

**REPORT NUMBER: SPNCAP-KAR-19-018
NEW CAR ASSESSMENT PROGRAM (NCAP)
SIDE IMPACT POLE TEST**

**BAYERISCHE MOTOREN WERKE AG
2019 BMW X3 SDRIVE30I 5-DOOR MPV**

NHTSA No: M20194101

**PREPARED BY:
APPLUS IDIADA KARCO ENGINEERING, LLC.
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FEBRUARY 28, 2019

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
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Division Chief, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

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16. Abstract A 32.20 km/h 75° rigid pole side NCAP impact test was conducted on the subject 2019 BMW X3 sDrive30i 5-door MPV 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 February 14, 2019. The impact velocity was 31.42 km/h and the outside ambient temperature at the struck (driver's) side of the vehicle was 15.0°C. The target vehicle's maximum post-test static crush was 324 mm located at level 3. The test vehicle's occupant performance data is as follows:																														
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="text-align: left;">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 style="background-color: #cccccc;"></td> <td style="text-align: center;">1000</td> <td style="text-align: center;">281.4</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;">43</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;">2776</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</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;">31</td> </tr> </tbody> </table>				Measurement Description	Driver ATD (SID-IIs)			Units	Threshold	Result	Head Injury Criteria (HIC ₃₆)		1000	281.4	Resultant Lower Spine Acceleration	g	82	43	Total Pelvic Force (Sum of Acetabular and Iliac Forces)	N	5525	2776	Maximum Thoracic Rib Deflection	mm	38	25	Maximum Abdominal Rib Deflection	mm	45	31
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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. Technical Information Services Division, NPO-411 1200 New Jersey Ave., SE Washington, DC 20590 e-mail: tis@nhtsa.dot.gov FAX: 202-493-2833																												
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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 number DTNH22-14-D-00355L. The purpose of this test is to generate comparative side impact performance in a 2019 BMW X3 sDrive30i 5-door MPV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure date October 2015.

SECTION 2 SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2019 BMW X3 sDrive30i 5-door MPV. The subject vehicle was towed into the rigid pole at an angle of 75.8° and a velocity of 31.42 km/h. The test was conducted by Applus IDIADA KARCO Engineering, LLC. in Adelanto, California on February 14, 2019. 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 October 2015. 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.

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	281.4
Lower Spine (T12) Resultant Acceleration	g	82	43
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2776
Maximum Thoracic Rib Deflection	mm	38*	25
Maximum Abdominal Rib Deflection	mm	45*	31

*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	No	
Knee Airbag	Yes	No	No	
Side Airbag 1 (Curtain)	Yes	Yes	Yes	Yes
Side Airbag 2 (Torso/Pelvis)	Yes	Yes	No	
Seat Belt Pretensioner	Yes	Yes	Yes	N/A
Seat Belt Load Limiter	Yes	Yes	Yes	N/A

GENERAL COMMENTS

The struck side doors of the vehicle were jammed shut. There was no separation at the hinges or latches. The remaining doors remained closed and latched. There were no ATD values that exceeded limits. The Driver Lower Thorax Rib Y channel failed at 77.3 ms to 145.6 ms and after 211.0 ms. The Left Floor Sill Y had questionable data from 30.0 ms to 35.0 ms. Left Lower A-Post Y channel failed at 49.1 ms, Left Mid A-Post Y channel failed at 120.2 ms, Left B-Post at Sill Y channel failed at 70.0 ms, and the Left Mid B-Post Y channel failed at 55.0 ms.

SECTION 3

OCCUPANT AND VEHICLE INFORMATION/DATA SHEETS

Test Vehicle: 2019 BMW X3 sDrive30i 5-Door MPV NHTSA No. M20194101

Test Program: NCAP Side Pole Impact Test Test Date: 02/14/19

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: 2019 BMW X3 sDrive30i 5-Door MPV NHTSA No. M20194101
 Test Program: NCAP Side Pole Impact Test Test Date: 02/14/19

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	M20194101
Model Year	2019
Make	BMW
Model	X3 sDrive30i
Body Style	5-Door MPV
VIN	5UXTR7C57KLF34067
Body Color	Dark Graphite Metallic
Odometer Reading (km / mi)	31 / 19
Engine Displacement (L)	2.0
Type / No. of Cylinders	Inline 4
Engine Placement	Longitudinal
Transmission Type	Automatic
Transmission Speeds	8 Speed
Overdrive	Yes
Final Drive	RWD
Roof Rack	Yes
Sunroof / T-Top	Yes
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	No
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	No
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	N/A

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	Nov-18
Vehicle Type	MPV

GVWR (kg)	2330
GAWR Front (kg)	1090
GAWR Rear (kg)	1365

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity	2	3		5	
Capacity Weight (VCW) (kg)				425.0	A
DSC x 68.04 (kg)				340.2	B
Cargo Weight (RCLW) (kg)				84.8	A-B

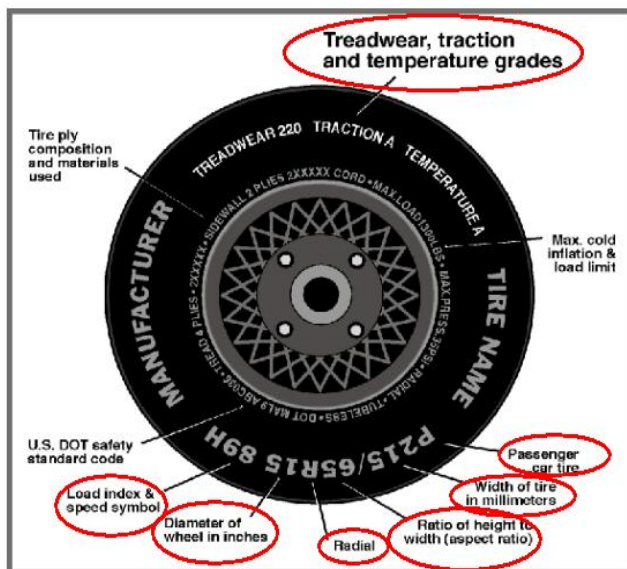
VEHICLE SEAT TYPE

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

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2019 BMW X3 sDrive30i 5-Door MPV NHTSA No. M20194101
 Test Program: NCAP Side Pole Impact Test Test Date: 02/14/19



Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	340	340
Cold Pressure (kPa)	220	240
Recommended Tire Size	P245/50R19	P245/50R19
Tire Size on Vehicle	P245/50R19	P245/50R19
Tire Manufacturer	Pirelli	Pirelli
Tire Model	Cinturato P7	Cinturato P7
Treadware	500	500
Traction Grade	A	A
Temperature Grade	A	A
Tire Plies Sidewall	1 Rayon	1 Rayon
Tire Plies Body	1 Rayon, 2 Steel, 1 Polyamide	1 Rayon, 2 Steel, 1 Polyamide
Load Index/Speed Symbol	105H	105H
Tire Material	Rayon, Steel, Polyamide	Rayon, Steel, Polyamide
DOT Safety Code Left	UN0P VA77 3718	UN0P VA77 3718
DOT Safety Code Right	UN0P VA77 3718	UN0P VA77 3718

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2019 BMW X3 sDrive30i 5-Door MPV NHTSA No. M20194101
 Test Program: NCAP Side Pole Impact Test Test Date: 02/14/19

TIRE PRESSURES

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

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	424.0	487.0		438.0	536.5		432.0	558.5	
Right	kg	448.5	460.5		454.0	518.0		448.0	518.5	
Ratio	%	47.9%	52.1%	100.0%	45.8%	54.2%	100.0%	45.0%	55.0%	100.0%
Total	kg	872.5	947.5	1820.0	892.0	1054.5	1946.5	880.0	1077.0	1957.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1820.0	A
Actual Weight of 1 P572V ATD Used	kg	49.0	B
Rated Cargo/Luggage Wt (RCLW)	kg	84.8	C
Calculated Vehicle Target Wt (TVTW)	kg	1953.8	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)*	°	-0.8	-0.6	-0.5	Yes
Front Passenger Sill Angle (front-to-rear)*	°	-0.4	-0.3	-0.3	Yes
Front Bumper-Line Angle (left-to-right)**	°	0.0	-0.1	-0.1	Yes
Rear Bumper-Line Angle (left-to-right)**	°	0.0	0.0	0.0	Yes
Vehicle CG (Aft of Front Axle)	mm	1490	1550	1575	
Vehicle CG (Left (+)/Right (-) from Longitudinal Centerline)	mm	1	1	10	

*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: 2019 BMW X3 sDrive30i 5-Door MPV NHTSA No. M20194101
Test Program: NCAP Side Pole Impact Test Test Date: 02/14/19

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Trunk Trim	8.0
Ballast / Equipment Added	85.5

Test Height Adjustable Setting (If Applicable)	
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DATA SHEET NO. 2

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

Test Vehicle: 2019 BMW X3 sDrive30i 5-Door MPV NHTSA No. M20194101
 Test Program: NCAP Side Pole Impact Test Test Date: 02/14/19

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	9.4	0.0	4.7
Front Passenger Seat	9.5	0.0	4.8
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)		
				Rearmost	Mid Fore/Aft	Forwardmost
Driver Seat	4.7	408	Max	401	415	428
			Mid	382	395	408
			Min	363	375	387
Front Passenger Seat	4.8	420	Max	420	431	444
			Mid	396	408	420
			Min	372	385	395
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 BMW X3 sDrive30i 5-Door MPV NHTSA No. M20194101
 Test Program: NCAP Side Pole Impact Test Test Date: 02/14/19

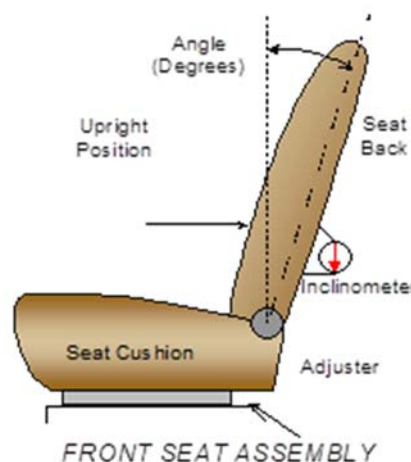
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position From Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	246		0	
Front Passenger Seat	231		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 a straight-edge across the seat back.



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degree	Detent*
Driver Seat w/Seated Dummy	64.3		13.7	
Front Passenger Seat	66.1		13.7	
Front Center Seat				
Struck Side Rear Seat w/Seated Dummy	9.9	8	21.1	0
Non-Struck Side Rear Seat	10.4	8	19.2	0
Rear Center Seat	9.9	8	21.1	0

*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: 2019 BMW X3 sDrive30i 5-Door MPV NHTSA No. M20194101

Test Program: NCAP Side Pole Impact Test Test Date: 02/14/19

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, M3, M2, ..., 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	3	Lowest

DATA SHEET NO. 2 ... (CONTINUED)

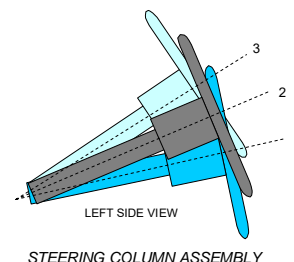
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT, AND FUEL SYSTEM DATA

Test Vehicle: 2019 BMW X3 sDrive30i 5-Door MPV NHTSA No. M20194101
 Test Program: NCAP Side Pole Impact Test Test Date: 02/14/19

STEERING COLUMN ADJUSTMENT

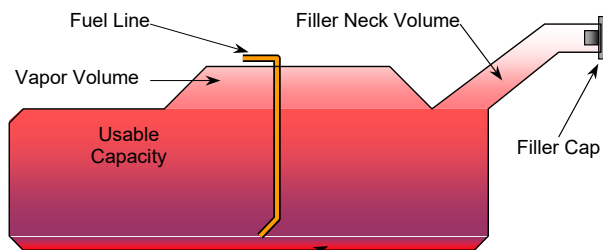
Steering wheel and column adjustments are made so that the steering wheel hub is at the center of the geometric locus it describes when it moves through its full range of motion.

	Degrees	Fore-Aft Position (mm)
Lowermost - Position 1	23.2	128
Geometric Center - Position 2	24.8	159
Uppermost - Position 3	26.4	190
Telescoping Steering Wheel Travel		62
Test Position	24.8	159



FUEL PUMP

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



VEHICLE FUEL TANK ASSEMBLY

FUEL TANK CAPACITY

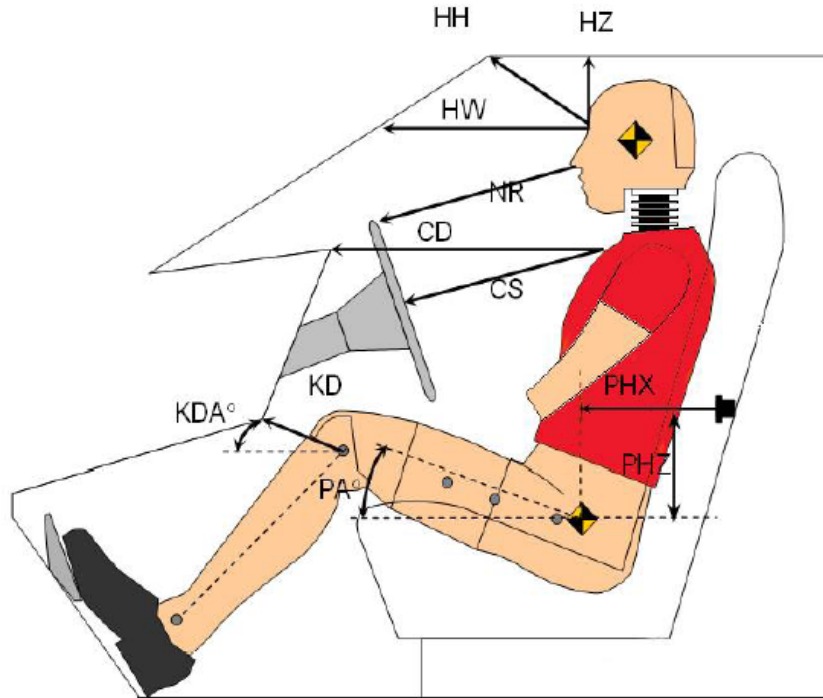
Description	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	67.98
Usable Capacity of "Optional Tank" (see Form No. 1)	
Usable Capacity of "Standard Tank" (see Owner's Manual)	67.98
Usable Capacity of "Optional Tank" (see Owner's Manual)	
93% of Usable Capacity	63.22
Actual amount of Solvent Used in Test	63.22
1/3 of Usable Capacity	22.66

Is the Actual Amount of Solvent Used in the test equal to 93% ± 1% of the Usable Capacity stated in the Form No. 1? Yes No

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2019 BMW X3 sDrive30i 5-Door MPV NHTSA No. M20194101
 Test Program: NCAP Side Pole Impact Test Test Date: 02/14/19



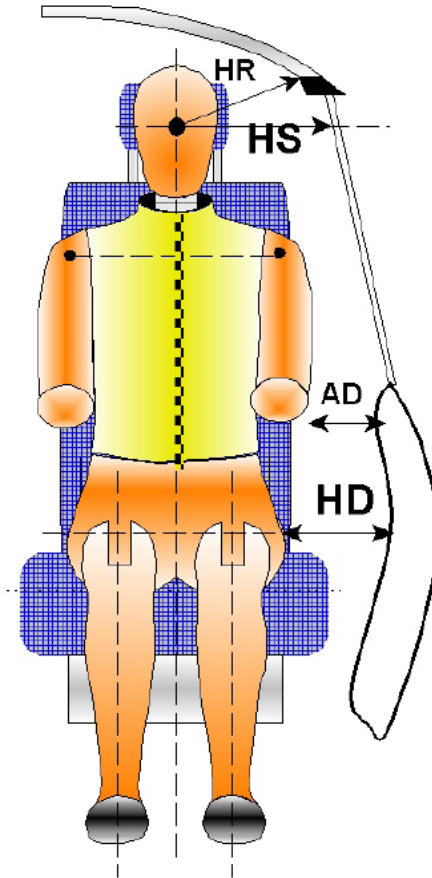
Driver Code	Description	Driver	
		Length (mm)	Angle (°)
HH	Head to Header	344	
HW	Head to Windshield	642	
HZ	Head to Roof	227	
NR	Nose to Rim	233	
CD	Chest to Dash	393	
CS	Chest to Steering Wheel	180	
KD(L)/KDA(L)°	Left Knee to Dash	142	32.3
KD(R)/KDA(R)°	Right Knee to Dash	129	18.7
PAX°	Pelvic Tilt Angle (x-axis)		21.4
PAY°	Pelvic Tilt Angle (y-axis)		0.3
PHX	Hip Point to Striker (x-axis)	299	
PHZ	Hip Point to Striker (z-axis)	176	

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2019 BMW X3 sDrive30i 5-Door MPV NHTSA No. M20194101

Test Program: NCAP Side Pole Impact Test Test Date: 02/14/19

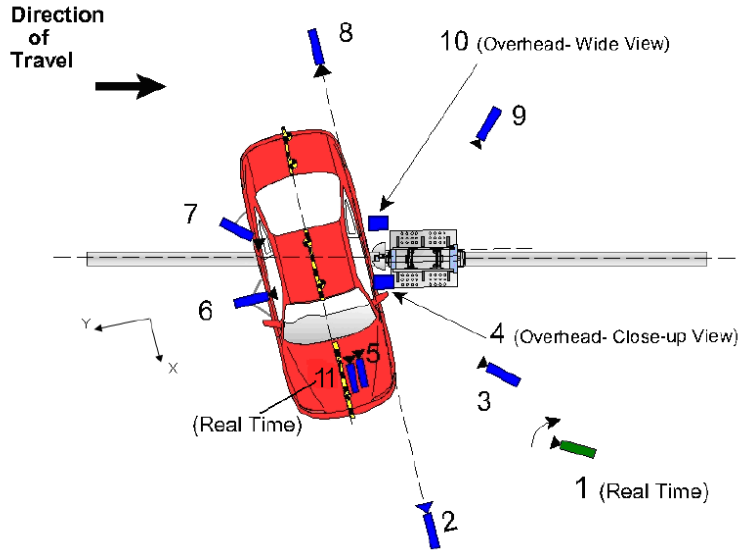


Code	Measurement Description	Units	Driver
HR	Head to Side Header	mm	276
HS	Head to Side Window	mm	385
AD	Arm to Door	mm	172
HD	Hip Point to Door	mm	178

DATA SHEET NO. 5

CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2019 BMW X3 sDrive30i 5-Door MPV NHTSA No. M20194101
 Test Program: NCAP Side Pole Impact Test Test Date: 02/14/19



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	24	1000
3	Impact Side 45° - Forward Pole View	4.10	-2.15	-1.15	8.5	1000
4	Overhead Close-Up View of Impact	0.00	0.00	-5.79	12.5	1000
5	On-Board - Dummy Front View	1.16	0.55	-1.45	8.5	1000
6	On-Board - Dummy Side View	-0.01	1.72	-1.13	8.5	1000
7	On-Board - Dummy Rear Oblique View	-0.91	1.74	-1.16	8.5	1000
8	Rear Ground Level - Impact View	-6.12	-6.23	-0.96	24	1000
9	Impact Side 45° - Rearward Pole View	-8.02	0.04	-1.01	35	1000
10	Overhead Wide View of Impact	-0.06	0.22	-5.79	14	1000
11	Real Time Dummy Front View	1.16	0.48	-1.44		30

*All measurements accurate to ±6 mm

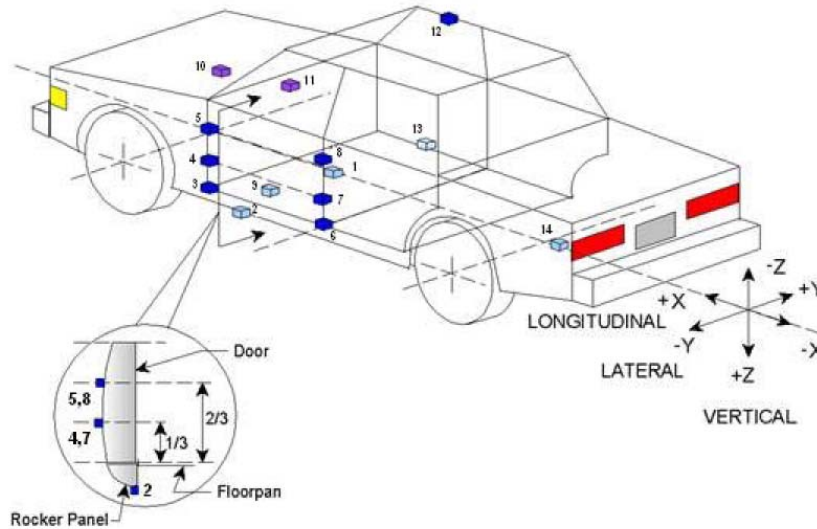
INSTRUMENTATION

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

DATA SHEET NO. 6

TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2019 BMW X3 sDrive30i 5-Door MPV NHTSA No. M20194101
 Test Program: NCAP Side Pole Impact Test Test Date: 02/14/19

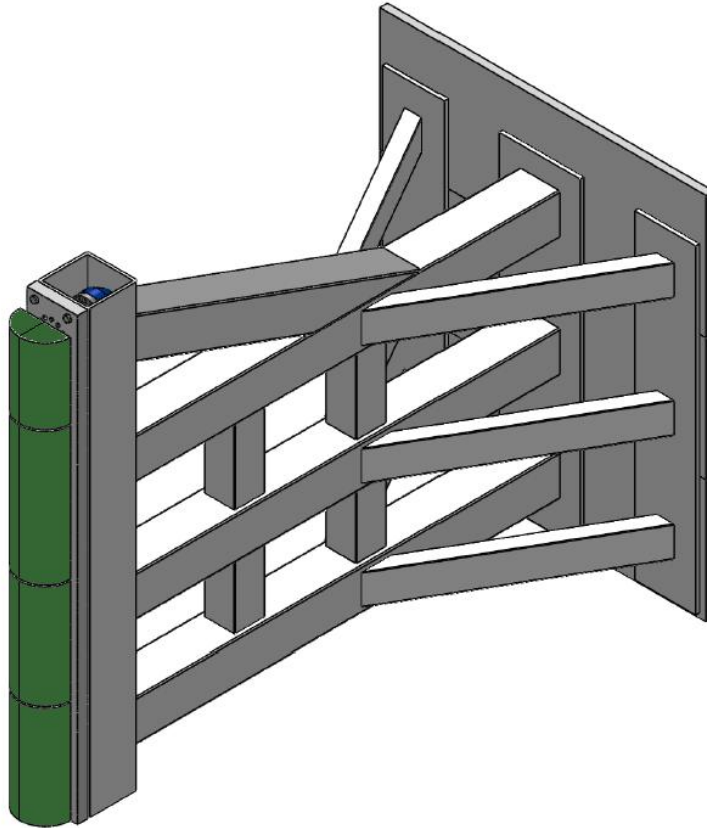


Loc. No.	Sensor Description	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2100	0	-605
2	Left Floor Sill	2450	-740	-565
3	A-Pillar Sill	3175	-725	-465
4	A-Pillar Low	3185	-810	-540
5	A-Pillar Mid	3170	-810	-840
6	B-Pillar Sill	2010	-750	-540
7	B-Pillar Low	2030	-740	-810
8	B-Pillar Mid	2030	-740	-1050
9	Driver Seat Track	2250	-610	-510
10	Engine Top	3840	0	-1070
11	Firewall	3300	410	-1020
12	Right Roof	2120	545	-1660
13	Right Floor Sill	2450	740	-470
14	Rear Floorpan	1110	0	-820

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: 2019 BMW X3 sDrive30i 5-Door MPV NHTSA No. M20194101
Test Program: NCAP Side Pole Impact Test Test Date: 02/14/19



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: 2019 BMW X3 sDrive30i 5-Door MPV NHTSA No. M20194101
 Test Program: NCAP Side Pole Impact Test Test Date: 02/14/19

TEST DUMMY INFORMATION AND CONTACT POINTS

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

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	Yes
Total Separation from Vehicle at Hinges or Latches	No	No	No	No	No
Latch or Hinge System Pulled Out of Their Anchorages	No	No	No	No	No
Disengaged from Latched Position	No	No	No	No	No
Latch Separated from Striker	No	No	No	No	No
Jammed Shut	Yes	Yes	No	No	No
If Door Opened at Striker, Record Width of Opening at Striker (mm)	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	
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: 2019 BMW X3 sDrive30i 5-Door MPV NHTSA No. M20194101
 Test Program: NCAP Side Pole Impact Test Test Date: 02/14/19

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No separation occurred
Sill Separation	No separation occurred
Windshield Damage	Broken
Side Window Damage	Left front window 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	No	
Knee Airbag	Yes	No	No	
Side Airbag 1 (Curtain)	Yes	Yes	Yes	Yes
Side Airbag 2 (Torso/Pelvis)	Yes	Yes	No	
Seat Belt Pretensioner	Yes	Yes	Yes	N/A
Seat Belt Load Limiter	Yes	Yes	Yes	N/A

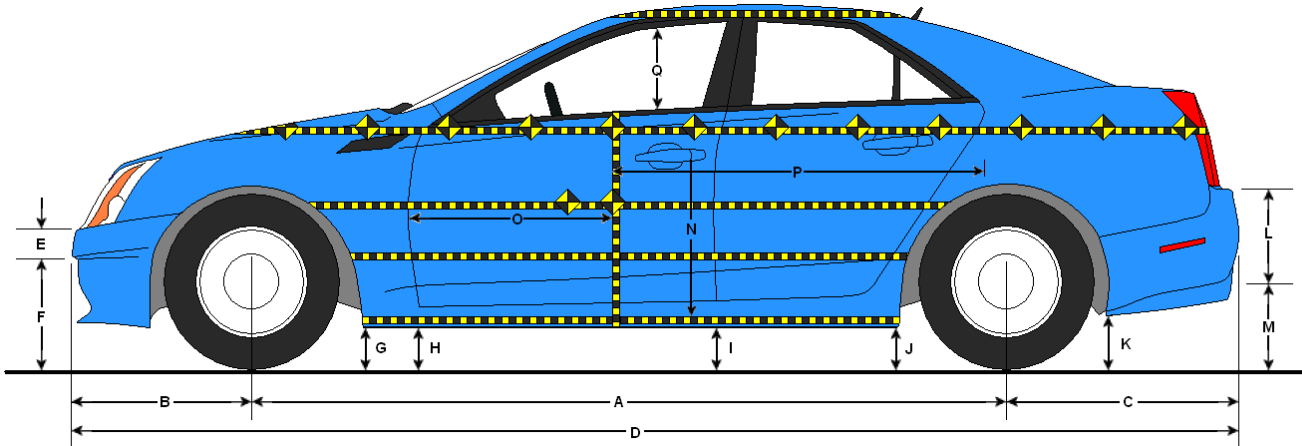
IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vertical Impact Reference Line (Aft of Front Axle)(Intended Impact Point)	mm		1327
Actual Impact Point (Aft of Front Axle)	mm		1329
Horizontal Offset (+ forward / - rearward)	mm	± 38 of Intended Impact Point	-2
Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion	°	75 ± 3	75.8
Trap No. 1 Velocity (Primary)	km/h	31.4 to 33.0	31.42
Trap No. 2 Velocity (Redundant)	km/h	31.4 to 33.0	31.41

