

REPORT NUMBER: SPNCAP-MGA-19-057

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

**AUDI AG
2019 Audi e-tron quattro 5-Door SUV
NHTSA No.: O20195804**

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



Test Date: October 18, 2019

Final Report Date: December 6, 2019

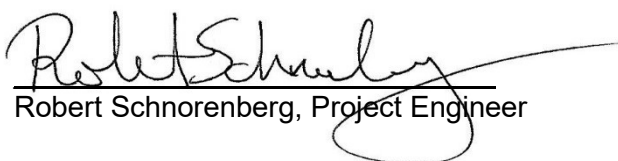
FINAL REPORT

**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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Prepared by: 
Ben Fischer, Project Engineer

Approved by: 
Robert Schnorenberg, Project Engineer

Approval Date: December 6, 2019

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 2019 Audi e-tron quattro 5-Door SUV, NHTSA No.: O20195804		5. Report Date December 6, 2019																											
		6. Performing Organization Code MGA																											
7. Author(s) Ben Fischer, Project Engineer		8. Performing Organization Report No. SPNCAP-MGA-19-057																											
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105		10. Work Unit No.																											
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15. Supplementary Notes																													
16. Abstract A 32.20 km/h, 75° oblique impact Side NCAP Test was conducted on the subject 2019 Audi e-tron quattro 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 October 18, 2019. The impact velocity was 32.49 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 22.0°C. The test vehicle post-test maximum crush was 194 mm at level 3. The test vehicle's performance was as follows: <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th rowspan="2">Units</th> <th colspan="2">Driver ATD (SID-IIs)</th> </tr> <tr> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td></td> <td>1000</td> <td>279</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td>g</td> <td>82</td> <td>60</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td>N</td> <td>5525</td> <td>2808</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38*</td> <td>27</td> </tr> <tr> <td>Maximum Abdomen Rib Deflection</td> <td>mm</td> <td>45*</td> <td>27</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	279	Resultant Lower Spine Acceleration	g	82	60	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2808	Maximum Thoracic Rib Deflection	mm	38*	27	Maximum Abdomen Rib Deflection	mm	45*	27
Measurement Description	Units	Driver ATD (SID-IIs)																											
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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, NPO-411 1200 New Jersey Ave, SE Washington, DC 20590																											
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SECTION 1 TEST PURPOSE AND PROCEDURE

This side impact test is part of the MY 2019 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 2019 Audi e-tron quattro 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 October 2015.

SECTION 2 SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2019 Audi e-tron quattro 5-Door SUV. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.49 km/h. The test was conducted by MGA Research Corporation in Burlington, Wisconsin on October 18, 2019. 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 October 2015. 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
- 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	279
Resultant Lower Spine Acceleration	g	82	60
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2808
Maximum Thoracic Rib Deflection	mm	38*	27
Maximum Abdomen Rib Deflection	mm	45*	27

*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	No		
Knee Airbag	Yes	No		
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	No	
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes		Yes	
Other:	No		No	

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 5 ms.

Left Lower B-Post Y recorded questionable data.

Driver Seat Track Y recorded no valid data after 20 ms.

Floorpan @ Rear Axle X questionable data between 50-55 ms.

Floorpan @ Rear Axle Y questionable data between 50-55 ms.

Load Cell Pole #8 Fy recorded no valid data.

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

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2019 Audi e-tron quattro 5-Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20195804
 Test Date: 10/18/2019

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	O20195804	Traction Control System (TCS)	Yes
Model Year	2019	Auto-Leveling System	Yes
Make	Audi	Automatic Door Locks (ADL)	Yes
Model	e-tron quattro	Power Window Auto-Reverse	Yes
Body Style	5-Door SUV	Other Optional Feature	No
VIN	WA1LAAGE9KB013705	Driver Front Airbag	Yes
Body Color	Catalunya Red Metallic	Driver Curtain Airbag	Yes
Odometer Reading (km/mi)	95 km / 59 mi	Driver Head/Torso Airbag	No
Engine Displacement (L)		Driver Torso Airbag	No
Type/No. Cylinders	Electric	Driver Torso/Pelvis Airbag	Yes
Engine Placement		Driver Pelvis Airbag	No
Transmission Type	Automatic	Driver Knee Airbag	Yes
Transmission Speeds	1	Rear Pass. Curtain Airbag	Yes
Overdrive	No	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	Yes	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 Restraint Feature	N/A

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

DATA FROM CERTIFICATION LABEL

Manufactured By	AUDI AG	GVMR (kg)	3165
Date of Manufacture	05/19	GAWR Front (kg)	1600
		GAWR Rear (kg)	1850

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3		5	
Capacity Weight (VCW) (kg)				480	(A)
DSC x 68.04 kg				340	(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

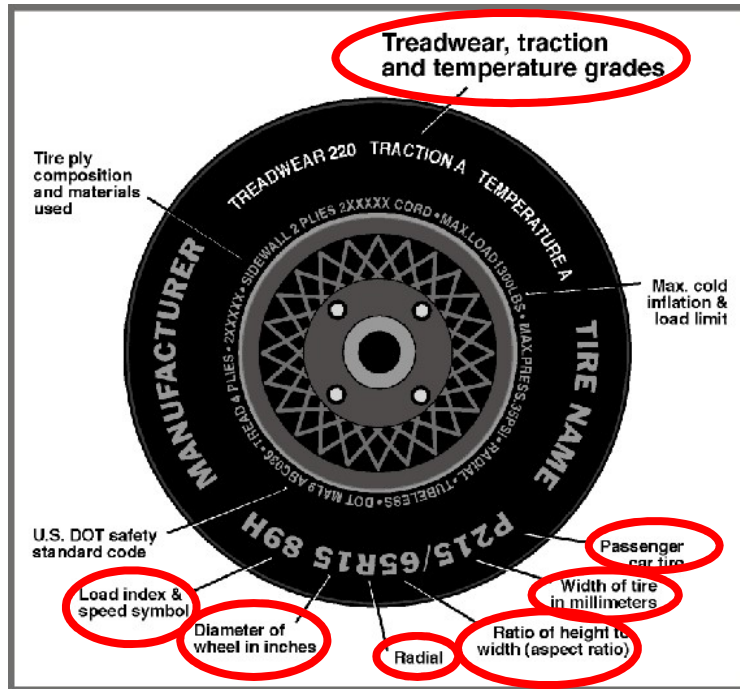
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						Manual	Power
Front Seat	X						X
Rear or Second Row				X	X		
Third Row Seat							

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

Test Vehicle: 2019 Audi e-tron quattro 5-Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20195804
 Test Date: 10/18/2019

VEHICLE TIRE INFORMATION



Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	340	340
Cold Pressure (kPa)	260	280
Recommended Tire Size	255/50 R20 109H	255/50 R20 109H
Tire Size on Vehicle	255/50 R20	255/50 R20
Tire Manufacturer	Goodyear	Goodyear
Tire Model	Eagle Sport	Eagle Sport
Treadwear	560	560
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	109H	109H
Tire Material	Rubber	Rubber
DOT Safety Code Left	K5N4 JK1R 0119	K5N4 JK1R 0219
DOT Safety Code Right	K5N4 JK1R 0119	K5N4 JK1R 0219

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

Test Vehicle: 2019 Audi e-tron quattro 5-Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20195804
 Test Date: 10/18/2019

TEST PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	215	255	255	180
Tire Placard	kPa	260	260	280	280
Owner's Manual	kPa	260	260	280	280
As Tested	kPa	260	260	280	280

TEST AXLE VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	688.5	626.0		705.0	707.0		686.5	733.0	
Right	kg	623.5	686.0		638.0	756.5		634.0	758.5	
Ratio	%	50.0%	50.0%		47.9%	52.1%		47.0%	53.0%	
Totals	kg	1312.0	1312.0	2624.0	1343.0	1463.5	2806.5	1320.5	1491.5	2812.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	2624.0	(A)
Sum of Actual Weight of 2 P572 ATDs Used	kg	52	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	136	(C)
Calculated Test Vehicle Target Weight (TVTW)	kg	2812.0	(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	1.0	1.1	1.1	Yes
Front Pass. Door Sill Angle (front-to-back)*	deg	-1.4	-1.2	-1.2	Yes
Front Bumper Angle (left-to-right)**	deg	0.4	0.5	0.6	Yes
Rear Bumper Angle (left-to-right)**	deg	0.8	0.7	0.7	Yes
Vehicle CG (Aft of Front Axle)	mm	1466	1528	1555	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	2	5	8	

* 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	122
Components Removed: none	kg	

Test height adjustable suspension setting, if applicable:	Auto
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DATA SHEET NO. 2
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEM DATA

Test Vehicle: 2019 Audi e-tron quattro 5-Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20195804
 Test Date: 10/18/2019

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	25.2	14.0	19.6
Front Passenger Seat	24.9	14.5	19.7
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	19.6	0	Max	66	66	66
			Mid	33	33	33
			Min	0	0	0
Front Passenger Seat	19.7	0	Max	66	66	66
			Mid	33	33	33
			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: 2019 Audi e-tron quattro 5-Door SUV
 Test Program: NCAP Side Pole Impact Test

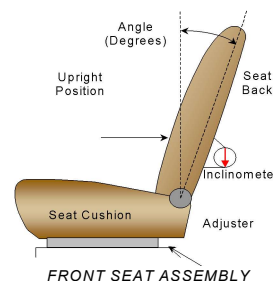
NHTSA No.: O20195804
 Test Date: 10/18/2019

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	247		0	
Front Passenger Seat	247		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. 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	67.0		12.0	
Front Passenger Seat	67.1		12.0	
Front Center Seat				
Struck Side Rear Seat	Fixed		Fixed	
Non-Struck Side Rear Seat	Fixed		Fixed	
Rear Center Seat	Fixed		Fixed	

Seat back angles measured on seat back centerline

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	1 (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	5	0 (Lowest as 0) / Forward

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

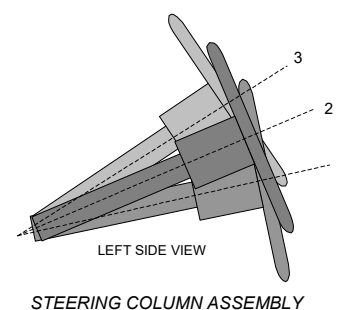
Test Vehicle: 2019 Audi e-tron quattro 5-Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20195804
 Test Date: 10/18/2019

STEERING COLUMN ADJUSTMENT

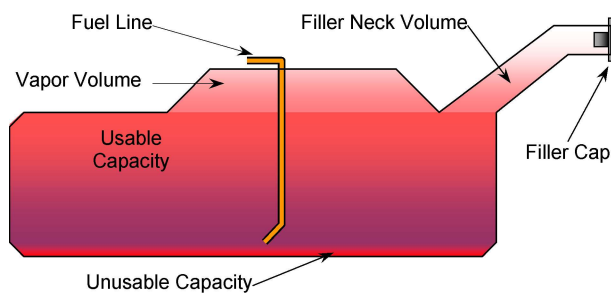
Steering wheel and column adjustments are made so that the steering wheel geometric locus is described when it moves through its full range of motion.

	Wheel Angle (°)	Fore/Aft Position (mm)
Lowermost, Position 1	67.7	
Geometric Center, Position 2	65.8	
Uppermost, Position 3	63.9	
Telescoping Steering Wheel Travel		64
Test Position	65.8	32



FUEL PUMP

The vehicle propulsion system is fully electric and does not contain a fuel pump.



FUEL TANK CAPACITY DATA

VEHICLE FUEL TANK ASSEMBLY

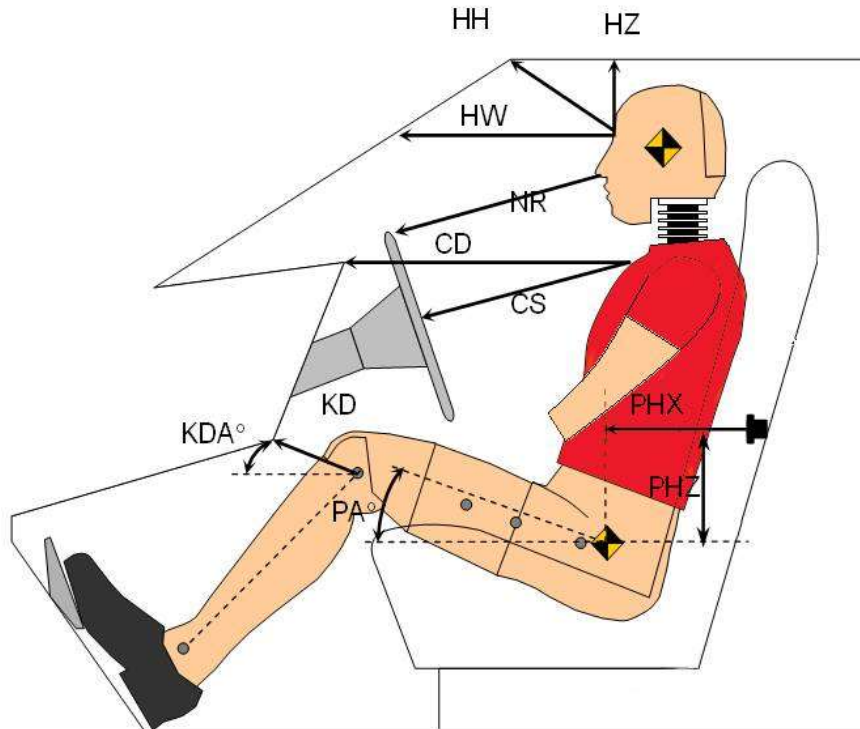
	Liters
Usable Capacity of Standard Tank (see Form No. 1)	
Usable Capacity of Optional Tank (see Form No. 1)	
Usable Capacity of Standard Tank as Specified in Owner's Manual	
Usable Capacity of Optional Tank as Specified in Owner's Manual	
93% of Usable Capacity	
Actual Amount of Solvent Used	
1/3 of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

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

**.DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS**

Test Vehicle: 2019 Audi e-tron quattro 5-Door SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20195804
Test Date: 10/18/2019



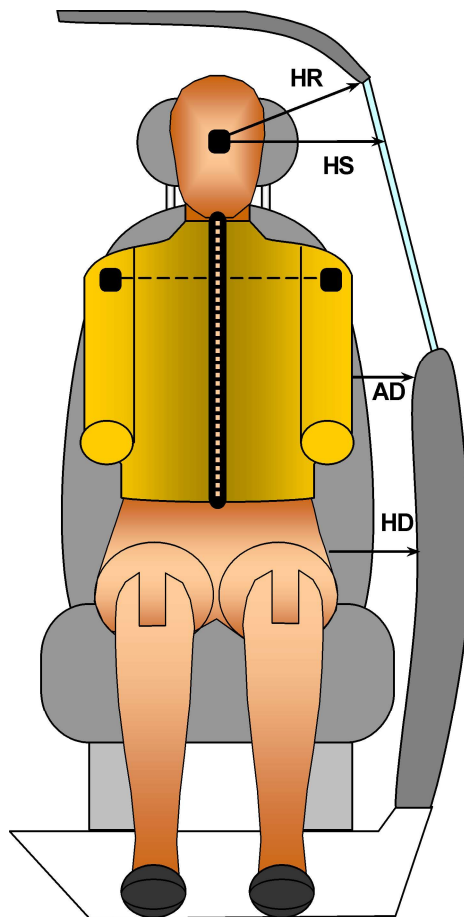
LEFT SIDE VIEW

Driver Code	Pass. Code	Measurement Description	Driver	
			Length (mm)	Angle (°)
HH		Head to Header	271	
HW		Head to Windshield	566	
HZ	HZ	Head to Roof Liner	179	
NR	NB	Nose to Rim/Seat Back	216	
CD	CB	Chest to Dashboard/Seat Back	400	
CS		Chest to Steering Wheel	170	
KDL	KBL	Left Knee to Dash/Seat Back	178	40.7
KDR	KBR	Right Knee to Dash/Seat Back	175	38.9
PAX	PAX	Pelvic Tilt Angle X		21.2
PAY	PAY	Pelvic Tilt Angle Y		0.6
PHX	PHX	Hip Point to Striker (X-Axis)	299	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	118	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2019 Audi e-tron quattro 5-Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20195804
 Test Date: 10/18/2019



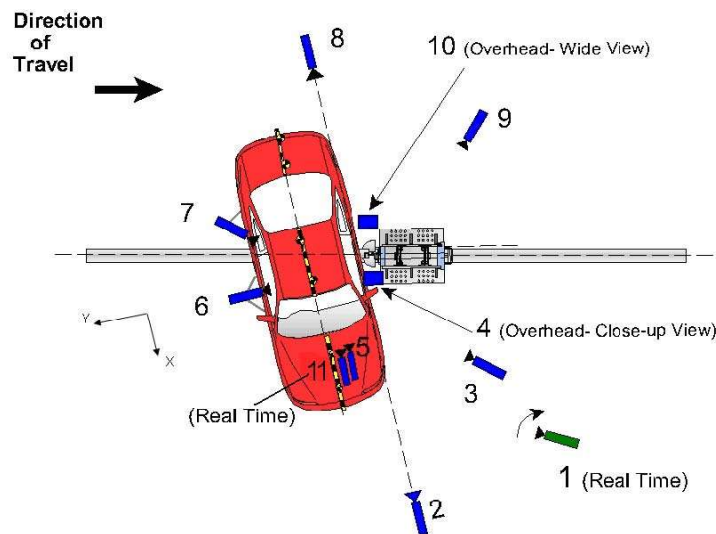
FRONT VIEW OF DUMMY

Code	Measurement Description	Driver
		Length (mm)
HR	Head to Side Header	248
HS	Head to Side Window	387
AD	Arm to Door	195
HD	Hip Point to Door	170

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2019 Audi e-tron quattro 5-Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20195804
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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	6090	70	-1990	24	1000
3	Impact Side 45° Forward	4520	-1470	-1780	16	1000
4	Overhead Closeup	0	0	-6670	85	1000
5	Onboard – Driver Front				16	1000
6	Onboard – Driver Side				8.5	1000
7	Onboard – Driver Rear				8	1000
8	Rear Ground Level	-6940	20	-1820	24	1000
9	Impact Side 45° Rearward	-2000	-4120	-1860	16	1000
10	Overhead Wide View	-30	870	-6650	11	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

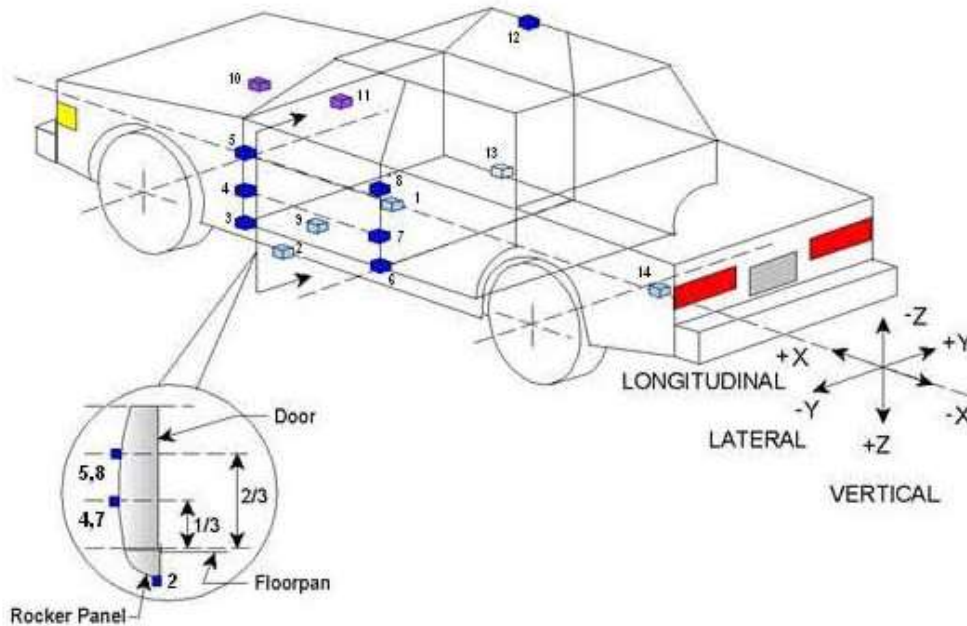
INSTRUMENTATION

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

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

Test Vehicle: 2019 Audi e-tron quattro 5-Door SUV
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TEST VEHICLE ACCELEROMETER LOCATIONS

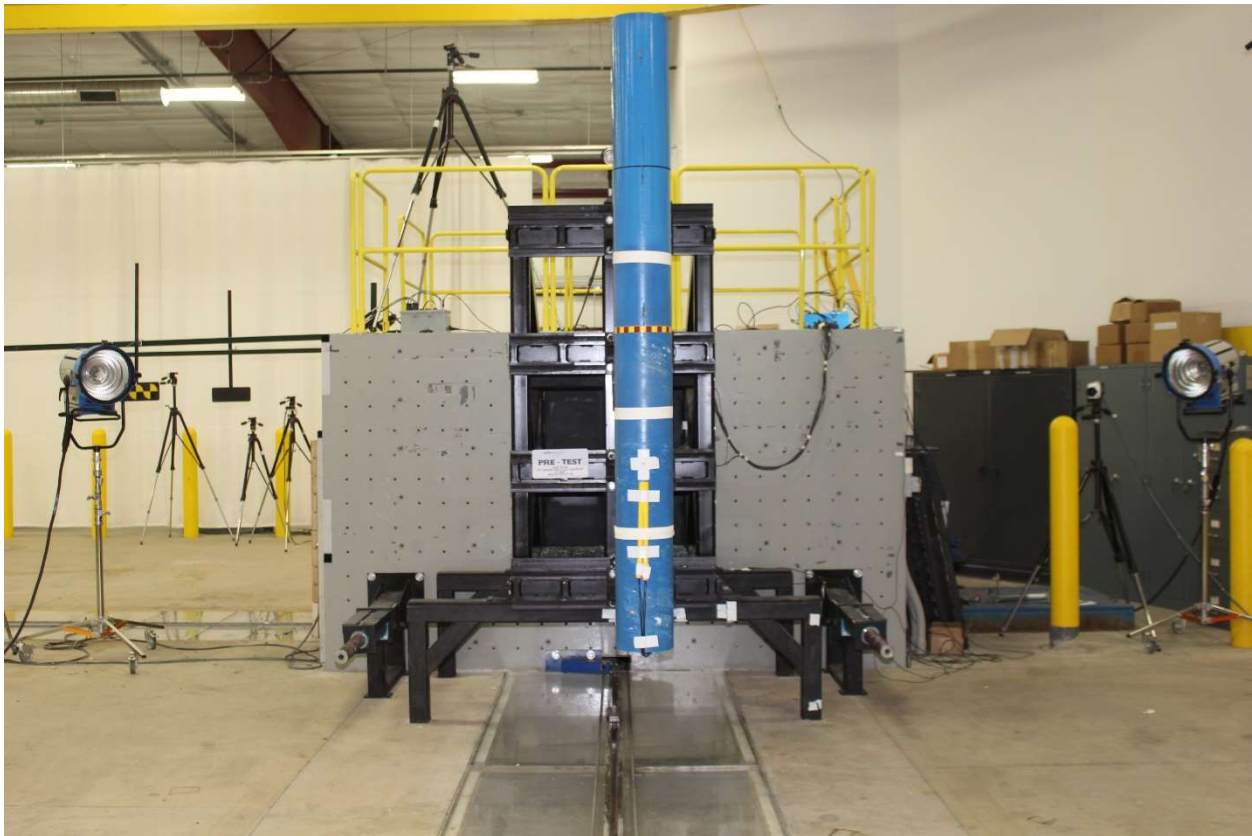
No.	ID	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2458	0	-185
2	Left Floor Sill	2808	-785	-215
3	A Pillar Sill	3476	-860	-320
4	A Pillar Low	3338	-852	-615
5	A Pillar Mid	3335	-845	-810
6	B Pillar Sill	2278	-785	-215
7	B Pillar Low	2203	-753	-640
8	B Pillar Mid	2209	-759	-850
9	Driver Seat Track	2407	-380	-377
10	Engine Top	4003	-379	-1001
11	Firewall	3673	-244	-1056
12	Right Roof	2261	544	-1586
13	Right Floor Sill	2803	860	-215
14	Rear Floorpan	1092	-2	-574

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: 2019 Audi e-tron quattro 5-Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20195804
 Test Date: 10/18/2019



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: 2019 Audi e-tron quattro 5-Door SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20195804
Test Date: 10/18/2019

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Driver Dummy (SID-IIs)
Face	Curtain Airbag
Top of Head	Curtain Airbag
Left Side of Head	Curtain Airbag
Back of Head	Curtain Airbag, Headrest
Left Shoulder	Side Torso/Pelvis Airbag
Upper Torso	Side Torso/Pelvis Airbag, Seat Back
Lower Torso	Side Torso/Pelvis Airbag, Seat Back
Left Hip	Seat Cushion, Door Panel
Left Knee	Door Panel

POST-TEST DOOR PERFORMANCE

Description	Struck Side		Non-Struck Side		Rear Hatch
	Front	Rear	Front	Rear	
Remained Closed and Operational	No	No	Yes	Yes	
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: 2019 Audi e-tron quattro 5-Door SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20195804
Test Date: 10/18/2019

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

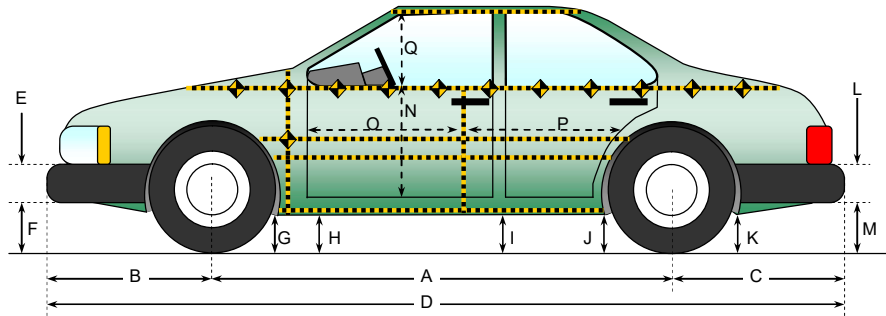
SPEED, ANGLE AT IMPACT, AND IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		1208
Actual Impact Point (Aft of Front Axle)	mm		1208
Horizontal Offset (+forward / -rearward)	mm	+/- 38 of Intended Impact Point	0
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	32.49
Trap No. 2 Velocity (Redundant)	km/h	31.4 to 33.0	32.48

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

Test Vehicle: 2019 Audi e-tron quattro 5-Door SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20195804
Test Date: 10/18/2019



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

LEFT SIDE VIEW

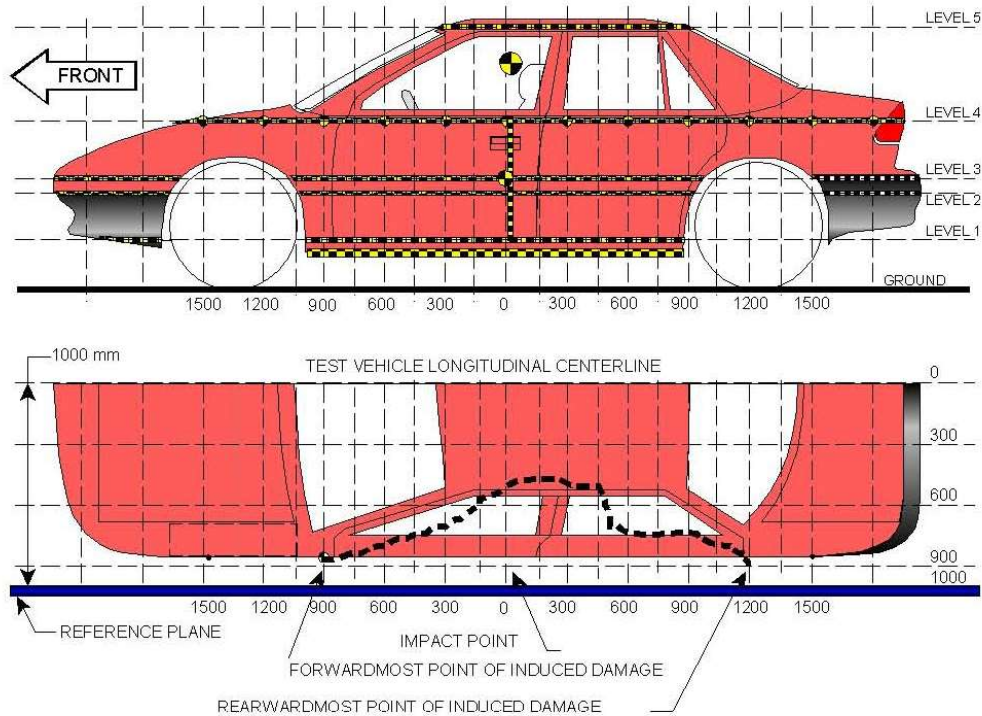
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2931	2891	40
B	Front Axle to FSOV	927	963	-36
C	Rear Axle to RSOV	1049	1040	9
D	Total Vehicle Length at Centerline	4907	4894	13
E	Front Bumper Thickness	120	120	0
F	Front Bumper Bottom to Ground	190	187	3
G	Sill Height at Front Wheel Well	222	222	0
H	Sill Height at Front Door Leading Edge	222	222	0
I	Sill Height at B-Pillar	183	176	7
J1	Sill Height at Rear Wheel Well	220	227	-7
J2	Pinch Weld Height at Rear Wheel Well	220	228	-8
K	Sill Height Aft of Rear Wheel Well	274	285	-11
L	Rear Bumper Thickness	140	140	0
M	Rear Bumper Bottom to Ground	323	330	-7
N	Sill Height to Bottom of Front Window Sill	695	717	-22
O	Front Door Leading Edge to Impact CL	666	625	41
P	Rear Door Trailing Edge to Impact CL	1368	1307	61
Q	Front Window Opening	397	356	41
R	Right Side Length	4137	4146	-9
S	Left Side Length	4137	4108	29
T	Vehicle Width at B-Pillars	1938	1923	15

DATA SHEET NO. 10 VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2019 Audi e-tron quattro 5-Door SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20195804
Test Date: 10/18/2019



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	560	186	0
2	Mid Door	650	192	0
3	Occupant H-Point	676	194	75
4	Window Sill	1061	148	75
5	Window Top	1530	7	675

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

Test Vehicle: 2019 Audi e-tron quattro 5-Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20195804
 Test Date: 10/18/2019

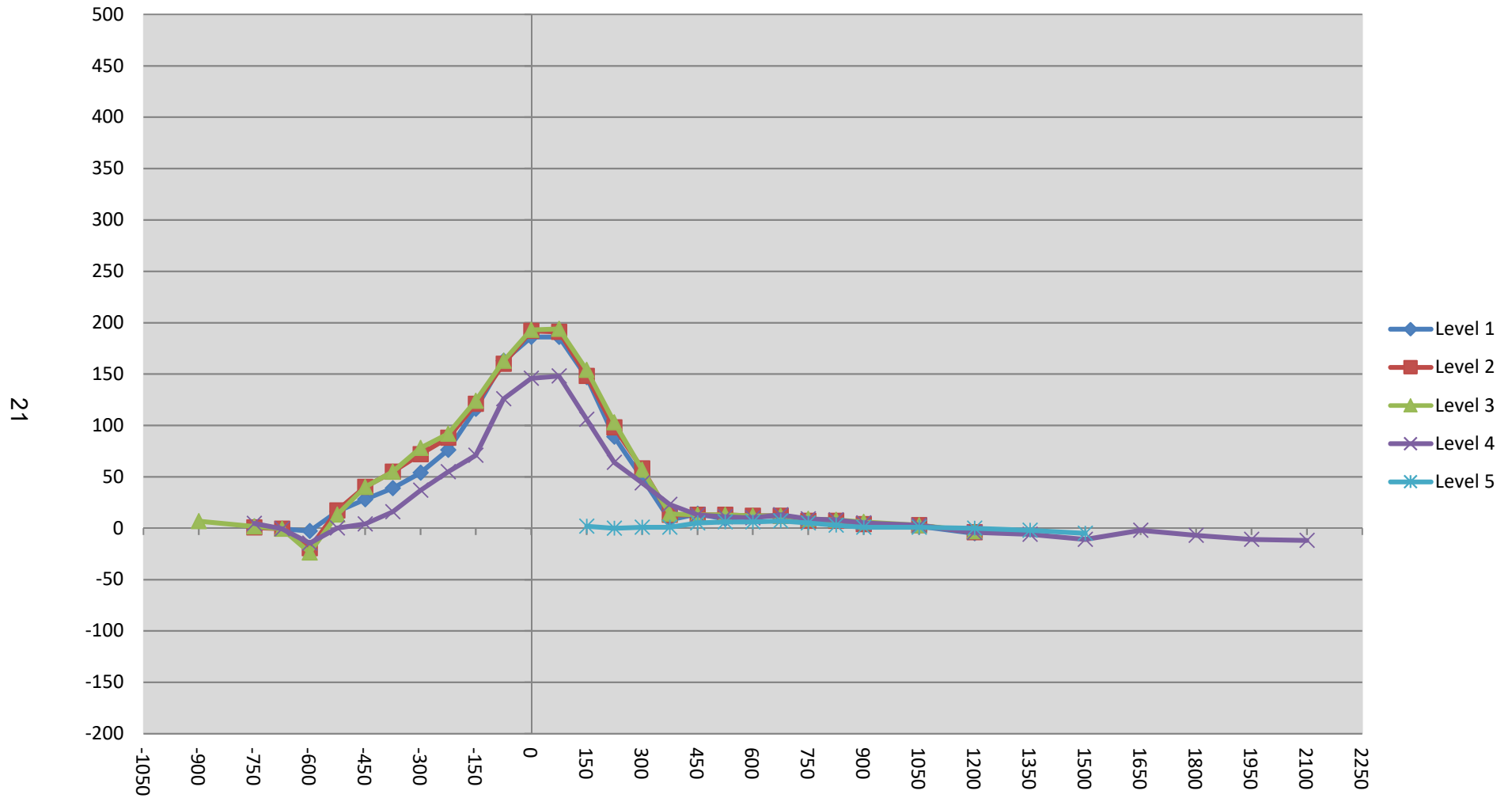
Pre-test measurements are taken when the vehicle is in the "As Tested" weight condition. Vehicle measurements forward of the vertical impact reference line are negative. The crush profile grid is established prior to the test based on an estimated impact point.

	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															
-900			137					144					7		
-825															
-750	144	141	142	268		146	142	144	273		2	1	2	5	
-675	146	145	145	264		145	144	144	263		-1	-1	-1	-1	
-600	150	147	147	263		147	127	123	248		-3	-20	-24	-15	
-525	153	150	150	256		169	167	163	256		16	17	13	0	
-450	158	153	152	255		186	193	192	259		28	40	40	4	
-375	162	156	155	251		201	211	210	267		39	55	55	16	
-300	164	159	158	247		218	231	236	284		54	72	78	37	
-225	163	160	158	243		239	248	250	298		76	88	92	55	
-150	160	160	158	237		276	281	282	308		116	121	124	71	
-75	157	159	157	233		320	319	320	359		163	160	163	126	
0	154	158	156	230		340	350	349	376		186	192	193	146	
75	150	157	156	223		336	348	350	371		186	191	194	148	
150	147	157	155	222	482	294	305	309	328	484	147	148	154	106	2
225	143	156	155	220	474	232	254	258	284	474	89	98	103	64	0
300	140	156	155	217	473	189	214	212	261	474	49	58	57	44	1
375	138	156	155	215	470	146	169	169	238	471	8	13	14	23	1
450	137	156	155	213	468	151	169	168	226	473	14	13	13	13	5
525	136	156	155	212	470	145	169	168	223	476	9	13	13	11	6
600	134	157	156	213	470	146	169	168	223	476	12	12	12	10	6
675	133	157	157	211	472	145	169	169	224	479	12	12	12	13	7
750	133	158	158	211	472	140	165	167	220	477	7	7	9	9	5
825	133	158	158	213	475	140	165	166	221	478	7	7	8	8	3
900	134	158	158	213	477	138	162	164	218	478	4	4	6	5	1
1050	136	151	151	214	482	138	154	154	217	483	2	3	3	3	1
1200	143	137	138	204	489	138	133	135	200	489	-5	-4	-3	-4	0
1350				195	508				189	506				-6	-2
1500				191	527				180	522				-11	-5
1650				191					189					-2	
1800				198					191					-7	
1950				208					197					-11	
2100				222					210					-12	
2250															
2400															
2550															
2700															

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

Test Vehicle: 2019 Audi e-tron quattro 5-Door SUV
Test Program: NCAP Side Pole Impact Test

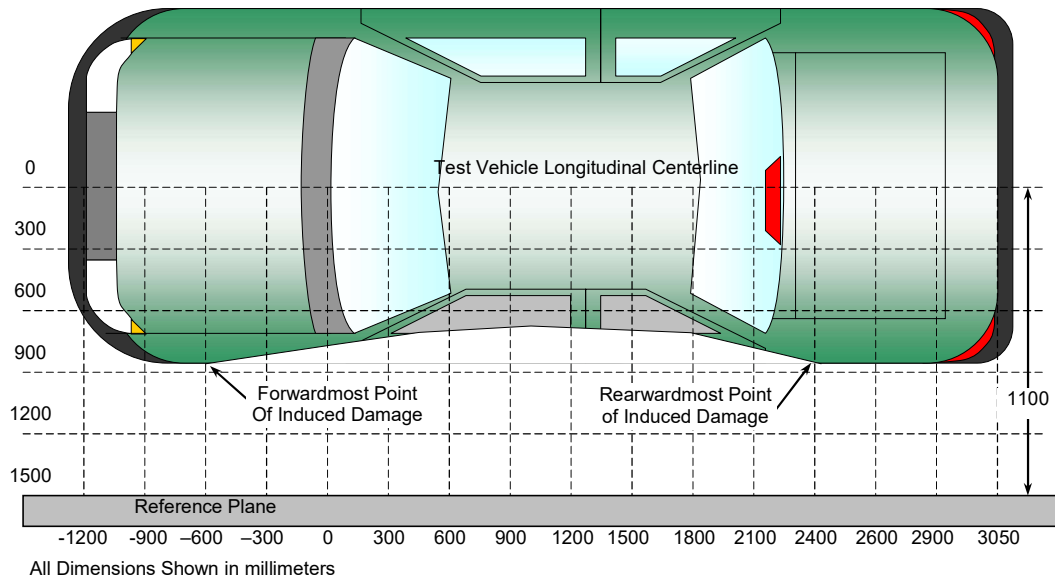
NHTSA No.: O20195804
Test Date: 10/18/2019



DATA SHEET NO. 11 **VEHICLE DAMAGE PROFILE DISTANCES**

Test Vehicle: 2019 Audi e-tron quattro 5-Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20195804
 Test Date: 10/18/2019



TOP VIEW

VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance from Impact Point (mm)	Level	Pre-Test (mm)	Post-Test (mm)	Max. Static Crush (mm)
1	425	3	155	146	-9
2	206	3	155	272	117
3	-13	3	156	348	192
4	-232	3	158	250	92
5	-451	3	152	188	36
6	-670	3	145	99	-46

DATA SHEET NO. 12
FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2019 Audi e-tron quattro 5-Door SUV
 Test Program: NCAP Side Pole Impact Test

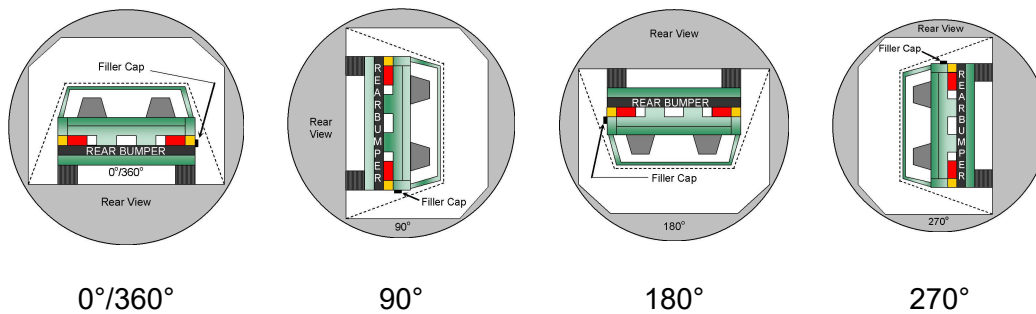
NHTSA No.: O20195804
 Test Date: 10/18/2019

Test Time: 11:03 am

Temperature: 22.0°C

- A. From impact until vehicle motion ceases: (Maximum Allowable = 1 ounce) N/A oz.
 B. For the 5 minute period after motion ceases: (Maximum Allowable = 5 ounces) N/A oz.
 C. For the following 25 minutes: (Maximum Allowable = 1 ounce / minute) N/A
 D. Spillage Details: N/A

FMVSS 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°			
90° to 180°			
180° to 270°			
270° to 360°			

FMVSS 301 ROLLOVER SPILLAGE TABLE (UNITS IN OUNCES)

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

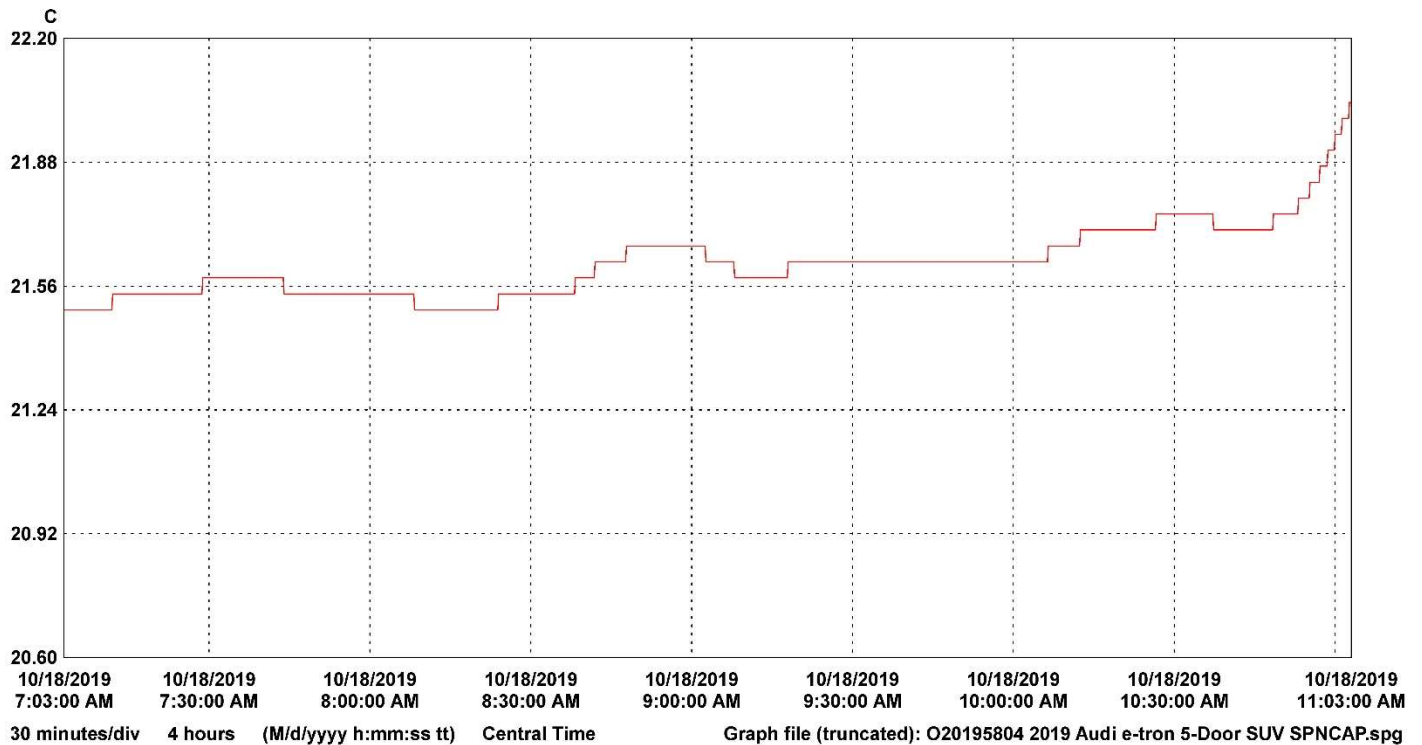
ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 13 **DUMMY/VEHICLE TEMPERATURE STABILIZATION DATA**

