

REPORT NUMBER: SPNCAP-MGA-20-015

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

**GENERAL MOTORS LLC
2020 GMC Acadia SLE 5-Door SUV
NHTSA No.: M20200112**

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



Test Date: February 20, 2020

Final Report Date: May 19, 2020

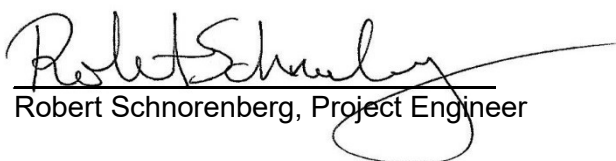
FINAL REPORT

**U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Office of Crashworthiness Standards
Mail Code: NRM-110
1200 New Jersey Ave, SE
Room W43-410
Washington, DC 20590**

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Approval Date: May 19, 2020

FINAL REPORT ACCEPTANCE BY OCWS:

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

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

TECHNICAL REPORT DOCUMENTATION PAGE

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4. Title and Subtitle Final Report of New Car Assessment Program Side Impact Pole Testing of a 2020 GMC Acadia SLE 5-Door SUV NHTSA No.: M20200112		5. Report Date May 19, 2020																											
		6. Performing Organization Code MGA																											
7. Author(s) Ben Fischer, Project Engineer		8. Performing Organization Report No. SPNCAP-MGA-20-015																											
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		14. Sponsoring Agency Code NRM-110																											
15. Supplementary Notes																													
16. Abstract A 32.20 km/h, 75° oblique impact Side NCAP Test was conducted on the subject 2020 GMC Acadia SLE 5-Door SUV 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 MGA Research Corporation in Burlington, Wisconsin on February 20, 2020. The impact velocity was 32.26 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 21.7°C. The test vehicle post-test maximum crush was 358 mm at level 3. The test vehicle's performance was as follows: <table border="1" style="margin: 10px auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2" style="text-align: left;">Measurement Description</th> <th rowspan="2">Units</th> <th colspan="2">Driver ATD (SID-IIs)</th> </tr> <tr> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td style="text-align: left;">Head Injury Criteria (HIC₃₆)</td> <td></td> <td>1000</td> <td>381</td> </tr> <tr> <td style="text-align: left;">Resultant Lower Spine Acceleration</td> <td>g</td> <td>82</td> <td>36</td> </tr> <tr> <td style="text-align: left;">Total Pelvic Force (sum of acetabular and iliac forces)</td> <td>N</td> <td>5525</td> <td>3381</td> </tr> <tr> <td style="text-align: left;">Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38*</td> <td>17</td> </tr> <tr> <td style="text-align: left;">Maximum Abdomen Rib Deflection</td> <td>mm</td> <td>45*</td> <td>16</td> </tr> </tbody> </table> *Proposed IARV The doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.				Measurement Description	Units	Driver ATD (SID-IIs)		Threshold	Result	Head Injury Criteria (HIC ₃₆)		1000	381	Resultant Lower Spine Acceleration	g	82	36	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3381	Maximum Thoracic Rib Deflection	mm	38*	17	Maximum Abdomen Rib Deflection	mm	45*	16
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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																											
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SECTION 1 PURPOSE AND SUMMARY OF TEST

PURPOSE

This side pole impact test is part of the MY 2020 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-14-D-00353. The purpose of this test is to generate comparative side impact performance in a 2020 GMC Acadia SLE 5-Door SUV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Pole Laboratory Test Procedure, dated April 2018.

SUMMARY

A rigid pole side impact test was conducted on a 2020 GMC Acadia SLE 5-Door SUV. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.26 km/h. The test was conducted by MGA Research Corporation in Burlington, Wisconsin on February 20, 2020. Pre-test and post-test photographs of the test vehicle and side impact dummy (SID-IIs) are included in Appendix A of 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 April 2018. 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	381
Resultant Lower Spine Acceleration	g	82	36
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3381
Maximum Thoracic Rib Deflection	mm	38*	17
Maximum Abdomen Rib Deflection	mm	45*	16

*Proposed IARV

Supplemental restraint information is given below:

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

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

GENERAL COMMENTS

Left Lower A-Post Y recorded no valid data after 50 ms.

Left Lower B-Post Y was not installed.

Left Mid B-Post Y was not installed.

Load Cell Pole #8 Fy recorded no valid data.

SECTION 2
OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2020 GMC Acadia SLE 5-Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20200112
 Test Date: 2/20/2020

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20200112	Traction Control System (TCS)	Yes
Model Year	2020	Auto-Leveling System	No
Make	GMC	Automatic Door Locks (ADL)	Yes
Model	Acadia SLE	Power Window Auto-Reverse	Yes
Body Style	5-Door SUV	Other Optional Feature	No
VIN	1GKKNKLS5LZ158230	Driver Front Airbag	Yes
Body Color	Satin Steel Metallic	Driver Curtain Airbag	Yes
Odometer Reading (km/mi)	66 km / 41 mi	Driver Head/Torso Airbag	No
Engine Displacement (L)	3.6 L	Driver Torso Airbag	No
Type/No. Cylinders	V6	Driver Torso/Pelvis Airbag	Yes
Engine Placement	Lateral	Driver Pelvis Airbag	No
Transmission Type	Automatic	Driver Knee Airbag	Yes
Transmission Speeds	9	Rear Pass. Curtain Airbag	Yes
Overdrive	Yes	Rear Pass. Head/Torso Airbag	No
Final Drive	FWD	Rear Pass. Torso Airbag	No
Roof Rack	No	Rear Pass. Torso/Pelvis Airbag	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	No
Power Seats	No	Driver Load Limiter	Yes
Anti-Lock Brakes (ABS)	Yes	Rear Pass. Load Limiter	No
		Front Center Airbag	Yes

Does owner's manual provide instruction to turn off automatic door locks?	No
---	----

DATA FROM CERTIFICATION LABEL

Manufactured By	GENERAL MOTORS LLC	GVWR (kg)	2722
Date of Manufacture	12/19	GAWR Front (kg)	1350
Vehicle Type	MPV	GAWR Rear (kg)	1545

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	2	2	6	
Capacity Weight (VCW) (kg)				849	(A)
DSC x 68.04 kg				408	(B)
Rated Cargo and Luggage Weight (RCLW) (kg)				136*	(A-B)

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

VEHICLE SEAT TYPE

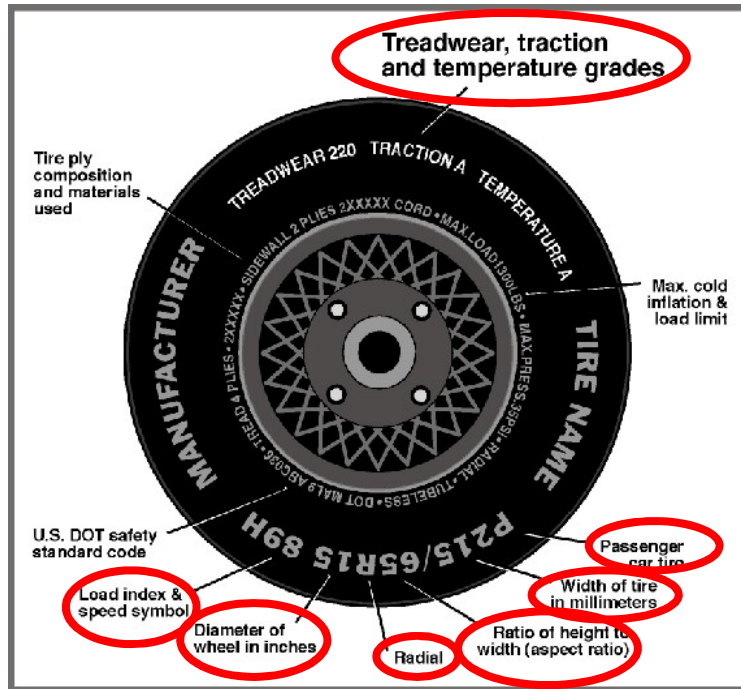
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						w/ Lever	w/ Knob
Front Seat	X					X	
Rear or Second Row	X					X	
Third Row Seat			X		X		

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

Test Vehicle: 2020 GMC Acadia SLE 5-Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20200112
 Test Date: 2/20/2020

VEHICLE TIRE INFORMATION



Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	240	240
Recommended Tire Size	235/65R18	235/65R18
Tire Size on Vehicle	235/65R18	235/65R18
Tire Manufacturer	Continental	Continental
Tire Model	CrossContact	CrossContact
Treadwear	480	480
Traction	A	A
Temperature Grade	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel, 1 Polyamide	2 Polyester, 2 Steel, 1 Polyamide
Load Index/Speed Symbol	106H	106H
Tire Material	Rubber	Rubber
DOT Safety Code Left	A3LM WD30 4419	A3LM WD30 4319
DOT Safety Code Right	A3LM WD30 4319	A3LM WD30 4319

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

Test Vehicle: 2020 GMC Acadia SLE 5-Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20200112
 Test Date: 2/20/2020

TEST PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	250	250	250	255
Tire Placard	kPa	240	240	240	240
Owner's Manual	kPa	240	240	240	240
As Tested	kPa	240	240	240	240

TEST AXLE VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	551.0	397.0		557.5	488.0		557.0	496.5	
Right	kg	527.5	390.5		529.5	473.5		519.0	481.5	
Ratio	%	57.8%	42.2%		53.1%	46.9%		52.4%	47.6%	
Totals	kg	1078.5	787.5	1866.0	1087.0	961.5	2048.5	1076.0	978.0	2054.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1866.0	(A)
Actual Weight of 1 P572 ATD (SID-IIs) Used	kg	52	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	136	(C)
Calculated Test Vehicle Target Weight (TVTW)	kg	2054.0	(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	-1.2	-1.0	-0.6	Yes
Front Pass. Door Sill Angle (front-to-back)*	deg	-0.9	-0.3	-0.3	Yes
Front Bumper Angle (left-to-right)**	deg	0.1	0.0	0.0	Yes
Rear Bumper Angle (left-to-right)**	deg	-0.3	-0.3	-0.3	Yes
Vehicle CG (Aft of Front Axle)	mm	1207	1342	1362	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	13	17	21	

* 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	116
Components Removed: none	kg	

Test height adjustable suspension setting, if applicable:	Not Applicable
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DATA SHEET NO. 2
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEM DATA

Test Vehicle: 2020 GMC Acadia SLE 5-Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20200112
 Test Date: 2/20/2020

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	14.5	10.1	12.3
Front Passenger Seat	Fixed	Fixed	Fixed
Front Center Seat			
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat			

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	12.3	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Front Passenger Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Front Center Seat			Max			
			Mid			
			Min			
Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Rear Center Seat			Max			
			Mid			
			Min			

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

Test Vehicle: 2020 GMC Acadia SLE 5-Door SUV
 Test Program: NCAP Side Pole Impact Test

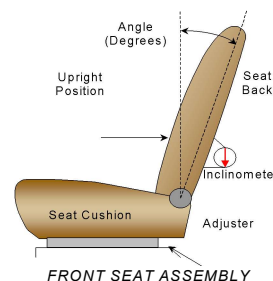
NHTSA No.: M20200112
 Test Date: 2/20/2020

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	240	25	0	0
Front Passenger Seat	240	25	0	0
Front Center Seat				
Struck Side Rear Seat	150	15	150	14
Non-Struck Side Rear Seat	150	15	150	14
Rear Center Seat				

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. All rear passenger seat backs are positioned in accordance with the information provided by the manufacturer on Form No. 1 for the 5th percentile female dummy in a Side NCAP MDB test.



Seat	Total Seat Back Angle Range		Test Position from Vertical	
	Degrees	Detents (1 st as 1)	Degrees	Detent (1 st as 0)
Driver Seat	66.1	33	-27.8	4
Front Passenger Seat	65.6	33	-26.9	4
Front Center Seat				
Struck Side Rear Seat	11.1	6	14.2	0
Non-Struck Side Rear Seat	11.1	6	14.2	0
Rear Center Seat				

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 Form No. 1.

	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	9	0 (Lowest as 0) / Fixed Fore-Aft

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

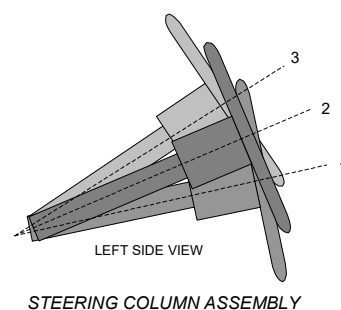
Test Vehicle: 2020 GMC Acadia SLE 5-Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20200112
 Test Date: 2/20/2020

STEERING COLUMN ADJUSTMENT

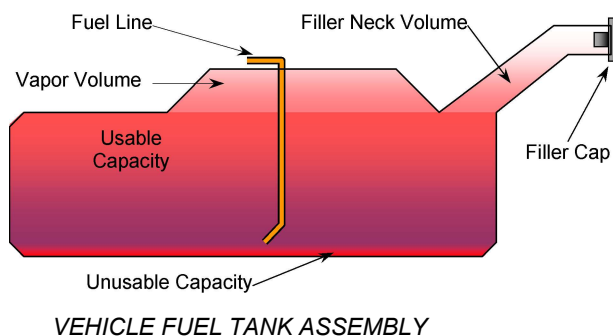
Steering wheel and column adjustments are made so that the steering wheel geometric locus is described when it moves through its full range of motion.

	Wheel Angle (°)	Fore/Aft Position (mm)
Lowermost, Position 1	70.0	
Geometric Center, Position 2	67.8	
Uppermost, Position 3	65.6	
Telescoping Steering Wheel Travel		60
Test Position	67.8	30



FUEL PUMP

The vehicle is equipped with an electronic fuel pump. Pump will run for about 3 seconds when the key is turned on and then will not run unless the engine is cranking or running. The filler neck is located on the driver's side.



FUEL TANK CAPACITY DATA

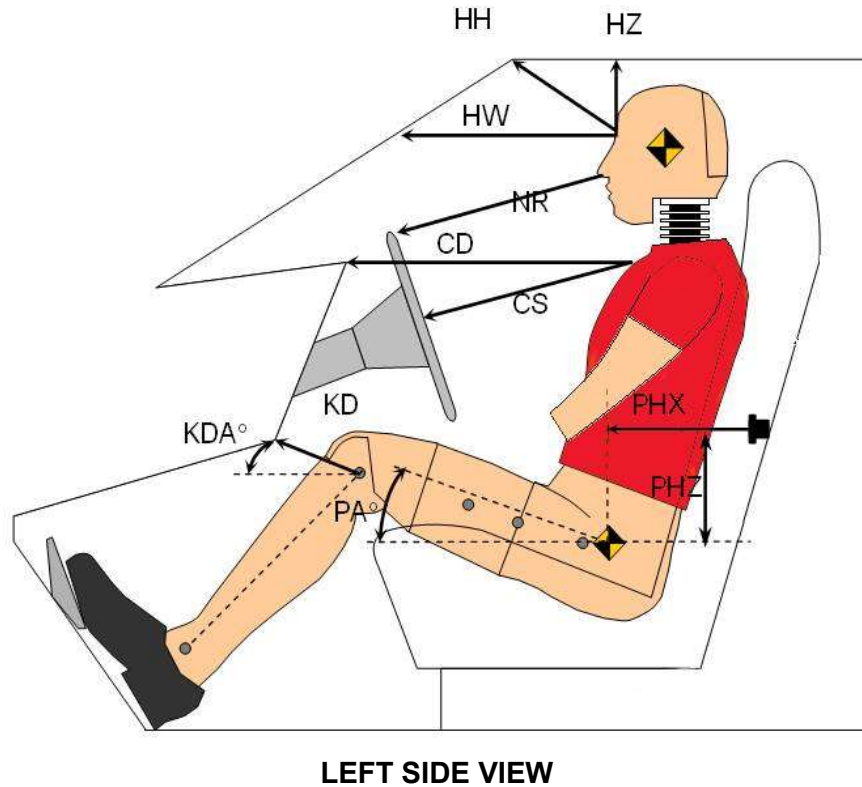
	Liters
Usable Capacity of Standard Tank (see Form No. 1)	73.4
Usable Capacity of Optional Tank (see Form No. 1)	82.1
Usable Capacity of Standard Tank as Specified in Owner's Manual	73.4
Usable Capacity of Optional Tank as Specified in Owner's Manual	82.1
93% of Usable Capacity	68.3
Actual Amount of Solvent Used	68.1
1/3 of Usable Capacity	24.5

Is the actual amount of solvent used in the test equal to 93% $\pm$ 1%
 of the Usable Capacity stated in Form No. 1? **YES**

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2020 GMC Acadia SLE 5-Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20200112
 Test Date: 2/20/2020

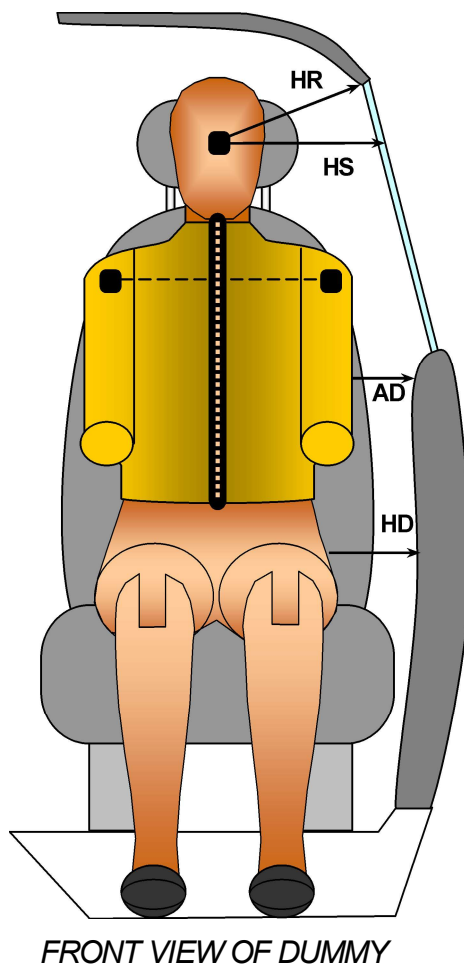


Code	Measurement Description	Driver	
		Length (mm)	Angle (°)
HH	Head to Header	342	
HW	Head to Windshield	717	
HZ	Head to Roof Liner	241	
NR	Nose to Rim/Seat Back	262	
CD	Chest to Dashboard/Seat Back	445	
CS	Chest to Steering Wheel	222	
KDL / KDAL	Left Knee to Dash/Seat Back	193	31.1
KDR / KDAL	Right Knee to Dash/Seat Back	187	30.9
PAX	Pelvic Tilt Angle X		18.3
PAY	Pelvic Tilt Angle Y		0.0
PHX	Hip Point to Striker (X-Axis)	300	
PHZ	Hip Point to Striker (Z-Axis)	86	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2020 GMC Acadia SLE 5-Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20200112
 Test Date: 2/20/2020

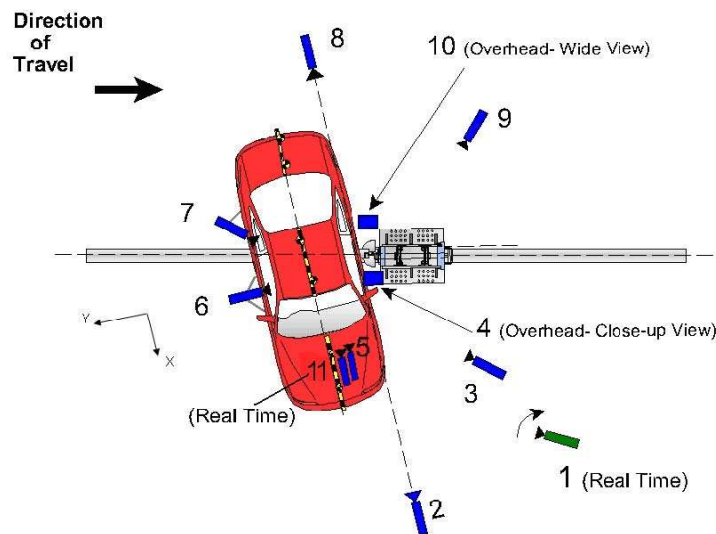


Code	Measurement Description	Driver
		Length (mm)
HR	Head to Side Header	298
HS	Head to Side Window	403
AD	Arm to Door	103
HD	Hip Point to Door	170

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2020 GMC Acadia SLE 5-Door SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20200112
Test Date: 2/20/2020



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	6380	-200	-1900	24	1000
3	Impact Side 45° Forward	3790	-1400	-1910	12	1000
4	Overhead Closeup	0	0	-6700	85	1000
5	Onboard – Driver Front				16	1000
6	Onboard – Driver Side				8	1000
7	Onboard – Driver Rear				8	1000
8	Rear Ground Level	-6755	-50	-1930	24	1000
9	Impact Side 45° Rearward	-3180	-2990	-1910	12	1000
10	Overhead Wide View	0	900	-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

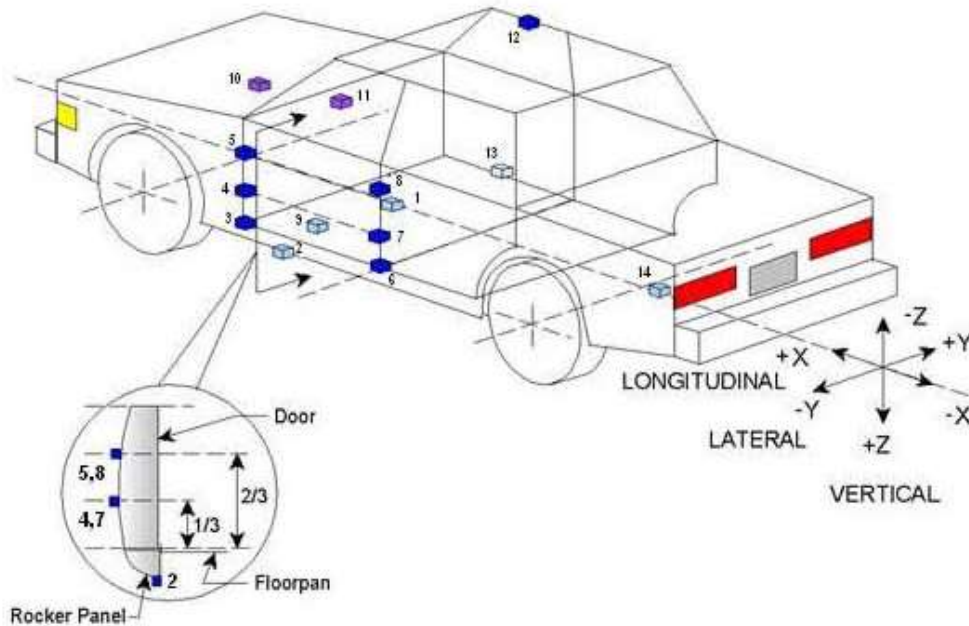
INSTRUMENTATION

	Number of Channels
Driver Dummy	19
Vehicle Structure	18
Pole Load Cells	8
Total	45

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

Test Vehicle: 2020 GMC Acadia SLE 5-Door SUV
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TEST VEHICLE ACCELEROMETER LOCATIONS

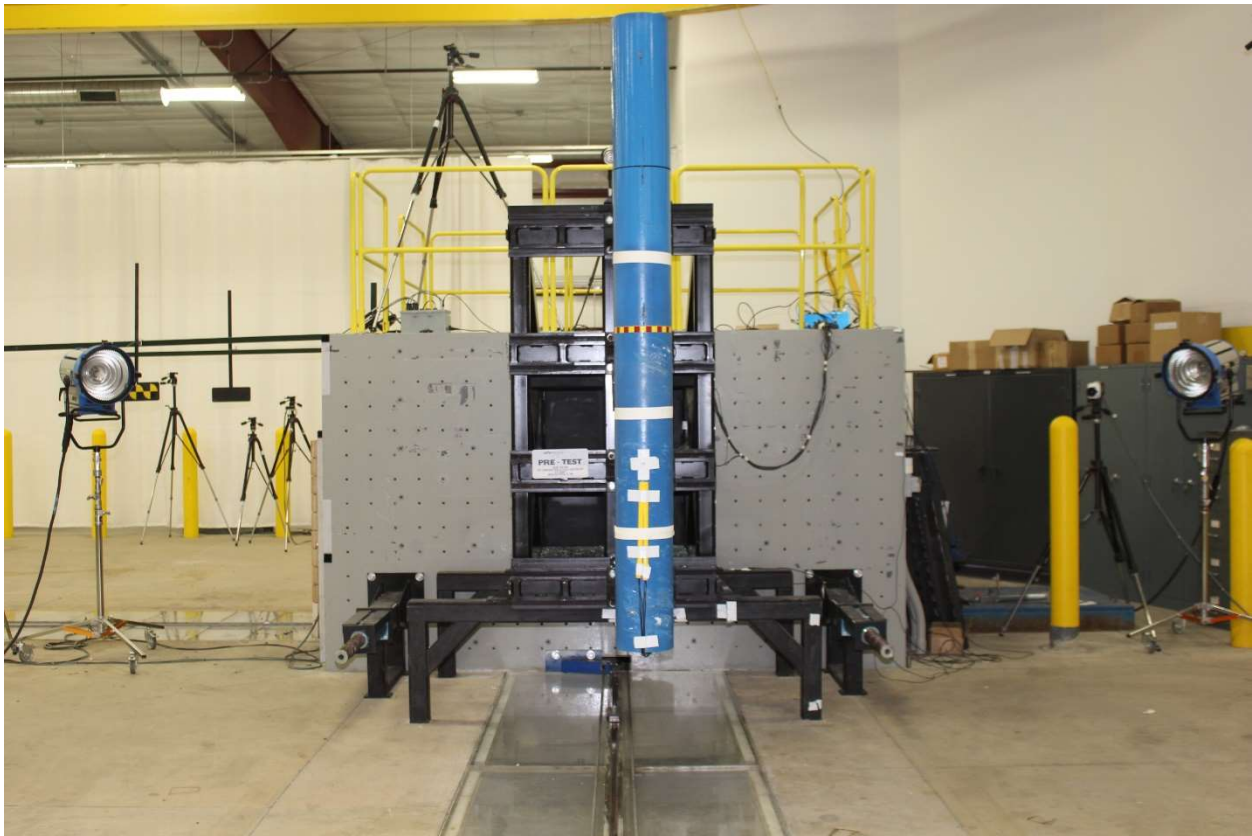
No.	ID	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2571	0	-375
2	Left Floor Sill	3145	-770	-290
3	A Pillar Sill	3420	-770	-290
4	A Pillar Low	3370	-860	-640
5	A Pillar Mid	3378	-860	-920
6	B Pillar Sill	2300	-770	-290
7	B Pillar Low			
8	B Pillar Mid			
9	Driver Seat Track	2442	-345	-405
10	Engine Top	4270	-65	-990
11	Firewall	3850	0	-985
12	Right Roof	2295	615	-1665
13	Right Floor Sill	3145	770	-290
14	Rear Floorpan	751	0	-490

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: 2020 GMC Acadia SLE 5-Door SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20200112
Test Date: 2/20/2020



254 mm Diameter Rigid Pole

Load Cell Locations	
ID	Height from Impact 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: 2020 GMC Acadia SLE 5-Door SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20200112
Test Date: 2/20/2020

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Driver Dummy (SID-IIs)
Face	Curtain Airbag, Front Airbag, Front Center Airbag
Top of Head	Curtain Airbag, Front Center Airbag
Left Side of Head	Curtain Airbag
Back of Head	Curtain Airbag, Headrest
Left Shoulder	Side Torso/Pelvis Airbag, Seatback
Upper Torso	Seatback
Lower Torso	Side Torso/Pelvis Airbag, Seatback
Left Hip	Side Torso/Pelvis Airbag, Door Panel
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: 2020 GMC Acadia SLE 5-Door SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20200112
Test Date: 2/20/2020

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

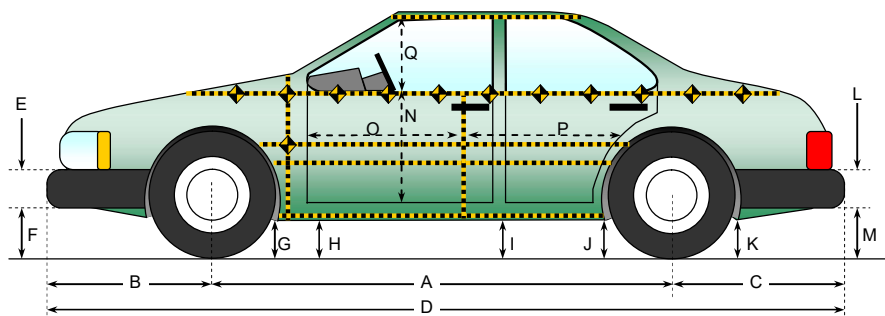
SPEED, ANGLE AT IMPACT, AND IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		1151
Actual Impact Point (Aft of Front Axle)	mm		1154
Horizontal Offset (+forward / -rearward)	mm	+/- 38 of Intended Impact Point	-3
Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion	degrees	75 +/- 3	75.0
Trap No. 1 Velocity (Primary)	km/h	31.4 to 33.0	32.26
Trap No. 2 Velocity (Redundant)	km/h	31.4 to 33.0	32.27

DATA SHEET NO. 9 **TEST VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2020 GMC Acadia SLE 5-Door SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20200112
Test Date: 2/20/2020



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

LEFT SIDE VIEW

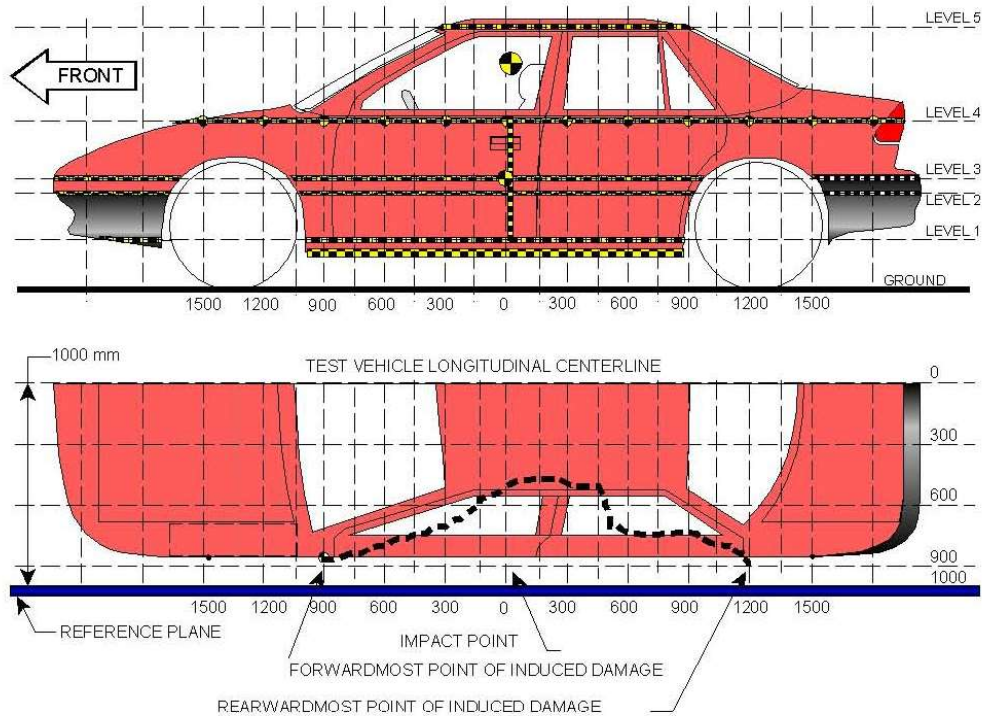
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2860	2786	74
B	Front Axle to FSOV	1002	1055	-53
C	Rear Axle to RSOV	1070	1043	27
D	Total Vehicle Length at Centerline	4932	4884	48
E	Front Bumper Thickness	160	160	0
F	Front Bumper Bottom to Ground	232	253	-21
G	Sill Height at Front Wheel Well	275	270	5
H	Sill Height at Front Door Leading Edge	277	275	2
I	Sill Height at B-Pillar	274	275	-1
J1	Sill Height at Rear Wheel Well	277	282	-5
J2	Pinch Weld Height at Rear Wheel Well	276	283	-7
K	Sill Height Aft of Rear Wheel Well	290	298	-8
L	Rear Bumper Thickness	80	80	0
M	Rear Bumper Bottom to Ground	340	334	6
N	Sill Height to Bottom of Front Window Sill	860	817	43
O	Front Door Leading Edge to Impact CL	669	527	142
P	Rear Door Trailing Edge to Impact CL	1328	1256	72
Q	Front Window Opening	456	400	56
R	Right Side Length	4000	4008	-8
S	Left Side Length	4000	3914	86
T	Vehicle Width at B-Pillars	1875	1792	83
U	Front Wheel Track Width	2860	2786	74
V	Rear Wheel Track Width	1002	1055	-53

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

Test Vehicle: 2020 GMC Acadia SLE 5-Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20200112
 Test Date: 2/20/2020



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	576	355	0
2	Occupant H-Point	694	357	0
3	Mid Door	719	358	0
4	Window Sill	1101	316	0
5	Window Top	1630	106	75

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

Test Vehicle: 2020 GMC Acadia SLE 5-Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20200112
 Test Date: 2/20/2020

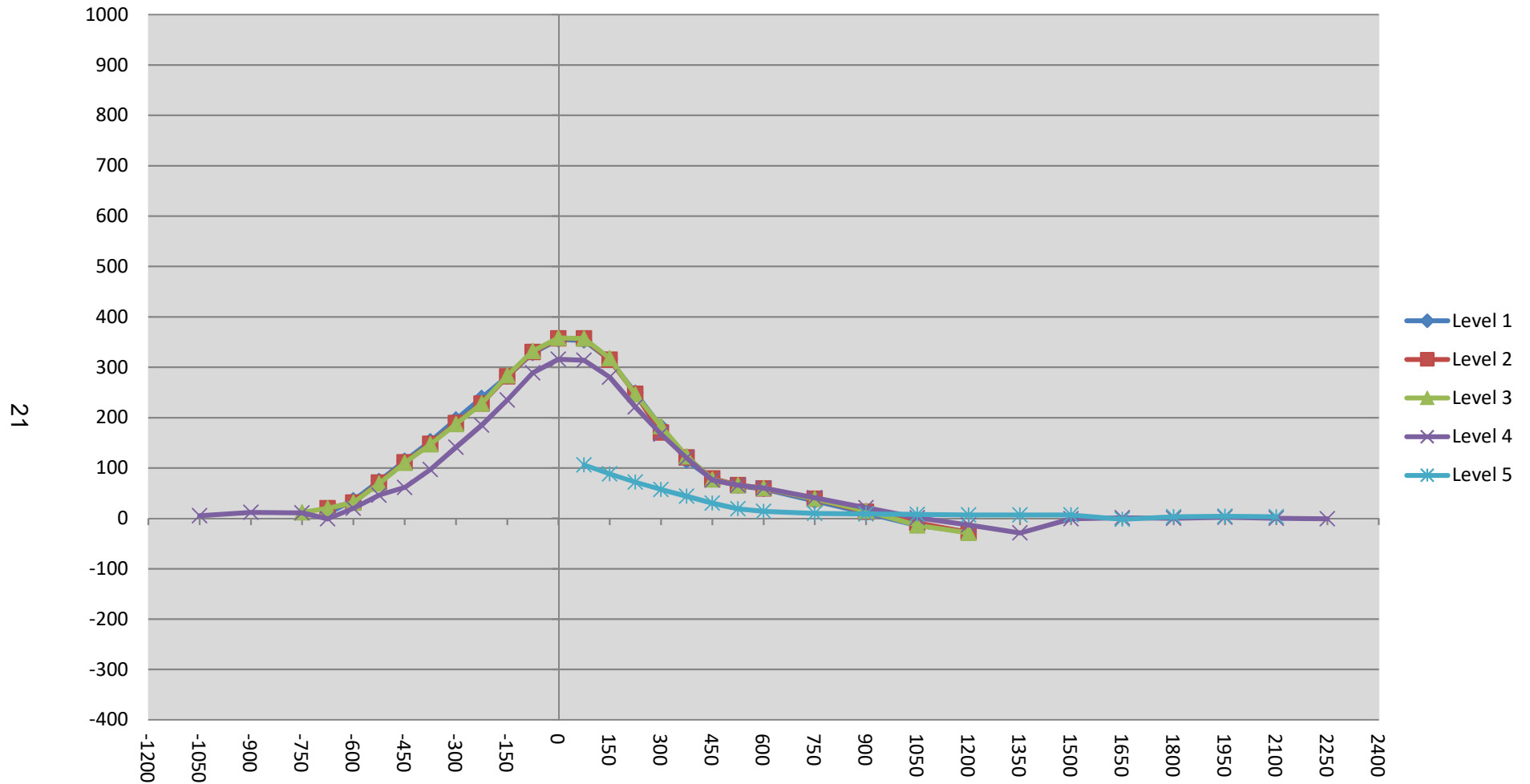
Pre-test measurements are taken when the vehicle is in the "As Tested" weight condition. Vehicle measurements forward of the vertical impact reference line are negative. The crush profile grid is established prior to the test based on an estimated impact point.

	Pre-Test					Post-Test					Difference				
	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				275					280					5	
-900				260					272					12	
-825															
-750			156	253				168	264				12	11	
-675	163	164	165	249		173	184	185	248		10	20	20	-1	
-600	169	169	169	244		205	200	200	264		36	31	31	20	
-525	173	171	171	241		247	242	240	287		74	71	69	46	
-450	175	173	173	241		289	284	283	302		114	111	110	61	
-375	175	174	174	239		328	322	321	336		153	148	147	97	
-300	175	174	174	235		371	363	361	376		196	189	187	141	
-225	174	174	174	234		413	402	402	419		239	228	228	185	
-150	174	175	174	229		456	457	458	464		282	282	284	235	
-75	173	175	175	228		501	505	507	517		328	330	332	289	
0	172	175	175	225		527	532	533	541		355	357	358	316	
75	172	175	175	223	467	525	532	532	537	573	353	357	357	314	106
150	171	176	175	221	460	486	491	493	501	548	315	315	318	280	88
225	170	176	175	220	457	419	423	421	441	529	249	247	246	221	72
300	170	176	175	218	455	352	346	358	385	512	182	170	183	167	57
375	170	176	176	218	455	284	297	299	338	499	114	121	123	120	44
450	170	177	177	218	454	248	256	254	294	484	78	79	77	76	30
525	169	178	177	216	452	234	244	243	282	471	65	66	66	66	19
600	168	178	177	216	452	226	237	237	276	466	58	59	60	60	14
675															
750	167	177	177	214	452	202	216	216	255	462	35	39	39	41	10
825															
900	166	174	174	210	453	177	187	189	231	462	11	13	15	21	9
1050	165	165	165	204	455	151	156	151	205	463	-14	-9	-14	1	8
1200	161	153	153	194	458	134	125	124	181	465	-27	-28	-29	-13	7
1350				186	462				157	469				-29	7
1500				186	469				185	476				-1	7
1650				187	479				188	477				1	-2
1800				192	490				192	493				0	3
1950				201	506				203	510				2	4
2100				221	528				221	531				0	3
2250				249					248					-1	
2400															
2550															
2700															

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

Test Vehicle: 2020 GMC Acadia SLE 5-Door SUV
Test Program: NCAP Side Pole Impact Test

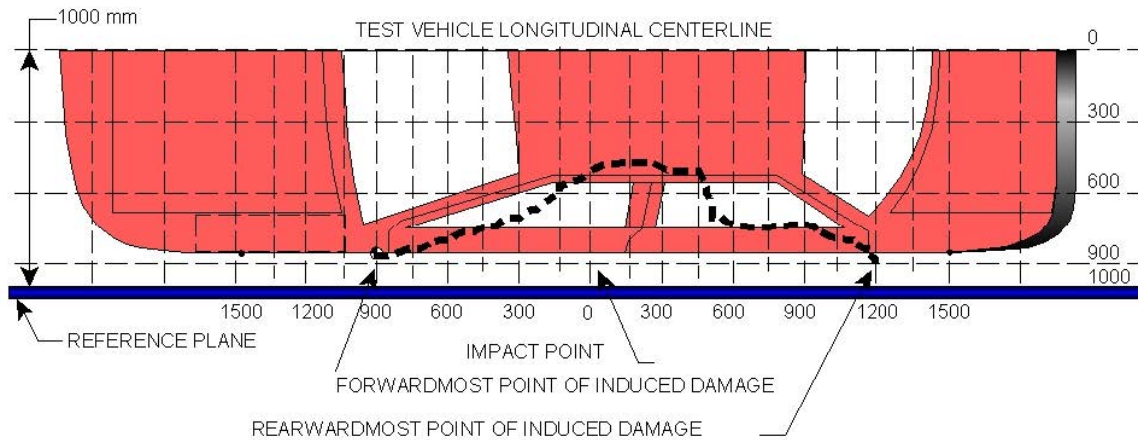
NHTSA No.: M20200112
Test Date: 2/20/2020



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

Test Vehicle: 2020 GMC Acadia SLE 5-Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20200112
 Test Date: 2/20/2020



VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance from Impact Point (mm)	Level	Pre-Test (mm)	Post-Test (mm)	Max. Static Crush (mm)
1	420	3	177	263	86
2	200	3	175	448	273
3	-20	3	175	527	352
4	-240	3	174	394	220
5	-460	3	173	278	105
6	-680	3	164	159	-5

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

Test Vehicle: 2020 GMC Acadia SLE 5-Door SUV
 Test Program: NCAP Side Pole Impact Test

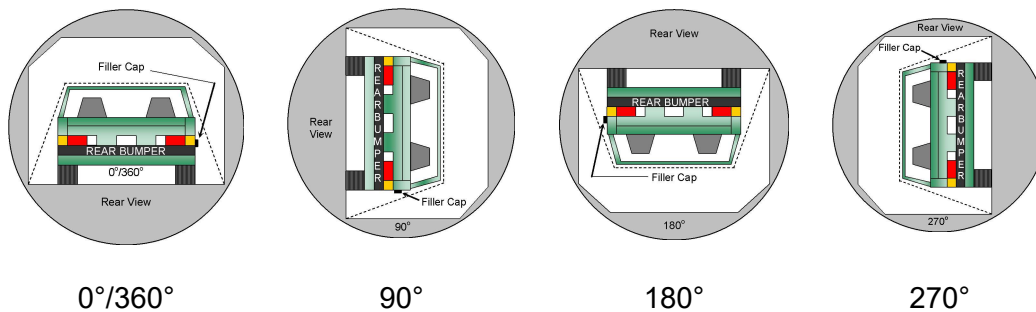
NHTSA No.: M20200112
 Test Date: 2/20/2020

Test Time: 10:39 am

Temperature: 21.7°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°	112	300	412
90° to 180°	109	300	409
180° to 270°	107	300	407
270° to 360°	111	300	411

