

**REPORT NUMBER: SideNCAPPole-KAR-23-005
NEW CAR ASSESSMENT PROGRAM (NCAP)
SIDE IMPACT POLE TEST**

**HYUNDAI MOTOR MANUFACTURING ALABAMA, LLC
2023 HYUNDAI SANTA CRUZ 4-DOOR TRUCK**

NHTSA No: M20234201

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



MARCH 9, 2023

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
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Approval Date: _____ March 9, 2023

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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		15. Supplementary Notes																												
16. Abstract A 32.2 km/h 75° rigid pole side NCAP impact test was conducted on the subject 2023 Hyundai Santa Cruz 4-Door Truck 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 February 23, 2023. The impact velocity was 32.47 km/h and the outside ambient temperature at the struck (driver's) side of the vehicle was 5.6°C. The target vehicle's maximum post-test static crush was 379 mm located at level 3. The test vehicle's occupant performance data is as follows:																														
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="width: 35%;">Measurement Description</th> <th colspan="3" style="text-align: center;">Driver ATD (SID-IIs)</th> </tr> <tr> <th style="width: 15%;">Units</th> <th style="width: 15%;">Threshold</th> <th style="width: 35%;">Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td></td> <td style="text-align: center;">1000</td> <td style="text-align: center;">303.279</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td style="text-align: center;">g</td> <td style="text-align: center;">82</td> <td style="text-align: center;">37.317</td> </tr> <tr> <td>Total Pelvic Force (Sum of Acetabular and Iliac Forces)</td> <td style="text-align: center;">N</td> <td style="text-align: center;">5525</td> <td style="text-align: center;">3017.126</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td style="text-align: center;">mm</td> <td style="text-align: center;">38</td> <td style="text-align: center;">26.389</td> </tr> <tr> <td>Maximum Abdominal Rib Deflection</td> <td style="text-align: center;">mm</td> <td style="text-align: center;">45</td> <td style="text-align: center;">17.004</td> </tr> </tbody> </table>				Measurement Description	Driver ATD (SID-IIs)			Units	Threshold	Result	Head Injury Criteria (HIC ₃₆)		1000	303.279	Resultant Lower Spine Acceleration	g	82	37.317	Total Pelvic Force (Sum of Acetabular and Iliac Forces)	N	5525	3017.126	Maximum Thoracic Rib Deflection	mm	38	26.389	Maximum Abdominal Rib Deflection	mm	45	17.004
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17. Key Words New Car Assessment Program (NCAP) Side Impact Pole Part 572V SID-IIs		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Admin. Office of Crashworthiness Standards (NRM-100) 1200 New Jersey Ave., SE Washington, DC 20590																												
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SECTION 1

TEST PURPOSE AND SUMMARY OF TEST

PURPOSE

This side impact test is part of the 2022 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract number 693JJ920D000015. The purpose of this test is to generate comparative side impact performance in a 2023 Hyundai Santa Cruz 4-door truck. 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 2023 Hyundai Santa Cruz 4-door truck. The subject vehicle was towed into the rigid pole at an angle of 75.6° and a velocity of 32.47 km/h. The test was conducted by Applus IDIADA KARCO Engineering, LLC. in Adelanto, California on February 23, 2023. 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.

SECTION 1 ...(CONTINUED)
TEST PURPOSE AND SUMMARY OF TEST

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	303.279
Lower Spine (T12) Resultant Acceleration	g	82	37.317
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3017.126
Maximum Thoracic Rib Deflection	mm	38*	26.389
Maximum Abdominal Rib Deflection	mm	45*	17.004

*Proposed IARV

Supplemental restraint information is given below:

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	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

Both 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.

- Left Lower B-Post AY, Channel Failed at 74.0 ms.
- Load Cell Pole #8 FY, Channel Failed, No Data

SECTION 2

OCCUPANT AND VEHICLE INFORMATION/DATA SHEETS

Test Vehicle: 2023 Hyundai Santa Cruz 4-Door Truck NHTSA No. M20234201

Test Program: NCAP Side Pole Impact Test Test Date: 02/23/23

CONVERSION FACTORS

Quantity	Typical Application	Std Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	miles/hr	km/hr	1.609344
Length or Distance	Measurements	in	mm	25.4
Volume	Fuel Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.574
Pressure	Tire Pressures	lbf/in ²	kPa	6.895
Temperature	General Use	°F	°C	$=(T_f - 32)/1.8$
Force	Dynamic Forces	lbf	N	4.448
Moment	Torque	lbf-ft	N•m	1.355

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2023 Hyundai Santa Cruz 4-Door Truck NHTSA No. M20234201
 Test Program: NCAP Side Pole Impact Test Test Date: 02/23/23

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	M20234201
Model Year	2023
Make	Hyundai
Model	Santa Cruz
Body Style	4-Door Truck
VIN	5NTJC4AE3PH055375
Body Color	Black
Odometer Reading (km / mi)	219 / 136
Engine Displacement (L)	2.5
Type / No. of Cylinders	Inline-4
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	8
Overdrive	Yes
Final Drive	AWD
Roof Rack	Yes
Sunroof / T-Top	Yes
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	Yes

Traction Control System (TCS)	Yes
Auto-Leveling System	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	No
Driver Load Limiter	Yes
Rear Pass. Load Limiter	No
Other Safety Restraint	Yes

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Hyundai Motor Manufacturing Alabama LLC
Date of Manufacture	Dec-22
Vehicle Type	Truck

GVWR (kg)	2475
GAWR Front (kg)	1200
GAWR Rear (kg)	1450

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity	2	3		5	
Capacity Weight (VCW) (kg)				640.0	A
DSC x 68.04 (kg)				340.2	B
Cargo Weight (RCLW) (kg)				136.0	A-B*

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

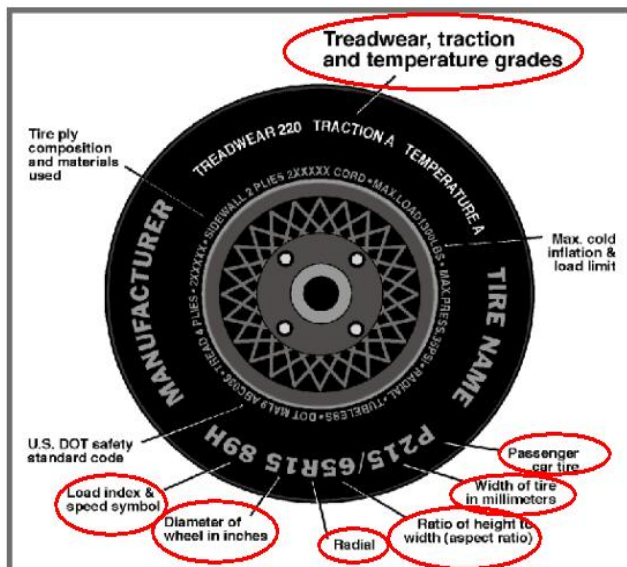
VEHICLE SEAT TYPE

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

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2023 Hyundai Santa Cruz 4-Door Truck NHTSA No. M20234201
 Test Program: NCAP Side Pole Impact Test Test Date: 02/23/23



Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	240	240
Recommended Tire Size	245/60 R18	245/60 R18
Tire Size on Vehicle	245/60 R18	245/60 R18
Tire Manufacturer	Kumho	Kumho
Tire Model	Crunhen HP71	Crunhen HP71
Treadware	540	540
Traction Grade	A	A
Temperature Grade	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Steel, 2 Polyamide	2 Steel, 2 Polyamide
Load Index/Speed Symbol	150H	150H
Tire Material	Polyester, Steel, Polyamide	Polyester, Steel, Polyamide
DOT Safety Code Left	000 J8YA8E 4822	000 J8YA8E 4822
DOT Safety Code Right	000 J8YA8E 4822	000 J8YA8E 4822

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2023 Hyundai Santa Cruz 4-Door Truck NHTSA No. M20234201
 Test Program: NCAP Side Pole Impact Test Test Date: 02/23/23

TIRE PRESSURES

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

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	477.5	387.5		484.5	486.0		487.0	475.5	
Right	kg	488.0	365.0		471.5	454.5		490.0	445.5	
Ratio	%	56.2%	43.8%	100.0%	50.4%	49.6%	100.0%	51.5%	48.5%	100.0%
Total	kg	965.5	752.5	1718.0	956.0	940.5	1896.5	977.0	921.0	1898.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1718.0	A
Actual Weight of 1 SID II-s ATD Used	kg	49.0	B
Rated Cargo/Luggage Wt (RCLW)	kg	136.0	C
Calculated Vehicle Target Wt (TVTW)	kg	1903.0	A+B+C

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

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

TEST VEHICLE ATTITUDE AND CG

Measurement Description	Units	As Delivered	As Tested	Fully Loaded	Meets Requirement***
Driver Door Sill Angle (front-to-rear)*	°	0.2	-0.2	-0.4	Yes
Front Passenger Sill Angle (front-to-rear)*	°	1.1	0.7	0.7	Yes
Front Bumper-Line Angle (left-to-right)**	°	0.5	0.5	0.6	Yes
Rear Bumper-Line Angle (left-to-right)**	°	-0.3	0.4	0.5	Yes
Vehicle CG (Aft of Front Axle)	mm	1318	1492	1460	
Vehicle CG (Left (+)/Right (-) from Longitudinal Centerline)	mm	6	19	12	

*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: 2023 Hyundai Santa Cruz 4-Door Truck NHTSA No. M20234201
Test Program: NCAP Side Pole Impact Test Test Date: 02/23/23

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Bedliner	17.0

TEST SURFACE MARKINGS

	Distance from 75° Impact Location Line (mm)
Fore 25 mm target	3
Aft 25 mm target	2

DATA SHEET NO. 2

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

Test Vehicle: 2023 Hyundai Santa Cruz 4-Door Truck NHTSA No. M20234201
 Test Program: NCAP Side Pole Impact Test Test Date: 02/23/23

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	4.3	0.0	2.2
Front Passenger Seat	28.0	0.0	10.0
Front Center Seat			
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCR Height (mm)	SCR Height Position	SCR Height (mm)		
				Rearmost	Mid Fore/Aft	Forwardmost
Driver Seat	2.2	729	Max	732	738	751
			Mid	715	723	729
			Min	699	707	712
Front Passenger Seat	10.0	650	Max			
			Mid	634	645	650
			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: 2023 Hyundai Santa Cruz 4-Door Truck NHTSA No. M20234201
 Test Program: NCAP Side Pole Impact Test Test Date: 02/23/23

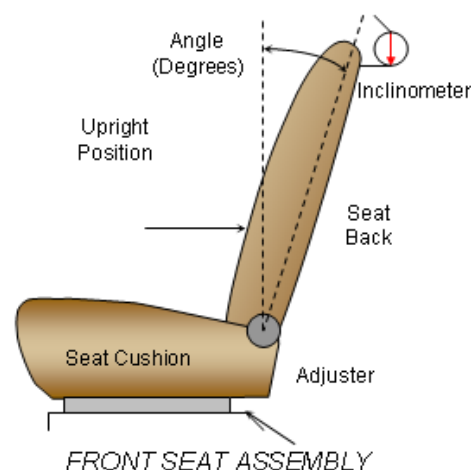
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position From Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	238		0	
Front Passenger Seat	241	37	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 an inclinometer along the bottom of the headrest post.



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degree	Detent*
Driver Seat w/Seated Dummy	64.0		2.8	
Front Passenger Seat	65.4		2.8	
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: 2023 Hyundai Santa Cruz 4-Door Truck NHTSA No. M20234201

Test Program: NCAP Side Pole Impact Test Test Date: 02/23/23

SEAT BELT ANCHORAGE ADJUSTMENT

Seat belt anchorages are adjusted in accordance with the information provided by the manufacturer on Form No. 1. The positions are marked H, M2, M1, L from top to bottom.

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

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	5	L

DATA SHEET NO. 2 ... (CONTINUED)

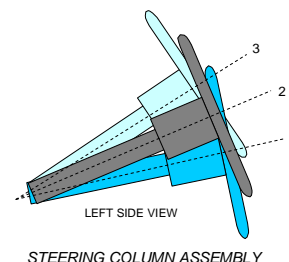
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT, AND FUEL SYSTEM DATA

Test Vehicle: 2023 Hyundai Santa Cruz 4-Door Truck NHTSA No. M20234201
 Test Program: NCAP Side Pole Impact Test Test Date: 02/23/23

STEERING COLUMN ADJUSTMENT

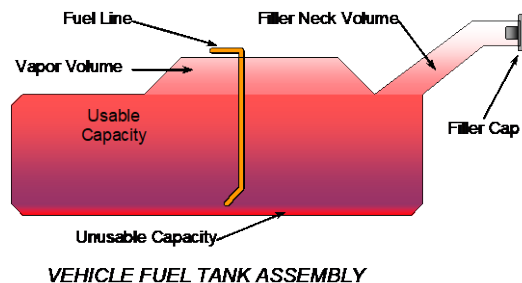
Steering wheel and column adjustments are made so that the steering wheel hub is at the center of the geometric locus it describes when it moves through its full range of motion.

	Degrees	Fore-Aft Position (mm)
Lowermost - Position 1	23.8	208
Geometric Center - Position 2	26.2	233
Uppermost - Position 3	28.6	258
Telescoping Steering Wheel Travel		50
Test Position	26.2	233



FUEL PUMP

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



FUEL TANK CAPACITY

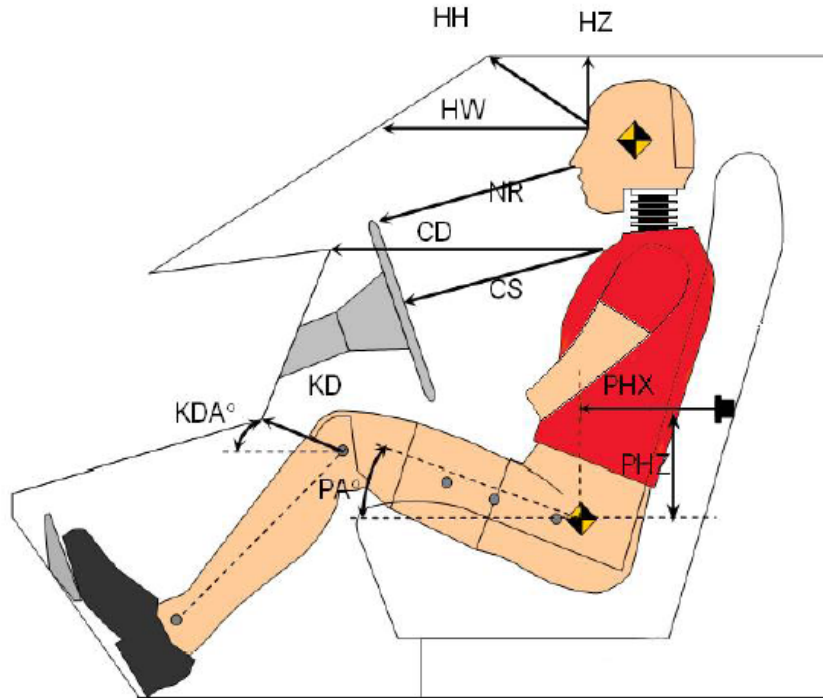
Description	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	67.00
Usable Capacity of "Optional Tank" (see Form No. 1)	
Usable Capacity of "Standard Tank" (see Owner's Manual)*	
Usable Capacity of "Optional Tank" (see Owner's Manual)*	
93% of Usable Capacity	62.31
Actual amount of Solvent Used in Test	62.31
1/3 of Usable Capacity	22.33

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: 2023 Hyundai Santa Cruz 4-Door Truck NHTSA No. M20234201
 Test Program: NCAP Side Pole Impact Test Test Date: 02/23/23

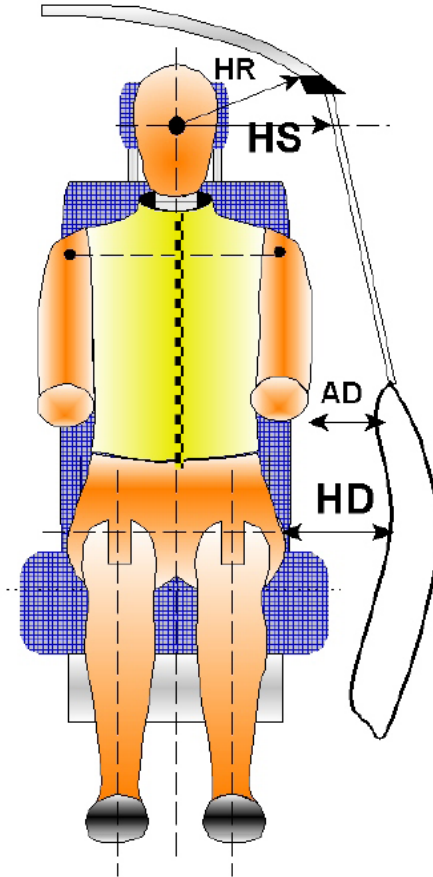


Driver Code	Description	Driver	
		Length (mm)	Angle (°)
HH	Head to Header	290	
HW	Head to Windshield	696	
HZ	Head to Roof	225	
NR	Nose to Rim	295	
CD	Chest to Dash	550	
CS	Chest to Steering Wheel	205	
KD(L)/KDA(L)°	Left Knee to Dash	149	39.2
KD(R)/KDA(R)°	Right Knee to Dash	156	31.1
PAX°	Pelvic Tilt Angle (x-axis)		21.7
PAY°	Pelvic Tilt Angle (y-axis)		0.0
PHX	Hip Point to Striker (x-axis)	296	
PHZ	Hip Point to Striker (z-axis)	181	

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2023 Hyundai Santa Cruz 4-Door Truck NHTSA No. M20234201
Test Program: NCAP Side Pole Impact Test Test Date: 02/23/23

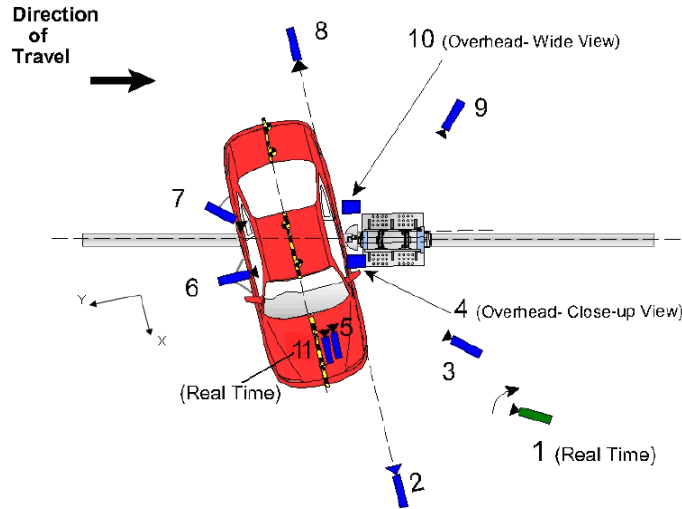


Code	Measurement Description	Units	Driver
HR	Head to Side Header	mm	263
HS	Head to Side Window	mm	338
AD	Arm to Door	mm	161
HD	Hip Point to Door	mm	195

DATA SHEET NO. 5

CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2023 Hyundai Santa Cruz 4-Door Truck NHTSA No. M20234201
 Test Program: NCAP Side Pole Impact Test Test Date: 02/23/23



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	35	1000
3	Impact Side 45° - Forward Pole View	4.10	-2.15	-1.15	25	1000
4	Overhead Close-Up View of Impact	0.00	0.00	-5.79	35	1000
5	On-Board - Dummy Front View	-1.18	-0.84	-0.83	8	1000
6	On-Board - Dummy Side View	-1.19	-0.84	-0.82	6	1000
7	On-Board - Dummy Rear Oblique View	0.90	-0.92	-0.55	6	1000
8	Rear Ground Level - Impact View	-1.30	1.68	-1.26	35	1000
9	Impact Side 45° - Rearward Pole View	-8.02	0.04	-1.01	25	1000
10	Overhead Wide View of Impact	-0.06	0.22	-5.79	15	1000
11	Real Time Dummy Front View	0.88	-0.96	-0.54		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

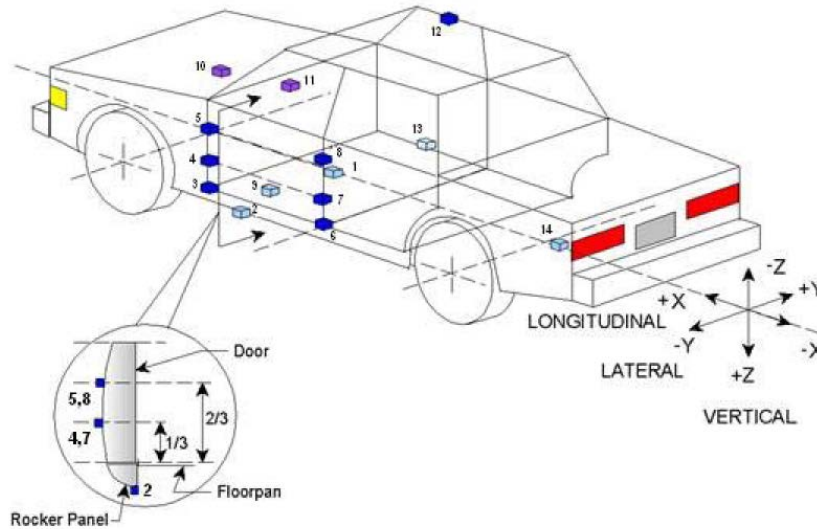
INSTRUMENTATION

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

DATA SHEET NO. 6

TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2023 Hyundai Santa Cruz 4-Door Truck NHTSA No. M20234201
 Test Program: NCAP Side Pole Impact Test Test Date: 02/23/23

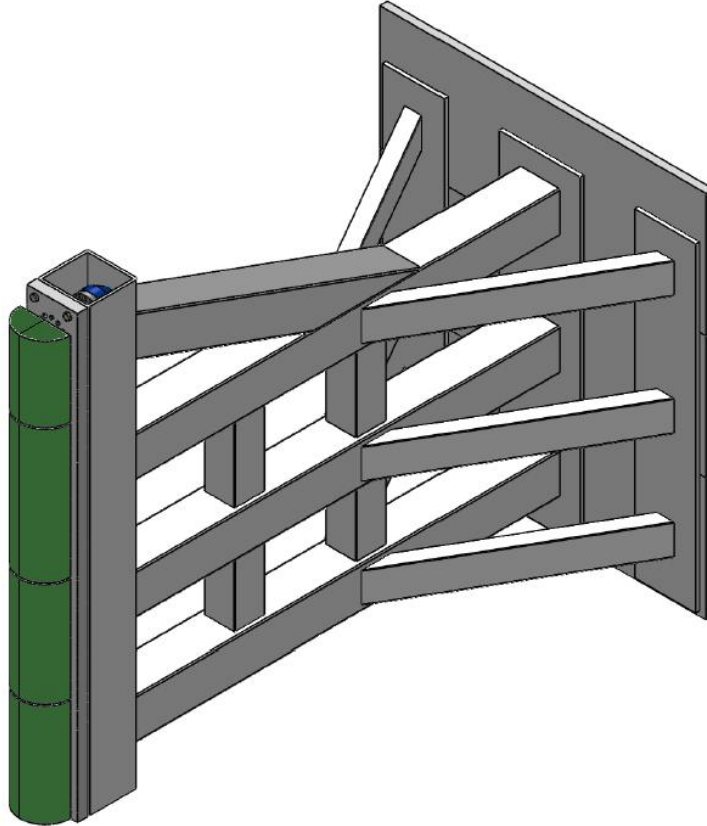


Loc. No.	Sensor Description	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	1547	0	-666
2	Left Floor Sill	1344	-693	-408
3	A-Pillar Sill	1415	710	-499
4	A-Pillar Low	17	770	-800
5	A-Pillar Mid	1515	770	-1020
6	B-Pillar Sill	2147	715	-434
7	B-Pillar Low	2322	730	-767
8	B-Pillar Mid	2355	730	-1066
9	Driver Seat Track	2413	152	-572
10	Engine Top	547	477	-888
11	Firewall	926	0	-999
12	Right Roof	1843	610	-1444
13	Right Floor Sill	1340	693	-440
14	Rear Floorpan	3460	0	-1345

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: 2023 Hyundai Santa Cruz 4-Door Truck NHTSA No. M20234201
Test Program: NCAP Side Pole Impact Test Test Date: 02/23/23



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: 2023 Hyundai Santa Cruz 4-Door Truck NHTSA No. M20234201
 Test Program: NCAP Side Pole Impact Test Test Date: 02/23/23

