

REPORT NUMBER: SINCAP-KAR-20-013

**NEW CAR ASSESSMENT PROGRAM (NCAP)
MOVING DEFORMABLE BARRIER SIDE IMPACT TEST**

**VOLVO CAR CORPORATION
2020 VOLVO XC60 T5 5-DOOR MPV**

NHTSA No: M20205905

**PREPARED BY:
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FEBRUARY 5, 2020


FINAL REPORT

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U.S. DEPARTMENT OF TRANSPORTATION
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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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16. Abstract <p>A 55 / 28 km/h 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2020 Volvo XC60 T5 5-door MPV in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for the generation of consumer information on vehicle side crash protection. The test was conducted at the Applus IDIADA KARCO Engineering, LLC. facility in Adelanto, California on January 22, 2020.</p> <p>The impact velocity of the Moving Deformable Barrier was 62.13 km/h and the outside ambient temperature at the struck (driver's) side of the vehicle was 15.6°C. The target vehicle's maximum post-test static crush was 194 mm located at level 2. The test vehicle's occupant performance data is as follows:</p> <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th colspan="3">Driver ATD (ES-2re)</th> </tr> <tr> <th>Units</th> <th>IARV</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td></td> <td>1000</td> <td>72.5</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>44</td> <td>17</td> </tr> <tr> <td>Total Abdominal Force</td> <td>N</td> <td>2500</td> <td>560</td> </tr> <tr> <td>Pubic Symphysis Force</td> <td>N</td> <td>6000</td> <td>846</td> </tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th colspan="3">Passenger ATD (SID-IIs)</th> </tr> <tr> <th>Units</th> <th>IARV</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td></td> <td>1000</td> <td>185.1</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td>g</td> <td>82</td> <td>45</td> </tr> <tr> <td>Total Pelvic Force (Sum of Acetubular and Iliac Forces)</td> <td>N</td> <td>5525</td> <td>4032</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38*</td> <td>6</td> </tr> <tr> <td>Maximum Abdominal Rib Deflection</td> <td>mm</td> <td>45*</td> <td>9</td> </tr> </tbody> </table> <p>Both the left front driver and left rear passenger doors were jammed shut. The doors on the struck side of the vehicle did not separate from the body at the hinges or latches. The opposite side doors did not open during the side impact event.</p>				Measurement Description	Driver ATD (ES-2re)			Units	IARV	Result	Head Injury Criteria (HIC ₃₆)		1000	72.5	Maximum Thoracic Rib Deflection	mm	44	17	Total Abdominal Force	N	2500	560	Pubic Symphysis Force	N	6000	846	Measurement Description	Passenger ATD (SID-IIs)			Units	IARV	Result	Head Injury Criteria (HIC ₃₆)		1000	185.1	Resultant Lower Spine Acceleration	g	82	45	Total Pelvic Force (Sum of Acetubular and Iliac Forces)	N	5525	4032	Maximum Thoracic Rib Deflection	mm	38*	6	Maximum Abdominal Rib Deflection	mm	45*	9
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New Car Assessment Program (NCAP) Side Impact Moving Deformable Barrier (MDB) ES-2re SID-IIs		Copies of this report are available from: National Highway Traffic Safety Admin. Technical Reference Division 1200 New Jersey Ave., SE Room W43-410 Washington, DC 20590																																																			
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* Proposed IARV

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SECTION 1
TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test is part of the MY 2020 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract number DTNH22-14-D-00355L. The purpose of this test is to generate comparative side impact performance in a 2020 Volvo XC60 T5 5-door MPV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated October 2015.

SECTION 2

SUMMARY OF TEST RESULTS

A 2020 Volvo XC60 T5 5-door MPV was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 62.13 km/h (38.61 mph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by Applus IDIADA KARCO Engineering, LLC. in Adelanto, California, on January 22, 2020. Pre- and post-test photographs of the test vehicle, the MDB and the dummy (ES-2re and SID-IIs) are included in Appendix A of this report.

The dummies were placed in the driver and left rear designated seating position according to instructions specified in the OCWS Side Impact Laboratory Test Procedure, dated October 2015. The side impact event was documented by 10 cameras. Camera locations are included in Data Sheet No. 5 of this report.

The dummies were instrumented in the following manner:

DRIVER ATD (ES-2re)

Primary and redundant head CG tri-axial accelerometers

Chest upper rib, middle rib and lower rib y-axis displacement potentiometers

Abdomen forward, middle, and rear y-axis load cells

Lower spine (12) tri-axial accelerometers

Pubic symphysis y-axis load cell

PASSENGER ATD (SID-IIs)

Primary and redundant head CG tri-axial accelerometers

Chest upper rib, middle rib and lower rib y-axis displacement potentiometers

Abdomen upper rib and lower rib y-axis displacement potentiometers

Lower spine (12) tri-axial accelerometers

Acetabulum and iliac wing y-axis load cells

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 of this report contains the test equipment and instrumentation calibration data.

Dummy injury readings were recorded as follows:

Measurement Description	Units	Driver ATD (ES-2re)	
		Threshold	Result
Head Injury Criteria (HIC ₃₆)		1000	72.5
Maximum Thoracic Rib Deflection	mm	44	17
Combined Abdominal Force	N	2500	560
Pubic Symphysis Force	N	6000	846

Measurement Description	Units	Passenger ATD (SID-IIs)	
		Threshold	Result
Head Injury Criteria (HIC ₃₆)		1000	185.1
Lower Spine (T12) Resultant Acceleration	g	82	45
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	4032
Maximum Thoracic Rib Deflection	mm	38*	6
Maximum Abdominal Rib Deflection	mm	45*	9

*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	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes

GENERAL COMMENTS

The doors on the struck side of the vehicle remained closed and latched. There was no separation at the hinges or latches. The doors on the non-struck side remained closed and latched. There was no ATD value that exceeded its limit. Left Rear Sill Acceleration Y channel failed at 10.2 milliseconds, Left Mid A-Post Acceleration Y channel failed at 10.4 milliseconds, Left Mid B-Post Acceleration Y channel failed at 10.7 milliseconds, Floorpan at Rear Axle Acceleration X channel failed at 32.3 milliseconds, Floorpan at Rear Axle Acceleration Y channel failed at 32.3 milliseconds, and Floorpan at Rear Axle Acceleration Z channel failed at 31.2 milliseconds. The Left Lower A-Post Acceleration Y channel failed and no data was collected.

SECTION 3

OCCUPANT AND VEHICLE INFORMATION/DATA SHEETS

Test Vehicle: 2020 Volvo XC60 T5 5-Door MPV NHTSA No. M20205905
Test Program: NCAP MDB Side Impact Test Test Date: 01/22/20

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: 2020 Volvo XC60 T5 5-Door MPV NHTSA No. M20205905
 Test Program: NCAP MDB Side Impact Test Test Date: 01/22/20

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	M20205905
Model Year	2020
Make	Volvo
Model	XC60 T5
Body Style	5-Door MPV
VIN	YV4102DK1L1458735
Body Color	Denim Blue Metallic
Odometer Reading (km / mi)	32 / 20
Engine Displacement (L)	2.0
Type / No. of Cylinders	Inline 4
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	8
Overdrive	Yes
Final Drive	FWD
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	Yes
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	No

Does Owner's Manual provide instructions to turn off automatic door locks? No

DATA FROM CERTIFICATION LABEL

Manufactured By	Volvo Car Corporation
Date of Manufacture	Aug-19
Vehicle Type	MPV

GVWR (kg)	2370
GAWR Front (kg)	1188
GAWR Rear (kg)	1220

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total
Designated Seating Capacity	2	3		5
Capacity Weight (VCW) (kg)				430.0
DSC x 68.04 (kg)				340.2
Cargo Weight (RCLW) (kg)				89.8

A
B
A-B

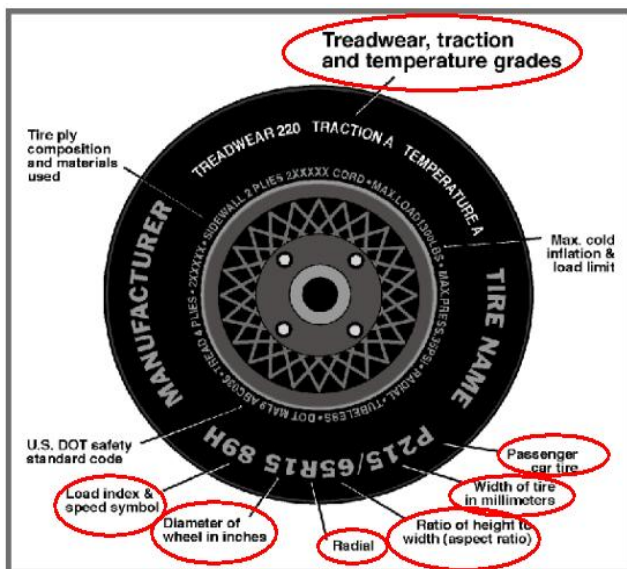
VEHICLE SEAT TYPE

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: 2020 Volvo XC60 T5 5-Door MPV NHTSA No. M20205905
 Test Program: NCAP MDB Side Impact Test Test Date: 01/22/20



Measured Parameter	Front	Rear
Max. Tire Pressure (kpa)	340	340
Cold Pressure (kPa)	240	240
Recommended Tire Size	235/55 R19	235/55 R19
Tire Size on Vehicle	235/55 R19	235/55 R19
Tire Manufacturer	Pirelli	Pirelli
Tire Model	Scorpion Zero	Scorpion Zero
Treadware	500	500
Traction Grade	A	A
Temperature Grade	A	A
Tire Plies Sidewall	2 Rayon	2 Rayon
Tire Plies Body	2 Rayon, 2 Steel, 1 Polyamide	2 Rayon, 2 Steel, 1 Polyamide
Load Index/Speed Symbol	105V	105V
Tire Material	Rayon, Steel, Polyamide	Rayon, Steel, Polyamide
DOT Safety Code Left	XB08 031B 2019	XB08 031B 2019
DOT Safety Code Right	XB08 031B 2019	XB08 031B 2019

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2020 Volvo XC60 T5 5-Door MPV NHTSA No. M20205905
 Test Program: NCAP MDB Side Impact Test Test Date: 01/22/20

TIRE PRESSURES

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

MDB TIRE SPECIFICATIONS

	Units	Requirement	LF	RF	LR	RR
Tire Size		P205/60R16	P205/60R16	P205/60R16	P205/60R16	P205/60R16
Tire Pressure	kPa	230 ± 21	230	230	230	230

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UWV)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	493.0	403.0		516.5	523.5		515.5	506.0	
Right	kg	513.5	398.5		509.5	466.5		522.0	479.0	
Ratio	%	55.7%	44.3%	100.0%	50.9%	49.1%	100.0%	51.3%	48.7%	100.0%
Total	kg	1006.5	801.5	1808.0	1026.0	990.0	2016.0	1037.5	985.0	2022.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UWV)	kg	1808.0	A
Actual Weight of 2 P572 ATD Used	kg	125.0	B
Rated Cargo/Luggage Wt (RCLW)	kg	89.8	C
Calculated Vehicle Target Wt (TVTW)	kg	2022.8	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	Fully Loaded	As Tested	Meets Requirement***
LF	mm	816	810	Yes
RF	mm	820	815	Yes
LR	mm	803	812	Yes
RR	mm	820	826	Yes
Vehicle CG (Aft of Front Axle)	mm	1389	1401	
Vehicle CG (Left (+)/Right (-) from Longitudinal Centerline)	mm	8	26	

***The "As Tested" vehicle attitude measurements must be equal to or within ±10 mm of the "Fully Loaded" vehicle attitude measurements at each wheel well. Indicate "Yes" or "No" for "Meets Requirement"

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2020 Volvo XC60 T5 5-Door MPV NHTSA No. M20205905
Test Program: NCAP MDB Side Impact Test Test Date: 01/22/20

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Spare Tire and Tools	18.0
Trim	2.0
Ballast / Equipment Added	103.0

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

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

Test Vehicle: 2020 Volvo XC60 T5 5-Door MPV NHTSA No. M20205905
 Test Program: NCAP MDB Side Impact Test Test Date: 01/22/20

SEAT POSITIONING

The driver's seat, front center seat (if applicable), and right front passenger's seat should be set to the mid-track, lowest, mid-angle position. The struck side rear passenger's seat, rear center seat, and non-struck side rear passenger's seats should be set to the rearmost, lowest, mid-angle position.

SCRL ANGLE RANGE

Seat	SCRL (°)		
	Max	Min	Mid
Driver Seat	9.6	0.0	4.8
Front Passenger Seat	7.9	0.0	4.0
Front Center Seat			
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid Fore/Aft	Forwardmost
Driver Seat	4.8	229	Max	260	263	270
			Mid	240	246	252
			Min	219	229	234
Front Passenger Seat	4.0	230	Max	260	260	272
			Mid	242	245	254
			Min	223	230	235
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: 2020 Volvo XC60 T5 5-Door MPV NHTSA No. M20205905
 Test Program: NCAP MDB Side Impact Test Test Date: 01/22/20

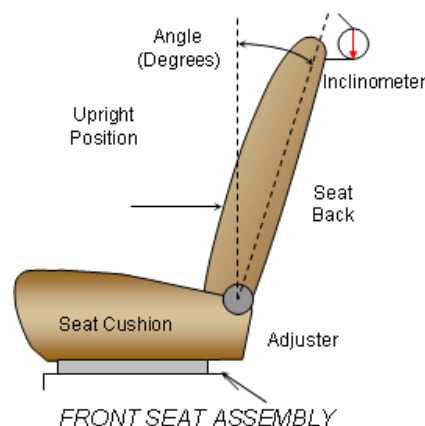
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position From Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	265		133	
Front Passenger Seat	265		133	
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 to the manufacturer's designated design angle. The right front passenger's seat back is positioned in a similar manner as the driver's seat back. The struck side rear seat back is fixed. The rear center and non-struck side rear outboard seat backs are positioned in a similar manner as the struck side rear seat back. Seat back angle is measured using the outboard head restraint post.



SEAT BACK POSITION

Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degree	Detent*
Driver Seat w/ Seated Dummy	70.7		22.0	
Front Passenger Seat	69.8		22.0	
Front Center Seat				
Struck Side Rear Seat w/Seated Dummy	Fixed		Fixed	
Non-Struck Side Rear Seat	Fixed		Fixed	
Rear Center Seat	Fixed		Fixed	

*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: 2020 Volvo XC60 T5 5-Door MPV NHTSA No. M20205905
 Test Program: NCAP MDB Side Impact Test Test Date: 01/22/20

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	4	H
Rear Seat	Fixed	Fixed

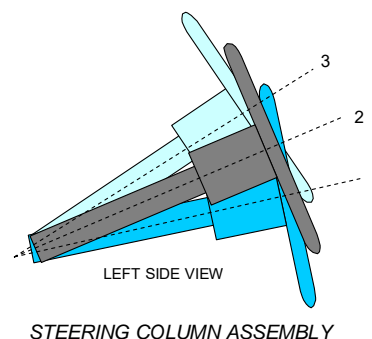
HEAD RESTRAINT ADJUSTMENT

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

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

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	21.9	85
Geometric Center - Position 2	24.7	110
Uppermost - Position 3	27.4	135
Telescoping Steering Wheel Travel		50
Test Position	24.7	110

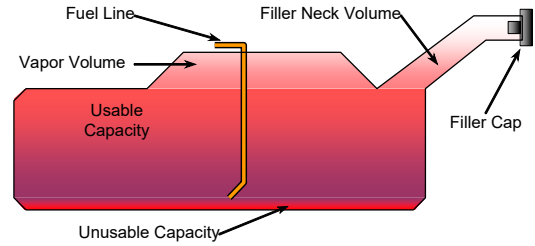
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SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT, AND FUEL SYSTEM DATA

Test Vehicle: 2020 Volvo XC60 T5 5-Door MPV NHTSA No. M20205905
 Test Program: NCAP MDB Side Impact Test Test Date: 01/22/20

FUEL PUMP

The fuel pump operates a few seconds after the ignition switch is turned to the ON position after that the pump operates only when the engine is running.



VEHICLE FUEL TANK ASSEMBLY

FUEL TANK CAPACITY

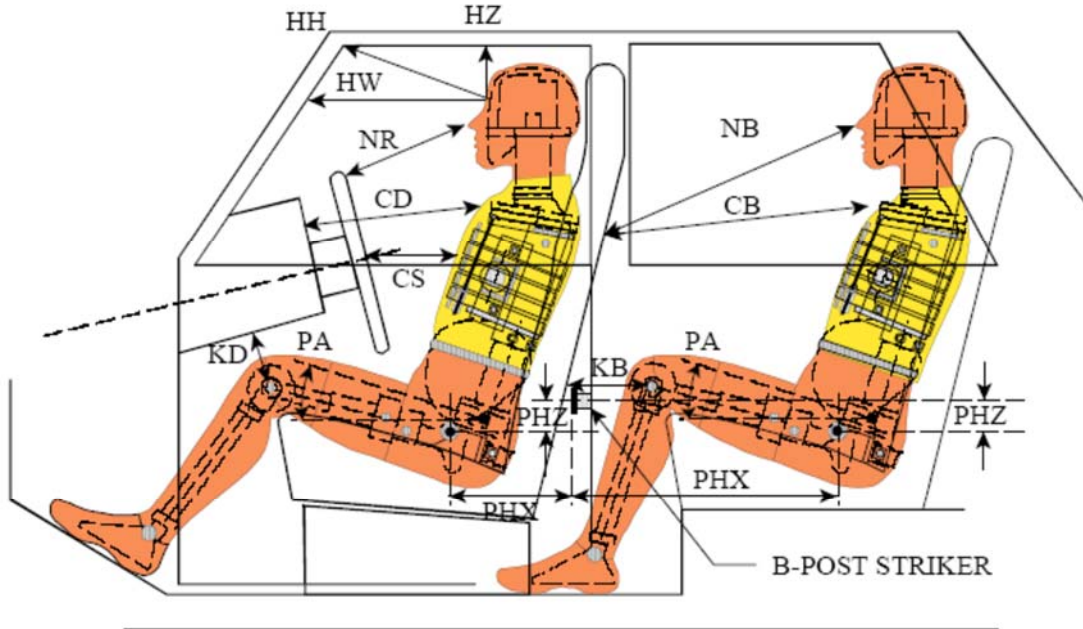
Description	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	70.02
Usable Capacity of "Optional Tank" (see Form No. 1)	
Usable Capacity of "Standard Tank" (see Owner's Manual)	70.02
Usable Capacity of "Optional Tank" (see Owner's Manual)	
93% of Usable Capacity	65.12
Actual amount of Solvent Used in Test	65.10
1/3 of Usable Capacity	23.34

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: 2020 Volvo XC60 T5 5-Door MPV NHTSA No. M20205905
 Test Program: NCAP MDB Side Impact Test Test Date: 01/22/20



LEFT SIDE VIEW

NOTE: 2-DOOR VEHICLE SHOWN.
 REAR DUMMY PHX & PHZ
 MEASUREMENTS FOR A 4-DOOR
 VEHICLE WOULD USE THE C-POST
 STRIKER AS A REFERENCE POINT

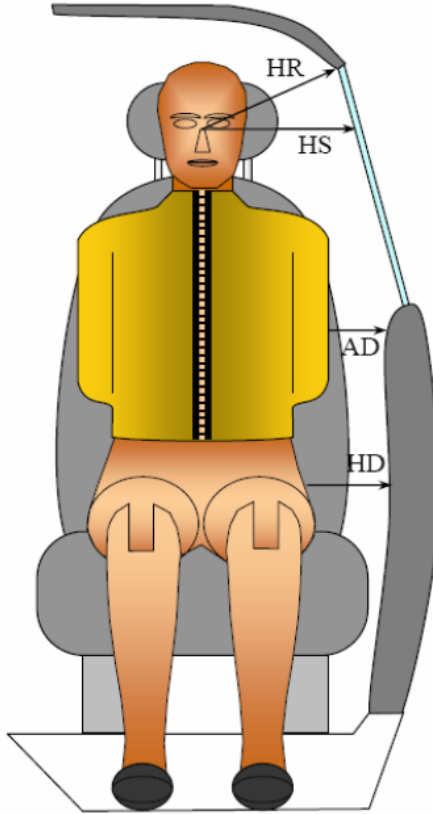
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Description	Driver		Passenger	
			Length (mm)	Angle (°)	Length (mm)	Angle (°)
HH		Head to Header	315			
HW		Head to Windshield	633			
HZ	HZ	Head to Roof	166		354	
NR	NB	Nose to Rim/Seat Back	495		526	
CD	CB	Chest to Dash/Seat Back	608		498	
CS		Chest to Steering Wheel	392			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	217	26.4	268	16.7
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	164	21.1	278	15.2
PAX°	PAX°	Pelvic Tilt Angle X		18.2		22.4
	PAY°	Pelvic Tilt Angle Y		0.2		0.1
PHX	PHX	Hip Point to Striker (x-axis)	141		177	
PHZ	PHZ	Hip Point to Striker (z-axis)	127		244	

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2020 Volvo XC60 T5 5-Door MPV NHTSA No. M20205905
Test Program: NCAP MDB Side Impact Test Test Date: 01/22/20



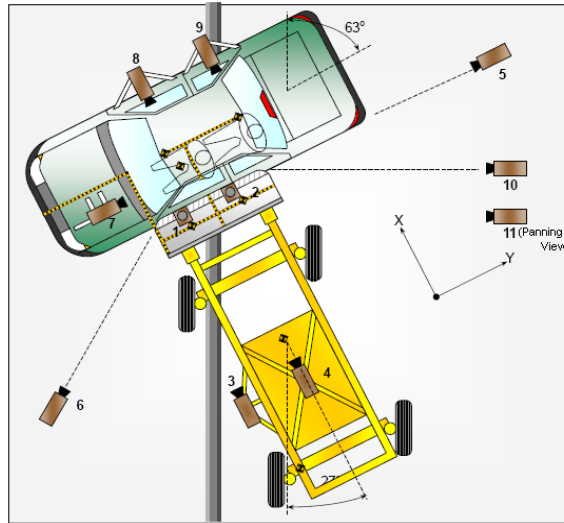
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver	Passenger
HR	Head to Side Header	mm	185	280
HS	Head to Side Window	mm	377	390
AD	Arm to Door	mm	86	144
HD	H-Point to Door	mm	187	215

DATA SHEET NO. 5

CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2020 Volvo XC60 T5 5-Door MPV NHTSA No. M20205905
 Test Program: NCAP MDB Side Impact Test Test Date: 01/22/20



CAMERA LOCATIONS AND DATA

No.	View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	1220	2287	-5486	14	1000
2	Overhead Close-Up	609	2287	-5102	35	1000
3	Left Impact Point (MDB)	-2134	0	-1143	25	1000
4	Side Overall (MDB)	-3912	838	-1829	12.5	1000
5	Rear	-64	2485	-1348	85	1000
6	Left Front	-2266	-3564	-1475	24	1000
7	Driver Front (On-Board)	497	49	654	6	1000
8	Driver Side (On-Board)	1744	627	420	6	1000
9	Passenger Side (On-Board)	1694	1754	433	6	1000
10	Real Time Overall				Zoom	30
11	Real Time Inrun				Zoom	30

Reference: Impact Point Projected to Ground; +X = To Front of MDB, +Y = To Right of MDB, +Z = Down

*All measurements accurate to ±6 mm

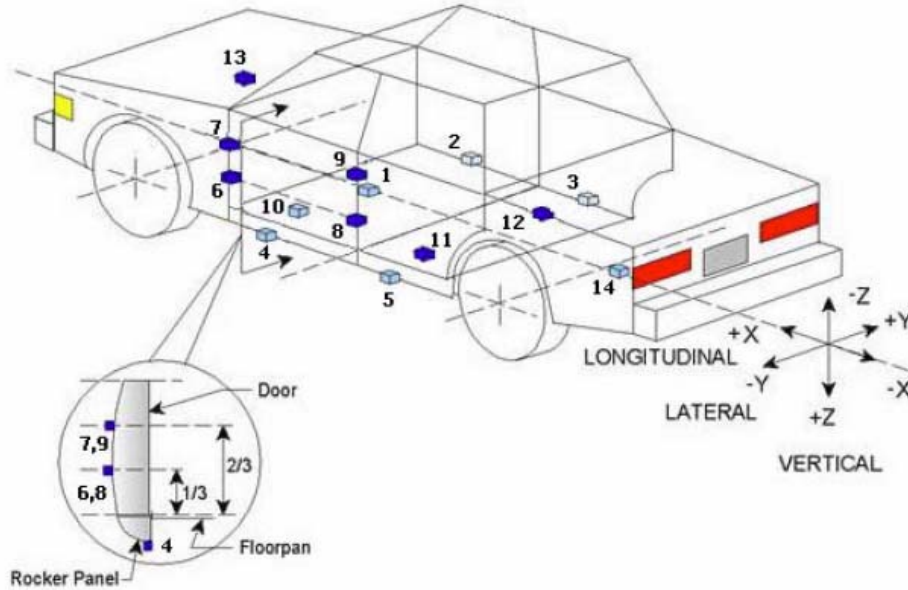
INSTRUMENTATION

Driver Dummy Channels	16
Passenger Dummy Channels	19
Vehicle Structure Accelerometers	23
MDB Channels	7
Total	65

DATA SHEET NO. 6

TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2020 Volvo XC60 T5 5-Door MPV NHTSA No. M20205905
 Test Program: NCAP MDB Side Impact Test Test Date: 01/22/20



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

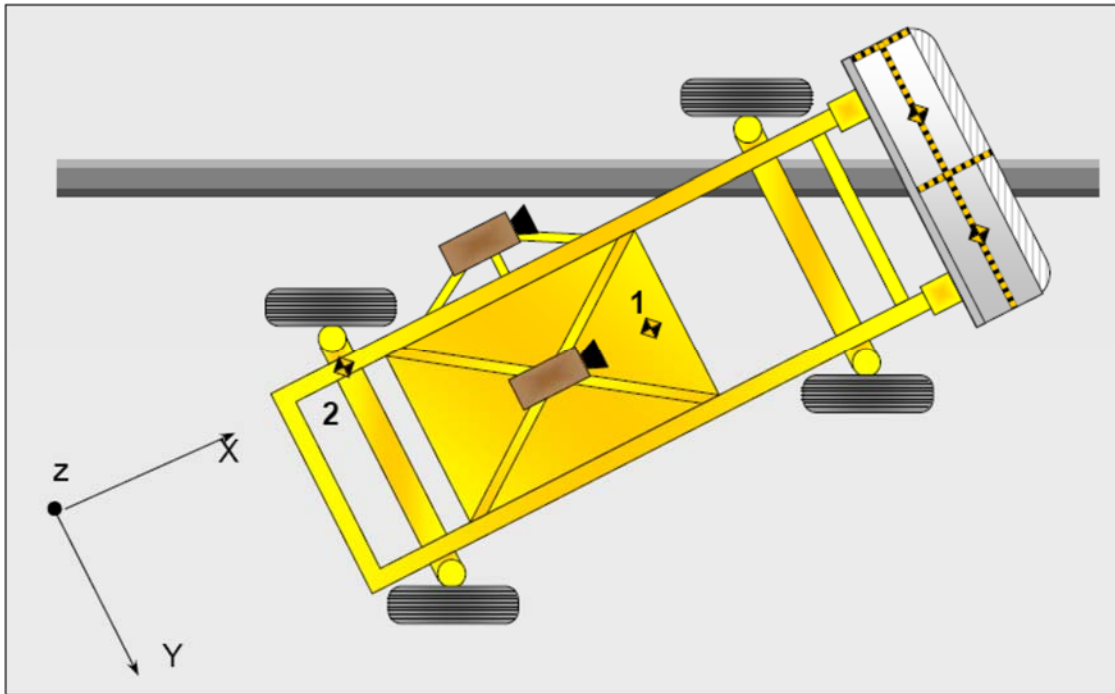
Loc. No.	Sensor Description	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	1940	0	-540
2	Right Sill at Front Seat	2600	735	-440
3	Right Sill at Rear Seat	1670	680	-420
4	Left Sill at Front Door	2450	-585	-420
5	Left Sill at Rear Door	1480	-680	-440
6	A-Pillar Lower	3140	-800	-500
7	A-Pillar Middle	3165	-835	-700
8	B-Pillar Lower	2180	-760	-540
9	B-Pillar Middle	2660	-755	-1080
10	Front Seat Track	2200	-580	-490
11	Rear Seat Structure	1780	-360	-535
12	Right Rear Occupant Compartment	1789	-360	-545
13	Engine Block	4080	470	-855
14	Rear Floorpan Above Axle	1120	0	-620

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

DATA SHEET NO. 7

MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2020 Volvo XC60 T5 5-Door MPV NHTSA No. M20205905
 Test Program: NCAP MDB Side Impact Test Test Date: 01/22/20



MDB ACCELEROMETER LOCATIONS

Loc. No.	Accelerometer Location	Measurement		
		X	Y	Z
1	MDB CG	-1195	0	-430
2	MDB Rear	-2642	-593	-608

Reference: X – Face of MDB (+ forward)
 Y – MDB centerline (+ to right)
 Z – Ground plane (+ down)

DATA SHEET NO. 8
POST-TEST OBSERVATIONS

Test Vehicle: 2020 Volvo XC60 T5 5-Door MPV NHTSA No. M20205905
 Test Program: NCAP MDB Side Impact Test Test Date: 01/22/20

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Front Seat Dummy (ES-2re)	Rear Seat Dummy (SID-IIs)
Face	Curtain Airbag	Curtain Airbag
Top of Head	Curtain Airbag, Side Header	Curtain Airbag
Left Side of Head	Curtain Airbag, Side Header	Curtain Airbag
Back of Head	Curtain Airbag, Side Header, Headrest	Curtain Airbag, Headrest
Left Shoulder	Door Panel	Door Panel
Upper Torso	Side Airbag, Seat	Seat
Lower Torso	Side Airbag, Seat	Door Panel
Left Hip	Side Airbag, Door Panel, Seat	Door Panel, Seat
Left Knee	None	Door Panel

POST-TEST DOOR PERFORMANCE

Description	Struck Side		Non-Struck Side		Rear Hatch/Other
	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

DATA SHEET NO. 8 ... (CONTINUED)

POST-TEST OBSERVATIONS

Test Vehicle: 2020 Volvo XC60 T5 5-Door MPV NHTSA No. M20205905
Test Program: NCAP MDB Side Impact Test Test Date: 01/22/20

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	
Seat Back Movement from Initial Position	No		No	
Seat Back Collapse	No		No	

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No separation
Sill Separation	No separation
Windshield Damage	None
Side Window Damage	None
Other Notable Effects	None

DATA SHEET NO. 8 ... (CONTINUED)

POST-TEST OBSERVATIONS

Test Vehicle: 2020 Volvo XC60 T5 5-Door MPV NHTSA No. M20205905
 Test Program: NCAP MDB Side Impact Test Test Date: 01/22/20

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side		Struck Side	
	Driver		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	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		2853
Vertical Impact Reference Line (Aft of Front Axle)(Intended Impact Point)	mm		486
Actual Impact Point (Aft of Front Axle)	mm		473
Horizontal Offset (+ forward / - rearward)	mm	± 50 of Intended Impact Point	13
Vertical Offset (+ down / - up)	mm	± 20 of Intended Impact Point	4

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2020 Volvo XC60 T5 5-Door MPV NHTSA No. M20205905
 Test Program: NCAP MDB Side Impact Test Test Date: 01/22/20

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1251
Overall Length including Honeycomb Face	4115
Wheel Base of Framework Carriage	2595
CG location aft of Front Axle	1118

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	402.0	297.5	699.5
Right	kg	377.0	290.0	667.0
Ratio	%	57.0%	43.0%	100.0%
Totals	kg	779.0	587.5	1366.5

SPEED AND IMPACT DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.13
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.16
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90.8
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	62.8
MDB Crabbed Angle to MDB Forward Line of Motion	degrees	26.0 to 28.0	27.8

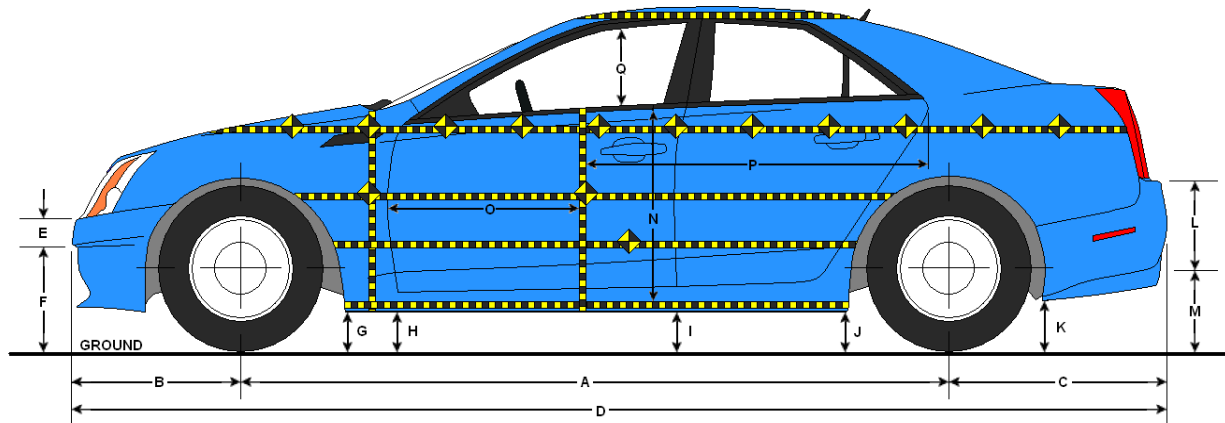
MAXIMUM STATIC CRUSH OF HONEYCOMB FACE

Row	Vertical Location Description	Height (mm)	From Centerline		Max. Crush (mm)
			Distance (mm)	Direction	
A	Center of Bumper	432	0	Center	251
B	Top of Bumper	533	800	Left	141
C	Mid Level	686	800	Left	157
D	Top of Stack	813	800	Left	209

DATA SHEET NO. 10

TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2020 Volvo XC60 T5 5-Door MPV NHTSA No. M20205905
 Test Program: NCAP MDB Side Impact Test Test Date: 01/22/20



LEFT SIDE VIEW

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2853	2843	-10
B	Front Axle to FSOV	872	885	13
C	Rear Axle to RSOV	959	953	-6
D	Total Length at Centerline	4683	4681	-2
E	Front Bumper Thickness	374	375	1
F	Front Bumper Bottom to Ground	458	456	-2
G	Sill Height at Front Wheel Well	393	390	-3
H	Sill Height at Front Door Leading Edge	432	403	-29
I	Sill Height at B-Pillar	479	437	-42
J1	Sill Height at Rear Wheel Well	426	407	-19
J2	Pinch Weld Height at Rear Wheel Well	356	342	-14
K	Sill Height Aft of Rear Wheel Well	480	474	-6
L	Rear Bumper Thickness	276	279	3
M	Rear Bumper Bottom to Ground	530	526	-4
N	Sill Height to Bottom of Front Window Sill	754	750	-4
O	Front Door Leading Edge to Impact CL	707	691	-16
P	Rear Door Trailing Edge to Impact CL	1378	1348	-30
Q	Front Window Opening	459	486	27
R	Right Side Length	3314	3316	2
S	Left Side Length	3313	3305	-8
T	Vehicle Width at B-Pillar	1900	1809	-91

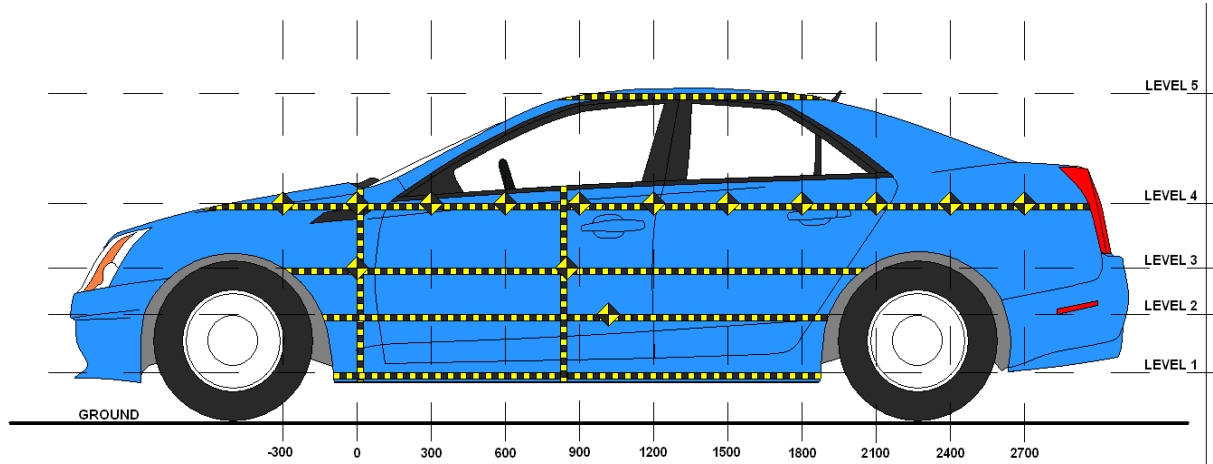
All measurements in mm with tolerance of ± 3 mm

DATA SHEET NO. 11

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2020 Volvo XC60 T5 5-Door MPV NHTSA No. M20205905

Test Program: NCAP MDB Side Impact Test Test Date: 01/22/20



LEFT SIDE VIEW

Level	Description	Height Above Ground (mm)	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	520	132	1350
2	Occupant H-Point	797	194	1650
3	Mid-Door	872	186	1650
4	Window Sill	1151	34	1350
5	Window Top	1718	-3	900

DATA SHEET NO. 11 ... (CONTINUED)

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2020 Volvo XC60 T5 5-Door MPV NHTSA No. M20205905
 Test Program: NCAP MDB Side Impact Test Test Date: 01/22/20

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															
-750															
-600															
-450															
-300				666					651					-15	
-150		551	551	657			545	545	643			-6	-6	-14	
0	575	559	559	648		575	556	555	635		0	-3	-4	-13	
150	577	562	560	637		660	650	629	624		83	88	69	-13	
300	574	561	560	631		664	692	667	604		90	131	107	-27	
450	570	561	559	585		667	704	705	583		97	143	146	-2	
600	568	561	559	615		672	706	724	630		104	145	165	15	
750	567	562	559	609		679	718	727	625		112	156	168	16	
900	566	562	560	605	894	686	725	720	619	891	120	163	160	14	-3
1050	566	563	560	600	892	683	716	697	623	885	117	153	137	23	-7
1200	569	567	561	597	901	695	688	667	624	892	126	121	106	27	-9
1350	571	569	564	595	901	703	719	682	629	890	132	150	118	34	-11
1500	573	574	567	595	897	705	732	732	626	891	132	158	165	31	-6
1650	576	572	570	597	897	694	766	756	628	893	118	194	186	31	-4
1800	580	569	567	595	899	640	735	739	627	895	60	166	172	32	-4
1950		558	558	568	902		614	627	594	898		56	69	26	-4
2100			551	587	908			540	579	899			-11	-8	-9
2250				599	915				603	911				4	-4
2400				603	925				605	921				2	-4
2550															
2700															
2850															

DATA SHEET NO. 11 ... (CONTINUED)

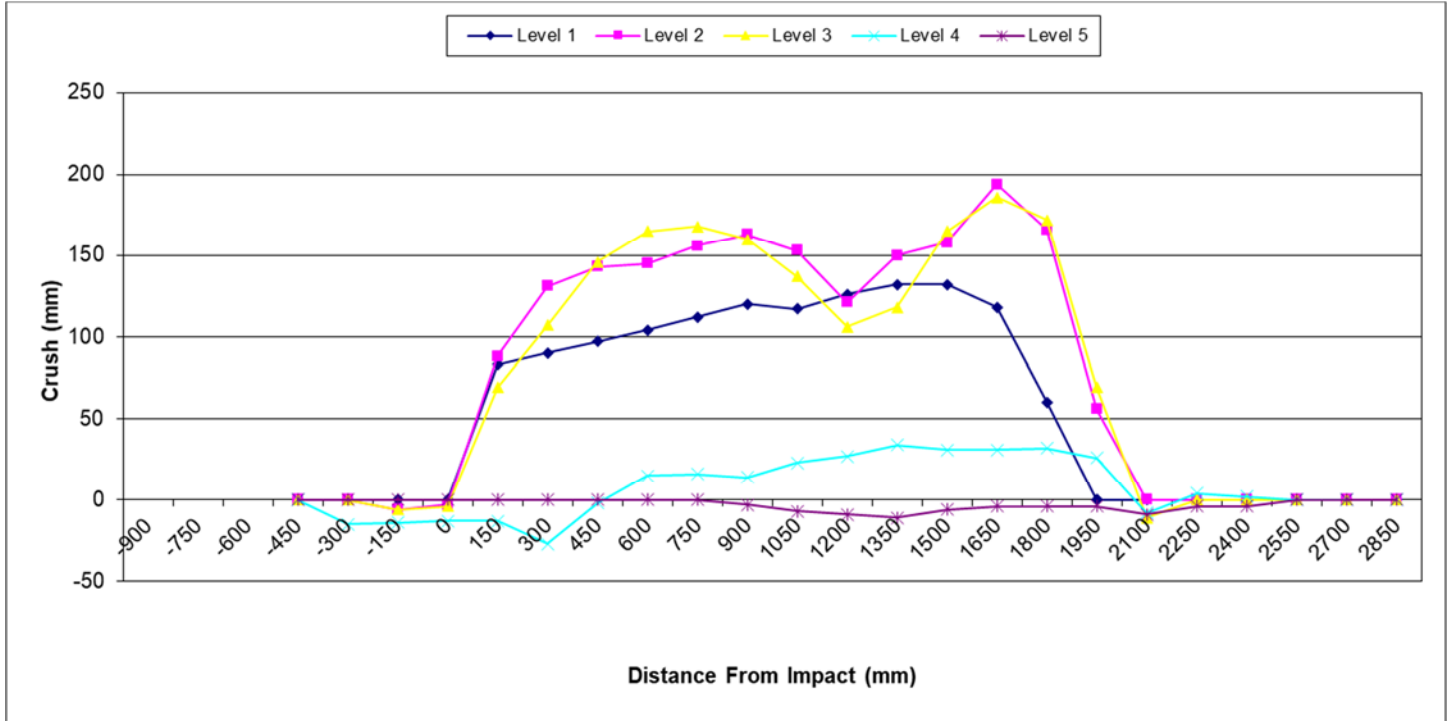
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2020 Volvo XC60 T5 5-Door MPV

NHTSA No. M20205905

Test Program: NCAP MDB Side Impact Test

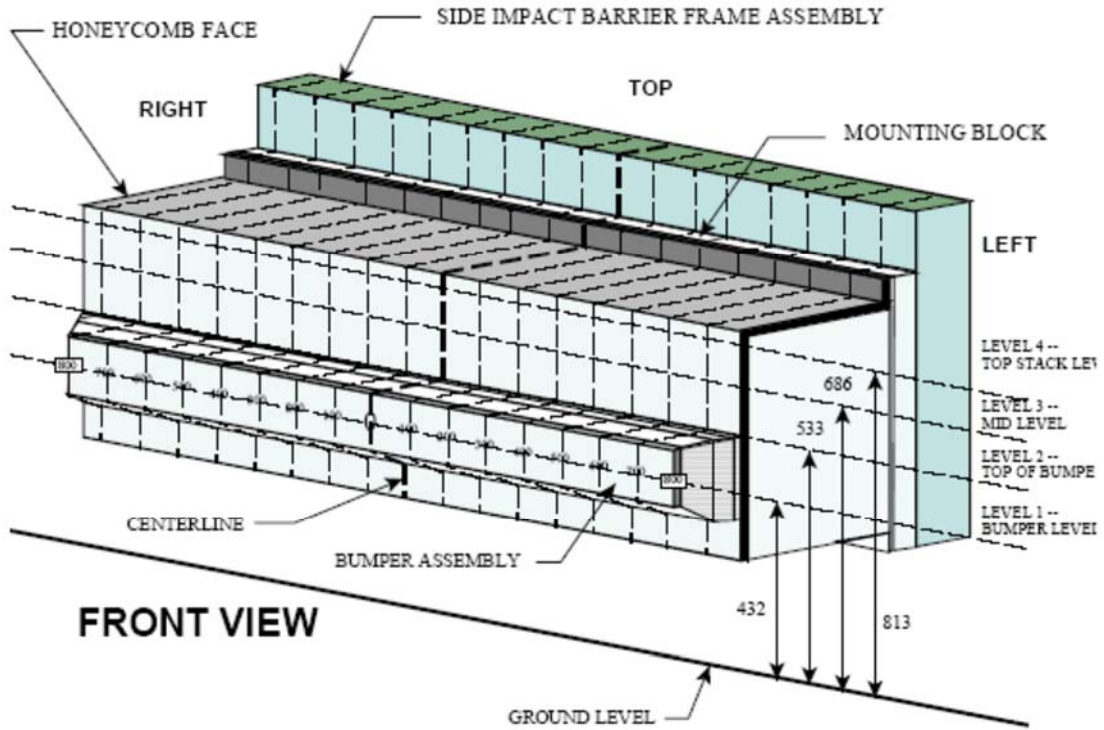
Test Date: 01/22/20



DATA SHEET NO. 12

MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2020 Volvo XC60 T5 5-Door MPV NHTSA No. M20205905
 Test Program: NCAP MDB Side Impact Test Test Date: 01/22/20



NOTE: Dimensions are shown in millimeters, mm

DEFORMABLE BARRIER STATIC CRUSH

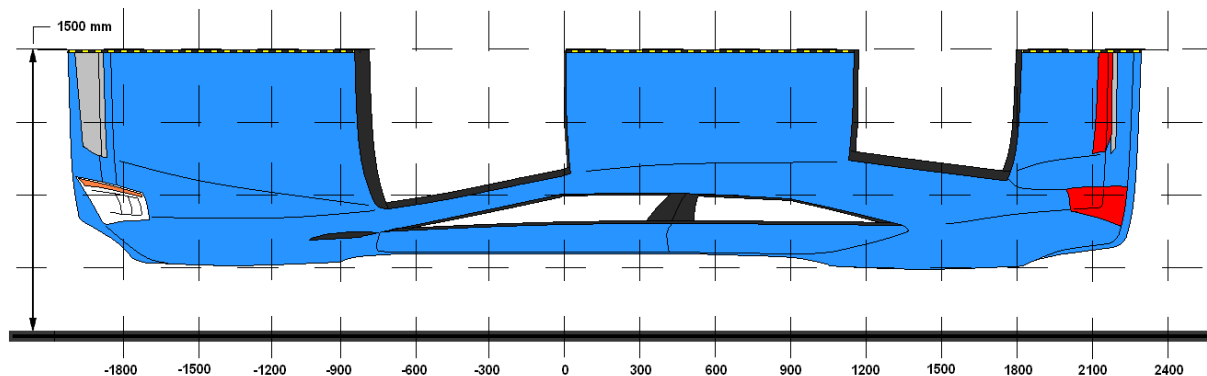
Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
1	213	201	203	201	207	204	209	204	251	207	206	209	209	207	215	216	232
2	117	112	111	107	105	115	104	107	107	110	112	117	119	124	128	133	141
3	70	55	69	79	77	92	84	61	54	52	59	66	70	72	87	120	157
4	87	84	84	105	133	142	127	97	78	66	62	62	76	99	142	182	209

All dimensions in millimeters.

