REPORT NUMBER: SideNCAPMDB-KAR-24-008

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

SUBARU CORPORATION

2024 SUBARU WRX 4-DOOR SEDAN

NHTSA No: O20245505

PREPARED BY:

APPLUS+ IDIADA KARCO ENGINEERING, LLC.

9270 HOLLY ROAD

ADELANTO, CA 92301

AUGUST 14, 2024

FINAL REPORT

PREPARED FOR:

U.S. DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

OFFICE OF CRASHWORTHINESS STANDARDS

MAIL CODE: NRM-100

1200 NEW JERSEY AVE, SE

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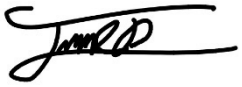
Prepared By: 

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Approval Date: August 14, 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: _____

TECHNICAL REPORT DOCUMENTATION PAGE

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4. Title and Subtitle	5. Report Date
Final Report of New Car Assessment Program Side Impact MDB Testing of a 2024 Subaru WRX 4-Door Sedan NHTSA No. O20245505	August 14, 2024
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7. Authors Mr. Jose Castañeda, Passive Safety Engineer, Applus+ IDIADA KARCO Engineering, LLC Mr. Alex Beltran, Engineering Manager, Applus+ IDIADA KARCO Engineering, LLC	**8. Performing Organization Report No.** TR-P44204-01-NC
9. Performing Organization Name and Address Applus+ IDIADA KARCO Engineering, LLC. 9270 Holly Rd. Adelanto, CA 92301	**10. Work Unit No.**
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12. Sponsoring Agency Name and Address U. S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards (NRM-100) 1200 New Jersey Ave., SE Washington, D.C. 20590	**13. Type of Report and Period Covered** Final Test Report, July 31 - August 14, 2024
	14. Sponsoring Agency Code NRM-100

15. Supplementary Notes

16. Abstract

A 61.9 km/h 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2024 Subaru WRX 4-Door Sedan 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 31, 2024.

The impact velocity of the Moving Deformable Barrier was 61.84 km/h and the outside ambient temperature at the struck (driver's) side of the vehicle was 36.1°C. The target vehicle's maximum post-test static crush was 177 mm located at level 2. The test vehicle's occupant performance data is as follows:

Measurement Description	Driver ATD (ES-2re)		
	Units	IARV	Result
Head Injury Criteria (HIC_{36})		1000	166.226
Maximum Thoracic Rib Deflection	mm	44	22.567
Total Abdominal Force	N	2500	601.419
Pubic Symphysis Force	N	6000	1295.695

Measurement Description	Passenger ATD (SID-IIs)		
	Units	IARV	Result
Head Injury Criteria (HIC_{36})		1000	254.643
Resultant Lower Spine Acceleration	g	82	48.378
Total Pelvic Force (Sum of Acetubular and Iliac Forces)	N	5525	2285.328
Maximum Thoracic Rib Deflection	mm	38*	16.421
Maximum Abdominal Rib Deflection	mm	45*	21.070

17. Key Words	18. Distribution Statement
New Car Assessment Program (NCAP) Side Impact Moving Deformable Barrier (MDB) ES-2re SID-IIs	Copies of this report are available from: National Highway Traffic Safety Admin. Technical Reference Division 1200 New Jersey Ave., SE Washington, DC 20590

19. Security Classification of this report	20. Security Classification of this page	21. No. of Pages	22. Price
		154	

**Proposed IARV*

TABLE OF CONTENTS

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 Subaru WRX 4-Door Sedan. 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 Subaru WRX 4-Door Sedan 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 61.84 km/h (38.43 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 31, 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	166.226
Maximum Thoracic Rib Deflection	mm	44	22.567
Combined Abdominal Force	N	2500	601.419
Pubic Symphysis Force	N	6000	1295.695
Lower Spine (T12) Resultant Acceleration	G	82*	26.272

**Proposed IARV*

Measurement Description	Units	Passenger ATD (SID-IIs)	
		Threshold	Result
Head Injury Criteria (HIC_{36})		1000	254.643
Lower Spine (T12) Resultant Acceleration	g	82	48.378
Total Pelvic Force (sum of acetabular and iliac forces	N	5525	2285.328
Maximum Thoracic Rib Deflection	mm	38*	16.421
Maximum Abdominal Rib Deflection	mm	45*	21.070

**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 Air Bag	Yes	No		
Knee Air Bag	Yes	No		
Side Air Bag 1 (Curtain)	Yes	Yes	Yes	Yes
Side Air Bag 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 Subaru WRX 4-Door Sedan NHTSA No. O20245505

Test Program: NCAP MDB Side Impact Test Test Date: 7/31/24

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	^oF	^oC	=(Tf -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 Subaru WRX 4-Door Sedan NHTSA No. O20245505

Test Program: NCAP MDB Side Impact Test Test Date: 7/31/24

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	M20245505
Model Year	2024
Make	Subaru
Model	WRX
Body Style	4-Door Sedan
VIN	JF1VBAB68R9803435
Body Color	Ceramic White
Odometer Reading (km / mi)	16/10
Engine Displacement (L)	2.4
Type / No. of Cylinders	4 Cylinder
Engine Placement	Longitudinal
Transmission Type	Manual
Transmission Speeds	6
Overdrive	Yes
Final Drive	AWD
Roof Rack	No
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes

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

Does Owner's Manual provide instructions to turn off automatic door locks?	Yes; Page 127

DATA FROM CERTIFICATION LABEL

Manufactured By	Subaru Corporation
Date of Manufacture	02/24
Vehicle Type	PC/VT

GVWR (kg)	2100
GAWR Front (kg)	1140
GAWR Rear (kg)	1100

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity	2	3		5	
Capacity Weight (VCW) (kg)				378.5	*A*
DSC x 68 (kg)				340.0	*B*
Cargo Weight (RCLW) (kg)				38.5	*A-B**

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

VEHICLE SEAT TYPE

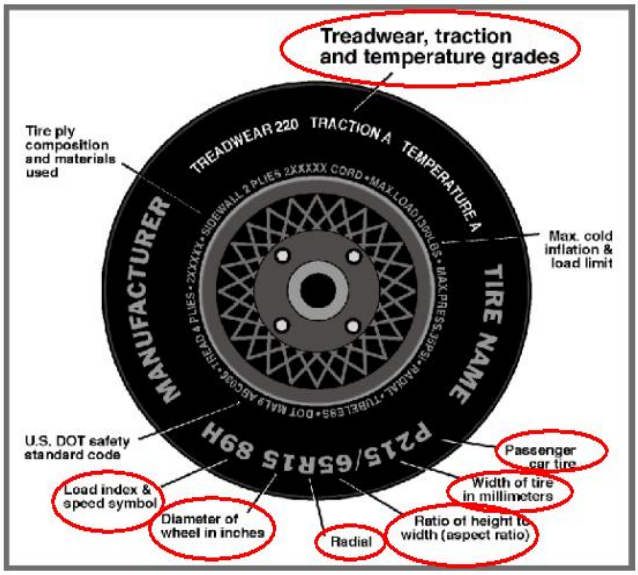
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable w/ Lever	Adjustable w/ Knob
Front Seat	Yes					Yes	
Rear or Second Row Seat		Yes			Yes		
Third Row Seat							

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2024 Subaru WRX 4-Door Sedan NHTSA No. O20245505

Test Program: NCAP MDB Side Impact Test Test Date: 7/31/24



Measured Parameter	Front	Rear
Max. Tire Pressure (kpa)	340	340
Cold Pressure (kPa)	230	220
Recommended Tire Size	235/45R17	225/45R17
Tire Size on Vehicle	235/45R17	235/45R17
Tire Manufacturer	Dunlop	Dunlop
Tire Model	SPSport MaxxGT 600A	SPSport MaxxGT 600A
Treadware	200	200
Traction Grade	A	A
Temperature Grade	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel, 1 Polyamide	2 Polyester, 2 Steel, 1 Polyamide
Load Index/Speed Symbol	97W	97W
Tire Material	Rubber	Rubber
DOT Safety Code Left	1420L AVYR0424	1420L AVYR0424
DOT Safety Code Right	1420L AVYR0424	1420L AVYR0424

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2024 Subaru WRX 4-Door Sedan NHTSA No. O20245505

Test Program: NCAP MDB Side Impact Test Test Date: 7/31/24

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	230	230	220	220
Tire Placard	kPa	230	230	220	220
Owner's Manual	kPa	230	230	220	220
As Tested	kPa	240	240	240	240

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

		As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
	Units	Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	469.5	317.5		523.0	346.5		503.5	393.5	
Right	kg	433.0	277.5		398.5	386.5		435.0	327.5	
Ratio	%	60.3%	39.7%		55.7%	44.3%		56.6%	43.4%	
Total	kg	902.5	595.0	1497.5	921.5	733.0	1654.5	938.5	721.0	1659.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1497.5	A
Sum of Actual Weight of 2 P572 ATD Used	kg	125.0	B
Rated Cargo/Luggage Weight (RCLW)	kg	38.5	C
Calculated Target Vehicle Test Weight (TVTW)	kg	1661.0	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	678	675	Yes
RF	mm	689	695	Yes
LR	mm	667	677	Yes
RR	mm	678	675	Yes
Vehicle CG (Aft of Front Axle)	mm	1162	1185	
Vehicle CG (Left (+)/Right (-) from Longitudinal Centerline)	mm	63	40	

***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 Subaru WRX 4-Door Sedan NHTSA No. O20245505

Test Program: NCAP MDB Side Impact Test Test Date: 7/31/24

Test Height Adjustable Setting (If Applicable)	

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Trunk Items	7.0
Tail Lights	3.0
Headrest Rear	1.0
Non Struck floormats	2.0

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 Subaru WRX 4-Door Sedan NHTSA No. O20245505

Test Program: NCAP MDB Side Impact Test Test Date: 7/31/24

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	19.7	15.4	17.5
Front Passenger Seat			17.1
Front Center Seat			
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid Fore/Aft	Forwardmost
Driver Seat	17.5	652	Max			
			Mid	642	652	663
			Min			
Front Passenger Seat	17.1	701	Max			
			Mid	695	701	712
			Min			
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 Subaru WRX 4-Door Sedan NHTSA No. O20245505

Test Program: NCAP MDB Side Impact Test Test Date: 7/31/24

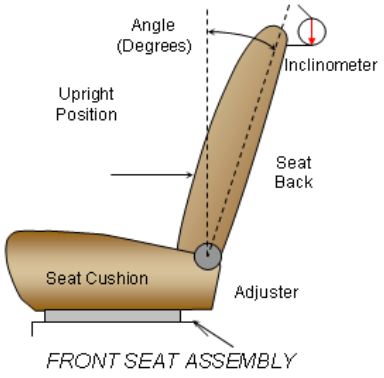
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position From Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	260	27	130	13
Front Passenger Seat	260	27	130	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	71.8	38	5.5	
Front Passenger Seat	63.8	36	5.6	
Front Center Seat				
Struck Side Rear Seat w/ Seated Dummy	Fixed	Fixed	18.9	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	18.9	Fixed
Rear Center Seat	Fixed	Fixed	18.9	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 Subaru WRX 4-Door Sedan NHTSA No. O20245505

Test Program: NCAP MDB Side Impact Test Test Date: 7/31/24

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	M2
Rear Seat	Fixed	Fixed

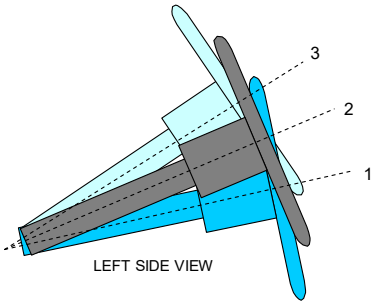
HEAD RESTRAINT ADJUSTMENT

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	4	H
Rear Seat	Fixed	Fixed

STEERING COLUMN ADJUSTMENT

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



STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONING

	Degrees	Fore-Aft Position (mm)
Lowermost Position, No. 1	67.6	132
Geometric Center Position, No. 2	69.4	159
Uppermost Position, No. 3	71.2	185
Telescoping Steering Wheel Travel		53
Test Position	69.4	159

DATA SHEET NO. 2 … (CONTINUED)

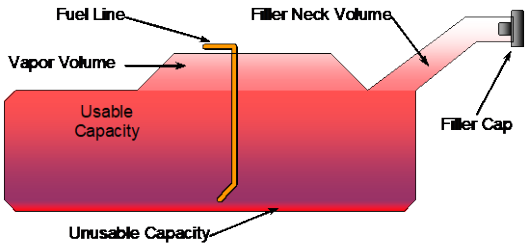
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT, AND FUEL SYSTEM DATA

Test Vehicle: 2024 Subaru WRX 4-Door Sedan NHTSA No. O20245505

Test Program: NCAP MDB Side Impact Test Test Date: 7/31/24

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.



VEHICLE FUEL TANK ASSEMBLY

FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	62.84
Usable Capacity of "Optional Tank" (see Form No. 1)	
Usable Capacity of "Standard Tank" (see Owner's Manual)	62.84
Usable Capacity of "Optional Tank" (see Owner's Manual)	
93% of Usable Capacity	58.44
Actual Amount of Solvent Used in Test	58.44
1/3 of Usable Capacity	20.95

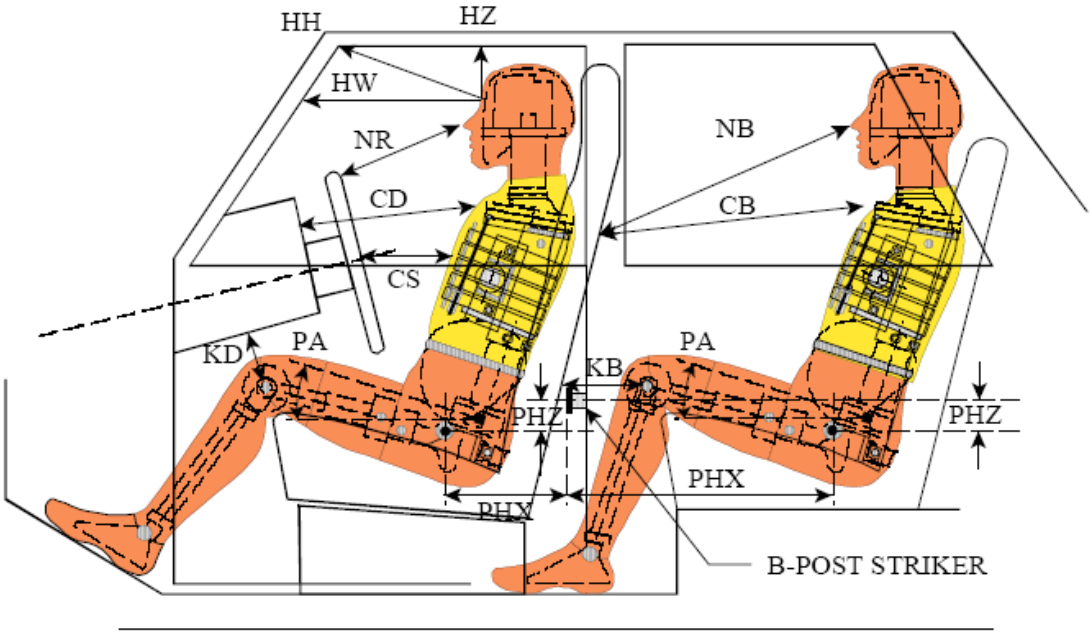
Is the Actual Amount of Solvent Used in the test equal to 93% ± 1% of the Usable Capacity stated in the Form No. 1? ☒ **Yes** ☐ **No**

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2024 Subaru WRX 4-Door Sedan NHTSA No. O20245505

Test Program: NCAP MDB Side Impact Test Test Date: 7/31/24



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

LEFT SIDE VIEW

DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

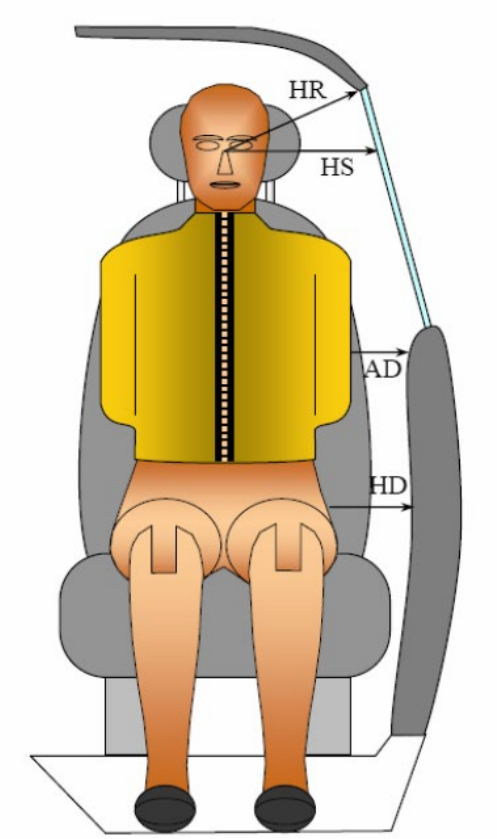
Driver Code	Pass. Code	Description	Driver		Passenger	
			Length (mm)	Angle (º)	Length (mm)	Angle (º)
HH		Head to Header	333			
HW		Head to Windshield	561	0		
HZ	HZ	Head to Roof	157	90.0	249	90.0
NR	NB	Nose to Rim/Seat Back	410		588	
CD	CB	Chest to Dash/Seat Back	568		585	
CS		Chest to Steering Wheel	281	0		
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	192	17.8	323	14.9
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	156	28.0	328	16.5
PAX°	PAX°	Pelvic Tilt Angle X		18.2		21.7
	PAY°	Pelvic Tilt Angle Y		0		0
PHX	PHX	Hip Point to Striker (x-axis)	222		702	
PHZ	PHZ	Hip Point to Striker (z-axis)	192		182	

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2024 Subaru WRX 4-Door Sedan NHTSA No. O20245505

Test Program: NCAP MDB Side Impact Test Test Date: 7/31/24



DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

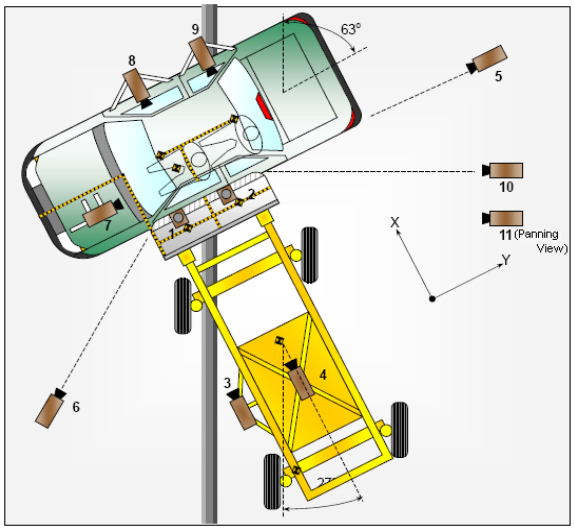
Code	Measurement Description	Units	Driver	Passenger
HR	Head to Side Header	mm	223	240
HS	Head to Side Window	mm	370	300
AD	Arm to Door	mm	100	135
HD	H-Point to Door	mm	162	193

DATA SHEET NO. 5

CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2024 Subaru WRX 4-Door Sedan NHTSA No. O20245505

Test Program: NCAP MDB Side Impact Test Test Date: 7/31/24



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)	609	-406	-1162	8.5	1000
8	Driver Side (On-Board)	1783	762	-895	8	1000
9	Passenger Side (On-Board)	1783	1574	-895	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

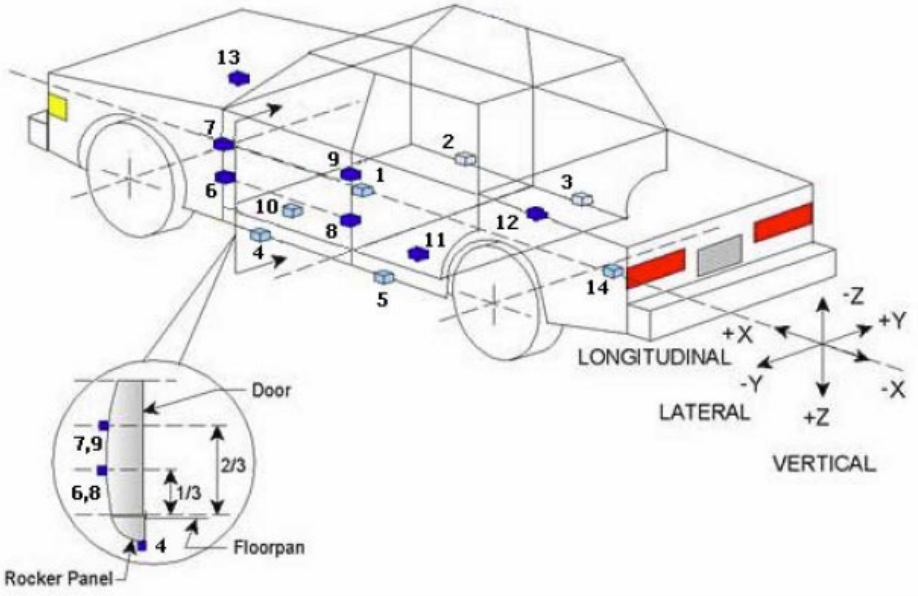
Driver Dummy Channels	16
Passenger Dummy Channels	19
Vehicle Structure Accelerometers	23
MDB Channels	5
Total	63

DATA SHEET NO. 6

TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2024 Subaru WRX 4-Door Sedan NHTSA No. O20245505

Test Program: NCAP MDB Side Impact Test Test Date: 7/31/24



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

Loc. No.	Sensor Description	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	1870	0	-130
2	Right Sill at Front Seat	2980	715	-125
3	Right Sill at Rear Seat	1700	716	-130
4	Left Sill at Front Door	2220	-810	-130
5	Left Sill at Rear Door	1670	-810	-130
6	A-Pillar Lower	3220	-730	-295
7	A-Pillar Middle	3220	-730	-447
8	B-Pillar Lower	2130	-724	-351
9	B-Pillar Middle	2140	-724	-550
10	Front Seat Track	2400	-600	-105
11	Rear Seat Structure	1720	-427	-255
12	Right Rear Occupant Compartment	1940	384	-280
13	Engine Block	4100	-10	-700
14	Rear Floorpan Above Axle	993	0	421

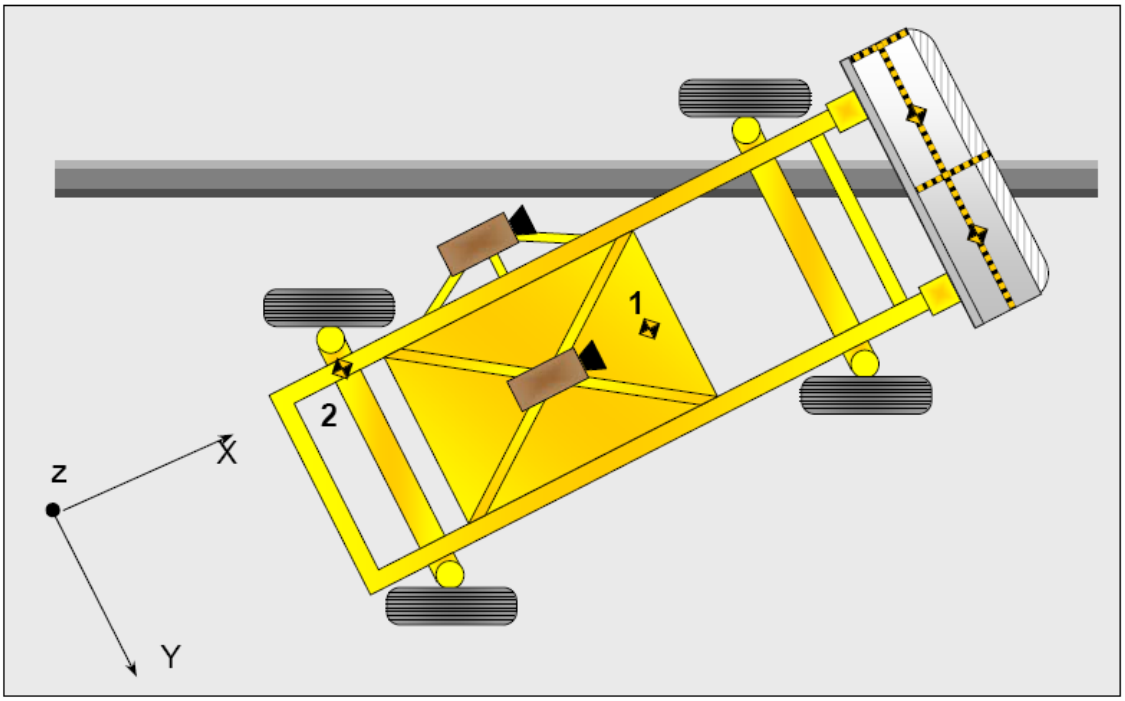
Reference: X – Rear surface of vehicle (+ forward)
Y – Vehicle centerline (+ to right)
Z – Ground plane (+ down)

DATA SHEET NO. 7

MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2024 Subaru WRX 4-Door Sedan NHTSA No. O20245505

Test Program: NCAP MDB Side Impact Test Test Date: 7/31/24



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 Subaru WRX 4-Door Sedan NHTSA No. O20245505

Test Program: NCAP MDB Side Impact Test Test Date: 7/31/24

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Front Seat Dummy (ES-2re)	Rear Seat Dummy (SID-IIs)
Face	Curtain Air Bag	Curtain Air Bag
Top of Head	N/A	Headliner, Headrest
Left Side of Head	Curtain Air Bag, Headliner	Curtain Air Bag
Back of Head	Headrest, Curtain Air Bag, Headliner	Headrest, Curtain Air Bag
Left Shoulder	Curtain Air Bag	Door Panel
Upper Torso	Torso/Pelvis Air Bag, Seat Bolster	Door Panel, Seat Bolster
Lower Torso	Torso/Pelvis Air Bag, Seat Bolster	Door Panel, Seat Bolster
Left Hip	Torso/Pelvis Air Bag, Seat Bolster	Door Panel
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 Subaru WRX 4-Door Sedan NHTSA No. O20245505

Test Program: NCAP MDB Side Impact Test Test Date: 7/31/24

POST-TEST SEAT PERFORMANCE

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

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	Good
Sill Separation	None
Windshield Damage	None
Side Window Damage	Both broken, driver small window broken
Other Notable Effects	None

DATA SHEET NO. 8 … (CONTINUED)

POST-TEST OBSERVATIONS

Test Vehicle: 2024 Subaru WRX 4-Door Sedan NHTSA No. O20245505

Test Program: NCAP MDB Side Impact Test Test Date: 7/31/24

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Frontal Air Bag	Yes	No		
Knee Air Bag	Yes	No		
Side Air Bag 1 (Curtain)	Yes	Yes	Yes	Yes
Side Air Bag 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		2674
Vertical Impact Reference Line (Aft of Front Axle)(Intended Impact Point)	mm		405
Actual Impact Point (Aft of Front Axle)	mm		375
Horizontal Offset (+ forward / - rearward)	mm	± 50 of Intended Impact Point	30
Vertical Offset (+ down / - up)	mm	± 20 of Intended Impact Point	12

DATA SHEET NO. 9

MDB SUMMARY OF RESULTS

Test Vehicle: 2024 Subaru WRX 4-Door Sedan NHTSA No. O20245505

Test Program: NCAP MDB Side Impact Test Test Date: 7/31/24

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1251
Overall Length Including Honeycomb Face	4115
Wheelbase 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	61.84
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.99
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90.0
MDB Forw ard Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	62.7
MDB Crabbed Angle to MDB Forw ard Line of Motion	degrees	26.0 to 28.0	27.3

MAXIMUM STATIC CRUSH OF HONEYCOMB FACE

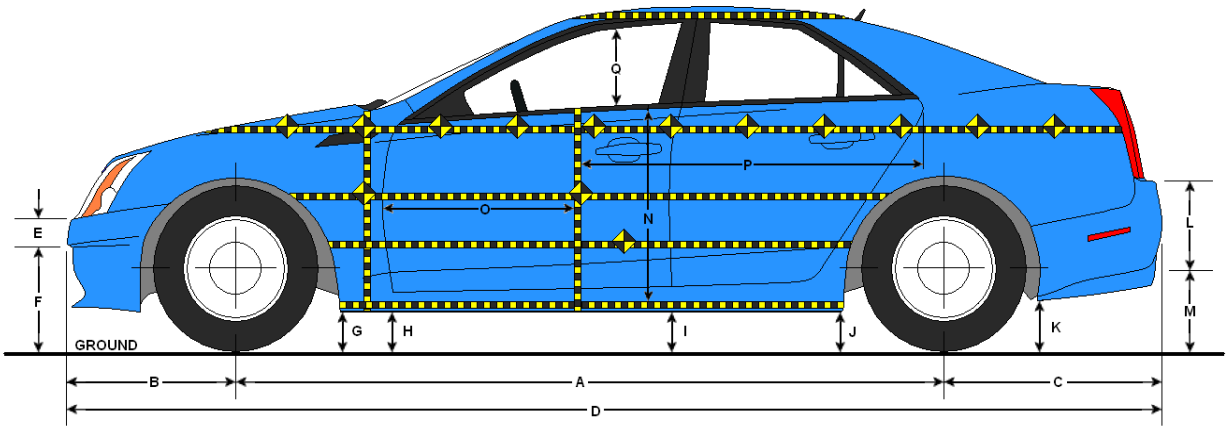
Vertical Location			From Centerline		Max. Crush (mm)
Row	Description	Height (mm)	Distance (mm)	Direction	
A	Center of Bumper	432	800	Right	286
B	Top of Bumper	533	800	Right	163
C	Mid Level	686	800	Left	124
D	Top of Stack	813	800	Left	154

DATA SHEET NO. 10

TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2024 Subaru WRX 4-Door Sedan NHTSA No. O20245505

Test Program: NCAP MDB Side Impact Test Test Date: 7/31/24



LEFT SIDE VIEW

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Change
A	Wheelbase	2674	2665	-9
B	Front Axle to FSOV	1004	997	-7
C	Rear Axle to RSOV	982	997	15
D	Total Length at Centerline	4657	4659	2
E	Front Bumper Thickness	71	71	0
F	Front Bumper Bottom to Ground	408	413	5
G	Sill Height at Front Wheel Well	254	252	-2
H	Sill Height at Front Door Leading Edge	266	301	35
I	Sill Height at B-Pillar	305	310	5
J1	Sill Height at Rear Wheel Well	279	286	7
J2	Pinch Weld Height at Rear Wheel Well	175	178	3
K	Sill Height Aft of Rear Wheel Well	311	320	9
L	Rear Bumper Thickness	256	257	1
M	Rear Bumper Bottom to Ground	324	324	0
N	Sill Height to Bottom of Front Window Sill	660	652	-8
O	Front Door Leading Edge to Impact CL	783	732	-51
P	Rear Door Trailing Edge to Impact CL	1400	1347	-53
Q	Front Window Opening	397	416	19
R	Right Side Length	3395	3397	2
S	Left Side Length	3396	3386	-10
T	Vehicle Width at B-Pillar	1770	1662	-108

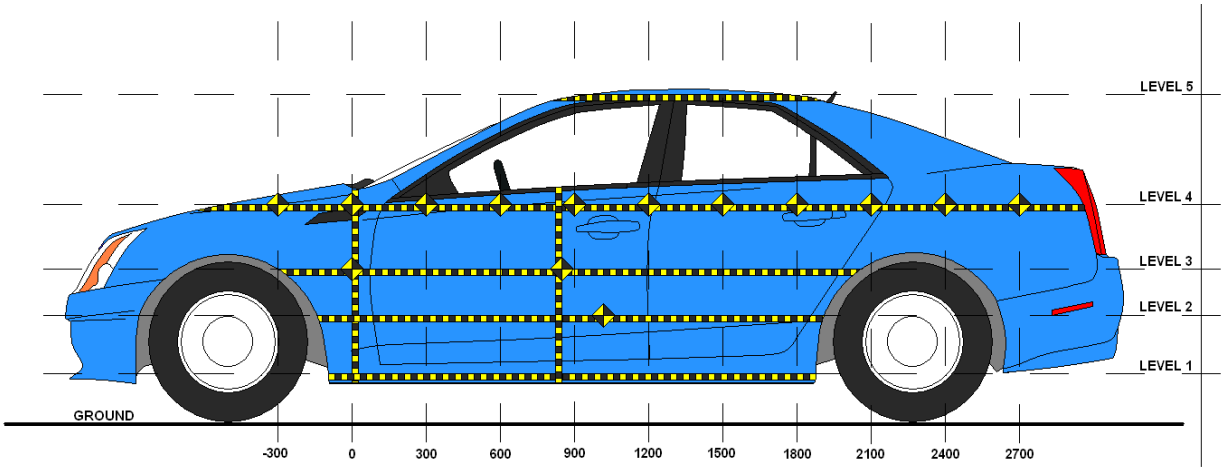
All measurements in mm with tolerance of ± 3mm

DATA SHEET NO. 11

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2024 Subaru WRX 4-Door Sedan NHTSA No. O20245505

Test Program: NCAP MDB Side Impact Test Test Date: 7/31/24



LEFT SIDE VIEW

Level	Description	Height Above Ground (mm)	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	289	52	450
2	Occupant H-Point	556	177	450
3	Mid-Door	659	171	1350
4	Window Sill	895	175	1650
5	Window Top	1413	-9	750

DATA SHEET NO. 11 … (CONTINUED)

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2024 Subaru WRX 4-Door Sedan NHTSA No. O20245505

Test Program: NCAP MDB Side Impact Test Test Date: 7/31/24

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

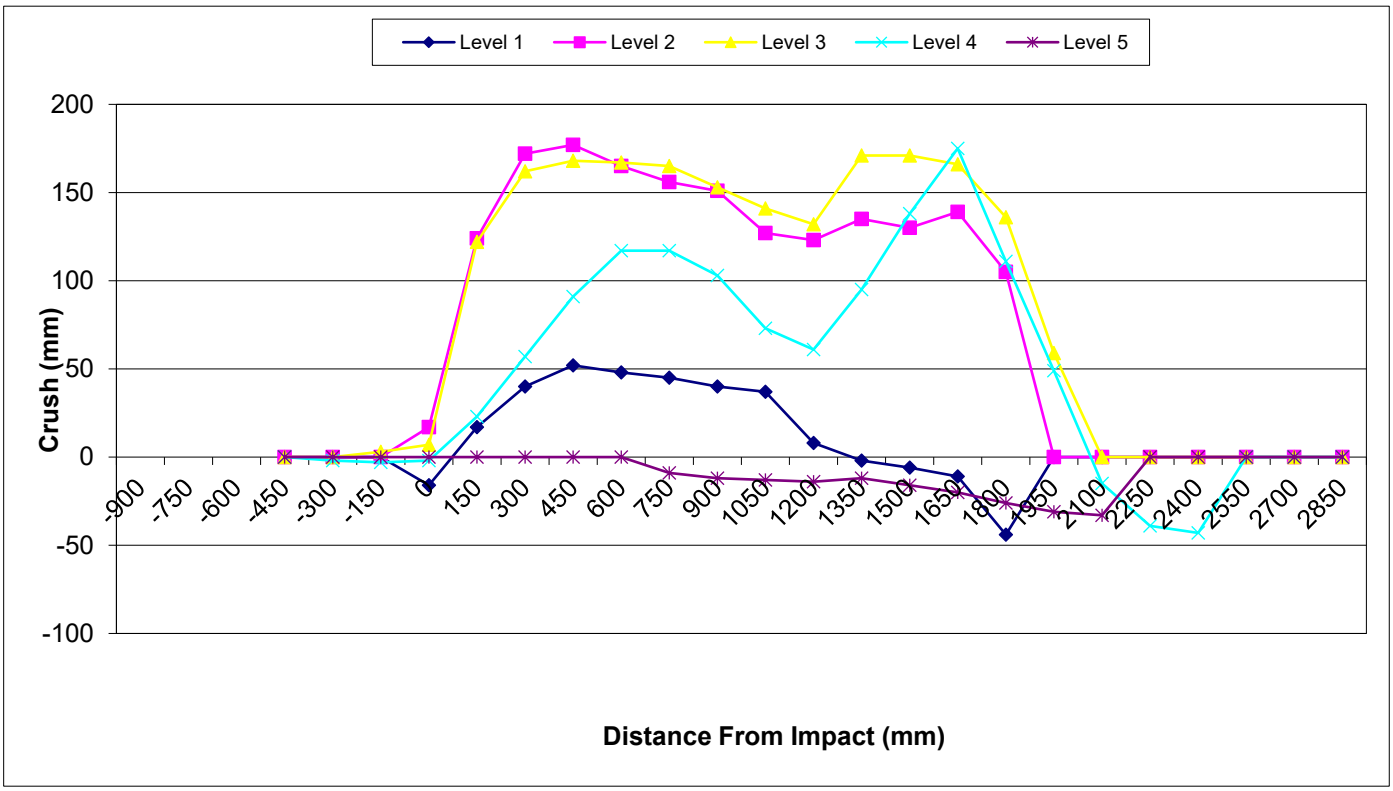
	Pre-Test (mm)					Post-Test (mm)					Crush (mm)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750															
-600															
-450															
-300				670					668					-2	
-150			589	673				592	670				3	-3	
0	617	600	606	678		601	617	613	676		-16	17	7	-2	
150	641	615	614	672		658	739	736	695		17	124	122	23	
300	640	614	611	661		680	786	773	718		40	172	162	57	
450	642	611	607	657		694	788	775	748		52	177	168	91	
600	642	610	605	648		690	775	772	765		48	165	167	117	
750	642	610	605	643	884	687	766	770	760	875	45	156	165	117	-9
900	643	611	604	635	883	683	762	757	738	871	40	151	153	103	-12
1050	647	612	605	634	888	684	739	746	707	875	37	127	141	73	-13
1200	649	614	608	627	893	657	737	740	688	879	8	123	132	61	-14
1350	652	616	611	626	895	650	751	782	721	883	-2	135	171	95	-12
1500	652	616	612	627	896	646	746	783	765	880	-6	130	171	138	-16
1650	641	605	602	632	895	630	744	768	807	875	-11	139	166	175	-20
1800	615	591	589	636	894	571	696	725	747	868	-44	105	136	111	-26
1950			585	634	898			644	683	867			59	49	-31
2100				614	908				599	875				-15	-33
2250				614					575					-39	
2400				618					575					-43	
2550															
2700															
2850															

DATA SHEET NO. 11 … (CONTINUED)

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2024 Subaru WRX 4-Door Sedan NHTSA No. O20245505

Test Program: NCAP MDB Side Impact Test Test Date: 7/31/24

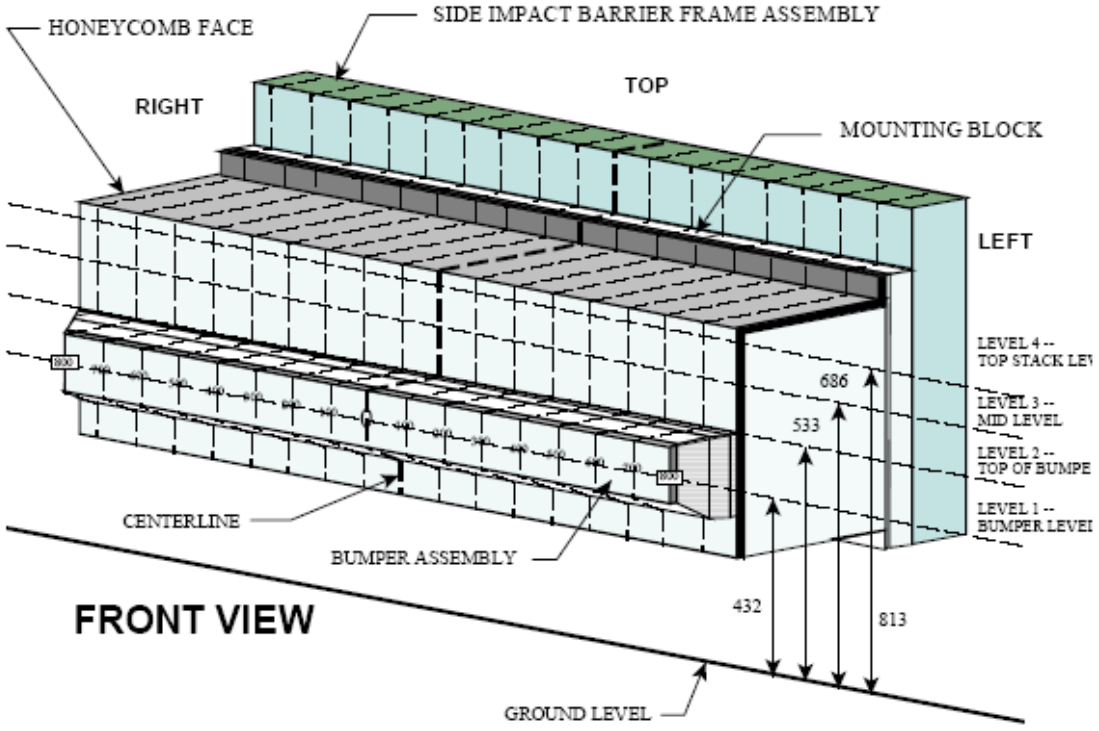


DATA SHEET NO. 12

MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2024 Subaru WRX 4-Door Sedan NHTSA No. O20245505

Test Program: NCAP MDB Side Impact Test Test Date: 7/31/24



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	0	100	200	300	400	500	600	700	800
1	286	266	251	240	234	230	222	214	216	201	198	194	189	184	192	213	242
2	163	160	140	126	121	112	123	115	111	101	6	108	104	105	103	115	135
3	84	60	54	49	57	75	101	95	79	61	48	43	43	52	65	83	124
4	50	23	27	42	65	107	111	93	63	45	31	28	31	49	76	111	154

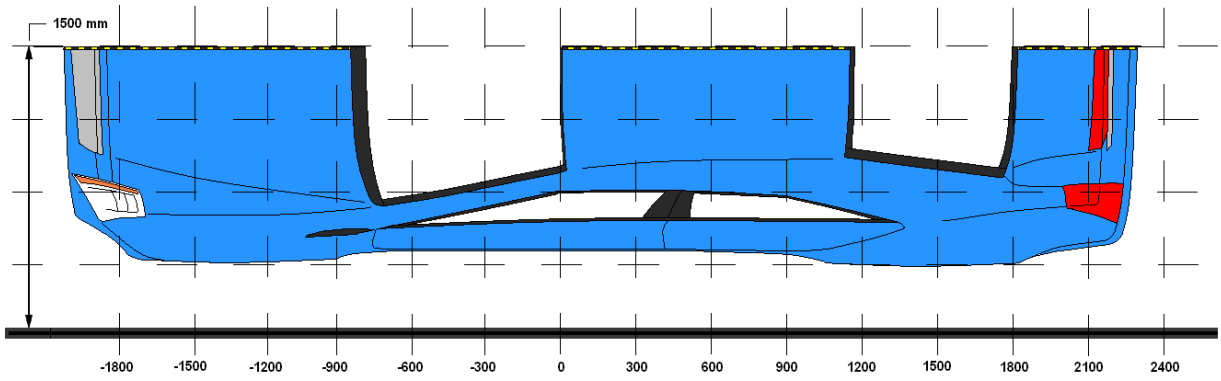
All dimensions in millimeters.

