

REPORT NUMBER: SideNCAPPole-MGA-23-045

**NEW CAR ASSESSMENT PROGRAM (NCAP)
Side Impact Pole Test**

**TOYOTA MOTOR CORPORATION
2023 Toyota Crown XLE HEV 4-Door Sedan
NHTSA No.: O20235115**

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



Test Date: October 10, 2023

Final Report Date: October 18, 2024

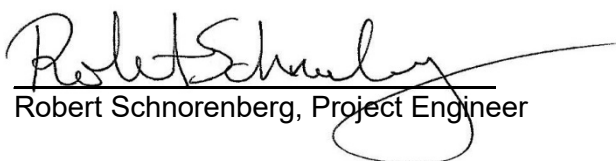
FINAL REPORT

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

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Approval Date: October 18, 2024

FINAL REPORT ACCEPTANCE BY OCWS:

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

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

TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No. SideNCAPPole-MGA-23-045	2. Government Accession No.	3. Recipient's Catalog No.																											
4. Title and Subtitle Final Report of New Car Assessment Program Side Impact Pole Testing and FMVSS No. 305 Indicant Testing of a 2023 Toyota Crown XLE HEV 4-Door Sedan, NHTSA No.: O20235115		5. Report Date October 18, 2024																											
		6. Performing Organization Code MGA																											
7. Author(s) Ben Fischer, Program Manager		8. Performing Organization Report No. SideNCAPPole-MGA-23-045																											
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105		10. Work Unit No.																											
		11. Contract or Grant No. 693JJ920D000017																											
12. Sponsoring Agency Name and Address United States Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards Mail Code: NRM-100 1200 New Jersey Ave, SE Washington, DC 20590		13. Type of Report and Period Covered: Final Test Report October 10, 2023 to October 18, 2024																											
		14. Sponsoring Agency Code NRM-100																											
15. Supplementary Notes																													
16. Abstract A 32.20 km/h, 75° oblique impact Side NCAP Test was conducted on the subject 2023 Toyota Crown XLE HEV 4-Door Sedan in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP Pole Laboratory Test Procedure for the generation of consumer information on vehicle side pole crash protection. The test was conducted at the MGA Research Corporation facility in Burlington, Wisconsin on October 10, 2023. The impact velocity was 32.28 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 21.8°C. The test vehicle post-test maximum crush was 339 mm at level 3. The test vehicle's performance was as follows: <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <thead> <tr> <th rowspan="2" style="text-align: center;">Measurement Description</th> <th rowspan="2" style="text-align: center;">Units</th> <th colspan="2" style="text-align: center;">Driver ATD (SID-IIs)</th> </tr> <tr> <th style="text-align: center;">Threshold</th> <th style="text-align: center;">Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td></td> <td style="text-align: center;">1000</td> <td style="text-align: center;">293.060</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td style="text-align: center;">g</td> <td style="text-align: center;">82</td> <td style="text-align: center;">36.412</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td style="text-align: center;">N</td> <td style="text-align: center;">5525</td> <td style="text-align: center;">3133.179</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td style="text-align: center;">mm</td> <td style="text-align: center;">38*</td> <td style="text-align: center;">10.712</td> </tr> <tr> <td>Maximum Abdomen Rib Deflection</td> <td style="text-align: center;">mm</td> <td style="text-align: center;">45*</td> <td style="text-align: center;">19.707</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 (SID-IIs)		Threshold	Result	Head Injury Criteria (HIC ₃₆)		1000	293.060	Resultant Lower Spine Acceleration	g	82	36.412	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3133.179	Maximum Thoracic Rib Deflection	mm	38*	10.712	Maximum Abdomen Rib Deflection	mm	45*	19.707
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17. Key Words New Car Assessment Program (NCAP) Side Impact Pole Part 572V SID-IIs		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division 1200 New Jersey Ave, SE Washington, DC 20590																											
19. Security Classification of Report Unclassified	20. Security Classification of Page Unclassified	21. No. of Pages 174	22. Price																										

TABLE OF CONTENTS

<u>Section</u>		<u>Page No.</u>
1	Purpose and Summary of Test	1
2	Occupant and Vehicle Information / Data Sheets	3
 <u>Data Sheet No.</u>		 <u>Page No.</u>
1	General Test and Vehicle Parameter Data	4
2	Seat, Seat Belt, Steering Wheel Adjustment and Fuel System Data	8
3	Dummy Longitudinal Clearance Dimensions	11
4	Dummy Lateral Clearance Dimensions	12
5	Camera and Instrumentation Data	13
6	Test Vehicle Accelerometer Locations	14
7	Rigid Pole Load Cell Data	15
8	Post-Test Observations	16
9	Test Vehicle Profile Measurements	18
10	Test Vehicle Exterior Crush Measurements	19
11	FMVSS No. 301 Static Rollover Results	23
12	Dummy/Vehicle Temperature and Humidity Stabilization Data	24
305-1	General Test and Vehicle Parameter Data for Indicant FMVSS No. 305 Testing	25
305-2	Pre-Impact Data for Indicant FMVSS No. 305 Testing	26
305-3	Pre-Impact Electrical Isolation Measurements and Calculations for Indicant FMVSS No. 305 Testing	27
305-4	Post-Impact Data for Indicant FMVSS No. 305 Testing	29
305-5	Static Rollover Test Data for Indicant FMVSS No. 305 Testing	32
 <u>Appendix</u>		
A	Photographs	A
B	Dummy Response Data Plots	B
C	Dummy Qualification and Performance Verification	C
D	Test Equipment and Instrumentation Calibration	D

SECTION 1 PURPOSE AND SUMMARY OF TEST

PURPOSE

This side pole impact test is part of the MY 2023 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. 693JJ920D000017. The purpose of this test is to generate comparative side impact performance in a 2023 Toyota Crown XLE HEV 4-Door Sedan. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Pole Laboratory Test Procedure, dated March 2020.

SUMMARY

A rigid pole side impact test was conducted on a 2023 Toyota Crown XLE HEV 4-Door Sedan. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.28 km/h. The test was conducted by MGA Research Corporation in Burlington, Wisconsin on October 10, 2023. Pre-test and post-test photographs of the test vehicle and side impact dummy (SID-IIs) are included in this report.

One Part 572V (SID-IIs) dummy was placed in the driver designated seating position according to instructions specified in the OCWS Side NCAP Pole Laboratory Test Procedure dated March 2020. Camera locations and other pertinent camera information are included in this report.

The Part 572V (SID-IIs) dummy was instrumented accordingly:

- Primary and Redundant Head CG Triaxial Accelerometers
- Head Triaxial Angular Rate Sensors
- Thorax Upper, Middle, and Lower Rib Displacement Potentiometers
- Abdomen Upper Rib and Lower Rib Displacement Potentiometers
- Lower Spine (T12) Triaxial Accelerometers
- Iliac Load Cell
- Acetabulum Load Cell

Appendix B contains the vehicle and 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.

Injury readings for the SID-IIs dummy were recorded as follows:

Measurement Description	Units	Driver ATD (SID-IIs)	
		Threshold	Result
Head Injury Criteria (HIC ₃₆)		1000	293.060
Resultant Lower Spine Acceleration	g	82	36.412
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3133.179
Maximum Thoracic Rib Deflection	mm	38*	10.712
Maximum Abdomen Rib Deflection	mm	45*	19.707

*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	No	
Side Airbag (Other)				
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes		Yes	
Other:				

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

GENERAL COMMENTS

Left Floor Sill Y recorded no valid data after 11 ms.
 Left A-Post at Sill Y recorded no valid data after 44 ms
 Left Lower B-Post Y recorded questionable data.
 Left Mid B-Post Y recorded no valid data after 11 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: 2023 Toyota Crown XLE HEV 4-Door Sedan
Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
Test Date: 10/10/2023

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	O20235115	Traction Control System (TCS)	Yes
Model Year	2023	Auto-Leveling System	No
Make	Toyota	Automatic Door Locks (ADL)	Yes
Model	Crown XLE HEV	Power Window Auto-Reverse	Yes
Body Style	4-Door Sedan	Other Optional Feature	No
VIN	JTDAAAF4P3007343	Driver Front Airbag	Yes
Body Color	Supersonic Red	Driver Curtain Airbag	Yes
Odometer Reading (km/mi)	85 km / 53 mi	Driver Head/Torso Airbag	No
Engine Displacement (L)	2.5 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	AWD	Rear Pass. Torso Airbag	No
Roof Rack	No	Rear Pass. Torso/Pelvis Airbag	No
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	Yes
Power Seats	Yes	Driver Load Limiter	Yes
Anti-Lock Brakes (ABS)	Yes	Rear Pass. Load Limiter	Yes
		Other Safety Restraint	N/A

Does owner's manual provide instruction to turn off automatic door locks?	Yes
---	-----

DATA FROM CERTIFICATION LABEL

Manufactured By	TOYOTA MOTOR CORPORATION	GVWR (kg)	2277
Date of Manufacture	05/23	GAWR Front (kg)	1250
Vehicle Type	Passenger Car	GAWR Rear (kg)	1250

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3		5	
Capacity Weight (VCW) (kg)				410	(A)
DSC x 68 kg				340	(B)
Rated Cargo and Luggage Weight (RCLW) (kg)				62	(A-B)

* Rated Cargo and Luggage Weight (RCLW) reduced by 8 kg to account for Load Carrying Capacity Reduction Label.

VEHICLE SEAT TYPE

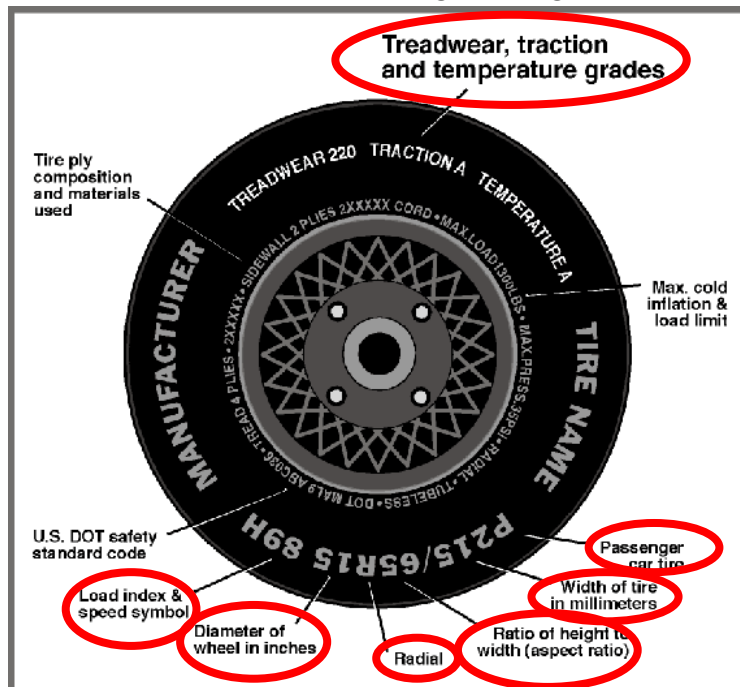
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						w/ Lever	w/ Knob
Front Seat	X					X	
Rear or Second Row				X	X		
Third Row Seat							

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

Test Vehicle: 2023 Toyota Crown XLE HEV 4-Door Sedan
Test Program: NCAP Side Pole Impact Test

NHTSA No.: 020235115
Test Date: 10/10/2023

VEHICLE TIRE INFORMATION



Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	210	210
Recommended Tire Size	225/55/R19	225/55/R19
Tire Size on Vehicle	225/55/R19	225/55/R19
Tire Manufacturer	Bridgestone	Bridgestone
Tire Model	Ecopia	Ecopia
Treadwear	600	600
Traction	A	A
Temperature Grade	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	1 Polyester, 2 Steel, 1 Polyester	1 Polyester, 2 Steel, 1 Polyester
Load Index/Speed Symbol	99V	99V
Tire Material	Rubber	Rubber
DOT Safety Code Left	EJT4 CFE 2023	EJT4 CFE 2023
DOT Safety Code Right	EJT4 CFE 2023	EJT4 CFE 2023

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

Test Vehicle: 2023 Toyota Crown XLE HEV 4-Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
 Test Date: 10/10/2023

TEST PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	250	240	240	240
Tire Placard	kPa	210	210	210	210
Owner's Manual	kPa	210	210	210	210
As Tested	kPa	210	210	210	210

TEST AXLE VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	516.0	397.5		535.5	442.0		532.0	451.5	
Right	kg	491.5	409.0		500.5	444.5		492.5	452.5	
Ratio	%	55.5%	44.5%		53.9%	46.1%		53.1%	46.9%	
Totals	kg	1007.5	806.5	1814.0	1036.0	886.5	1922.5	1024.5	904.0	1928.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1814.0	(A)
Actual Weight of 1 P572 ATD (SID-IIs) Used	kg	52	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	62	(C)
Calculated Test Vehicle Target Weight (TVTW)	kg	1928.0	(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	As Delivered	As Tested	Fully Loaded	Meets Requirement
Driver Door Sill Angle (front-to-back)*	deg	-0.2	0.5	0.6	Yes
Front Pass. Door Sill Angle (front-to-back)*	deg	-0.1	0.4	0.6	Yes
Front Bumper Angle (left-to-right)**	deg	-0.3	-0.3	-0.3	Yes
Rear Bumper Angle (left-to-right)**	deg	-0.1	0.0	0.0	Yes
Vehicle CG (Aft of Front Axle)	mm	1271	1318	1340	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	6	14	16	

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

*** The "As Tested" vehicle attitude measurements must be equal to or between the "As Delivered" and "Fully Loaded" vehicle attitude measurements.

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Units	Weight
Weight of Ballast Added	kg	28
Components Removed: none	kg	

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: 2023 Toyota Crown XLE HEV 4-Door Sedan
Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
Test Date: 10/10/2023

TEST SURFACE MARKINGS

	Distance from 75° Impact Location Line (mm)
Fore 25 mm Target	927
Aft 25 mm Target	920

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

Test Vehicle: 2023 Toyota Crown XLE HEV 4-Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
 Test Date: 10/10/2023

SEAT POSITIONING

The driver's seat, front center seat (if applicable), and right front passenger's seat should be set to the forward-most, mid-height, 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	23.1	14.1	18.6
Front Passenger Seat	21.8	14.2	18.0
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	18.6	23	Max	46	46	46
			Mid	23	23	23
			Min	0	0	0
Front Passenger Seat	18.0	17	Max	34	34	34
			Mid	17	17	17
			Min	0	0	0
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: 2023 Toyota Crown XLE HEV 4-Door Sedan
 Test Program: NCAP Side Pole Impact Test

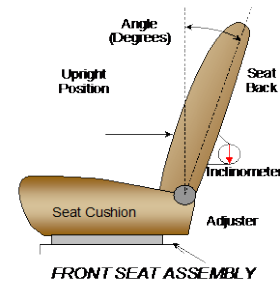
NHTSA No.: O20235115
 Test Date: 10/10/2023

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		0	
Front Passenger Seat	260		0	
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 such that the dummy's head is level. 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 passenger seat back is positioned in accordance with the information provided by the manufacturer on S1 – Vehicle Setup Information for the 5th percentile female dummy in a Side NCAP MDB test. The rear center and non-struck side rear passenger's seat back is set to match 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	52.1		-1.5	
Front Passenger Seat	52.5		-1.5	
Front Center Seat				
Struck Side Rear Seat	Fixed		Fixed	
Non-Struck Side Rear Seat	Fixed		Fixed	
Rear Center Seat	Fixed		Fixed	

All seat back angles measured on outboard headrest post.

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)

HEAD RESTRAINT ADJUSTMENT

Head restraints are adjusted to the lowest and most full forward in-use position.

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

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

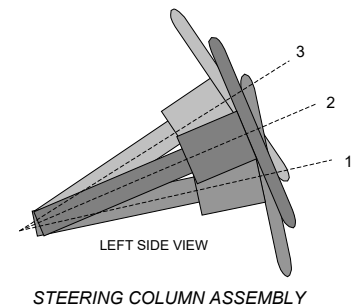
Test Vehicle: 2023 Toyota Crown XLE HEV 4-Door Sedan
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STEERING COLUMN ADJUSTMENT

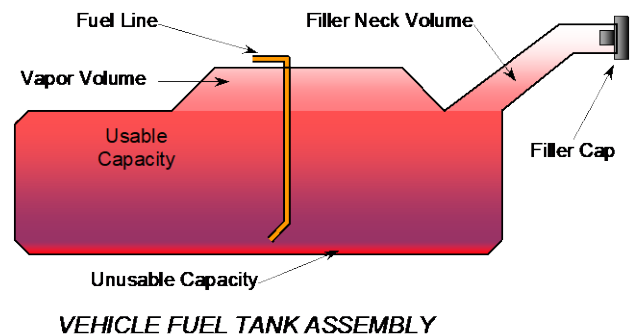
Steering wheel and column adjustments are made so that the steering wheel geometric locus is described when it moves through its full range of motion.

	Wheel Angle (°)	Fore/Aft Position (mm)
Lowermost, Position 1	71.8	
Geometric Center, Position 2	69.8	
Uppermost, Position 3	67.7	
Telescoping Steering Wheel Travel		56
Test Position	69.8	28



FUEL PUMP

The vehicle is equipped with an electronic fuel pump. The fuel pump will run when the engine is running. The pump will also briefly run when the ignition key is turned to the “on” position. The filler neck is located on the driver’s side.



FUEL TANK CAPACITY DATA

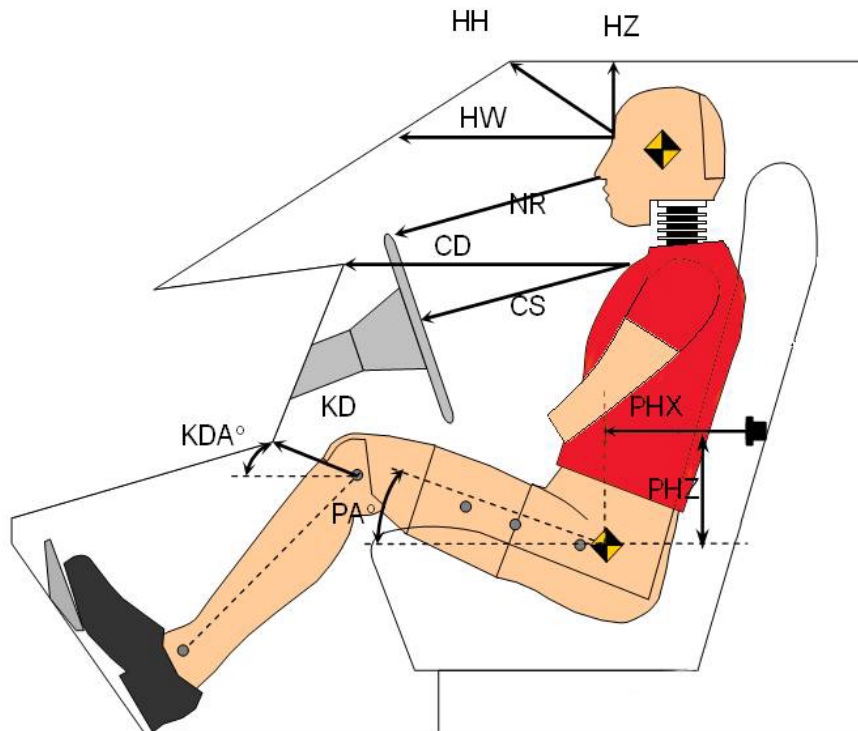
	Liters
Usable Capacity of Standard Tank (see S1 – Vehicle Setup Information)	54.9
Usable Capacity of Optional Tank (see S1 – Vehicle Setup Information)	
Usable Capacity of Standard Tank as Specified in Owner’s Manual	55.0
Usable Capacity of Optional Tank as Specified in Owner’s Manual	
93% of Usable Capacity	51.0
Actual Amount of Solvent Used	51.1
1/3 of Usable Capacity	18.3

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: 2023 Toyota Crown XLE HEV 4-Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
 Test Date: 10/10/2023



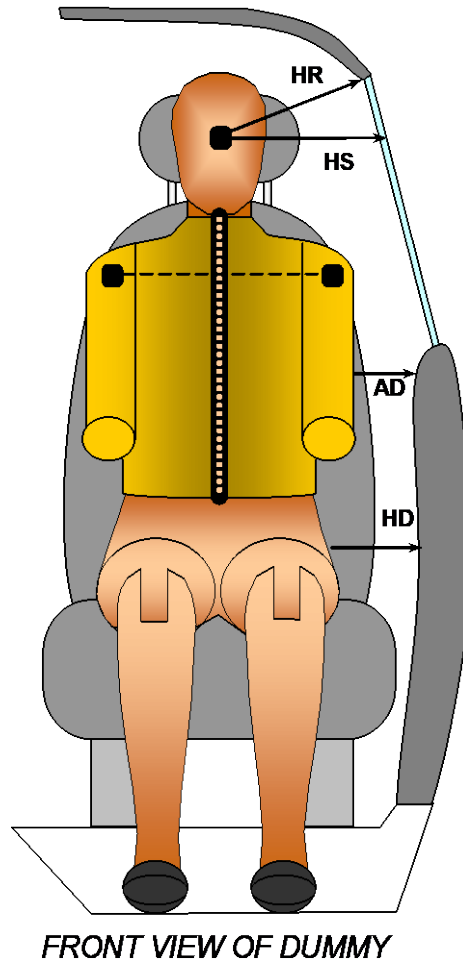
LEFT SIDE VIEW

Code	Measurement Description	Driver	
		Length (mm)	Angle (°)
HH	Head to Header	216	
HW	Head to Windshield	506	
HZ	Head to Roof Liner	150	
NR	Nose to Rim/Seat Back	212	
CD	Chest to Dashboard/Seat Back	416	
CS	Chest to Steering Wheel	140	
KDL / KDAL	Left Knee to Dash/Seat Back	117	37.1
KDR / KDAL	Right Knee to Dash/Seat Back	114	37.8
PAX	Pelvic Tilt Angle X		21.5
PAY	Pelvic Tilt Angle Y		0.9
PHX	Hip Point to Striker (X-Axis)	349	
PHZ	Hip Point to Striker (Z-Axis)	209	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2023 Toyota Crown XLE HEV 4-Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
 Test Date: 10/10/2023

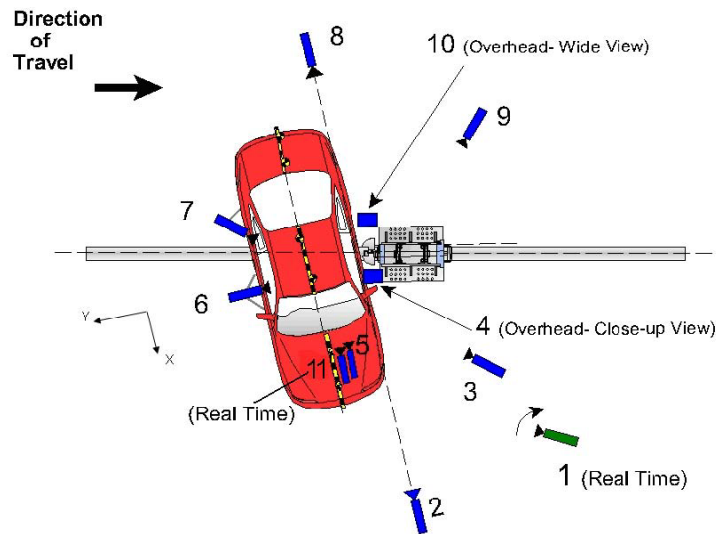


Code	Measurement Description	Driver
		Length (mm)
HR	Head to Side Header	207
HS	Head to Side Window	351
AD	Arm to Door	182
HD	Hip Point to Door	173

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2023 Toyota Crown XLE HEV 4-Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
 Test Date: 10/10/2023



Reference: (from Point of Impact for X and Y; from Ground for Z):
 +X = Forward of Impact, + Y = Right of Impact, +Z = Down

No.	Camera View	Coordinates* (mm)			Lens (mm)	Frame Rate (fps)
		X	Y	Z		
1	Real-Time Pan View					30
2	Front Ground Level	7545	-900	-1535	35	1000
3	Impact Side 45° Forward	4505	-2855	-1520	12	1000
4	Overhead Closeup	0	825	-6700	85	1000
5	Onboard – Driver Front				16	1000
6	Onboard – Driver Side				8.5	1000
7	Onboard – Driver Rear				8.5	1000
8	Rear Ground Level	-6590	-265	-1555	24	1000
9	Impact Side 45° Rearward	-2995	-3505	-1600	12	1000
10	Overhead Wide View	110	1425	-6540	12	1000
11	Real-Time Dummy Front View					30

*All measurements accurate to ± 6 mm

Note: Vehicle was positioned at a 75° angle to the rigid pole.

Explain why camera(s) did not operate as intended: None

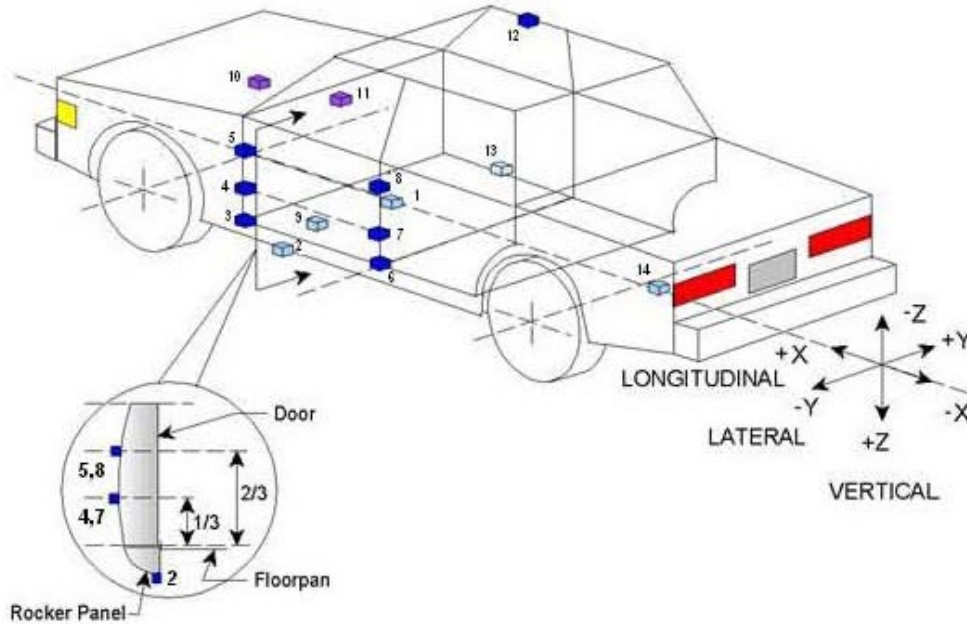
INSTRUMENTATION

	Number of Channels
Driver Dummy	21
Vehicle Structure	18
Pole Load Cells	8
Total	47

DATA SHEET NO. 6 **TEST VEHICLE ACCELEROMETER LOCATIONS**

Test Vehicle: 2023 Toyota Crown XLE HEV 4-Door Sedan
Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
Test Date: 10/10/2023



TEST VEHICLE ACCELEROMETER LOCATIONS

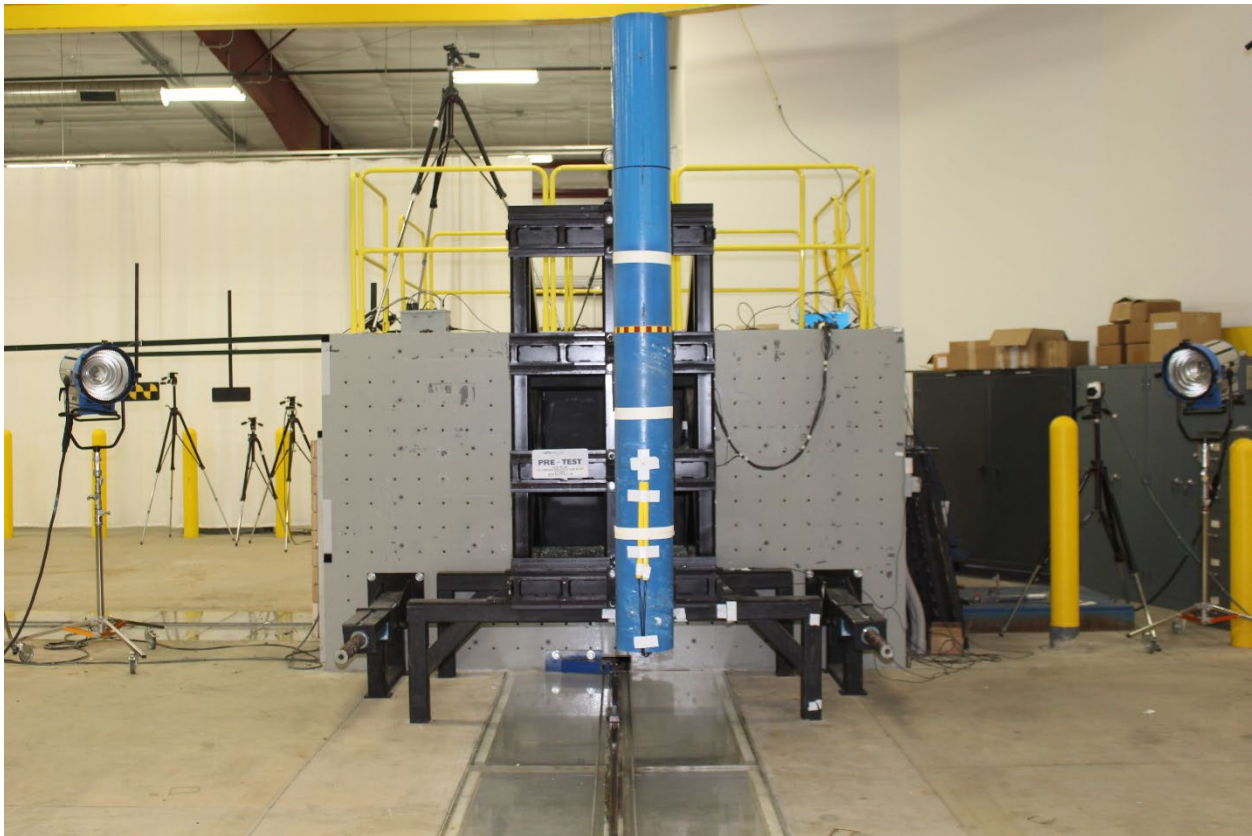
No.	ID	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2618	0	-307
2	Left Floor Sill	3172	-717	-235
3	A Pillar Sill	3404	-717	-235
4	A Pillar Low	3434	-837	-478
5	A Pillar Mid	3434	-837	-684
6	B Pillar Sill	2318	-717	-239
7	B Pillar Low	2234	-738	-627
8	B Pillar Mid	2234	-738	-817
9	Driver Seat Track	2392	-427	-321
10	Engine Top	4091	0	-852
11	Firewall	3663	0	-787
12	Right Roof	2439	502	-1528
13	Right Floor Sill	3172	717	-235
14	Rear Floorpan	1103	0	-546

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

DATA SHEET NO. 7
RIGID POLE LOAD CELL DATA

Test Vehicle: 2023 Toyota Crown XLE HEV 4-Door Sedan
Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
Test Date: 10/10/2023



254 mm Diameter Rigid Pole

Load Cell Locations	
ID	Height from Test Surface (mm)
1	182
2	470
3	698
4	986
5	1212
6	1641
7	1854
8	2053

DATA SHEET NO. 8
POST-TEST OBSERVATIONS

Test Vehicle: 2023 Toyota Crown XLE HEV 4-Door Sedan
Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
Test Date: 10/10/2023

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Driver Dummy (SID-IIs)
Face	Curtain Airbag
Top of Head	Curtain Airbag, Headrest
Left Side of Head	Curtain Airbag, Headrest
Back of Head	Curtain Airbag, Headrest, Seatback
Left Shoulder	Seatback
Upper Torso	Seatback
Lower Torso	Side Torso/Pelvis Airbag, Seatback
Left Hip	Side Torso/Pelvis Airbag, Seat Cushion
Left Knee	None

POST-TEST DOOR PERFORMANCE

Description	Struck Side		Non-Struck Side		Rear Hatch
	Front	Rear	Front	Rear	
Remained Closed and Operational	No	No	Yes	Yes	
Total Separation from Vehicle at Hinges or Latches	No	No	No	No	
Latch or Hinge Systems Pulled Out of Their Anchorages	No	No	No	No	
Disengaged from Latched Position	No	No	No	No	
Latch Separated from Striker	No	No	No	No	
Jammed Shut	Yes	Yes	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	Cracked
Side Window Damage	LF window broken
Other Notable Effects	None

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

Test Vehicle: 2023 Toyota Crown XLE HEV 4-Door Sedan
Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
Test Date: 10/10/2023

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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	No	
Side Airbag (Other)				
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes		Yes	
Other:				

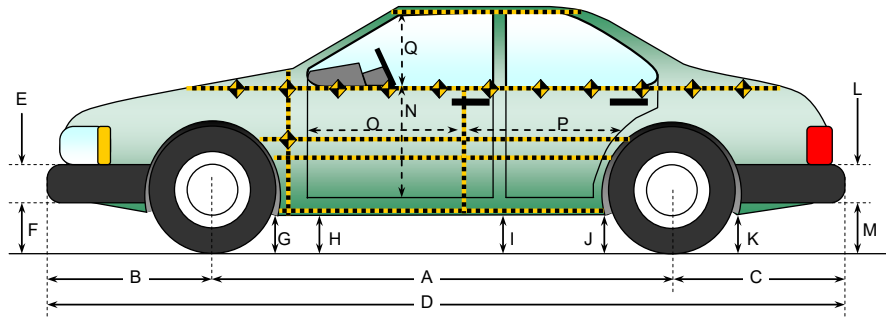
SPEED, ANGLE AT IMPACT, AND IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		1170
Actual Impact Point (Aft of Front Axle)	mm		1172
Horizontal Offset (+forward / -rearward)	mm	+/- 38 of Intended Impact Point	-2
Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion	degrees	75 +/- 3	75.3
Trap No. 1 Velocity (Primary)	km/h	31.4 to 33.0	32.28
Trap No. 2 Velocity (Redundant)	km/h	31.4 to 33.0	32.30

DATA SHEET NO. 9
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2023 Toyota Crown XLE HEV 4-Door Sedan
Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
Test Date: 10/10/2023



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

LEFT SIDE VIEW

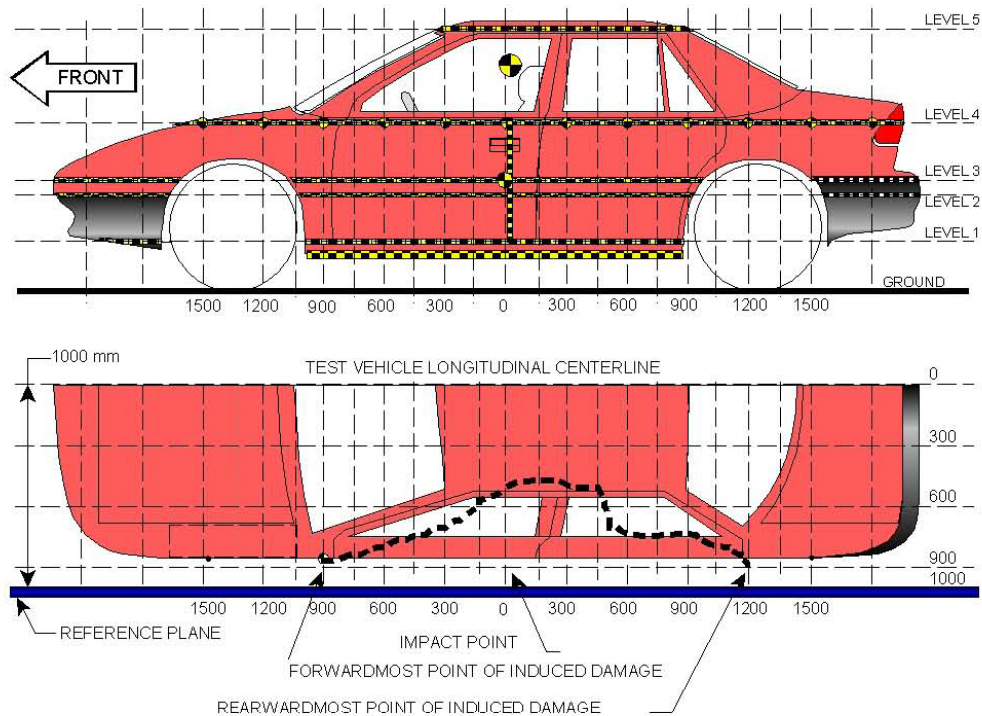
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Change
A	Wheelbase	2859	2801	-58
B	Front Axle to FSOV	1016	1122	106
C	Rear Axle to RSOV	1109	1028	-81
D	Total Vehicle Length at Centerline	4984	4951	-33
E	Front Bumper Thickness	146	146	0
F	Front Bumper Bottom to Ground	204	237	33
G	Sill Height at Front Wheel Well	211	195	-16
H	Sill Height at Front Door Leading Edge	210	196	-14
I	Sill Height at B-Pillar	213	224	11
J1	Sill Height at Rear Wheel Well	221	222	1
J2	Pinch Weld Height at Rear Wheel Well	214	214	0
K	Sill Height Aft of Rear Wheel Well	200	249	49
L	Rear Bumper Thickness	117	117	0
M	Rear Bumper Bottom to Ground	242	305	63
N	Sill Height to Bottom of Front Window Sill	771	652	-119
O	Front Door Leading Edge to Impact CL	686	628	-58
P	Rear Door Trailing Edge to Impact CL	1276	1219	-57
Q	Front Window Opening	373	321	-52
R	Right Side Length	3793	3794	1
S	Left Side Length	3793	3703	-90
T	Vehicle Width at B-Pillars	1702	1757	55
U	Front Wheel Track Width	1601		
V	Rear Wheel Track Width	1607		

DATA SHEET NO. 10 **TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2023 Toyota Crown XLE HEV 4-Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
 Test Date: 10/10/2023



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

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	354	293	0
2	Occupant H-Point	609	335	0
3	Mid Door	650	339	0
4	Window Sill	1021	281	0
5	Window Top	1460	100	0

DATA SHEET NO. 10 (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2023 Toyota Crown XLE HEV 4-Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
 Test Date: 10/10/2023

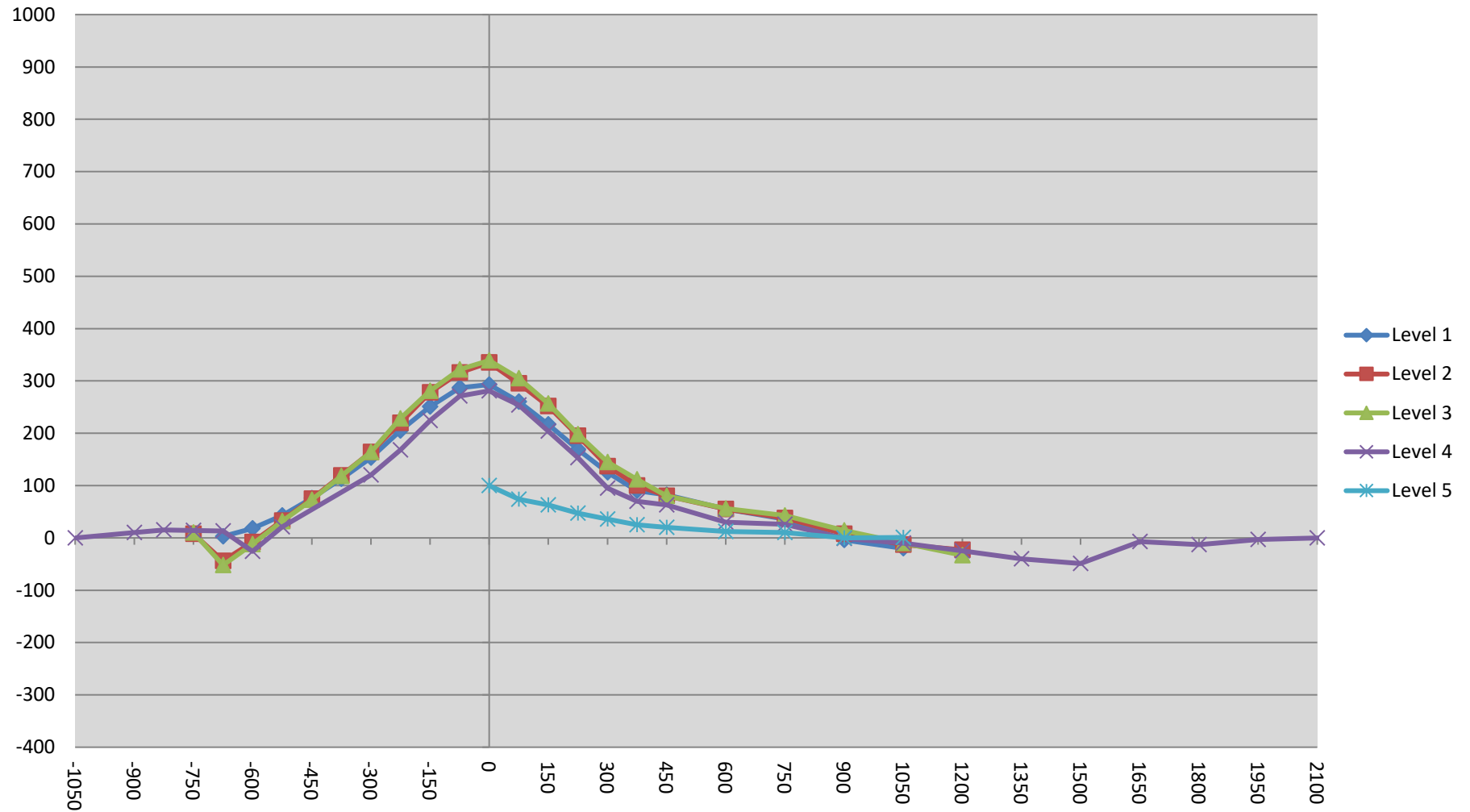
Pre-test measurements are taken when the vehicle is in the "As Tested" weight condition. Vehicle measurements forward of the vertical impact reference line are negative. The crush profile grid is established prior to the test based on an estimated impact point.

	Pre-Test					Post-Test					Exterior Crush				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-2700															
-2550															
-2400															
-2250															
-2100															
-1950															
-1800															
-1650															
-1500															
-1350															
-1200															
-1050				319					319					0	
-900				303					313					10	
-825				299					314					15	
-750		180	178	295			188	188	309			8	10	14	
-675	195	178	178	288		198	134	126	301		3	-44	-52	13	
-600	198	180	180	285		216	172	168	259		18	-8	-12	-26	
-525	207	182	180	283		250	215	212	304		43	33	32	21	
-450	212	182	181			288	257	254			76	75	73		
-375	212	183	181			325	302	299			113	119	118		
-300	210	184	181	270		363	348	345	390		153	164	164	120	
-225	207	185	181	267		412	405	409	435		205	220	228	168	
-150	206	185	182	260		457	463	463	484		251	278	281	224	
-75	205	187	183	256		492	503	505	527		287	316	322	271	
0	204	187	184	252	524	497	522	523	533	624	293	335	339	281	100
75	201	189	185	250	512	461	484	490	504	586	260	295	305	254	74
150	200	190	186	249	504	417	442	443	453	567	217	252	257	204	63
225	199	190	187	245	501	368	385	385	398	548	169	195	198	153	47
300	198	192	189	244	500	323	329	334	339	536	125	137	145	95	36
375	196	193	190	242	500	286	293	302	312	525	90	100	112	70	25
450	195	190	190	243	501	277	270	270	306	521	82	80	80	63	20
525															
600	193	188	190	249	502	248	243	246	279	514	55	55	56	30	12
675															
750	192	184	188	252	505	228	222	231	278	515	36	38	43	26	10
825															
900	192	180	184	253	514	188	188	198	252	514	-4	8	14	-1	0
1050	192	178	179	260	538	172	165	169	250	539	-20	-13	-10	-10	1
1200		175	185	262			152	152	237			-23	-33	-25	
1350				263					223					-40	
1500				258					209					-49	
1650				250					243					-7	
1800				257					244					-13	
1950				260					257					-3	
2100				273					273					0	
2250				298					300					2	
2400															
2550															
2700															

DATA SHEET NO. 10 (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2023 Toyota Crown XLE HEV 4-Door Sedan
Test Program: NCAP Side Pole Impact Test

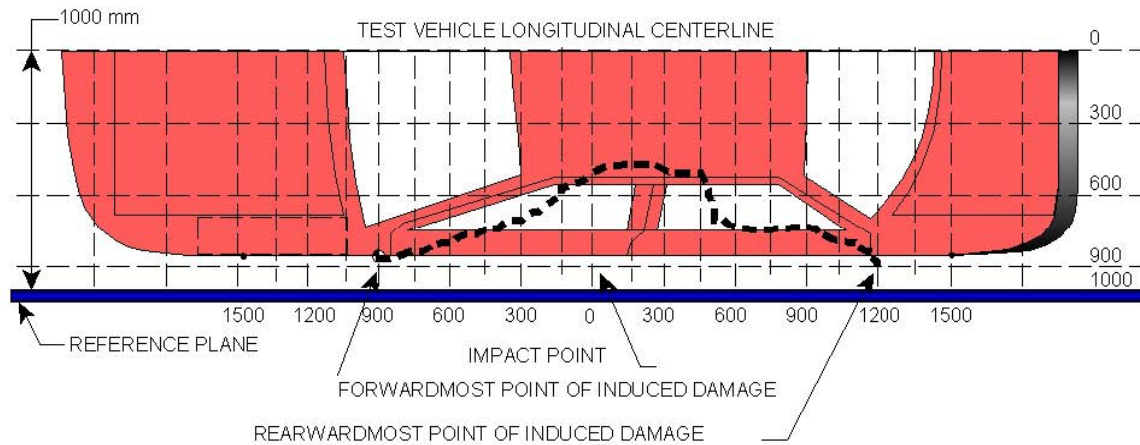
NHTSA No.: O20235115
Test Date: 10/10/2023



DATA SHEET NO. 10 (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2023 Toyota Crown XLE HEV 4-Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
 Test Date: 10/10/2023



VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance from Impact Point (mm)	Level	Pre-Test (mm)	Post-Test (mm)	Max. Static Crush (mm)
1	400	3	185	268	83
2	180	3	186	394	208
3	-40	3	183	513	330
4	-260	3	181	381	200
5	-480	3	181	241	60
6	-700	3	178	187	9

DATA SHEET NO. 11
FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2023 Toyota Crown XLE HEV 4-Door Sedan
 Test Program: NCAP Side Pole Impact Test

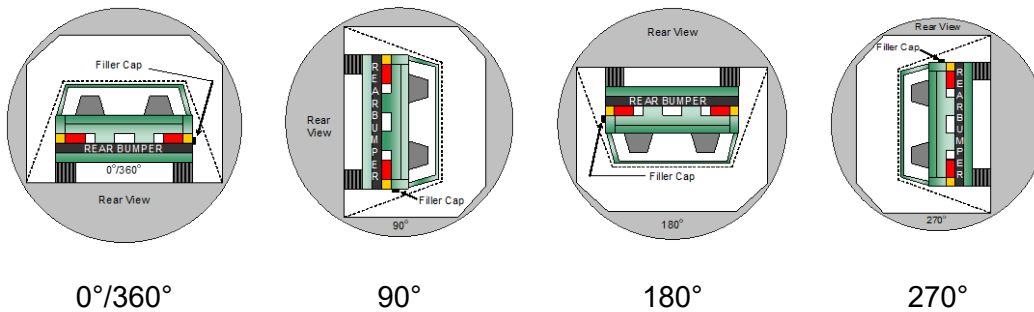
NHTSA No.: O20235115
 Test Date: 10/10/2023

Test Time: 11:07 am

Temperature: 21.8°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°	109	300	409
90° to 180°	110	300	410
180° to 270°	108	300	408
270° to 360°	112	300	412

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	

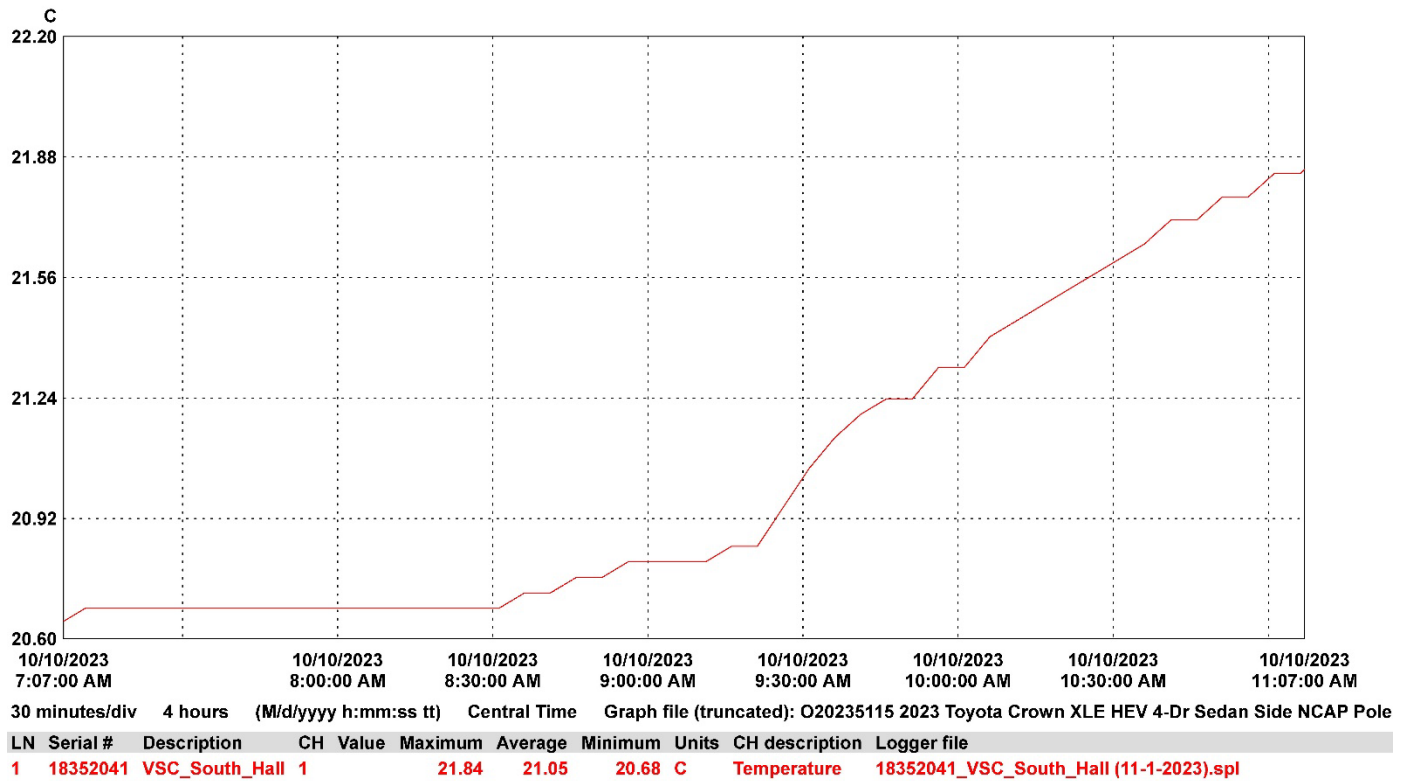
ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 12 **DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA**

Test Vehicle: 2023 Toyota Crown XLE HEV 4-Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
 Test Date: 10/10/2023



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

Test Vehicle: 2023 Toyota Crown XLE HEV 4-Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
 Test Date: 10/10/2023

ELECTRIC VEHICLE PROPULSION SYSTEM

	Units	Observations and Conclusions
Type of Electric Vehicle		Gas-Electric Hybrid
Propulsion Battery Type		Ni Battery
Nominal Voltage	V	230.4
Physical Location of Automatic Propulsion Battery Disconnect		Inside the traction battery case
Auxiliary Battery Type		LN3

PROPULSION BATTERY SYSTEM DATA

	Units	Observations and Conclusions
Electrolyte Fluid Type		KOH (Potassium Hydroxide)
Electrolyte Fluid Specific Gravity	g/cm ³	1.27
Electrolyte Fluid Kinematic Viscosity	cSt	23.6
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 2 nd row seat cushion.

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	
<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	314.8 V
Test Voltage – Maximum practicable State of Charge within Normal Operating Range	259.2 V

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

Test Vehicle: 2023 Toyota Crown XLE HEV 4-Door Sedan
Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
Test Date: 10/10/2023

VEHICLE CHASSIS GROUND POINT(S) LOCATION(S)

Details of Vehicle Chassis Ground Point(s) & Location(s)	High-voltage battery case mounting point
---	--

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: 2023 Toyota Crown XLE HEV 4-Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
 Test Date: 10/10/2023

VOLTMETER INFORMATION

	Units	Observations and Conclusions
Make		
Model		
Serial Number		
Internal Impedance Value	MΩ	
Resolution	V	
Last Calibration Date		

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	
----	---	--

ELECTRIC ISOLATION MEASUREMENTS
PROPULSION BATTERY TO VEHICLE CHASSIS

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

V1	V	
V2	V	

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	
----	---	--

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

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

Test Vehicle: 2023 Toyota Crown XLE HEV 4-Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
 Test Date: 10/10/2023

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

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

	Yes	No (Fail)
Is the measured Electrical Isolation Value $\geq 500 \Omega/V$?		
Additional Comments	Not Applicable, vehicle was certified to FMVSS No. 305 S5.3(c).	

