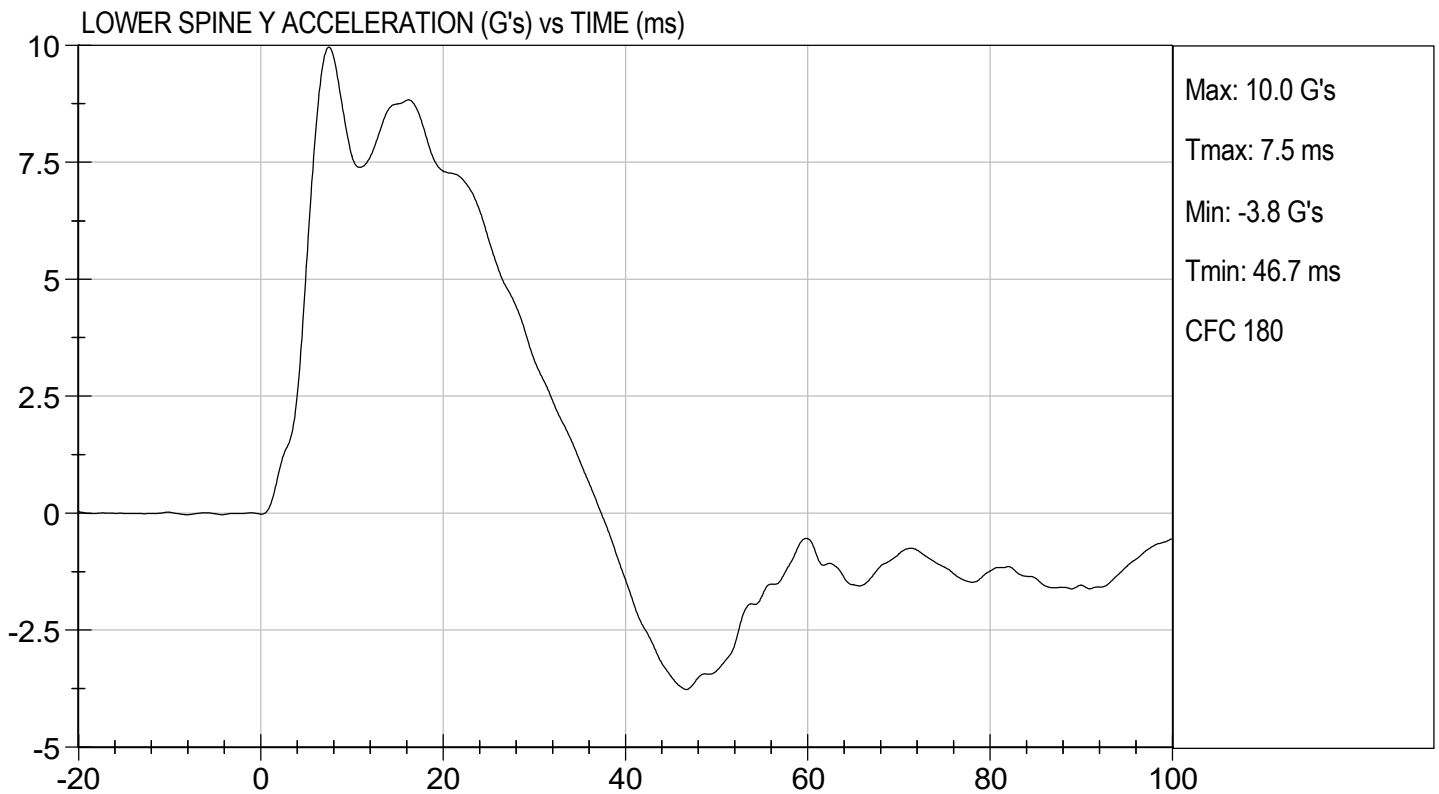
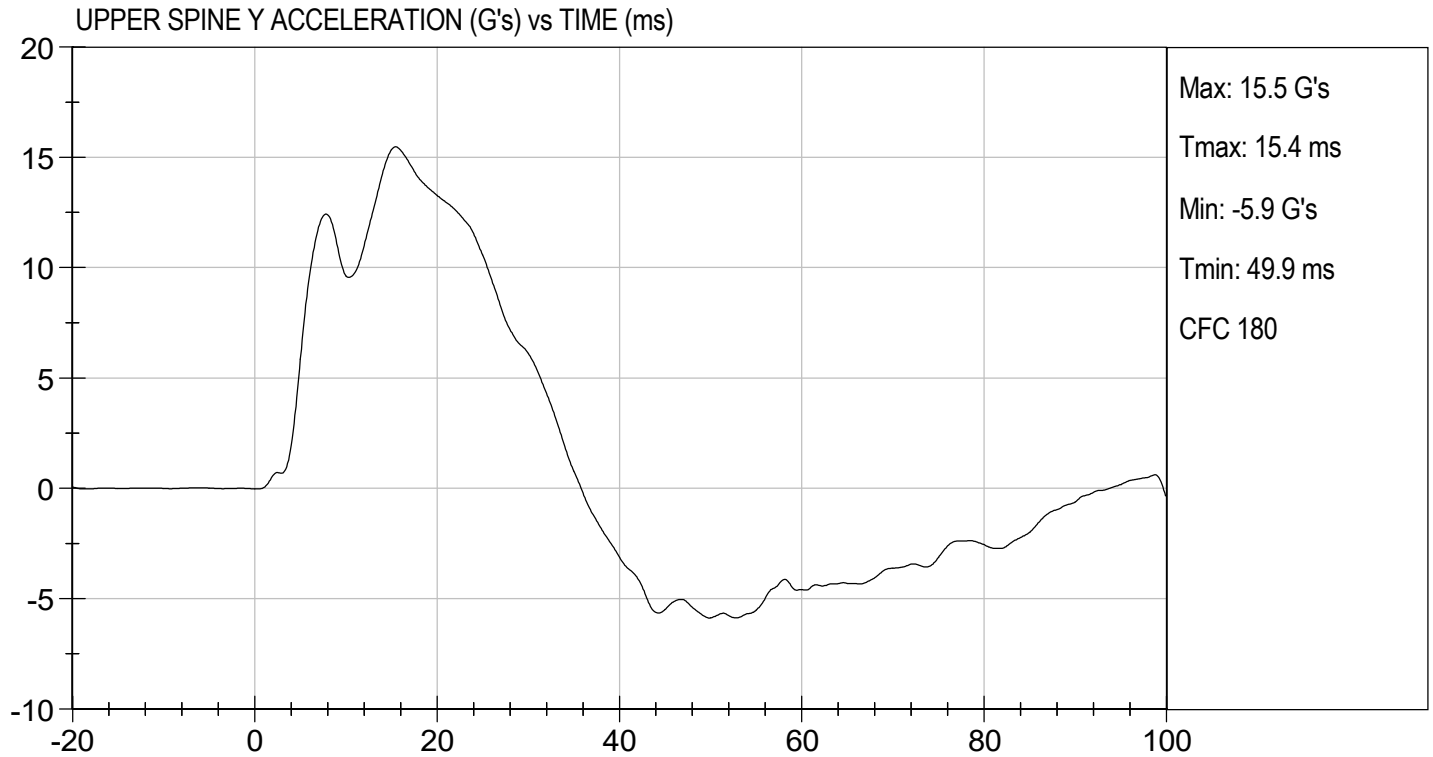
TEST DATE: 02/08/2021
TEST #: D210325





TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 02/08/2021
TEST #: D210325



MGA RESEARCH CORPORATION

ABDOMINAL IMPACT TEST

SID-1Is BUILD LEVEL D DUMMY

ATD Serial No: 306

Test I.D: D210326

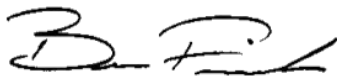
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.0	Pass
Humidity	%	10 to 70	13	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Maximum Probe Acceleration	G's	12 to 16	13	Pass
Upper Abdomen Rib Displacement	mm	36 to 47	44	Pass
Lower Abdomen Rib Displacement	mm	33 to 44	42	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	11	Pass
Overall Test Results				Pass



Laboratory Technician

02/08/2021

Test Date

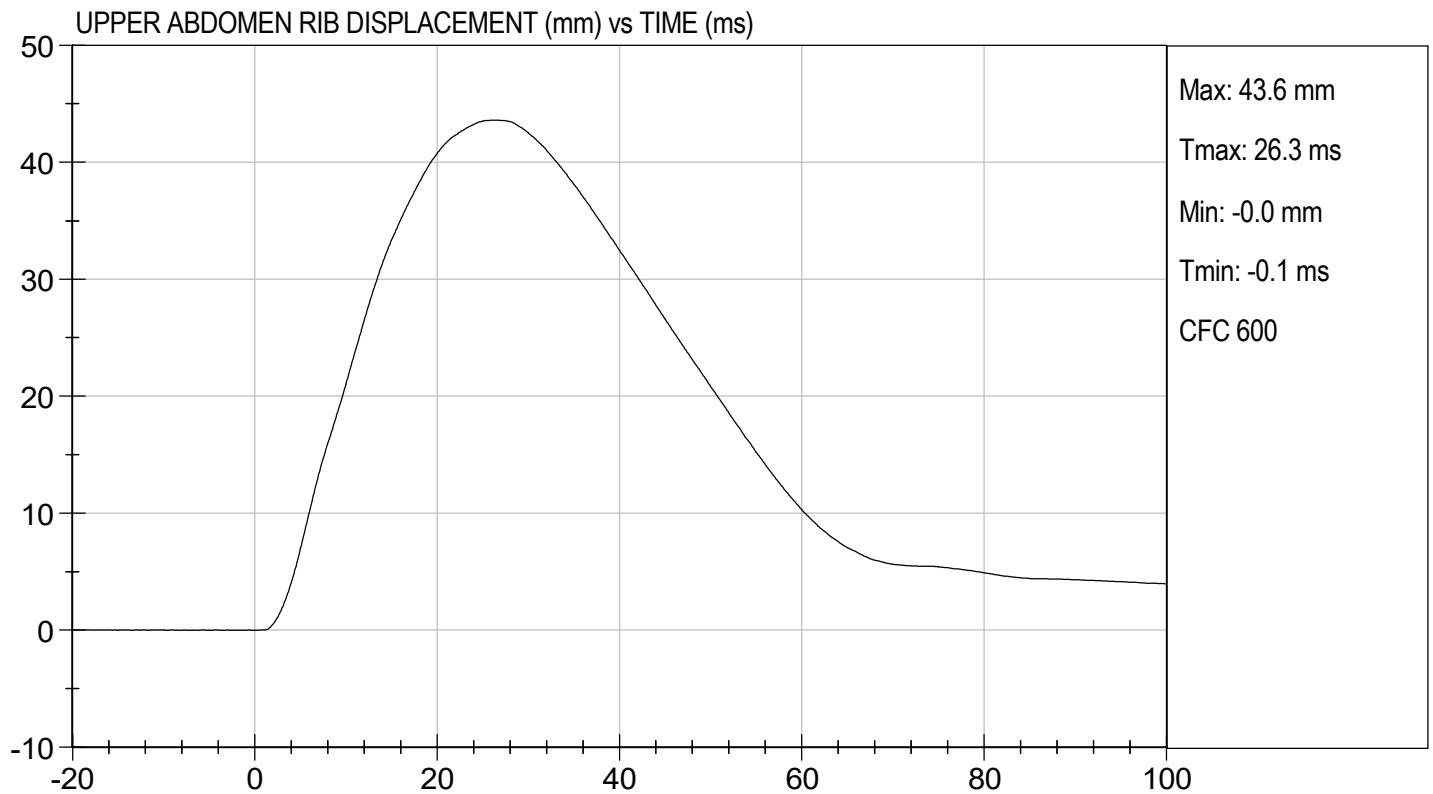
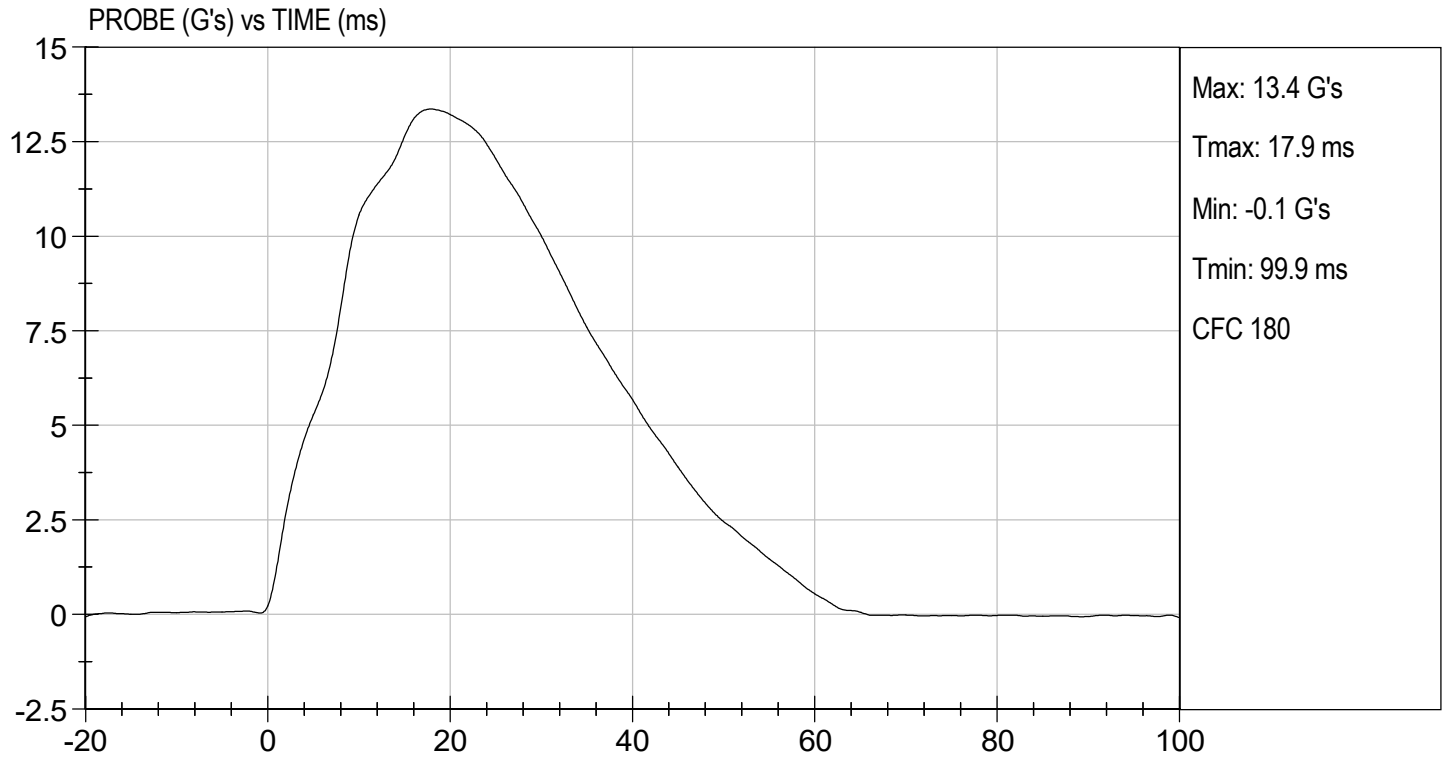


Approved By



TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.24 ft/s, 4.34 m/s

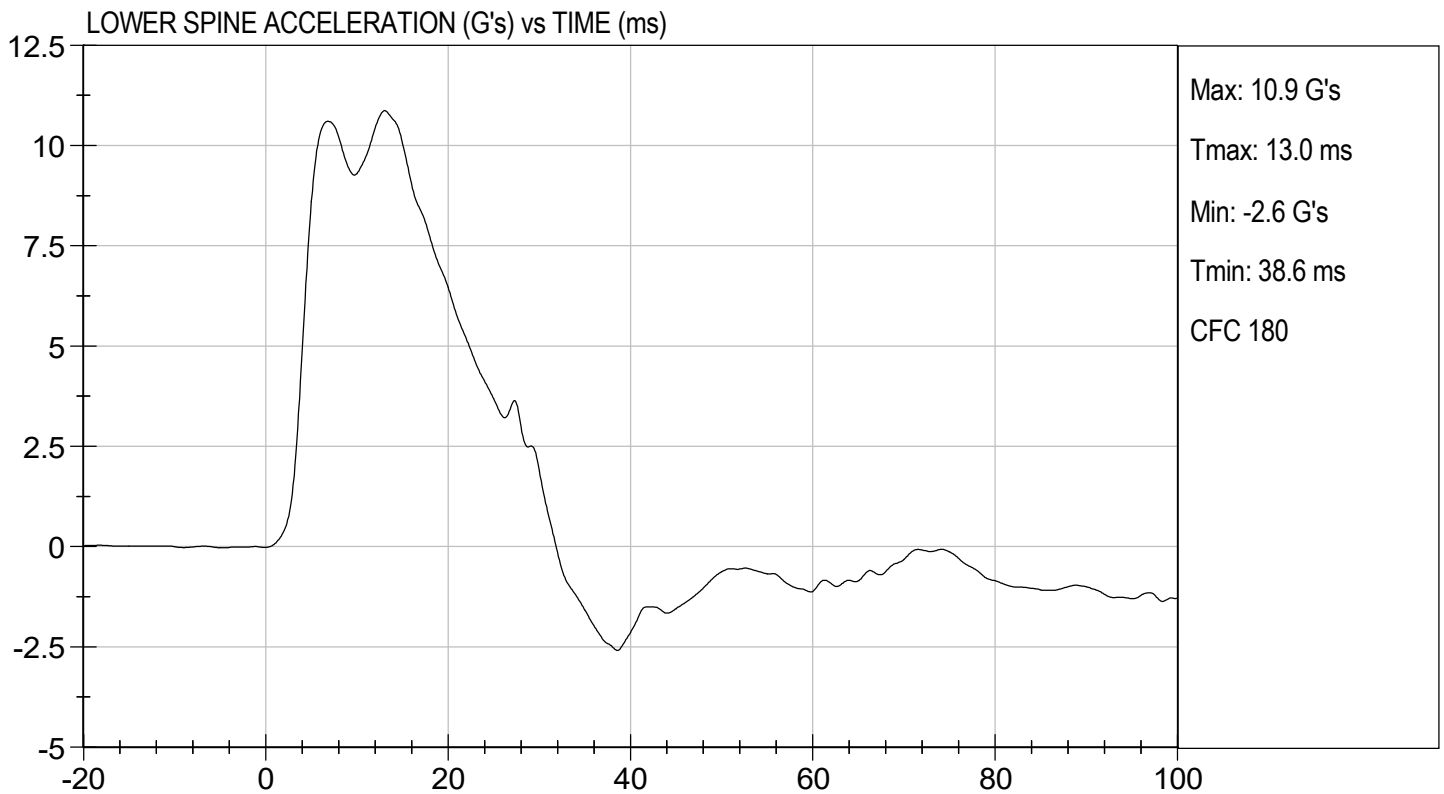
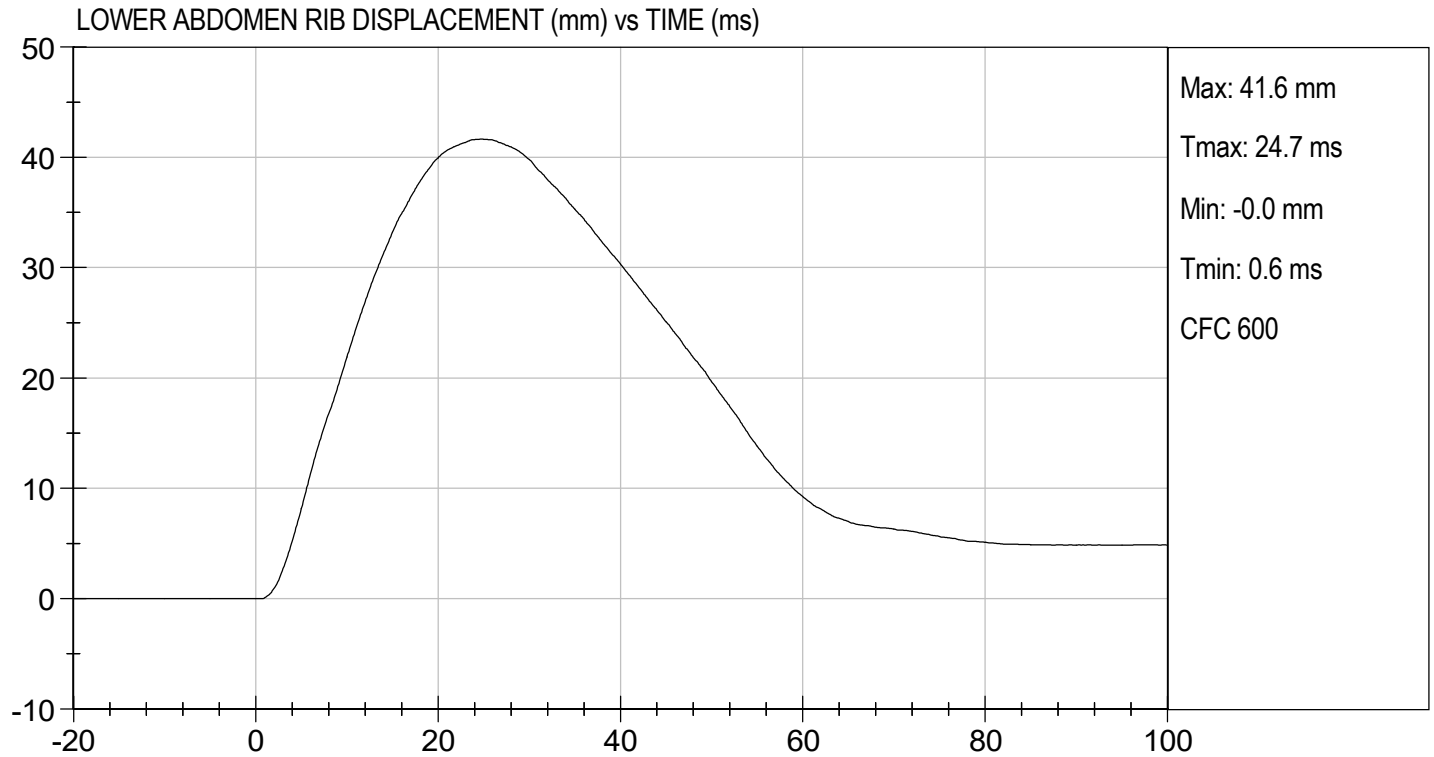
TEST DATE: 02/08/2021
TEST #: D210326





TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.24 ft/s, 4.34 m/s

TEST DATE: 02/08/2021
TEST #: D210326



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

Test I.D: D210327

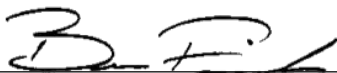
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.0	Pass
Humidity	%	10 to 70	13	Pass
Impact Velocity	m/s	6.60 to 6.80	6.60	Pass
Maximum Probe Acceleration	G's	38 to 47	42	Pass
Pelvis Y Acceleration After 6 ms	G's	34 to 42	39	Pass
Peak Acetabulum Force	N	3600 to 4300	3,864	Pass
Overall Test Results				Pass