Test Vehicle: 2019 Audi e-tron quattro 5-Door SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20195804
 Test Date: 10/18/2019



LN	Serial #	Description	CH	Value	Maximum	Average	Minimum	Units	CH description	Logger file
1	15212045	VSC_South_Hall 1	1		22.03	21.62	21.50	C	Temperature	15212045_VSC_South_Hall.spl

**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

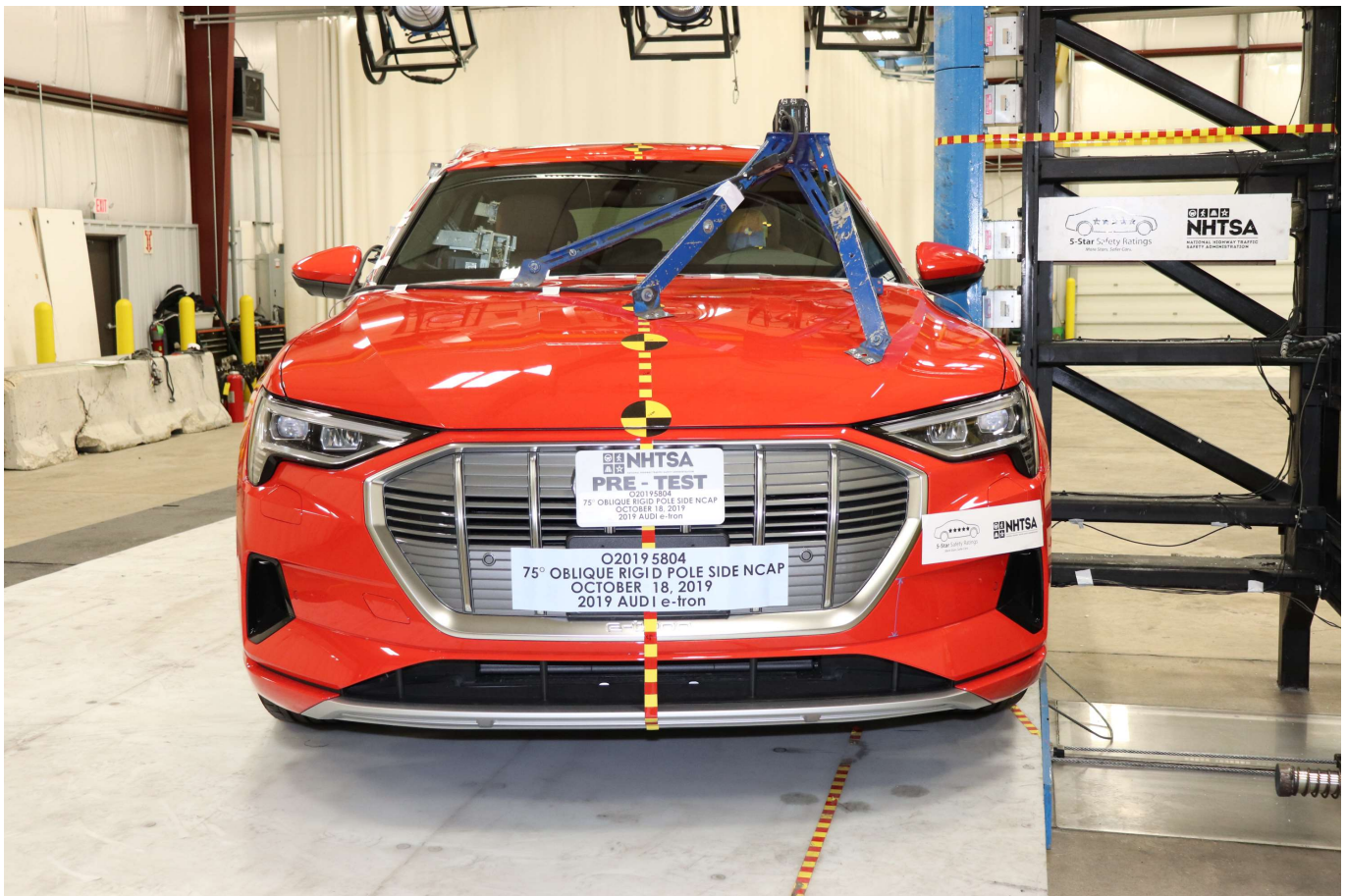


Photo No. 003 - Pre-Test Frontal View of Test Vehicle



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

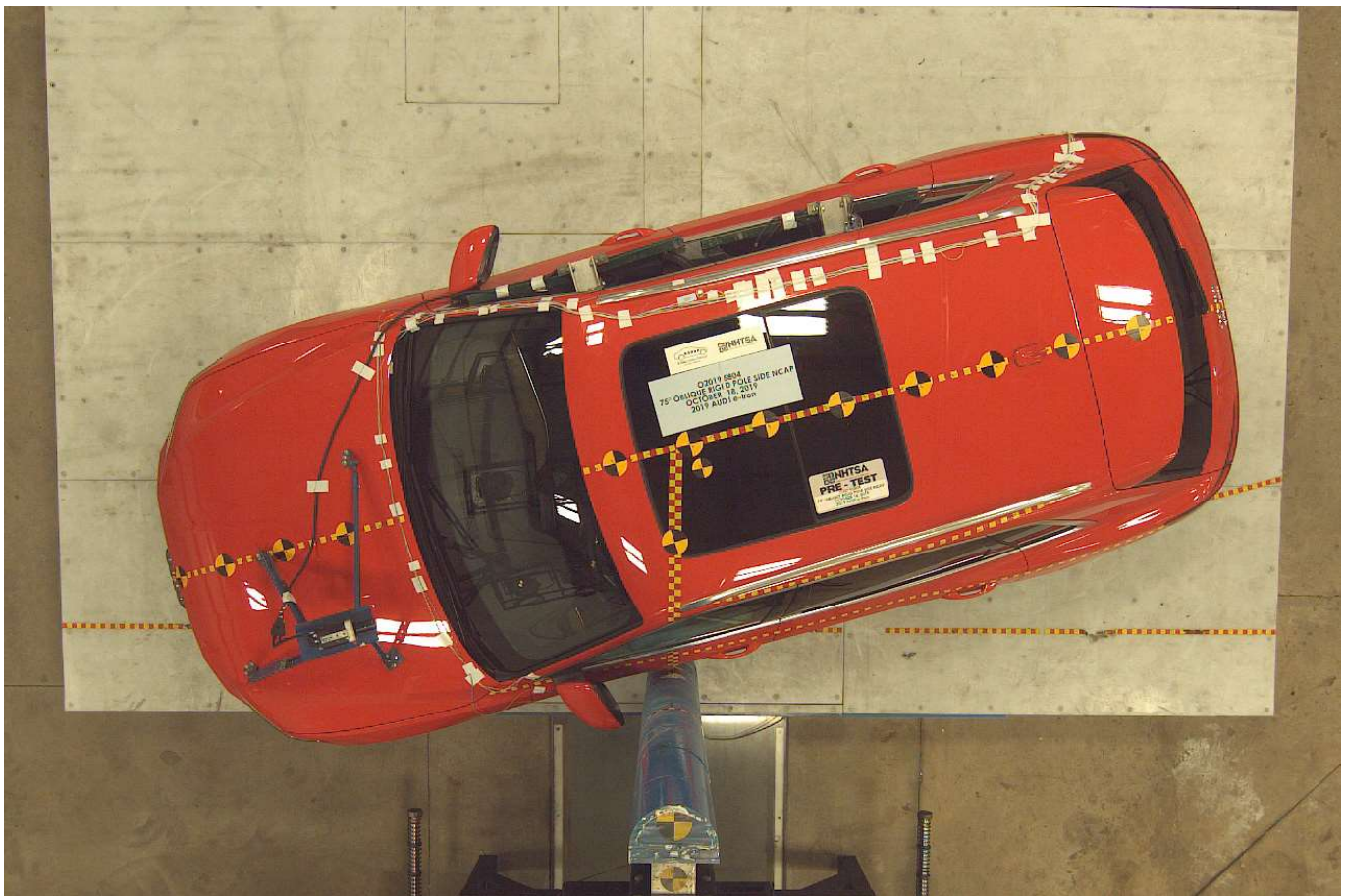


Photo No. 015 - Pre-Test Overhead View of Test Area

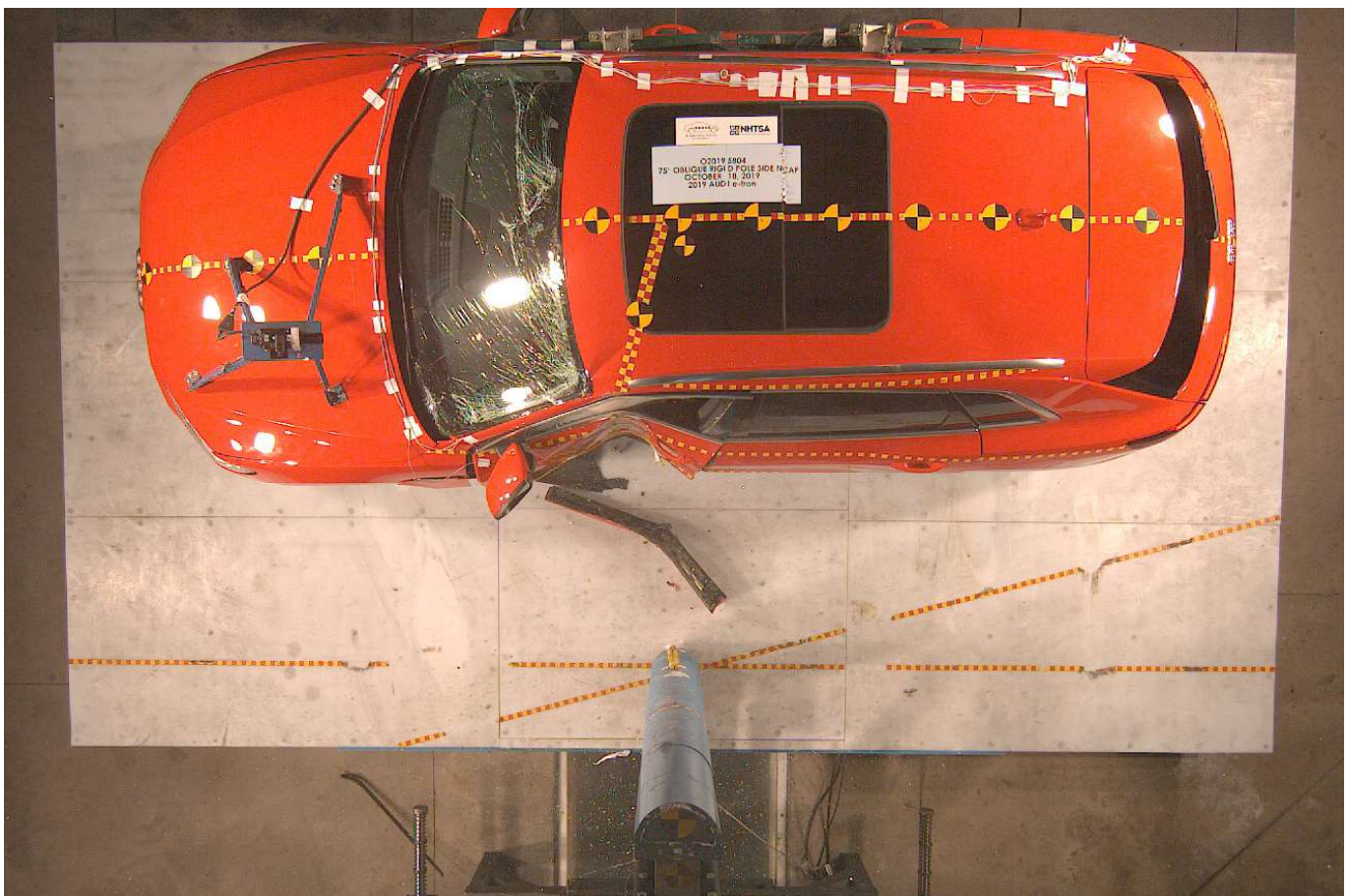


Photo No. 016 - Post-Test Overhead View of Test Area



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

PHOTOGRAPH NOT APPLICABLE

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



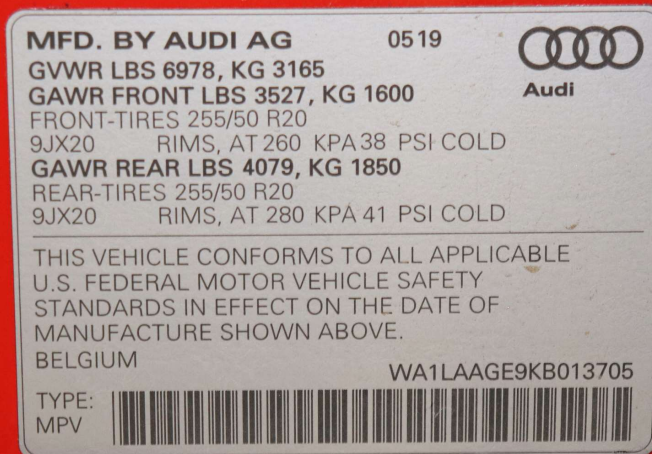
Photo No. 052 - Post-Test Dummy Close-Up Knee Contact with Vehicle Interior View



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



O20195804

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



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

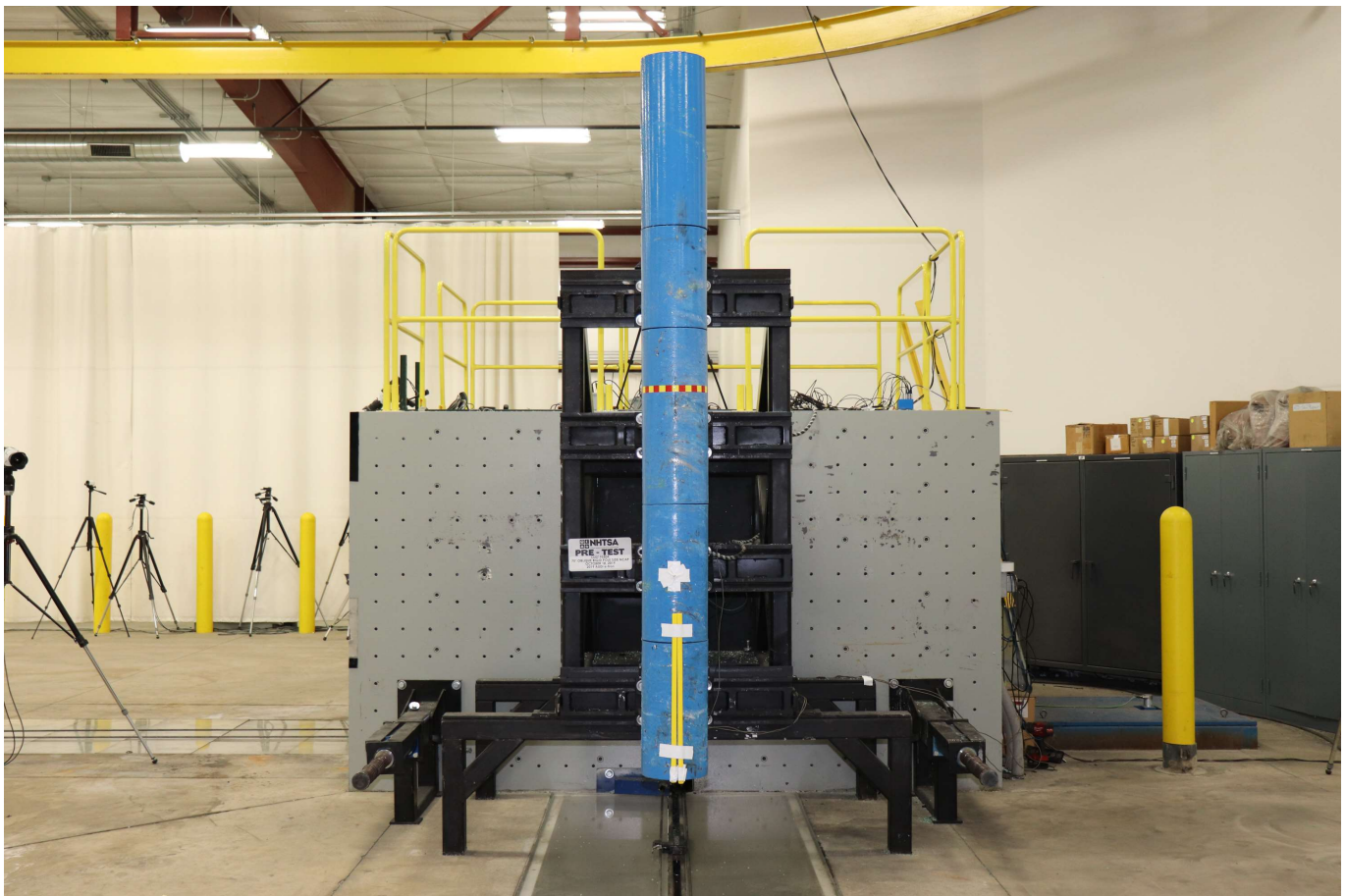


Photo No. 057 - Pre-Test Pole Barrier Front View

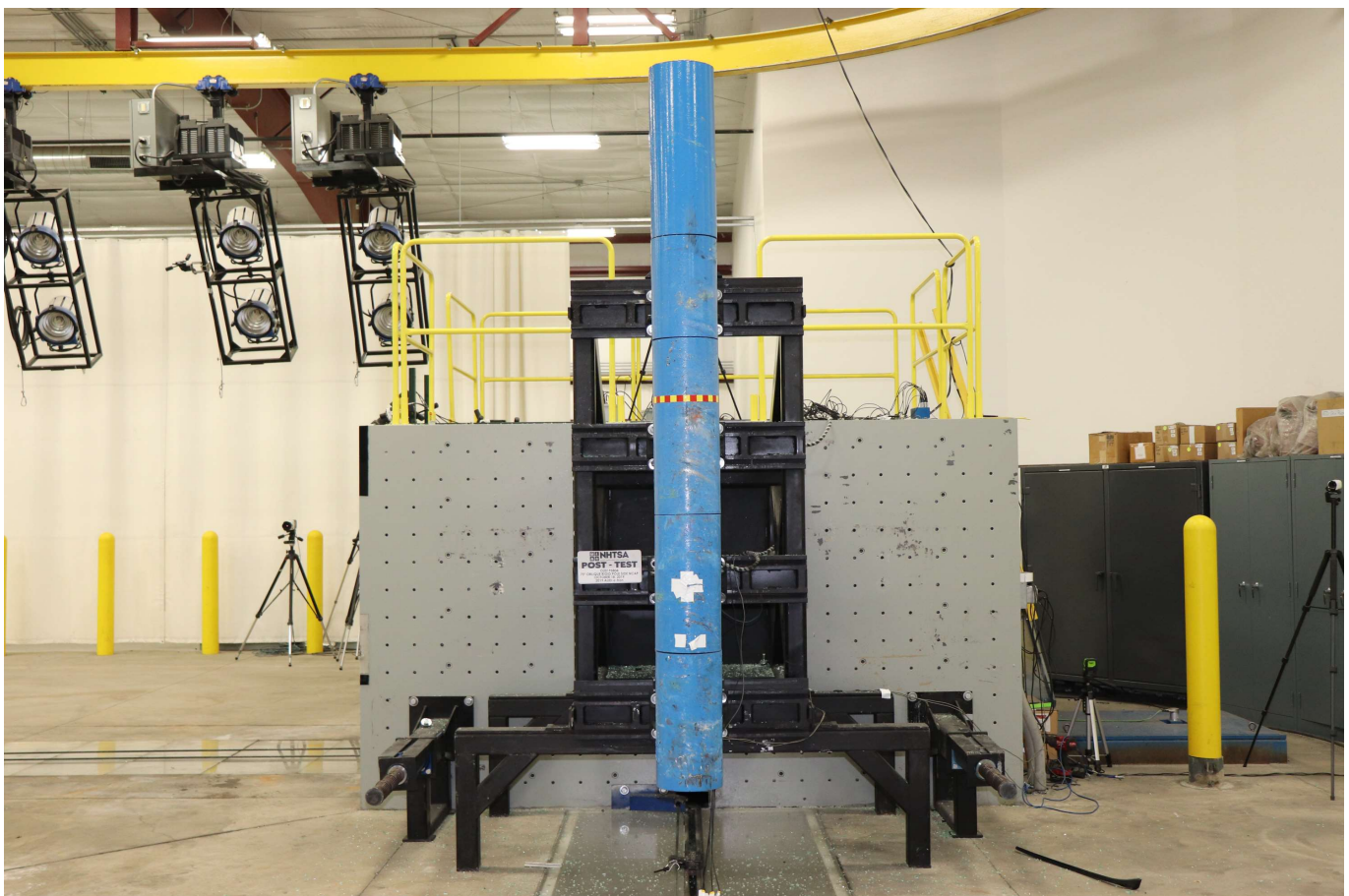


Photo No. 058 - Post-Test Pole Barrier Front View



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

PHOTOGRAPH NOT APPLICABLE

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

PHOTOGRAPH NOT APPLICABLE

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

PHOTOGRAPH NOT APPLICABLE

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

PHOTOGRAPH NOT APPLICABLE

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

PHOTOGRAPH NOT APPLICABLE

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



Photo No. 068 - Impact Event

STANDARD EQUIPMENT (unless replaced by options)

TECHNICAL

- 95 kWh battery w/ active liquid cooling
- Dual asynchronous electric motors w/ adjustable regenerative braking system
- quattro® all-wheel-drive
- 20-inch 5-Arm-design wheels w/ all-season tires
- Space-saving spare tire

COMFORT/TECHNOLOGY

- Audi advanced key and power tailgate w/ handsfree release
- Audi connect (CARF, PRIME, PLUS) w/ e-tron online services (with six-month complimentary trial)
- Audi Navigation plus w/ MMI® touch response
- Audi smartphone interface
- Audi virtual cockpit plus w/ e-tron display option
- Adaptive air suspension
- Auto-dimming interior mirror w/ compass, and Integrated Toll Module (ITM)
- Bang & Olufsen® sound system w/ 3D sound
- FM / HD FM / SIRIUS Satellite Radio (with three-month complimentary subscription)
- Four-zone automatic climate control w/ heat pump and comfort pre-conditioning
- Garage door opener (HomeLink®)
- Heated, auto-dimming, and power-folding exterior mirrors, with memory
- Leather seating surfaces w/ extended interior elements in mono.pur
- Matrix-design LED headlights w/ animation
- Natural Burl Walnut Wood inlays
- Panoramic sunroof (two-piece w/ electric sunshade)
- Power adjustable tilting & telescoping steering column
- Twelve-way power front seats, heated and ventilated, with driver memory
- Leather seating surfaces w/ extended interior elements in mono.pur
- Trailer hitch preparation (includes brake controller wiring)
- 4-spoke multifunction steering wheel, w/ regenerative braking paddles

SAFETY/CONVENIENCE

- Advanced Airbag Protection System with 8 airbags
- Anti-lock Braking System (ABS) w/ Brake Assist
- Audi pre sense basic (preventative occupant protection)
- Audi pre sense front
- Audi pre sense rear
- Child safety locks in rear doors, power
- Electronic Stabilization Control (ESC) w/ Offroad mode
- Electronic vehicle immobilization w/ anti-theft alarm & interior motion sensor
- LED headlights with LED Daytime Running Lights (DRLs)
- Power adjustable tilting & telescoping steering column
- Lower Anchors and Tethers for Children (LATCH)
- Rearview camera
- Tire Pressure Monitoring System (TPMS)

WARRANTY/MAINTENANCE

- 4 Year/50,000 mile (whichever occurs first) New Vehicle Limited Warranty*
- 8 Year/100,000 mile (whichever occurs first) High-Voltage Battery Coverage*
- 12 Year Limited Warranty Against Corrosion Perforation
- 1 Year/10,000 mile (whichever occurs first) First Scheduled Maintenance Service FREE OF CHARGE
- 4 Year Roadside Assistance coverage provided by a third party supplier

*Please refer to the 2019 Audi Warranty and Maintenance Booklet for complete coverage information.

MANUFACTURER'S SUGGESTED RETAIL PRICE

2019 Audi e-tron quattro \$74,800.00

PACKAGES / OPTIONS

Catalunya Red metallic \$595.00
Okapi Brown interior Included

Destination Charge \$995.00

Total Price: \$76,390.00

Fuel, license, title fees, taxes and dealer-installed accessories are not included.

MODEL: GENBAE

VIN: WA1LAAGE9KB013705

DEALER: 422A29
AUDI PACIFIC
20460 HAWTHORNE BLVD
TORRANCE, CA 90503
Port of Entry: SAN DIEGO

SHIP TO: 422A29
AUDI PACIFIC
20460 HAWTHORNE BLVD
TORRANCE, CA 90503
COMM NUM: VXS958
Transportation Method: TRUCK

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.

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 Not Rated

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

EPA DOT

Fuel Economy and Environment

Electric Vehicle

Fuel Economy

74 MPGe

combined city/hwy

74 city

73 highway

46

kW-hrs per 100 miles

204 miles

Charge Time: 10 hours (240V)

Standard Sport Utility Vehicles range from 13 to 93 MPG. The best vehicle rates 136 MPGe.

You save

\$2,500

in fuel costs

over 5 years

compared to the

average new vehicle.

Annual fuel cost

\$900

Fuel Economy & Greenhouse Gas Rating (tailpipe only)

1 10 10 Best

This vehicle emits 0 grams of CO₂ per mile. The best emits 0 grams per mile (tailpipe only). Does not include emissions from generating electricity; learn more at fueleconomy.gov.

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 \$7,000 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$0.13 per kW-hr. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fueleconomy.gov

Calculate personalized estimates and compare vehicles

Smog Rating (tailpipe only)

1 10 10 Best

This vehicle emits 0 grams of CO₂ per mile. The best emits 0 grams per mile (tailpipe only). Does not include emissions from generating electricity; learn more at fueleconomy.gov.

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 \$7,000 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$0.13 per kW-hr. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fueleconomy.gov

Calculate personalized estimates and compare vehicles

PARTS CONTENT INFORMATION

For Vehicles In This Carline

U.S./Canadian Parts Content: 0%

Major Sources Of Foreign

Parts Content: POLAND: 32%

GERMANY: 27%

For This Vehicle:

Final Assembly Point: BRUSSELS, BELGIUM

Country Of Origin:

ENGINE (MOTOR): HUNGARY

TRANSMISSION: HUNGARY

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

Photo No. 069 - Monroney Label

Sitting correctly and safely

- You are always holding the steering wheel with both hands on the outer edge at the sides (9:00 and 3:00 position) when driving

WARNING

- If you are too close to the steering wheel, the driver's airbag cannot provide optimal protection, which increases the risk of injury or death.

- Never hold the steering wheel in the 12:00 position or in any other way, such as holding the center of the steering wheel. Otherwise, your arms, hands, and head could be injured in the event that the driver's airbag deploys.

Power steering wheel position adjustment

Applies to: vehicles with power steering wheel adjustment

The steering wheel position can be adjusted electrically up/down and forward/back.



Fig. 53 Steering column: switch for adjusting the steering wheel position

- To move the steering wheel upward or downward, press the switch upward or downward.
- To move the steering wheel forward or backward, press the switch forward or backward.

The steering wheel can also be adjusted when the ignition is switched off.

In vehicles with memory function*, the steering column settings are stored together with the seat position.

Tips

The entry assistance makes entering and exiting the vehicle easier, because the steering column moves upward into the park position when the ignition is switched off. After enter-

ing the vehicle, the steering column returns to the stored position once the ignition is switched on. To use entry assistance, select on the home screen: **VEHICLE > Seats > Additional seat settings > Driver seat entry assistance.**

Head restraints

General information



Fig. 54 Correctly adjusted head restraints

Make sure that:

- The upper edge of the head restraint is as even as possible with the top of your head
- The head restraint is as close as possible to the back of your head
- The head restraints on the occupied rear seats are positioned all the way up

WARNING

- There is one head restraint for each seat. All vehicle occupants must adjust the head restraint correctly before every trip. Having head restraints that are not adjusted correctly or not installed in the vehicle increases the risk of a neck injury during sudden or unexpected driving or braking maneuvers or in a collision.
- Only remove the rear seat head restraints if it is necessary to install a child safety seat → page 69. Stow the removed head restraints securely, for example in the luggage compartment. Reinstall the head restraints immediately once the child safety seat has been removed. Driving without head restraints increases the risk of serious neck injuries.

Sitting correctly and safely

Front head restraints

Applies to: vehicles with adjustable head restraints

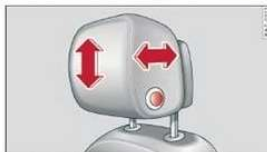


Fig. 55 Front seat: adjusting the head restraint (example)

Adjusting the head restraints

- To adjust the head restraint upward or forward*, slide it until it locks into place.
- To adjust the head restraint downward or backward*, press the side button and slide the head restraint in the desired direction until it locks into place.

Rear head restraints

Applies to: vehicles with adjustable head restraints



Fig. 56 Rear seat: adjusting or removing the head restraint (example)

Adjusting the head restraints

- Upward: slide the head restraint upward until it latches into place.
- Downward: press the button on the head restraint base (1) → Fig. 56 and slide the head restraint downward. Release the button and slide the head restraint farther until it locks into place.

Removing the head restraints

Applies to: vehicles with removable head restraints

- Move the head restraint upward all the way.

- Press the release point on the head restraint base (2) → Fig. 56 using the mechanical key → page 33. Key set and press the button (3). Pull the head restraint out of the backrest at the same time → Fig. 56 in General information on page 59.

Installing the head restraints

Applies to: vehicles with removable head restraints

- Slide the posts on the head restraint down into the guides until the posts click into place.
- Press the button (3) and slide the head restraint all the way down. It should not be possible to remove the head restraint from the backrest without pressing the button.

Safety belts

General information

Each seat is equipped with a three-point safety belt. Safety belts that are worn correctly are the most effective way to reduce the risk of serious or fatal injuries in a collision. Therefore, wear your safety belt correctly and make sure that all vehicle occupants also wear their safety belts correctly when the vehicle is moving.

Even though your vehicle is equipped with an airbag system, all vehicle occupants must still always wear their safety belts. In addition to their normal protective function, safety belts also hold vehicle occupants in the correct seating position in the event of a collision so that the airbags can deploy correctly and provide additional protection. Safety belts provide protection during collisions when the airbags do not deploy or if they have already deployed.

WARNING

The risk of serious or fatal injury increases if the safety belt is not fastened, if it is worn incorrectly, or if it is damaged.

- All vehicle occupants, including the driver, must fasten their safety belts correctly before every trip and must always keep their safety belts fastened during the trip, regardless of whether the seat is equipped with an airbag or not. This also applies to children



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)

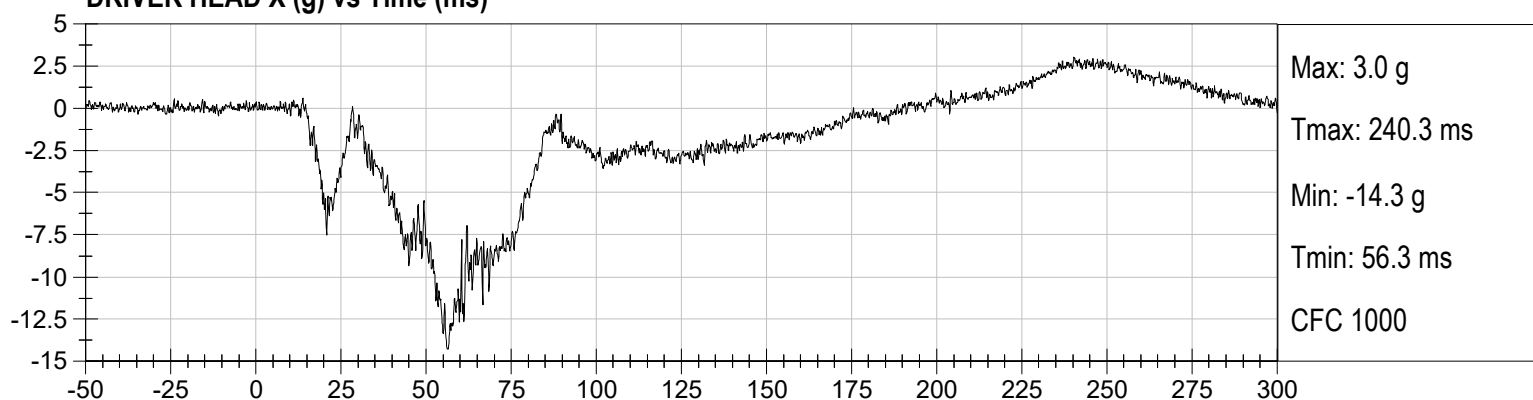
Load Cell Pole Barrier #5 Force (Y)

Load Cell Pole Barrier #6 Force (Y)

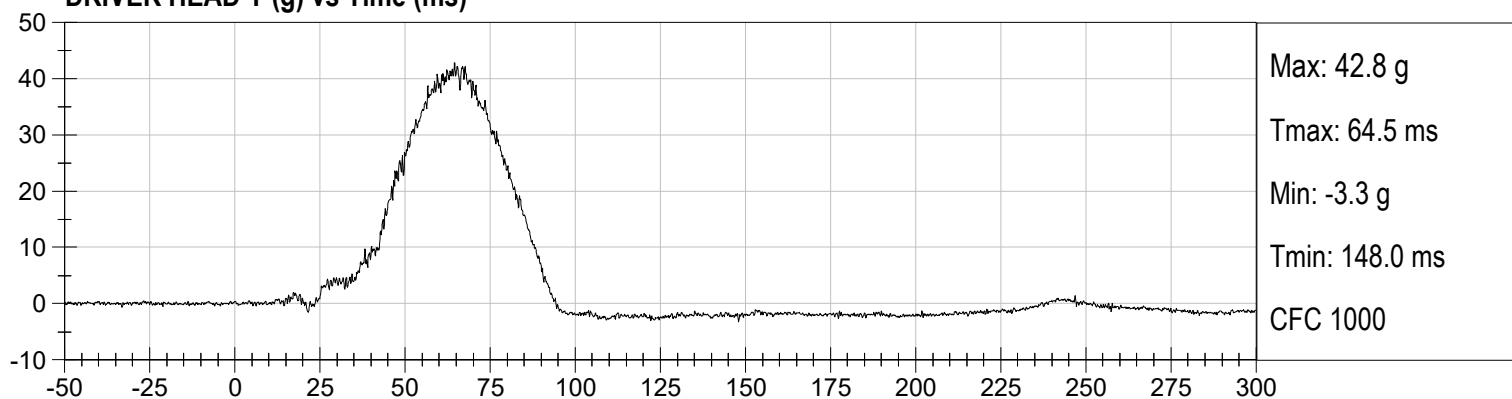
Load Cell Pole Barrier #7 Force (Y)

Load Cell Pole Barrier #8 Force (Y)

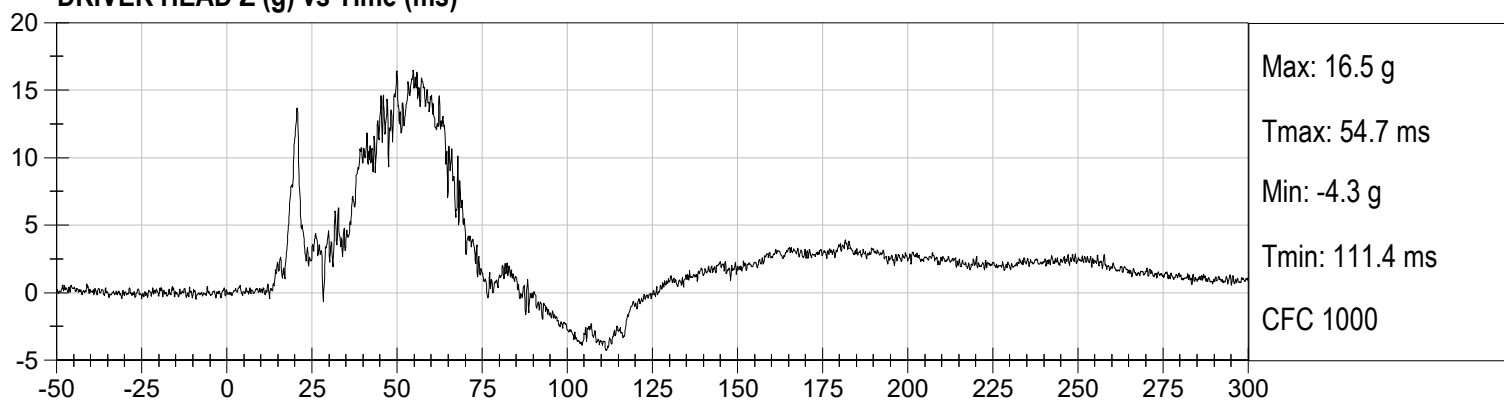
DRIVER HEAD X (g) vs Time (ms)



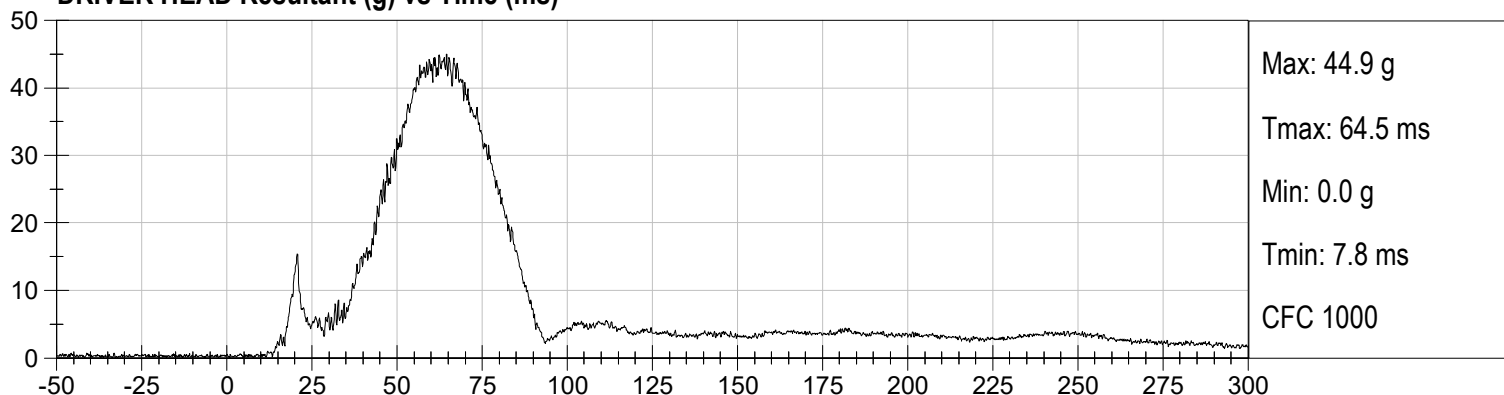
DRIVER HEAD Y (g) vs Time (ms)



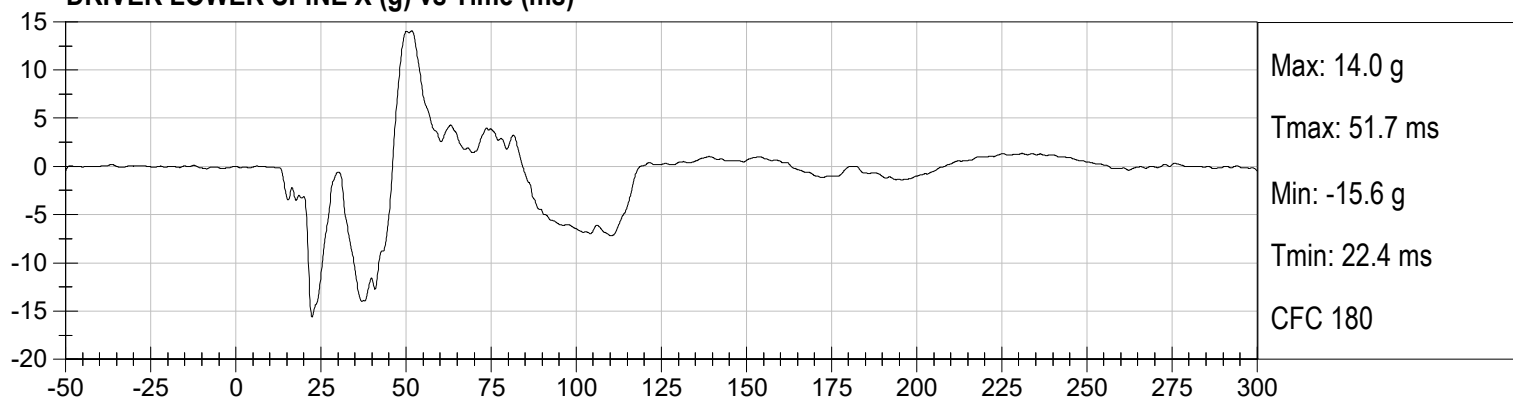
DRIVER HEAD Z (g) vs Time (ms)



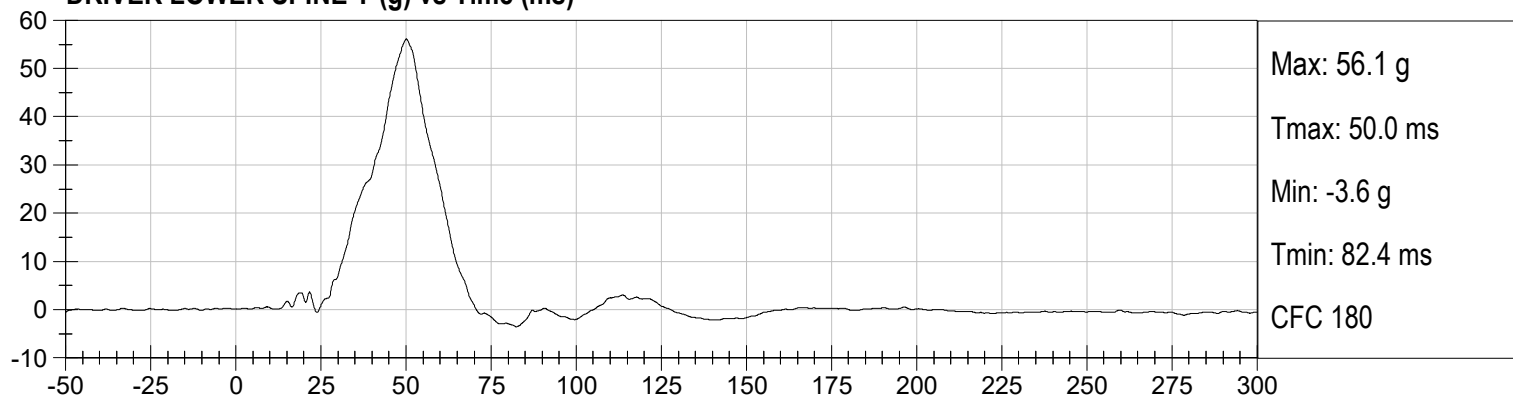
DRIVER HEAD Resultant (g) vs Time (ms)



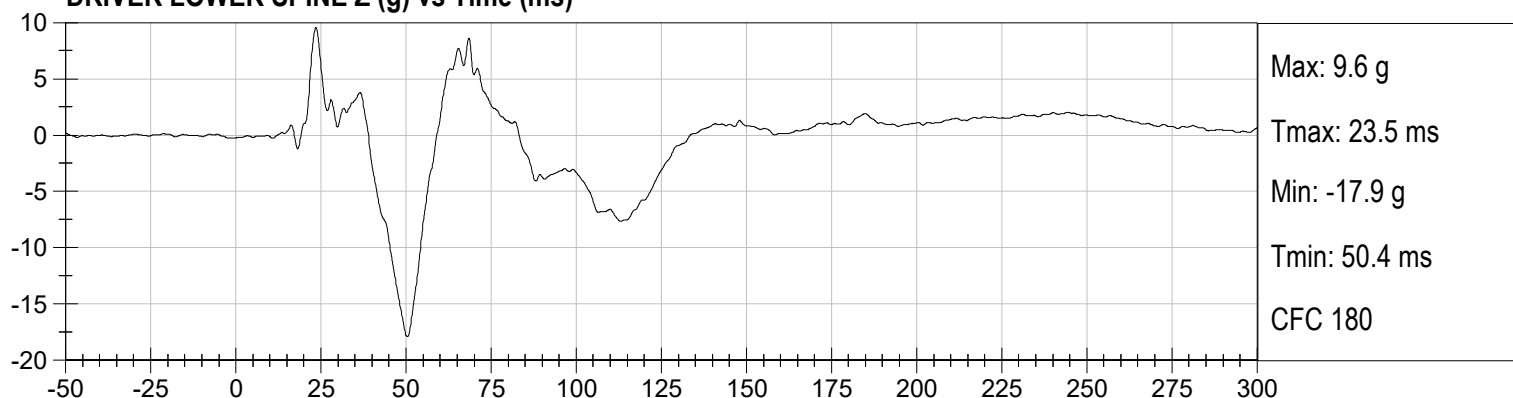
DRIVER LOWER SPINE X (g) vs Time (ms)