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

Test Vehicle: 2023 Toyota Crown XLE HEV 4-Door Sedan
Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
Test Date: 10/10/2023

VOLTMETER INFORMATION

	Units	Observations and Conclusions
Make		
Model		
Serial Number		
Internal Impedance Value	MΩ	
Resolution	V	
Last Calibration Date		

ELECTRICAL ISOLATION MEASUREMENTS

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

V1 Post-Impact	V		Impact Time		Minutes		Seconds
V2 Post-Impact	V				Minutes		Seconds
V1' Post-Impact	V				Minutes		Seconds
V2' Post-Impact	V				Minutes		Seconds

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

Test Vehicle: 2023 Toyota Crown XLE HEV 4-Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
 Test Date: 10/10/2023

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

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

	Yes	No (Fail)
Is the measured Electrical Isolation Value $\geq 500 \Omega/V$?		
Additional Comments	Not Applicable, vehicle was certified to FMVSS No. 305 S5.3(c).	

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

Test Vehicle: 2023 Toyota Crown XLE HEV 4-Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
 Test Date: 10/10/2023

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

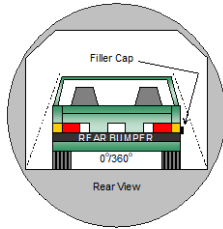
	Yes (Fail)	No
Is the Propulsion Battery Electrolyte Spillage visible in the passenger compartment?		X

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

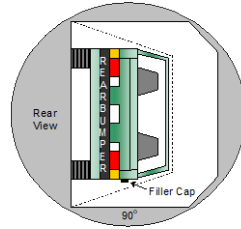
Test Vehicle: 2023 Toyota Crown XLE HEV 4-Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
 Test Date: 10/10/2023

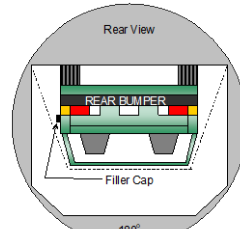
PROPULSION BATTERY SYSTEM COMPONENTS



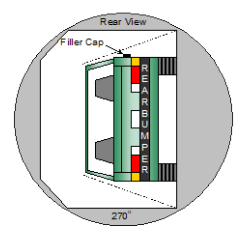
0°/360°



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	49	sec	5	min	6	min	49	sec	7	min
90° - 180°	1	min	50	sec	5	min	6	min	50	sec	7	min
180° - 270°	1	min	48	sec	5	min	6	min	48	sec	7	min
270° - 360°	1	min	52	sec	5	min	6	min	52	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: 2023 Toyota Crown XLE HEV 4-Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
 Test Date: 10/10/2023

VOLTMETER INFORMATION

	Units	Observations and Conclusions
Make		
Model		
Serial Number		
Internal Impedance Value	MΩ	
Resolution	V	
Last Calibration Date		

ELECTRICAL ISOLATION MEASUREMENTS

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

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		V	0°		min		sec
			90°				
			180°				
			270°				
			360°				
V2		V	0°		min		sec
			90°				
			180°				
			270°				
			360°				
V1'		V	0°		min		sec
			90°				
			180°				
			270°				
			360°				
V2'		V	0°		min		sec
			90°				
			180°				
			270°				
			360°				

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

Test Vehicle: 2023 Toyota Crown XLE HEV 4-Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
 Test Date: 10/10/2023

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		Ω	0°		min		sec
			90°				
			180°				
			270°				
			360°				
Ri2 = Ro (1 + V1/V2) [(V2-V2')/V2']							
Ri2		Ω	0°		min		sec
			90°				
			180°				
			270°				
			360°				
Ri = The lesser of Ri1 and Ri2							
Ri		Ω	0°		min		sec
			90°				
			180°				
			270°				
			360°				
Ri / Vb = Electrical Isolation Value / Nominal Battery Voltage							
Ri / Vb		Ω/V	0°		min		sec
			90°				
			180°				
			270°				
			360°				

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

	Yes	No (Fail)
Is the measured Electrical Isolation Value $\geq 500 \Omega/V$?		
Additional Comments	Not Applicable, vehicle was certified to FMVSS No. 305 S5.3(c).	

DATA SHEET NO. 305A-1
EVALUATE PROTECTION FROM DIRECT CONTACT WITH HIGH VOLTAGES SOURCES
FOR INDICANT FMVSS NO. 305 TESTING

Test Vehicle: 2023 Toyota Crown XLE HEV 4-Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
 Test Date: 10/10/2023

For each data point where the IPXXB probe is used to evaluate electrical protection from direct contact with high voltage sources, provide a thumbnail photo and be as descriptive of the locations as possible. If an apparent failure is detected, include a photograph showing the direct contact between probe and the high voltage source and/or the probe lamp being illuminated.

POST-CRASH / PRE-ROLLOVER

Description of Evaluated Location	Probe Contact with High Voltage Source		Probe Lamp Illuminated	
	Yes, Fail	No, Pass	Yes, Fail	No, Pass
Front Drive Unit / Transmission Assembly to Electrical Ground		X		X
High-Voltage Battery Case to Electrical Ground		X		X
Rear Drive Unit to Electrical Ground		X		X
Front Drive Unit / Transmission Assembly to High-Voltage Battery Case		X		X
Rear Drive Unit to High-Voltage Battery Case		X		X

STATIC ROLLOVER

Description of Evaluated Location	Probe Contact with High Voltage Source		Probe Lamp Illuminated	
	Yes, Fail	No, Pass	Yes, Fail	No, Pass
Front Drive Unit / Transmission Assembly to Electrical Ground		X		X
High-Voltage Battery Case to Electrical Ground		X		X
Rear Drive Unit to Electrical Ground		X		X
Front Drive Unit / Transmission Assembly to High-Voltage Battery Case		X		X
Rear Drive Unit to High-Voltage Battery Case		X		X

POST-ROLLOVER

Description of Evaluated Location	Probe Contact with High Voltage Source		Probe Lamp Illuminated	
	Yes, Fail	No, Pass	Yes, Fail	No, Pass
Front Drive Unit / Transmission Assembly to Electrical Ground		X		X
High-Voltage Battery Case to Electrical Ground		X		X
Rear Drive Unit to Electrical Ground		X		X
Front Drive Unit / Transmission Assembly to High-Voltage Battery Case		X		X
Rear Drive Unit to High-Voltage Battery Case		X		X

DATA SHEET NO. 305A-2
EVALUATE PROTECTION AGAINST INDIRECT CONTACT WITH HIGH VOLTAGE SOURCES
USING A RESISTANCE TESTER OR DC POWER SUPPLY, VOLTMETER AND AMMETER
FOR INDICANT FMVSS NO. 305 TESTING

Test Vehicle: 2023 Toyota Crown XLE HEV 4-Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
 Test Date: 10/10/2023

For any measuring points where protection against indirect contact with high voltage sources is evaluated, provide a thumbnail photo and be as descriptive of the locations as possible. If an apparent failure is detected, include a photograph showing the locations in question and the related measured values. If the resistance is calculated using separately measured resistances, describe each measurement and the final calculation as separate entries in the table below.

Measuring Path	Pass	Fail
BC: Between exposed conductive parts of the electrical protection barrier of the high voltage source and the electrical chassis.	< 0.1 Ω	$\geq$ 0.1 Ω
BB: Between exposed conductive parts of the electrical protection barrier of the high voltage source and any other simultaneously reachable exposed conductive parts of the electrical protection barriers within 2.5 meters.	< 0.2 Ω	$\geq$ 0.2 Ω

POST-CRASH / PRE-ROLLOVER

Description of Evaluated Location	Measuring Path	Method 2 ONLY		Methods 1 & 2	Pass or Fail
	BC or BB	Voltage (V) Volts	Current (I) Amps	Resistance (R=V/I) Ω	
Front Drive Unit / Transmission Assembly to Electrical Ground	BC			0.00	Pass
High-Voltage Battery Case to Electrical Ground	BC			0.02	Pass
Rear Drive Unit to Electrical Ground	BC			0.02	Pass
Front Drive Unit / Transmission Assembly to High-Voltage Battery Case	BB			0.01	Pass
Rear Drive Unit to High-Voltage Battery Case	BB			0.03	Pass
Front Drive Unit / Transmission Assembly To Rear Drive Unit	BB			0.03	Pass

STATIC ROLLOVER

Description of Evaluated Location	Measuring Path	Method 2 ONLY		Methods 1 & 2	Pass or Fail
	BC or BB	Voltage (V) Volts	Current (I) Amps	Resistance (R=V/I) Ω	
Front Drive Unit / Transmission Assembly to Electrical Ground	BC			0.01	Pass
High-Voltage Battery Case to Electrical Ground	BC			0.03	Pass
Rear Drive Unit to Electrical Ground	BC			0.04	Pass
Front Drive Unit / Transmission Assembly to High-Voltage Battery Case	BB			0.01	Pass
Rear Drive Unit to High-Voltage Battery Case	BB			0.03	Pass
Front Drive Unit / Transmission Assembly To Rear Drive Unit	BB			0.02	Pass

* Final resistance values reported after subtracting the resistance of the measurement device extensions.

DATA SHEET NO. 305A-2 (CONTINUED)
EVALUATE PROTECTION AGAINST INDIRECT CONTACT WITH HIGH VOLTAGE SOURCES
USING A RESISTANCE TESTER OR DC POWER SUPPLY, VOLTMETER AND AMMETER
FOR INDICANT FMVSS NO. 305 TESTING

Test Vehicle: 2023 Toyota Crown XLE HEV 4-Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
 Test Date: 10/10/2023

For any measuring points where protection against indirect contact with high voltage sources is evaluated, provide a thumbnail photo and be as descriptive of the locations as possible. If an apparent failure is detected, include a photograph showing the locations in question and the related measured values. If the resistance is calculated using separately measured resistances, describe each measurement and the final calculation as separate entries in the table below.

Measuring Path	Pass	Fail
BC: Between exposed conductive parts of the electrical protection barrier of the high voltage source and the electrical chassis.	< 0.1 Ω	$\geq$ 0.1 Ω
BB: Between exposed conductive parts of the electrical protection barrier of the high voltage source and any other simultaneously reachable exposed conductive parts of the electrical protection barriers within 2.5 meters.	< 0.2 Ω	$\geq$ 0.2 Ω

POST-ROLLOVER

Description of Evaluated Location	Measuring Path	Method 2 ONLY		Methods 1 & 2	Pass or Fail
	BC or BB	Voltage (V) Volts	Current (I) Amps	Resistance (R=V/I) Ω	
Front Drive Unit / Transmission Assembly to Electrical Ground	BC			0.02	Pass
High-Voltage Battery Case to Electrical Ground	BC			0.03	Pass
Rear Drive Unit to Electrical Ground	BC			0.04	Pass
Front Drive Unit / Transmission Assembly to High-Voltage Battery Case	BB			0.01	Pass
Rear Drive Unit to High-Voltage Battery Case	BB			0.03	Pass
Front Drive Unit / Transmission Assembly To Rear Drive Unit	BB			0.02	Pass

* Final resistance values reported after subtracting the resistance of the measurement device extensions.

DATA SHEET NO. 305A-3
DETERMINE VOLTAGE BETWEEN EXPOSED CONDUCTIVE PARTS
OF ELECTRICAL PROTECTION BARRIERS AND THE ELECTRICAL CHASSIS
AND BETWEEN EXPOSED PARTS OF ELECTRICAL PROTECTION BARRIERS

Test Vehicle: 2023 Toyota Crown XLE HEV 4-Door Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
 Test Date: 10/10/2023

For each data point where the voltage between exposed conductive parts of electrical protection barriers and the electrical chassis and between exposed conductive parts of electrical protection barriers is determined, provide a thumbnail photo and be as descriptive of the locations as possible. If an apparent failure is detected, include a photograph showing the locations in question and the related measured values.

Measuring Path	Pass	Fail
BC: Between exposed conductive parts of the electrical protection barrier of the high voltage source and the electrical chassis.	≤ 30 VAC ≤ 60 VDC	> 30 VAC > 60 VDC
BB: Between exposed conductive parts of the electrical protection barrier of the high voltage source and any other simultaneously reachable exposed conductive parts of the electrical protection barriers within 2.5 meters.	≤ 30 VAC ≤ 60 VDC	> 30 VAC > 60 VDC

POST-CRASH / PRE-ROLLOVER

Description of Evaluated Location	Measuring Path	Measured Voltage		Pass or Fail
	BC or BB	VAC (V) Volts	VDC (V) Volts	
Front Drive Unit / Transmission Assembly to Electrical Ground	BC	0.0	0.0	Pass
High-Voltage Battery Case to Electrical Ground	BC	0.0	0.0	Pass
Rear Drive Unit to Electrical Ground	BC	0.0	0.0	Pass
Front Drive Unit / Transmission Assembly to High-Voltage Battery Case	BB	0.0	0.0	Pass
Rear Drive Unit to High-Voltage Battery Case	BB	0.0	0.0	Pass
Front Drive Unit / Transmission Assembly To Rear Drive Unit	BB	0.0	0.0	Pass

STATIC ROLLOVER

Description of Evaluated Location	Measuring Path	Measured Voltage		Pass or Fail
	BC or BB	VAC (V) Volts	VDC (V) Volts	
Front Drive Unit / Transmission Assembly to Electrical Ground	BC	0.0	0.0	Pass
High-Voltage Battery Case to Electrical Ground	BC	0.0	0.0	Pass
Rear Drive Unit to Electrical Ground	BC	0.0	0.0	Pass
Front Drive Unit / Transmission Assembly to High-Voltage Battery Case	BB	0.0	0.0	Pass
Rear Drive Unit to High-Voltage Battery Case	BB	0.0	0.0	Pass
Front Drive Unit / Transmission Assembly To Rear Drive Unit	BB	0.0	0.0	Pass

DATA SHEET NO. 305A-3 (CONTINUED)
DETERMINE VOLTAGE BETWEEN EXPOSED CONDUCTIVE PARTS
OF ELECTRICAL PROTECTION BARRIERS AND THE ELECTRICAL CHASSIS
AND BETWEEN EXPOSED PARTS OF ELECTRICAL PROTECTION BARRIERS

Test Vehicle: 2023 Toyota Crown XLE HEV 4-Door Sedan
Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20235115
Test Date: 10/10/2023

For each data point where the voltage between exposed conductive parts of electrical protection barriers and the electrical chassis and between exposed conductive parts of electrical protection barriers is determined, provide a thumbnail photo and be as descriptive of the locations as possible. If an apparent failure is detected, include a photograph showing the locations in question and the related measured values.

Measuring Path	Pass	Fail
BC: Between exposed conductive parts of the electrical protection barrier of the high voltage source and the electrical chassis.	≤ 30 VAC ≤ 60 VDC	> 30 VAC > 60 VDC
BB: Between exposed conductive parts of the electrical protection barrier of the high voltage source and any other simultaneously reachable exposed conductive parts of the electrical protection barriers within 2.5 meters.	≤ 30 VAC ≤ 60 VDC	> 30 VAC > 60 VDC

POST-ROLLOVER

Description of Evaluated Location	Measuring Path	Measured Voltage		Pass or Fail
	BC or BB	VAC (V) Volts	VDC (V) Volts	
Front Drive Unit / Transmission Assembly to Electrical Ground	BC	0.0	0.0	Pass
High-Voltage Battery Case to Electrical Ground	BC	0.0	0.0	Pass
Rear Drive Unit to Electrical Ground	BC	0.0	0.0	Pass
Front Drive Unit / Transmission Assembly to High-Voltage Battery Case	BB	0.0	0.0	Pass
Rear Drive Unit to High-Voltage Battery Case	BB	0.0	0.0	Pass
Front Drive Unit / Transmission Assembly To Rear Drive Unit	BB	0.0	0.0	Pass

**APPENDIX A
PHOTOGRAPHS**

TABLE OF PHOTOGRAPHS

		<u>Page No.</u>
Photo No. 001	As Delivered Right Front $\frac{3}{4}$ View of Test Vehicle	A-1
Photo No. 002	As Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle	A-1
Photo No. 003	Pre-Test Frontal View of Test Vehicle	A-2
Photo No. 004	Post-Test Frontal View of Test Vehicle	A-2
Photo No. 005	Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle	A-3
Photo No. 006	Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle	A-3
Photo No. 007	Pre-Test Left Side View of Test Vehicle	A-4
Photo No. 008	Post-Test Left Side View of Test Vehicle	A-4
Photo No. 009	Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle	A-5
Photo No. 010	Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle	A-5
Photo No. 011	Pre-Test Rear View of Test Vehicle	A-6
Photo No. 012	Post-Test Rear View of Test Vehicle	A-6
Photo No. 013	Pre-Test Right Side View of Test Vehicle	A-7
Photo No. 014	Post-Test Right Side View of Test Vehicle	A-7
Photo No. 015	Pre-Test Overhead View of Test Area	A-8
Photo No. 016	Post-Test Overhead View of Test Area	A-8
Photo No. 017	Pre-Test Left Side View of Pole Positioned Against Side of Vehicle	A-9
Photo No. 018	Pre-Test Right Side View of Pole Positioned Against Side of Vehicle	A-9
Photo No. 019	Pre-Test Close-Up View of Impact Point Target	A-10
Photo No. 020	Post-Test Close-Up View of Impact Point Target Showing Impact Location	A-10
Photo No. 021	Pre-Test Front Close-Up View of Dummy Head and Chest	A-11
Photo No. 022	Post-Test Front Close-Up View of Dummy	A-11
Photo No. 023	Pre-Test Left Side View of Dummy Showing Belt and Chalking	A-12
Photo No. 024	Pre-Test Left Side View of Dummy Shoulder and Door Top View	A-12
Photo No. 025	Post-Test Left Side View of Dummy Shoulder and Door Top View	A-13
Photo No. 026	Pre-Test Front View of Seat Back Prior to Dummy Positioning	A-13
Photo No. 027	Pre-Test Front Close-Up View of Dummy Head and Shoulders in Relation to Head Restraint	A-14
Photo No. 028	Pre-Test Front View of Seat Pan Prior to Dummy Positioning	A-14
Photo No. 029	Pre-Test Overhead View of Dummy Thighs on Seat Pan	A-15

		<u>Page No.</u>
Photo No. 030	Pre-Test Left Side View of Dummy's Neck Showing Position of Adjustable Neck Bracket	A-15
Photo No. 031	Pre-Test Left Side View of Dummy's Head Showing Dummy's Head is Level	A-16
Photo No. 032	Pre-Test Placement of Dummy's Feet	A-16
Photo No. 033	Pre-Test View of Belt Anchorage for Dummy	A-17
Photo No. 034	Pre-Test Left Side View of Steering Wheel	A-17
Photo No. 035	Pre-Test View of Disengaged Parking Brake	A-18
Photo No. 036	Pre-Test View of Parking Brake	A-18
Photo No. 037	Pre-Test Close-Up Left Side View of Driver Seat Track	A-19
Photo No. 038	Pre-Test Close-Up Left Side View of Driver Seat Back	A-19
Photo No. 039	Pre-Test Close-Up View of Driver Seat Back or Head Restraint	A-20
Photo No. 040	Pre-Test Dummy and Door Clearance View	A-20
Photo No. 041	Post-Test Dummy and Door Clearance View	A-21
Photo No. 042	Pre-Test Right Side View of Dummy and Front Seat of Occupant Compartment	A-21
Photo No. 043	Post-Test Right Side View of Dummy and Front Seat of Occupant Compartment	A-22
Photo No. 044	Pre-Test Inner Door Panel View	A-22
Photo No. 045	Post-Test Inner Door Panel View Showing Dummy Contact Location	A-23
Photo No. 046	Post-Test Dummy Close-Up Head Contact with Vehicle Interior View	A-23
Photo No. 047	Post-Test Dummy Close-Up Head Contact with Side Air Bag View	A-24
Photo No. 048	Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View	A-24
Photo No. 049	Post-Test Dummy Close-Up Torso Contact with Side Air Bag View	A-25
Photo No. 050	Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View	A-25
Photo No. 051	Post-Test Dummy Close-Up Pelvis Contact with Side Air Bag View	A-26
Photo No. 052	Post-Test Dummy Close-Up Knee Contact with Vehicle Interior View	A-26
Photo No. 053	Post-Test Right Side View of Dummy and Rear Seat of Occupant Compartment	A-27
Photo No. 054	Post-Test Inner Rear Passenger Torso Air Bag Deployment View	A-27
Photo No. 055	Pre-Test View of Fuel Filler Cap or Fuel Filler Neck	A-28
Photo No. 056	Post-Test View of Fuel Filler Cap or Fuel Filler Neck	A-28
Photo No. 057	Close-Up View of Vehicle's Certification Label	A-29

		<u>Page No.</u>
Photo No. 058	Close-Up View of Vehicle's Tire Information Placard or Label	A-29
Photo No. 058a	Close-Up View of Vehicle Load Carrying Capacity Reduction Label	A-30
Photo No. 059	Pre-Test Pole Barrier Front View	A-30
Photo No. 060	Post-Test Pole Barrier Front View	A-31
Photo No. 061	Pre-Test Pole Barrier Side View	A-31
Photo No. 062	Post-Test Pole Barrier Side View	A-32
Photo No. 063	Pre-Test Ballast View	A-32
Photo No. 064	Post-Test Primary and Redundant Speed Trap Read-Out	A-33
Photo No. 065	FMVSS No. 301 Static Rollover 0 Degrees	A-33
Photo No. 066	FMVSS No. 301 Static Rollover 90 Degrees	A-34
Photo No. 067	FMVSS No. 301 Static Rollover 180 Degrees	A-34
Photo No. 068	FMVSS No. 301 Static Rollover 270 Degrees	A-35
Photo No. 069	FMVSS No. 301 Static Rollover 360 Degrees	A-35
Photo No. 070	Impact Event	A-36
Photo No. 071	Monroney Label	A-36
Photo No. 072	Head Restraint Use and Adjustment Information from Vehicle Owner's Manual	A-37
Photo No. 073	Post-Test View of Shattered Vehicle Inner Door Panel	A-37
Photo No. 305-01	Auxiliary Power Module Warning Label	A-38
Photo No. 305-02	Power Inverter Warning Label	A-38
Photo No. 305-03	First Responder Warning Label	A-39
Photo No. 305-04	First Responder Warning Location	A-39
Photo No. 305-05	Other Vehicle Label(s) Related to Electrical Propulsion System	A-40
Photo No. 305-06	Manual High Voltage Service Disconnect in Place	A-40
Photo No. 305-07	Manual High Voltage Service Disconnect Removed	A-41
Photo No. 305-08	Manual High Voltage Service Disconnect Removed	A-41
Photo No. 305-09	Pre-Impact View of Propulsion Battery	A-42
Photo No. 305-10	Post-Impact Front View of Propulsion Battery	A-42
Photo No. 305-11	Post-Impact Rear View of Propulsion Battery	A-43
Photo No. 305-12	Pre-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules	A-43

		<u>Page No.</u>
Photo No. 305-13	Post-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules	A-44
Photo No. 305-14	Pre-Impact View of Propulsion Battery Module(s)	A-44
Photo No. 305-15	Post-Impact View of Propulsion Battery Module(s)	A-45
Photo No. 305-16	Pre-Impact View of Electric Propulsion Drive	A-45
Photo No. 305-17	Post-Impact View of Electric Propulsion Drive	A-46
Photo No. 305-18	Pre-Impact View of High Voltage Interconnect(s)	A-46
Photo No. 305-19	Pre-Impact View Propulsion Battery Venting System(s)	A-47
Photo No. 305-20	Pre-Impact View of Other Visible Electric Propulsion Components	A-47
Photo No. 305-21	Pre-Impact View of Ground Lead Attached	A-48
Photo No. 305-22	Pre-Impact View of High Voltage Leads Attached	A-48
Photo No. 305-23	Pre-Impact Close-Up View of High Voltage Leads Attached	A-49
Photo No. 305-24	Pre-Impact View of Installed Test Interface Port	A-49
Photo No. 305-25	Post-Impact View of Installed Test Interface Port	A-50
Photo No. 305-26	Pre-Impact View of Other Test Devices	A-50
Photo No. 305-27	Post-Impact View of Other Test Devices	A-51
Photo No. 305-28	FMVSS No. 305 Static Rollover at 90 Degrees	A-51
Photo No. 305-29	FMVSS No. 305 Static Rollover at 180 Degrees	A-52
Photo No. 305-30	FMVSS No. 305 Static Rollover at 270 Degrees	A-52
Photo No. 305-31	FMVSS No. 305 Static Rollover at 360 Degrees	A-53
Photo No. 305-32	Pre-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery	A-53
Photo No. 305-33	Post-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery	A-54
Photo No. 305-34	Post-Impact Propulsion Battery System Mounting and/or Intrusion Failure(s)	A-54
Photo No. 305-35	Post-Impact View of Battery Component Intrusion	A-55
Photo No. 305-36	Post-Impact View of Battery Module Movement or Retention Loss	A-55
Photo No. 305-37	Post-Impact View of Propulsion Battery Electrolyte Spillage Location	A-56
Photo No. 305-38	Post-Test View of Propulsion Battery Electrolyte Spillage Location	A-56



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 Rear Three-Quarter View of Test Vehicle



Photo No. 010 - Post-Test Left Rear Three-Quarter 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

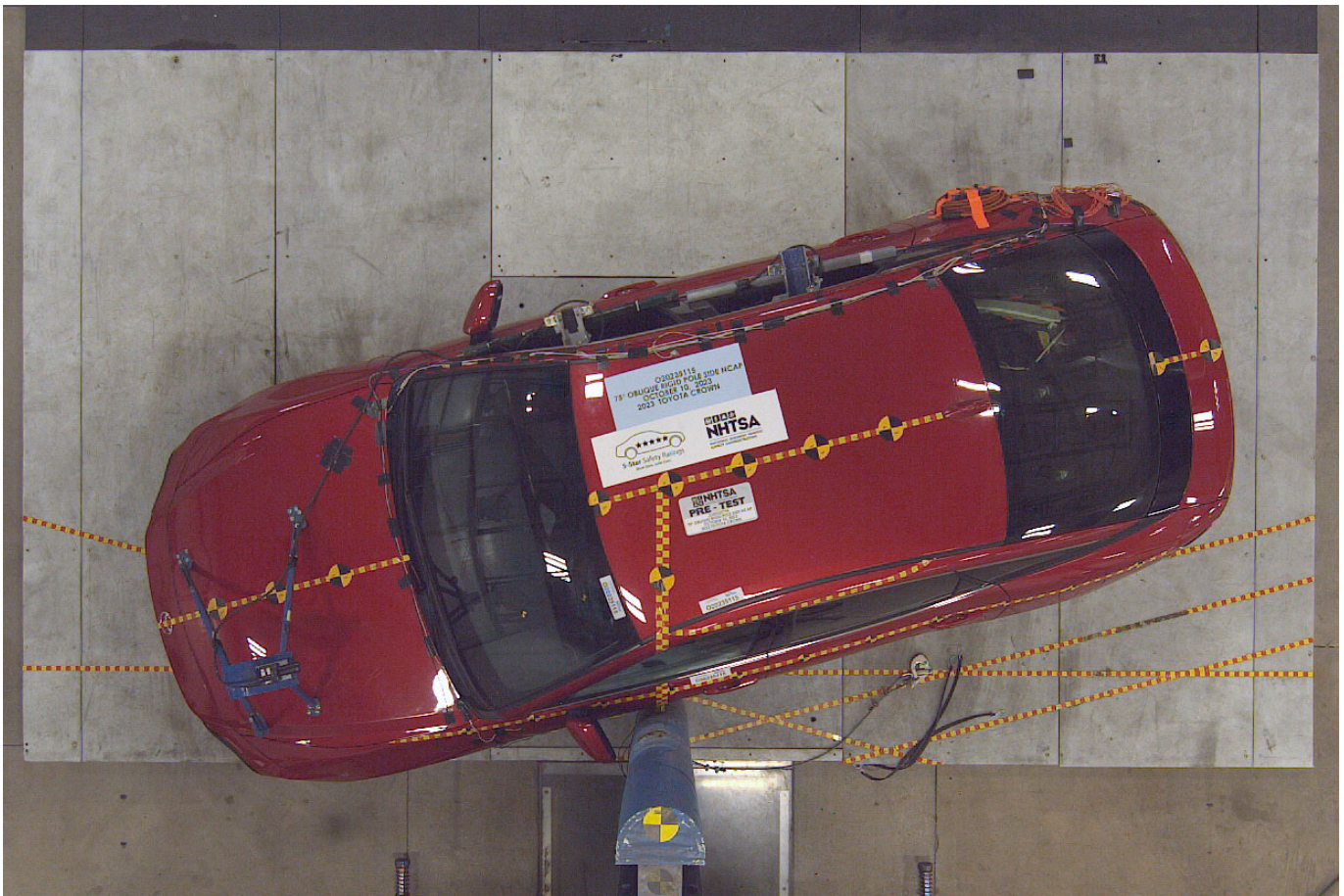


Photo No. 015 - Pre-Test Overhead View of Test Area

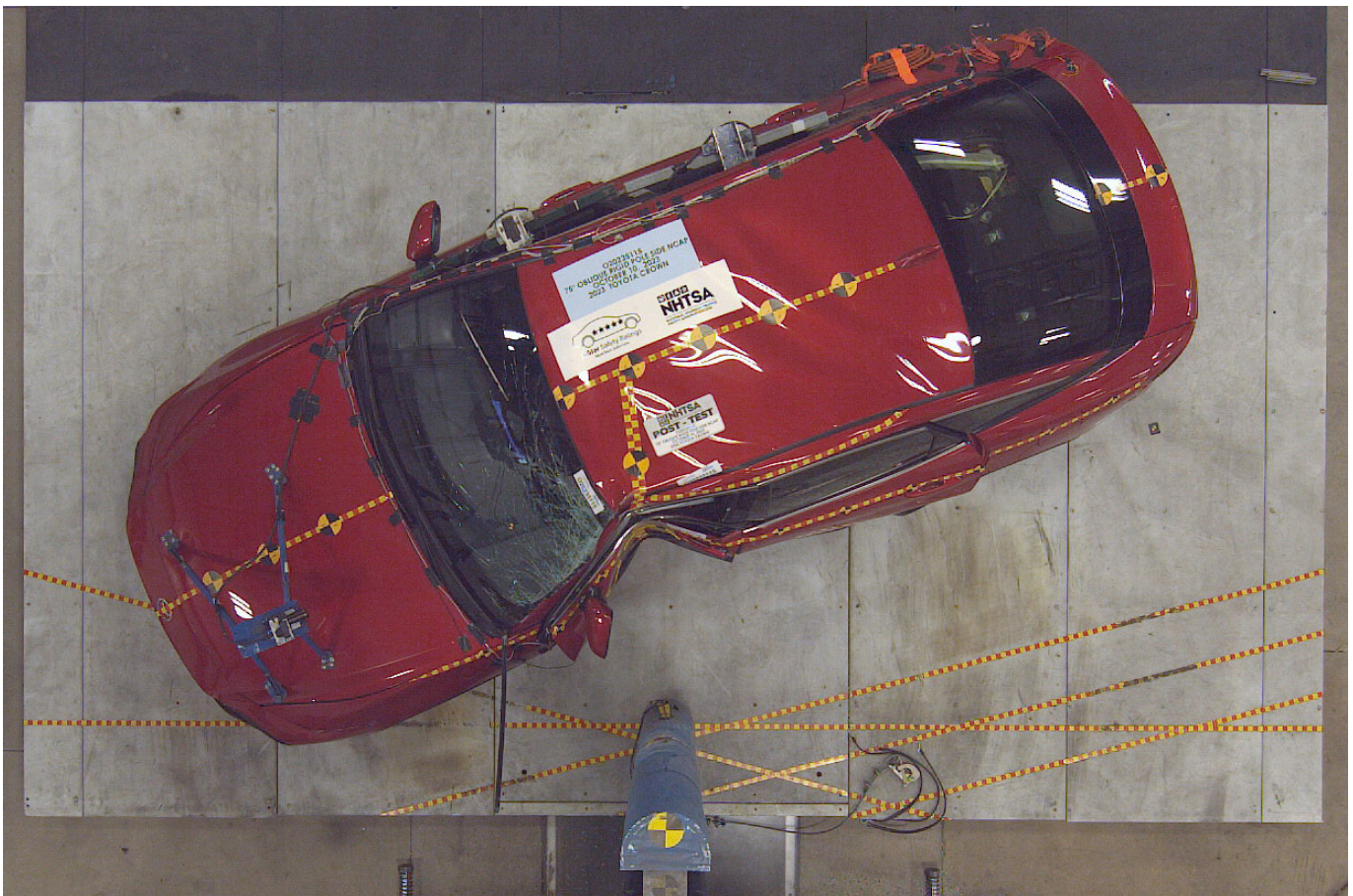


Photo No. 016 - Post-Test Overhead View of Test Area



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



Photo No. 018 - Pre-Test Right Side View of Pole Positioned Against Side of 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 Showing Impact Location



Photo No. 021 - Pre-Test Front Close-Up View of Dummy Head and Chest



Photo No. 022 - Post-Test Front Close-Up View of Dummy



Photo No. 023 - Pre-Test Left Side View of Dummy Showing Belt and Chalking



Photo No. 024 - Pre-Test Left Side View of Dummy Shoulder and Door Top View



Photo No. 025 - Post-Test Left Side View of Dummy Shoulder and Door Top View



Photo No. 026 - Pre-Test Front View of Seat Back Prior to Dummy Positioning



Photo No. 027 - Pre-Test Front Close-Up View of Dummy Head and Shoulders in Relation to Head Restraint



Photo No. 028 - Pre-Test Front View of Seat Pan Prior to Dummy Positioning



Photo No. 029 - Pre-Test Overhead View of Dummy Thighs on Seat Pan

PHOTOGRAPH NOT AVAILABLE

Photo No. 030 - Pre-Test Left Side View of Dummy's Neck Showing Position of Adjustable Neck Bracket

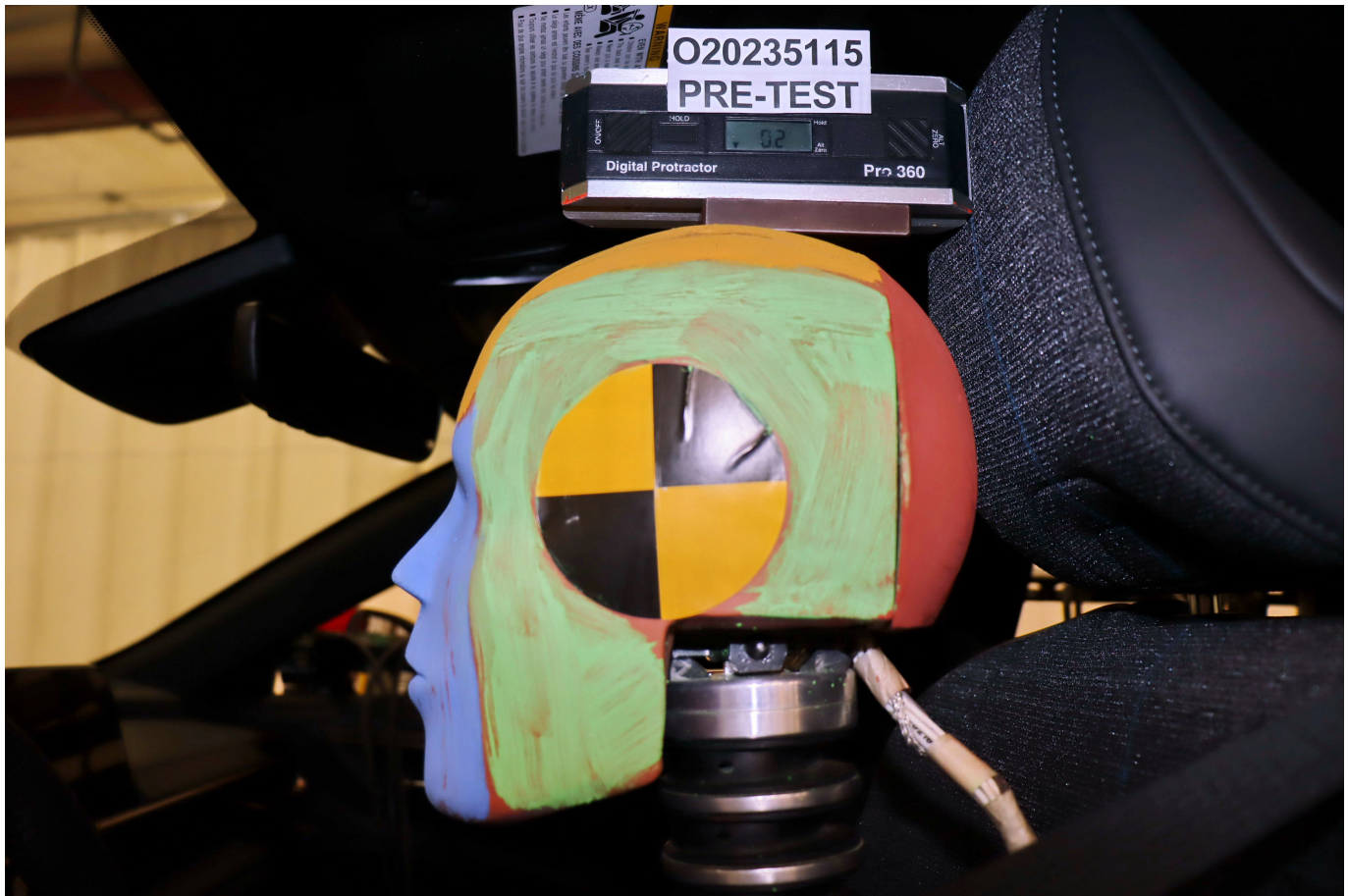


Photo No. 031 - Pre-Test Left Side View of Dummy's Head Showing Dummy's Head is Level



Photo No. 032 - Pre-Test Placement of Dummy's Feet



Photo No. 033 - Pre-Test View of Belt Anchorage for Dummy



Photo No. 034 - Pre-Test Left Side View of Steering Wheel



Photo No. 035 - Pre-Test View of Disengaged Parking Brake



Photo No. 036 - Pre-Test View of Parking Brake



Photo No. 037 - Pre-Test Close-Up Left Side View of Driver Seat Track



Photo No. 038 - Pre-Test Close-Up Left Side View of Driver Seat Back



Photo No. 039 - Pre-Test Close-Up View of Driver Seat Back or Head Restraint



Photo No. 040 - Pre-Test Dummy and Door Clearance View



Photo No. 041 - Post-Test Dummy and Door Clearance View



Photo No. 042 - Pre-Test Right Side View of Dummy and Front Seat of Occupant Compartment



Photo No. 043 - Post-Test Right Side View of Dummy and Front Seat of Occupant Compartment



Photo No. 044 - Pre-Test Inner Door Panel View



Photo No. 045 - Post-Test Inner Door Panel View Showing Dummy Contact Location



Photo No. 046 - Post-Test Dummy Close-Up Head Contact with Vehicle Interior View



Photo No. 047 - Post-Test Dummy Close-Up Head Contact with Side Air Bag View



Photo No. 048 - Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View



Photo No. 049 - Post-Test Dummy Close-Up Torso Contact with Side Air Bag View



Photo No. 050 - Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View



Photo No. 051 - Post-Test Dummy Close-Up Pelvis Contact with Side Air Bag View

PHOTOGRAPH NOT APPLICABLE

Photo No. 052 - Post-Test Dummy Close-Up Knee Contact with Vehicle Interior View



Photo No. 053 - Post-Test Right Side View of Dummy and Rear Seat of Occupant Compartment

PHOTOGRAPH NOT APPLICABLE

Photo No. 054 - Post-Test Inner Rear Passenger Torso Air Bag Deployment View



Photo No. 055 - Pre-Test View of Fuel Filler Cap or Fuel Filler Neck

PHOTOGRAPH NOT AVAILABLE

Photo No. 056 - Post-Test View of Fuel Filler Cap or Fuel Filler Neck



Photo No. 057 - Close-Up View of Vehicle's Certification Label

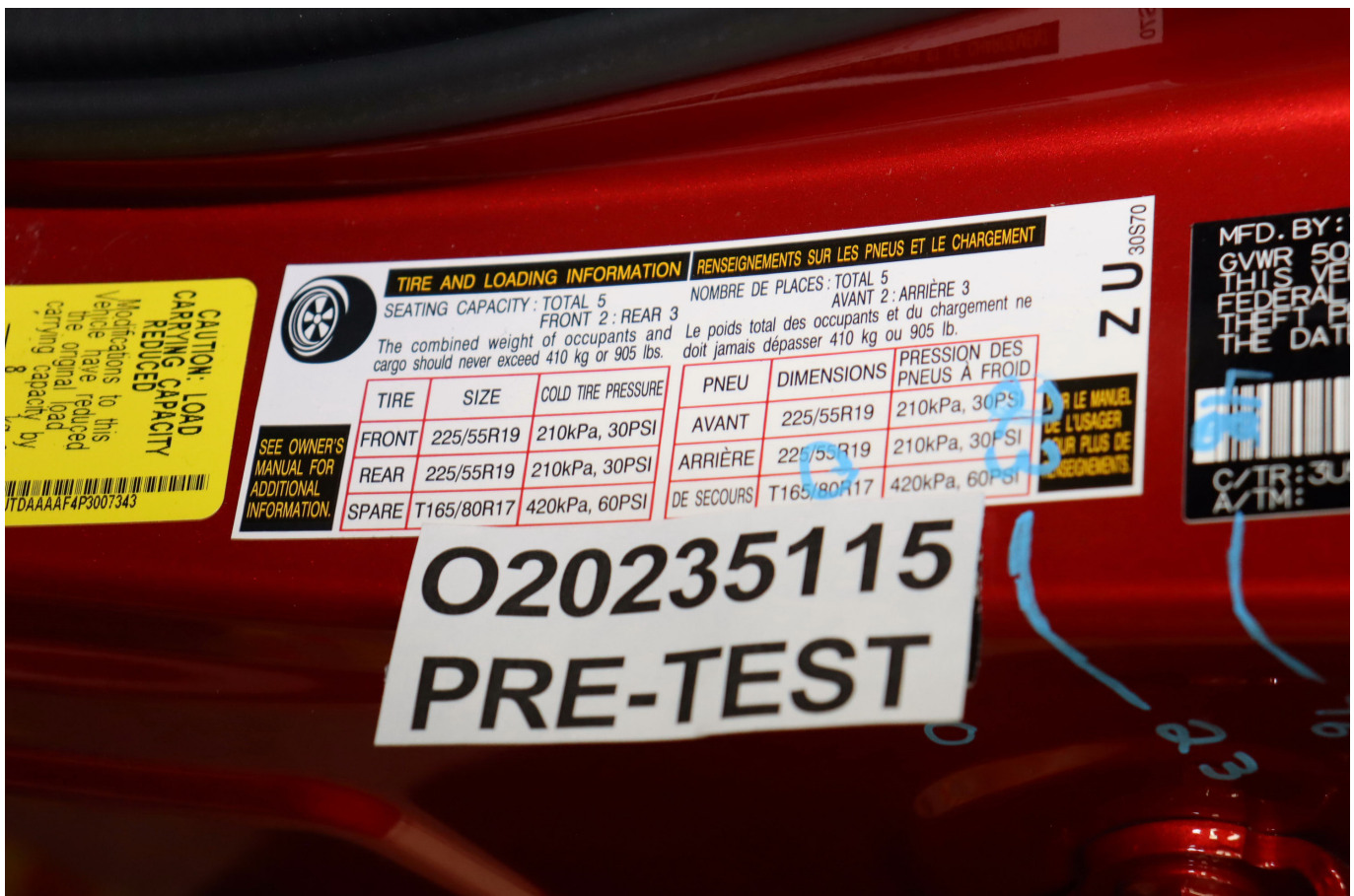


Photo No. 058 - Close-Up View of Vehicle's Tire Information Placard or Label

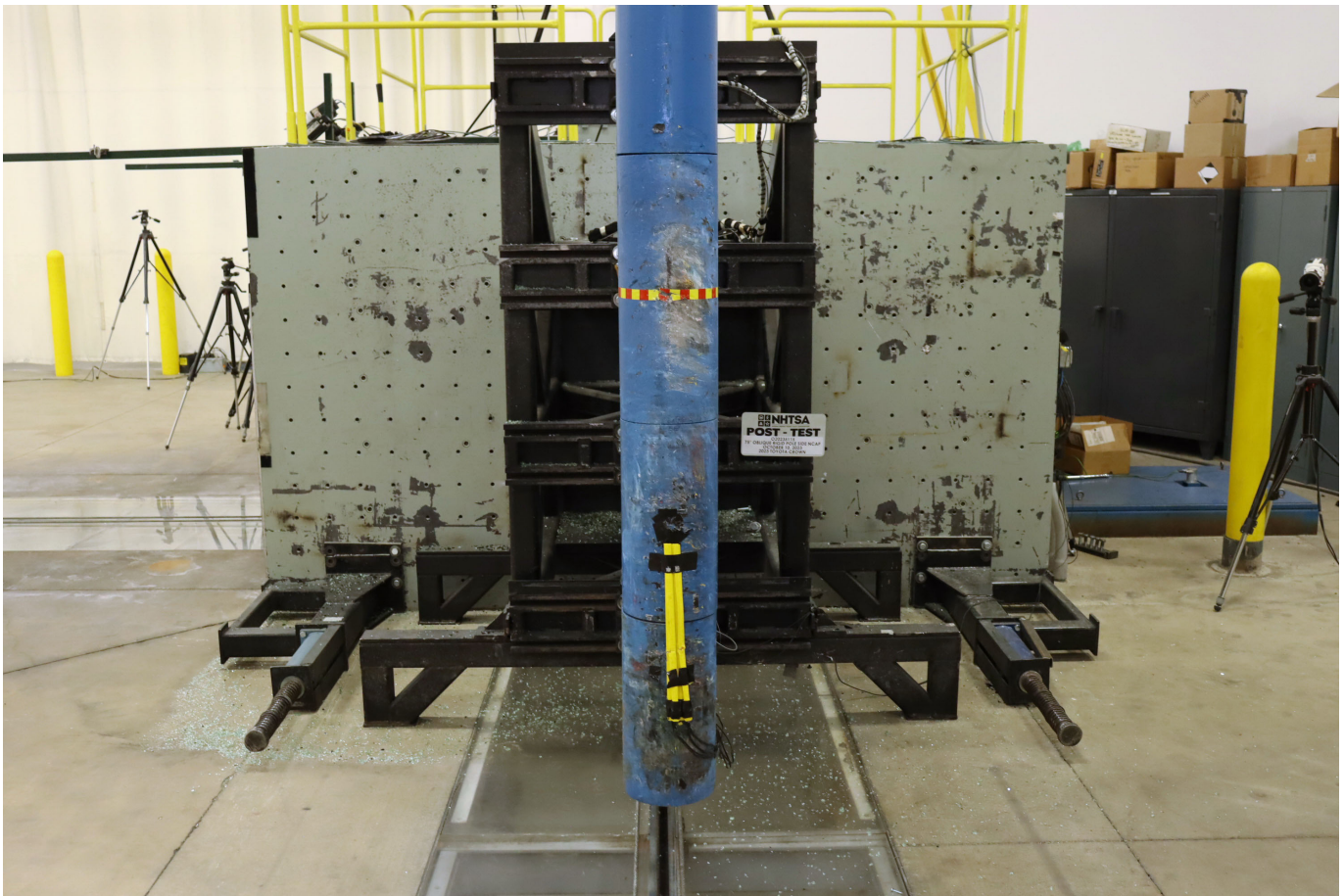


Photo No. 060 - Post-Test Pole Barrier Front View



Photo No. 061 - Pre-Test Pole Barrier Side View



Photo No. 062 - Post-Test Pole Barrier Side View

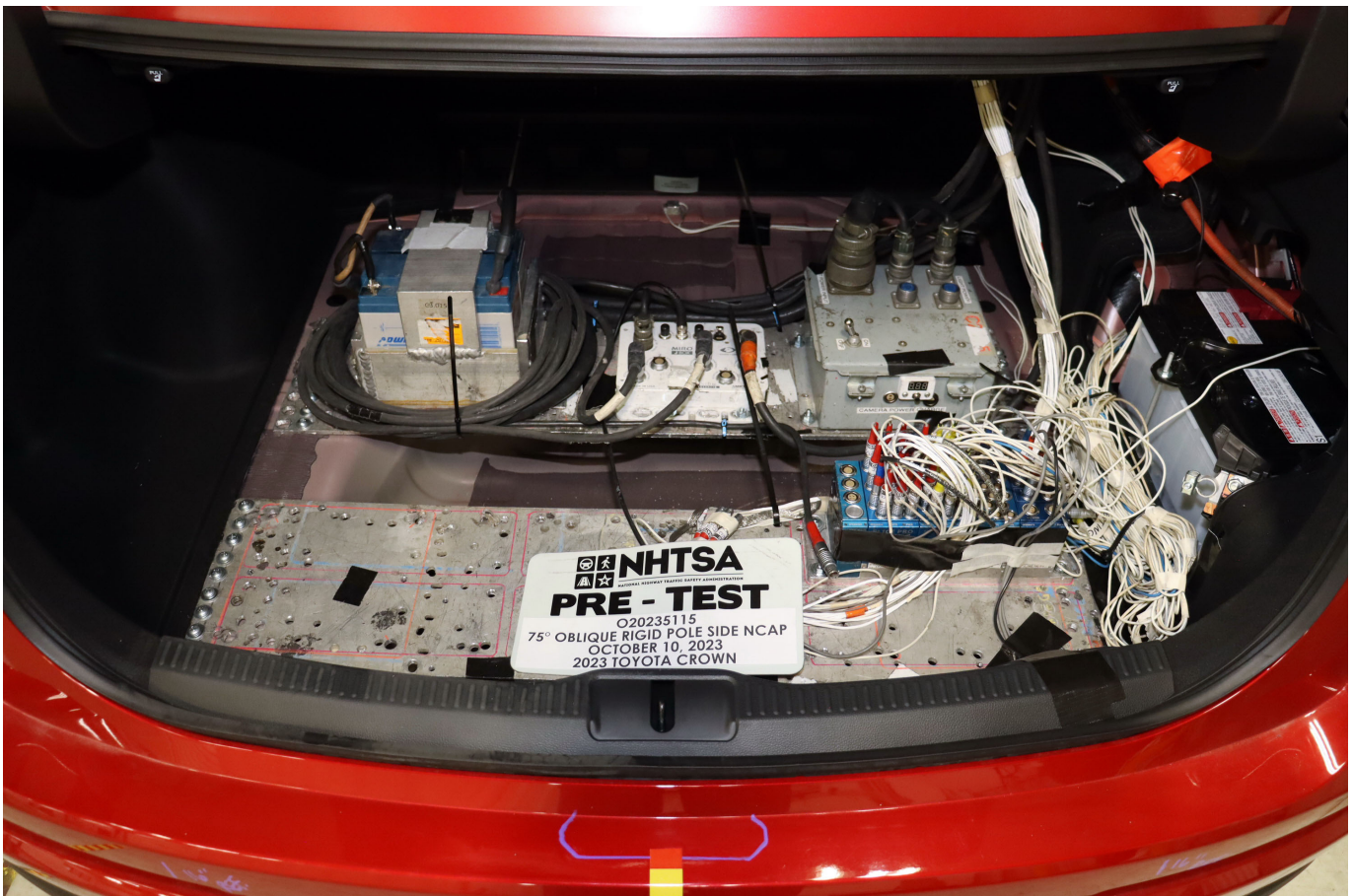


Photo No. 063 - Pre-Test Ballast View



Photo No. 064 - Post-Test Primary and Redundant Speed Trap Read-Out



Photo No. 065 - FMVSS Photo No. 301 Static Rollover 0 Degrees

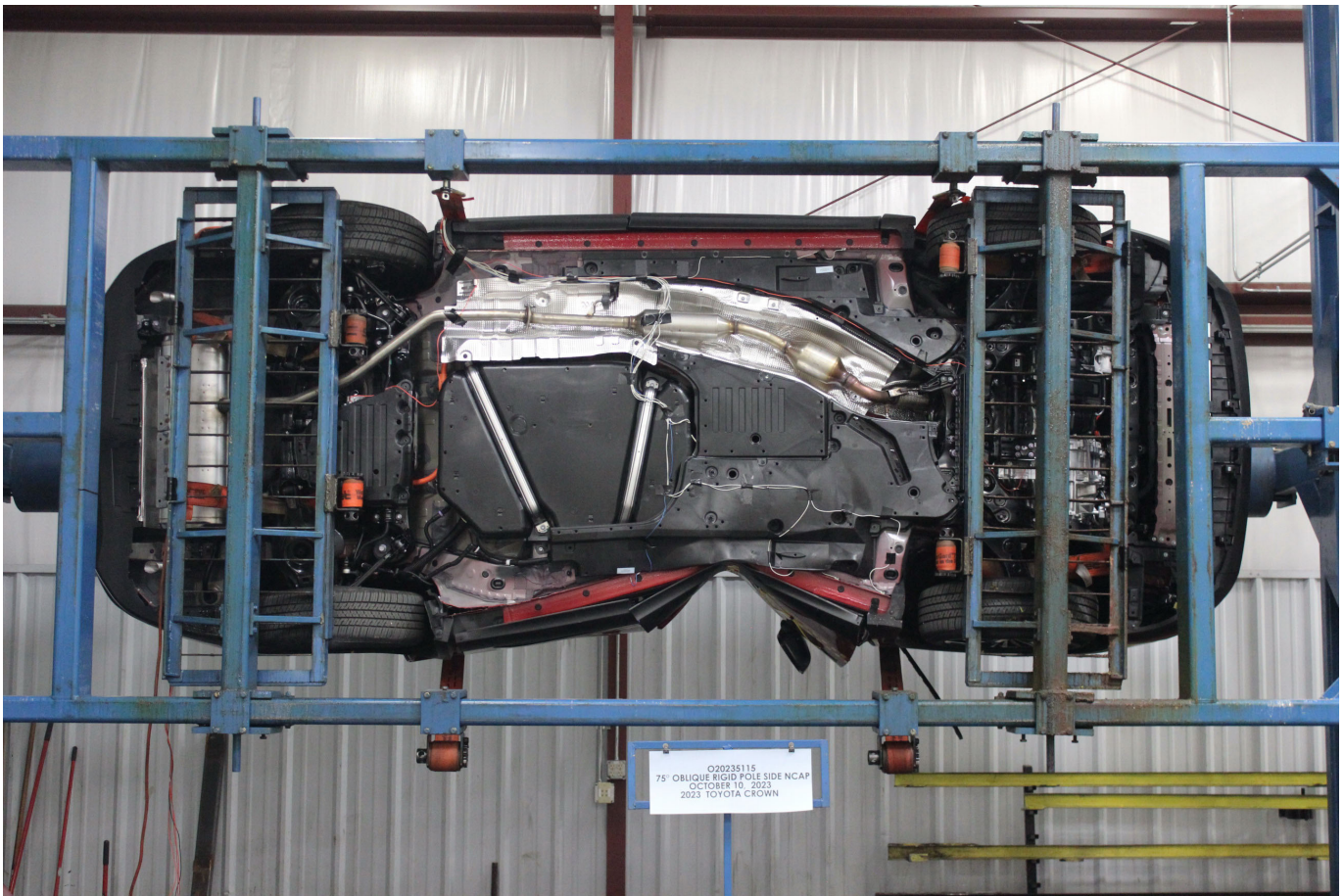


Photo No. 066 - FMVSS Photo No. 301 Static Rollover 90 Degrees



Photo No. 067 - FMVSS Photo No. 301 Static Rollover 180 Degrees



Photo No. 068 - FMVSS Photo No. 301 Static Rollover 270 Degrees



Photo No. 069 - FMVSS Photo No. 301 Static Rollover 360 Degrees



Photo No. 070 - Impact Event

TOYOTA

DESC.: **Toyota Crown XLE** Sedan
 VIN: **JTDAAAF4P3007343**
 YR/MDL: 2023/4015A
 CLR: SUPERSONIC RED/FA20 (03U5/20)
 FINAL ASSEMBLY POINT: TOYOTA, AICHI, JAPAN

STANDARD EQUIPMENT

UNLESS REPLACED BY OPTIONAL EQUIPMENT

MECHANICAL & PERFORMANCE

- 2.5L 4-Cylinder Engine
- Hybrid System w/ EV, ECO, NORMAL & SPORT Drive Modes
- 236 Combined System Net Horsepower
- Electronic Continuous Var. Tran. (ECVT)
- Electronic On-Demand All-Wheel Drive

SAFETY & CONVENIENCE

- Toyota Safety Sense 3.0: Pre-Collision Sys w/ Pedestrian Detection, Full-Speed Range Dynamic Radar Cruise Control, Lane Departure Alert w/ Steering Asst, Lane Tracing Asst, Automatic High Beams, Road Sign Asst, Proactive Driving Asst
- Backup Camera w/ Dynamic Guidelines
- Blind Spot Monitor w/ Rear Cross-Traffic Alert
- 2-Door Smart Key System w/ Push Button Start
- Connected Services Capable. 4G network dependent. See Toyota.com for details

EXTERIOR

- Bi-LED headlights & LED Daytime Running Lights (DRL) w/ Auto On/Off
- 19-in Multi-Spoke Machined Finish Two-Tone Alloy Wheels

INTERIOR

- 12.3-in. Toyota Audio Multimedia w/ 6-Speakers, Wireless Apple CarPlay and Android Auto Compatibility
- SiriusXM w/ 3-Month Platinum Plan Trial
- Fabric Seats with SofTex Trim w/ Heated and Powered Front Seats
- 12.3-in Multi-Information Display
- Auto-Dimming Rearview Mirror w/ HomeLink
- Wireless Smartphone Charging

For Full Product Details, Please Visit Toyota.com/Crown

BASE MANUFACTURER'S SUGGESTED RETAIL PRICE \$39,950.00

OPTIONAL EQUIPMENT

Code	Description	Price
FE	50 State Emissions	425.00
PC	Premium Paint Charge	309.00
ZT	All Weather Floor Liners/Cargo Tray	

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

EPA DOT Fuel Economy and Environment

Fuel Economy

41 MPG combined city/hwy
 42 city 41 highway
 2.4 gallons per 100 miles

You save \$2,500 in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost \$1,100

Fuel Economy & Greenhouse Gas Rating (tailpipe only) **Smog Rating** (tailpipe only)

1 (Best) **8** (Worst) **10** (Best) **7** (Worst) **10** (Best)

This vehicle emits 214 grams CO₂ per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions, learn more at fuelconomy.gov.