Laboratory Technician

02/08/2021

Test Date

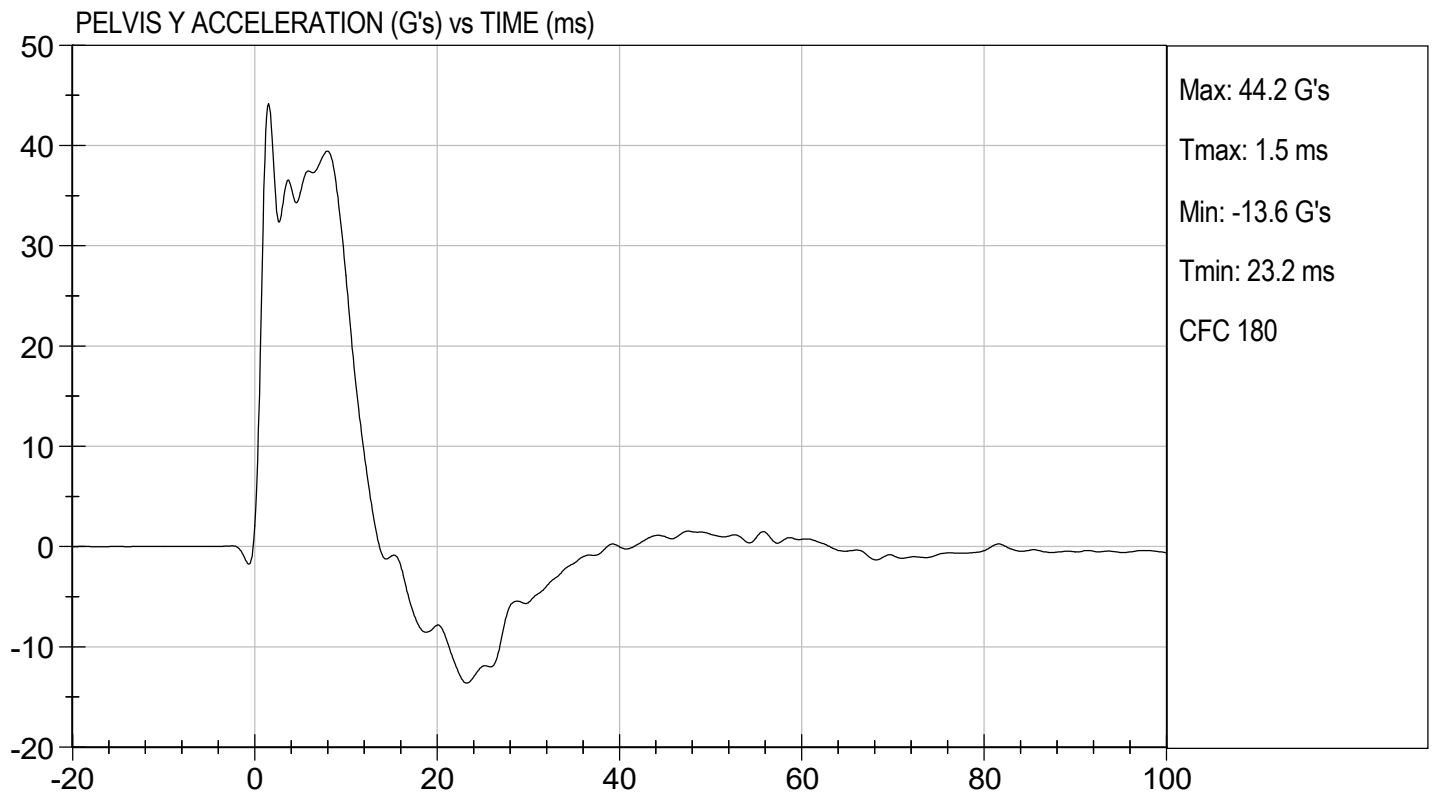
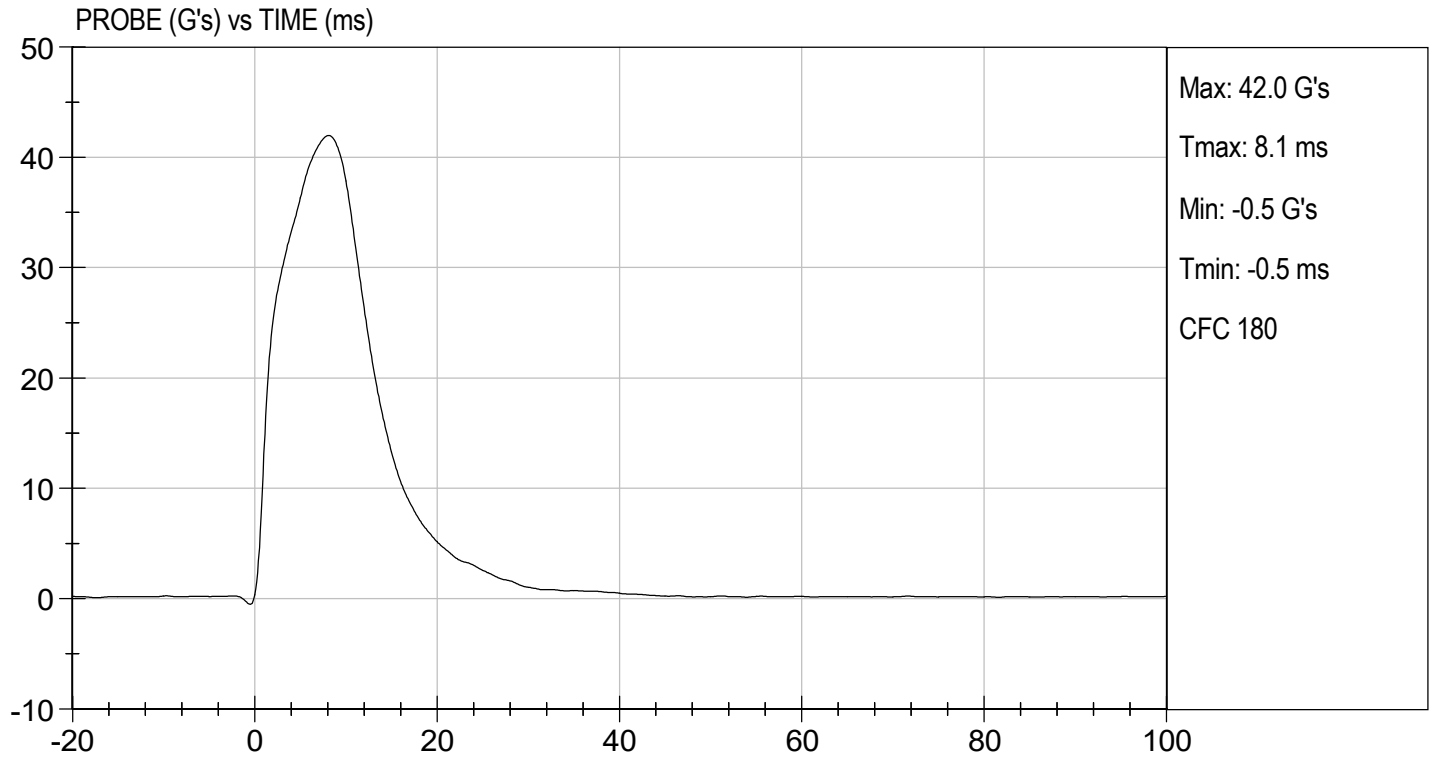


Approved By



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

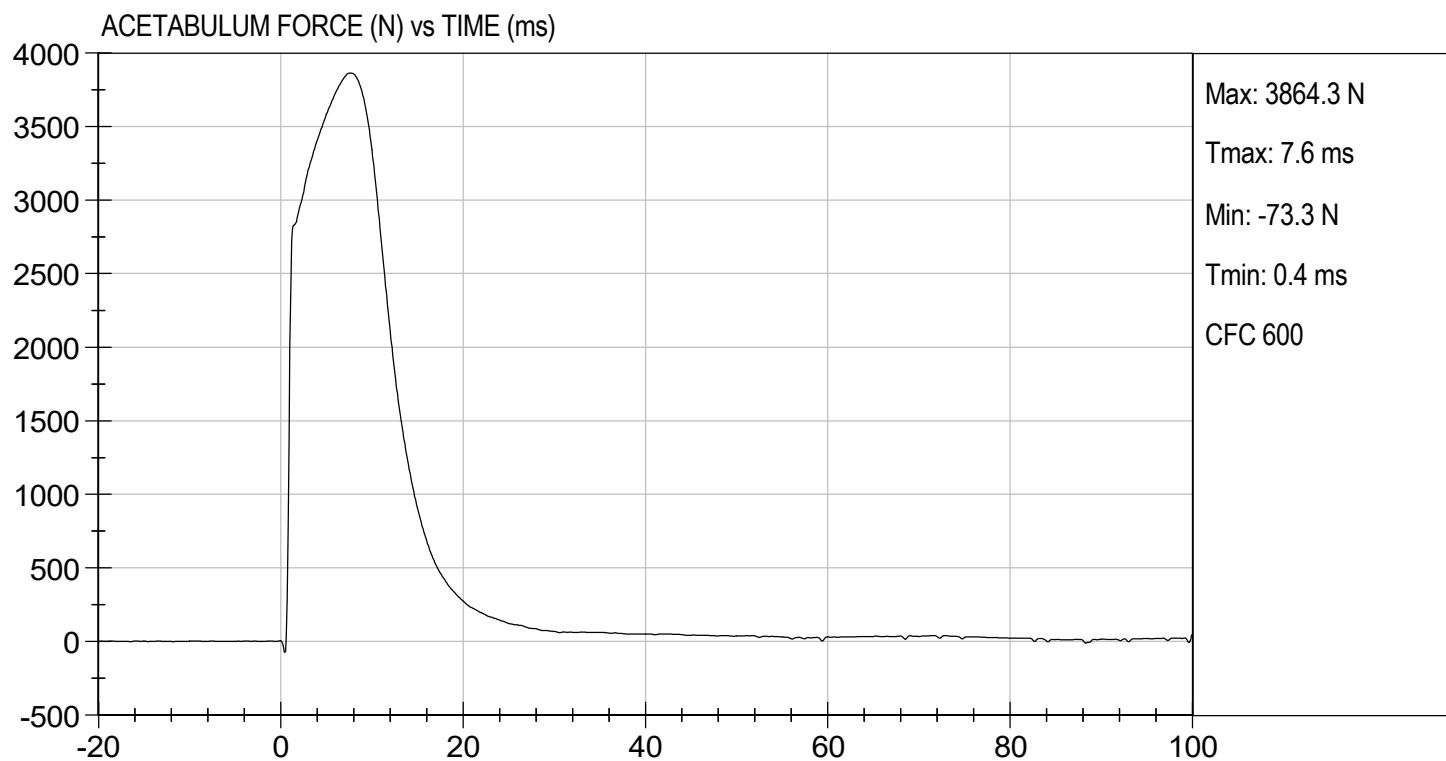
TEST DATE: 02/08/2021
TEST #: D210327





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

TEST DATE: 02/08/2021
TEST #: D210327



MGA RESEARCH CORPORATION

ILIAC IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

Test I.D: D210328

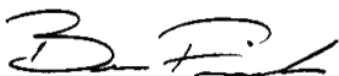
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.0	Pass
Humidity	%	10 to 70	13	Pass
Impact Velocity	m/s	4.20 to 4.40	4.20	Pass
Maximum Probe Acceleration	G's	36 to 45	43	Pass
Pelvis Y Acceleration	G's	28 to 39	37	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4,900	Pass
Overall Test Results				Pass



Laboratory Technician

02/08/2021

Test Date

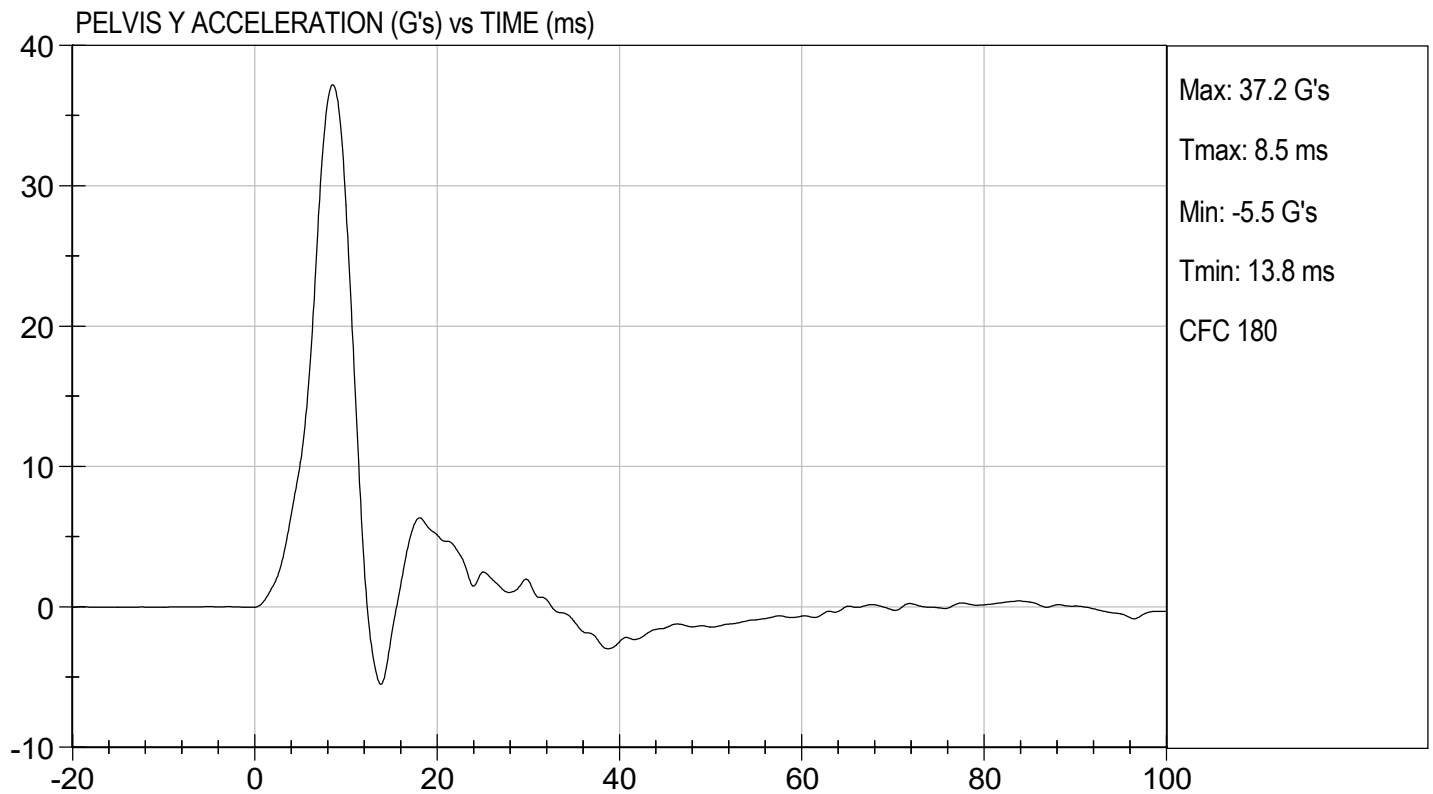
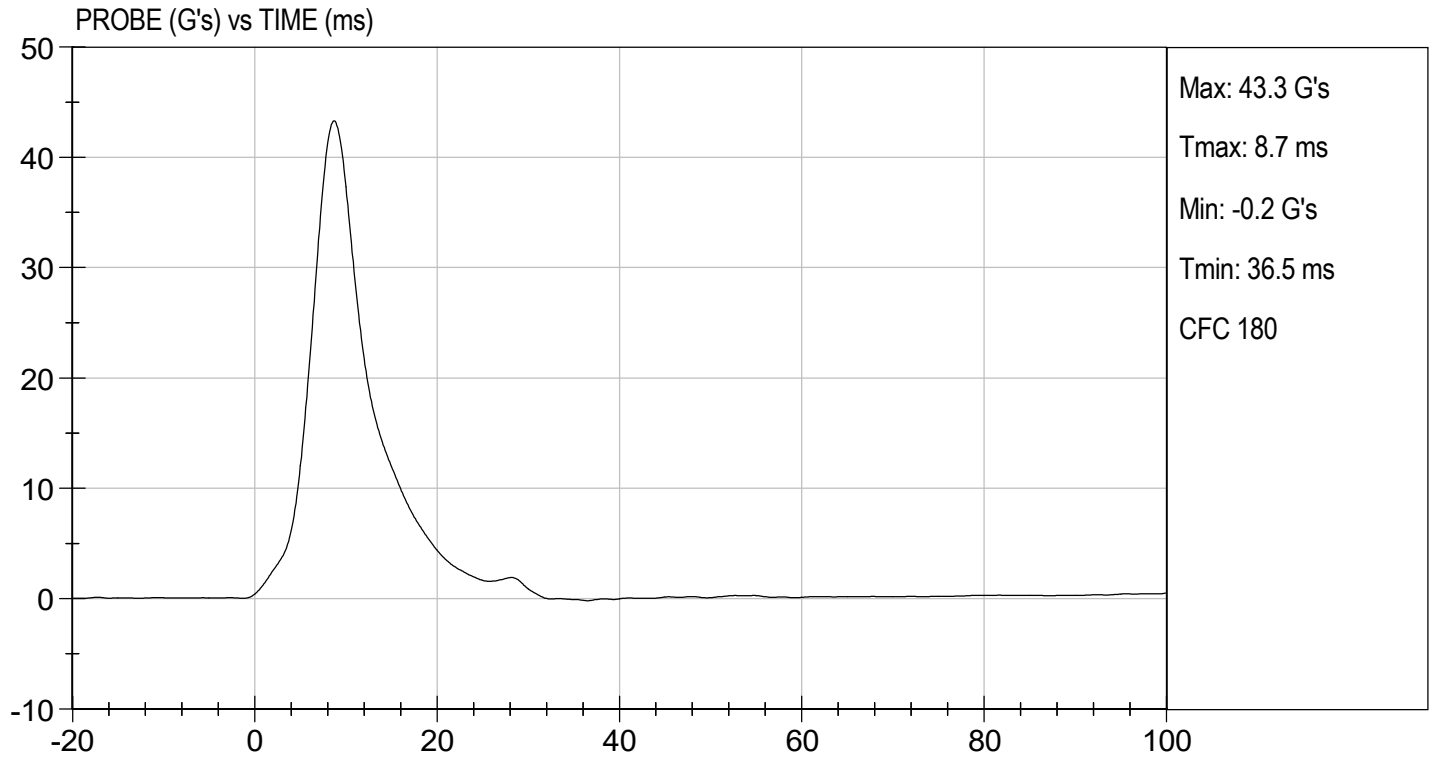


Approved By



TEST DESC: ILLIAC
VELOCITY: 13.77 ft/s, 4.20 m/s

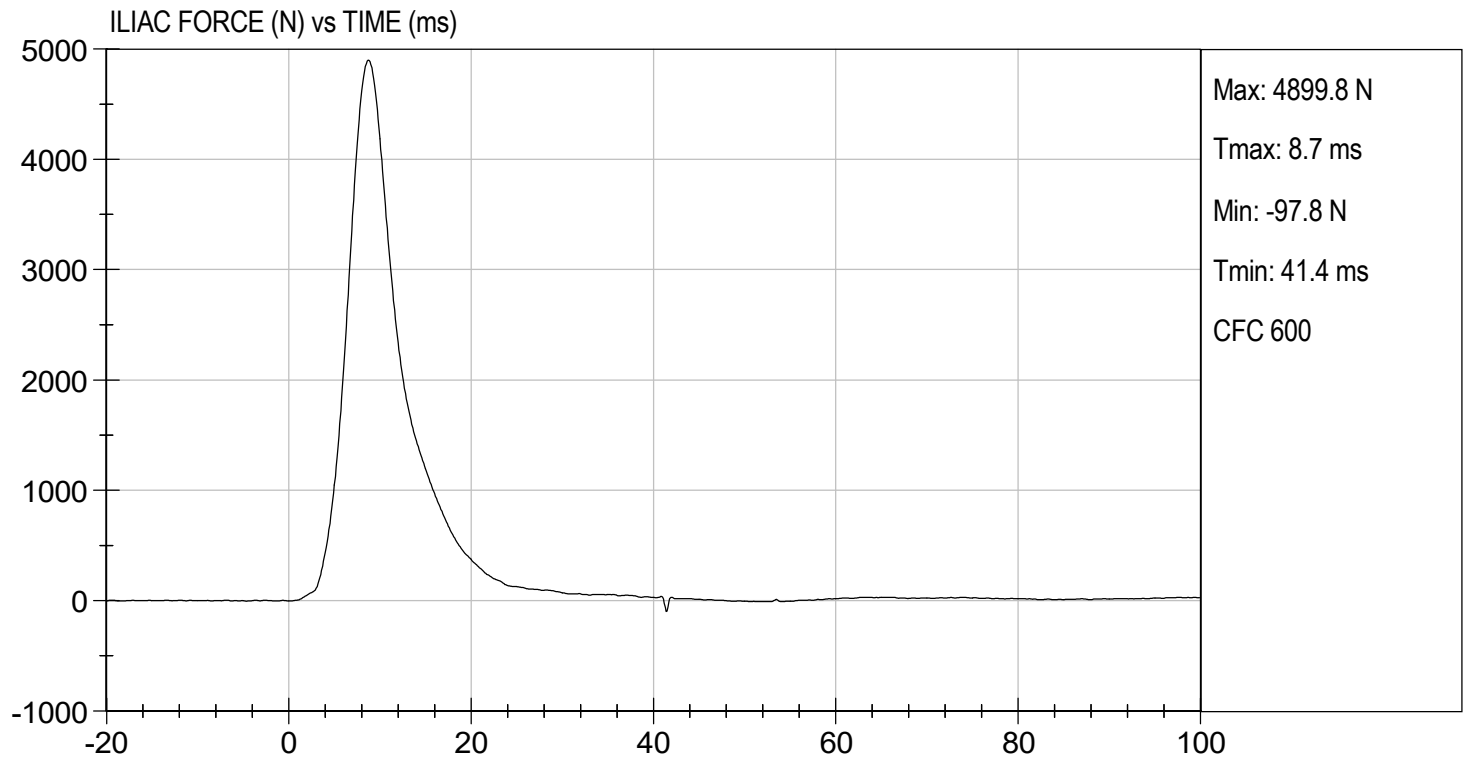
TEST DATE: 02/08/2021
TEST #: D210328





TEST DESC: ILLIAC
VELOCITY: 13.77 ft/s, 4.20 m/s

TEST DATE: 02/08/2021
TEST #: D210328



CALIBRATION TEST RESULTS

POST-TEST

SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD

SID-IIsD External Measurements
SN: 306

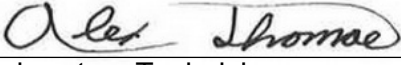
No.	Name	Spec. (mm)	Result	Pass/Fail
A	Sitting Height	772 - 788	785	Pass
B	Shoulder Pivot Height	437 - 453	449	Pass
C	H-point Height	79 - 89	86	Pass
D	H-point from Seatback	141 - 151	147	Pass
E	Shoulder Pivot from Backline	97 - 107	99	Pass
F	Thigh Clearance	119 -135	120	Pass
G	Head Breadth	140 - 148	141	Pass
H	Head Back from Backline	40 - 46	45	Pass
I	Head Depth	178 - 188	182	Pass
J	Head Circumference	541 - 551	550	Pass
K	Buttock to Knee Length	514 - 540	538	Pass
L	Popliteal Height	343 - 369	349	Pass
M	Knee Pivot to Floor Height	392 - 409	394	Pass
N	Buttock Popliteal Length	416 - 442	435	Pass
O	Chest Depth w/o Jacket	195 - 211	198	Pass
P	Foot Length	216 - 232	222	Pass
Q	Hip Breadth (w/ pelvic plugs)	313 - 323	317	Pass
R	Arm Length	249 - 259	250	Pass
S	Knee Joint to Seatback	477 - 493	483	Pass
V	Shoulder Width	341 - 357	351	Pass
W	Foot Width	78 - 94	82	Pass
Y	Chest Circumference w/ jacket	851 - 881	863	Pass
Z	Waist Circumference	761 - 791	782	Pass

