REPORT NUMBER: SideNCAPPole-KAR-21-014

NEW CAR ASSESSMENT PROGRAM (NCAP)

SIDE IMPACT POLE TEST

VOLKSWAGEN GROUP OF AMERICA

2021 VOLKSWAGEN ID.4 5-DOOR SUV

NHTSA No: M20215801

PREPARED BY:

APPLUS IDIADA KARCO ENGINEERING, LLC.

9270 HOLLY ROAD

ADELANTO, CA 92301

SEPTEMBER 23, 2021

FINAL REPORT

PREPARED FOR:

U.S. DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

OFFICE OF CRASHWORTHINESS STANDARDS

MAIL CODE: NRM-110

1200 NEW JERSEY AVE, SE, ROOM W43-410

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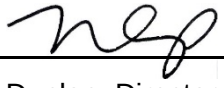
Approved By: 

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Approval Date: September 23, 2021

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date:

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

Date:

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SideNCAPPole-KAR-21-014		

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Final Report of New Car Assessment Program Side Impact Pole and FMVSS No. 305 Testing of a 2021 Volkswagen ID.4 5-Door SUV NHTSA No. M20215801	September 23, 2021 **6. Performing Organization Code** KAR
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15. Supplementary Notes

16. Abstract

A 32.2 km/h 75° rigid pole side NCAP impact test was conducted on the subject 2021 Volkswagen ID.4 5-door SUV in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP Pole Laboratory Test Procedure for the generation of consumer information on vehicle side pole crash protection. The test was conducted at the Applus IDIADA KARCO Engineering, LLC. facility in Adelanto, California on July 28, 2021.

The impact velocity was 31.91 km/h and the outside ambient temperature at the struck (driver's) side of the vehicle was 37.2°C. The target vehicle's maximum post-test static crush was 160 mm located at level 3. The test vehicle's occupant performance data is as follows:

Measurement Description	Driver ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC_{36})		1000	333.4
Resultant Lower Spine Acceleration	g	82	43
Total Pelvic Force (Sum of Acetabular and Iliac Forces)	N	5525	4114
Maximum Thoracic Rib Deflection	mm	38	24
Maximum Abdominal Rib Deflection	mm	45	17

The struck side door at the front of the vehicle was jammed shut and did not separate from the body at the hinges or latches. The remaining doors did not open during the side impact event.

17. Key Words	18. Distribution Statement
New Car Assessment Program (NCAP) Side Impact Pole Part 572V SID-IIs	Copies of this report are available from: National Highway Traffic Safety Admin. Technical Information Services 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
UNCLASSIFIED	UNCLASSIFIED	132	

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SECTION 1
TEST PURPOSE AND SUMMARY OF TEST

PURPOSE

This side impact test is part of the MY 2021 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract number DTNH22-14-D-00355L. The purpose of this test is to generate comparative side impact performance in a 2021 Volkswagen ID.4 5-Door SUV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure date March 2020.

SUMMARY

A rigid pole side impact test was conducted on a 2021 Volkswagen ID.4 5-Door SUV. The subject vehicle was towed into the rigid pole at an angle of 75.0° and a velocity of 31.91 km/h. The test was conducted by Applus IDIADA KARCO Engineering, LLC. in Adelanto, California on July 28, 2021. Pre- and post-test photographs of the test vehicle and side impact dummy (SID-IIs) are included in Appendix A of this report.

One Part 572V (SID-IIs) dummy was placed in the driver designated seating position according to instructions specified in the OCWS Side NCAP Pole Laboratory Test Procedure, dated March 2020. Camera locations and other pertinent camera information are included in this report.

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

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

Appendix B contains the vehicle and dummy response data. Dummy configuration and performance verification data can be found in Appendix C of this report. Appendix D contains the test equipment and instrumentation calibration data.

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

Measurement Description	Units	Driver ATD (SID-IIs)	
		IARV	Result
Head Injury Criteria (HIC_{36})		1000	333.4
Lower Spine (T12) Resultant Acceleration	g	82	43
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	4114
Maximum Thoracic Rib Deflection	mm	38*	24
Maximum Abdominal Rib Deflection	mm	45*	17

**Proposed IARV*

Supplemental restraint information is given below:

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

GENERAL COMMENTS

The struck side door at the front of the vehicle was jammed shut. There was no separation at the hinges or latches. The remaining doors remained closed and latched. There were no ATD values that exceeded limits.

- The vehicle CG Ax, channel failed at 24.6 ms, sensor detached during impact
- The vehicle CG AY, channel failed at 24.6 ms, sensor detached during impact
- The vehicle CG AZ, channel failed at 24.6 ms, sensor detached during impact
- The left Mid A-Post AY, channel failed, no data collected
- The floor pan at Rear Axle AY, channel failed at 23.5 ms
- The left lower B-Post AY, questionable data spikes throughout
- The load cell #7 at pole FY, channel failed, no data collected
- Some Post-Test photographs were taken with the Pre-Test placard instead of the Post-Test placard

SECTION 2

OCCUPANT AND VEHICLE INFORMATION/DATA SHEETS

Test Vehicle: 2021 Volkswagen ID.4 5-Door SUV NHTSA No. M20215801

Test Program: NCAP Side Pole Impact Test Test Date: 07/28/21

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: 2021 Volkswagen ID.4 5-Door SUV NHTSA No. M20215801

Test Program: NCAP Side Pole Impact Test Test Date: 07/28/21

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	M20215801
Model Year	2021
Make	Volkswagen
Model	ID.4
Body Style	5-Door SUV
VIN	WVGRMPE29MP027074
Body Color	Silver
Odometer Reading (km / mi)	146 / 91
Engine Displacement (L)	N/A
Type / No. of Cylinders	N/A
Engine Placement	N/A
Transmission Type	Automatic
Transmission Speeds	1
Overdrive	Yes
Final Drive	RWD
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)	No
Auto-Leveling System	No
Automatic Door Locks	Yes
Power Window Auto-Reverse	Yes
Other Optional Feature	Yes
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	No
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head/Torso Airbag	No
Rear Pass. Torso Airbag	No
Rear Pass. Torso/Pelvis Airbag	No
Rear Pass. Pelvis Airbag	No
Driver Seat Belt Pretensioner	Yes
Rear Pass. Seat Belt Pretensioner	Yes
Driver Load Limiter	Yes
Rear Pass. Load Limiter	No
Other Safety Restraint	N/A

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Volkswagen Group of America
Date of Manufacture	Mar-21
Vehicle Type	SUV

GVWR (kg)	2560
GAWR Front (kg)	1130
GAWR Rear (kg)	1480

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

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

VEHICLE SEAT TYPE

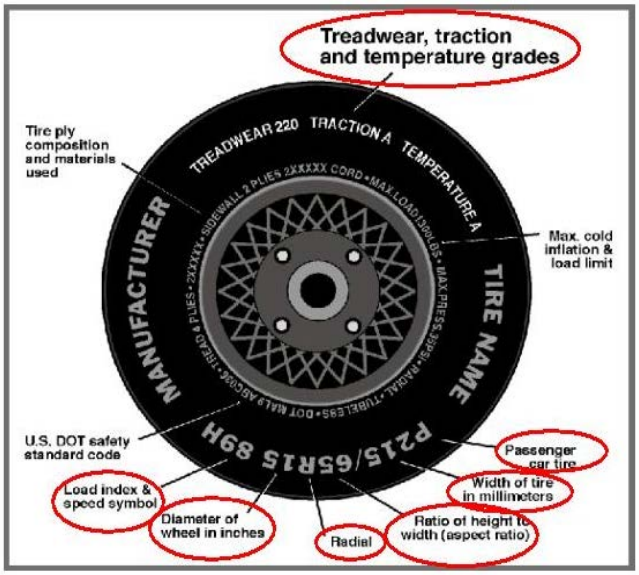
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable w/ Lever	Adjustable w/ Knob
Front Seat	Yes					Yes	
Rear or Second Row Seat			Yes		Yes		
Third Row Seat							

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2021 Volkswagen ID.4 5-Door SUV NHTSA No. M20215801

Test Program: NCAP Side Pole Impact Test Test Date: 07/28/21



Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	340	340
Cold Pressure (kPa)	290	290
Recommended Tire Size	P235/55 R19	P255/50 R19
Tire Size on Vehicle	P235/55 R19	P255/50 R19
Tire Manufacturer	Hankook	Hankook
Tire Model	Kinergy AS X	Kinergy AS X
Treadware	500	500
Traction Grade	A	A
Temperature Grade	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Polyester, 2 Nylon	2 Polyester, 2 Polyester, 2 Nylon
Load Index/Speed Symbol	105T	105T
Tire Material	Polyester, Steel, Nylon	Polyester, Steel, Nylon
DOT Safety Code Left	15 M98 9U HO	15 M7F 9U HO
DOT Safety Code Right	15 M98 9U HO	15 M7F 9U HO

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2021 Volkswagen ID.4 5-Door SUV NHTSA No. M20215801

Test Program: NCAP Side Pole Impact Test Test Date: 07/28/21

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	290	290	290	290
Tire Placard	kPa	290	290	290	290
Owner's Manual	kPa	290	290	290	290
As Tested	kPa	290	290	290	290

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	487.5	525.0		520.0	595.0		505.0	606.0	
Right	kg	499.0	562.5		498.5	592.0		485.0	619.0	
Ratio	%	47.6%	52.4%	100.0%	46.2%	53.8%	100.0%	44.7%	55.3%	100.0%
Total	kg	986.5	1087.5	2074.0	1018.5	1187.0	2205.5	990.0	1225.0	2215.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	2074.0	A
Actual Weight of 1 SID II-s ATD Used	kg	49.0	B
Rated Cargo/Luggage Wt (RCLW)	kg	89.8	C
Calculated Vehicle Target Wt (TVTW)	kg	2212.8	A+B+C

Does the measured As Tested Vehicle Weight lie within the required weight range (i.e. Calculated Test Vehicle Target Weight -4.5 kg to -9.0 kg)? ☒ **Yes** ☐ **No**

TEST VEHICLE ATTITUDE AND CG

Measurement Description	Units	As Delivered	As Tested	Fully Loaded	Meets Requirement***
Driver Door Sill Angle (front-to-rear)*	°	-0.4	-0.2	-0.2	Yes
Front Passenger Sill Angle (front-to-rear)*	°	-0.5	-0.4	-0.3	Yes
Front Bumper-Line Angle (left-to-right)**	°	0.1	0.5	0.5	Yes
Rear Bumper-Line Angle (left-to-right)**	°	0.1	0.5	0.5	Yes
Vehicle CG (Aft of Front Axle)	mm	1446	1484	1525	
Vehicle CG (Left (+)/Right (-) from Longitudinal Centerline)	mm	-18	8	2	

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

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

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2021 Volkswagen ID.4 5-Door SUV NHTSA No. M20215801

Test Program: NCAP Side Pole Impact Test Test Date: 07/28/21

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Rear Trim	3.0
Ballast / Equipment Added	67.7

TEST SURFACE MARKINGS

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

DATA SHEET NO. 2

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

Test Vehicle: 2021 Volkswagen ID.4 5-Door SUV NHTSA No. M20215801

Test Program: NCAP Side Pole Impact Test Test Date: 07/28/21

SEAT POSITIONING

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

SCRL ANGLE RANGE

Seat	SCRL (°)		
	Max	Min	Mid
Driver Seat	4.1	0.0	2.1
Front Passenger Seat	4.2	0.0	2.1
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	2.1	205	Max			
			Mid	200	205	210
			Min			
Front Passenger Seat	2.1	221	Max			
			Mid	216	221	227
			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: 2021 Volkswagen ID.4 5-Door SUV NHTSA No. M20215801

Test Program: NCAP Side Pole Impact Test Test Date: 07/28/21

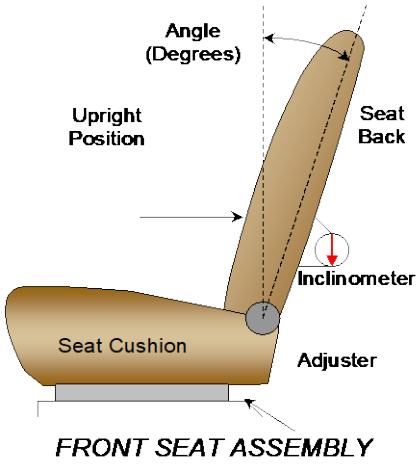
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position From Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	248	36	124	19
Front Passenger Seat	248	36	124	19
Front Center Seat				
Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed	Fixed

*Detent zero (0) is the forward most detent

SEAT BACK ADJUSTMENT

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



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degree	Detent*
Driver Seat w/Seated Dummy	66.2	15	9.6	13
Front Passenger Seat	67.7	14	17.0	12
Front Center Seat				
Struck Side Rear Seat w/Seated Dummy	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed	Fixed

*Detent zero (0) is the forward most detent

DATA SHEET NO. 2 … (CONTINUED)

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

Test Vehicle: 2021 Volkswagen ID.4 5-Door SUV NHTSA No. M20215801

Test Program: NCAP Side Pole Impact Test Test Date: 07/28/21

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	L

HEAD RESTRAINT ADJUSTMENT

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

	Total No. of Positions	Placed in Position
Driver Seat	4	L

DATA SHEET NO. 2 … (CONTINUED)

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

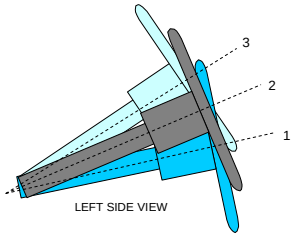
Test Vehicle: 2021 Volkswagen ID.4 5-Door SUV NHTSA No. M20215801

Test Program: NCAP Side Pole Impact Test Test Date: 07/28/21

STEERING COLUMN ADJUSTMENT

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

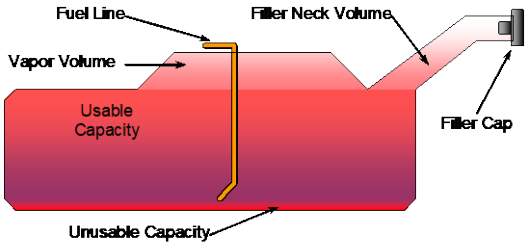
	Degrees	Fore-Aft Position (mm)
Lowermost - Position 1	21.1	150
Geometric Center - Position 2	23.8	177.5
Uppermost - Position 3	26.5	205
Telescoping Steering Wheel Travel		55
Test Position	23.8	177.5



STEERING COLUMN ASSEMBLY

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

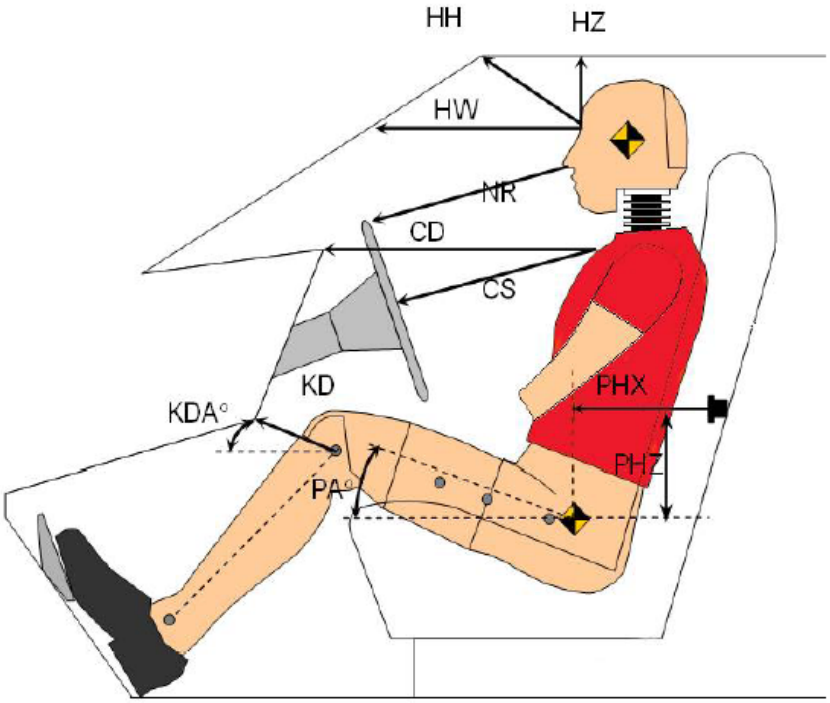
Is the Actual Amount of Solvent Used in the test equal to 93% ± 1% of the Usable Capacity stated in the Form No. 1? ☐ **Yes** ☐ **No**

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2021 Volkswagen ID.4 5-Door SUV NHTSA No. M20215801

Test Program: NCAP Side Pole Impact Test Test Date: 07/28/21



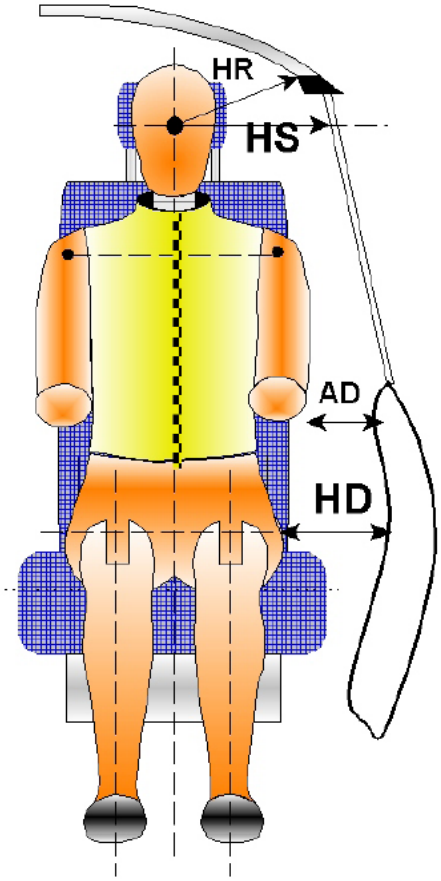
Driver Code	Description	Driver	
		Length (mm)	Angle (º)
HH	Head to Header	297	
HW	Head to Windshield	710	
HZ	Head to Roof	222	
NR	Nose to Rim	244	
CD	Chest to Dash	416	
CS	Chest to Steering Wheel	202	
KD(L)/KDA(L)°	Left Knee to Dash	203	30.5
KD(R)/KDA(R)°	Right Knee to Dash	194	29.8
PAX°	Pelvic Tilt Angle (x-axis)		18.0
PAY°	Pelvic Tilt Angle (y-axis)		0.2
PHX	Hip Point to Striker (x-axis)	329	
PHZ	Hip Point to Striker (z-axis)	218	

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2021 Volkswagen ID.4 5-Door SUV NHTSA No. M20215801

Test Program: NCAP Side Pole Impact Test Test Date: 07/28/21



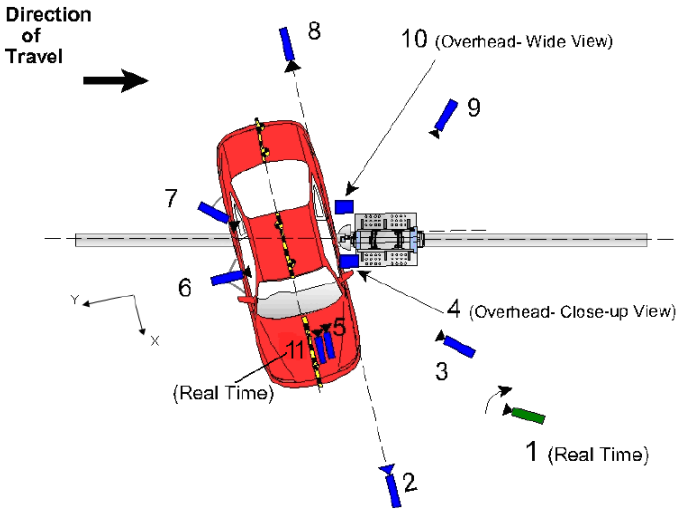
Code	Measurement Description	Units	Driver
HR	Head to Side Header	mm	277
HS	Head to Side Window	mm	371
AD	Arm to Door	mm	180
HD	Hip Point to Door	mm	176

DATA SHEET NO. 5

CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2021 Volkswagen ID.4 5-Door SUV NHTSA No. M20215801

Test Program: NCAP Side Pole Impact Test Test Date: 07/28/21



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

Camera No.	View	Coordinates (m)			Lens (mm)	Film Speed (fps)
		X*	Y*	Z*		
1	Real Time Pan View of Impact	8.89	46.57	-3.04		30
2	Front Ground Level - Impact View	8.34	-0.05	-0.93	24	1000
3	Impact Side 45° - Forward Pole View	4.10	-2.15	-1.15	8.5	1000
4	Overhead Close-Up View of Impact	0.00	0.00	-5.79	12.5	1000
5	On-Board - Dummy Front View	1.34	-0.53	-1.57	8.5	1000
6	On-Board - Dummy Side View	0.06	0.73	-1.32	8.5	1000
7	On-Board - Dummy Rear Oblique View	-0.97	0.70	-1.36	8.5	1000
8	Rear Ground Level - Impact View	-1.30	1.68	-1.26	24	1000
9	Impact Side 45° - Rearward Pole View	-8.02	0.04	-1.01	35	1000
10	Overhead Wide View of Impact	-0.06	0.22	-5.79	14	1000
11	Real Time Dummy Front View	1.34	-0.52	-1.56		30

*All measurements accurate to ±6 mm

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

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

INSTRUMENTATION

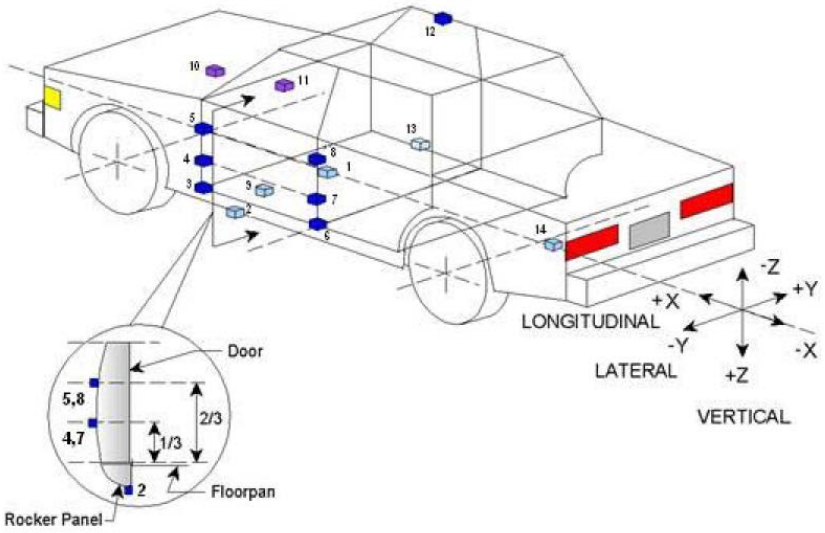
Driver Dummy Channels	19
Vehicle Structure Accelerometers	18
Pole Load Cells	8
Total	45

DATA SHEET NO. 6

TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2021 Volkswagen ID.4 5-Door SUV NHTSA No. M20215801

Test Program: NCAP Side Pole Impact Test Test Date: 07/28/21



Loc. No.	Sensor Description	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	1870	0	-380
2	Left Floor Sill	2860	-750	-440
3	A-Pillar Sill	3110	-770	-420
4	A-Pillar Low	3110	-790	-550
5	A-Pillar Mid	3110	-850	-810
6	B-Pillar Sill	2020	-750	-410
7	B-Pillar Low	2020	-770	-530
8	B-Pillar Mid	2020	-780	-760
9	Driver Seat Track	2360	-670	-640
10	Engine Top	3790	210	-870
11	Firewall	3610	370	-860
12	Right Roof	2220	510	-1580
13	Right Floor Sill	1800	800	-430
14	Rear Floorpan	990	0	-520

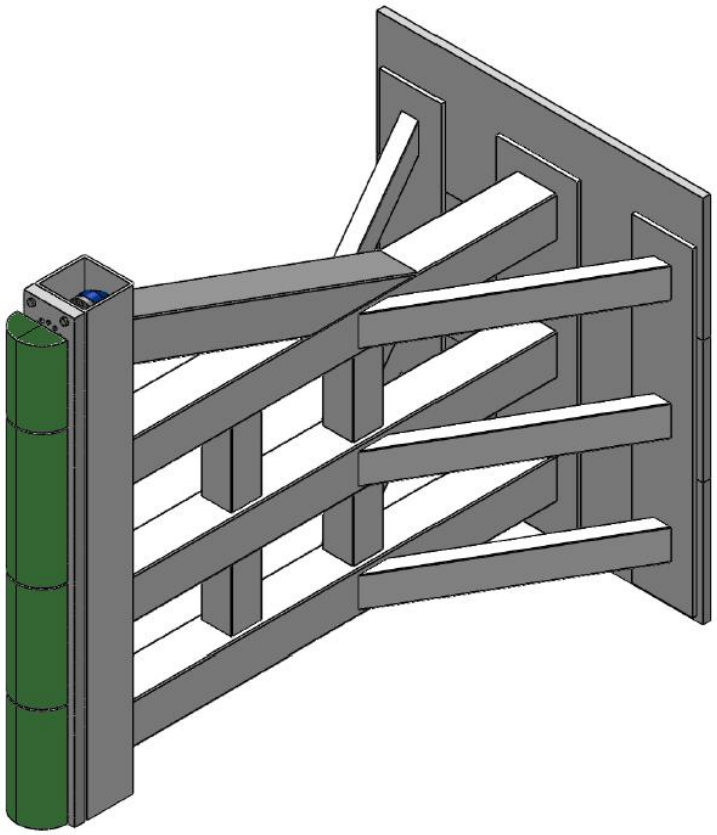
Reference: X – Rear surface of vehicle (+ forward)
Y – Vehicle centerline (+ to right)
Z – Ground plane (+ down)

DATA SHEET NO. 7

RIGID POLE LOAD CELL DATA

Test Vehicle: 2021 Volkswagen ID.4 5-Door SUV NHTSA No. M20215801

Test Program: NCAP Side Pole Impact Test Test Date: 07/28/21



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

DATA SHEET NO. 8

POST-TEST OBSERVATIONS

Test Vehicle: 2021 Volkswagen ID.4 5-Door SUV NHTSA No. M20215801

Test Program: NCAP Side Pole Impact Test Test Date: 07/28/21

TEST DUMMY INFORMATION AND CONTACT POINTS

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

POST-TEST DOOR PERFORMANCE

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

POST-TEST SEAT PERFORMANCE

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

DATA SHEET NO. 8 … (CONTINUED)

POST-TEST OBSERVATIONS

Test Vehicle: 2021 Volkswagen ID.4 5-Door SUV NHTSA No. M20215801

Test Program: NCAP Side Pole Impact Test Test Date: 07/28/21

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No separation occurred
Sill Separation	No separation occurred
Windshield Damage	Broken
Side Window Damage	Left front window broken
Other Notable Effects	Left rear window lowered after impact

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

IMPACT POINT LOCATION DATA

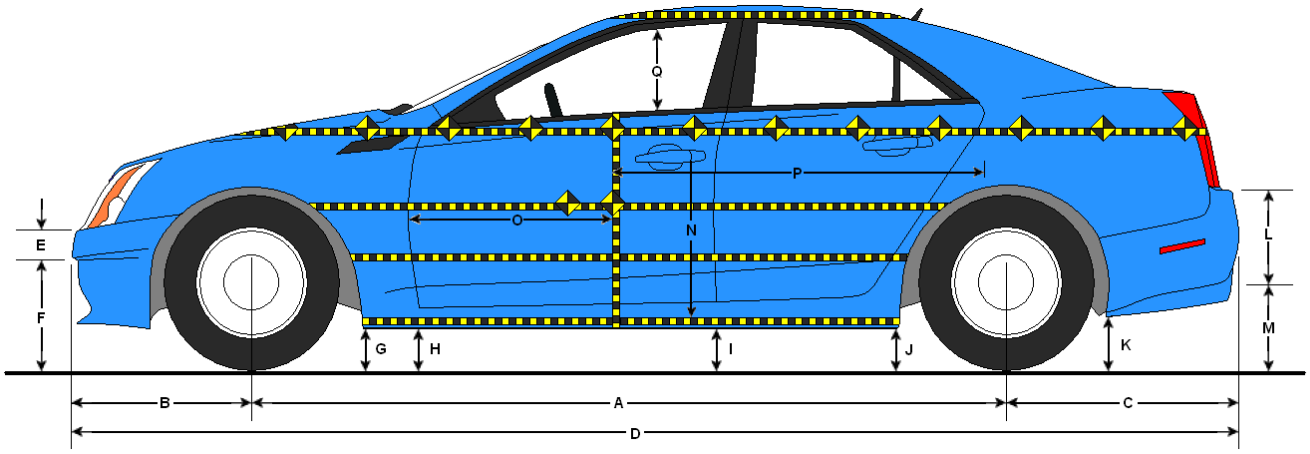
Measured Parameter	Units	Tolerance	Value
Vertical Impact Reference Line (Aft of Front Axle)(Intended Impact Point)	mm		1307
Actual Impact Point (Aft of Front Axle)	mm		1306
Horizontal Offset (+ forward / - rearward)	mm	± 38 of Intended Impact Point	1
Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion	°	75 ± 3	75.0
Trap No. 1 Velocity (Primary)	km/h	31.4 to 33.0	31.91
Trap No. 2 Velocity (Redundant)	km/h	31.4 to 33.0	31.91

DATA SHEET NO. 9

TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2021 Volkswagen ID.4 5-Door SUV NHTSA No. M20215801

Test Program: NCAP Side Pole Impact Test Test Date: 07/28/21



LEFT SIDE VIEW

All measurements in mm with tolerance of ± 3mm

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

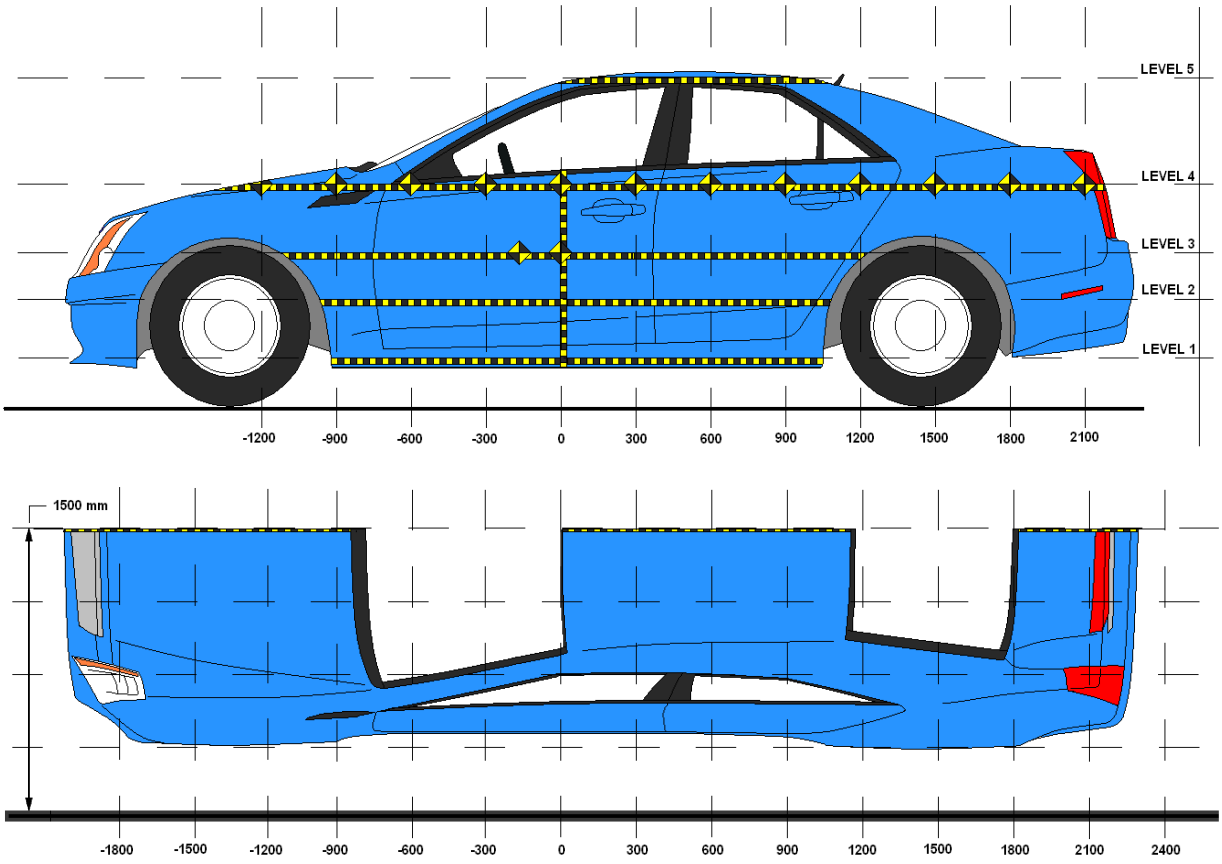
Code	Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2757	2749	-8
B	Front Axle to FSOV	857	869	12
C	Rear Axle to RSOV	974	972	-2
D	Total Length at Centerline	4587	4590	3
E	Front Bumper Thickness	158	157	-1
F	Fromt Bumper Bottom to Ground	608	586	-22
G	Sill Height at Front Wheel Well	446	435	-11
H	Sill Height at Front Door Leading Edge	415	397	-18
I	Sill Height at B-Pillar	430	405	-25
J1	Sill Height at Rear Wheel Well	421	423	2
J2	Pinch Weld Height at Rear Wheel Well	396	393	-3
K	Sill Height Aft of Rear Wheel Well	505	506	1
L	Rear Bumper Thickness	152	151	-1
M	Rear Bumper Bottom to Ground	560	563	3
N	Sill Height to Bottom of Front Window Sill	801	831	30
O	Front Door Leading Edge to Impact CL	808	628	-180
P	Rear Door Trailing Edge to Impact CL	1384	1528	144
Q	Front Window Opening	410	401	-9
R	Right Side Length	3418	3428	10
S	Left Side Length	3417	3403	-14
T	Vehicle Width at B-Pillar	1834	1850	16