DATA SHEET NO. 13

VEHICLE AND MDB DAMAGE PROFILE DISTANCES

Test Vehicle: 2024 Subaru WRX 4-Door Sedan NHTSA No. O20245505

Test Program: NCAP MDB Side Impact Test Test Date: 7/31/24



VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point (mm)	Level	Pre-Test (mm)	Post-Test (mm)	Crush (mm)
1	2400	4	618	575	-43
2	1800	3	589	725	136
3	1350	3	611	782	171
4	750	3	605	770	165
5	150	2	615	739	124
6	-300	4	670	668	-2

MDB DAMAGE PROFILE DISTANCES

DPD	From MDB Centerline		Level	Crush (mm)
	Distance (mm)	Direction		
1	800	Left	1	242
2	500	Left	1	184
3	200	Left	1	198
4	200	Right	1	222
5	500	Right	1	240
6	800	Right	1	286

DATA SHEET NO. 14

FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2024 Subaru WRX 4-Door Sedan NHTSA No. O20245505

Test Program: NCAP MDB Side Impact Test Test Date: 7/31/24

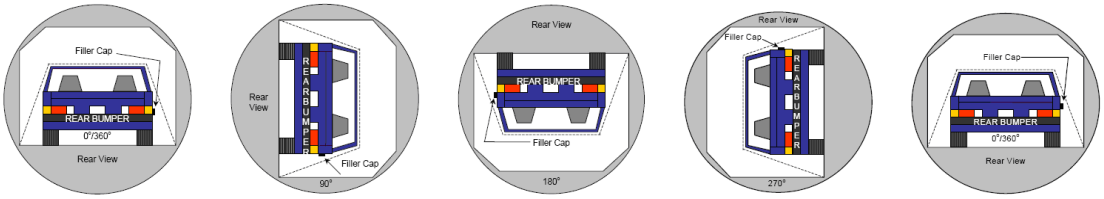
Temperature at Time of Impact: 36.1°C Test Time: 5:08 P.M.

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: _____



0° TO 90° 90° TO 180° 180° TO 270° 270° TO 360°

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°	81	300	381

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

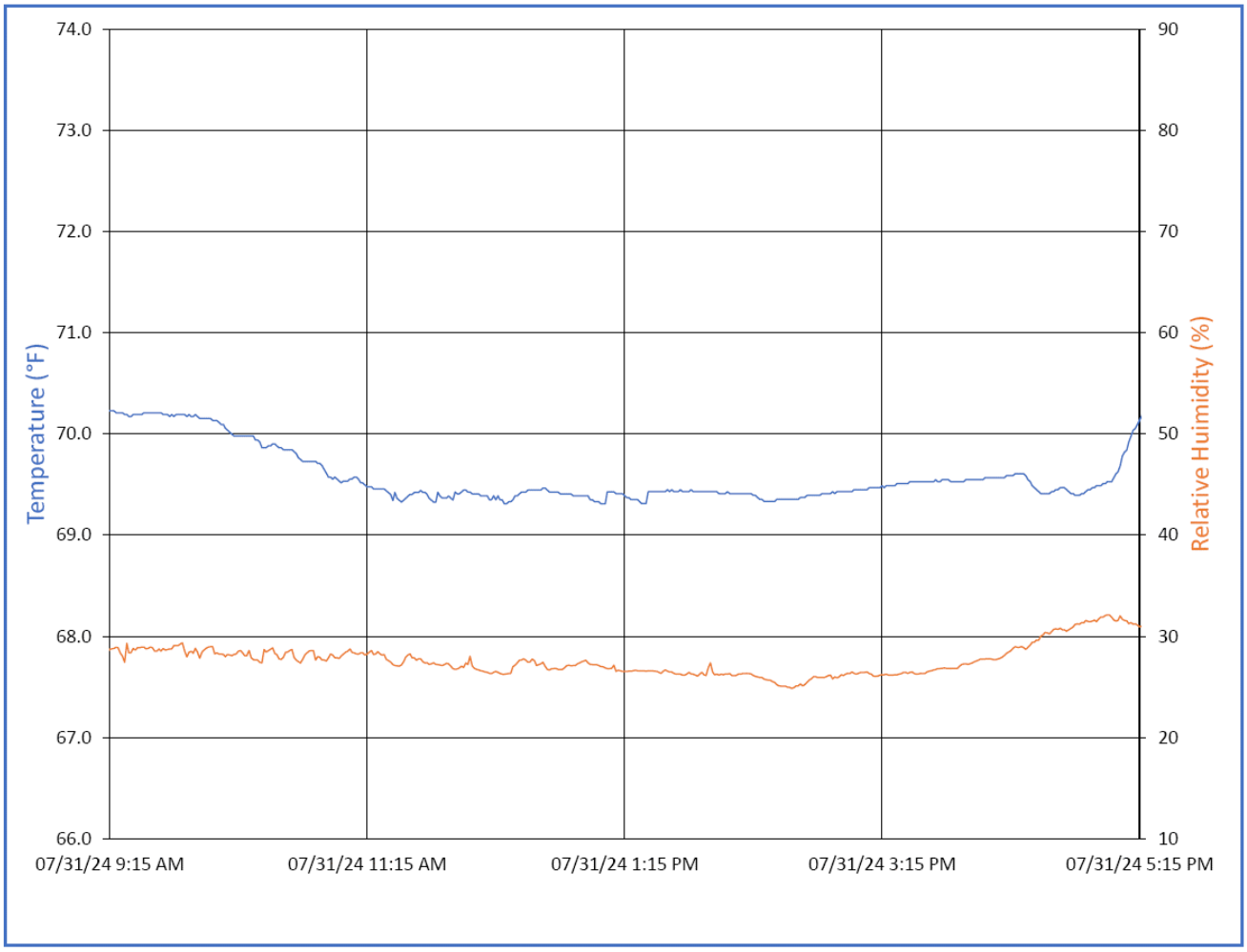
Test Phase	Spillage Location
0° To 90°	
90° To 180°	
180° To 270°	
270° To 360°	

DATA SHEET NO. 15

DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION

Test Vehicle: 2024 Subaru WRX 4-Door Sedan NHTSA No. O20245505

Test Program: NCAP MDB Side Impact Test Test Date: 7/31/24



APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

TABLE OF PHOTOGRAPHS … (CONTINUED)

TABLE OF PHOTOGRAPHS … (CONTINUED)

TABLE OF PHOTOGRAPHS … (CONTINUED)

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

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

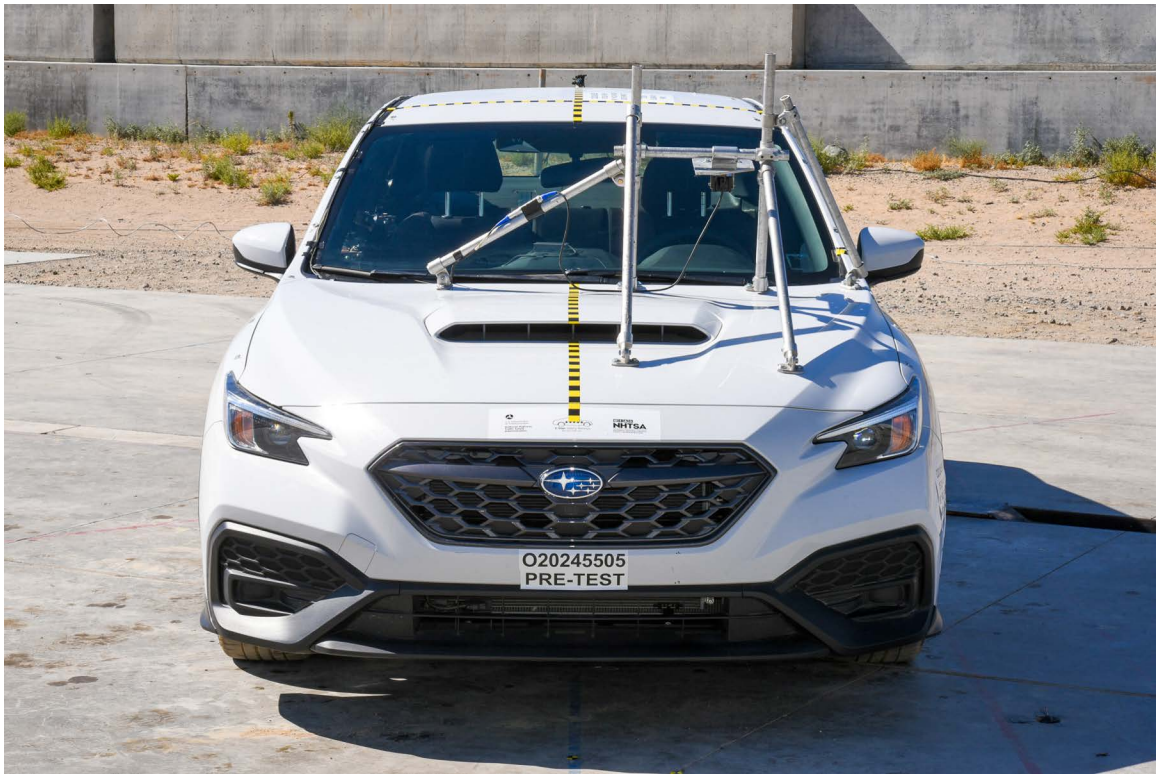


FIGURE 3. Pre-Test Frontal View of Test Vehicle

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

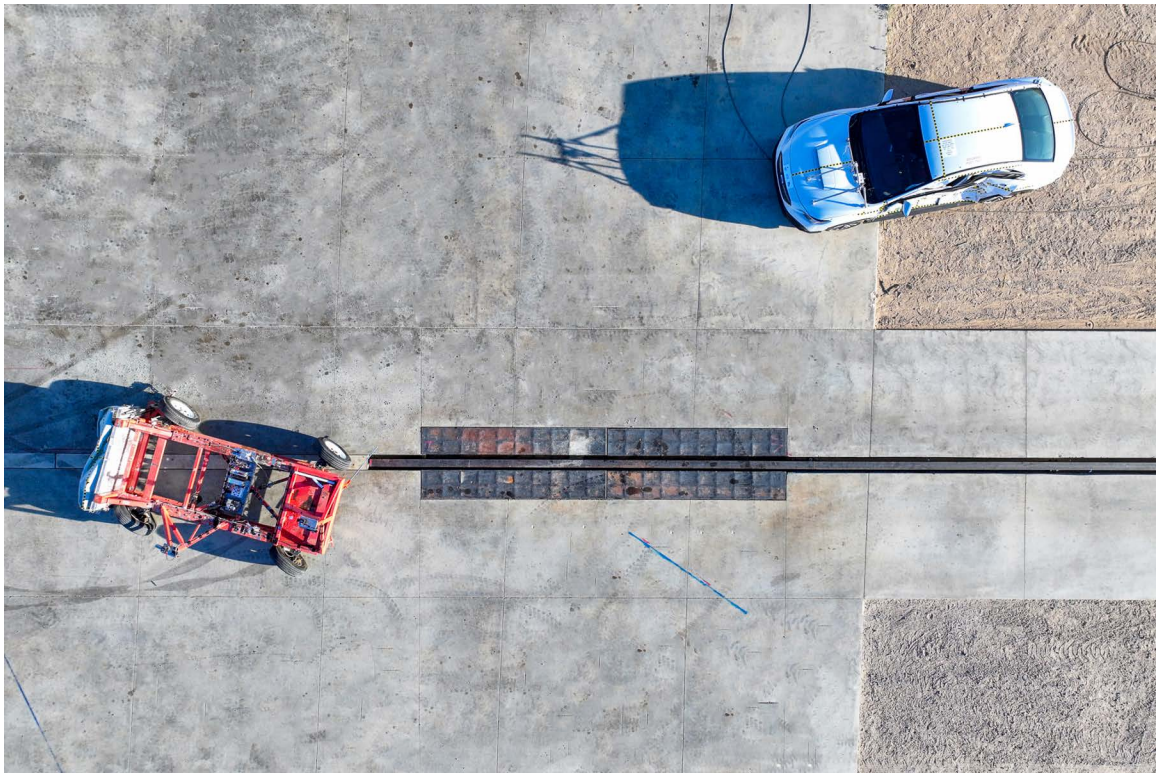


FIGURE 16. Post-Test Overhead View of Test Area

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

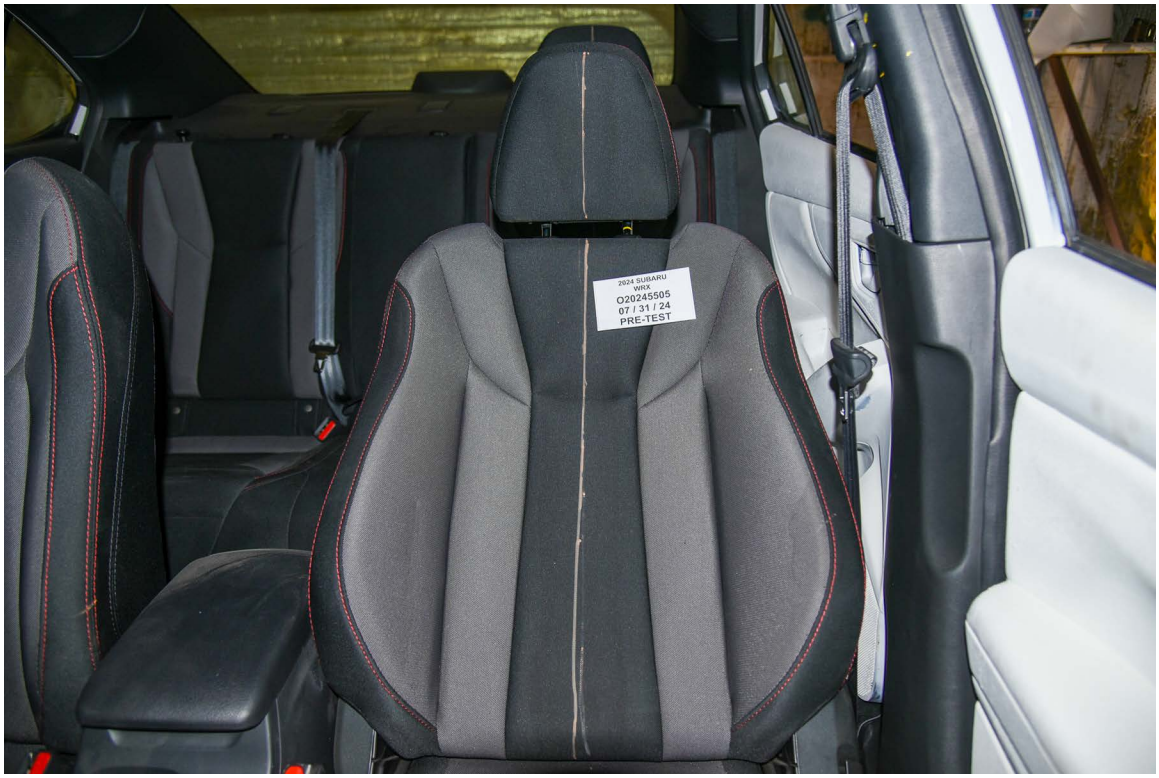


FIGURE 30. Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning

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 Air Bag View

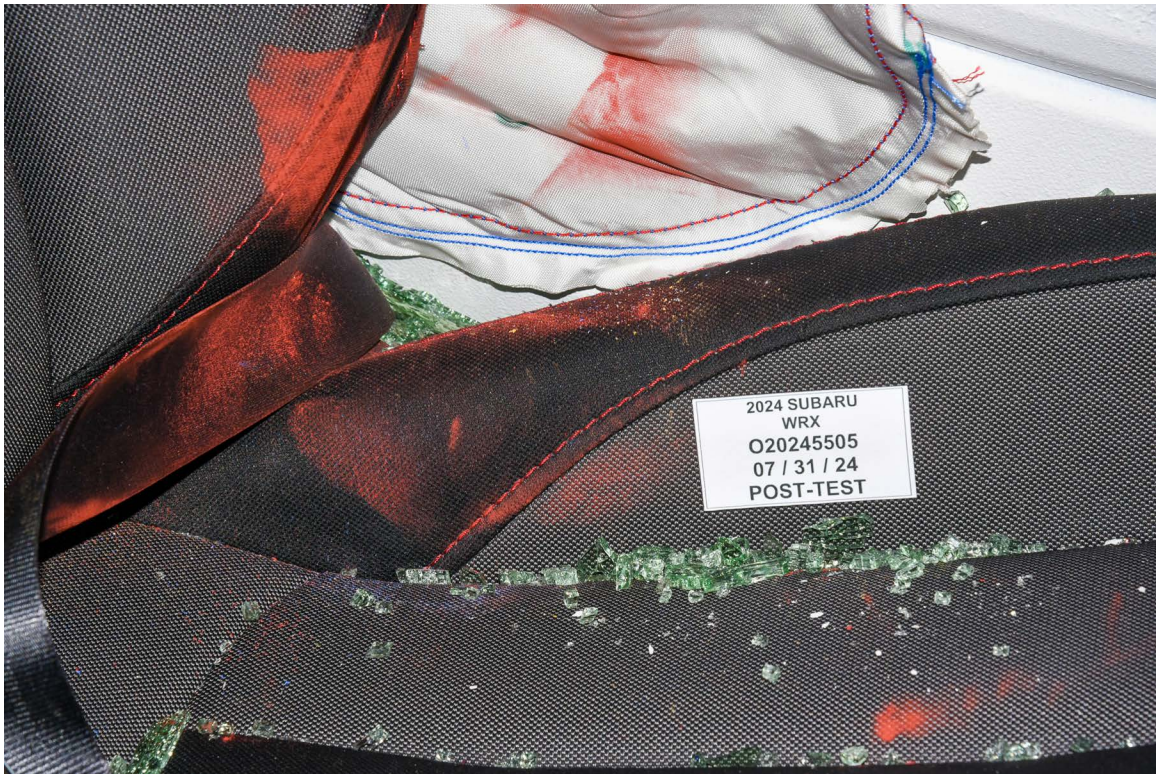


FIGURE 52. Post-Test Driver Dummy Close-Up Pelvis Contact With Vehicle Interior View

FIGURE 53. Post-Test Driver Dummy Close-Up Pelvis Contact With Side Air Bag 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

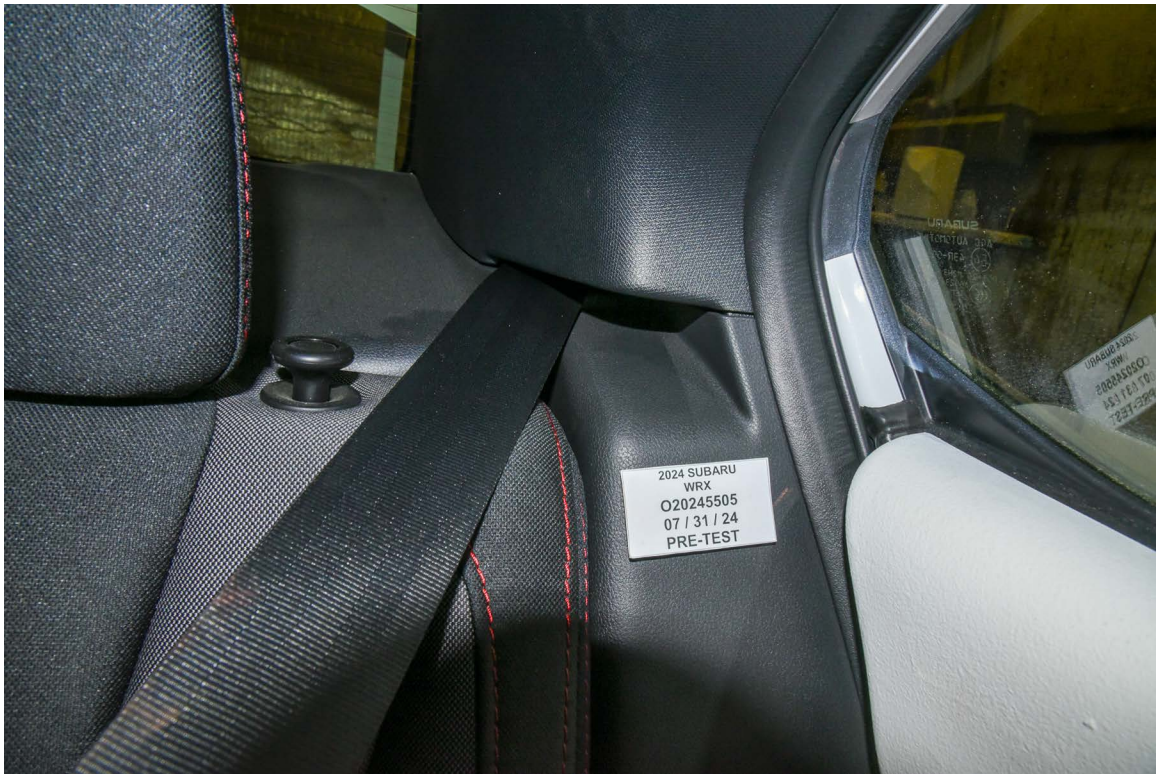


FIGURE 65. Pre-Test View of Belt Anchorage for Rear Passenger Dummy

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 Showing Rear Passenger Dummy Contact Locations

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

FIGURE 76. Post-Test Rear Passenger Dummy Close-Up Head Contact with Side Air Bag 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 Air Bag

FIGURE 78. Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Side Air Bag 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 Air Bag

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

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

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

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

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

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

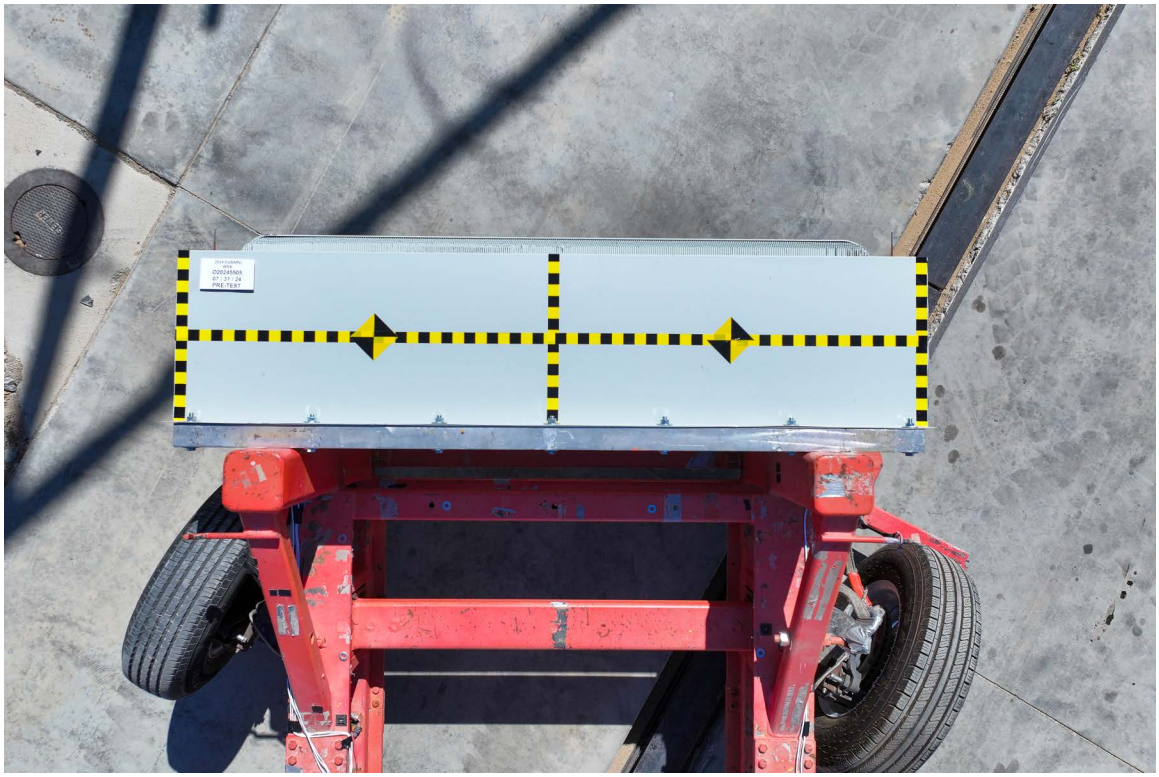


FIGURE 86. Pre-Test Top View of MDB Impactor Face

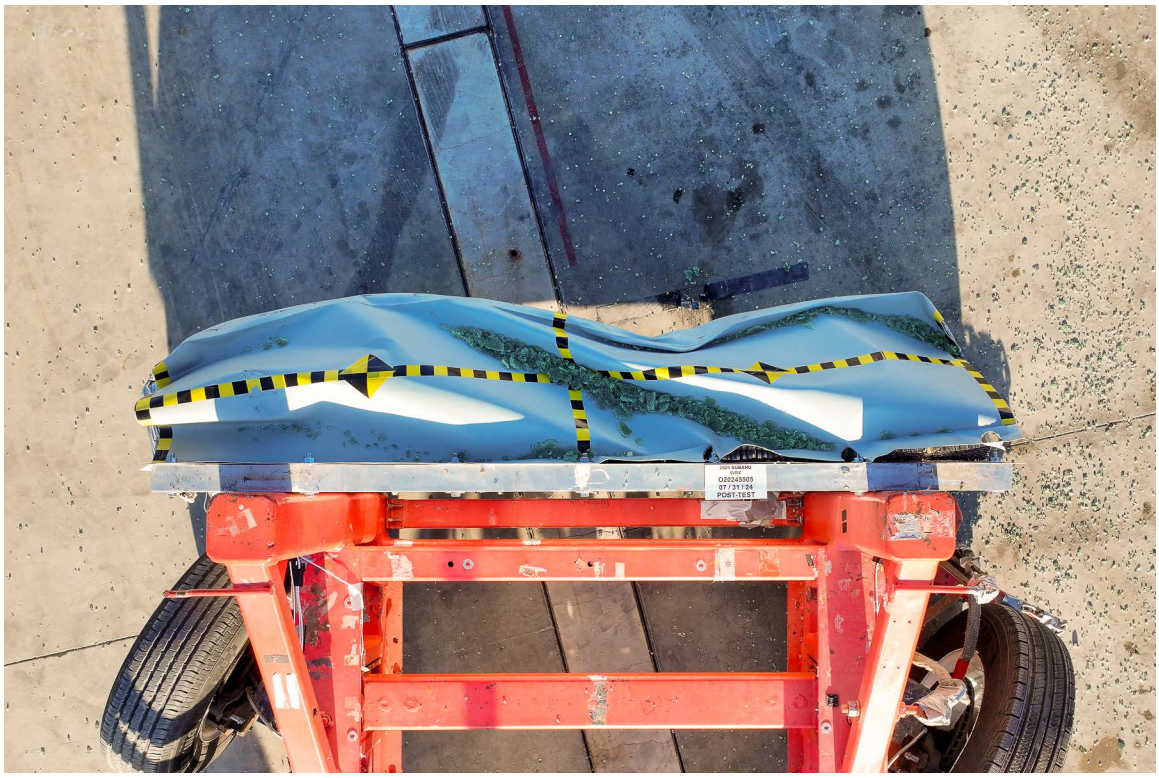


FIGURE 87. Post-Test Top View of MDB Impactor Face

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

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

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

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

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

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

FIGURE 94. Pre-Test Ballast View

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

FIGURE 96. FMVSS No. 301 Static Rollover 0 Degrees

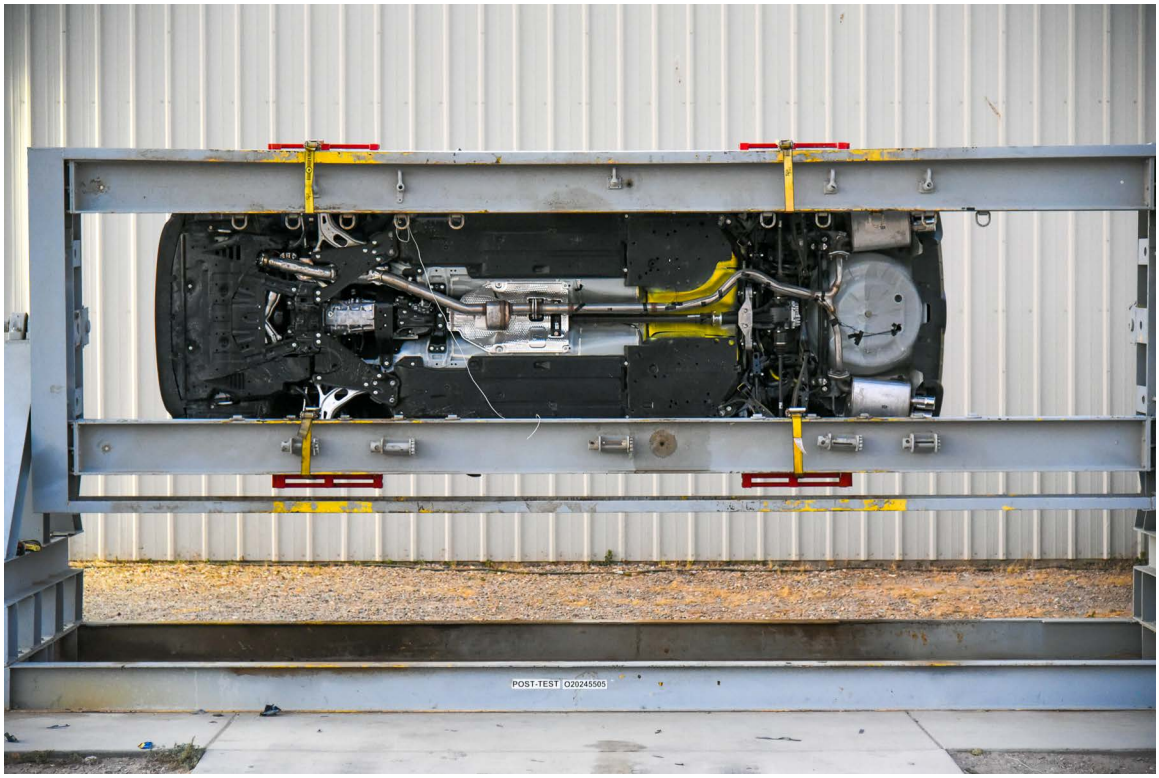


FIGURE 97. FMVSS No. 301 Static Rollover 90 Degrees

FIGURE 98. FMVSS No. 301 Static Rollover 180 Degrees

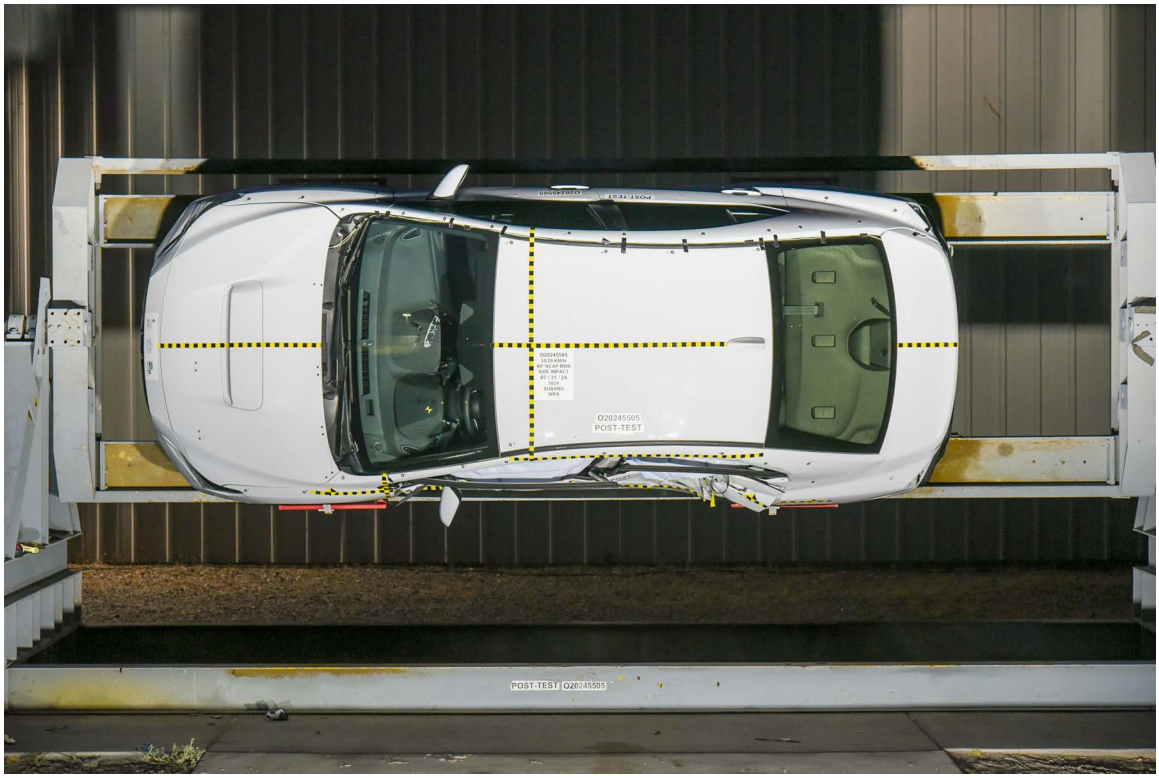


FIGURE 99. FMVSS No. 301 Static Rollover 270 Degrees

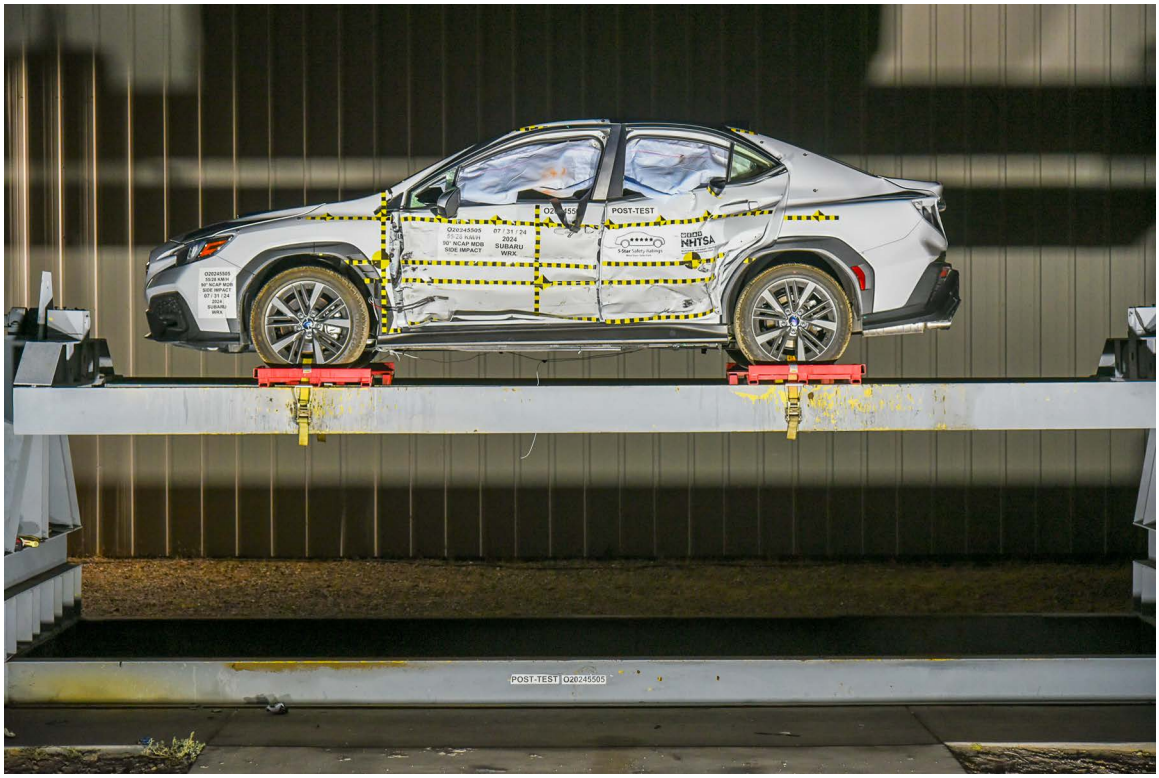


FIGURE 100. FMVSS No. 301 Static Rollover 360 Degrees

FIGURE 101. Impact Event

WRX®

VIN JF1VBAB68R9803435
Model/Code 2024 Subaru WRX/RUA
Port / Assembly Boston, MA
Deliver by / Carrier Diversified Automotive, Inc

SHIP TO: 020206
Maguire Cars, LLC
320 Elmira Road
Ithaca, NY 14850

SOLD TO: 020206
Maguire Cars, LLC
320 Elmira Road
Ithaca, NY 14850

SUBARU

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 ★★★★★
Based on the risk of injury in a frontal impact.
Should ONLY be compared to other vehicles of similar size and weight.

Side Crash — Front Seat NOT RATED / Rear Seat NOT RATED
Based on the risk of injury in a side impact.

Rollover ★★★★★
Based on the risk of rollover in a single-vehicle crash.