MGA RESEARCH CORPORATION
HEAD DROP TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

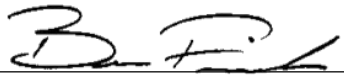
Test ID: D210481

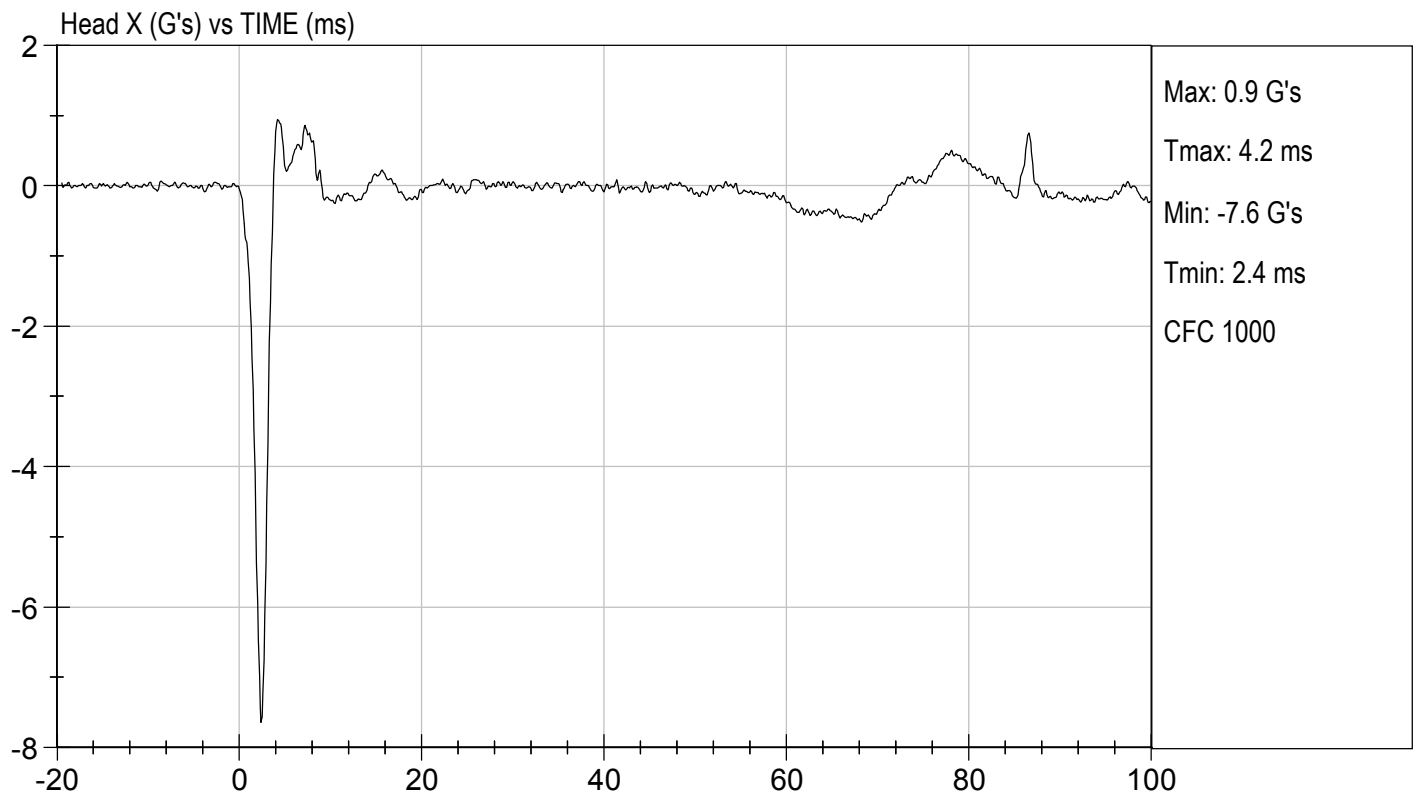
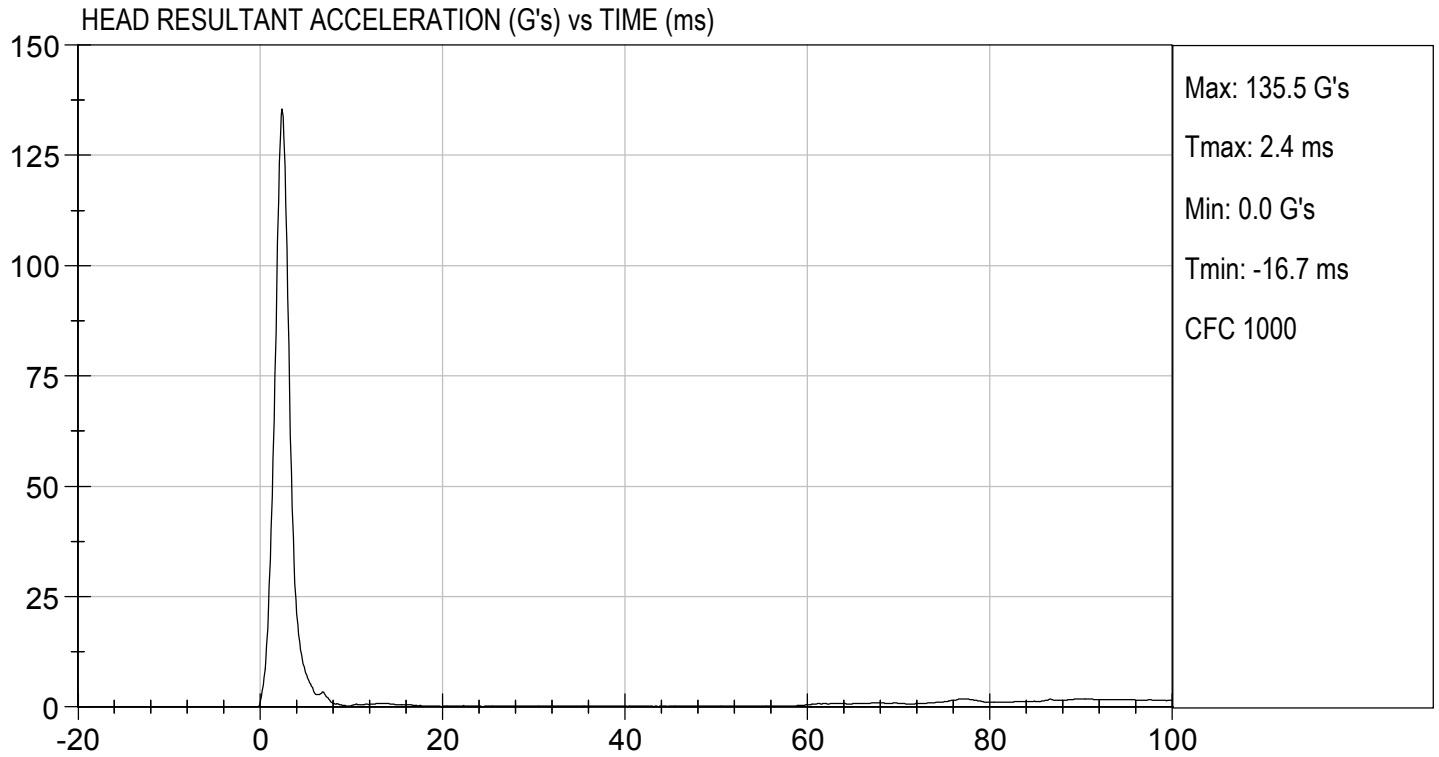
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Peak Resultant Acceleration	G's	115 to 137	135	Pass
Peak Longitudinal Acceleration	G's	+/- 15	-7.6	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	<15%	Yes	Pass
Overall Test Results			Pass	

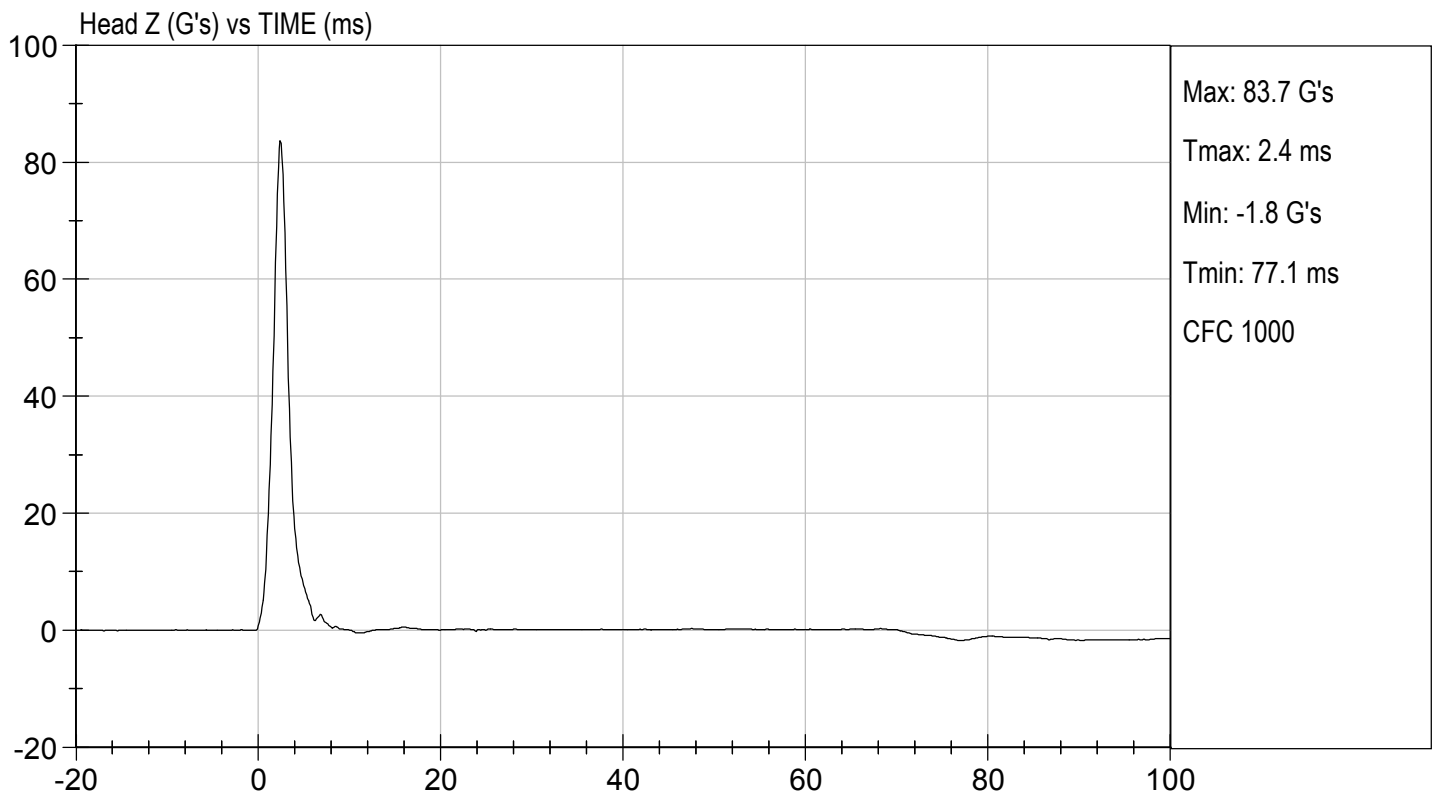
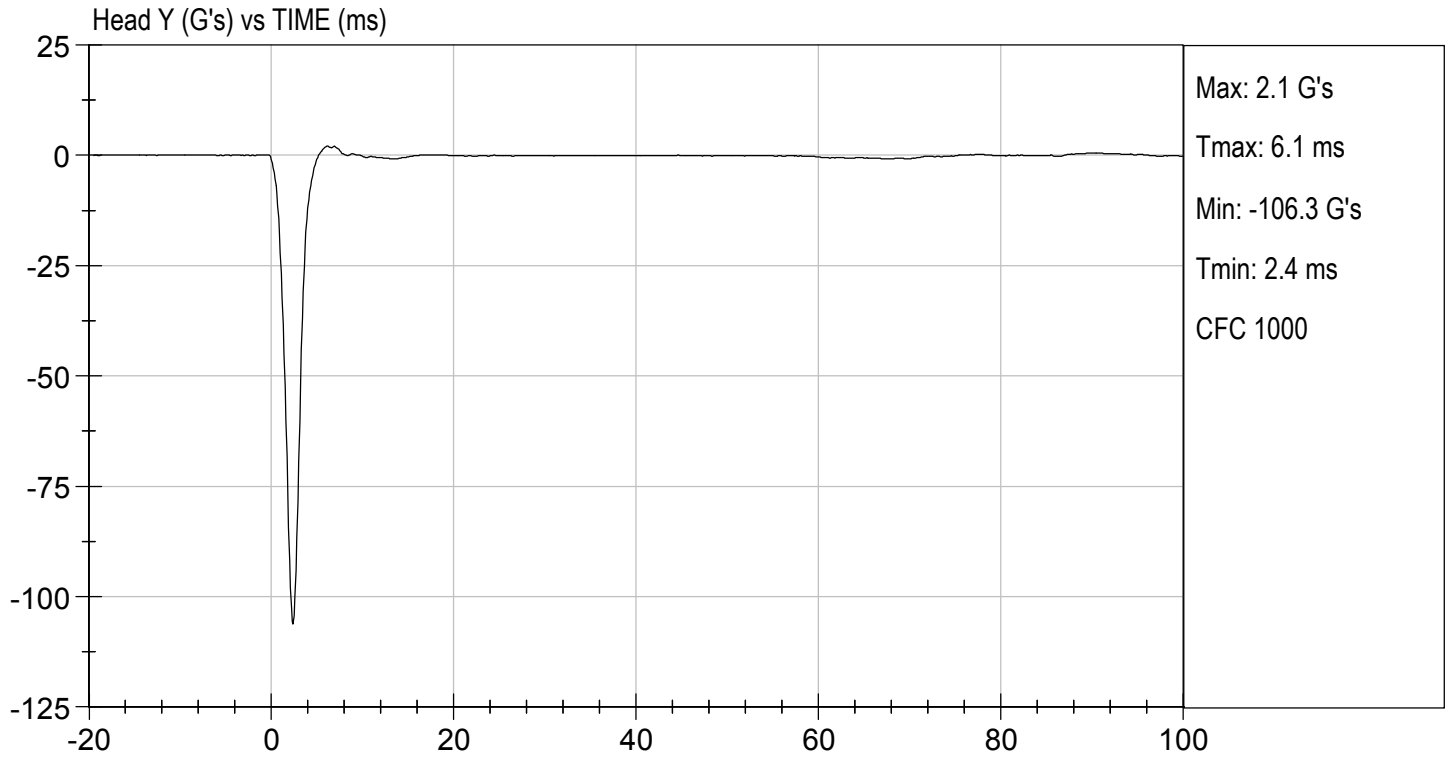

Laboratory Technician

02/19/2021

Test Date


Approved By



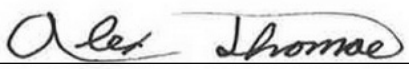


MGA RESEARCH CORPORATION
LATERAL NECK PENDULUM TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

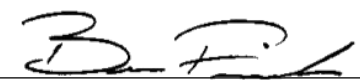
Test I.D: D210482

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.6	Pass
Humidity		%	10 to 70	24	Pass
Impact Velocity		m/s	5.51 to 5.63	5.58	Pass
Pendulum Velocity	10 ms	m/s	2.20 to 2.80	2.76	Pass
	15 ms	m/s	3.30 to 4.10	3.89	Pass
	20 ms	m/s	4.40 to 5.40	5.13	Pass
	25 ms	m/s	5.40 to 6.10	5.62	Pass
	25-100 ms	m/s	5.50 to 6.20	5.63	Pass
Maximum D-Plane Rotation		deg	71 to 81	71	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	59	Pass
Maximum Occipital Condyle Moment		Nm	-44 to -36	-37	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	110	Pass
Overall Test Results					Pass


 Laboratory Technician

02/18/2021

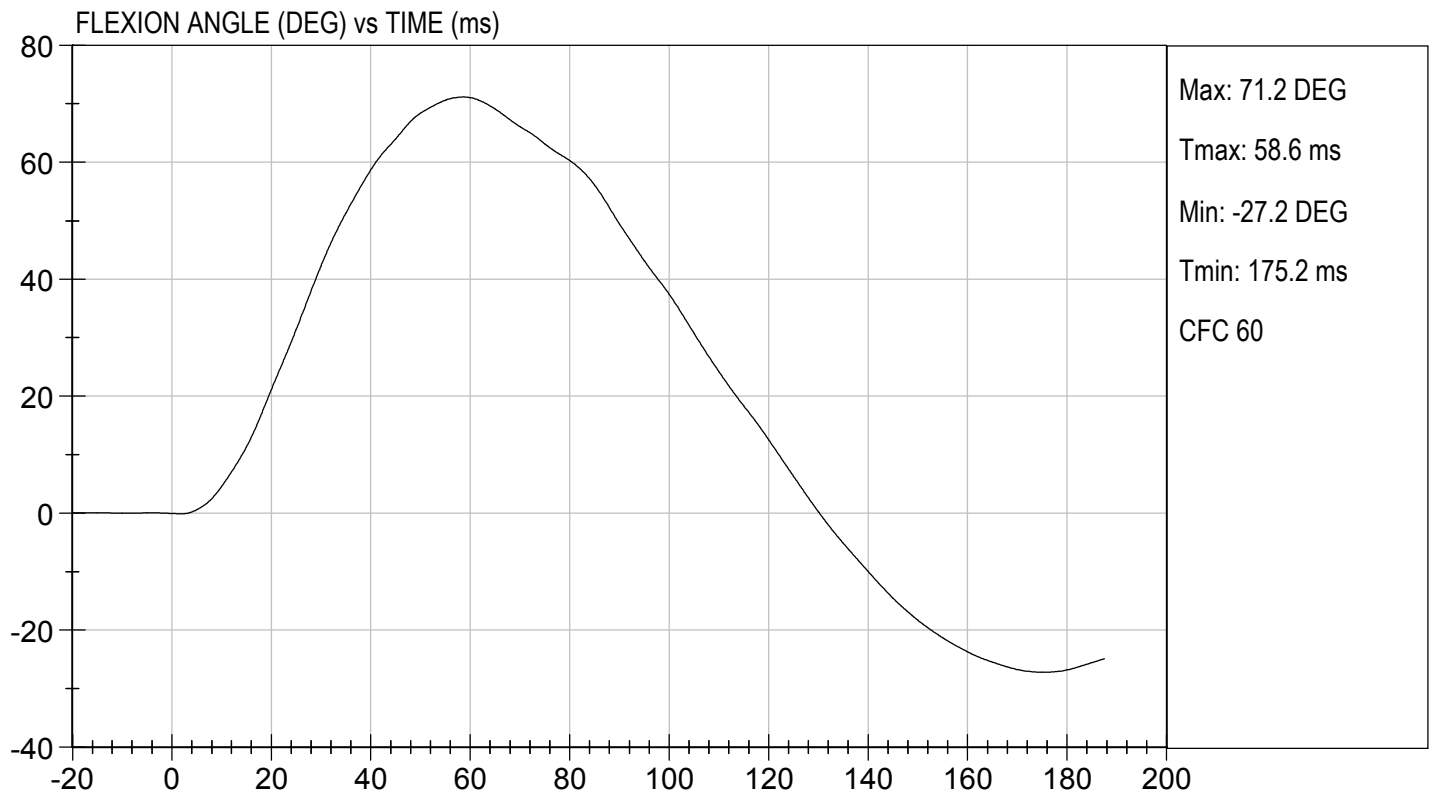
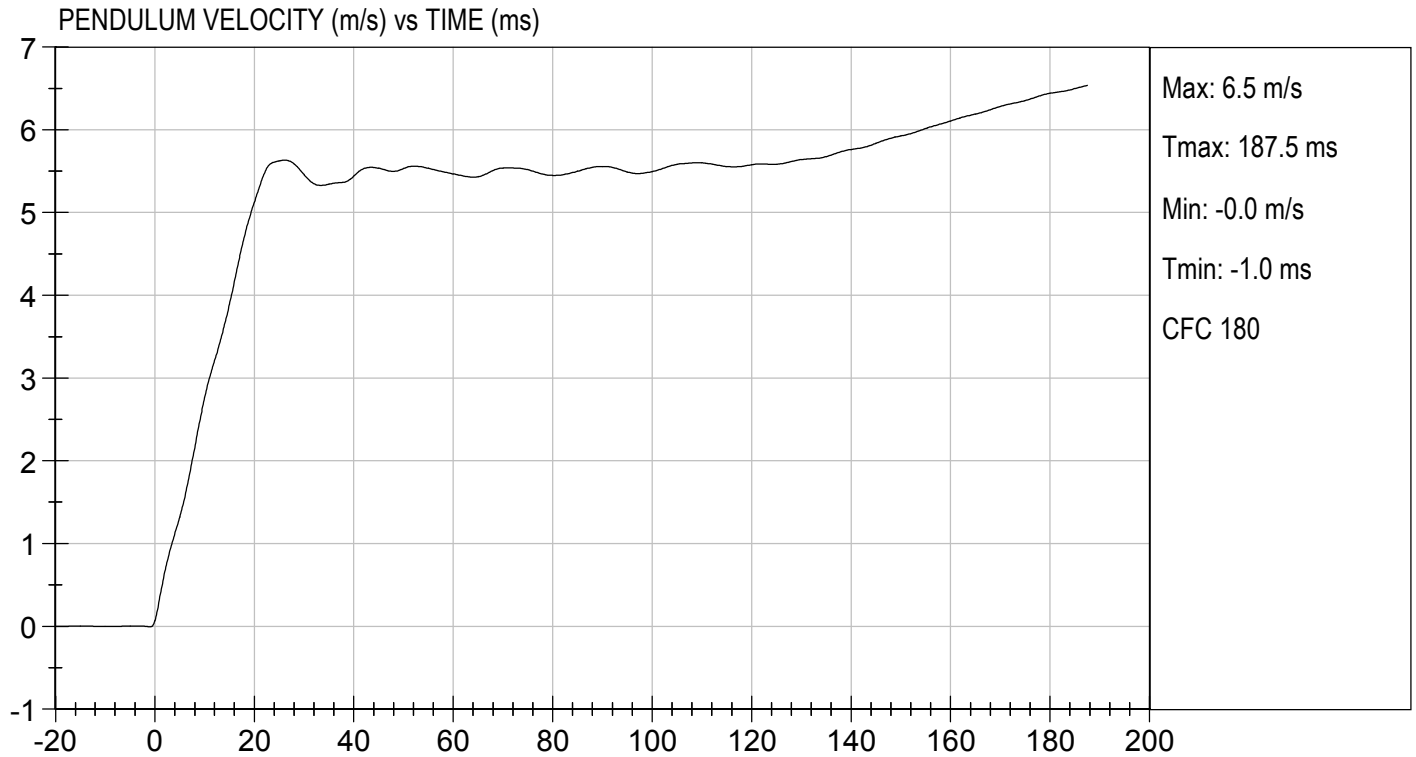
Test Date