DATA SHEET NO. 10

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2021 Volkswagen ID.4 5-Door SUV NHTSA No. M20215801

Test Program: NCAP Side Pole Impact Test Test Date: 07/28/21



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

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Description	Height Above Ground (mm)	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	472	104	-150
2	Occupant H-Point	828	158	-150
3	Mid-Door	873	160	-150
4	Window Sill	1209	128	150
5	Window Top	1717	12	1650

DATA SHEET NO. 10 … (CONTINUED)

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2021 Volkswagen ID.4 5-Door SUV NHTSA No. M20215801

Test Program: NCAP Side Pole Impact Test Test Date: 07/28/21

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

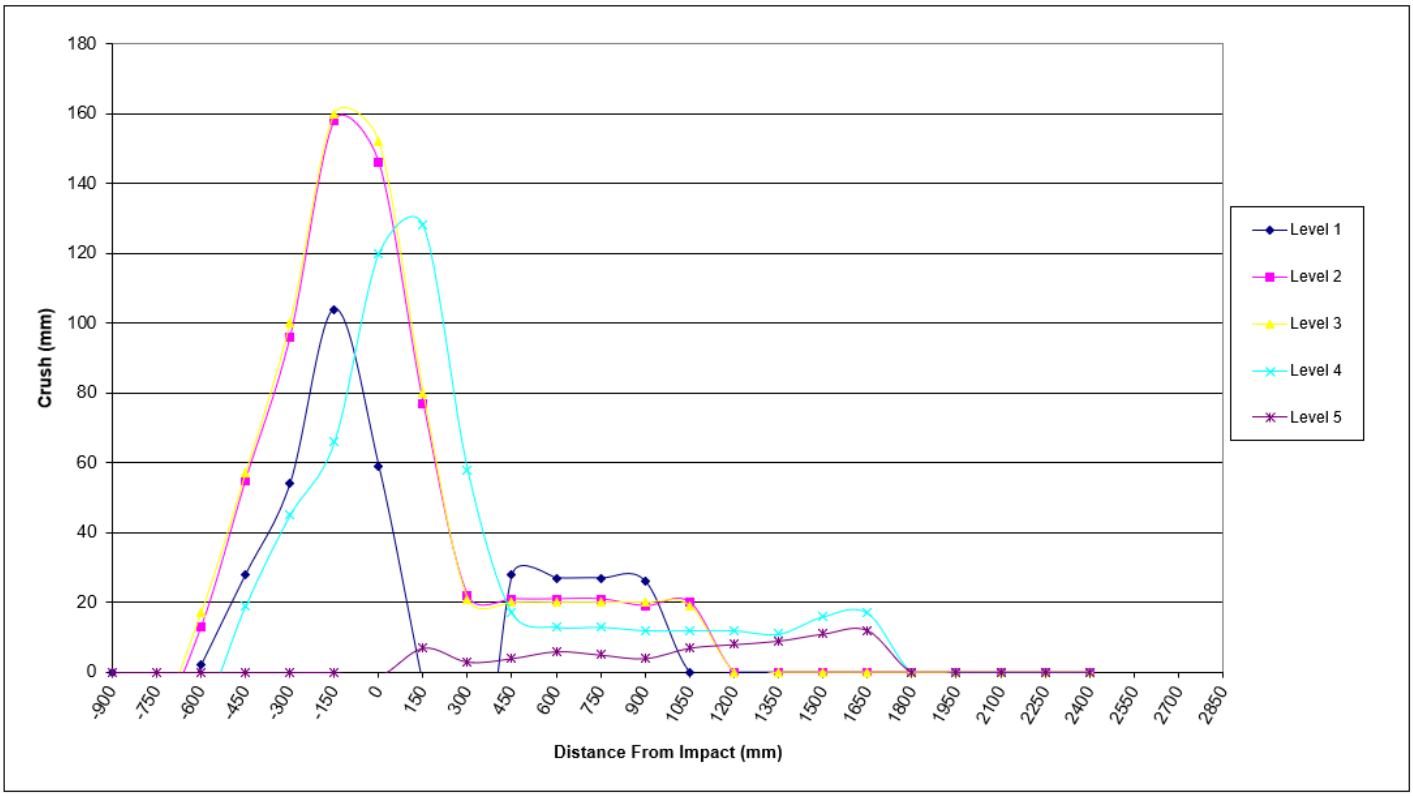
	Pre-Test (mm)					Post-Test (mm)					Difference (mm)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900		572	569	647			568	563	625			-4	-6	-22	
-750	593	574	572	644		568	561	560	627		-25	-13	-12	-17	
-600	593	575	573	641		595	588	590	629		2	13	17	-12	
-450	599	576	574	640		627	631	631	659		28	55	57	19	
-300	600	577	574	637		654	673	674	682		54	96	100	45	
-150	601	578	575	634		705	736	735	700		104	158	160	66	
0	603	579	576	630	873	662	725	728	750	872	59	146	152	120	-1
150	604	581	578	625	868	600	658	658	753	875	-4	77	80	128	7
300	604	582	579	621	868	539	604	600	679	871	-65	22	21	58	3
450	605	581	578	618	872	633	602	598	635	876	28	21	20	17	4
600	604	580	578	616	876	631	601	598	629	882	27	21	20	13	6
750	593	579	577	614	878	620	600	597	627	883	27	21	20	13	5
900	592	577	575	617	882	618	596	595	629	886	26	19	20	12	4
1050		577	575	617	883		597	594	629	890		20	19	12	7
1200				610	888				622	896				12	8
1350				599	893				610	902				11	9
1500				597	898				613	909				16	11
1650				600	904				617	916				17	12
1800															
1950															
2100															
2250															
2400															
2550															
2700															
2850															

DATA SHEET NO. 10 … (CONTINUED)

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2021 Volkswagen ID.4 5-Door SUV NHTSA No. M20215801

Test Program: NCAP Side Pole Impact Test Test Date: 07/28/21

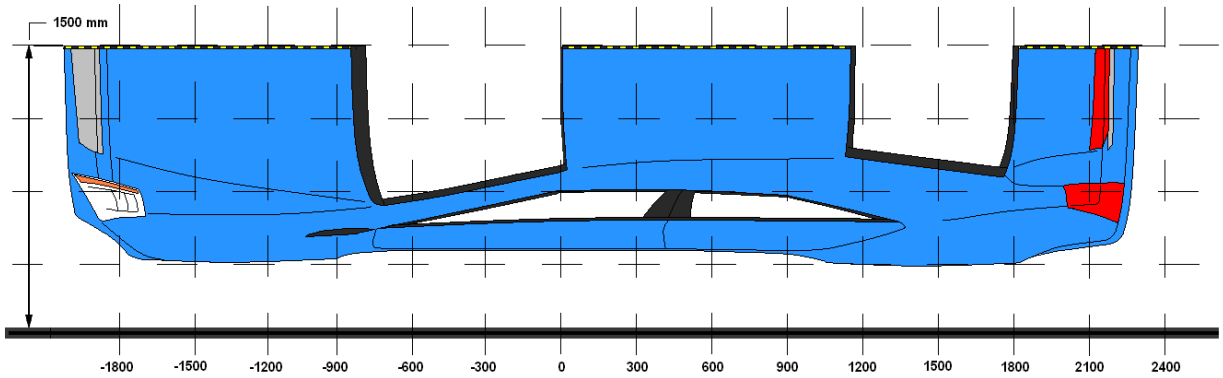


DATA SHEET NO. 11

VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2021 Volkswagen ID.4 5-Door SUV NHTSA No. M20215801

Test Program: NCAP Side Pole Impact Test Test Date: 07/28/21



DPD	Distance From Impact Point (mm)	Level	Pre-Test (mm)	Post-Test (mm)	Crush (mm)
1	1650	4	600	617	17
2	1200	4	610	622	12
3	600	1	604	631	27
4	150	4	625	753	128
5	-450	3	574	631	57
6	-900	2	572	568	-4

DATA SHEET NO. 12

FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2021 Volkswagen ID.4 5-Door SUV NHTSA No. M20215801

Test Program: NCAP Side Pole Impact Test Test Date: 07/28/21

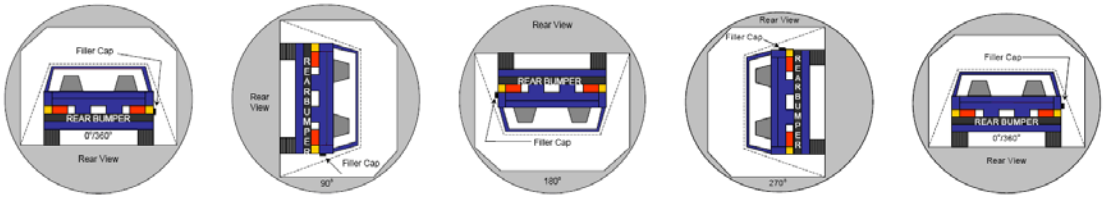
Temperature at Time of Impact: 21.4° C Test Time: 4:20 PM

A. From impact until vehicle motion ceases: 0 oz.
(Maximum allowable = 1 oz.)

B. For the 5 minute period after motion ceases: 0 oz.
(Maximum allowable = 5 oz.)

C. For the following 25 minutes: 0 oz.
(Maximum allowable = 1 oz./minute)

D. Spillage Details: There was no Stoddard solvent spillage.



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°	88	300	388
90° To 180°	81	300	381
180° To 270°	84	300	384
270° To 360°	88	300	388

FMVSS 301 SPILLAGE TABLE

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

SOLVENT SPILLAGE LOCATION TABLE

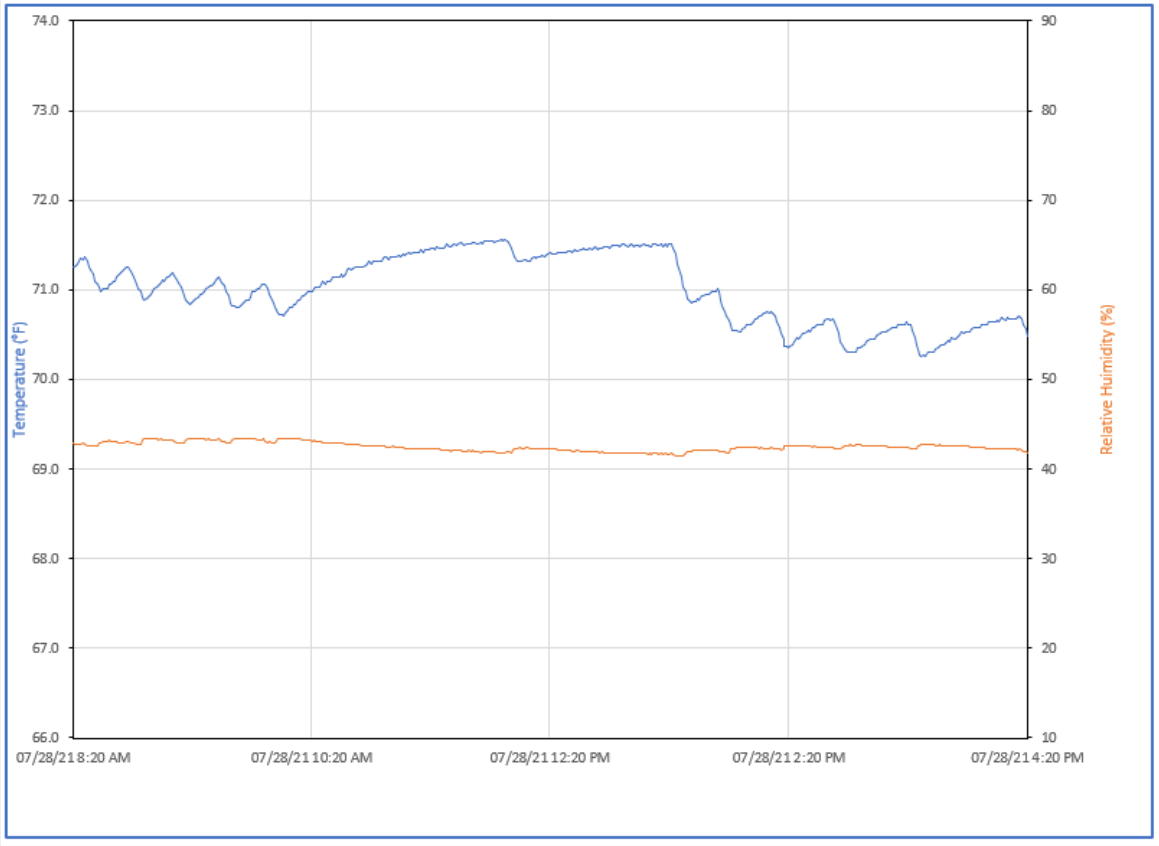
Test Phase	Spillage Location
0° To 90°	
90° To 180°	
180° To 270°	
270° To 360°	

DATA SHEET NO. 13

DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION

Test Vehicle: 2021 Volkswagen ID.4 5-Door SUV NHTSA No. M20215801

Test Program: NCAP Side Pole Impact Test Test Date: 07/28/21



DATA SHEET NO. 305-1

GENERAL TEST AND VEHICLE PARAMETER DATA FOR INDICANT FMVSS NO. 305 TESTING

Test Vehicle: 2021 Volkswagen ID.4 5-Door SUV NHTSA No.: M20215801

Test Program: NCAP Side Pole Impact Test Test Date: 07/28/21

TEST VEHICLE INFORMATION

NHTSA Number	M20215801
Model Year	2021
Make	Volkswagen
Model	ID.4
Body Style	5-Door SUV
Body Color	Silver
Odometer Reading (km / mi)	146 / 91

DATA FROM VEHICLE'S CERTIFICATION LABEL

Manufactured By	Volkswagen Group of America
Date of Manufacture	Mar-21
VIN	WVGRMPE29MP027074
GVWR (kg)	2560

ELECTRIC VEHICLE PROPULSION SYSTEM

Type of Electrical Vehicle	Electric
Propulsion Battery Type	Lithium-Ion
Nominal Voltage (V)	352
Automatic Propulsion Battery Disconnect	Yes
Physical Location of Automatic Propulsion Battery Disconnect	Internal to HV Battery
Auxiliary Battery Type	12 Volt

PROPULSION BATTERY SYSTEM DATA

Electrolyte Fluid Type	LiPF6 + EC + EMC
Electrolyte Fluid Specific Gravity (g/cc)	1.29
Electrolyte Fluid Dynamic Viscosity (mPa s)	2-6 cSt
Electrolyte Fluid Color	Clear and colorless
Propulsion Battery Coolant Type	G12evo
Propulsion Battery Coolant Color	Pink (Magenta)
Propulsion Battery Coolant Specific Gravity	

LOCATION OF BATTERY MODULES

Location	Outside Passenger Compartment

DATA SHEET NO. 305-1…(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA FOR INDICANT FMVSS NO. 305 TESTING

Test Vehicle: 2021 Volkswagen ID.4 5-Door SUV NHTSA No.: M20215801

Test Program: NCAP Side Pole Impact Test Test Date: 07/28/21

For all battery types:

Description	Volts
Minimum Operating Voltage	240.0
Maximum Operating Voltage	408.0
95% of Maximum Operating Voltage	387.6
Test Voltage (no less than 95% of Maximum)*	378.7

*This test was conducted below the required 95% battery voltage.

For batteries that are rechargeable ONLY by an energy source on the vehicle:

Description	Volts
Minimum Operating Voltage	
Maximum Operating Voltage	
Test Voltage (Maximum practicable state of charge within normal operating range)	

DATA SHEET NO. 305-2

PRE-IMPACT DATA FOR INDICANT FMVSS NO. 305 TESTING

Test Vehicle: 2021 Volkswagen ID.4 5-Door SUV NHTSA No.: M20215801

Test Program: NCAP Side Pole Impact Test Test Date: 07/28/21

VEHICLE CHASSIS GROUND POINT(S) LOCATION(S)

DETAILS OF VEHICLE CHASSIS GROUND POINT(S) AND LOCATION(S):

The FMVSS 305 ground terminal is located in the trunk compartment of the vehicle.

PROPULSION BATTERY SYSTEM

DETAILS OF PROPULSION BATTERY COMPONENTS:

The FMVSS 305 connections for high voltage battery positive and negative are located under the front passenger dashboard.

DATA SHEET NO. 305-3

PRE-IMPACT ELECTRICAL ISOLATION MEASUREMENTS AND CALCULATIONS FOR INDICANT FMVSS NO. 305 TESTING

Test Vehicle: 2021 Volkswagen ID.4 5-Door SUV NHTSA No.: M20215801

Test Program: NCAP Side Pole Impact Test Test Date: 07/28/21

VOLTMETER INFORMATION

Make	Fluke
Model	87V MAX
Serial No.	50790043
Internal Impedence Value	50 MΩ
Resolution	0.001

HV BATTERY ELECTRICAL ISOLATION DATA

Code	Units	Threshold	Pre-Test
V_b	V		375.70
V_1	V		308.00
V_2	V		154.00
R_o	Ω		219,300
V_1'	V		33.00
V_2'	V		88.00
R_{i1}	Ω		2,741,250
R_{i2}	Ω		493,425
R_i	Ω		493,425
R_i/V_b	Ω/V	500	1,313

Is the Measured Electrical Isolation Value ≥ 500 Ω/V?	Yes

DATA SHEET NO. 305-4

POST-IMPACT DATA FOR INDICANT FMVSS NO. 305 TESTING

Test Vehicle: 2021 Volkswagen ID.4 5-Door SUV NHTSA No.: M20215801

Test Program: NCAP Side Pole Impact Test Test Date: 07/28/21

VOLTMETER INFORMATION

Make	Fluke
Model	87V MAX
Serial No.	50790043
Internal Impedence Value	50 MΩ
Resolution	0.001

HV BATTERY ELECTRICAL ISOLATION DATA

Code	Units	Threshold	Post-Test
V_b	V		0.00
V_1	V		0.39
V_2	V		0.48
R_o	Ω		219,300
V_1'	V		0.20
V_2'	V		0.26
R_{i1}	Ω		464,747
R_{i2}	Ω		336,330
R_i	Ω		336,330
R_i/V_b	Ω/V	500	*Zero Volts

* ”Zero Volts” is considered as being compliant.

Is the Measured Electrical Isolation Value ≥ 500 Ω/V?	Yes

PROPULSION BATTERY SYSTEM COMPONENTS

Has the propulsion battery module moved within the passenger compartment?

No

Describe any movement: There was no movement of the propulsion battery within the passenger compartment.

Has an outside propulsion battery component intruded into the passenger compartment?

No

Describe any intrusion: There was no intrusion of the outside propulsion battery into the passenger compartment.

Is there propulsion battery electrolyte spillage visible in the passenger compartment?

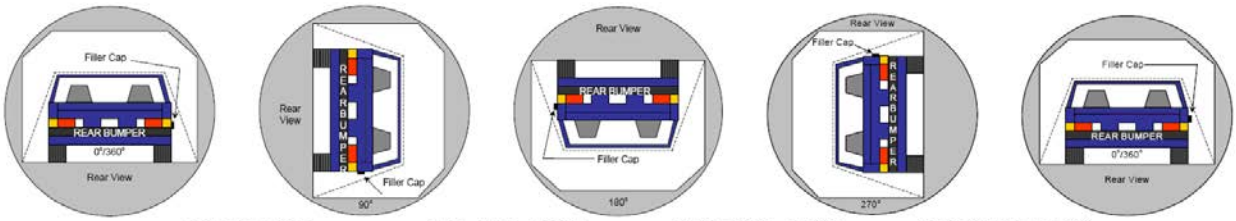
No

DATA SHEET NO. 305-5

STATIC ROLLOVER TEST DATA FOR INDICANT FMVSS NO. 305 TESTING

Test Vehicle: 2021 Volkswagen ID.4 5-Door SUV NHTSA No.: M20215801

Test Program: NCAP Side Pole Impact Test Test Date: 07/28/21



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

PROPULSION BATTERY ELECTROLYTE COLLECTION TIME PERIOD

Test Phase	Rotation Time	Hold Time	Total Time
0° To 90°	88	300	388
90° To 180°	81	300	381
180° To 270°	84	300	384
270° To 360°	88	300	388

TEST VEHICLE PROPULSION BATTERY ELECTROLYTE SPILLAGE

NOTE: The maximum allowable Propulsion Battery Electrolyte Spillage is 5.0 Liters.

Test Phase	Propulsion Battery Electrolyte Spillage (L)	Spillage Location
0° To 90°	0.0	N/A
90° To 180°	0.0	N/A
180° To 270°	0.0	N/A
270° To 360°	0.0	N/A

Is the Total Propulsion Battery Electrolyte Spillage Greater Than 5.0 Liters?	No spillage occurred
Is the Propulsion Battery Electrolyte Spillage Visible in the Passenger Compartment?	N/A

DATA SHEET NO. 305-5

STATIC ROLLOVER TEST DATA FOR INDICANT FMVSS NO. 305 TESTING

Test Vehicle: 2021 Volkswagen ID.4 5-Door SUV NHTSA No.: M20215801

Test Program: NCAP Side Pole Impact Test Test Date: 07/28/21

VOLTMETER INFORMATION

Make	Fluke
Model	87V MAX
Serial No.	50790043
Internal Impedence Value	50 MΩ
Nominal Propulsion Battery Voltage (Vb)	0.001

HV BATTERY ELECTRICAL ISOLATION MEASUREMENTS AND CALCULATIONS

Code	Units	Threshold	0°	90°	180°	270°	360°
V_b	V		0.001	0.001	0.001	0.000	0.000
V_1	V		0.030	0.018	0.006	-0.007	0.005
V_2	V		0.028	0.012	0.001	-0.002	0.010
R_o	Ω		312,600	312,600	312,600	312,600	312,600
V_1'	V		0.011	0.004	0.000	-0.001	0.003
V_2'	V		0.010	0.005	0.000	-0.001	0.001
R_{i1}	Ω		1,043,895	1,823,500	*ZERO VOLTS	2,411,486	625,200
R_{i2}	Ω		1,165,551	1,094,100	*ZERO VOLTS	1,406,700	4,220,100
R_i	Ω		1,043,895	1,094,100	*ZERO VOLTS	1,406,700	625,200
R_i/V_b	Ω/V	500	1,043,894,545	1,094,100,000	*ZERO VOLTS	*ZERO VOLTS	*ZERO VOLTS

* "Zero Volts" is considered as being compliant.

Is the Measured Electrical Isolation Value ≥ 500 Ω/V?	Yes

APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

TABLE OF PHOTOGRAPHS … (CONTINUED)

TABLE OF PHOTOGRAPHS … (CONTINUED)

TABLE OF PHOTOGRAPHS … (CONTINUED)

Some Post-Test photographs were taken with the Pre-Test placard instead of the Post-test placard