DATA SHEET NO. 13

VEHICLE AND MDB DAMAGE PROFILE DISTANCES

Test Vehicle: 2020 Volvo XC60 T5 5-Door MPV NHTSA No. M20205905
 Test Program: NCAP MDB Side Impact Test Test Date: 01/22/20



VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point (mm)	Level	Pre-Test (mm)	Post-Test (mm)	Crush (mm)
1	2400	4	603	605	2
2	1950	3	558	627	69
3	1350	2	569	719	150
4	750	3	559	727	168
5	150	2	562	650	88
6	-300	4	666	651	-15

MDB DAMAGE PROFILE DISTANCES

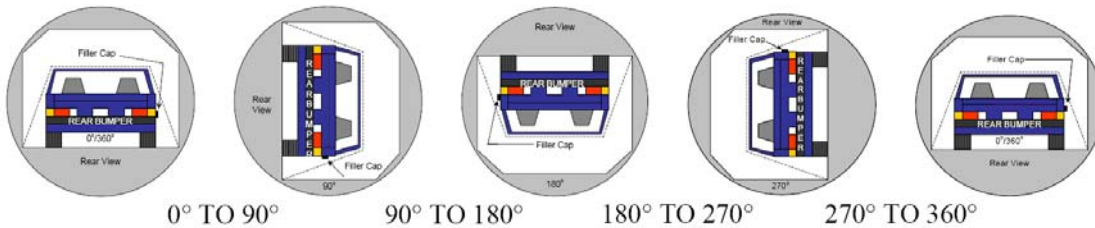
DPD	From MDB Centerline		Level	Crush (mm)
	Distance (mm)	Direction		
1	800	Left	1	232
2	500	Left	1	207
3	200	Left	1	206
4	200	Right	1	209
5	500	Right	1	201
6	800	Right	1	213

DATA SHEET NO. 14

FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2020 Volvo XC60 T5 5-Door MPV NHTSA No. M20205905
 Test Program: NCAP MDB Side Impact Test Test Date: 01/22/20
 Temperature at Time of Impact: 15.6 °C Test Time: 1:25 P.M.

- 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°	82	300	382
90° To 180°	80	300	380
180° To 270°	79	300	379
270° To 360°	80	300	380

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

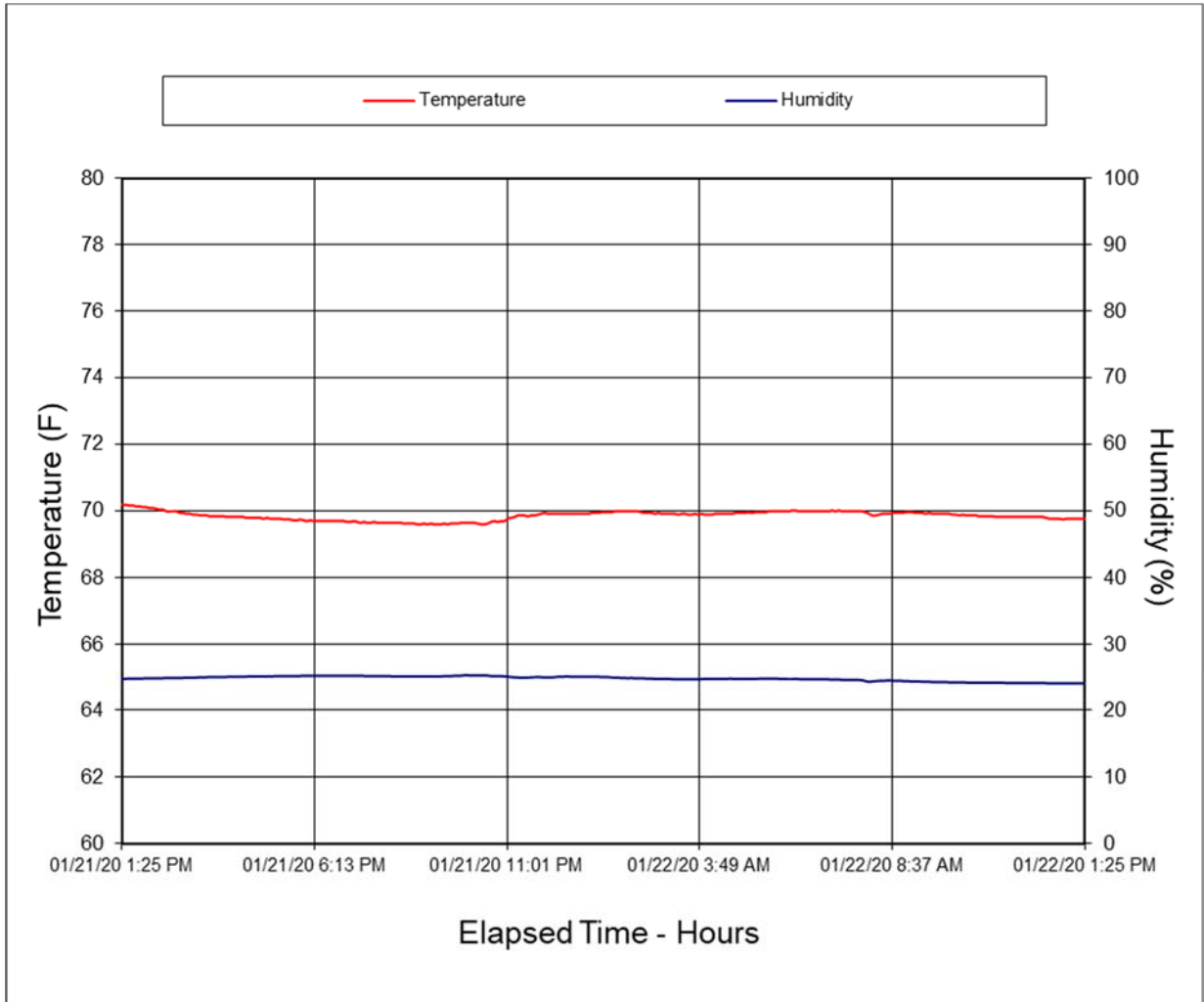
Test Phase	Spillage Location
0° To 90°	N/A
90° To 180°	N/A
180° To 270°	N/A
270° To 360°	N/A

DATA SHEET NO. 15

DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION

Test Vehicle: 2020 Volvo XC60 T5 5-Door MPV NHTSA No. M20205905

Test Program: NCAP MDB Side Impact Test Test Date: 01/22/20



**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 ¾ View of Test Vehicle



FIGURE 10. Post-Test Left Rear ¾ 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

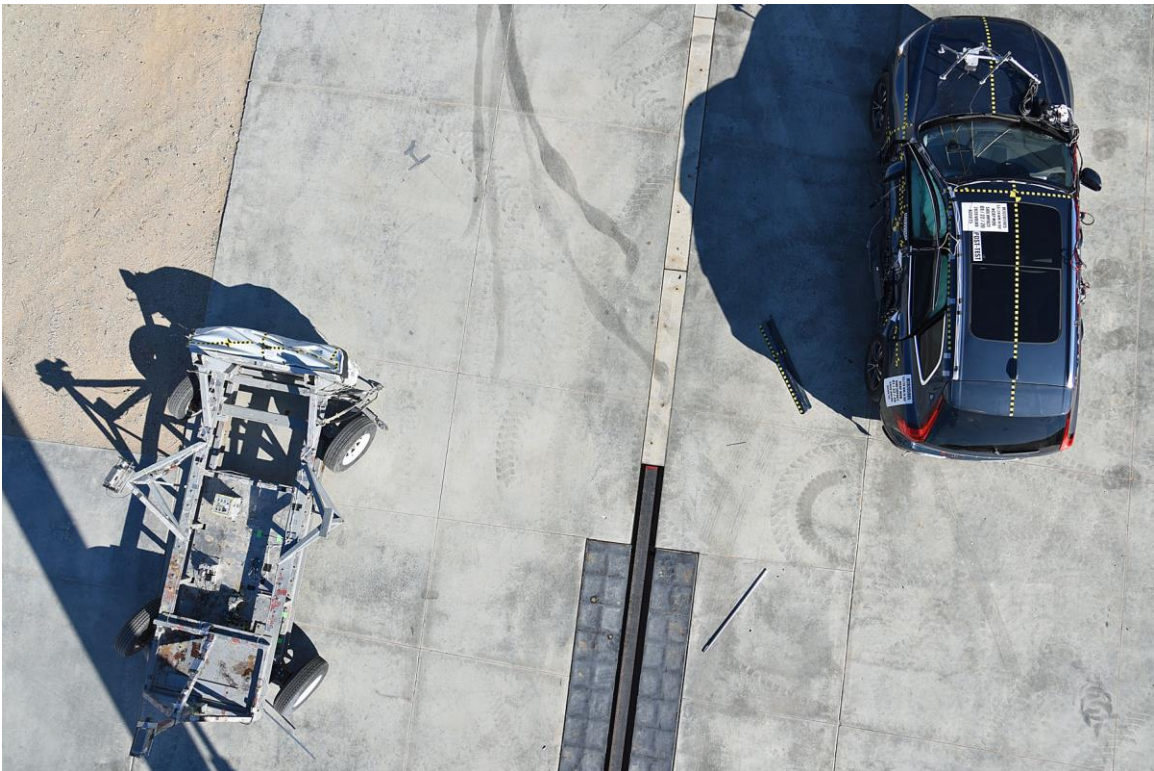


FIGURE 16. Post-Test Overhead View of Test Area



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



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



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



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



FIGURE 21. Pre-Test Left Front Door Latch Close-Up

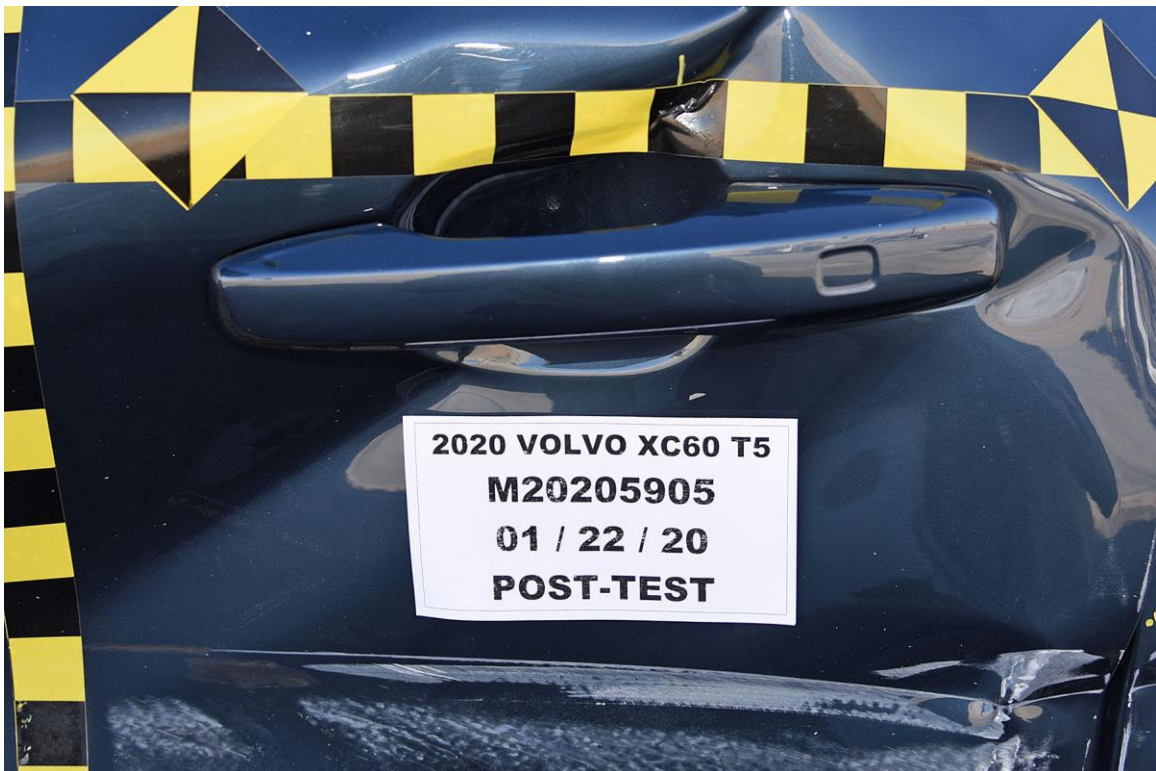


FIGURE 22. Post-Test Left Front Door Latch Close-Up



FIGURE 23. Pre-Test Left Rear Door Latch Close-Up



FIGURE 24. Post-Test Left Rear Door Latch Close-Up



FIGURE 25. Pre-Test Front Close-Up View of Driver Dummy



FIGURE 26. Post-Test Front Close-Up View of Driver Dummy



FIGURE 27. Pre-Test Left Side View of Driver Dummy
Showing Belt and Chalking



FIGURE 28. Pre-Test Left Side View of Driver Dummy Shoulder and Door Top View



FIGURE 29. Post-Test Left Side View of Driver Dummy Shoulder and Door Top View



FIGURE 30. Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning



FIGURE 31. Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint



FIGURE 32. Pre-Test Overhead View of Driver Seat Pan Prior to Dummy Positioning



FIGURE 33. Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan



FIGURE 34. Pre-Test Placement of Driver Dummy's Feet



FIGURE 35. Pre-Test View of Belt Anchorage for Driver Dummy

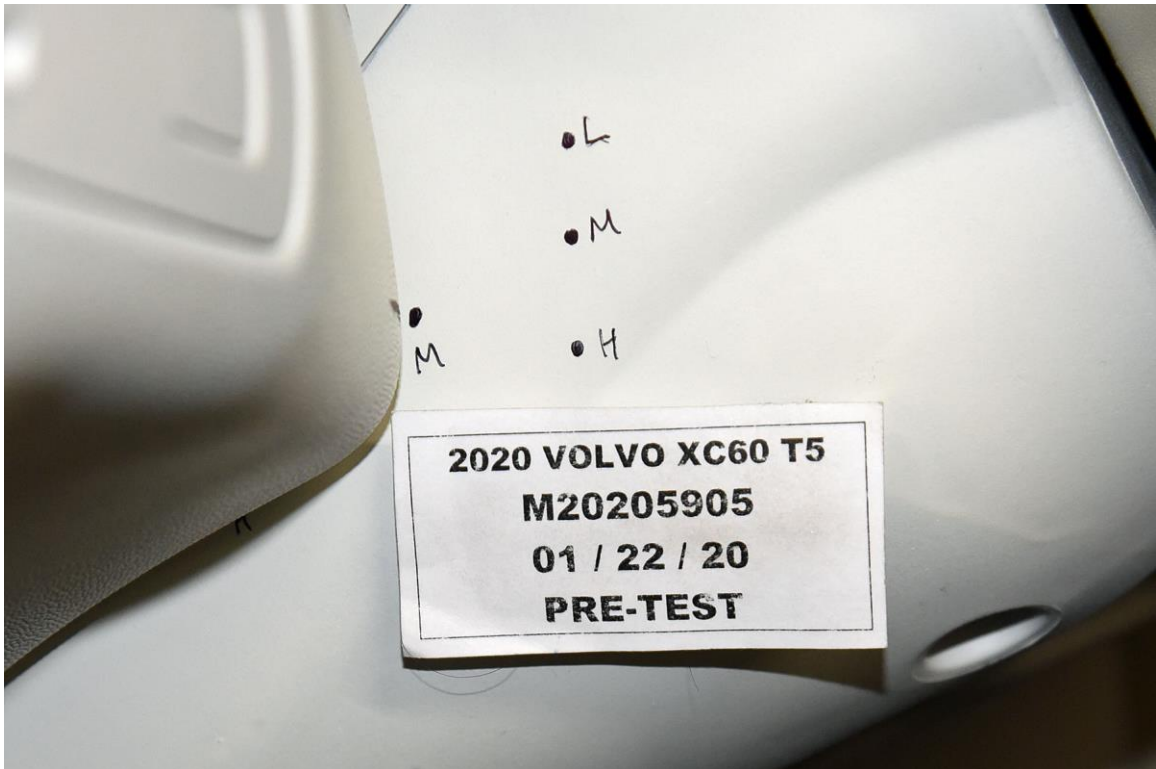


FIGURE 36. Pre-Test Left Side View of Steering Wheel



FIGURE 37. View of Disengaged Parking Brake



FIGURE 38. Pre-Test View of Parking Brake

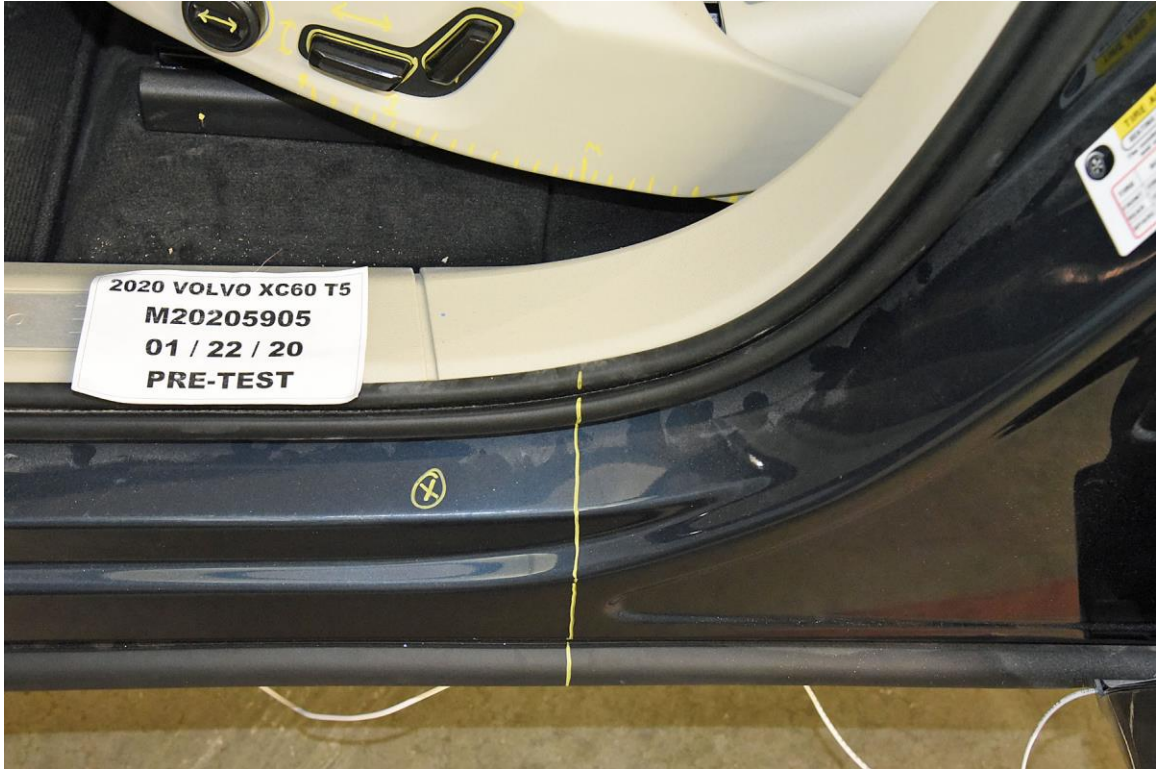


FIGURE 39. Pre-Test Close-Up Left Side View of Driver Seat Track



FIGURE 40. Pre-Test Close-Up Left Side View of Driver Seat Back



FIGURE 41. Pre-Test Close-Up View of Driver Seat Back or Head Restraint



FIGURE 42. Pre-Test Driver Dummy and Door Clearance View



FIGURE 43. Post-Test Driver Dummy and Door Clearance View



FIGURE 44. Pre-Test Right Side View of Driver Dummy
and Front Seat Occupant Compartment



FIGURE 45. Post-Test Right Side View of Driver Dummy and Front Seat Occupant Compartment



FIGURE 46. Pre-Test Driver Inner Door Panel View



FIGURE 47. Post-Test Driver Inner Door Panel View
Showing Driver Dummy Contact Locations



FIGURE 48. Post-Test Driver Dummy Close-Up Head Contact
with Vehicle Interior View



FIGURE 49. Post-Test Driver Dummy Close-Up Head Contact with Side Airbag View



FIGURE 50. Post-Test Driver Dummy Close-Up Torso Contact with Vehicle Interior View



FIGURE 51. Post-Test Driver Dummy Close-Up Torso Contact with Side Airbag View



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



FIGURE 53. Post-Test Driver Dummy Close-Up Pelvis Contact with Side Airbag View

Photograph Not Available

FIGURE 54. Post-Test Driver Dummy Close-Up Knee Contact View



FIGURE 55. Pre-Test Left Side View of Rear Passenger Dummy
Showing Belt and Chalking



FIGURE 56. Pre-Test Left Side View of Rear Passenger Dummy
Shoulder and Door Top View



FIGURE 57. Post-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View



FIGURE 58. Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning



FIGURE 59. Pre-Test Frontal View of Rear Passenger Dummy
Head and Shoulders in Relation to Head Restraint



FIGURE 60. Pre-Test Overhead View of Rear Passenger
Seat Pan Prior to Dummy Positioning



FIGURE 61. Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan

Photograph Not Available

FIGURE 62. Pre-Test View of Rear Passenger Dummy's Neck
Showing Position of Adjustable Neck Bracket



FIGURE 63. Pre-Test View of Rear Passenger Dummy's Head
Showing Dummy's Head is Level



FIGURE 64. Pre-Test Placement of Rear Passenger Dummy's Feet



FIGURE 65. Pre-Test View of Belt Anchorage for Rear Passenger Dummy

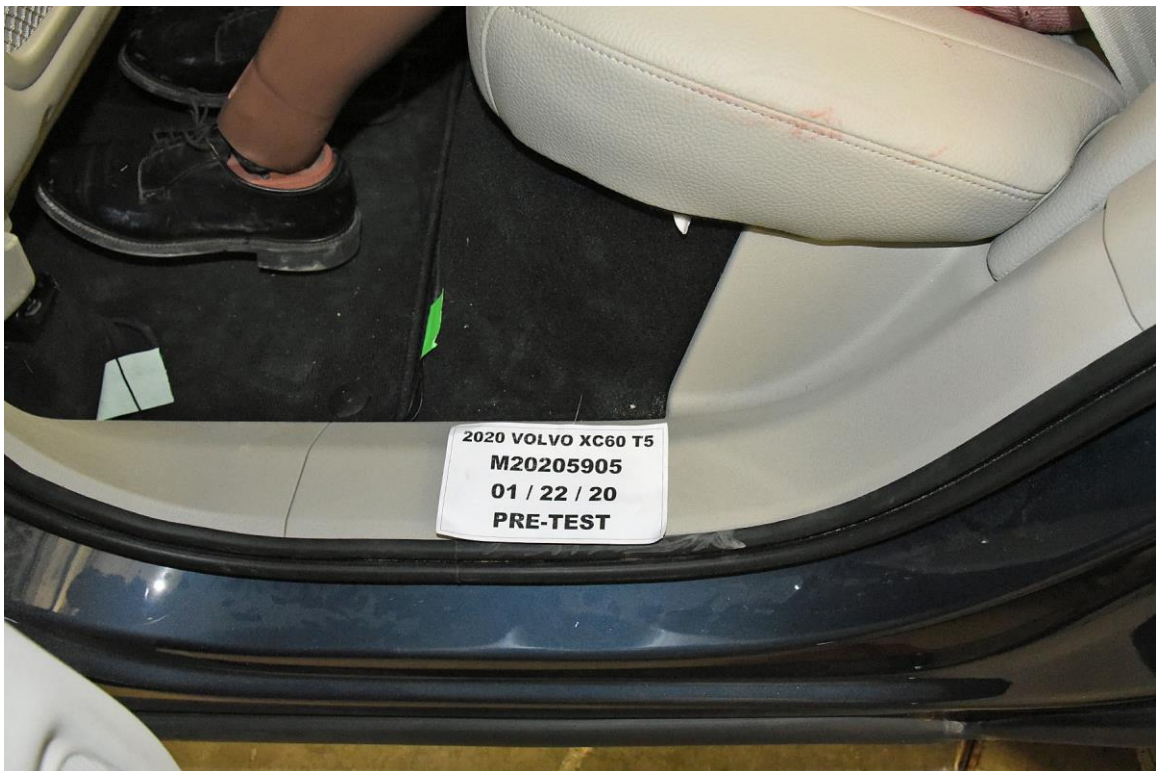


FIGURE 66. Pre-Test Close-Up Left Side View of Rear Passenger Seat Track



FIGURE 67. Pre-Test Close-Up Left Side View of Rear Passenger Seat Back



FIGURE 68. Pre-Test Close-Up View of Rear Passenger Seat Back or Head Restraint



FIGURE 69. Pre-Test Rear Passenger Dummy and Door Clearance View



FIGURE 70. Post-Test Rear Passenger Dummy and Door Clearance View



FIGURE 71. Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



FIGURE 72. Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



FIGURE 73. Pre-Test Rear Passenger Inner Door Panel View



FIGURE 74. Post-Test Rear Passenger Inner Door Panel View
Showing Rear Passenger Dummy Contact Locations



FIGURE 75. Post-Test Rear Passenger Dummy Close-Up
Head Contact with Vehicle Interior View



FIGURE 76. Post-Test Rear Passenger Dummy Close-Up
Head Contact with Side Airbag View



FIGURE 77. Post-Test Rear Passenger Dummy Close-Up
Torso Contact with Vehicle Interior View

Photograph Not Applicable

**Vehicle Not Equipped with
Rear Passenger Side Airbag**

FIGURE 78. Post-Test Rear Passenger Dummy Close-Up
Torso Contact with Side Airbag View



FIGURE 79. Post-Test Rear Passenger Dummy Close-Up
Pelvis Contact with Vehicle Interior View

Photograph Not Applicable

**Vehicle Not Equipped with
Rear Passenger Side Airbag**

FIGURE 80. Post-Test Rear Passenger Dummy Close-Up
Pelvis Contact with Side Airbag View



FIGURE 81. Post-Test Rear Passenger Dummy Close-Up Knee Contact View

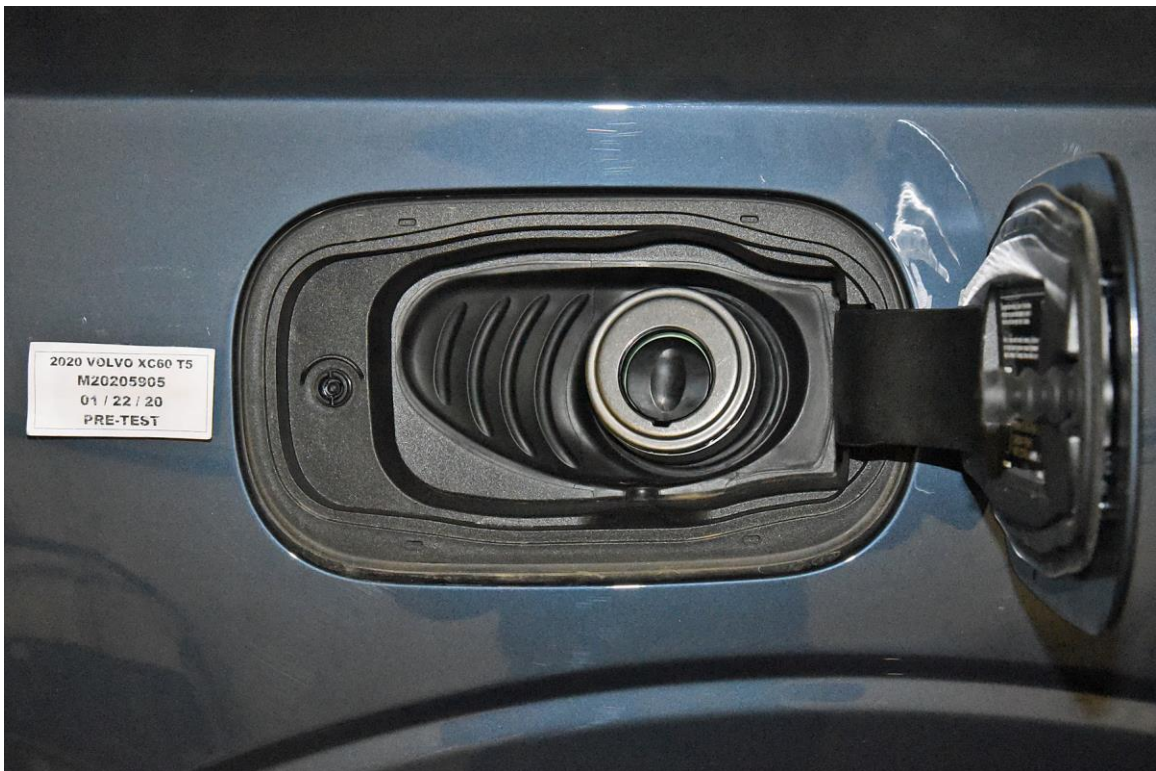


FIGURE 82. Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



FIGURE 83. Post-Test View of Fuel Filler Cap or Fuel Filler Neck



FIGURE 84. Pre-Test Front View of MDB Impactor Face



FIGURE 85. Post-Test Front View of MDB Impactor Face



FIGURE 86. Pre-Test Top View of MDB Impactor Face



FIGURE 87. Post-Test Top View of MDB Impactor Face



FIGURE 88. Pre-Test Left Side View of MDB Impactor Face



FIGURE 89. Post-Test Left Side View of MDB Impactor Face



FIGURE 90. Pre-Test Right Side View of MDB Impactor Face



FIGURE 91. Post-Test Right Side View of MDB Impactor Face



FIGURE 92. Close-Up View of Vehicle's Certification Label

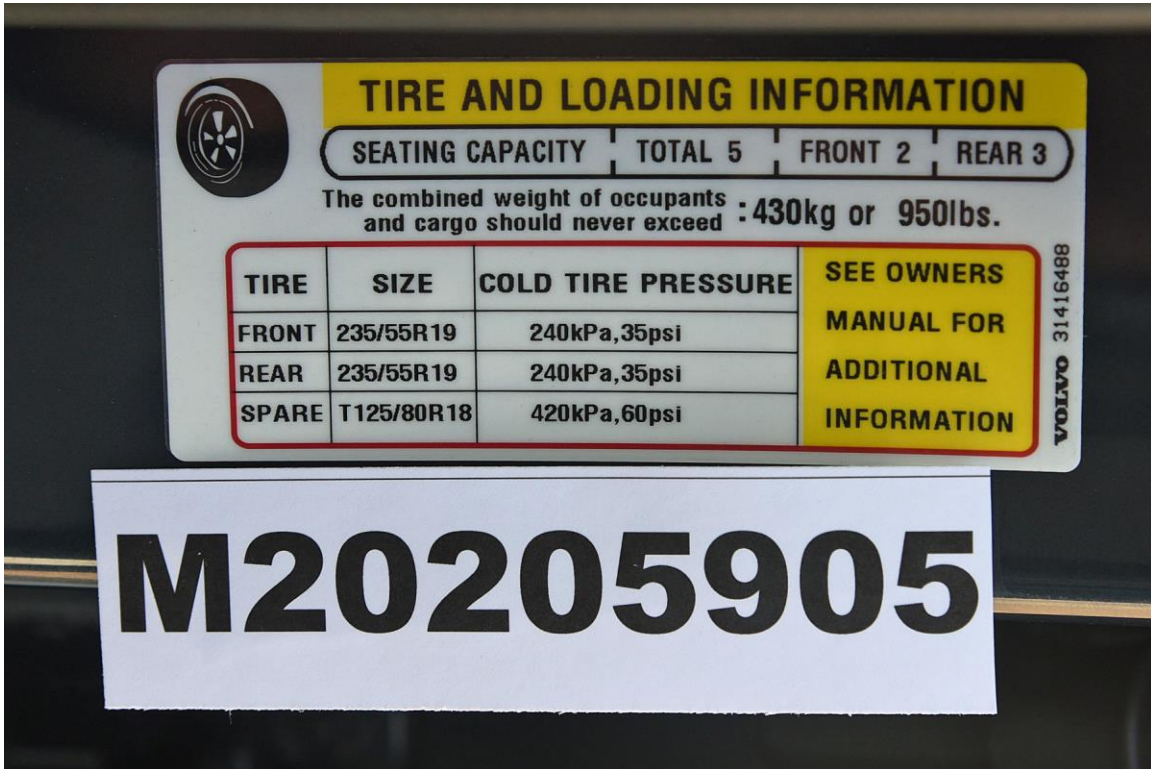


FIGURE 93. Close-Up View of Vehicle's Tire Information Placard or Label

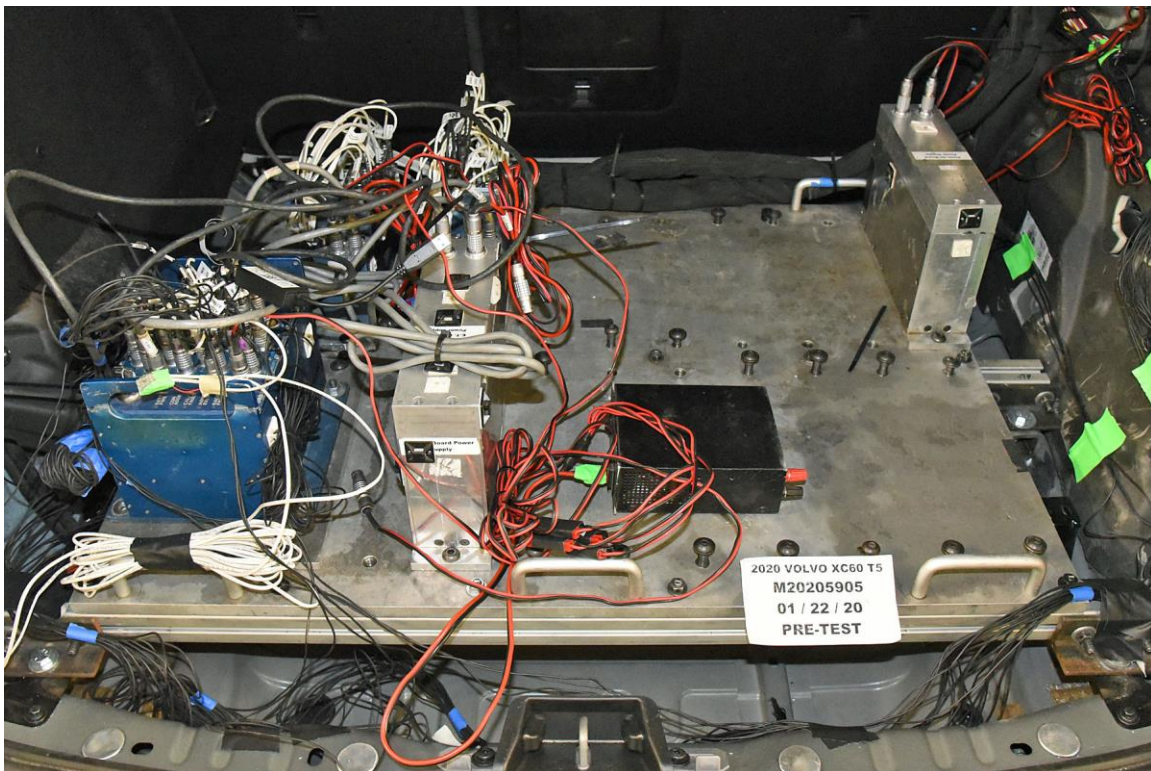


FIGURE 94. Pre-Test Ballast View



FIGURE 95. Post-Test Primary and Redundant Speed Trap Read-Out



FIGURE 96. FMVSS No. 301 Static Rollover 0 Degrees



FIGURE 97. FMVSS No. 301 Static Rollover 90 Degrees

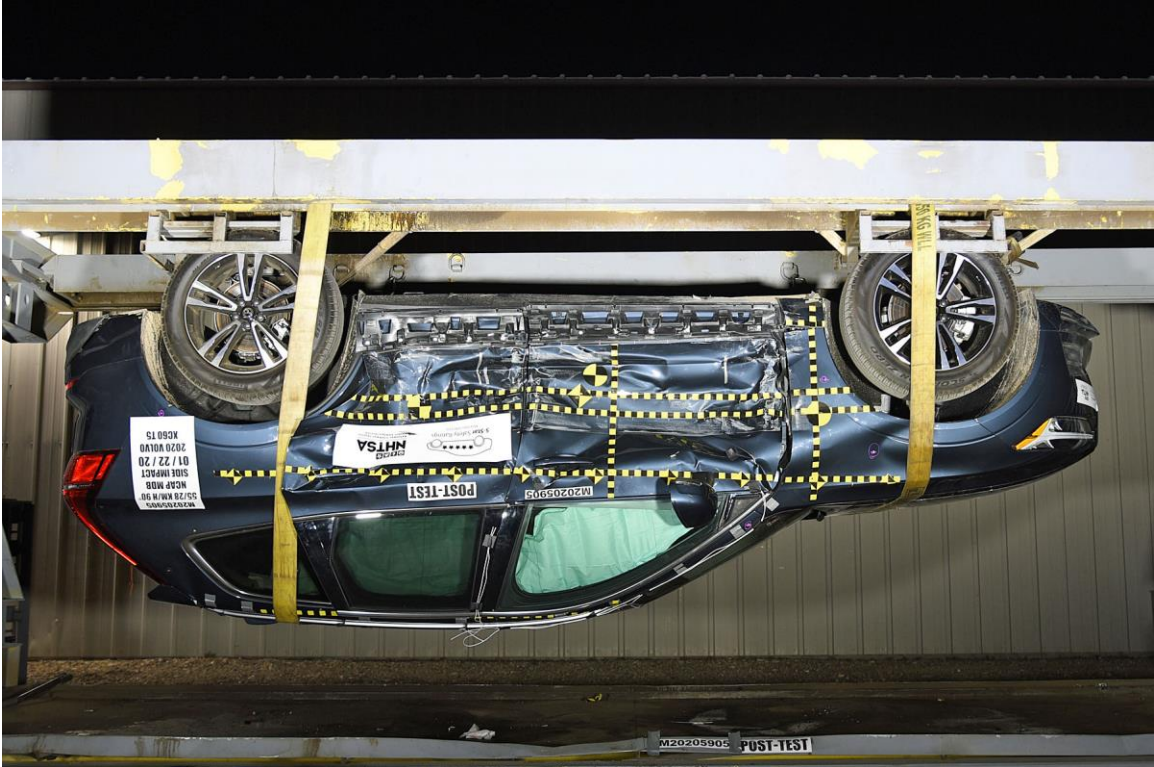


FIGURE 98. FMVSS No. 301 Static Rollover 180 Degrees

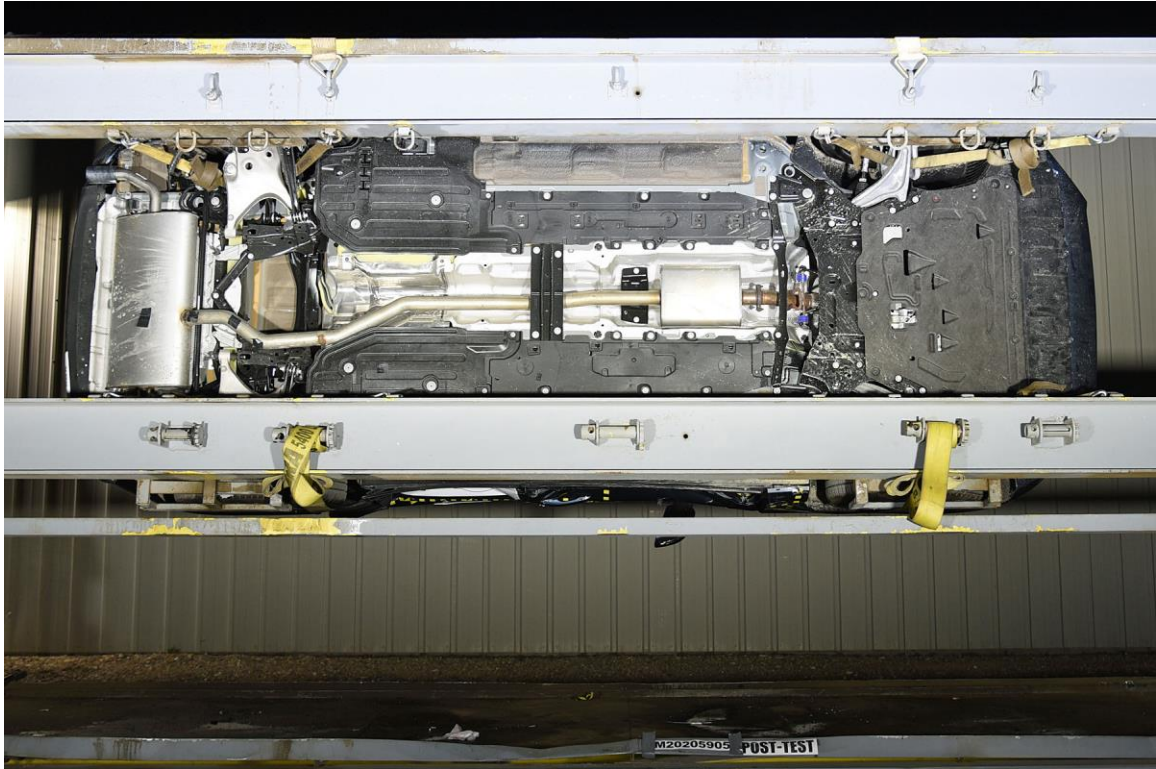


FIGURE 99. FMVSS No. 301 Static Rollover 270 Degrees



FIGURE 100. FMVSS No. 301 Static Rollover 360 Degrees



FIGURE 101. Impact Event

Photograph Not Available

FIGURE 102. Monroney Label

Photograph Not Available

FIGURE 103. Driver Head Restraint Use and Adjustment Information
from Vehicle Owner's Manual