 Approved By



TEST DESC: NECK BENDING
VELOCITY: 18.32 ft/s, 5.58 m/s

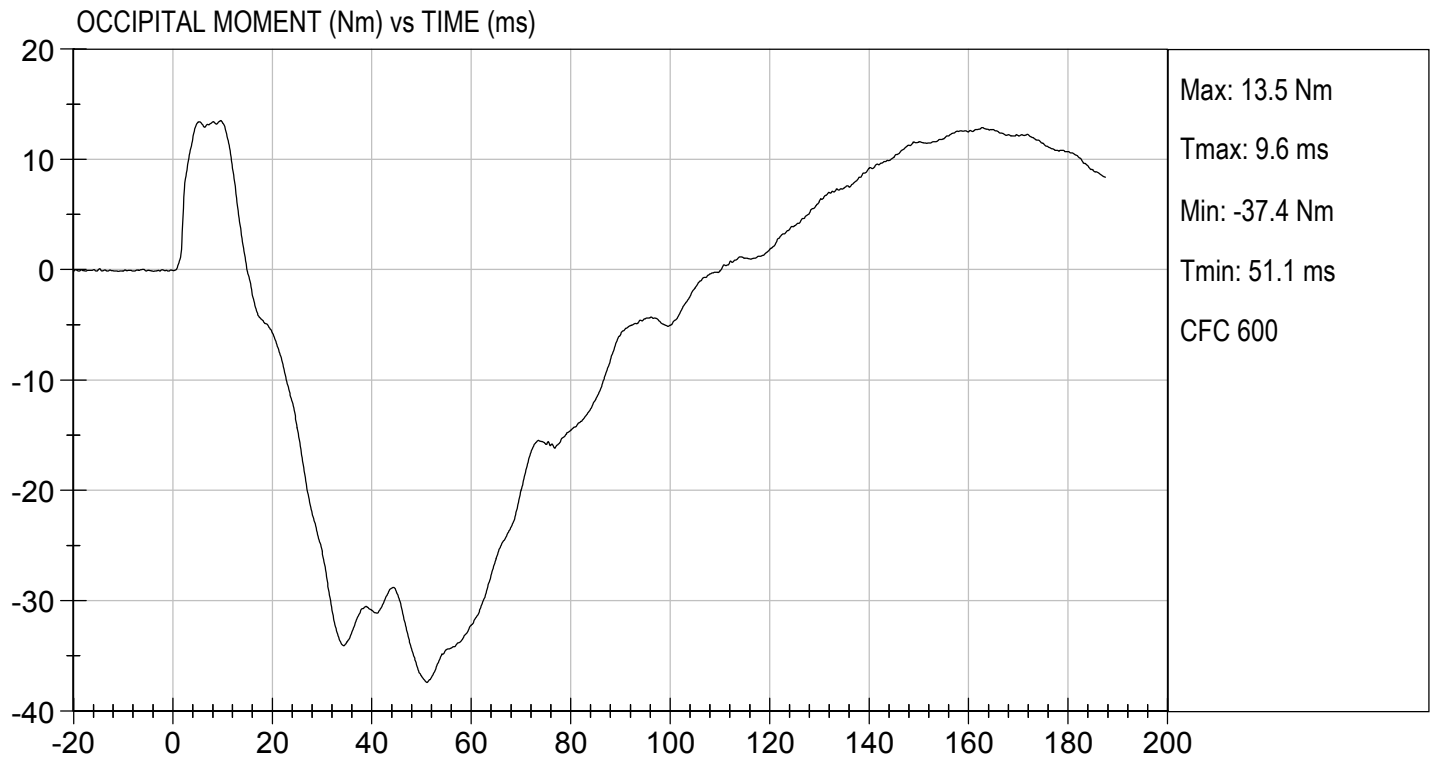
TEST DATE: 02/18/2021
TEST #: D210482





TEST DESC: NECK BENDING
VELOCITY: 18.32 ft/s, 5.58 m/s

TEST DATE: 02/18/2021
TEST #: D210482



MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

Test ID: D210483

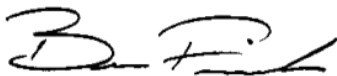
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	23	Pass
Impact Velocity	m/s	4.20 to 4.40	4.23	Pass
Maximum Probe Acceleration	G's	13 to 18	15	Pass
Shoulder Displacement	mm	28 to 37	29	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	18	Pass
Overall Test Results				Pass



Laboratory Technician

02/19/2021

Test Date

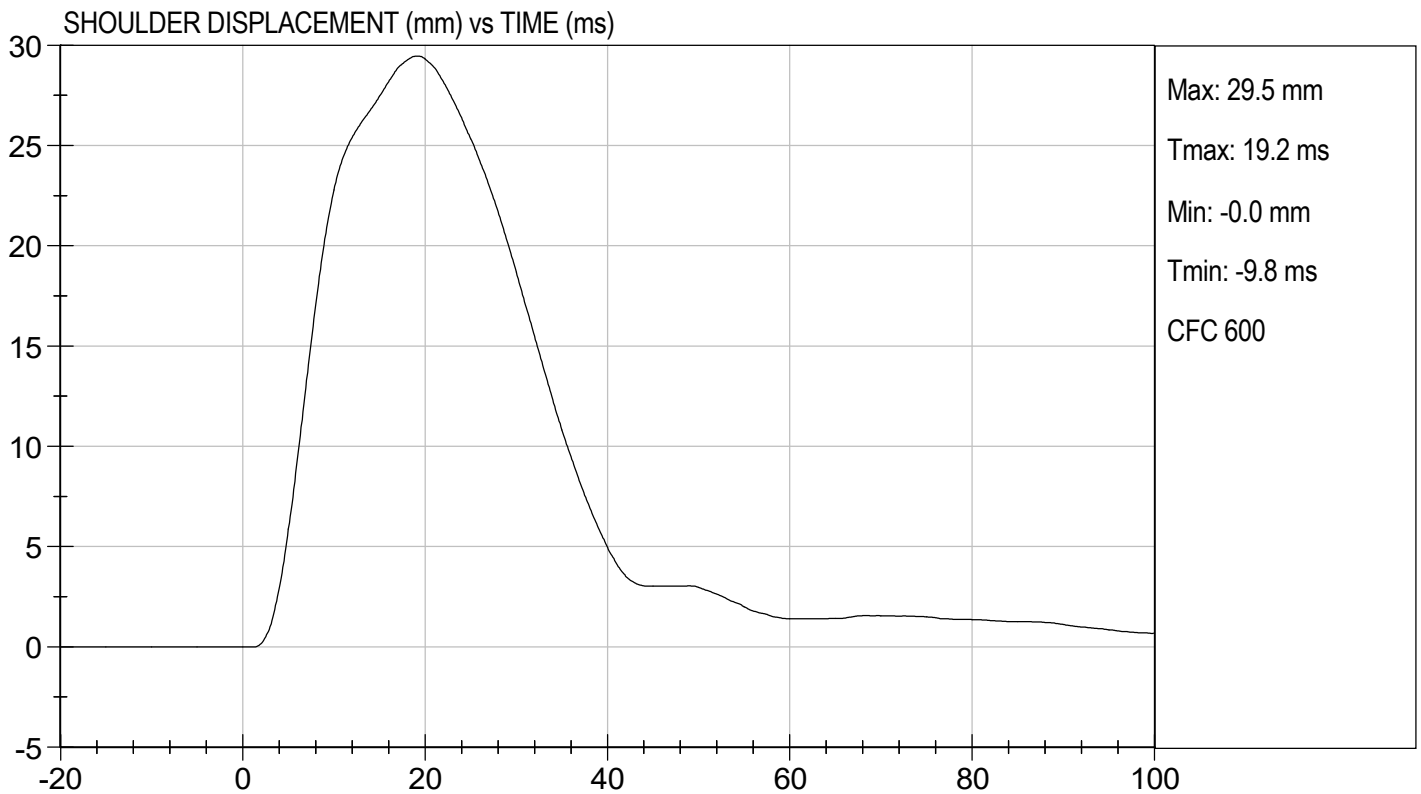
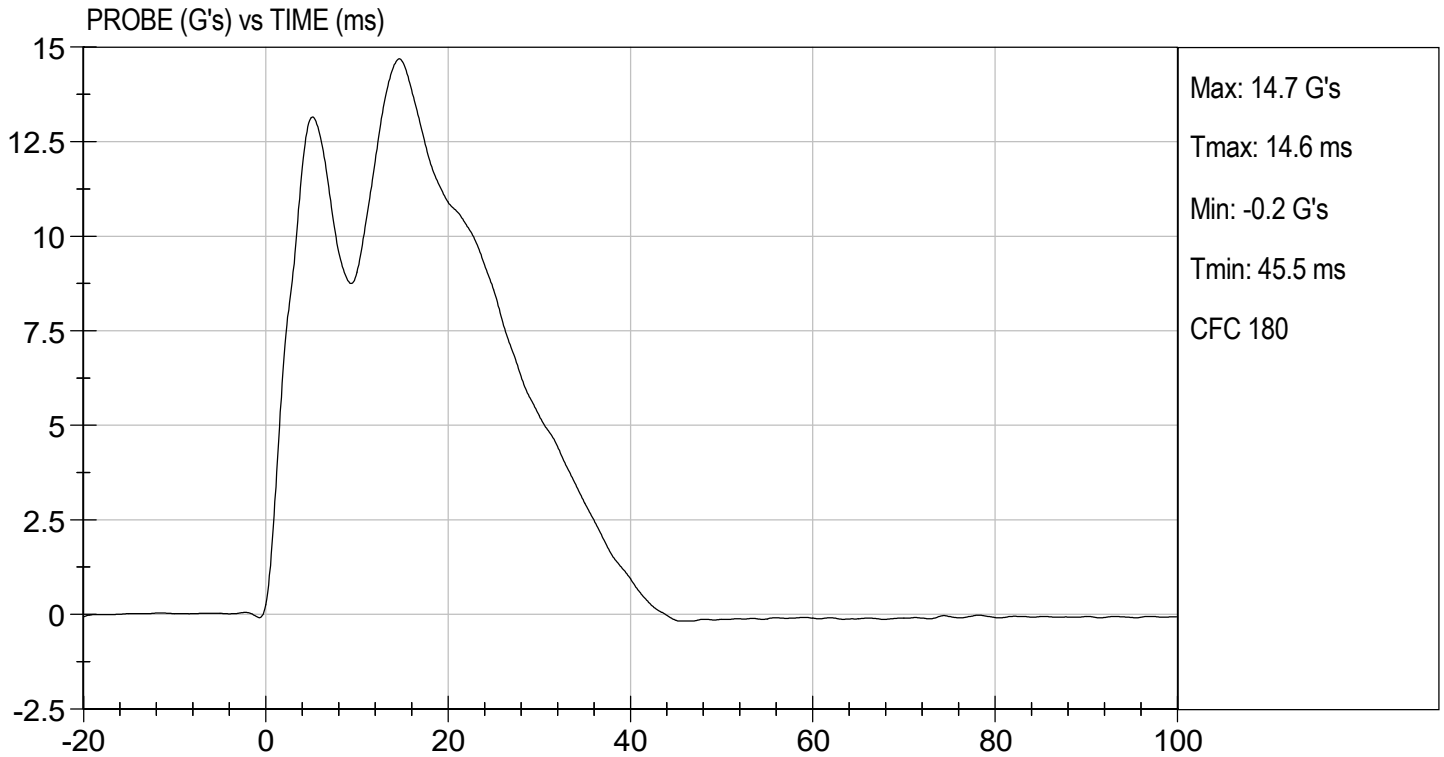


Approved By



TEST DESC: SHOULDER IMPACT
VELOCITY: 13.89 ft/s, 4.23 m/s

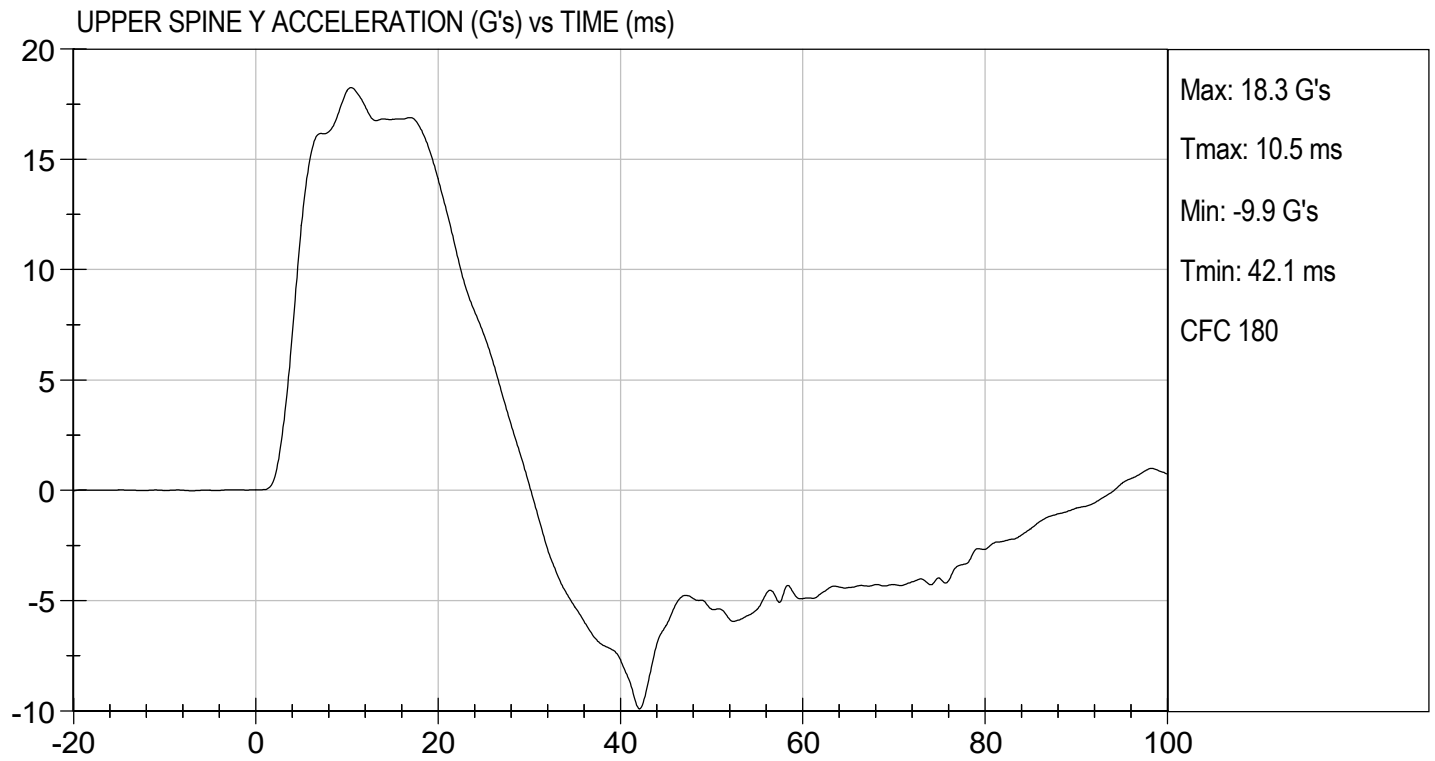
TEST DATE: 02/19/2021
TEST #: D210483





TEST DESC: SHOULDER IMPACT
VELOCITY: 13.89 ft/s, 4.23 m/s

TEST DATE: 02/19/2021
TEST #: D210483



MGA RESEARCH CORPORATION
THORAX (WITH ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

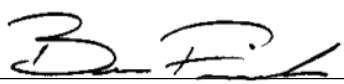
ATD Serial No: 306

Test I.D: D210484

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.8	Pass
Humidity	%	10 to 70	23	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Maximum Probe Acceleration	G's	30 to 36	33	Pass
Shoulder Displacement	mm	31 to 40	36	Pass
Upper Rib Displacement	mm	25 to 32	28	Pass
Middle Rib Displacement	mm	30 to 36	31	Pass
Lower Rib Displacement	mm	32 to 38	34	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	40	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	32	Pass
Overall Test Results				Pass


Laboratory Technician

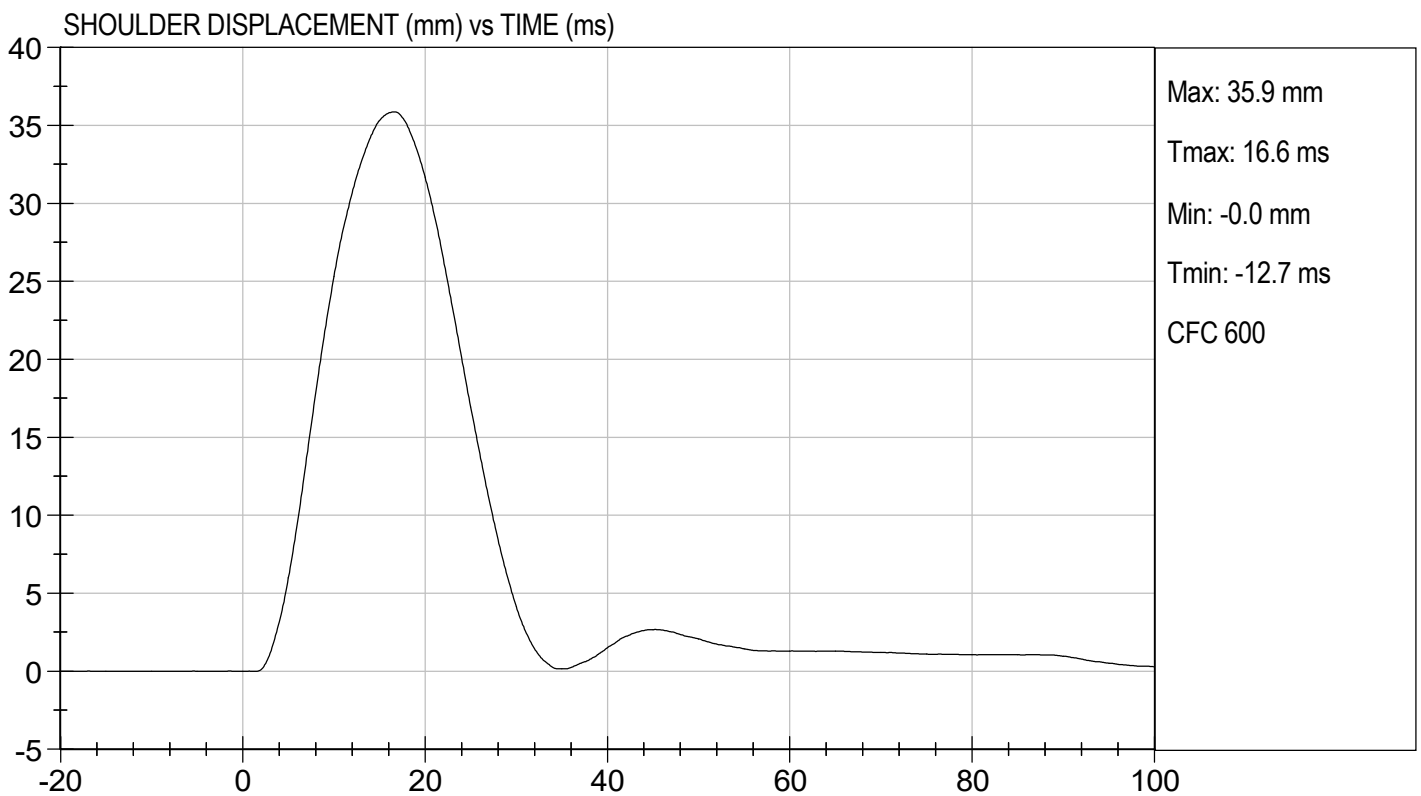
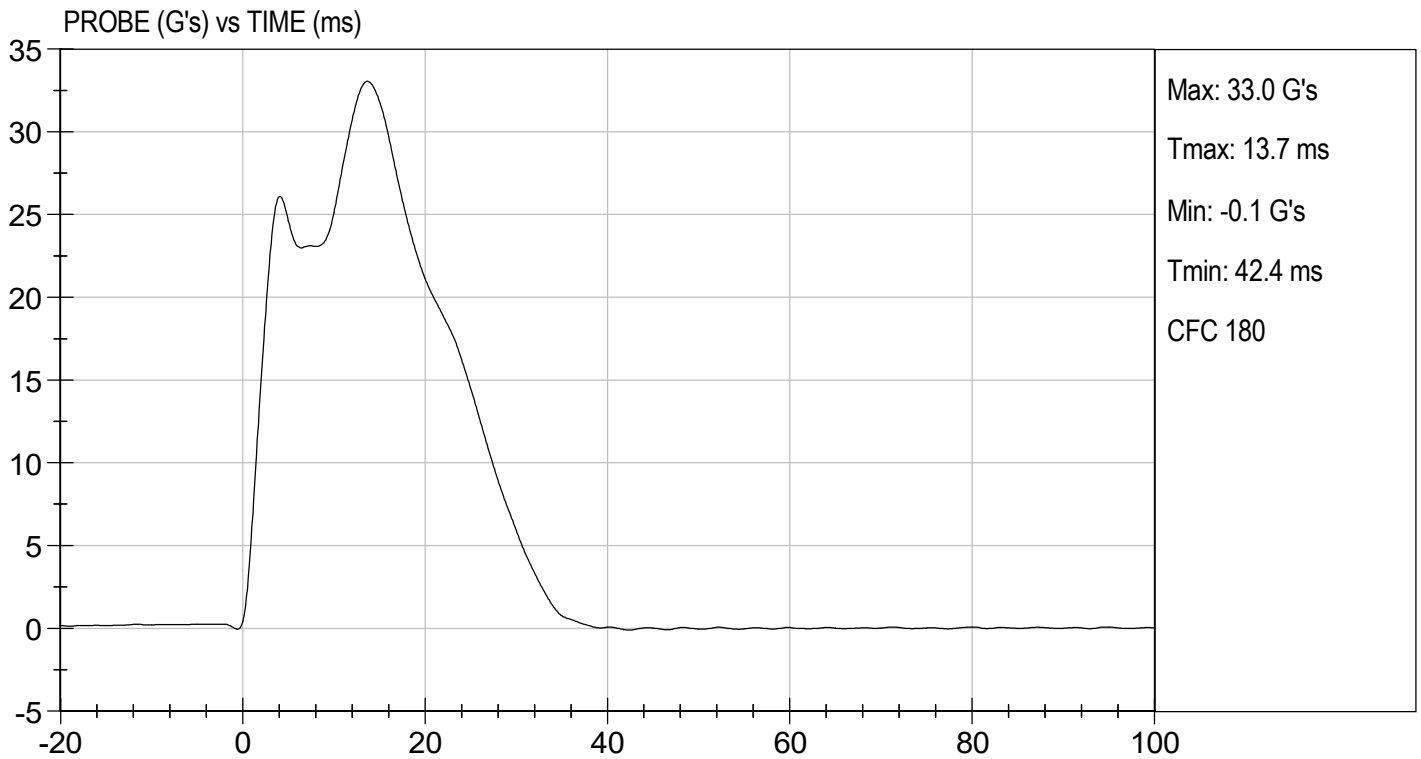
02/19/2021
Test Date