FIGURE 1. As-Delivered Right Front ¾ View of Test Vehicle

FIGURE 2. As-Delivered Left Rear ¾ View of Test Vehicle

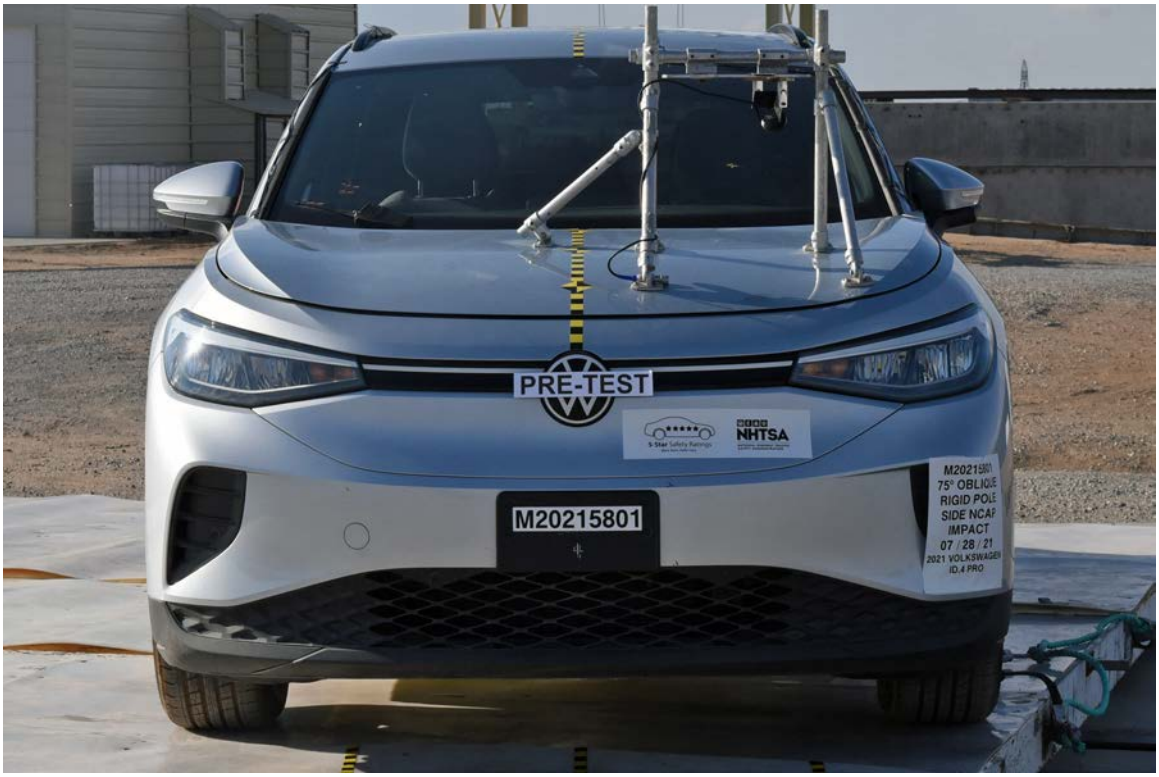


FIGURE 3. Pre-Test Frontal View of Test Vehicle

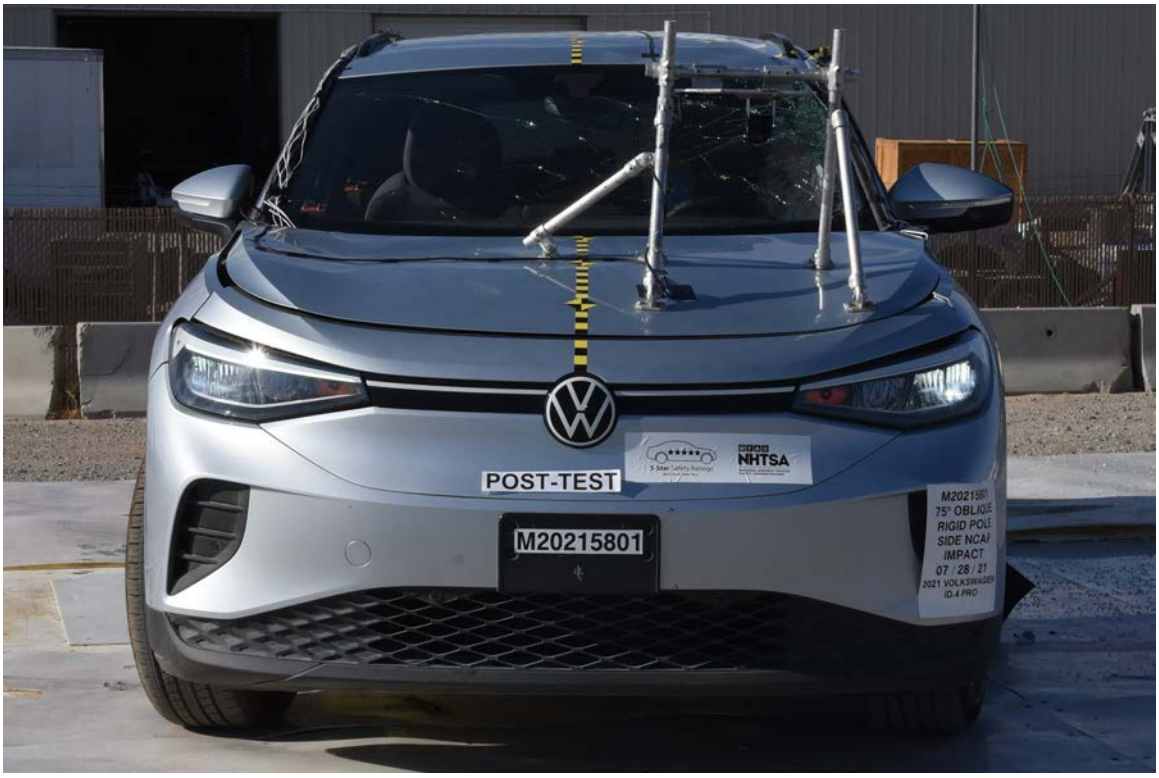


FIGURE 4. Post-Test Frontal View of Test Vehicle

FIGURE 5. Pre-Test Left Front ¾ View of Test Vehicle

FIGURE 6. Post-Test Left Front ¾ View of Test Vehicle

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

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

FIGURE 9. Pre-Test Left Rear ¾ View of Test Vehicle

FIGURE 10. Post-Test Left Rear ¾ View of Test Vehicle

FIGURE 11. Pre-Test Rear View of Test Vehicle

FIGURE 12. Post-Test Rear View of Test Vehicle

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

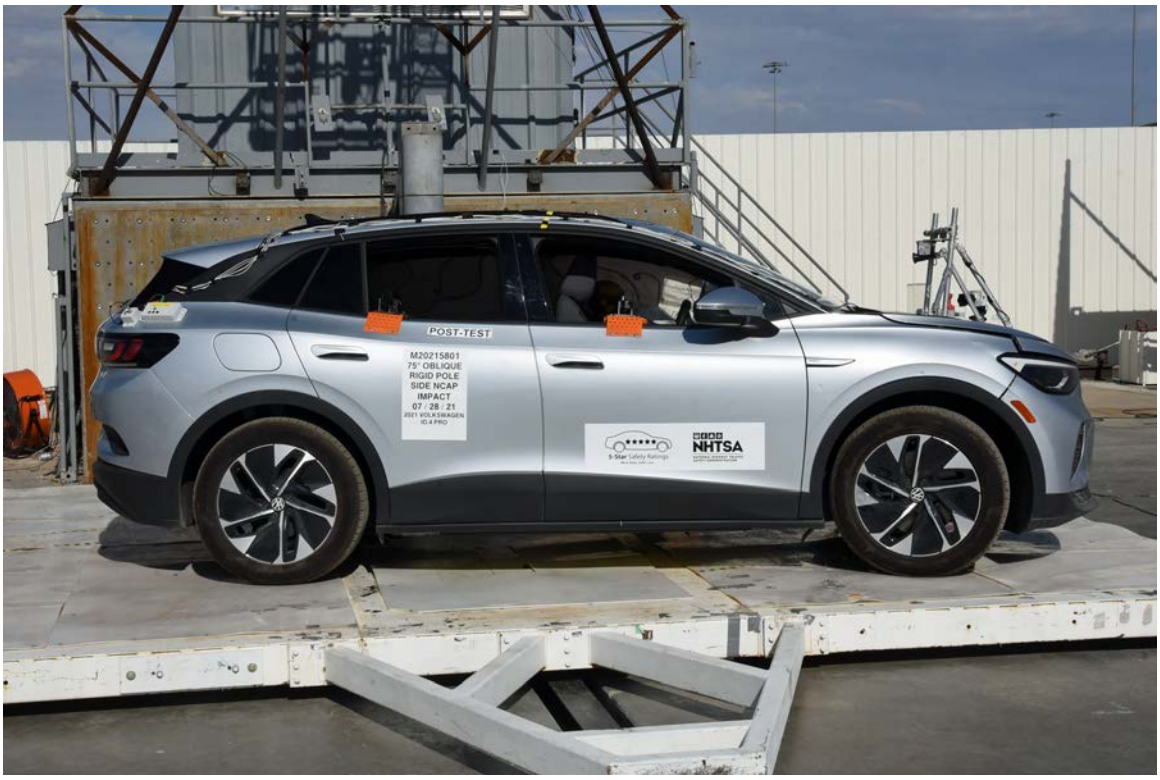


FIGURE 14. Post-Test Right Side View of Test Vehicle

FIGURE 15. Pre-Test Overhead View of Test Area

FIGURE 16. Post-Test Overhead View of Test Area

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

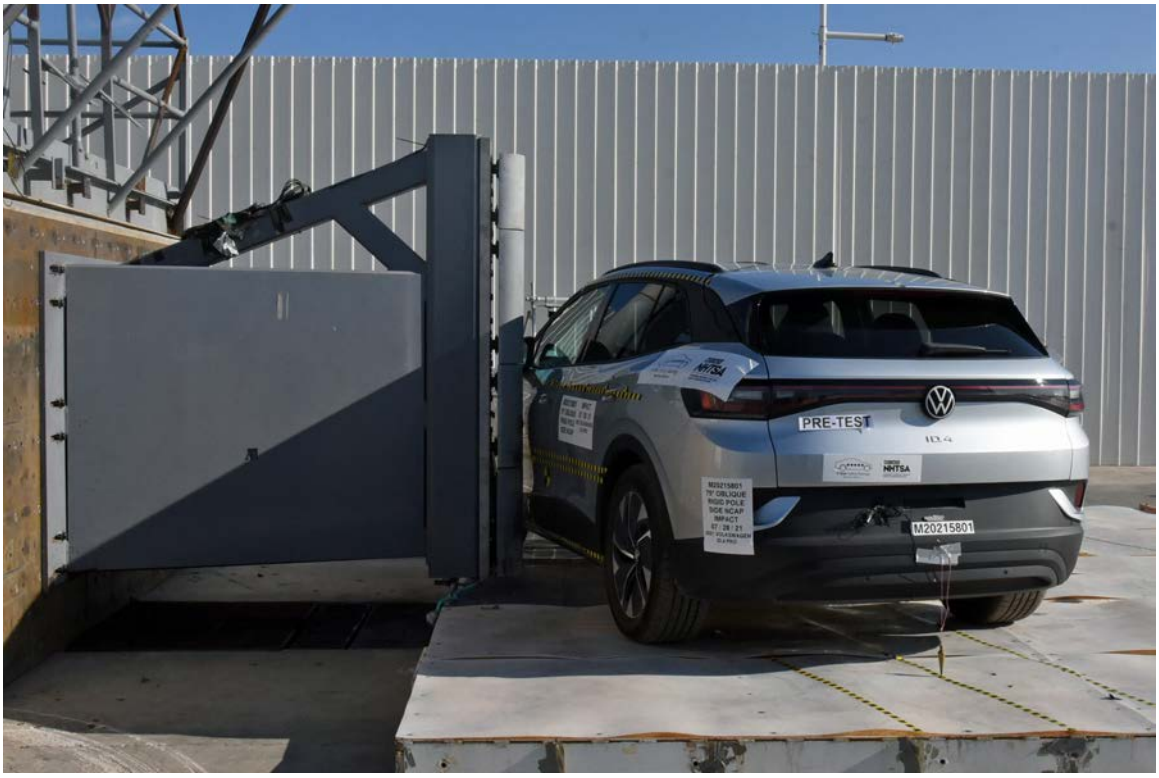


FIGURE 18. Pre-Test Right Side View of Pole Positioned Against Side of Vehicle

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

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

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

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

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

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

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

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

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

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

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

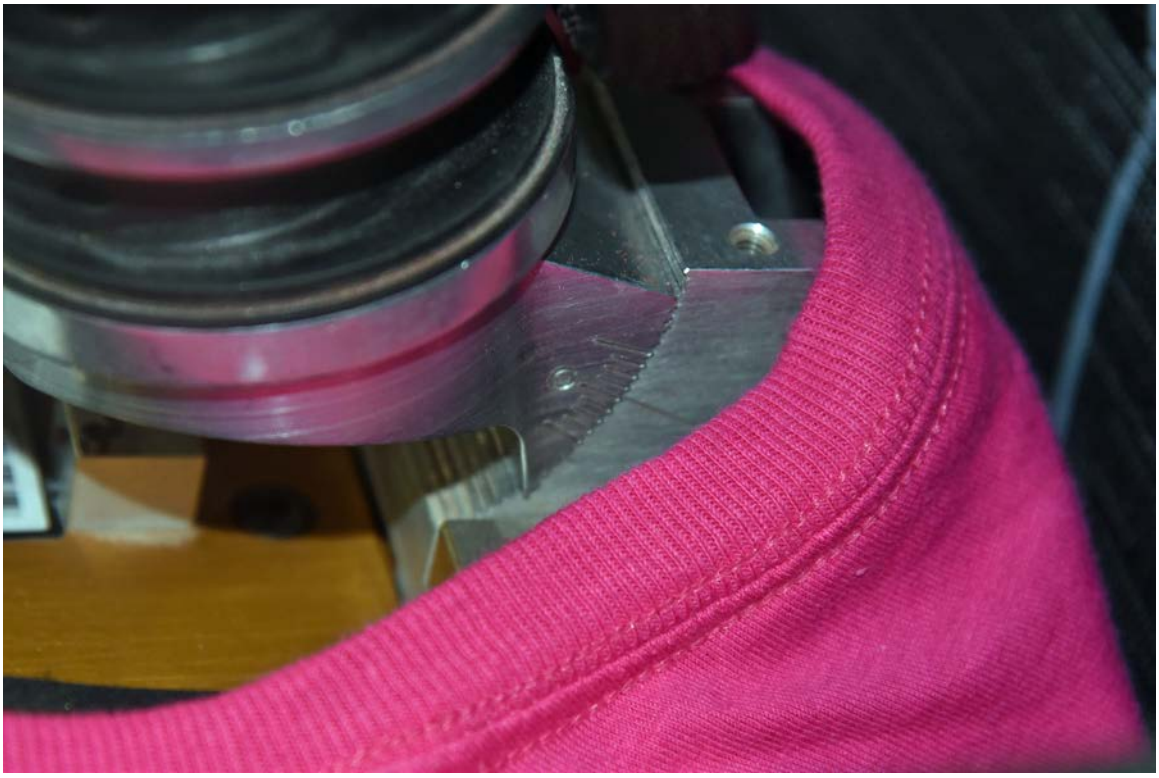


FIGURE 30. Pre-Test Left Side View of Dummy's Neck
Showing Position of Adjustable Neck Bracket

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

Showing Dummy’s Head is Level

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

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

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

FIGURE 35. View of Disengaged Parking Brake

FIGURE 36. Pre-Test View of Parking Brake

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

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

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

FIGURE 40. Pre-Test Dummy and Door Clearance View

FIGURE 41. Post-Test Dummy and Door Clearance View

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

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

FIGURE 44. Pre-Test Inner Door Panel View

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

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

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

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

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

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

Photograph Not Applicable

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

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

FIGURE 53. Pre-Test Inner Rear Passenger Torso Airbag Deployment View

FIGURE 54. Post-Test Right Side View of Dummy and Rear Seat of Occupant Compartment

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

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

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

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

FIGURE 59. Pre-Test Pole Barrier Front View

FIGURE 60. Post-Test Pole Barrier Front View

FIGURE 61. Pre-Test Pole Barrier Side View

FIGURE 62. Post-Test Pole Barrier Side View

FIGURE 63. Pre-Test Ballast View

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

FIGURE 65. FMVSS No. 301 Static Rollover 0 Degrees

FIGURE 66. FMVSS No. 301 Static Rollover 90 Degrees

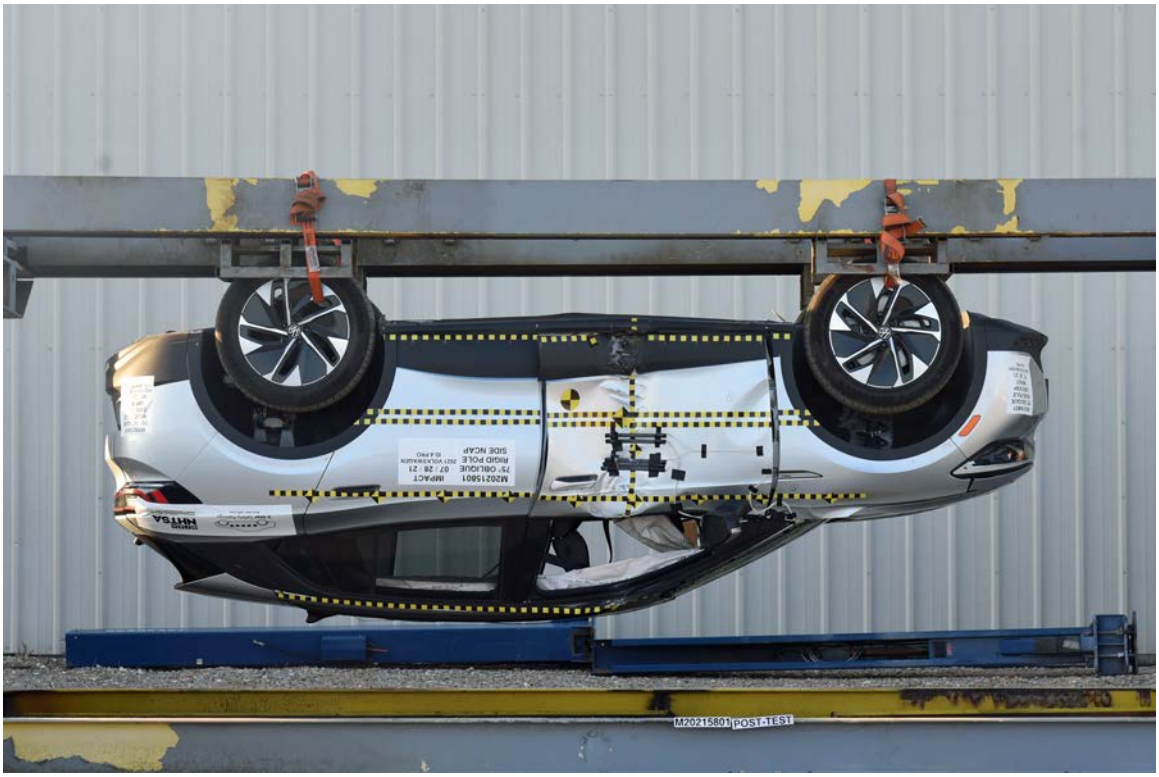


FIGURE 67. FMVSS No. 301 Static Rollover 180 Degrees

FIGURE 68. FMVSS No. 301 Static Rollover 270 Degrees

FIGURE 69. FMVSS No. 301 Static Rollover 360 Degrees

FIGURE 70. Impact Event

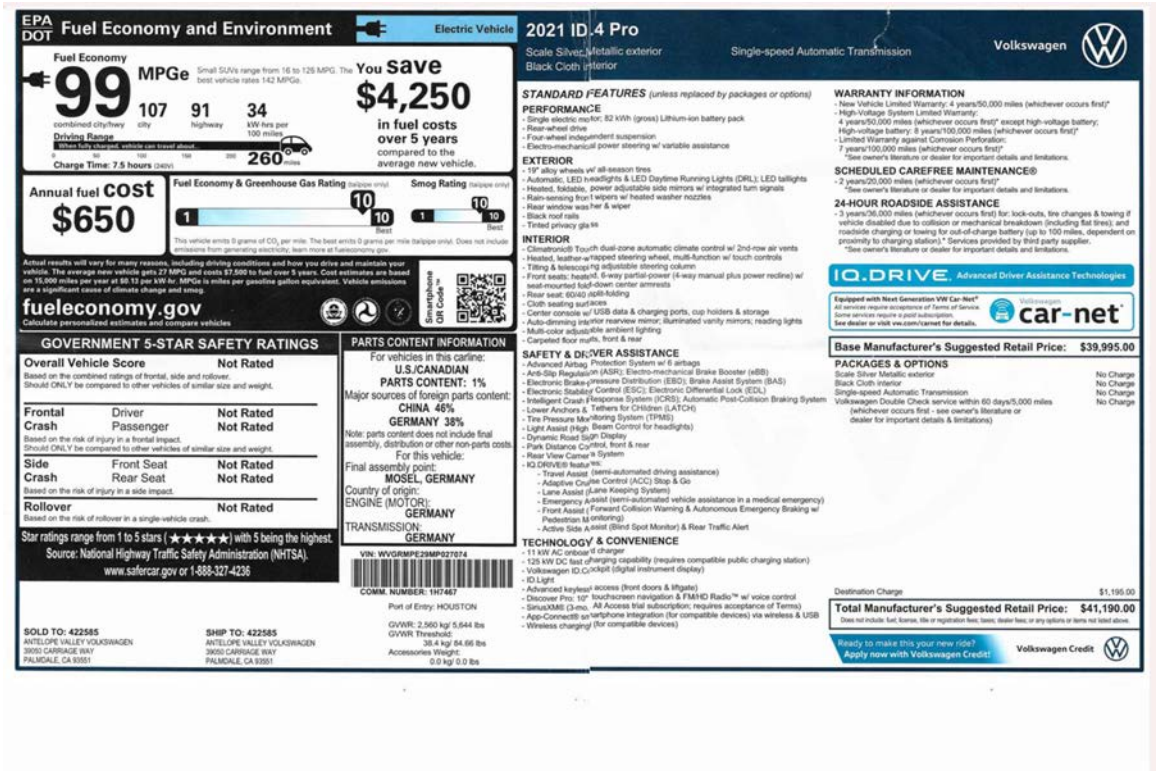


FIGURE 71. Monroney Label

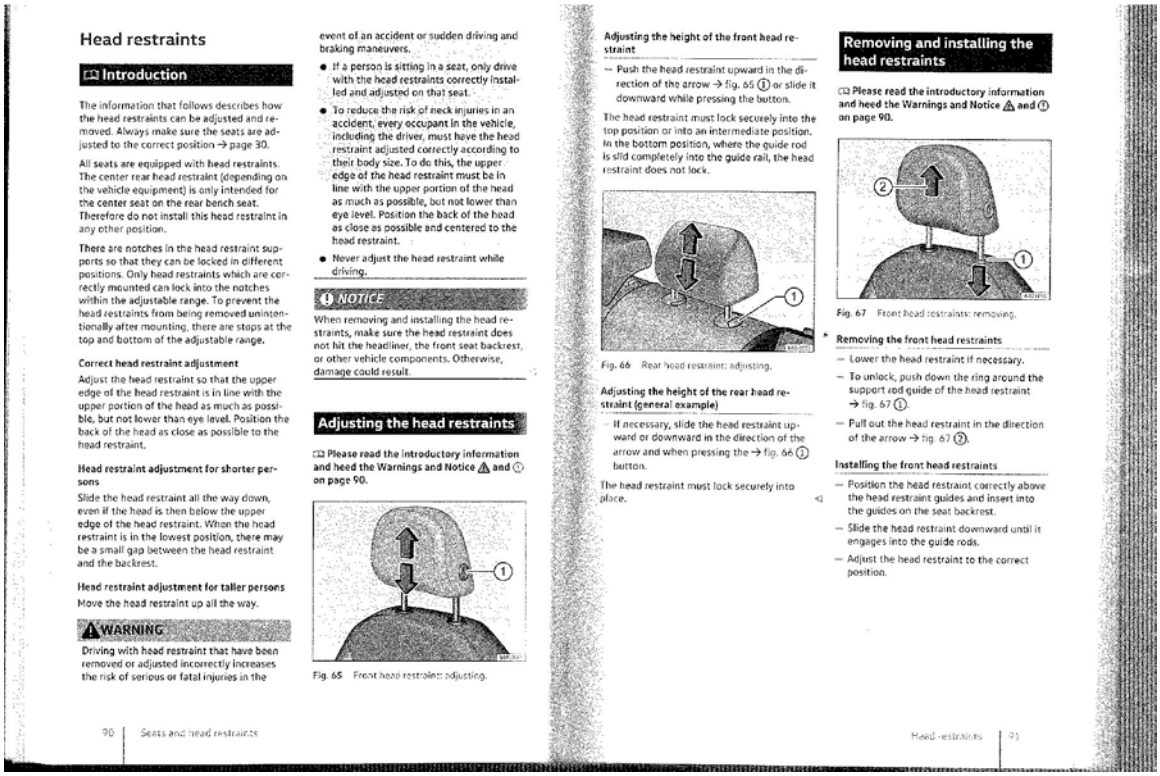


FIGURE 72. Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

Photograph Not Applicable

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

FIGURE 305-01. Auxiliary Power Module Warning Label

FIGURE 305-01a. Auxiliary Power Module Warning Label

FIGURE 305-02. Power Inverter Warning Label

Photograph Not Available

Unable to Locate First Responder Warning Label

FIGURE 305-03. First Responder Warning Label

FIGURE 305-04. First Responder Warning Location
Label Located Behind Passenger Tail Light