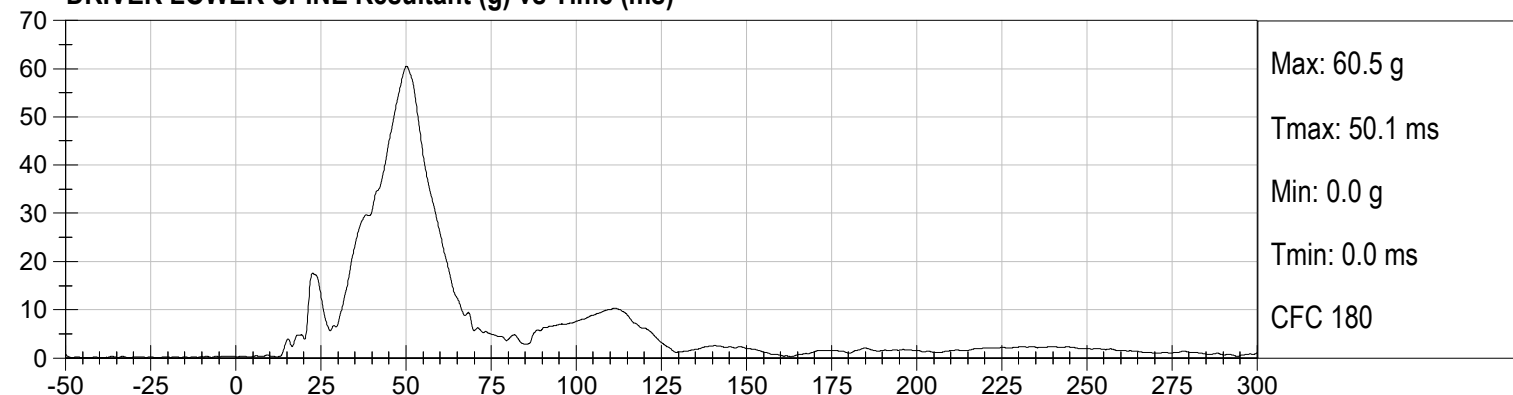
DRIVER LOWER SPINE Y (g) vs Time (ms)



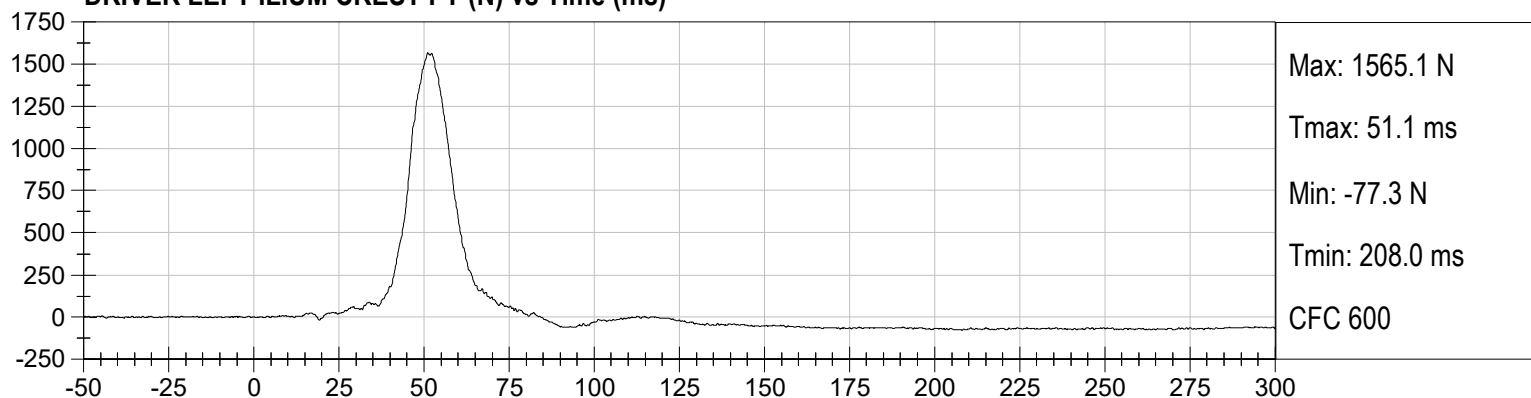
DRIVER LOWER SPINE Z (g) vs Time (ms)



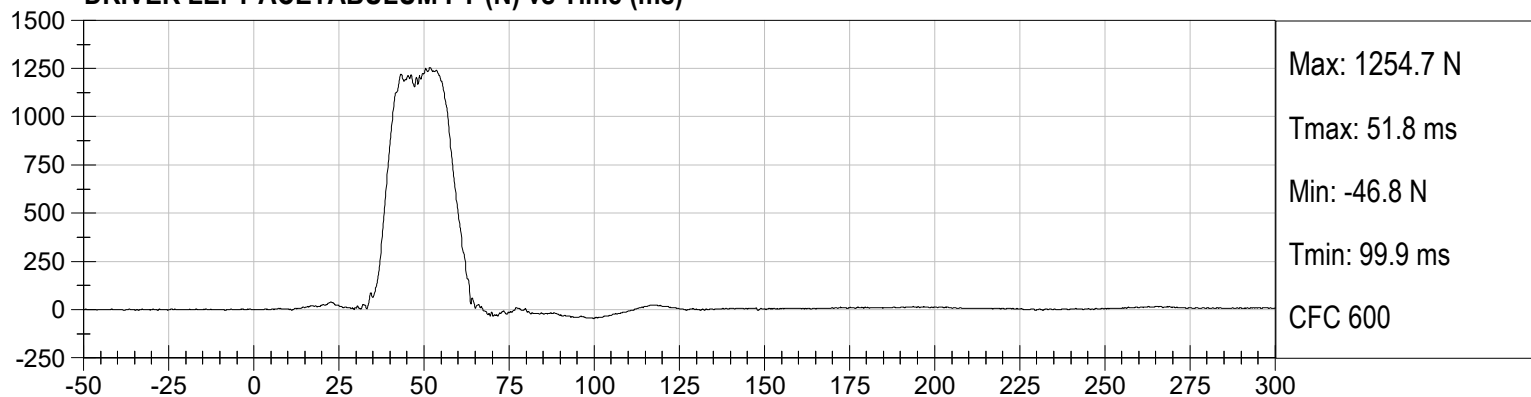
DRIVER LOWER SPINE Resultant (g) vs Time (ms)



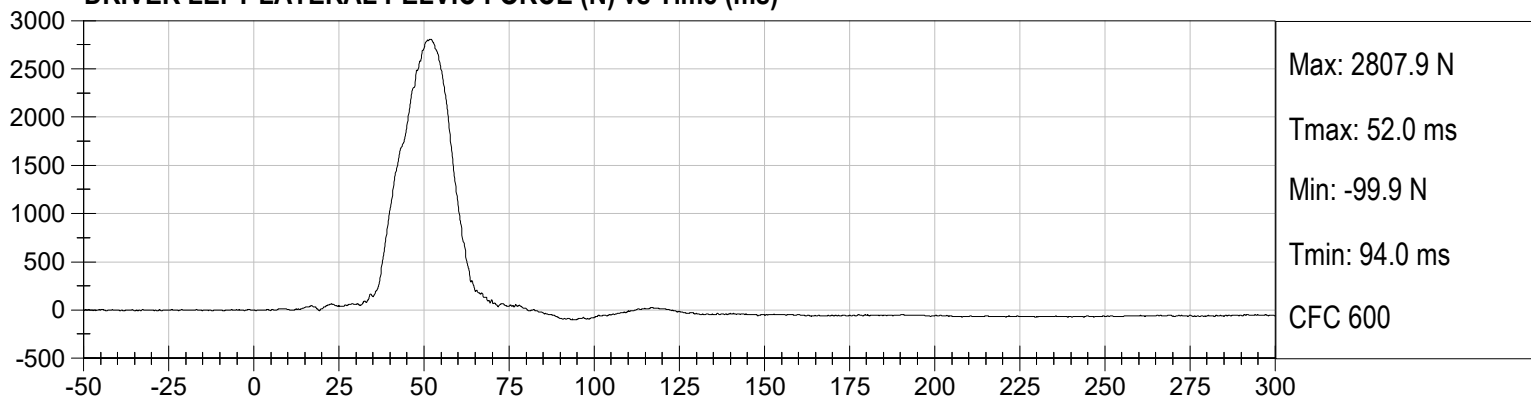
DRIVER LEFT ILIUM CREST FY (N) vs Time (ms)



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: 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: D193031

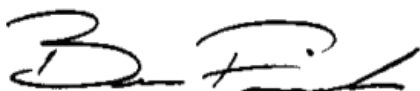
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	44	Pass
Peak Resultant Acceleration	G's	115 to 137	119	Pass
Peak Longitudinal Acceleration	G's	+/- 15	-3.7	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	<15%	Yes	Pass
			Overall Test Results	Pass



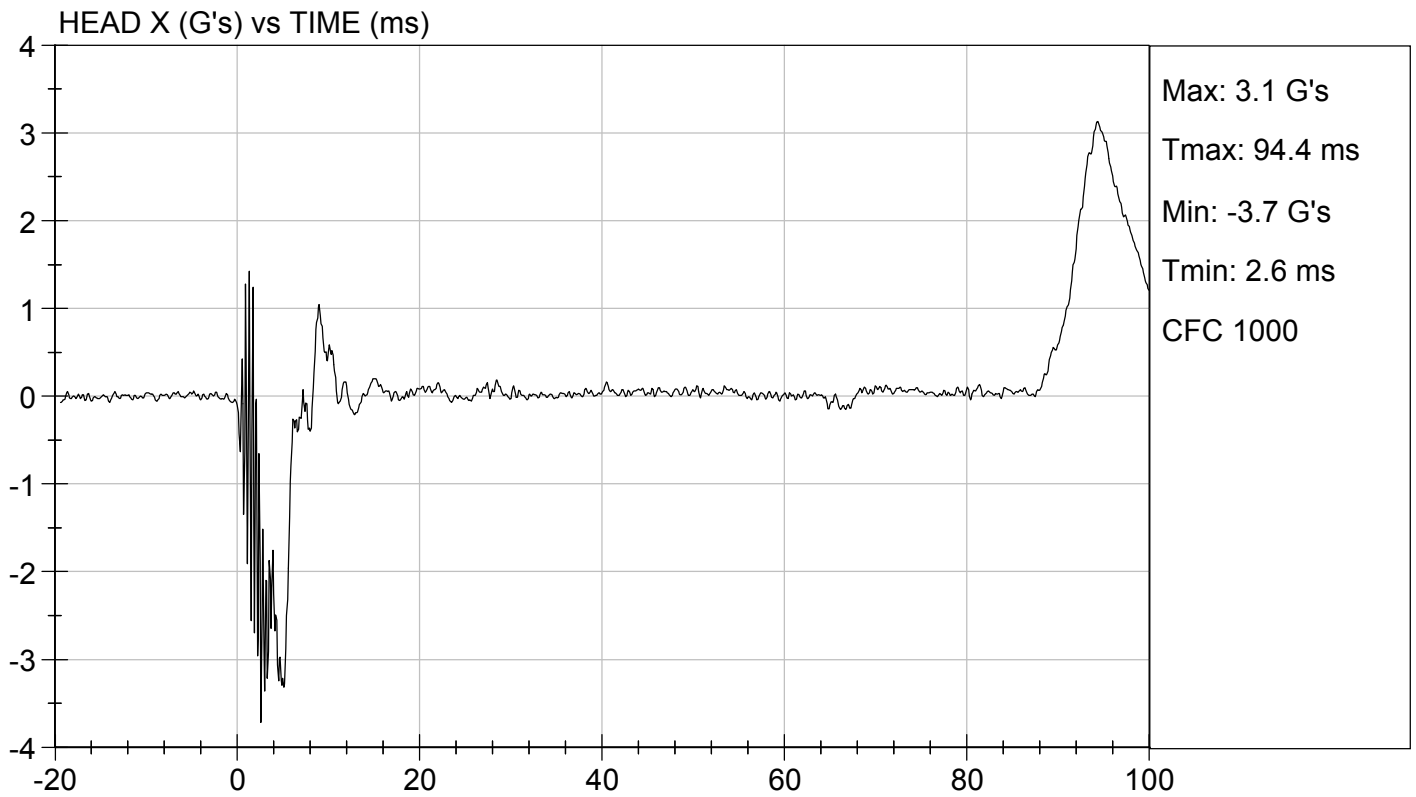
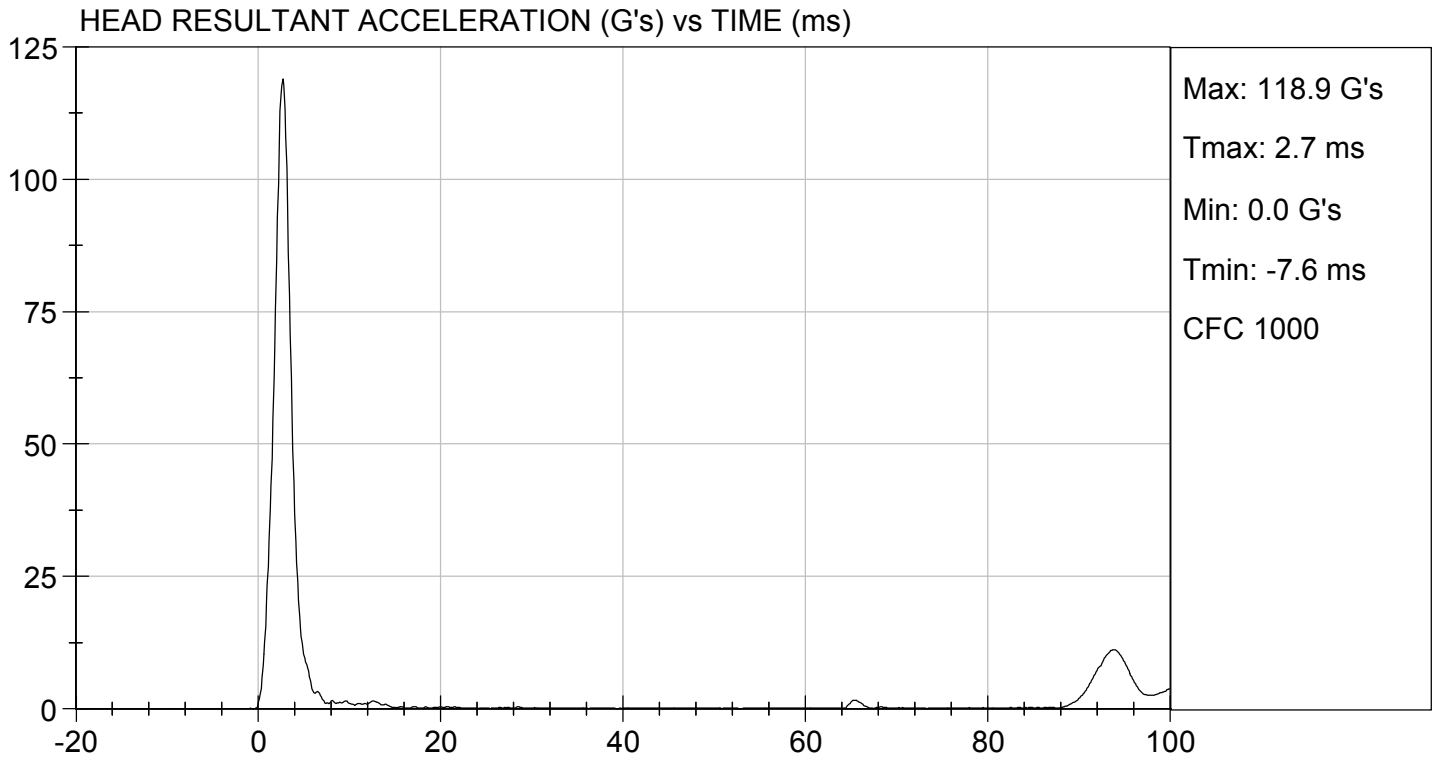
Laboratory Technician

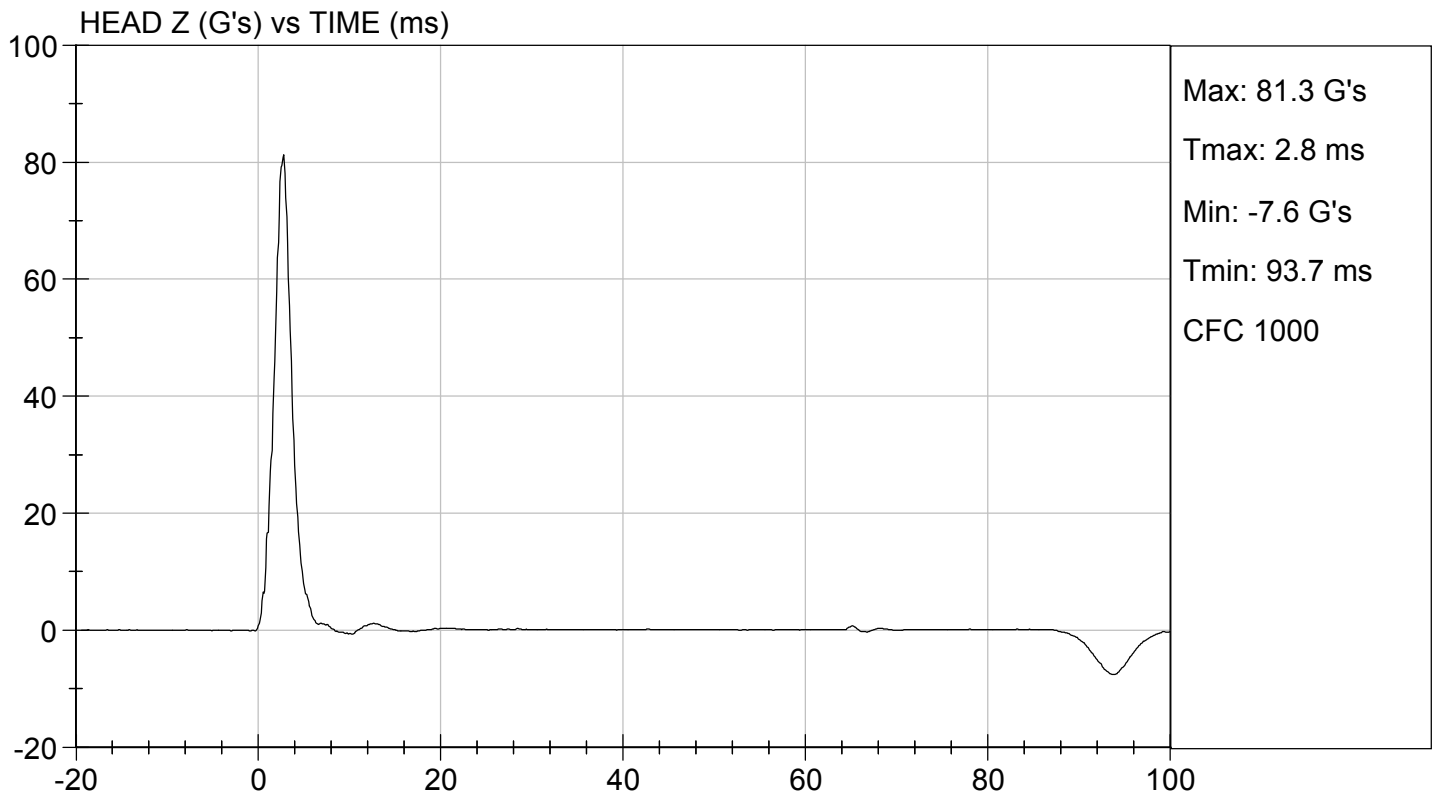
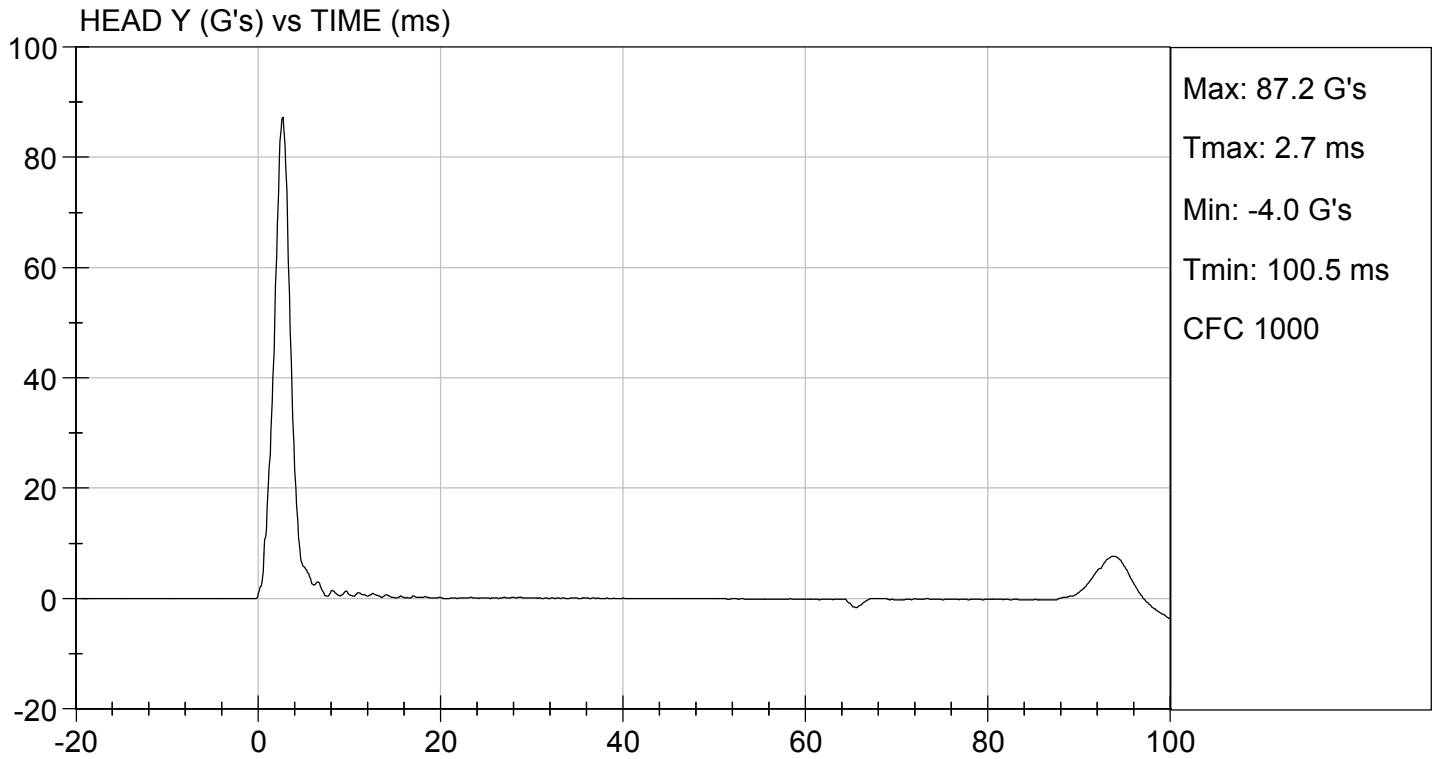
09/25/2019

Test Date



Approved By





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

ATD Serial No: 296

Test I.D: D193032

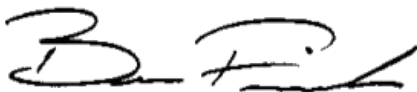
Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.6	Pass
Humidity		%	10 to 70	38	Pass
Impact Velocity		m/s	5.51 to 5.63	5.58	Pass
Pendulum Velocity	10 ms	m/s	2.20 to 2.80	2.63	Pass
	15 ms	m/s	3.30 to 4.10	3.74	Pass
	20 ms	m/s	4.40 to 5.40	5.02	Pass
	25 ms	m/s	5.40 to 6.10	5.63	Pass
	25-100 ms	m/s	5.50 to 6.20	5.63	Pass
Maximum D-Plane Rotation		deg	71 to 81	73	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	62	Pass
Maximum Occipital Condyle Moment		Nm	-44 to -36	-36	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	118	Pass
Overall Test Results					Pass



Laboratory Technician

09/26/2019

Test Date

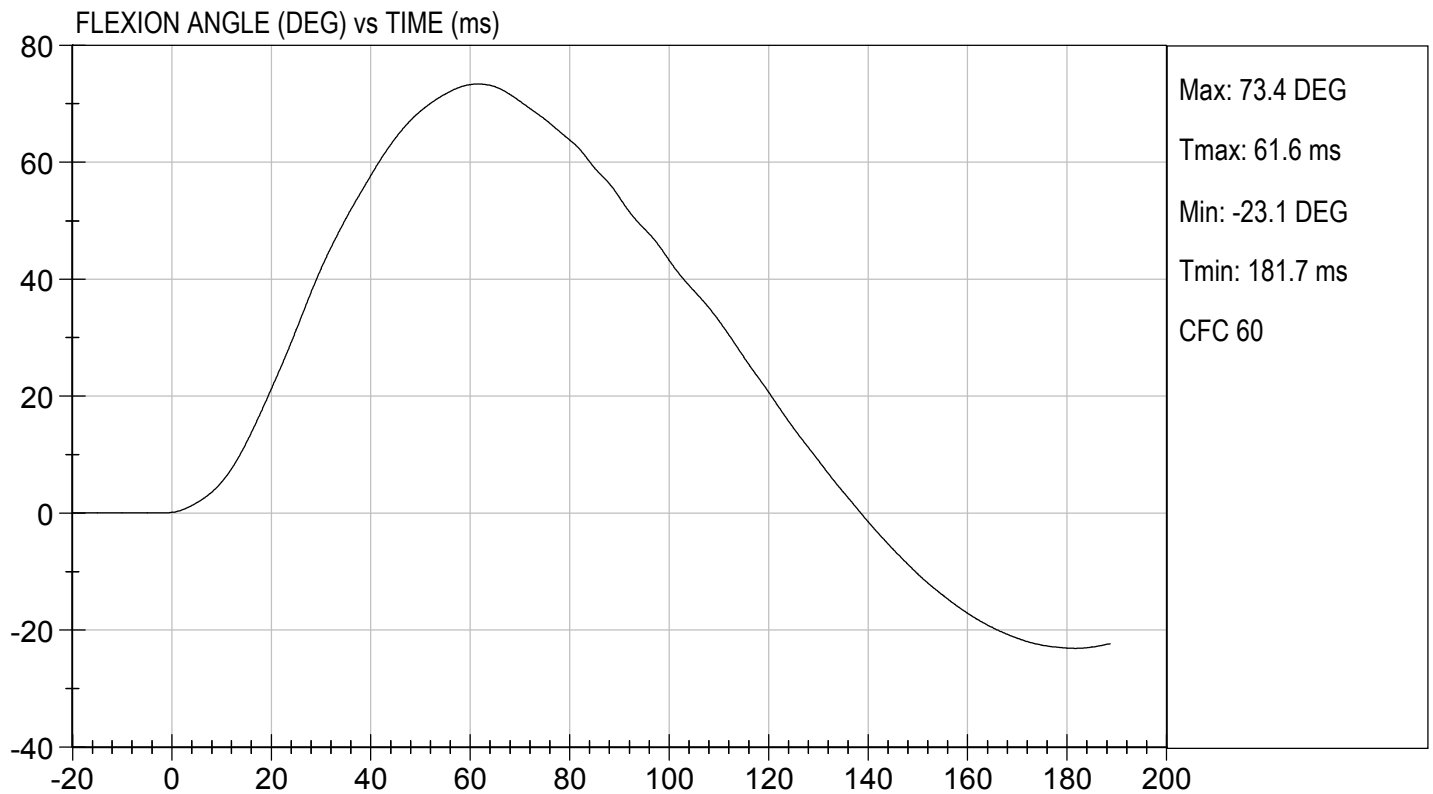
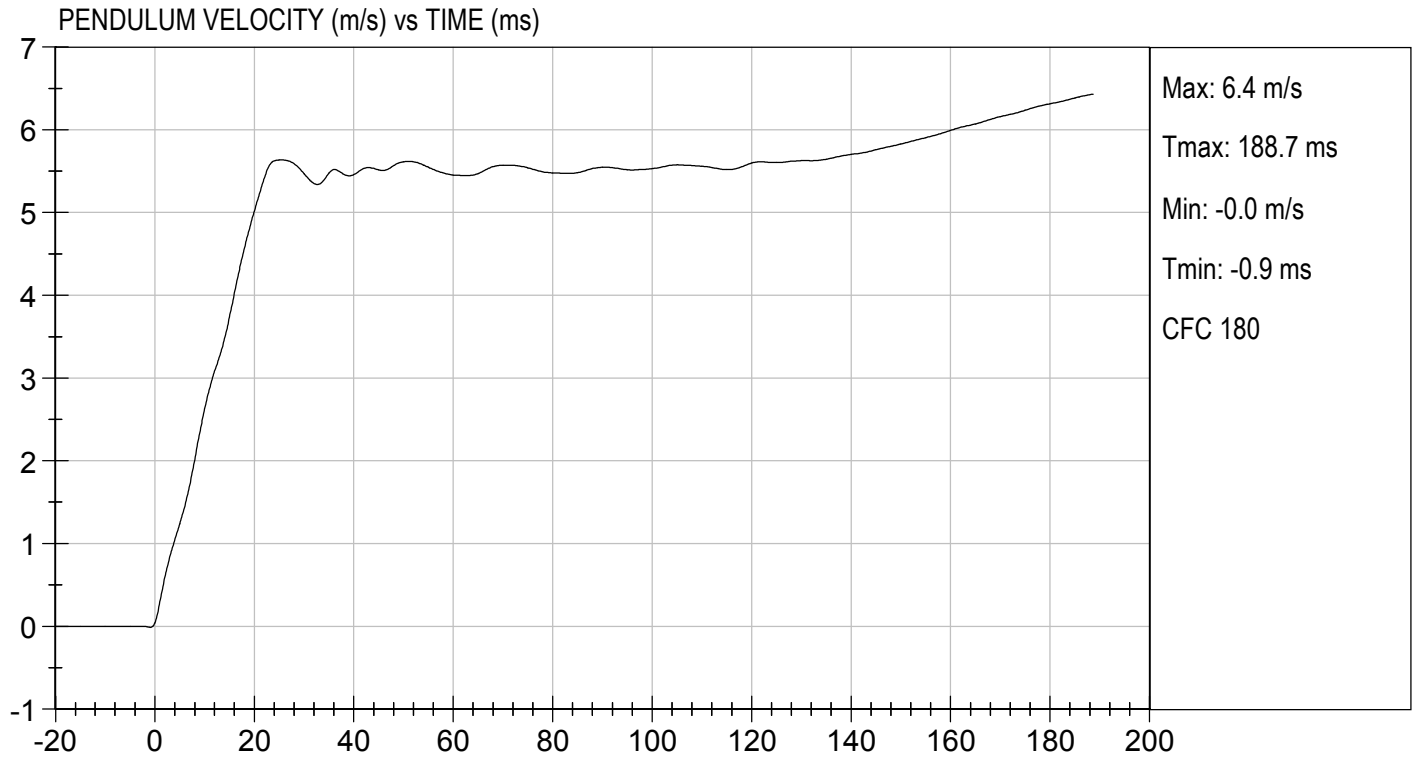


Approved By



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

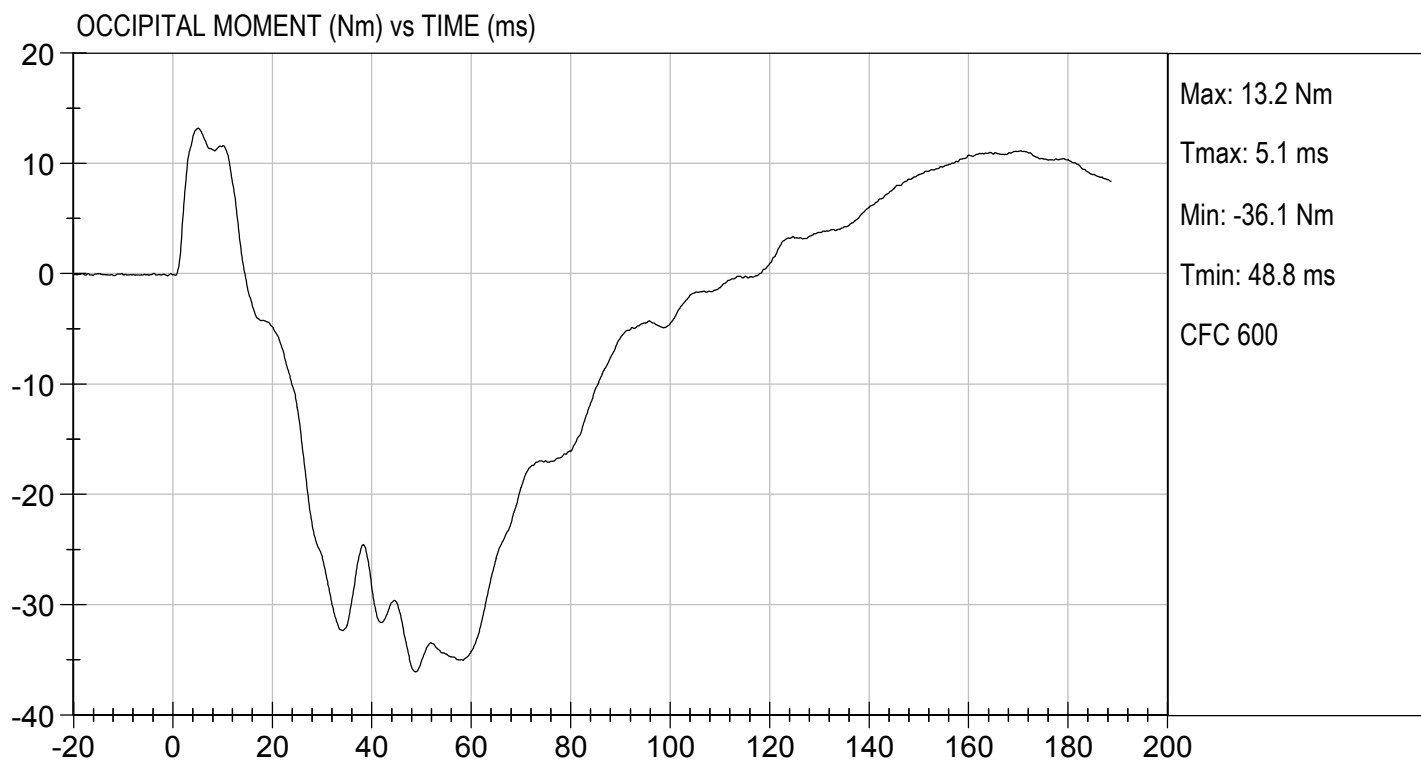
TEST DATE: 09/26/2019
TEST #: D193032





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

TEST DATE: 09/26/2019
TEST #: D193032

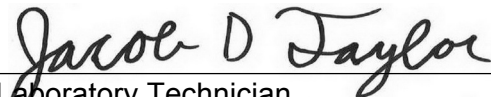


MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

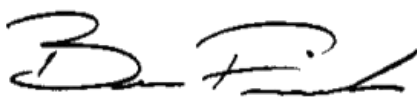
Test ID: D193033

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	38	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Maximum Probe Acceleration	G's	13 to 18	14	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

09/26/2019

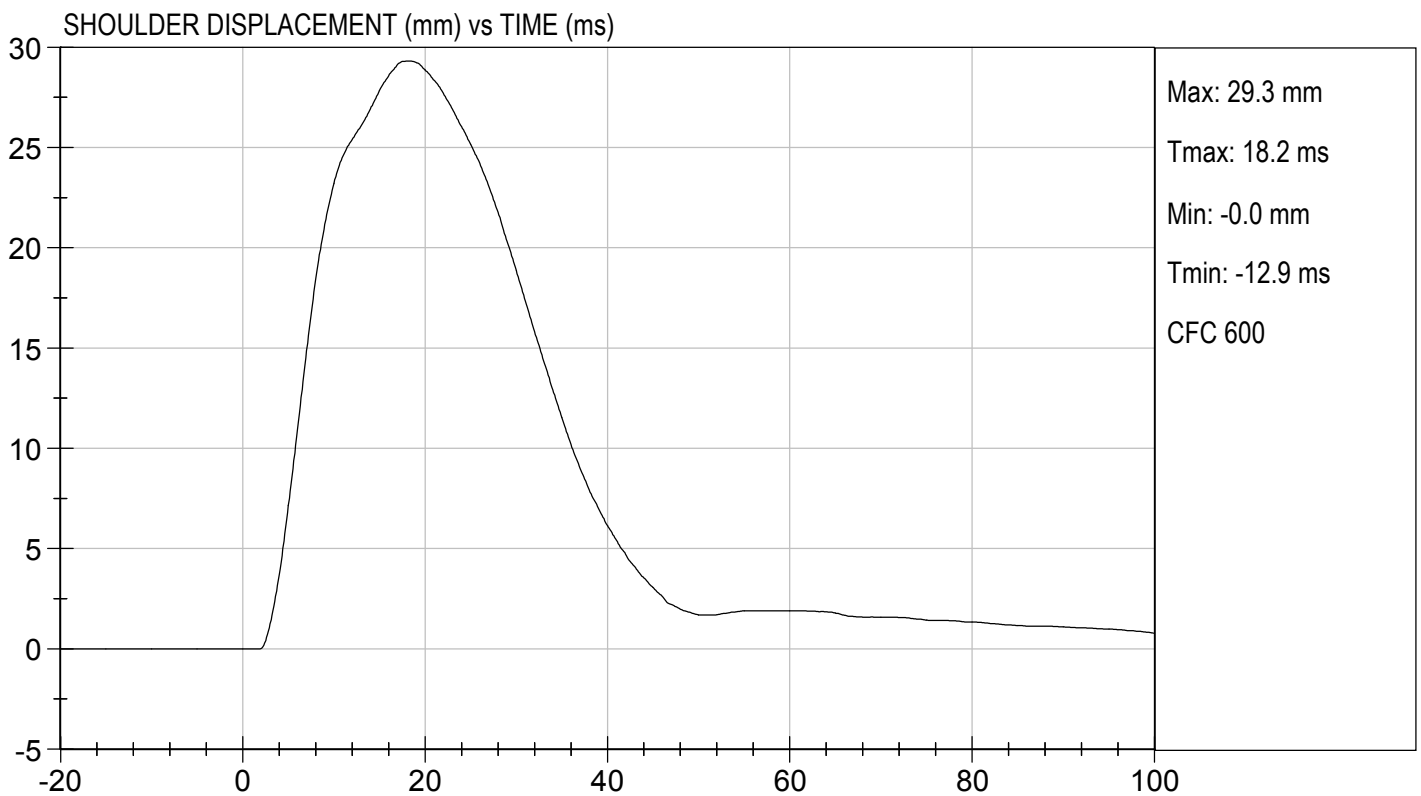
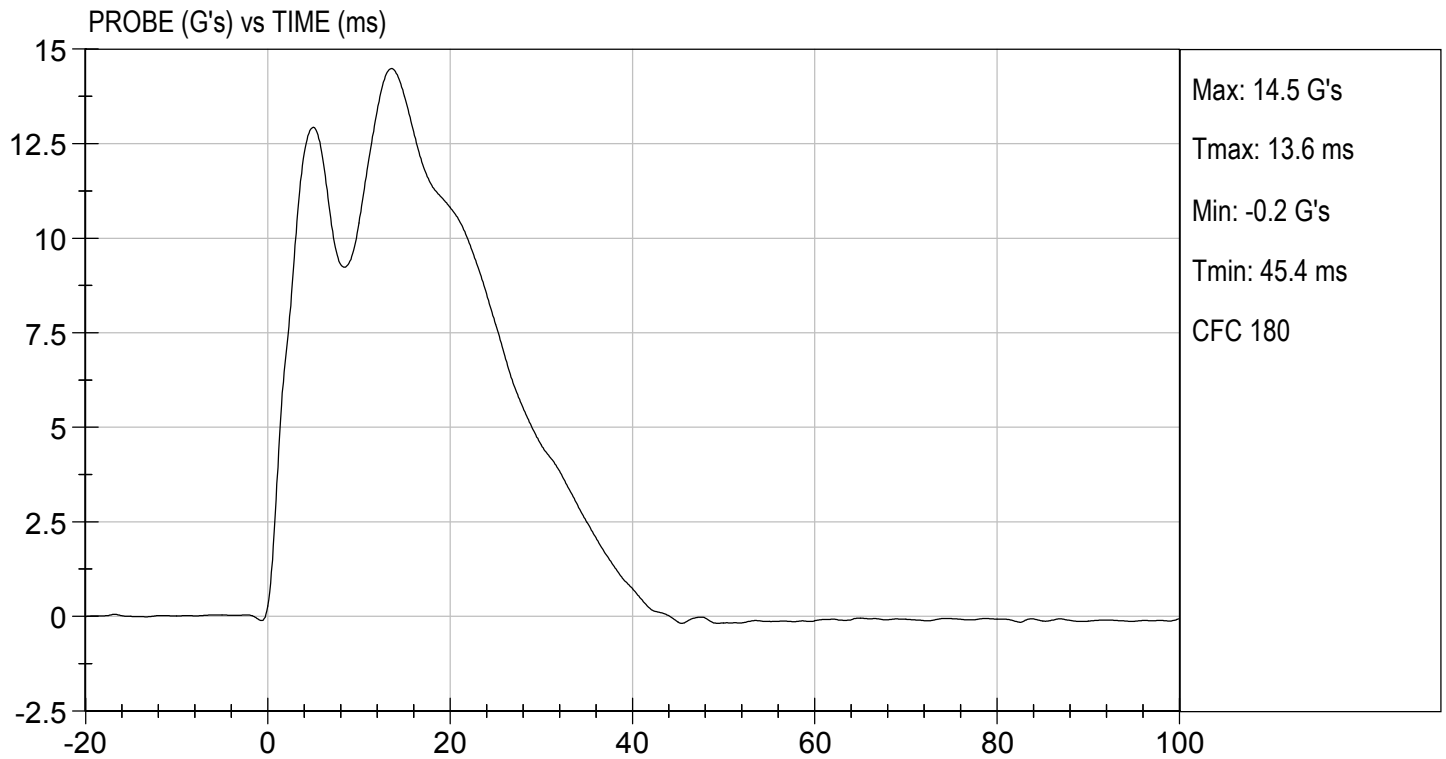
Test Date


