REPORT NUMBER: SPNCAP-KAR-19-025

NEW CAR ASSESSMENT PROGRAM (NCAP)

SIDE IMPACT POLE TEST

KIA MOTORS CORPORATION

2019 KIA NIRO HYBRID LX 5-DOOR MPV

NHTSA No: M20194210

PREPARED BY:

APPLUS IDIADA KARCO ENGINEERING, LLC.

9270 HOLLY ROAD

ADELANTO, CA 92301

JUNE 7, 2019

FINAL REPORT

PREPARED FOR:

U.S. DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

OFFICE OF CRASHWORTHINESS STANDARDS

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1200 NEW JERSEY AVE, SE, ROOM W43-410

WASHINGTON, D.C. 20590

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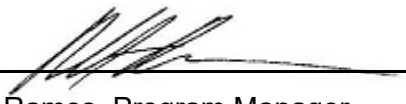
Prepared By: 

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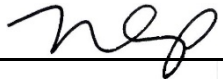
Reviewed By: 

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Approval Date: June 7, 2019

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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SPNCAP-KAR-19-025		

4. Title and Subtitle	5. Report Date
Final Report of New Car Assessment Program Side Impact Pole Testing of a 2019 Kia Niro Hybrid LX 5-Door MPV NHTSA No. M20194210	June 7, 2019 **6. Performing Organization Code** KAR
7. Authors Mr. Robert S. Ramos, Program Manager, Applus IDIADA KARCO Mr. Steven D. Matsusaka, Engineering Manager, Applus IDIADA KARCO	**8. Performing Organization Report No.** TR-P39147-01-NC
9. Performing Organization Name and Address Applus IDIADA KARCO Engineering, LLC. 9270 Holly Rd. Adelanto, CA 92301	**10. Work Unit No.** **11. Contract or Grant No.** DTNH22-14-D-00355L
12. Sponsoring Agency Name and Address U. S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards (NRM-110) 1200 New Jersey Ave., SE, Room W43-410 Washington, D.C. 20590	**13. Type of Report and Period Covered** Final Test Report, May 22, 2019 -June 7, 2019 **14. Sponsoring Agency Code** NRM-110

15. Supplementary Notes

16. Abstract

A 32.20 km/h 75° rigid pole side NCAP impact test was conducted on the subject 2019 Kia Niro Hybrid LX 5-door MPV in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP Pole Laboratory Test Procedure for the generation of consumer information on vehicle side pole crash protection. The test was conducted at the Applus IDIADA KARCO Engineering, LLC. facility in Adelanto, California on May 22, 2019.

The impact velocity was 31.87 km/h and the outside ambient temperature at the struck (driver's) side of the vehicle was 16.3°C. The target vehicle's maximum post-test static crush was 288 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	213.6
Resultant Lower Spine Acceleration	g	82	31
Total Pelvic Force (Sum of Acetabular and Iliac Forces)	N	5525	3166
Maximum Thoracic Rib Deflection	mm	38	23
Maximum Abdominal Rib Deflection	mm	45	18

The struck side doors of the vehicle were 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, NPO-411 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	105	

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SECTION 1
TEST PURPOSE AND PROCEDURE

This side impact test is part of the MY 2019 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract number DTNH22-14-D-00355L. The purpose of this test is to generate comparative side impact performance in a 2019 Kia Niro Hybrid LX 5-door MPV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure date October 2015.

SECTION 2
SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2019 Kia Niro Hybrid LX 5-door MPV. The subject vehicle was towed into the rigid pole at an angle of 75.9° and a velocity of 31.87 km/h. The test was conducted by Applus IDIADA KARCO Engineering, LLC. in Adelanto, California on May 22, 2019. Pre- and post-test photographs of the test vehicle and side impact dummy (SID-IIs) are included in Appendix A of this report.

One Part 572V (SID-IIs) dummy was placed in the driver designated seating position according to instructions specified in the OCWS Side NCAP Pole Laboratory Test Procedure, dated October 2015. Camera locations and other pertinent camera information are included in this report.

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

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

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

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

Measurement Description	Units	Driver ATD (SID-IIs)	
		IARV	Result
Head Injury Criteria (HIC_{36})		1000	213.6
Lower Spine (T12) Resultant Acceleration	g	82	31
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3166
Maximum Thoracic Rib Deflection	mm	38*	23
Maximum Abdominal Rib Deflection	mm	45*	18

**Proposed IARV*

Supplemental restraint information is given below:

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

GENERAL COMMENTS

The struck side doors of the vehicle were jammed shut. There was no separation at the hinges or latches. The remaining doors remained closed and latched. There were no ATD values that exceeded limits. The Left Floor Sill Y channel failed at 30.0 ms and the Driver Seat Track Y channel failed at 35.1 ms. The Right Sill Y, Floorpan at Rear Axle X, and Load Cell Pole #3 Force Y channels failed and no data was collected.

SECTION 3

OCCUPANT AND VEHICLE INFORMATION/DATA SHEETS

Test Vehicle: 2019 Kia Niro Hybrid LX 5-Door MPV NHTSA No. M20194210

Test Program: NCAP Side Pole Impact Test Test Date: 05/22/19

CONVERSION FACTORS

Quantity	Typical Application	Std Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	miles/hr	km/hr	1.609344
Length or Distance	Measurements	in	mm	25.4
Volume	Fuel Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.574
Pressure	Tire Pressures	lbf/in^2	kPa	6.895
Temperature	General Use	^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: 2019 Kia Niro Hybrid LX 5-Door MPV NHTSA No. M20194210

Test Program: NCAP Side Pole Impact Test Test Date: 05/22/19

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	M20194210
Model Year	2019
Make	Kia
Model	Niro Hybrid LX
Body Style	5-Door MPV
VIN	KNDCB3LC2K5242616
Body Color	Runway Red
Odometer Reading (km / mi)	138 / 86
Engine Displacement (L)	1.6
Type / No. of Cylinders	Inline 4
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	6 Speed
Overdrive	Yes
Final Drive	FWD
Roof Rack	Yes
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 Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	Yes
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head/Torso Airbag	No
Rear Pass. Torso Airbag	No
Rear Pass. Torso/Pelvis Airbag	No
Rear Pass. Pelvis Airbag	No
Driver Seat Belt Pretensioner	Yes
Rear Pass. Seat Belt Pretensioner	No
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?	No

DATA FROM CERTIFICATION LABEL

Manufactured By	Kia Motors Corporation
Date of Manufacture	Oct-18
Vehicle Type	MPV

GVWR (kg)	1900
GAWR Front (kg)	1052
GAWR Rear (kg)	908

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity	2	3		5	
Capacity Weight (VCW) (kg)				385.0	*A*
DSC x 68.04 (kg)				340.2	*B*
Cargo Weight (RCLW) (kg)				44.8	*A-B*

VEHICLE SEAT TYPE

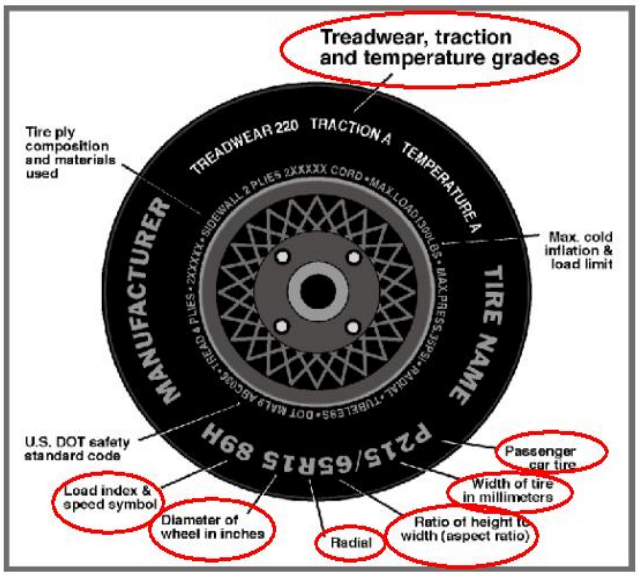
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable w/ Lever	Adjustable w/ Knob
Front Seat	Yes						Yes
Rear or Second Row Seat			Yes			Yes	
Third Row Seat							

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2019 Kia Niro Hybrid LX 5-Door MPV NHTSA No. M20194210

Test Program: NCAP Side Pole Impact Test Test Date: 05/22/19



Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	250	250
Recommended Tire Size	205/60R16	205/60R16
Tire Size on Vehicle	205/60R16	205/60R16
Tire Manufacturer	Michelin	Michelin
Tire Model	Energy Saver A/S	Energy Saver A/S
Treadware	480	480
Traction Grade	A	A
Temperature Grade	A	A
Tire Plies Sidewall	1 Polyester	1 Polyester
Tire Plies Body	1 Polyester, 2 Steel, 1 Polyamide	1 Polyester, 2 Steel, 1 Polyamide
Load Index/Speed Symbol	92H	92H
Tire Material	Polyester, Steel, Polyamide	Polyester, Steel, Polyamide
DOT Safety Code Left	B37R 04MX 5317	B37R 04MX 5317
DOT Safety Code Right	B37R 04MX 5317	B37R 04MX 5317

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2019 Kia Niro Hybrid LX 5-Door MPV NHTSA No. M20194210

Test Program: NCAP Side Pole Impact Test Test Date: 05/22/19

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	250	250	250	250
Tire Placard	kPa	250	250	250	250
Owner's Manual	kPa	250	250	250	250
As Tested	kPa	250	250	250	250

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	431.5	290.5		456.0	333.0		450.5	339.5	
Right	kg	431.5	270.0		427.5	294.0		430.0	297.0	
Ratio	%	60.6%	39.4%	100.0%	58.5%	41.5%	100.0%	58.0%	42.0%	100.0%
Total	kg	863.0	560.5	1423.5	883.5	627.0	1510.5	880.5	636.5	1517.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1423.5	A
Actual Weight of 1 P572V ATD Used	kg	49.0	B
Rated Cargo/Luggage Wt (RCLW)	kg	44.8	C
Calculated Vehicle Target Wt (TVTW)	kg	1517.3	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)*	°	-0.3	0.0	0.2	Yes
Front Passenger Sill Angle (front-to-rear)*	°	-0.5	-0.3	0.2	Yes
Front Bumper-Line Angle (left-to-right)**	°	0.0	-0.1	-0.1	Yes
Rear Bumper-Line Angle (left-to-right)**	°	0.0	0.0	-0.5	Yes
Vehicle CG (Aft of Front Axle)	mm	1062	1120	1132	
Vehicle CG (Left (+)/Right (-) from Longitudinal Centerline)	mm	11	35	32	

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

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

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2019 Kia Niro Hybrid LX 5-Door MPV NHTSA No. M20194210

Test Program: NCAP Side Pole Impact Test Test Date: 05/22/19

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Trunk Trim	6.0
Ballast / Equipment Added	44.0

Test Height Adjustable Setting (If Applicable)	

DATA SHEET NO. 2

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

Test Vehicle: 2019 Kia Niro Hybrid LX 5-Door MPV NHTSA No. M20194210

Test Program: NCAP Side Pole Impact Test Test Date: 05/22/19

SEAT POSITIONING

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

SCRL ANGLE RANGE

Seat	SCRL (°)		
	Max	Min	Mid
Driver Seat	3.0	0.0	1.5
Front Passenger Seat	3.0	0.0	1.5
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	3.0	191	Max			
			Mid	178	185	191
			Min			
Front Passenger Seat	3.0	587	Max			
			Mid	569	578	587
			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: 2019 Kia Niro Hybrid LX 5-Door MPV NHTSA No. M20194210

Test Program: NCAP Side Pole Impact Test Test Date: 05/22/19

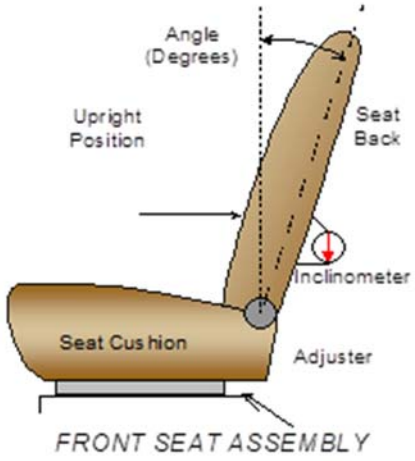
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position From Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	255	63	0	0
Front Passenger Seat	255	63	0	0
Front Center Seat				
Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed	Fixed

*Detent zero (0) is the forward most detent

SEAT BACK ADJUSTMENT

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



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degree	Detent*
Driver Seat w/Seated Dummy	59.9	19	7.9	2
Front Passenger Seat	59.3	19	7.9	2
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: 2019 Kia Niro Hybrid LX 5-Door MPV NHTSA No. M20194210

Test Program: NCAP Side Pole Impact Test Test Date: 05/22/19

SEAT BELT ANCHORAGE ADJUSTMENT

Seat belt anchorages are adjusted in accordance with the information provided by the manufacturer on Form No. 1. The positions are marked H, M3, M2, …, L from top to bottom.

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

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	6	Lowest

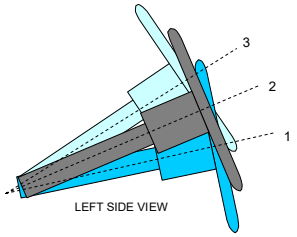
Test Vehicle: 2019 Kia Niro Hybrid LX 5-Door MPV NHTSA No. M20194210

Test Program: NCAP Side Pole Impact Test Test Date: 05/22/19

STEERING COLUMN ADJUSTMENT

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

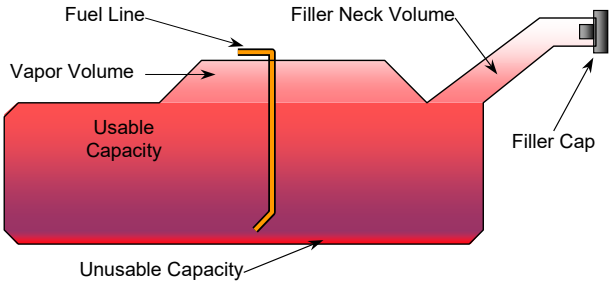
	Degrees	Fore-Aft Position (mm)
Lowermost - Position 1	22.7	95
Geometric Center - Position 2	25.2	119
Uppermost - Position 3	27.7	143
Telescoping Steering Wheel Travel		48
Test Position	25.2	119



STEERING COLUMN ASSEMBLY

FUEL PUMP

The vehicle is equipped with an electronic fuel pump. The fuel pump operates when the engine system is normally operating.



VEHICLE FUEL TANK ASSEMBLY

FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	45.00
Usable Capacity of "Optional Tank" (see Form No. 1)	
Usable Capacity of "Standard Tank" (see Owner's Manual)	45.00
Usable Capacity of "Optional Tank" (see Owner's Manual)	
93% of Usable Capacity	41.85
Actual amount of Solvent Used in Test	41.86
1/3 of Usable Capacity	15.00

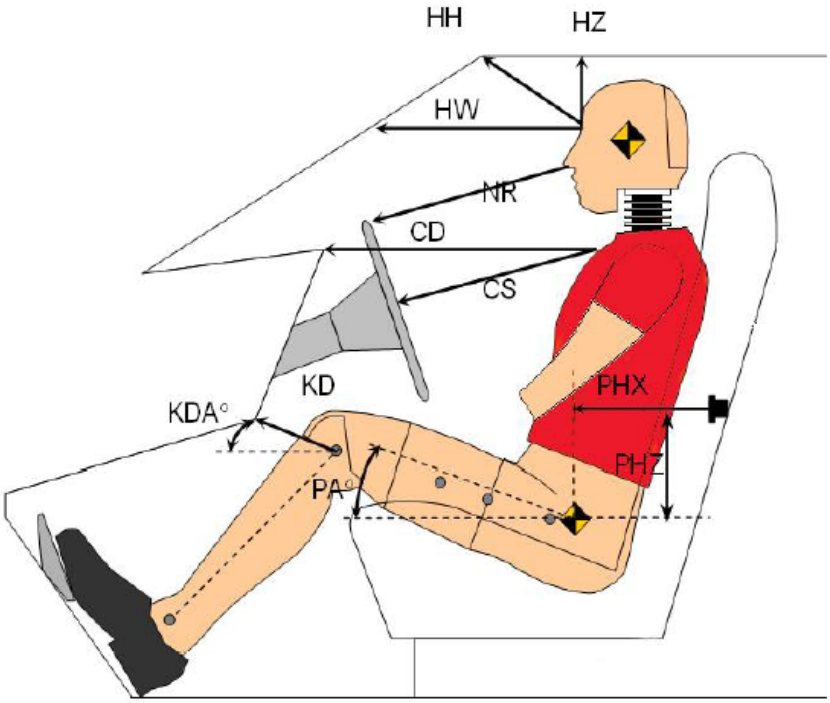
Is the Actual Amount of Solvent Used in the test equal to 93% ± 1% of the Usable Capacity stated in the Form No. 1? ☒ **Yes** ☐ **No**

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2019 Kia Niro Hybrid LX 5-Door MPV NHTSA No. M20194210

Test Program: NCAP Side Pole Impact Test Test Date: 05/22/19



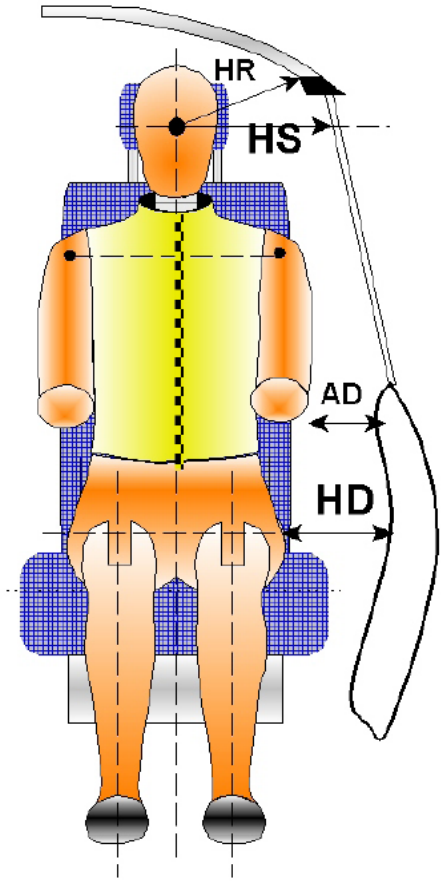
Driver Code	Description	Driver	
		Length (mm)	Angle (º)
HH	Head to Header	308	
HW	Head to Windshield	629	
HZ	Head to Roof	215	
NR	Nose to Rim	239	
CD	Chest to Dash	426	
CS	Chest to Steering Wheel	180	
KD(L)/KDA(L)°	Left Knee to Dash	157	35.4
KD(R)/KDA(R)°	Right Knee to Dash	126	35.7
PAX°	Pelvic Tilt Angle (x-axis)		19.1
PAY°	Pelvic Tilt Angle (y-axis)		0.3
PHX	Hip Point to Striker (x-axis)	349	
PHZ	Hip Point to Striker (z-axis)	242	

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2019 Kia Niro Hybrid LX 5-Door MPV NHTSA No. M20194210

Test Program: NCAP Side Pole Impact Test Test Date: 05/22/19



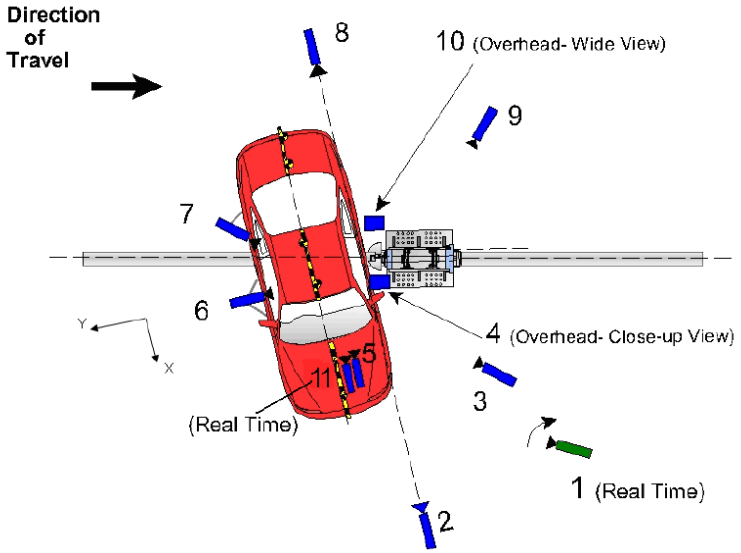
Code	Measurement Description	Units	Driver
HR	Head to Side Header	mm	273
HS	Head to Side Window	mm	393
AD	Arm to Door	mm	186
HD	Hip Point to Door	mm	176

DATA SHEET NO. 5

CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2019 Kia Niro Hybrid LX 5-Door MPV NHTSA No. M20194210

Test Program: NCAP Side Pole Impact Test Test Date: 05/22/19



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

Camera No.	View	Coordinates (m)			Lens (mm)	Film Speed (fps)
		X*	Y*	Z*		
1	Real Time Pan View of Impact	8.89	46.57	-3.04		30
2	Front Ground Level - Impact View	8.34	-0.05	-0.93	24	1000
3	Impact Side 45° - Forward Pole View	4.10	-2.15	-1.15	8.5	1000
4	Overhead Close-Up View of Impact	0.00	0.00	-5.79	12.5	1000
5	On-Board - Dummy Front View	1.20	0.52	-1.34	8.5	1000
6	On-Board - Dummy Side View	1.21	0.49	-1.32	8.5	1000
7	On-Board - Dummy Rear Oblique View	-0.03	1.64	-1.08	8.5	1000
8	Rear Ground Level - Impact View	-6.12	-6.23	-0.96	24	1000
9	Impact Side 45° - Rearward Pole View	-8.02	0.04	-1.01	35	1000
10	Overhead Wide View of Impact	-0.06	0.22	-5.79	14	1000
11	Real Time Dummy Front View	-0.93	1.61	-1.16		30

*All measurements accurate to ±6 mm

INSTRUMENTATION

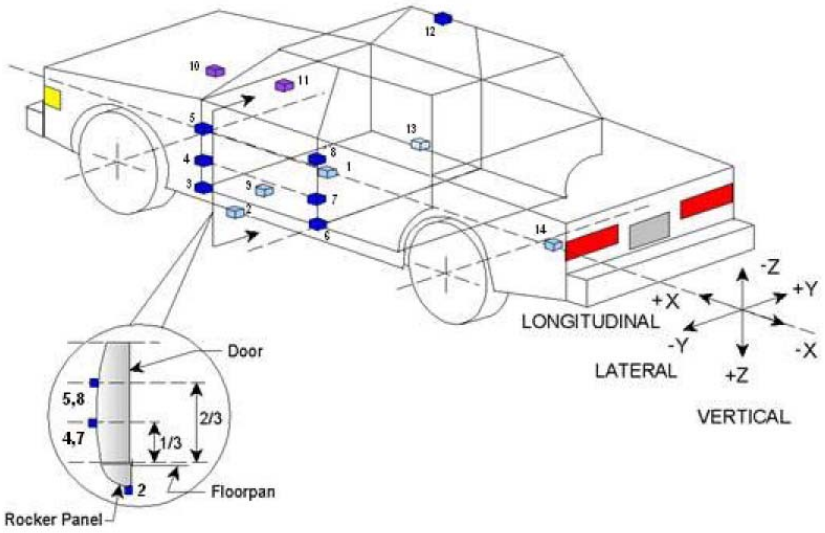
Driver Dummy Channels	19
Vehicle Structure Accelerometers	18
Pole Load Cells	8
Total	45

DATA SHEET NO. 6

TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2019 Kia Niro Hybrid LX 5-Door MPV NHTSA No. M20194210

Test Program: NCAP Side Pole Impact Test Test Date: 05/22/19



Loc. No.	Sensor Description	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	1880	0	-380
2	Left Floor Sill	2600	-735	-195
3	A-Pillar Sill	3010	-820	-450
4	A-Pillar Low	3010	-810	-650
5	A-Pillar Mid	3010	-800	-780
6	B-Pillar Sill	1900	-730	-410
7	B-Pillar Low	1900	-720	-600
8	B-Pillar Mid	1900	-710	-920
9	Driver Seat Track	2210	-580	-350
10	Engine Top	3640	370	-880
11	Firewall	3220	450	-790
12	Right Roof	2030	680	-1550
13	Right Floor Sill	2520	670	-490
14	Rear Floorpan	1020	0	-671

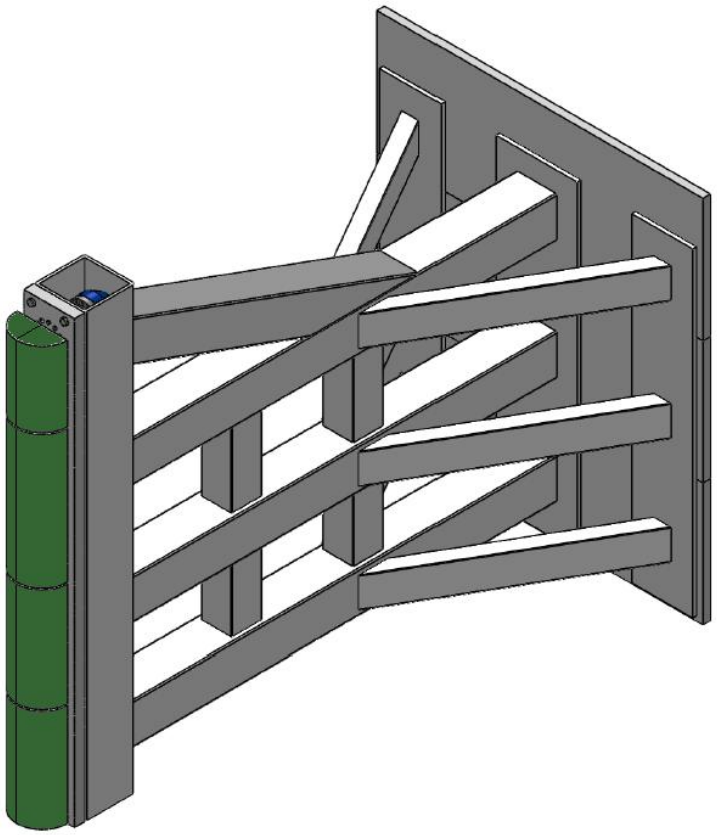
Reference: X – Rear surface of vehicle (+ forward)
Y – Vehicle centerline (+ to right)
Z – Ground plane (+ down)

DATA SHEET NO. 7

RIGID POLE LOAD CELL DATA

Test Vehicle: 2019 Kia Niro Hybrid LX 5-Door MPV NHTSA No. M20194210

Test Program: NCAP Side Pole Impact Test Test Date: 05/22/19



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

DATA SHEET NO. 8

POST-TEST OBSERVATIONS

Test Vehicle: 2019 Kia Niro Hybrid LX 5-Door MPV NHTSA No. M20194210

Test Program: NCAP Side Pole Impact Test Test Date: 05/22/19

TEST DUMMY INFORMATION AND CONTACT POINTS

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

POST-TEST DOOR PERFORMANCE

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

POST-TEST SEAT PERFORMANCE

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

DATA SHEET NO. 8 … (CONTINUED)