DATA SHEET NO. 9

TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2019 BMW X3 sDrive30i 5-Door MPV NHTSA No. M20194101
 Test Program: NCAP Side Pole Impact Test Test Date: 02/14/19



LEFT SIDE VIEW

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

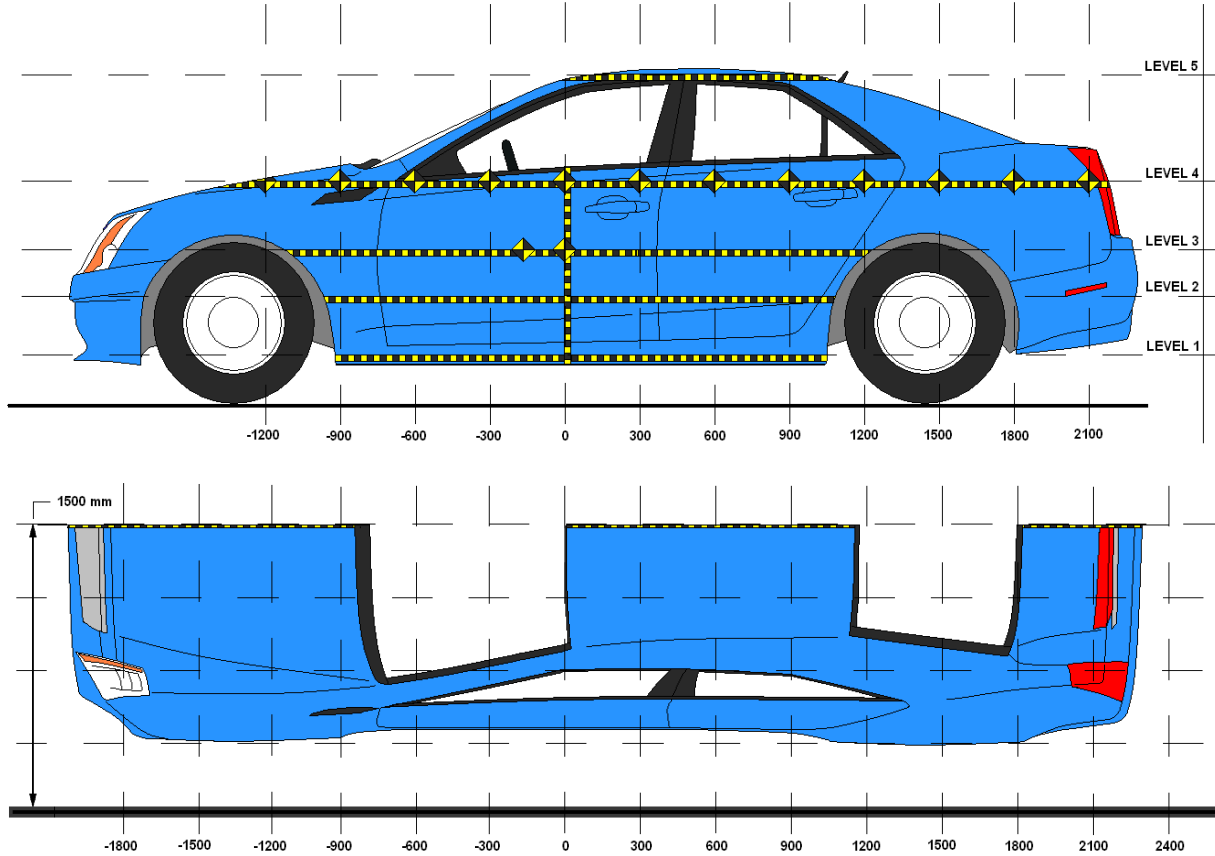
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2862	2815	-47
B	Front Axle to FSOV	852	882	30
C	Rear Axle to RSOV	986	983	-3
D	Total Length at Centerline	4699	4681	-18
E	Front Bumper Thickness	158	157	-1
F	Front Bumper Bottom to Ground	478	498	20
G	Sill Height at Front Wheel Well	284	279	-5
H	Sill Height at Front Door Leading Edge	247	244	-3
I	Sill Height at B-Pillar	256	260	4
J1	Sill Height at Rear Wheel Well	238	247	9
J2	Pinch Weld Height at Rear Wheel Well	213	219	6
K	Sill Height Aft of Rear Wheel Well	289	290	1
L	Rear Bumper Thickness	151	152	1
M	Rear Bumper Bottom to Ground	470	469	-1
N	Sill Height to Bottom of Front Window Sill	783	797	14
O	Front Door Leading Edge to Impact CL	681	599	-82
P	Rear Door Trailing Edge to Impact CL	1448	1392	-56
Q	Front Window Opening	481	485	4
R	Right Side Length	3377	3377	0
S	Left Side Length	3378	3320	-58
T	Vehicle Width at B-Pillar	1878	1794	-84

DATA SHEET NO. 10

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2019 BMW X3 sDrive30i 5-Door MPV NHTSA No. M20194101
 Test Program: NCAP Side Pole Impact Test Test Date: 02/14/19



NOTE: All measurements in mm with tolerance of ± 3 mm

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Description	Height Above Ground (mm)	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	265	210	150
2	Occupant H-Point	698	320	0
3	Mid-Door	742	324	0
4	Window Sill	1044	266	0
5	Window Top	1602	75	150

DATA SHEET NO. 10 ... (CONTINUED)

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2019 BMW X3 sDrive30i 5-Door MPV NHTSA No. M20194101
 Test Program: NCAP Side Pole Impact Test Test Date: 02/14/19

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

	Pre-Test (mm)					Post-Test (mm)					Difference (mm)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900		564	564	663			552	550	635			-12	-14	-28	
-750	632	570	569	655		625	562	559	634		-7	-8	-10	-21	
-600	645	568	567	648		673	597	591	647		28	29	24	-1	
-450	647	565	563	643		706	661	657	676		59	96	94	33	
-300	648	563	561	638		744	723	722	736		96	160	161	98	
-150	648	562	560	631		786	798	806	810		138	236	246	179	
0	648	562	560	627		843	882	884	893		195	320	324	266	
150	647	563	561	621	893	857	848	853	874	968	210	285	292	253	75
300	647	565	561	615	889	766	732	737	765	951	119	167	176	150	62
450	647	568	564	613	888	727	651	646	692	942	80	83	82	79	54
600	647	570	567	609	893	698	634	629	671	934	51	64	62	62	41
750	648	572	569	608	895	673	613	610	652	923	25	41	41	44	28
900	641	571	569	604	897	641	590	587	633	915	0	19	18	29	18
1050	620	564	563	603	895	597	563	562	616	911	-23	-1	-1	13	16
1200		561	558	583	898		561	544	577	906		0	-14	-6	8
1350				607	903				585	906				-22	3
1500				611	907				613	905				2	-2
1650				620	914				620	909				0	-5
1800				633	925				633	918				0	-7
1950				650					649					-1	
2100															
2250															
2400															
2550															
2700															
2850															

DATA SHEET NO. 10 ... (CONTINUED)

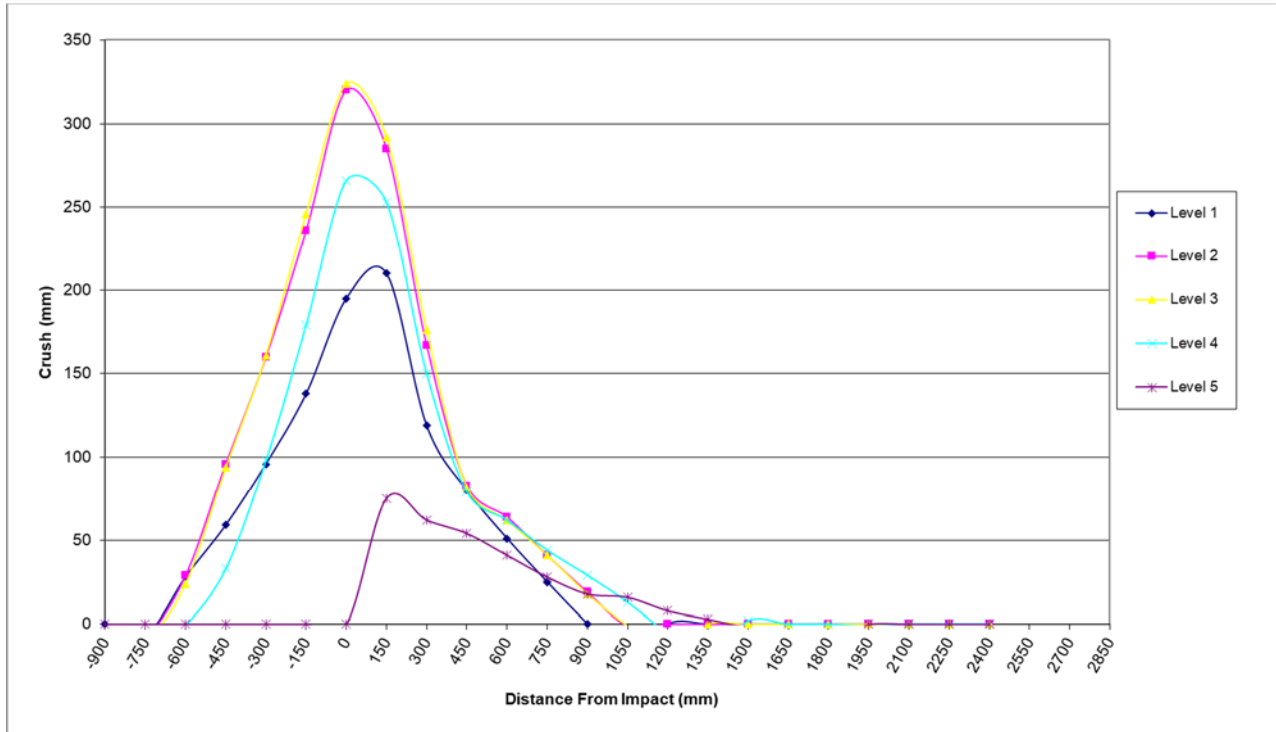
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2019 BMW X3 sDrive30i 5-Door MPV

NHTSA No. M20194101

Test Program: NCAP Side Pole Impact Test

Test Date: 02/14/19

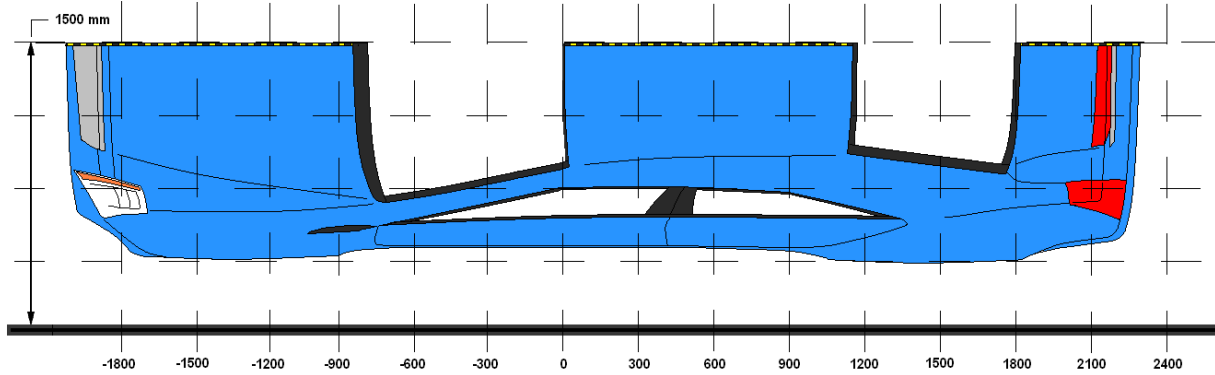


DATA SHEET NO. 11

VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2019 BMW X3 sDrive30i 5-Door MPV NHTSA No. M20194101

Test Program: NCAP Side Pole Impact Test Test Date: 02/14/19



DPD	Distance From Impact Point (mm)	Level	Pre-Test (mm)	Post-Test (mm)	Crush (mm)
1	1950	4	650	649	-1
2	1350	5	903	906	3
3	750	4	608	652	44
4	300	3	561	737	176
5	-300	3	561	722	161
6	-900	2	564	552	-12

DATA SHEET NO. 12

FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2019 BMW X3 sDrive30i 5-Door MPV NHTSA No. M20194101

Test Program: NCAP Side Pole Impact Test Test Date: 02/14/19

Time of Impact: 15.0° C Test Time: 2:13 PM

From impact until vehicle motion ceases: 0 oz.

(Maximum allowable = 1 oz.)

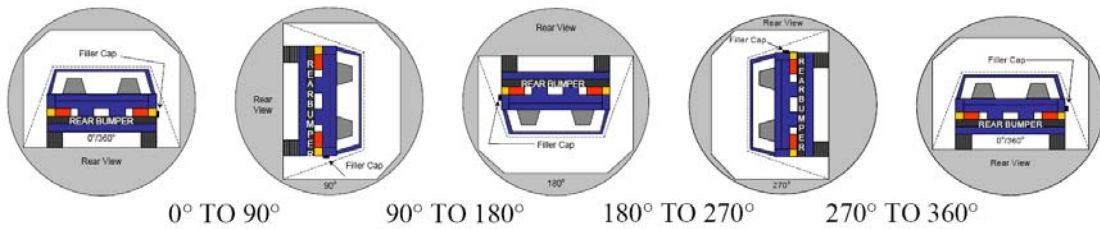
For the 5 minute period after motion ceases: 0 oz.

(Maximum allowable = 5 oz.)

For the following 25 minutes: 0 oz.

(Maximum allowable = 1 oz./minute)

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°	79	300	379
90° To 180°	80	300	380
180° To 270°	81	300	381
270° To 360°	79	300	379

FMVSS 301 SPILLAGE TABLE

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

SOLVENT SPILLAGE LOCATION TABLE

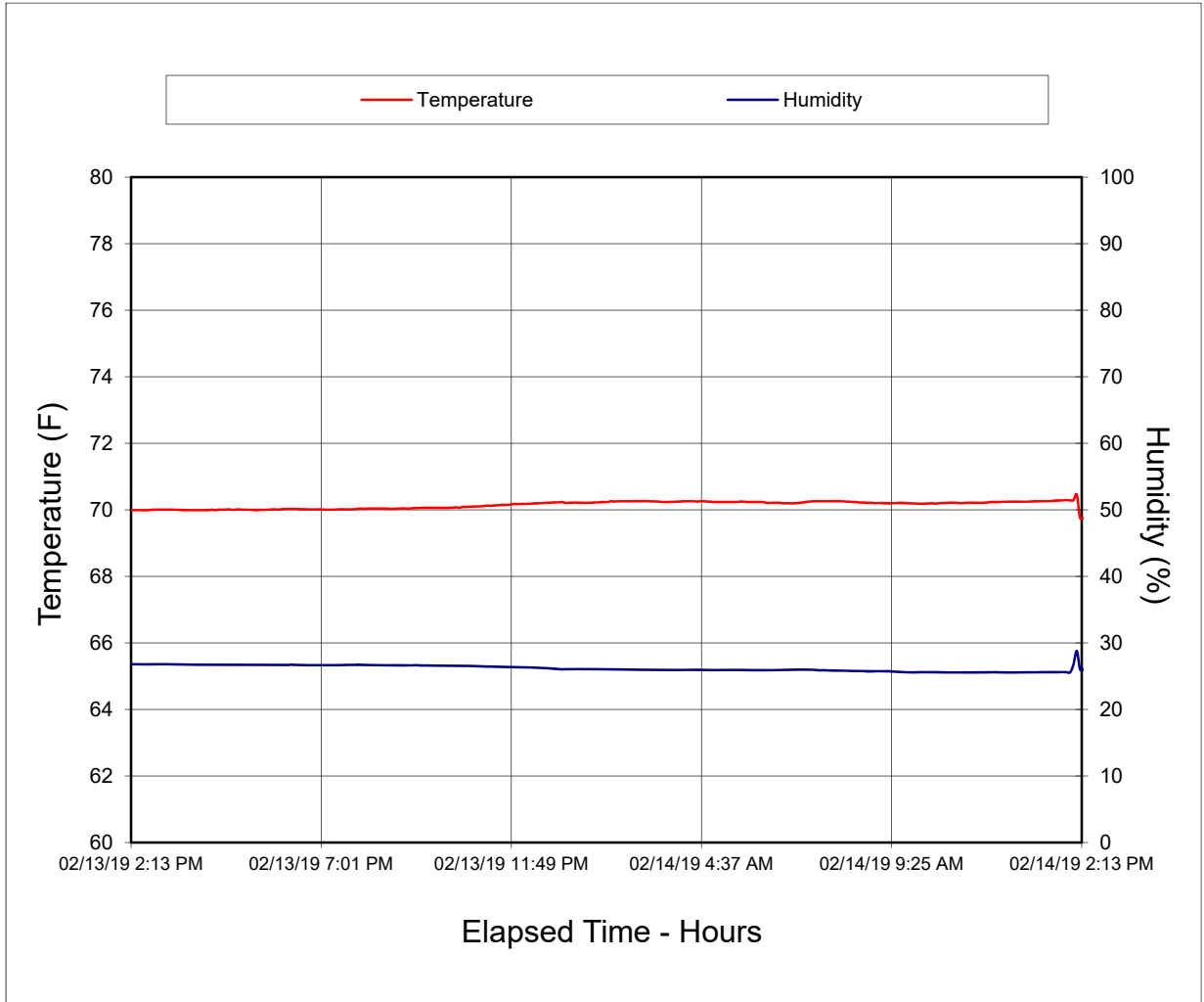
Test Phase	Spillage Location
0° To 90°	No Spillage Occurred
90° To 180°	No Spillage Occurred
180° To 270°	No Spillage Occurred
270° To 360°	No Spillage Occurred

DATA SHEET NO. 13

DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION

Test Vehicle: 2019 BMW X3 sDrive30i 5-Door MPV NHTSA No. M20194101

Test Program: NCAP Side Pole Impact Test Test Date: 02/14/19



**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

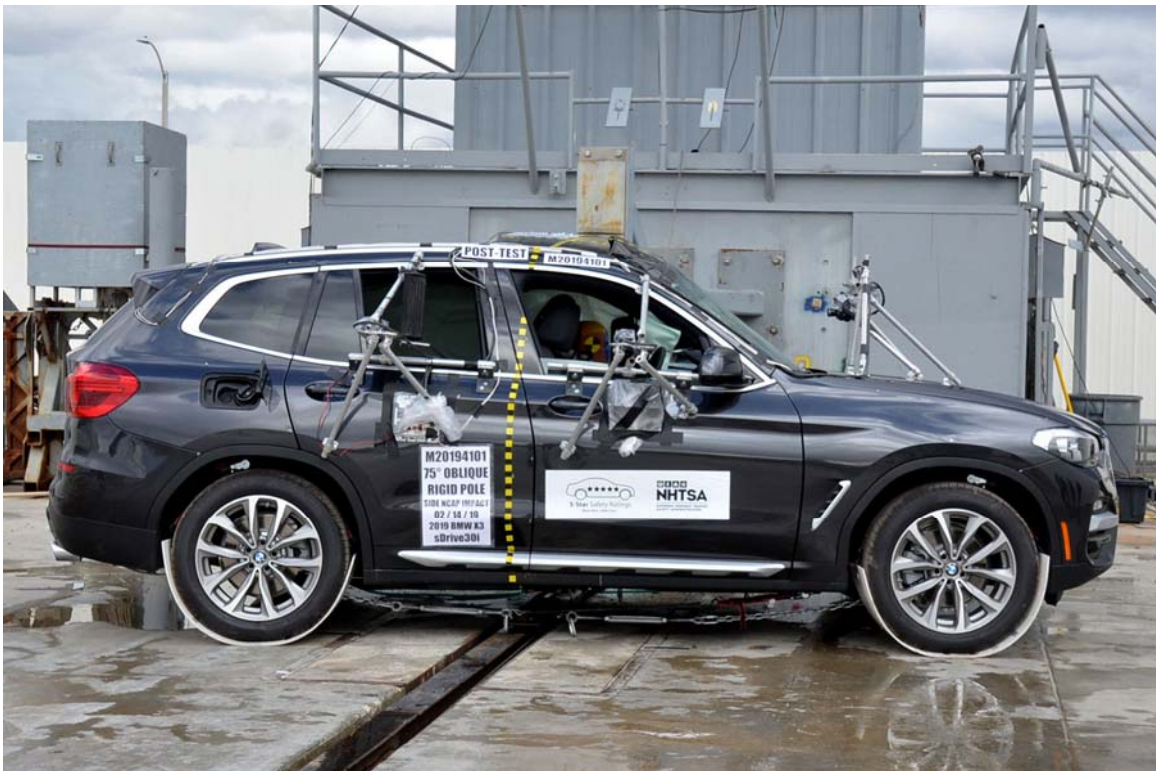


FIGURE 14. Post-Test Right Side View of Test Vehicle



FIGURE 15. Pre-Test Overhead View of Test Area

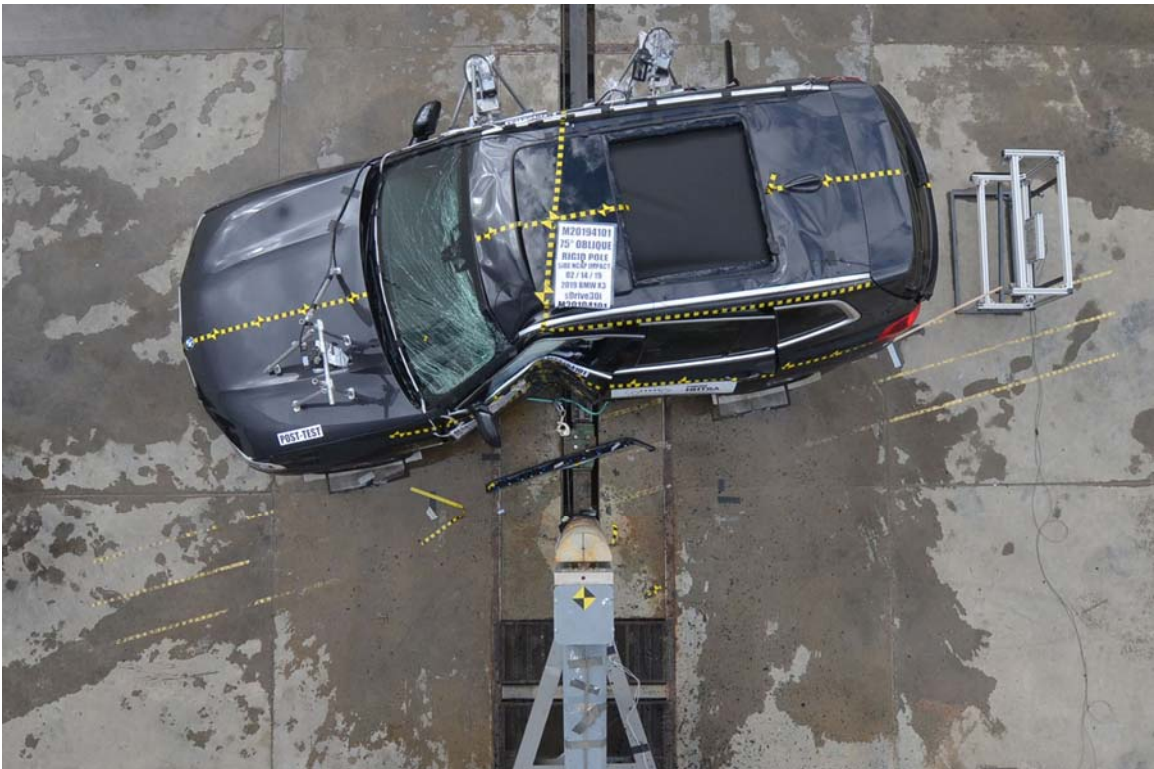


FIGURE 16. Post-Test Overhead View of Test Area

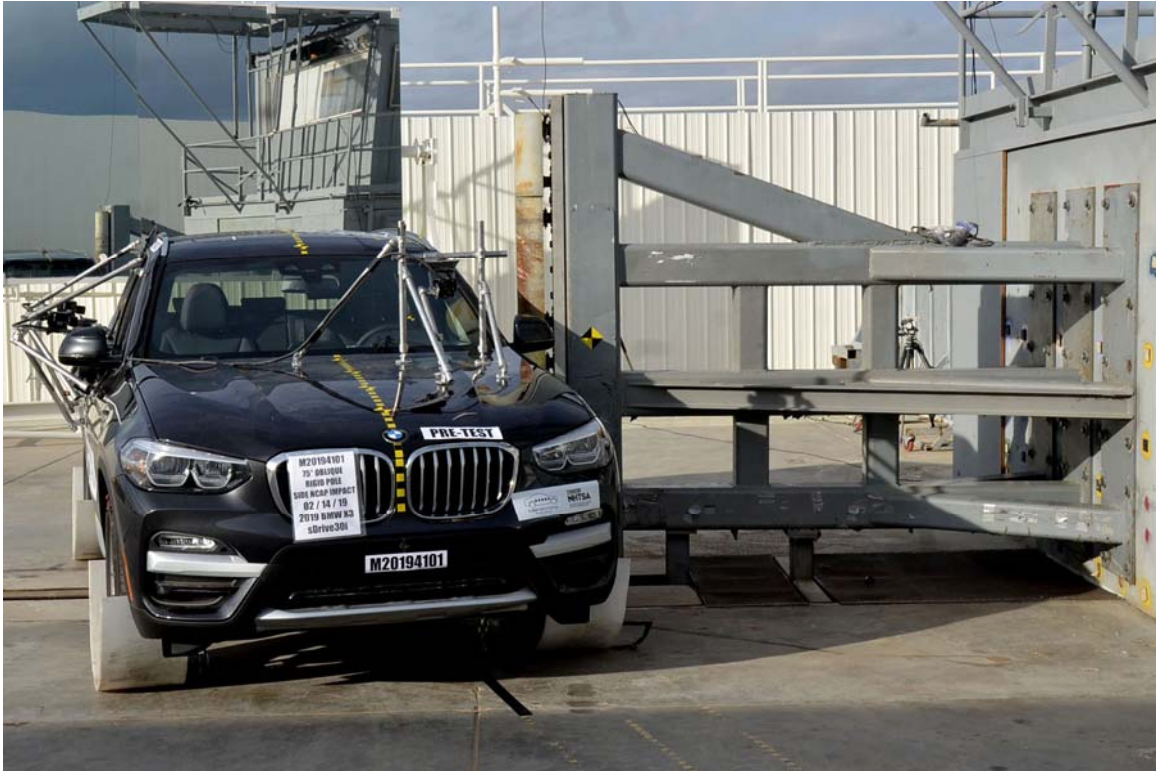


FIGURE 17. Pre-Test Left Side View of Pole Positioned Against Side of Vehicle



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

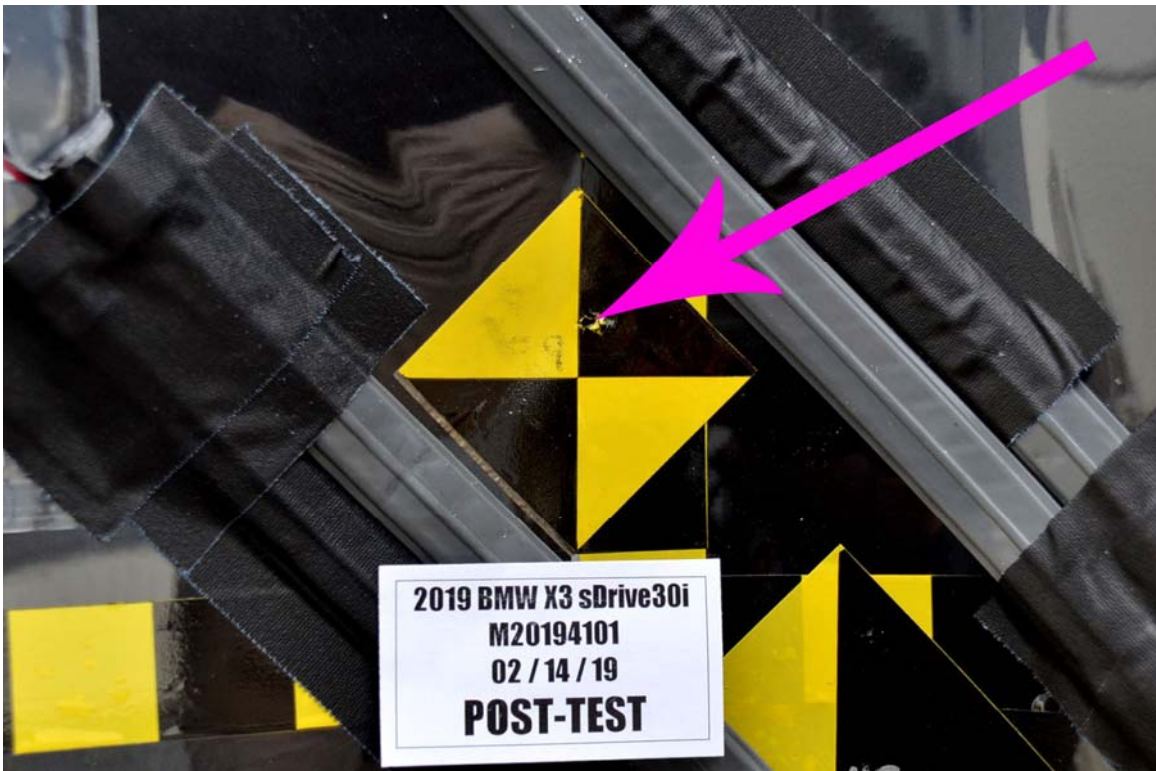


FIGURE 20. Post-Test Close-Up View of Impact Point Target Showing Impact Location



