

REPORT NUMBER: SideNCAPPole-KAR-23-009
NEW CAR ASSESSMENT PROGRAM (NCAP)
SIDE IMPACT POLE TEST

BAYERISCHE MOTOREN WERKE AG
2023 BMW X1 XDRIVE28I 5-DOOR SUV

NHTSA No: M20234101

PREPARED BY:
APPLUS IDIADA KARCO ENGINEERING, LLC.
9270 HOLLY ROAD
ADELANTO, CA 92301



MAY 15, 2023

FINAL REPORT

PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
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WASHINGTON, D.C. 20590

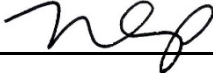
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Approval Date: May 15, 2023

FINAL REPORT ACCEPTANCE BY OCWS:


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

Date: _____


COTR, New Car Assessment Program
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Date: _____

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		14. Sponsoring Agency Code NRM-100																												
15. Supplementary Notes																														
16. Abstract A 32.2 km/h 75° rigid pole side NCAP impact test was conducted on the subject 2023 BMW X1 xDrive28i 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 the Applus IDIADA KARCO Engineering, LLC. facility in Adelanto, California on April 26, 2023. The impact velocity was 32.45 km/h and the outside ambient temperature at the struck (driver's) side of the vehicle was 27°C. The target vehicle's maximum post-test static crush was 347 mm located at level 3. The test vehicle's occupant performance data is as follows: <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th rowspan="2" style="text-align: center;">Measurement Description</th> <th colspan="3" style="text-align: center;">Driver ATD (SID-IIs)</th> </tr> <tr> <th style="text-align: center;">Units</th> <th style="text-align: center;">Threshold</th> <th style="text-align: center;">Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td></td> <td style="text-align: center;">1000</td> <td style="text-align: center;">230.400</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td style="text-align: center;">g</td> <td style="text-align: center;">82</td> <td style="text-align: center;">41.853</td> </tr> <tr> <td>Total Pelvic Force (Sum of Acetabular and Iliac Forces)</td> <td style="text-align: center;">N</td> <td style="text-align: center;">5525</td> <td style="text-align: center;">2883.471</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td style="text-align: center;">mm</td> <td style="text-align: center;">38</td> <td style="text-align: center;">25.341</td> </tr> <tr> <td>Maximum Abdominal Rib Deflection</td> <td style="text-align: center;">mm</td> <td style="text-align: center;">45</td> <td style="text-align: center;">24.596</td> </tr> </tbody> </table>				Measurement Description	Driver ATD (SID-IIs)			Units	Threshold	Result	Head Injury Criteria (HIC ₃₆)		1000	230.400	Resultant Lower Spine Acceleration	g	82	41.853	Total Pelvic Force (Sum of Acetabular and Iliac Forces)	N	5525	2883.471	Maximum Thoracic Rib Deflection	mm	38	25.341	Maximum Abdominal Rib Deflection	mm	45	24.596
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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 Admin. Office of Crashworthiness Standards (NRM-100) 1200 New Jersey Ave., SE Washington, DC 20590																												
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SECTION 1

TEST PURPOSE AND SUMMARY OF TEST

PURPOSE

This side impact test is part of the 2022 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract number 693JJ920D000015. The purpose of this test is to generate comparative side impact performance in a 2023 BMW X1 xDrive28i 5-Door SUV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure date March 2020.

SUMMARY

A rigid pole side impact test was conducted on a 2023 BMW X1 xDrive28i 5-Door SUV. The subject vehicle was towed into the rigid pole at an angle of 75.6° and a velocity of 32.45 km/h. The test was conducted by Applus IDIADA KARCO Engineering, LLC. in Adelanto, California on April 26, 2023. Pre- 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 March 2020. Camera locations and other pertinent camera information are included in this report.

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

- Primary and Redundant Head CG tri-axial accelerometers
- Thorax upper, middle and lower rib displacement potentiometers
- Abdomen upper and lower rib displacement potentiometers
- Lower spine (12) tri-axial 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.

SECTION 1 ...(CONTINUED)
TEST PURPOSE AND SUMMARY OF TEST

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

Measurement Description	Units	Driver ATD (SID-IIs)	
		IARV	Result
Head Injury Criteria (HIC ₃₆)		1000	230.400
Lower Spine (T12) Resultant Acceleration	g	82	41.853
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2883.471
Maximum Thoracic Rib Deflection	mm	38*	25.341
Maximum Abdominal Rib Deflection	mm	45*	24.596

**Proposed IARV*

Supplemental restraint information is given below:

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	Yes	No		
Side Airbag 1 (Curtain)	Yes	Yes	Yes	No
Side Airbag 2 (Torso/Pelvis)	Yes	Yes	Yes	No
Seat Belt Pretensioner	Yes	Yes	Yes	No
Seat Belt Load Limiter	Yes	Yes	Yes	No

GENERAL COMMENTS: NONE

SECTION 2

OCCUPANT AND VEHICLE INFORMATION/DATA SHEETS

Test Vehicle: 2023 BMW X1 xDrive28i 5-Door SUV NHTSA No. M20234101
Test Program: NCAP Side Pole Impact Test Test Date: 04/26/23

CONVERSION FACTORS

Quantity	Typical Application	Std Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	miles/hr	km/hr	1.609344
Length or Distance	Measurements	in	mm	25.4
Volume	Fuel Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.574
Pressure	Tire Pressures	lbf/in ²	kPa	6.895
Temperature	General Use	°F	°C	$=(T_f - 32)/1.8$
Force	Dynamic Forces	lbf	N	4.448
Moment	Torque	lbf-ft	N•m	1.355

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2023 BMW X1 xDrive28i 5-Door SUV NHTSA No. M20234101
 Test Program: NCAP Side Pole Impact Test Test Date: 04/26/23

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	M20234101
Model Year	2023
Make	BMW
Model	X1 XDrive 28i
Body Style	5-Door SUV
VIN	WBX73EF08P5W19941
Body Color	Phytonic Blue Metallic
Odometer Reading (km / mi)	42 / 26
Engine Displacement (L)	2.0
Type / No. of Cylinders	4
Engine Placement	Inline
Transmission Type	Automatic
Transmission Speeds	7
Overdrive	Yes
Final Drive	AWD
Roof Rack	No
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	Yes

Traction Control System (TCS)	Yes
Auto-Leveling System	No
Automatic Door Locks	Yes
Power Window Auto-Reverse	Yes
Other Optional Feature	Yes
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	Yes
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head/Torso Airbag	No
Rear Pass. Torso Airbag	No
Rear Pass. Torso/Pelvis Airbag	Yes
Rear Pass. Pelvis Airbag	No
Driver Seat Belt Pretensioner	Yes
Rear Pass. Seat Belt Pretensioner	Yes
Driver Load Limiter	Yes
Rear Pass. Load Limiter	Yes
Other Safety Restraint	No

Does Owner's Manual provide instructions to turn off automatic door locks?

Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	BAYERISCHE MOTOREN WERKE AG
Date of Manufacture	Dec-22
Vehicle Type	SUV

GVWR (kg)	2200
GAWR Front (kg)	1155
GAWR Rear (kg)	1145

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity	2	3		5	
Capacity Weight (VCW) (kg)				451.0	A
DSC x 68 (kg)				340.0	B
Cargo Weight (RCLW) (kg)				111.0	A-B*

*For trucks or MPVs, if A-B>136, RCLW=136 kg

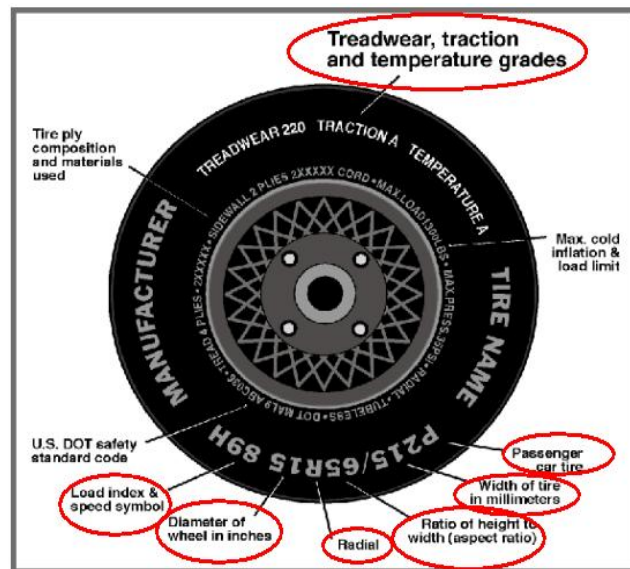
VEHICLE SEAT TYPE

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

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2023 BMW X1 xDrive28i 5-Door SUV NHTSA No. M20234101
 Test Program: NCAP Side Pole Impact Test Test Date: 04/26/23



Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	240	220
Recommended Tire Size	225/55R18	225/55R18
Tire Size on Vehicle	225/55R18	225/55R18
Tire Manufacturer	Continental	Continental
Tire Model	ProContact GX	ProContact GX
Treadware	500	500
Traction Grade	A	A
Temperature Grade	A	A
Tire Plies Sidewall	1 Polyester	1 Polyester
Tire Plies Body	1 Polyester, 2 Steel, 1 Polyamide	1 Polyester, 2 Steel, 1 Polyamide
Load Index/Speed Symbol	102H	102H
Tire Material	Polyester, Steel, Polyamide	Polyester, Steel, Polyamide
DOT Safety Code Left	16Y OFBENP 4322	16Y OFBENP 4322
DOT Safety Code Right	16Y OFBENP 4322	16Y OFBENP 4322

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2023 BMW X1 xDrive28i 5-Door SUV NHTSA No. M20234101
 Test Program: NCAP Side Pole Impact Test Test Date: 04/26/23

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	240	240	220	220
Tire Placard	kPa	240	240	220	220
Owner's Manual	kPa	240	240	220	220
As Tested	kPa	240	240	220	220

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	471.5	350.5		532.0	382.0		496.0	428.0	
Right	kg	474.5	360.0		418.0	479.0		466.0	426.0	
Ratio	%	57.1%	42.9%	100.0%	52.5%	47.5%	100.0%	53.0%	47.0%	100.0%
Total	kg	946.0	710.5	1656.5	950.0	861.0	1811.0	962.0	854.0	1816.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1656.5	A
Actual Weight of 1 SID II-s ATD Used	kg	49.0	B
Rated Cargo/Luggage Wt (RCLW)	kg	110.8	C
Calculated Vehicle Target Wt (TVTW)	kg	1816.3	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 -9.0 kg)? ☒ Yes ☐ No

TEST VEHICLE ATTITUDE AND CG

Measurement Description	Units	As Delivered	As Tested	Fully Loaded	Meets Requirement***
Driver Door Sill Angle (front-to-rear)*	°	0.0	0.0	-0.1	Yes
Front Passenger Sill Angle (front-to-rear)*	°	0.3	0.4	0.6	Yes
Front Bumper-Line Angle (left-to-right)**	°	-0.1	-0.2	-0.4	Yes
Rear Bumper-Line Angle (left-to-right)**	°	-0.1	0.0	0.1	Yes
Vehicle CG (Aft of Front Axle)	mm	1150	1275	1261	
Vehicle CG (Left (+)/Right (-) from Longitudinal Centerline)	mm	-6	7	14	

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

***The "As Tested" vehicle attitude angle measurements must be within "As Delivered" and the "Fully Loaded" vehicle attitude measurements at each location. Indicate "Yes" or "No" for "Meets Requirement"

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2023 BMW X1 xDrive28i 5-Door SUV NHTSA No. M20234101
Test Program: NCAP Side Pole Impact Test Test Date: 04/26/23

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Amount of Ballast Added	17.5

TEST SURFACE MARKINGS

	Distance from 75° Impact Location Line (mm)
Fore 25 mm target	0
Aft 25 mm target	0

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

Test Vehicle: 2023 BMW X1 xDrive28i 5-Door SUV NHTSA No. M20234101
 Test Program: NCAP Side Pole Impact Test Test Date: 04/26/23

SEAT POSITIONING

The driver's seat, front center seat (if applicable), and 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 seat should be set to the rear most, lowest, mid-angle position.

SCRL ANGLE RANGE

Seat	SCRL (°)		
	Max	Min	Mid
Driver Seat	14.4	21.5	17.9
Front Passenger Seat	12.2	19.9	16.1
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 SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid Fore/Aft	Forwardmost
Driver Seat	17.9	739	Max	747	757	762
			Mid	724	734	739
			Min	701	711	716
Front Passenger Seat	16.1	740	Max	749	756	762
			Mid	724	734	740
			Min	702	712	715
Front Center Seat			Max			
			Mid			
			Min			
Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed

DATA SHEET NO. 2 ... (CONTINUED)

SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT, AND FUEL SYSTEM DATA

Test Vehicle: 2023 BMW X1 xDrive28i 5-Door SUV NHTSA No. M20234101
 Test Program: NCAP Side Pole Impact Test Test Date: 04/26/23

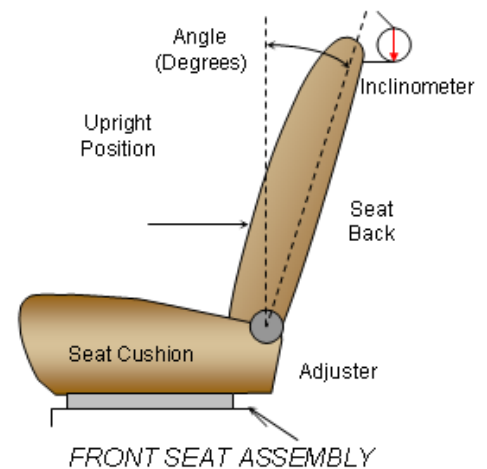
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position From Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	240		0	
Front Passenger Seat	241		0	
Front Center Seat				
Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed	Fixed

*Detent zero (0) is the forward most detent

SEAT BACK ADJUSTMENT

The driver's seat back is positioned such that the dummy's head is level. The front passenger's seat back is positioned in a similar manner to the driver's seat. The struck side rear passenger seat back is positioned in accordance with the information provided by the manufacturer in Form 1 for the 5th percentile female dummy in a Side NCAP MDB Test. The rear center and non-struck side rear passenger's seat back is set to match the struck side rear seat back. Seat back angle is measured using an inclinometer along a straight edge at the seat back.



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degree	Detent*
Driver Seat w/Seated Dummy	56.4		13.2	
Front Passenger Seat	65.9		5.9	
Front Center Seat				
Struck Side Rear Seat w/Seated Dummy				
Non-Struck Side Rear Seat				
Rear Center Seat				

*Detent zero (0) is the forward most detent

DATA SHEET NO. 2 ... (CONTINUED)**SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT, AND FUEL SYSTEM DATA**Test Vehicle: 2023 BMW X1 xDrive28i 5-Door SUV NHTSA No. M20234101Test Program: NCAP Side Pole Impact Test Test Date: 04/26/23**SEAT BELT ANCHORAGE ADJUSTMENT**

Seat belt anchorages are adjusted in accordance with the information provided by the manufacturer on Form No. 1. The positions are marked H, M2, M1, L from top to bottom.

	Total No. of Positions	Placed in Position
Driver Seat	Fixed	Fixed

HEAD RESTRAINT ADJUSTMENT

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

	Total No. of Positions	Placed in Position
Driver Seat	5	L

DATA SHEET NO. 2 ... (CONTINUED)

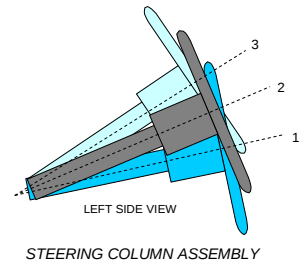
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT, AND FUEL SYSTEM DATA

Test Vehicle: 2023 BMW X1 xDrive28i 5-Door SUV NHTSA No. M20234101
Test Program: NCAP Side Pole Impact Test Test Date: 04/26/23

STEERING COLUMN ADJUSTMENT

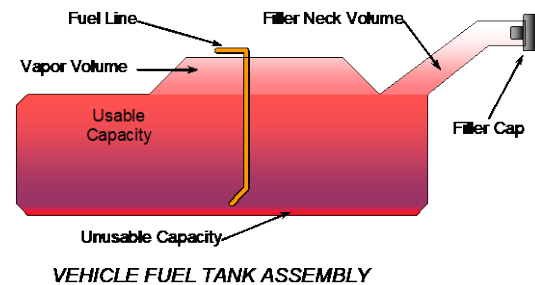
Steering wheel and column adjustments are made so that the steering wheel hub is at the center of the geometric locus it describes when it moves through its full range of motion.

	Degrees	Fore-Aft Position (mm)
Lowermost - Position 1	24.1	168
Geometric Center - Position 2	26.3	196.5
Uppermost - Position 3	28.5	225
Telescoping Steering Wheel Travel		57
Test Position	26.3	196.5



FUEL PUMP

The vehicle is equipped with an electric fuel pump. The fuel pump starts when the ignition is on. The fuel pump will operate for 5 seconds. After pressure has been built up the fuel pump switches to sleep mode until the engine will be started or the pressure decreases.



FUEL TANK CAPACITY

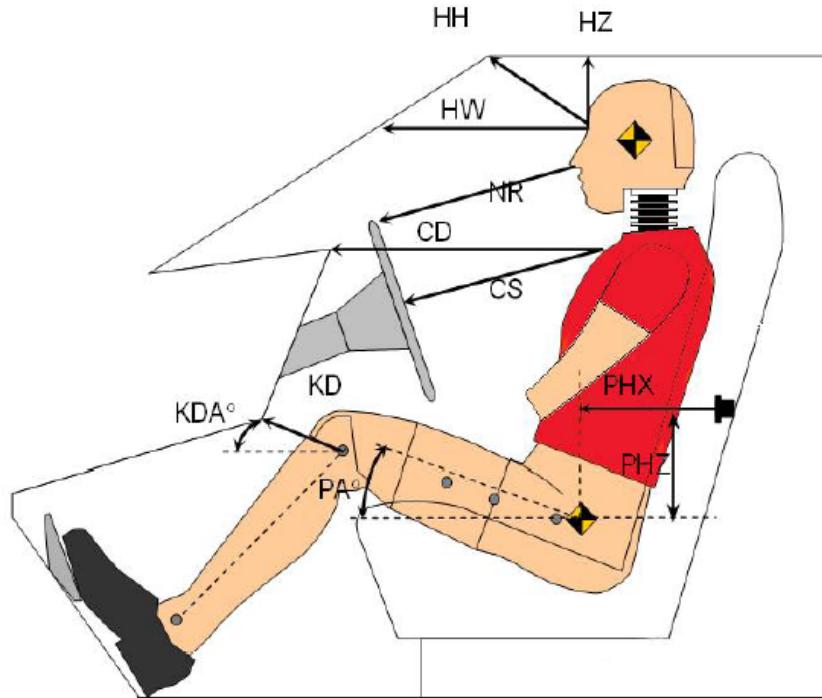
Description	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	54.10
Usable Capacity of "Optional Tank" (see Form No. 1)	
Usable Capacity of "Standard Tank" (see Owner's Manual)*	
Usable Capacity of "Optional Tank" (see Owner's Manual)*	
93% of Usable Capacity	50.31
Actual amount of Solvent Used in Test	50.31
1/3 of Usable Capacity	18.03

Is the Actual Amount of Solvent Used in the test equal to 93% $\pm$ 1% of the Usable Capacity stated in the Form No. 1? ☒ Yes ☐ No

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2023 BMW X1 xDrive28i 5-Door SUV NHTSA No. M20234101
 Test Program: NCAP Side Pole Impact Test Test Date: 04/26/23

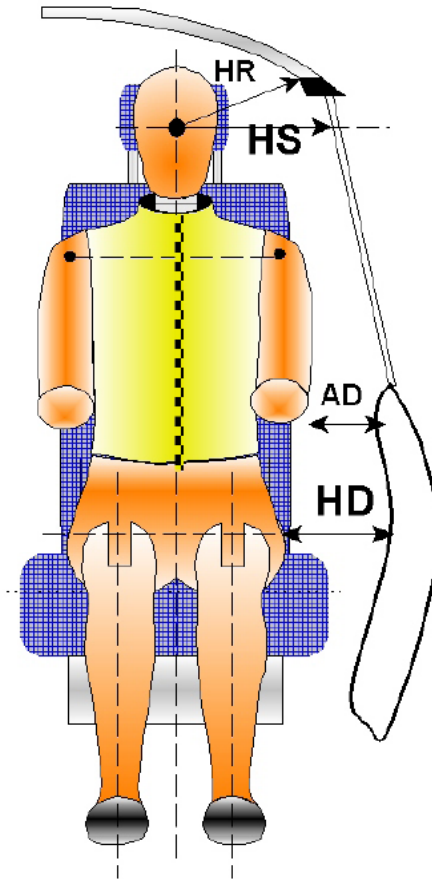


Driver Code	Description	Driver	
		Length (mm)	Angle (°)
HH	Head to Header	296	
HW	Head to Windshield	624	
HZ	Head to Roof	264	
NR	Nose to Rim	302	
CD	Chest to Dash	500	
CS	Chest to Steering Wheel	200	
KD(L)/KDA(L)°	Left Knee to Dash	152	39.4
KD(R)/KDA(R)°	Right Knee to Dash	135	41.2
PAX°	Pelvic Tilt Angle (x-axis)		0.0
PAY°	Pelvic Tilt Angle (y-axis)		21.2
PHX	Hip Point to Striker (x-axis)	310	
PHZ	Hip Point to Striker (z-axis)	310	

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2023 BMW X1 xDrive28i 5-Door SUV NHTSA No. M20234101
Test Program: NCAP Side Pole Impact Test Test Date: 04/26/23

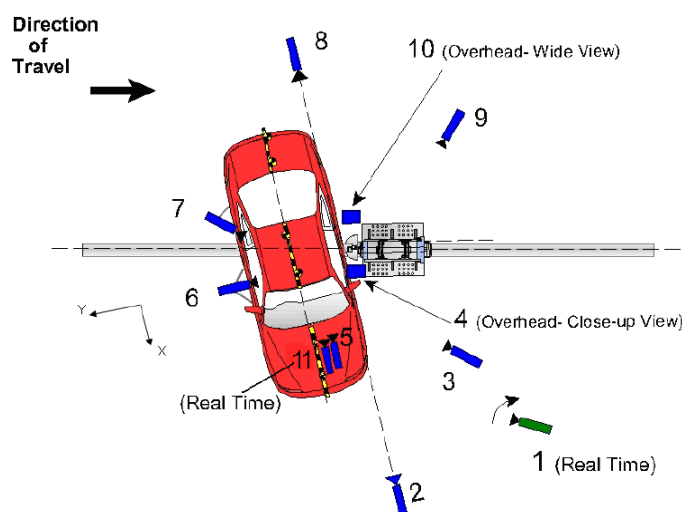


Code	Measurement Description	Units	Driver
HR	Head to Side Header	mm	358
HS	Head to Side Window	mm	414
AD	Arm to Door	mm	168
HD	Hip Point to Door	mm	224

DATA SHEET NO. 5

CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2023 BMW X1 xDrive28i 5-Door SUV NHTSA No. M20234101
 Test Program: NCAP Side Pole Impact Test Test Date: 04/26/23



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

Camera No.	View	Coordinates (m)			Lens (mm)	Film Speed (fps)
		X*	Y*	Z*		
1	Real Time Pan View of Impact	8.89	46.57	-3.04		30
2	Front Ground Level - Impact View	8.34	-0.05	-0.93	35	1000
3	Impact Side 45° - Forward Pole View	4.10	-2.15	-1.15	25	1000
4	Overhead Close-Up View of Impact	0.00	0.00	-5.79	35	1000
5	On-Board - Dummy Front View	-1.06	-0.97	0.86	8	1000
6	On-Board - Dummy Side View	-1.04	-0.95	0.83	6	1000
7	On-Board - Dummy Rear Oblique View	-1.05	-0.94	0.83	6	1000
8	Rear Ground Level - Impact View	-1.30	1.68	-1.26	35	1000
9	Impact Side 45° - Rearward Pole View	-8.02	0.04	-1.01	25	1000
10	Overhead Wide View of Impact	-0.06	0.22	-5.79	15	1000
11	Real Time Dummy Front View	-1.07	-0.93	0.82		30

*All measurements accurate to ± 6 mm

NOTE: Vehicle is at a 75 angle to the rigid pole.