Star ratings range from 1 to 5 stars (★★★★★) with 5 being the highest.
Source: National Highway Traffic Safety Administration (NHTSA)
www.safercar.gov or 1-888-327-4236

ADDED SECURITY

Subaru Added Security®
Agreement Backed By Subaru
The Only Extended Service™

- Protection designed to fit your driving needs, up to 10 years/100,000 miles of coverage
- We only use Genuine Subaru replacement parts
- We use Subaru-trained technicians - those who know your vehicle best
- Towing and rental car reimbursements during covered repairs
- Transferable coverage to the next owner

Scan the QR code or ask your sales representative for more details

EPA DOT Fuel Economy and Environment — Gasoline Vehicle

Fuel Economy
22 MPG
19 city 26 highway
combined city/hwy
4.5 gallons per 100 miles

Midsize Cars cars range from 15 to 140 MPG.
The best vehicle rates 140 MPGe.

You spend $ 5,000 more in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost $2,950

Fuel Economy & Greenhouse Gas Rating (tailpipe only): 5 (1 — 10 Best)
Smog Rating (tailpipe only): 3 (1 — 10 Best)
This vehicle emits 408 grams CO_2 per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also creates emissions; learn more at fueleconomy.gov.

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 28 MPG and costs $9,750 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at $3.60 per gallon. MPGe is miles per gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fueleconomy.gov
Calculate personalized estimates and compare vehicles

Smartphone QR Code™

PARTS CONTENT INFORMATION
FOR VEHICLES IN THIS CARLINE:
U.S./CANADIAN PARTS CONTENT:
MAJOR SOURCES OF FOREIGN PARTS CONTENT: JAPAN 85%
FOR THIS VEHICLE:
FINAL ASSEMBLY POINT: OTA, GUNMA, JAPAN
COUNTRY OF ORIGIN:
ENGINE: JAPAN
TRANSMISSION: JAPAN
Note: Parts content does not include final assembly, distribution, or other non-parts costs.

STANDARD EQUIPMENT

SAFETY
Ring-Shaped Reinforcement Frame
Symmetrical All-Wheel Drive (AWD)
EyeSight Driver-Assist System w/ EyeSight Assist Monitor
Multi-Mode Vehicle Dynamics Control System (VDC)
Subaru Advanced Frontal Airbag System
Front Seat Side (Pelvis/Torso) Airbags
Driver's Side Knee Airbag
Side-Curtain Airbags
4-Wheel Disc Brakes w/ Brake Assist
Brake Override System; Safety Pedal System
Anti-Lock Braking System (ABS)
Electronic Brake-Force Distribution
LATCH System for Child Safety Seats, Rear Seat Reminder
Whiplash Reducing Front Seats
Tire Pressure Monitoring System (TPMS)
Anti-Theft Alarm & Engine Immobilizer System
LED Headlights, High Beam Assist (HBA)
LED Daytime Running Lights (DRL)
Rear Vision Camera

PERFORMANCE AND EXTERIOR
2.4L BOXER DOHC Intercooled Turbocharged Engine
6-Speed Manual Transmission
Sport-Tuned Suspension
17" Aluminum-Alloy Wheels
235/45 R17 Summer Performance Tires w/ Tire Repair Kit
Active Torque Vectoring
Quick Ratio Dual Pinion Electric Power-Assisted Steering
Dual Outlet, Dual Tailpipe Exhaust w/ Stainless Steel Tips
Performance Design Front Seats

COMFORT, CONVENIENCE AND INTERIOR
Dual-Zone Automatic Climate Control w/ Air Filtration System
SUBARU STARLINK 11.6" Multimedia Audio System
Dual Front USB Ports (USB-A/USB-C)
SUBARU STARLINK Safety Plus - 3 Years Free
+Not Available to Massachusetts Residents or Businesses
SiriusXM Radio & SiriusXM Travel Link - 4 Months Free
Wireless Apple CarPlay & Android Auto
Tilt/Telescopic Steering Wheel w/ Bluetooth & Audio Switches
Leather-Wrapped Steering Wheel, Leather Trimmed Shifter
Power Door Locks & Dual Power Mirrors
Remote Keyless Entry System
Advanced Adaptive Cruise Control w/ Lane Centering
Auto-Up/Down Front Driver/Passenger Windows
60/40 Split Fold-Down Rear Seatback

LIMITED WARRANTY/ROADSIDE ASSISTANCE
3 Years / 36,000 Miles Basic
5 Years / 60,000 Miles Powertrain
5 Years / Unlimited Mileage Rust Perforation
3 Years / 36,000 24/7 Roadside Assistance
See Owner Info Kit & Warranty For Details

Privacy Notice
www.subaru.com/company/privacy.html

OPTIONAL EQUIPMENT AND OTHER ITEMS

1) Manufacturer's Suggested Retail Price	**$32,735.00**
Exterior Color: Ceramic White	
2) Accessories and Optional Equipment Suggested Retail Price	
Standard Option: 01	
LED Upgrade - Map and Dome Lights	$112.00
All-Weather Floor Liners	$132.00
3) Transportation	**$1,130.00**
(Inland Freight Charge & Handling Charge)	
4) Total of 1+2+3 above	**$34,109.00**
Emission Compliance	**$59.00**
Full Tank of Gas	**INCLD**
Total	**$34,168.00**

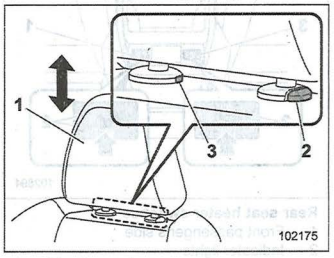
00763480

THIS LABEL HAS BEEN APPLIED PURSUANT TO FEDERAL LAW, DO NOT REMOVE OR ALTER PRIOR TO THE DELIVERY TO THE ULTIMATE PURCHASER.

FIGURE 102. Monroney Label

ble in the following ways.

▼ **Head restraint height adjustment**



1 Head restraint
2 Release button
3 Remove button

To release:

- Lowermost to the 1st step

Pull the head restraint up to the 1st step.

To raise:

- 1st step to the 3rd step

Pull the head restraint up while pressing the release button on the top of the seatback.

To lower:

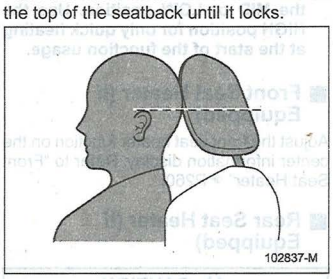
Push the head restraint down while pressing the release button on the top of the seatback.

To remove:

Use a key or other hard, pointed object to press the remove button, then pull out the head restraint.

To install:

Push the head restraint into the holes on the top of the seatback until it locks.

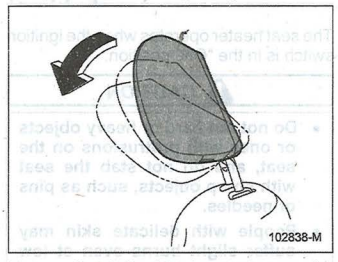


Each head restraint should be adjusted so that the center of the head restraint is closest to the top of the occupant's ears.

NOTE

It is not possible to remove or install the head restraint without reclining the front seatback. Reclining the front seatback and then remove or install the head restraint.

▼ **Head restraint angle adjustment**



The angle of the head restraint can be adjusted in several steps. While maintaining a suitable driving posture, adjust the head restraint to a position where the back of your head is as close to the head restraint as possible.

To tilt:

Tilt the head restraint by hand to the preferred position. A click will be audible when the head restraint is locked.

To return:

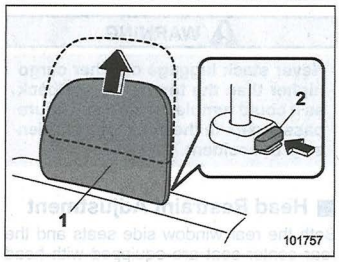
Tilt the head restraint once as far forward as it can go. The head restraint will automatically return to the fully upright position. Then, adjust the head restraint again to the preferred angle.

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

risk of serious neck injury in the event that the vehicle is struck from the rear. Therefore, when the head restraints are removed, all head restraints must be reinstalled properly to protect vehicle occupants.

- **The vehicle should not be operated until the head restraints are installed in the proper position.**

▼ **Rear windows side seating position**



1 Head restraint
2 Release button

To remove:

While pressing the release button, pull out the head restraint.

To install:

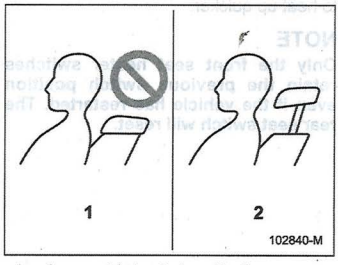
Install the head restraint into the holes that are located on the top of the seatback until the head restraint locks. Press and hold the release button to lower the head restraint.

After installing the head restraint, make sure it is securely locked.

NOTE

When the head restraint cannot be pulled out or installed due to insufficient clearance between the head restraint and the roof, tilt the seat and then perform the installation and removal tasks.

▼ **Rear center seating position**

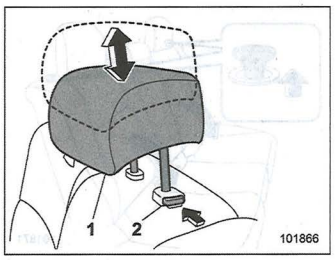


1 Incorrect (retracted position)
2 Correct (extended position)

CAUTION

The head restraint is not intended to be used in the retracted position. Before sitting on the seat, raise the head restraint to the extended position.

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



1 Head restraint
2 Release button

To raise:

Pull the head restraint up.

To lower:

Push the head restraint down while pressing the release button on the top of the seatback.

To remove:

While pressing the release button, pull out the head restraint.

To install:

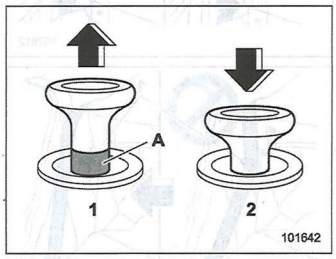
Install the head restraint into the holes that are located on the top of the seatback until the head restraint locks. Press and hold the release button to lower the head restraint.

When the rear-center seating position is occupied, raise the head restraint to the extended position. When the rear center seating position is not occupied, lower the head restraint to improve rearward visibility.

■ Folding Down the Rear Seatback

⚠ WARNING

- **When you fold down the seatback, check that there are no passengers or objects on the rear seat. Not doing so creates a risk of injury or property damage if the seatback suddenly folds down.**
- **Never allow passengers to ride on the folded rear seatback or in the trunk. Doing so may result in serious injury or death.**
- **Secure all objects and especially long items properly to prevent them from being thrown around inside the vehicle and causing serious injury during a sudden stop, a sudden steering maneuver or a rapid acceleration.**
- **When you return the seatback to its original position, shake the seatback slightly to confirm that it is securely fixed in place. If the seatback is not securely fixed in place, the seatback may suddenly fold down in the event of sudden braking, or objects may move out from the trunk, which could cause serious injury or death.**



Lock release knob
1 Unlocked
2 Locked
A Unlocking marker in red

– CONTINUED –

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

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

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

Additional Driver & Passenger Dummy Instrumentation Data

Driver Lower Spine T12 Acceleration (X)

Driver Lower Spine T12 Acceleration (Y)

Driver Lower Spine T12 Acceleration (Z)

Driver Head Acceleration Redundant (X)

Driver Head Acceleration Redundant (Y)

Driver Head Acceleration Redundant (Z)

Passenger Head Acceleration Redundant (X)

Passenger Head Acceleration Redundant (Y)

Passenger Head Acceleration Redundant (Z)

Vehicle Instrumentation Data

Vehicle Center of Gravity Acceleration (X)

Vehicle Center of Gravity Acceleration (Y)

Vehicle Center of Gravity Acceleration (Z)

Right Side Sill at Front Seat Acceleration (X)

Right Side Sill at Front Seat Acceleration (Y)

Right Side Sill at Front Seat Acceleration (Z)

Right Side Sill at Rear Seat Acceleration (X)

Right Side Sill at Rear Seat Acceleration (Y)

Right Side Sill at Rear Seat Acceleration (Z)

Left Side Sill at Front Seat Acceleration (Y)

Left Side Sill at Rear Seat Acceleration (Y)

Lower A-Post Acceleration (Y)

Middle A-Post Acceleration (Y)

Lower B-Post Acceleration (Y)

Middle B-Post Acceleration (Y)

Front Seat Track Acceleration (Y)

Rear Seat Structure Acceleration (Y)

Right Rear Occupant Compartment Acceleration (Y)

Engine Block (X)

Engine Block (Y)

Rear Floorpan Above Axle Acceleration (X)

Rear Floorpan Above Axle Acceleration (Y)

Rear Floorpan Above Axle Acceleration (Z)

MDB Instrumentation Data

MDB Center of Gravity Acceleration (X)

MDB Center of Gravity Acceleration (Y)

MDB Center of Gravity Acceleration (Z)

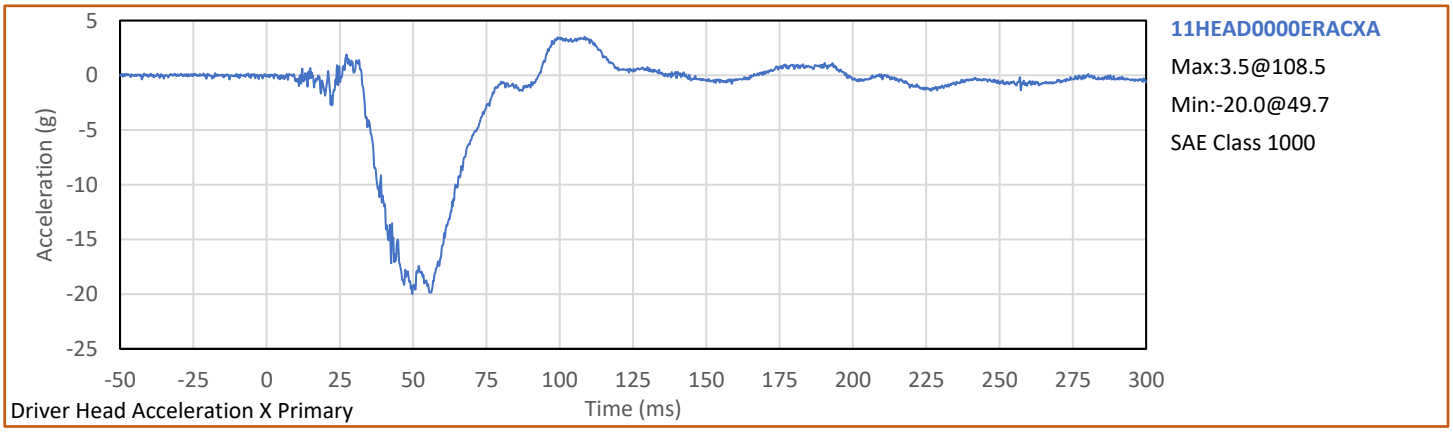
MDB Rear Acceleration (X)

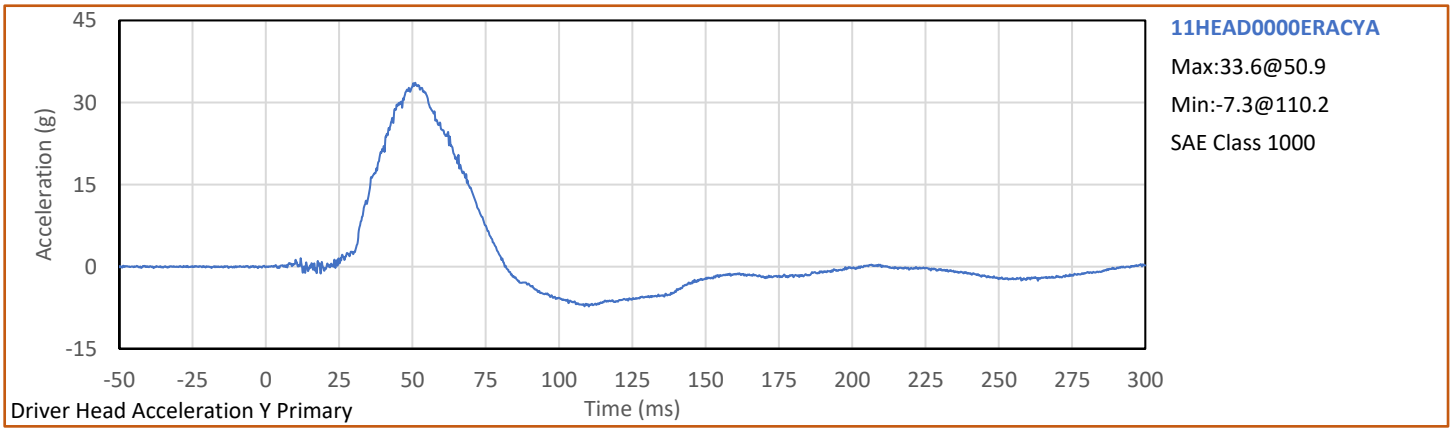
MDB Rear Acceleration (Y)

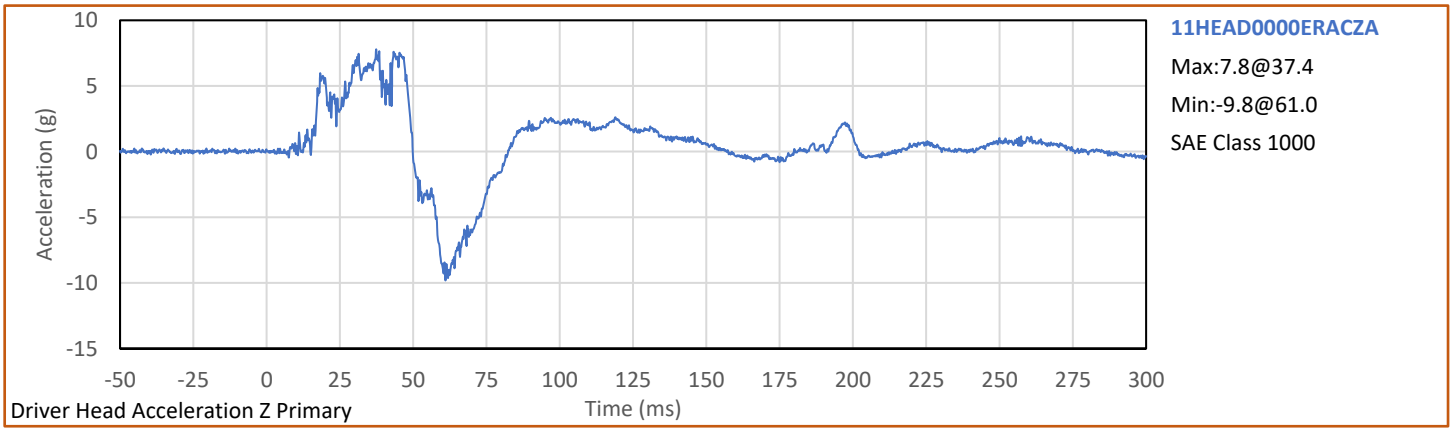
Left MDB Contact Switch

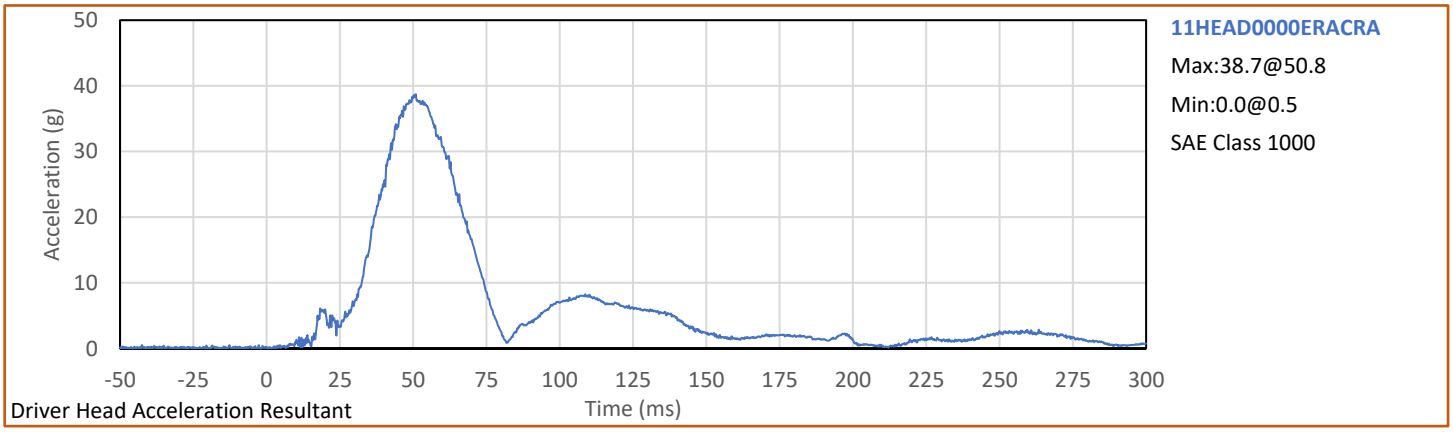
Right MDB Contact Switch

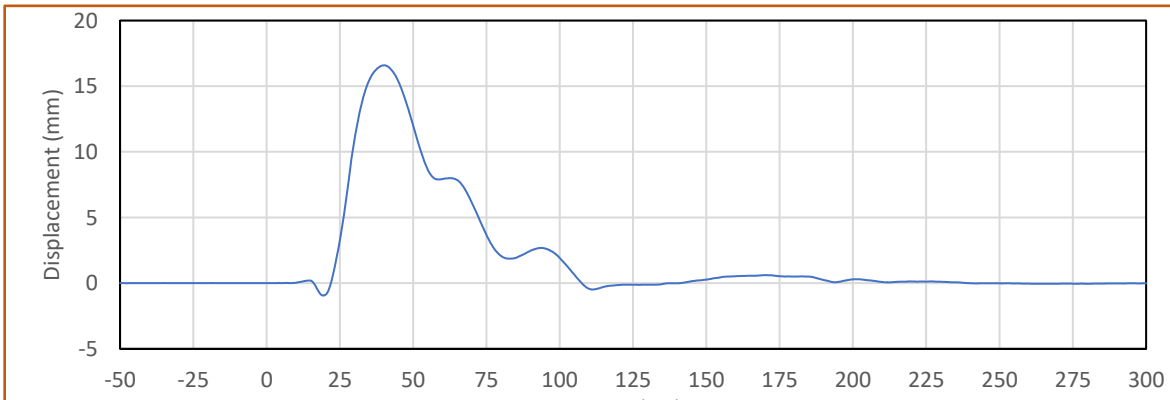
Test Vehicle:	2024 Subaru WRX 4-Door Sedan	NHTSA No.:	O20245505
Test Program:	NCAP MDB Side Impact Test	Test Date:	7/31/2024





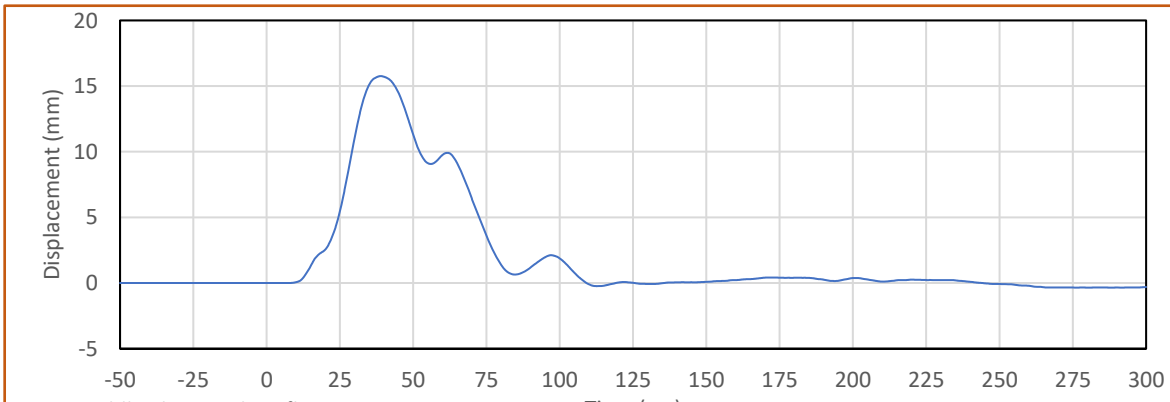






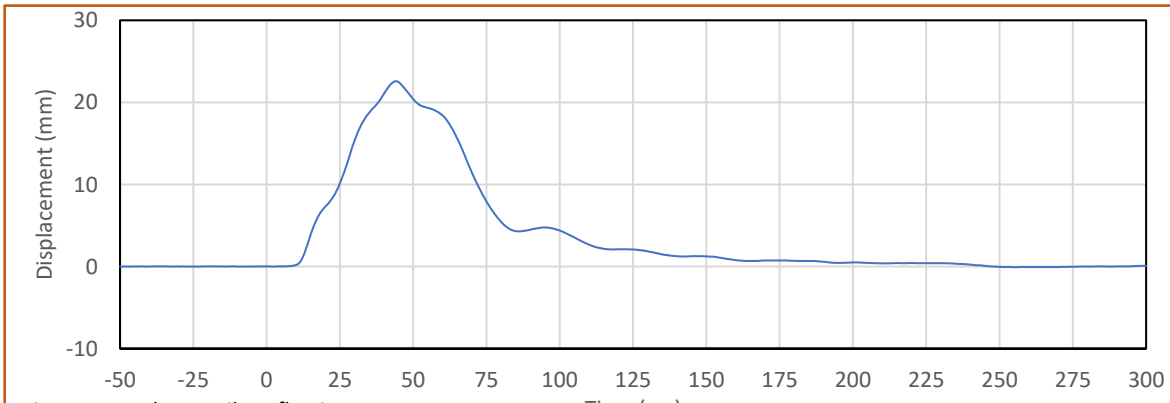
11RIBSLEUPERDSYC
Max:16.6@40.1
Min:-0.9@19.4
SAE Class 180

Driver Upper Thorax Rib Deflection Y



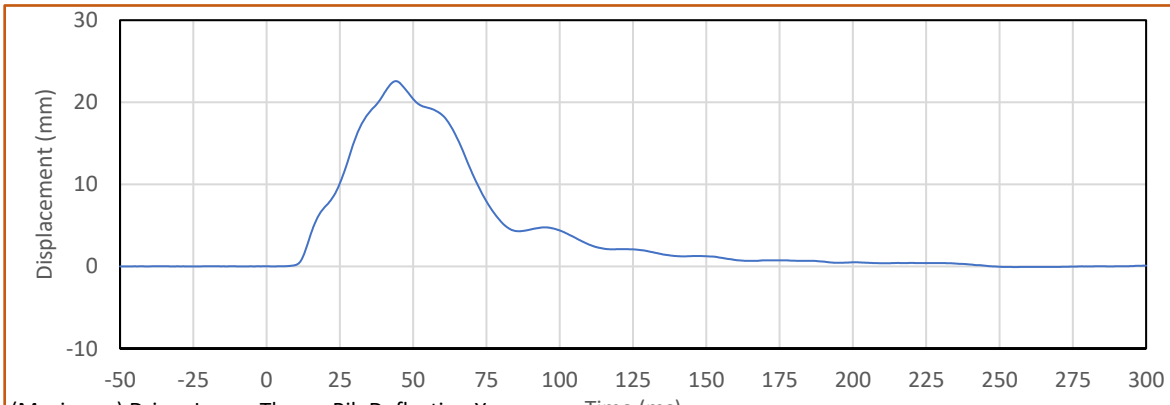
11RIBSLEMIERDSYC
Max:15.8@38.9
Min:-0.4@280.3
SAE Class 180

Driver Middle Thorax Rib Deflection Y



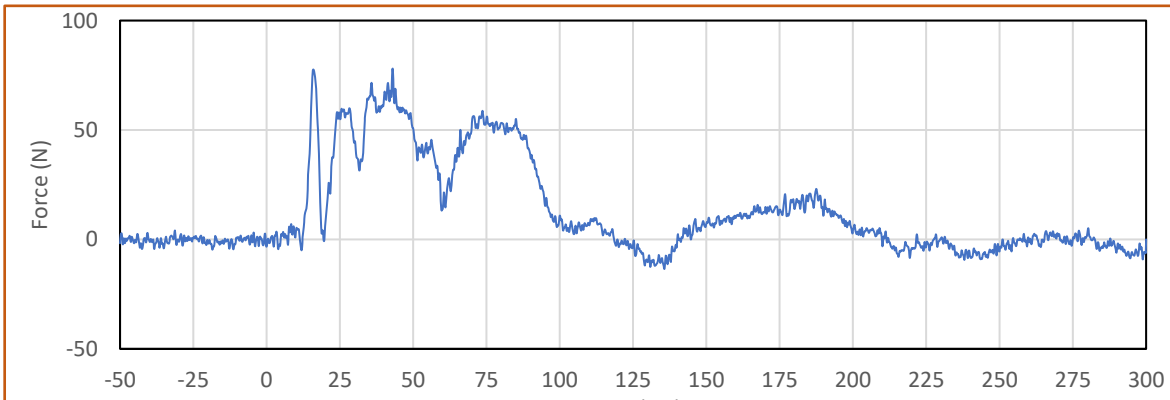
11RIBSLELOERDSYC
Max:22.6@44.1
Min:-0.1@254.9
SAE Class 180

Driver Lower Thorax Rib Deflection Y



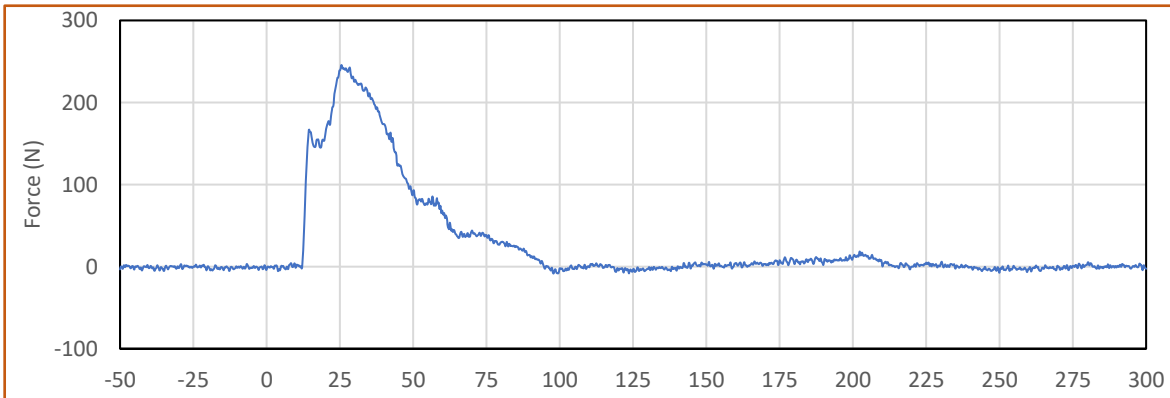
11RIBSLELOERDSYC
Max:22.6@44.1
Min:-0.1@254.9
SAE Class 180

(Maximum) Driver Lower Thorax Rib Deflection Y



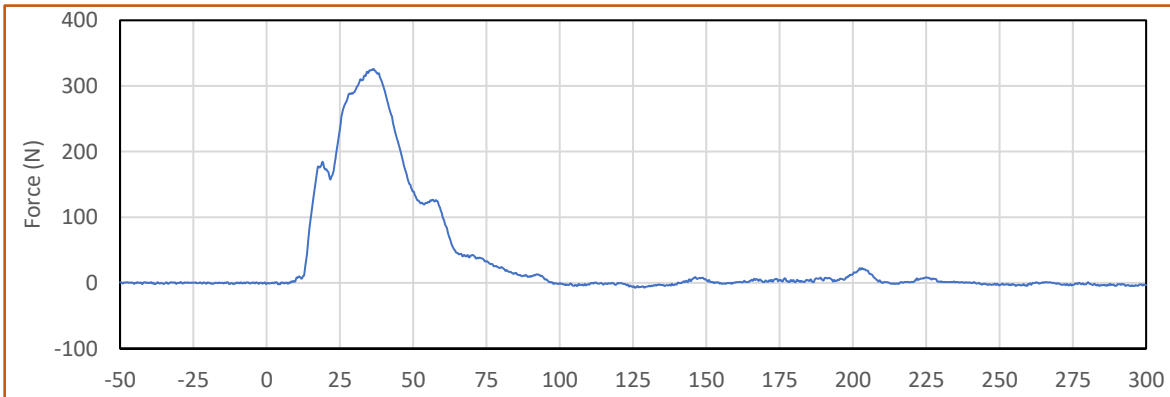
Driver Anterior Abdominal Force Y

11ABDOLEFRERFOYB
Max:78.0@43.0
Min:-13.6@135.7
SAE Class 600



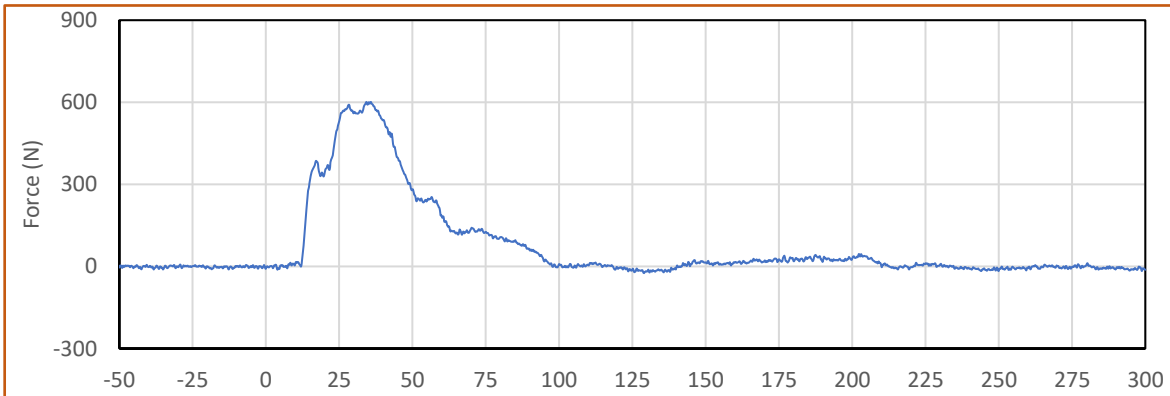
Driver Middle Abdominal Force Y

11ABDOLEMIERFOYB
Max:245.6@25.5
Min:-8.4@97.8
SAE Class 600



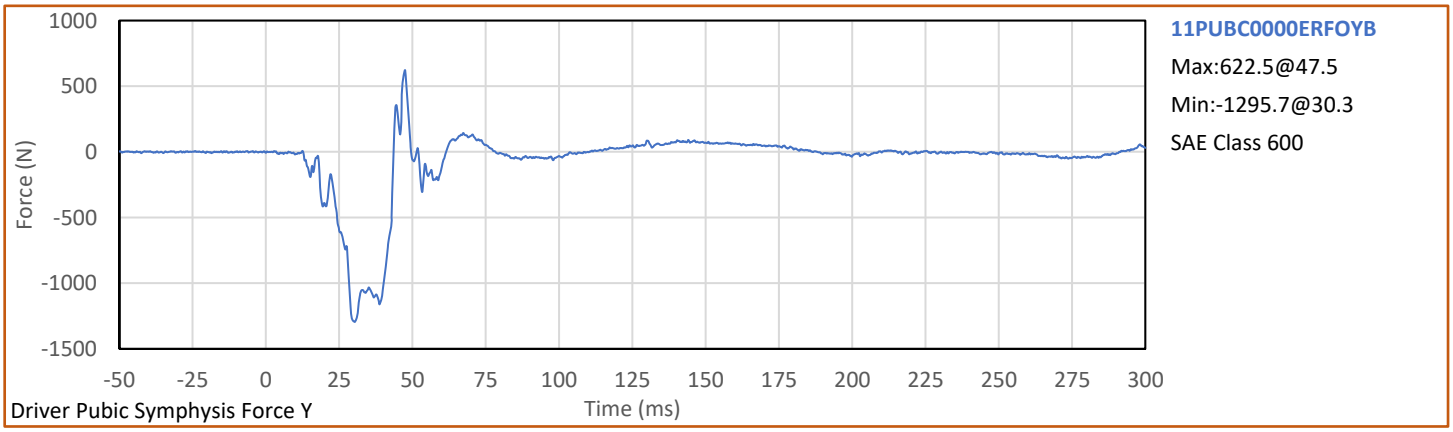
Driver Posterior Abdominal Force Y

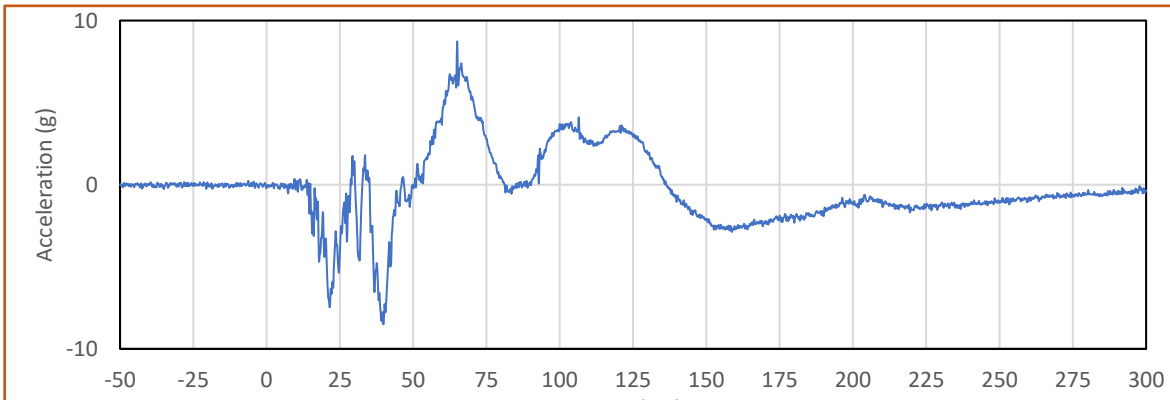
11ABDOLEREERFOYB
Max:325.8@36.5
Min:-7.3@125.7
SAE Class 600



Driver Total Abdominal Force Y

11ABDOLESUERFOYB
Max:601.4@35.8
Min:-24.6@129.0
SAE Class 600


1000
500
0
-500
-1000
-1500
Force (N)
-50
-25
0
25
50
75
100
125
150
175
200
225
250
275
300
Time (ms)
Driver Pubic Symphysis Force Y
11PUBC0000ERFOYB
Max:622.5@47.5
Min:-1295.7@30.3
SAE Class 600

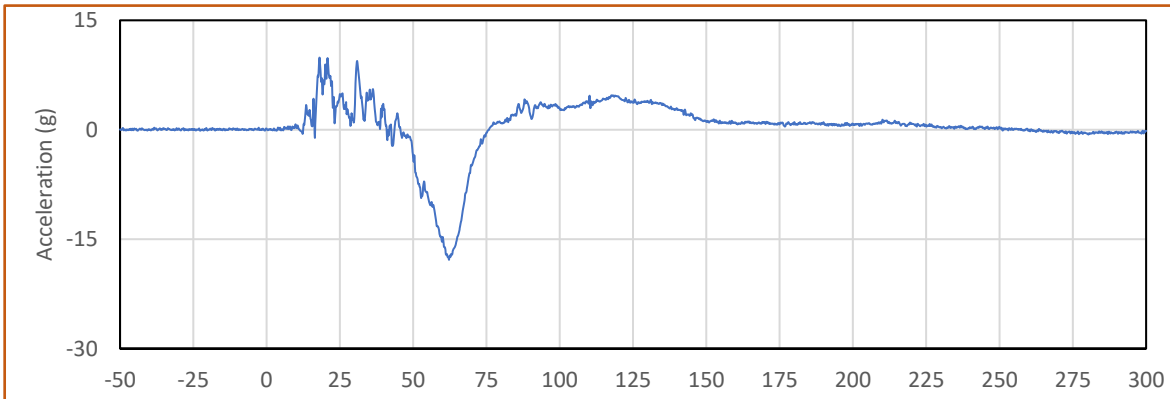


14HEAD0000S2ACXA
Max:8.7@65.0
Min:-8.5@39.9
SAE Class 1000

Passenger Head Acceleration X Primary

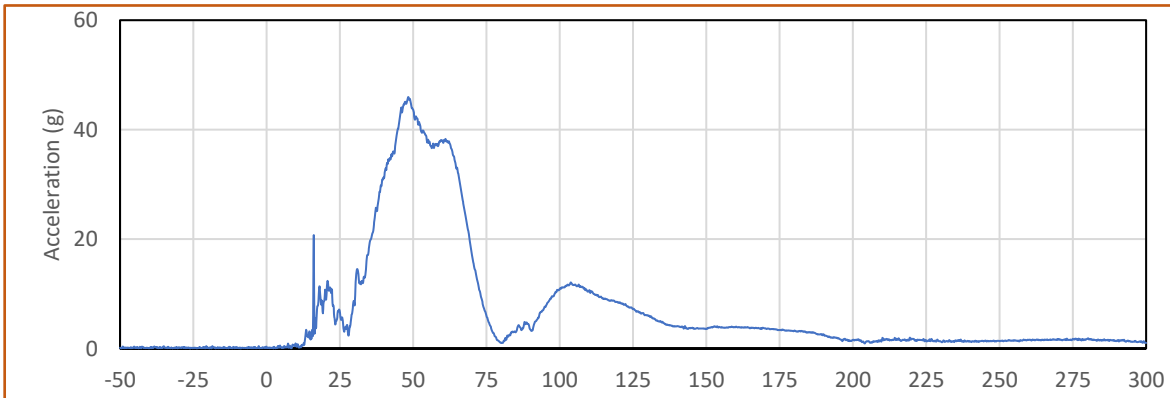
14HEAD0000S2ACYA
Max:46.0@48.3
Min:-11.0@103.8
SAE Class 1000

