

REPORT NUMBER: SideNCAPMDB-KAR-24-007

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

**FORD MOTOR CO.
2024 FORD RANGER 4-DOOR CREW CAB**

NHTSA No: M20240204

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



AUGUST 6, 2024

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
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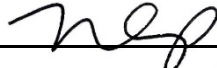
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Approval Date: _____ August 6, 2024 _____

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

Date: _____

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15. Supplementary Notes																																																					
16. Abstract A 61.9 km/h 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2024 Ford Ranger 4-Door Crew Cab 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 July 23, 2024. The impact velocity of the Moving Deformable Barrier was 61.10 km/h and the outside ambient temperature at the struck (driver's) side of the vehicle was 37.7°C. The target vehicle's maximum post-test static crush was 233 mm located at level 1. The test vehicle's occupant performance data is as follows: <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th rowspan="2">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>42.764</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>44</td> <td>31.237</td> </tr> <tr> <td>Total Abdominal Force</td> <td>N</td> <td>2500</td> <td>865.932</td> </tr> <tr> <td>Pubic Symphysis Force</td> <td>N</td> <td>6000</td> <td>1005.526</td> </tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <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>47.429</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td>g</td> <td>82</td> <td>25.189</td> </tr> <tr> <td>Total Pelvic Force (Sum of Acetubular and Iliac Forces)</td> <td>N</td> <td>5525</td> <td>1348.400</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38*</td> <td>9.077</td> </tr> <tr> <td>Maximum Abdominal Rib Deflection</td> <td>mm</td> <td>45*</td> <td>8.389</td> </tr> </tbody> </table>				Measurement Description	Driver ATD (ES-2re)			Units	IARV	Result	Head Injury Criteria (HIC ₃₆)		1000	42.764	Maximum Thoracic Rib Deflection	mm	44	31.237	Total Abdominal Force	N	2500	865.932	Pubic Symphysis Force	N	6000	1005.526	Measurement Description	Passenger ATD (SID-IIs)			Units	IARV	Result	Head Injury Criteria (HIC ₃₆)		1000	47.429	Resultant Lower Spine Acceleration	g	82	25.189	Total Pelvic Force (Sum of Acetubular and Iliac Forces)	N	5525	1348.400	Maximum Thoracic Rib Deflection	mm	38*	9.077	Maximum Abdominal Rib Deflection	mm	45*	8.389
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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 2024 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract number 693JJ920D000015. The purpose of this test is to generate comparative side impact performance in a 2024 Ford Ranger 4-Door Crew Cab. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated March 2020.

SECTION 2

SUMMARY OF TEST RESULTS

A 2024 Ford Ranger 4-Door Crew Cab 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 61.10 km/h (37.97 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 July 23, 2024. Pre- and post-test photographs of the test vehicle, the MDB and the dummies (ES-2re and SID-IIs) are included in Appendix A of this report.

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 March 2020. The side impact event was documented by 11 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

Head Triaxial Angular Rate Sensors

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	42.764
Maximum Thoracic Rib Deflection	mm	44	31.237
Combined Abdominal Force	N	2500	865.932
Pubic Symphysis Force	N	6000	1005.526
Lower Spine (T12) Resultant Acceleration	G	82*	31.088

**Proposed IARV*

Measurement Description	Units	Passenger ATD (SID-IIs)	
		Threshold	Result
Head Injury Criteria (HIC ₃₆)		1000	47.429
Lower Spine (T12) Resultant Acceleration	g	82	25.189
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	1348.400
Maximum Thoracic Rib Deflection	mm	38*	9.077
Maximum Abdominal Rib Deflection	mm	45*	8.389

**Proposed IARV*

Supplemental restraint information is given below:

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

GENERAL COMMENTS:

None

SECTION 3

OCCUPANT AND VEHICLE INFORMATION/DATA SHEETS

Test Vehicle: 2024 Ford Ranger 4-Door Crew Cab NHTSA No. M20240204
Test Program: NCAP MDB Side Impact Test Test Date: 7/23/24

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: 2024 Ford Ranger 4-Door Crew Cab NHTSA No. M20240204
 Test Program: NCAP MDB Side Impact Test Test Date: 7/23/24

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	M20240204	Traction Control System (TCS)	Yes
Model Year	2024	Auto-Leveling System	No
Make	Ford	Automatic Door Locks	Yes
Model	Ranger	Power Window Auto-Reverse	Yes
Body Style	4-Door Crew Cab	Other Optional Feature	No
VIN	1FTER4BH1RLE01834	Driver Front Airbag	Yes
Body Color	Cactus Gray	Driver Curtain Airbag	Yes
Odometer Reading (km / mi)	13.8	Driver Head/Torso Airbag	No
Engine Displacement (L)	2.3	Driver Torso Airbag	No
Type / No. of Cylinders	4	Driver Torso/Pelvis Airbag	Yes
Engine Placement	Longitudinal	Driver Pelvis Airbag	No
Transmission Type	Automatic	Driver Knee Airbag	Yes
Transmission Speeds	10	Rear Pass. Curtain Airbag	Yes
Overdrive	Yes	Rear Pass. Head/Torso Airbag	No
Final Drive	RWD	Rear Pass. Torso Airbag	No
Roof Rack	No	Rear Pass. Torso/Pelvis Airbag	No
Sunroof / T-Top	No	Rear Pass. Pelvis Airbag	No
Running Boards	No	Driver Seat Belt Pretensioner	Yes
Tilt Steering Wheel	Yes	Rear Pass. Seat Belt Pretensioner	Yes
Power Seats	Yes	Driver Load Limiter	Yes
Anti-Lock Brakes (ABS)	Yes	Rear Pass. Load Limiter	Yes
		Other Safety Restraint	Yes
Does Owner's Manual provide instructions to turn off automatic door locks?			No

DATA FROM CERTIFICATION LABEL

Manufactured By	FORD MOTOR CO.	GVWR (kg)	2744
Date of Manufacture	04/24	GAWR Front (kg)	1329
Vehicle Type	Truck	GAWR Rear (kg)	1621

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity	2	3		5	
Capacity Weight (VCW) (kg)				807.0	A
DSC x 68 (kg)				340.0	B
Cargo Weight (RCLW) (kg)				136.0	A-B*

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

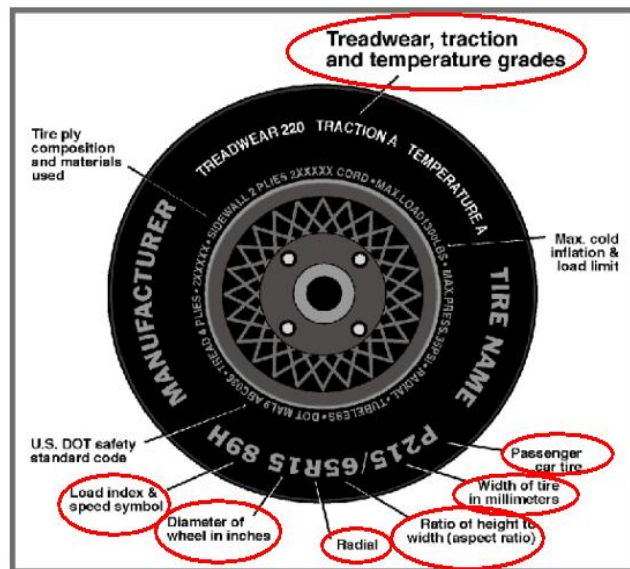
VEHICLE SEAT TYPE

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

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2024 Ford Ranger 4-Door Crew Cab NHTSA No. M20240204
 Test Program: NCAP MDB Side Impact Test Test Date: 7/23/24



Measured Parameter	Front	Rear
Max. Tire Pressure (kpa)	340	340
Cold Pressure (kPa)	260	260
Recommended Tire Size	225/70R17	225/70R17
Tire Size on Vehicle	225/70R17	225/70R17
Tire Manufacturer	Goodyear	Goodyear
Tire Model	Wrangler	Wrangler
Treadware	580	580
Traction Grade	B	B
Temperature Grade	B	B
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel, 1 Polyamide	2 Polyester, 2 Steel, 1 Polyamide
Load Index/Speed Symbol	112T	112T
Tire Material	Polyester, Steel, Polyamide	Polyester, Steel, Polyamide
DOT Safety Code Left	1PLE8 JJ1R 0324	1PLE8 JJ1R 0324
DOT Safety Code Right	1PLE8 JJ1R 0324	1PLE8 JJ1R 0324

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2024 Ford Ranger 4-Door Crew Cab NHTSA No. M20240204
 Test Program: NCAP MDB Side Impact Test Test Date: 7/23/24

TIRE PRESSURES

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

MDB TIRE SPECIFICATIONS

	Units	Requirement	LF	RF	LR	RR
Tire Size		P205/75R15	P205/75R15	P205/75R15	P205/75R15	P205/75R15
Tire Pressure	kPa	200 ± 21	220	220	220	220

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UWW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	535.0	452.0		577.0	570.0		578.0	579.0	
Right	kg	512.0	417.0		513.0	512.0		494.0	526.0	
Ratio	%	54.6%	45.4%		50.2%	49.8%		49.2%	50.8%	
Total	kg	1047.0	869.0	1916.0	1090.0	1082.0	2172.0	1072.0	1105.0	2177.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UWW)	kg	1916.0	A
Sum of Actual Weight of 2 P572 ATD Used	kg	125.0	B
Rated Cargo/Luggage Weight (RCLW)	kg	136.0	C
Calculated Target Vehicle Test Weight (TVTW)	kg	2177.0	A+B+C

Does the measured As Tested Vehicle Weight lie within the required weight range (i.e.

Calculated Test Vehicle Target Weight -4.5 kg to -9.0 kg)? ☒ Yes ☐ No

TEST VEHICLE ATTITUDE AND CG

Measurement Description	Units	Fully Loaded	As Tested	Meets Requirement***
LF	mm	923	922	Yes
RF	mm	940	944	Yes
LR	mm	940	944	Yes
RR	mm	955	945	Yes
Vehicle CG (Aft of Front Axle)	mm	1660	1629	
Vehicle CG (Left (+)/Right (-) from Longitudinal Centerline)	mm	51	46	

***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: 2024 Ford Ranger 4-Door Crew Cab NHTSA No. M20240204
Test Program: NCAP MDB Side Impact Test Test Date: 7/23/24

Test Height Adjustable Setting (If Applicable)	
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WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
None	

TEST SURFACE MARKINGS

	Distance from 63° Impact Angle Line (mm)
Fore 25 mm target	0
Aft 25 mm target	0
Pre-Impact Angle Line	63°

Parallel Track Target	X Location (mm)	Y Location (mm)
A	0	0
B	1355	689
C	1355	3756
D	0	3059

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

Test Vehicle: 2024 Ford Ranger 4-Door Crew Cab NHTSA No. M20240204
 Test Program: NCAP MDB Side Impact Test Test Date: 7/23/24

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	12	17.0	14.5
Front Passenger Seat			18.1
Front Center Seat			
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid Fore/Aft	Forwardmost
Driver Seat	14.5	801	Max			
			Mid	790	801	809
			Min			
Front Passenger Seat	18.1	863	Max			
			Mid			
			Min	855	863	873
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: 2024 Ford Ranger 4-Door Crew Cab NHTSA No. M20240204
 Test Program: NCAP MDB Side Impact Test Test Date: 7/23/24

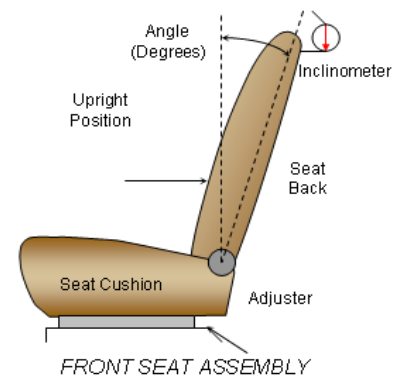
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position From Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	250	26	125	13
Front Passenger Seat	250	26	125	13
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 adjustable. 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 at the head rest post.



SEAT BACK POSITION

Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degree	Detent*
Driver Seat w/ Seated Dummy	49.9	26	3.0	
Front Passenger Seat	50.0	26		
Front Center Seat				
Struck Side Rear Seat w/Seated Dummy	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

DATA SHEET NO. 2 ... (CONTINUED)

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

Test Vehicle: 2024 Ford Ranger 4-Door Crew Cab NHTSA No. M20240204
Test Program: NCAP MDB Side Impact Test Test Date: 7/23/24

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

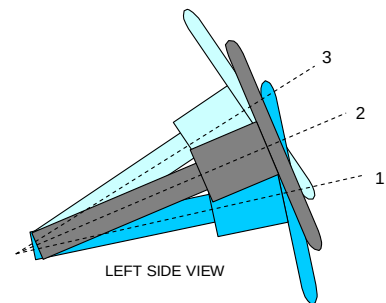
HEAD RESTRAINT ADJUSTMENT

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	2	H
Rear Seat	2	L

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.



STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONING

	Degrees	Fore-Aft Position (mm)
Lowermost Position, No. 1	19.9	155
Geometric Center Position, No. 2	22.7	125
Uppermost Position, No. 3	25.5	95
Telescoping Steering Wheel Travel		60
Test Position	22.7	125

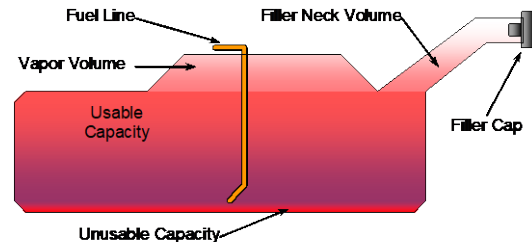
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SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT, AND FUEL SYSTEM DATA

Test Vehicle: 2024 Ford Ranger 4-Door Crew Cab NHTSA No. M20240204
Test Program: NCAP MDB Side Impact Test Test Date: 7/23/24

FUEL PUMP

The vehicle is equipped with an electric fuel pump. The pump will work at "ignition on" until pressure in the system has reached working pressure in the system; then it will stop pumping fuel until the engine has been started.



FUEL TANK CAPACITY

VEHICLE FUEL TANK ASSEMBLY

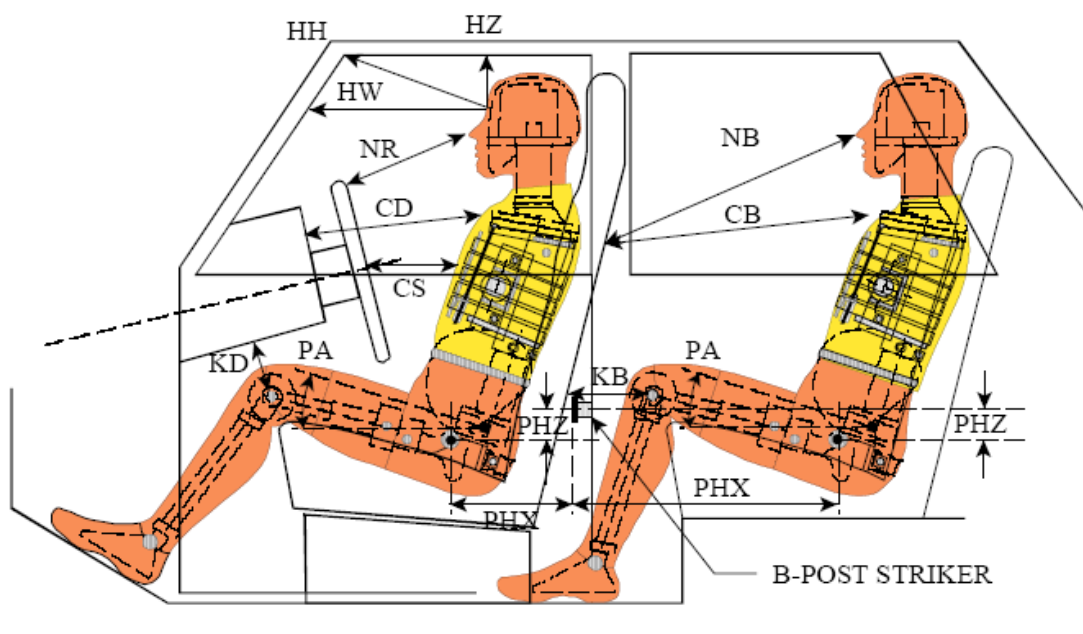
Description	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	76.46
Usable Capacity of "Optional Tank" (see Form No. 1)	
Usable Capacity of "Standard Tank" (see Owner's Manual)	76.46
Usable Capacity of "Optional Tank" (see Owner's Manual)	
93% of Usable Capacity	71.16
Actual amount of Solvent Used in Test	71.16
1/3 of Usable Capacity	25.48

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

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2024 Ford Ranger 4-Door Crew Cab NHTSA No. M20240204
 Test Program: NCAP MDB Side Impact Test Test Date: 7/23/24



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

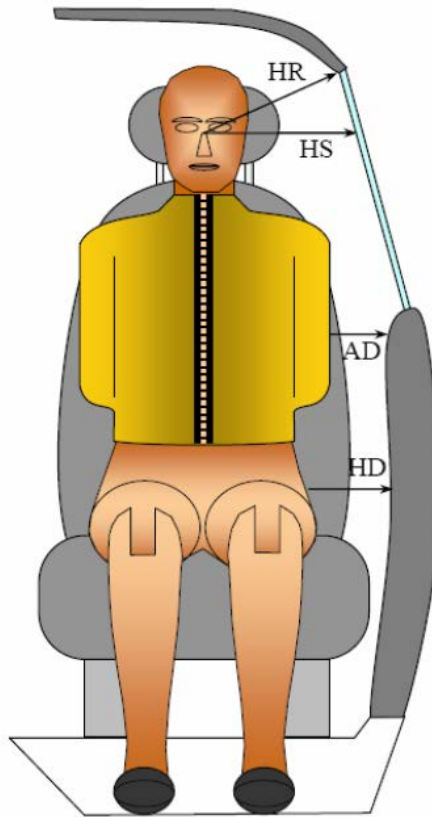
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Description	Driver		Passenger	
			Length (mm)	Angle (°)	Length (mm)	Angle (°)
HH		Head to Header	380			
HW		Head to Windshield	665			
HZ	HZ	Head to Roof	200		292	
NR	NB	Nose to Rim/Seat Back	426		608	
CD	CB	Chest to Dash/Seat Back	597		560	
CS		Chest to Steering Wheel	298			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	234	22.3	291	0.0
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	203	27.1	293	0
PAX°	PAX°	Pelvic Tilt Angle X		15.0		21.7
	PAY°	Pelvic Tilt Angle Y				0.0
PHX	PHX	Hip Point to Striker (x-axis)	189		204	
PHZ	PHZ	Hip Point to Striker (z-axis)	149		155	

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2024 Ford Ranger 4-Door Crew Cab NHTSA No. M20240204
Test Program: NCAP MDB Side Impact Test Test Date: 7/23/24



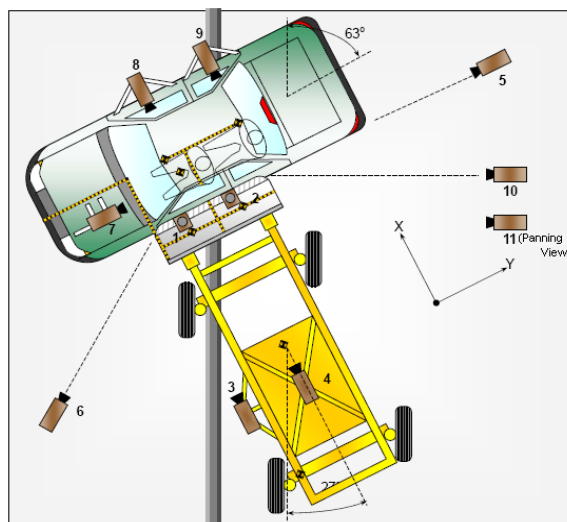
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver	Passenger
HR	Head to Side Header	mm	198	275
HS	Head to Side Window	mm	325	377
AD	Arm to Door	mm	85	137
HD	H-Point to Door	mm	161	158

DATA SHEET NO. 5

CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2024 Ford Ranger 4-Door Crew Cab NHTSA No. M20240204
 Test Program: NCAP MDB Side Impact Test Test Date: 7/23/24



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)	316	-1424	608	8.5	1000
8	Driver Side (On-Board)	435	-1451	576	8	1000
9	Passenger Side (On-Board)	342	-1418	650	8	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

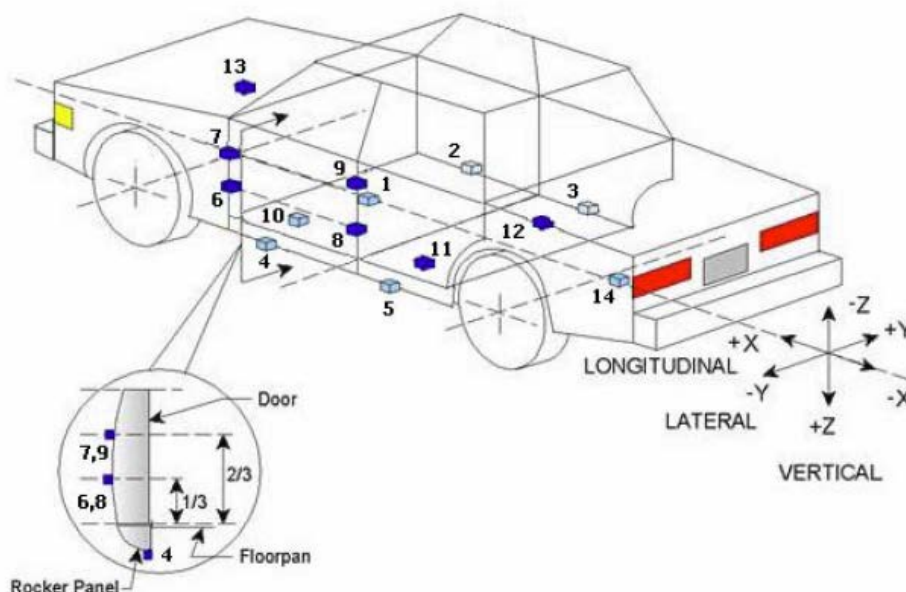
INSTRUMENTATION

Driver Dummy Channels	16
Passenger Dummy Channels	19
Vehicle Structure Accelerometers	23
MDB Channels	5
Total	63

DATA SHEET NO. 6

TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2024 Ford Ranger 4-Door Crew Cab NHTSA No. M20240204
 Test Program: NCAP MDB Side Impact Test Test Date: 7/23/24



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

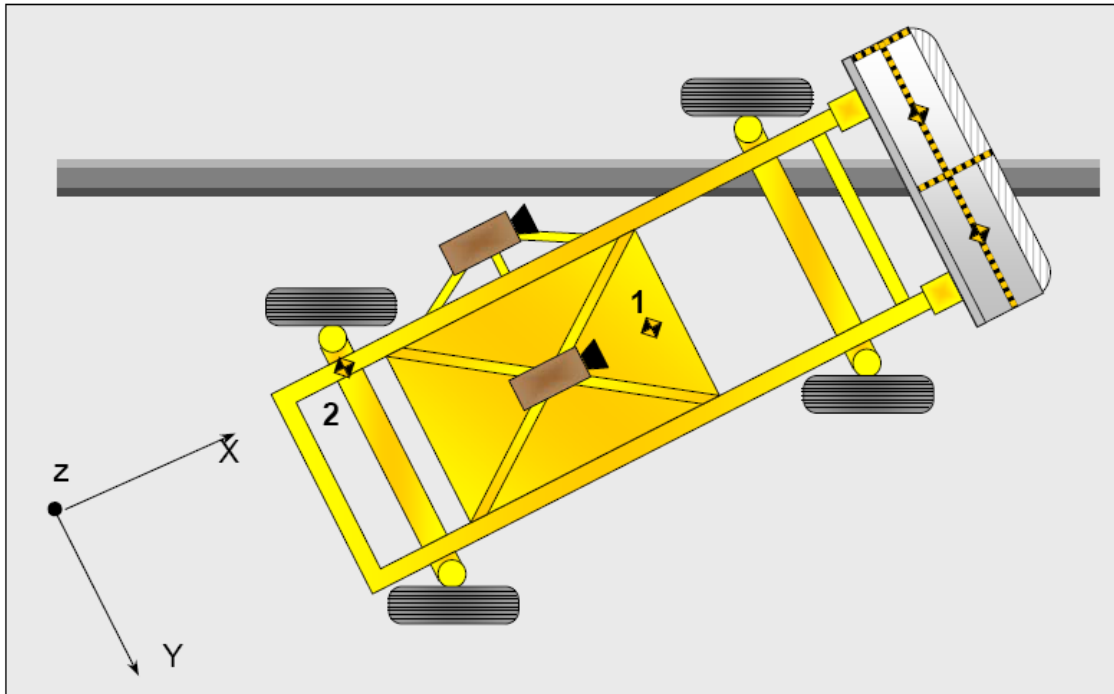
Loc. No.	Sensor Description	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2620	0	-710
2	Right Sill at Front Seat	3480	715	-318
3	Right Sill at Rear Seat	2100	705	-545
4	Left Sill at Front Door	2620	-780	-430
5	Left Sill at Rear Door	1800	-780	-440
6	A-Pillar Lower	3720	-805	-945
7	A-Pillar Middle	3720	-805	-1190
8	B-Pillar Lower	2850	-715	-955
9	B-Pillar Middle	2850	-715	-1185
10	Front Seat Track	3080	-600	-670
11	Rear Seat Structure	2400	-385	-715
12	Right Rear Occupant Compartment	2540	391	-585
13	Engine Block	4670	-50	-985
14	Rear Floorpan Above Axle	1200	0	-845

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: 2024 Ford Ranger 4-Door Crew Cab NHTSA No. M20240204
Test Program: NCAP MDB Side Impact Test Test Date: 7/23/24



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: 2024 Ford Ranger 4-Door Crew Cab NHTSA No. M20240204
 Test Program: NCAP MDB Side Impact Test Test Date: 7/23/24

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Front Seat Dummy (ES-2re)	Rear Seat Dummy (SID-IIs)
Face	Curtain Airbag	N/A
Top of Head	Headliner	Curtain Airbag
Left Side of Head	Curtain Airbag	Curtain Airbag
Back of Head	Headrest, Curtain Airbag, Headliner	Headrest
Left Shoulder	Torso/Pelvis Airbag	Door Panel
Upper Torso	Torso/Pelvis Airbag, Seat Bolster	Door Panel
Lower Torso	Torso/Pelvis Airbag, Seat Bolster	Door Panel
Left Hip	Torso/Pelvis Airbag	Door Panel, Seat
Left Knee	Door Panel	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	
Total Separation from Vehicle at Hinges or Latches	No	No	No	No	
Latch or Hinge System Pulled Out of Their Anchorages	No	No	No	No	
Disengaged from Latched Position	No	No	No	No	
Latch Separated from Striker	No	No	No	No	
Jammed Shut	Yes	Yes	No	No	
If Door Opened at Striker, Record Width of Opening at Striker (mm)	N/A	N/A	N/A	N/A	

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

Test Vehicle: 2024 Ford Ranger 4-Door Crew Cab NHTSA No. M20240204
Test Program: NCAP MDB Side Impact Test Test Date: 7/23/24

POST-TEST SEAT PERFORMANCE

Description	Struck Side		Non-Struck Side	
	Front	Rear	Front	Rear
Seat Movement Along Seat Track	No		No	
Seat Disengagement from Floor Pan	No	No	No	No
Seat Back Movement from Initial Position	No		No	
Seat Back Collapse	No	No	No	No

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	Good
Sill Separation	None
Windshield Damage	None
Side Window Damage	None
Other Notable Effects	None

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

Test Vehicle: 2024 Ford Ranger 4-Door Crew Cab NHTSA No. M20240204
Test Program: NCAP MDB Side Impact Test Test Date: 7/23/24

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	Yes	No		
Side Airbag 1 (Curtain)	Yes	Yes	Yes	Yes
Side Airbag 2 (Torso/Pelvis)	Yes	Yes		
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 Wheelbase	mm		3271
Vertical Impact Reference Line (Aft of Front Axle)(Intended Impact Point)	mm		516
Actual Impact Point (Aft of Front Axle)	mm		515
Horizontal Offset (+ forward / - rearward)	mm	± 50 of Intended Impact Point	1
Vertical Offset (+ down / - up)	mm	± 20 of Intended Impact Point	18

DATA SHEET NO. 9**MDB SUMMARY OF RESULTS**

Test Vehicle: 2024 Ford Ranger 4-Door Crew Cab NHTSA No. M20240204
 Test Program: NCAP MDB Side Impact Test Test Date: 7/23/24

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	61.10
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.27
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90.0
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	63.1
MDB Crabbed Angle to MDB Forward Line of Motion	degrees	26.0 to 28.0	26.9

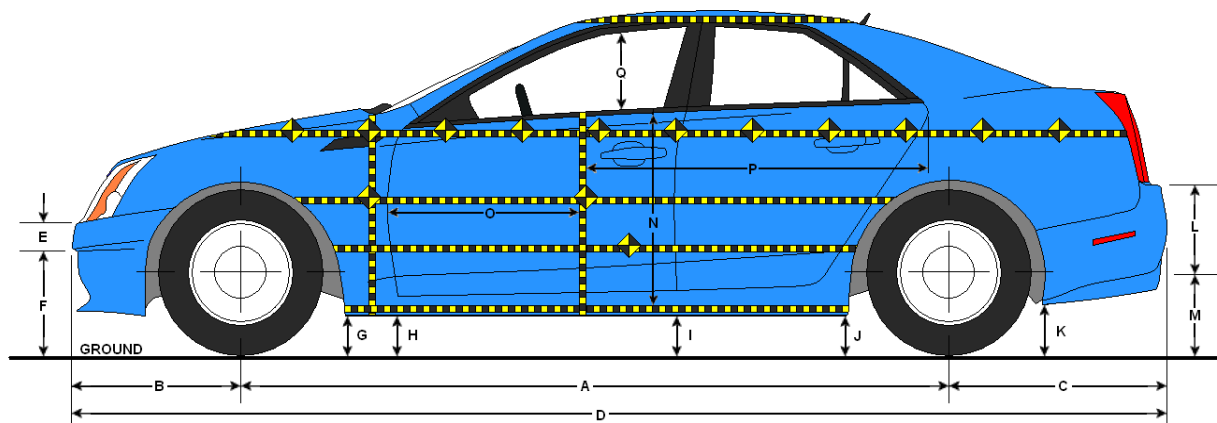
MAXIMUM STATIC CRUSH OF HONEYCOMB FACE

Vertical Location			From Centerline		Max. Crush (mm)
Row	Description	Height (mm)	Distance (mm)	Direction	
A	Center of Bumper	432	800	Left	130
B	Top of Bumper	533	800	Right	171
C	Mid Level	686	800	Right	158
D	Top of Stack	813	800	Right	200

DATA SHEET NO. 10

TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2024 Ford Ranger 4-Door Crew Cab NHTSA No. M20240204
 Test Program: NCAP MDB Side Impact Test Test Date: 7/23/24



LEFT SIDE VIEW

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Change
A	Wheelbase	3271	3267	-4
B	Front Axle to FSOV	872	890	18
C	Rear Axle to RSOV	1247	1229	-18
D	Total Length at Centerline	5393	5385	-8
E	Front Bumper Thickness	93	93	0
F	Front Bumper Bottom to Ground	671	685	14
G	Sill Height at Front Wheel Well	465	471	6
H	Sill Height at Front Door Leading Edge	483	509	26
I	Sill Height at B-Pillar	497	508	11
J1	Sill Height at Rear Wheel Well	485	488	3
J2	Pinch Weld Height at Rear Wheel Well	426	441	15
K	Sill Height Aft of Rear Wheel Well	535	535	0
L	Rear Bumper Thickness	204	205	1
M	Rear Bumper Bottom to Ground	507	506	-1
N	Sill Height to Bottom of Front Window Sill	762	759	-3
O	Front Door Leading Edge to Impact CL	681	675	-6
P	Rear Door Trailing Edge to Impact CL	1275	1250	-25
Q	Front Window Opening	416	435	19
R	Right Side Length	4640	4640	0
S	Left Side Length	4675	4653	-22
T	Vehicle Width at B-Pillar	1905	1914	9

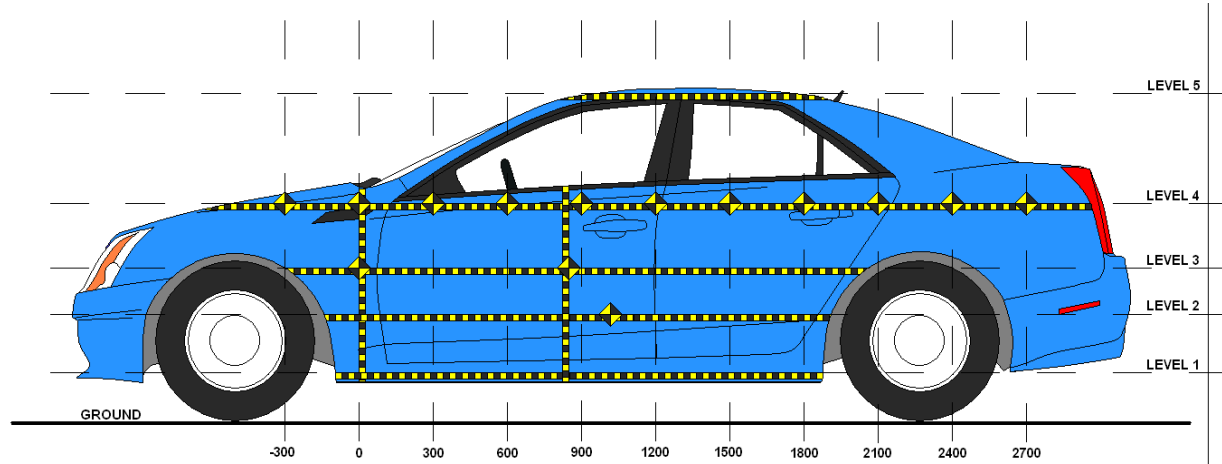
All measurements in mm with tolerance of ± 3 mm

DATA SHEET NO. 11

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2024 Ford Ranger 4-Door Crew Cab NHTSA No. M20240204

Test Program: NCAP MDB Side Impact Test Test Date: 7/23/24



LEFT SIDE VIEW

Level	Description	Height Above Ground (mm)	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	480	233	1650
2	Occupant H-Point	865	139	1500
3	Mid-Door	945	140	1350
4	Window Sill	1240	62	1350
5	Window Top	1777	16	1950

DATA SHEET NO. 11 ... (CONTINUED)

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2024 Ford Ranger 4-Door Crew Cab NHTSA No. M20240204
 Test Program: NCAP MDB Side Impact Test Test Date: 7/23/24

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

	Pre-Test (mm)					Post-Test (mm)					Crush (mm)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750															
-600															
-450															
-300															
-150			559	674				559	649				0	-25	
0	595	572	572	670		608	595	592	652		13	23	20	-18	
150	625	592	593	666		709	629	611	656		84	37	18	-10	
300	646	604	603	662		737	663	670	651		91	59	67	-11	
450	648	608	606	659		792	691	667	655		144	83	61	-4	
600	647	612	606	655		802	700	686	658		155	88	80	3	
750	646	615	605	652	859	819	716	695	663	846	173	101	90	11	-13
900	646	616	605	647	871	831	709	688	667	868	185	93	83	20	-3
1050	645	617	605	644	873	841	729	691	671	871	196	112	86	27	-2
1200	647	617	604	641	873	850	745	702	681	875	203	128	98	40	2
1350	649	619	605	640	876	859	747	745	702	878	210	128	140	62	2
1500	649	618	605	638	874	871	757	737	688	879	222	139	132	50	5
1650	651	615	605	638	874	884	739	719	674	882	233	124	114	36	8
1800	651	611	604	635	872	881	720	706	659	884	230	109	102	24	12
1950	653	606	602	634	872	776	697	682	648	888	123	91	80	14	16
2100	653	603	601	633		736	661	651	640		83	58	50	7	
2250		592	595	633			588	591	630			-4	-4	-3	
2400			566	635				561	614				-5	-21	
2550															
2700															
2850															

DATA SHEET NO. 11 ... (CONTINUED)