Approved By



TEST DESC: SHOULDER IMPACT
VELOCITY: 14.12 ft/s, 4.30 m/s

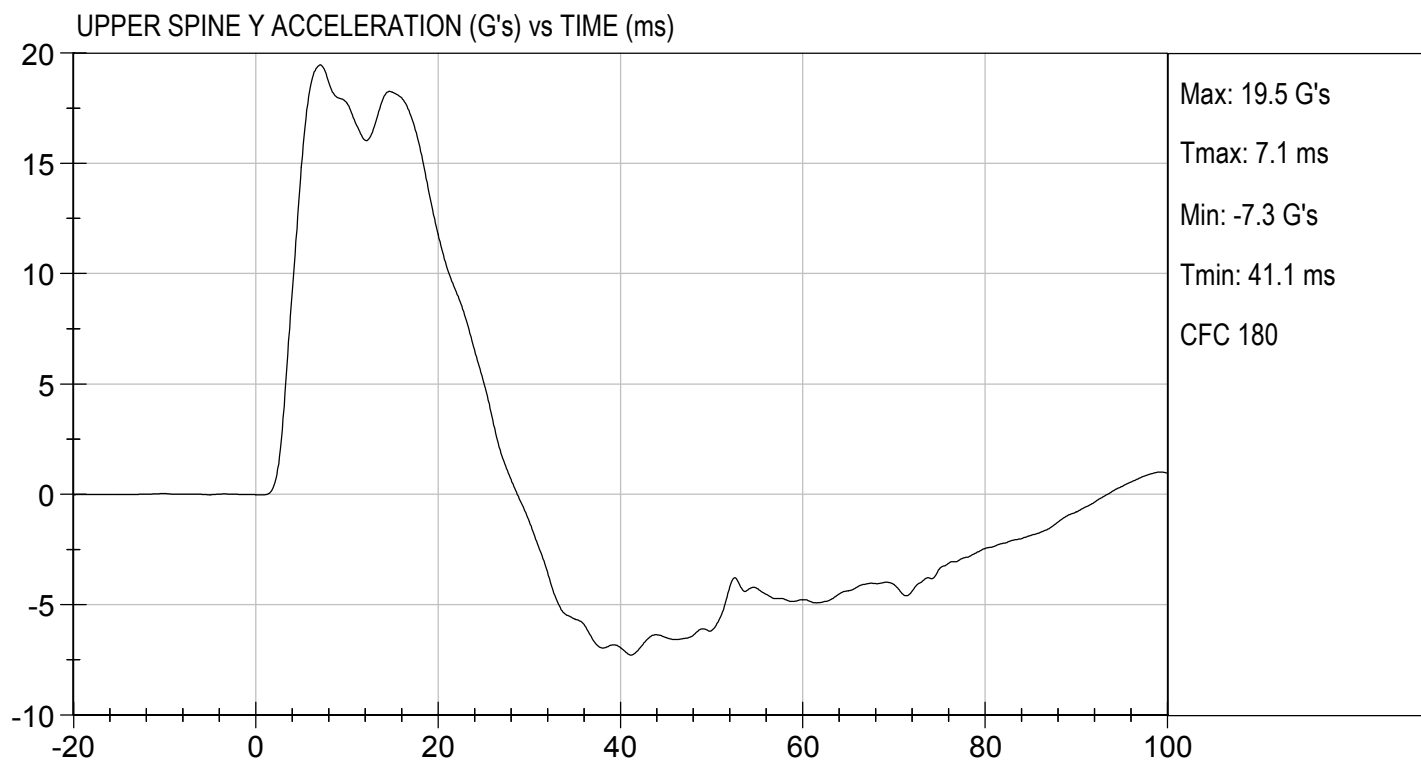
TEST DATE: 09/26/2019
TEST #: D193033





TEST DESC: SHOULDER IMPACT
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 09/26/2019
TEST #: D193033

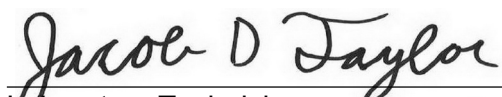


MGA RESEARCH CORPORATION
THORAX (WITH ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

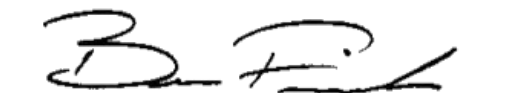
Test I.D: D193034

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.6	Pass
Humidity	%	10 to 70	38	Pass
Impact Velocity	m/s	6.60 to 6.80	6.80	Pass
Maximum Probe Acceleration	G's	30 to 36	33	Pass
Shoulder Displacement	mm	31 to 40	35	Pass
Upper Rib Displacement	mm	25 to 32	27	Pass
Middle Rib Displacement	mm	30 to 36	30	Pass
Lower Rib Displacement	mm	32 to 38	33	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	39	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	34	Pass
			Overall Test Results	Pass


Laboratory Technician

09/26/2019

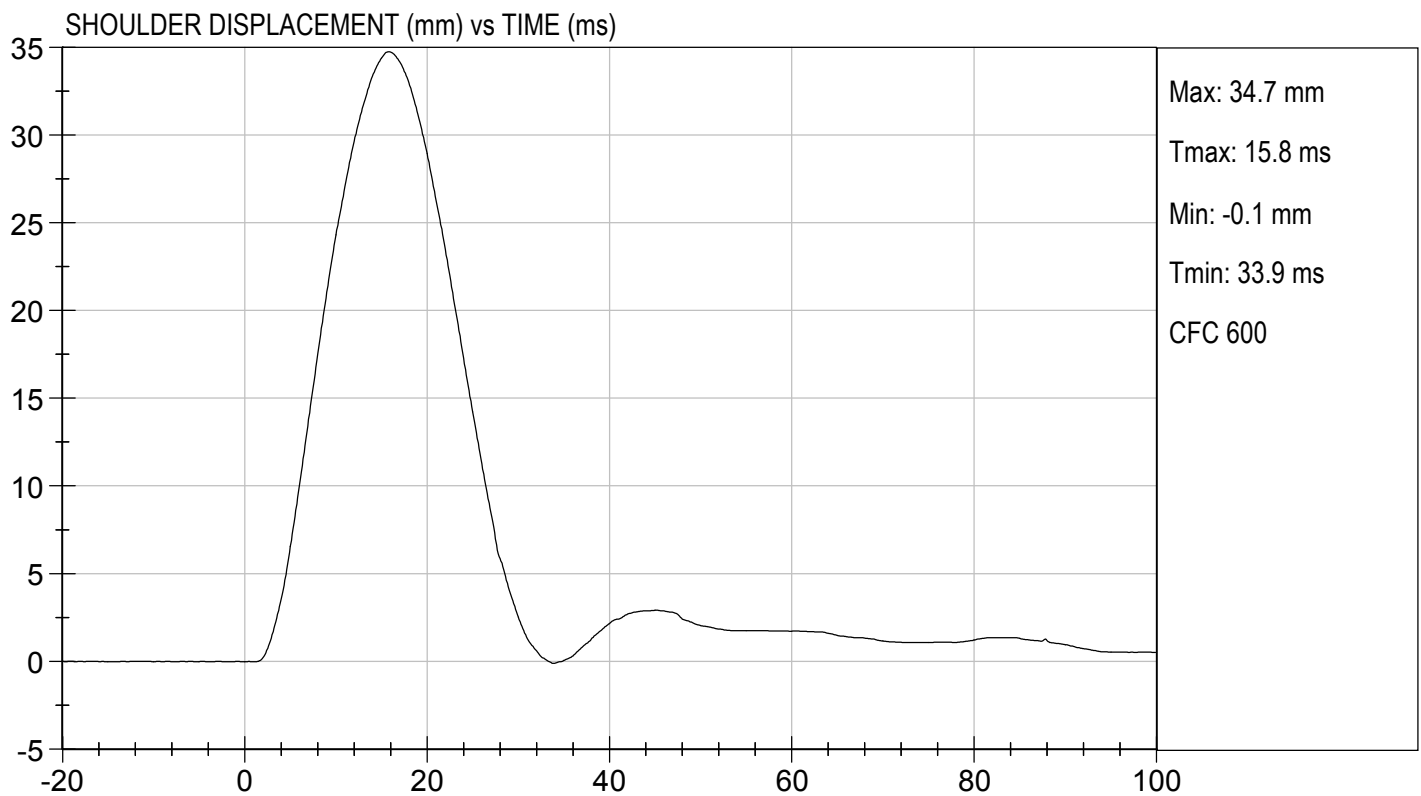
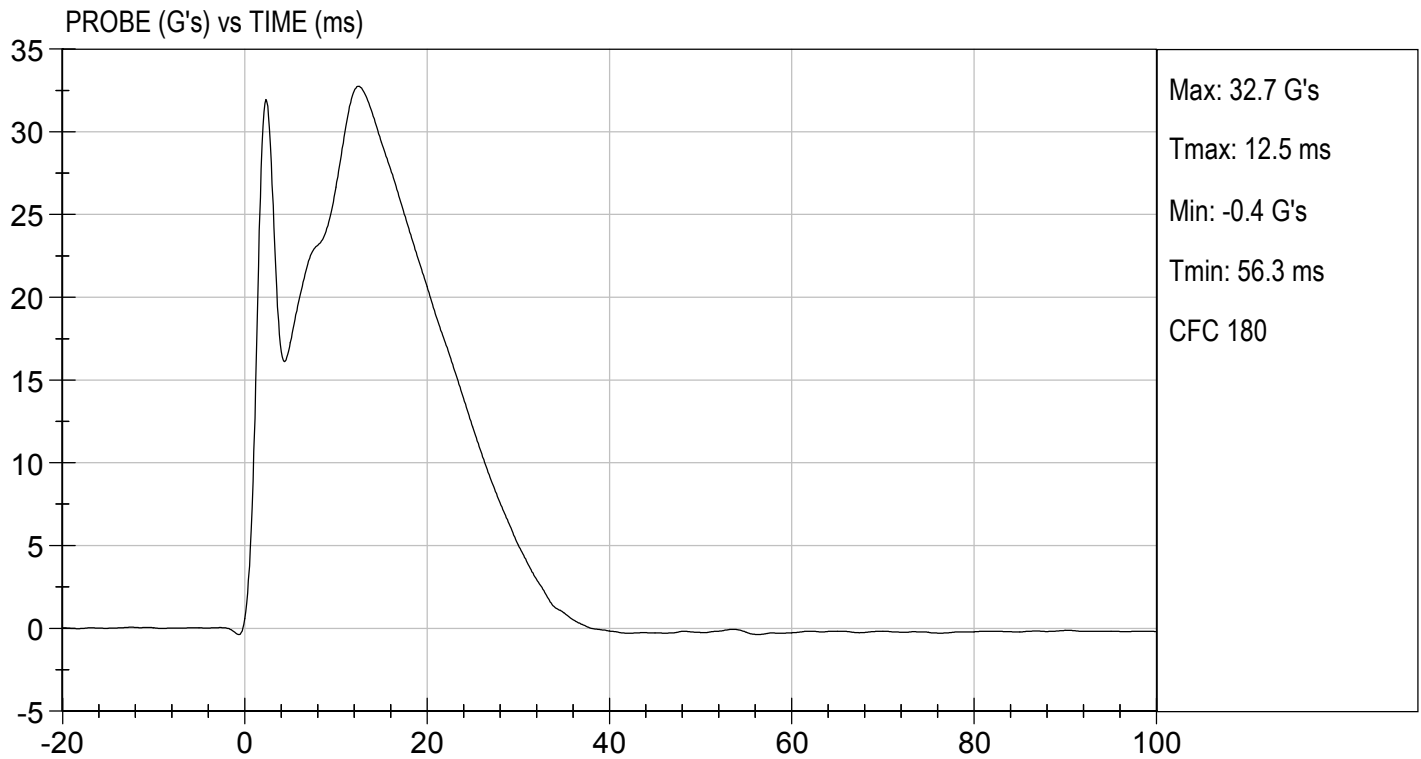
Test Date


Approved By



TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.30 ft/s, 6.80 m/s

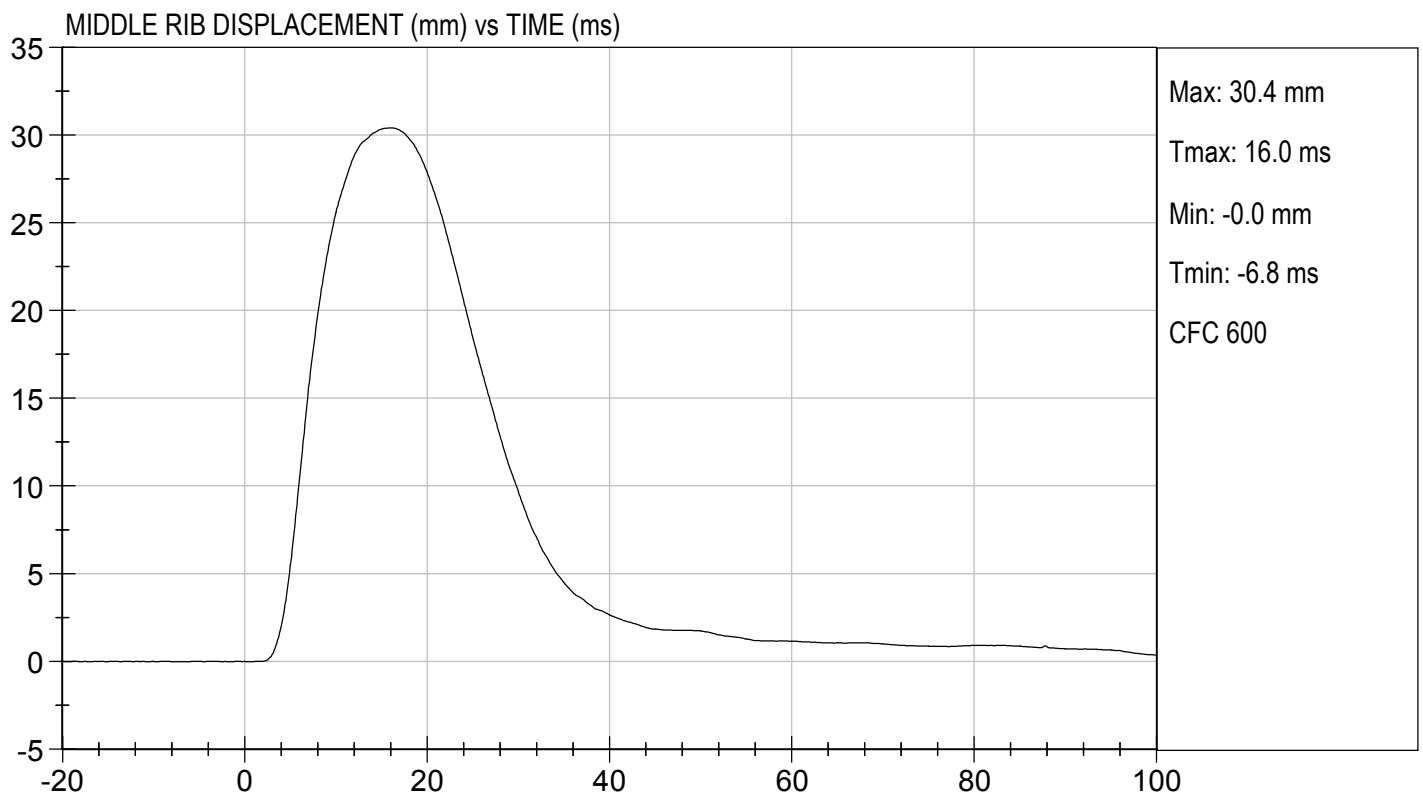
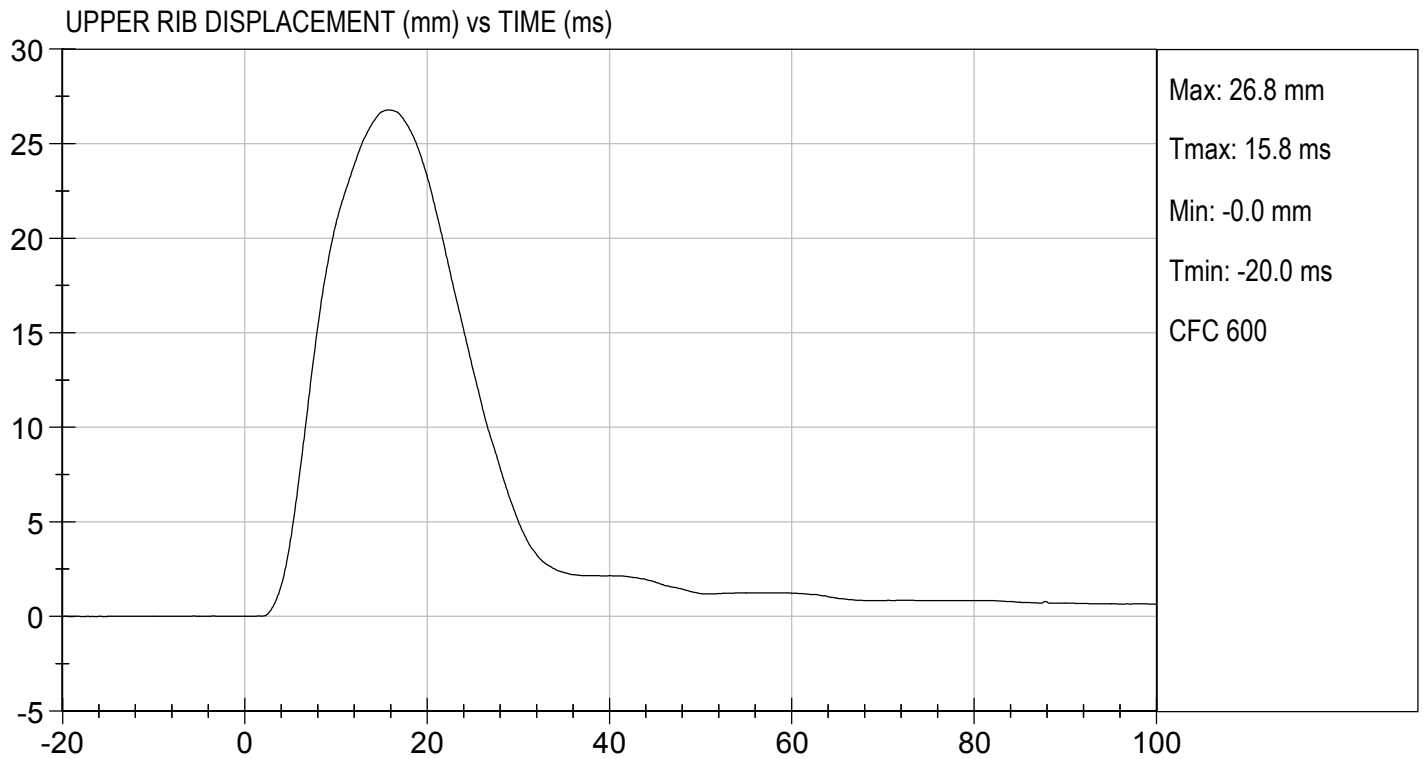
TEST DATE: 09/26/2019
TEST #: D193034





TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.30 ft/s, 6.80 m/s

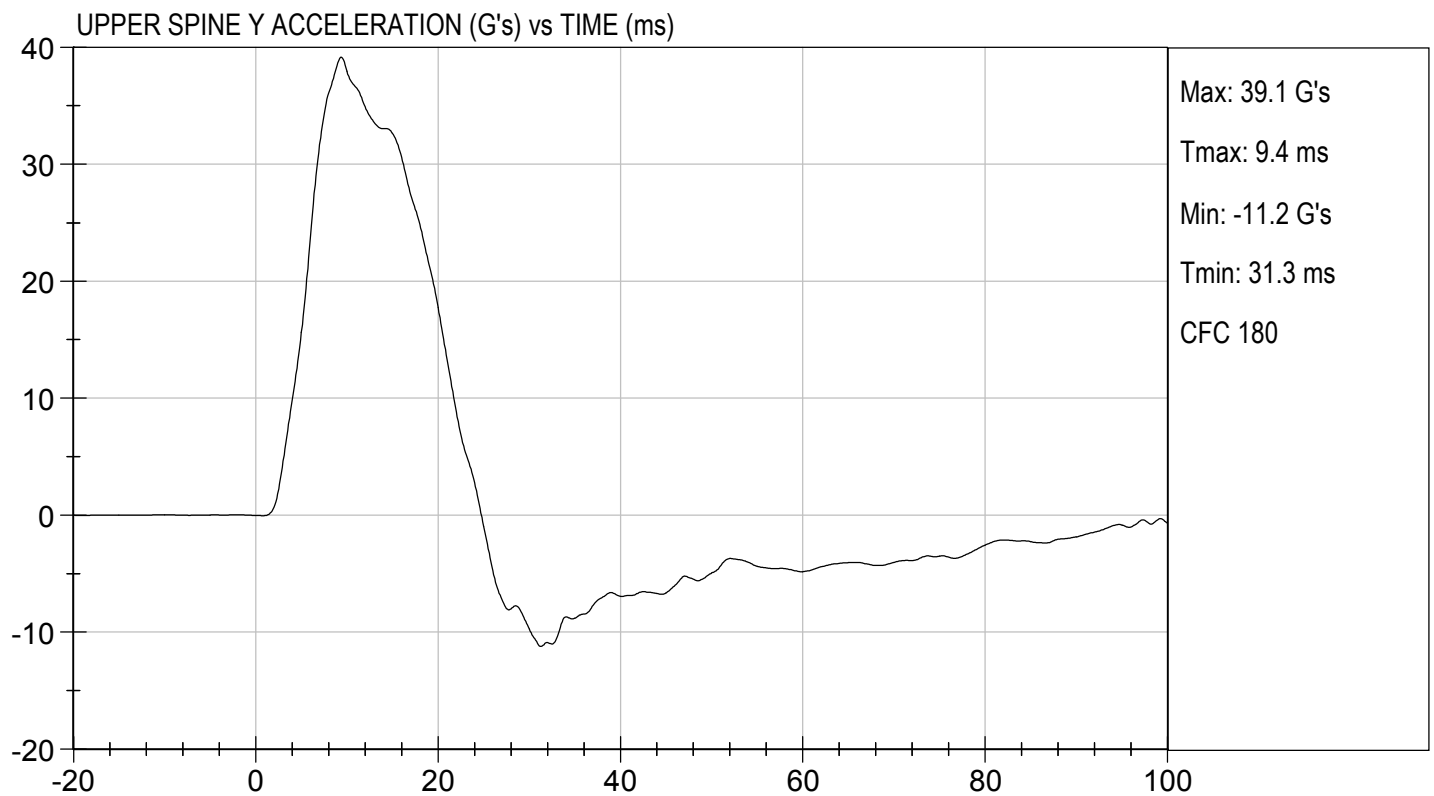
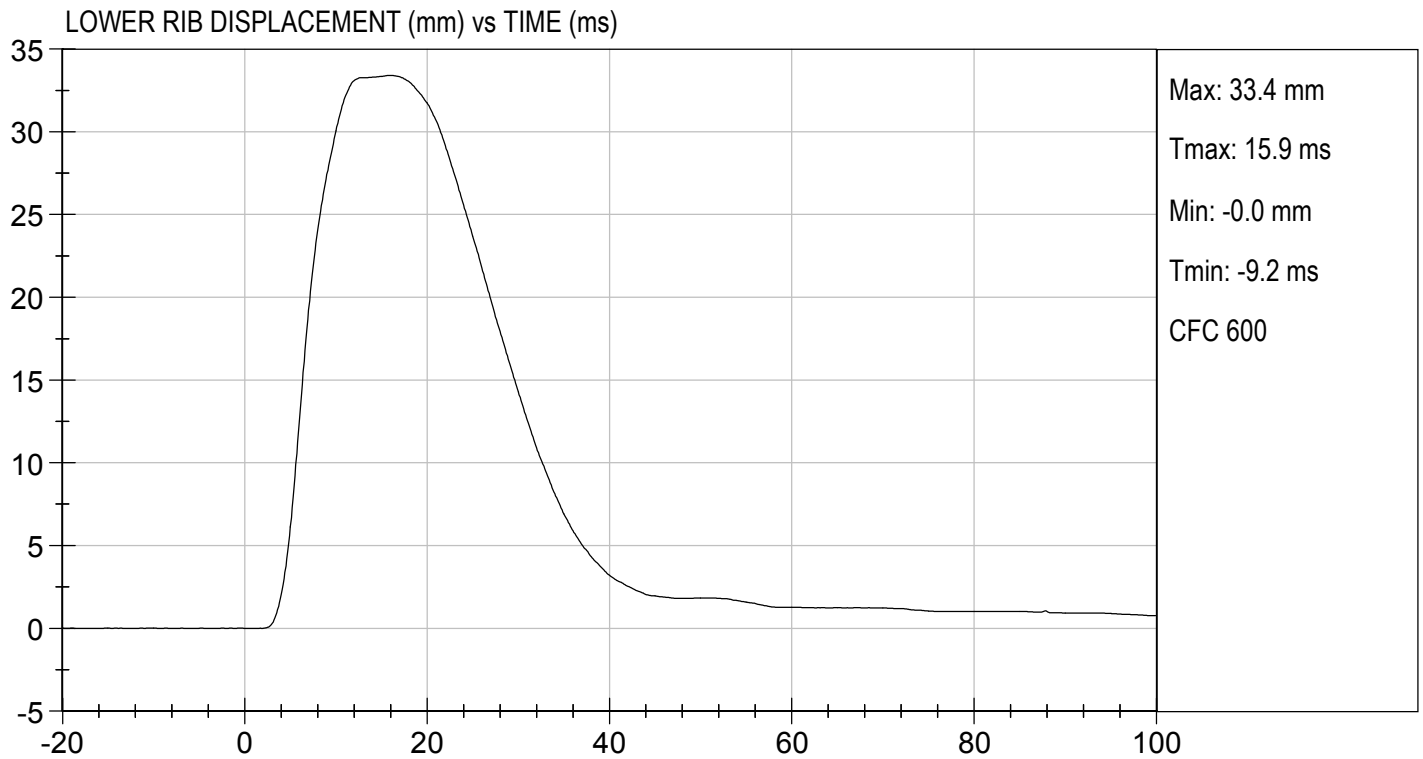
TEST DATE: 09/26/2019
TEST #: D193034





TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.30 ft/s, 6.80 m/s

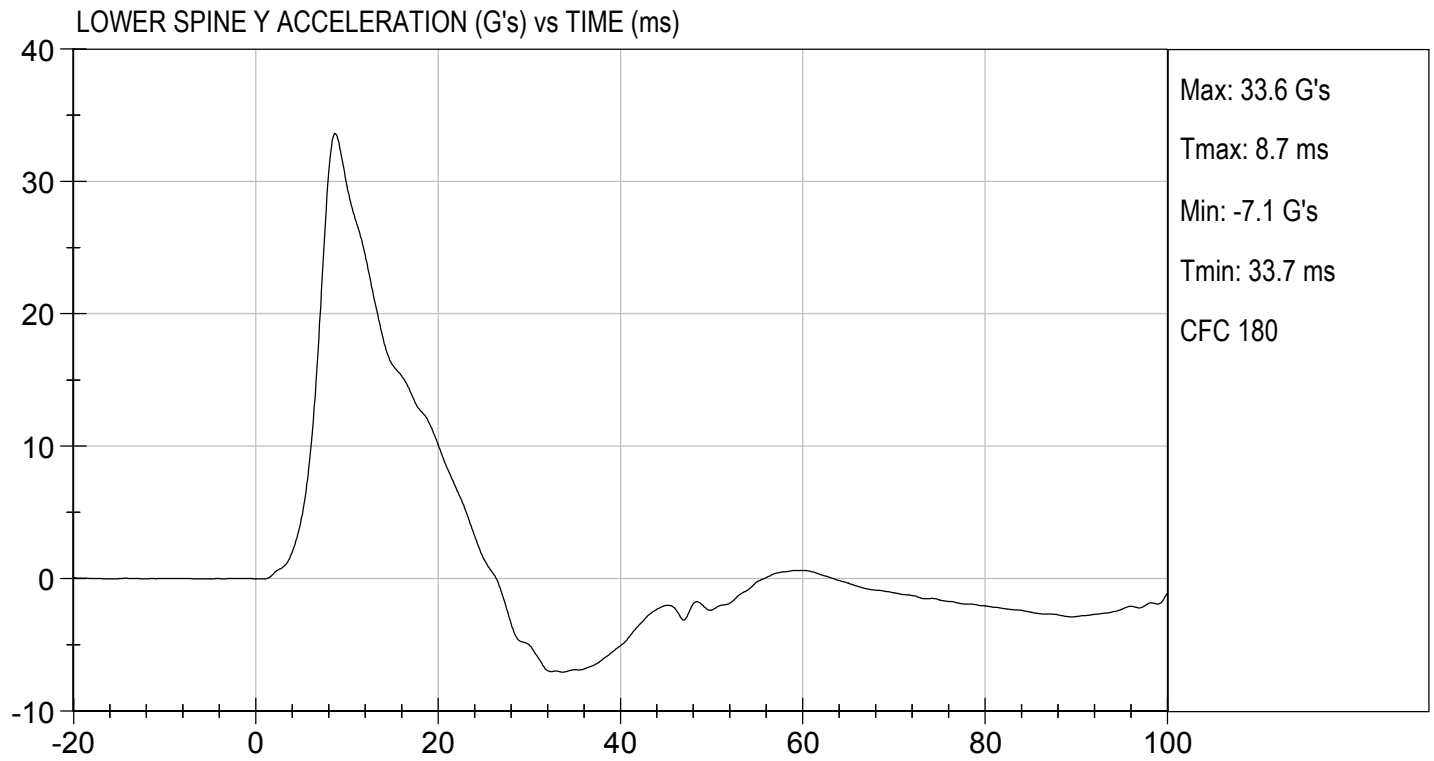
TEST DATE: 09/26/2019
TEST #: D193034





TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.30 ft/s, 6.80 m/s

TEST DATE: 09/26/2019
TEST #: D193034

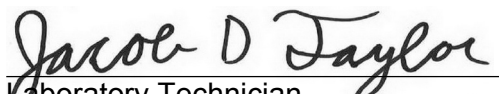


MGA RESEARCH CORPORATION
THORAX (WITHOUT ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

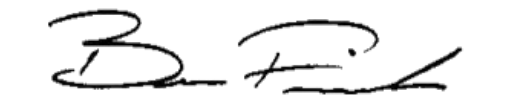
Test I.D: D193035

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.6	Pass
Humidity	%	10 to 70	38	Pass
Impact Velocity	m/s	4.20 to 4.40	4.23	Pass
Maximum Probe Acceleration	G's	14 to 18	15	Pass
Upper Rib Displacement	mm	32 to 40	38	Pass
Middle Rib Displacement	mm	39 to 45	42	Pass
Lower Rib Displacement	mm	35 to 43	40	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	14	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	9	Pass
Overall Test Results				Pass


 Laboratory Technician

09/26/2019

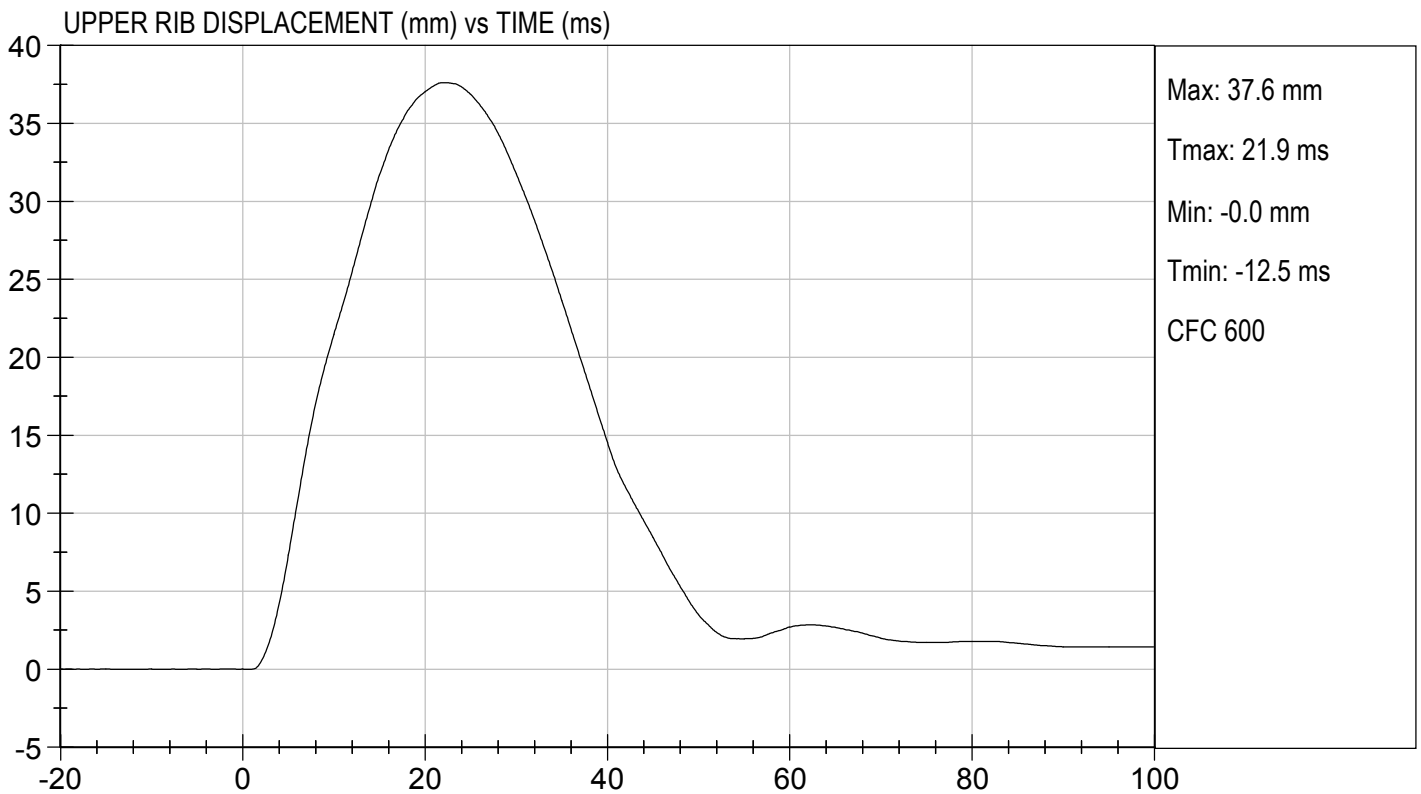
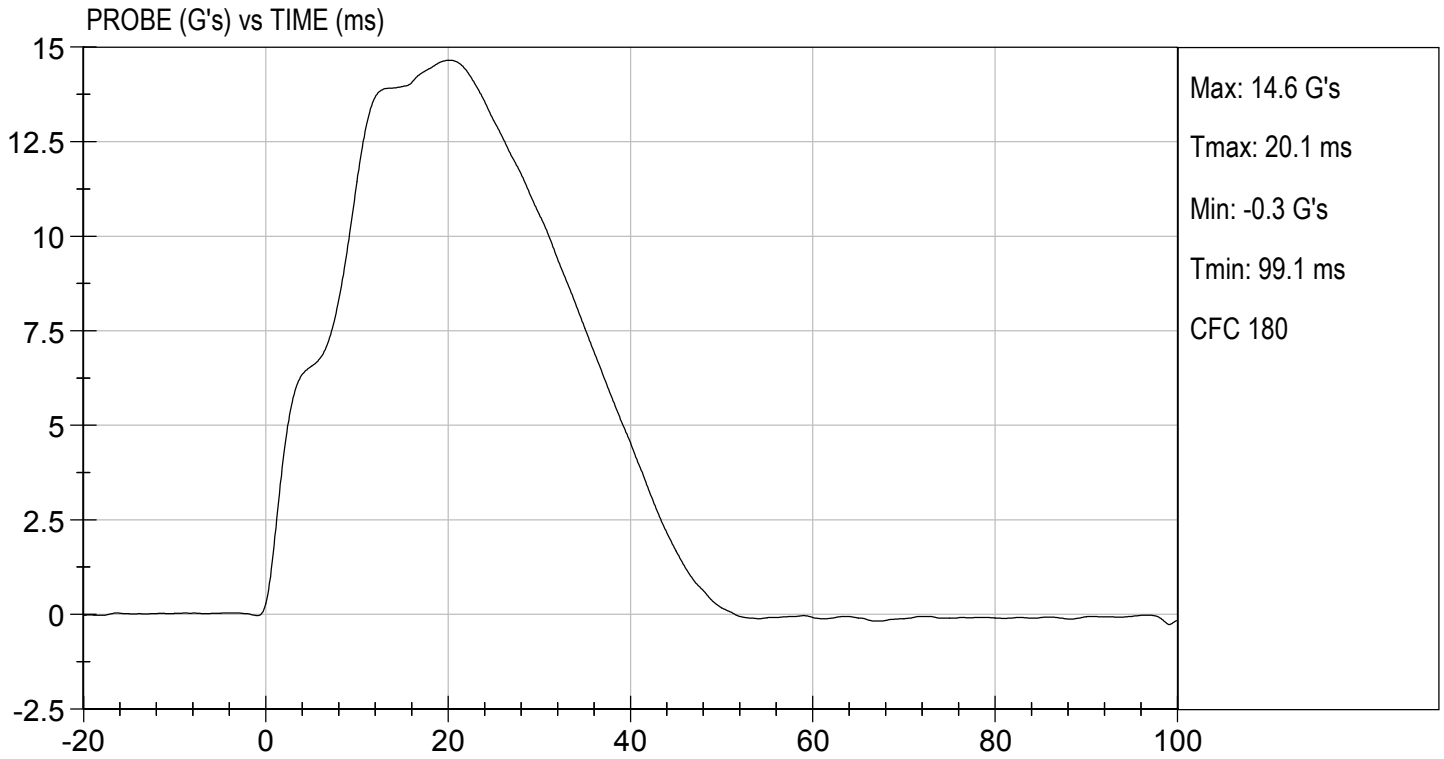
Test Date


 Approved By



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

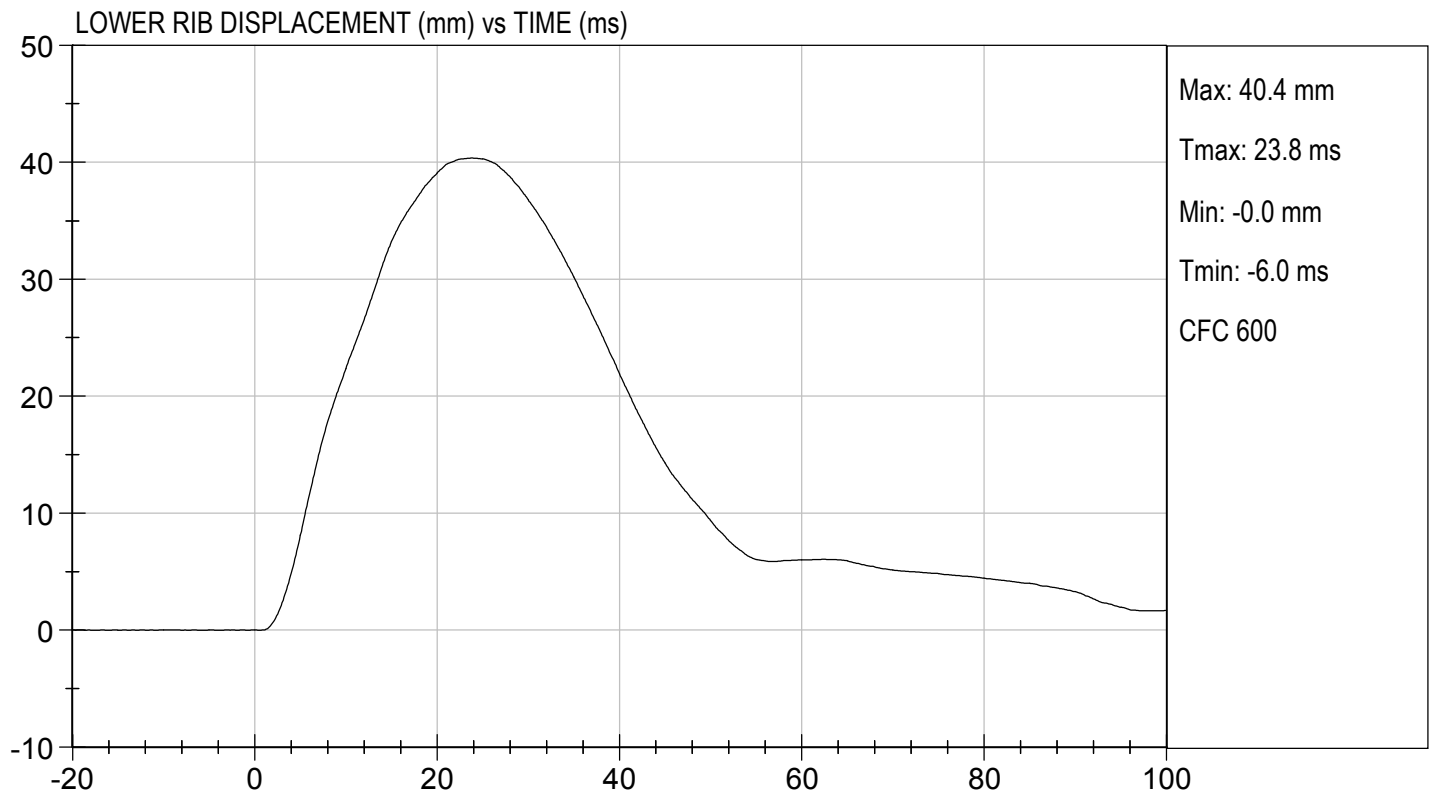
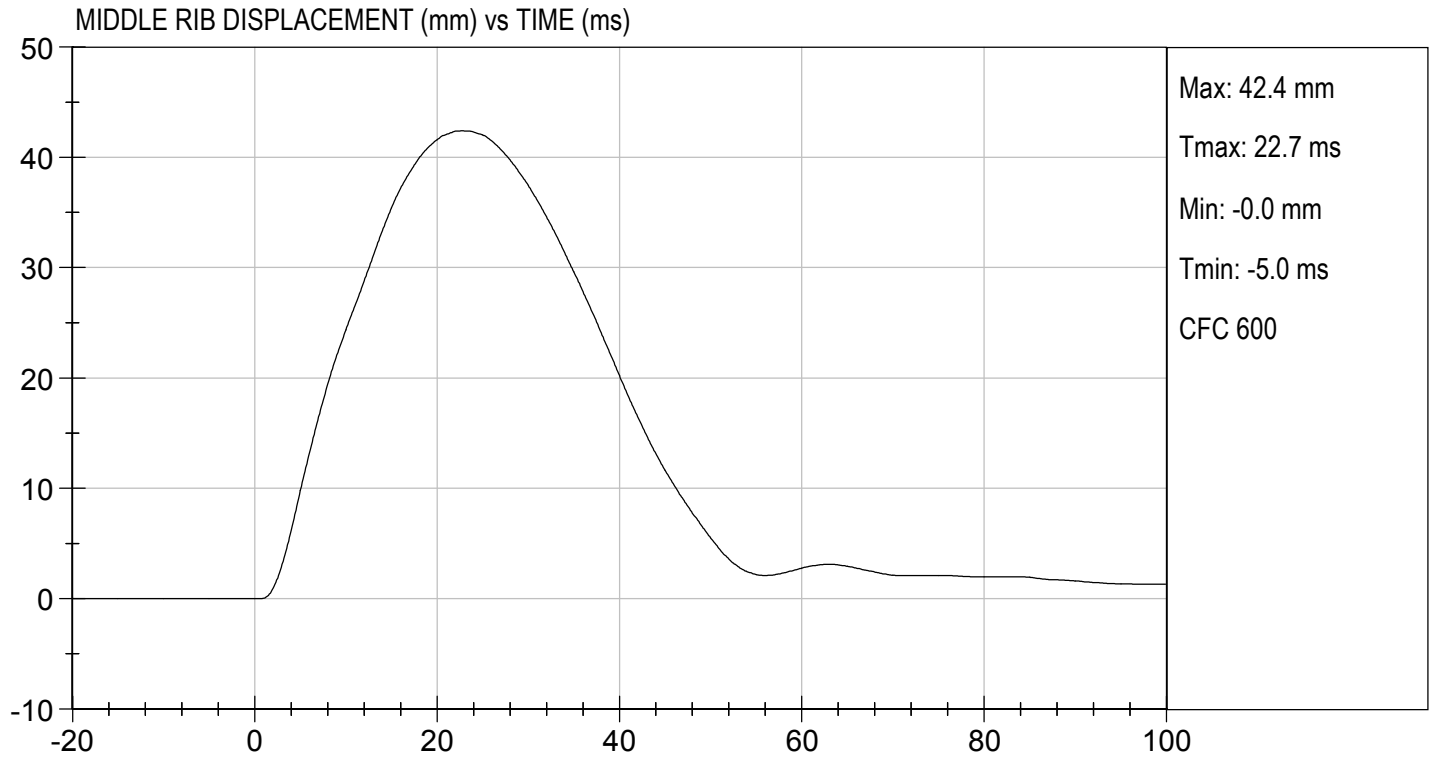
TEST DATE: 09/26/2019
TEST #: D193035