Approved By



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

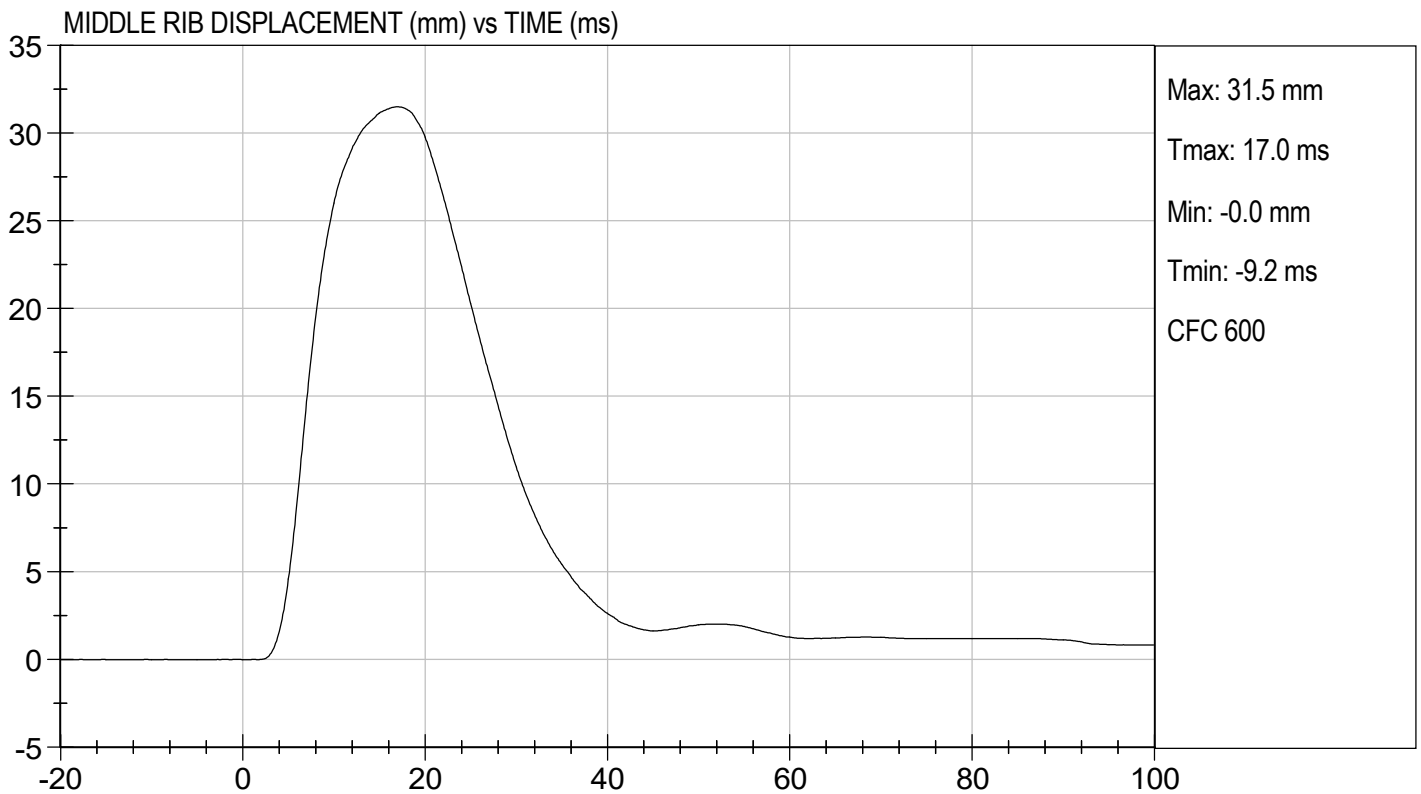
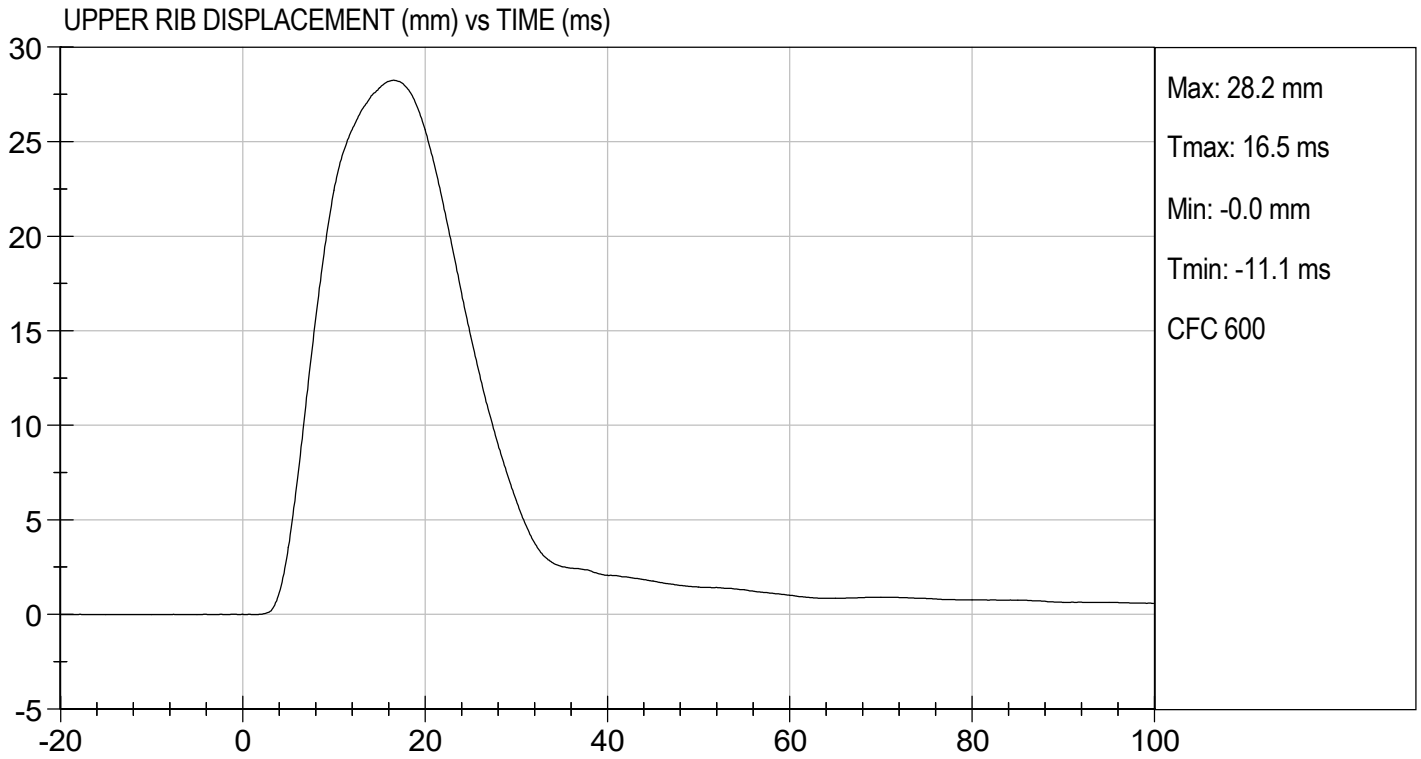
TEST DATE: 02/19/2021
TEST #: D210484





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

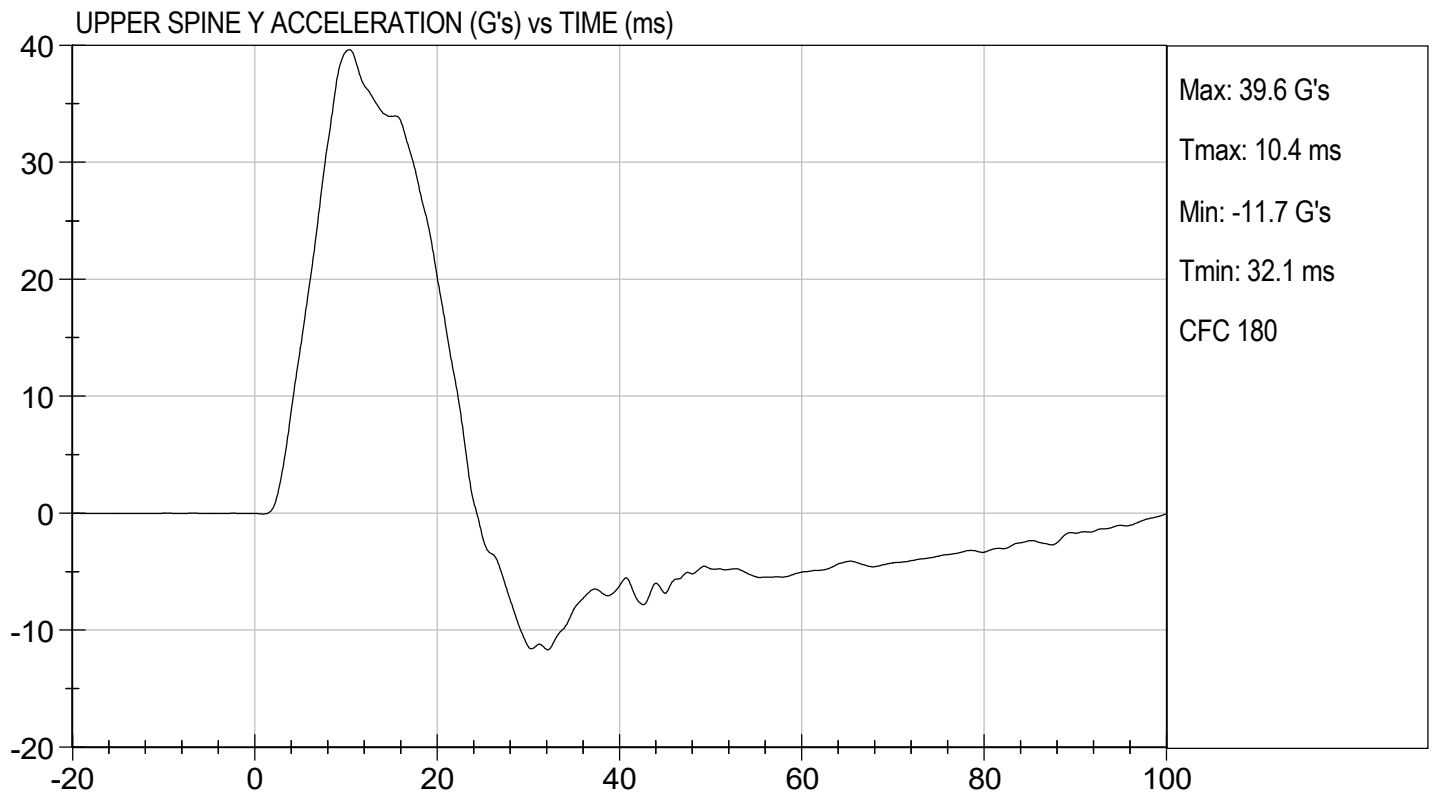
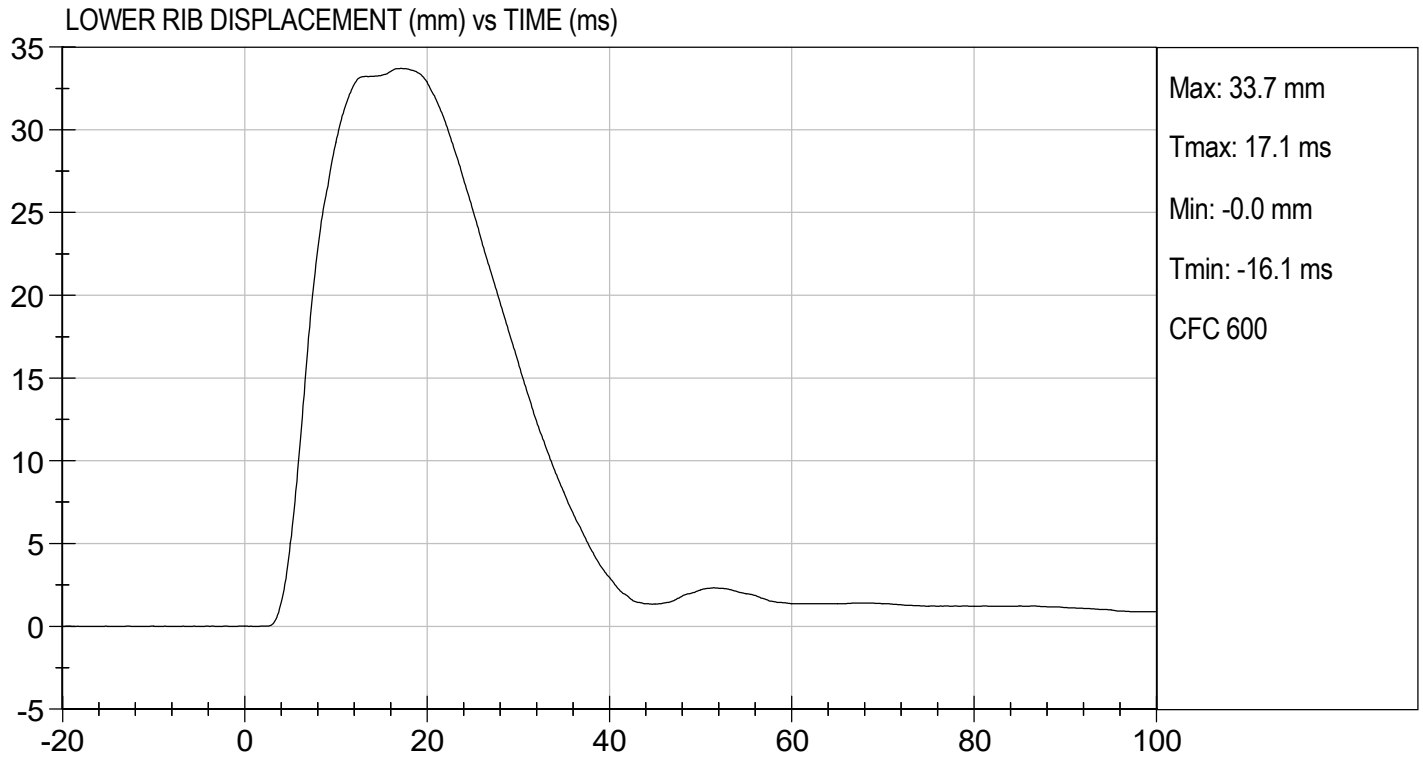
TEST DATE: 02/19/2021
TEST #: D210484





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

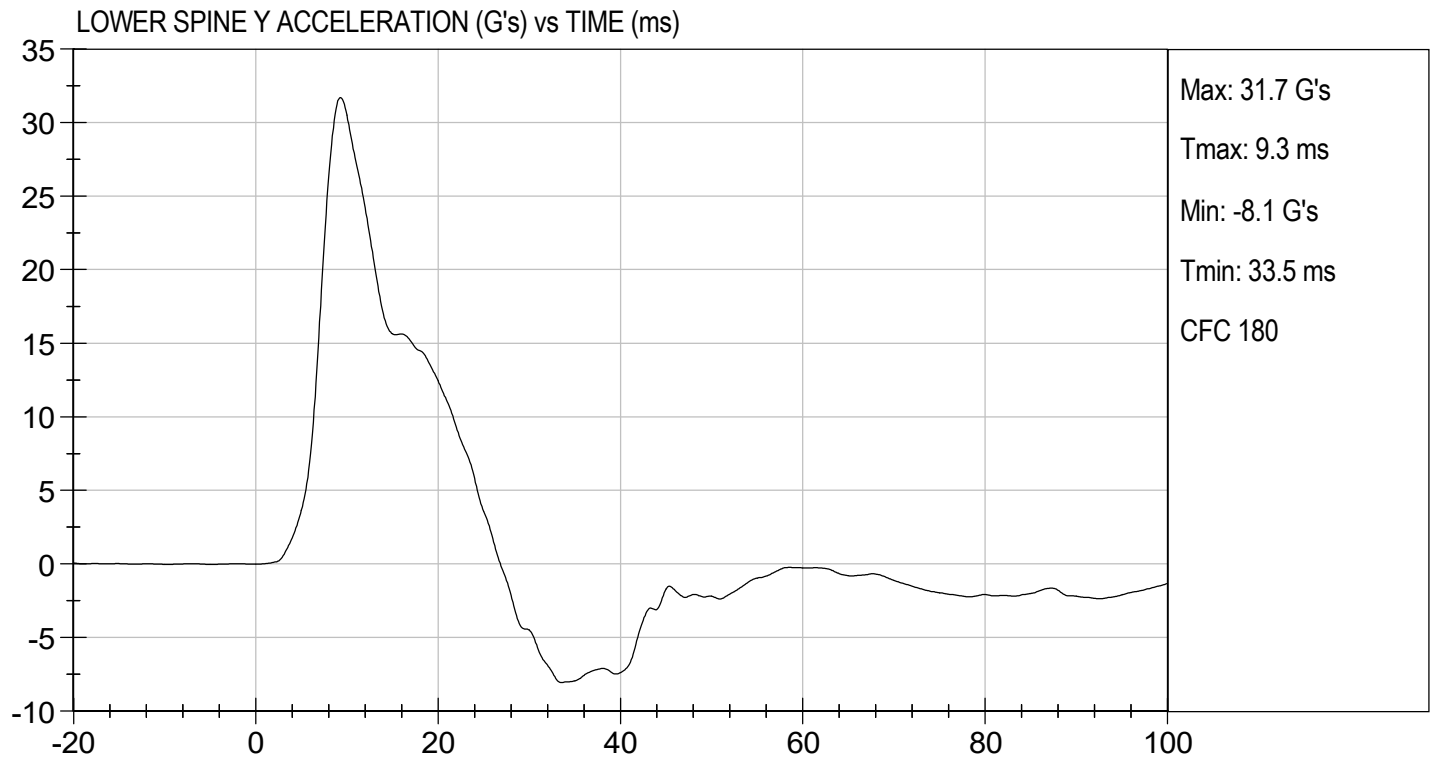
TEST DATE: 02/19/2021
TEST #: D210484





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

TEST DATE: 02/19/2021
TEST #: D210484



MGA RESEARCH CORPORATION
THORAX (WITHOUT ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

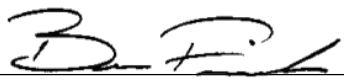
Test I.D: D210485

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.8	Pass
Humidity	%	10 to 70	23	Pass
Impact Velocity	m/s	4.20 to 4.40	4.23	Pass
Maximum Probe Acceleration	G's	14 to 18	15	Pass
Upper Rib Displacement	mm	32 to 40	38	Pass
Middle Rib Displacement	mm	39 to 45	42	Pass
Lower Rib Displacement	mm	35 to 43	39	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	15	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	10	Pass
			Overall Test Results	Pass