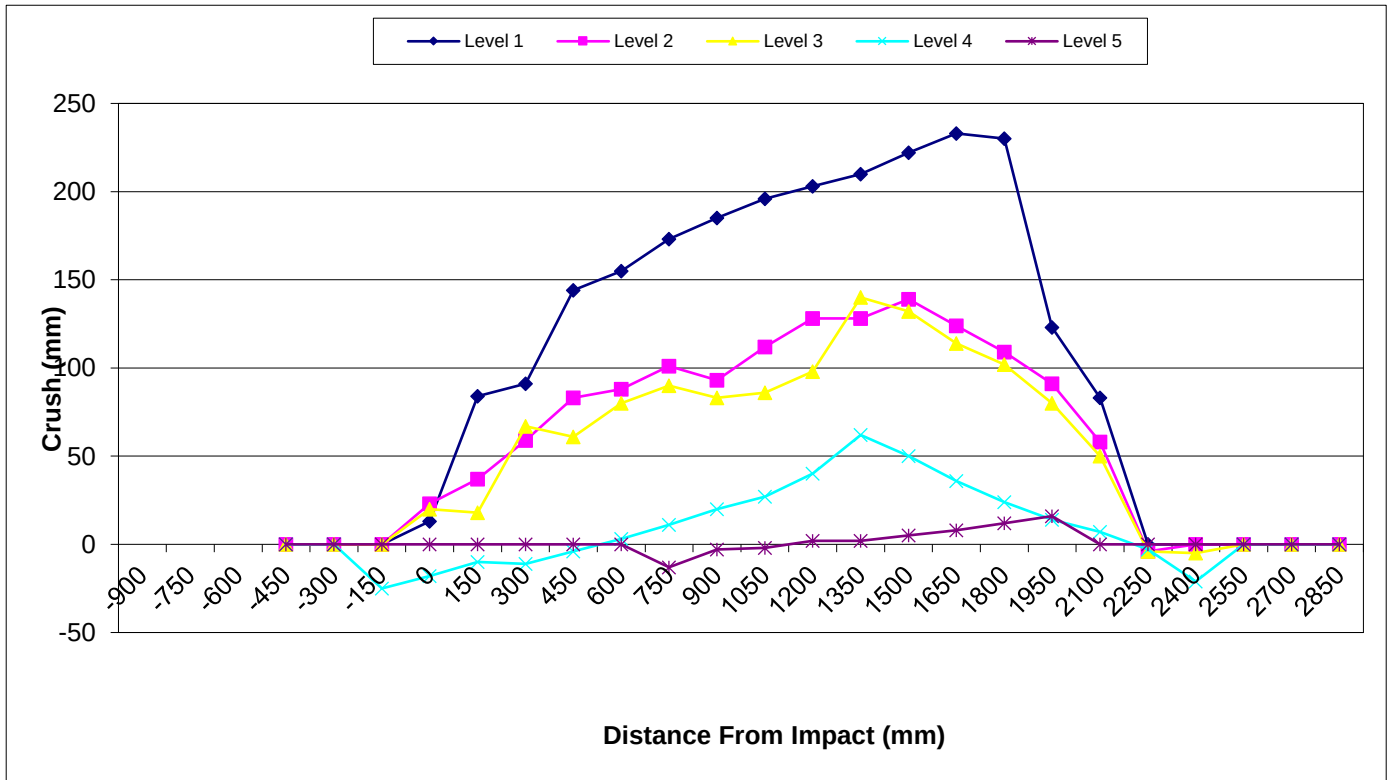
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2024 Ford Ranger 4-Door Crew Cab

NHTSA No. M20240204

Test Program: NCAP MDB Side Impact Test

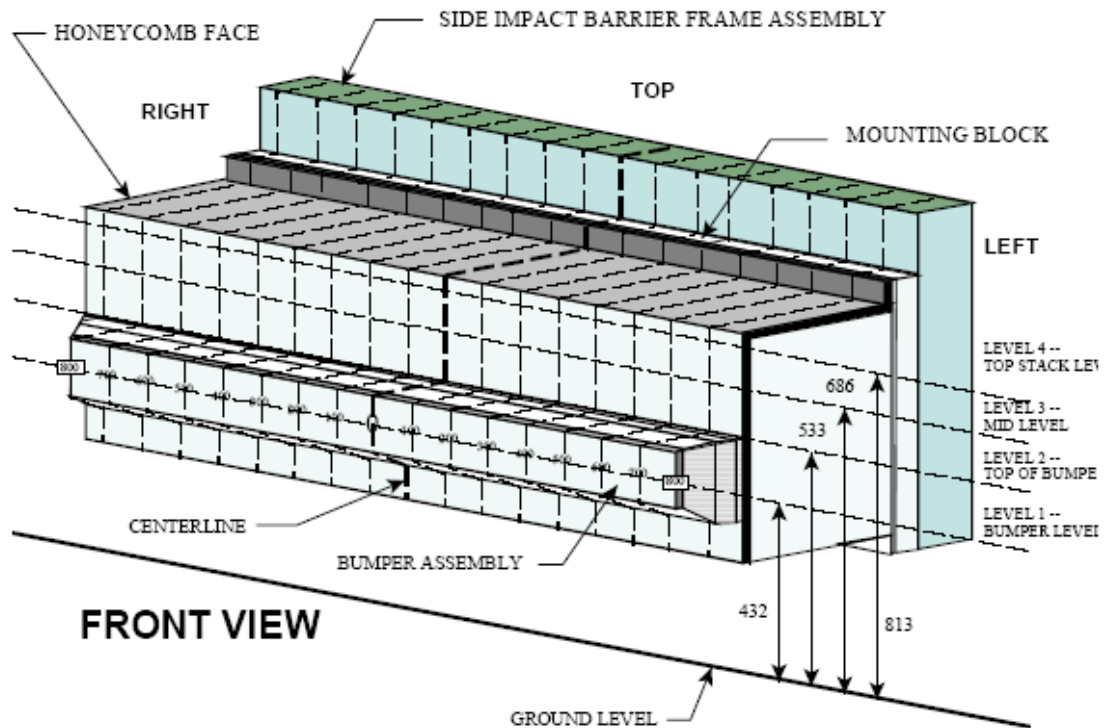
Test Date: 7/23/24



DATA SHEET NO. 12

MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2024 Ford Ranger 4-Door Crew Cab NHTSA No. M20240204
 Test Program: NCAP MDB Side Impact Test Test Date: 7/23/24



NOTE: Dimensions are shown in millimeters, mm

DEFORMABLE BARRIER STATIC CRUSH

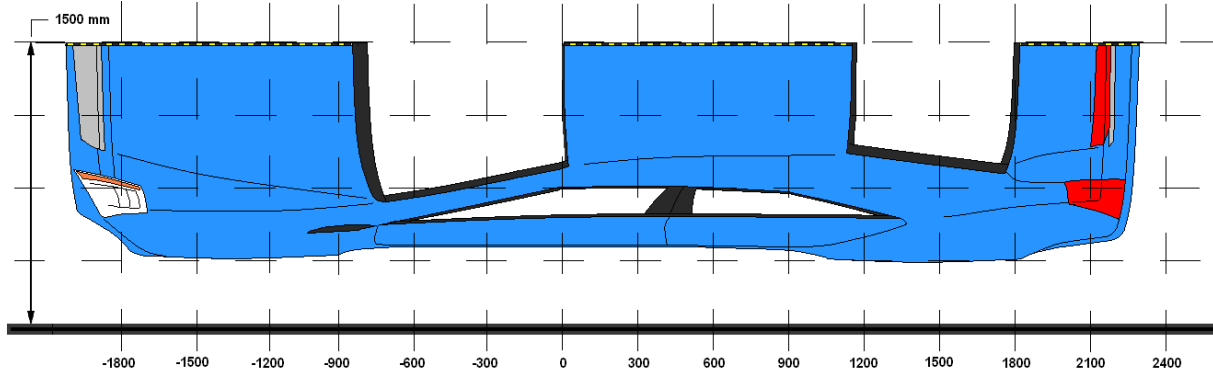
Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
1	108	94	87	87	85	85	84	86	87	89	92	93	98	98	103	109	130
2	171	101	77	106	101	101	103	108	111	114	114	118	123	123	129	133	136
3	158	109	89	91	95	99	104	95	103	96	99	102	103	108	119	131	158
4	200	161	129	108	110	128	173	140	126	102	97	94	96	101	111	135	183

All dimensions in millimeters.

DATA SHEET NO. 13

VEHICLE AND MDB DAMAGE PROFILE DISTANCES

Test Vehicle: 2024 Ford Ranger 4-Door Crew Cab NHTSA No. M20240204
 Test Program: NCAP MDB Side Impact Test Test Date: 7/23/24



VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point (mm)	Level	Pre-Test (mm)	Post-Test (mm)	Crush (mm)
1	2400	4	635	614	-21
2	1800	1	651	881	230
3	1350	1	649	859	210
4	900	1	646	831	185
5	300	1	648	792	144
6	-150	4	674	649	-25

MDB DAMAGE PROFILE DISTANCES

DPD	From MDB Centerline		Level	Crush (mm)
	Distance (mm)	Direction		
1	800	Left	1	130
2	500	Left	2	123
3	200	Left	2	114
4	200	Right	4	173
5	500	Right	4	108
6	800	Right	4	200

DATA SHEET NO. 14

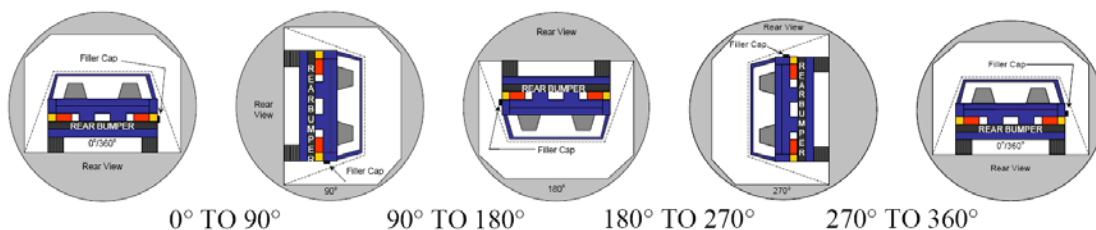
FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2024 Ford Ranger 4-Door Crew Cab NHTSA No. M20240204

Test Program: NCAP MDB Side Impact Test Test Date: 7/23/24

Temperature at Time of Impact: 37.7°C Test Time: 3:37 P.M.

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



SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° To 90°	80	300	380
90° To 180°	81	300	381
180° To 270°	80	300	380
270° To 360°	80	300	380

FMVSS 301 SPILLAGE TABLE

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

SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 15

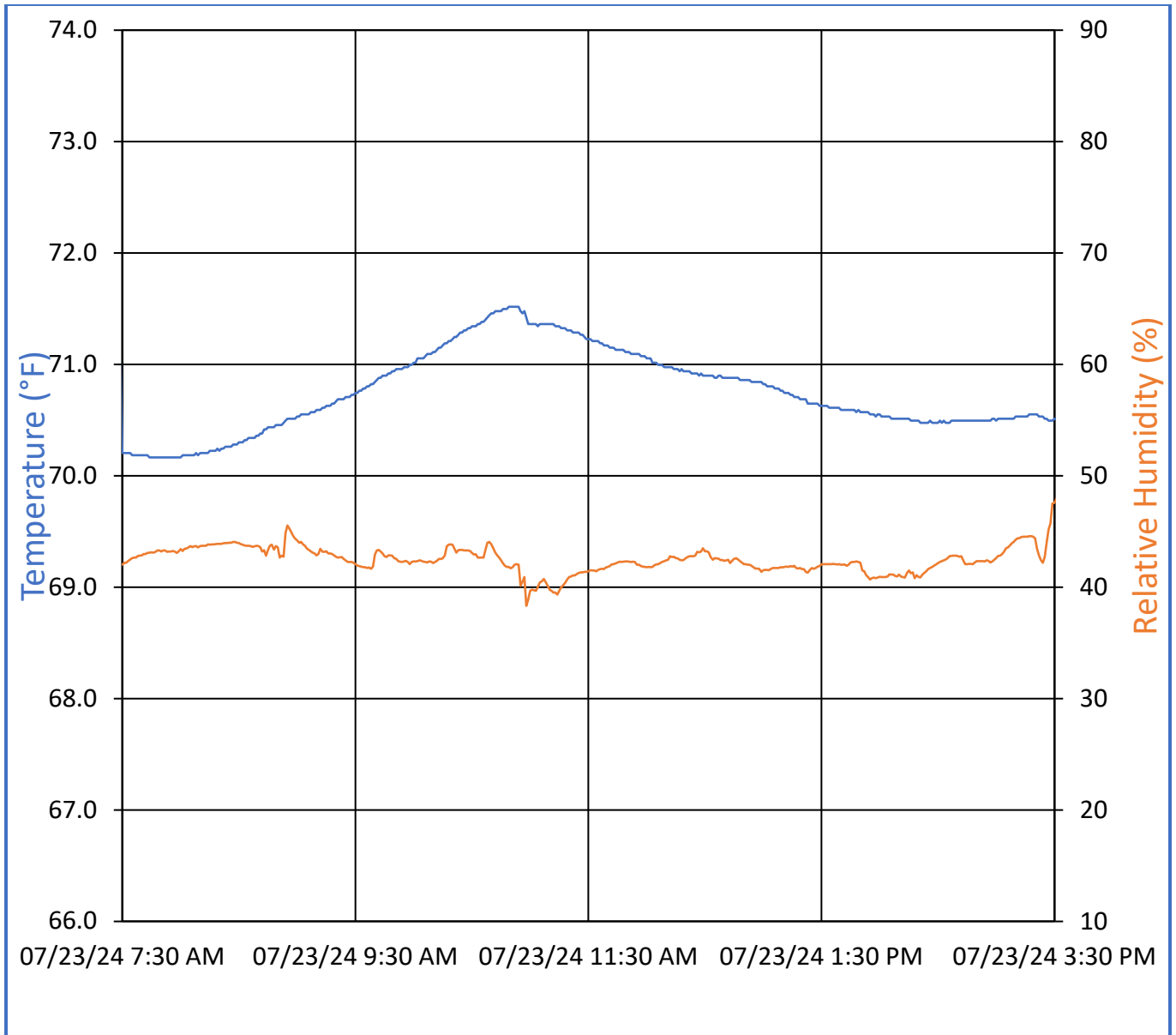
DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION

Test Vehicle: 2024 Ford Ranger 4-Door Crew Cab

NHTSA No. M20240204

Test Program: NCAP MDB Side Impact Test

Test Date: 7/23/24



APPENDIX A
PHOTOGRAPHS

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FIGURE 1. As-Delivered Right Front 3/4 View of Test Vehicle



FIGURE 2. As-Delivered Left Rear 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 3/4 View of Test Vehicle



FIGURE 6. Post-Test Left Front 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 3/4 View of Test Vehicle



FIGURE 10. Post-Test Left Rear 3/4 View of Test Vehicle



FIGURE 11. Pre-Test Rear View of Test Vehicle



FIGURE 12. Post-Test Rear View of Test Vehicle



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



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



FIGURE 15. Pre-Test Overhead View of Test Area

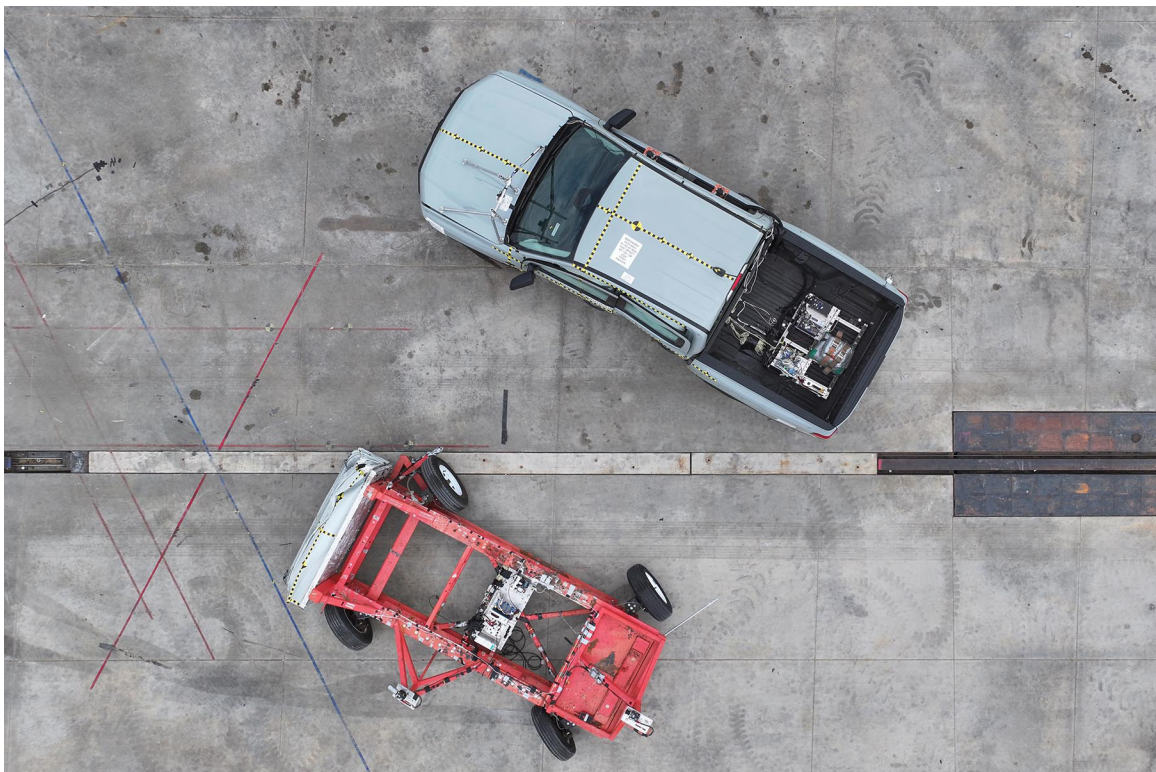


FIGURE 16. Post-Test Overhead View of Test Area



FIGURE 17. Pre-Test Left Side View of 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 of Occupant Compartment



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



FIGURE 46. Pre-Test Driver Inner Door Panel View



FIGURE 47. Post-Test Driver Inner Door Panel View



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 Air Bag 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



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



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



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 Vehicle 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 View of MDB Impactor Face



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



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



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

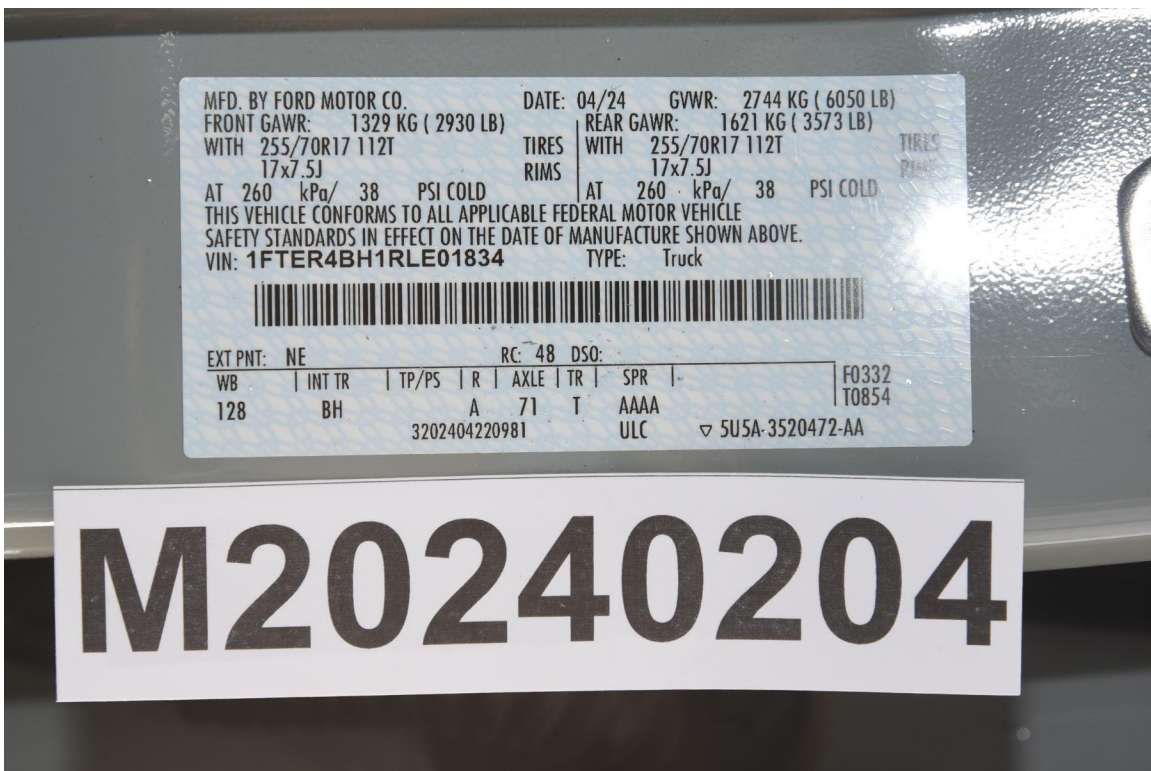


FIGURE 92. Close-Up View of Vehicle's Certification Label

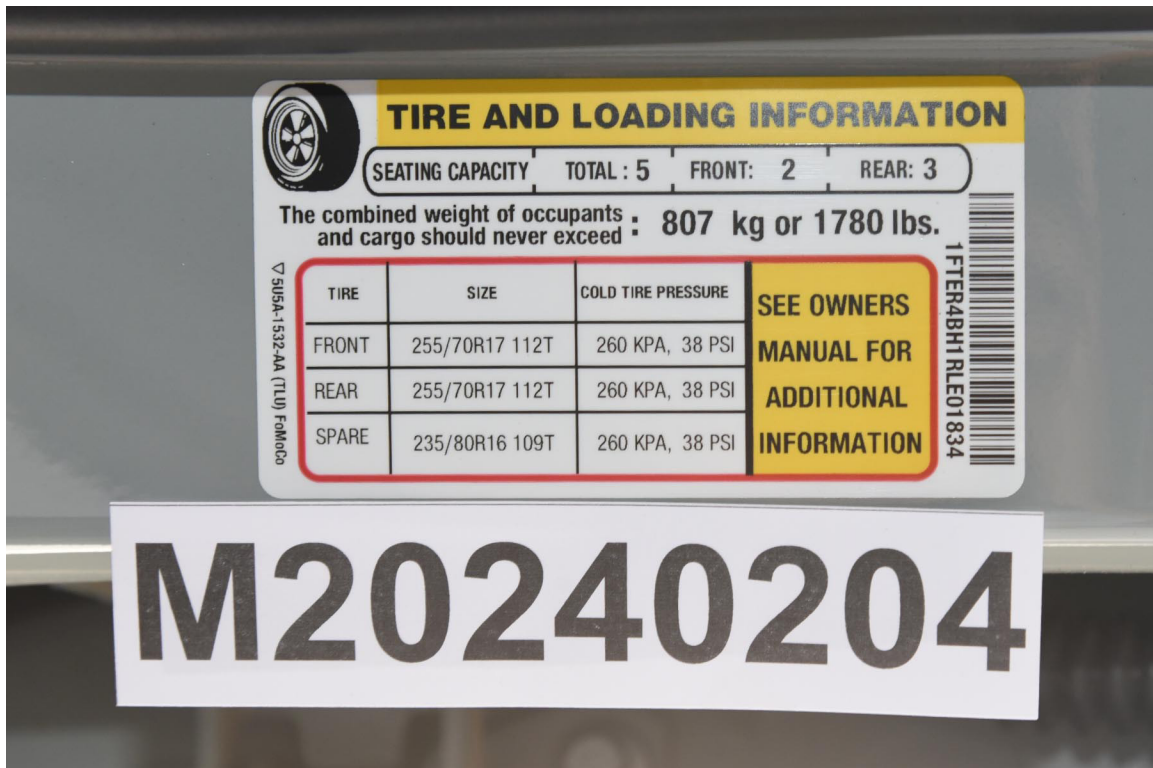


FIGURE 93. Close-Up View of Vehicle's Tire Information Placard or Label



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

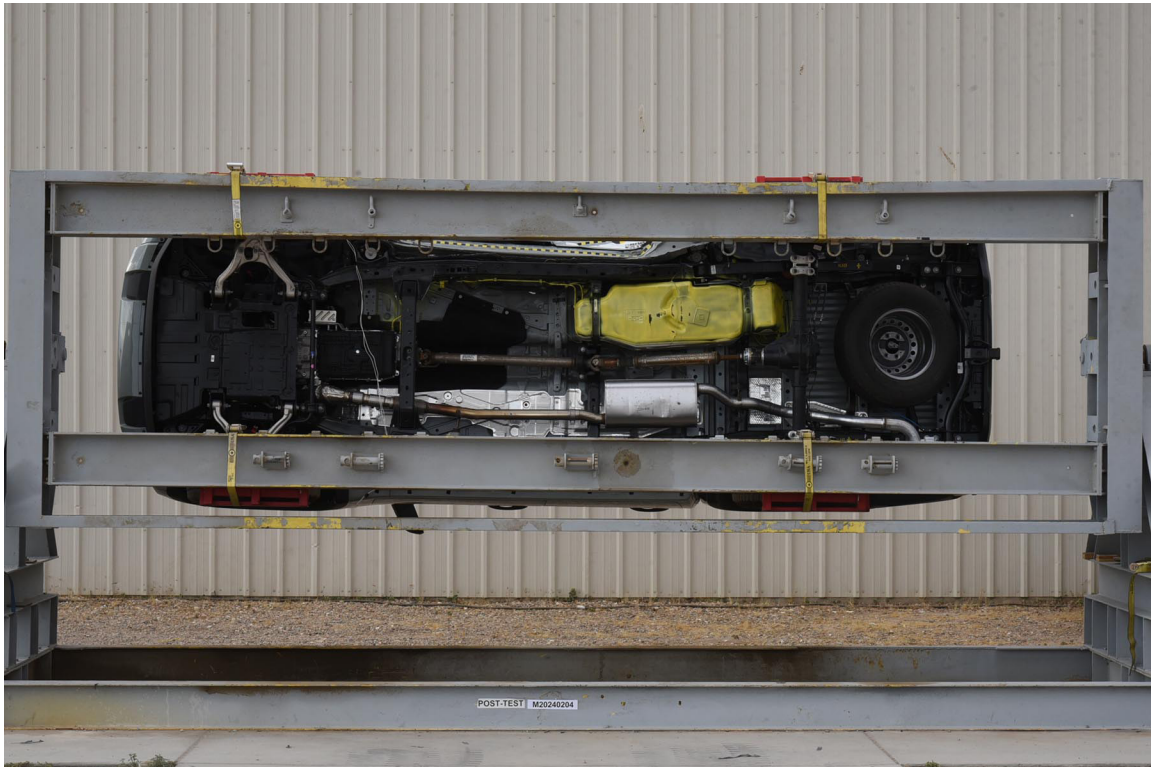


FIGURE 99. FMVSS No. 301 Static Rollover 270 Degrees



FIGURE 100. FMVSS No. 301 Static Rollover 360 Degrees



FIGURE 101. Impact Event

VEHICLE DESCRIPTION
RANGER
2024 SUPERCREW 4X2 XL
120" WHEELBASE
2.3L ECOBOOST ENGINE
10-SPEED AUTO TRANSMISSION

EXTERIOR
CACTUS GRAY

INTERIOR
EBONY PREMIUM CLOTH SEATS

RL E01834

STANDARD EQUIPMENT INCLUDED AT NO EXTRA CHARGE

EXTERIOR

- DAYTIME RUNNING LIGHTS
- EASY FUEL FILL CAPLESS FILLER
- FENDER BADGE
- FULL SIZE SPARE TIRE/WHEEL
- FULLY BOXED STEEL FRAME
- GRILLE - BLACK
- HEADLAMPS - AUTO ON/OFF
- PICKUP BOX TIE DOWN HOOKS
- REMOTE TAILGATE LOCK
- WHEEL LIP MOLDINGS
- WIPERS - INTERMITTENT

INTERIOR

- 1-TOUCH UP/DOWN DRIVER WIN
- 10" CENTER TOUCHSCREEN
- 2ND ROW FOLD BENCH
- DIGITAL INSTRUMENT CLUSTER
- DUAL SURVIVORS
- LOCKING GLOVE BOX
- POWER LOCKS AND WINDOWS
- POWERPOINTS-12V, USB A & C
- SEATS - MANUAL
- TILT/TELESCOPE STR COLUMN

FUNCTIONAL

- AUDIO - 6 SPEAKERS
- BRAKES - ANTI-LOCK SYSTEM
- ELECTRIC PARKING BRAKE
- INDEPENDENT FRONT SUSPENSION
- PRE-COLLISION ASSIST WARNER
- REAR VIEW CAMERA
- REMOTE KEYLESS ENTRY
- SELECTSHIFT
- SYNCHRA

SAFETY/SECURITY

- AIRBAGS - SAFETY CANOPY
- BELT-MINDER CHIME
- CTR HIGH MOUNT STOP LAMP
- LATCH CHILD SAFETY SYSTEM
- PASSIVE ANTI-THEFT SYSTEM
- TIRE PRESSURE MONIT SYS

WARRANTY

- 3YR/50,000 BUMPER / BUMPER
- 5YR/60,000 POWERTRAIN
- 5YR/60,000 ROADSIDE ASSIST

INCLUDED ON THIS VEHICLE
EQUIPMENT GROUP 100A
-XL SERIES

OPTIONAL EQUIPMENT/OTHER
250/70 R17 AT TIRE
STX APPEARANCE PACKAGE
FOG LAMPS
17" SILVER PAINTED ALUM WHL
TRAILER TOW PACKAGE
BEDLINER-TOUGHBED SPRAY-IN

(MSRP)
NO CHARGE
495.00
495.00

PRICE INFORMATION
BASE PRICE \$32,670.00
TOTAL OPTIONS/OTHER 990.00
TOTAL VEHICLE & OPTIONS/OTHER 33,660.00
DESTINATION & DELIVERY 1,995.00

(MSRP)
\$35,655.00

Fuel Economy and Environment
Fuel Economy
22 MPG
combined city/highway
21 city
25 highway
4.5 gallons per 100 miles
You spend \$2,500 more in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost \$2,450
Fuel Economy & Greenhouse Gas Rating
5
Smog Rating
6
The vehicle emits 402 grams CO₂ per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also creates emissions; learn more at fuelconomy.gov.

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 24 MPG and costs \$2,350 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$3.60 per gallon. MPG is miles per gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fuelconomy.gov
Calculate personalized estimates and compare vehicles

GOVERNMENT 5-STAR SAFETY RATINGS
Overall Vehicle Score Not Rated
Based on the combined ratings of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight.
Frontal Crash Driver Passenger Not Rated
Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.
Side Crash Front seat Rear seat Not Rated
Based on the risk of injury in a side impact.
Rollover Not Rated
Based on the risk of rollover in a single-vehicle crash.
Star ratings range from 1 to 5 stars (***), with 5 being the highest. Source: National Highway Traffic Safety Administration (NHTSA). www.safercar.gov or 1-888-327-4258**

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Access Vehicle Control Features

- Remotely start, lock and unlock your vehicle.
- Locate your vehicle and check approximate fuel range.
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Activate 4G LTE Wi-Fi Hotspot

- New vehicles include a 3-month or 360 data (whichever comes first) Wi-Fi trial.
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*Connectivity available on select vehicles. See ford.com/fordpass for details. ©2024 Ford Motor Company. All rights reserved. Ford, FordPass, FordPass Connect, and the FordPass logo are trademarks of Ford Motor Company. All other trademarks are the property of their respective owners.

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WARNING: Operating, servicing and maintaining a passenger vehicle, pickup truck, van, or off-road vehicle can expose you to chemicals including engine exhaust, carbon monoxide, phthalates, and lead, which are known to the State of California to cause cancer and birth defects or other reproductive harm. To minimize exposure, avoid breathing exhaust, do not idle the engine except as necessary, service your vehicle in a well-ventilated area and wear gloves or wash your hands frequently when servicing your vehicle. For more information go to www.P65Warnings.ca.gov/passenger-vehicle.

QR CODE
Scan QR code to view vehicle details and financing options.

SOLD TO
Fennellus Ford, Inc.
10459 North Stralis Highway
Cheboygan MI 49721

49W 600

RAMP ONE
CM4G

FINAL ASSEMBLY PLANT
MICHIGAN

TOTAL MSRP \$35,255.00

Whether you decide to lease or finance your vehicle, you'll find the choice that is right for you. See your dealer for details or visit www.ford.com/finance.

RD152 N RB X 425 006116 04 15 24

SHIP TO (IF OTHER THAN SOLD TO)
Fennellus Ford, Inc.
10459 North Stralis Highway
Cheboygan MI 49721

49W 600

RAMP TWO

ITEM #
48-0620 Q/T 2

SHIP THROUGH
GROUND EFFECTS
39053 MAPLE AVE
WAYNE MI

This label is affixed pursuant to the Federal Automobile Information Disclosure Act. Gasoline, License, and Title Fees, State and Local taxes are not included. Dealer installed options or accessories are not included unless listed above.

FIGURE 102. Monroney Label

A-51

TR-P44215-01-NC

SITTING IN THE CORRECT POSITION



When you use them properly, the seat, head restraint, seatbelt and airbags will provide optimum protection in the event of a crash.

We recommend that you follow these guidelines:

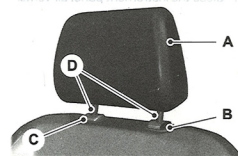
- Sit in an upright position with the base of your spine as far back as possible.
- Do not recline the seat backrest so that your torso is more than 30 degrees from the upright position.
- Adjust the head restraint so that the top of it is level with the top of your head and as far forward as possible. Make sure that you remain comfortable.
- Keep sufficient distance between yourself and the steering wheel. We recommend a minimum of 10 in (25 cm) between your breastbone and the airbag cover.
- Hold the steering wheel with your arms slightly bent.

- Bend your legs slightly so that you can press the pedals fully.
- Position the shoulder strap of the seatbelt over the center of your shoulder and position the lap strap tightly across your hips.

Make sure that your driving position is comfortable and that you can maintain full control of your vehicle.

MANUAL SEATS

HEADRESTRAINT COMPONENTS



The head restraints consist of:

- A An energy absorbing head restraint.
- B Guide sleeve lock and release button.
- C Guide sleeve.
- D Two steel stems.

ADJUSTING THE HEAD RESTRAINT

WARNING: Fully adjust the head restraint before you sit in or operate your vehicle. This will help minimize the risk of neck injury in the event of a crash. Do not adjust the head restraint when your vehicle is moving.

WARNING: The head restraint is a safety device. Whenever possible it should be installed and properly adjusted when the seat is occupied. Failure to adjust the head restraint properly could reduce its effectiveness during certain impacts.

WARNING: Adjust the head restraints for all passengers before you drive your vehicle. This will help minimize the risk of neck injury in the event of a crash. Do not adjust the head restraints when your vehicle is moving.

Note: Adjust the seat backrest to an upright driving position before adjusting the head restraint. Adjust the head restraint so that the top of it is level with the top of your head. Make sure that you remain comfortable. If you are tall, adjust the head restraint to its highest position.

Pull the head restraint up to raise it.

To lower the head restraint:

1. Press and hold the adjust and release button.
2. Push the head restraint down.

REMOVING THE HEAD RESTRAINT

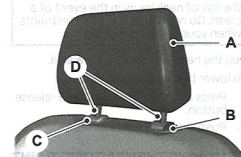
1. Pull up the head restraint until it reaches its highest position.
2. Press and hold the adjust and release button and the unlock and remove button.
3. Pull up the head restraint.

INSTALLING THE HEAD RESTRAINT

Align the steel stems into the guide sleeves and push the head restraint down until it locks.

POWER SEATS (IF EQUIPPED)

HEADRESTRAINT COMPONENTS



The head restraints consist of:

- A An energy absorbing head restraint.
- B Guide sleeve lock and release button.
- C Guide sleeve.
- D Two steel stems.

52

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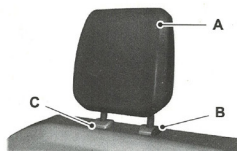
FIGURE 103. Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

Rear Seats

MANUAL SEATS

HEADRESTRAINT COMPONENTS

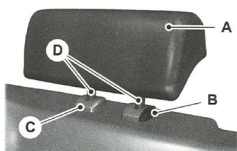
Rear Seat Outermost Head Restraints



The head restraints consist of:

- A An energy absorbing head restraint.
- B Guide sleeve.
- C Locking guide sleeve.

Rear Seat Center Head Restraint



The head restraint consists of:

- A An energy absorbing head restraint.
- B Two steel stems.

- C Guide sleeve adjust and release button.
- D Guide sleeve unlock and remove button (if equipped).

ADJUSTING THE HEAD RESTRAINT

WARNING: The head restraint is a safety device. Whenever possible it should be installed and properly adjusted when the seat is occupied. Failure to adjust the head restraint properly could reduce its effectiveness during certain impacts.

WARNING: Adjust the head restraints for all passengers before you drive your vehicle. This will help minimize the risk of neck injury in the event of a crash. Do not adjust the head restraints when your vehicle is moving.

Adjust the head restraint so that the top of it is level with the top of your head.

The outermost head restraints are non-adjustable.

Pull the center head restraint up to raise it.

To lower the center head restraint:

1. Press and hold the unlock and remove button.
2. Push the head restraint down.

REMOVING THE HEAD RESTRAINT

1. Fold the seat backrest forward before removing the head restraint.
2. Pull up the head restraint until it reaches its highest position.

Rear Seats

3. Press and hold the adjust and release button and the unlock and remove button.
4. Pull up the head restraint.

INSTALLING THE HEAD RESTRAINT

1. Fold the seat backrest forward before installing the head restraint.
2. Align the steel stems into the guide sleeves and push the head restraint down until it locks.