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 28 MPG and costs \$8,000 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$2.95 per gallon. MPG is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fuelconomy.gov
 Calculate personalized estimates and compare vehicles

Smartphone QR Code

MANUFACTURER'S SUGGESTED RETAIL PRICE \$40,684.00

DELIVERY, PROCESSING AND HANDLING FEE 1,095.00

TOTAL \$41,779.00

Delivered by Truck to: TOYOTA OF BROOKFIELD 48065
 20655 WEST CAPITOL DR
 BROOKFIELD WI53045

*Manufacturer's suggested retail price excludes delivery processing and handling fees, license and title fees, applicable federal, state and local taxes, and dealer and distributor options and accessories.

TML1E2N1S0F0W0

Photo No. 071 - Monroney Label

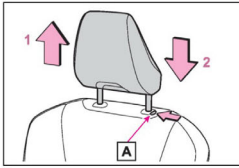
Head restraints

Head restraints are provided for all seats.

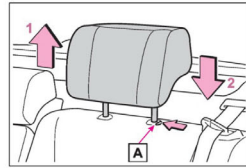
WARNING**Head restraint precautions**

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.

Vertical adjustment**Front seat**

- 1 Up**
Pull the head restraints up.
- 2 Down**
Push the head restraint down while pressing the lock release button **A**.

Rear seat

- 1 Up**
Pull the head restraints up.
- 2 Down**
Push the head restraint down while pressing the lock release button **A**.

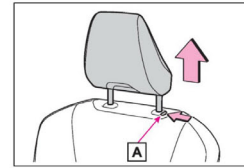
Adjusting the height of the head restraints

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

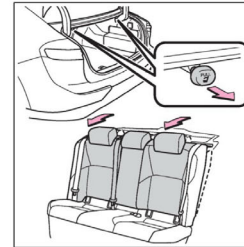
**Removing the head restraints****Front seat**

- Pull the head restraint up while pressing the lock release button **A**.
- If the head restraint touches the ceiling, making the removal difficult, change the seat height or

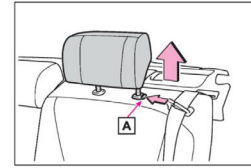
angle. (→P.132)

**Rear seat**

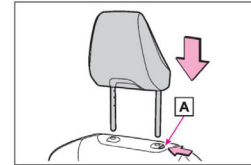
- 1** Pull the seatback lever in the trunk and fold down the seatback until it reaches the position where the head restraints can be removed.



- 2** Pull the head restraint up while pressing the lock release button **A**.

**Installing the head restraints****Front seat**

Align the head restraint with the installation holes and push it down to the lock position. Press and hold the lock release button **A** when lowering the head restraint.

**Rear seat**

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

Photo No. 072 - Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

PHOTOGRAPH NOT AVAILABLE

Photo No. 073 - Post-Test View of Shattered Vehicle Inner Door Panel

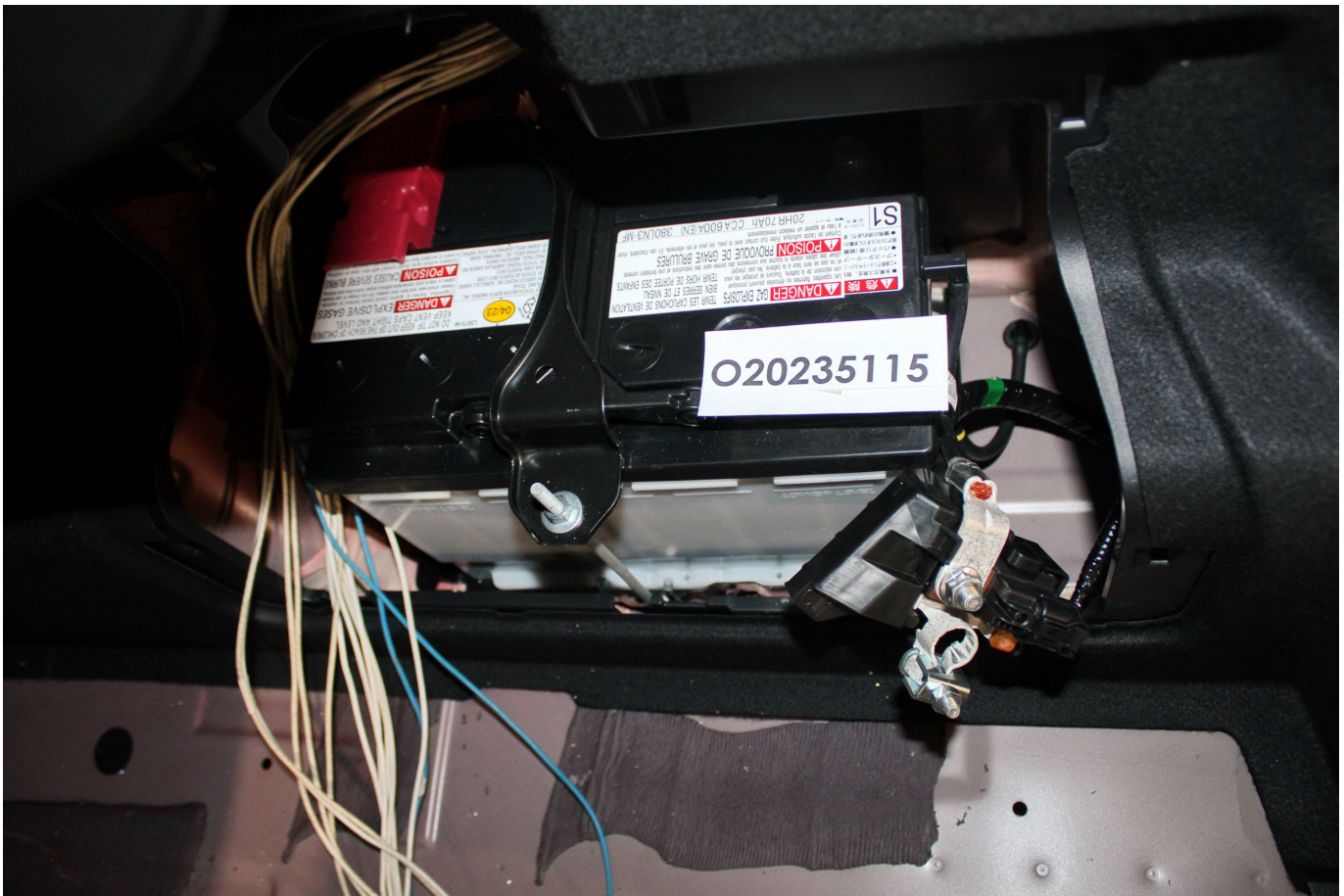


Photo No. 305-01 - Auxiliary Power Module Warning Label

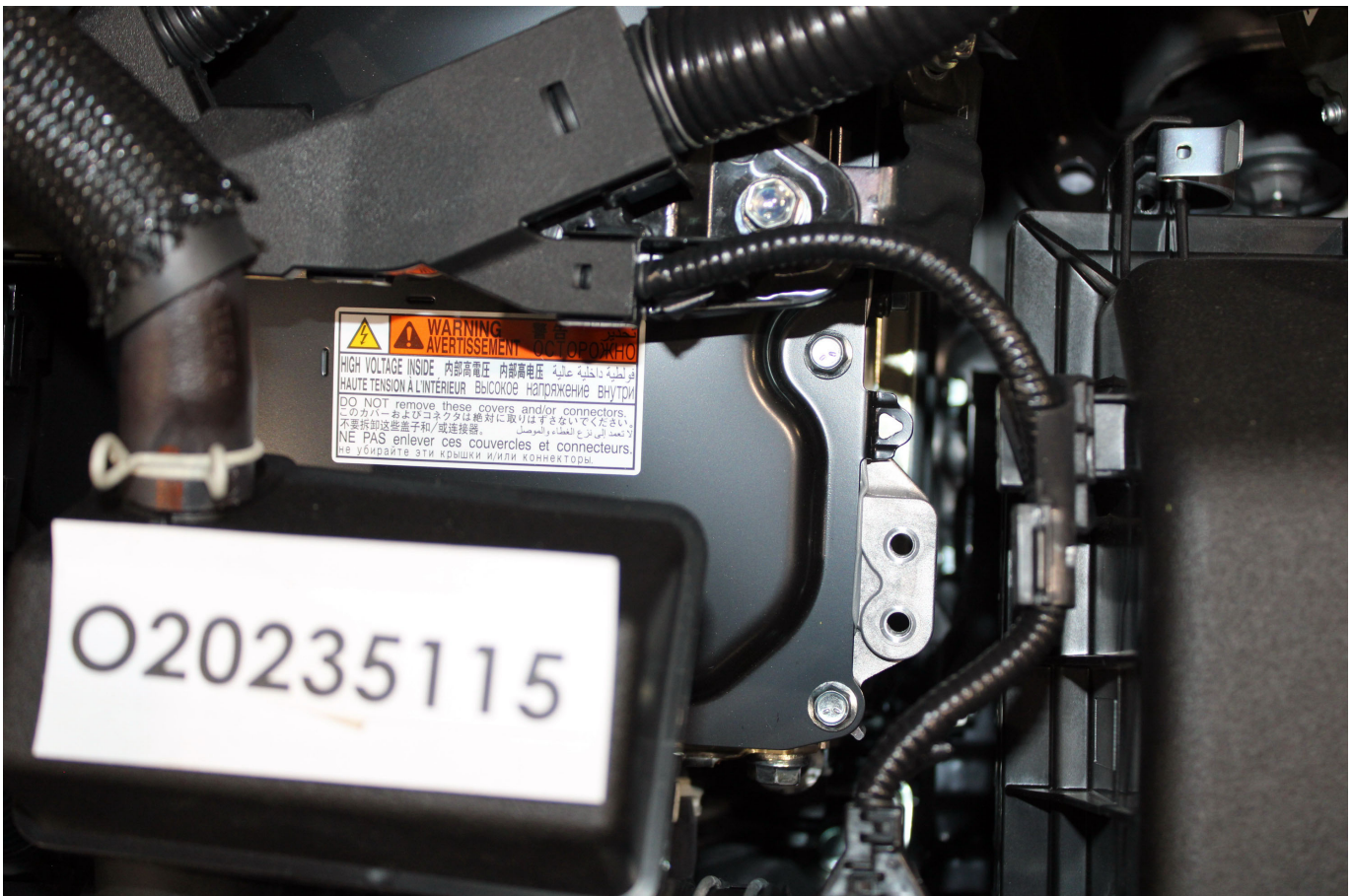


Photo No. 305-02 - Power Inverter Warning Label



Photo No. 305-03 - First Responder Warning Label



Photo No. 305-04 - First Responder Warning Location



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



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



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

PHOTOGRAPH NOT AVAILABLE

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

PHOTOGRAPH NOT AVAILABLE

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)

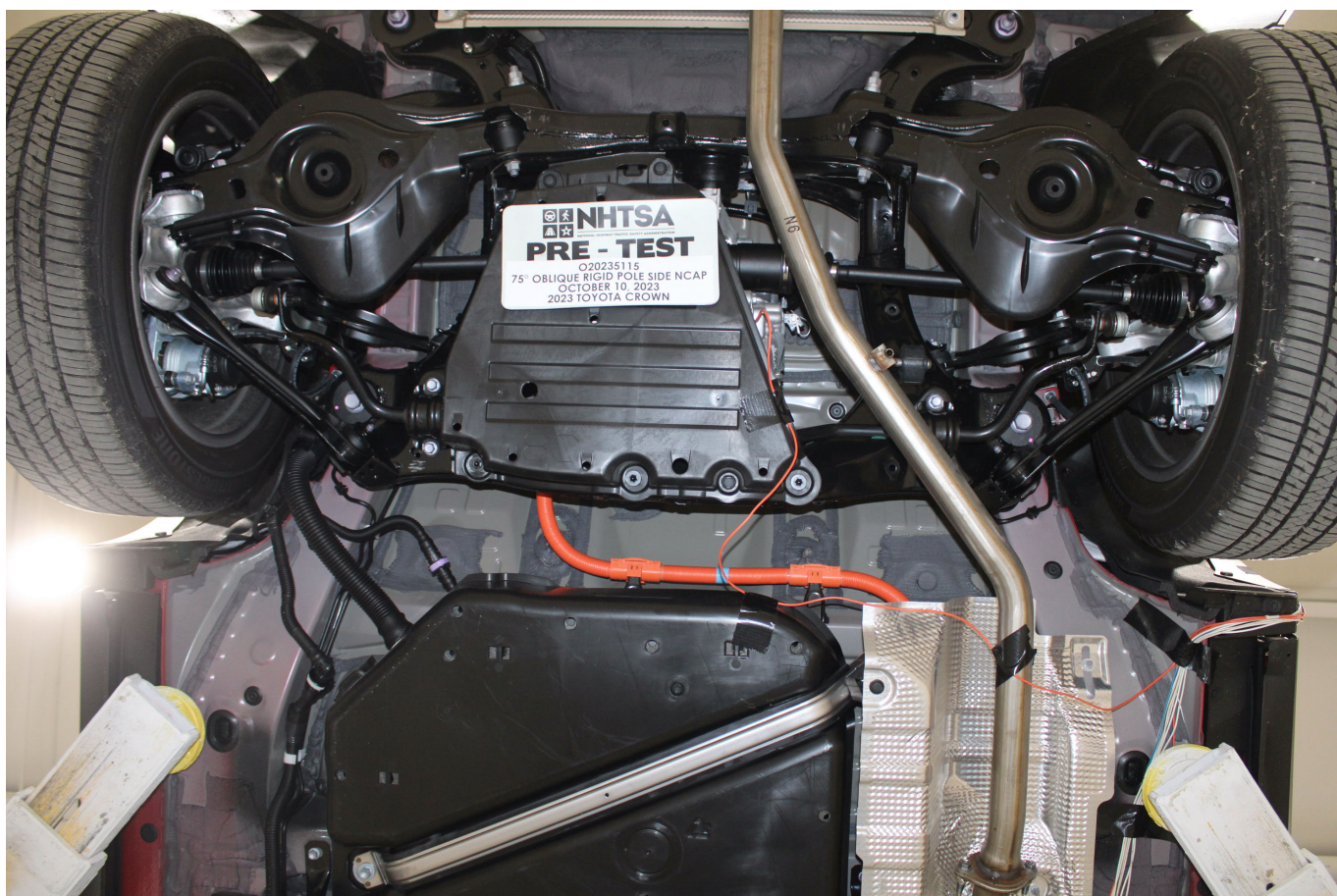


Photo No. 305-16 - Pre-Impact View of Electric Propulsion Drive

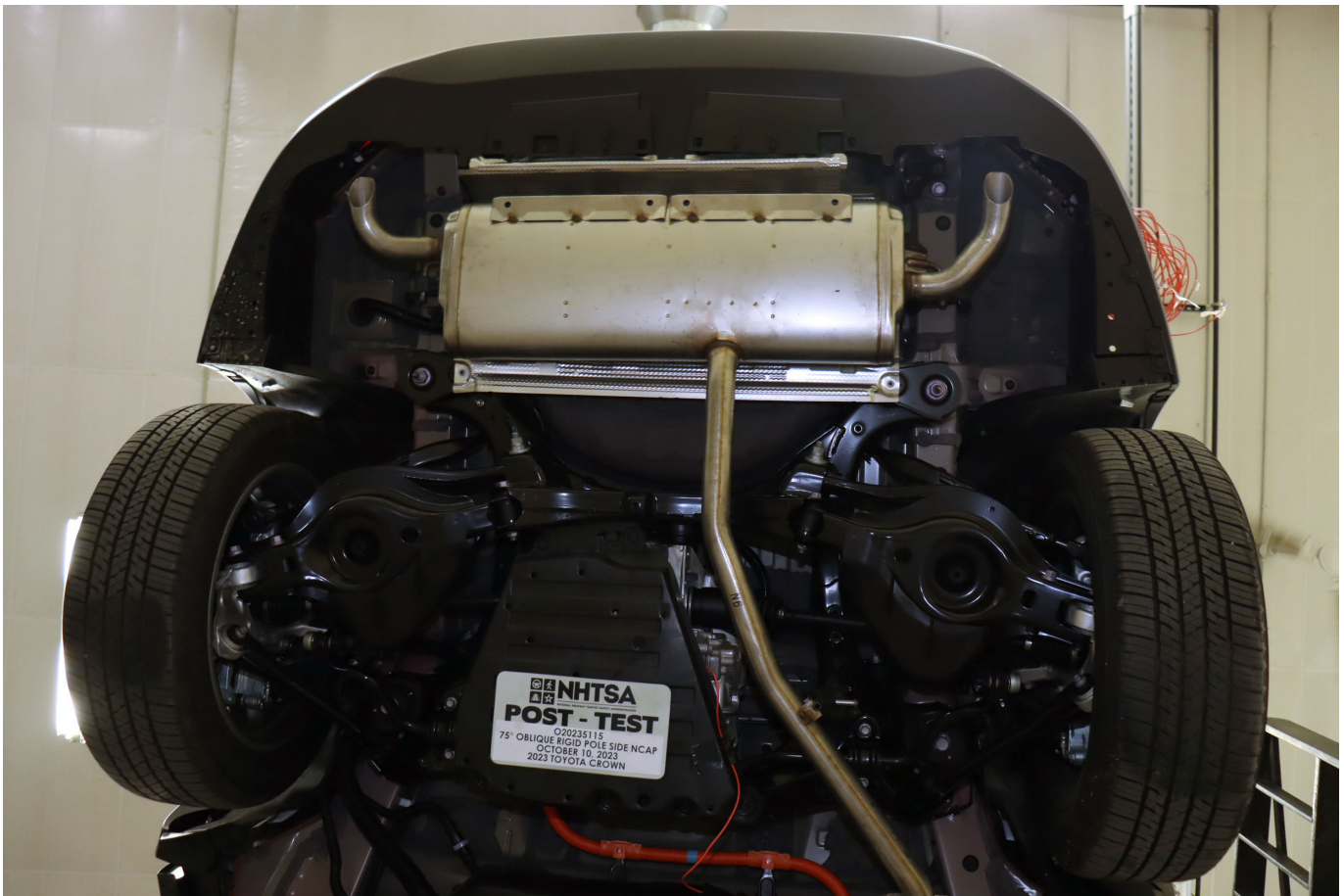


Photo No. 305-17 - Post-Impact View of Electric Propulsion Drive

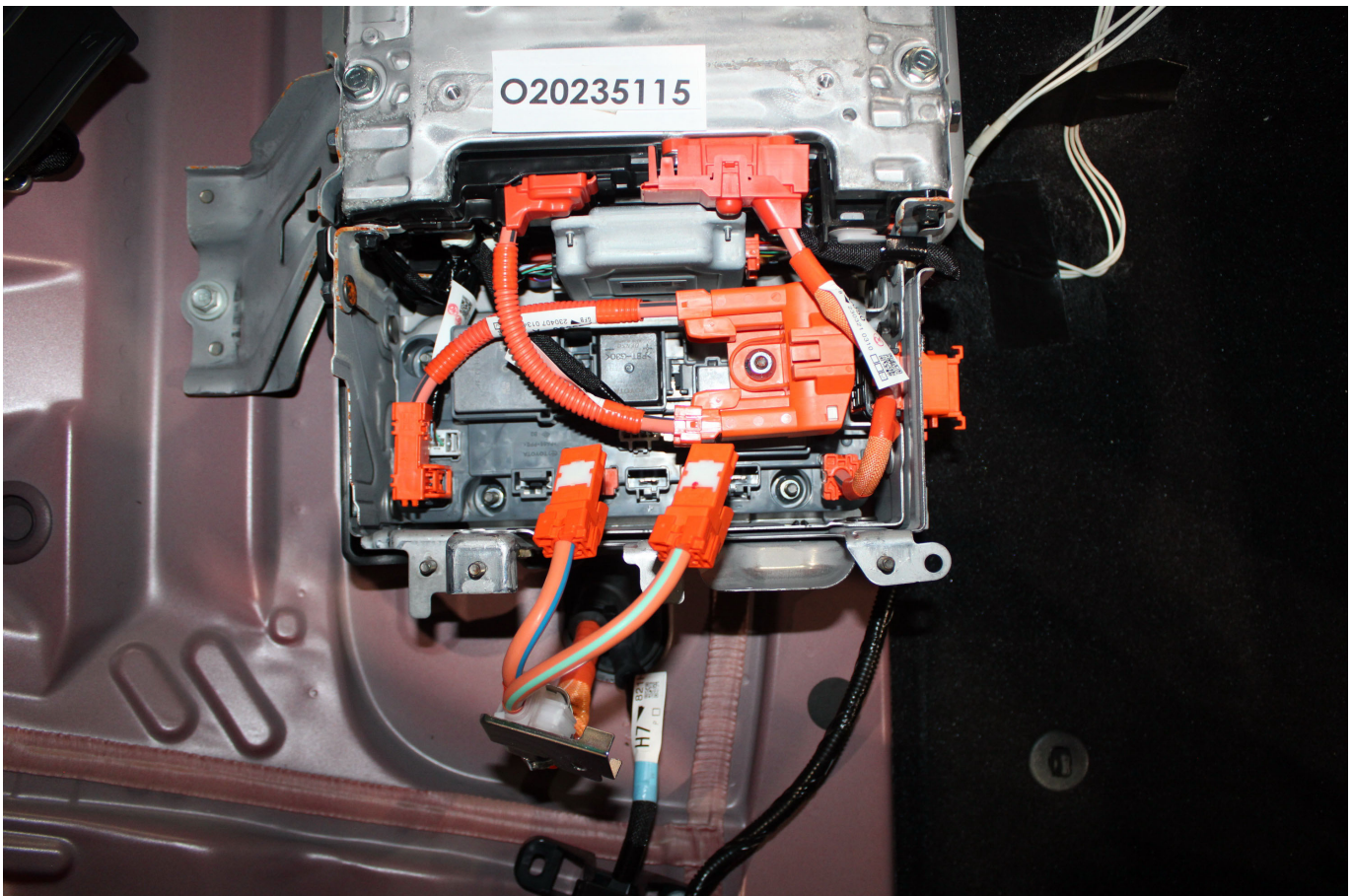


Photo No. 305-18 - Pre-Impact View of High Voltage Interconnect(s)

PHOTOGRAPH NOT APPLICABLE

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

PHOTOGRAPH NOT APPLICABLE

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



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

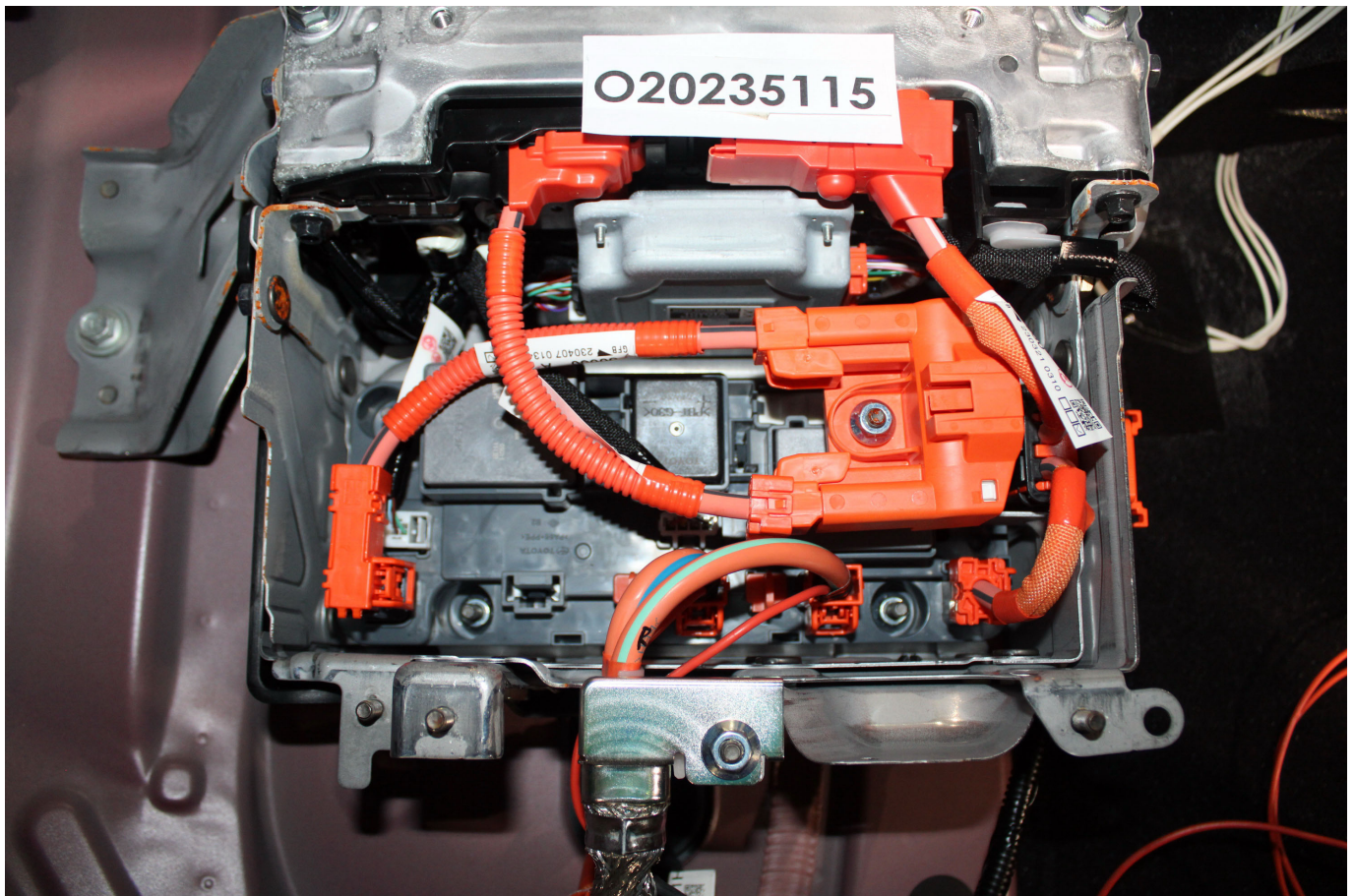


Photo No. 305-22 - Pre-Impact View of High Voltage Leads Attached

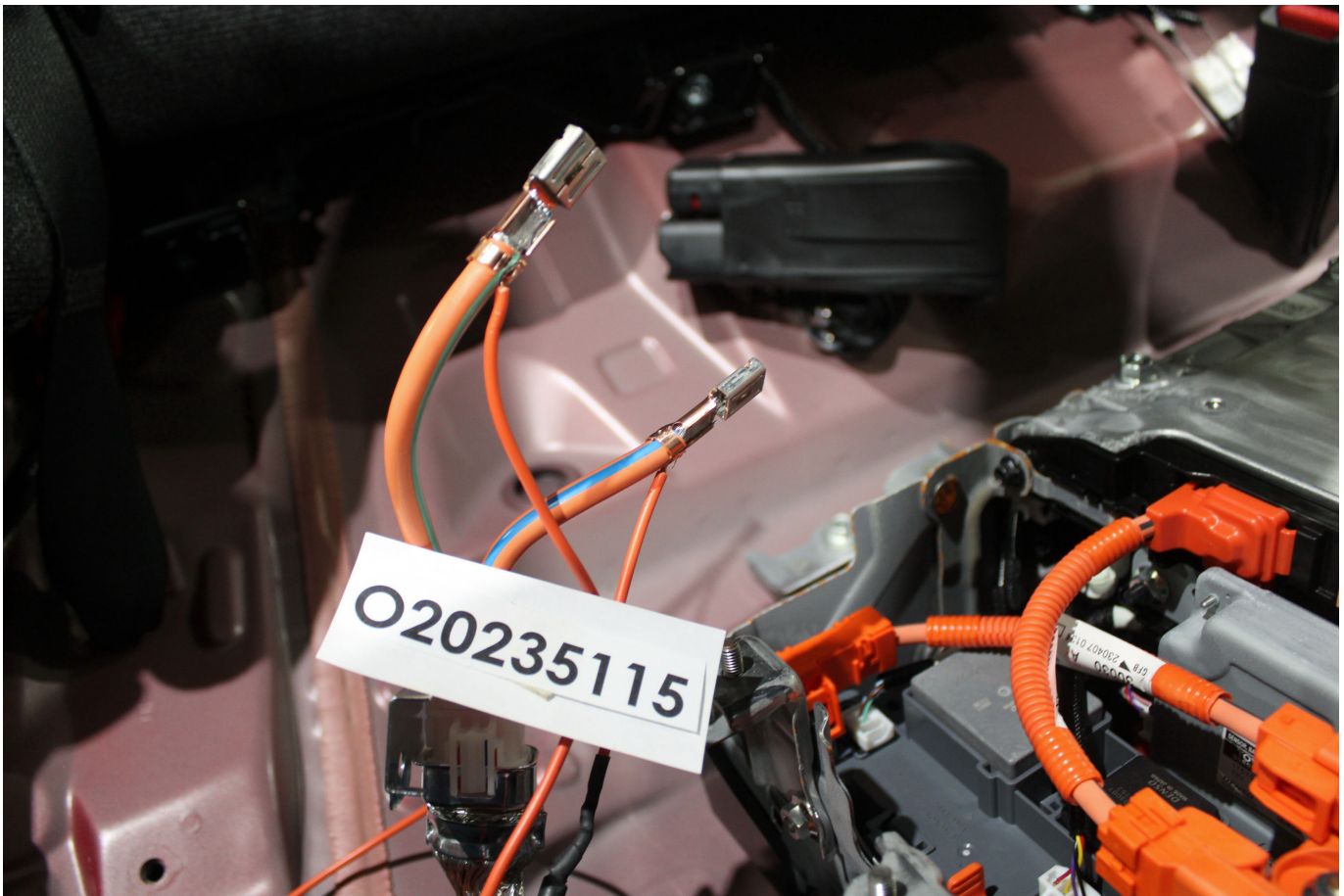


Photo No. 305-23 - Pre-Impact Close-Up View of High Voltage Leads Attached



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

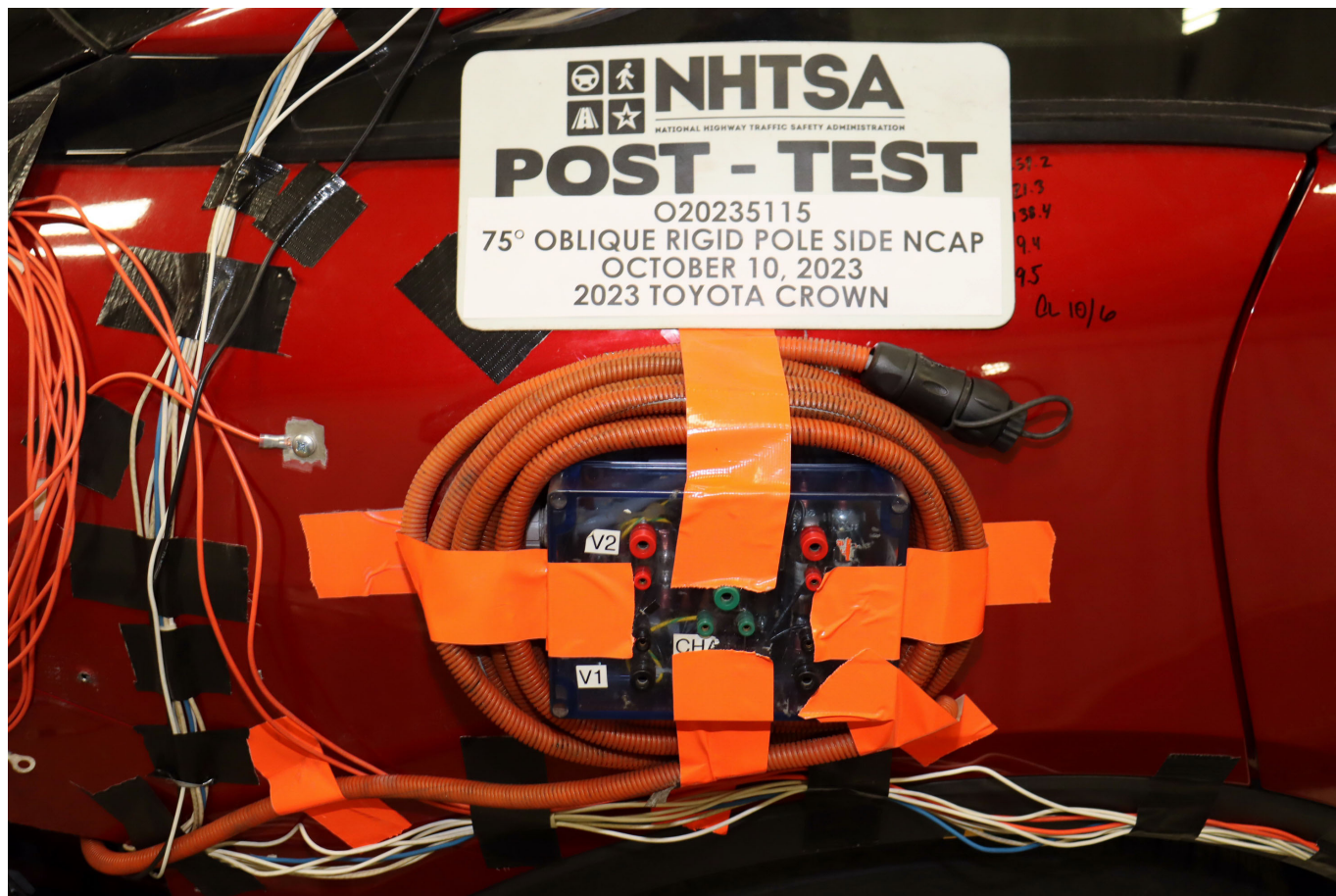


Photo No. 305-25 - Post-Impact View of Installed Test Interface Port

PHOTOGRAPH NOT AVAILABLE

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

PHOTOGRAPH NOT AVAILABLE

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

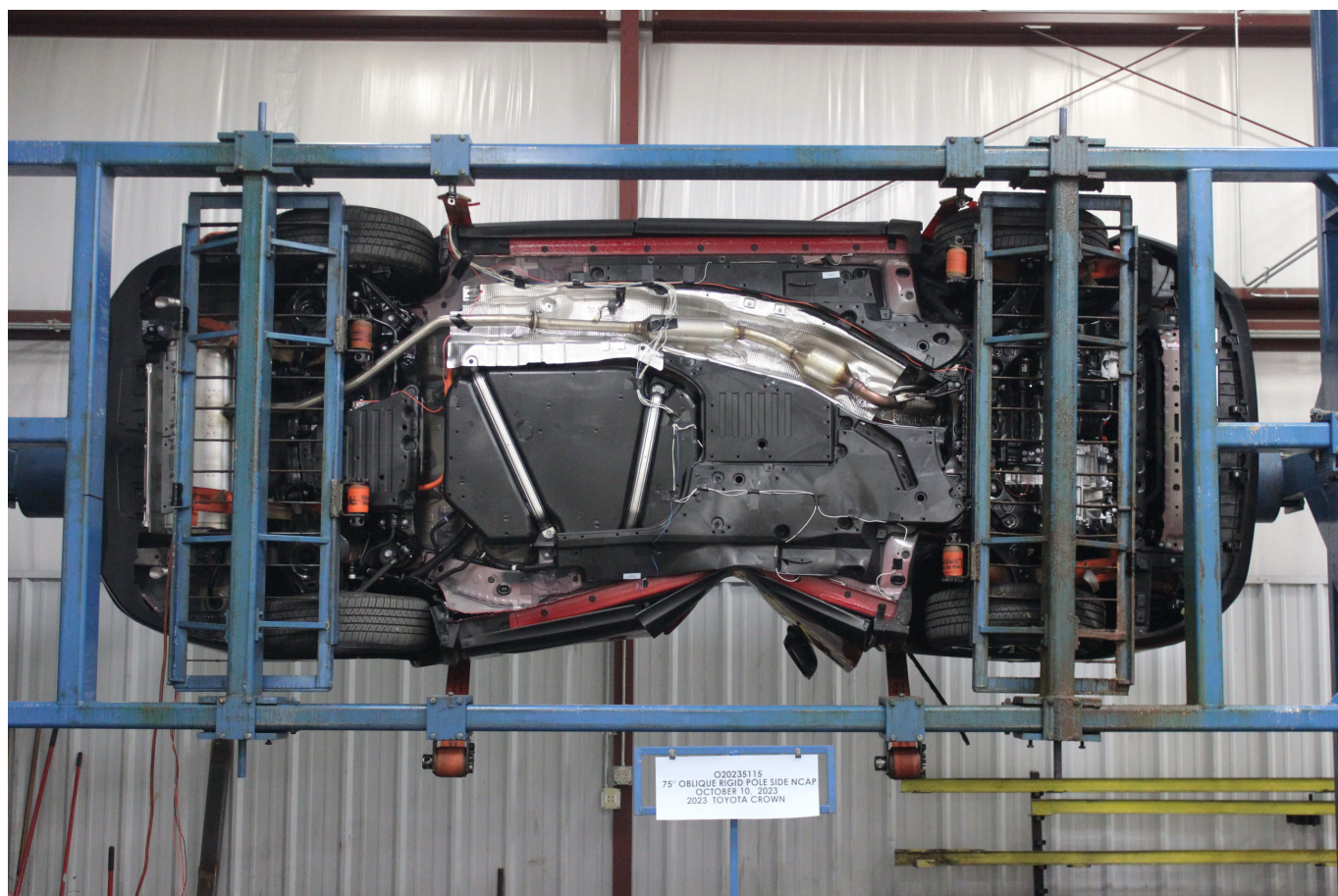


Photo No. 305-28 - FMVSS No. 305 Static Rollover at 90 Degrees



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



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



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



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



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

PHOTOGRAPH NOT APPLICABLE

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

PHOTOGRAPH NOT APPLICABLE

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

PHOTOGRAPH NOT APPLICABLE

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

PHOTOGRAPH NOT APPLICABLE

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

PHOTOGRAPH NOT APPLICABLE

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

APPENDIX B
DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS
Driver Dummy Instrumentation Plots

		<u>Page No.</u>
Figure No. 1.	Driver Head CG Acceleration (X) vs. Time	B-1
Figure No. 2.	Driver Head CG Acceleration (Y) vs. Time	B-1
Figure No. 3.	Driver Head CG Acceleration (Z) vs. Time	B-1
Figure No. 4.	Driver Head CG Resultant Acceleration (X) vs. Time	B-1
Figure No. 5.	Driver Lower Spine T12 Acceleration (X) vs. Time	B-2
Figure No. 6.	Driver Lower Spine T12 Acceleration (Y) vs. Time	B-2
Figure No. 7.	Driver Lower Spine T12 Acceleration (Z) vs. Time	B-2
Figure No. 8.	Driver Lower Spine T12 Resultant Acceleration vs. Time	B-2
Figure No. 9.	Driver Iliac Wing Force on Impact Side (Y) vs. Time	B-3
Figure No. 10.	Driver Acetabulum Force on Impact Side (Y) vs. Time	B-3
Figure No. 11.	Driver Total Pelvis Force on Impact Side (Y) vs. Time	B-3

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 Dummy Instrumentation Data

Driver Head CG Redundant Acceleration (X) vs. Time
Driver Head CG Redundant Acceleration (Y) vs. Time
Driver Head CG Redundant Acceleration (Z) vs. Time
Driver Head Angular Velocity X (Deg/Sec) vs. Time
Driver Head Angular Velocity Y (Deg/Sec) vs. Time
Driver Head Angular Velocity Z (Deg/Sec) vs. Time
Driver Upper Thorax Rib Deflection (Y)
Driver Middle Thorax Rib Deflection (Y)
Driver Lower Thorax Rib Deflection (Y)
Driver Upper Abdomen Rib Deflection (Y)
Driver Lower Abdomen Rib Deflection (Y)

Vehicle Instrumentation Data

Vehicle Center of Gravity Acceleration (X)

Vehicle Center of Gravity Acceleration (Y)

Vehicle Center of Gravity Acceleration (Z)

Left Floor Sill Acceleration (Y)

Left A-Pillar Sill Acceleration (Y)

Left Lower A-Pillar Acceleration (Y)

Left Mid A-Pillar Acceleration (Y)

Left B-Pillar Sill Acceleration (Y)

Left Lower B-Pillar Acceleration (Y)

Left Mid B-Pillar Acceleration (Y)

Driver Seat Track at Dummy Hip Point Acceleration (Y)

Engine Top Acceleration (X)

Engine Top Acceleration (Y)

Firewall Center Acceleration (Y)

Right Roof at Vertical Impact Reference Line Acceleration (Y)

Right Sill at Vertical Impact Reference Line Acceleration (Y)

Rear Floorpan Behind Rear Axle at Centerline Acceleration (X)

Rear Floorpan Behind Rear Axle at Centerline Acceleration (Y)

Pole Instrumentation Data

Load Cell Pole Barrier #1 Force (Y)

Load Cell Pole Barrier #2 Force (Y)

Load Cell Pole Barrier #3 Force (Y)

Load Cell Pole Barrier #4 Force (Y)

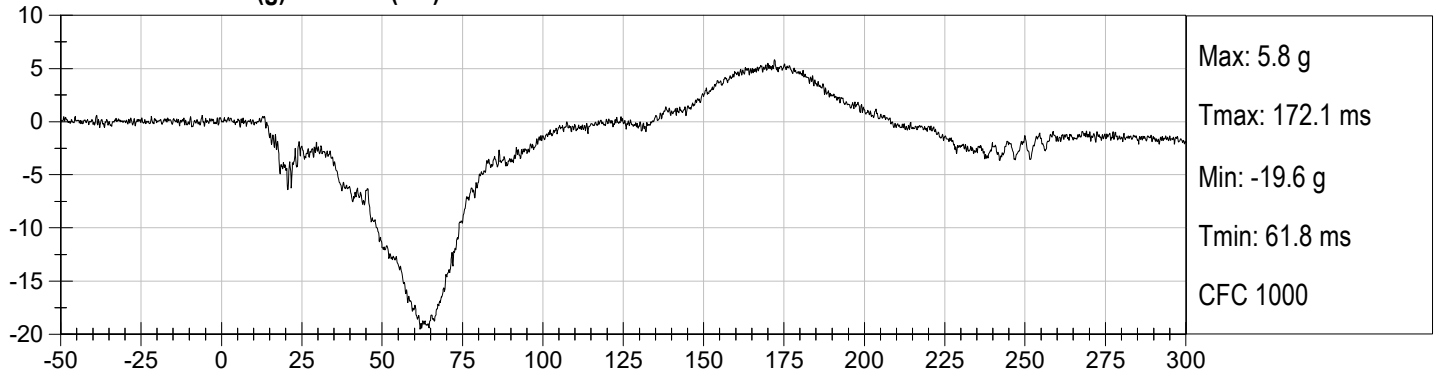
Load Cell Pole Barrier #5 Force (Y)

Load Cell Pole Barrier #6 Force (Y)

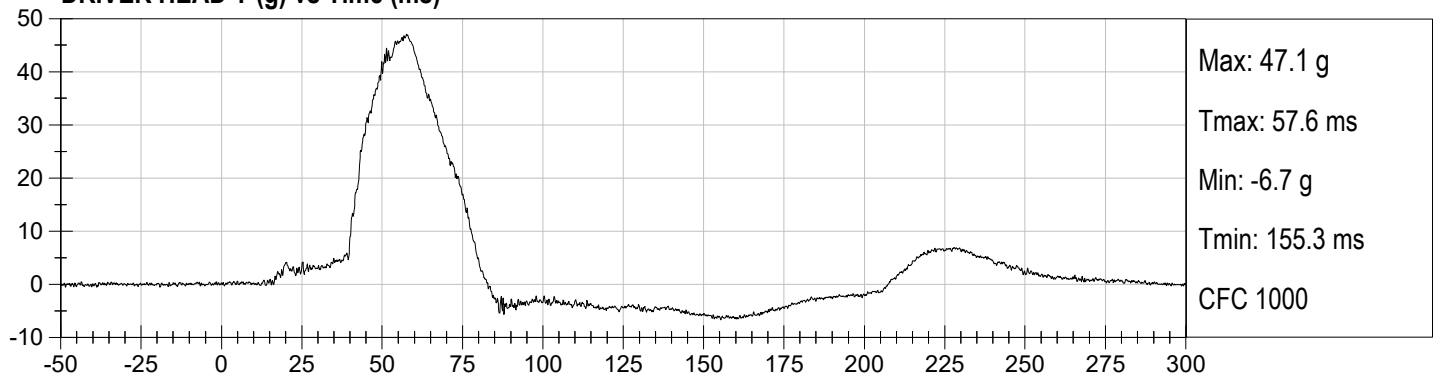
Load Cell Pole Barrier #7 Force (Y)

Load Cell Pole Barrier #8 Force (Y)

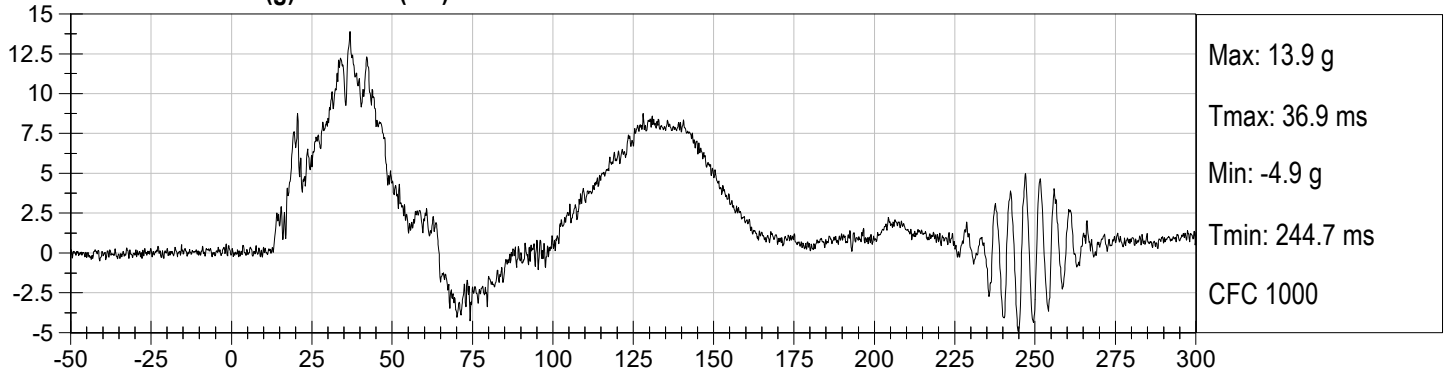
DRIVER HEAD X (g) vs Time (ms)



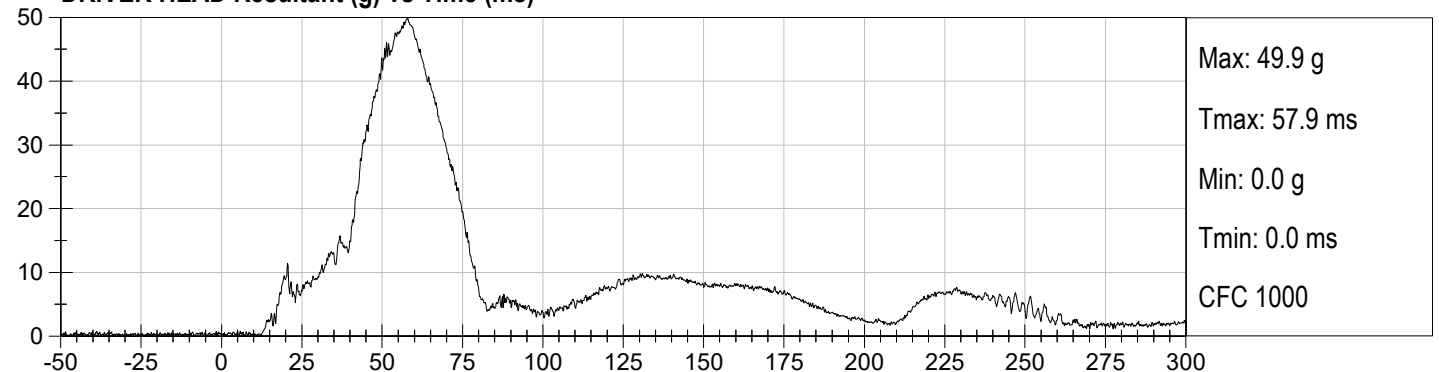
DRIVER HEAD Y (g) vs Time (ms)



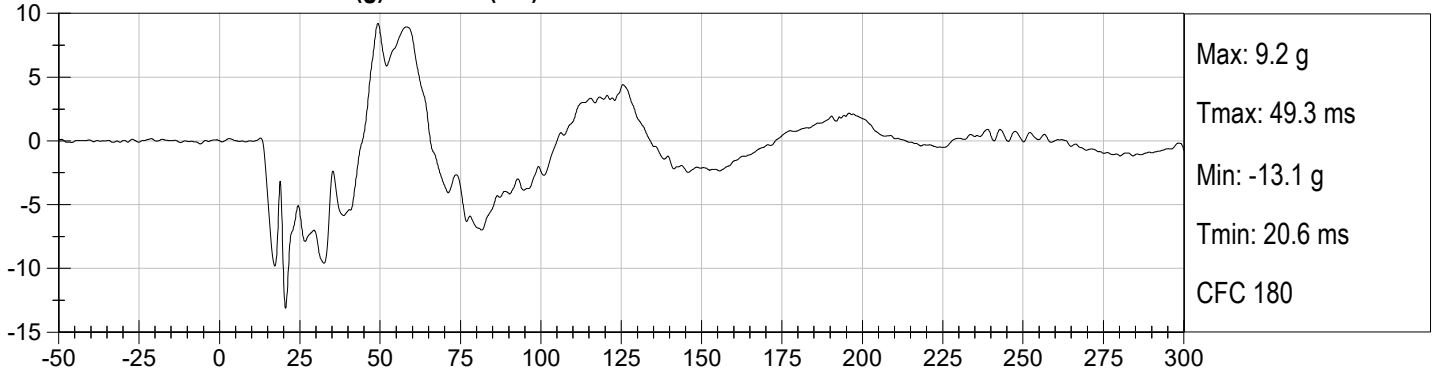
DRIVER HEAD Z (g) vs Time (ms)