POST-TEST OBSERVATIONS

Test Vehicle: 2019 Kia Niro Hybrid LX 5-Door MPV NHTSA No. M20194210

Test Program: NCAP Side Pole Impact Test Test Date: 05/22/19

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No separation occurred
Sill Separation	No separation occurred
Windshield Damage	Broken
Side Window Damage	Left front window broken
Other Notable Effects	None

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

IMPACT POINT LOCATION DATA

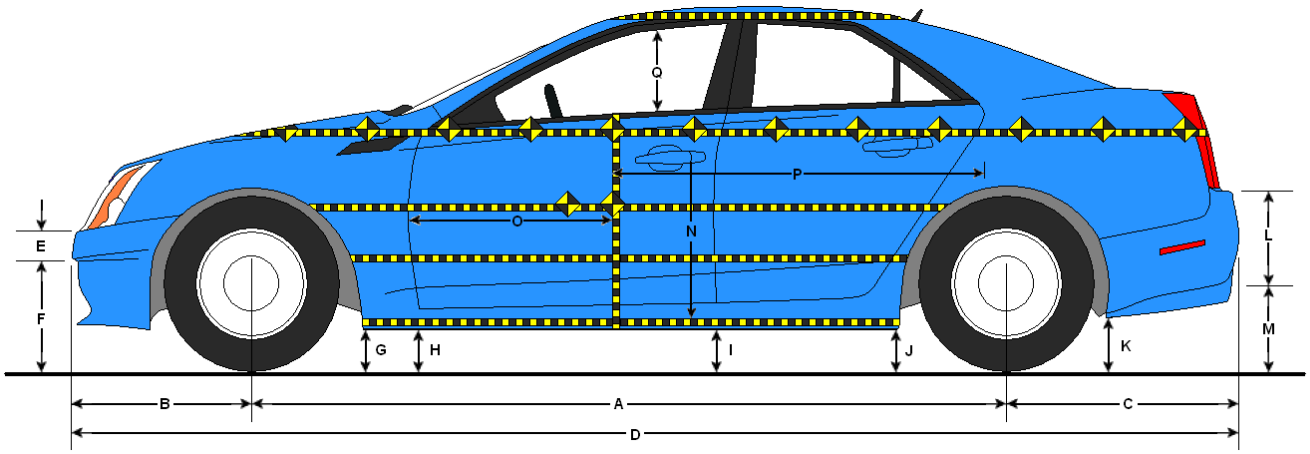
Measured Parameter	Units	Tolerance	Value
Vertical Impact Reference Line (Aft of Front Axle)(Intended Impact Point)	mm		1072
Actual Impact Point (Aft of Front Axle)	mm		1086
Horizontal Offset (+ forward / - rearward)	mm	± 38 of Intended Impact Point	-14
Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion	°	75 ± 3	75.9
Trap No. 1 Velocity (Primary)	km/h	31.4 to 33.0	31.87
Trap No. 2 Velocity (Redundant)	km/h	31.4 to 33.0	31.87

DATA SHEET NO. 9

TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2019 Kia Niro Hybrid LX 5-Door MPV NHTSA No. M20194210

Test Program: NCAP Side Pole Impact Test Test Date: 05/22/19



LEFT SIDE VIEW

All measurements in mm with tolerance of ± 3mm

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

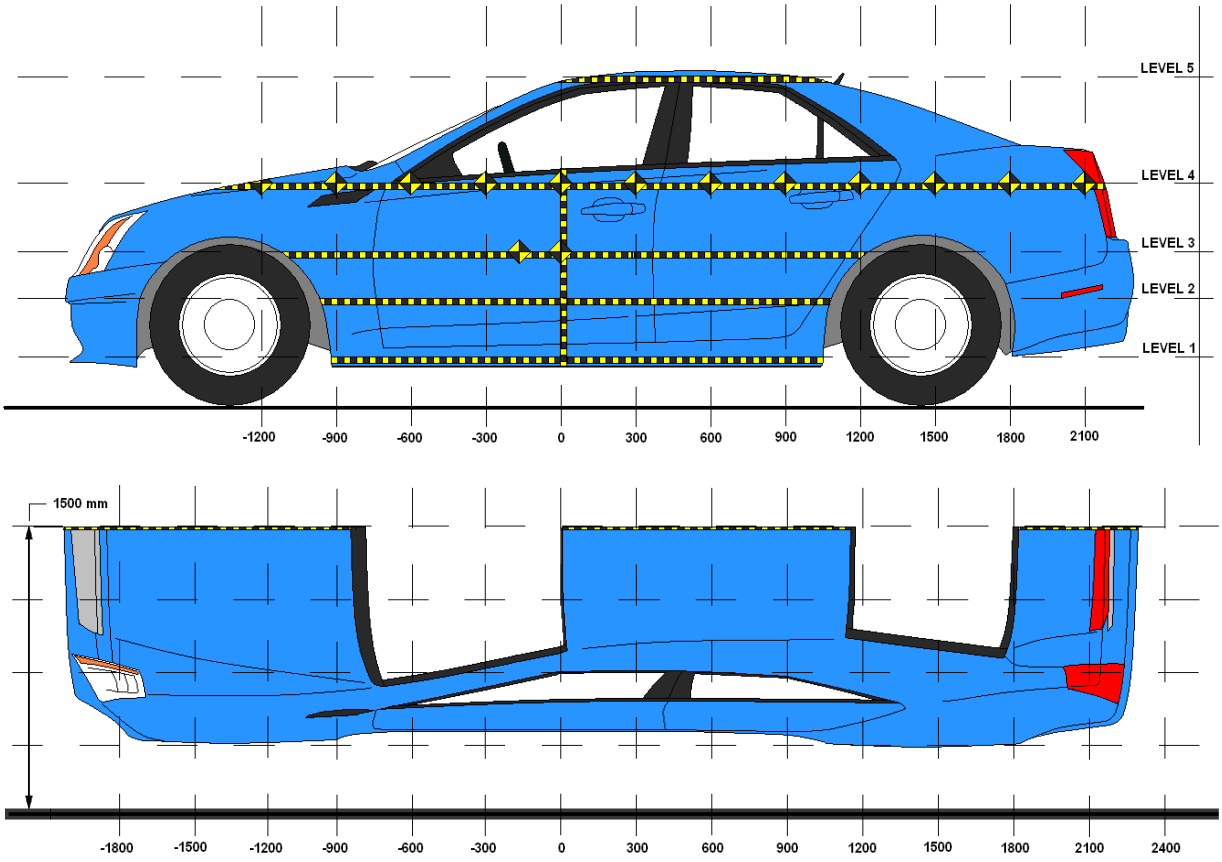
Code	Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2699	2669	-30
B	Front Axle to FSOV	868	874	6
C	Rear Axle to RSOV	782	785	3
D	Total Length at Centerline	4349	4327	-22
E	Front Bumper Thickness	129	129	0
F	Fromt Bumper Bottom to Ground	461	458	-3
G	Sill Height at Front Wheel Well	259	290	31
H	Sill Height at Front Door Leading Edge	255	277	22
I	Sill Height at B-Pillar	277	266	-11
J1	Sill Height at Rear Wheel Well	273	287	14
J2	Pinch Weld Height at Rear Wheel Well	224	230	6
K	Sill Height Aft of Rear Wheel Well	342	338	-4
L	Rear Bumper Thickness	210	210	0
M	Rear Bumper Bottom to Ground	420	417	-3
N	Sill Height to Bottom of Front Window Sill	703	720	17
O	Front Door Leading Edge to Impact CL	625	564	-61
P	Rear Door Trailing Edge to Impact CL	1502	1423	-79
Q	Front Window Opening	413	412	-1
R	Right Side Length	3153	3160	7
S	Left Side Length	3150	3093	-57
T	Vehicle Width at B-Pillar	1795	1719	-76

DATA SHEET NO. 10

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2019 Kia Niro Hybrid LX 5-Door MPV NHTSA No. M20194210

Test Program: NCAP Side Pole Impact Test Test Date: 05/22/19



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	288	215	0
2	Occupant H-Point	592	275	150
3	Mid-Door	694	288	150
4	Window Sill	986	266	150
5	Window Top	1488	99	150

DATA SHEET NO. 10 … (CONTINUED)

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2019 Kia Niro Hybrid LX 5-Door MPV NHTSA No. M20194210

Test Program: NCAP Side Pole Impact Test Test Date: 05/22/19

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

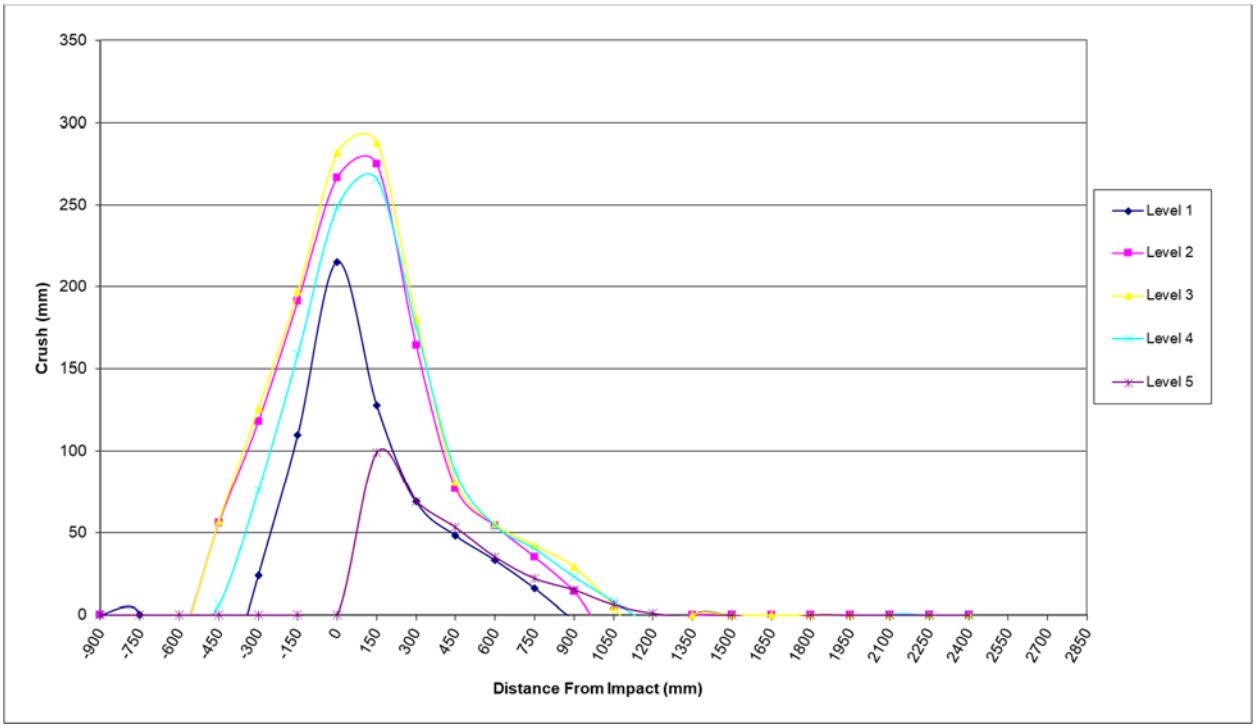
	Pre-Test (mm)					Post-Test (mm)					Difference (mm)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900			605					573					-32		
-750		608	608	701			581	580	676			-27	-28	-25	
-600	644	615	615	701		500	599	598	688		-144	-16	-17	-13	
-450	657	624	619	694		596	680	676	700		-61	56	57	6	
-300	662	627	621	685		686	745	747	761		24	118	126	76	
-150	662	627	621	676		772	818	818	835		110	191	197	159	
0	658	630	621	665		873	897	903	914		215	267	282	249	
150	658	631	621	661	887	786	906	909	927	986	128	275	288	266	99
300	656	632	620	654	892	725	796	800	829	961	69	164	180	175	69
450	657	633	620	649	893	705	710	701	736	946	48	77	81	87	53
600	658	634	621	648	896	691	688	676	702	931	33	54	55	54	35
750	660	635	623	647	898	676	670	665	687	920	16	35	42	40	22
900	660	634	625	648	895	657	648	654	671	910	-3	14	29	23	15
1050	652	628	626	649	897	635	612	631	657	903	-17	-16	5	8	6
1200	641	616	618	650	899	612	610	594	643	900	-29	-6	-24	-7	1
1350				620	904				599	903				-21	-1
1500				656	906				622	906				-34	0
1650				661	912				656	909				-5	-3
1800				667					660					-7	
1950				678					668					-10	
2100															
2250															
2400															
2550															
2700															
2850															

DATA SHEET NO. 10 … (CONTINUED)

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2019 Kia Niro Hybrid LX 5-Door MPV NHTSA No. M20194210

Test Program: NCAP Side Pole Impact Test Test Date: 05/22/19

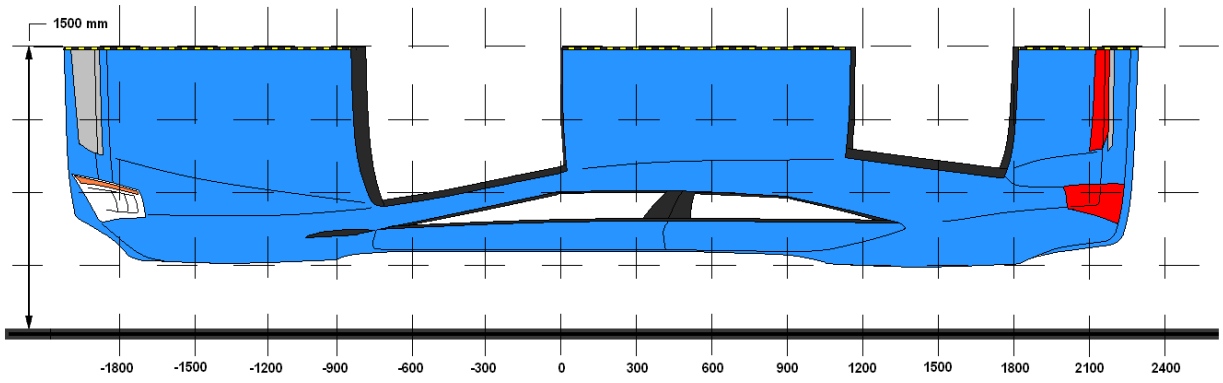


DATA SHEET NO. 11

VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2019 Kia Niro Hybrid LX 5-Door MPV NHTSA No. M20194210

Test Program: NCAP Side Pole Impact Test Test Date: 05/22/19



DPD	Distance From Impact Point (mm)	Level	Pre-Test (mm)	Post-Test (mm)	Crush (mm)
1	1950	4	678	668	-10
2	1350	5	904	903	-1
3	750	3	623	665	42
4	300	3	620	800	180
5	-300	3	621	747	126
6	-900	3	605	573	-32

DATA SHEET NO. 12

FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2019 Kia Niro Hybrid LX 5-Door MPV NHTSA No. M20194210

Test Program: NCAP Side Pole Impact Test Test Date: 05/22/19

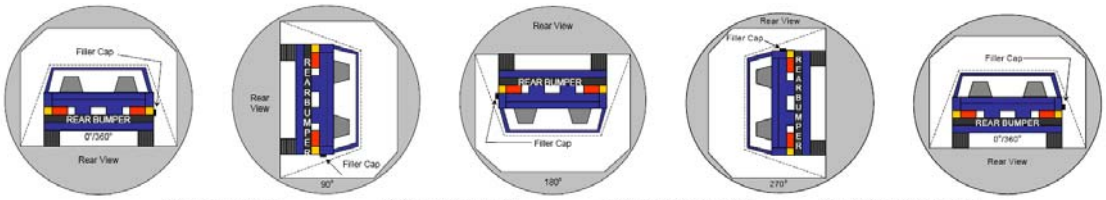
Time of Impact: 21.9° C Test Time: 11:50 AM

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

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

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

Spillage Details: There was no Stoddard solvent spillage.



SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° To 90°	79	300	379
90° To 180°	80	300	380
180° To 270°	81	300	381
270° To 360°	79	300	379

FMVSS 301 SPILLAGE TABLE

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

SOLVENT SPILLAGE LOCATION TABLE

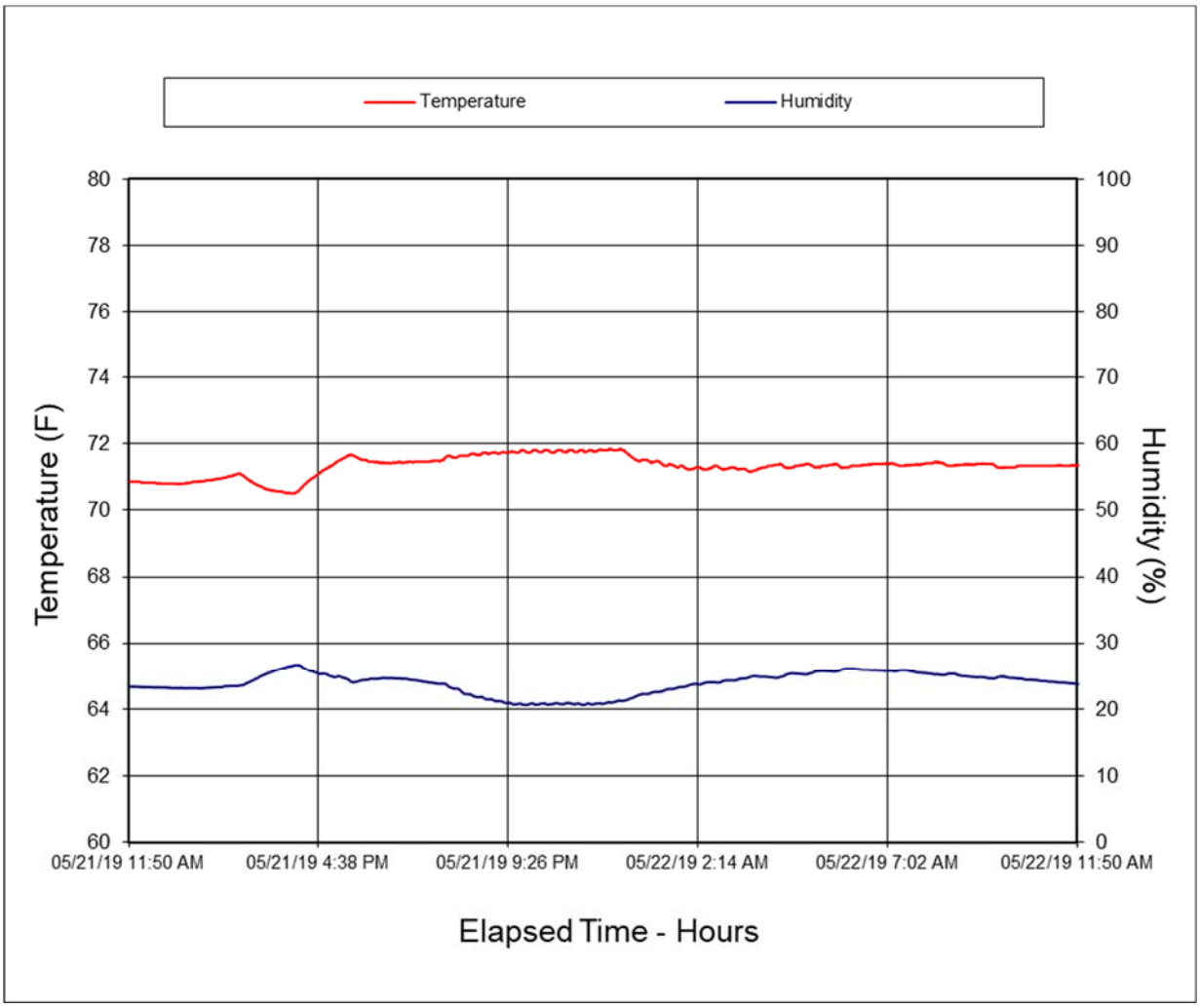
Test Phase	Spillage Location
0° To 90°	No Spillage Occurred
90° To 180°	No Spillage Occurred
180° To 270°	No Spillage Occurred
270° To 360°	No Spillage Occurred

DATA SHEET NO. 13

DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION

Test Vehicle: 2019 Kia Niro Hybrid LX 5-Door MPV NHTSA No. M20194210

Test Program: NCAP Side Pole Impact Test Test Date: 05/22/19



APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

TABLE OF PHOTOGRAPHS … (CONTINUED)

TABLE OF PHOTOGRAPHS … (CONTINUED)