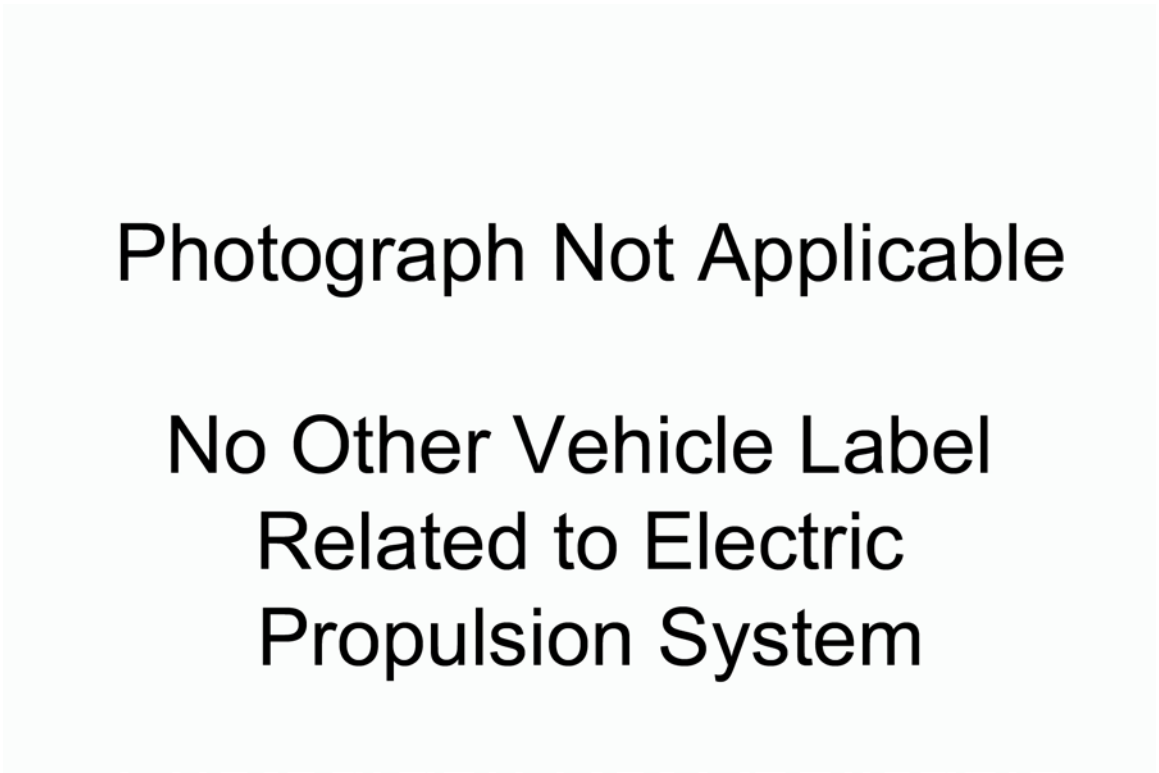


FIGURE 305-05. Other Vehicle Label(s) Related to Electrical Propulsion System

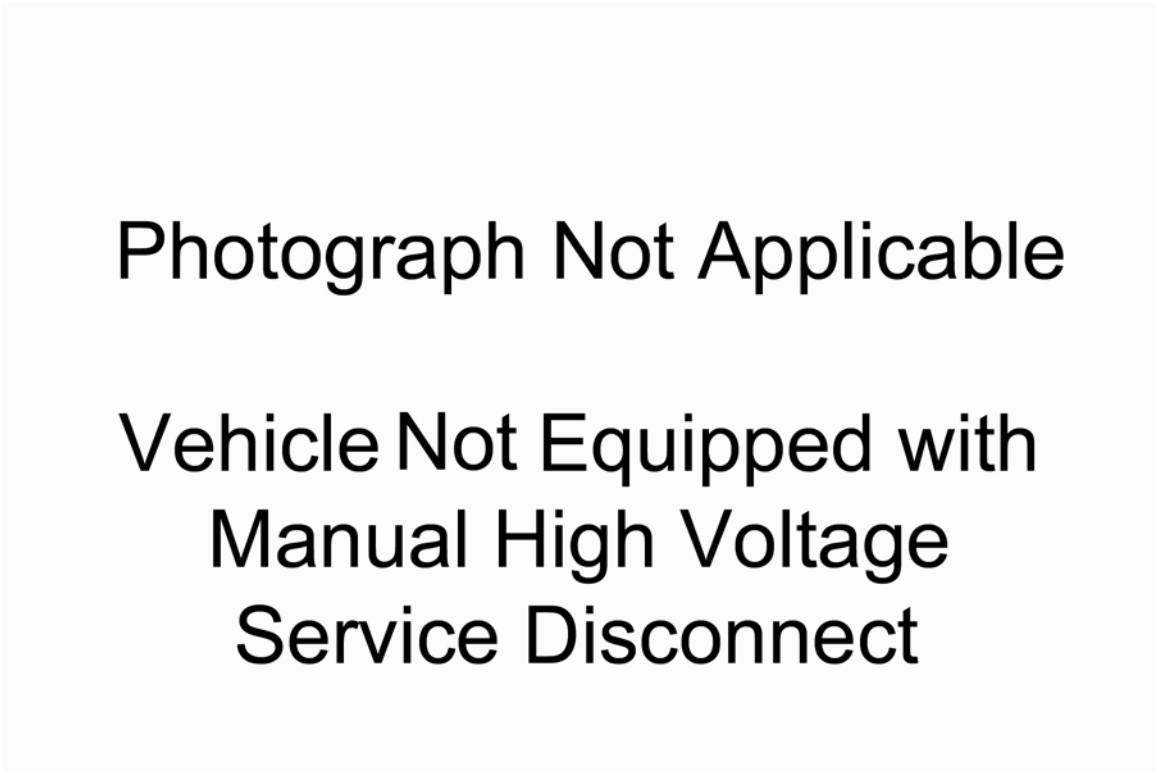


FIGURE 305-06. Manual High Voltage Service Disconnect in Place

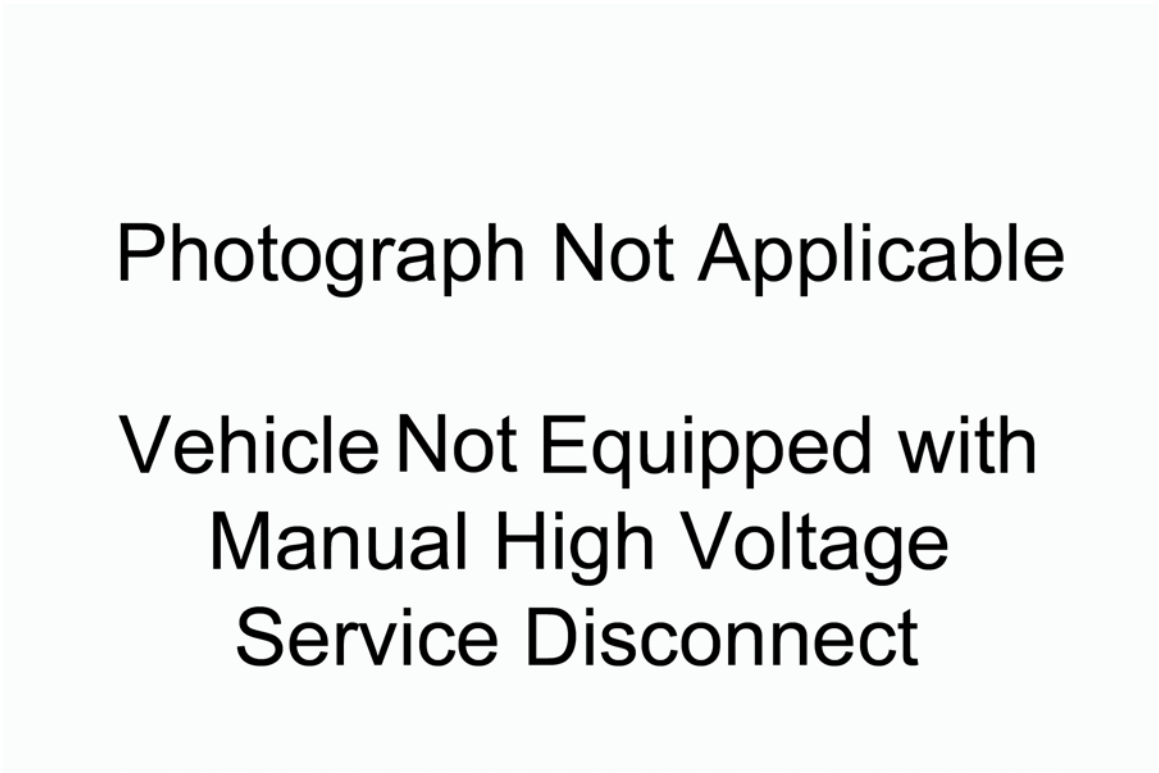


FIGURE 305-07. Manual High Voltage Service Disconnect Removed

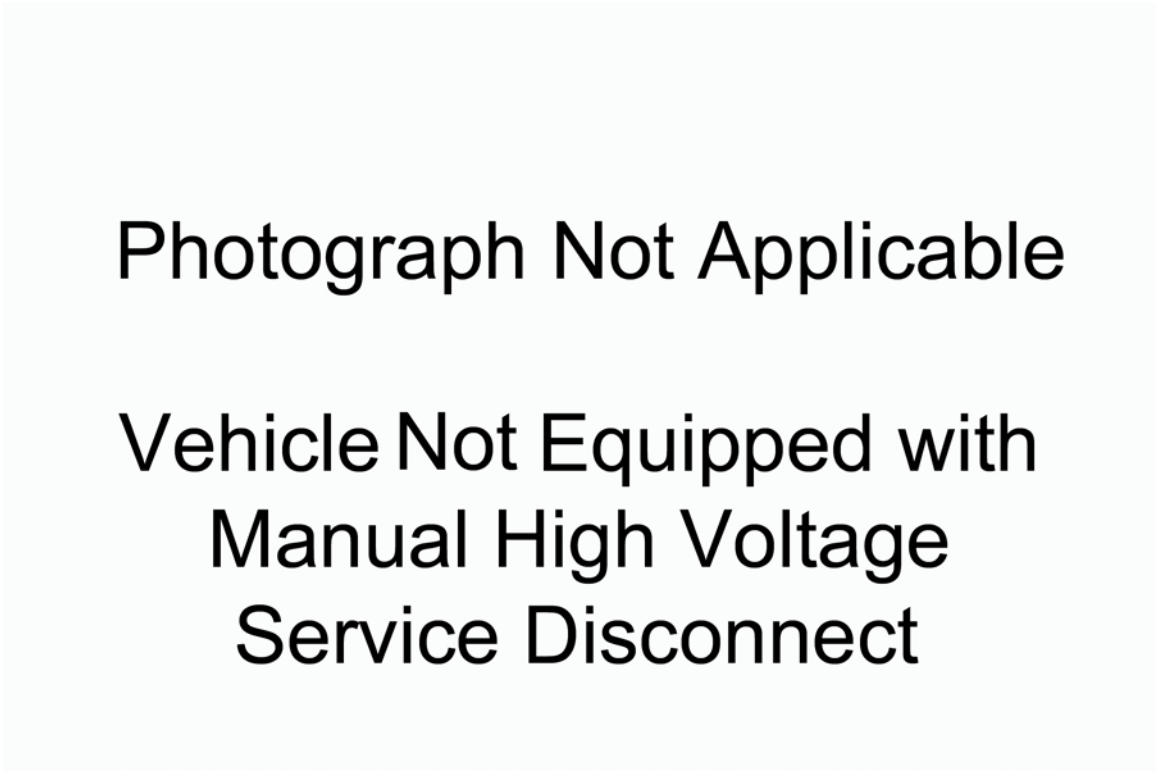


FIGURE 305-08. Manual High Voltage Service Disconnect Removed

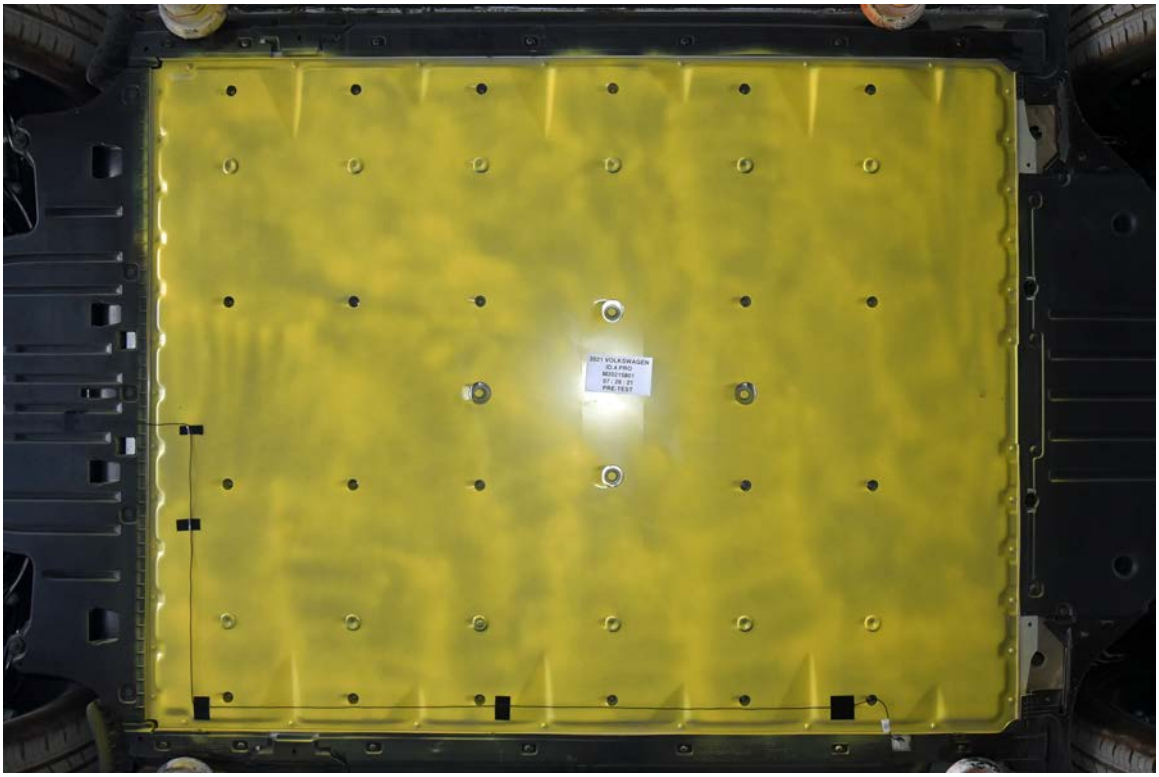


FIGURE 305-09. Pre-Impact View of Propulsion Battery

FIGURE 305-09a. Pre-Impact View of Propulsion Battery

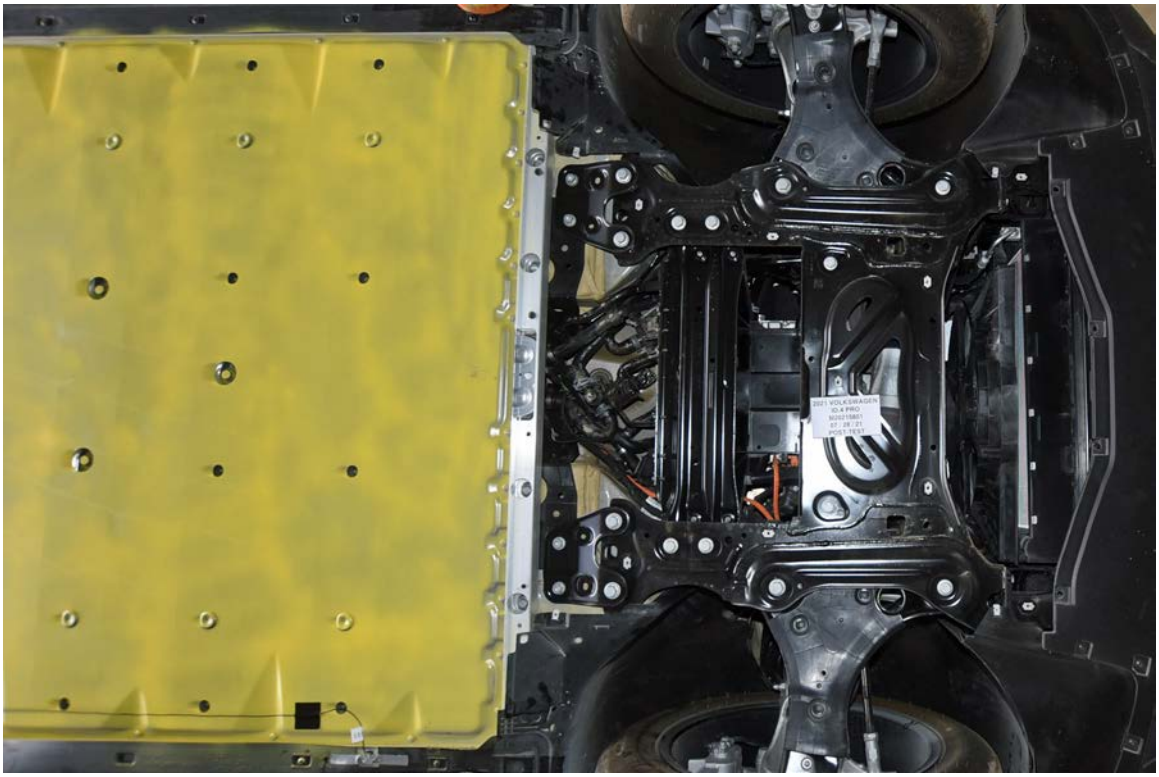


FIGURE 305-010. Post-Impact Front View of Propulsion Battery

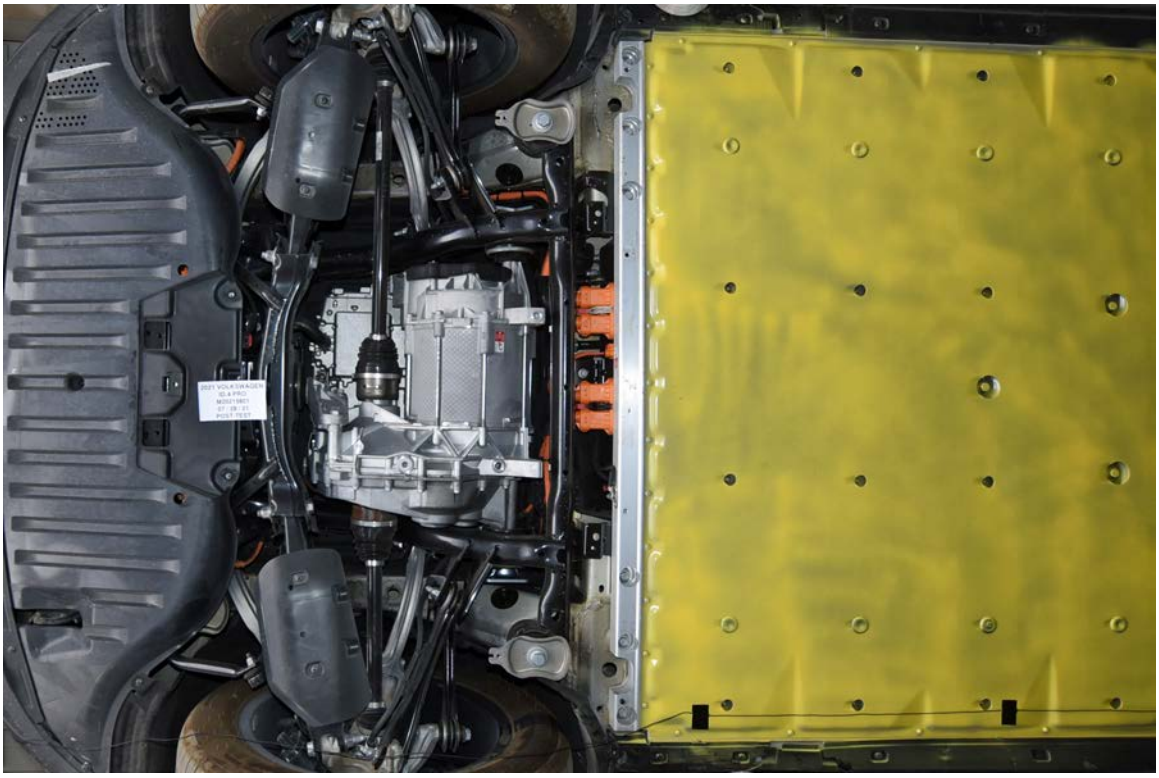


FIGURE 305-011. Post-Impact Rear View of Propulsion Battery

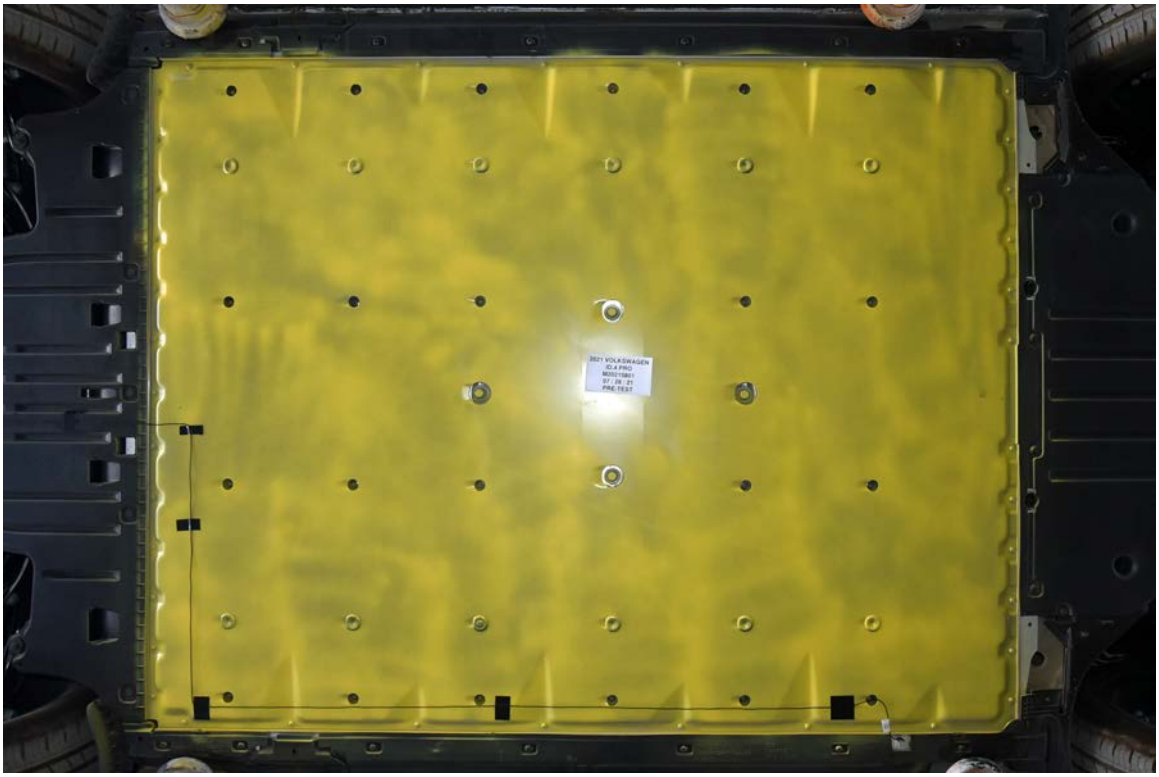


FIGURE 305-012. Pre-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules

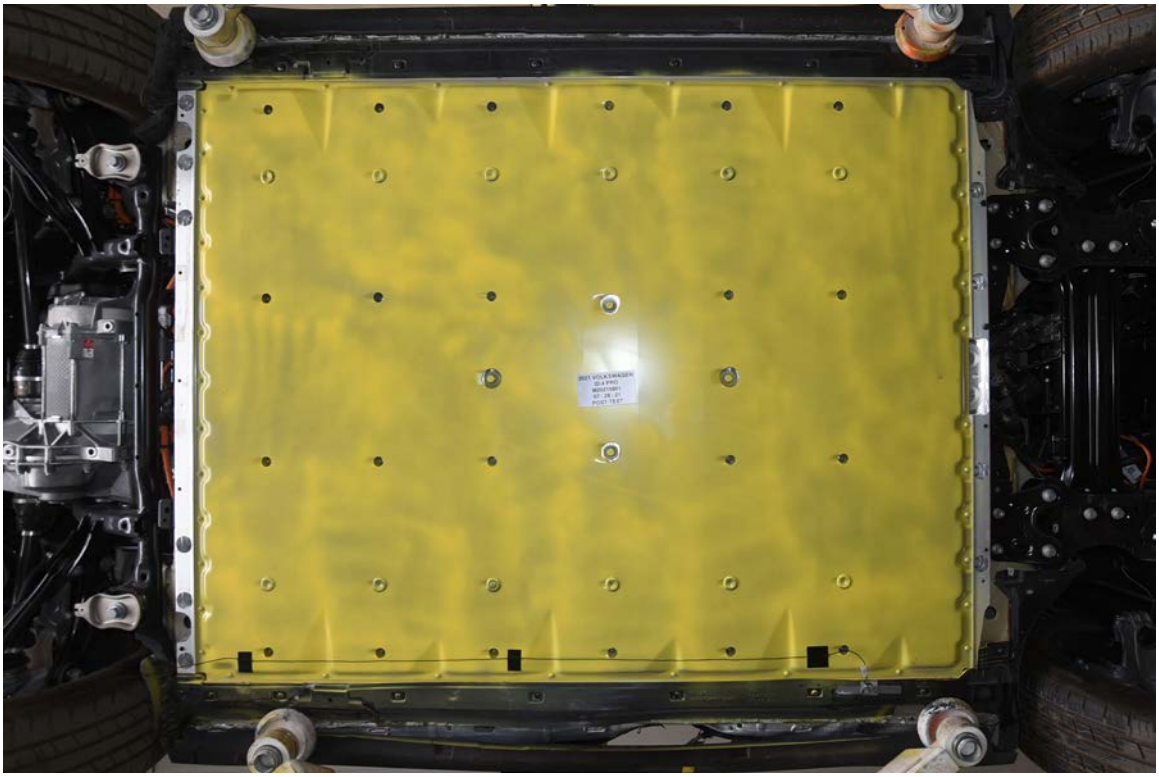


FIGURE 305-013. Post-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules

FIGURE 305-014. Pre-Impact View of Propulsion Battery Module(s)

FIGURE 305-015. Post-Impact View of Propulsion Battery Module(s)

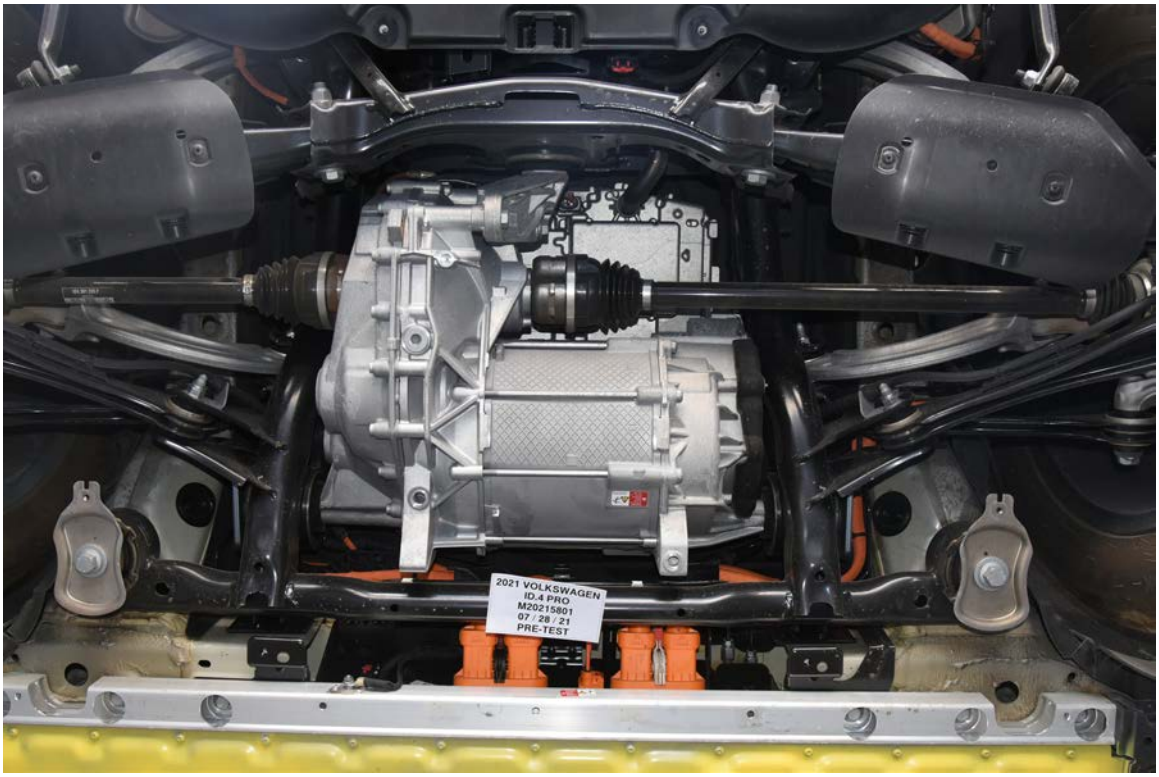


FIGURE 305-016. Pre-Impact View of Electric Propulsion Drive

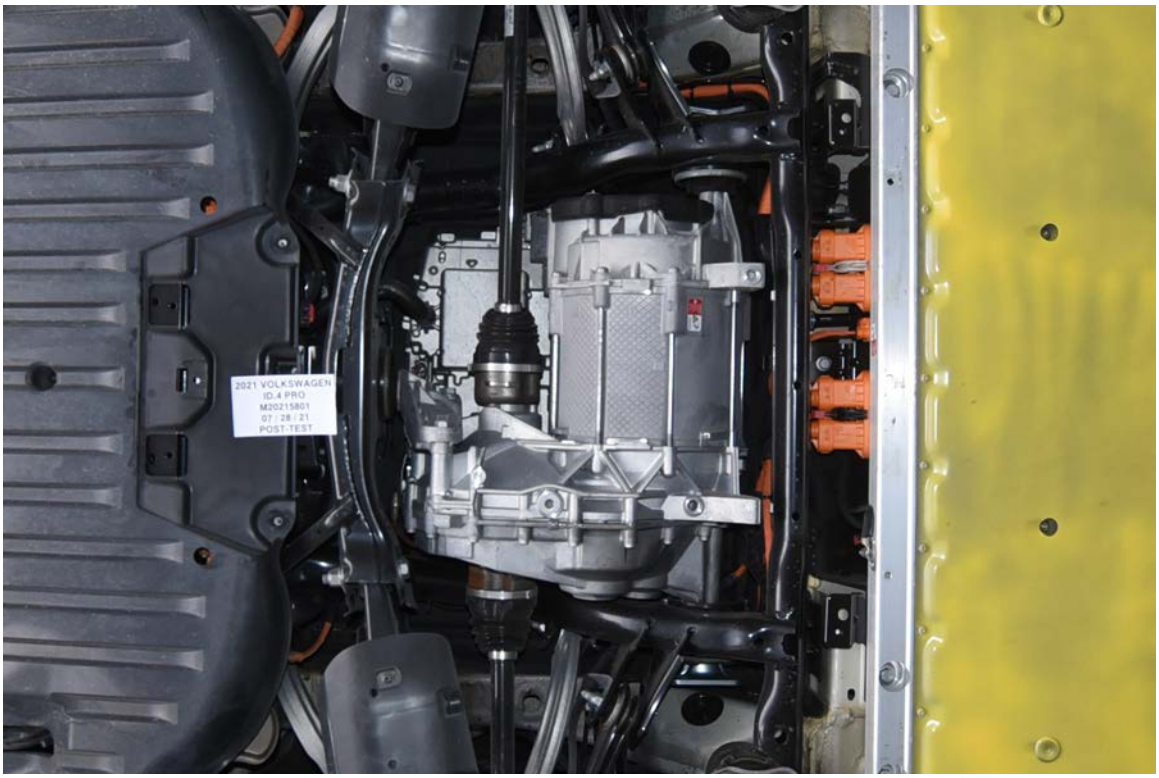


FIGURE 305-017. Post-Impact View of Electric Propulsion Drive

FIGURE 305-018. Pre-Impact View of High Voltage Interconnect(s)

FIGURE 305-018a. Pre-Impact View of High Voltage Interconnect(s)

Photograph Not Available

Propulsion Battery Venting System Not Visible

FIGURE 305-019. Pre-Impact View Propulsion Battery Venting System(s)

FIGURE 305-020. Pre-Impact View of Other Visible Electric Propulsion Components

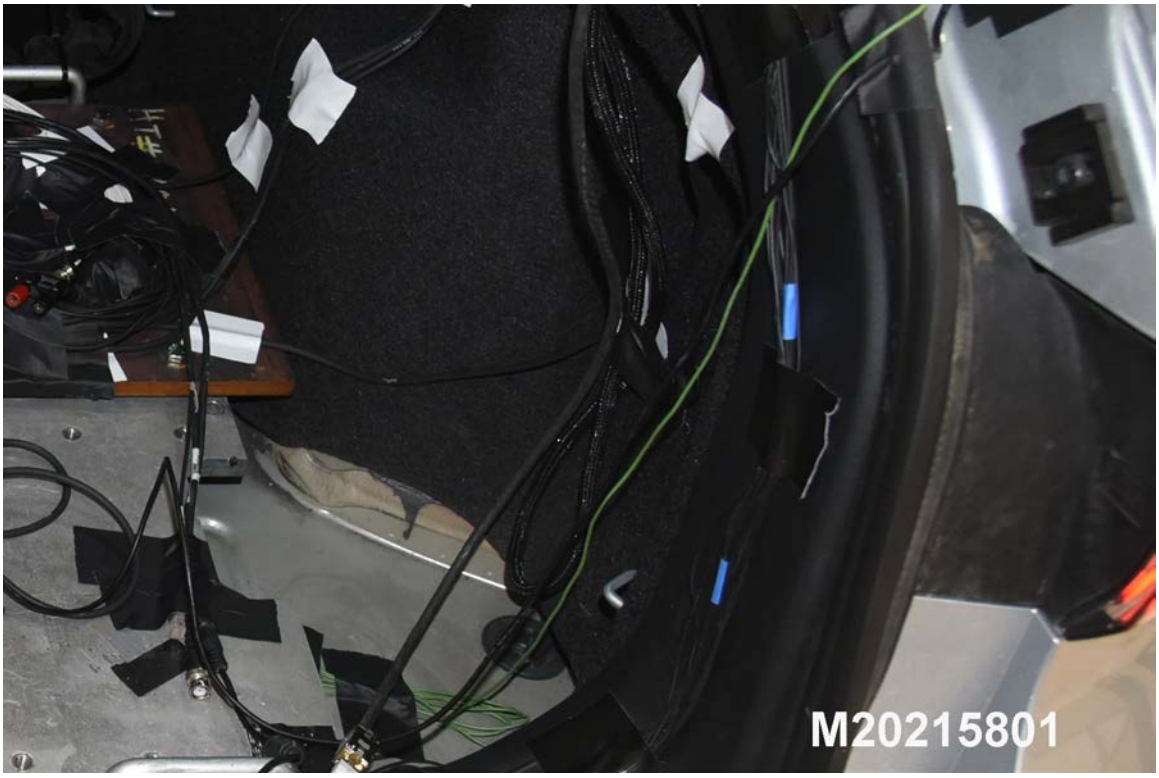


FIGURE 305-021. Pre-Impact View of Ground Lead Attached

FIGURE 305-022. Pre-Impact View of High Voltage Leads Attached

FIGURE 305-023. Pre-Impact Close-Up View of High Voltage Leads Attached

FIGURE 305-024. Pre-Impact View of Installed Test Interface Port

FIGURE 305-025. Post-Impact View of Installed Test Interface Port

FIGURE 305-026. Pre-Impact View of Other Test Devices

FIGURE 305-027. Post-Impact View of Other Test Devices

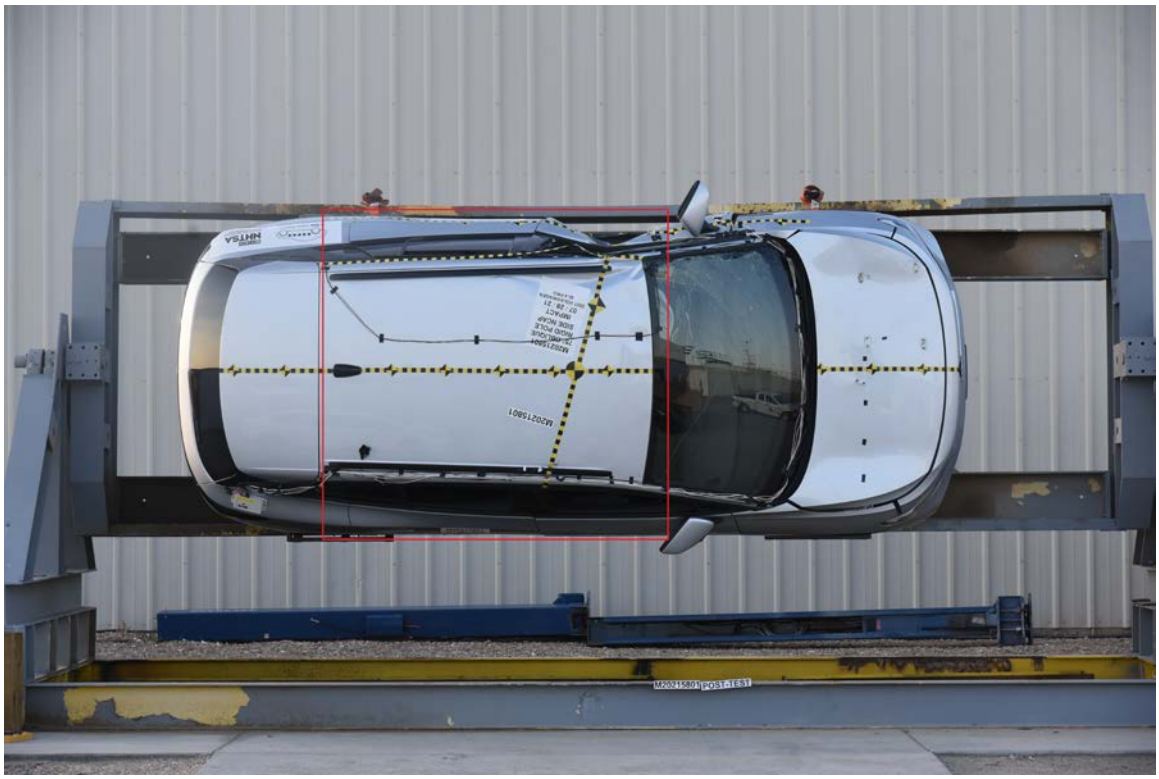


FIGURE 305-028. FMVSS No. 305 Static Rollover at 90°

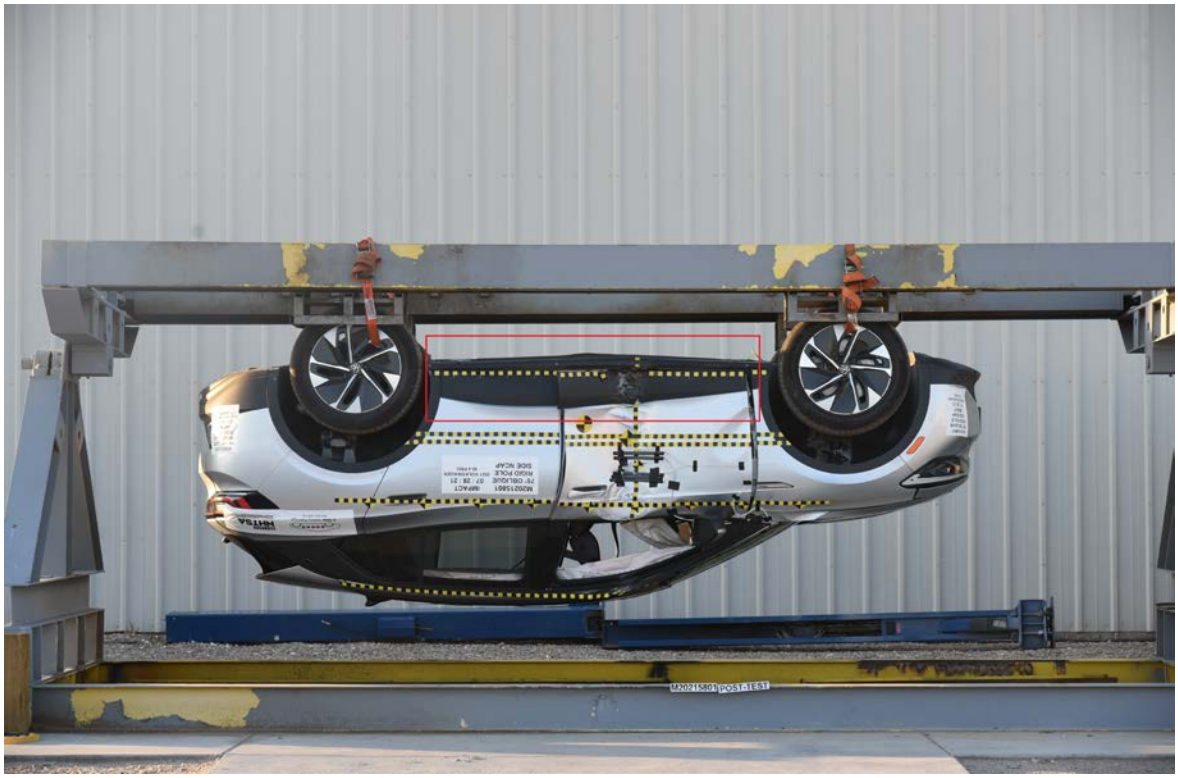


FIGURE 305-029. FMVSS No. 305 Static Rollover at 180°

FIGURE 305-030. FMVSS No. 305 Static Rollover at 270°

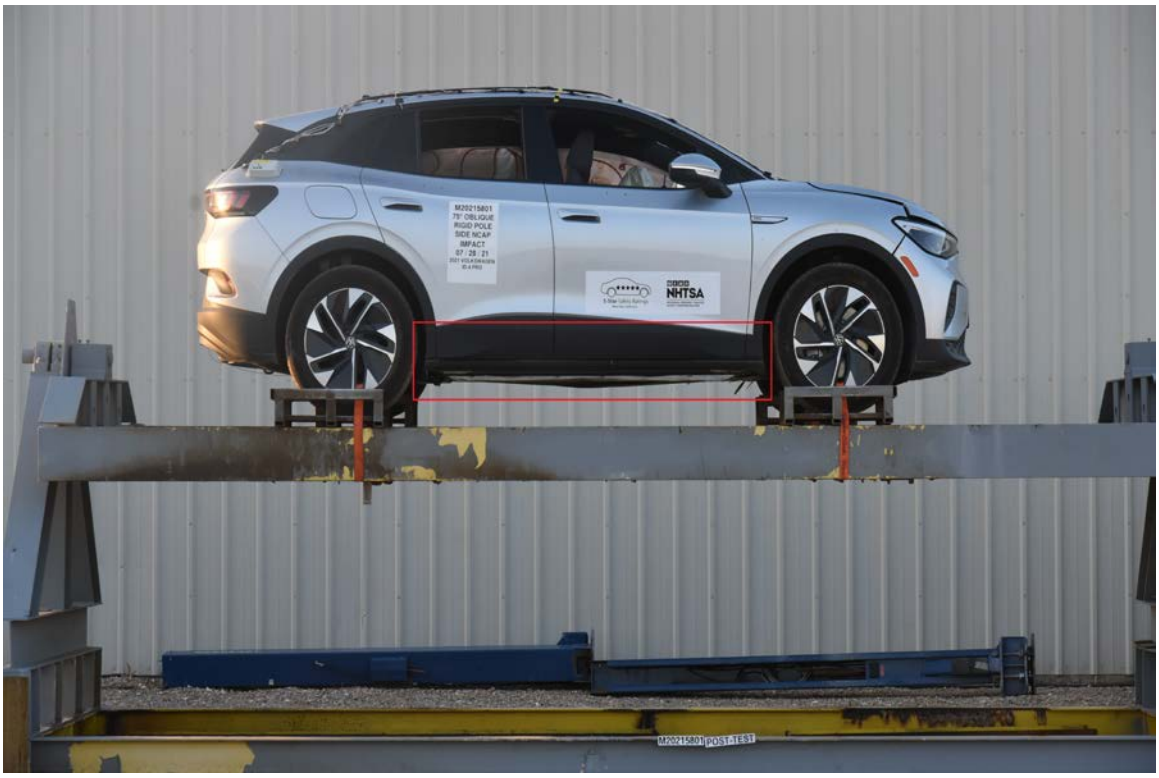


FIGURE 305-031. FMVSS No. 305 Static Rollover at 360°

FIGURE 305-032. Pre-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery

FIGURE 305-033. Post-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery

Photograph Not Applicable

No Propulsion Battery Mounting and/or Intrusion Failure

FIGURE 305-034. Post-Impact Propulsion Battery System Mounting and or Intrusion Failure(s)