Photograph Not Available

FIGURE 104. Left Rear Passenger Head Restraint Use and Adjustment Information
from Vehicle Owner's Manual

APPENDIX B
DUMMY RESPONSE DATA

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The following additional data for this test can be obtained from the Research and Development section of the NHTSA website (www.NHTSA.gov)

Additional Driver & Passenger Dummy Instrumentation Data

Driver Lower Spine T12 Acceleration (X)
Driver Lower Spine T12 Acceleration (Y)
Driver Lower Spine T12 Acceleration (Z)
Driver Head Acceleration Redundant (X)
Driver Head Acceleration Redundant (Y)
Driver Head Acceleration Redundant (Z)
Passenger Head Acceleration Redundant (X)
Passenger Head Acceleration Redundant (Y)
Passenger Head Acceleration Redundant (Z)

Vehicle Instrumentation Data

Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Right Side Sill at Front Seat Acceleration (X)
Right Side Sill at Front Seat Acceleration (Y)
Right Side Sill at Front Seat Acceleration (Z)
Right Side Sill at Rear Seat Acceleration (X)
Right Side Sill at Rear Seat Acceleration (Y)
Right Side Sill at Rear Seat Acceleration (Z)
Left Side Sill at Front Seat Acceleration (Y)
Left Side Sill at Rear Seat Acceleration (Y)
Lower A-Post Acceleration (Y)
Middle A-Post Acceleration (Y)
Lower B-Post Acceleration (Y)
Middle B-Post Acceleration (Y)
Front Seat Track Acceleration (Y)
Rear Seat Structure Acceleration (Y)
Right Rear Occupant Compartment Acceleration (Y)
Engine Block (X)
Engine Block (Y)
Rear Floorpan Above Axle Acceleration (X)
Rear Floorpan Above Axle Acceleration (Y)
Rear Floorpan Above Axle Acceleration (Z)

MDB Instrumentation Data

MDB Center of Gravity Acceleration (X)

MDB Center of Gravity Acceleration (Y)

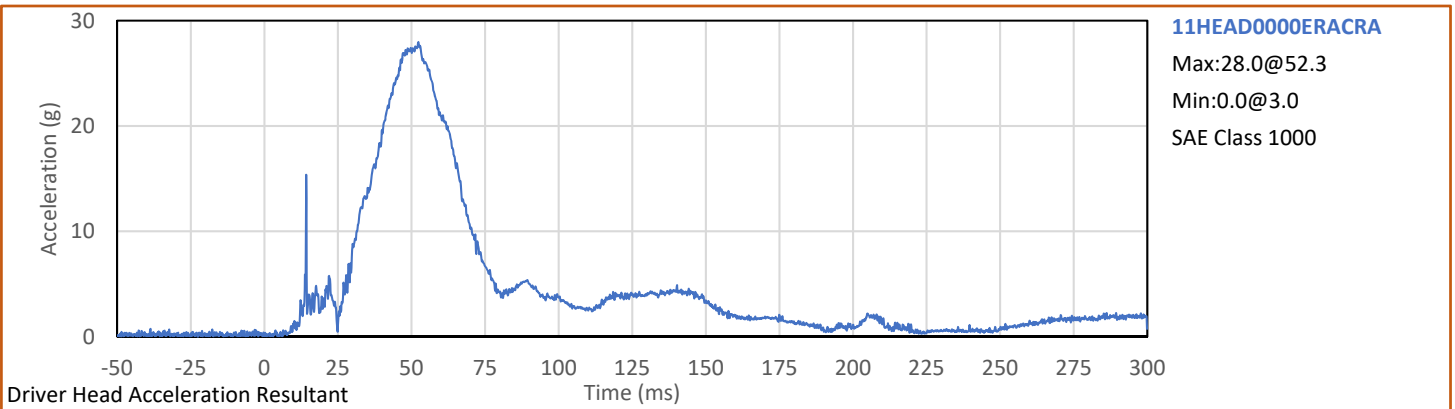
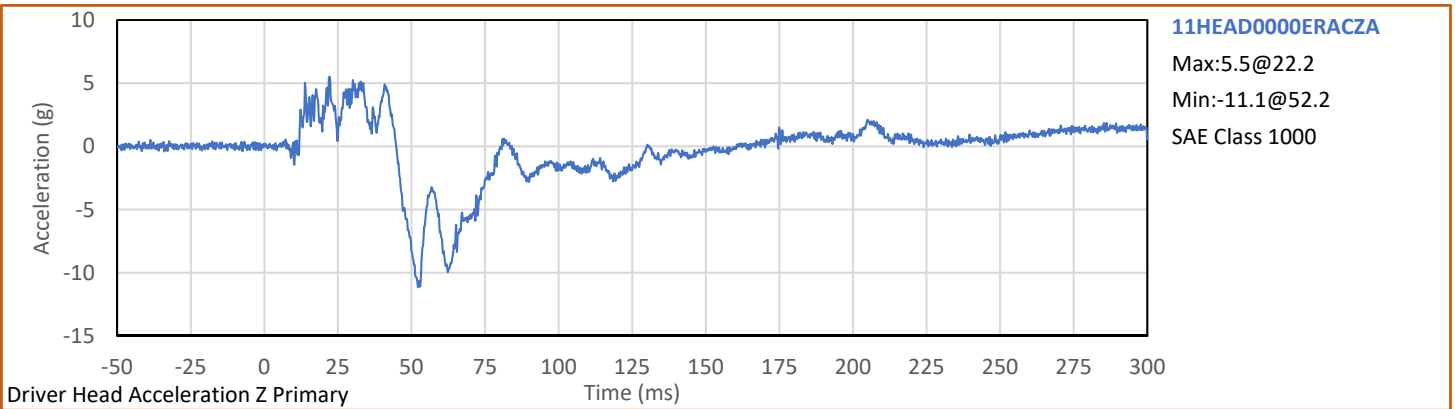
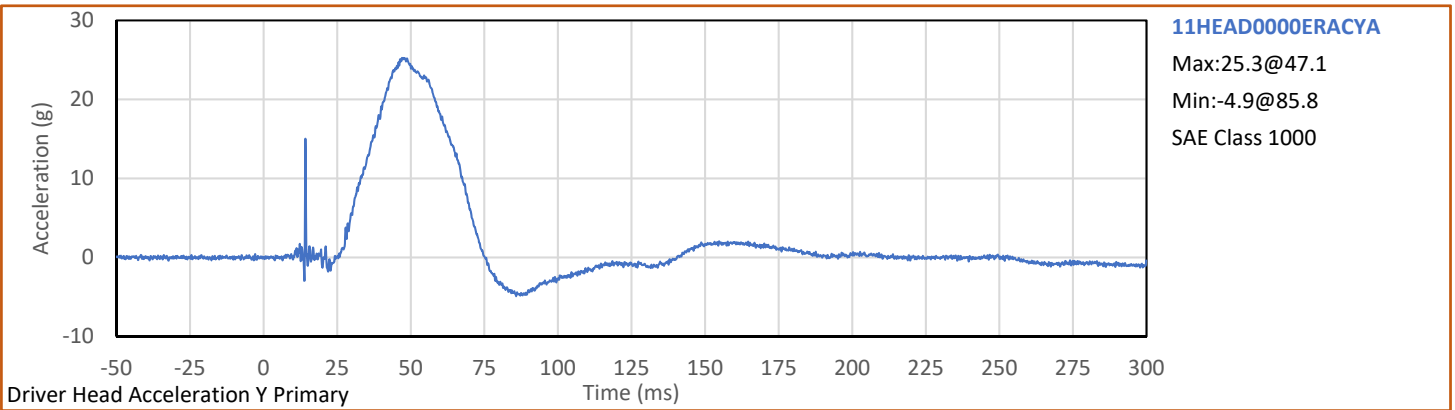
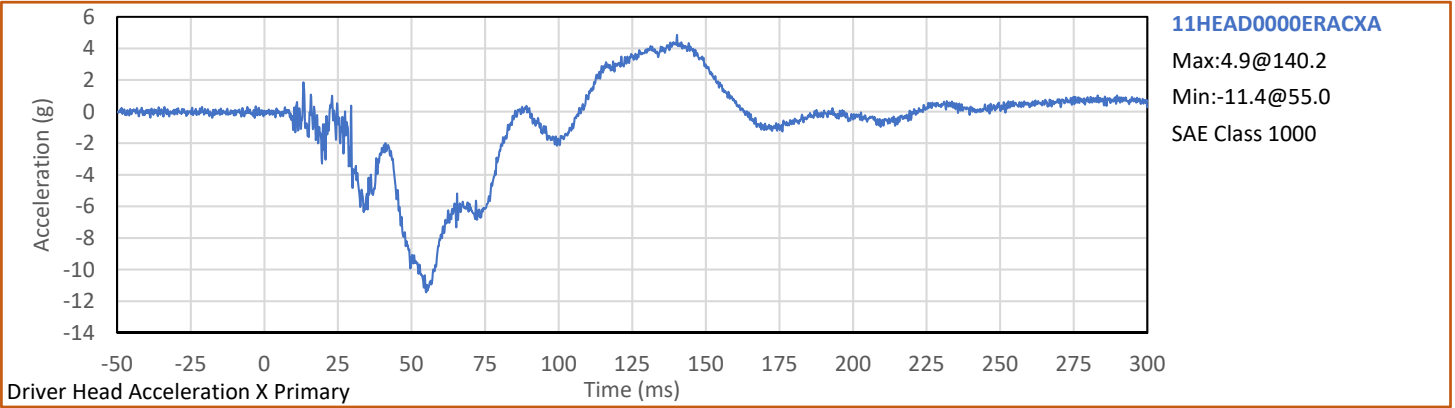
MDB Center of Gravity Acceleration (Z)

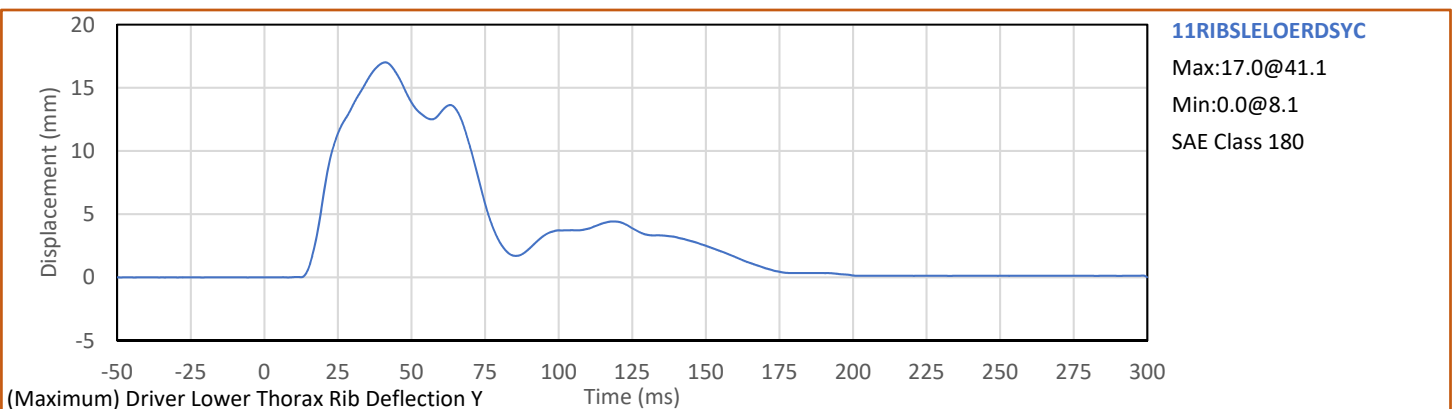
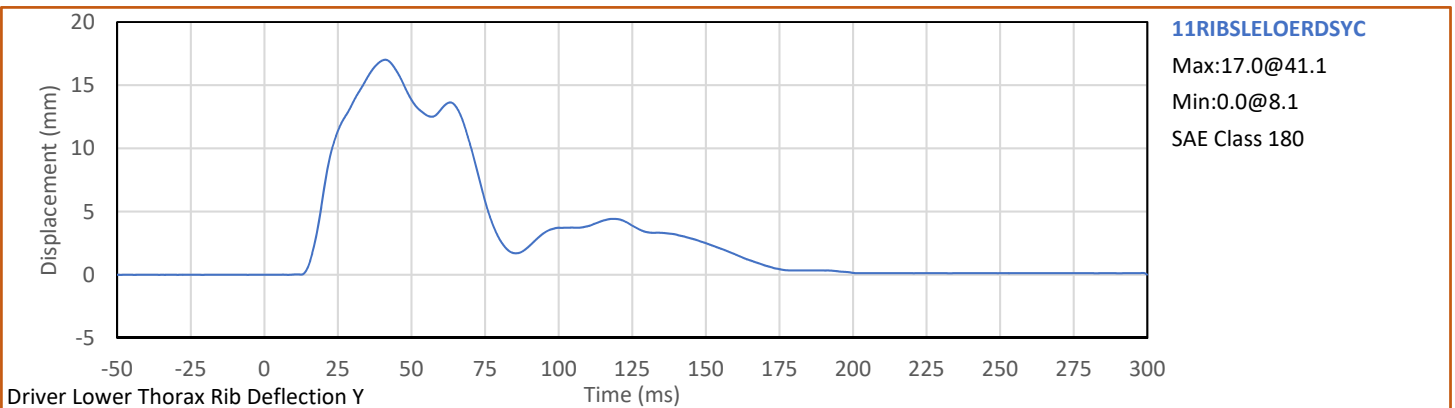
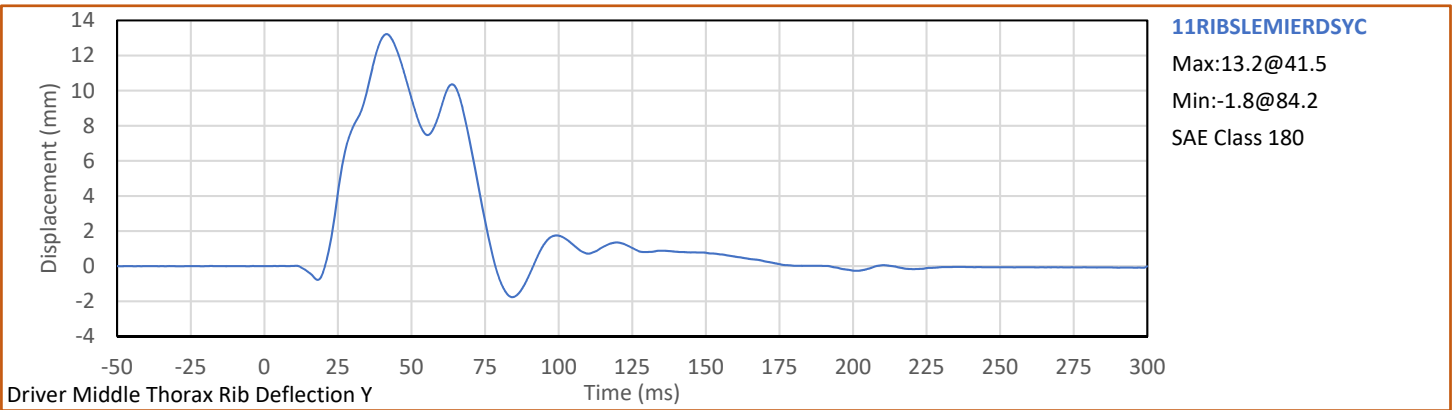
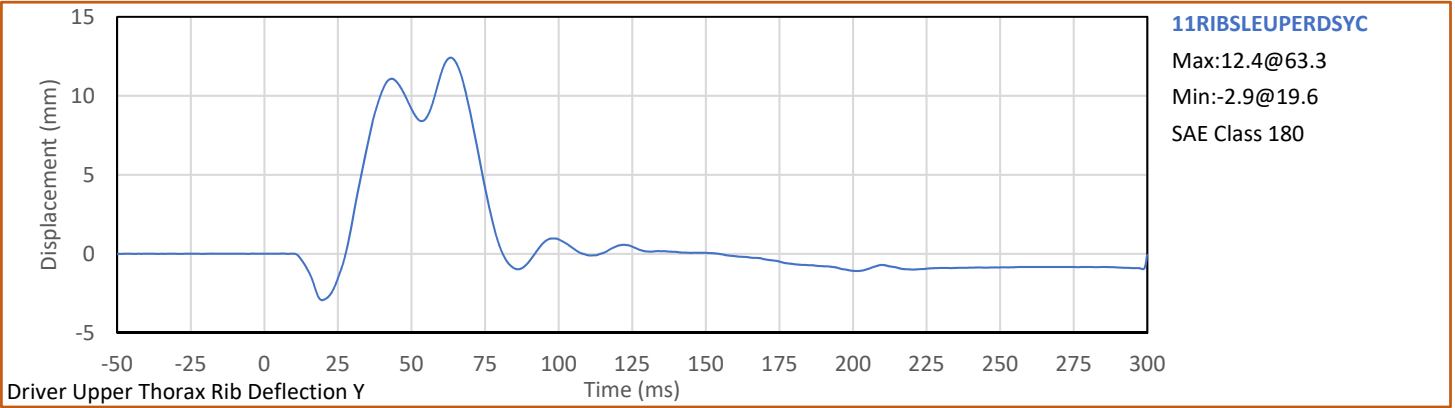
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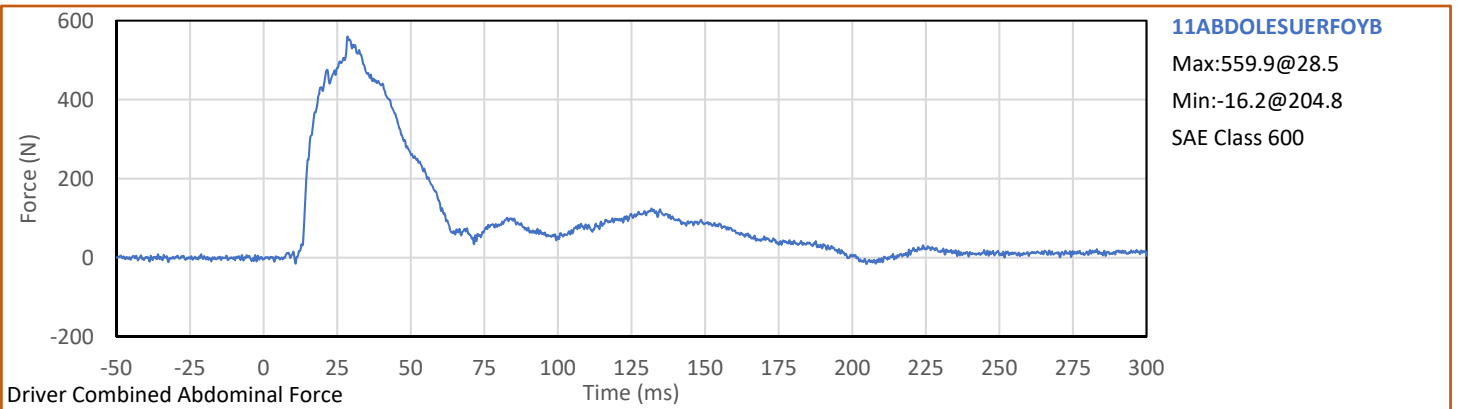
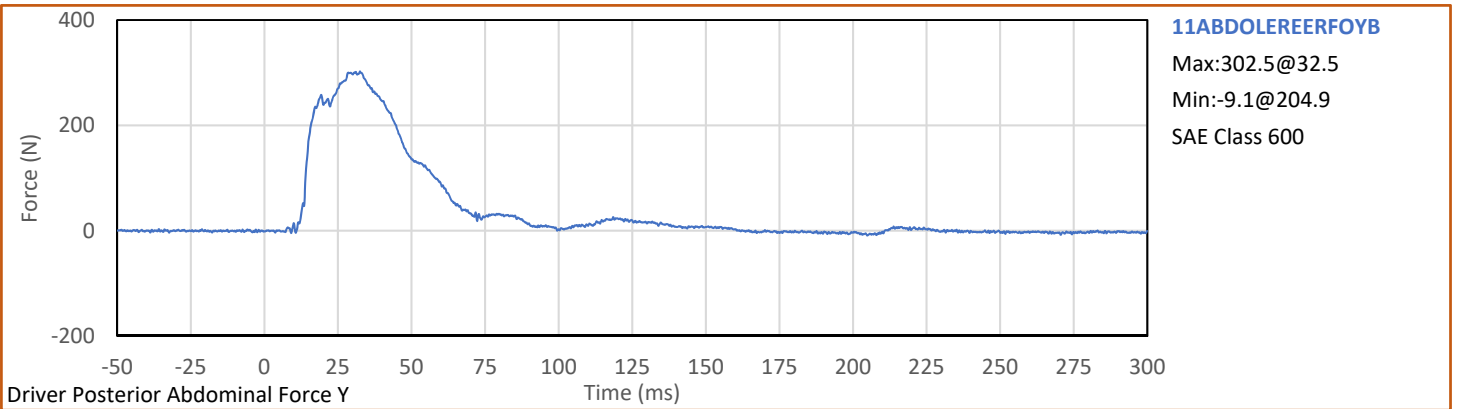
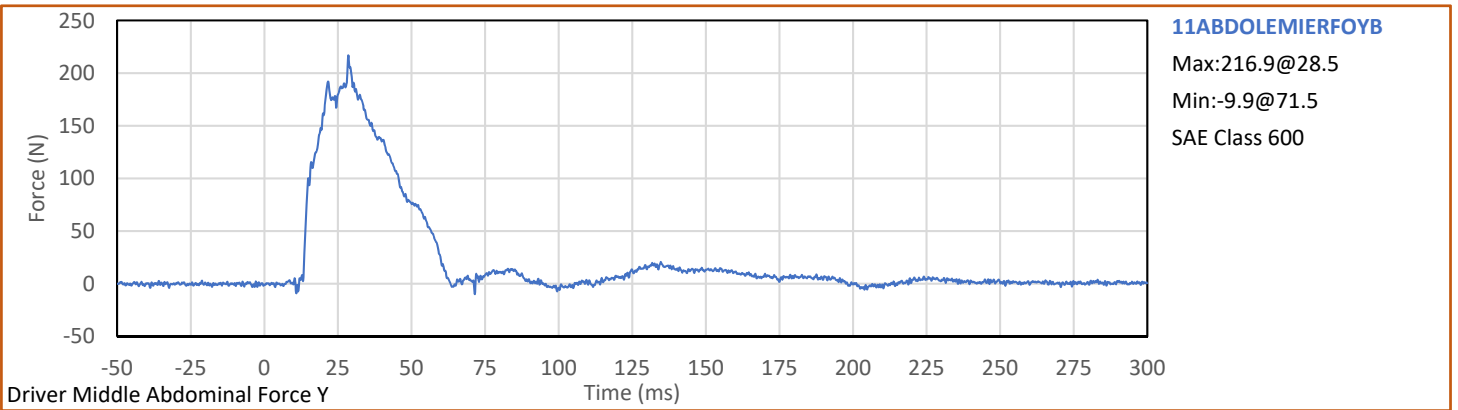
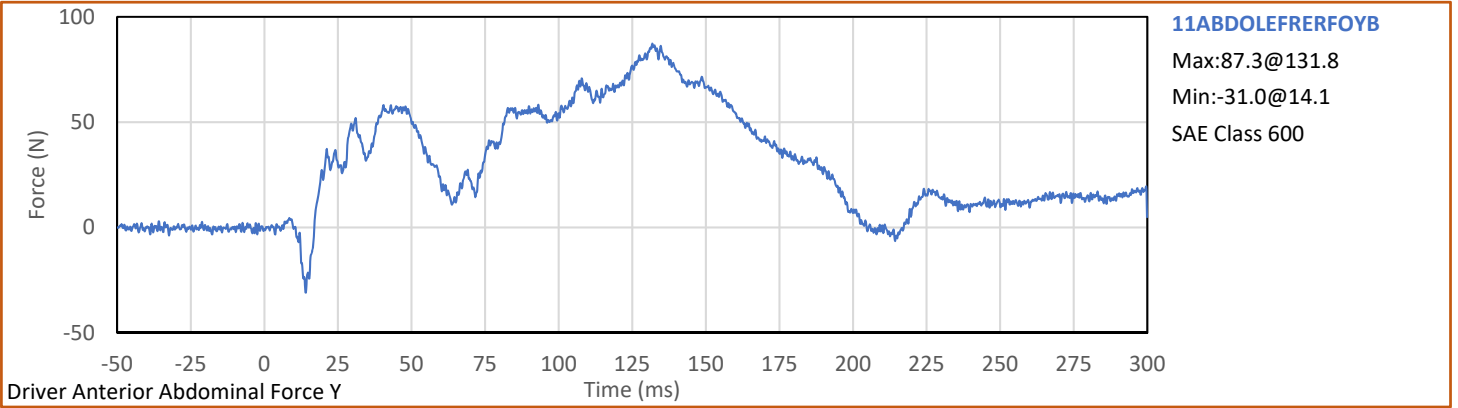
MDB Rear Acceleration (Y)

Left MDB Contact Switch

Right MDB Contact Switch

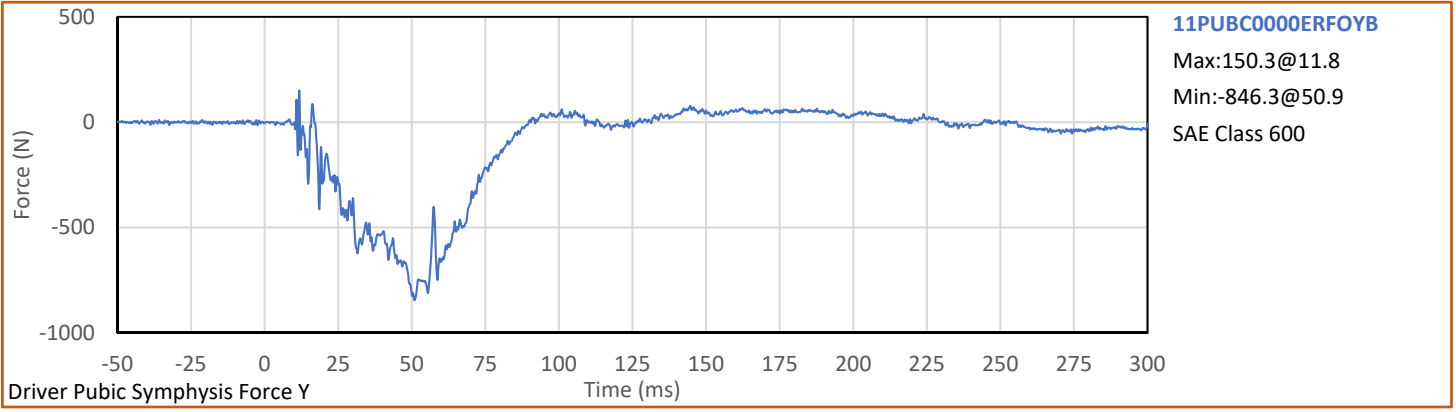


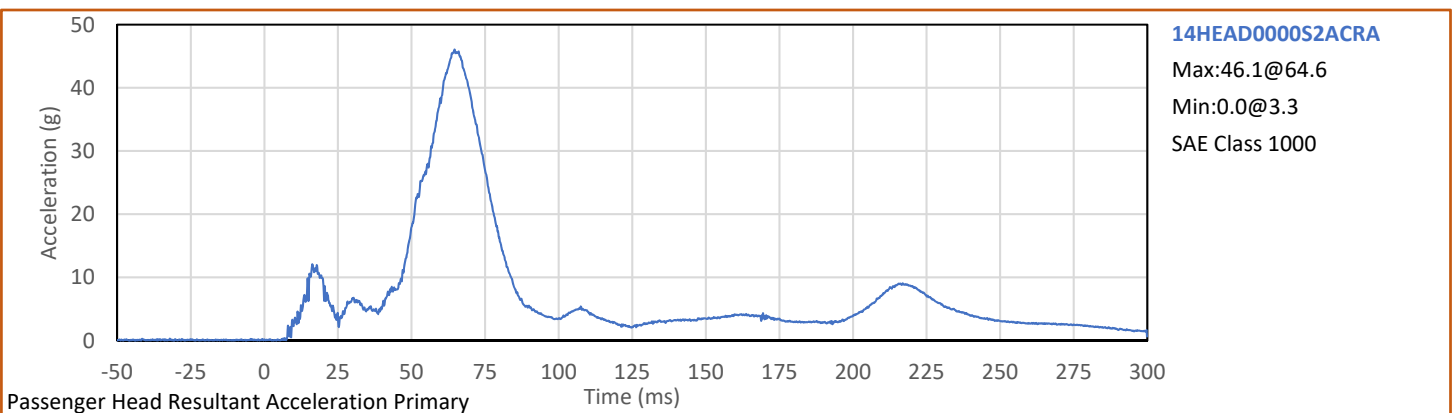
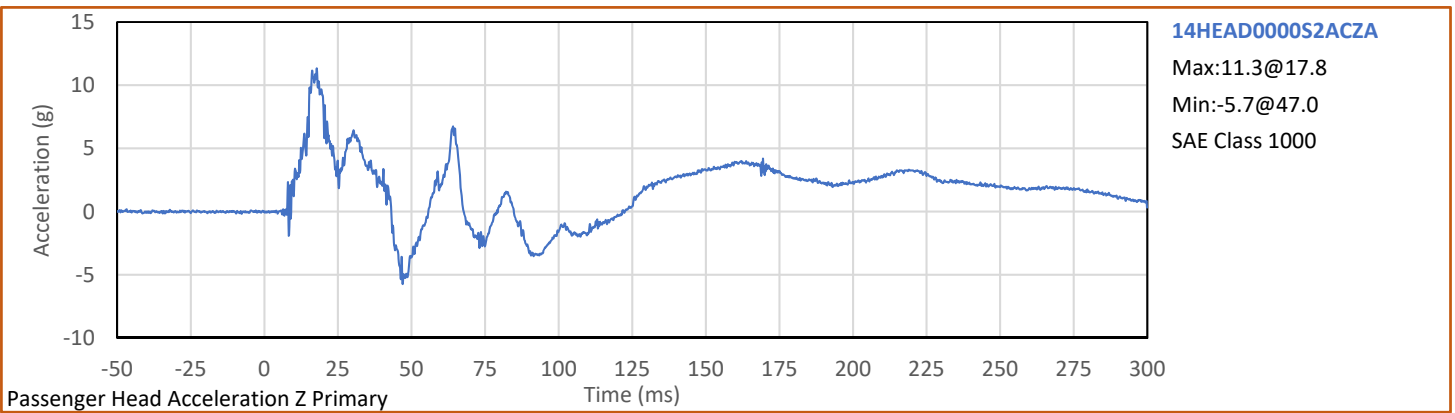
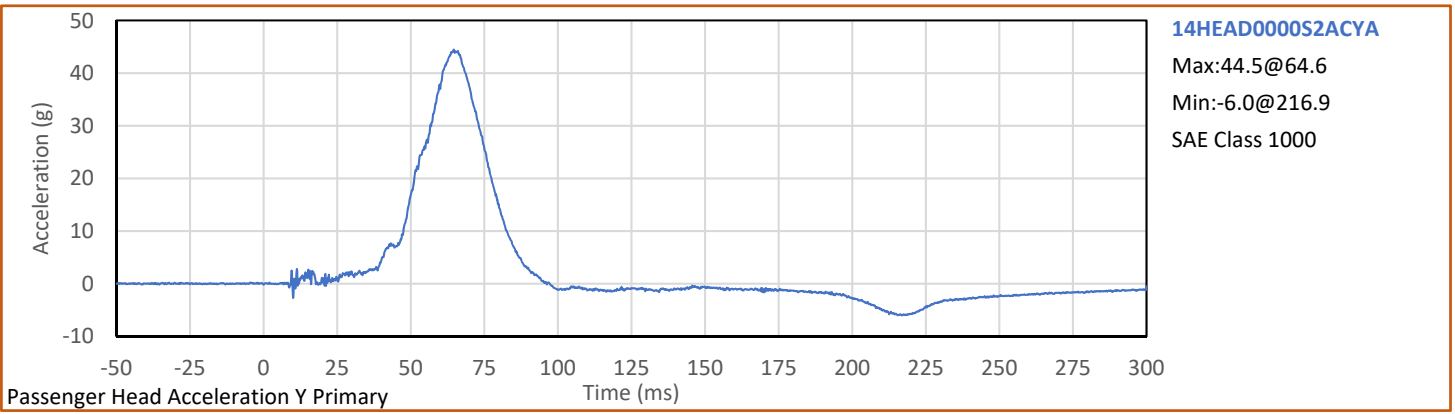
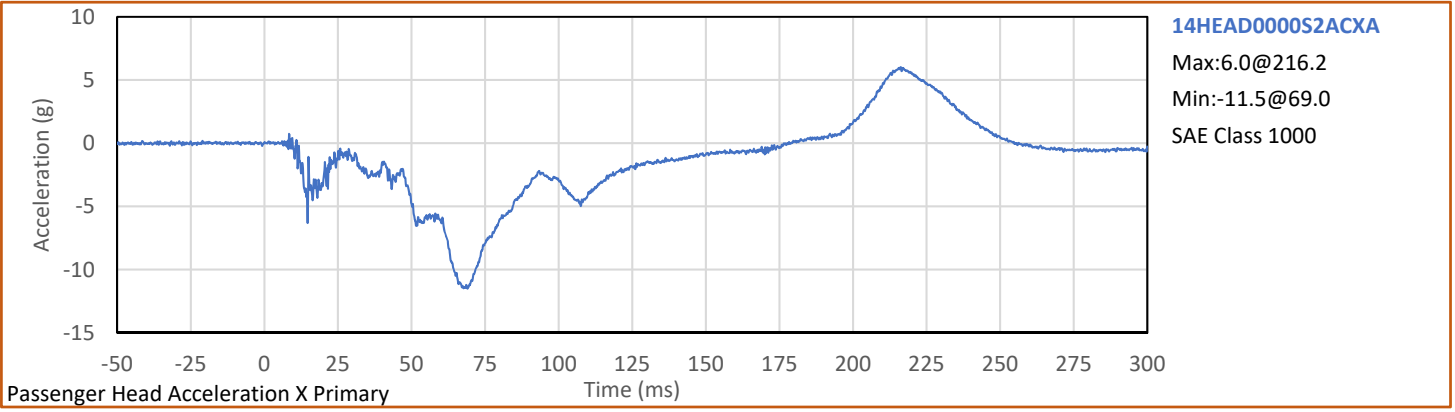


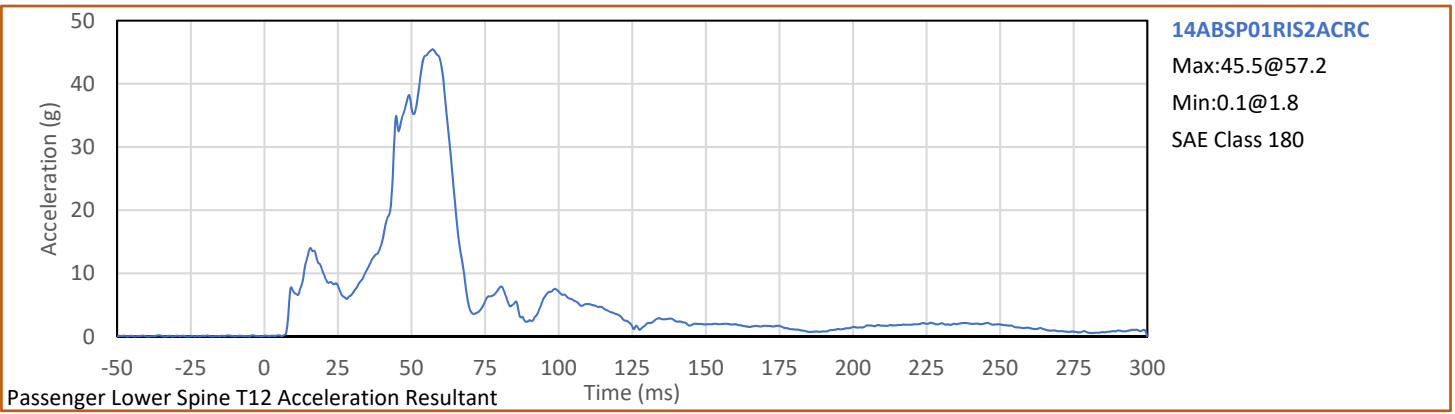
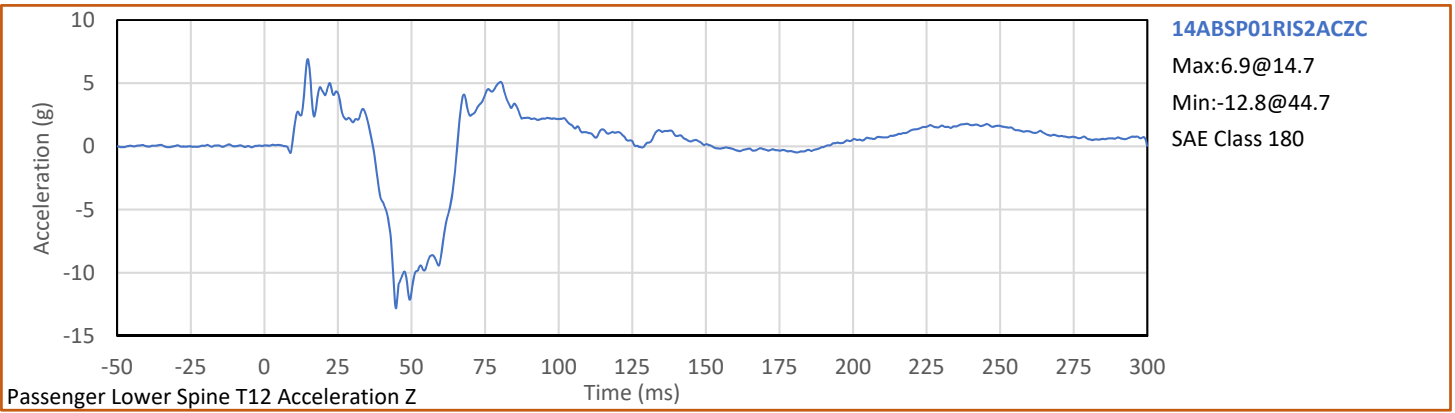
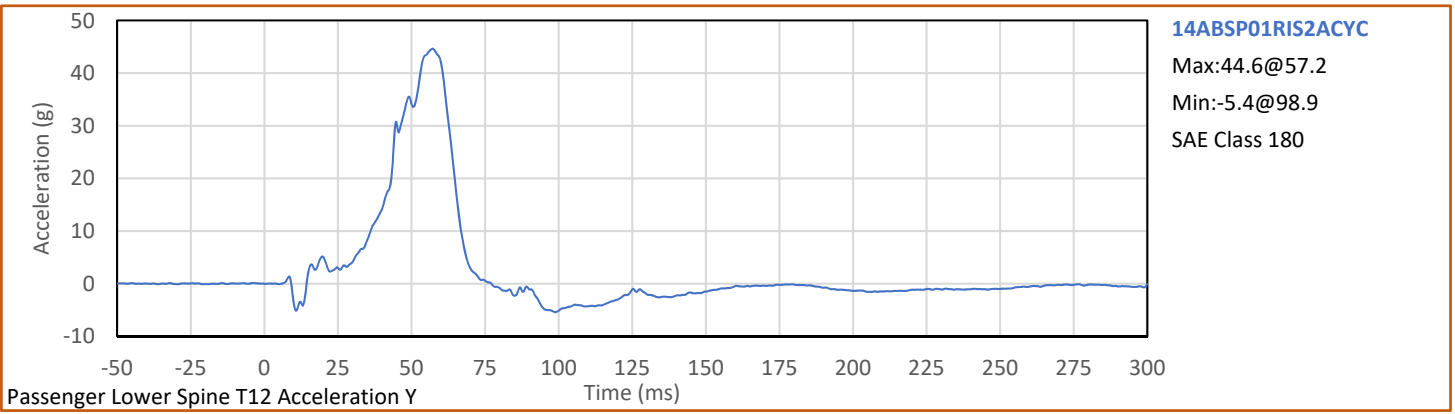
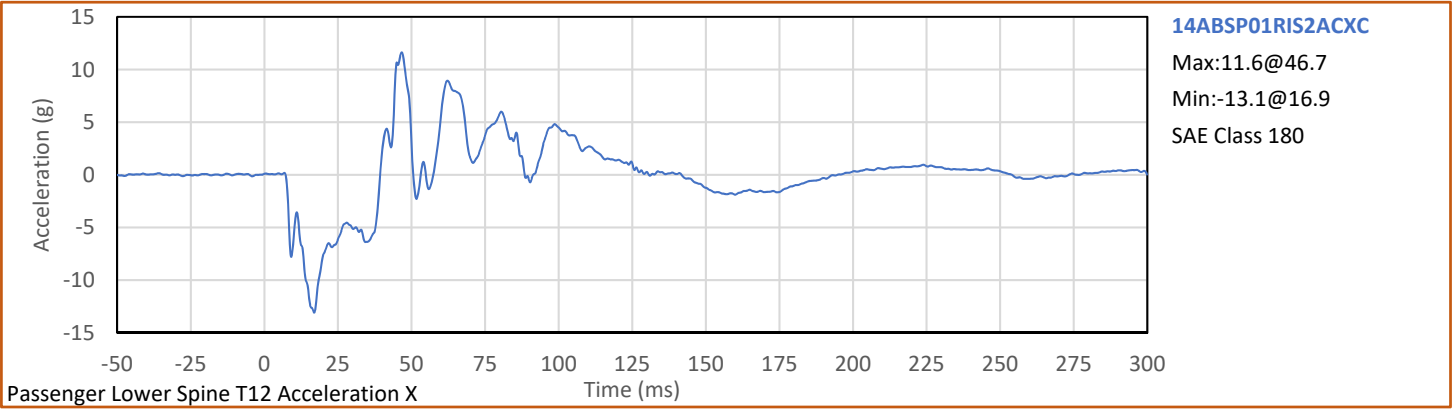