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	

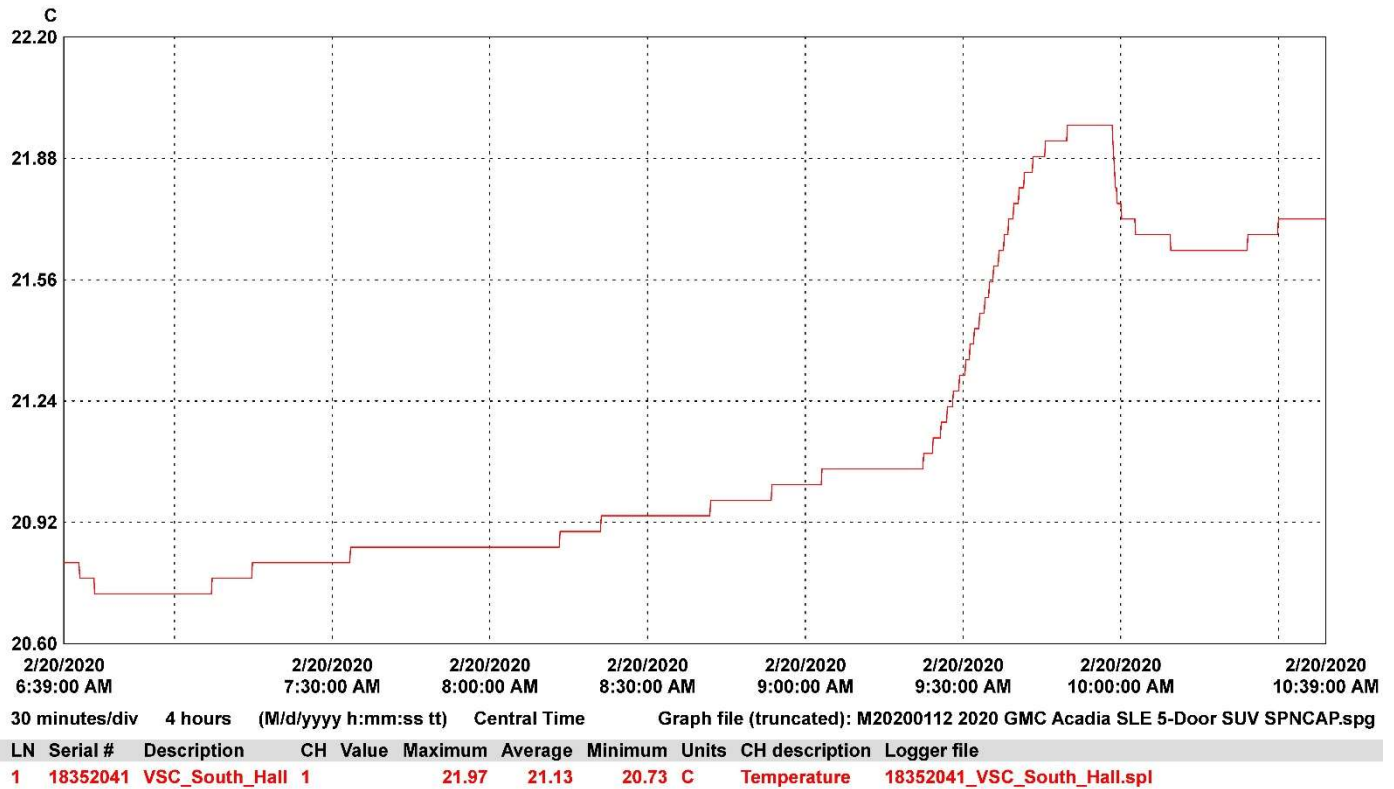
ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

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: 2020 GMC Acadia SLE 5-Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20200112
 Test Date: 2/20/2020



APPENDIX A
PHOTOGRAPHS

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



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



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



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



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



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

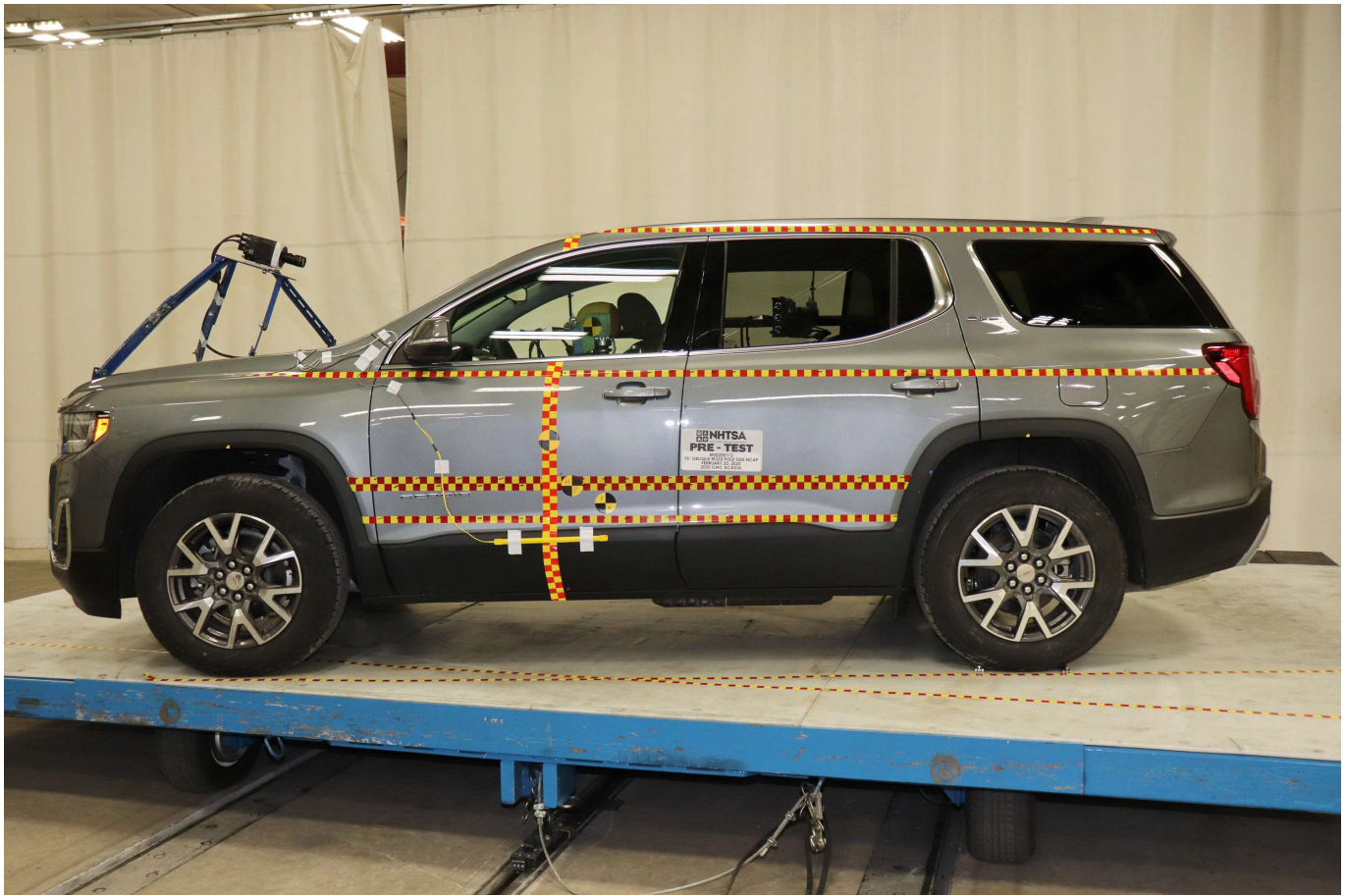


Photo No. 007 - Pre-Test Left Side View of Test Vehicle



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



Photo No. 009 - Pre-Test Left 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

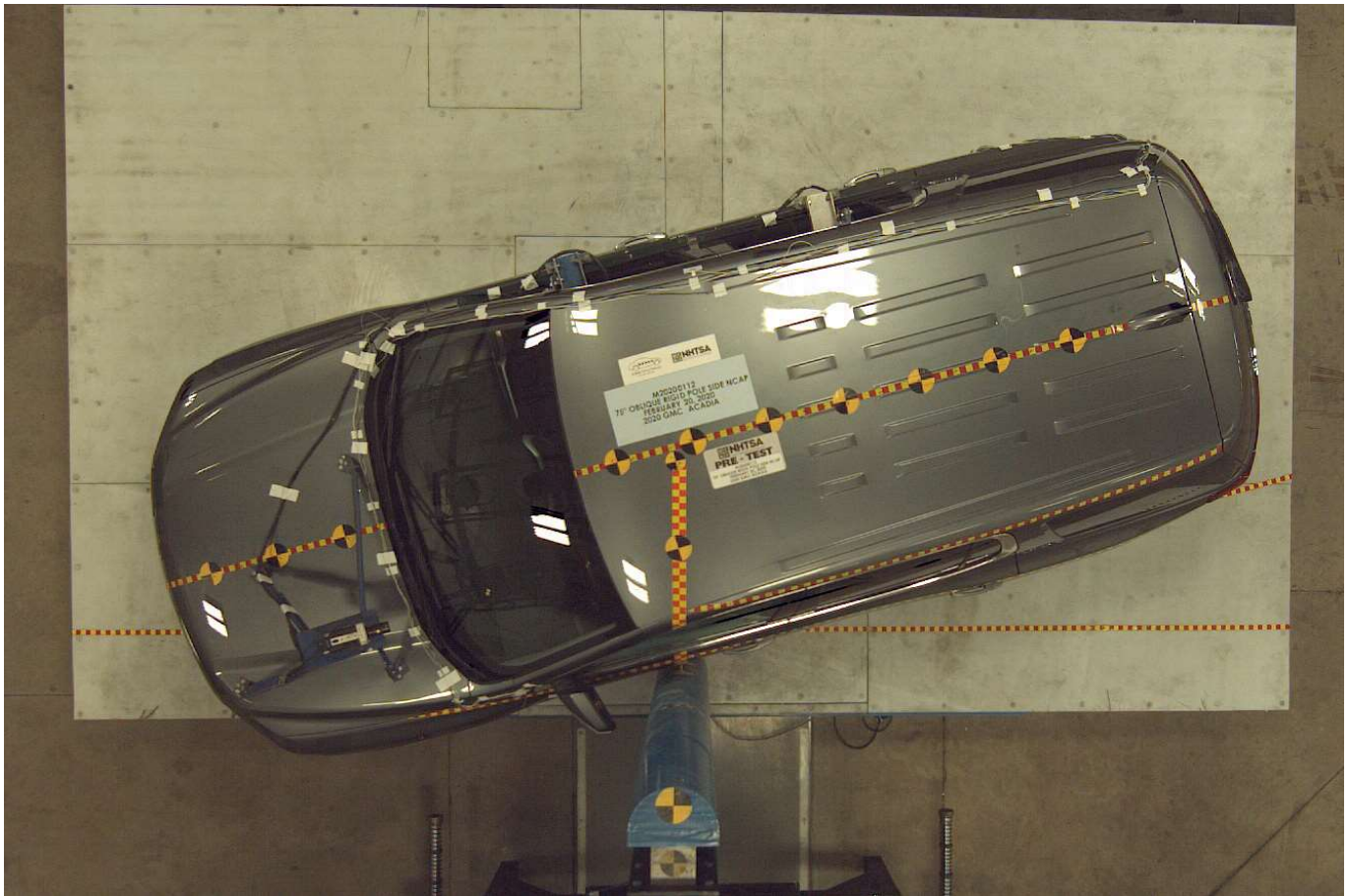


Photo No. 015 - Pre-Test Overhead View of Test Area

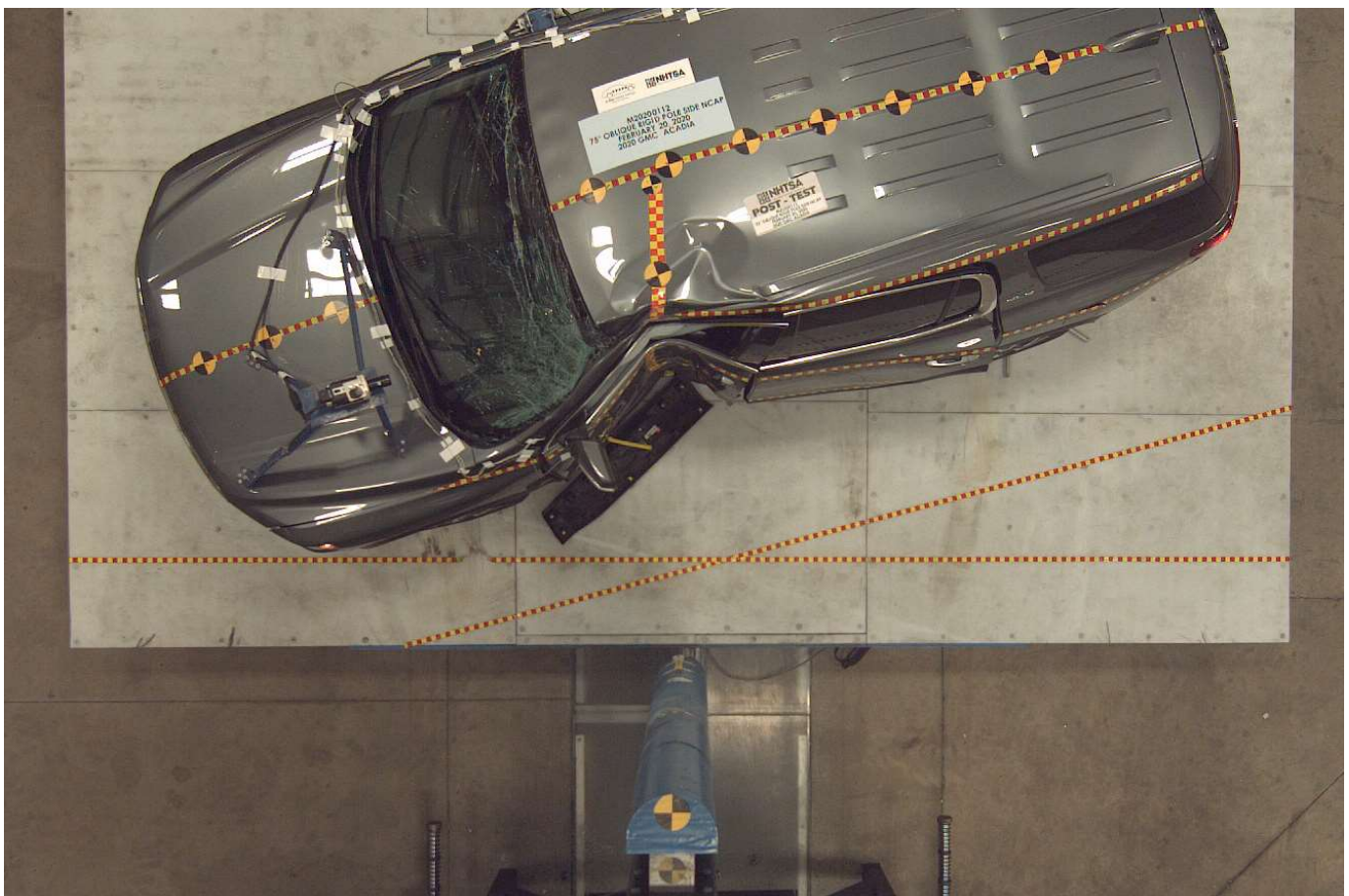


Photo No. 016 - Post-Test Overhead View of Test Area



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



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



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



Photo No. 032 - Pre-Test Placement of Dummy 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 - Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



Photo No. 054 - Post-Test View of Fuel Filler Cap or Fuel Filler Neck



Photo No. 055 - Close-Up View of Vehicle Certification Label



Photo No. 056 - Close-Up View of Vehicle Tire Information Placard or Label

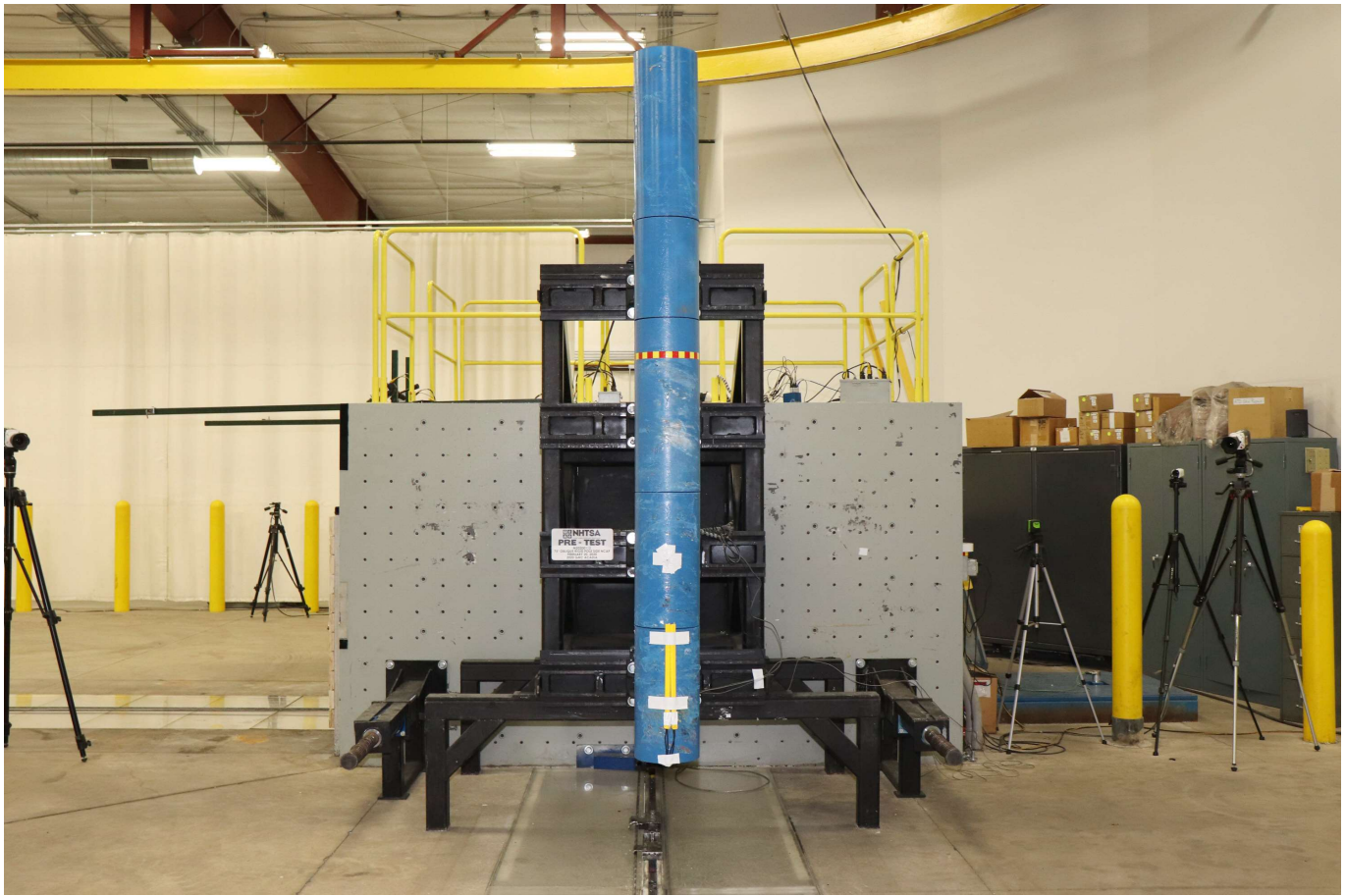


Photo No. 057 - Pre-Test Pole Barrier Front View

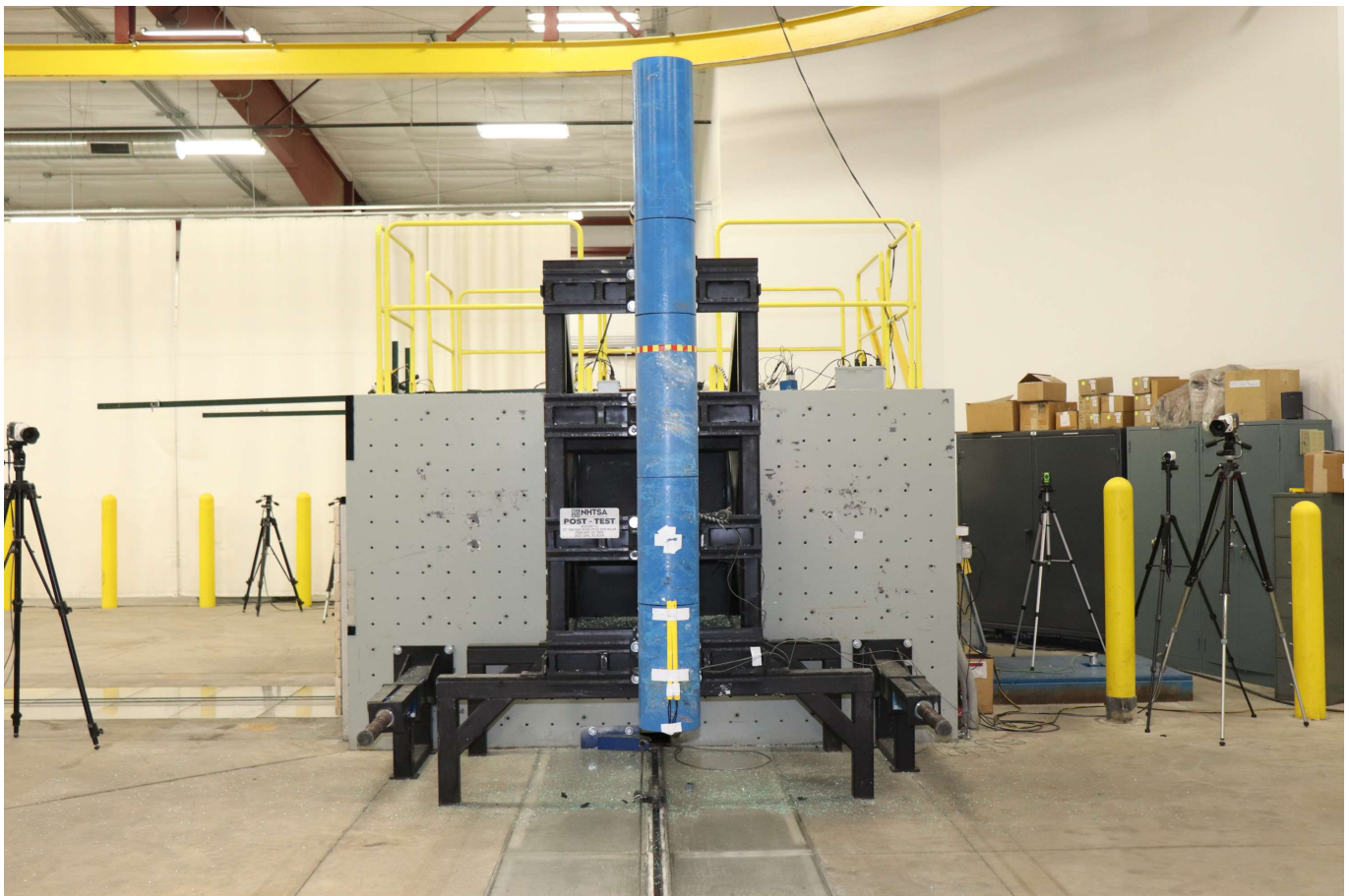


Photo No. 058 - Post-Test Pole Barrier Front View



Photo No. 059 - Pre-Test Pole Barrier Side View



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



Photo No. 061 - Pre-Test Ballast View



Photo No. 062 - Post-Test Primary and Redundant Speed Trap Read-Out



Photo No. 063 - FMVSS Photo No. 301 Static Rollover 0 Degrees

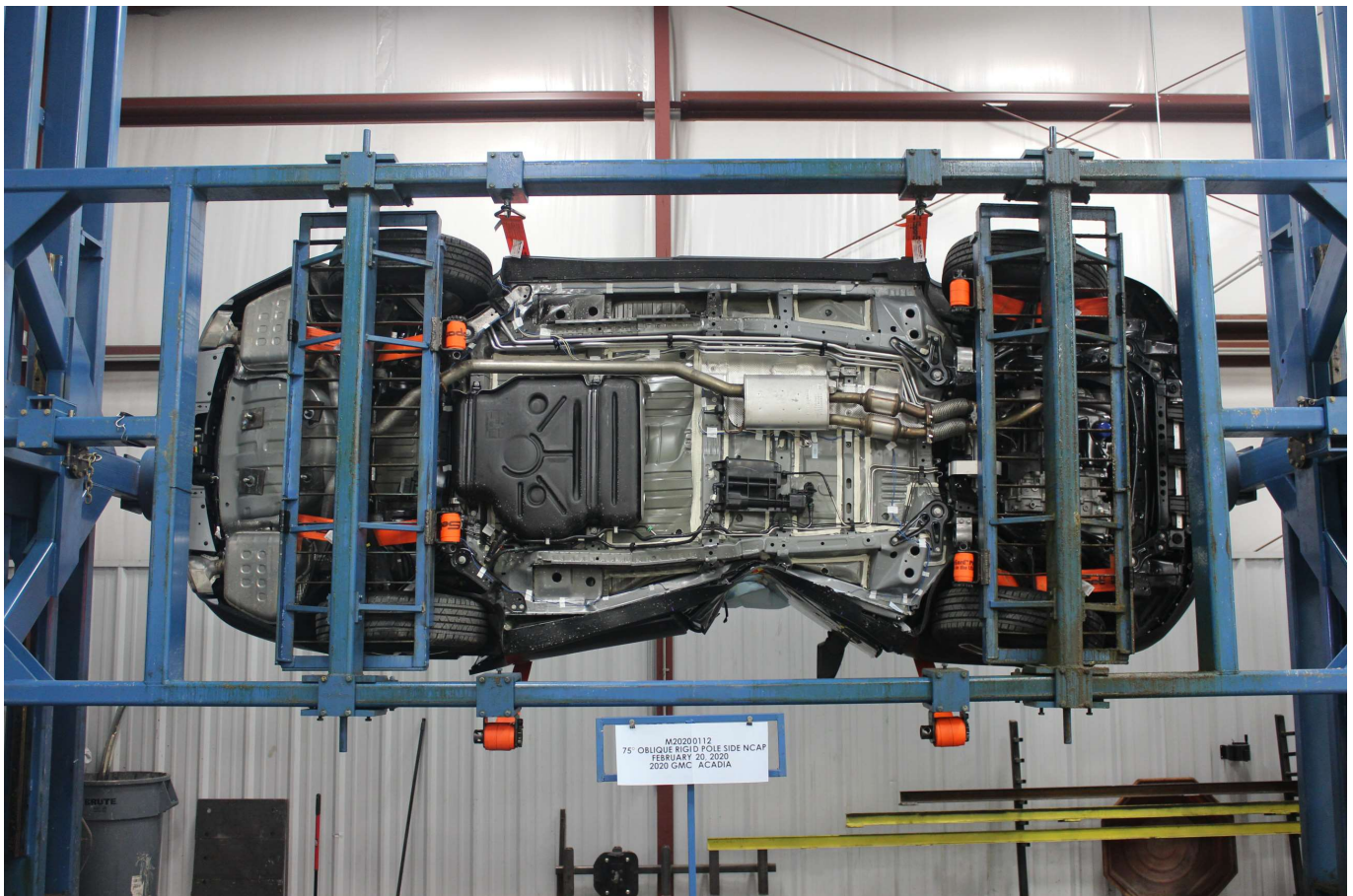


Photo No. 064 - FMVSS Photo No. 301 Static Rollover 90 Degrees



Photo No. 065 - FMVSS Photo No. 301 Static Rollover 180 Degrees



Photo No. 066 - FMVSS Photo No. 301 Static Rollover 270 Degrees



Photo No. 067 - FMVSS Photo No. 301 Static Rollover 360 Degrees



Photo No. 068 - Impact Event



2020 ACADIA FWD SLE

EXTERIOR: SATIN STEEL METALLIC
INTERIOR: JET BLACK

ENGINE: 3.6L V6, SIDI, DOHC,
TRANSMISSION: 9-SPEED

Visit us at www.gmc.com

STANDARD EQUIPMENT

ITEMS FEATURED BELOW ARE INCLUDED AT NO EXTRA CHARGE IN THE STANDARD VEHICLE PRICE SHOWN

OWNER BENEFITS

- 3 YEAR/36,000 MILE* BUMPER-TO-BUMPER LIMITED WARRANTY
- 5 YEAR/60,000 MILE* POWERTRAIN LIMITED WARRANTY, ROADSIDE ASSISTANCE & COURTESY TRANSPORTATION
- FIRST MAINTENANCE VISIT
- *WHICHEVER COME FIRST SEE GMC.COM OR DEALER FOR TERMS, DETAILS & LIMITS

PERFORMANCE & MECHANICAL

- ANTILOCK BRAKE SYSTEM, 4 WHEEL DISC
- ENG CONTROL STOP/START SYS
- WHEELS, 18" ALUMINUM WITH DARK ACCENTS
- WHEEL, SPARE, 18" STEEL

CONNECTIVITY & TECHNOLOGY

- GMC INFOTAINMENT SYSTEM, 8" DIA. COLOR MULTI-TOUCH DISPLAY, BLUETOOTH STREAMING AUDIO, ANDROID AUTO AND APPLE CARPLAY CAPABILITY FOR COMPATIBLE PHONES
- DISPLAY, MULTI-COLOR DRIVER INSTRUMENT INFO ENHANCED
- ACTIVE NOISE CANCELLATION
- KEYLESS OPEN AND START
- REAR SEAT REMINDER
- SIRIUSXM RADIO CAPABLE, ALL ACCESS TRIAL W/ SUBSCRIPTION SOLD SEPARATELY
- ONSTAR (R) SERVICES & 4G LTE WI-FI (R) AVAILABLE; SEE ONSTAR.COM FOR TERMS

INTERIOR

- SEATING, 7-PASSENGER
- LEATHER WRAP STEERING WHEEL
- STEERING COLUMN, TILT &

TELESCOPING

- SEAT ADJUSTER, DRIVER 4-WAY MANUAL
- SEAT ADJUSTER, PASSENGER 4-WAY MANUAL
- AIR CONDITIONING, TRI ZONE AUTO CLIMATE CONTROL
- WINDOWS, POWER, DRIVER WITH EXPRESS UP/DOWN, FRONT PASSENGER EXPRESS DOWN

EXTERIOR

- MIRRORS, OUTSIDE HEATED, POWER ADJUSTABLE, BODY COLOR TURN SIGNAL INDICATORS
- HEADLAMPS, LED
- DAYTIME RUNNING LAMPS, LED

SAFETY & SECURITY

- REAR PARK ASSIST
- REAR CROSS TRAFFIC ALERT
- LANE CHANGE ALERT WITH SIDE BLIND ZONE ALERT
- HD REAR VISION CAMERA

TEEN DRIVER

MANUFACTURER'S SUGGESTED RETAIL PRICE

STANDARD VEHICLE PRICE \$33,800.00

OPTIONS & PRICING

OPTIONS INSTALLED BY THE MANUFACTURER (MAY REPLACE STANDARD EQUIPMENT SHOWN)

ENGINE, 3.6L V6, SIDI, DOHC, VVT	1,095.00
TRAILERING PACKAGE:	650.00
• HITCH GUIDANCE W/ HITCH VIEW	
• ALTERNATOR, 170 AMPS	
• COOLING SYSTEM, HEAVY DUTY	
SATIN STEEL METALLIC	495.00
SEATING, 6-PASSENGER	INC.
TOTAL OPTIONS	\$2,240.00
TOTAL VEHICLE & OPTIONS	\$36,040.00
DESTINATION CHARGE	1,195.00

TOTAL VEHICLE PRICE* \$37,235.00

EPA DOT Fuel Economy and Environment

Gasoline Vehicle

Fuel Economy
22 MPG
combined city/hwy
19 city
27 highway
4.5 gallons per 100 miles

Standard SUVs range from 13 to 93 MPG. The best vehicle rates 136 MPGe.

You spend \$1,750 more in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost \$1,850

Fuel Economy & Greenhouse Gas Rating (tailpipe only)

4 Best

This vehicle emits 413 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.

Smog Rating (tailpipe only)

6 Best

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 27 MPG and costs \$7,500 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$2.70 per gallon. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fuelconomy.gov

Calculate personalized estimates and compare vehicles



GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score

Based on the combined ratings of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight.

Not Rated

Frontal Crash

Driver Passenger

Not Rated
Not Rated

Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.

Side Crash

Front seat Rear seat

Not Rated
Not Rated

Based on the risk of injury in a side impact.

Rollover

Based on the risk of rollover in a single-vehicle crash.

★★★★

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



Equipped with the safety and security of OnStar.

Visit onstar.com for details.

onstar.com/privacy

PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS CARLINE:
U.S./CANADIAN PARTS CONTENT: 52%
MAJOR SOURCES OF FOREIGN PARTS CONTENT: MEXICO 21%

NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.

FOR THIS VEHICLE:

FINAL ASSEMBLY POINT:

SPRING HILL, TN U.S.A.

COUNTRY OF ORIGIN:

ENGINE: UNITED STATES

TRANSMISSION: UNITED STATES

This label has been applied pursuant to Federal law - Do not remove prior to delivery to the ultimate purchaser. *Includes Manufacturer's Recommended Pre-Delivery Service. Does not include dealer installed options and accessories not listed above, local taxes or license fees.

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ORDER NO XE4VNF SALES CODE E

SALES MODEL CODE 1N626

DEALER NO 12766

FINAL ASSEMBLY:

SPRING HILL, TN, U.S.A.

VIN 1GKKKLSL5LZ158230

REISSUE

DEALER TO WHOM DELIVERED

BOUCHER BUICK GMC

1907 E MORELAND RD

WAUKESHA, WI 53186-4020



Photo No. 069 - Monroney Label

42 Seats and Restraints

Head Restraints

Front Seats



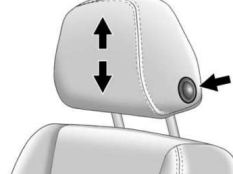
With head restraints that are not installed and adjusted properly, there is a greater chance that occupants will suffer a neck/spinal injury in a crash. Do not drive until the head restraints for all occupants are installed and adjusted properly.

The vehicle's front seats have adjustable head restraints in the outboard seating positions.



Adjust the head restraint so that the top of the restraint is at the same height as the top of the occupant's head. This position reduces the chance of a neck injury in a crash.

The height of the head restraint can be adjusted.



To raise or lower the head restraint, press the button located on the side of the head restraint, and pull up or push the head restraint down, and release the button. Pull and push on the head restraint after the button is released to make sure that it is locked in place.

The front seat outboard head restraints are not removable.

Rear Seats

Second Row Seats

The vehicle's rear second row seats have adjustable head restraints in the outboard seating positions.

The height of the head restraint can be adjusted. Pull the head restraint up to raise it. Try to move the head restraint to make sure that it is locked in place.



To lower the head restraint, press the button, located on the top of the seatback, and push the head restraint down. Try to move the head restraint after the button is released to make sure that it is locked in place.

The second row head restraints are not removable.

Third Row Seats

The vehicle's rear third row seats have head restraints in the outboard seating positions that cannot be adjusted up or down.

The rear third row outboard head restraints are not removable.

The rear third row outboard head restraints are designed to be folded.

The head restraint can be folded to allow for better visibility when the rear seat is unoccupied.

When folding the seatback down, the head restraint will automatically fold out of the way as the seat is folded down.

Return the lowered head restraint to the upright position until it locks into place. Push and pull on the head restraint to make sure it is locked.

Seats and Restraints 43

Front Seats

Seat Adjustment



You can lose control of the vehicle if you try to adjust a driver seat while the vehicle is moving. Adjust the driver seat only when the vehicle is not moving.



To adjust a manual seat:

1. Lift the handle under the seat to unlock it.

Photo No. 070 - Head Restraint Use and Adjustment Information from Vehicle Owners Manual



Photo No. 071 - Post-Test View of Shattered Vehicle Inner Door Panel

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)

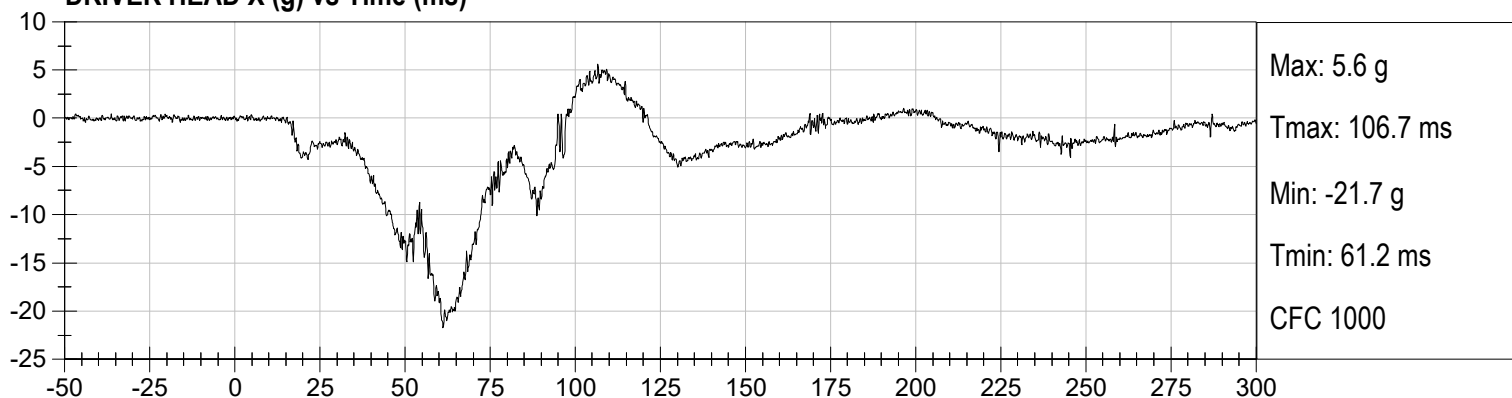
Load Cell Pole Barrier #5 Force (Y)

Load Cell Pole Barrier #6 Force (Y)

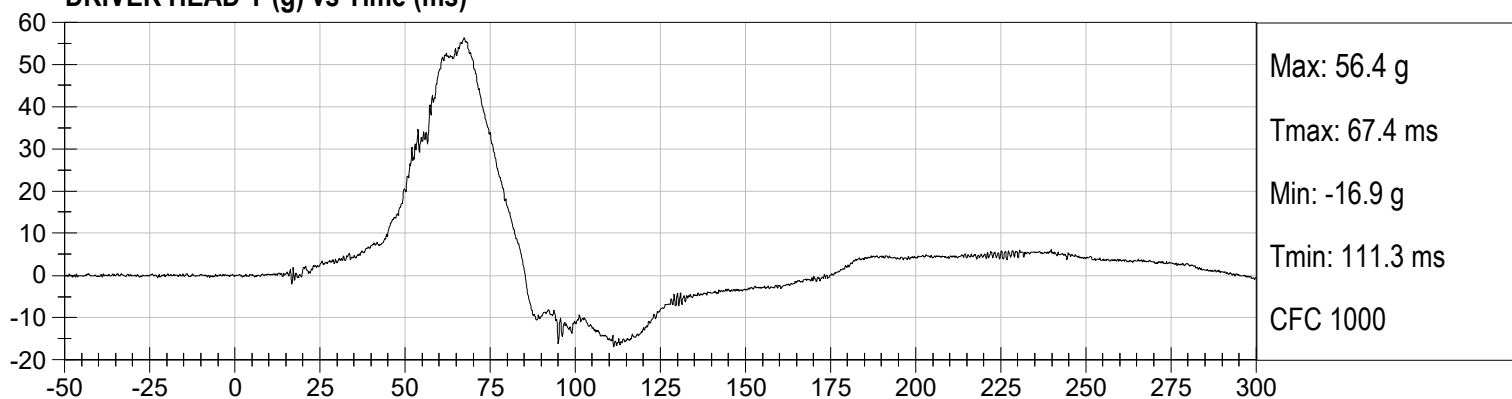
Load Cell Pole Barrier #7 Force (Y)

Load Cell Pole Barrier #8 Force (Y)

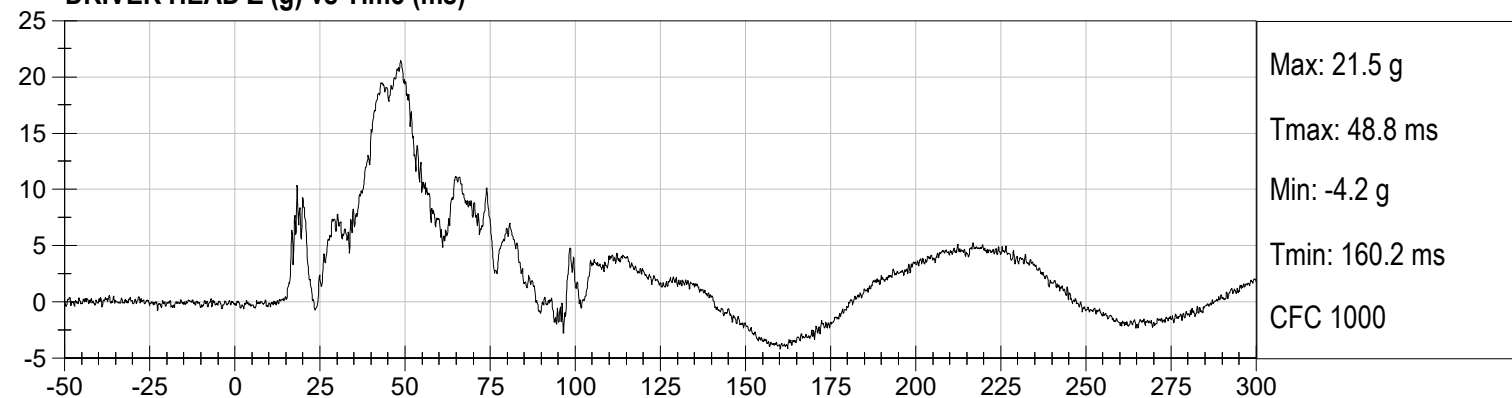
DRIVER HEAD X (g) vs Time (ms)



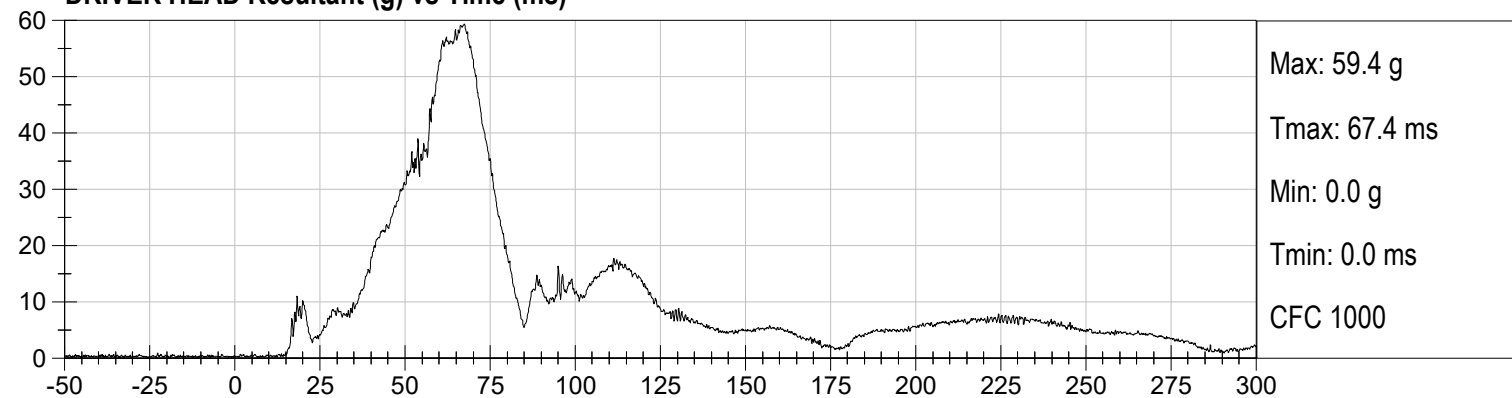
DRIVER HEAD Y (g) vs Time (ms)



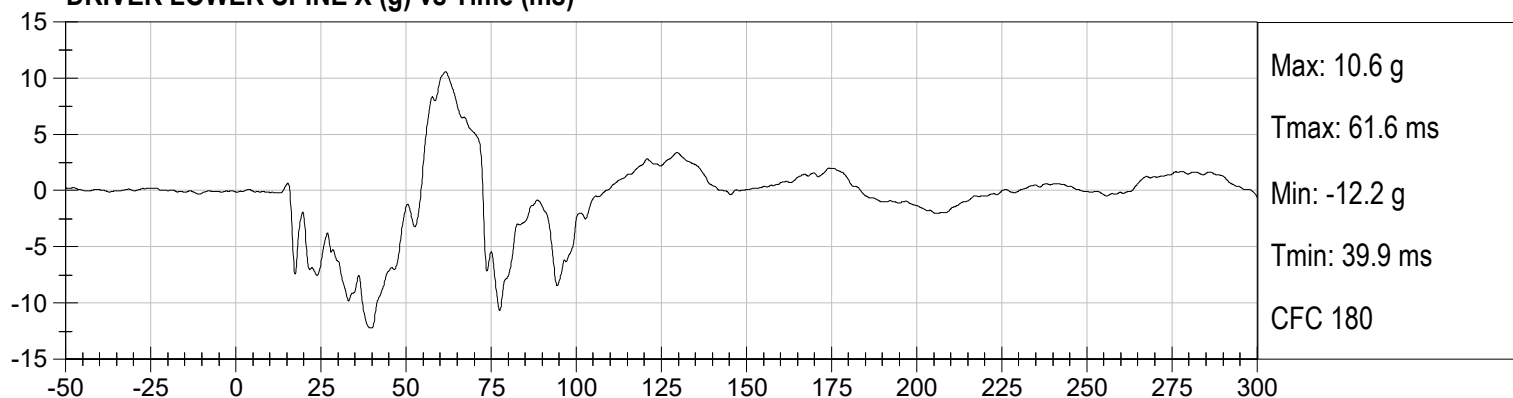
DRIVER HEAD Z (g) vs Time (ms)



