

REPORT NUMBER: NCAP-KAR-24-003

**NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST**

**SUBARU CORPORATION
2024 SUBARU CROSSTREK 5-DOOR SW**

NHTSA NUMBER: O20245500

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



AUGUST 22, 2023

FINAL REPORT

**U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
MAIL CODE : NRM-100
1200 NEW JERSEY AVE, SE
WASHINGTON, DC 20590**

TECHNICAL REPORT DOCUMENTATION PAGE

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		6. Performing Organization Code KAR																																																					
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		15. Supplementary Notes																																																					
16. Abstract A 56.3 km/h NCAP Frontal Impact Test was conducted on a 2024 Subaru Crosstrek 5-Door SW in accordance with the specifications of the Office of Crashworthiness Standards Frontal NCAP Laboratory Test Procedure. The test was conducted at the Applus+ IDIADA KARCO Engineering, LLC. facility in Adelanto, California on August 8, 2023. The impact velocity of the vehicle was 56.04 km/h and the ambient temperature at the barrier face at the time of impact was 32.8°C. The target vehicle's post-test maximum crush was 373 mm at DPD 2 to the left of the vehicle's centerline. The test vehicle's performance is as follows: <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">Measurement Description</th><th rowspan="2">Units</th><th colspan="2">Driver ATD</th><th colspan="2">Passenger ATD</th></tr> <tr> <th>Threshold</th><th>Result</th><th>Threshold</th><th>Result</th></tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₁₅)</td><td>N/A</td><td>700</td><td>222.480</td><td>700</td><td>169.520</td></tr> <tr> <td>Maximum Chest Compression</td><td>mm</td><td>63</td><td>-19.455</td><td>52</td><td>-11.619</td></tr> <tr> <td>Nij</td><td>N/A</td><td>1</td><td>0.224</td><td>1</td><td>0.288</td></tr> <tr> <td>Neck Tension</td><td>N</td><td>4170</td><td>1189.592</td><td>2620</td><td>703.283</td></tr> <tr> <td>Neck Compression</td><td>N</td><td>4000</td><td>-441.255</td><td>2520</td><td>-227.355</td></tr> <tr> <td>Left Femur Force</td><td>N</td><td>10008</td><td>-1177.255</td><td>6800</td><td>-1293.275</td></tr> <tr> <td>Right Femur Force</td><td>N</td><td>10008</td><td>-1292.264</td><td>6800</td><td>-1214.139</td></tr> </tbody> </table>				Measurement Description	Units	Driver ATD		Passenger ATD		Threshold	Result	Threshold	Result	Head Injury Criteria (HIC ₁₅)	N/A	700	222.480	700	169.520	Maximum Chest Compression	mm	63	-19.455	52	-11.619	Nij	N/A	1	0.224	1	0.288	Neck Tension	N	4170	1189.592	2620	703.283	Neck Compression	N	4000	-441.255	2520	-227.355	Left Femur Force	N	10008	-1177.255	6800	-1293.275	Right Femur Force	N	10008	-1292.264	6800	-1214.139
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17. Key Words 56.3 km/h (35 mph) Full Frontal Rigid Barrier Impact Test New Car Assessment Program (NCAP)		18. Distribution Statement National Highway Traffic Safety Administration Technical Information Services Division 1200 New Jersey Ave, SE Washington, DC 20590																																																					
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SECTION 1

PURPOSE AND SUMMARY OF TEST

PURPOSE

This 56.3 km/h frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program, sponsored by the National Highway Traffic Safety Administration (NHTSA) under contract number 693JJ919D000004. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for consumer information purposes.

The 56.3 km/h frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Procedure dated May 2018 for NCAP Full Frontal Rigid Barrier Impact Testing.

SUMMARY

A load cell barrier consisting of 176 load cells was impacted by a type of car at a velocity of 56.04 km/h. The test was performed at Applus+ IDIADA KARCO Engineering, LLC. on August 8, 2023. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A of this report.

One (1) real-time cameras and sixteen (16) high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in Data Sheet 6 of this report.

One Part IIII 50th percentile male anthropomorphic test device (ATD) was placed in the driver seating position and one Part IIII 5th percentile female ATD was placed in the right-front passenger seating position according to dummy placement instructions specified in the Laboratory Procedure for NCAP Full Frontal Rigid Barrier Impact Testing.

Both ATDs were fully instrumented with head, chest and pelvis tri-axial accelerometers, chest displacement potentiometers, upper neck force transducers, right / left femur load cells, and lower leg instrumentation.

The driver (position 1) ATD (Serial No. 360) and the right-front passenger (position 2) ATD (Serial No. DH1644) were qualified prior to this test. Certification details, along with instrumentation calibration data, are found in Appendix C of this report.

The 105 channels of dummy and vehicle response data were recorded on an on-board data acquisition system. Appendix B contains the dummy response data traces. Appendix D contains a complete list of instrumentation used for dummies and the vehicle.

There was 100 percent windshield retention and intrusion into the protected zone of the windshield during the event. There was no Stoddard solvent leakage after the event or during any phase of the static rollover.