Passenger Head Acceleration Y Primary



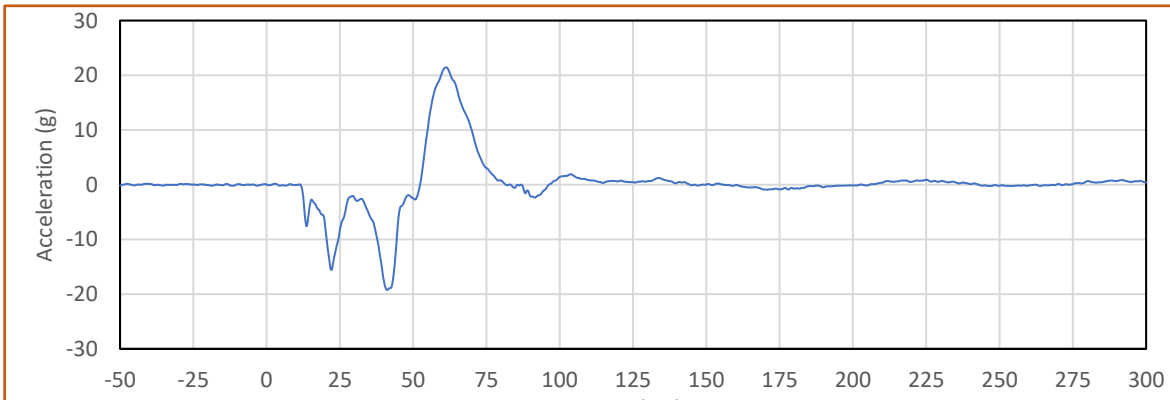
14HEAD0000S2ACZA
Max:9.9@18.0
Min:-17.8@62.2
SAE Class 1000

Passenger Head Acceleration Z Primary



14HEAD0000S2ACRA
Max:46.0@48.3
Min:0.0@2.3
SAE Class 1000

Passenger Head Resultant Acceleration Primary

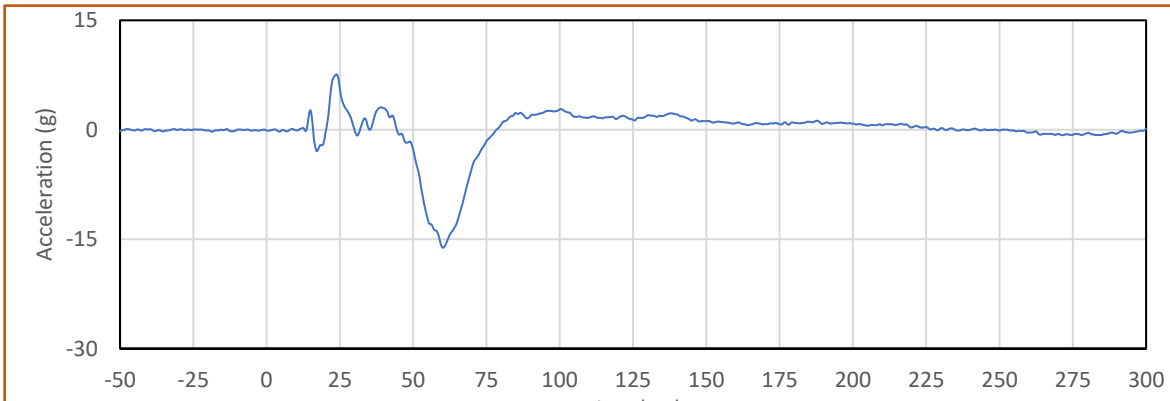


14ABSP01RIS2ACXC
Max:21.4@61.2
Min:-19.2@41.1
SAE Class 180

Passenger Lower Spine T12 Acceleration X

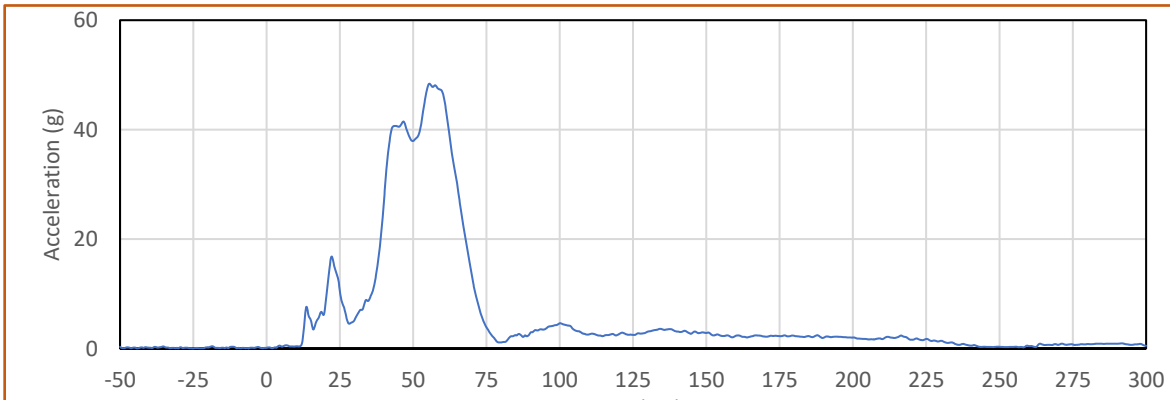
14ABSP01RIS2ACYC
Max:45.2@55.1
Min:-3.4@15.1
SAE Class 180

Passenger Lower Spine T12 Acceleration Y



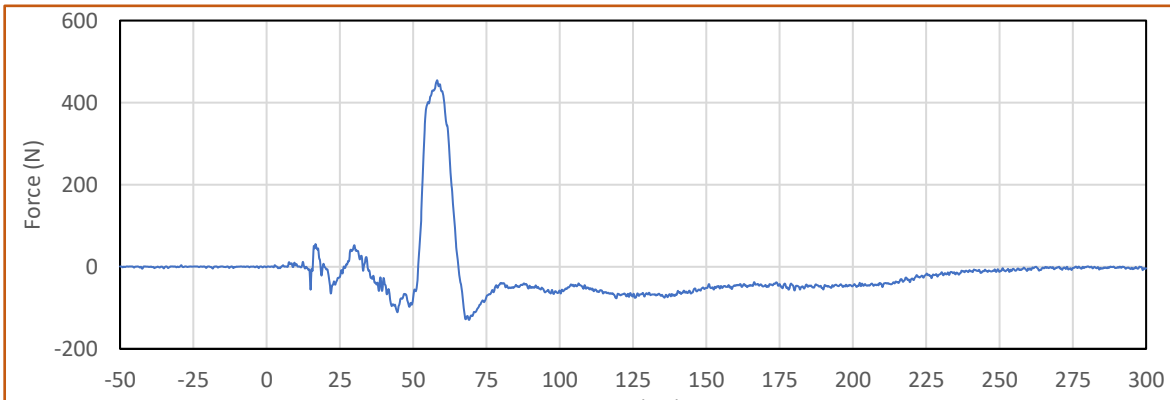
14ABSP01RIS2ACZC
Max:7.6@23.9
Min:-16.2@60.1
SAE Class 180

Passenger Lower Spine T12 Acceleration Z



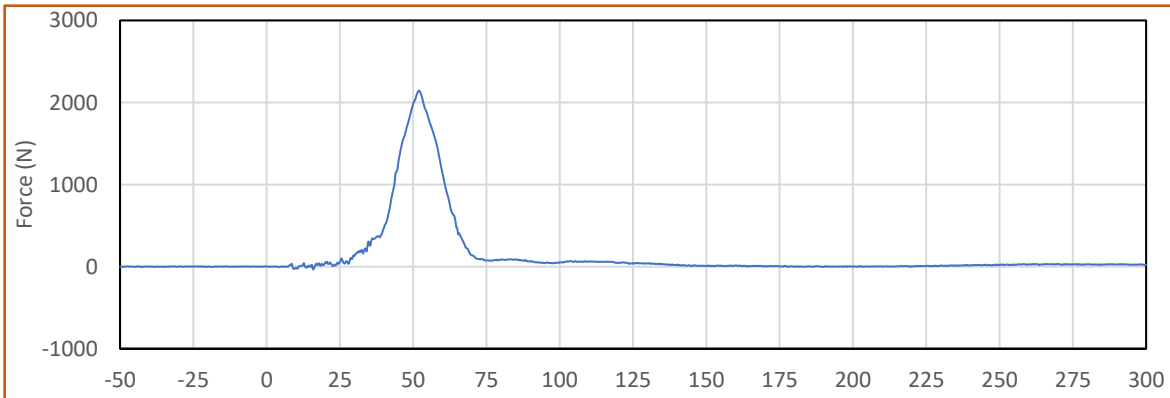
14ABSP01RIS2ACRC
Max:48.4@55.6
Min:0.0@1.9
SAE Class 180

Passenger Lower Spine T12 Acceleration Resultant



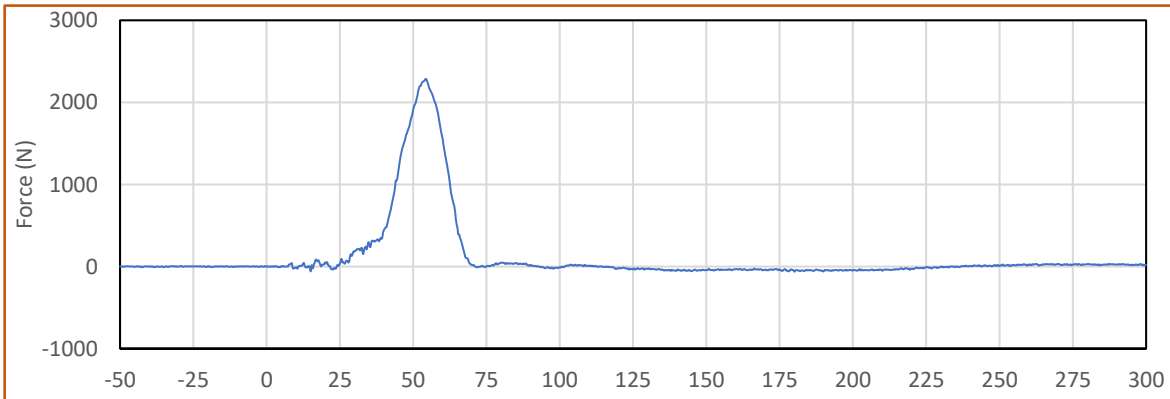
14ILACLE00S2FOYB
Max:454.7@58.2
Min:-129.4@69.1
SAE Class 600

Passenger Iliac Force on Impact Side Y



14ACTBLE00S2FOYB
Max:2142.4@52.1
Min:-35.0@15.9
SAE Class 600

Passenger Acetabulum Impact Side Force Y



14PELVLE00S2FOYB
Max:2285.3@54.3
Min:-62.6@180.1
SAE Class 600

Passenger Total Pelvic Force on Impact Side Y

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

Applus IDIADA KARCO

ES-2re 50th Male Side Impact ATD
External Measurements

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

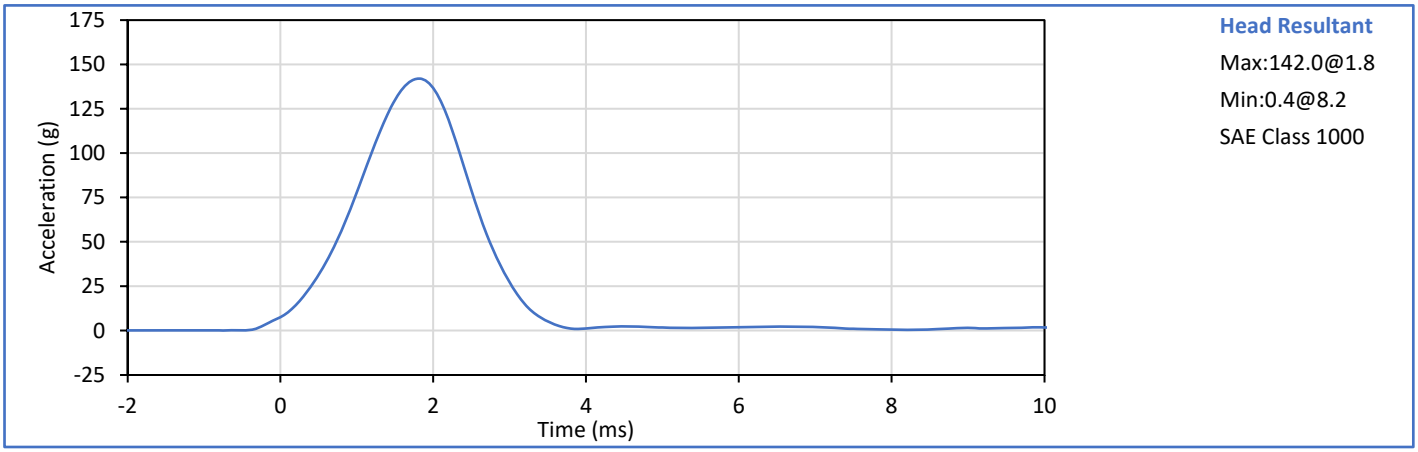
Approved By: J. Hernandez

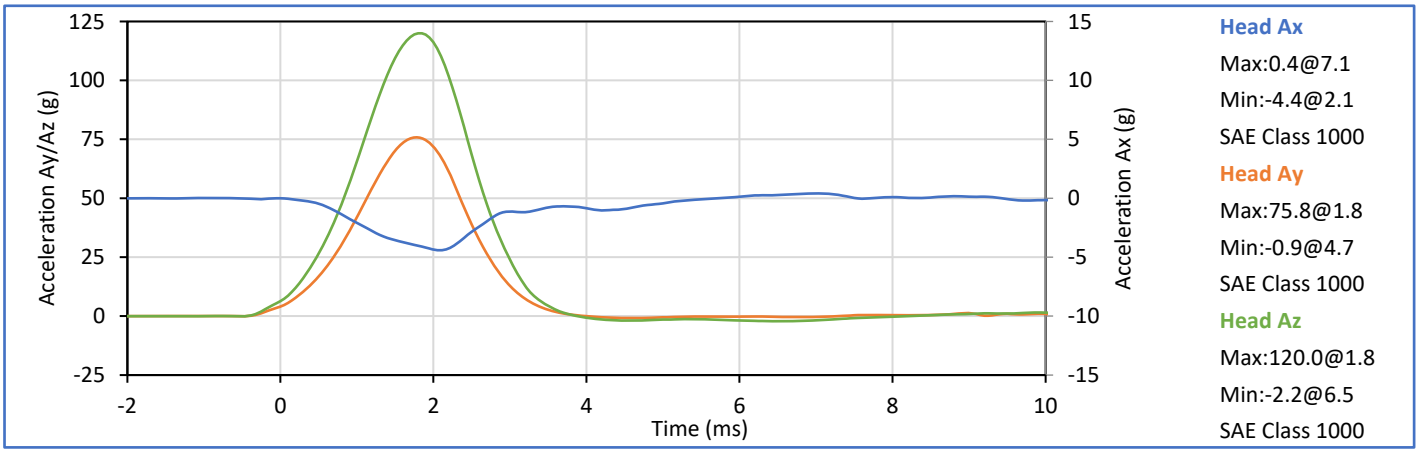
Applus IDIADA KARCO

ES-2re 50th Male Side Impact ATD
Head Drop

ATD Serial No.: F037 Test Date: 2024-07-24

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

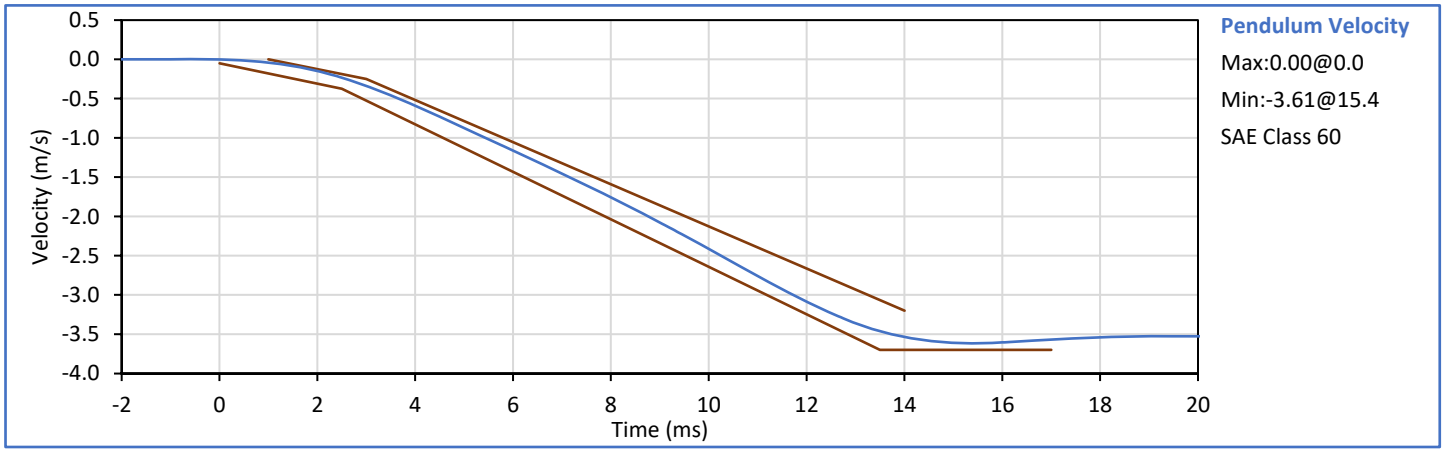
Approved By: J. Hernandez

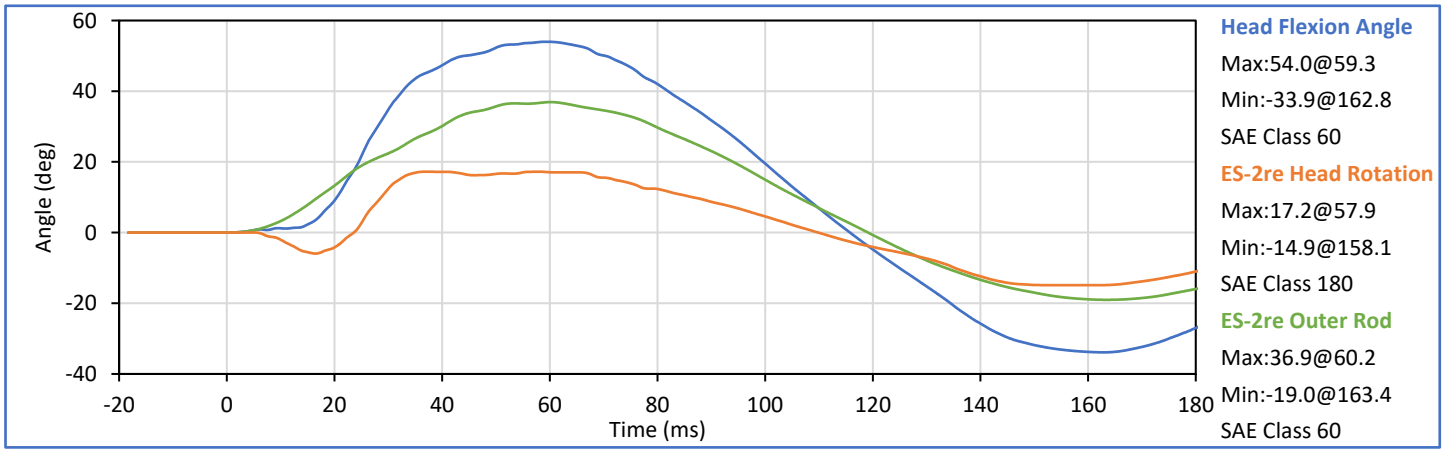
Applus IDIADA KARCO

ES-2re 50th Male Side Impact ATD
Neck Flexion

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	21.4	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

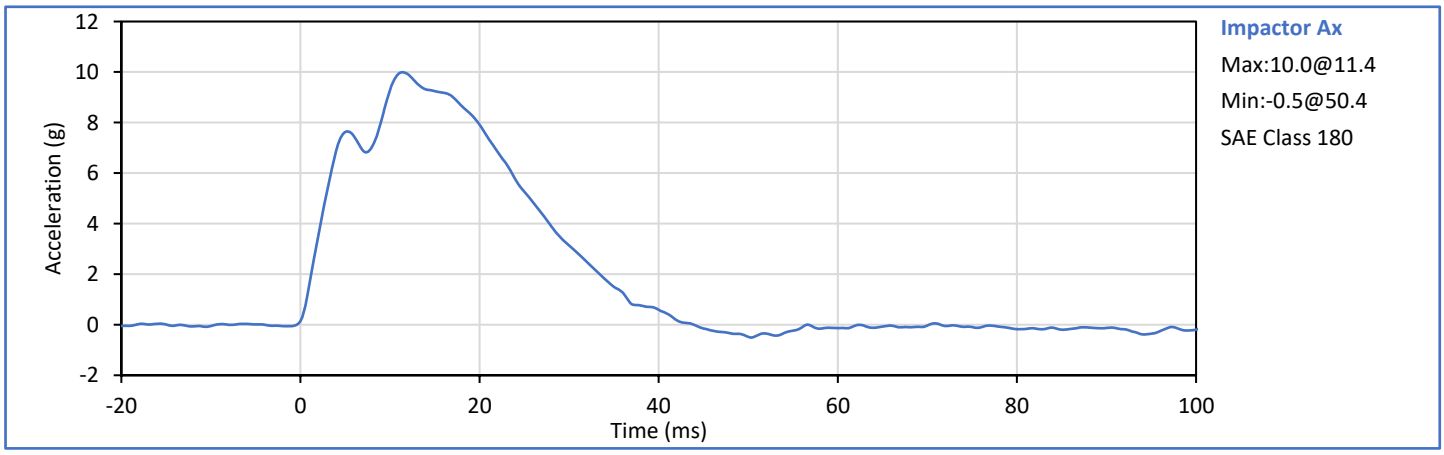
Approved By: J. Hernandez

Applus IDIADA KARCO

ES-2re 50th Male Side Impact ATD
Shoulder Impact Test

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

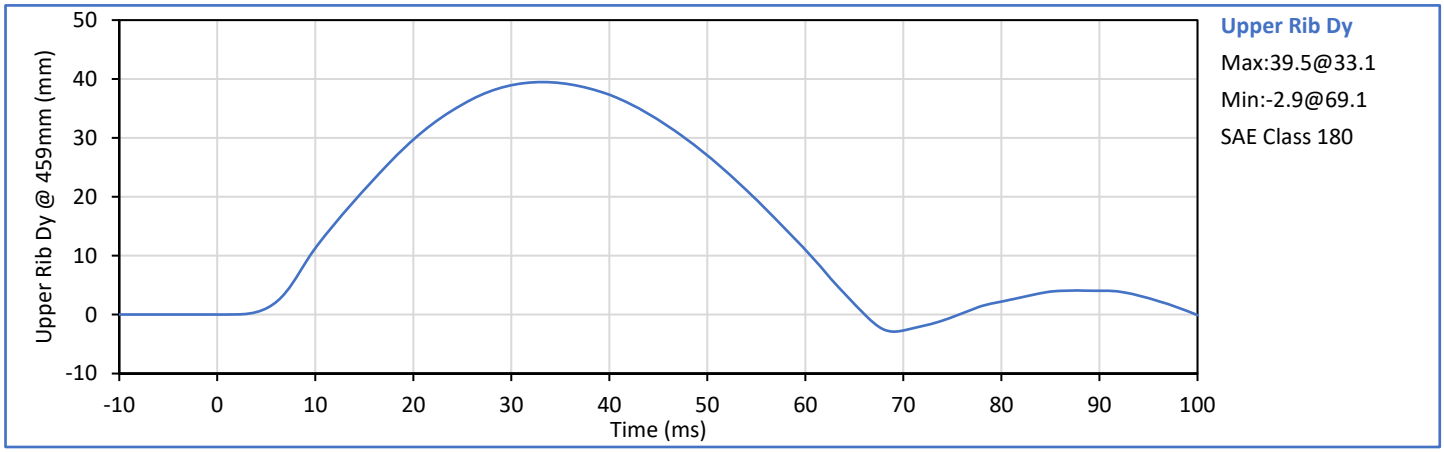
Approved By: J. Hernandez

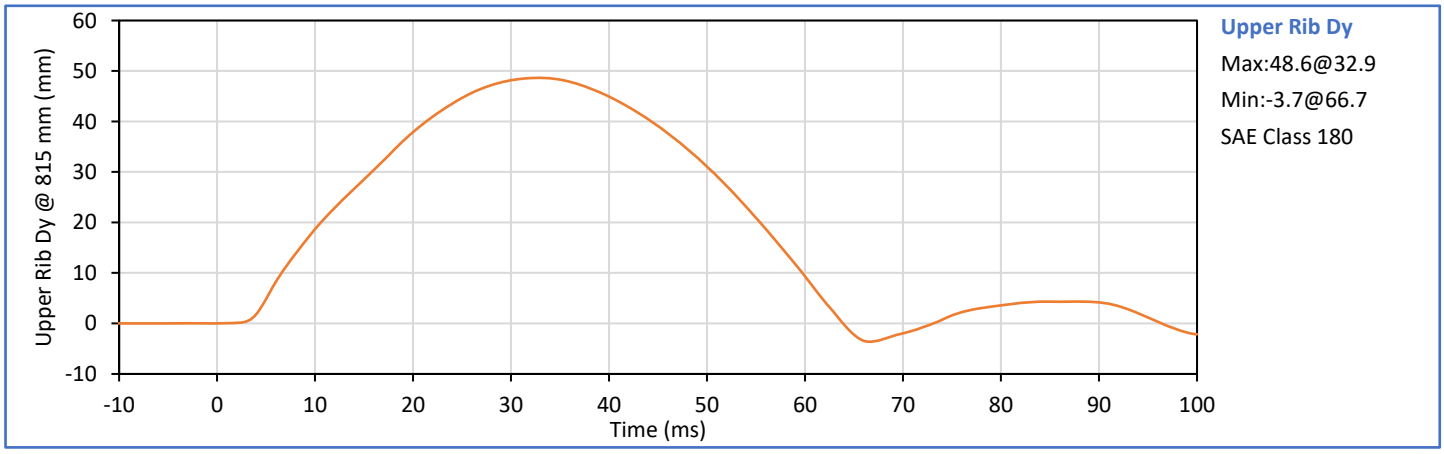
Applus IDIADA KARCO

ES-2re 50th Male Side Impact ATD
Upper Rib Drop Test

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	21.1	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





Technician: G. Fuentes

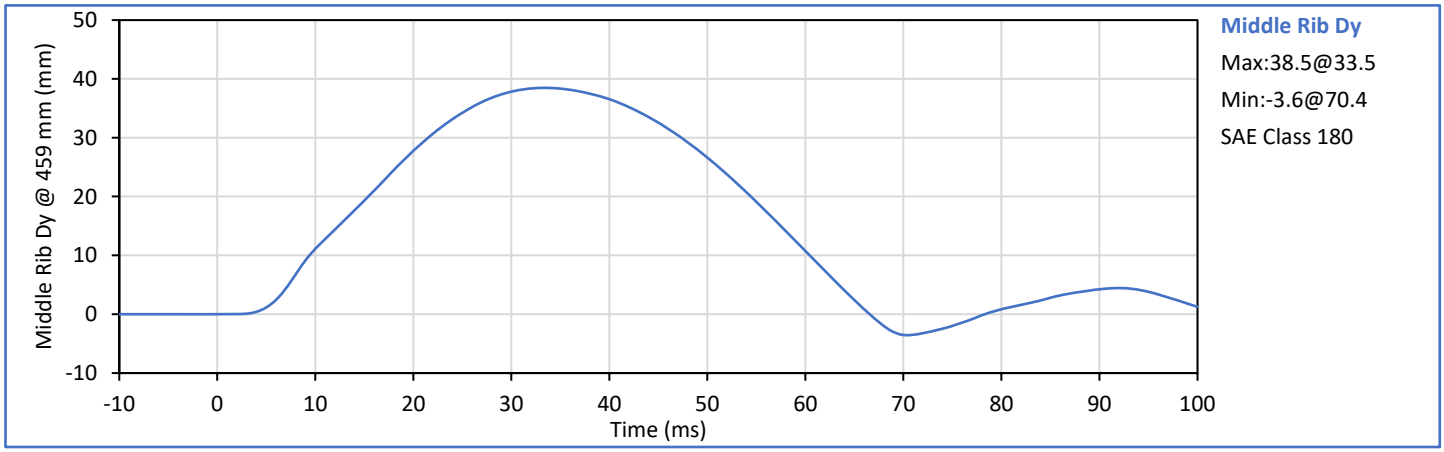
Approved By: J. Hernandez

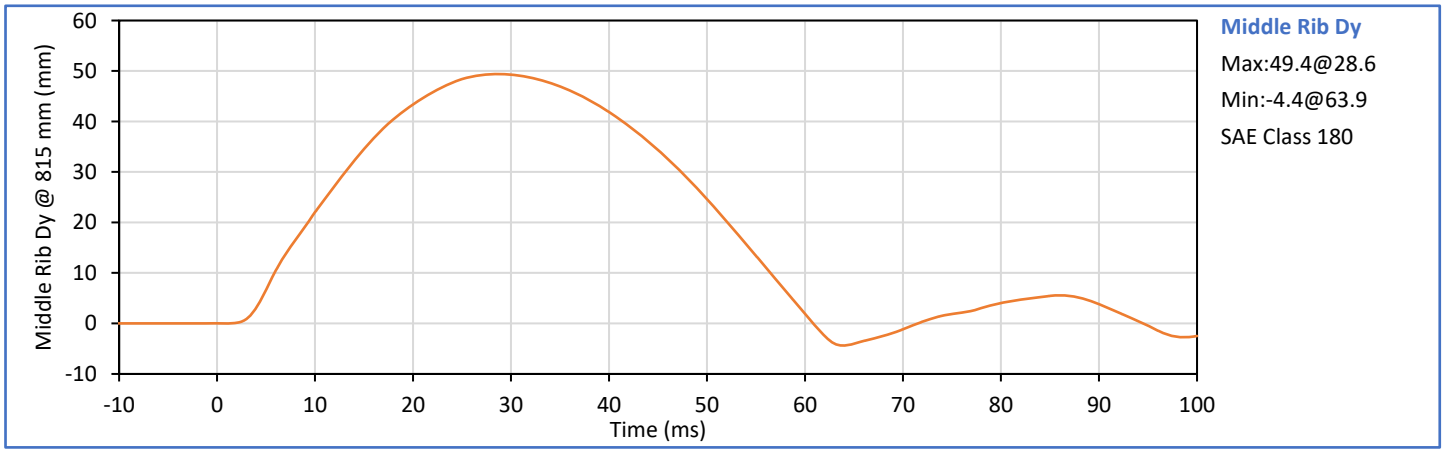
Applus IDIADA KARCO

ES-2re 50th Male Side Impact ATD
Middle Rib Drop Test

ATD Serial No.: F037 Test Date: 2024-07-22

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





Technician: G. Fuentes

Approved By: J. Hernandez

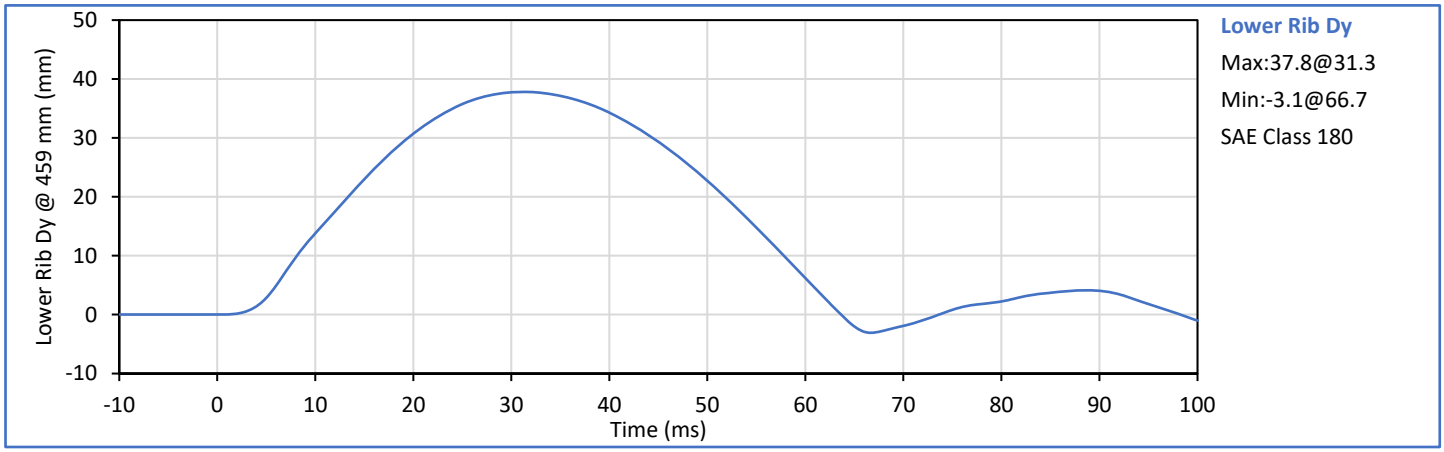
Applus IDIADA KARCO

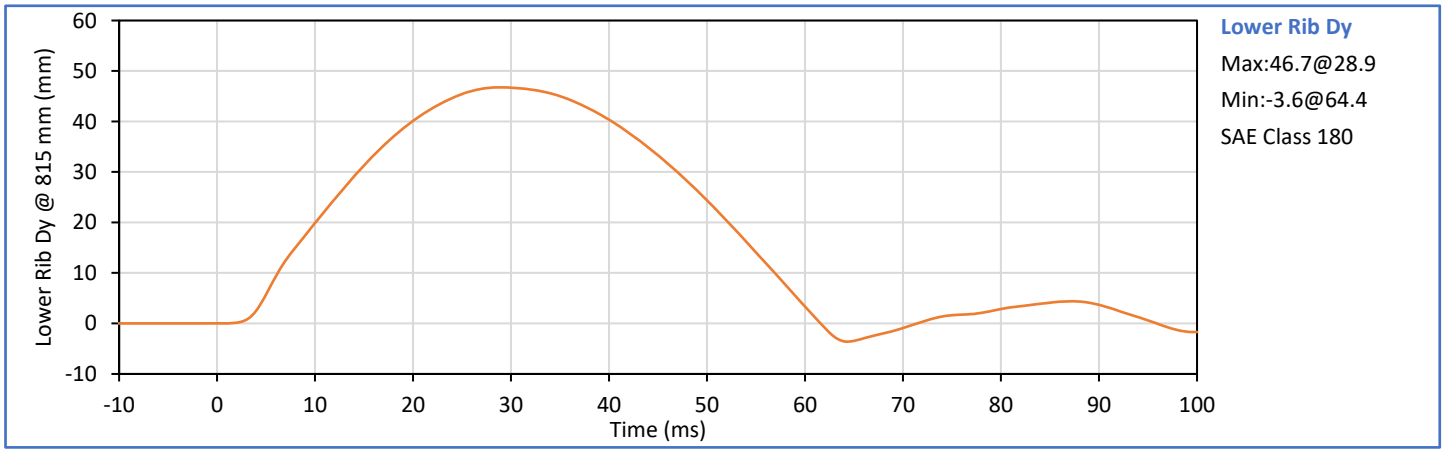
ES-2re 50th Male Side Impact ATD
Lower Rib Drop Test

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	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





Technician: G. Fuentes

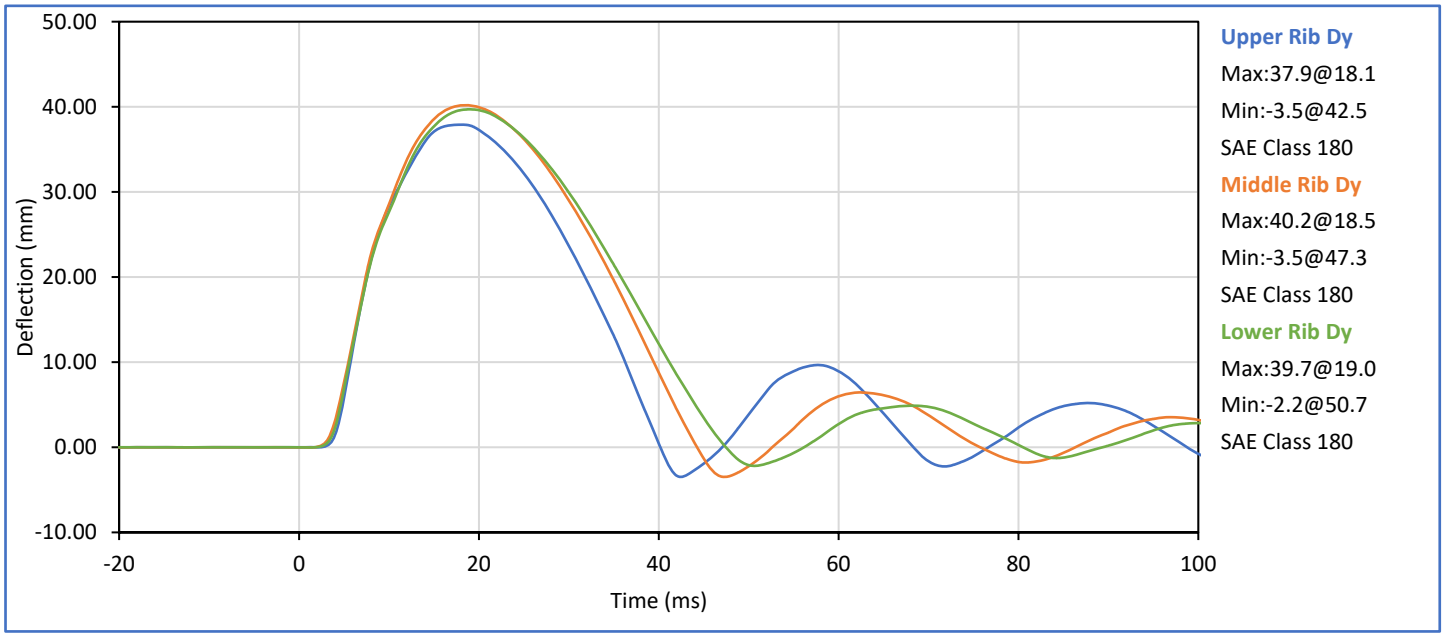
Approved By: J. Hernandez

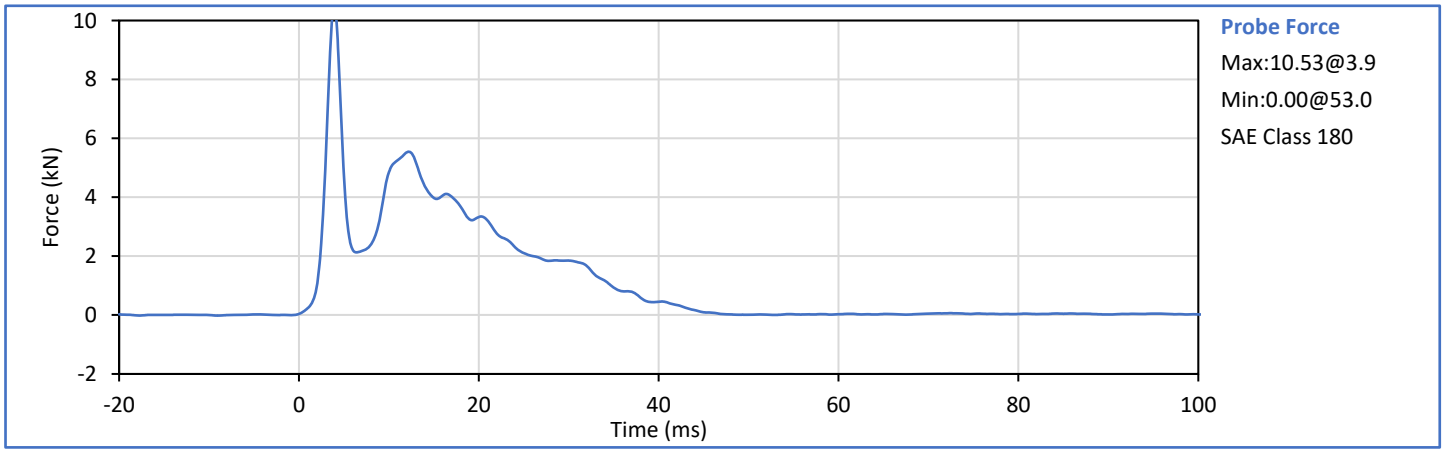
Applus IDIADA KARCO

ES-2re 50th Male Side Impact ATD
Thorax Impact (Full Body)