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

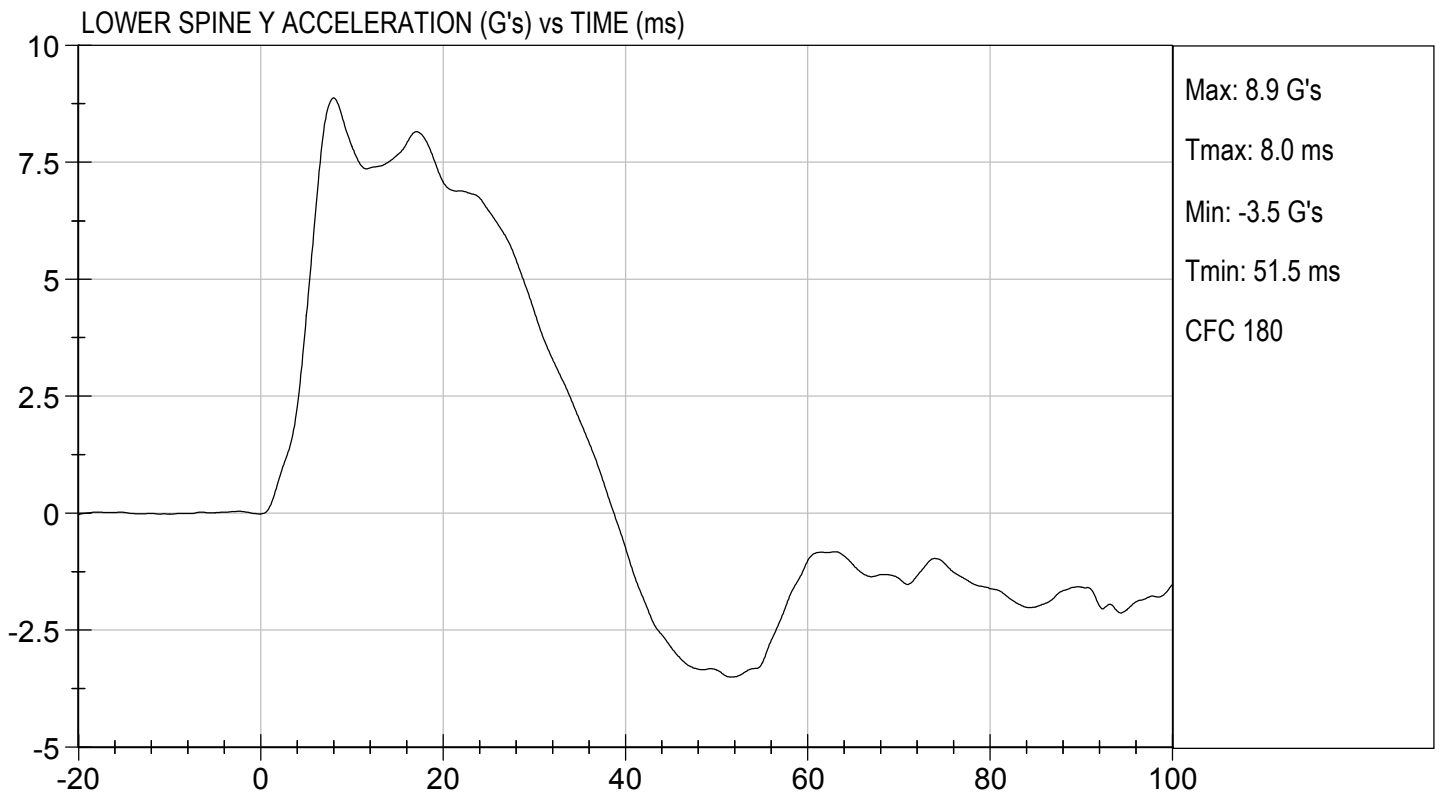
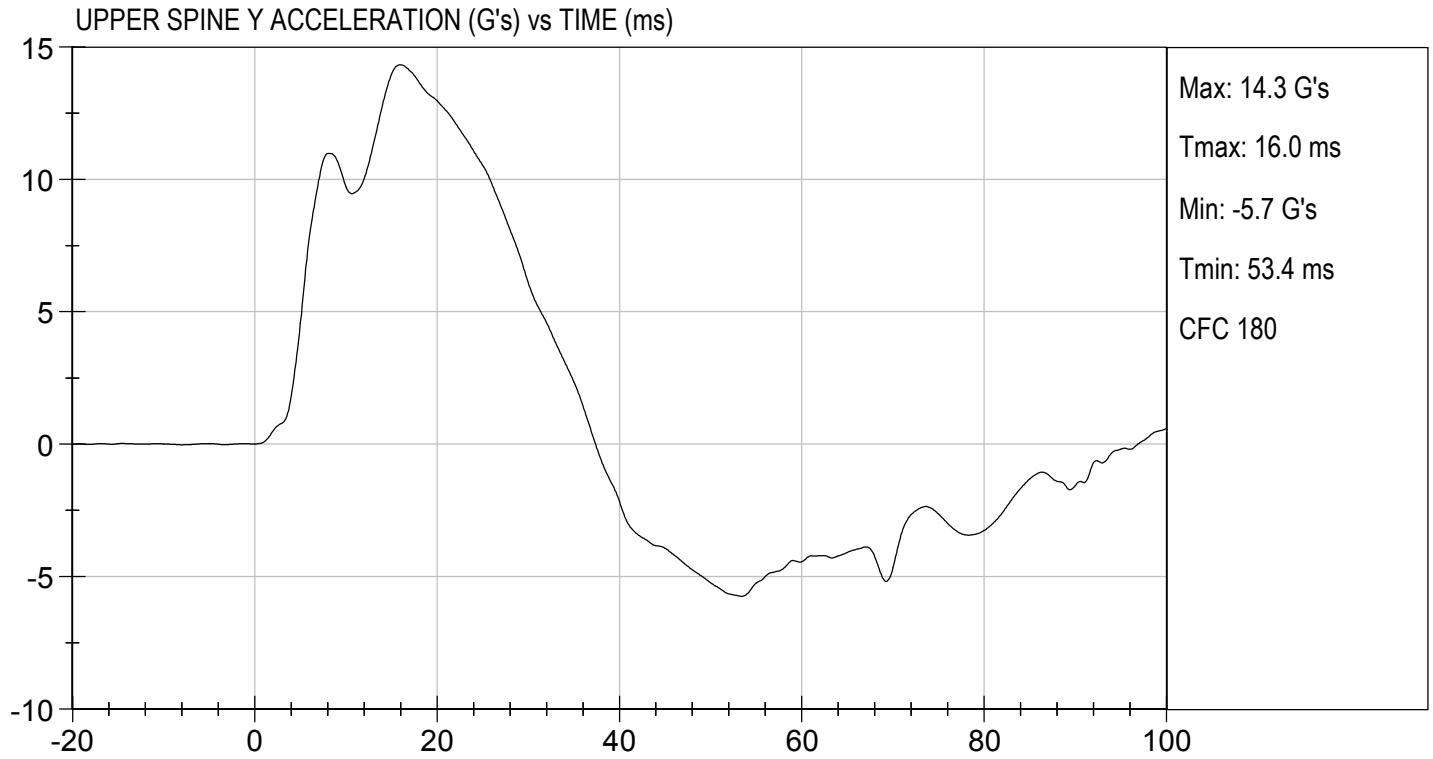
TEST DATE: 09/26/2019
TEST #: D193035





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

TEST DATE: 09/26/2019
TEST #: D193035



MGA RESEARCH CORPORATION

ABDOMINAL IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

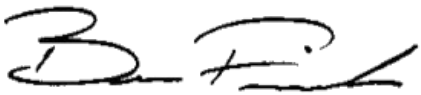
Test I.D: D193036

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.6	Pass
Humidity	%	10 to 70	38	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Maximum Probe Acceleration	G's	12 to 16	14	Pass
Upper Abdomen Rib Displacement	mm	36 to 47	37	Pass
Lower Abdomen Rib Displacement	mm	33 to 44	38	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	11	Pass
Overall Test Results				Pass


Laboratory Technician

09/26/2019

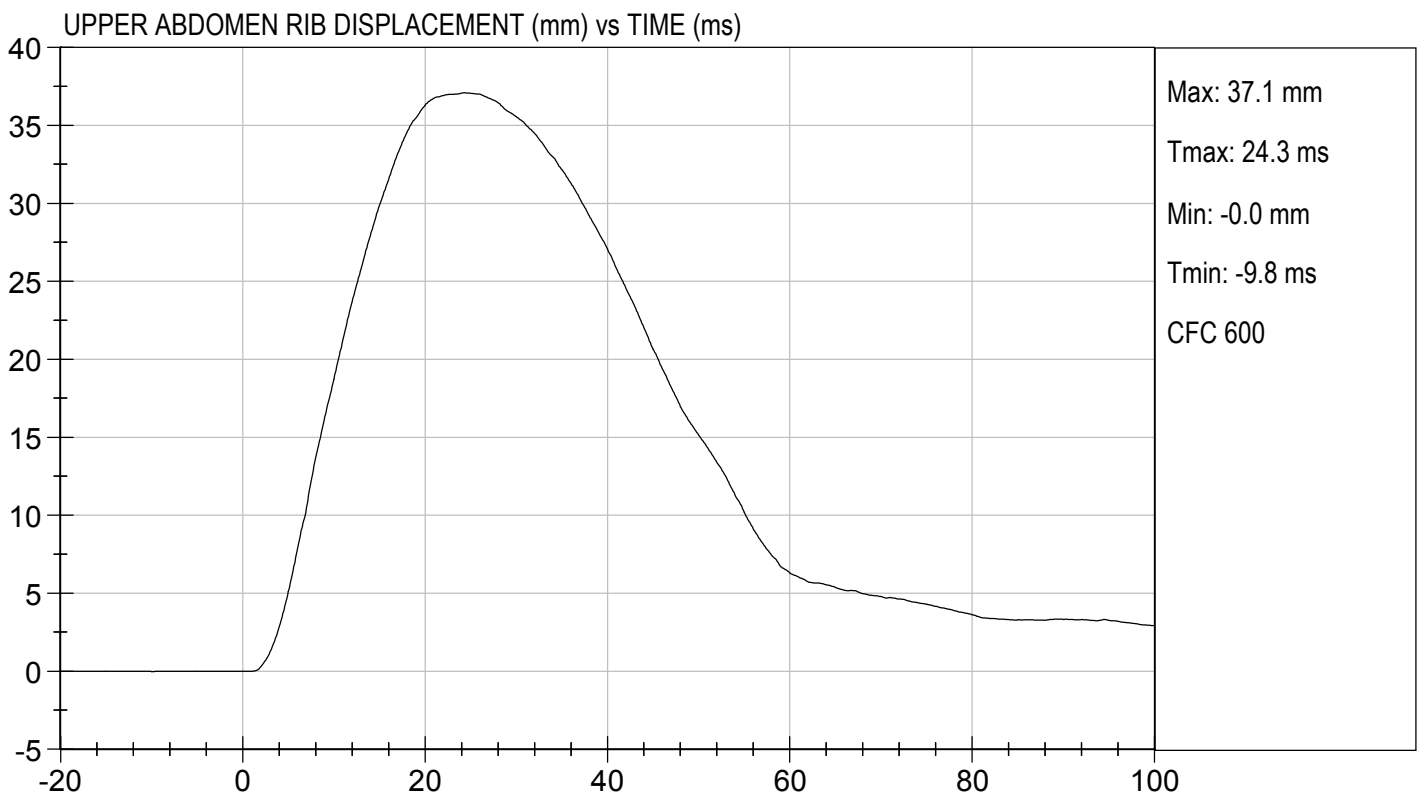
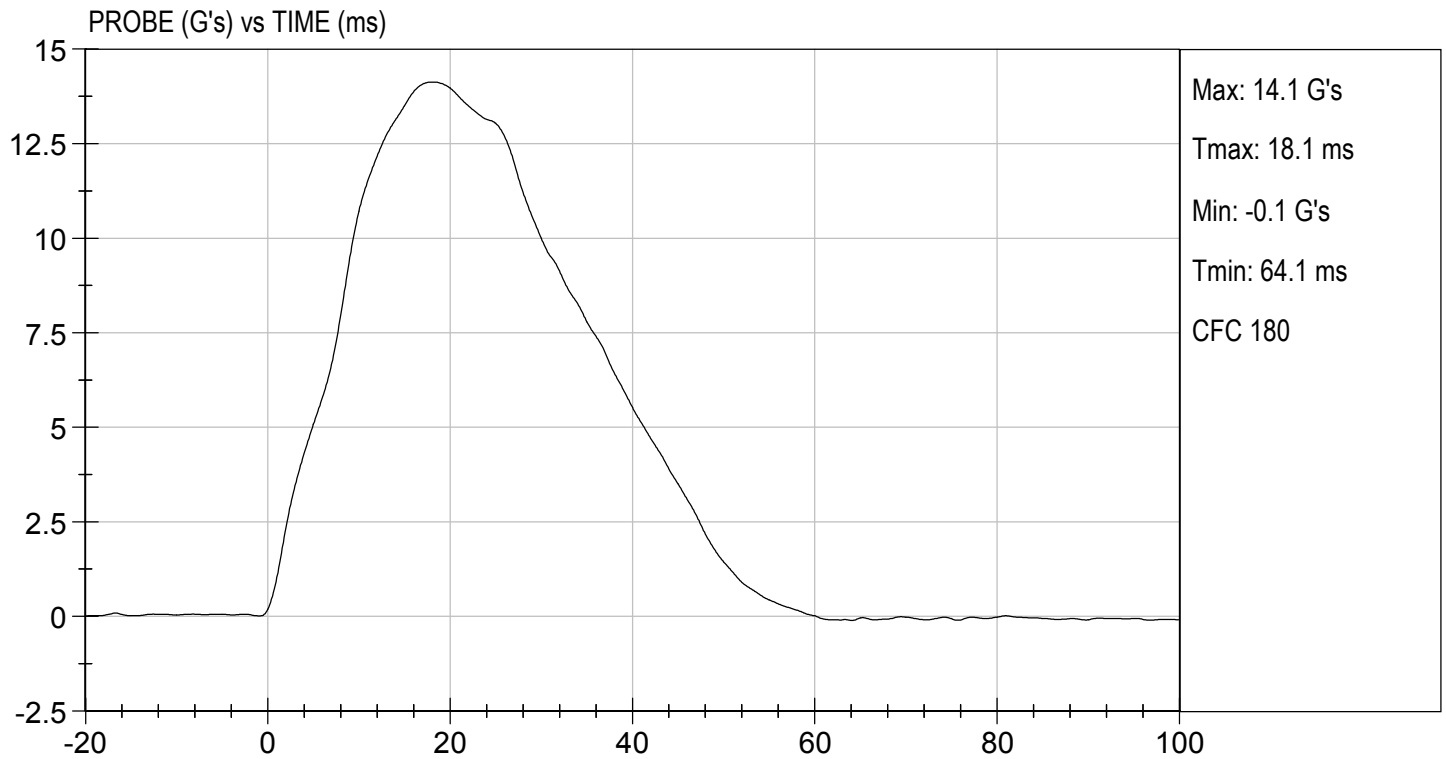
Test Date


Approved By



TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.12 ft/s, 4.30 m/s

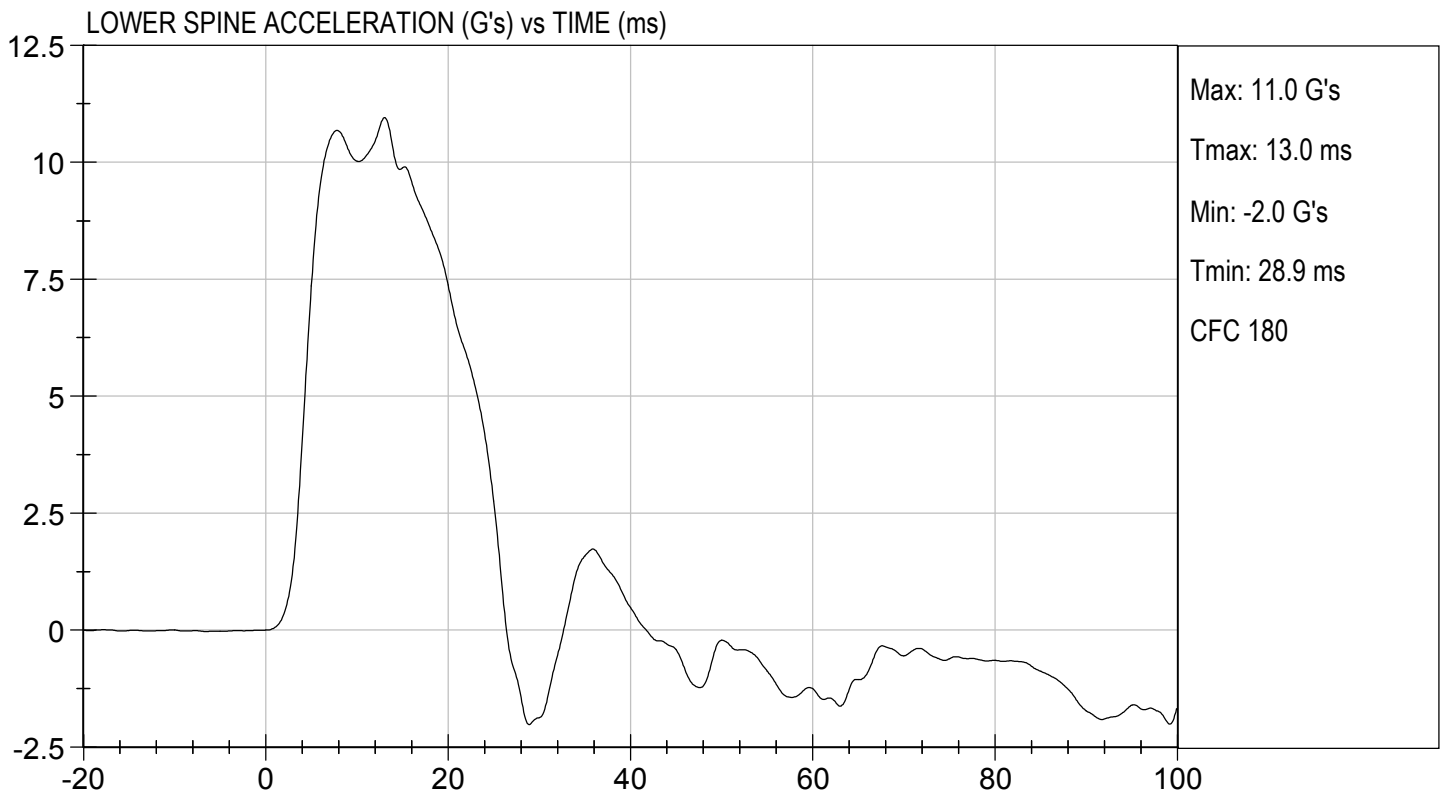
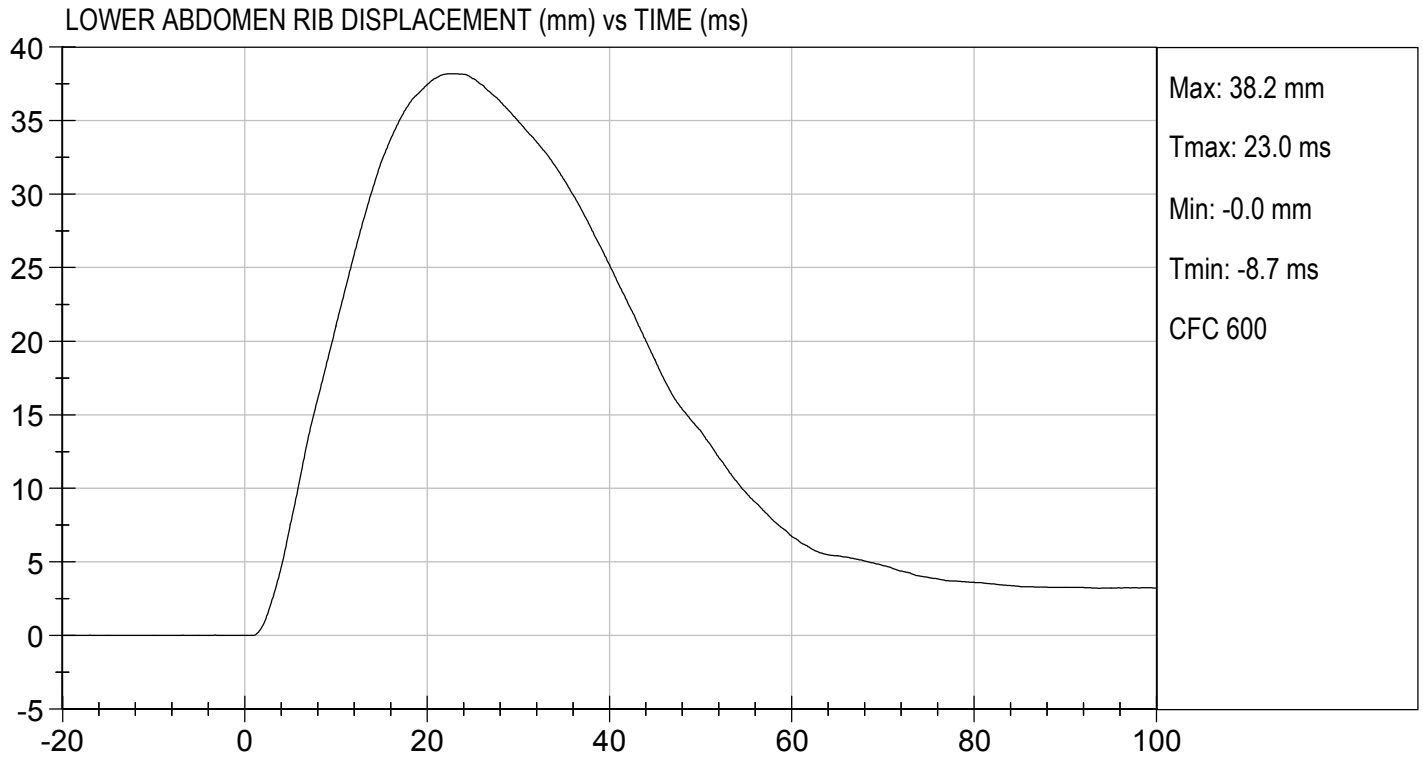
TEST DATE: 09/26/2019
TEST #: D193036





TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 09/26/2019
TEST #: D193036



MGA RESEARCH CORPORATION

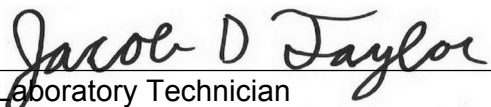
PELVIS IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

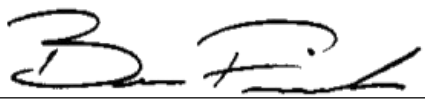
Test I.D: D193037

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.6	Pass
Humidity	%	10 to 70	38	Pass
Impact Velocity	m/s	6.60 to 6.80	6.60	Pass
Maximum Probe Acceleration	G's	38 to 47	47	Pass
Pelvis Y Acceleration After 6 ms	G's	34 to 42	35	Pass
Peak Acetabulum Force	N	3600 to 4300	4,250	Pass
Overall Test Results				Pass


Laboratory Technician

09/26/2019

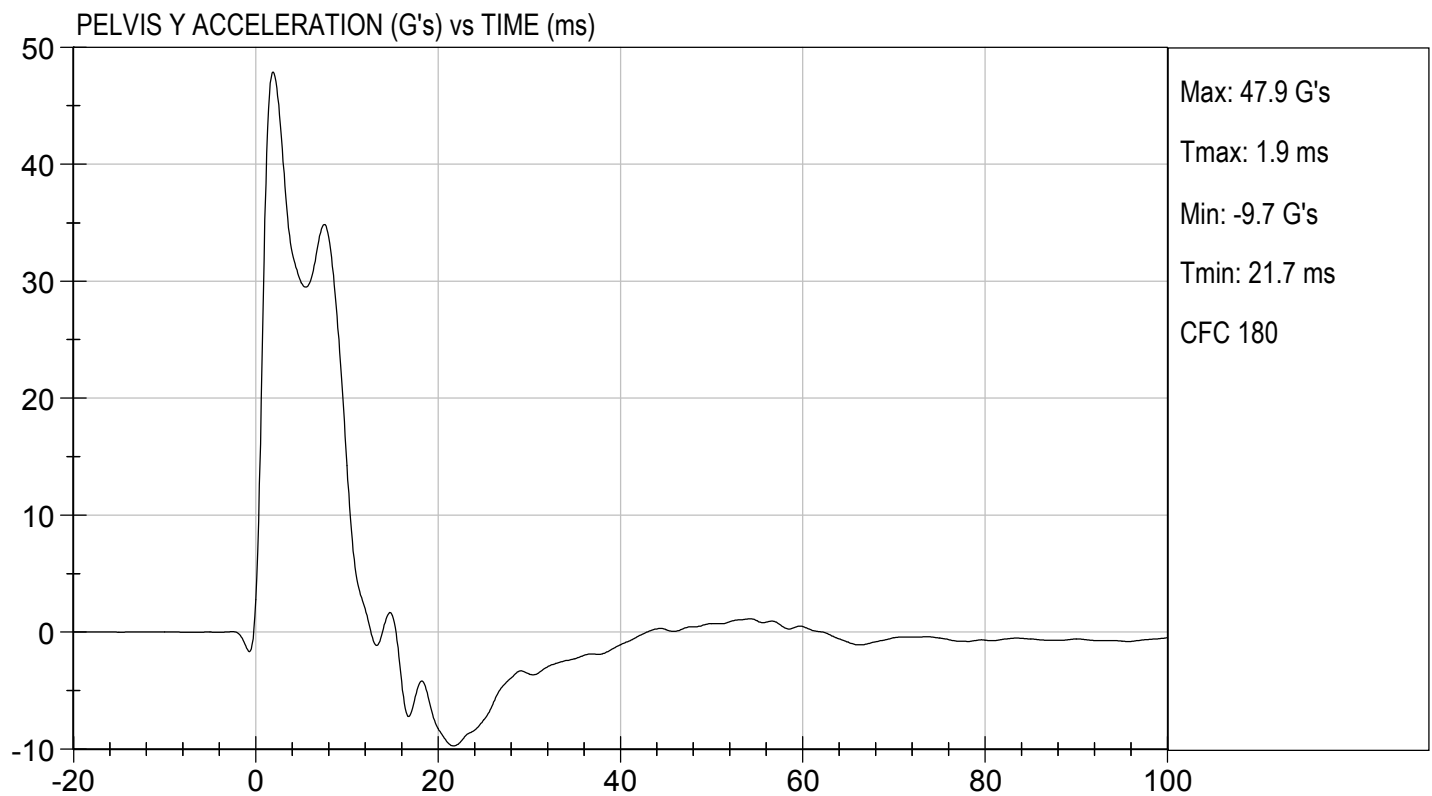
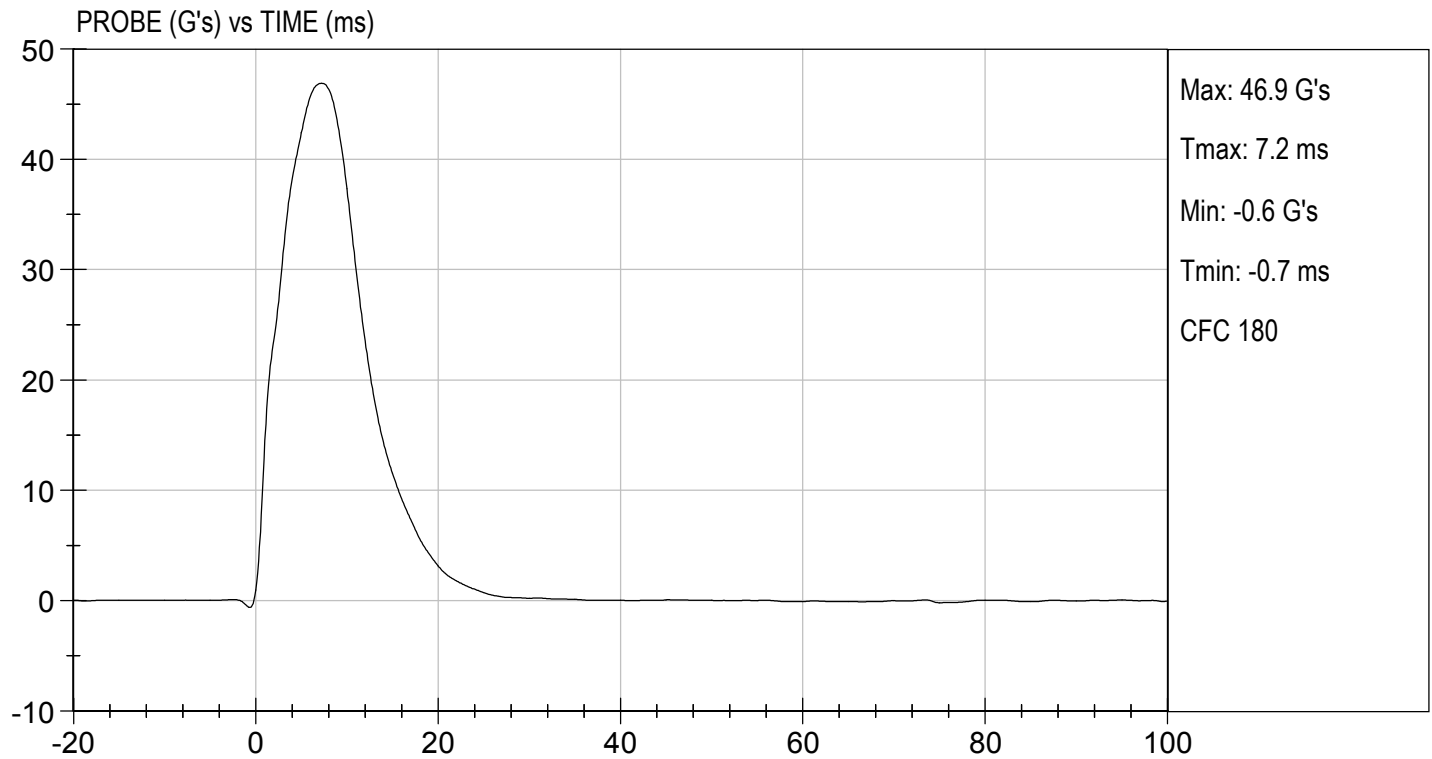
Test Date

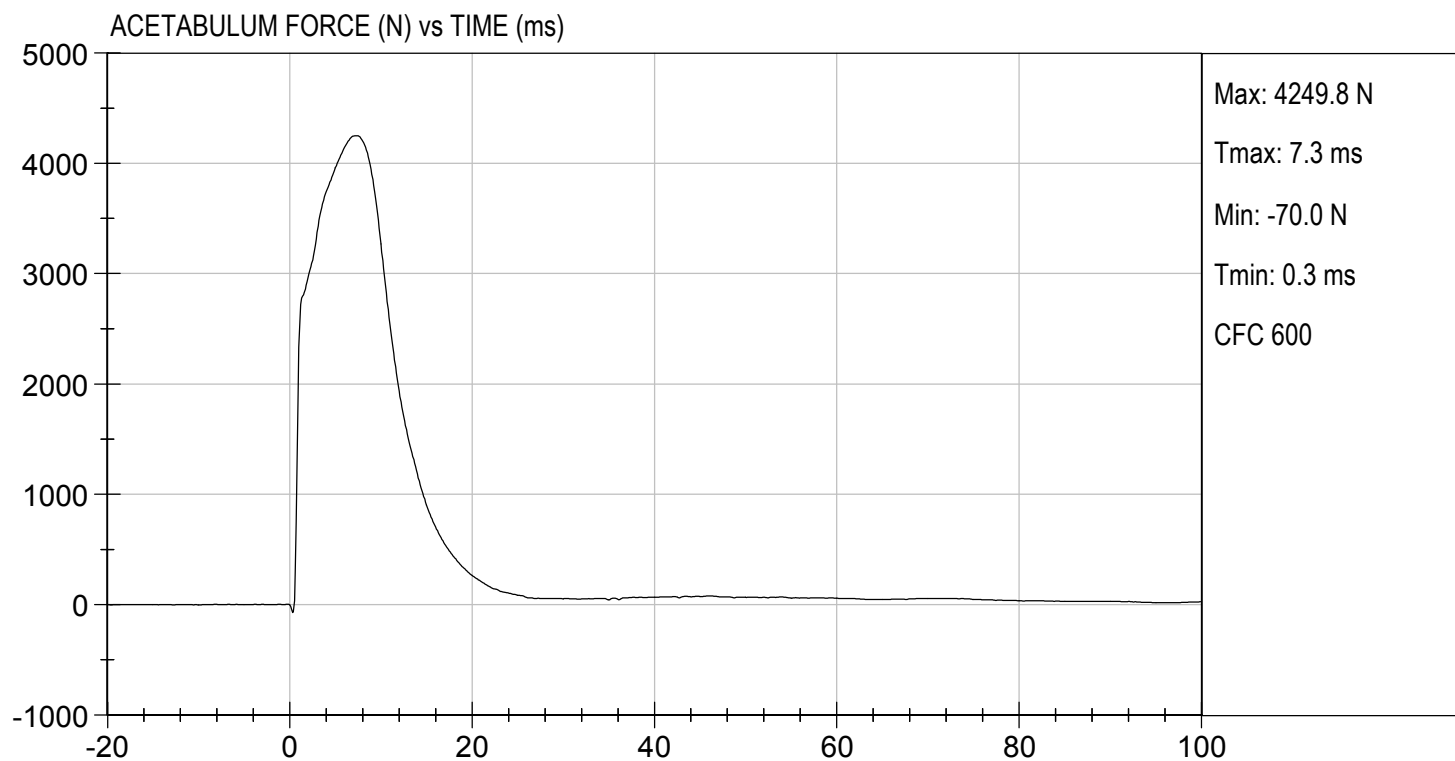

Approved By



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

TEST DATE: 09/26/2019
TEST #: D193037





MGA RESEARCH CORPORATION

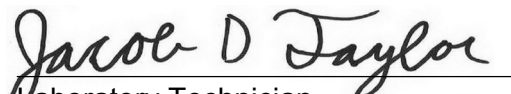
ILIAC IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

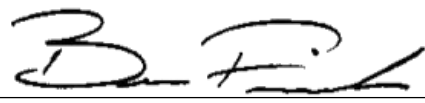
Test I.D: D193038

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	22.0	Pass
Humidity	%	10 to 70	44	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Maximum Probe Acceleration	G's	36 to 45	37	Pass
Pelvis Y Acceleration	G's	28 to 39	29	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4,380	Pass
Overall Test Results				Pass


Laboratory Technician

09/26/2019

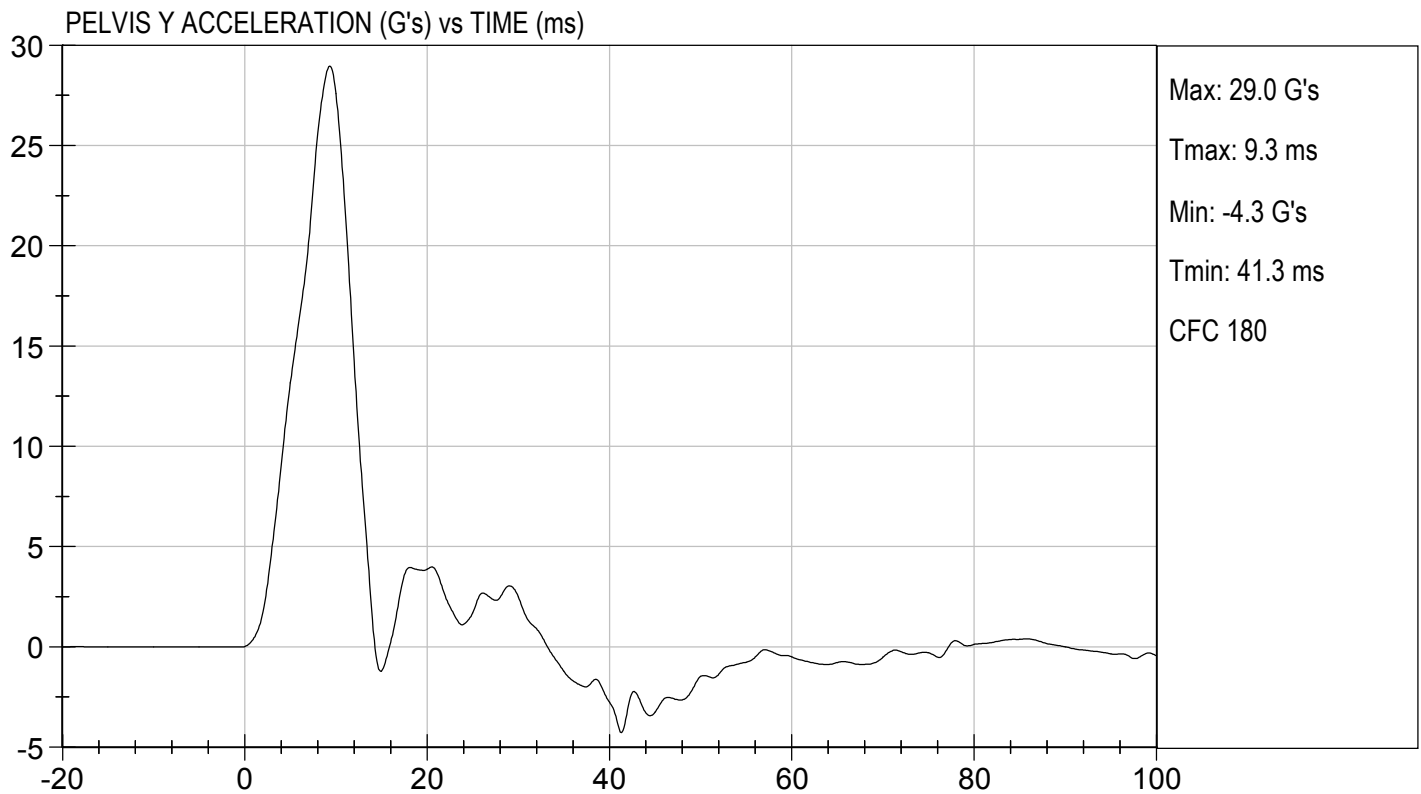
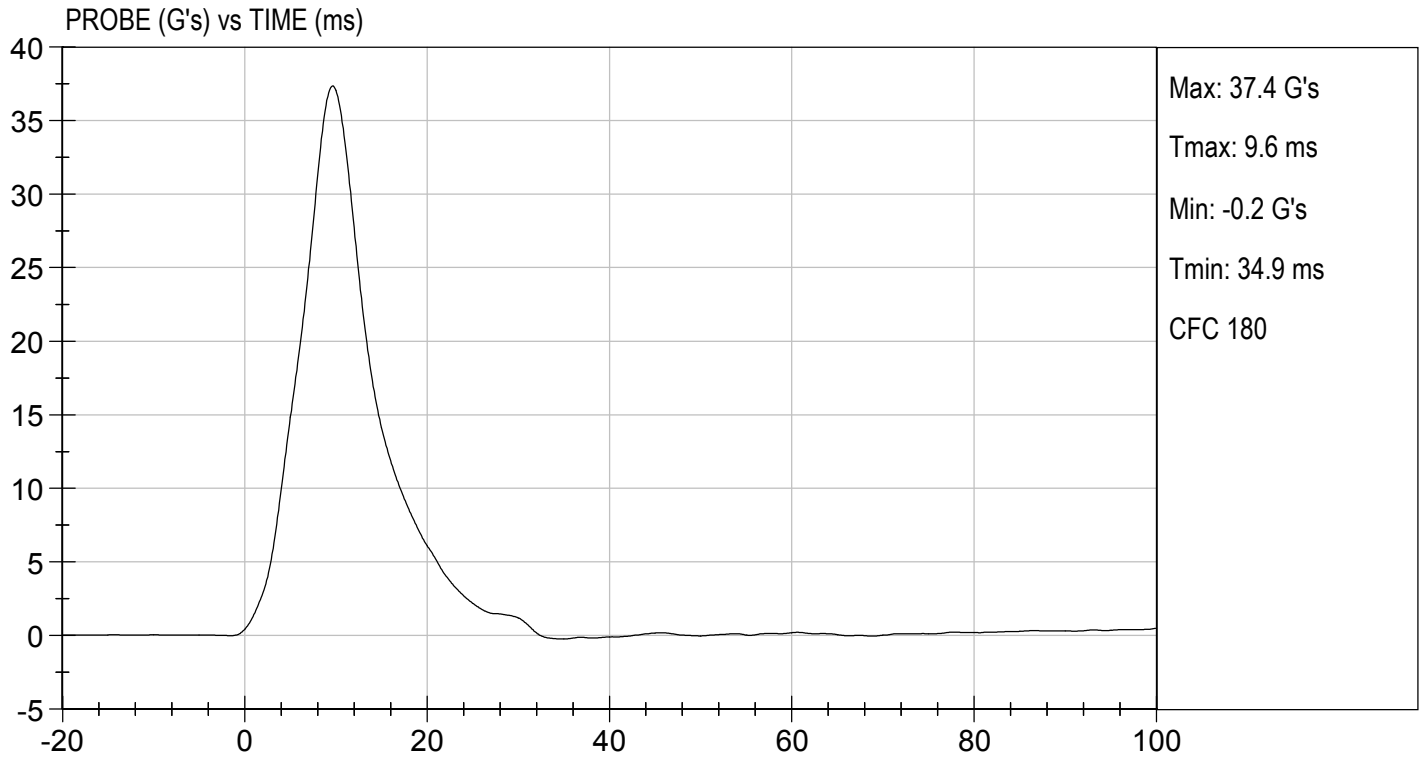
Test Date


Approved By



TEST DESC: ILLIAC
VELOCITY: 14.37 ft/s, 4.38 m/s

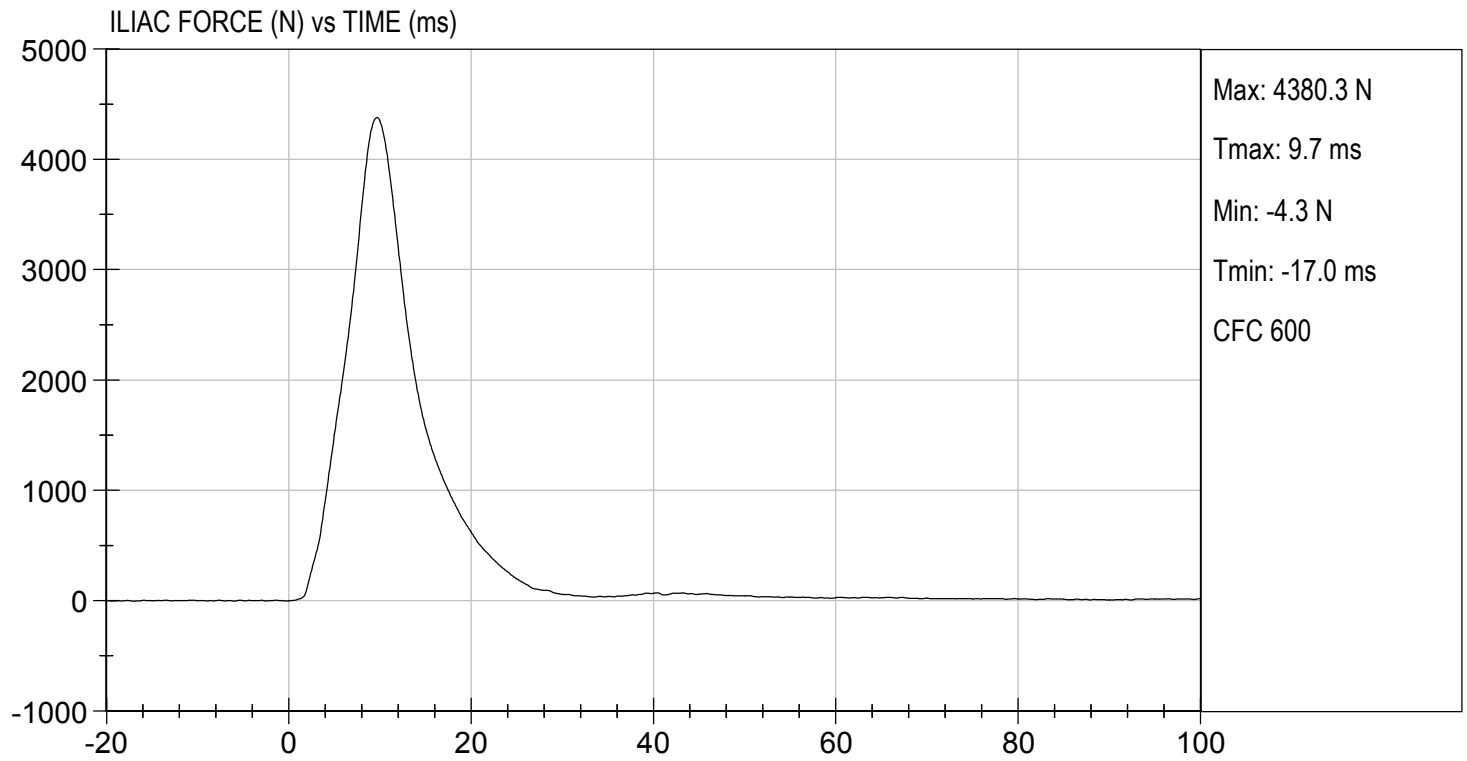
TEST DATE: 09/26/2019
TEST #: D193038





TEST DESC: ILLIAC
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 09/26/2019
TEST #: D193038