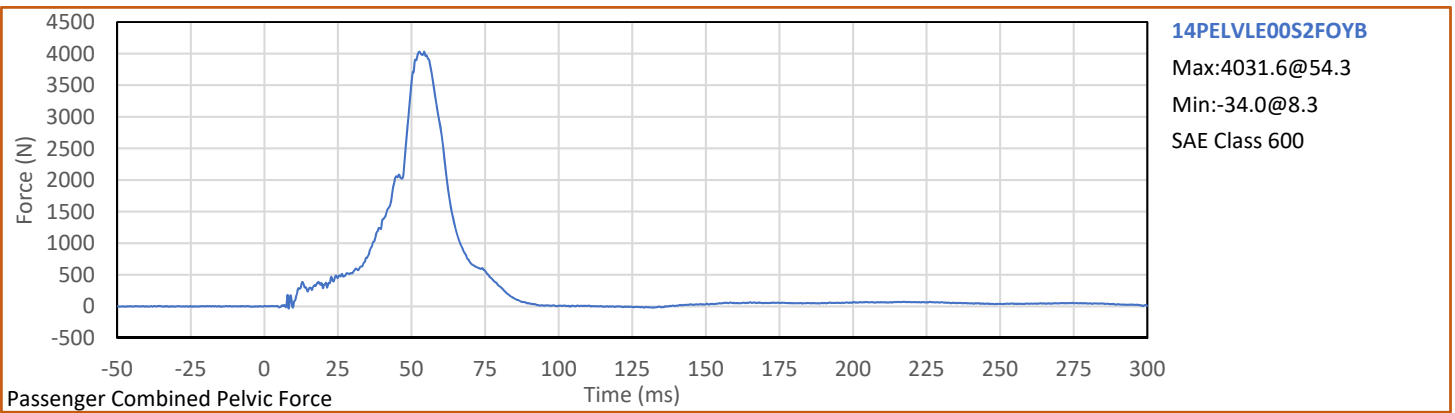
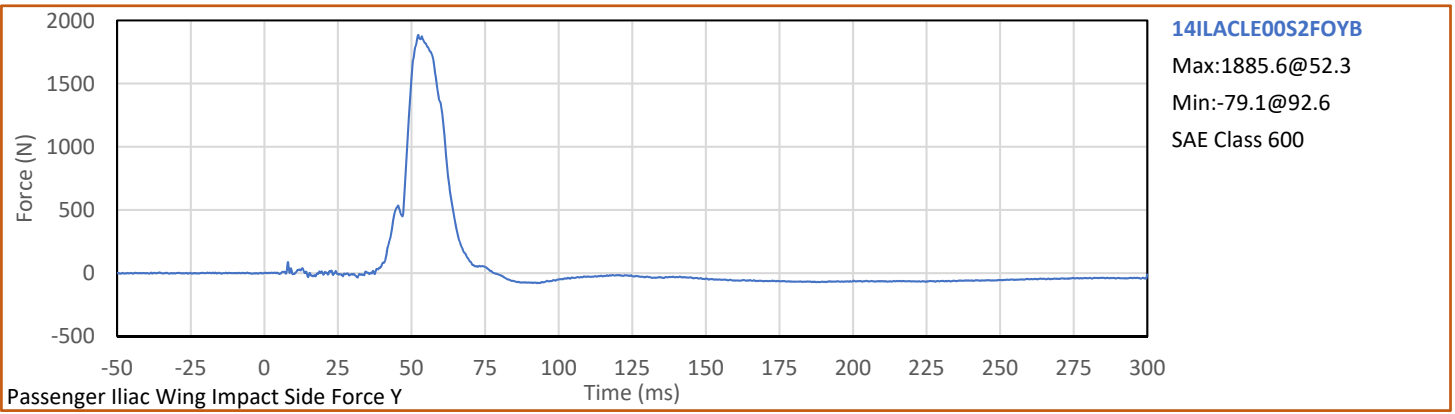
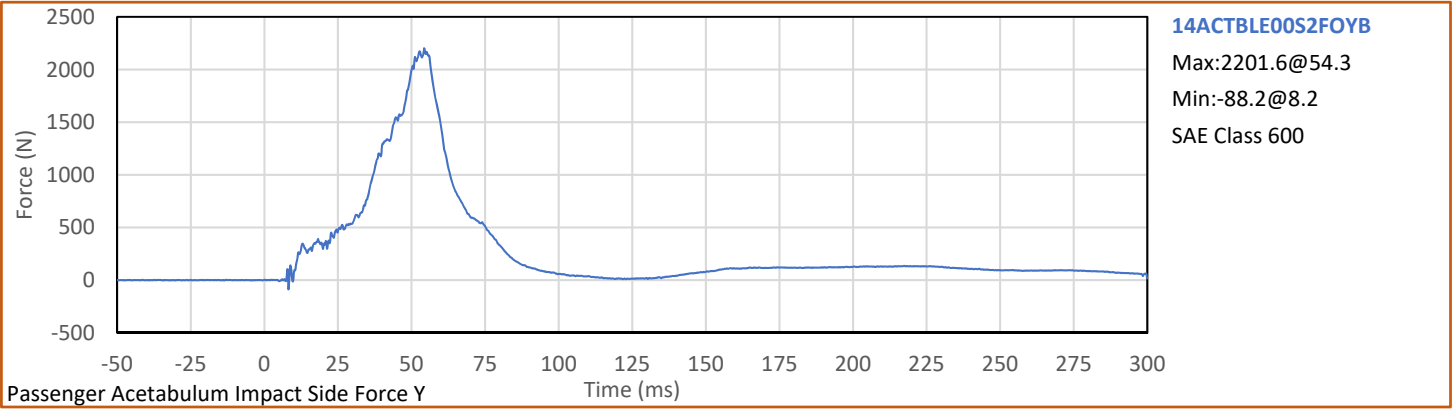
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Test Program: NCAP MDB Side Impact Test

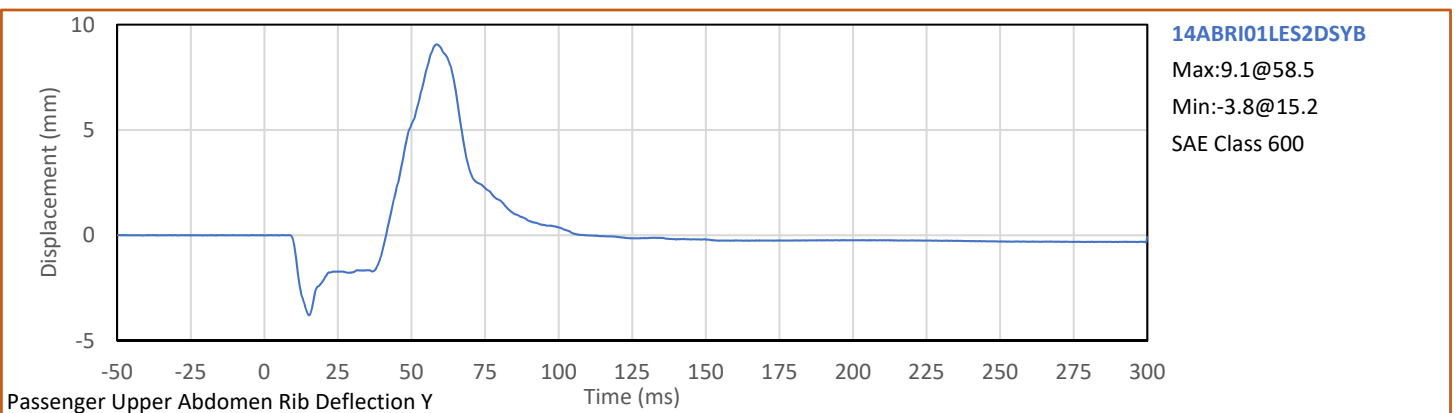
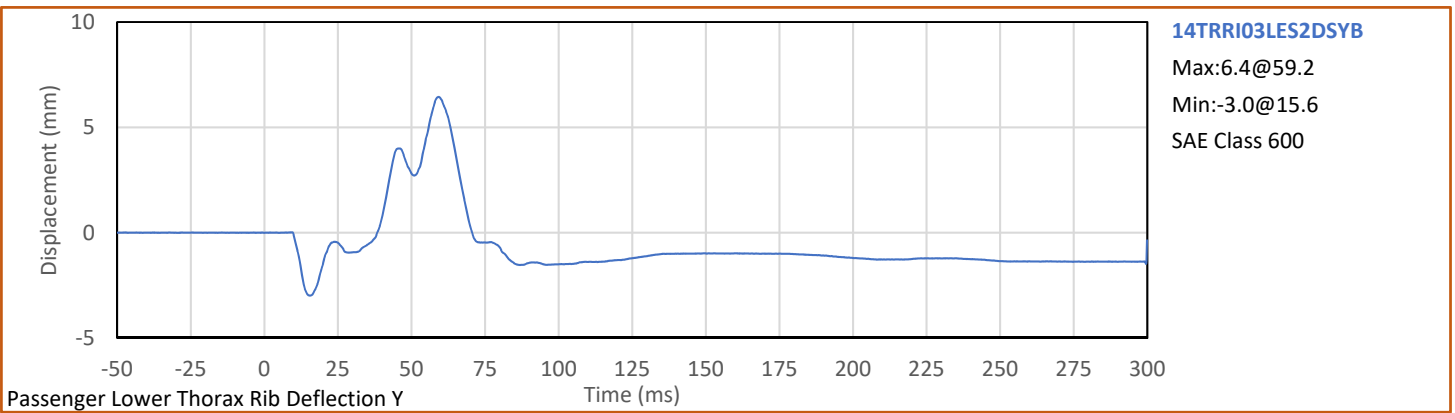
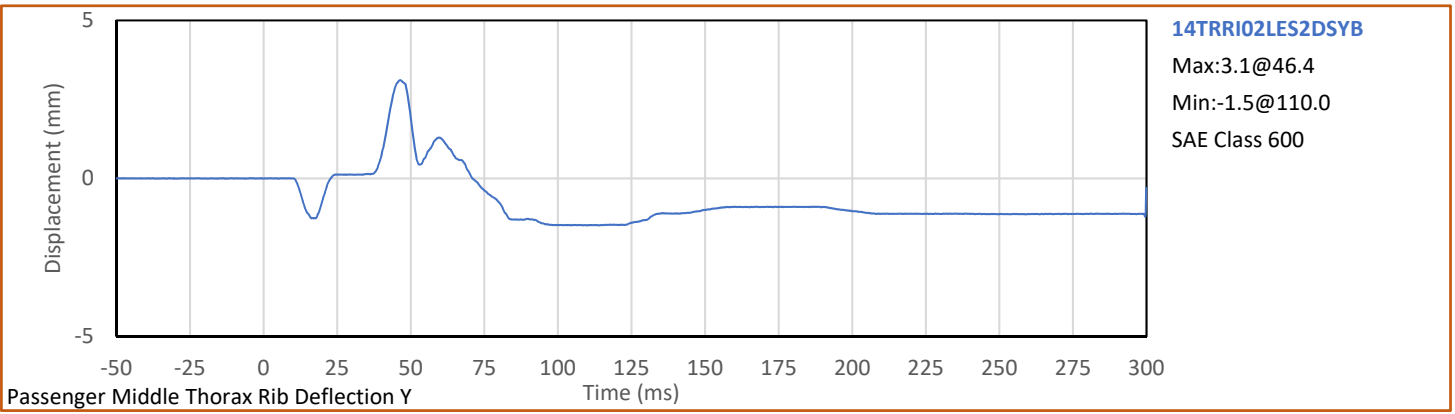
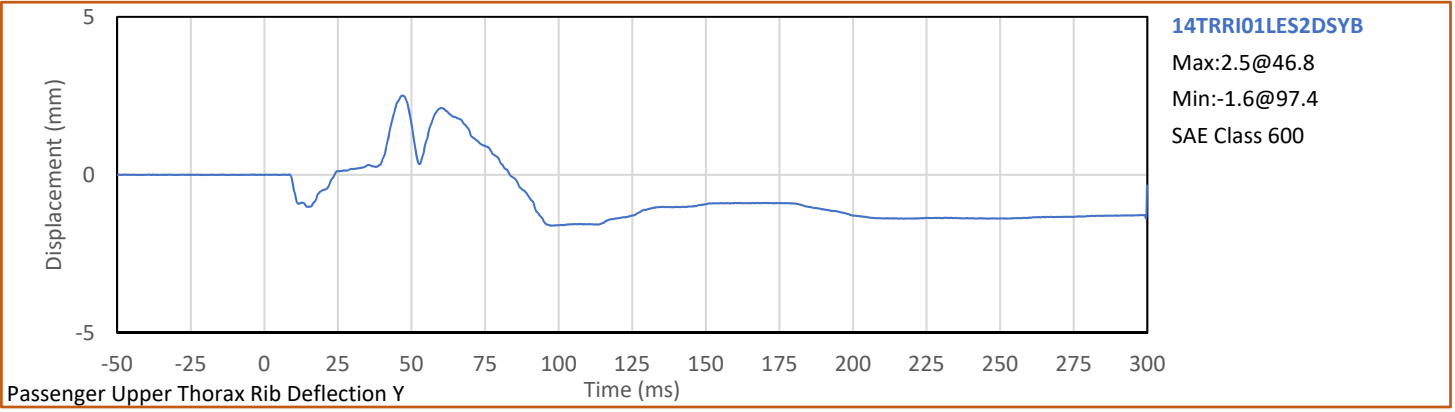
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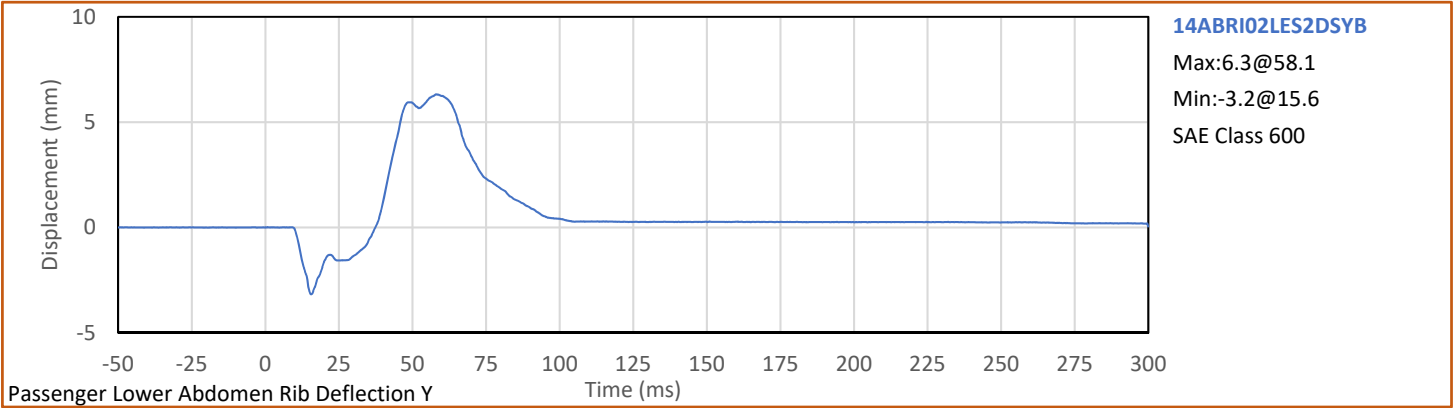
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Test Program: NCAP MDB Side Impact Test

Test Date: 1/22/2020

IDIADA

KARCO



APPENDIX C
ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA


APPENDIX C
Pre-Test ATD Qualification and Performance Verification
ES-2re 50th Male Side Impact ATD
S/N: F035

ATD Serial No.: F035

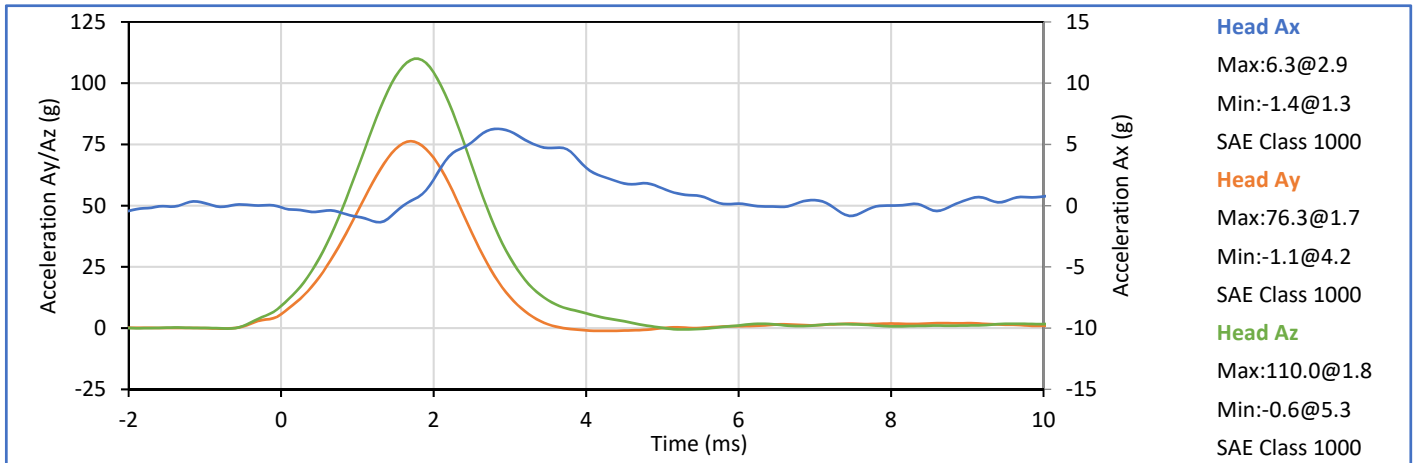
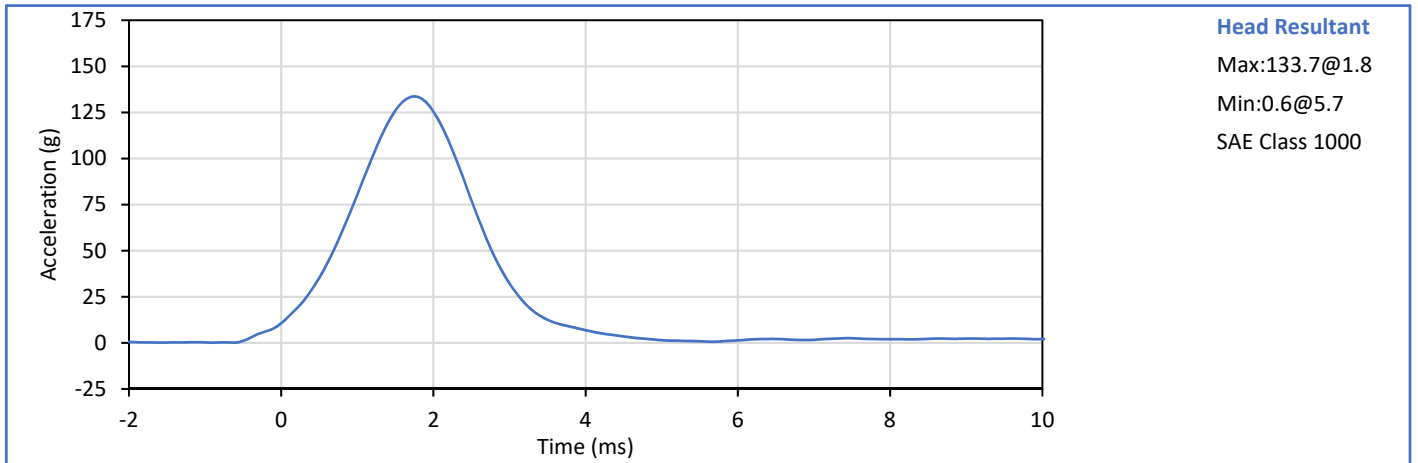
Test Date: 2020-01-13


Tested Parameter	Units	Spec Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	32	Pass
1 - Sitting Height	mm	900	918	909	Pass
2 - Seat to Shoulder Joint	mm	558	572	565	Pass
3 - Seat to Lower Face of Thoracic Spine Box	mm	346	356	350	Pass
4 - Seat to Hip Joint (bolt center)	mm	97	103	101	Pass
5 - Sole to Seat, Sitting	mm	433	451	443	Pass
6 - Head Width	mm	152	158	156	Pass
7 - Shoulder/Arm Width	mm	461	479	475	Pass
8 - Thorax Width	mm	322	332	326	Pass
9 - Abdomen Width	mm	273	287	277	Pass
10 - Pelvis Lap Width	mm	359	373	365	Pass
11 - Head Depth	mm	196	206	200	Pass
12 - Thorax Depth	mm	262	272	268	Pass
13 - Abdomen Depth	mm	194	204	198	Pass
14 - Pelvis Depth	mm	235	245	240	Pass
15 - Back of Buttocks to Hip Joint (bolt Center)	mm	150	160	158	Pass
16 - Back of Buttocks to Front Knee	mm	597	615	613	Pass
				Overall Test Results	Pass


Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

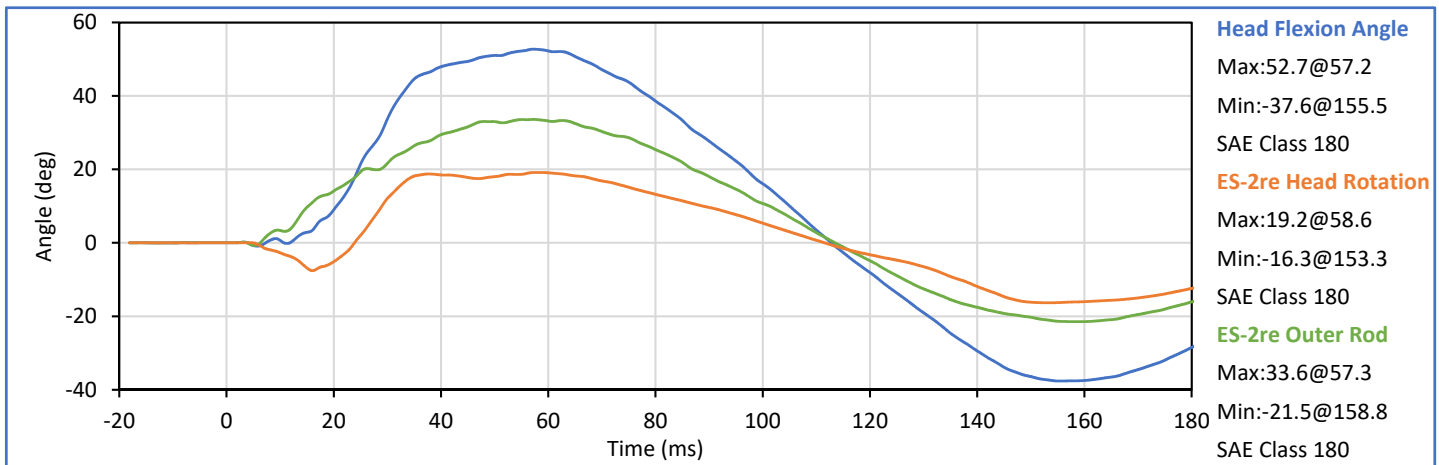
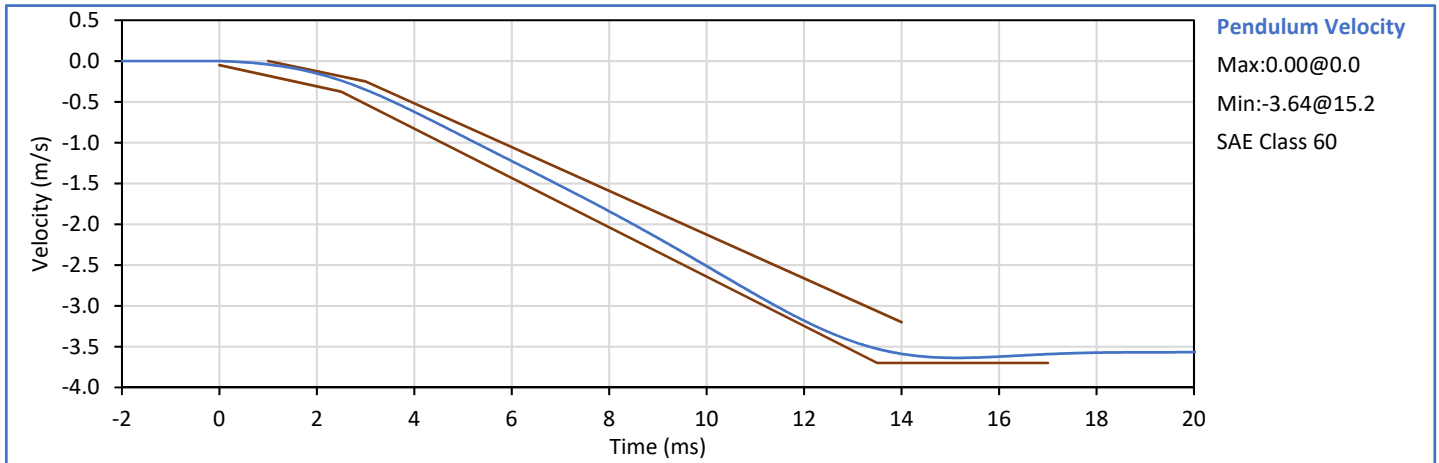
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.1	Pass
Laboratory Relative Humidity	%	10	70	23	Pass
Peak Resultant Acceleration	g	125.0	155.0	133.7	Pass
Peak Head Ax	g	-15.0	15.0	6.3	Pass
Oscillations After Main Pulse	%	0.0	15.0	1.9	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
Overall Test Results					Pass





Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

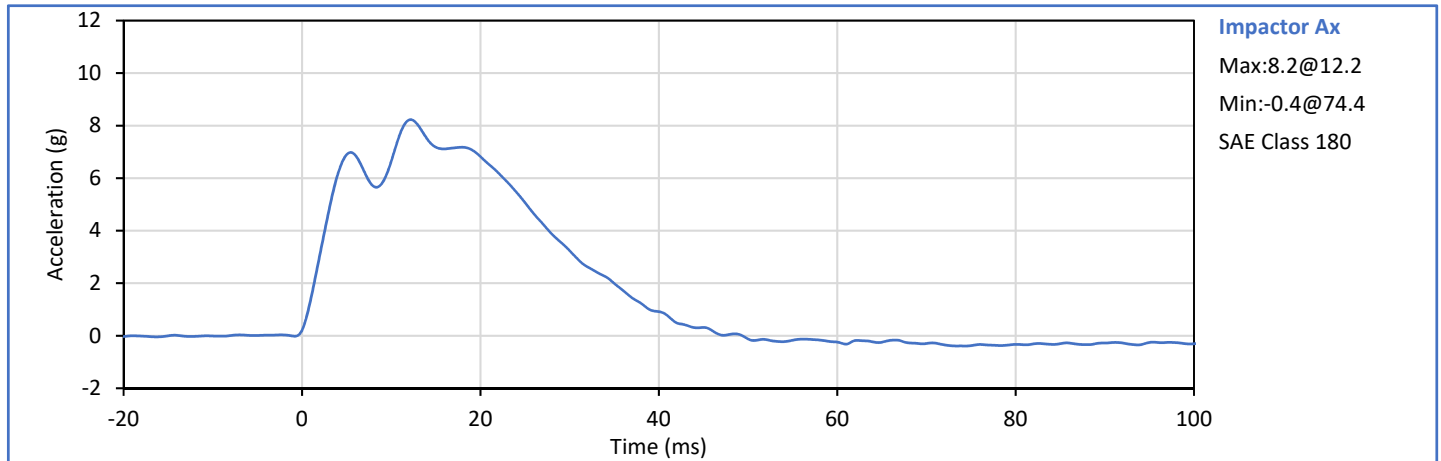
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
Pendulum Velocity	m/s	3.30	3.50	3.46	Pass
Peak Headform Flexion	deg	49.0	59.0	52.7	Pass
Time of Peak Headform Flexion	ms	54.0	66.0	57.2	Pass
Flexion Decay (Peak to zero)	ms	53.0	88.0	55.6	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 Relative Humidity	%	10	70	22	Pass
Impactor Velocity	m/s	4.20	4.40	4.30	Pass
Peak Impactor Ax	g	7.5	10.5	8.2	Pass
Overall Test Results					Pass



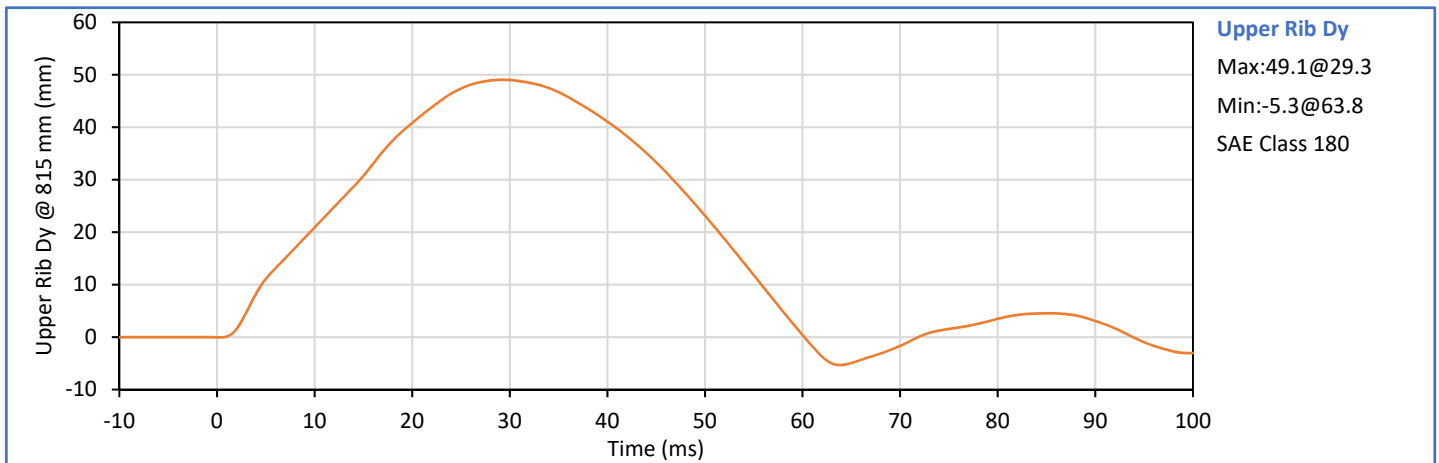
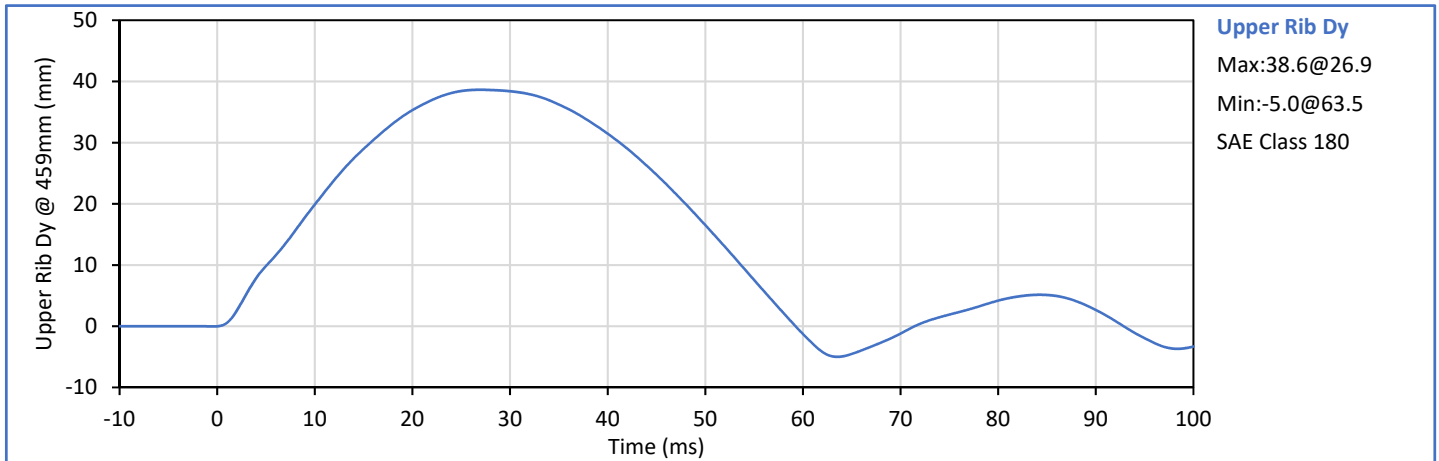
Technician: *J. Hernandez*
J. Hernandez

Approved By: *P. Puzzuto*
P. Puzzuto

ATD Serial No.: F035

Test Date: 2020-01-14

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	32	Pass
Upper Rib Dy @ 459mm	mm	36.0	40.0	38.6	Pass
Upper Rib Dy @ 815mm	mm	46.0	51.0	49.1	Pass
Overall Test Results					Pass



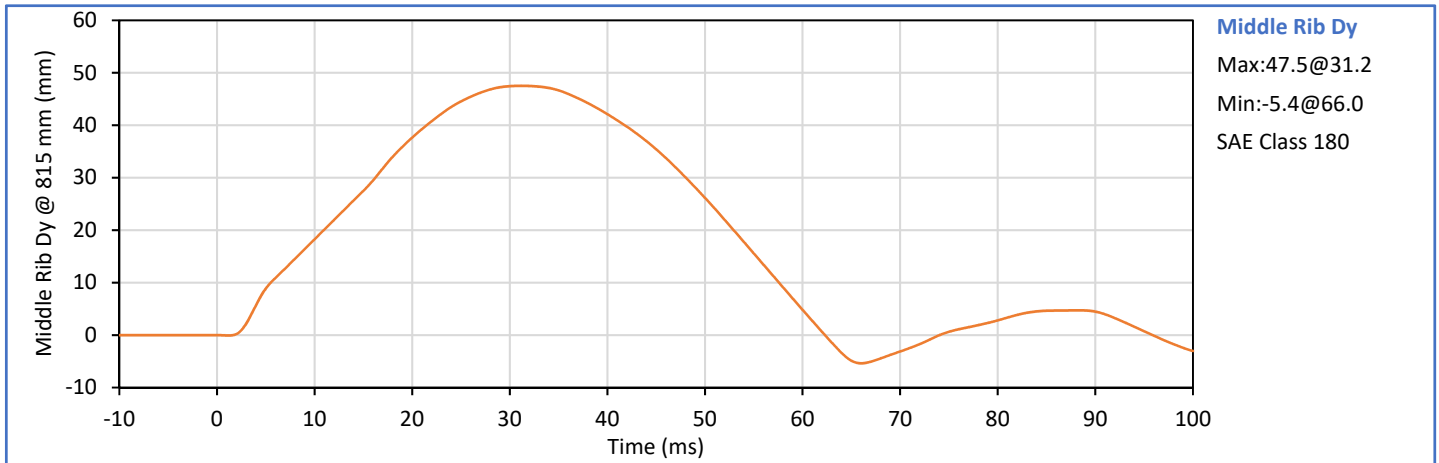
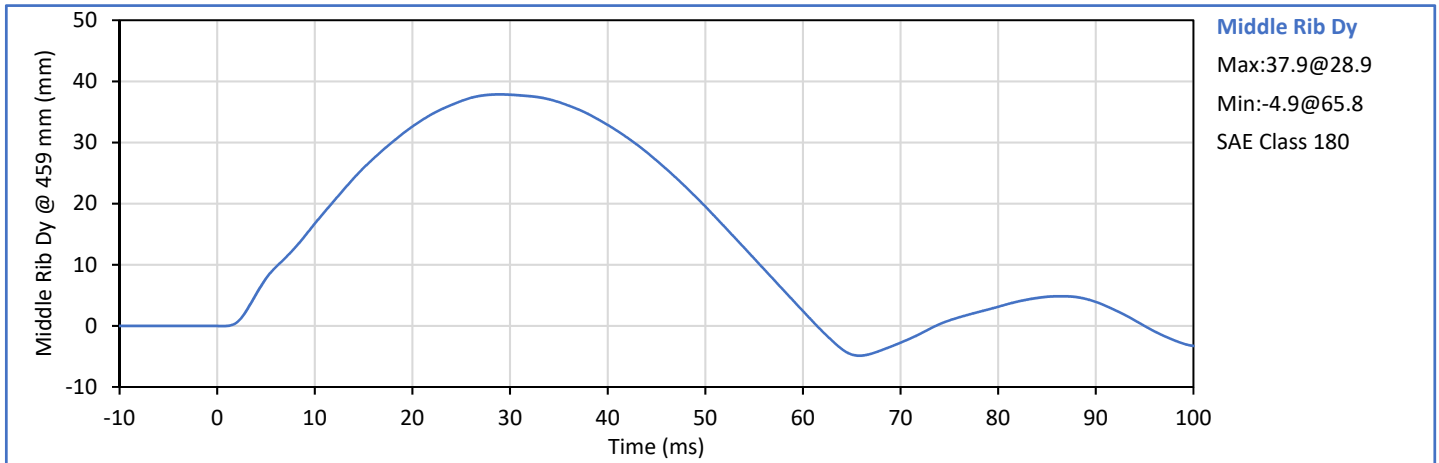
Technician: *J. Hernandez*
J. Hernandez

Approved By: *P. Puzzuto*
P. Puzzuto

ATD Serial No.: F035

Test Date: 2020-01-14

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	32	Pass
Middle Rib Dy @ 459mm	mm	36.0	40.0	37.9	Pass
Middle Rib Dy @ 815mm	mm	46.0	51.0	47.5	Pass
Overall Test Results					Pass



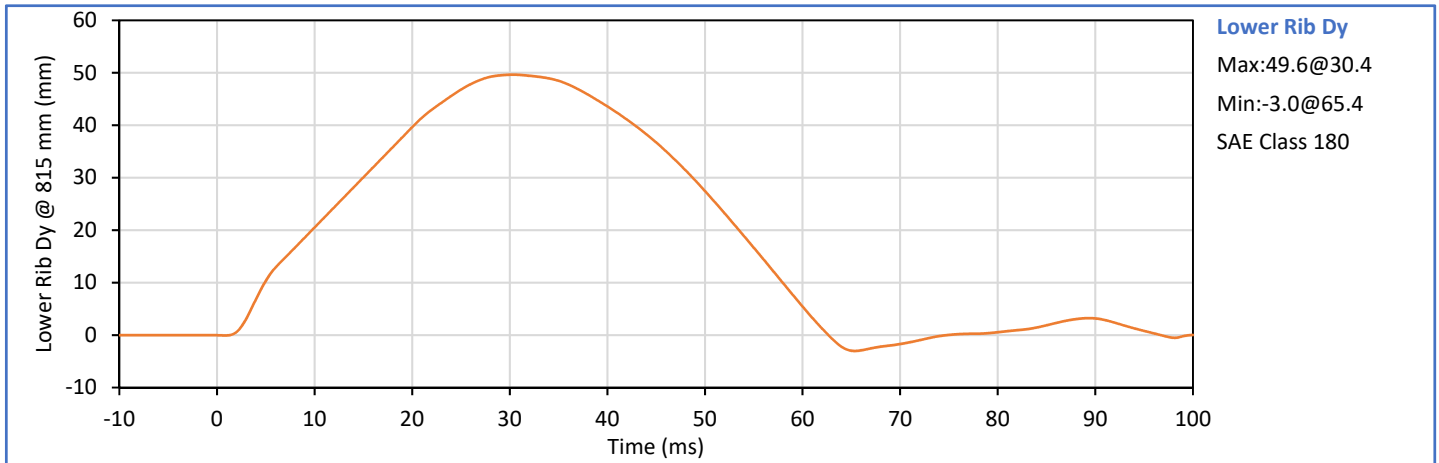
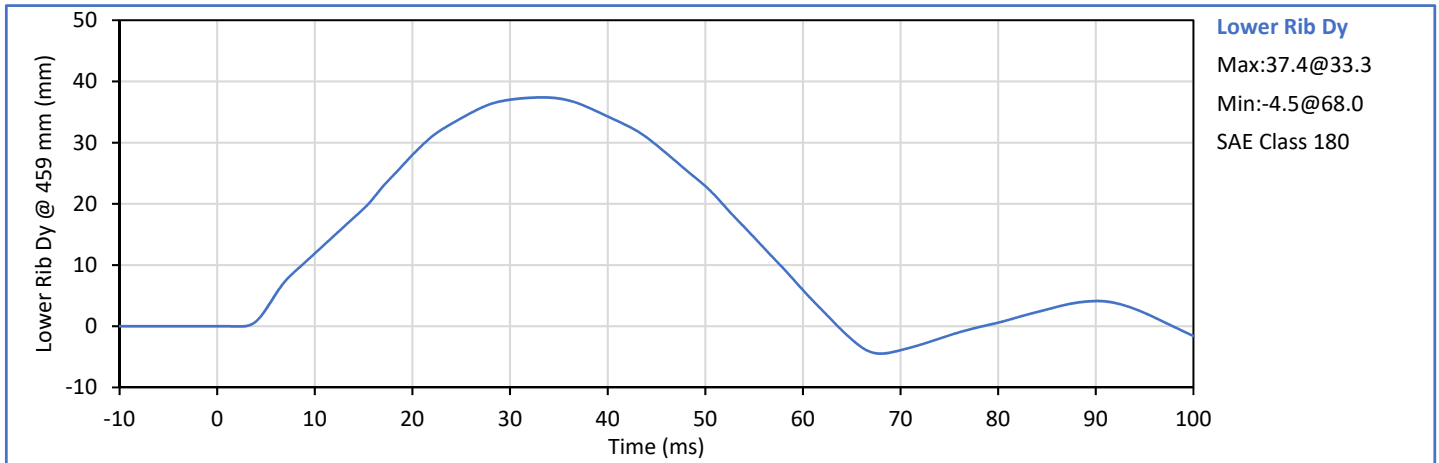
Technician: *J. Hernandez*
J. Hernandez