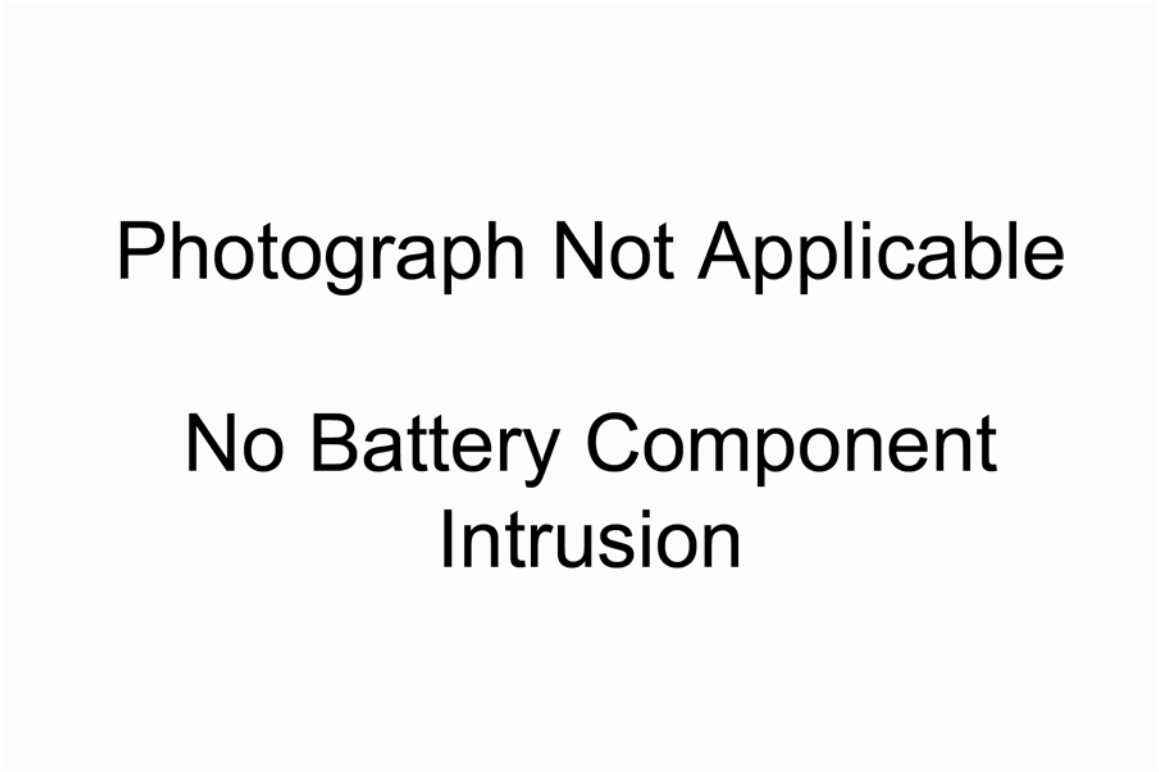


FIGURE 305-035. Post-Impact View of Battery Component Intrusion

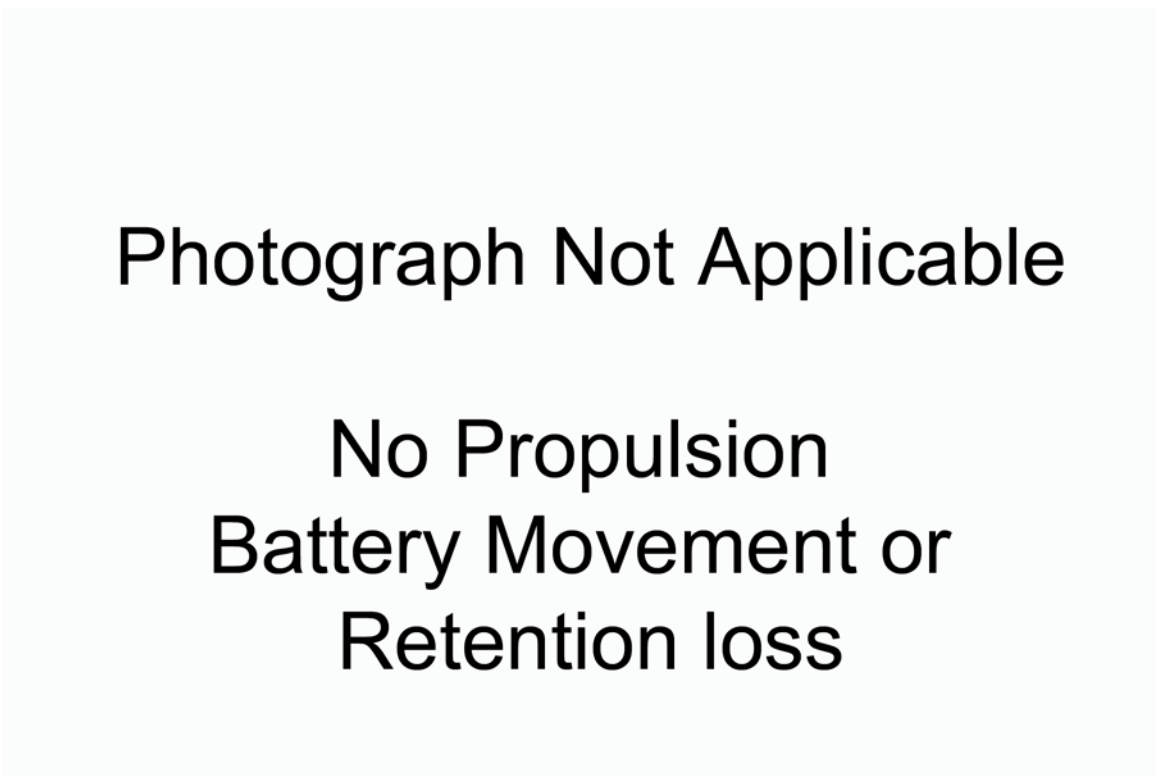


FIGURE 305-036. Post-Impact View of Battery Module Movement or Retention Loss

FIGURE 305-037. Post-Impact View of Propulsion Battery Electrolyte Spillage Location

FIGURE 305-038. Post-Impact View of Propulsion Battery Electrolyte Spillage Location

APPENDIX B
DUMMY RESPONSE DATA

TABLE OF DATA PLOTS

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

Additional Driver Dummy Instrumentation Data

Driver Head Acceleration Redundant (X)

Driver Head Acceleration Redundant (Y)

Driver Head Acceleration Redundant (Z)

Vehicle Instrumentation Data

Vehicle Center of Gravity Acceleration (X)

Vehicle Center of Gravity Acceleration (Y)

Vehicle Center of Gravity Acceleration (Z)

Left Floor Sill Acceleration (Y)

Left A-Pillar Sill Acceleration (Y)

Left Lower A-Pillar Acceleration (Y)

Left Mid A-Pillar Acceleration (Y)

Left B-Pillar Sill Acceleration

Left Lower B-Pillar Acceleration (Y)

Left Mid B-Pillar Acceleration (Y)

Driver Seat Track at Dummy Hip Point Acceleration (Y)

Engine Top Acceleration (X)

Engine Top Acceleration (Y)

Firewall Center Acceleration (Y)

Right Roof at Vertical Impact Reference Line Acceleration (Y)

Right Sill at Vertical Impact Reference Line Acceleration (Y)

Rear Floorpan Behind Rear Axle at Centerline Acceleration (X)

Rear Floorpan Behind Rear Axle at Centerline Acceleration (Y)

Pole Instrumentation Data

Load Cell Pole Barrier #1 Force (Y)

Load Cell Pole Barrier #2 Force (Y)

Load Cell Pole Barrier #3 Force (Y)

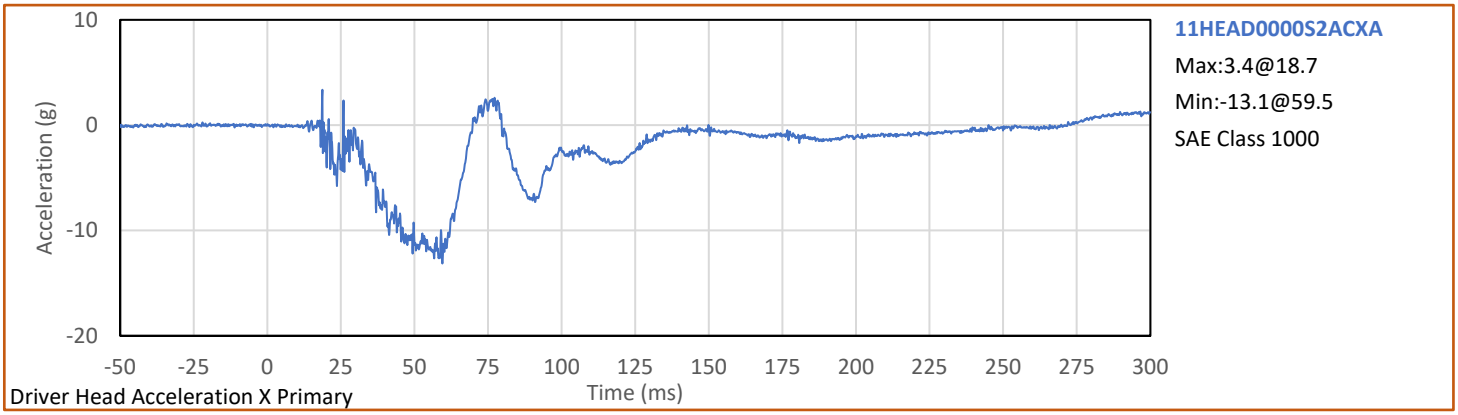
Load Cell Pole Barrier #4 Force (Y)

Load Cell Pole Barrier #5 Force (Y)

Load Cell Pole Barrier #6 Force (Y)

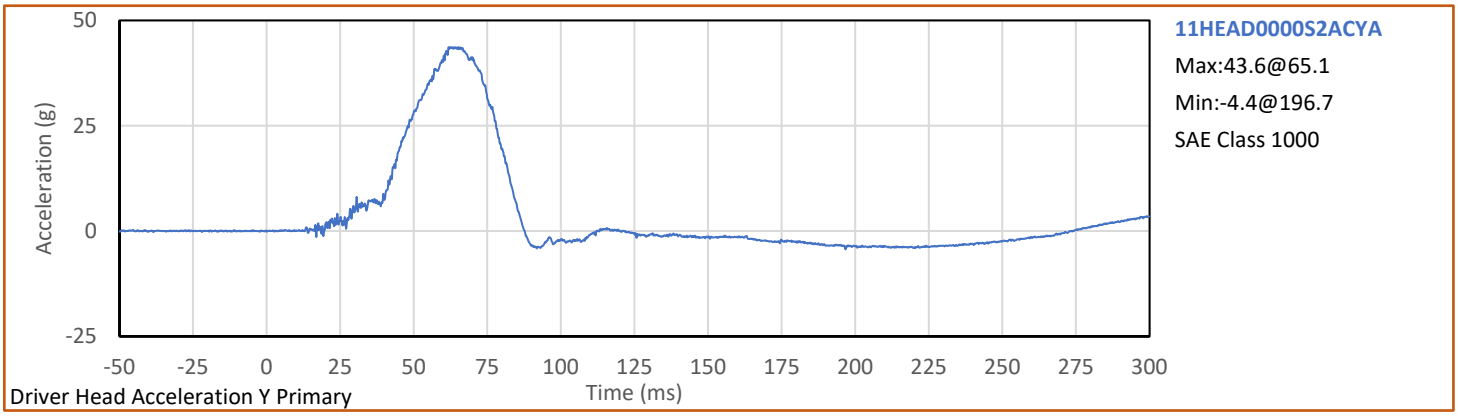
Load Cell Pole Barrier #7 Force (Y)

Load Cell Pole Barrier #8 Force (Y)



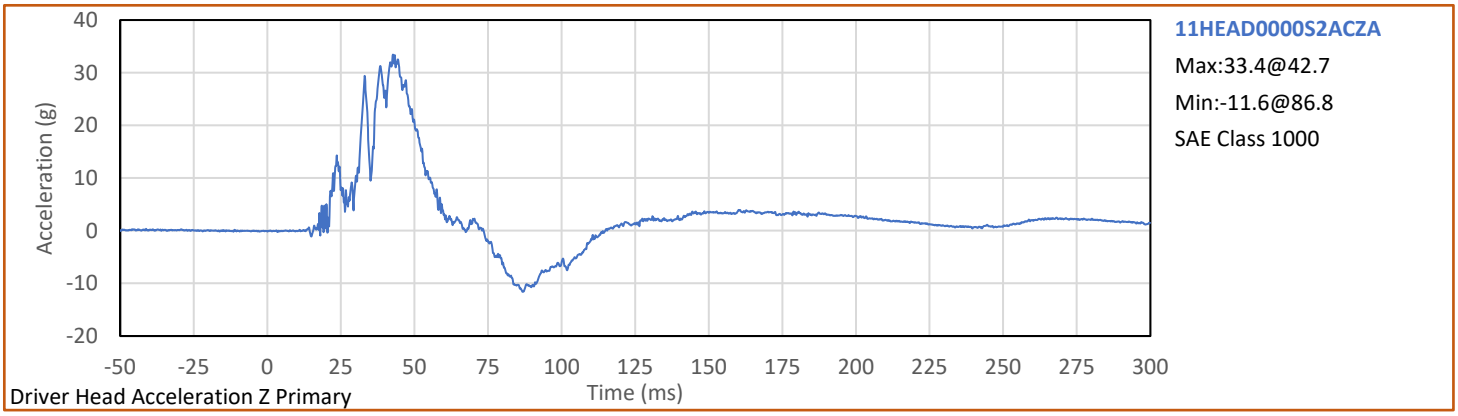
11HEAD0000S2ACXA
Max:3.4@18.7
Min:-13.1@59.5
SAE Class 1000

Driver Head Acceleration X Primary



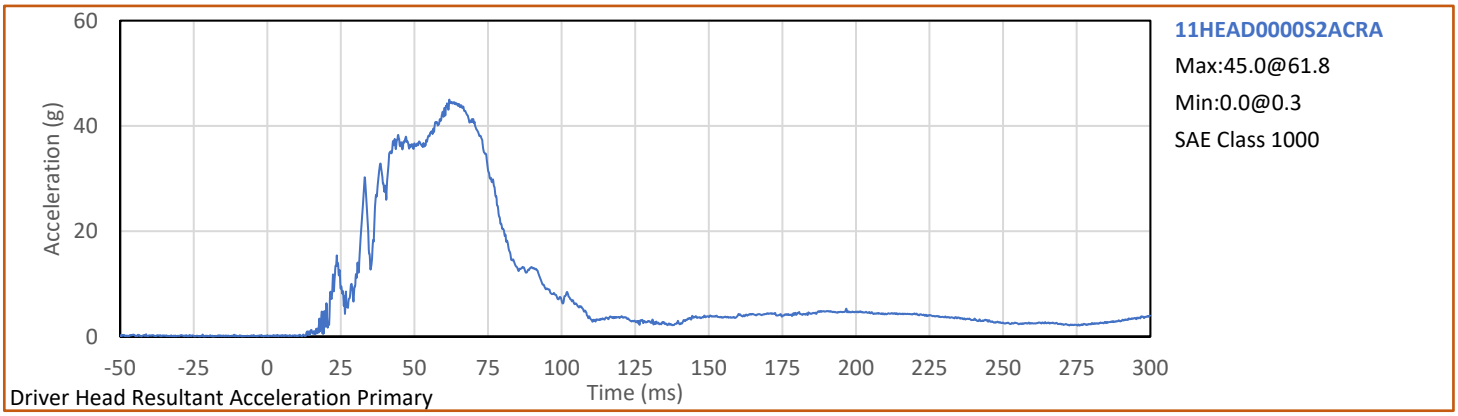
11HEAD0000S2ACYA
Max:43.6@65.1
Min:-4.4@196.7
SAE Class 1000

Driver Head Acceleration Y Primary



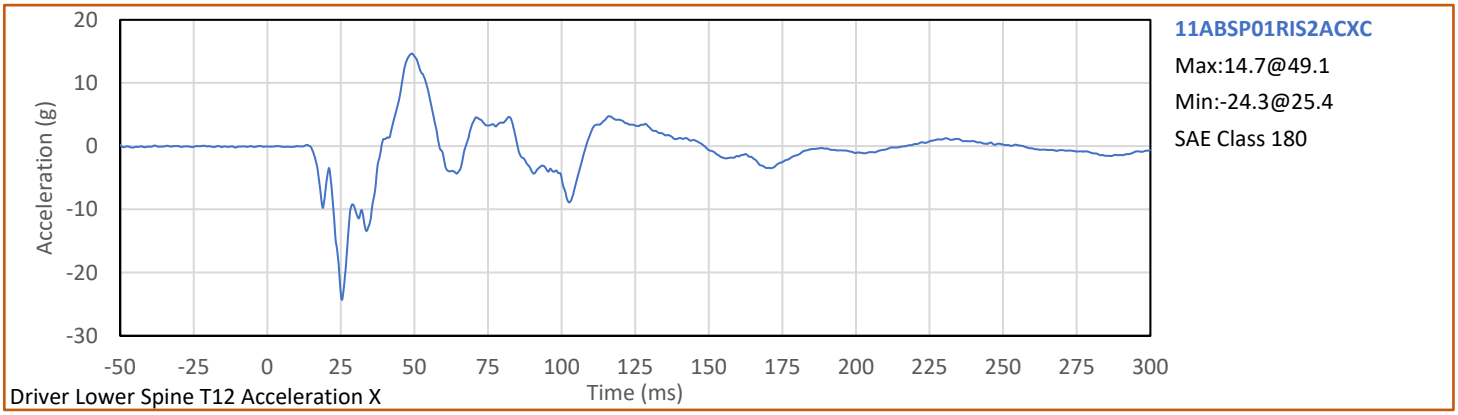
11HEAD0000S2ACZA
Max:33.4@42.7
Min:-11.6@86.8
SAE Class 1000

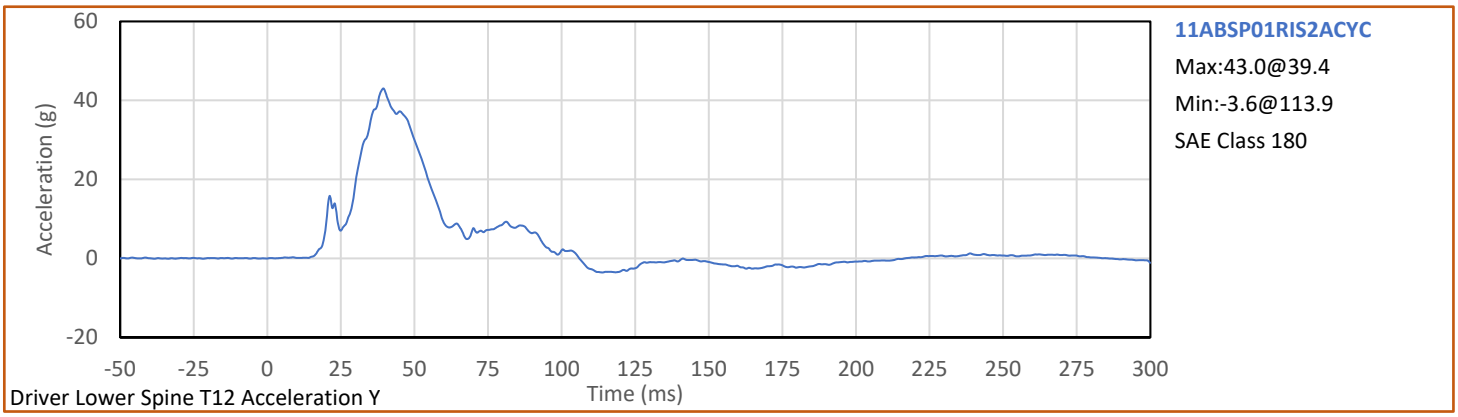
Driver Head Acceleration Z Primary

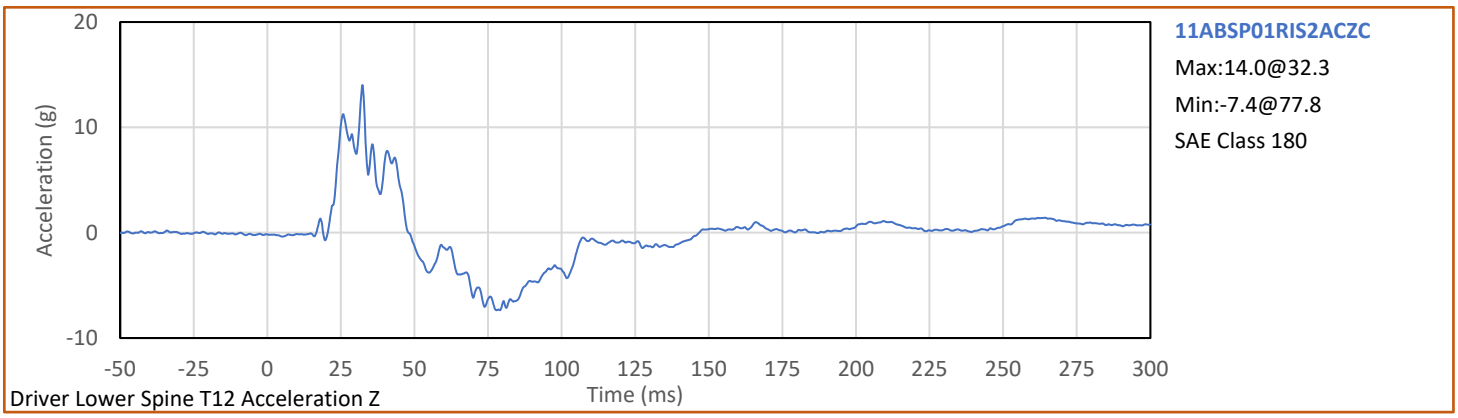


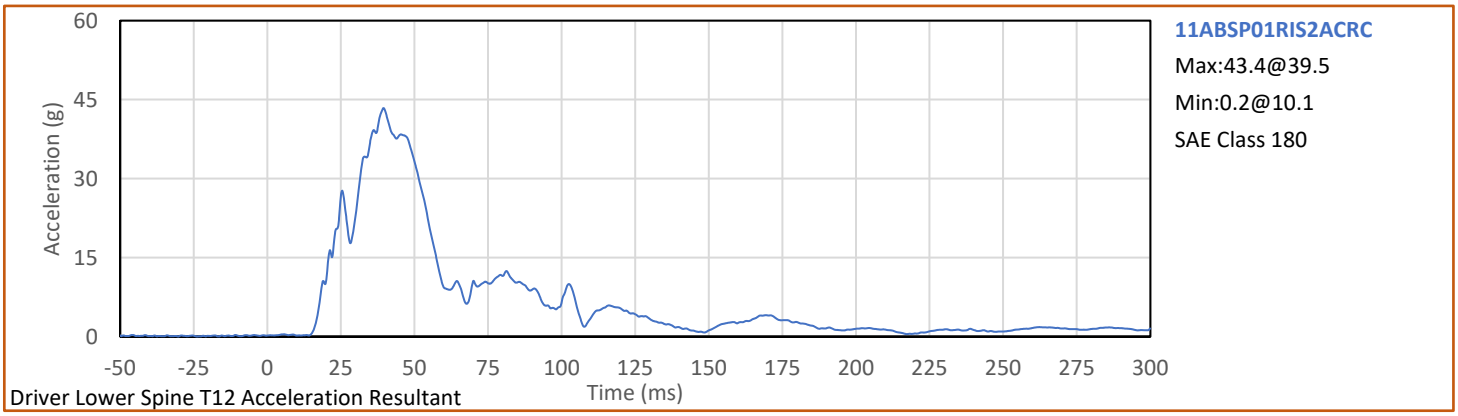
11HEAD0000S2ACRA
Max:45.0@61.8
Min:0.0@0.3
SAE Class 1000

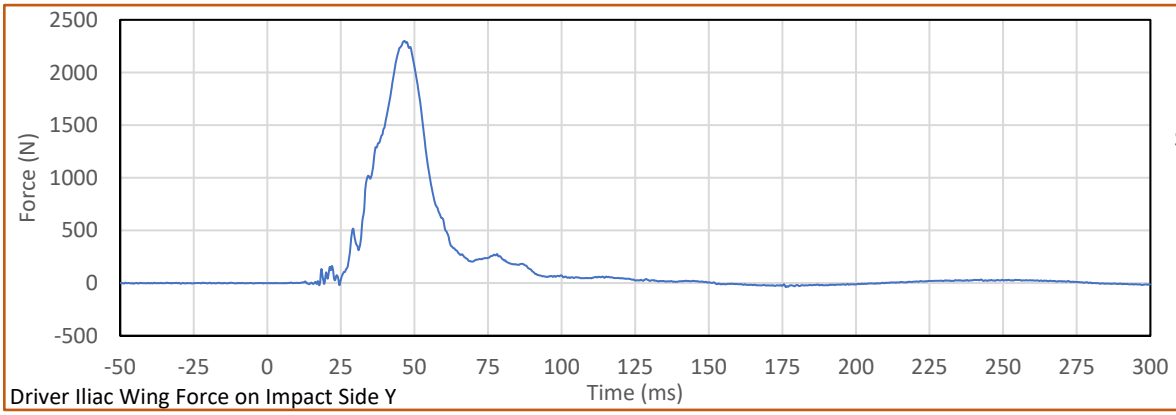
Driver Head Resultant Acceleration Primary


11ABSP01RIS2ACXC
Max:14.7@49.1
Min:-24.3@25.4
SAE Class 180
Acceleration (g)
Time (ms)
Driver Lower Spine T12 Acceleration X


11ABSP01RIS2ACYC
Max:43.0@39.4
Min:-3.6@113.9
SAE Class 180
Acceleration (g)
Time (ms)
Driver Lower Spine T12 Acceleration Y

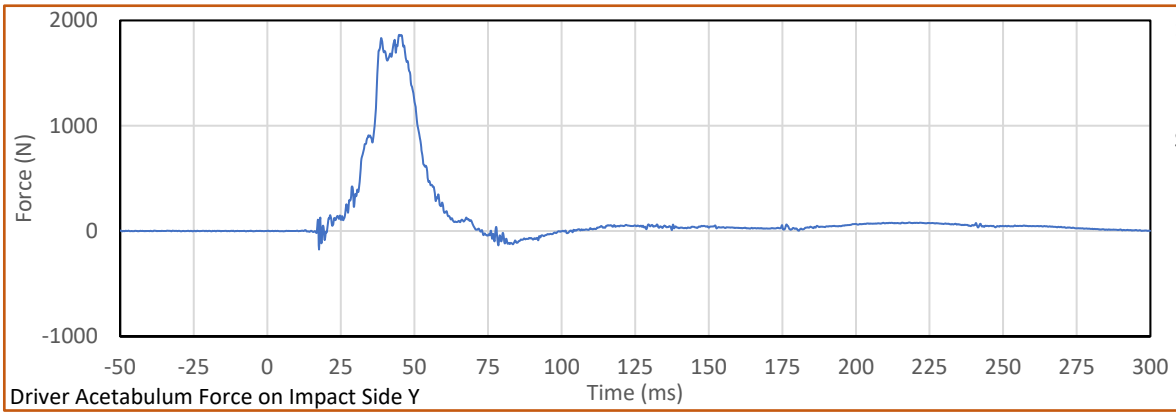

11ABSP01RIS2ACZC
Max:14.0@32.3
Min:-7.4@77.8
SAE Class 180
Acceleration (g)
Time (ms)
Driver Lower Spine T12 Acceleration Z


11ABSP01RIS2ACRC
Max:43.4@39.5
Min:0.2@10.1
SAE Class 180
Acceleration (g)
Time (ms)
Driver Lower Spine T12 Acceleration Resultant



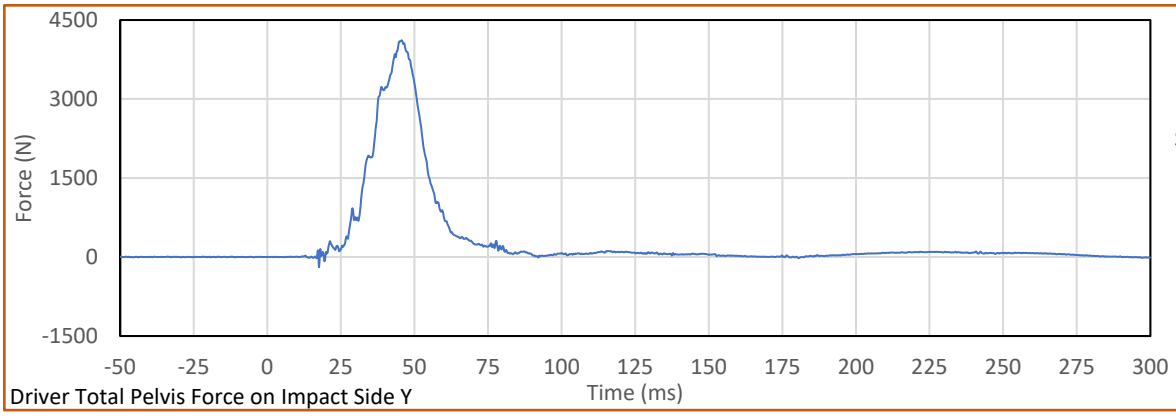
11ILACLE00S2FOYB
Max:2299.8@46.6
Min:-37.9@176.2
SAE Class 600

Driver Iliac Wing Force on Impact Side Y



11ACTBLE00S2FOYB
Max:1863.7@44.8
Min:-175.0@17.6
SAE Class 600

Driver Acetabulum Force on Impact Side Y



11PELVLE00S2FOYB
Max:4114.4@45.7
Min:-195.2@17.6
SAE Class 600

Driver Total Pelvis Force on Impact Side Y

APPENDIX C
ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA

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

Applus IDIADA
KARCO

SID-IIs Small Side Impact ATD
External Measurements

ATD Serial No.: 299 Test Date: 2021-07-23

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	31	Pass
A - Sitting Height	mm	772	788	781	Pass
B - Shoulder Pivot Height	mm	437	453	450	Pass
C - Hpoint Height	mm	79	89	86	Pass
D - H Point From Seatback	mm	141	151	150	Pass
E - Shoulder Pivot From Backline	mm	97	107	102	Pass
F - Thigh Clearance	mm	119	135	127	Pass
G - Head Breadth	mm	140	148	144	Pass
H - Head Back From Backline	mm	40	46	42	Pass
I - Head Depth	mm	178	188	187	Pass
J - Head Circumference	mm	541	551	549	Pass
K - Buttock To Knee Length	mm	514	540	532	Pass
L - Popliteal Height	mm	343	369	357	Pass
K - Knee Pivot To Floor Height	mm	392	409	399	Pass
N - Buttock Popliteal Length	mm	416	442	431	Pass
O - Chest Depth W/O Jacket	mm	195	211	201	Pass
P - Foot Length	mm	216	232	220	Pass
Q - Hip Breadth (W/Pelvic Plugs)	mm	313	323	318	Pass
R - Arm Length	mm	249	259	255	Pass
S - Knee Joint To Seatback	mm	477	493	489	Pass
V - Shoulder Width	mm	341	357	350	Pass
W - Foot Width	mm	78	94	81	Pass
Y - Chest Circumference W/Jacket	mm	851	881	866	Pass
Z - Waist Circumference	mm	761	791	783	Pass
			Overall Test Results		Pass

Technician: J. Hernandez

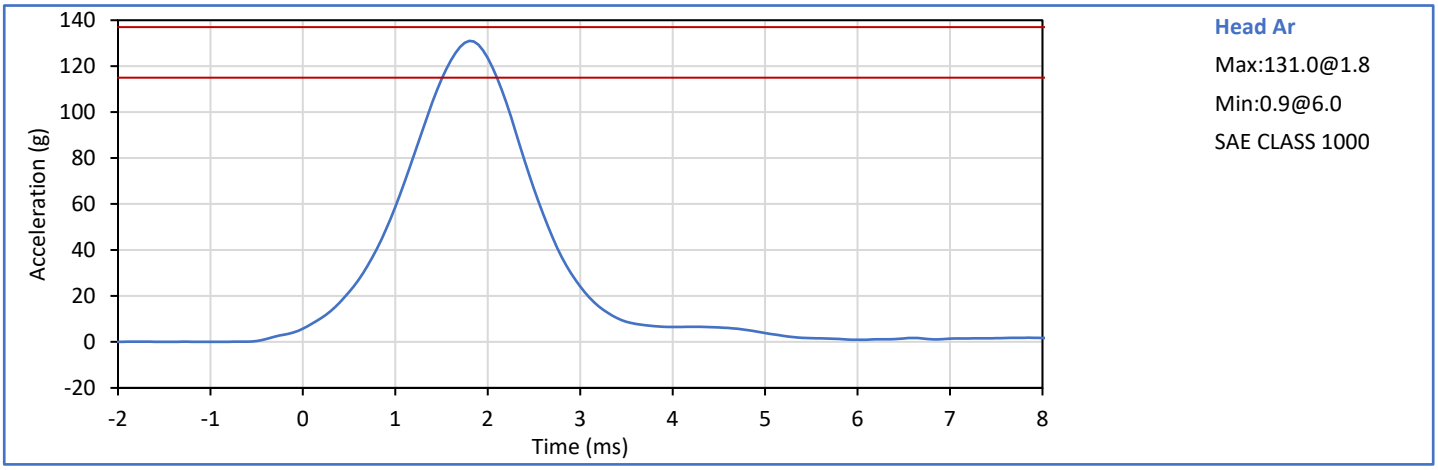
Approved By: P. Puzzuto

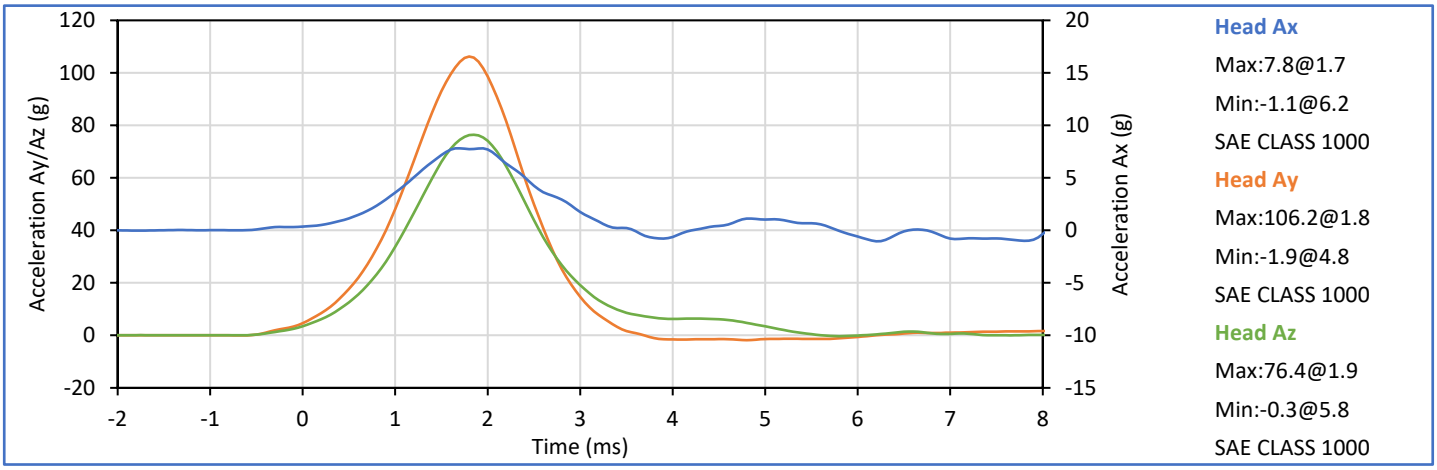
Applus IDIADA KARCO

SID-IIs Small Side Impact ATD
Head Drop

ATD Serial No.: 299 Test Date: 2021-07-26

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	55	Pass
Peak Resultant Acceleration	g	115.0	137.0	131.0	Pass
Peak Head Ax	g	-15.0	15.0	7.8	Pass
Oscillations After Main Pulse	%	0.0	15.0	1.4	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
			Overall Test Results		Pass