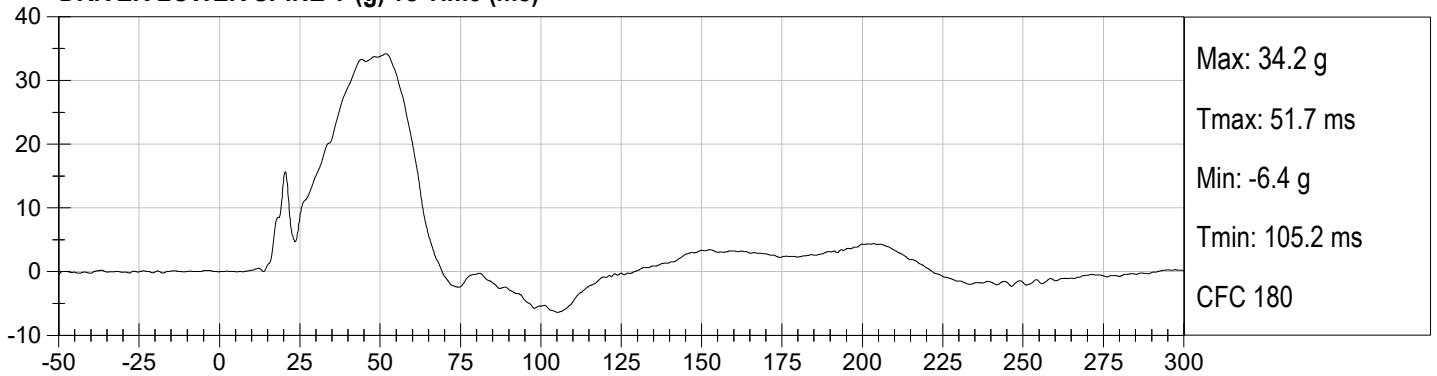
DRIVER HEAD Resultant (g) vs Time (ms)



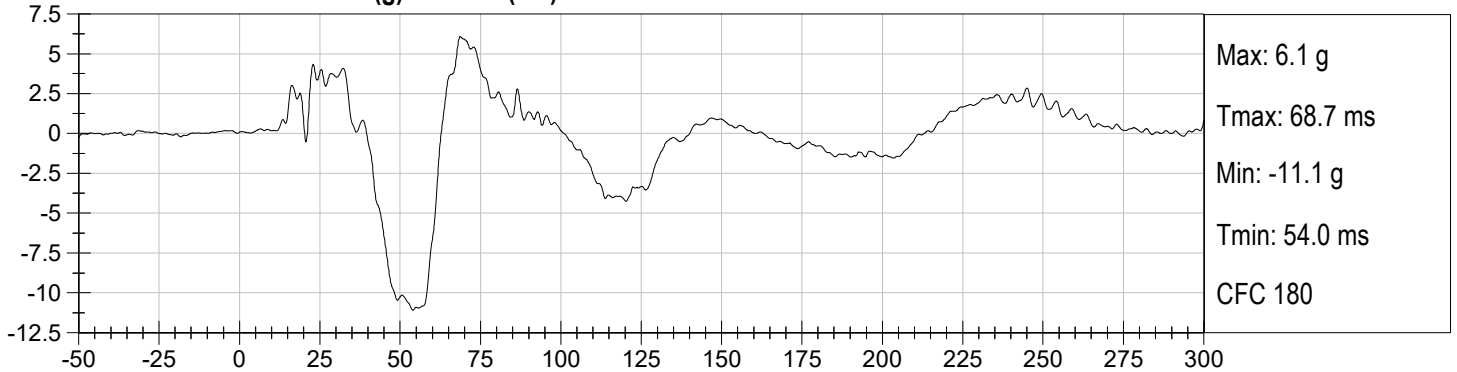
DRIVER LOWER SPINE X (g) vs Time (ms)



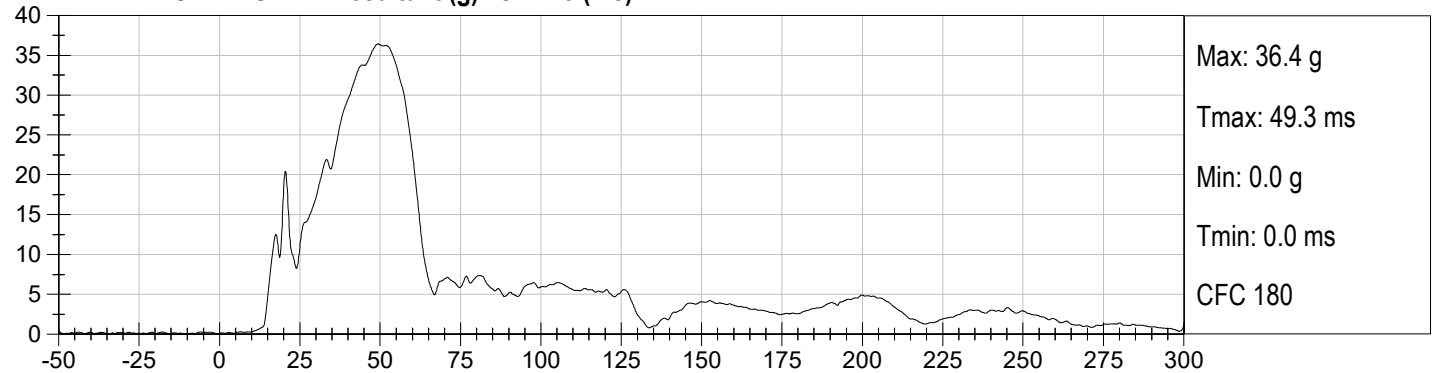
DRIVER LOWER SPINE Y (g) vs Time (ms)



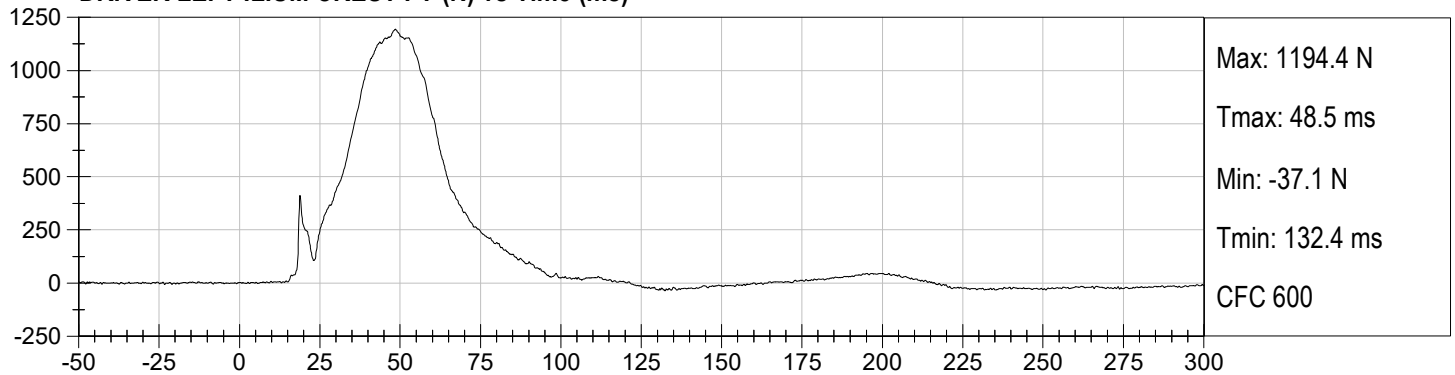
DRIVER LOWER SPINE Z (g) vs Time (ms)



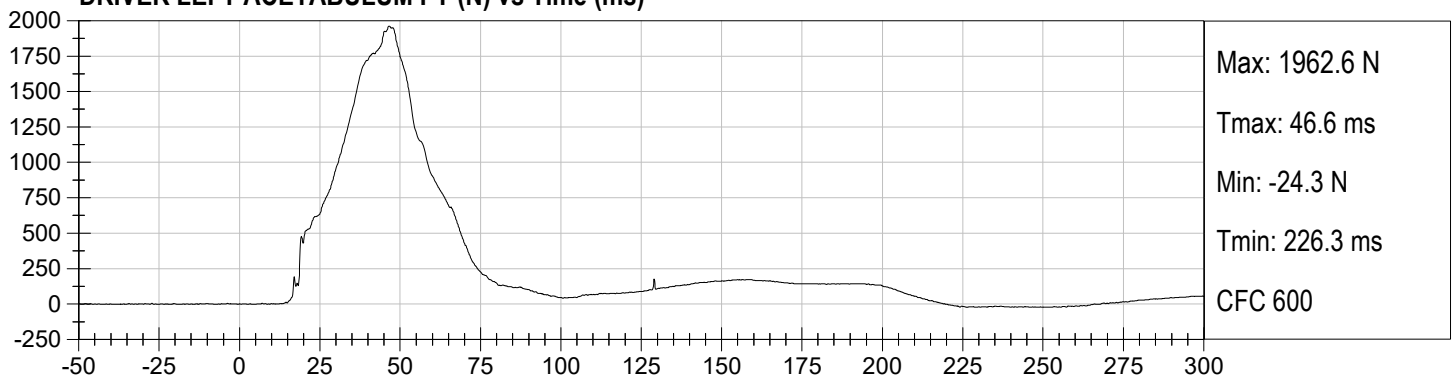
DRIVER LOWER SPINE Resultant (g) vs Time (ms)



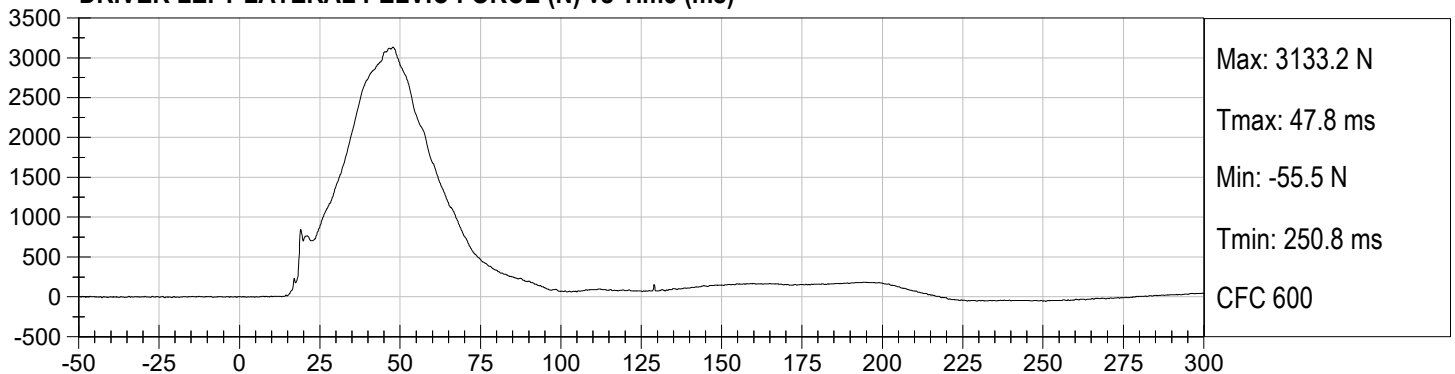
DRIVER LEFT ILIUM CREST FY (N) vs Time (ms)



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



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



APPENDIX C
DUMMY QUALIFICATION AND PERFORMANCE VERIFICATION

QUALIFICATION TEST RESULTS

PRE-TEST

SID-IIS 5TH PERCENTILE FEMALE - DRIVER ATD

SID-IIsD External Measurements
SN: 296

No.	Name	Spec. (mm)	Result	Pass/Fail
A	Sitting Height	772 - 788	784	Pass
B	Shoulder Pivot Height	437 - 453	442	Pass
C	H-point Height	79 - 89	83	Pass
D	H-point from Seatback	141 - 151	145	Pass
E	Shoulder Pivot from Backline	97 - 107	99	Pass
F	Thigh Clearance	119 -135	121	Pass
G	Head Breadth	140 - 148	142	Pass
H	Head Back from Backline	40 - 46	45	Pass
I	Head Depth	178 - 188	180	Pass
J	Head Circumference	541 - 551	548	Pass
K	Buttock to Knee Length	514 - 540	535	Pass
L	Popliteal Height	343 - 369	358	Pass
M	Knee Pivot to Floor Height	392 - 409	404	Pass
N	Buttock Popliteal Length	416 - 442	435	Pass
O	Chest Depth w/o Jacket	195 - 211	206	Pass
P	Foot Length	216 - 232	219	Pass
Q	Hip Breadth (w/ pelvic plugs)	313 - 323	316	Pass
R	Arm Length	249 - 259	250	Pass
S	Knee Joint to Seatback	477 - 493	481	Pass
V	Shoulder Width	341 - 357	346	Pass
W	Foot Width	78 - 94	85	Pass
Y	Chest Circumference w/ jacket	851 - 881	870	Pass
Z	Waist Circumference	761 - 791	772	Pass

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

ATD Serial No: 296

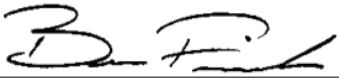
Test ID: D232671

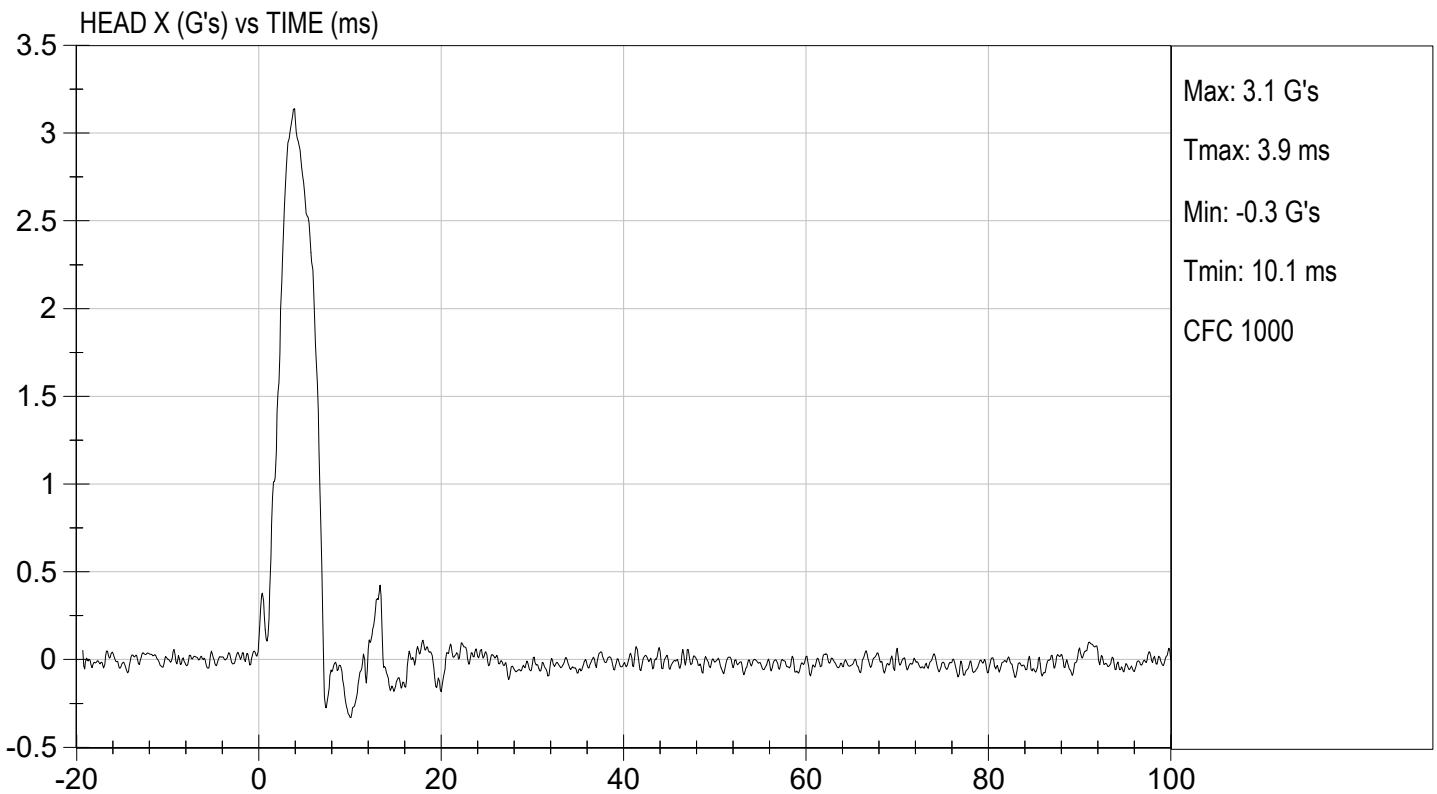
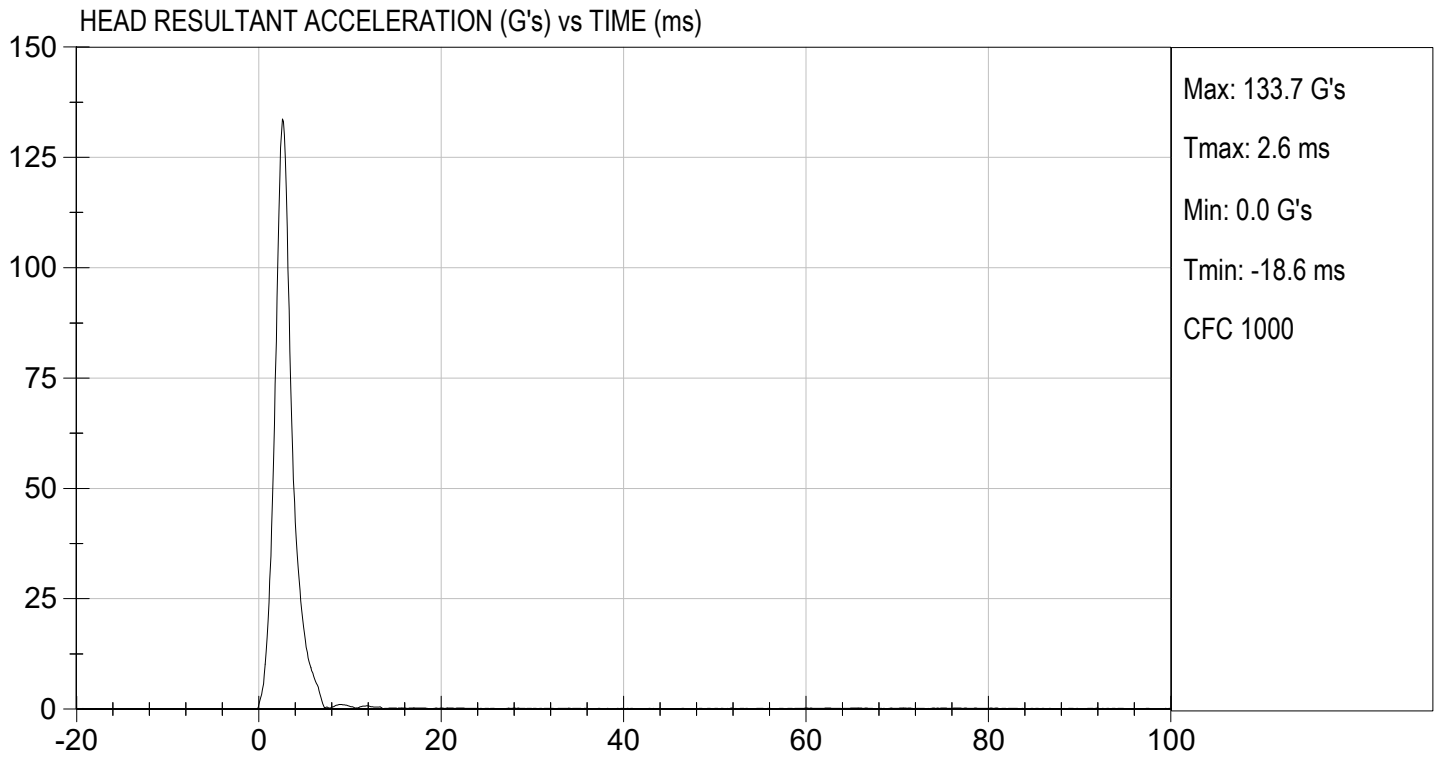
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	48	Pass
Peak Resultant Acceleration	G's	115 to 137	134	Pass
Peak Longitudinal Acceleration	G's	+/- 15	3.1	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	<15%	Yes	Pass
			Overall Test Results	Pass

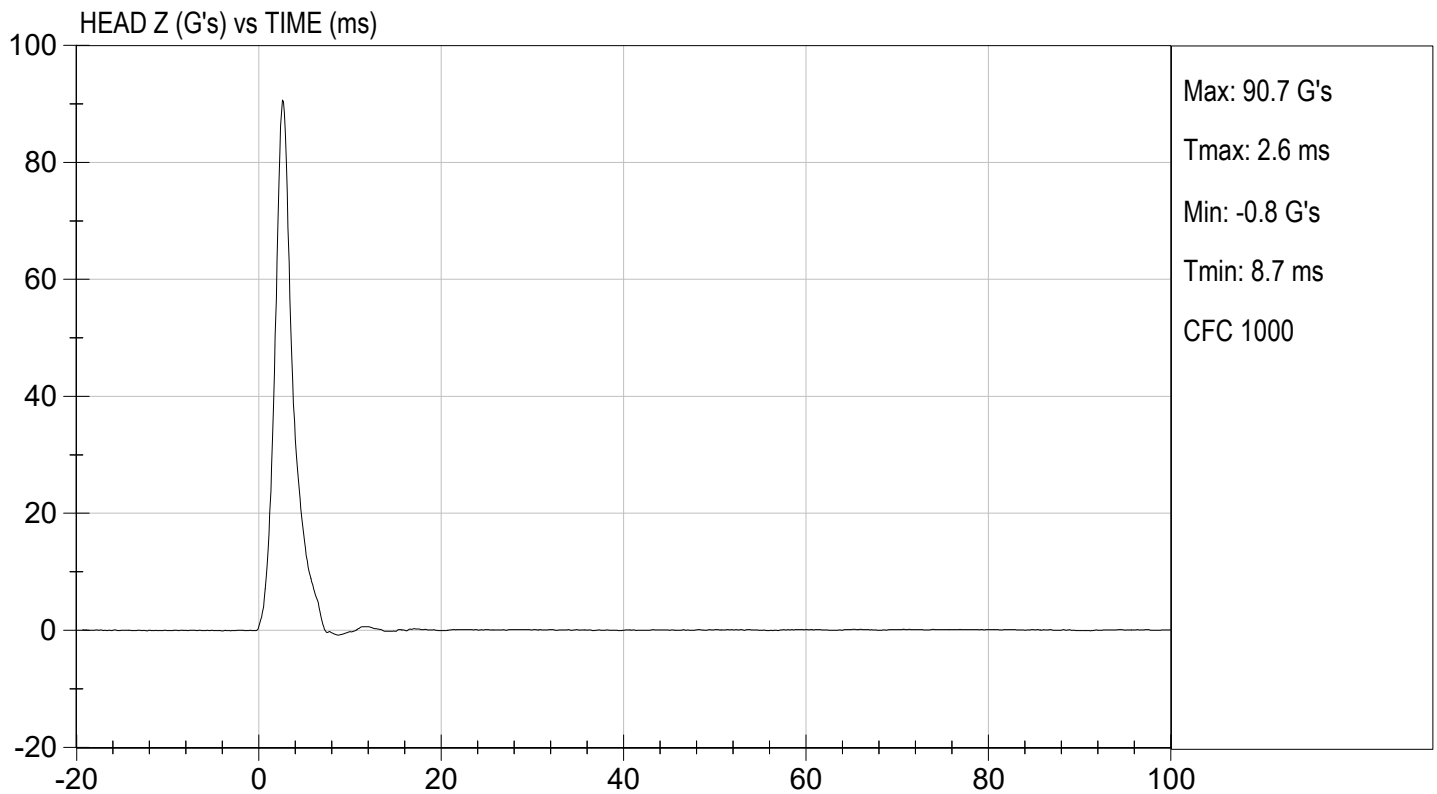
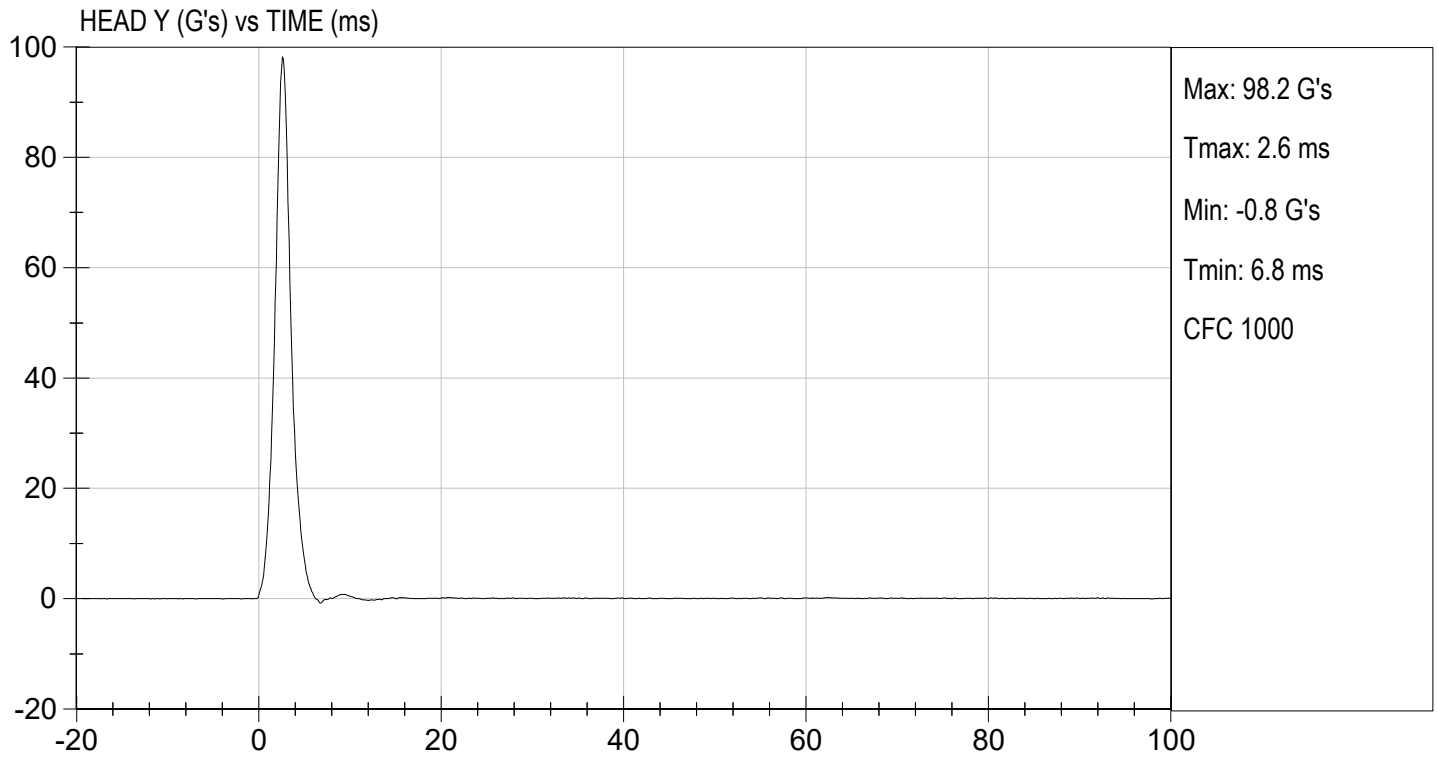

Laboratory Technician

09/28/2023

Test Date


Approved By





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

ATD Serial No: 296

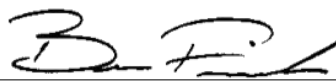
Test I.D: D232672

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.2	Pass
Humidity		%	10 to 70	47	Pass
Impact Velocity		m/s	5.51 to 5.63	5.53	Pass
Pendulum Velocity	10 ms	m/s	2.20 to 2.80	2.44	Pass
	15 ms	m/s	3.30 to 4.10	3.76	Pass
	20 ms	m/s	4.40 to 5.40	5.26	Pass
	25 ms	m/s	5.40 to 6.10	5.78	Pass
	25-100 ms	m/s	5.50 to 6.20	5.82	Pass
Maximum D-Plane Rotation		deg	71 to 81	75	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	60	Pass
Maximum Occipital Condyle Moment		Nm	-44 to -36	-40	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	118	Pass
Overall Test Results				Pass	


 Laboratory Technician

09/28/2023

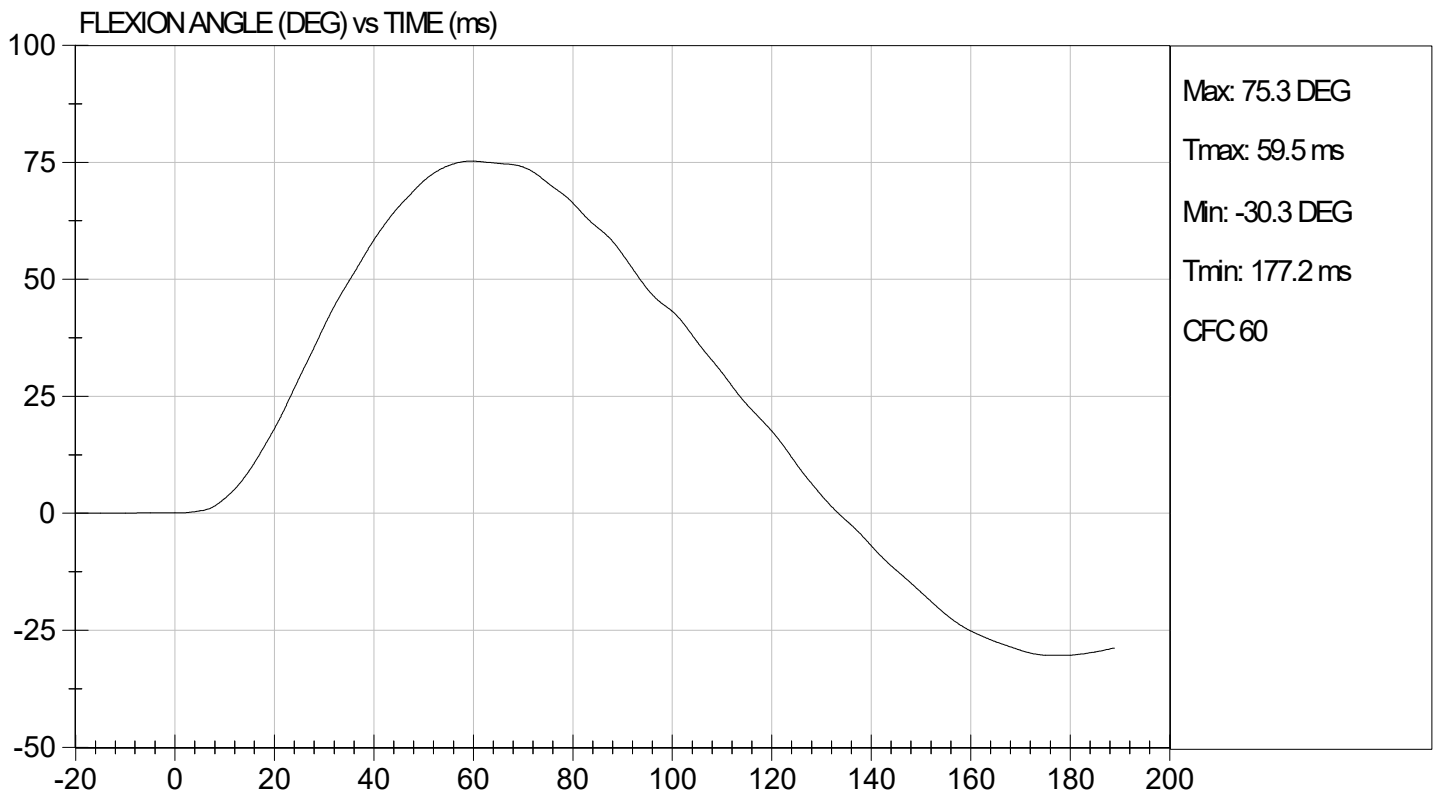
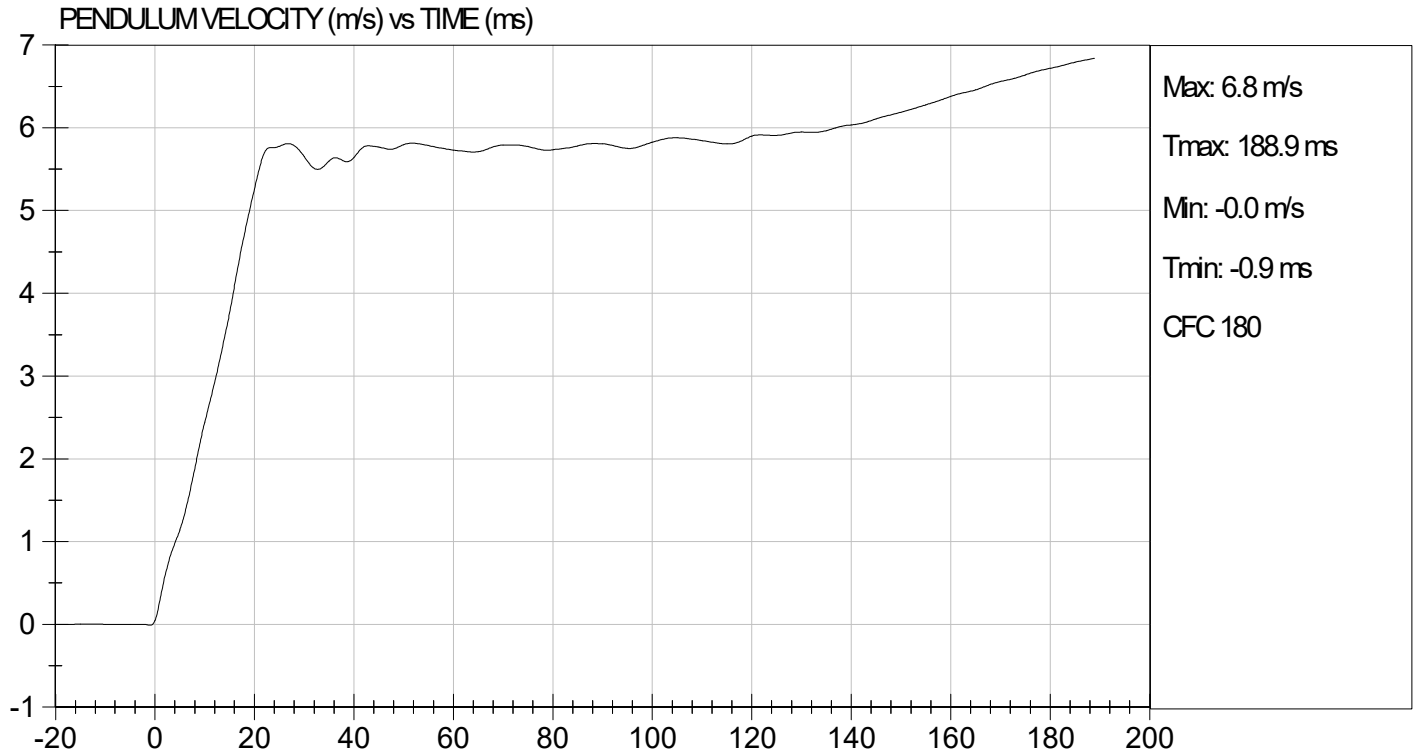
Test Date


 Approved By



TEST DESC: NECK BENDING
VELOCITY: 18.15 ft/s, 5.53 m/s

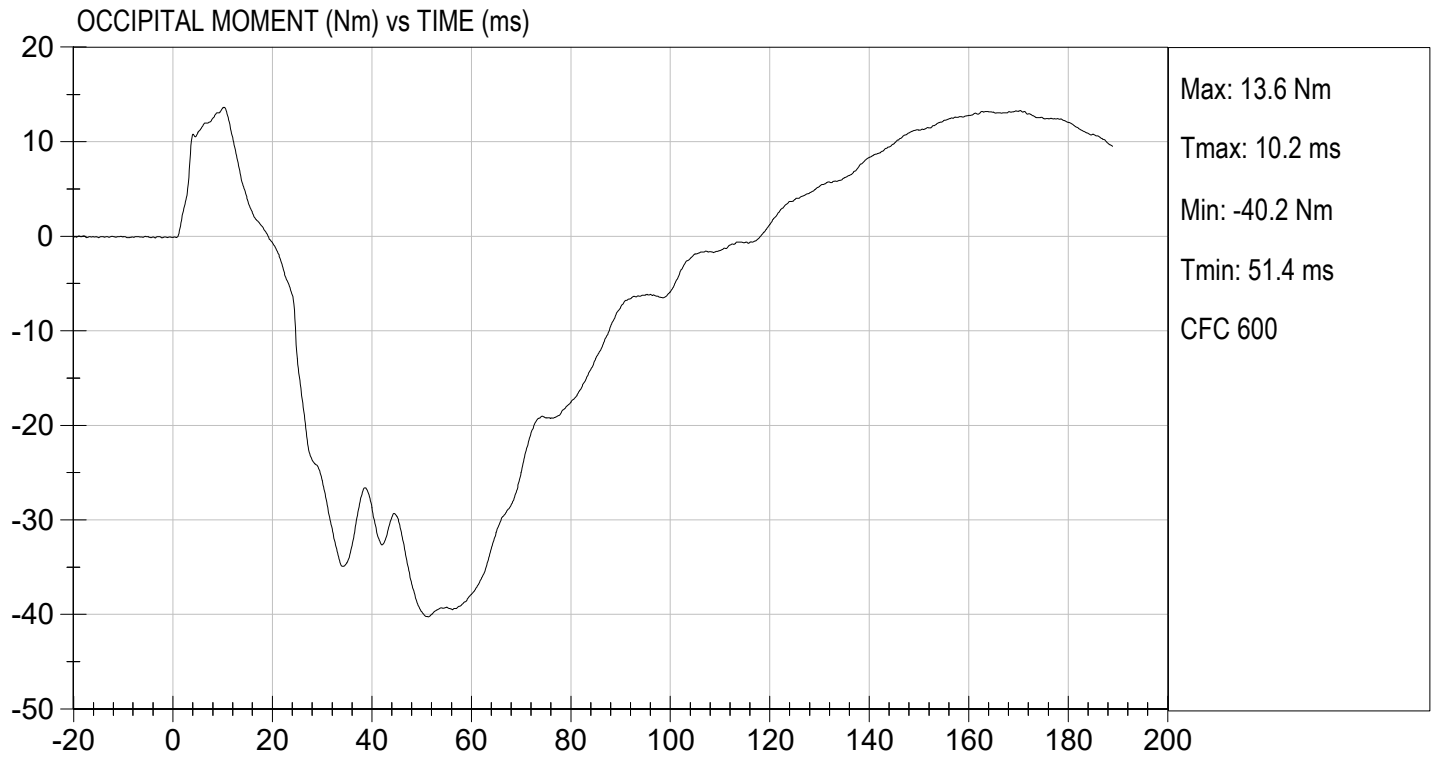
TEST DATE: 09/28/2023
TEST #: D232672





TEST DESC: NECK BENDING
VELOCITY: 18.15 ft/s, 5.53 m/s

TEST DATE: 09/28/2023
TEST #: D232672



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

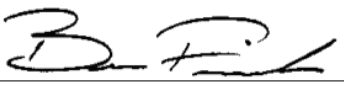
ATD Serial No: 296

Test ID: D232673

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	41	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	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	19	Pass
			Overall Test Results	Pass


Laboratory Technician

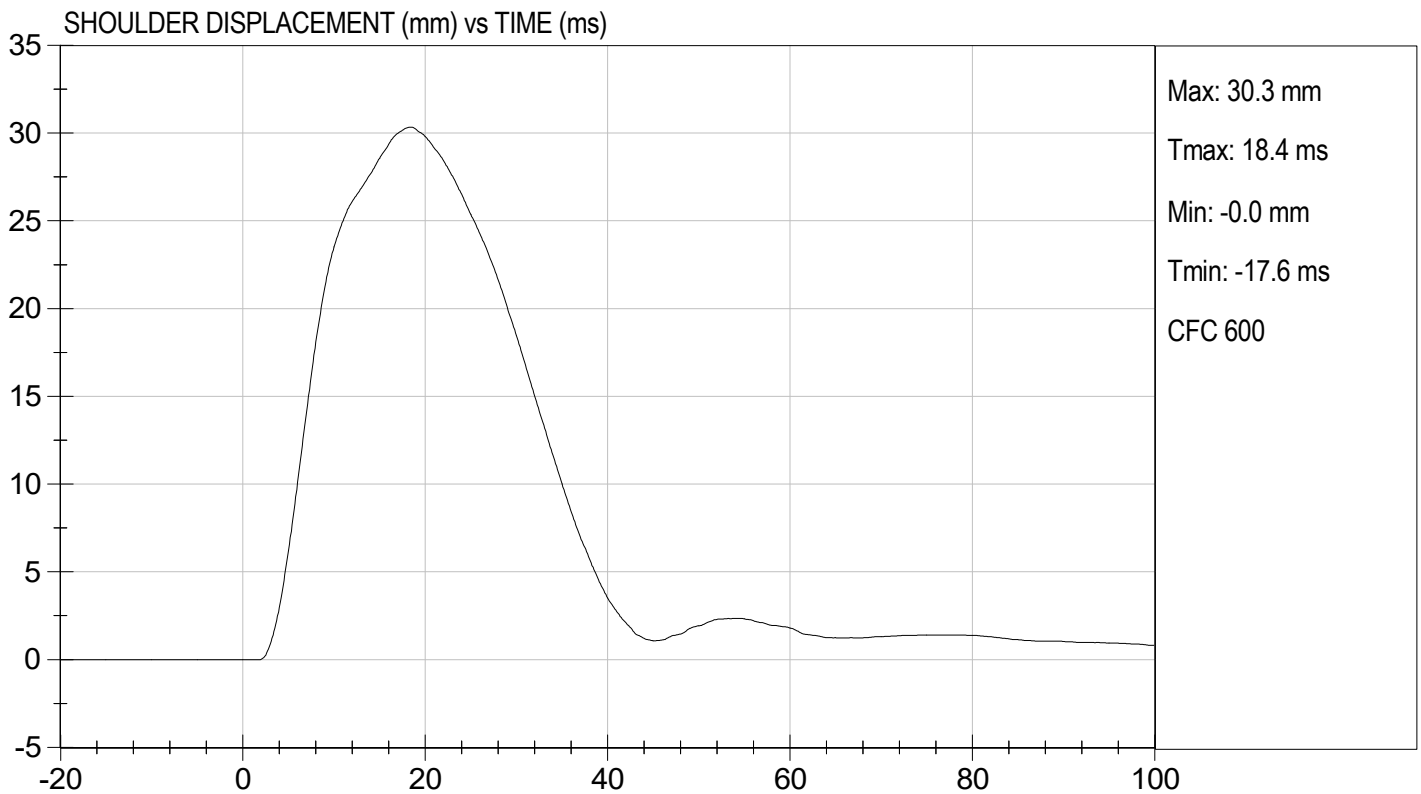
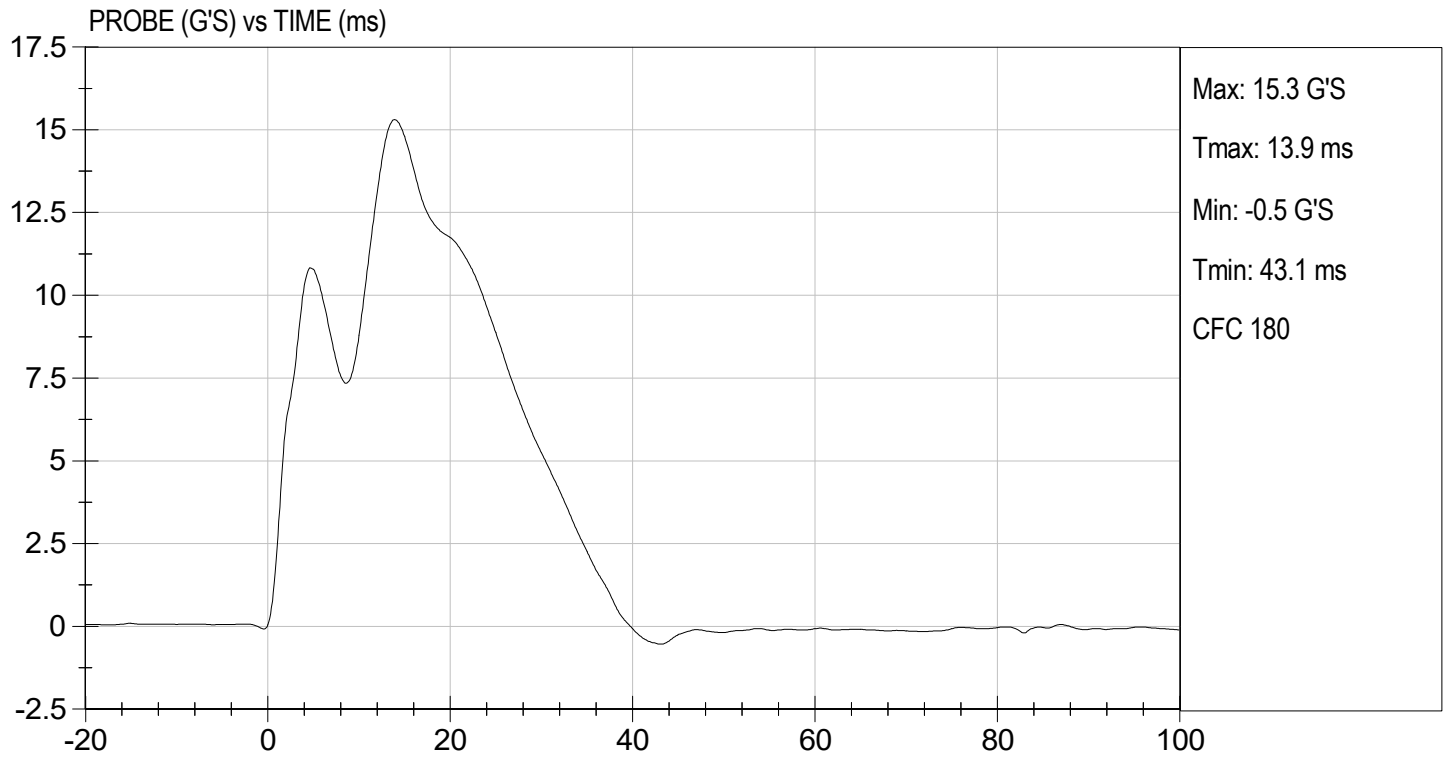
09/28/2023
Test Date


Approved By



TEST DESC: SHOULDER IMPACT
VELOCITY: 14.25 ft/s, 4.34 m/s

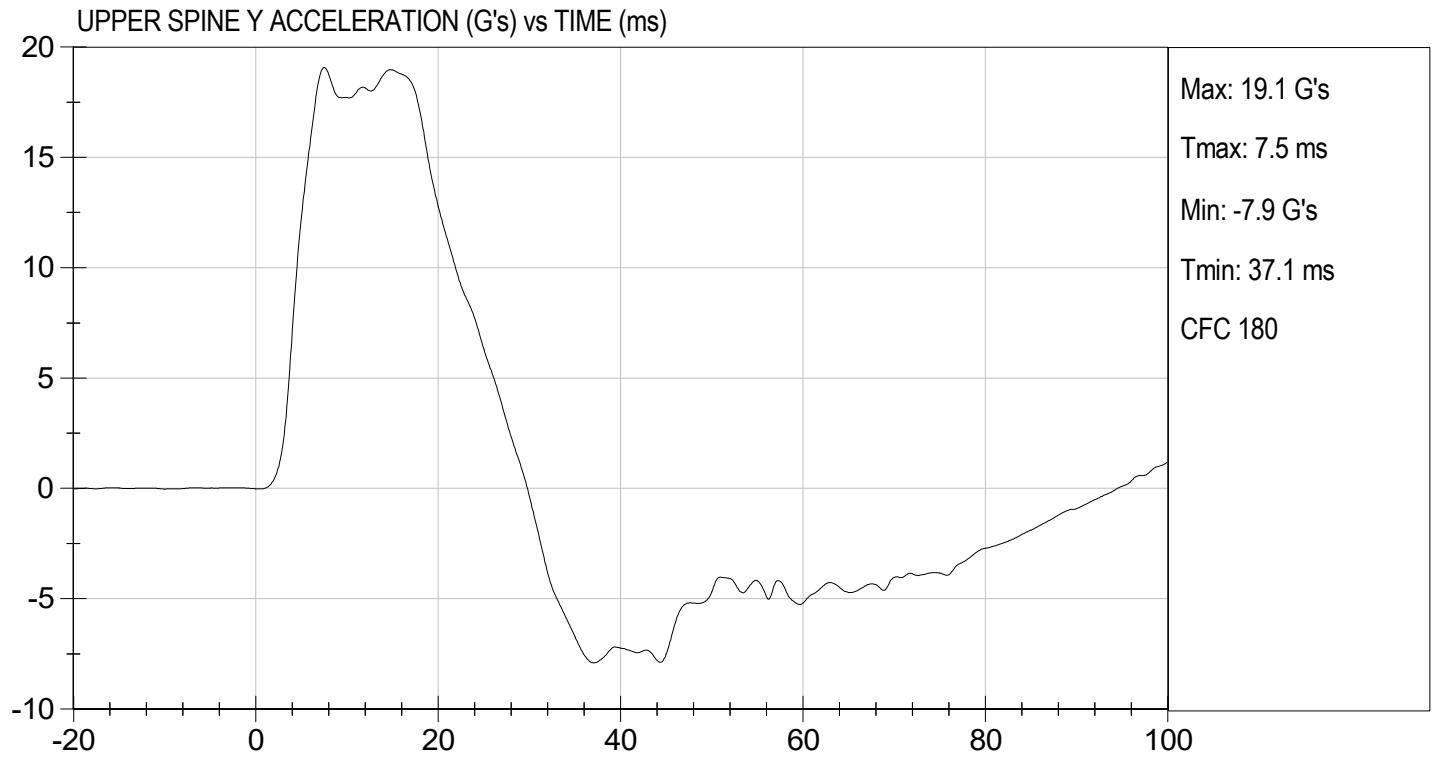
TEST DATE: 09/28/2023
TEST #: D232673





TEST DESC: SHOULDER IMPACT
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 09/28/2023
TEST #: D232673



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

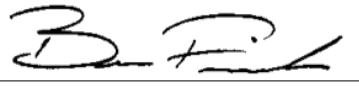
ATD Serial No: 296

Test I.D: D232674

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.1	Pass
Humidity	%	10 to 70	46	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	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	29	Pass
Middle Rib Displacement	mm	30 to 36	32	Pass
Lower Rib Displacement	mm	32 to 38	33	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	38	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	35	Pass
Overall Test Results				Pass