If applicable, explain why camera(s) did not operate as intended: N/A

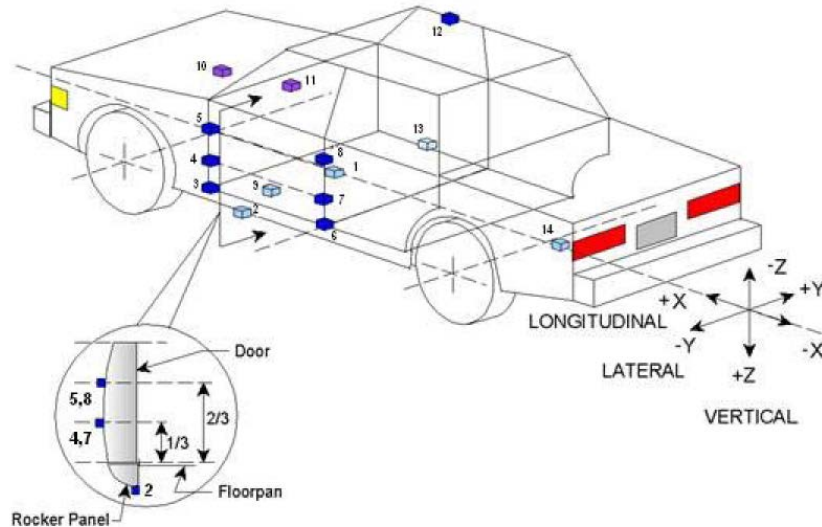
INSTRUMENTATION

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

DATA SHEET NO. 6

TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2023 BMW X1 xDrive28i 5-Door SUV NHTSA No. M20234101
 Test Program: NCAP Side Pole Impact Test Test Date: 04/26/23

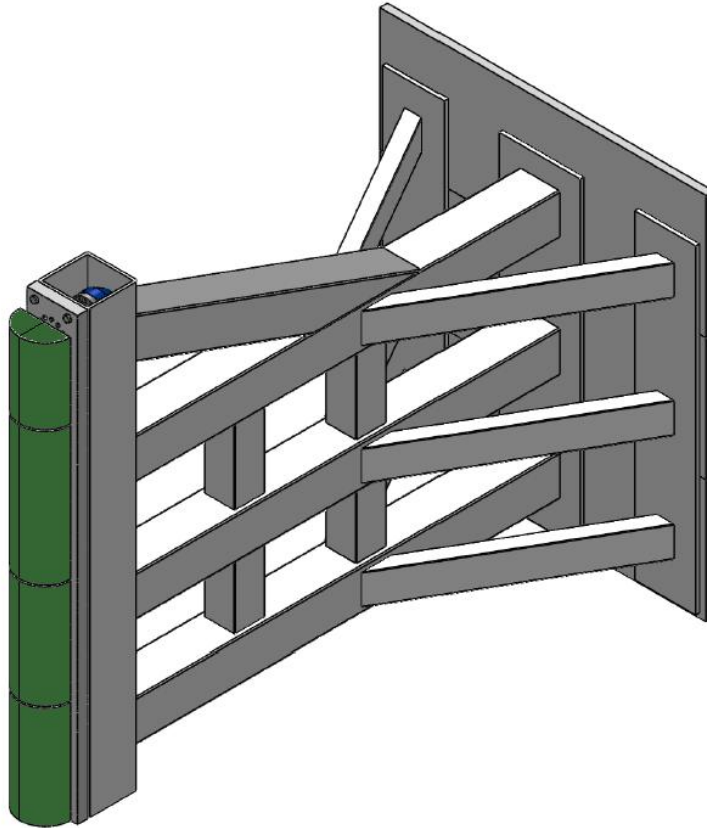


Sensor Description	Coordinates (mm)		
	X	Y	Z
Vehicle CG	2422	0	-370
Left Floor Sill	2825	710	-264
A-Pillar Sill	1310	822	-325
A-Pillar Low	1310	819	-620
A-Pillar Mid	1315	819	-850
B-Pillar Sill	2411	654	-310
B-Pillar Low	2395	651	-633
B-Pillar Mid	2395	651	-867
Driver Seat Track	1980	577	-405
Engine Top	908	108	-907
Firewall	1214	544	-885
Right Roof	2205	495	-1620
Right Floor Sill	1946	430	-330
Rear Floorpan	2710	396	-804

Reference: X – Rear surface of vehicle (+ forward)
 Y – Vehicle centerline (+ to right)
 Z – Ground plane (+ down)

DATA SHEET NO. 7
RIGID POLE LOAD CELL DATA

Test Vehicle: 2023 BMW X1 xDrive28i 5-Door SUV NHTSA No. M20234101
Test Program: NCAP Side Pole Impact Test Test Date: 04/26/23



ID	Units	Height From Ground
1	mm	87
2	mm	468
3	mm	648
4	mm	978
5	mm	1168
6	mm	1651
7	mm	1816
8	mm	2057

DATA SHEET NO. 8**POST-TEST OBSERVATIONS**

Test Vehicle: 2023 BMW X1 xDrive28i 5-Door SUV NHTSA No. M20234101
 Test Program: NCAP Side Pole Impact Test Test Date: 04/26/23

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Driver SID-IIs Dummy
Face	Curtain Airbag
Top of Head	Curtain Airbag, Headrest
Left Side of Head	Curtain Airbag
Back of Head	Torso/Pelvis Airbag, Headrest, Seatback
Left Shoulder	Torso/Pelvis Airbag, Seatback
Upper Torso	Torso/Pelvis Airbag, Seatback
Lower Torso	Torso/Pelvis Airbag, Seatback
Left Hip	Torso/Pelvis Airbag, Door Trim, Seat Pan
Left Knee	Door Trim

POST-TEST DOOR PERFORMANCE

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

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

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

Test Vehicle: 2023 BMW X1 xDrive28i 5-Door SUV NHTSA No. M20234101
 Test Program: NCAP Side Pole Impact Test Test Date: 04/26/23

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	Good
Sill Separation	None
Windshield Damage	Broken, Torn 10 Inches Along Driver Side Frame Edge
Side Window Damage	Broken
Other Notable Effects	None

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Driver		Struck Side Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	Yes	No	No	
Side Airbag 1 (Curtain)	Yes	Yes	Yes	Yes
Side Airbag 2 (Torso/Pelvis)	Yes	Yes	Yes	Yes
Seat Belt Pretensioner	Yes	Yes	Yes	No
Seat Belt Load Limiter	Yes	Yes	Yes	No

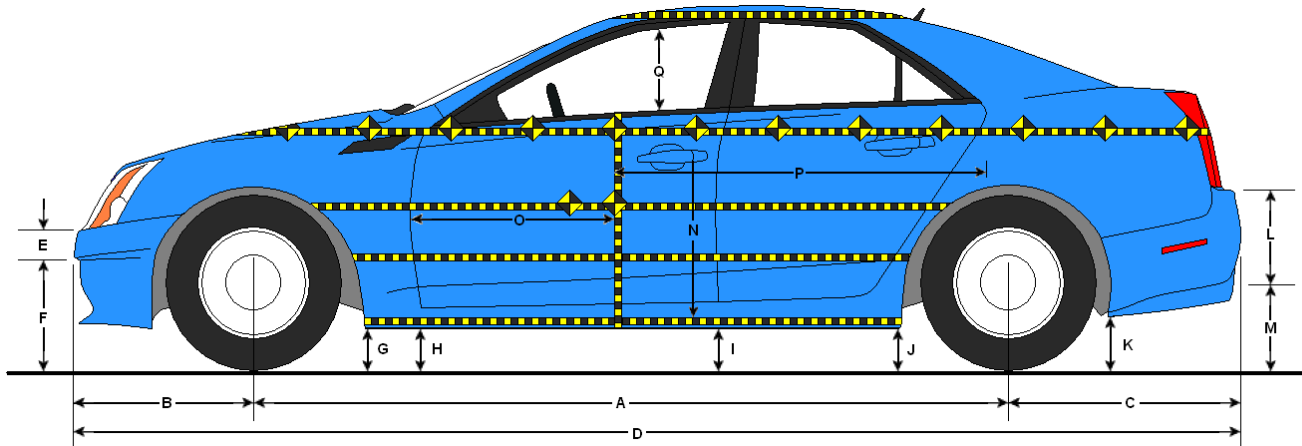
IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vertical Impact Reference Line (Aft of Front Axle)(Intended Impact Point)	mm		1148
Actual Impact Point (Aft of Front Axle)	mm		1148
Horizontal Offset (+ forward / - rearward)	mm	± 38 of Intended Impact Point	0
Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion	°	75 ± 3	76.2
Trap No. 1 Velocity (Primary)	km/h	31.4 to 33.0	32.45
Trap No. 2 Velocity (Redundant)	km/h	31.4 to 33.0	

DATA SHEET NO. 9

TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2023 BMW X1 xDrive28i 5-Door SUV NHTSA No. M20234101
 Test Program: NCAP Side Pole Impact Test Test Date: 04/26/23



LEFT SIDE VIEW

All measurements in mm with tolerance of $\pm 3\text{mm}$

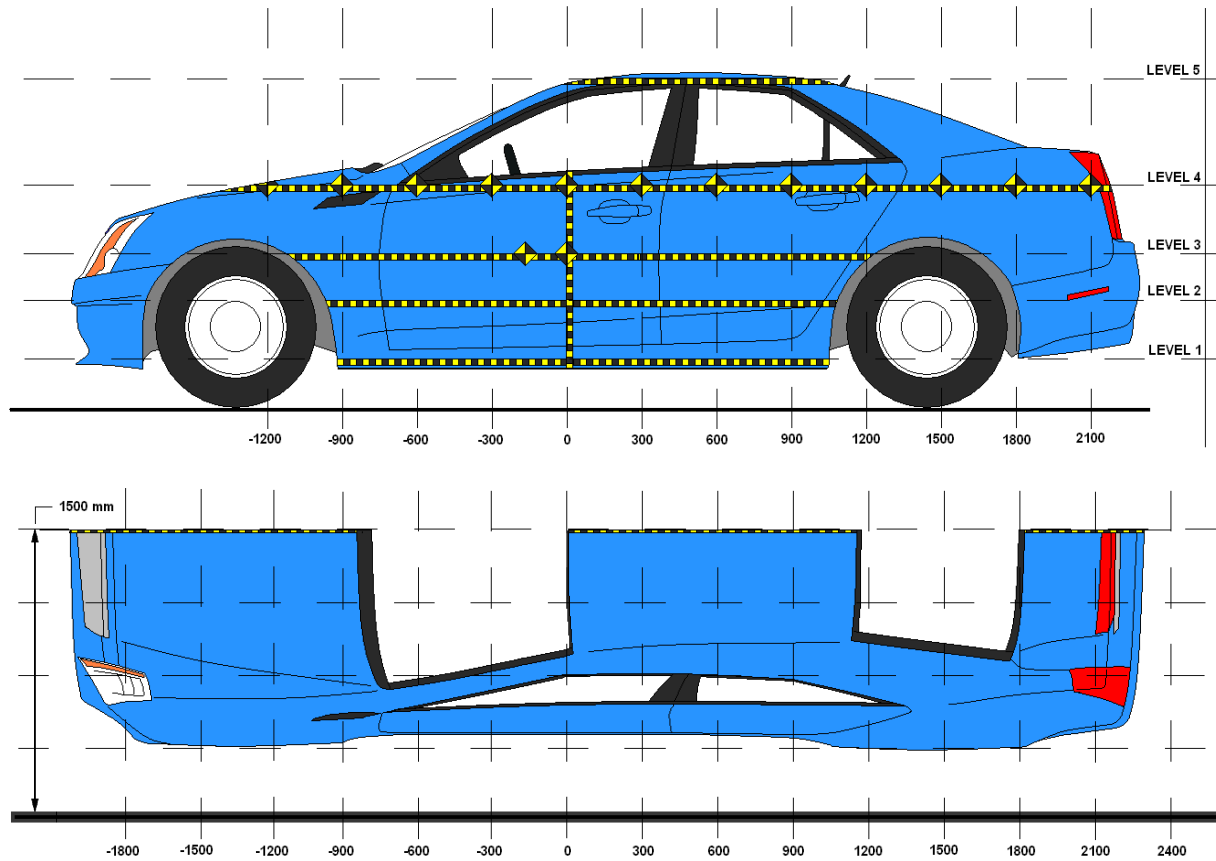
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Change
A	Wheelbase	2681	2614	-67
B	Front Axle to FSOV	868	906	38
C	Rear Axle to RSOV	941	938	-3
D	Total Length at Centerline	4490	4458	-32
E	Front Bumper Thickness	178	177	-1
F	Front Bumper Bottom to Ground	584	581	-3
G	Sill Height at Front Wheel Well	304	298	-6
H	Sill Height at Front Door Leading Edge	372	354	-18
I	Sill Height at B-Pillar	387	359	-28
J1	Sill Height at Rear Wheel Well	336	347	11
J2	Pinch Weld Height at Rear Wheel Well	284	276	-8
K	Sill Height Aft of Rear Wheel Well	399	388	-11
L	Rear Bumper Thickness	202	189	-13
M	Rear Bumper Bottom to Ground	521	523	2
N	Sill Height to Bottom of Front Window Sill	688	649	-39
O	Front Door Leading Edge to Impact CL	634	531	-103
P	Rear Door Trailing Edge to Impact CL	1367	1269	-98
Q	Front Window Opening	428	420	-8
R	Right Side Length	3197	3207	10
S	Left Side Length	3200	3109	-91
T	Vehicle Width at B-Pillar	1821	1713	-108

DATA SHEET NO. 10

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2023 BMW X1 xDrive28i 5-Door SUV NHTSA No. M20234101
 Test Program: NCAP Side Pole Impact Test Test Date: 04/26/23



NOTE: All measurements in mm with tolerance of $\pm 3\text{mm}$

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Description	Height Above Ground (mm)	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	424	288	0
2	Occupant H-Point	736	342	0
3	Mid-Door	792	347	0
4	Window Sill	1087	306	0
5	Window Top	1617	110	0

DATA SHEET NO. 10 ... (CONTINUED)

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2023 BMW X1 xDrive28i 5-Door SUV NHTSA No. M20234101
 Test Program: NCAP Side Pole Impact Test Test Date: 04/26/23

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

	Pre-Test (mm)					Post-Test (mm)					Exterior Crush (mm)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750		598	594	694			576	572	661			-22	-22	-33	
-600	625	597	598	683		589	547	549	641		-36	-50	-49	-42	
-450	636	600	599	673		687	638	640	705		51	38	41	33	
-300	643	600	597	659		767	731	731	770		124	131	134	111	
-150	645	599	595	648		842	836	838	848		197	237	244	200	
0	645	598	594	638	870	933	940	941	944	980	288	342	347	306	110
150	645	597	594	629	872	905	917	919	932	976	260	320	325	303	104
300	645	598	593	620	875	787	781	786	807	958	142	183	193	187	83
450	644	597	593	613	876	725	694	690	714	946	81	97	97	101	70
600	647	597	594	614	878	723	673	671	694	930	76	76	77	80	52
750	643	595	592	614	879	701	652	650	677	916	58	57	58	63	37
900	631	593	590	615	883	666	627	625	660	908	35	34	35	45	25
1050	620	589	585	615	885	635	627	611	644	904	15	25	26	29	19
1200			587	618	891		614	593	626	902			6	8	11
1350				620	895				613	904				-7	9
1500				628	905				635	909				7	4
1650				637	916				640	916				3	0
1800															
1950															
2100															
2250															
2400															
2550															
2700															
2850															

DATA SHEET NO. 10 ... (CONTINUED)

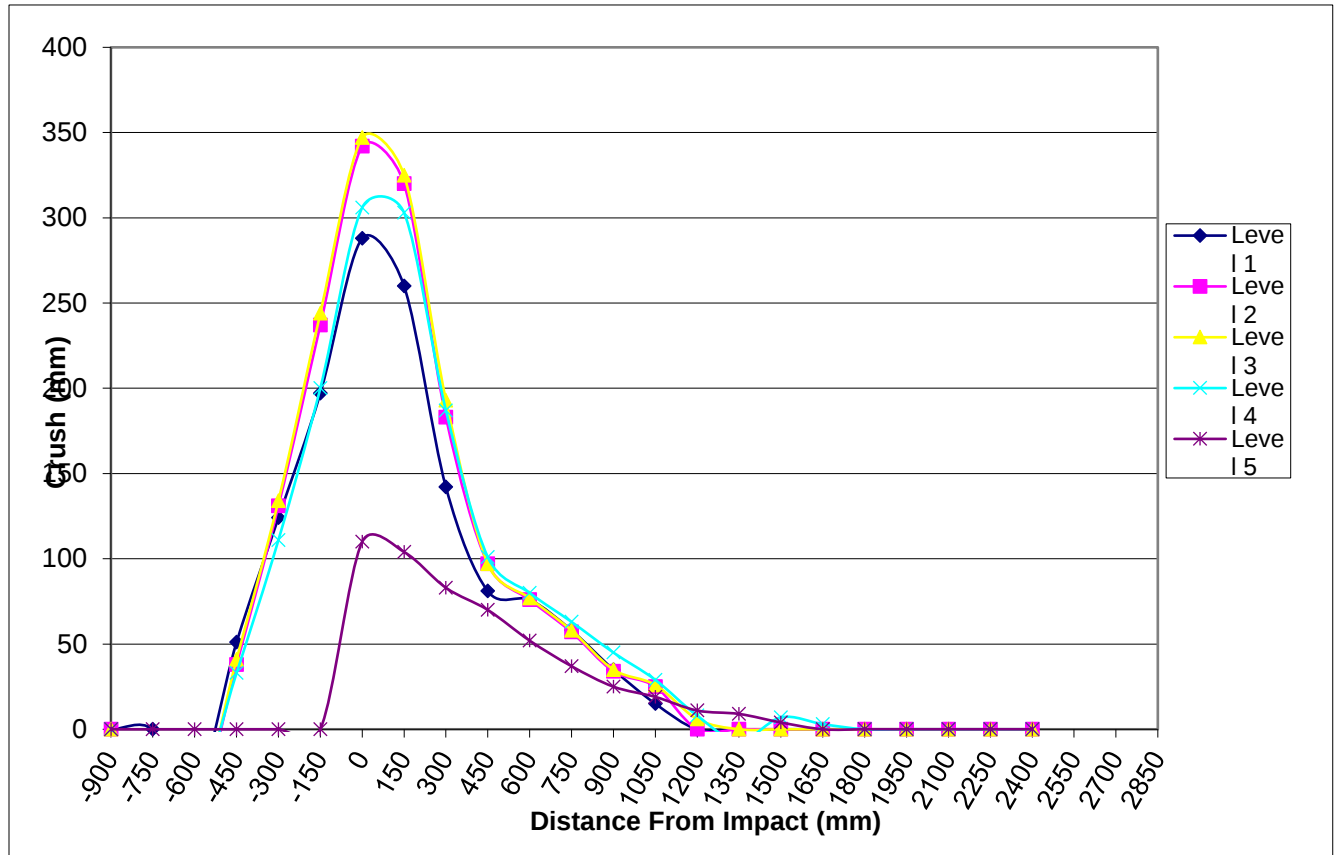
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2023 BMW X1 xDrive28i 5-Door SUV

NHTSA No. M20234101

Test Program: NCAP Side Pole Impact Test

Test Date: 04/26/23

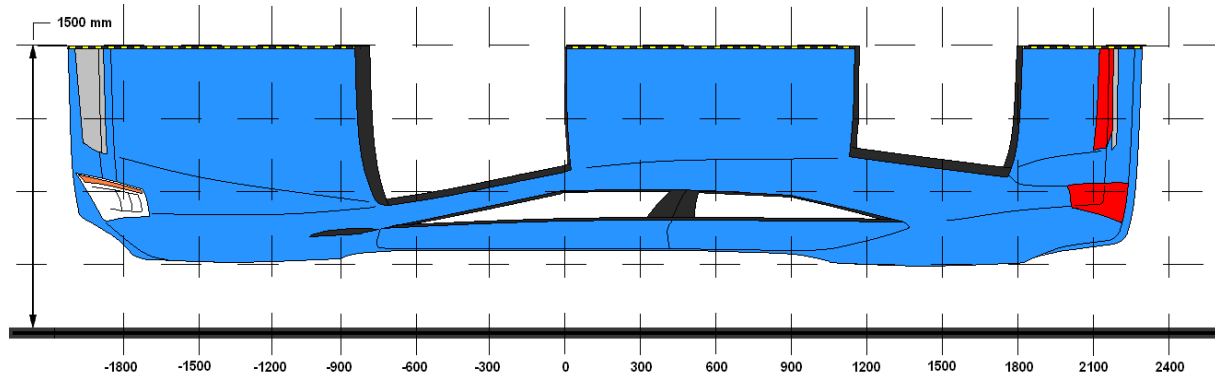


DATA SHEET NO. 11

VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2023 BMW X1 xDrive28i 5-Door SUV NHTSA No. M20234101

Test Program: NCAP Side Pole Impact Test Test Date: 04/26/23



DPD	Distance From Impact Point (mm)	Level	Pre-Test (mm)	Post-Test (mm)	Crush (mm)
1	1650	4	637	640	3
2	1200	5	891	902	11
3	750	4	614	677	63
4	150	3	594	919	325
5	-300	3	597	731	134
6	-750	3	594	572	-22

DATA SHEET NO. 12

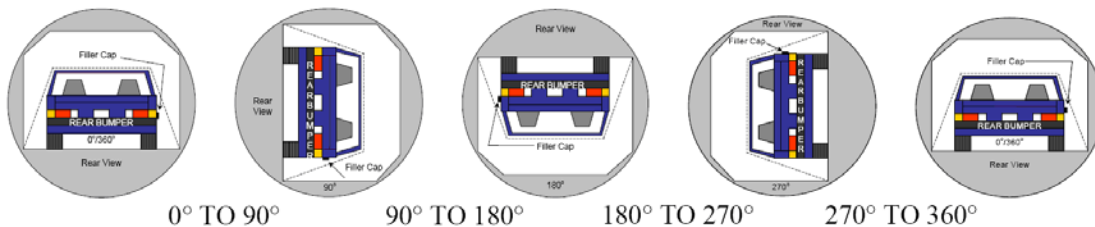
FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2023 BMW X1 xDrive28i 5-Door SUV NHTSA No. M20234101

Test Program: NCAP Side Pole Impact Test Test Date: 04/26/23

Temperature at Time of Impact: 27° C Test Time: 2:55 PM

- A. From impact until vehicle motion ceases: 0 oz.
(Maximum allowable = 1 oz.)
- B. For the 5 minute period after motion ceases: 0 oz.
(Maximum allowable = 5 oz.)
- C. For the following 25 minutes: 0 oz.
(Maximum allowable = 1 oz./minute)
- D. Spillage Details: There was no Stoddard solvent spillage.



SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° To 90°	80	300	380
90° To 180°	80	300	380
180° To 270°	82	300	382
270° To 360°	83	300	383

FMVSS 301 SPILLAGE TABLE

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

SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 13

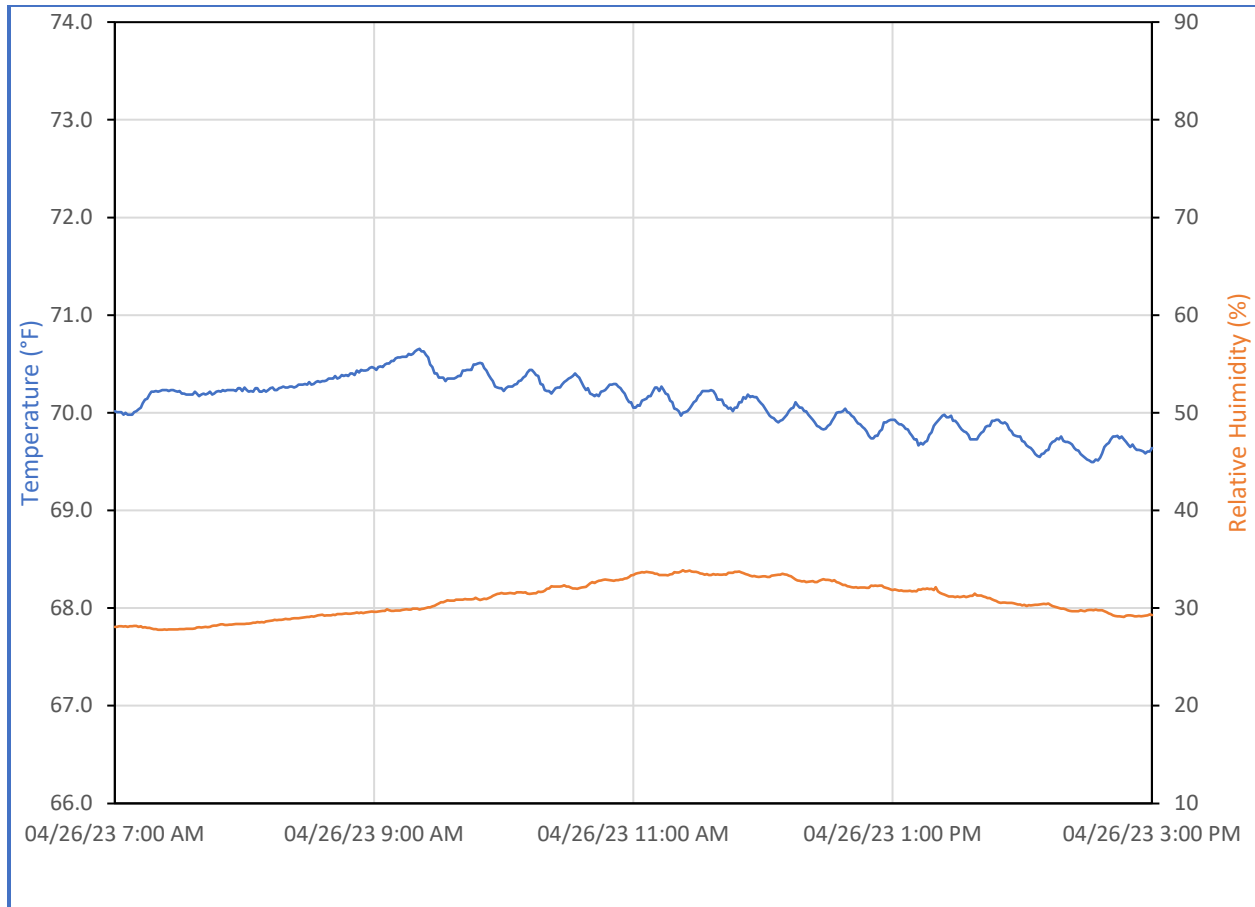
DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION

Test Vehicle: 2023 BMW X1 xDrive28i 5-Door SUV

NHTSA No. M20234101

Test Program: NCAP Side Pole Impact Test

Test Date: 04/26/23



APPENDIX A
PHOTOGRAPHS

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FIGURE 1. As-Delivered Right Front $\frac{3}{4}$ View of Test Vehicle



FIGURE 2. As-Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle



FIGURE 3. Pre-Test Frontal View of Test Vehicle



FIGURE 4. Post-Test Frontal View of Test Vehicle



FIGURE 5. Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle



FIGURE 6. Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle



FIGURE 7. Pre-Test Left Side View of Test Vehicle



FIGURE 8. Post-Test Left Side View of Test Vehicle



FIGURE 9. Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



FIGURE 10. Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



FIGURE 11. Pre-Test Rear View of Test Vehicle



FIGURE 12. Post-Test Rear View of Test Vehicle



FIGURE 13. Pre-Test Right Side View of Test Vehicle



FIGURE 14. Post-Test Right Side View of Test Vehicle



FIGURE 15. Pre-Test Overhead View of Test Area

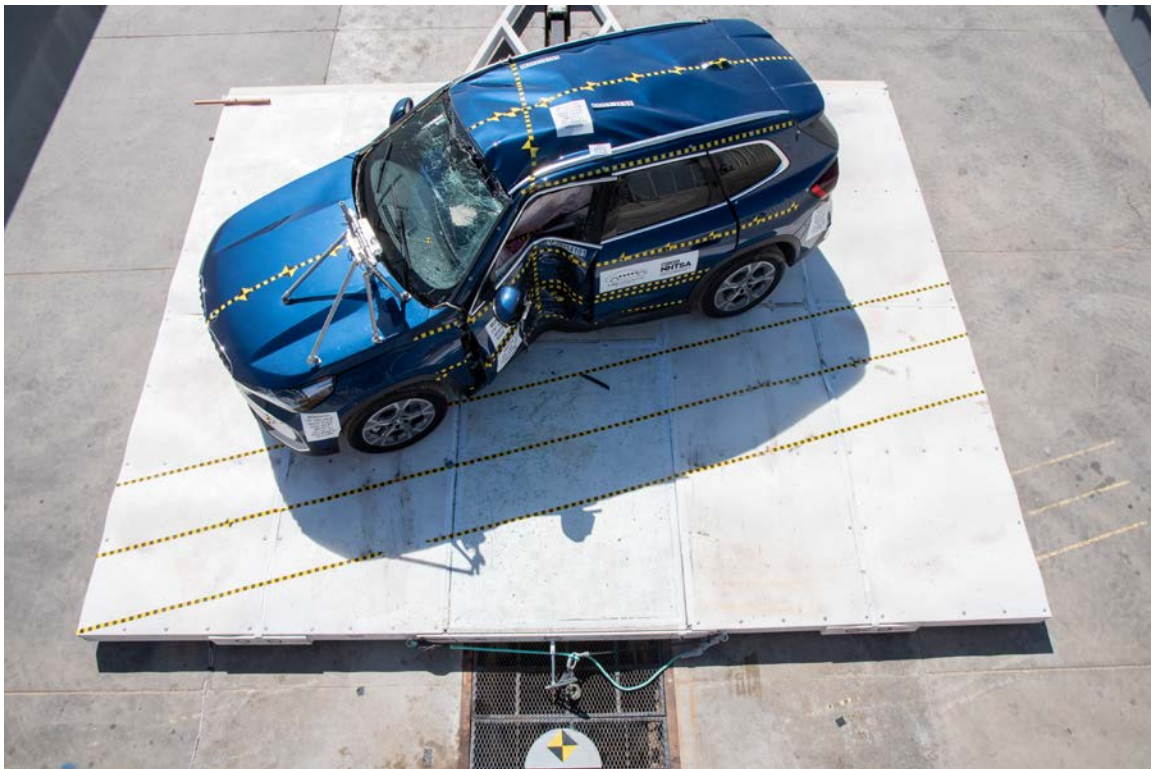


FIGURE 16. Post-Test Overhead View of Test Area



FIGURE 17. Pre-Test Left Side View of Pole Positioned Against Side of Vehicle



FIGURE 18. Pre-Test Right Side View of Pole Positioned Against Side of Vehicle



FIGURE 19. Pre-Test Close-Up View of Impact Point Target



FIGURE 20. Post-Test Close-Up View of Impact Point Target Showing Impact Location



FIGURE 21. Pre-Test Front Close-Up View of Dummy Head and Chest



FIGURE 22. Post-Test Front Close-Up View of Dummy



FIGURE 23. Pre-Test Left Side View of Dummy Showing Belt and Chalking



FIGURE 24. Pre-Test Left Side View of Dummy Shoulder and Door Top View



FIGURE 25. Post-Test Left Side View of Dummy Shoulder and Door Top View



FIGURE 26. Pre-Test Frontal View of Seat Back Prior to Dummy Positioning



FIGURE 27. Pre-Test Frontal Close-Up View of Dummy Head and Shoulders in Relation to Head Restraint



FIGURE 28. Pre-Test Overhead View of Seat Pan Prior to Dummy Positioning



FIGURE 29. Pre-Test Overhead View of Dummy Thighs on Seat Pan



FIGURE 30. Pre-Test Left Side View of Dummy's Neck
Showing Position of Adjustable Neck Bracket



FIGURE 31. Pre-Test Left Side View of Dummy's Head
Showing Dummy's Head is Level



FIGURE 32. Pre-Test Placement of Dummy's Feet



FIGURE 33. Pre-Test View of Belt Anchorage for Dummy



FIGURE 34. Pre-Test Left Side View of Steering Wheel



FIGURE 35. View of Disengaged Parking Brake



FIGURE 36. Pre-Test View of Parking Brake



FIGURE 37. Pre-Test Close-Up Left Side View of Driver Seat Track



FIGURE 38. Pre-Test Close-Up Left Side View of Driver Seat Back



FIGURE 39. Pre-Test Close-Up View of Driver Seat Back or Head Restraint



FIGURE 40. Pre-Test Dummy and Door Clearance View



FIGURE 41. Post-Test Dummy and Door Clearance View



FIGURE 42. Pre-Test Right Side View of Dummy and Front Seat of Occupant Compartment



FIGURE 43. Post-Test Right Side View of Dummy and Front Seat of Occupant Compartment



FIGURE 44. Pre-Test Inner Door Panel View



FIGURE 45. Post-Test Inner Door Panel View Showing Dummy Contact Locations



FIGURE 46. Post-Test Dummy Close-Up Head Contact with Vehicle Interior View



FIGURE 47. Post-Test Dummy Close-Up Head Contact With Side Airbag View



FIGURE 48. Post-Test Dummy Close-Up Torso Contact With Vehicle Interior View



FIGURE 49. Post-Test Dummy Close-Up Torso Contact With Side Airbag View



FIGURE 50. Post-Test Dummy Close-Up Pelvis Contact With Vehicle Interior View



FIGURE 51. Post-Test Dummy Close-Up Pelvis Contact With Side Airbag View



FIGURE 52. Post-Test Dummy Close-Up Knee Contact with Vehicle Interior View



FIGURE 53. Post-Test Right Side View of Dummy and Rear Seat of Occupant Compartment



FIGURE 54. Post-Test Inner Rear Passenger Torso Airbag Deployment View



FIGURE 55. Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



FIGURE 56. Post-Test View of Fuel Filler Cap or Fuel Filler Neck



FIGURE 57. Close-Up View of Vehicle's Certification Label



FIGURE 58. Close-Up View of Vehicle's Tire Information Placard or Label



FIGURE 59. Pre-Test Pole Barrier Front View



FIGURE 60. Post-Test Pole Barrier Front View



FIGURE 61. Pre-Test Pole Barrier Side View



FIGURE 62. Post-Test Pole Barrier Side View



FIGURE 63. Pre-Test Ballast View



FIGURE 64. Post-Test Primary and Redundant Speed Trap Read-Out



FIGURE 65. FMVSS No. 301 Static Rollover 0 Degrees



FIGURE 66. FMVSS No. 301 Static Rollover 90 Degrees



FIGURE 67. FMVSS No. 301 Static Rollover 180 Degrees

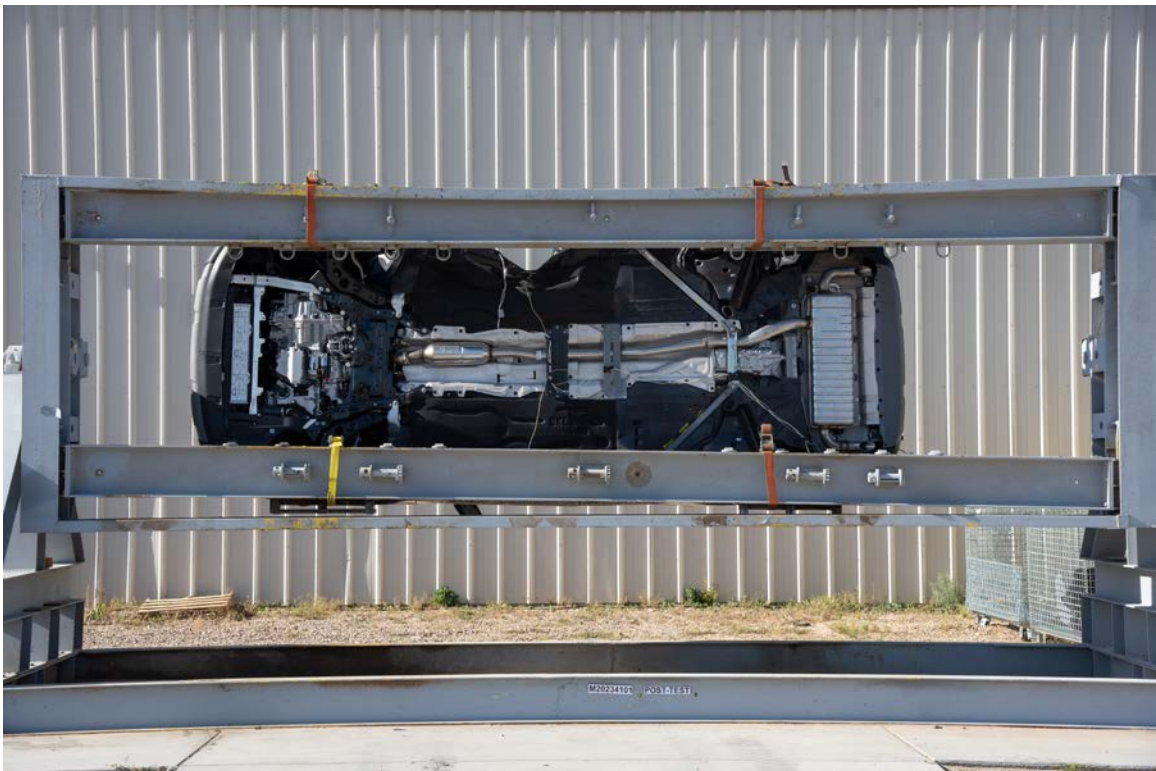


FIGURE 68. FMVSS No. 301 Static Rollover 270 Degrees



FIGURE 69. FMVSS No. 301 Static Rollover 360 Degrees



FIGURE 70. Impact Event

The Ultimate Driving Machine®
2023 BMW X1 xDrive28i

Manufacturer's Suggested Retail Price \$ 33,090.00
Options and Additional Charges: (Optional equipment may increase standard equipment; check with your authorized BMW dealer.)

Phytonic Blue Metallic \$ 650.00
Standard Equipment Included
Oyster Porcelain Sensatec w/ Active Blind Spot Detection
Fit Coi Warm w/ City Out Mitig Lane Departure Warning
SULEV20 exhaust emission std
18" V Spoke Bi-color wheels, a 7-Speed Dual Clutch Transmission
Roof rails in Satin Aluminum
Satin aluminum exterior trim
Active Driving Assistant
LED Headlights w/ Cornering Parking Assistant
Connected Package Pro
Widescreen Display
SiriusXM with 360L + 1 year PI
Anti-rattle headliner
Refrigerant
Destination Charge \$ 995.00
Total Suggested Retail Price \$ 40,245.00

Standard Features
Performance and efficiency
• 2.0-liter BMW TwinPower Turbo engine with variable valve control (DUAL VANOS) and 8-speed automatic transmission
• 7-Speed Dual Clutch Transmission
Handling, ride and braking
• Driving Dynamics Control with various driving modes
• Performance Control
• Dynamic Stability Control (DSC) with Dynamic Traction Control (DTC)
• 4-wheel optional anti-lock disc brakes (ABS) with Dynamic Brake Control (DBC) and Cornering Brake Control (CBC)
• Drive-All-Wheel-Drive system
Connectivity
• Apple CarPlay and Android Auto compatibility
• Remote Software Update capability
• Connected Package Pro features Real-Time Traffic, On-Street Parking (Mobile Services), and BMW Remote Services
Exterior
• Satin Aluminum roof rails
• Satin Aluminum exterior trim
Interior trim
• Perfected Sensatec upholstery
• Airtronic ventilation

Audio system
• HiFi Sound System
• 500-Watt Stereo Radio with 1-year subscription
Instrumentation and controls
• iDrive with integrated voice control
• Live Cockpit Plus features Navigation, BMW Curved Display, operated by voice and touchscreens
Comfort and convenience
• Multi-zone Climate Control
• Sun-protecting window shades
• Power front seats including driver seat memory
• Keyless-Go and Keyless-Start
Safety and security
• Second-row head-curtain side-impact airbags
• Active Driving Assistant features Forward Collision Warning, Active Lane Departure Warning, and Lane Departure Warning
• Front and Rear Park Distance Control
• LED headlights with Cornering Lights
Warranty
• 3-year/50,000-mile New Vehicle Limited Warranty for Passenger Cars and Light Trucks 2020 Models
• 12-year/Unlimited Mileage Rust Perforation Limited Warranty
• 1-year/Unlimited Mileage Roadside Assistance Program

PARTS CONTENT INFORMATION
For Vehicles in this Car Line: US/Canadian Parts Content: 21%
Major Source of Foreign Parts Content: GERMANY: 21%
Note: Parts content does not include final assembly, distribution, or other non-parts costs.
For this Vehicle: Final Assembly Point: REGENSBURG, GERMANY
Country of Origin: GERMANY
Engine: GERMANY
Transmission: GERMANY

GOVERNMENT 5-STAR SAFETY RATINGS
Overall Vehicle Score Not Rated
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 Not Rated
Passenger Not Rated
Based on the risk of injury in a frontal impact.
Side Crash Front seat Not Rated
Rear seat 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
This vehicle is equipped with bumpers that can withstand an impact of 2.5 miles per hour with no damage to the vehicle's body and safety systems, although the bumper and related components may sustain damage. The bumper system on this vehicle conforms to the current federal bumper standard of 2.5 miles per hour.

BMW of North America, LLC
Woodcliff Lake, NJ 07777
VPC Location: OAKLAND, CALIFORNIA
Port of Entry: HUENEME, CALIFORNIA
Carrier: DELUXE AUTO CARRIERS
Sold To: Century West BMW
PO Box 979
North Hollywood CA 91603-0979
Ship To: Century West BMW
4245 Lankershim Blvd
North Hollywood CA 91602-2802
(818) 432-5800 (818) 432-5879 (818) 432-5800 (818) 432-2802

BMW Ultimate Care™
\$0 Maintenance Program
For the first 3 years or 35,000 miles, whichever comes first on scheduled maintenance.
Your Maintenance Costs:
Engine Oil Services: \$0
Cabin Microfilter: \$0
Vehicle Checks: \$0
Air Filter: \$0
Spark Plugs: \$0
Brake Fluid: \$0

EPA Fuel Economy and Environment
Gasoline Vehicle
Fuel Economy
28 MPG combined city/hwy
25 MPG city
34 MPG highway
3.6 gallons per 100 miles
Small SUVs range from 14 to 129 MPG. The best vehicle is 132 MPG.
You spend \$1,750 more in fuel costs over 5 years
compared to the average new vehicle.
Annual fuel cost \$1,950
Actual results will vary for many reasons, including driving conditions and your vehicle's condition. The average new vehicle gets 28 MPG city and 34 MPG highway. Fuel economy is based on 15,000 miles per year at \$3.00 per gallon. *MPG is miles per gallon. Vehicle emissions are a significant source of air pollution and global warming.
fuel economy.gov
Calculate personalized estimates and compare vehicles

VIN: WBX73EF08P5W19441

FIGURE 71. Monroney Label

CONTROLS Seats, mirrors and steering wheel

Warning
Objects on the head restraint reduce the protective effect in the head and neck area. There is a risk of injury.
• Do not use seat or head restraint covers.
• Do not hang objects, for instance clothes hangers, directly on the head restraint.
• Only use accessories that have been determined to be safe for attachment to a head restraint.
• Do not use any accessories, for instance pillows, while driving.

Adjusting the height
To lower: press the button, arrow 1, and push the head restraint down.
To raise: push the head restraint up. After setting the height, make sure that the head restraint engages correctly.

Adjusting the distance
The distance to the back of the head is adjusted via the backrest inclination. Adjust the distance so that the head restraint is as close as possible to the back of the head.

Removing the head restraints
Only remove the head restraint if no one will be sitting in the seat in question.

Installing head restraints
Proceed in the reverse order to install the head restraint.

Rear head restraints
Safety information
Warning
Removal or incorrect adjustment of head restraints can cause injuries in the head and neck area. There is a risk of injury.
• Before driving, install the removed head restraints on the occupied seats.
• Adjust the head restraint so its center supports the back of the head at as close to eye level as possible.
• Adjust the distance so that the head restraint is as close as possible to the back of the head. Adjust the distance via the backrest tilt as needed.

Folding down the head restraints
General information
To improve the view to the rear, the head restraints can be folded back. Only fold the head restraint back if no one will be sitting in the corresponding seat.

Folding down the head restraints
To the rear: press the button, arrow 1, and fold the head restraint backward.
Forward: fold the head restraint toward the front as far as it will go. Make sure that the head restraint engages correctly.

Adjusting the height
To lower: press the button, arrow 1, and push the head restraint down.
To raise: push the head restraint up. After setting the height, make sure that the head restraint engages correctly.

Removing the head restraint
Only remove the head restraint if no one will be sitting in the seat in question.
1. Fold down the rear seat backrest in question.