Technician: J. Hernandez

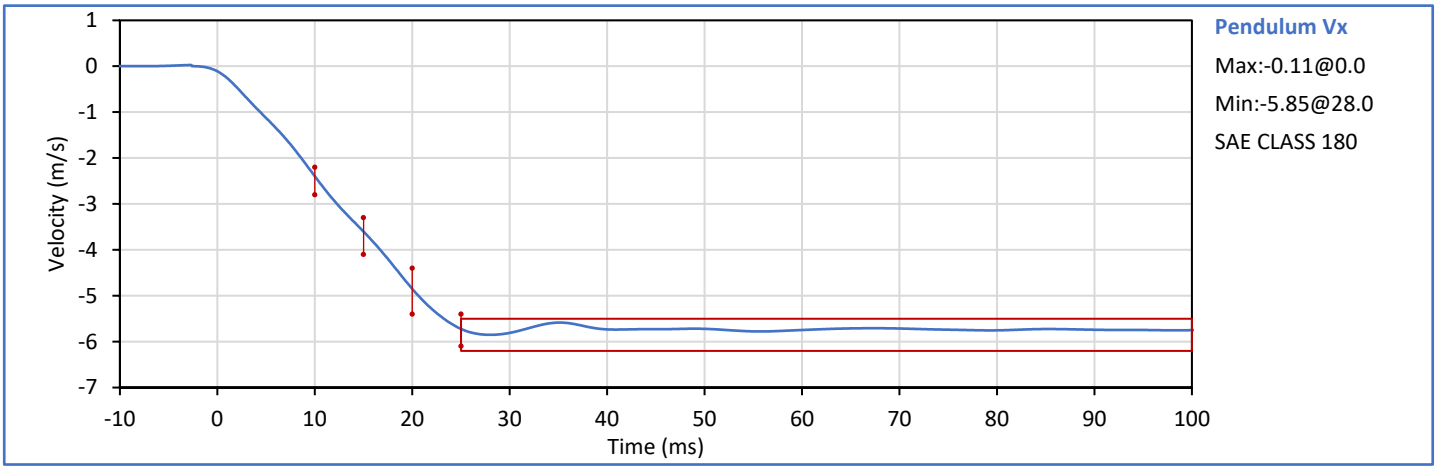
Approved By: P. Puzzuto

Applus IDIADA
KARCO

SID-IIs Small Side Impact ATD
Neck Flexion

ATD Serial No.: 299 Test Date: 2021-07-27

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	55	Pass
Pendulum Velocity	m/s	5.51	5.63	5.58	Pass
Pendulum Decel at 10 ms	m/s	-2.80	-2.20	-2.40	Pass
Pendulum Decel at 15 ms	m/s	-4.10	-3.30	-3.60	Pass
Pendulum Decel at 20 ms	m/s	-5.40	-4.40	-4.85	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	-5.85/-5.59	Pass
Peak "D" Plane Rotation	deg	-81.0	-71.0	-74.3	Pass
Time of Peak "D" Plane Rotation	ms	50.0	70.0	62.3	Pass
Peak Occ. Condyle Moment	Nm	36.0	44.0	38.9	Pass
Time of Moment Decay to 0 Nm	ms	102.0	126.0	118.2	Pass
			Overall Test Results		Pass



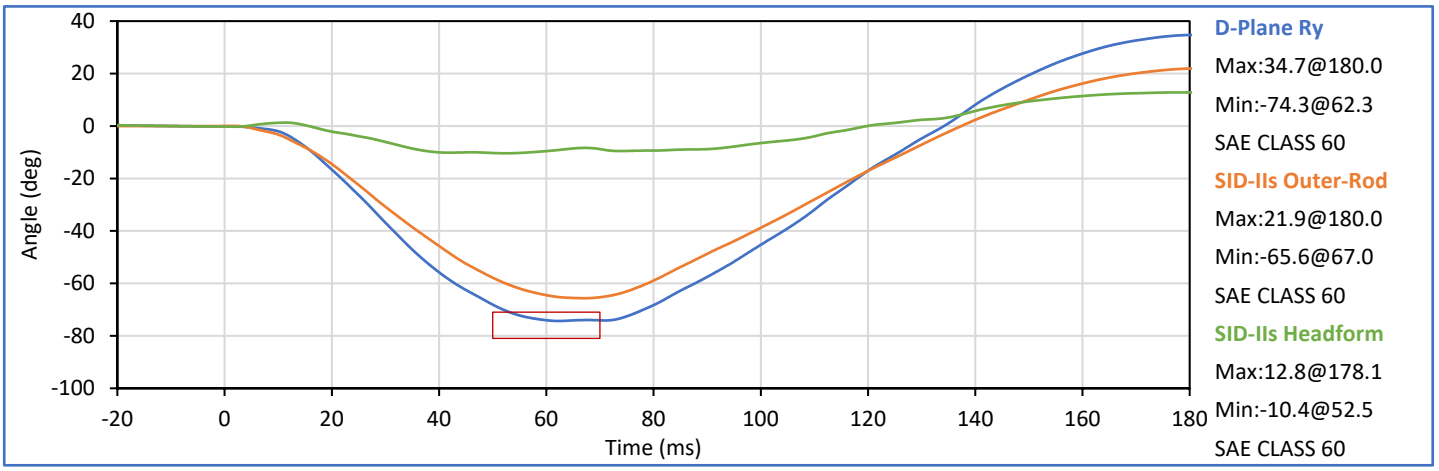
Technician: J. Hernandez

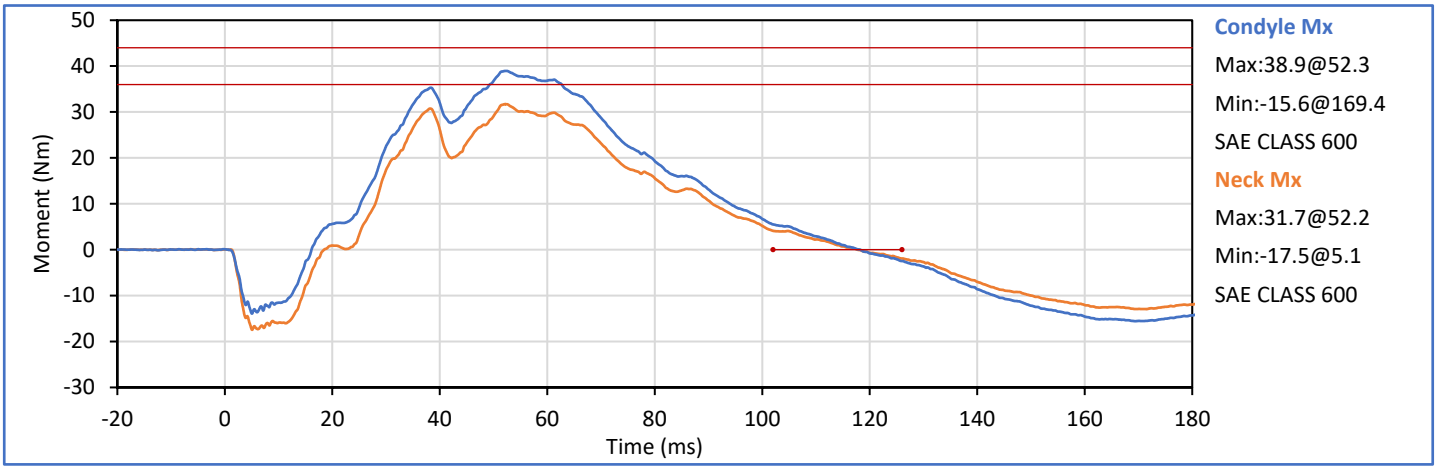
Approved By: P. Puzzuto

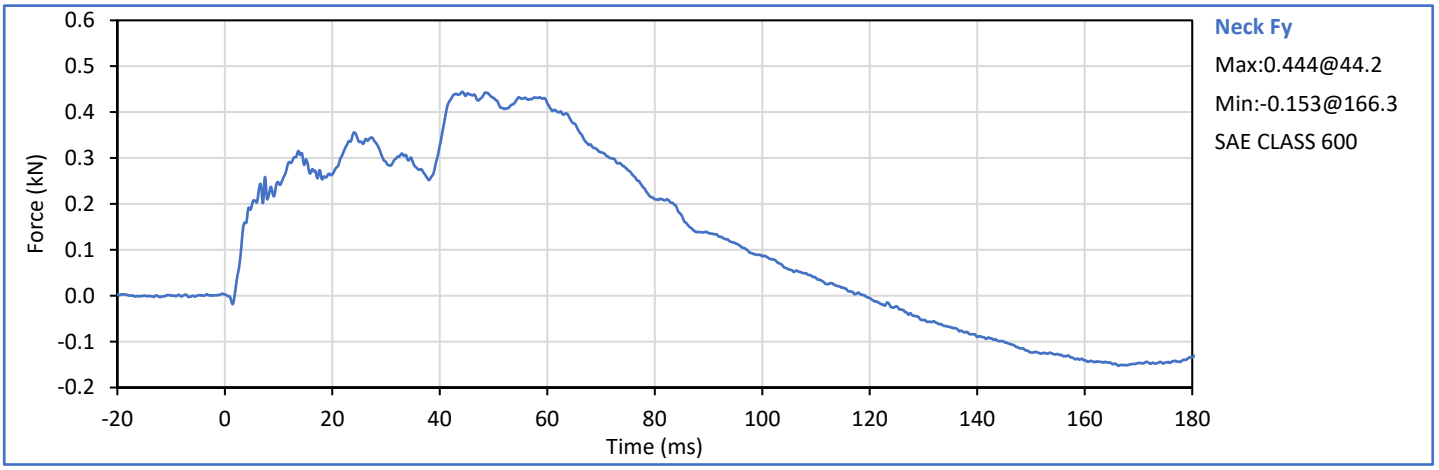
Applus IDIADA
KARCO

SID-IIs Small Side Impact ATD
Neck Flexion

ATD Serial No.: 299 Test Date: 2021-07-27





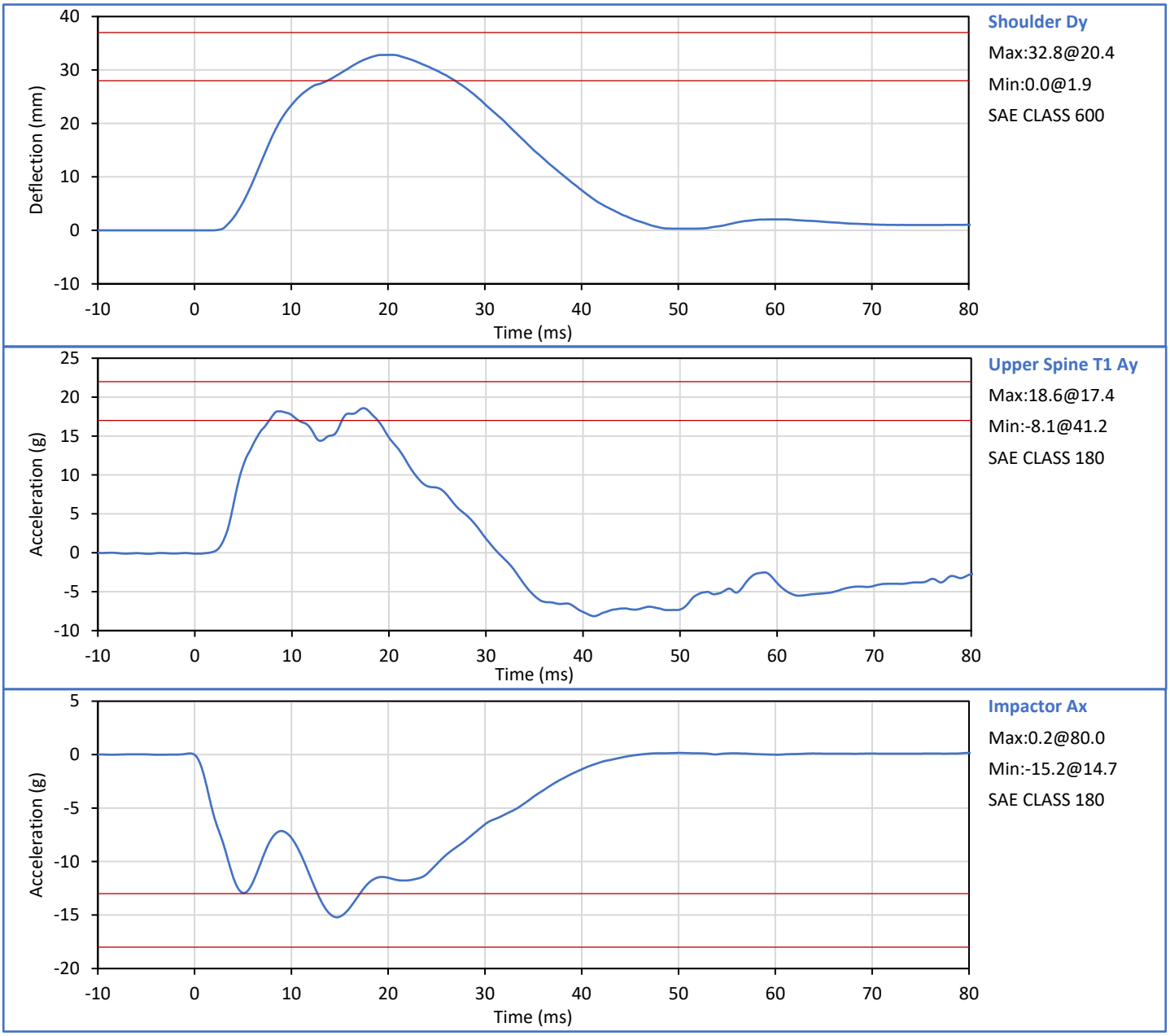


Applus IDIADA
KARCO

SID-IIs Small Side Impact ATD
Shoulder Impact Test

ATD Serial No.: 299 Test Date: 2021-07-24

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	47	Pass
Impactor Velocity	m/s	4.20	4.40	4.32	Pass
Peak Shoulder Dy	mm	28.0	37.0	32.8	Pass
Peak Upper Spine (T1) Ay	g	17.0	22.0	18.6	Pass
Peak Impactor Ax	g	-18.0	-13.0	-15.2	Pass
			Overall Test Results		Pass



Technician: J. Hernandez

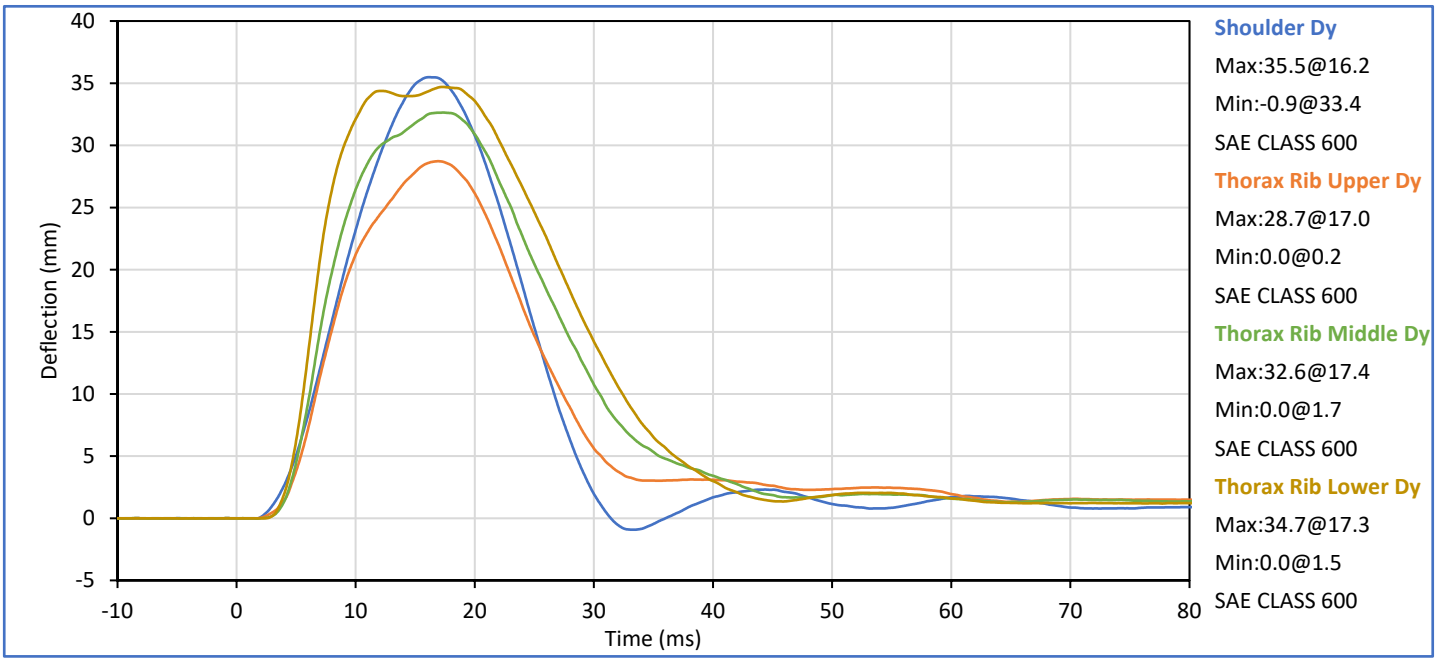
Approved By: P. Puzzuto

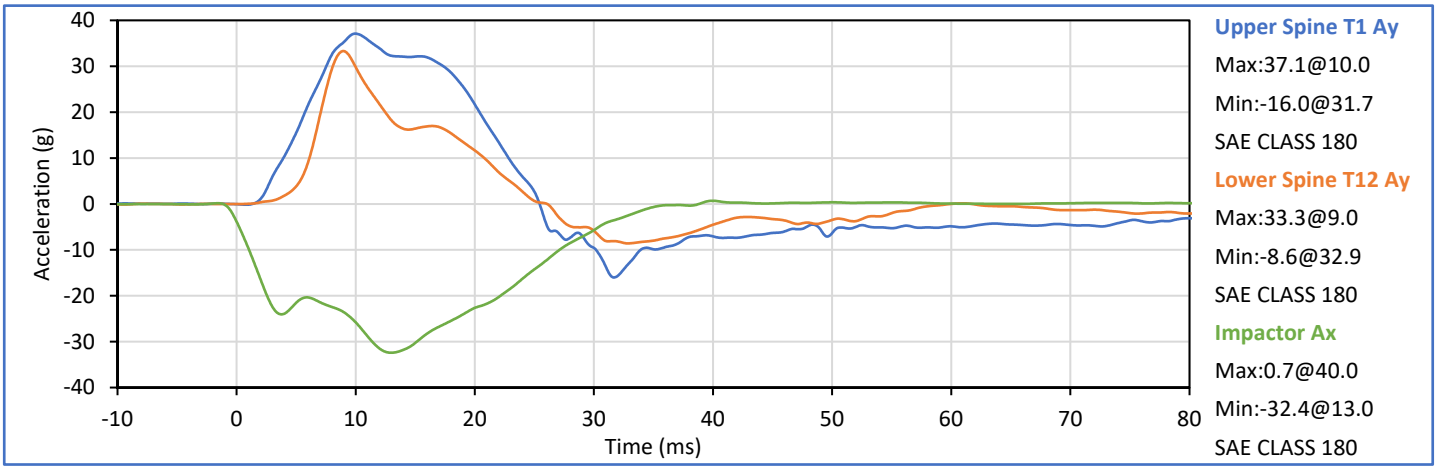
Applus IDIADA
KARCO

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

ATD Serial No.: 299 Test Date: 2021-07-24

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	42	Pass
Impactor Velocity	m/s	6.60	6.80	6.67	Pass
Peak Shoulder Dy	mm	31.0	40.0	35.5	Pass
Peak Upper Rib Dy	mm	25.0	32.0	28.7	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	37.1	Pass
Peak Lower Spine (T12) Ay	g	29.0	37.0	33.3	Pass
Peak Impactor Ax	g	-36.0	-30.0	-32.4	Pass
			Overall Test Results		Pass





Technician: J. Hernandez

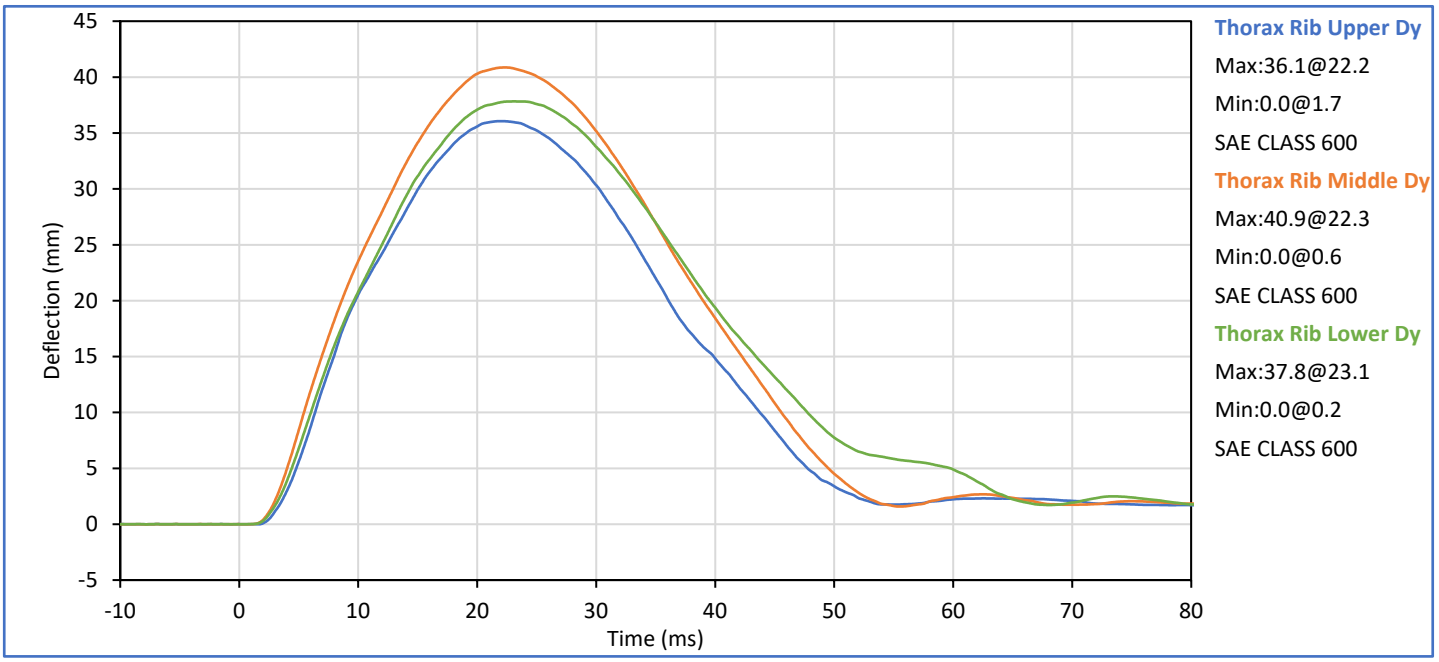
Approved By: P. Puzzuto

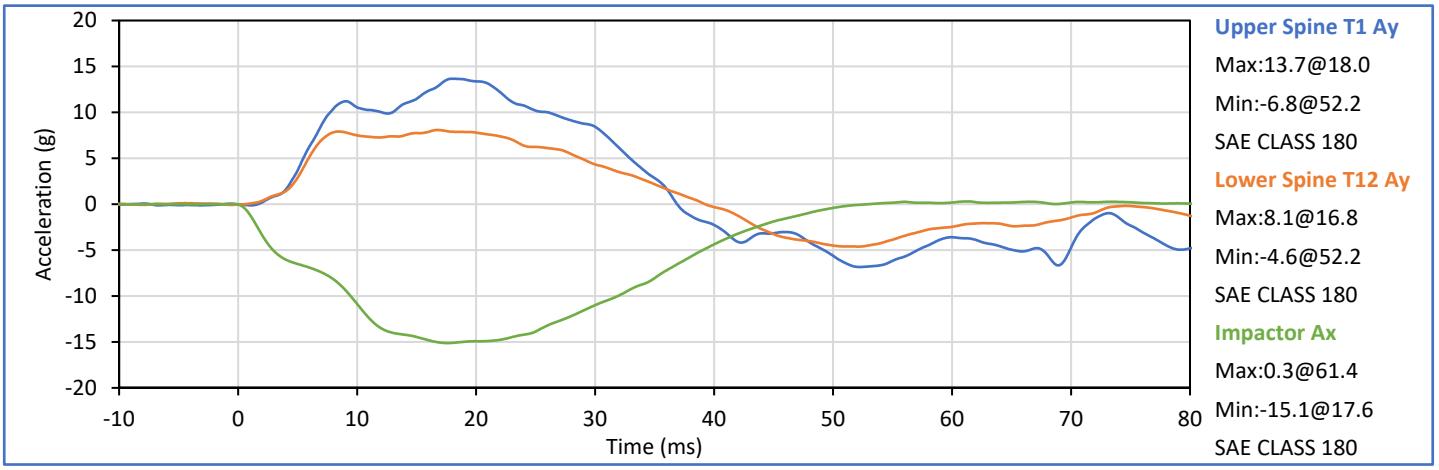
Applus IDIADA
KARCO

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

ATD Serial No.: 299 Test Date: 2021-07-26

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	50	Pass
Impactor Velocity	m/s	4.20	4.40	4.30	Pass
Peak Thorax Rib Upper Dy	mm	32.0	40.0	36.1	Pass
Peak Thorax Rib Middle Dy	mm	39.0	45.0	40.9	Pass
Peak Thorax Rib Lower Dy	mm	35.0	43.0	37.8	Pass
Peak Spine Upper T1 Ay	g	13.0	17.0	13.7	Pass
Peak Spine Lower T12 Ay	g	7.0	11.0	8.1	Pass
Peak Impactor Ax	g	-18.0	-14.0	-15.1	Pass
			Overall Test Results		Pass





Technician: J. Hernandez

Approved By: P. Puzzuto

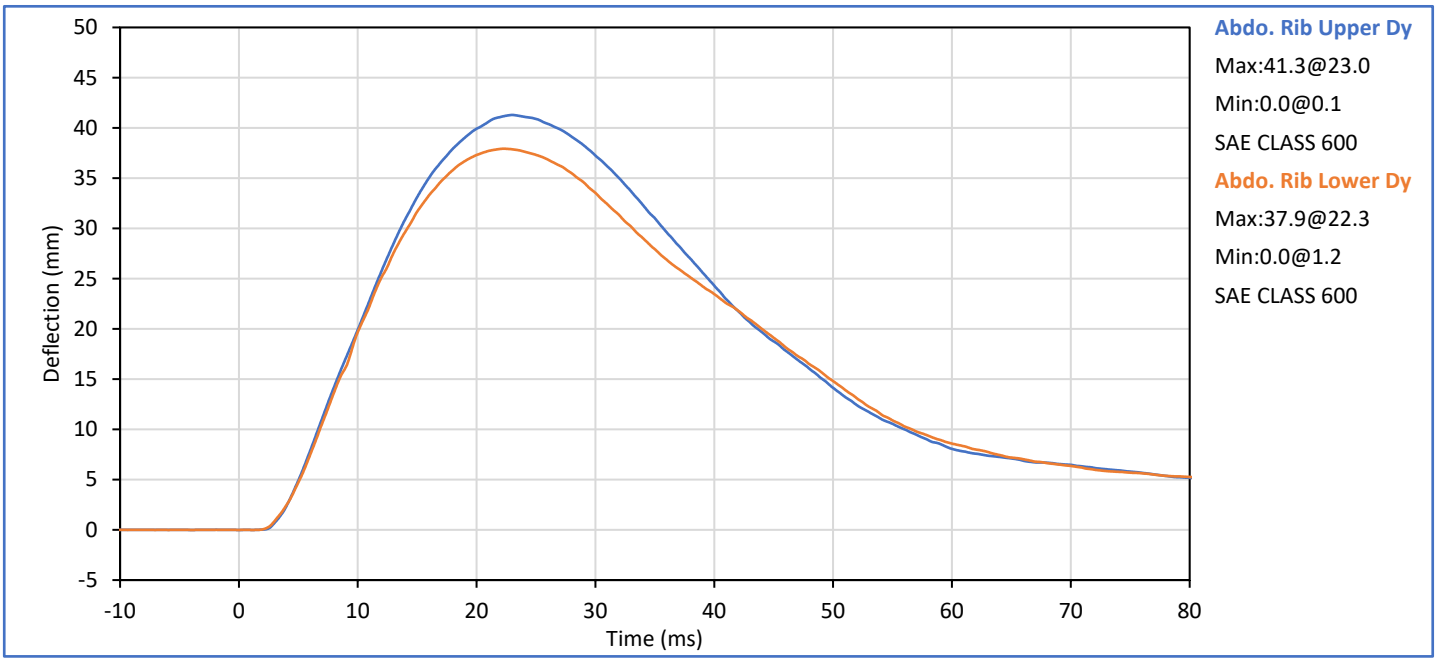
Applus IDIADA
KARCO

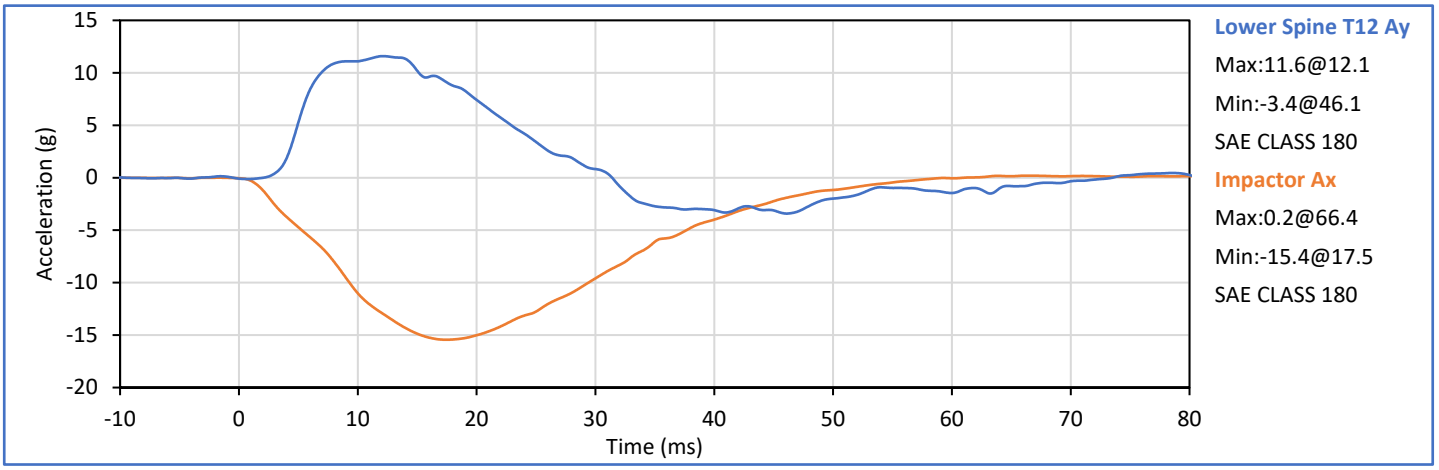
SID-IIs Small Side Impact ATD
Abdomen Impact

ATD Serial No.: 299

Test Date: 2021-07-26

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	4.20	4.40	4.32	Pass
Peak Upper Abdomen Rib Dy	mm	36.0	47.0	41.3	Pass
Peak Lower Abdomen Rib Dy	mm	33.0	44.0	37.9	Pass
Peak Lower Spine T12 Ay	mm	9.0	14.0	11.6	Pass
Peak Impactor Ax	g	-16.0	-12.0	-15.4	Pass
			Overall Test Results		Pass