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Driver SID-IIs Dummy
Face	Curtain Airbag, Torso/Pelvis Airbag
Top of Head	Curtain Airbag
Left Side of Head	Curtain Airbag, Torso/Pelvis Airbag
Back of Head	Headrest, Curtain Airbag
Left Shoulder	Torso/Pelvis Airbag
Upper Torso	Torso/Pelvis Airbag, Seatback Bolster
Lower Torso	Torso/Pelvis Airbag, Seatback Bolster
Left Hip	Torso/Pelvis Airbag, Seat Cushion Bolster
Left Knee	None

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: 2023 Hyundai Santa Cruz 4-Door Truck NHTSA No. M20234201
 Test Program: NCAP Side Pole Impact Test Test Date: 02/23/23

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	Good
Sill Separation	None
Windshield Damage	Broken, Separated from Roof
Side Window Damage	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		
Knee Airbag	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	

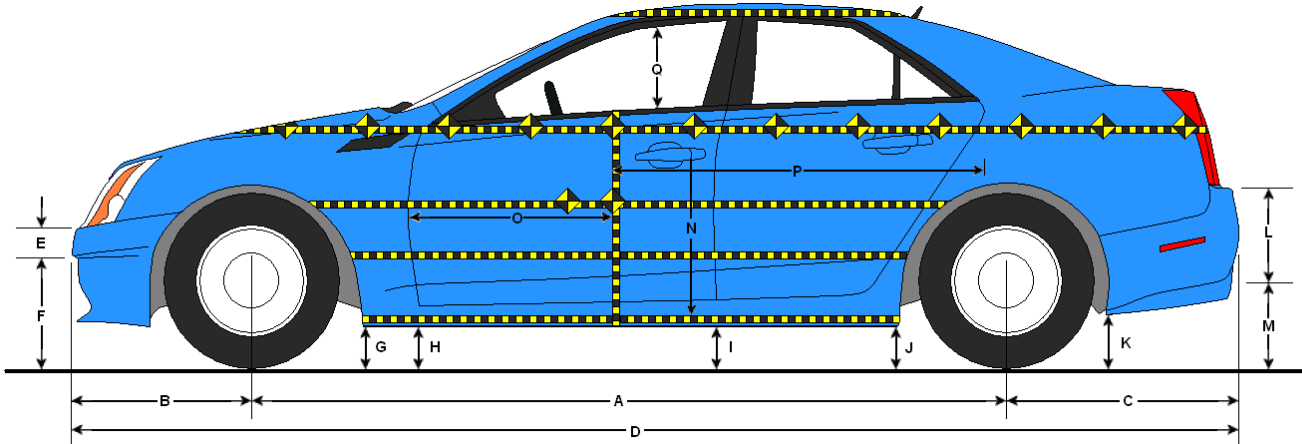
IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vertical Impact Reference Line (Aft of Front Axle)(Intended Impact Point)	mm		1138
Actual Impact Point (Aft of Front Axle)	mm		1139
Horizontal Offset (+ forward / - rearward)	mm	± 38 of Intended Impact Point	-1
Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion	°	75 ± 3	75.6
Trap No. 1 Velocity (Primary)	km/h	31.4 to 33.0	32.47
Trap No. 2 Velocity (Redundant)	km/h	31.4 to 33.0	32.37

DATA SHEET NO. 9

TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2023 Hyundai Santa Cruz 4-Door Truck NHTSA No. M20234201
 Test Program: NCAP Side Pole Impact Test Test Date: 02/23/23



LEFT SIDE VIEW

All measurements in mm with tolerance of $\pm 3\text{mm}$

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

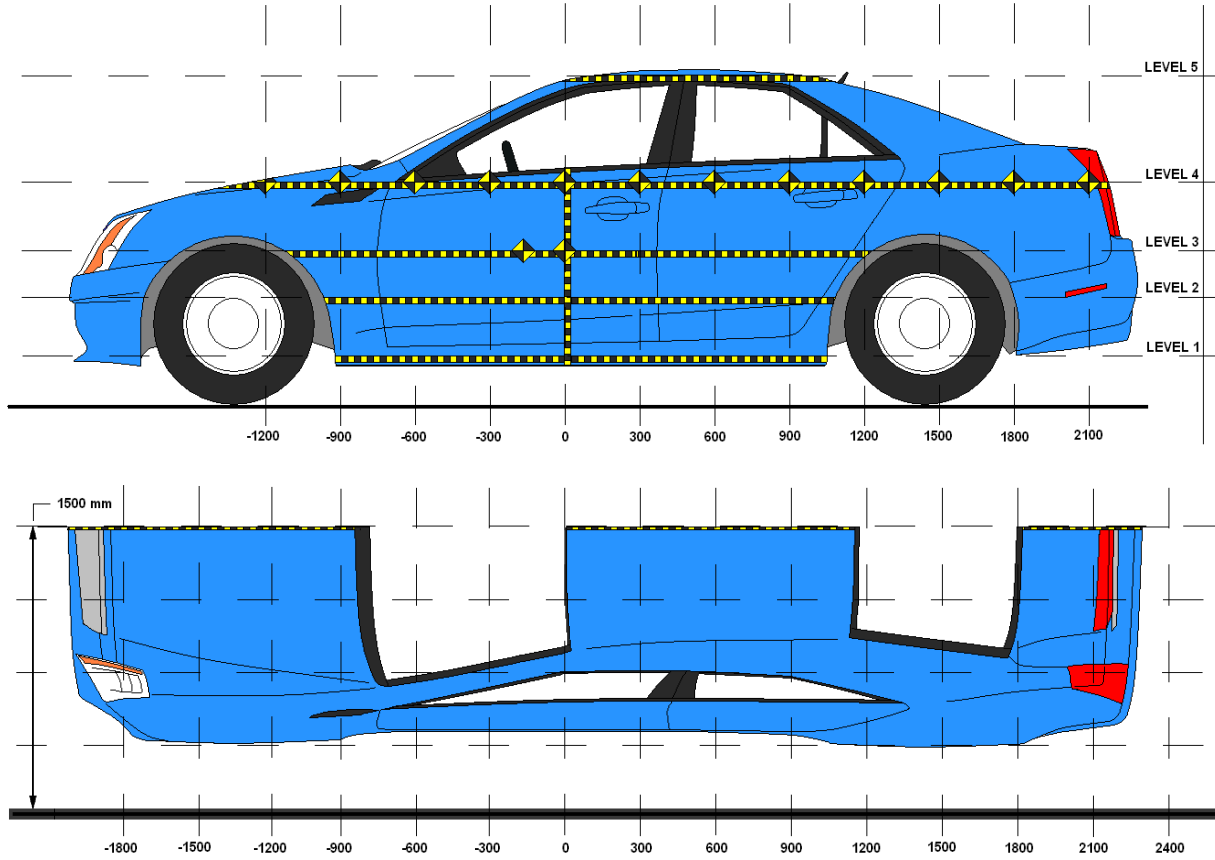
Code	Description	Pre-Test	Post-Test	Change
A	Wheelbase	3008	2902	-106
B	Front Axle to FSOV	905	907	2
C	Rear Axle to RSOV	1075	1136	61
D	Total Length at Centerline	4980	4938	-42
E	Front Bumper Thickness	85	84	-1
F	Front Bumper Bottom to Ground	530	545	15
G	Sill Height at Front Wheel Well	340	361	21
H	Sill Height at Front Door Leading Edge	343	341	-2
I	Sill Height at B-Pillar	342	350	8
J1	Sill Height at Rear Wheel Well	345	368	23
J2	Pinch Weld Height at Rear Wheel Well	327	357	30
K	Sill Height Aft of Rear Wheel Well	383	409	26
L	Rear Bumper Thickness	189	189	0
M	Rear Bumper Bottom to Ground	495	528	33
N	Sill Height to Bottom of Front Window Sill	720	769	49
O	Front Door Leading Edge to Impact CL	642	518	-124
P	Rear Door Trailing Edge to Impact CL	1423	1282	-141
Q	Front Window Opening	424	408	-16
R	Right Side Length	4240	4241	1
S	Left Side Length	4230	4090	-140
T	Vehicle Width at B-Pillar	1832	1756	-76

DATA SHEET NO. 10

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2023 Hyundai Santa Cruz 4-Door Truck NHTSA No. M20234201

Test Program: NCAP Side Pole Impact Test Test Date: 02/23/23



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

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Description	Height Above Ground (mm)	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	-374	365	0
2	Occupant H-Point	-686	377	0
3	Mid-Door	-718	379	0
4	Window Sill	-1092	280	0
5	Window Top	-1533	121	150

DATA SHEET NO. 10 ... (CONTINUED)

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2023 Hyundai Santa Cruz 4-Door Truck NHTSA No. M20234201
 Test Program: NCAP Side Pole Impact Test Test Date: 02/23/23

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

	Pre-Test (mm)					Post-Test (mm)					Crush (mm)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900				700					695					-5	
-750			540	687				549	680				9	-7	
-600	559	539	547	668		559	566	565	625		0	27	18	-43	
-450	558	547	552	648		684	641	636	669		126	94	84	21	
-300	557	552	554	660		755	736	729	773		198	184	175	113	
-150	558	555	553	654		838	833	832	849		280	278	279	195	
0	560	555	552	644	853	925	932	931	924	939	365	377	379	280	86
150	560	554	551	635	848	876	904	903	904	969	316	350	352	269	121
300	561	554	549	624	844	745	771	773	784	915	184	217	224	160	71
450	566	552	549	614	843	645	628	624	674	881	79	76	75	60	38
600	563	551	549	608	843	607	595	592	640	848	44	44	43	32	5
750	563	552	548	601	845	570	563	560	605	824	7	11	12	4	-21
900	562	551	548	594	851	534	531	528	570	805	-28	-20	-20	-24	-46
1050	560	550	540	589	851	500	500	498	536	790	-60	-50	-42	-53	-61
1200	559	539	518	584	847	466	455	458	501	770	-93	-84	-60	-83	-77
1350				582	847				470	752				-112	-95
1500				584					474					-110	
1650				582					463					-119	
1800				580					450					-130	
1950				552					436					-116	
2100															
2250															
2400															
2550															
2700															
2850															

DATA SHEET NO. 10 ... (CONTINUED)

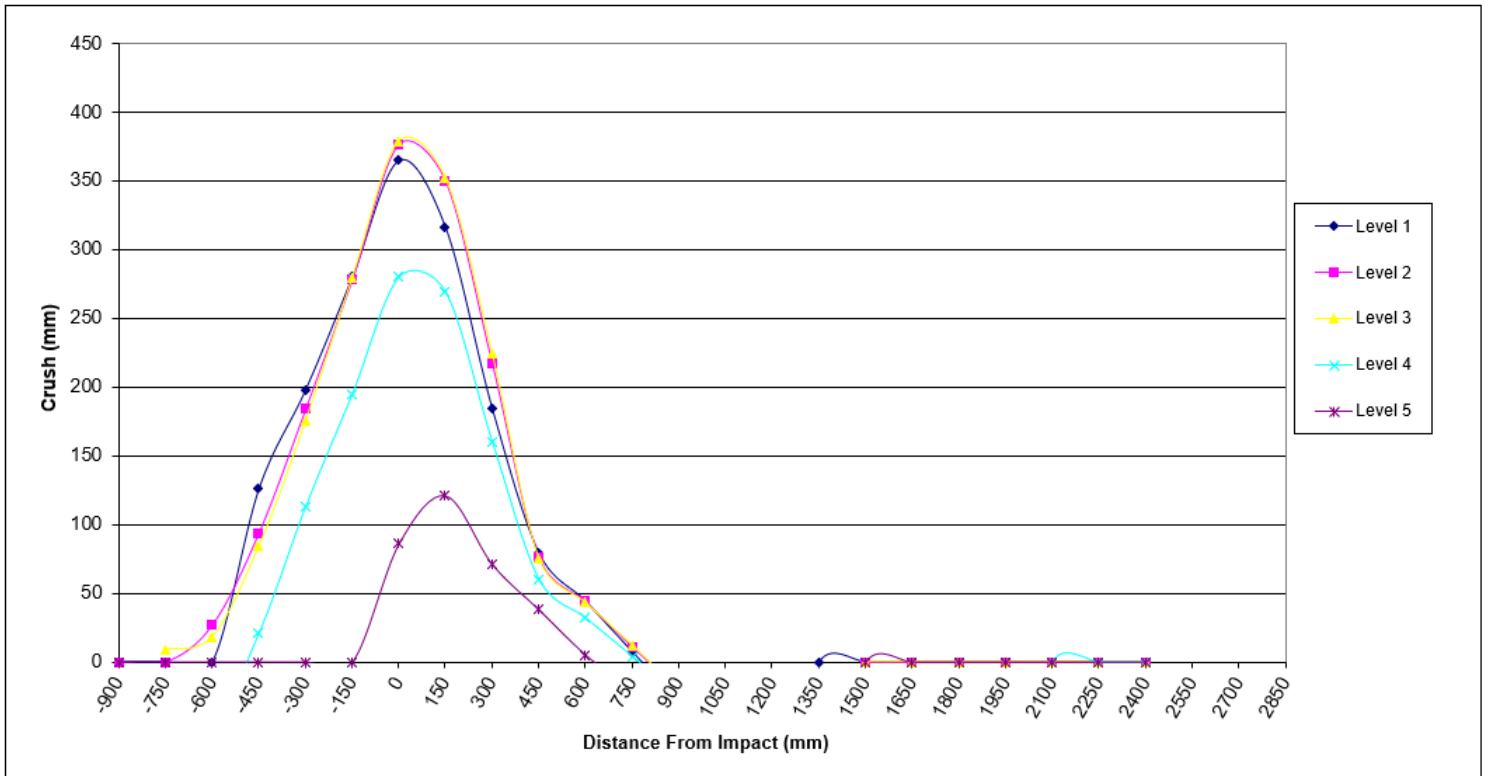
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2023 Hyundai Santa Cruz 4-Door Truck

NHTSA No. M20234201

Test Program: NCAP Side Pole Impact Test

Test Date: 02/23/23

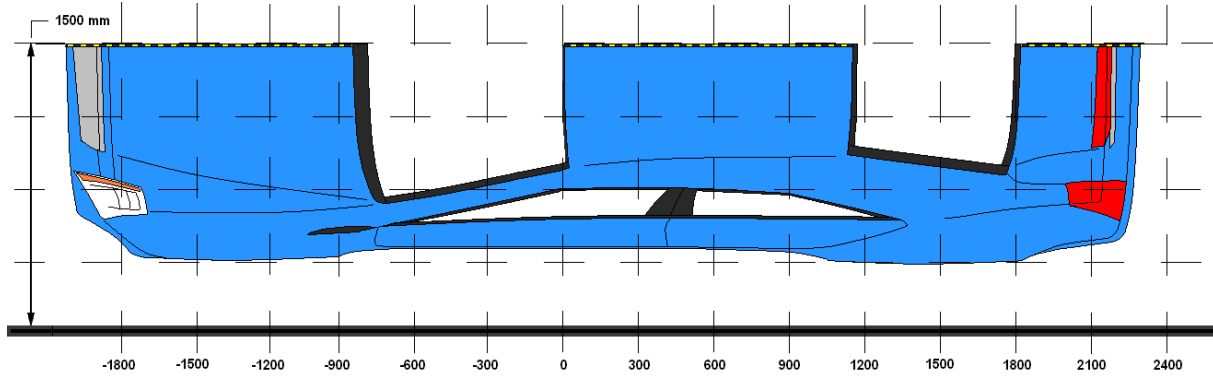


DATA SHEET NO. 11

VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2023 Hyundai Santa Cruz 4-Door Truck NHTSA No. M20234201

Test Program: NCAP Side Pole Impact Test Test Date: 02/23/23



DPD	Distance From Impact Point (mm)	Level	Pre-Test (mm)	Post-Test (mm)	Crush (mm)
1	1950	4	552	436	-116
2	1350	5	847	752	-95
3	750	3	548	560	12
4	300	3	549	773	224
5	-300	1	557	755	198
6	-900	4	700	695	-5

DATA SHEET NO. 12

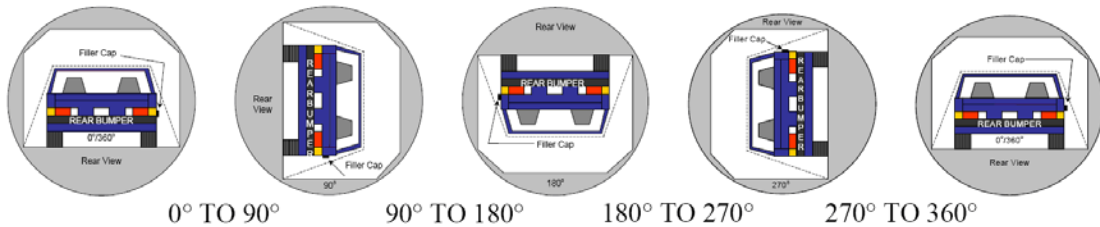
FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2023 Hyundai Santa Cruz 4-Door Truck NHTSA No. M20234201

Test Program: NCAP Side Pole Impact Test Test Date: 02/23/23

Temperature at Time of Impact: 5.6 °C Test Time: 1:35 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.



SOLVENT COLLECTION TIME TABLE IN SECONDS

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

FMVSS 301 SPILLAGE TABLE

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

SOLVENT SPILLAGE LOCATION TABLE

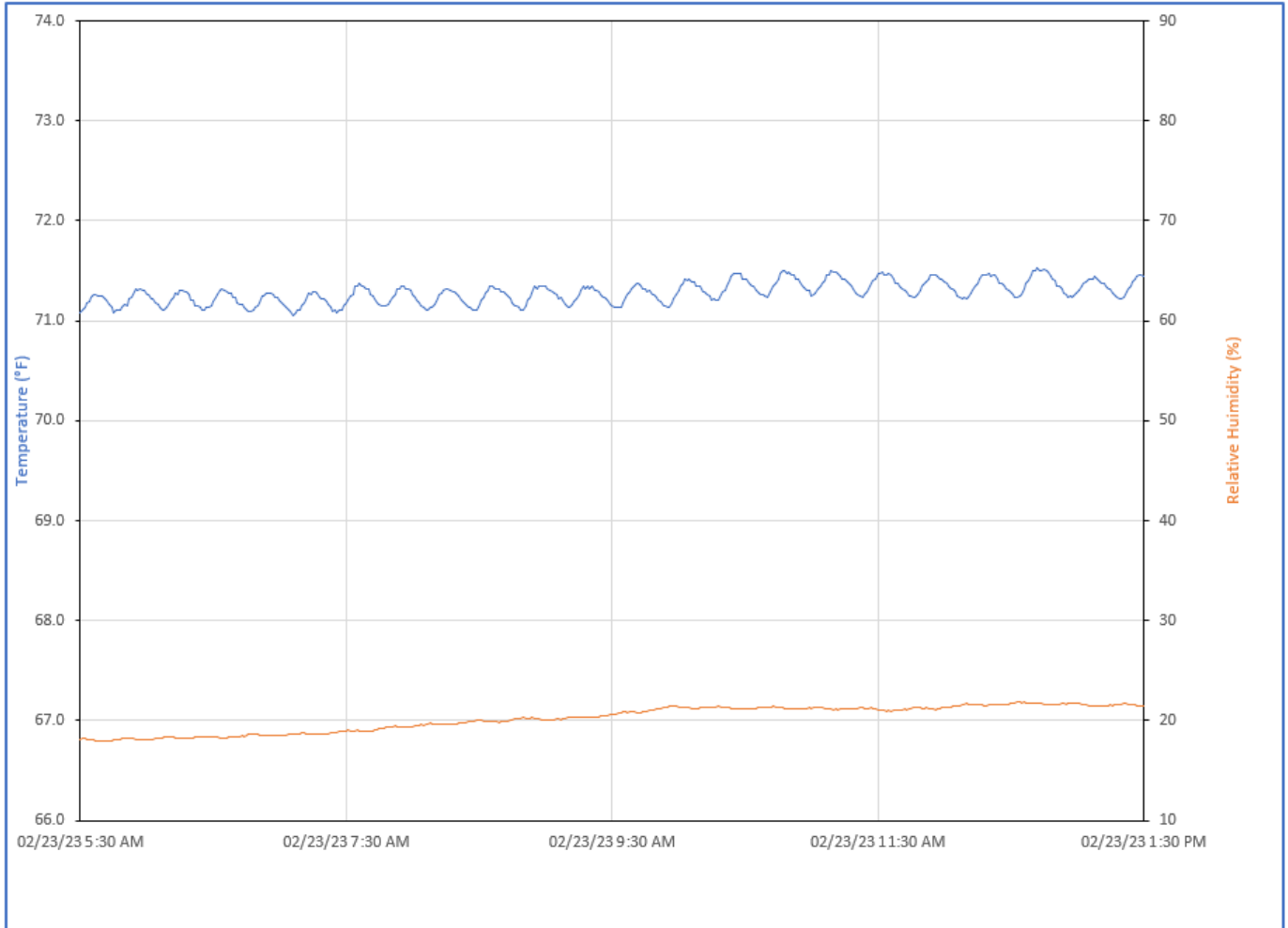
Test Phase	Spillage Location
0° To 90°	
90° To 180°	
180° To 270°	
270° To 360°	