FIGURE 72. Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

Photograph Not Applicable

FIGURE 73. Post-Test View of Shattered Vehicle Inner Door Panel

APPENDIX B
DUMMY RESPONSE DATA

TABLE OF DATA PLOTS

Plot		Page
1	Driver Head Acceleration (X) Primary	B-1
2	Driver Head Acceleration (Y) Primary	B-1
3	Driver Head Acceleration (Z) Primary	B-1
4	Driver Head Acceleration Primary Resultant	B-1
5	Driver Lower Spine T12 Acceleration (X)	B-2
6	Driver Lower Spine T12 Acceleration (Y)	B-2
7	Driver Lower Spine T12 Acceleration (Z)	B-2
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9	Driver Upper Thorax Rib Deflection (Y)	B-3
10	Driver Middle Thorax Rib Deflection (Y)	B-3
11	Driver Lower Thorax Rib Deflection (Y)	B-3
12	Driver Upper Abdomen Rib Deflection (Y)	B-3
13	Driver Lower Abdomen Rib Deflection (Y)	B-4
14	Driver Acetabulum Force on Impact Side (Y)	B-4
15	Driver Iliac Wing Force on Impact Side (Y)	B-4
16	Driver Total Pelvis Force on Impact Side (Y)	B-4

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 Acceleration Redundant (X)

Driver Head Acceleration Redundant (Y)

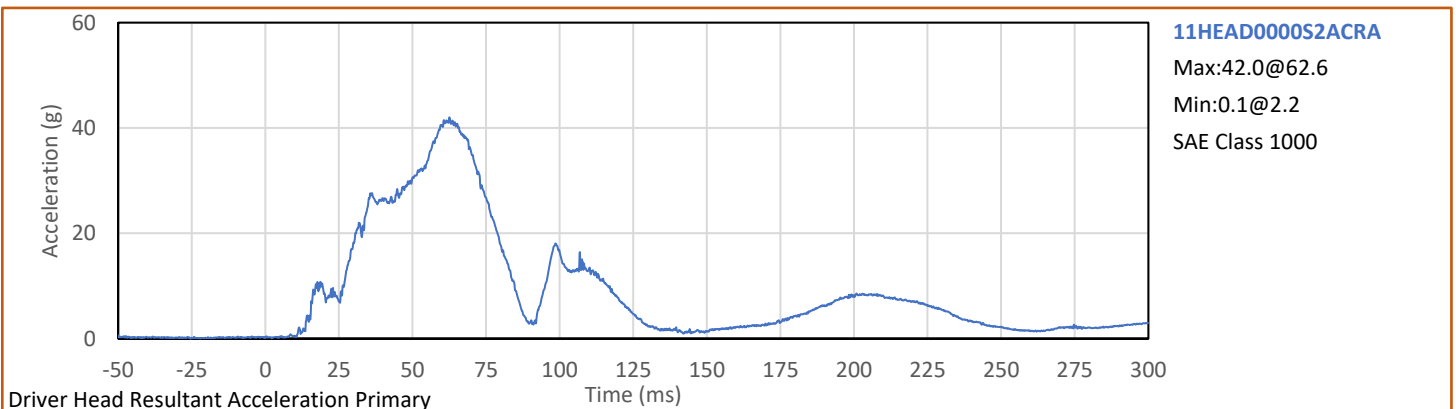
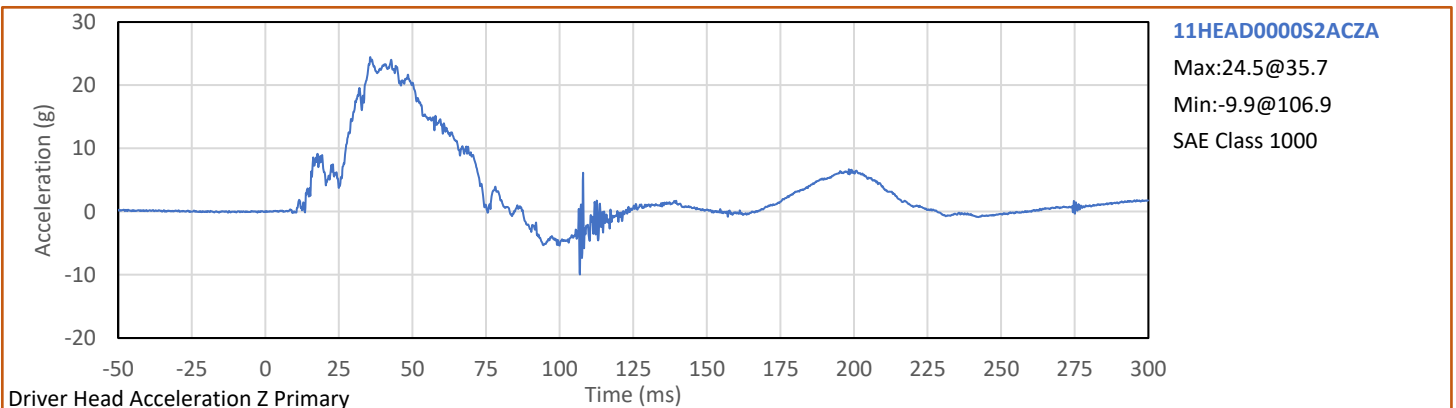
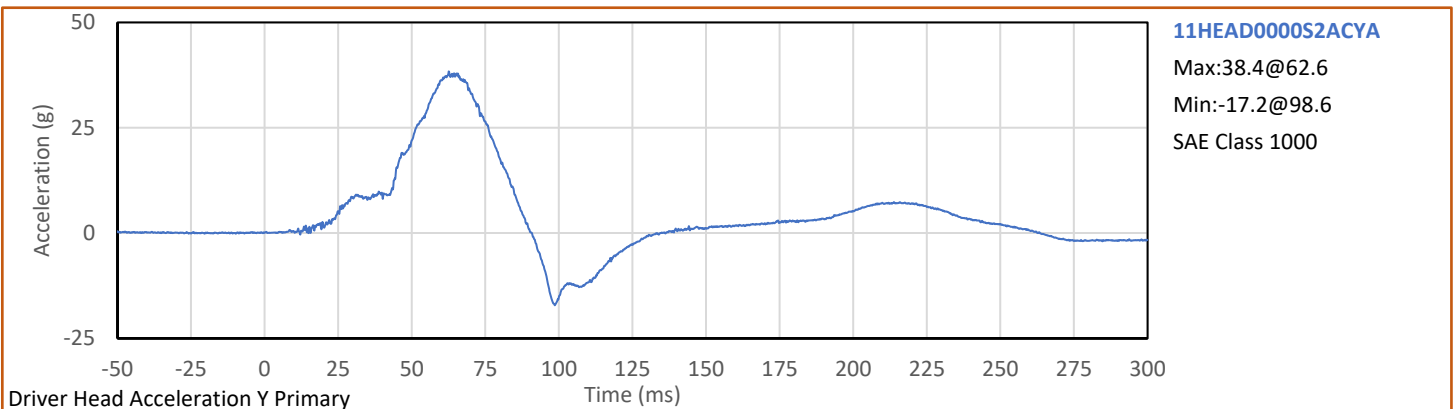
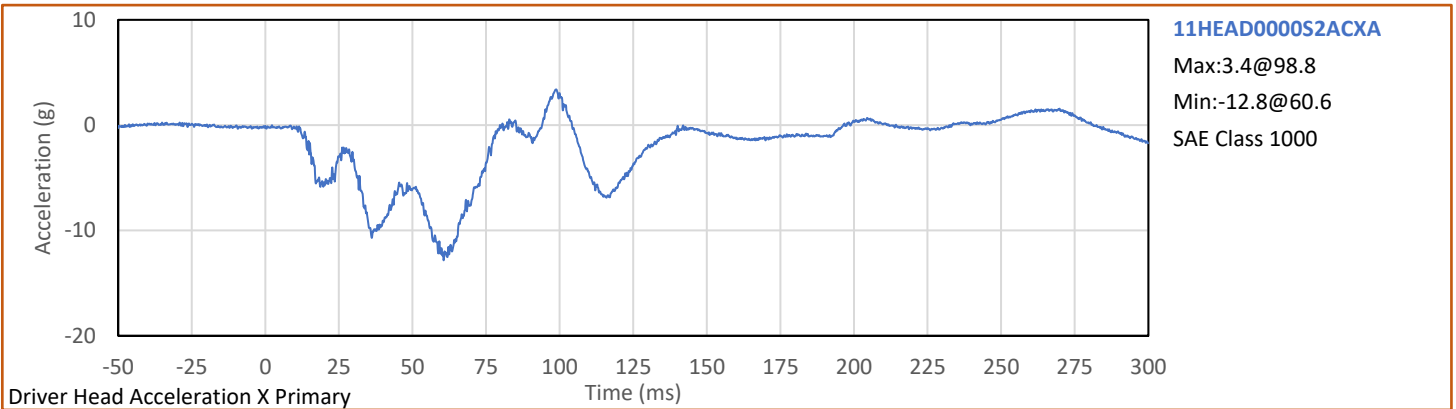
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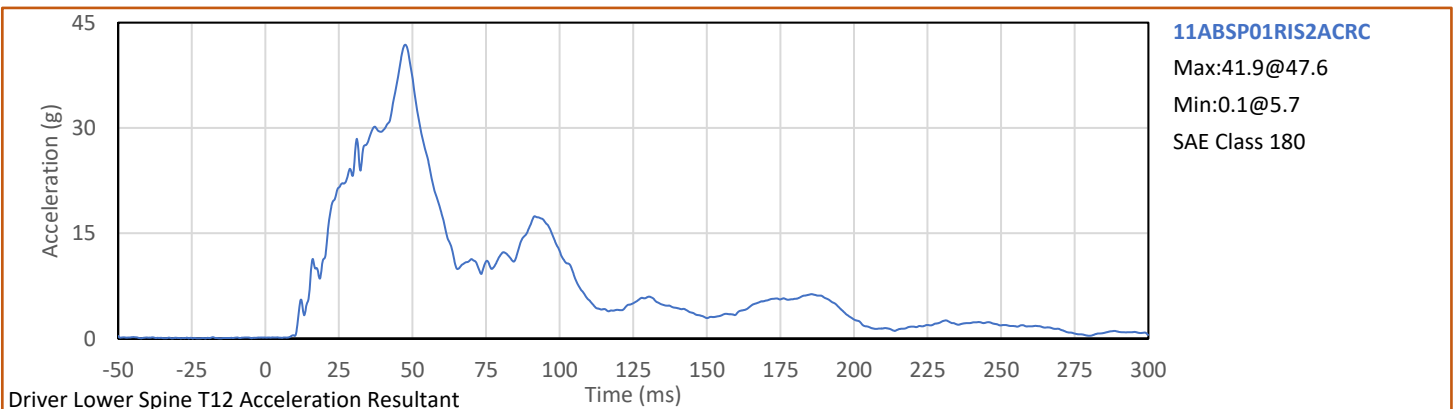
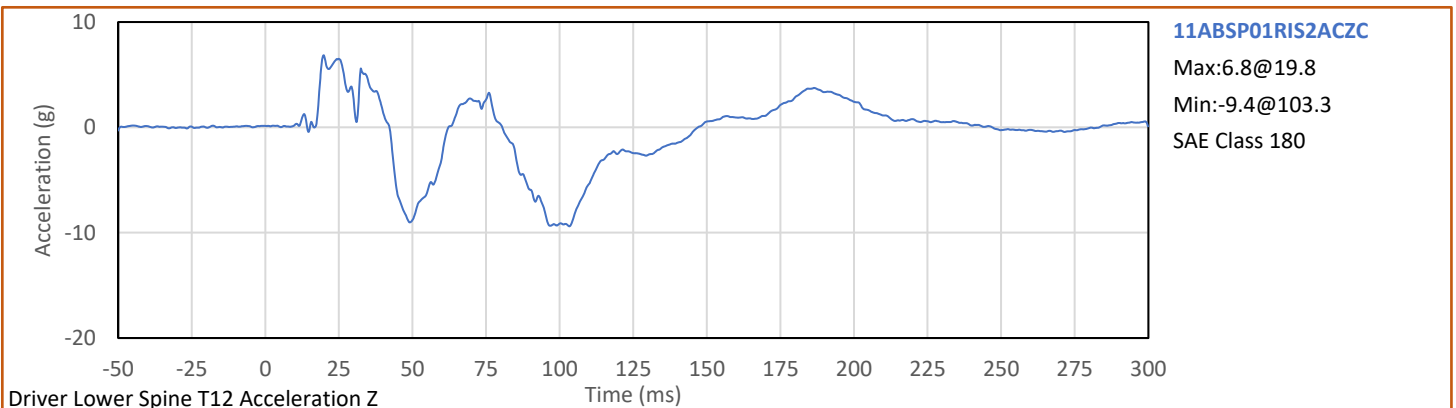
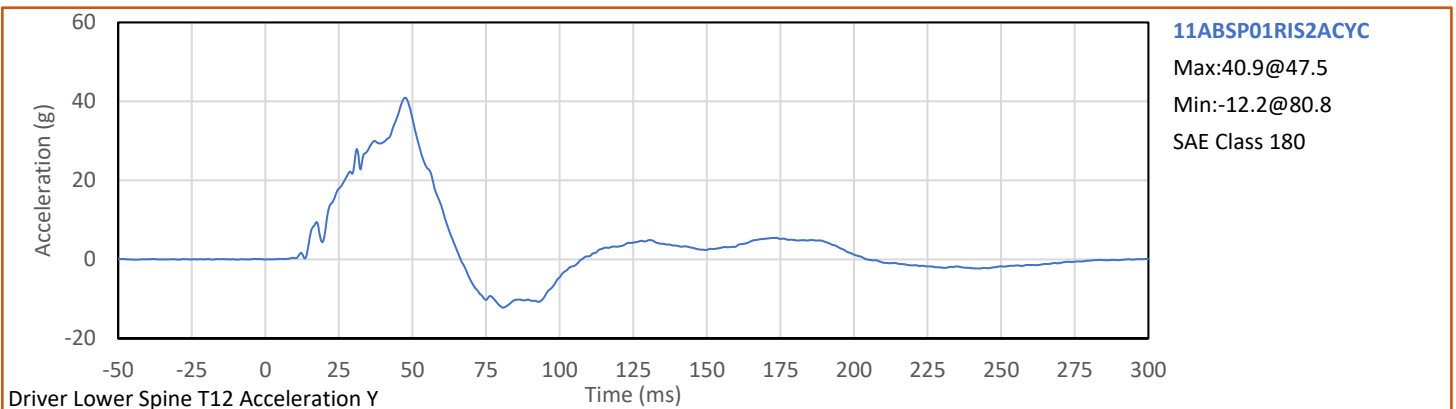
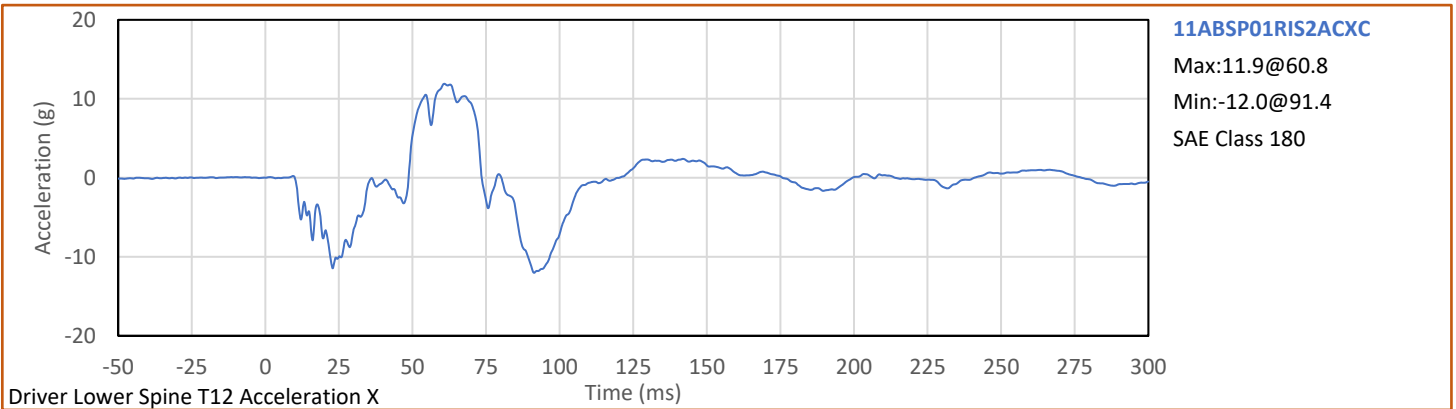
Vehicle Instrumentation Data

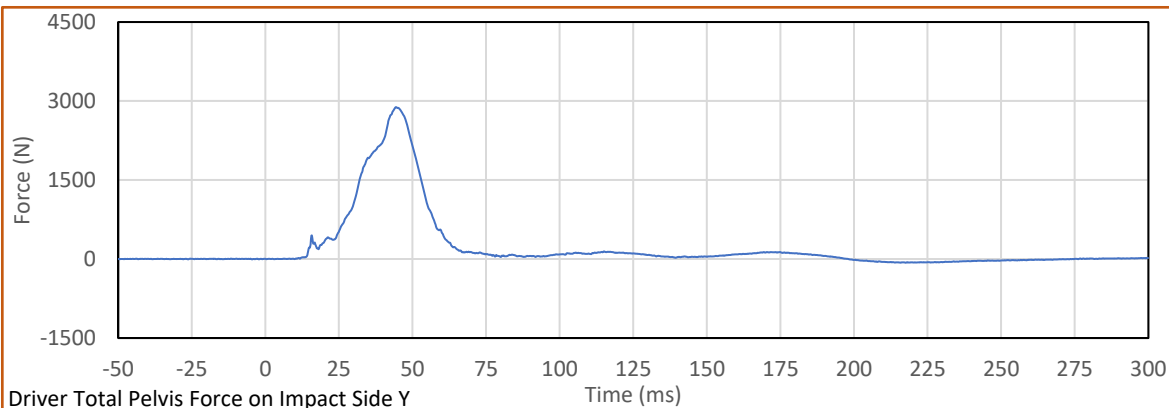
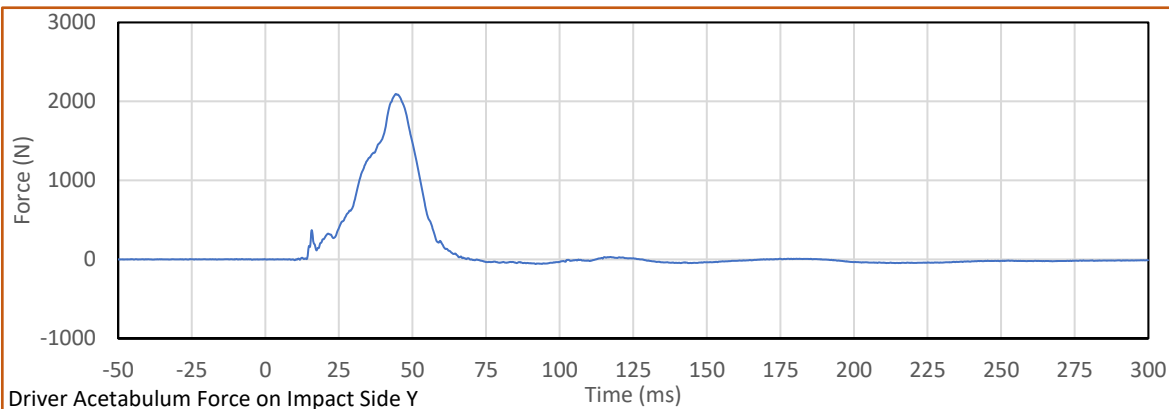
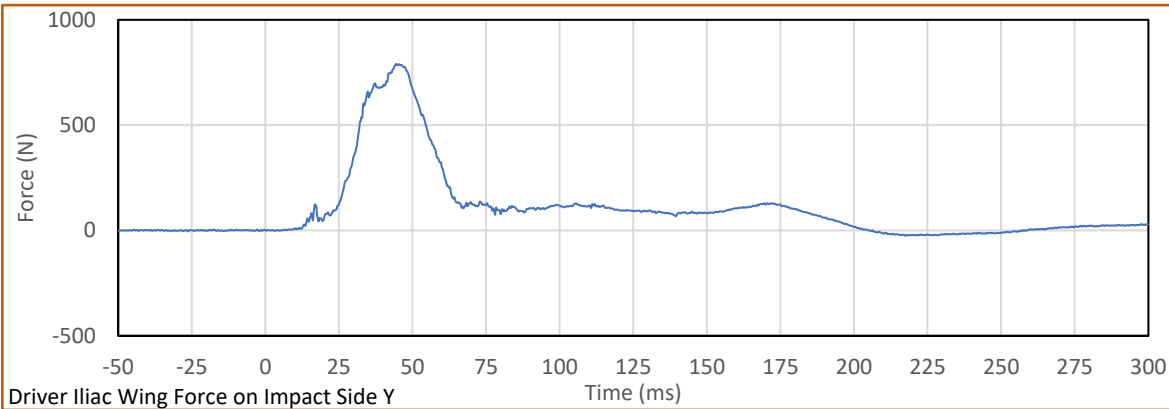
Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Left Floor Sill Acceleration (Y)
Left A-Pillar Sill Acceleration (Y)
Left Lower A-Pillar Acceleration (Y)
Left Mid A-Pillar Acceleration (Y)
Left B-Pillar Sill Acceleration
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) -No Data







APPENDIX C
ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA

APPENDIX C
Pre-Test ATD Qualification and Performance Verification
SID-IIs Small Side Impact ATD, Left Side Configuration
S/N: 299

ATD Serial No.: 299

Test Date: 2023-04-20

Tested Parameter	Units	Spec Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.8	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
A - Sitting Height	mm	772	788	775	Pass
B - Shoulder Pivot Height	mm	437	453	450	Pass
C - Hpoint Height	mm	79	89	85	Pass
D - H Point From Seatback	mm	141	151	146	Pass
E - Shoulder Pivot From Backline	mm	97	107	103	Pass
F - Thigh Clearance	mm	119	135	123	Pass
G - Head Breadth	mm	140	148	146	Pass
H - Head Back From Backline	mm	40	46	45	Pass
I - Head Depth	mm	178	188	184	Pass
J - Head Circumference	mm	541	551	545	Pass
K - Buttock To Knee Length	mm	514	540	532	Pass
L - Popliteal Height	mm	343	369	350	Pass
K - Knee Pivot To Floor Height	mm	392	409	398	Pass
N - Buttock Popliteal Length	mm	416	442	426	Pass
O - Chest Depth W/O Jacket	mm	195	211	202	Pass
P - Foot Length	mm	216	232	219	Pass
Q - Hip Breadth (W/Pelvic Plugs)	mm	313	323	317	Pass
R - Arm Length	mm	249	259	253	Pass
S - Knee Joint To Seatback	mm	477	493	488	Pass
V - Shoulder Width	mm	341	357	346	Pass
W - Foot Width	mm	78	94	87	Pass
Y - Chest Circumference W/Jacket	mm	851	881	869	Pass
Z - Waist Circumference	mm	761	791	784	Pass
				Overall Test Results	Pass

Technician:



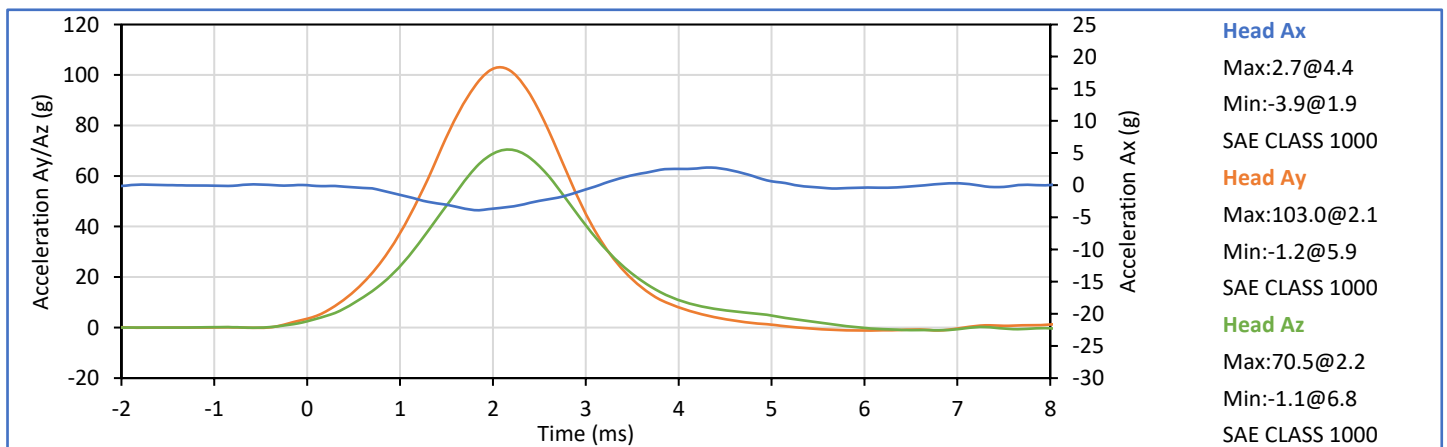
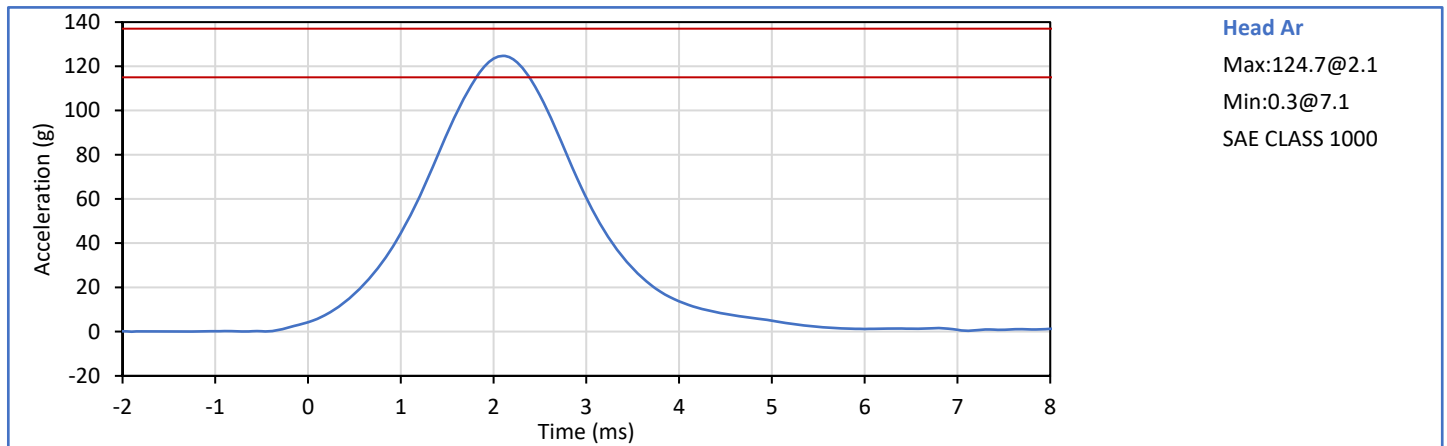
G. Fuentes