Approved By: *P. Puzzuto*
P. Puzzuto

ATD Serial No.: F035

Test Date: 2020-01-14

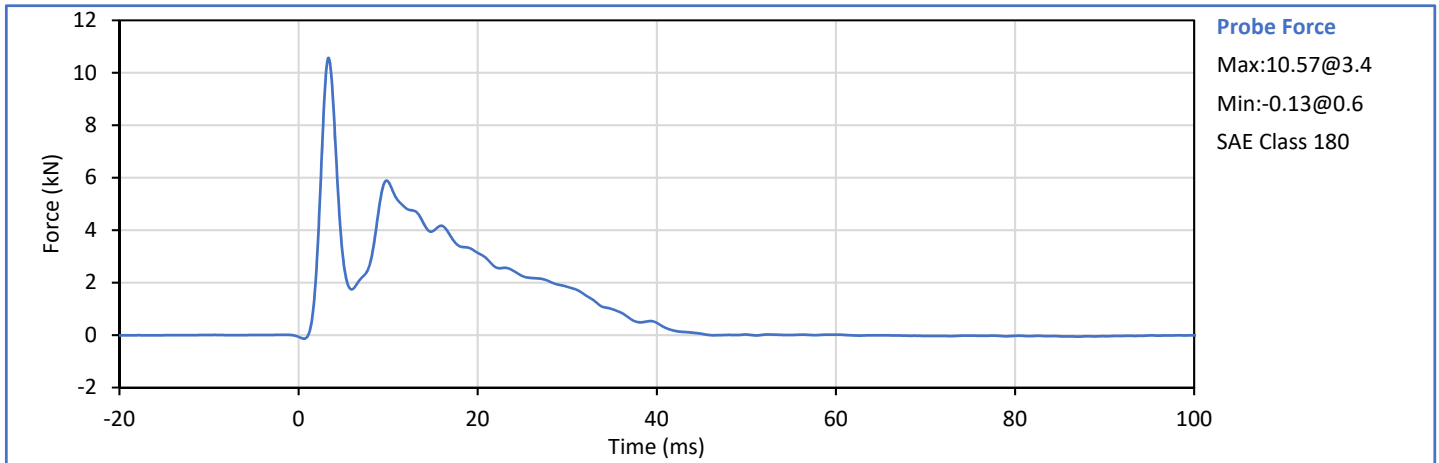
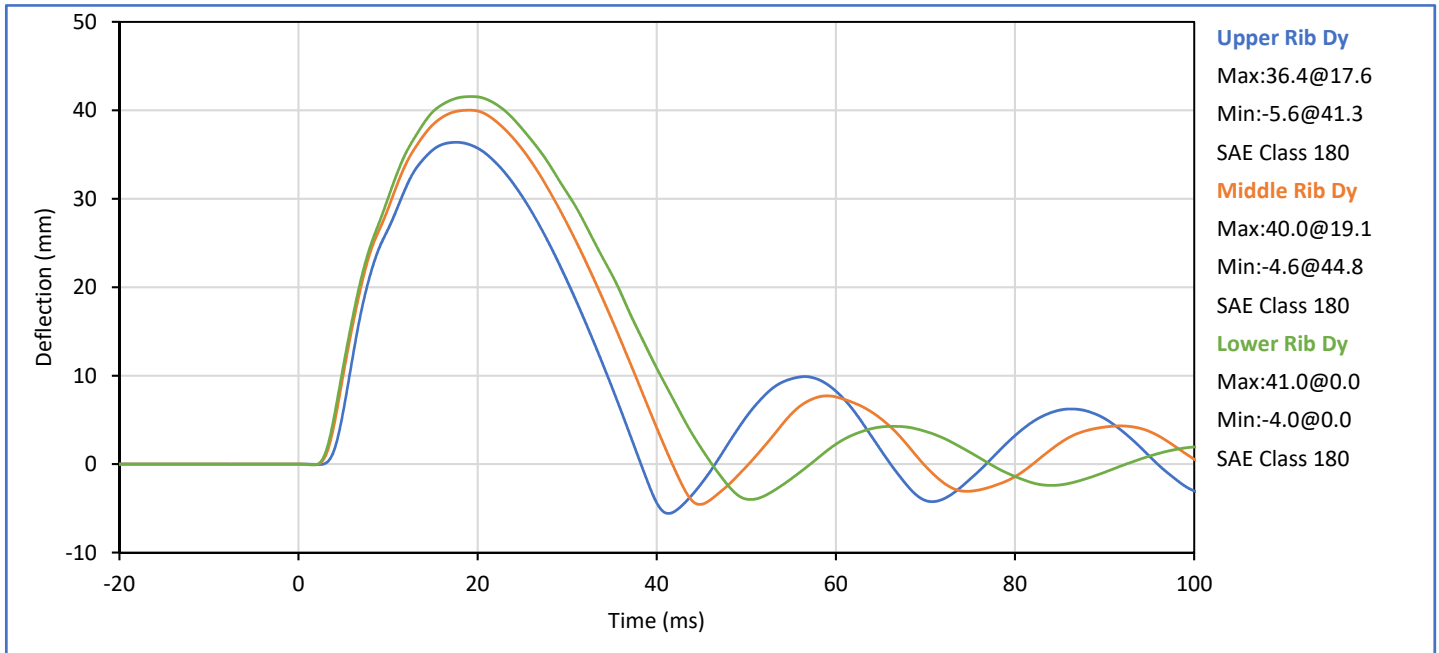
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	32	Pass
Lower Rib Dy @ 459mm	mm	36.0	40.0	37.4	Pass
Lower Rib Dy @ 815mm	mm	46.0	51.0	49.6	Pass
Overall Test Results					Pass

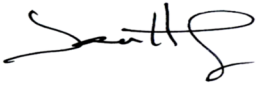



Technician: *J. Hernandez*
J. Hernandez

Approved By: *P. Puzzuto*
P. Puzzuto

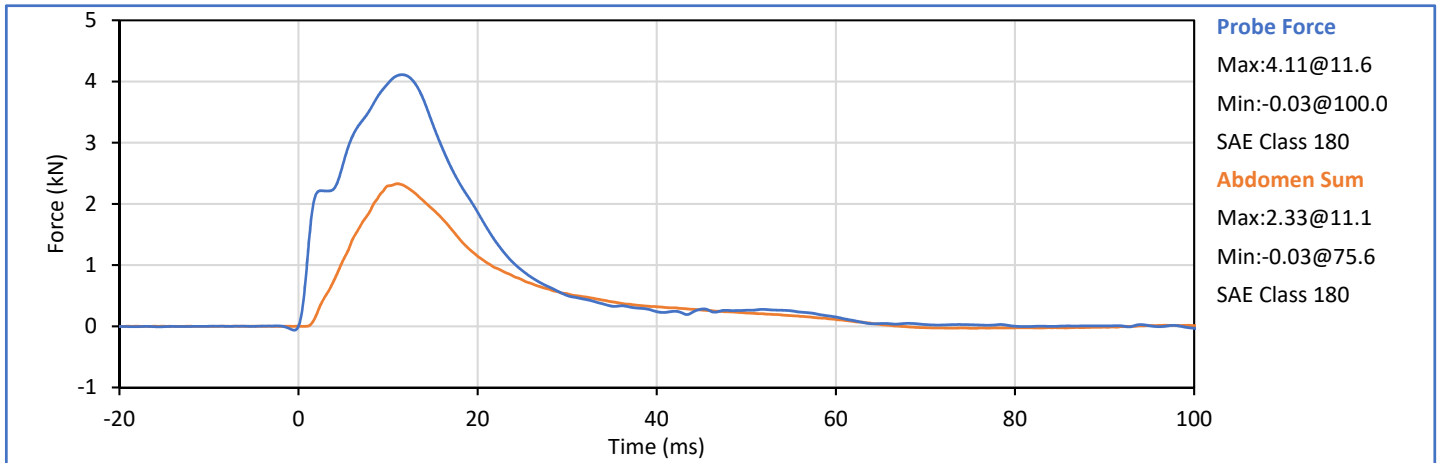
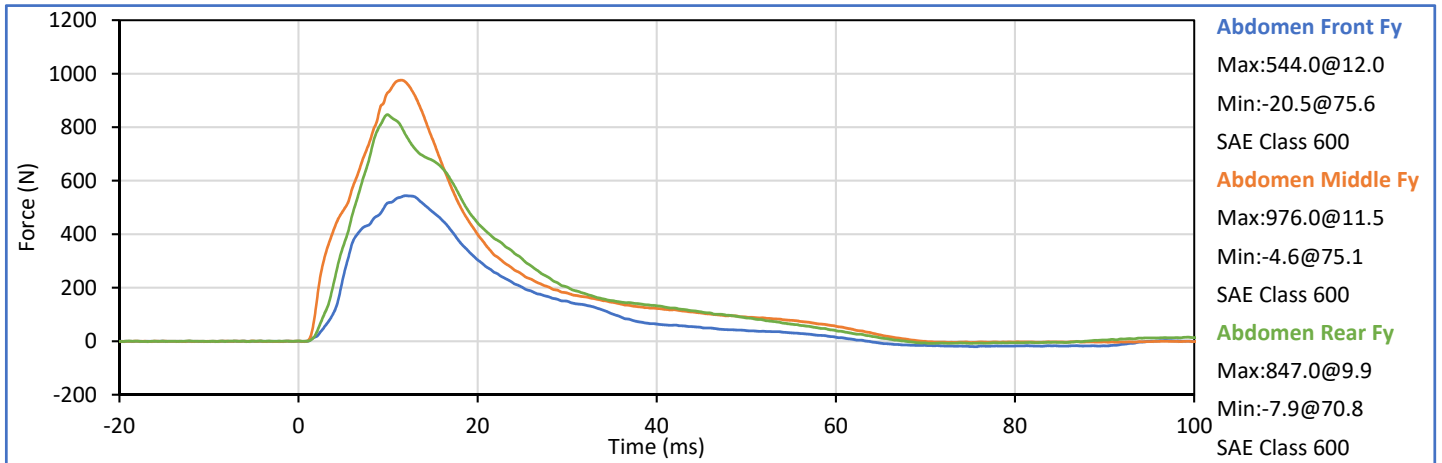
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	32	Pass
Impactor Velocity	m/s	5.40	5.60	5.52	Pass
Peak Upper Rib Dy	mm	34.0	41.0	36.4	Pass
Peak Middle Rib Dy	mm	37.0	45.0	40.0	Pass
Peak Lower Rib Dy	mm	37.0	44.0	41.6	Pass
Peak Impactor Force After 6 ms	kN	5.10	6.20	5.89	Pass
Overall Test Results					Pass

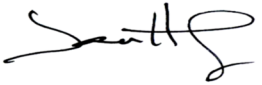



Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

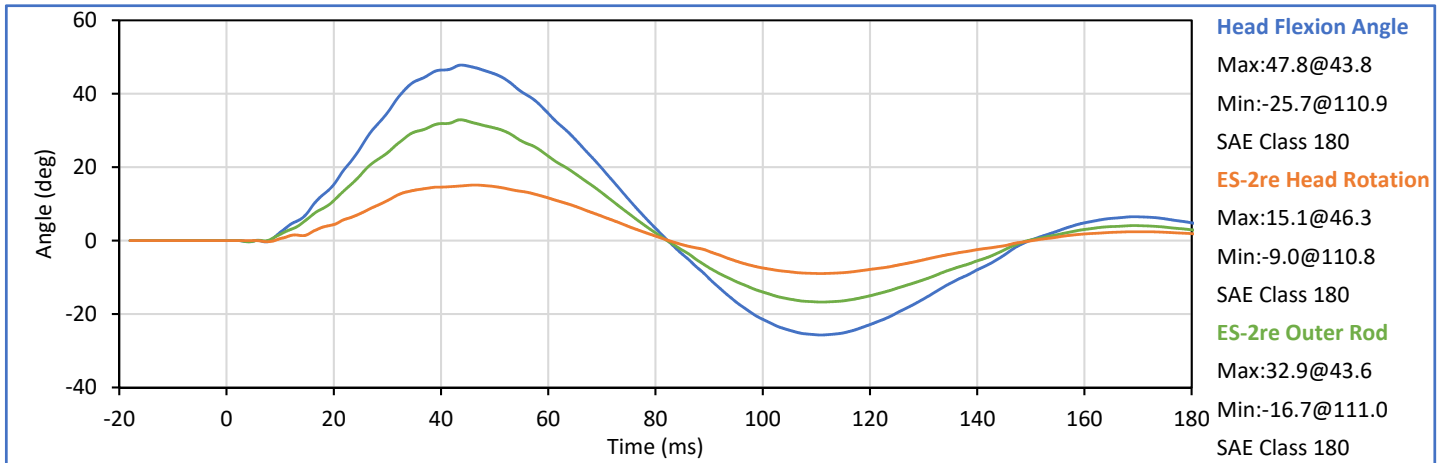
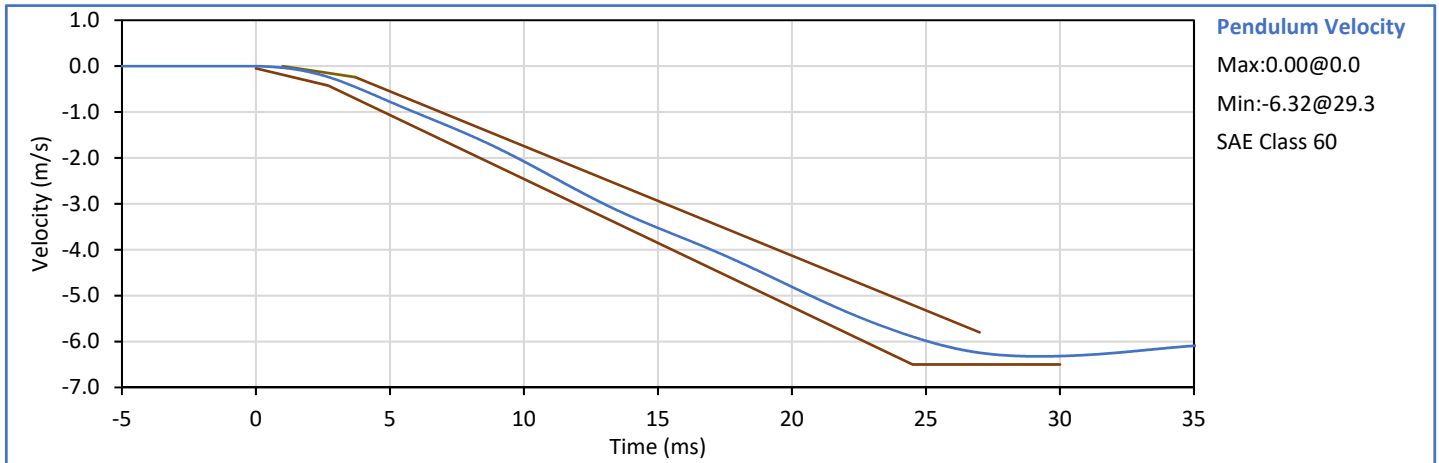
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	26	Pass
Impactor Velocity	m/s	3.90	4.10	4.03	Pass
Peak Impactor Force	kN	4.00	4.80	4.11	Pass
Time of Peak Impactor Force	ms	10.6	13.0	11.6	Pass
Sum of Abdomen Forces	kN	2.20	2.70	2.33	Pass
Time of Peak Sum Abdomen Force	ms	10.0	12.3	11.1	Pass
Overall Test Results					Pass





Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

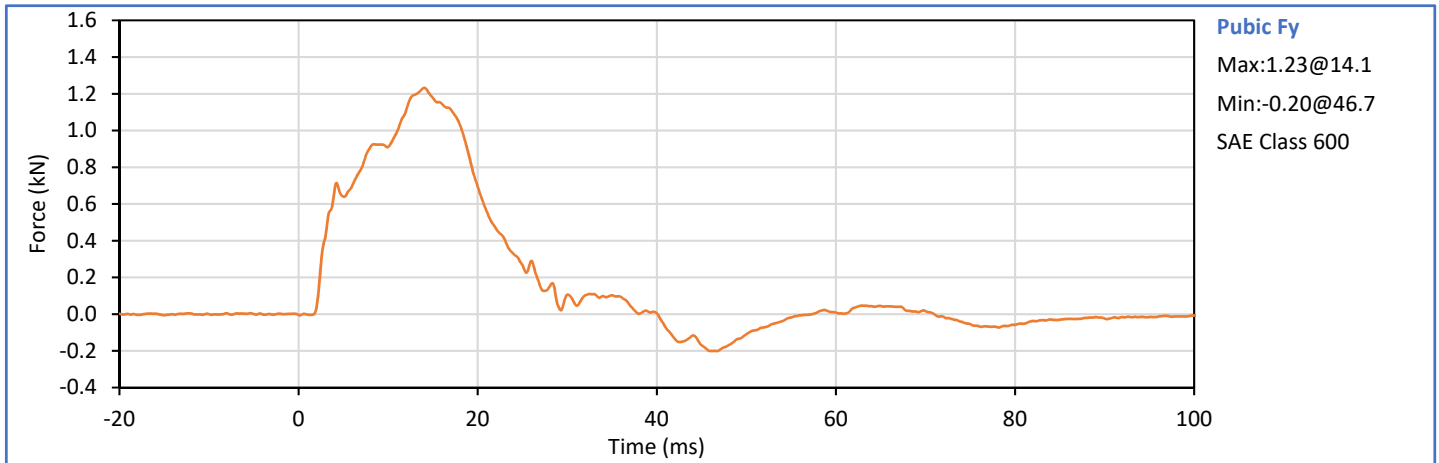
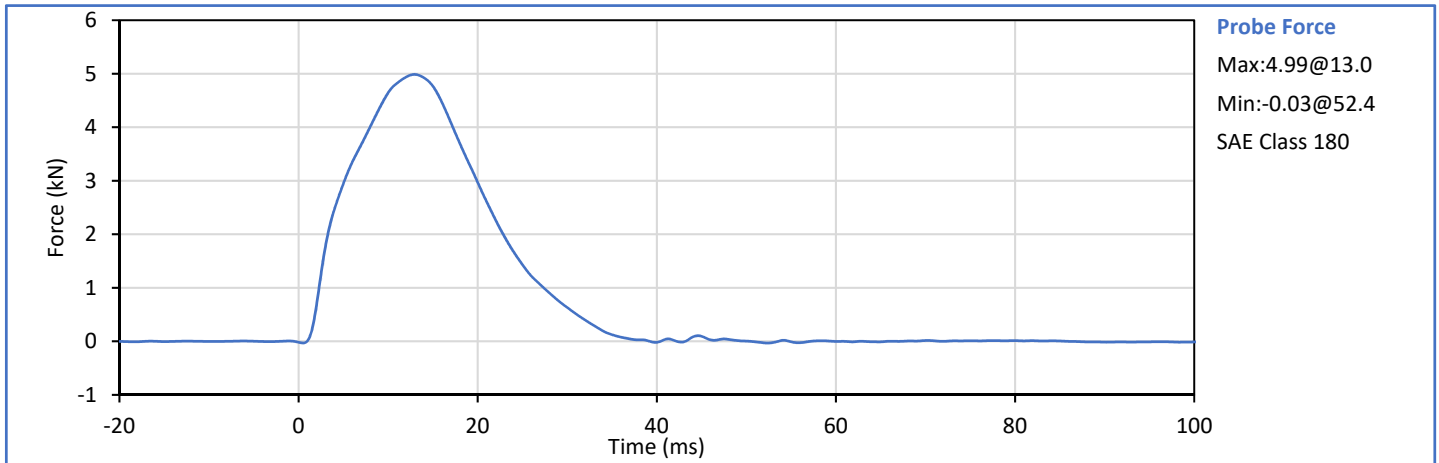
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	31	Pass
Pendulum Velocity	m/s	5.95	6.15	6.08	Pass
Peak Headform Flexion	deg	45.0	55.0	47.8	Pass
Time of Peak Headform Flexion	ms	39.0	53.0	43.8	Pass
Flexion Decay (Peak to zero)	ms	37.0	57.0	38.6	Pass
Overall Test Results					Pass

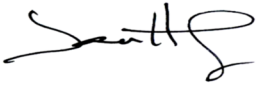



Technician: 
J. Hernandez

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 Relative Humidity	%	10	70	26	Pass
Impactor Velocity	m/s	4.20	4.40	4.31	Pass
Peak Impactor Force	kN	4.70	5.40	4.99	Pass
Time of Peak Impactor Force	ms	11.8	16.1	13.0	Pass
Pubic Symphysis Fy	kN	1.23	1.59	1.23	Pass
Time of Peak Pubic Symphysis Fy	ms	12.2	17.0	14.1	Pass
Overall Test Results					Pass



Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

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

Tested Parameter	Units	Spec Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	26	Pass
A - Sitting Height	mm	772	788	778	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	149	Pass
E - Shoulder Pivot From Backline	mm	97	107	102	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	43	Pass
I - Head Depth	mm	178	188	185	Pass
J - Head Circumference	mm	541	551	544	Pass
K - Buttock To Knee Length	mm	514	540	525	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	427	Pass
O - Chest Depth W/O Jacket	mm	195	211	202	Pass
P - Foot Length	mm	216	232	224	Pass
Q - Hip Breadth (W/Pelvic Plugs)	mm	313	323	319	Pass
R - Arm Length	mm	249	259	254	Pass
S - Knee Joint To Seatback	mm	477	493	487	Pass
V - Shoulder Width	mm	341	357	351	Pass
W - Foot Width	mm	78	94	86	Pass
Y - Chest Circumference W/Jacket	mm	851	881	862	Pass
Z - Waist Circumference	mm	761	791	780	Pass
Overall Test Results					Pass

Technician:



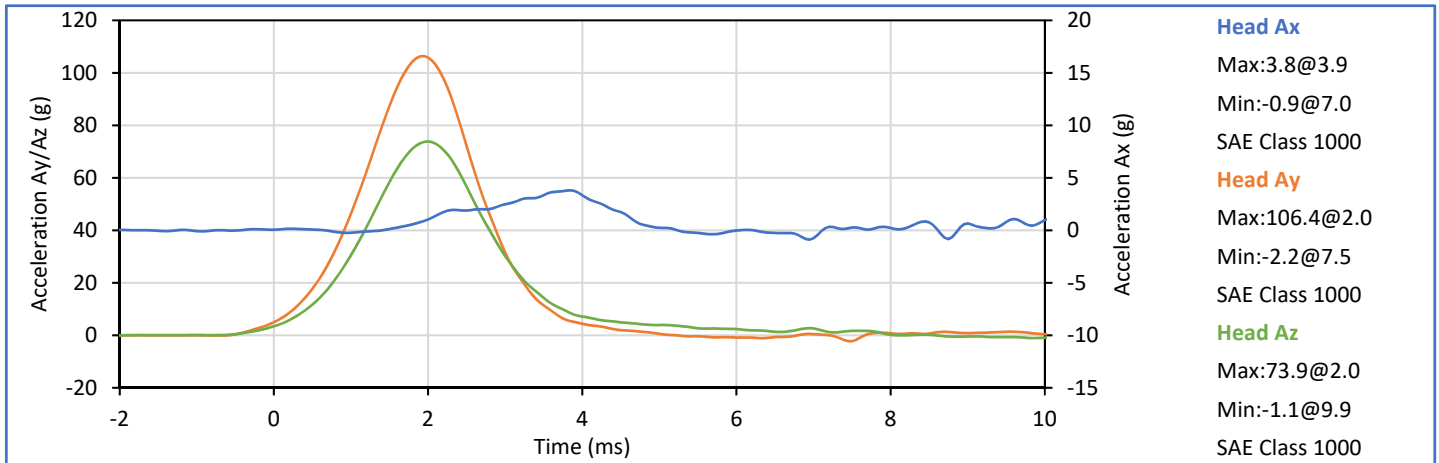
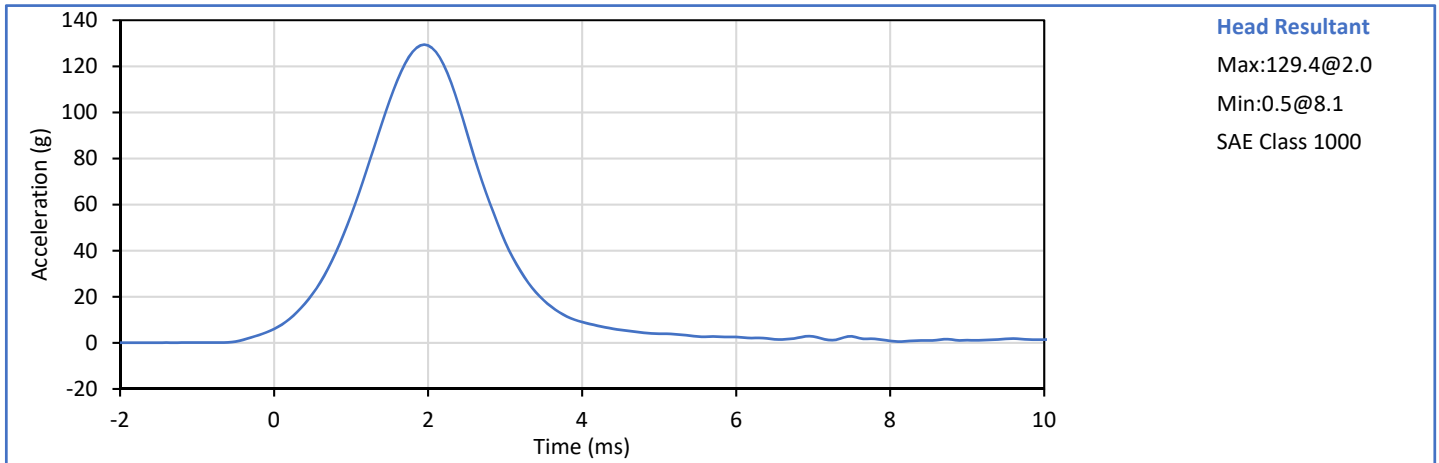
J. Hernandez

Approved By:




P. Puzzuto

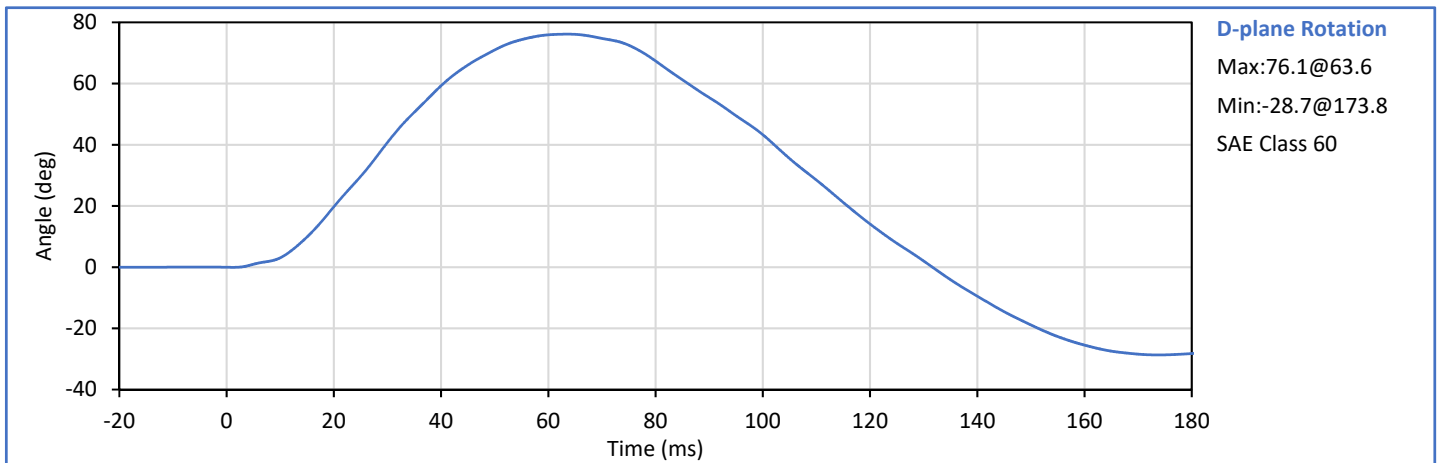
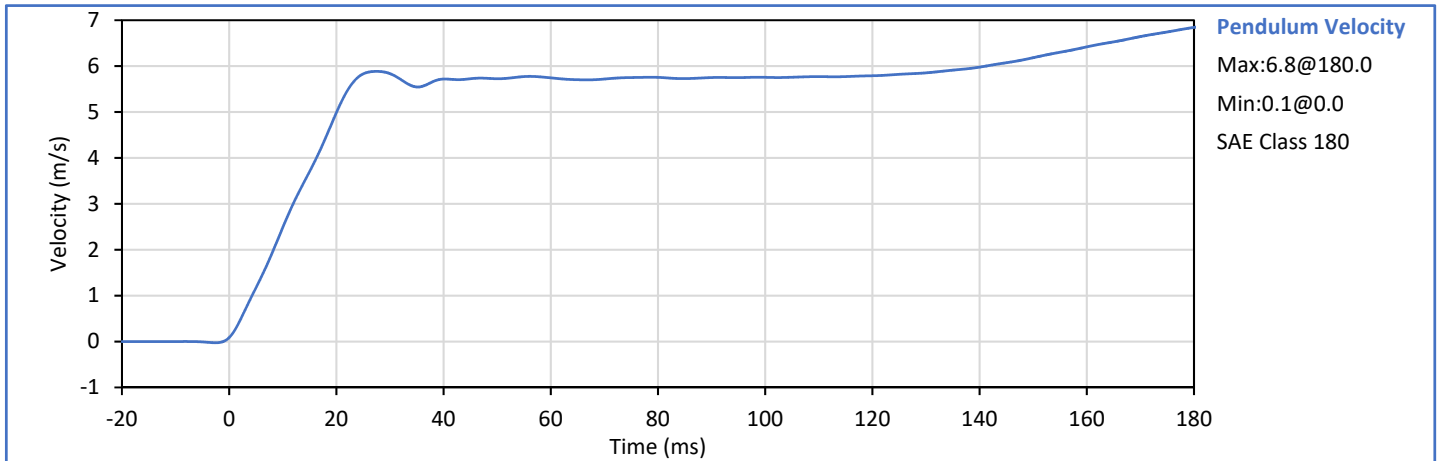
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.1	Pass
Laboratory Humidity	%	10	70	26	Pass
Peak Resultant Acceleration	g	115.0	137.0	129.4	Pass
Peak Head Ax	g	-15.0	15.0	-0.9	Pass
Oscillations After Main Pulse	%	0.0	15.0	2.3	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
Overall Test Results					Pass




Technician: 
J. Hernandez

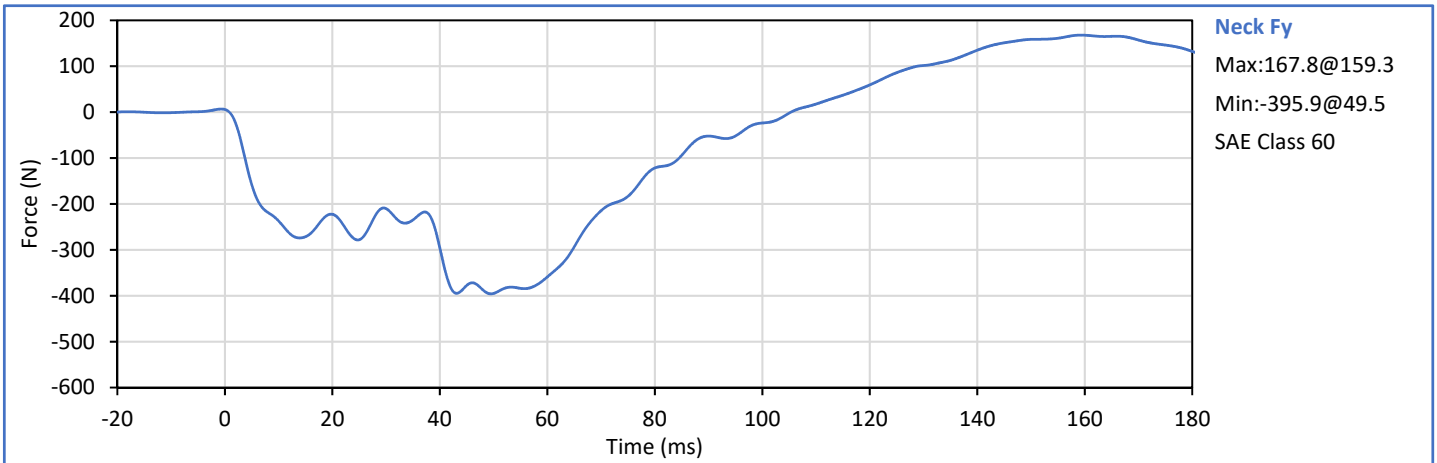
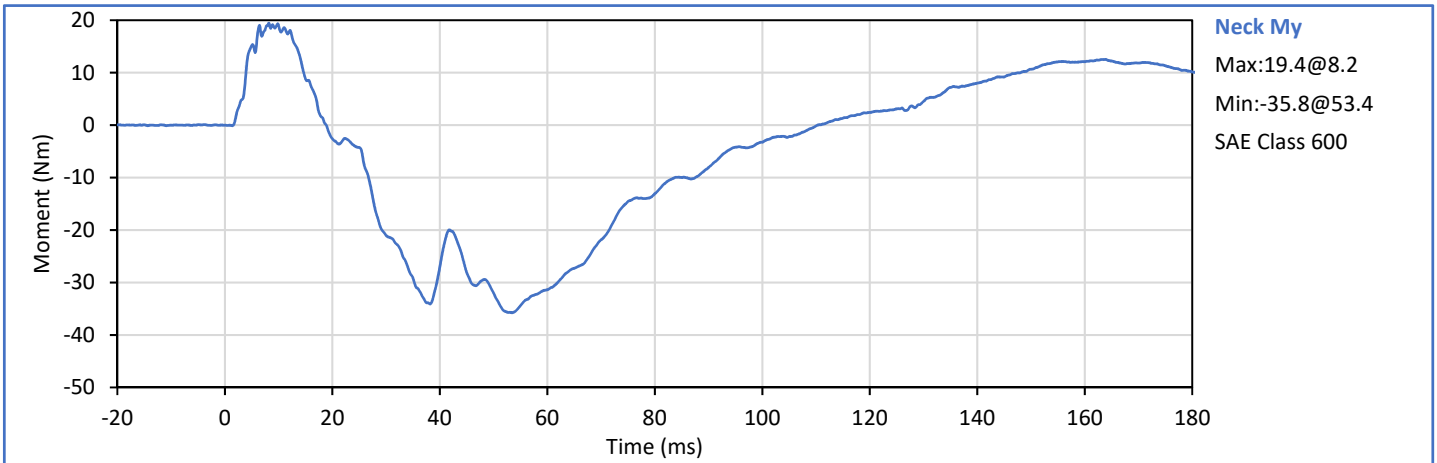
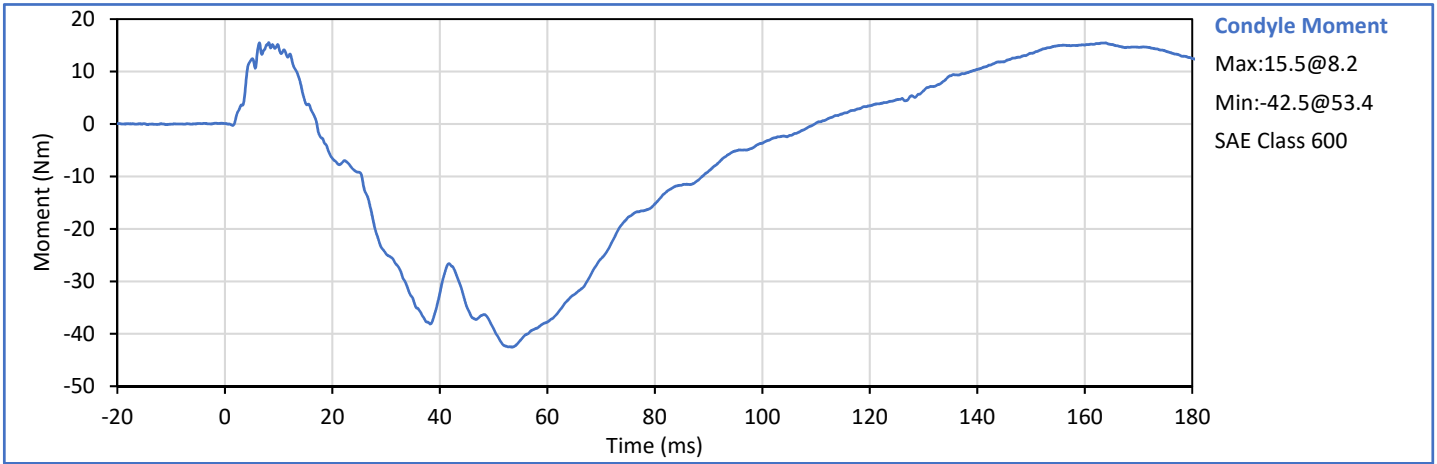
Approved By: 
P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Humidity	%	10	70	27	Pass
Pendulum Velocity	m/s	5.51	5.63	5.62	Pass
Pendulum Decel at 10 ms	m/s	2.20	2.80	2.48	Pass
Pendulum Decel at 15 ms	m/s	3.30	4.10	3.70	Pass
Pendulum Decel at 20 ms	m/s	4.40	5.40	4.98	Pass
Pendulum Decel at 25 ms	m/s	5.40	6.10	5.83	Pass
Pendulum Decel from 25-100 ms	m/s	5.50	6.20	5.89	Pass
Peak "D" Plane Rotation	deg	71.0	81.0	76.1	Pass
Time of Peak "D" Plane Rotation	ms	50.0	70.0	63.6	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	109.8	Pass
Overall Test Results					Pass

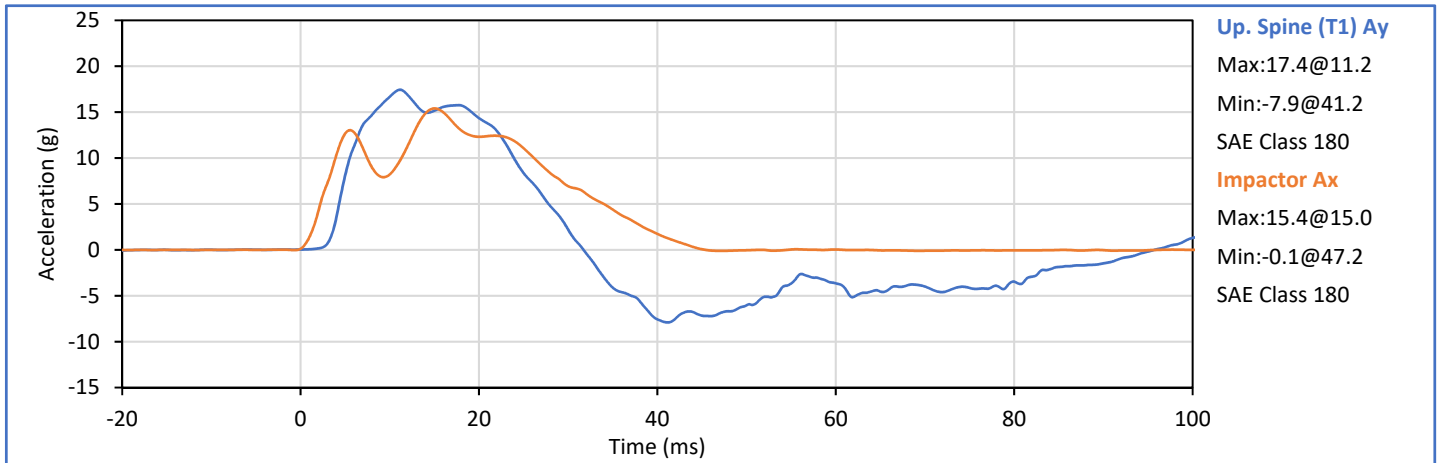
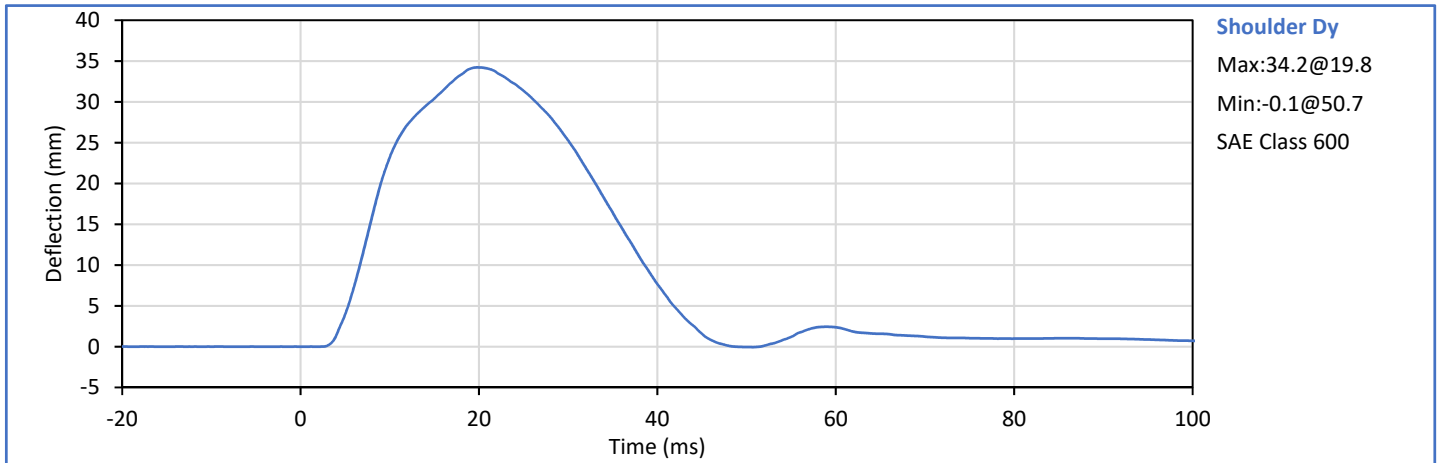