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



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

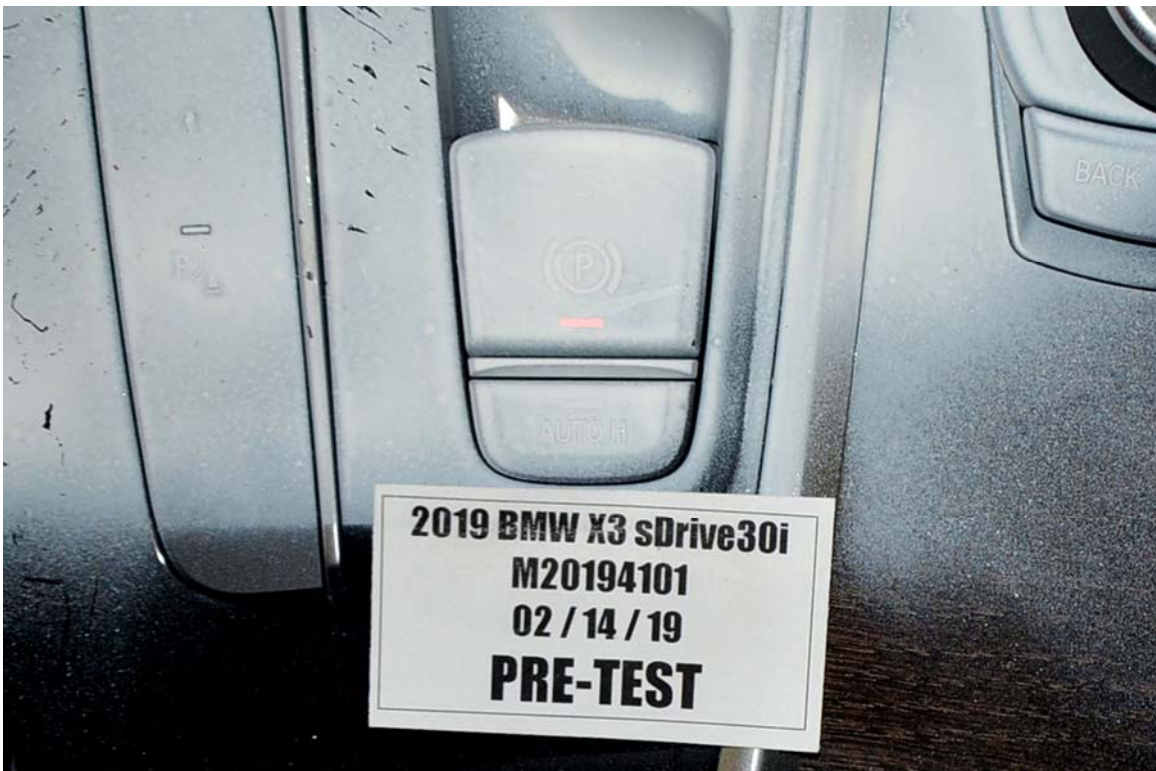


FIGURE 36. Pre-Test View of Parking Brake



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

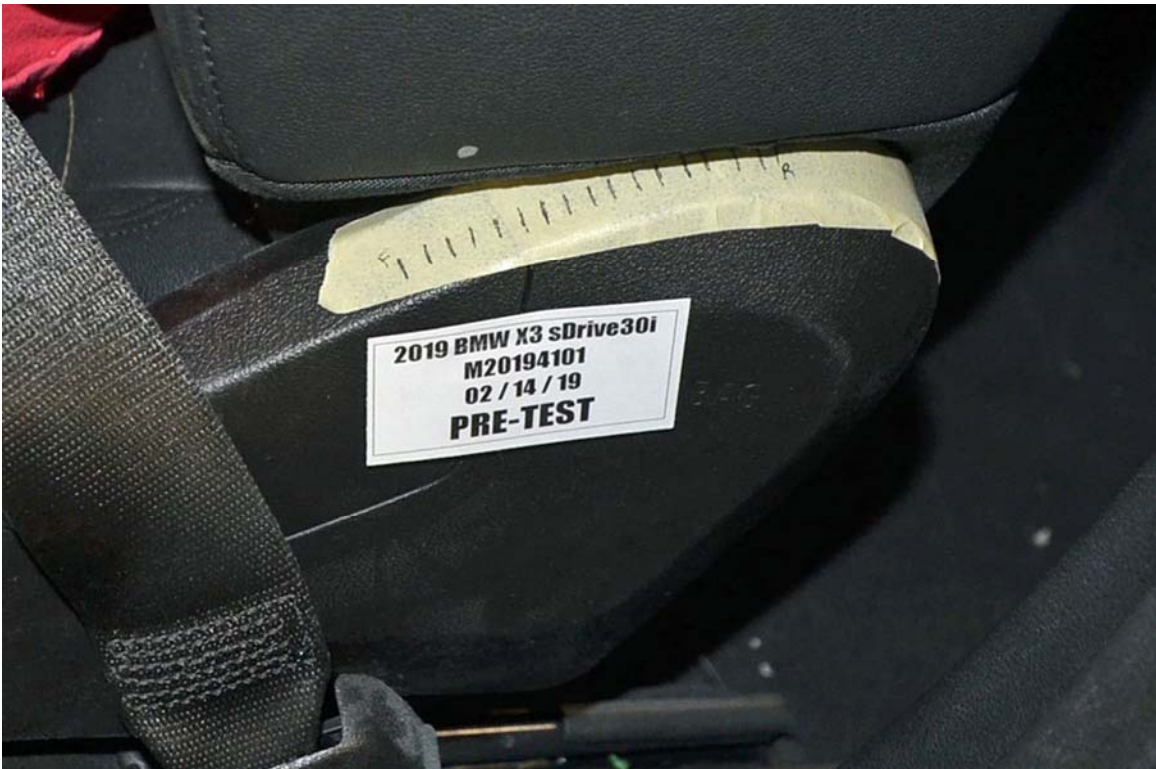


FIGURE 38. Pre-Test Close-Up Left Side View of Driver Seat Back



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



FIGURE 40. Pre-Test Dummy and Door Clearance View

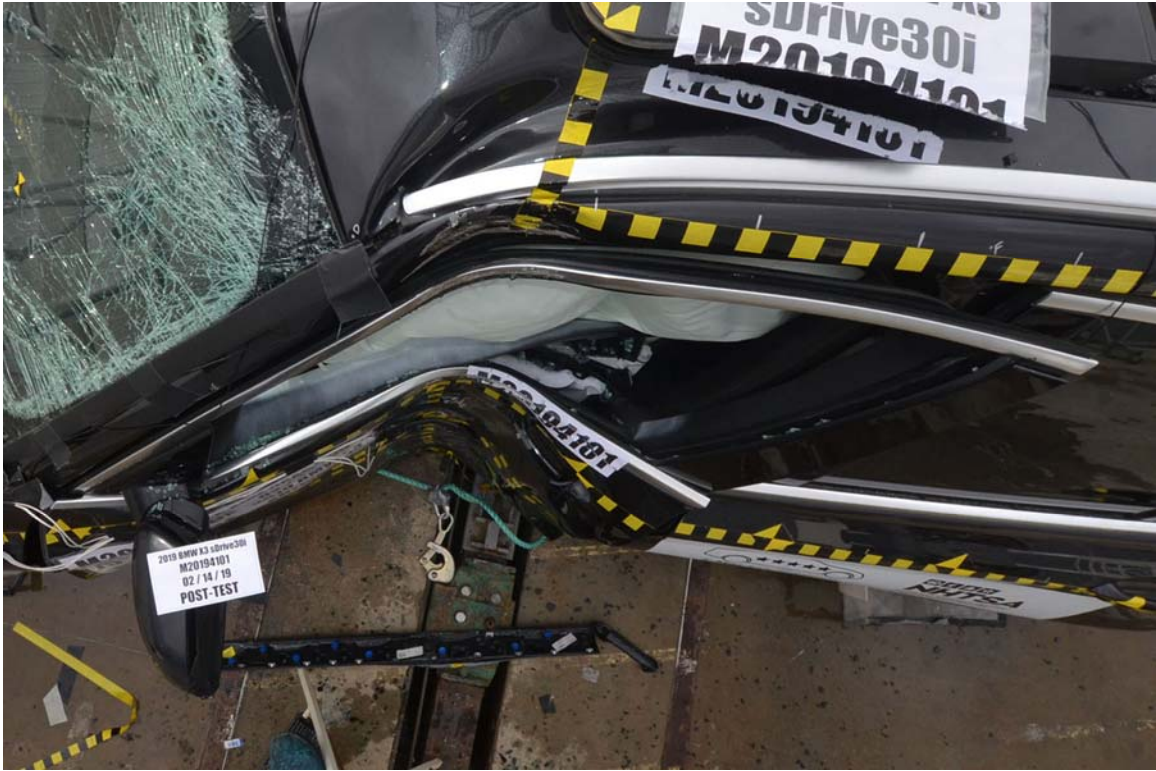


FIGURE 41. Post-Test Dummy and Door Clearance View



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

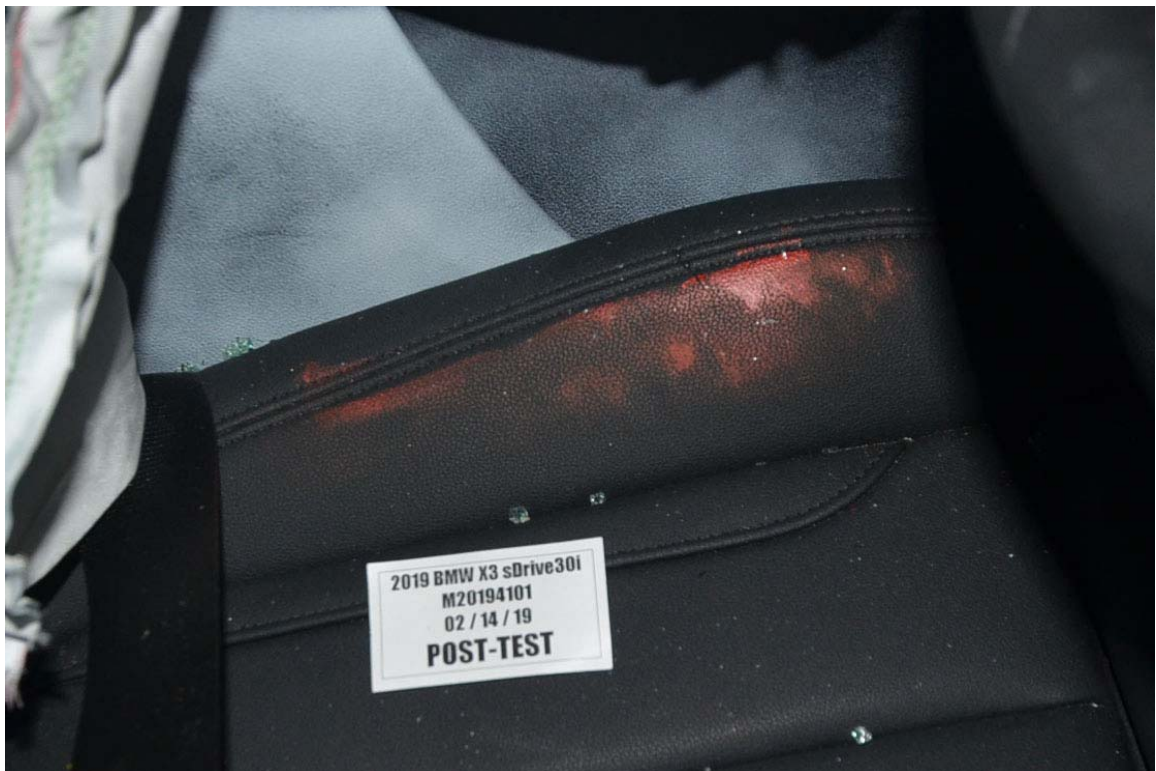


FIGURE 50. Post-Test Dummy Close-Up Pelvis Contact With Vehicle Interior View



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



FIGURE 54. Post-Test View of Fuel Filler Cap or Fuel Filler Neck

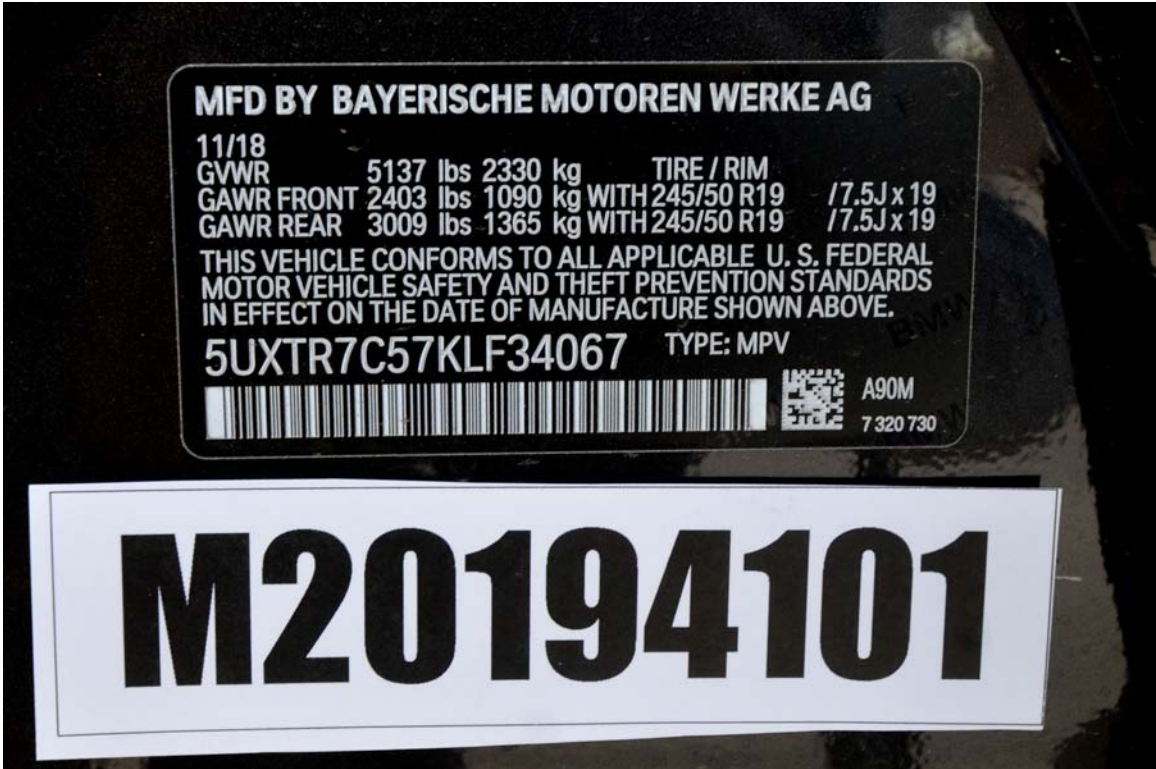


FIGURE 55. Close-Up View of Vehicle's Certification Label



FIGURE 56. Close-Up View of Vehicle's Tire Information Placard or Label



FIGURE 57. Pre-Test Pole Barrier Front View



FIGURE 58. Post-Test Pole Barrier Front View



FIGURE 59. Pre-Test Pole Barrier Side View



FIGURE 60. Post-Test Pole Barrier Side View

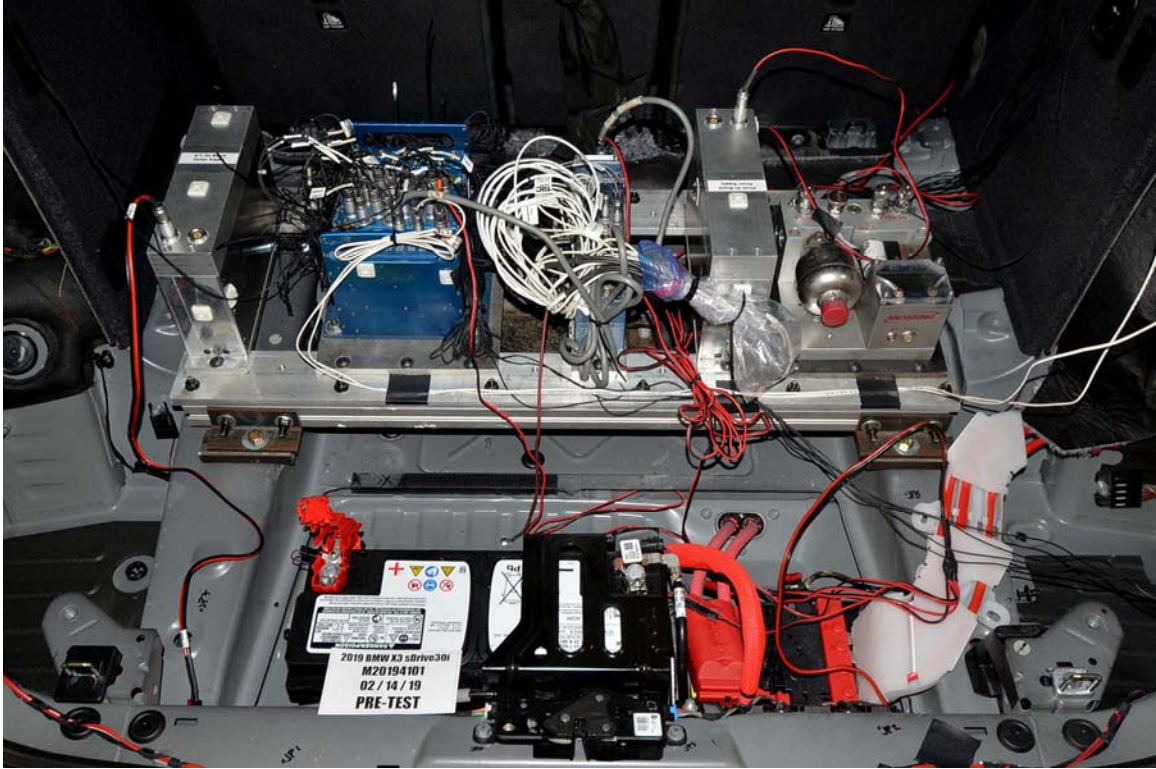


FIGURE 61. Pre-Test Ballast View



FIGURE 62. Post-Test Primary and Redundant Speed Trap Read-Out



FIGURE 63. FMVSS No. 301 Static Rollover 0 Degrees

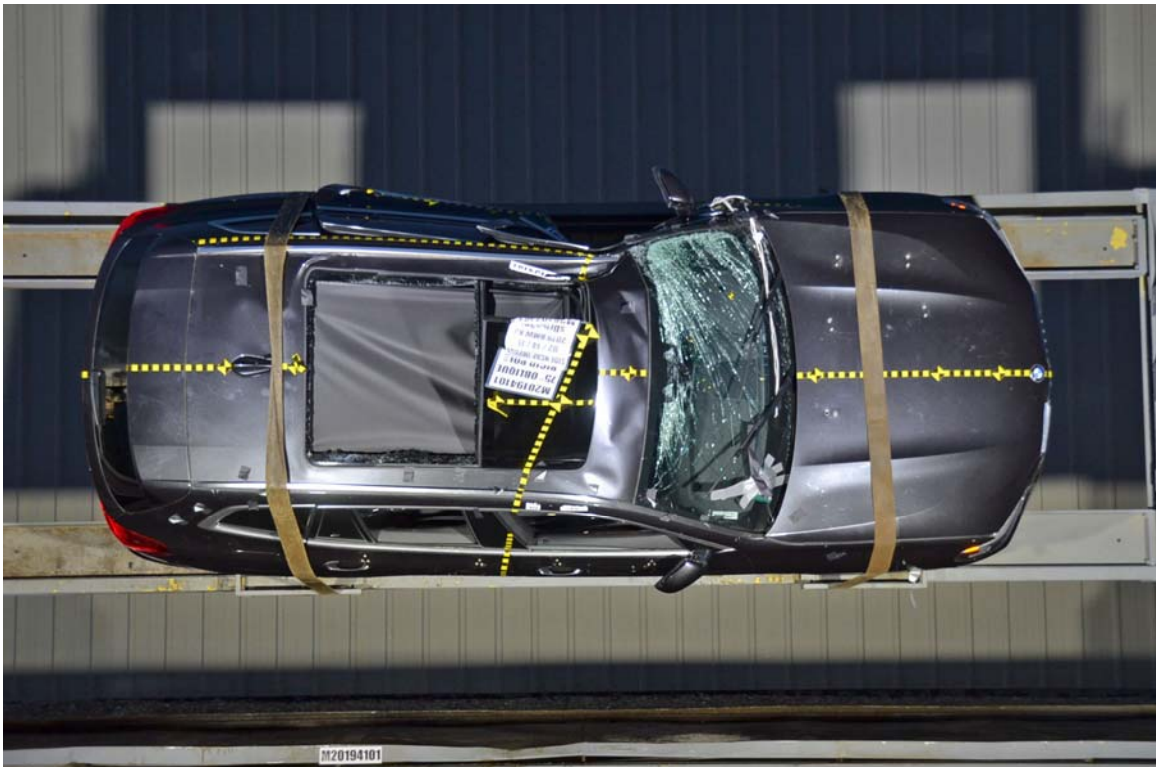


FIGURE 64. FMVSS No. 301 Static Rollover 90 Degrees

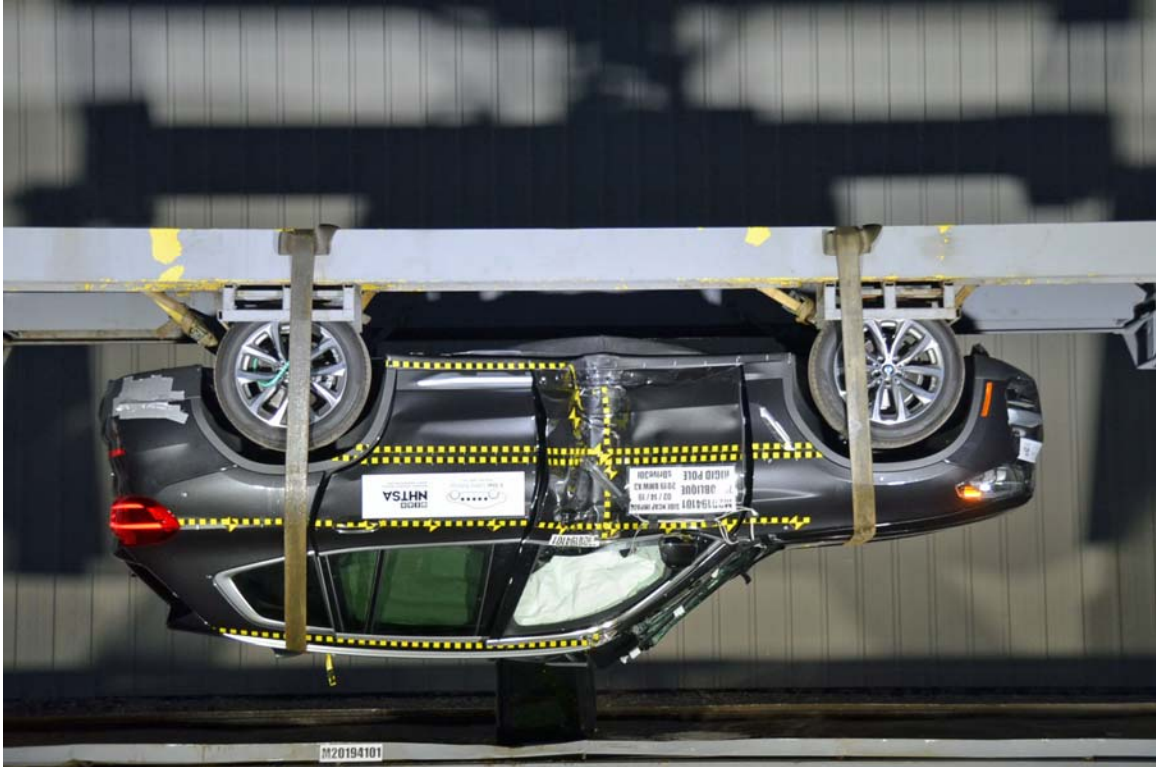


FIGURE 65. FMVSS No. 301 Static Rollover 180 Degrees

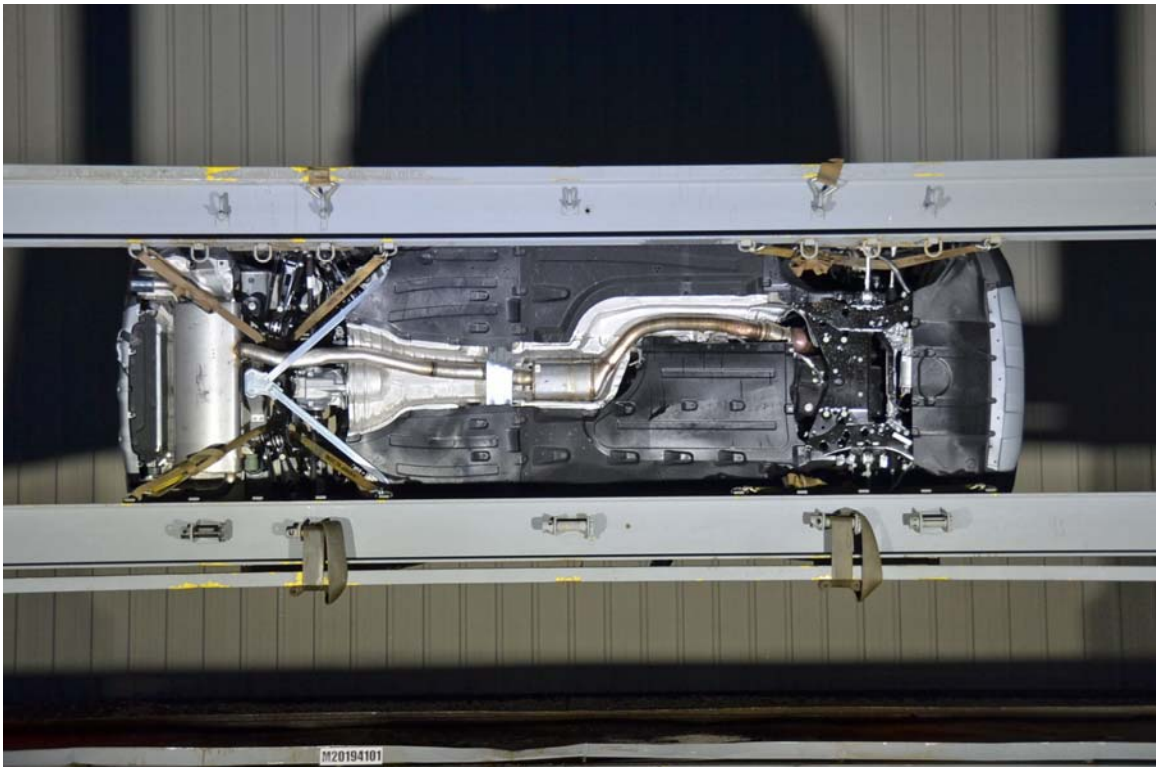


FIGURE 66. FMVSS No. 301 Static Rollover 270 Degrees



FIGURE 67. FMVSS No. 301 Static Rollover 360 Degrees



FIGURE 68. Impact Event

The Ultimate Driving Machine®

2019 BMW X3 sDrive30i

Manufacturer's Suggested Retail Price	\$ 41,000.00
Options and Additional Charges: (Optional equipment may supersede standard equipment; check with your authorized BMW center).	
Dark Graphite Metallic	\$ 550.00
Black SensaTec	Included
Driving Assistance Package	\$ 500.00
- Active Driving Assistant	
- Lane Departure Warning	
Sport Automatic Transmission	Included
19" wheel 692 w/ as rft	600.00
Sport leather steering wheel	Included
Rundfah lines	Included
Rear view camera	Included
Roof rails in Satin Aluminum	Included
Satin aluminum exterior trim	Included
Universal garage-door opener	Included
Dark Oak Wood Trim	Included
Panoramic moonroof	\$ 1,350.00
Power Front Seats	Included
Rear seat back adjustment	Included
Sport seats	Included
Heated front seats	\$ 500.00
Active Protection	Included
Active Driving Assistant	Included
LED Fog Lights	Included
Park Distance Control	Included
Automatic climate control	Included
Anthracite headliner	Included
Refrigerant	Included
Destination Charge	\$ 995.00
Total Suggested Retail Price	\$ 45,495.00

Standard Features

Performance and efficiency

- 20-hp BMW TwinPower Turbo inline 4-cylinder, 16-valve engine with variable valve control (Double-VANOS) and high-revving direct injection
- Driving Dynamics Control with ECO PRO, COMFORT, and SPORT modes
- 8-speed Sport Automatic transmission with Sport and ManualShift modes and steering wheel-mounted paddle shifters and Launch Control

Handling, ride and braking

- Dynamic Stability Control (DSC), including Brake Fade Compensation, Start-off Assistant, Brake Dryness, and Brake Stand-by feature, with Dynamic Traction Control (DTC)
- 4-wheel ventilated disc brakes with anti-lock braking system (ABS), composite front sensors and Dynamic Brake Control (DBC), brake pad wear indicators and Cornering Brake Control (CBC)

Exterior

- LED low-beam and halogen high-beam headlights; LED fog lights
- Power-adding, heated side mirrors
- Satin Aluminum exterior trim

Interior seating and trim

- 10-way power front sport seats with driver's seat memory
- Anthracite headliner
- 4000mAh split-losing rear seats

Audio system

- HiFi Sound System with HD Radio

Instrumentation and controls

- 3-spoke leather-wrapped sport steering wheel
- Drive iD system with on-board computer, Controller and 7 programmable memory buttons
- USB audio connection and hands-free Bluetooth

Comfort and convenience

- Automatic 3-zone climate control
- Park Distance Control, front and rear, and Rear-view Camera
- Power windows, sunroof/tilt with adjustable speed and automatic headlight control
- Power mirrors
- Privacy glass

Safety and security

- Active Protection System and Active Guard
- Front and rear Head Protection System (HPS)
- Reinforced front side-impact straps

Warranty

- 4-year/50,000-mile New Vehicle Limited Warranty for Passenger Cars and Light Trucks (27-Mileage)
- 13-year Unlimited Mileage Rust-Prevention Limited Warranty
- 4-year Unlimited Mileage Roadside Assistance Program

BMW Ultimate Care™

\$0 Maintenance Program For the first 3 years or 36,000 miles, whichever comes first on scheduled maintenance*

Your Maintenance Costs:

Engine Oil Services: \$0 Air Filter: \$0
Cabin Microfilter: \$0 Spark Plugs: \$0
Vehicle Checks: \$0 Brake Fluid: \$0

*Coverage is not transferable to subsequent purchasers, owners or lessees. Please see bmwusa.com/hpdisclaimer or ask your authorized BMW center for details.

EPA DOT Fuel Economy and Environment

Fuel Economy

26 MPG Small SUVs range from 18 to 27 MPG. The best-in-class rate is 32 MPG.

23 30
combined city highway

3.8 gallons per 100 miles

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

Annual fuel cost \$1,750

Fuel Economy & Greenhouse Gas Rating (mpg only) Smog Rating (toxic only)

1 5 10 15 20 Best

This vehicle emits 344 grams CO₂ per mile. The best emits 2 grams per mile (tailpipe only). Producing and distributing fuel all create emissions, learn more at fuelconomy.gov.

Actual results will vary. Only for city driving. Fuel economy performance may vary with driving conditions and vehicle load. The average new vehicle gets 27 MPG city and cost \$7,000, but never 1 year. Cost estimates are based on 15,000 miles per year at \$1.65 per gallon. MPGe is miles per gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fuelconomy.gov

Calculate personalized estimates and compare vehicles.

PARTS CONTENT INFORMATION

For Vehicles in this Car Line:
US/Canadian Parts Content: **30%**
Major Source of Foreign Parts Content:
GERMANY: 20%
MEXICO: 20%

Note: Parts content does not include final assembly, distribution, or other non-parts costs.

For this Vehicle:
Final Assembly Point: **SPARTANBURG, SC, USA**
Country of Origin:
Engine: **AUSTRIA**
Transmission: **GERMANY**

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score	Not Rated
Based on the combined ratings of front, side and rollover. Should ONLY be compared to other vehicles of similar size and weight.	
Frontal Crash	Driver 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 Not Rated
Based on the risk of injury in a side impact.	
Rollover	Rear seat 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 horns that use ultrasonic in excess of 2.5 miles per hour with damage to the vehicle's body and safety systems, although the bumper and related components are not damaged. The bumper system on this vehicle conforms to the current federal bumper standards of 2.5 miles per hour.