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

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA PLOTS

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1	Driver Head Acceleration (X) Primary vs. Time	B-1
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24	Passenger Total Pelvic Force on Impact Side (Y) vs. Time	B-7

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)

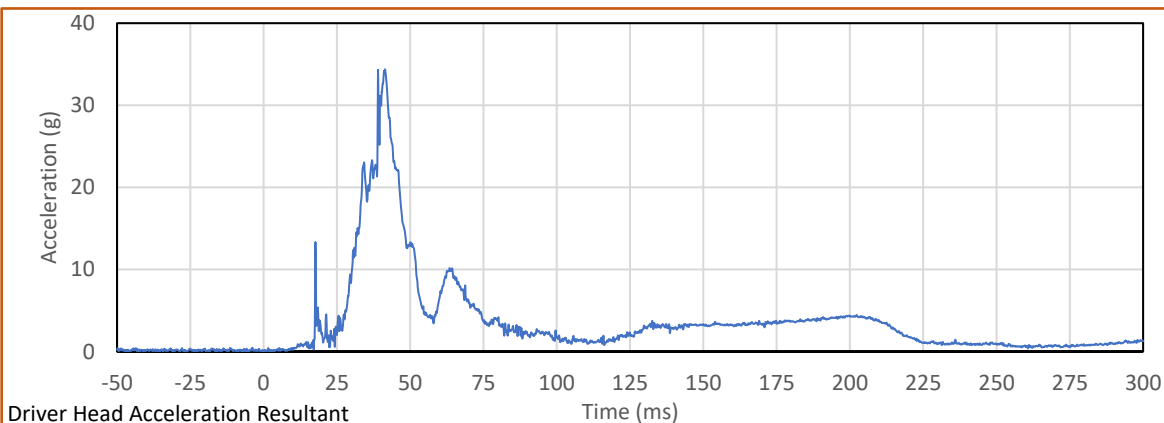
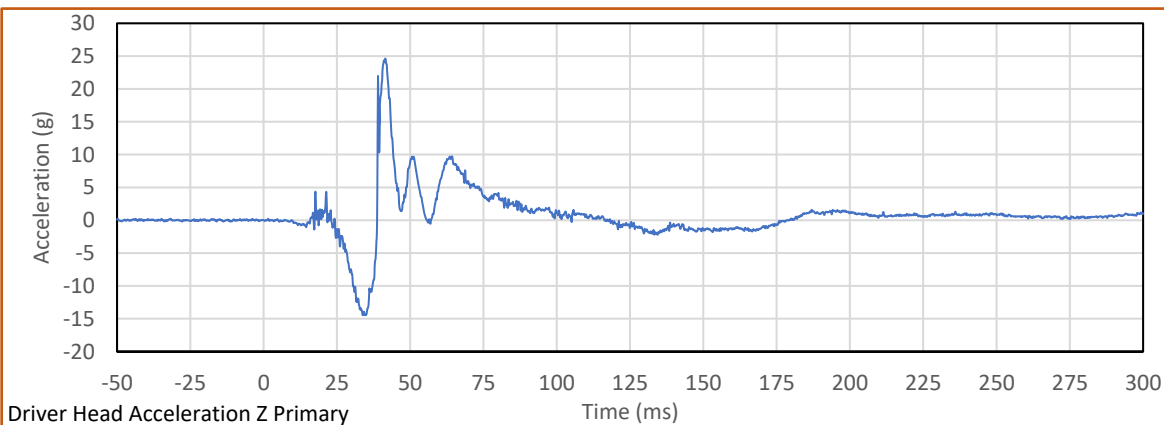
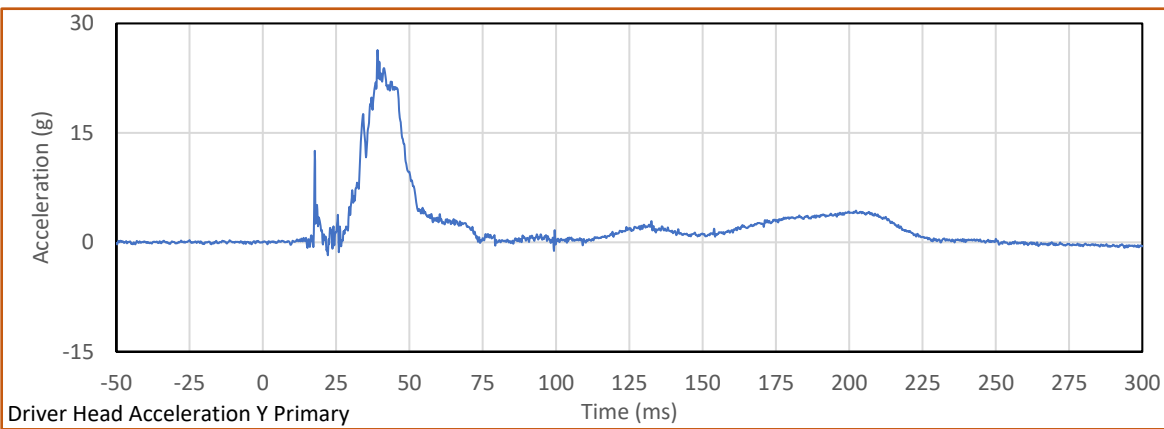
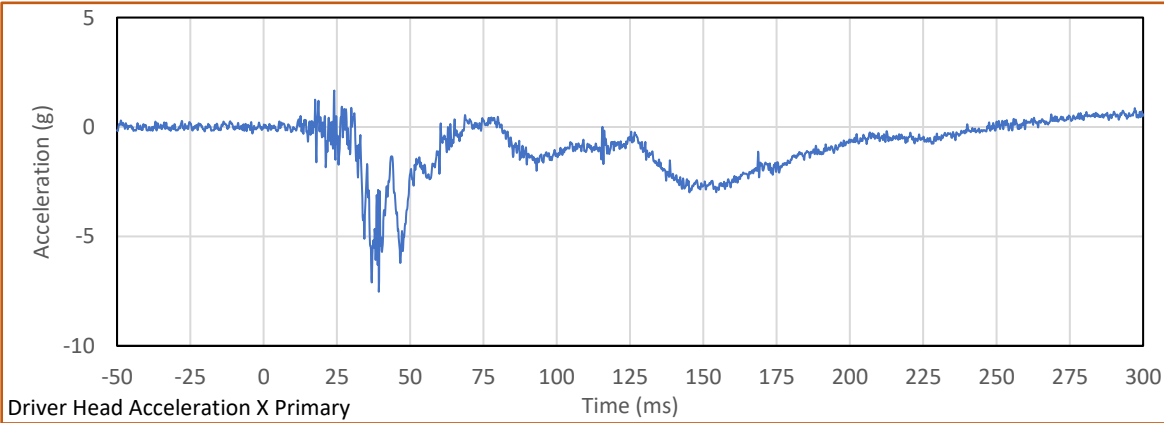
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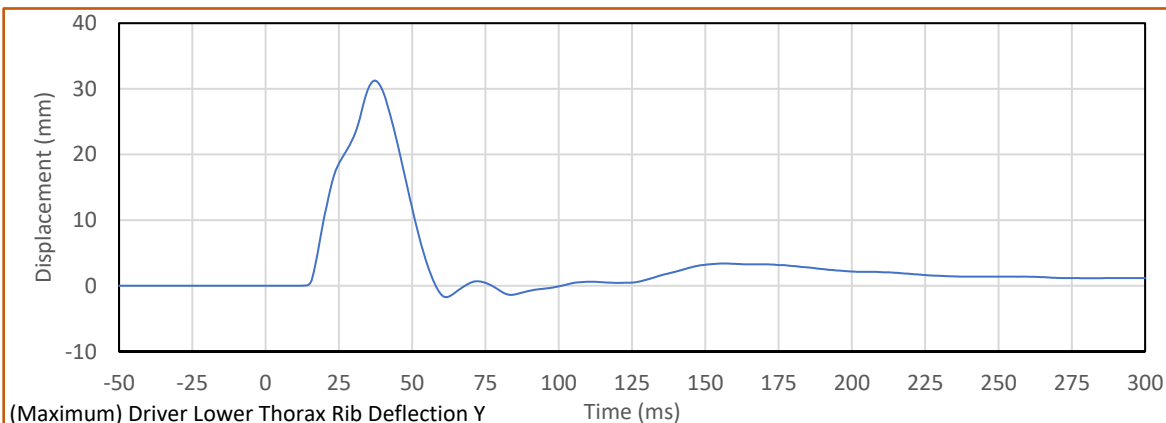
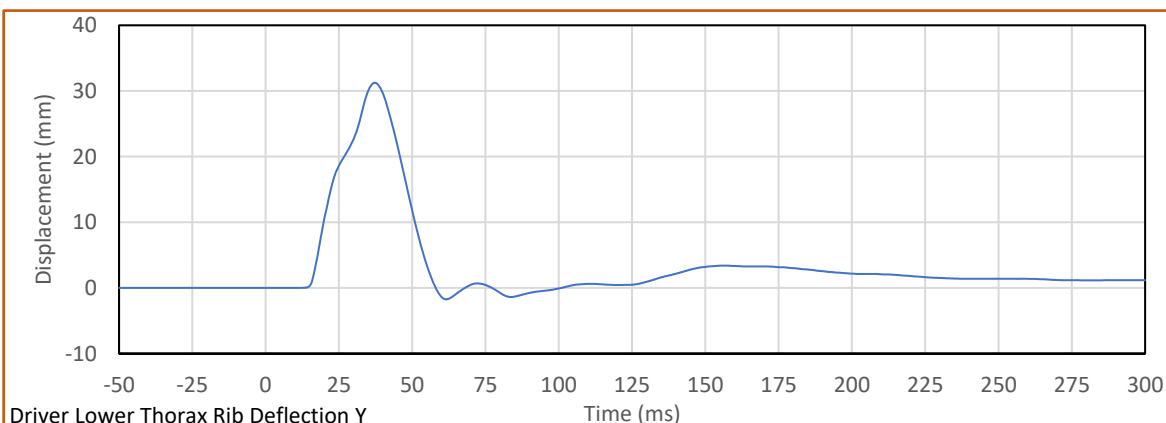
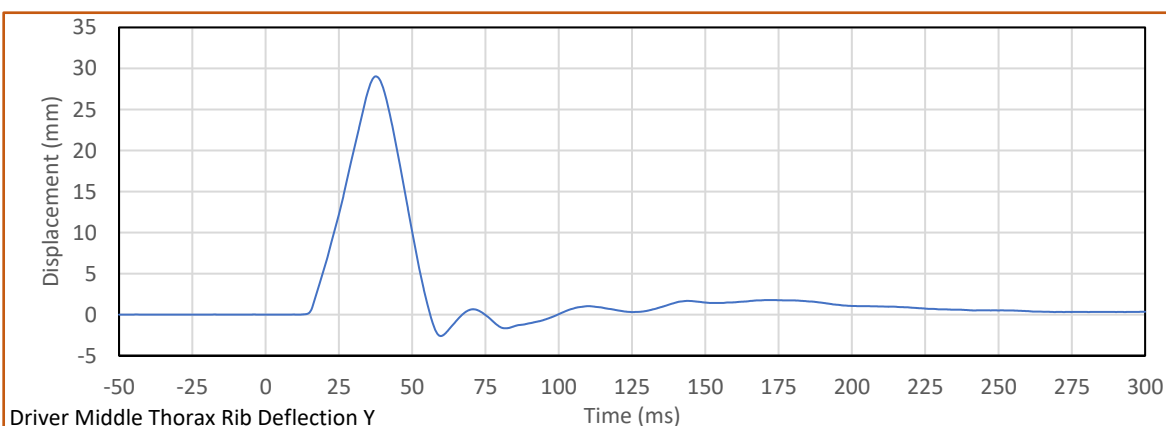
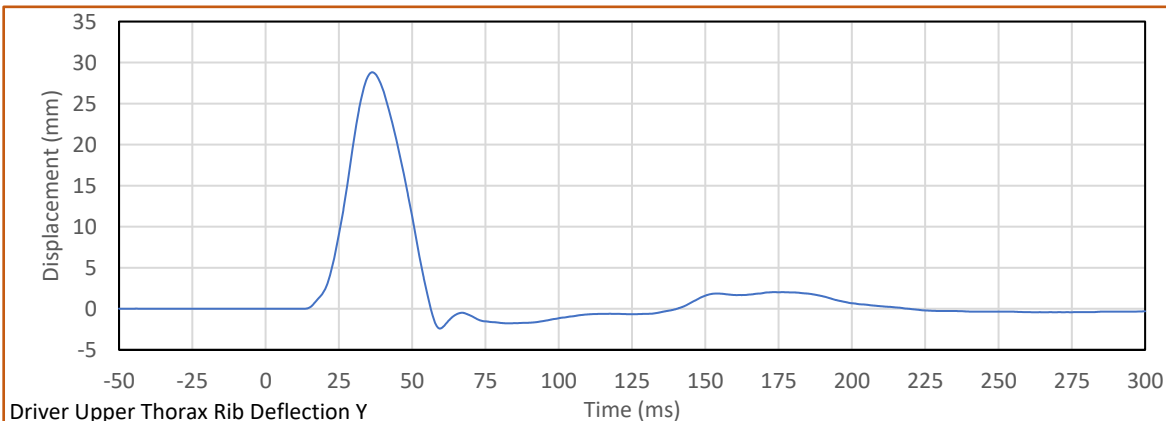
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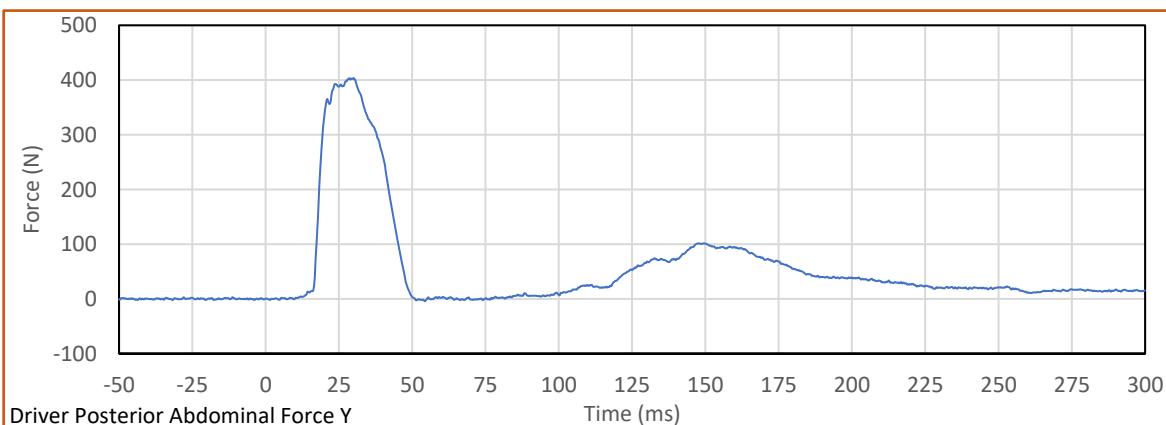
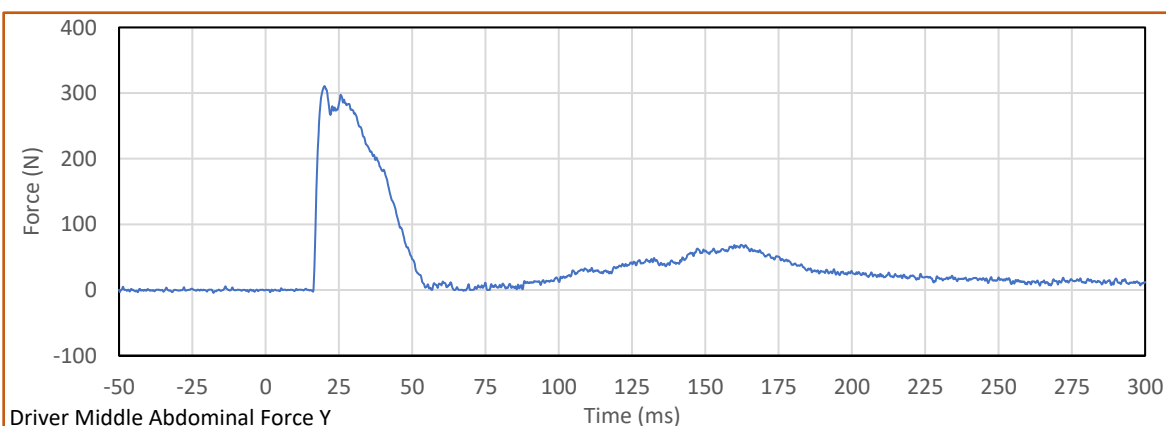
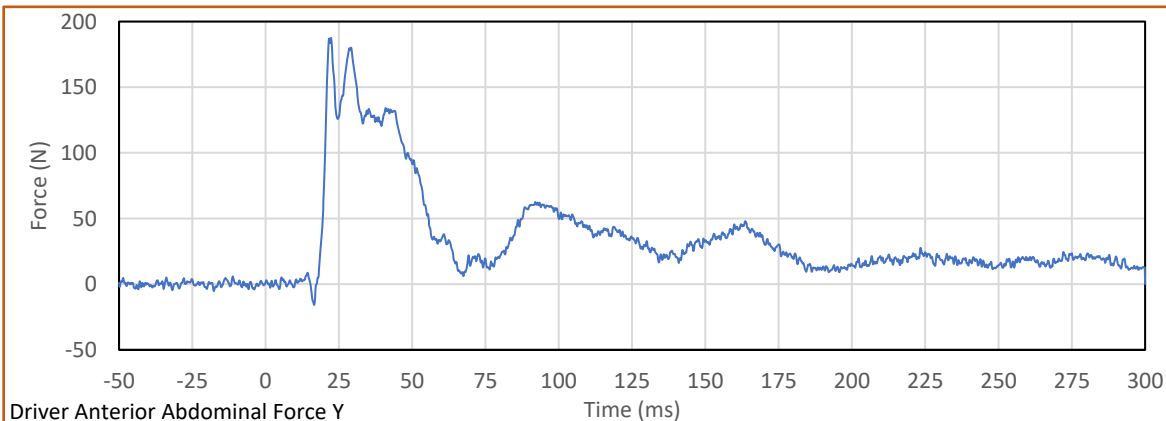
MDB Rear Acceleration (Y)

Left MDB Contact Switch

Right MDB Contact Switch

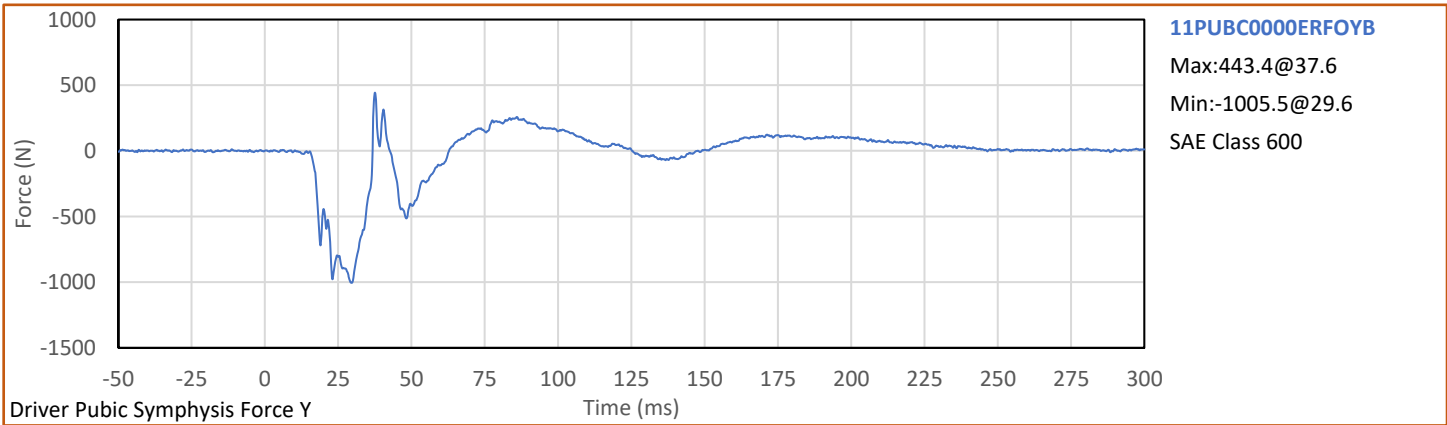


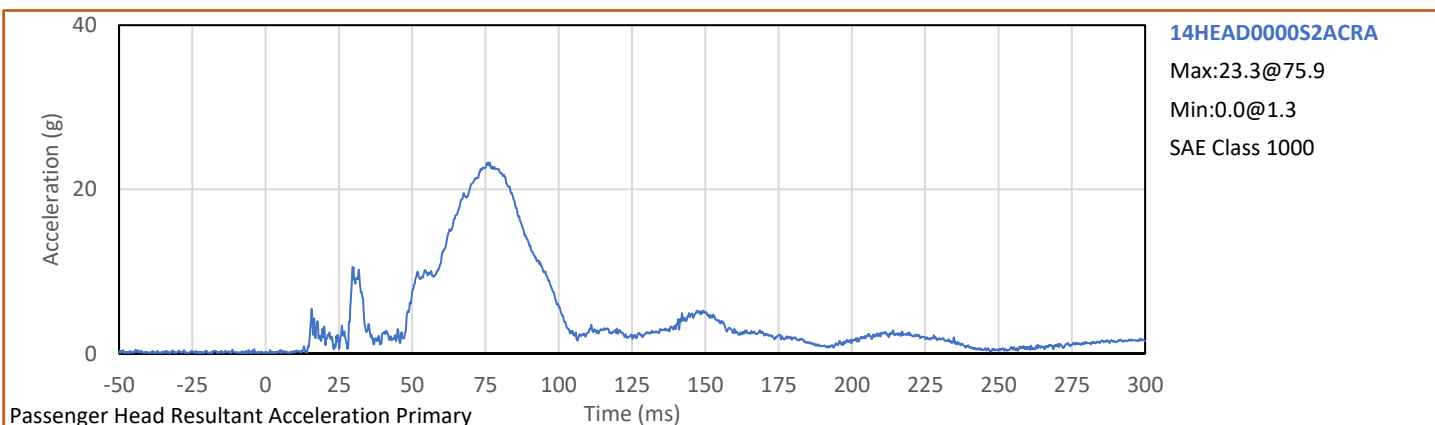
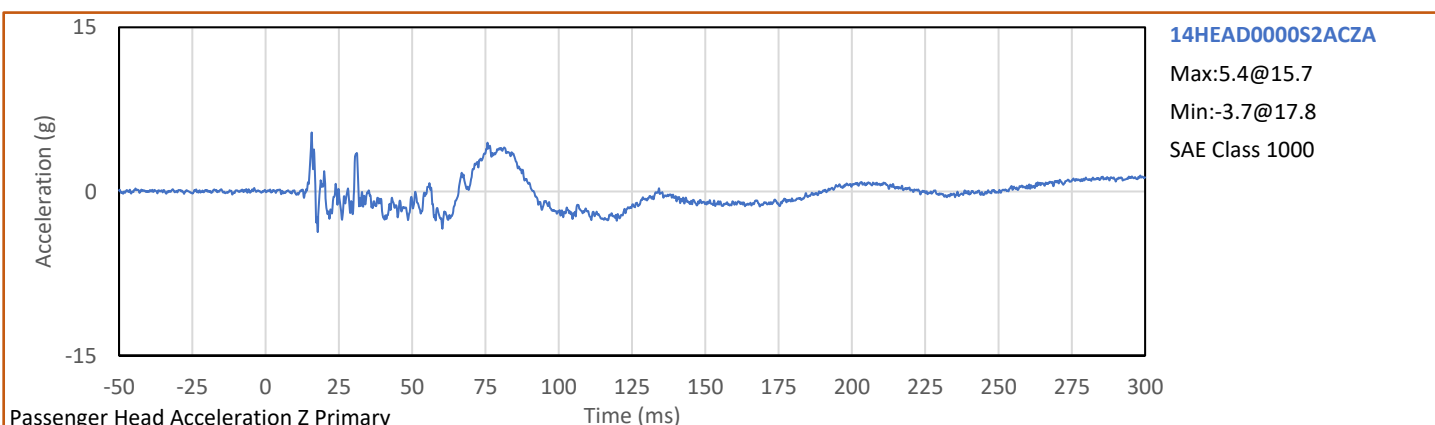
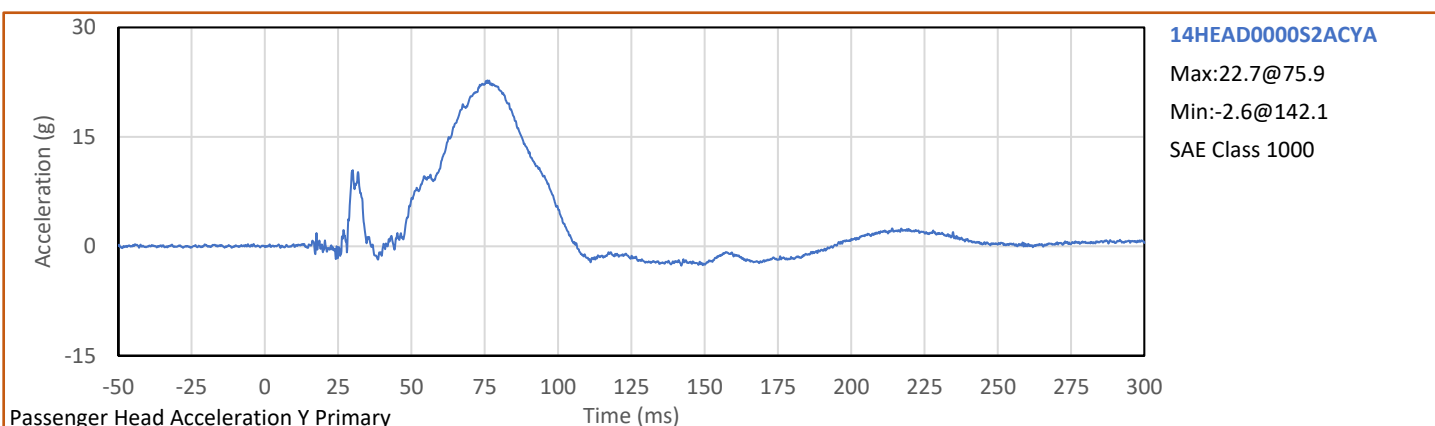
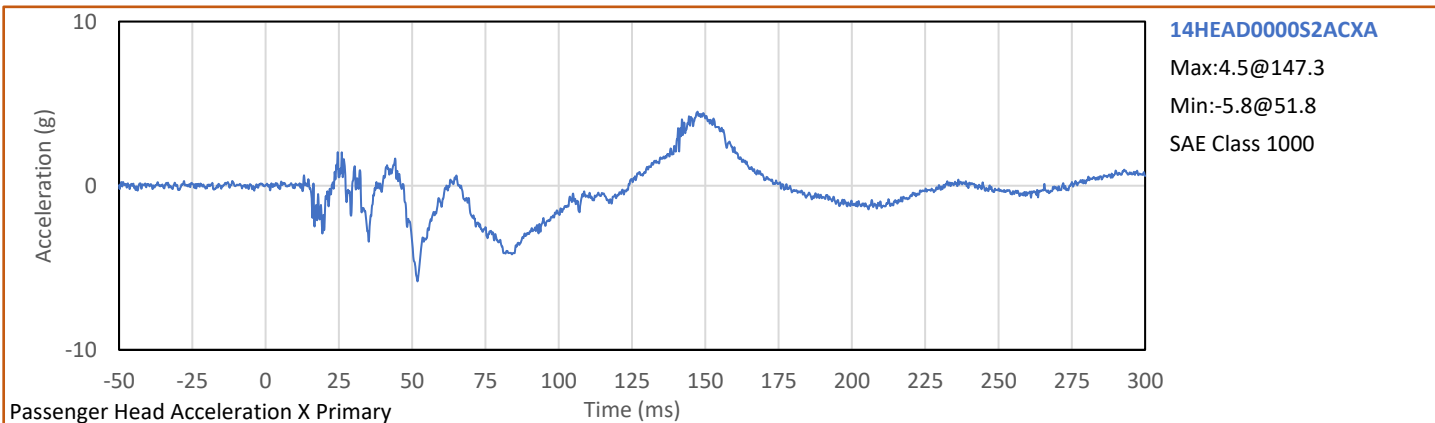


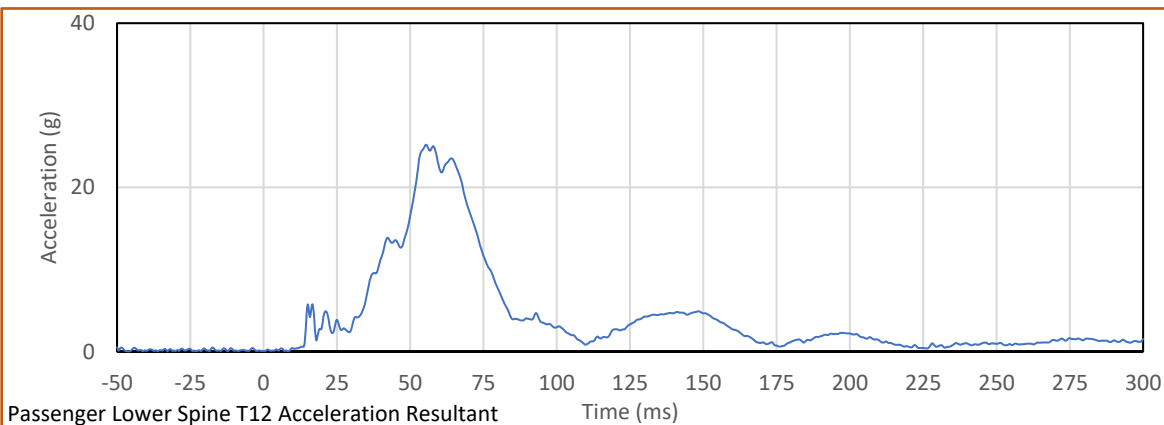
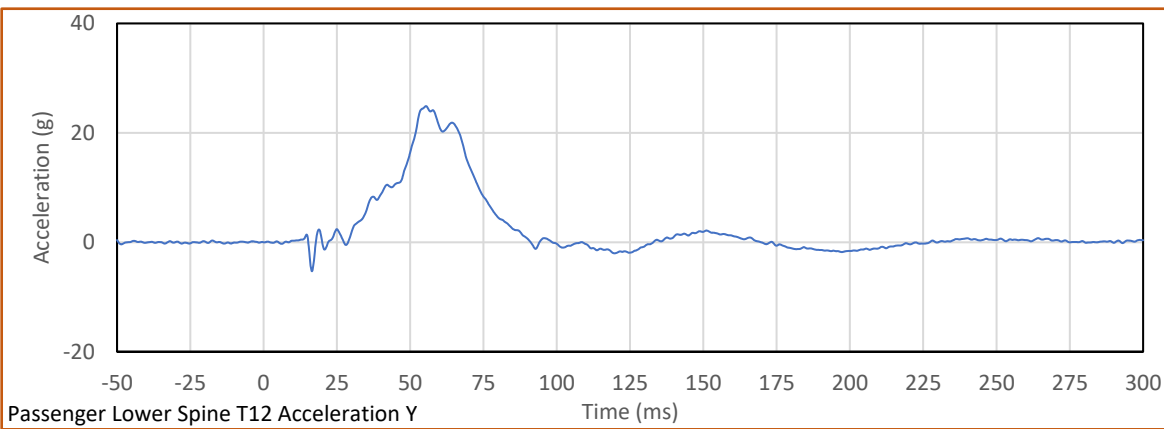
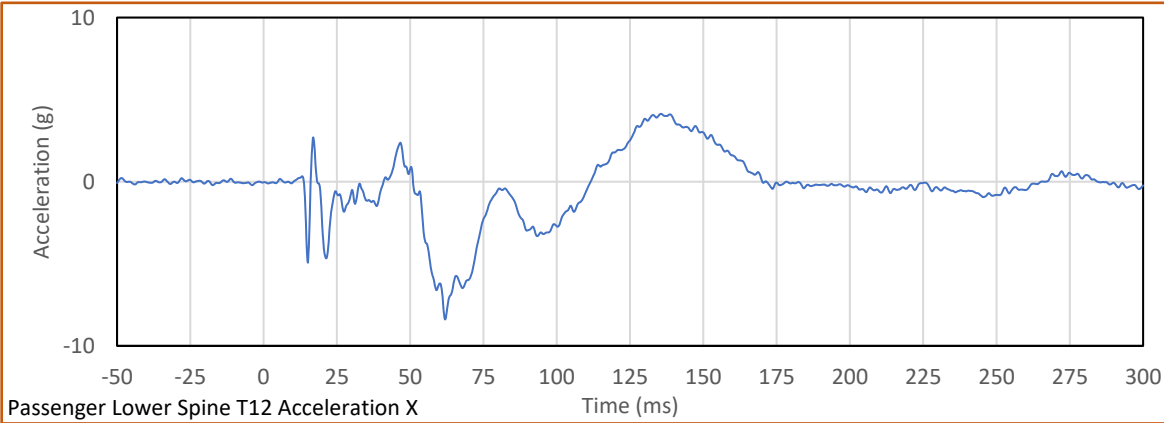


Test Vehicle: 2024 Ford Ranger 4-Door Crew Cab
Test Program: NCAP MDB Side Impact Test

NHTSA No.: M20240204
Test Date: 7/23/2024

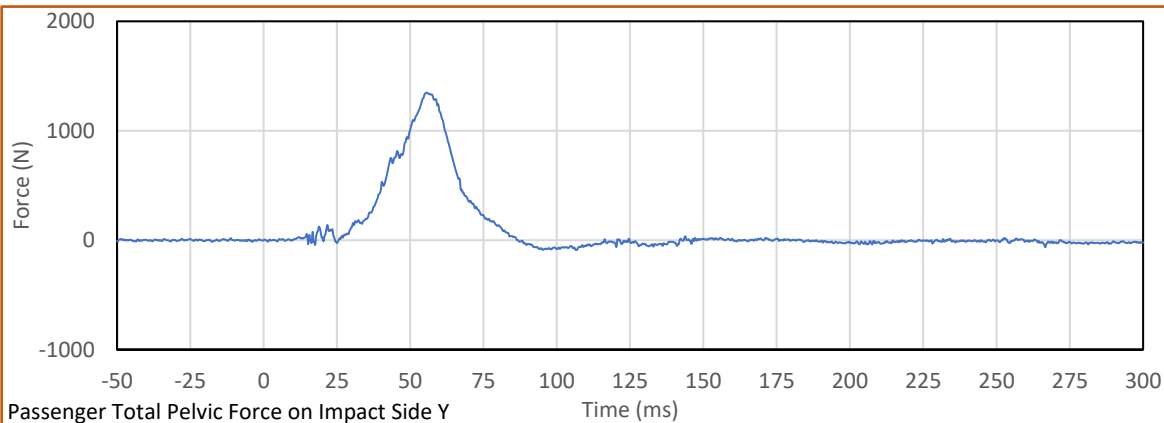
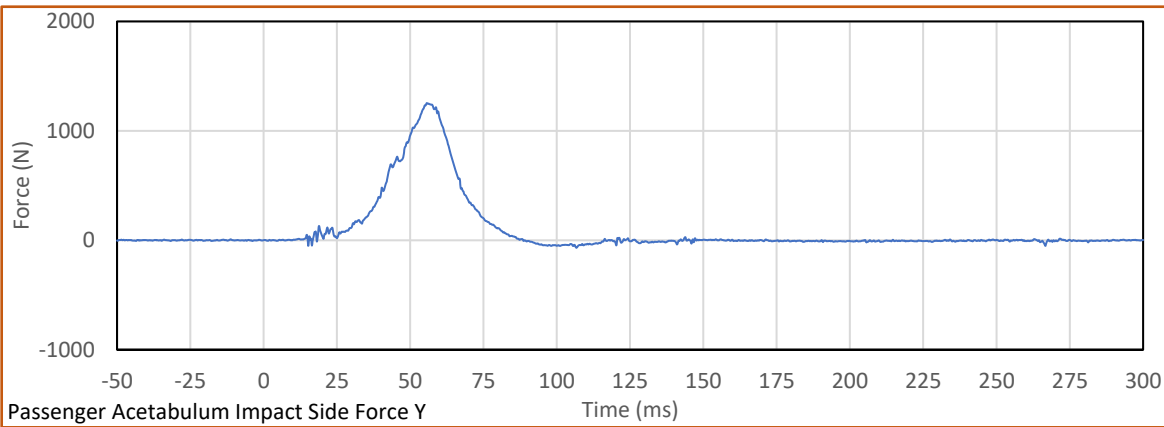
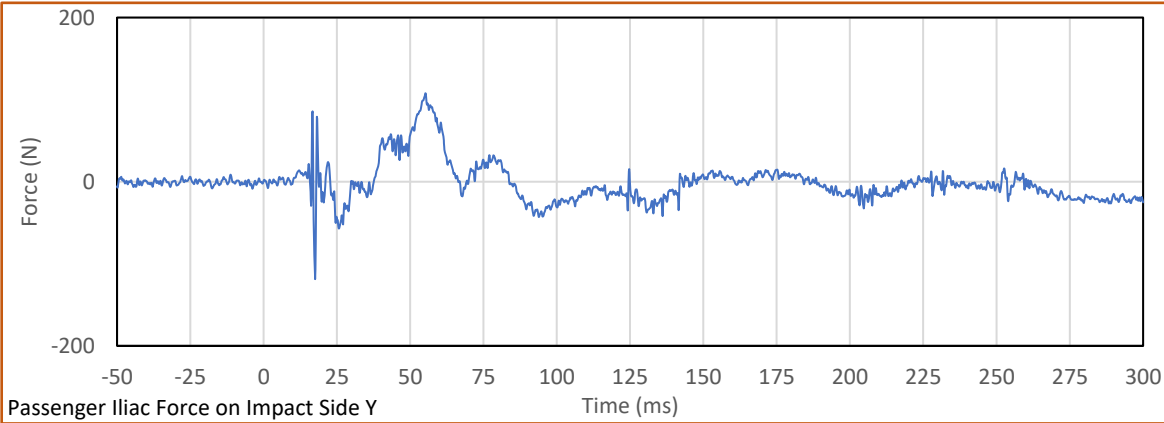






Test Vehicle: 2024 Ford Ranger 4-Door Crew Cab
Test Program: NCAP MDB Side Impact Test

NHTSA No.: M20240204
Test Date: 7/23/2024



APPENDIX C
ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA

APPENDIX C

**Pre-Test ATD Qualification and Performance Verification
ES-2re 50th Male Side Impact ATD, Left Side Configuration
S/N: F037**