Technician: 
J. Hernandez


Approved By: 
P. Puzzuto



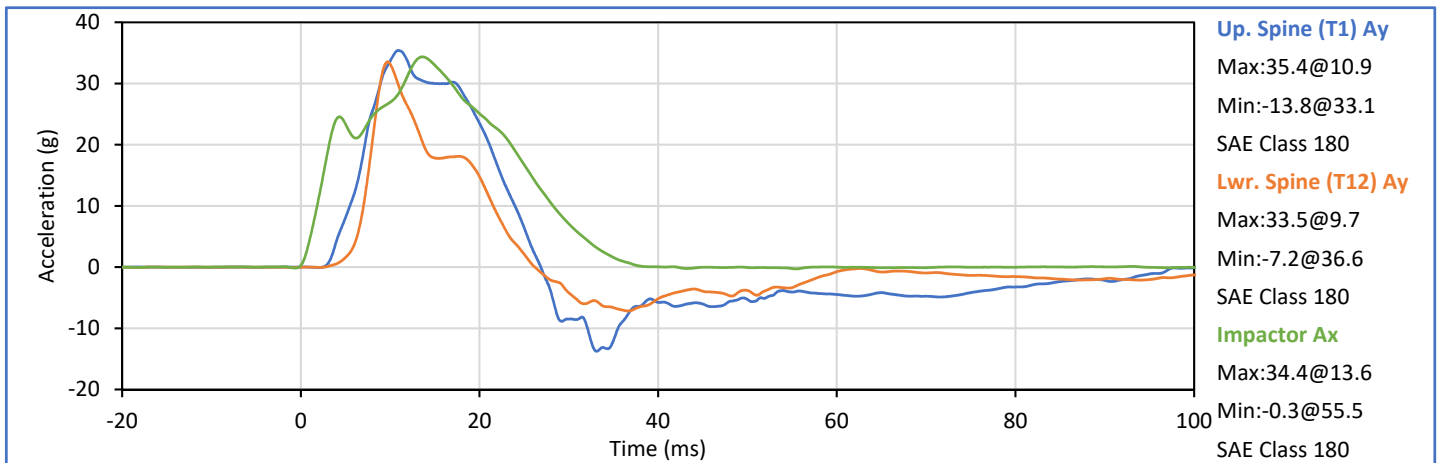
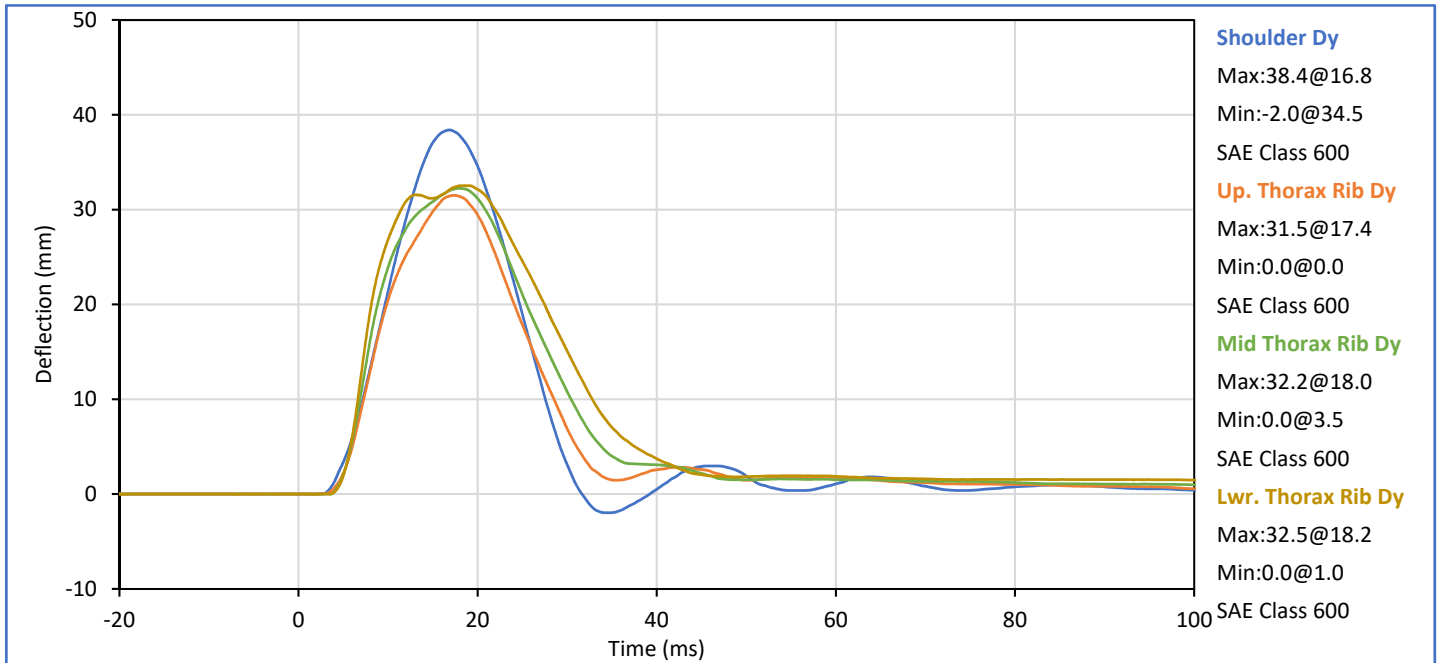
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.7	Pass
Laboratory Humidity	%	10	70	26	Pass
Impactor Velocity	m/s	4.20	4.40	4.31	Pass
Peak Shoulder Dy	mm	28.0	37.0	34.2	Pass
Peak Upper Spine (T1) Ay	g	17.0	22.0	17.4	Pass
Peak Impactor Ax	g	13.0	18.0	15.4	Pass
Overall Test Results					Pass





Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

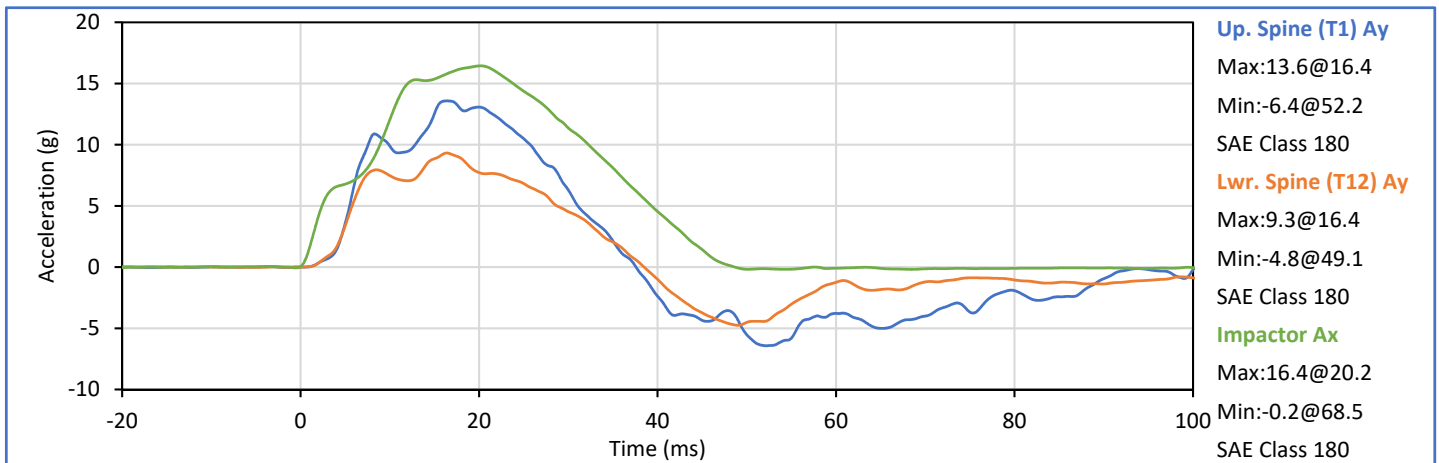
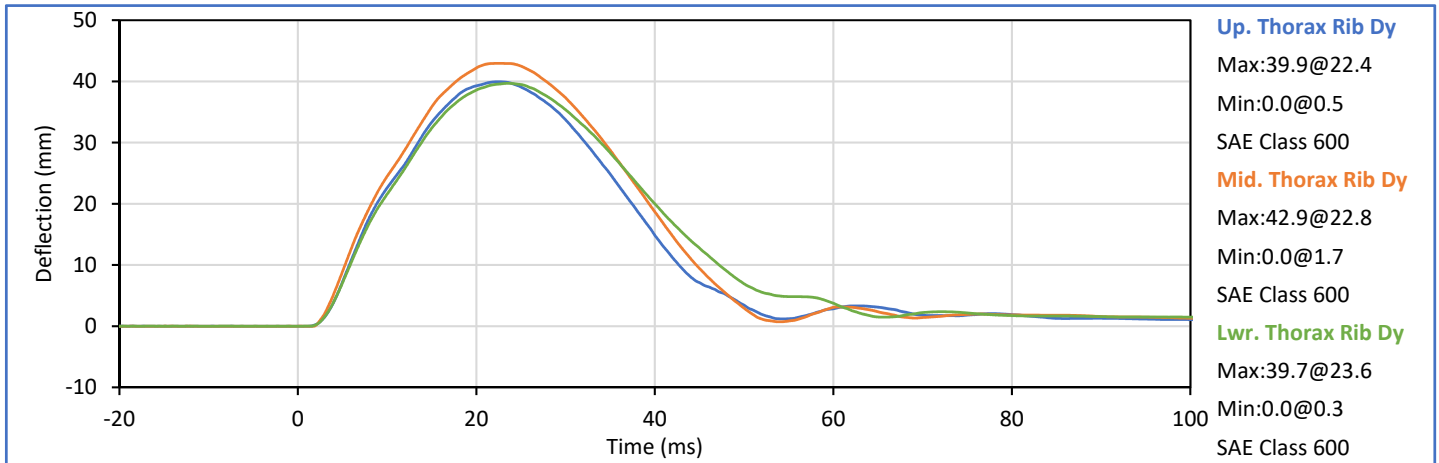
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Humidity	%	10	70	26	Pass
Impactor Velocity	m/s	6.60	6.80	6.66	Pass
Peak Shoulder Dy	mm	31.0	40.0	38.4	Pass
Peak Upper Rib Dy	mm	25.0	32.0	31.5	Pass
Peak Middle Rib Dy	mm	30.0	36.0	32.2	Pass
Peak Lower Rib Dy	mm	32.0	38.0	32.5	Pass
Peak Upper Spine (T1) Ay	g	34.0	43.0	35.4	Pass
Peak Lower Spine (T12) Ay	g	29.0	37.0	33.5	Pass
Peak Impactor Ax	g	30.0	36.0	34.4	Pass
Overall Test Results					Pass




Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

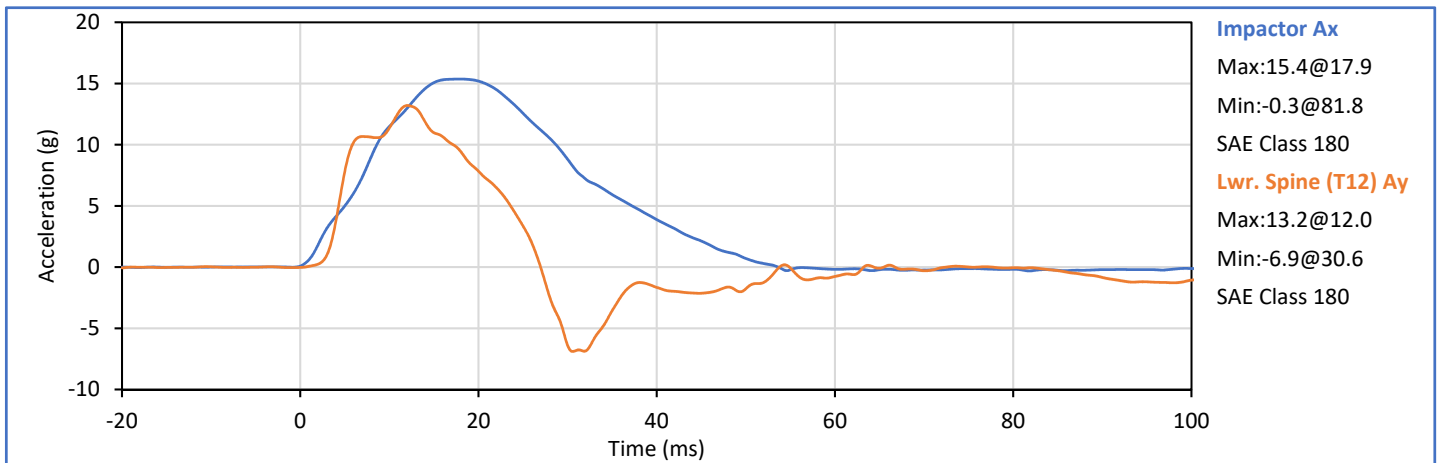
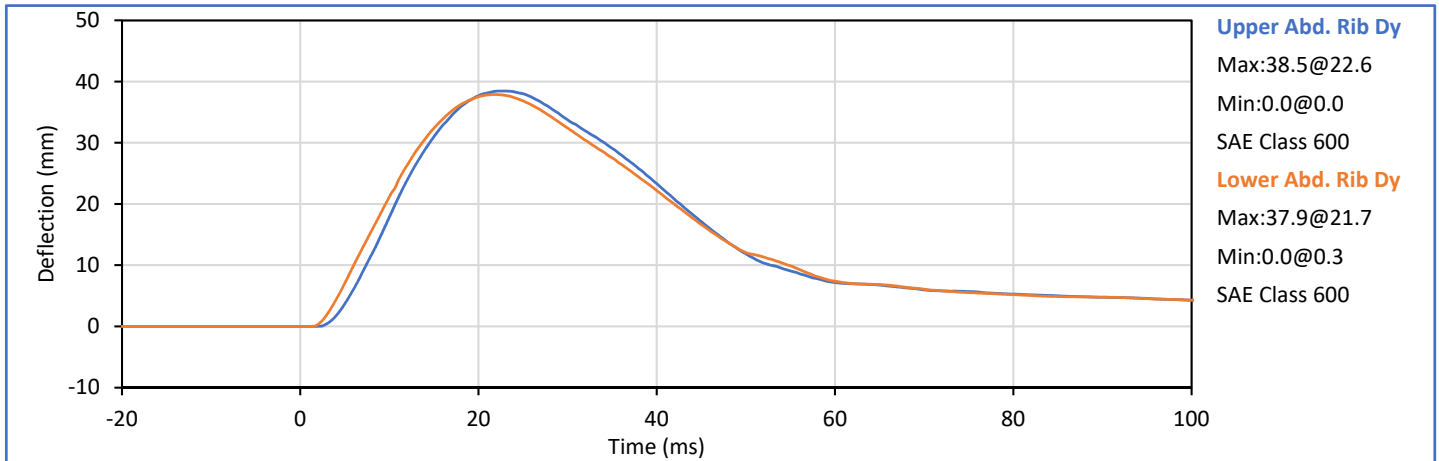
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Humidity	%	10	70	26	Pass
Impactor Velocity	m/s	4.20	4.40	4.31	Pass
Peak Upper Rib Dy	mm	32.0	40.0	39.9	Pass
Peak Middle Rib Dy	mm	39.0	45.0	42.9	Pass
Peak Lower Rib Dy	mm	35.0	43.0	39.7	Pass
Peak Upper Spine (T1) Ay	g	13.0	17.0	13.6	Pass
Peak Lower Spine (T12) Ay	g	7.0	11.0	9.3	Pass
Peak Impactor Ax	g	14.0	18.0	16.4	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	26	Pass
Impactor Velocity	m/s	4.20	4.40	4.36	Pass
Peak Upper Abdomen Rib Dy	mm	36.0	47.0	38.5	Pass
Peak Lower Abdomen Rib Dy	mm	33.0	44.0	37.9	Pass
Peak Lower Spine T12 Ay	mm	9.0	14.0	13.2	Pass
Peak Impactor Ax	g	12.0	16.0	15.4	Pass
Overall Test Results					Pass

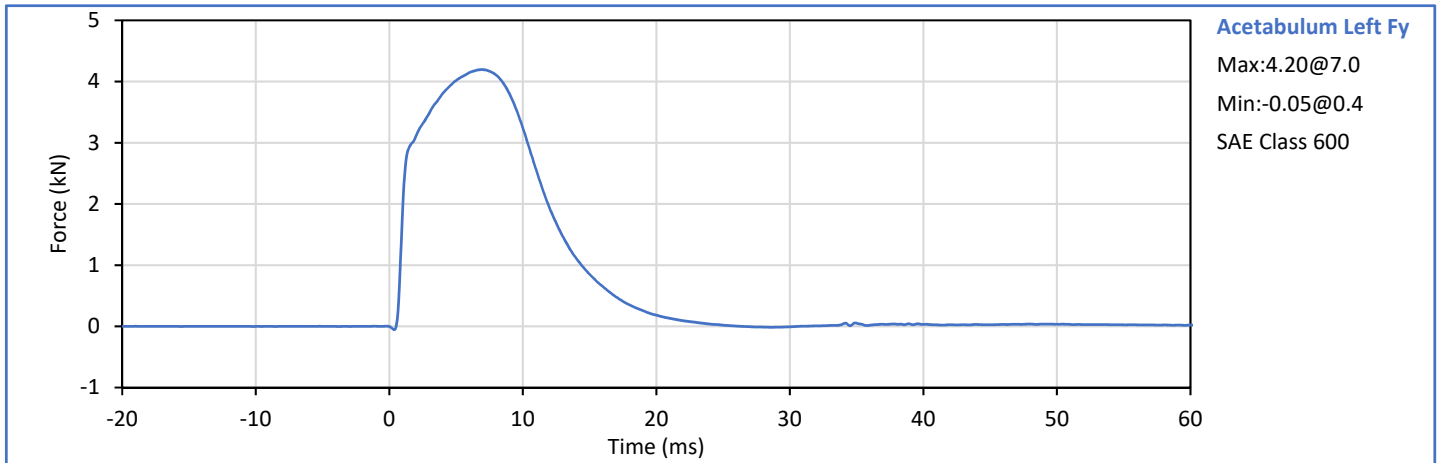
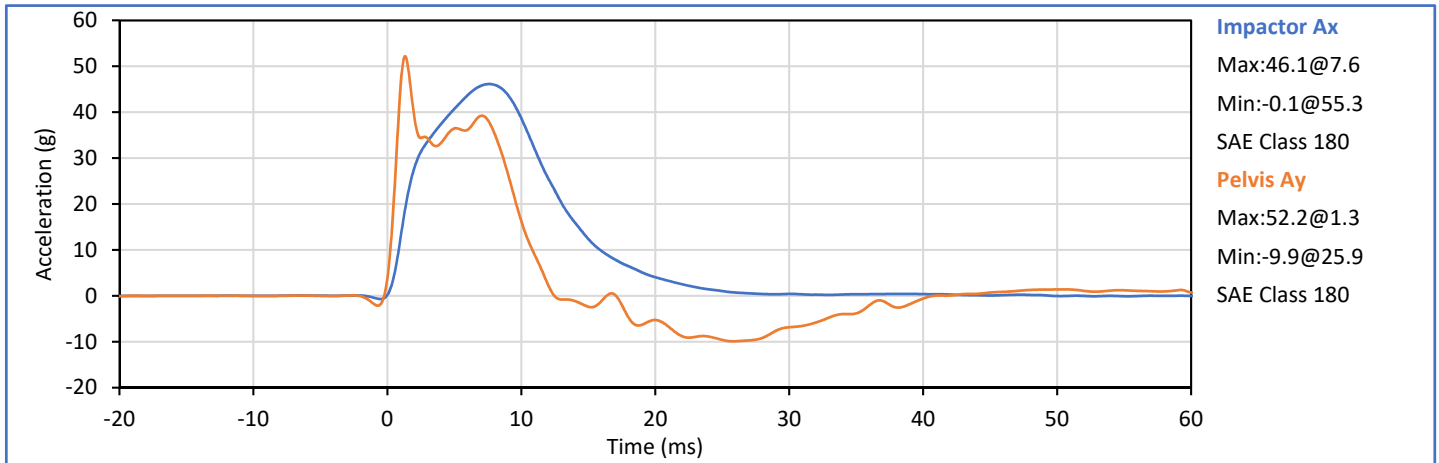



Technician: 
J. Hernandez


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	26	Pass
Impactor Velocity	m/s	6.60	6.80	6.71	Pass
Peak Acetabulum Fy	kN	3.60	4.30	4.20	Pass
Pelvis Ay after 6ms	g	34.0	42.0	39.2	Pass
Peak Impactor Ax	g	38.0	47.0	46.1	Pass
Overall Test Results					Pass

Pelvis Plug S/N: 12341 (SACO)



Technician: 
J. Hernandez

Approved By: 
P. Puzzuto



SID-IIs Pelvis Plug Certification Test

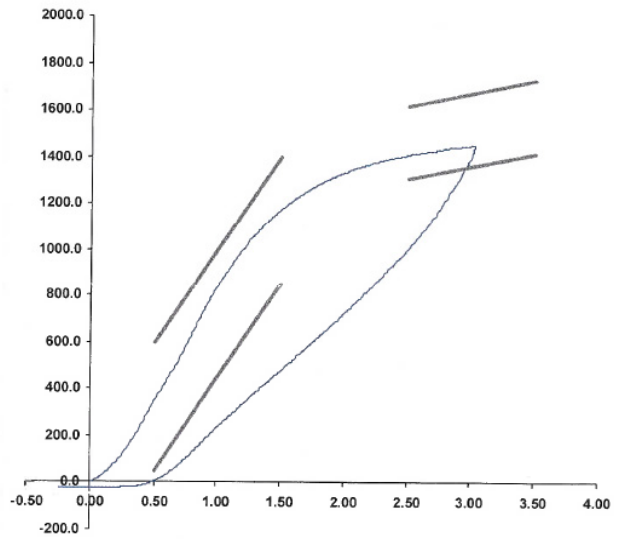
Plug S/N 12314
Test Number 6699
Report Number 6714
Test Date 3/21/2018 12:20:17 PM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	353.84	50.00	600.00
Force @ 1.5 mm (N)	1,174.64	850.00	1,400.00
Force @ 2.5 mm (N)	1,409.36	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,449.45	1,361.00	1,673.00

Testing Machine STM-20 5965542
Load Cell S/N (FI360947), Units (LBS) 1000
Crosshead Speed (mm / min) or Rate 12.7
Extension or Position Measured by XHD_100 (XHD100)

Notes:

Force (-N) vs Extension (-mm)



Operator _____
Part Number 180-4450

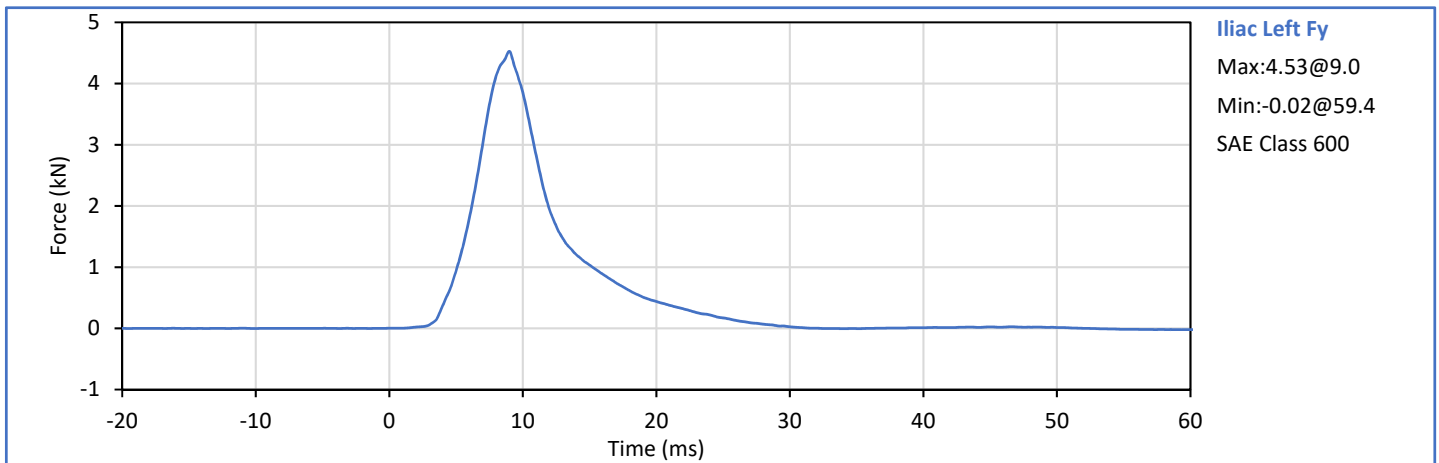
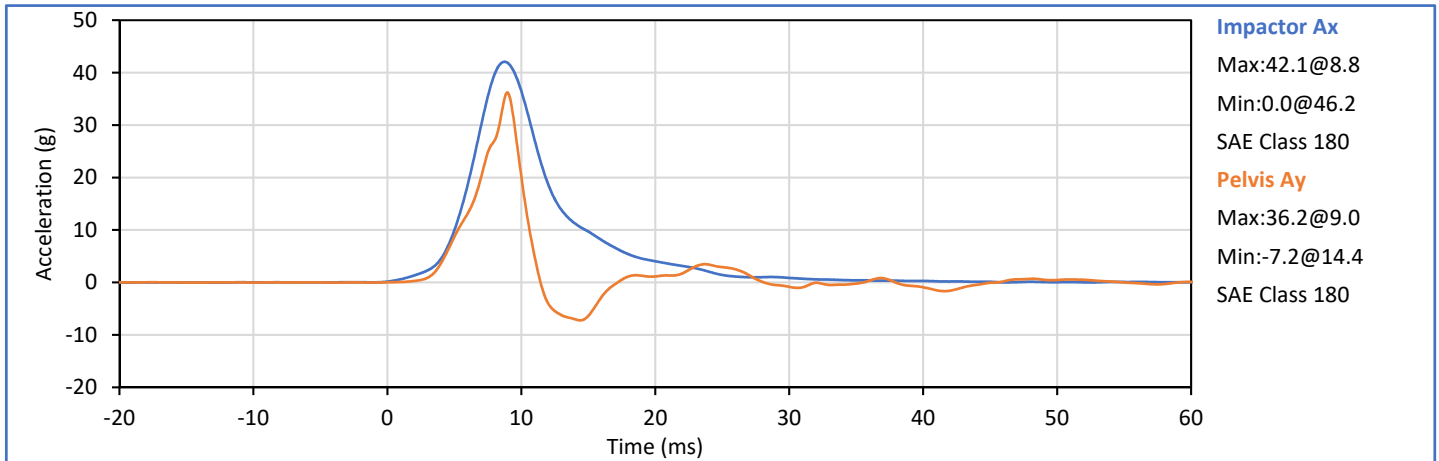
Template No 107 22-Mar-18
SACO Research

By: DC Date: 3/21/18

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Humidity	%	10	70	25	Pass
Impactor Velocity	m/s	4.20	4.40	4.31	Pass
Peak Iliac Fy	kN	4.10	5.10	4.53	Pass
Pelvis Ay after 6ms	g	28.0	39.0	36.2	Pass
Peak Impactor Ax	g	36.0	45.0	42.1	Pass
Overall Test Results					Pass

Pelvis Plug S/N: 12228 (SACO) *

* Plug is not impacted and remains certified



Technician: *J. Hernandez*
J. Hernandez

Approved By: *P. Puzzuto*
P. Puzzuto

APPENDIX C
Post-Test ATD Qualification and Performance Verification
ES-2re 50th Male Side Impact ATD
S/N: F035

ATD Serial No.: F035

Test Date: 2020-01-29

Tested Parameter	Units	Spec Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	32	Pass
1 - Sitting Height	mm	900	918	905	Pass
2 - Seat to Shoulder Joint	mm	558	572	565	Pass
3 - Seat to Lower Face of Thoracic Spine Box	mm	346	356	349	Pass
4 - Seat to Hip Joint (bolt center)	mm	97	103	102	Pass
5 - Sole to Seat, Sitting	mm	433	451	446	Pass
6 - Head Width	mm	152	158	157	Pass
7 - Shoulder/Arm Width	mm	461	479	472	Pass
8 - Thorax Width	mm	322	332	325	Pass
9 - Abdomen Width	mm	273	287	278	Pass
10 - Pelvis Lap Width	mm	359	373	365	Pass
11 - Head Depth	mm	196	206	203	Pass
12 - Thorax Depth	mm	262	272	266	Pass
13 - Abdomen Depth	mm	194	204	198	Pass
14 - Pelvis Depth	mm	235	245	238	Pass
15 - Back of Buttocks to Hip Joint (bolt Center)	mm	150	160	156	Pass
16 - Back of Buttocks to Front Knee	mm	597	615	605	Pass
Overall Test Results					Pass

Technician:



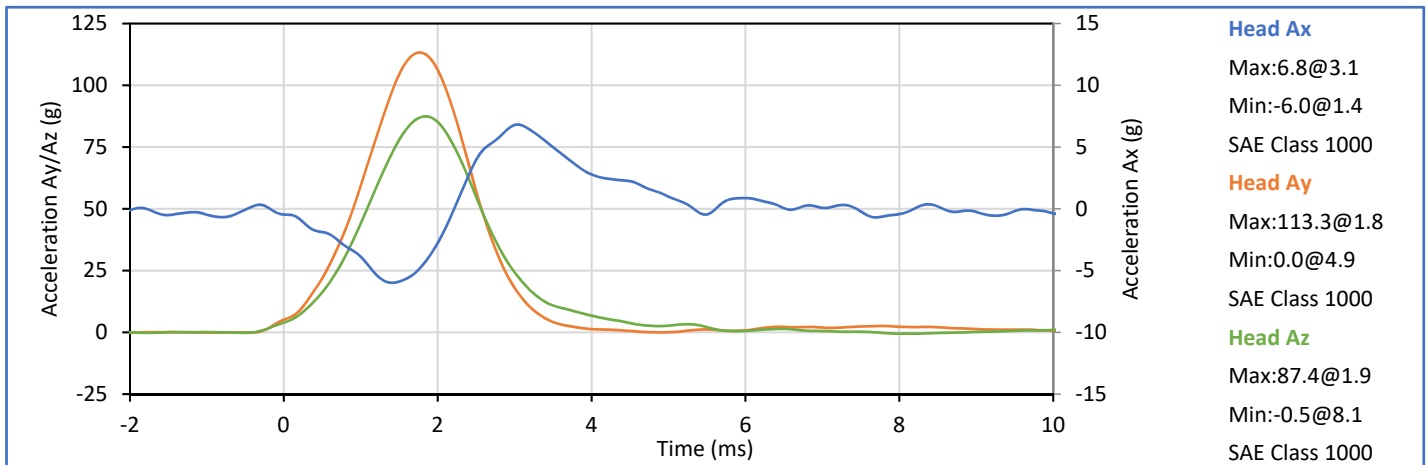
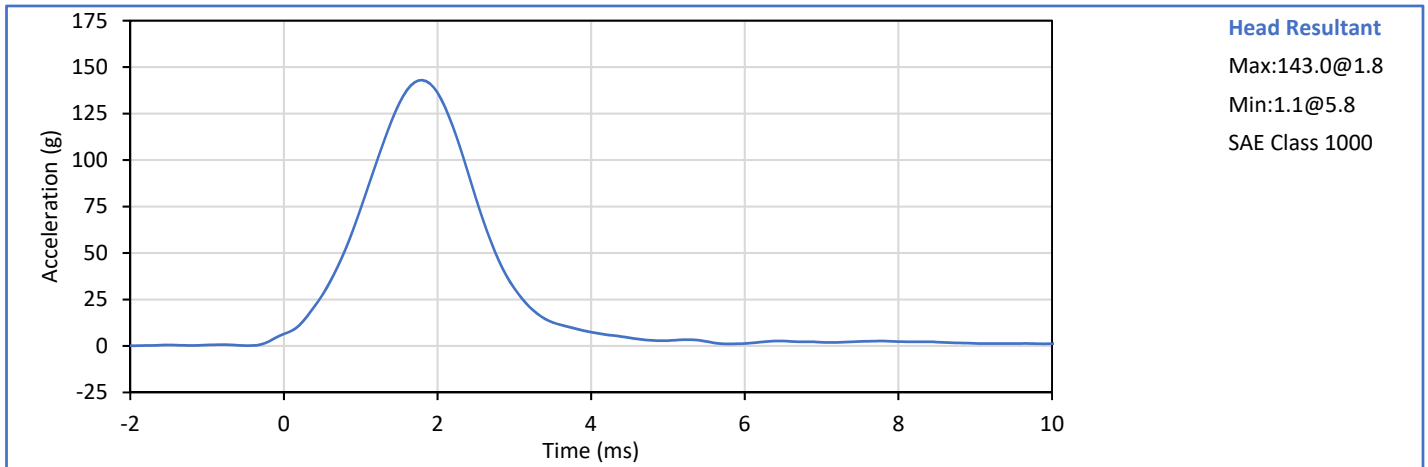
J. Hernandez

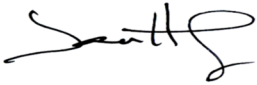
Approved By:




P. Puzzuto

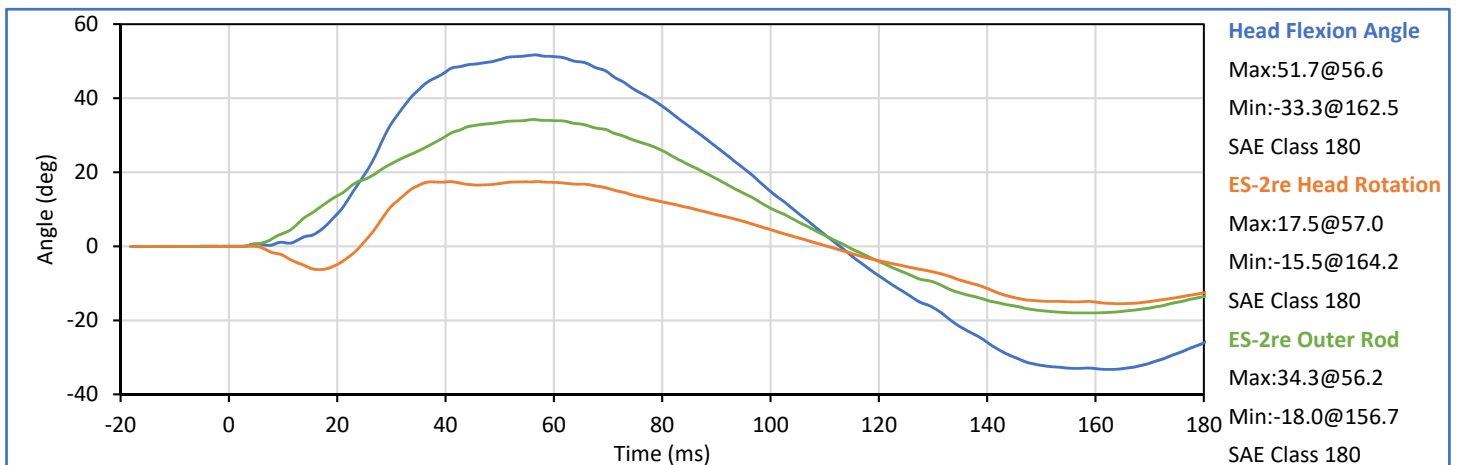
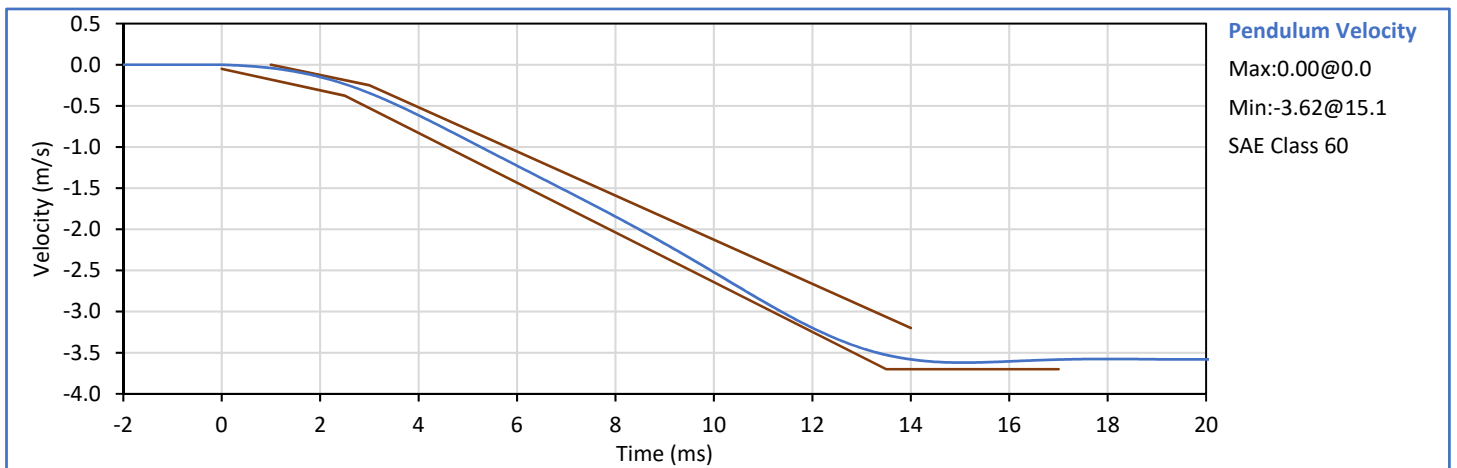
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.1	Pass
Laboratory Relative Humidity	%	10	70	27	Pass
Peak Resultant Acceleration	g	125.0	155.0	143.0	Pass
Peak Head Ax	g	-15.0	15.0	6.8	Pass
Oscillations After Main Pulse	%	0.0	15.0	1.9	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
Overall Test Results					Pass

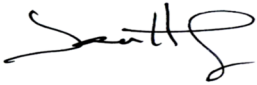



Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

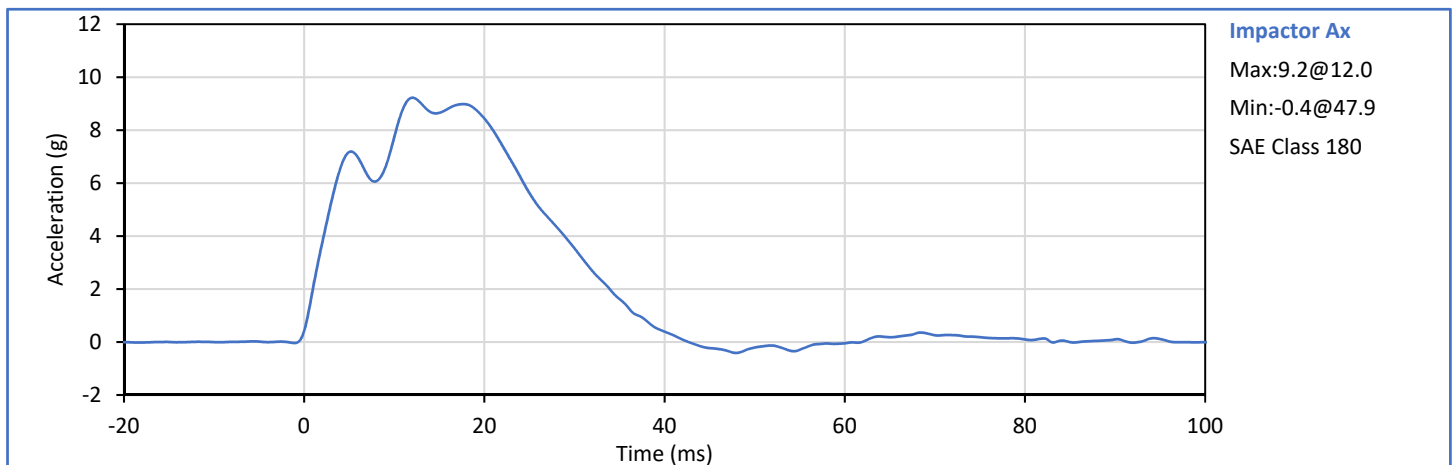
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
Pendulum Velocity	m/s	3.30	3.50	3.44	Pass
Peak Headform Flexion	deg	49.0	59.0	51.7	Pass
Time of Peak Headform Flexion	ms	54.0	66.0	56.6	Pass
Flexion Decay (Peak to zero)	ms	53.0	88.0	56.2	Pass
Overall Test Results					Pass

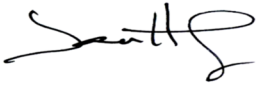



Technician: 
J. Hernandez

Approved By: 
C-25 P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	32	Pass
Impactor Velocity	m/s	4.20	4.40	4.34	Pass
Peak Impactor Ax	g	7.5	10.5	9.2	Pass
Overall Test Results					Pass



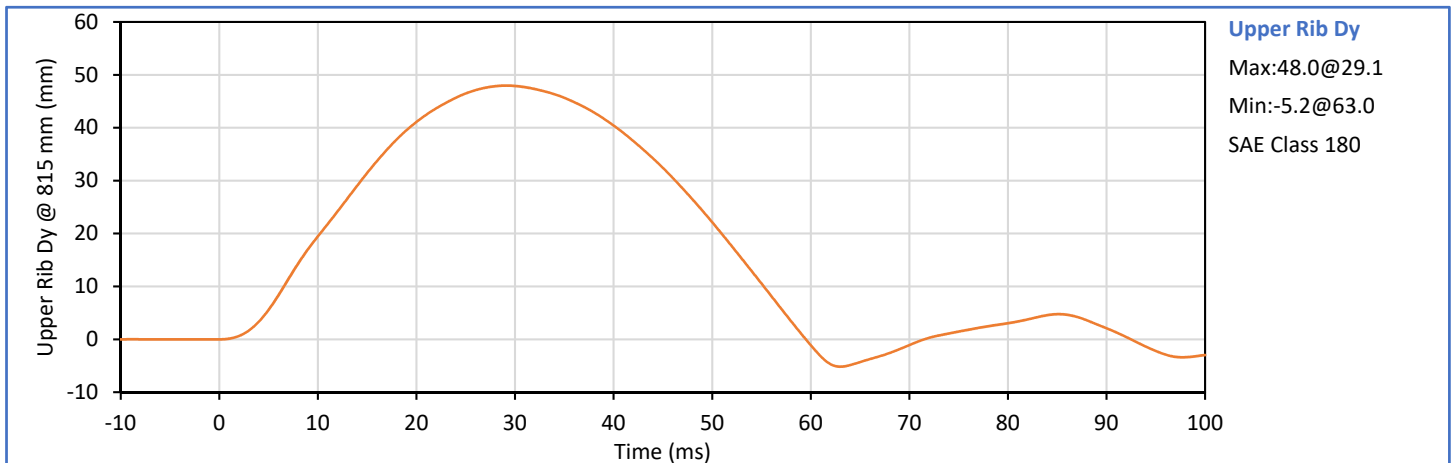
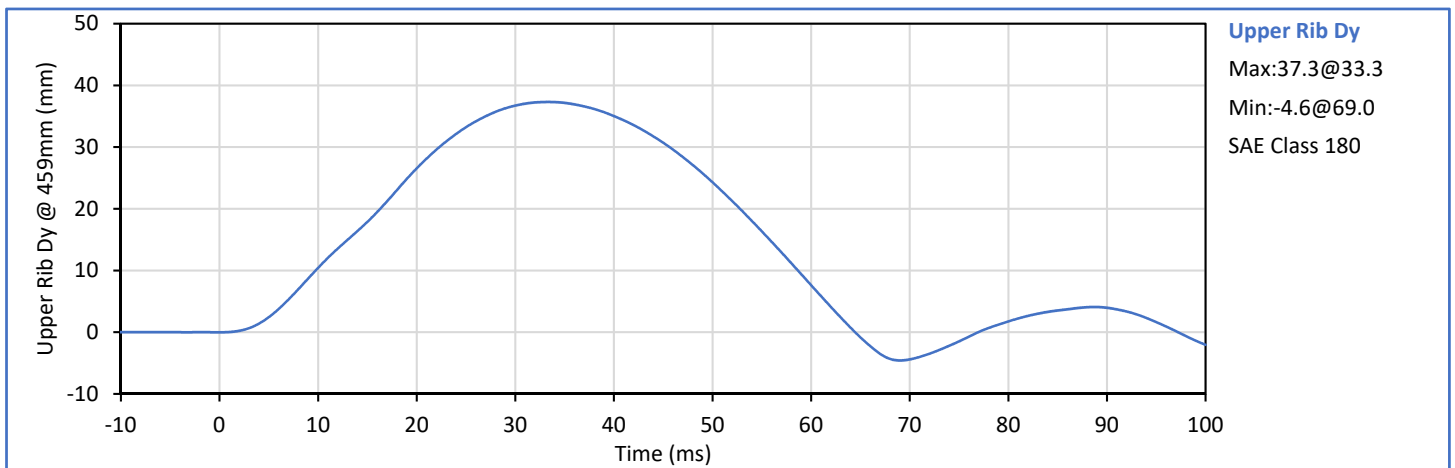
Technician: 
J. Hernandez