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	21.6	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

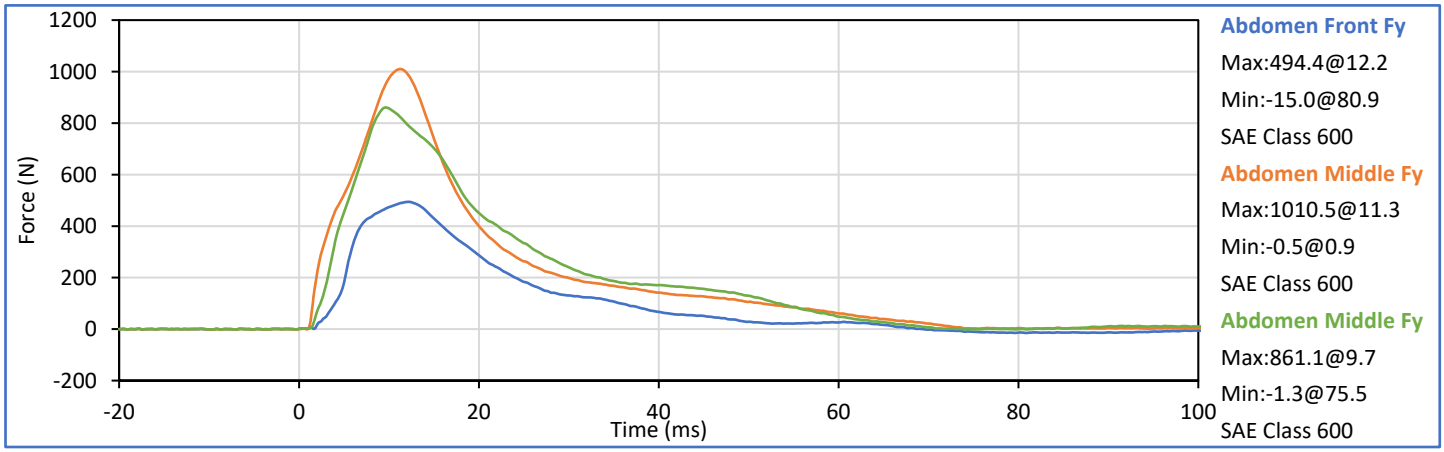
Approved By: J. Hernandez

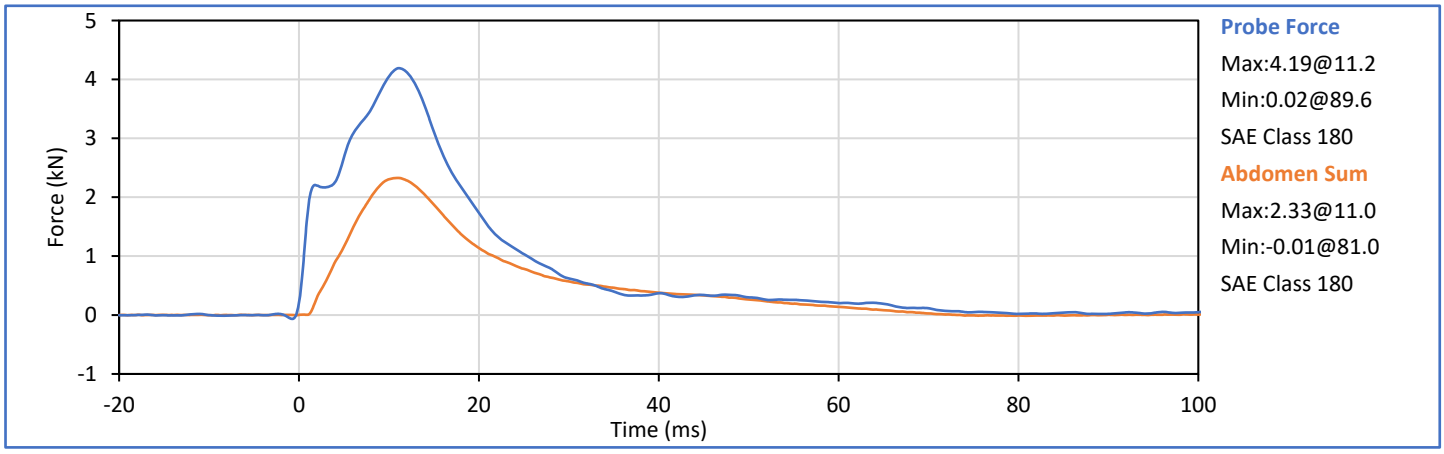
Applus IDIADA KARCO

ES-2re 50th Male Side Impact ATD
Abdomen Impact

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	21.5	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

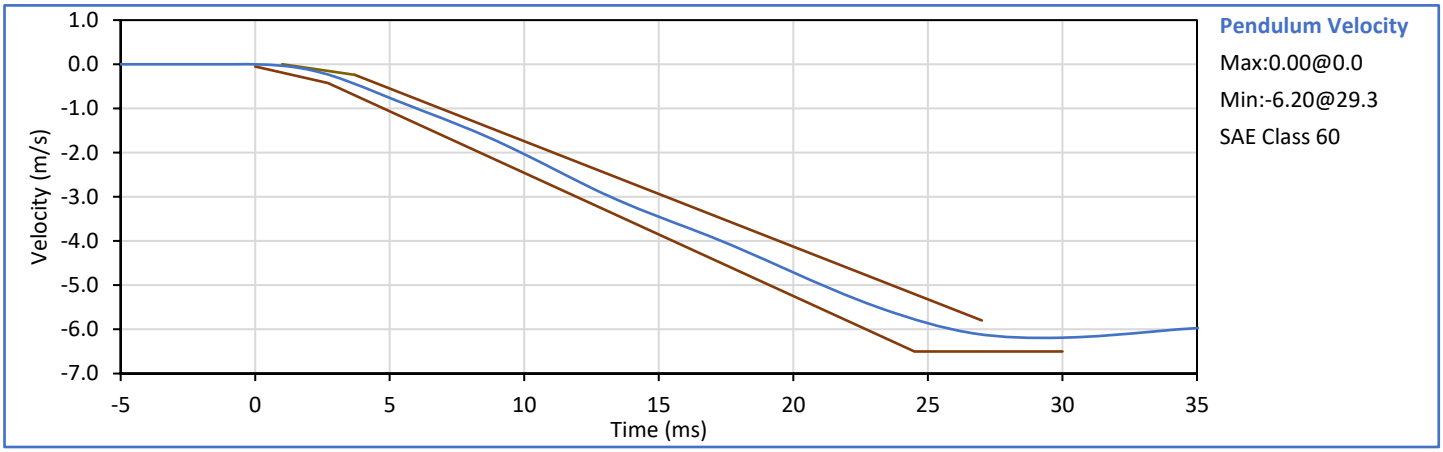
Approved By: J. Hernandez

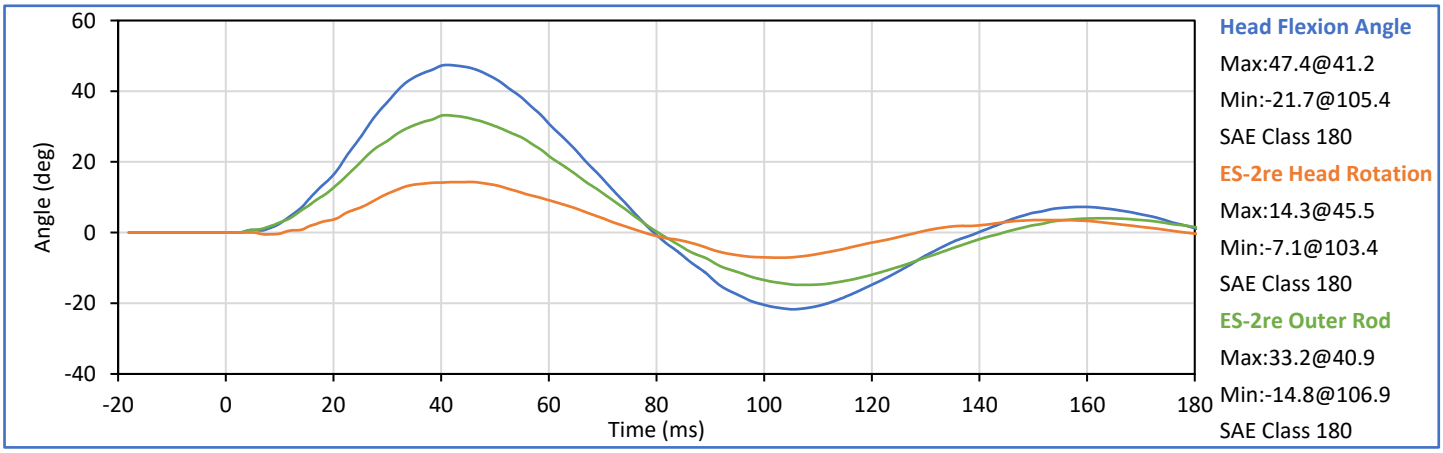
Applus IDIADA KARCO

ES-2re 50th Male Side Impact ATD
Lumbar Spine Flexion

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	21.4	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

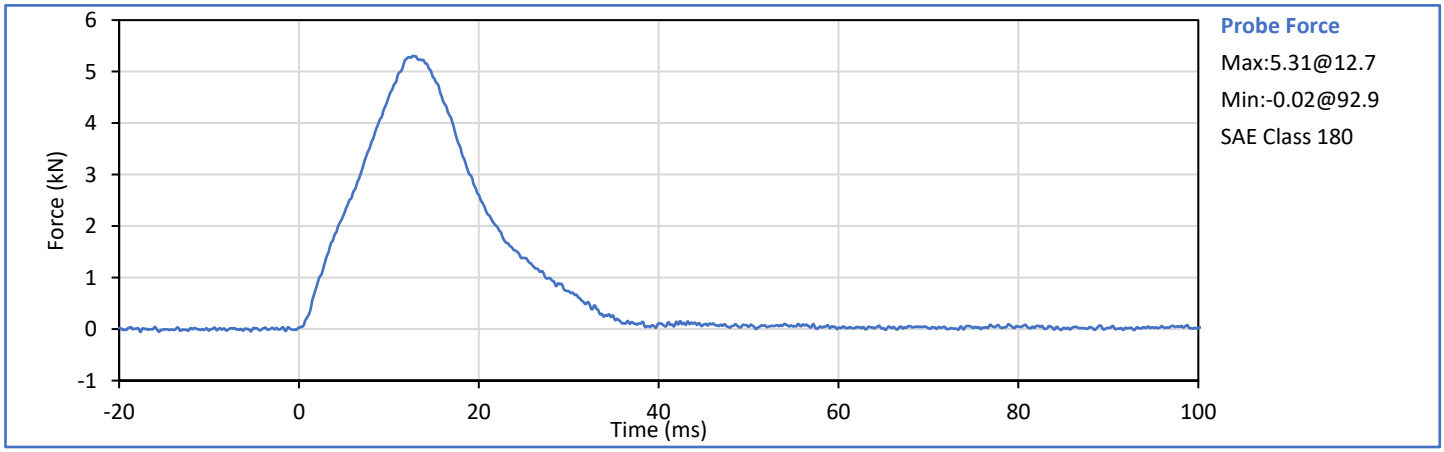
Approved By: J. Hernandez

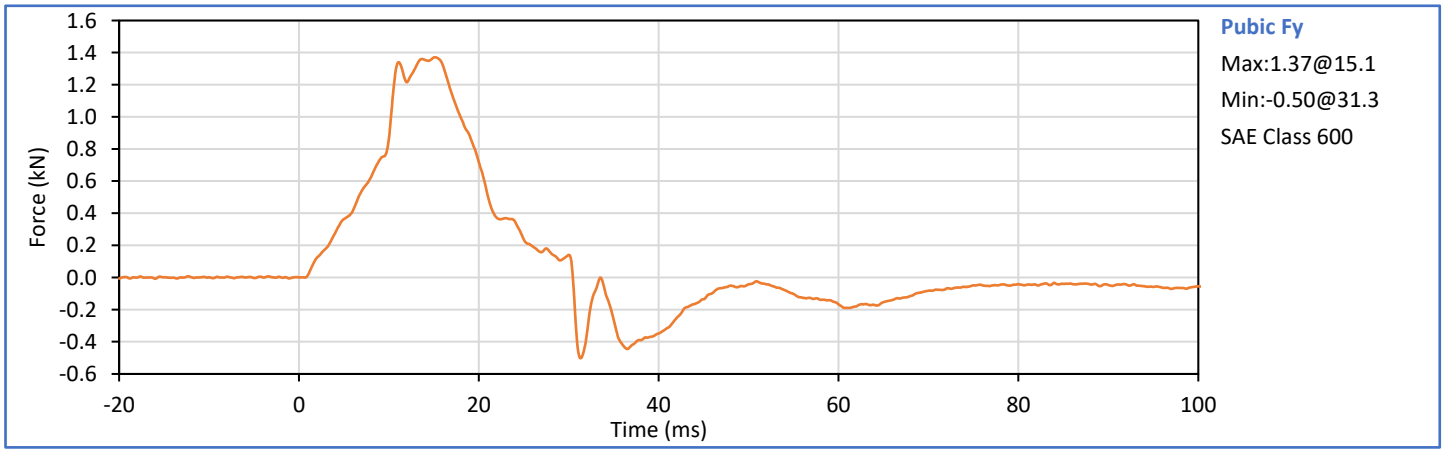
Applus IDIADA KARCO

ES-2re 50th Male Side Impact ATD
Pelvis Impact

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	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





Technician: G. Fuentes

Approved By: J. Hernandez

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

Applus IDIADA KARCO

SID-IIs Small Side Impact ATD
External Measurements

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

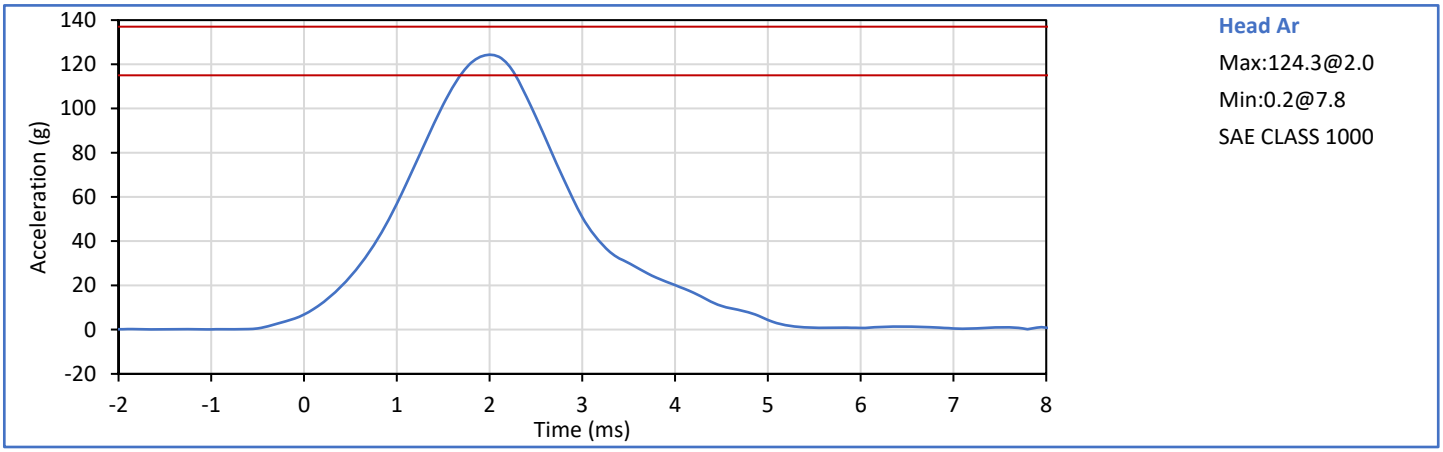
Approved By: J. Hernandez

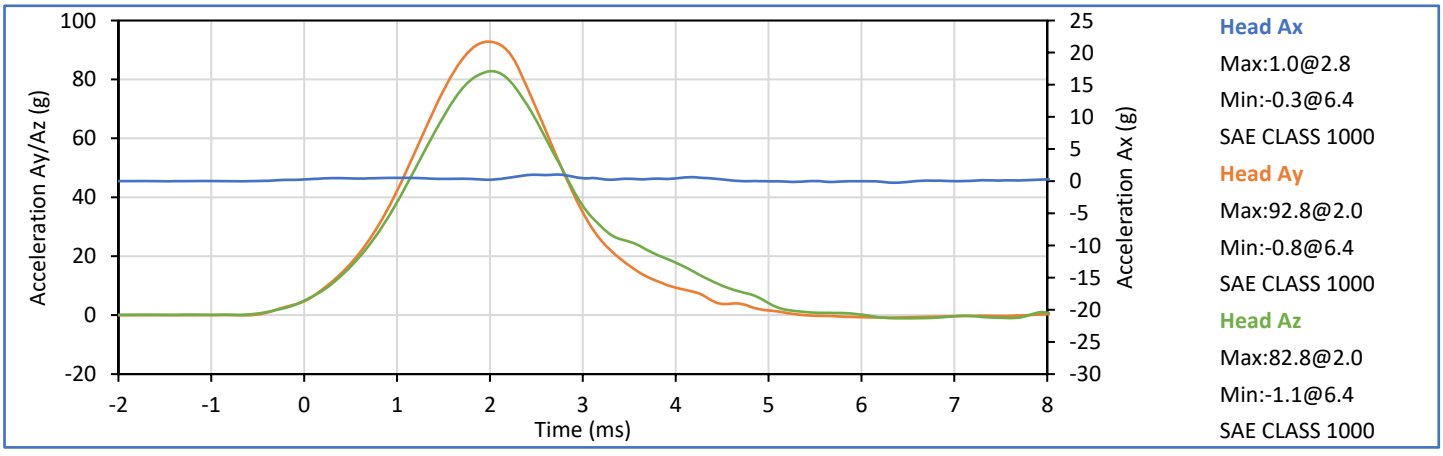
Applus IDIADA KARCO

SID-IIs Small Side Impact ATD
Head Drop

ATD Serial No.: 299 Test Date: 2024-07-25

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

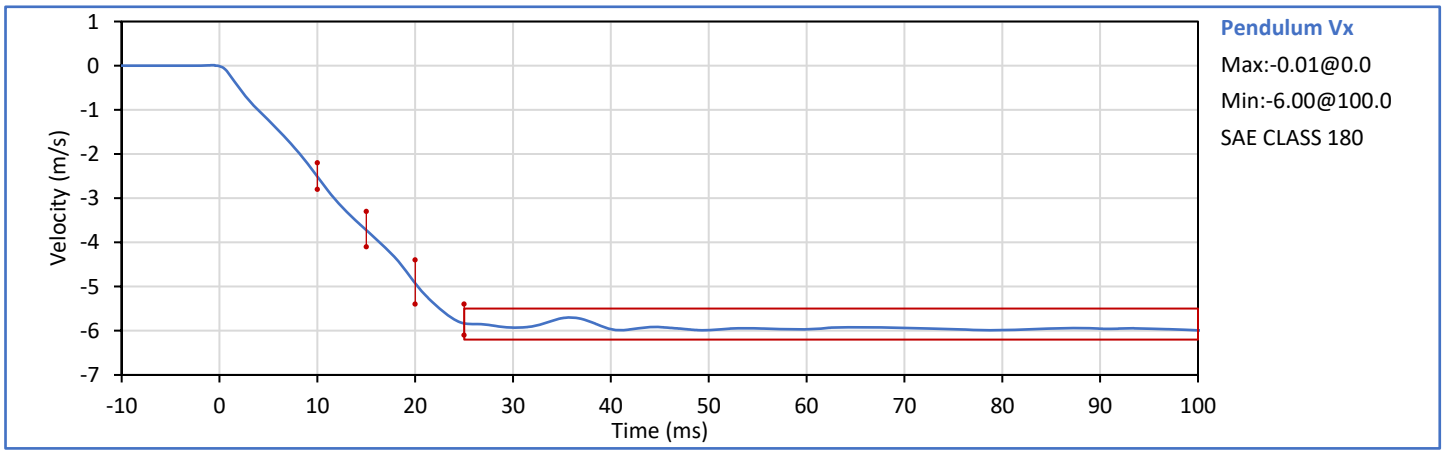
Approved By: J. Hernandez

Applus IDIADA KARCO

SID-IIs Small Side Impact ATD
Neck Flexion

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	21.3	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



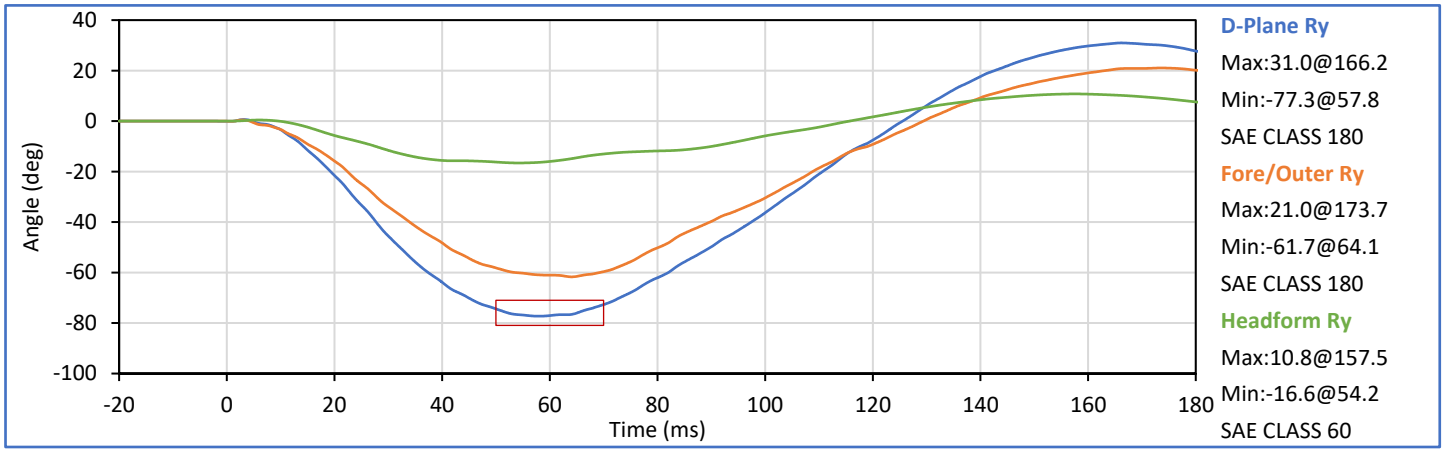
Technician: G. Fuentes

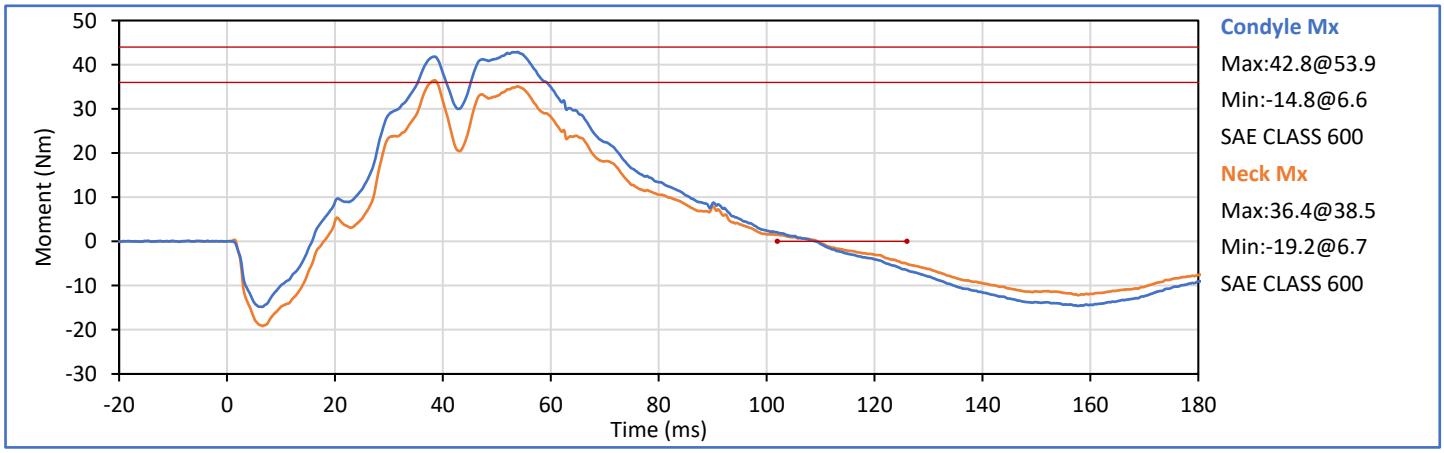
Approved By: J. Hernandez

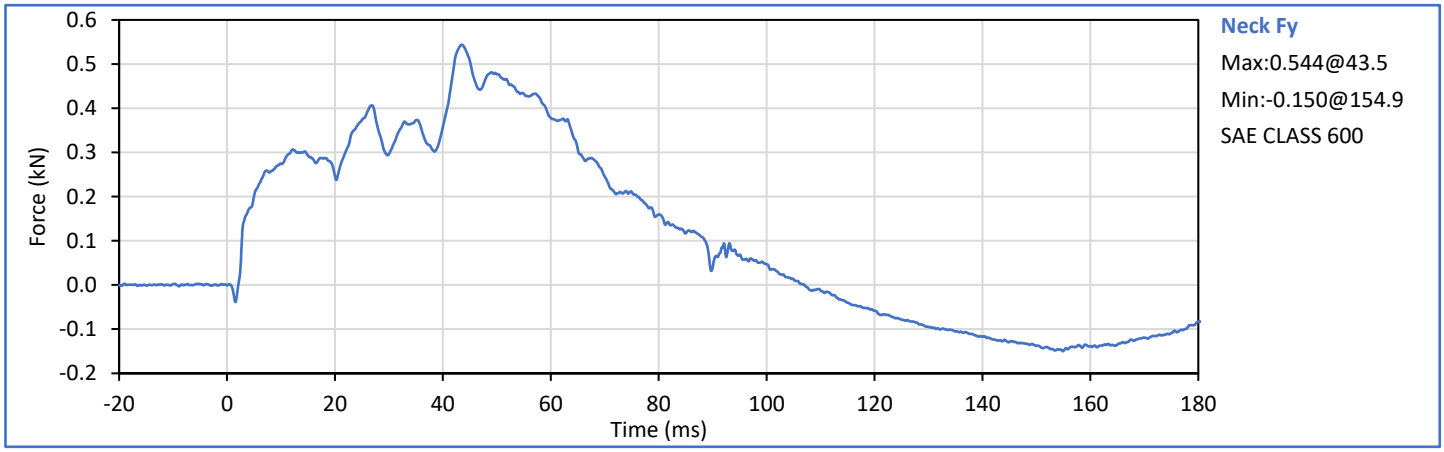
Applus IDIADA
KARCO

SID-IIs Small Side Impact ATD
Neck Flexion

ATD Serial No.: 299 Test Date: 2024-07-26





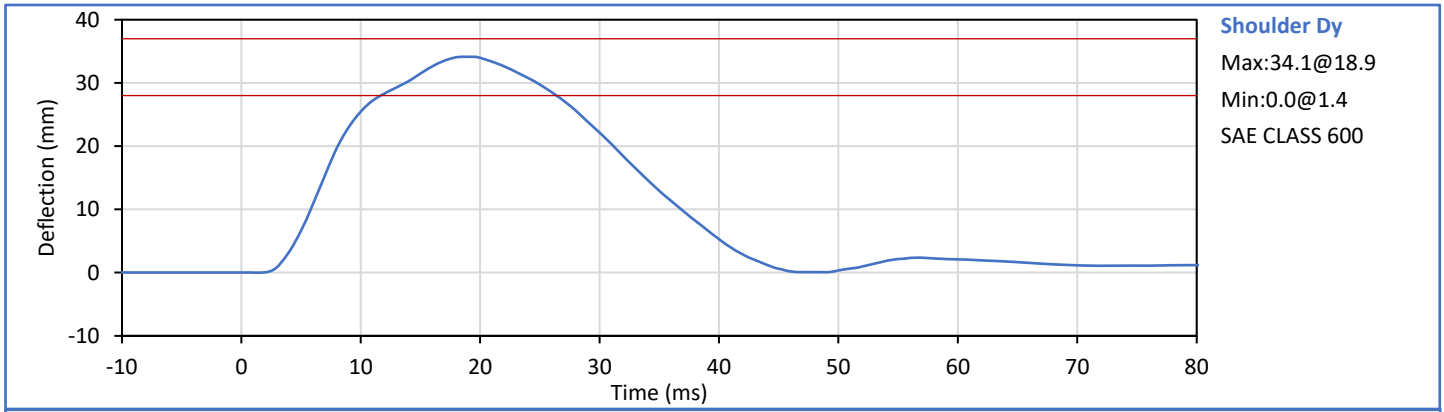


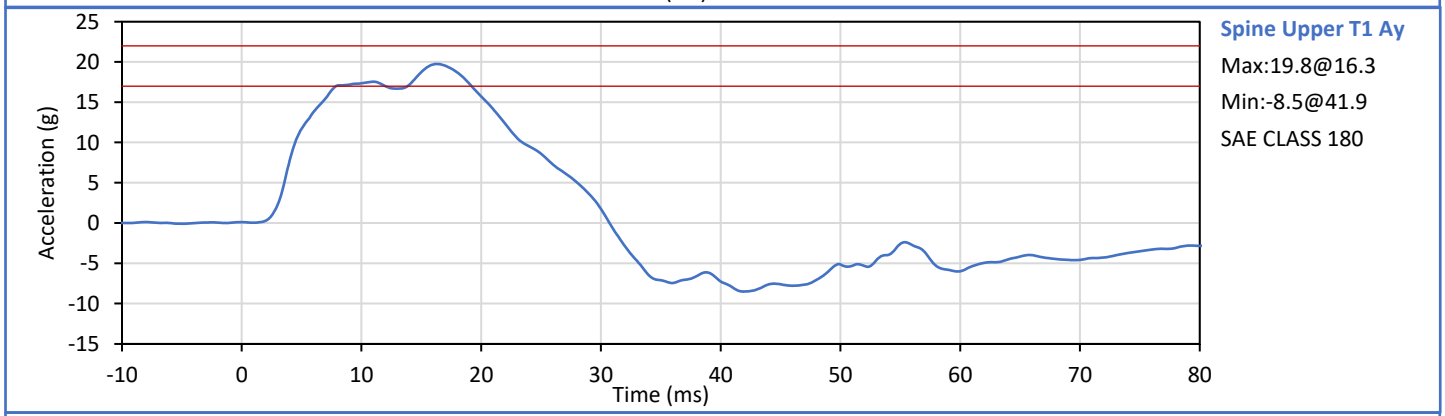
Applus IDIADA KARCO

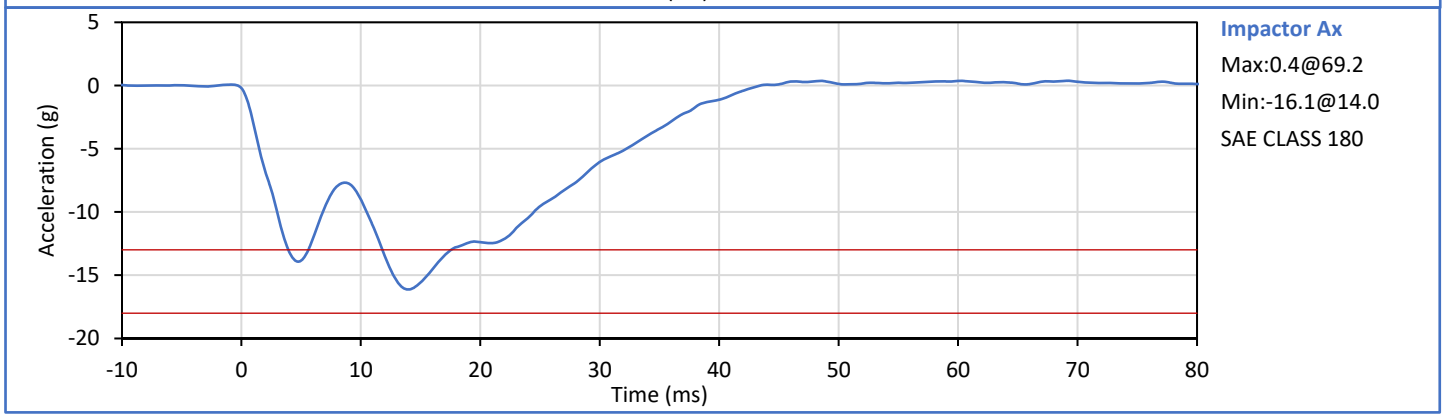
SID-IIs Small Side Impact ATD
Shoulder Impact Test

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	21.3	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

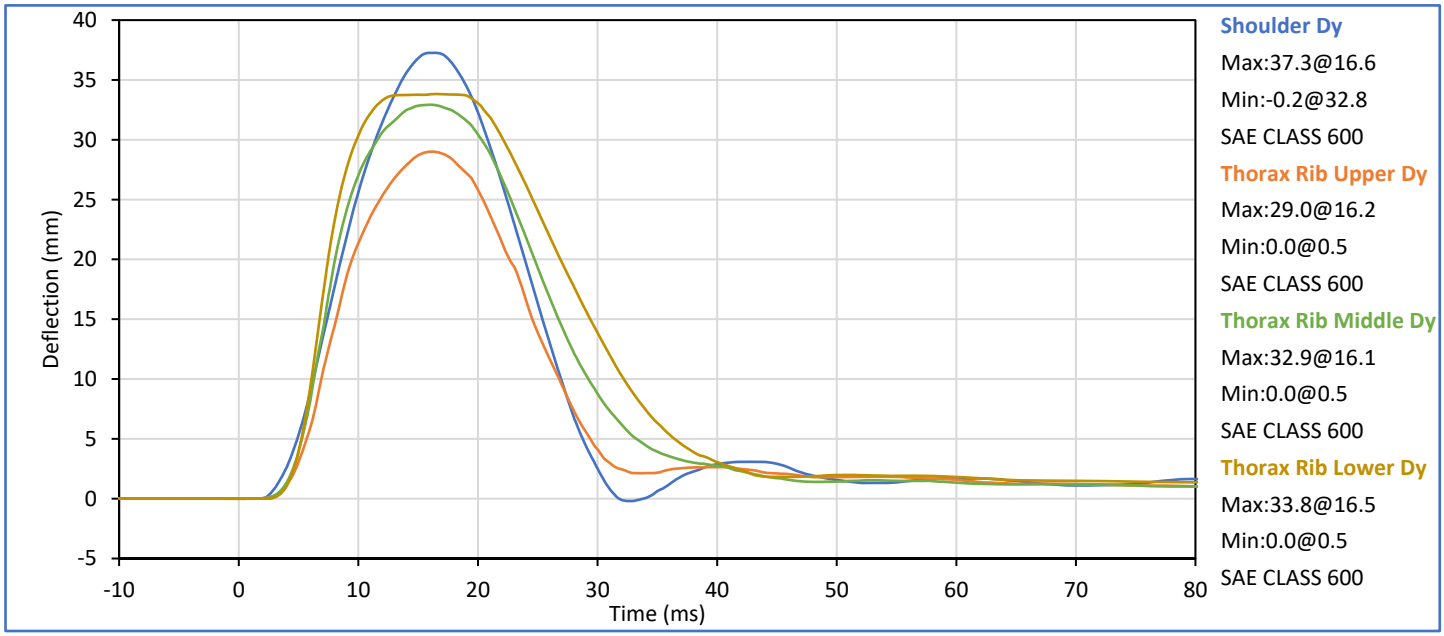
Approved By: J. Hernandez

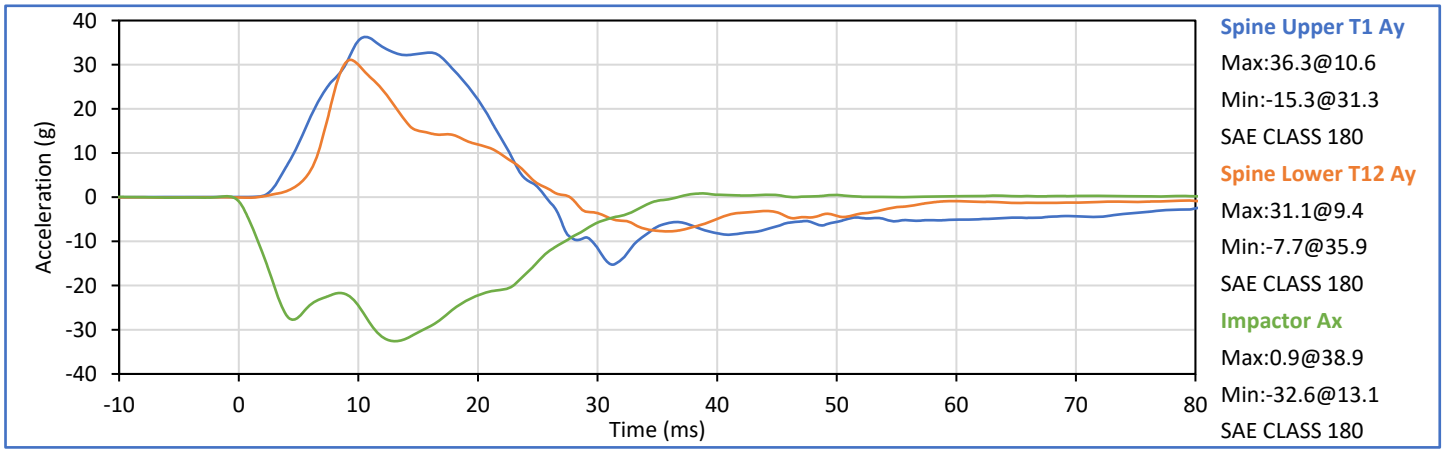
Applus IDIADA KARCO

SID-IIs Small Side Impact ATD
Thorax (With Arm)

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	21.5	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