Technician: J. Hernandez

Approved By: P. Puzzuto

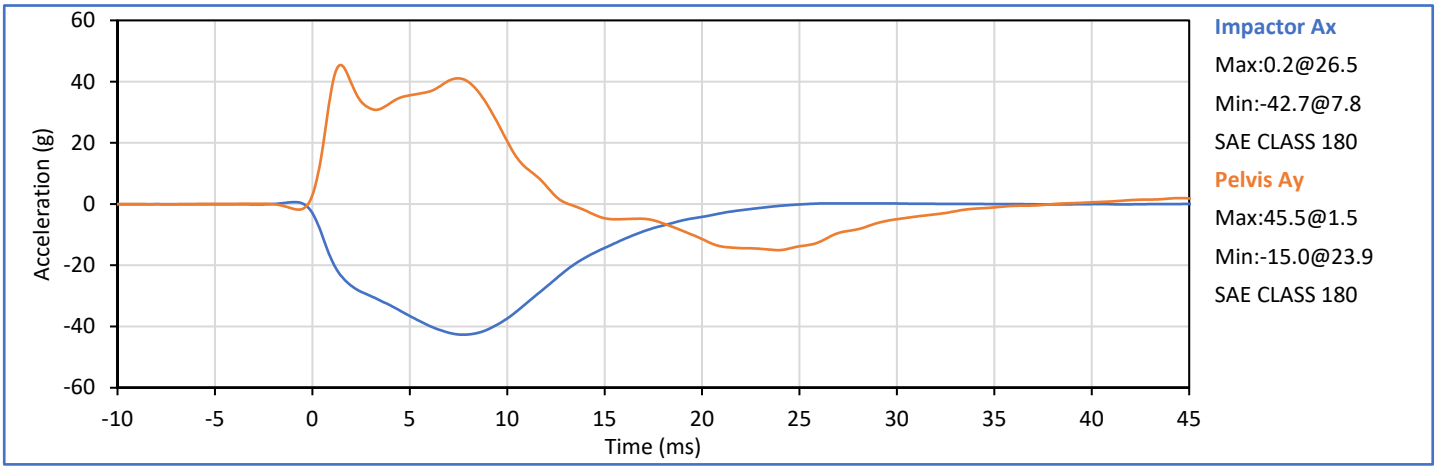
Applus IDIADA
KARCO

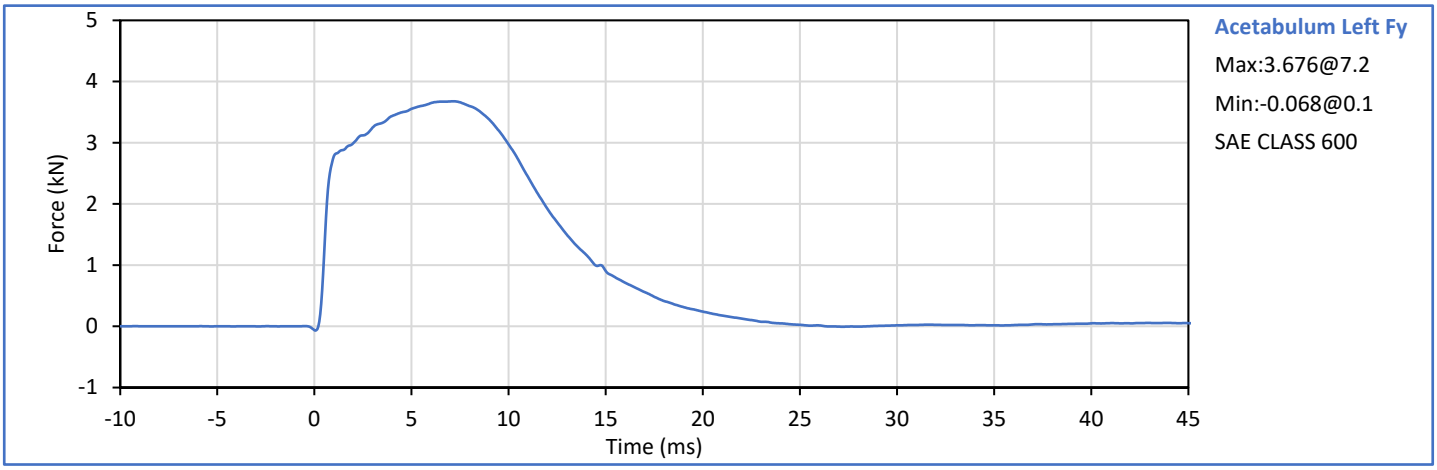
SID-IIs Small Side Impact ATD
Pelvis Acetabulum Impact

ATD Serial No.: 299 Test Date: 2021-07-23

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
Impactor Velocity	m/s	6.60	6.80	6.70	Pass
Peak Acetabulum Fy	kN	3.60	4.30	3.68	Pass
Pelvis Ay after 6ms	g	34.0	42.0	41.1	Pass
Peak Impactor Ax	g	-47.0	-38.0	-42.7	Pass
			Overall Test Results		Pass

Pelvis Plug S/N: 13707





Technician: J. Hernandez

Approved By: P. Puzzuto

SID-IIs Small Side Impact ATD
Pelvis Acetabulum Impact

ATD Serial No.: 299 Test Date: 2021-07-23

Pelvis Plug S/N: 13707

SACO RESEARCH

SID-IIs Pelvis Plug Certification Test

Plug S/N 13707
Test Number 12335
Report Number 12378
Test Date 2/6/2020 12:27:22 PM

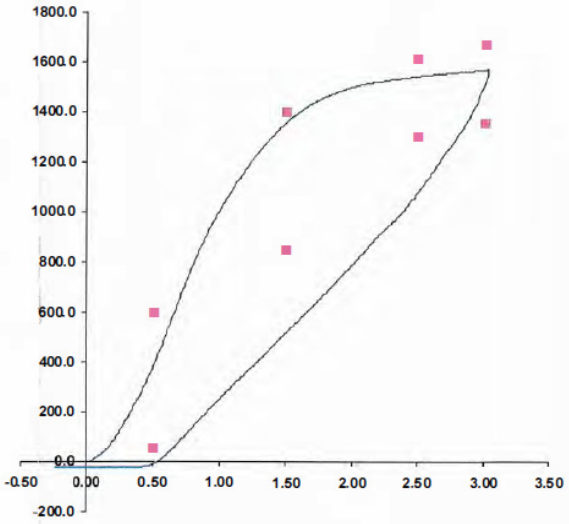
	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	394.88	50.00	600.00
Force @ 1.5 mm (N)	1,359.06	850.00	1,400.00
Force @ 2.5 mm (N)	1,543.82	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,570.51	1,361.00	1,673.00

Testing Machine STM-20 5965542
Load Cell S/N (TI240813), Units (LBS) 1000

Crosshead Speed (mm / min) or Rate 12.7
Extension or Position Measured by XHD_100 (XHD100)

Notes:

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107 06-Feb-20
SACO Research

By : DC Date : 2/6/2020

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

Applus IDIADA
KARCO

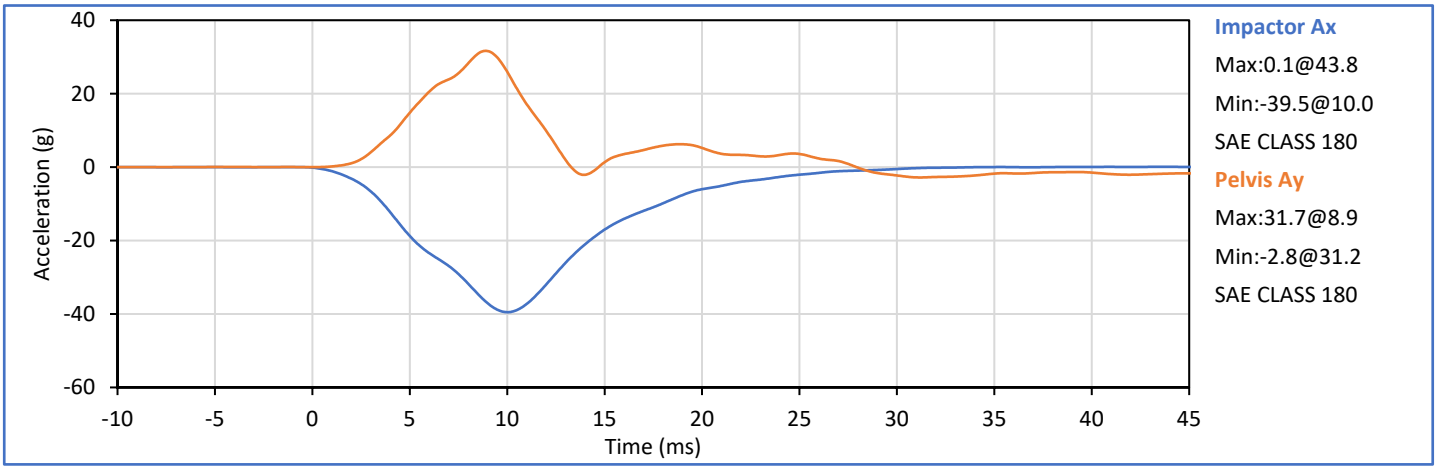
SID-IIs Small Side Impact ATD
Pelvis Iliac Impact

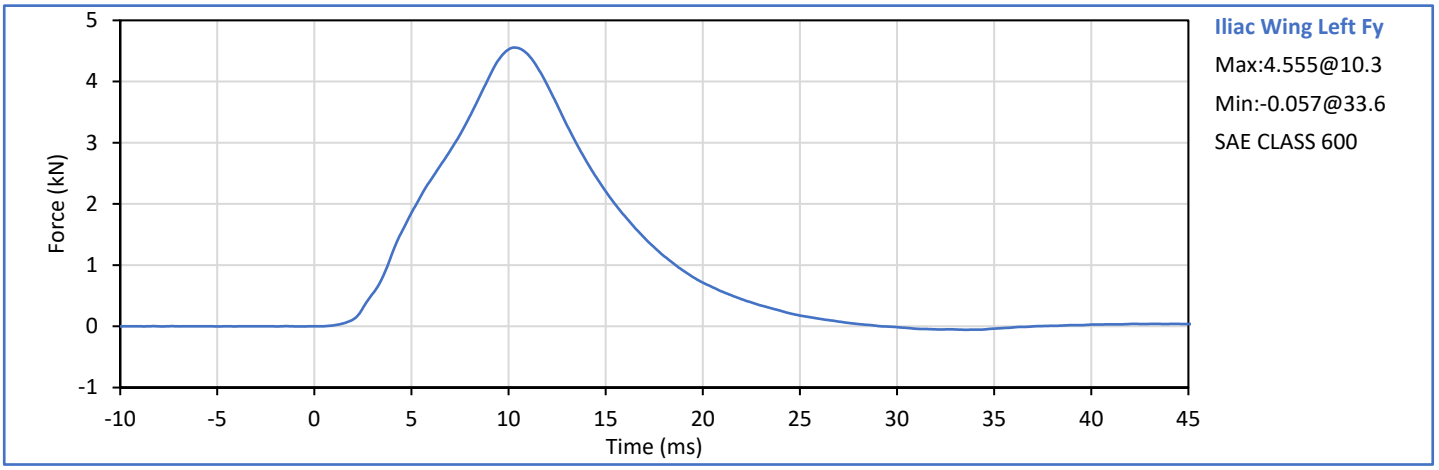
ATD Serial No.: 299 Test Date: 2021-07-26

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.6	Pass
Laboratory Relative Humidity	%	10	70	32	Pass
Impactor Velocity	m/s	4.20	4.40	4.33	Pass
Peak Iliac Fy	kN	4.10	5.10	4.55	Pass
Peak Pelvis Ay	g	28.0	39.0	34.7	Pass
Peak Impactor Ax	g	-45.0	-36.0	-39.5	Pass
			Overall Test Results		Pass

Pelvis Plug S/N: 12228 *

* Plug is not impacted and remains certified





Technician: J. Hernandez

Approved By: P. Puzzuto

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: 2021-08-03

Tested Parameter	Units	Spec Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
A - Sitting Height	mm	772	788	781	Pass
B - Shoulder Pivot Height	mm	437	453	450	Pass
C - Hpoint Height	mm	79	89	85	Pass
D - H Point From Seatback	mm	141	151	148	Pass
E - Shoulder Pivot From Backline	mm	97	107	101	Pass
F - Thigh Clearance	mm	119	135	124	Pass
G - Head Breadth	mm	140	148	146	Pass
H - Head Back From Backline	mm	40	46	43	Pass
I - Head Depth	mm	178	188	185	Pass
J - Head Circumference	mm	541	551	547	Pass
K - Buttock To Knee Length	mm	514	540	525	Pass
L - Popliteal Height	mm	343	369	353	Pass
K - Knee Pivot To Floor Height	mm	392	409	404	Pass
N - Buttock Popliteal Length	mm	416	442	430	Pass
O - Chest Depth W/O Jacket	mm	195	211	202	Pass
P - Foot Length	mm	216	232	226	Pass
Q - Hip Breadth (W/Pelvic Plugs)	mm	313	323	316	Pass
R - Arm Length	mm	249	259	252	Pass
S - Knee Joint To Seatback	mm	477	493	483	Pass
V - Shoulder Width	mm	341	357	350	Pass
W - Foot Width	mm	78	94	88	Pass
Y - Chest Circumference W/Jacket	mm	851	881	874	Pass
Z - Waist Circumference	mm	761	791	784	Pass
			Overall Test Results		Pass

Technician: J. Hernandez

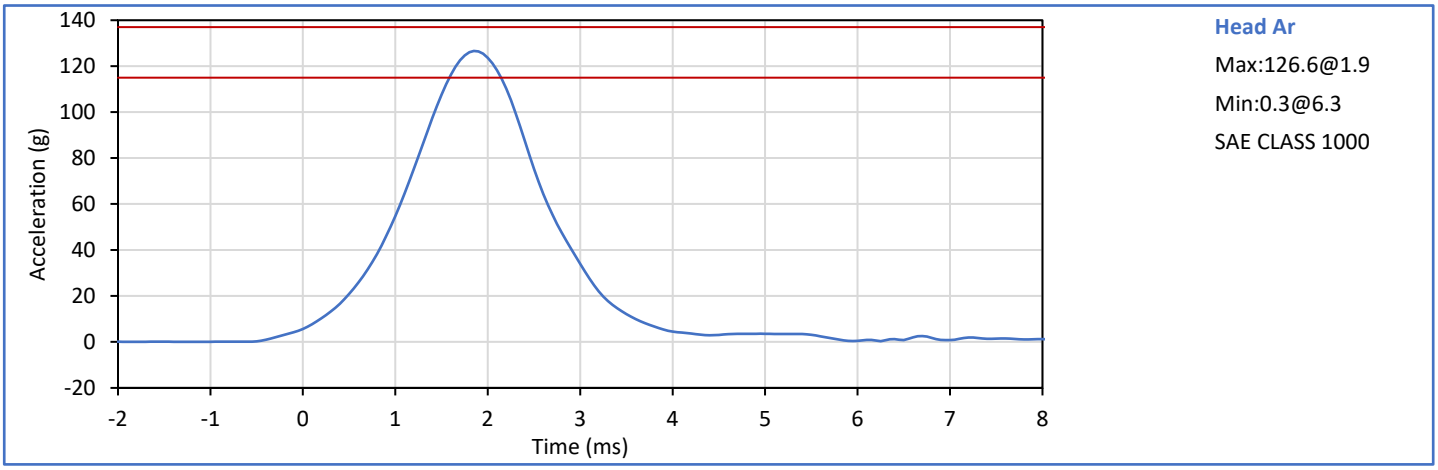
Approved By: P. Puzzuto

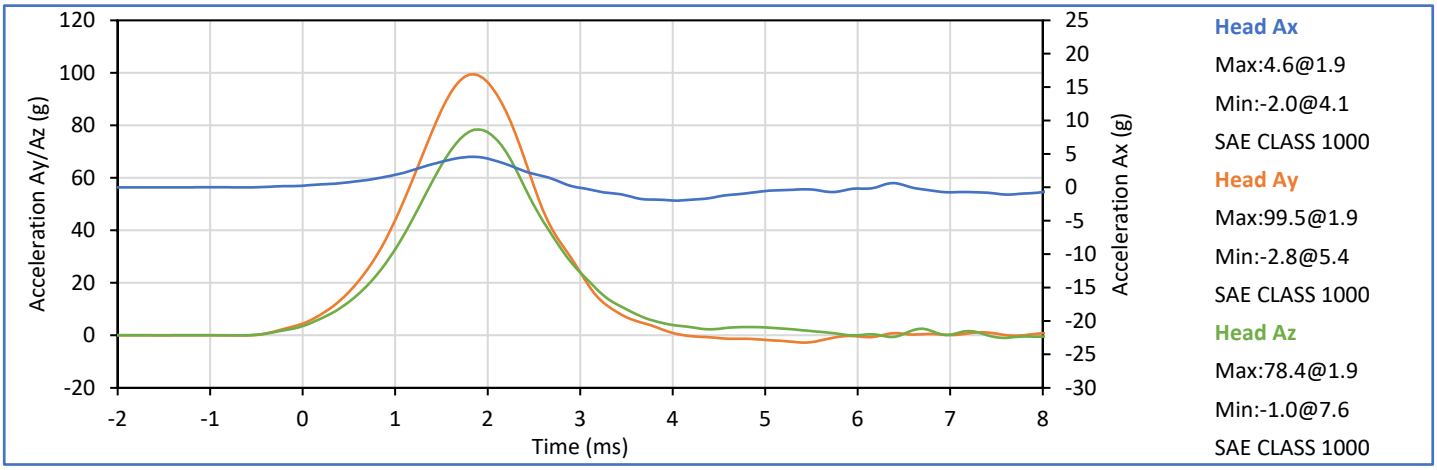
Applus IDIADA KARCO

SID-IIs Small Side Impact ATD
Head Drop

ATD Serial No.: 299 Test Date: 2021-08-03

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	22.5	Pass
Laboratory Relative Humidity	%	10	70	36	Pass
Peak Resultant Acceleration	g	115.0	137.0	126.6	Pass
Peak Head Ax	g	-15.0	15.0	4.6	Pass
Oscillations After Main Pulse	%	0.0	15.0	2.0	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
			Overall Test Results		Pass





Technician: J. Hernandez

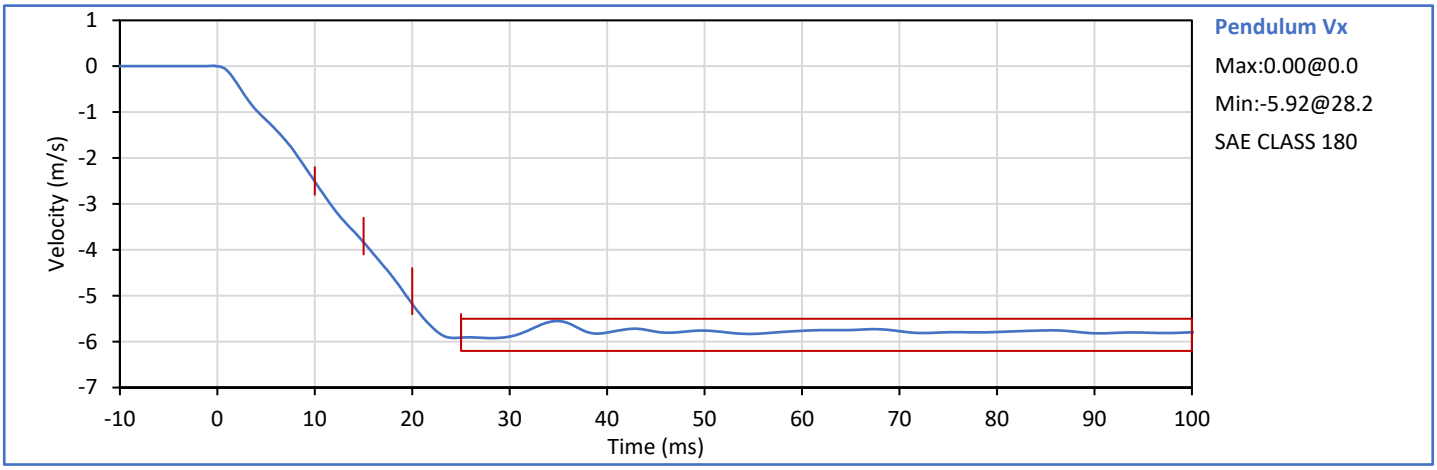
Approved By: P. Puzzuto

Applus IDIADA
KARCO

SID-IIs Small Side Impact ATD
Neck Flexion

ATD Serial No.: 299 Test Date: 2021-08-03

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
Pendulum Velocity	m/s	5.51	5.63	5.58	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	-3.83	Pass
Pendulum Decel at 20 ms	m/s	-5.40	-4.40	-5.18	Pass
Pendulum Decel at 25 ms	m/s	-6.10	-5.40	-5.91	Pass
Pendulum Decel from 25-100 ms	m/s	-6.20	-5.50	-5.92/-5.55	Pass
Peak "D" Plane Rotation	deg	-81.0	-71.0	-73.8	Pass
Time of Peak "D" Plane Rotation	ms	50.0	70.0	60.1	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	109.8	Pass
			Overall Test Results		Pass



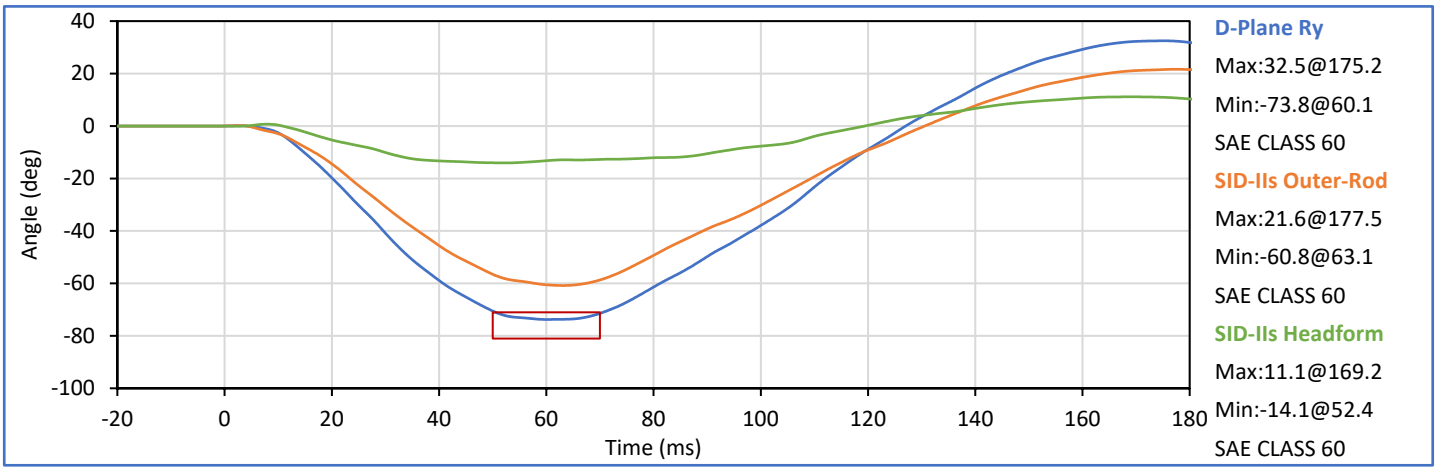
Technician: J. Hernandez

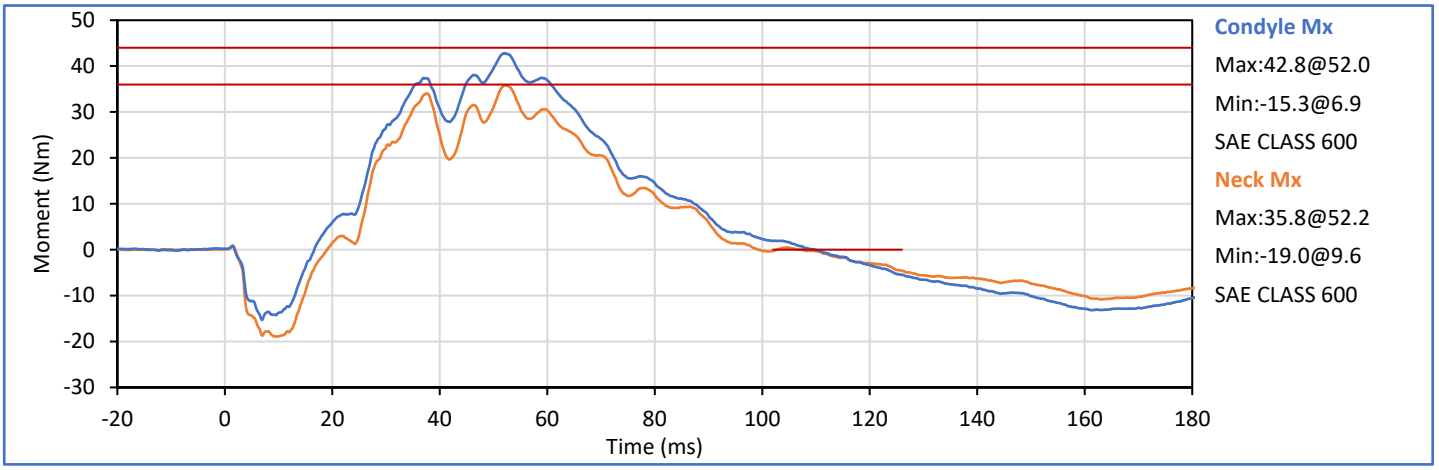
Approved By: P. Puzzuto

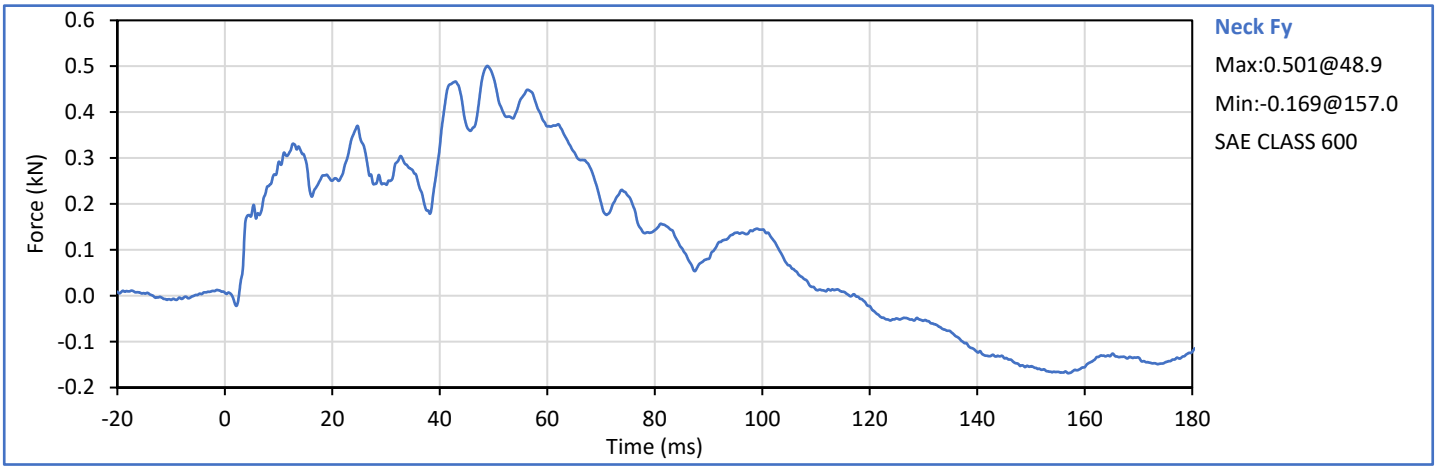
Applus IDIADA KARCO

SID-IIs Small Side Impact ATD
Neck Flexion

ATD Serial No.: 299 Test Date: 2021-08-03





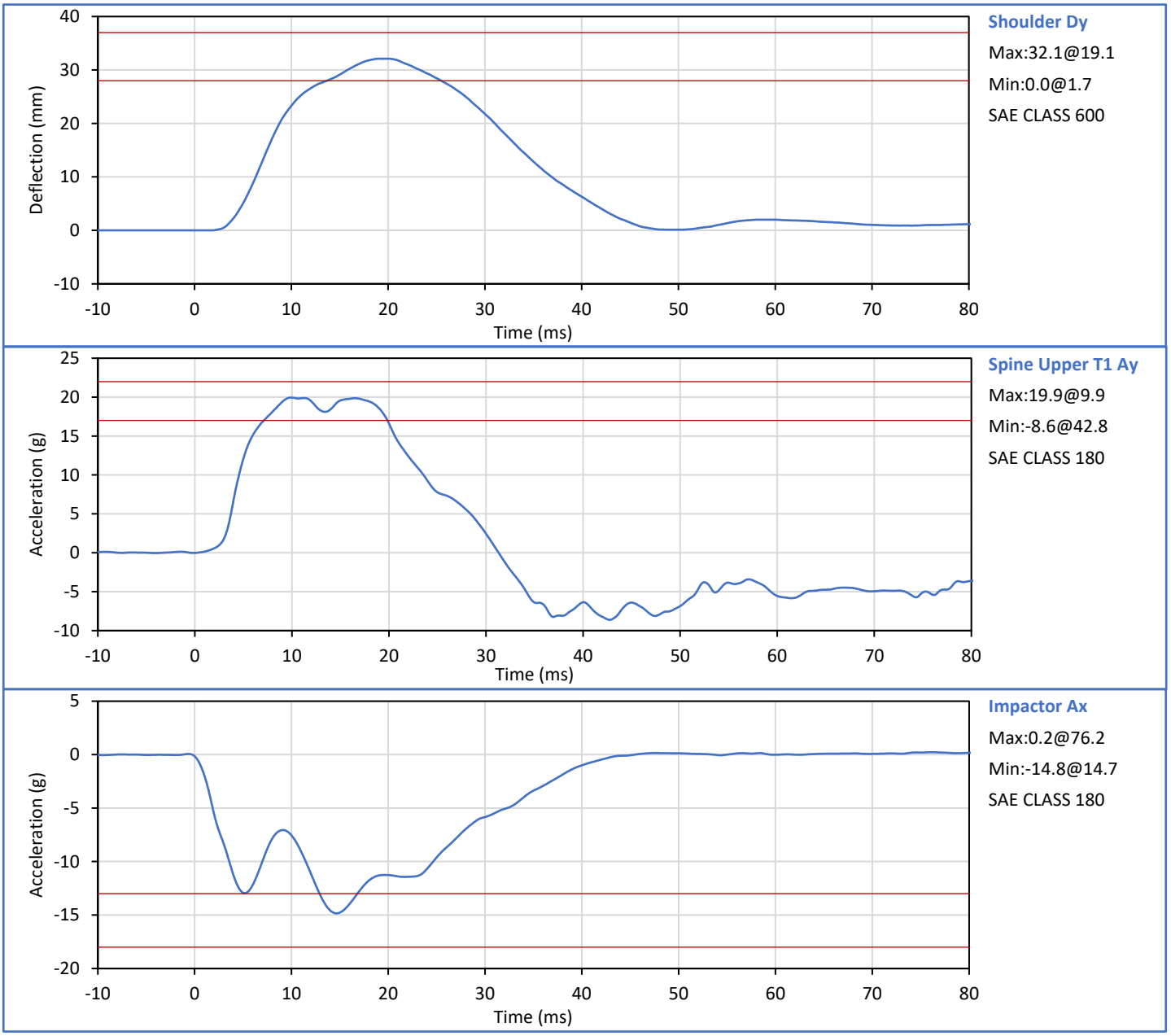


Applus IDIADA
KARCO

SID-IIs Small Side Impact ATD
Shoulder Impact Test

ATD Serial No.: 299 Test Date: 2021-08-03

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
Impactor Velocity	m/s	4.20	4.40	4.31	Pass
Peak Shoulder Dy	mm	28.0	37.0	32.1	Pass
Peak Upper Spine (T1) Ay	g	17.0	22.0	19.9	Pass
Peak Impactor Ax	g	-18.0	-13.0	-14.8	Pass
			Overall Test Results		Pass