ATD Serial No.: F037

Test Date: 2024-07-20

Tested Parameter	Units	Spec Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Relative Humidity	%	10	70	40	Pass
1 - Sitting Height	mm	900	918	908	Pass
2 - Seat to Shoulder Joint	mm	558	572	570	Pass
3 - Seat to Lower Face of Thoracic Spine Box	mm	346	356	351	Pass
4 - Seat to Hip Joint (bolt center)	mm	97	103	102	Pass
5 - Sole to Seat, Sitting	mm	433	451	439	Pass
6 - Head Width	mm	152	158	158	Pass
7 - Shoulder/Arm Width	mm	461	479	475	Pass
8 - Thorax Width	mm	322	332	325	Pass
9 - Abdomen Width	mm	273	287	284	Pass
10 - Pelvis Lap Width	mm	359	373	369	Pass
11 - Head Depth	mm	196	206	198	Pass
12 - Thorax Depth	mm	262	272	269	Pass
13 - Abdomen Depth	mm	194	204	197	Pass
14 - Pelvis Depth	mm	235	245	240	Pass
15 - Back of Buttocks to Hip Joint (bolt Center)	mm	150	160	153	Pass
16 - Back of Buttocks to Front Knee	mm	597	615	601	Pass
				Overall Test Results	Pass

Technician:



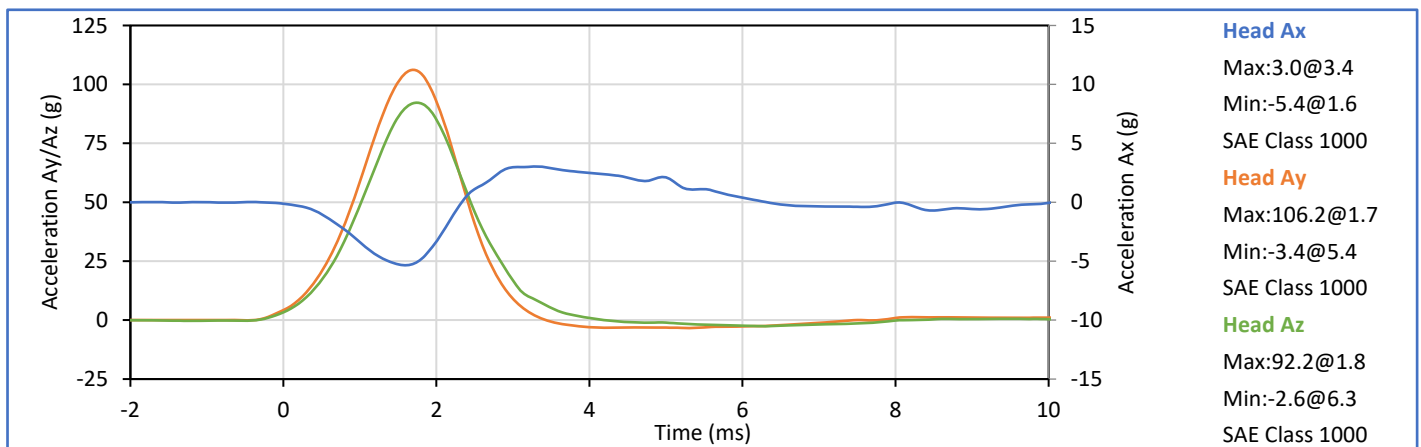
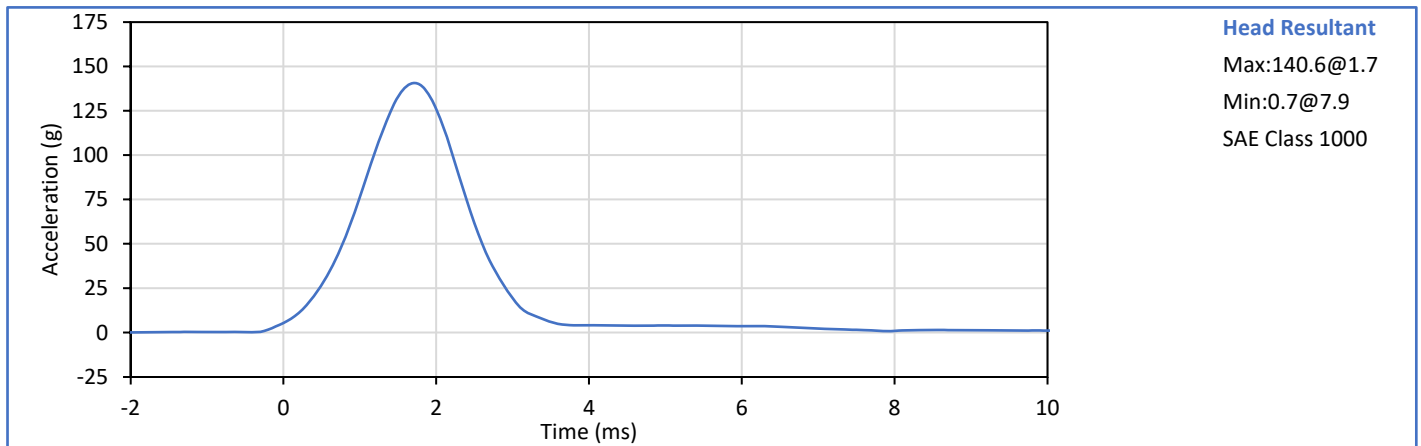
G. Fuentes

Approved By:



J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.4	Pass
Laboratory Relative Humidity	%	10	70	40	Pass
Peak Resultant Acceleration	g	125.0	155.0	140.6	Pass
Peak Head Ax	g	-15.0	15.0	3.0	Pass
Oscillations After Main Pulse	%	0.0	15.0	2.6	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
			Overall Test Results		Pass



Technician:

G. Fuentes

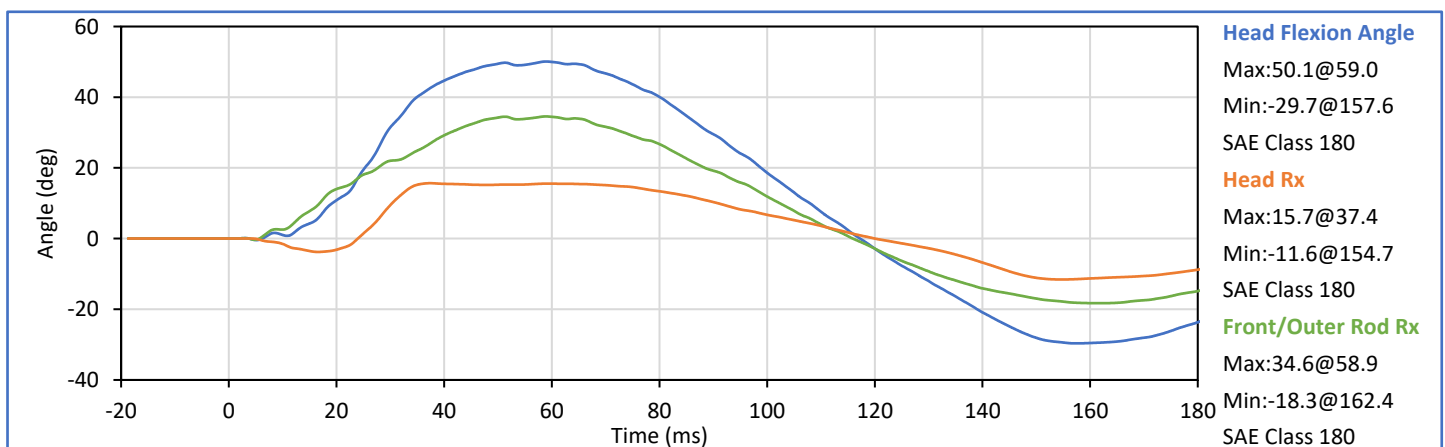
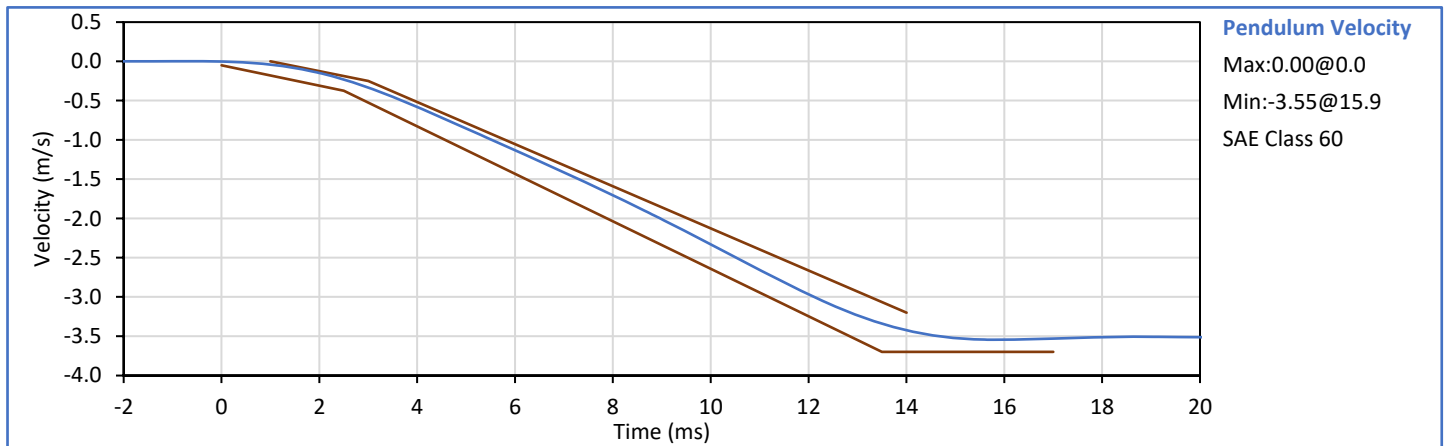
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.4	Pass
Laboratory Relative Humidity	%	10	70	46	Pass
Pendulum Velocity	m/s	3.30	3.50	3.37	Pass
Peak Headform Flexion	deg	49.0	59.0	50.1	Pass
Time of Peak Headform Flexion	ms	54.0	66.0	59.0	Pass
Flexion Decay (Peak to zero)	ms	53.0	88.0	58.3	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

G. Fuentes

Approved By:

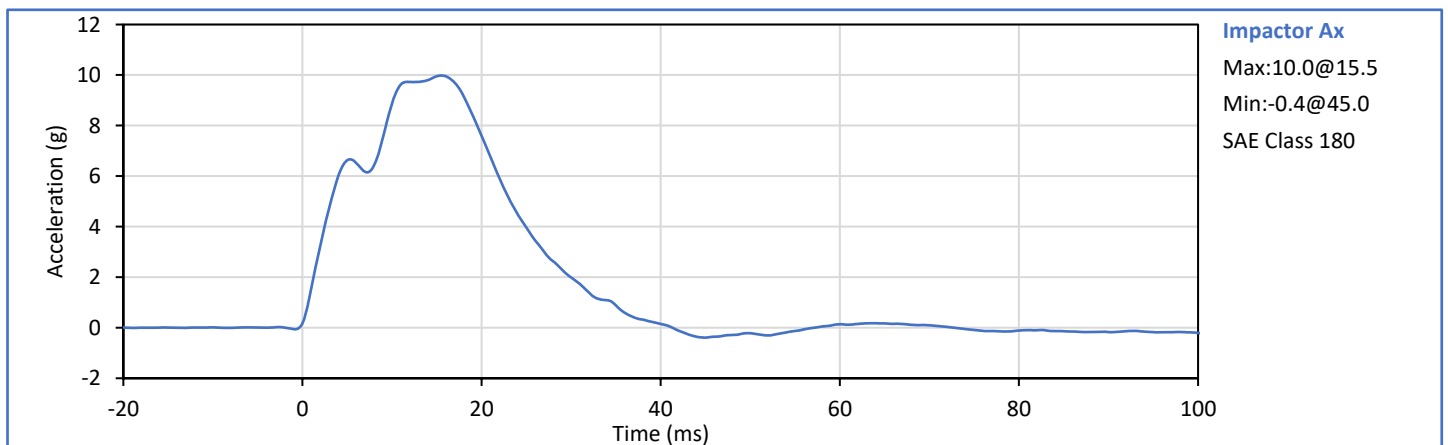
J. Hernandez

J. Hernandez

ATD Serial No.: F037

Test Date: 2024-07-20

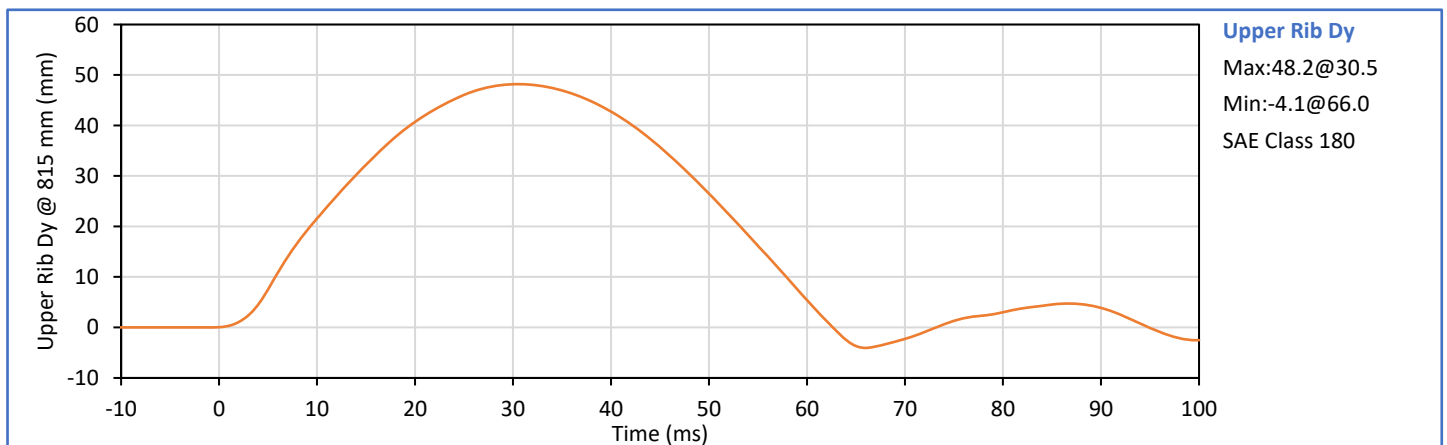
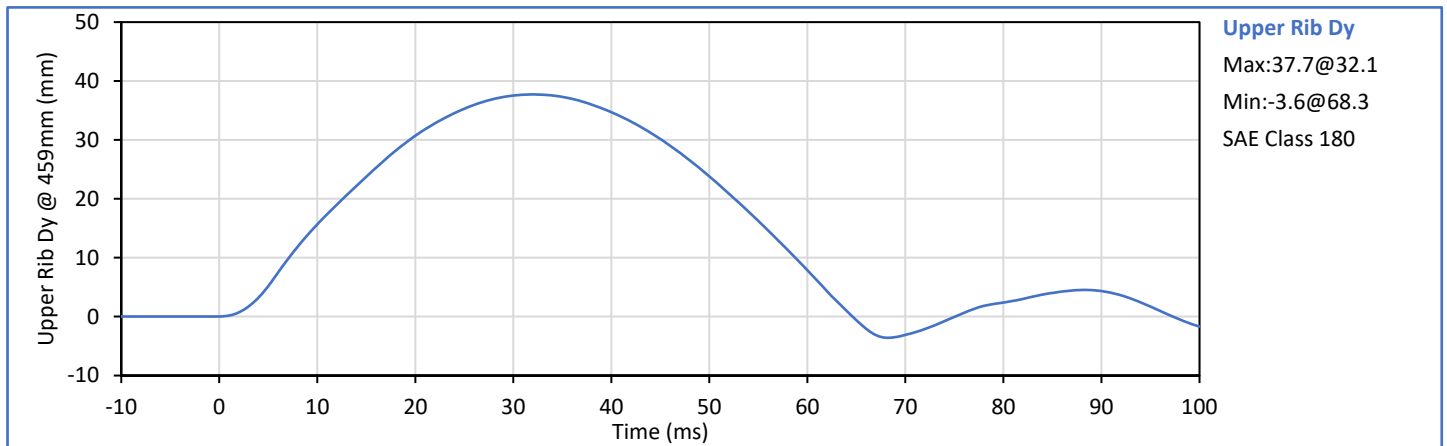
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Relative Humidity	%	10	70	40	Pass
Impactor Velocity	m/s	4.20	4.40	4.37	Pass
Peak Impactor Ax	g	7.5	10.5	10.0	Pass
				Overall Test Results	Pass



Technician: Mill LLS III
G. Fuentes

Approved By: J. Hernandez
J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	40	Pass
Upper Rib Dy @ 459mm	mm	36.0	40.0	37.7	Pass
Upper Rib Dy @ 815mm	mm	46.0	51.0	48.2	Pass
Overall Test Results				Pass	Pass



Technician:

G. Fuentes

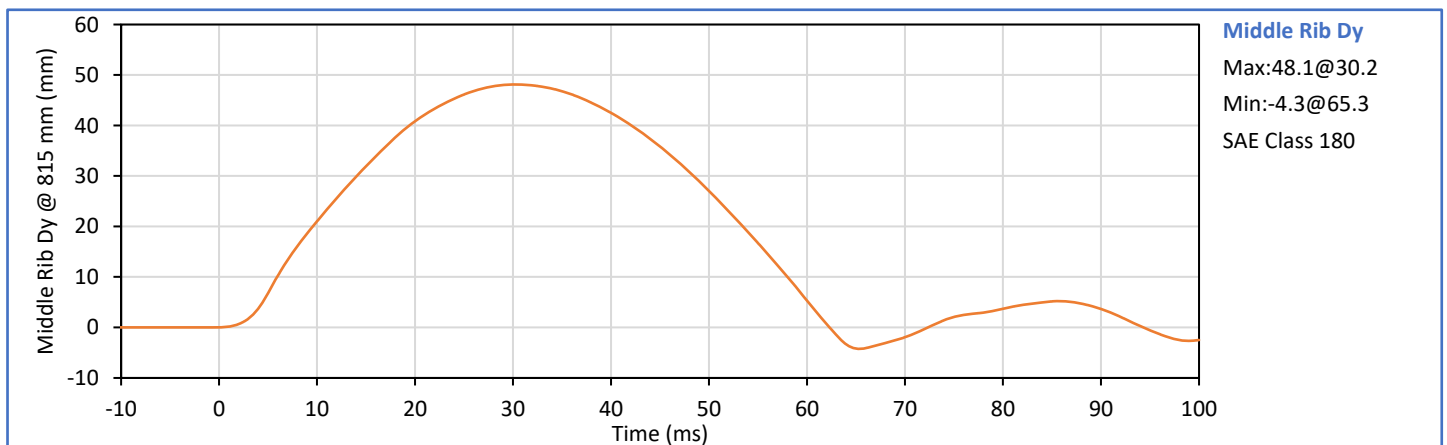
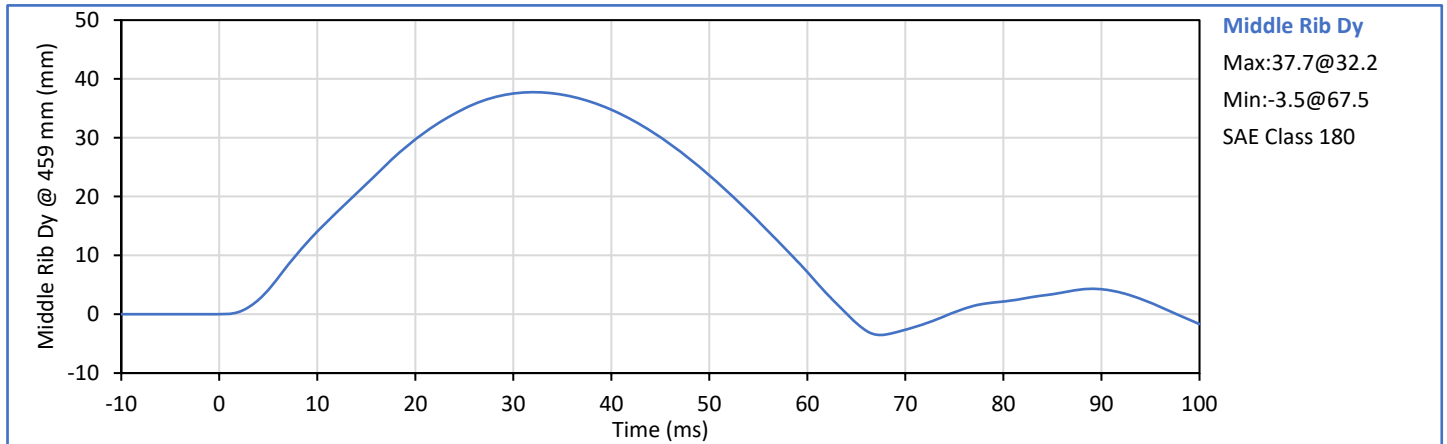
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Relative Humidity	%	10	70	40	Pass
Middle Rib Dy @ 459mm	mm	36.0	40.0	37.7	Pass
Middle Rib Dy @ 815mm	mm	46.0	51.0	48.1	Pass
Overall Test Results				Pass	Pass



Technician:

G. Fuentes

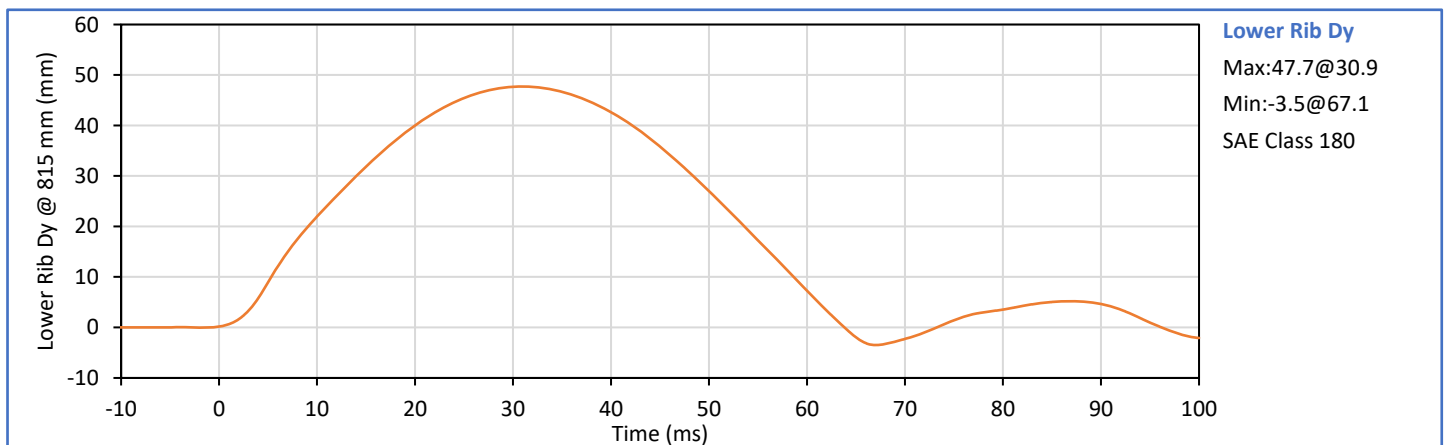
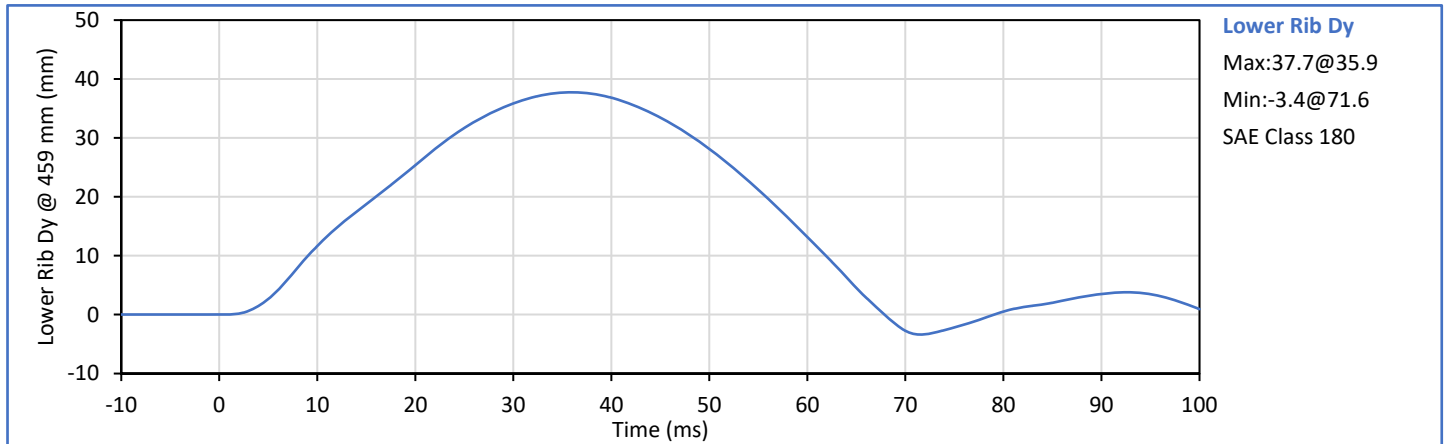
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.3	Pass
Laboratory Relative Humidity	%	10	70	40	Pass
Lower Rib Dy @ 459mm	mm	36.0	40.0	37.7	Pass
Lower Rib Dy @ 815mm	mm	46.0	51.0	47.7	Pass
Overall Test Results				Pass	Pass



Technician:

G. Fuentes

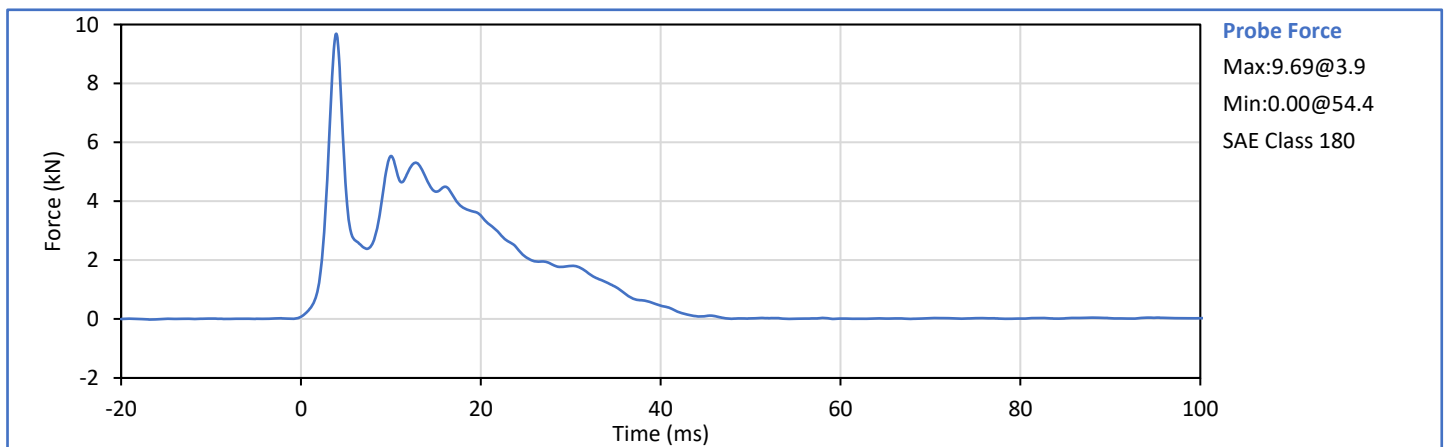
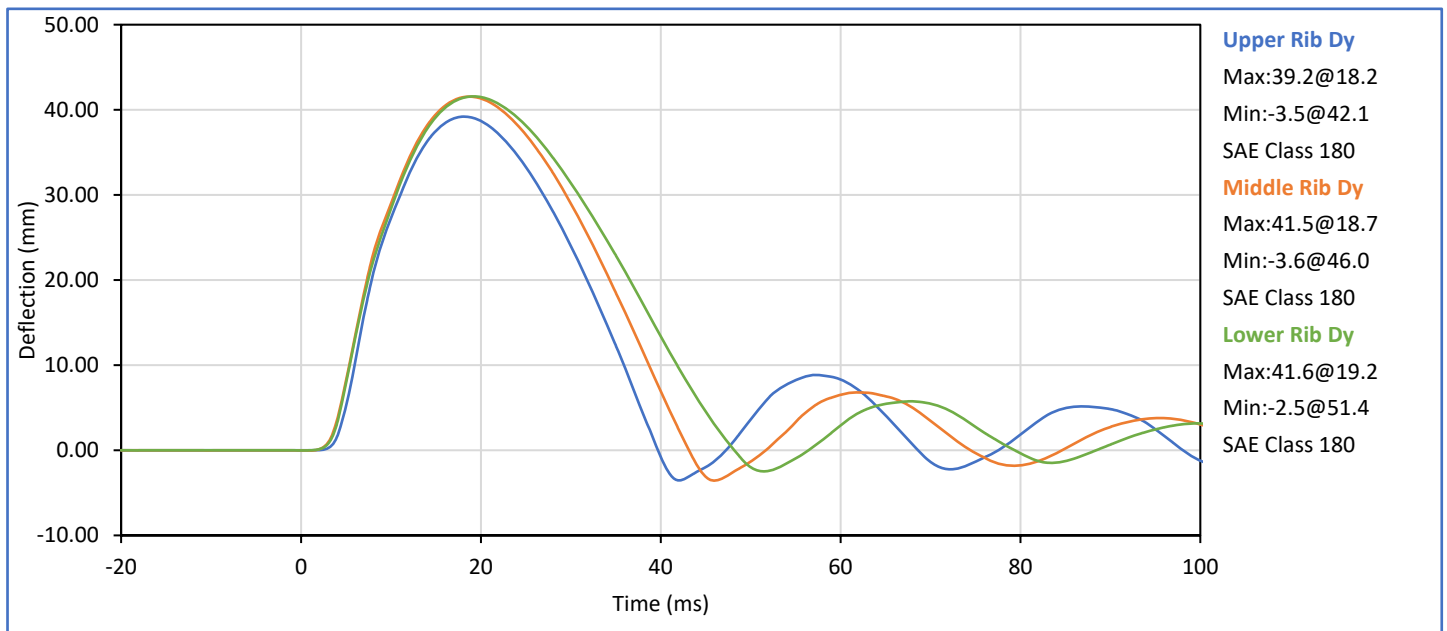
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.3	Pass
Laboratory Relative Humidity	%	10	70	47	Pass
Impactor Velocity	m/s	5.40	5.60	5.48	Pass
Peak Upper Rib Dy	mm	34.0	41.0	39.2	Pass
Peak Middle Rib Dy	mm	37.0	45.0	41.5	Pass
Peak Lower Rib Dy	mm	37.0	44.0	41.6	Pass
Peak Impactor Force After 6 ms	kN	5.10	6.20	5.53	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

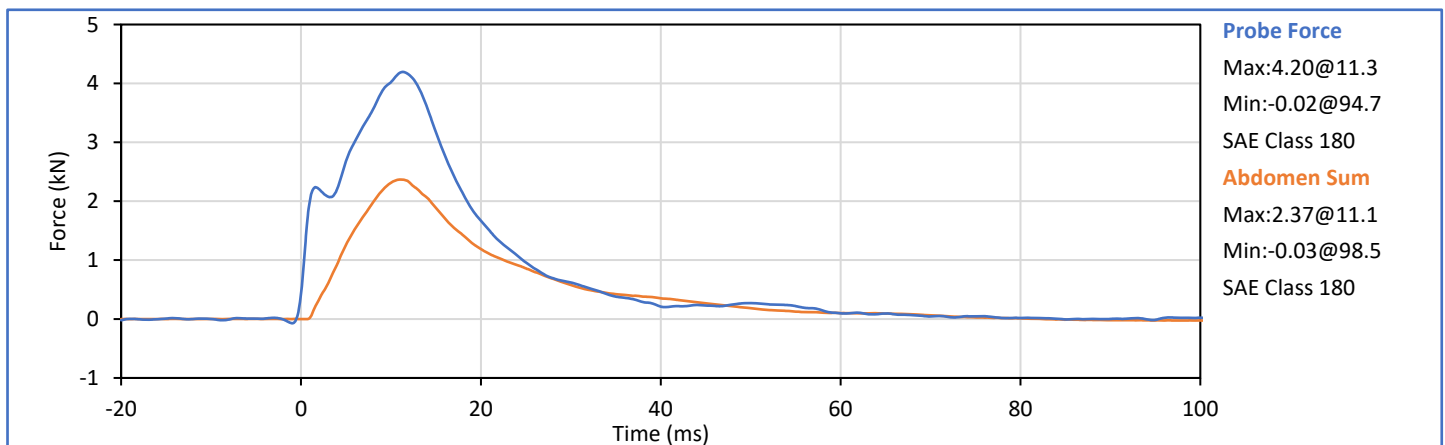
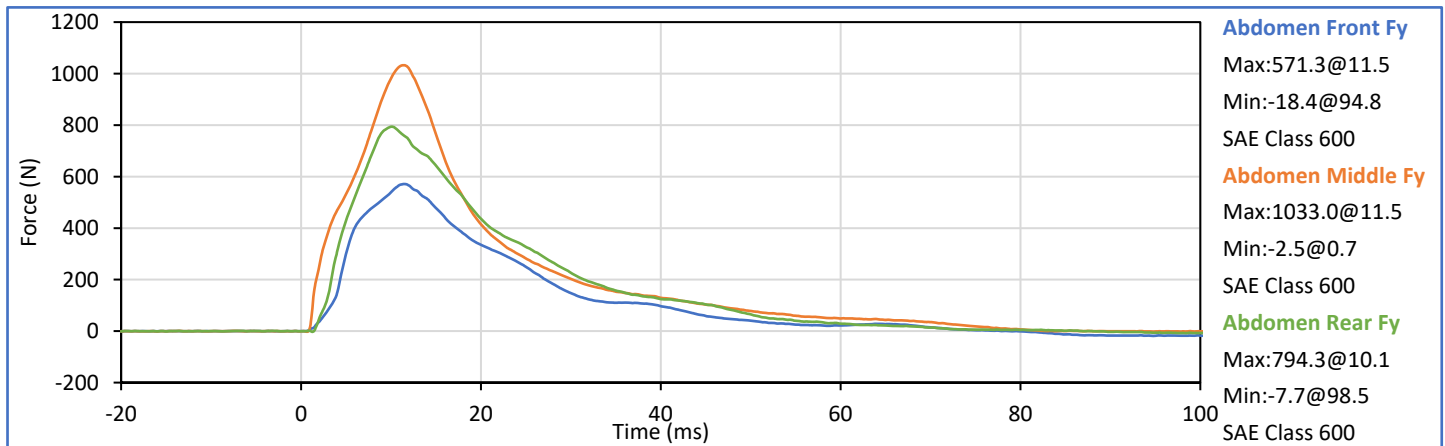
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.3	Pass
Laboratory Relative Humidity	%	10	70	46	Pass
Impactor Velocity	m/s	3.90	4.10	3.96	Pass
Peak Impactor Force	kN	4.00	4.80	4.20	Pass
Time of Peak Impactor Force	ms	10.6	13.0	11.3	Pass
Sum of Abdomen Forces	kN	2.20	2.70	2.37	Pass
Time of Peak Sum Abdomen Force	ms	10.0	12.3	11.1	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

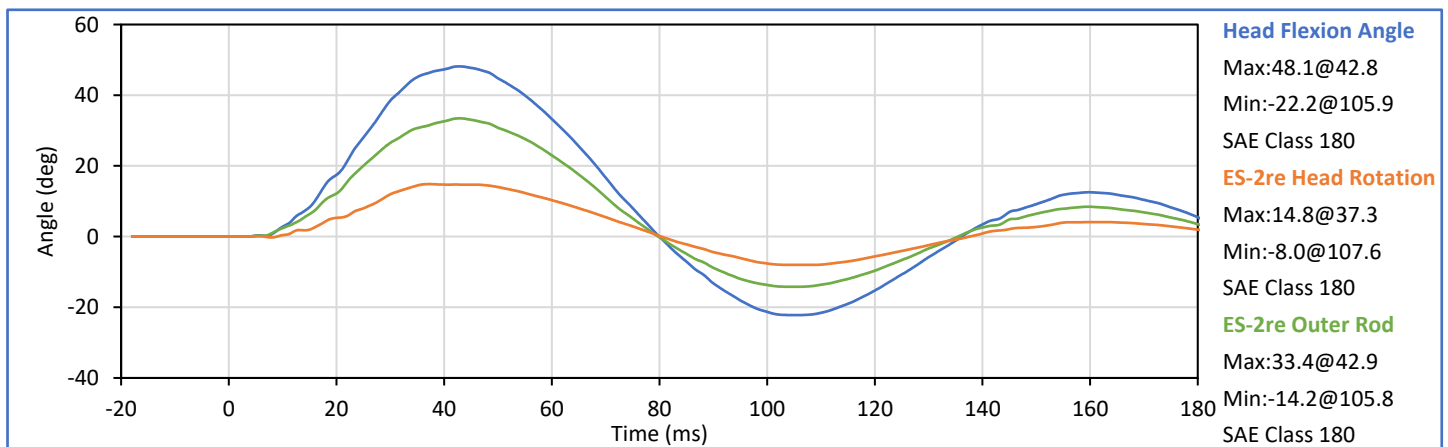
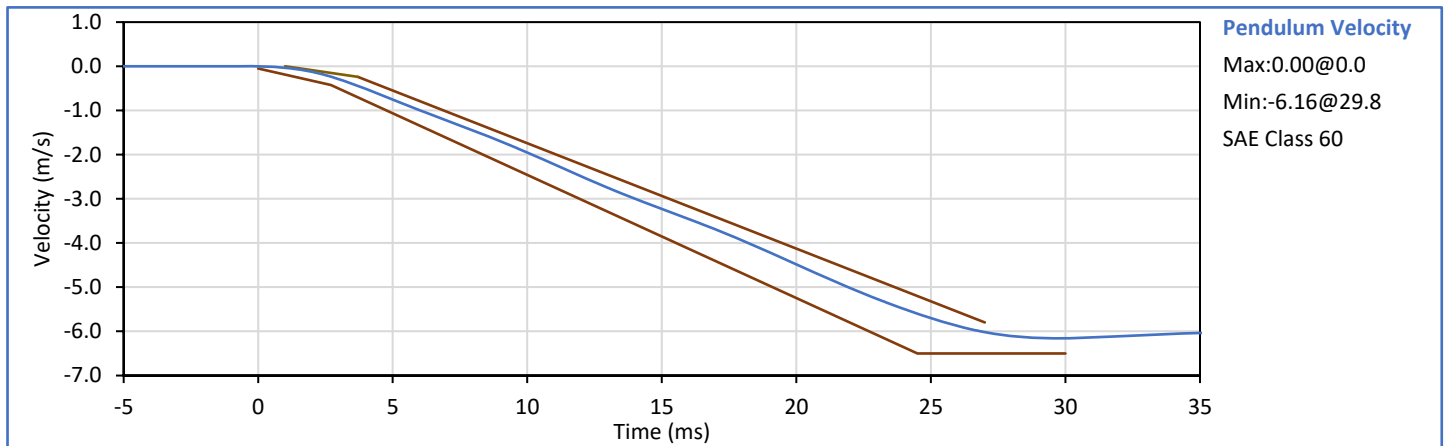
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Relative Humidity	%	10	70	40	Pass
Pendulum Velocity	m/s	5.95	6.15	6.02	Pass
Peak Headform Flexion	deg	45.0	55.0	48.1	Pass
Time of Peak Headform Flexion	ms	39.0	53.0	42.8	Pass
Flexion Decay (Peak to zero)	ms	37.0	57.0	37.2	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