Technician: G. Fuentes

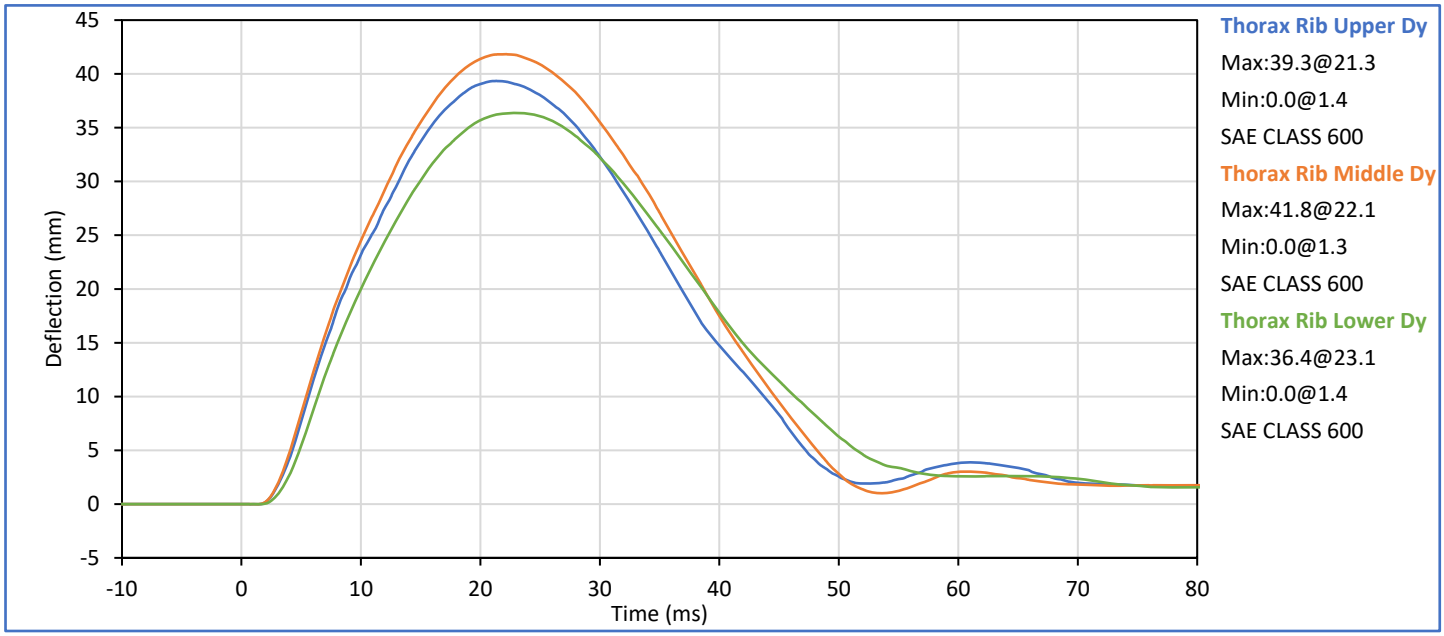
Approved By: J. Hernandez

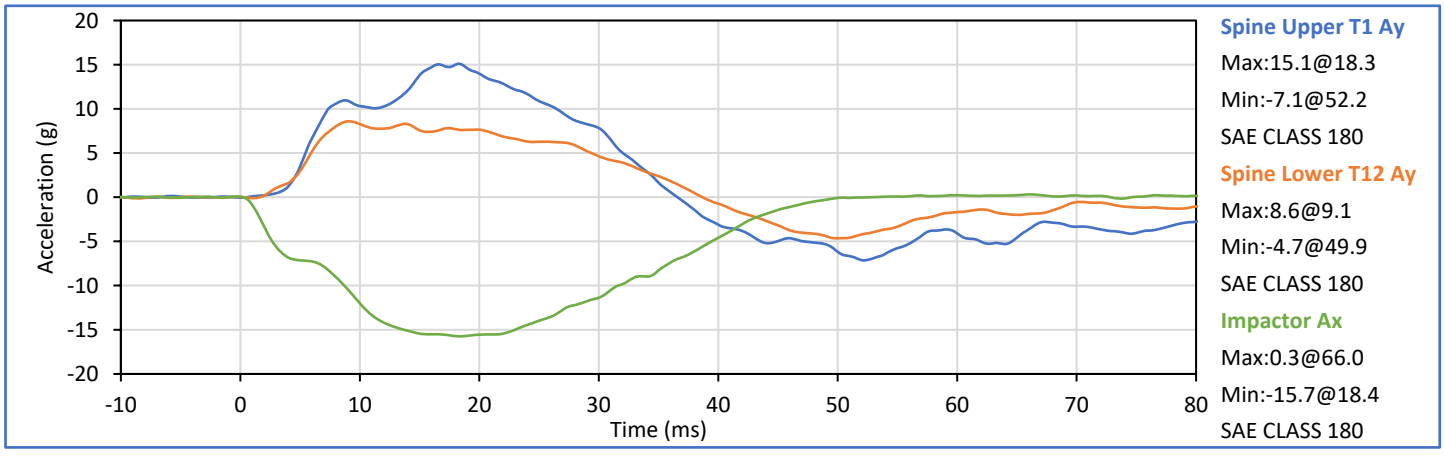
Applus IDIADA KARCO

SID-IIs Small Side Impact ATD
Thorax (No Arm)

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	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





Technician: G. Fuentes

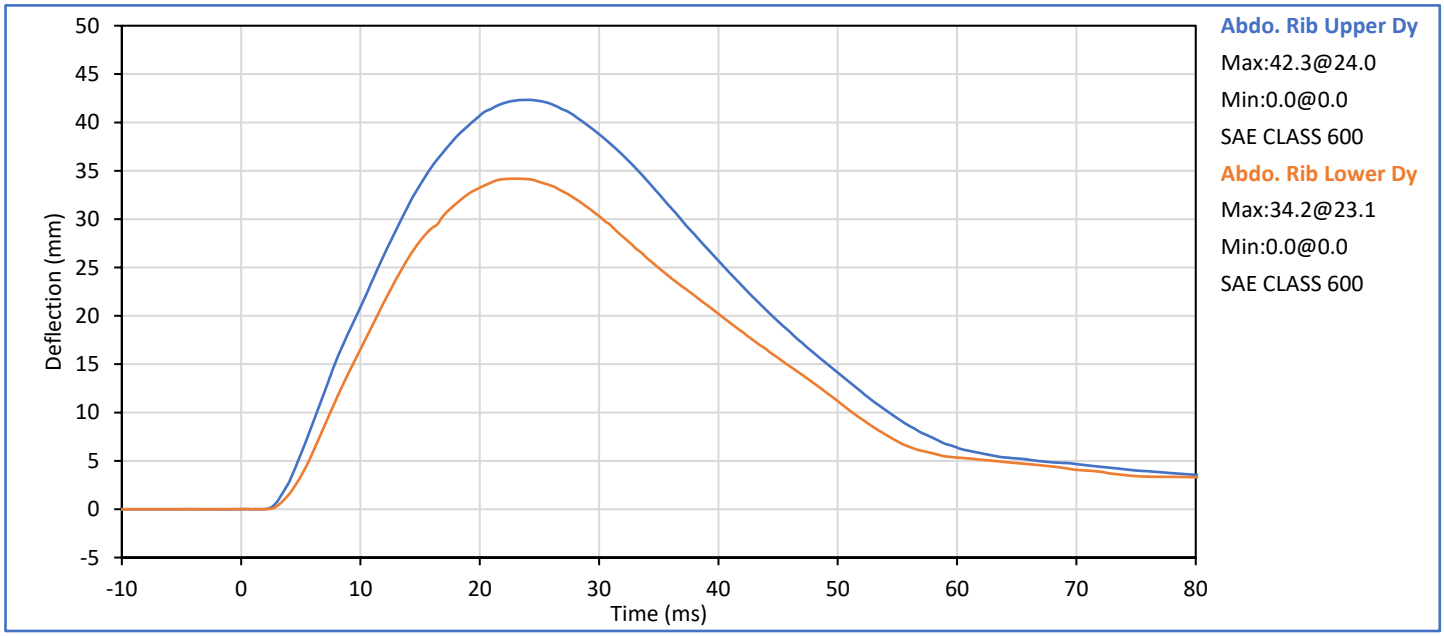
Approved By: J. Hernandez

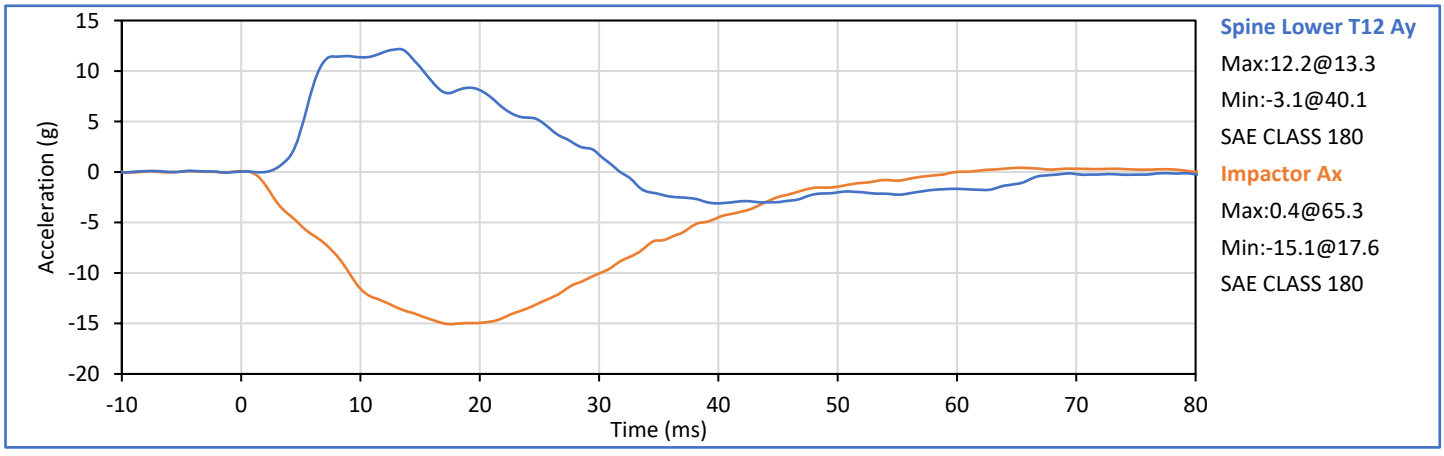
Applus IDIADA KARCO

SID-IIs Small Side Impact ATD
Abdomen Impact

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	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

Approved By: J. Hernandez

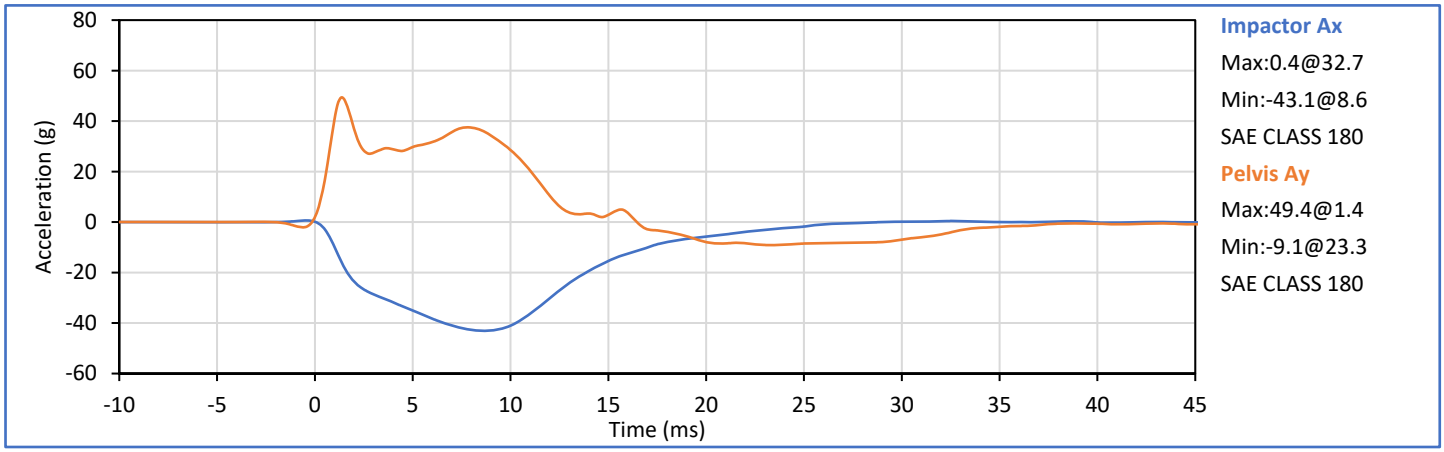
Applus IDIADA KARCO

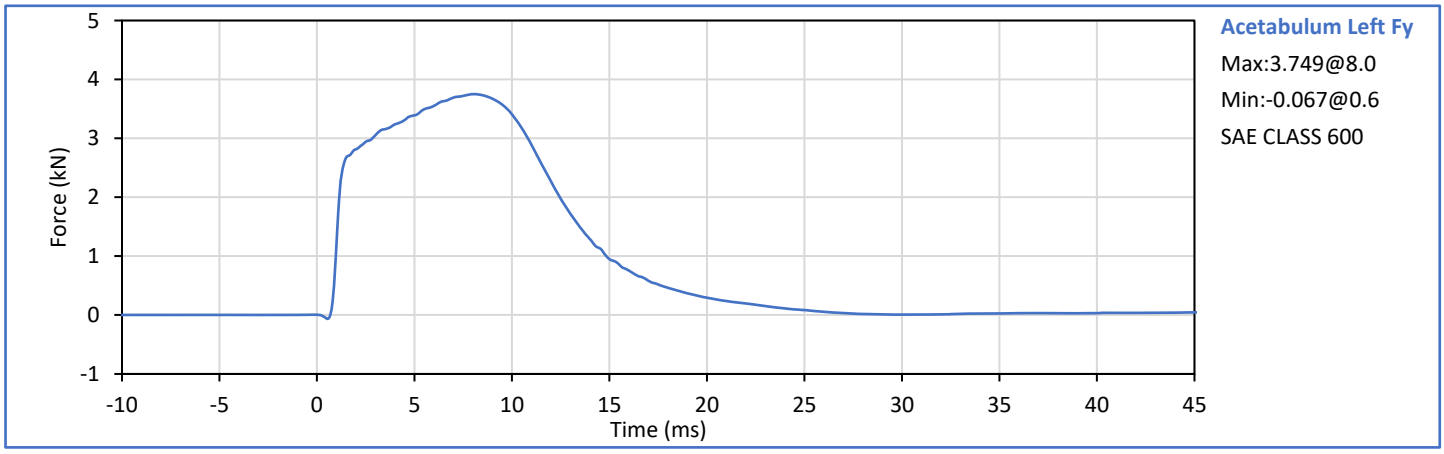
SID-IIs Small Side Impact ATD
Pelvis Acetabulum Impact

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

Approved By: J. Hernandez

ATD Serial No.: 299 Test Date: 2024-07-27

Pelvis Plug S/N: 14728

SACO RESEARCH

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

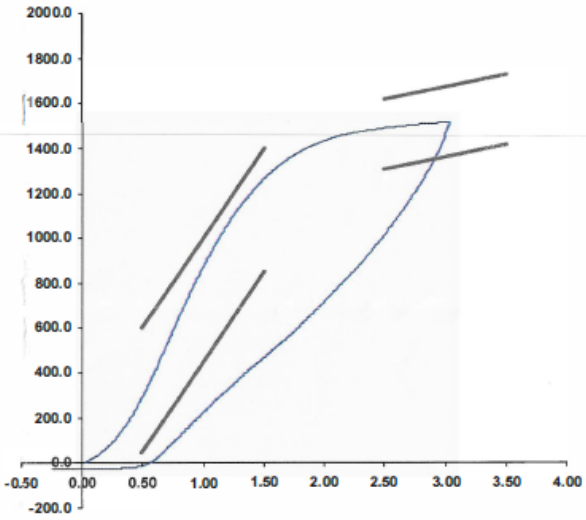
	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	297.37	50.00	600.00
Force @ 1.5 mm (N)	1,264.08	850.00	1,400.00
Force @ 2.5 mm (N)	1,489.71	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,515.61	1,361.00	1,673.00

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

Applus IDIADA KARCO

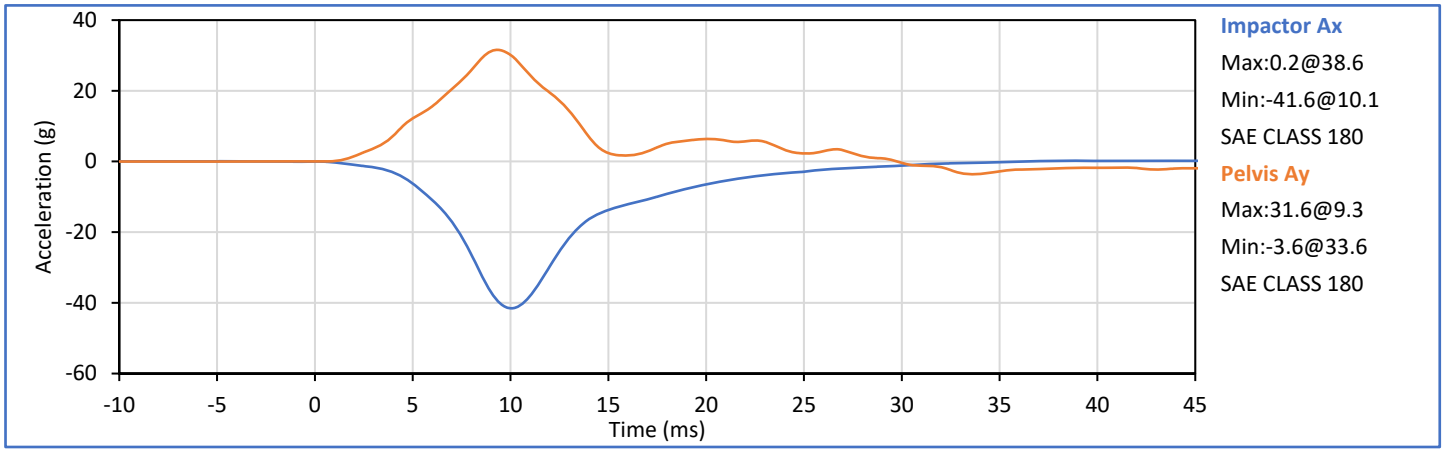
SID-IIs Small Side Impact ATD
Pelvis Iliac Impact

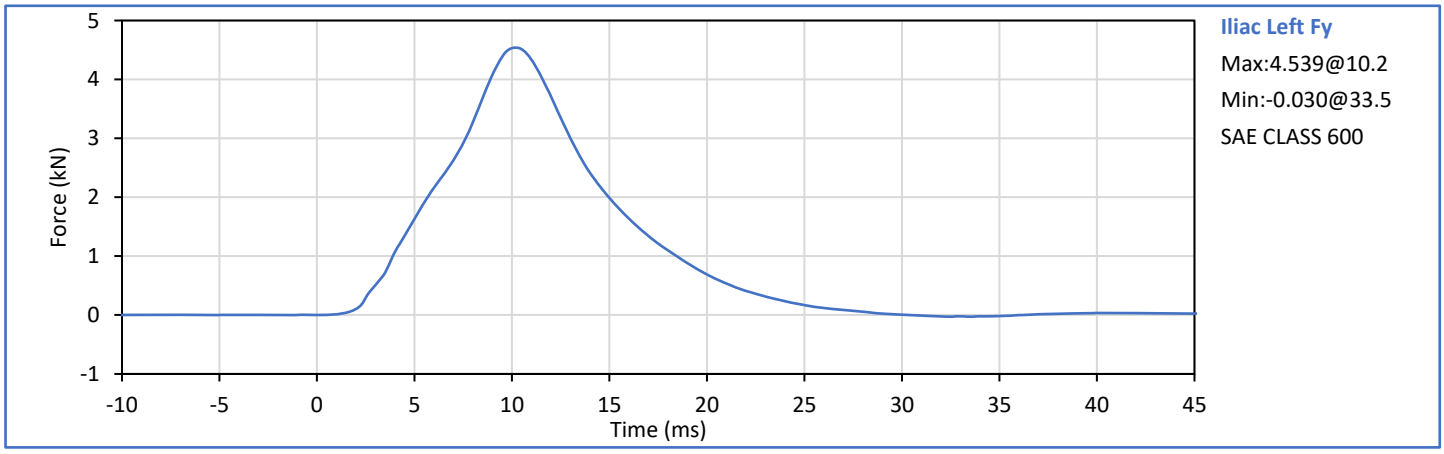
ATD Serial No.: 299 Test Date: 2024-07-26

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

Approved By: J. Hernandez

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

Applus IDIADA KARCO

ES-2re 50th Male Side Impact ATD
External Measurements

ATD Serial No.: F037 Test Date: 2024-08-05

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	41	Pass
1 - Sitting Height	mm	900	918	911	Pass
2 - Seat to Shoulder Joint	mm	558	572	562	Pass
3 - Seat to Lower Face of Thoracic Spine Box	mm	346	356	348	Pass
4 - Seat to Hip Joint (bolt center)	mm	97	103	101	Pass
5 - Sole to Seat, Sitting	mm	433	451	442	Pass
6 - Head Width	mm	152	158	157	Pass
7 - Shoulder/Arm Width	mm	461	479	471	Pass
8 - Thorax Width	mm	322	332	327	Pass
9 - Abdomen Width	mm	273	287	277	Pass
10 - Pelvis Lap Width	mm	359	373	369	Pass
11 - Head Depth	mm	196	206	201	Pass
12 - Thorax Depth	mm	262	272	271	Pass
13 - Abdomen Depth	mm	194	204	202	Pass
14 - Pelvis Depth	mm	235	245	241	Pass
15 - Back of Buttocks to Hip Joint (bolt Center)	mm	150	160	156	Pass
16 - Back of Buttocks to Front Knee	mm	597	615	611	Pass
			Overall Test Results		Pass

Technician: G. Fuentes

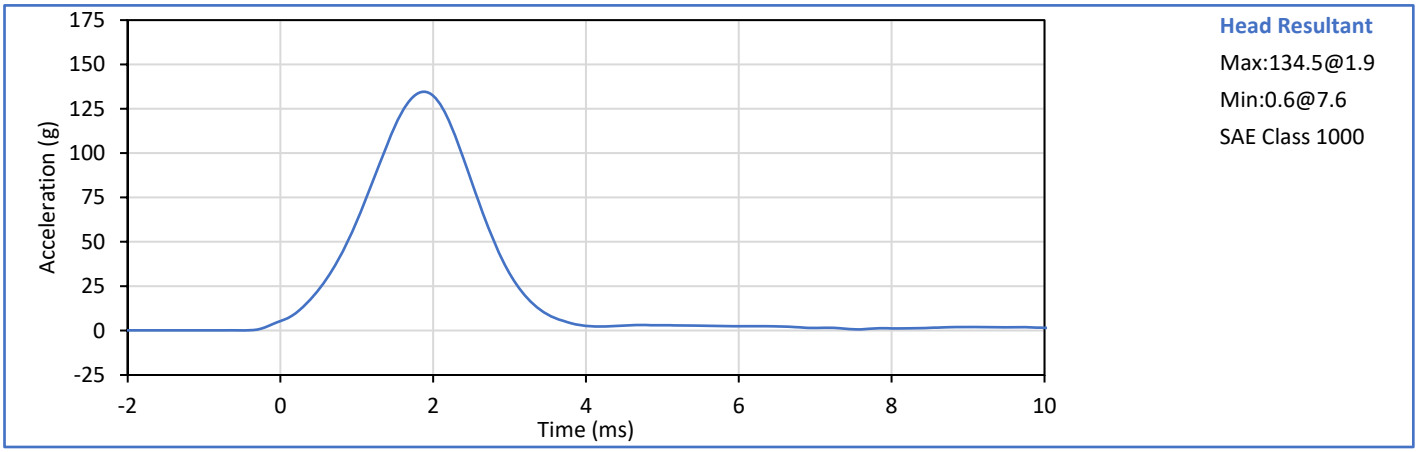
Approved By: J. Hernandez

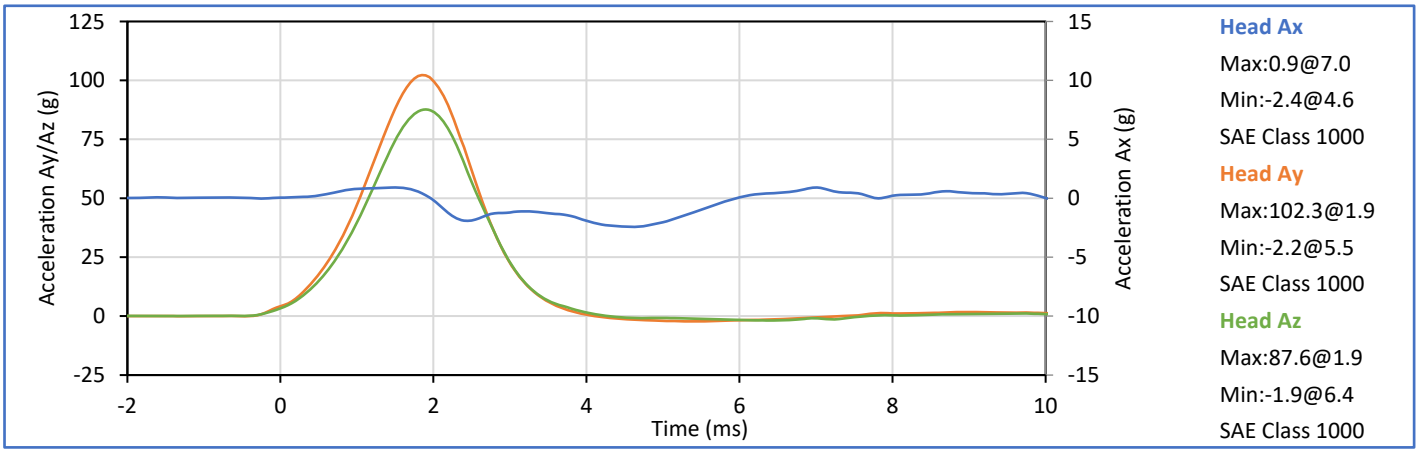
Applus IDIADA KARCO

ES-2re 50th Male Side Impact ATD
Head Drop

ATD Serial No.: F037 Test Date: 2024-08-05

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	134.5	Pass
Peak Head Ax	g	-15.0	15.0	0.9	Pass
Oscillations After Main Pulse	%	0.0	15.0	1.8	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
			Overall Test Results		Pass





Technician: G. Fuentes

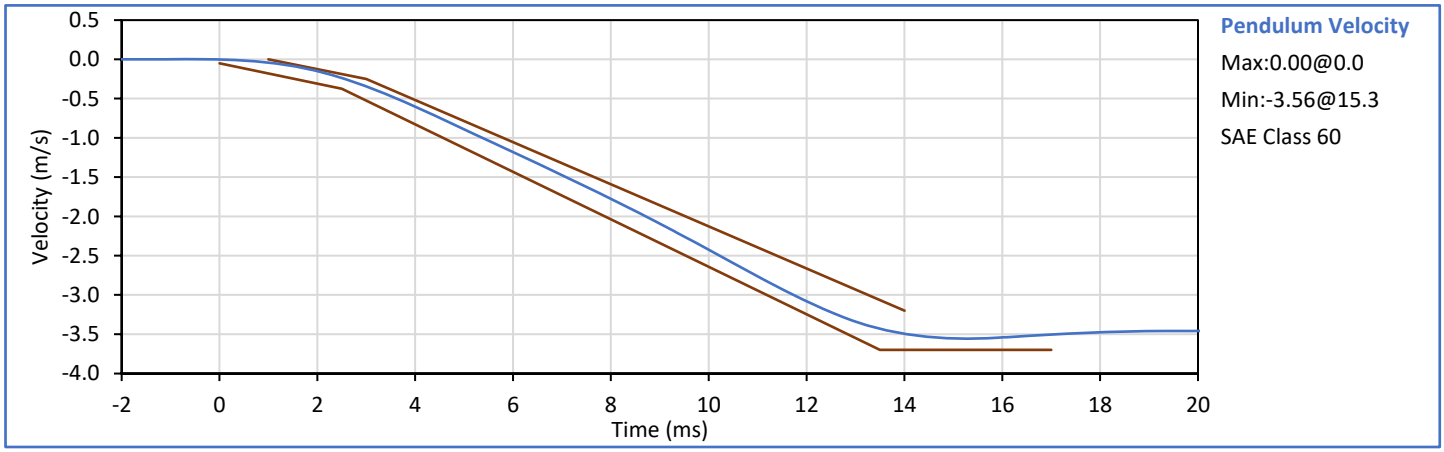
Approved By: J. Hernandez

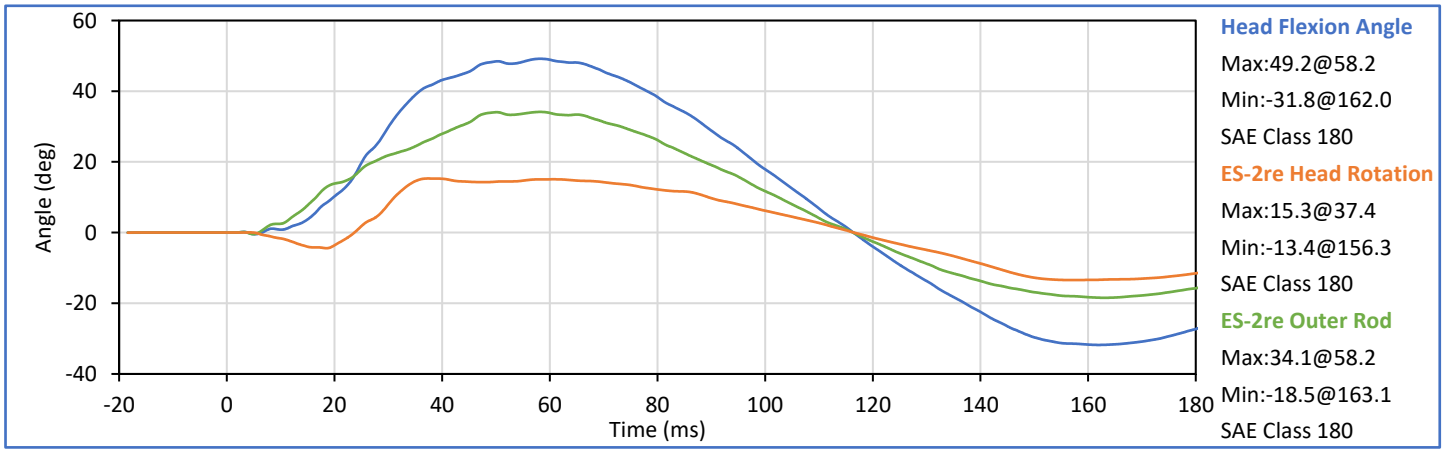
Applus IDIADA KARCO

ES-2re 50th Male Side Impact ATD
Neck Flexion

ATD Serial No.: F037 Test Date: 2024-08-07

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	49.2	Pass
Time of Peak Headform Flexion	ms	54.0	66.0	58.2	Pass
Flexion Decay (Peak to zero)	ms	53.0	88.0	58.2	Pass
			Overall Test Results		Pass





Technician: G. Fuentes

Approved By: J. Hernandez

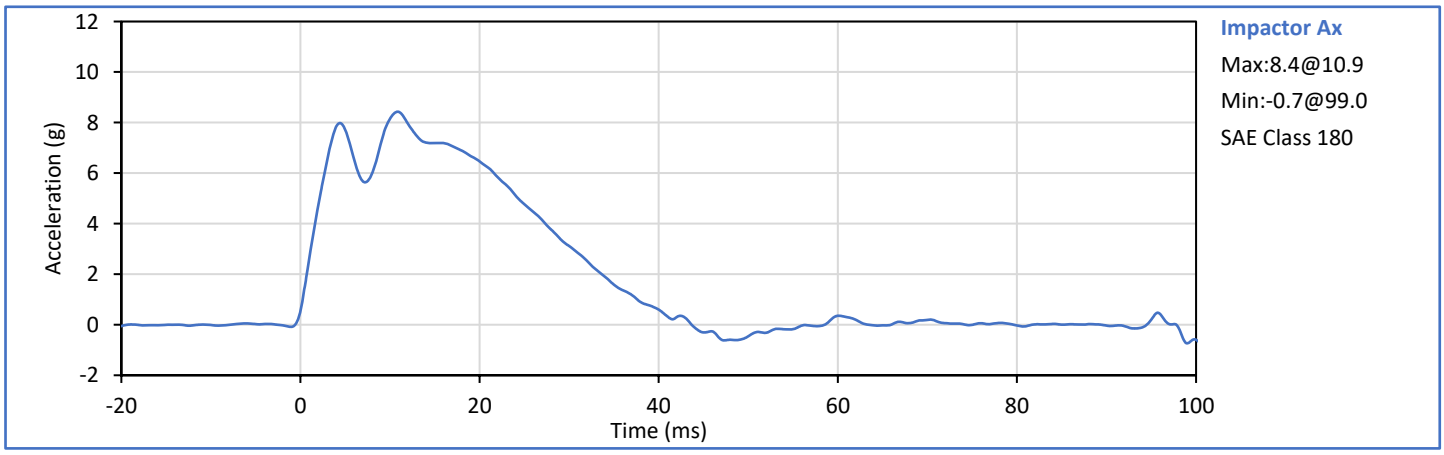
Applus IDIADA KARCO

ES-2re 50th Male Side Impact ATD
Shoulder Impact Test

ATD Serial No.: F037

Test Date: 2024-08-05

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	43	Pass
Impactor Velocity	m/s	4.20	4.40	4.32	Pass
Peak Impactor Ax	g	7.5	10.5	8.4	Pass
			Overall Test Results		Pass



Technician: G. Fuentes

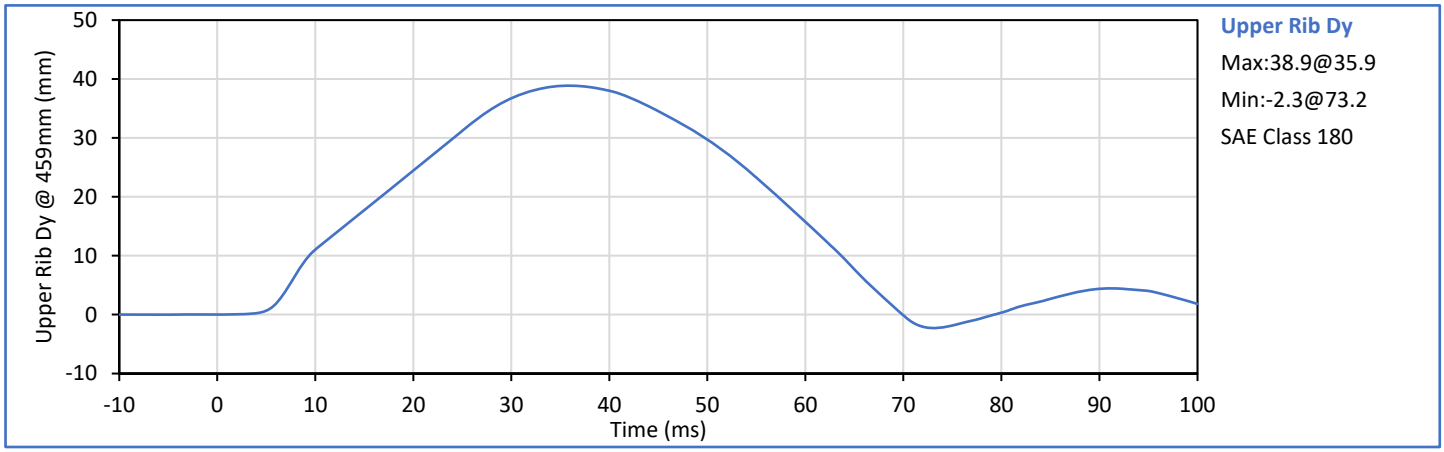
Approved By: J. Hernandez

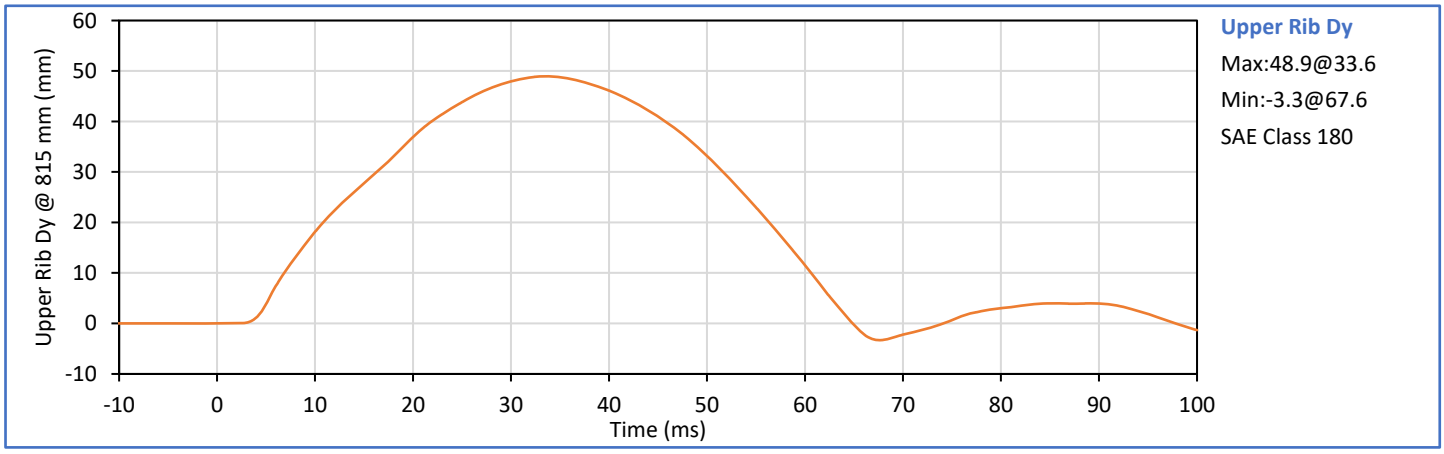
Applus IDIADA KARCO

ES-2re 50th Male Side Impact ATD
Upper Rib Drop Test

ATD Serial No.: F037 Test Date: 2024-08-07

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	38.9	Pass
Upper Rib Dy @ 815mm	mm	46.0	51.0	48.9	Pass
			Overall Test Results		Pass





Technician: G. Fuentes

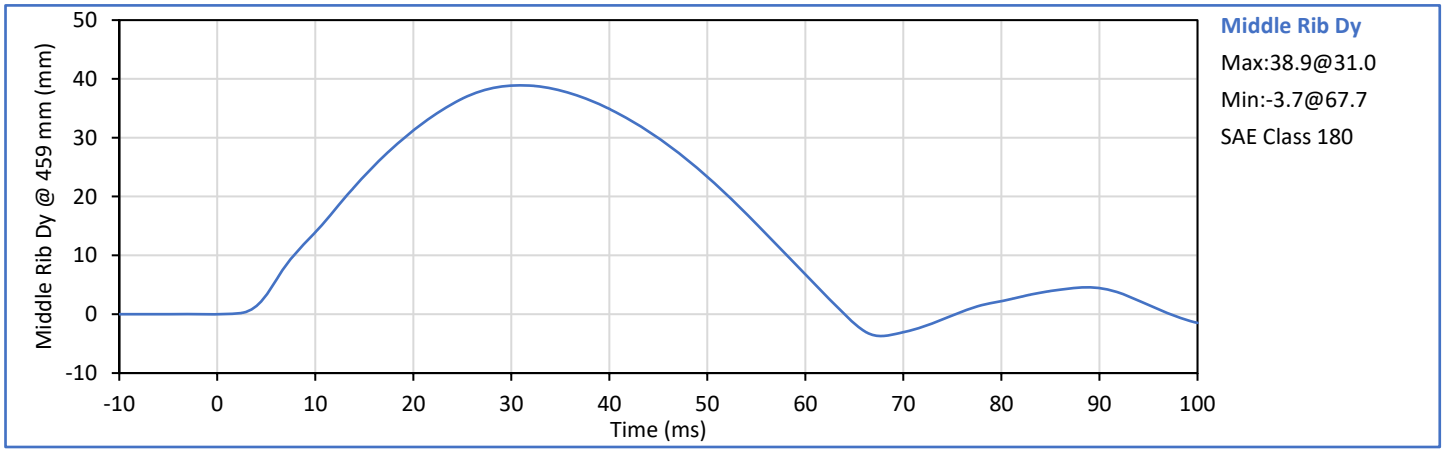
Approved By: J. Hernandez

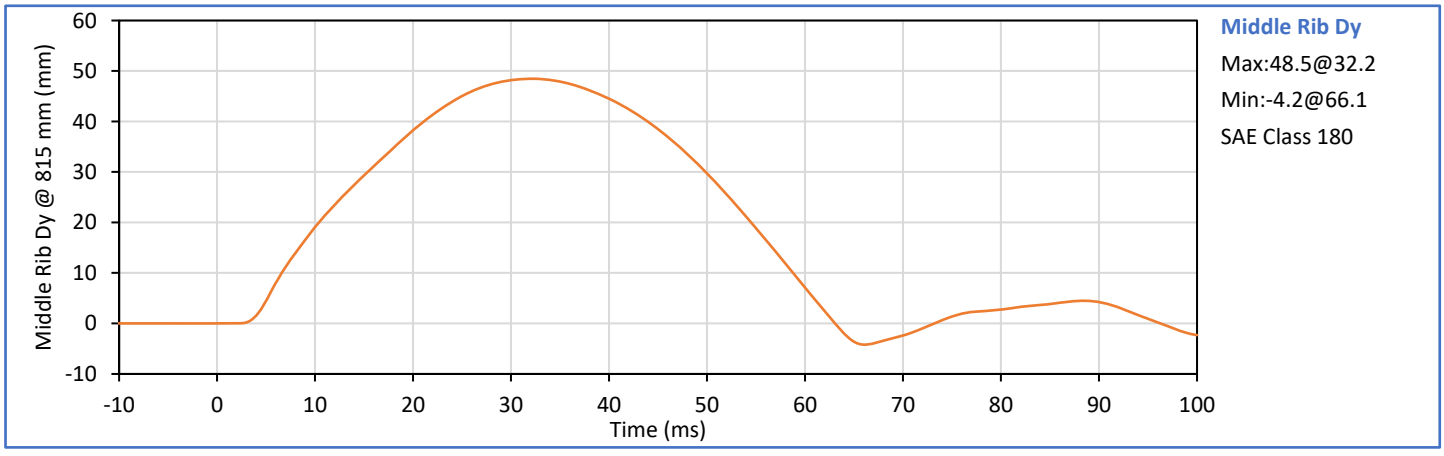
Applus IDIADA KARCO

ES-2re 50th Male Side Impact ATD
Middle Rib Drop Test

ATD Serial No.: F037 Test Date: 2024-08-07

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	44	Pass
Middle Rib Dy @ 459mm	mm	36.0	40.0	38.9	Pass
Middle Rib Dy @ 815mm	mm	46.0	51.0	48.5	Pass
			Overall Test Results		Pass