CALIBRATION TEST RESULTS

POST-TEST

SID-IIS 5TH PERCENTILE FEMALE - DRIVER ATD

SID-IIsD External Measurements
SN: 296

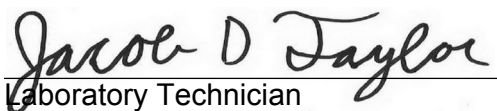
No.	Name	Spec. (mm)	Result	Pass/Fail
A	Sitting Height	772 - 788	784	Pass
B	Shoulder Pivot Height	437 - 453	442	Pass
C	H-point Height	79 - 89	83	Pass
D	H-point from Seatback	141 - 151	145	Pass
E	Shoulder Pivot from Backline	97 - 107	99	Pass
F	Thigh Clearance	119 -135	121	Pass
G	Head Breadth	140 - 148	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

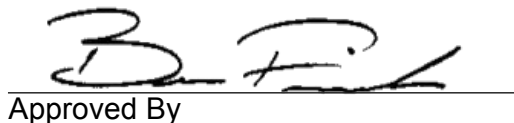
Test ID: D193311

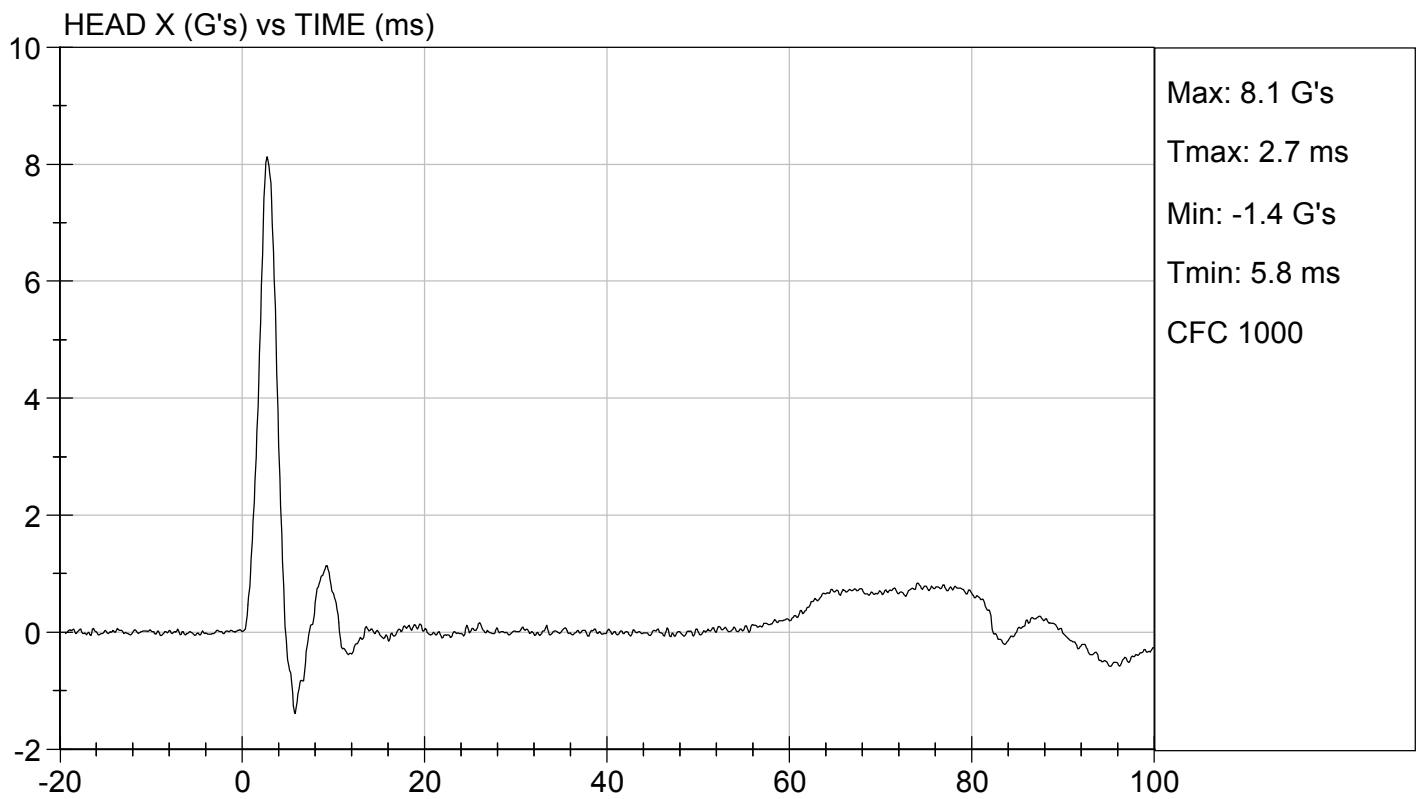
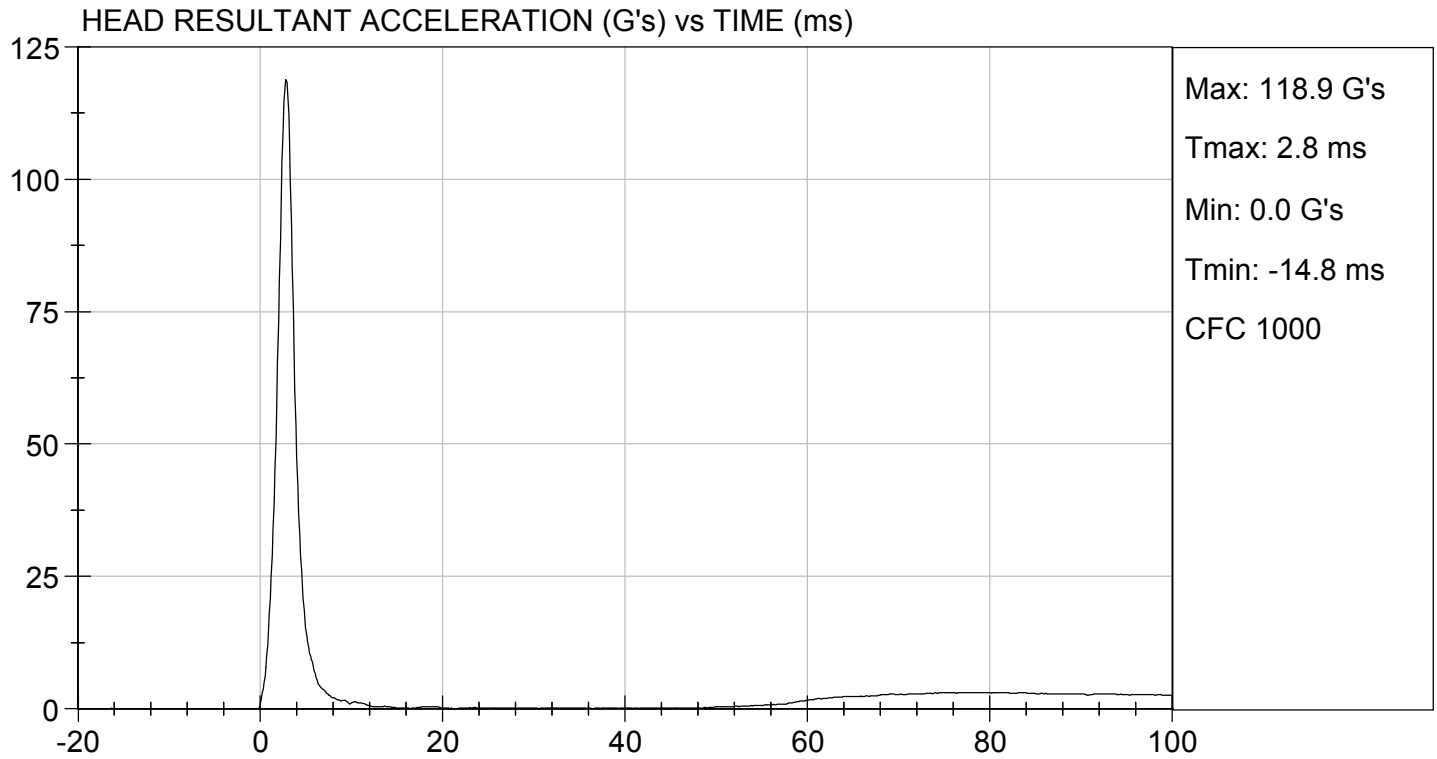
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	33	Pass
Peak Resultant Acceleration	G's	115 to 137	119	Pass
Peak Longitudinal Acceleration	G's	+/- 15	8.1	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	<15%	Yes	Pass
Overall Test Results			Pass	

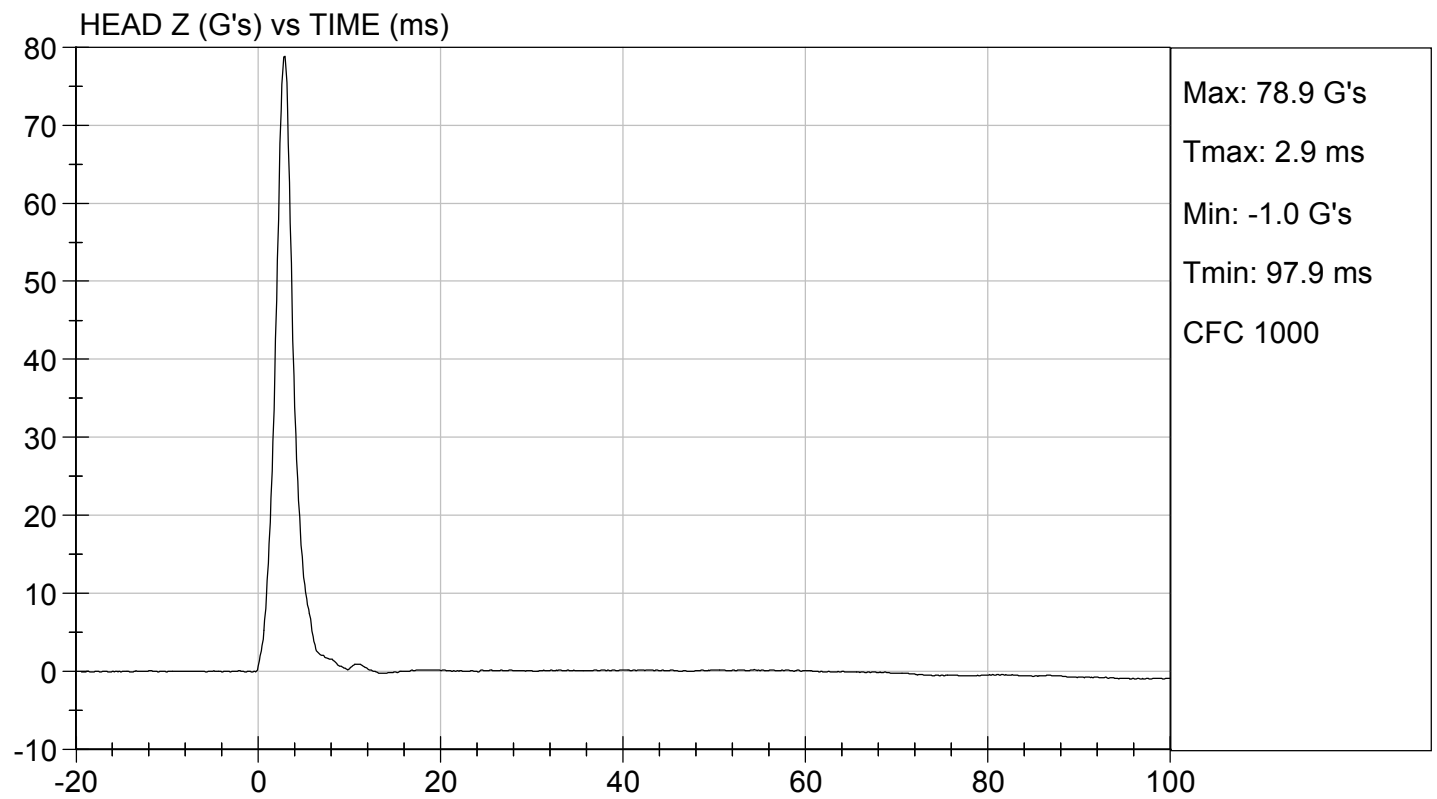
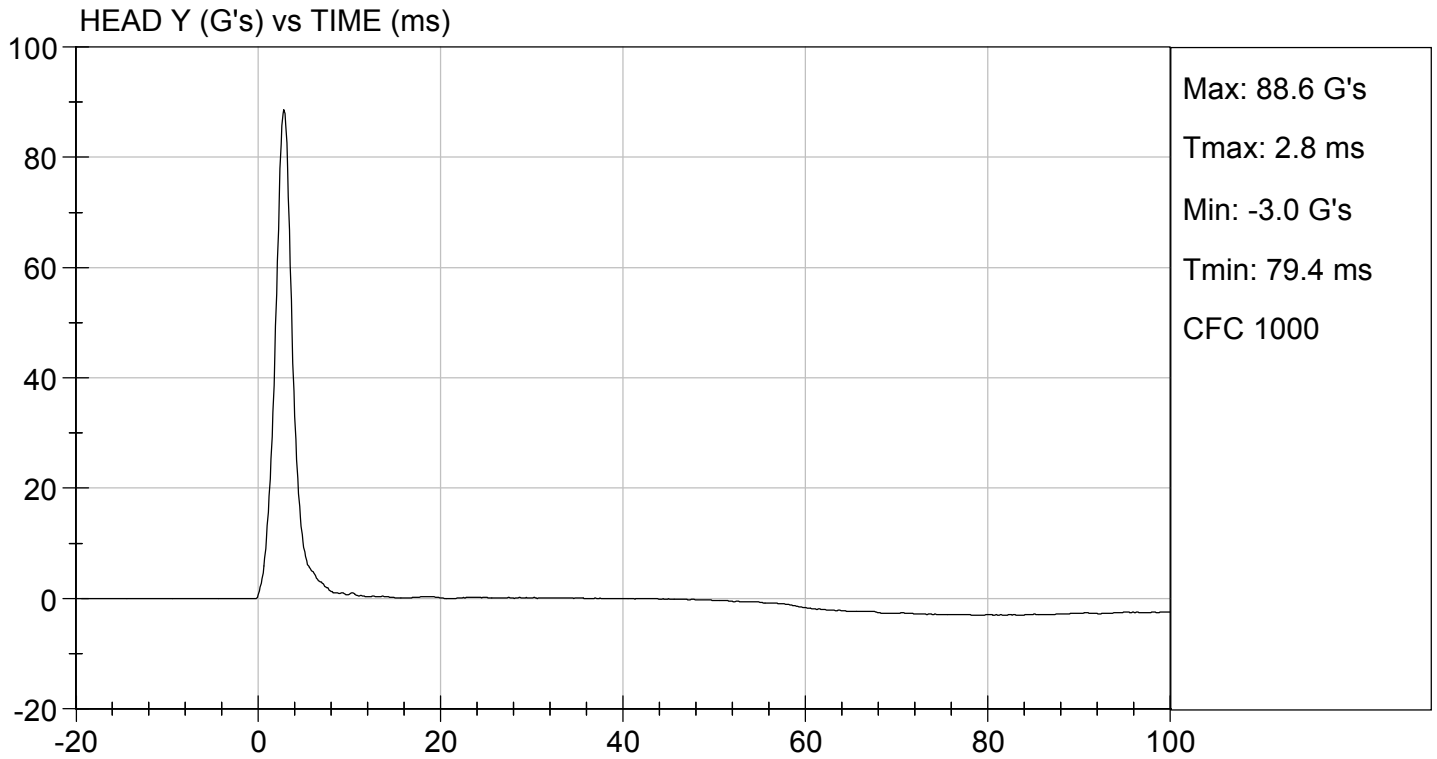

Laboratory Technician

10/18/2019

Test Date


Approved By





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

ATD Serial No: 296

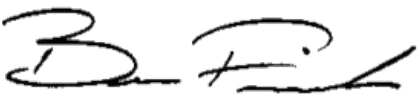
Test I.D: D193312

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.5	Pass
Humidity		%	10 to 70	32	Pass
Impact Velocity		m/s	5.51 to 5.63	5.63	Pass
Pendulum Velocity	10 ms	m/s	2.20 to 2.80	2.23	Pass
	15 ms	m/s	3.30 to 4.10	3.31	Pass
	20 ms	m/s	4.40 to 5.40	4.69	Pass
	25 ms	m/s	5.40 to 6.10	5.67	Pass
	25-100 ms	m/s	5.50 to 6.20	5.68	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	-36	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	115	Pass
Overall Test Results					Pass


 Laboratory Technician

10/23/2019

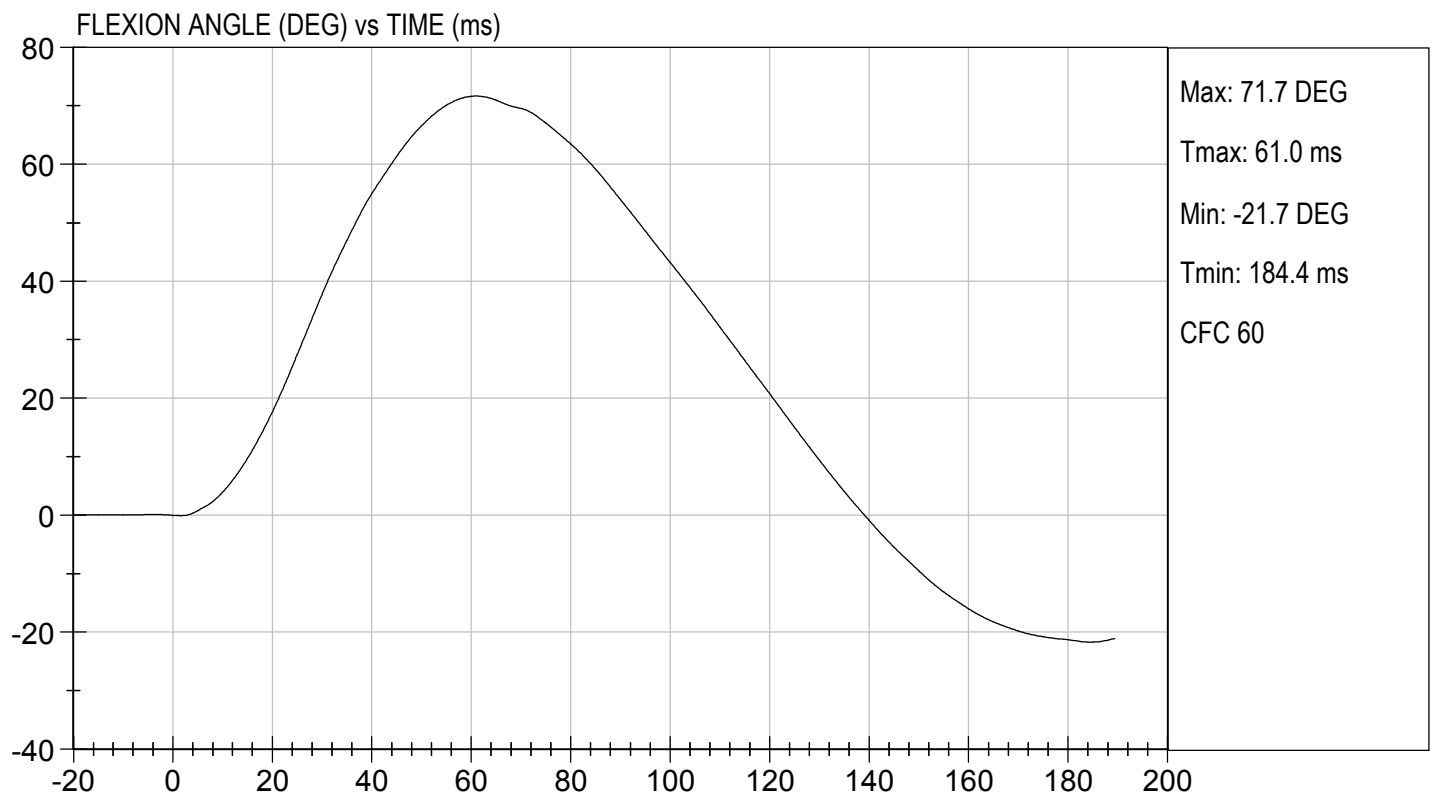
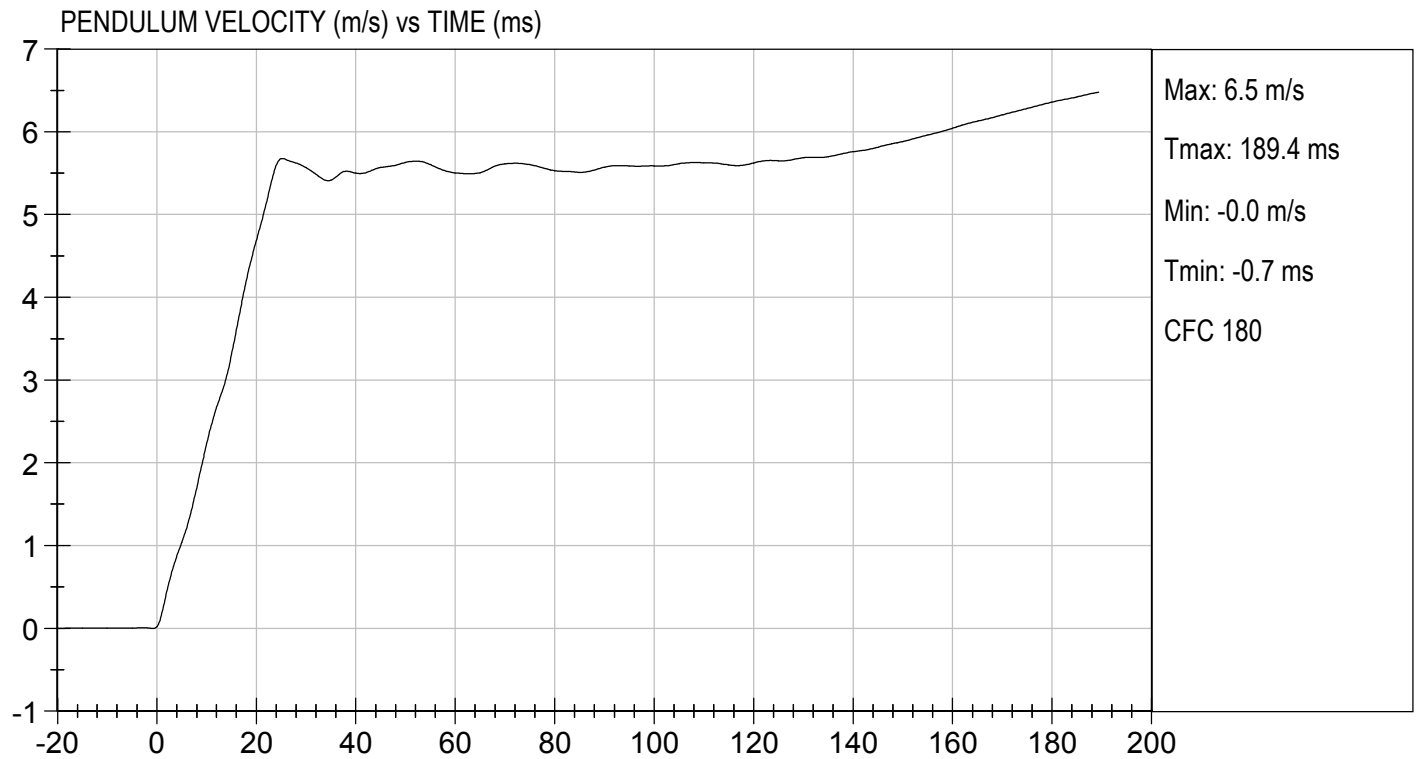
Test Date


 Approved By



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

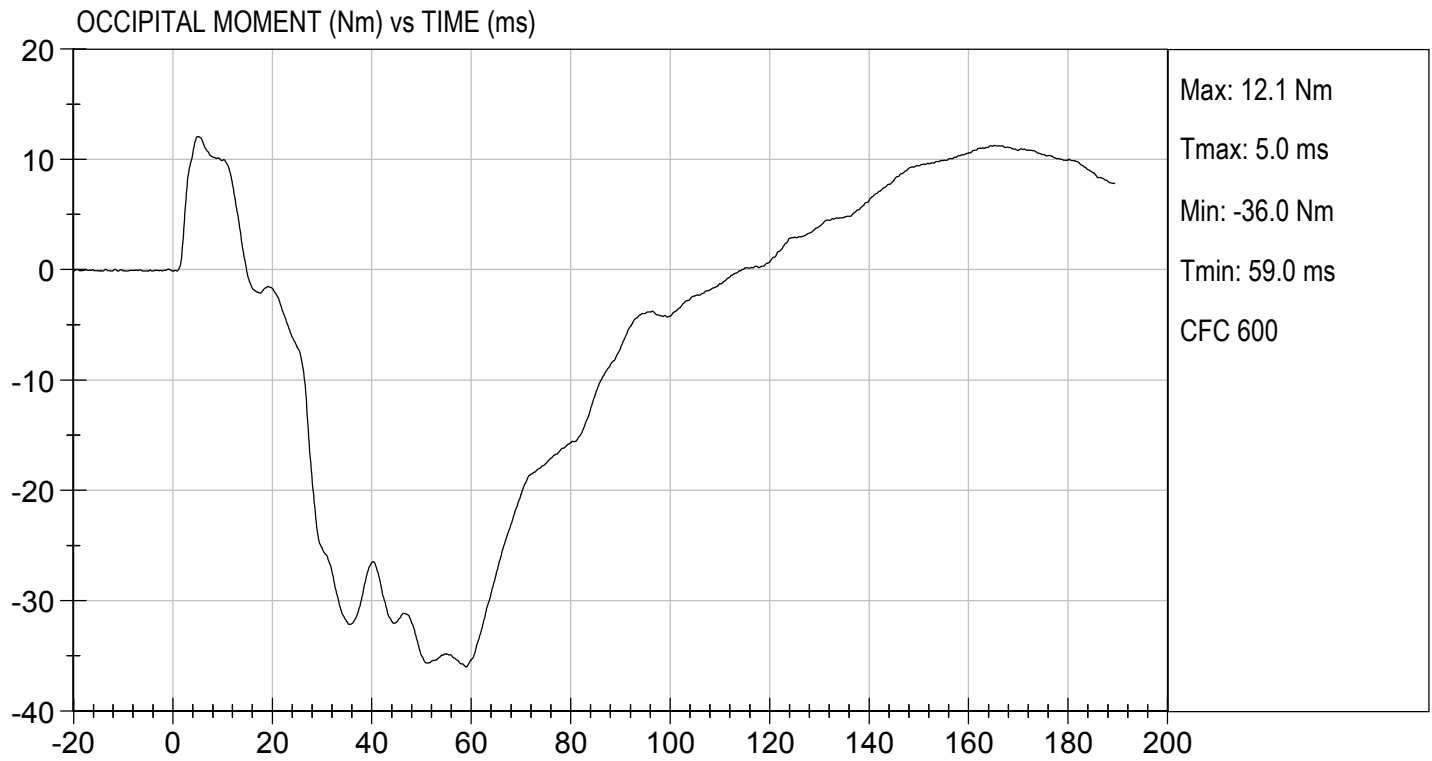
TEST DATE: 10/23/2019
TEST #: D193312





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

TEST DATE: 10/23/2019
TEST #: D193312

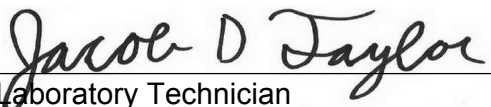


MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

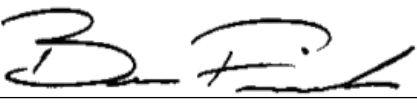
Test ID: D193313

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	39	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Maximum Probe Acceleration	G's	13 to 18	14	Pass
Shoulder Displacement	mm	28 to 37	29	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	18	Pass
Overall Test Results			Pass	


Laboratory Technician

10/22/2019

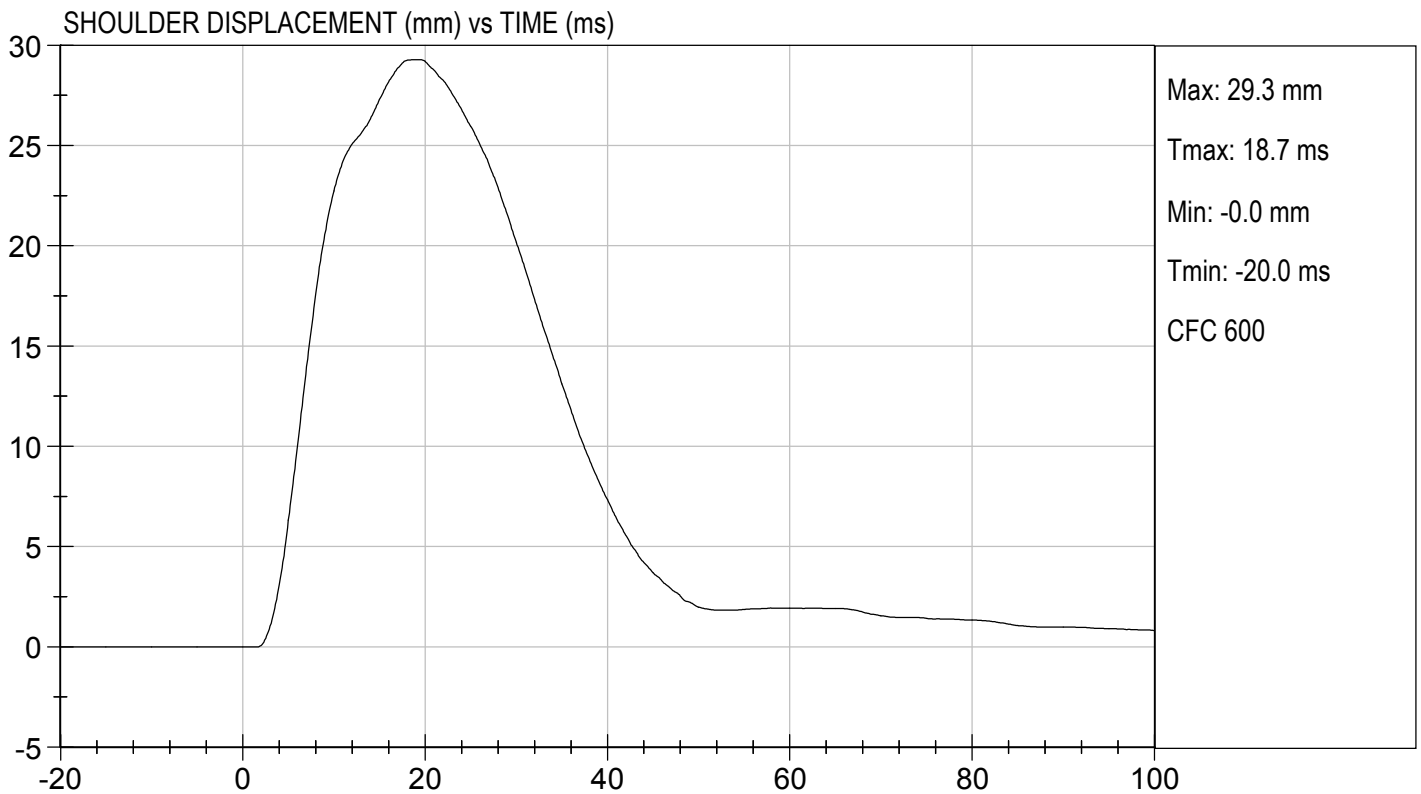
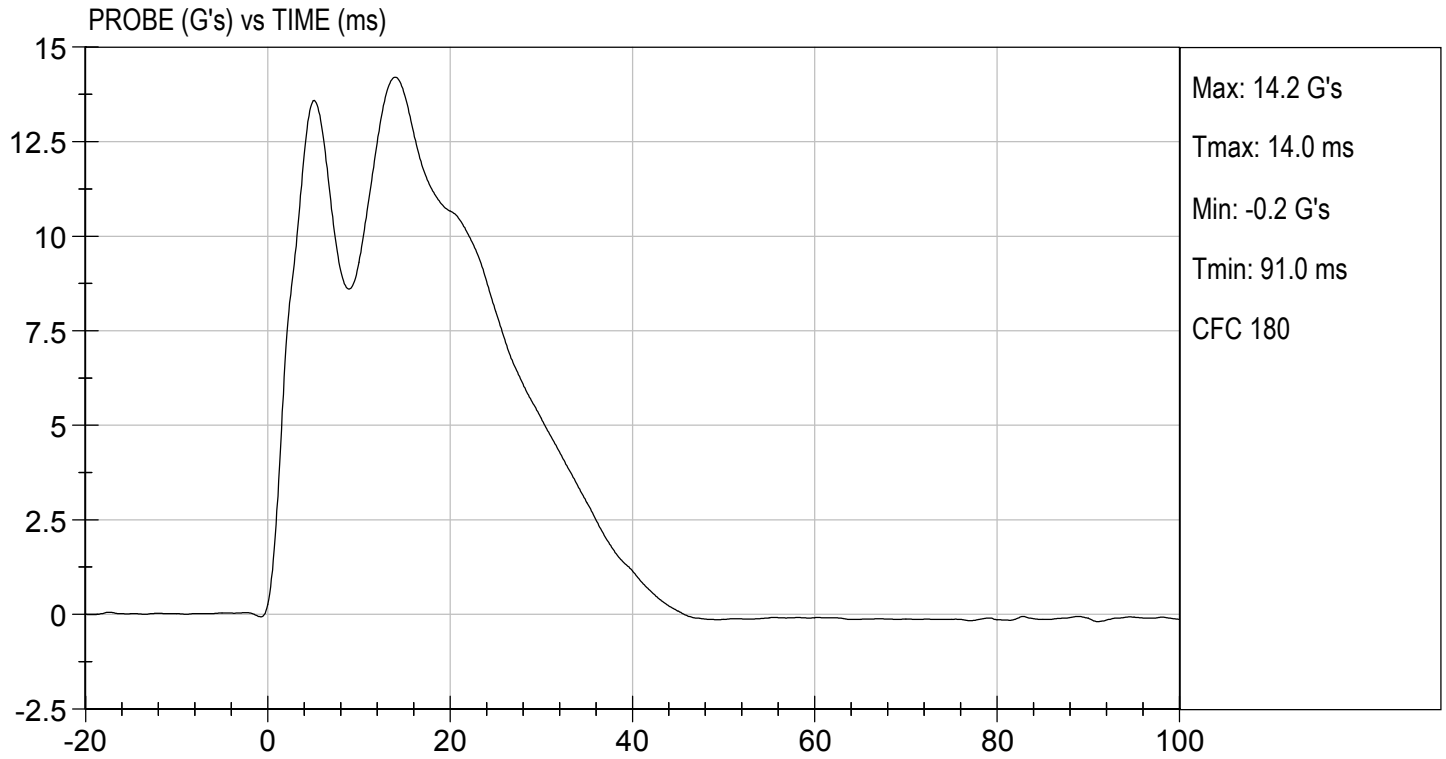
Test Date


Approved By



TEST DESC: SHOULDER IMPACT
VELOCITY: 14.12 ft/s, 4.30 m/s

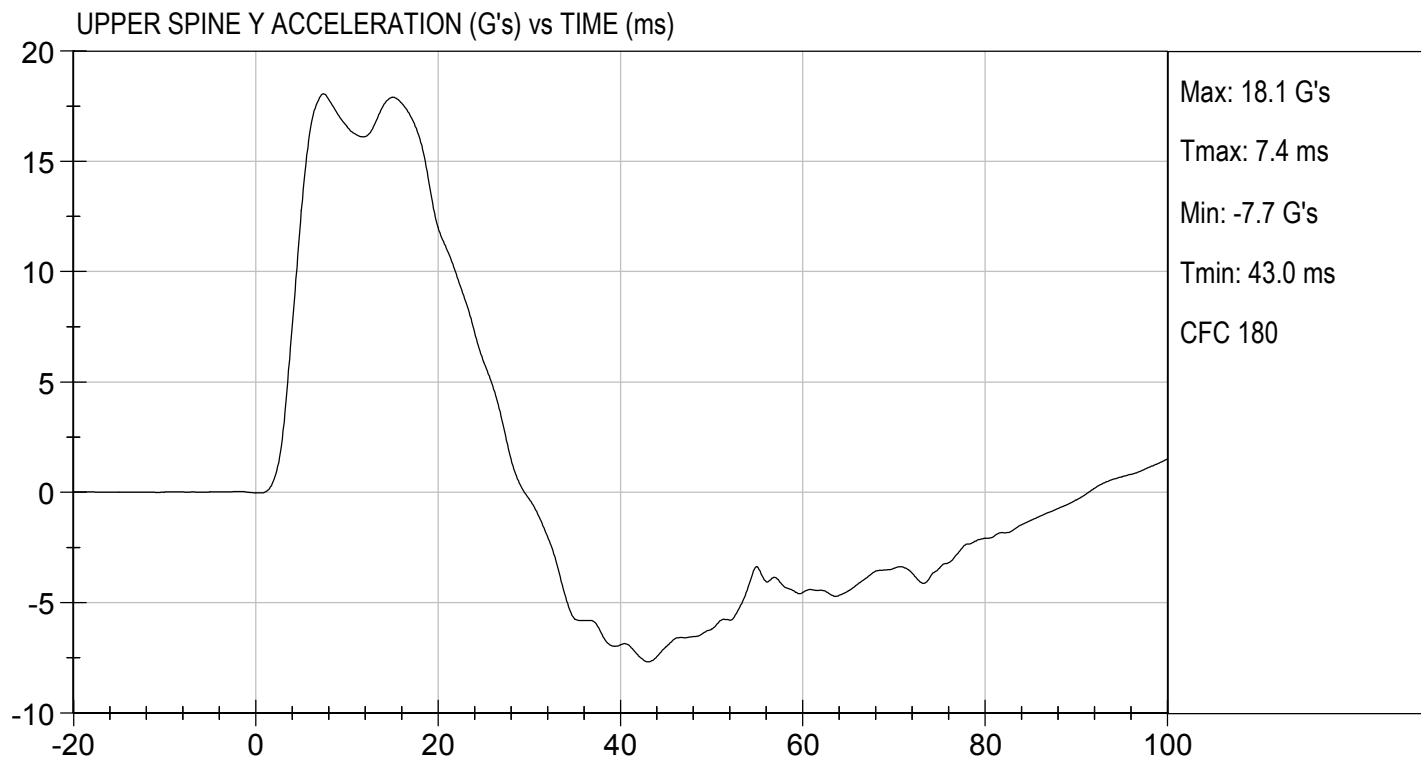
TEST DATE: 10/22/2019
TEST #: D193313





TEST DESC: SHOULDER IMPACT
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 10/22/2019
TEST #: D193313

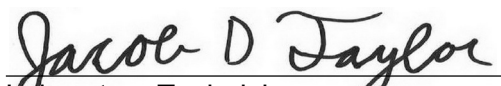


MGA RESEARCH CORPORATION
THORAX (WITH ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

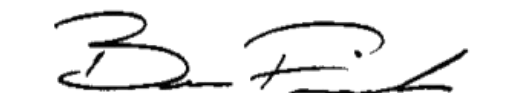
Test I.D: D193314

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	39	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	35	Pass
Upper Rib Displacement	mm	25 to 32	27	Pass
Middle Rib Displacement	mm	30 to 36	31	Pass
Lower Rib Displacement	mm	32 to 38	34	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	38	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	34	Pass
Overall Test Results				Pass


Laboratory Technician

10/22/2019

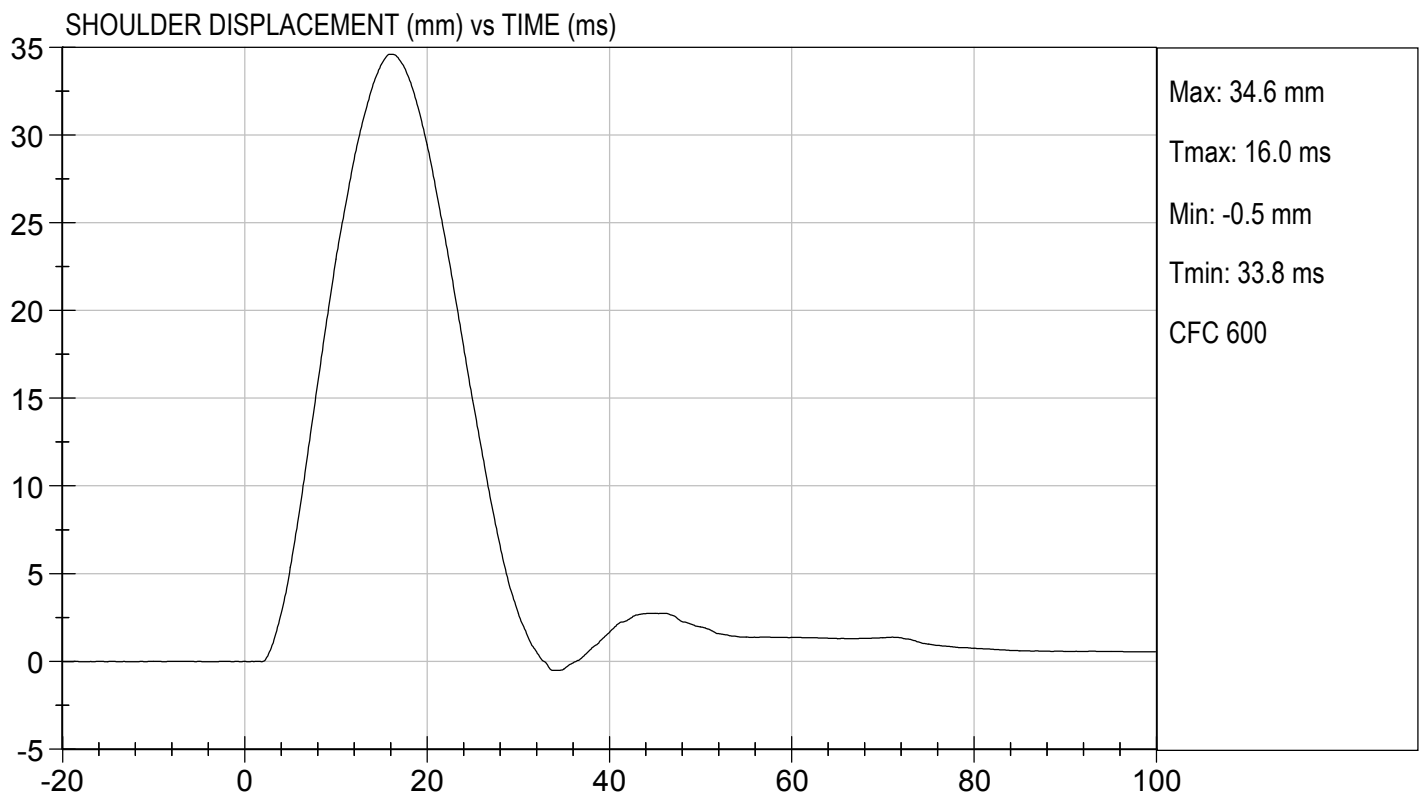
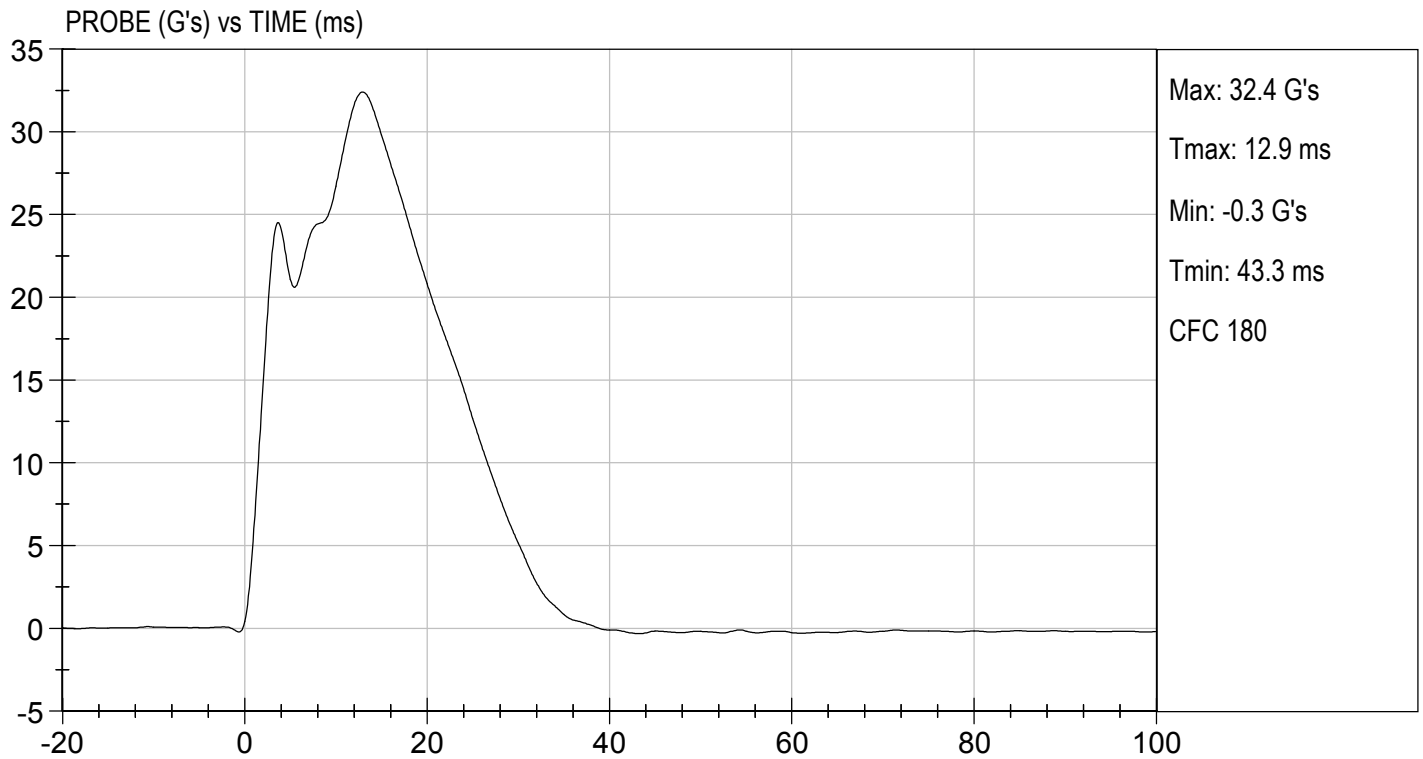
Test Date