BMW of North America, LLC
Woodcliff Lake, NJ 07877
VPC Location: OXONARD, CALIFORNIA
Part of Entry: GREENVALE-SPARTANBURG
Center: UNITED ROAD SERVICES

Sold To:
Century West BMW
PO Box 978
North Hollywood CA
(818) 432-5800

Ship To:
Century West BMW
4245 Lankershim Blvd
North Hollywood CA
(818) 432-5800

FIGURE 69. Monroney Label

CONTROLS Seats, mirrors, and steering wheel

2. Press the red button in the safety belt buckle.

3. Guide the safety belt back into its roll-up mechanism.

Safety belt reminder for driver's seat and front passenger seat

Display in the instrument cluster

The indicator light lights up and a signal sounds. Make sure that the safety belts are positioned correctly. The safety belt reminder can also be activated if objects are placed on the front passenger seat.

Safety belt reminder for rear seats

General information

The safety belt reminder is automatically activated each time the engine starts.

The safety belt reminder is also activated when a passenger unbuckles a rear seat safety belt during the trip.

Display in the instrument cluster

The indicator light in the instrument cluster illuminates after the engine is started.

Symbol	Description
🟢	Green: the safety belt is buckled on the corresponding rear seat.
🔴	Red: the safety belt is not buckled on the corresponding rear seat.

safety mode

critical situations, for instance during an emergency stop, the front safety belts tighten automatically.


In situation passes without an accident occurring, the belt tension relaxes.

CONTROLS Seats, mirrors, and steering wheel

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



1. Raise the head restraint up against the resistance.
2. Press the button, arrow 1, and pull the head restraint out completely.

Installing

Proceed in the reverse order to install the head restraint.

Rear head restraints

Safety information

WARNING

A missing protective effect due to removed or not correctly adjusted 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.

WARNING


Body parts can be jammed when moving the head restraint. There is a risk of injury. Make sure that the area of movement is clear when moving the head restraint.

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.

Adjusting the distance



1. Back: press the button and push the head restraint toward the rear.
2. Forward: pull the head restraint toward the front.

After setting the distance, move the head restraint forward or backward slightly, making sure it engages properly.

CONTROLS Seats, mirrors, and steering wheel

WARNING

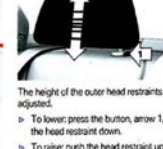
Body parts can be jammed when moving the head restraint. There is a risk of injury. Make sure that the area of movement is clear when moving the head restraint.

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.

Adjusting the height




The height of the outer head restraints can be adjusted.

- To lower: press the button, arrow 1, and pull the head restraint down.
- To raise: push the head restraint up.

After setting the height, move the head restraint up or down slightly, making sure it engages properly.

Removing

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




1. Fold down the rear seat backrest, refer to page 263, in question.
2. Raise the head restraint up against the resistance.
3. Press the button, arrow 1, and pull the head restraint out completely.

Installing

Proceed in the reverse order to install the head restraint.

Folding down the head restraint

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.



- 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.

FIGURE 70. Head Restraint Use and Adjustment

A-35

TR-P39004-01-NC

Photograph Not Applicable

FIGURE 71. Information from Vehicle Owner's Manual

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
8	Driver Lower Spine T12 Acceleration Resultant	B-2
9	Driver Iliac Wing Force on Impact Side (Y)	B-3
10	Driver Acetabulum Force on Impact Side (Y)	B-3
11	Driver Total Pelvis Force on Impact Side (Y)	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 Acceleration Redundant (X)
Driver Head Acceleration Redundant (Y)
Driver Head Acceleration Redundant (Z)
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)

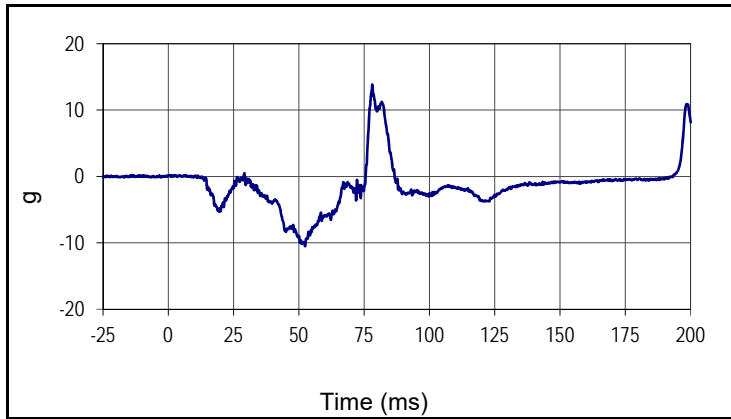
Left B-Pillar Sill Acceleration
Left Lower B-Pillar Acceleration (Y)
Left Mid B-Pillar Acceleration (Y)
Driver Seat Track at Dummy Hip Point Acceleration (Y)
Engine Top Acceleration (X)
Engine Top Acceleration (Y)
Firewall Center Acceleration (Y)
Right Roof at Vertical Impact Reference Line Acceleration (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

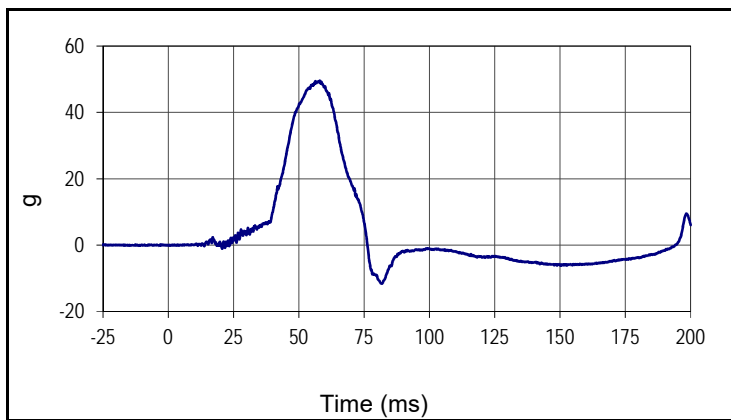
Load Cell Pole Barrier #1 Force (Y)
Load Cell Pole Barrier #2 Force (Y)
Load Cell Pole Barrier #3 Force (Y)
Load Cell Pole Barrier #4 Force (Y)
Load Cell Pole Barrier #5 Force (Y)
Load Cell Pole Barrier #6 Force (Y)
Load Cell Pole Barrier #7 Force (Y)
Load Cell Pole Barrier #8 Force (Y)

Test Vehicle: 2019 BMW X3 sDrive30i 5-Door MPV
 Test Program: NCAP Side Pole Impact Test

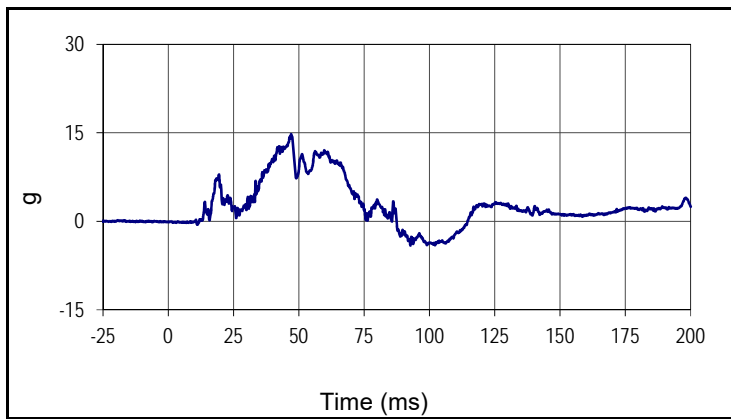
NHTSA No.: M20194101
 Test Date: 02/14/19



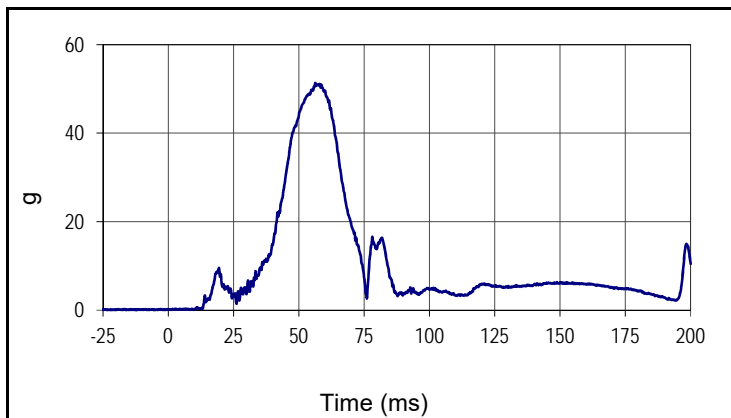
Curve Description			
Driver Head Acceleration X Primary			
Plot No.		SAE Class	Units
001		1000	g
Max	Time	Min	Time
13.9	78.1	-10.5	52.4



Curve Description			
Driver Head Acceleration Y Primary			
Plot No.		SAE Class	Units
002		1000	g
Max	Time	Min	Time
49.6	58.0	-11.6	81.8



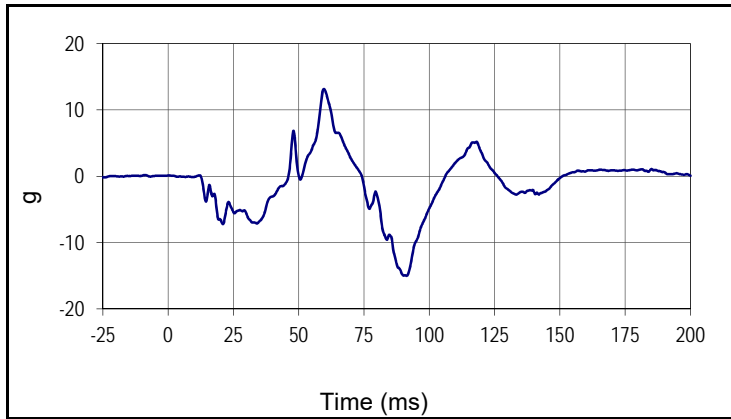
Curve Description			
Driver Head Acceleration Z Primary			
Plot No.		SAE Class	Units
003		1000	g
Max	Time	Min	Time
14.8	47.0	-4.1	92.7



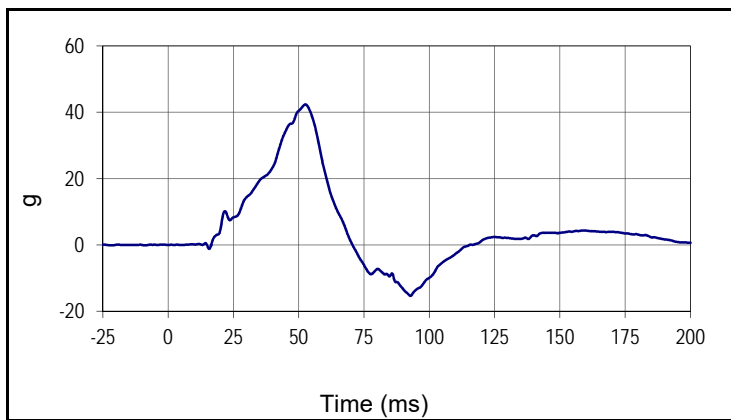
Curve Description			
Driver Head Acceleration Primary Resultant			
Plot No.		SAE Class	Units
004		1000	g
Max	Time	Min	Time
51.4	56.3	0.1	1.0

Test Vehicle: 2019 BMW X3 sDrive30i 5-Door MPV
 Test Program: NCAP Side Pole Impact Test

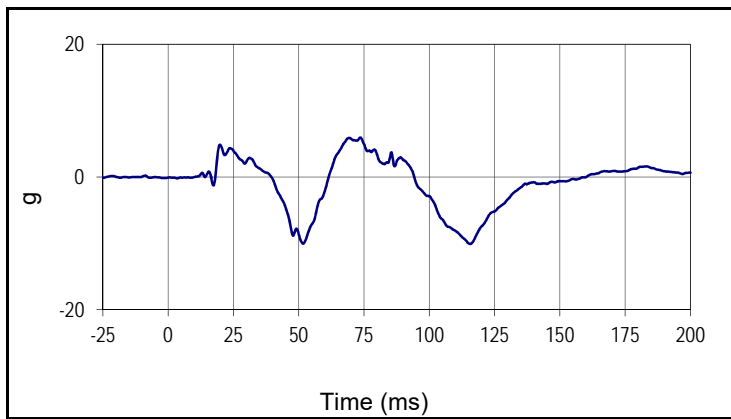
NHTSA No.: M20194101
 Test Date: 02/14/19



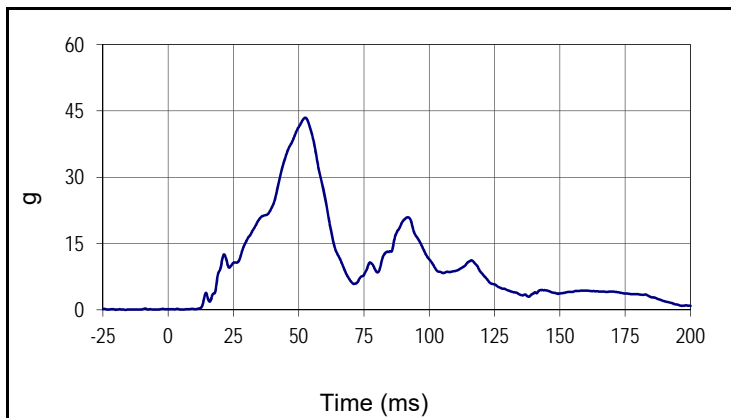
Curve Description			
Driver Lower Spine T12 Acceleration X			
Plot No.		SAE Class	Units
005		180	g
Max	Time	Min	Time
13.1	59.6	-15.0	91.3



Curve Description			
Driver Lower Spine T12 Acceleration Y			
Plot No.		SAE Class	Units
006		180	g
Max	Time	Min	Time
42.3	52.6	-15.4	92.8



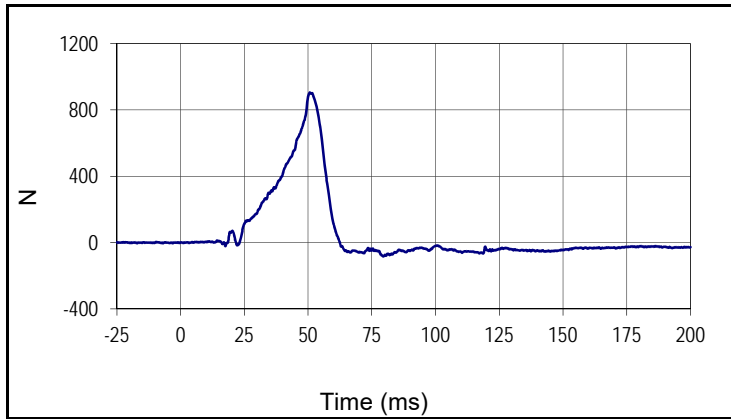
Curve Description			
Driver Lower Spine T12 Acceleration Z			
Plot No.		SAE Class	Units
007		180	g
Max	Time	Min	Time
5.9	73.6	-10.1	115.7



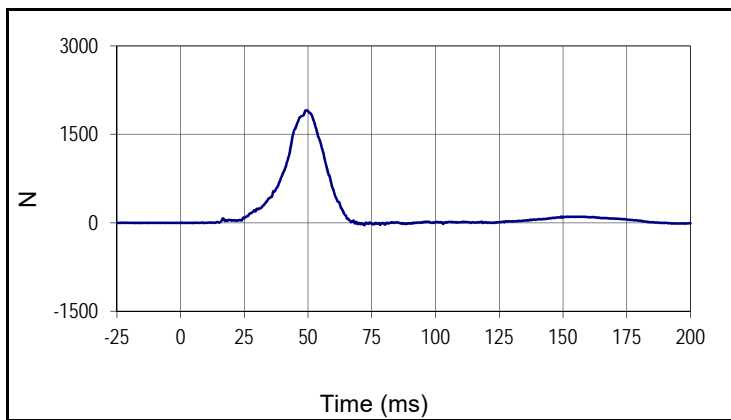
Curve Description			
Driver Lower Spine T12 Acceleration Resultant			
Plot No.		SAE Class	Units
008		180	g
Max	Time	Min	Time
43.5	52.5	0.1	4.6

Test Vehicle: 2019 BMW X3 sDrive30i 5-Door MPV
 Test Program: NCAP Side Pole Impact Test

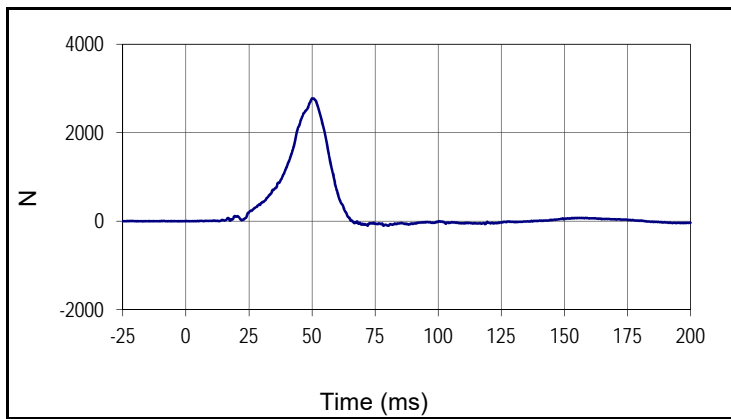
NHTSA No.: M20194101
 Test Date: 02/14/19



Curve Description			
Driver Iliac Wing Force on Impact Side Y			
Plot No.		SAE Class	Units
009		600	N
Max	Time	Min	Time
905.2	50.7	-82.7	79.5



Curve Description			
Driver Acetabulum Force on Impact Side Y			
Plot No.		SAE Class	Units
010		600	N
Max	Time	Min	Time
1905.5	49.1	-40.3	72.1