Laboratory Technician

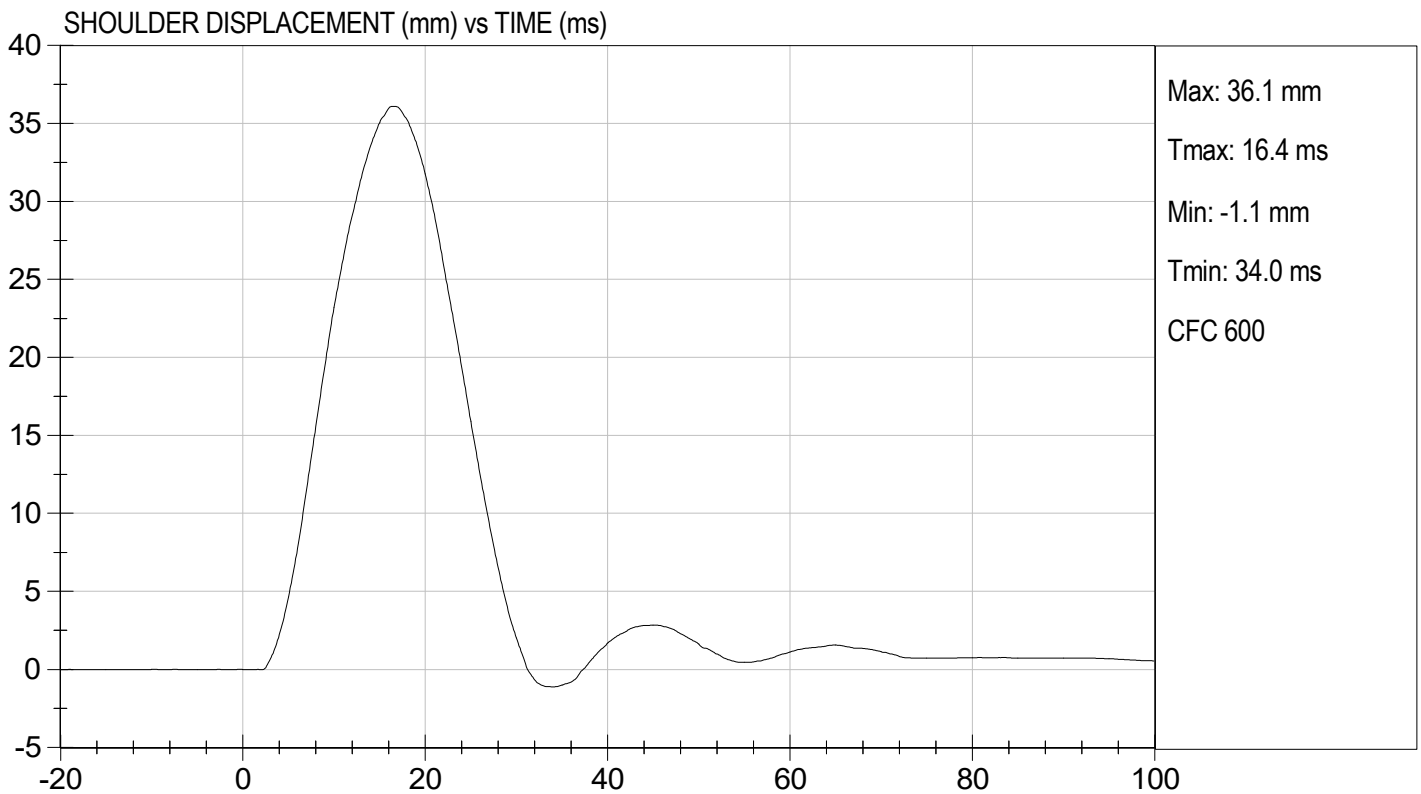
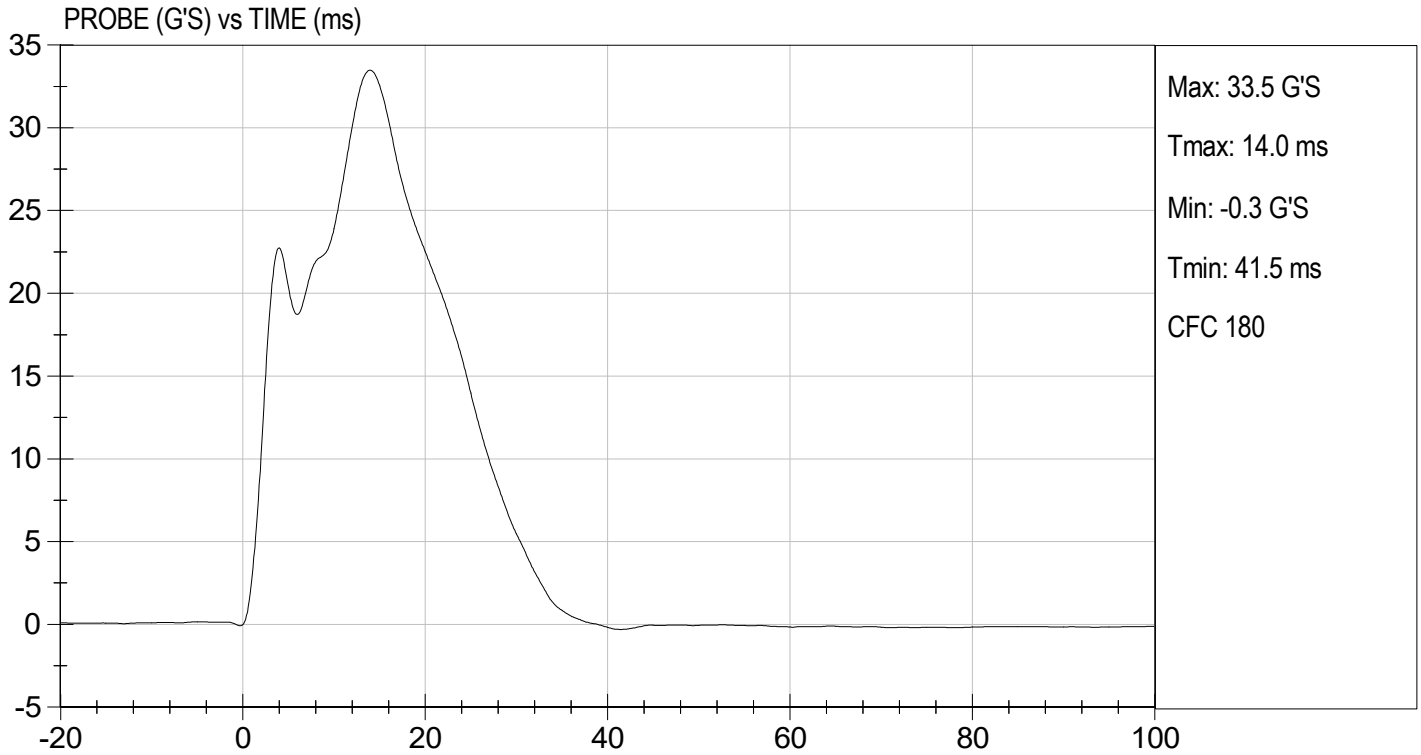
09/28/2023
Test Date


Approved By



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

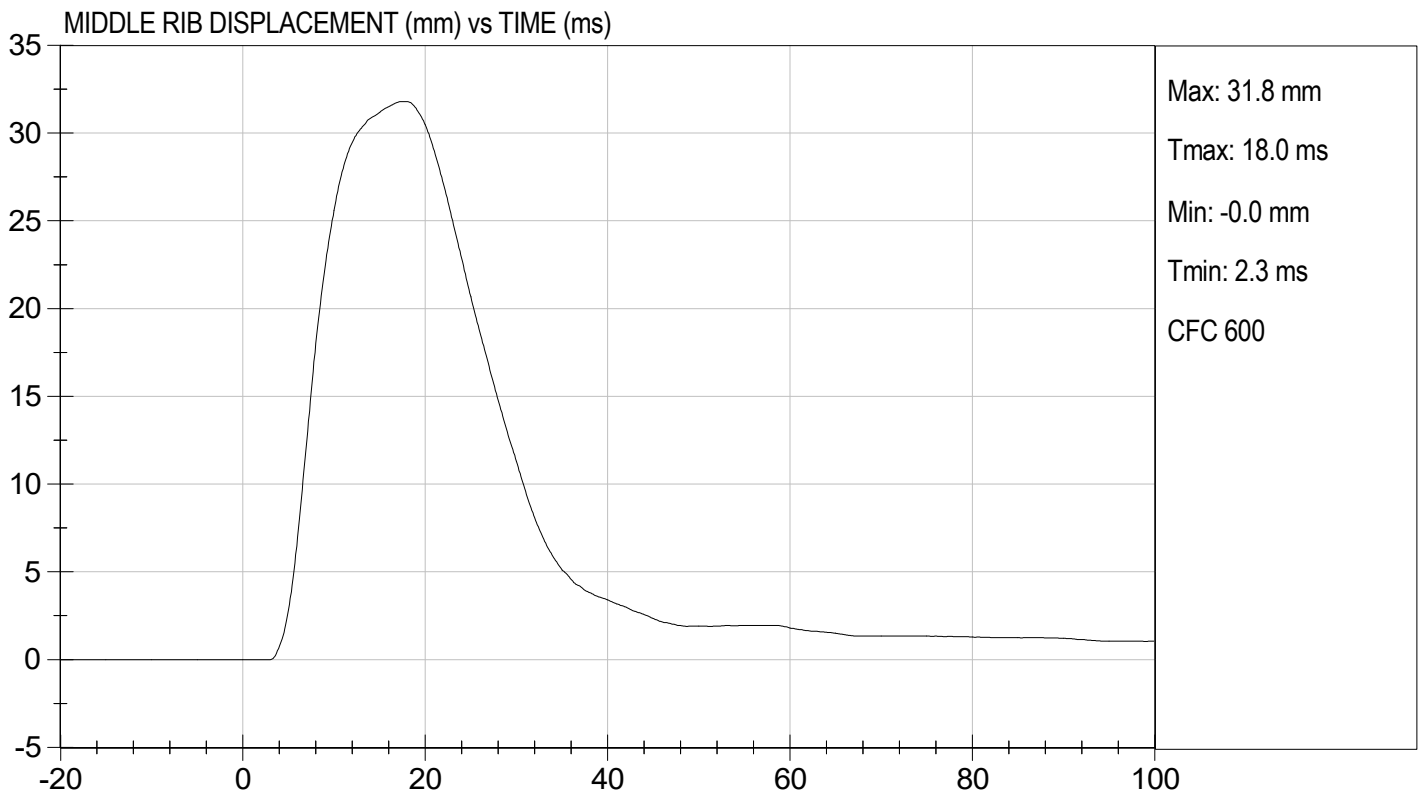
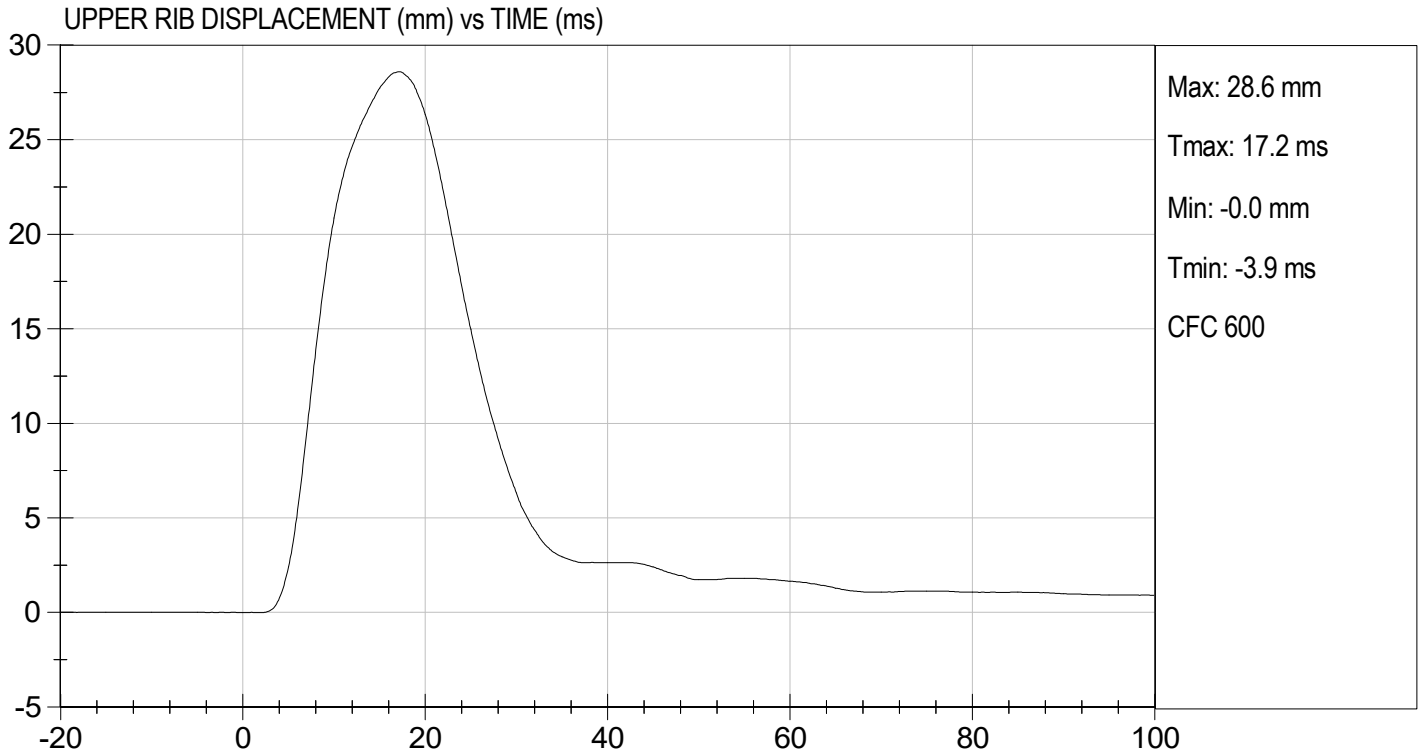
TEST DATE: 09/28/2023
TEST #: D232674





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

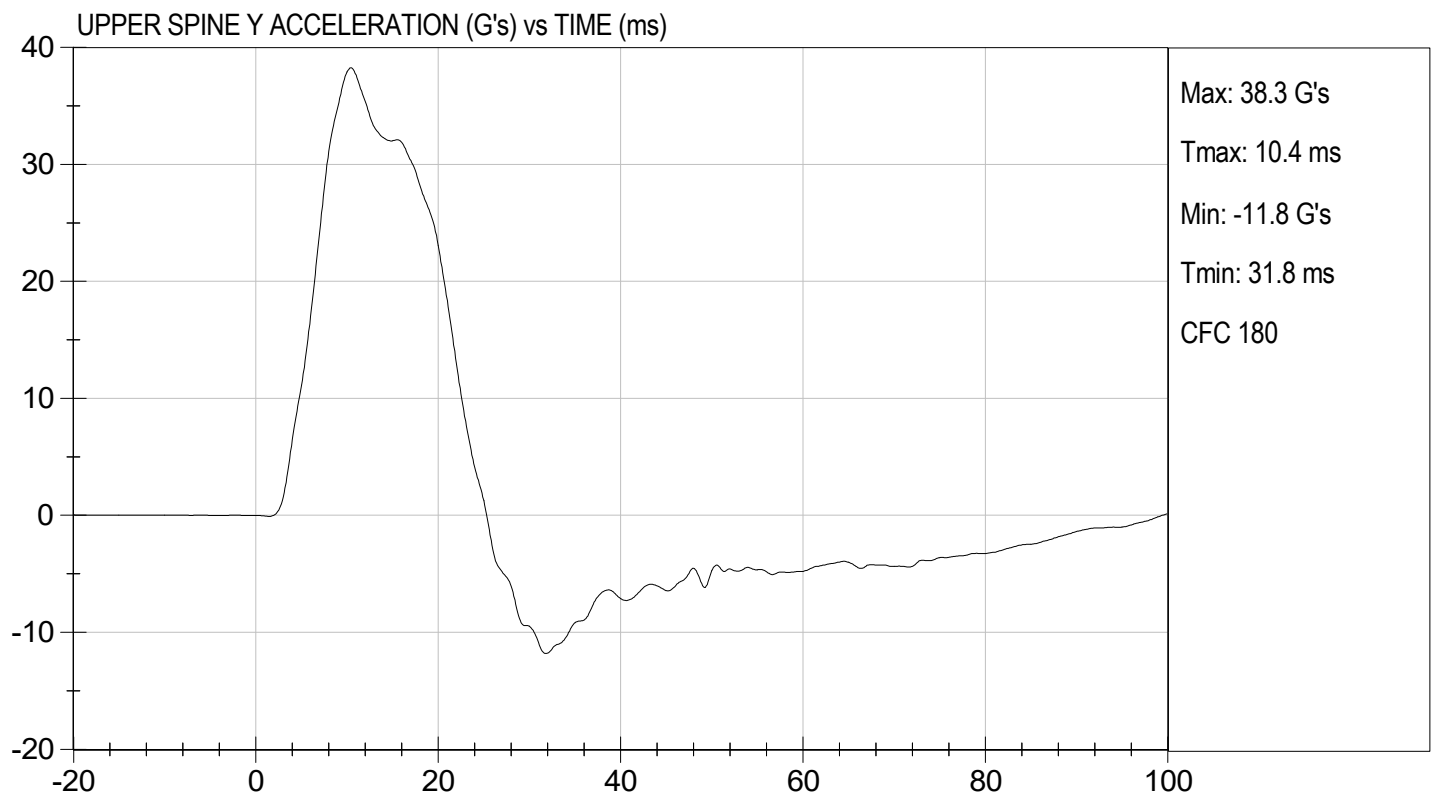
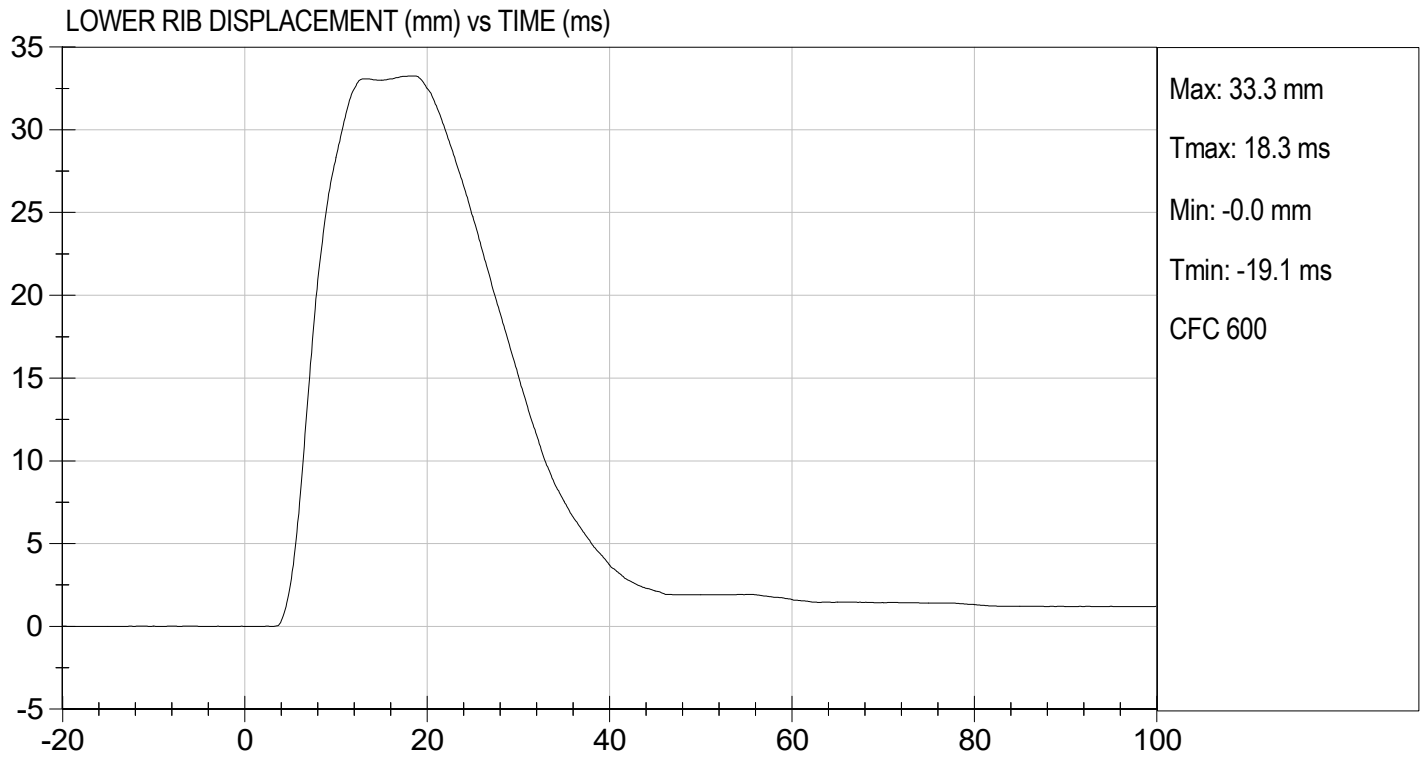
TEST DATE: 09/28/2023
TEST #: D232674





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

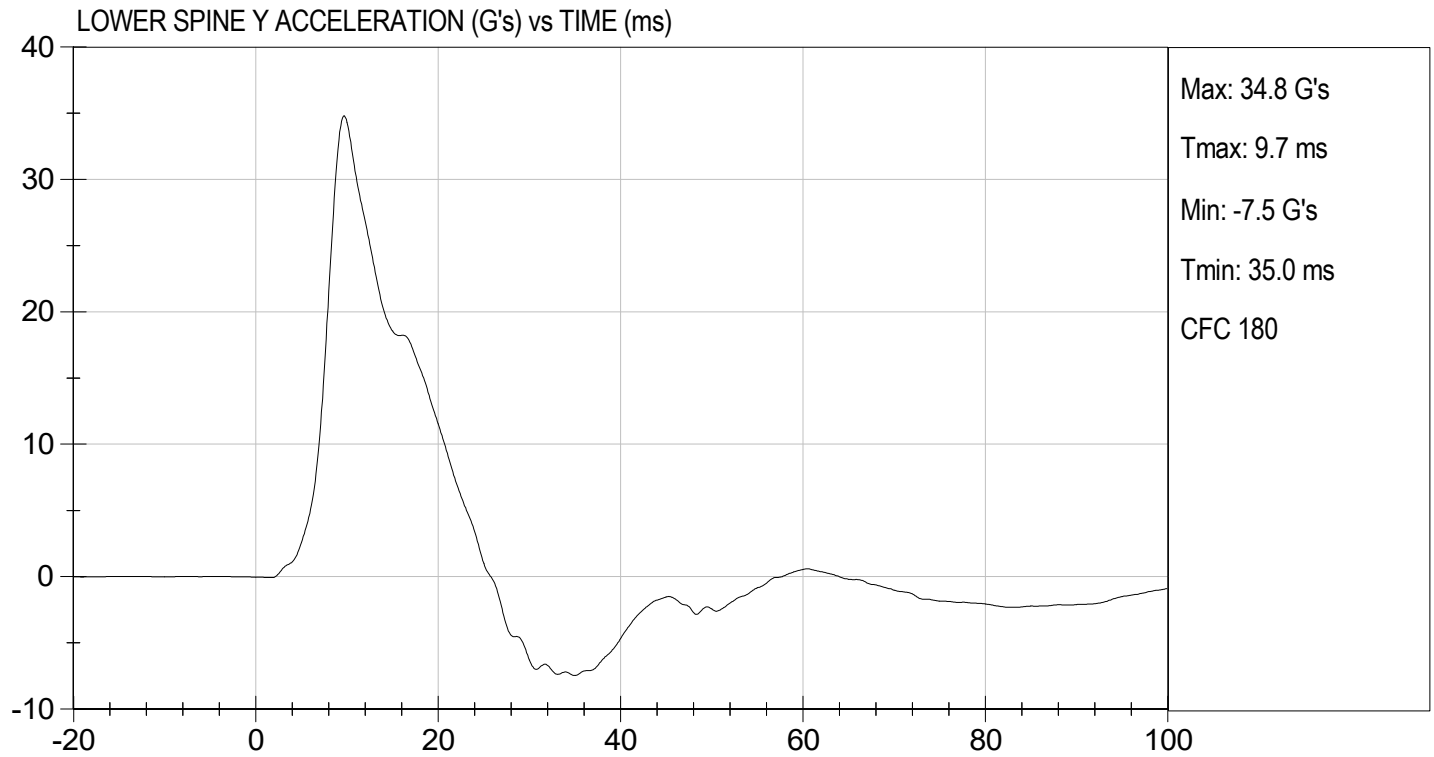
TEST DATE: 09/28/2023
TEST #: D232674





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

TEST DATE: 09/28/2023
TEST #: D232674



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

ATD Serial No: 296

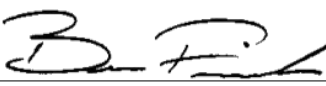
Test I.D: D232675

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.1	Pass
Humidity	%	10 to 70	40	Pass
Impact Velocity	m/s	4.20 to 4.40	4.27	Pass
Maximum Probe Acceleration	G's	14 to 18	16	Pass
Upper Rib Displacement	mm	32 to 40	38	Pass
Middle Rib Displacement	mm	39 to 45	43	Pass
Lower Rib Displacement	mm	35 to 43	40	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

09/28/2023

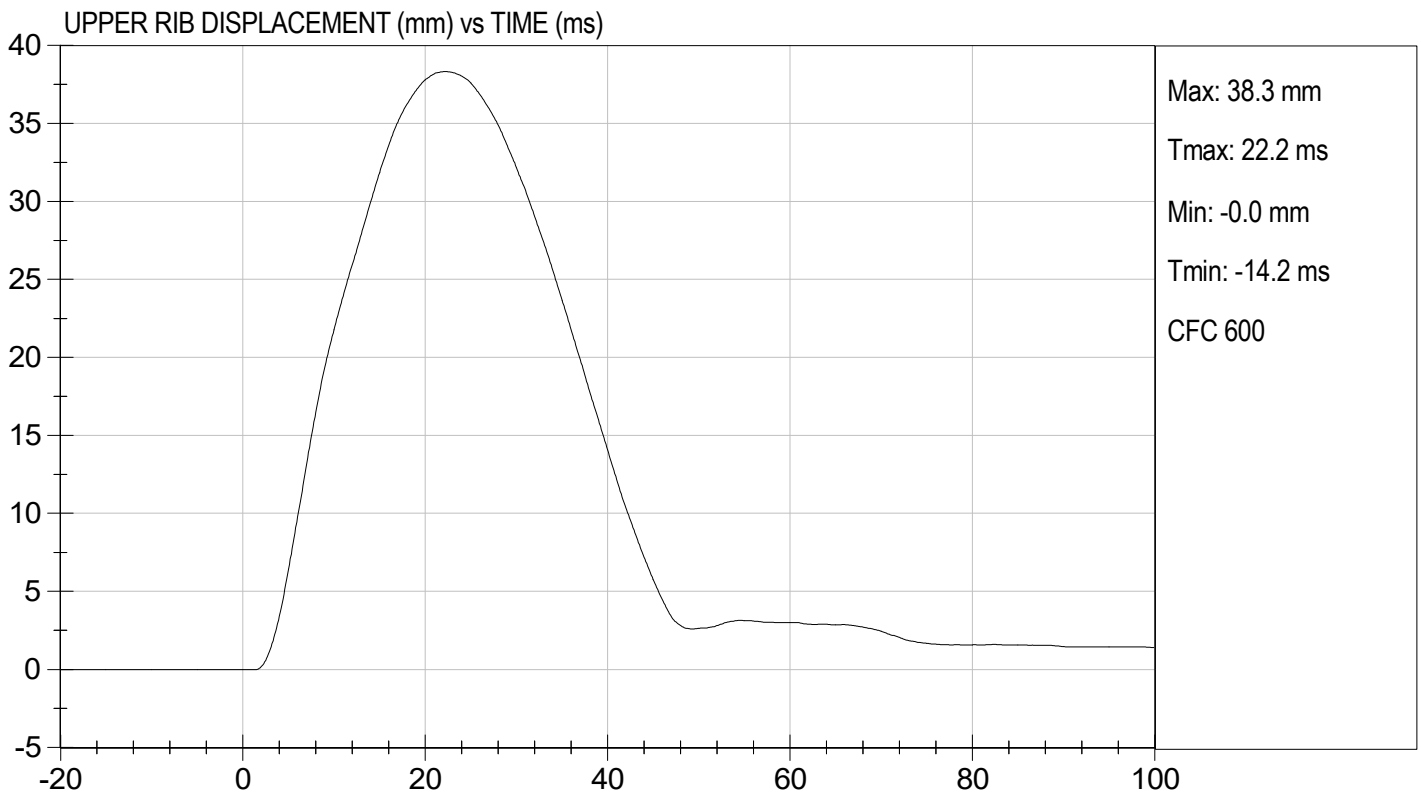
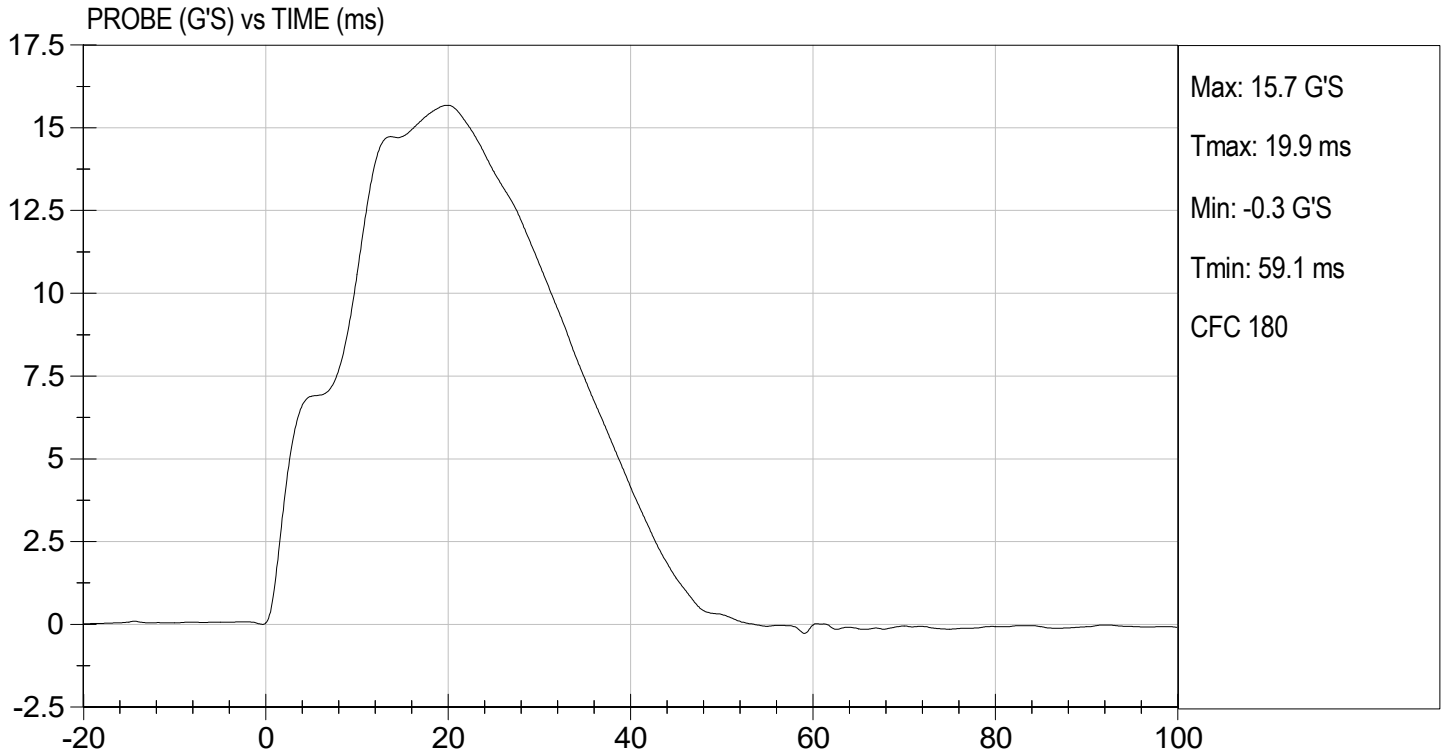
Test Date


Approved By



TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.01 ft/s, 4.27 m/s

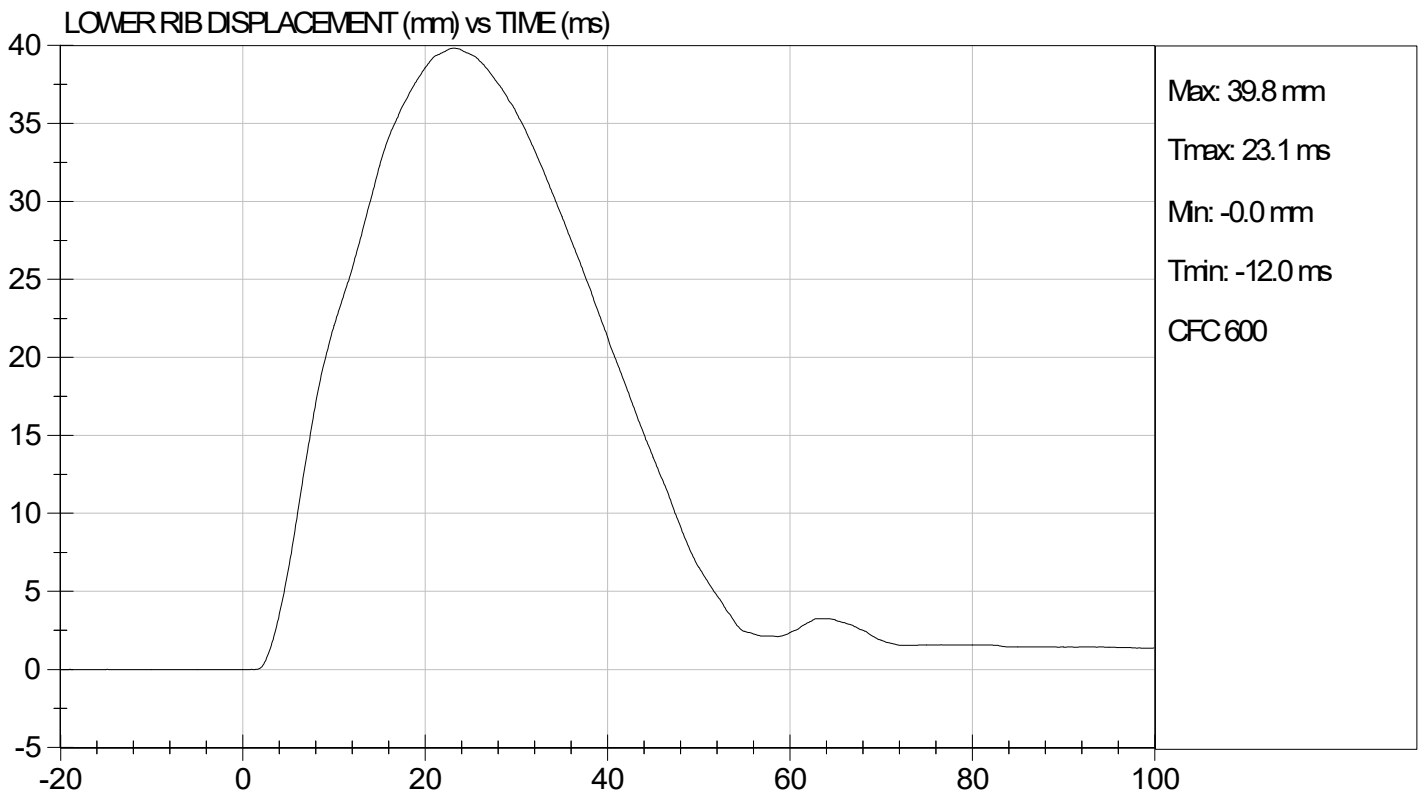
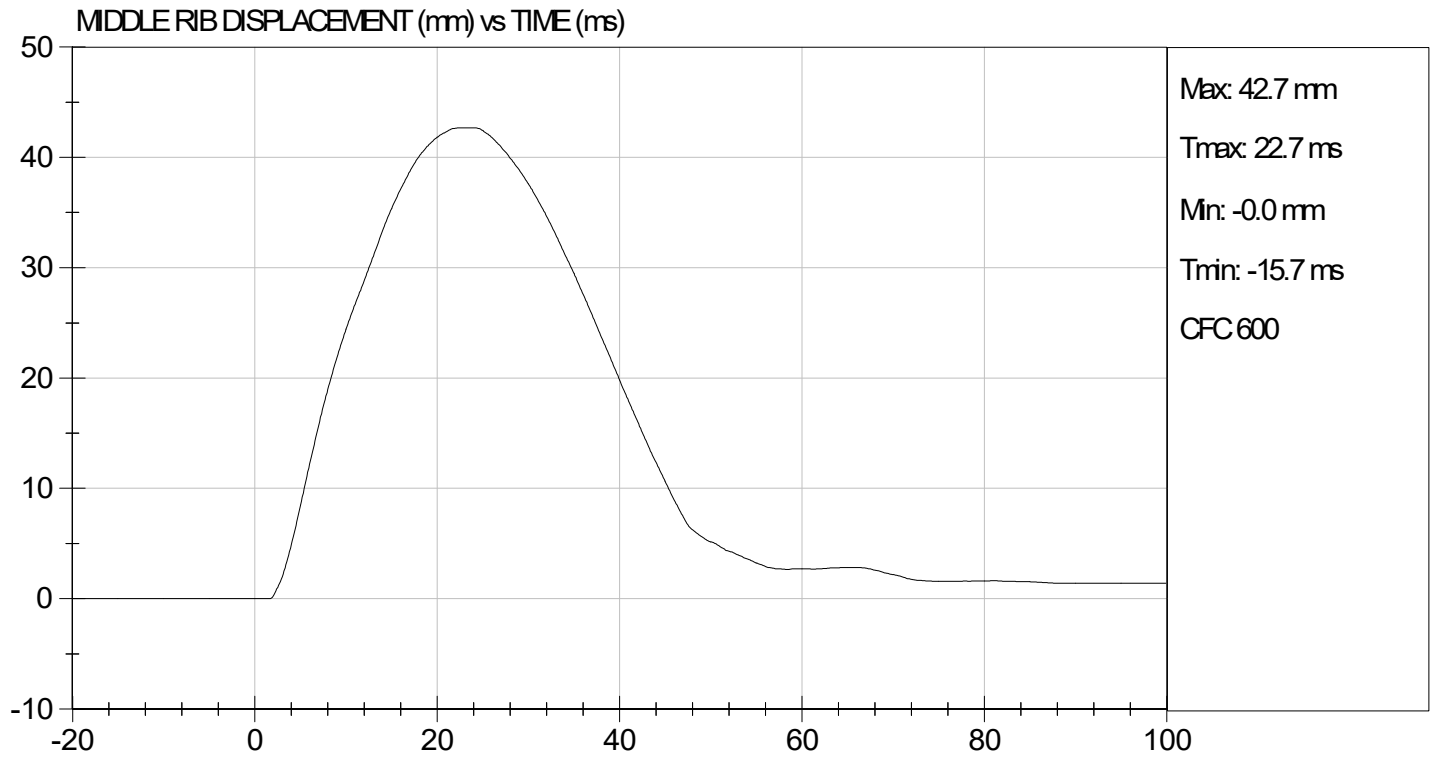
TEST DATE: 09/28/2023
TEST #: D232675





TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.01 ft/s, 4.27 m/s

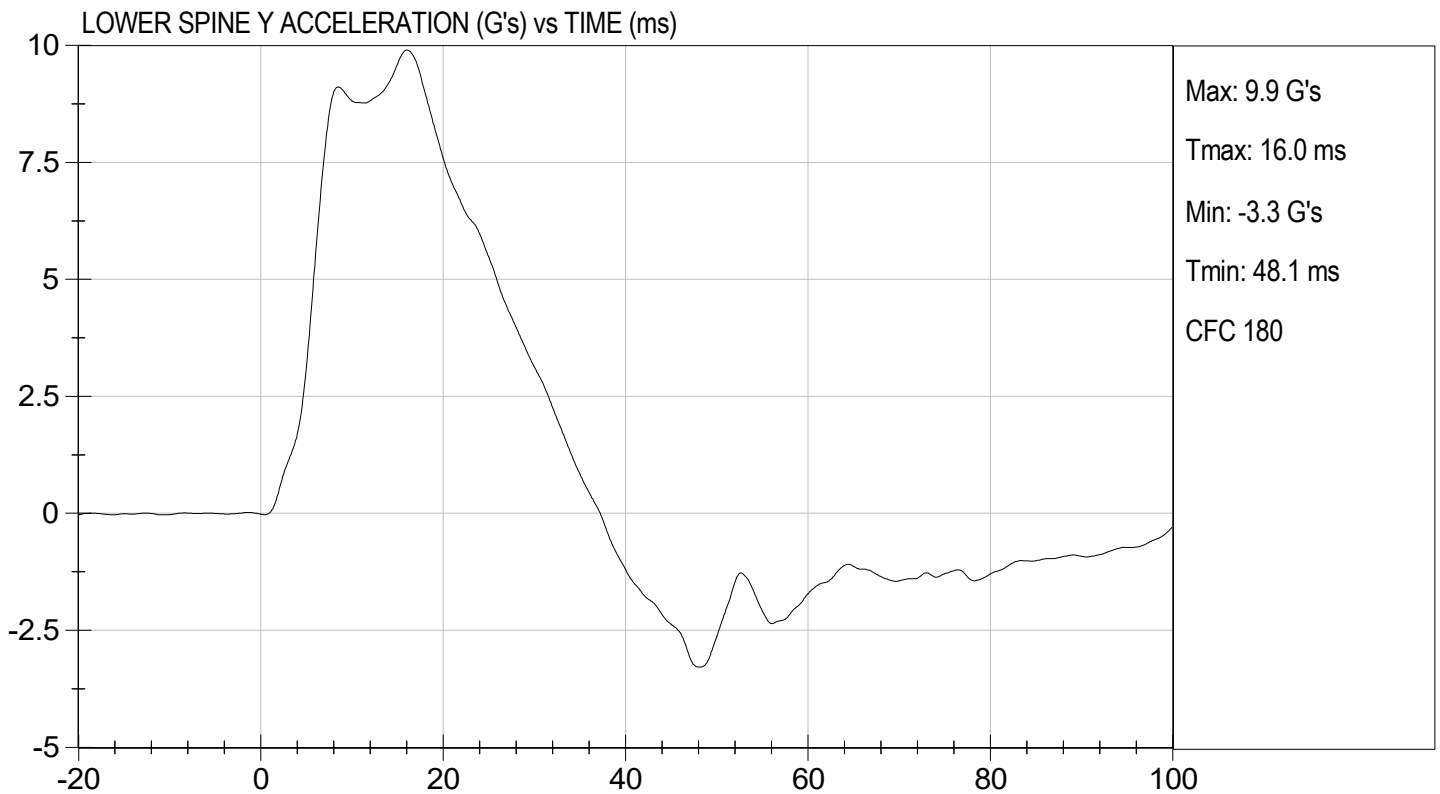
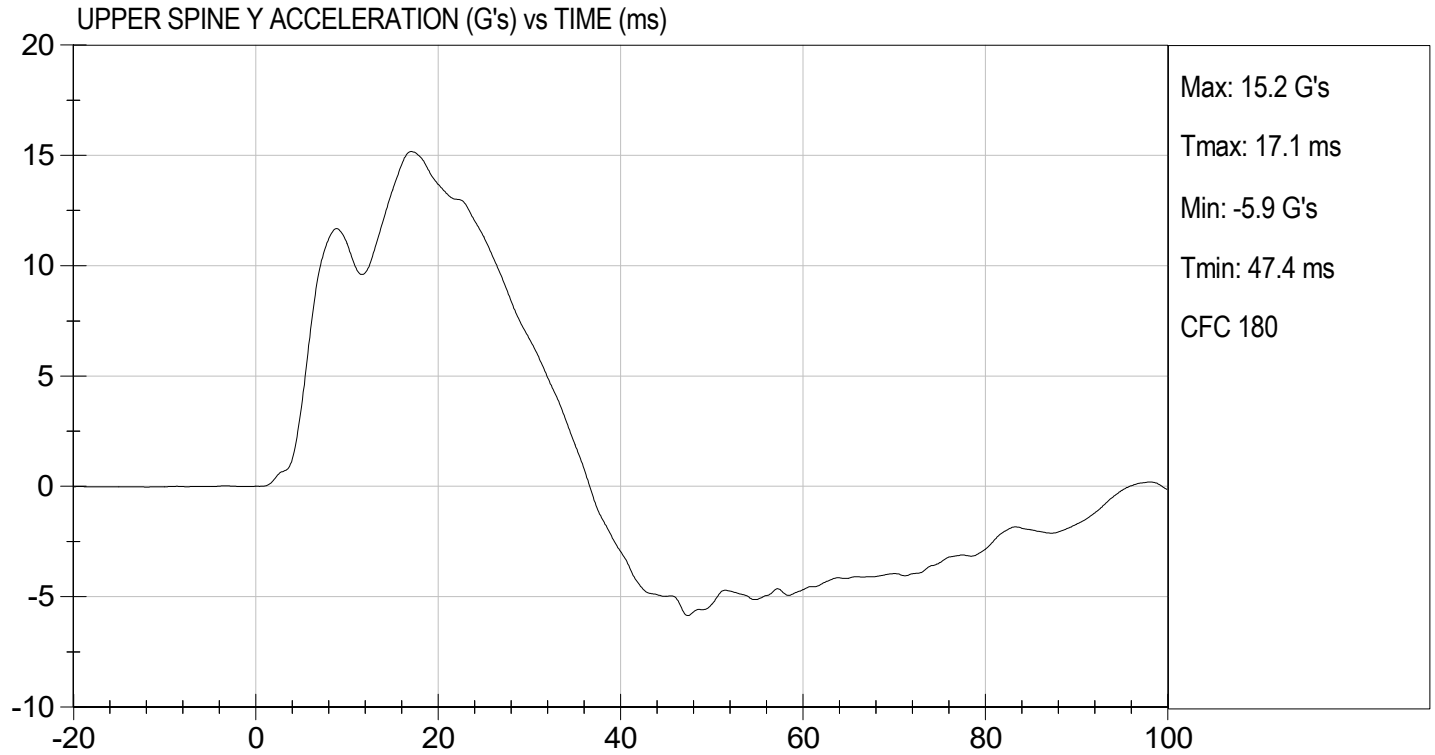
TEST DATE: 09/28/2023
TEST #: D232675





TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.01 ft/s, 4.27 m/s

TEST DATE: 09/28/2023
TEST #: D232675



MGA RESEARCH CORPORATION
ABDOMINAL IMPACT TEST
SID-11s BUILD LEVEL D DUMMY

ATD Serial No: 296

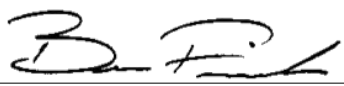
Test I.D: D232676

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.2	Pass
Humidity	%	10 to 70	40	Pass
Impact Velocity	m/s	4.20 to 4.40	4.27	Pass
Maximum Probe Acceleration	G's	12 to 16	14	Pass
Upper Abdomen Rib Displacement	mm	36 to 47	42	Pass
Lower Abdomen Rib Displacement	mm	33 to 44	36	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	12	Pass
Overall Test Results				Pass


Laboratory Technician

09/28/2023

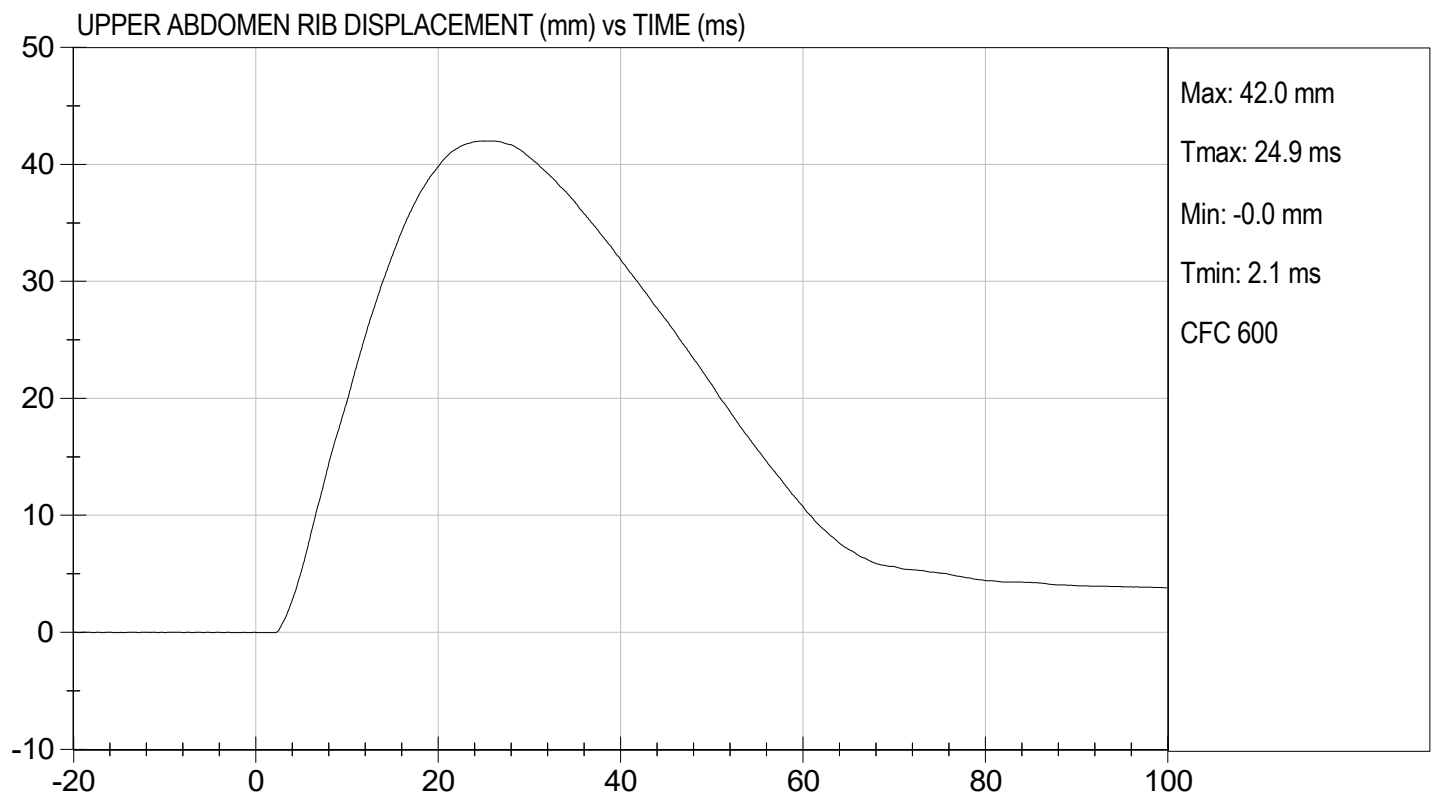
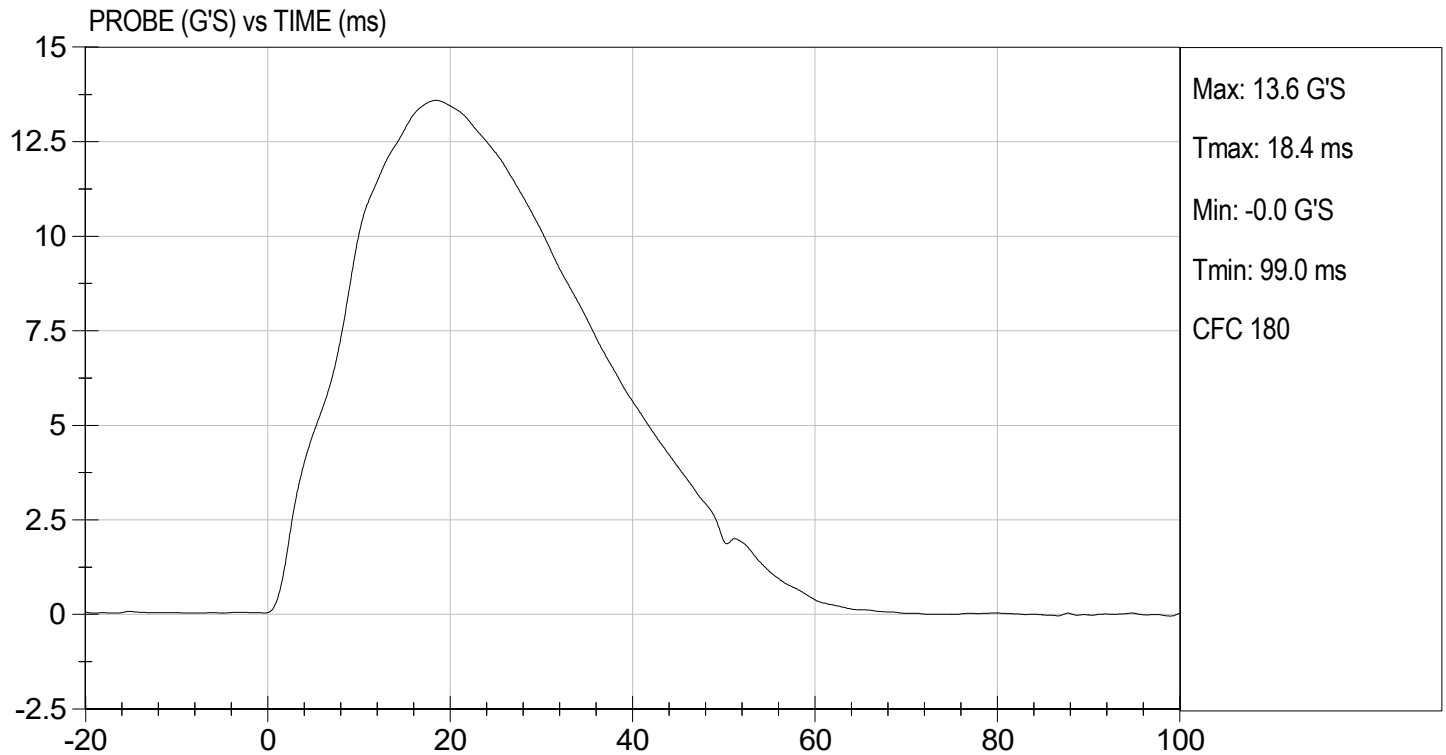
Test Date