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

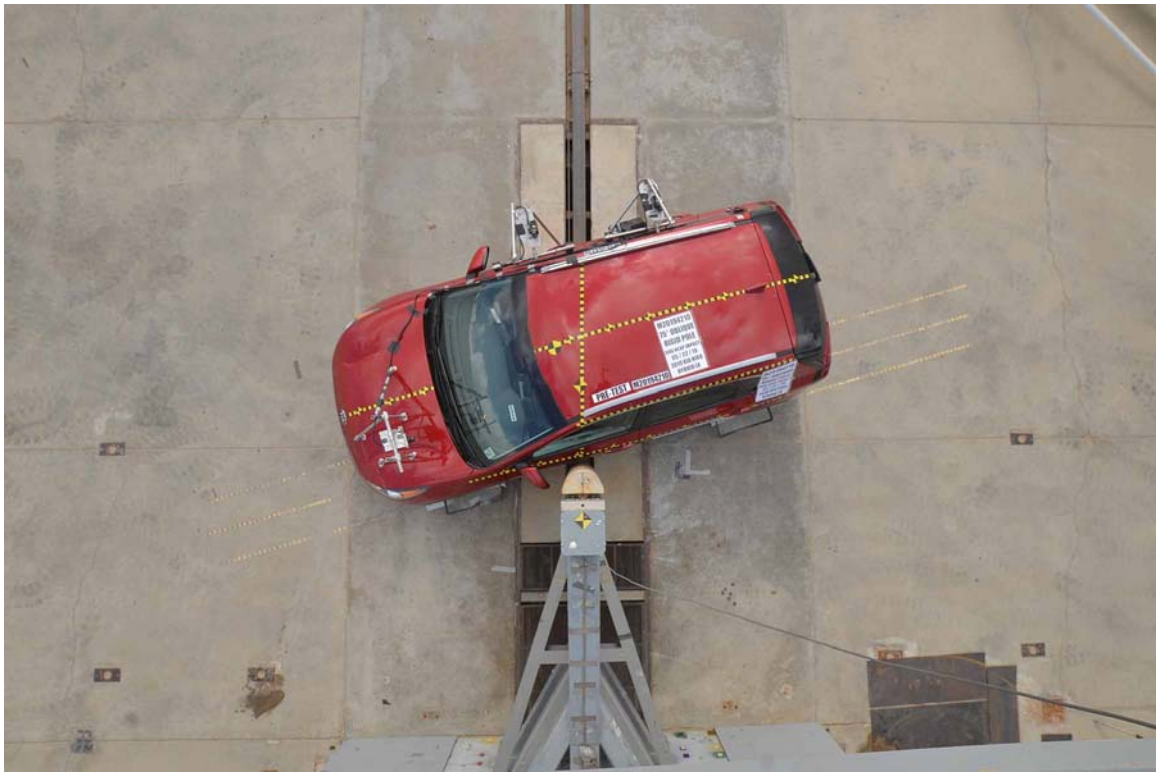


FIGURE 15. Pre-Test Overhead View of Test Area

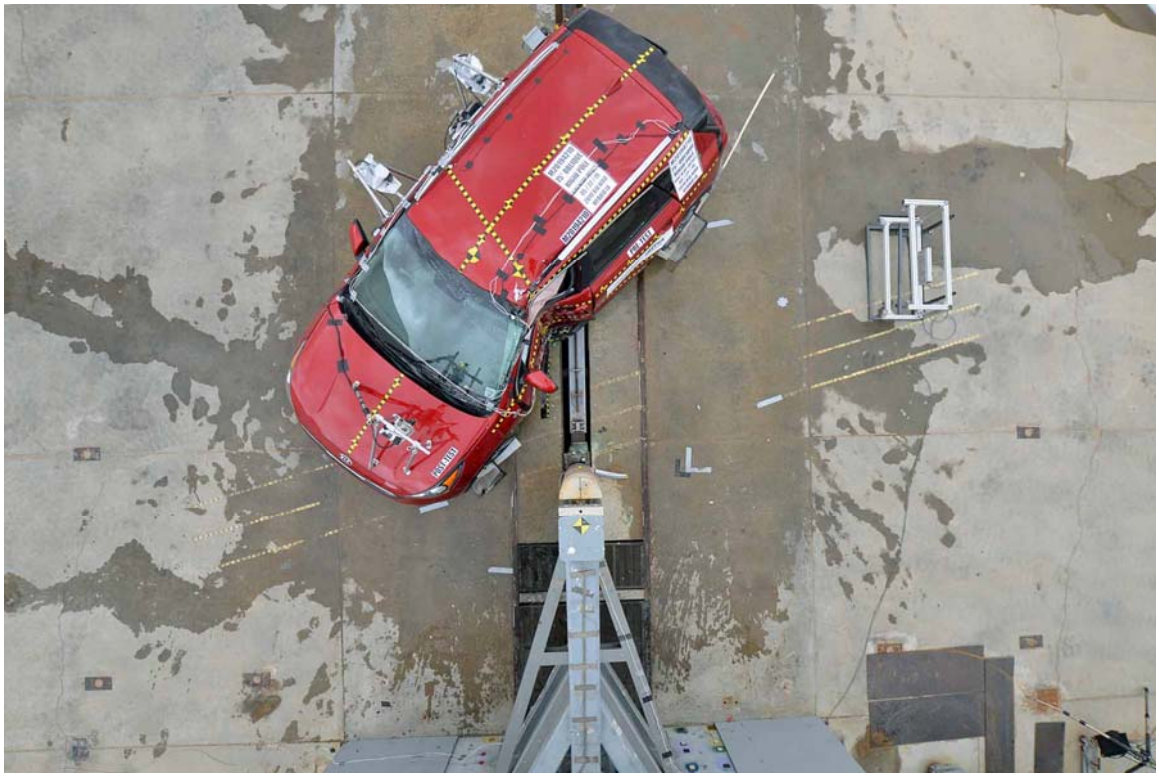


FIGURE 16. Post-Test Overhead View of Test Area

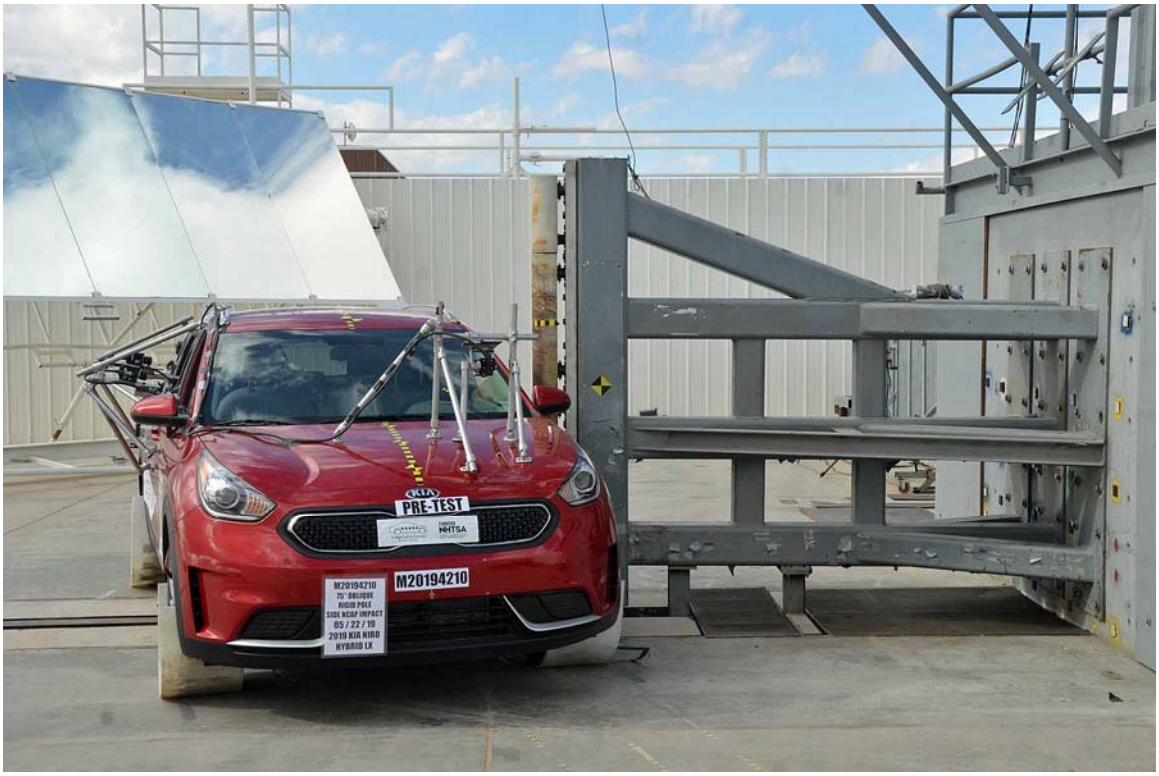


FIGURE 17. Pre-Test Left Side View of Pole Positioned Against Side of Vehicle

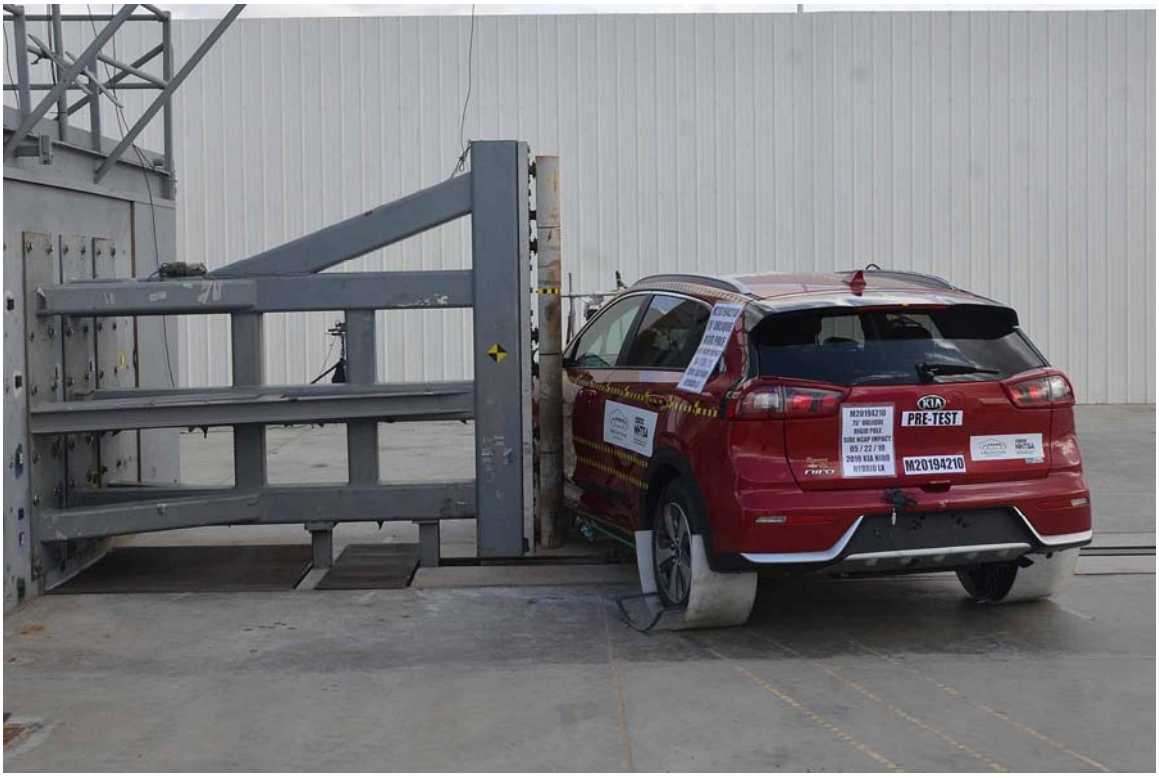


FIGURE 18. Pre-Test Right Side View of Pole Positioned Against Side of Vehicle

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

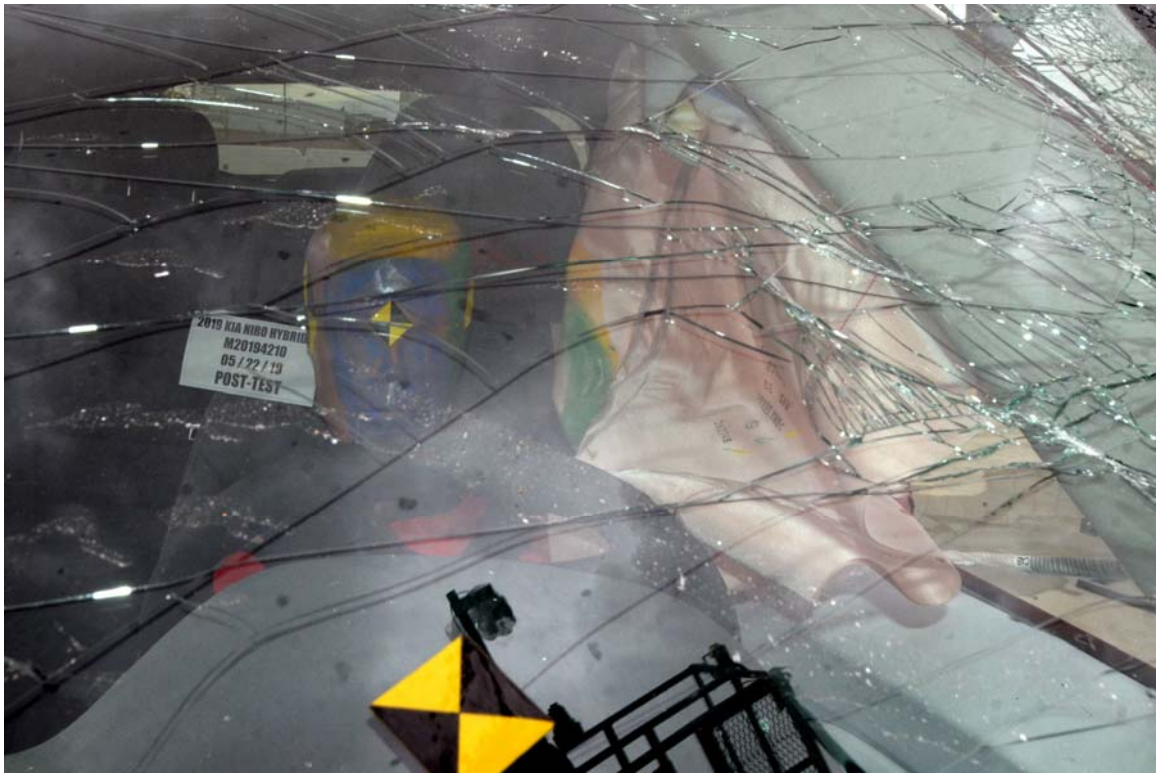


FIGURE 22. Post-Test Front Close-Up View of Dummy

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

Photograph Not Applicable

No Driver Dummy Pelvis Contact with Vehicle Interior

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

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

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

FIGURE 53. Pre-Test View of Fuel Filler Cap or Fuel Filler Neck

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

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

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

FIGURE 57. Pre-Test Pole Barrier Front View

FIGURE 58. Post-Test Pole Barrier Front View

FIGURE 59. Pre-Test Pole Barrier Side View

FIGURE 60. Post-Test Pole Barrier Side View

FIGURE 61. Pre-Test Ballast View

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

FIGURE 63. FMVSS No. 301 Static Rollover 0 Degrees

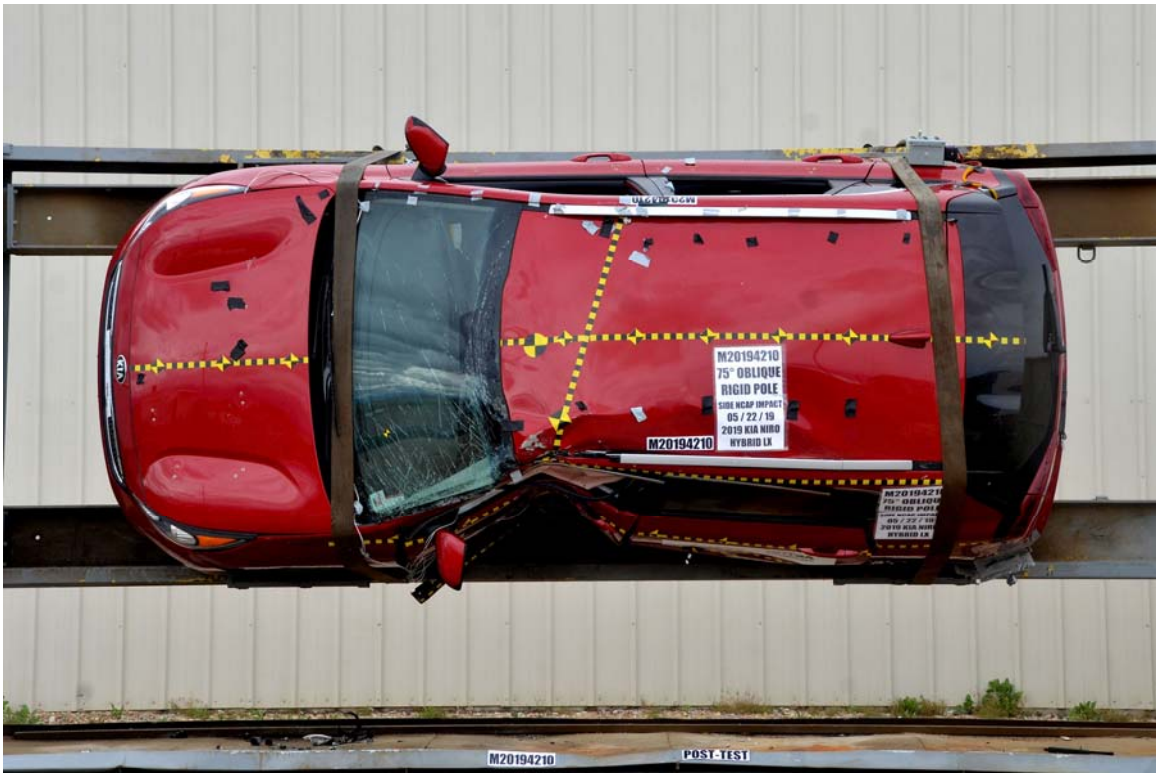


FIGURE 64. FMVSS No. 301 Static Rollover 90 Degrees

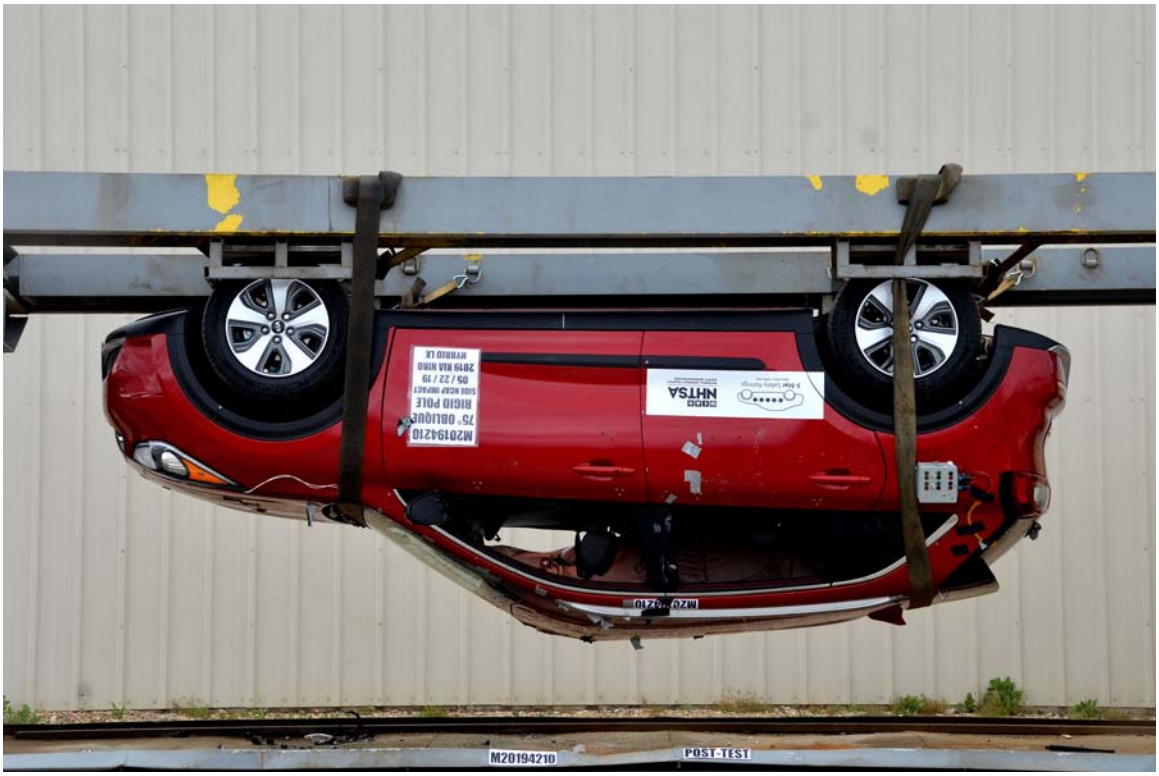


FIGURE 65. FMVSS No. 301 Static Rollover 180 Degrees

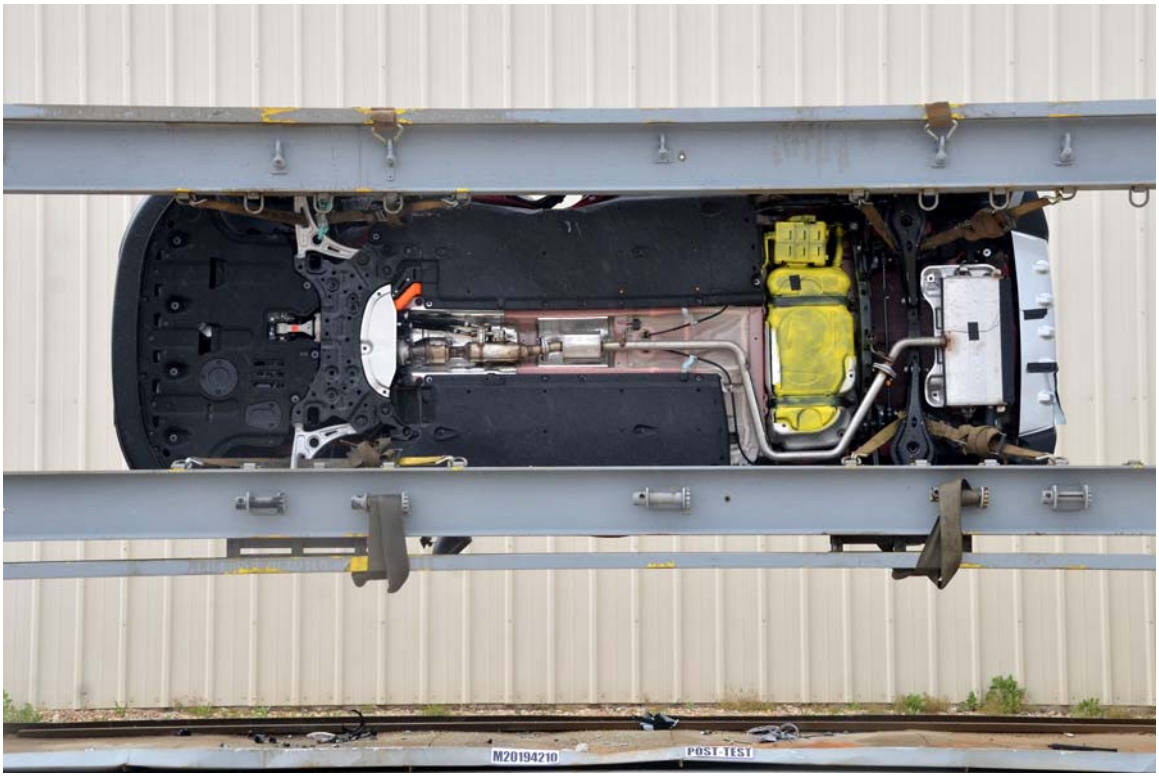
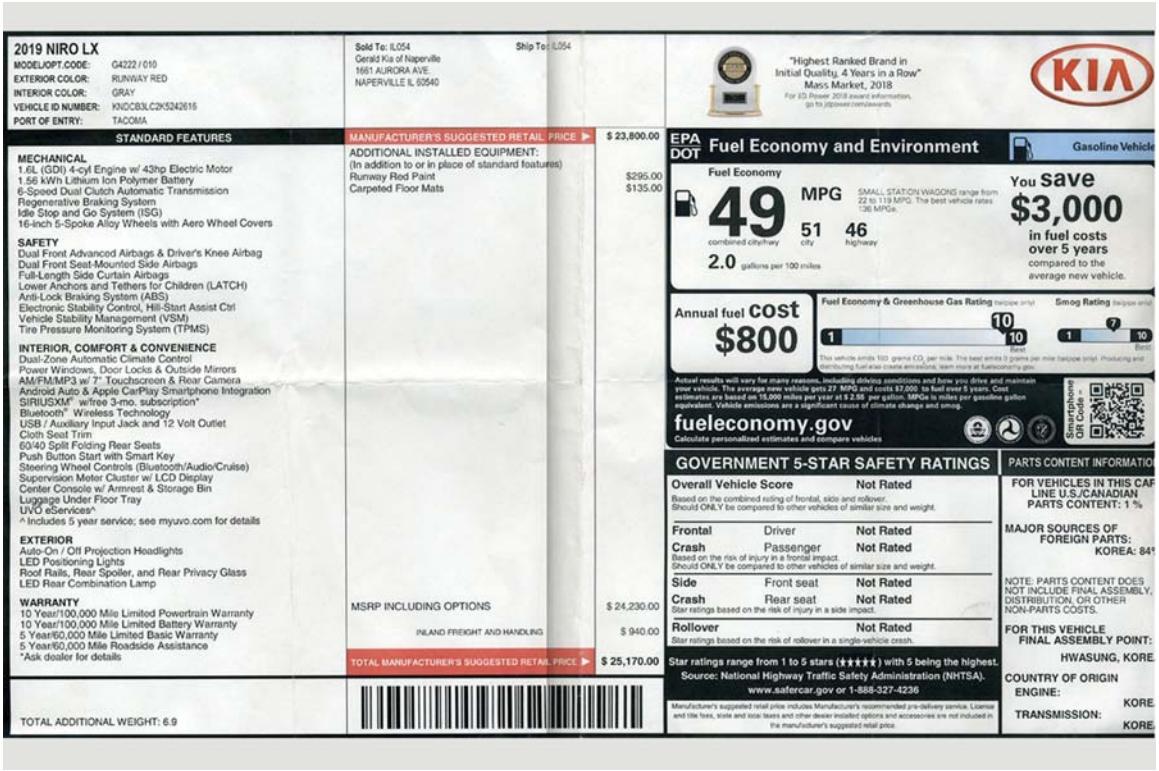


FIGURE 66. FMVSS No. 301 Static Rollover 270 Degrees

FIGURE 67. FMVSS No. 301 Static Rollover 360 Degrees

FIGURE 68. Impact Event



2019 NIRO LX
MODEL/OPT.CODE: G4222 / 010
EXTERIOR COLOR: RUNWAY RED
INTERIOR COLOR: GRAY
VEHICLE ID NUMBER: KNDCB3LC2K5242616
PORT OF ENTRY: TACOMA

Sold To: IL054
Gerald Kia of Naperville
1661 AURORA AVE
NAPERVILLE IL 60540
Ship To: IL054

"Highest Ranked Brand in Initial Quality, 4 Years in a Row" Mass Market, 2018

STANDARD FEATURES

MECHANICAL
1.6L (GDI) 4-cyl Engine w/ 43hp Electric Motor
1.56 kWh Lithium Ion Polymer Battery
6-Speed Dual Clutch Automatic Transmission
Regenerative Braking System
Idle Stop and Go System (ISG)
16-inch 5-Spoke Alloy Wheels with Aero Wheel Covers

SAFETY
Dual Front Advanced Airbags & Driver's Knee Airbag
Dual Front Seat-Mounted Side Airbags
Full-Length Side Curtain Airbags
Lower Anchors and Tethers for Children (LATCH)
Anti-Lock Braking System (ABS)
Electronic Stability Control, Hill-Start Assist Ctrl
Vehicle Stability Management (VSM)
Tire Pressure Monitoring System (TPMS)

INTERIOR, COMFORT & CONVENIENCE
Dual-Zone Automatic Climate Control
Power Windows, Door Locks & Outside Mirrors
AM/FM/MP3 w/ 7" Touchscreen & Rear Camera
Android Auto & Apple CarPlay Smartphone Integration
SIRIUSXM® w/free 3-mo. subscription*
Bluetooth® Wireless Technology
USB / Auxiliary Input Jack and 12 Volt Outlet
Cloth Seat Trim
60/40 Split Folding Rear Seats
Push Button Start with Smart Key
Steering Wheel Controls (Bluetooth/Audio/Cruise)
Supervision Meter Cluster w/ LCD Display
Center Console w/ Armrest & Storage Bin
Luggage Under Floor Tray
UVO eServices^
^ Includes 5 year service; see myuvo.com for details

EXTERIOR
Auto-On / Off Projection Headlights
LED Positioning Lights
Roof Rails, Rear Spoiler, and Rear Privacy Glass
LED Rear Combination Lamp

WARRANTY
10 Year/100,000 Mile Limited Powertrain Warranty
10 Year/100,000 Mile Limited Battery Warranty
5 Year/60,000 Mile Limited Basic Warranty
5 Year/60,000 Mile Roadside Assistance
*Ask dealer for details

TOTAL ADDITIONAL WEIGHT: 6.9

MANUFACTURER'S SUGGESTED RETAIL PRICE ▶	$ 23,800.00
ADDITIONAL INSTALLED EQUIPMENT: (In addition to or in place of standard features)	
Runway Red Paint	$295.00
Carpeted Floor Mats	$135.00
MSRP INCLUDING OPTIONS	$ 24,230.00
INLAND FREIGHT AND HANDLING	$ 940.00
TOTAL MANUFACTURER'S SUGGESTED RETAIL PRICE ▶	$ 25,170.00

EPA DOT Fuel Economy and Environment — Gasoline Vehicle

Fuel Economy
49 MPG combined city/hwy
51 city
46 highway
2.0 gallons per 100 miles
SMALL STATION WAGONS range from 22 to 119 MPG. The best vehicle rates 136 MPGe.

You Save $3,000 in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost $800

Fuel Economy & Greenhouse Gas Rating (1 Worst, 10 Best)
Smog Rating (1 Worst, 7, 10 Best)

This vehicle emits 150 grams CO2 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 27 MPG and costs $7,000 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at $ 2.55 per gallon. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fueleconomy.gov
Calculate personalized estimates and compare vehicles

Smartphone QR Code

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score: Not Rated
Based on the combined rating of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight.

Frontal Crash	Driver	Not Rated
	Passenger	Not Rated
Side Crash	Front seat	Not Rated
	Rear seat	Not Rated
Rollover		Not Rated

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

Manufacturer's suggested retail price includes Manufacturer's recommended pre-delivery service. License and title fees, state and local taxes and other dealer installed options and accessories are not included in the manufacturer's suggested retail price.

PARTS CONTENT INFORMATIO

FOR VEHICLES IN THIS CAR LINE U.S./CANADIAN PARTS CONTENT: 1 %

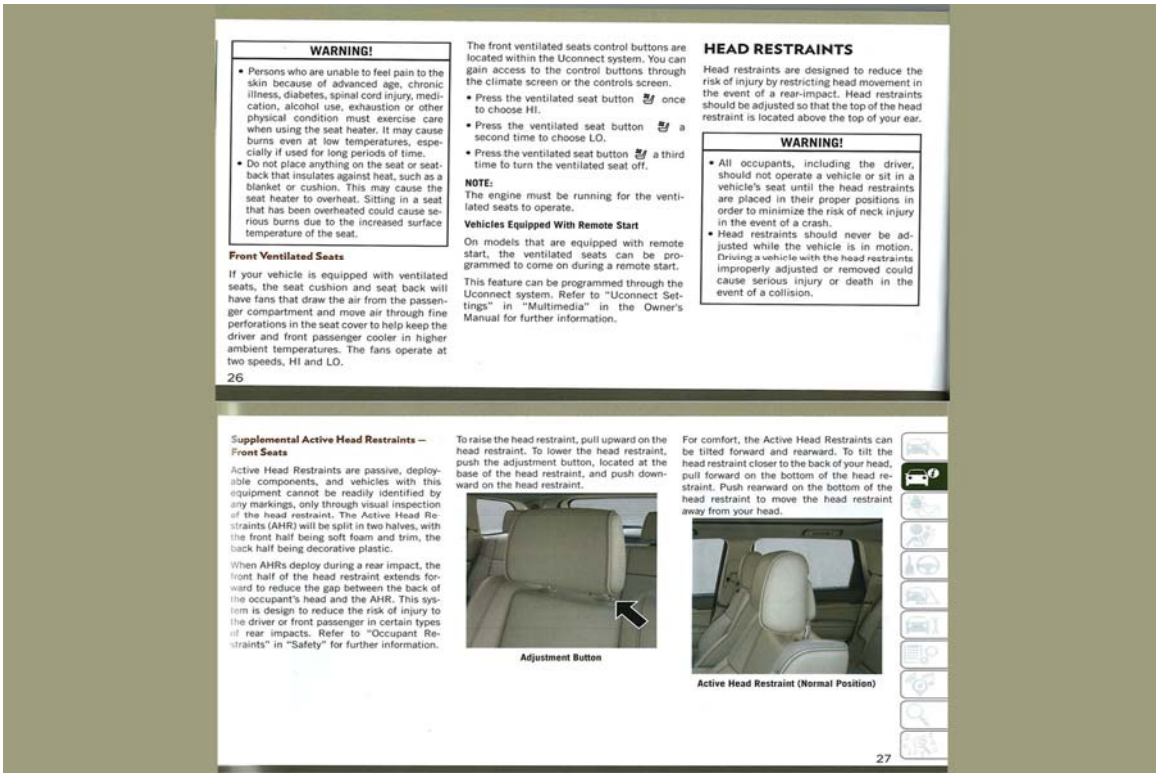
MAJOR SOURCES OF FOREIGN PARTS: KOREA: 84

NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.