The maximum static crush of the test vehicle was 373 mm at DPD 2 to the left of the vehicle's centerline. Both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

The driver's visible contact points were as follows: the driver ATD's head contacted the frontal airbag and headrest. Both left and right knees contacted the knee airbag.

The passenger's visible contact points were as follows: the passenger ATD's head contacted the frontal airbag and headrest. The upper and lower torso contacted the frontal airbag. Both left and right knees contacted the knee bolster.

The occupant data is summarized below:

ATD Position	HIC ₁₅	Nij	Neck Tension (N)	Neck Comp. (N)	3ms Chest Clip (g)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver (50th Male)	222.480	0.224	1189.592	-441.255	43.277	-19.455	-1177.255	-1292.264
Passenger (5th Female)	169.520	0.288	703.283	-227.355	38.066	-11.619	-1293.275	-1214.139

GENERAL COMMENTS:

None

SECTION 2

OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

Test Vehicle: 2024 Subaru Crosstrek 5-Door SW NHTSA No.: O20245500
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/08/2023

CONVERSION FACTORS

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

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2024 Subaru Crosstrek 5-Door SW NHTSA No.: O20245500
 Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/08/2023

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	O20245500
Model Year	2024
Make	Subaru
Model	Crosstrek
Body Style	5-Door SW
VIN	JF2GUADC3RH227924
Body Color	White
Odometer Reading (km / mi)	159/99
Engine Displacement (L)	2.0
Type / No. of Cylinders	4 Cylinder
Engine Placement	Longitudinal
Transmission Type	Automatic
Transmission Speeds	8
Overdrive	Yes
Final Drive	AWD
Roof Rack	No
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes
Automatic Door Locks (ADLs)	Yes

Traction Control System	Yes
Power Steering	Yes
Power Window Auto-Reverse	Yes
Driver Frontal 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
Front Pass. Frontal Airbag	Yes
Front Pass. Curtain Airbag	Yes
Front Pass. Head/Torso Airbag	No
Front Pass. Torso Airbag	No
Front Pass. Torso/Pelvis Airbag	Yes
Front Pass. Pelvis Airbag	No
Front Pass. Knee Airbag	No
Driver Seat Belt Pretensioner	Yes
Driver Load Limiter	Yes
Front Pass. Seat Belt Pretensioner	Yes
Front Pass. Load Limiter	Yes
Other Safety Restraint	Yes

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

Yes, Page 134

DATA FROM CERTIFICATION LABEL

Manufactured By	Subaru Corporation
Date of Manufacture	Apr-23

GVWR (kg)	2185
GAWR Front (kg)	1165
GAWR Rear (kg)	1130

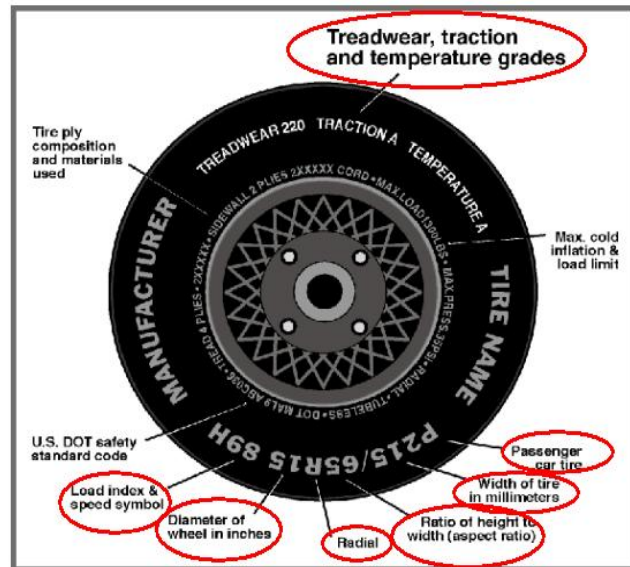
VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total	
Type of Seats	Bucket	Bench			
Designated Seating Capacity	2	3		5	
Capacity Weight (VCW) (kg)				408.0	A
DSC x 68 (kg)				340.0	B
Cargo Weight (RCLW) (kg)				68.0	A-B

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2024 Subaru Crosstrek 5-Door SW NHTSA No.: O20245500
 Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/08/2023



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	230	220
Recommended Tire Size	225/60 R17	225/60 R17
Tire Size on Vehicle	225/60 R17	225/60 R17
Tire Manufacturer	Yokohama	Yokohama
Tire Model	Geolander G91	Geolander G91
Treadware	280	280
Traction Grade	B	B
Temperature Grade	A	A
Tire Plies Sidewall	Polyester	Polyester
Tire Plies Body	Polyester, Steel, Nylon	Polyester, Steel, Nylon
Load Index/Speed Symbol	99H	99H
Tire Material	Polyester, Steel, Nylon	Polyester, Steel, Nylon
DOT Safety Code Left	IFDFCYL161223	IFDFCYL161223
DOT Safety Code Right	IFDFCYL161223	IFDFCYL161223