Technician: J. Hernandez

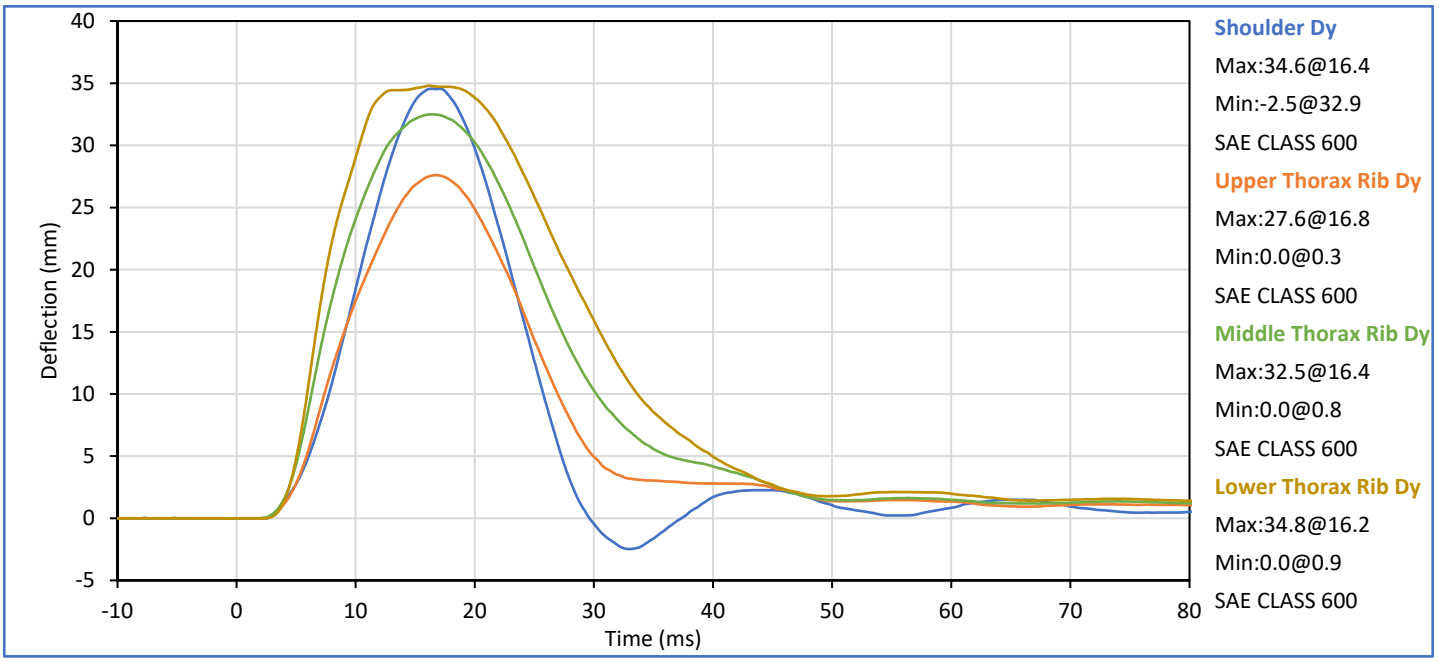
Approved By: P. Puzzuto

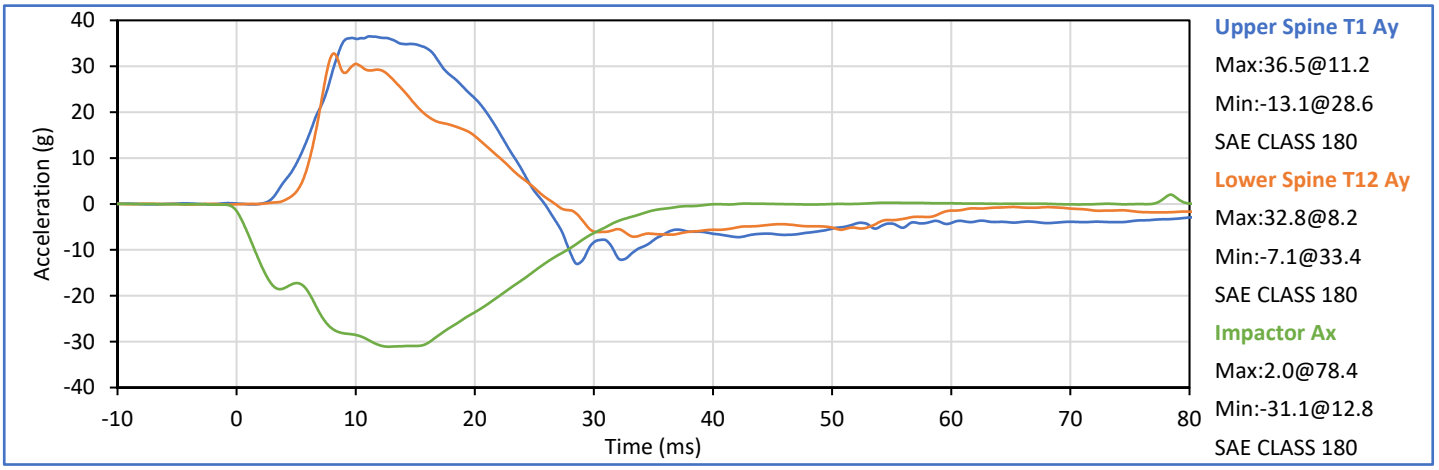
Applus IDIADA
KARCO

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

ATD Serial No.: 299 Test Date: 2021-08-03

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
Impactor Velocity	m/s	6.60	6.80	6.65	Pass
Peak Shoulder Dy	mm	31.0	40.0	34.6	Pass
Peak Upper Rib Dy	mm	25.0	32.0	27.6	Pass
Peak Middle Rib Dy	mm	30.0	36.0	32.5	Pass
Peak Lower Rib Dy	mm	32.0	38.0	34.8	Pass
Peak Upper Spine (T1) Ay	g	34.0	43.0	36.5	Pass
Peak Lower Spine (T12) Ay	g	29.0	37.0	32.8	Pass
Peak Impactor Ax	g	-36.0	-30.0	-31.1	Pass
			Overall Test Results		Pass





Technician: J. Hernandez

Approved By: P. Puzzuto

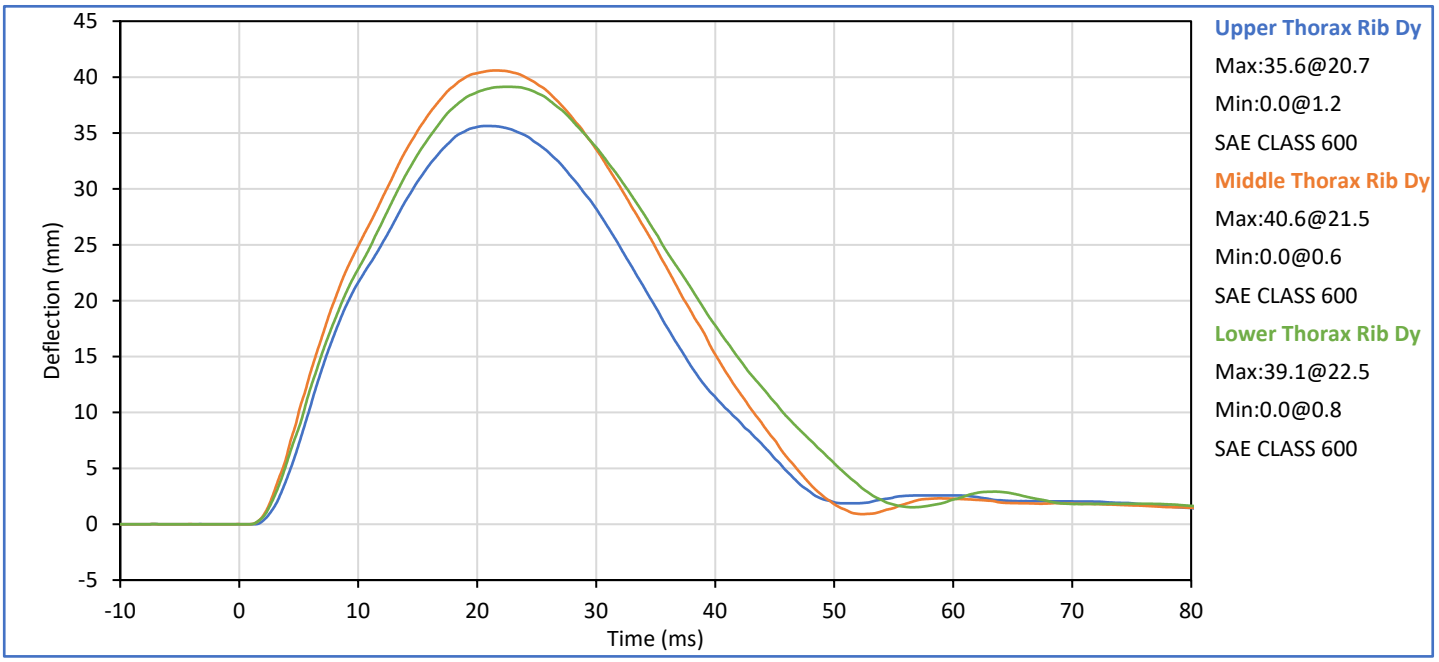
Applus IDIADA
KARCO

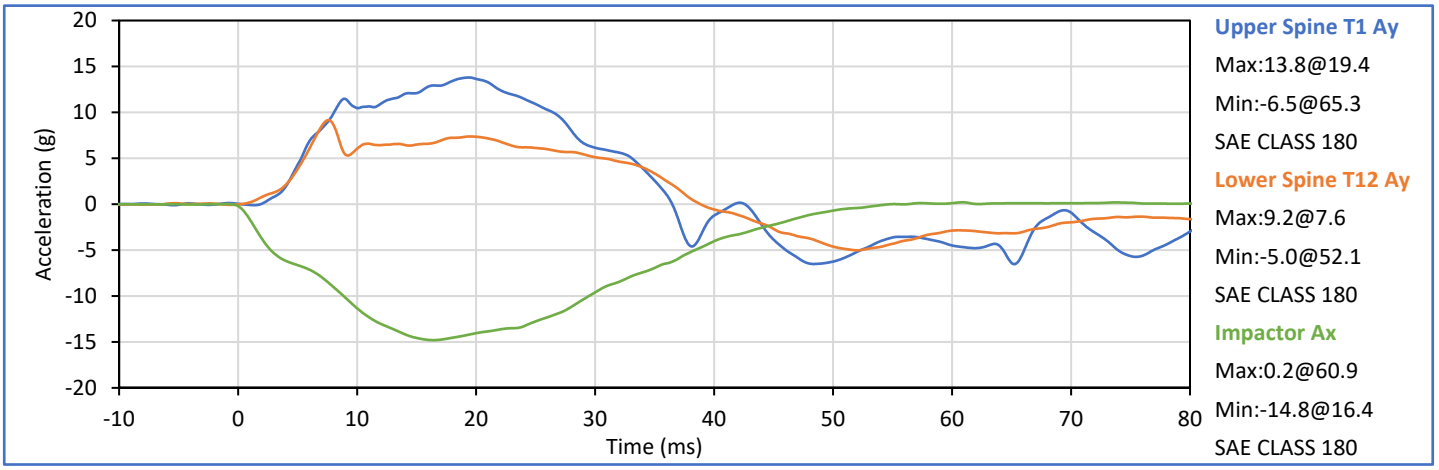
SID-IIs Small Side Impact ATD
Thorax (No Arm)

ATD Serial No.: 299

Test Date: 2021-08-03

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	31	Pass
Impactor Velocity	m/s	4.20	4.40	4.31	Pass
Peak Thorax Rib Upper Dy	mm	32.0	40.0	35.6	Pass
Peak Thorax Rib Middle Dy	mm	39.0	45.0	40.6	Pass
Peak Thorax Rib Lower Dy	mm	35.0	43.0	39.1	Pass
Peak Spine Upper T1 Ay	g	13.0	17.0	13.8	Pass
Peak Spine Lower T12 Ay	g	7.0	11.0	9.2	Pass
Peak Impactor Ax	g	-18.0	-14.0	-14.8	Pass
			Overall Test Results		Pass





Technician: J. Hernandez

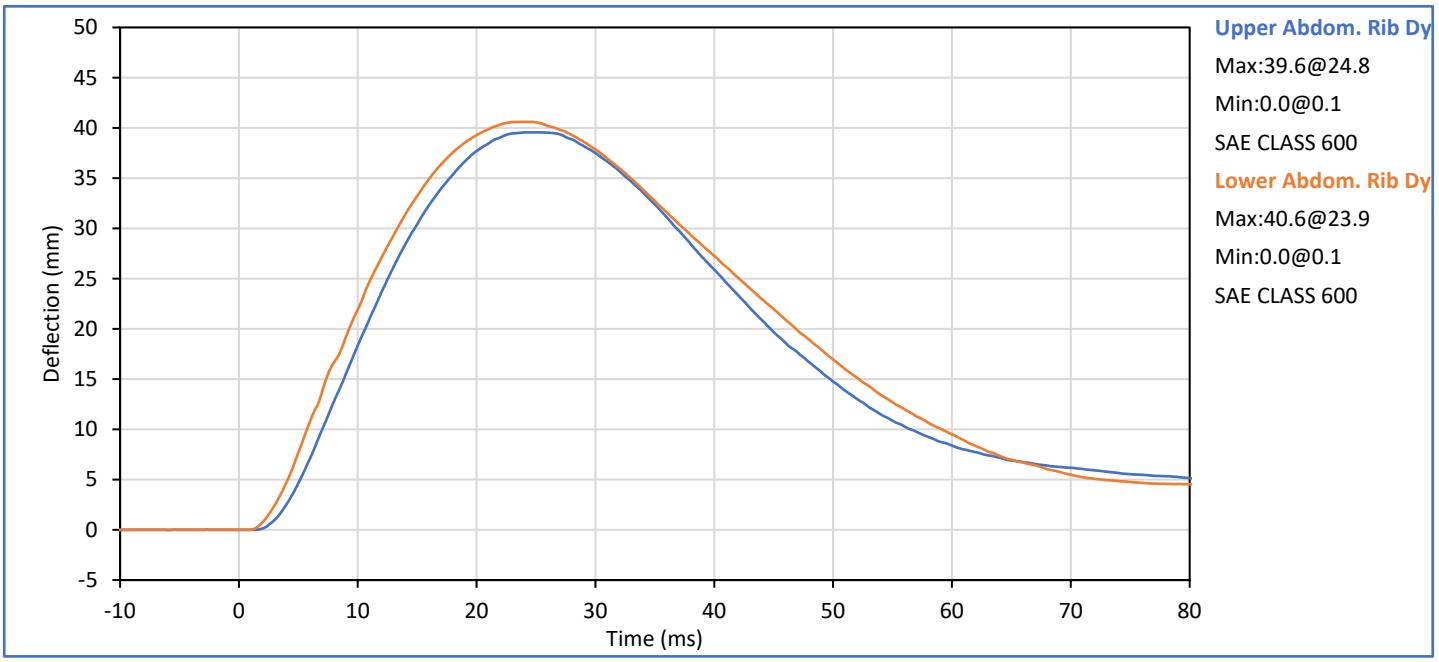
Approved By: P. Puzzuto

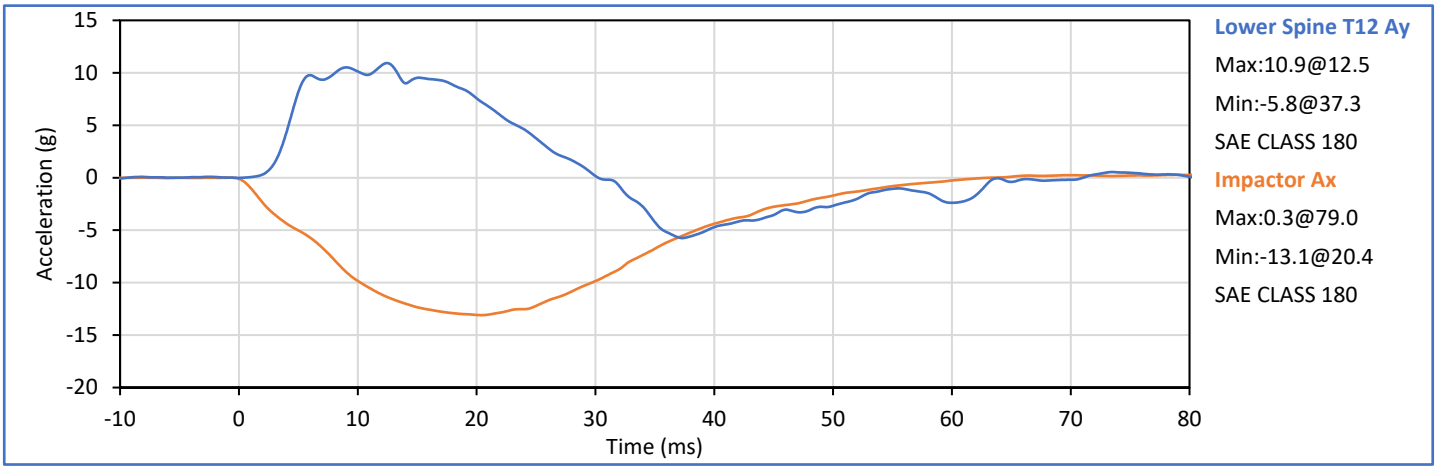
Applus IDIADA
KARCO

SID-IIs Small Side Impact ATD
Abdomen Impact

ATD Serial No.: 299 Test Date: 2021-08-03

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	4.20	4.40	4.35	Pass
Peak Upper Abdomen Rib Dy	mm	36.0	47.0	39.6	Pass
Peak Lower Abdomen Rib Dy	mm	33.0	44.0	40.6	Pass
Peak Lower Spine T12 Ay	mm	9.0	14.0	10.9	Pass
Peak Impactor Ax	g	-16.0	-12.0	-13.1	Pass
			Overall Test Results		Pass





Technician: J. Hernandez

Approved By: P. Puzzuto

Applus IDIADA KARCO

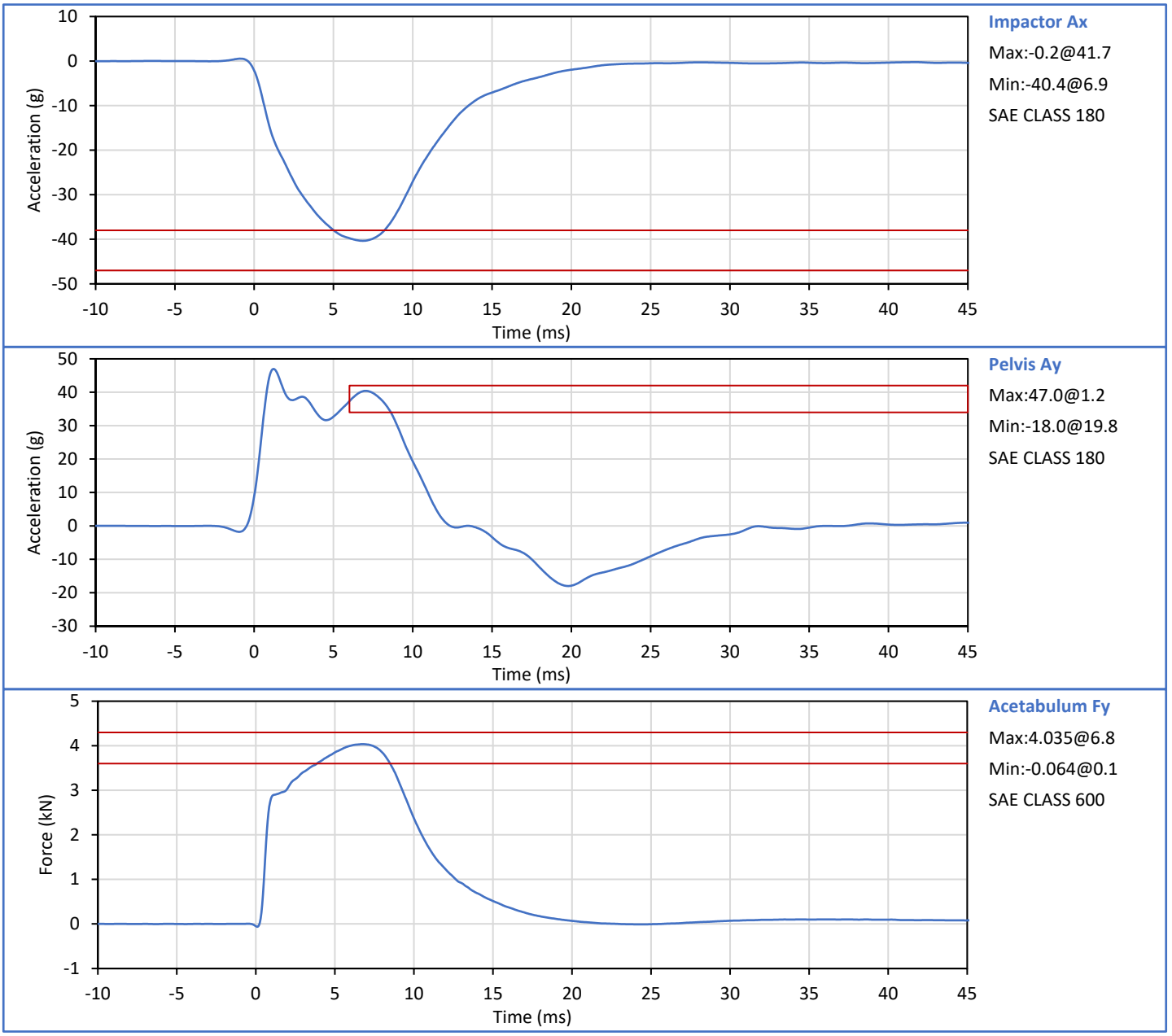
SID-IIs Small Side Impact ATD
Pelvis Acetabulum Impact

ATD Serial No.: 299

Test Date: 2021-08-03

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	32	Pass
Impactor Velocity	m/s	6.60	6.80	6.72	Pass
Peak Impactor Ax	g	-47.0	-38.0	-40.4	Pass
Pelvis Ay after 6ms	g	34.0	42.0	40.4	Pass
Peak Acetabulum Fy	kN	3.60	4.30	4.03	Pass
			Overall Test Results		Pass

Pelvis Plug S/N: 13298



Technician: J. Hernandez

Approved By: P. Puzzuto

SID-IIs Small Side Impact ATD
Pelvis Acetabulum Impact

ATD Serial No.: 299 Test Date: 2021-08-03

Pelvis Plug S/N: 13298

SACO RESEARCH

SID-IIs Pelvis Plug Certification Test

Plug S/N 13298
Test Number 10721
Report Number 10758
Test Date 8/12/2019 2:06:50 PM

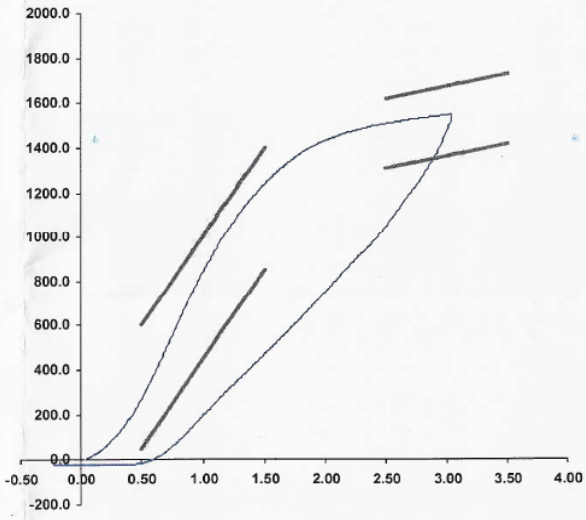
	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	288.01	50.00	600.00
Force @ 1.5 mm (N)	1,240.18	850.00	1,400.00
Force @ 2.5 mm (N)	1,507.01	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,546.16	1,361.00	1,673.00

Testing Machine STM-20 5965542
Load Cell S/N (FI360947), Units (LBS 1000

Crosshead Speed (mm / min) or Rab 12.7
Extension or Position Measured by XHD_100 (XHD100)

Notes:

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107 12-Aug-19
SACO Research

By : DC Date : 8/12/2019

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

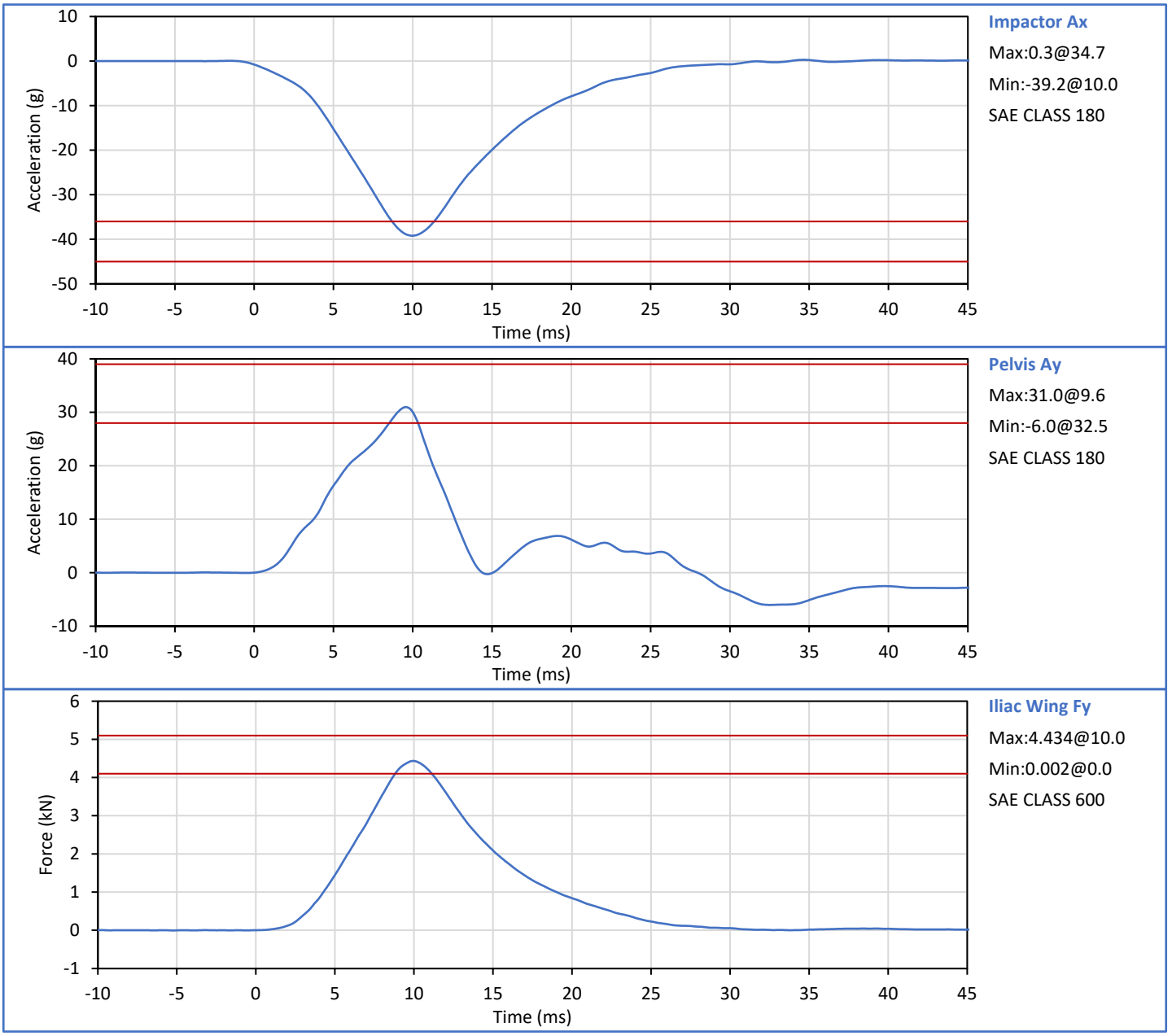
Applus IDIADA
KARCO

SID-IIs Small Side Impact ATD
Pelvis Iliac Impact

ATD Serial No.: 299 Test Date: 2021-08-03

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	32	Pass
Impactor Velocity	m/s	4.20	4.40	4.32	Pass
Peak Impactor Ax	g	-45.0	-36.0	-39.2	Pass
Peak Pelvis Ay	g	28.0	39.0	34.7	Pass
Peak Iliac Fy	kN	4.10	5.10	4.43	Pass
Pelvis Plug S/N: 12228 *			Overall Test Results		Pass

* Plug is not impacted and remains certified



Technician: J. Hernandez

Approved By: P. Puzzuto

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

SID-IIs ATD S/N: 299

Table 1 - Driver ATD Instrumentation

Sensor Location	Sensor S\N	Mfr	Model	Cal Date
Head Acceleration X Primary	P51929	Endevco	7264C-2k	2021-07-27
Head Acceleration Y Primary	P50086	Endevco	7264C-2k	2021-07-27
Head Acceleration Z Primary	P51931	Endevco	7264C-2k	2021-07-27
Head Acceleration X Redundant	P68604	Endevco	7264C-2k	2021-07-27
Head Acceleration Y Redundant	P51934	Endevco	7264C-2k	2021-07-27
Head Acceleration Z Redundant	P58736	Endevco	7264C-2k	2021-07-27
Head Rotation Rate X	ARS7342	DTS	ARS PRO-8k (2kHz)	2021-03-02
Head Rotation Rate Y	ARS7473	DTS	ARS PRO-8k (2kHz)	2021-03-02
Head Rotation Rate Z	ARS7548	DTS	ARS PRO-8k (2kHz)	2021-03-02
Upper Thorax Rib Deflection Y	1143	Servo	08TCI-3725	2021-07-27
Middle Thorax Rib Deflection Y	1075	Servo	08TCI-3725	2021-07-27
Lower Thorax Rib Deflection Y	1213	Servo	08TCI-3725	2021-07-27
Upper Abdomen Rib Deflection Y	1218	Servo	08TCI-3725	2021-07-27
Lower Abdomen Rib Deflection Y	1177	Servo	08TCI-3725	2021-07-27
Lower Spine T12 Acceleration X	P58761	Endevco	7264C-2k	2021-07-27
Lower Spine T12 Acceleration Y	P50077	Endevco	7264C-2k	2021-07-27
Lower Spine T12 Acceleration Z	P58795	Endevco	7264C-2k	2021-07-27
Iliac Wing Impact Side Force Y	289 Fy (Iliac)	R.A. Denton	3228J	2021-01-18
Acetabulum Impact Side Force Y	277 Fy (Acetabulum)	R.A. Denton	3249J	2021-01-18

Table 2 - Vehicle Instrumentation

Sensor Location	Sensor S\N	Mfr	Model	Cal Date
Vehicle CG Ax	11177	Endevco	757F-2k	2021-06-28
Vehicle CG Ay	A254926	MSI	52F-2k	2021-06-28
Vehicle CG Az	A331798	MSI	52F-2k	2021-06-28
Left Floor Sill Ay	10870	Endevco	757F-2k	2021-03-22
A-Pillar Sill Ay	A298350	MSI	52F-2k	2021-06-24
A-Pillar Low Ay	A298340	MSI	52F-2k	2021-06-24
A-Pillar Mid Ay	A298382	MSI	52F-2k	2021-06-24
B-Pillar Sill Ay	10894	Endevco	757F-2k	2021-06-28
B-Pillar Low Ay	10852	Endevco	757F-2k	2021-06-24
B-Pillar Mid Ay	11153	Endevco	757F-2k	2021-06-28
Driver Seat Track at H-Point Ay	A331797	MSI	52F-2k	2021-03-22
Engine Top Ax	A298317	MSI	52F-2k	2021-06-24
Engine Top Ay	A298353	MSI	52F-2k	2021-06-24
Firewall Ay	A331824	MSI	52F-2k	2021-06-24
Right Roof Ay	10395	Endevco	757F-2k	2021-03-11
Right Floor Sill Ay	A298324	MSI	52F-2k	2021-06-24
Rear Floorpan Ax	10824	Endevco	757F-2k	2021-06-28
Rear Floorpan Ay	A298297	MSI	52F-2k	2021-06-28

Table 3 - Barrier Pole Instrumentation

Sensor Location	Sensor S\N	Mfr	Model	Cal Date
Barrier Pole 01 Fx	19461A	Interface	1220FS-50k	2020-03-18
Barrier Pole 02 Fx	131822A	Interface	1220AF-50k	2020-03-18
Barrier Pole 03 Fx	131816A	Interface	1220AF-50k	2020-03-18
Barrier Pole 04 Fx	19325	Interface	1220FS-50k	2020-03-18
Barrier Pole 05 Fx	131827A	Interface	1220AF-50k	2020-03-18
Barrier Pole 06 Fx	19340	Interface	1220FS-50k	2020-03-18
Barrier Pole 07 Fx	19267	Interface	1220FS-50k	2020-03-18
Barrier Pole 08 Fx	19466A	Interface	1220FS-50k	2020-03-18