Approved By:



J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.2	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
Peak Resultant Acceleration	g	115.0	137.0	124.7	Pass
Peak Head Ax	g	-15.0	15.0	-3.9	Pass
Oscillations After Main Pulse	%	0.0	15.0	1.3	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
			Overall Test Results	Pass	



Technician:

G. Fuentes

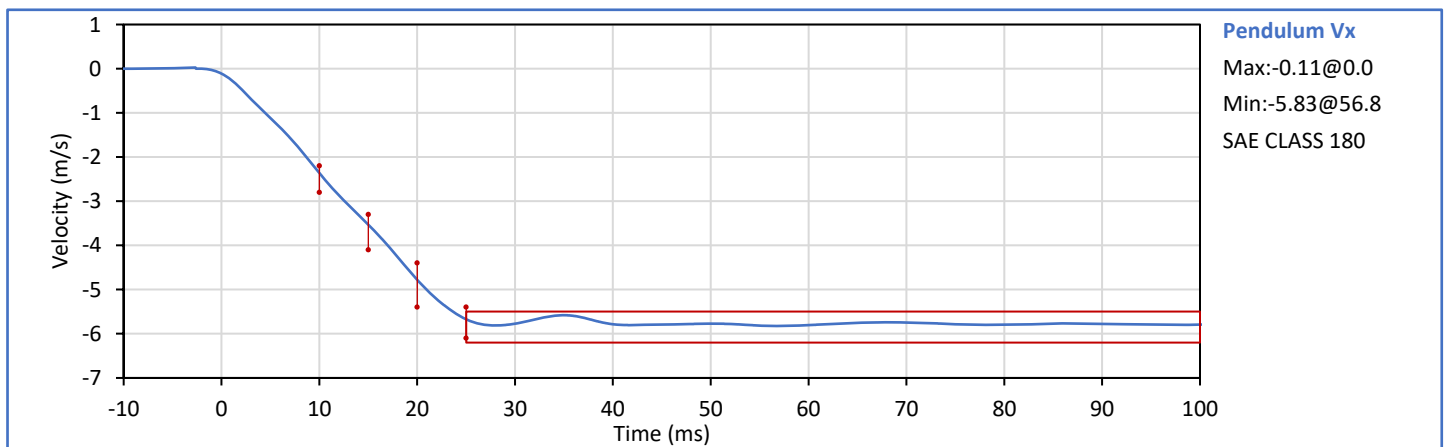
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
Pendulum Velocity	m/s	5.51	5.63	5.58	Pass
Pendulum Decel at 10 ms	m/s	-2.80	-2.20	-2.36	Pass
Pendulum Decel at 15 ms	m/s	-4.10	-3.30	-3.53	Pass
Pendulum Decel at 20 ms	m/s	-5.40	-4.40	-4.78	Pass
Pendulum Decel at 25 ms	m/s	-6.10	-5.40	-5.67	Pass
Pendulum Decel from 25-100 ms	m/s	-6.20	-5.50	-5.83/-5.58	Pass
Peak "D" Plane Rotation	deg	-81.0	-71.0	-76.3	Pass
Time of Peak "D" Plane Rotation	ms	50.0	70.0	60.8	Pass
Peak Occ. Condyle Moment	Nm	36.0	44.0	41.9	Pass
Time of Moment Decay to 0 Nm	ms	102.0	126.0	111.8	Pass
				Overall Test Results	Pass



Technician:

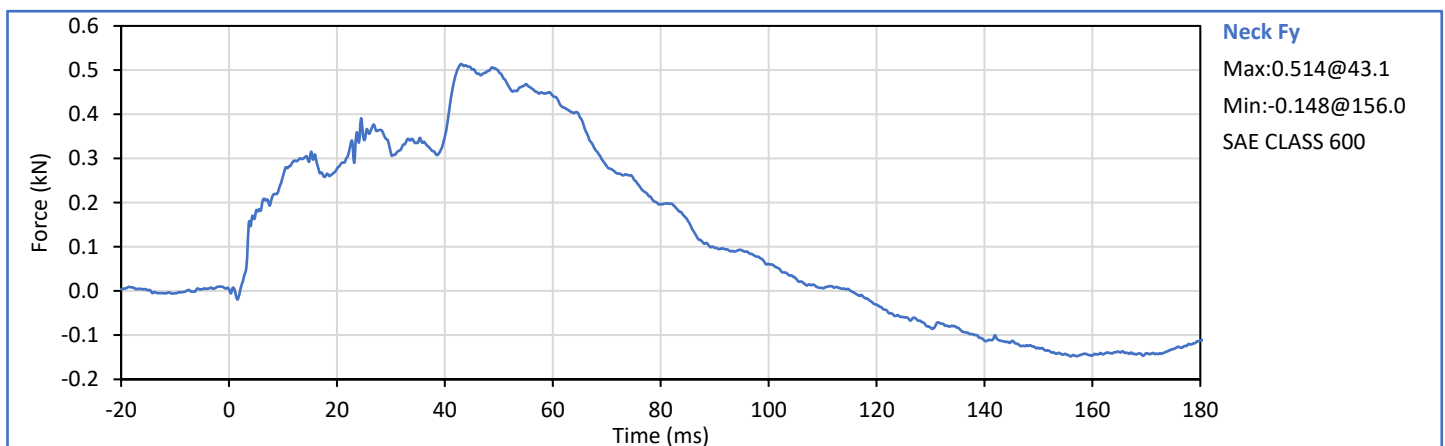
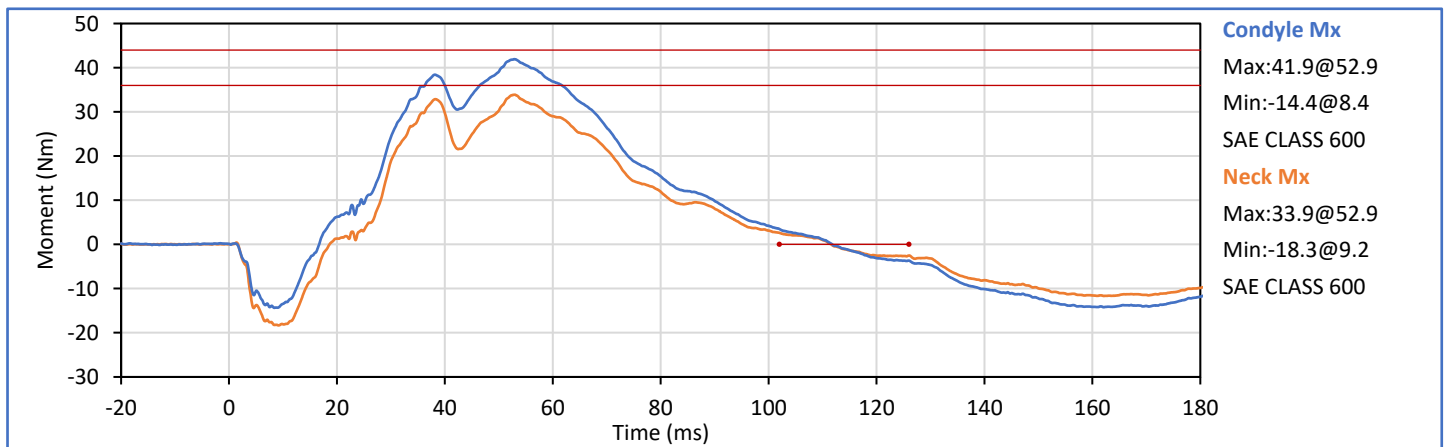
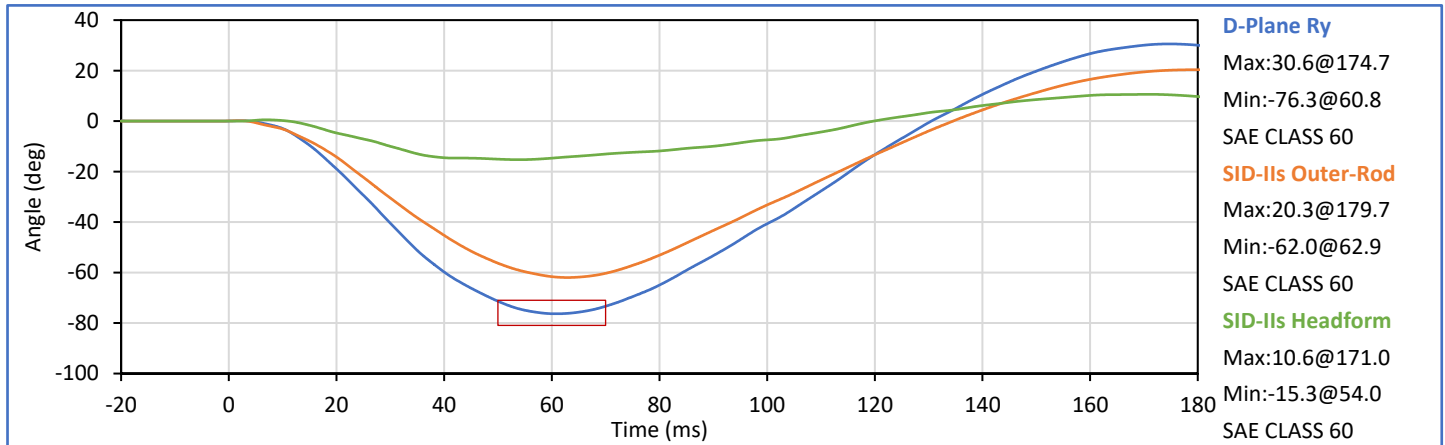
G. Fuentes

G. Fuentes

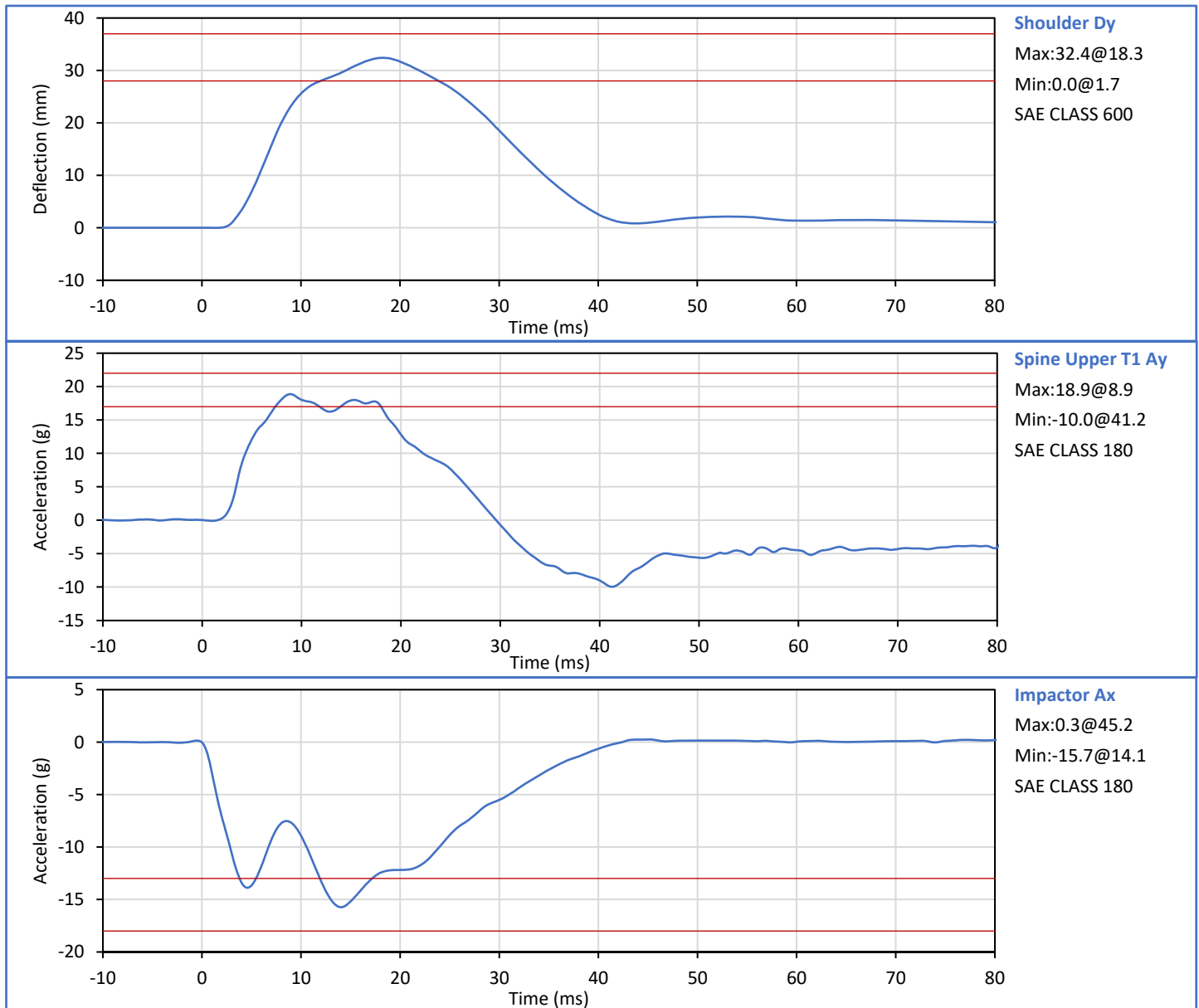
Approved By:

J. Hernandez

J. Hernandez



Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.6	Pass
Laboratory Relative Humidity	%	10	70	31	Pass
Impactor Velocity	m/s	4.20	4.40	4.33	Pass
Peak Shoulder Dy	mm	28.0	37.0	32.4	Pass
Peak Upper Spine (T1) Ay	g	17.0	22.0	18.9	Pass
Peak Impactor Ax	g	-18.0	-13.0	-15.7	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

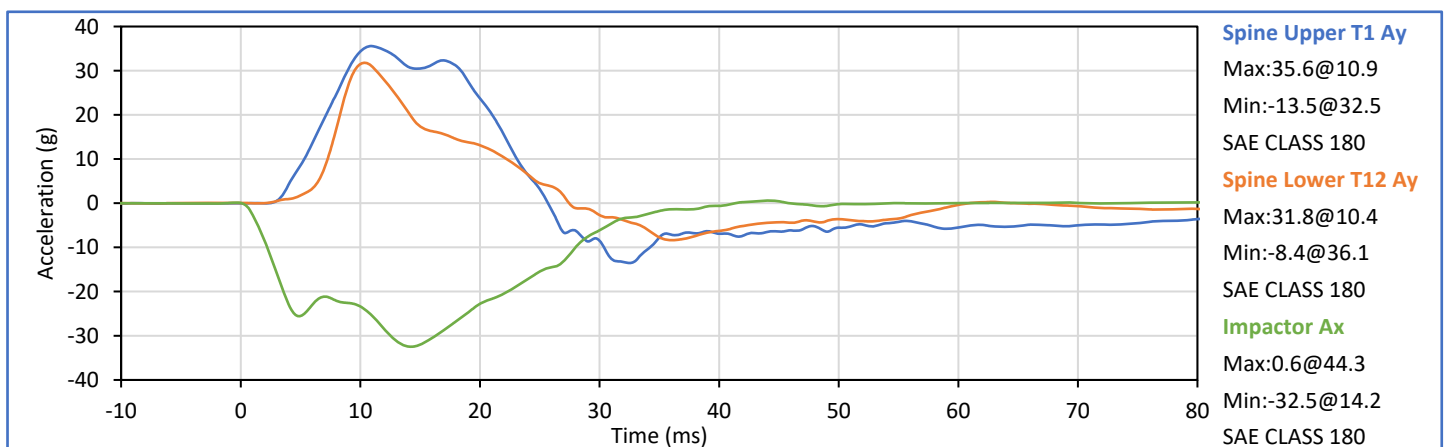
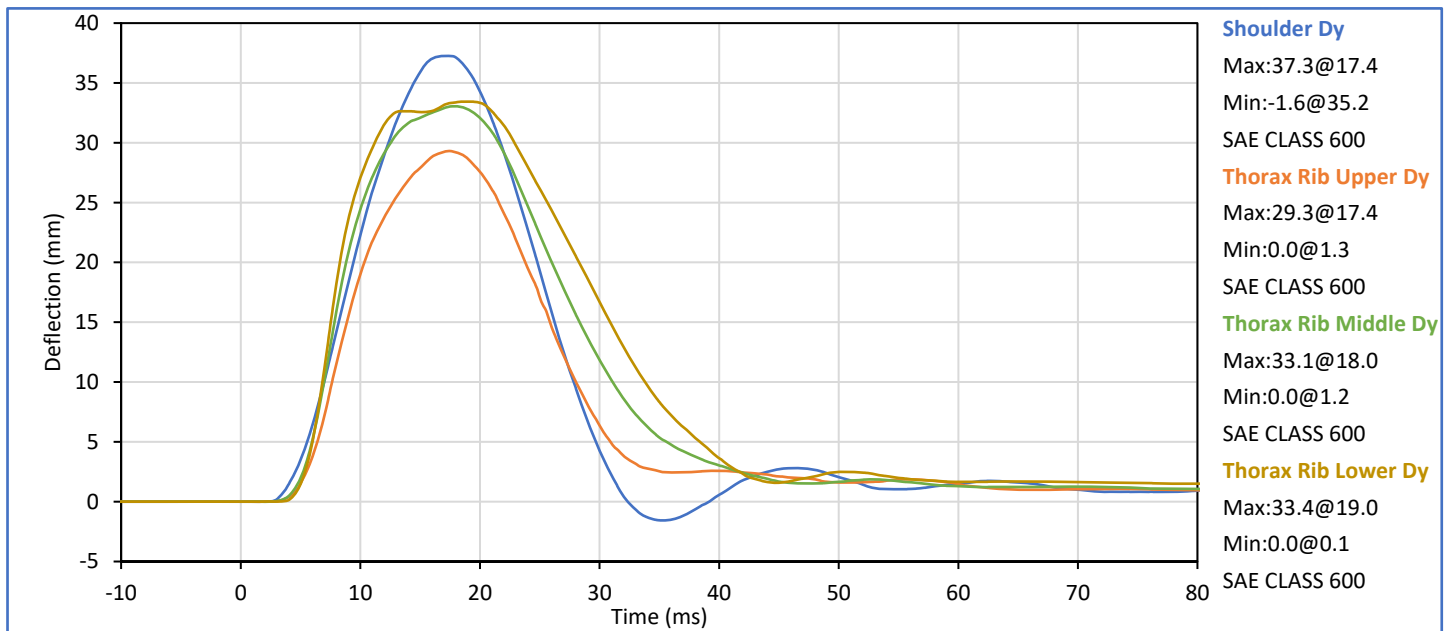
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.4	Pass
Laboratory Relative Humidity	%	10	70	31	Pass
Impactor Velocity	m/s	6.60	6.80	6.70	Pass
Peak Shoulder Dy	mm	31.0	40.0	37.3	Pass
Peak Upper Rib Dy	mm	25.0	32.0	29.3	Pass
Peak Middle Rib Dy	mm	30.0	36.0	33.1	Pass
Peak Lower Rib Dy	mm	32.0	38.0	33.4	Pass
Peak Upper Spine (T1) Ay	g	34.0	43.0	35.6	Pass
Peak Lower Spine (T12) Ay	g	29.0	37.0	31.8	Pass
Peak Impactor Ax	g	-36.0	-30.0	-32.5	Pass
Overall Test Results				Pass	Pass



Technician:

G. Fuentes

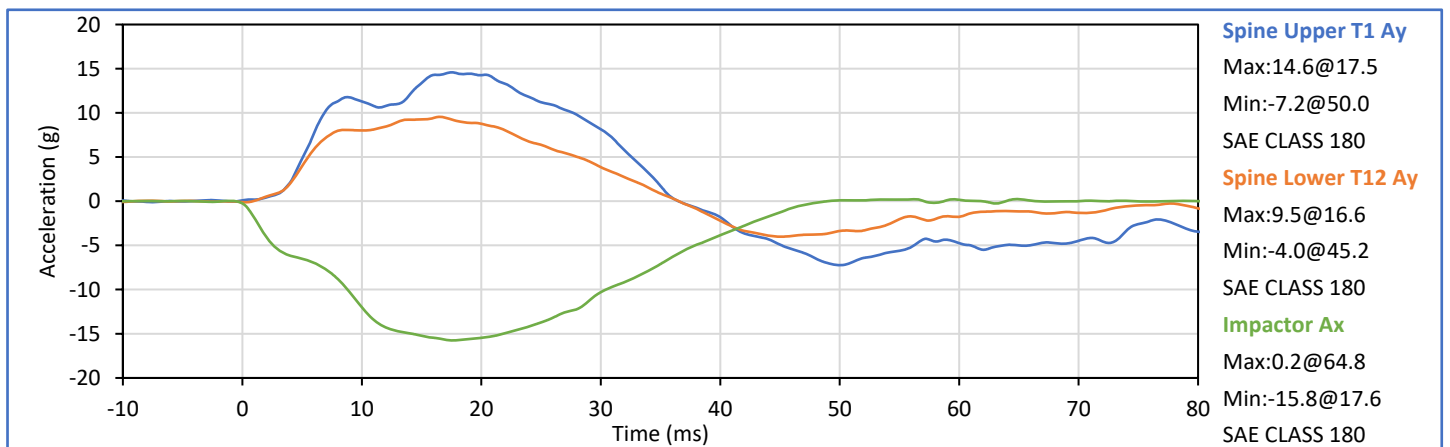
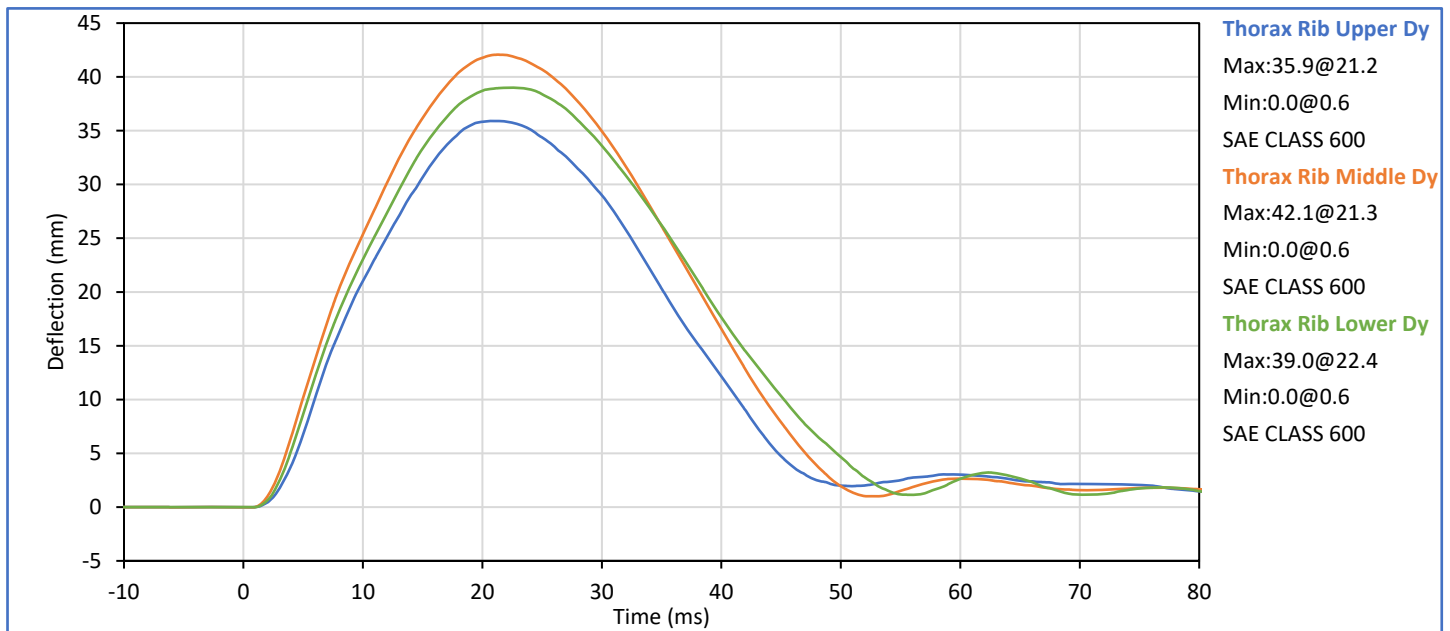
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.6	Pass
Laboratory Relative Humidity	%	10	70	31	Pass
Impactor Velocity	m/s	4.20	4.40	4.30	Pass
Peak Thorax Rib Upper Dy	mm	32.0	40.0	35.9	Pass
Peak Thorax Rib Middle Dy	mm	39.0	45.0	42.1	Pass
Peak Thorax Rib Lower Dy	mm	35.0	43.0	39.0	Pass
Peak Spine Upper T1 Ay	g	13.0	17.0	14.6	Pass
Peak Spine Lower T12 Ay	g	7.0	11.0	9.5	Pass
Peak Impactor Ax	g	-18.0	-14.0	-15.8	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

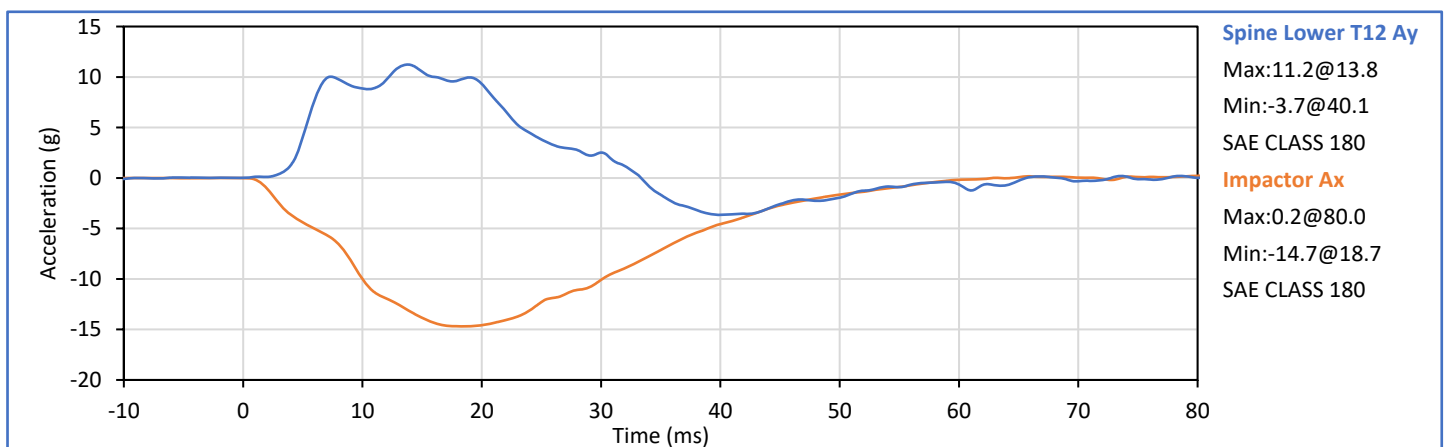
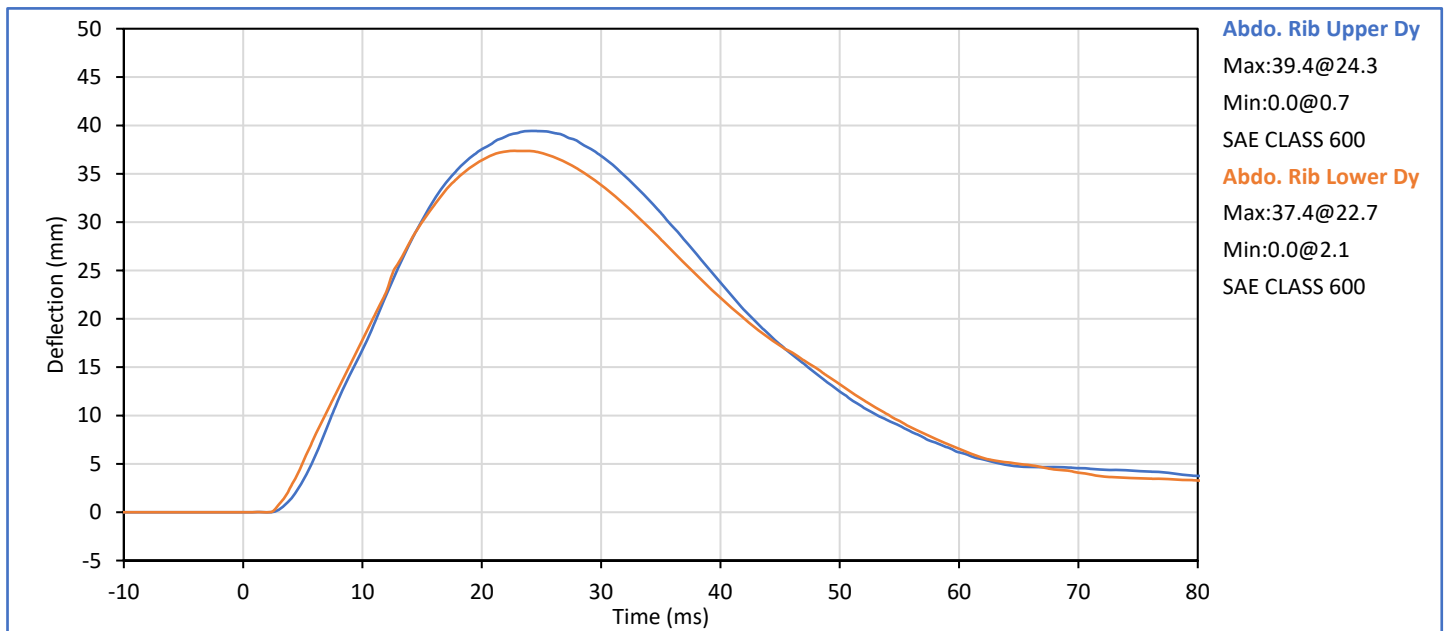
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.6	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
Impactor Velocity	m/s	4.20	4.40	4.30	Pass
Peak Upper Abdomen Rib Dy	mm	36.0	47.0	39.4	Pass
Peak Lower Abdomen Rib Dy	mm	33.0	44.0	37.4	Pass
Peak Lower Spine T12 Ay	mm	9.0	14.0	11.2	Pass
Peak Impactor Ax	g	-16.0	-12.0	-14.7	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

G. Fuentes

Approved By:

J. Hernandez

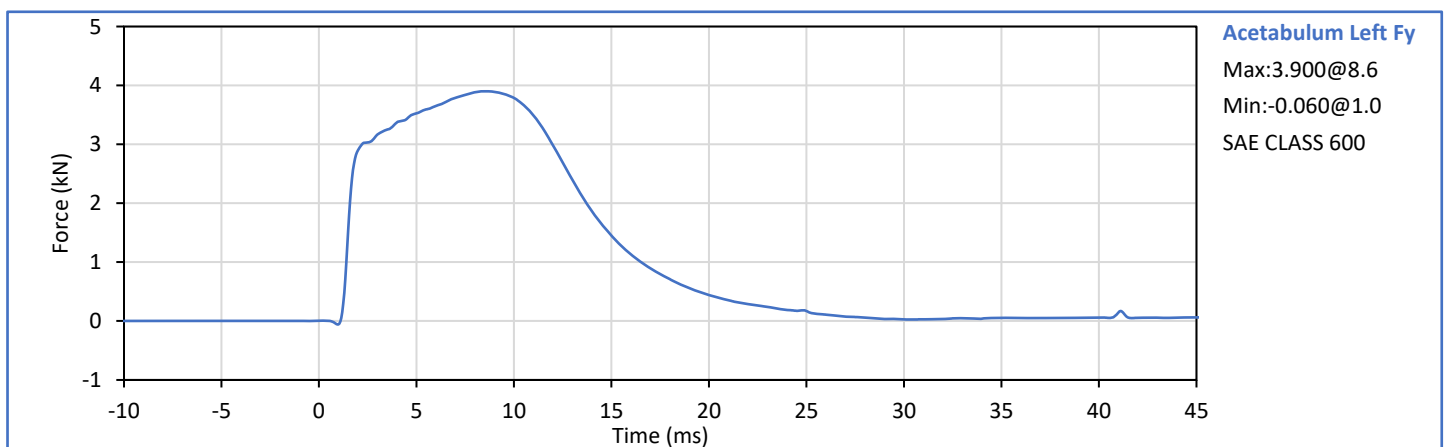
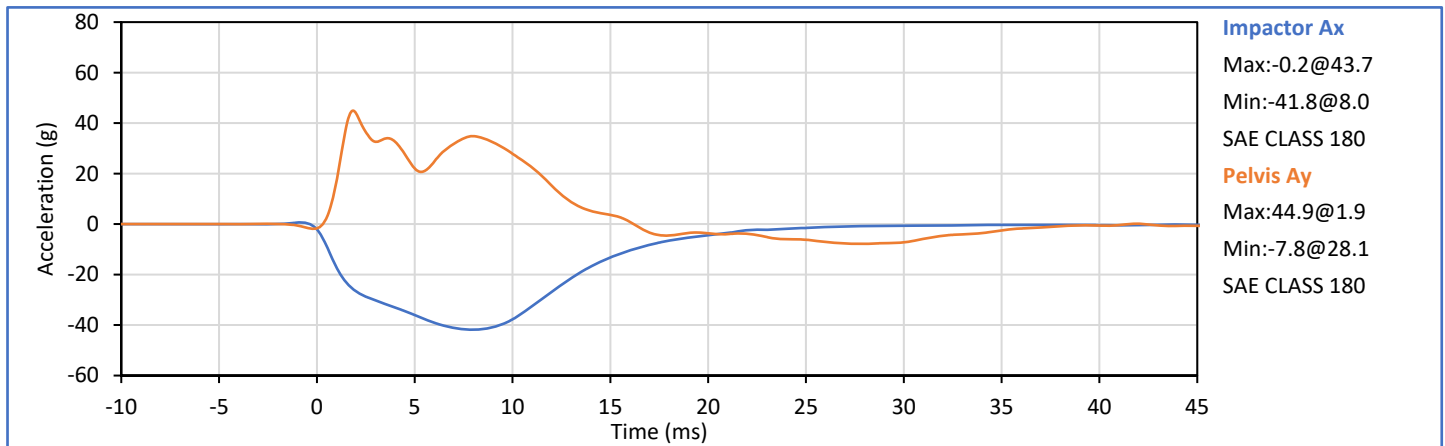
J. Hernandez

ATD Serial No.: 299

Test Date: 2023-04-24

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Relative Humidity	%	10	70	39	Pass
Impactor Velocity	m/s	6.60	6.80	6.70	Pass
Peak Acetabulum Fy	kN	3.60	4.30	3.90	Pass
Pelvis Ay after 6ms	g	34.0	42.0	34.8	Pass
Peak Impactor Ax	g	-47.0	-38.0	-41.8	Pass
Overall Test Results					Pass

Pelvis Plug S/N: 14756



Technician:

G. Fuentes

G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

ATD Serial No.: 299

SID-IIs Small Side Impact ATD
Pelvis Acetabulum Impact

Test Date: 2023-04-24

Pelvis Plug S/N: 14756



SID-IIs Pelvis Plug Certification Test

Plug S/N 14756

Test Number 16728

Report Number 16774

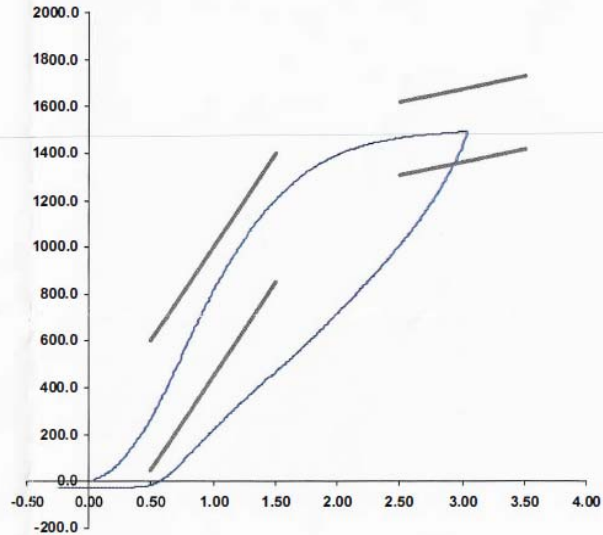
Test Date 12/28/2020 10:45:55 AM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	270.96	50.00	600.00
Force @ 1.5 mm (N)	1,204.01	850.00	1,400.00
Force @ 2.5 mm (N)	1,465.23	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,492.22	1,361.00	1,673.00

Testing Machine STM-20 5965542
Load Cell S/N (F1360947), 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 28-Dec-20
SACO Research

By: DC Date: 12/28/20

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

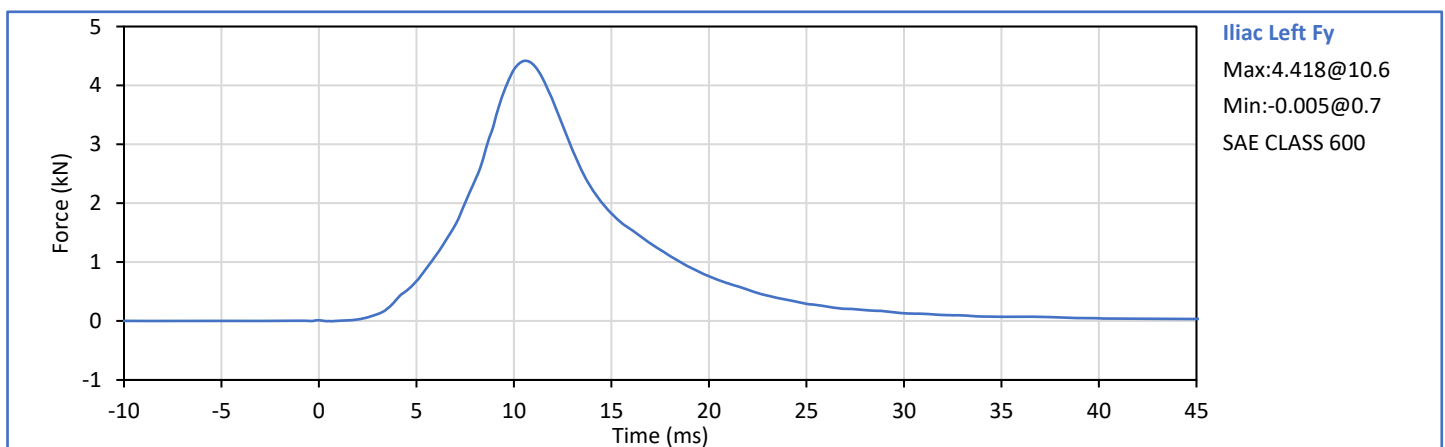
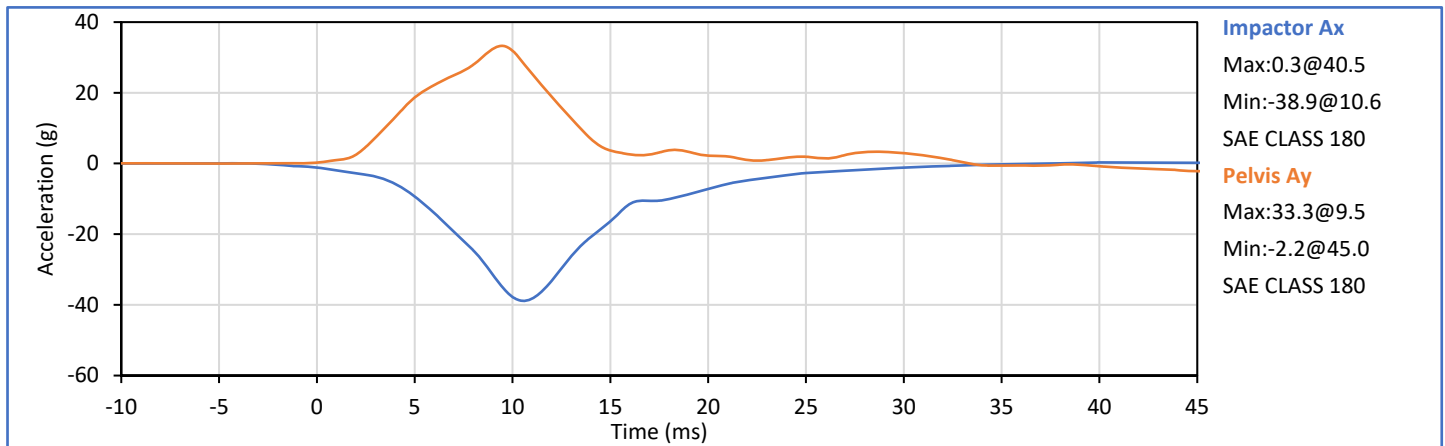
ATD Serial No.: 299

Test Date: 2023-04-25

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.3	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
Impactor Velocity	m/s	4.20	4.40	4.32	Pass
Peak Iliac Fy	kN	4.10	5.10	4.42	Pass
Peak Pelvis Ay	g	28.0	39.0	34.7	Pass
Peak Impactor Ax	g	-45.0	-36.0	-38.9	Pass
Overall Test Results					Pass

Pelvis Plug S/N: 12228 *

* Plug is not impacted and remains certified



Technician:

G. Fuentes

G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

APPENDIX C
Post-Test ATD Qualification and Performance Verification
SID-IIs Small Side Impact ATD, Left Side Configuration
S/N: 299

ATD Serial No.: 299

Test Date: 2023-05-01

Tested Parameter	Units	Spec Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.8	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
A - Sitting Height	mm	772	788	781	Pass
B - Shoulder Pivot Height	mm	437	453	450	Pass
C - Hpoint Height	mm	79	89	82	Pass
D - H Point From Seatback	mm	141	151	149	Pass
E - Shoulder Pivot From Backline	mm	97	107	105	Pass
F - Thigh Clearance	mm	119	135	124	Pass
G - Head Breadth	mm	140	148	145	Pass
H - Head Back From Backline	mm	40	46	44	Pass
I - Head Depth	mm	178	188	188	Pass
J - Head Circumference	mm	541	551	543	Pass
K - Buttock To Knee Length	mm	514	540	520	Pass
L - Popliteal Height	mm	343	369	361	Pass
K - Knee Pivot To Floor Height	mm	392	409	396	Pass
N - Buttock Popliteal Length	mm	416	442	432	Pass
O - Chest Depth W/O Jacket	mm	195	211	203	Pass
P - Foot Length	mm	216	232	219	Pass
Q - Hip Breadth (W/Pelvic Plugs)	mm	313	323	321	Pass
R - Arm Length	mm	249	259	256	Pass
S - Knee Joint To Seatback	mm	477	493	480	Pass
V - Shoulder Width	mm	341	357	353	Pass
W - Foot Width	mm	78	94	83	Pass
Y - Chest Circumference W/Jacket	mm	851	881	874	Pass
Z - Waist Circumference	mm	761	791	773	Pass
				Overall Test Results	Pass

Technician:



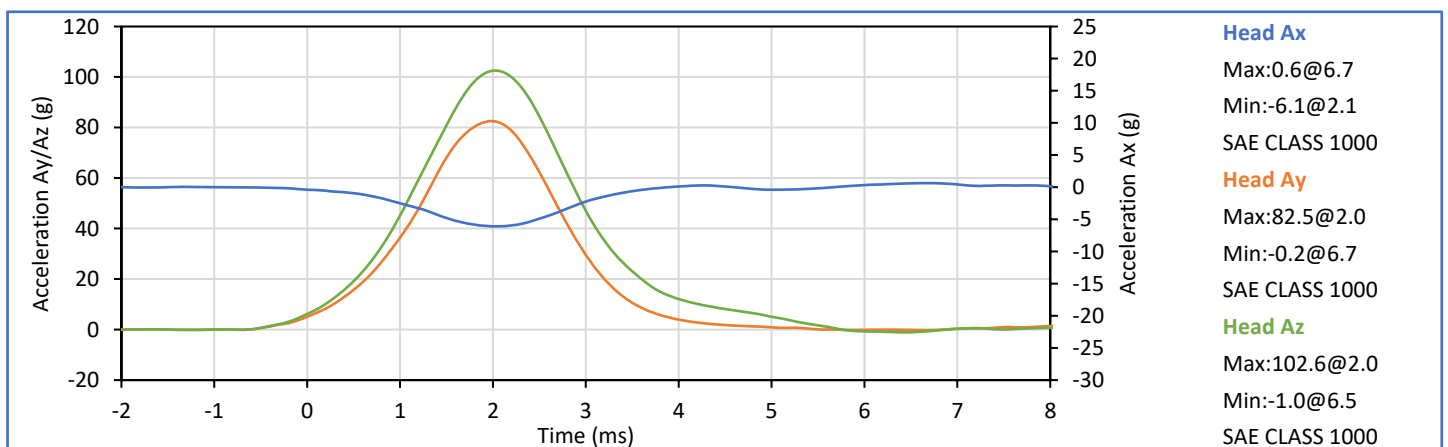
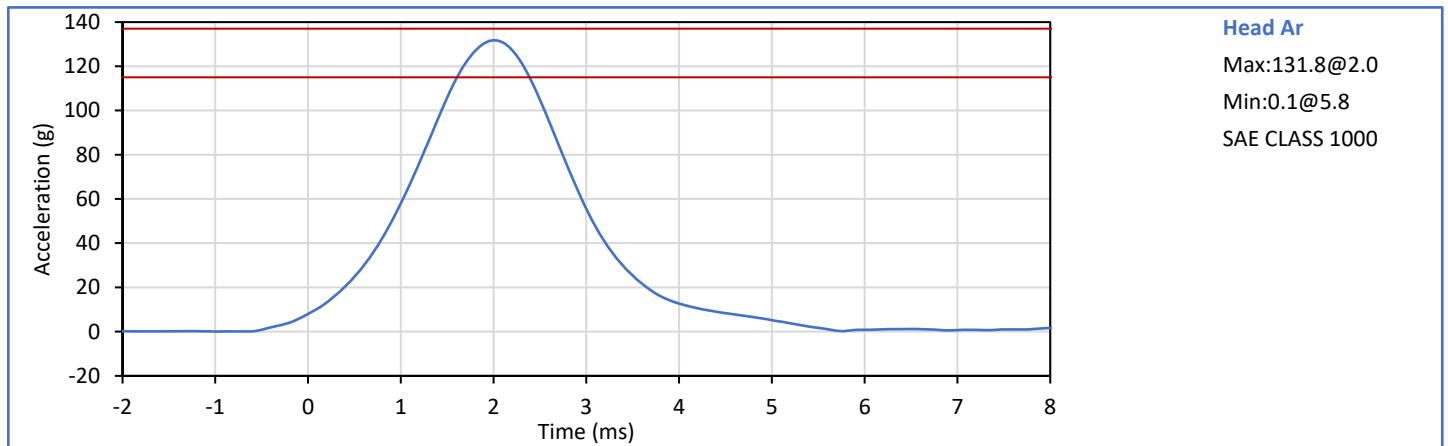
G. Fuentes