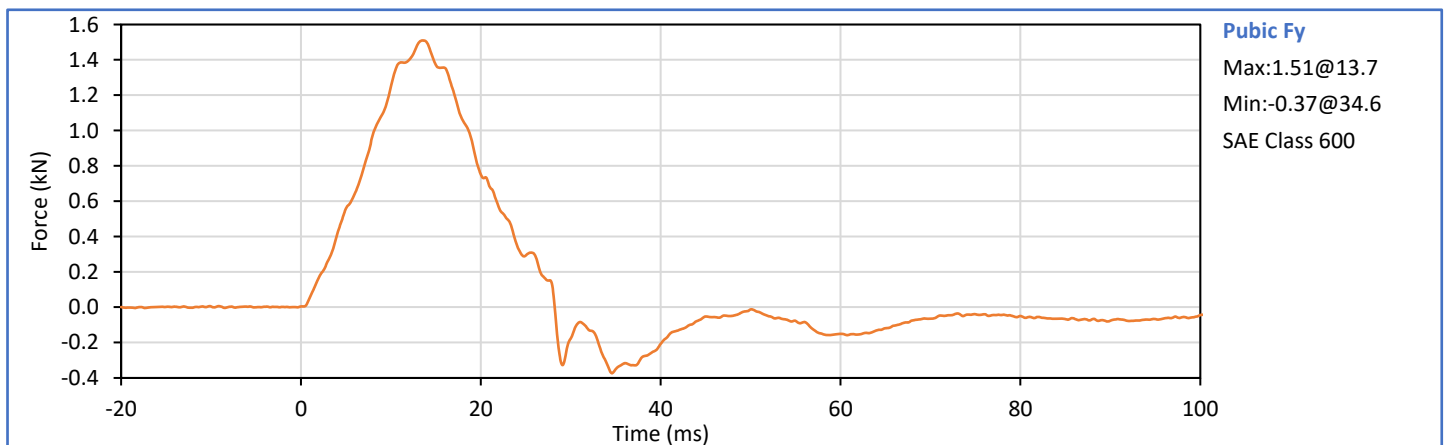
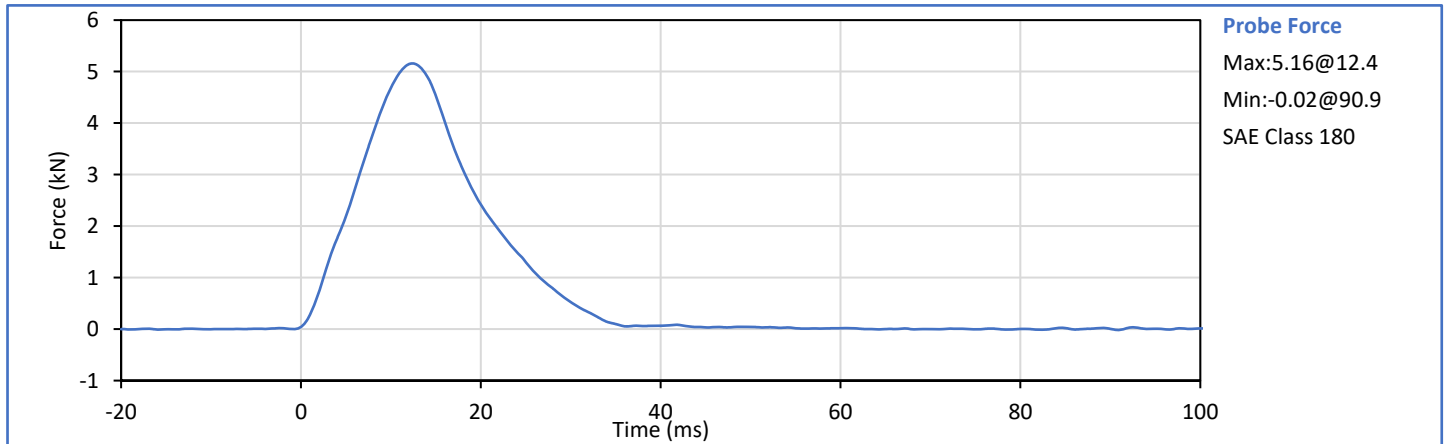
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Relative Humidity	%	10	70	40	Pass
Impactor Velocity	m/s	4.20	4.40	4.31	Pass
Peak Impactor Force	kN	4.70	5.40	5.16	Pass
Time of Peak Impactor Force	ms	11.8	16.1	12.4	Pass
Pubic Symphysis Fy	kN	1.23	1.59	1.51	Pass
Time of Peak Pubic Symphysis Fy	ms	12.2	17.0	13.7	Pass
Overall Test Results					Pass



Technician: Mill LLS III
G. Fuentes

Approved By: Santh
J. Hernandez

APPENDIX C

Pre-Test ATD Qualification and Performance Verification

SID-IIs Small Side Impact ATD, Left Side Configuration

S/N: 299

ATD Serial No.: 299

Test Date: 2024-07-18

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	50	Pass
A - Sitting Height	mm	772	788	783	Pass
B - Shoulder Pivot Height	mm	437	453	450	Pass
C - Hpoint Height	mm	79	89	84	Pass
D - H Point From Seatback	mm	141	151	144	Pass
E - Shoulder Pivot From Backline	mm	97	107	106	Pass
F - Thigh Clearance	mm	119	135	126	Pass
G - Head Breadth	mm	140	148	146	Pass
H - Head Back From Backline	mm	40	46	43	Pass
I - Head Depth	mm	178	188	181	Pass
J - Head Circumference	mm	541	551	548	Pass
K - Buttock To Knee Length	mm	514	540	526	Pass
L - Popliteal Height	mm	343	369	356	Pass
K - Knee Pivot To Floor Height	mm	392	409	399	Pass
N - Buttock Popliteal Length	mm	416	442	436	Pass
O - Chest Depth W/O Jacket	mm	195	211	202	Pass
P - Foot Length	mm	216	232	223	Pass
Q - Hip Breadth (W/Pelvic Plugs)	mm	313	323	321	Pass
R - Arm Length	mm	249	259	254	Pass
S - Knee Joint To Seatback	mm	477	493	490	Pass
V - Shoulder Width	mm	341	357	346	Pass
W - Foot Width	mm	78	94	86	Pass
Y - Chest Circumference W/Jacket	mm	851	881	866	Pass
Z - Waist Circumference	mm	761	791	769	Pass
				Overall Test Results	Pass

Technician:



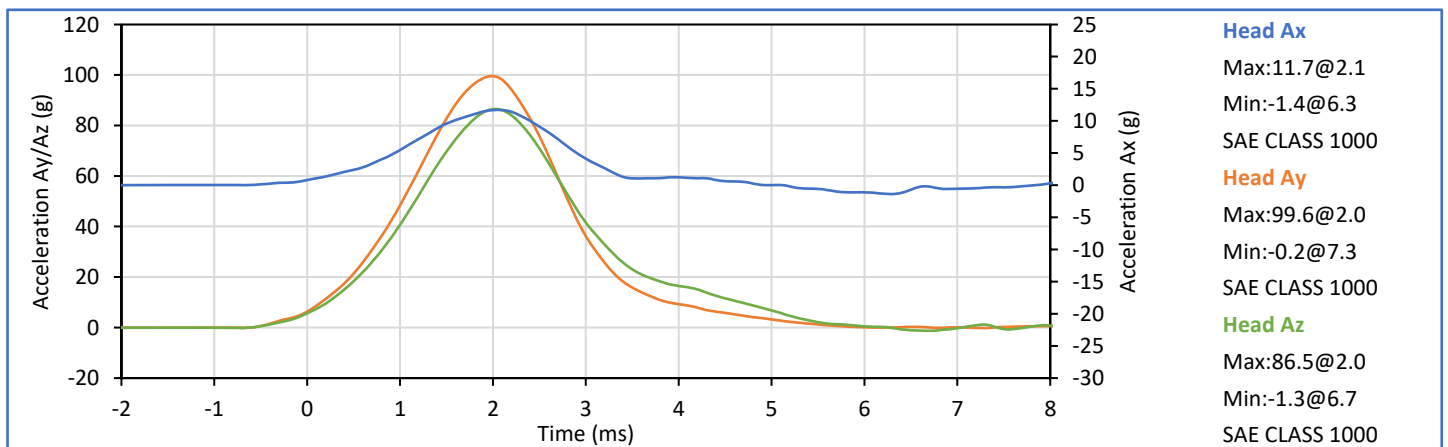
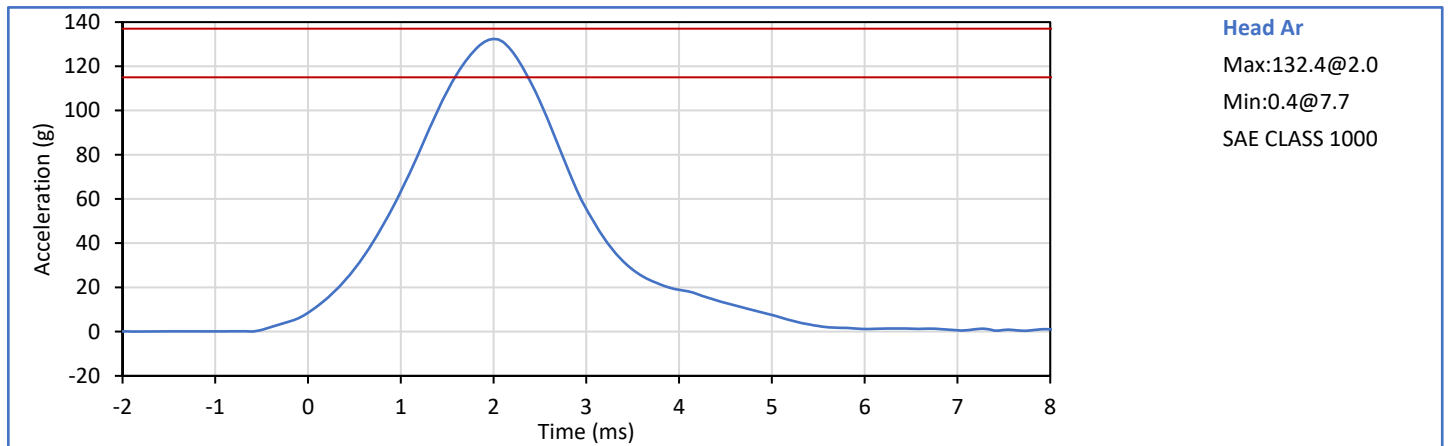
G. Fuentes

Approved By:



J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	20.6	Pass
Laboratory Relative Humidity	%	10	70	44	Pass
Peak Resultant Acceleration	g	115.0	137.0	132.4	Pass
Peak Head Ax	g	-15.0	15.0	11.7	Pass
Oscillations After Main Pulse	%	0.0	15.0	1.1	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
			Overall Test Results	Pass	



Technician:

G. Fuentes

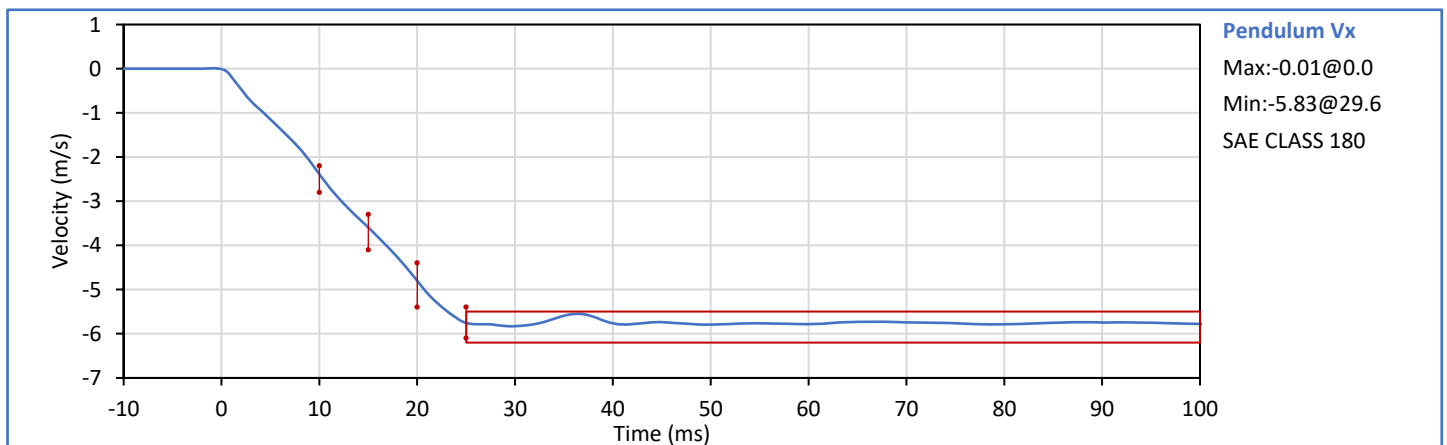
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.4	Pass
Laboratory Relative Humidity	%	10	70	49	Pass
Pendulum Velocity	m/s	5.51	5.63	5.59	Pass
Pendulum Decel at 10 ms	m/s	-2.80	-2.20	-2.39	Pass
Pendulum Decel at 15 ms	m/s	-4.10	-3.30	-3.59	Pass
Pendulum Decel at 20 ms	m/s	-5.40	-4.40	-4.80	Pass
Pendulum Decel at 25 ms	m/s	-6.10	-5.40	-5.76	Pass
Pendulum Decel from 25-100 ms	m/s	-6.20	-5.50	-5.83/-5.55	Pass
Peak "D" Plane Rotation	deg	-81.0	-71.0	-73.9	Pass
Time of Peak "D" Plane Rotation	ms	50.0	70.0	58.5	Pass
Peak Occ. Condyle Moment	Nm	36.0	44.0	43.2	Pass
Time of Moment Decay to 0 Nm	ms	102.0	126.0	111.9	Pass
				Overall Test Results	Pass



Technician:

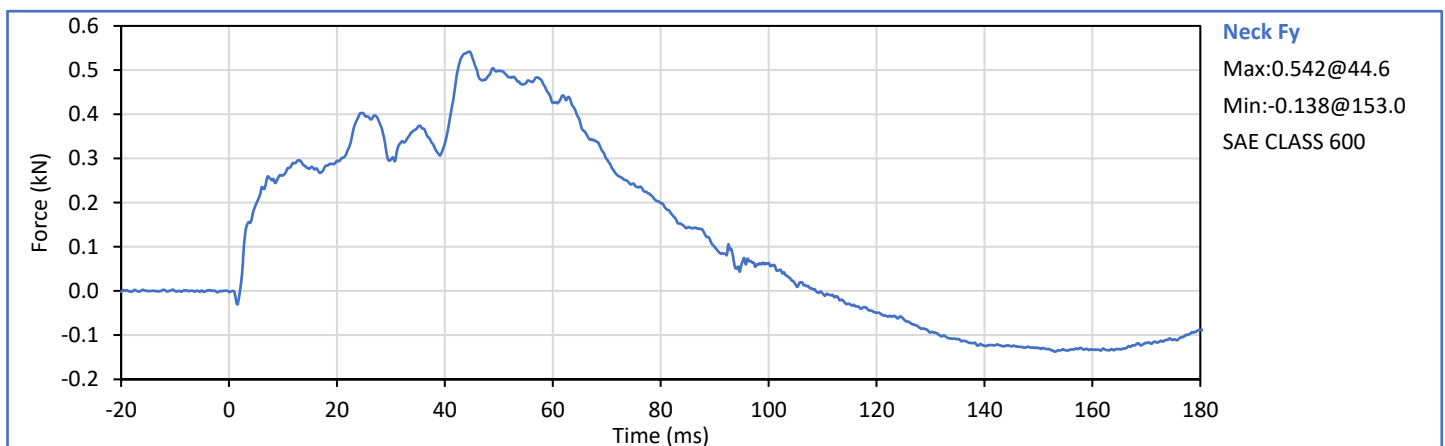
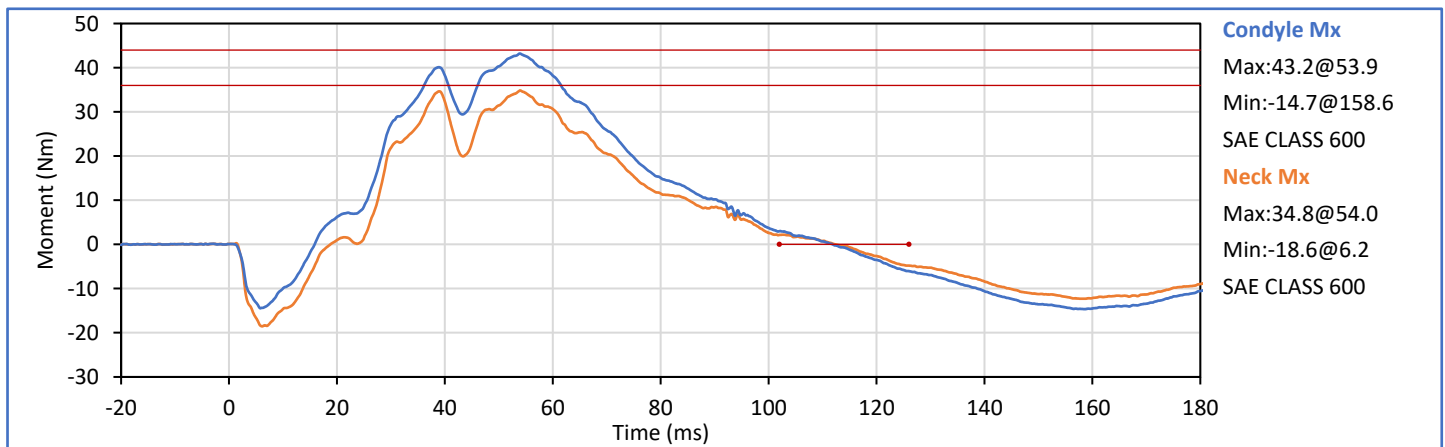
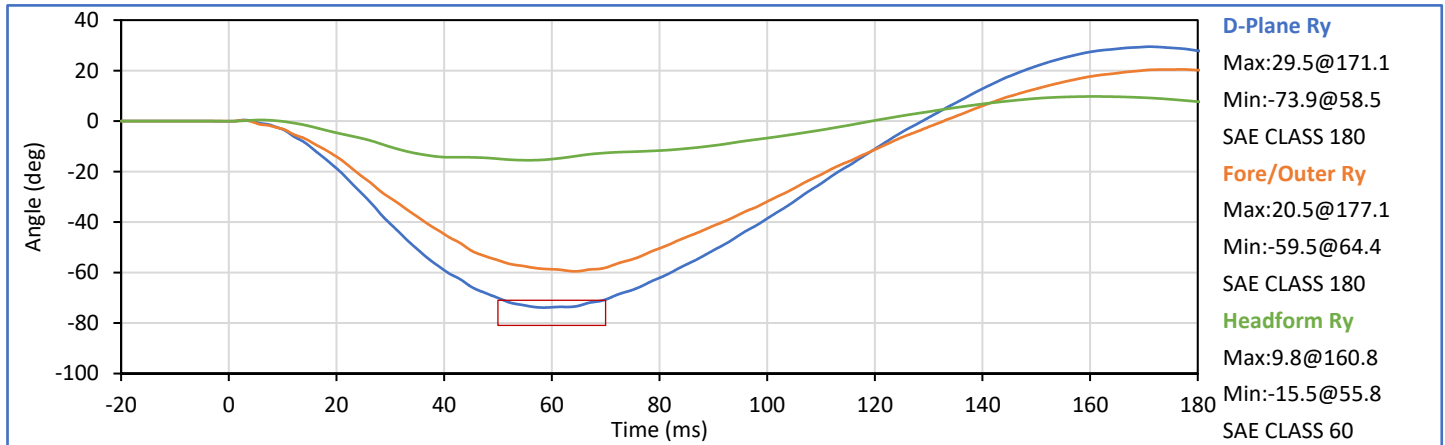
G. Fuentes

G. Fuentes

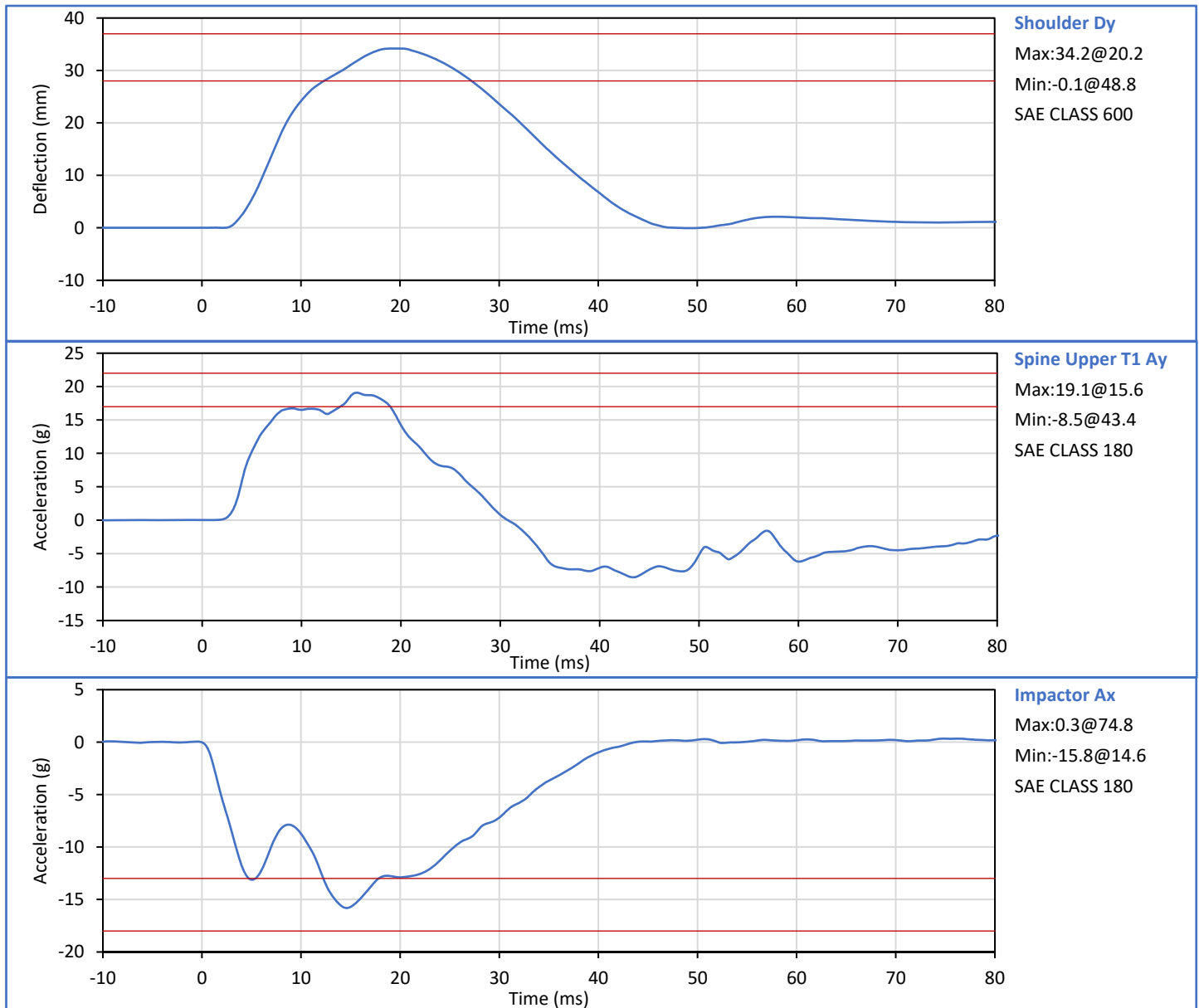
Approved By:

J. Hernandez

J. Hernandez



Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	20.9	Pass
Laboratory Relative Humidity	%	10	70	47	Pass
Impactor Velocity	m/s	4.20	4.40	4.37	Pass
Peak Shoulder Dy	mm	28.0	37.0	34.2	Pass
Peak Upper Spine (T1) Ay	g	17.0	22.0	19.1	Pass
Peak Impactor Ax	g	-18.0	-13.0	-15.8	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

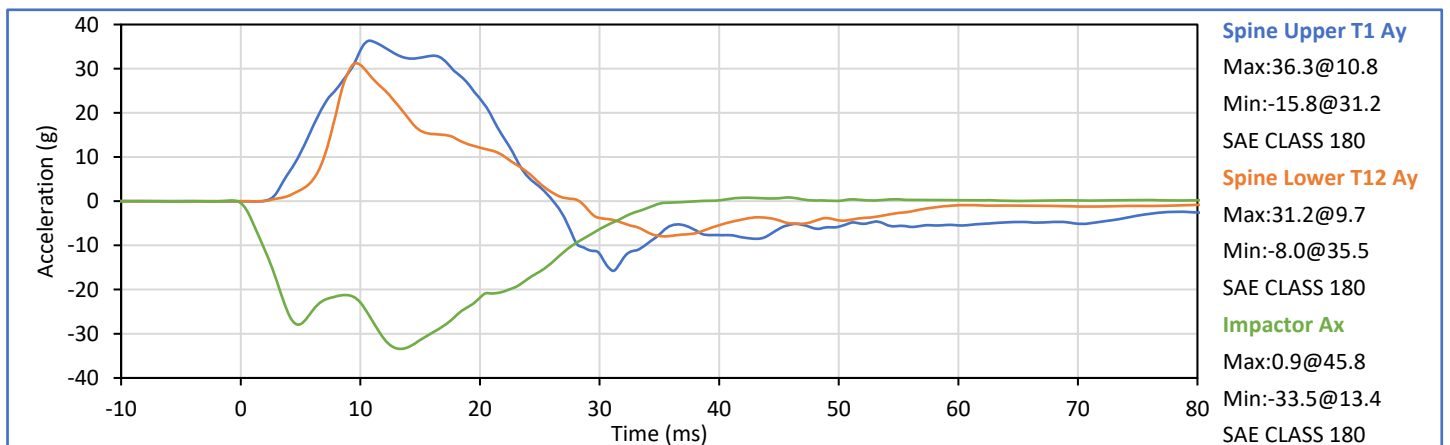
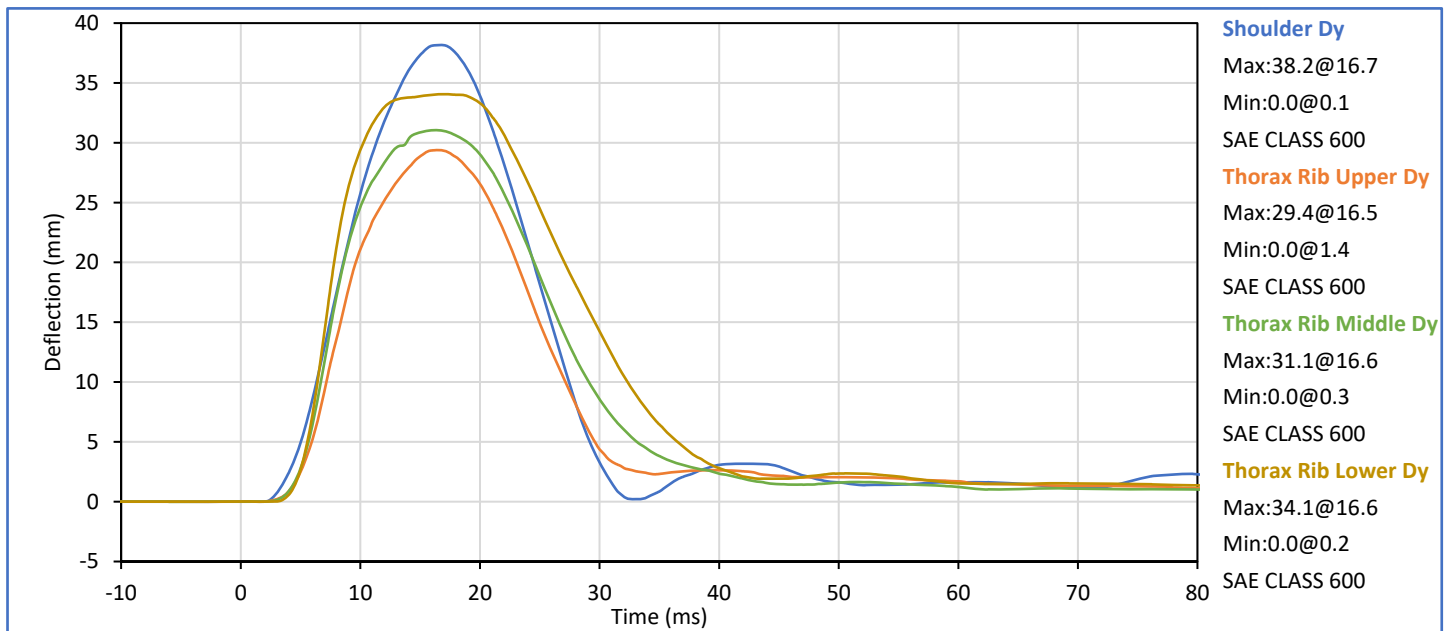
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.6	Pass
Laboratory Relative Humidity	%	10	70	47	Pass
Impactor Velocity	m/s	6.60	6.80	6.65	Pass
Peak Shoulder Dy	mm	31.0	40.0	38.2	Pass
Peak Upper Rib Dy	mm	25.0	32.0	29.4	Pass
Peak Middle Rib Dy	mm	30.0	36.0	31.1	Pass
Peak Lower Rib Dy	mm	32.0	38.0	34.1	Pass
Peak Upper Spine (T1) Ay	g	34.0	43.0	36.3	Pass
Peak Lower Spine (T12) Ay	g	29.0	37.0	31.2	Pass
Peak Impactor Ax	g	-36.0	-30.0	-33.5	Pass
Overall Test Results				Pass	Pass



Technician:

G. Fuentes

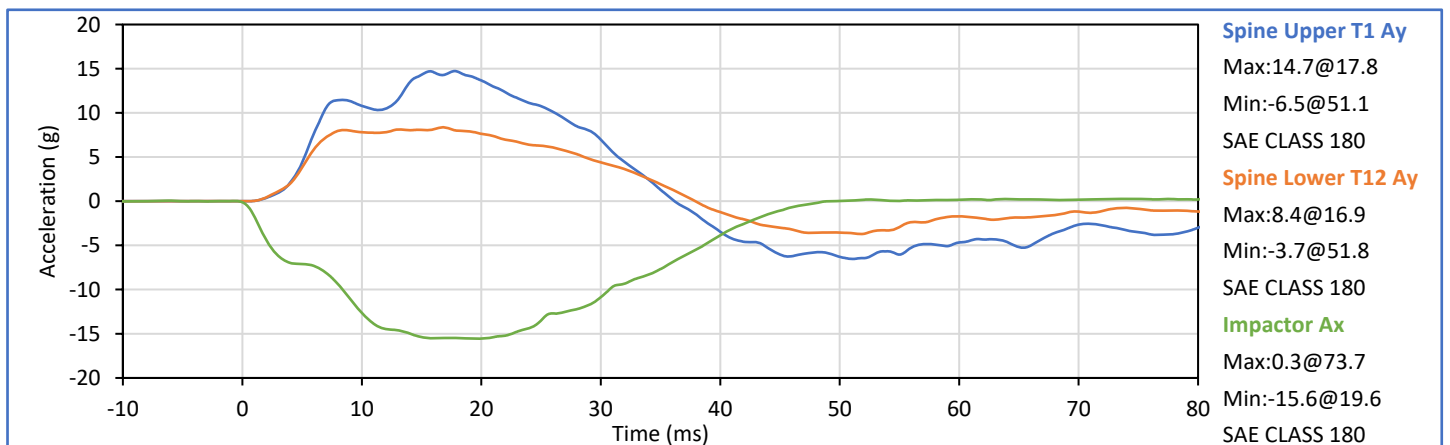
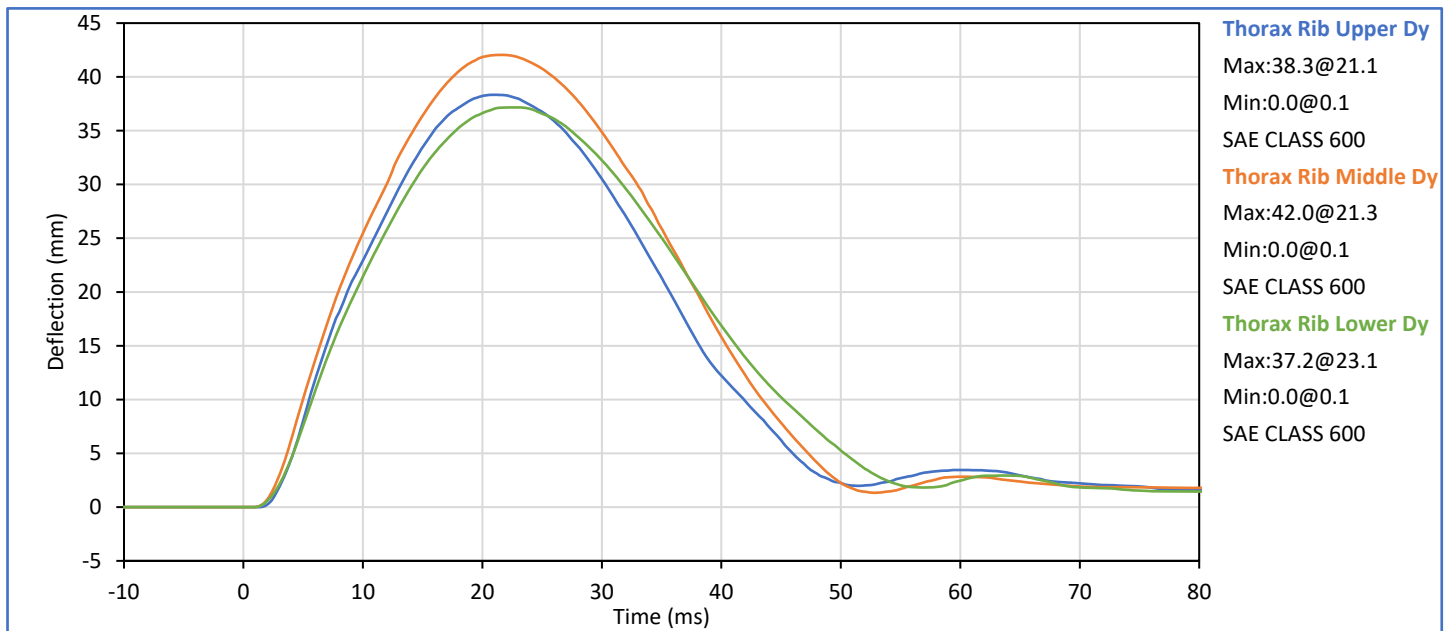
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.4	Pass
Laboratory Relative Humidity	%	10	70	47	Pass
Impactor Velocity	m/s	4.20	4.40	4.35	Pass
Peak Thorax Rib Upper Dy	mm	32.0	40.0	38.3	Pass
Peak Thorax Rib Middle Dy	mm	39.0	45.0	42.0	Pass
Peak Thorax Rib Lower Dy	mm	35.0	43.0	37.2	Pass
Peak Spine Upper T1 Ay	g	13.0	17.0	14.7	Pass
Peak Spine Lower T12 Ay	g	7.0	11.0	8.4	Pass
Peak Impactor Ax	g	-18.0	-14.0	-15.6	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