Curve Description			
Driver Total Pelvic Force on Impact Side Y			
Plot No.		SAE Class	Units
011		600	N
Max	Time	Min	Time
2775.7	50.1	-104.1	72.0

APPENDIX C
ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA

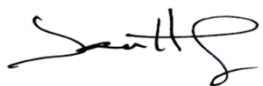
APPENDIX C
PRE-TEST ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA
LEFT SIDE CONFIGURATION




ATD Serial No.: 299

Test Date: 2019-02-01

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	32	Pass
A - Sitting Height	mm	772	788	781	Pass
B - Shoulder Pivot Height	mm	437	453	450	Pass
C - Hpoint Height	mm	79	89	86	Pass
D - H Point From Seatback	mm	141	151	147	Pass
E - Shoulder Pivot From Backline	mm	97	107	103	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	42	Pass
I - Head Depth	mm	178	188	184	Pass
J - Head Circumference	mm	541	551	548	Pass
K - Buttock To Knee Length	mm	514	540	525	Pass
L - Popliteal Height	mm	343	369	362	Pass
K - Knee Pivot To Floor Height	mm	392	409	400	Pass
N - Buttock Popliteal Length	mm	416	442	439	Pass
O - Chest Depth W/O Jacket	mm	195	211	201	Pass
P - Foot Length	mm	216	232	223	Pass
Q - Hip Breadth (W/Pelvic Plugs)	mm	313	323	318	Pass
R - Arm Length	mm	249	259	258	Pass
S - Knee Joint To Seatback	mm	477	493	488	Pass
V - Shoulder Width	mm	341	357	352	Pass
W - Foot Width	mm	78	94	88	Pass
Y - Chest Circumference W/Jacket	mm	851	881	869	Pass
Z - Waist Circumference	mm	761	791	772	Pass
Overall Test Results					Pass

Technician: 
 J. Hernandez

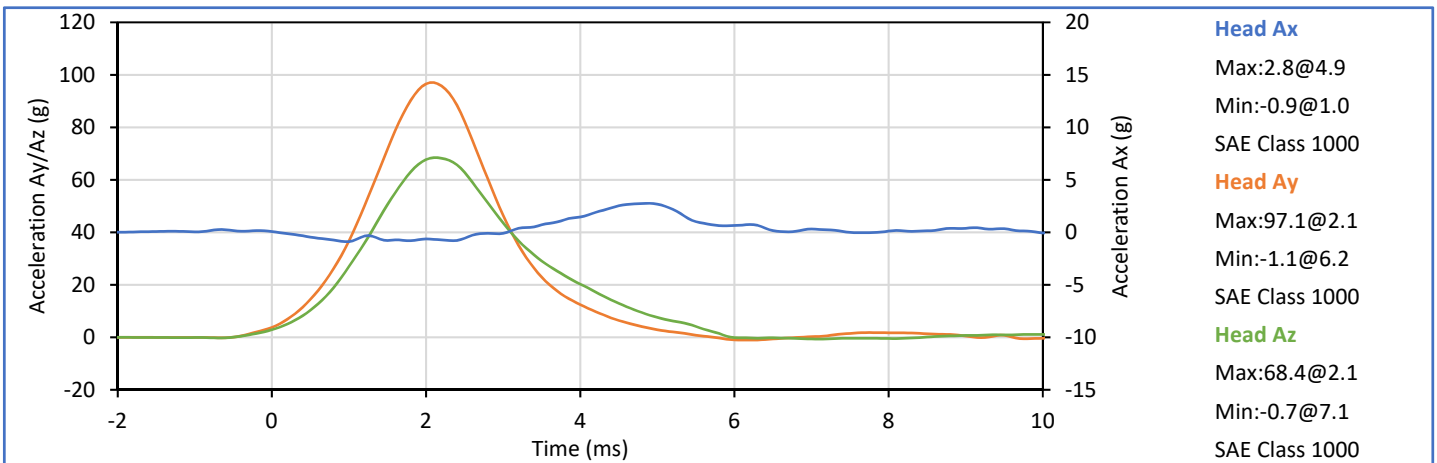
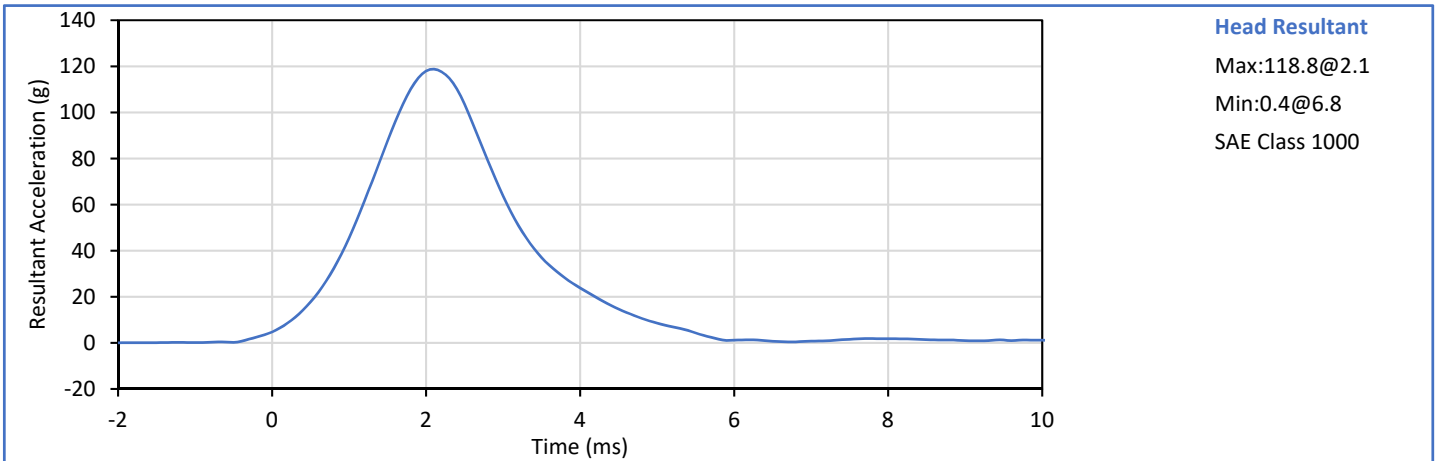
Approved By: 
 P. Puzzuto



ATD Serial No.: 299

Test Date: 2019-02-04

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.9	Pass
Laboratory Humidity	%	10	70	33	Pass
Peak Resultant Acceleration	g	115.0	137.0	118.8	Pass
Peak Head Ax	g	-15.0	15.0	-0.9	Pass
Oscillations After Main Pulse	%	0.0	15.0	1.6	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
Overall Test Results					Pass



Technician:
 J. Hernandez

Approved By:
 P. Puzzuto

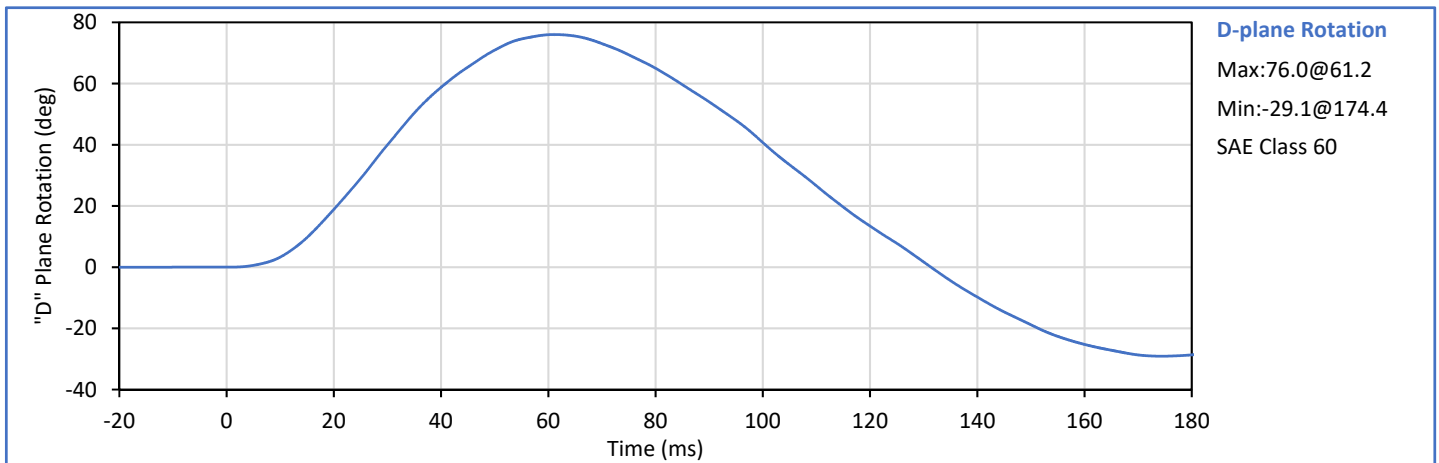
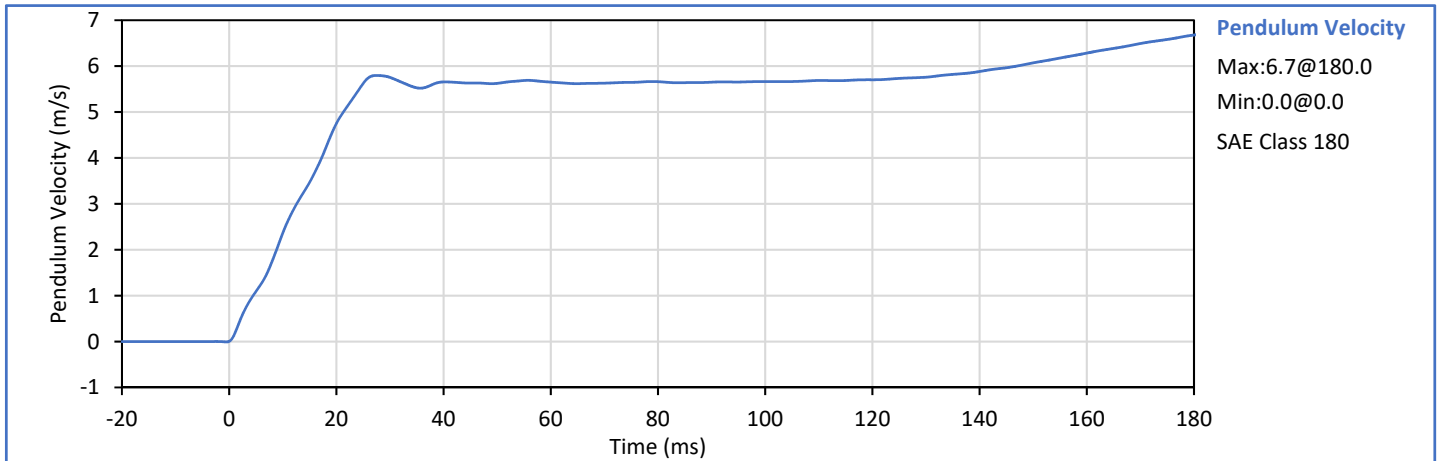


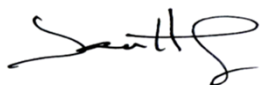
**SID-IIs Small Side Impact ATD
 Neck Flexion**


ATD Serial No.: 299

Test Date: 2019-02-05

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.7	Pass
Laboratory Humidity	%	10	70	29	Pass
Pendulum Velocity	m/s	5.51	5.63	5.52	Pass
Pendulum Decel at 10 ms	m/s	2.20	2.80	2.36	Pass
Pendulum Decel at 15 ms	m/s	3.30	4.10	3.47	Pass
Pendulum Decel at 20 ms	m/s	4.40	5.40	4.75	Pass
Pendulum Decel at 25 ms	m/s	5.40	6.10	5.62	Pass
Pendulum Decel from 25-100 ms	m/s	5.50	6.20	5.80	Pass
Peak "D" Plane Rotation	deg	71.0	81.0	76.0	Pass
Time of Peak "D" Plane Rotation	ms	50.0	70.0	61.2	Pass
Peak Occ. Condyle Moment	Nm	-44.0	-36.0	-42.5	Pass
Time of Moment Decay to 0 Nm	ms	102.0	126.0	111.7	Pass
Overall Test Results					Pass



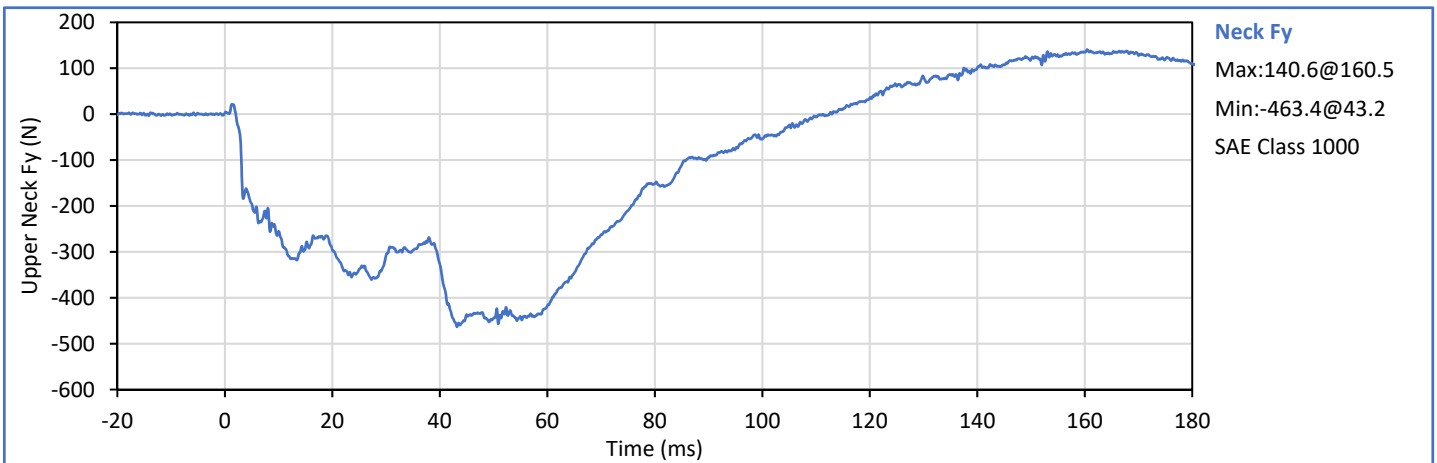
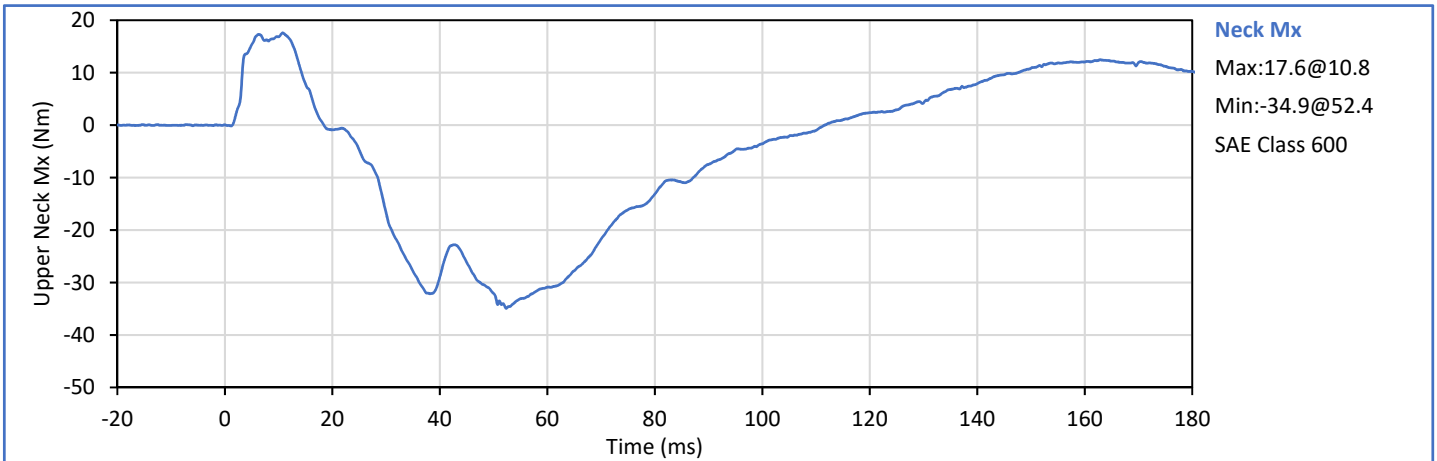
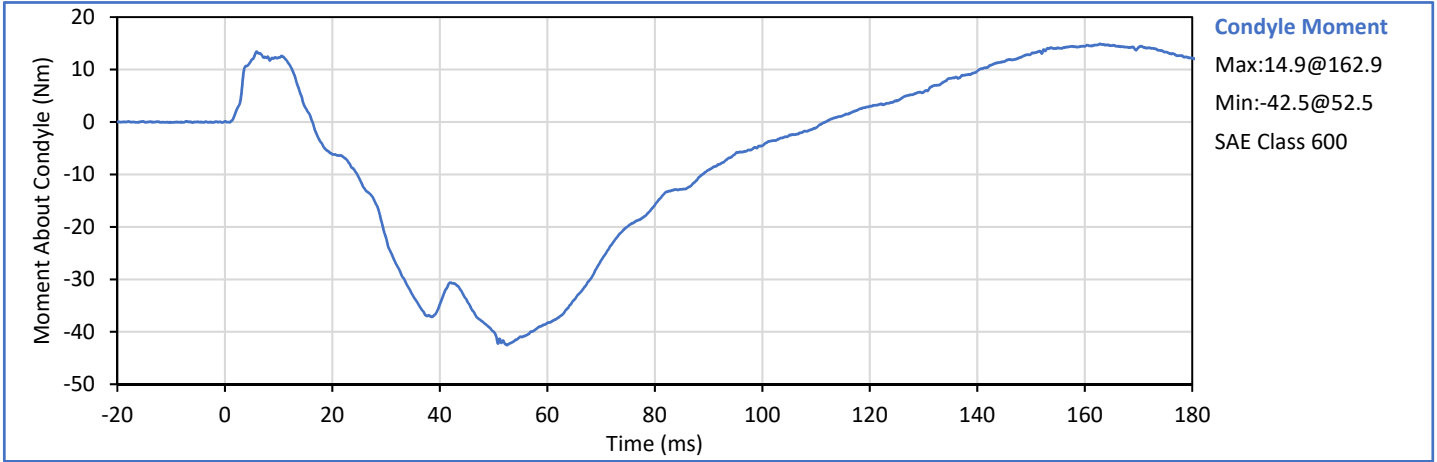
Technician: 
 J. Hernandez

Approved By: 
 P. Puzzuto



ATD Serial No.: 299

Test Date: 2019-02-05

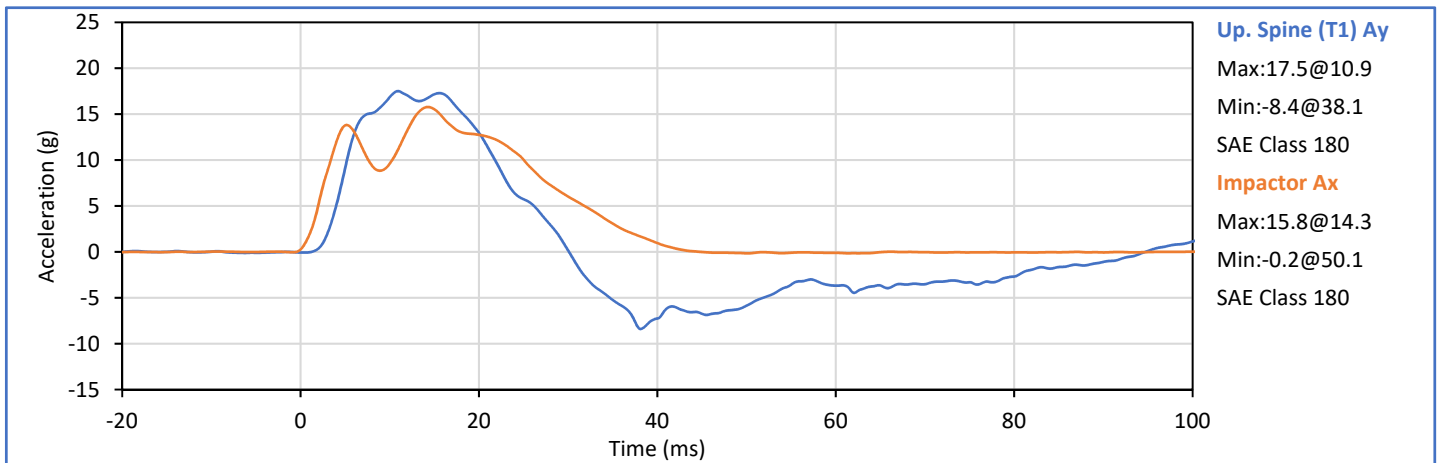
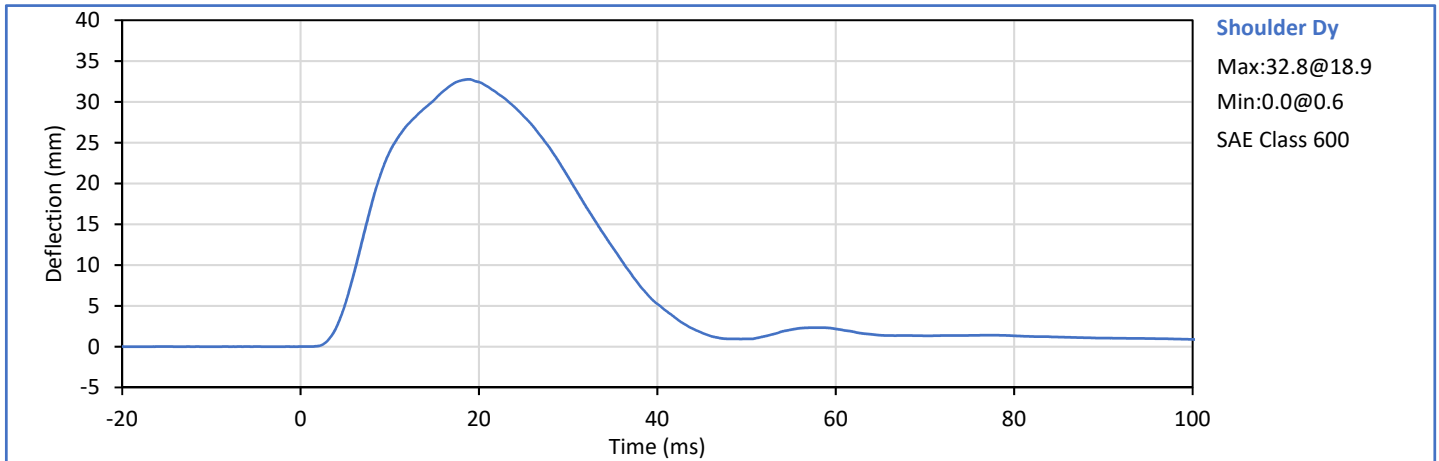




ATD Serial No.: 299

Test Date: 2019-02-01

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Humidity	%	10	70	39	Pass
Impactor Velocity	m/s	4.20	4.40	4.29	Pass
Peak Shoulder Dy	mm	28.0	37.0	32.8	Pass
Peak Upper Spine (T1) Ay	g	17.0	22.0	17.5	Pass
Peak Impactor Ax	g	13.0	18.0	15.8	Pass
Overall Test Results					Pass



Technician:
 J. Hernandez

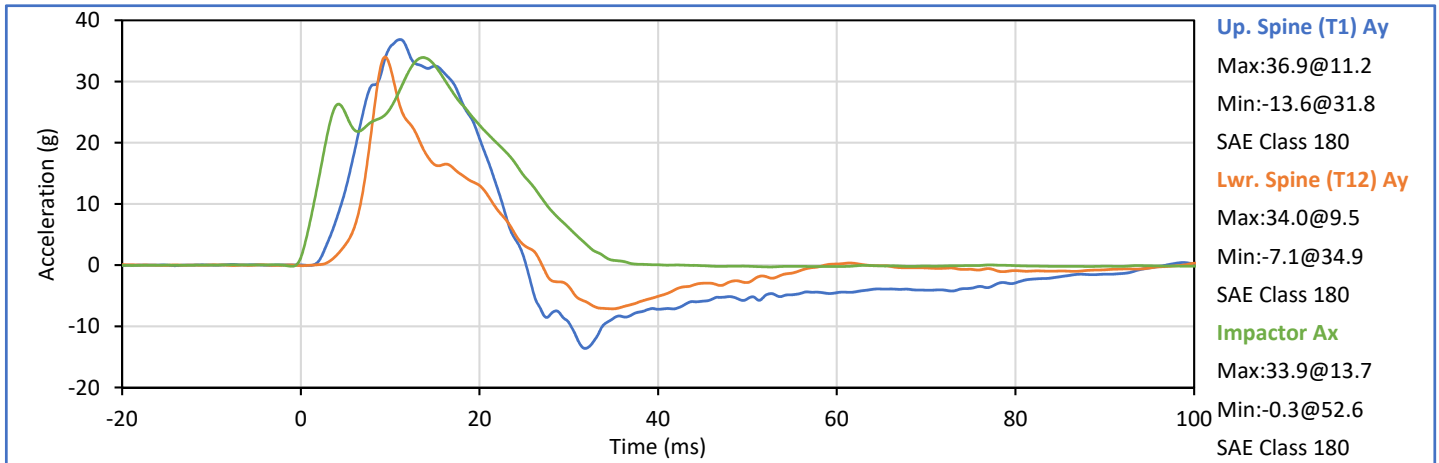
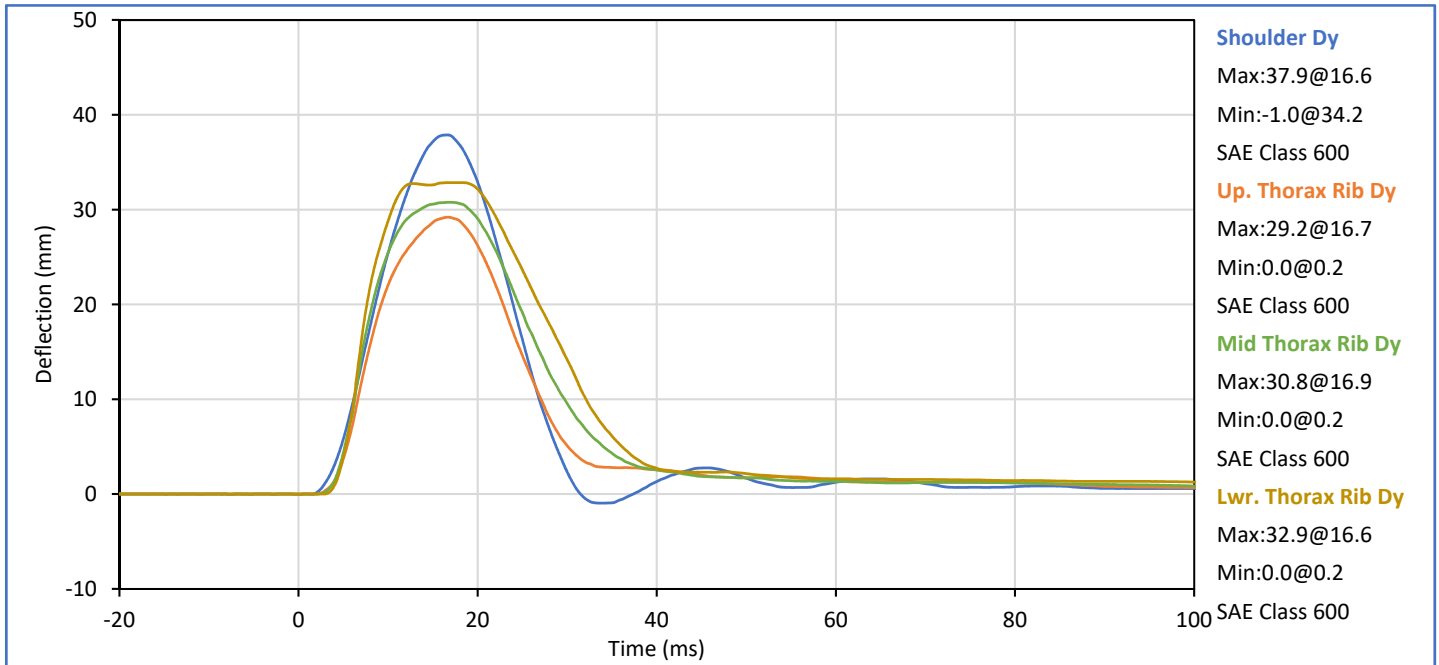
Approved By:
 P. Puzzuto