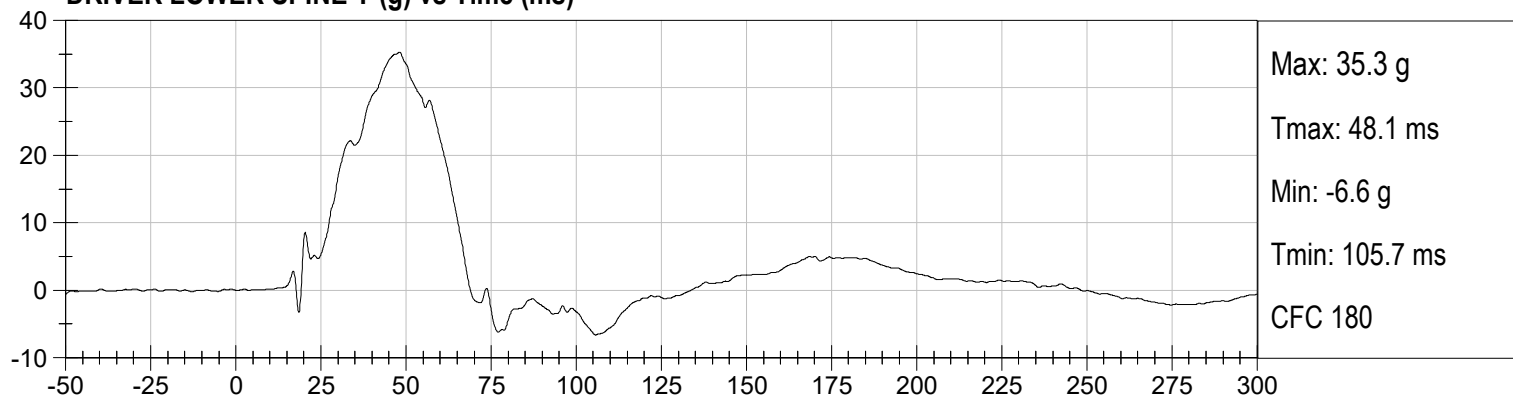
DRIVER HEAD Resultant (g) vs Time (ms)



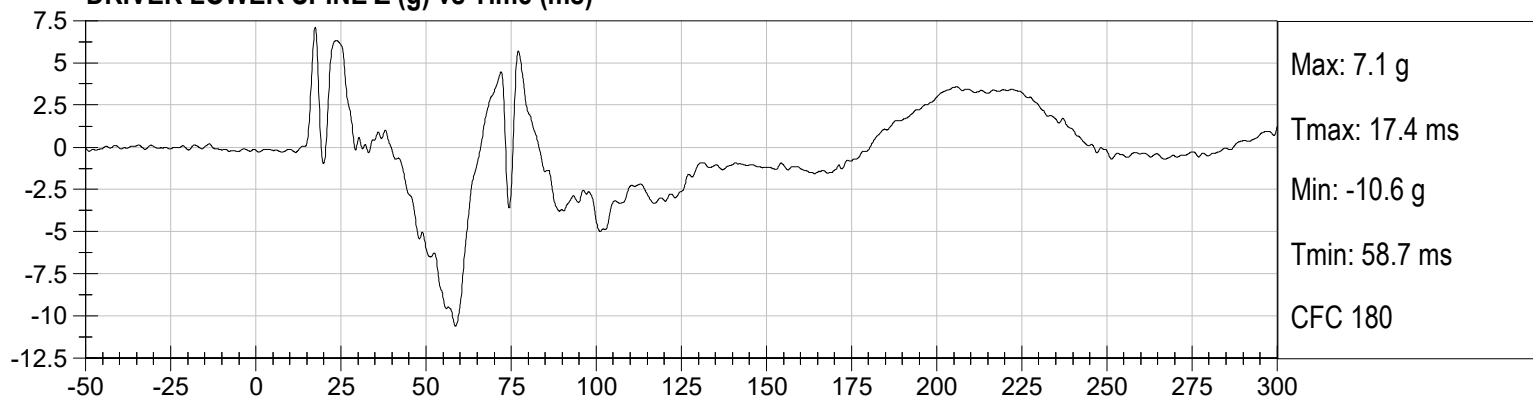
DRIVER LOWER SPINE X (g) vs Time (ms)



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



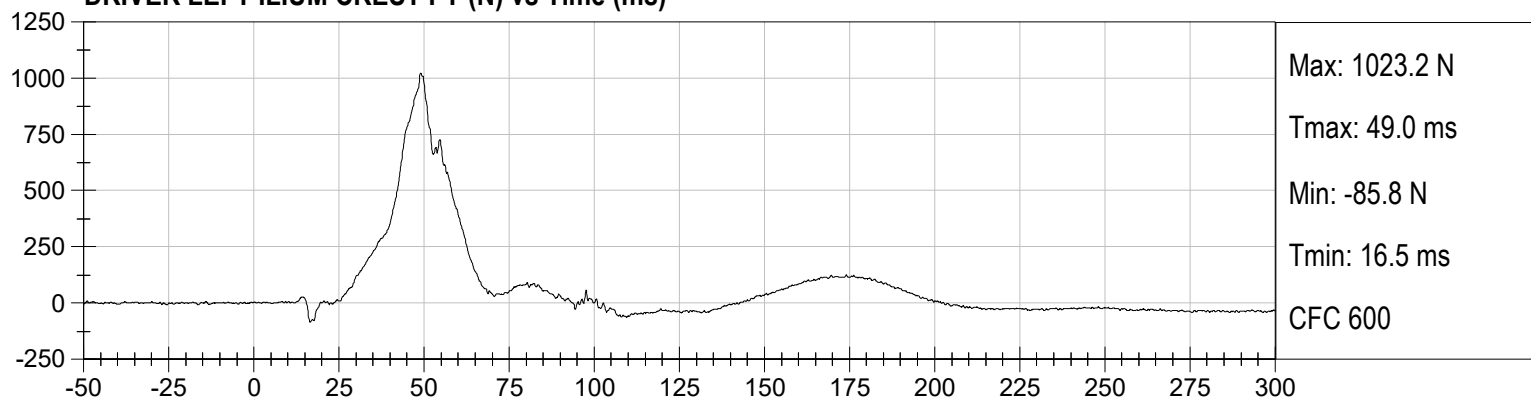
DRIVER LOWER SPINE Z (g) vs Time (ms)



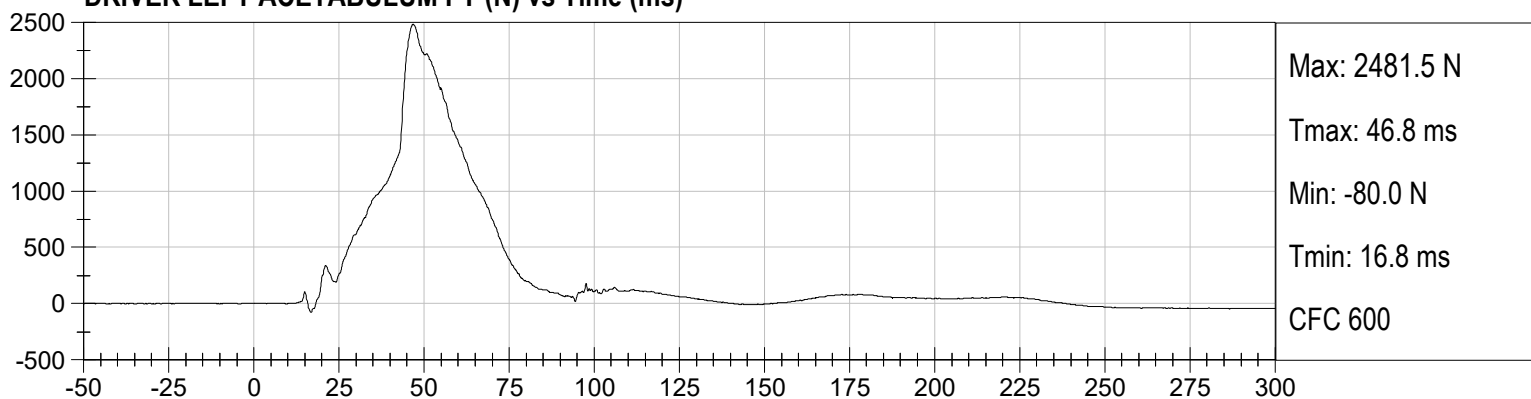
DRIVER LOWER SPINE Resultant (g) vs Time (ms)



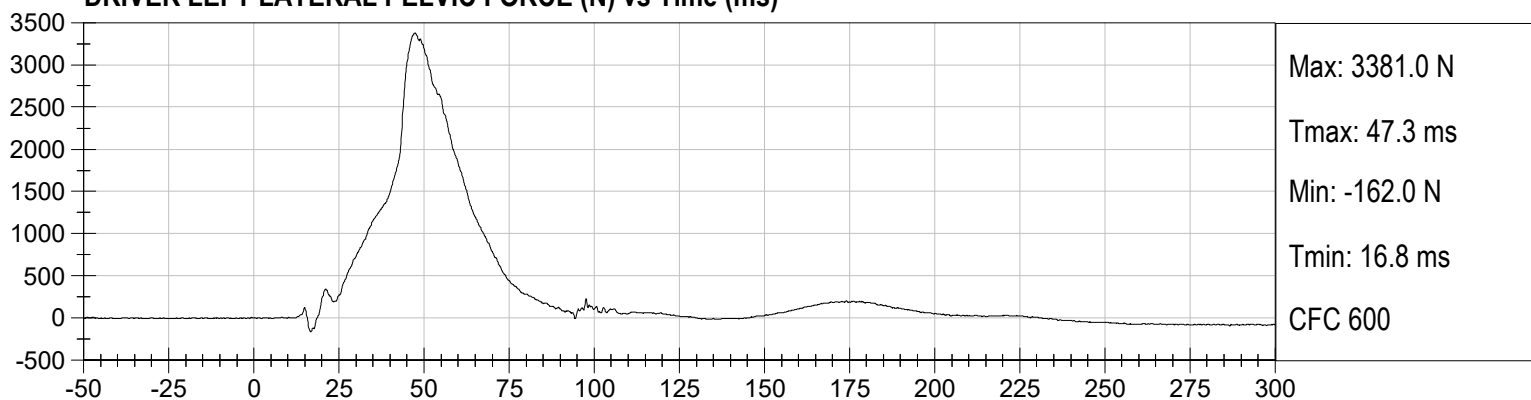
DRIVER LEFT ILIUM CREST FY (N) vs Time (ms)



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



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



APPENDIX C
DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

SID-IIS 5TH PERCENTILE FEMALE - DRIVER ATD

SID-IIsD External Measurements
SN: 306

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

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

ATD Serial No: 306

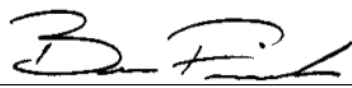
Test ID: D200361

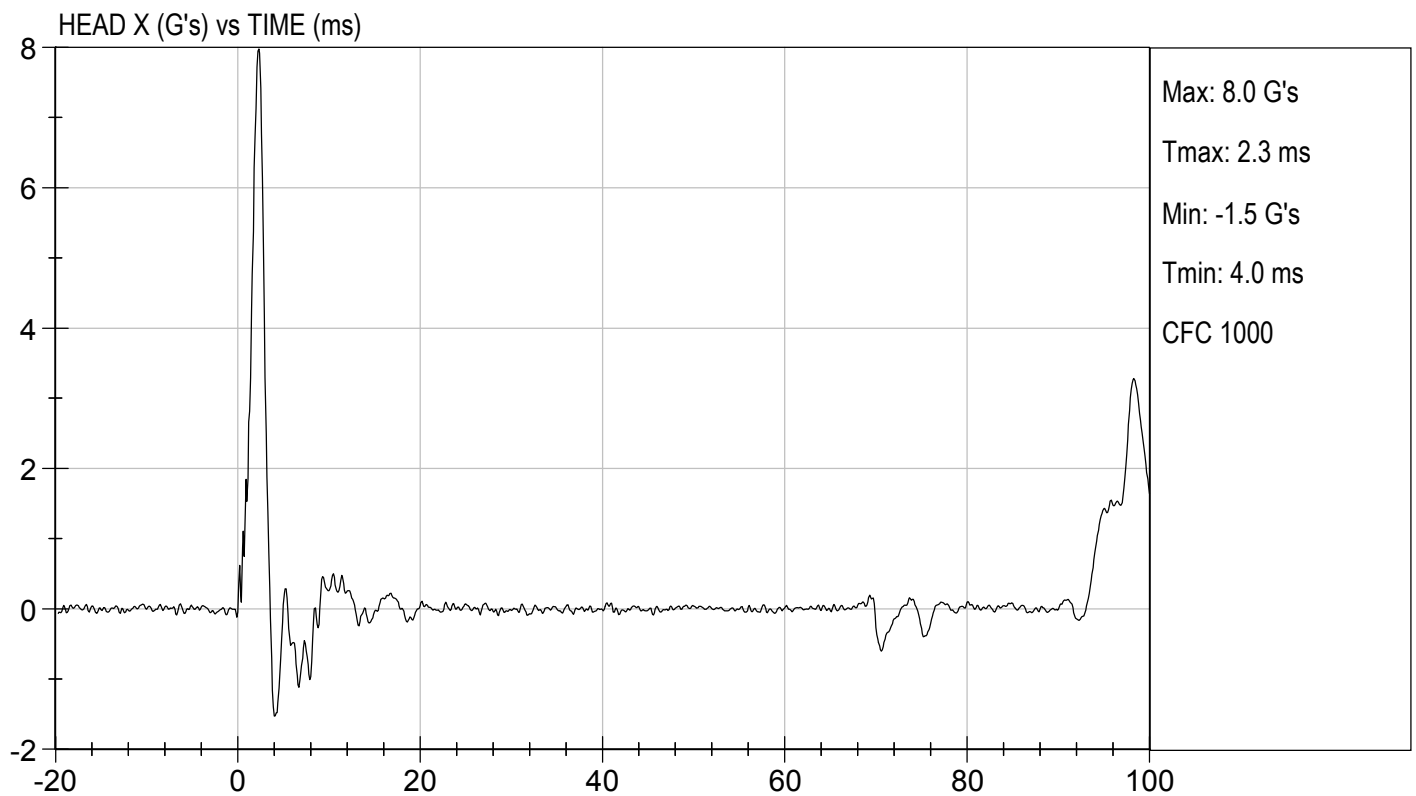
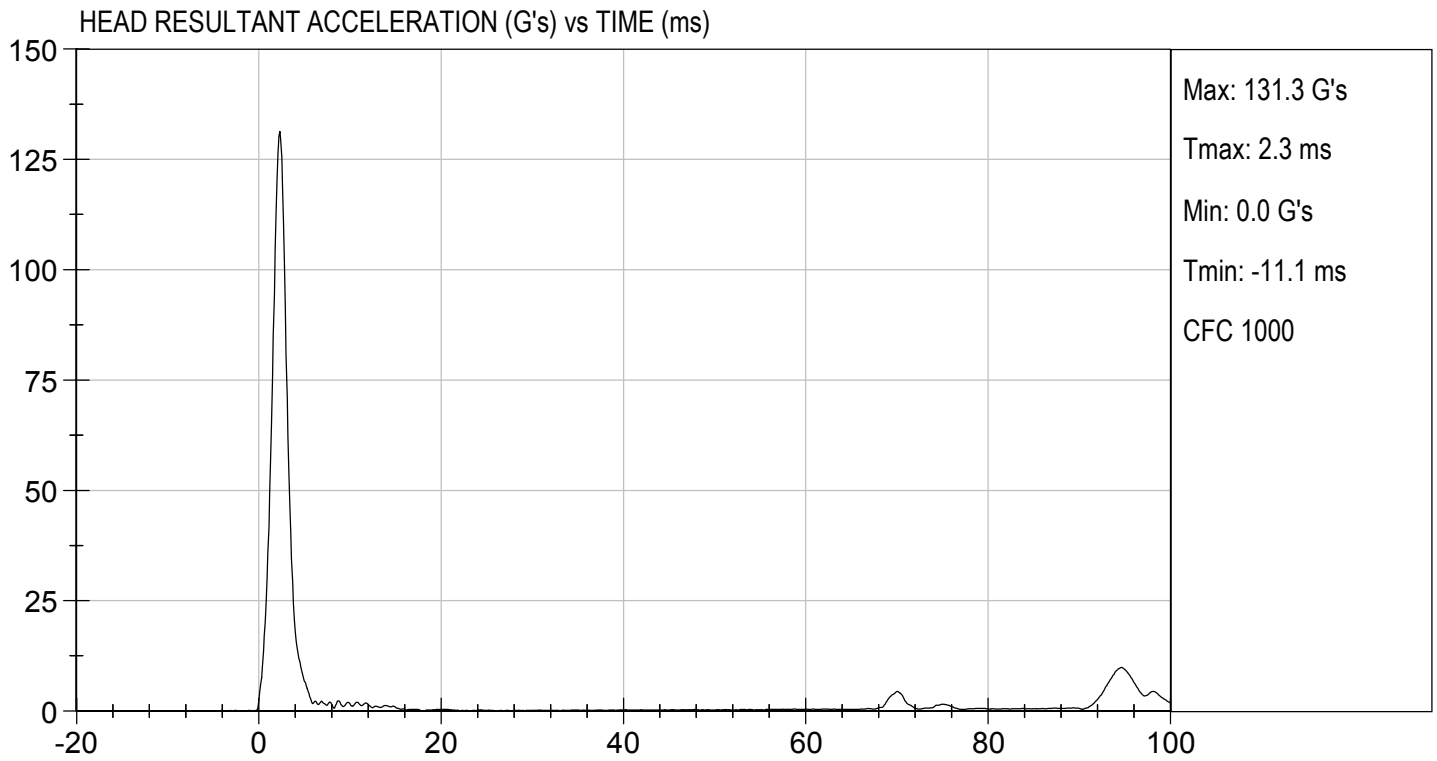
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	25	Pass
Peak Resultant Acceleration	G's	115 to 137	131	Pass
Peak Longitudinal Acceleration	G's	+/- 15	8.0	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	<15%	Yes	Pass
			Overall Test Results	Pass

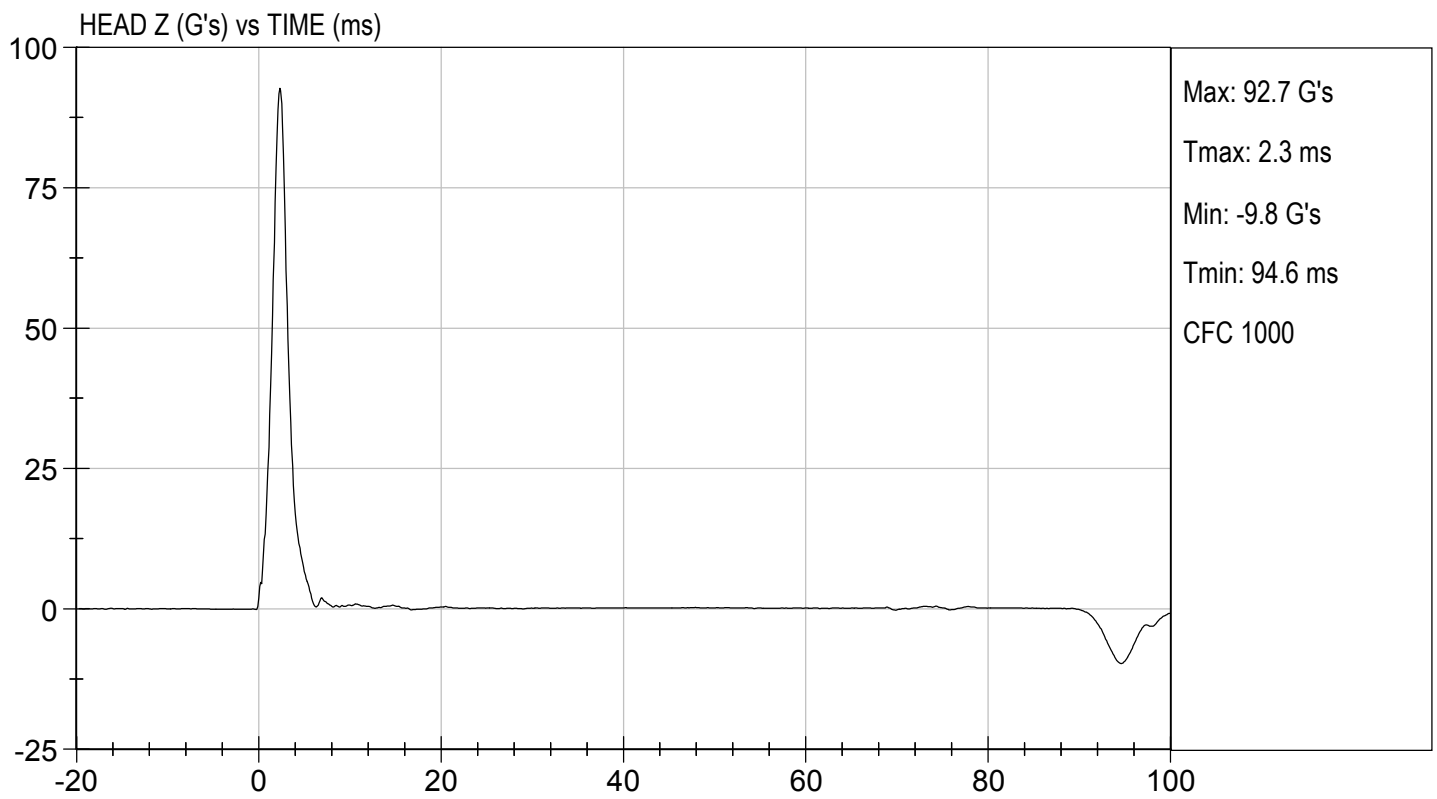
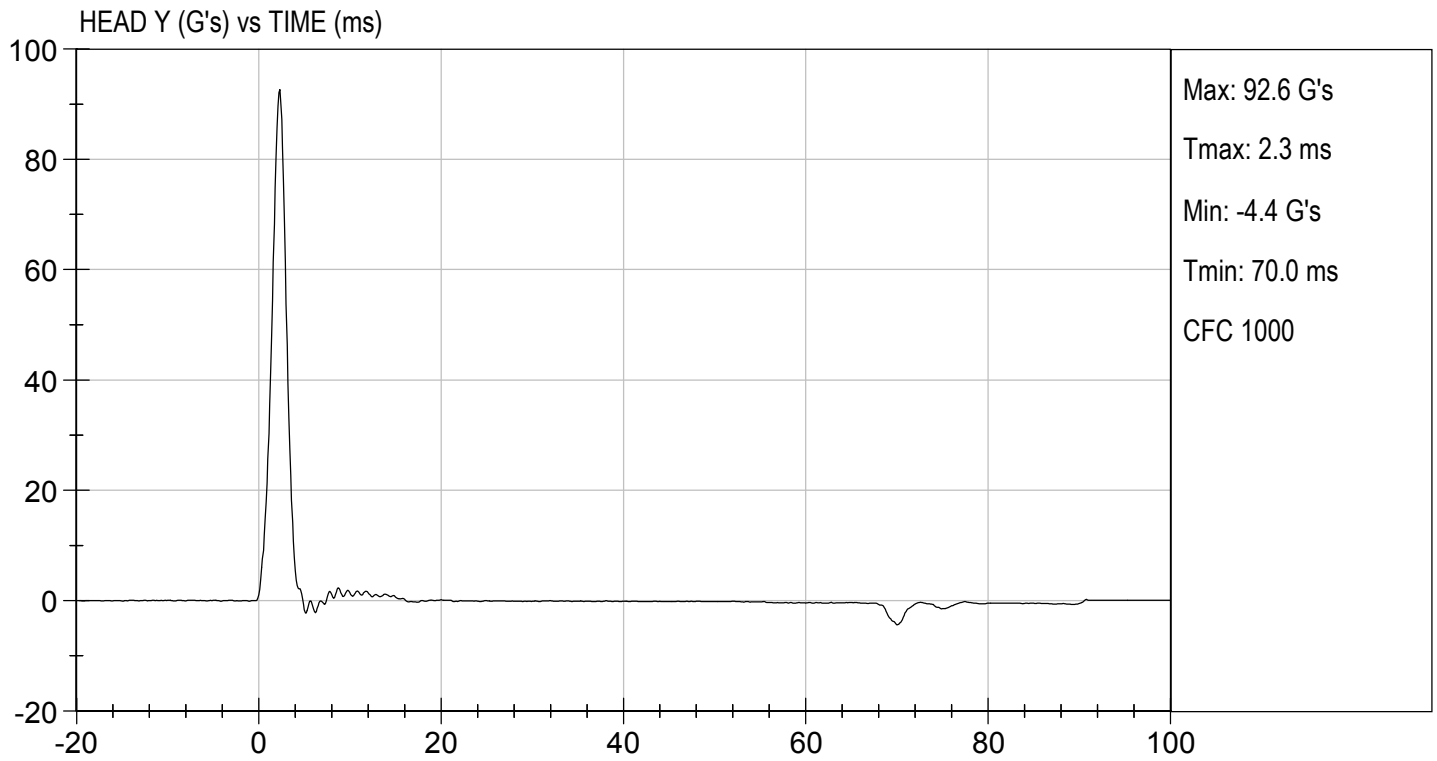

Laboratory Technician

01/31/2020

Test Date


Approved By





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

ATD Serial No: 306

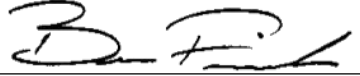
Test I.D: D200362

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	20.6	Pass
Humidity		%	10 to 70	23	Pass
Impact Velocity		m/s	5.51 to 5.63	5.63	Pass
Pendulum Velocity	10 ms	m/s	2.20 to 2.80	2.63	Pass
	15 ms	m/s	3.30 to 4.10	3.76	Pass
	20 ms	m/s	4.40 to 5.40	5.30	Pass
	25 ms	m/s	5.40 to 6.10	5.69	Pass
	25-100 ms	m/s	5.50 to 6.20	5.73	Pass
Maximum D-Plane Rotation		deg	71 to 81	72	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	61	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

01/31/2020

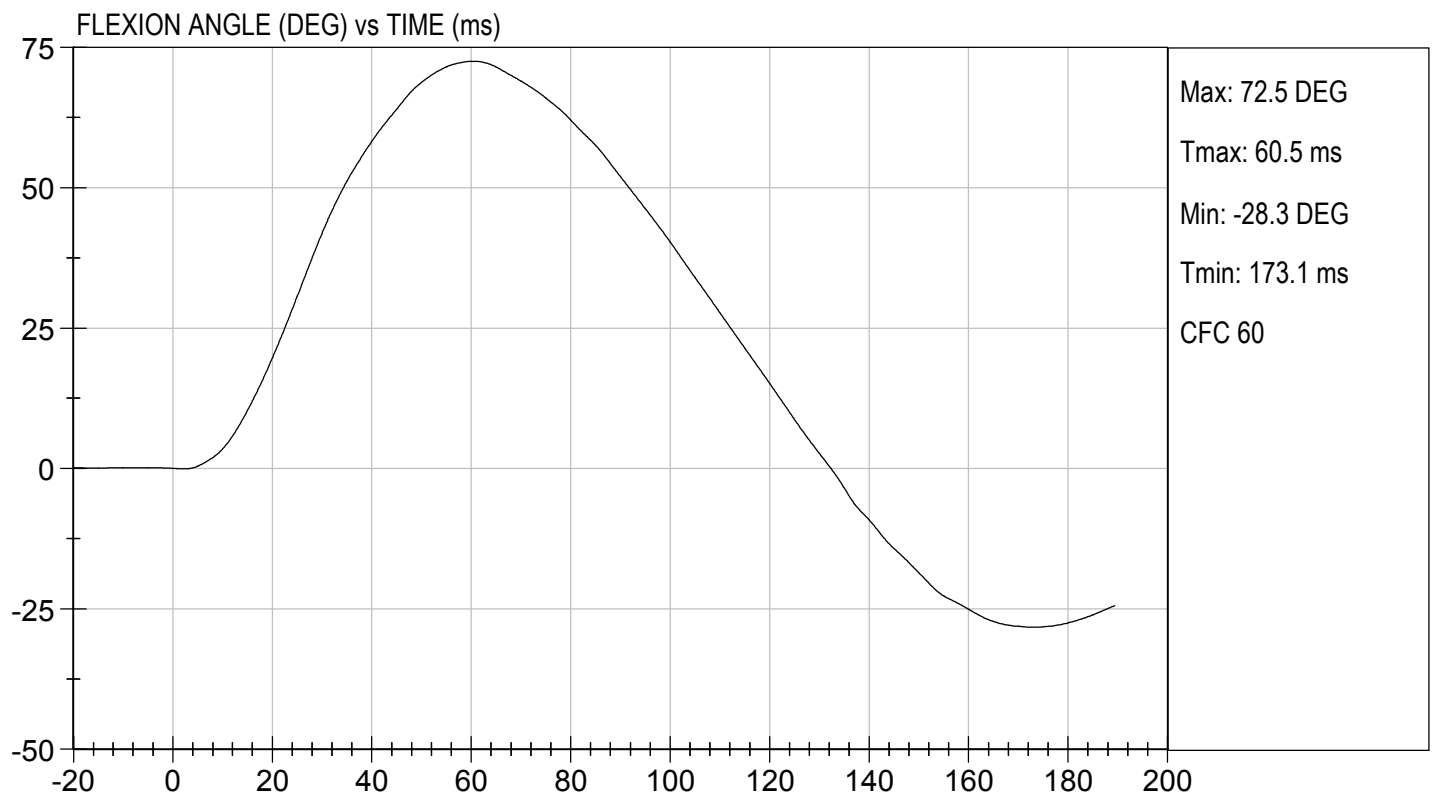
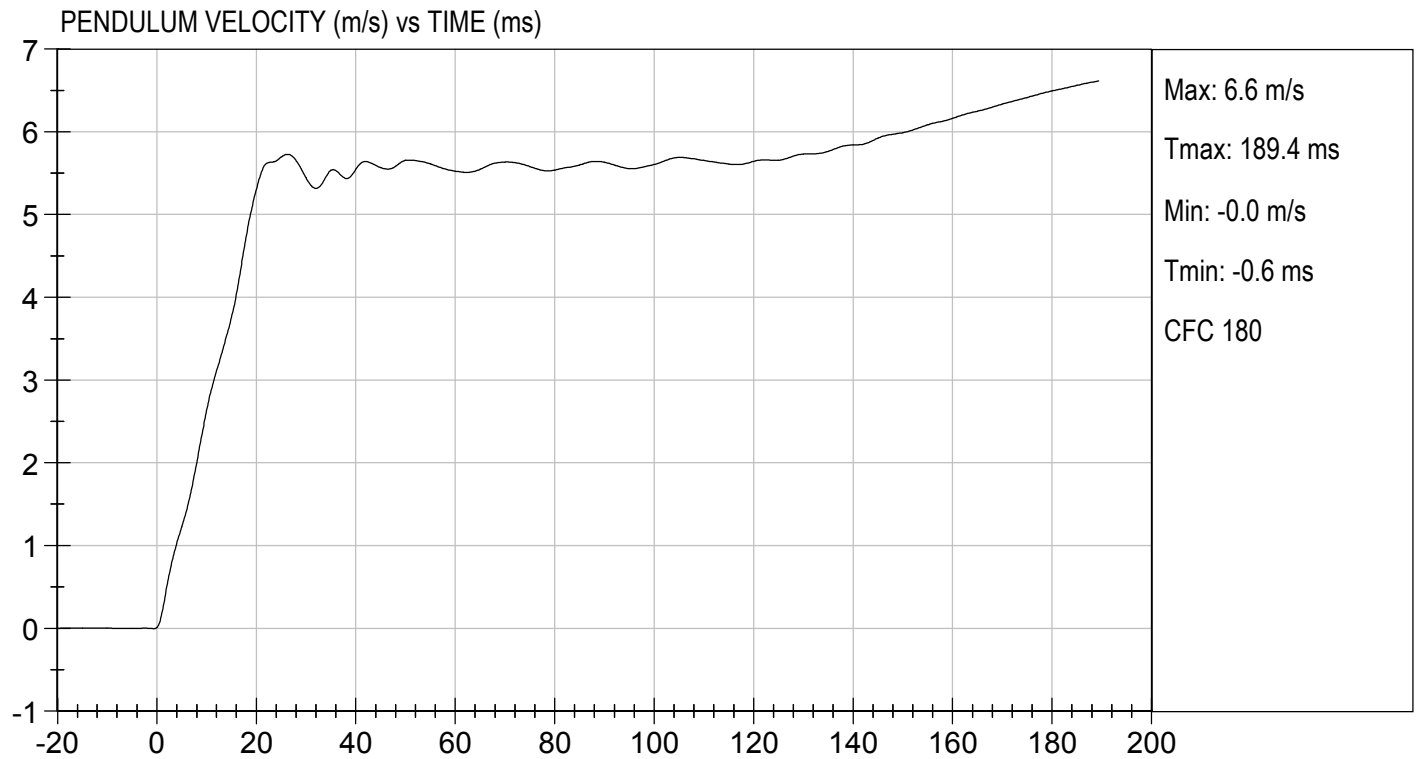
Test Date


 Approved By



TEST DESC: NECK BENDING
VELOCITY: 18.48 ft/s, 5.63 m/s

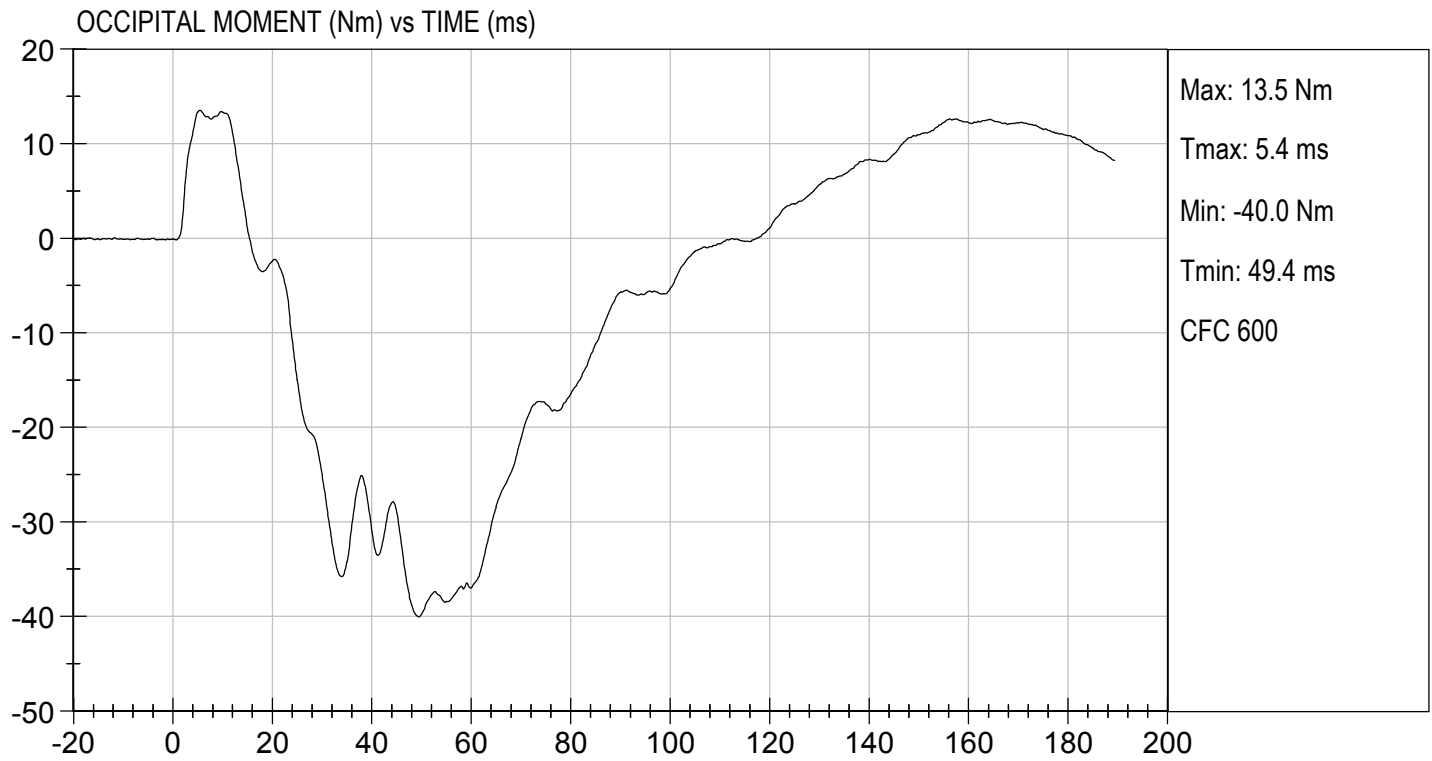
TEST DATE: 01/31/2020
TEST #: D200362





TEST DESC: NECK BENDING
VELOCITY: 18.48 ft/s, 5.63 m/s

TEST DATE: 01/31/2020
TEST #: D200362



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

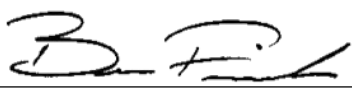
ATD Serial No: 306

Test ID: D200363

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	25	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Maximum Probe Acceleration	G's	13 to 18	15	Pass
Shoulder Displacement	mm	28 to 37	29	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	19	Pass
			Overall Test Results	Pass


Laboratory Technician

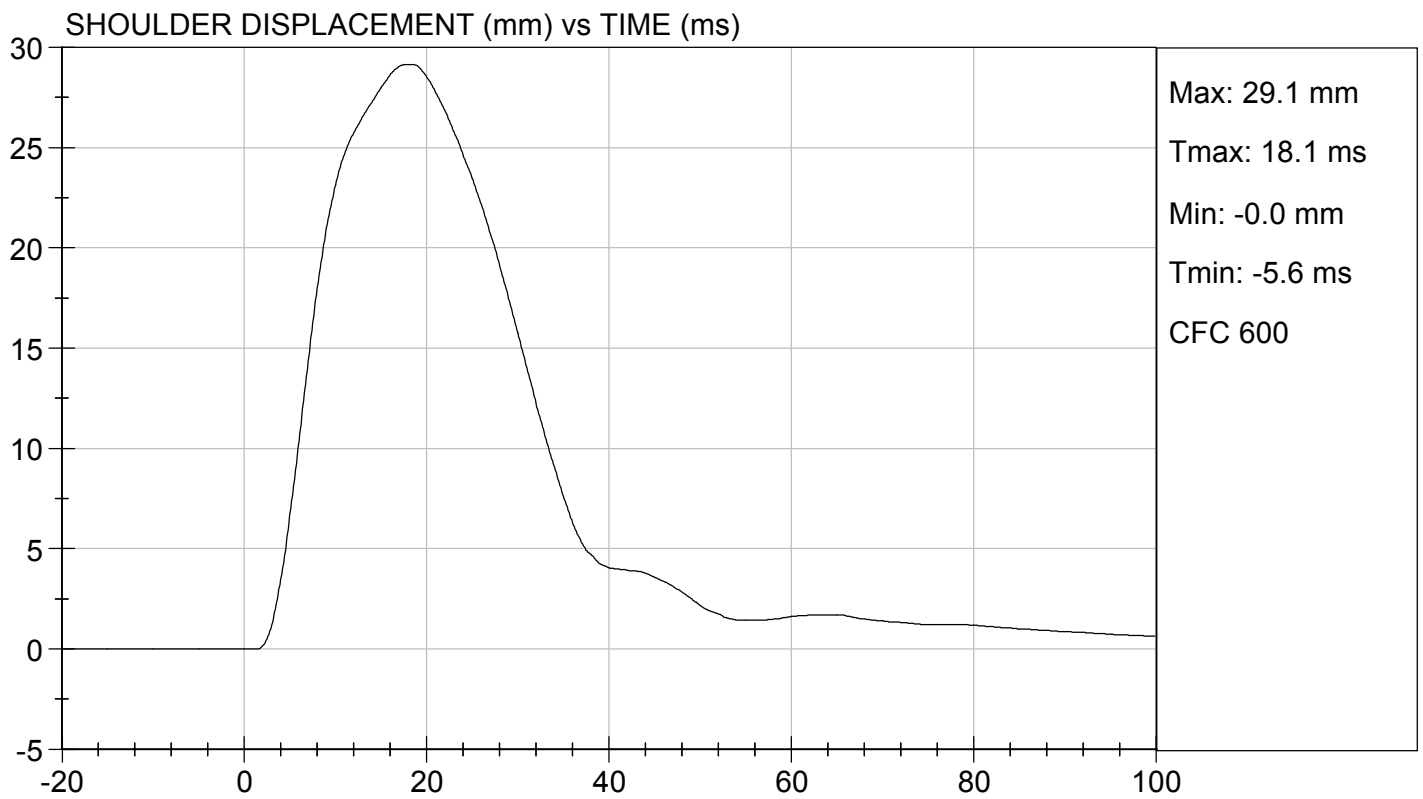
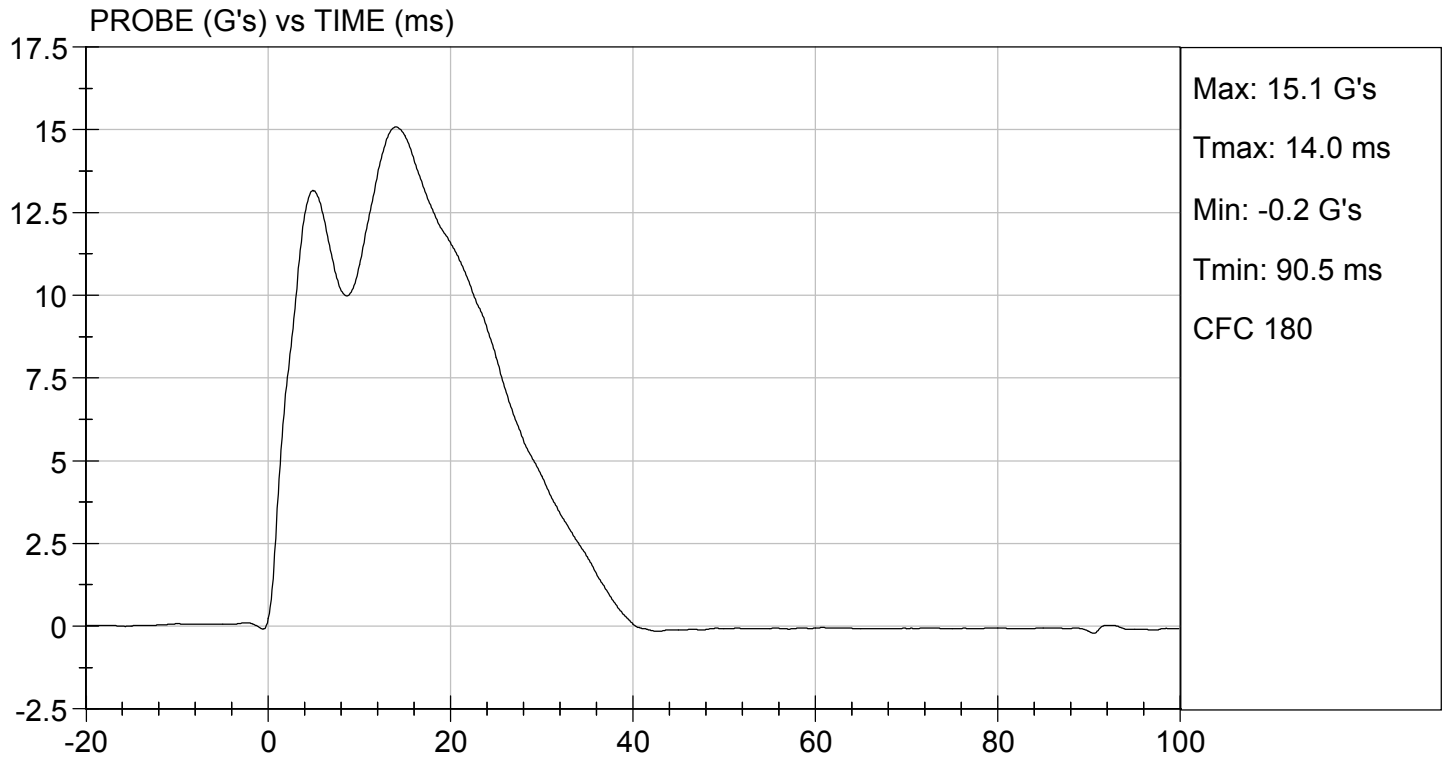
01/30/2020
Test Date