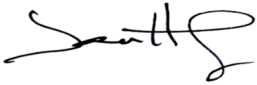
Approved By: 
P. Puzzuto


ATD Serial No.: F035

Test Date: 2020-01-29

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	28	Pass
Upper Rib Dy @ 459mm	mm	36.0	40.0	37.3	Pass
Upper Rib Dy @ 815mm	mm	46.0	51.0	48.0	Pass
Overall Test Results					Pass



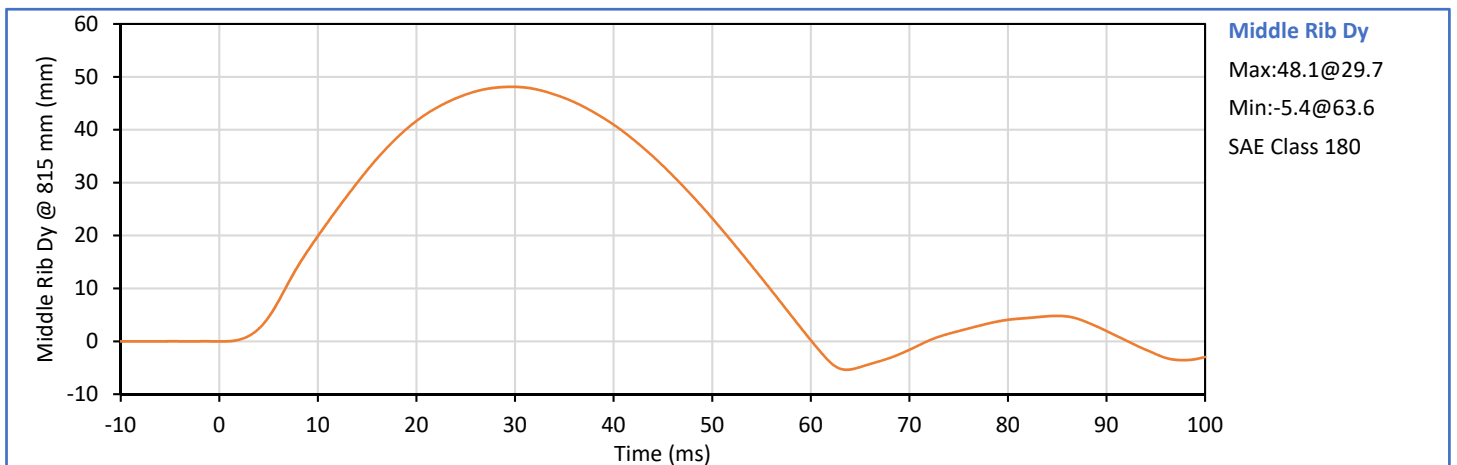
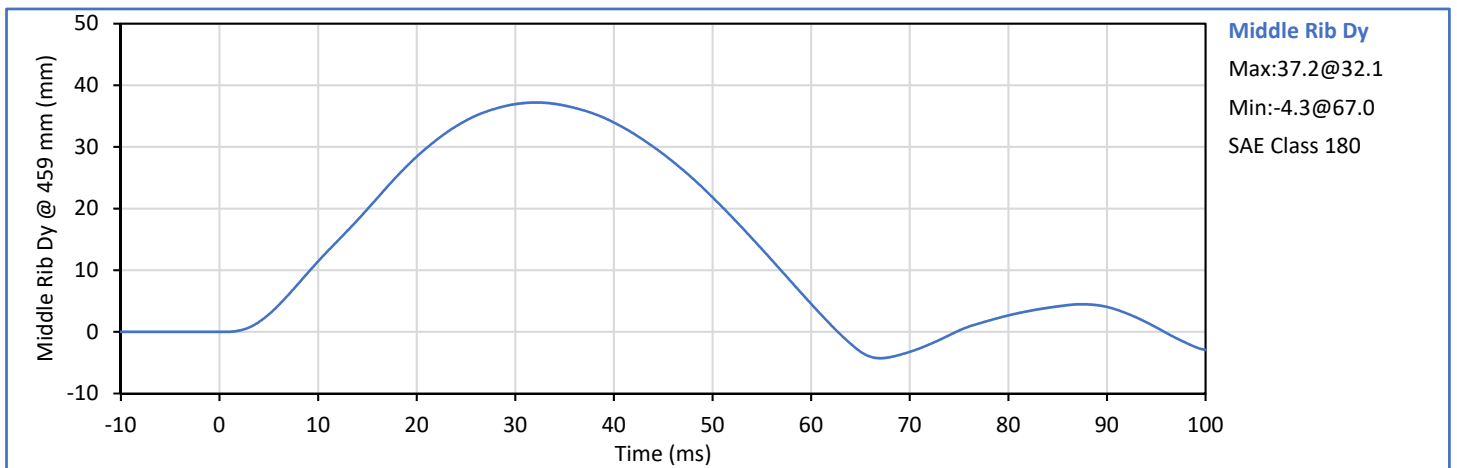
Technician: 
J. Hernandez

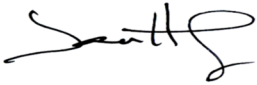
Approved By: 
C-27 P. Puzzuto


ATD Serial No.: F035

Test Date: 2020-01-29

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	28	Pass
Middle Rib Dy @ 459mm	mm	36.0	40.0	37.2	Pass
Middle Rib Dy @ 815mm	mm	46.0	51.0	48.1	Pass
Overall Test Results					Pass



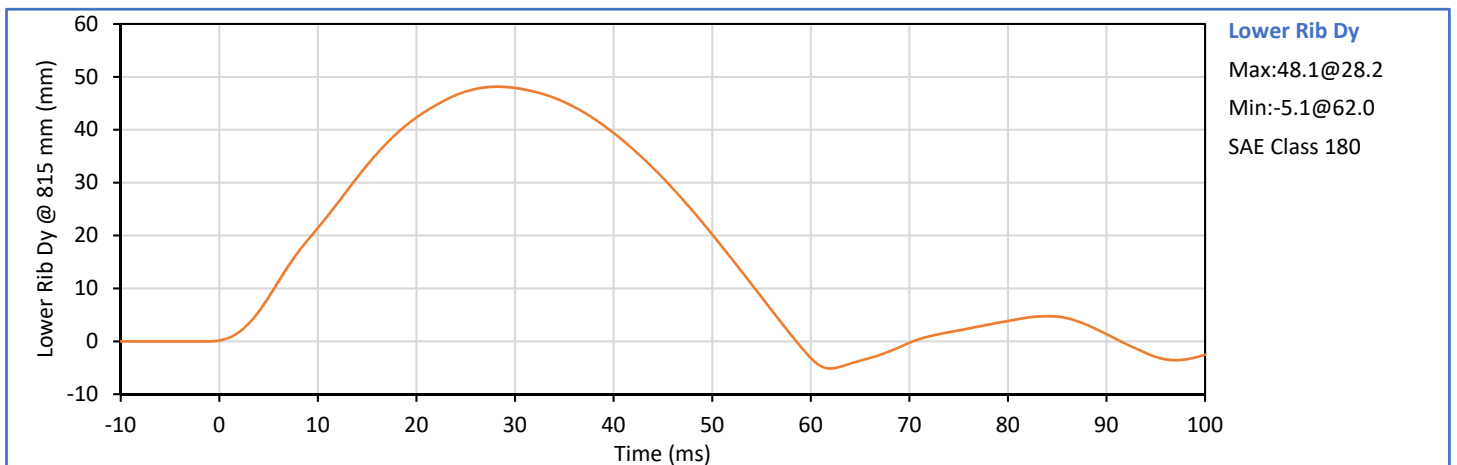
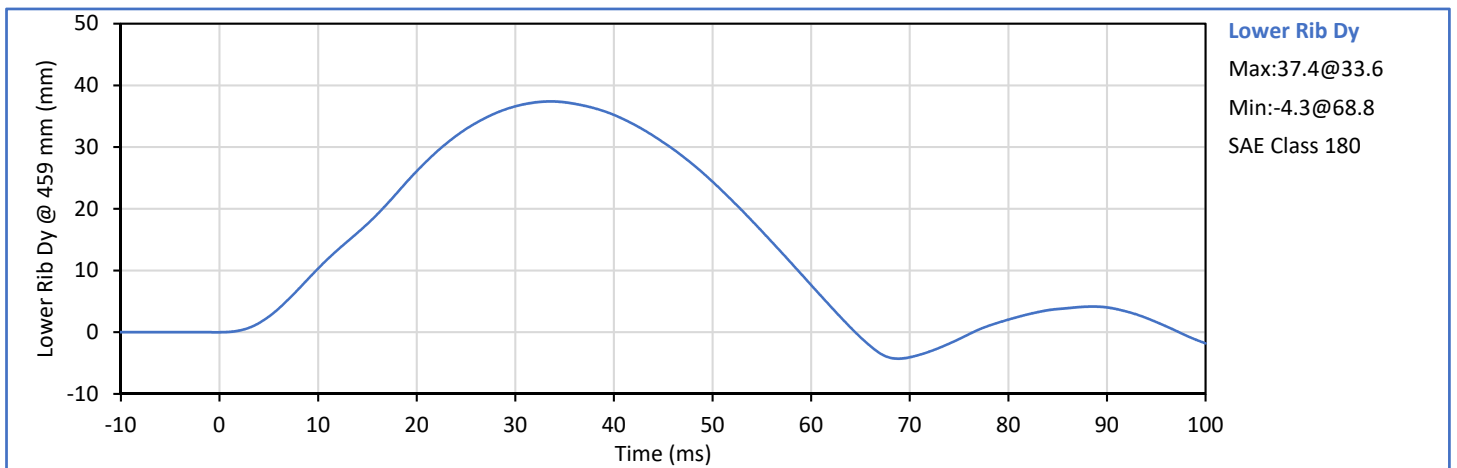
Technician: 
J. Hernandez

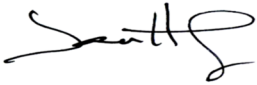
Approved By: 
P. Puzzuto


ATD Serial No.: F035

Test Date: 2020-01-29

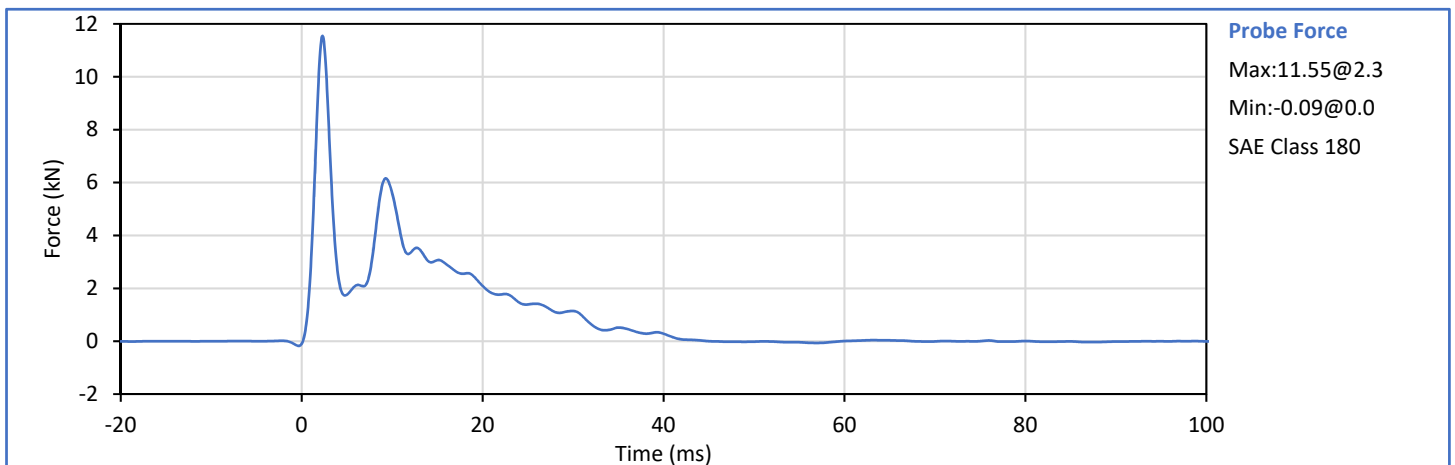
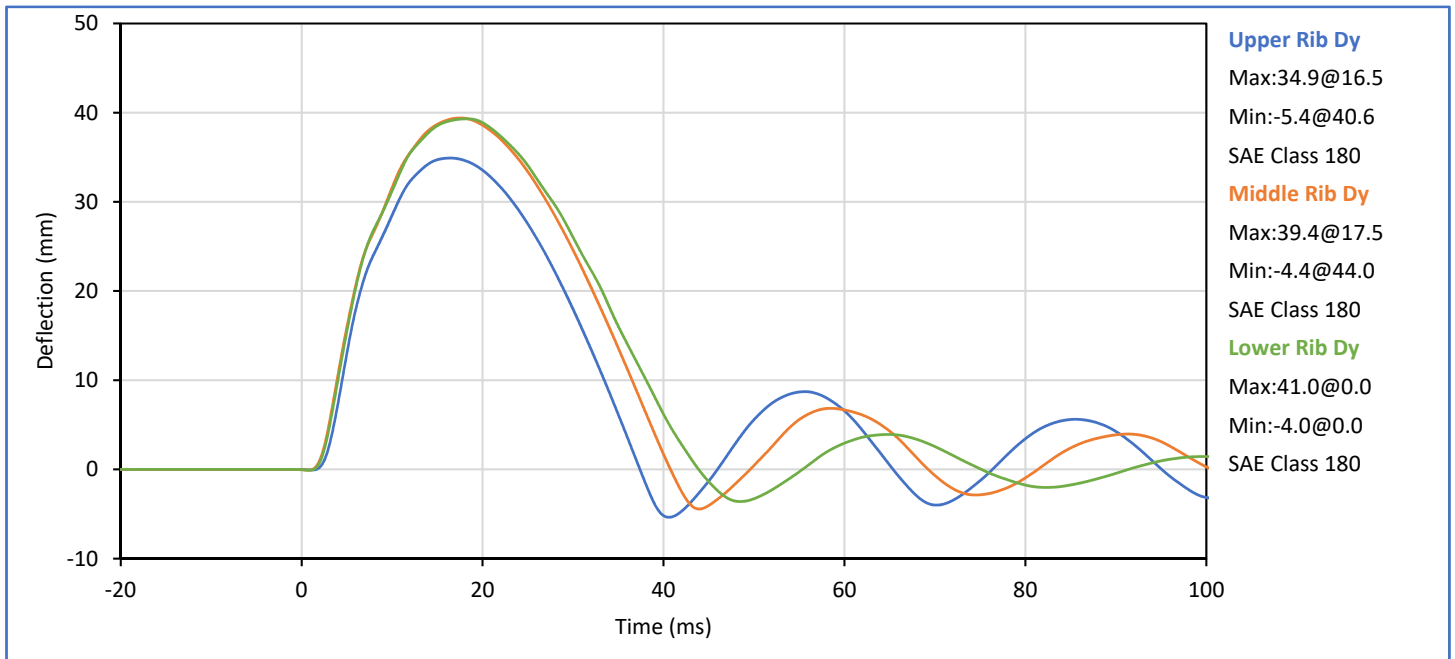
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.7	Pass
Laboratory Relative Humidity	%	10	70	28	Pass
Lower Rib Dy @ 459mm	mm	36.0	40.0	37.4	Pass
Lower Rib Dy @ 815mm	mm	46.0	51.0	48.1	Pass
Overall Test Results					Pass

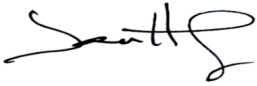



Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

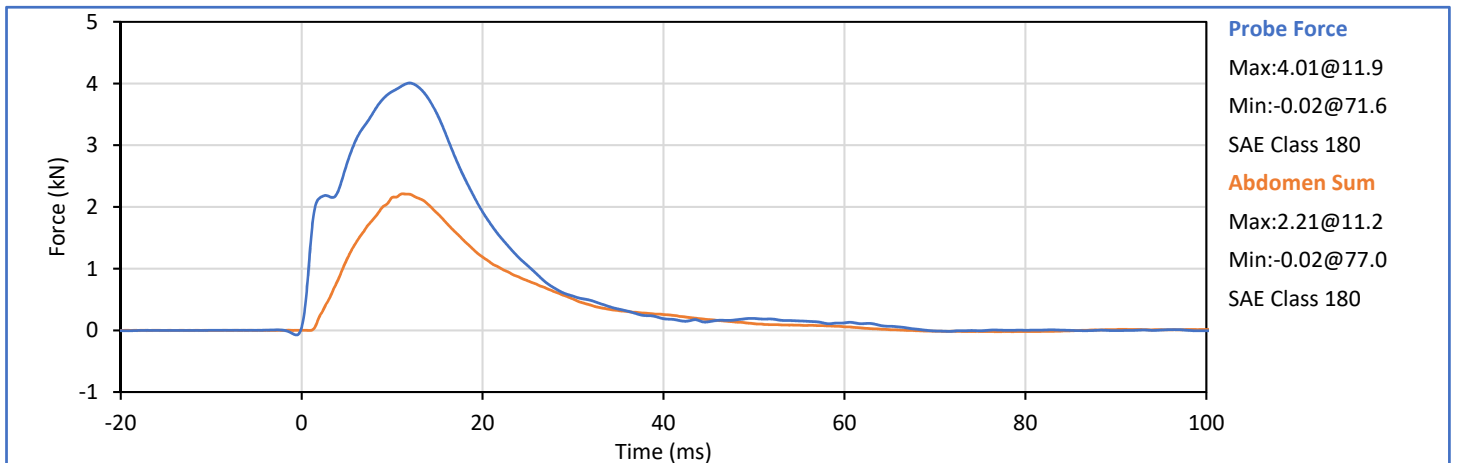
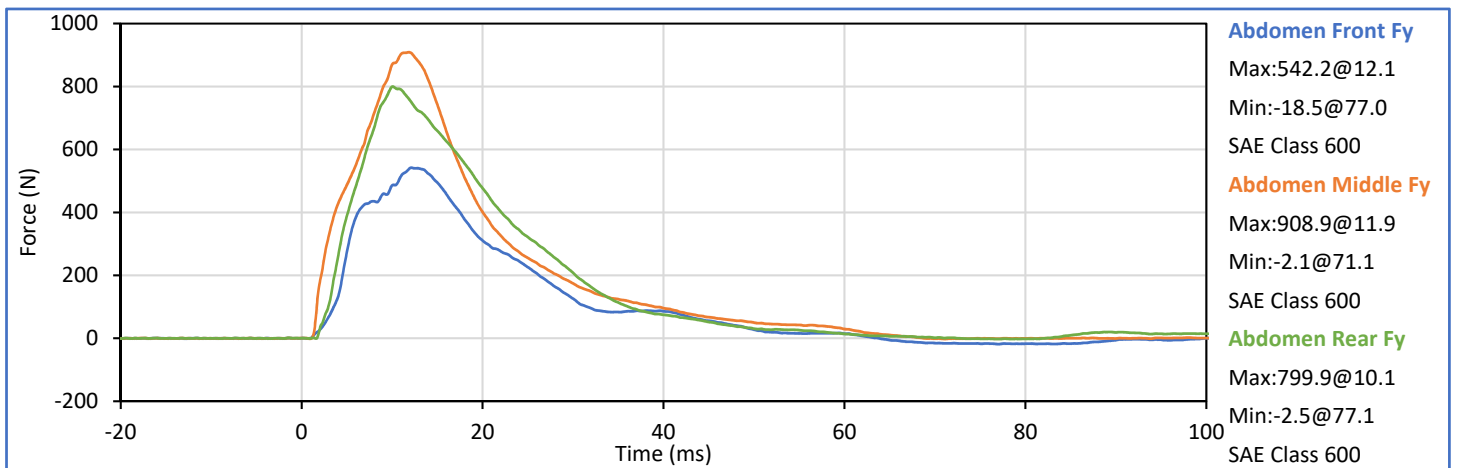
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Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	26	Pass
Impactor Velocity	m/s	5.40	5.60	5.51	Pass
Peak Upper Rib Dy	mm	34.0	41.0	34.9	Pass
Peak Middle Rib Dy	mm	37.0	45.0	39.4	Pass
Peak Lower Rib Dy	mm	37.0	44.0	39.3	Pass
Peak Impactor Force After 6 ms	kN	5.10	6.20	6.16	Pass
Overall Test Results					Pass

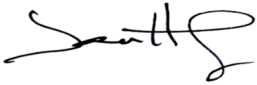



Technician: 
J. Hernandez

Approved By: 
C-30 P. Puzzuto

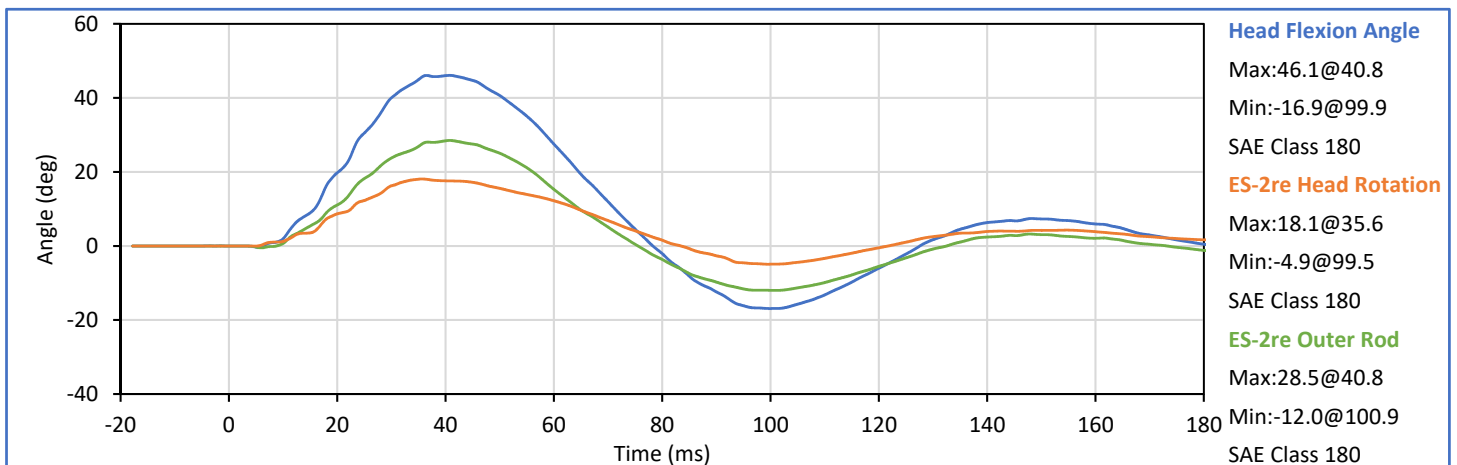
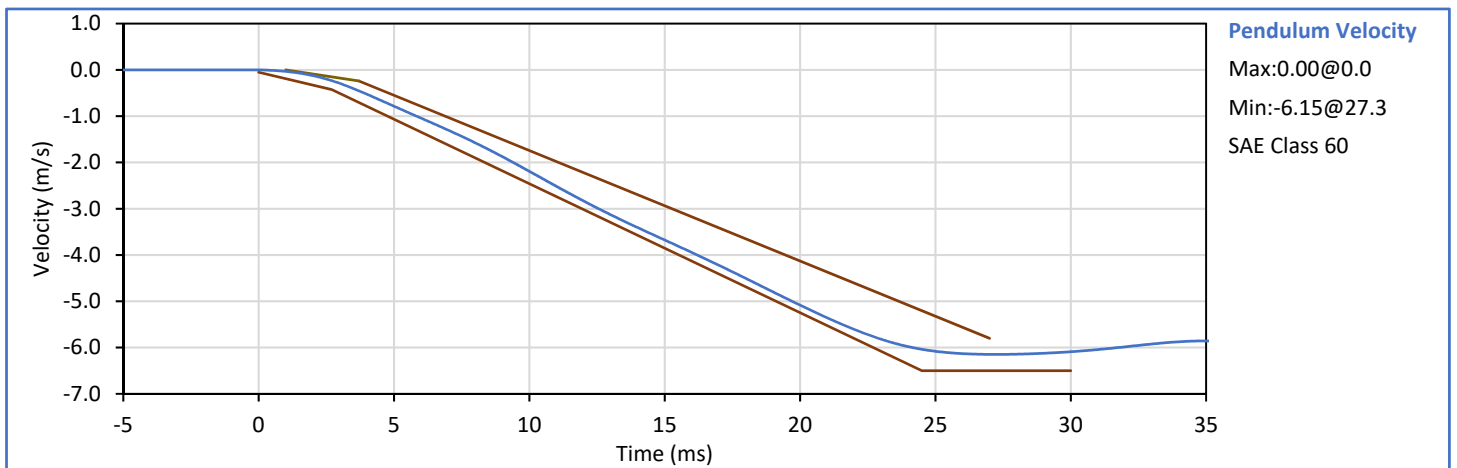
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	26	Pass
Impactor Velocity	m/s	3.90	4.10	4.01	Pass
Peak Impactor Force	kN	4.00	4.80	4.01	Pass
Time of Peak Impactor Force	ms	10.6	13.0	11.9	Pass
Sum of Abdomen Forces	kN	2.20	2.70	2.21	Pass
Time of Peak Sum Abdomen Force	ms	10.0	12.3	11.2	Pass
Overall Test Results					Pass

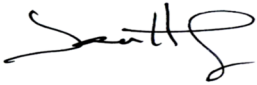



Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

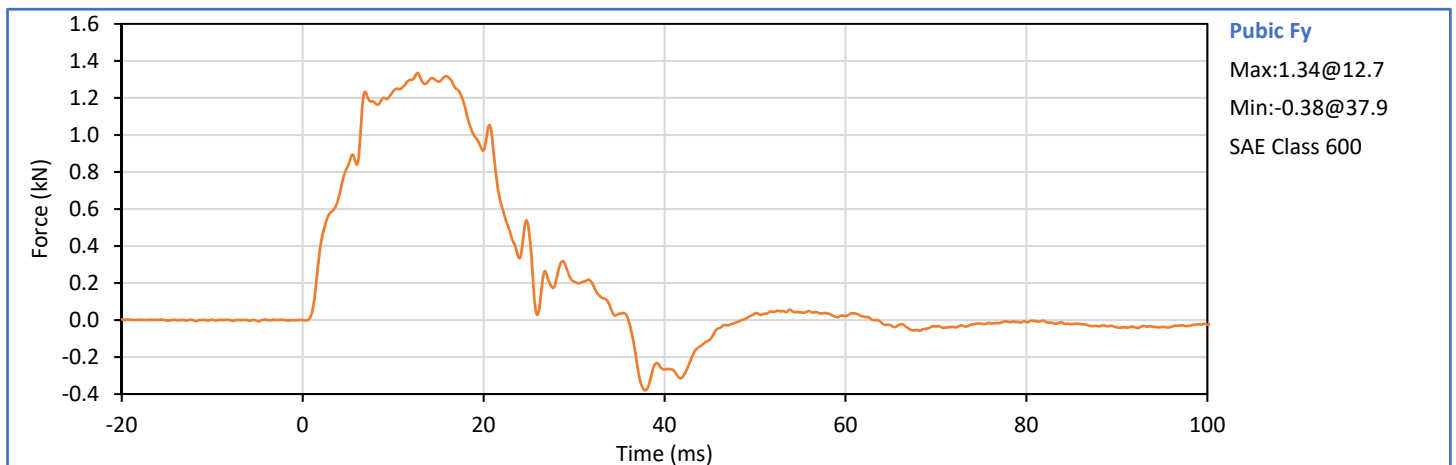
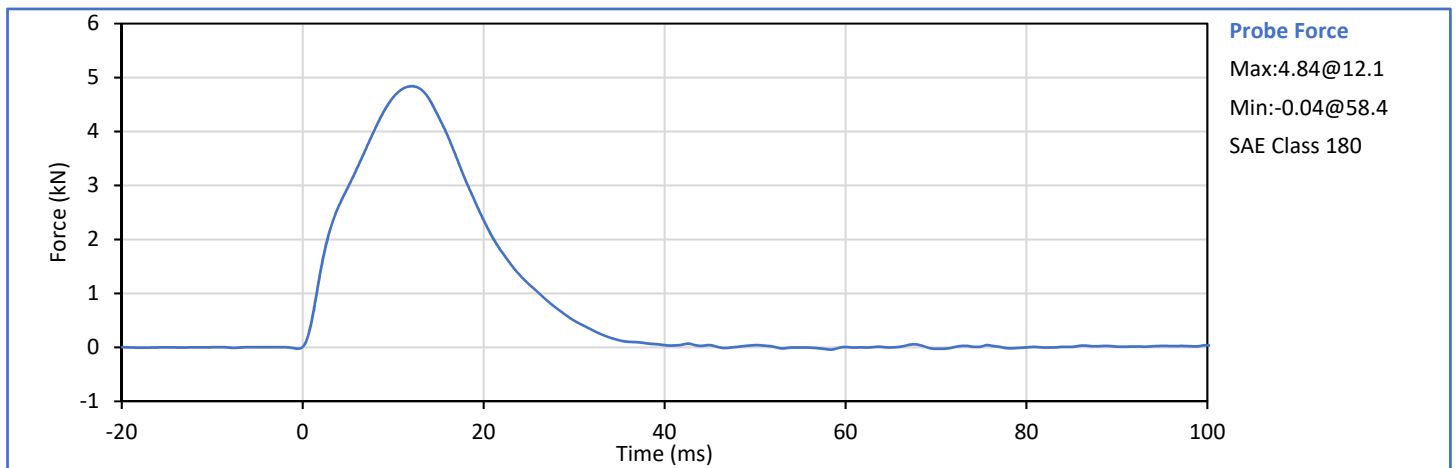
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	31	Pass
Pendulum Velocity	m/s	5.95	6.15	6.08	Pass
Peak Headform Flexion	deg	45.0	55.0	46.1	Pass
Time of Peak Headform Flexion	ms	39.0	53.0	40.8	Pass
Flexion Decay (Peak to zero)	ms	37.0	57.0	37.5	Pass
Overall Test Results					Pass

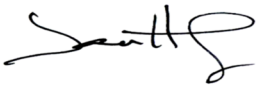



Technician: 
J. Hernandez

Approved By: 
C-32 P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	26	Pass
Impactor Velocity	m/s	4.20	4.40	4.35	Pass
Peak Impactor Force	kN	4.70	5.40	4.84	Pass
Time of Peak Impactor Force	ms	11.8	16.1	12.1	Pass
Pubic Symphysis Fy	kN	1.23	1.59	1.34	Pass
Time of Peak Pubic Symphysis Fy	ms	12.2	17.0	12.7	Pass
Overall Test Results					Pass



Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

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

Tested Parameter	Units	Spec Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	28	Pass
A - Sitting Height	mm	772	788	781	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	149	Pass
E - Shoulder Pivot From Backline	mm	97	107	102	Pass
F - Thigh Clearance	mm	119	135	127	Pass
G - Head Breadth	mm	140	148	145	Pass
H - Head Back From Backline	mm	40	46	43	Pass
I - Head Depth	mm	178	188	183	Pass
J - Head Circumference	mm	541	551	545	Pass
K - Buttock To Knee Length	mm	514	540	529	Pass
L - Popliteal Height	mm	343	369	353	Pass
K - Knee Pivot To Floor Height	mm	392	409	402	Pass
N - Buttock Popliteal Length	mm	416	442	430	Pass
O - Chest Depth W/O Jacket	mm	195	211	205	Pass
P - Foot Length	mm	216	232	226	Pass
Q - Hip Breadth (W/Pelvic Plugs)	mm	313	323	316	Pass
R - Arm Length	mm	249	259	255	Pass
S - Knee Joint To Seatback	mm	477	493	486	Pass
V - Shoulder Width	mm	341	357	350	Pass
W - Foot Width	mm	78	94	87	Pass
Y - Chest Circumference W/Jacket	mm	851	881	865	Pass
Z - Waist Circumference	mm	761	791	779	Pass
Overall Test Results					Pass

Technician:



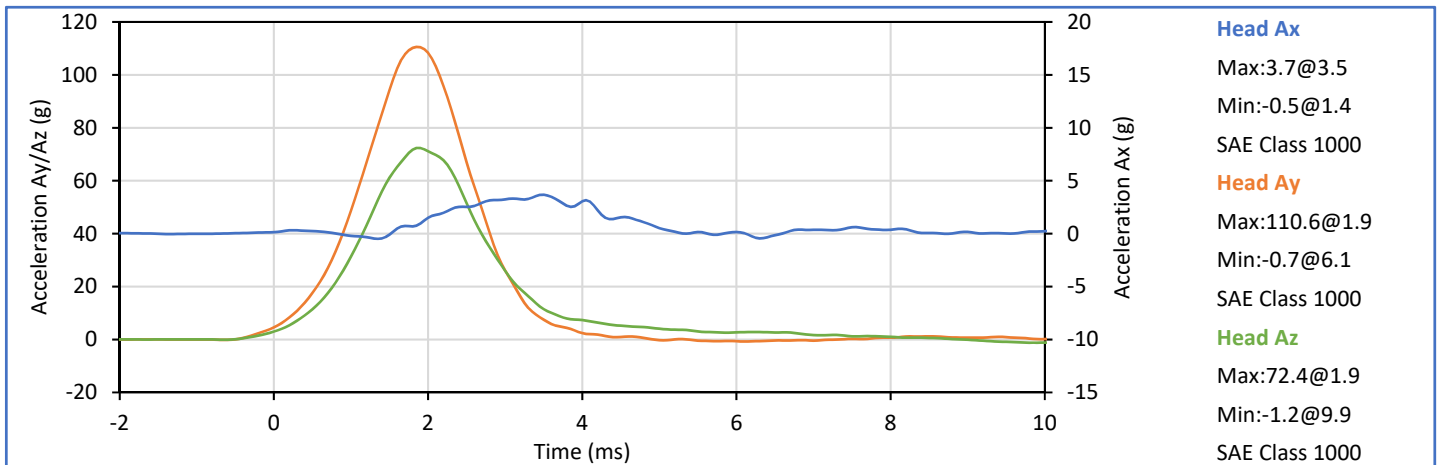
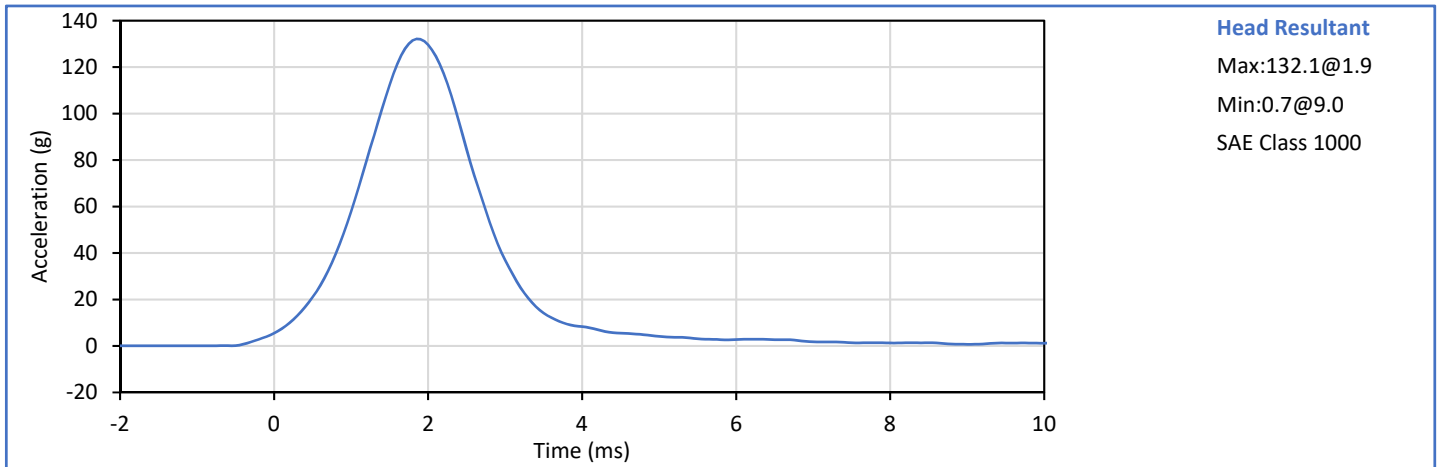
J. Hernandez

Approved By:



P. Puzzuto

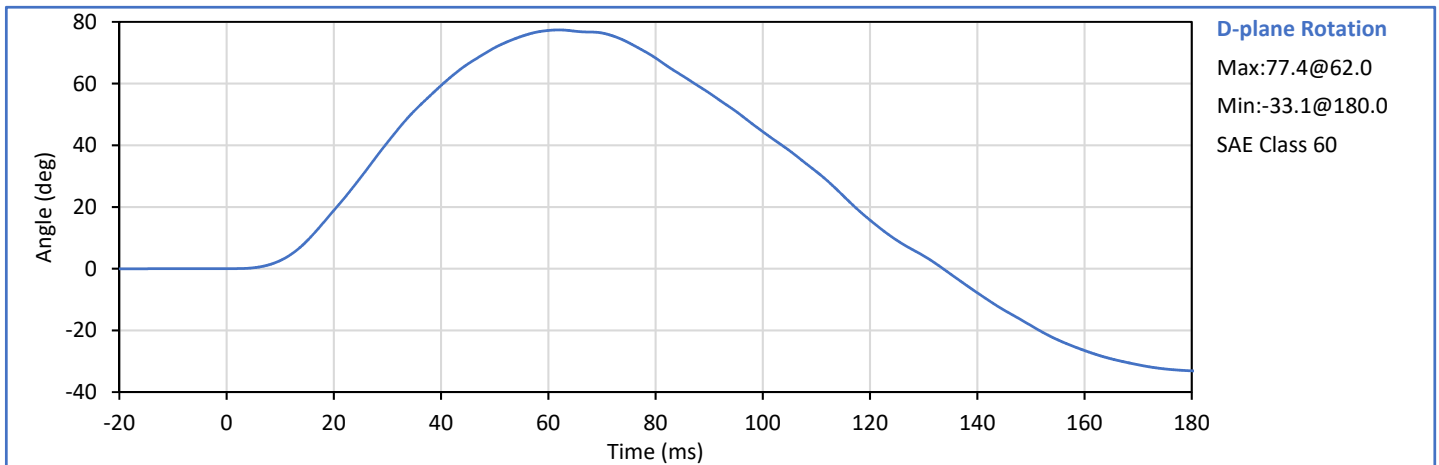
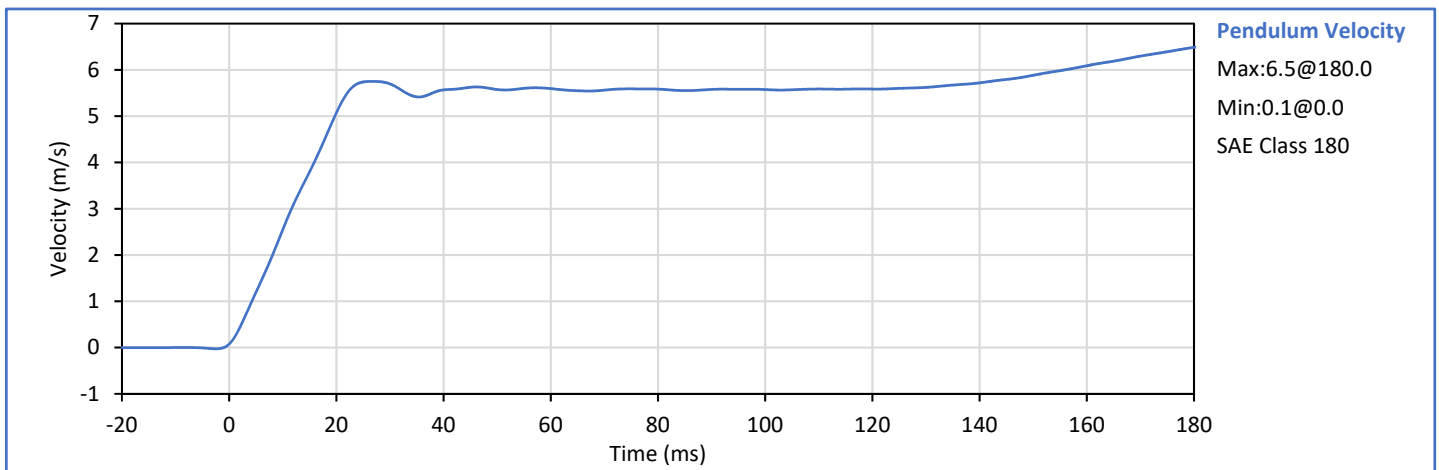
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.1	Pass
Laboratory Humidity	%	10	70	29	Pass
Peak Resultant Acceleration	g	115.0	137.0	132.1	Pass
Peak Head Ax	g	-15.0	15.0	-0.5	Pass
Oscillations After Main Pulse	%	0.0	15.0	2.2	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
Overall Test Results					Pass