Laboratory Technician

02/19/2021

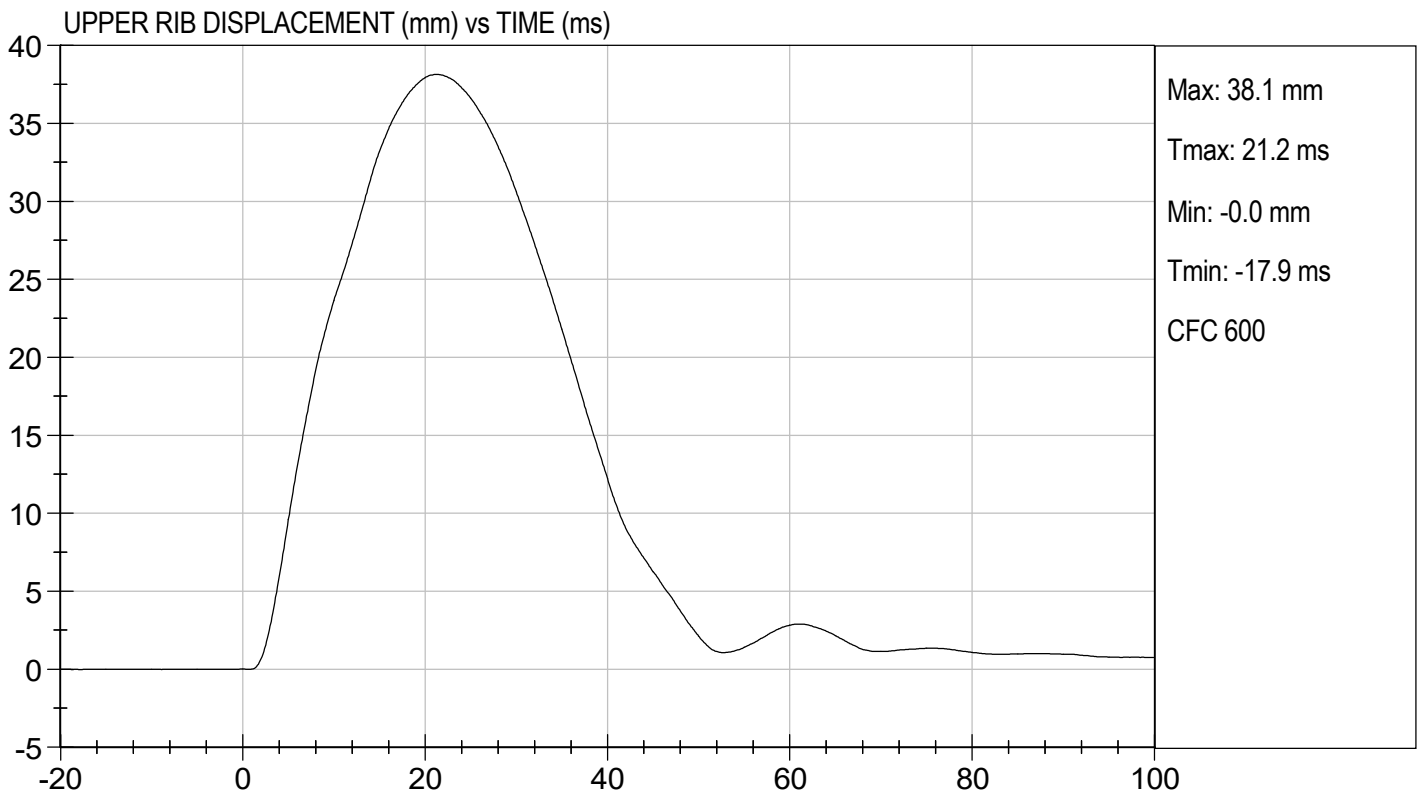
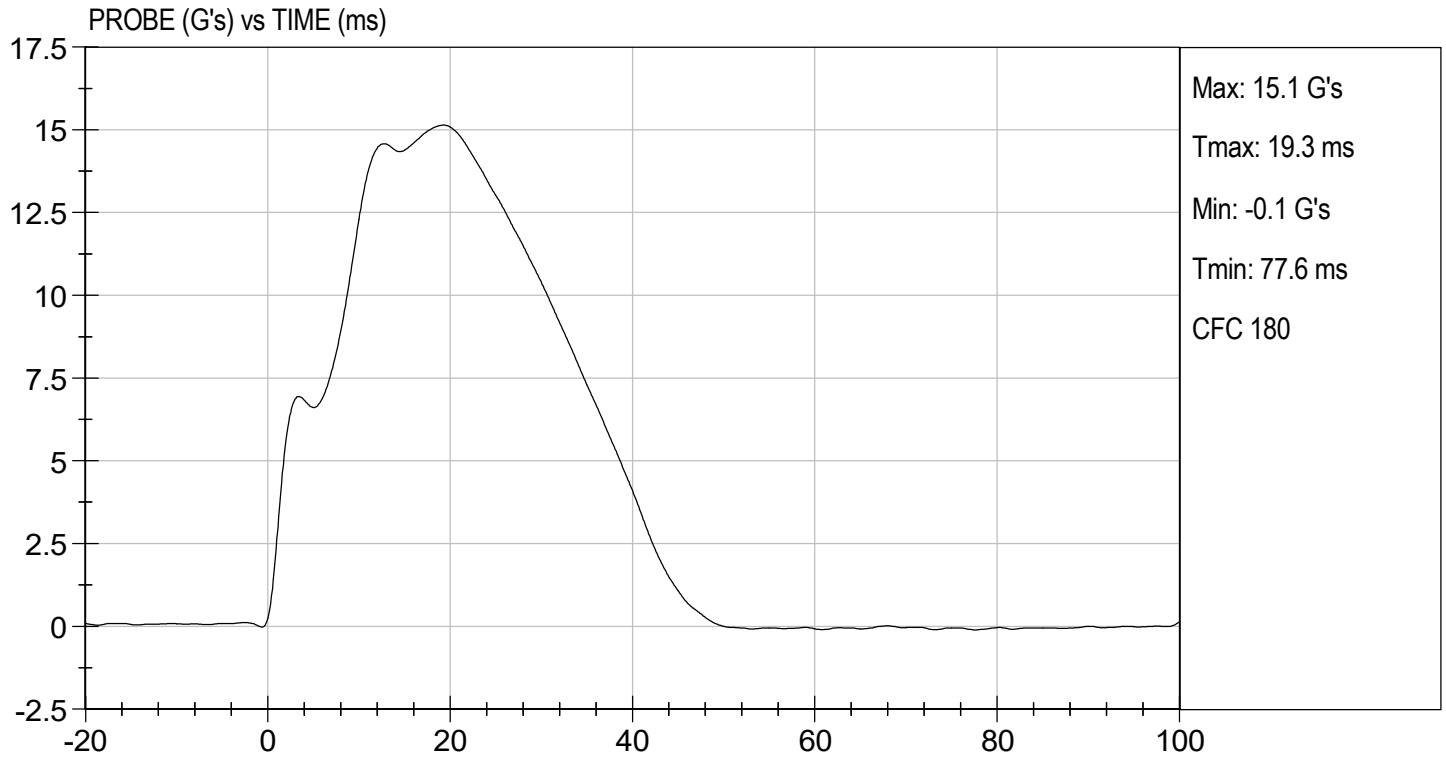
Test Date


Approved By



TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 13.89 ft/s, 4.23 m/s

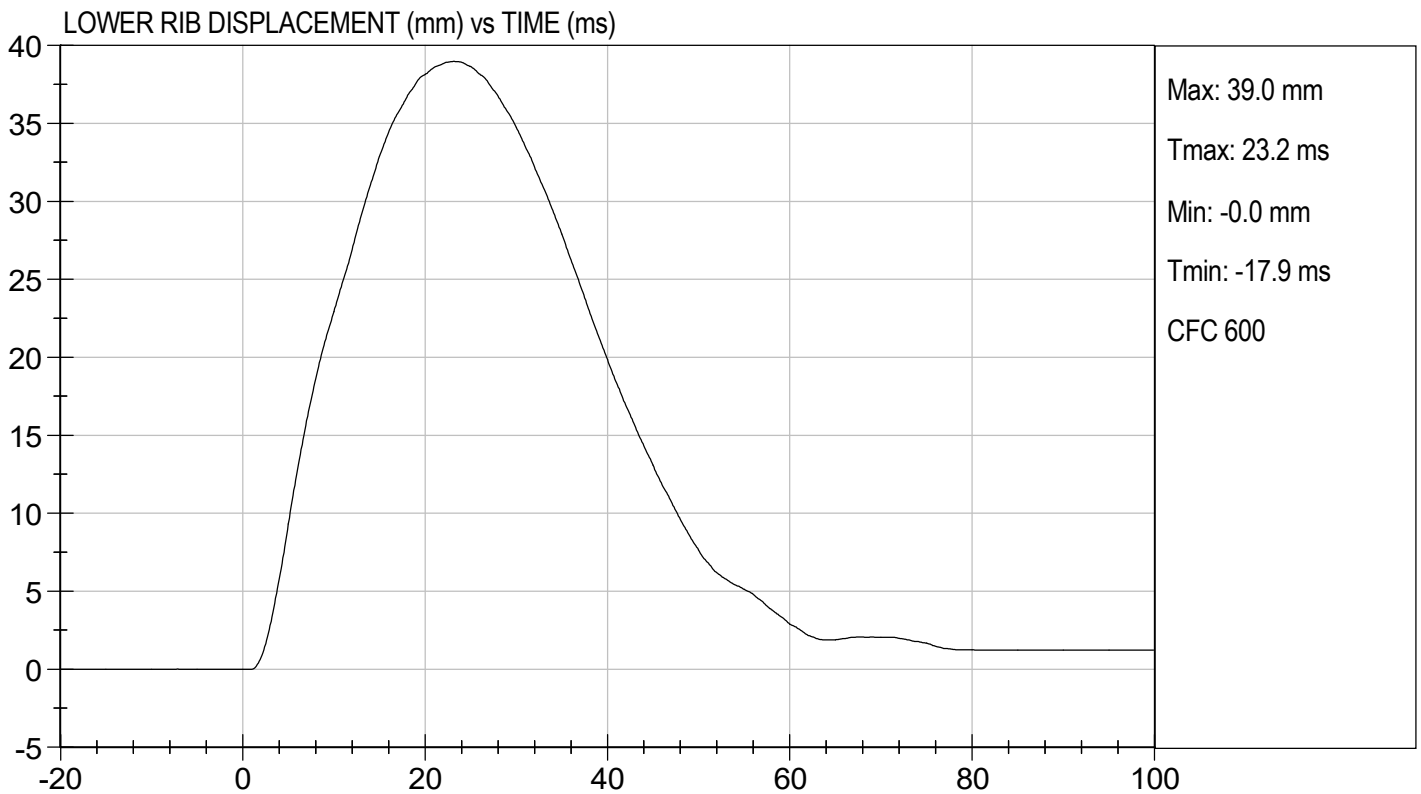
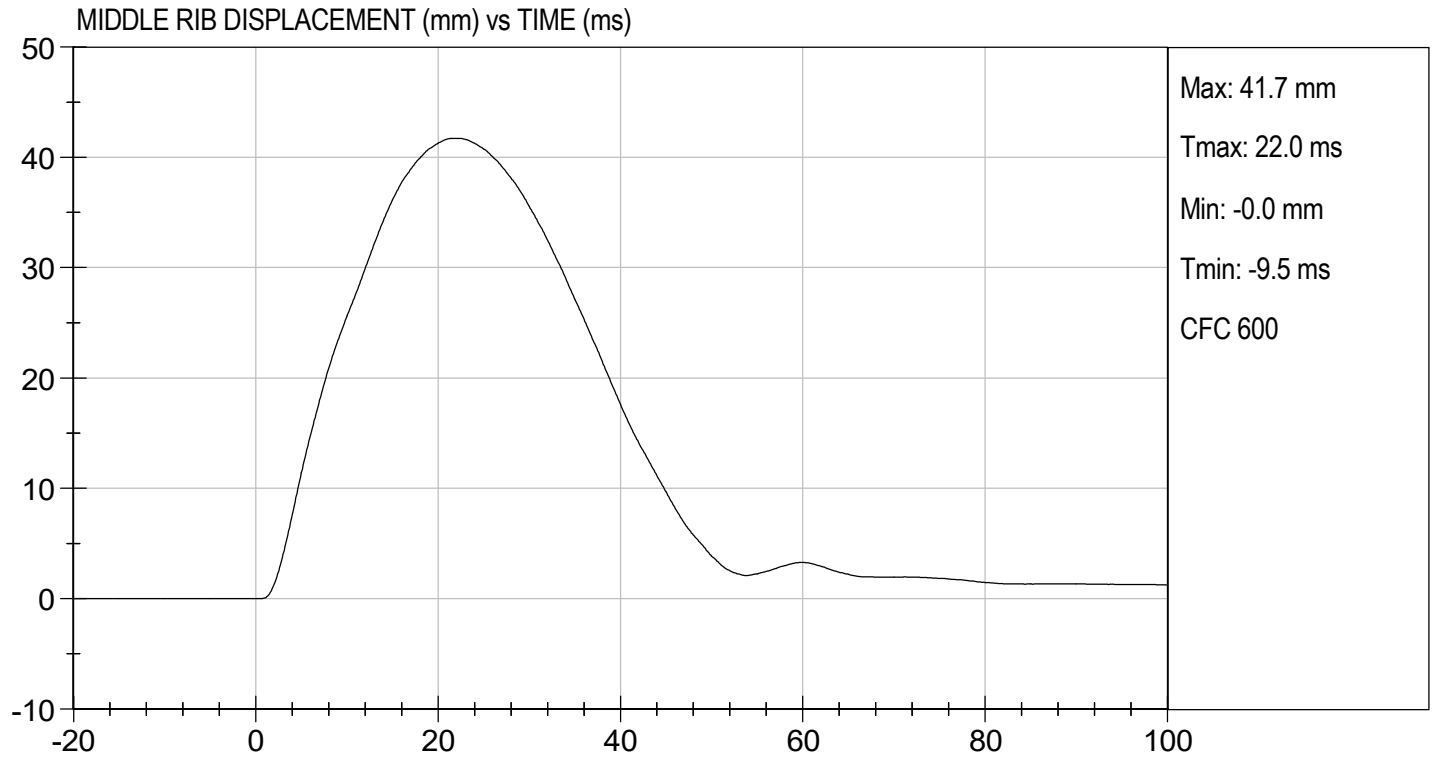
TEST DATE: 02/19/2021
TEST #: D210485





TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 13.89 ft/s, 4.23 m/s

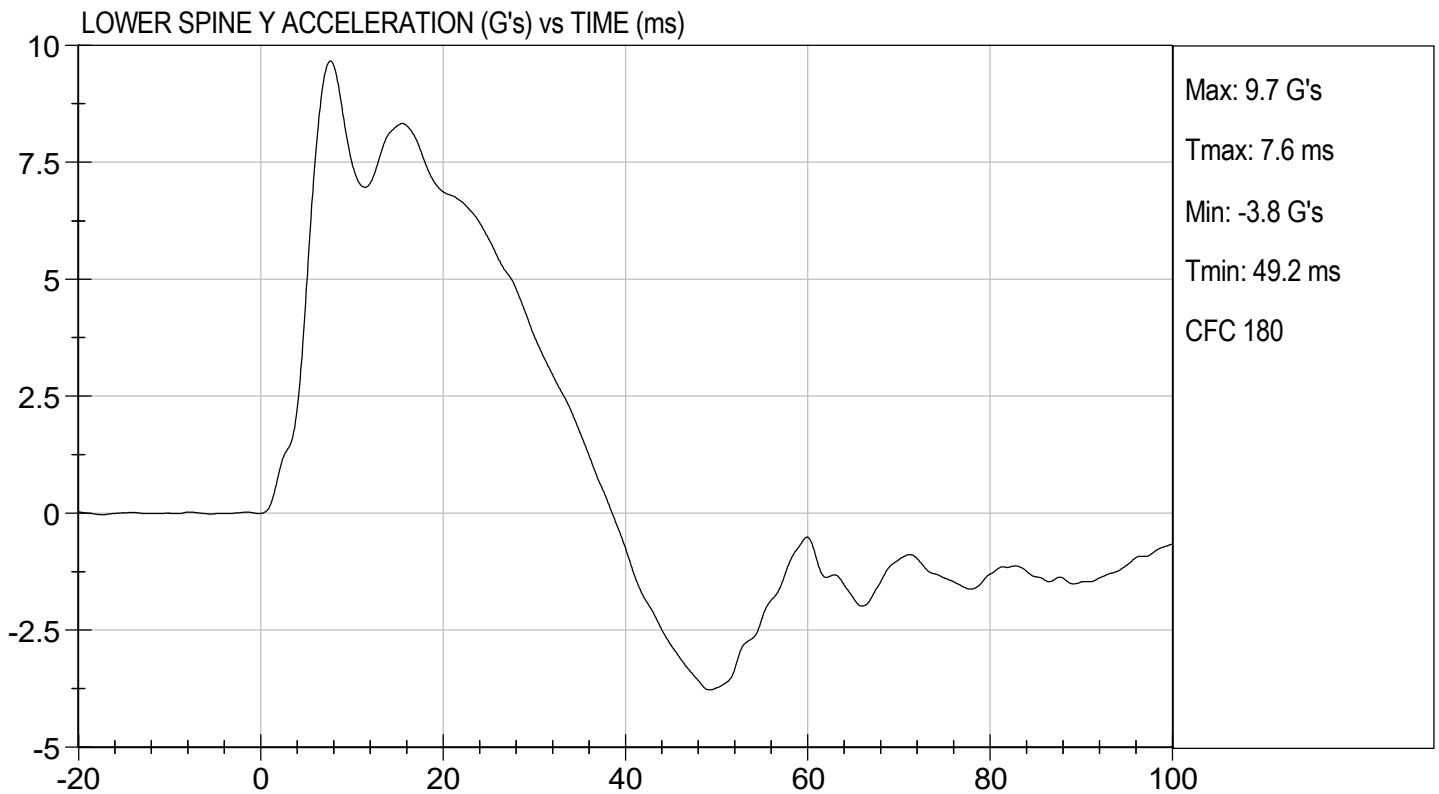
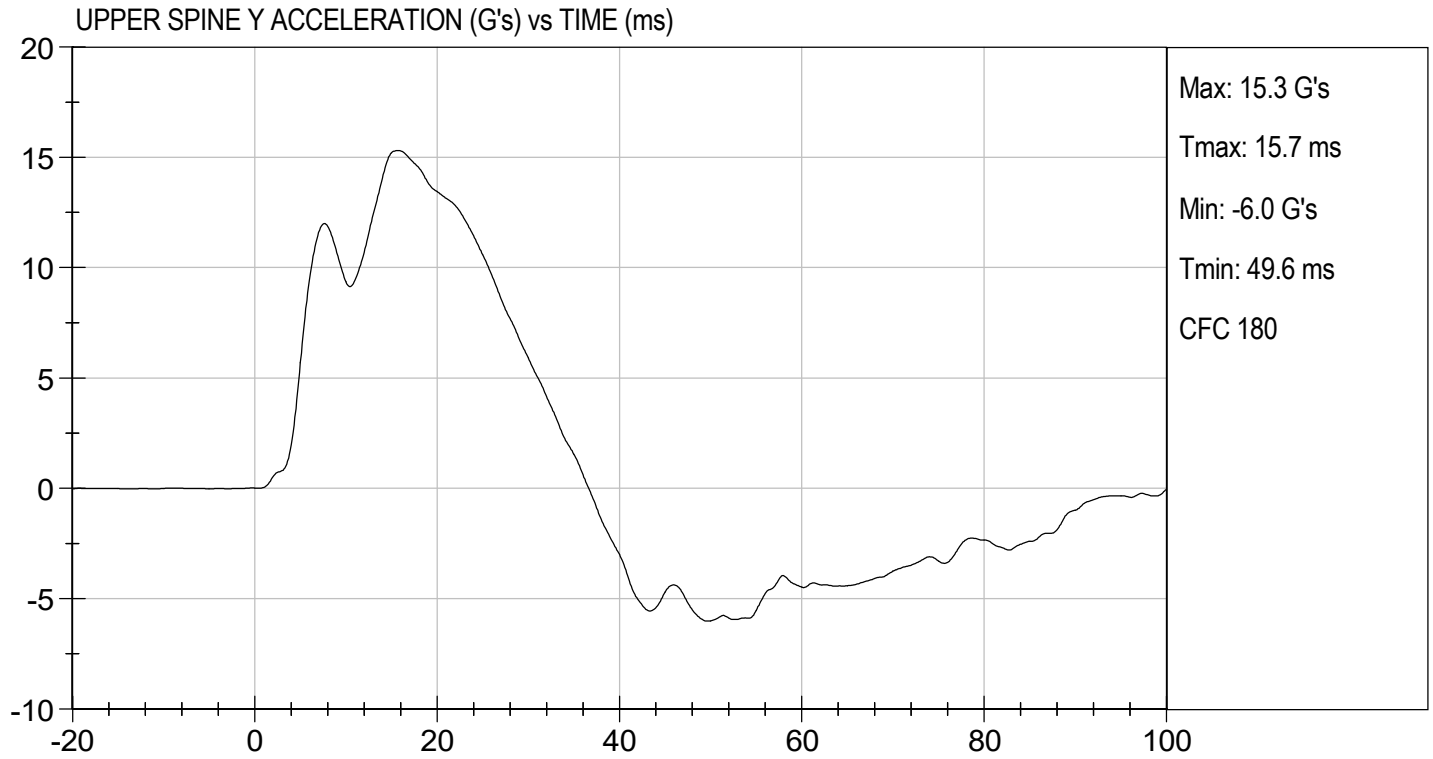
TEST DATE: 02/19/2021
TEST #: D210485





TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 13.89 ft/s, 4.23 m/s

TEST DATE: 02/19/2021
TEST #: D210485



MGA RESEARCH CORPORATION

ABDOMINAL IMPACT TEST

SID-III BUILD LEVEL D DUMMY

ATD Serial No: 306

Test I.D: D210486

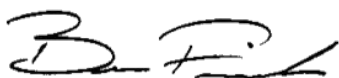
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.8	Pass
Humidity	%	10 to 70	23	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Maximum Probe Acceleration	G's	12 to 16	13	Pass
Upper Abdomen Rib Displacement	mm	36 to 47	42	Pass
Lower Abdomen Rib Displacement	mm	33 to 44	41	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	11	Pass
Overall Test Results				Pass