FOR THIS VEHICLE FINAL ASSEMBLY POINT: HWASUNG, KORE

COUNTRY OF ORIGIN
ENGINE: KORE
TRANSMISSION: KORE

FIGURE 69. Monroney Label



WARNING!

- Persons who are unable to feel pain to the skin because of advanced age, chronic illness, diabetes, spinal cord injury, medication, alcohol use, exhaustion or other physical condition must exercise care when using the seat heater. It may cause burns even at low temperatures, especially if used for long periods of time.
- Do not place anything on the seat or seatback that insulates against heat, such as a blanket or cushion. This may cause the seat heater to overheat. Sitting in a seat that has been overheated could cause serious burns due to the increased surface temperature of the seat.

Front Ventilated Seats

If your vehicle is equipped with ventilated seats, the seat cushion and seat back will have fans that draw the air from the passenger compartment and move air through fine perforations in the seat cover to help keep the driver and front passenger cooler in higher ambient temperatures. The fans operate at two speeds, HI and LO.

The front ventilated seats control buttons are located within the Uconnect system. You can gain access to the control buttons through the climate screen or the controls screen.

- Press the ventilated seat button once to choose HI.
- Press the ventilated seat button a second time to choose LO.
- Press the ventilated seat button a third time to turn the ventilated seat off.

NOTE:
The engine must be running for the ventilated seats to operate.

Vehicles Equipped With Remote Start

On models that are equipped with remote start, the ventilated seats can be programmed to come on during a remote start.

This feature can be programmed through the Uconnect system. Refer to "Uconnect Settings" in "Multimedia" in the Owner's Manual for further information.

HEAD RESTRAINTS

Head restraints are designed to reduce the risk of injury by restricting head movement in the event of a rear-impact. Head restraints should be adjusted so that the top of the head restraint is located above the top of your ear.

WARNING!

- All occupants, including the driver, should not operate a vehicle or sit in a vehicle's seat until the head restraints are placed in their proper positions in order to minimize the risk of neck injury in the event of a crash.
- Head restraints should never be adjusted while the vehicle is in motion. Driving a vehicle with the head restraints improperly adjusted or removed could cause serious injury or death in the event of a collision.

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Supplemental Active Head Restraints — Front Seats

Active Head Restraints are passive, deployable components, and vehicles with this equipment cannot be readily identified by any markings, only through visual inspection of the head restraint. The Active Head Restraints (AHR) will be split in two halves, with the front half being soft foam and trim, the back half being decorative plastic.

When AHRs deploy during a rear impact, the front half of the head restraint extends forward to reduce the gap between the back of the occupant's head and the AHR. This system is design to reduce the risk of injury to the driver or front passenger in certain types of rear impacts. Refer to "Occupant Restraints" in "Safety" for further information.

To raise the head restraint, pull upward on the head restraint. To lower the head restraint, push the adjustment button, located at the base of the head restraint, and push downward on the head restraint.

Adjustment Button

For comfort, the Active Head Restraints can be tilted forward and rearward. To tilt the head restraint closer to the back of your head, pull forward on the bottom of the head restraint. Push rearward on the bottom of the head restraint to move the head restraint away from your head.

Active Head Restraint (Normal Position)

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FIGURE 70. Head Restraint Use and Adjustment

FIGURE 71. Post-Test View of Shattered Vehicle Inner Door Panel

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)

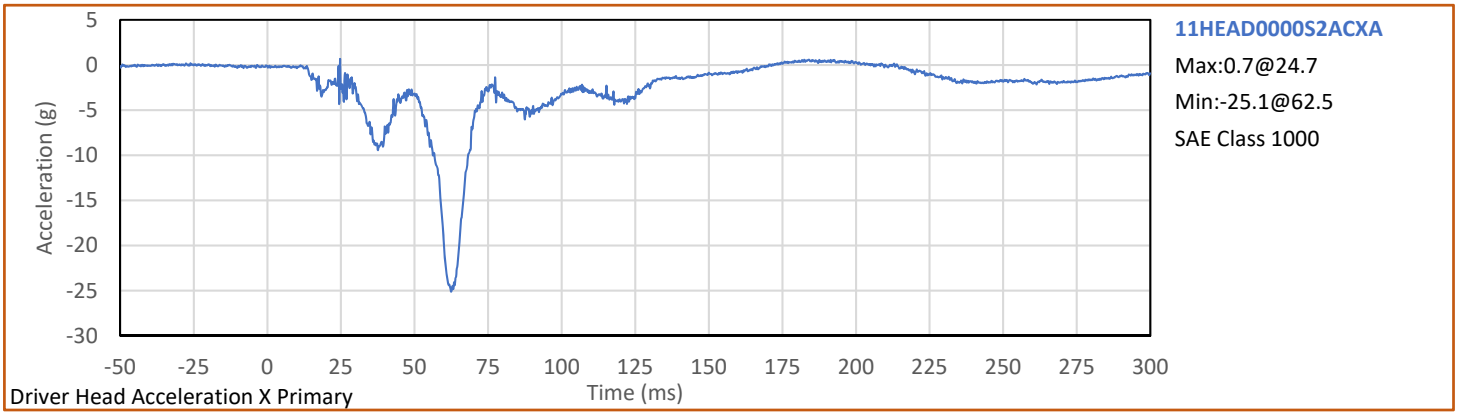
Load Cell Pole Barrier #4 Force (Y)

Load Cell Pole Barrier #5 Force (Y)

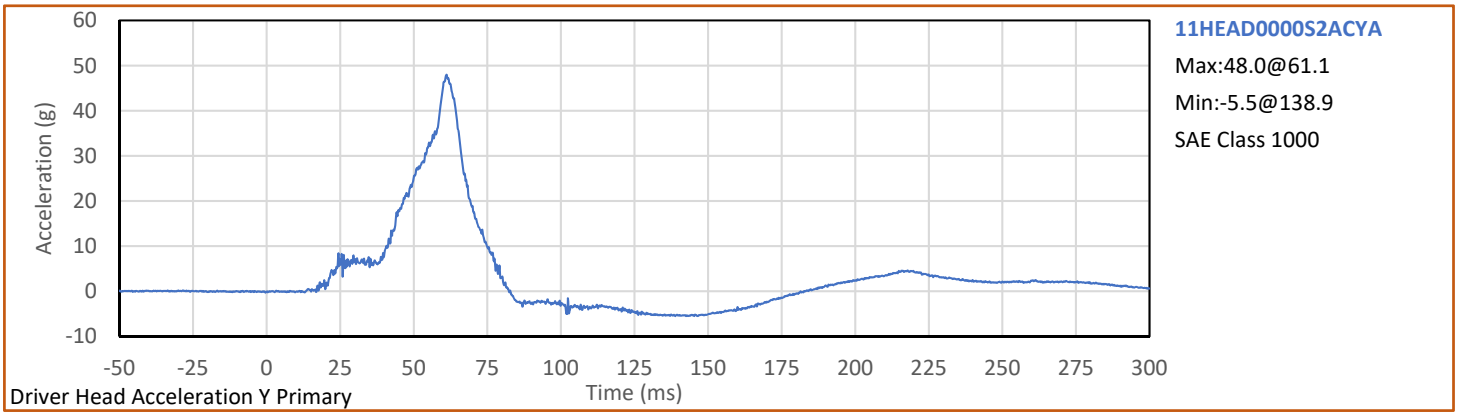
Load Cell Pole Barrier #6 Force (Y)

Load Cell Pole Barrier #7 Force (Y)

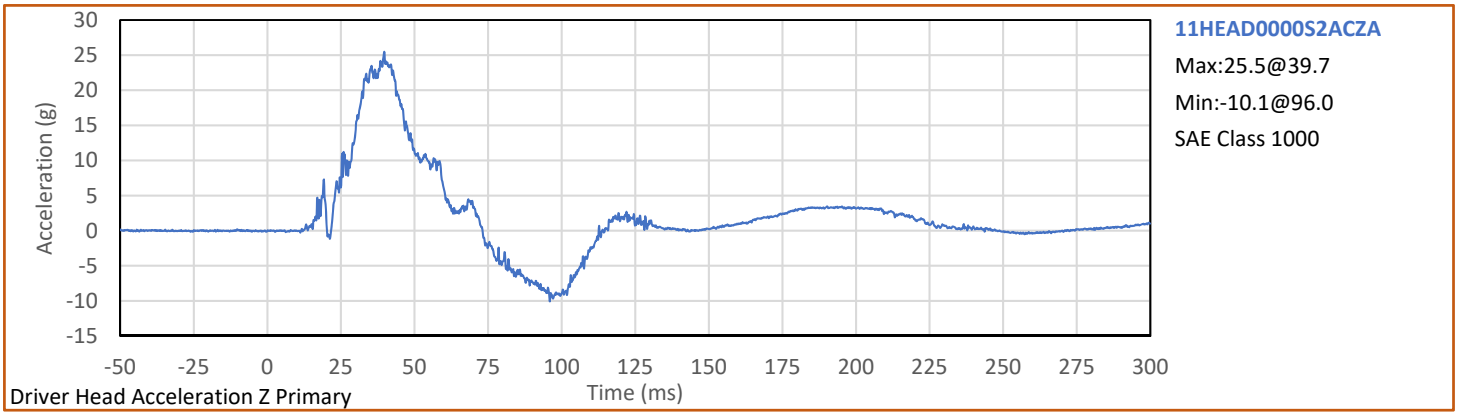
Load Cell Pole Barrier #8 Force (Y)



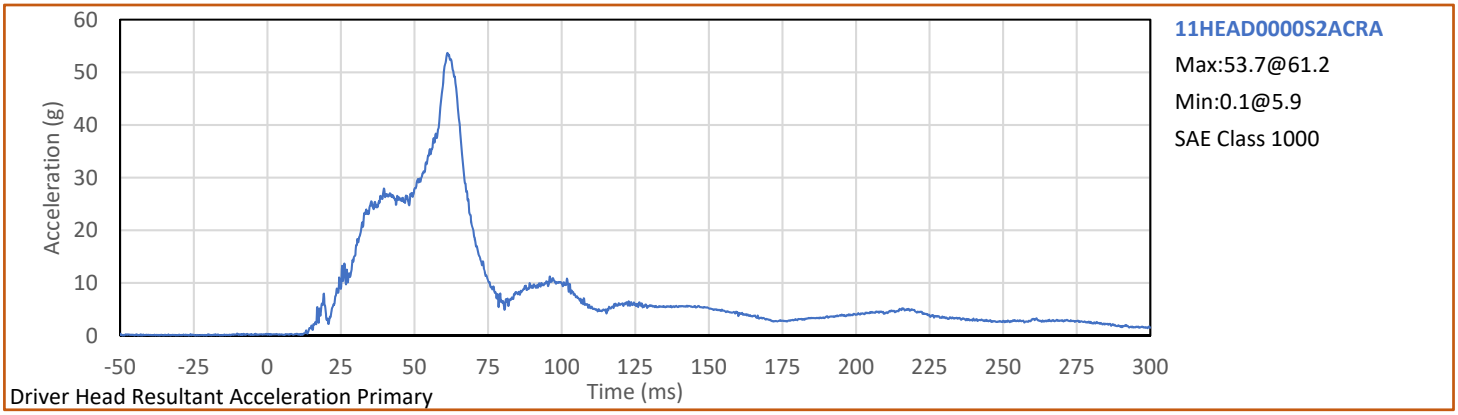
Driver Head Acceleration X Primary



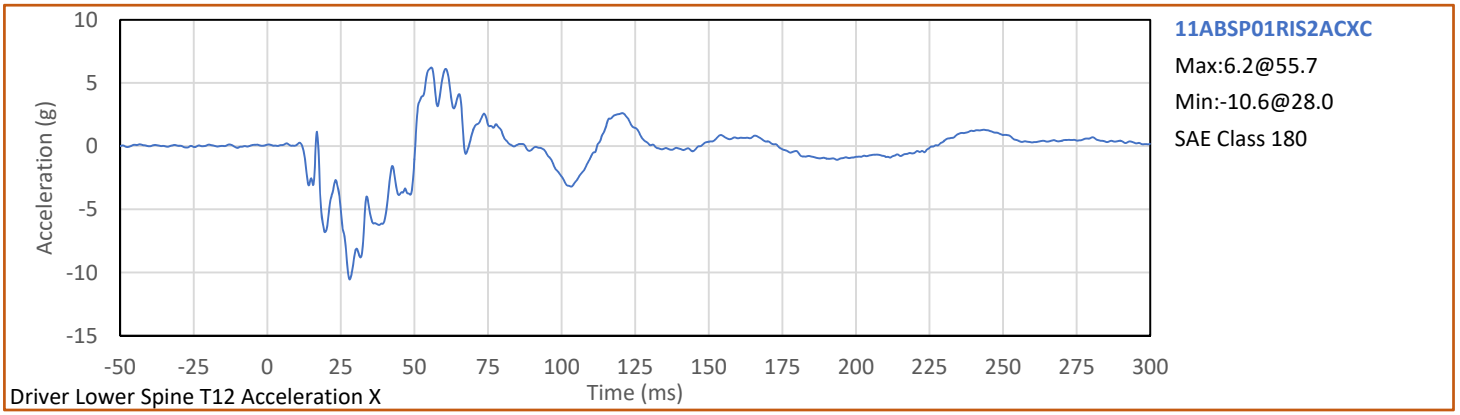
Driver Head Acceleration Y Primary



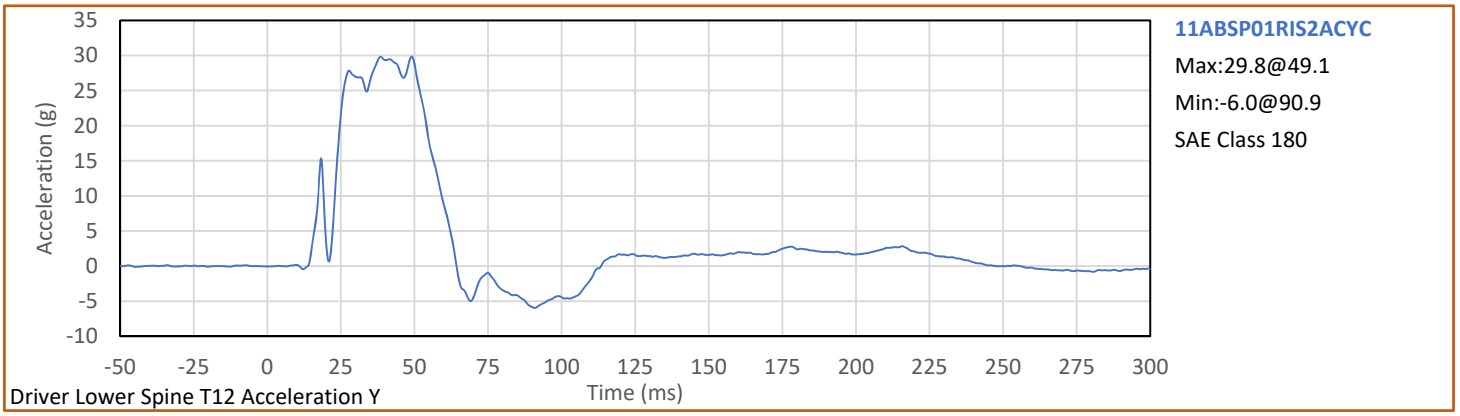
Driver Head Acceleration Z Primary



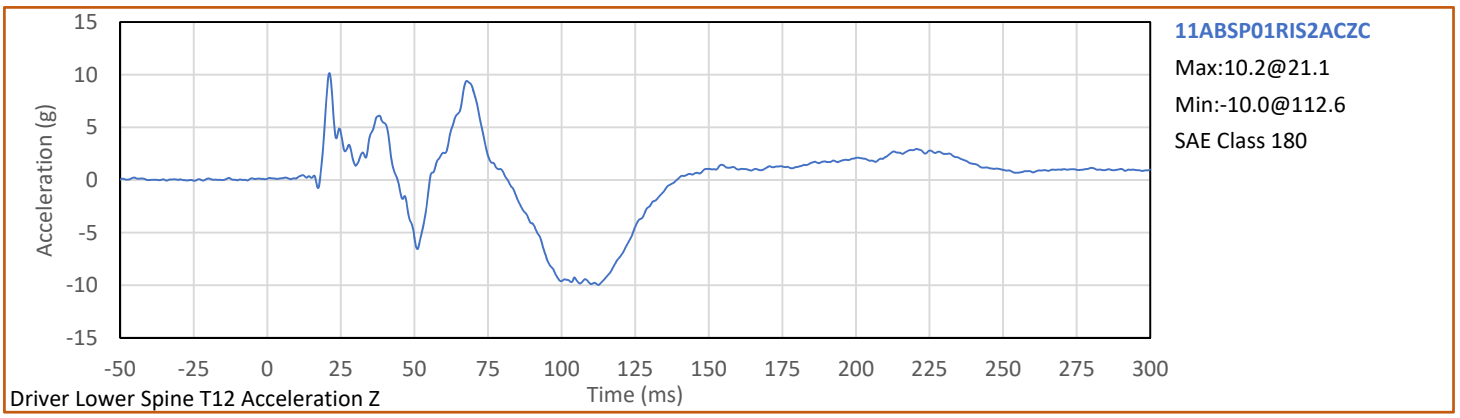
Driver Head Resultant Acceleration Primary



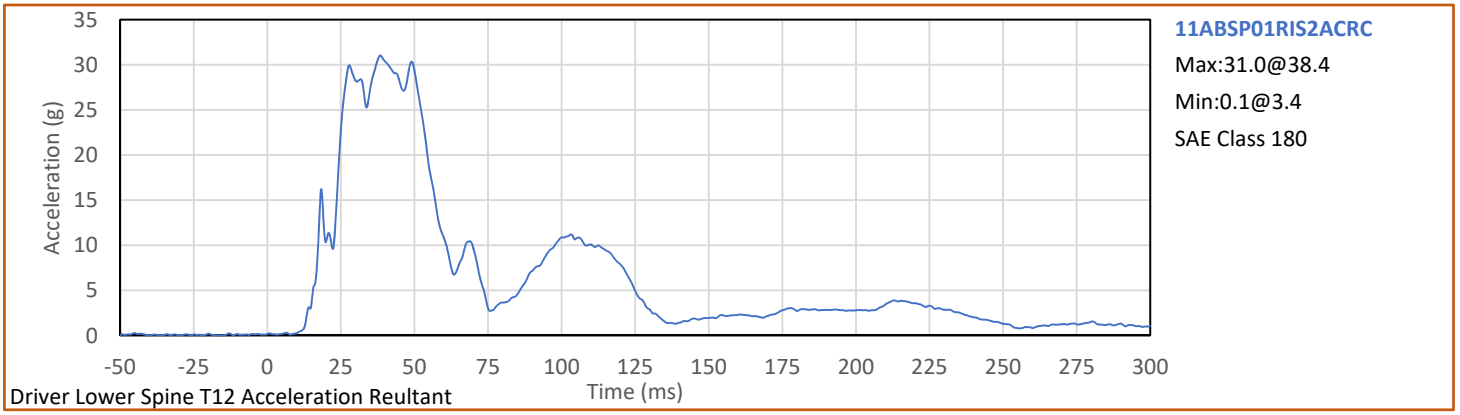
Driver Lower Spine T12 Acceleration X



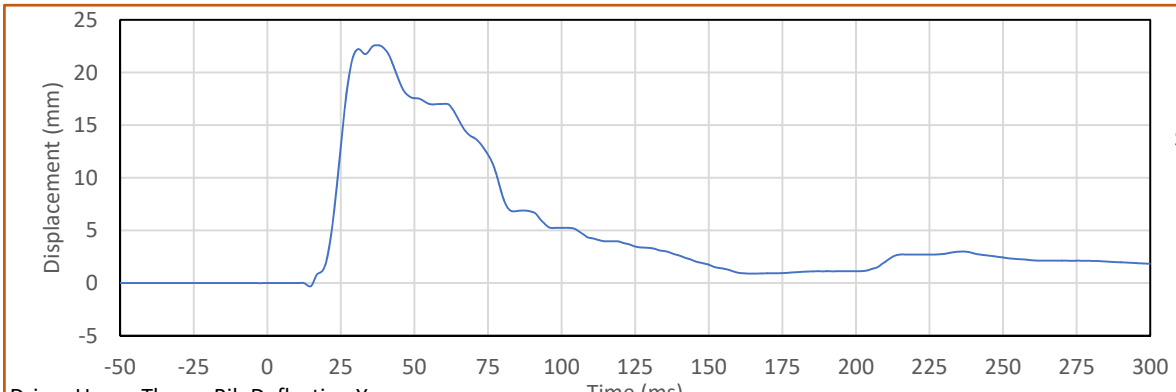
Driver Lower Spine T12 Acceleration Y



Driver Lower Spine T12 Acceleration Z

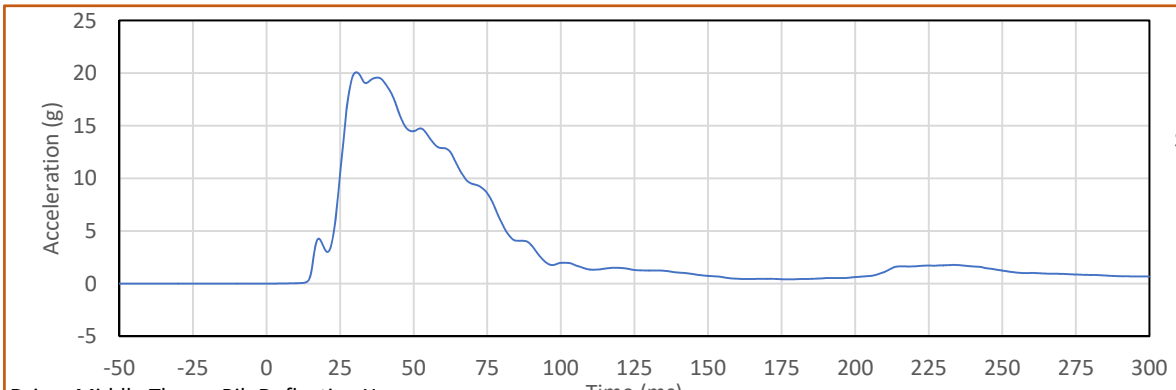


Driver Lower Spine T12 Acceleration Reultant



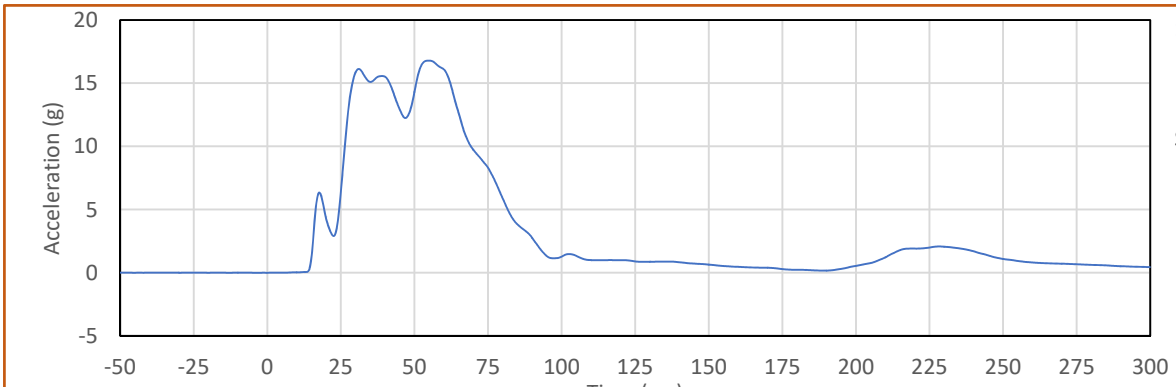
Driver Upper Thorax Rib Deflection Y

11TRRI01LES2DSYC
Max:22.6@37.2
Min:-0.3@14.5
SAE Class 180



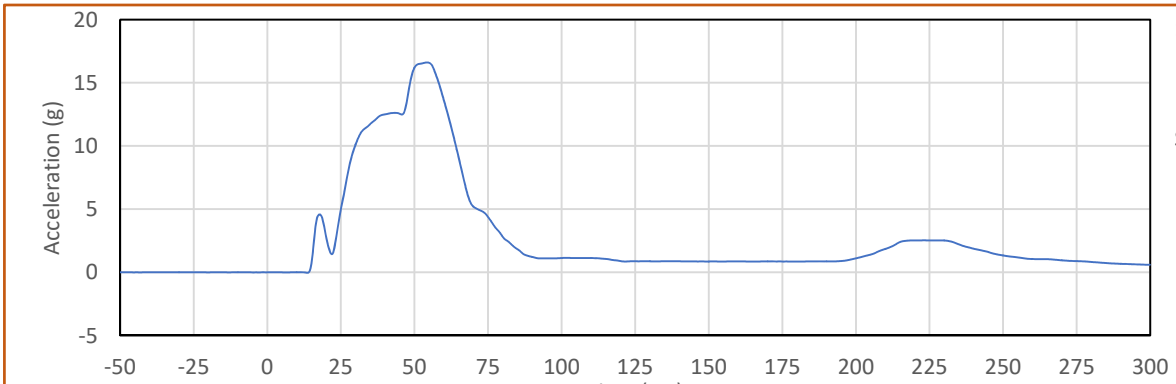
Driver Middle Thorax Rib Deflection Y

11TRRI02LES2DSYC
Max:20.1@30.5
Min:0.0@0.1
SAE Class 180



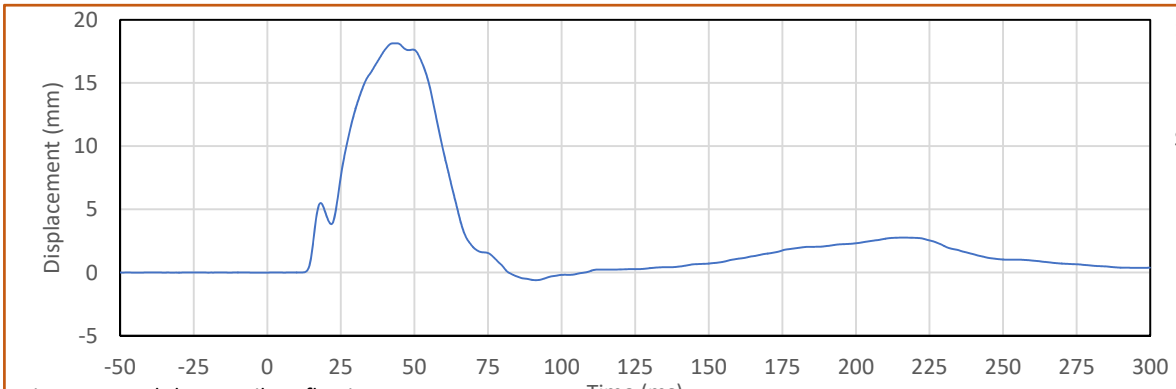
Driver Lower Thorax Rib Deflection Y

11TRRI03LES2DSYC
Max:16.8@54.9
Min:0.0@0.1
SAE Class 180



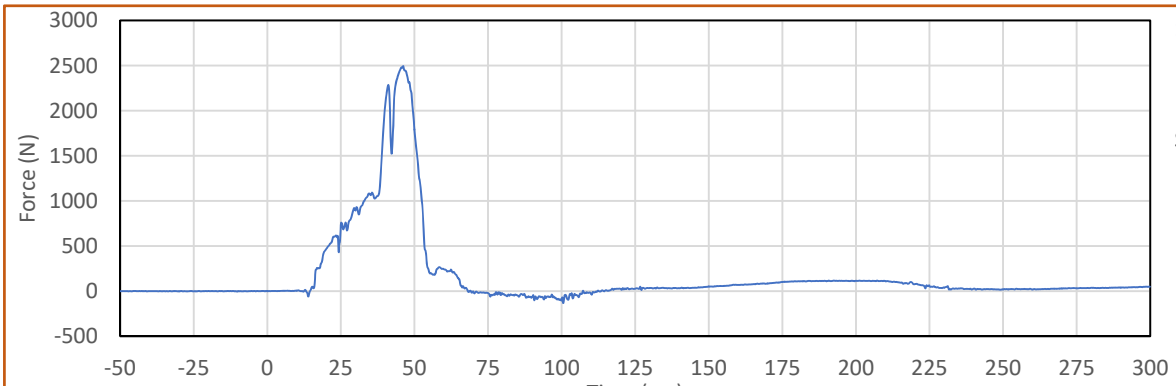
Driver Upper Abdomen Rib Deflection Y

11ABRI01LES2DSYC
Max:16.6@54.3
Min:0.0@13.7
SAE Class 180



Driver Lower Abdomen Rib Deflection Y

11ABRI02LES2DSYC
Max:18.1@43.9
Min:-0.6@91.3
SAE Class 180



Driver Acetabulum Impact Side Force Y

11ACTBLE00S2FOYB
Max:2493.6@46.2
Min:-132.9@100.6
SAE Class 600

Driver Iliac Wing Impact Side Force Y

11ILACLE00S2FOYB
Max:878.9@38.7
Min:-78.8@260.3
SAE Class 600

Driver Combined Pelvic Force

11PELVLE00S2FOYB
Max:3165.6@45.1
Min:-173.9@100.6
SAE Class 600

APPENDIX C
ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA

APPENDIX C
Pre-Test ATD Configuration And Performance Verification Data
SID-IIs Small Side Impact ATD
S/N: 299