Approved By



TEST DESC: SHOULDER IMPACT
VELOCITY: 14.37 ft/s, 4.38 m/s

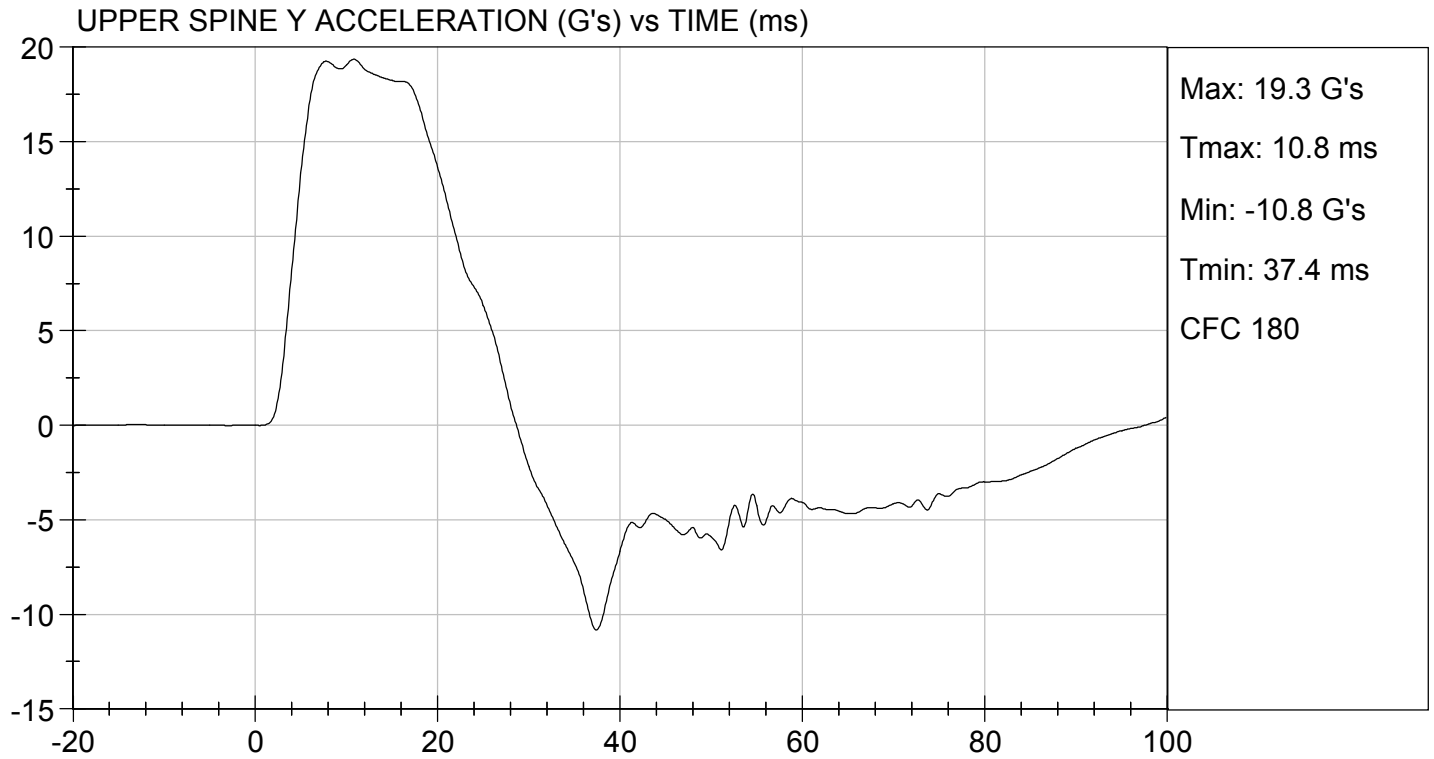
TEST DATE: 01/30/2020
TEST #: D200363





TEST DESC: SHOULDER IMPACT
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 01/30/2020
TEST #: D200363



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

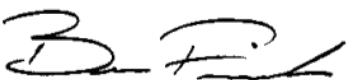
ATD Serial No: 306

Test I.D: D200364

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.4	Pass
Humidity	%	10 to 70	25	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Maximum Probe Acceleration	G's	30 to 36	32	Pass
Shoulder Displacement	mm	31 to 40	33	Pass
Upper Rib Displacement	mm	25 to 32	26	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	41	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	32	Pass
Overall Test Results				Pass


 Laboratory Technician

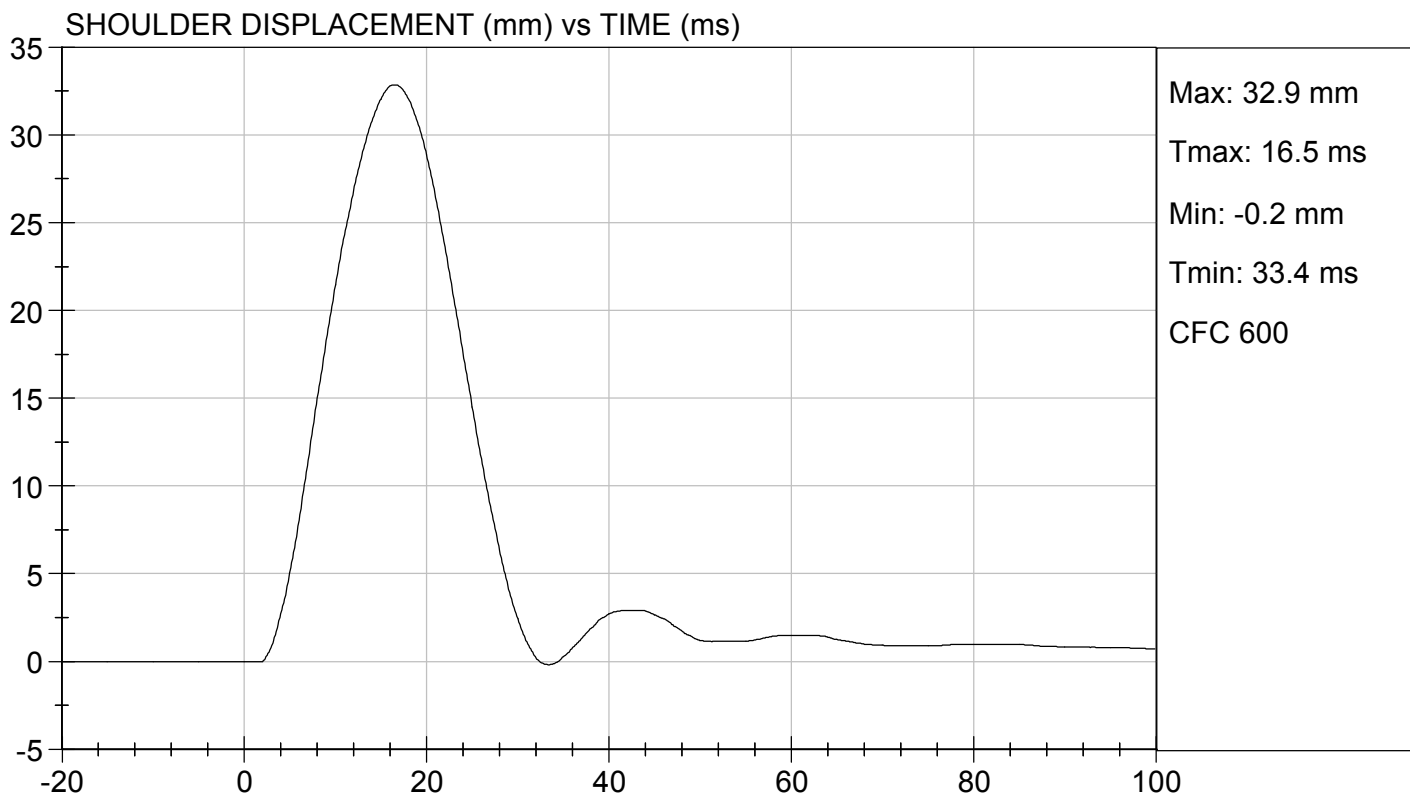
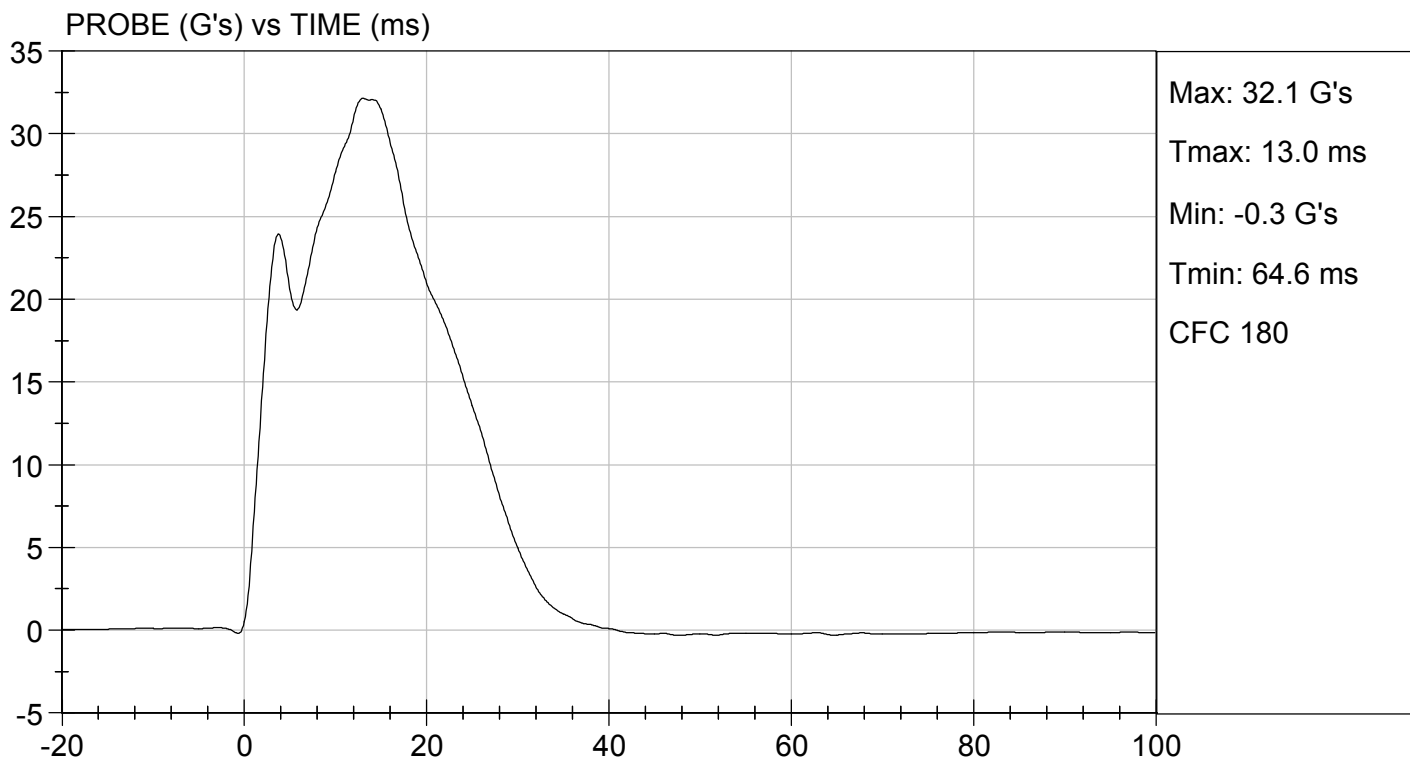
01/30/2020
 Test Date


 Approved By



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

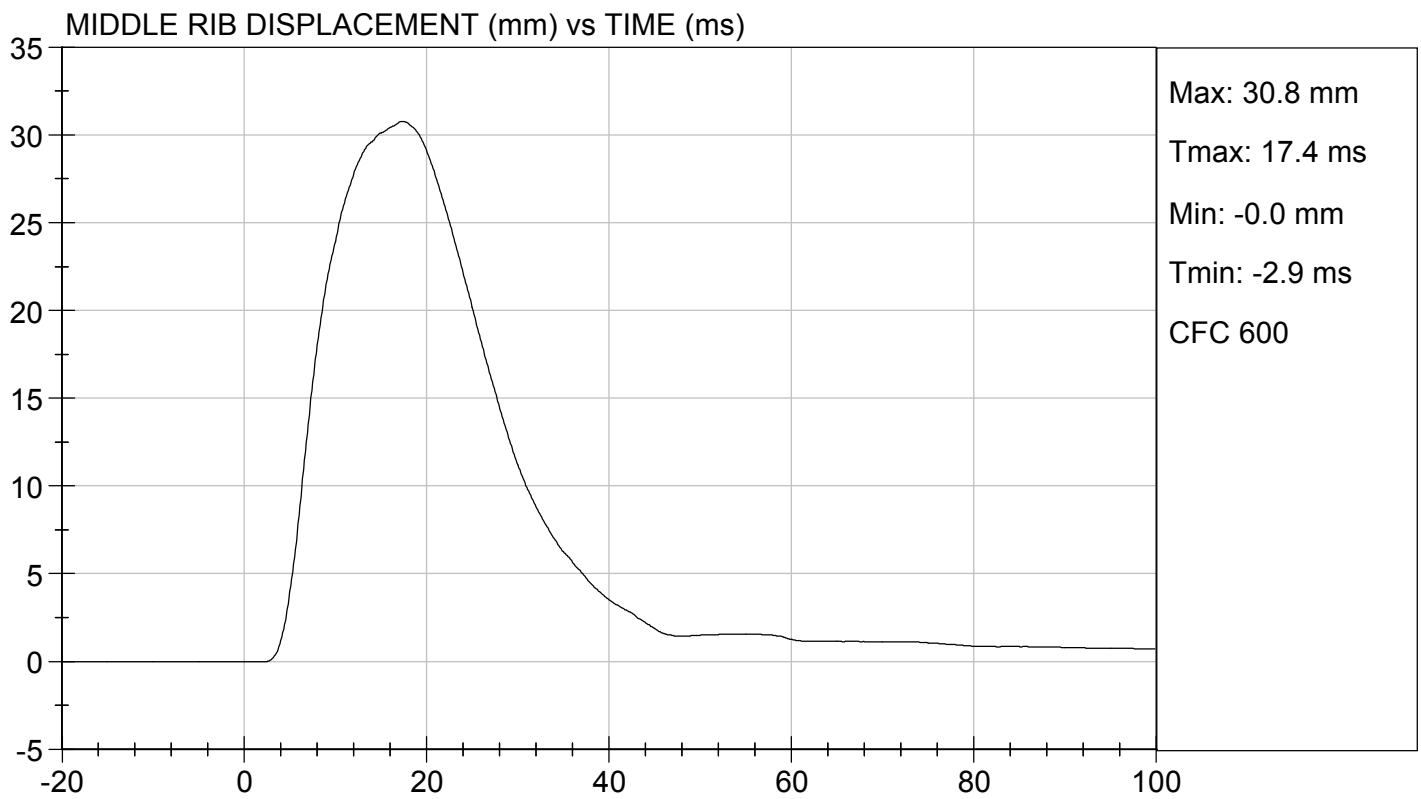
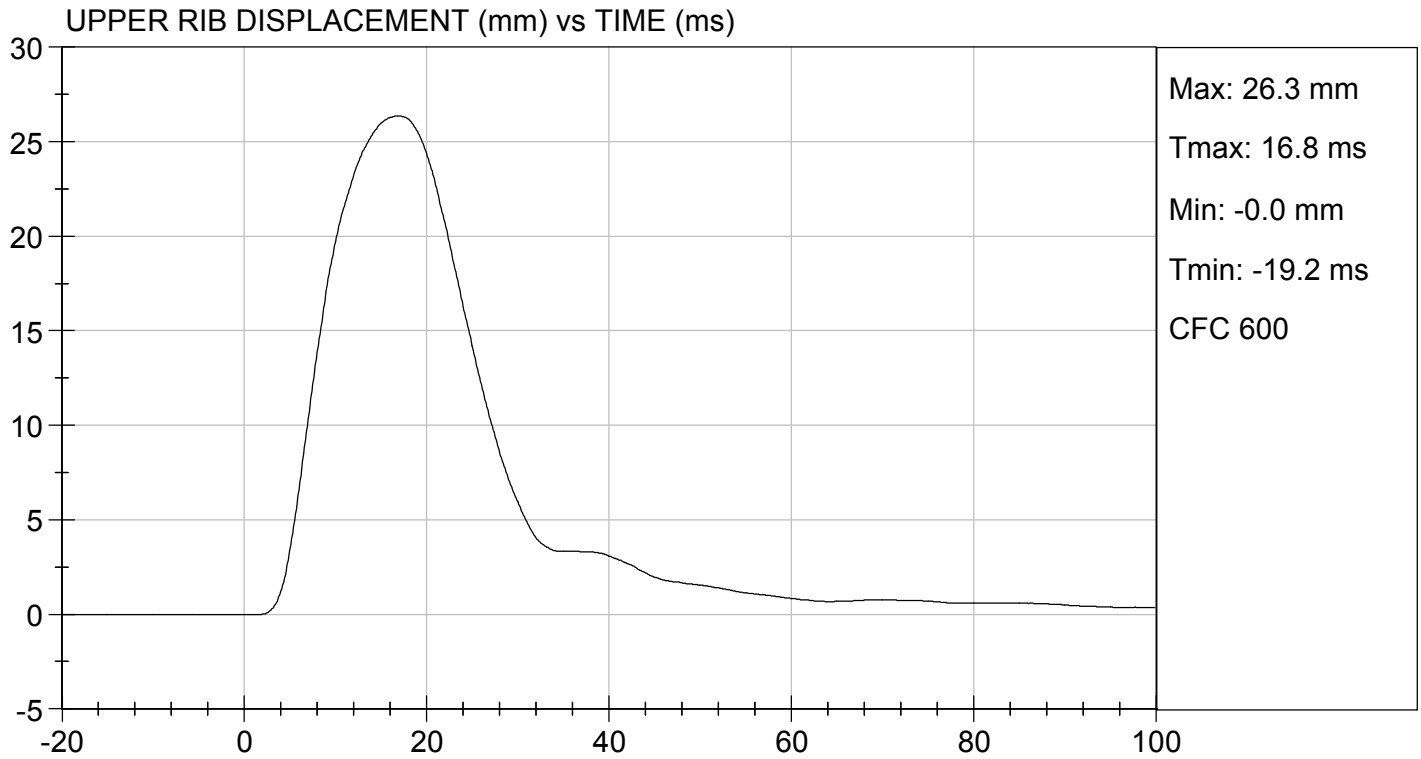
TEST DATE: 01/30/2020
TEST #: D200364





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

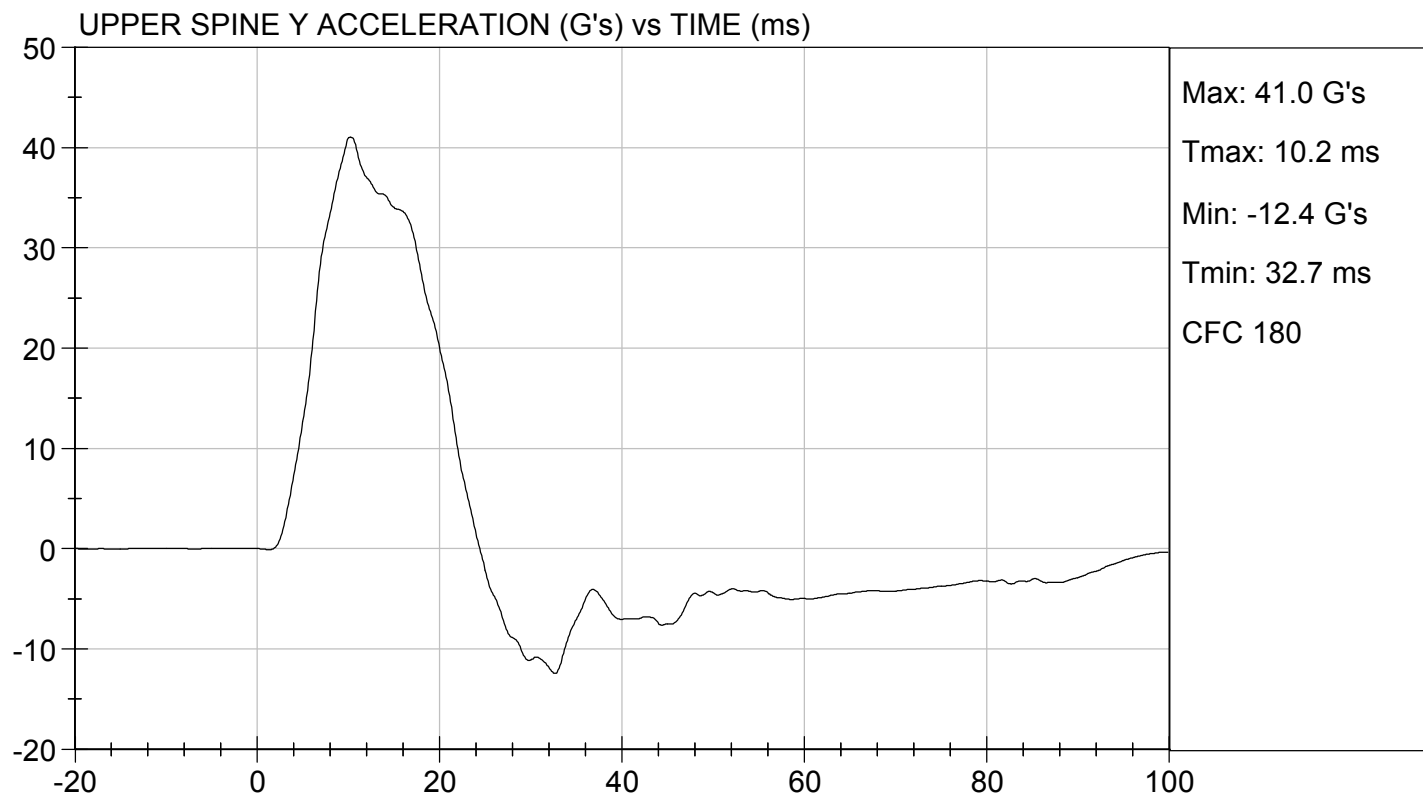
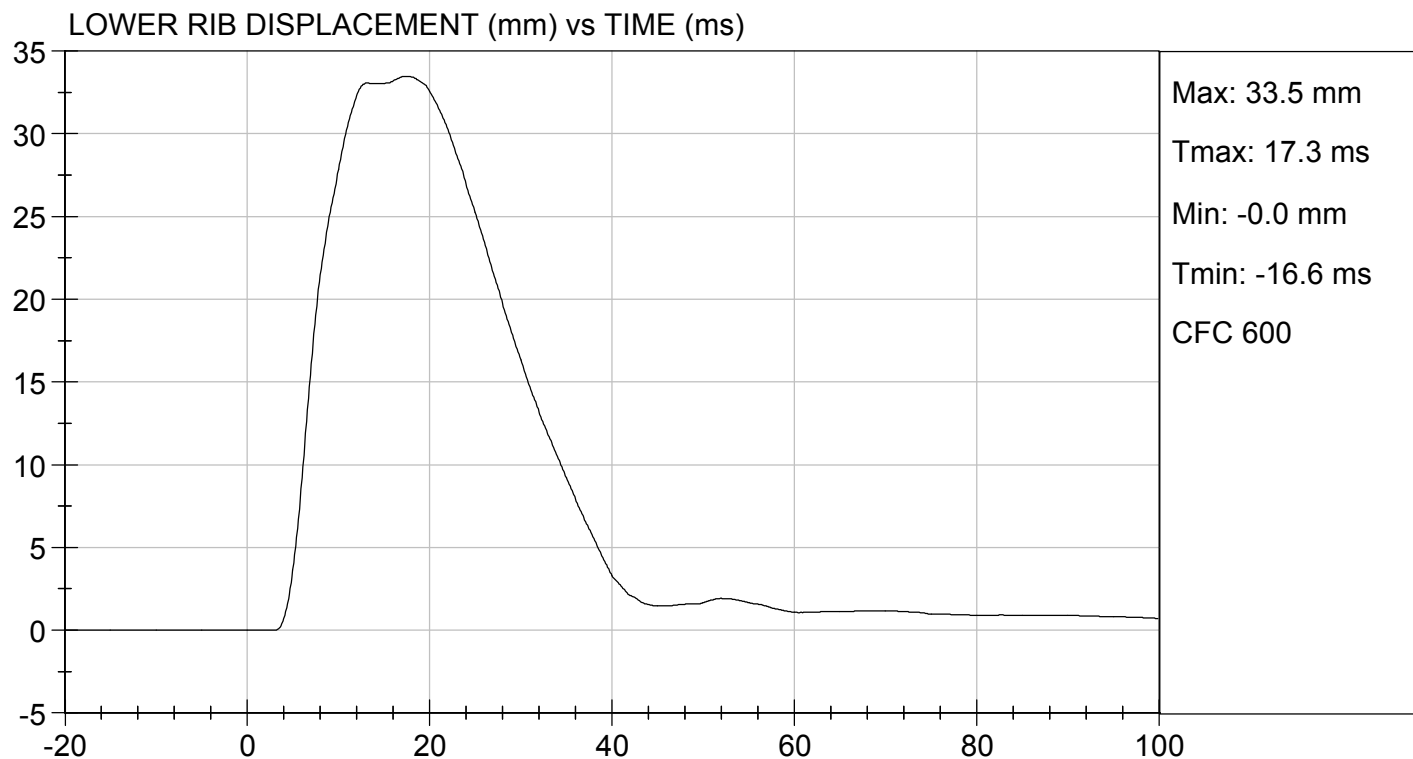
TEST DATE: 01/30/2020
TEST #: D200364





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

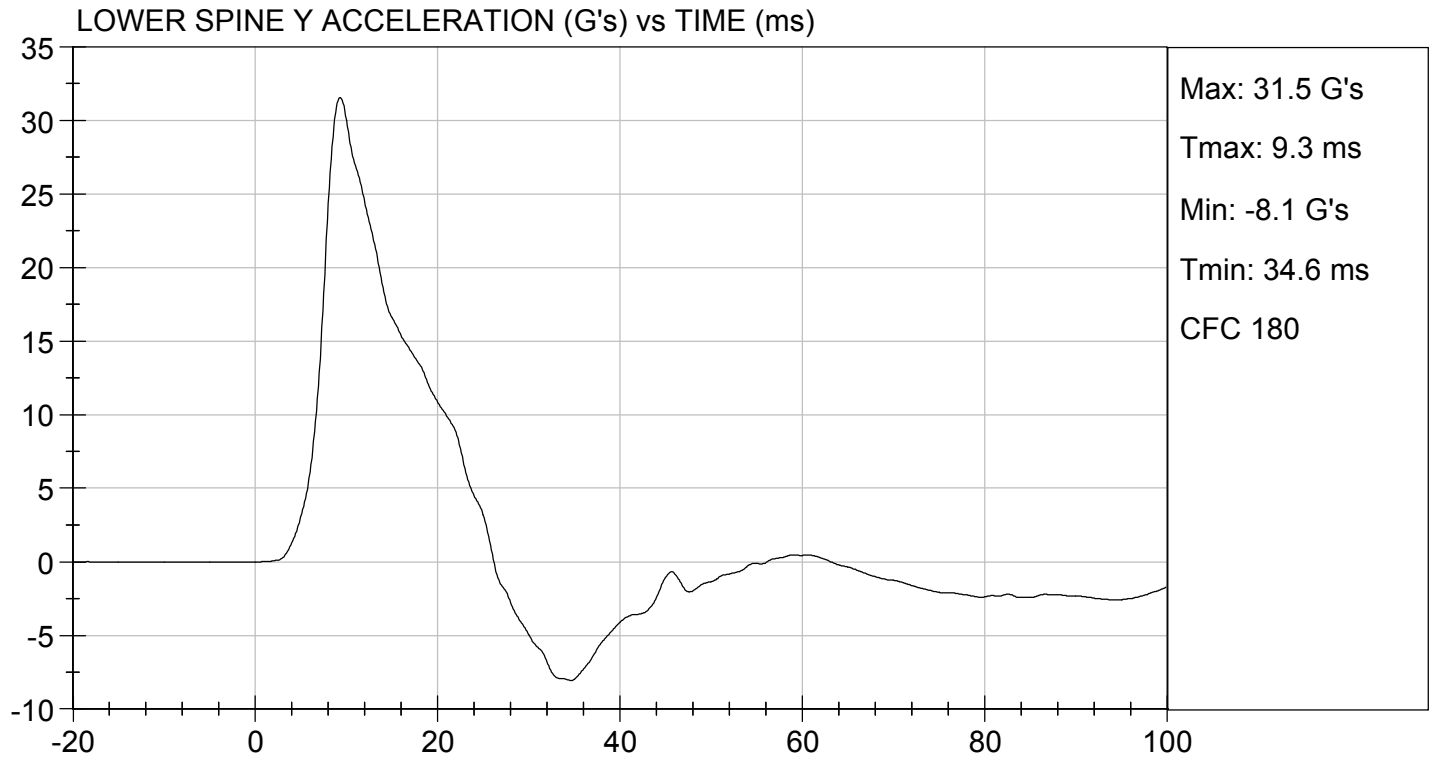
TEST DATE: 01/30/2020
TEST #: D200364





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

TEST DATE: 01/30/2020
TEST #: D200364



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

ATD Serial No: 306

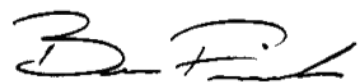
Test I.D: D200365

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.4	Pass
Humidity	%	10 to 70	25	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Maximum Probe Acceleration	G's	14 to 18	15	Pass
Upper Rib Displacement	mm	32 to 40	34	Pass
Middle Rib Displacement	mm	39 to 45	40	Pass
Lower Rib Displacement	mm	35 to 43	39	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	15	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	9	Pass
			Overall Test Results	Pass


Laboratory Technician

01/30/2020

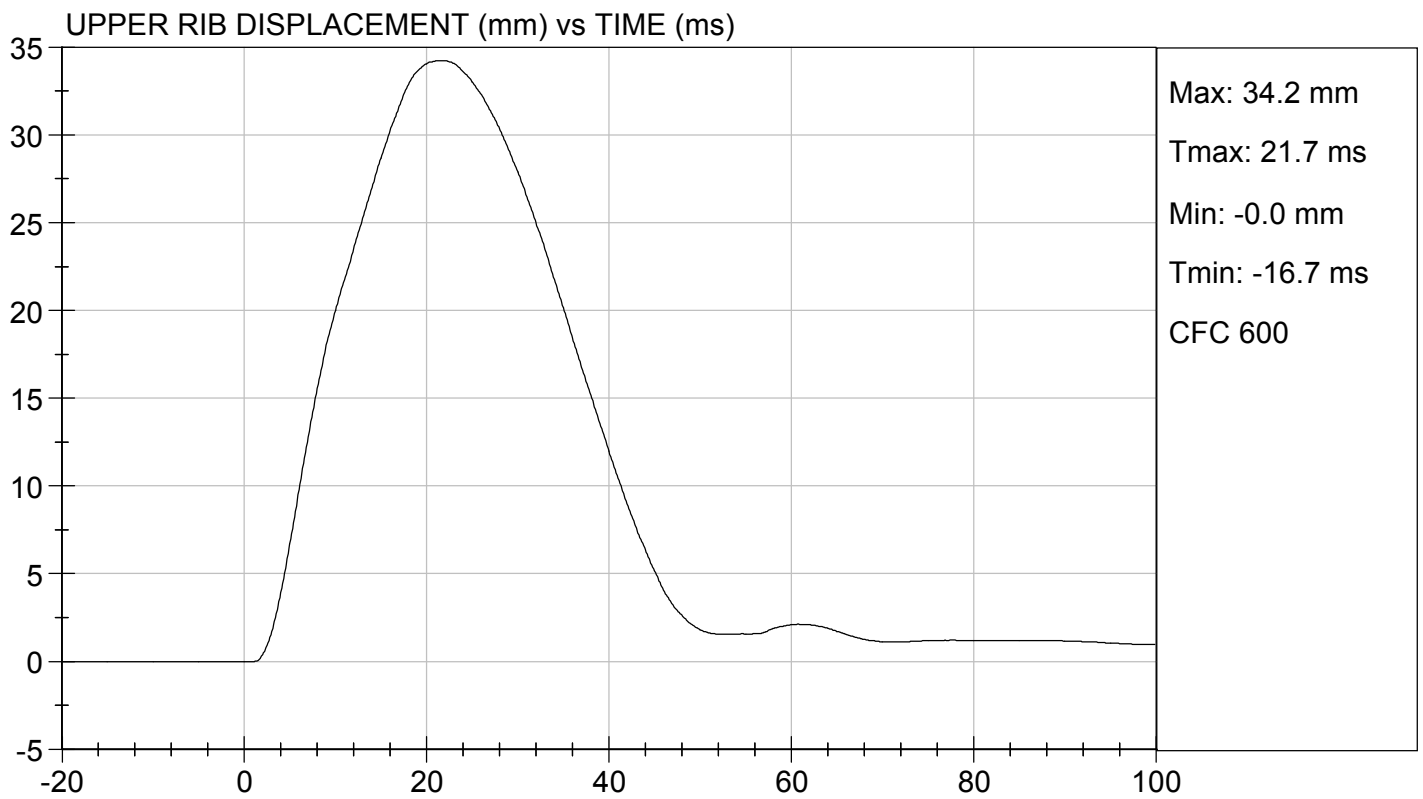
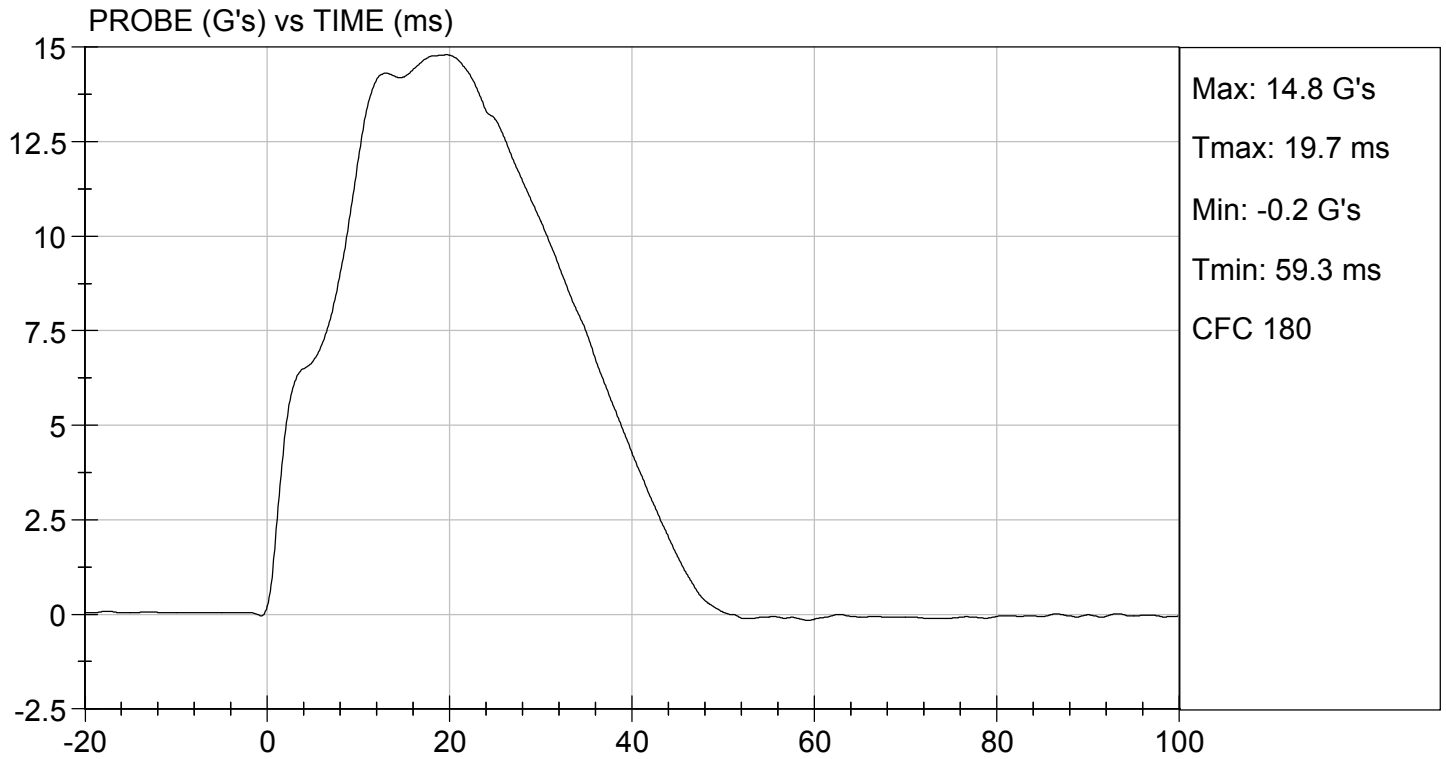
Test Date


Approved By



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

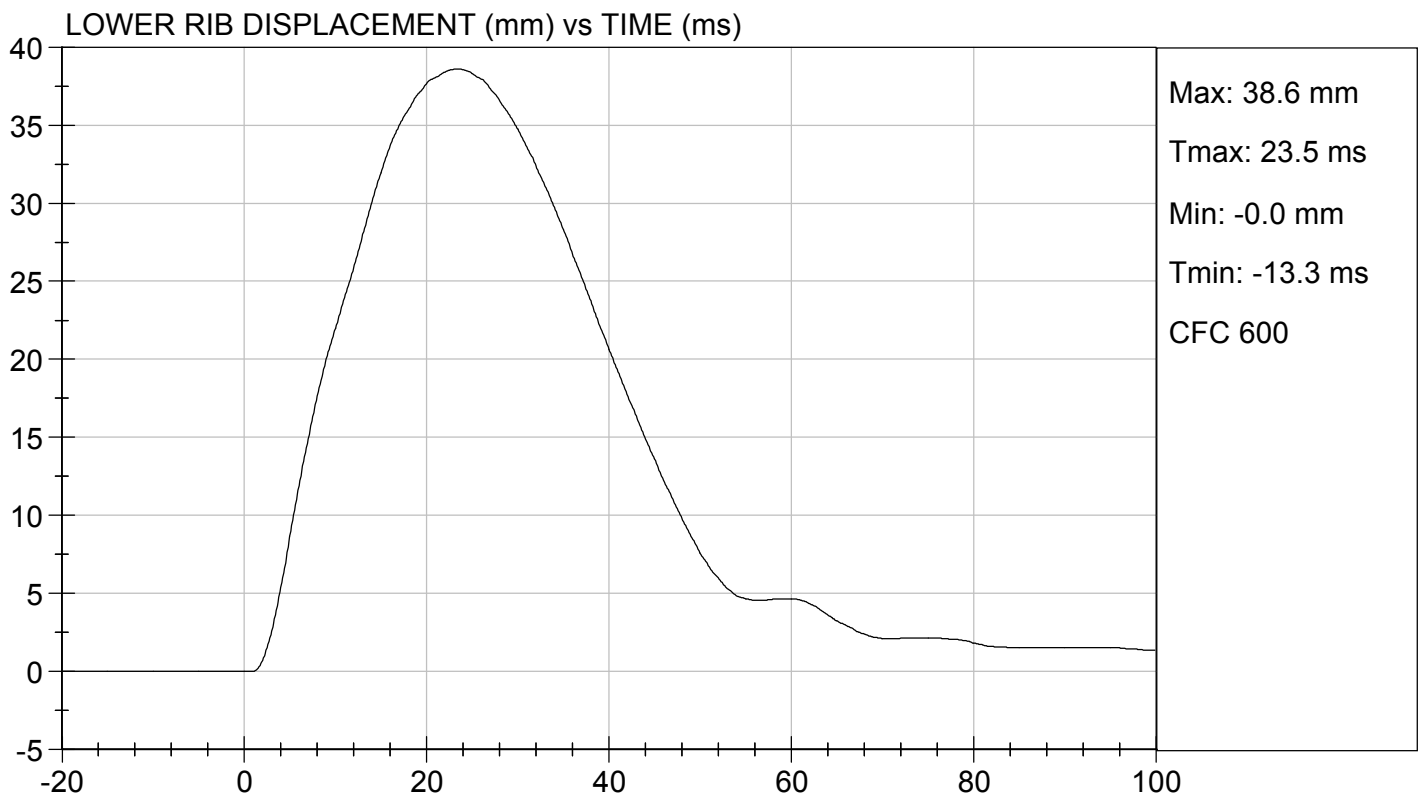
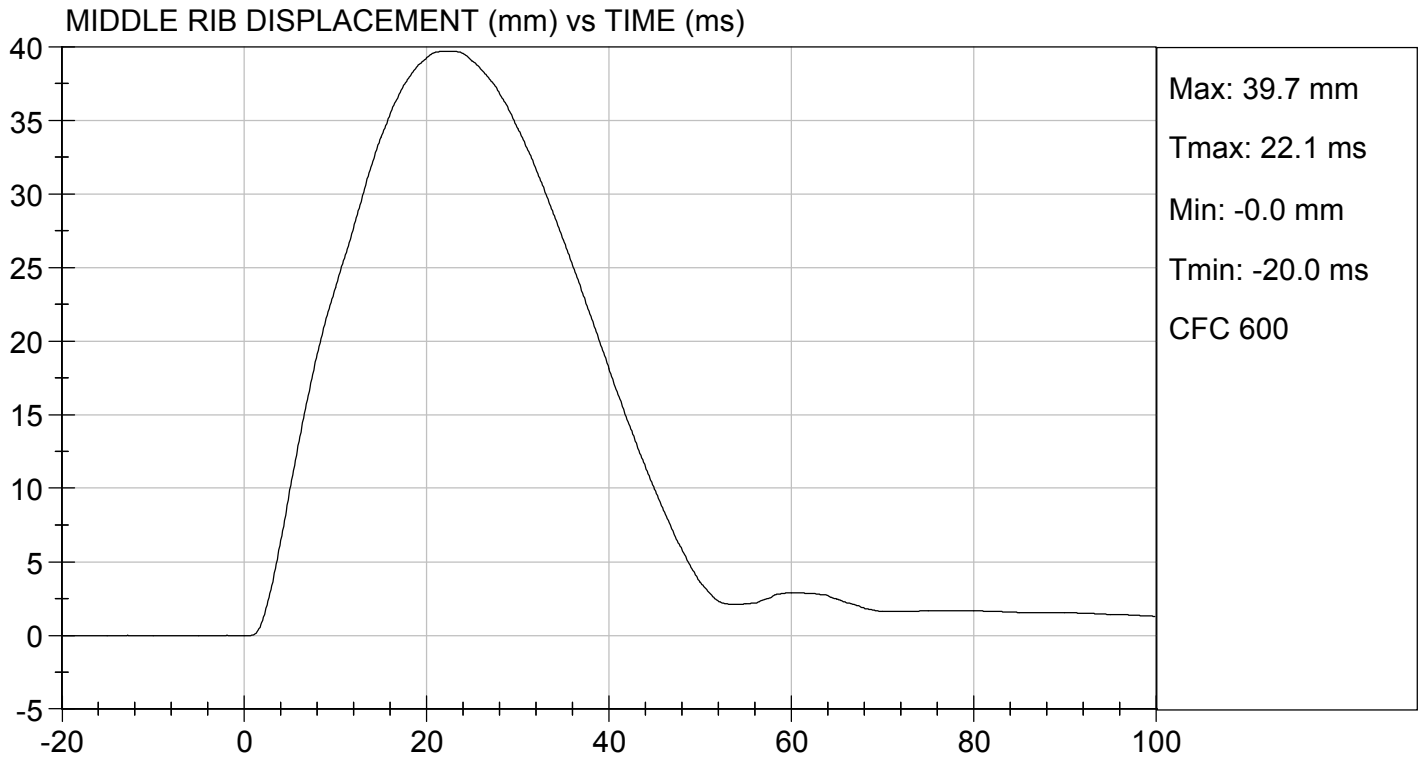
TEST DATE: 01/30/2020
TEST #: D200365