DATA SHEET NO. 13

DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION

Test Vehicle: 2023 Hyundai Santa Cruz 4-Door Truck NHTSA No. M20234201

Test Program: NCAP Side Pole Impact Test Test Date: 02/23/23



**APPENDIX A
PHOTOGRAPHS**

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



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



FIGURE 3. Pre-Test Frontal View of Test Vehicle

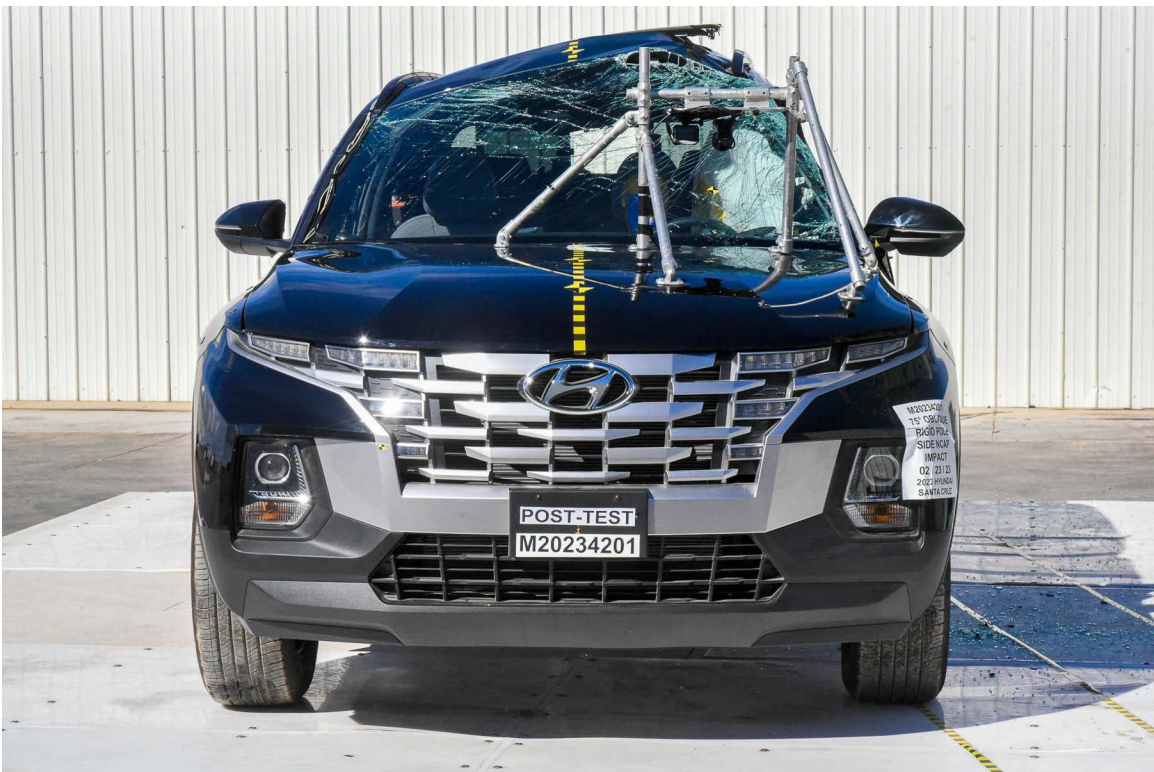


FIGURE 4. Post-Test Frontal View of Test Vehicle



FIGURE 5. Pre-Test Left Front 3/4 View of Test Vehicle



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



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



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



FIGURE 9. Pre-Test Left Rear 3/4 View of Test Vehicle



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



FIGURE 11. Pre-Test Rear View of Test Vehicle

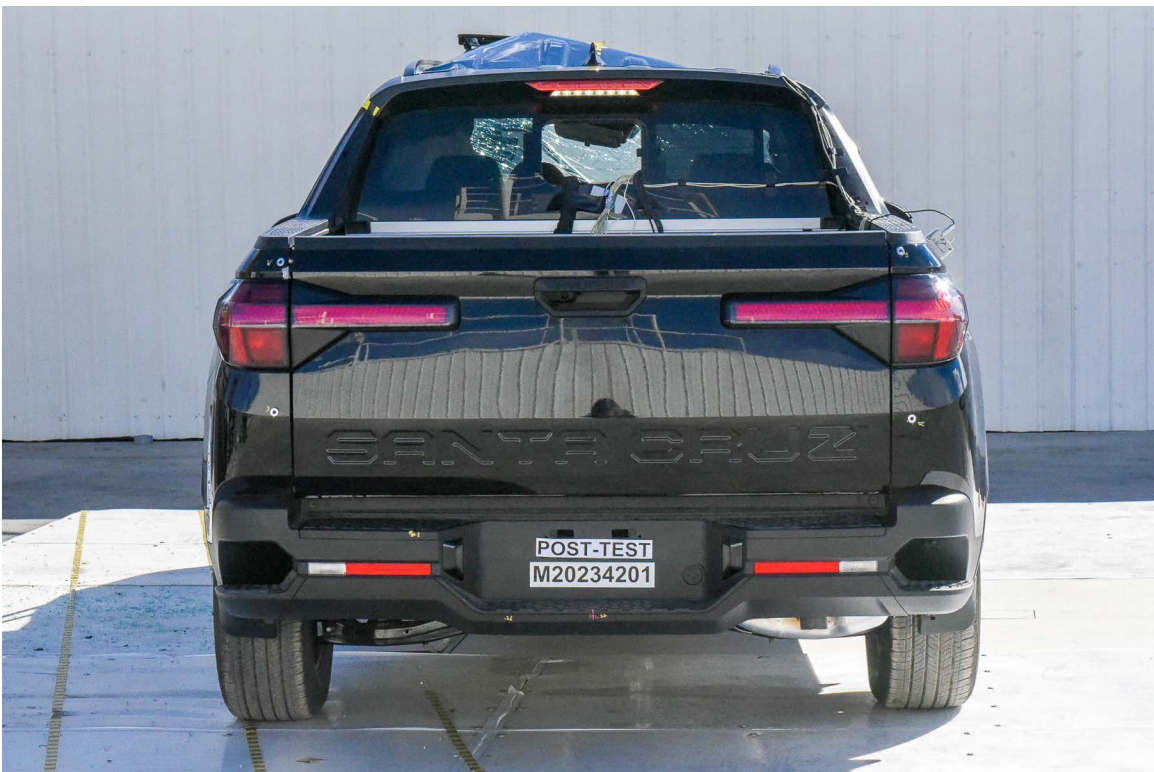


FIGURE 12. Post-Test Rear View of Test Vehicle



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



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

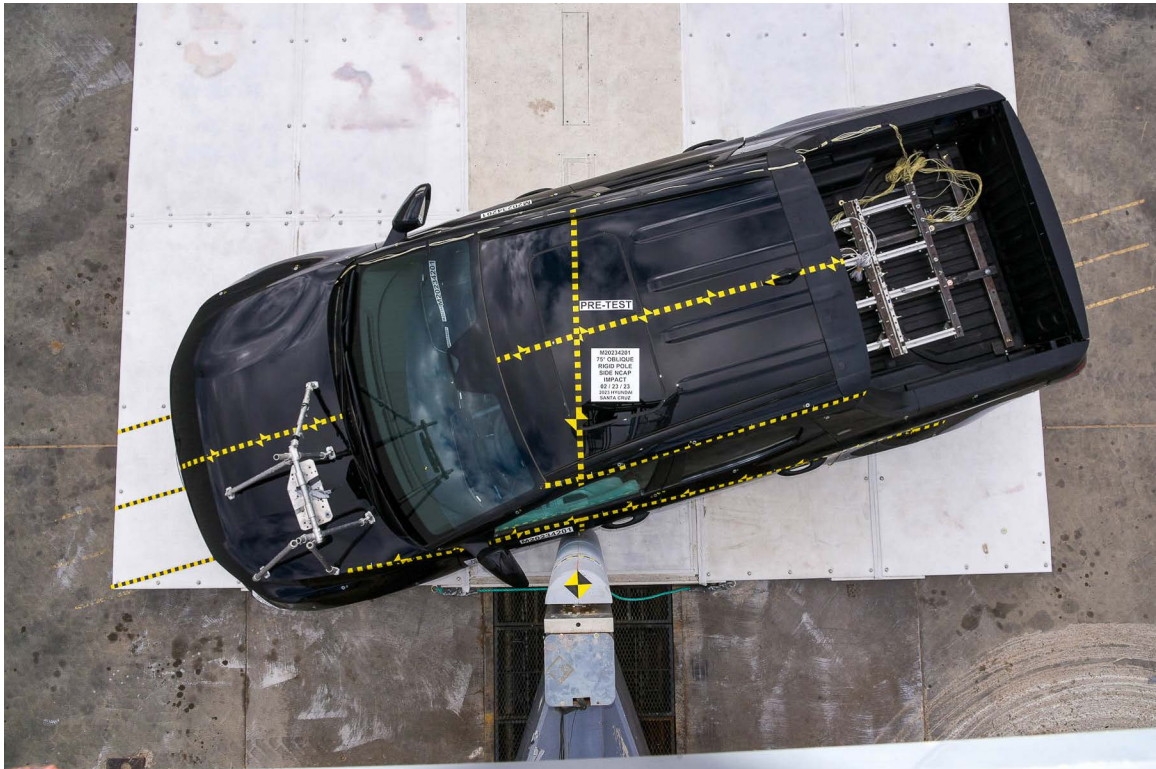


FIGURE 15. Pre-Test Overhead View of Test Area



FIGURE 16. Post-Test Overhead View of Test Area



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

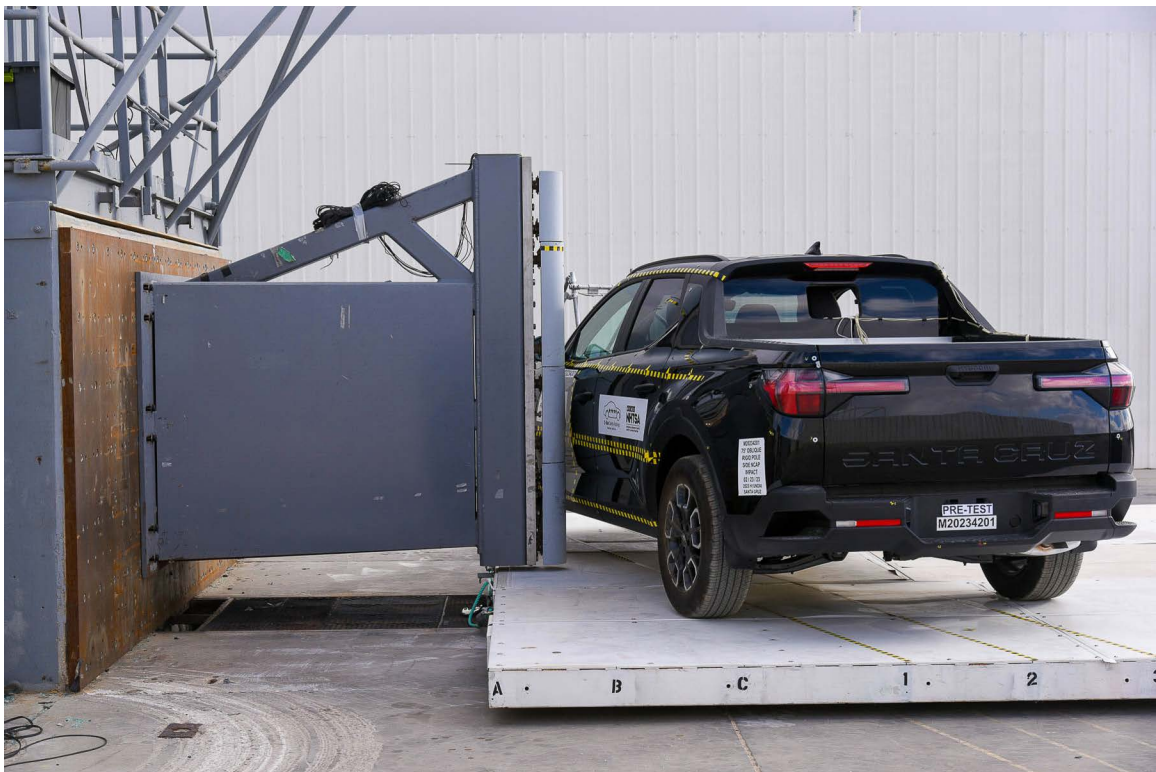


FIGURE 18. Pre-Test Right Side View of Pole Positioned Against Side of Vehicle



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
Incorrect Placard. Correct NHTSA No. M20234201



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



FIGURE 23. Pre-Test Left Side View of Dummy Showing Belt and Chalking
Incorrect Placard. Correct NHTSA No. M20234201



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
Incorrect Placard. Correct NHTSA No. M20234201



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



FIGURE 28. Pre-Test Overhead View of Seat Pan Prior to Dummy Positioning
Incorrect Placard. Correct NHTSA No. M20234201



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 Head is Level



FIGURE 32. Pre-Test Placement of Dummy's Feet
Incorrect Placard. Correct NHTSA No. M20234201



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
Incorrect Placard. Correct NHTSA No. M20234201



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
Incorrect Placard. Correct NHTSA No. M20234201



FIGURE 41. Post-Test Dummy and Door Clearance View



FIGURE 42. Pre-Test Right Side View of Dummy and Front Seat of Occupant Compartment. **Incorrect Placard. Correct NHTSA No. M20234201**



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



FIGURE 44. Pre-Test Inner Door Panel View
Incorrect Placard. Correct NHTSA No. M20234201



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.
Incorrect Placard. Correct NHTSA No. M20234201 and Test Date 2/23/23



FIGURE 47. Post-Test Dummy Close-Up Head Contact With Side Airbag View.
Incorrect Placard. Correct NHTSA No. M20234201 and Test Date 2/23/23



FIGURE 48. Post-Test Dummy Close-Up Torso Contact With Vehicle Interior View.
Incorrect Placard. Correct NHTSA No. M20234201 and Test Date 2/23/23



FIGURE 49. Post-Test Dummy Close-Up Torso Contact With Side Airbag View.
Incorrect Placard. Correct NHTSA No. M20234201 and Test Date 2/23/23



FIGURE 50. Post-Test Dummy Close-Up Pelvis Contact With Vehicle Interior View.
Incorrect Placard. Correct NHTSA No. M20234201 and Test Date 2/23/23



FIGURE 51. Post-Test Dummy Close-Up Pelvis Contact With Side Airbag View.
Incorrect Placard. Correct NHTSA No. M20234201 and Test Date 2/23/23

Photograph Not Applicable

No Dummy Knee Contact with Vehicle Interior View

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



FIGURE 53. Post-Test Right Side View of Dummy and Rear Seat of Occupant Compartment

Photograph Not Applicable

No Rear Passenger Torso Airbag Installed

FIGURE 54. Post-Test Inner Rear Passenger Torso Air Bag Deployment



FIGURE 55. Pre-Test View of Fuel Filler Cap or Fuel Filler Neck
Incorrect Placard. Correct NHTSA No. M20234201



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

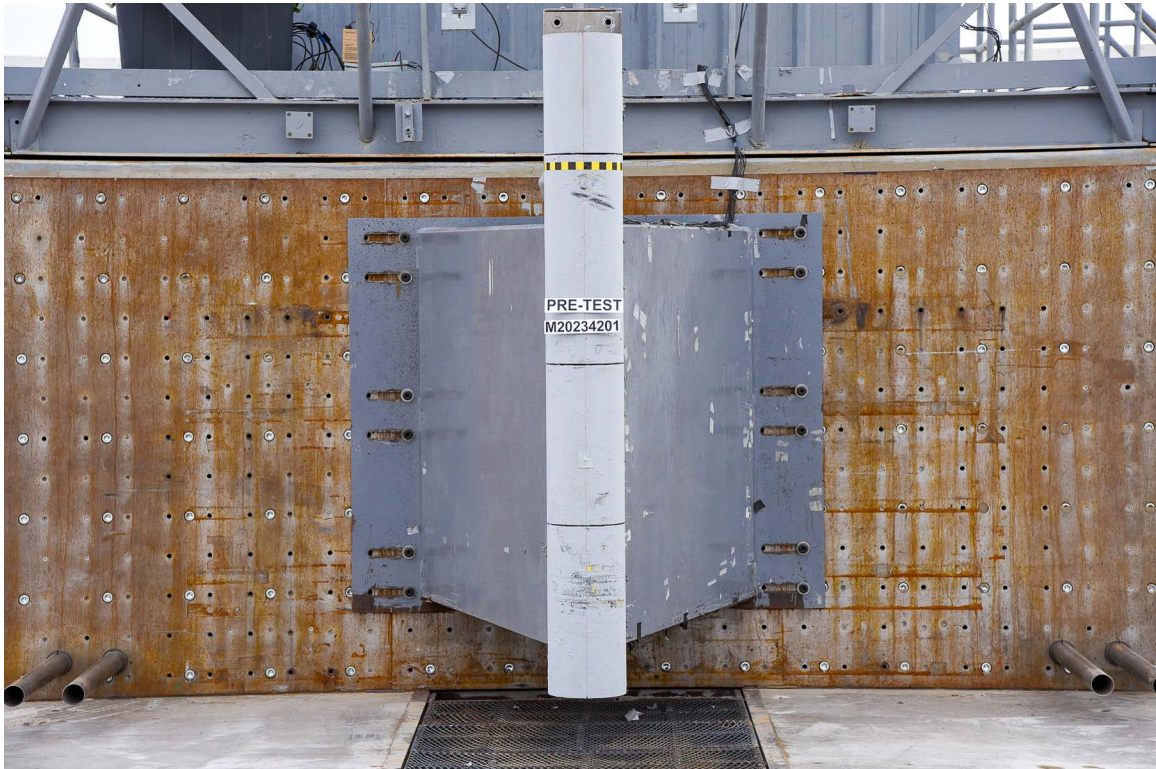


FIGURE 59. Pre-Test Pole Barrier Front View



FIGURE 60. Post-Test Pole Barrier Front View



FIGURE 61. Pre-Test Pole Barrier Side View



FIGURE 62. Post-Test Pole Barrier Side View

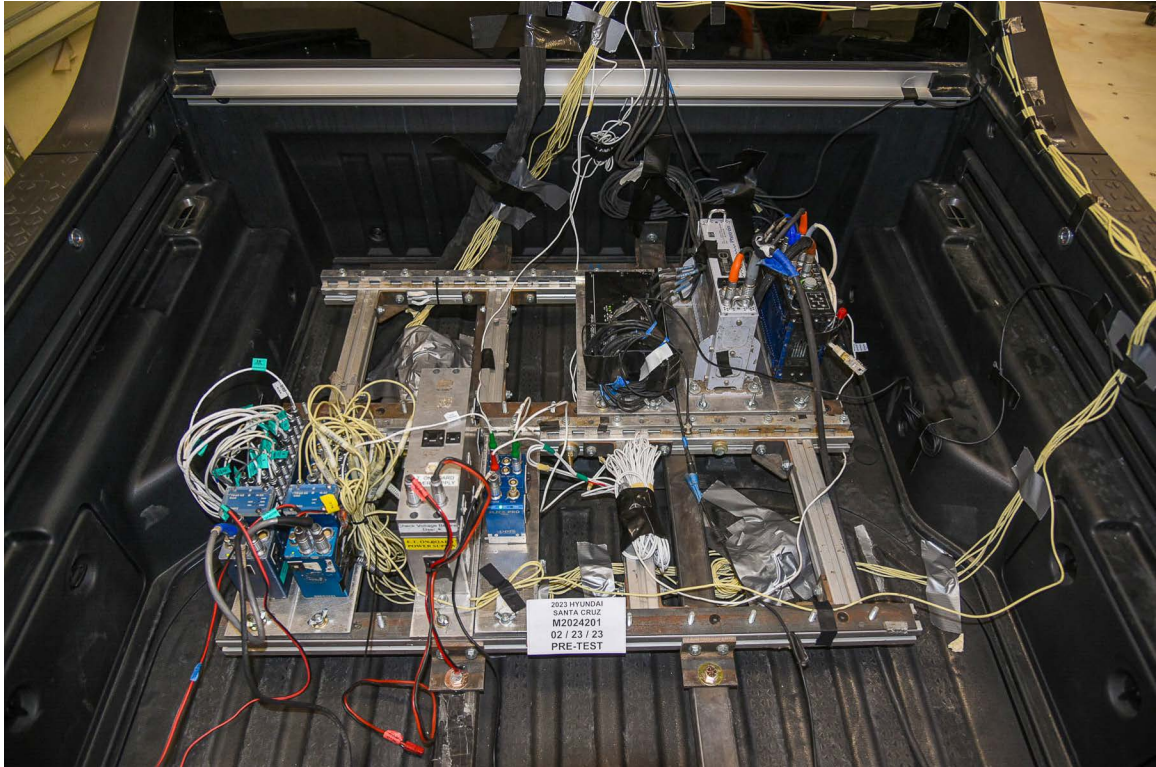


FIGURE 63. Pre-Test Ballast View
Incorrect Placard. Correct NHTSA No. M20234201



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

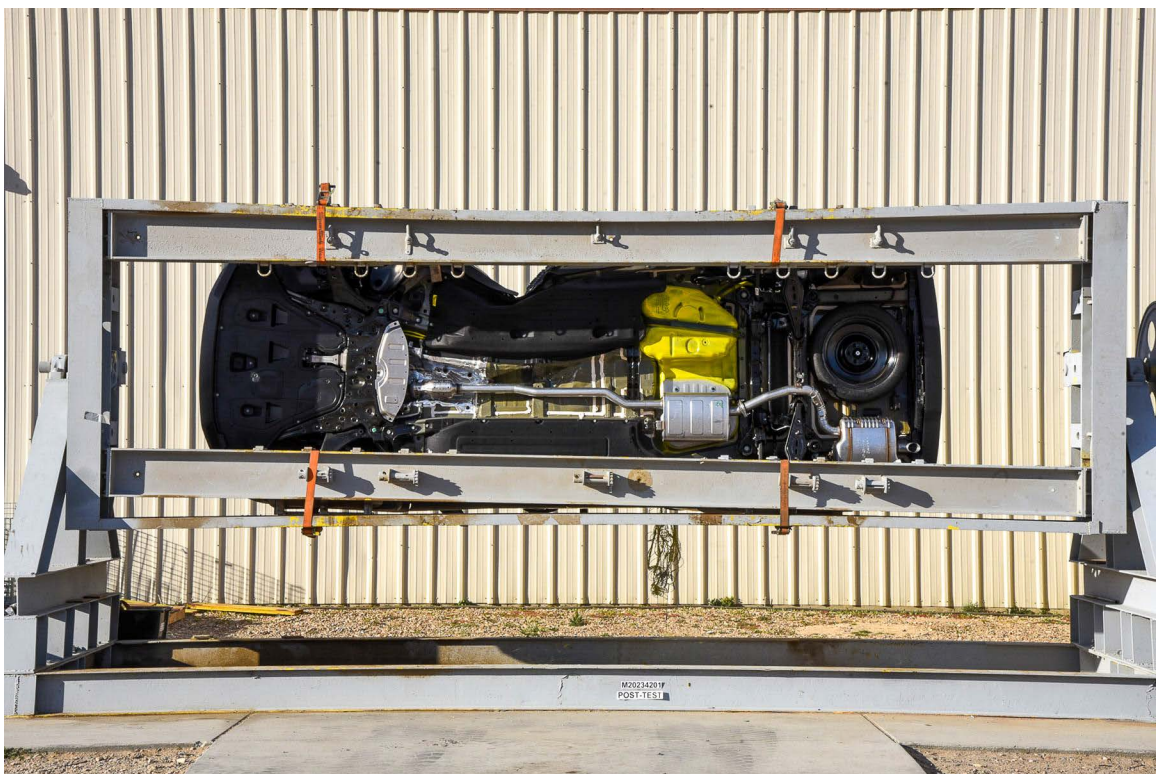


FIGURE 68. FMVSS No. 301 Static Rollover 270 Degrees



FIGURE 69. FMVSS No. 301 Static Rollover 360 Degrees



FIGURE 70. Impact Event



2023 SANTA CRUZ SEL | D

SOLD TO: TX169
 BAYTOWN HYUNDAI
 4302 EAST FREEWAY 1-10
 BAYTOWN TX 77521

SHIPPED TO: TX169

VIN: 5NTJJC4E3PH055376
MODEL: 90432F45
ENGINE: G4KNNK346174
PORT OF ENTRY: MA
EXTERIOR COLOR: PHANTOM BLACK
INTERIOR/SEAT COLOR: GRAY/GRAY
TRANSPORT: TRUCK
ACCESSORY WEIGHT: 19 lbs. 9 kgs.
EMISSIONS: This vehicle is certified to meet emission requirements in all 50 states

GOVERNMENT 5-STAR SAFETY RATINGS

This vehicle has not been rated by the government for overall vehicle score, frontal crash, side crash or rollover risk.

Source: National Highway Traffic Safety Administration (NHTSA).
www.safercar.gov or 1-888-327

STANDARD FEATURES:
 AMERICA'S BEST WARRANTY
 5-year/100,000-mile New Vehicle Warranty*
 10-year/100,000-mile Powertrain Warranty*
 7-year/100,000-mile Anti-rust/Perforation Warranty*
 3-year/50,000-mile Complimentary Maintenance*
 5-year/100,000-mile Roadside Assistance

ADVANCED SAFETY TECHNOLOGY
 *Limited warranties, see dealer for details
 Forward Collision-avoidance Assist
 Blind-spot Collision-avoidance Assist
 Rear Cross-traffic Collision-avoidance Assist
 Lane Keeping Assist; Lane Following Assist
 Driver Attention Warning
 Safe Exit Warning
 Front, Front Side & Side-curtain Airbag Inflator
POWERTRAIN TECHNOLOGY
 Smartstream 2.5L 4-cylinder Engine
 8-speed Automatic Transmission w/ SHIFTRONIC®

EXTERIOR
 18-inch Alloy Wheels
 Automatic Headlights
 LED Daytime Running Lights
 LED Taillights
 Sheet Molded Composite Bed
 Under Bed & Storage Compartments
 Rear Bumper Corner Steps
 Temporary Compact Spare Tire

COMFORT & CONVENIENCE
 Proximity Key w/ Push Button Start
 Remote Engine Start
 Power Driver's Seat w/ Lumbar Support
 Heated Front Seats
 60/40 Flip-up Rear Seat w/ Storage Bin
 Air Conditioning w/ Cabin Air Filter
 LCD Multi-information Display
 8-inch Display Audio w/ Android Auto(TM) & Apple CarPlay(TM)
 AMPROD Radio(TM) Audio System
 Rear View Monitor
 Dual Front USB Ports
 SiriusXM Radio w/ 90-day Platinum trial subscription;
 Not Available in AK & HI
 Bluetooth® Connected Services 3-years Standard (enrollment req)
 Bluetooth® Remote Start (3-year Complimentary Service)

COMFORT & CONVENIENCE(cont.)
 Full Tank of Fuel
 Manufacturer's Suggested Retail Price: \$27,190.00

ADDED FEATURES:
 Activity Package: \$3,270.00
 Power Sunroof
 Integrated Tonneau Cover
 Adjustable Channel Chest Rail System
 Roof Side Rails
 110V AC Power Inverter in Bed
 10.25-inch Digital Instrument Cluster
 Wireless Device Charging
 LED Interior Lights & Bed Lighting
 Rear Sliding Glass
 *Carpeted Floor Mats
 *Cargo Net, Envelop
 *Hot Spots
 *Cross Rails
 *Wheel Locks

Inland Freight & Handling: \$1,295.00
Total Price: \$33,125.00

The 2023 Hyundai SANTA CRUZ.
 Our one-of-a-kind Sport Adventure Vehicle.