Approved By



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

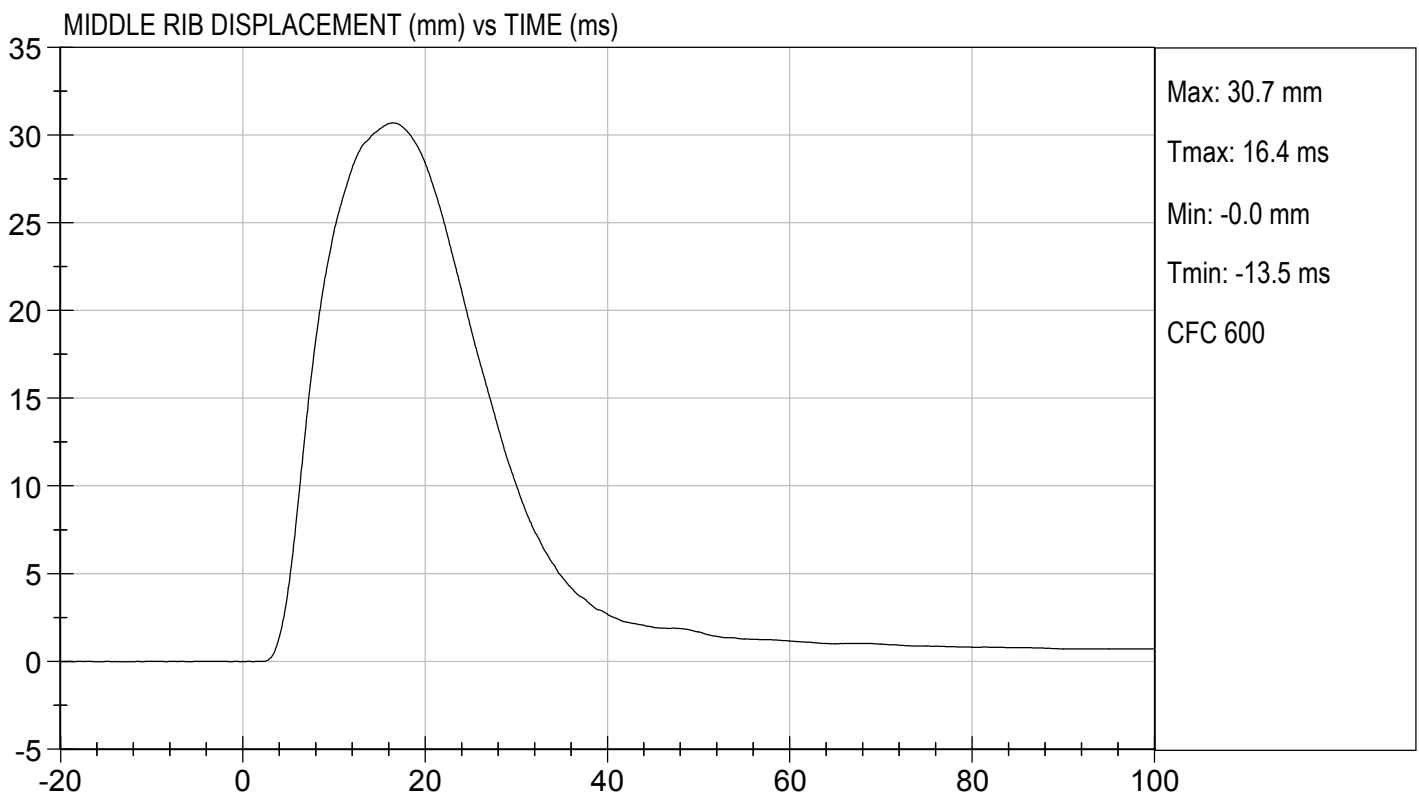
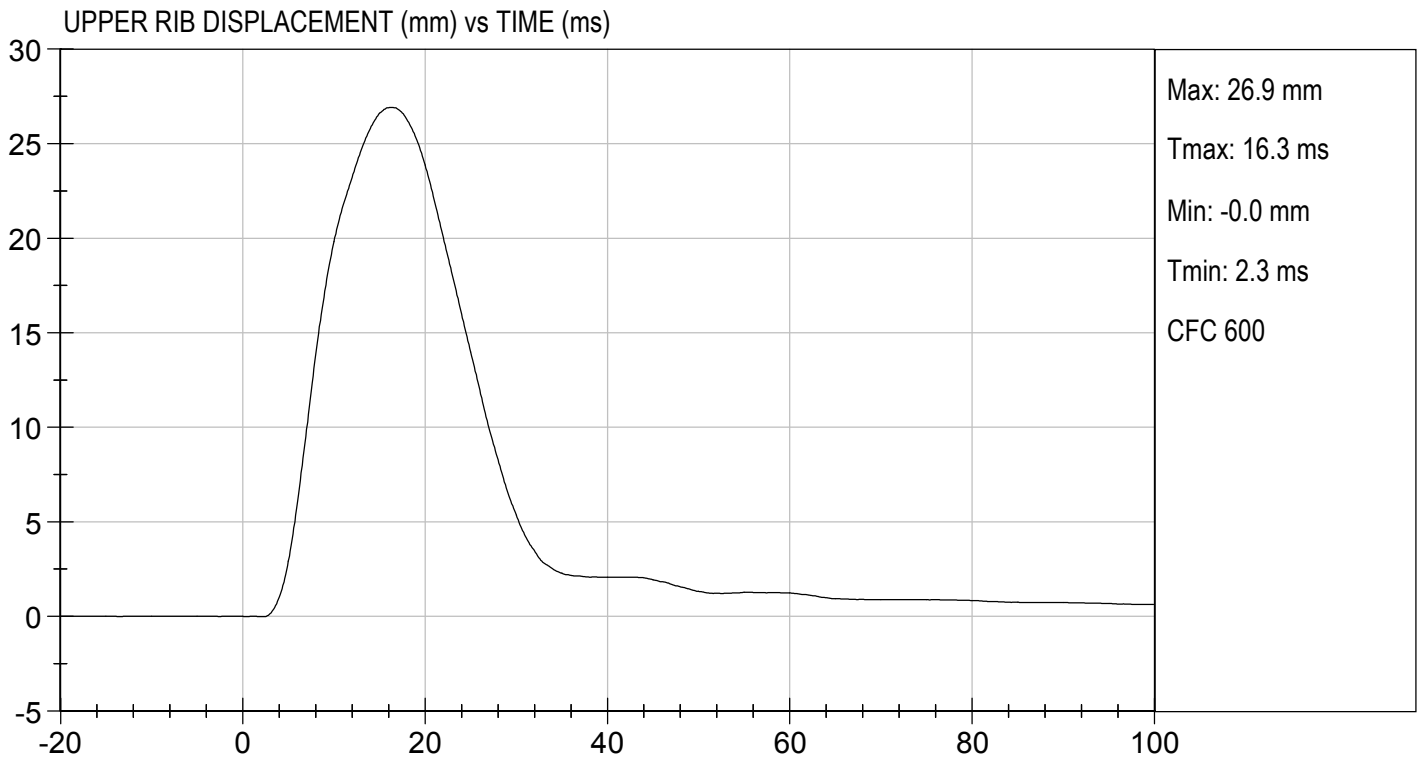
TEST DATE: 10/22/2019
TEST #: D193314





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

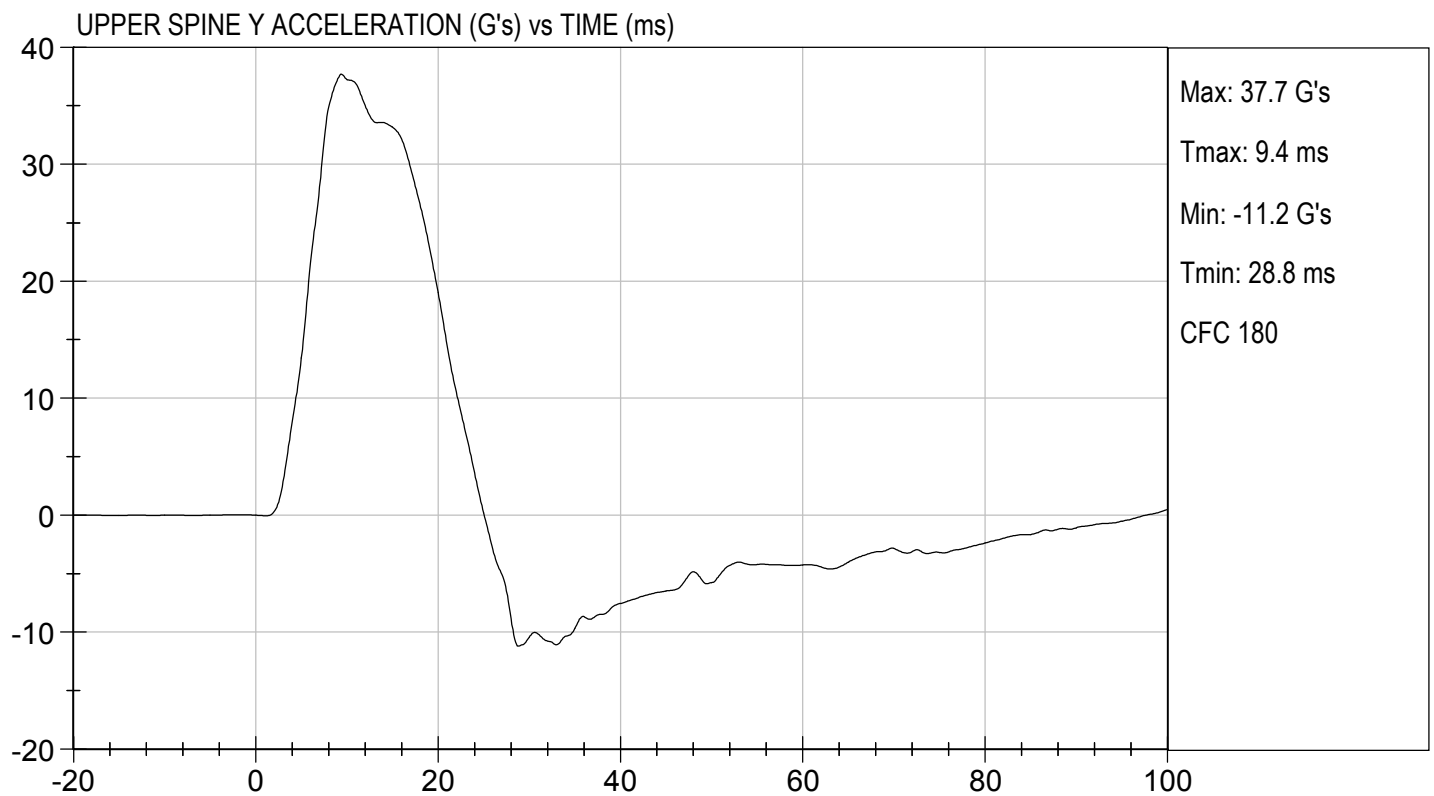
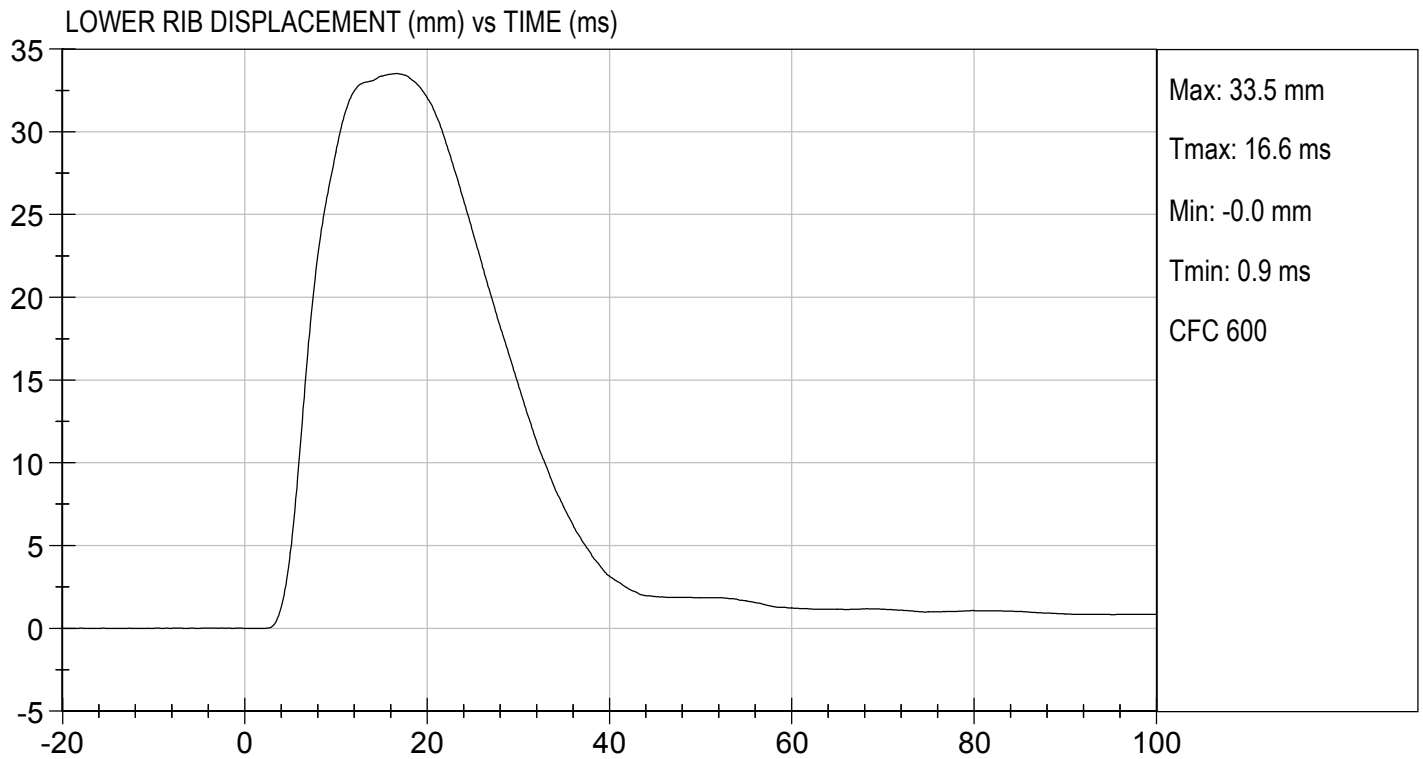
TEST DATE: 10/22/2019
TEST #: D193314





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

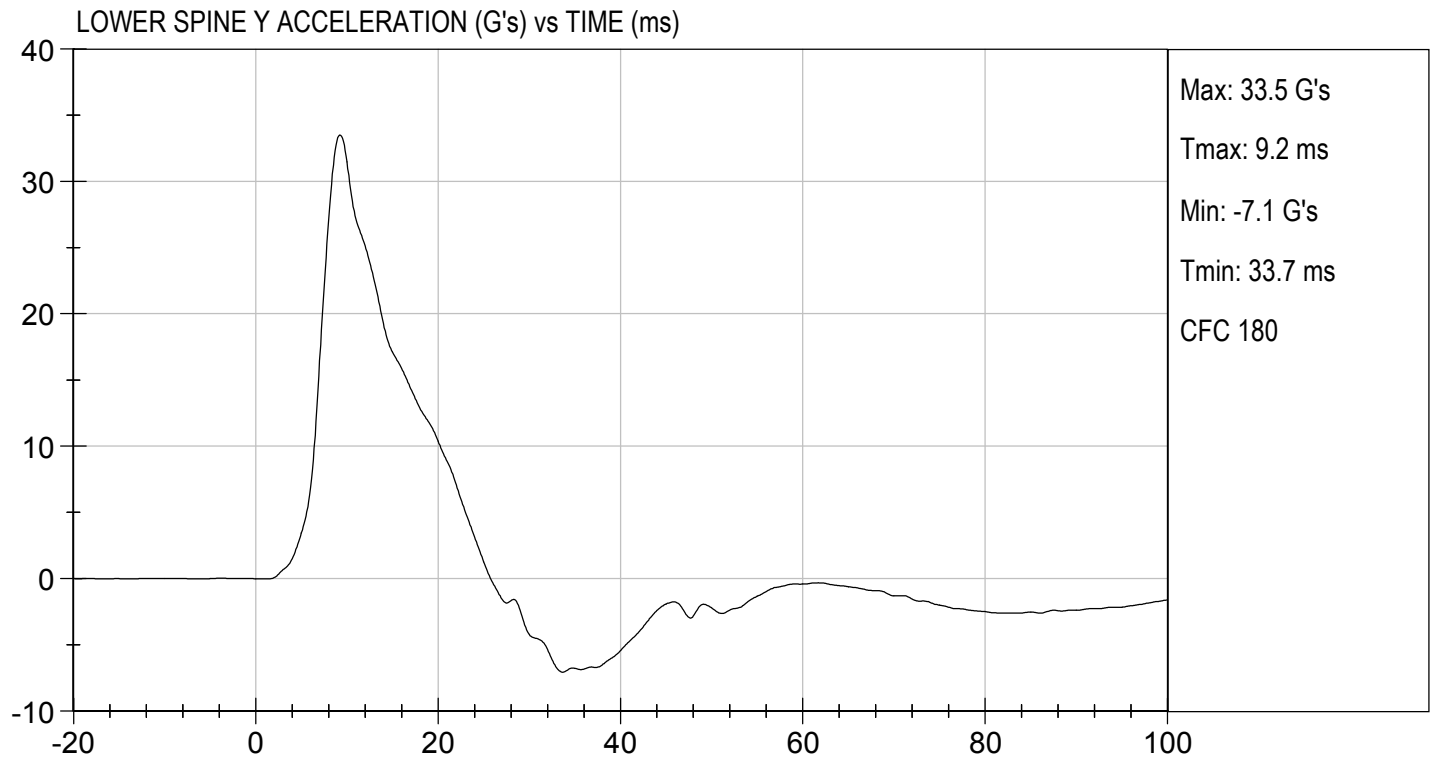
TEST DATE: 10/22/2019
TEST #: D193314





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

TEST DATE: 10/22/2019
TEST #: D193314

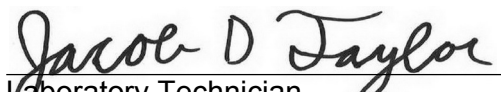


MGA RESEARCH CORPORATION
THORAX (WITHOUT ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

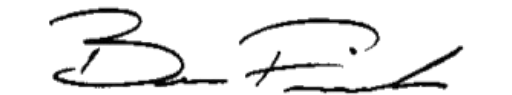
Test I.D: D193315

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	39	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Maximum Probe Acceleration	G's	14 to 18	14	Pass
Upper Rib Displacement	mm	32 to 40	40	Pass
Middle Rib Displacement	mm	39 to 45	43	Pass
Lower Rib Displacement	mm	35 to 43	38	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

10/22/2019

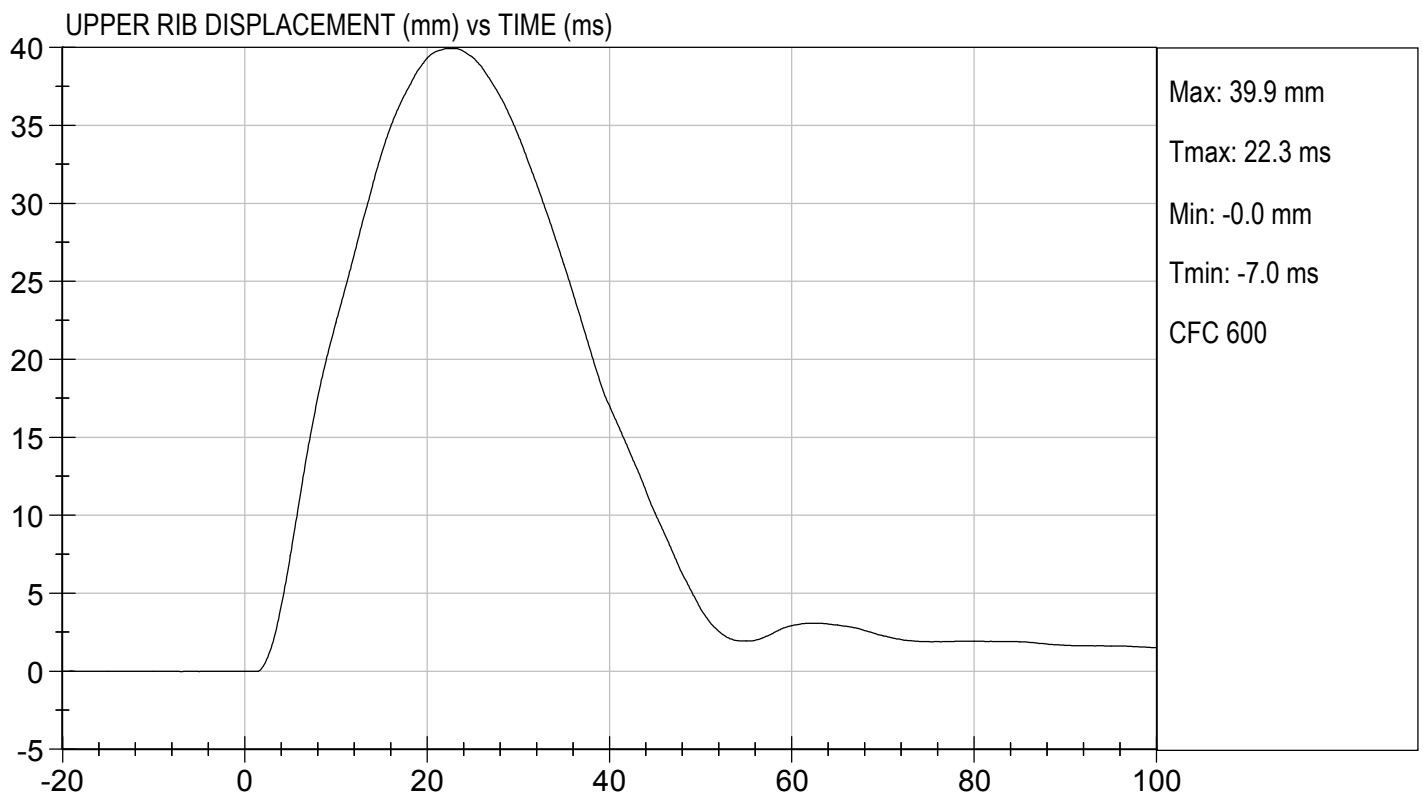
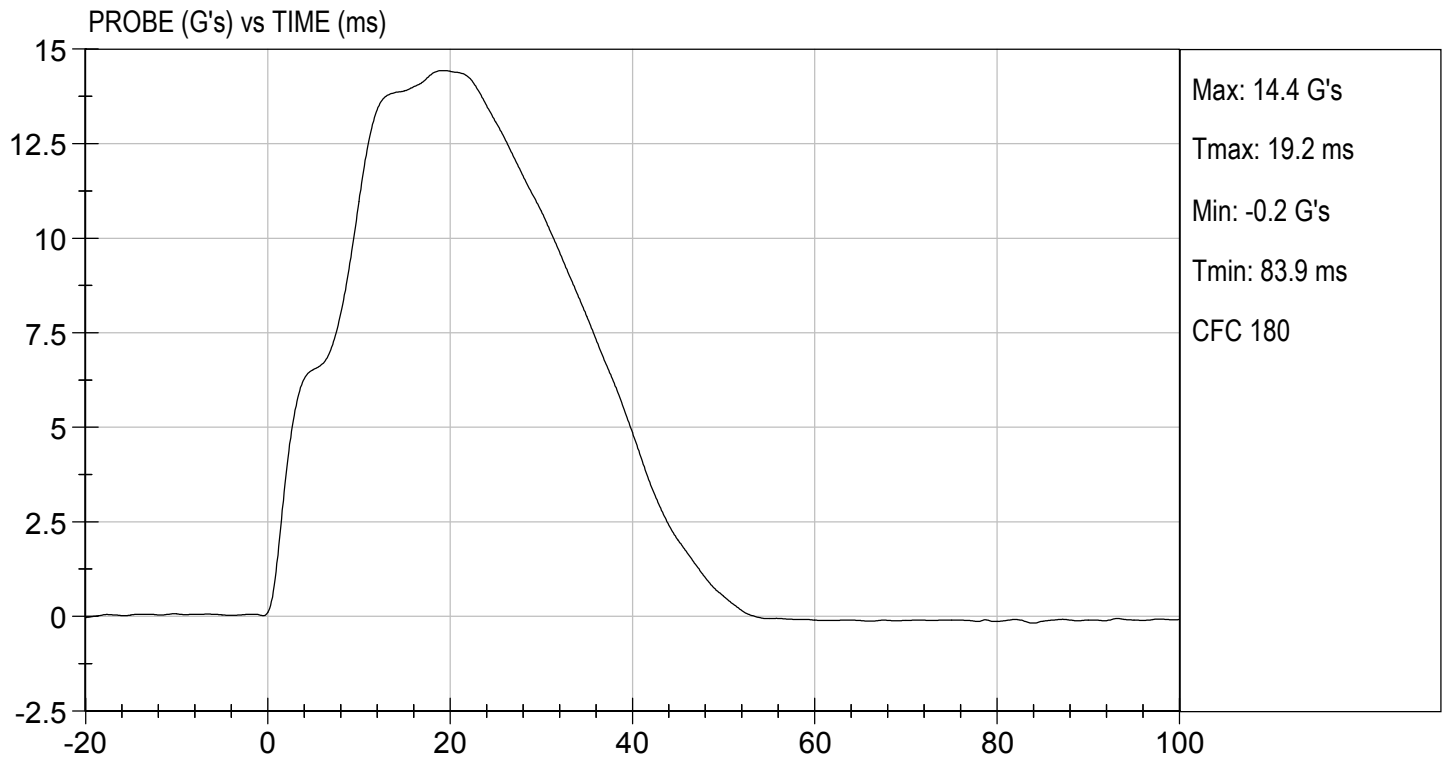
Test Date


 Approved By



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

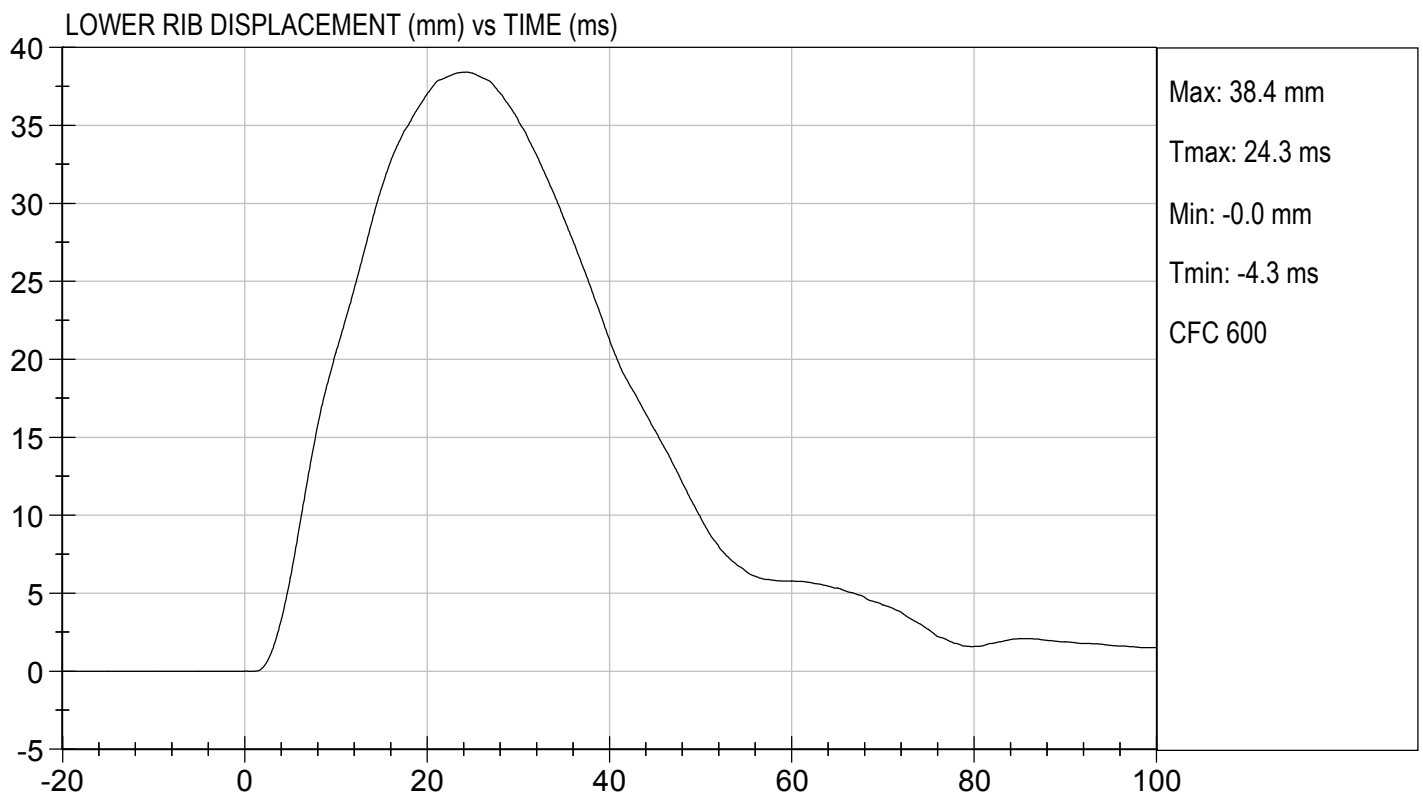
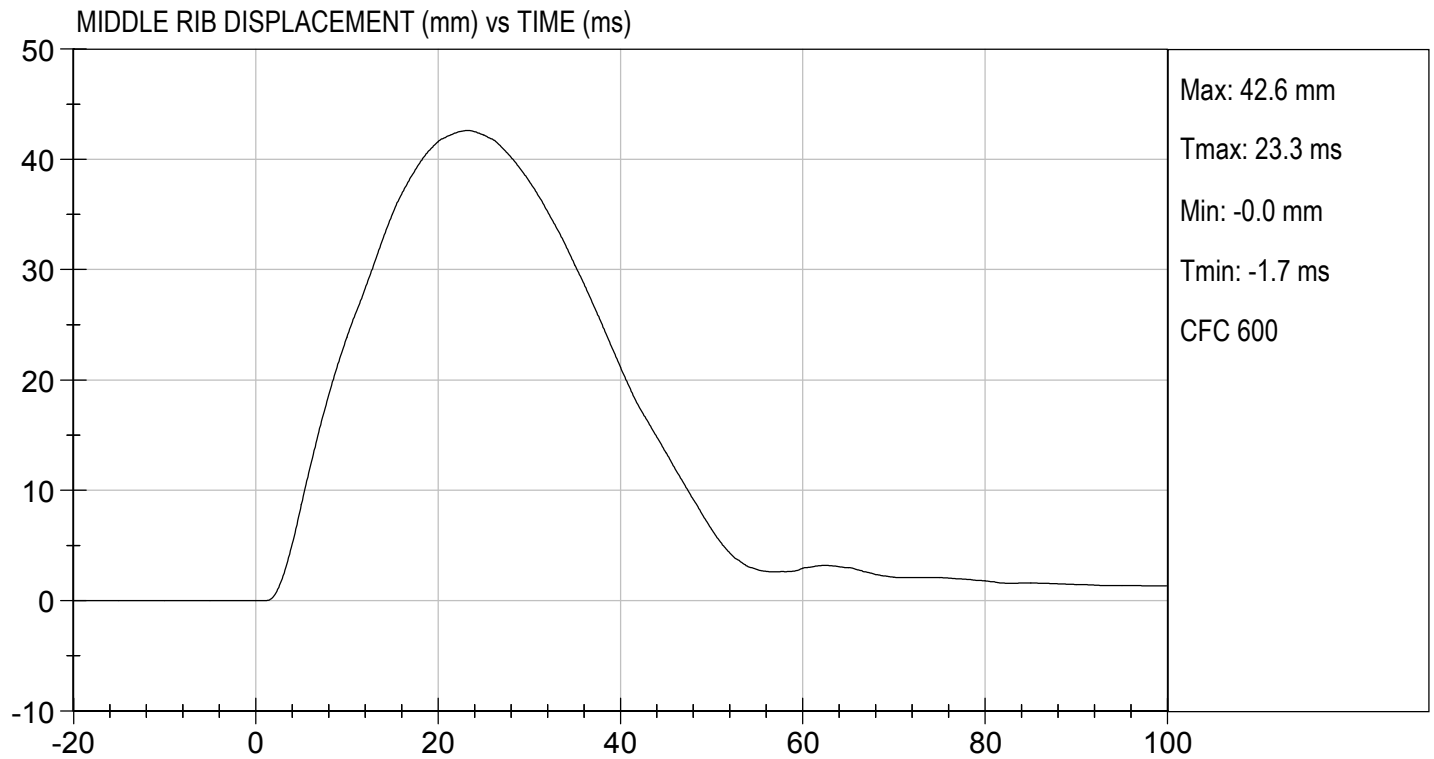
TEST DATE: 10/22/2019
TEST #: D193315





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

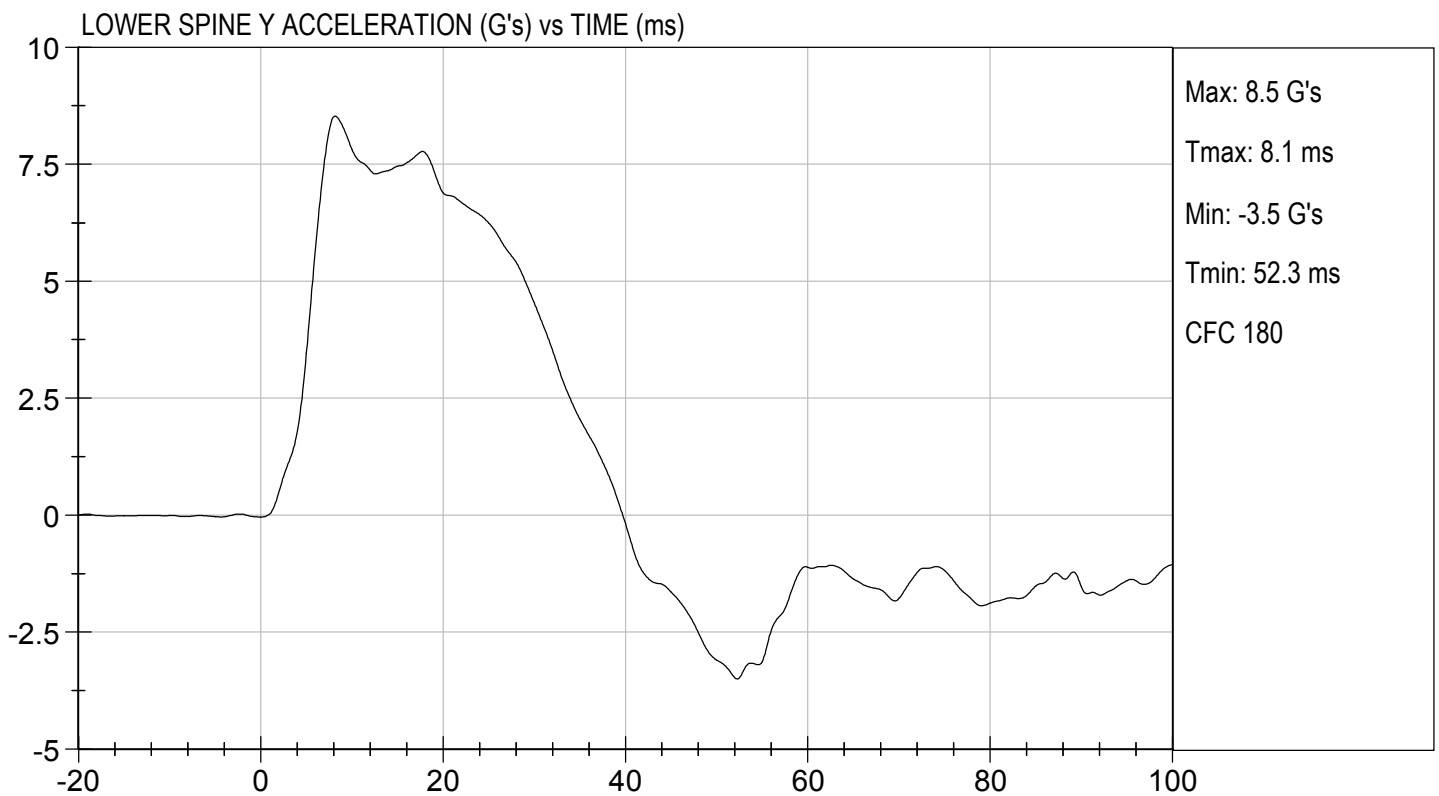
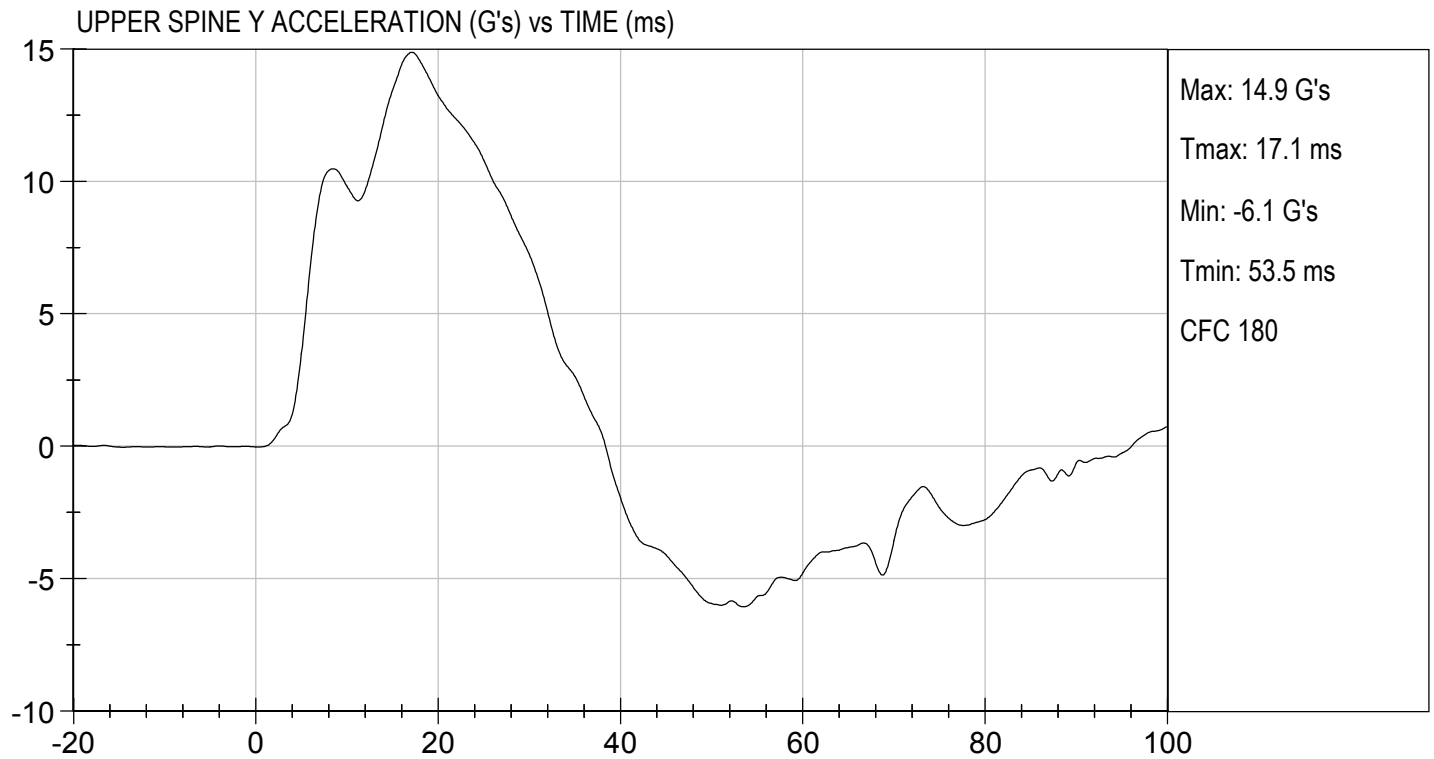
TEST DATE: 10/22/2019
TEST #: D193315





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

TEST DATE: 10/22/2019
TEST #: D193315



MGA RESEARCH CORPORATION

ABDOMINAL IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

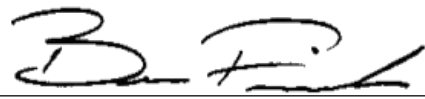
Test I.D: D193316

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	39	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	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	34	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	12	Pass
Overall Test Results				Pass