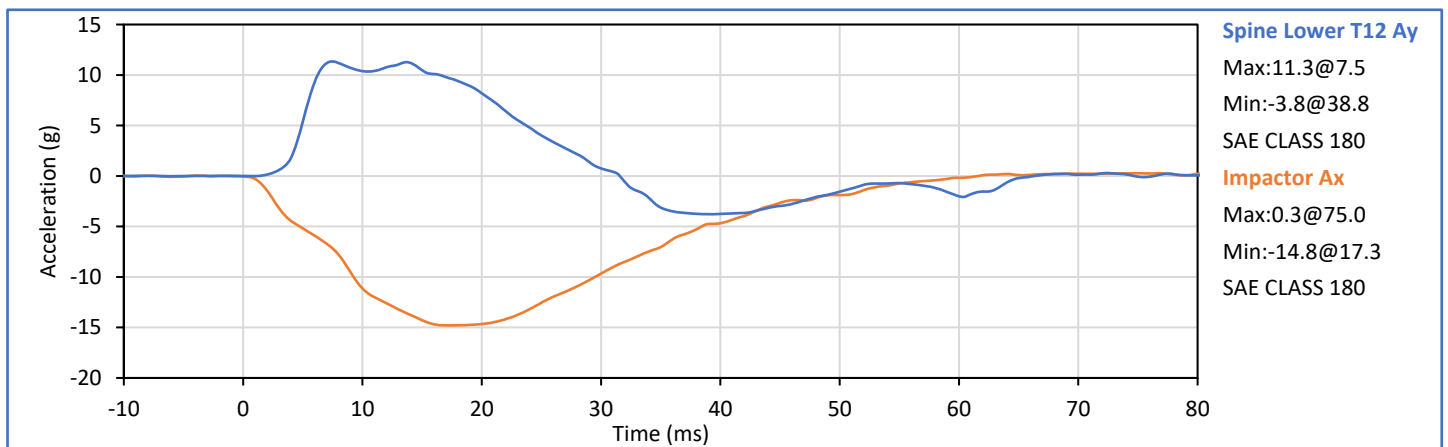
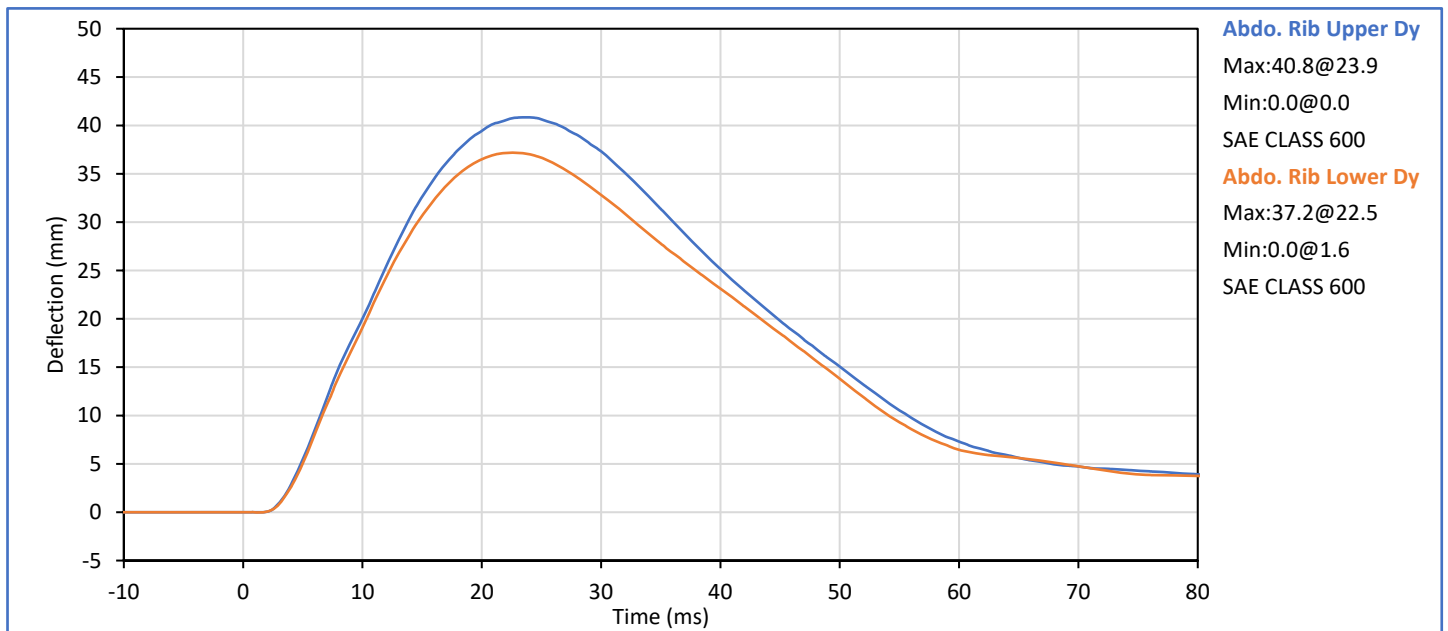
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Relative Humidity	%	10	70	47	Pass
Impactor Velocity	m/s	4.20	4.40	4.37	Pass
Peak Upper Abdomen Rib Dy	mm	36.0	47.0	40.8	Pass
Peak Lower Abdomen Rib Dy	mm	33.0	44.0	37.2	Pass
Peak Lower Spine T12 Ay	mm	9.0	14.0	11.3	Pass
Peak Impactor Ax	g	-16.0	-12.0	-14.8	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

G. Fuentes

Approved By:

J. Hernandez

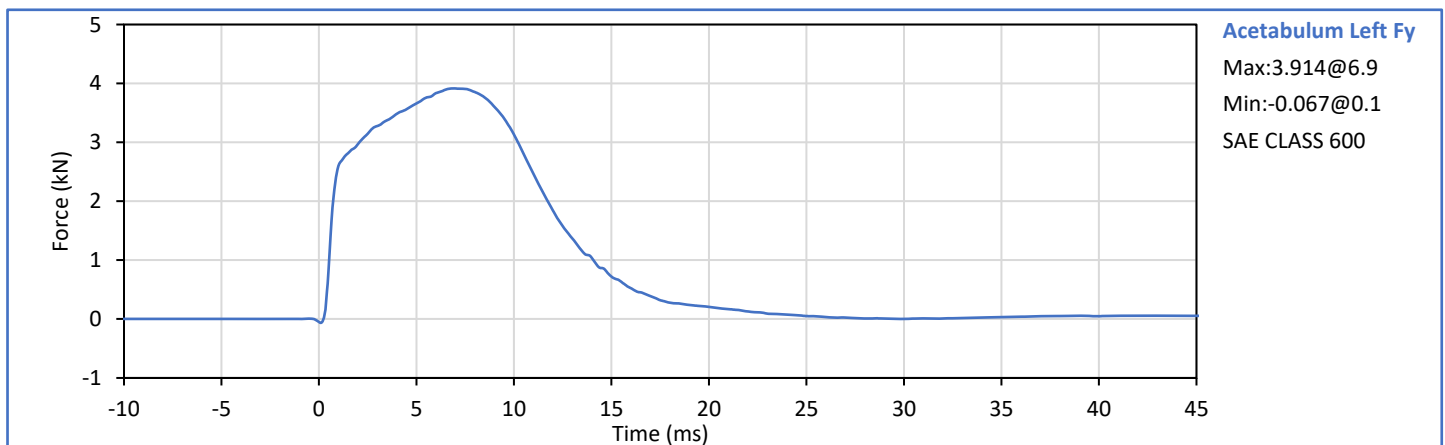
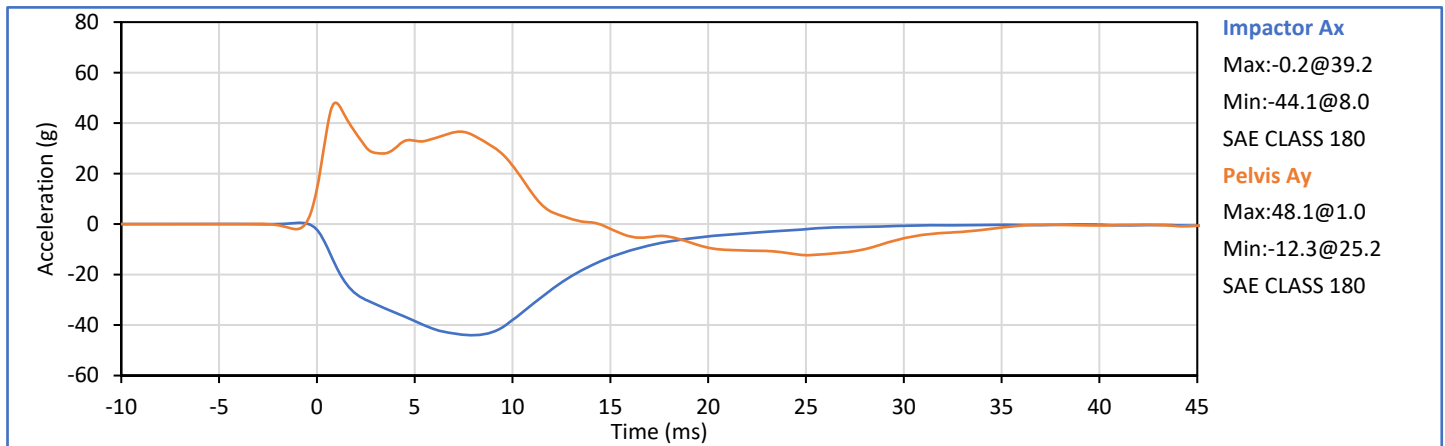
J. Hernandez

ATD Serial No.: 299

Test Date: 2024-07-19

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Relative Humidity	%	10	70	49	Pass
Impactor Velocity	m/s	6.60	6.80	6.71	Pass
Peak Acetabulum Fy	kN	3.60	4.30	3.91	Pass
Pelvis Ay after 6ms	g	34.0	42.0	36.6	Pass
Peak Impactor Ax	g	-47.0	-38.0	-44.1	Pass
Overall Test Results					Pass

Pelvis Plug S/N: 14702



Technician:

G. Fuentes

G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

ATD Serial No.: 299

Test Date: 2024-07-19

Pelvis Plug S/N: 14702



SID-IIs Pelvis Plug Certification Test

Plug S/N 14702

Test Number 16665

Report Number 16711

Test Date 12/22/2020 10:32:43 AM

	Test Results	Spec. Min	Spec. Max
Force @ 0.5 mm (N)	285.17	50.00	600.00
Force @ 1.5 mm (N)	1,132.36	850.00	1,400.00
Force @ 2.5 mm (N)	1,412.38	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,465.54	1,361.00	1,673.00

Testing Machine STM-20 5965542

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

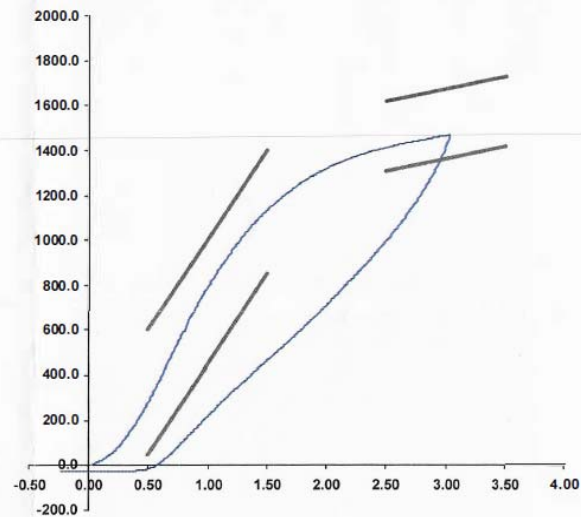
Preload Value (-N) 22.24

Crosshead Speed (mm / min) or Rate 12.7

Extension or Position Measured by XHD_100 (XHD100)

Notes:

Force (-N) vs Extension (-mm)



Operator 146

Part Number 180-4450

Template No 107 22-Dec-20

SACO Research

By: DC

Date: 12/22/20

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

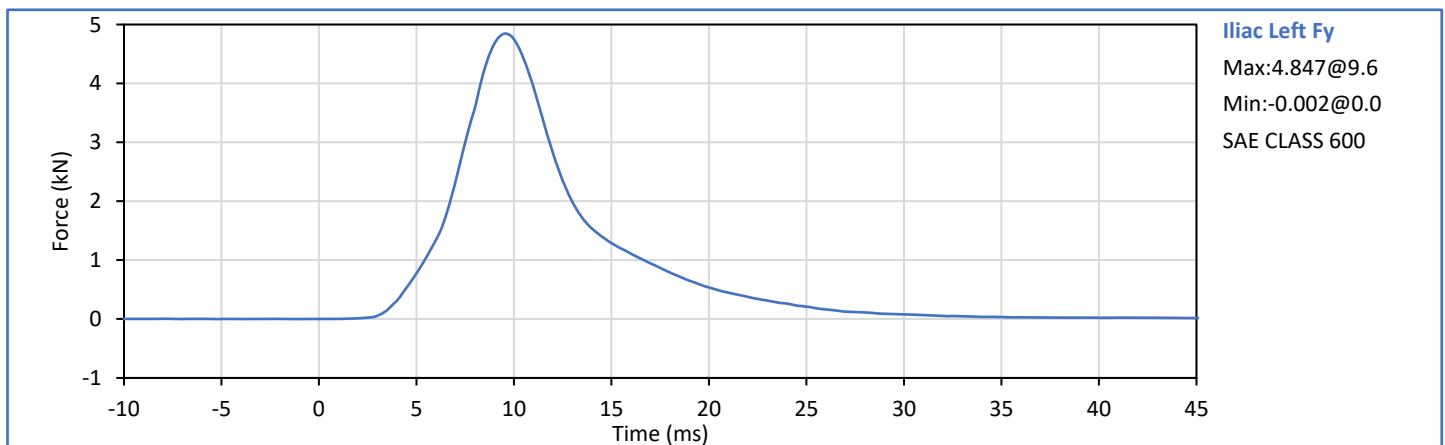
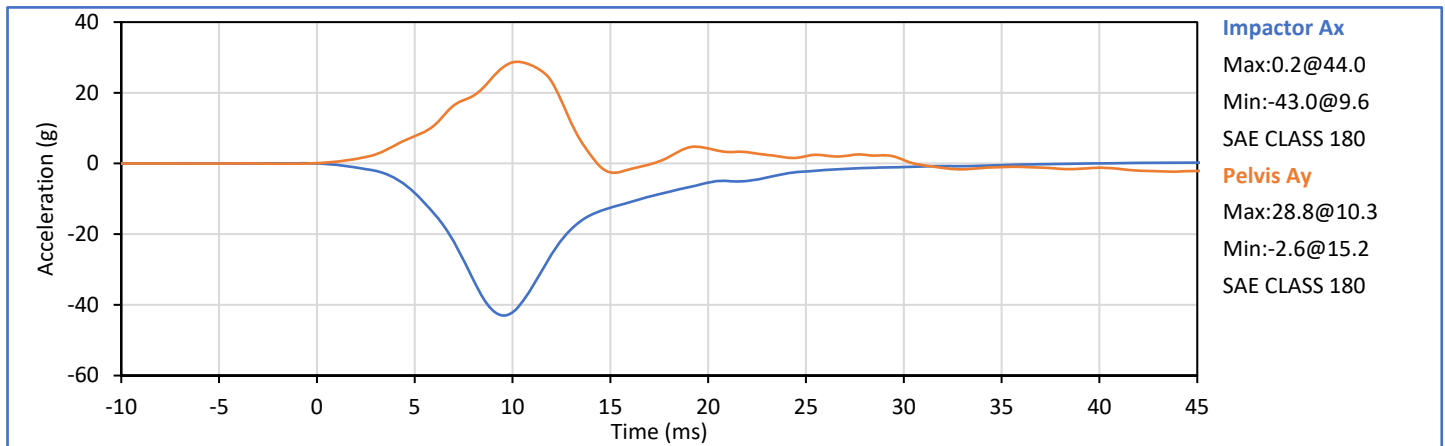
ATD Serial No.: 299

Test Date: 2024-07-18

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.4	Pass
Laboratory Relative Humidity	%	10	70	43	Pass
Impactor Velocity	m/s	4.20	4.40	4.36	Pass
Peak Iliac Fy	kN	4.10	5.10	4.85	Pass
Peak Pelvis Ay	g	28.0	39.0	34.7	Pass
Peak Impactor Ax	g	-45.0	-36.0	-43.0	Pass
Overall Test Results					Pass

Pelvis Plug S/N: 12228 *

* Plug is not impacted and remains certified



Technician:

G. Fuentes

G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

APPENDIX C
Post-Test ATD Qualification and Performance Verification
ES-2re 50th Male Side Impact ATD, Left Side Configuration
S/N: F037

ATD Serial No.: F037

Test Date: 2024-07-24

Tested Parameter	Units	Spec Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Relative Humidity	%	10	70	41	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	354	Pass
4 - Seat to Hip Joint (bolt center)	mm	97	103	102	Pass
5 - Sole to Seat, Sitting	mm	433	451	439	Pass
6 - Head Width	mm	152	158	156	Pass
7 - Shoulder/Arm Width	mm	461	479	476	Pass
8 - Thorax Width	mm	322	332	324	Pass
9 - Abdomen Width	mm	273	287	279	Pass
10 - Pelvis Lap Width	mm	359	373	365	Pass
11 - Head Depth	mm	196	206	198	Pass
12 - Thorax Depth	mm	262	272	270	Pass
13 - Abdomen Depth	mm	194	204	198	Pass
14 - Pelvis Depth	mm	235	245	242	Pass
15 - Back of Buttocks to Hip Joint (bolt Center)	mm	150	160	154	Pass
16 - Back of Buttocks to Front Knee	mm	597	615	603	Pass
				Overall Test Results	Pass

Technician:



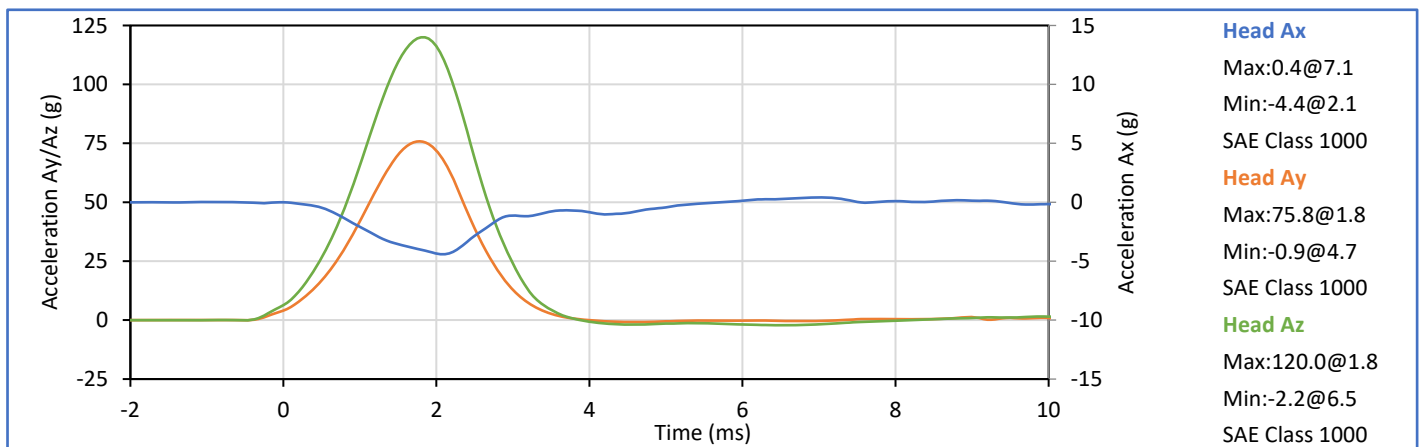
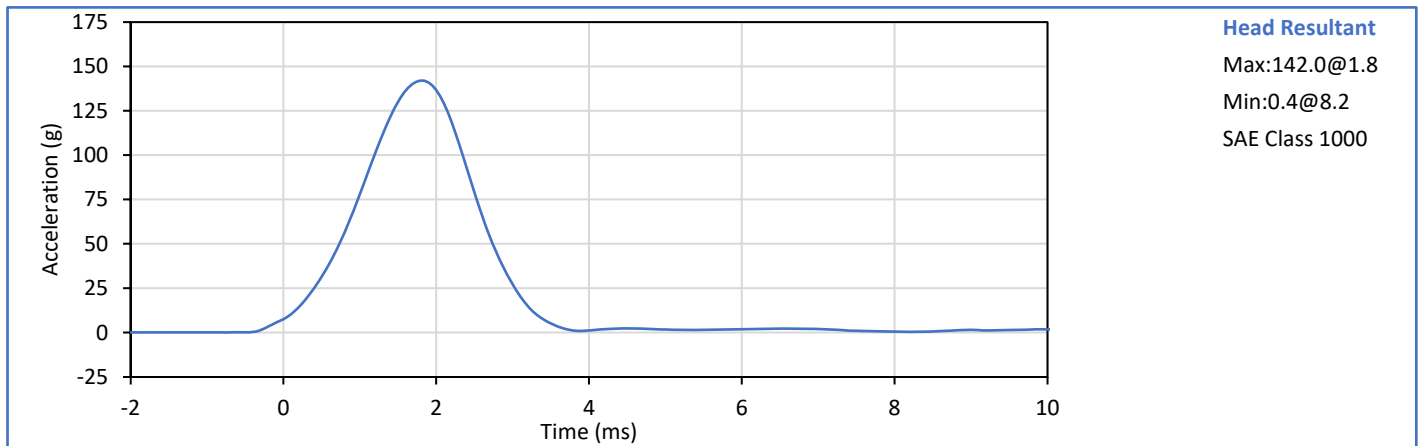
G. Fuentes

Approved By:



J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.4	Pass
Laboratory Relative Humidity	%	10	70	40	Pass
Peak Resultant Acceleration	g	125.0	155.0	142.0	Pass
Peak Head Ax	g	-15.0	15.0	0.4	Pass
Oscillations After Main Pulse	%	0.0	15.0	1.6	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
			Overall Test Results	Pass	



Technician:

G. Fuentes

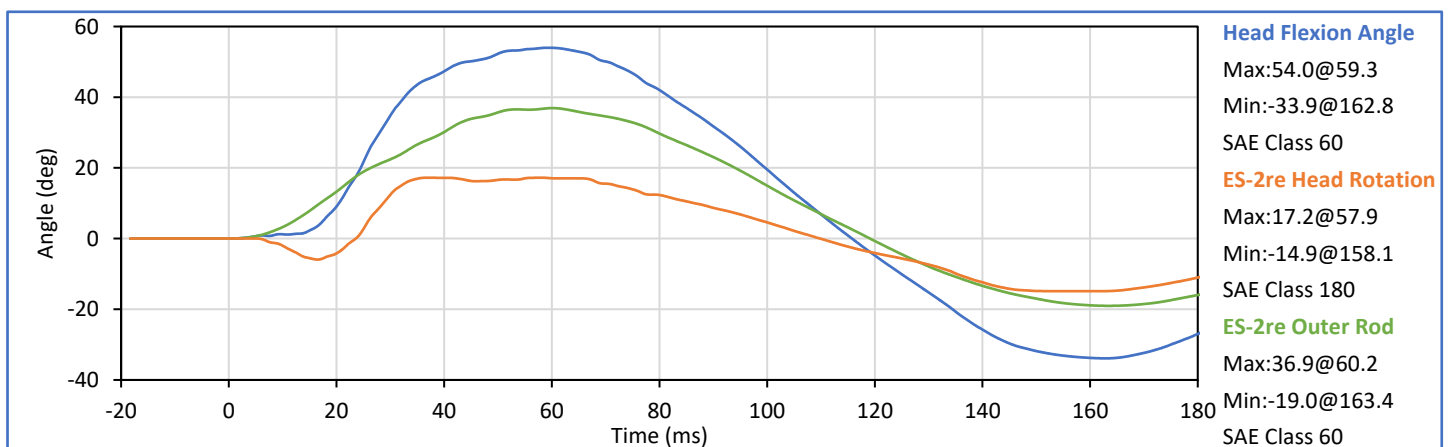
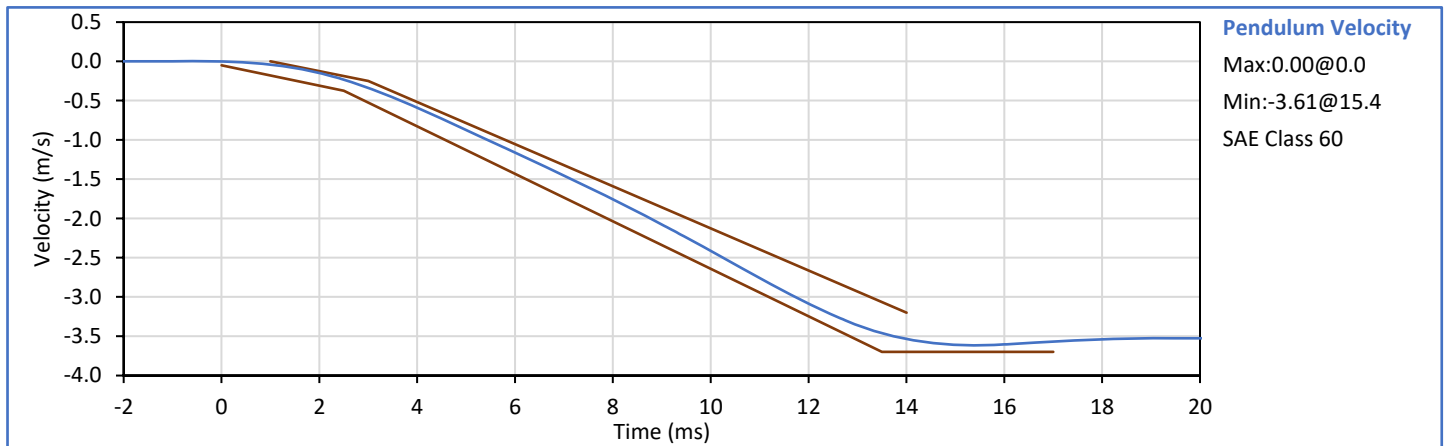
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.4	Pass
Laboratory Relative Humidity	%	10	70	46	Pass
Pendulum Velocity	m/s	3.30	3.50	3.39	Pass
Peak Headform Flexion	deg	49.0	59.0	54.0	Pass
Time of Peak Headform Flexion	ms	54.0	66.0	59.3	Pass
Flexion Decay (Peak to zero)	ms	53.0	88.0	56.5	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

G. Fuentes

Approved By:

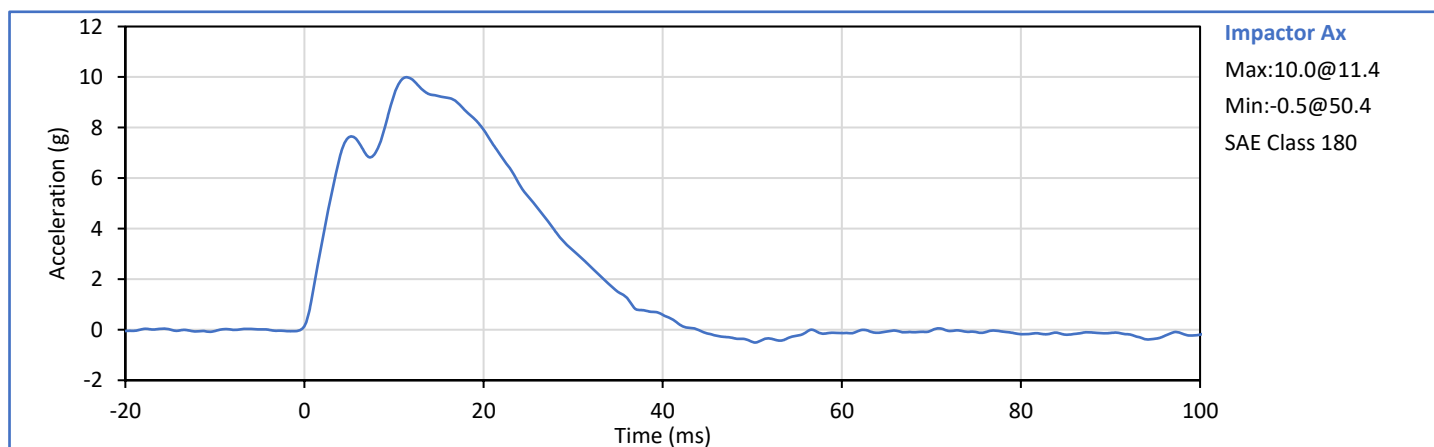
J. Hernandez

J. Hernandez

ATD Serial No.: F037

Test Date: 2024-07-29

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.3	Pass
Laboratory Relative Humidity	%	10	70	34	Pass
Impactor Velocity	m/s	4.20	4.40	4.34	Pass
Peak Impactor Ax	g	7.5	10.5	10.0	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

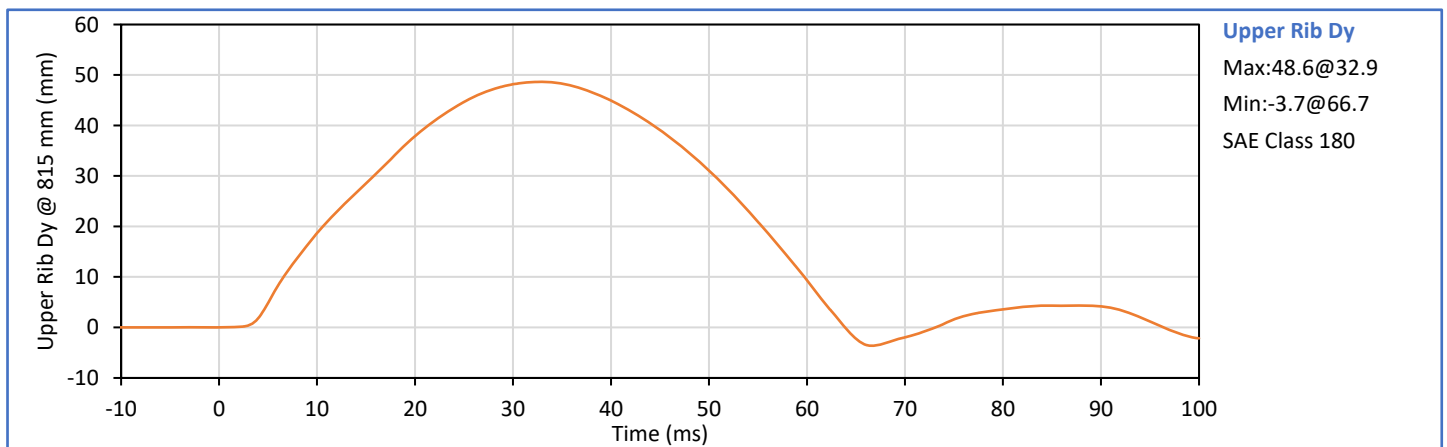
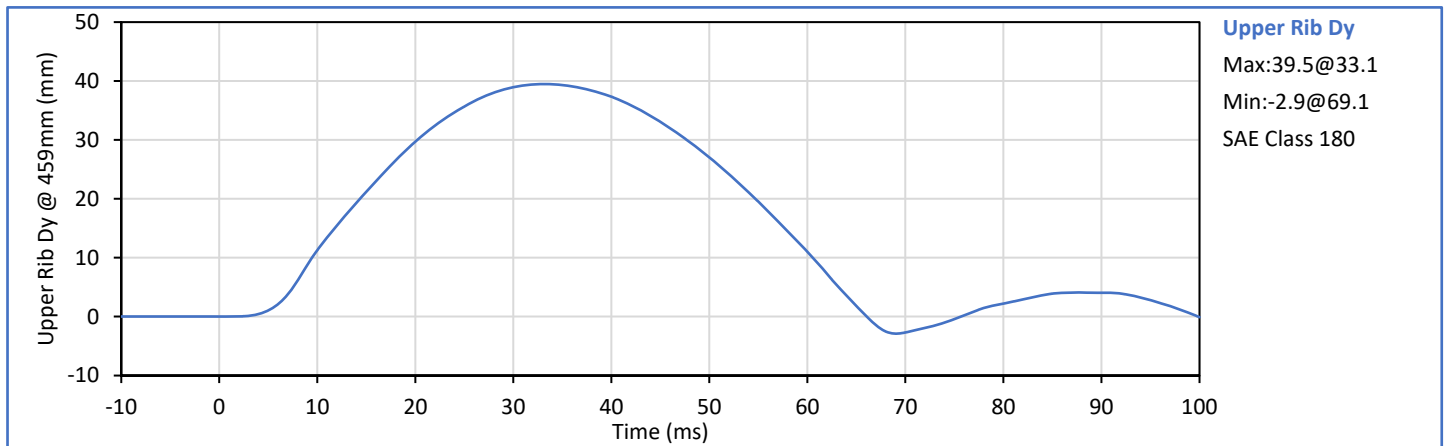
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	40	Pass
Upper Rib Dy @ 459mm	mm	36.0	40.0	39.5	Pass
Upper Rib Dy @ 815mm	mm	46.0	51.0	48.6	Pass
Overall Test Results				Pass	Pass



Technician:

G. Fuentes

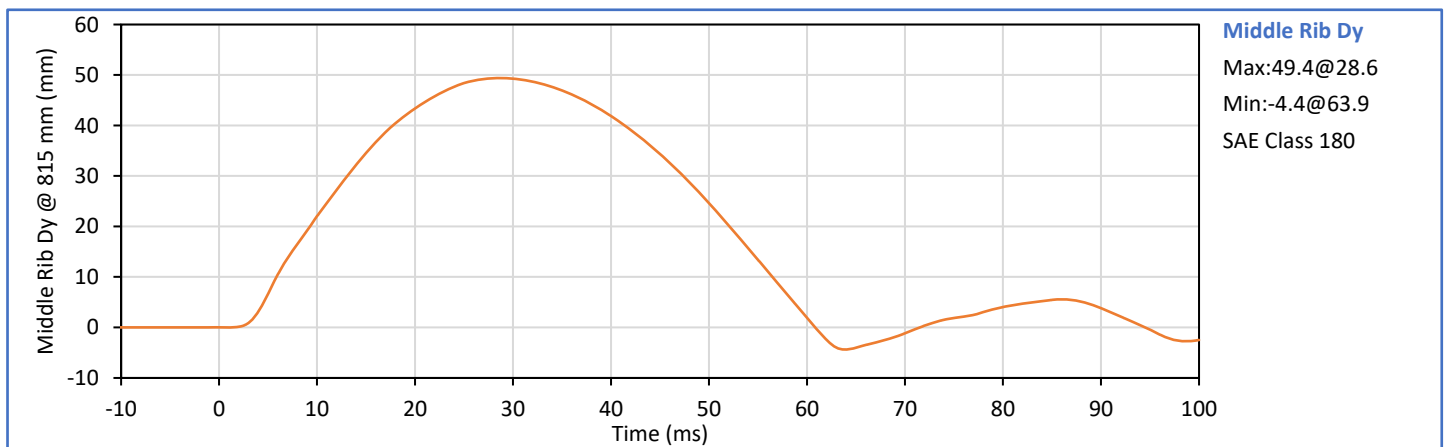
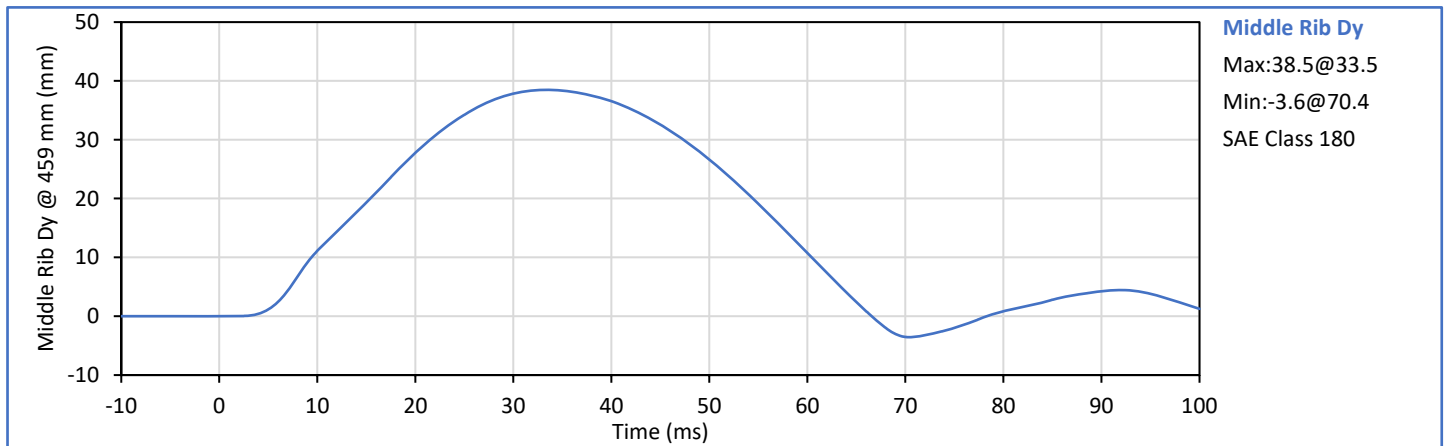
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Relative Humidity	%	10	70	40	Pass
Middle Rib Dy @ 459mm	mm	36.0	40.0	38.5	Pass
Middle Rib Dy @ 815mm	mm	46.0	51.0	49.4	Pass
Overall Test Results				Pass	Pass



Technician:

G. Fuentes

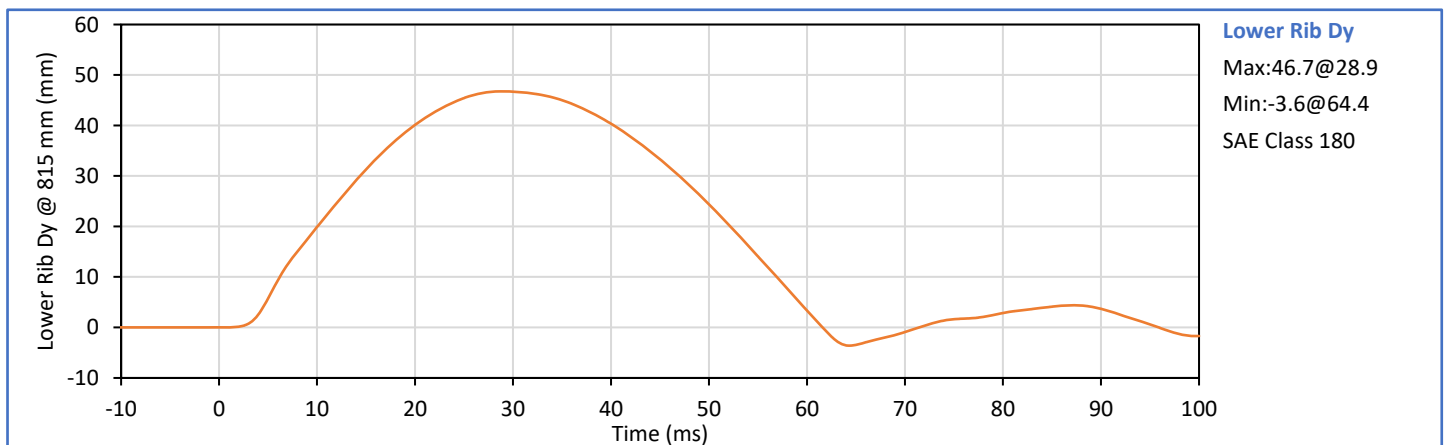
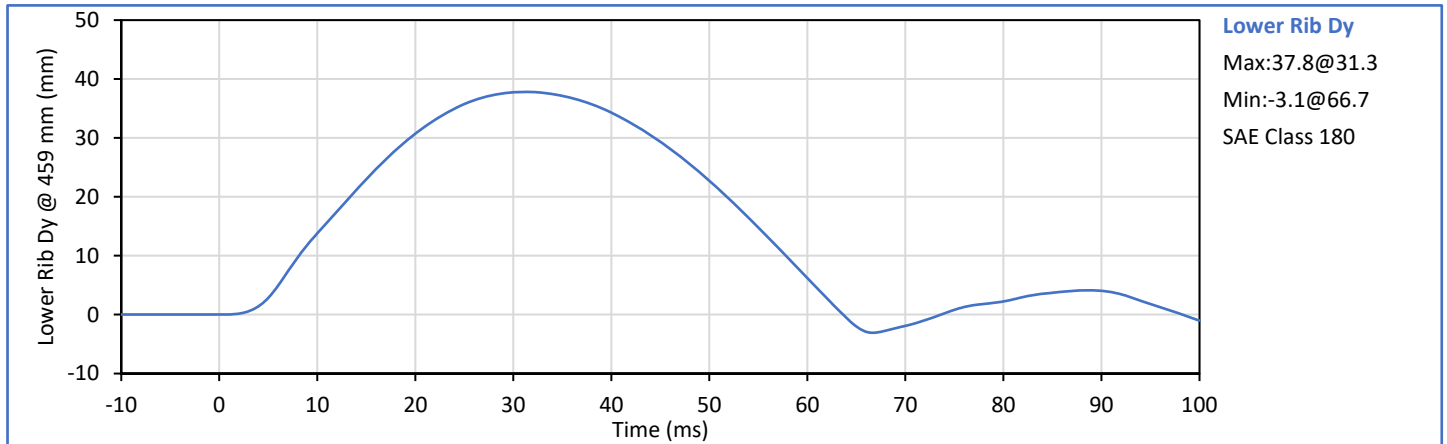
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

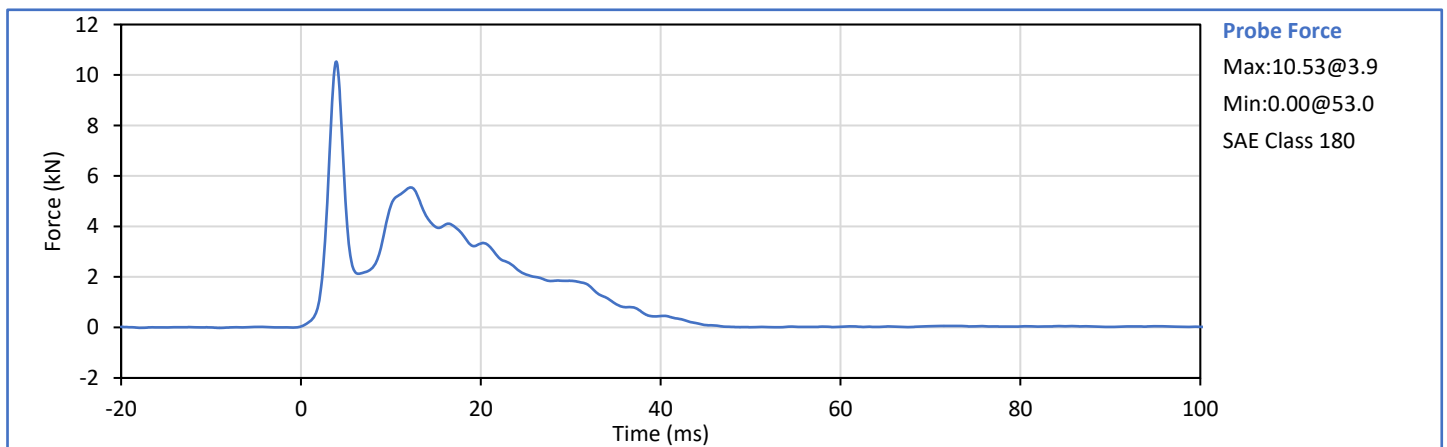
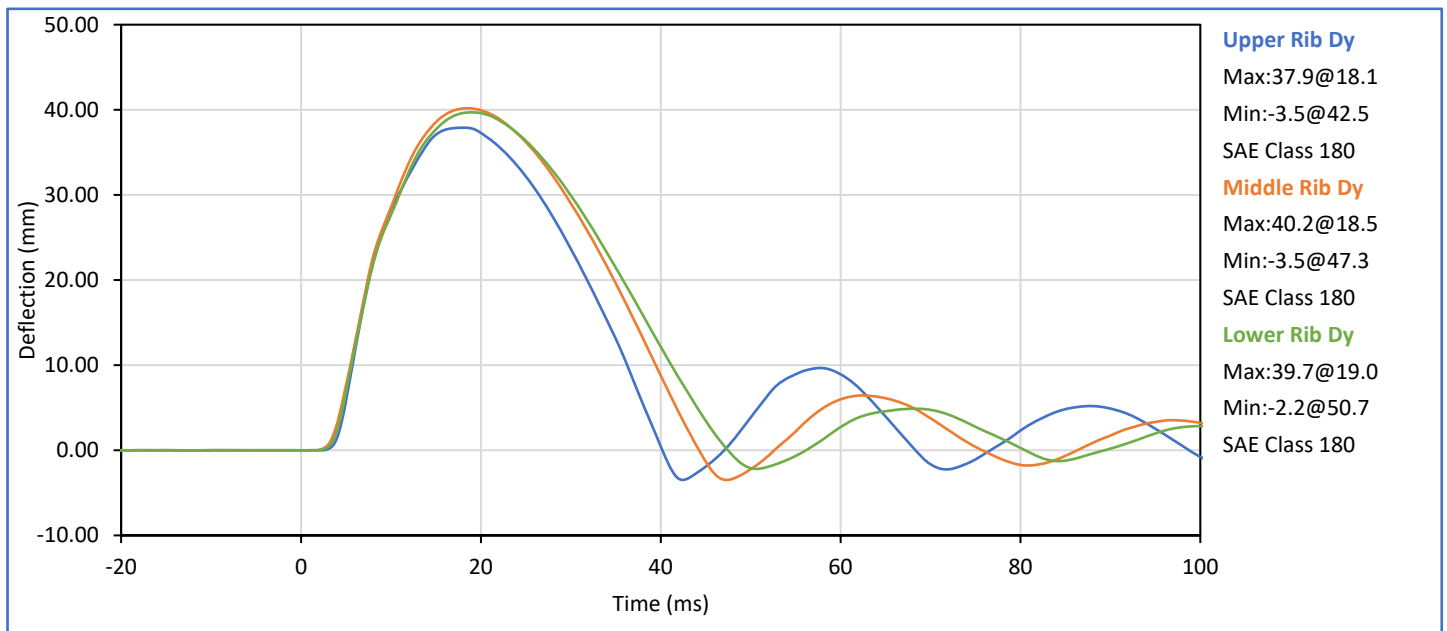
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.3	Pass
Laboratory Relative Humidity	%	10	70	40	Pass
Lower Rib Dy @ 459mm	mm	36.0	40.0	37.8	Pass
Lower Rib Dy @ 815mm	mm	46.0	51.0	46.7	Pass
Overall Test Results				Pass	Pass



Technician: Mill LLS III
G. Fuentes

Approved By: Santh
J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.6	Pass
Laboratory Relative Humidity	%	10	70	33	Pass
Impactor Velocity	m/s	5.40	5.60	5.48	Pass
Peak Upper Rib Dy	mm	34.0	41.0	37.9	Pass
Peak Middle Rib Dy	mm	37.0	45.0	40.2	Pass
Peak Lower Rib Dy	mm	37.0	44.0	39.7	Pass
Peak Impactor Force After 6 ms	kN	5.10	6.20	5.54	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

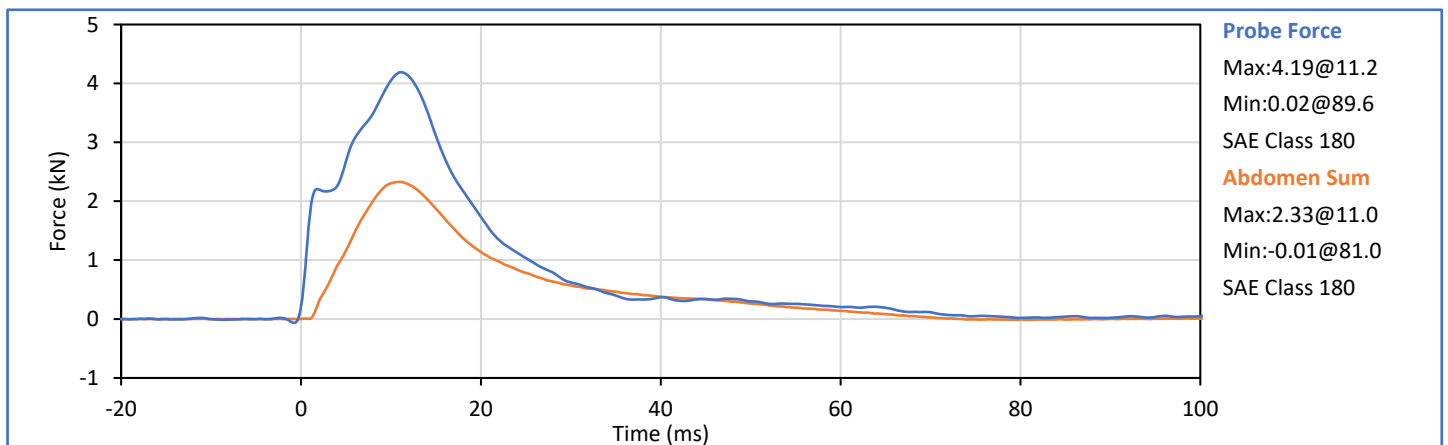
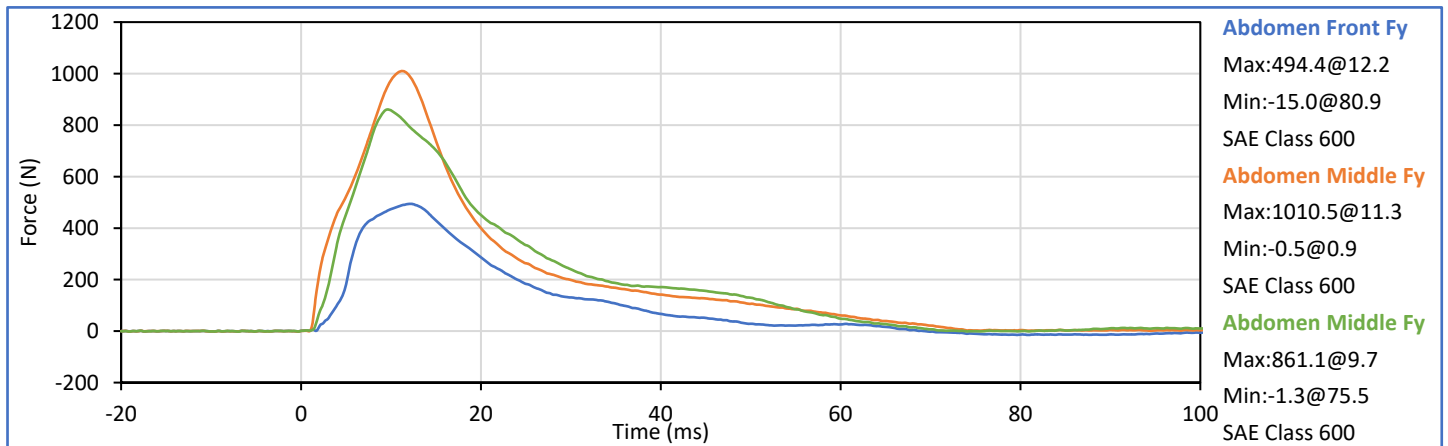
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.5	Pass
Laboratory Relative Humidity	%	10	70	33	Pass
Impactor Velocity	m/s	3.90	4.10	3.99	Pass
Peak Impactor Force	kN	4.00	4.80	4.19	Pass
Time of Peak Impactor Force	ms	10.6	13.0	11.2	Pass
Sum of Abdomen Forces	kN	2.20	2.70	2.33	Pass
Time of Peak Sum Abdomen Force	ms	10.0	12.3	11.0	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

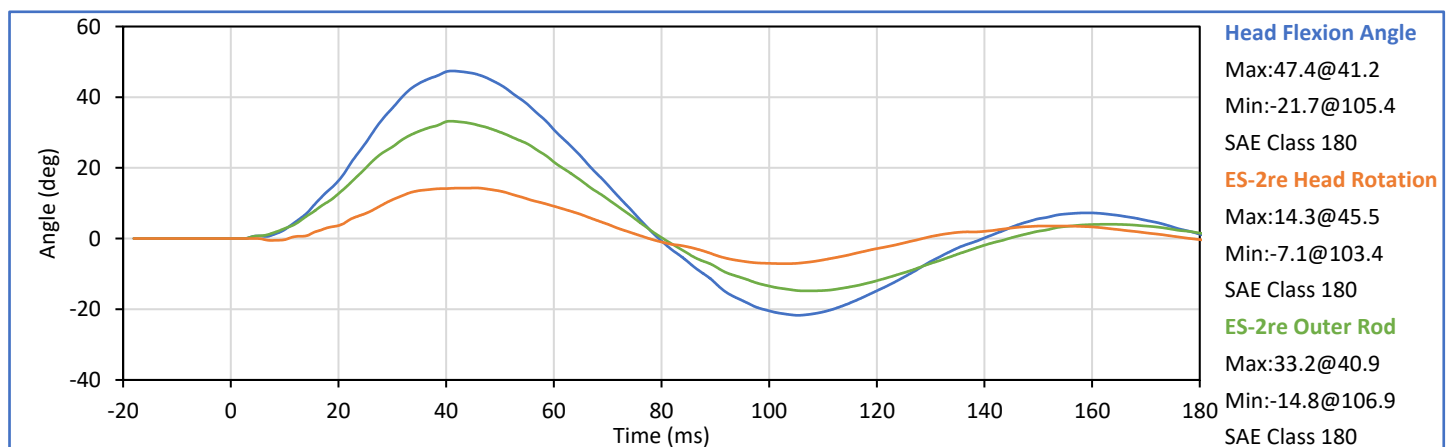
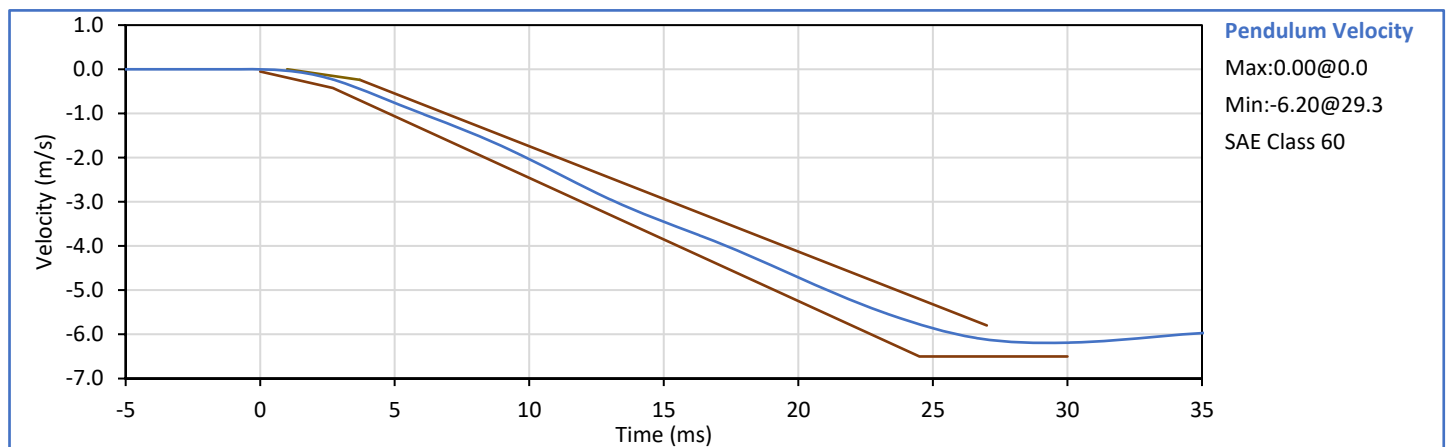
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.4	Pass
Laboratory Relative Humidity	%	10	70	47	Pass
Pendulum Velocity	m/s	5.95	6.15	6.02	Pass
Peak Headform Flexion	deg	45.0	55.0	47.4	Pass
Time of Peak Headform Flexion	ms	39.0	53.0	41.2	Pass
Flexion Decay (Peak to zero)	ms	37.0	57.0	38.3	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

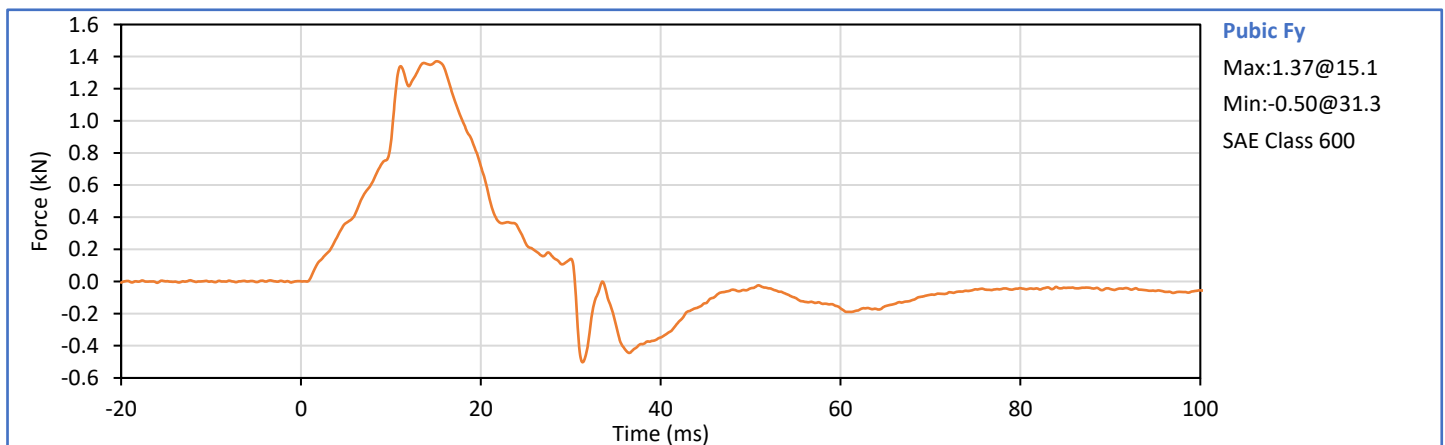
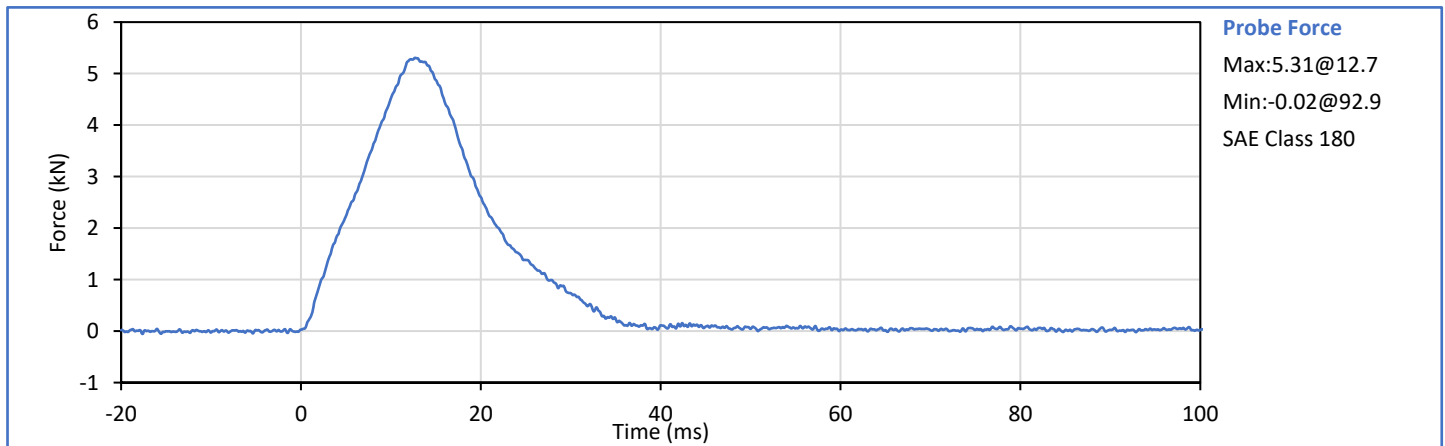
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.3	Pass
Laboratory Relative Humidity	%	10	70	33	Pass
Impactor Velocity	m/s	4.20	4.40	4.34	Pass
Peak Impactor Force	kN	4.70	5.40	5.31	Pass
Time of Peak Impactor Force	ms	11.8	16.1	12.7	Pass
Pubic Symphysis Fy	kN	1.23	1.59	1.37	Pass
Time of Peak Pubic Symphysis Fy	ms	12.2	17.0	15.1	Pass
Overall Test Results				Pass	Pass



Technician:

G. Fuentes

G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

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

ATD Serial No.: 299

Test Date: 2024-07-25

Tested Parameter	Units	Spec Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.6	Pass
Laboratory Relative Humidity	%	10	70	51	Pass
A - Sitting Height	mm	772	788	784	Pass
B - Shoulder Pivot Height	mm	437	453	450	Pass
C - Hpoint Height	mm	79	89	82	Pass
D - H Point From Seatback	mm	141	151	146	Pass
E - Shoulder Pivot From Backline	mm	97	107	103	Pass
F - Thigh Clearance	mm	119	135	123	Pass
G - Head Breadth	mm	140	148	147	Pass
H - Head Back From Backline	mm	40	46	43	Pass
I - Head Depth	mm	178	188	182	Pass
J - Head Circumference	mm	541	551	546	Pass
K - Buttock To Knee Length	mm	514	540	530	Pass
L - Popliteal Height	mm	343	369	353	Pass
K - Knee Pivot To Floor Height	mm	392	409	399	Pass
N - Buttock Popliteal Length	mm	416	442	437	Pass
O - Chest Depth W/O Jacket	mm	195	211	200	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	257	Pass
S - Knee Joint To Seatback	mm	477	493	486	Pass
V - Shoulder Width	mm	341	357	346	Pass
W - Foot Width	mm	78	94	89	Pass
Y - Chest Circumference W/Jacket	mm	851	881	861	Pass
Z - Waist Circumference	mm	761	791	777	Pass
				Overall Test Results	Pass

Technician:



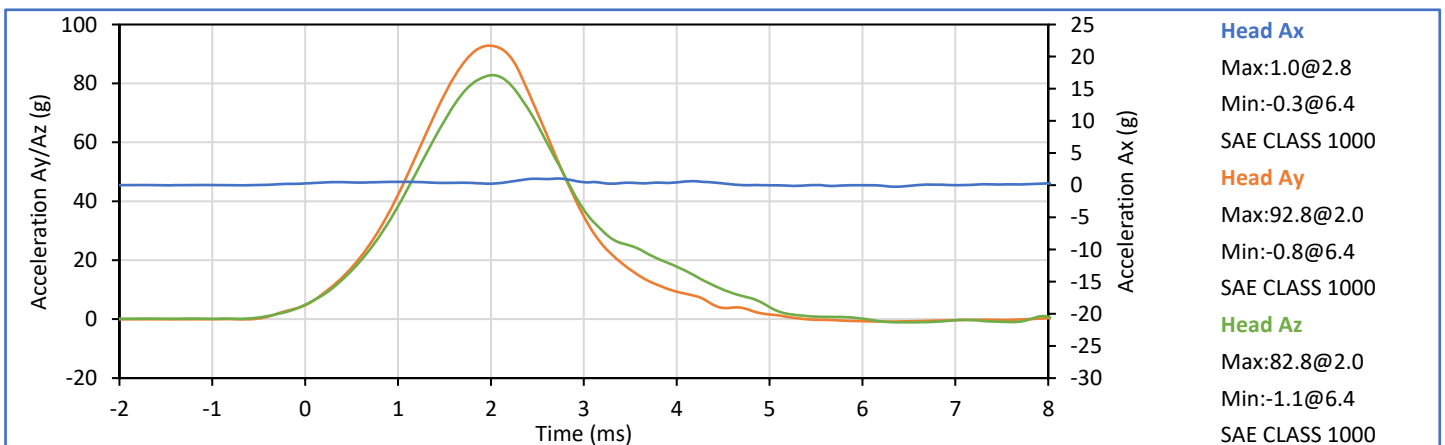
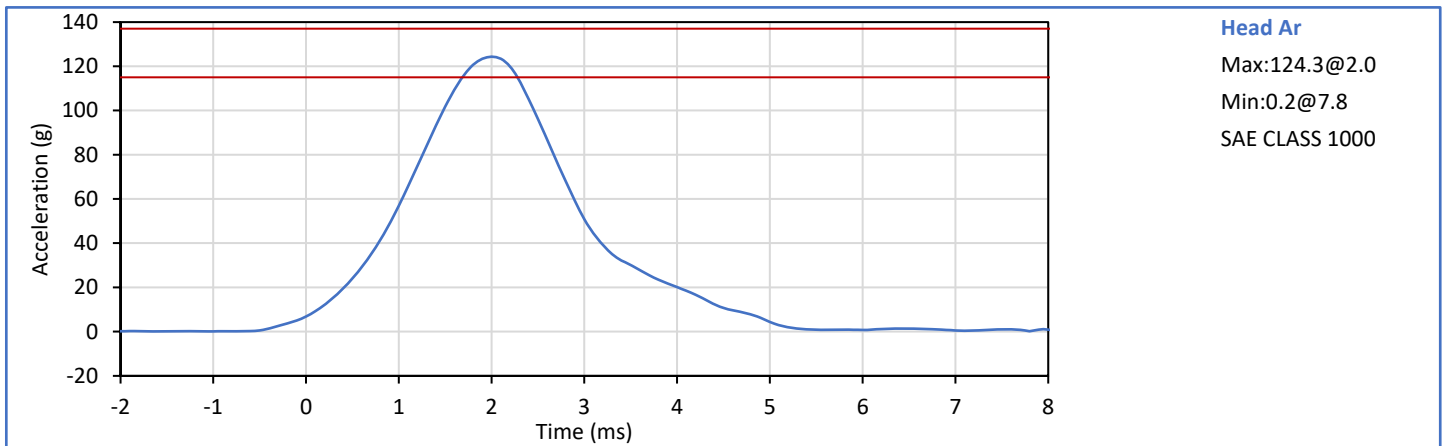
G. Fuentes

Approved By:



J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.0	Pass
Laboratory Relative Humidity	%	10	70	51	Pass
Peak Resultant Acceleration	g	115.0	137.0	124.3	Pass
Peak Head Ax	g	-15.0	15.0	1.0	Pass
Oscillations After Main Pulse	%	0.0	15.0	1.1	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
			Overall Test Results	Pass	



Technician:

G. Fuentes

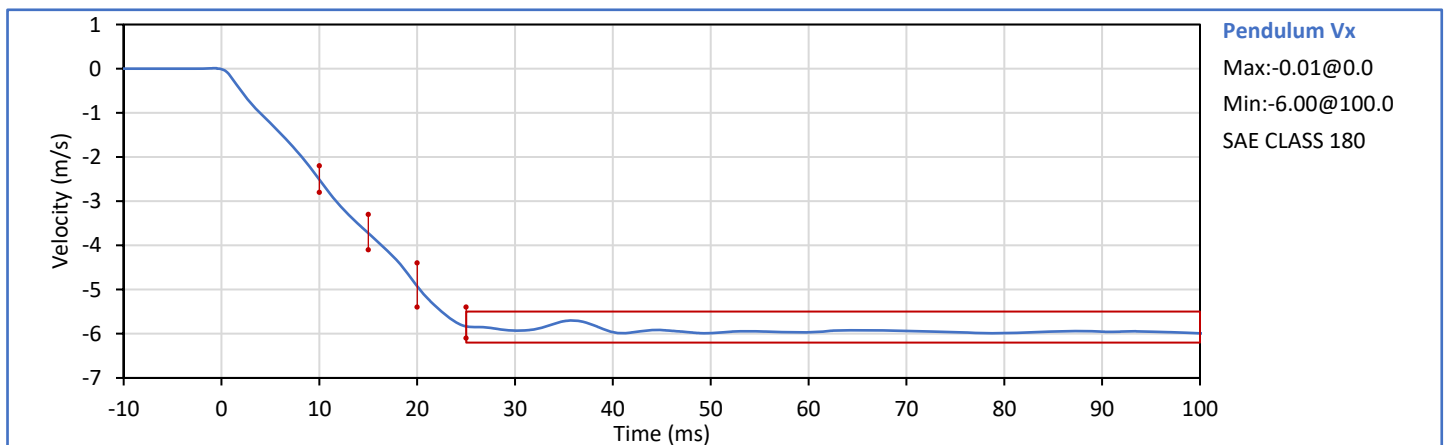
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.3	Pass
Laboratory Relative Humidity	%	10	70	49	Pass
Pendulum Velocity	m/s	5.51	5.63	5.56	Pass
Pendulum Decel at 10 ms	m/s	-2.80	-2.20	-2.51	Pass
Pendulum Decel at 15 ms	m/s	-4.10	-3.30	-3.72	Pass
Pendulum Decel at 20 ms	m/s	-5.40	-4.40	-4.93	Pass
Pendulum Decel at 25 ms	m/s	-6.10	-5.40	-5.84	Pass
Pendulum Decel from 25-100 ms	m/s	-6.20	-5.50	-6/-5.7	Pass
Peak "D" Plane Rotation	deg	-81.0	-71.0	-77.3	Pass
Time of Peak "D" Plane Rotation	ms	50.0	70.0	57.8	Pass
Peak Occ. Condyle Moment	Nm	36.0	44.0	42.8	Pass
Time of Moment Decay to 0 Nm	ms	102.0	126.0	109.1	Pass
				Overall Test Results	Pass



Technician:

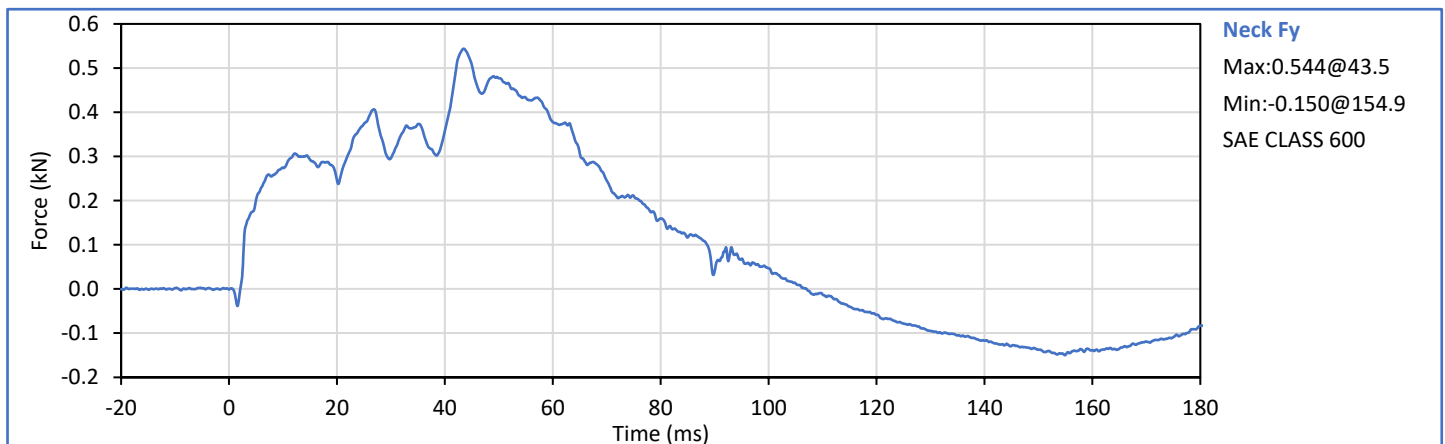
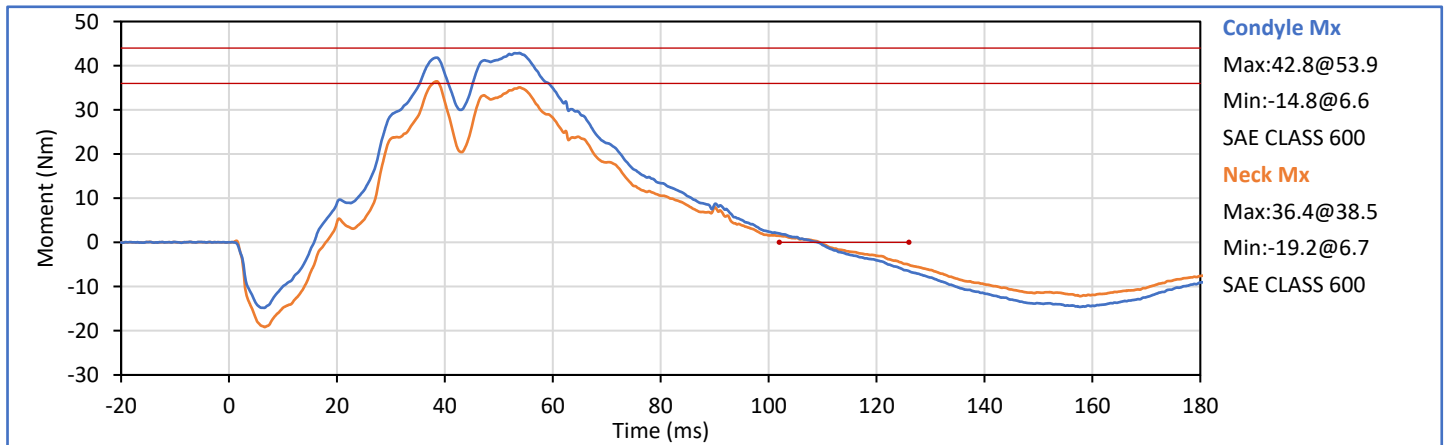
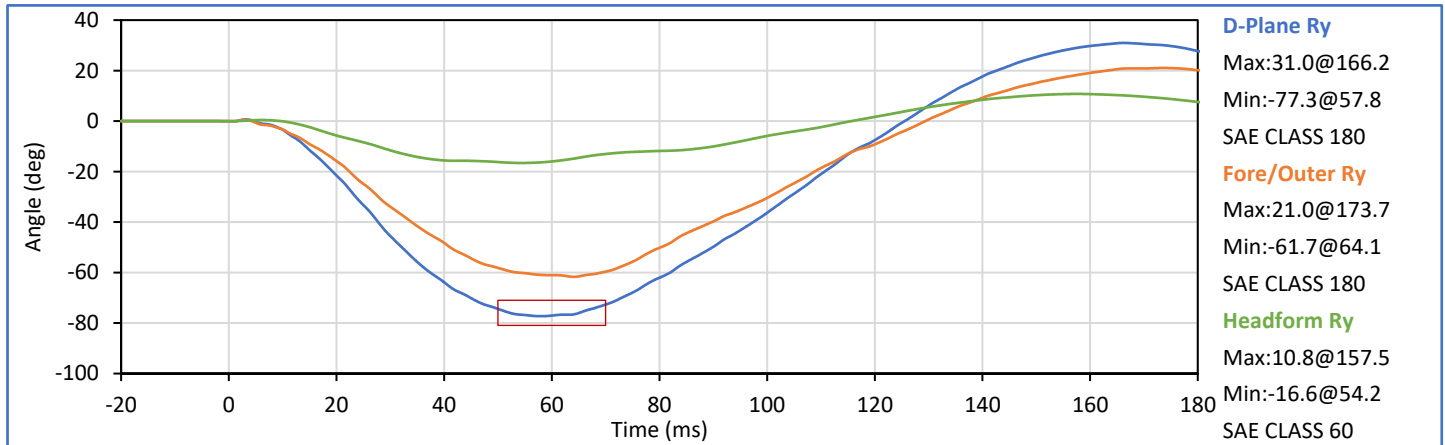
G. Fuentes