EPA DOT Fuel Economy and Environment

Fuel Economy

23 MPG Small SUVs range from 14 to 128 MPG. The best vehicle rates 132 MPG.

You spend \$1,500 more in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost \$1,900

Fuel Economy & Greenhouse Gas Rating (mpg only) Smog Rating (tailpipe only)

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 24 MPG and costs \$8,000 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at 2.65 per gallon. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fuelconomy.gov
 Calculate personalized estimates and compare vehicles.

Manufacturer's suggested retail price includes manufacturer's recommended pre-delivery service. Gasoline license and title fees state and local taxes and dealer-installed options and accessories are not included in the manufacturer's suggested retail price. This label has been affixed to this vehicle by Hyundai Motor America, pursuant to the requirements of 16 U.S.C. 1201 et seq, which prohibits its removal or alteration prior to delivery to the ultimate purchaser.

PARTS CONTENT INFORMATION FOR VEHICLE IN THIS COUNTRY:
 U.S./CANADIAN PARTS CONTENT: 55 %
 MAJOR SOURCES OF FOREIGN PARTS CONTENT: KOREA: 35 %

Note: Parts content does not include final assembly, distribution, or other non-parts costs.

FOR THIS VEHICLE:
 FINAL ASSEMBLY POINT: MONTGOMERY, ALABAMA, U.S.A.
 COUNTRY OF ORIGIN: ENGINE: U.S.A.
 TRANSMISSION: U.S.A./KOREA

FIGURE 71. Monroney Label

Head Restraints

The vehicle's front and rear (second row and/or third row) seats have adjustable head restraints. The head restraints provide comfort for passengers, but more importantly they are designed to help protect passengers from whiplash and other neck and spinal injuries during an accident, especially in a rear impact collision.

WARNING

To help reduce the risk of serious injury or death in an accident, take the following precautions when adjusting your head restraints:

- Always properly adjust the head restraints for all passengers BEFORE starting the vehicle.
- NEVER let anyone ride in a seat with the head restraints removed or reversed.

WARNING

When sitting on the rear seat, do not adjust the height of the head restraints to the lowest position.

CAUTION

When there is no occupant in the rear seats, adjust the height of the head restraints to the lowest position. The rear seat head restraints can reduce the visibility of the rear area.

NOTICE

To prevent damage, NEVER hit or pull on the head restraints.

Front seat head restraints

The driver's and front passenger's seats are equipped with adjustable head restraint for the passengers safety and comfort.

NOTICE

If you recline the seatback towards the front with the head restraint and seat cushion raised, the head restraint may come in contact with the sunvisor or other parts of the vehicle.

Adjusting the height up and down

To raise the head restraint:

- Pull it up to the desired position (1).

To lower the head restraint:

- Push and hold the release button (2) on the head restraint support.
- Lower the head restraint to the desired position (3).

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

APPENDIX B
DUMMY RESPONSE DATA

TABLE OF DATA PLOTS

Plot		Page
1	Driver Head Acceleration (X) Primary	B-1
2	Driver Head Acceleration (Y) Primary	B-1
3	Driver Head Acceleration (Z) Primary	B-1
4	Driver Head Acceleration Primary Resultant	B-1
5	Driver Lower Spine T12 Acceleration (X)	B-2
6	Driver Lower Spine T12 Acceleration (Y)	B-2
7	Driver Lower Spine T12 Acceleration (Z)	B-2
8	Driver Lower Spine T12 Acceleration Resultant	B-2
9	Driver Acetabulum Force on Impact Side (Y)	B-3
10	Driver Iliac Wing Force on Impact Side (Y)	B-3
11	Driver Total Pelvis Force on Impact Side (Y)	B-3

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)

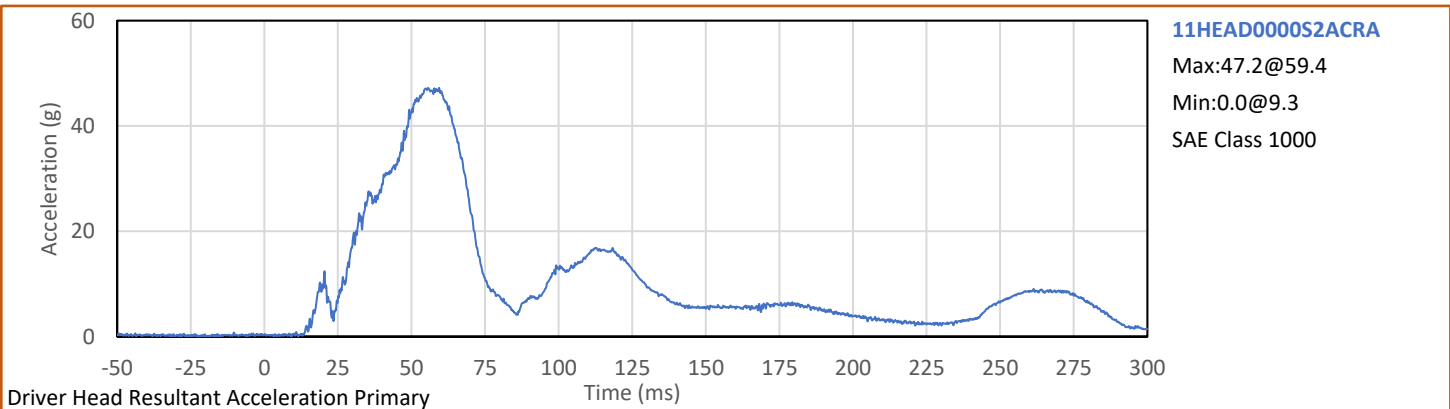
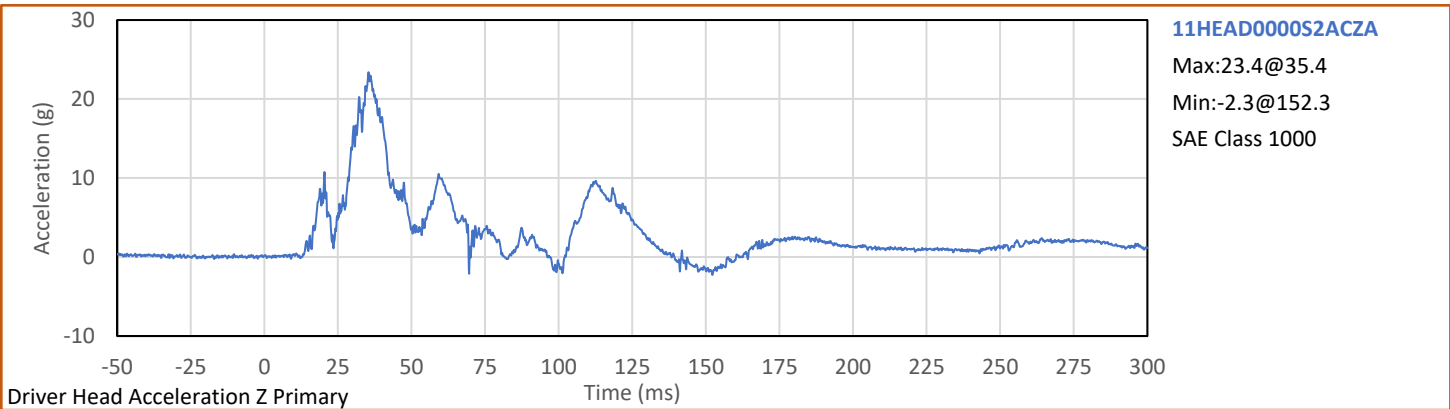
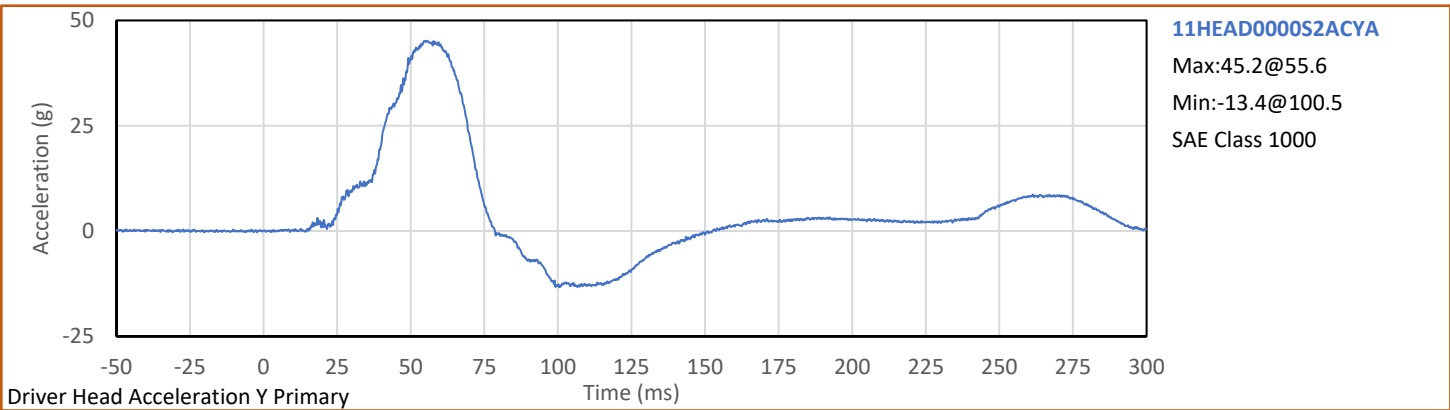
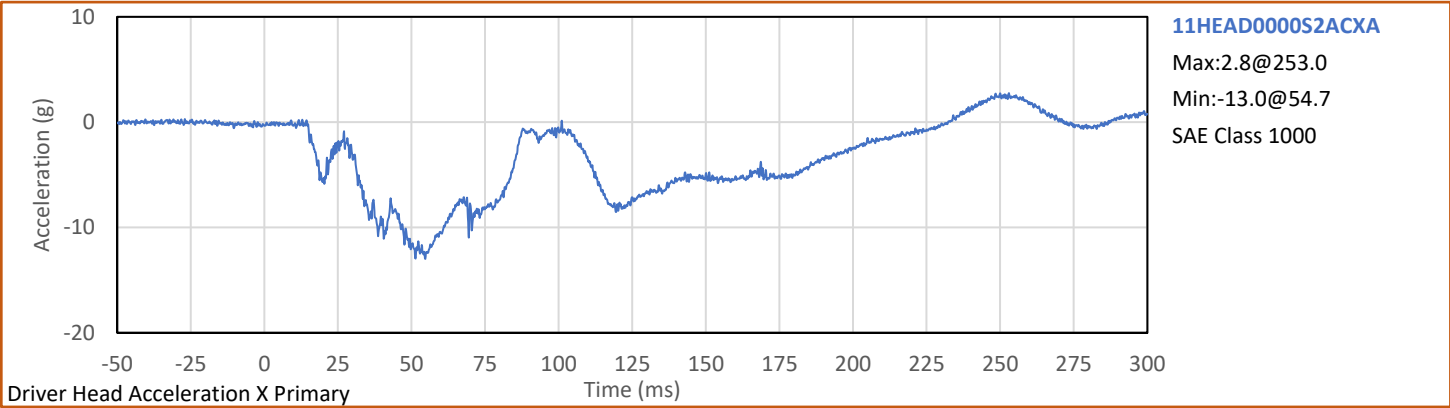
Driver Head Acceleration Redundant (Z)

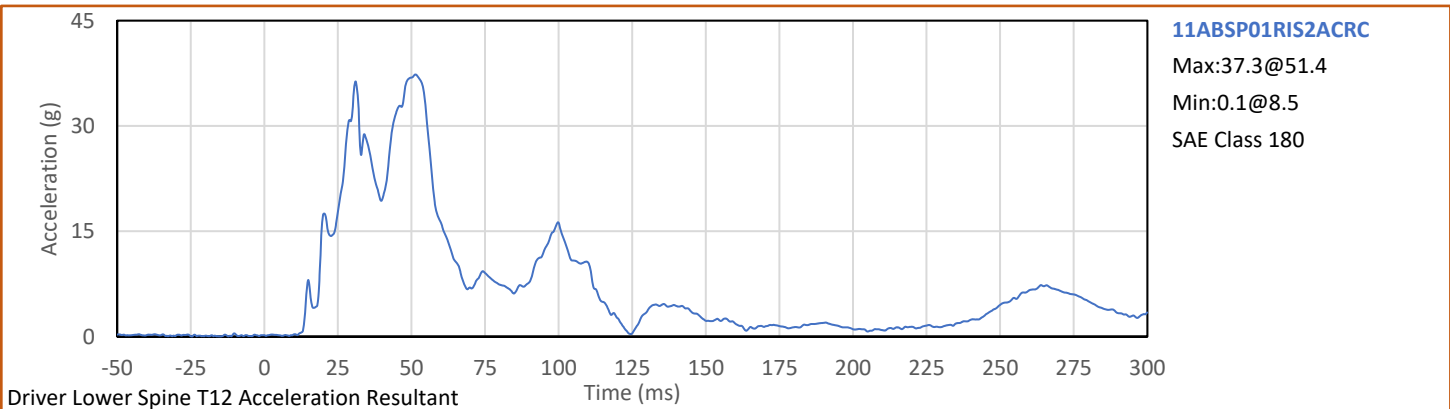
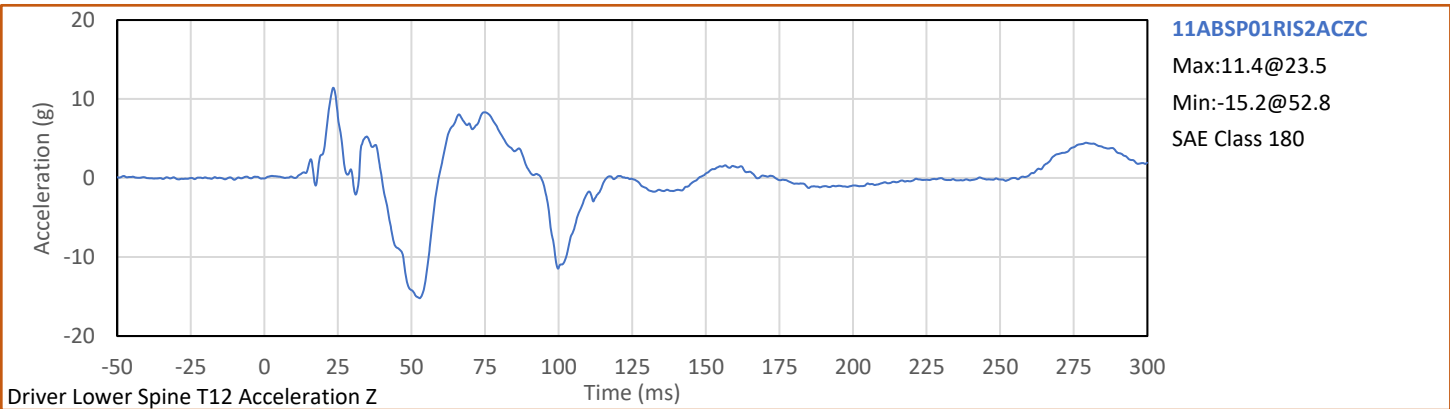
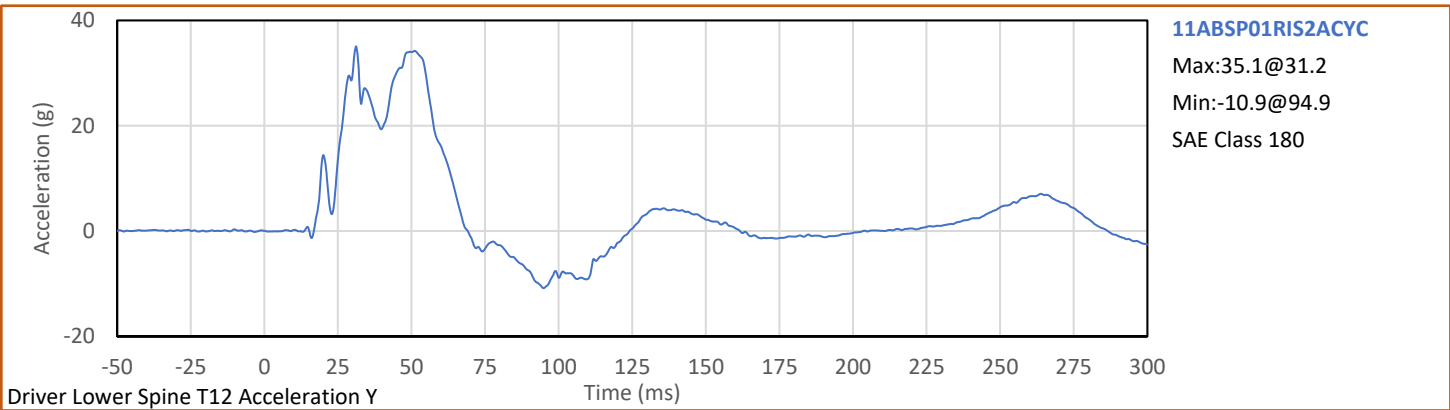
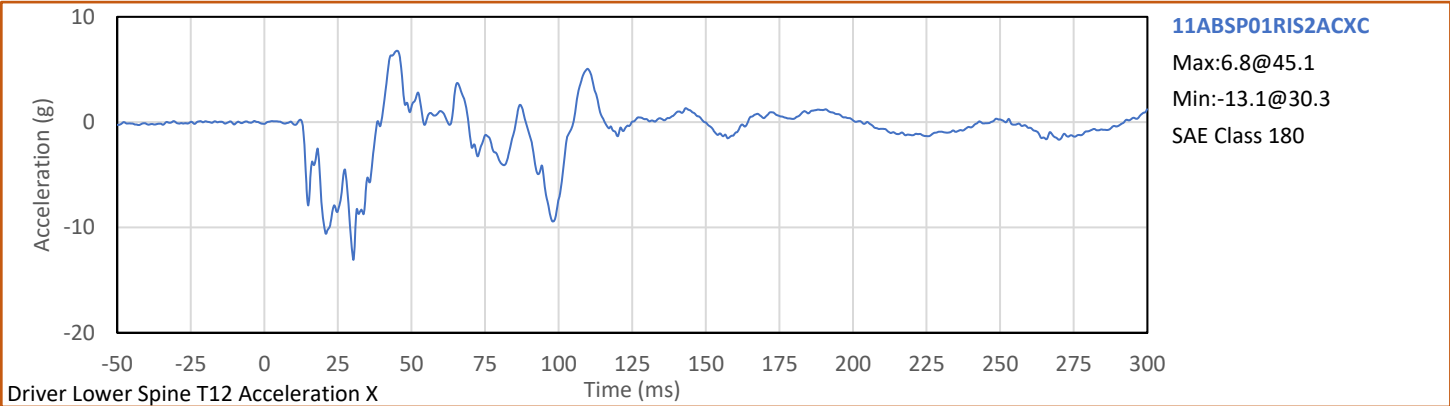
Vehicle Instrumentation Data

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)





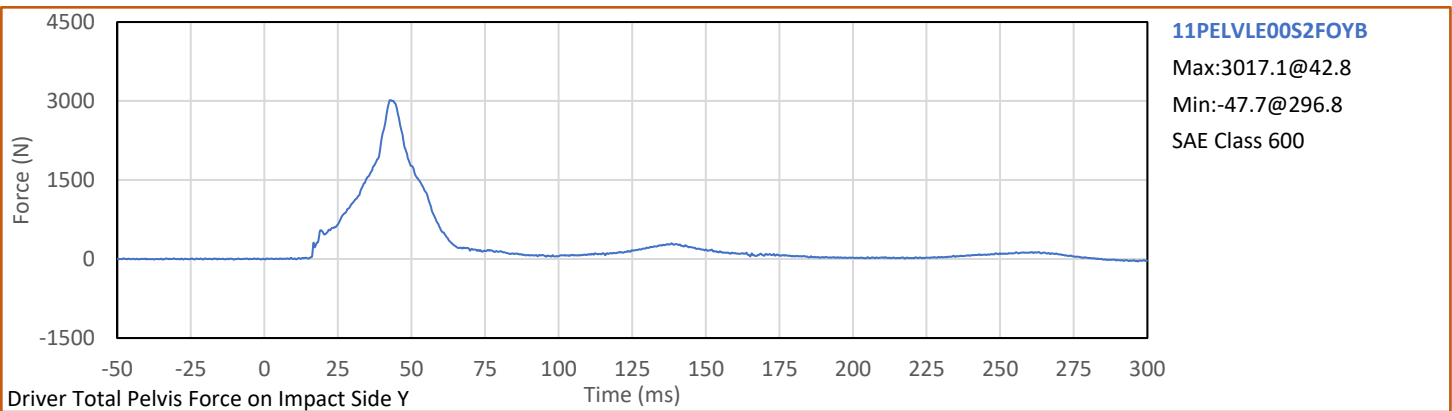
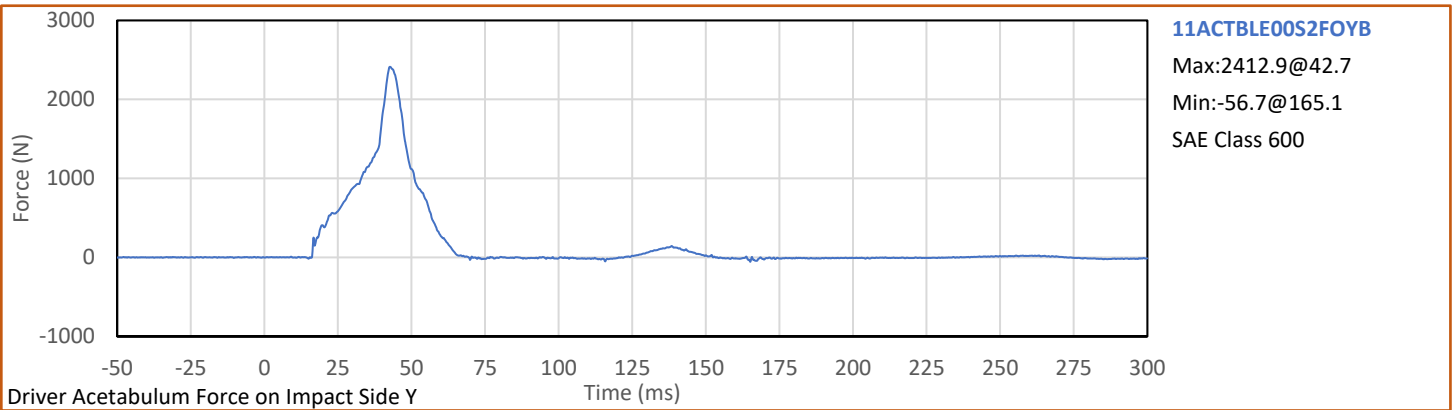
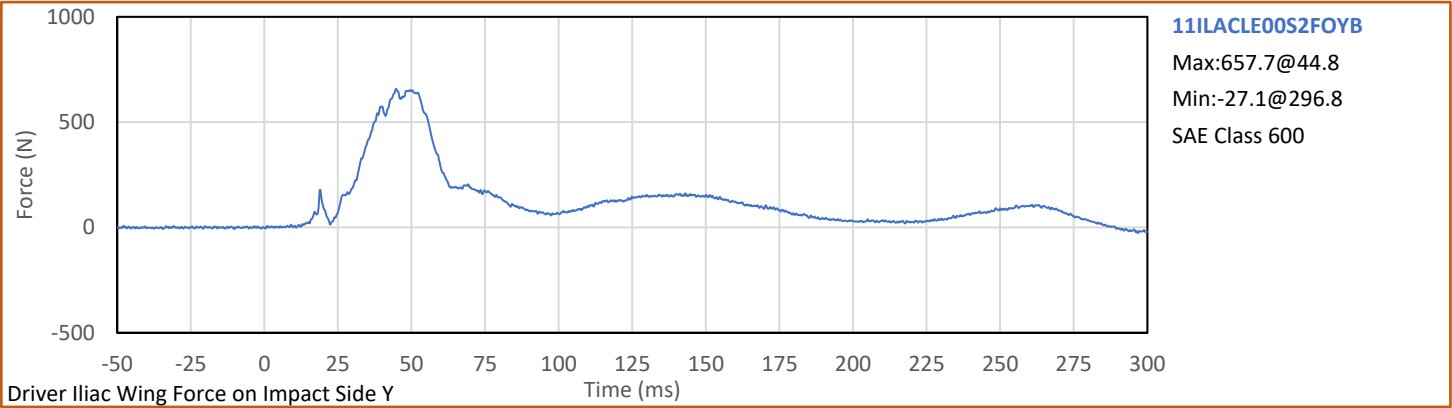
Test Vehicle: 2023 Hyundai Santa Cruz 4-Door Truck