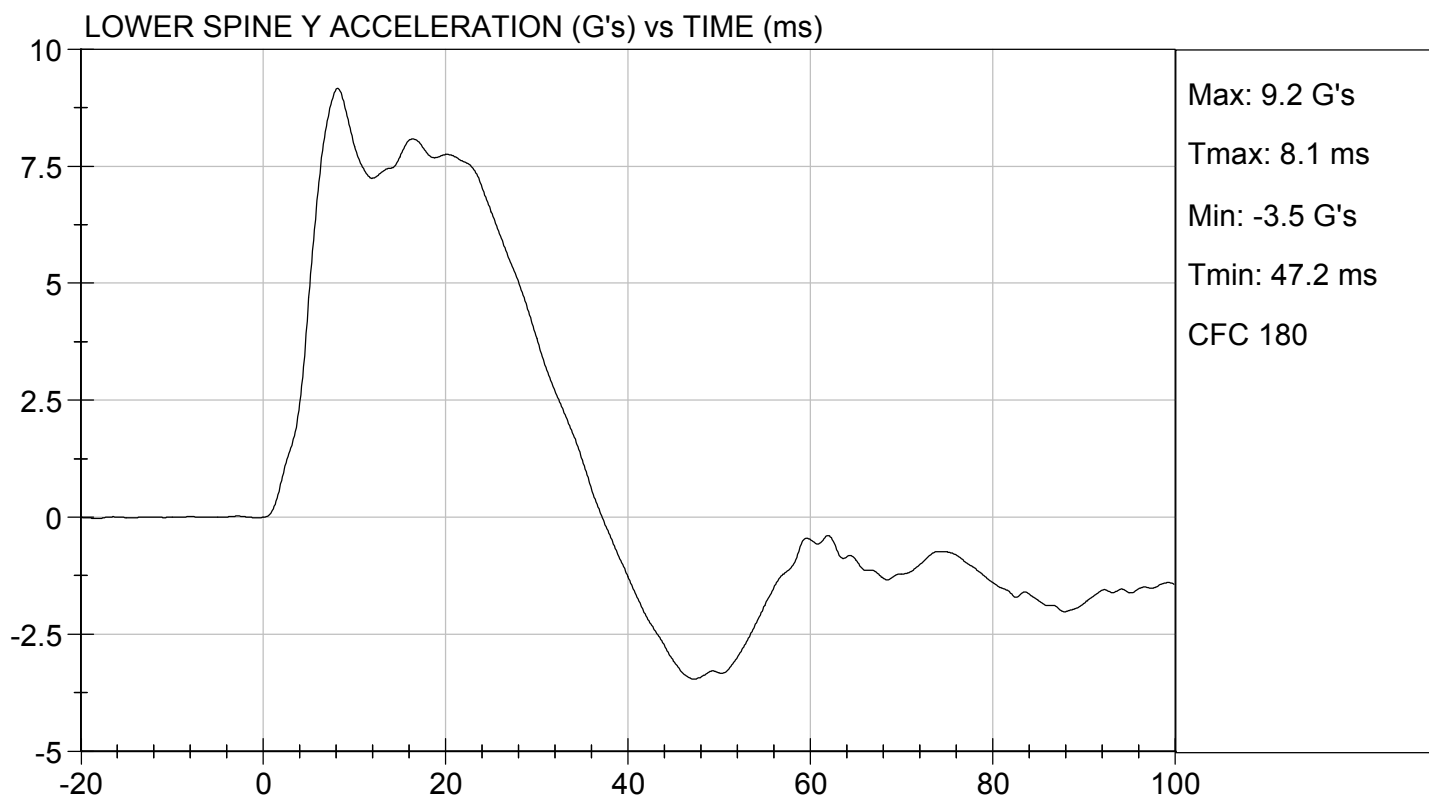
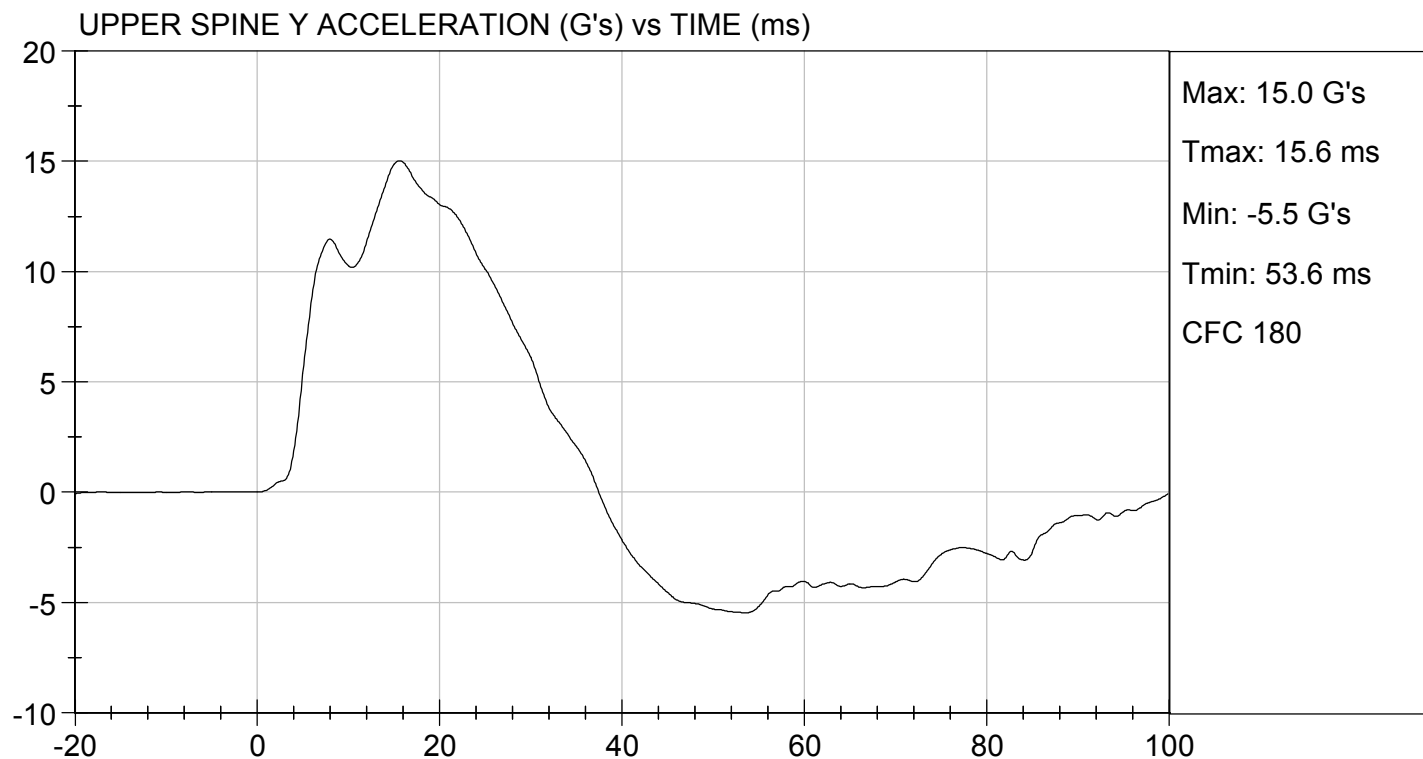




TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 01/30/2020
TEST #: D200365





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

ATD Serial No: 306

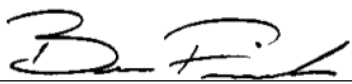
Test I.D: D200366

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.4	Pass
Humidity	%	10 to 70	25	Pass
Impact Velocity	m/s	4.20 to 4.40	4.23	Pass
Maximum Probe Acceleration	G's	12 to 16	13	Pass
Upper Abdomen Rib Displacement	mm	36 to 47	39	Pass
Lower Abdomen Rib Displacement	mm	33 to 44	41	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	11	Pass
Overall Test Results				Pass


Laboratory Technician

01/30/2020

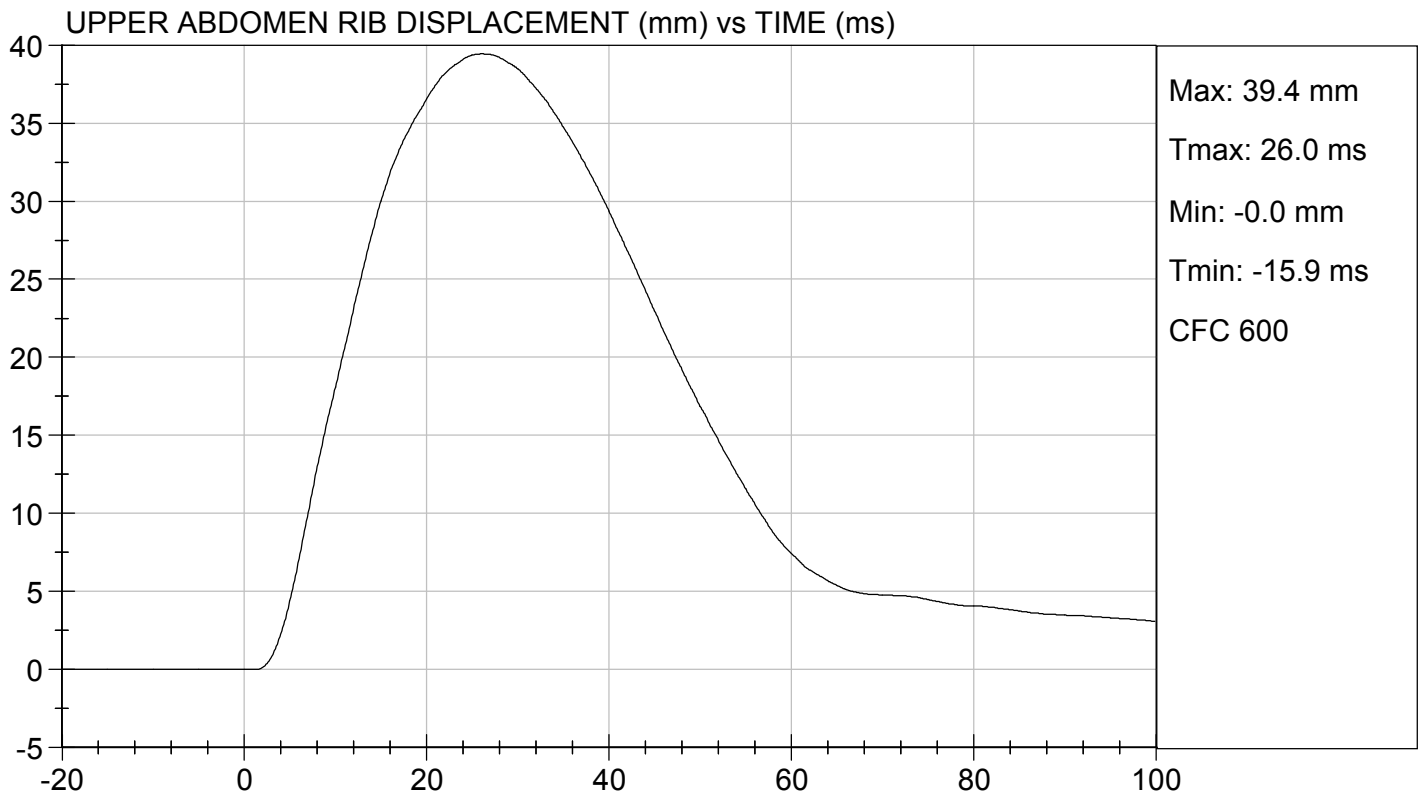
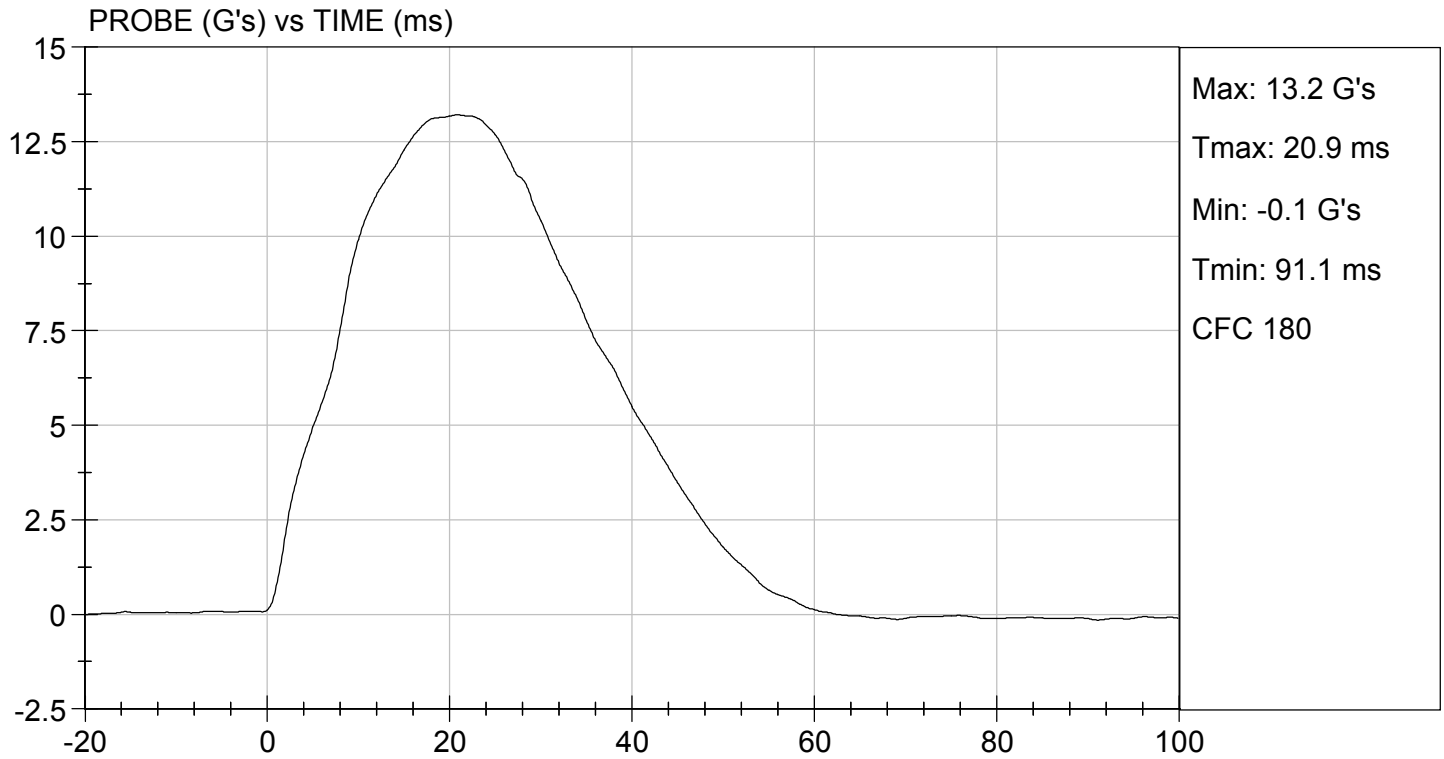
Test Date


Approved By



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

TEST DATE: 01/30/2020
TEST #: D200366

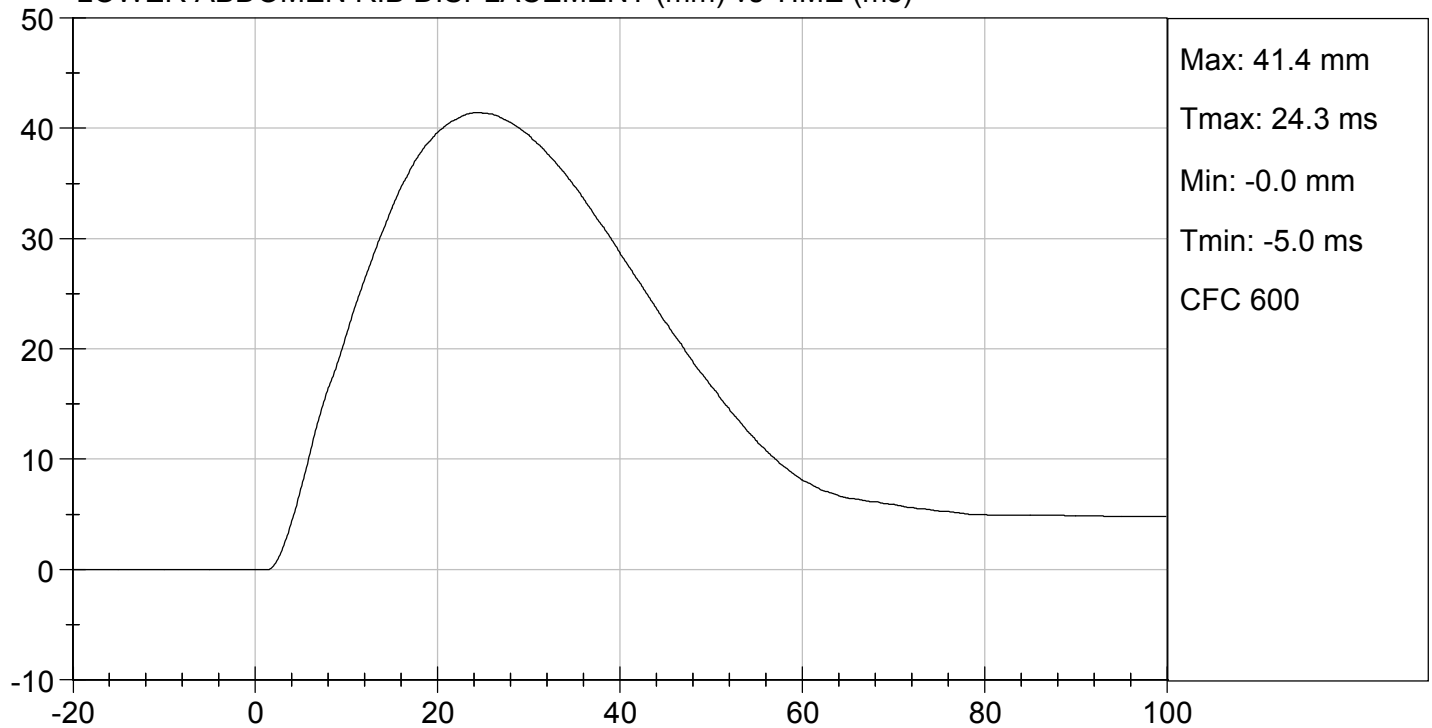




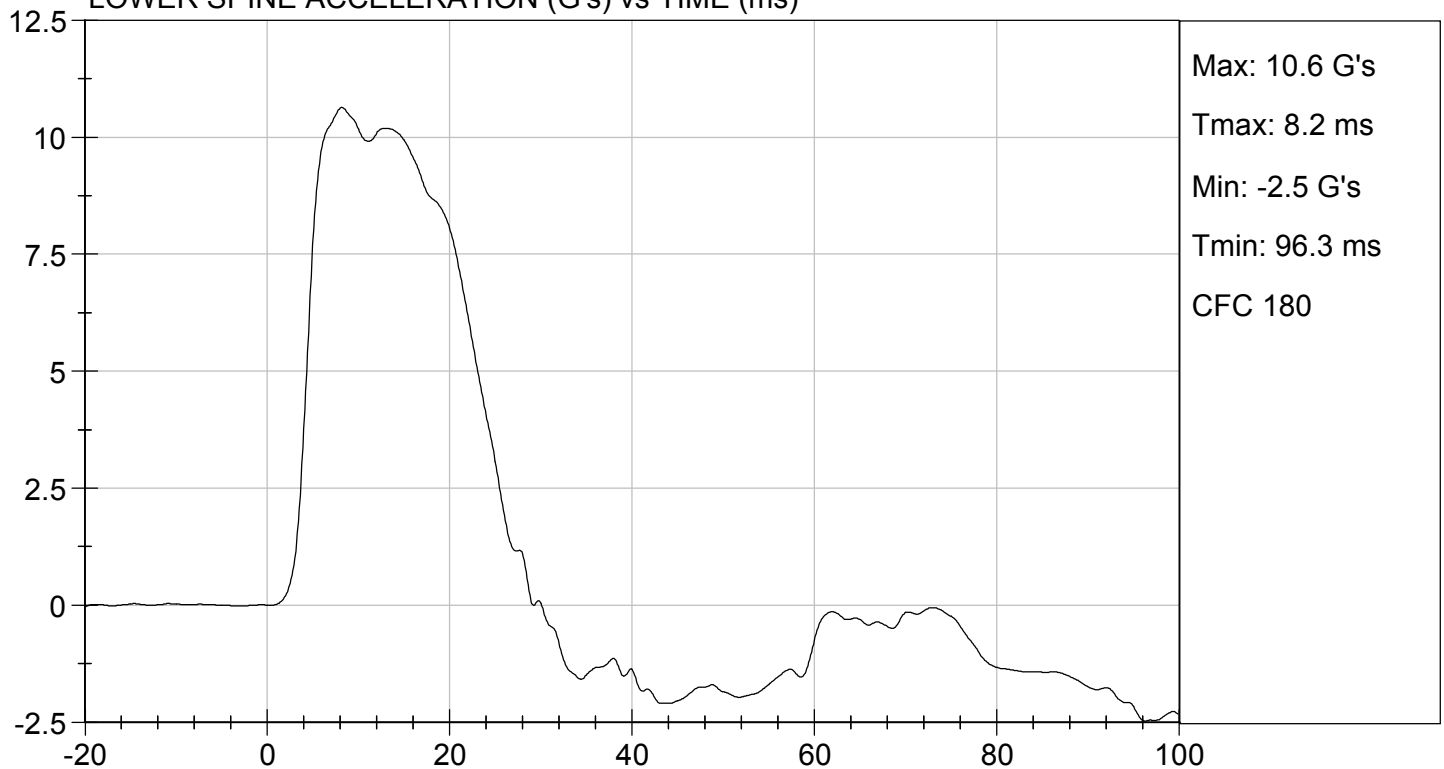
TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.89 ft/s, 4.23 m/s

TEST DATE: 01/30/2020
TEST #: D200366

LOWER ABDOMEN RIB DISPLACEMENT (mm) vs TIME (ms)



LOWER SPINE ACCELERATION (G's) vs TIME (ms)



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

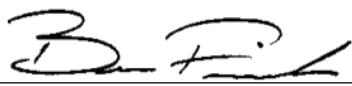
ATD Serial No: 306

Test I.D: D200367

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.4	Pass
Humidity	%	10 to 70	25	Pass
Impact Velocity	m/s	6.60 to 6.80	6.60	Pass
Maximum Probe Acceleration	G's	38 to 47	42	Pass
Pelvis Y Acceleration After 6 ms	G's	34 to 42	39	Pass
Peak Acetabulum Force	N	3600 to 4300	3,853	Pass
Overall Test Results				Pass


Laboratory Technician

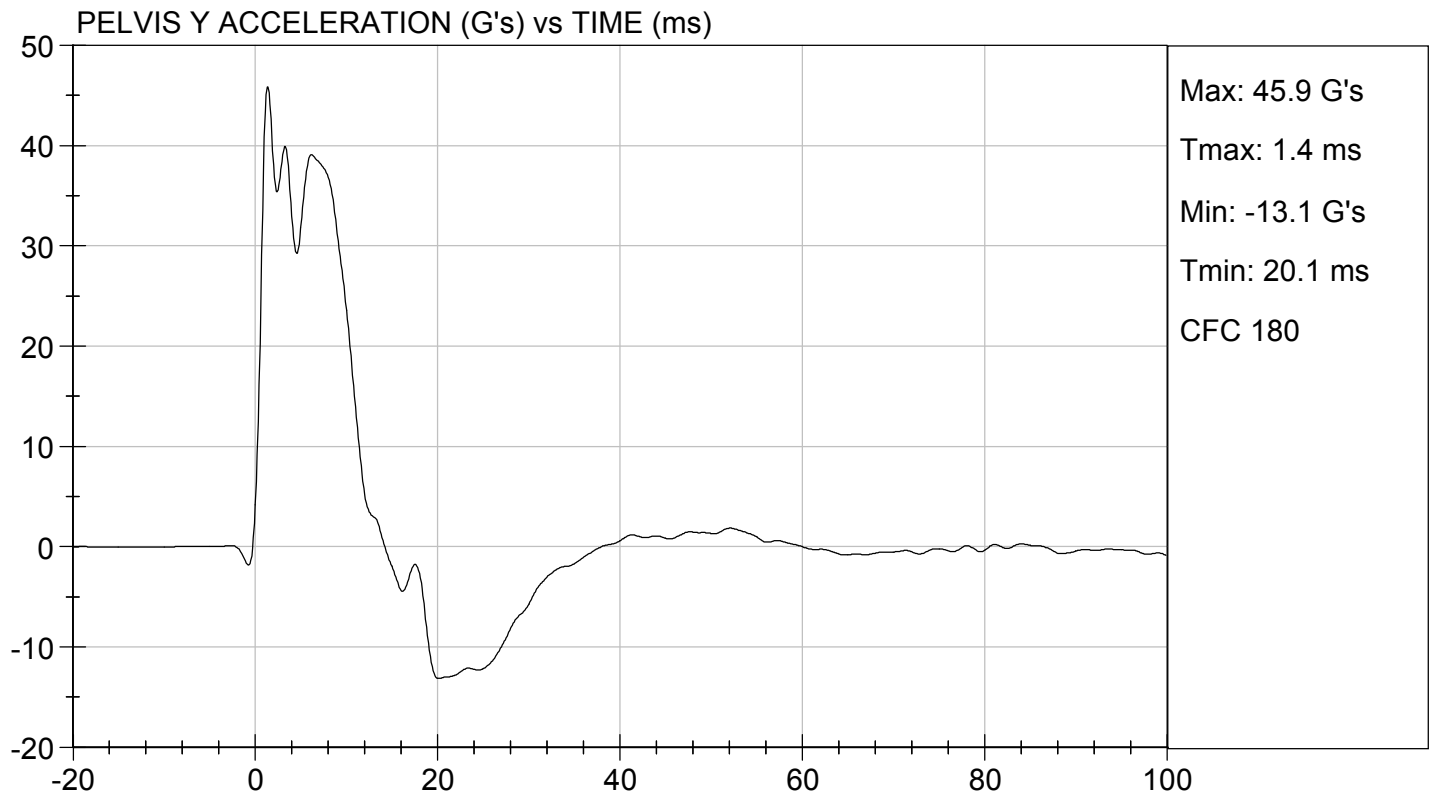
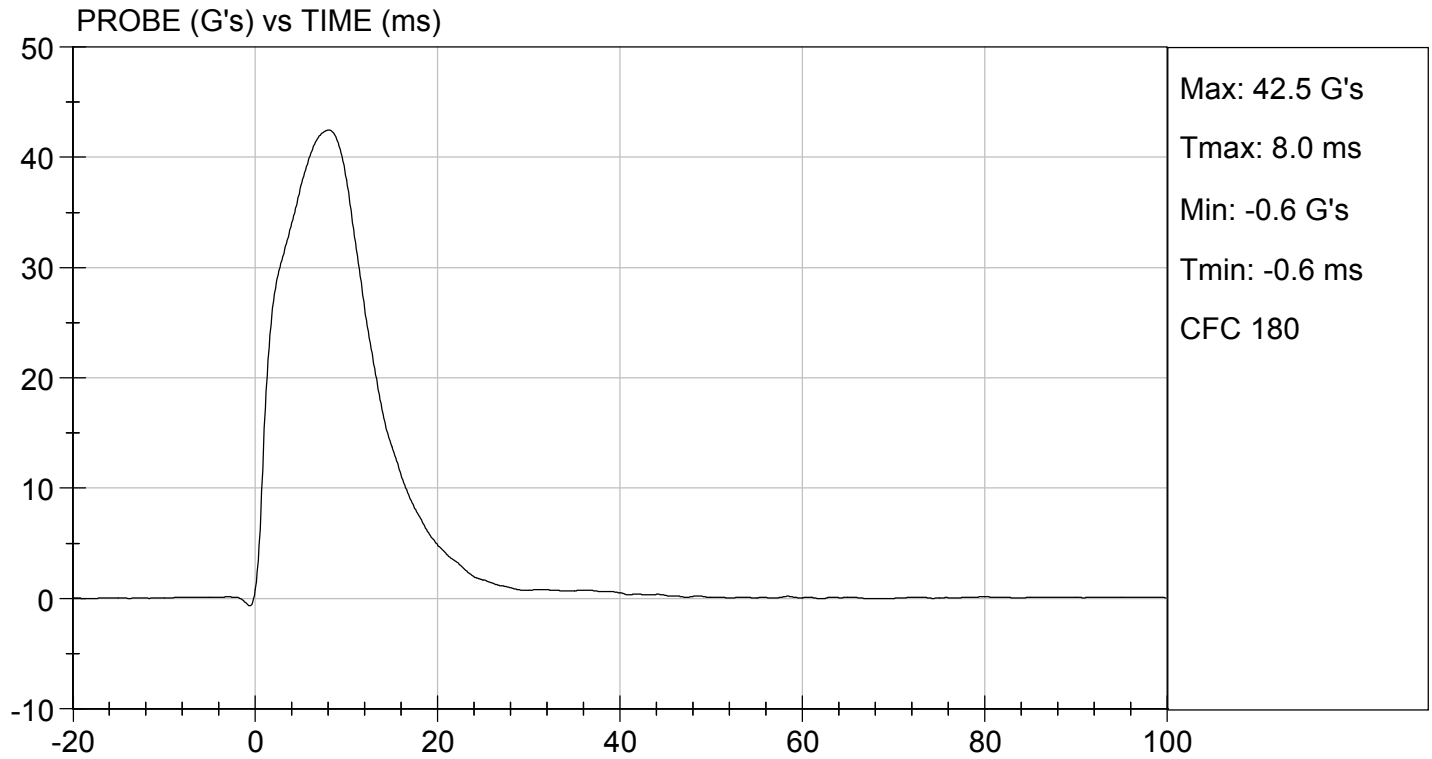
01/30/2020
Test Date


Approved By



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

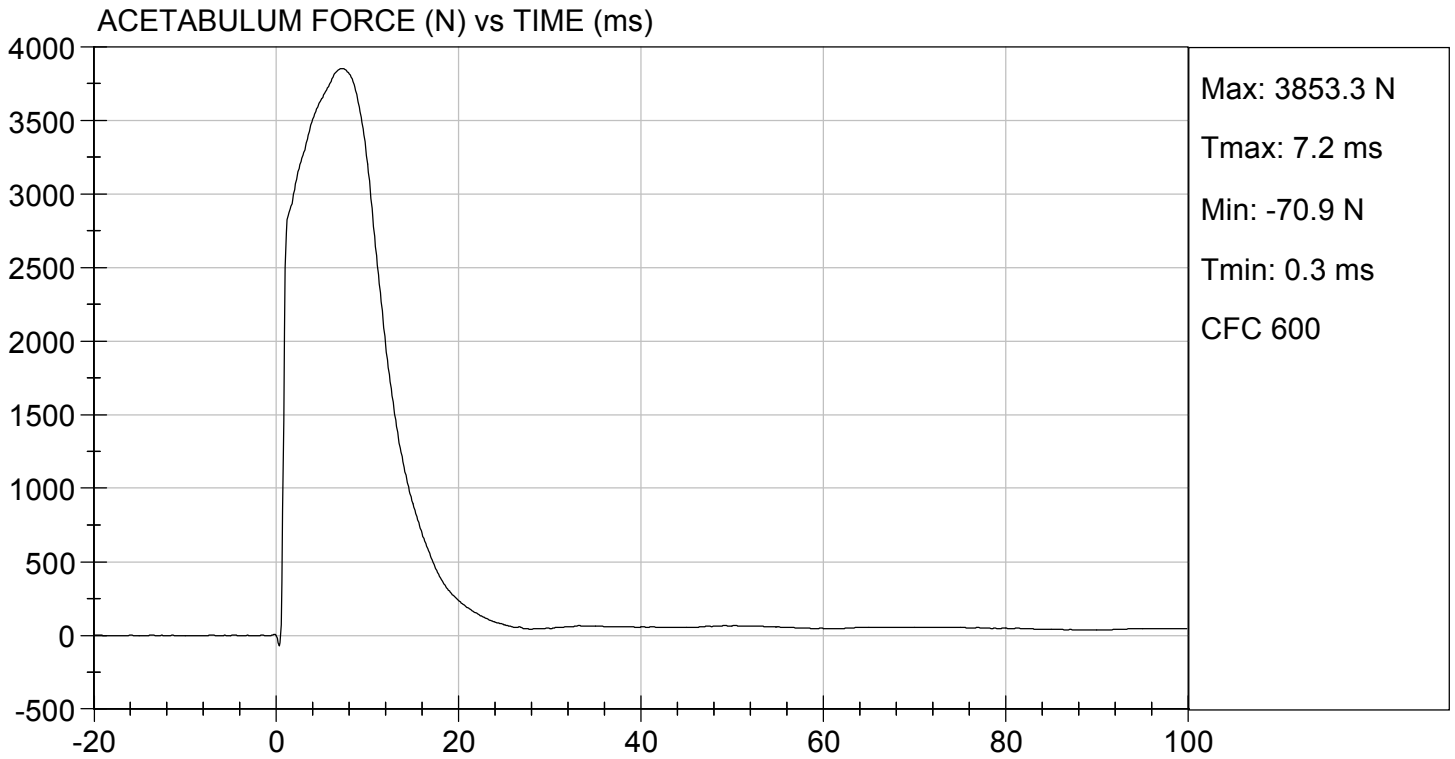
TEST DATE: 01/30/2020
TEST #: D200367





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

TEST DATE: 01/30/2020
TEST #: D200367



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

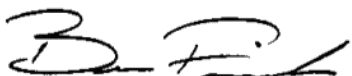
ATD Serial No: 306

Test I.D: D200368

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.6	Pass
Humidity	%	10 to 70	23	Pass
Impact Velocity	m/s	4.20 to 4.40	4.20	Pass
Maximum Probe Acceleration	G's	36 to 45	43	Pass
Pelvis Y Acceleration	G's	28 to 39	38	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4,981	Pass
Overall Test Results				Pass


Laboratory Technician

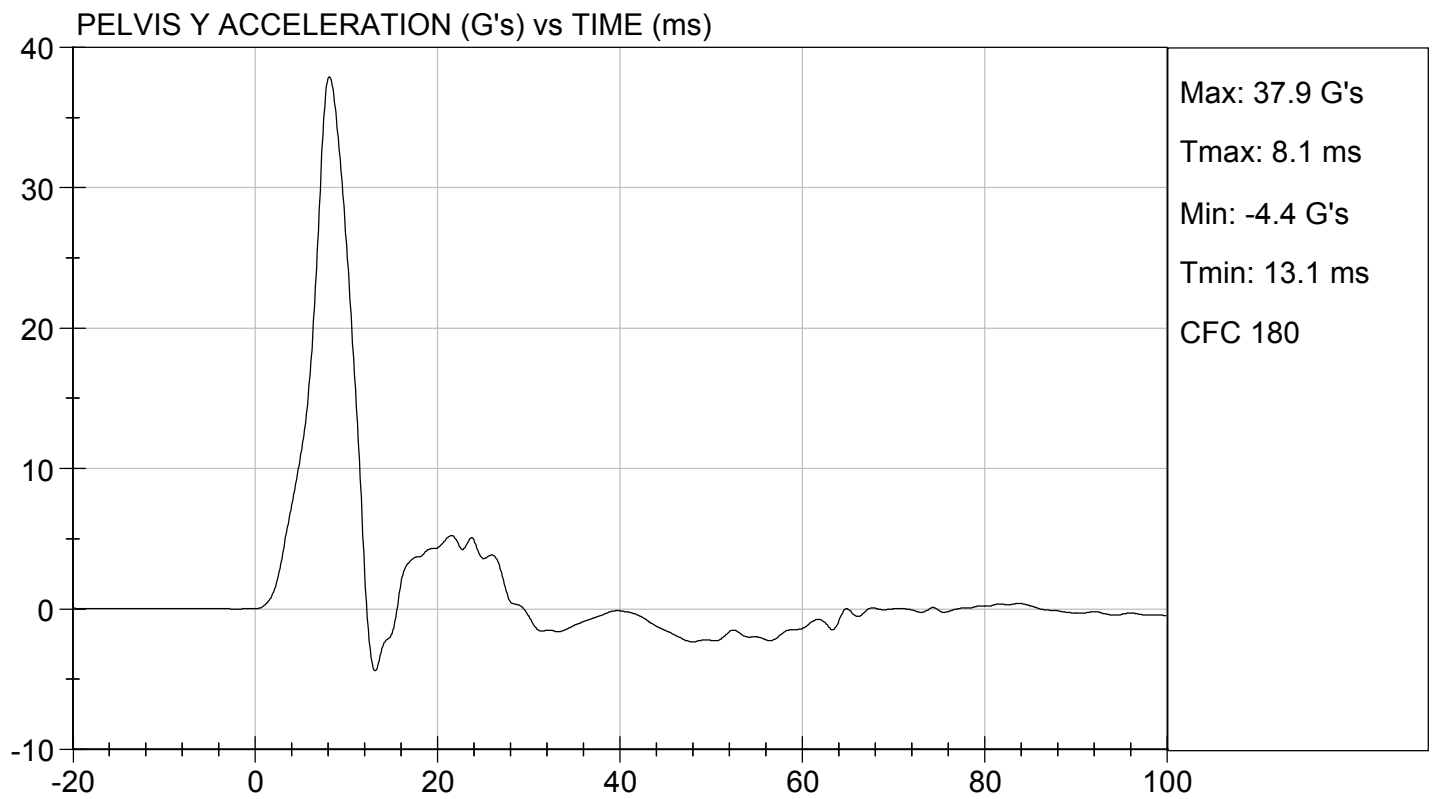
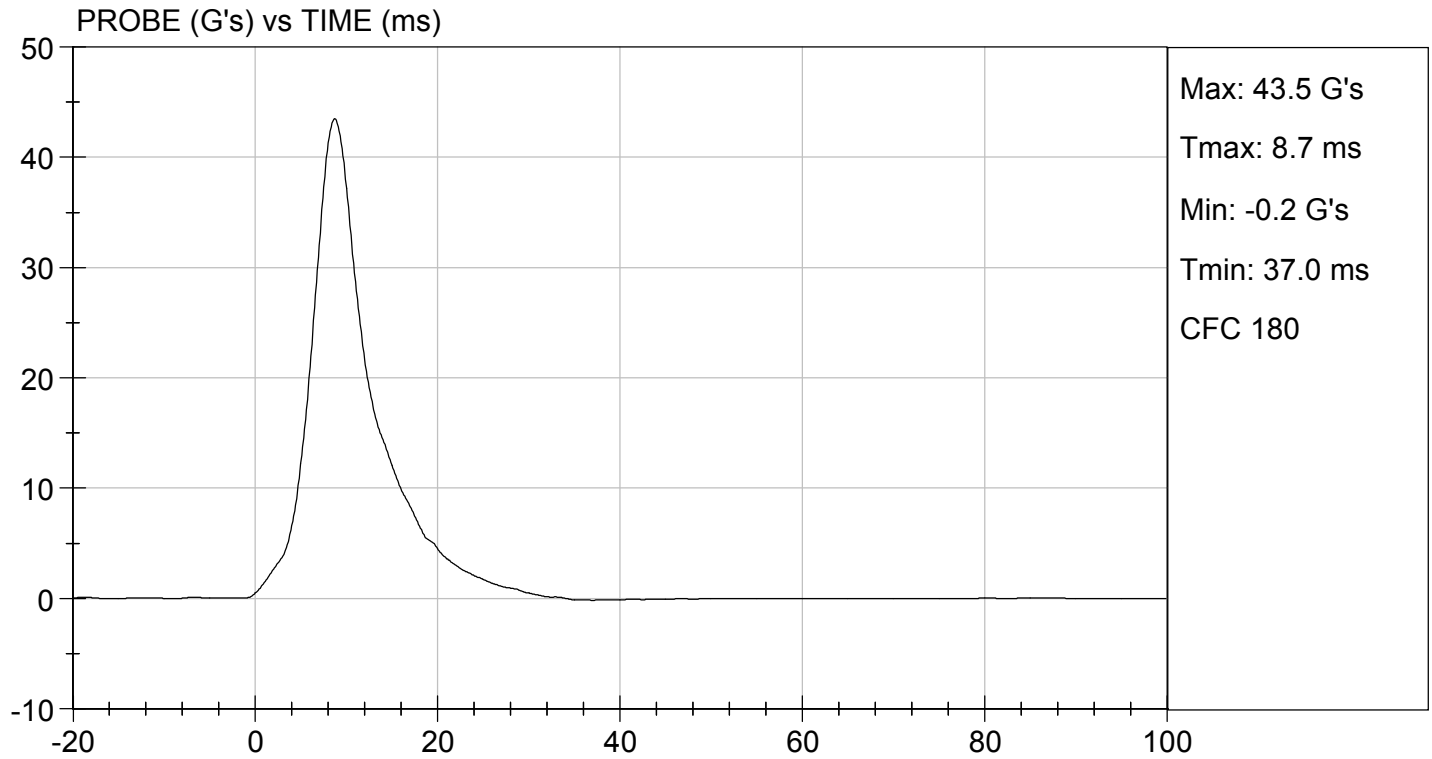
01/31/2020
Test Date