ATD Serial No.: 299

Test Date: 2019-02-02

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Humidity	%	10	70	35	Pass
Impactor Velocity	m/s	6.60	6.80	6.62	Pass
Peak Shoulder Dy	mm	31.0	40.0	37.9	Pass
Peak Upper Rib Dy	mm	25.0	32.0	29.2	Pass
Peak Middle Rib Dy	mm	30.0	36.0	30.8	Pass
Peak Lower Rib Dy	mm	32.0	38.0	32.9	Pass
Peak Upper Spine (T1) Ay	g	34.0	43.0	36.9	Pass
Peak Lower Spine (T12) Ay	g	29.0	37.0	34.0	Pass
Peak Impactor Ax	g	30.0	36.0	33.9	Pass
Overall Test Results					Pass



Technician: J. Hernandez

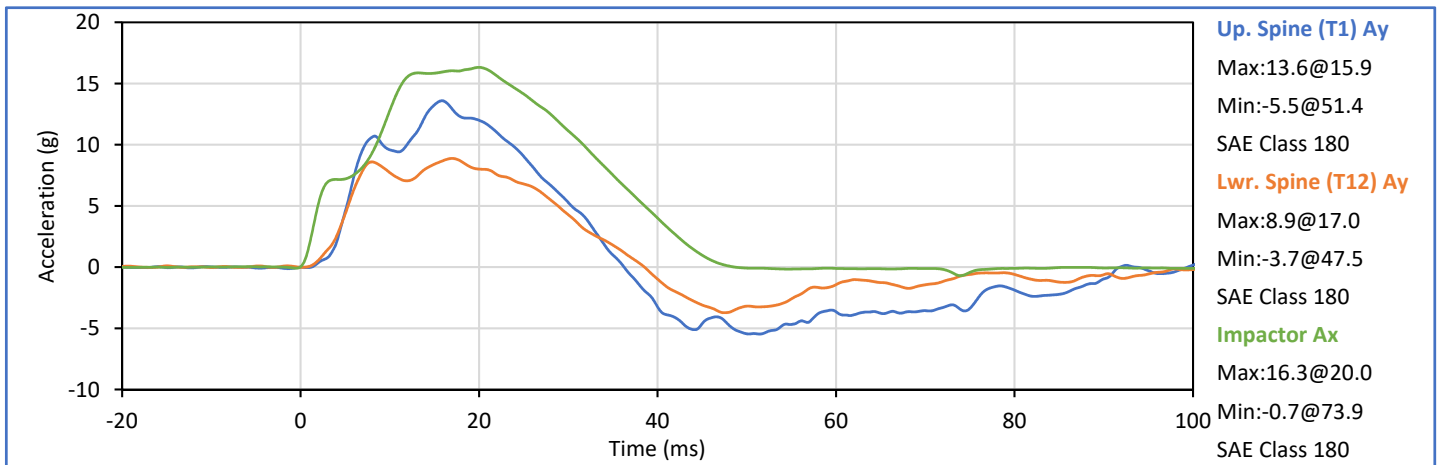
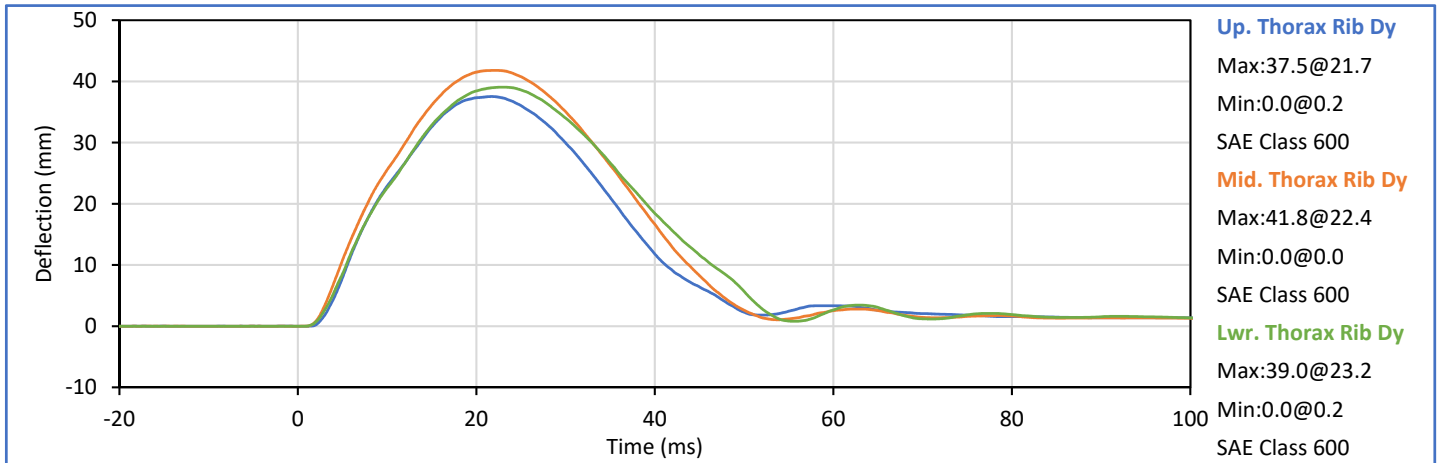
Approved By: P. Puzzuto

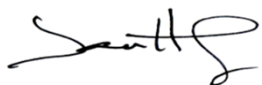



ATD Serial No.: 299

Test Date: 2019-02-01

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Humidity	%	10	70	35	Pass
Impactor Velocity	m/s	4.20	4.40	4.27	Pass
Peak Upper Rib Dy	mm	32.0	40.0	37.5	Pass
Peak Middle Rib Dy	mm	39.0	45.0	41.8	Pass
Peak Lower Rib Dy	mm	35.0	43.0	39.0	Pass
Peak Upper Spine (T1) Ay	g	13.0	17.0	13.6	Pass
Peak Lower Spine (T12) Ay	g	7.0	11.0	8.9	Pass
Peak Impactor Ax	g	14.0	18.0	16.3	Pass
Overall Test Results					Pass



Technician: 
 J. Hernandez

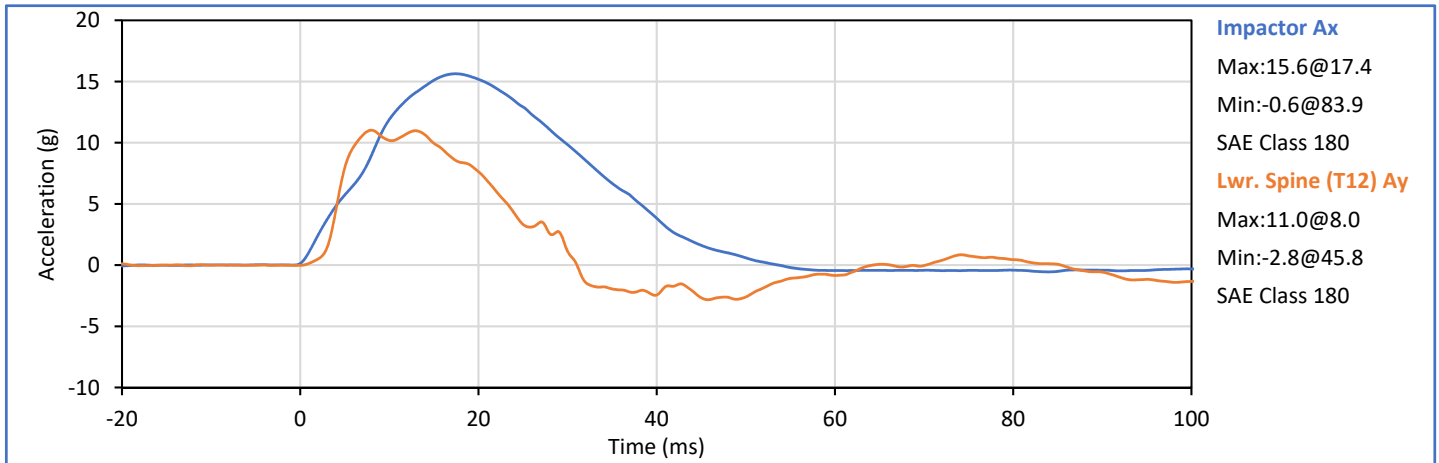
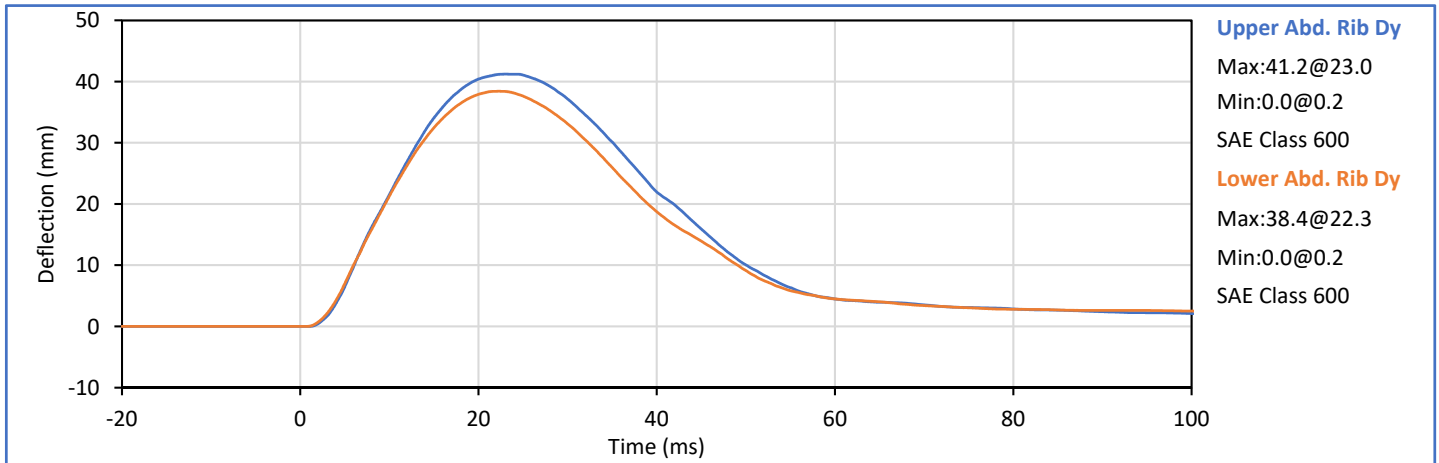
Approved By: 
 P. Puzzuto

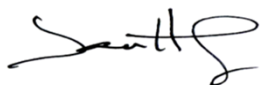



ATD Serial No.: 299

Test Date: 2019-02-02

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Humidity	%	10	70	40	Pass
Impactor Velocity	m/s	4.20	4.40	4.32	Pass
Peak Upper Abdomen Rib Dy	mm	36.0	47.0	41.2	Pass
Peak Lower Abdomen Rib Dy	mm	33.0	44.0	38.4	Pass
Peak Lower Spine T12 Ay	mm	9.0	14.0	11.0	Pass
Peak Impactor Ax	g	12.0	16.0	15.6	Pass
Overall Test Results					Pass



Technician: 
 J. Hernandez

Approved By: 
 P. Puzzuto

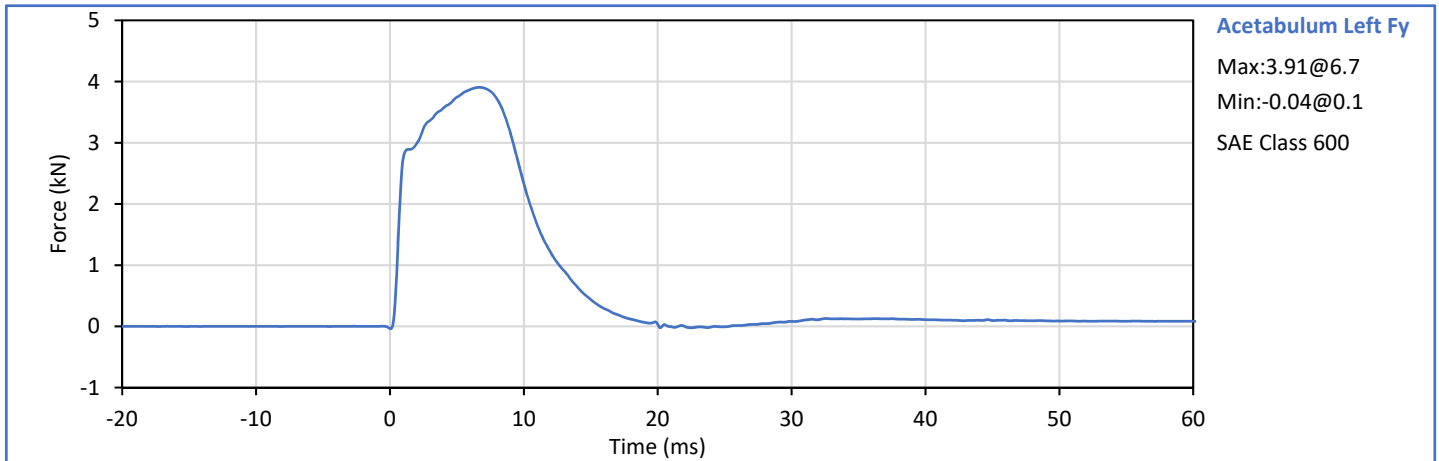
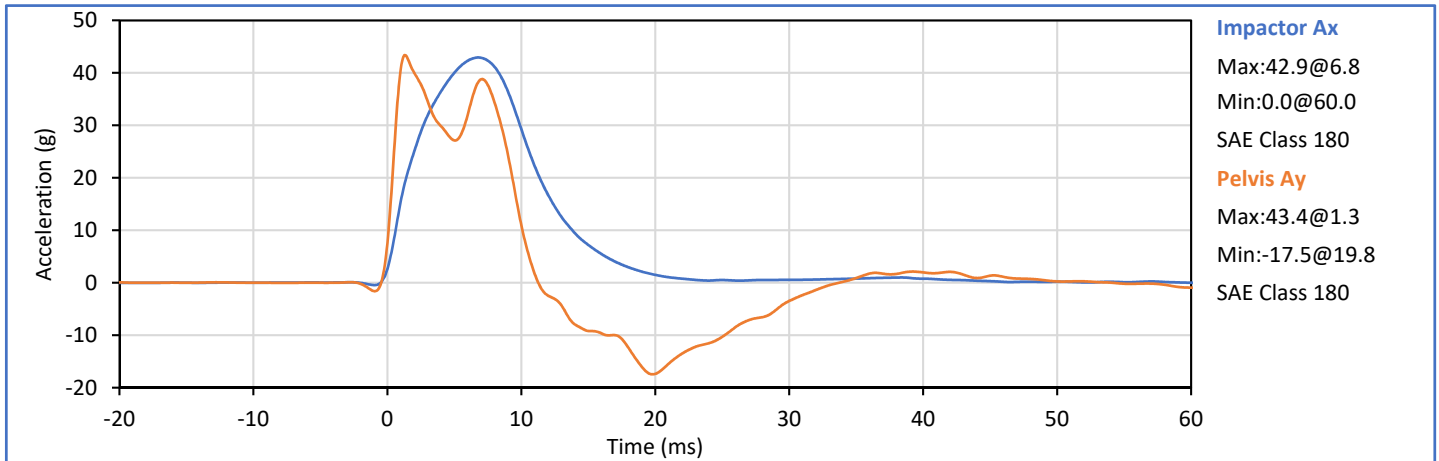


ATD Serial No.: 299

Test Date: 2019-02-01

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.3	Pass
Laboratory Humidity	%	10	70	35	Pass
Impactor Velocity	m/s	6.60	6.80	6.65	Pass
Peak Acetabulum Fy	kN	3.60	4.30	3.91	Pass
Pelvis Ay after 6ms	g	34.0	42.0	38.8	Pass
Peak Impactor Ax	g	38.0	47.0	42.9	Pass
Overall Test Results					Pass

Pelvis Plug S/N: 11501 (SACO)



Technician:
 J. Hernandez

Approved By:
 P. Puzzuto



ATD Serial No.: 299

Test Date: 2019-02-01

Pelvis Plug S/N: 11501 (SACO)



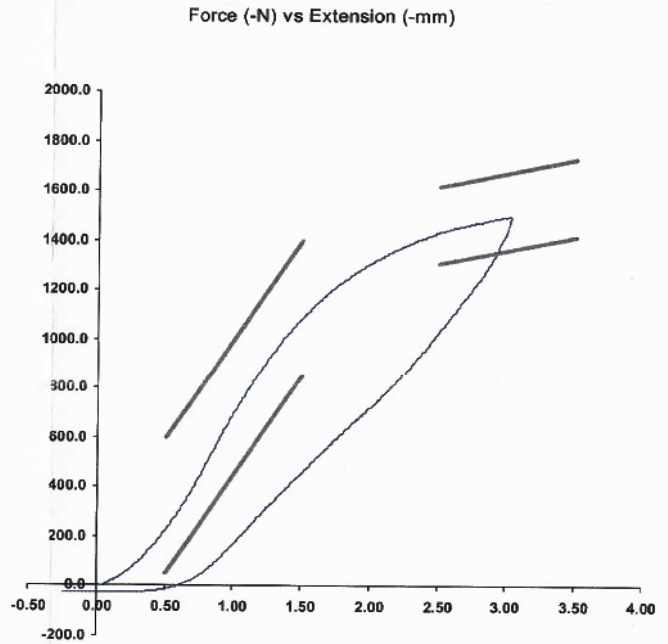
SID-IIs Pelvis Plug Certification Test

Plug S/N 11501
 Test Number 3005
 Report Number 3002
 Test Date 8/31/2016 10:43:13 AM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	224.41	50.00	600.00
Force @ 1.5 mm (N)	1,085.97	850.00	1,400.00
Force @ 2.5 mm (N)	1,433.61	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,496.07	1,361.00	1,673.00

Testing Machine STM-20 5965542
 Load Cell S/N (TI240813), Units (LBS) 1000
 Crosshead Speed (mm / min) or Rate 12.7
 Extension or Position Measured by XHD_100 (XHD100)

Notes:



Operator DC
 Part Number 180-4450

Template No 107 31-Aug-16
 SACO Research

By: DC Date: 8/31/16



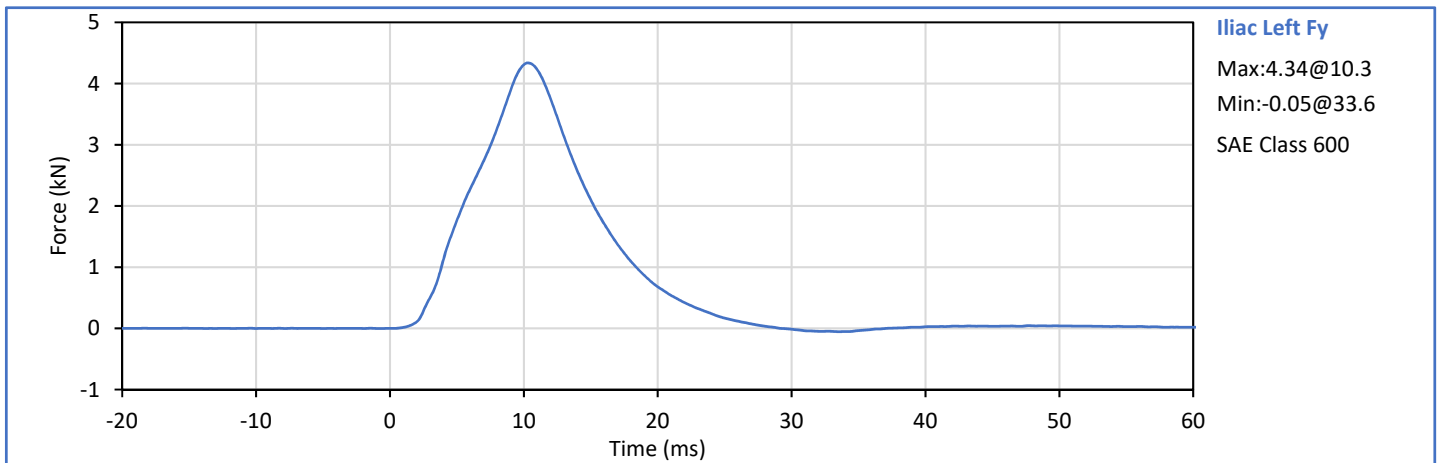
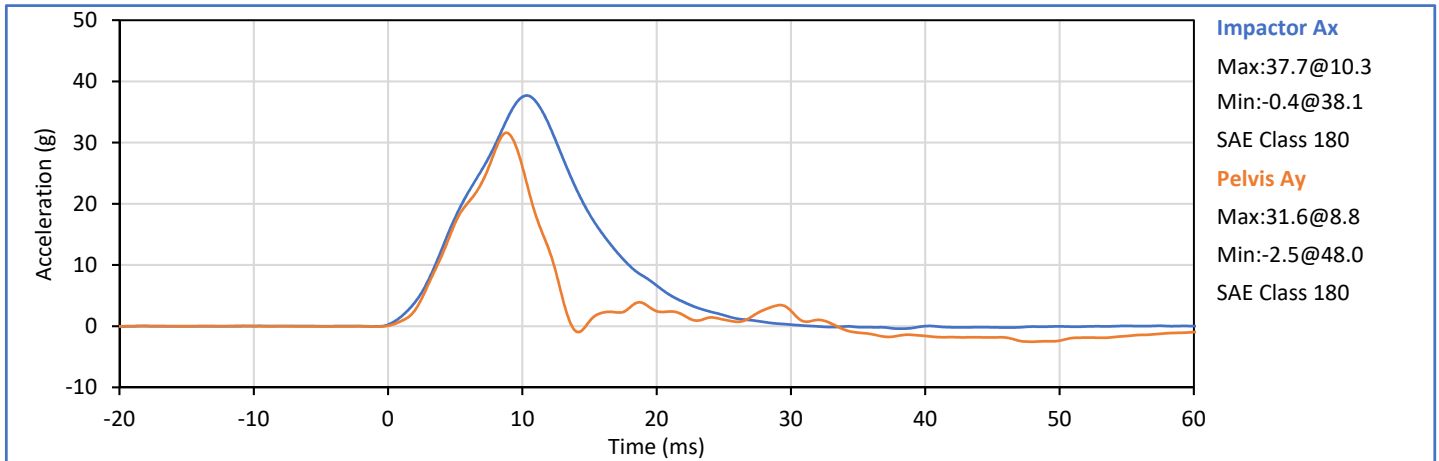
ATD Serial No.: 299

Test Date: 2019-02-02

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.8	Pass
Laboratory Humidity	%	10	70	35	Pass
Impactor Velocity	m/s	4.20	4.40	4.34	Pass
Peak Iliac Fy	kN	4.10	5.10	4.34	Pass
Pelvis Ay after 6ms	g	28.0	39.0	31.6	Pass
Peak Impactor Ax	g	36.0	45.0	37.7	Pass
Overall Test Results					Pass