NHTSA No.: M20234201



Test Program: NCAP Side Pole Impact Test

Test Date: 2/23/2023



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

ATD Serial No.: 299

Test Date: 2023-02-14

Tested Parameter	Units	Spec Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.8	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
A - Sitting Height	mm	772	788	774	Pass
B - Shoulder Pivot Height	mm	437	453	450	Pass
C - Hpoint Height	mm	79	89	81	Pass
D - H Point From Seatback	mm	141	151	145	Pass
E - Shoulder Pivot From Backline	mm	97	107	105	Pass
F - Thigh Clearance	mm	119	135	134	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	519	Pass
L - Popliteal Height	mm	343	369	356	Pass
K - Knee Pivot To Floor Height	mm	392	409	396	Pass
N - Buttock Popliteal Length	mm	416	442	432	Pass
O - Chest Depth W/O Jacket	mm	195	211	205	Pass
P - Foot Length	mm	216	232	223	Pass
Q - Hip Breadth (W/Pelvic Plugs)	mm	313	323	316	Pass
R - Arm Length	mm	249	259	257	Pass
S - Knee Joint To Seatback	mm	477	493	484	Pass
V - Shoulder Width	mm	341	357	351	Pass
W - Foot Width	mm	78	94	85	Pass
Y - Chest Circumference W/Jacket	mm	851	881	874	Pass
Z - Waist Circumference	mm	761	791	784	Pass
				Overall Test Results	Pass

Technician:



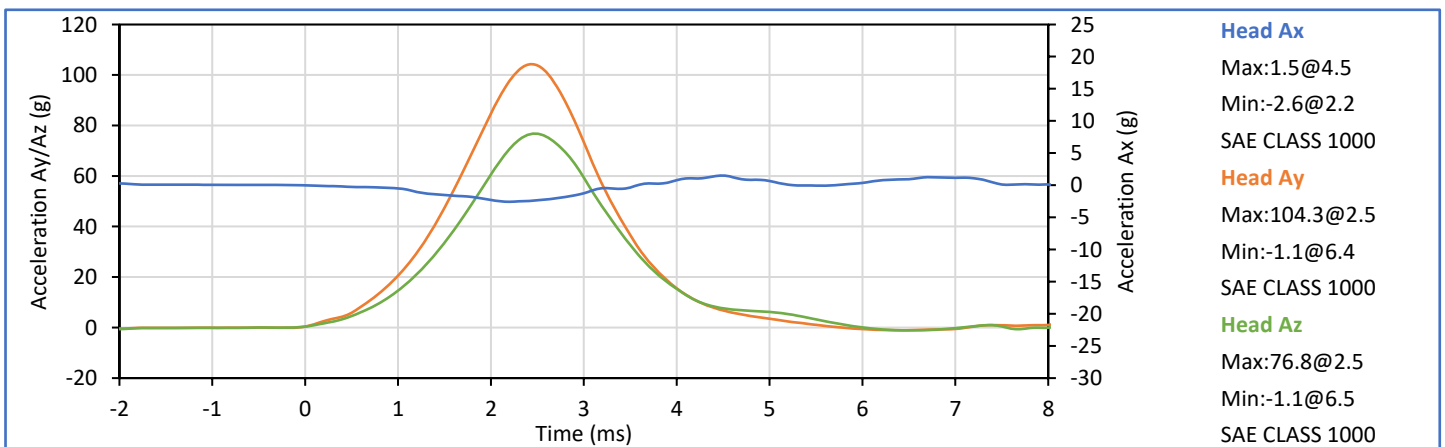
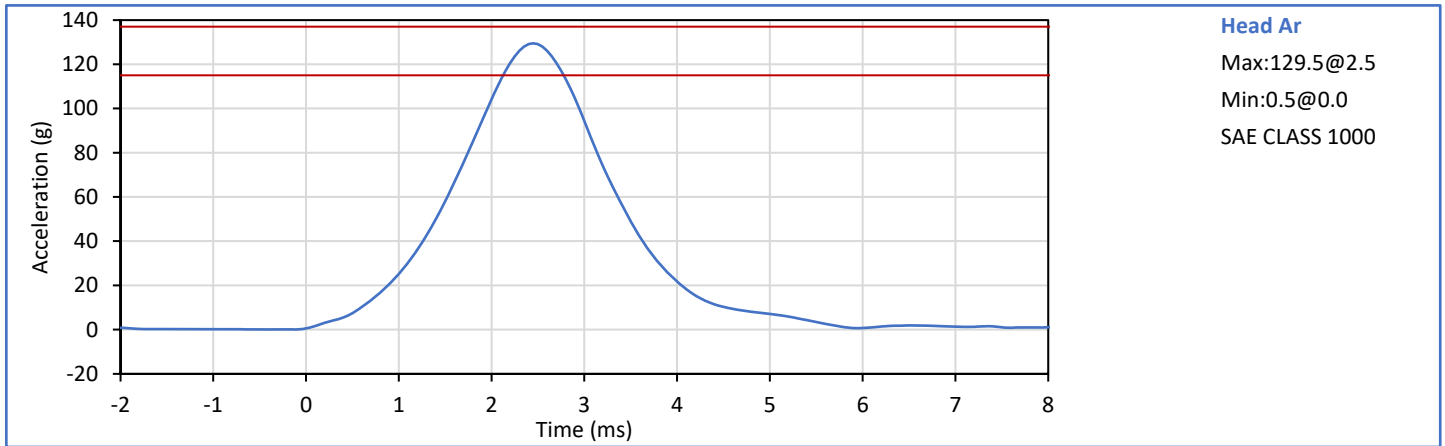
G. Fuentes

Approved By:



J. Hernandez

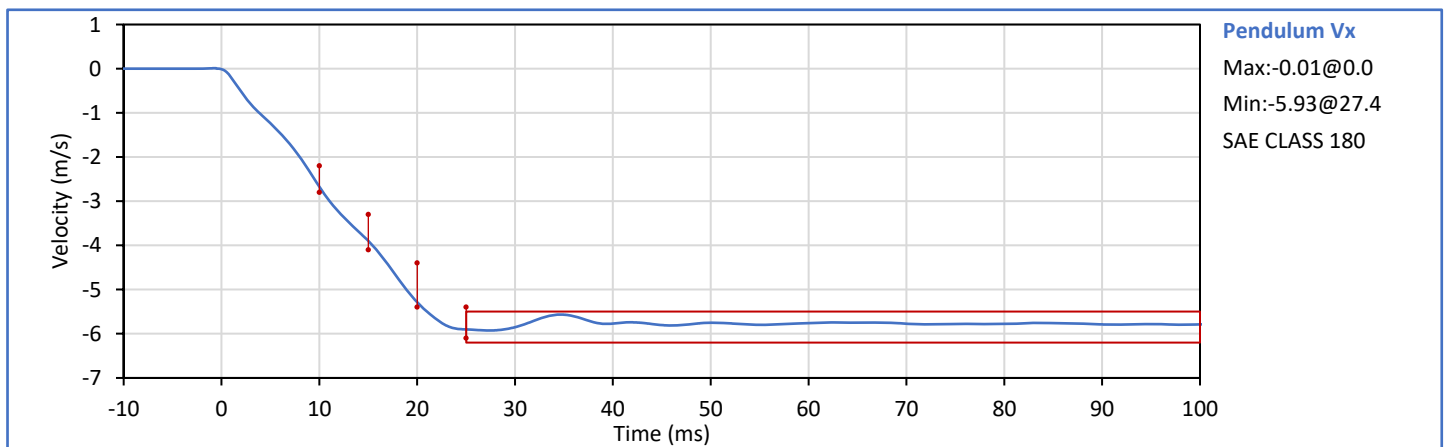
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.2	Pass
Laboratory Relative Humidity	%	10	70	31	Pass
Peak Resultant Acceleration	g	115.0	137.0	129.5	Pass
Peak Head Ax	g	-15.0	15.0	-2.6	Pass
Oscillations After Main Pulse	%	0.0	15.0	2.1	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
Overall Test Results					Pass



Technician: *Mill LGS III*
G. Fuentes

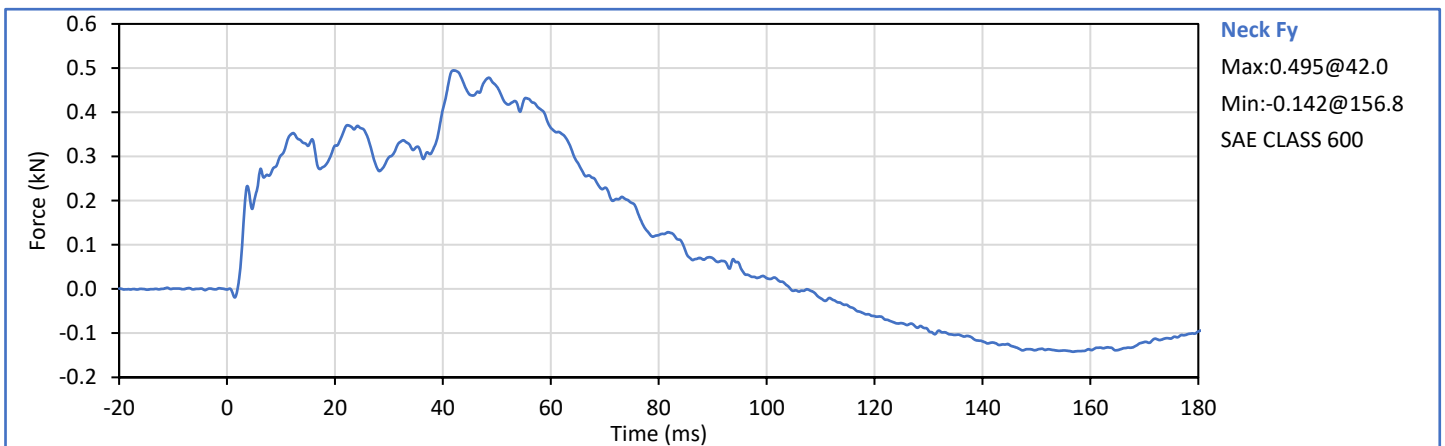
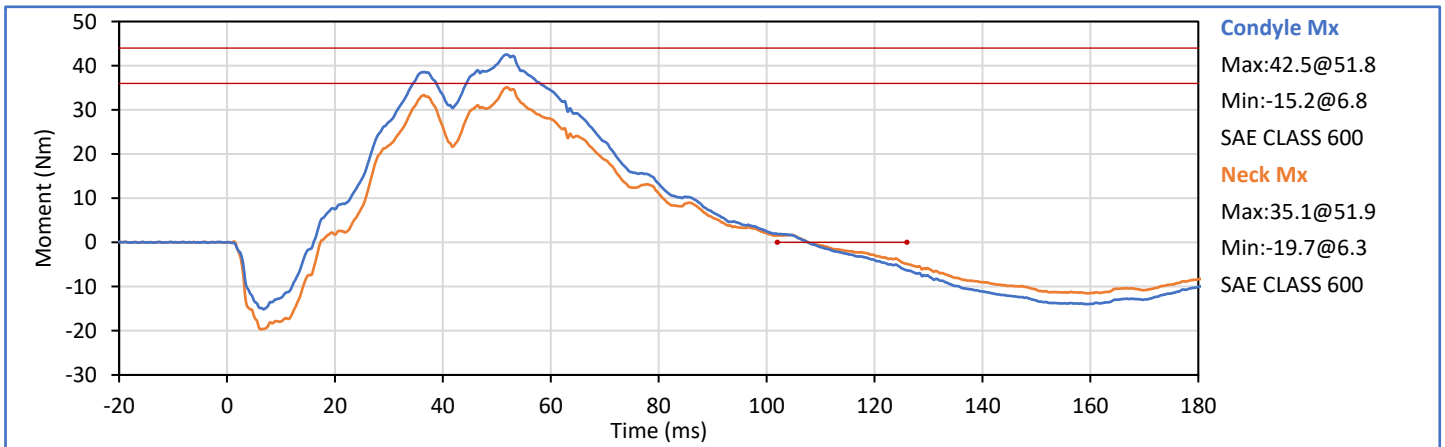
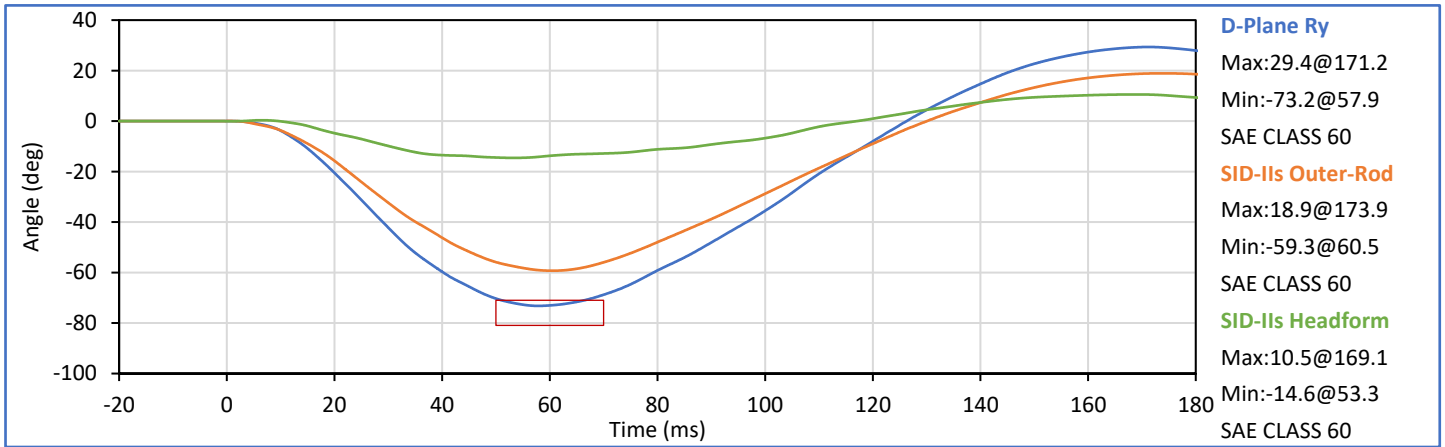
Approved By: *Smith*
J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	22.0	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	-2.67	Pass
Pendulum Decel at 15 ms	m/s	-4.10	-3.30	-3.90	Pass
Pendulum Decel at 20 ms	m/s	-5.40	-4.40	-5.29	Pass
Pendulum Decel at 25 ms	m/s	-6.10	-5.40	-5.90	Pass
Pendulum Decel from 25-100 ms	m/s	-6.20	-5.50	-5.93/-5.57	Pass
Peak "D" Plane Rotation	deg	-81.0	-71.0	-73.2	Pass
Time of Peak "D" Plane Rotation	ms	50.0	70.0	57.9	Pass
Peak Occ. Condyle Moment	Nm	36.0	44.0	42.5	Pass
Time of Moment Decay to 0 Nm	ms	102.0	126.0	107.7	Pass
Overall Test Results					Pass

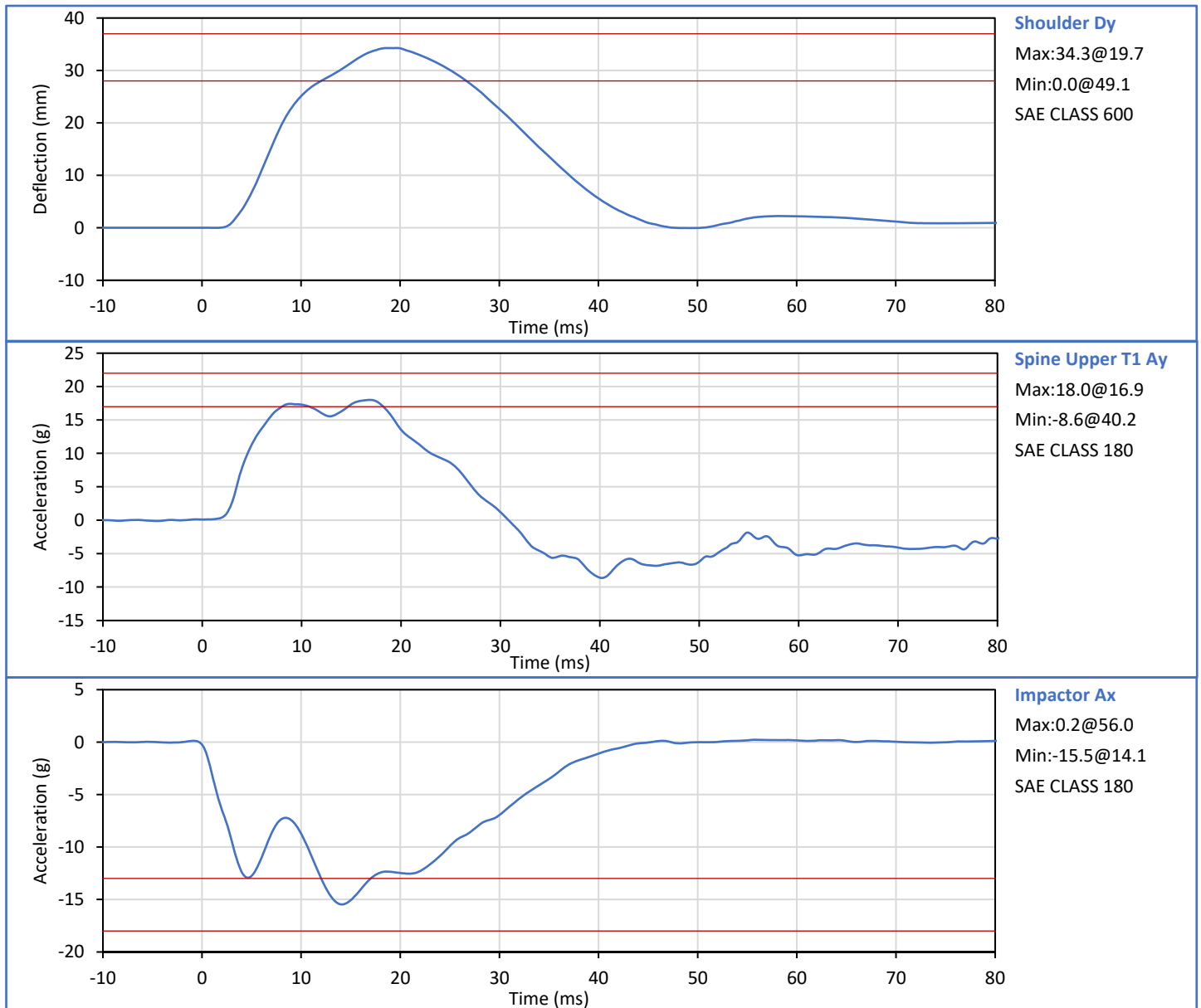


Technician: *Mill LGS III*
G. Fuentes

Approved By: *Seath*
J. Hernandez



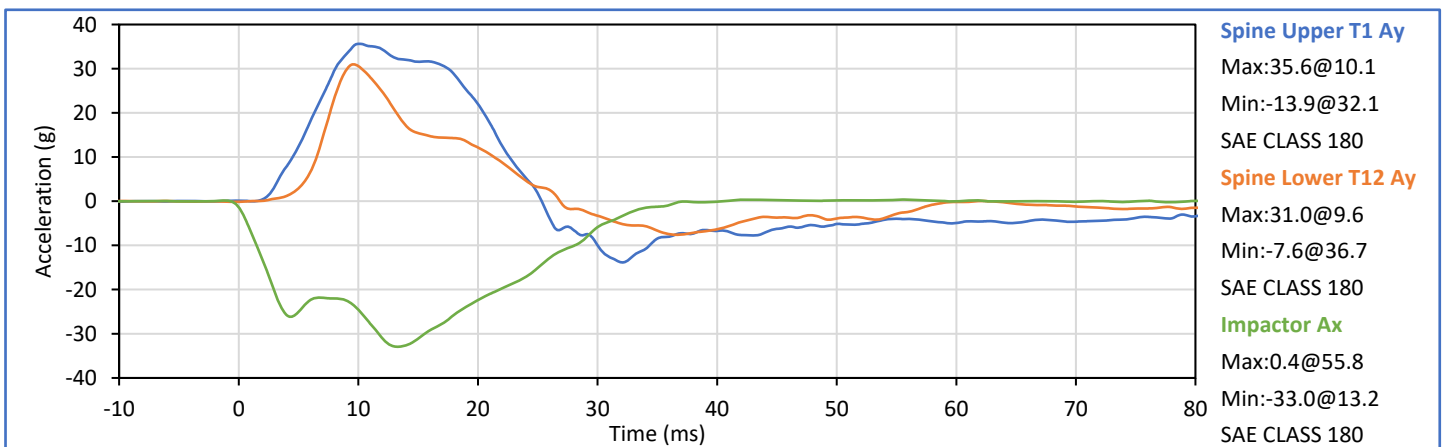
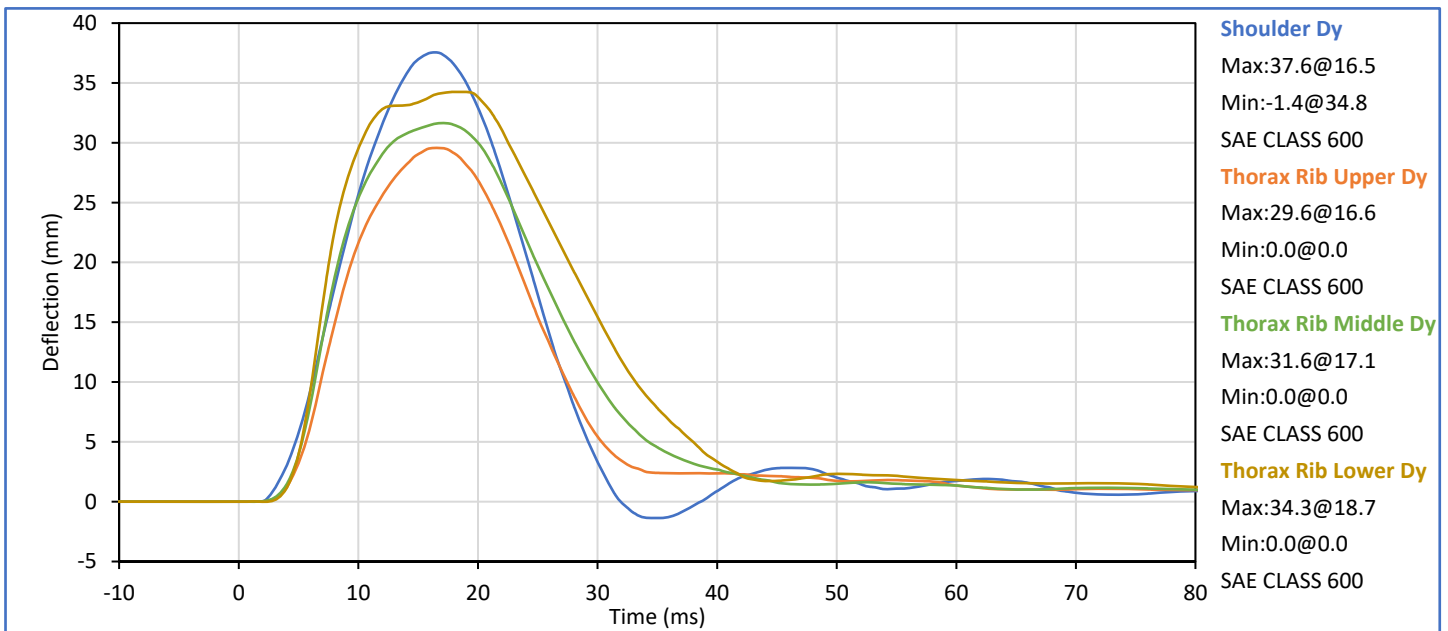
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.6	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
Impactor Velocity	m/s	4.20	4.40	4.32	Pass
Peak Shoulder Dy	mm	28.0	37.0	34.3	Pass
Peak Upper Spine (T1) Ay	g	17.0	22.0	18.0	Pass
Peak Impactor Ax	g	-18.0	-13.0	-15.5	Pass
Overall Test Results					Pass