Applus IDIADA
KARCO

SID-IIs Small Side Impact ATD
External Measurements

ATD Serial No.: 299 Test Date: 2019-04-30

Tested Parameter	Units	Spec Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Relative Humidity	%	10	70	44	Pass
A - Sitting Height	mm	772	788	782	Pass
B - Shoulder Pivot Height	mm	437	453	450	Pass
C - Hpoint Height	mm	79	89	83	Pass
D - H Point From Seatback	mm	141	151	149	Pass
E - Shoulder Pivot From Backline	mm	97	107	105	Pass
F - Thigh Clearance	mm	119	135	126	Pass
G - Head Breadth	mm	140	148	143	Pass
H - Head Back From Backline	mm	40	46	42	Pass
I - Head Depth	mm	178	188	186	Pass
J - Head Circumference	mm	541	551	547	Pass
K - Buttock To Knee Length	mm	514	540	524	Pass
L - Popliteal Height	mm	343	369	350	Pass
K - Knee Pivot To Floor Height	mm	392	409	398	Pass
N - Buttock Popliteal Length	mm	416	442	437	Pass
O - Chest Depth W/O Jacket	mm	195	211	207	Pass
P - Foot Length	mm	216	232	221	Pass
Q - Hip Breadth (W/Pelvic Plugs)	mm	313	323	318	Pass
R - Arm Length	mm	249	259	256	Pass
S - Knee Joint To Seatback	mm	477	493	486	Pass
V - Shoulder Width	mm	341	357	345	Pass
W - Foot Width	mm	78	94	84	Pass
Y - Chest Circumference W/Jacket	mm	851	881	862	Pass
Z - Waist Circumference	mm	761	791	779	Pass
			Overall Test Results		Pass

Technician: J. Hernandez

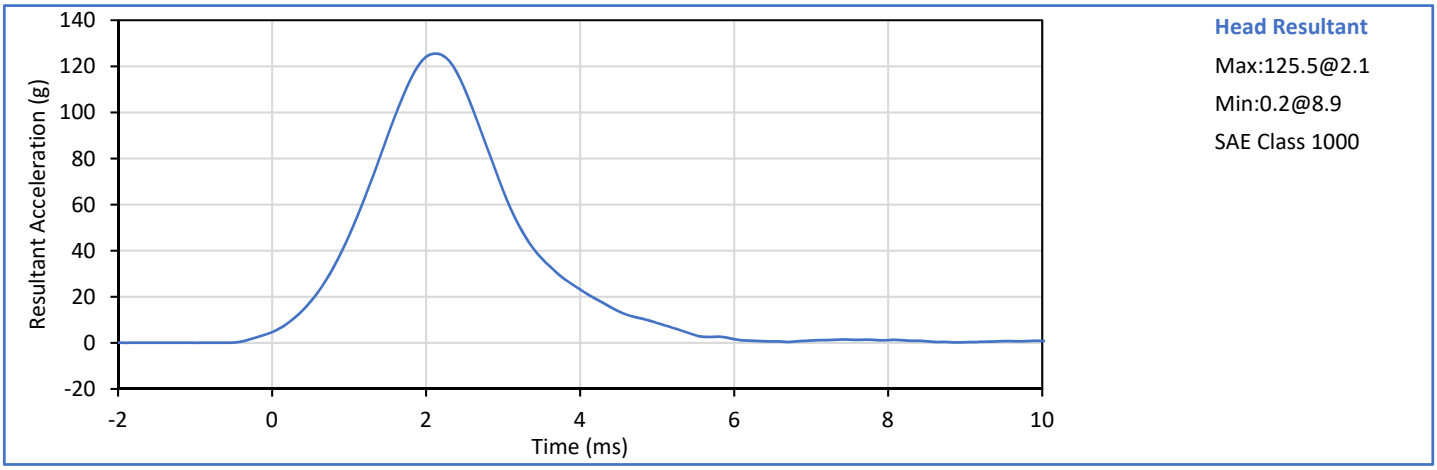
Approved By: P. Puzzuto

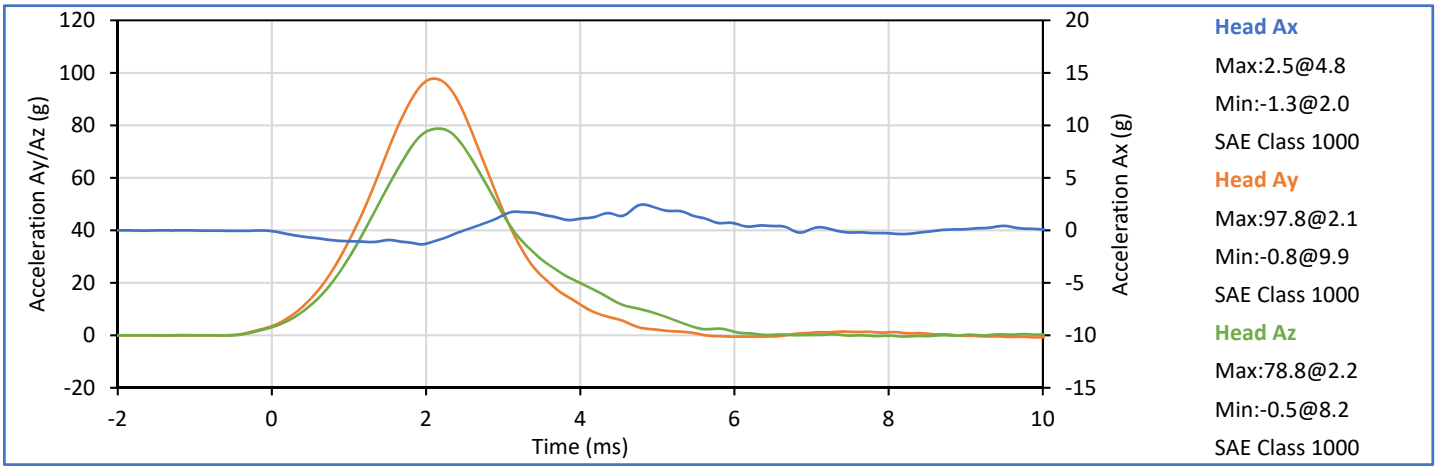
Applus IDIADA
KARCO

SID-IIs Small Side Impact ATD
Head Drop

ATD Serial No.: 299 Test Date: 2019-04-30

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.7	Pass
Laboratory Humidity	%	10	70	40	Pass
Peak Resultant Acceleration	g	115.0	137.0	125.5	Pass
Peak Head Ax	g	-15.0	15.0	-1.3	Pass
Oscillations After Main Pulse	%	0.0	15.0	1.2	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
			Overall Test Results		Pass





Technician: J. Hernandez

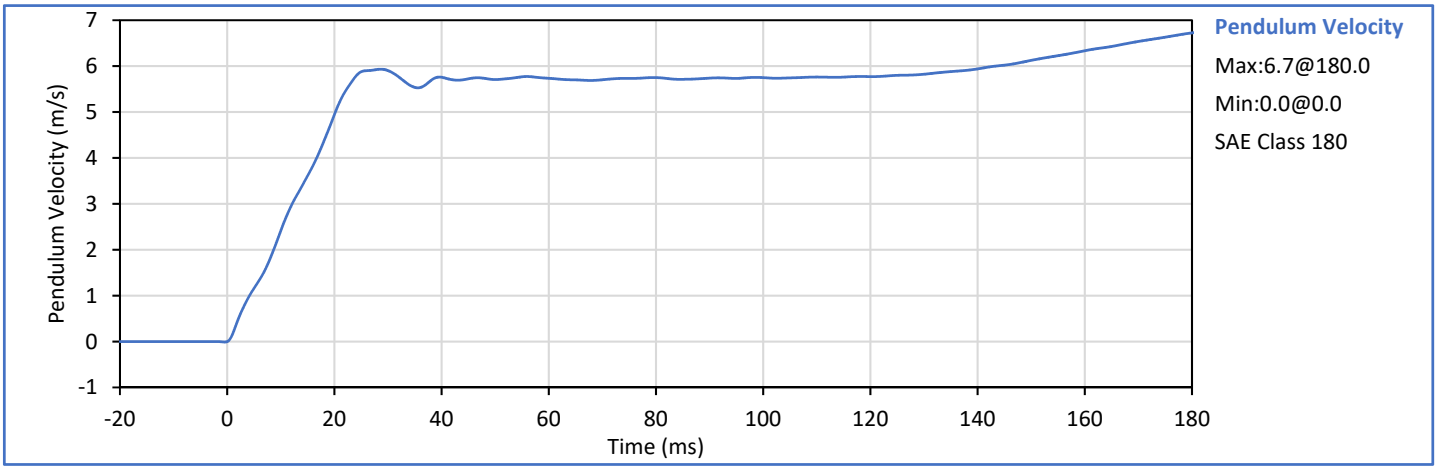
Approved By: P. Puzzuto

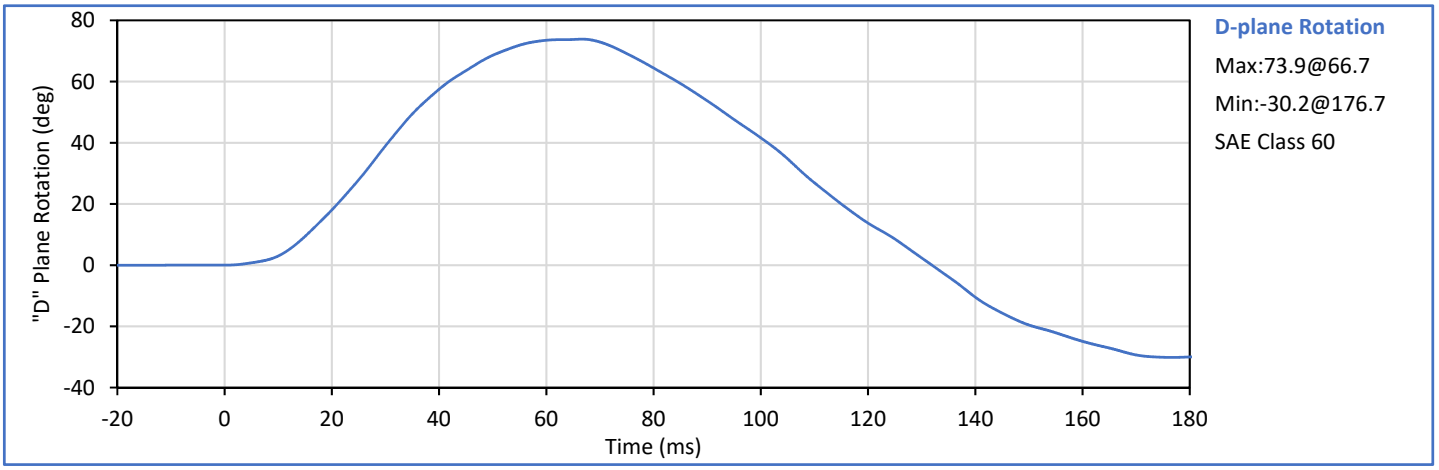
Applus IDIADA
KARCO

SID-IIs Small Side Impact ATD
Neck Flexion

ATD Serial No.: 299 Test Date: 2019-04-30

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Humidity	%	10	70	30	Pass
Pendulum Velocity	m/s	5.51	5.63	5.51	Pass
Pendulum Decel at 10 ms	m/s	2.20	2.80	2.41	Pass
Pendulum Decel at 15 ms	m/s	3.30	4.10	3.61	Pass
Pendulum Decel at 20 ms	m/s	4.40	5.40	4.94	Pass
Pendulum Decel at 25 ms	m/s	5.40	6.10	5.88	Pass
Pendulum Decel from 25-100 ms	m/s	5.50	6.20	5.93	Pass
Peak "D" Plane Rotation	deg	71.0	81.0	73.9	Pass
Time of Peak "D" Plane Rotation	ms	50.0	70.0	66.7	Pass
Peak Occ. Condyle Moment	Nm	-44.0	-36.0	-40.8	Pass
Time of Moment Decay to 0 Nm	ms	102.0	126.0	113.1	Pass
			Overall Test Results		Pass



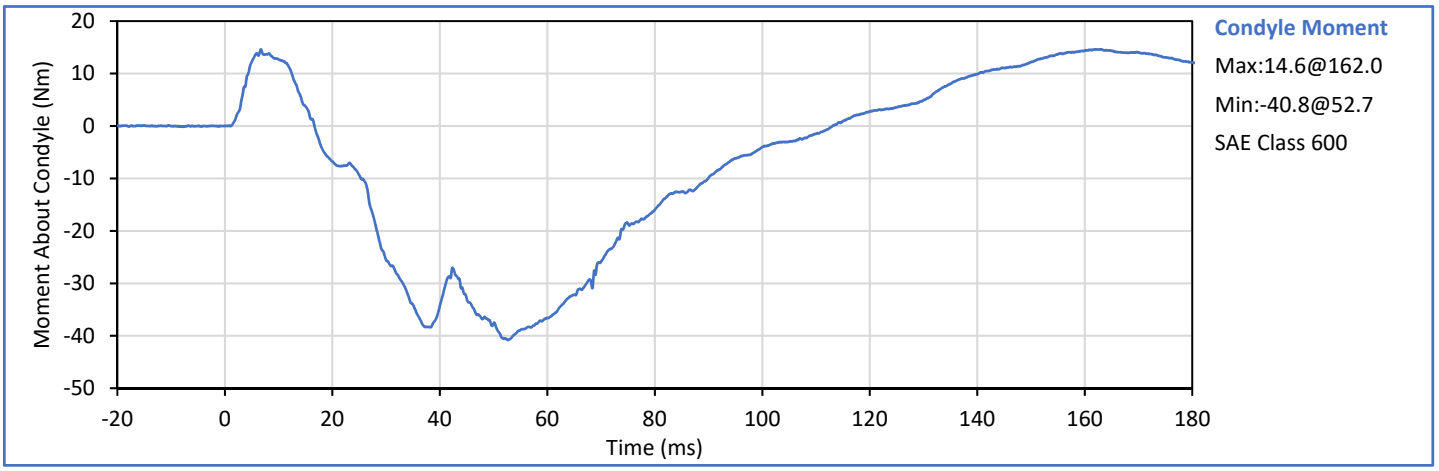


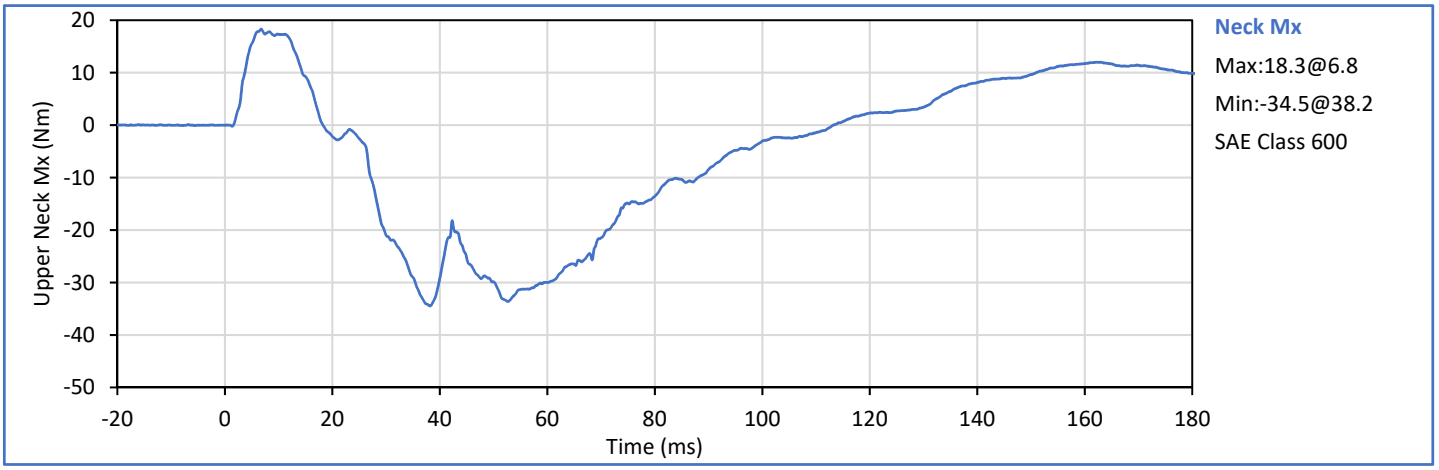
Technician: J. Hernandez

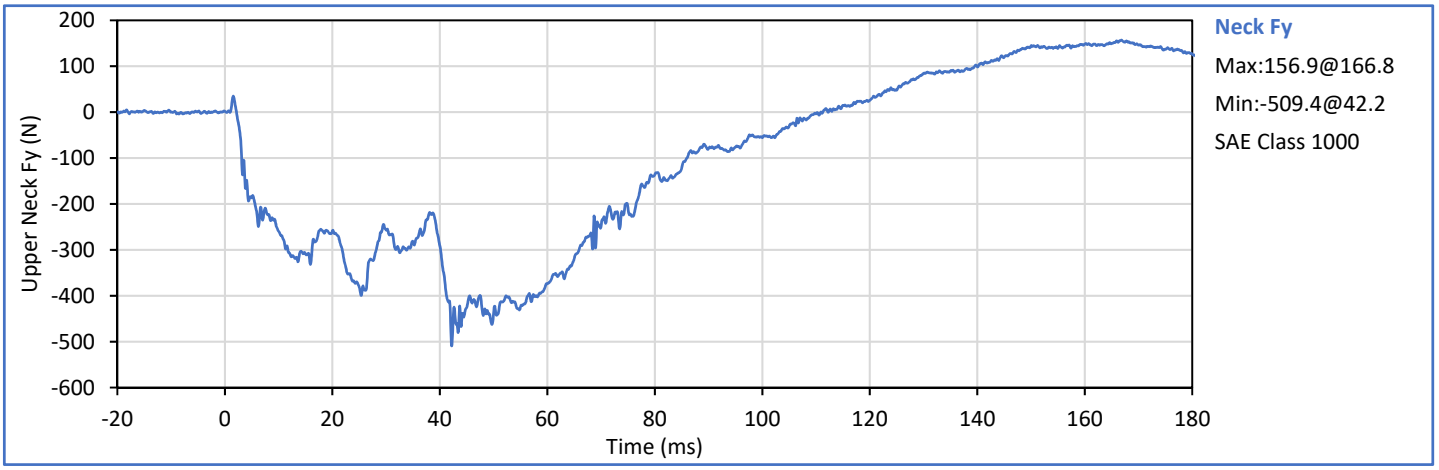
Approved By: P. Puzzuto

SID-IIs Small Side Impact ATD
Neck Flexion

ATD Serial No.: 299 Test Date: 2019-04-30





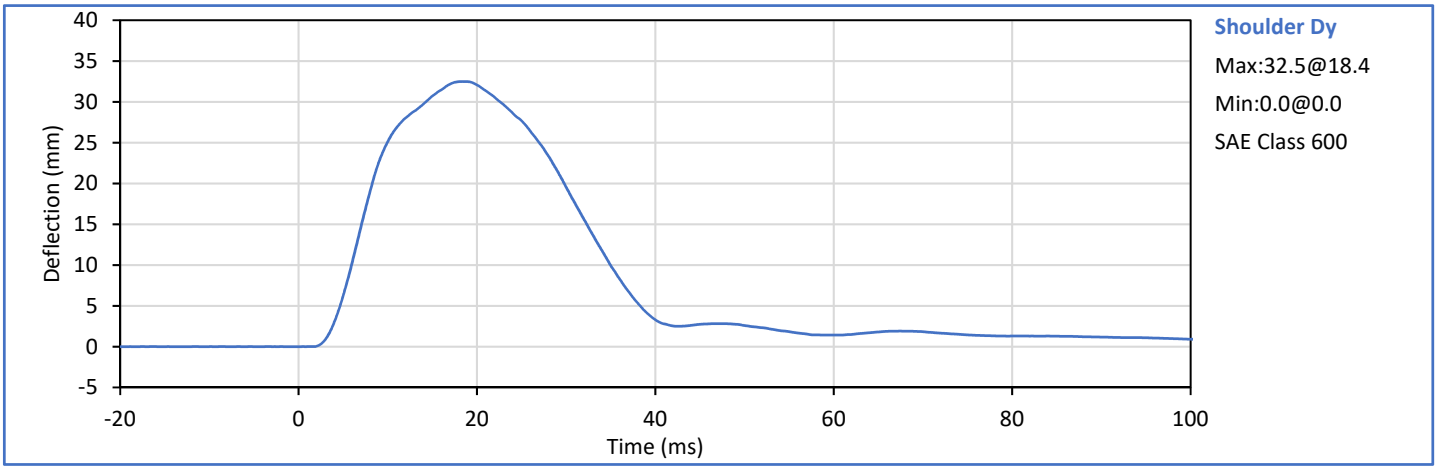


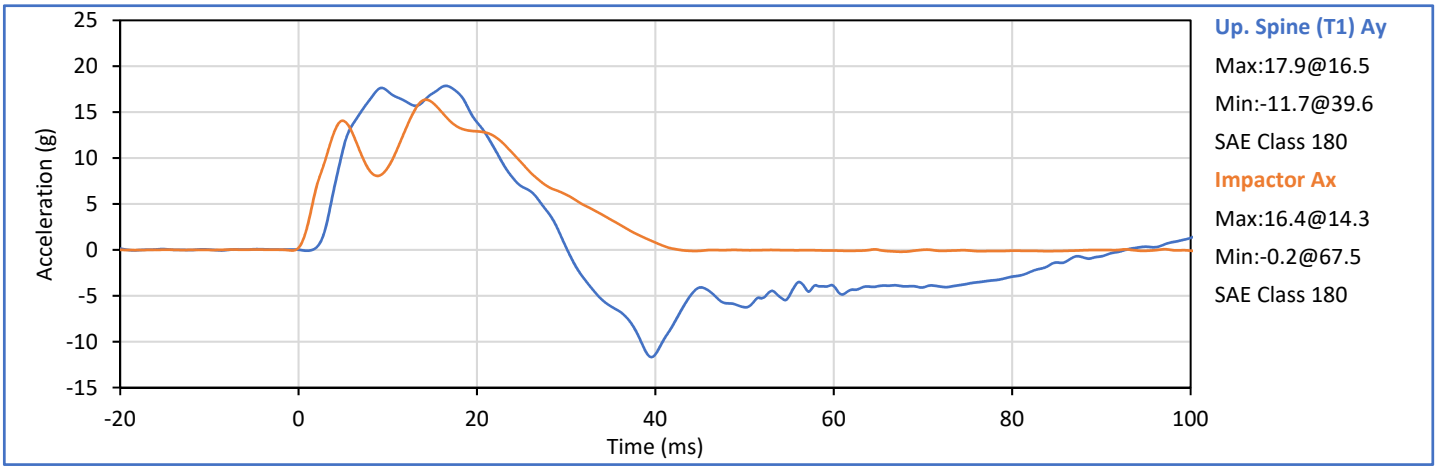
Applus IDIADA
KARCO

SID-IIs Small Side Impact ATD
Shoulder Impact Test

ATD Serial No.: 299 Test Date: 2019-05-03

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.6	Pass
Laboratory Humidity	%	10	70	32	Pass
Impactor Velocity	m/s	4.20	4.40	4.33	Pass
Peak Shoulder Dy	mm	28.0	37.0	32.5	Pass
Peak Upper Spine (T1) Ay	g	17.0	22.0	17.9	Pass
Peak Impactor Ax	g	13.0	18.0	16.4	Pass
			Overall Test Results		Pass