Technician: G. Fuentes

Approved By: J. Hernandez

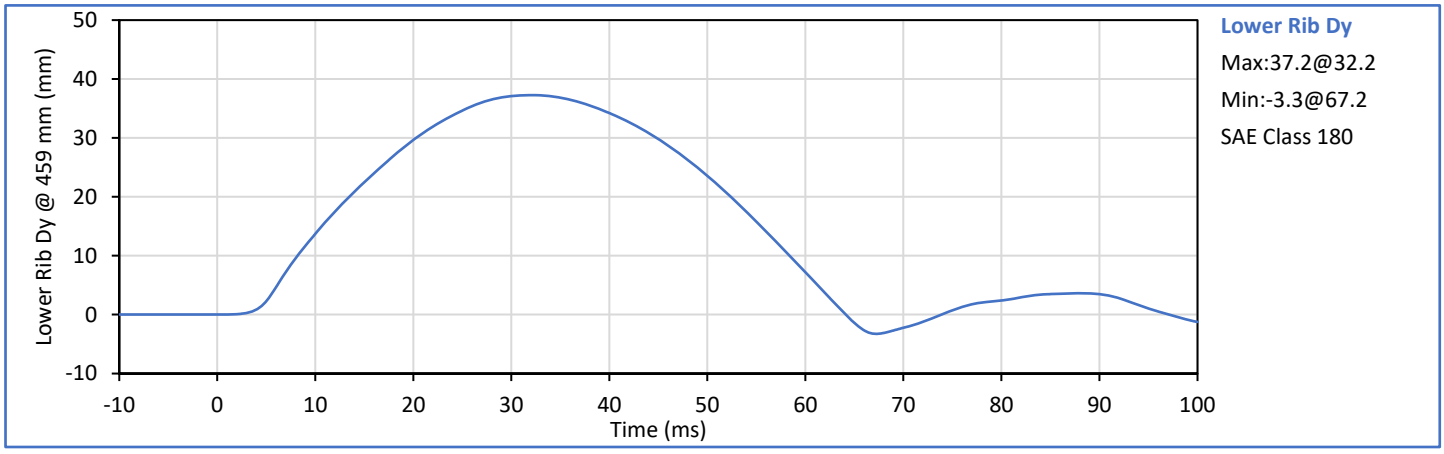
Applus IDIADA KARCO

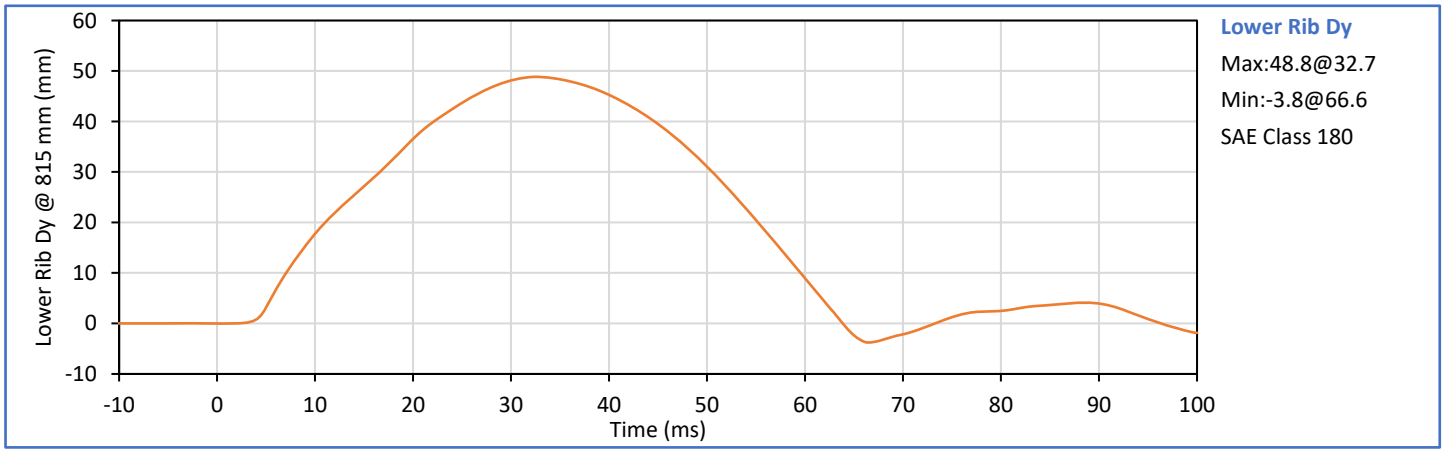
ES-2re 50th Male Side Impact ATD
Lower Rib Drop Test

ATD Serial No.: F037

Test Date: 2024-08-07

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	43	Pass
Lower Rib Dy @ 459mm	mm	36.0	40.0	37.2	Pass
Lower Rib Dy @ 815mm	mm	46.0	51.0	48.8	Pass
			Overall Test Results		Pass





Technician: G. Fuentes

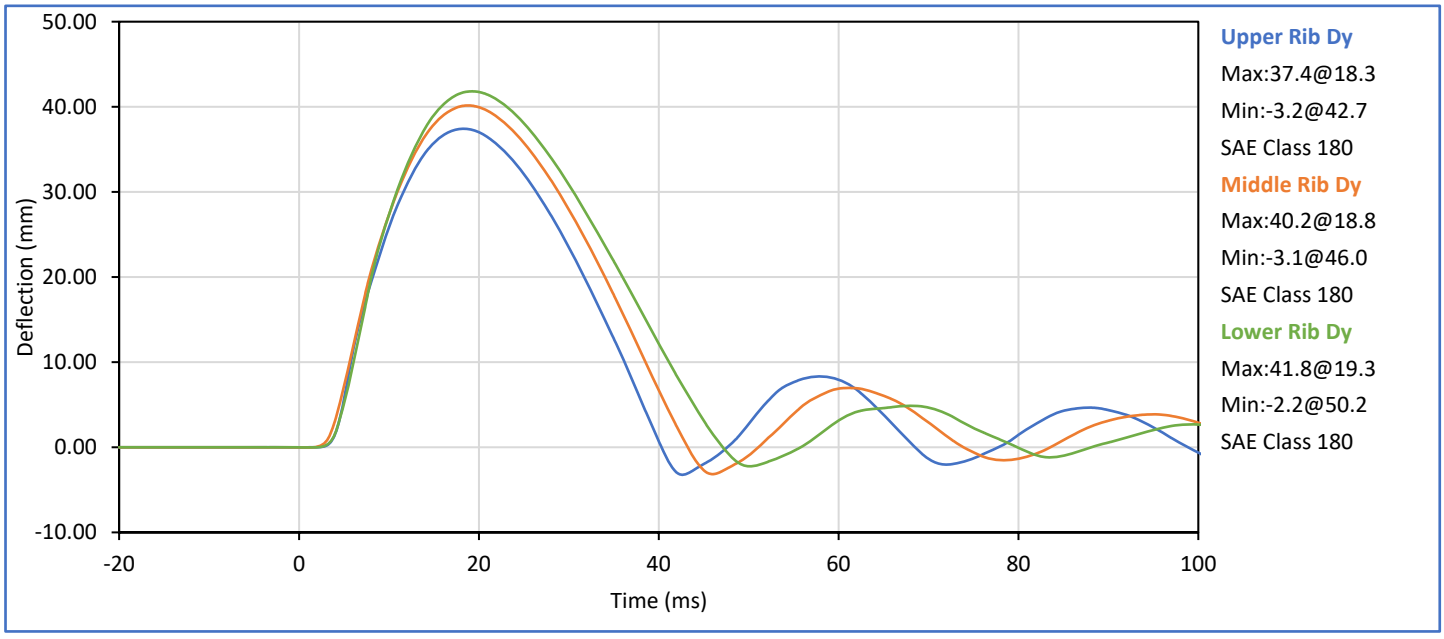
Approved By: J. Hernandez

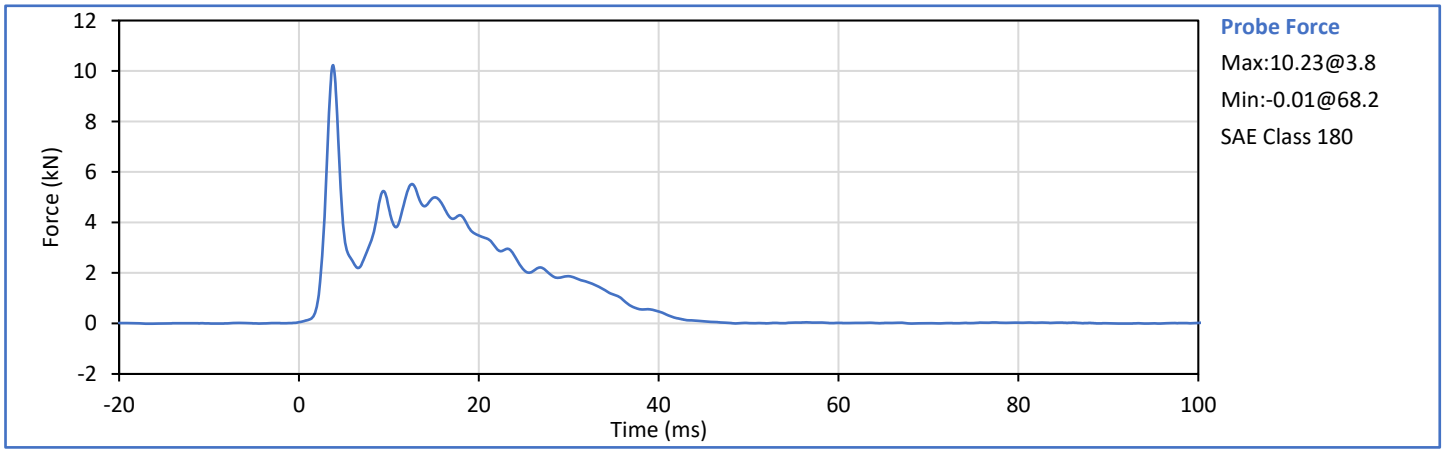
Applus IDIADA KARCO

ES-2re 50th Male Side Impact ATD
Thorax Impact (Full Body)

ATD Serial No.: F037 Test Date: 2024-08-05

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	20.8	Pass
Laboratory Relative Humidity	%	10	70	43	Pass
Impactor Velocity	m/s	5.40	5.60	5.48	Pass
Peak Upper Rib Dy	mm	34.0	41.0	37.4	Pass
Peak Middle Rib Dy	mm	37.0	45.0	40.2	Pass
Peak Lower Rib Dy	mm	37.0	44.0	41.8	Pass
Peak Impactor Force After 6 ms	kN	5.10	6.20	5.52	Pass
			Overall Test Results		Pass





Technician: G. Fuentes

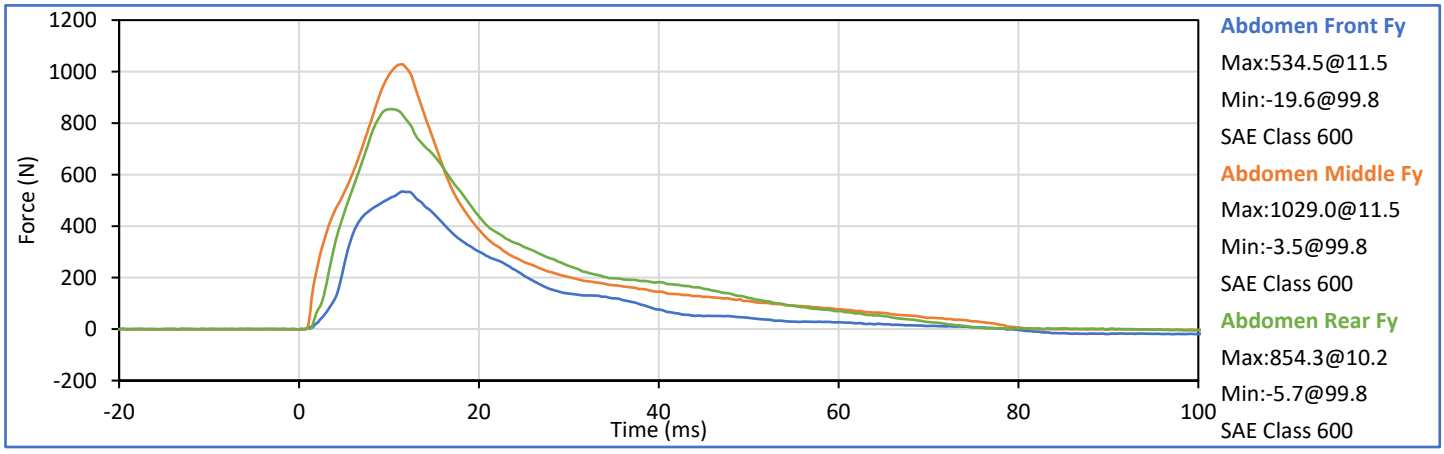
Approved By: J. Hernandez

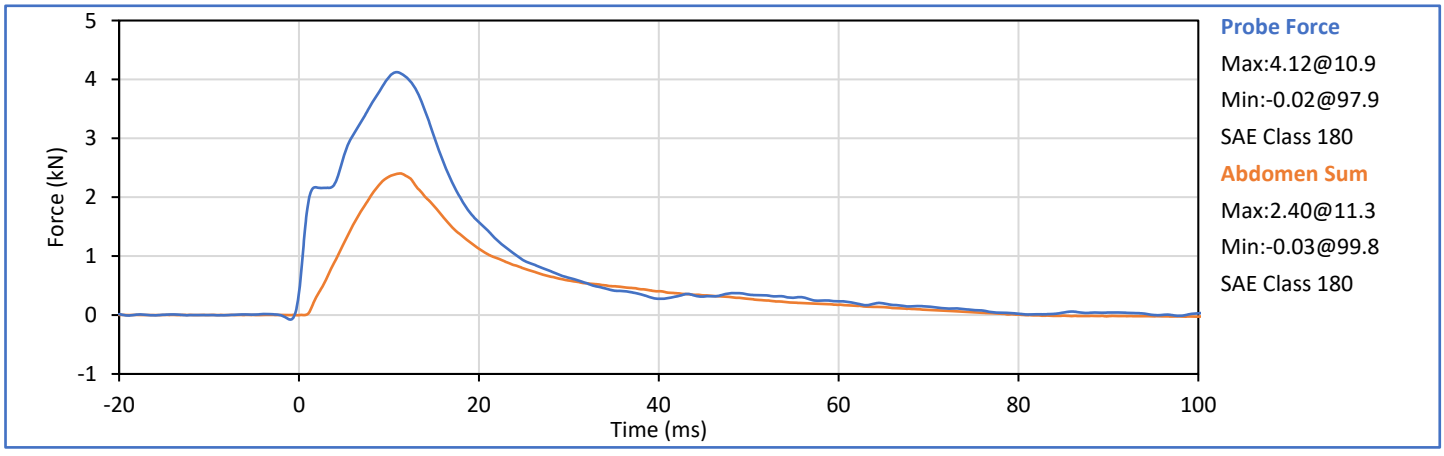
Applus IDIADA KARCO

ES-2re 50th Male Side Impact ATD
Abdomen Impact

ATD Serial No.: F037 Test Date: 2024-08-05

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	43	Pass
Impactor Velocity	m/s	3.90	4.10	3.98	Pass
Peak Impactor Force	kN	4.00	4.80	4.12	Pass
Time of Peak Impactor Force	ms	10.6	13.0	10.9	Pass
Sum of Abdomen Forces	kN	2.20	2.70	2.40	Pass
Time of Peak Sum Abdomen Force	ms	10.0	12.3	11.3	Pass
			Overall Test Results		Pass





Technician: G. Fuentes

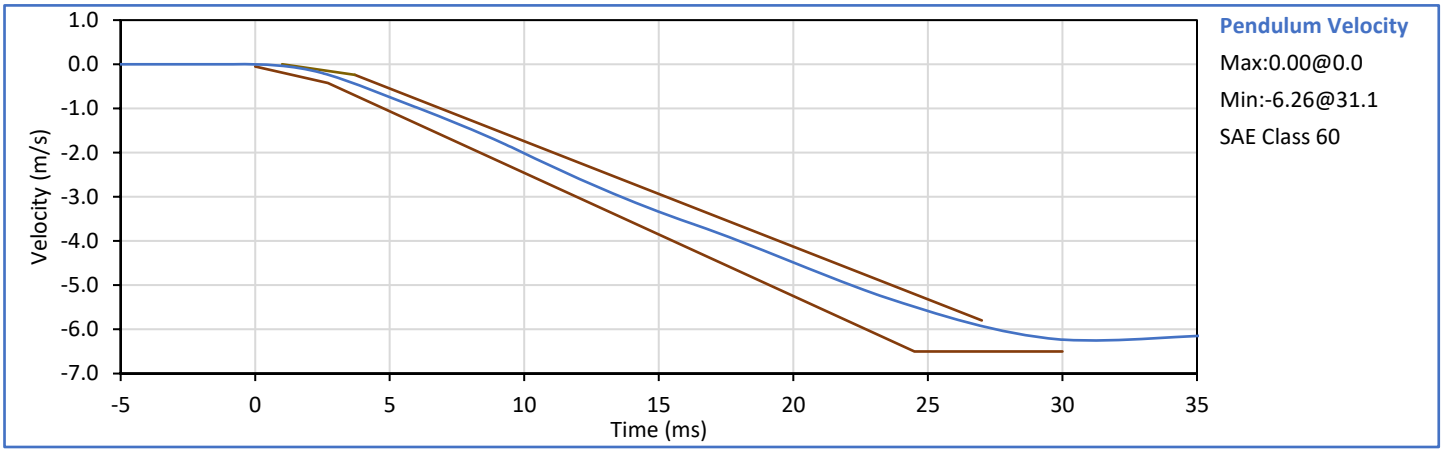
Approved By: J. Hernandez

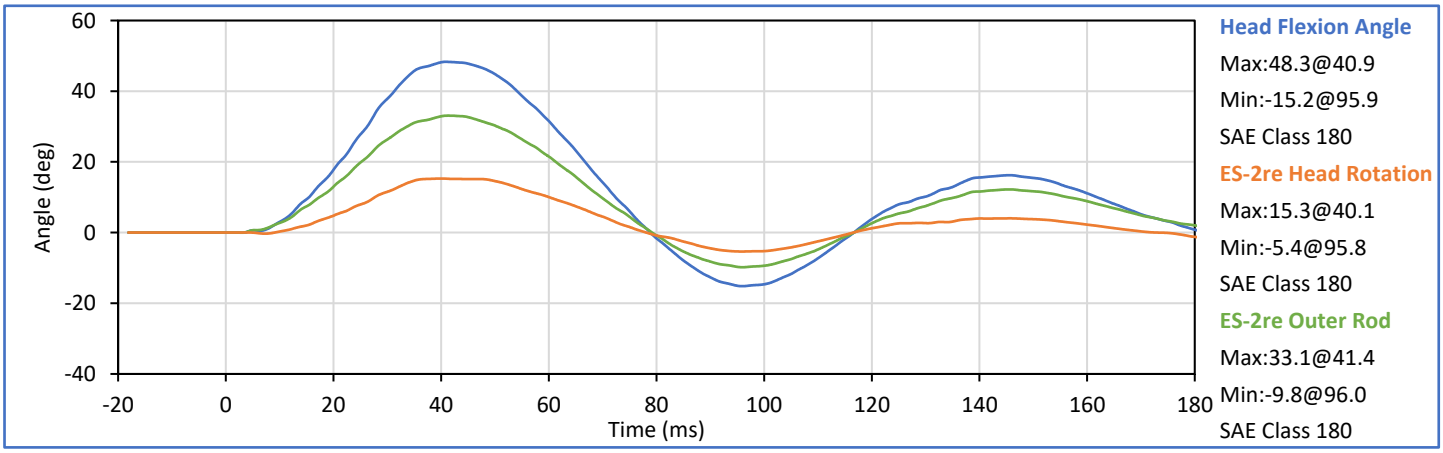
Applus IDIADA KARCO

ES-2re 50th Male Side Impact ATD
Lumbar Spine Flexion

ATD Serial No.: F037 Test Date: 2024-08-07

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	48.3	Pass
Time of Peak Headform Flexion	ms	39.0	53.0	40.9	Pass
Flexion Decay (Peak to zero)	ms	37.0	57.0	38.0	Pass
			Overall Test Results		Pass





Technician: G. Fuentes

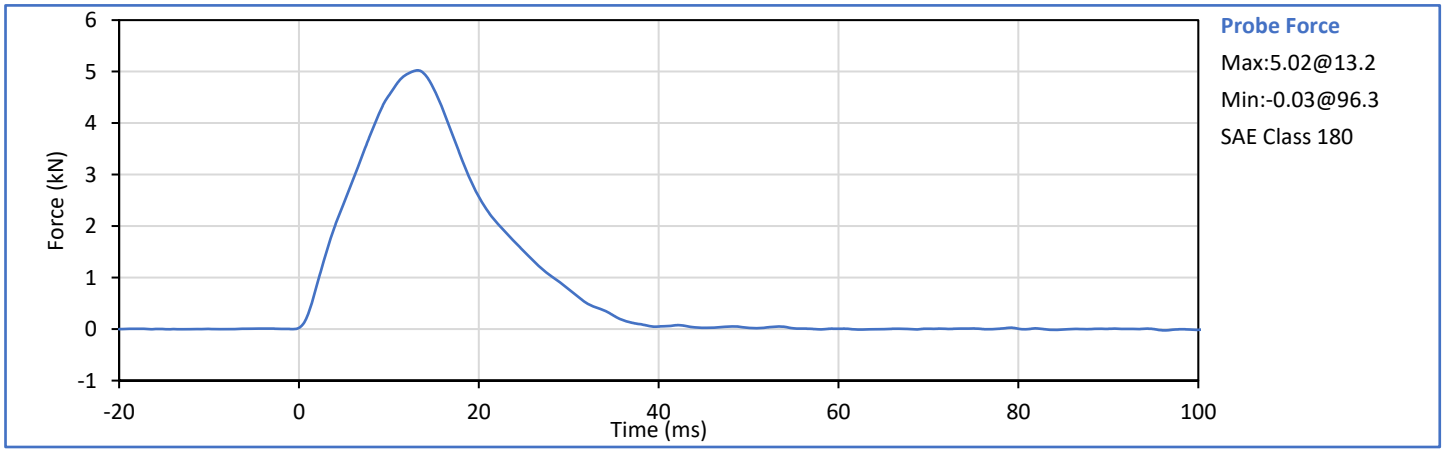
Approved By: J. Hernandez

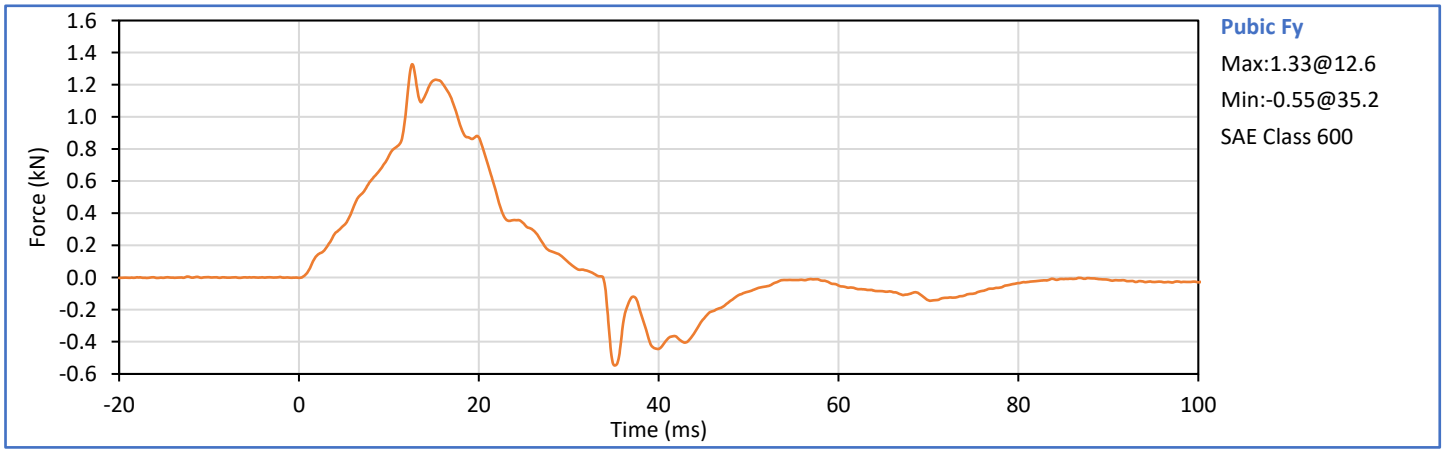
Applus IDIADA KARCO

ES-2re 50th Male Side Impact ATD
Pelvis Impact

ATD Serial No.: F037 Test Date: 2024-08-05

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	20.8	Pass
Laboratory Relative Humidity	%	10	70	43	Pass
Impactor Velocity	m/s	4.20	4.40	4.29	Pass
Peak Impactor Force	kN	4.70	5.40	5.02	Pass
Time of Peak Impactor Force	ms	11.8	16.1	13.2	Pass
Pubic Symphysis Fy	kN	1.23	1.59	1.33	Pass
Time of Peak Pubic Symphysis Fy	ms	12.2	17.0	12.6	Pass
			Overall Test Results		Pass





Technician: G. Fuentes

Approved By: J. Hernandez

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

Applus IDIADA
KARCO

SID-IIs Small Side Impact ATD
External Measurements

ATD Serial No.: 299 Test Date: 2024-08-05

Tested Parameter	Units	Spec Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.9	Pass
Laboratory Relative Humidity	%	10	70	42	Pass
A - Sitting Height	mm	772	788	782	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	149	Pass
E - Shoulder Pivot From Backline	mm	97	107	101	Pass
F - Thigh Clearance	mm	119	135	128	Pass
G - Head Breadth	mm	140	148	145	Pass
H - Head Back From Backline	mm	40	46	45	Pass
I - Head Depth	mm	178	188	183	Pass
J - Head Circumference	mm	541	551	547	Pass
K - Buttock To Knee Length	mm	514	540	524	Pass
L - Popliteal Height	mm	343	369	361	Pass
K - Knee Pivot To Floor Height	mm	392	409	401	Pass
N - Buttock Popliteal Length	mm	416	442	436	Pass
O - Chest Depth W/O Jacket	mm	195	211	201	Pass
P - Foot Length	mm	216	232	222	Pass
Q - Hip Breadth (W/Pelvic Plugs)	mm	313	323	317	Pass
R - Arm Length	mm	249	259	254	Pass
S - Knee Joint To Seatback	mm	477	493	485	Pass
V - Shoulder Width	mm	341	357	348	Pass
W - Foot Width	mm	78	94	85	Pass
Y - Chest Circumference W/Jacket	mm	851	881	860	Pass
Z - Waist Circumference	mm	761	791	782	Pass
			Overall Test Results		Pass

Technician: G. Fuentes

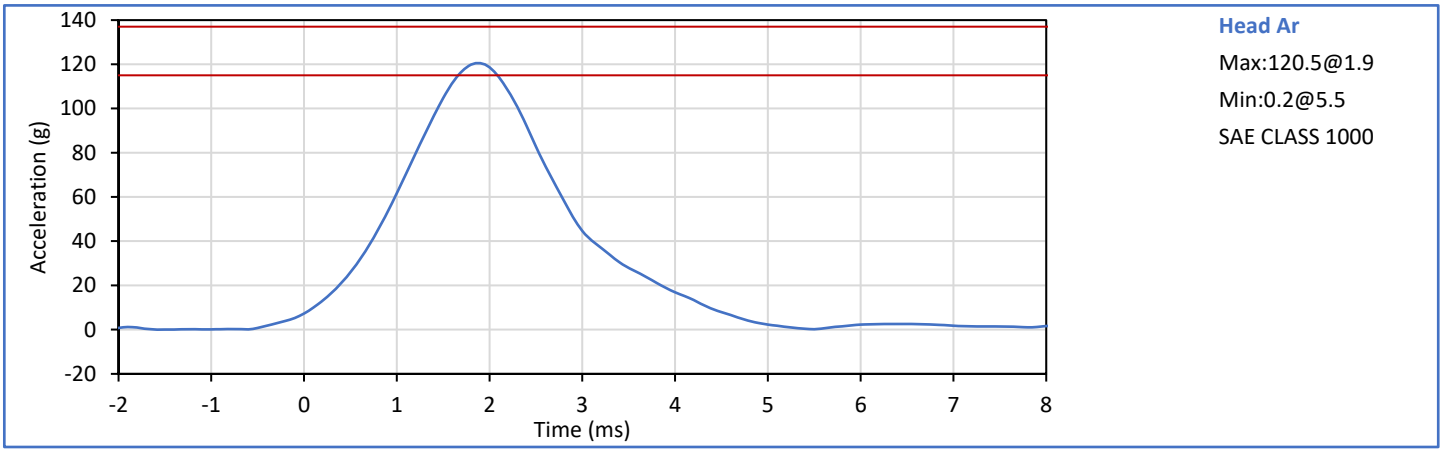
Approved By: J. Hernandez

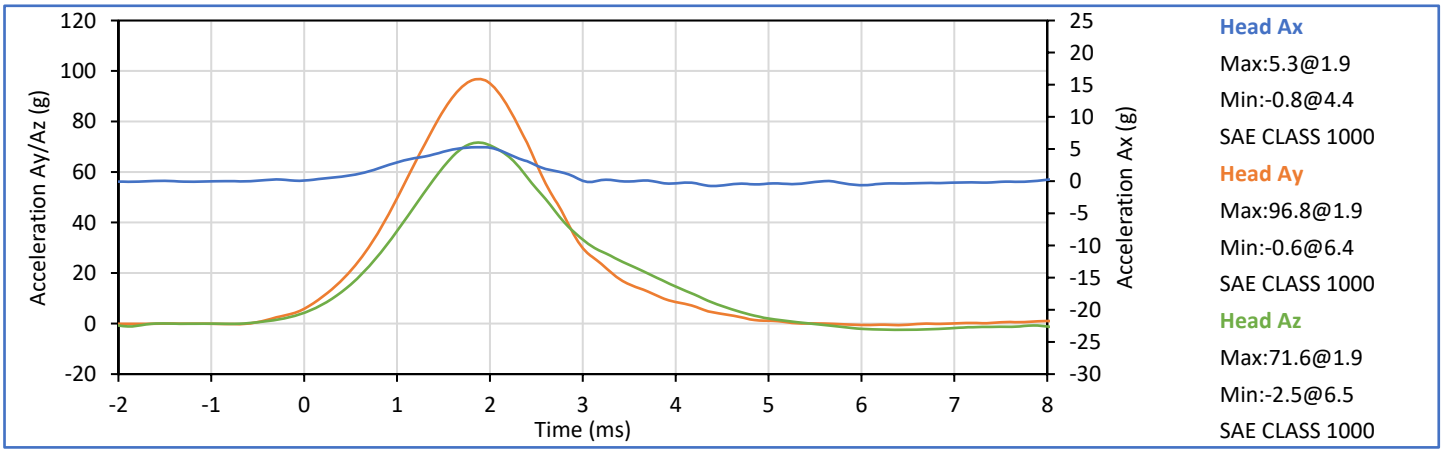
Applus IDIADA KARCO

SID-IIs Small Side Impact ATD
Head Drop

ATD Serial No.: 299 Test Date: 2024-08-06

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	120.5	Pass
Peak Head Ax	g	-15.0	15.0	5.3	Pass
Oscillations After Main Pulse	%	0.0	15.0	2.2	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
			Overall Test Results		Pass





Technician: G. Fuentes

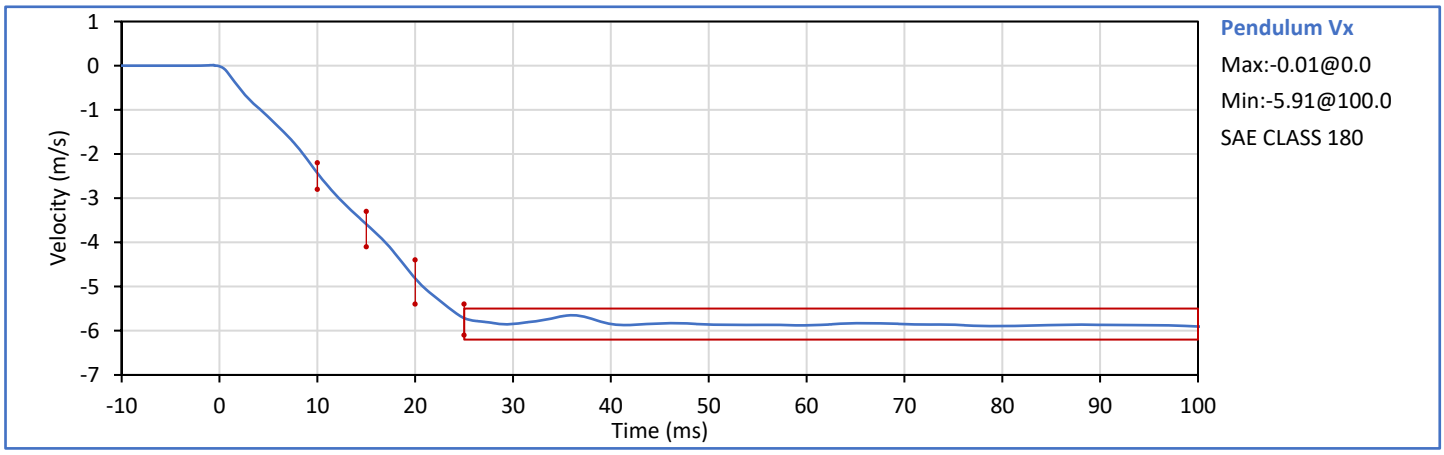
Approved By: J. Hernandez

Applus IDIADA KARCO

SID-IIs Small Side Impact ATD
Neck Flexion

ATD Serial No.: 299 Test Date: 2024-08-07

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.7	Pass
Laboratory Relative Humidity	%	10	70	44	Pass
Pendulum Velocity	m/s	5.51	5.63	5.55	Pass
Pendulum Decel at 10 ms	m/s	-2.80	-2.20	-2.43	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	-4.82	Pass
Pendulum Decel at 25 ms	m/s	-6.10	-5.40	-5.72	Pass
Pendulum Decel from 25-100 ms	m/s	-6.20	-5.50	-5.91/-5.65	Pass
Peak "D" Plane Rotation	deg	-81.0	-71.0	-76.0	Pass
Time of Peak "D" Plane Rotation	ms	50.0	70.0	56.9	Pass
Peak Occ. Condyle Moment	Nm	36.0	44.0	42.6	Pass
Time of Moment Decay to 0 Nm	ms	102.0	126.0	110.0	Pass
			Overall Test Results		Pass