Approved By



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

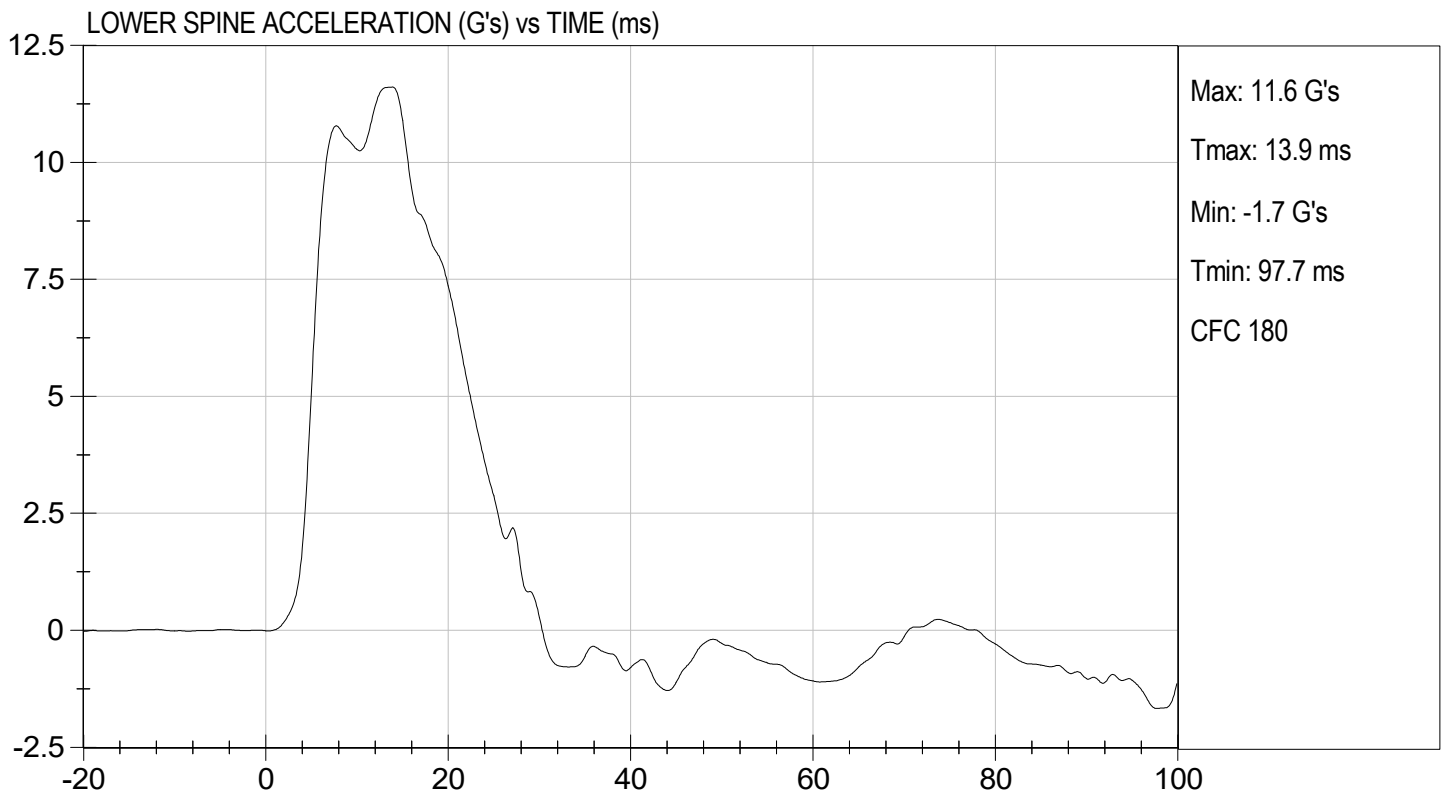
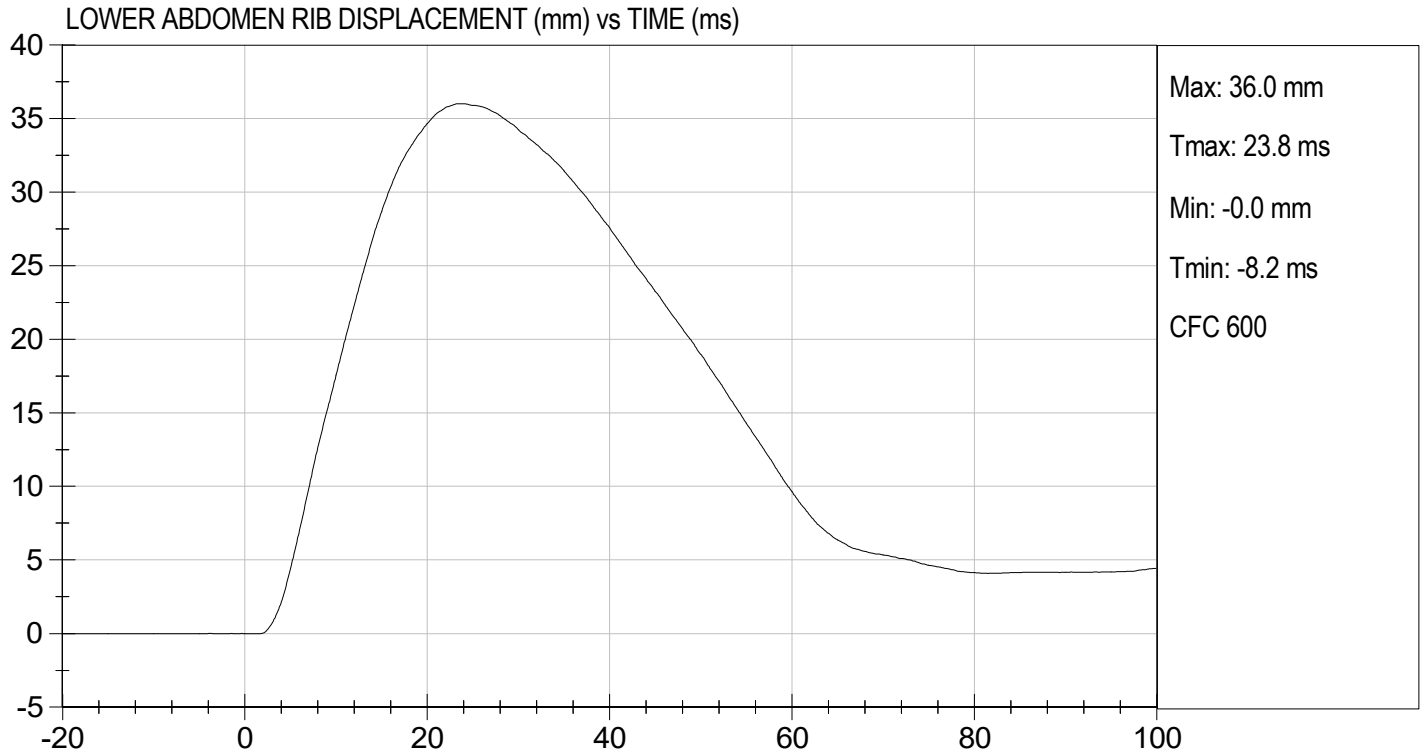
TEST DATE: 09/28/2023
TEST #: D232676





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

TEST DATE: 09/28/2023
TEST #: D232676



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

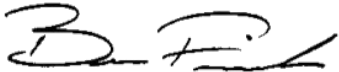
ATD Serial No: 296

Test I.D: D232677

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	22	Pass
Humidity	%	10 to 70	45	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	Pass
Maximum Probe Acceleration	G's	38 to 47	41	Pass
Pelvis Y Acceleration After 6 ms	G's	34 to 42	39.0	Pass
Peak Acetabulum Force	N	3600 to 4300	3,961	Pass
Overall Test Results				Pass


Laboratory Technician

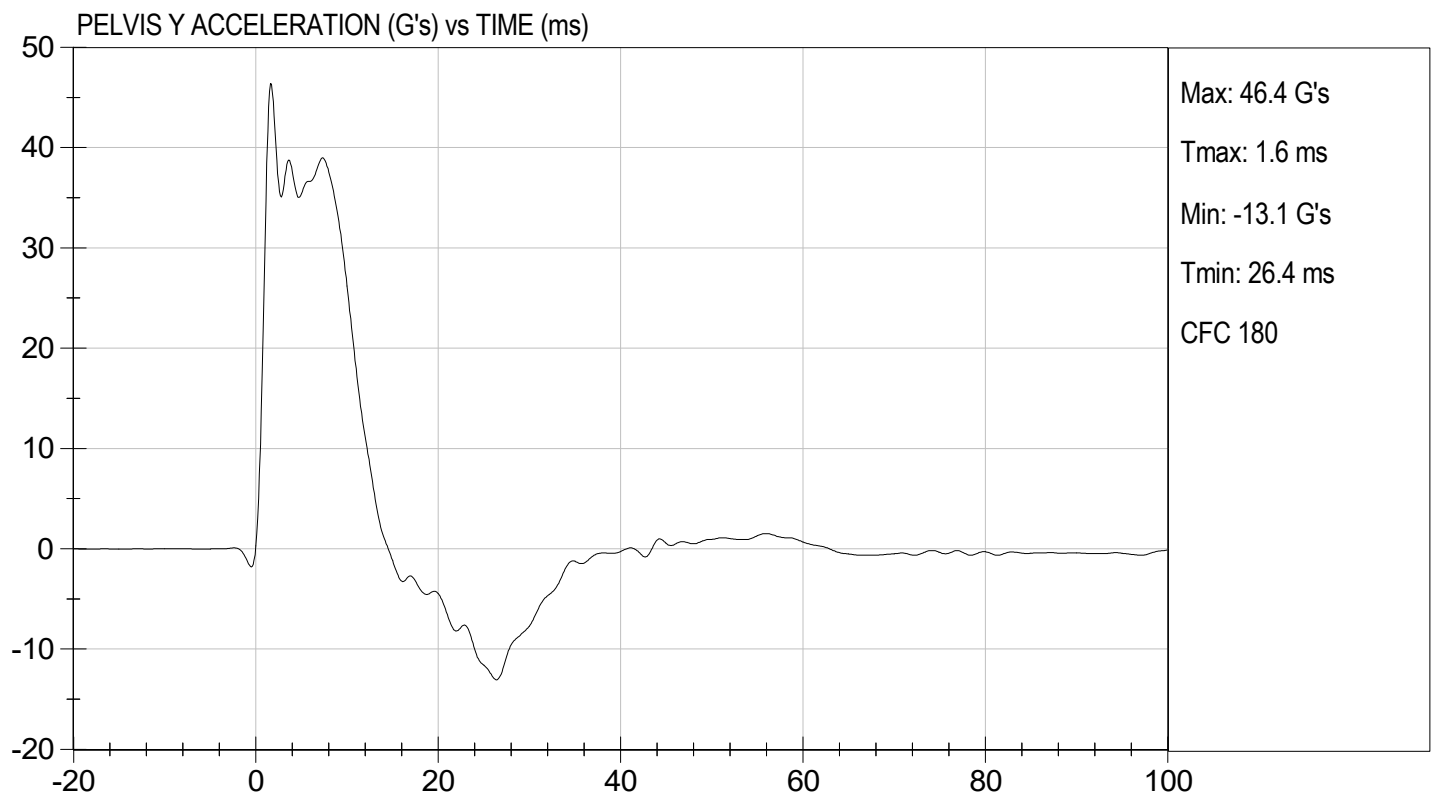
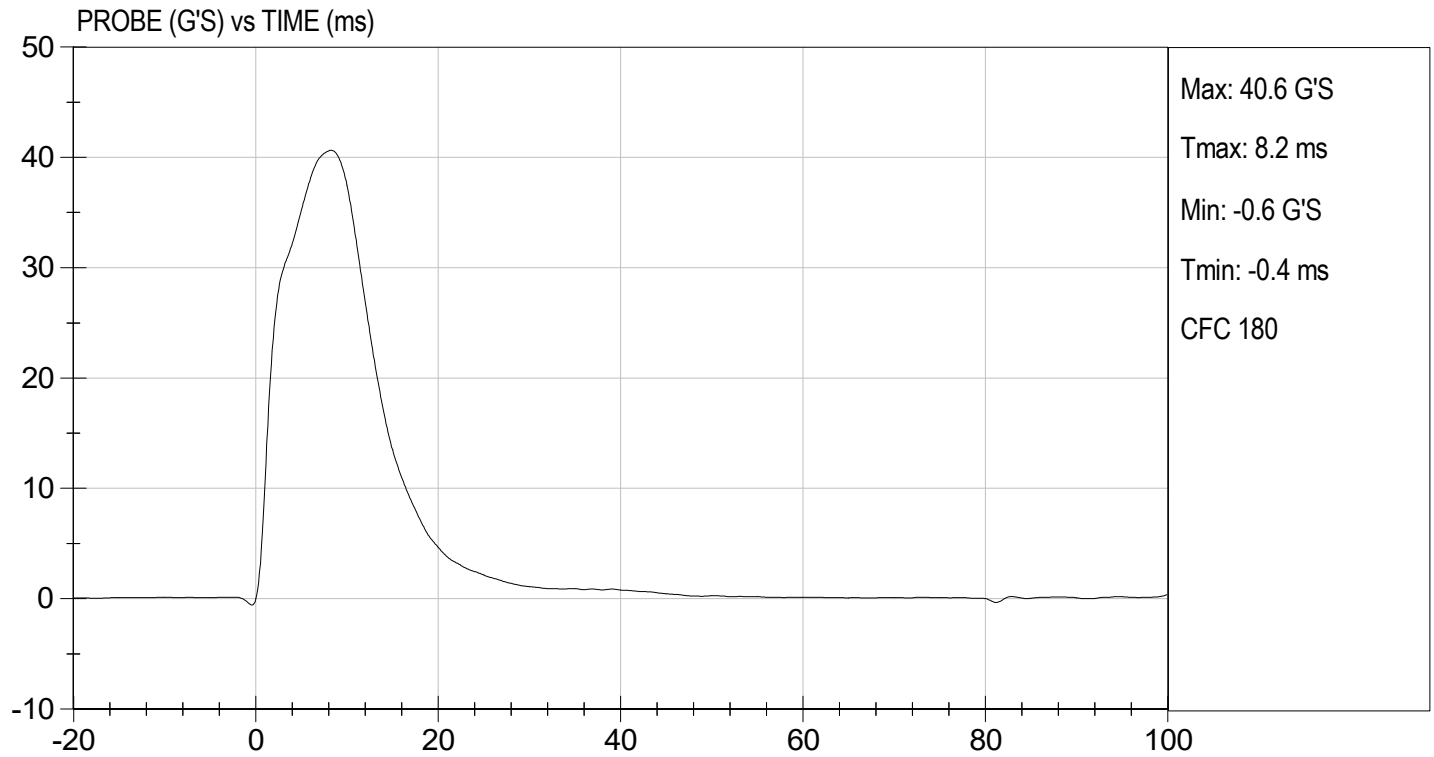
09/28/2023
Test Date


Approved By



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

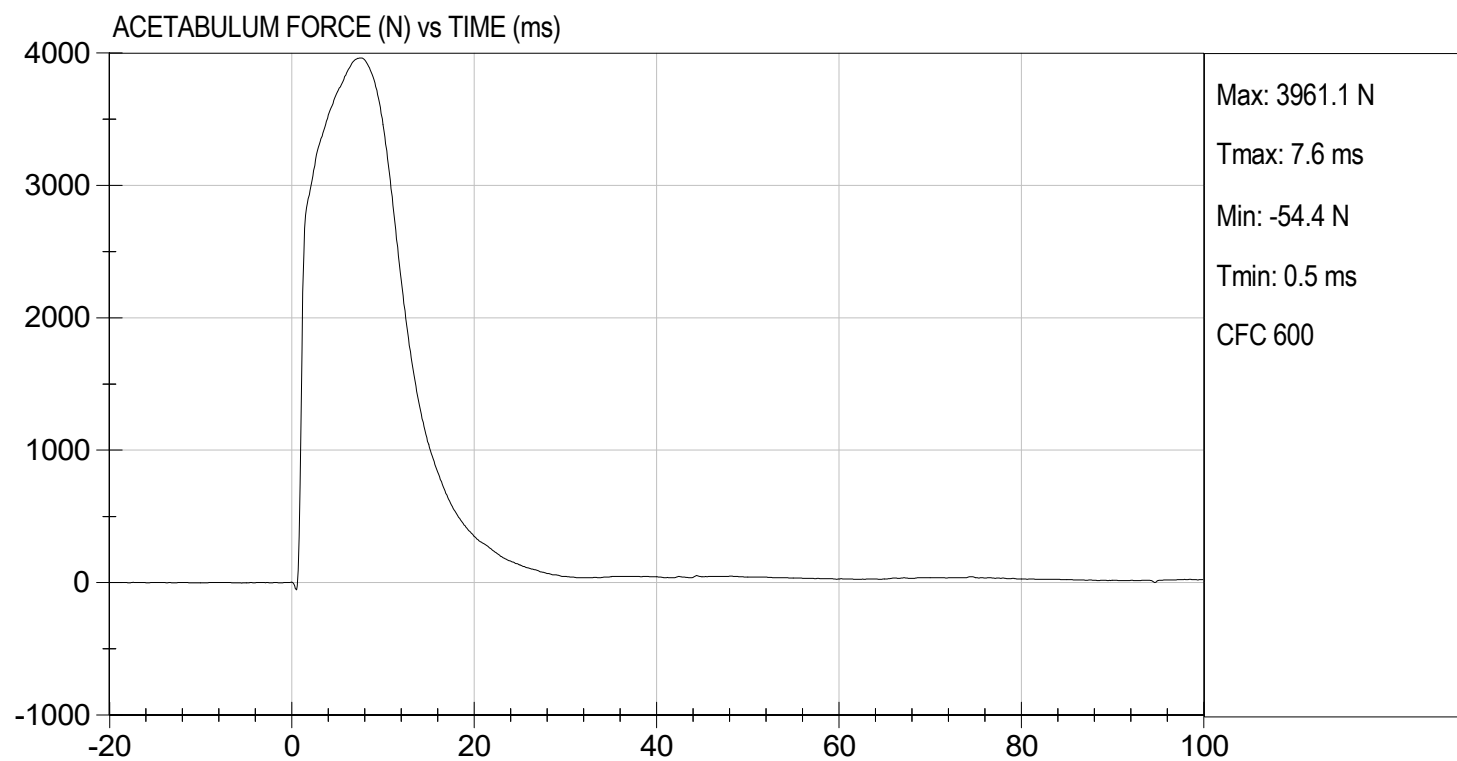
TEST DATE: 09/28/2023
TEST #: D232677





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

TEST DATE: 09/28/2023
TEST #: D232677



MGA RESEARCH CORPORATION

ILIAC IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D232678

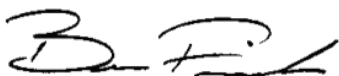
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	47	Pass
Impact Velocity	m/s	4.20 to 4.40	4.20	Pass
Maximum Probe Acceleration	G's	36 to 45	39	Pass
Pelvis Y Acceleration	G's	28 to 39	30	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4,624	Pass
Overall Test Results				Pass



Laboratory Technician

09/28/2023

Test Date

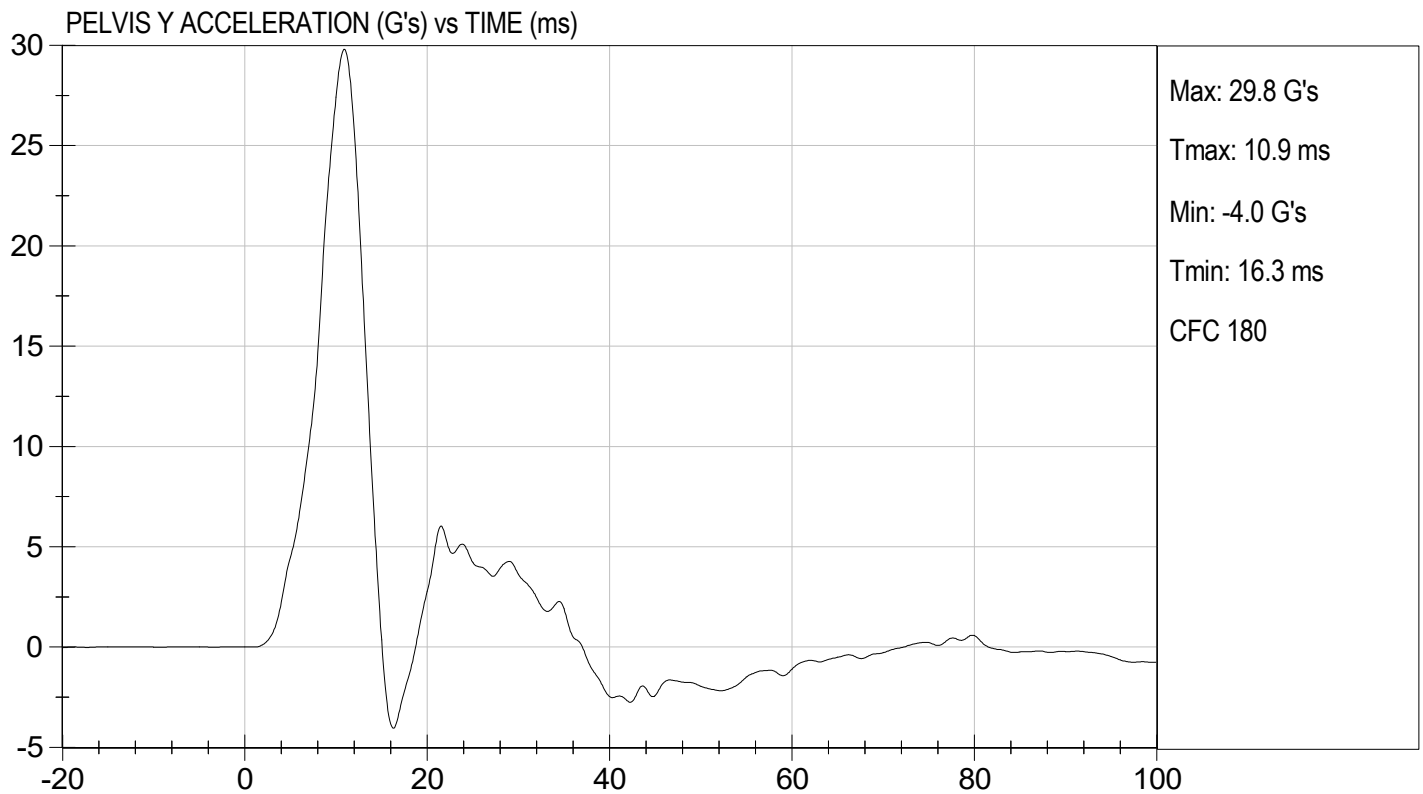
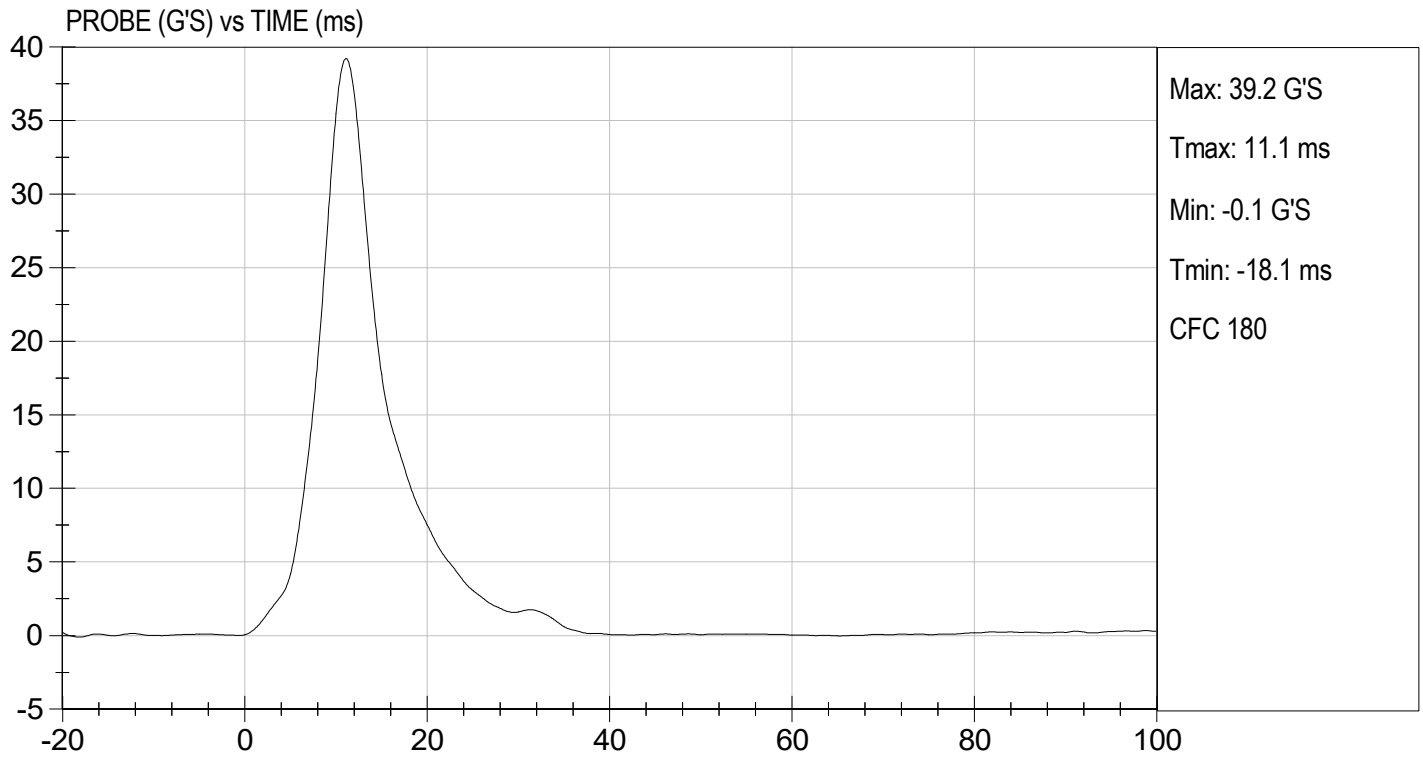


Approved By



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

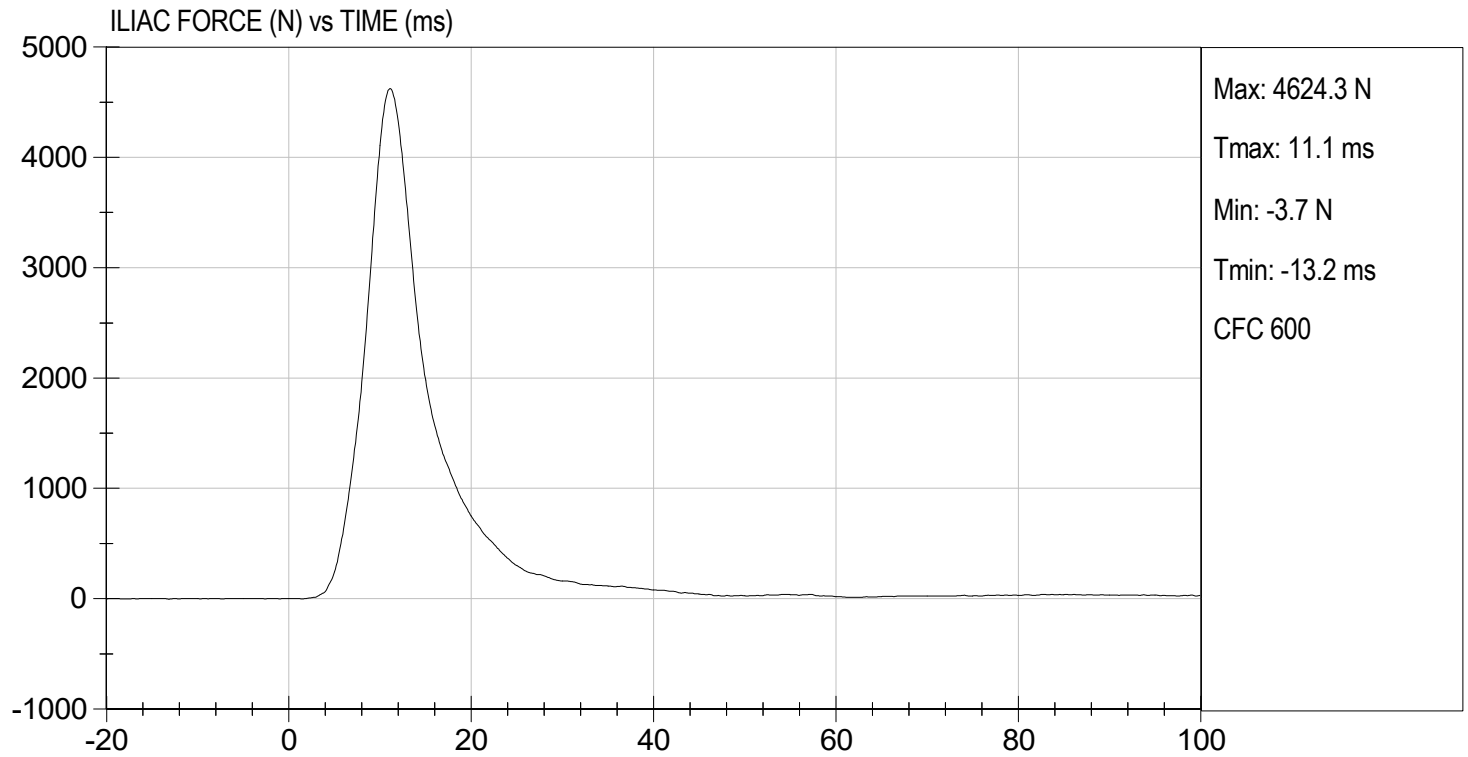
TEST DATE: 09/28/2023
TEST #: D232678





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

TEST DATE: 09/28/2023
TEST #: D232678



QUALIFICATION TEST RESULTS

POST-TEST

SID-IIS 5TH PERCENTILE FEMALE - DRIVER ATD

SID-IIsD External Measurements
SN: 296

No.	Name	Spec. (mm)	Result	Pass/Fail
A	Sitting Height	772 - 788	784	Pass
B	Shoulder Pivot Height	437 - 453	442	Pass
C	H-point Height	79 - 89	83	Pass
D	H-point from Seatback	141 - 151	145	Pass
E	Shoulder Pivot from Backline	97 - 107	99	Pass
F	Thigh Clearance	119 -135	121	Pass
G	Head Breadth	140 - 148	142	Pass
H	Head Back from Backline	40 - 46	45	Pass
I	Head Depth	178 - 188	180	Pass
J	Head Circumference	541 - 551	548	Pass
K	Buttock to Knee Length	514 - 540	535	Pass
L	Popliteal Height	343 - 369	358	Pass
M	Knee Pivot to Floor Height	392 - 409	404	Pass
N	Buttock Popliteal Length	416 - 442	435	Pass
O	Chest Depth w/o Jacket	195 - 211	206	Pass
P	Foot Length	216 - 232	219	Pass
Q	Hip Breadth (w/ pelvic plugs)	313 - 323	316	Pass
R	Arm Length	249 - 259	250	Pass
S	Knee Joint to Seatback	477 - 493	481	Pass
V	Shoulder Width	341 - 357	346	Pass
W	Foot Width	78 - 94	85	Pass
Y	Chest Circumference w/ jacket	851 - 881	870	Pass
Z	Waist Circumference	761 - 791	772	Pass

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

ATD Serial No: 296

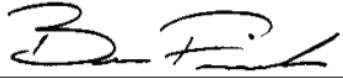
Test ID: D232811

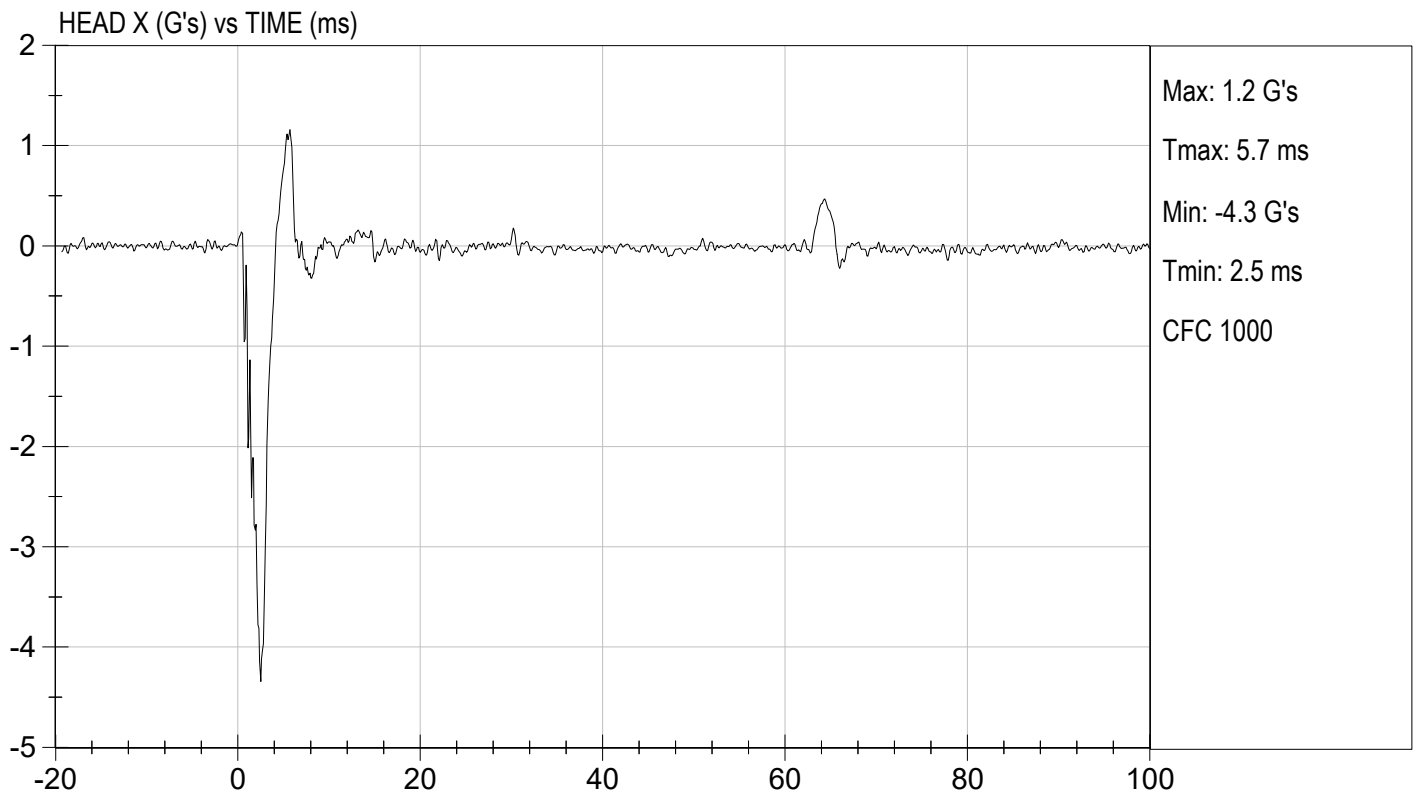
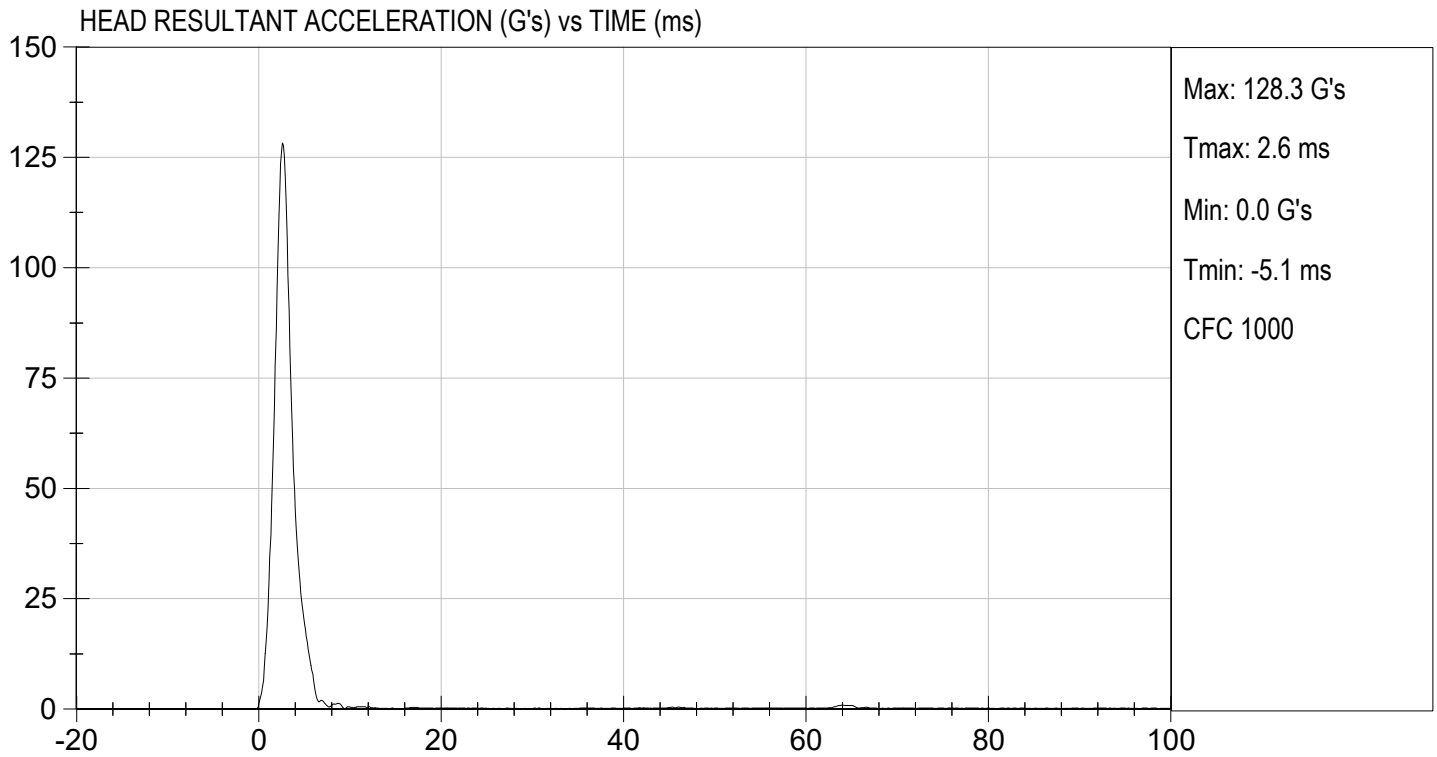
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	33	Pass
Peak Resultant Acceleration	G's	115 to 137	128	Pass
Peak Longitudinal Acceleration	G's	+/- 15	-4.3	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	<15%	Yes	Pass
			Overall Test Results	Pass

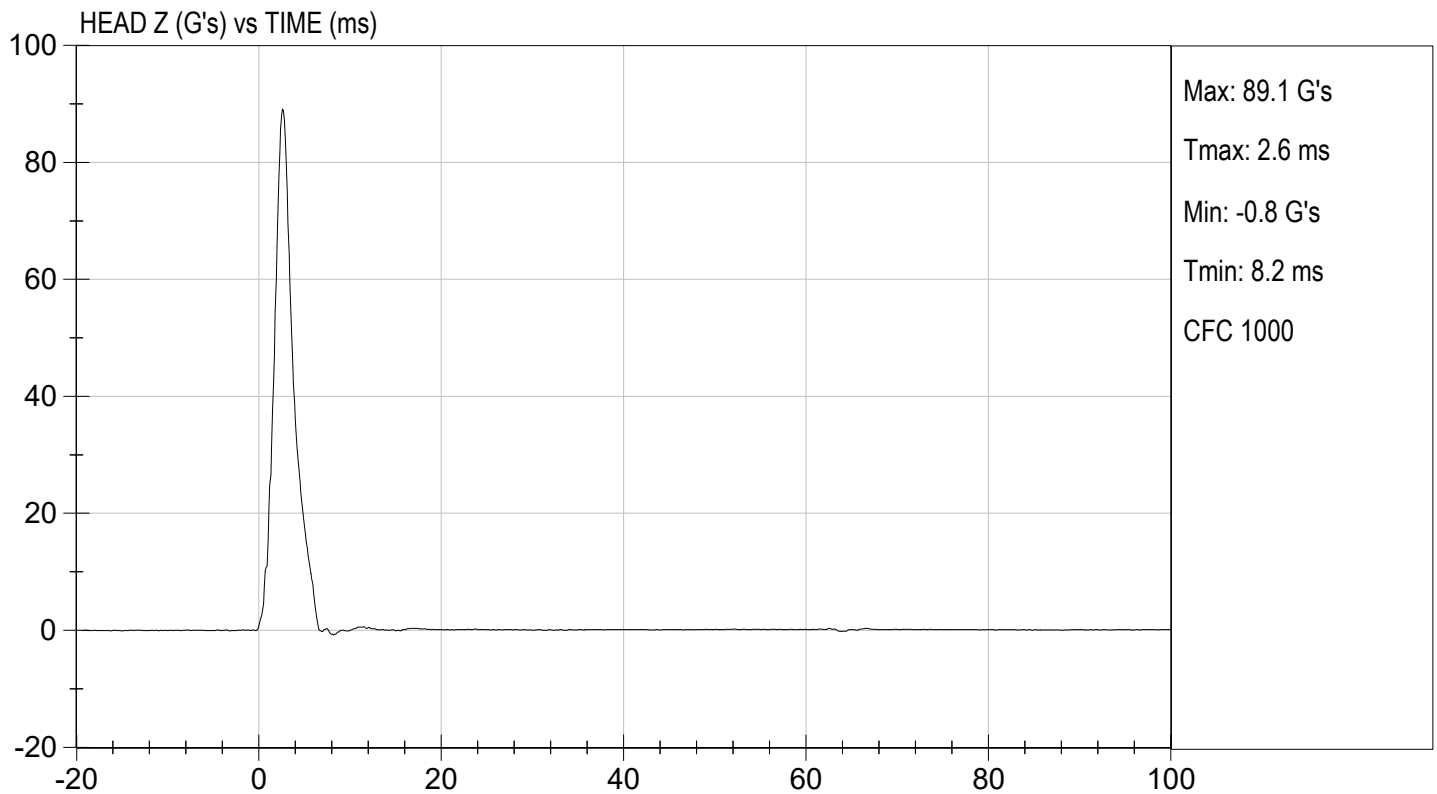
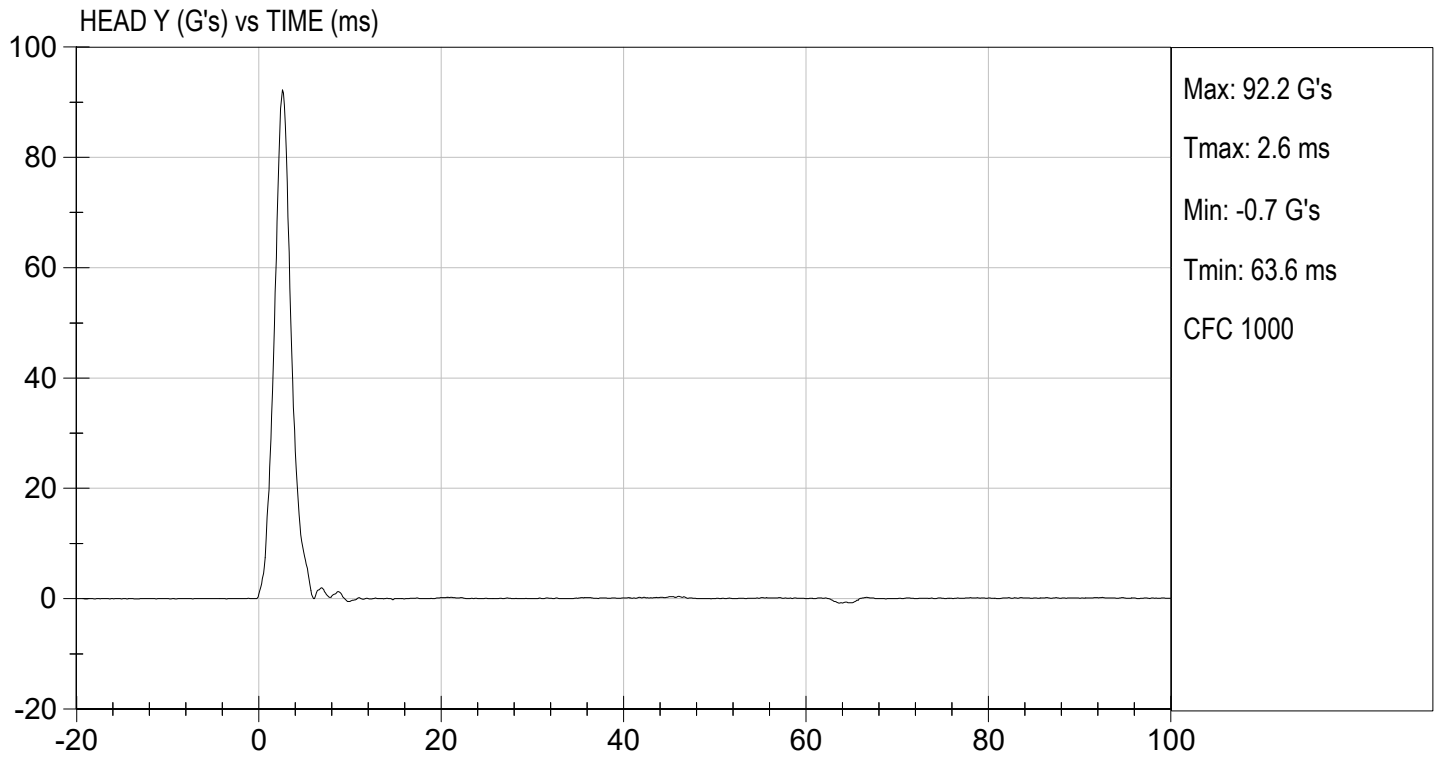

Laboratory Technician

10/11/2023

Test Date


Approved By





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

ATD Serial No: 296

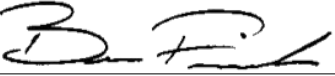
Test I.D: D232812

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.2	Pass
Humidity		%	10 to 70	33	Pass
Impact Velocity		m/s	5.51 to 5.63	5.62	Pass
Pendulum Velocity	10 ms	m/s	2.20 to 2.80	2.32	Pass
	15 ms	m/s	3.30 to 4.10	3.66	Pass
	20 ms	m/s	4.40 to 5.40	5.19	Pass
	25 ms	m/s	5.40 to 6.10	5.82	Pass
	25-100 ms	m/s	5.50 to 6.20	5.86	Pass
Maximum D-Plane Rotation		deg	71 to 81	75	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	62	Pass
Maximum Occipital Condyle Moment		Nm	-44 to -36	-41	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	118	Pass
Overall Test Results				Pass	


 Laboratory Technician

10/11/2023

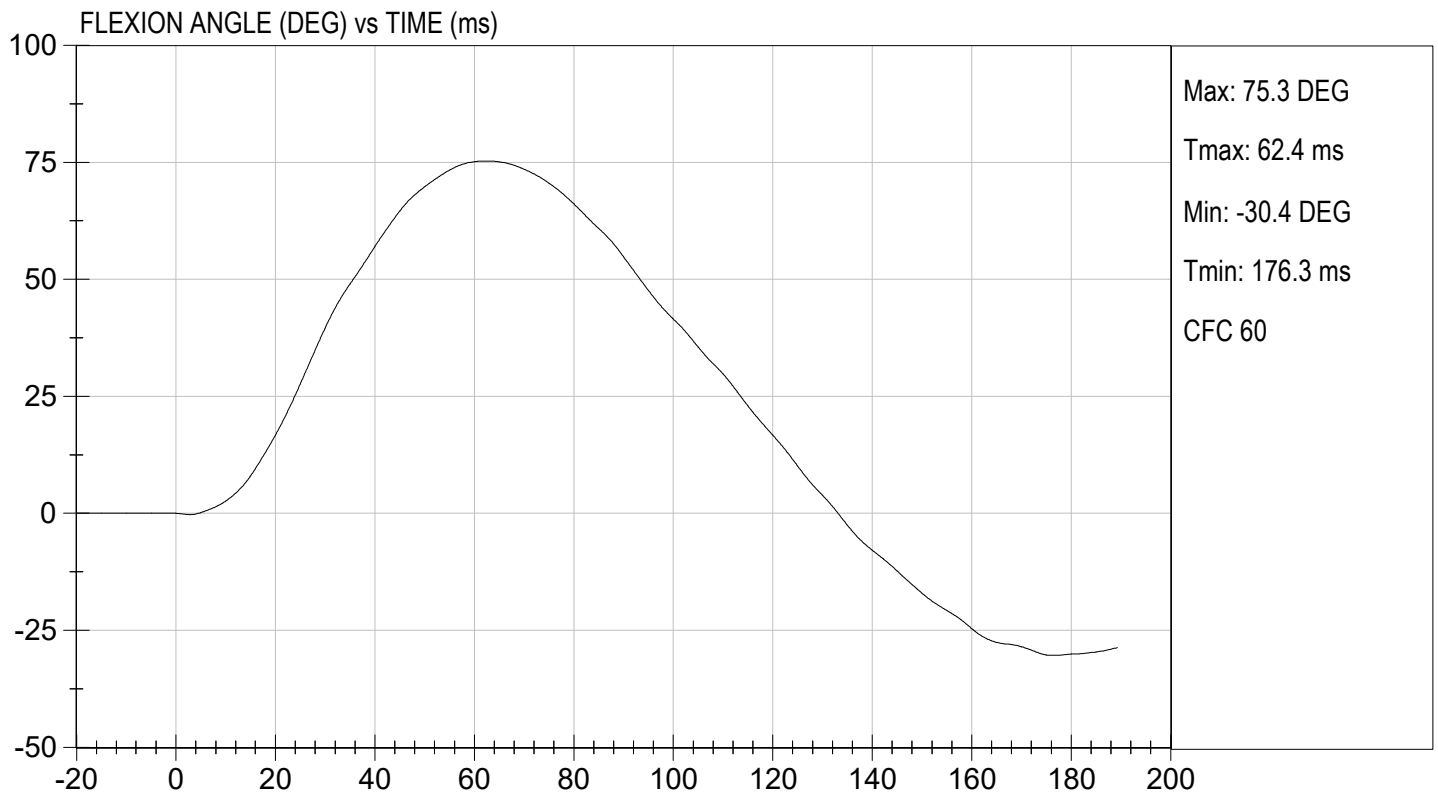
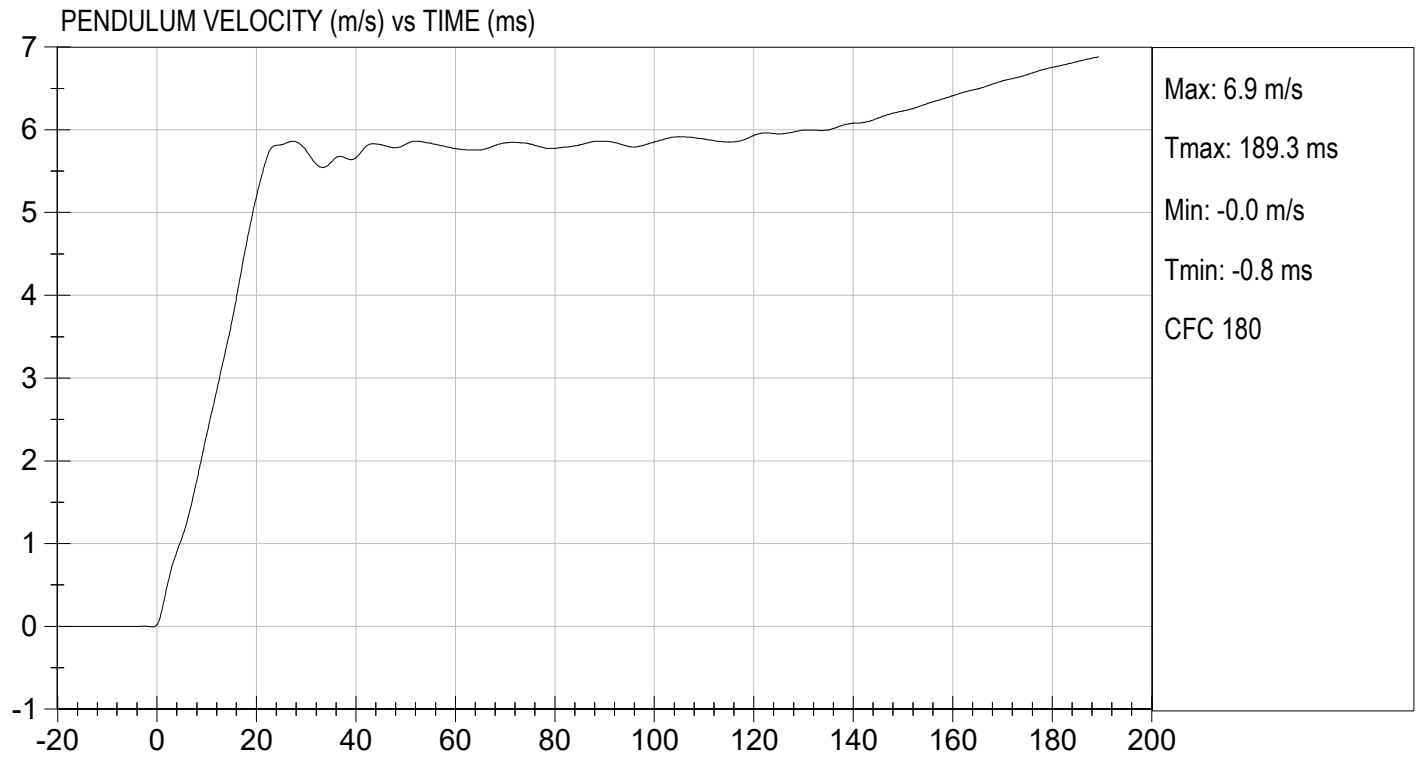
Test Date