Pelvis Plug S/N: 12228 (SACO) *

* Plug is not impacted and remains certified

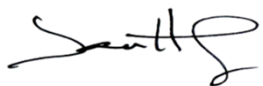



Technician:
 J. Hernandez

Approved By:
 P. Puzzuto

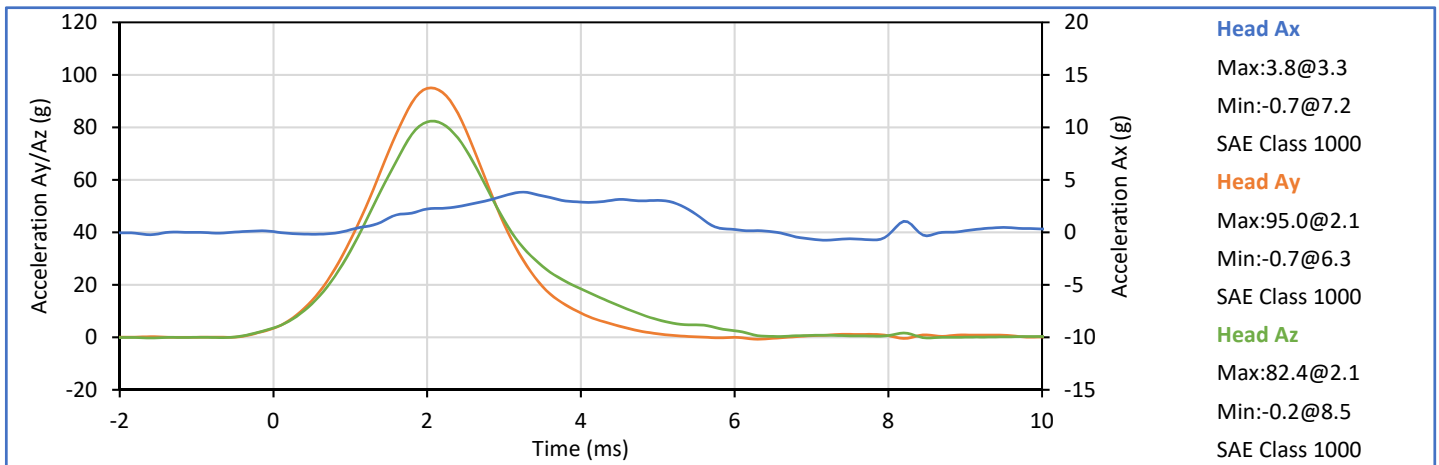
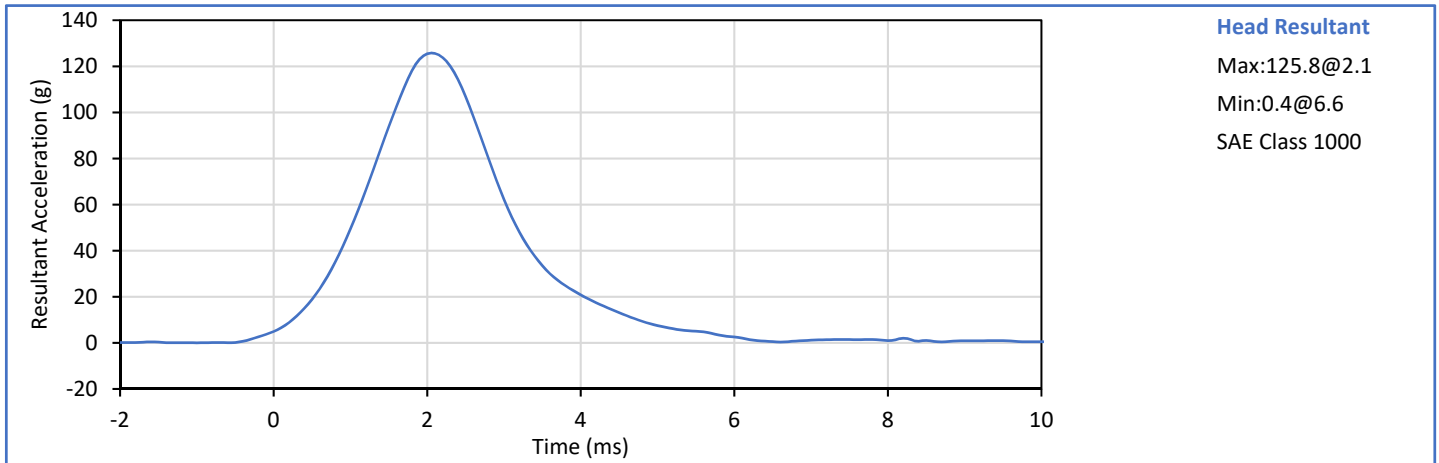
APPENDIX C
POST-TEST ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA
LEFT SIDE CONFIGURATION

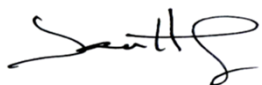
Tested Parameter	Units	Spec Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Relative Humidity	%	10	70	44	Pass
A - Sitting Height	mm	772	788	782	Pass
B - Shoulder Pivot Height	mm	437	453	450	Pass
C - Hpoint Height	mm	79	89	83	Pass
D - H Point From Seatback	mm	141	151	149	Pass
E - Shoulder Pivot From Backline	mm	97	107	105	Pass
F - Thigh Clearance	mm	119	135	126	Pass
G - Head Breadth	mm	140	148	143	Pass
H - Head Back From Backline	mm	40	46	42	Pass
I - Head Depth	mm	178	188	186	Pass
J - Head Circumference	mm	541	551	547	Pass
K - Buttock To Knee Length	mm	514	540	524	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	437	Pass
O - Chest Depth W/O Jacket	mm	195	211	207	Pass
P - Foot Length	mm	216	232	221	Pass
Q - Hip Breadth (W/Pelvic Plugs)	mm	313	323	318	Pass
R - Arm Length	mm	249	259	256	Pass
S - Knee Joint To Seatback	mm	477	493	486	Pass
V - Shoulder Width	mm	341	357	345	Pass
W - Foot Width	mm	78	94	84	Pass
Y - Chest Circumference W/Jacket	mm	851	881	862	Pass
Z - Waist Circumference	mm	761	791	779	Pass
Overall Test Results					Pass


Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

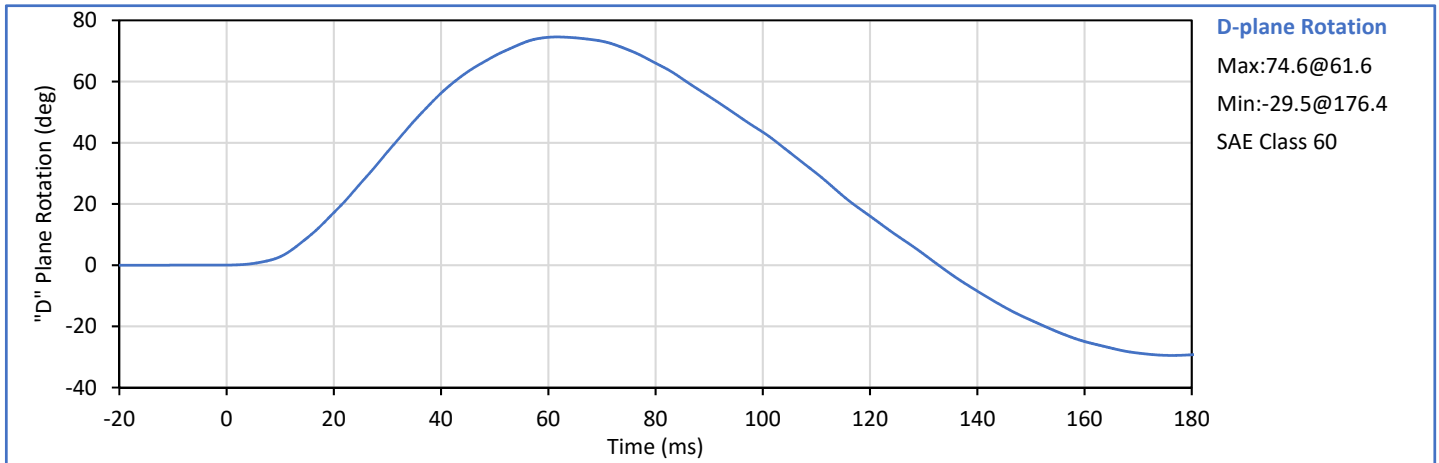
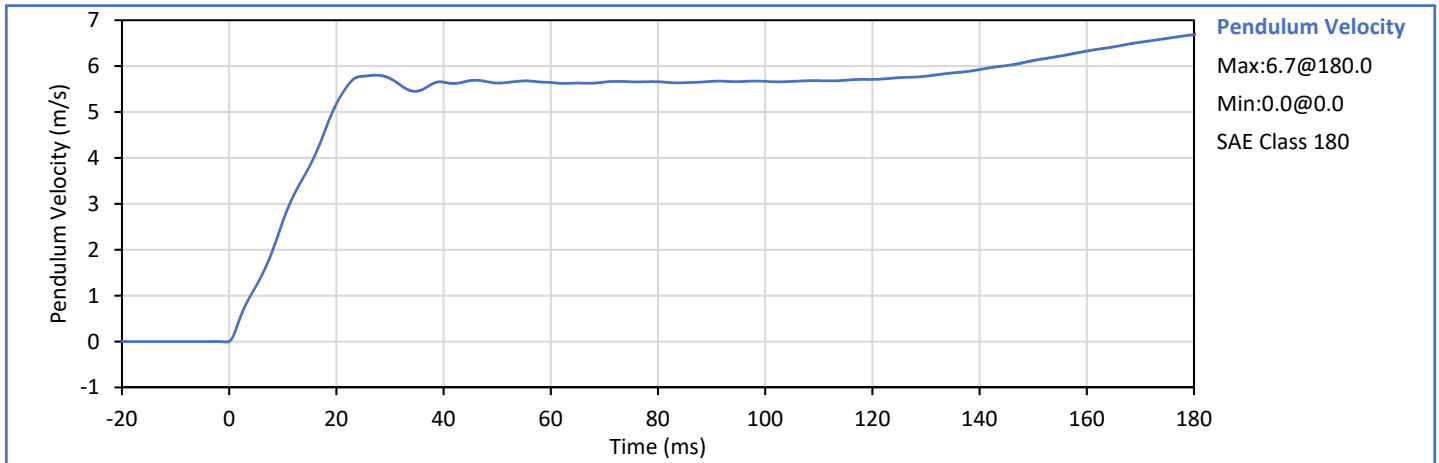
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.2	Pass
Laboratory Humidity	%	10	70	40	Pass
Peak Resultant Acceleration	g	115.0	137.0	125.8	Pass
Peak Head Ax	g	-15.0	15.0	-0.7	Pass
Oscillations After Main Pulse	%	0.0	15.0	1.9	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
Overall Test Results					Pass

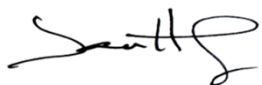



Technician: 
J. Hernandez

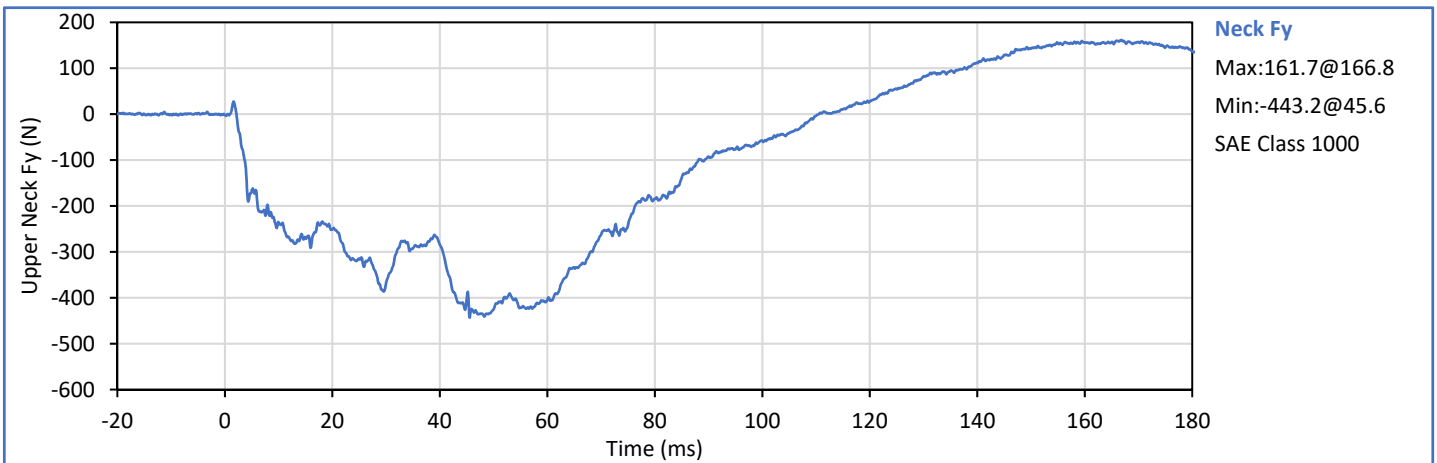
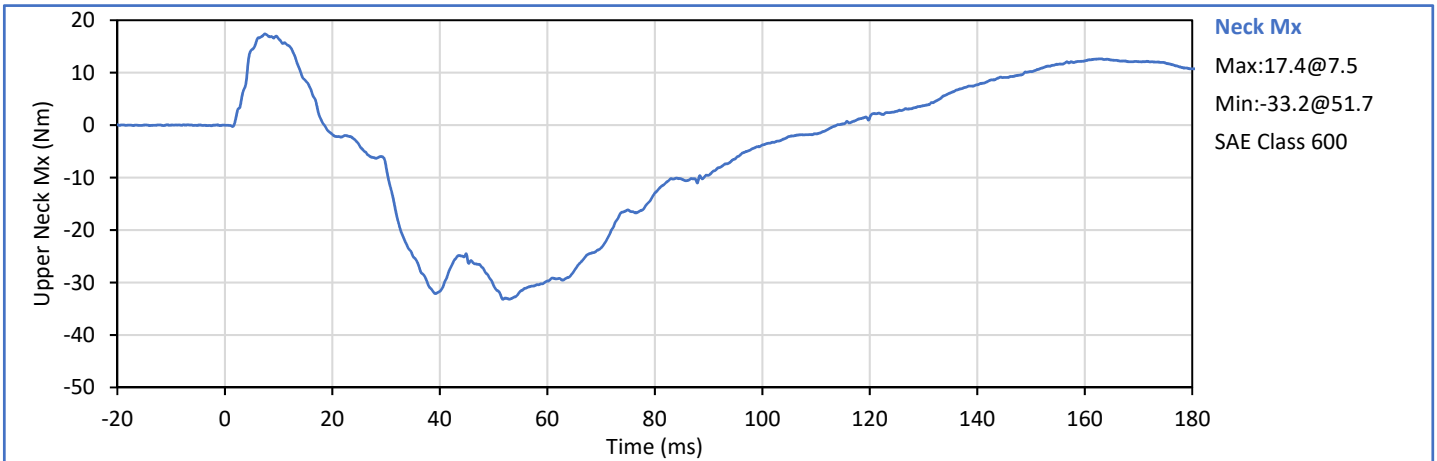
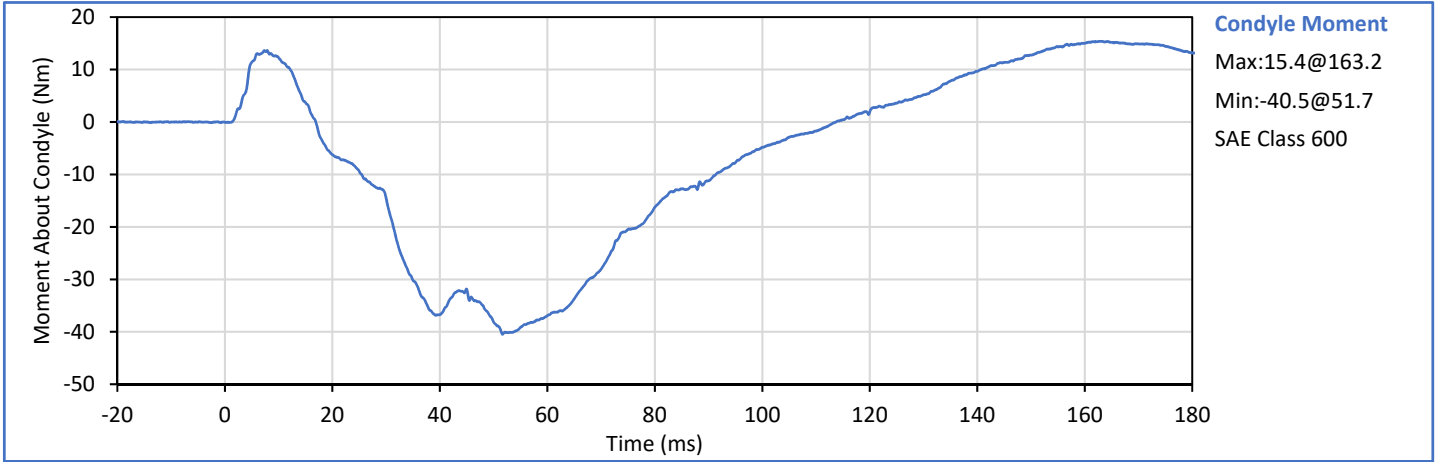
Approved By: 
P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.4	Pass
Laboratory Humidity	%	10	70	34	Pass
Pendulum Velocity	m/s	5.51	5.63	5.52	Pass
Pendulum Decel at 10 ms	m/s	2.20	2.80	2.61	Pass
Pendulum Decel at 15 ms	m/s	3.30	4.10	3.82	Pass
Pendulum Decel at 20 ms	m/s	4.40	5.40	5.18	Pass
Pendulum Decel at 25 ms	m/s	5.40	6.10	5.78	Pass
Pendulum Decel from 25-100 ms	m/s	5.50	6.20	5.80	Pass
Peak "D" Plane Rotation	deg	71.0	81.0	74.6	Pass
Time of Peak "D" Plane Rotation	ms	50.0	70.0	61.6	Pass
Peak Occ. Condyle Moment	Nm	-44.0	-36.0	-40.5	Pass
Time of Moment Decay to 0 Nm	ms	102.0	126.0	113.7	Pass
Overall Test Results					Pass

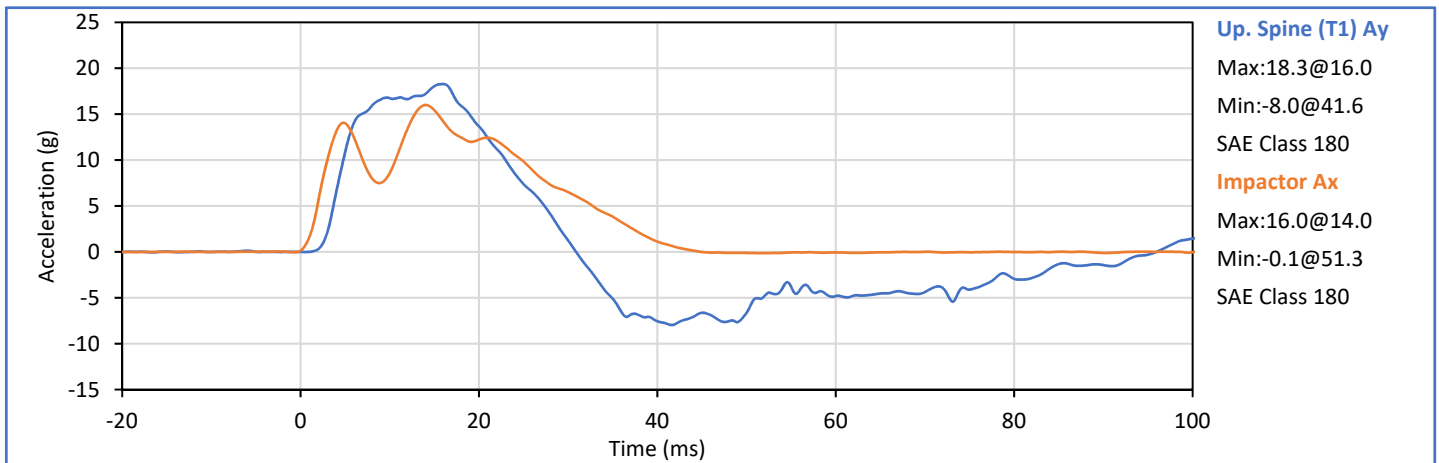
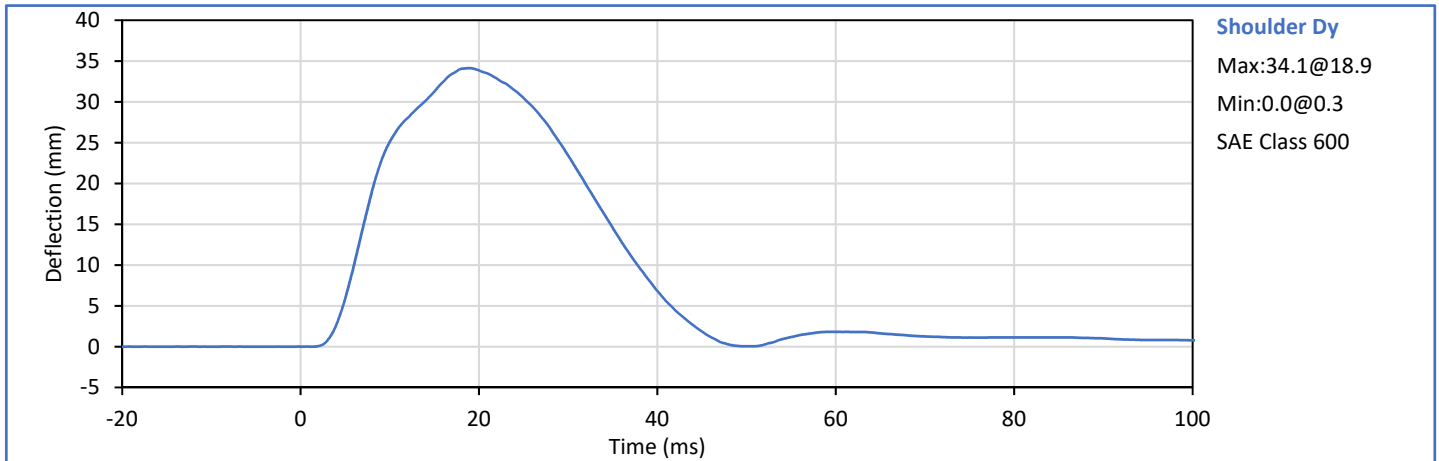


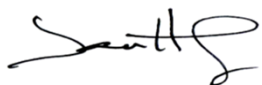
Technician: 
J. Hernandez


Approved By: 
P. Puzzuto



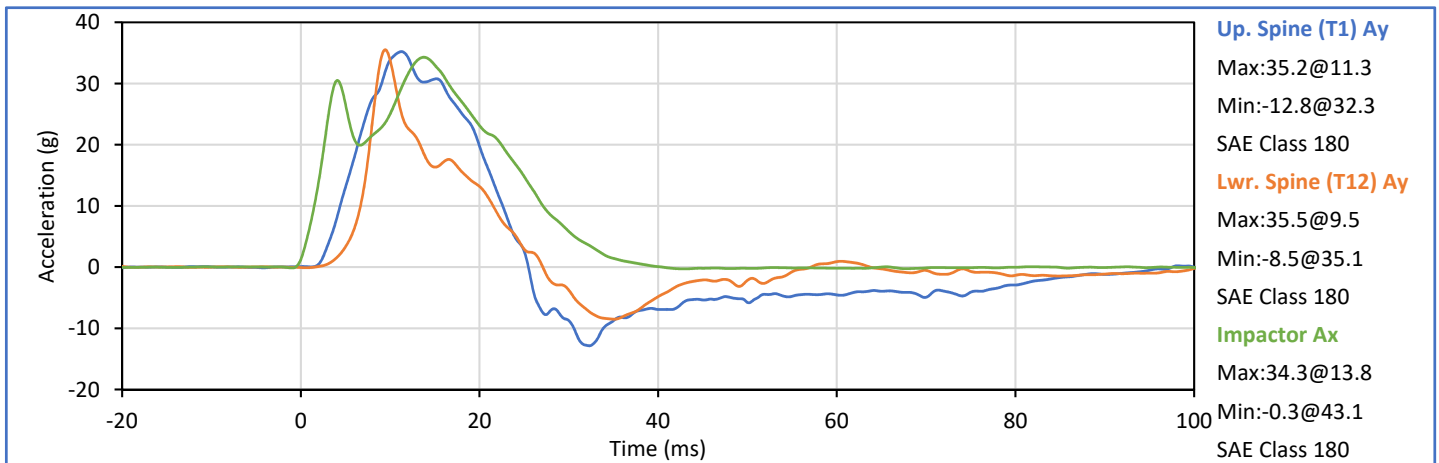
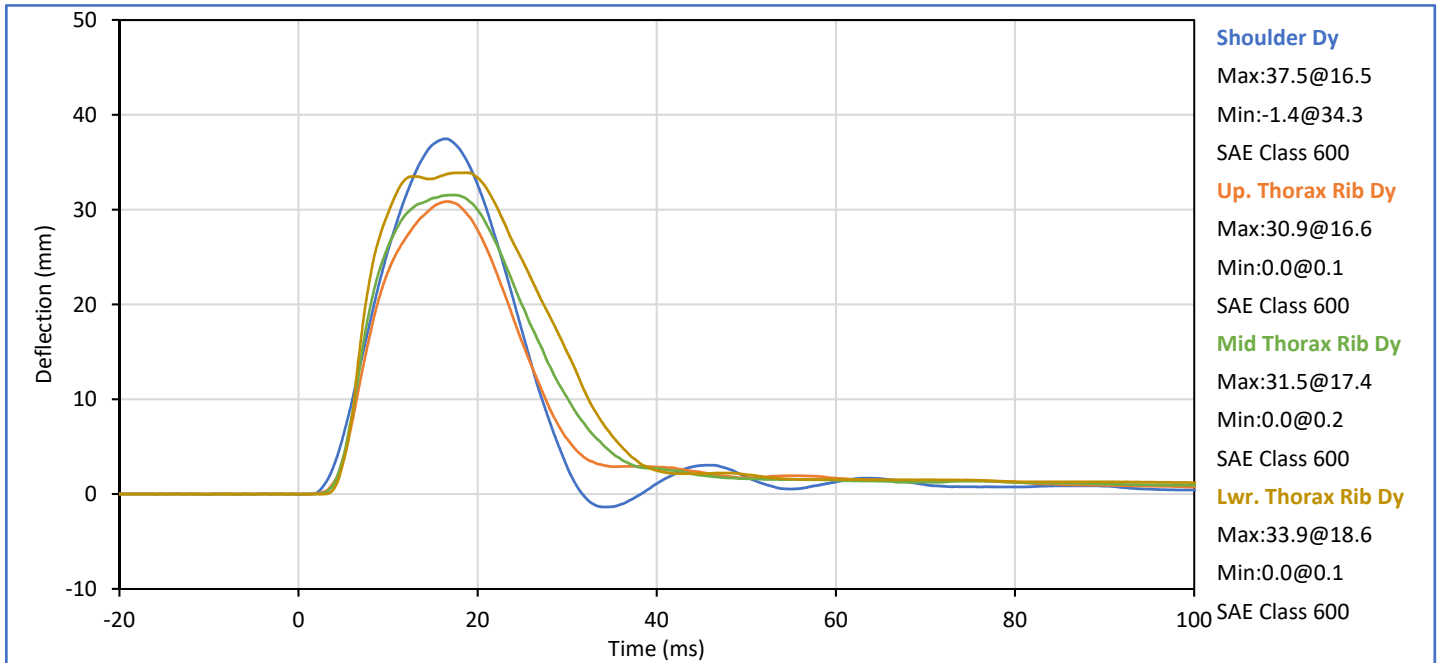
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.7	Pass
Laboratory Humidity	%	10	70	20	Pass
Impactor Velocity	m/s	4.20	4.40	4.28	Pass
Peak Shoulder Dy	mm	28.0	37.0	34.1	Pass
Peak Upper Spine (T1) Ay	g	17.0	22.0	18.3	Pass
Peak Impactor Ax	g	13.0	18.0	16.0	Pass
Overall Test Results					Pass