Laboratory Technician

02/19/2021

Test Date

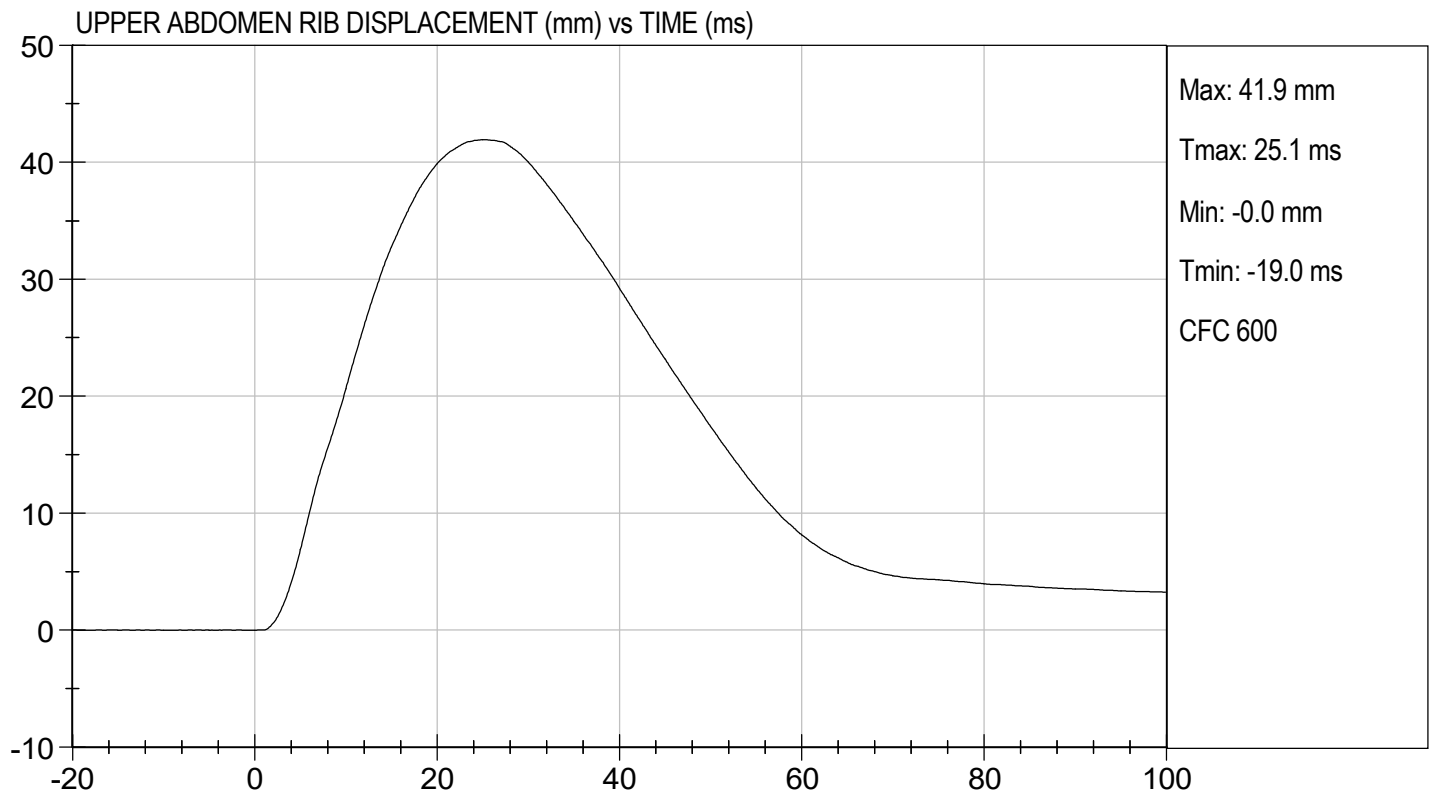
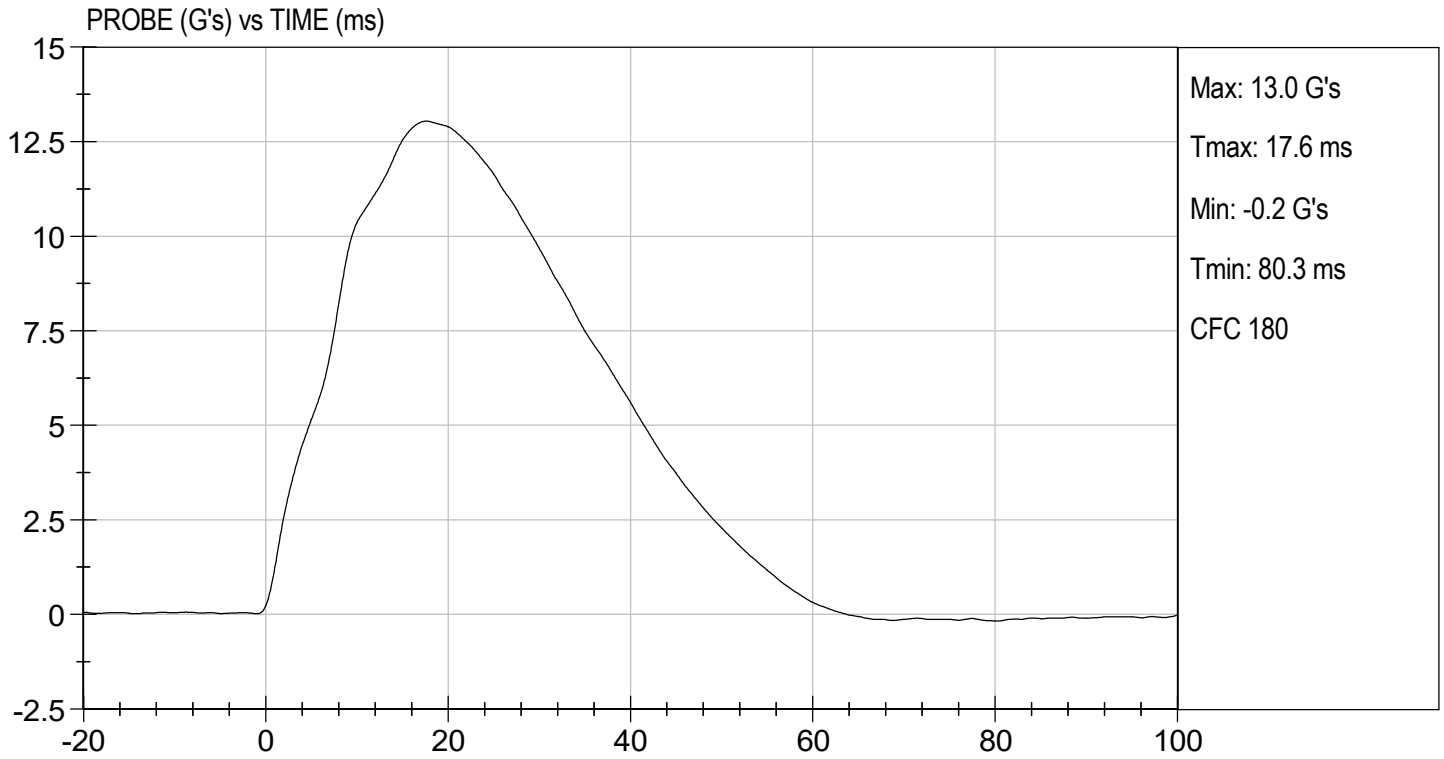


Approved By



TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.24 ft/s, 4.34 m/s

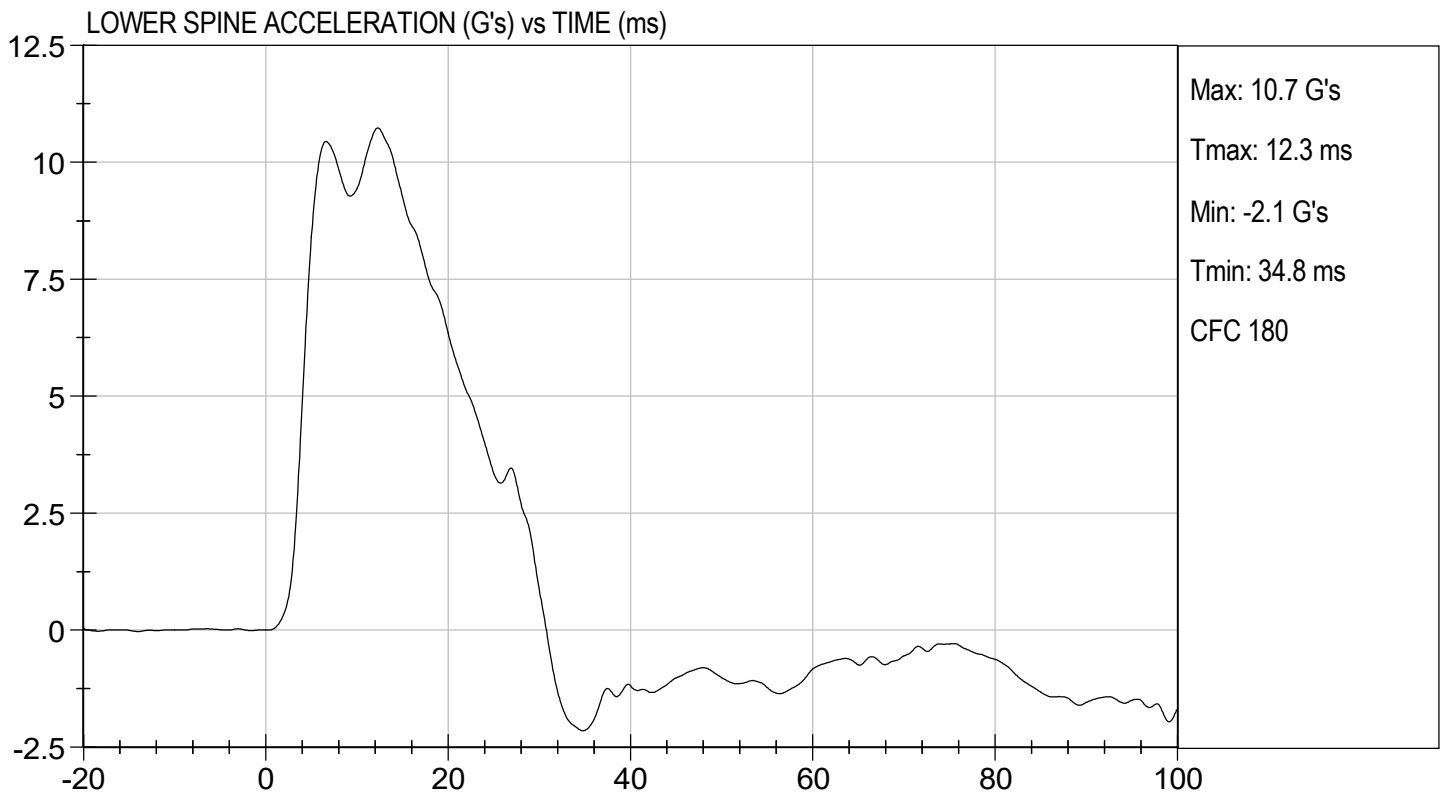
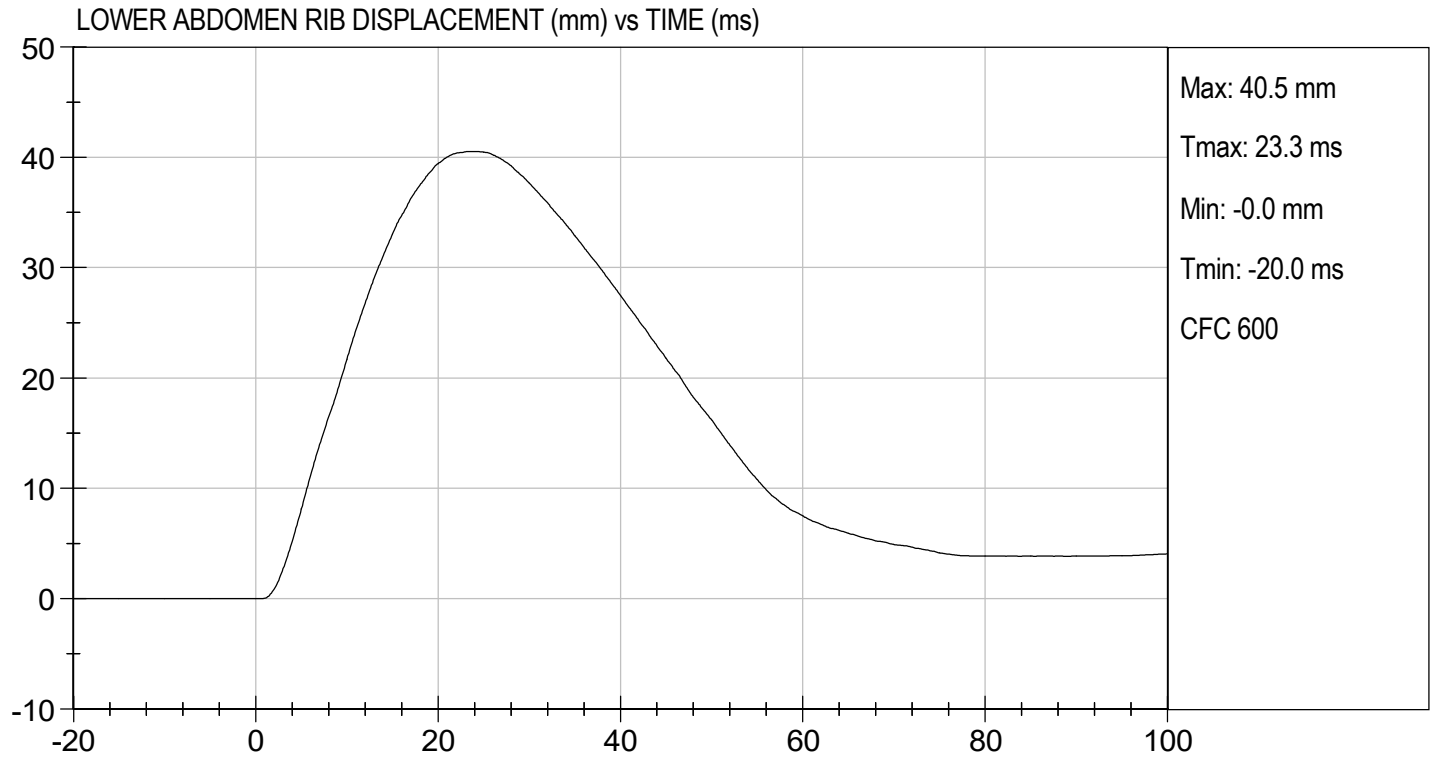
TEST DATE: 02/19/2021
TEST #: D210486





TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.24 ft/s, 4.34 m/s

TEST DATE: 02/19/2021
TEST #: D210486



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

Test I.D: D210487

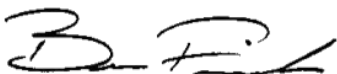
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.8	Pass
Humidity	%	10 to 70	23	Pass
Impact Velocity	m/s	6.60 to 6.80	6.60	Pass
Maximum Probe Acceleration	G's	38 to 47	42	Pass
Pelvis Y Acceleration After 6 ms	G's	34 to 42	40	Pass
Peak Acetabulum Force	N	3600 to 4300	3,714	Pass
Overall Test Results				Pass



Laboratory Technician

02/19/2021

Test Date

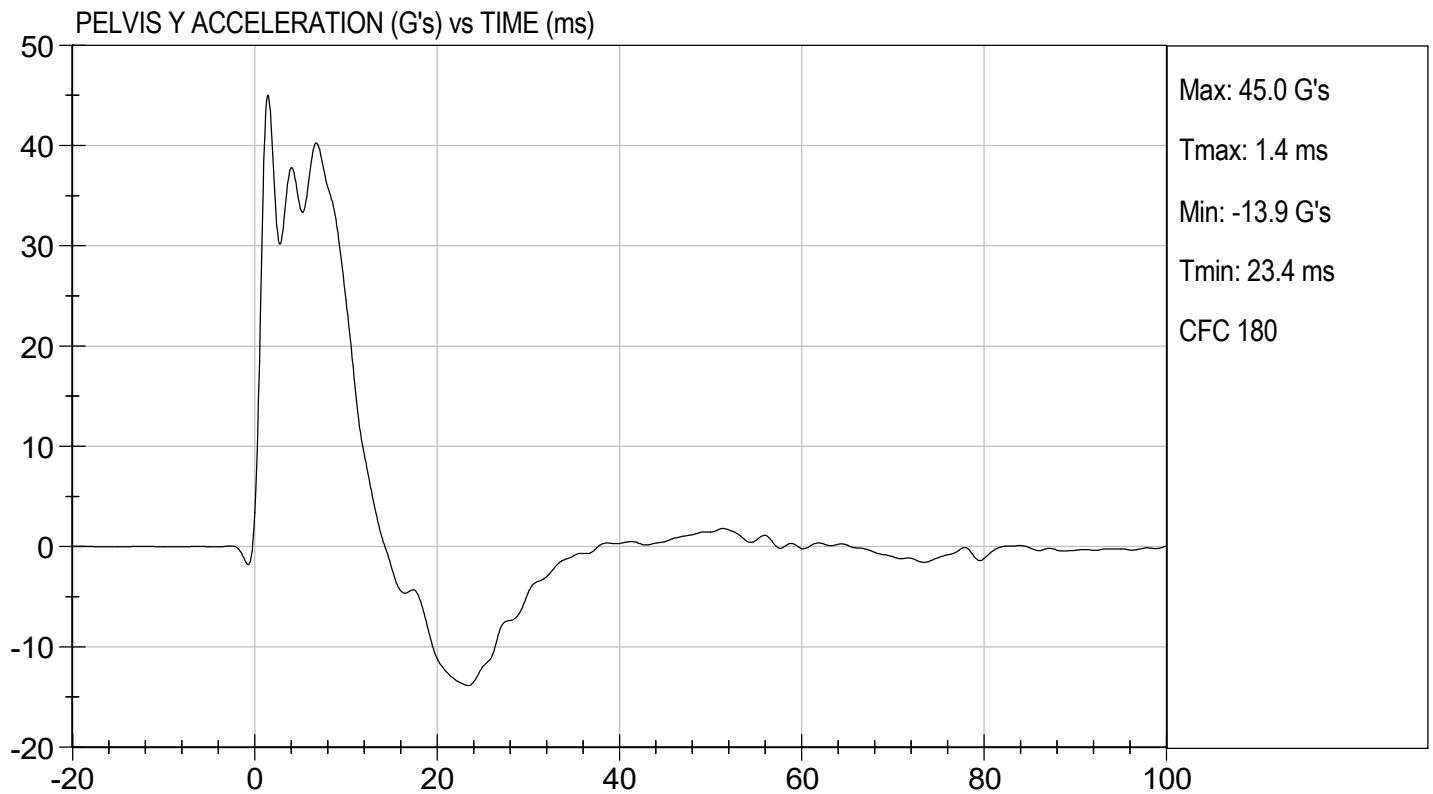
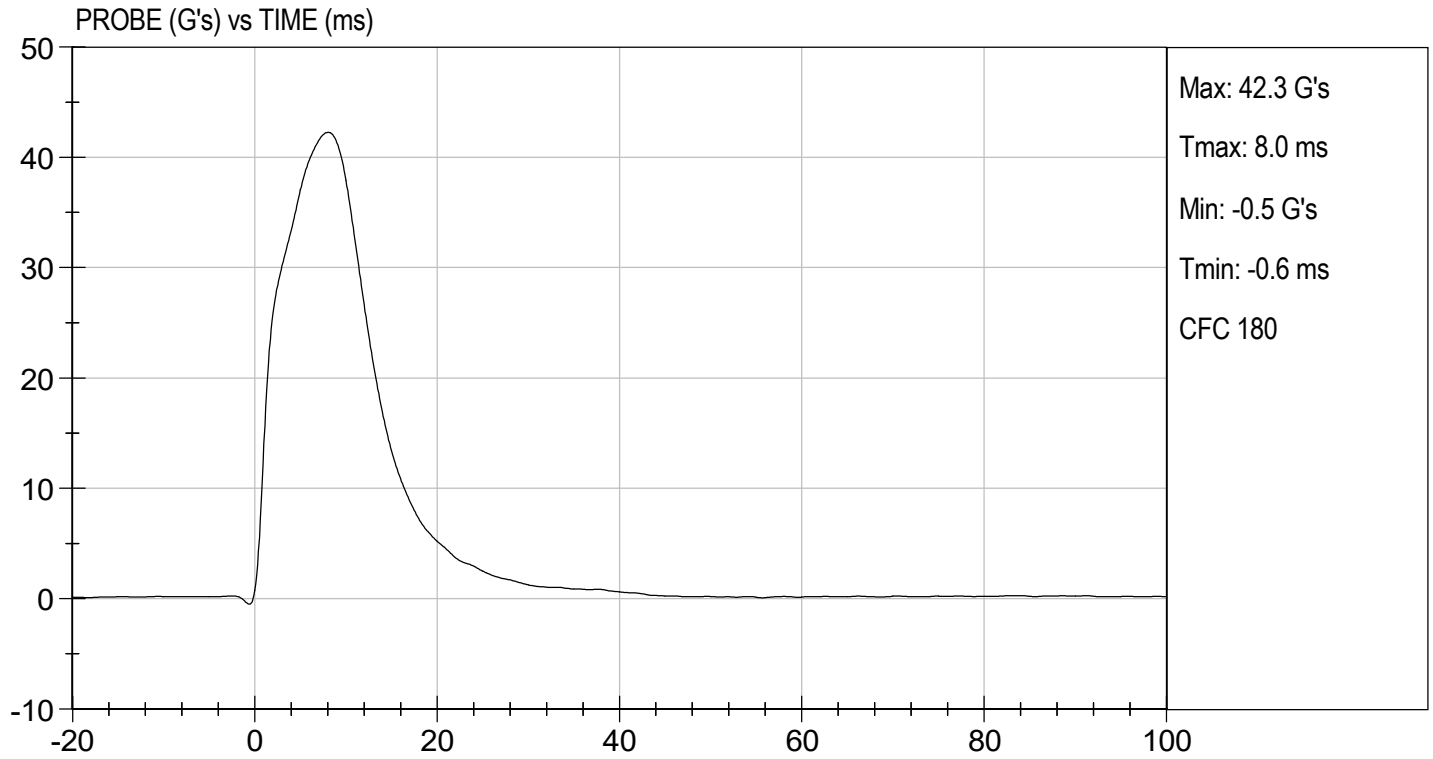


Approved By



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

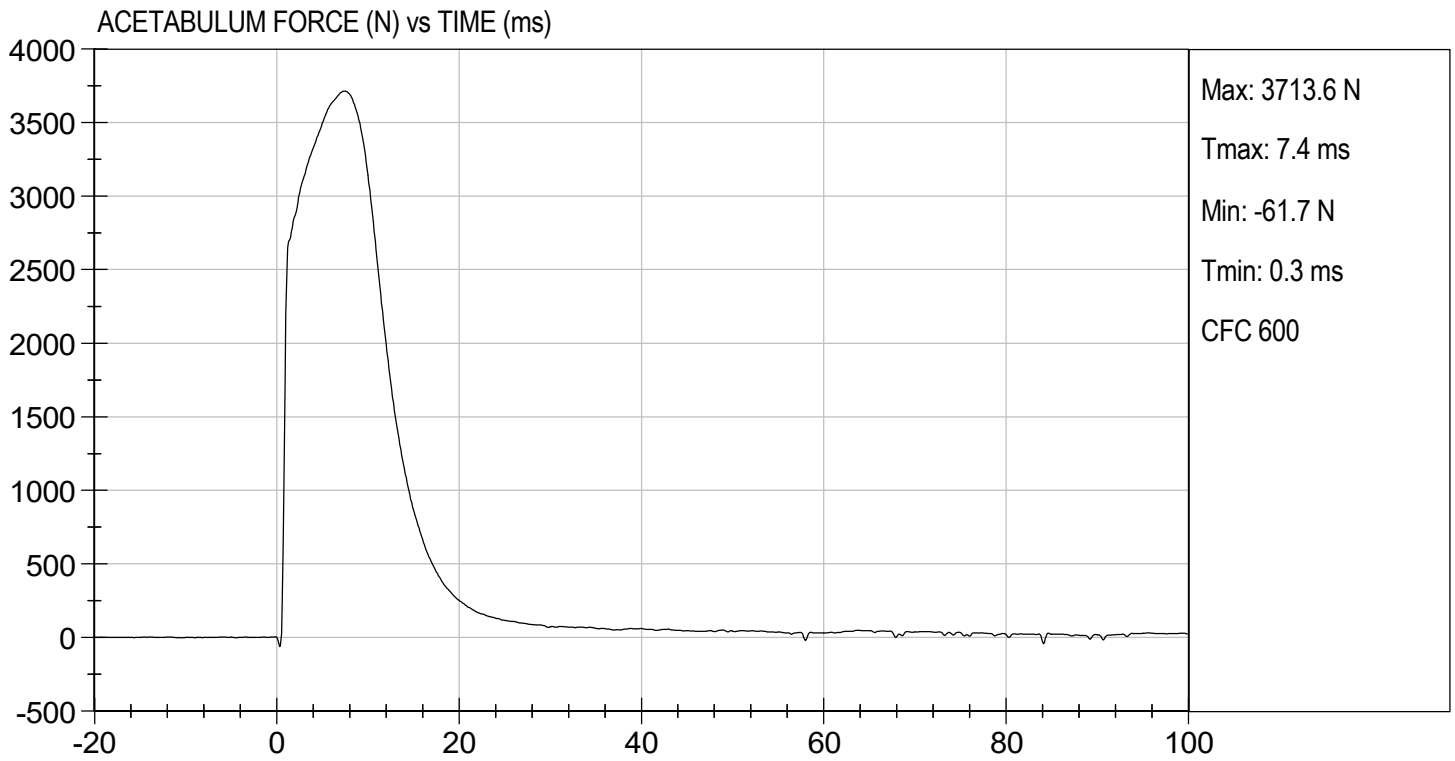
TEST DATE: 02/19/2021
TEST #: D210487





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

TEST DATE: 02/19/2021
TEST #: D210487



MGA RESEARCH CORPORATION

ILIAC IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

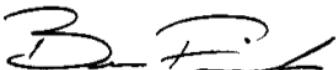
Test I.D: D210488

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.8	Pass
Humidity	%	10 to 70	23	Pass
Impact Velocity	m/s	4.20 to 4.40	4.20	Pass
Maximum Probe Acceleration	G's	36 to 45	44	Pass
Pelvis Y Acceleration	G's	28 to 39	37	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4,975	Pass
Overall Test Results				Pass