G. Fuentes

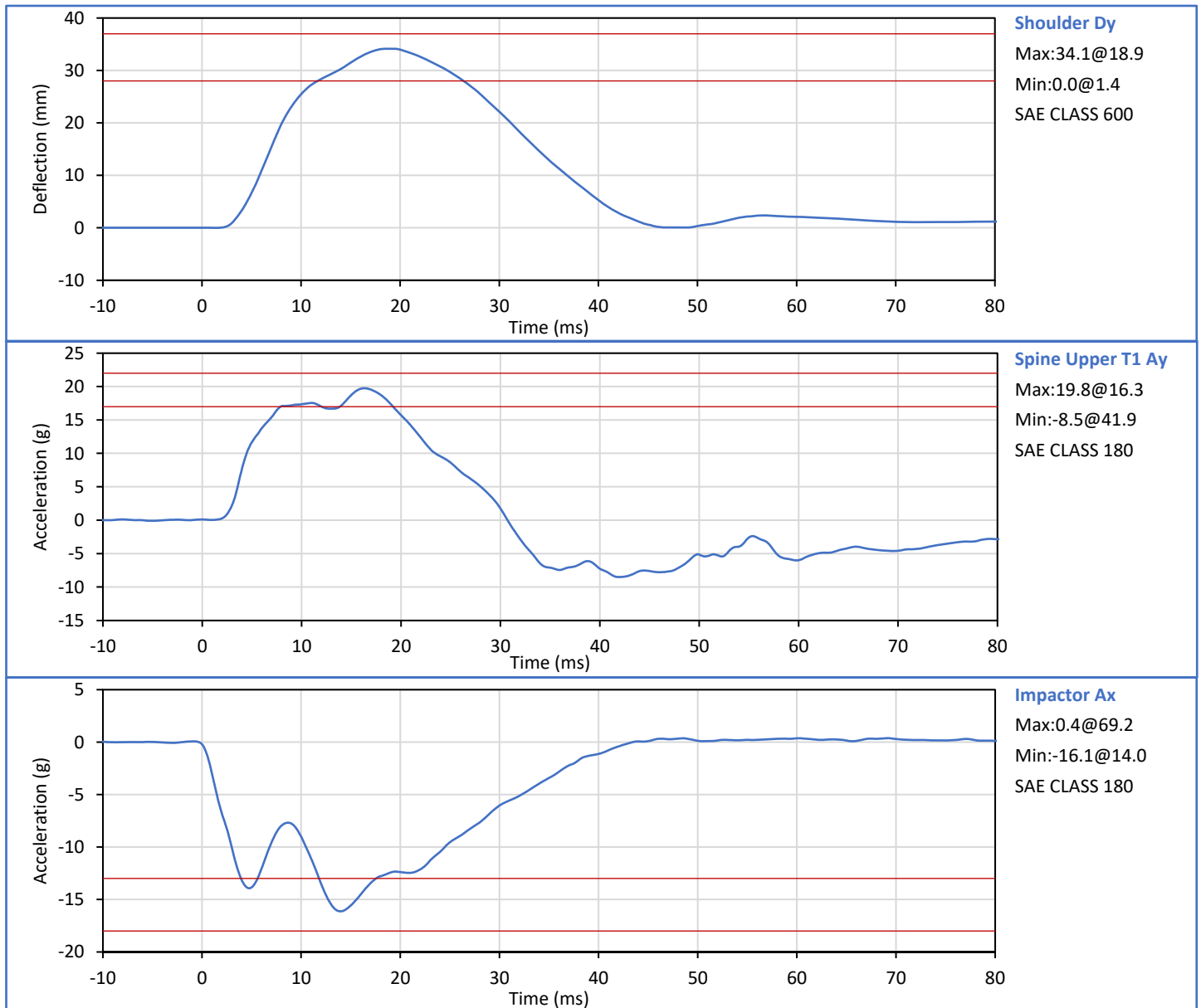
Approved By:

J. Hernandez

J. Hernandez



Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.3	Pass
Laboratory Relative Humidity	%	10	70	48	Pass
Impactor Velocity	m/s	4.20	4.40	4.37	Pass
Peak Shoulder Dy	mm	28.0	37.0	34.1	Pass
Peak Upper Spine (T1) Ay	g	17.0	22.0	19.8	Pass
Peak Impactor Ax	g	-18.0	-13.0	-16.1	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

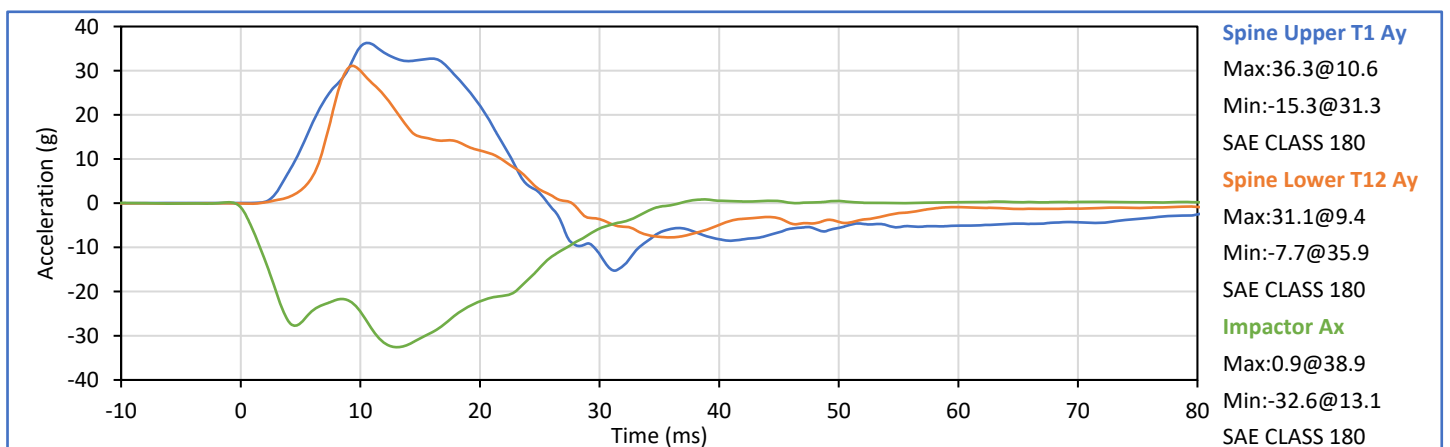
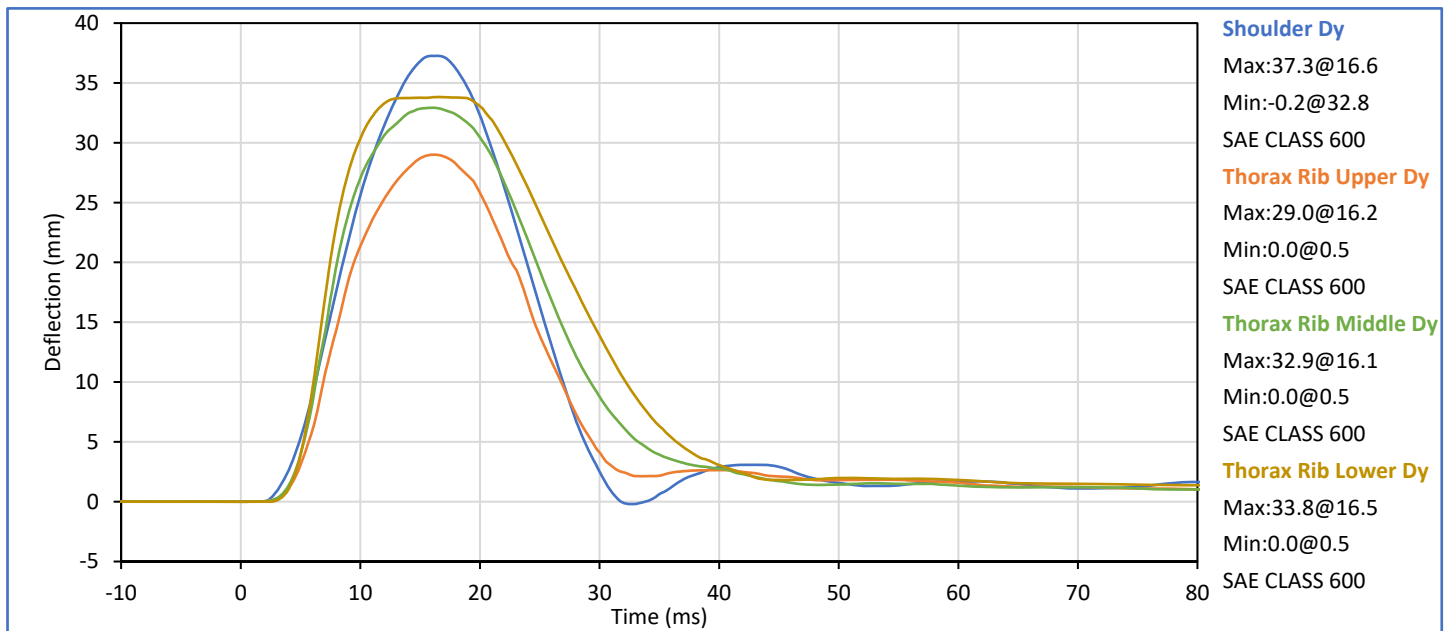
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.5	Pass
Laboratory Relative Humidity	%	10	70	48	Pass
Impactor Velocity	m/s	6.60	6.80	6.65	Pass
Peak Shoulder Dy	mm	31.0	40.0	37.3	Pass
Peak Upper Rib Dy	mm	25.0	32.0	29.0	Pass
Peak Middle Rib Dy	mm	30.0	36.0	32.9	Pass
Peak Lower Rib Dy	mm	32.0	38.0	33.8	Pass
Peak Upper Spine (T1) Ay	g	34.0	43.0	36.3	Pass
Peak Lower Spine (T12) Ay	g	29.0	37.0	31.1	Pass
Peak Impactor Ax	g	-36.0	-30.0	-32.6	Pass
Overall Test Results				Pass	Pass



Technician:

G. Fuentes

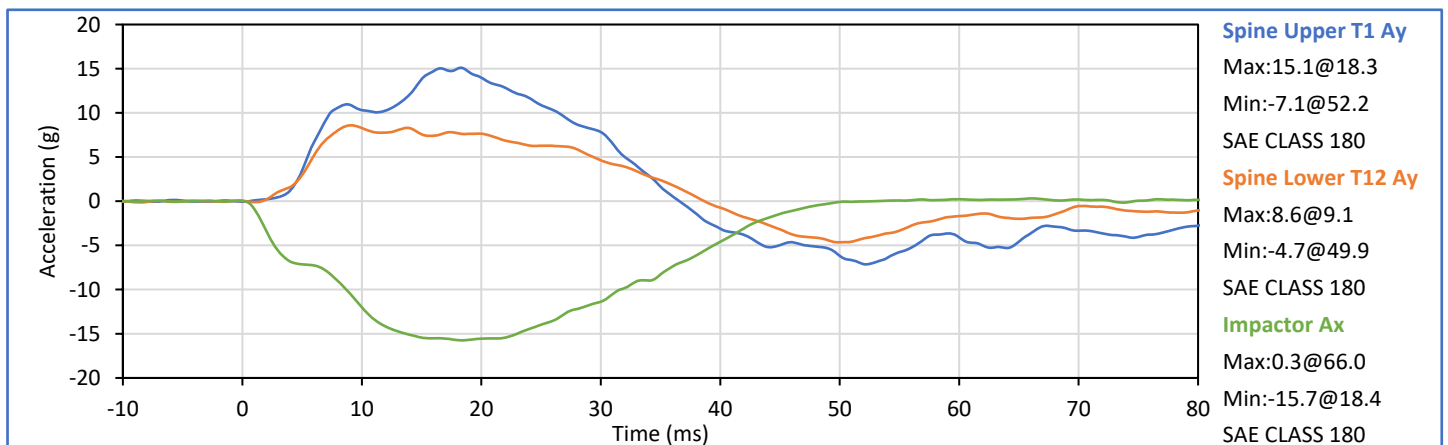
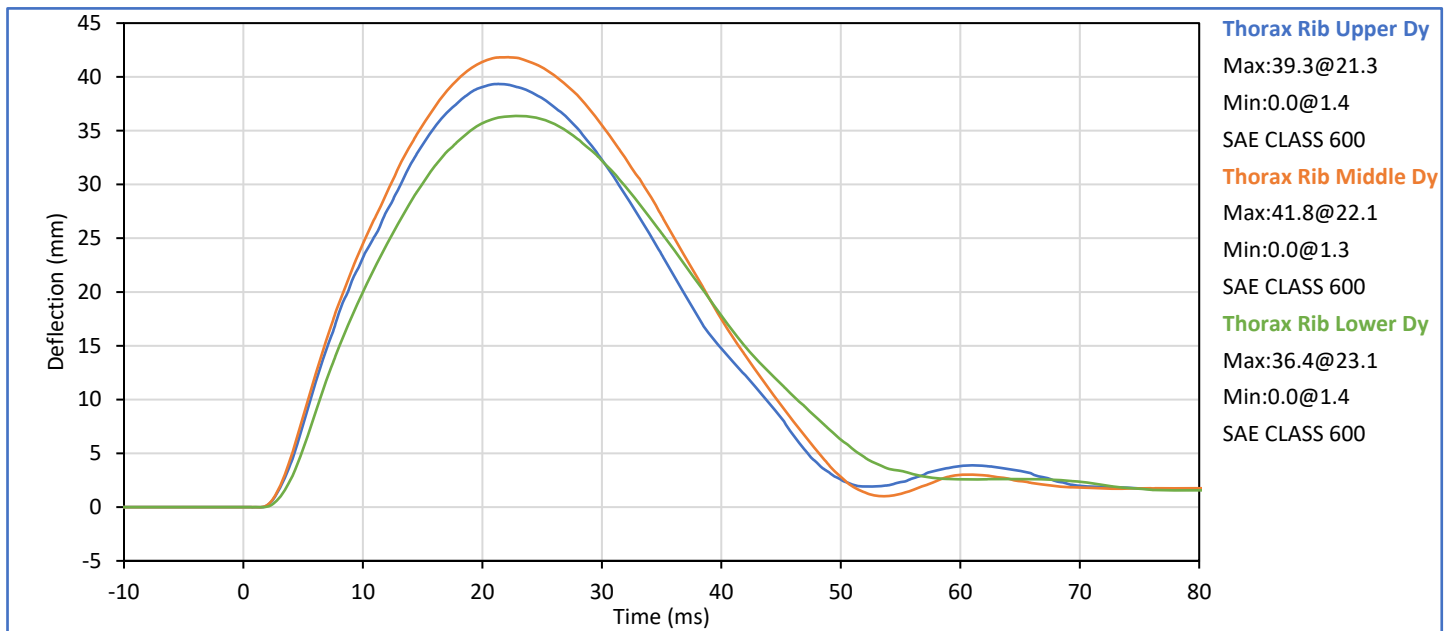
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	20.9	Pass
Laboratory Relative Humidity	%	10	70	47	Pass
Impactor Velocity	m/s	4.20	4.40	4.35	Pass
Peak Thorax Rib Upper Dy	mm	32.0	40.0	39.3	Pass
Peak Thorax Rib Middle Dy	mm	39.0	45.0	41.8	Pass
Peak Thorax Rib Lower Dy	mm	35.0	43.0	36.4	Pass
Peak Spine Upper T1 Ay	g	13.0	17.0	15.1	Pass
Peak Spine Lower T12 Ay	g	7.0	11.0	8.6	Pass
Peak Impactor Ax	g	-18.0	-14.0	-15.7	Pass
Overall Test Results				Pass	Pass



Technician:

G. Fuentes

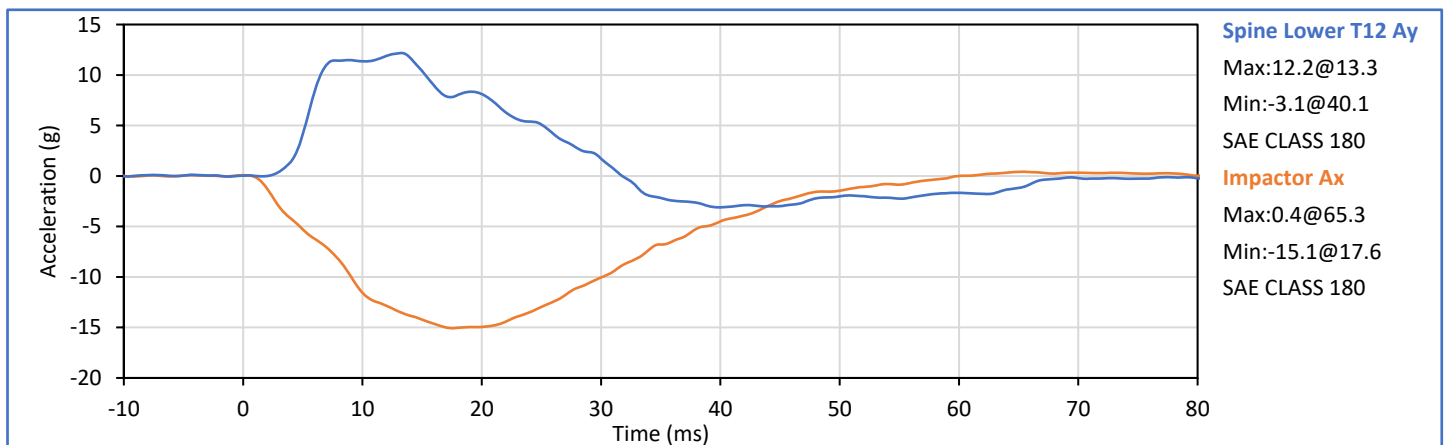
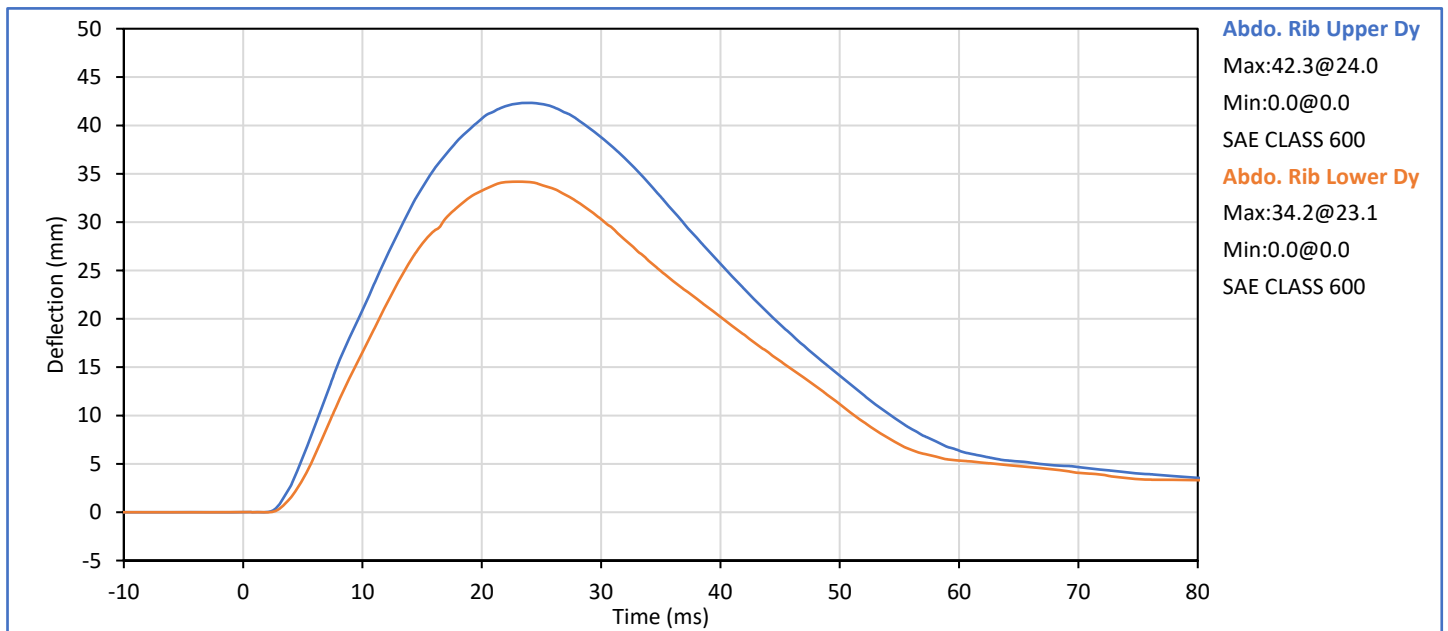
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	20.9	Pass
Laboratory Relative Humidity	%	10	70	47	Pass
Impactor Velocity	m/s	4.20	4.40	4.37	Pass
Peak Upper Abdomen Rib Dy	mm	36.0	47.0	42.3	Pass
Peak Lower Abdomen Rib Dy	mm	33.0	44.0	34.2	Pass
Peak Lower Spine T12 Ay	mm	9.0	14.0	12.2	Pass
Peak Impactor Ax	g	-16.0	-12.0	-15.1	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

G. Fuentes

Approved By:

J. Hernandez

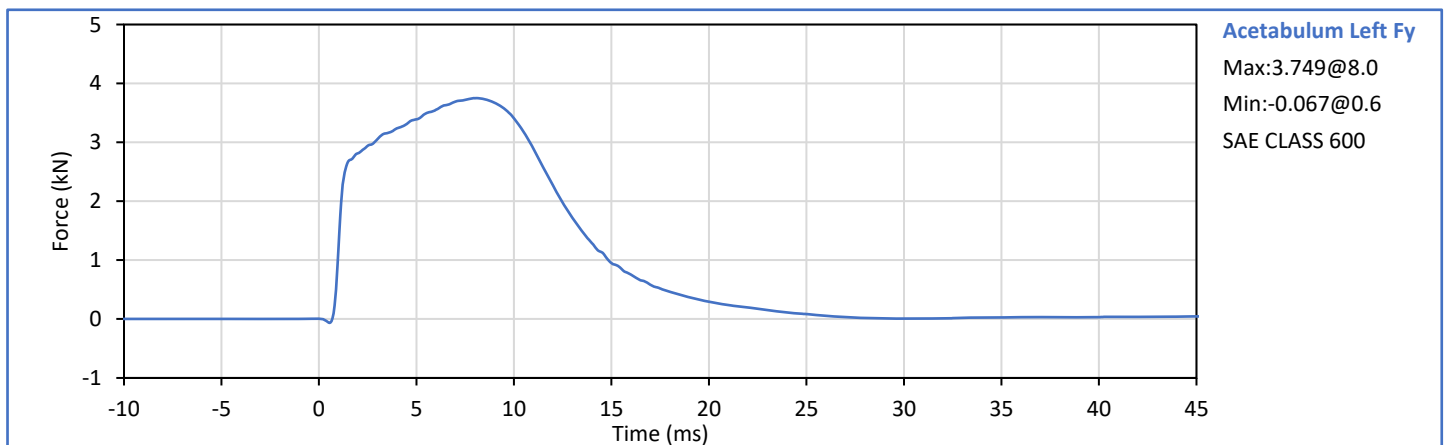
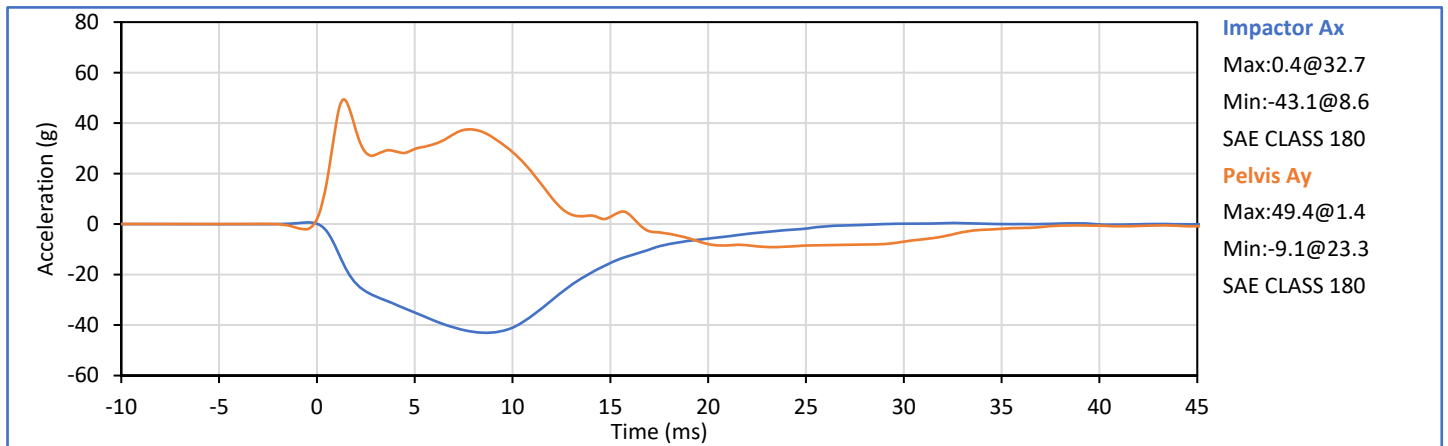
J. Hernandez

ATD Serial No.: 299

Test Date: 2024-07-27

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Relative Humidity	%	10	70	49	Pass
Impactor Velocity	m/s	6.60	6.80	6.72	Pass
Peak Acetabulum Fy	kN	3.60	4.30	3.75	Pass
Pelvis Ay after 6ms	g	34.0	42.0	37.5	Pass
Peak Impactor Ax	g	-47.0	-38.0	-43.1	Pass
Overall Test Results					Pass

Pelvis Plug S/N: 14728



Technician:

G. Fuentes

G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

ATD Serial No.: 299

Test Date: 2024-07-27

Pelvis Plug S/N: 14728



SID-IIs Pelvis Plug Certification Test

Plug S/N 14728

Test Number 16694

Report Number 16740

Test Date 12/23/2020 9:54:55 AM

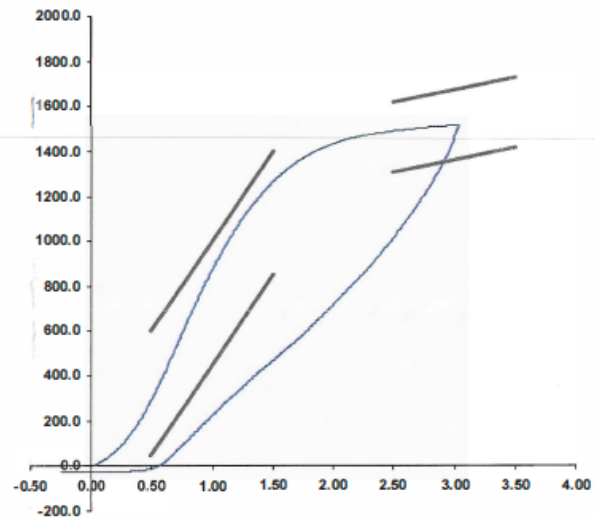
	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	297.37	50.00	600.00
Force @ 1.5 mm (N)	1,264.08	850.00	1,400.00
Force @ 2.5 mm (N)	1,489.71	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,515.61	1,361.00	1,673.00

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-Dec-20
SACO Research

By: DC Date: 12/23/20

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

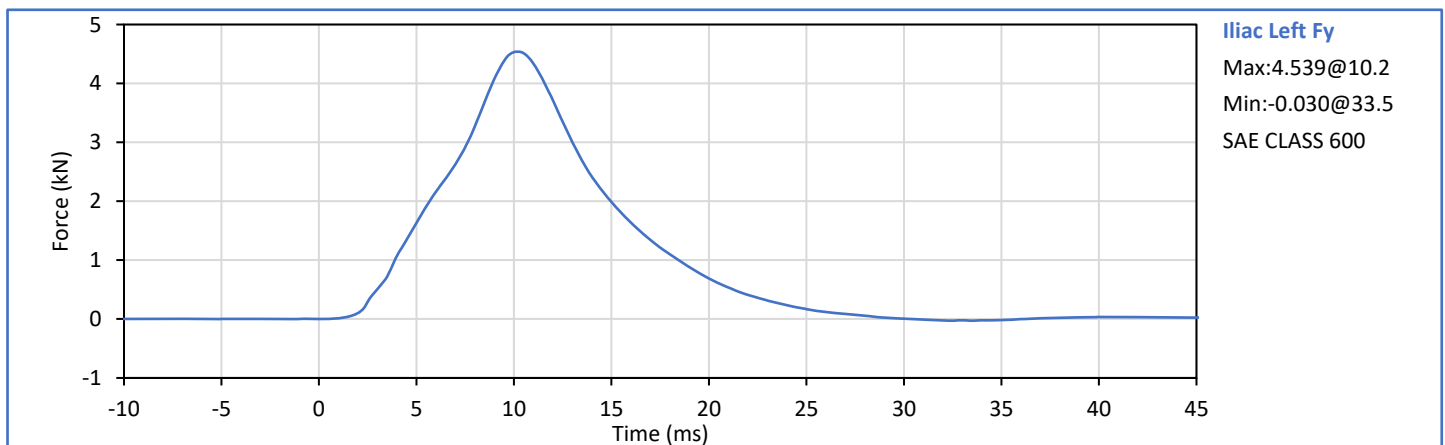
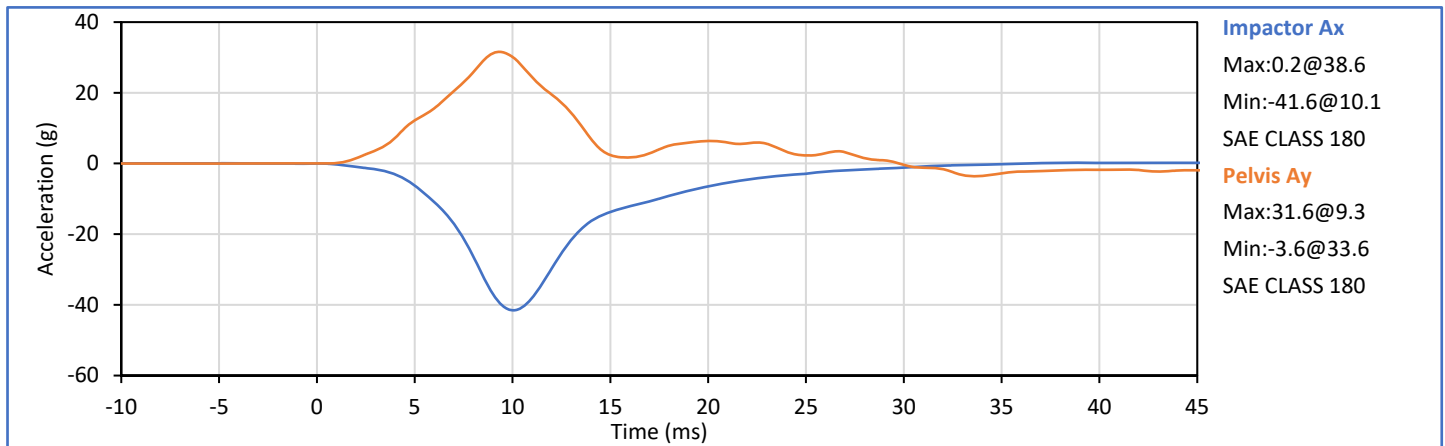
ATD Serial No.: 299

Test Date: 2024-07-26

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.4	Pass
Laboratory Relative Humidity	%	10	70	43	Pass
Impactor Velocity	m/s	4.20	4.40	4.34	Pass
Peak Iliac Fy	kN	4.10	5.10	4.54	Pass
Peak Pelvis Ay	g	28.0	39.0	34.7	Pass
Peak Impactor Ax	g	-45.0	-36.0	-41.6	Pass
Overall Test Results					Pass

Pelvis Plug S/N: 12228 *

* Plug is not impacted and remains certified



Technician:

G. Fuentes

G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 - Driver ATD Instrumentation

Sensor Location	Sensor S\N	Mfr	Model	Cal Date
Head Acceleration X Primary	P58858	Endevco	7264C-2k	2024-06-04
Head Acceleration Y Primary	P58865	Endevco	7264C-2k	2024-06-04
Head Acceleration Z Primary	P58867	Endevco	7264C-2k	2024-06-04
Head Acceleration X Redundant	P58859	Endevco	7264C-2k	2024-06-04
Head Acceleration Y Redundant	P58866	Endevco	7264C-2k	2024-06-04
Head Acceleration Z Redundant	P58873	Endevco	7264C-2k	2024-06-04
Upper Thorax Rib Deflection Y	209 (ES-2 Rib)	Honeywell	F38000203	2024-02-15
Middle Thorax Rib Deflection Y	210 (ES-2 Rib)	Honeywell	F38000203	2024-02-15
Lower Thorax Rib Deflection Y	207 (ES-2 Rib)	Honeywell	F38000203	2024-02-15
Anterior Abdominal Force Y	1504 Fy	R.A. Denton	2631J	2024-05-28
Middle Abdominal Force Y	1505 Fy	R.A. Denton	2631J	2024-05-28
Posterior Abdominal Force Y	1506 Fy	R.A. Denton	2631J	2024-05-28
Lower Spine T12 Acceleration X	P63856	Endevco	7264C-2k	2024-06-04
Lower Spine T12 Acceleration Y	P50063	Endevco	7264C-2k	2024-06-04
Lower Spine T12 Acceleration Z	P51880	Endevco	7264C-2k	2024-06-04
Pubic Symphysis Force Y	DG6834 Fy	FTSS	IF-556	2024-05-24

Table 2 - Left Rear Passenger ATD Instrumentation

Sensor Location	Sensor S\N	Mfr	Model	Cal Date
Head Acceleration X Primary	P51929	Endevco	7264C-2k	2024-06-05
Head Acceleration Y Primary	P50086	Endevco	7264C-2k	2024-06-05
Head Acceleration Z Primary	P51931	Endevco	7264C-2k	2024-06-05
Head Acceleration X Redundant	P68604	Endevco	7264C-2k	2024-06-05
Head Acceleration Y Redundant	P51934	Endevco	7264C-2k	2024-06-05
Head Acceleration Z Redundant	P58736	Endevco	7264C-2k	2024-06-05
Head Rotation Rate X	ARS11283	DTS	ARS PRO-18k (2kHz)	2023-11-15
Head Rotation Rate Y	ARS14935	DTS	ARS PRO-18k (2kHz)	2023-11-15
Head Rotation Rate Z	ARS4062	DTS	ARS PRO-18k (2kHz)	2023-11-15
Upper Thorax Rib Deflection Y	1143	Servo	08TCI-3725	2024-06-05
Middle Thorax Rib Deflection Y	1075	Servo	08TCI-3725	2024-06-05
Lower Thorax Rib Deflection Y	1213	Servo	08TCI-3725	2024-06-05
Upper Abdomen Rib Deflection Y	1218	Servo	08TCI-3725	2024-06-05
Lower Abdomen Rib Deflection Y	1177	Servo	08TCI-3725	2024-06-05
Lower Spine T12 Acceleration X	P58761	Endevco	7264C-2k	2024-06-06
Lower Spine T12 Acceleration Y	P50077	Endevco	7264C-2k	2024-06-06
Lower Spine T12 Acceleration Z	P58795	Endevco	7264C-2k	2024-06-06
Iliac Wing Impact Side Force Y	278 (Iliac)	R.A. Denton	3228J	2024-05-10
Acetabulum Impact Side Force Y	260 (Acetabulum)	R.A. Denton	3249J	2024-05-10

Table 3 - Vehicle Instrumentation

Sensor Location	Sensor S\N	Mfr	Model	Cal Date
Vehicle CG Ax	M13970	Endevco	758H-2k	2024-05-29
Vehicle CG Ay	M13972	Endevco	758H-2k	2024-05-29
Vehicle CG Az	M13947	Endevco	758H-2k	2024-05-29
Right Side Sill at Front Seat Ax	M13951	Endevco	758H-2k	2024-05-29
Right Side Sill at Front Seat Ay	M13974	Endevco	758H-2k	2024-05-29
Right Side Sill at Front Seat Az	M13949	Endevco	758H-2k	2024-05-29
Right Side Sill at Rear Seat Ax	M11233	Endevco	758H-2k	2024-06-19
Right Side Sill at Rear Seat Ay	M11287	Endevco	758H-2k	2024-06-19
Right Side Sill at Rear Seat Az	M13973	Endevco	758H-2k	2024-05-29
Left Side Sill at Front Seat Ay	M11202	Endevco	758H-2k	2024-02-07
Left Side Sill at Rear Seat Ay	223122	BST	11CF-2k	2024-05-23
Left Lower A-Pillar Ay	M11088	Endevco	758H-2k	2024-06-10
Left Middle A-Pillar Ay	M11037	Endevco	758H-2k	2024-06-19
Left Lower B-Pillar Ay	M11060	Endevco	758H-2k	2024-06-19
Left Middle B-Pillar Ay	M11254	Endevco	758H-2k	2024-06-19
Driver Seat Track at H-Point Ay	M11118	Endevco	758H-2k	2024-06-28
Rear Seat Structure Ay	M11269	Endevco	758H-2k	2024-06-19
Right Rear Occupant Comp. Ay	M11070	Endevco	758H-2k	2024-06-28
Engine Block Top Ax	M11126	Endevco	758H-2k	2024-06-10
Engine Block Top Ay	M11156	Endevco	758H-2k	2024-06-10
Rear Floopan Above Axle Ax	M13971	Endevco	758H-2k	2024-05-29
Rear Floopan Above Axle Ay	M13969	Endevco	758H-2k	2024-05-29
Rear Floopan Above Axle Az	M13981	Endevco	758H-2k	2024-05-29

Table 4 - Moving Deformable Barrier (MDB) Instrumentation

Sensor Location	Sensor S\N	Mfr	Model	Cal Date
MDB CG Ax	M13975	Endevco	758H-2k	2024-05-29
MDB CG Ay	M13976	Endevco	758H-2k	2024-05-29
MDB CG Az	M13989	Endevco	758H-2k	2024-05-29
MDB Left Side at Rear Axle Ax	M13977	Endevco	758H-2k	2024-05-29
MDB Left Side at Rear Axle Ay	M13978	Endevco	758H-2k	2024-05-29