Technician: J. Hernandez

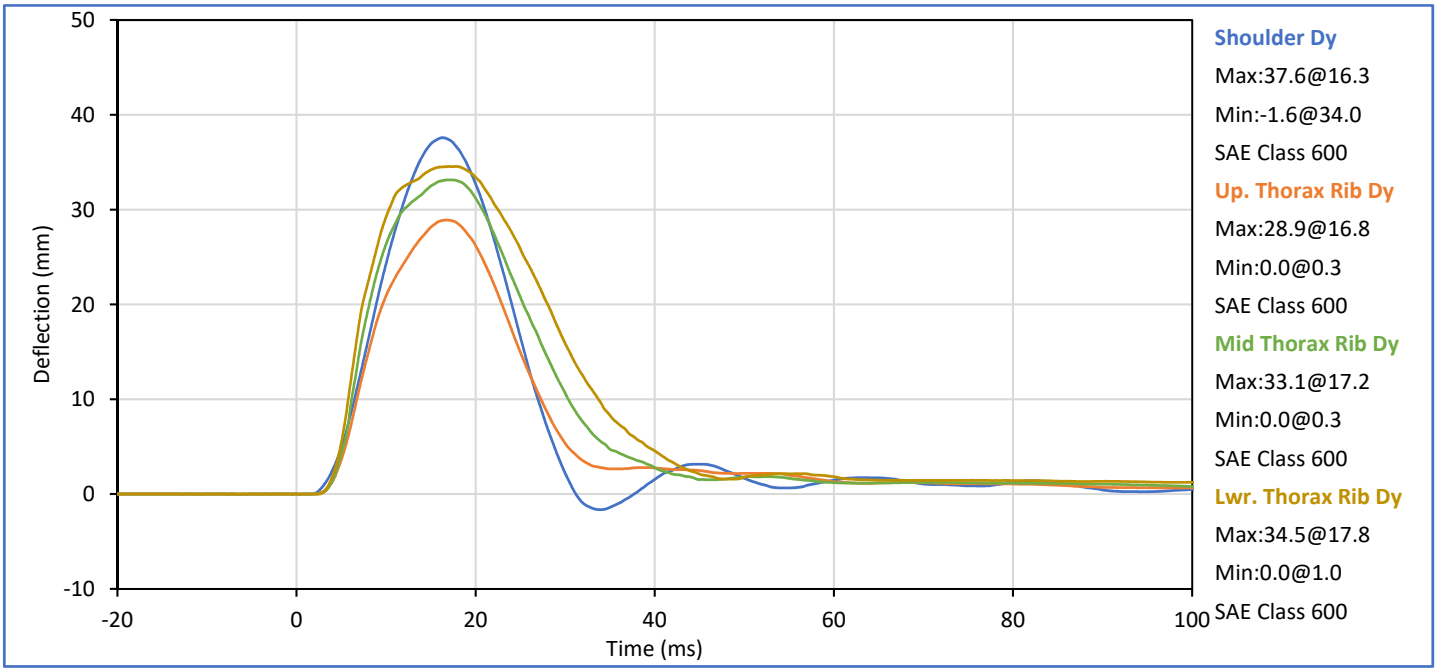
Approved By: P. Puzzuto

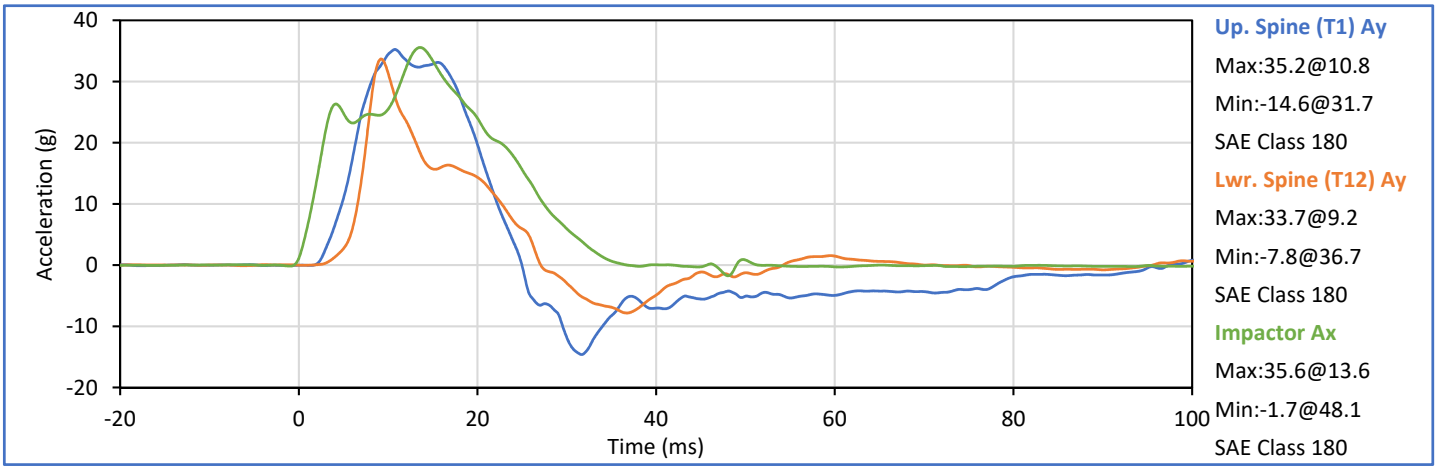
Applus IDIADA
KARCO

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

ATD Serial No.: 299 Test Date: 2019-05-03

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.9	Pass
Laboratory Humidity	%	10	70	32	Pass
Impactor Velocity	m/s	6.60	6.80	6.64	Pass
Peak Shoulder Dy	mm	31.0	40.0	37.6	Pass
Peak Upper Rib Dy	mm	25.0	32.0	28.9	Pass
Peak Middle Rib Dy	mm	30.0	36.0	33.1	Pass
Peak Lower Rib Dy	mm	32.0	38.0	34.5	Pass
Peak Upper Spine (T1) Ay	g	34.0	43.0	35.2	Pass
Peak Lower Spine (T12) Ay	g	29.0	37.0	33.7	Pass
Peak Impactor Ax	g	30.0	36.0	35.6	Pass
			Overall Test Results		Pass





Technician: J. Hernandez

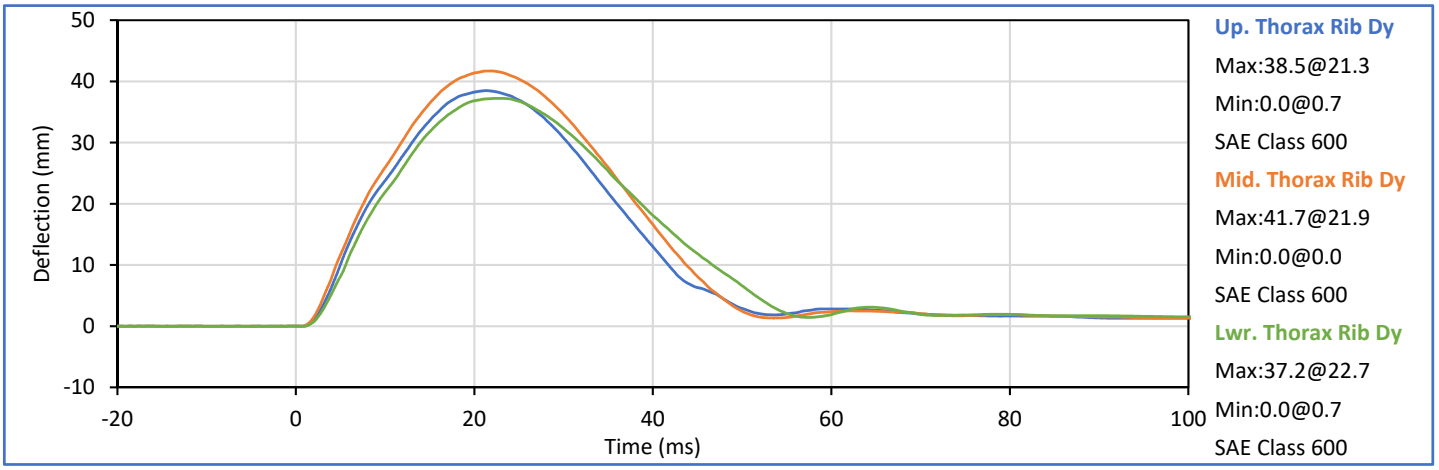
Approved By: P. Puzzuto

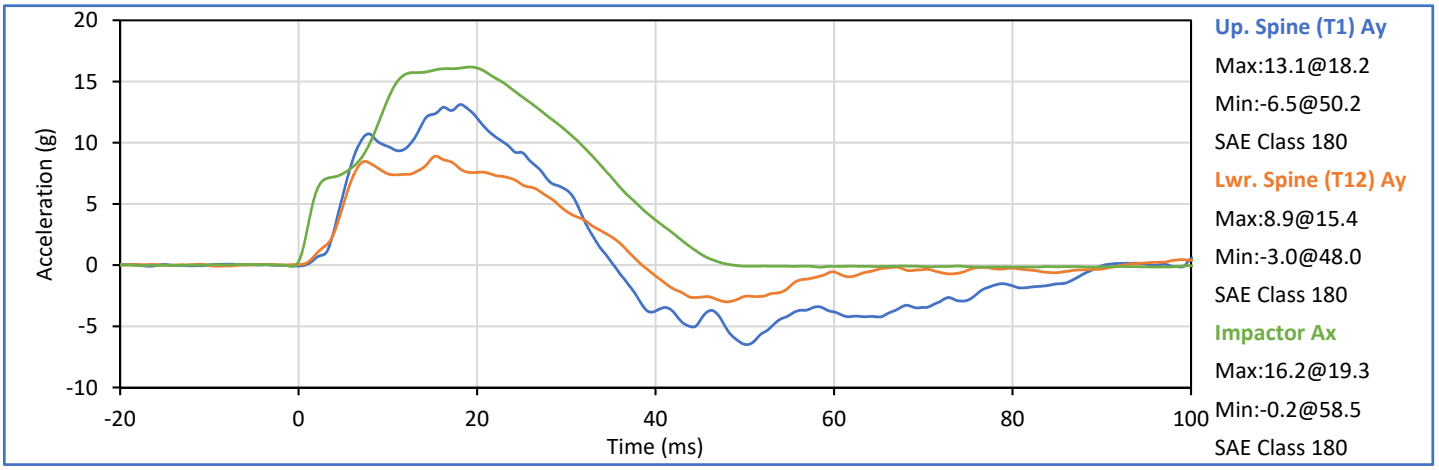
Applus IDIADA
KARCO

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

ATD Serial No.: 299 Test Date: 2019-05-03

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.7	Pass
Laboratory Humidity	%	10	70	32	Pass
Impactor Velocity	m/s	4.20	4.40	4.33	Pass
Peak Upper Rib Dy	mm	32.0	40.0	38.5	Pass
Peak Middle Rib Dy	mm	39.0	45.0	41.7	Pass
Peak Lower Rib Dy	mm	35.0	43.0	37.2	Pass
Peak Upper Spine (T1) Ay	g	13.0	17.0	13.1	Pass
Peak Lower Spine (T12) Ay	g	7.0	11.0	8.9	Pass
Peak Impactor Ax	g	14.0	18.0	16.2	Pass
			Overall Test Results		Pass





Technician: J. Hernandez

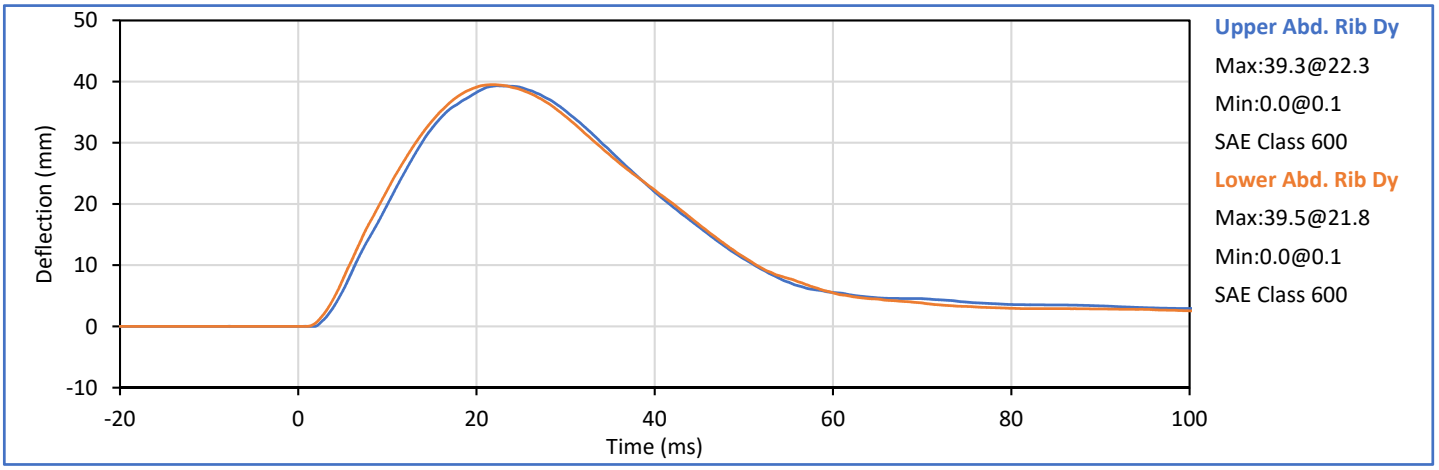
Approved By: P. Puzzuto

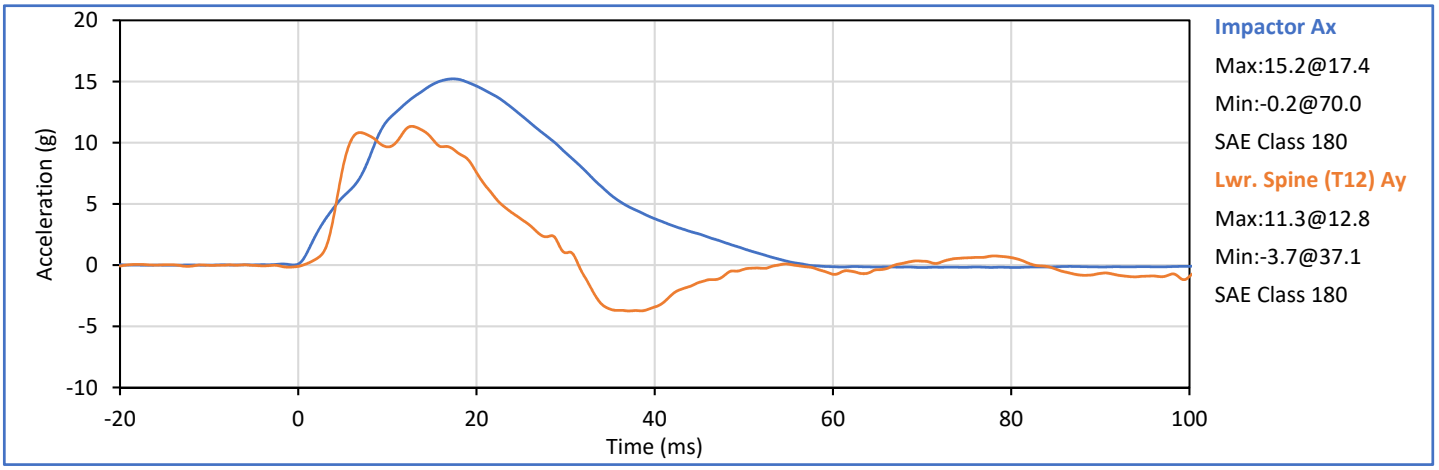
Applus IDIADA
KARCO

SID-IIs Small Side Impact ATD
Abdomen Impact

ATD Serial No.: 299 Test Date: 2019-05-03

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.7	Pass
Laboratory Humidity	%	10	70	32	Pass
Impactor Velocity	m/s	4.20	4.40	4.33	Pass
Peak Upper Abdomen Rib Dy	mm	36.0	47.0	39.3	Pass
Peak Lower Abdomen Rib Dy	mm	33.0	44.0	39.5	Pass
Peak Lower Spine T12 Ay	mm	9.0	14.0	11.3	Pass
Peak Impactor Ax	g	12.0	16.0	15.2	Pass
			Overall Test Results		Pass





Technician: J. Hernandez

Approved By: P. Puzzuto

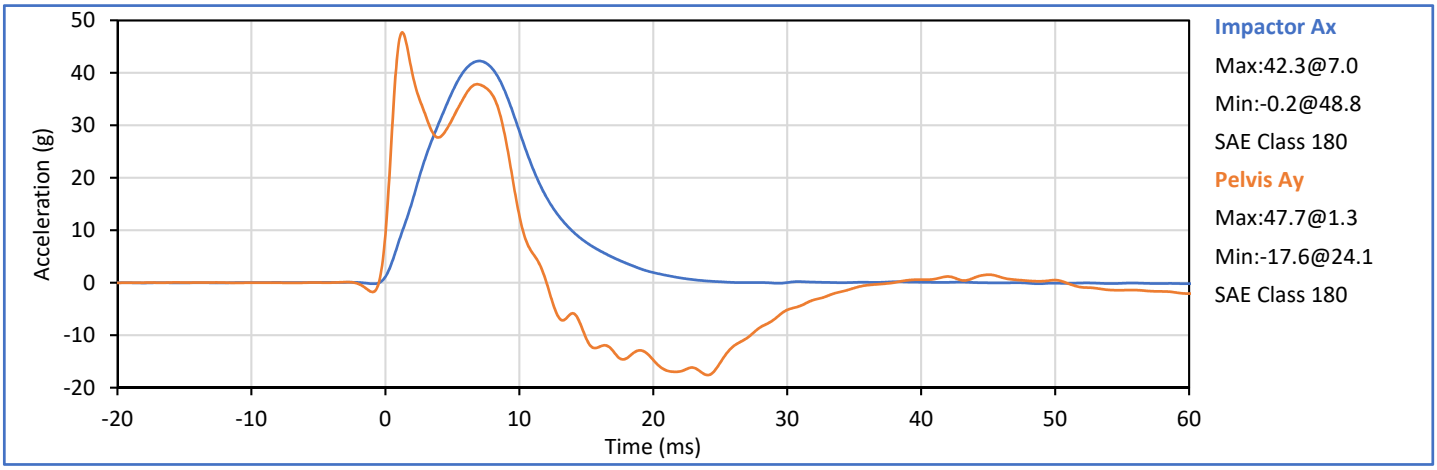
Applus IDIADA
KARCO

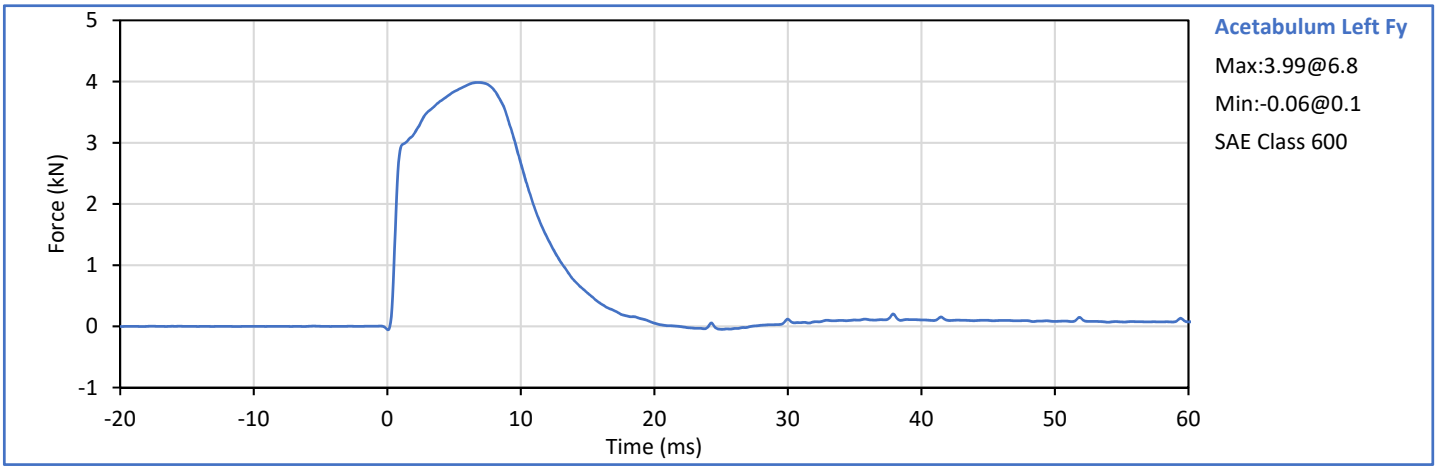
SID-IIs Small Side Impact ATD
Pelvis Acetabulum Impact

ATD Serial No.: 299 Test Date: 2019-05-03

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.7	Pass
Laboratory Humidity	%	10	70	32	Pass
Impactor Velocity	m/s	6.60	6.80	6.72	Pass
Peak Acetabulum Fy	kN	3.60	4.30	3.99	Pass
Pelvis Ay after 6ms	g	34.0	42.0	37.8	Pass
Peak Impactor Ax	g	38.0	47.0	42.3	Pass
			Overall Test Results		Pass

Pelvis Plug S/N: 11351 (SACO)





Technician: J. Hernandez

Approved By: P. Puzzuto

ATD Serial No.: 299 Test Date: 2019-05-03

Pelvis Plug S/N: 11351 (SACO)

SACO RESEARCH

SID-IIs Pelvis Plug Certification Test

Plug S/N 11351
Test Number 2744
Report Number 2741
Test Date 5/3/2016 7:54:46 AM

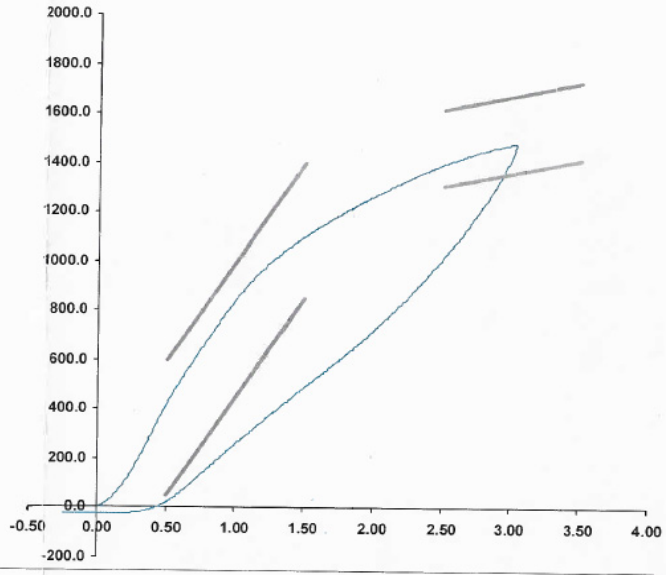
	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	416.66	50.00	600.00
Force @ 1.5 mm (N)	1,101.18	850.00	1,400.00
Force @ 2.5 mm (N)	1,395.69	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,478.03	1,361.00	1,673.00

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

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

Notes:

Force (-N) vs Extension (-mm)



Operator DC

Part Number 180-4450

Template No 107 03-May-16
SACO Research

By : DC Date : 5/3/16

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

Applus IDIADA
KARCO

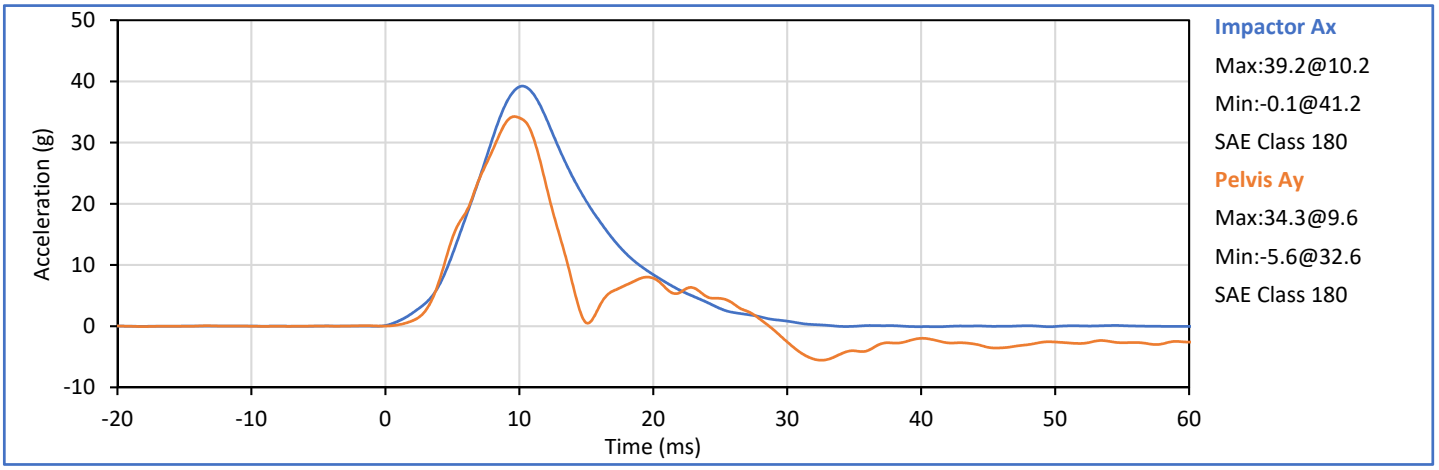
SID-IIs Small Side Impact ATD
Pelvis Iliac Impact

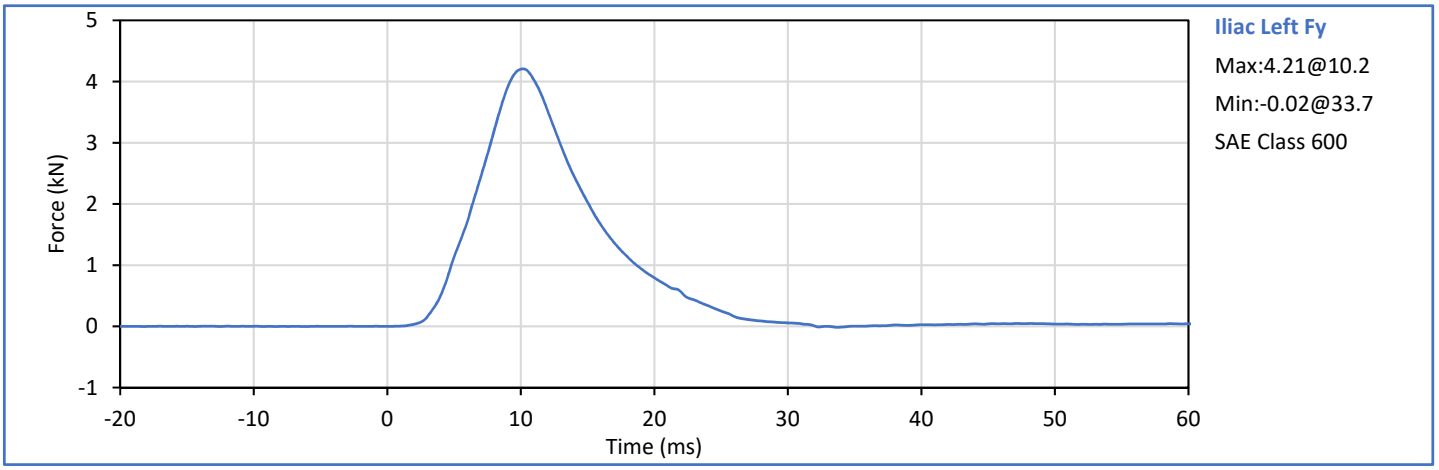
ATD Serial No.: 299 Test Date: 2019-05-03

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Humidity	%	10	70	30	Pass
Impactor Velocity	m/s	4.20	4.40	4.29	Pass
Peak Iliac Fy	kN	4.10	5.10	4.21	Pass
Pelvis Ay after 6ms	g	28.0	39.0	34.3	Pass
Peak Impactor Ax	g	36.0	45.0	39.2	Pass
			Overall Test Results		Pass

Pelvis Plug S/N: 12228 (SACO) *

* Plug is not impacted and remains certified





Technician: J. Hernandez

Approved By: P. Puzzuto

APPENDIX C
Post-Test ATD Configuration And Performance Verification Data
SID-IIs Small Side Impact ATD
S/N: 299