Technician: *Mill LGS III*
G. Fuentes

Approved By: *Smith*
J. Hernandez

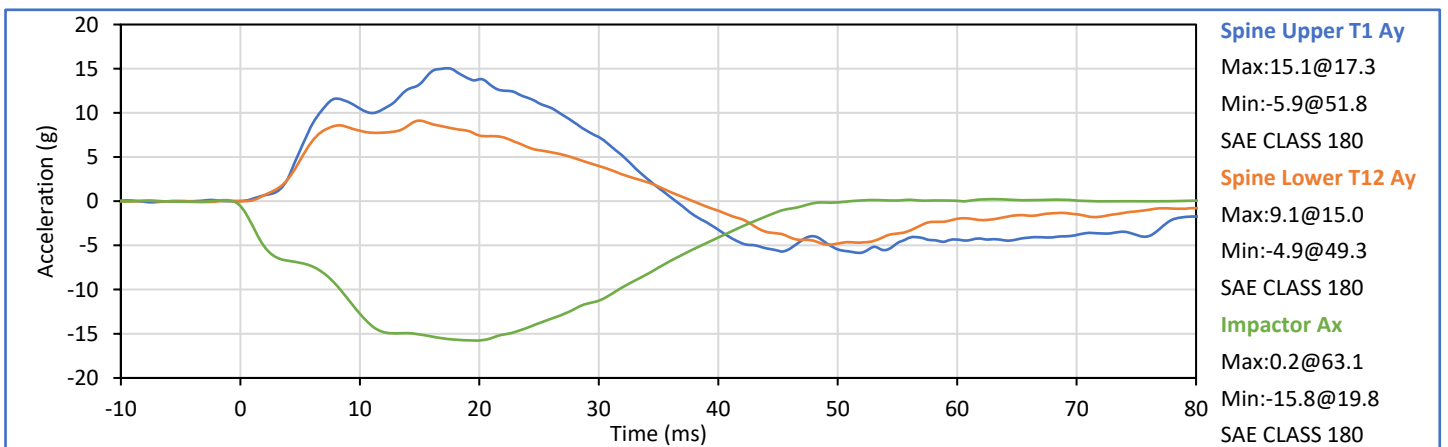
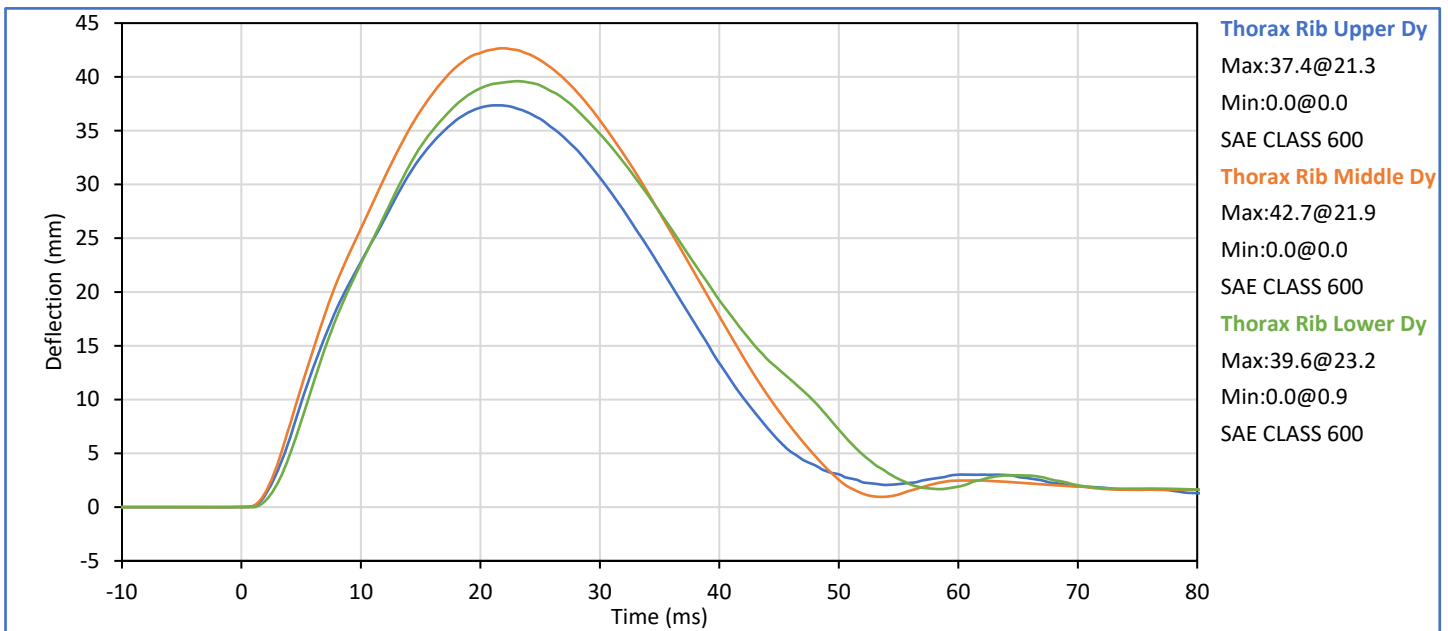
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.5	Pass
Laboratory Relative Humidity	%	10	70	29	Pass
Impactor Velocity	m/s	6.60	6.80	6.72	Pass
Peak Shoulder Dy	mm	31.0	40.0	37.6	Pass
Peak Upper Rib Dy	mm	25.0	32.0	29.6	Pass
Peak Middle Rib Dy	mm	30.0	36.0	31.6	Pass
Peak Lower Rib Dy	mm	32.0	38.0	34.3	Pass
Peak Upper Spine (T1) Ay	g	34.0	43.0	35.6	Pass
Peak Lower Spine (T12) Ay	g	29.0	37.0	31.0	Pass
Peak Impactor Ax	g	-36.0	-30.0	-33.0	Pass
Overall Test Results					Pass



Technician: Mill LGS III
G. Fuentes

Approved By: [Signature]
J. Hernandez

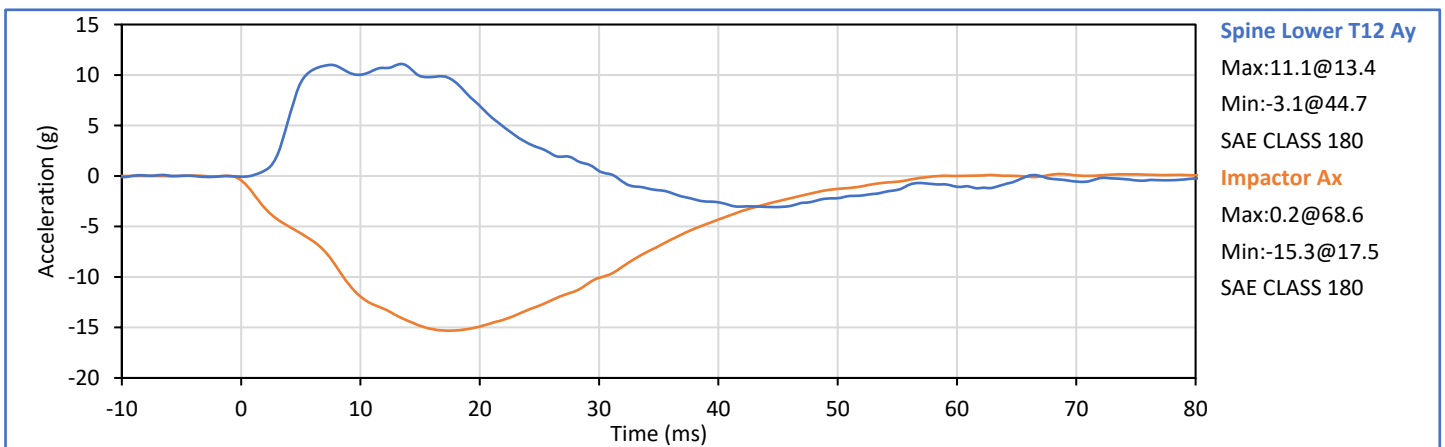
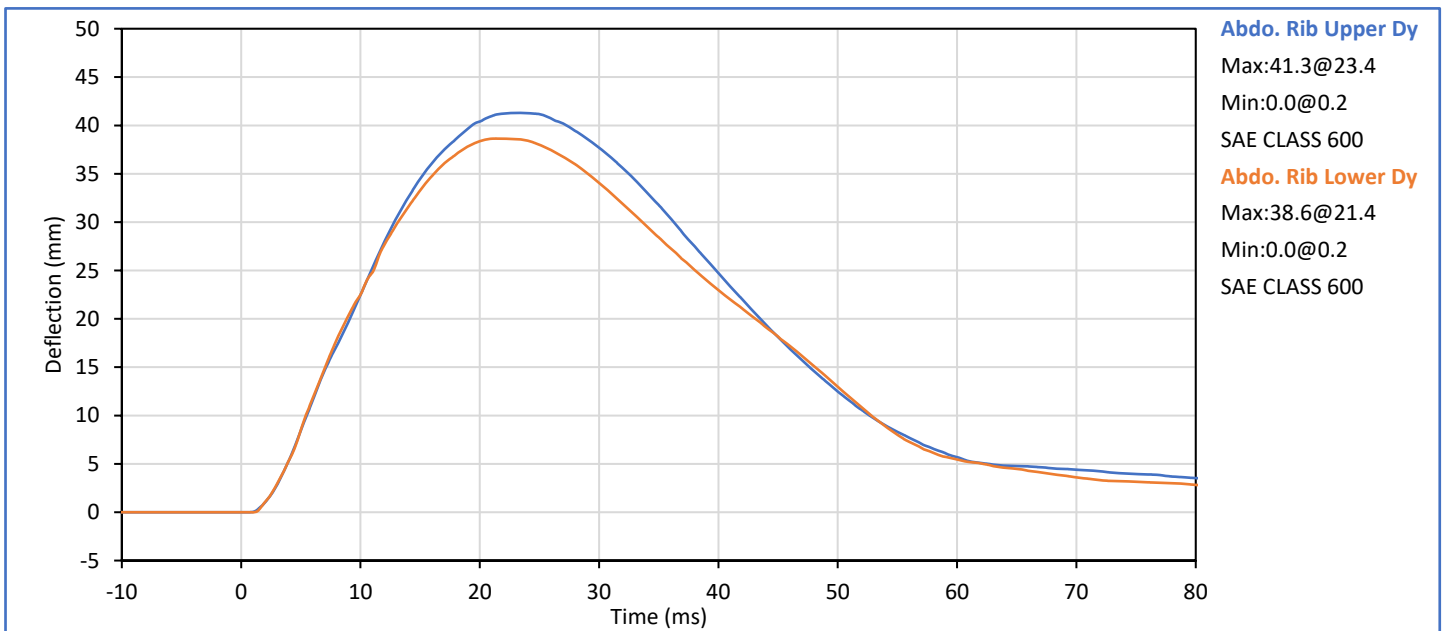
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.4	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
Impactor Velocity	m/s	4.20	4.40	4.31	Pass
Peak Thorax Rib Upper Dy	mm	32.0	40.0	37.4	Pass
Peak Thorax Rib Middle Dy	mm	39.0	45.0	42.7	Pass
Peak Thorax Rib Lower Dy	mm	35.0	43.0	39.6	Pass
Peak Spine Upper T1 Ay	g	13.0	17.0	15.1	Pass
Peak Spine Lower T12 Ay	g	7.0	11.0	9.1	Pass
Peak Impactor Ax	g	-18.0	-14.0	-15.8	Pass
Overall Test Results					Pass



Technician: Mill LGS III
G. Fuentes

Approved By: J. Hernandez
J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.0	Pass
Laboratory Relative Humidity	%	10	70	30	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	38.6	Pass
Peak Lower Spine T12 Ay	mm	9.0	14.0	11.1	Pass
Peak Impactor Ax	g	-16.0	-12.0	-15.3	Pass
Overall Test Results					Pass

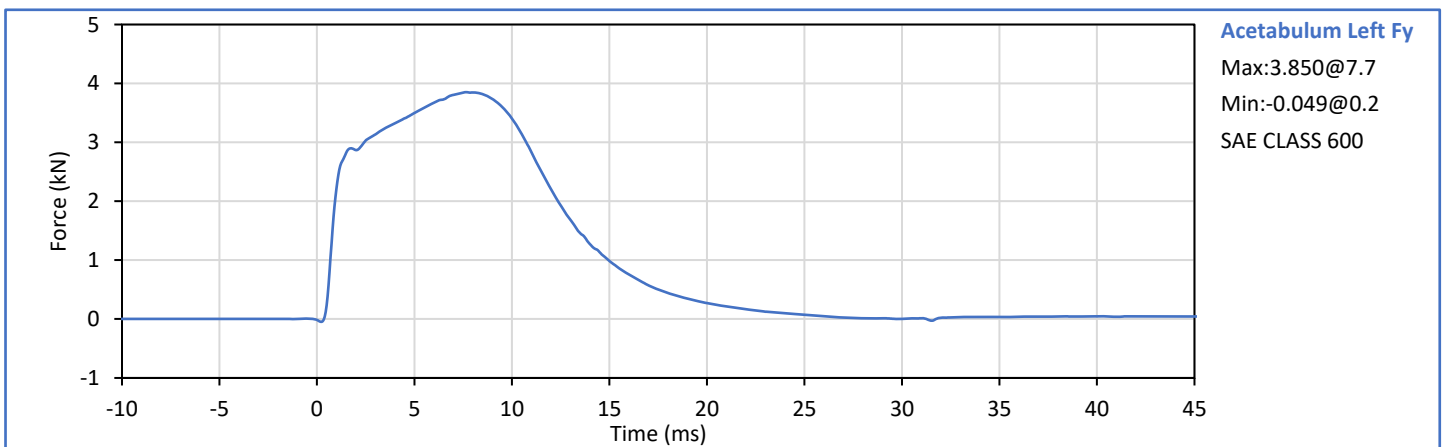
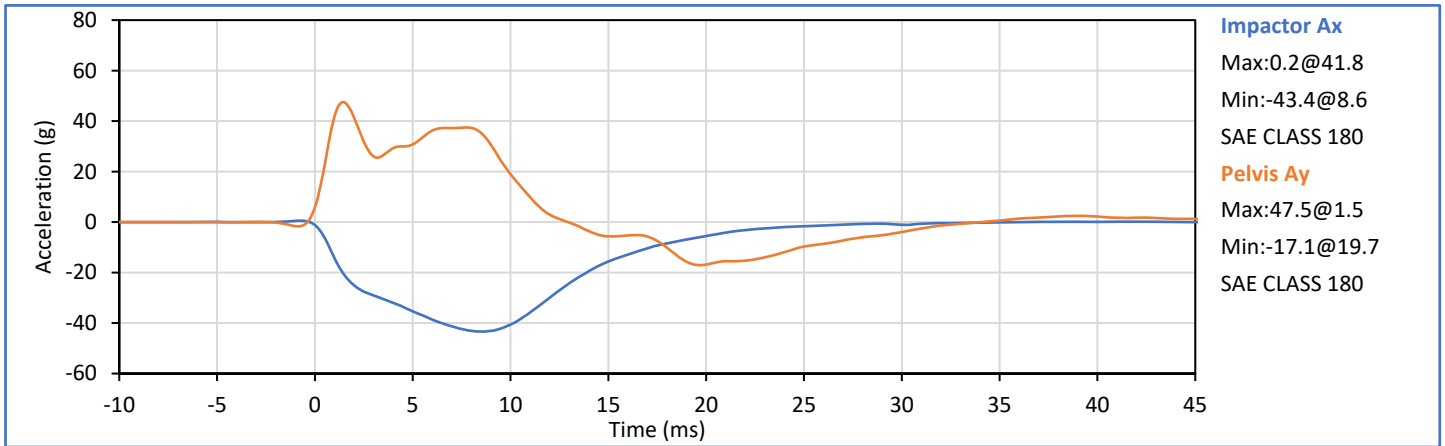


Technician: *Mill LGS III*
G. Fuentes

Approved By: *Seath*
J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
Impactor Velocity	m/s	6.60	6.80	6.70	Pass
Peak Acetabulum Fy	kN	3.60	4.30	3.85	Pass
Pelvis Ay after 6ms	g	34.0	42.0	37.5	Pass
Peak Impactor Ax	g	-47.0	-38.0	-43.4	Pass
Overall Test Results					Pass

Pelvis Plug S/N: 14814



Technician: *Mill LGS III*
G. Fuentes

Approved By: *Seath*
J. Hernandez

ATD Serial No.: 299

Test Date: 2023-02-15

Pelvis Plug S/N: 14814



SID-IIs Pelvis Plug Certification Test

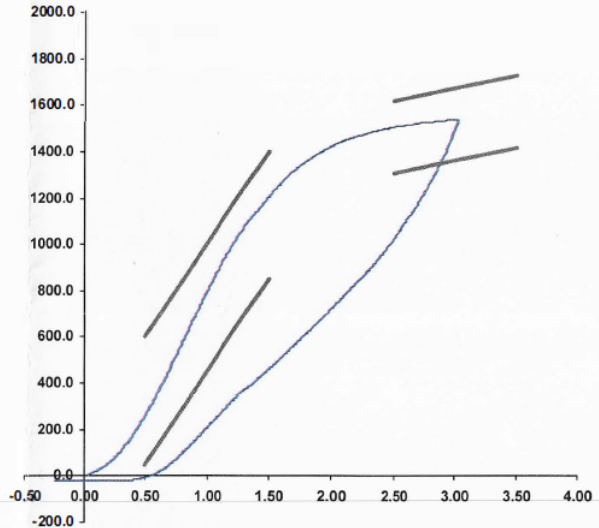
Plug S/N 14814
Test Number 16787
Report Number 16833
Test Date 12/29/2020 1:08:49 PM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	262.50	50.00	600.00
Force @ 1.5 mm (N)	1,209.68	850.00	1,400.00
Force @ 2.5 mm (N)	1,505.71	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,539.35	1,361.00	1,673.00

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

Notes:

Force (-N) vs Extension (-mm)



Operator _____
Part Number 180-4450

Template No 107 29-Dec-20
SACO Research

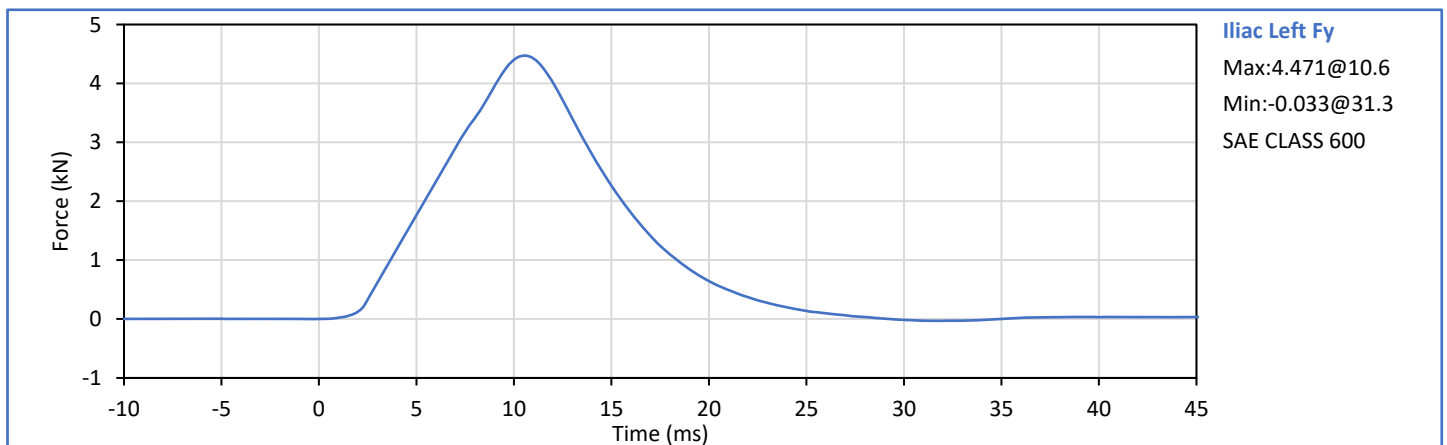
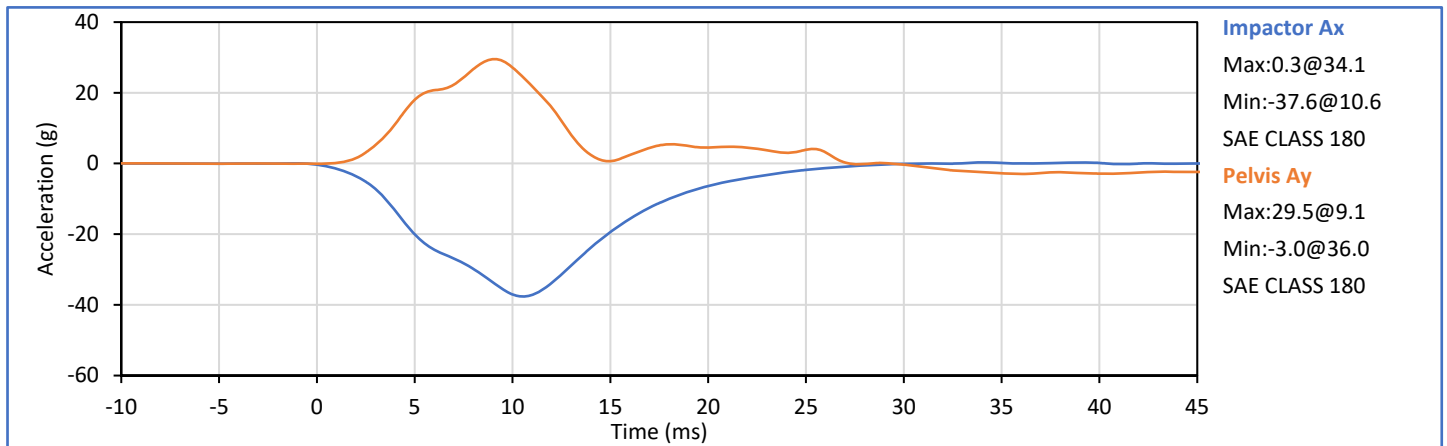
By: DC Date: 12/29/20

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

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.3	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
Impactor Velocity	m/s	4.20	4.40	4.34	Pass
Peak Iliac Fy	kN	4.10	5.10	4.47	Pass
Peak Pelvis Ay	g	28.0	39.0	34.7	Pass
Peak Impactor Ax	g	-45.0	-36.0	-37.6	Pass
Overall Test Results					Pass

Pelvis Plug S/N: 12228 *

* Plug is not impacted and remains certified



Technician: *Mill LGS III*
G. Fuentes

Approved By: *Seath*
J. Hernandez

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

ATD Serial No.: 299

Test Date: 2023-02-24

Tested Parameter	Units	Spec Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.8	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
A - Sitting Height	mm	772	788	775	Pass
B - Shoulder Pivot Height	mm	437	453	450	Pass
C - Hpoint Height	mm	79	89	84	Pass
D - H Point From Seatback	mm	141	151	148	Pass
E - Shoulder Pivot From Backline	mm	97	107	105	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	45	Pass
I - Head Depth	mm	178	188	187	Pass
J - Head Circumference	mm	541	551	544	Pass
K - Buttock To Knee Length	mm	514	540	526	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	429	Pass
O - Chest Depth W/O Jacket	mm	195	211	203	Pass
P - Foot Length	mm	216	232	222	Pass
Q - Hip Breadth (W/Pelvic Plugs)	mm	313	323	319	Pass
R - Arm Length	mm	249	259	254	Pass
S - Knee Joint To Seatback	mm	477	493	482	Pass
V - Shoulder Width	mm	341	357	349	Pass
W - Foot Width	mm	78	94	88	Pass
Y - Chest Circumference W/Jacket	mm	851	881	866	Pass
Z - Waist Circumference	mm	761	791	782	Pass
				Overall Test Results	Pass

Technician:



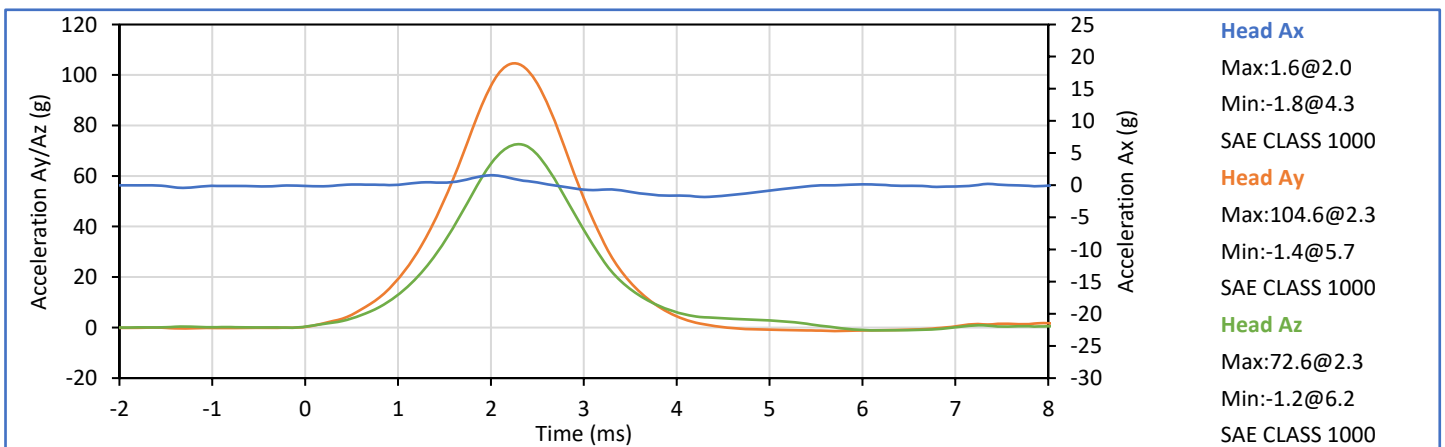
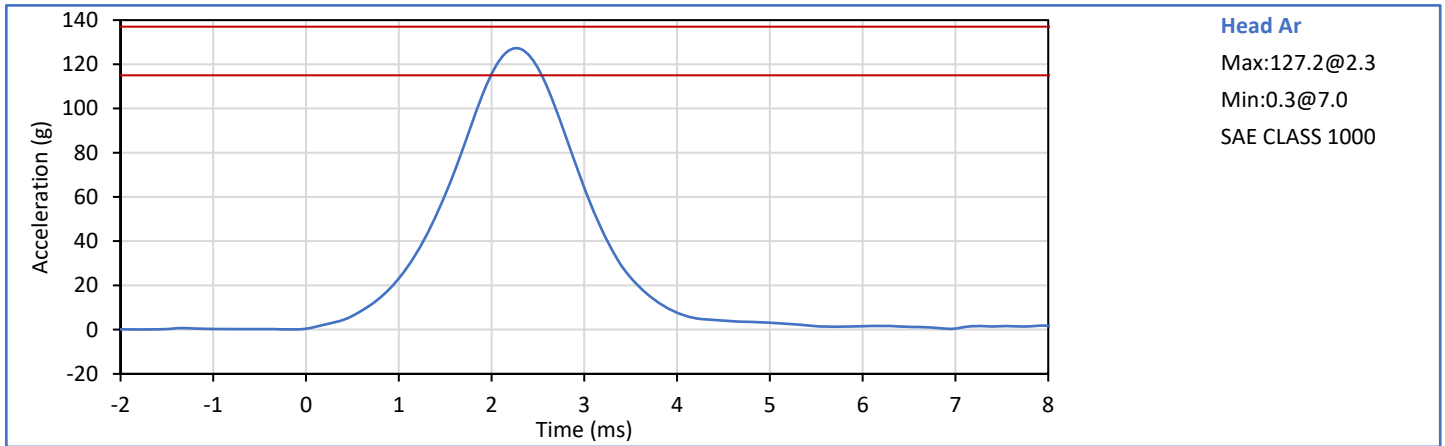
G. Fuentes

Approved By:



J. Hernandez

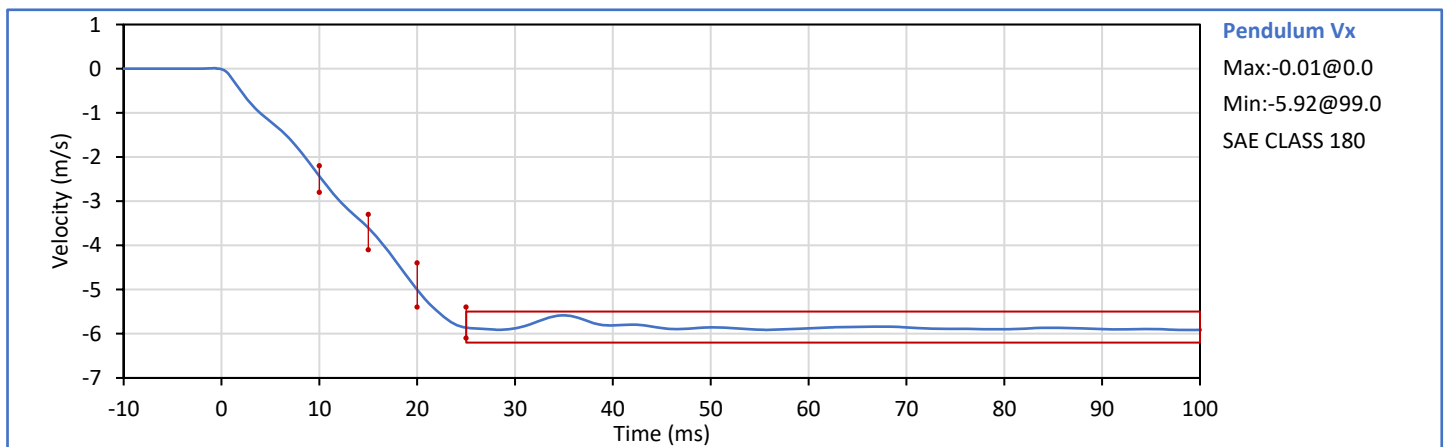
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.2	Pass
Laboratory Relative Humidity	%	10	70	29	Pass
Peak Resultant Acceleration	g	115.0	137.0	127.2	Pass
Peak Head Ax	g	-15.0	15.0	-1.8	Pass
Oscillations After Main Pulse	%	0.0	15.0	1.4	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
Overall Test Results					Pass



Technician: *Mill LGS III*
G. Fuentes

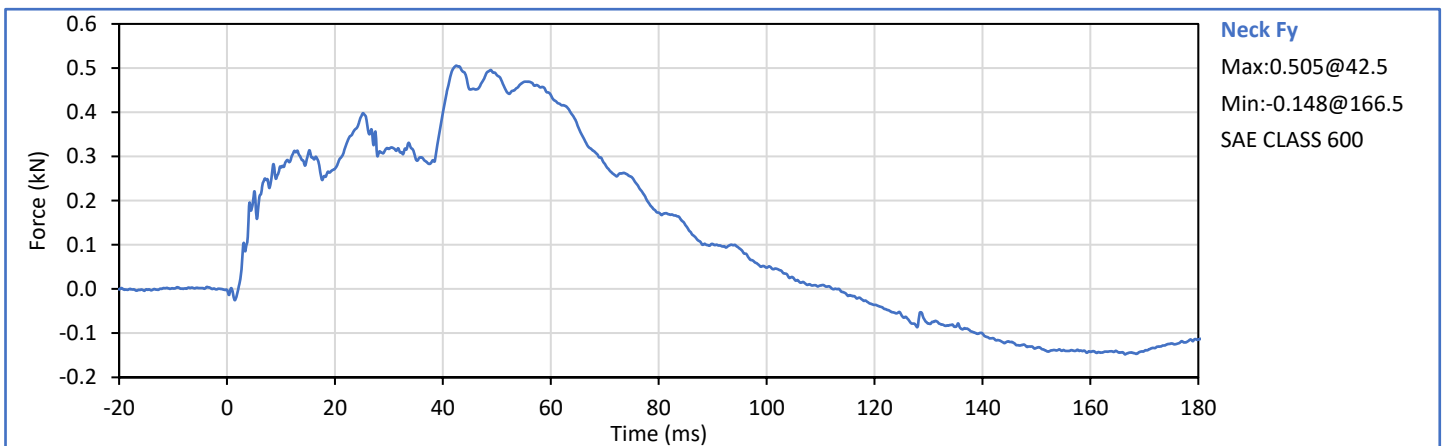
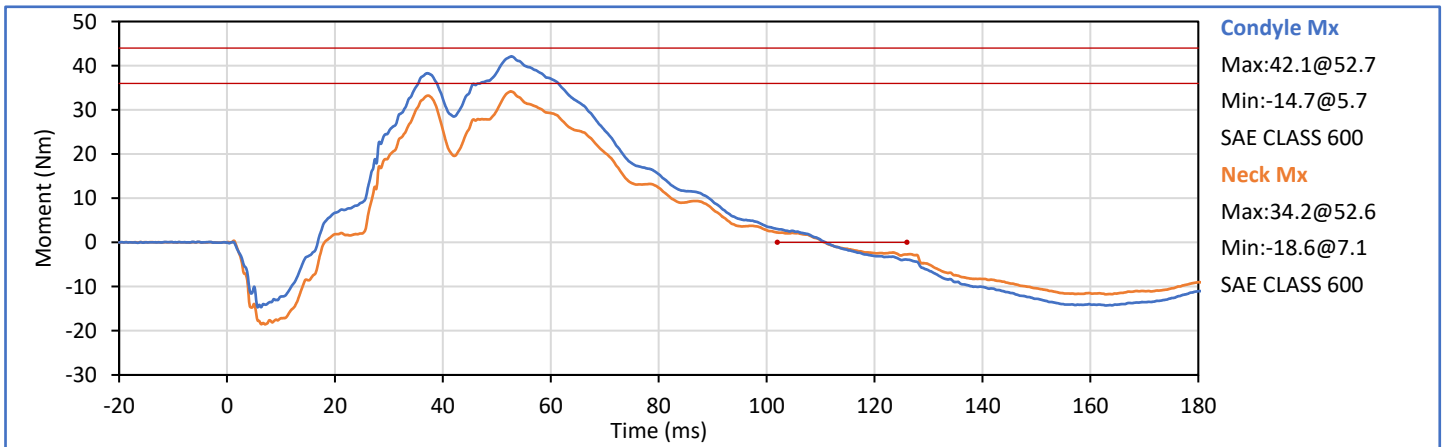
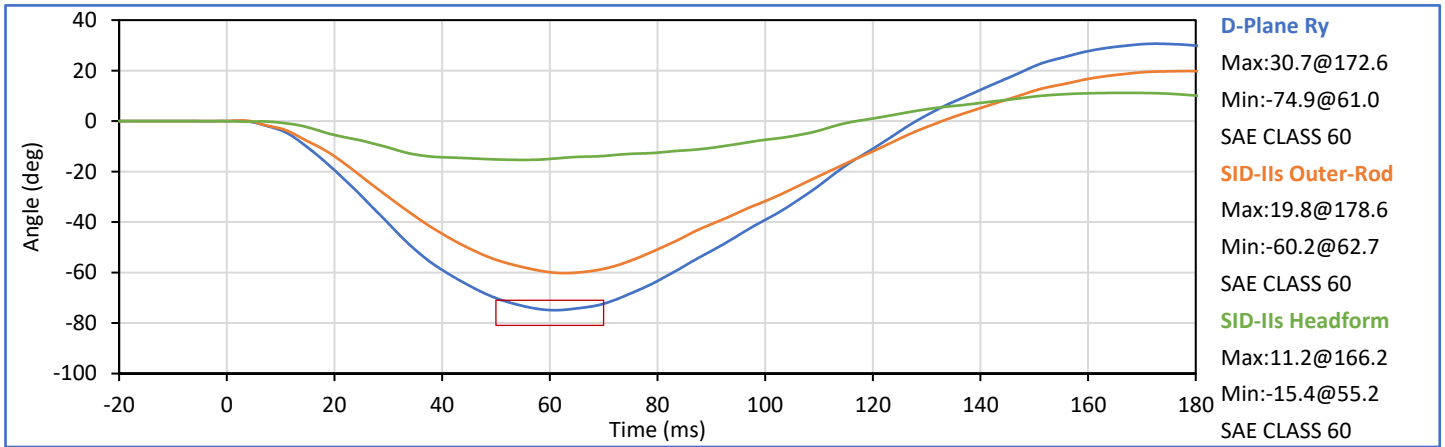
Approved By: *Smith*
J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	22.0	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	-2.43	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	-5.01	Pass
Pendulum Decel at 25 ms	m/s	-6.10	-5.40	-5.87	Pass
Pendulum Decel from 25-100 ms	m/s	-6.20	-5.50	-5.92/-5.59	Pass
Peak "D" Plane Rotation	deg	-81.0	-71.0	-74.9	Pass
Time of Peak "D" Plane Rotation	ms	50.0	70.0	61.0	Pass
Peak Occ. Condyle Moment	Nm	36.0	44.0	42.1	Pass
Time of Moment Decay to 0 Nm	ms	102.0	126.0	110.9	Pass
Overall Test Results					Pass

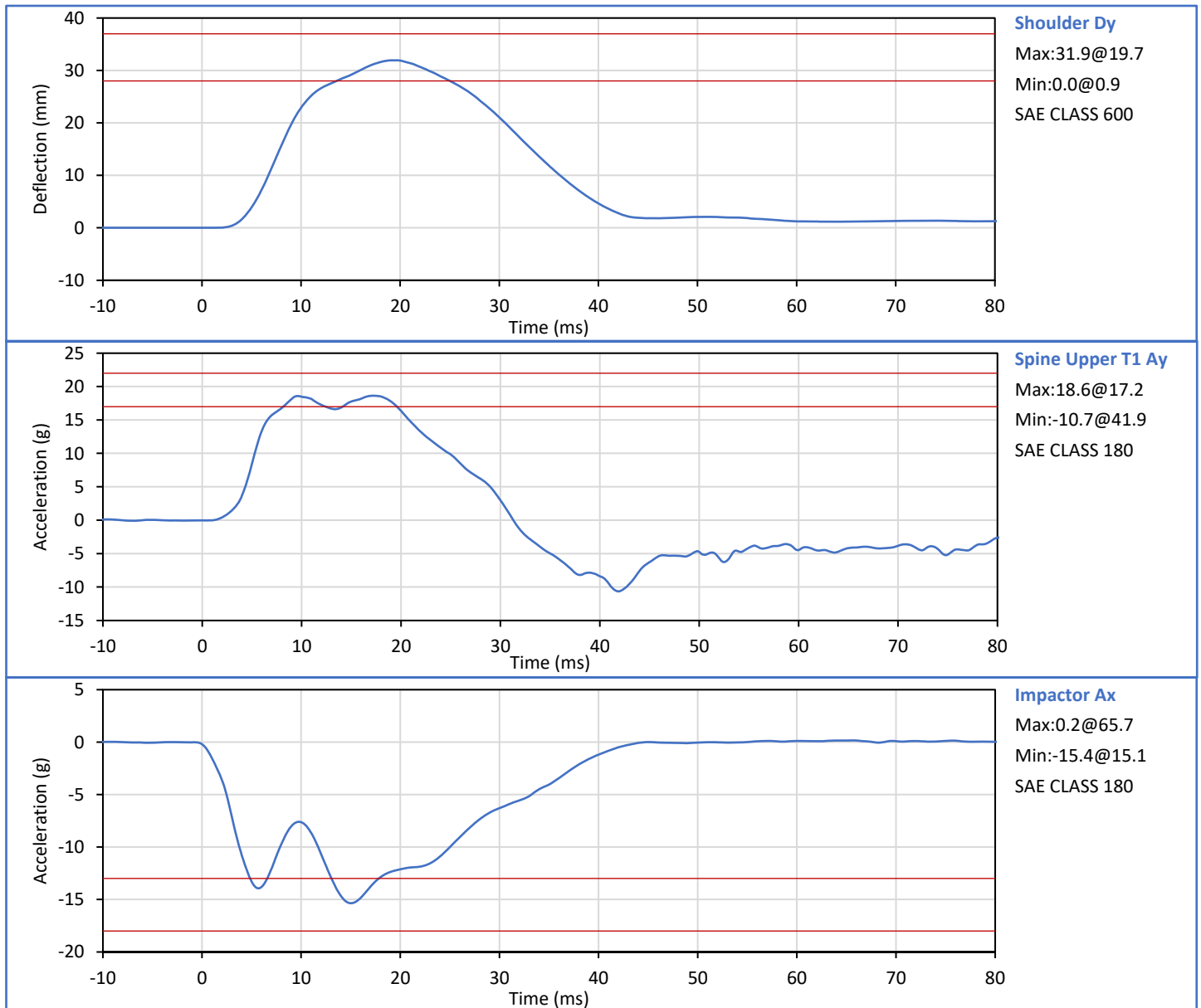


Technician: *Mill LGS III*
G. Fuentes

Approved By: *Seath*
J. Hernandez



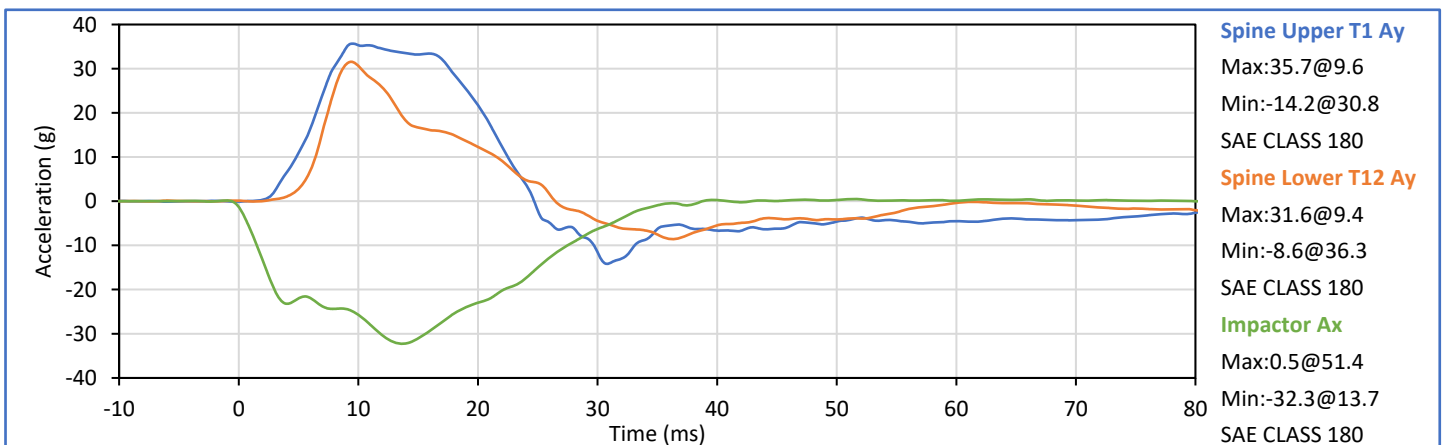
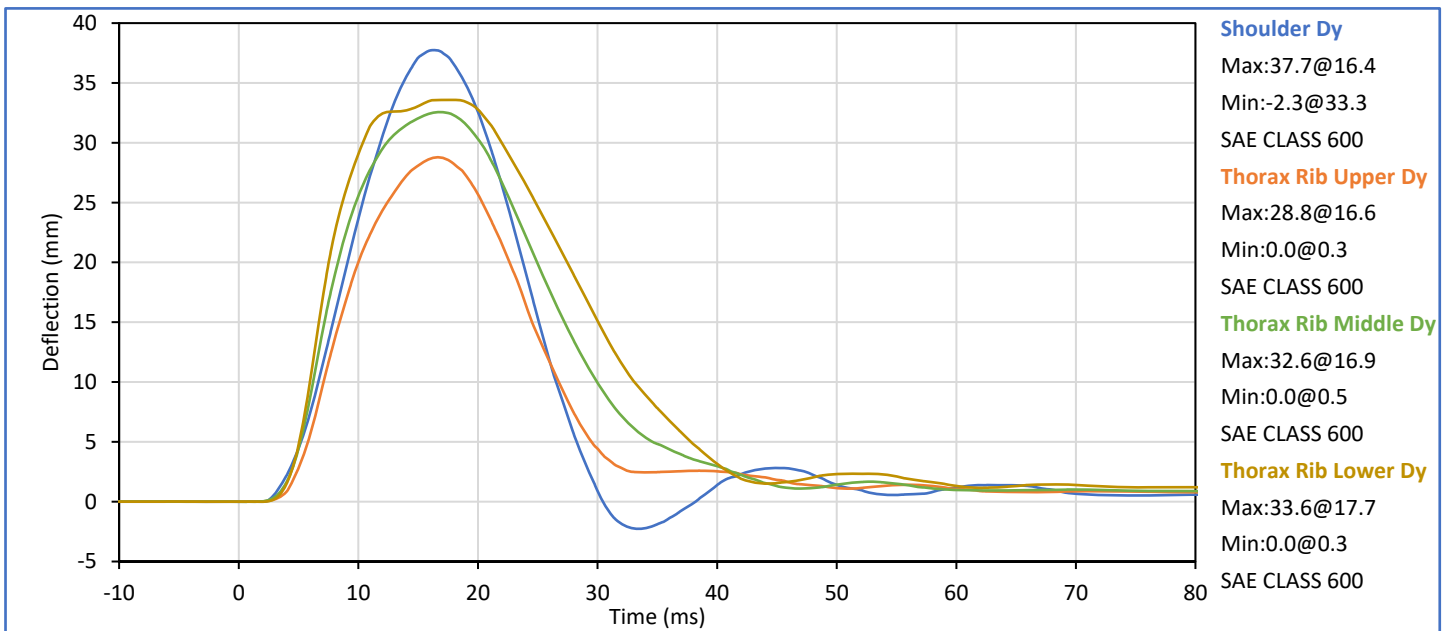
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.9	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
Impactor Velocity	m/s	4.20	4.40	4.32	Pass
Peak Shoulder Dy	mm	28.0	37.0	31.9	Pass
Peak Upper Spine (T1) Ay	g	17.0	22.0	18.6	Pass
Peak Impactor Ax	g	-18.0	-13.0	-15.4	Pass
Overall Test Results					Pass



Technician: *Mill LGS III*
G. Fuentes

Approved By: *Seath*
J. Hernandez

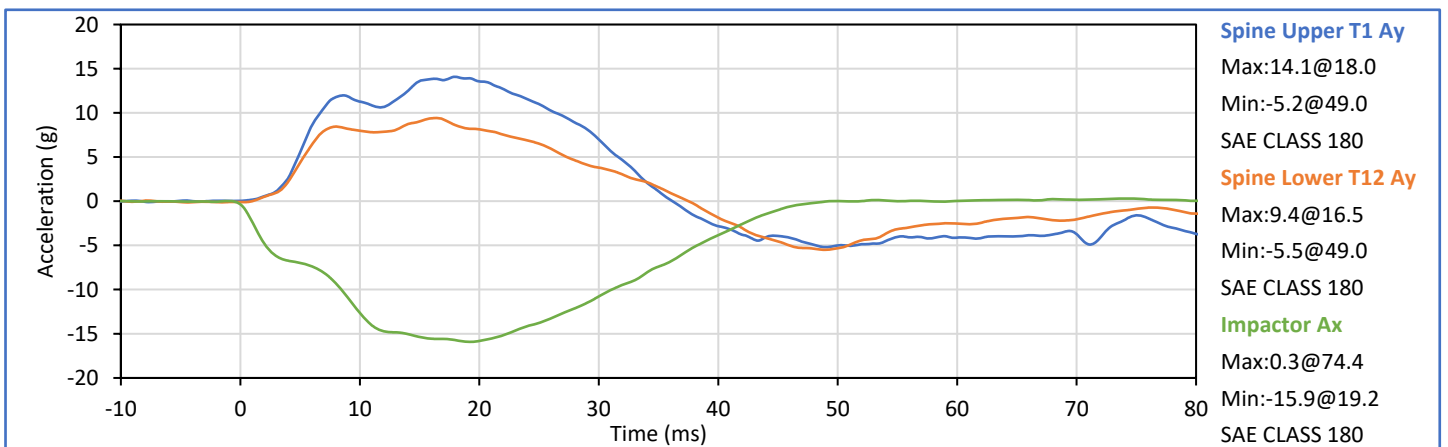
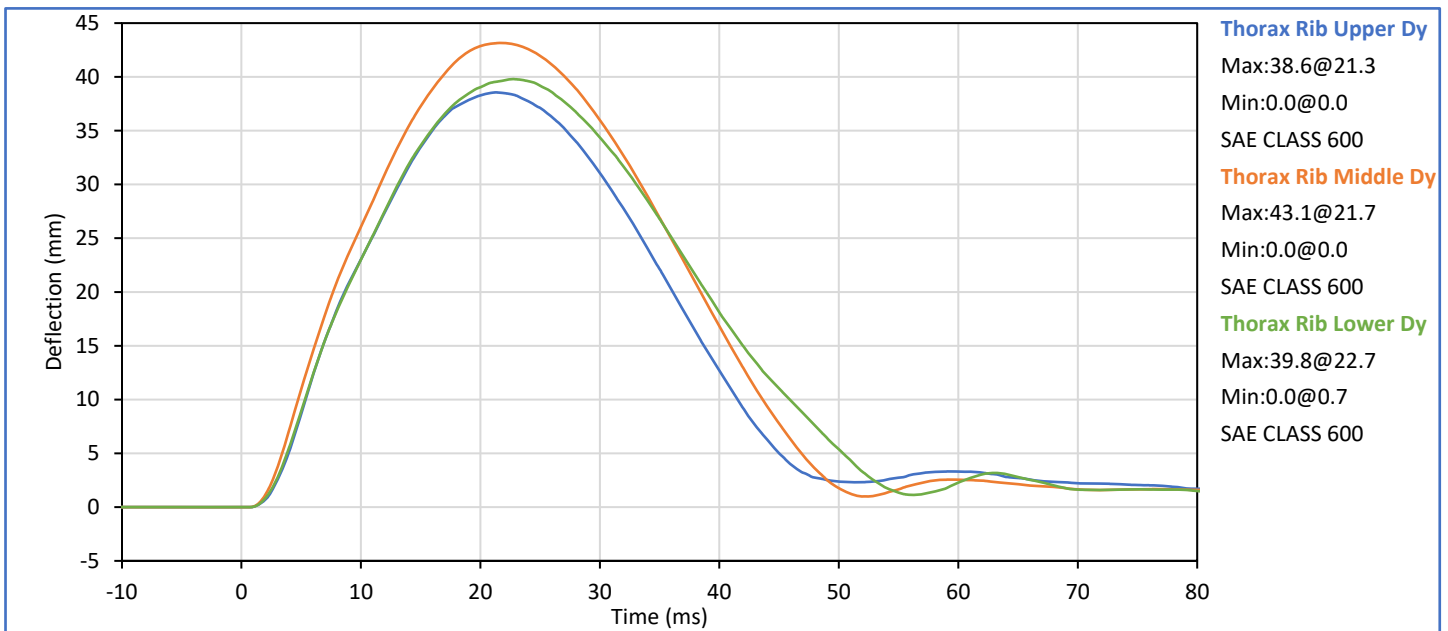
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.4	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
Impactor Velocity	m/s	6.60	6.80	6.70	Pass
Peak Shoulder Dy	mm	31.0	40.0	37.7	Pass
Peak Upper Rib Dy	mm	25.0	32.0	28.8	Pass
Peak Middle Rib Dy	mm	30.0	36.0	32.6	Pass
Peak Lower Rib Dy	mm	32.0	38.0	33.6	Pass
Peak Upper Spine (T1) Ay	g	34.0	43.0	35.7	Pass
Peak Lower Spine (T12) Ay	g	29.0	37.0	31.6	Pass
Peak Impactor Ax	g	-36.0	-30.0	-32.3	Pass
Overall Test Results					Pass