 Approved By



TEST DESC: NECK BENDING
VELOCITY: 18.45 ft/s, 5.62 m/s

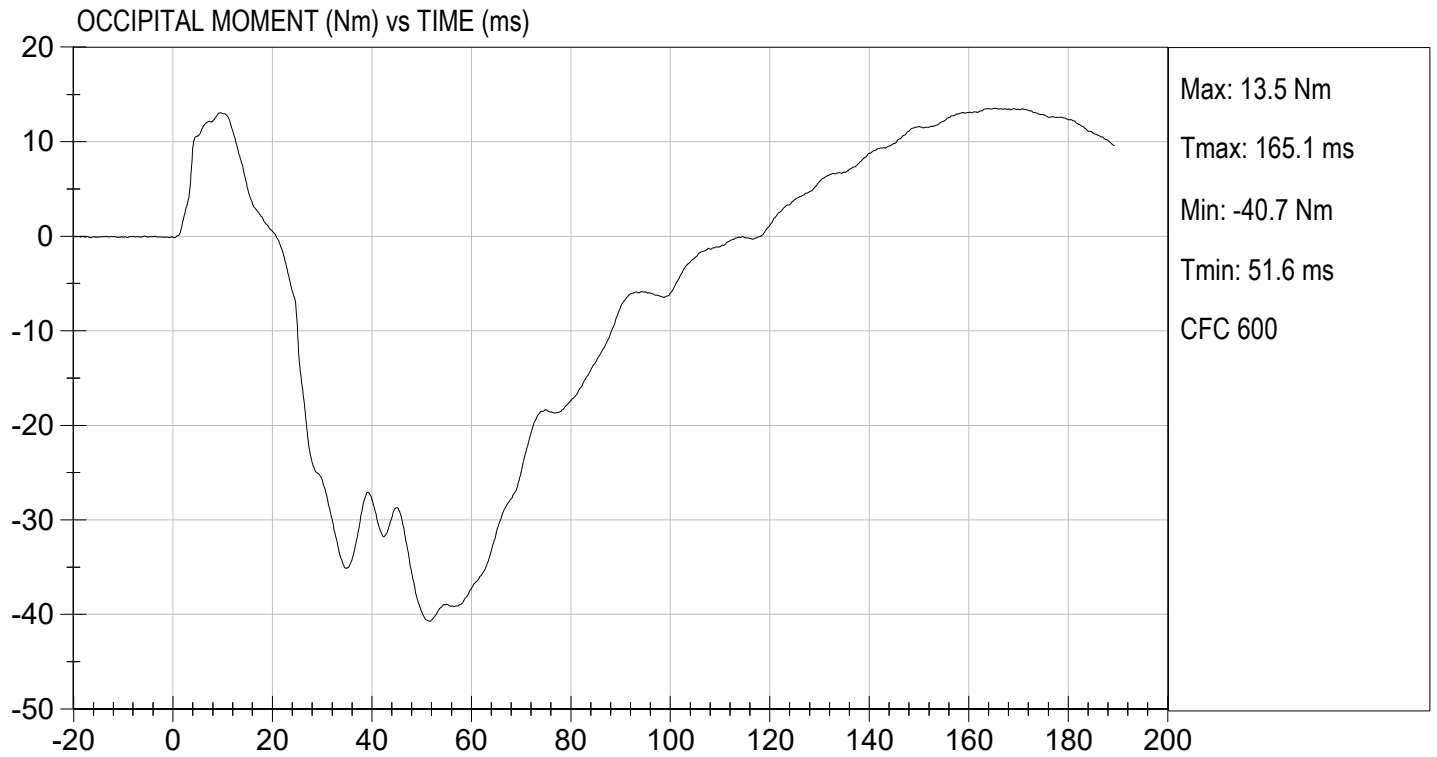
TEST DATE: 10/11/2023
TEST #: D232812





TEST DESC: NECK BENDING
VELOCITY: 18.45 ft/s, 5.62 m/s

TEST DATE: 10/11/2023
TEST #: D232812



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

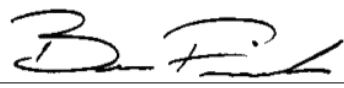
ATD Serial No: 296

Test ID: D232813

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	36	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Maximum Probe Acceleration	G's	13 to 18	16	Pass
Shoulder Displacement	mm	28 to 37	30	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	19	Pass
			Overall Test Results	Pass


Laboratory Technician

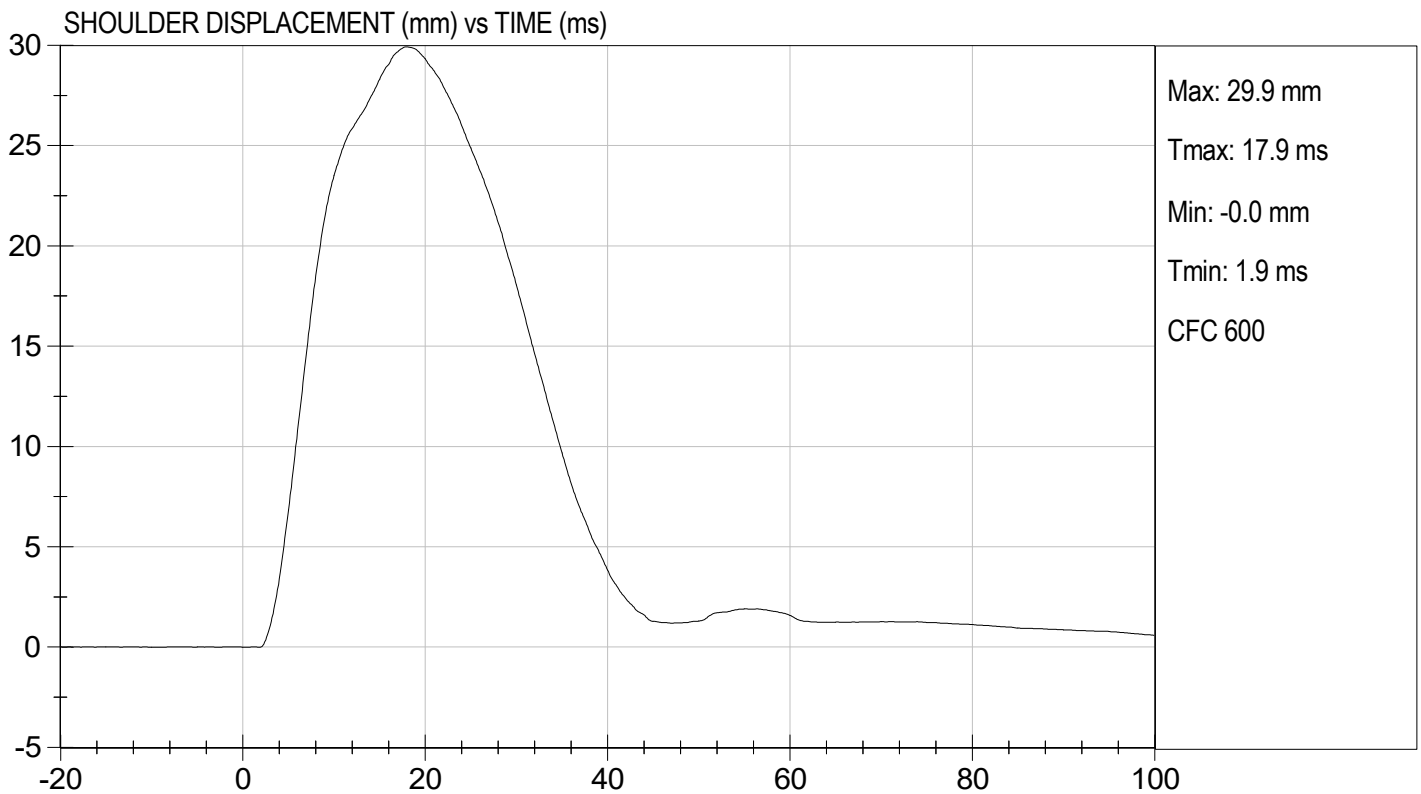
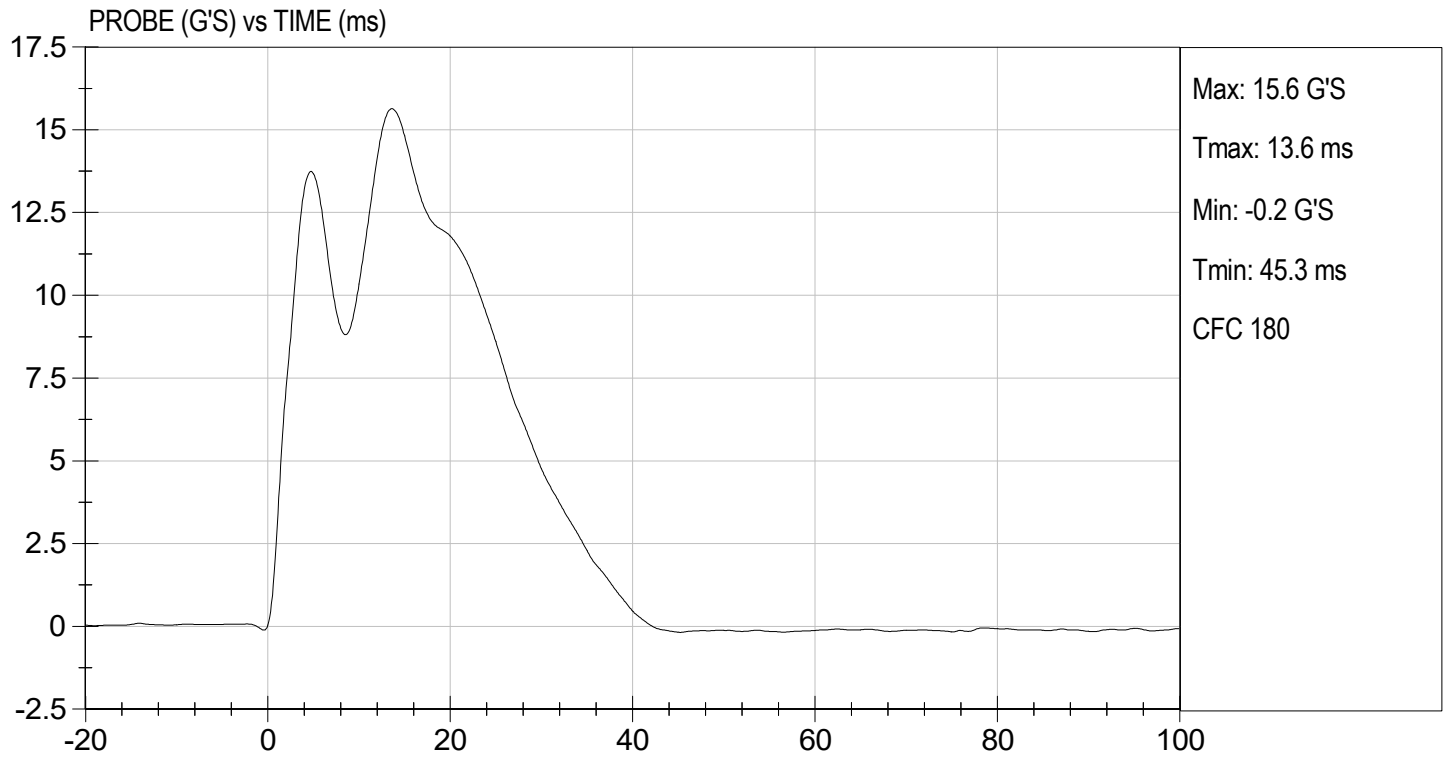
10/11/2023
Test Date


Approved By



TEST DESC: SHOULDER IMPACT
VELOCITY: 14.25 ft/s, 4.34 m/s

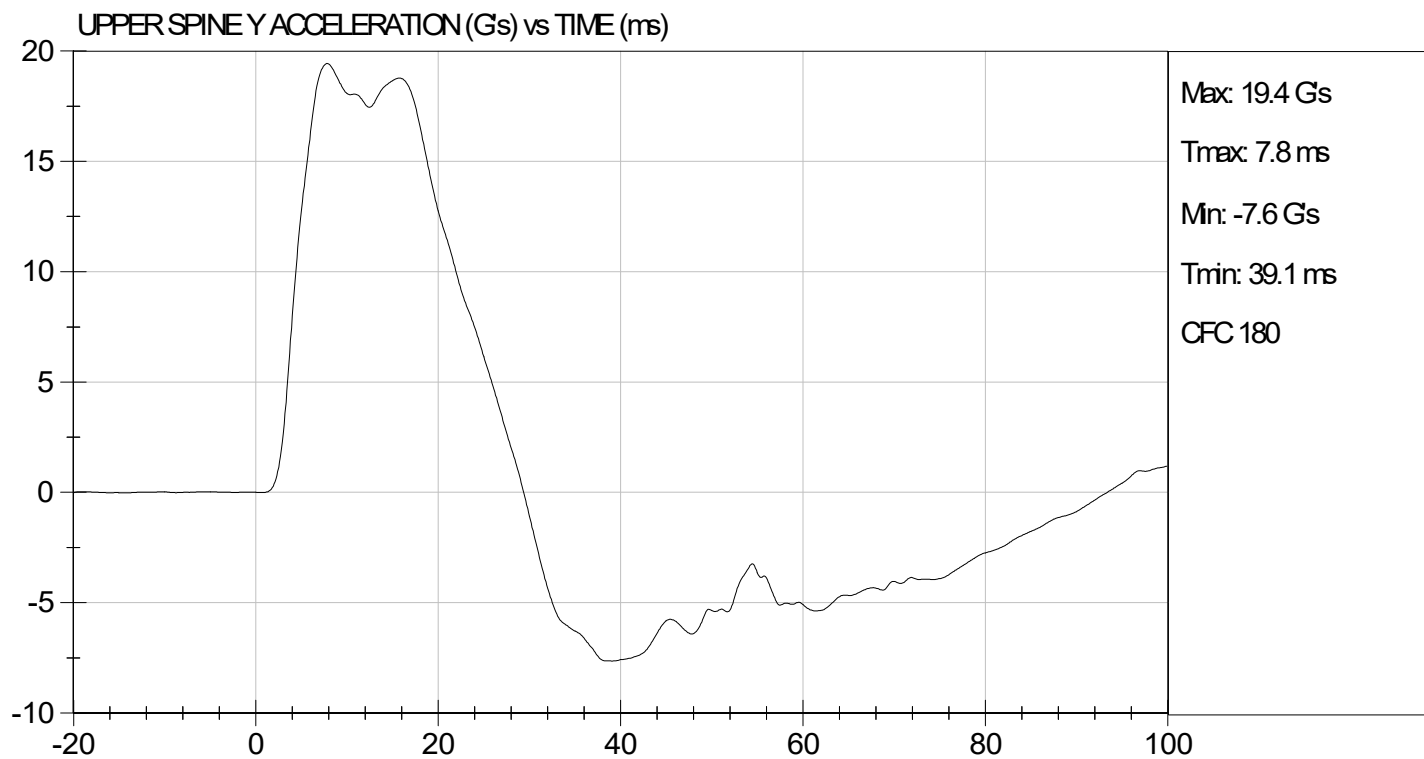
TEST DATE: 10/11/2023
TEST #: D232813





TEST DESC: SHOULDER IMPACT
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 10/11/2023
TEST #: D232813



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

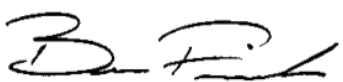
ATD Serial No: 296

Test I.D: D232814

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.2	Pass
Humidity	%	10 to 70	36	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	Pass
Maximum Probe Acceleration	G's	30 to 36	34	Pass
Shoulder Displacement	mm	31 to 40	37	Pass
Upper Rib Displacement	mm	25 to 32	29	Pass
Middle Rib Displacement	mm	30 to 36	31	Pass
Lower Rib Displacement	mm	32 to 38	33	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	38	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	35	Pass
Overall Test Results				Pass


Laboratory Technician

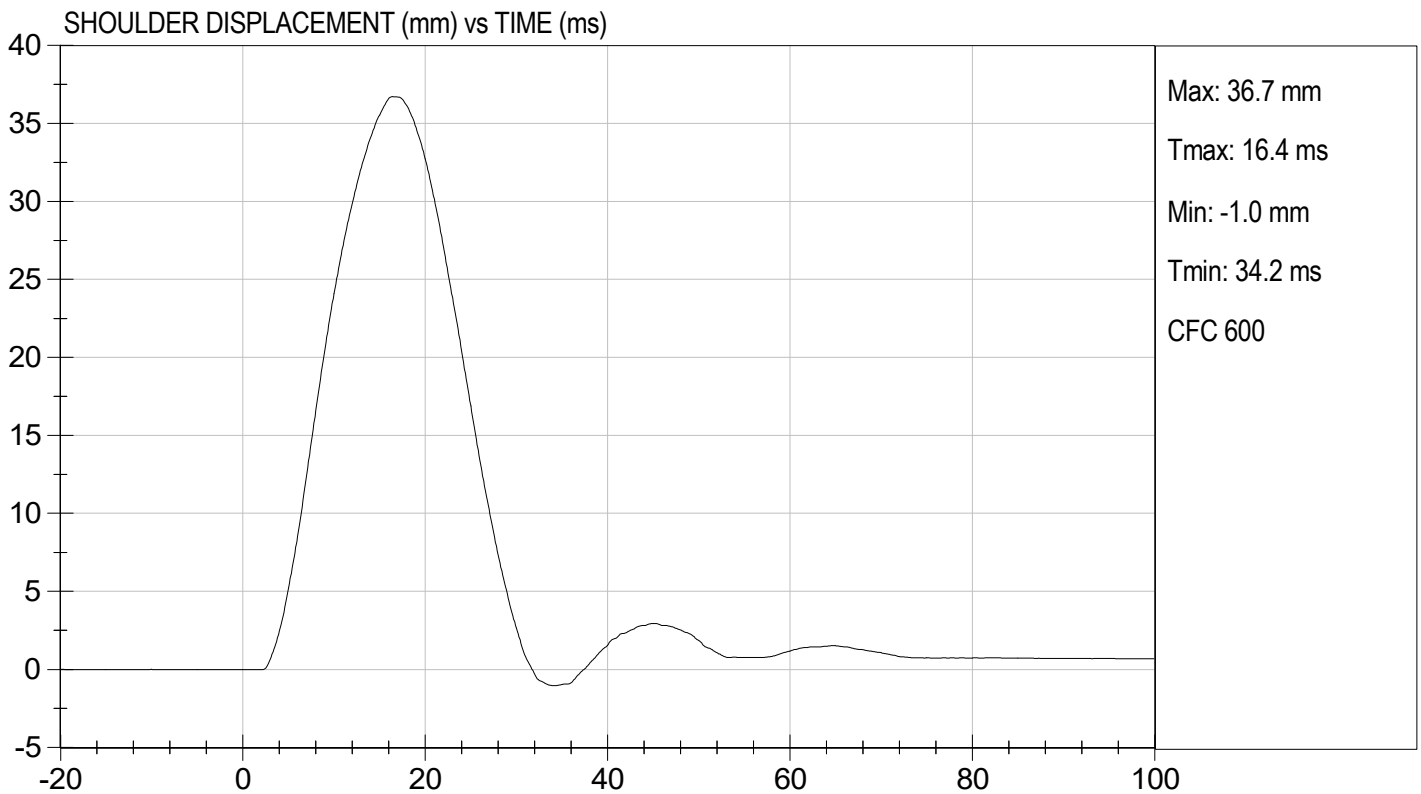
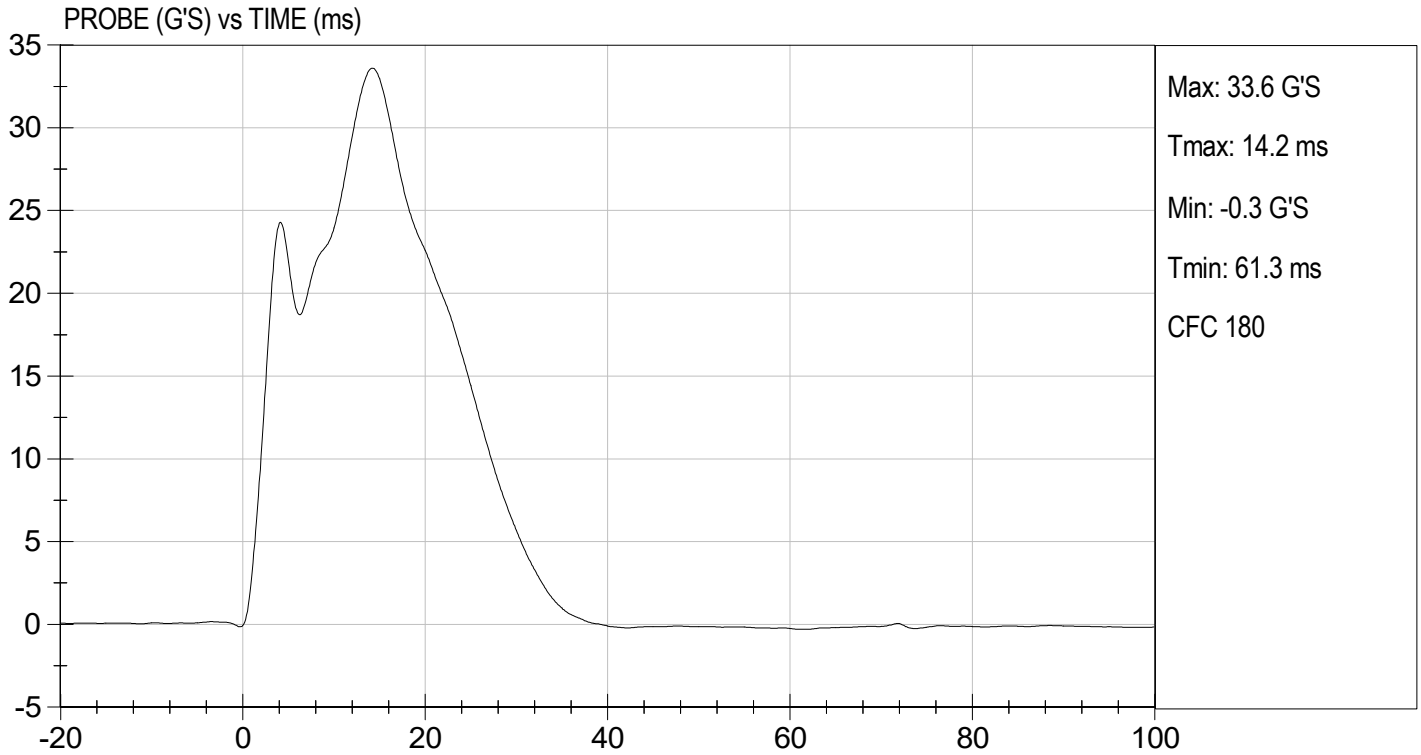
10/11/2023
Test Date


Approved By



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

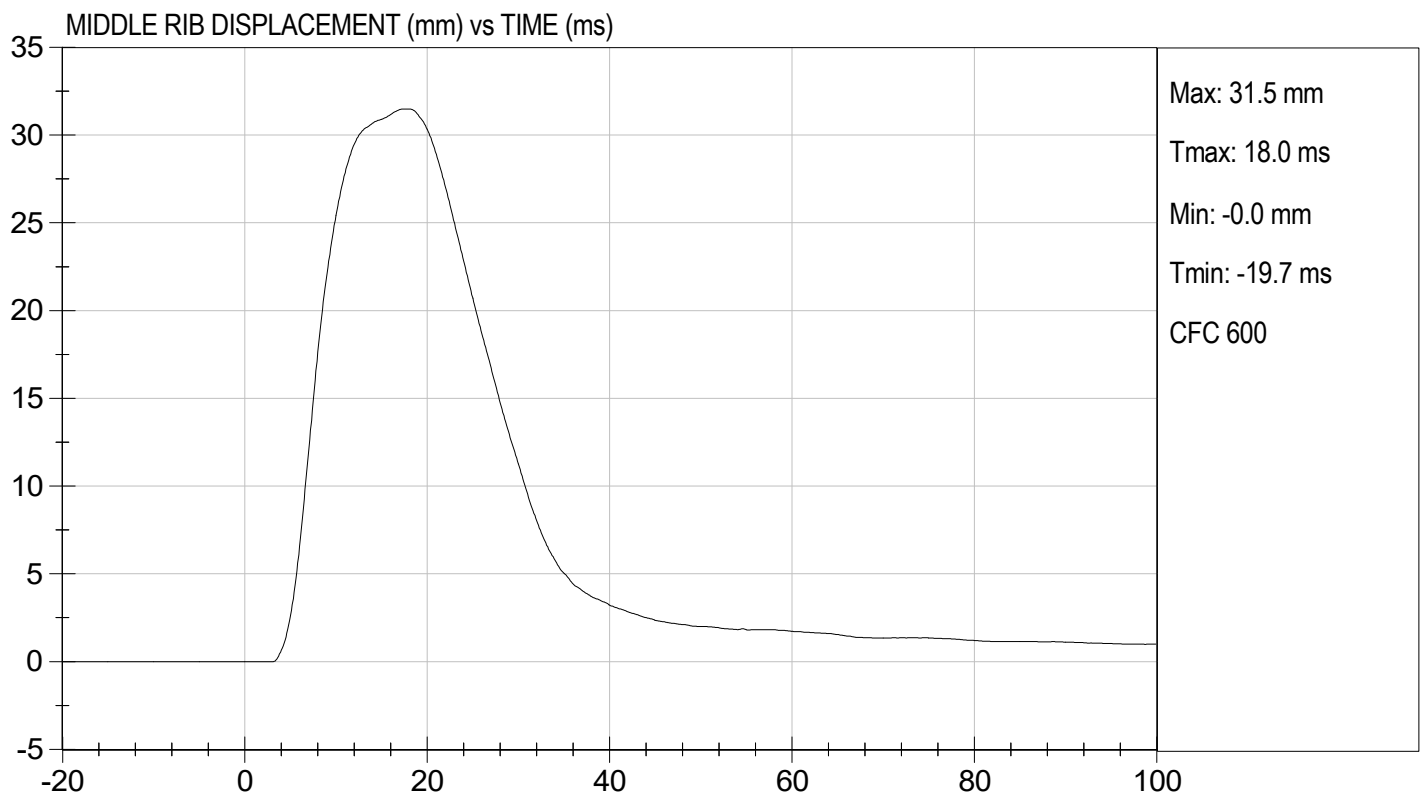
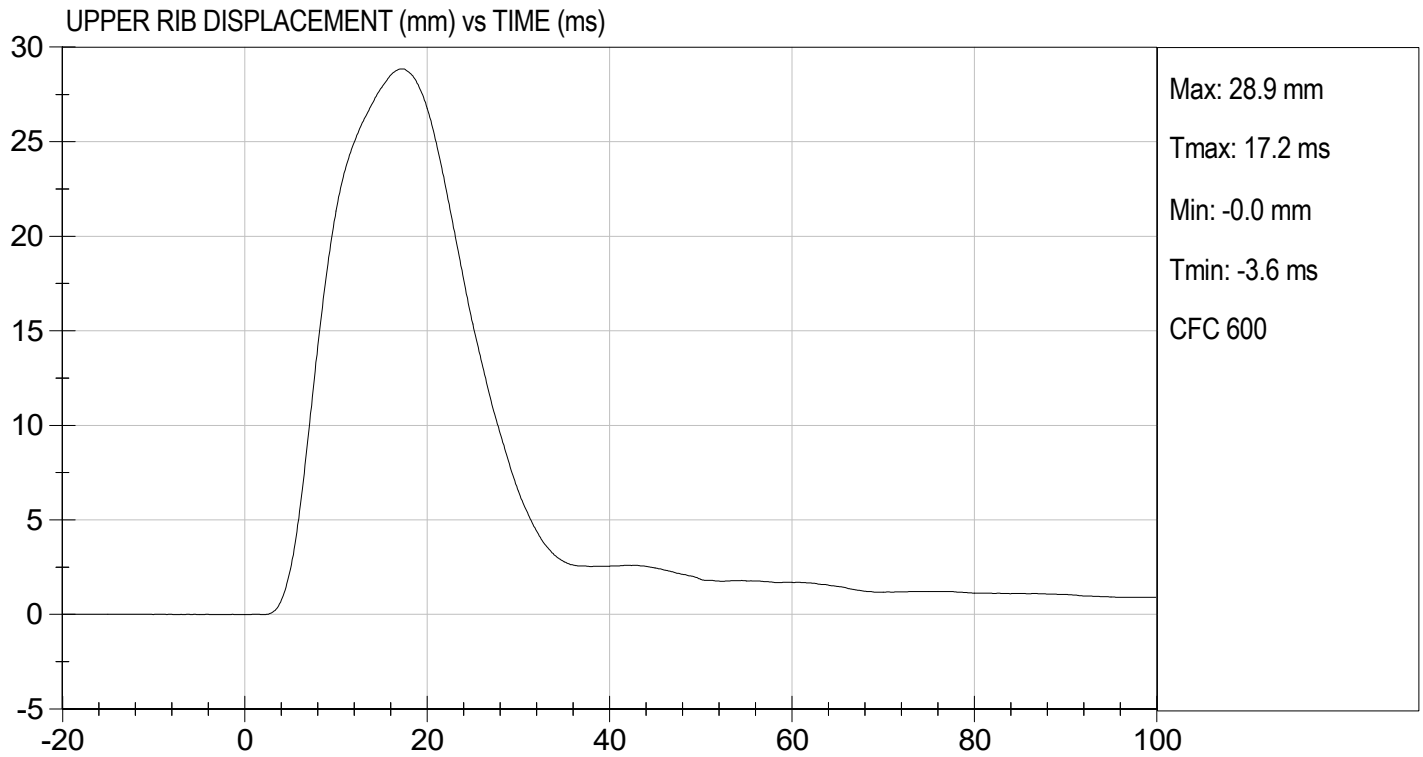
TEST DATE: 10/11/2023
TEST #: D232814





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

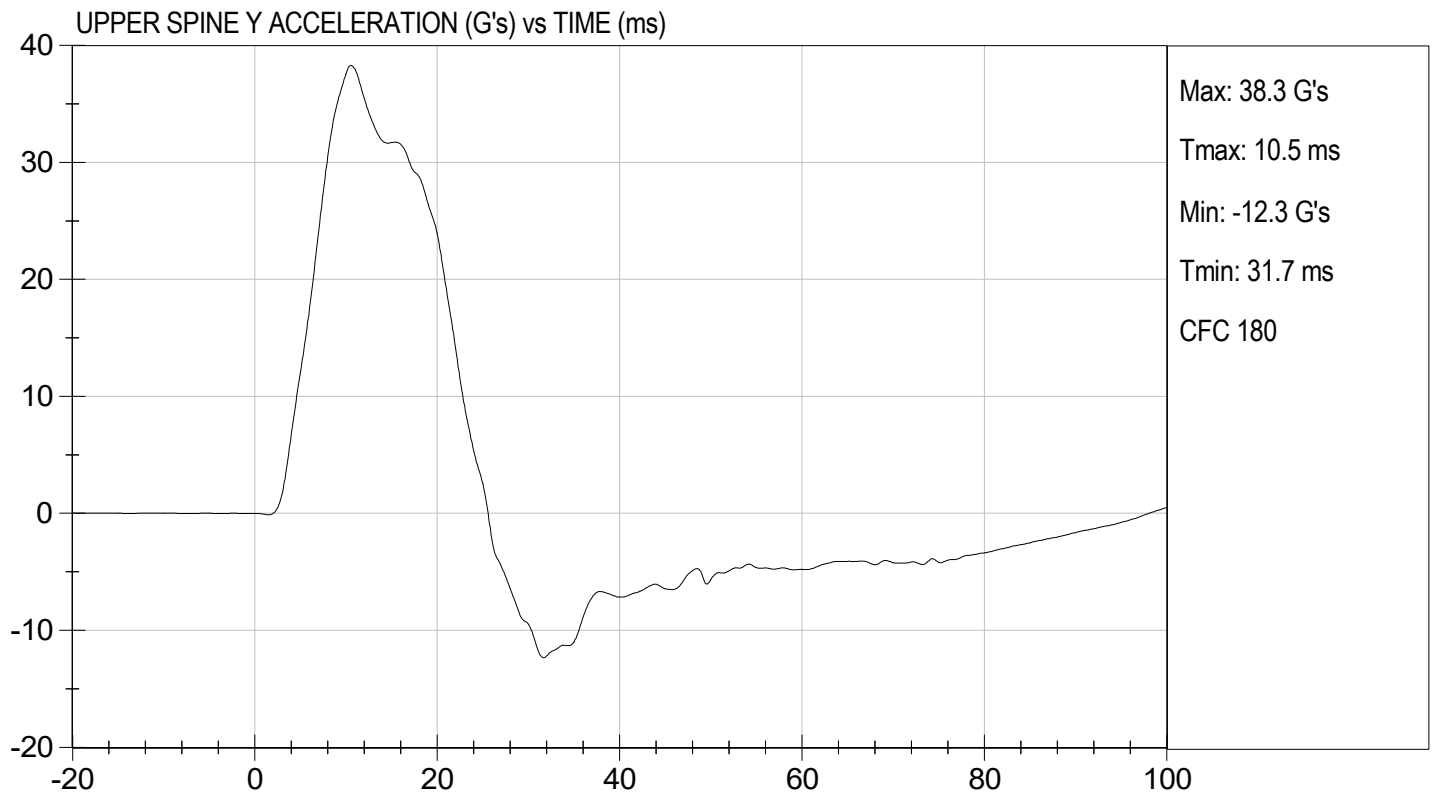
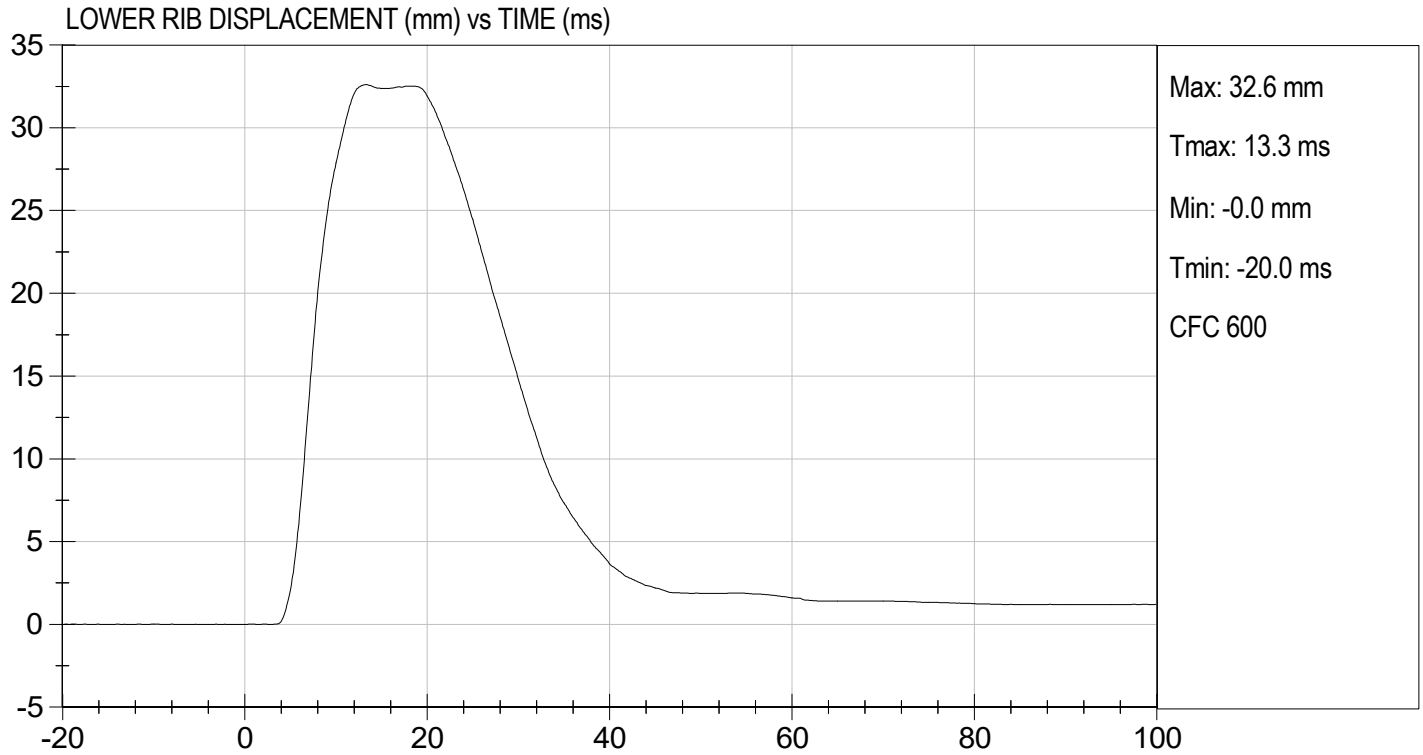
TEST DATE: 10/11/2023
TEST #: D232814





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

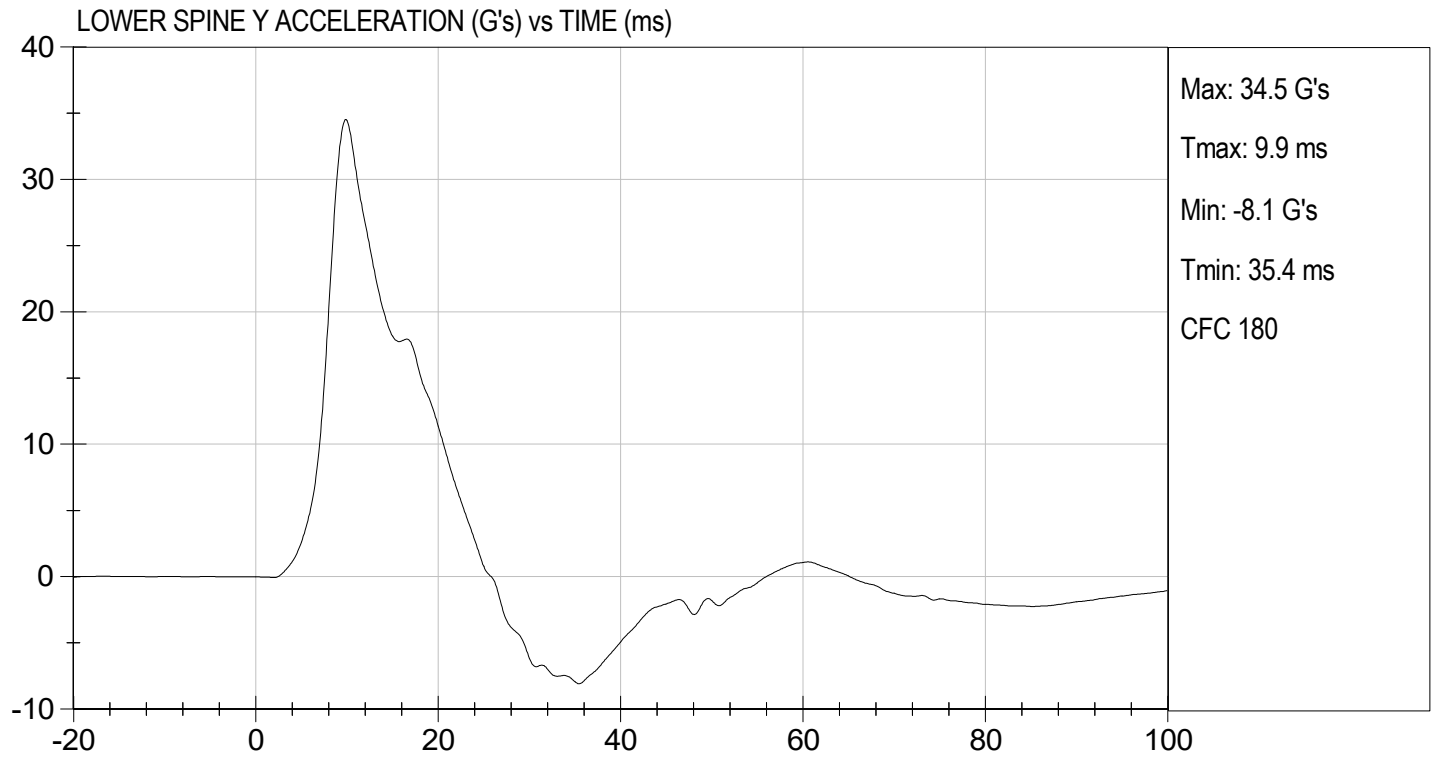
TEST DATE: 10/11/2023
TEST #: D232814





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

TEST DATE: 10/11/2023
TEST #: D232814



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

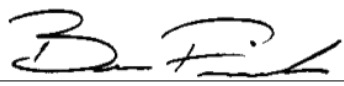
ATD Serial No: 296

Test I.D: D232815

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.2	Pass
Humidity	%	10 to 70	36	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Maximum Probe Acceleration	G's	14 to 18	16	Pass
Upper Rib Displacement	mm	32 to 40	39	Pass
Middle Rib Displacement	mm	39 to 45	43	Pass
Lower Rib Displacement	mm	35 to 43	40	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

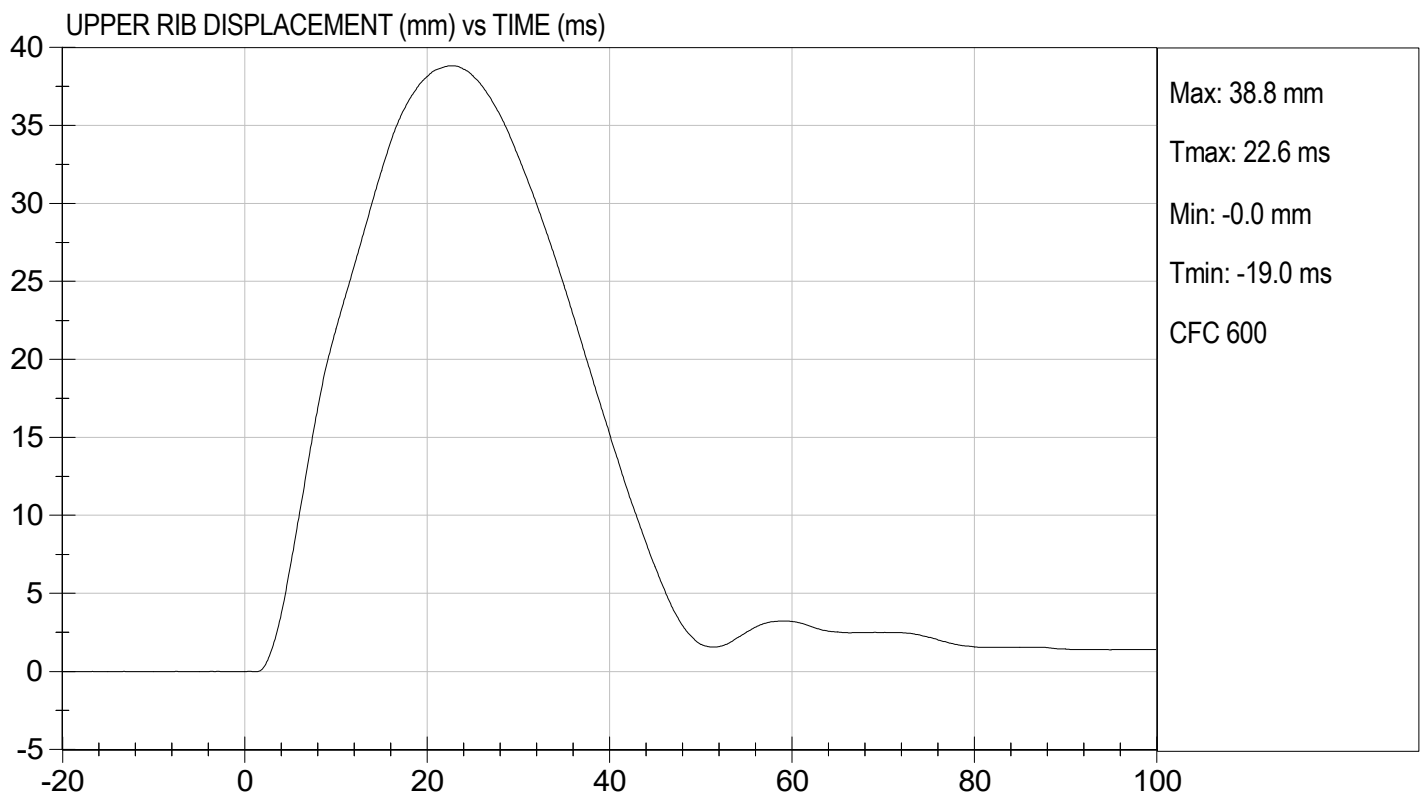
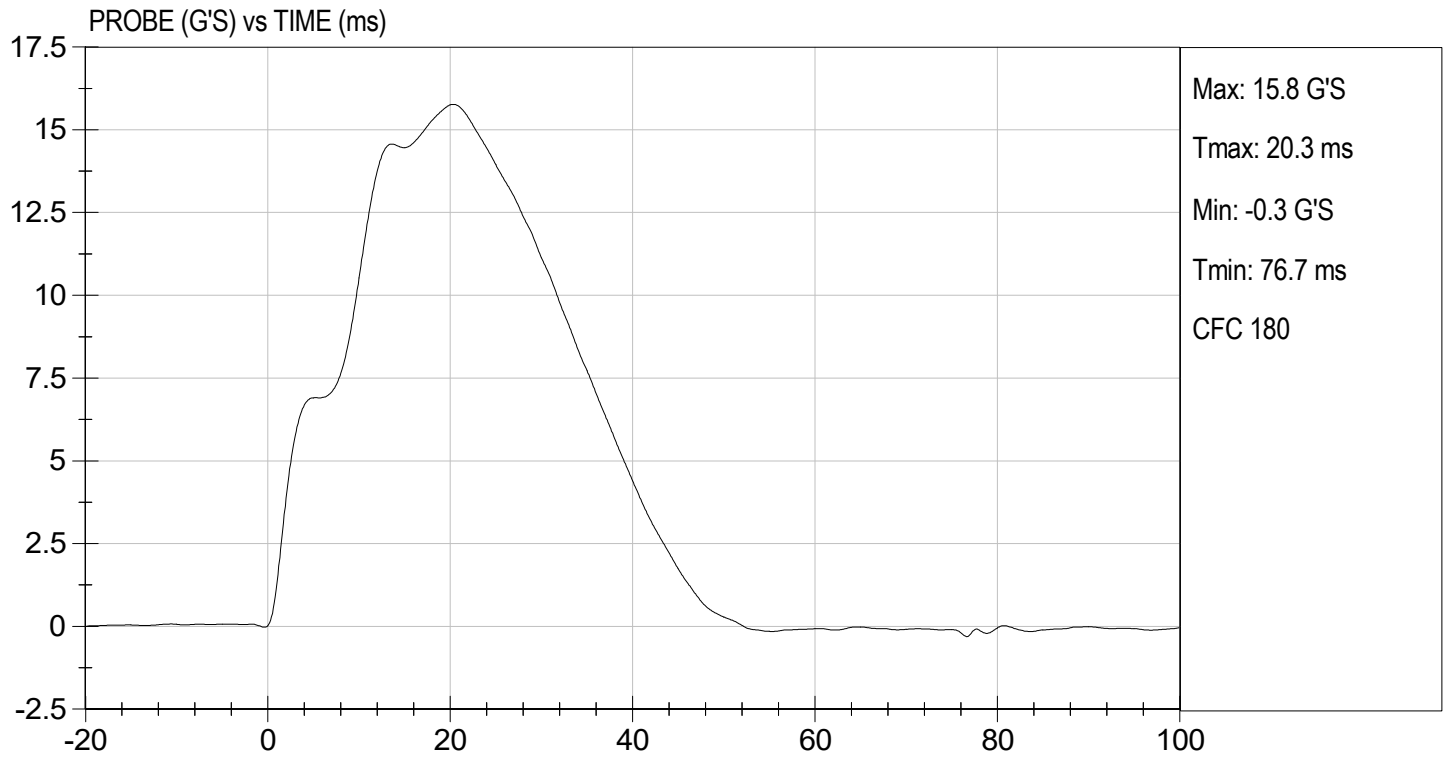
10/11/2023
 Test Date


 Approved By



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

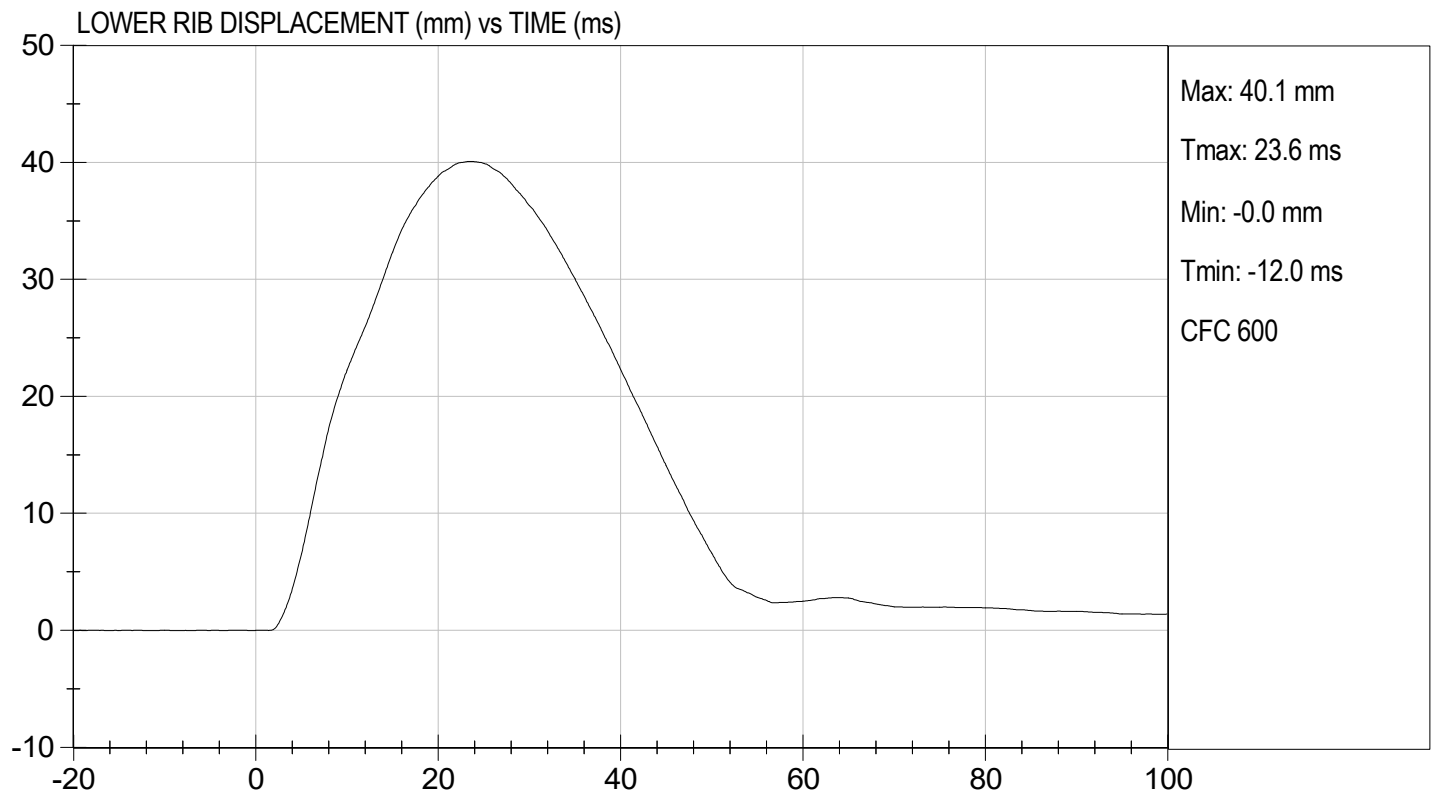
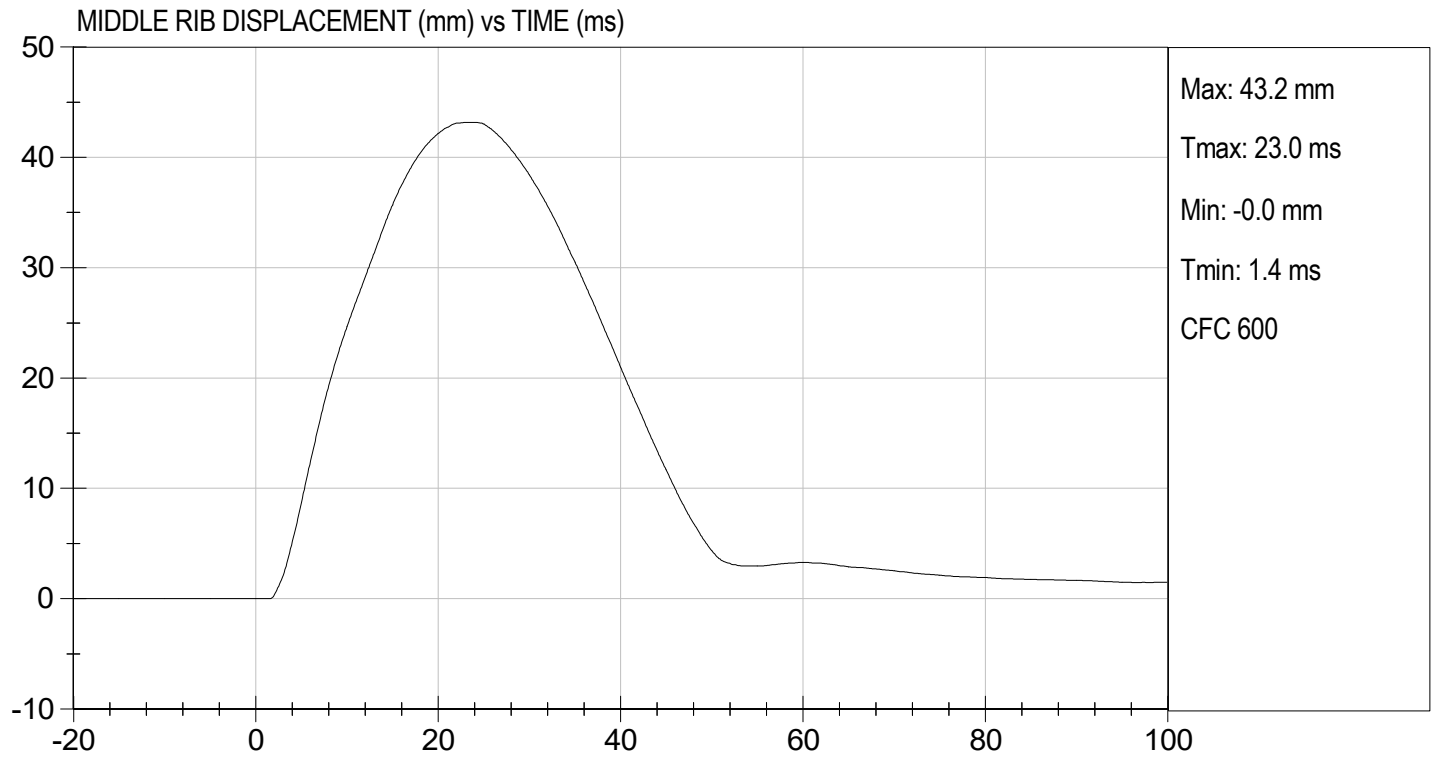
TEST DATE: 10/11/2023
TEST #: D232815