Approved By



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

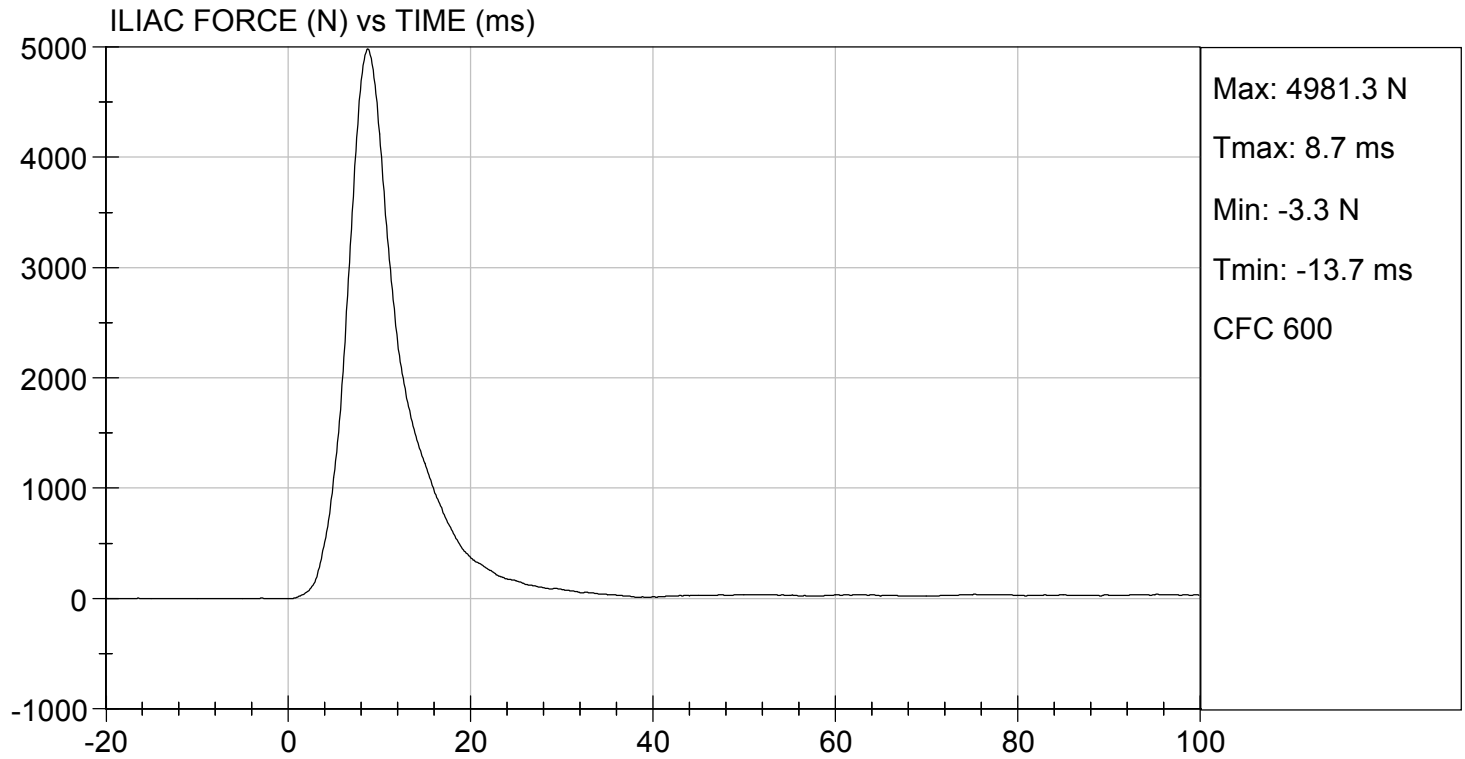
TEST DATE: 01/31/2020
TEST #: D200368





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

TEST DATE: 01/31/2020
TEST #: D200368



CALIBRATION TEST RESULTS

POST-TEST

SID-IIS 5TH PERCENTILE FEMALE - DRIVER ATD

SID-IIsD External Measurements
SN: 306

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

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

ATD Serial No: 306

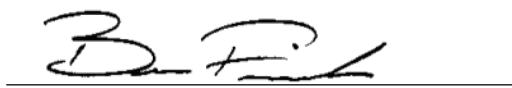
Test ID: D200651

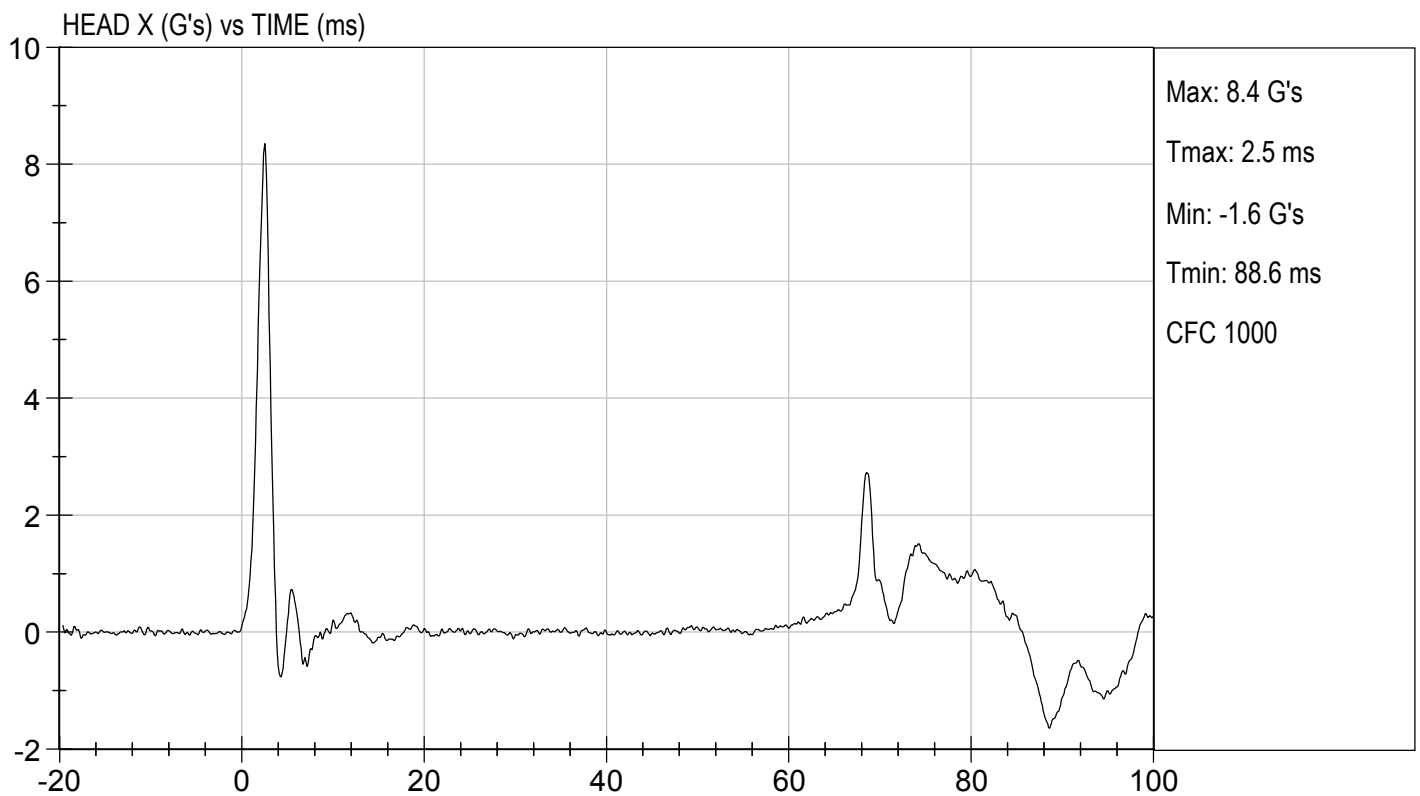
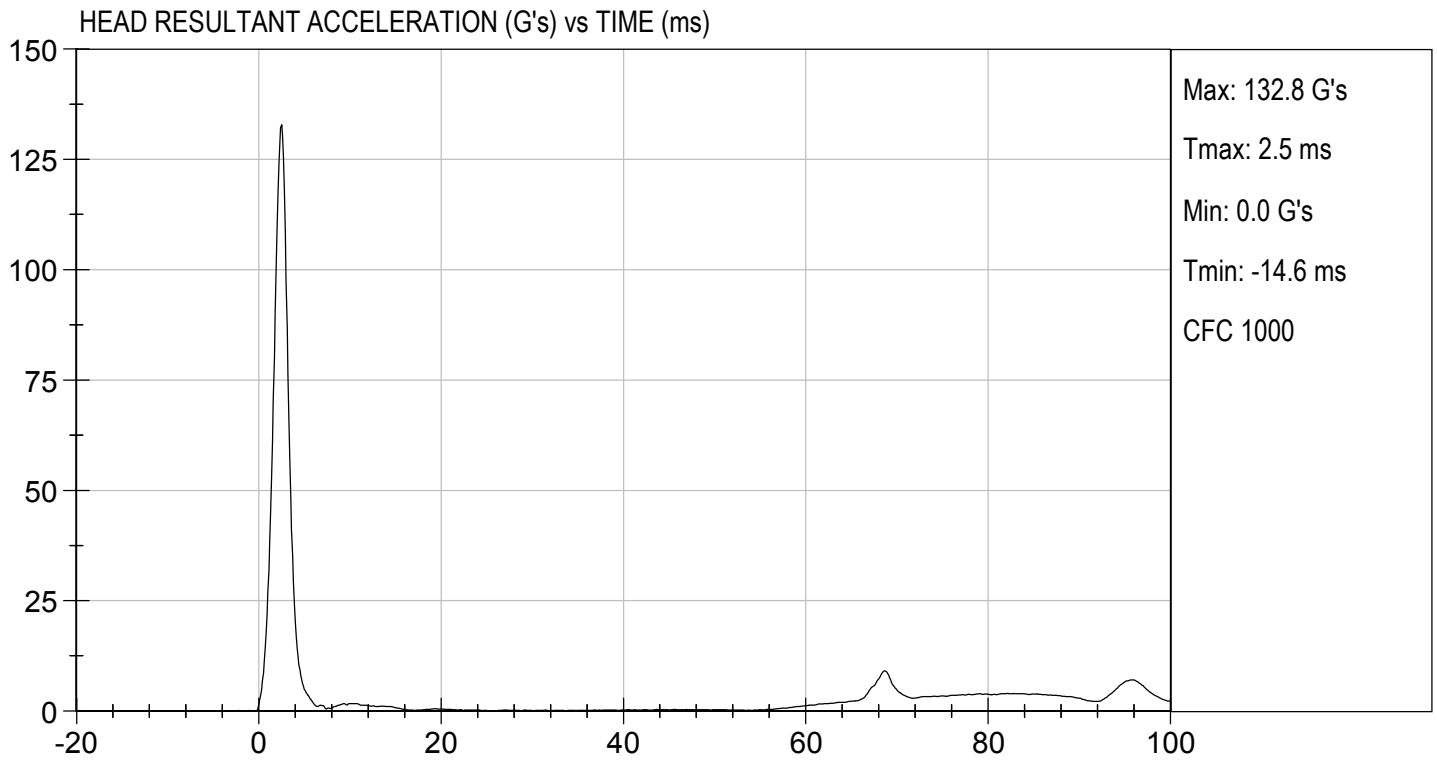
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Peak Resultant Acceleration	G's	115 to 137	133	Pass
Peak Longitudinal Acceleration	G's	+/- 15	8.4	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	<15%	Yes	Pass
Overall Test Results			Pass	

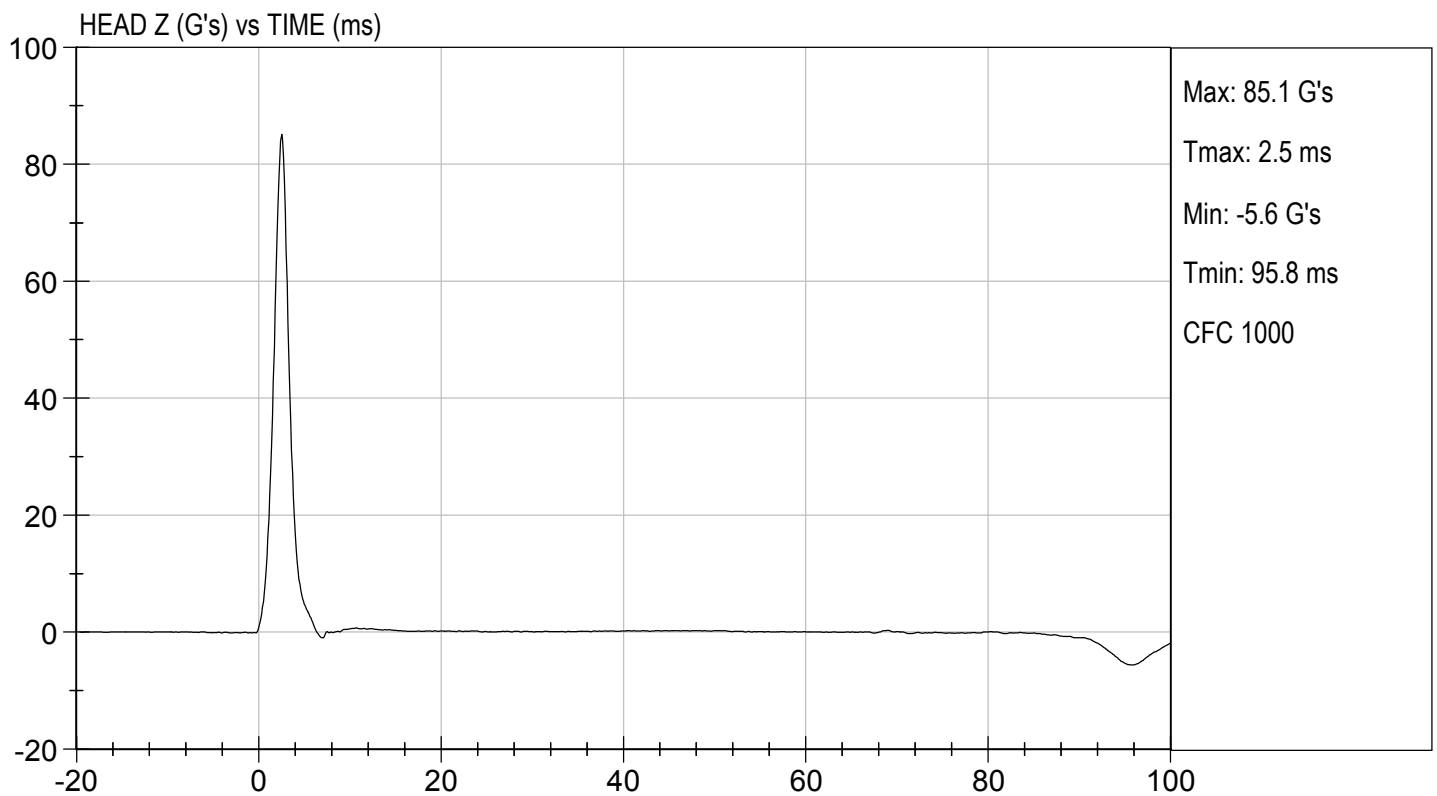
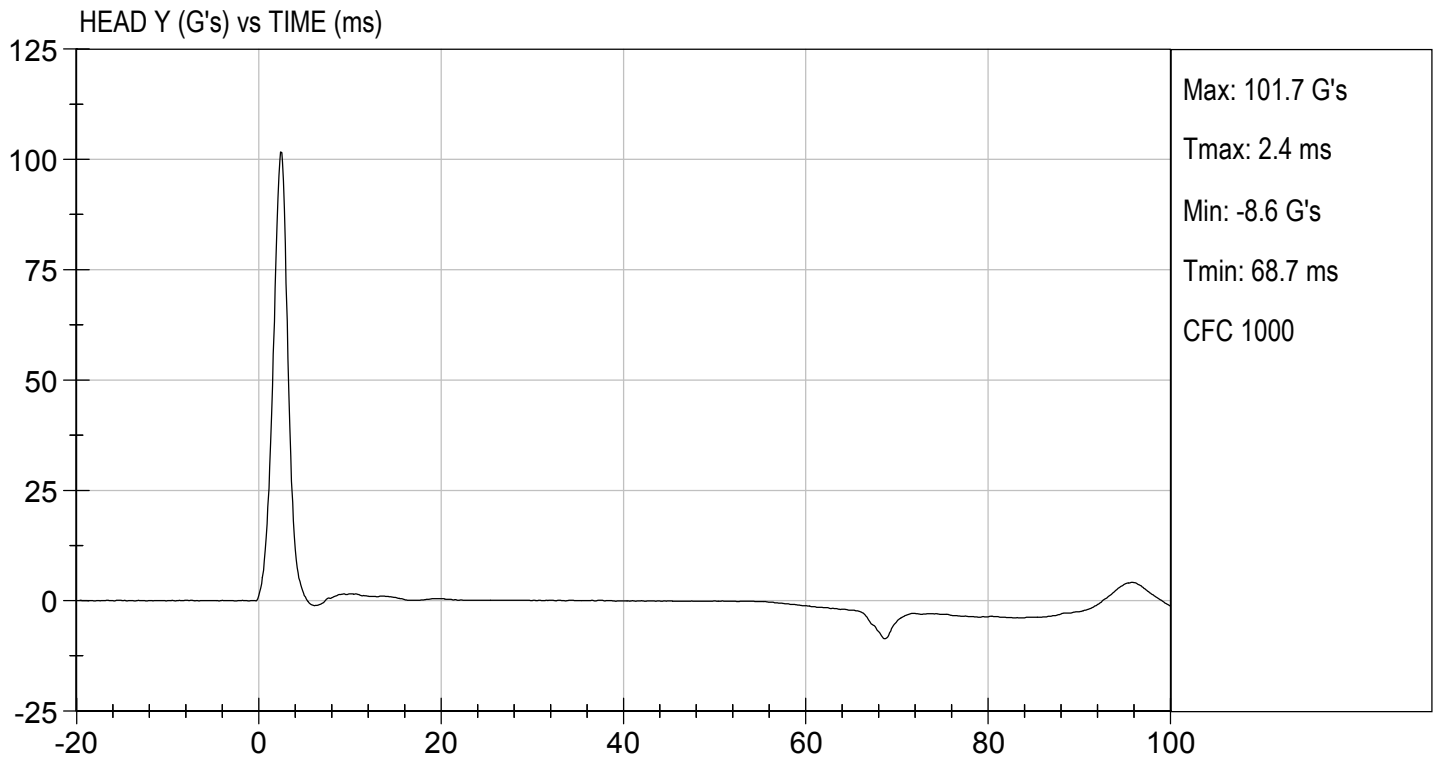

Laboratory Technician

02/24/2020

Test Date


Approved By





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

ATD Serial No: 306

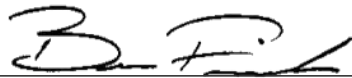
Test I.D: D200652

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.3	Pass
Humidity		%	10 to 70	20	Pass
Impact Velocity		m/s	5.51 to 5.63	5.58	Pass
Pendulum Velocity	10 ms	m/s	2.20 to 2.80	2.47	Pass
	15 ms	m/s	3.30 to 4.10	3.69	Pass
	20 ms	m/s	4.40 to 5.40	5.10	Pass
	25 ms	m/s	5.40 to 6.10	5.71	Pass
	25-100 ms	m/s	5.50 to 6.20	5.71	Pass
Maximum D-Plane Rotation		deg	71 to 81	75	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	63	Pass
Maximum Occipital Condyle Moment		Nm	-44 to -36	-39	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	119	Pass
Overall Test Results					Pass


 Laboratory Technician

02/26/2020

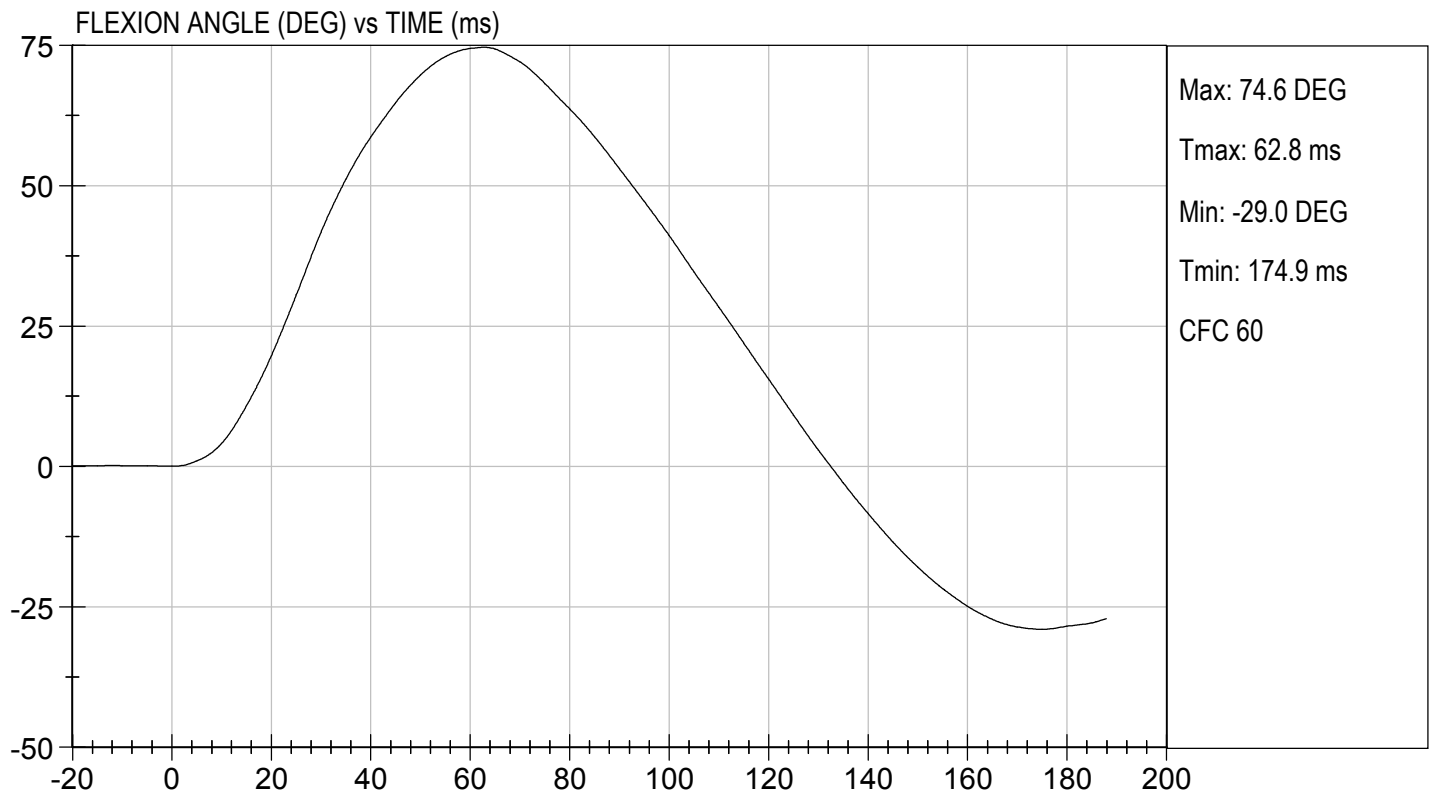
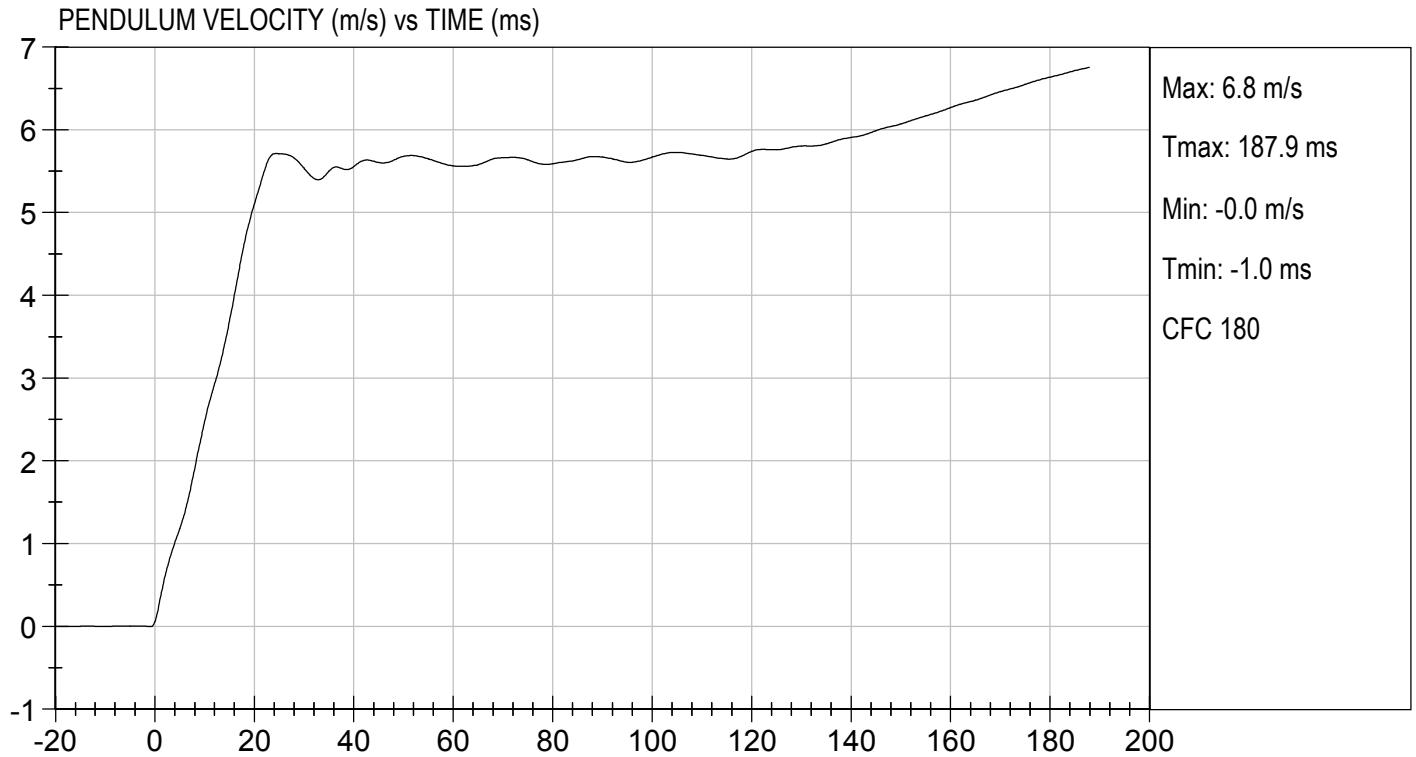
Test Date


 Approved By



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

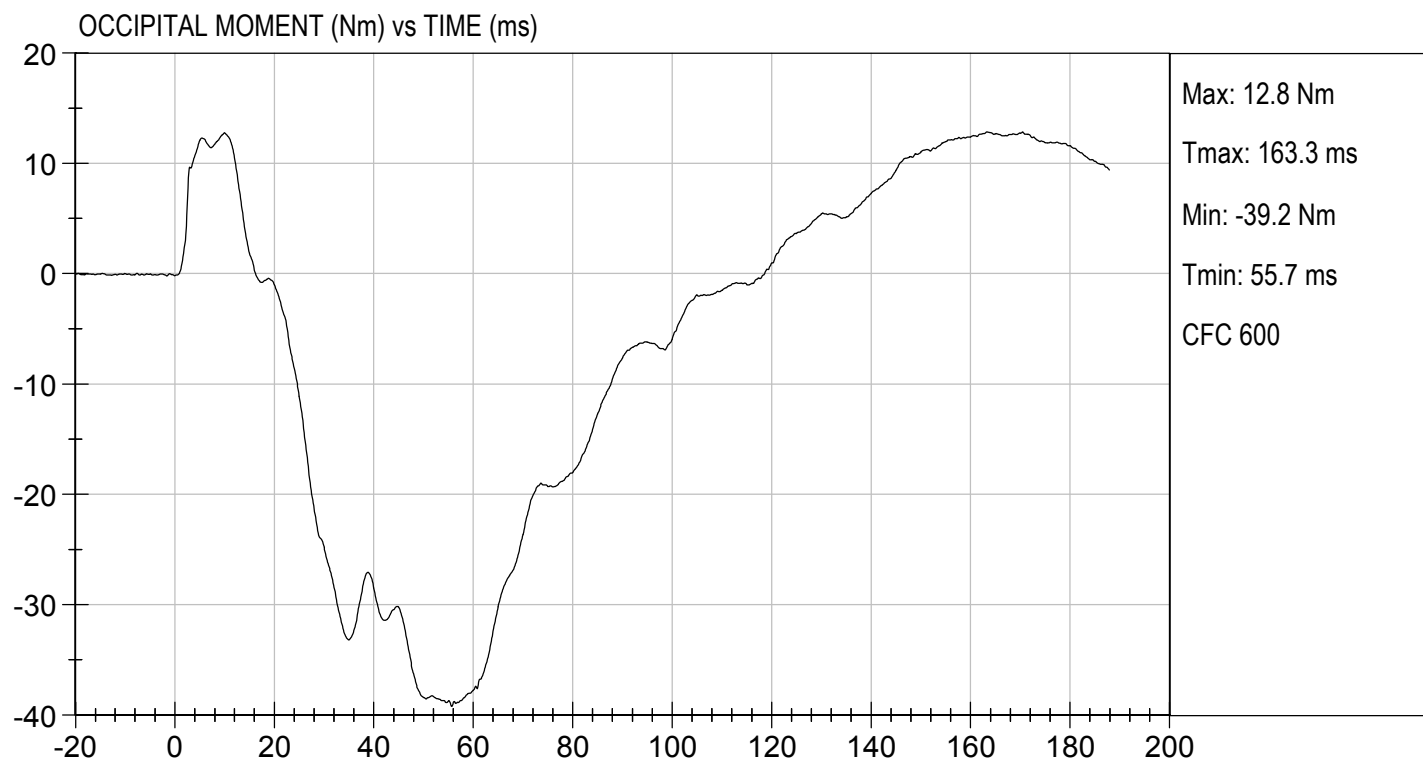
TEST DATE: 02/26/2020
TEST #: D200652





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

TEST DATE: 02/26/2020
TEST #: D200652



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

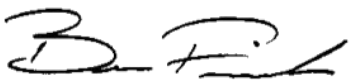
ATD Serial No: 306

Test ID: D200653

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Maximum Probe Acceleration	G's	13 to 18	15	Pass
Shoulder Displacement	mm	28 to 37	28	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	19	Pass
Overall Test Results			Pass	


Laboratory Technician

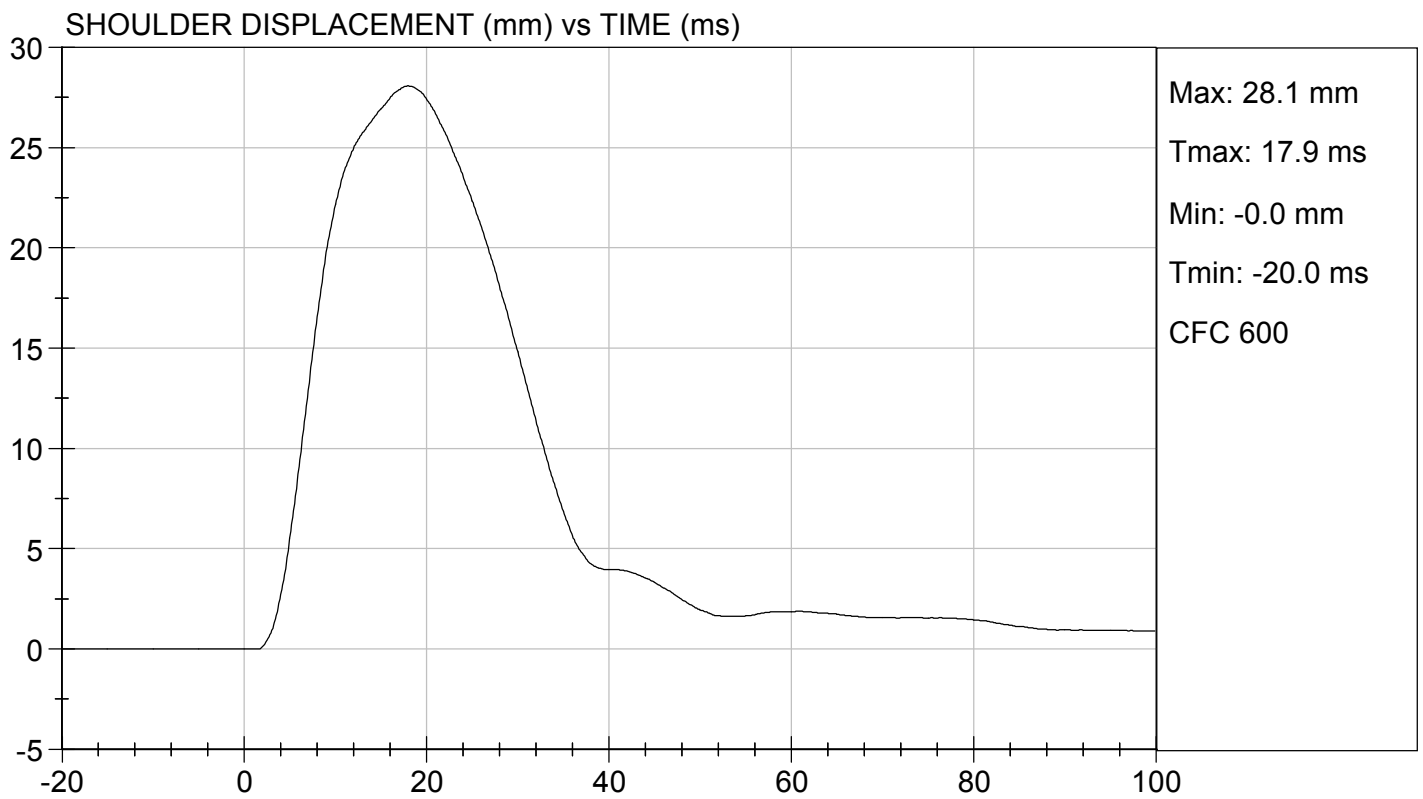
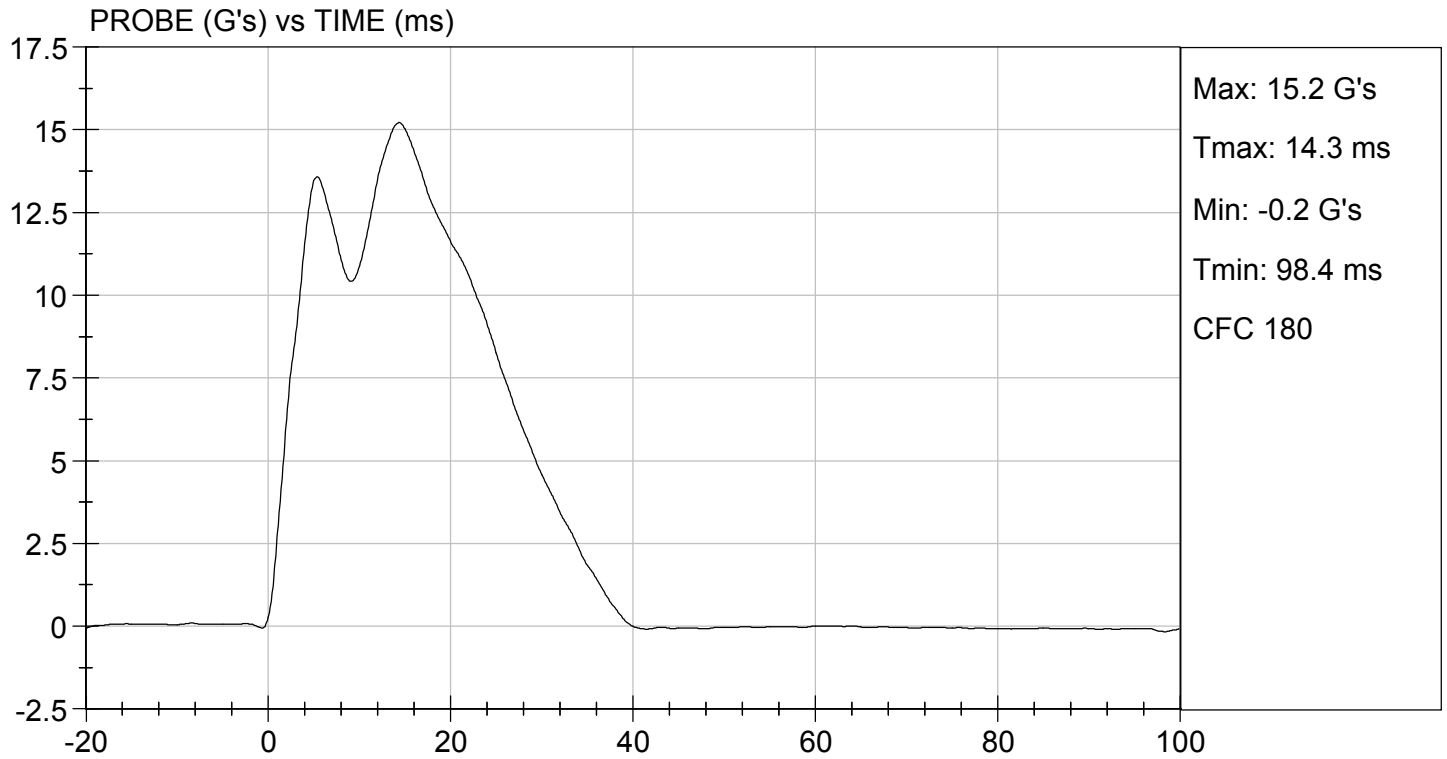
02/26/2020
Test Date


Approved By



TEST DESC: SHOULDER IMPACT
VELOCITY: 14.37 ft/s, 4.38 m/s

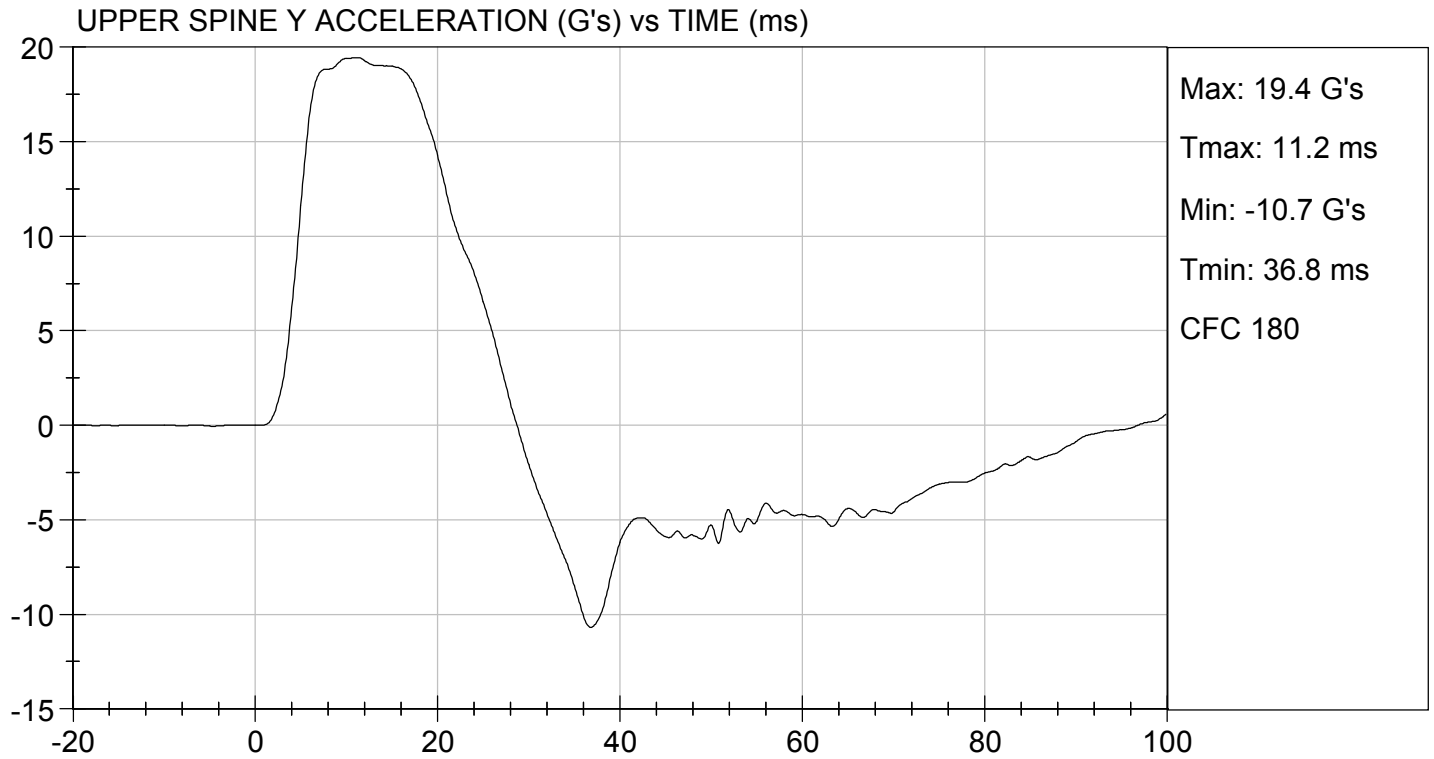
TEST DATE: 02/26/2020
TEST #: D200653





TEST DESC: SHOULDER IMPACT
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 02/26/2020
TEST #: D200653



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

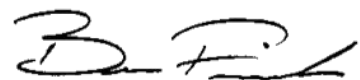
ATD Serial No: 306

Test I.D: D200654

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	20	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	Pass
Maximum Probe Acceleration	G's	30 to 36	32	Pass
Shoulder Displacement	mm	31 to 40	32	Pass
Upper Rib Displacement	mm	25 to 32	26	Pass
Middle Rib Displacement	mm	30 to 36	30	Pass
Lower Rib Displacement	mm	32 to 38	32	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	41	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	31	Pass
Overall Test Results				Pass


Laboratory Technician

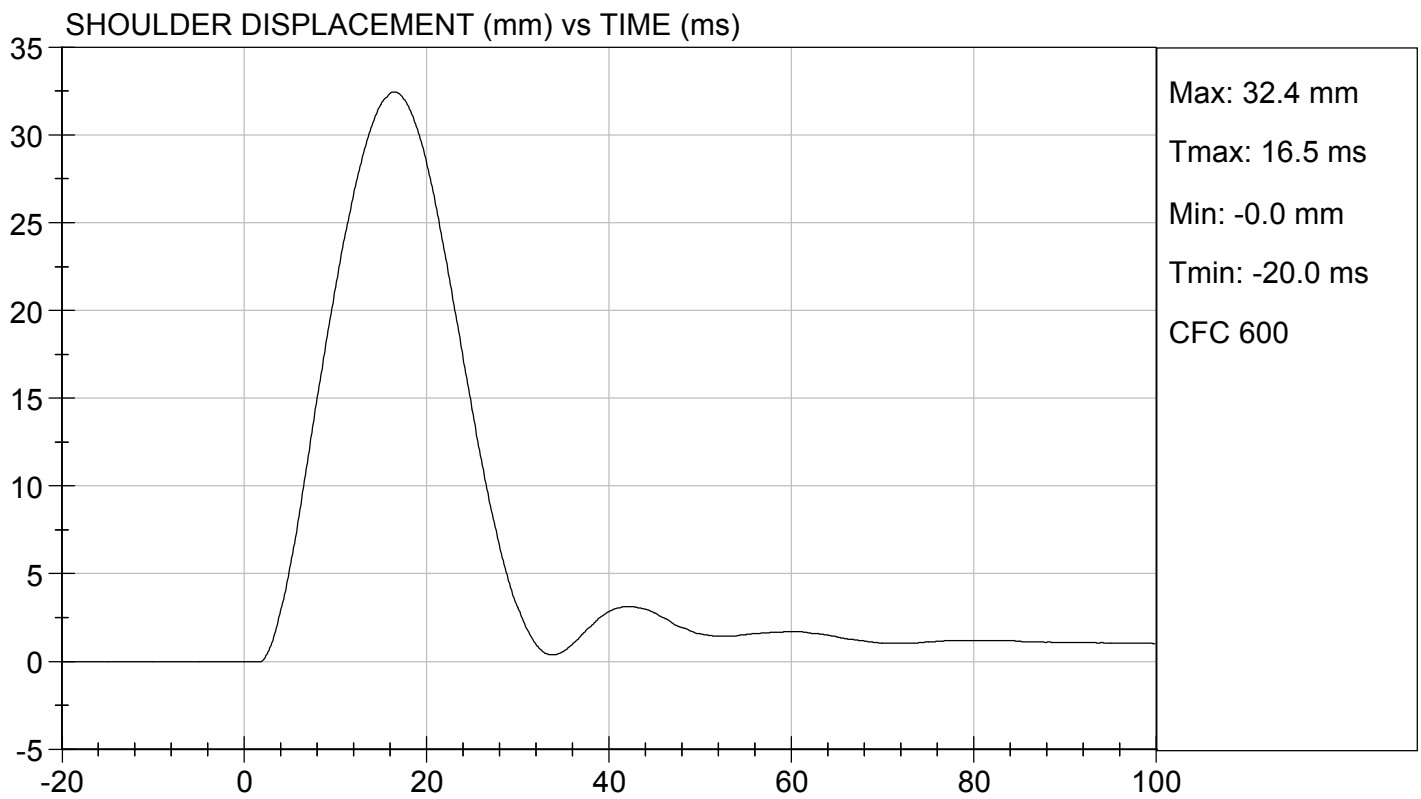
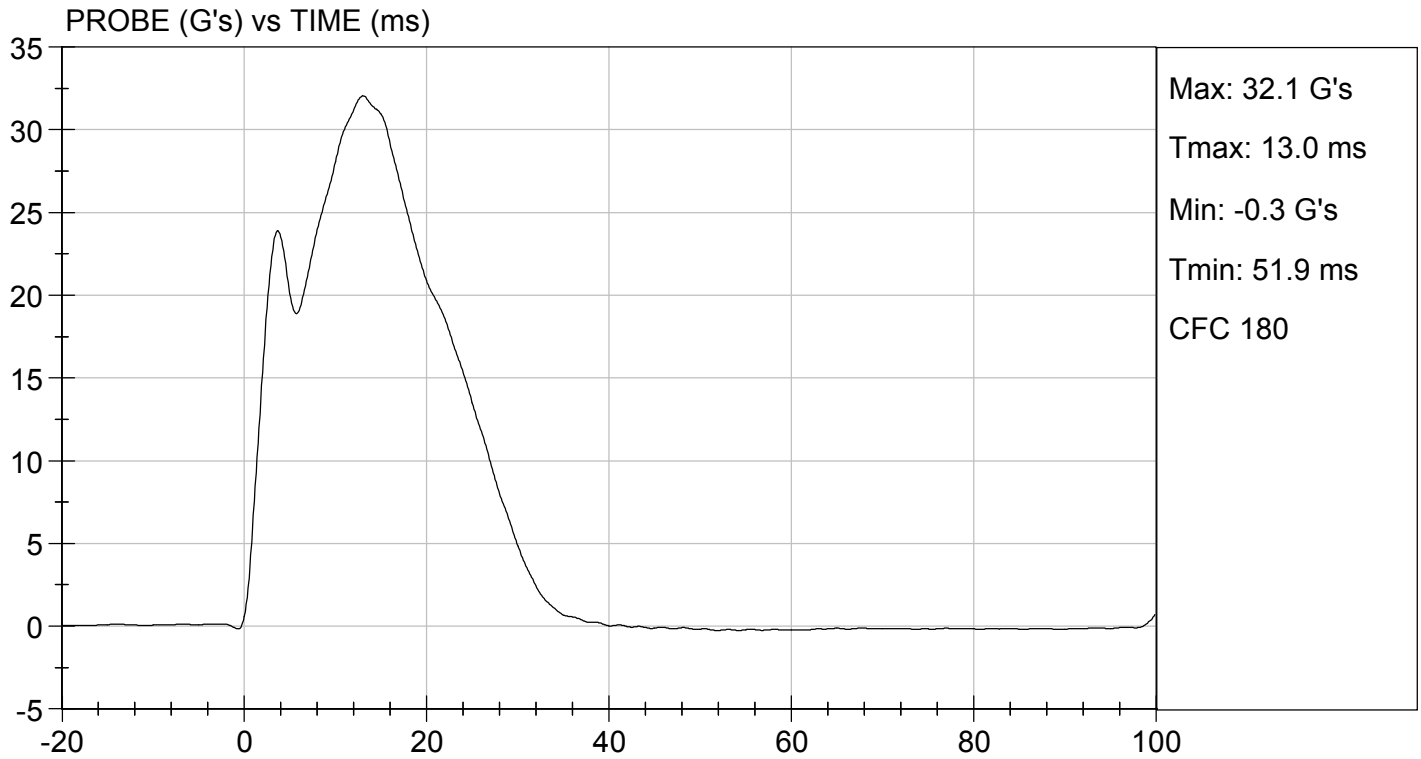
02/26/2020
Test Date