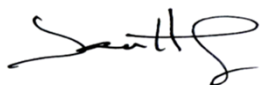



Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

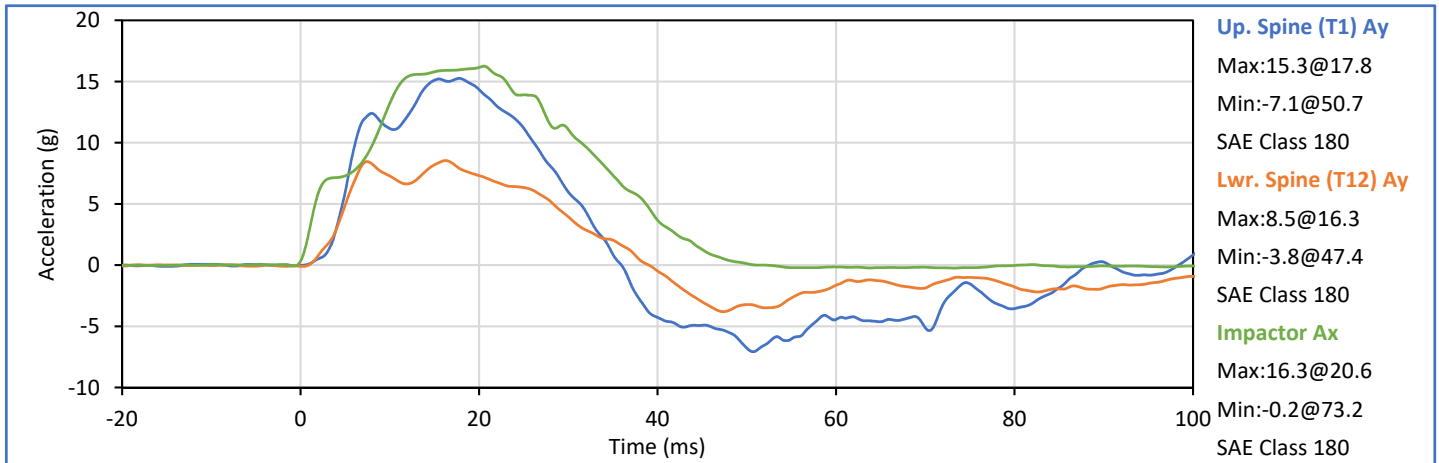
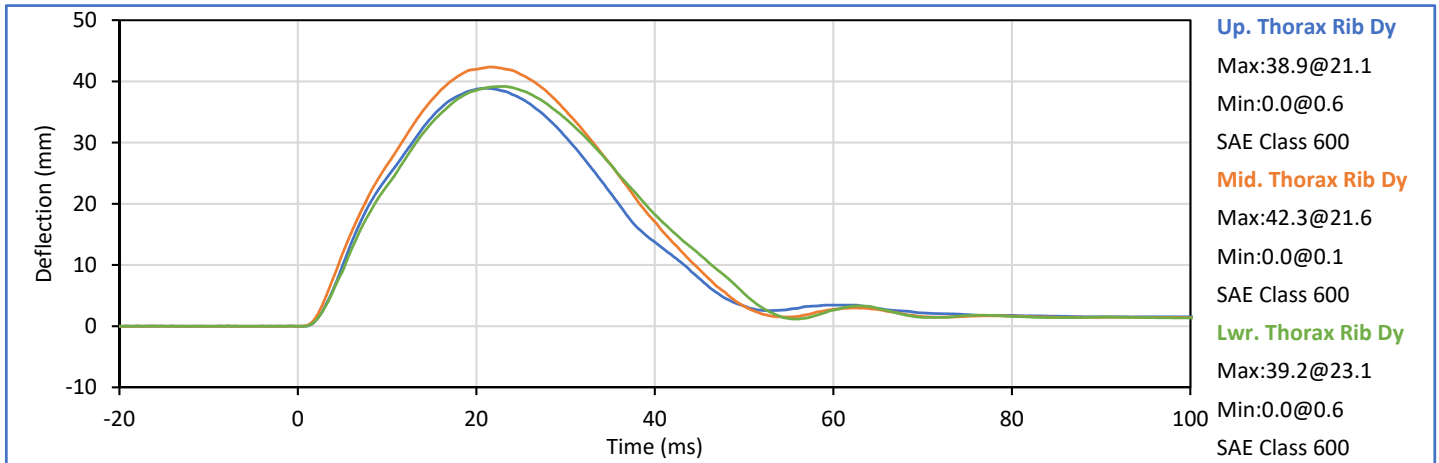
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Humidity	%	10	70	42	Pass
Impactor Velocity	m/s	6.60	6.80	6.64	Pass
Peak Shoulder Dy	mm	31.0	40.0	37.5	Pass
Peak Upper Rib Dy	mm	25.0	32.0	30.9	Pass
Peak Middle Rib Dy	mm	30.0	36.0	31.5	Pass
Peak Lower Rib Dy	mm	32.0	38.0	33.9	Pass
Peak Upper Spine (T1) Ay	g	34.0	43.0	35.2	Pass
Peak Lower Spine (T12) Ay	g	29.0	37.0	35.5	Pass
Peak Impactor Ax	g	30.0	36.0	34.3	Pass
Overall Test Results					Pass

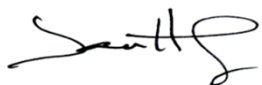



Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

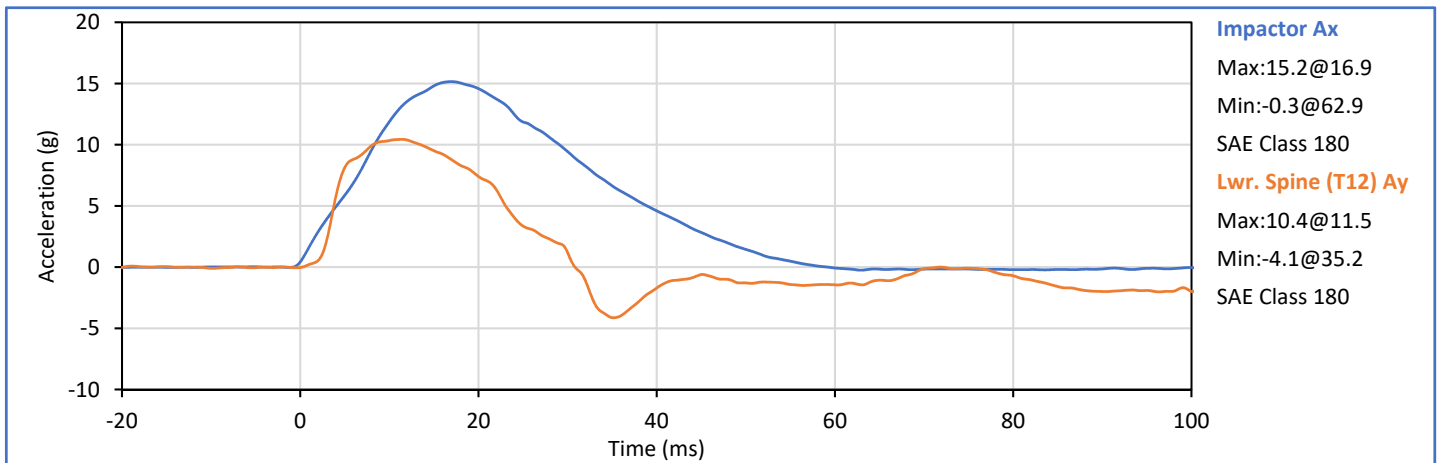
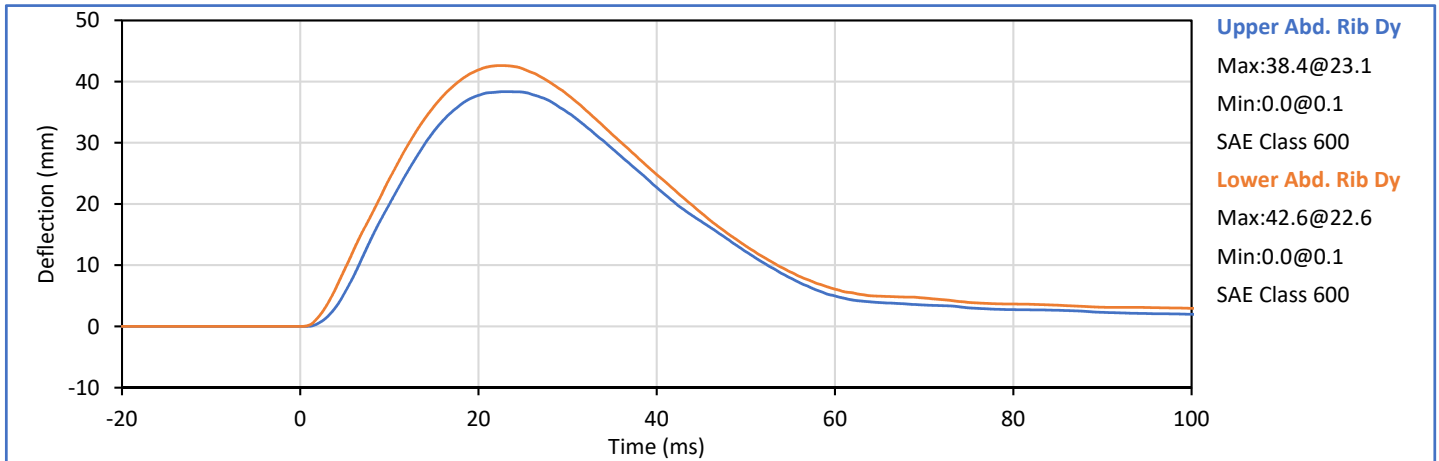
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.7	Pass
Laboratory Humidity	%	10	70	20	Pass
Impactor Velocity	m/s	4.20	4.40	4.27	Pass
Peak Upper Rib Dy	mm	32.0	40.0	38.9	Pass
Peak Middle Rib Dy	mm	39.0	45.0	42.3	Pass
Peak Lower Rib Dy	mm	35.0	43.0	39.2	Pass
Peak Upper Spine (T1) Ay	g	13.0	17.0	15.3	Pass
Peak Lower Spine (T12) Ay	g	7.0	11.0	8.5	Pass
Peak Impactor Ax	g	14.0	18.0	16.3	Pass
Overall Test Results					Pass

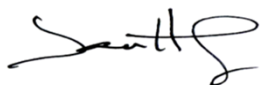



Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.7	Pass
Laboratory Humidity	%	10	70	20	Pass
Impactor Velocity	m/s	4.20	4.40	4.30	Pass
Peak Upper Abdomen Rib Dy	mm	36.0	47.0	38.4	Pass
Peak Lower Abdomen Rib Dy	mm	33.0	44.0	42.6	Pass
Peak Lower Spine T12 Ay	mm	9.0	14.0	10.4	Pass
Peak Impactor Ax	g	12.0	16.0	15.2	Pass
Overall Test Results					Pass

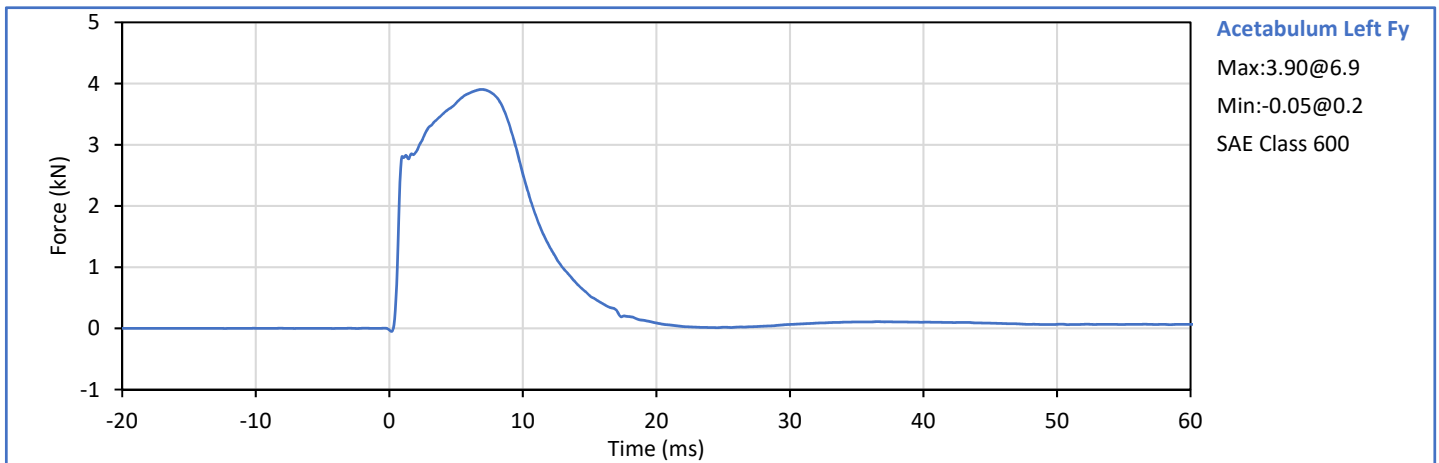
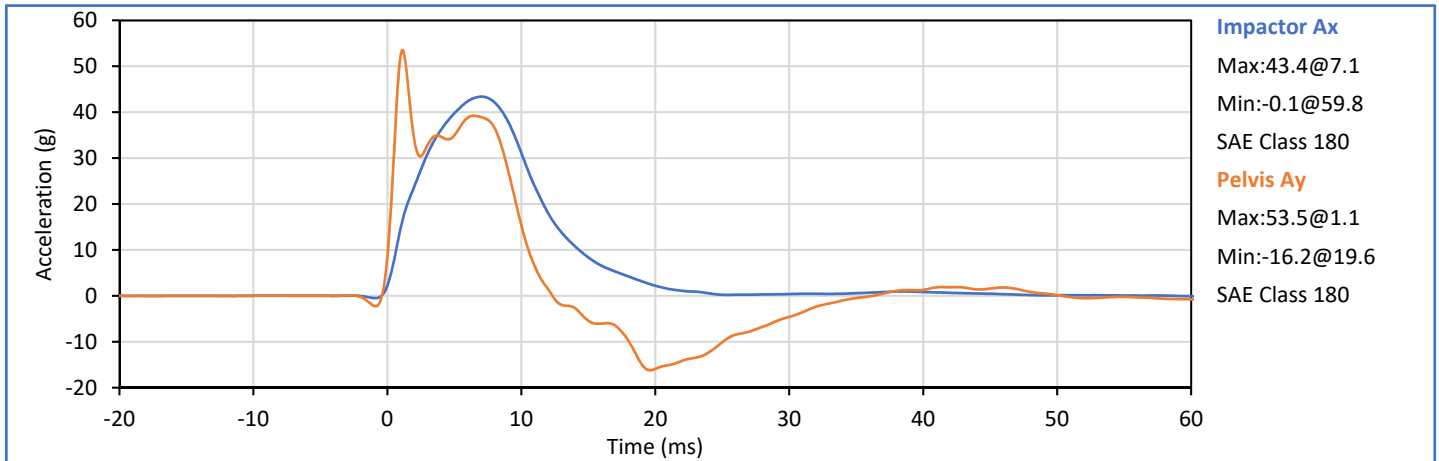


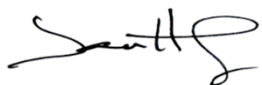
Technician: 
J. Hernandez


Approved By: 
P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Humidity	%	10	70	23	Pass
Impactor Velocity	m/s	6.60	6.80	6.77	Pass
Peak Acetabulum Fy	kN	3.60	4.30	3.90	Pass
Pelvis Ay after 6ms	g	34.0	42.0	39.2	Pass
Peak Impactor Ax	g	38.0	47.0	43.4	Pass
Overall Test Results					Pass

Pelvis Plug S/N: 11464 (SACO)



Technician: 
J. Hernandez

Approved By: 
P. Puzzuto



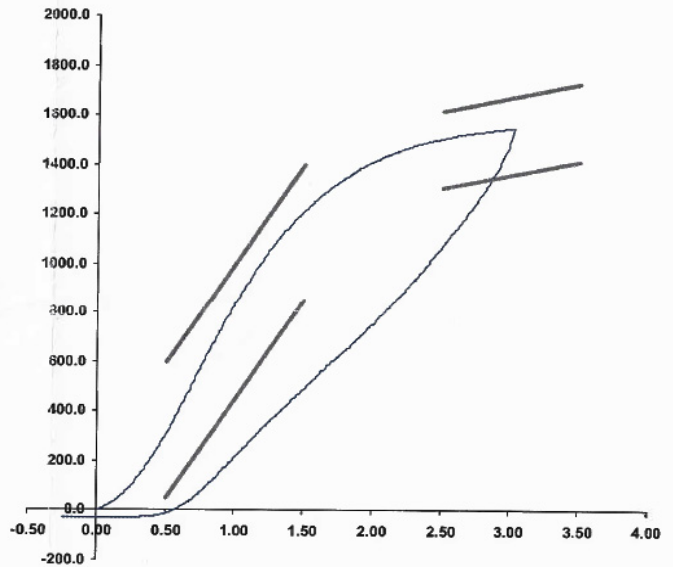
SID-IIs Pelvis Plug Certification Test

Plug S/N 11464
Test Number 2953
Report Number 2950
Test Date 8/30/2016 11:24:57 AM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	318.37	50.00	600.00
Force @ 1.5 mm (N)	1,213.78	850.00	1,400.00
Force @ 2.5 mm (N)	1,506.12	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,546.72	1,361.00	1,673.00

Testing Machine STM-20 5965542
Load Cell S/N (TI240813), Units (LBS) 1000
Crosshead Speed (mm / min) or Rate 12.7
Extension or Position Measured by XHD_100 (XHD100)
Notes:

Force (-N) vs Extension (-mm)



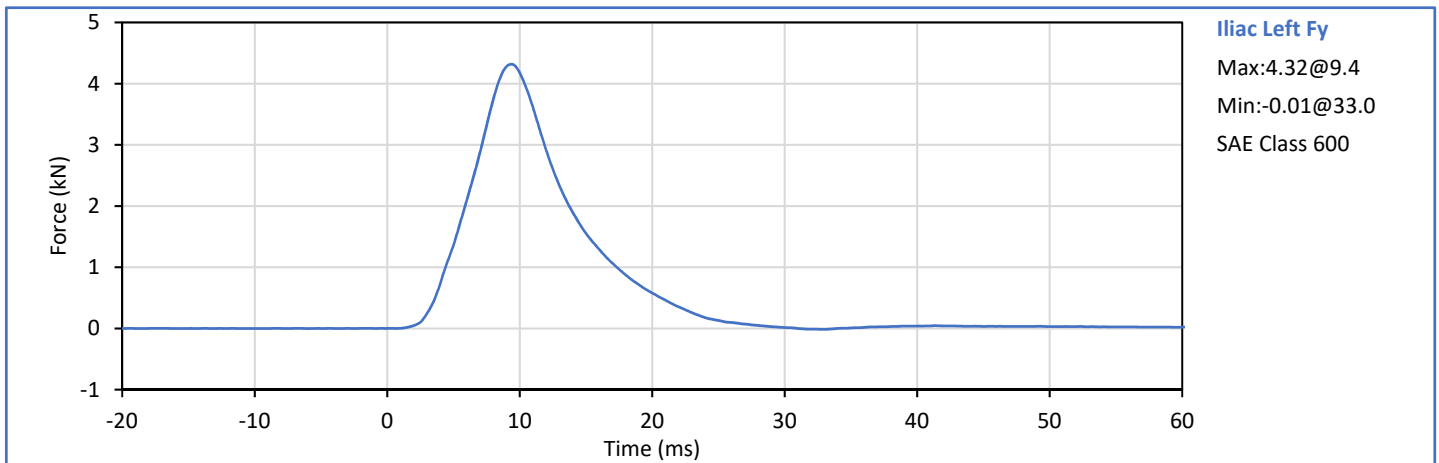
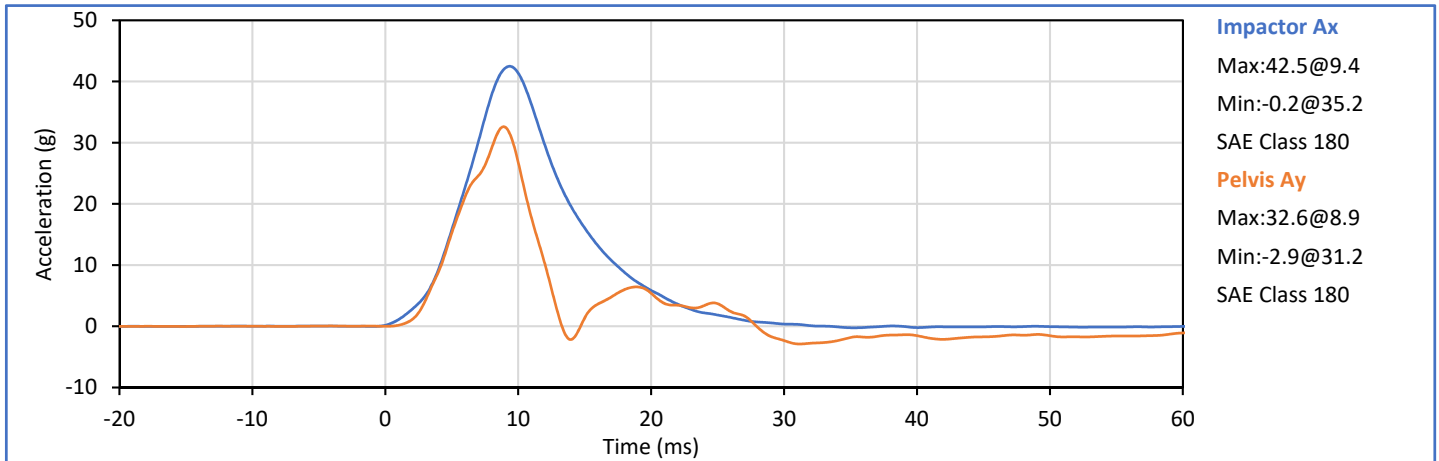
Operator DC
Part Number 180-4450
Template No 107 30-Aug-16
SACO Research

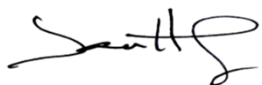
By: DC Date: 8/30/16


Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.7	Pass
Laboratory Humidity	%	10	70	20	Pass
Impactor Velocity	m/s	4.20	4.40	4.31	Pass
Peak Iliac Fy	kN	4.10	5.10	4.32	Pass
Pelvis Ay after 6ms	g	28.0	39.0	32.6	Pass
Peak Impactor Ax	g	36.0	45.0	42.5	Pass
Overall Test Results					Pass

Pelvis Plug S/N: 12228 (SACO) *

* Plug is not impacted and remains certified



Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Position: Driver
 ATD Type: SID-IIs
 ATD S/N: 299

Table 1a - Driver ATD Instrumentation

Sensor Location	Sensor S\N	Mfr	Model	Cal Due
Head Acceleration X Primary	P51929	Endevco	7264C-2k	2019-08-08
Head Acceleration Y Primary	P50086	Endevco	7264C-2k	2019-08-08
Head Acceleration Z Primary	P51931	Endevco	7264C-2k	2019-08-08
Head Acceleration X Redundant	P68604	Endevco	7264C-2k	2019-08-08
Head Acceleration Y Redundant	P51934	Endevco	7264C-2k	2019-08-08
Head Acceleration Z Redundant	P58736	Endevco	7264C-2k	2019-08-08
Upper Thorax Rib Deflection Y	1143	Servo	08TCI-3725	2019-08-15
Middle Thorax Rib Deflection Y	1160	Servo	08TCI-3725	2019-08-15
Lower Thorax Rib Deflection Y	1213	Servo	08TCI-3725	2019-08-15
Upper Abdomen Rib Deflection Y	1218	Servo	08TCI-3725	2019-08-15
Lower Abdomen Rib Deflection Y	1177	Servo	08TCI-3725	2019-08-15
Lower Spine T12 Acceleration X	04I20-Z04	Entran	EGEB6Q-2k	2019-08-16
Lower Spine T12 Acceleration Y	06A07-R08	Entran	EGEB6Q-2k	2019-08-16
Lower Spine T12 Acceleration Z	P58795	Endevco	7264C-2k	2019-08-16
Iliac Wing Impact Side Force Y	289 Fy (Iliac)	R.A. Denton	3228J	2019-10-11
Acetabulum Impact Side Force Y	277 Fy (Acetabulum)	R.A. Denton	3249J	2019-10-11

Table 1b - Driver ATD Optional Instrumentation (Research Data Only)

Sensor Location	Sensor S\N	Mfr	Model	Cal Due
Head Rotation Rate X	ARS7571	DTS	ARS PRO-8k (2000Hz)	2018-06-09
Head Rotation Rate Y	ARS7316	DTS	ARS PRO-8k (2000Hz)	2018-06-09
Head Rotation Rate Z	ARS7330	DTS	ARS PRO-8k (2000Hz)	2018-06-09

Table 2 - Vehicle Instrumentation

Sensor Location	Sensor S\N	Mfr	Model	Cal Due
Vehicle CG Ax	A264073	MSI	52F-2000	2019-07-11
Vehicle CG Ay	A265905	MSI	52F-2000	2019-07-06
Vehicle CG Az	A264816	MSI	52F-2000	2019-07-11
Left Floor Sill Ay	A254858	MSI	52F-2000	2019-06-18
A-Pillar Sill Ay	10380	Endevco	757F-2k	2019-09-04
A-Pillar Low Ay	10371	Endevco	757F-2k	2019-09-05
A-Pillar Mid Ay	10370	Endevco	757F-2k	2019-09-05
B-Pillar Sill Ay	10418	Endevco	757F-2k	2019-09-04
B-Pillar Low Ay	10437	Endevco	757F-2k	2019-09-04
B-Pillar Mid Ay	10427	Endevco	757F-2k	2019-09-05
Driver Seat Track at H-Point Ay	10117	Endevco	757F-2k	2020-01-29
Engine Top Ax	10100	Endevco	757F-2k	2020-01-28
Engine Top Ay	10113	Endevco	757F-2k	2020-01-29
Firewall Ay	10252	Endevco	757F-2k	2020-01-29
Right Roof Ay	10425	Endevco	757F-2k	2019-09-05
Right Floor Sill Ay	A248840	MSI	52F-2000	2019-09-15
Rear Floorpan Ax	A248845	MSI	52F-2000	2019-10-01
Rear Floorpan Ay	A248860	MSI	52F-2000	2019-09-15

Table 3 - Rigid Pole Instrumentation

Sensor Location	Sensor S\N	Mfr	Model	Cal Due
Load Cell Pole Barrier #1 Force Y	131822A	Interface	1220-FS	2019-05-02
Load Cell Pole Barrier #2 Force Y	132304A	Interface	1220-FS	2019-05-02
Load Cell Pole Barrier #3 Force Y	19477	Interface	1220-FS	2019-05-02
Load Cell Pole Barrier #4 Force Y	19325	Interface	1220-FS	2019-05-02
Load Cell Pole Barrier #5 Force Y	131827A	Interface	1220-FS	2019-05-02
Load Cell Pole Barrier #6 Force Y	132302A	Interface	1220-FS	2019-05-02
Load Cell Pole Barrier #7 Force Y	19267	Interface	1220-FS	2019-05-02
Load Cell Pole Barrier #8 Force Y	19321	Interface	1220-FS	2019-05-02