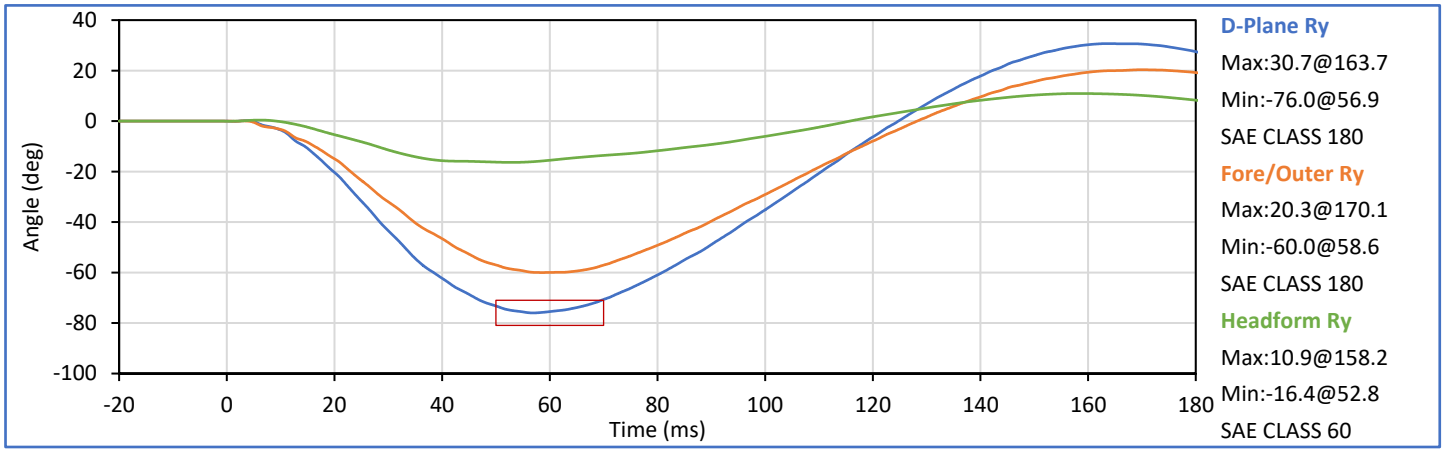
Technician: G. Fuentes

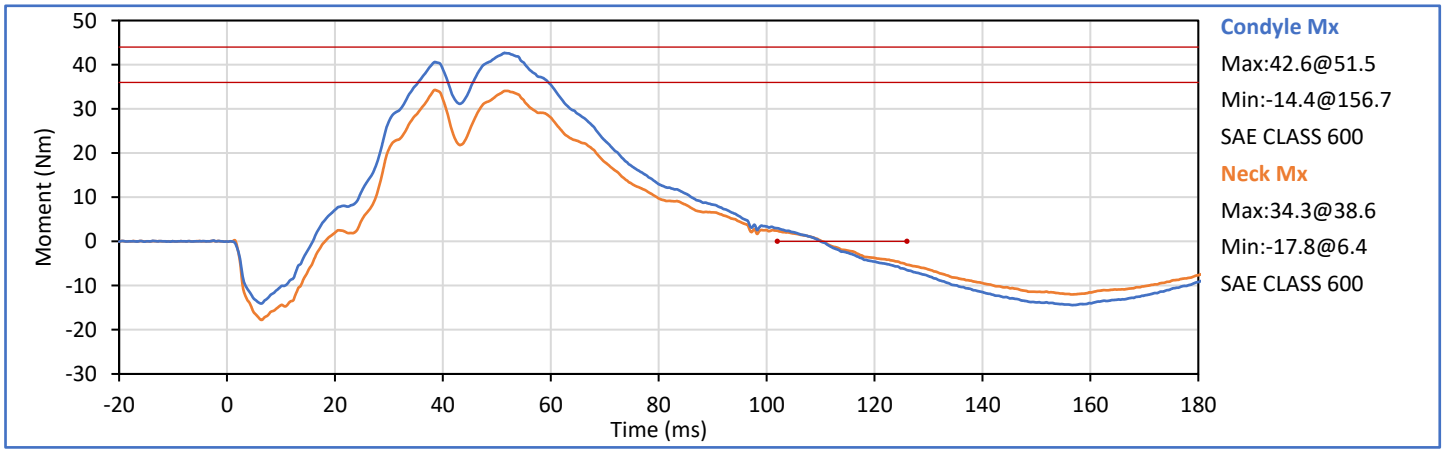
Approved By: J. Hernandez

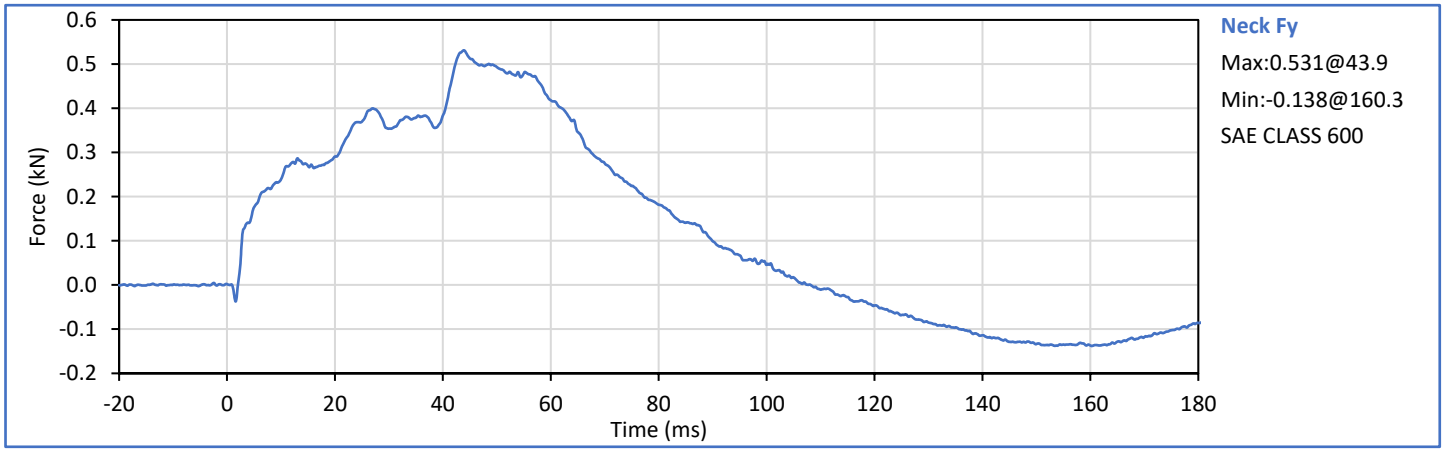
Applus IDIADA KARCO

SID-IIs Small Side Impact ATD
Neck Flexion

ATD Serial No.: 299 Test Date: 2024-08-07





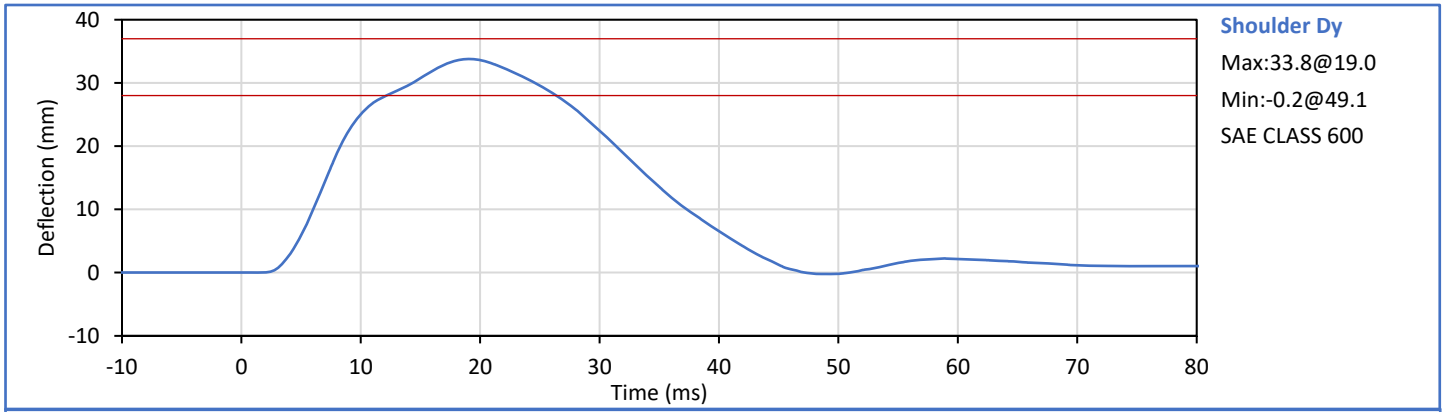


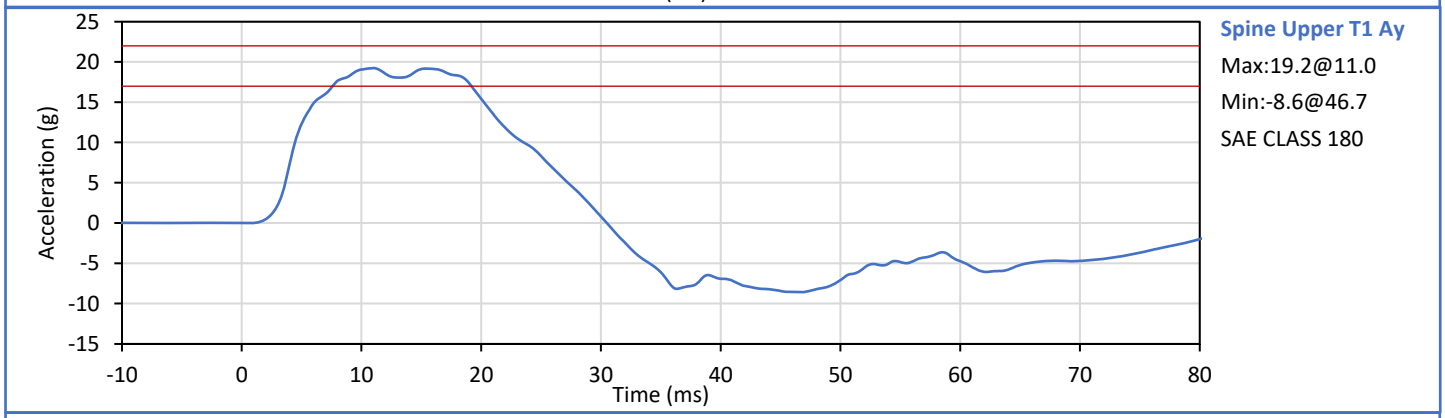
Applus IDIADA KARCO

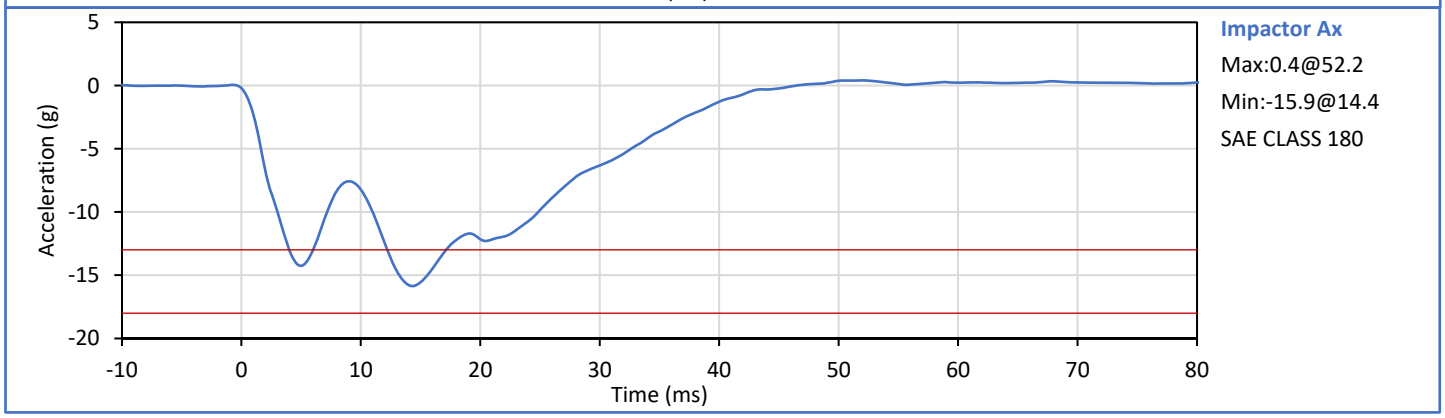
SID-IIs Small Side Impact ATD
Shoulder Impact Test

ATD Serial No.: 299 Test Date: 2024-08-05

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	33.8	Pass
Peak Upper Spine (T1) Ay	g	17.0	22.0	19.2	Pass
Peak Impactor Ax	g	-18.0	-13.0	-15.9	Pass
			Overall Test Results		Pass







Technician: G. Fuentes

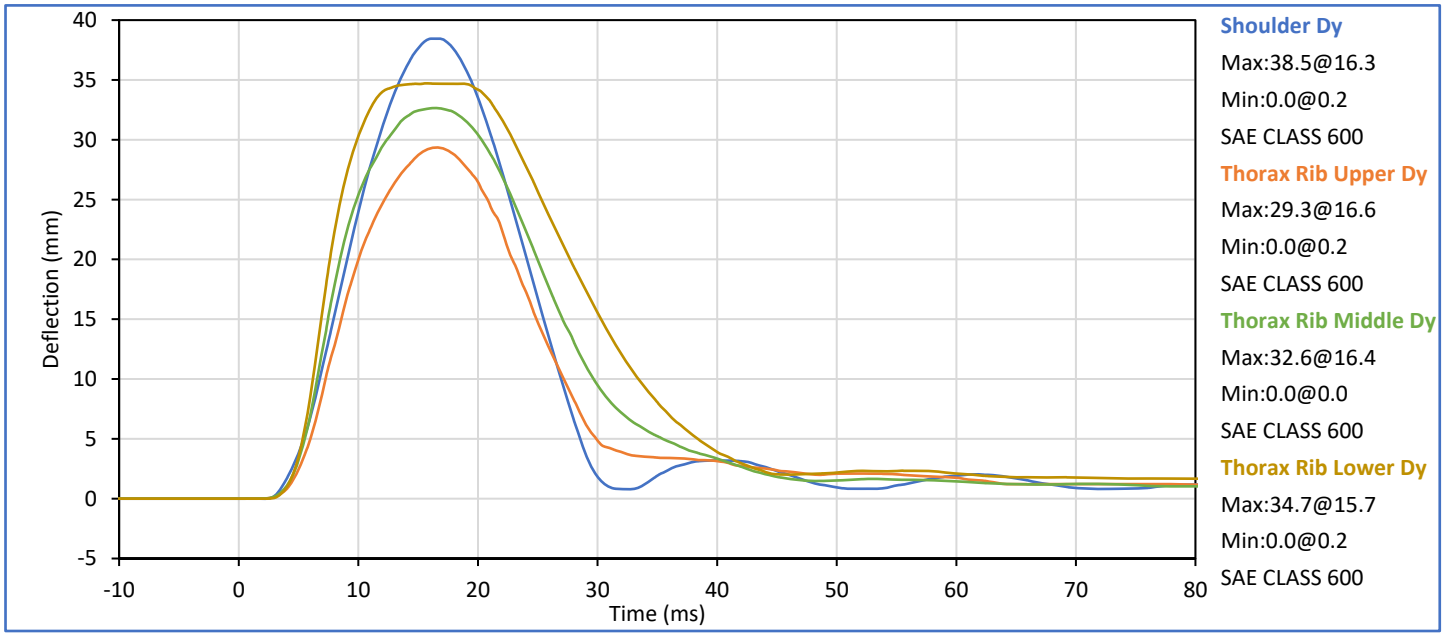
Approved By: J. Hernandez

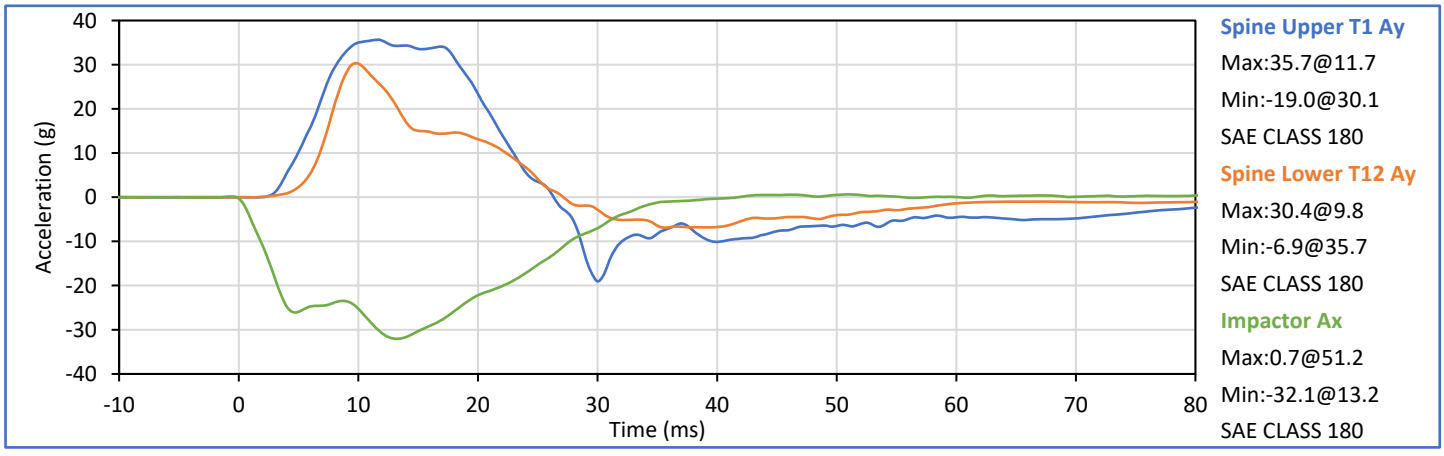
Applus IDIADA KARCO

SID-IIs Small Side Impact ATD
Thorax (With Arm)

ATD Serial No.: 299 Test Date: 2024-08-06

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	37	Pass
Impactor Velocity	m/s	6.60	6.80	6.65	Pass
Peak Shoulder Dy	mm	31.0	40.0	38.5	Pass
Peak Upper Rib Dy	mm	25.0	32.0	29.3	Pass
Peak Middle Rib Dy	mm	30.0	36.0	32.6	Pass
Peak Lower Rib Dy	mm	32.0	38.0	34.7	Pass
Peak Upper Spine (T1) Ay	g	34.0	43.0	35.7	Pass
Peak Lower Spine (T12) Ay	g	29.0	37.0	30.4	Pass
Peak Impactor Ax	g	-36.0	-30.0	-32.1	Pass
			Overall Test Results		Pass





Technician: G. Fuentes

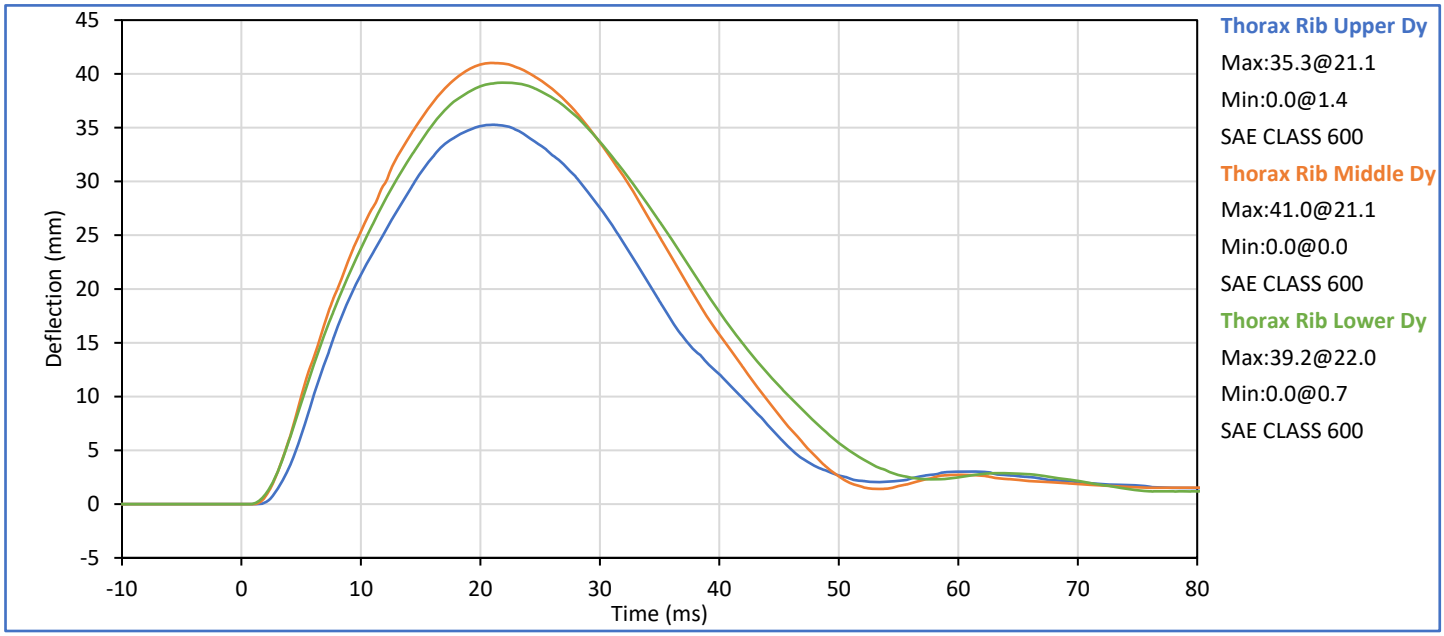
Approved By: J. Hernandez

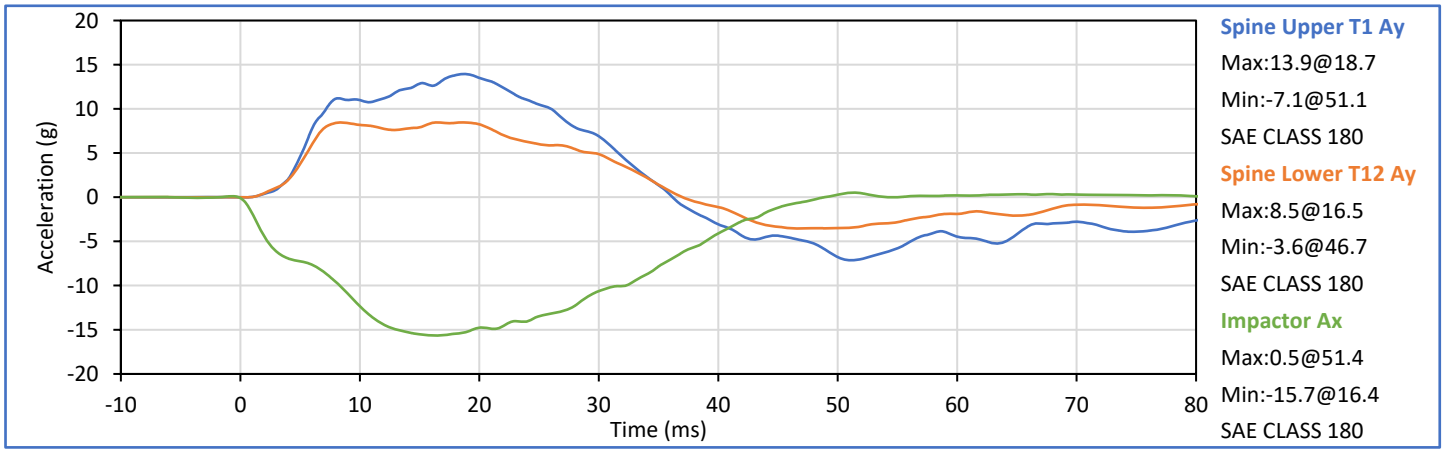
Applus IDIADA KARCO

SID-IIs Small Side Impact ATD
Thorax (No Arm)

ATD Serial No.: 299 Test Date: 2024-08-05

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	41	Pass
Impactor Velocity	m/s	4.20	4.40	4.32	Pass
Peak Thorax Rib Upper Dy	mm	32.0	40.0	35.3	Pass
Peak Thorax Rib Middle Dy	mm	39.0	45.0	41.0	Pass
Peak Thorax Rib Lower Dy	mm	35.0	43.0	39.2	Pass
Peak Spine Upper T1 Ay	g	13.0	17.0	13.9	Pass
Peak Spine Lower T12 Ay	g	7.0	11.0	8.5	Pass
Peak Impactor Ax	g	-18.0	-14.0	-15.7	Pass
			Overall Test Results		Pass





Technician: G. Fuentes

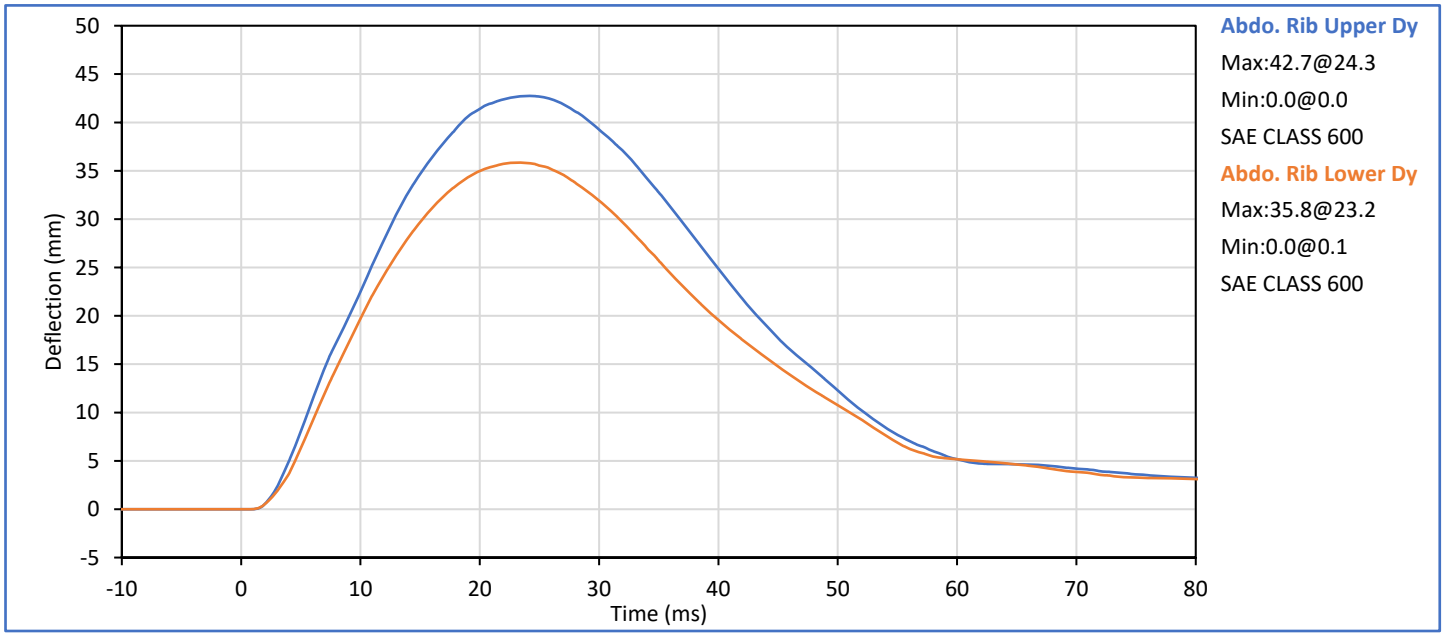
Approved By: J. Hernandez

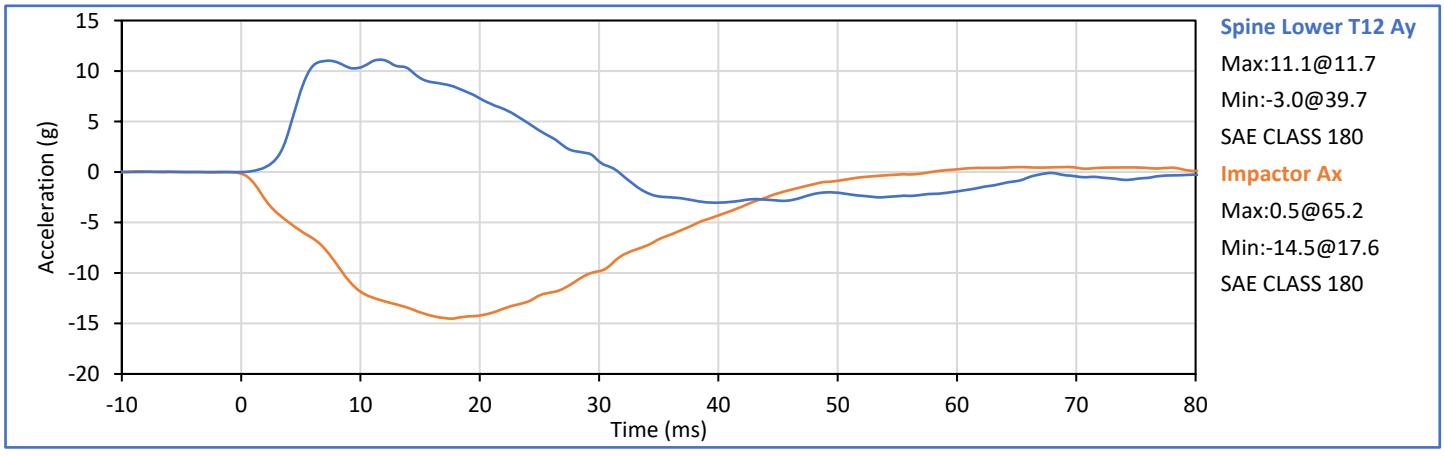
Applus IDIADA KARCO

SID-IIs Small Side Impact ATD
Abdomen Impact

ATD Serial No.: 299 Test Date: 2024-08-06

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	37	Pass
Impactor Velocity	m/s	4.20	4.40	4.38	Pass
Peak Upper Abdomen Rib Dy	mm	36.0	47.0	42.7	Pass
Peak Lower Abdomen Rib Dy	mm	33.0	44.0	35.8	Pass
Peak Lower Spine T12 Ay	mm	9.0	14.0	11.1	Pass
Peak Impactor Ax	g	-16.0	-12.0	-14.5	Pass
			Overall Test Results		Pass





Technician: G. Fuentes

Approved By: J. Hernandez

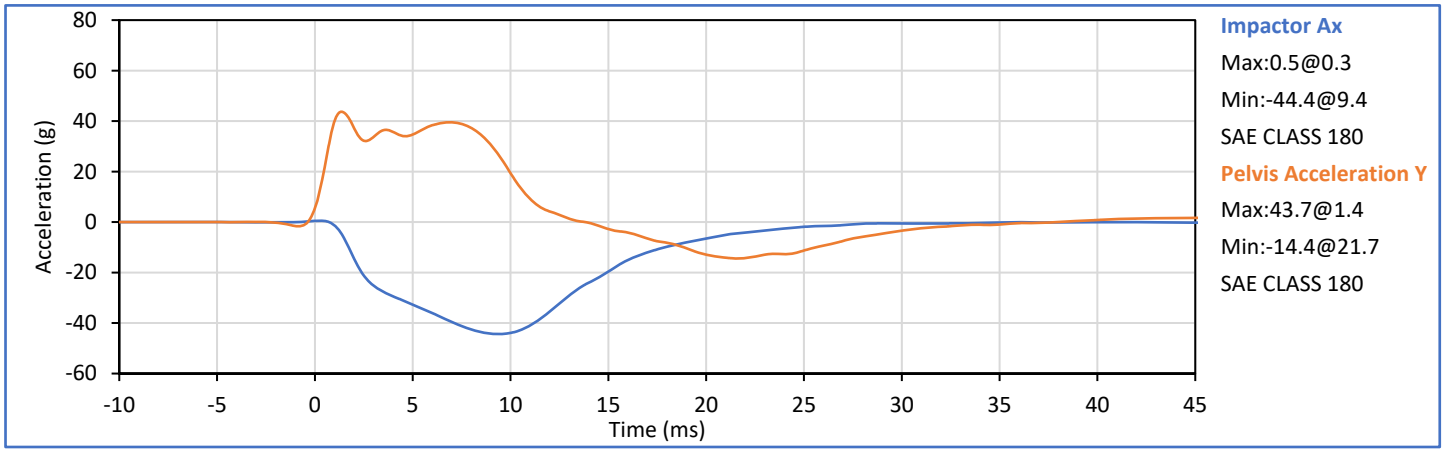
Applus IDIADA KARCO

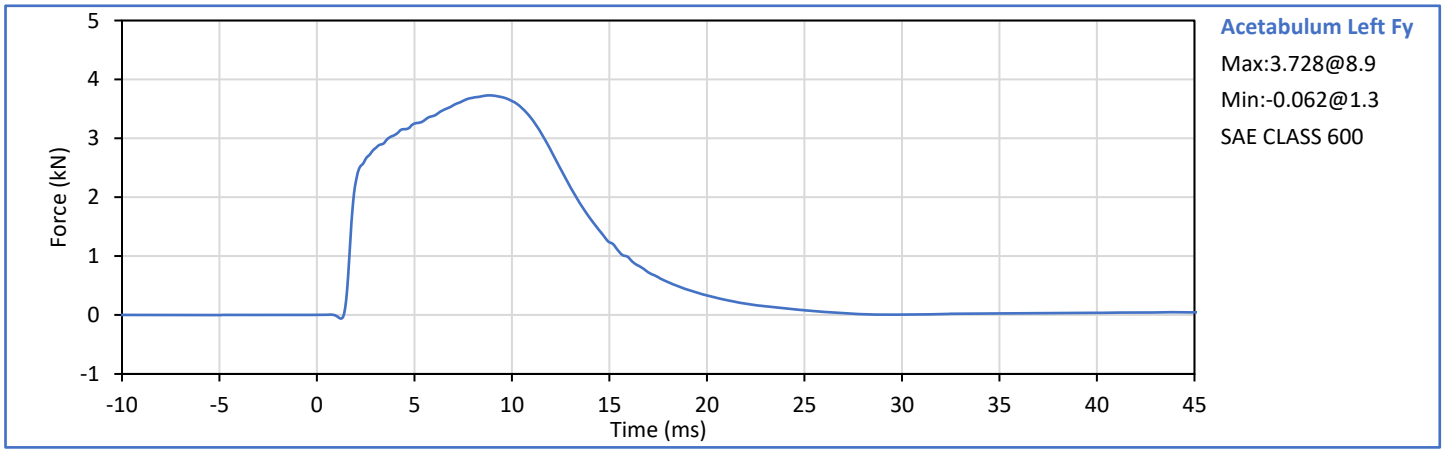
SID-IIs Small Side Impact ATD
Pelvis Acetabulum Impact

ATD Serial No.: 299 Test Date: 2024-08-06

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	38	Pass
Impactor Velocity	m/s	6.60	6.80	6.77	Pass
Peak Acetabulum Fy	kN	3.60	4.30	3.73	Pass
Pelvis Ay after 6ms	g	34.0	42.0	39.5	Pass
Peak Impactor Ax	g	-47.0	-38.0	-44.4	Pass
			Overall Test Results		Pass

Pelvis Plug S/N: 14829





Technician: G. Fuentes

Approved By: J. Hernandez

ATD Serial No.: 299 Test Date: 2024-08-06

Pelvis Plug S/N: 14829

SACO RESEARCH

SID-IIs Pelvis Plug Certification Test

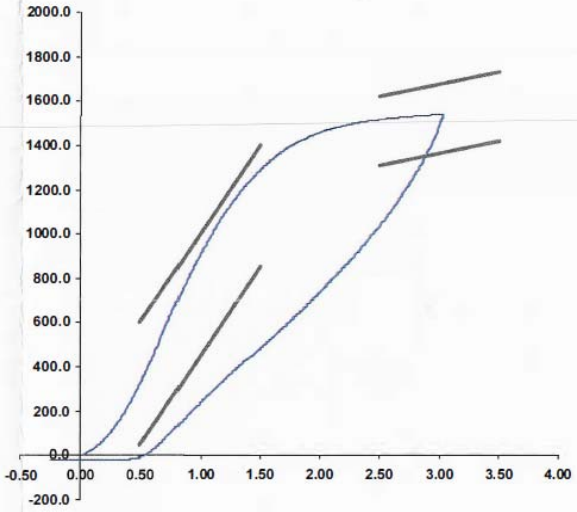
Plug S/N 14829
Test Number 16802
Report Number 16848
Test Date 12/29/2020 1:51:29 PM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	330.40	50.00	600.00
Force @ 1.5 mm (N)	1,289.36	850.00	1,400.00
Force @ 2.5 mm (N)	1,514.04	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,540.17	1,361.00	1,673.00

Testing Machine STM-20 5965542
Load Cell S/N (FI360947), Units (LBS) 1000
Preload Value (-N) 22.24
Crosshead Speed (mm / min) or Rate 12.7
Extension or Position Measured by XHD_100 (XHD100)

Notes:

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107 29-Dec-20
SACO Research

By : DC Date : 12/29/2020

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

Applus IDIADA KARCO

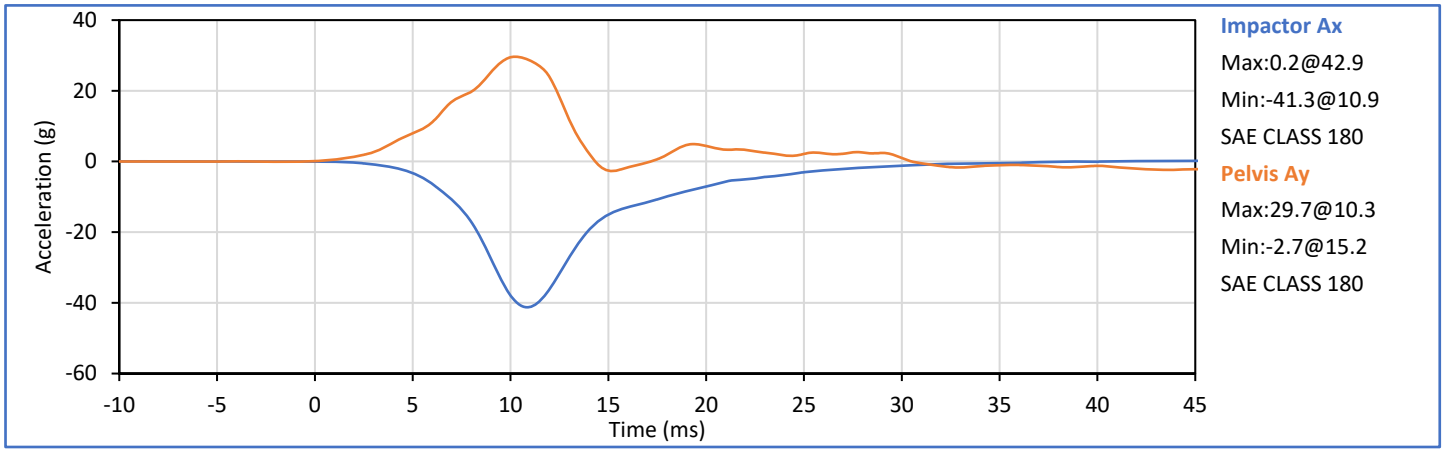
SID-IIs Small Side Impact ATD
Pelvis Iliac Impact

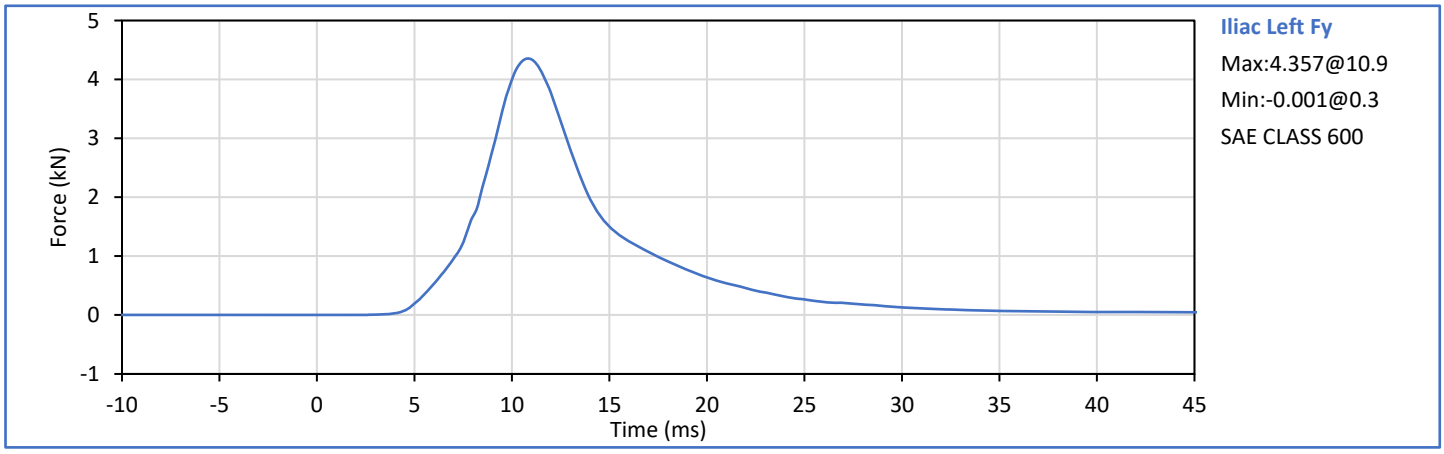
ATD Serial No.: 299 Test Date: 2024-08-07

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.8	Pass
Laboratory Relative Humidity	%	10	70	43	Pass
Impactor Velocity	m/s	4.20	4.40	4.33	Pass
Peak Iliac Fy	kN	4.10	5.10	4.36	Pass
Peak Pelvis Ay	g	28.0	39.0	34.7	Pass
Peak Impactor Ax	g	-45.0	-36.0	-41.3	Pass
			Overall Test Results		Pass

Pelvis Plug S/N: 12228 *

* Plug is not impacted and remains certified





Technician: G. Fuentes

Approved By: J. Hernandez

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

ES-2re ATD S/N: F037

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

SID-IIs ATD S/N: 299

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	M13980	Endevco	758H-2k	2024-05-29
Vehicle CG Ay	M13982	Endevco	758H-2k	2024-05-29
Vehicle CG Az	M13988	Endevco	758H-2k	2024-05-29
Right Side Sill at Front Seat Ax	M11100	Endevco	758H-2k	2024-03-08
Right Side Sill at Front Seat Ay	M11292	Endevco	758H-2k	2024-03-08
Right Side Sill at Front Seat Az	M11214	Endevco	758H-2k	2024-03-12
Right Side Sill at Rear Seat Ax	M13713	Endevco	758H-2k	2024-07-13
Right Side Sill at Rear Seat Ay	M11181	Endevco	758H-2k	2024-03-07
Right Side Sill at Rear Seat Az	M11219	Endevco	758H-2k	2024-03-01
Left Side Sill at Front Seat Ay	A361311	MSI	52F-2k	2024-03-25
Left Side Sill at Rear Seat Ay	A361471	MSI	52F-2k	2024-03-25
Left Lower A-Pillar Ay	223208	BST	11CF-2k	2024-05-23
Left Middle A-Pillar Ay	220108	BST	11CF-2k	2024-04-01
Left Lower B-Pillar Ay	M11120	Endevco	758H-2k	2024-03-22
Left Middle B-Pillar Ay	M14045	Endevco	758HM6-2k	2024-06-22
Driver Seat Track at H-Point Ay	M13986	Endevco	758H-2k	2024-05-29
Rear Seat Structure Ay	M13985	Endevco	758H-2k	2024-05-29
Right Rear Occupant Comp. Ay	M14025	Endevco	758HM6-2k	2024-06-19
Engine Block Top Ax	M11172	Endevco	758H-2k	2024-03-22
Engine Block Top Ay	M11104	Endevco	758H-2k	2024-03-08
Rear Floopan Above Axle Ax	M13945	Endevco	758H-2k	2024-05-29
Rear Floopan Above Axle Ay	M13984	Endevco	758H-2k	2024-05-29
Rear Floopan Above Axle Az	M13983	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