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

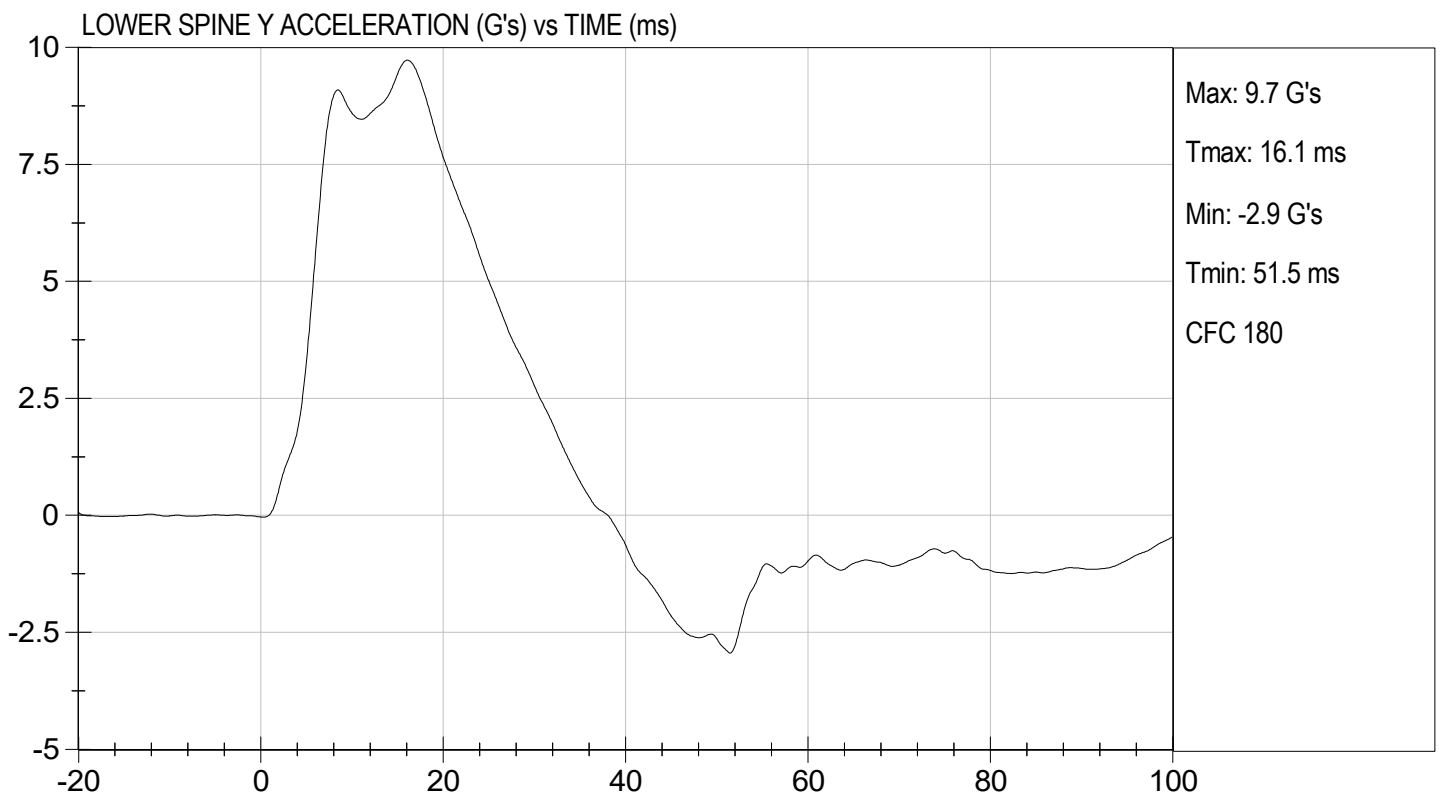
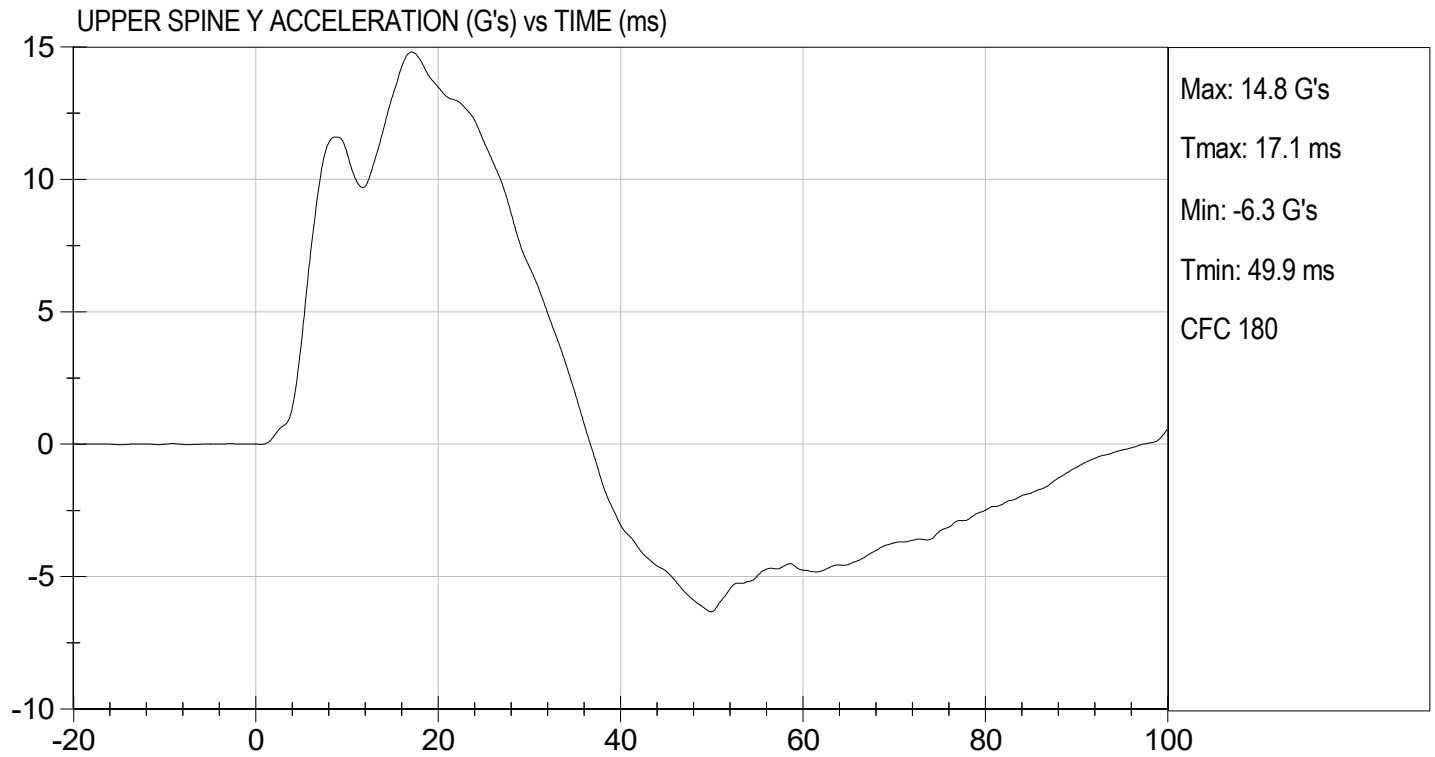
TEST DATE: 10/11/2023
TEST #: D232815





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

TEST DATE: 10/11/2023
TEST #: D232815



MGA RESEARCH CORPORATION
ABDOMINAL IMPACT TEST
SID-11s BUILD LEVEL D DUMMY

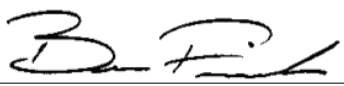
ATD Serial No: 296

Test I.D: D232816

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21	Pass
Humidity	%	10 to 70	36	Pass
Impact Velocity	m/s	4.20 to 4.40	4.27	Pass
Maximum Probe Acceleration	G's	12 to 16	14	Pass
Upper Abdomen Rib Displacement	mm	36 to 47	43	Pass
Lower Abdomen Rib Displacement	mm	33 to 44	37	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	12	Pass
Overall Test Results				Pass


Laboratory Technician

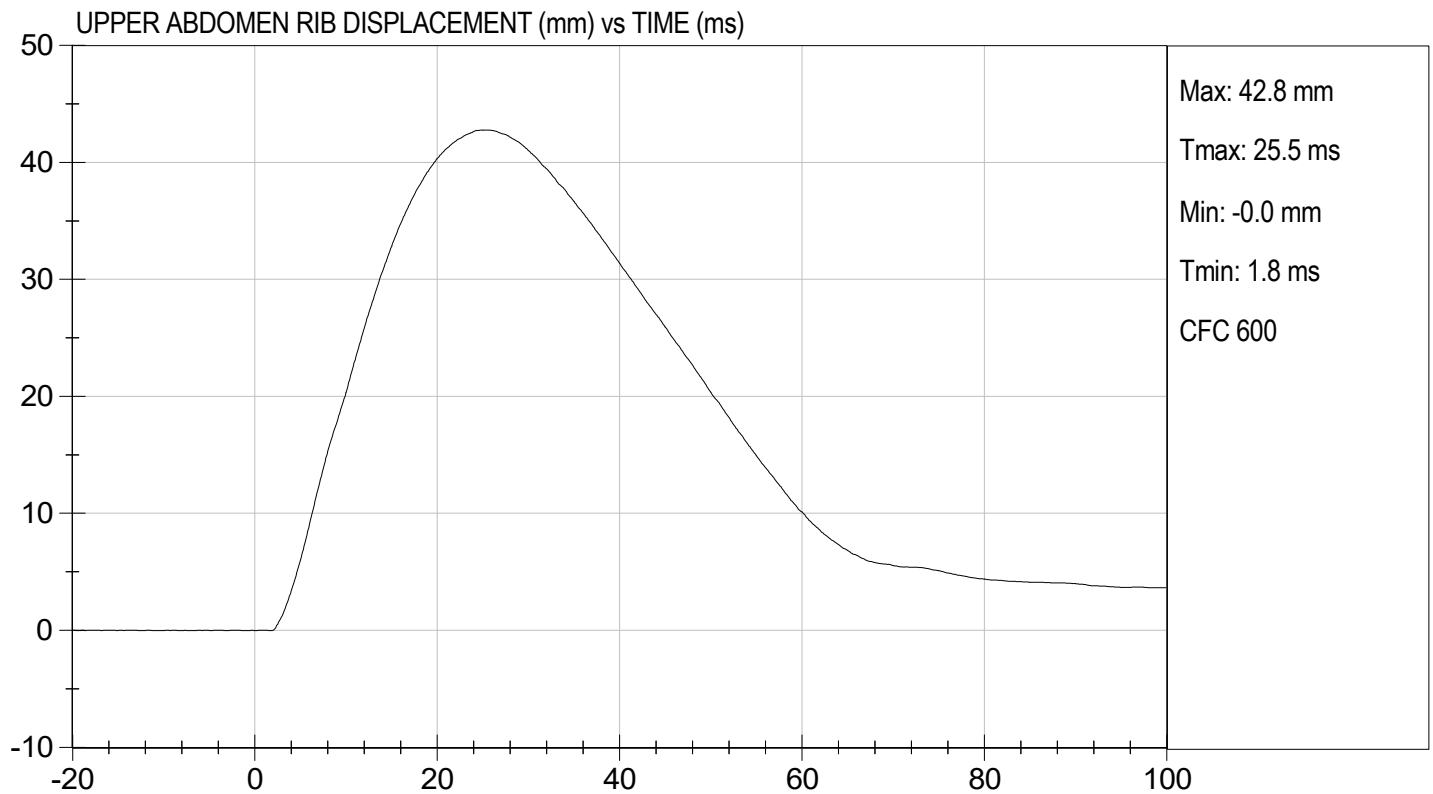
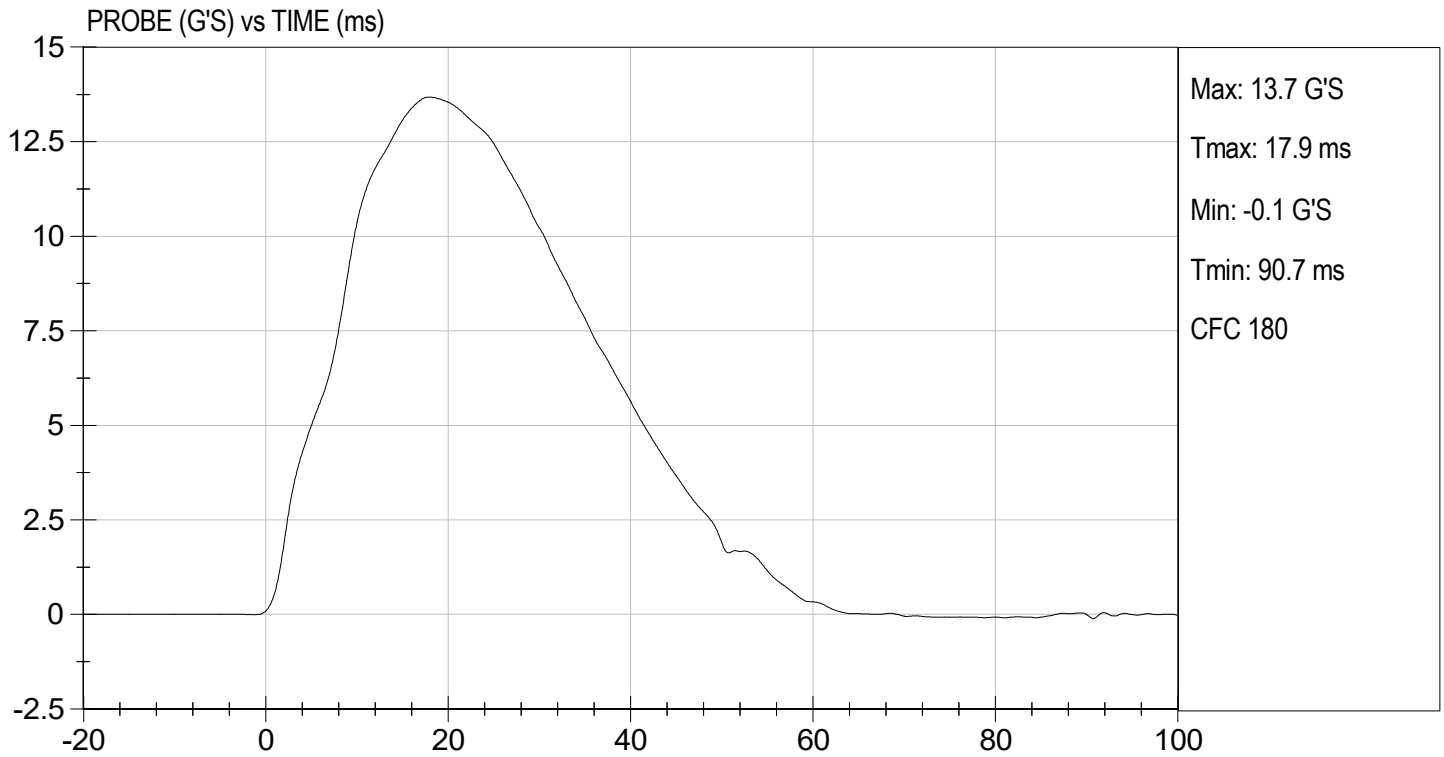
10/11/2023
Test Date


Approved By



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

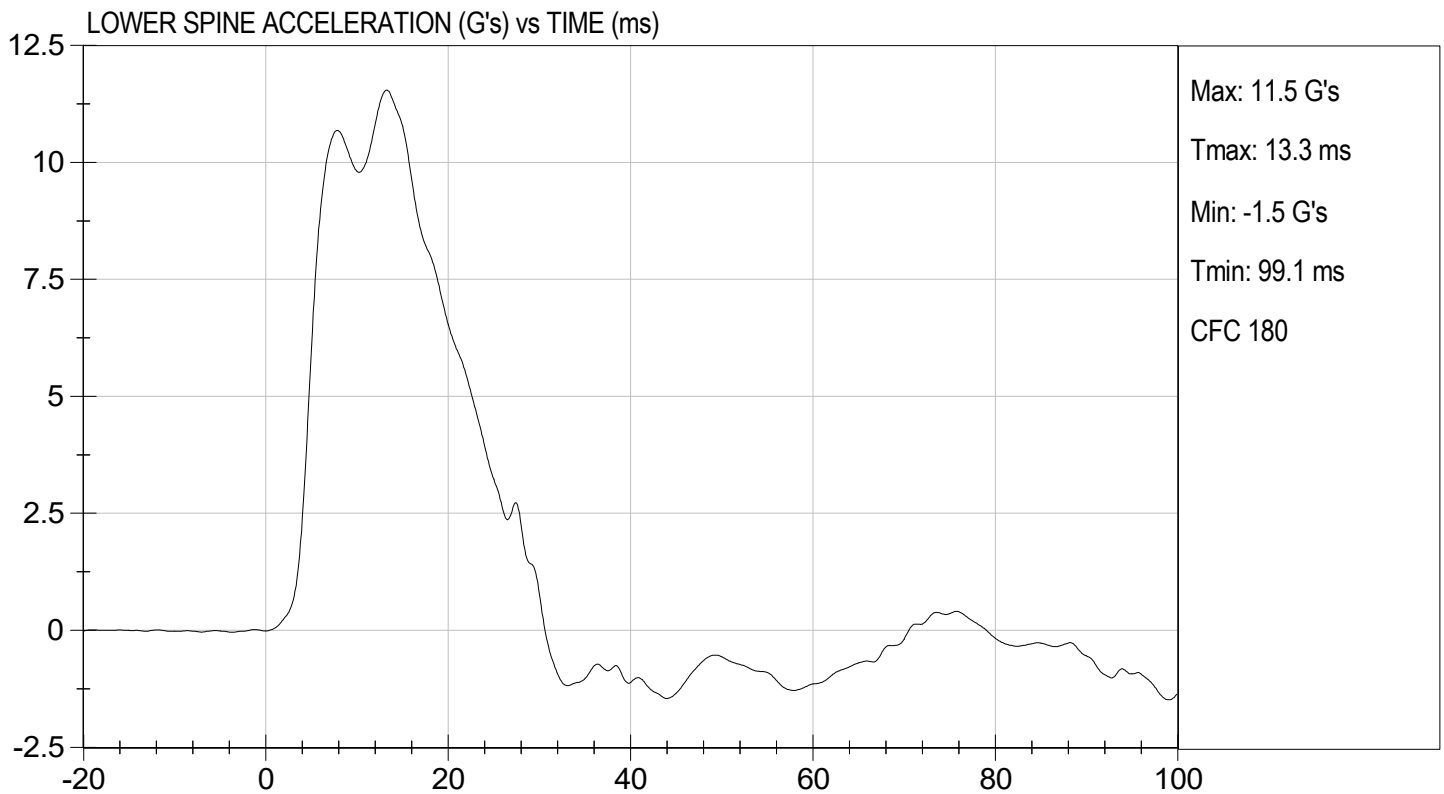
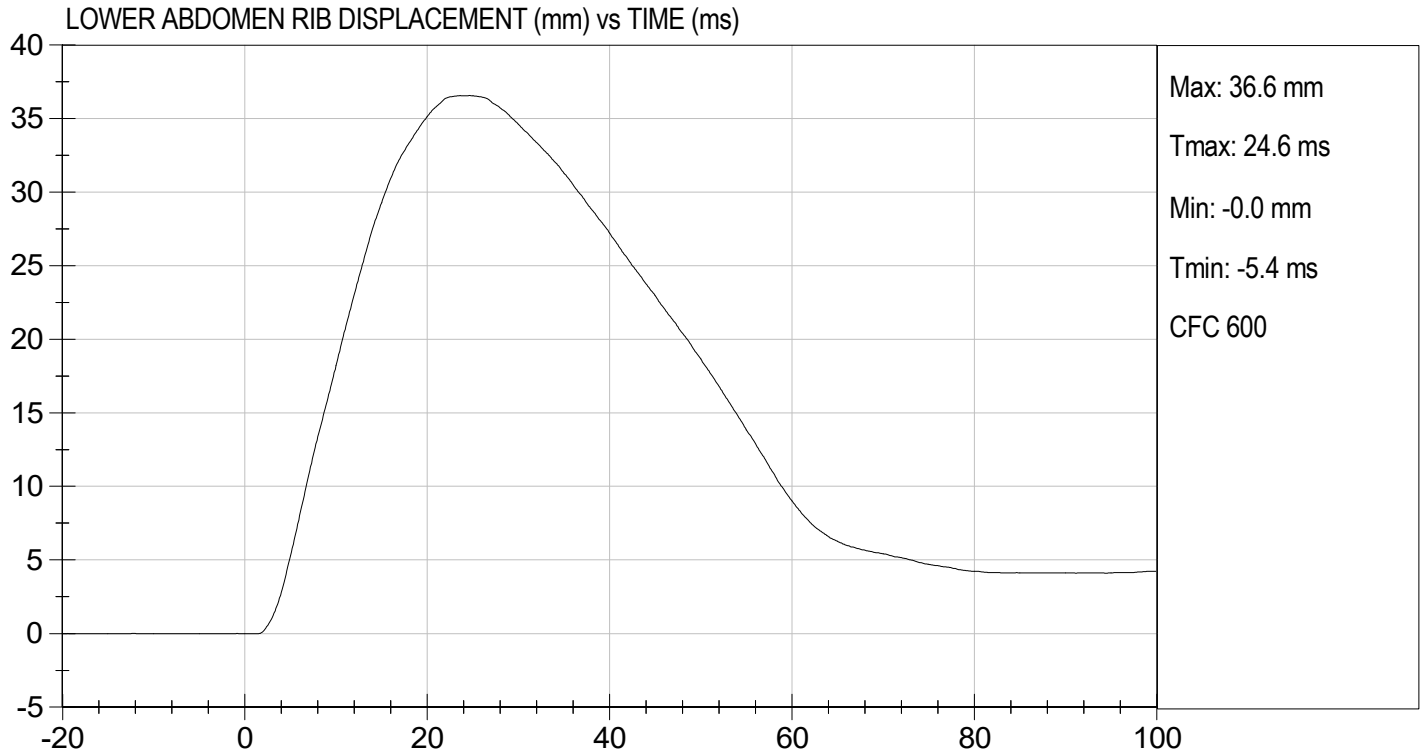
TEST DATE: 10/11/2023
TEST #: D232816





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

TEST DATE: 10/11/2023
TEST #: D232816



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

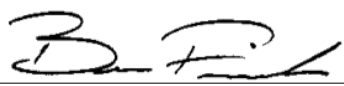
ATD Serial No: 296

Test I.D: D232817

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.2	Pass
Humidity	%	10 to 70	36	Pass
Impact Velocity	m/s	6.60 to 6.80	6.60	Pass
Maximum Probe Acceleration	G's	38 to 47	40	Pass
Pelvis Y Acceleration After 6 ms	G's	34 to 42	39.3	Pass
Peak Acetabulum Force	N	3600 to 4300	3,791	Pass
Overall Test Results				Pass


Laboratory Technician

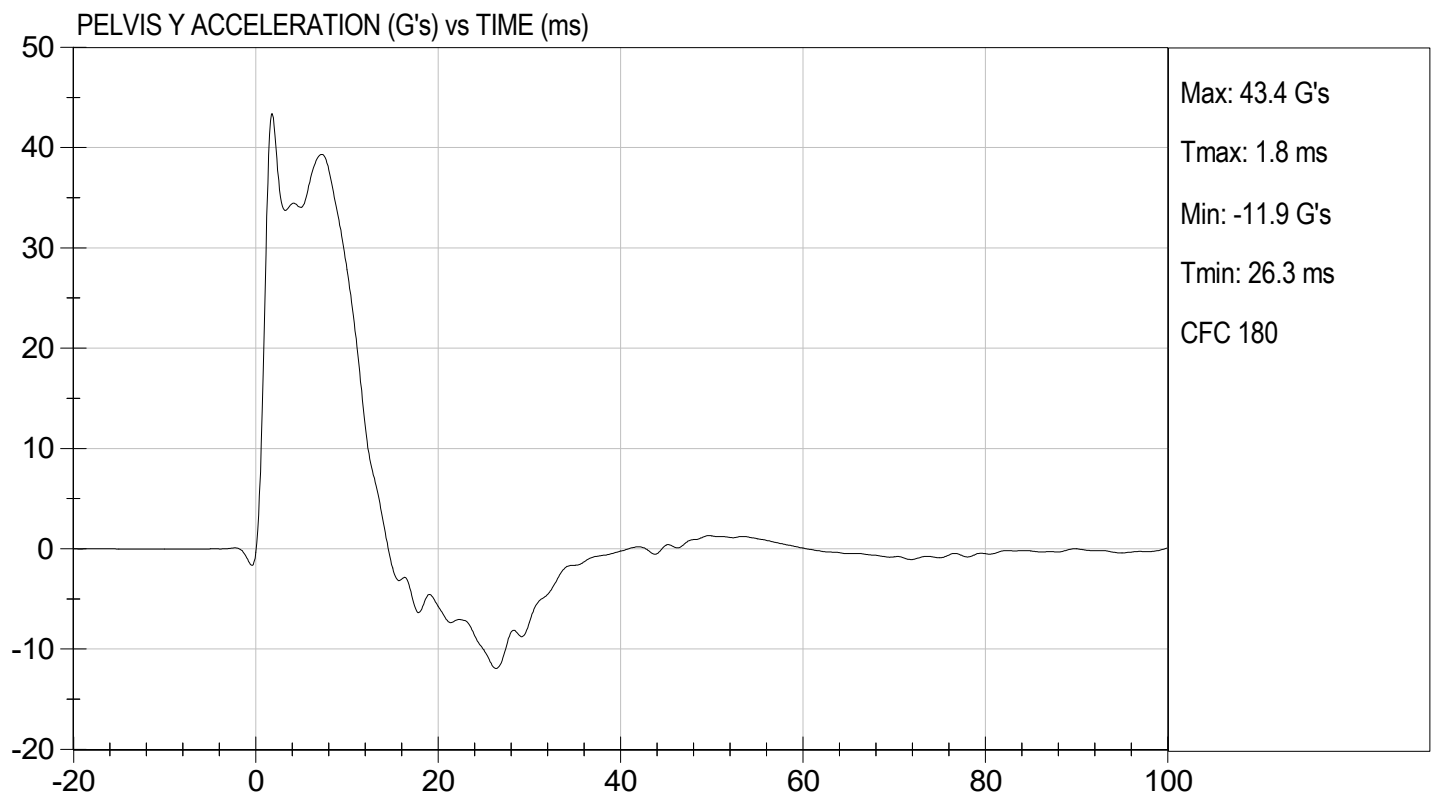
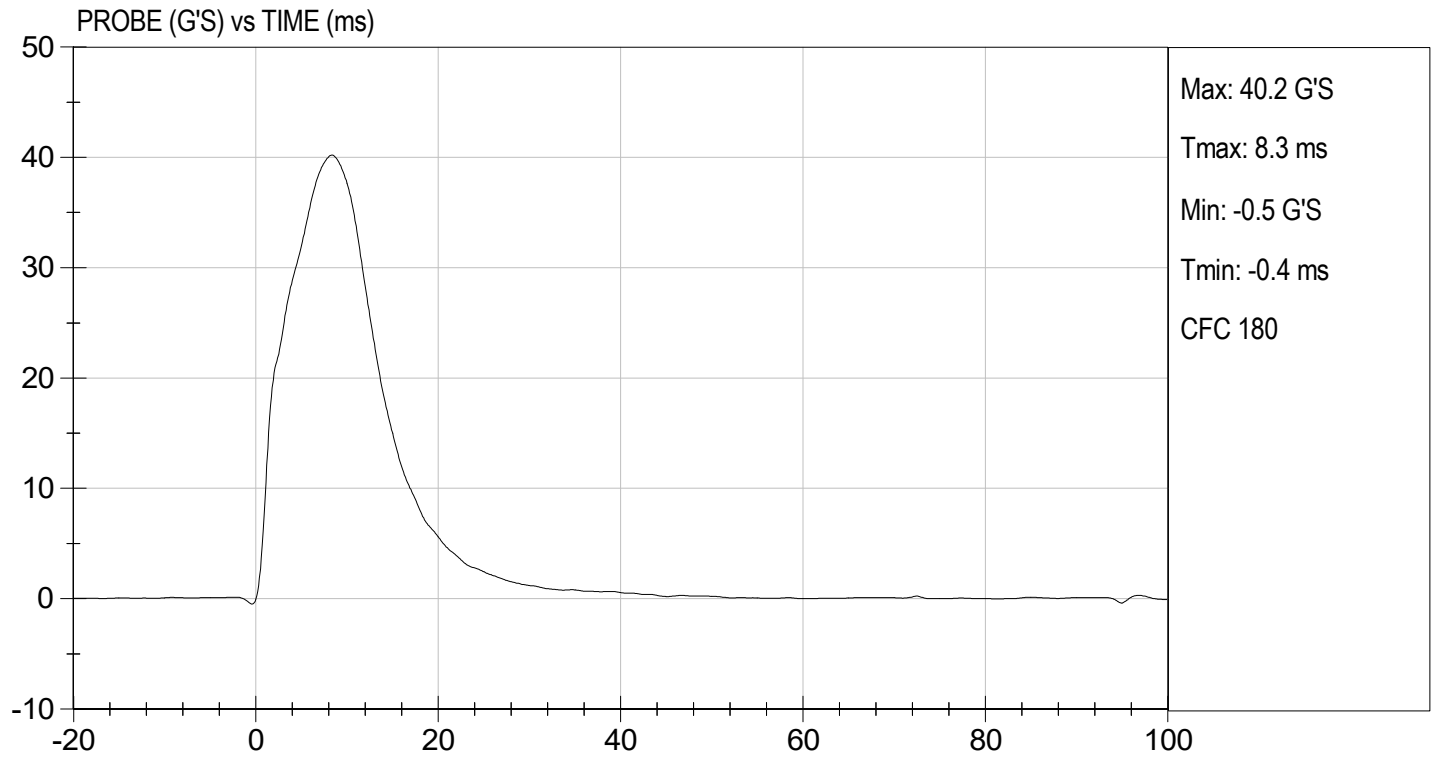
10/11/2023
Test Date


Approved By



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

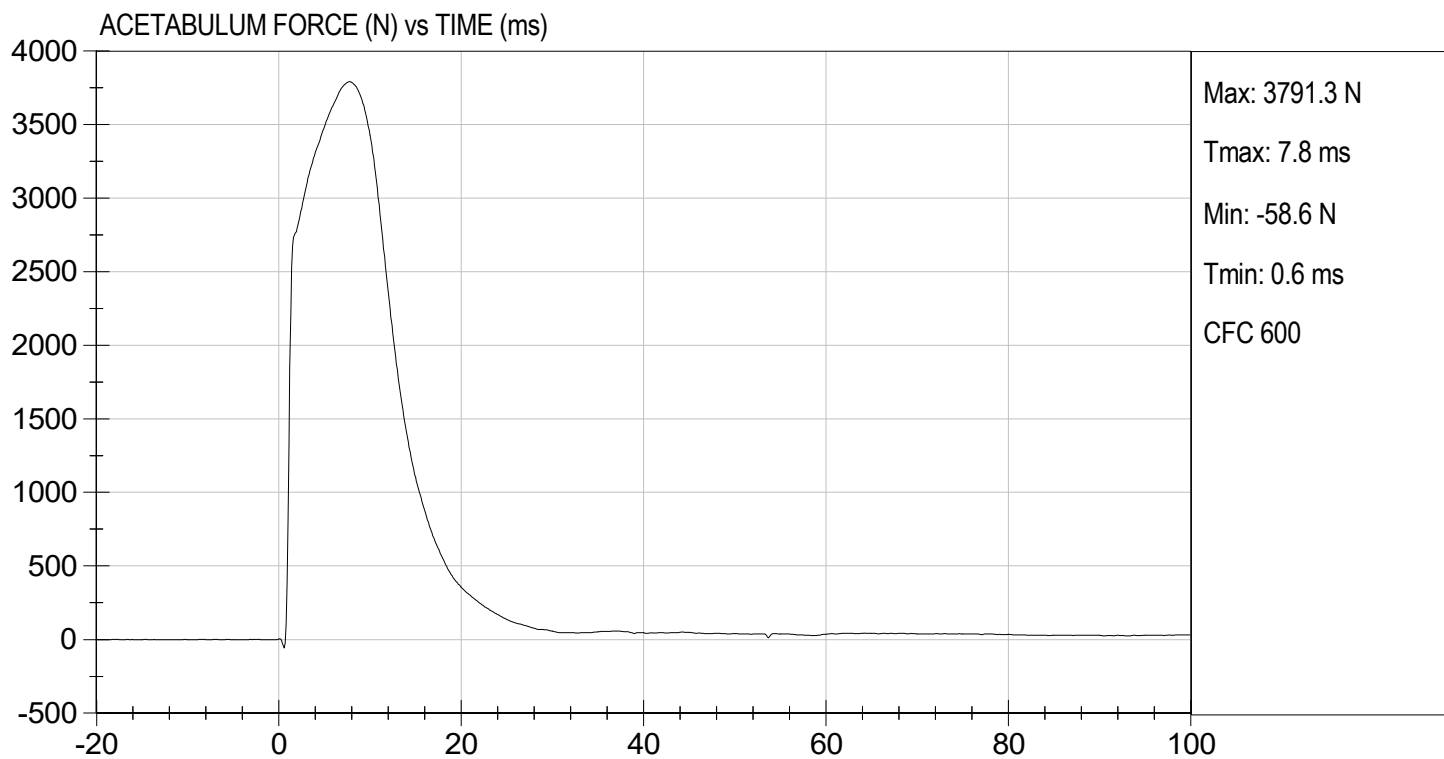
TEST DATE: 10/11/2023
TEST #: D232817





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

TEST DATE: 10/11/2023
TEST #: D232817



MGA RESEARCH CORPORATION**ILIAC IMPACT TEST****SID-IIs BUILD LEVEL D DUMMY**ATD Serial No: 296Test I.D: D232818

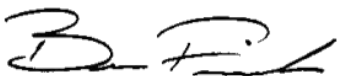
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.2	Pass
Humidity	%	10 to 70	31	Pass
Impact Velocity	m/s	4.20 to 4.40	4.23	Pass
Maximum Probe Acceleration	G's	36 to 45	39	Pass
Pelvis Y Acceleration	G's	28 to 39	32	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4,651	Pass
Overall Test Results				Pass



Laboratory Technician

10/11/2023

Test Date

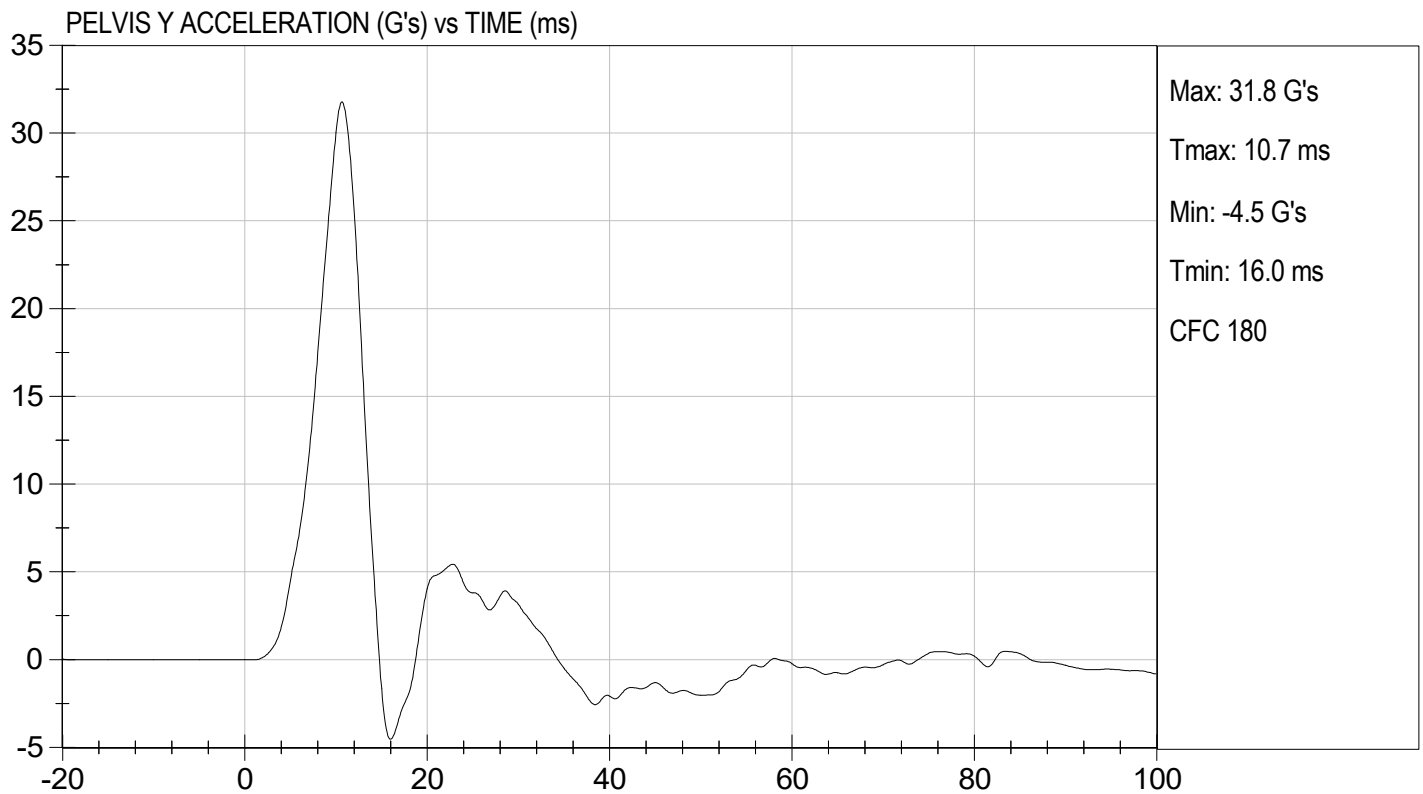
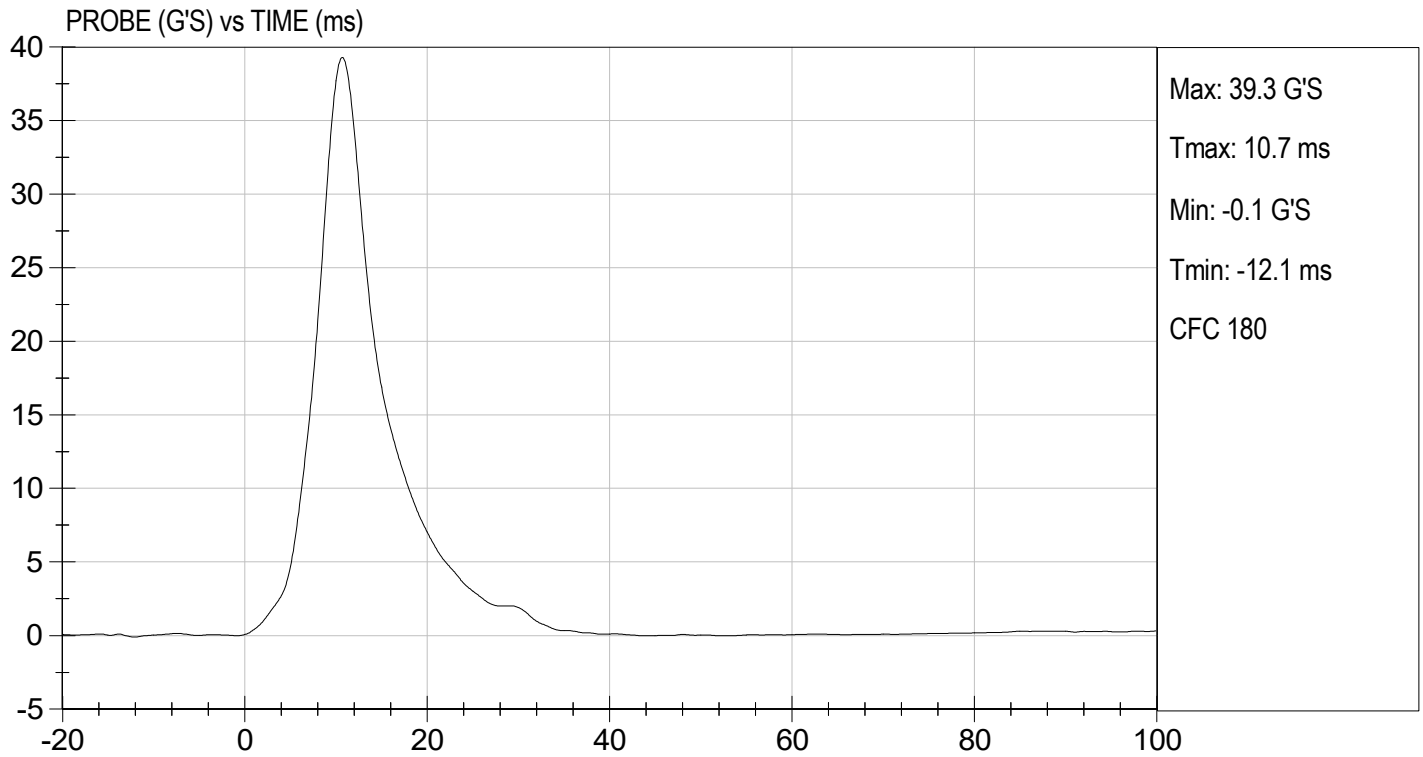


Approved By



TEST DESC: ILLIAC
VELOCITY: 13.89 ft/s, 4.23 m/s

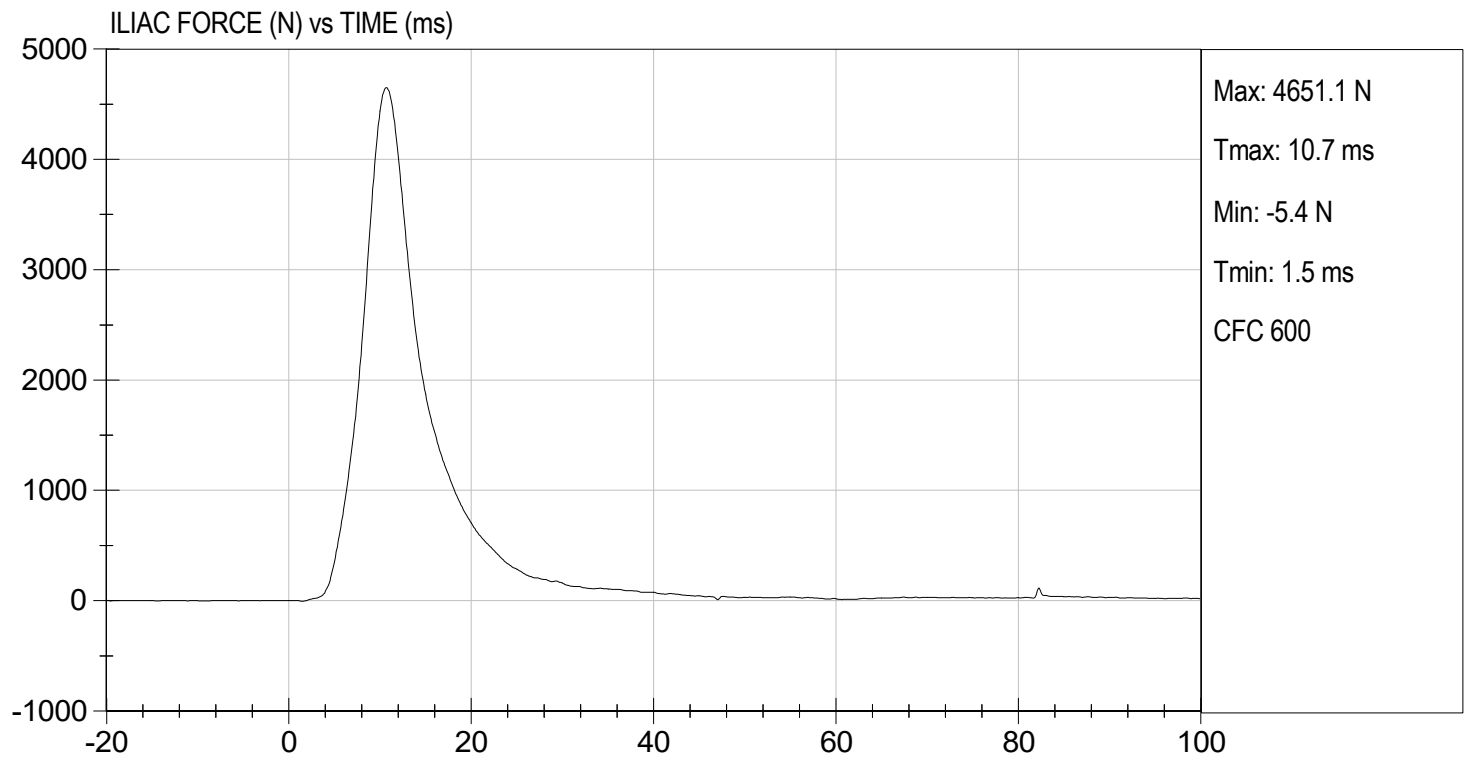
TEST DATE: 10/11/2023
TEST #: D232818





TEST DESC: ILLIAC
VELOCITY: 13.89 ft/s, 4.23 m/s

TEST DATE: 10/11/2023
TEST #: D232818





SID-IIs Pelvis Plug Certification Test

Plug S/N 15383

Test Number 19799

Report Number 19851

Test Date 7/26/2021 9:23:58 AM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	245	50	600
Force @ 1.5 mm (N)	1,172	850	1,400
Force @ 2.5 mm (N)	1,493	1,306	1,618
Force @ 3.0 mm (N)	1,539	1,361	1,673

Testing Machine STM-20 5965542

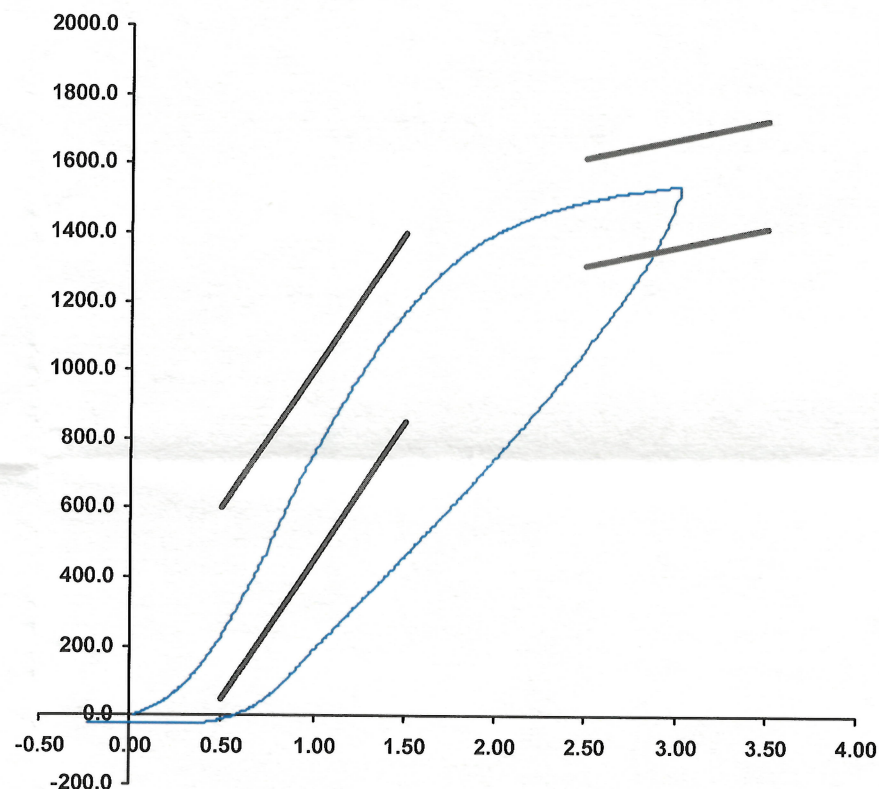
Load Cell S/N (FI360947), Units (LBS) 1000

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

26-Jul-21

SACO Research

By : DC

Date : 7/26/2021



SID-IIs Pelvis Plug Certification Test

Plug S/N 15287

Test Number 18162

Report Number 18210

Test Date 3/22/2021 11:54:22 AM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	324	50	600
Force @ 1.5 mm (N)	1,318	850	1,400
Force @ 2.5 mm (N)	1,525	1,306	1,618
Force @ 3.0 mm (N)	1,553	1,361	1,673

Testing Machine STM-20 5965542

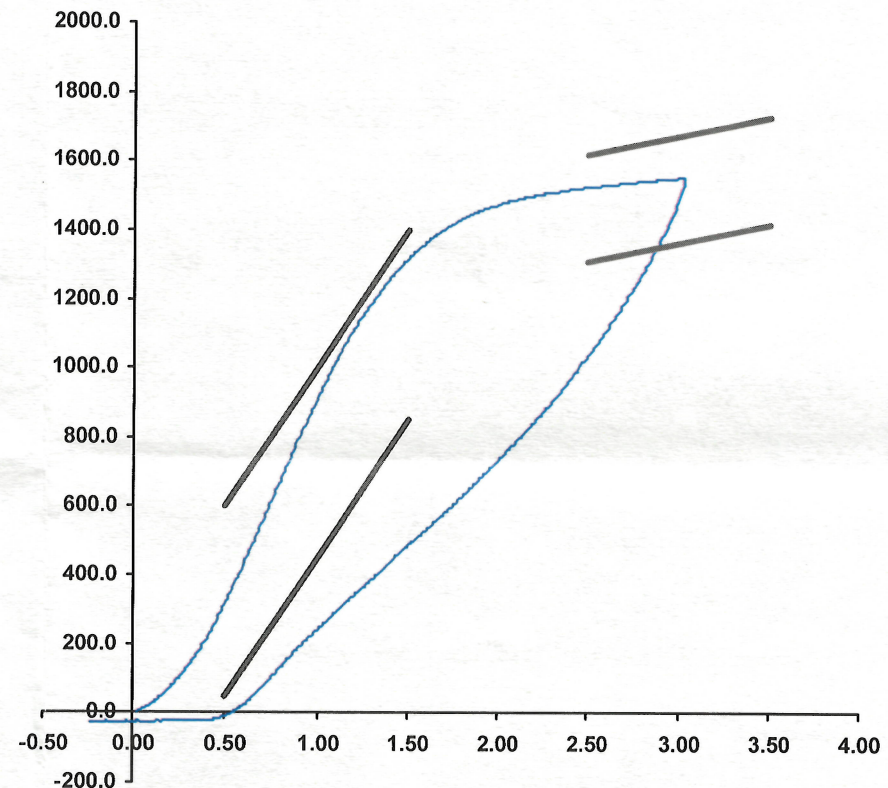
Load Cell S/N (FI360947), Units (LBS) 1000

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

22-Mar-21

SACO Research

By : DC Date : 3/22/2021

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION

Table 1 – Dummy Instrumentation

				SID-IIs S/N 296			
				Serial Number	Manufacturer	Calibration Date	
Head CG Accelerometers				X	P82109	Endevco	07/06/2023
				Y	P94783	Endevco	07/06/2023
				Z	P94786	Endevco	07/06/2023
				Xr	P94938	Endevco	07/06/2023
				Yr	P96854	Endevco	07/06/2023
				Zr	P97386	Endevco	07/06/2023
Head Angular Rate Sensors				X	ARS15213	DTS	04/07/2023
				Y	ARS15229	DTS	04/07/2023
				Z	ARS15231	DTS	04/07/2023
Displacement Potentiometers	Thoracic Rib	Upper	Y	G012	Servo	07/06/2023	
		Middle	Y	G1163	FTSS	07/06/2023	
		Lower	Y	G1158	FTSS	07/06/2023	
	Abdominal Rib	Upper	Y	G1146	FTSS	07/06/2023	
		Lower	Y	G1126	FTSS	07/06/2023	
Lower Spine Accelerometers (T12)				X	P79614	Endevco	07/06/2023
				Y	P79439	Endevco	07/06/2023
				Z	P79418	Endevco	07/06/2023
Acetabulum Load Cell				Y	ACG269	Denton	04/20/2023
Iliac Wing Load Cell				Y	IWG282	Denton	04/20/2023
Pelvis Plug (struck side)					15383	SACO	07/26/2021
Pelvis Plug (non-struck side)					15287	SACO	03/22/2021

Table 2 – Vehicle Instrumentation

		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	T32342	Endevco	06/08/2023
Vehicle Center of Gravity	Y	T34151	Endevco	04/13/2023
Vehicle Center of Gravity	Z	A424075	MSI	06/08/2023
Left Floor Sill	Y	T29897	Endevco	09/13/2023
A-Pillar Sill	Y	T35268	Endevco	04/12/2023
A-Pillar Low	Y	A337227	MSI	05/15/2023
A-Pillar Mid	Y	PCB773	PCB	09/20/2023
B-Pillar Sill	Y	PCB1403	PCB	05/11/2023
B-Pillar Low	Y	T34102	Endevco	04/18/2023
B-Pillar Mid	Y	T32354	Endevco	04/14/2023
Driver Seat	Y	T32745	Endevco	08/29/2023
Engine Top	X	P88170	Endevco	07/27/2023
Engine Top	Y	A390879	MSI	05/11/2023
Firewall	Y	T35252	Endevco	04/12/2023
Right Roof	Y	A383426	MSI	04/27/2023
Right Floor Sill	Y	P61618	Endevco	08/29/2023
Rear Floorpan	X	T32164	Endevco	05/19/2023
Rear Floorpan	Y	T33428	Endevco	04/18/2023

Table 3 – Pole Instrumentation

	Serial Number	Manufacturer	Calibration Date
Load Cell 1	DG6277	FTSS	07/30/2018
Load Cell 2	DG6278	FTSS	07/30/2018
Load Cell 3	DG6279	FTSS	07/30/2018
Load Cell 4	DG6280	FTSS	07/30/2018
Load Cell 5	DG6281	FTSS	07/30/2018
Load Cell 6	DG6283	FTSS	07/30/2018
Load Cell 7	DG6284	FTSS	07/30/2018
Load Cell 8	DG6582	FTSS	07/30/2018