Laboratory Technician

02/19/2021

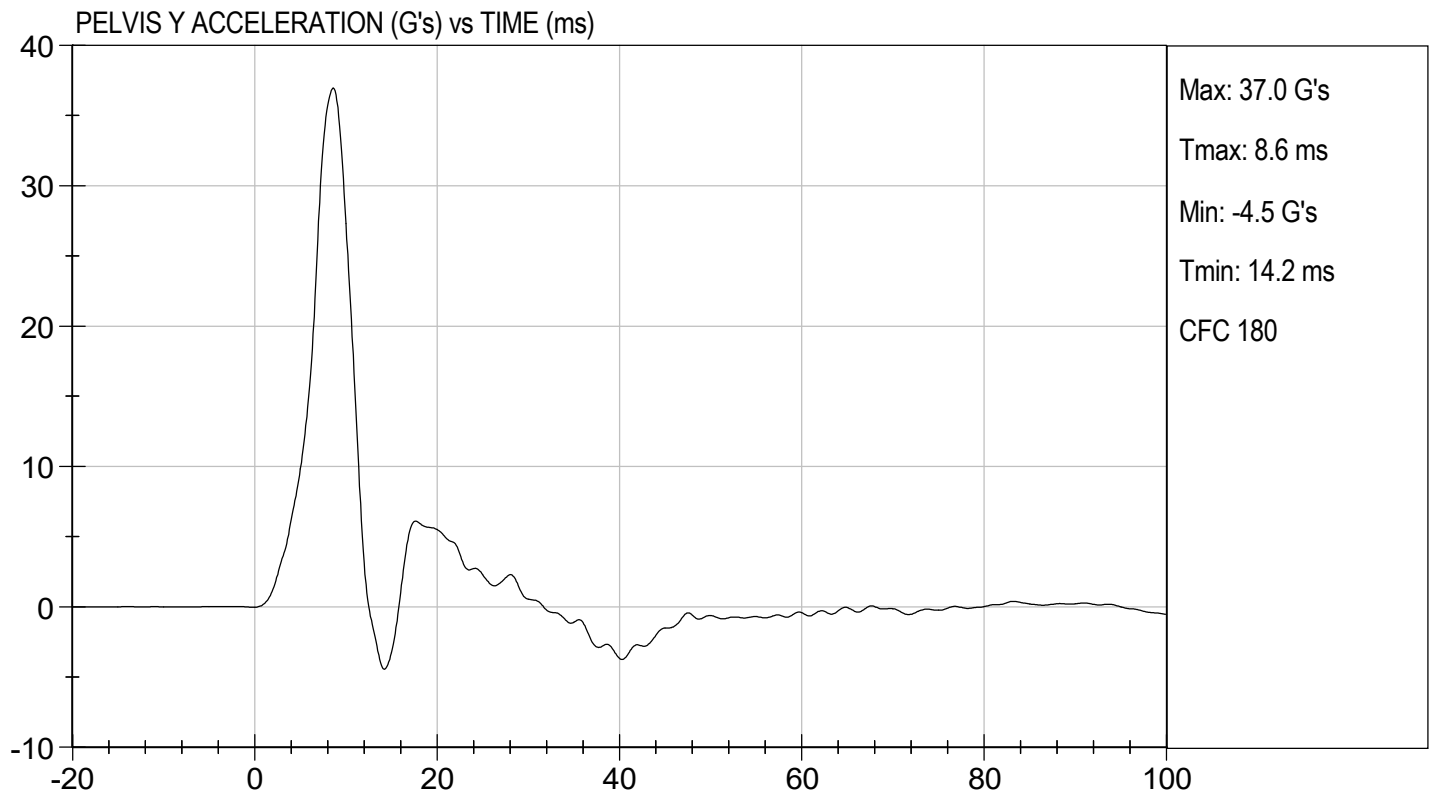
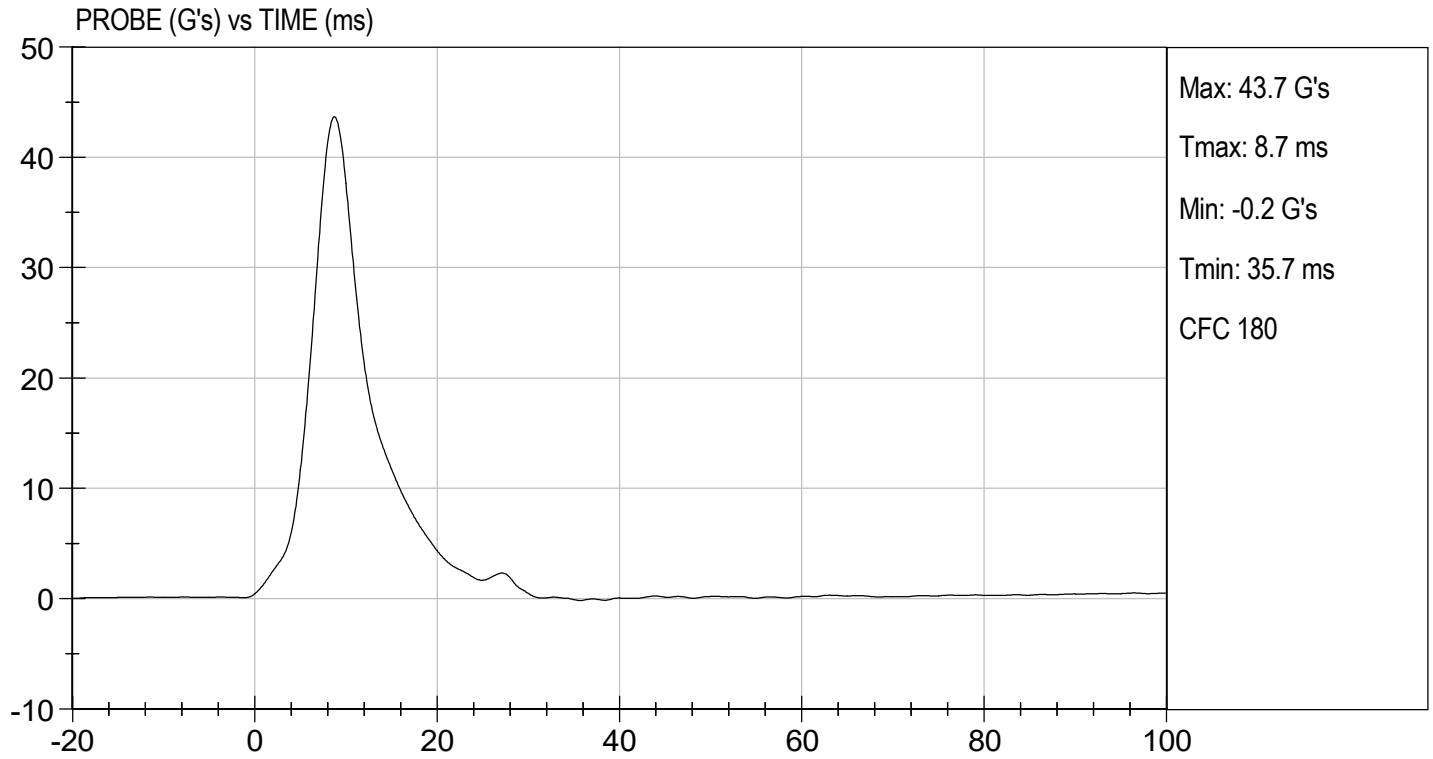
Test Date


Approved By



TEST DESC: ILLIAC
VELOCITY: 13.77 ft/s, 4.20 m/s

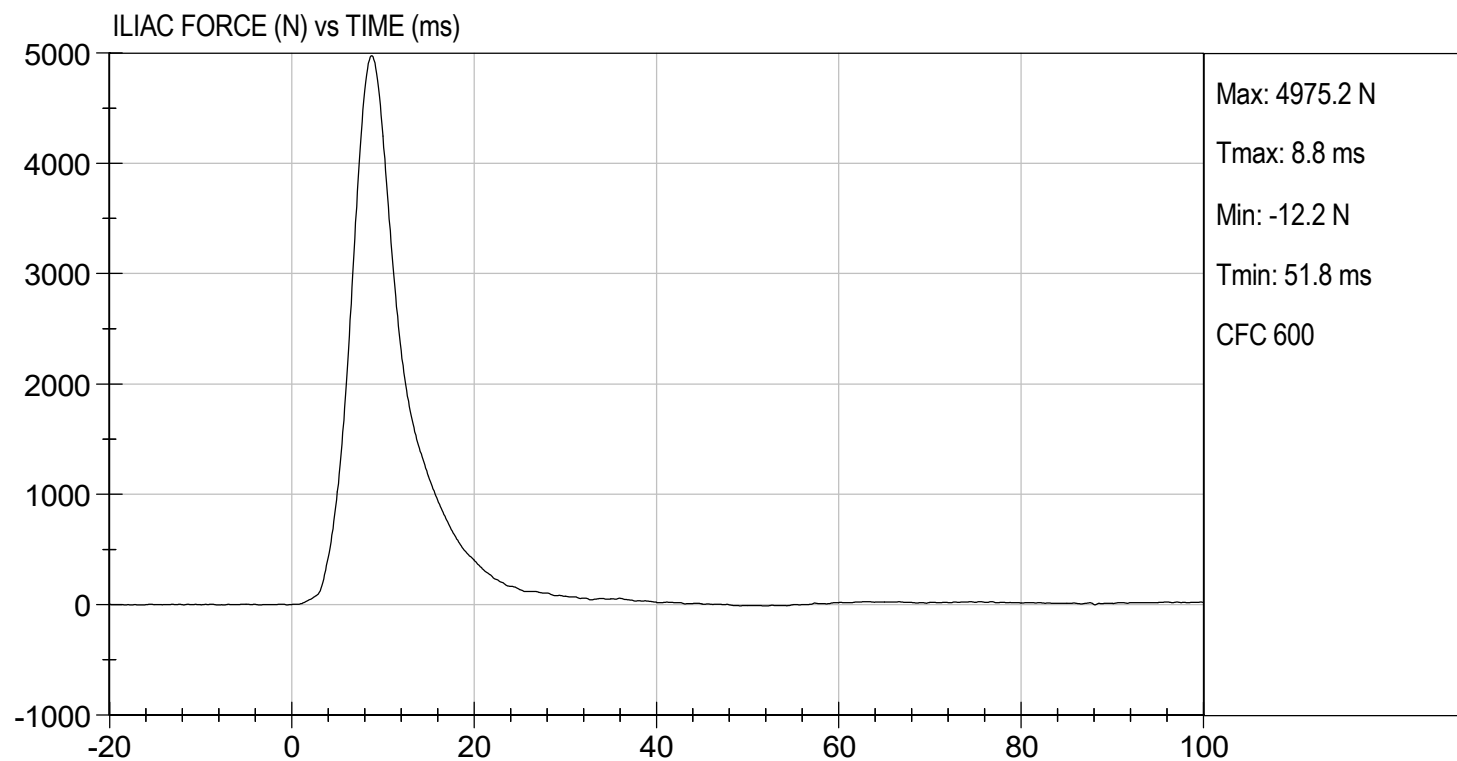
TEST DATE: 02/19/2021
TEST #: D210488





TEST DESC: ILLIAC
VELOCITY: 13.77 ft/s, 4.20 m/s

TEST DATE: 02/19/2021
TEST #: D210488





SID-IIs Pelvis Plug Certification Test

Plug S/N 13708

Test Number 12336

Report Number 12379

Test Date 2/6/2020 12:28:35 PM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	276.74	50.00	600.00
Force @ 1.5 mm (N)	1,241.99	850.00	1,400.00
Force @ 2.5 mm (N)	1,501.34	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,537.87	1,361.00	1,673.00

Testing Machine STM-20 5965542

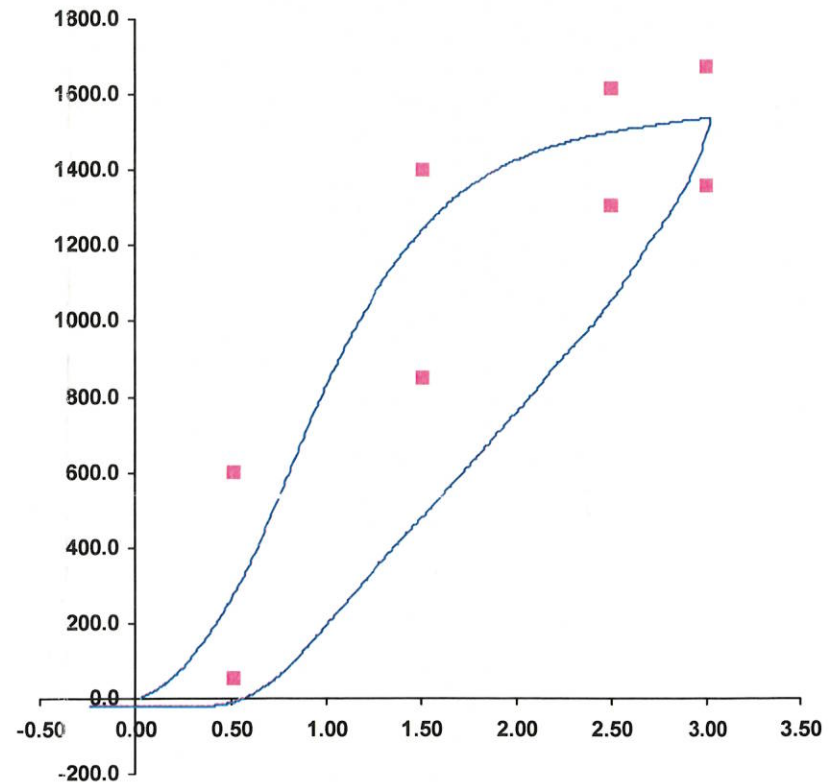
Load Cell S/N (TI240813), Units (LBS) 1000

Crosshead Speed (mm / min) or Rate 12.7

Extension or Position Measured by XHD_100 (XHD100)

Notes:

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107

06-Feb-20

SACO Research

By: DC

Date: 2/6/2020



SID-IIs Pelvis Plug Certification Test

Plug S/N 13706

Test Number 12334

Report Number 12377

Test Date 2/6/2020 12:26:02 PM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	331.81	50.00	600.00
Force @ 1.5 mm (N)	1,284.56	850.00	1,400.00
Force @ 2.5 mm (N)	1,504.92	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,534.82	1,361.00	1,673.00

Testing Machine STM-20 5965542

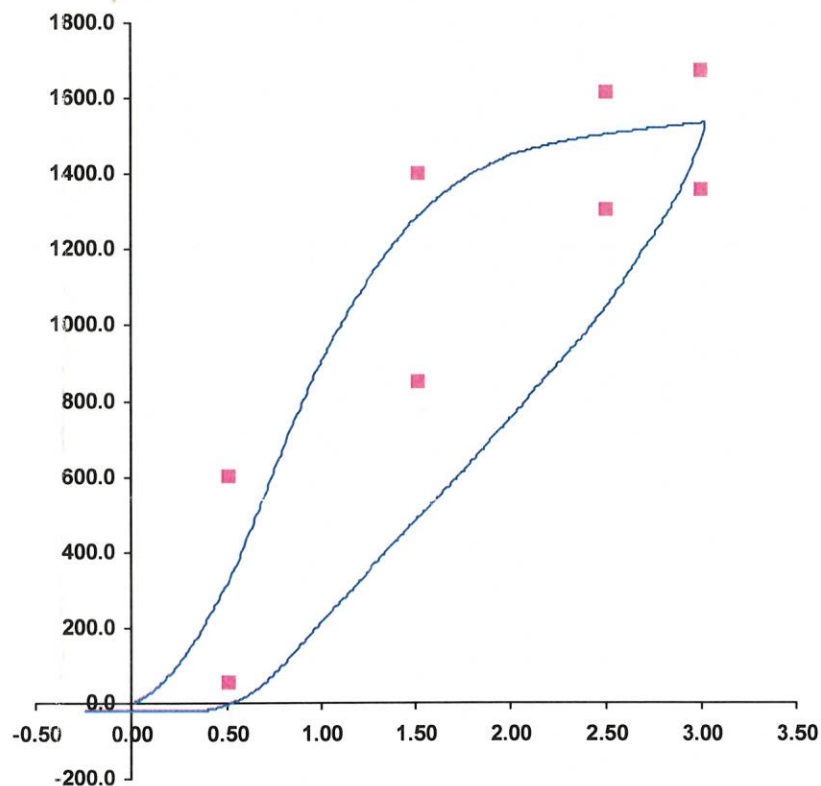
Load Cell S/N (TI240813), Units (LBS) 1000

Crosshead Speed (mm / min) or Rate 12.7

Extension or Position Measured by XHD_100 (XHD100)

Notes:

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107

06-Feb-20

SACO Research

By: DC

Date: 2/6/2020

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation (ES-2re)

			ES-2re S/N F032		
			Serial Number	Manufacturer	Calibration Date
Head CG Accelerometers		X	P79750	Endevco	01/20/2021
		Y	P79751	Endevco	01/20/2021
		Z	P79753	Endevco	01/20/2021
		Xr	P79711	Endevco	01/20/2021
		Yr	P79712	Endevco	01/20/2021
		Zr	P88170	Endevco	01/20/2021
Thorax Rib Displacement Potentiometers	Upper	Y	G176	Honeywell	12/21/2020
	Middle	Y	G169	Honeywell	12/21/2020
	Lower	Y	G164	Honeywell	12/21/2020
Abdomen Load Cells	Forward	Y	ABG1513	Denton	07/27/2020
	Middle	Y	ABG1531	Denton	07/27/2020
	Rear	Y	ABG1536	Denton	07/27/2020
Lower Spine Accelerometers (T12)		X	P79574	Endevco	01/20/2021
		Y	P82097	Endevco	01/20/2021
		Z	P82603	Endevco	01/20/2021
Public Symphysis Load Cell		Y	PG462	Denton	07/27/2020

Table 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N 306			
				Serial Number	Manufacturer	Calibration Date	
Head CG Accelerometers				X	P79445	Endevco	01/18/2021
				Y	P79721	Endevco	01/18/2021
				Z	P79724	Endevco	01/18/2021
				Xr	P84999	Endevco	01/18/2021
				Yr	P85000	Endevco	01/18/2021
				Zr	P85001	Endevco	01/18/2021
Head Angular Rate Sensors				X	ARS7391	DTS	08/04/2020
				Y	ARS7475	DTS	08/04/2020
				Z	ARS7516	DTS	08/04/2020
Displacement Potentiometers	Thoracic Rib	Upper	Y	G033	FTSS	12/22/2020	
		Middle	Y	2403	Servo	12/31/2020	
		Lower	Y	G1270	FTSS	12/22/2020	
	Abdominal Rib	Upper	Y	G032	FTSS	12/22/2020	
		Lower	Y	G1304	FTSS	12/22/2020	
Lower Spine Accelerometers (T12)				X	P96332	Endevco	01/18/2021
				Y	P96335	Endevco	01/18/2021
				Z	P96341	Endevco	01/18/2021
Acetabulum Load Cell				Y	ACG268	Denton	11/23/2020
Iliac Wing Load Cell				Y	IWG273	Denton	11/23/2020
Pelvis Plug (struck side)					13708	SACO	02/06/2020
Pelvis Plug (non-struck side)					13706	SACO	02/06/2020

Table 3 – Vehicle Instrumentation

			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	A340714	MSI	10/08/2020
	Vehicle Center of Gravity	Y	A361001	MSI	12/10/2020
	Vehicle Center of Gravity	Z	A340800	MSI	09/23/2020
2	Right Sill at Front Seat	X	A360945	MSI	12/09/2020
	Right Sill at Front Seat	Y	A356219	MSI	12/09/2020
	Right Sill at Front Seat	Z	A356236	MSI	12/09/2020
3	Right Sill at Rear Seat	X	A360973	MSI	12/14/2020
	Right Sill at Rear Seat	Y	A337162	MSI	12/03/2020
	Right Sill at Rear Seat	Z	P82096	Endevco	12/30/2020
4	Left Sill at Front Door	Y	T22577	Endevco	09/28/2020
5	Left Sill at Rear Door	Y	T22745	Endevco	11/02/2020
6	Left A-Post Lower	Y	A340792	MSI	10/11/2020
7	Left A-Post Middle	Y	A340799	MSI	10/11/2020
8	Left B-Post Lower	Y	A340213	MSI	12/14/2020
9	Left B-Post Middle	Y	A360965	MSI	12/14/2020
10	Front Seat Track	Y	A356212	MSI	12/09/2020
11	Rear Seat Track or Structure	Y	A340203	MSI	12/05/2020
12	Right Rear Occ. Compartment	Y	A305679	MSI	09/10/2020
13	Engine Block	X	A340782	MSI	12/12/2020
	Engine Block	Y	A361012	MSI	12/12/2020
14	Rear Floorpan Above Axle	X	A340766	MSI	12/05/2020
	Rear Floorpan Above Axle	Y	A337208	MSI	11/12/2020
	Rear Floorpan Above Axle	Z	T22784	Endevco	11/03/2020

Table 4 – MDB Instrumentation

		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	PCB796D	PCB	06/03/2020
MDB Center of Gravity	Y	PCB246D	PCB	06/03/2020
MDB Center of Gravity	Z	PCB794D	PCB	06/03/2020
Left Frame at Rear Axle Centerline	X	PCB1653D	PCB	06/03/2020
Left Frame at Rear Axle Centerline	Y	PCB1423D	PCB	06/03/2020