Approved By



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

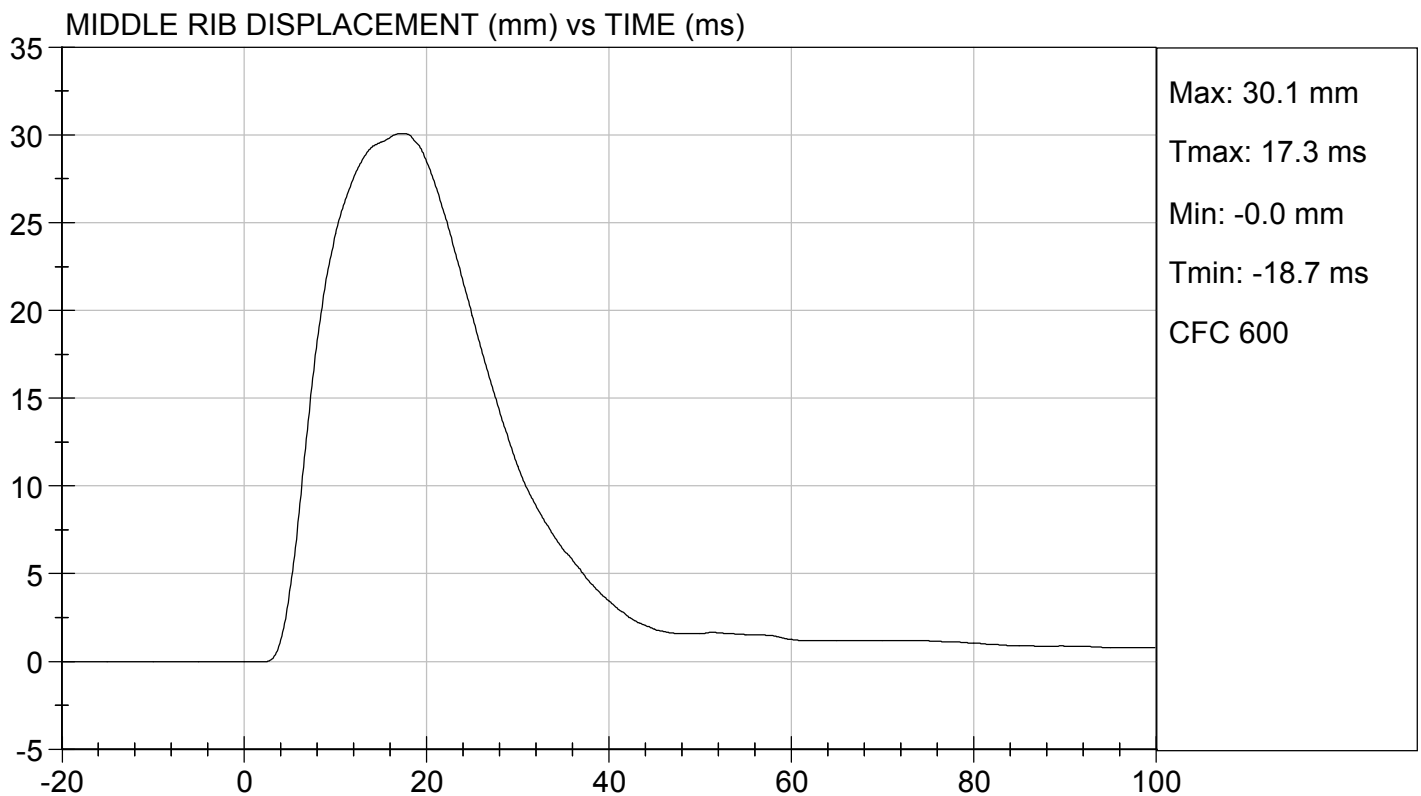
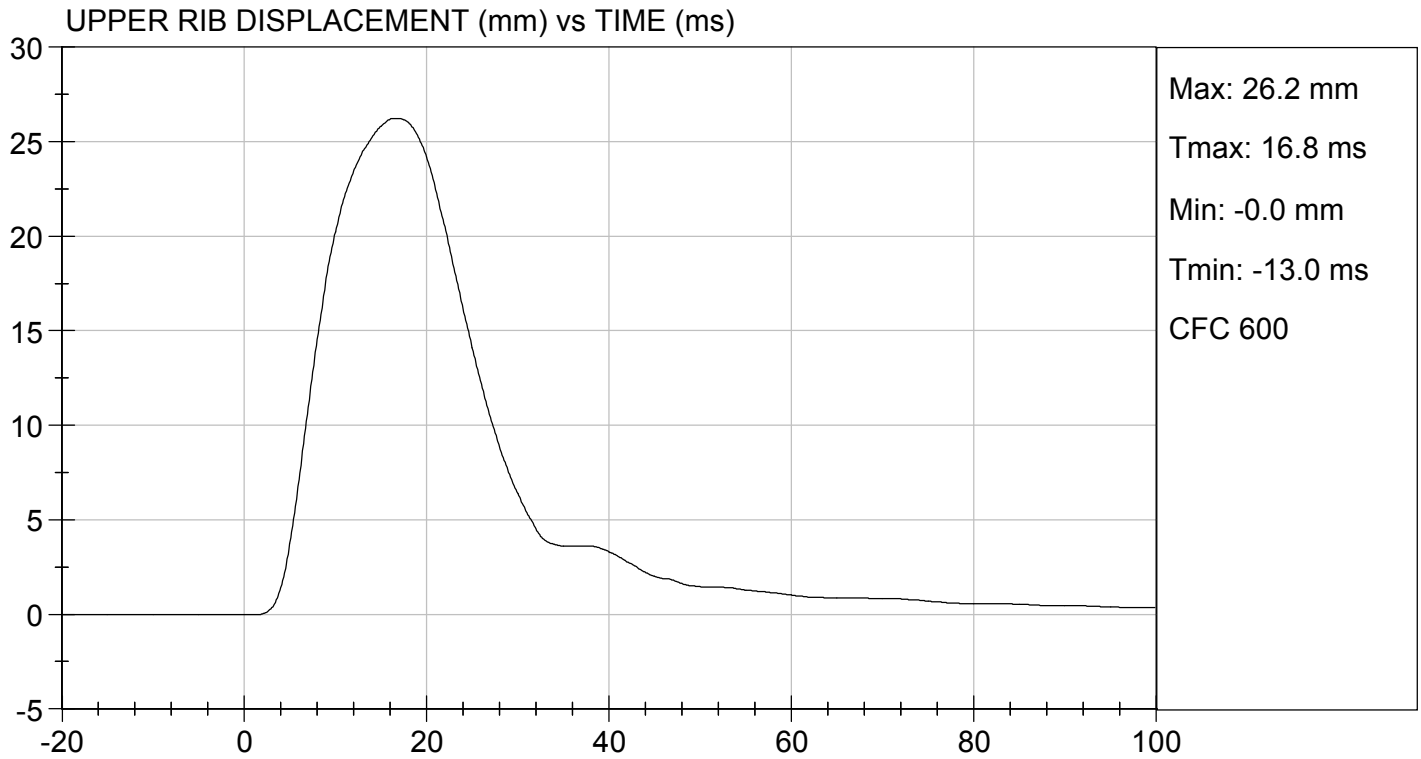
TEST DATE: 02/26/2020
TEST #: D200654





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

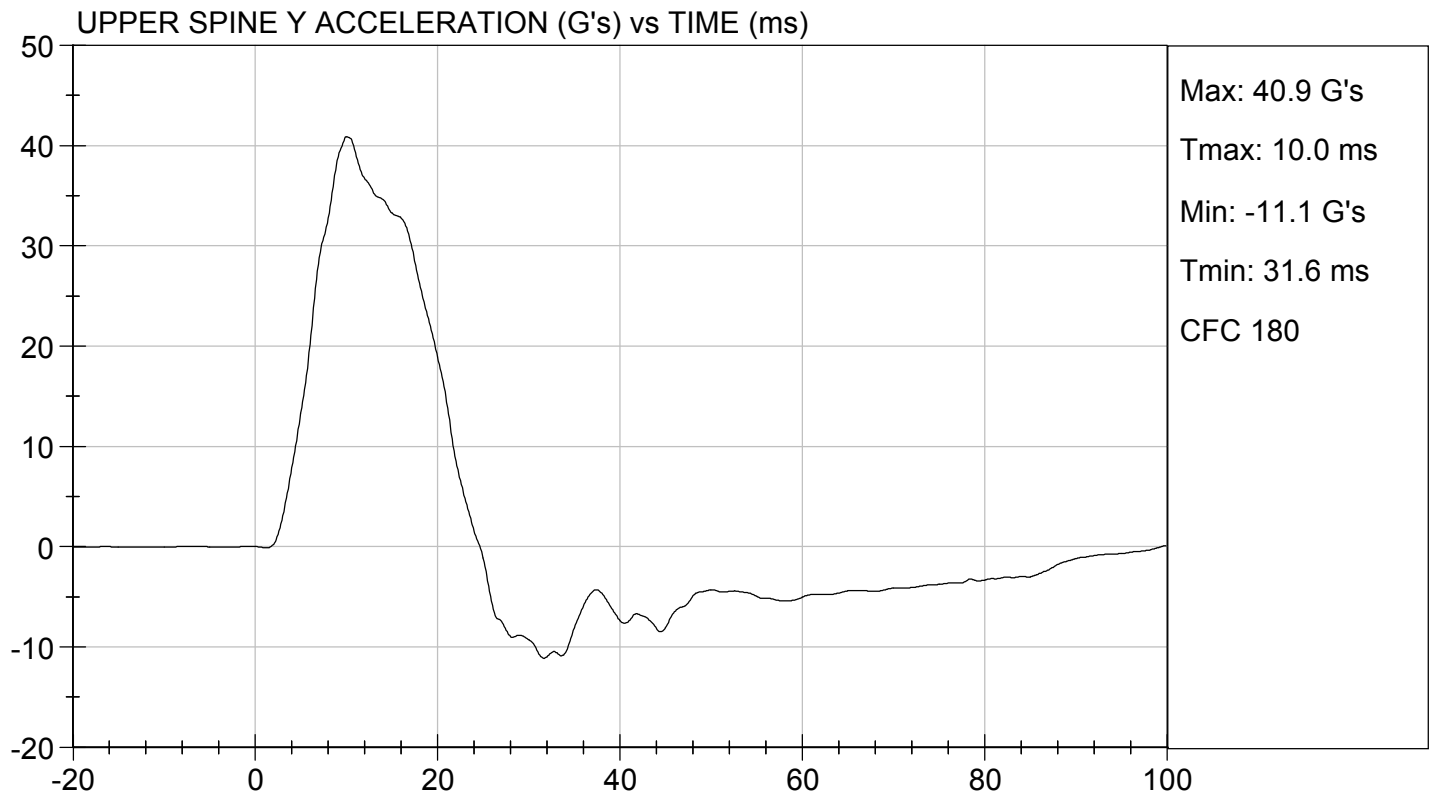
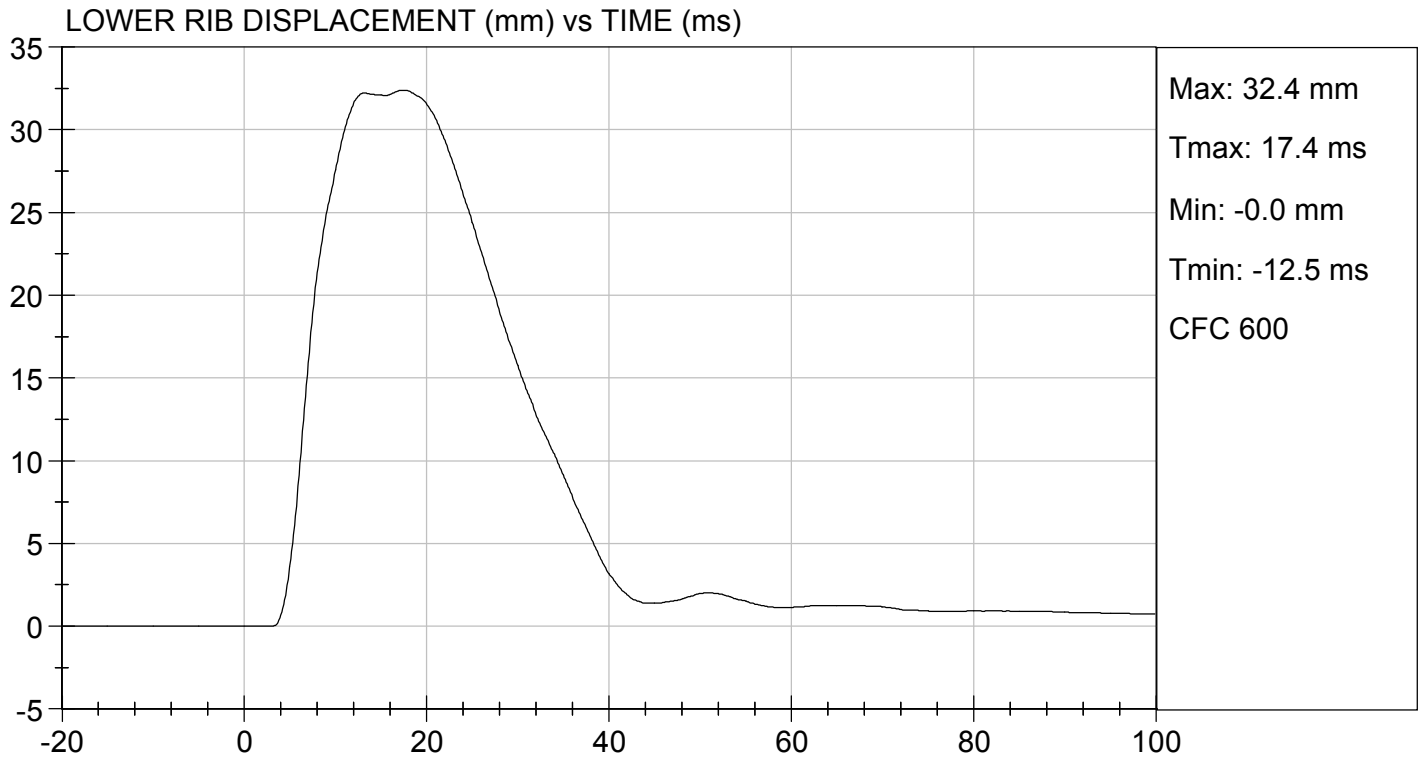
TEST DATE: 02/26/2020
TEST #: D200654





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

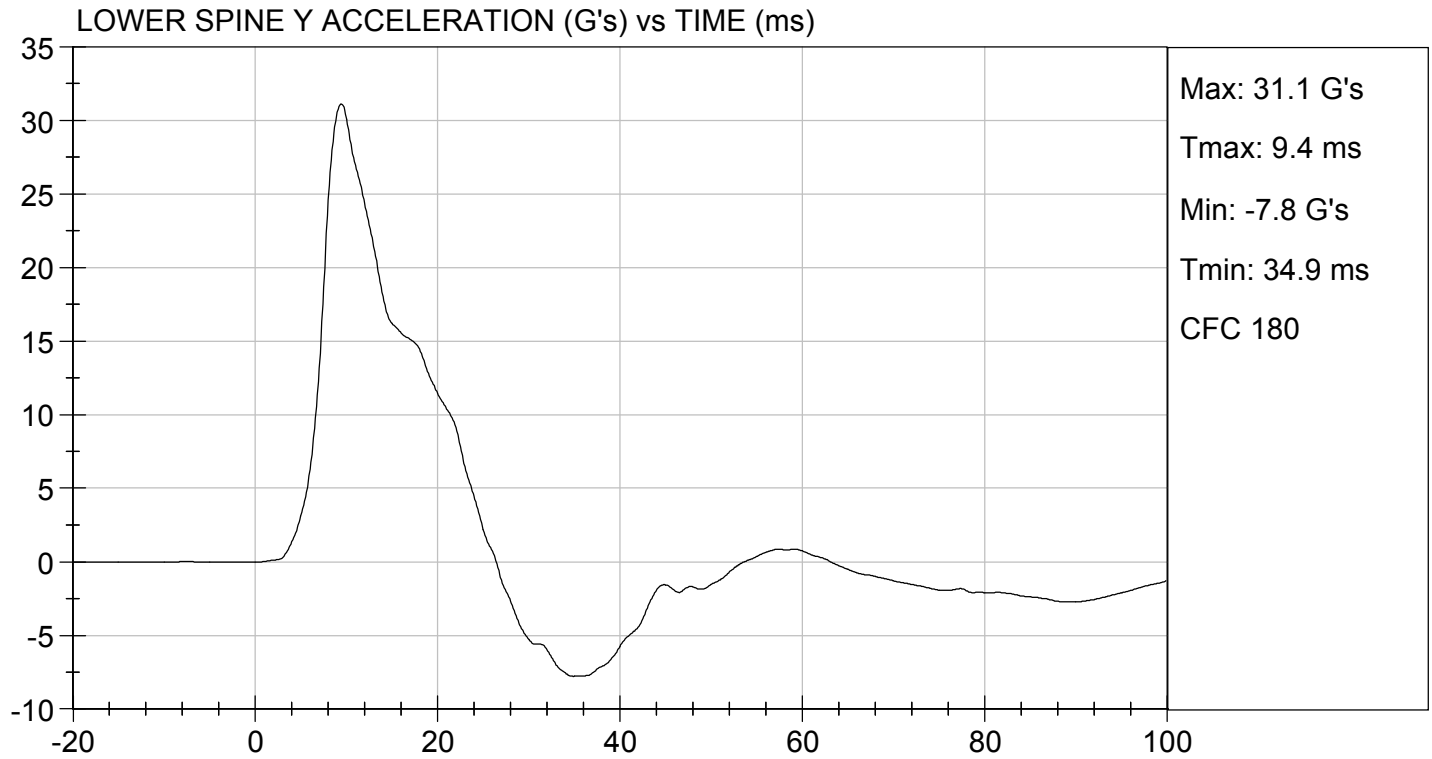
TEST DATE: 02/26/2020
TEST #: D200654





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

TEST DATE: 02/26/2020
TEST #: D200654



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

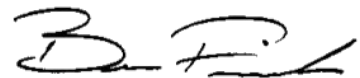
ATD Serial No: 306

Test I.D: D200655

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.4	Pass
Humidity	%	10 to 70	22	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Maximum Probe Acceleration	G's	14 to 18	15	Pass
Upper Rib Displacement	mm	32 to 40	36	Pass
Middle Rib Displacement	mm	39 to 45	41	Pass
Lower Rib Displacement	mm	35 to 43	39	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	15	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	9	Pass
			Overall Test Results	Pass


 Laboratory Technician

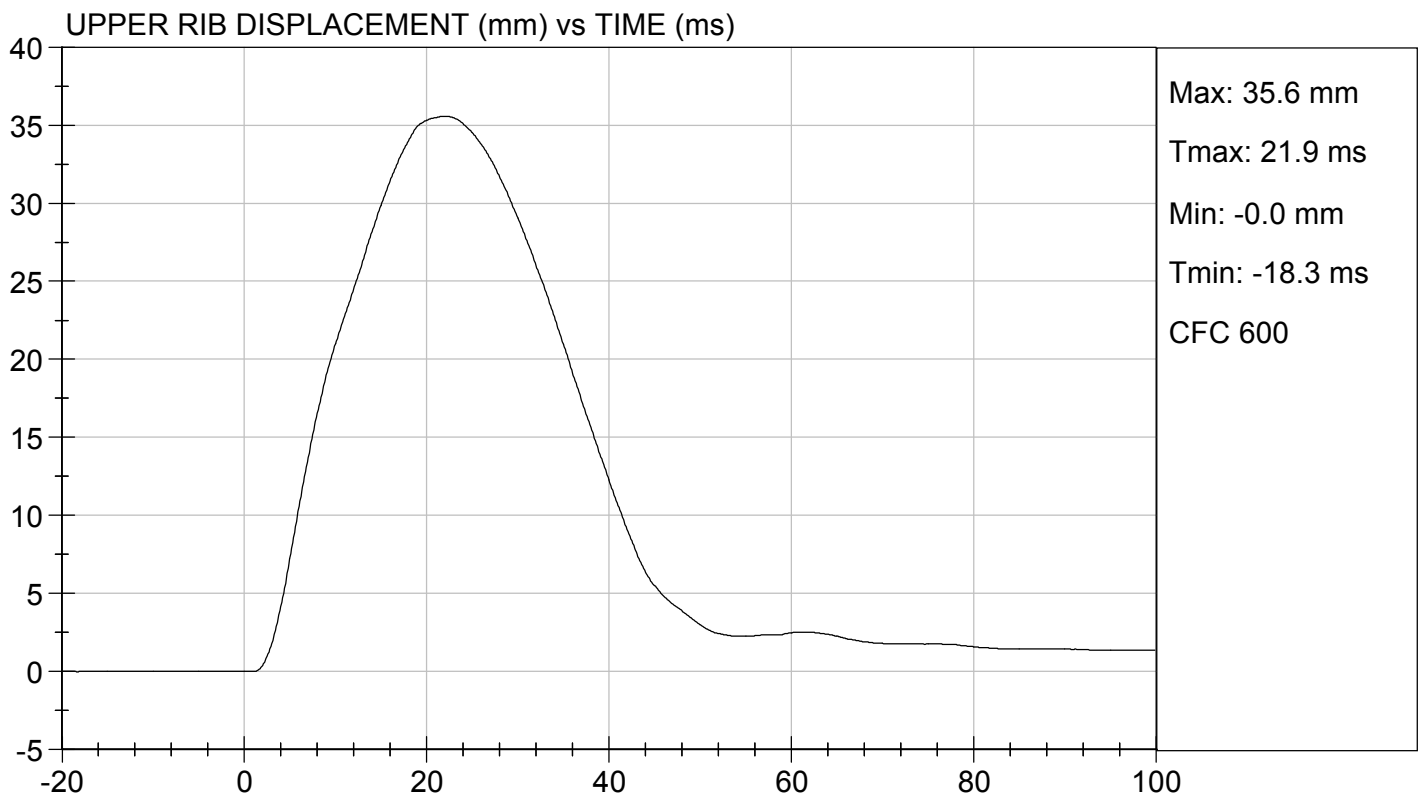
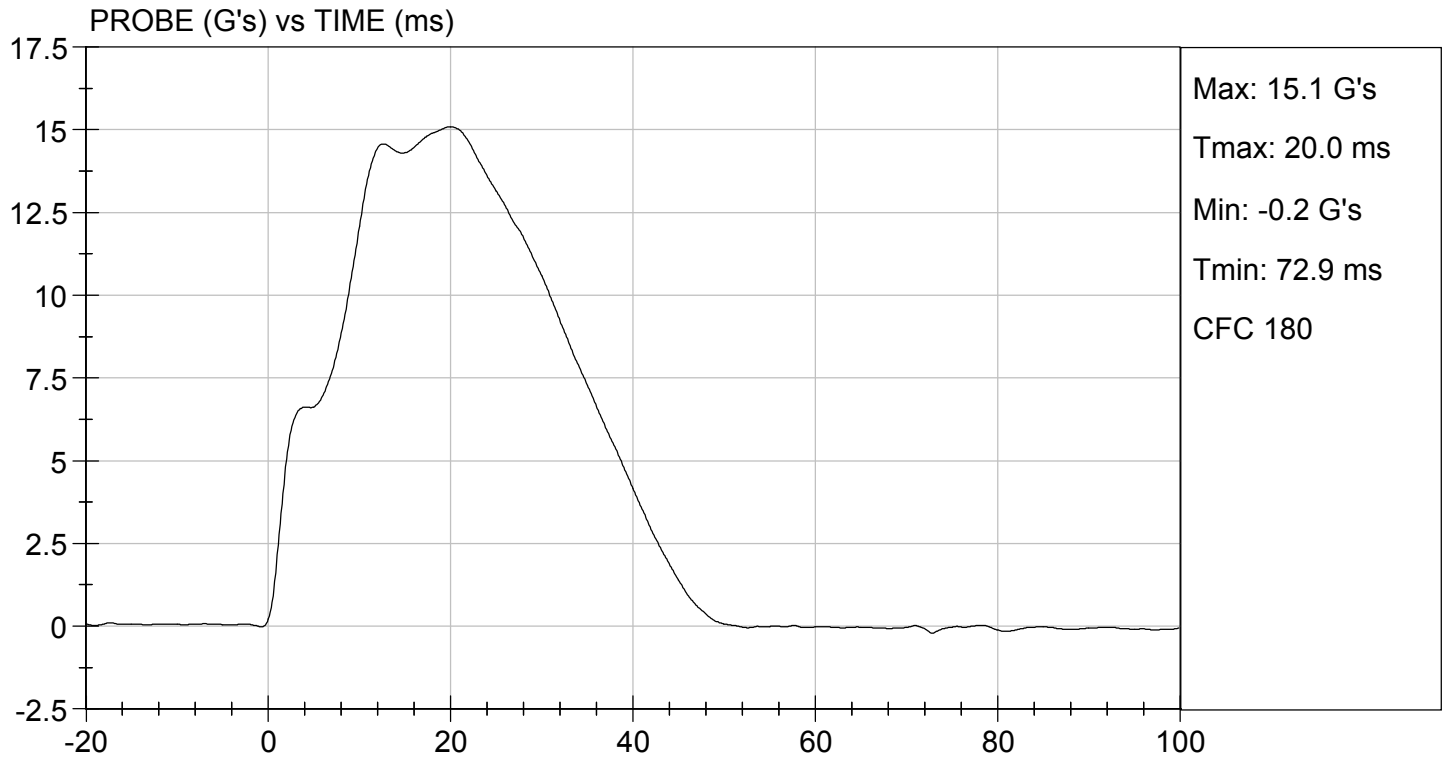
02/25/2020
 Test Date


 Approved By



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

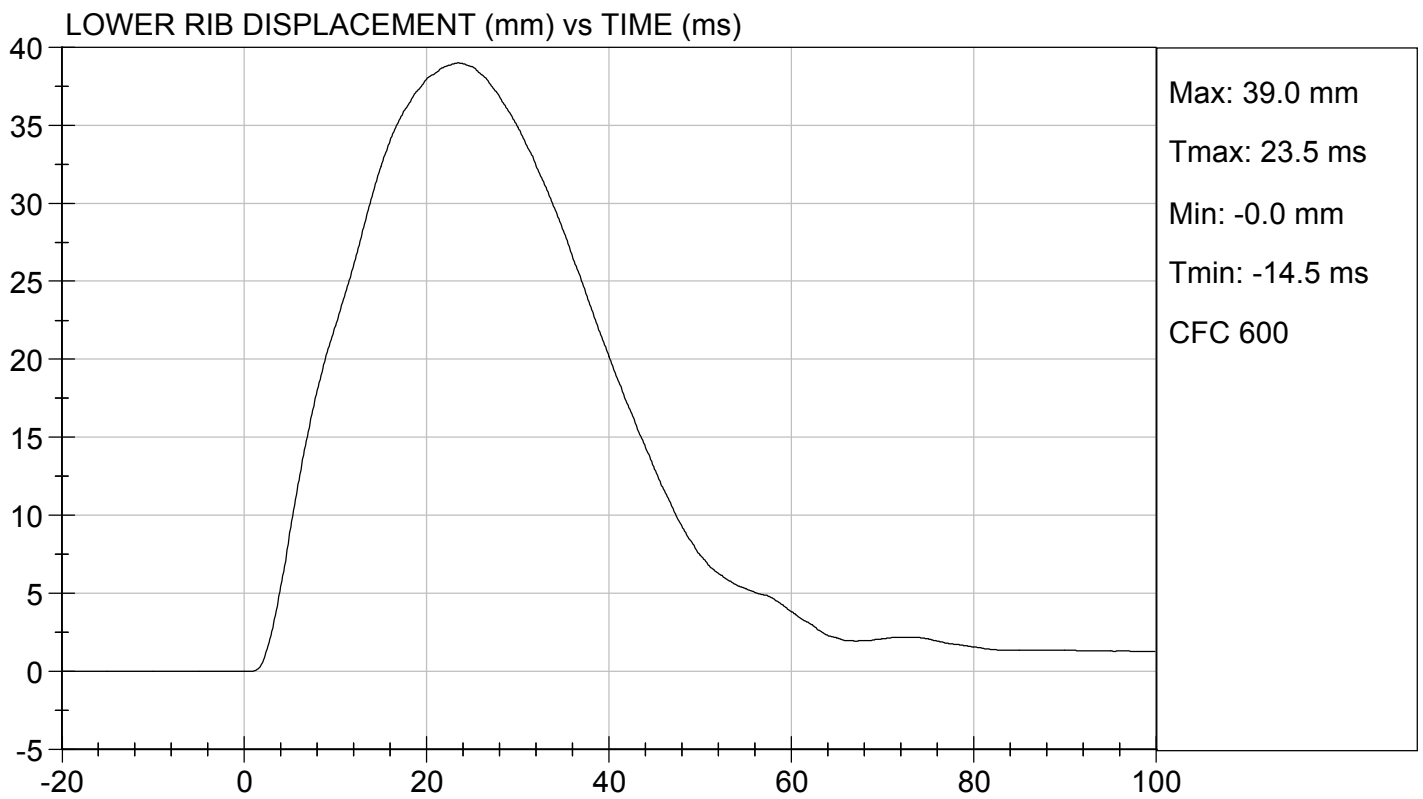
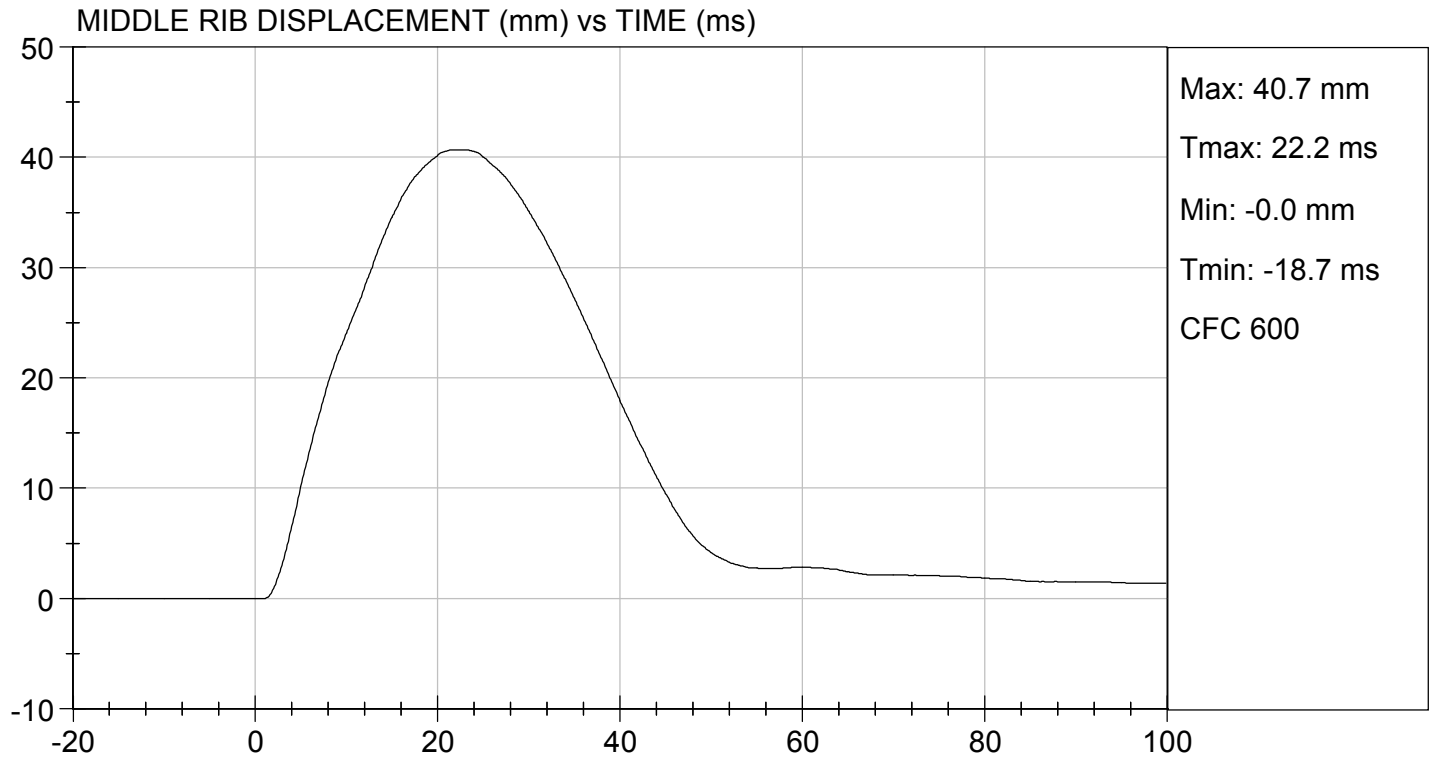
TEST DATE: 02/25/2020
TEST #: D200655

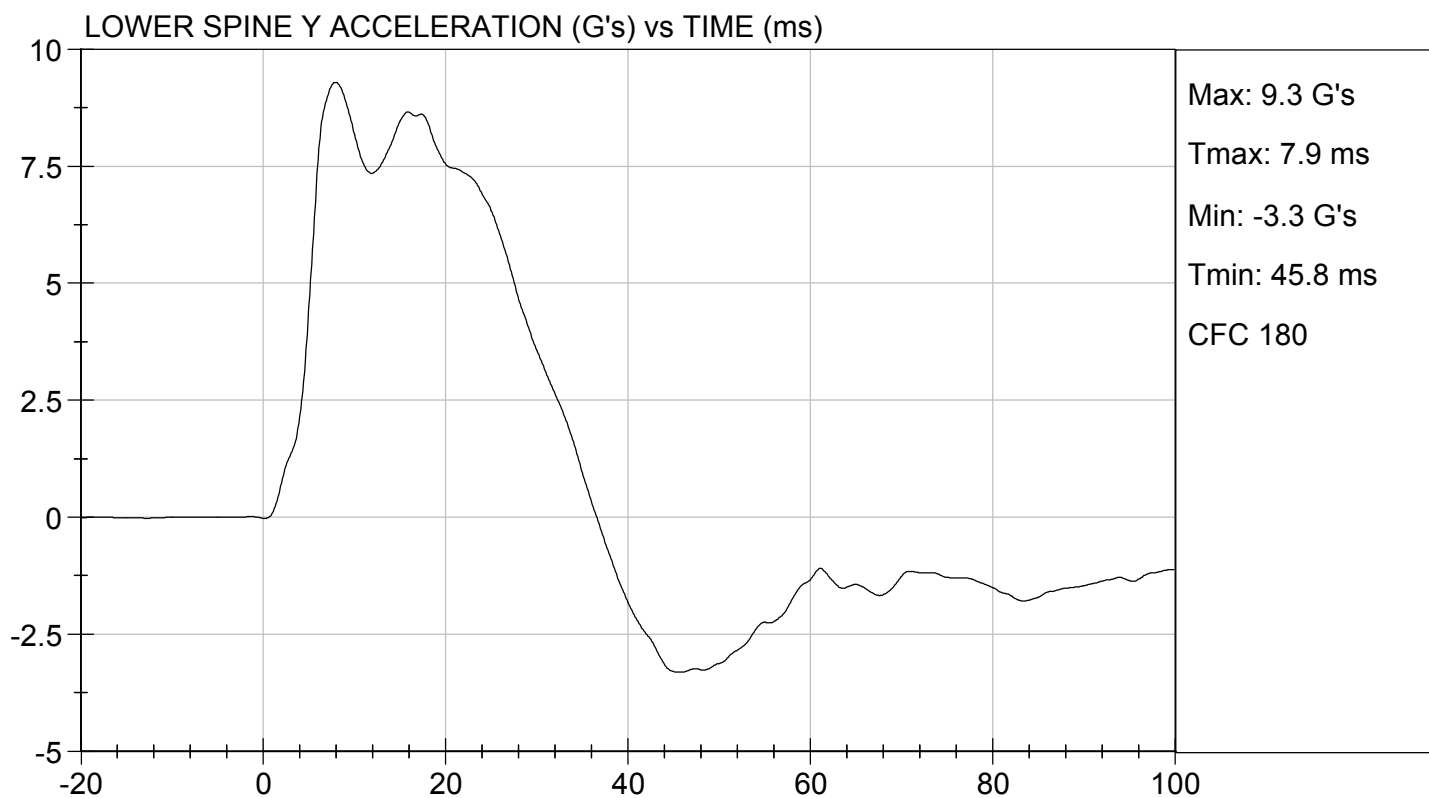
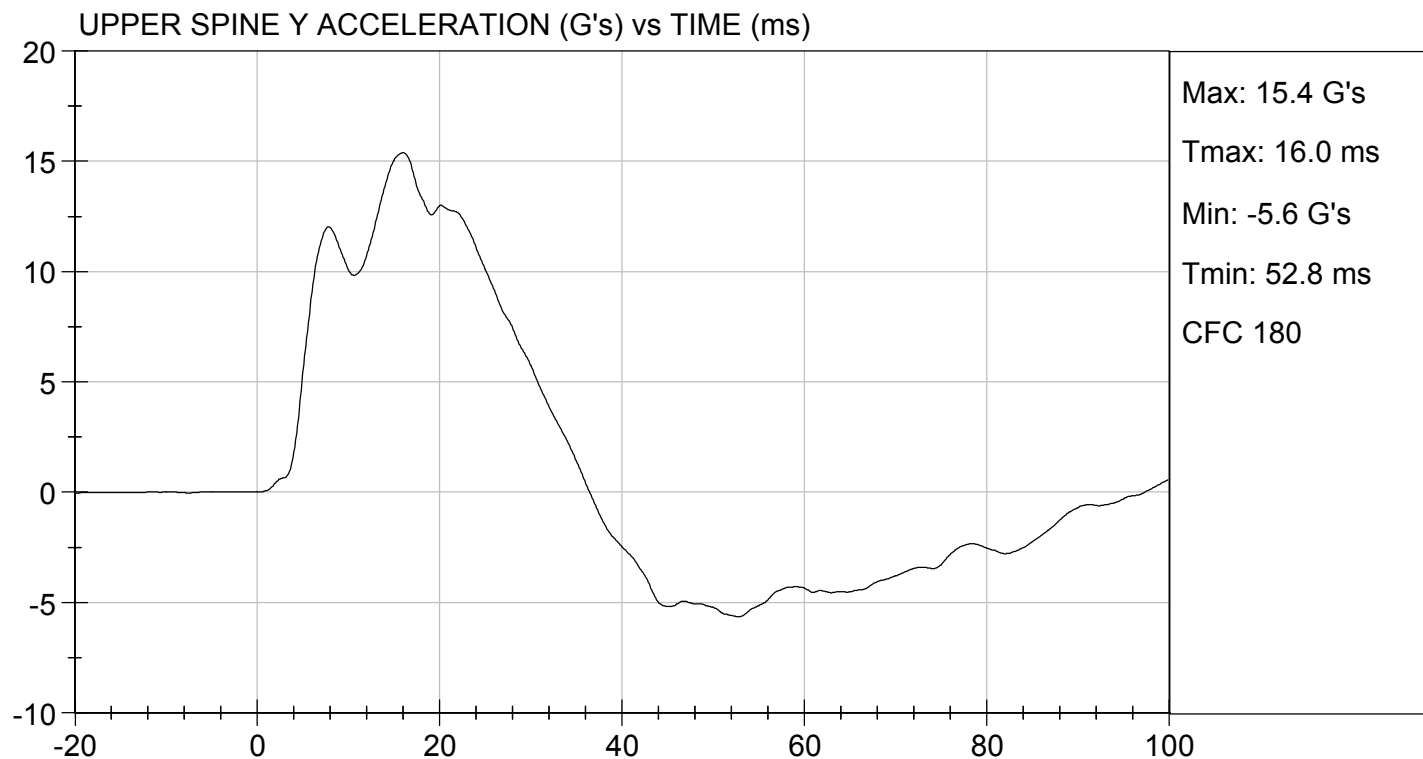




TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 02/25/2020
TEST #: D200655





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

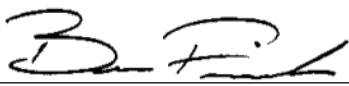
ATD Serial No: 306

Test I.D: D200656

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.4	Pass
Humidity	%	10 to 70	22	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Maximum Probe Acceleration	G's	12 to 16	14	Pass
Upper Abdomen Rib Displacement	mm	36 to 47	39	Pass
Lower Abdomen Rib Displacement	mm	33 to 44	41	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	11	Pass
Overall Test Results				Pass