Applus IDIADA
KARCO

SID-IIs Small Side Impact ATD
External Measurements

ATD Serial No.: 299 Test Date: 2019-05-23

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	44	Pass
A - Sitting Height	mm	772	788	782	Pass
B - Shoulder Pivot Height	mm	437	453	450	Pass
C - Hpoint Height	mm	79	89	83	Pass
D - H Point From Seatback	mm	141	151	149	Pass
E - Shoulder Pivot From Backline	mm	97	107	105	Pass
F - Thigh Clearance	mm	119	135	126	Pass
G - Head Breadth	mm	140	148	143	Pass
H - Head Back From Backline	mm	40	46	42	Pass
I - Head Depth	mm	178	188	186	Pass
J - Head Circumference	mm	541	551	547	Pass
K - Buttock To Knee Length	mm	514	540	524	Pass
L - Popliteal Height	mm	343	369	350	Pass
K - Knee Pivot To Floor Height	mm	392	409	398	Pass
N - Buttock Popliteal Length	mm	416	442	437	Pass
O - Chest Depth W/O Jacket	mm	195	211	207	Pass
P - Foot Length	mm	216	232	221	Pass
Q - Hip Breadth (W/Pelvic Plugs)	mm	313	323	318	Pass
R - Arm Length	mm	249	259	256	Pass
S - Knee Joint To Seatback	mm	477	493	486	Pass
V - Shoulder Width	mm	341	357	345	Pass
W - Foot Width	mm	78	94	84	Pass
Y - Chest Circumference W/Jacket	mm	851	881	862	Pass
Z - Waist Circumference	mm	761	791	779	Pass
			Overall Test Results		Pass

Technician: J. Hernandez

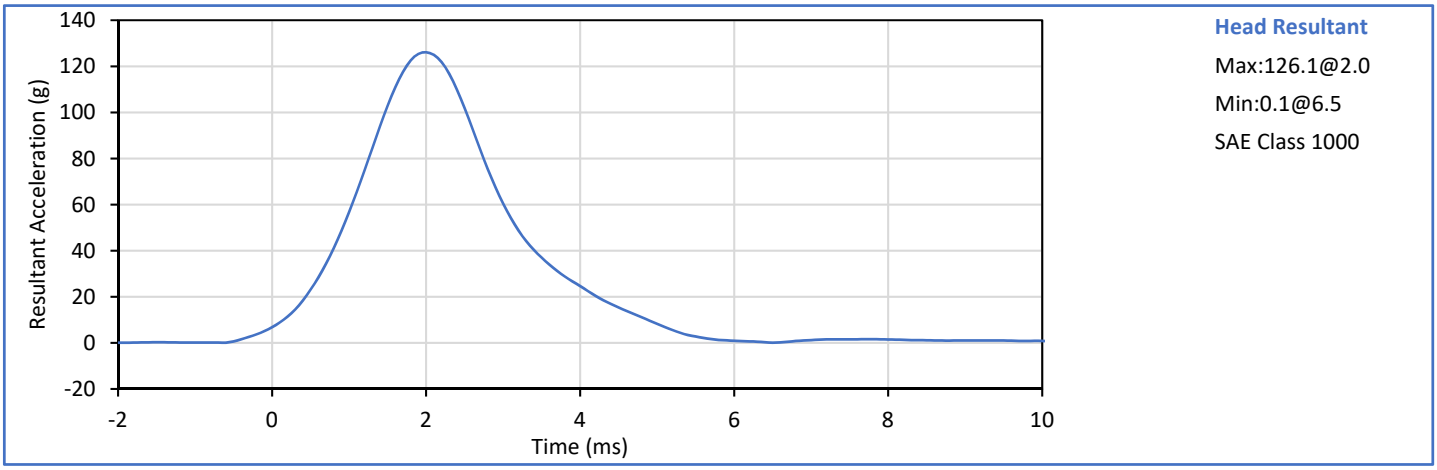
Approved By: P. Puzzuto

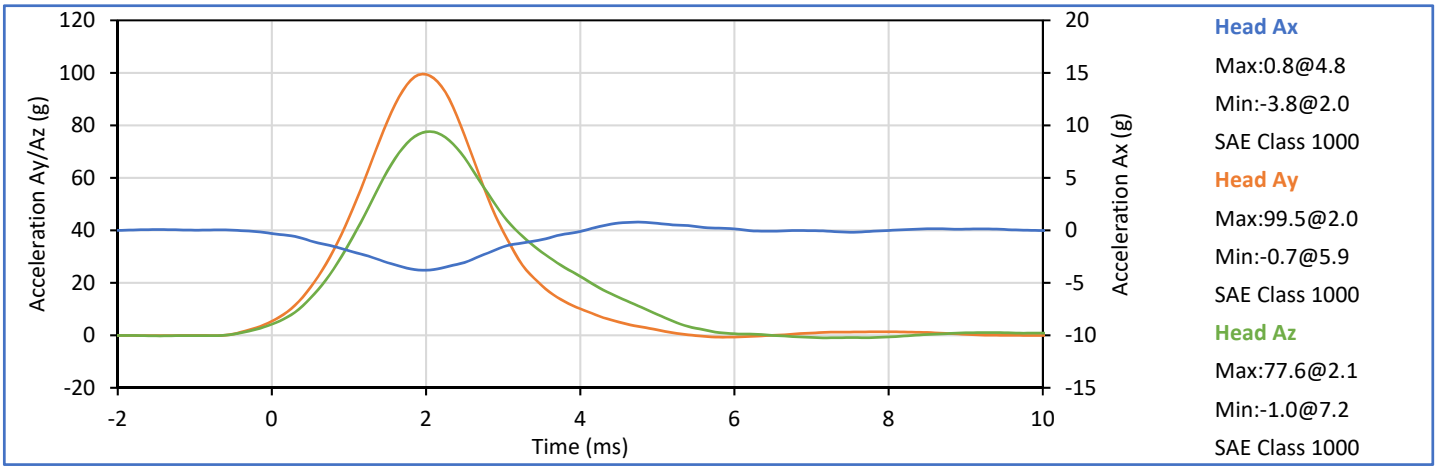
Applus IDIADA
KARCO

SID-IIs Small Side Impact ATD
Head Drop

ATD Serial No.: 299 Test Date: 2019-05-23

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.4	Pass
Laboratory Humidity	%	10	70	30	Pass
Peak Resultant Acceleration	g	115.0	137.0	126.1	Pass
Peak Head Ax	g	-15.0	15.0	-3.8	Pass
Oscillations After Main Pulse	%	0.0	15.0	1.3	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
			Overall Test Results		Pass





Technician: J. Hernandez

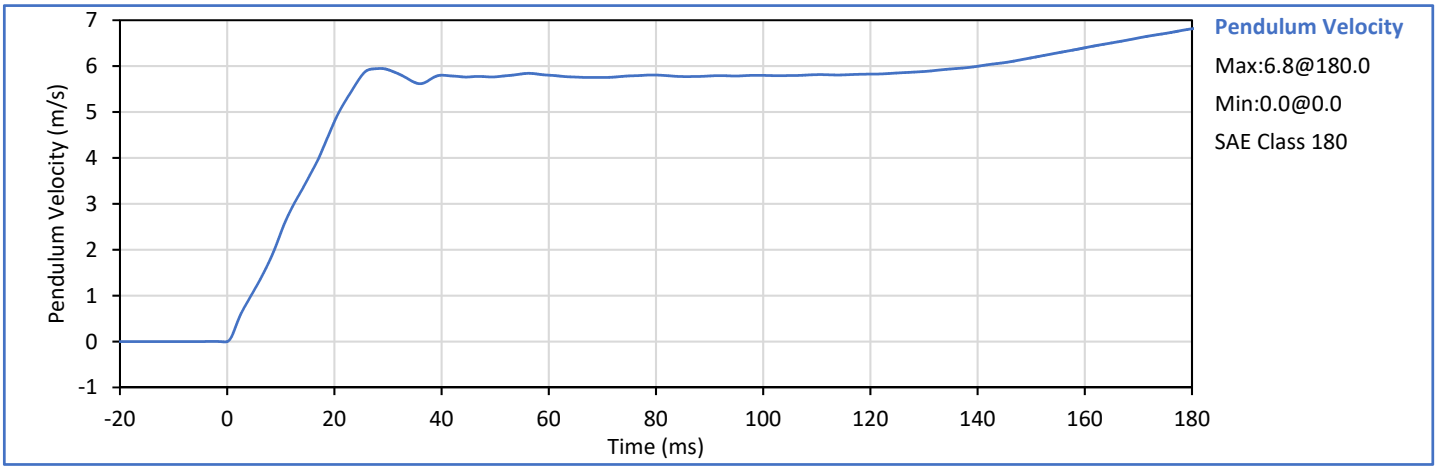
Approved By: P. Puzzuto

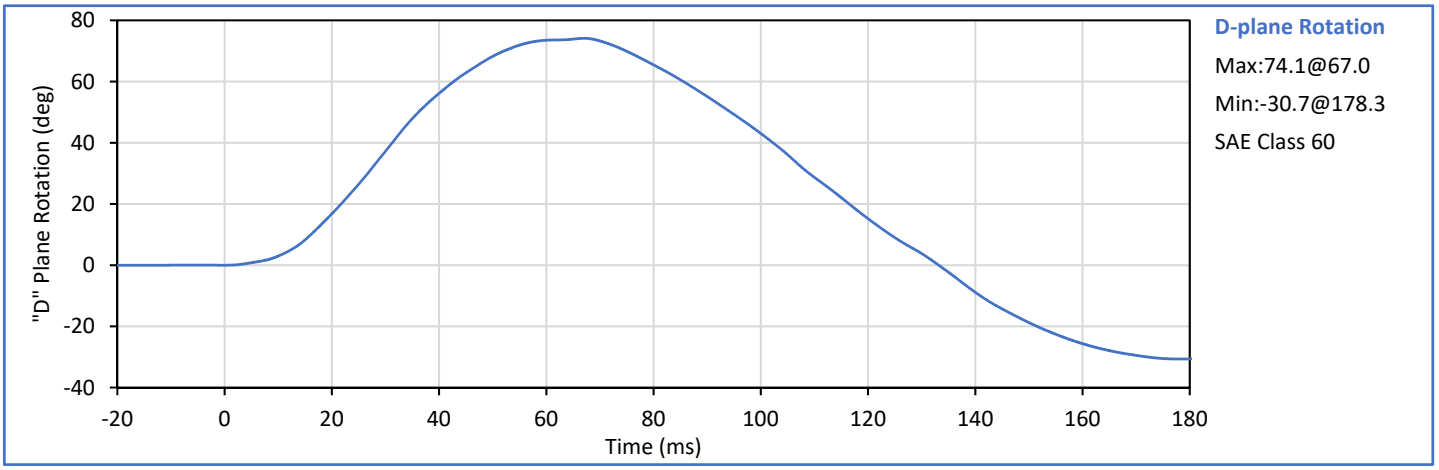
Applus IDIADA
KARCO

SID-IIs Small Side Impact ATD
Neck Flexion

ATD Serial No.: 299 Test Date: 2019-05-23

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.4	Pass
Laboratory Humidity	%	10	70	34	Pass
Pendulum Velocity	m/s	5.51	5.63	5.53	Pass
Pendulum Decel at 10 ms	m/s	2.20	2.80	2.36	Pass
Pendulum Decel at 15 ms	m/s	3.30	4.10	3.53	Pass
Pendulum Decel at 20 ms	m/s	4.40	5.40	4.79	Pass
Pendulum Decel at 25 ms	m/s	5.40	6.10	5.78	Pass
Pendulum Decel from 25-100 ms	m/s	5.50	6.20	5.95	Pass
Peak "D" Plane Rotation	deg	71.0	81.0	74.1	Pass
Time of Peak "D" Plane Rotation	ms	50.0	70.0	67.0	Pass
Peak Occ. Condyle Moment	Nm	-44.0	-36.0	-40.6	Pass
Time of Moment Decay to 0 Nm	ms	102.0	126.0	111.9	Pass
			Overall Test Results		Pass



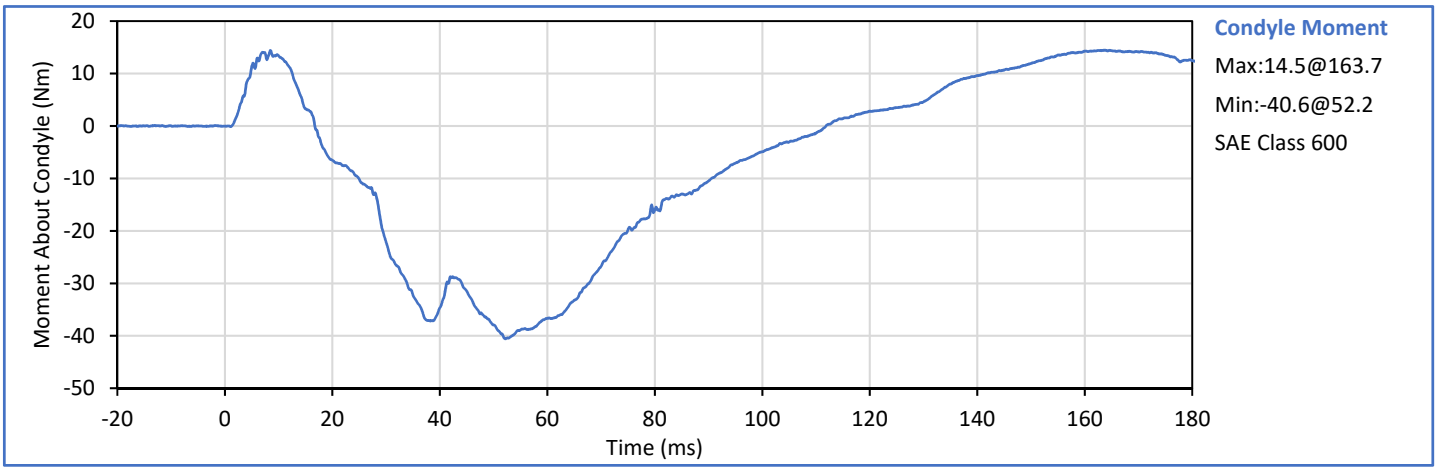


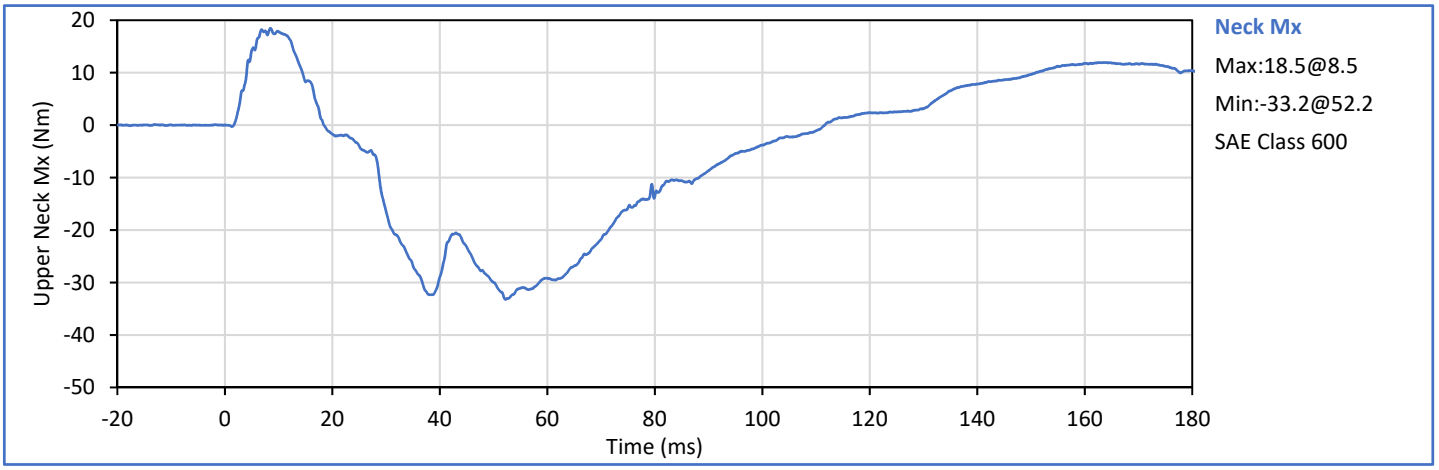
Technician: J. Hernandez

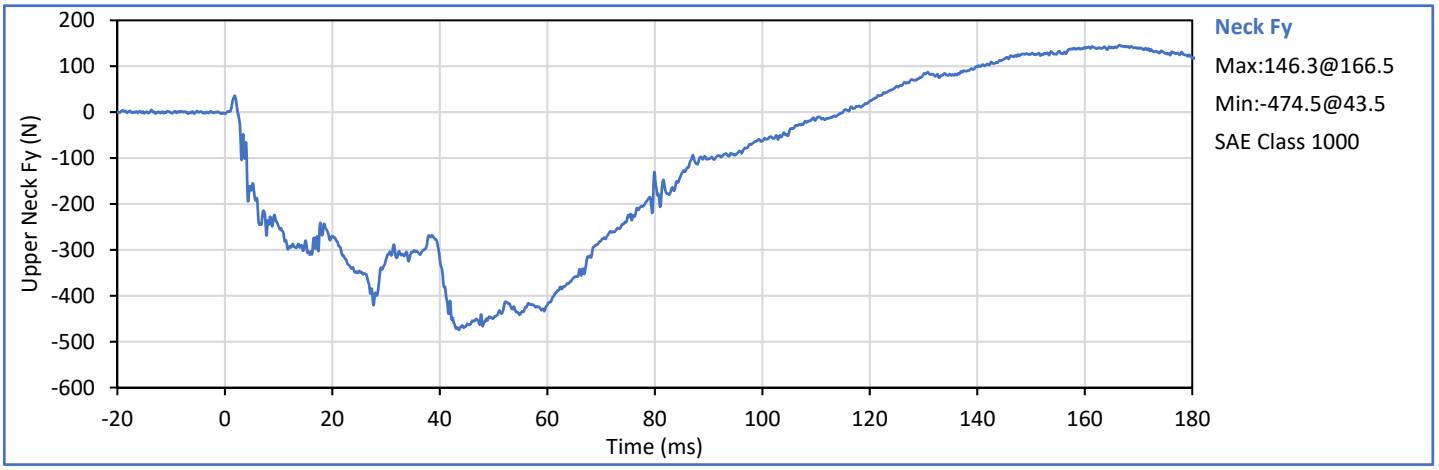
Approved By: P. Puzzuto

SID-IIs Small Side Impact ATD
Neck Flexion

ATD Serial No.: 299 Test Date: 2019-05-23





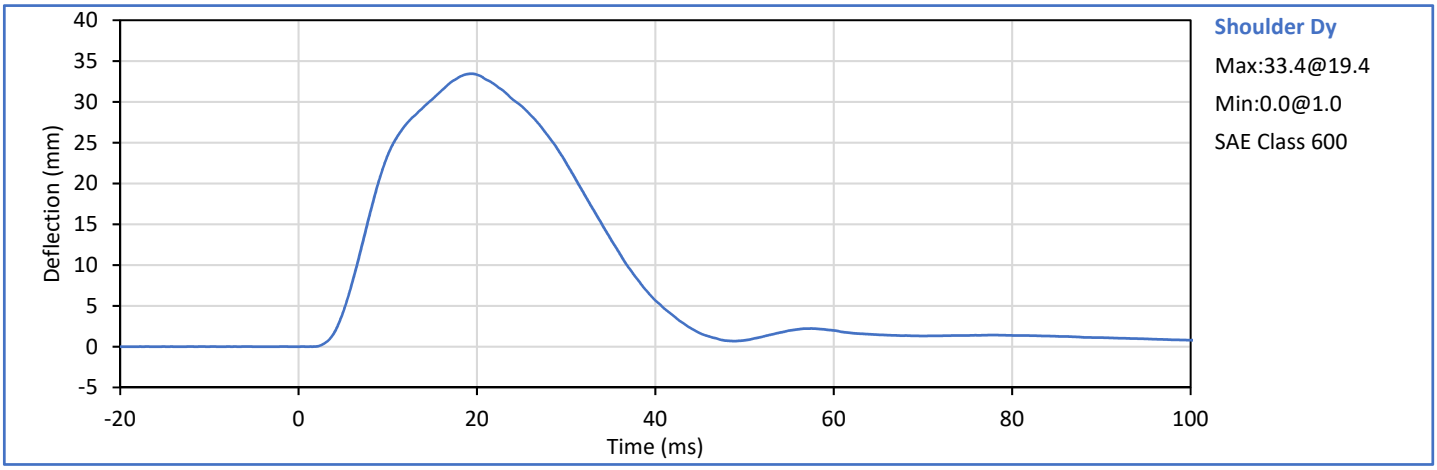


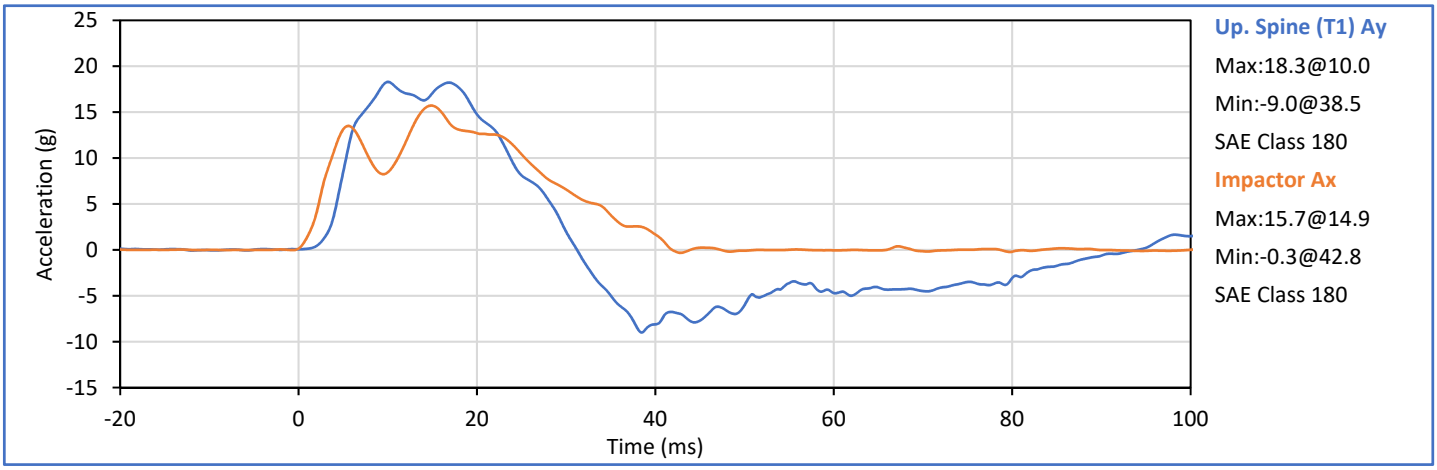
Applus IDIADA
KARCO

SID-IIs Small Side Impact ATD
Shoulder Impact Test

ATD Serial No.: 299 Test Date: 2019-05-24

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Humidity	%	10	70	28	Pass
Impactor Velocity	m/s	4.20	4.40	4.33	Pass
Peak Shoulder Dy	mm	28.0	37.0	33.4	Pass
Peak Upper Spine (T1) Ay	g	17.0	22.0	18.3	Pass
Peak Impactor Ax	g	13.0	18.0	15.7	Pass
			Overall Test Results		Pass





Technician: J. Hernandez

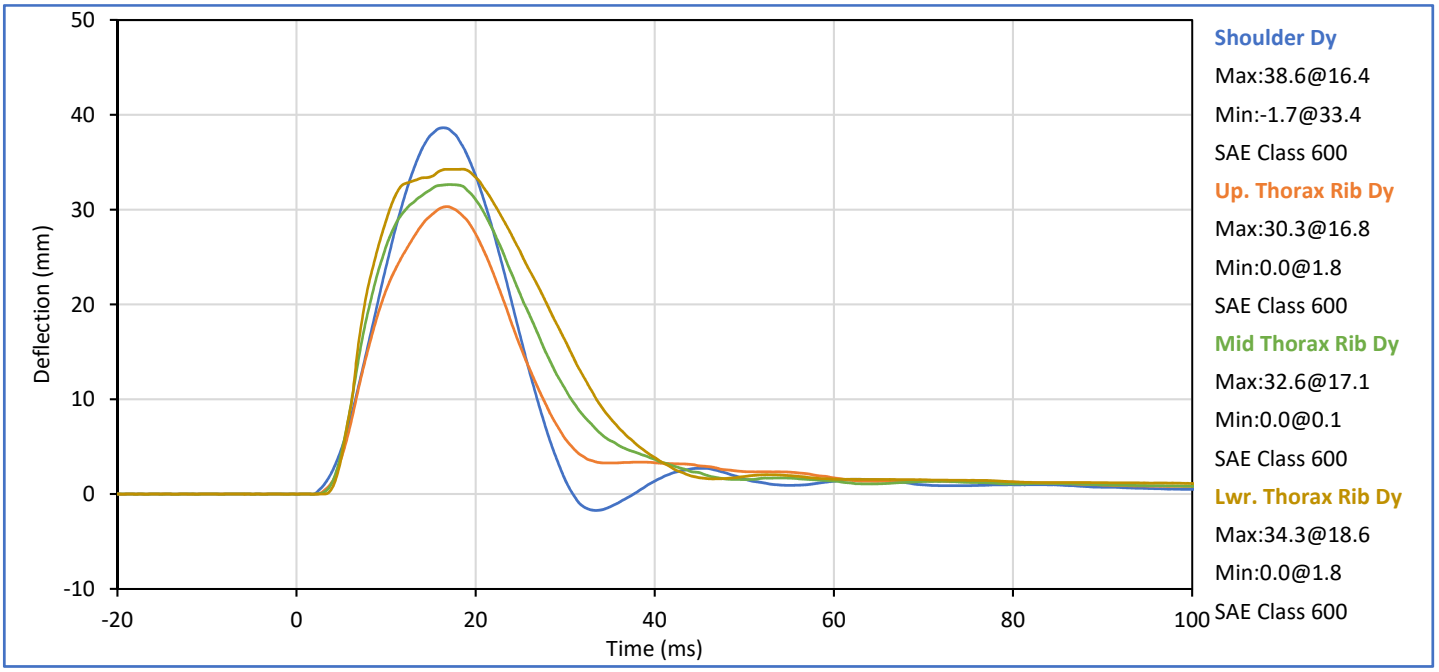
Approved By: P. Puzzuto

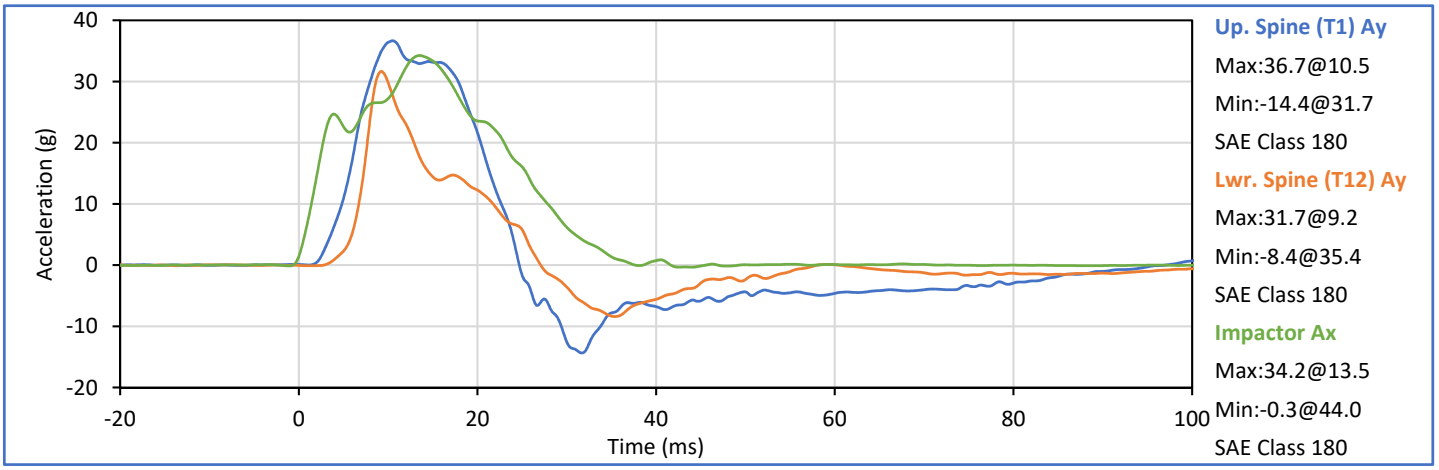
Applus IDIADA
KARCO

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

ATD Serial No.: 299 Test Date: 2019-05-24

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Humidity	%	10	70	28	Pass
Impactor Velocity	m/s	6.60	6.80	6.68	Pass
Peak Shoulder Dy	mm	31.0	40.0	38.6	Pass
Peak Upper Rib Dy	mm	25.0	32.0	30.3	Pass
Peak Middle Rib Dy	mm	30.0	36.0	32.6	Pass
Peak Lower Rib Dy	mm	32.0	38.0	34.3	Pass
Peak Upper Spine (T1) Ay	g	34.0	43.0	36.7	Pass
Peak Lower Spine (T12) Ay	g	29.0	37.0	31.7	Pass
Peak Impactor Ax	g	30.0	36.0	34.2	Pass
			Overall Test Results		Pass