Laboratory Technician

10/22/2019

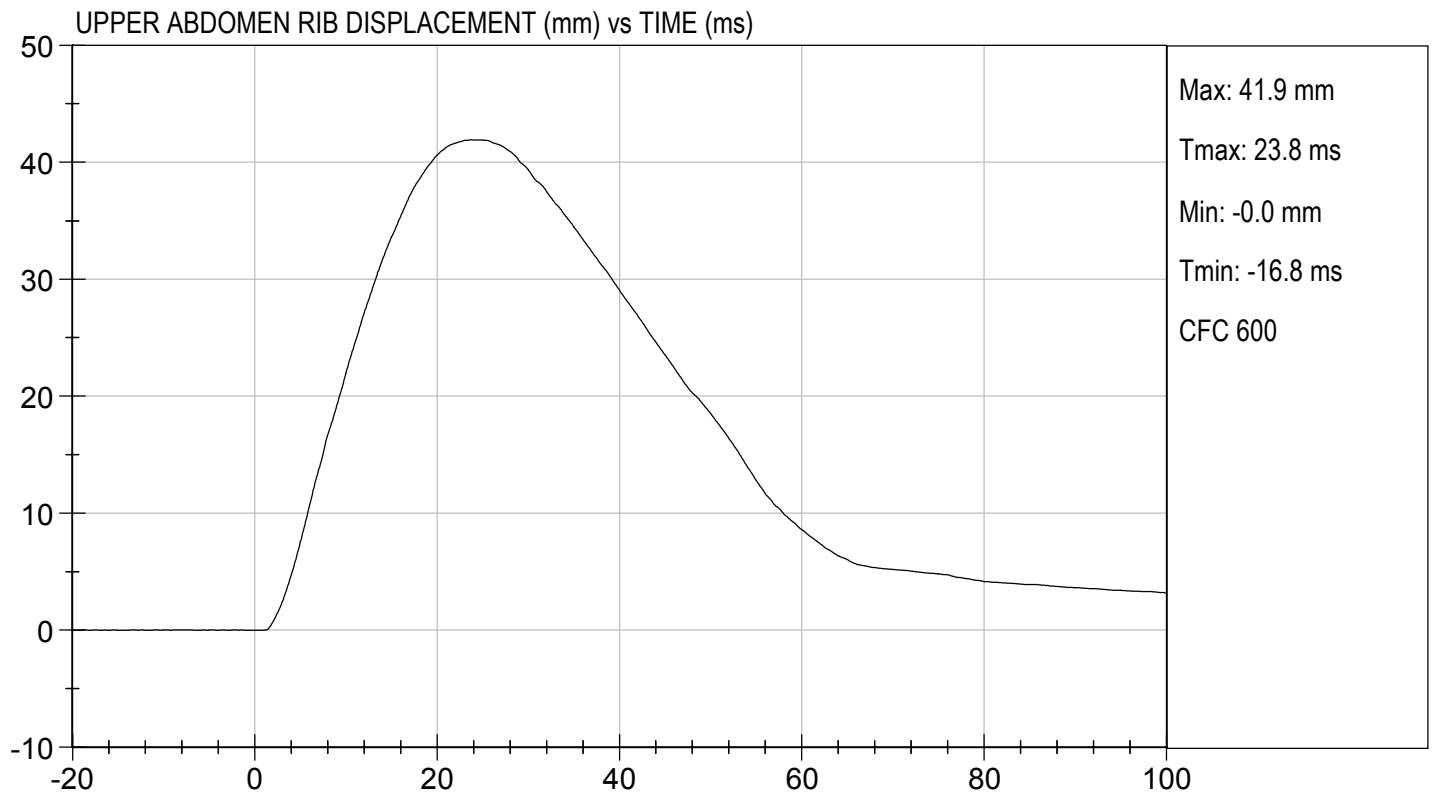
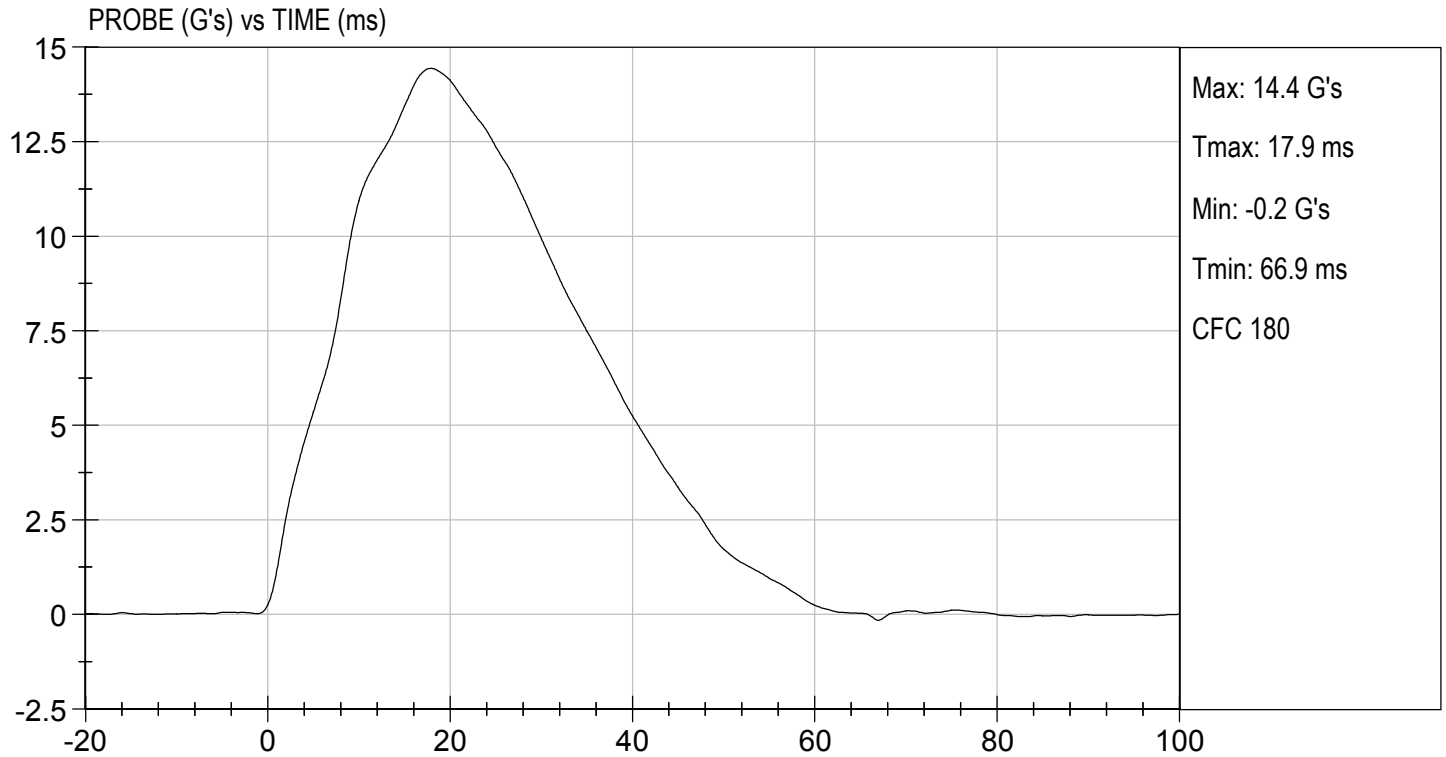
Test Date


Approved By



TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.12 ft/s, 4.30 m/s

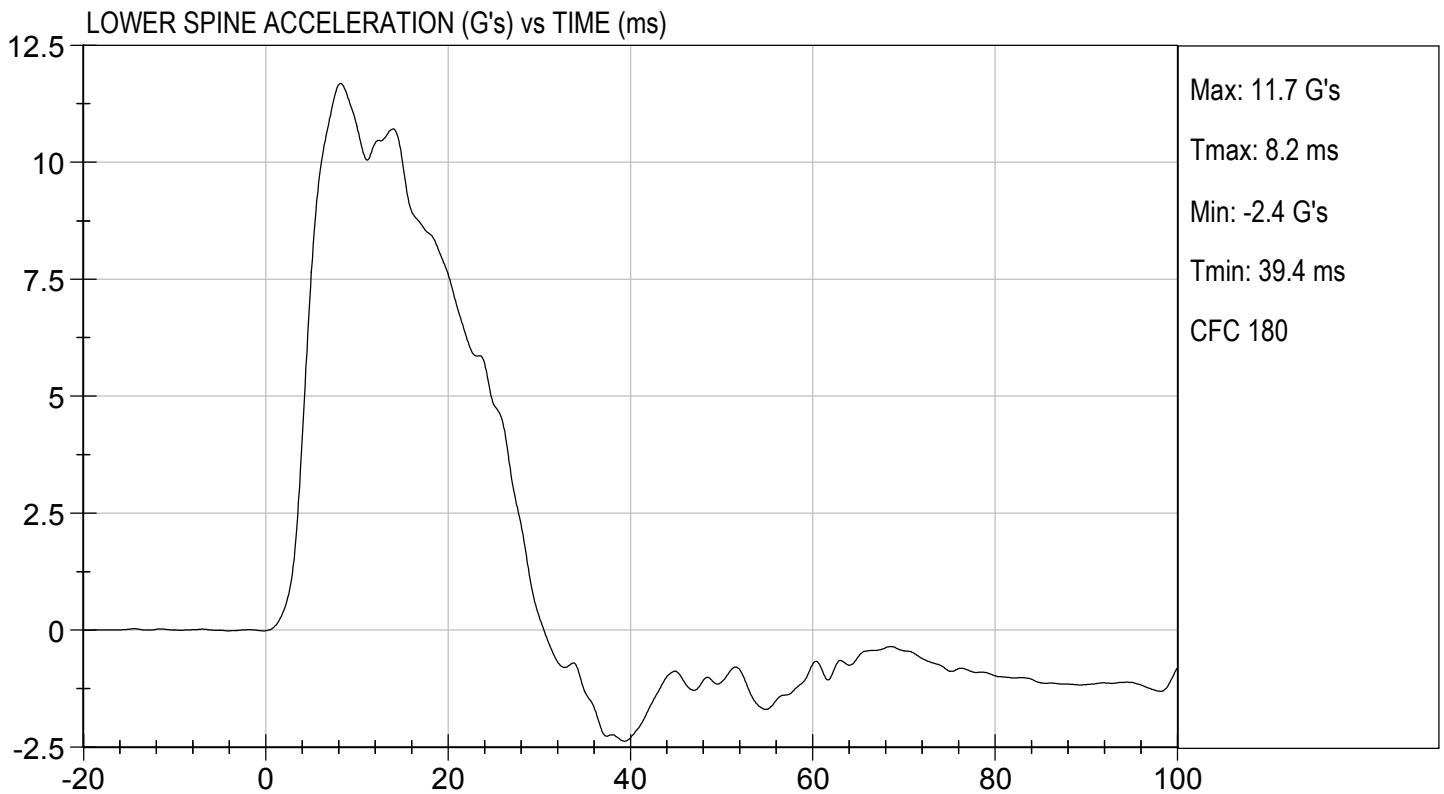
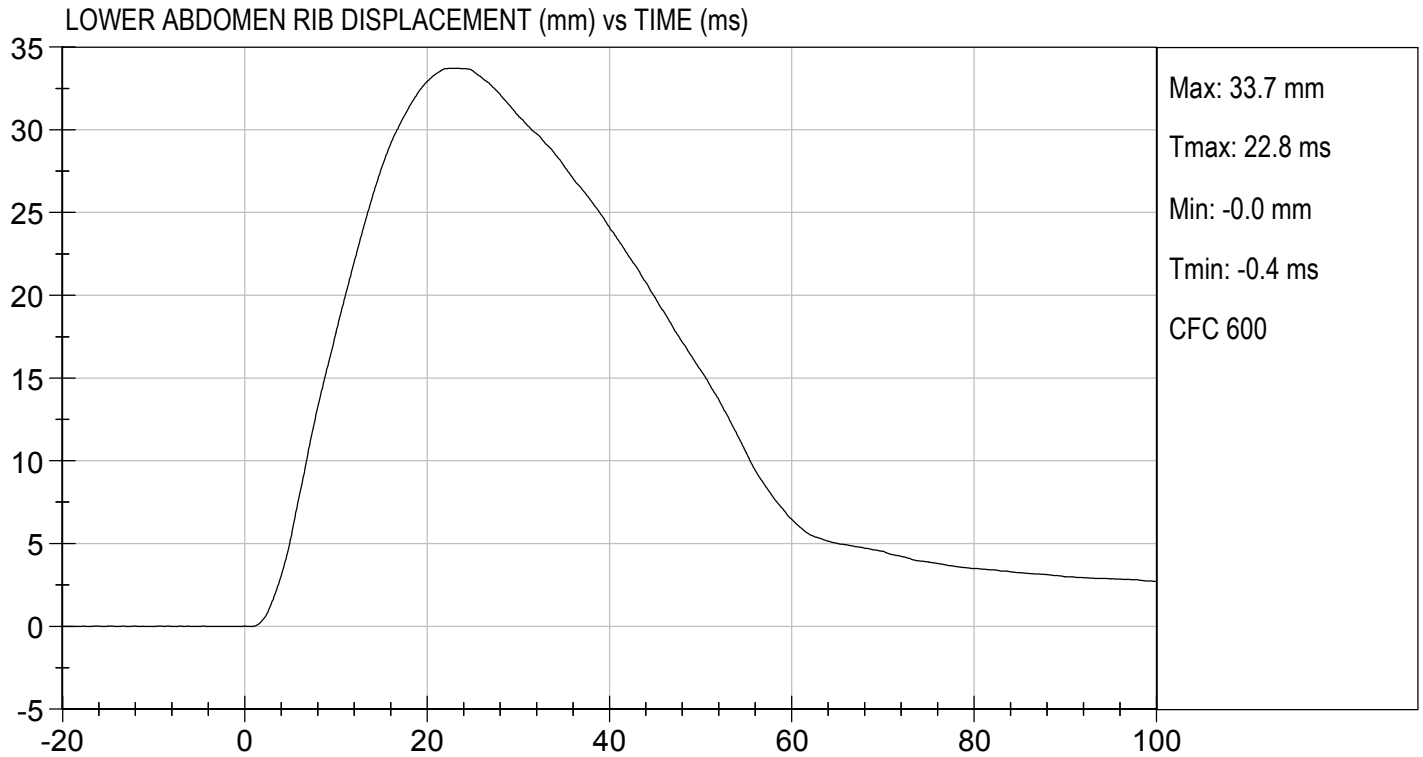
TEST DATE: 10/22/2019
TEST #: D193316





TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 10/22/2019
TEST #: D193316



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D193317

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	39	Pass
Impact Velocity	m/s	6.60 to 6.80	6.60	Pass
Maximum Probe Acceleration	G's	38 to 47	45	Pass
Pelvis Y Acceleration After 6 ms	G's	34 to 42	39	Pass
Peak Acetabulum Force	N	3600 to 4300	4,207	Pass
Overall Test Results				Pass

Jacob D Taylor
Laboratory Technician

10/22/2019

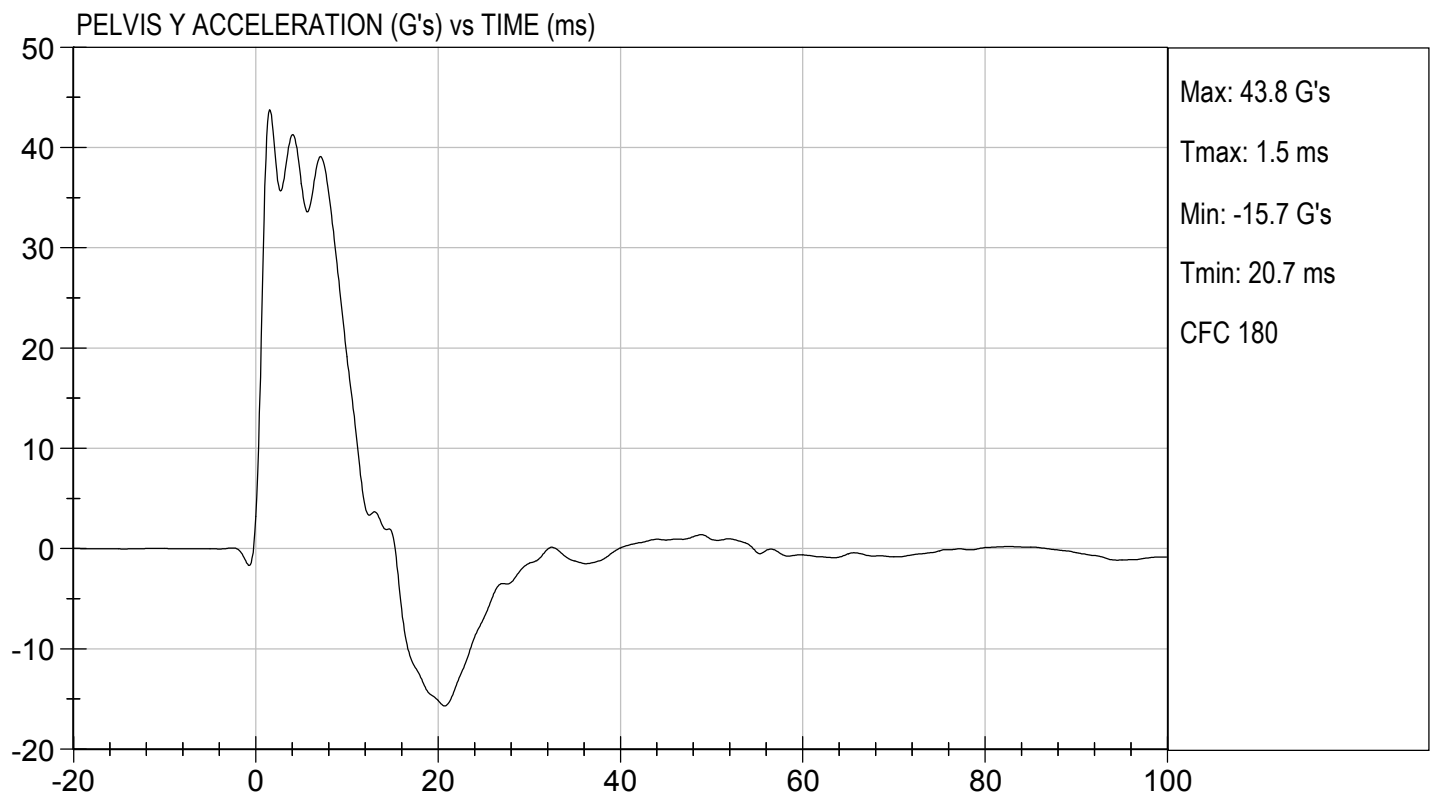
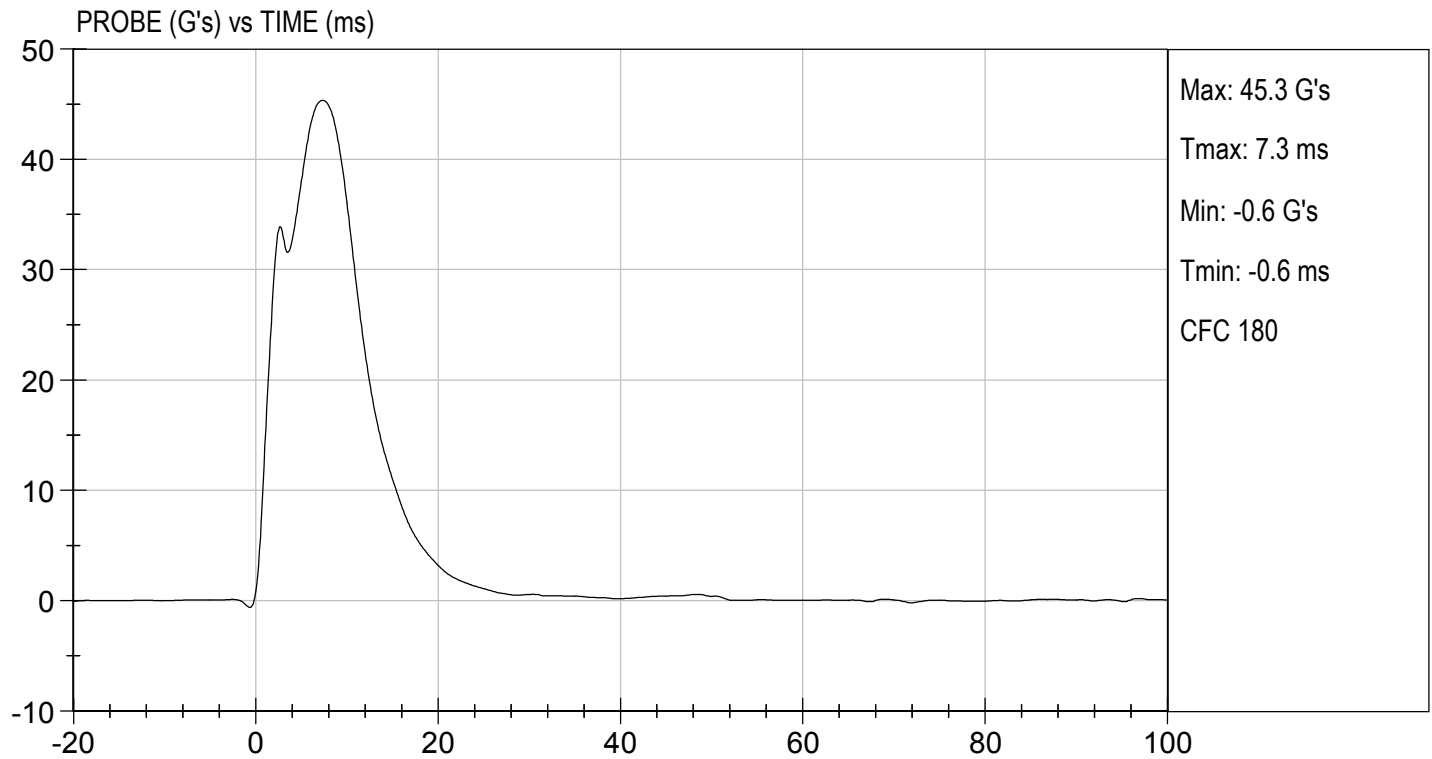
Test Date

B. F. H.
Approved By



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

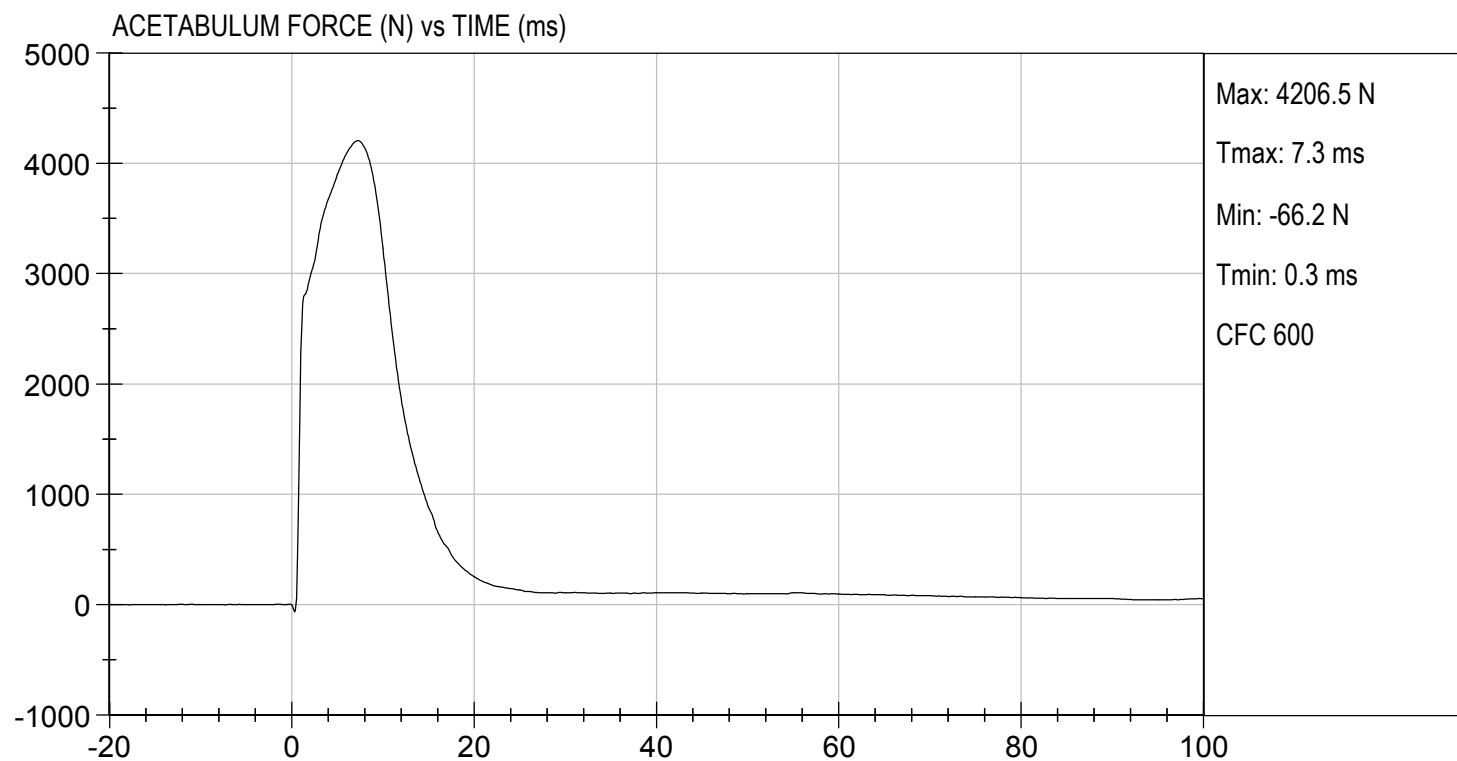
TEST DATE: 10/22/2019
TEST #: D193317





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

TEST DATE: 10/22/2019
TEST #: D193317



MGA RESEARCH CORPORATION

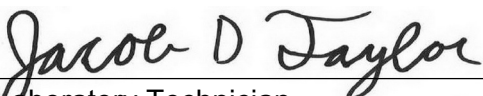
ILIAC IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

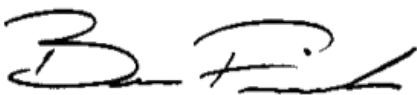
Test I.D: D193318

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.9	Pass
Humidity	%	10 to 70	43	Pass
Impact Velocity	m/s	4.20 to 4.40	4.40	Pass
Maximum Probe Acceleration	G's	36 to 45	39	Pass
Pelvis Y Acceleration	G's	28 to 39	31	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4,566	Pass
Overall Test Results				Pass


Laboratory Technician

10/21/2019

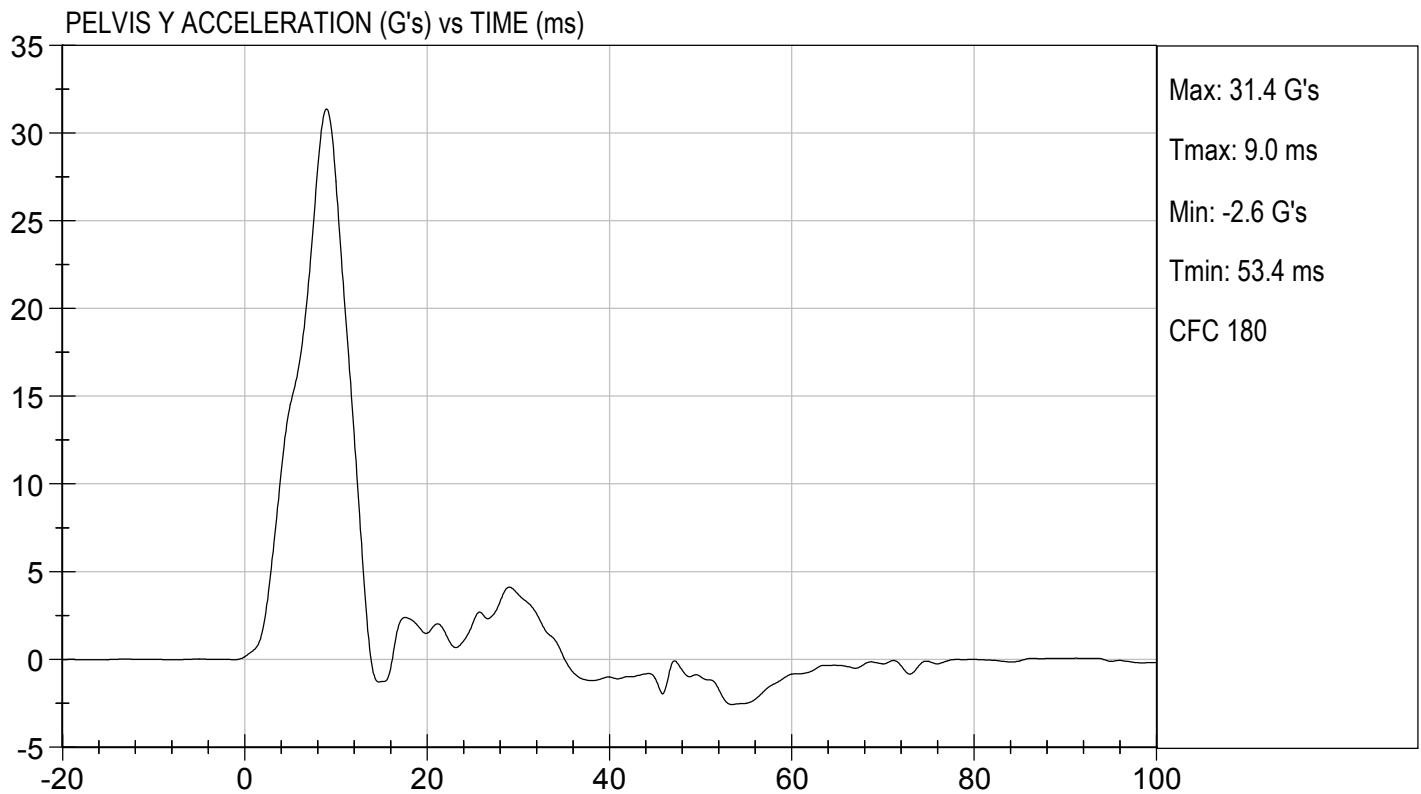
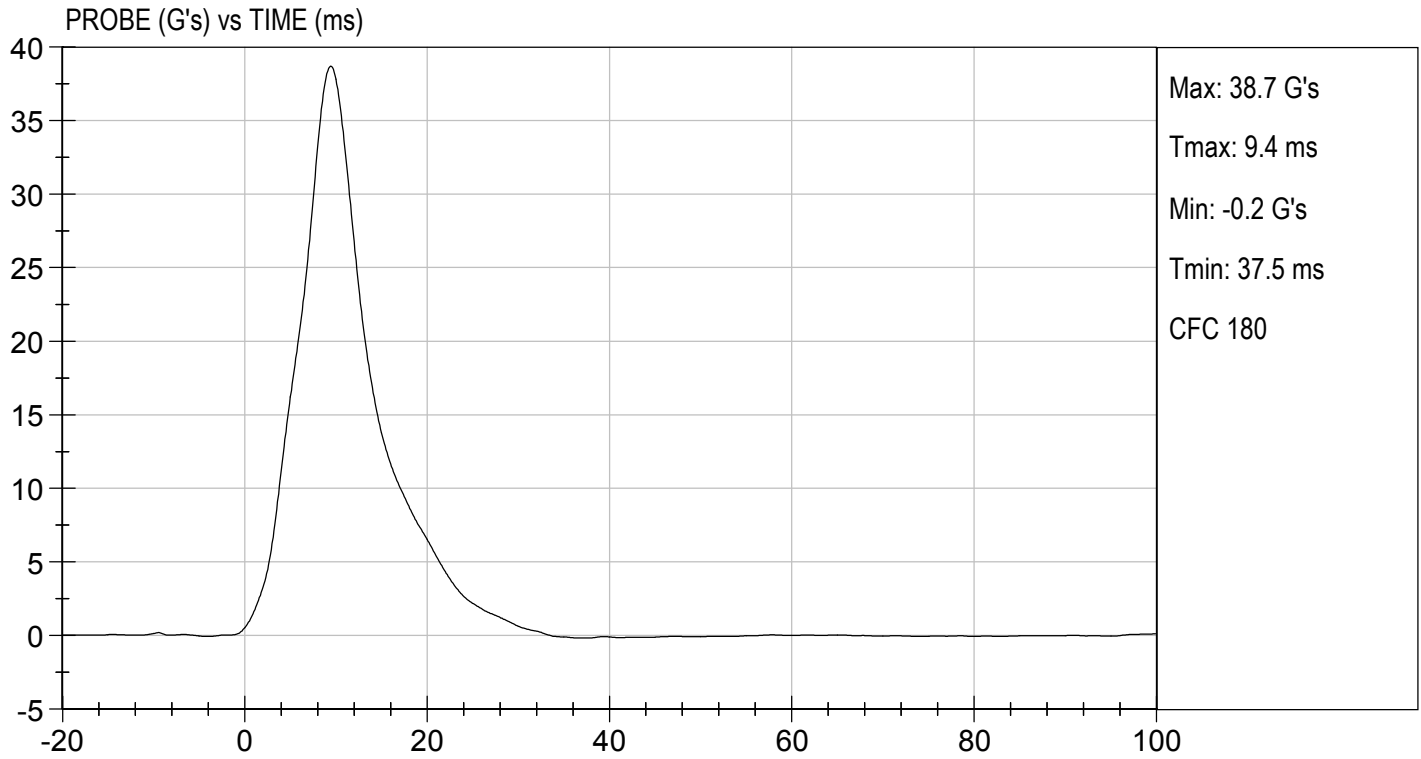
Test Date


Approved By



TEST DESC: ILLIAC
VELOCITY: 14.45 ft/s, 4.40 m/s

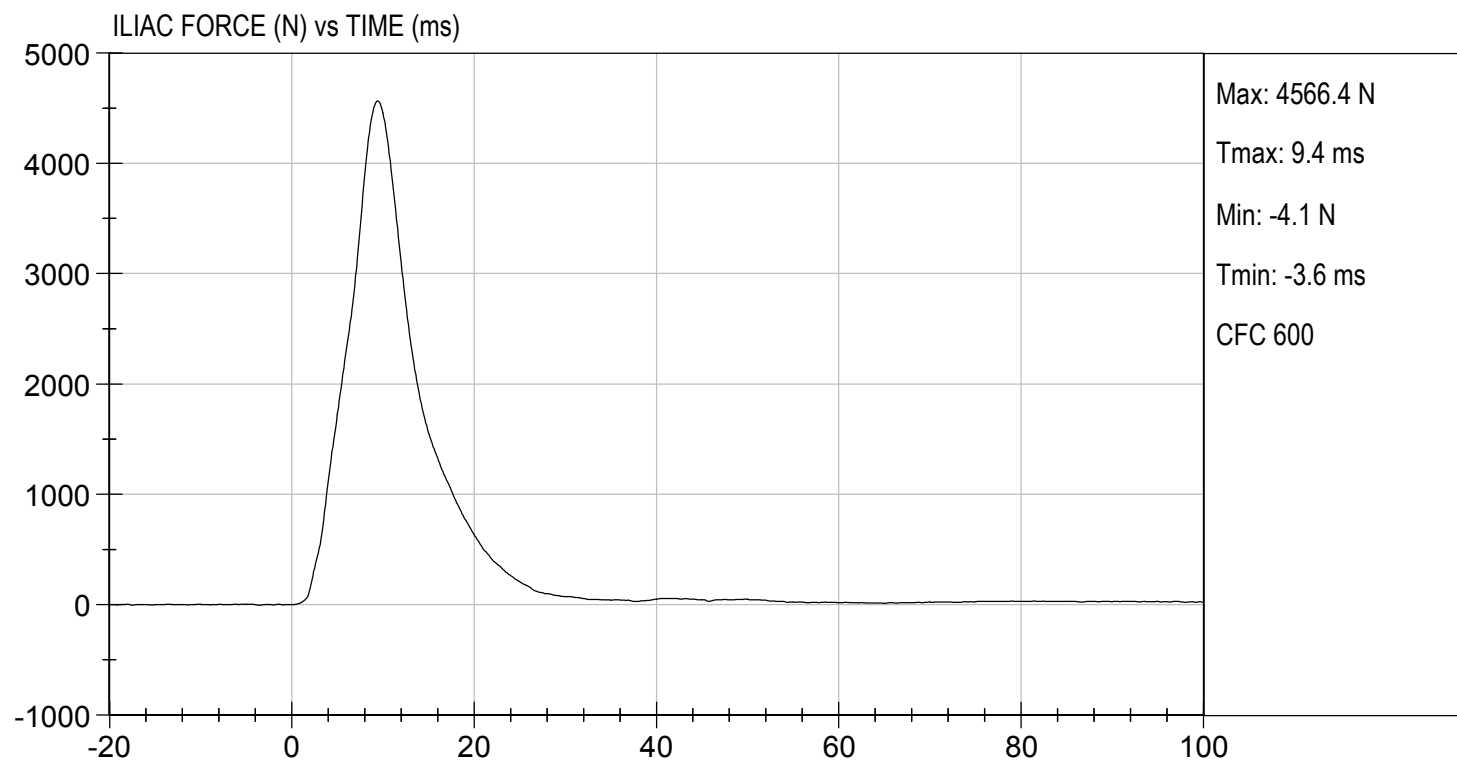
TEST DATE: 10/21/2019
TEST #: D193318





TEST DESC: ILLIAC
VELOCITY: 14.45 ft/s, 4.40 m/s

TEST DATE: 10/21/2019
TEST #: D193318





SID-ils Pelvis Plug Certification Test

Plug S/N ~~4826~~ 12380

Test Number 6768

Report Number 6783

Test Date 3/23/2018 9:51:04 AM

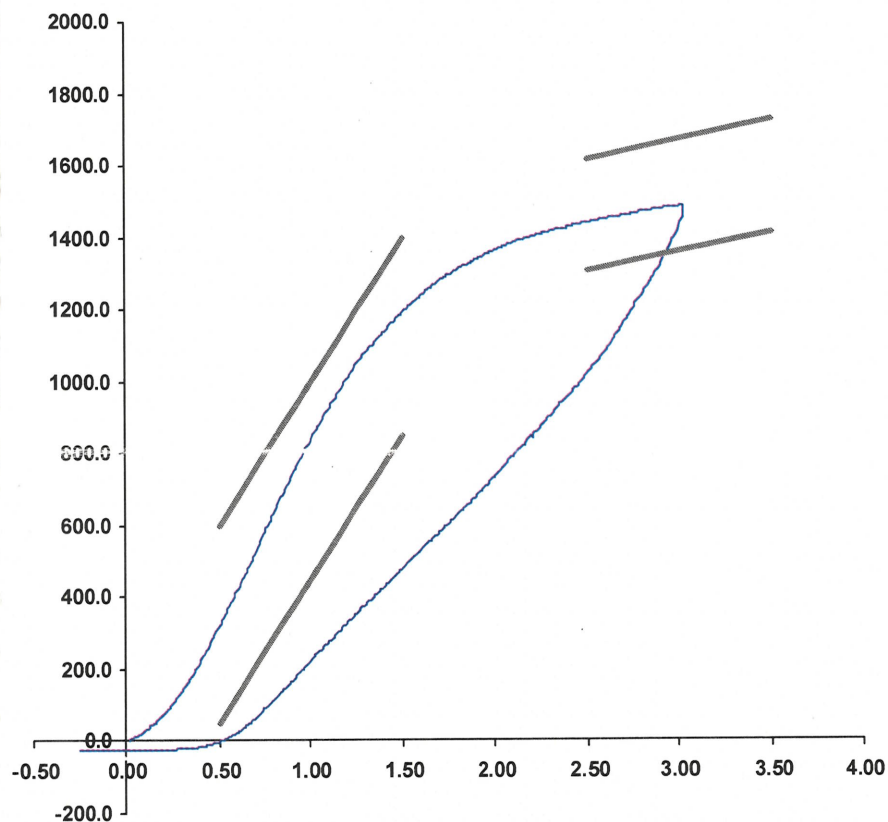
	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	320.90	50.00	600.00
Force @ 1.5 mm (N)	1,194.05	850.00	1,400.00
Force @ 2.5 mm (N)	1,441.46	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,486.30	1,361.00	1,673.00

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

23-Mar-18

SACO Research

By : DC

Date : 3/23/18

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



SID-IIs Pelvis Plug Certification Test

Plug S/N 12236

Test Number 6622

Report Number 6637

Test Date 3/14/2018 12:58:14 PM

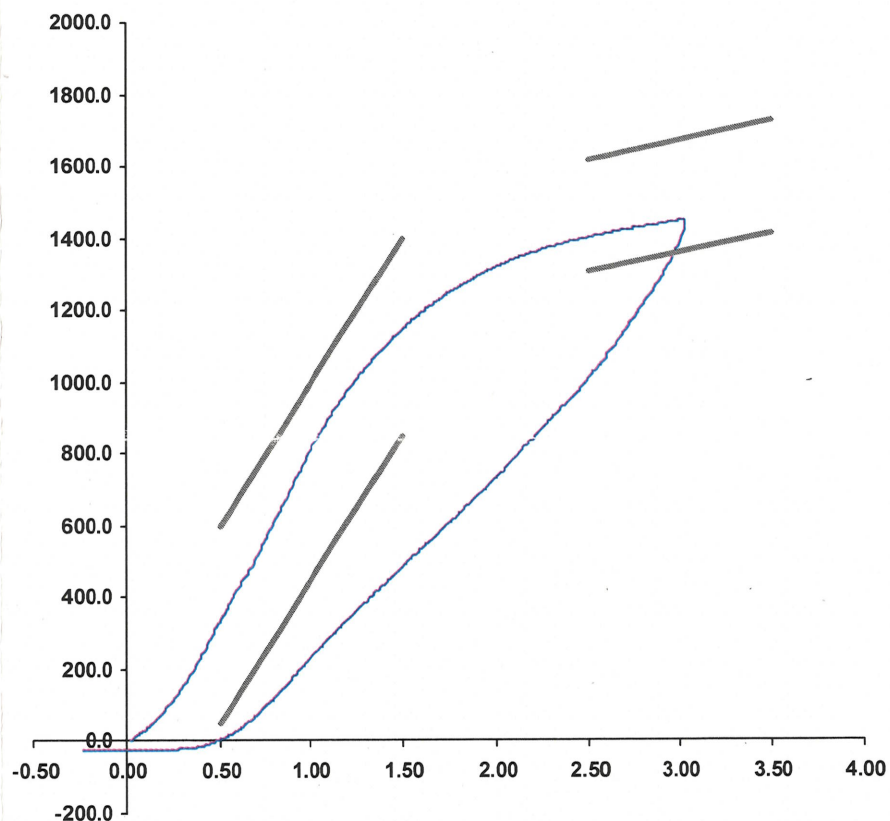
	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	333.17	50.00	600.00
Force @ 1.5 mm (N)	1,150.98	850.00	1,400.00
Force @ 2.5 mm (N)	1,403.13	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,450.48	1,361.00	1,673.00

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

14-Mar-18

SACO Research

By : DC

Date : 3/14/18

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

C-60

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation

				SID-IIs S/N 296			
				Serial Number	Manufacturer	Calibration Date	
Head CG Accelerometers				X	P85003	Endevco	7/12/2019
				Y	P94783	Endevco	7/12/2019
				Z	P94786	Endevco	7/12/2019
				Xr	P94938	Endevco	7/12/2019
				Yr	P96854	Endevco	7/12/2019
				Zr	P97386	Endevco	7/12/2019
Head Angular Rate Sensors				X	ARS7421	DTS	7/8/2019
				Y	ARS7413	DTS	7/8/2019
				Z	ARS7423	DTS	7/8/2019
Displacement Potentiometers	Thoracic Rib	Upper	Y	G012	Servo	7/12/2019	
		Middle	Y	G1163	FTSS	7/12/2019	
		Lower	Y	G1158	FTSS	7/12/2019	
	Abdominal Rib	Upper	Y	G1146	FTSS	7/12/2019	
		Lower	Y	G1126	FTSS	7/12/2019	
Lower Spine Accelerometers (T12)				X	P79418	Endevco	7/12/2019
				Y	P79439	Endevco	7/12/2019
				Z	P79614	Endevco	7/12/2019
Acetabulum Load Cell				Y	ACG269	Denton	3/15/2019
Iliac Wing Load Cell				Y	IWG282	Denton	3/15/2019
Pelvis Plug (struck side)					12380	SACO	3/23/2018
Pelvis Plug (non-struck side)					12236	SACO	3/14/2018

Table 2 – Vehicle Instrumentation

		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	T20350	Endevco	9/13/2019
Vehicle Center of Gravity	Y	T19500	Endevco	5/3/2019
Vehicle Center of Gravity	Z	T19543	Endevco	5/2/2019
Left Floor Sill	Y	T17582	Endevco	8/28/2019
A-Pillar Sill	Y	T19040	Endevco	8/28/2019
A-Pillar Low	Y	P79816	Endevco	7/10/2019
A-Pillar Mid	Y	P79817	Endevco	7/10/2019
B-Pillar Sill	Y	T19352	Endevco	5/2/2019
B-Pillar Low	Y	T18342	Endevco	7/19/2019
B-Pillar Mid	Y	T21395	Endevco	7/29/2019
Driver Seat	Y	T17921	Endevco	7/17/2019
Engine Top	X	T19991	Endevco	6/13/2019
Engine Top	Y	T20029	Endevco	4/22/2019
Firewall	Y	PCB1279	PCB	7/17/2019
Right Roof	Y	T19039	Endevco	9/27/2019
Right Floor Sill	Y	P88169	PCB	7/26/2019
Rear Floorpan	X	PCB1262	PCB	7/12/2019
Rear Floorpan	Y	PCB1189	PCB	7/12/2019

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