Technician: Mill LGS III
G. Fuentes

Approved By: J. Hernandez
J. Hernandez

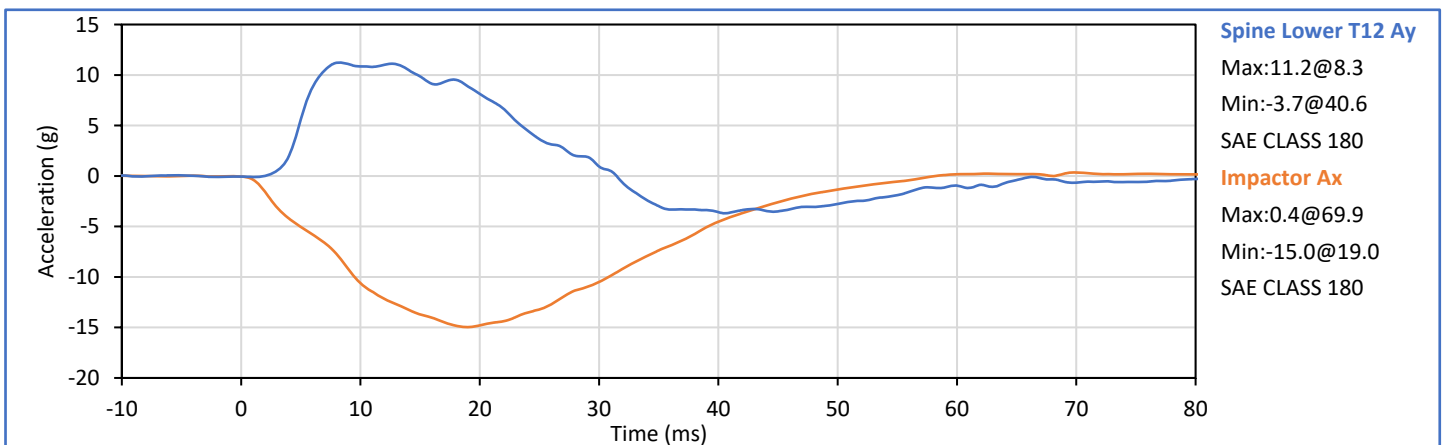
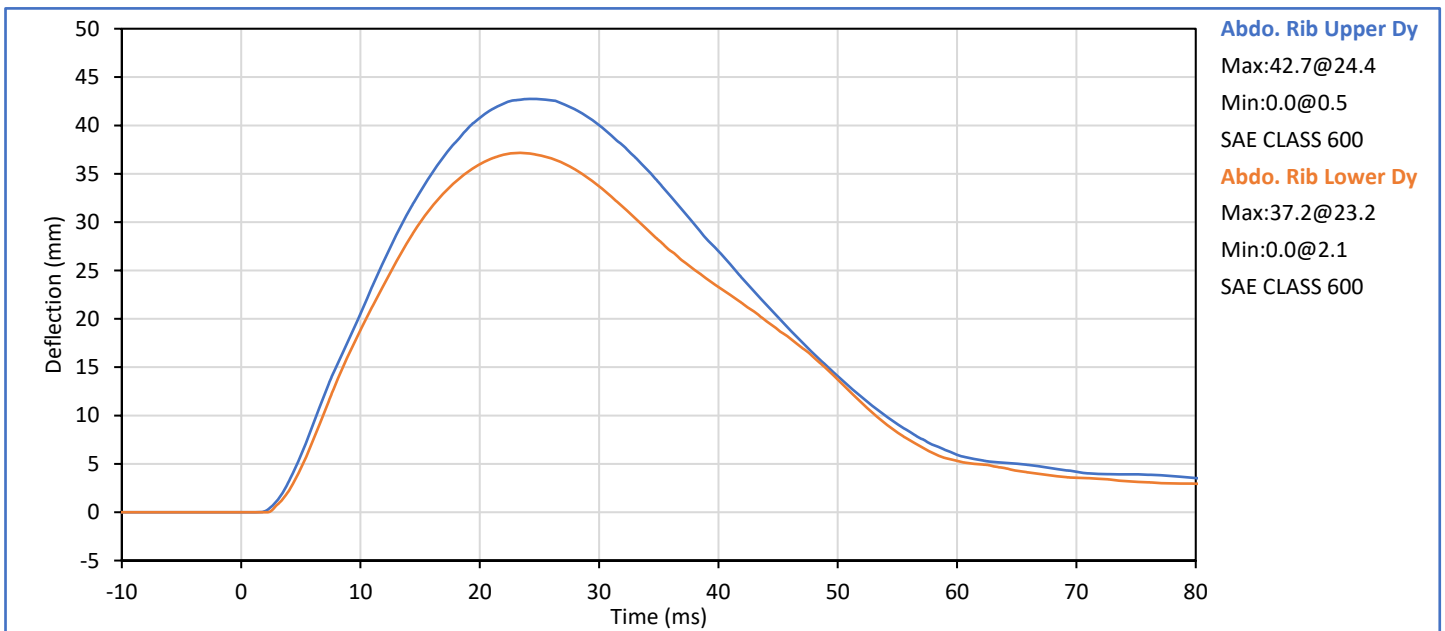
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.7	Pass
Laboratory Relative Humidity	%	10	70	29	Pass
Impactor Velocity	m/s	4.20	4.40	4.31	Pass
Peak Thorax Rib Upper Dy	mm	32.0	40.0	38.6	Pass
Peak Thorax Rib Middle Dy	mm	39.0	45.0	43.1	Pass
Peak Thorax Rib Lower Dy	mm	35.0	43.0	39.8	Pass
Peak Spine Upper T1 Ay	g	13.0	17.0	14.1	Pass
Peak Spine Lower T12 Ay	g	7.0	11.0	9.4	Pass
Peak Impactor Ax	g	-18.0	-14.0	-15.9	Pass
Overall Test Results					Pass



Technician: *Mill JG III*
G. Fuentes

Approved By: *Seath*
J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.6	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
Impactor Velocity	m/s	4.20	4.40	4.30	Pass
Peak Upper Abdomen Rib Dy	mm	36.0	47.0	42.7	Pass
Peak Lower Abdomen Rib Dy	mm	33.0	44.0	37.2	Pass
Peak Lower Spine T12 Ay	mm	9.0	14.0	11.2	Pass
Peak Impactor Ax	g	-16.0	-12.0	-15.0	Pass
Overall Test Results					Pass

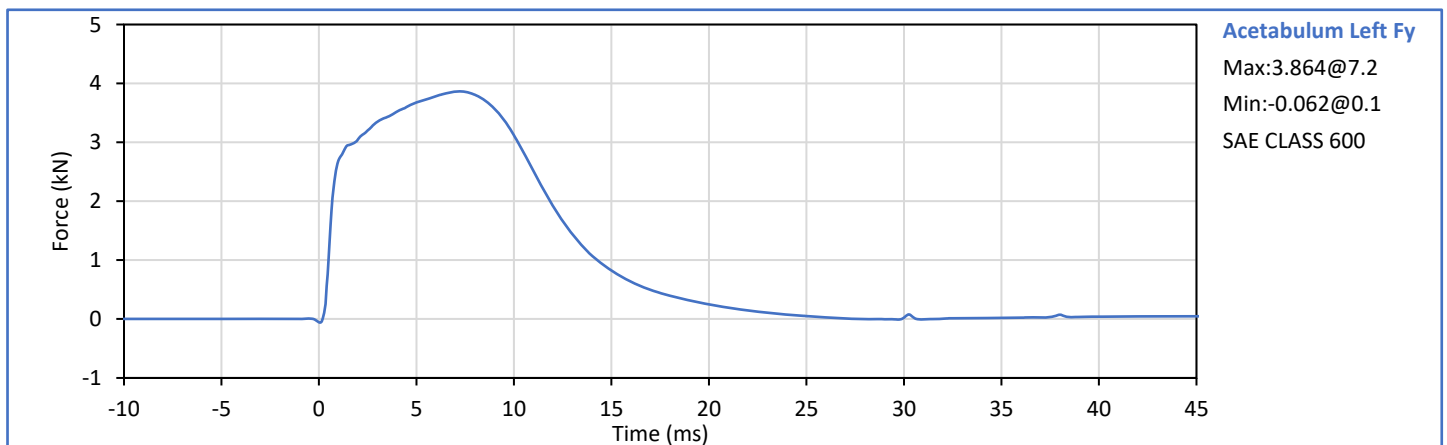
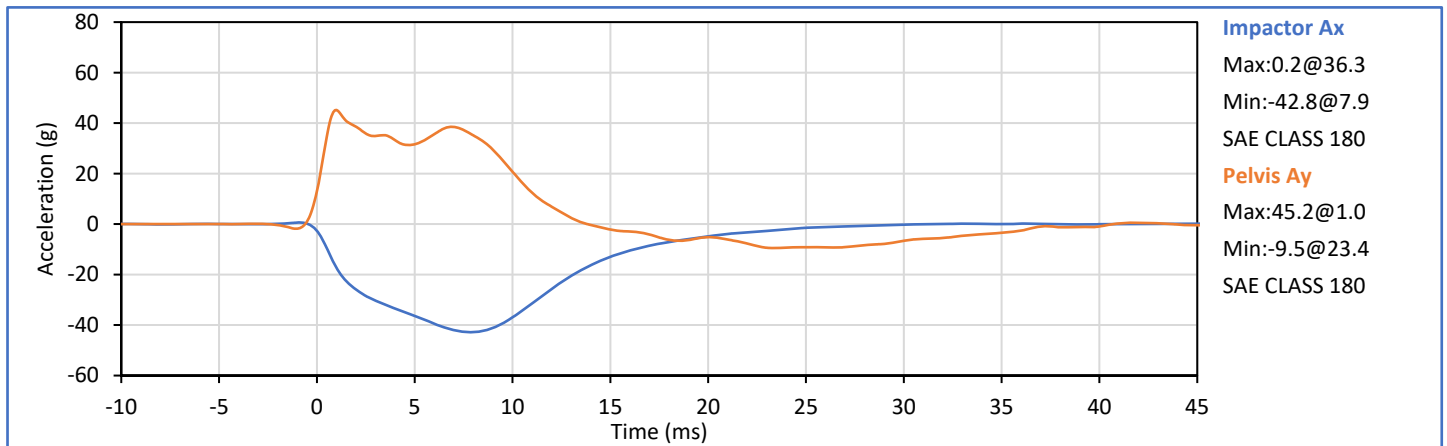


Technician: *Milli JG III*
G. Fuentes

Approved By: *Smith*
J. Hernandez

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	30	Pass
Impactor Velocity	m/s	6.60	6.80	6.70	Pass
Peak Acetabulum Fy	kN	3.60	4.30	3.86	Pass
Pelvis Ay after 6ms	g	34.0	42.0	38.5	Pass
Peak Impactor Ax	g	-47.0	-38.0	-42.8	Pass
Overall Test Results					Pass

Pelvis Plug S/N: 14660



Technician: *Mill JG III*
G. Fuentes

Approved By: *Smith*
J. Hernandez

ATD Serial No.: 299

Test Date: 2023-02-25

Pelvis Plug S/N: 14660



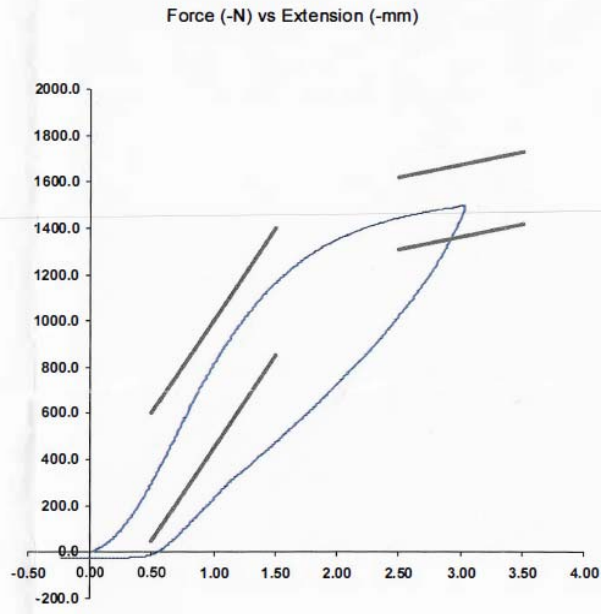
SID-IIs Pelvis Plug Certification Test

Plug S/N 14660
Test Number 16622
Report Number 16668
Test Date 12/22/2020 8:59:27 AM

	Test Results	Spec. Mn	Spec. Max
Force @ 0.5 mm (N)	298.94	50.00	600.00
Force @ 1.5 mm (N)	1,165.55	850.00	1,400.00
Force @ 2.5 mm (N)	1,442.98	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,496.77	1,361.00	1,673.00

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

Notes:



Operator 146

Part Number 180-4450

Template No 107 22-Dec-20
SACO Research

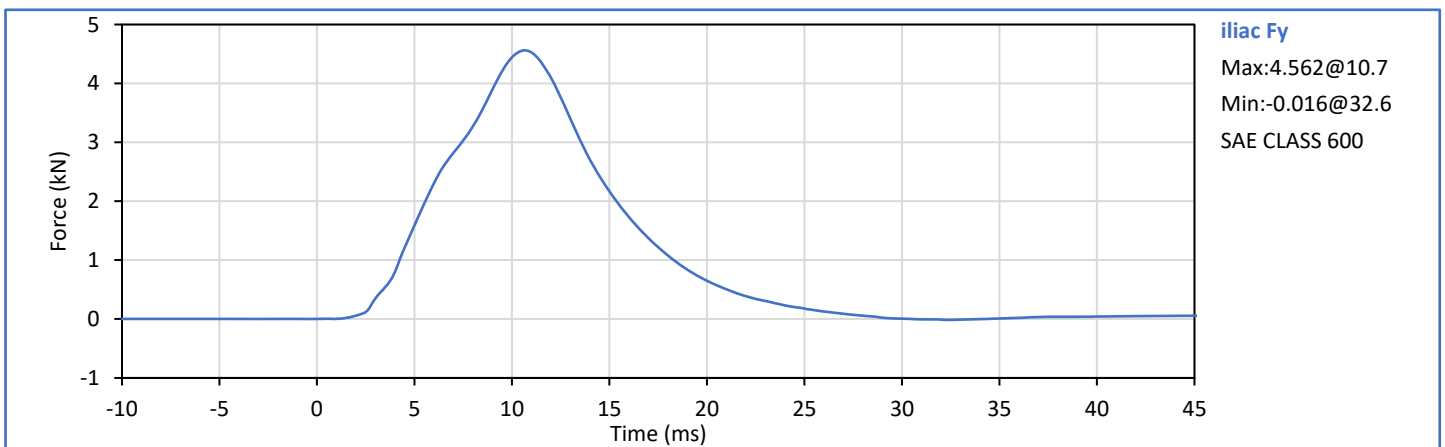
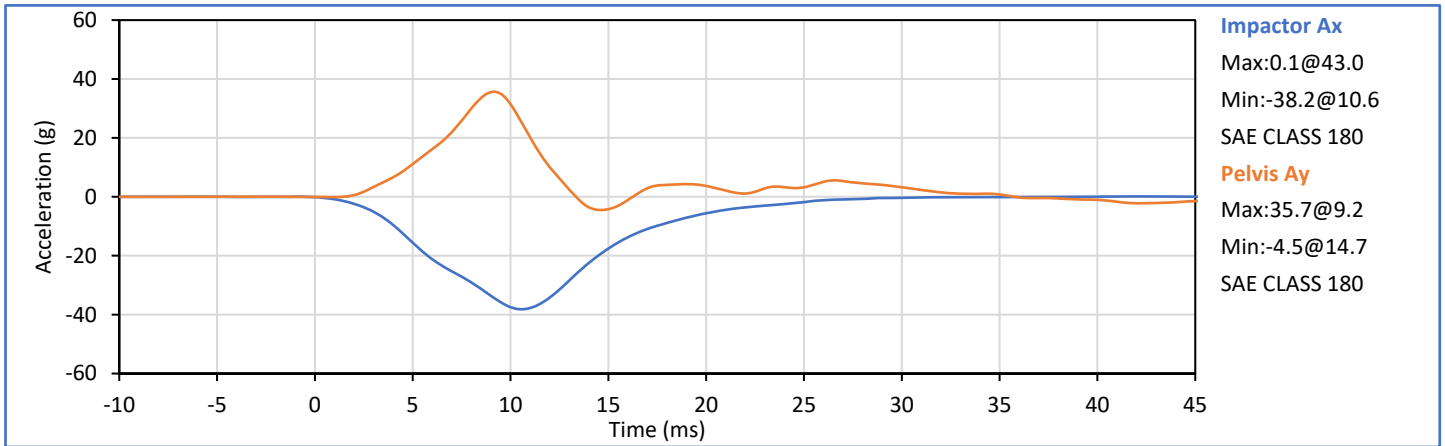
By: DC Date: 12/22/20

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

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.3	Pass
Laboratory Relative Humidity	%	10	70	29	Pass
Impactor Velocity	m/s	4.20	4.40	4.32	Pass
Peak Iliac Fy	kN	4.10	5.10	4.56	Pass
Peak Pelvis Ay	g	28.0	39.0	34.7	Pass
Peak Impactor Ax	g	-45.0	-36.0	-38.2	Pass
Overall Test Results					Pass

Pelvis Plug S/N: 12228 *

* Plug is not impacted and remains certified



Technician: *Mill LGS III*
G. Fuentes

Approved By: *Smith*
J. Hernandez

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 - Driver ATD Instrumentation

Sensor Location	Sensor S\N	Mfr	Model	Cal Date
Head Acceleration X Primary	P51929	Endevco	7264C-2k	2022-10-06
Head Acceleration Y Primary	P50086	Endevco	7264C-2k	2022-10-06
Head Acceleration Z Primary	P51931	Endevco	7264C-2k	2022-10-06
Head Acceleration X Redundant	P68604	Endevco	7264C-2k	2022-10-06
Head Acceleration Y Redundant	P51934	Endevco	7264C-2k	2022-10-06
Head Acceleration Z Redundant	P58736	Endevco	7264C-2k	2022-10-06
Head Rotation Rate X	ARS7342	DTS	ARS PRO-8k (2kHz)	2022-03-15
Head Rotation Rate Y	ARS7473	DTS	ARS PRO-8k (2kHz)	2022-03-15
Head Rotation Rate Z	ARS7548	DTS	ARS PRO-8k (2kHz)	2022-03-15
Upper Thorax Rib Deflection Y	1143	Servo	08TCI-3725	2022-10-12
Middle Thorax Rib Deflection Y	1075	Servo	08TCI-3725	2022-10-10
Lower Thorax Rib Deflection Y	1213	Servo	08TCI-3725	2022-10-10
Upper Abdomen Rib Deflection Y	1218	Servo	08TCI-3725	2022-10-10
Lower Abdomen Rib Deflection Y	1177	Servo	08TCI-3725	2022-10-10
Lower Spine T12 Acceleration X	P58761	Endevco	7264C-2k	2022-10-10
Lower Spine T12 Acceleration Y	P50077	Endevco	7264C-2k	2022-10-10
Lower Spine T12 Acceleration Z	P58795	Endevco	7264C-2k	2022-10-10
Iliac Wing Impact Side Force Y	284 (Iliac)	R.A. Denton	3228J	2022-03-30
Acetabulum Impact Side Force Y	272 (Acetabulum)	R.A. Denton	3249J	2022-03-30

Table 2 - Vehicle Instrumentation

Sensor Location	Sensor S\N	Mfr	Model	Cal Date
Vehicle CG Ax	M11156	Endevco	758H-2k	2022-12-25
Vehicle CG Ay	M10904	Endevco	758H-2k	2022-12-07
Vehicle CG Az	M11079	Endevco	758H-2k	2022-12-01
Left Floor Sill Ay	M11091	Endevco	758H-2k	2022-11-05
A-Pillar Sill Ay	M11095	Endevco	758H-2k	2022-10-08
A-Pillar Low Ay	M11083	Endevco	758H-2k	2022-12-01
A-Pillar Mid Ay	M11259	Endevco	758H-2k	2022-10-11
B-Pillar Sill Ay	M11166	Endevco	758H-2k	2022-11-04
B-Pillar Low Ay	M11103	Endevco	758H-2k	2022-11-05
B-Pillar Mid Ay	M11168	Endevco	758H-2k	2022-12-25
Driver Seat Track at H-Point Ay	M11199	Endevco	758H-2k	2022-12-16
Engine Top Ax	M11097	Endevco	758H-2k	2022-12-01
Engine Top Ay	M11272	Endevco	758H-2k	2022-11-03
Firewall Ay	M11249	Endevco	758H-2k	2022-10-07
Right Roof Ay	M11227	Endevco	758H-2k	2022-11-04
Right Floor Sill Ay	M11200	Endevco	758H-2k	2022-11-04
Rear Floorpan Ax	M11089	Endevco	758H-2k	2022-11-04
Rear Floorpan Ay	M11266	Endevco	758H-2k	2022-10-16

Table 3 - Barrier Pole Instrumentation

Sensor Location	Sensor S\N	Mfr	Model	Cal Date
Barrier Pole 01 Fx	19461A	Interface	1220FS-50k	2021-11-04
Barrier Pole 02 Fx	131822A	Interface	1220AF-50k	2021-11-04
Barrier Pole 03 Fx	131816A	Interface	1220AF-50k	2021-11-04
Barrier Pole 04 Fx	19325	Interface	1220AF-50k	2021-11-04
Barrier Pole 05 Fx	131827A	Interface	1220AF-50k	2021-11-04
Barrier Pole 06 Fx	19340	Interface	1220AF-50k	2021-11-05
Barrier Pole 07 Fx	19267	Interface	1220AF-50k	2021-11-05
Barrier Pole 08 Fx	19466A	Interface	1220AF-50k	2021-11-05