Technician: J. Hernandez

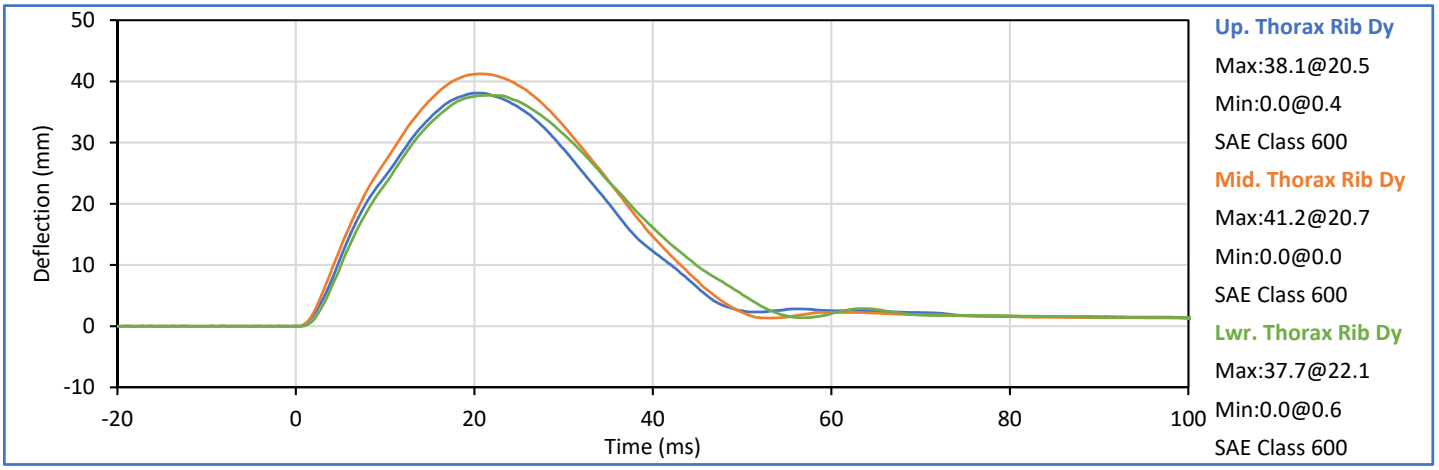
Approved By: P. Puzzuto

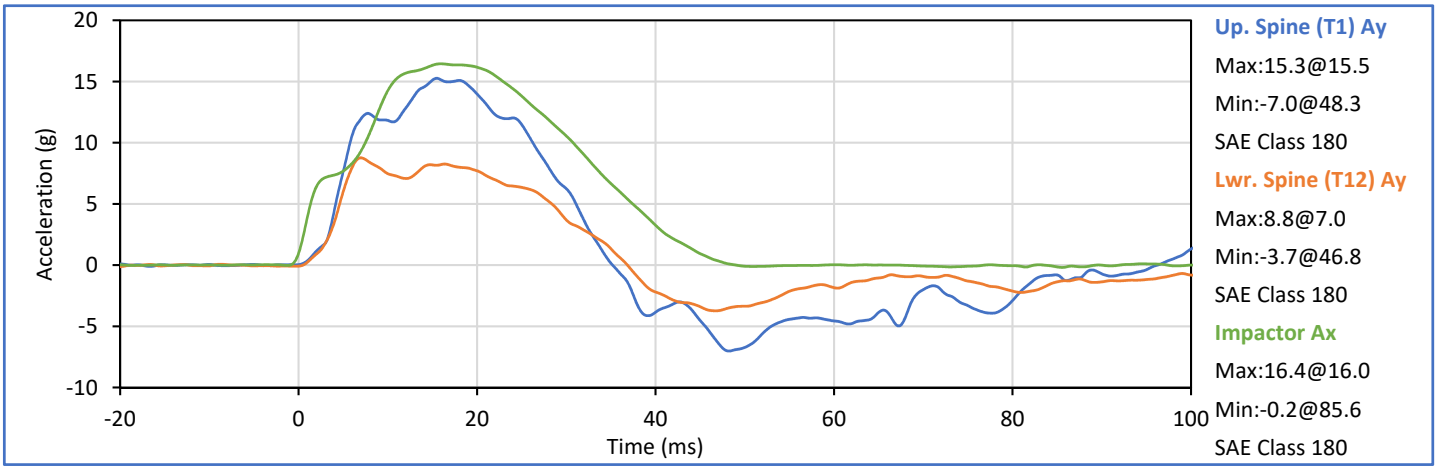
Applus IDIADA
KARCO

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

ATD Serial No.: 299 Test Date: 2019-05-24

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Humidity	%	10	70	40	Pass
Impactor Velocity	m/s	4.20	4.40	4.23	Pass
Peak Upper Rib Dy	mm	32.0	40.0	38.1	Pass
Peak Middle Rib Dy	mm	39.0	45.0	41.2	Pass
Peak Lower Rib Dy	mm	35.0	43.0	37.7	Pass
Peak Upper Spine (T1) Ay	g	13.0	17.0	15.3	Pass
Peak Lower Spine (T12) Ay	g	7.0	11.0	8.8	Pass
Peak Impactor Ax	g	14.0	18.0	16.4	Pass
			Overall Test Results		Pass





Technician: J. Hernandez

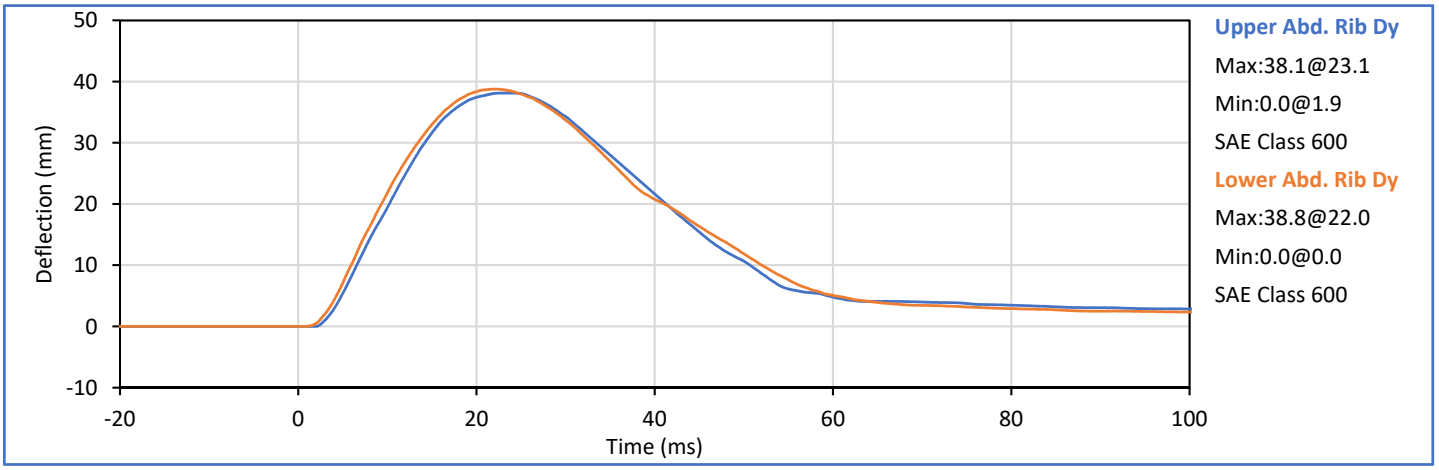
Approved By: P. Puzzuto

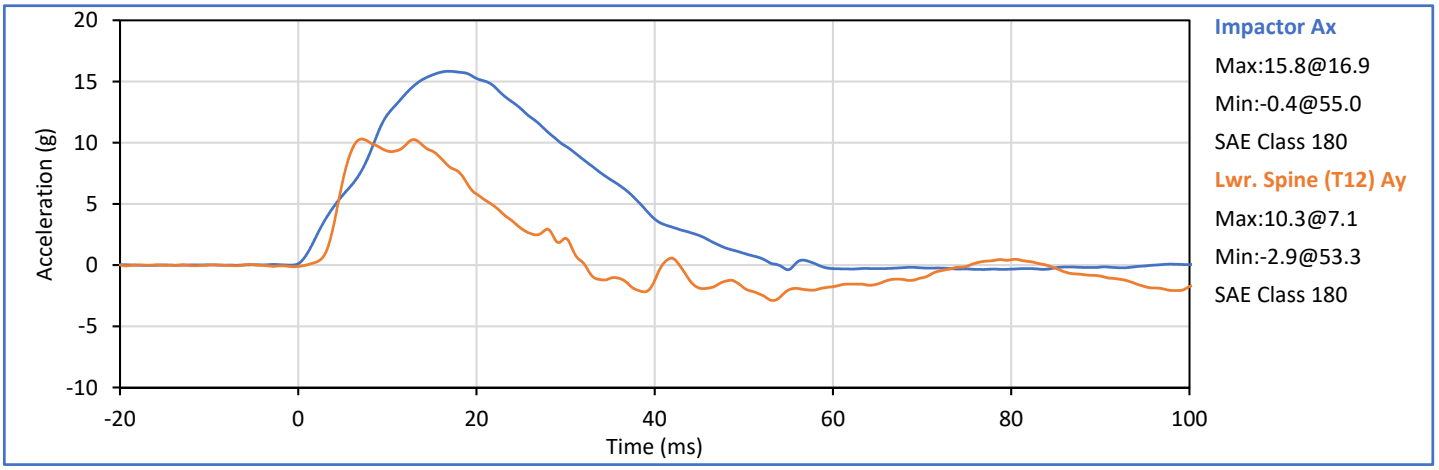
Applus IDIADA
KARCO

SID-IIs Small Side Impact ATD
Abdomen Impact

ATD Serial No.: 299 Test Date: 2019-05-24

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Humidity	%	10	70	40	Pass
Impactor Velocity	m/s	4.20	4.40	4.30	Pass
Peak Upper Abdomen Rib Dy	mm	36.0	47.0	38.1	Pass
Peak Lower Abdomen Rib Dy	mm	33.0	44.0	38.8	Pass
Peak Lower Spine T12 Ay	mm	9.0	14.0	10.3	Pass
Peak Impactor Ax	g	12.0	16.0	15.8	Pass
			Overall Test Results		Pass





Technician: J. Hernandez

Approved By: P. Puzzuto

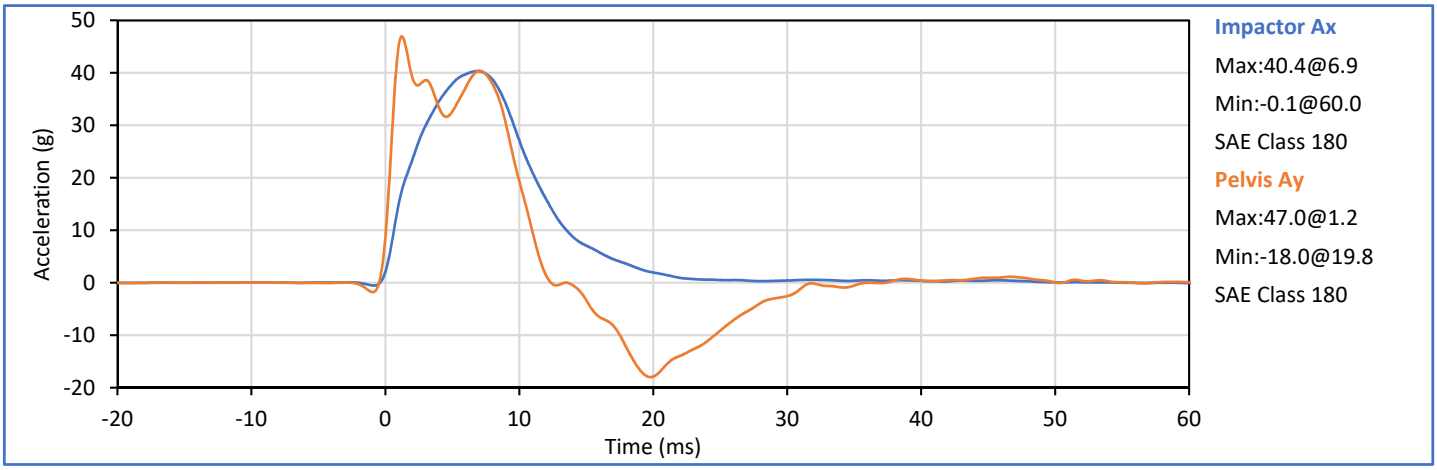
Applus IDIADA
KARCO

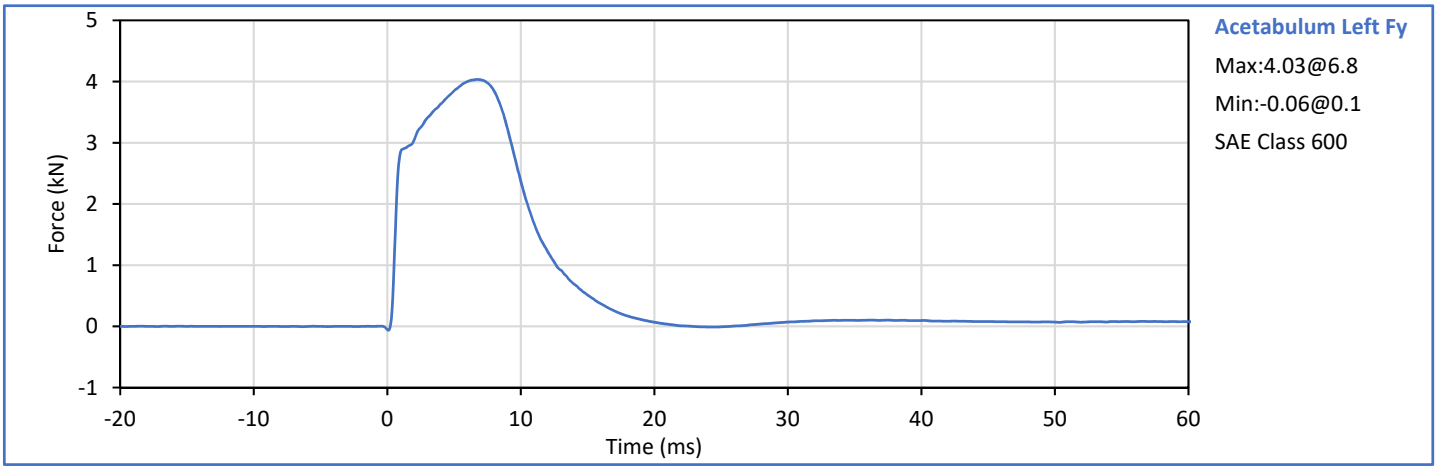
SID-IIs Small Side Impact ATD
Pelvis Acetabulum Impact

ATD Serial No.: 299 Test Date: 2019-05-24

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Humidity	%	10	70	42	Pass
Impactor Velocity	m/s	6.60	6.80	6.67	Pass
Peak Acetabulum Fy	kN	3.60	4.30	4.03	Pass
Pelvis Ay after 6ms	g	34.0	42.0	40.4	Pass
Peak Impactor Ax	g	38.0	47.0	40.4	Pass
			Overall Test Results		Pass

Pelvis Plug S/N: 11446 (SACO)





Technician: J. Hernandez

Approved By: P. Puzzuto

ATD Serial No.: 299 Test Date: 2019-05-24

Pelvis Plug S/N: 11446 (SACO)

SACO RESEARCH

SID-IIs Pelvis Plug Certification Test

Plug S/N 11446
Test Number 2915
Report Number 2912
Test Date 8/30/2016 9:07:07 AM

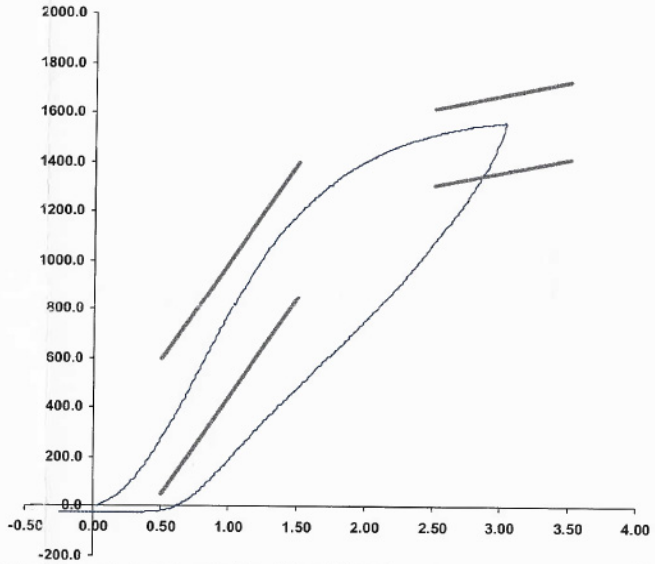
	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	279.70	50.00	600.00
Force @ 1.5 mm (N)	1,192.07	850.00	1,400.00
Force @ 2.5 mm (N)	1,512.46	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,560.39	1,361.00	1,673.00

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

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

Notes:

Force (-N) vs Extension (-mm)



Operator DC

Part Number 180-4450

Template No 107 30-Aug-16
SACO Research

By : DC Date : 8/30/16

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

Applus IDIADA
KARCO

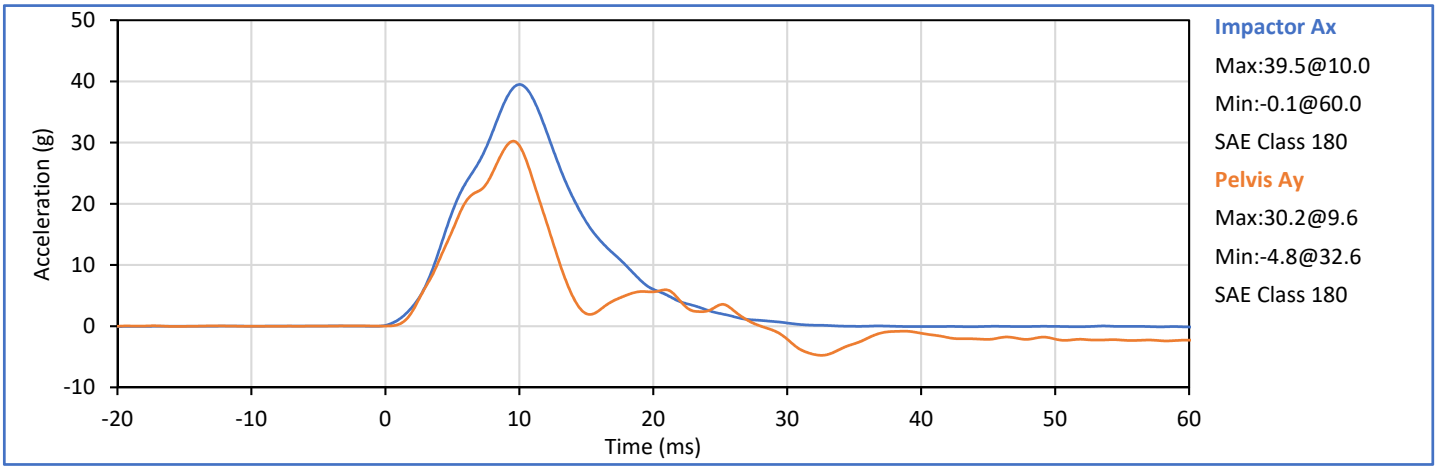
SID-IIs Small Side Impact ATD
Pelvis Iliac Impact

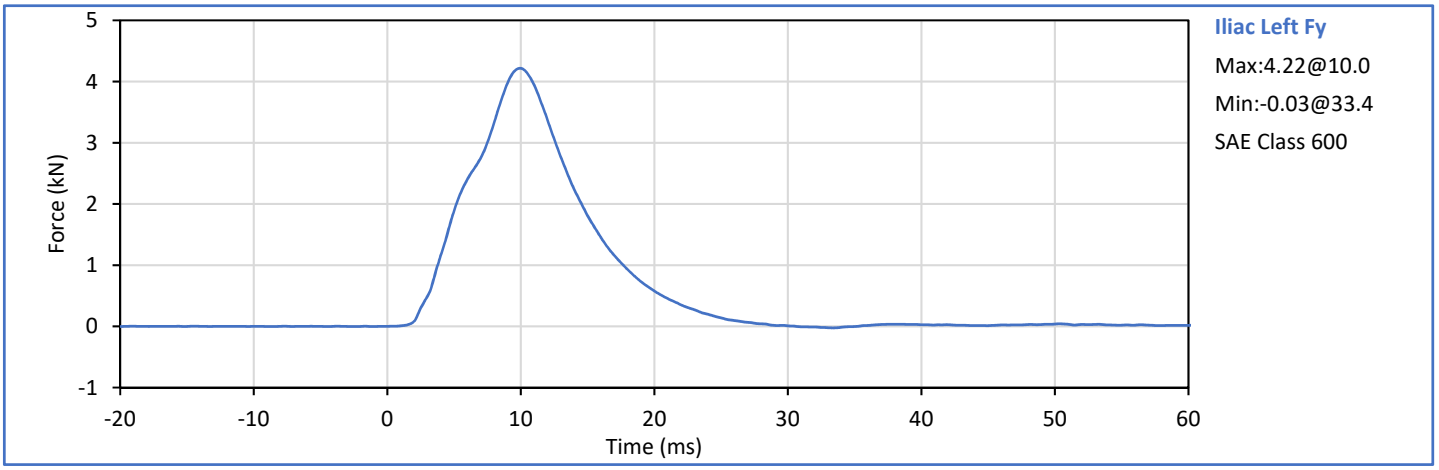
ATD Serial No.: 299 Test Date: 2019-05-24

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Humidity	%	10	70	44	Pass
Impactor Velocity	m/s	4.20	4.40	4.30	Pass
Peak Iliac Fy	kN	4.10	5.10	4.22	Pass
Pelvis Ay after 6ms	g	28.0	39.0	30.2	Pass
Peak Impactor Ax	g	36.0	45.0	39.5	Pass
			Overall Test Results		Pass

Pelvis Plug S/N: 12228 (SACO) *

* Plug is not impacted and remains certified





Technician: J. Hernandez

Approved By: P. Puzzuto

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

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

Table 1a - Driver ATD Instrumentation

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

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

Sensor Location	Sensor S\N	Mfr	Model	Cal Due
Head Rotation Rate X	ARS15063	DTS	ARS PRO-8k (2000Hz)	2019-09-06
Head Rotation Rate Y	ARS15064	DTS	ARS PRO-8k (2000Hz)	2019-09-06
Head Rotation Rate Z	ARS15065	DTS	ARS PRO-8k (2000Hz)	2019-09-06

Table 2 - Vehicle Instrumentation

Sensor Location	Sensor S\N	Mfr	Model	Cal Due
Vehicle CG Ax	A265917	MSI	52F-2000	2019-07-05
Vehicle CG Ay	A265882	MSI	52F-2000	2019-07-05
Vehicle CG Az	A265860	MSI	52F-2000	2019-07-05
Left Floor Sill Ay	A217308	MSI	52F-2000	2019-11-28
A-Pillar Sill Ay	A148315	MSI	52F-2000	2019-11-06
A-Pillar Low Ay	A145933	MSI	52F-2000	2019-11-06
A-Pillar Mid Ay	A224523	MSI	52F-2000	2019-09-26
B-Pillar Sill Ay	A227277	MSI	52F-2000	2019-09-25
B-Pillar Low Ay	A208773	MSI	52F-2000	2019-09-21
B-Pillar Mid Ay	A185596	MSI	52F-2000	2019-09-18
Driver Seat Track at H-Point Ay	A273043	MSI	52F-2000	2019-09-12
Engine Top Ax	A266328	MSI	52F-2000	2019-07-05
Engine Top Ay	A273424	MSI	52F-2000	2019-09-17
Firewall Ay	A254874	MSI	52F-2000	2019-06-19
Right Roof Ay	A273454	MSI	52F-2000	2019-09-12
Right Floor Sill Ay	A273413	MSI	52F-2000	2019-09-17
Rear Floorpan Ax	A185683	MSI	52F-2000	2019-11-07
Rear Floorpan Ay	A185575	MSI	52F-2000	2019-09-21

Table 3 - Rigid Pole Instrumentation

Sensor Location	Sensor S\N	Mfr	Model	Cal Due
Load Cell Pole Barrier #1 Force Y	131822A	Interface	1220-FS	2020-05-06
Load Cell Pole Barrier #2 Force Y	132304A	Interface	1220-FS	2020-05-06
Load Cell Pole Barrier #3 Force Y	19477	Interface	1220-FS	2020-05-06
Load Cell Pole Barrier #4 Force Y	19325	Interface	1220-FS	2020-05-06
Load Cell Pole Barrier #5 Force Y	131827A	Interface	1220-FS	2020-05-06
Load Cell Pole Barrier #6 Force Y	132302A	Interface	1220-FS	2020-05-06
Load Cell Pole Barrier #7 Force Y	19267	Interface	1220-FS	2020-05-06
Load Cell Pole Barrier #8 Force Y	19321	Interface	1220-FS	2020-05-06