Laboratory Technician

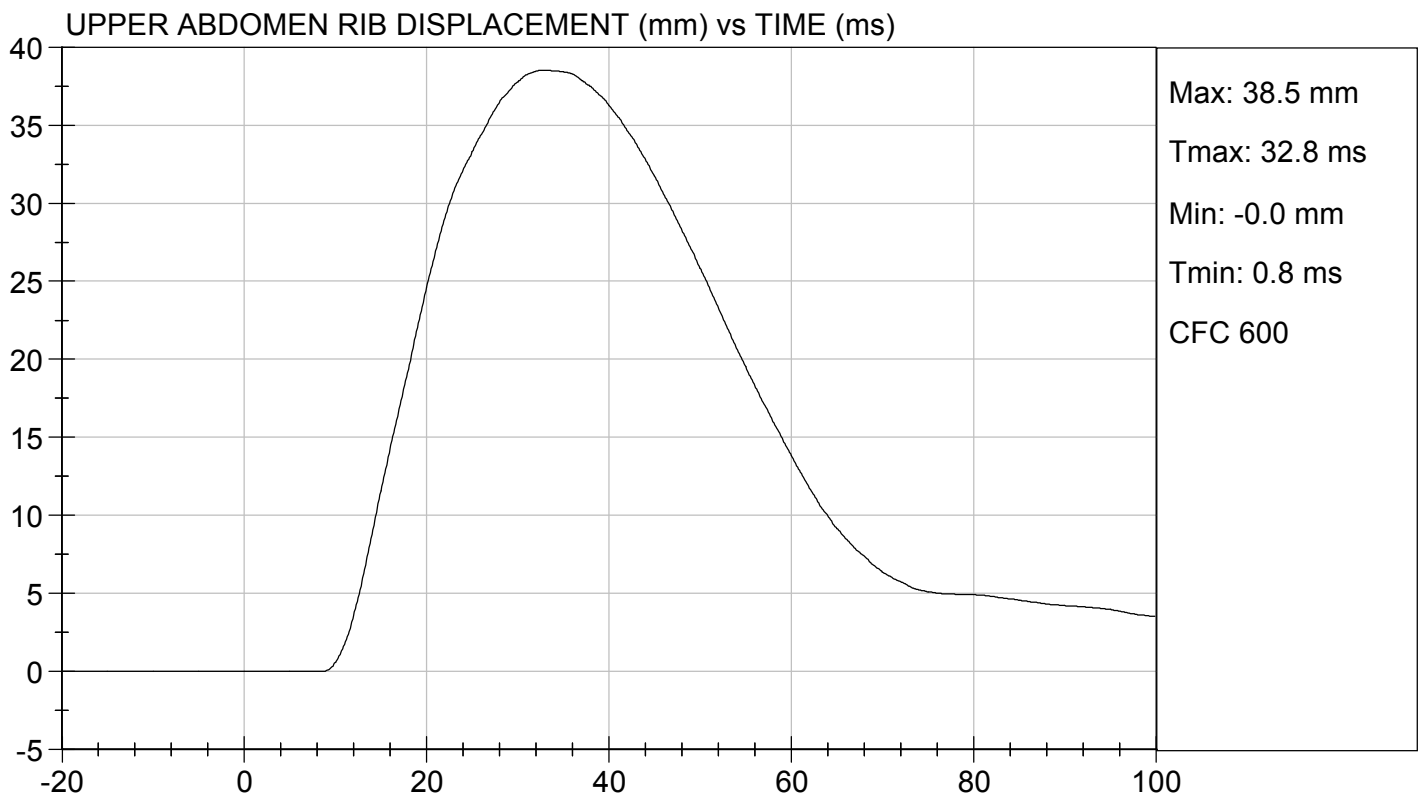
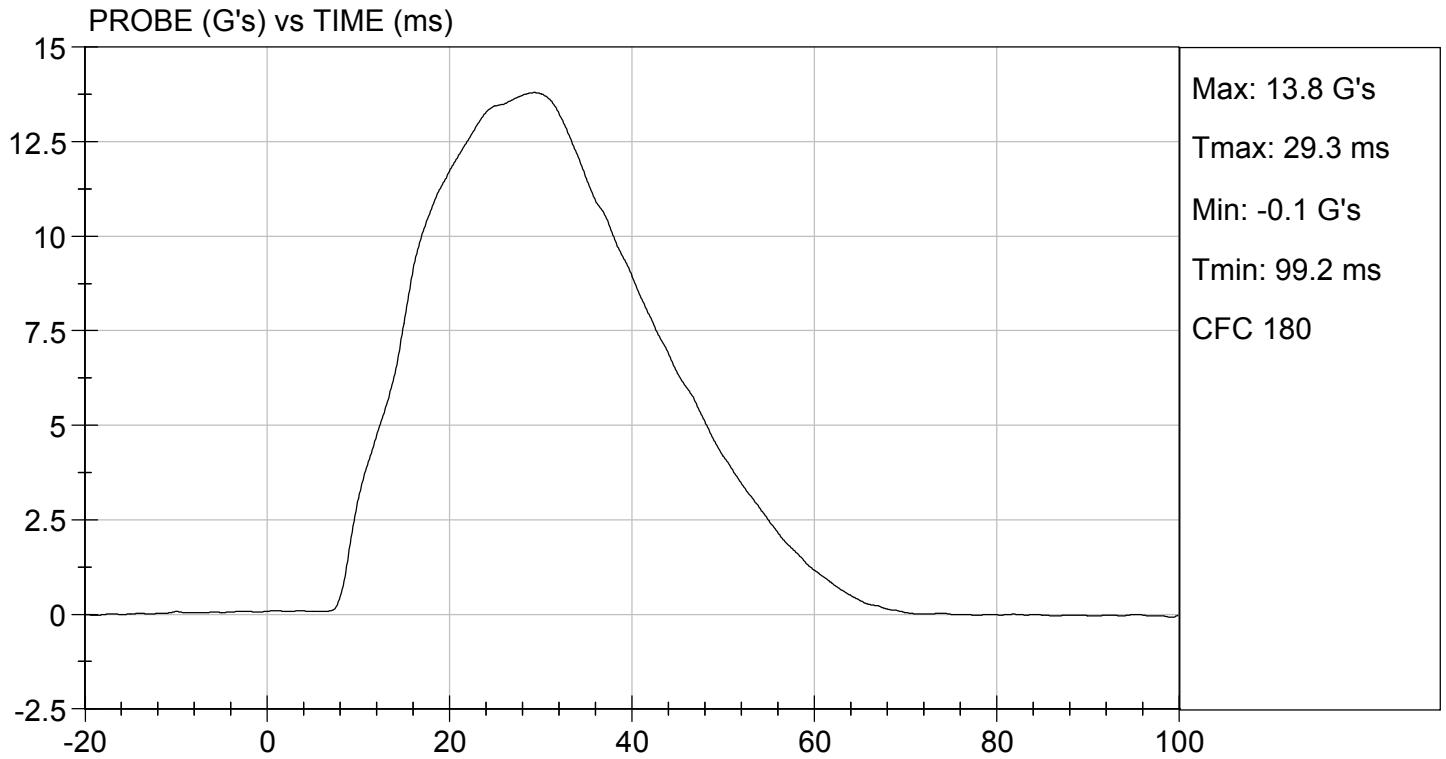
02/25/2020
Test Date


Approved By



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

TEST DATE: 02/25/2020
TEST #: D200656

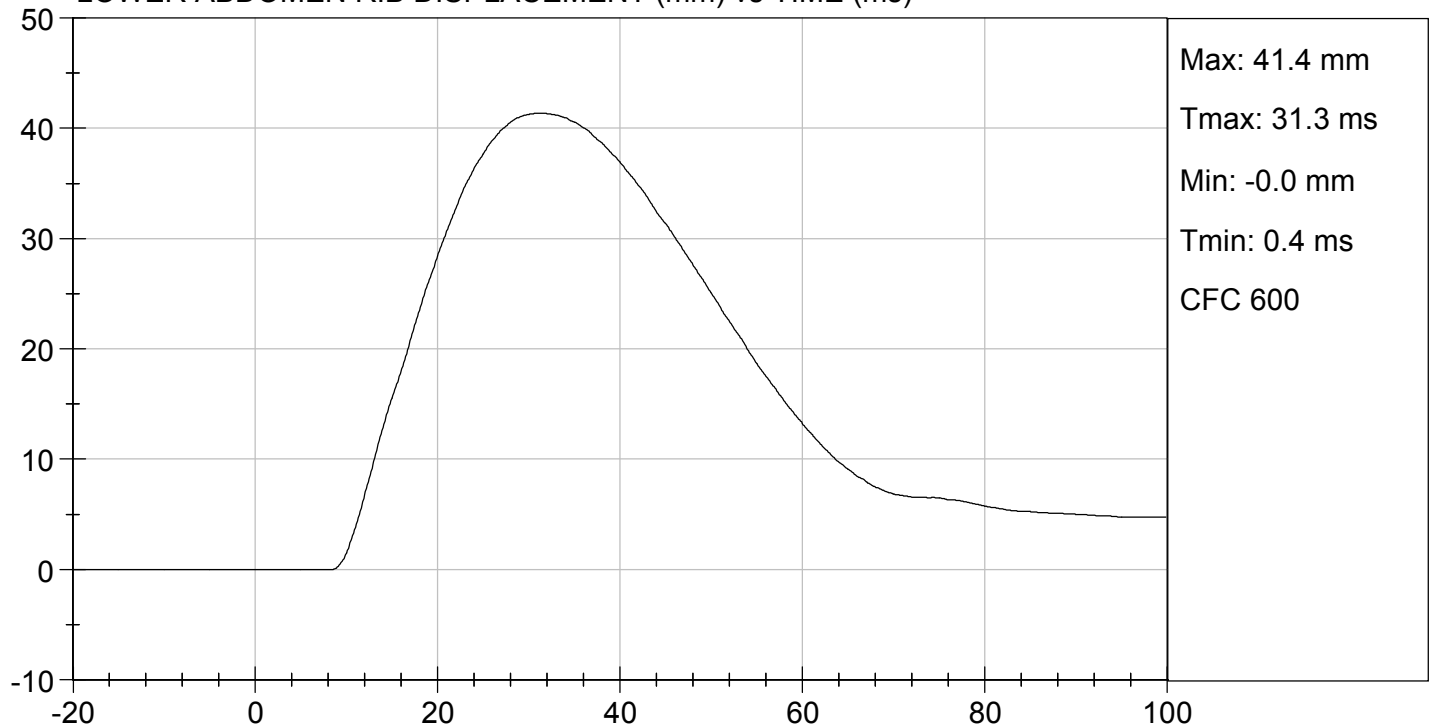




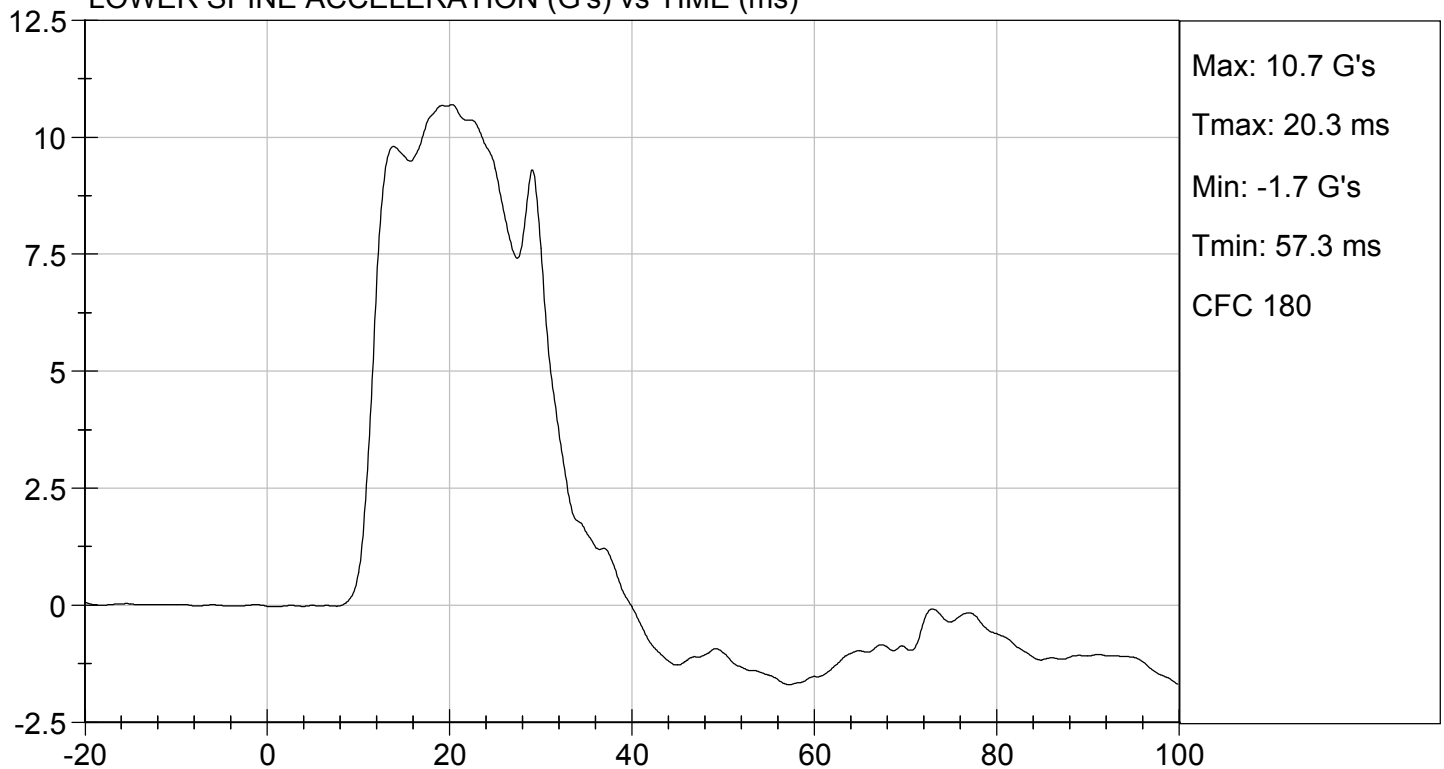
TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 02/25/2020
TEST #: D200656

LOWER ABDOMEN RIB DISPLACEMENT (mm) vs TIME (ms)



LOWER SPINE ACCELERATION (G's) vs TIME (ms)



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

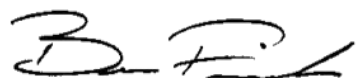
ATD Serial No: 306

Test I.D: D200657

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	20	Pass
Impact Velocity	m/s	6.60 to 6.80	6.60	Pass
Maximum Probe Acceleration	G's	38 to 47	43	Pass
Pelvis Y Acceleration After 6 ms	G's	34 to 42	40	Pass
Peak Acetabulum Force	N	3600 to 4300	3,900	Pass
Overall Test Results				Pass


Laboratory Technician

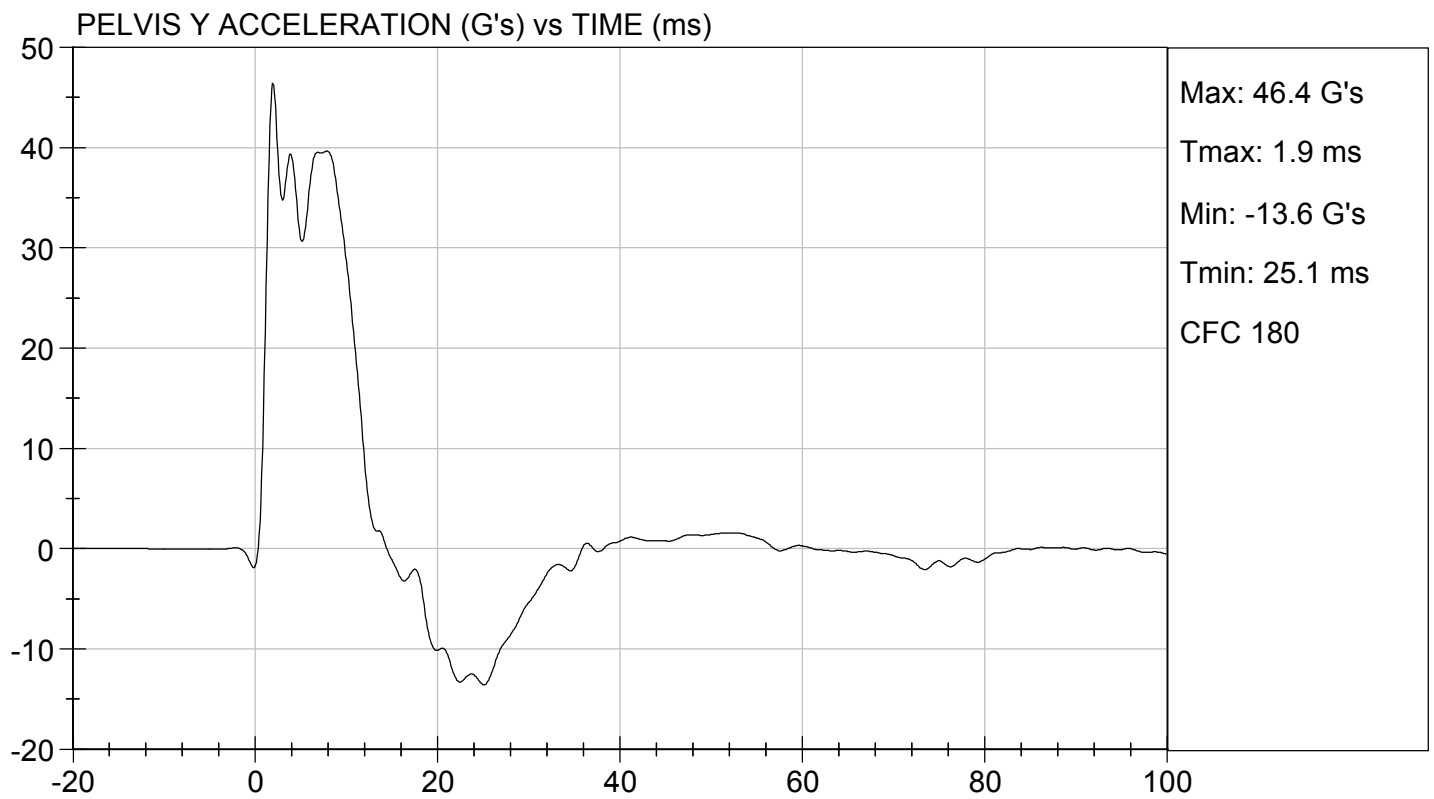
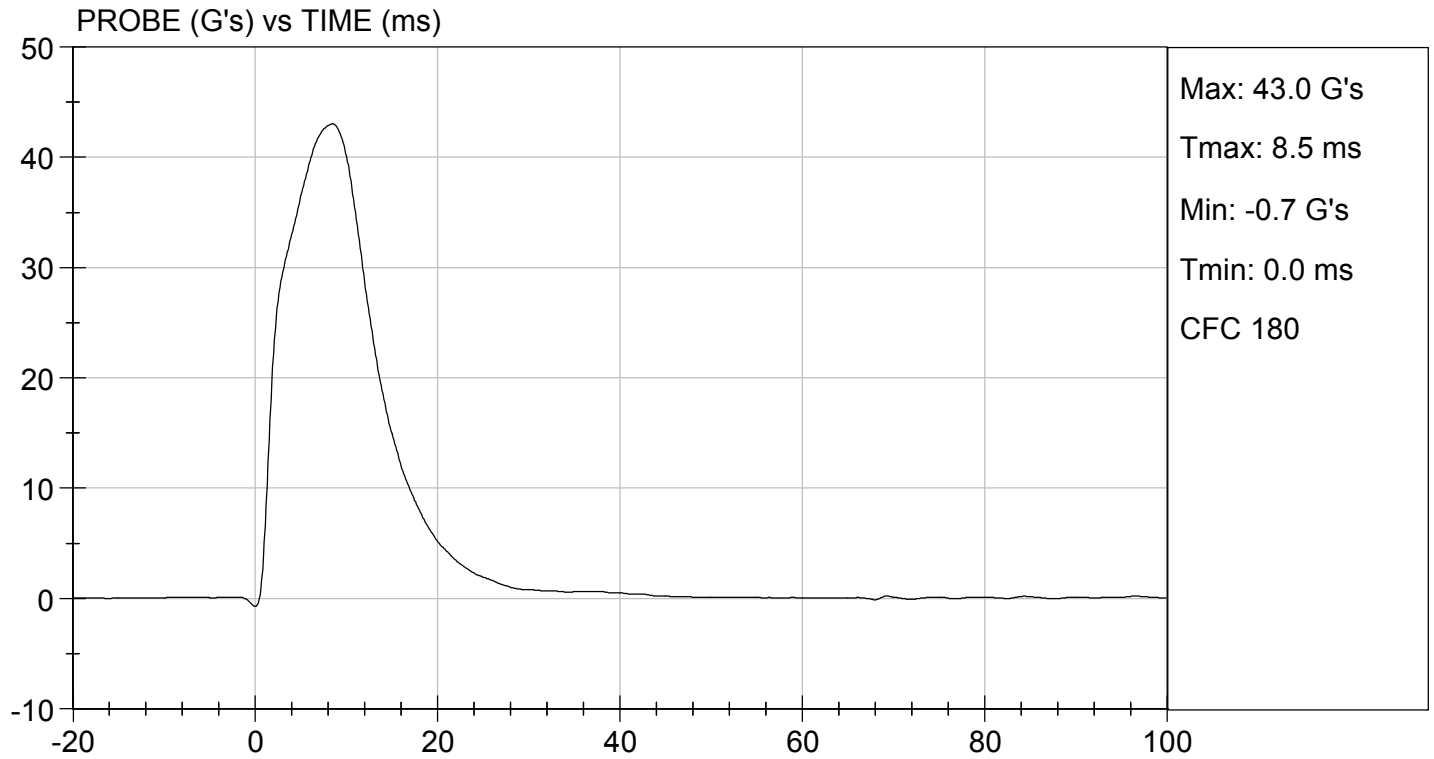
02/26/2020
Test Date


Approved By



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

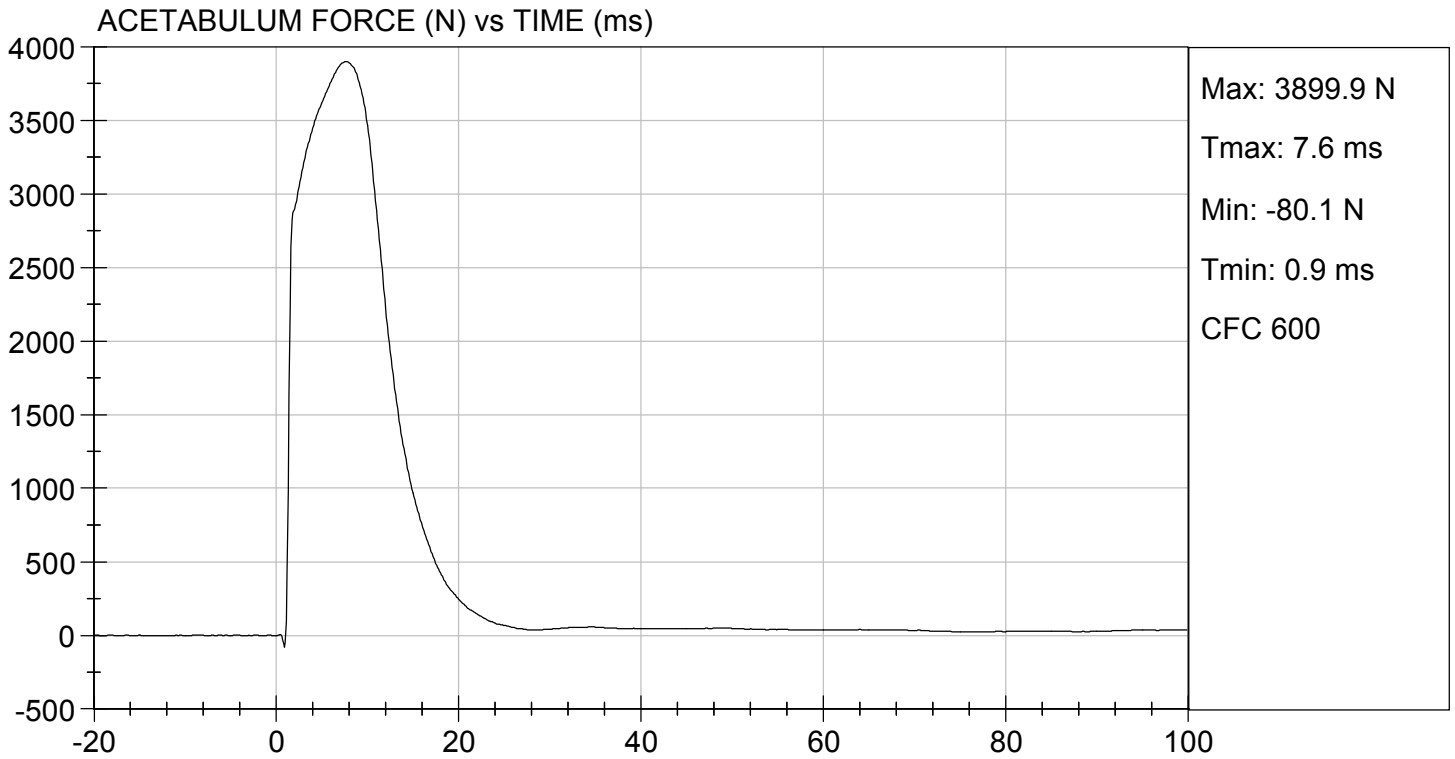
TEST DATE: 02/26/2020
TEST #: D200657





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

TEST DATE: 02/26/2020
TEST #: D200657



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

ATD Serial No: 306

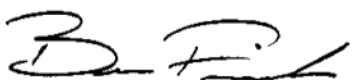
Test I.D: D200658

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	20	Pass
Impact Velocity	m/s	4.20 to 4.40	4.27	Pass
Maximum Probe Acceleration	G's	36 to 45	44	Pass
Pelvis Y Acceleration	G's	28 to 39	39	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	5,078	Pass
Overall Test Results				Pass


Laboratory Technician

02/26/2020

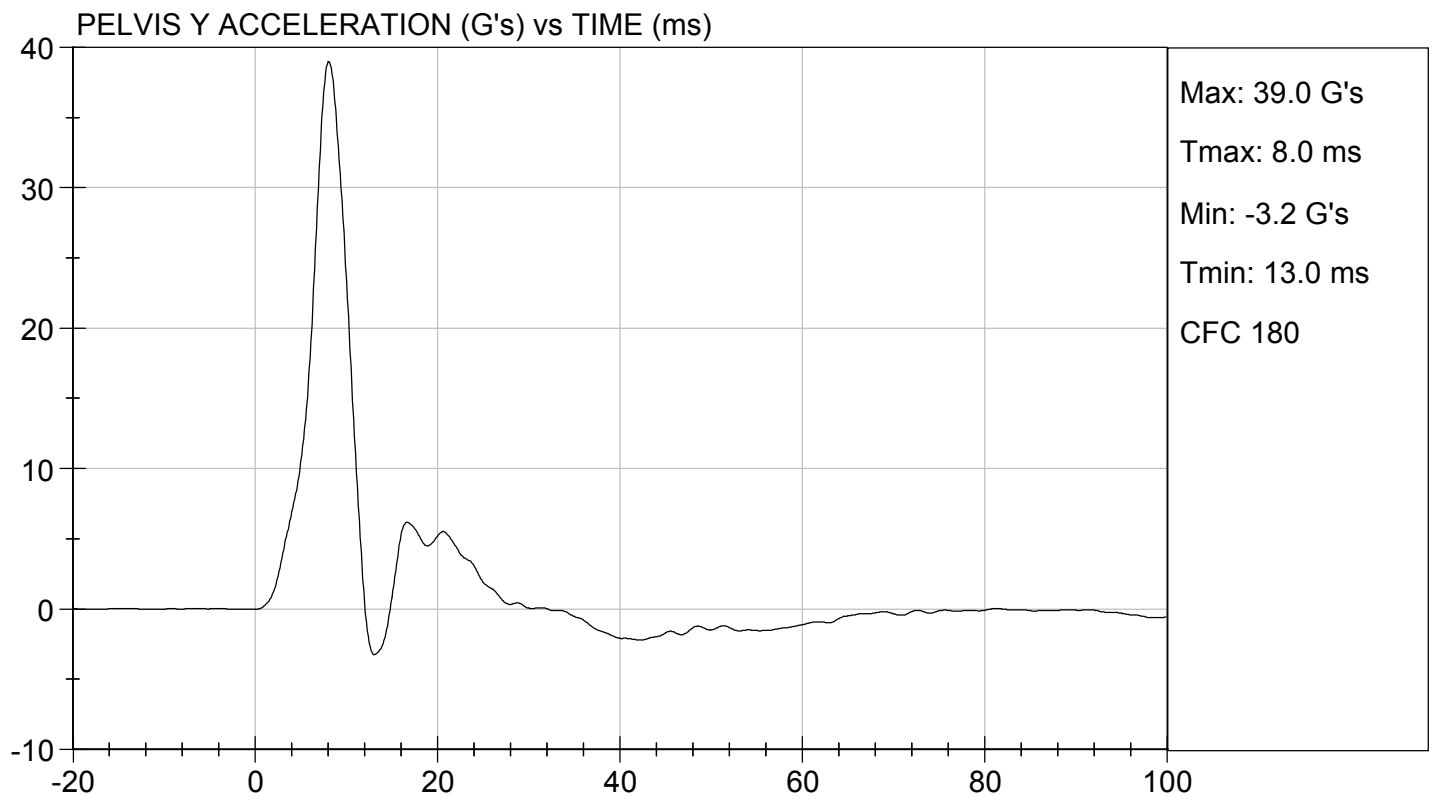
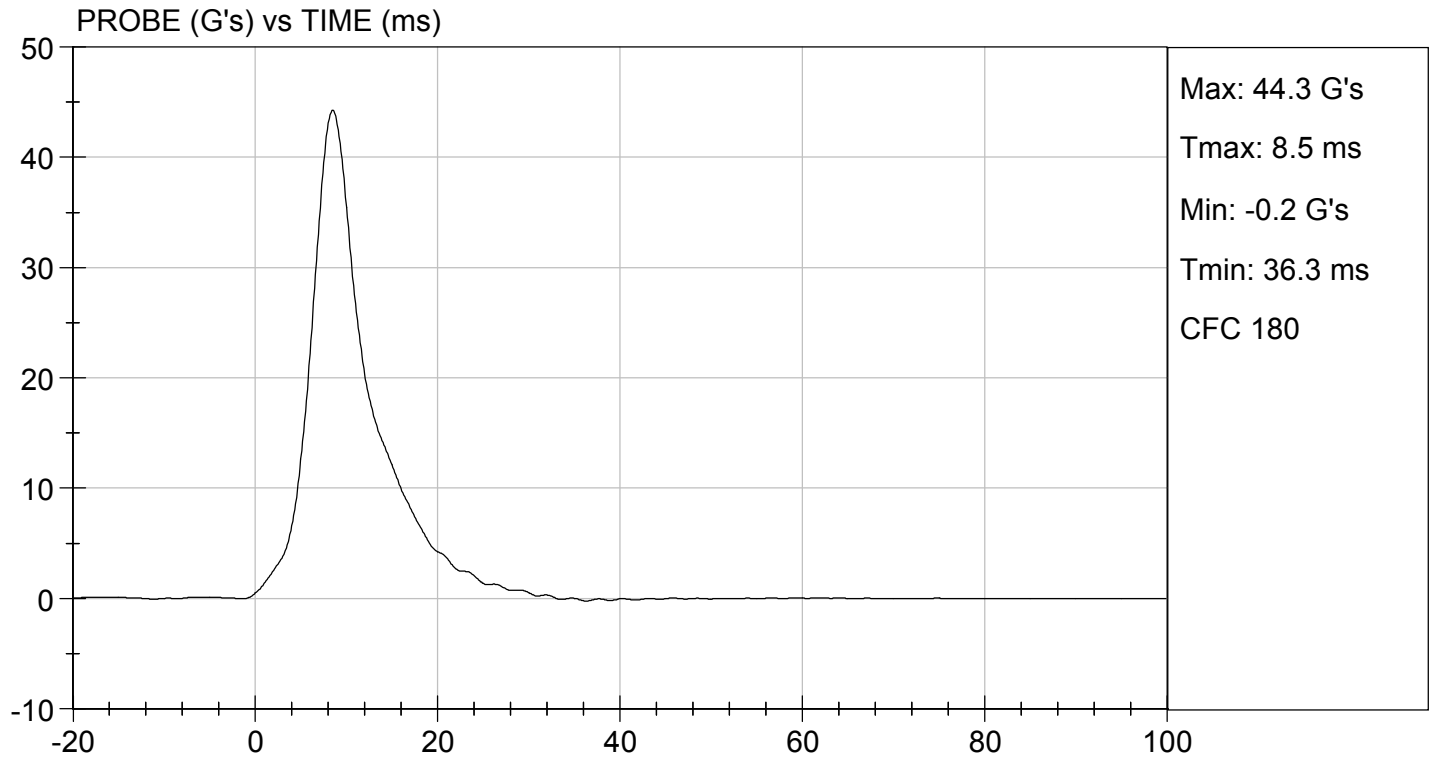
Test Date


Approved By



TEST DESC: ILLIAC
VELOCITY: 14.01 ft/s, 4.27 m/s

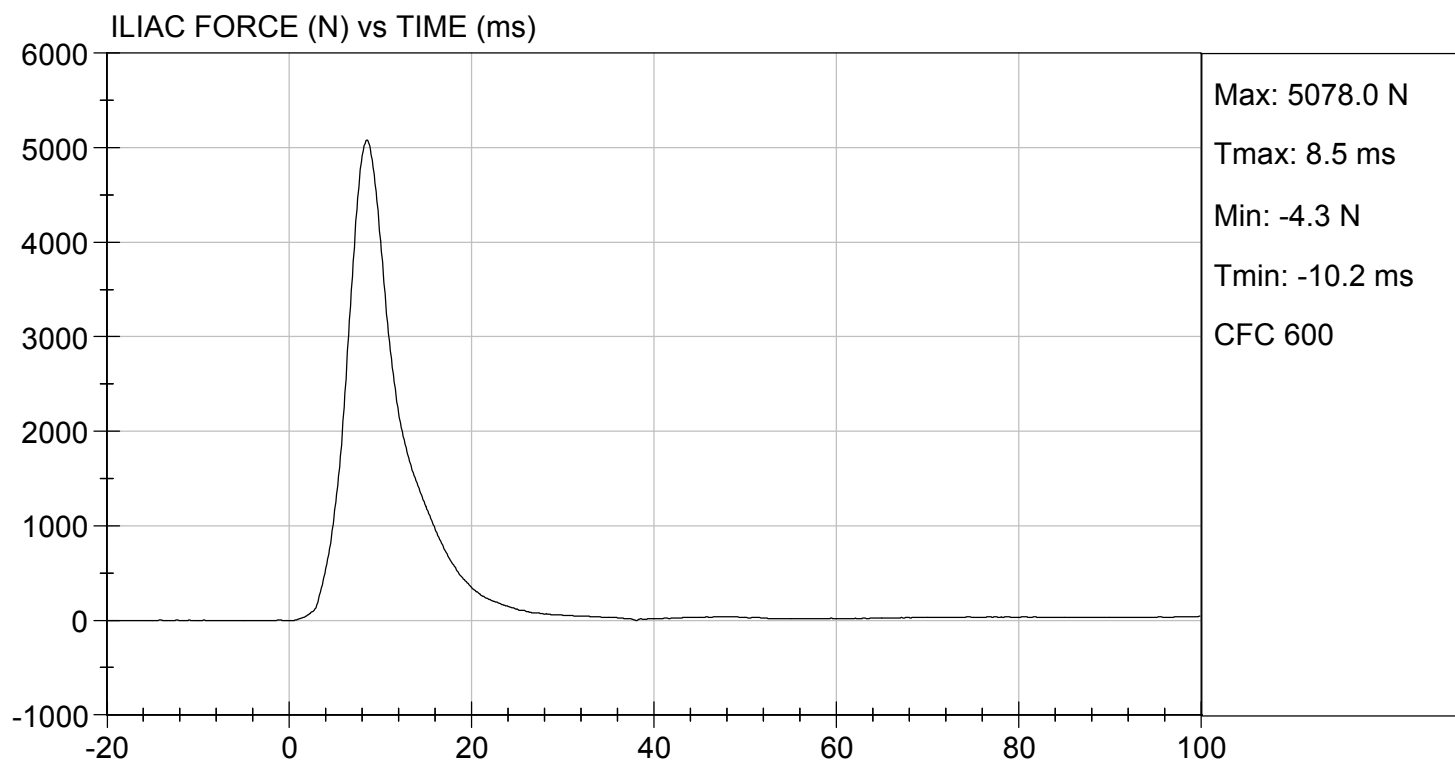
TEST DATE: 02/26/2020
TEST #: D200658





TEST DESC: ILLIAC
VELOCITY: 14.01 ft/s, 4.27 m/s

TEST DATE: 02/26/2020
TEST #: D200658





SID-IIs Pelvis Plug Certification Test

Plug S/N 12656

Test Number 7657

Report Number 7686

Test Date 11/21/2018 9:45:52 AM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	268.15	50.00	600.00
Force @ 1.5 mm (N)	1,159.30	850.00	1,400.00
Force @ 2.5 mm (N)	1,465.94	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,522.59	1,361.00	1,673.00

Testing Machine STM-20 5965542

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

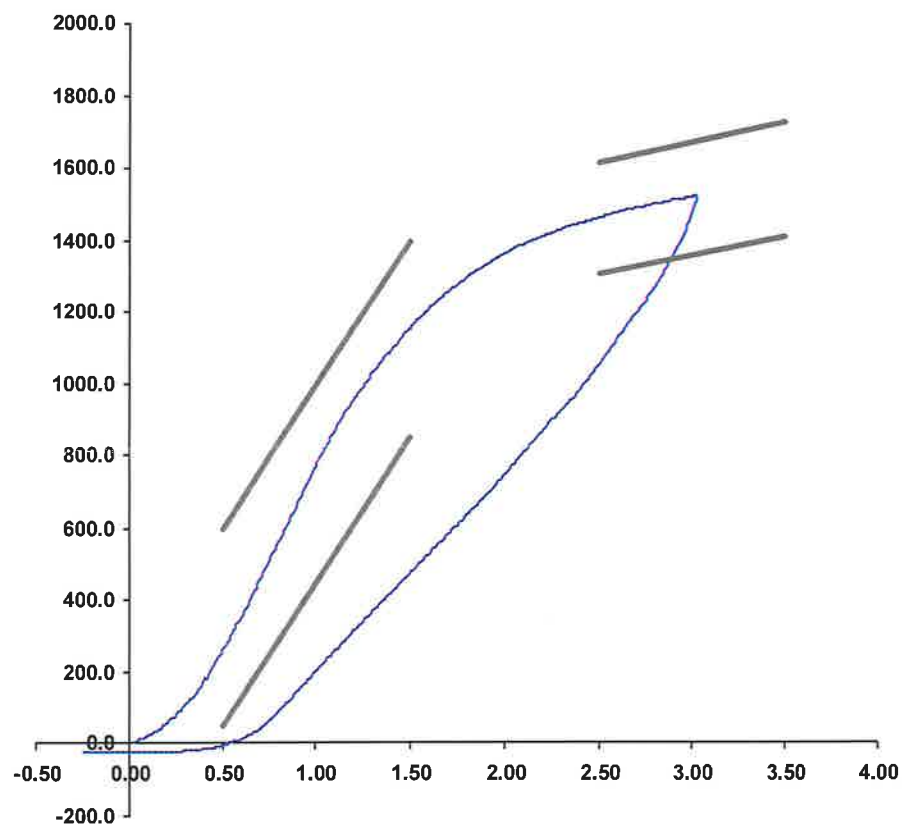
Preload Value (-N) 22.24

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

21-Nov-18

SACO Research

By : DC

Date : 11/21/2018

SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 FAX



SID-IIs Pelvis Plug Certification Test

Plug S/N 12584

Test Number 7514

Report Number 7529

Test Date 10/3/2018 10:20:07 AM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	318.09	50.00	600.00
Force @ 1.5 mm (N)	1,179.68	850.00	1,400.00
Force @ 2.5 mm (N)	1,447.93	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,497.86	1,361.00	1,673.00

Testing Machine STM-20 5965542

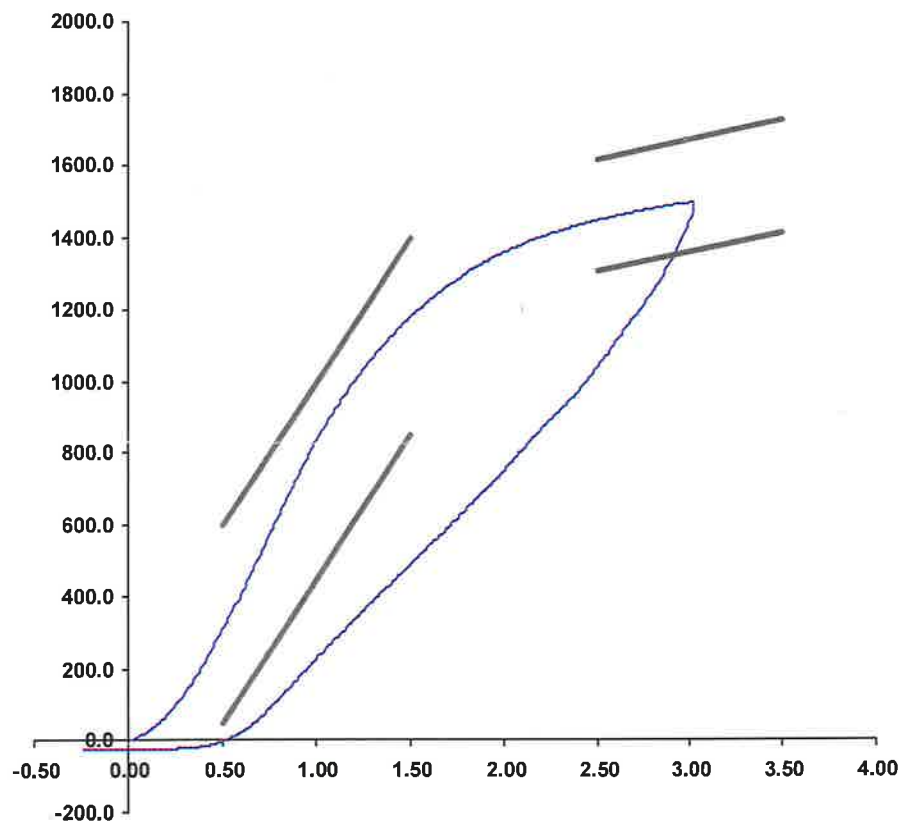
Load Cell S/N (FI360947), Units (LBS) 1000

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

03-Oct-18

SACO Research

By : DC

Date : 10/3/18

SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 FAX

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation

				SID-IIs S/N 306			
				Serial Number	Manufacturer	Calibration Date	
Head CG Accelerometers				X	P79721	Endevco	1/2/2020
				Y	P79724	Endevco	1/2/2020
				Z	P79445	Endevco	1/2/2020
				Xr	P84999	Endevco	1/2/2020
				Yr	P85000	Endevco	1/2/2020
				Zr	P85001	Endevco	1/2/2020
Head Angular Rate Sensors				X	ARS7416	DTS	7/8/2019
				Y	ARS7442	DTS	7/8/2019
				Z	ARS7475	DTS	7/8/2019
Displacement Potentiometers	Thoracic Rib	Upper	Y	G033	FTSS	1/2/2020	
		Middle	Y	G1261	FTSS	1/2/2020	
		Lower	Y	G1270	FTSS	1/2/2020	
	Abdominal Rib	Upper	Y	G032	FTSS	1/2/2020	
		Lower	Y	G1304	FTSS	1/2/2020	
Lower Spine Accelerometers (T12)				X	P96332	Endevco	1/2/2020
				Y	P96335	Endevco	1/2/2020
				Z	P96341	Endevco	1/2/2020
Acetabulum Load Cell				Y	ACG4285	FTSS	11/27/2019
Iliac Wing Load Cell				Y	IWG3023	FTSS	11/27/2019
Pelvis Plug (struck side)					12565	SACO	11/21/2018
Pelvis Plug (non-struck side)					12584	SACO	10/3/2018

Table 2 – Vehicle Instrumentation

		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	A305728	MSI	11/20/2019
Vehicle Center of Gravity	Y	A305686	MSI	11/20/2019
Vehicle Center of Gravity	Z	A305702	MSI	11/20/2019
Left Floor Sill	Y	PCB1361	PCB	12/4/2019
A-Pillar Sill	Y	PCB1385	PCB	12/17/2019
A-Pillar Low	Y	T20394	Endevco	9/26/2019
A-Pillar Mid	Y	T20757	Endevco	12/2/2019
B-Pillar Sill	Y	PCB1137	PCB	11/13/2019
B-Pillar Low	Y			
B-Pillar Mid	Y			
Driver Seat	Y	T19958	Endevco	12/18/2019
Engine Top	X	PCB1052	PCB	12/3/2019
Engine Top	Y	PCB1036	PCB	12/3/2019
Firewall	Y	T20765	Endevco	12/2/2019
Right Roof	Y	T20020	Endevco	12/3/2019
Right Floor Sill	Y	PCB1383	PCB	12/4/2019
Rear Floorpan	X	T20398	Endevco	9/13/2019
Rear Floorpan	Y	T20407	Endevco	9/13/2019

Table 3 – Pole Instrumentation

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