Approved By:



J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.4	Pass
Laboratory Relative Humidity	%	10	70	31	Pass
Peak Resultant Acceleration	g	115.0	137.0	131.8	Pass
Peak Head Ax	g	-15.0	15.0	-6.1	Pass
Oscillations After Main Pulse	%	0.0	15.0	1.2	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
			Overall Test Results	Pass	



Technician:

G. Fuentes

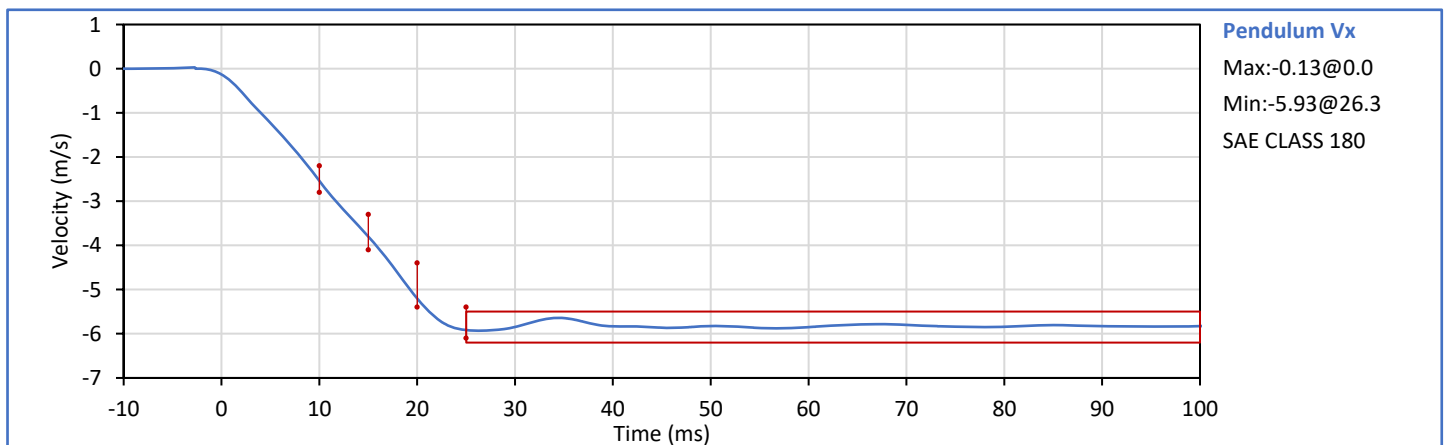
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.7	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
Pendulum Velocity	m/s	5.51	5.63	5.55	Pass
Pendulum Decel at 10 ms	m/s	-2.80	-2.20	-2.54	Pass
Pendulum Decel at 15 ms	m/s	-4.10	-3.30	-3.80	Pass
Pendulum Decel at 20 ms	m/s	-5.40	-4.40	-5.20	Pass
Pendulum Decel at 25 ms	m/s	-6.10	-5.40	-5.92	Pass
Pendulum Decel from 25-100 ms	m/s	-6.20	-5.50	-5.93/-5.64	Pass
Peak "D" Plane Rotation	deg	-81.0	-71.0	-77.1	Pass
Time of Peak "D" Plane Rotation	ms	50.0	70.0	62.7	Pass
Peak Occ. Condyle Moment	Nm	36.0	44.0	42.1	Pass
Time of Moment Decay to 0 Nm	ms	102.0	126.0	116.6	Pass
				Overall Test Results	Pass



Technician:

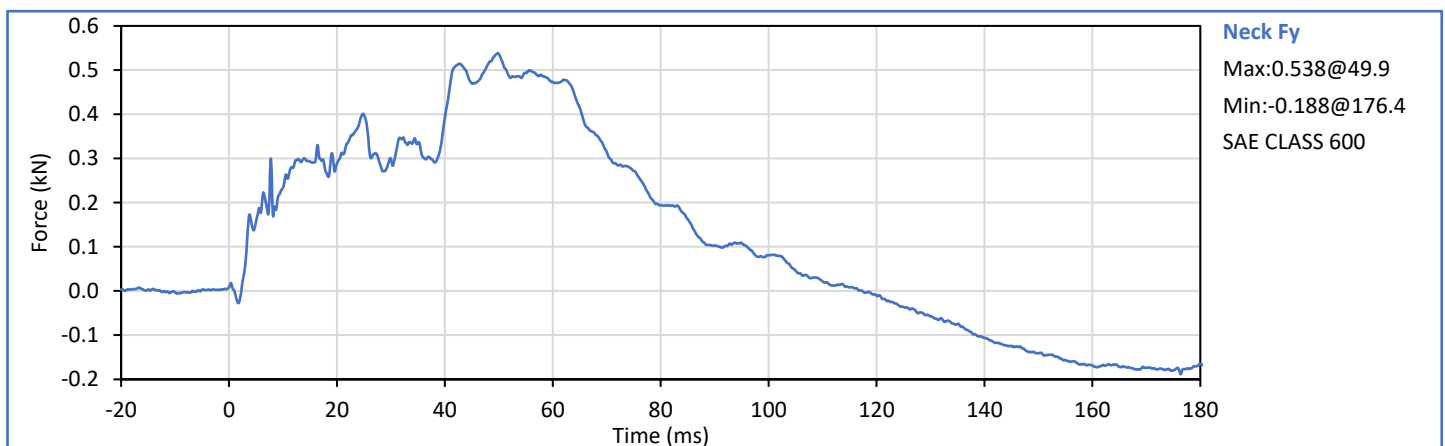
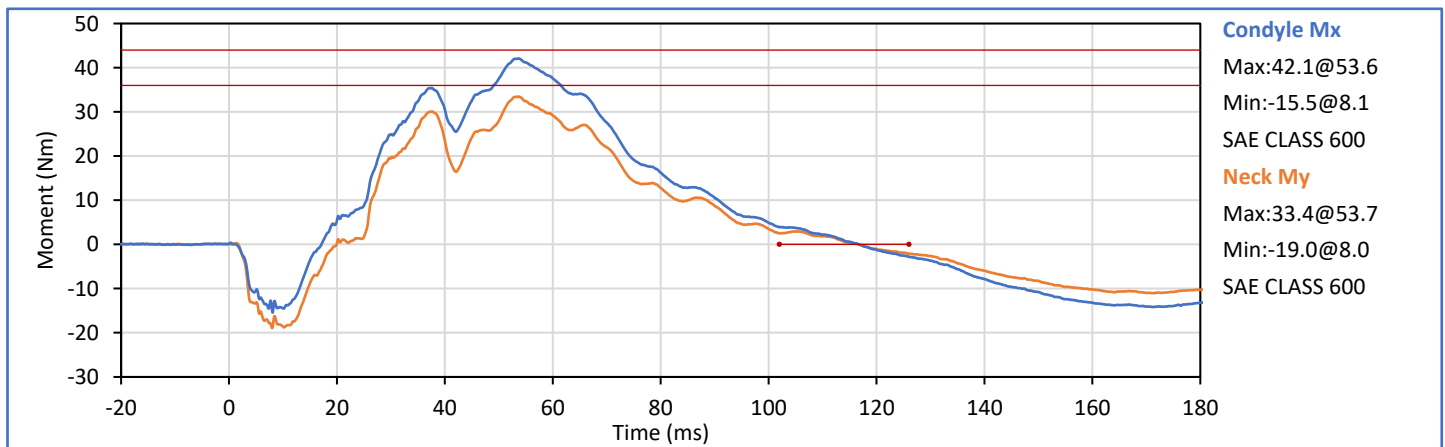
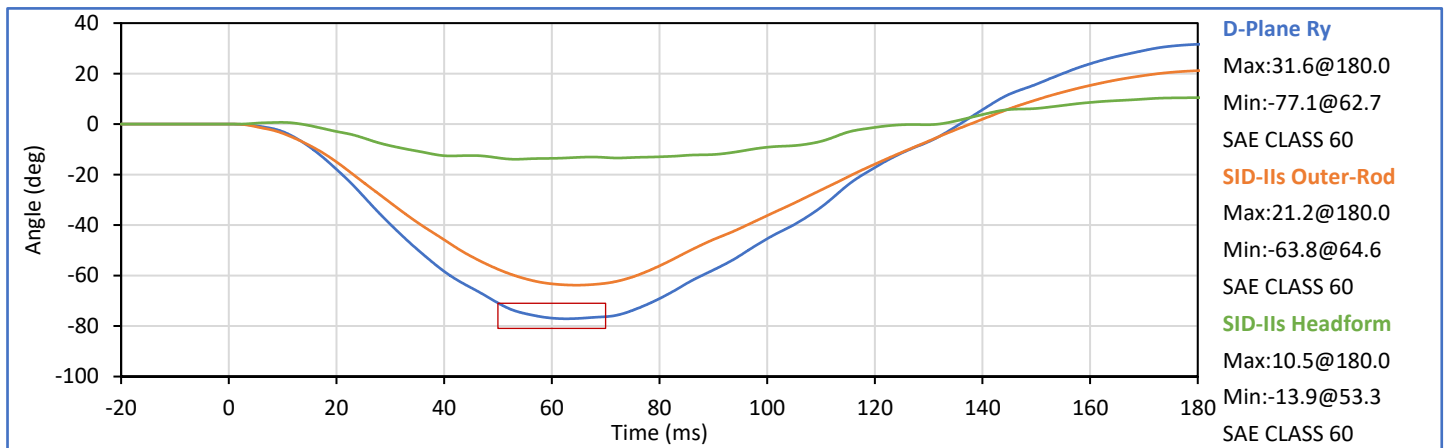
G. Fuentes

G. Fuentes

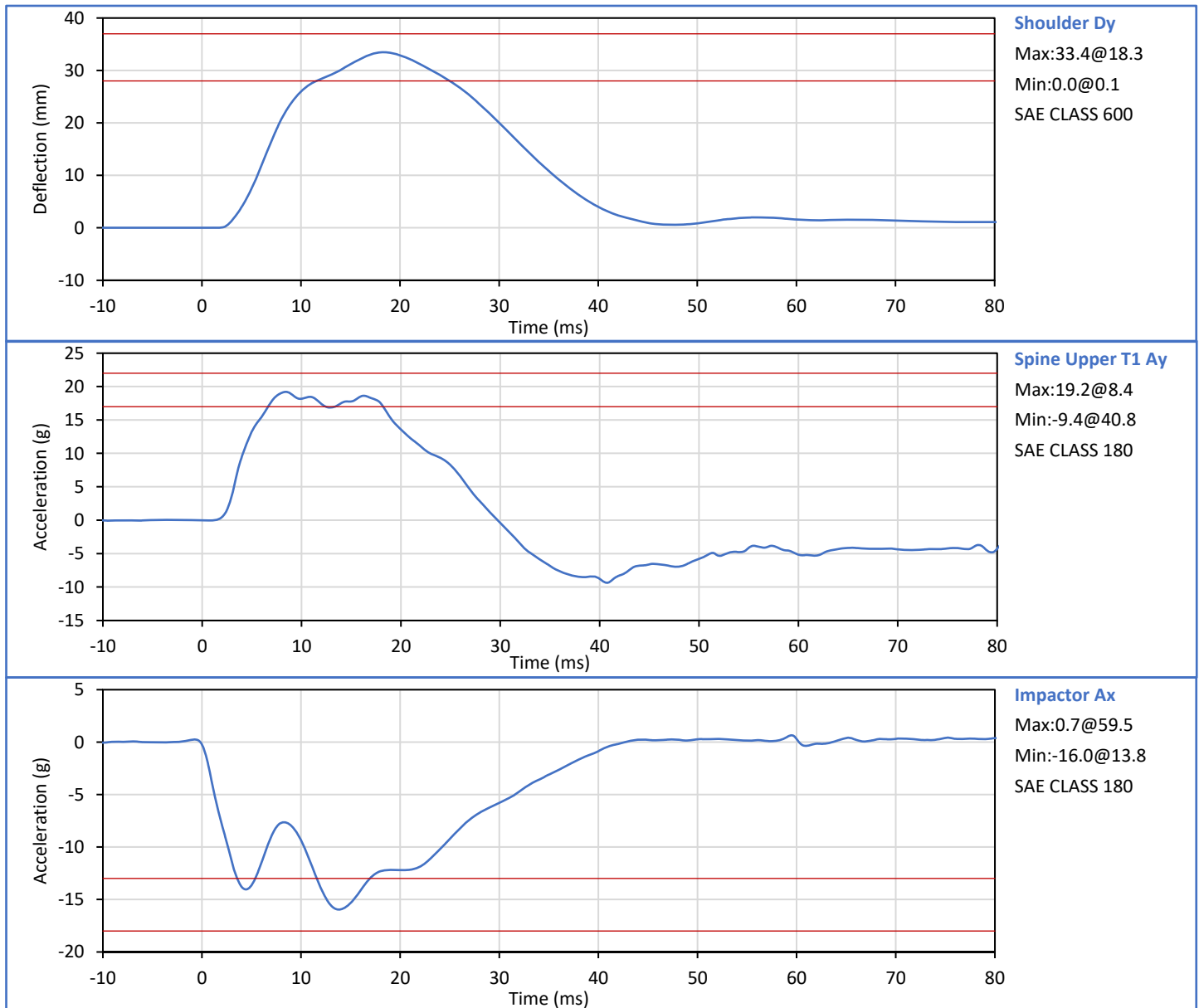
Approved By:

J. Hernandez

J. Hernandez



Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.6	Pass
Laboratory Relative Humidity	%	10	70	37	Pass
Impactor Velocity	m/s	4.20	4.40	4.32	Pass
Peak Shoulder Dy	mm	28.0	37.0	33.4	Pass
Peak Upper Spine (T1) Ay	g	17.0	22.0	19.2	Pass
Peak Impactor Ax	g	-18.0	-13.0	-16.0	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

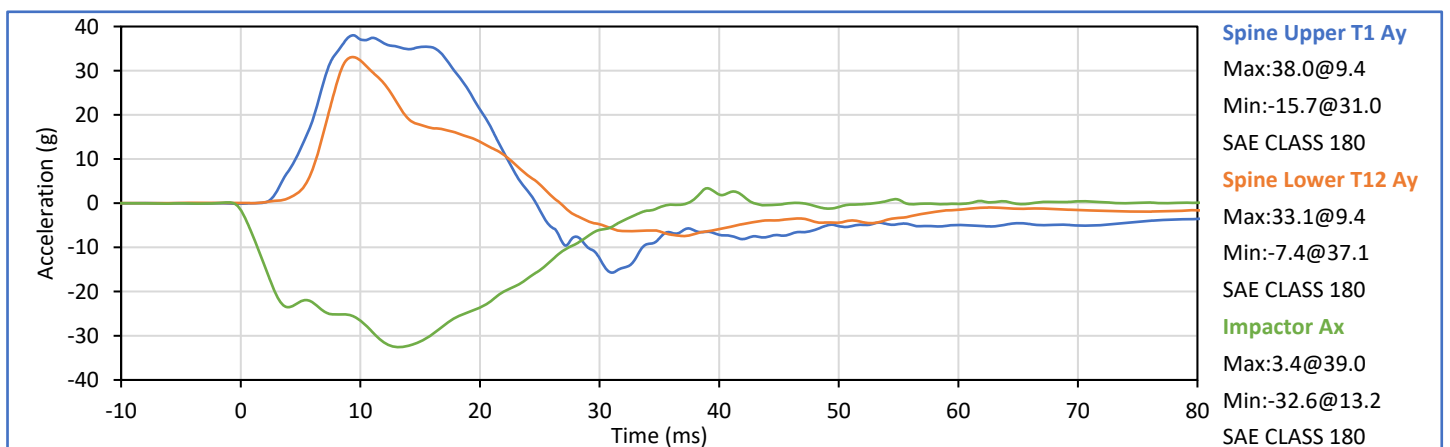
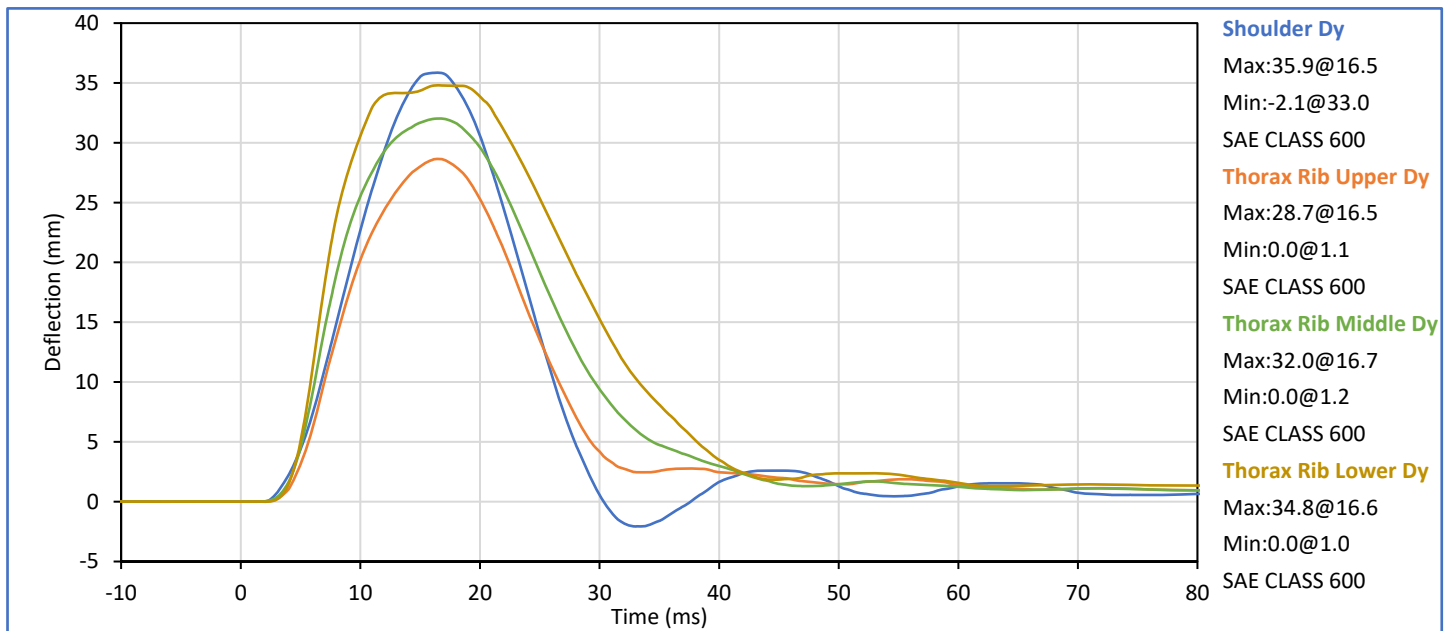
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.4	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
Impactor Velocity	m/s	6.60	6.80	6.70	Pass
Peak Shoulder Dy	mm	31.0	40.0	35.9	Pass
Peak Upper Rib Dy	mm	25.0	32.0	28.7	Pass
Peak Middle Rib Dy	mm	30.0	36.0	32.0	Pass
Peak Lower Rib Dy	mm	32.0	38.0	34.8	Pass
Peak Upper Spine (T1) Ay	g	34.0	43.0	38.0	Pass
Peak Lower Spine (T12) Ay	g	29.0	37.0	33.1	Pass
Peak Impactor Ax	g	-36.0	-30.0	-32.6	Pass
Overall Test Results				Pass	Pass



Technician:

G. Fuentes

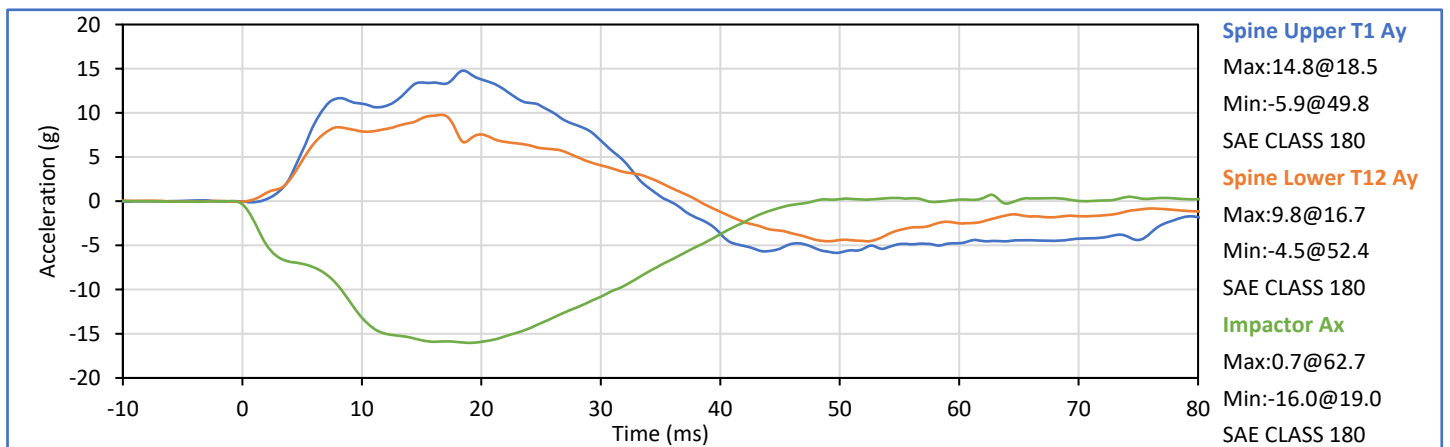
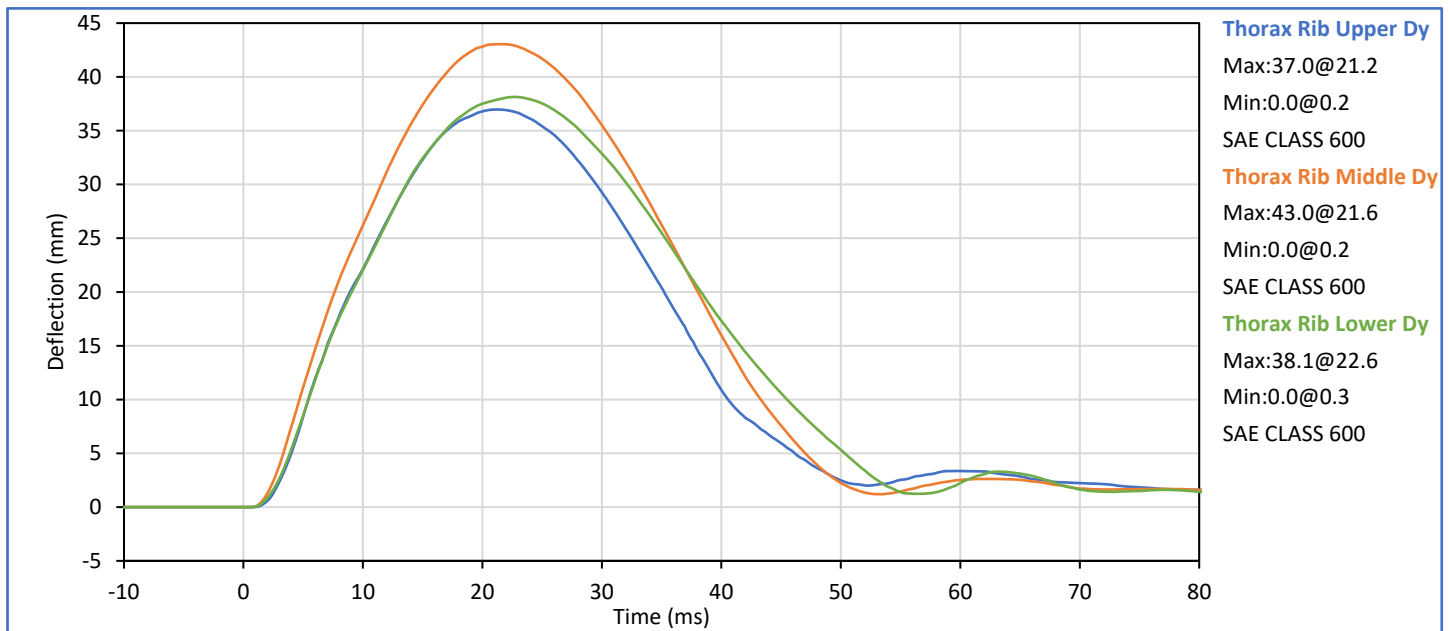
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.6	Pass
Laboratory Relative Humidity	%	10	70	35	Pass
Impactor Velocity	m/s	4.20	4.40	4.32	Pass
Peak Thorax Rib Upper Dy	mm	32.0	40.0	37.0	Pass
Peak Thorax Rib Middle Dy	mm	39.0	45.0	43.0	Pass
Peak Thorax Rib Lower Dy	mm	35.0	43.0	38.1	Pass
Peak Spine Upper T1 Ay	g	13.0	17.0	14.8	Pass
Peak Spine Lower T12 Ay	g	7.0	11.0	9.8	Pass
Peak Impactor Ax	g	-18.0	-14.0	-16.0	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

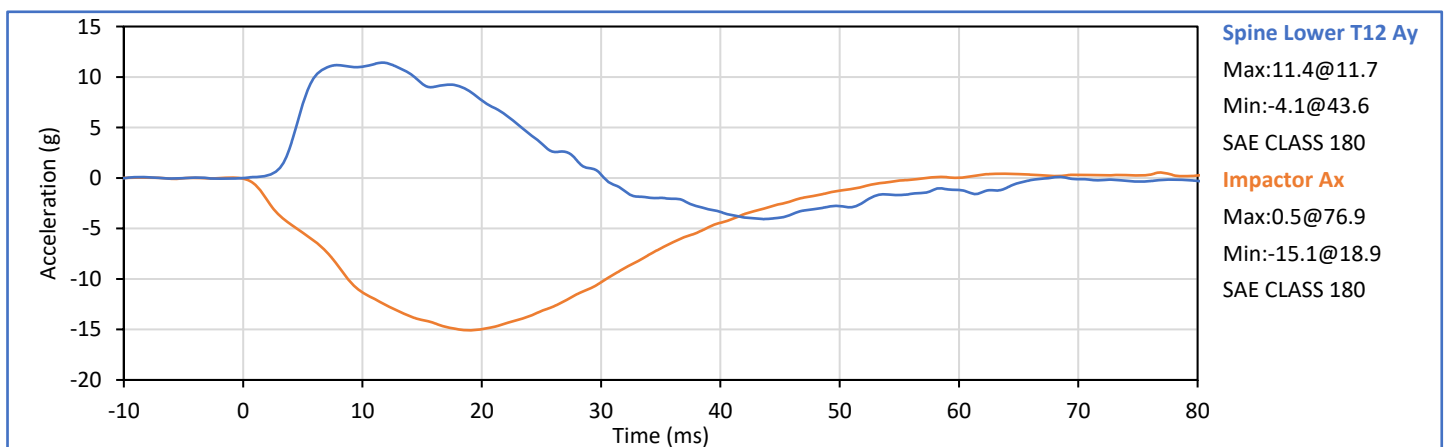
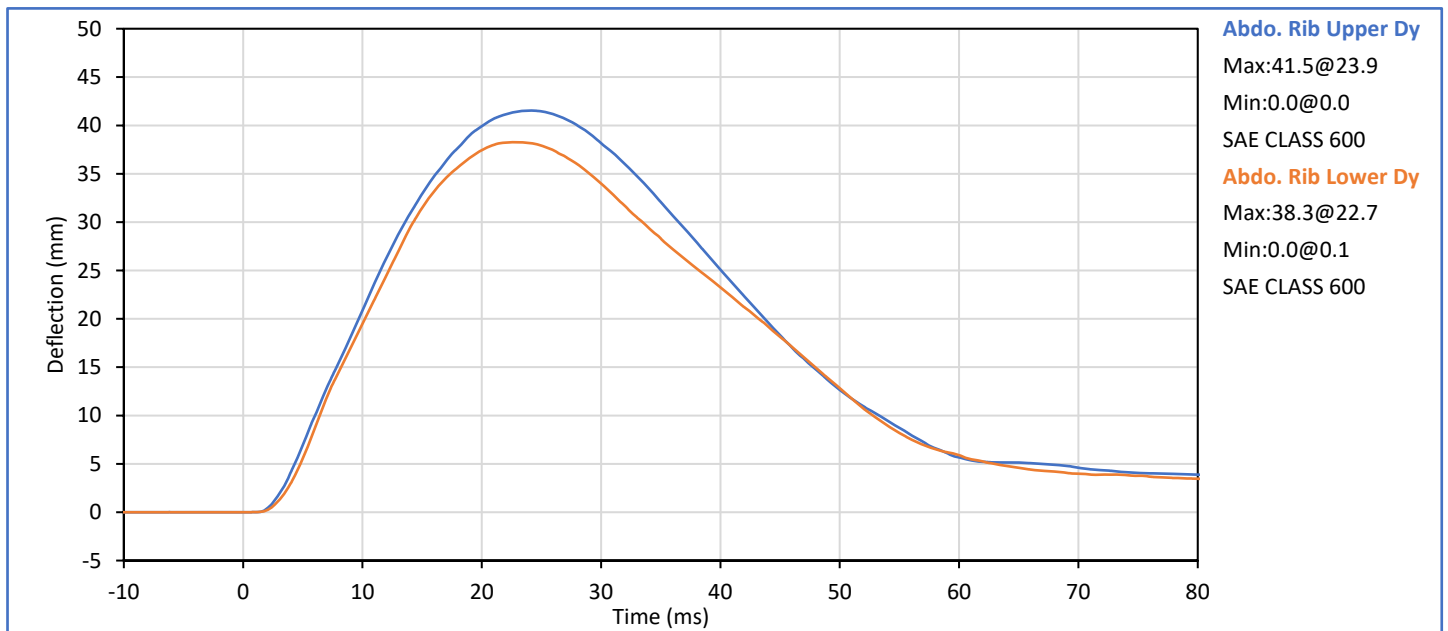
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.6	Pass
Laboratory Relative Humidity	%	10	70	32	Pass
Impactor Velocity	m/s	4.20	4.40	4.31	Pass
Peak Upper Abdomen Rib Dy	mm	36.0	47.0	41.5	Pass
Peak Lower Abdomen Rib Dy	mm	33.0	44.0	38.3	Pass
Peak Lower Spine T12 Ay	mm	9.0	14.0	11.4	Pass
Peak Impactor Ax	g	-16.0	-12.0	-15.1	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

G. Fuentes

Approved By:

J. Hernandez

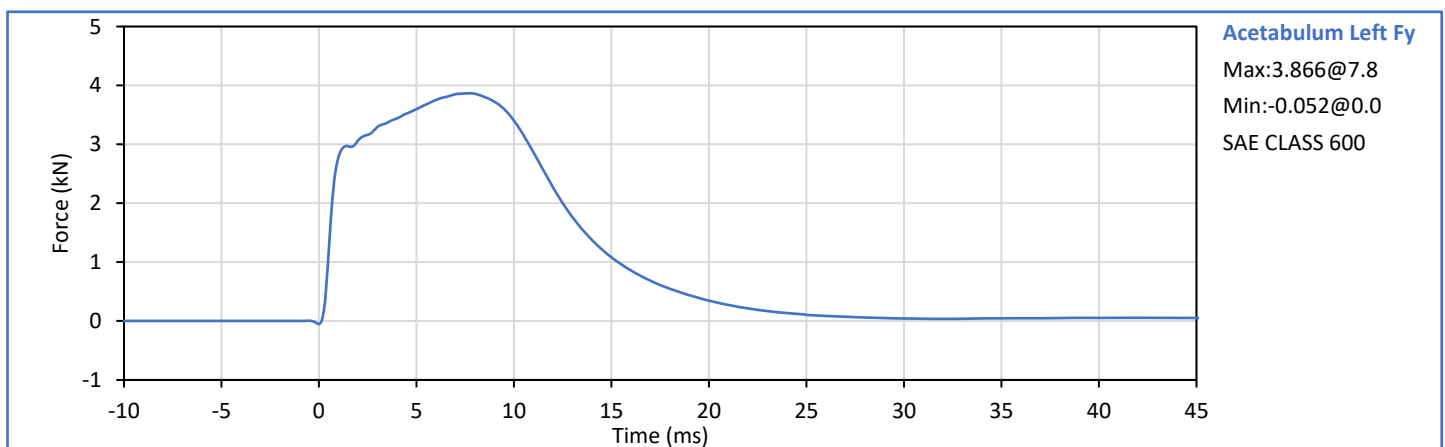
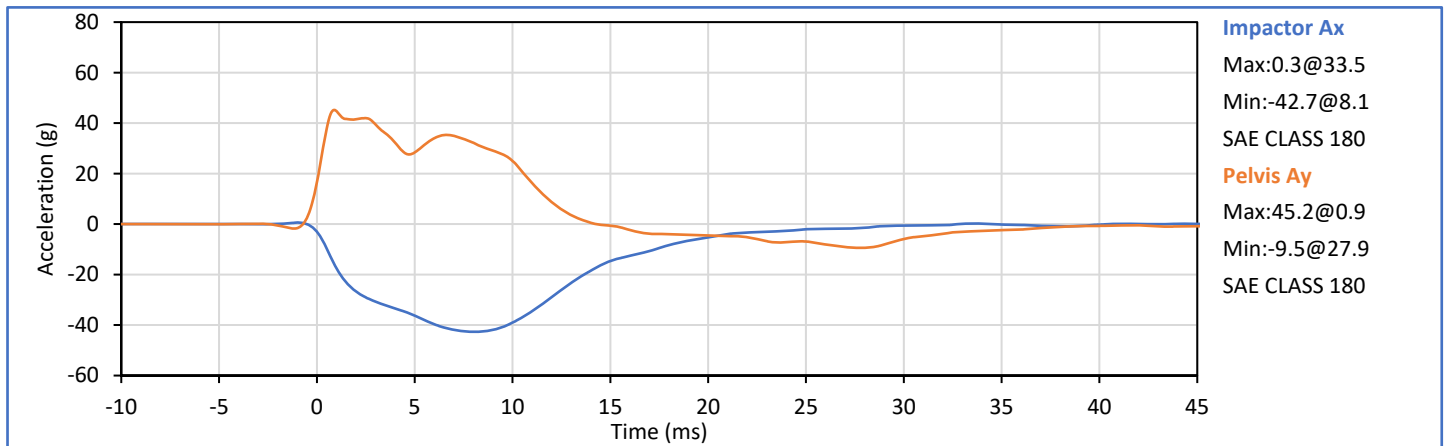
J. Hernandez

ATD Serial No.: 299

Test Date: 2023-05-01

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.5	Pass
Laboratory Relative Humidity	%	10	70	33	Pass
Impactor Velocity	m/s	6.60	6.80	6.71	Pass
Peak Acetabulum Fy	kN	3.60	4.30	3.87	Pass
Pelvis Ay after 6ms	g	34.0	42.0	35.3	Pass
Peak Impactor Ax	g	-47.0	-38.0	-42.7	Pass
Overall Test Results					Pass

Pelvis Plug S/N: 14802



Technician:

G. Fuentes

G. Fuentes

Approved By:

J. Hernandez

J. Hernandez



SID-IIs Pelvis Plug Certification Test

Plug S/N 14802

Test Number 16775

Report Number 16821

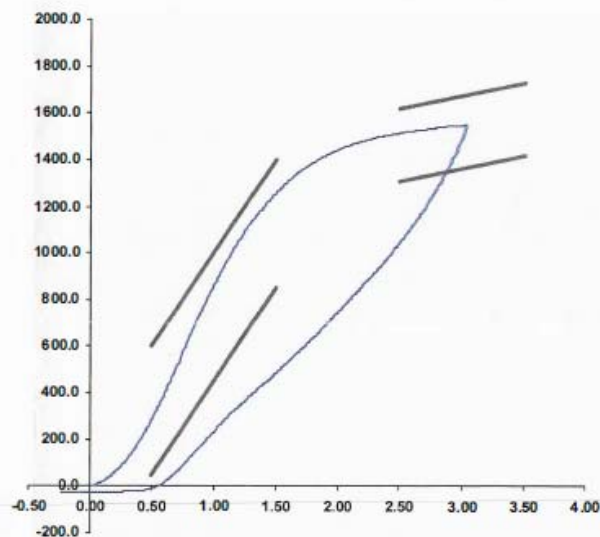
Test Date 12/29/2020 12:23:42 PM

	Test Results	Spec. Min	Spec. Max
Force @ 0.5 mm (N)	291.11	50.00	600.00
Force @ 1.5 mm (N)	1,260.53	850.00	1,400.00
Force @ 2.5 mm (N)	1,514.91	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,546.66	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 29-Dec-20
SACO Research

By : DC Date : 12/29/20

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

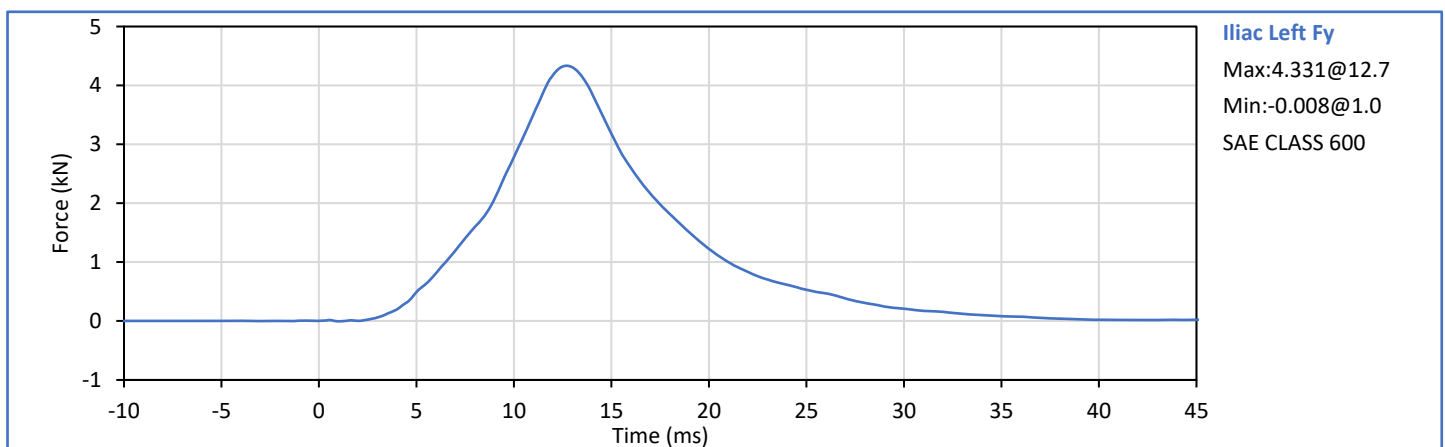
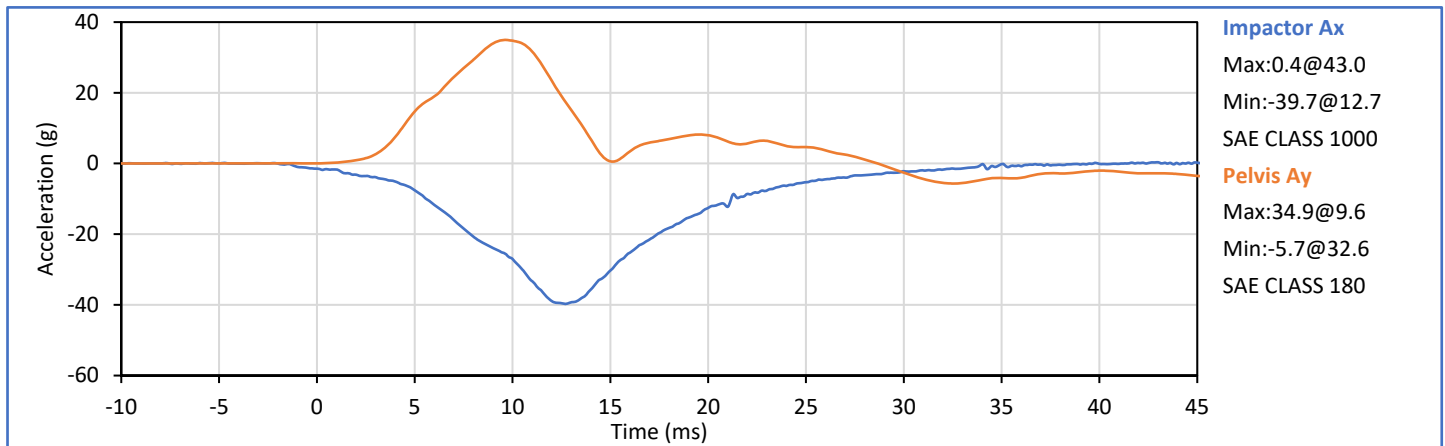
ATD Serial No.: 299

Test Date: 2023-05-02

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.3	Pass
Laboratory Relative Humidity	%	10	70	29	Pass
Impactor Velocity	m/s	4.20	4.40	4.32	Pass
Peak Iliac Fy	kN	4.10	5.10	4.33	Pass
Peak Pelvis Ay	g	28.0	39.0	34.7	Pass
Peak Impactor Ax	g	-45.0	-36.0	-39.7	Pass
Overall Test Results					Pass

Pelvis Plug S/N: 12228 *

* Plug is not impacted and remains certified



Technician:

G. Fuentes

G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 - Driver ATD Instrumentation

Sensor Location	Sensor S\N	Mfr	Model	Cal Date
Head Acceleration X Primary	P51929	Endevco	7264C-2k	2023-03-29
Head Acceleration Y Primary	P50086	Endevco	7264C-2k	2023-03-29
Head Acceleration Z Primary	P51931	Endevco	7264C-2k	2023-03-29
Head Acceleration X Redundant	P68604	Endevco	7264C-2k	2023-03-29
Head Acceleration Y Redundant	P51934	Endevco	7264C-2k	2023-03-29
Head Acceleration Z Redundant	P58736	Endevco	7264C-2k	2023-03-29
Head Rotation Rate X	ARS14943	DTS	ARS PRO-18k (2kHz)	2022-09-07
Head Rotation Rate Y	ARS14935	DTS	ARS PRO-18k (2kHz)	2022-09-09
Head Rotation Rate Z	ARS14936	DTS	ARS PRO-18k (2kHz)	2022-09-09
Upper Thorax Rib Deflection Y	1143	Servo	08TCI-3725	2023-03-27
Middle Thorax Rib Deflection Y	1075	Servo	08TCI-3725	2023-03-27
Lower Thorax Rib Deflection Y	1213	Servo	08TCI-3725	2023-03-27
Upper Abdomen Rib Deflection Y	1218	Servo	08TCI-3725	2023-03-27
Lower Abdomen Rib Deflection Y	1177	Servo	08TCI-3725	2023-03-27
Lower Spine T12 Acceleration X	P58761	Endevco	7264C-2k	2023-03-29
Lower Spine T12 Acceleration Y	P50077	Endevco	7264C-2k	2023-03-30
Lower Spine T12 Acceleration Z	P58795	Endevco	7264C-2k	2023-03-30
Iliac Wing Impact Side Force Y	278 (Iliac)	R.A. Denton	3228J	2023-02-16
Acetabulum Impact Side Force Y	260 (Acetabulum)	R.A. Denton	3249J	2023-02-16

Table 2 - Vehicle Instrumentation

Sensor Location	Sensor S\N	Mfr	Model	Cal Date
Vehicle CG Ax	M11204	Endevco	758H-2k	2022-12-15
Vehicle CG Ay	M11200	Endevco	758H-2k	2022-11-04
Vehicle CG Az	M11072	Endevco	758H-2k	2023-03-11
Left Floor Sill Ay	M11155	Endevco	758H-2k	2023-03-07
A-Pillar Sill Ay	M11213	Endevco	758H-2k	2022-11-09
A-Pillar Low Ay	M11284	Endevco	758H-2k	2023-03-08
A-Pillar Mid Ay	M11128	Endevco	758H-2k	2023-03-07
B-Pillar Sill Ay	220341	BST	11CF-2k	2022-12-19
B-Pillar Low Ay	A356493	MSI	52F-2k	2023-03-23
B-Pillar Mid Ay	A358724	MSI	52F-2k	2023-03-15
Driver Seat Track at H-Point Ay	220245	BST	11CF-2k	2023-04-19
Engine Top Ax	M11131	Endevco	758H-2k	2022-11-11
Engine Top Ay	M11290	Endevco	758H-2k	2022-12-28
Firewall Ay	M11045	Endevco	758H-2k	2023-04-01
Right Roof Ay	M11244	Endevco	758H-2k	2022-12-26
Right Floor Sill Ay	M11277	Endevco	758H-2k	2023-03-12
Rear Floorpan Ax	M11116	Endevco	758H-2k	2022-11-03
Rear Floorpan Ay	M11239	Endevco	758H-2k	2022-11-26

Table 3 - Barrier Pole Instrumentation

Sensor Location	Sensor S\N	Mfr	Model	Cal Date
Barrier Pole 01 Fx	19461A	Interface	1220FS-50k	2021-11-04
Barrier Pole 02 Fx	131822A	Interface	1220AF-50k	2021-11-04
Barrier Pole 03 Fx	131816A	Interface	1220AF-50k	2021-11-04
Barrier Pole 04 Fx	19325	Interface	1220AF-50k	2021-11-04
Barrier Pole 05 Fx	131827A	Interface	1220AF-50k	2021-11-04
Barrier Pole 06 Fx	19340	Interface	1220AF-50k	2021-11-05
Barrier Pole 07 Fx	19267	Interface	1220AF-50k	2021-11-05
Barrier Pole 08 Fx	19466A	Interface	1220AF-50k	2021-11-05