Technician: *J. Hernandez*
J. Hernandez

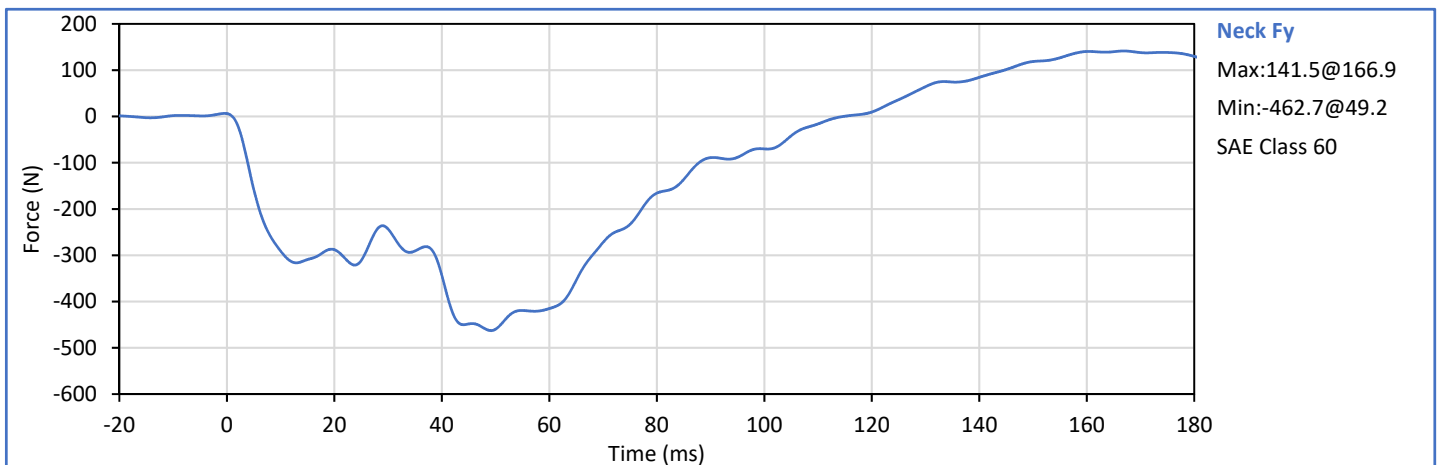
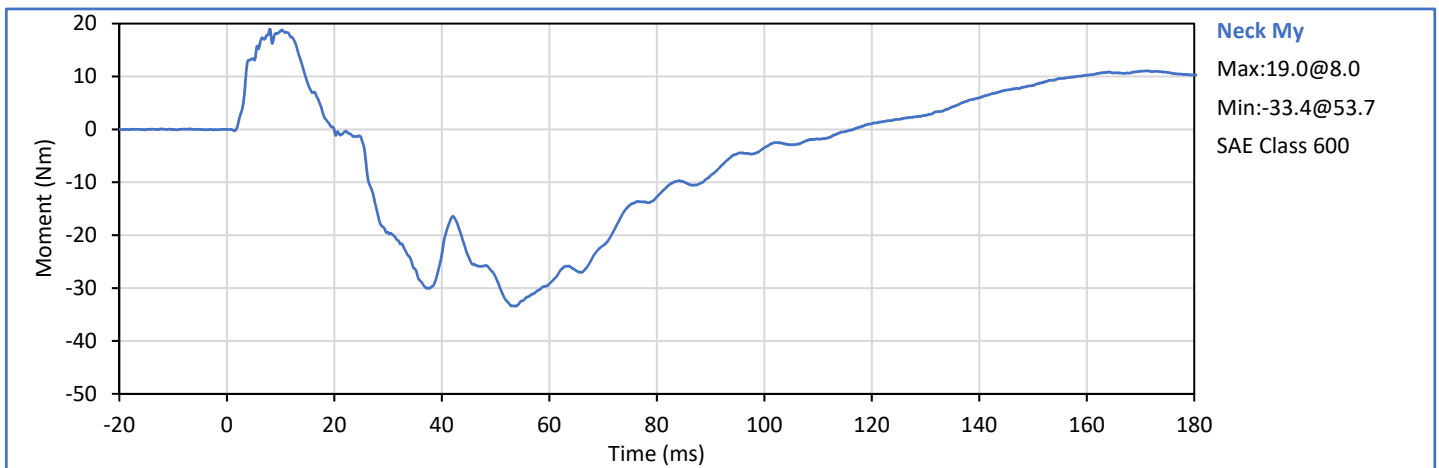
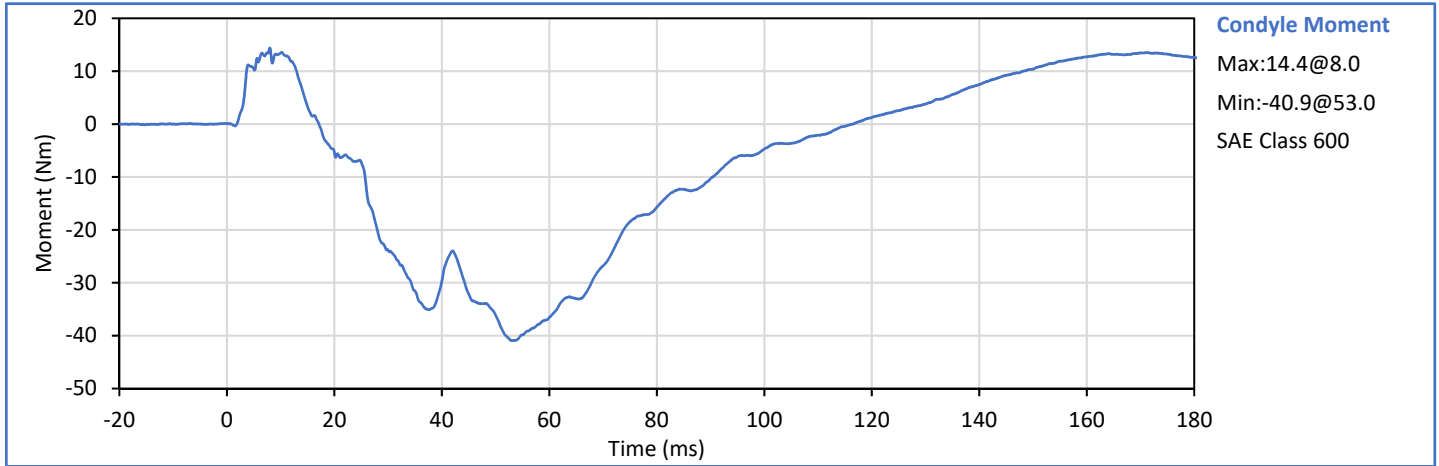
Approved By: *P. Puzzuto*
P. Puzzuto

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	5.58	Pass
Pendulum Decel at 10 ms	m/s	2.20	2.80	2.55	Pass
Pendulum Decel at 15 ms	m/s	3.30	4.10	3.80	Pass
Pendulum Decel at 20 ms	m/s	4.40	5.40	5.07	Pass
Pendulum Decel at 25 ms	m/s	5.40	6.10	5.74	Pass
Pendulum Decel from 25-100 ms	m/s	5.50	6.20	5.75	Pass
Peak "D" Plane Rotation	deg	71.0	81.0	77.4	Pass
Time of Peak "D" Plane Rotation	ms	50.0	70.0	62.0	Pass
Peak Occ. Condyle Moment	Nm	-44.0	-36.0	-40.9	Pass
Time of Moment Decay to 0 Nm	ms	102.0	126.0	116.5	Pass
Overall Test Results					Pass



Technician: *J. Hernandez*
J. Hernandez

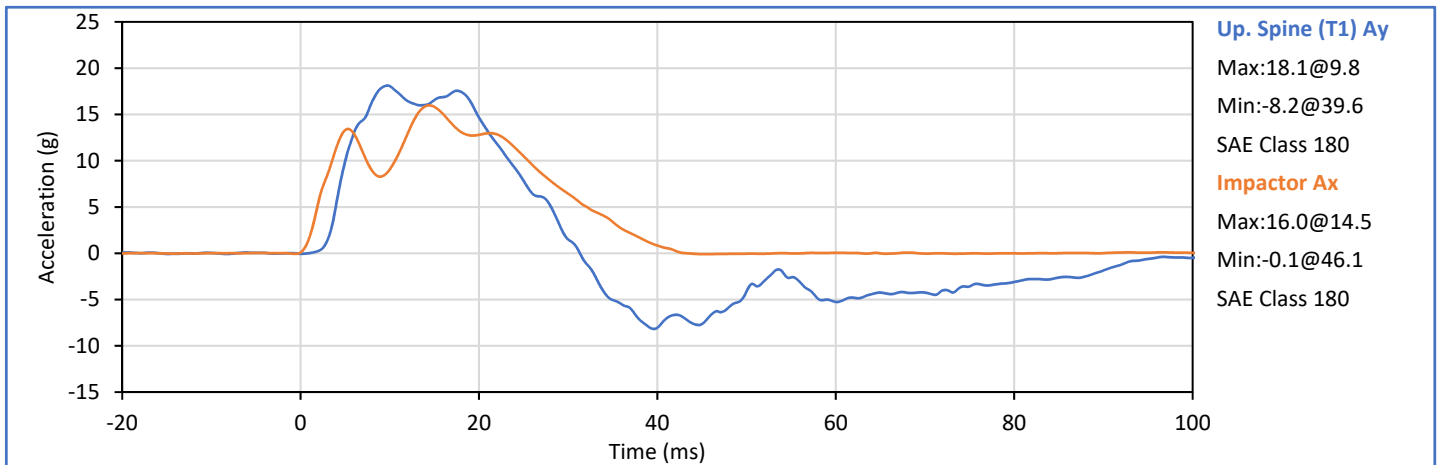
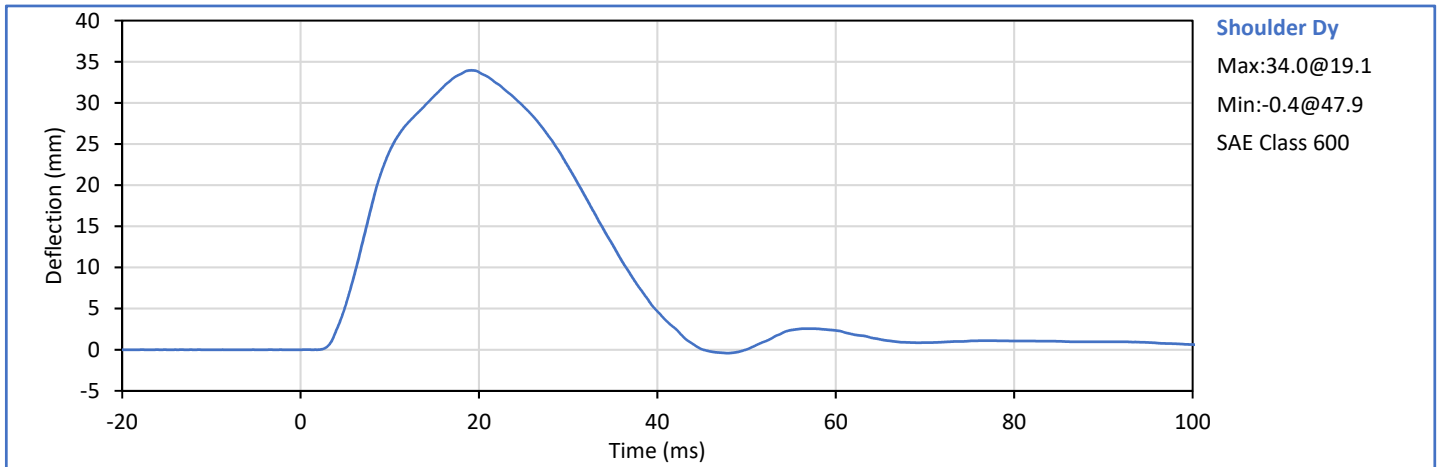
Approved By: *P. Puzzuto*
P. Puzzuto



ATD Serial No.: 299

Test Date: 2020-01-28

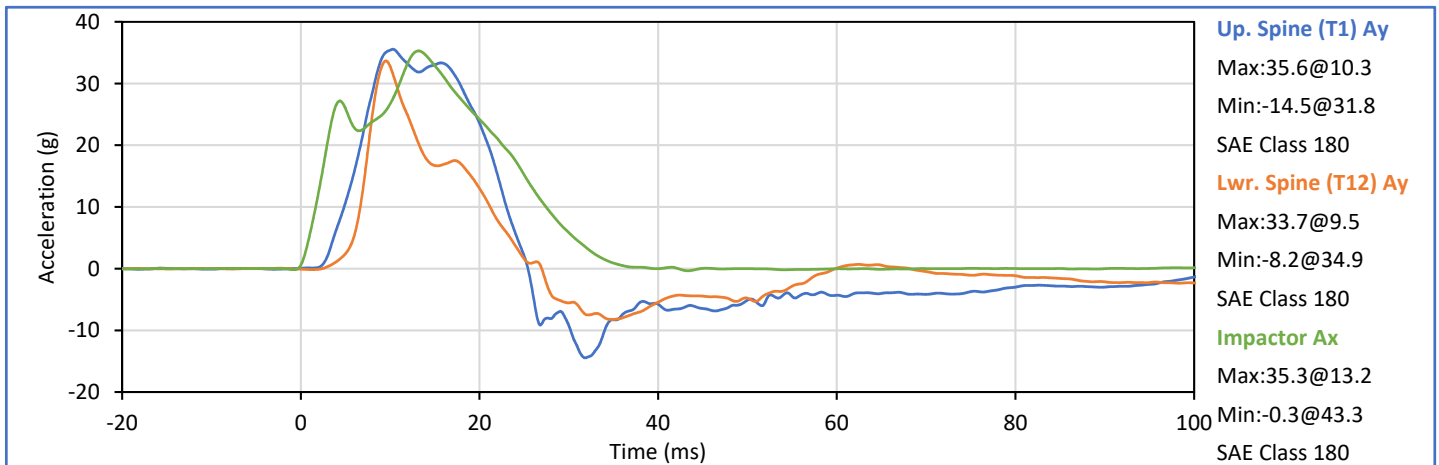
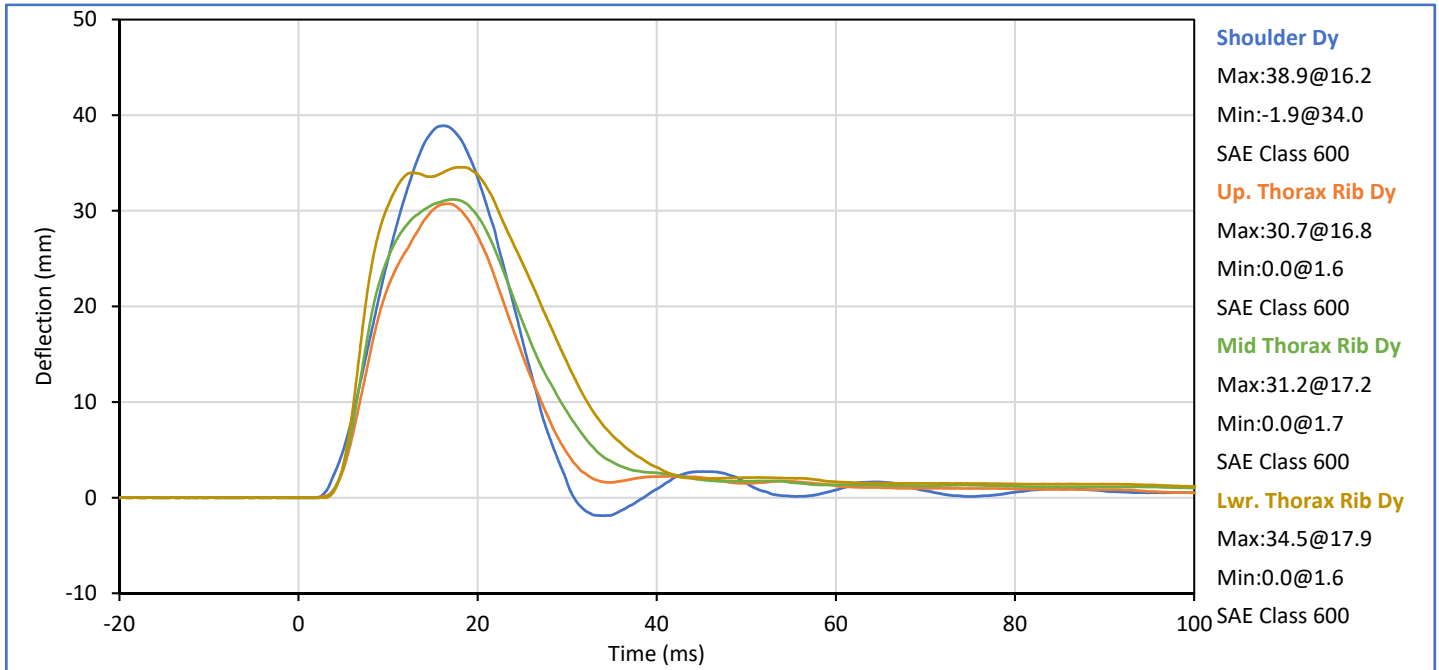
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Humidity	%	10	70	28	Pass
Impactor Velocity	m/s	4.20	4.40	4.38	Pass
Peak Shoulder Dy	mm	28.0	37.0	34.0	Pass
Peak Upper Spine (T1) Ay	g	17.0	22.0	18.1	Pass
Peak Impactor Ax	g	13.0	18.0	16.0	Pass
Overall Test Results					Pass



Technician: J. Hernandez

Approved By: P. Puzzuto

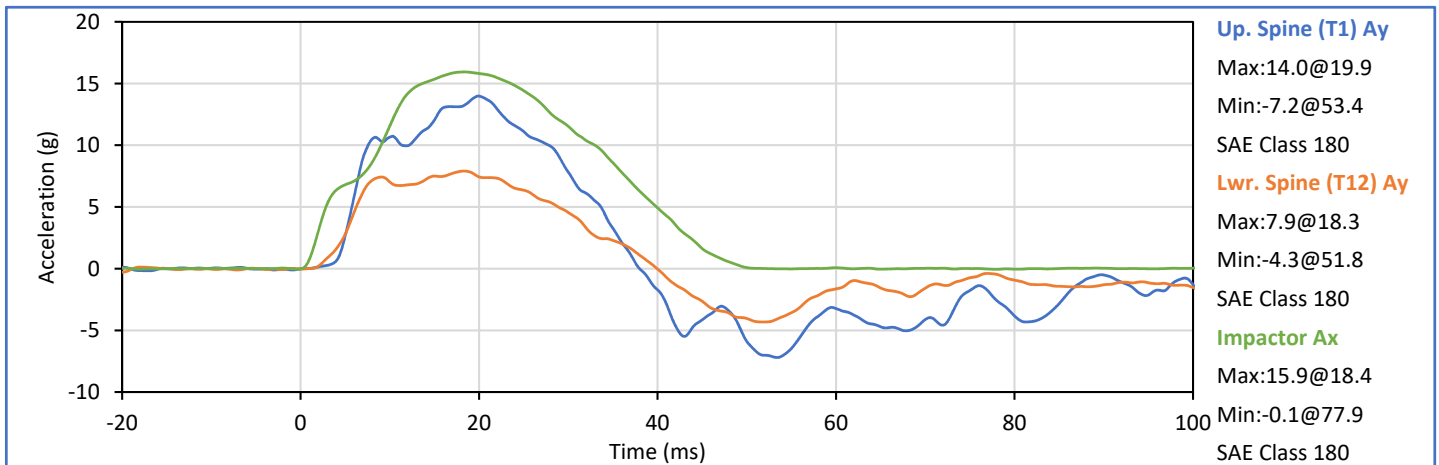
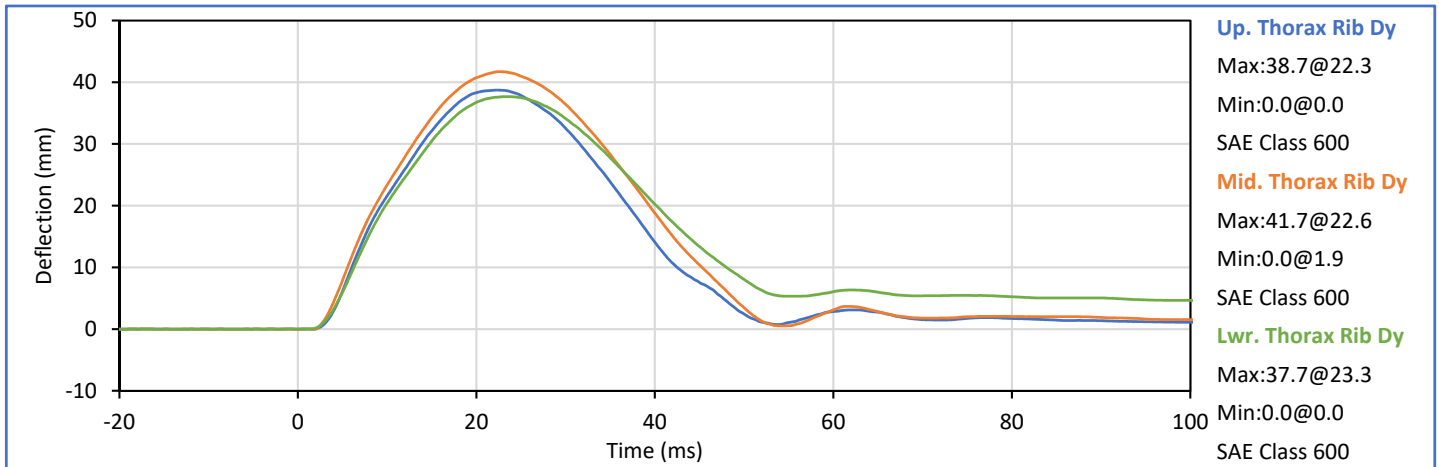
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Humidity	%	10	70	28	Pass
Impactor Velocity	m/s	6.60	6.80	6.76	Pass
Peak Shoulder Dy	mm	31.0	40.0	38.9	Pass
Peak Upper Rib Dy	mm	25.0	32.0	30.7	Pass
Peak Middle Rib Dy	mm	30.0	36.0	31.2	Pass
Peak Lower Rib Dy	mm	32.0	38.0	34.5	Pass
Peak Upper Spine (T1) Ay	g	34.0	43.0	35.6	Pass
Peak Lower Spine (T12) Ay	g	29.0	37.0	33.7	Pass
Peak Impactor Ax	g	30.0	36.0	35.3	Pass
Overall Test Results					Pass




Technician: J. Hernandez

Approved By: P. Puzzuto

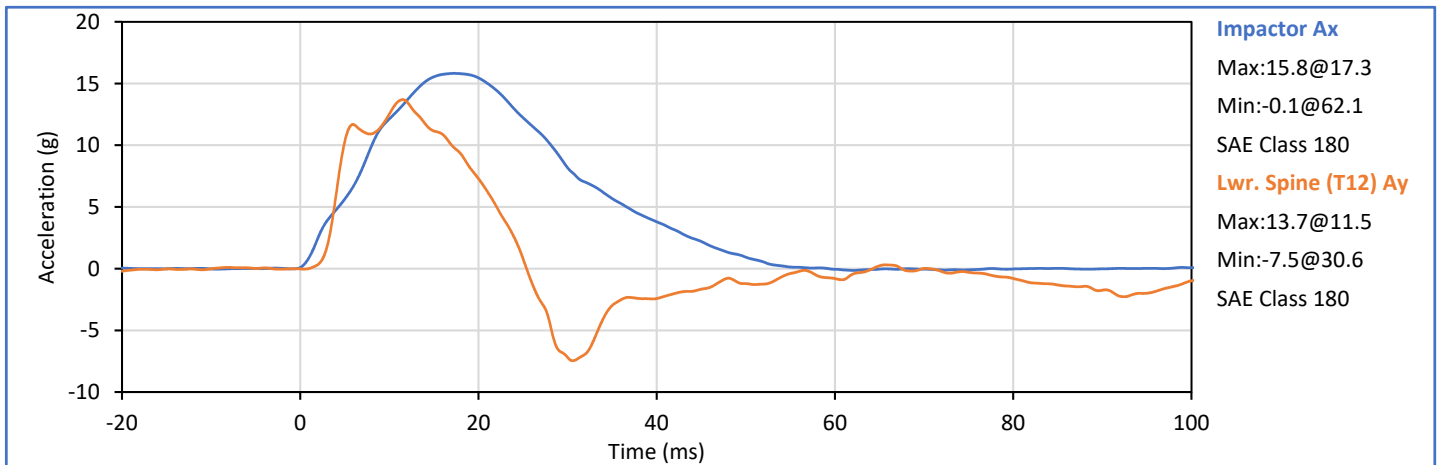
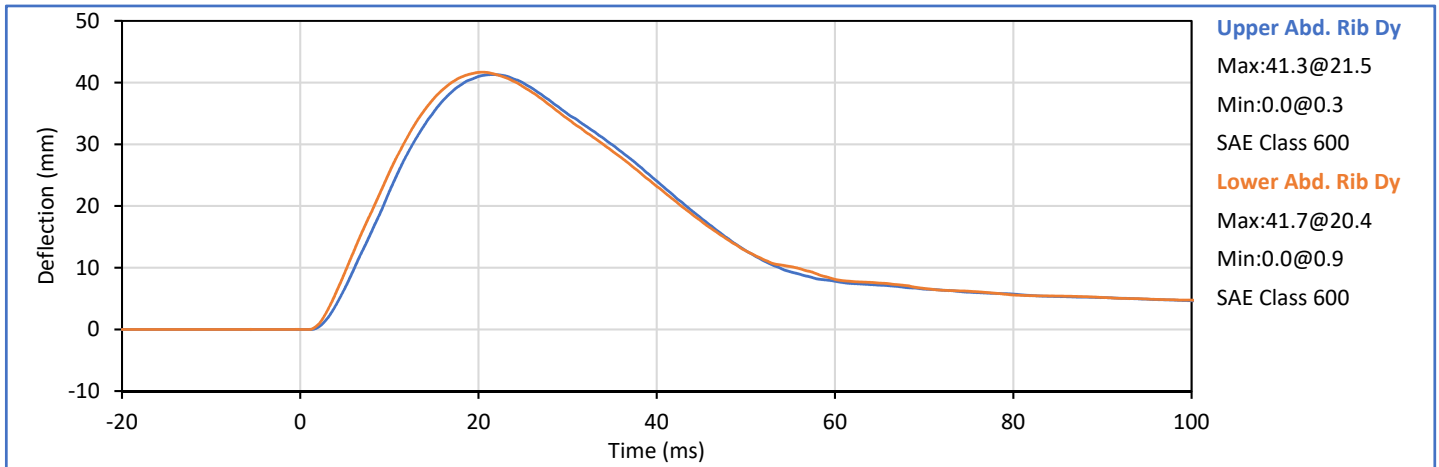
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Humidity	%	10	70	28	Pass
Impactor Velocity	m/s	4.20	4.40	4.34	Pass
Peak Upper Rib Dy	mm	32.0	40.0	38.7	Pass
Peak Middle Rib Dy	mm	39.0	45.0	41.7	Pass
Peak Lower Rib Dy	mm	35.0	43.0	37.7	Pass
Peak Upper Spine (T1) Ay	g	13.0	17.0	14.0	Pass
Peak Lower Spine (T12) Ay	g	7.0	11.0	7.9	Pass
Peak Impactor Ax	g	14.0	18.0	15.9	Pass
Overall Test Results					Pass





Technician: 
J. Hernandez

Approved By: 
C-40 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	28	Pass
Impactor Velocity	m/s	4.20	4.40	4.36	Pass
Peak Upper Abdomen Rib Dy	mm	36.0	47.0	41.3	Pass
Peak Lower Abdomen Rib Dy	mm	33.0	44.0	41.7	Pass
Peak Lower Spine T12 Ay	mm	9.0	14.0	13.7	Pass
Peak Impactor Ax	g	12.0	16.0	15.8	Pass
Overall Test Results					Pass

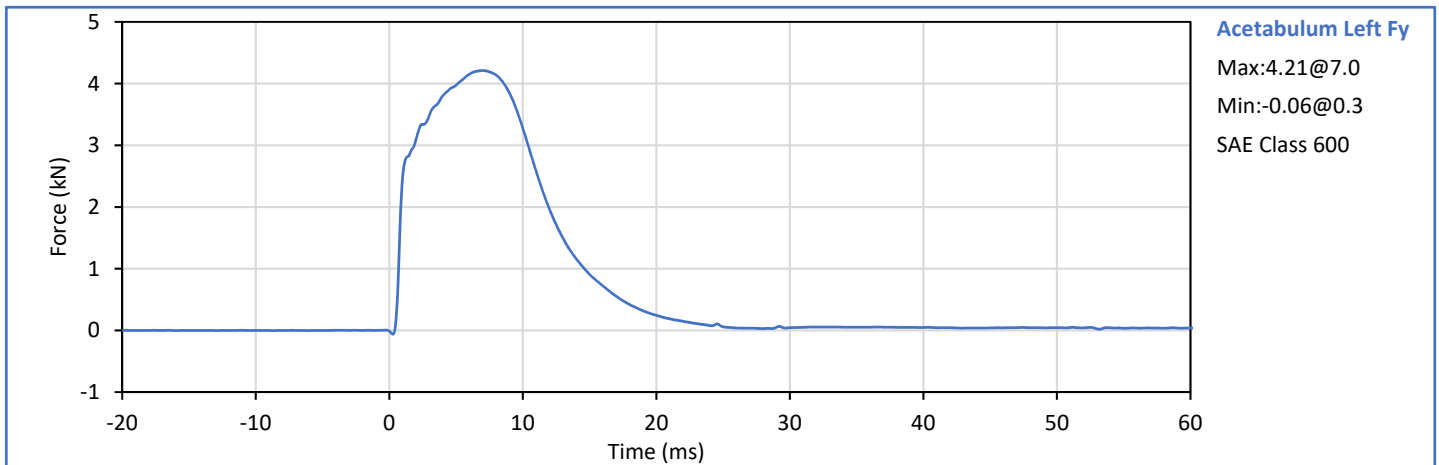
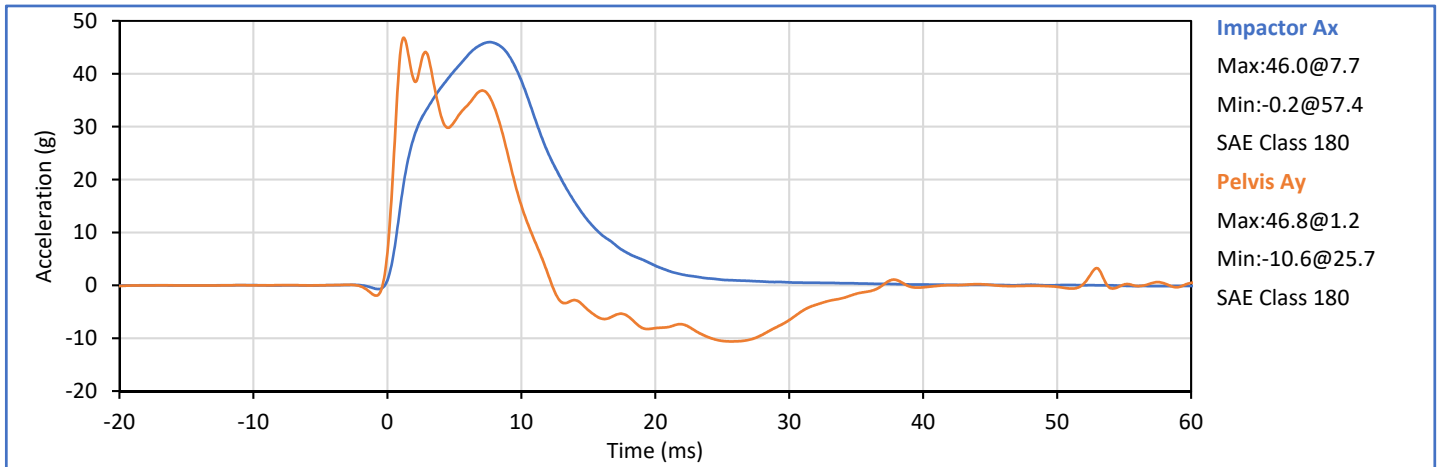


Technician: 
J. Hernandez

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	28	Pass
Impactor Velocity	m/s	6.60	6.80	6.72	Pass
Peak Acetabulum Fy	kN	3.60	4.30	4.21	Pass
Pelvis Ay after 6ms	g	34.0	42.0	36.8	Pass
Peak Impactor Ax	g	38.0	47.0	46.0	Pass
Overall Test Results					Pass

Pelvis Plug S/N: 12360 (SACO)



Technician: *J. Hernandez*
J. Hernandez

Approved By: *P. Puzzuto*
C-42 P. Puzzuto

ATD Serial No.: 299

Test Date: 2020-01-28

Pelvis Plug S/N: 12360 (SACO)



SID-IIs Pelvis Plug Certification Test

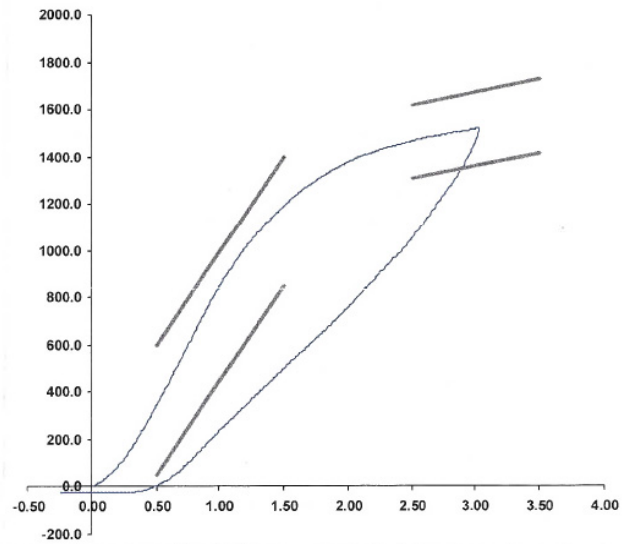
Plug S/N 12360
Test Number 6746
Report Number 6761
Test Date 3/23/2018 9:01:30 AM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	348.91	50.00	600.00
Force @ 1.5 mm (N)	1,192.29	850.00	1,400.00
Force @ 2.5 mm (N)	1,467.90	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,518.03	1,361.00	1,673.00

Testing Machine STM-20 5965542
Load Cell S/N (FI360947), Units (LBS) 1000
Crosshead Speed (mm / min) or Rate 12.7
Extension or Position Measured by XHD_100 (XHD100)

Notes:

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107 23-Mar-18
SACO Research

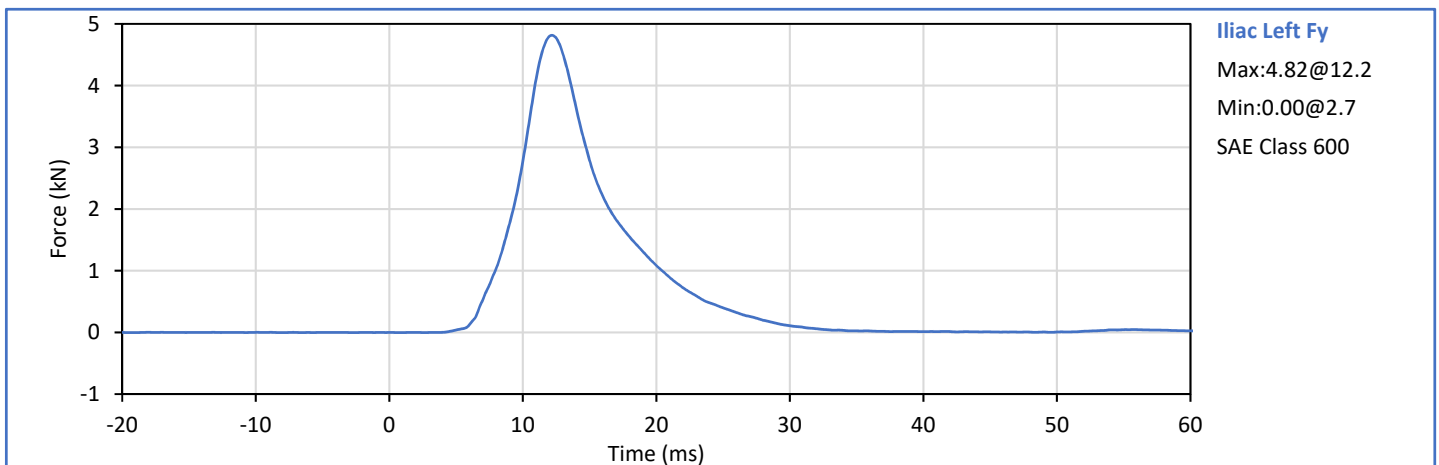
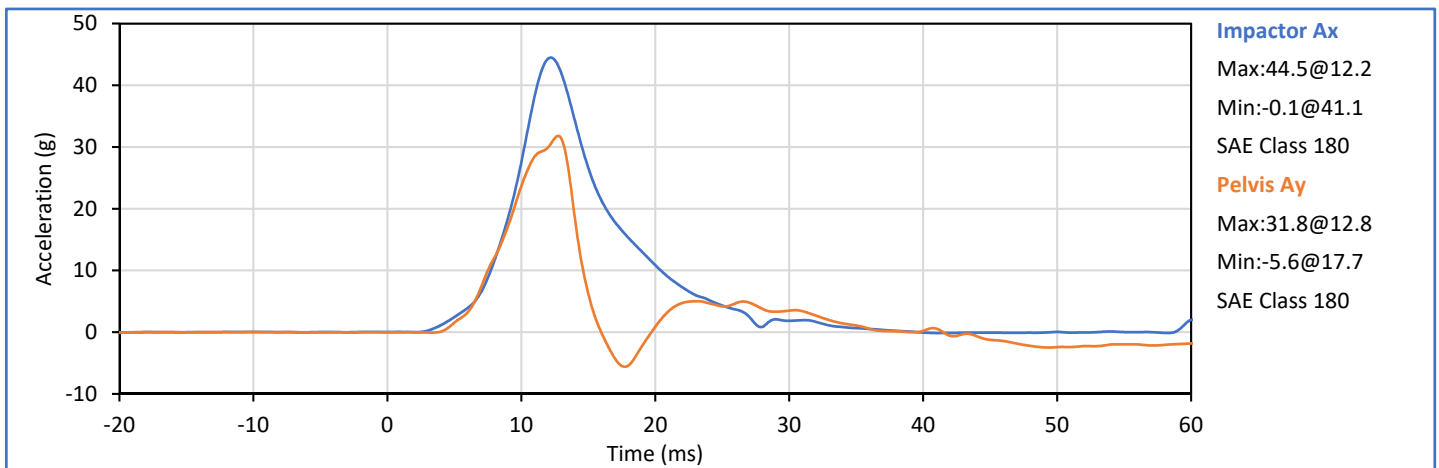
By: DC Date: 3/23/18

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


Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Humidity	%	10	70	27	Pass
Impactor Velocity	m/s	4.20	4.40	4.33	Pass
Peak Iliac Fy	kN	4.10	5.10	4.82	Pass
Pelvis Ay after 6ms	g	28.0	39.0	31.8	Pass
Peak Impactor Ax	g	36.0	45.0	44.5	Pass
Overall Test Results					Pass

Pelvis Plug S/N: 12228 (SACO) *

* Plug is not impacted and remains certified



Technician: 
J. Hernandez

Approved By: 
C-44 P. Puzzuto

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	P58760	Endevco	7264C-2k	2019-12-18
Head Acceleration Y Primary	P58763	Endevco	7264C-2k	2019-12-18
Head Acceleration Z Primary	P52093	Endevco	7264C-2k	2019-12-18
Head Acceleration X Redundant	P52072	Endevco	7264C-2k	2019-12-18
Head Acceleration Y Redundant	P58768	Endevco	7264C-2k	2019-12-18
Head Acceleration Z Redundant	P52074	Endevco	7264C-2k	2019-12-18
Upper Thorax Rib Deflection Y	180 (ES-2 Rib)	Honeywell	F38000203	2019-11-04
Middle Thorax Rib Deflection Y	177 (ES-2 Rib)	Honeywell	F38000203	2019-11-04
Lower Thorax Rib Deflection Y	186 (ES-2 Rib)	Honeywell	F38000203	2019-11-04
Anterior Abdominal Force Y	1514 Fy	R.A. Denton	2631J	2019-10-31
Middle Abdominal Force Y	1510 Fy	R.A. Denton	2631J	2019-10-31
Posterior Abdominal Force Y	1515 Fy	R.A. Denton	2631J	2019-10-31
Lower Spine T12 Acceleration X	P45011	Endevco	7264C-2k	2019-12-18
Lower Spine T12 Acceleration Y	P58992	Endevco	7264C-2k	2019-12-18
Lower Spine T12 Acceleration Z	P51700	Endevco	7264C-2k	2019-11-04
Pubic Symphysis Force Y	506 Fy	R.A. Denton	3096JFL	2019-10-31

Table 2 - Left Rear Passenger ATD Instrumentation

Sensor Location	Sensor S\N	Mfr	Model	Cal Date
Head Acceleration X Primary	P51929	Endevco	7264C-2k	2019-12-30
Head Acceleration Y Primary	P50086	Endevco	7264C-2k	2019-12-30
Head Acceleration Z Primary	P51931	Endevco	7264C-2k	2019-12-30
Head Acceleration X Redundant	P68604	Endevco	7264C-2k	2019-12-30
Head Acceleration Y Redundant	P51934	Endevco	7264C-2k	2019-12-30
Head Acceleration Z Redundant	P58736	Endevco	7264C-2k	2019-12-30
Head Rotation Rate X	ARS7571	DTS	ARS PRO-8k (2000Hz)	2019-07-08
Head Rotation Rate Y	ARS7316	DTS	ARS PRO-8k (2000Hz)	2019-07-08
Head Rotation Rate Z	ARS7330	DTS	ARS PRO-8k (2000Hz)	2019-07-08
Upper Thorax Rib Deflection Y	1143	Servo	08TCI-3725	2019-12-30
Middle Thorax Rib Deflection Y	1075	Servo	08TCI-3725	2019-12-30
Lower Thorax Rib Deflection Y	1213	Servo	08TCI-3725	2019-12-30
Upper Abdomen Rib Deflection Y	1218	Servo	08TCI-3725	2019-12-30
Lower Abdomen Rib Deflection Y	1177	Servo	08TCI-3725	2019-12-31
Lower Spine T12 Acceleration X	P58761	Endevco	7264C-2k	2019-12-30
Lower Spine T12 Acceleration Y	P50077	Endevco	7264C-2k	2019-12-30
Lower Spine T12 Acceleration Z	P58795	Endevco	7264C-2k	2019-12-30
Iliac Wing Impact Side Force Y	278 Fy (Iliac)	R.A. Denton	3228J	2019-04-11
Acetabulum Impact Side Force Y	260 Fy (Acetabulum)	R.A. Denton	3249J	2019-04-11

Table 3 - Vehicle Instrumentation

Sensor Location	Sensor S\N	Mfr	Model	Cal Date
Vehicle CG Ax	Accels\A265853	MSI	52F-2000	2019-11-13
Vehicle CG Ay	Accels\A266317	MSI	52F-2000	2019-11-13
Vehicle CG Az	Accels\A266323	MSI	52F-2000	2019-11-13
Right Side Sill at Front Seat Ax	Accels\A254903	MSI	52F-2000	2019-11-13
Right Side Sill at Front Seat Ay	Accels\A254900	MSI	52F-2000	2019-11-13
Right Side Sill at Front Seat Az	Accels\A254917	MSI	52F-2000	2019-11-13
Right Side Sill at Rear Seat Ax	Accels\A273397	MSI	52F-2000	2019-12-02
Right Side Sill at Rear Seat Ay	Accels\A273022	MSI	52F-2000	2019-12-02
Right Side Sill at Rear Seat Az	Accels\A273384	MSI	52F-2000	2019-12-02
Left Side Sill at Front Seat Ay	Accels\A254924	MSI	52F-2000	2019-12-02
Left Side Sill at Rear Seat Ay	Accels\A254926	MSI	52F-2000	2019-12-02
Left Lower A-Pillar Ay	Accels\10109	Endevco	757F-2k	2019-11-27
Left Middle A-Pillar Ay	Accels\11163	Endevco	757F-2k	2019-12-17
Left Lower B-Pillar Ay	Accels\10436	Endevco	757F-2k	2019-12-13
Left Middle B-Pillar Ay	Accels\10435	Endevco	757F-2k	2019-11-25
Driver Seat Track at H-Point Ay	Accels\10912	Endevco	757F-2k	2019-12-18
Rear Seat Structure Ay	Accels\A265902	MSI	52F-2000	2019-12-02
Right Rear Occupant Comp. Ay	Accels\A267280	MSI	52F-2000	2019-12-12
Engine Block Top Ax	Accels\A265924	MSI	52F-2000	2019-12-11
Engine Block Top Ay	Accels\A265901	MSI	52F-2000	2019-12-11
Rear Floopan Above Axle Ax	Accels\10438	Endevco	757F-2k	2019-11-25
Rear Floopan Above Axle Ay	Accels\10895	Endevco	757F-2k	2019-12-18
Rear Floopan Above Axle Az	Accels\10886	Endevco	757F-2k	2019-12-18

Table 4 - Moving Deformable Barrier (MDB) Instrumentation

Sensor Location	Sensor S\N	Mfr	Model	Cal Date
MDB CG Ax	Accels\A265905	MSI	52F-2000	2019-12-09
MDB CG Ay	Accels\A254840	MSI	52F-2000	2019-12-09
MDB CG Az	Accels\A265892	MSI	52F-2000	2019-12-09
MDB Left Side at Rear Axle Ax	Accels\A273028	MSI	52F-2000	2019-11-25
MDB Left Side at Rear Axle Ay	Accels\A273442	MSI	52F-2000	2019-11-25