DATA SHEET NO. 1 ... (CONTINUED)**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2024 Subaru Crosstrek 5-Door SW NHTSA No.: O20245500
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/08/2023

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UWV)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	455.0	317.0		483.0	395.0	
Right	kg	439.0	300.0		460.0	374.0	
Ratio	%	59.2%	40.8%	100.0%	55.1%	44.9%	100.0%
Total	kg	894.0	617.0	1511.0	943.0	769.0	1712.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UWV)	kg	1511.0	A
Weight of 1 P572E ATD & 1 P572O ATD	kg	141.0	B
Rated Cargo/Luggage Weight (RCLW)	kg	68.0	C
Calculated Vehicle Target Weight (TVTW)	kg	1720.0	A+B+C

TEST VEHICLE ATTITUDES

Condition	Units	LF	RF	LR	RR	CG Aft of Front Axle
As Delivered	mm	886	885	908	910	1091
As Tested	mm	752	757	756	766	1200
Post-Test	mm	N/A	N/A	744	737	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheelbase	mm	2671
Total Vehicle Length at Left Side	mm	3880
Total Vehicle Length at Centerline	mm	4475
Total Vehicle Length at Right Side	mm	3879
Weight of Ballast in Cargo Area	kg	73.3
Weight of Vehicle Components Removed	kg	29.0
Amount of Stoddard Solvent in Fuel Tank	L	58.30

VEHICLE COMPONENTS REMOVED TO MEET TEST WEIGHT:

DATA SHEET NO. 1 ... (CONTINUED)**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2024 Subaru Crosstrek 5-Door SW NHTSA No.: O20245500
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/08/2023

TARGET VEHICLE STRUCTURAL MEASUREMENTS

No.	Description	Pre-Test
1	Total Length	4475
2	Total Width	1801
3	Bumper Top Height	558
4	Bumper Bottom Height	480
5	Longitudinal Member Top Height	603
6	Distance Between Longitudinal Members	926
7	Longitudinal Member Width	104
8	Engine Top Height	893
9	Engine Bottom Height	281
10	Engine and Gearbox Width	598
11	Front Bumper to Engine Distance	514
12	Front Shock Absorber Fixing Height	942
13	Bonnet Leading Edge Height	914
14	Front Shock Absorber Fixing Width	1159
15	Front Bumper to Front Axle Distance	971
16	Front Axle to A-Pillar Distance	528
17	A-Pillar to B-Pillar Distance	1045
18	B-Pillar to Rear Axle Distance	1098
19	B-Pillar to C-Pillar Distance	986
20	Roof Sill Bottom Height	1495
21	Roof Sill Top Height	1545
22	Floor Sill Bottom Height	369
23	Floor Sill Top Height	422

All measurements in millimeters.

DATA SHEET NO. 2

SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

Test Vehicle: 2024 Subaru Crosstrek 5-Door SW

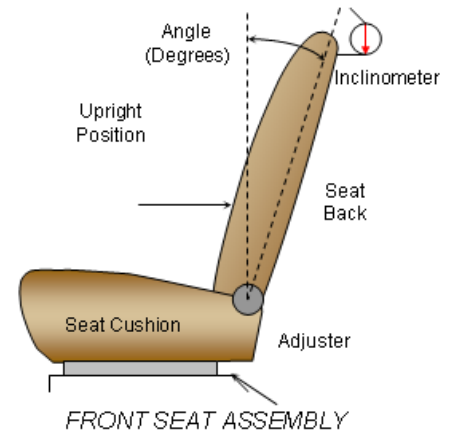
NHTSA No.: O20245500

Test Program: 56.3 km/h Frontal Impact NCAP Test

Test Date: 08/08/2023

NOMINAL DESIGN RIDING POSITION

The procedure for the driver is as follows: the seat back is set to the manufacturer's designated angle. The procedure for the passenger is as follows: the seat back is set to position the transverse instrumentation platform of the dummy's head at $0^\circ \pm 0.5^\circ$. Seat back angle is measured at the head restrain post.

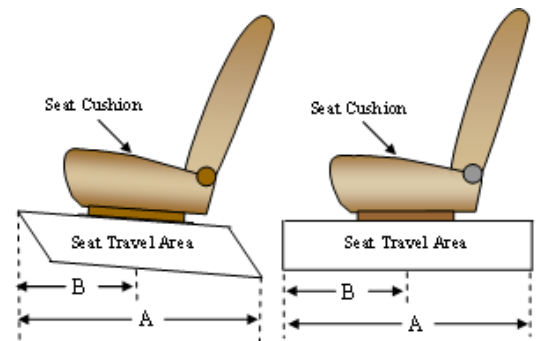


SEAT BACK ANGLE

Seating Position	Degrees
Driver Seat Back Angle	3.5
Passenger Seat Back Angle	4.8

SEAT FORE / AFT POSITIONING

The total seat travel is measured from the forward most possible position to the rear most possible position. The driver's seat is set to the middle of the fore-aft travel. The passenger's seat is set to the forward most position where the ATD will not contact any interior panels.



SEAT FORE/AFT POSITIONS

Seating Position	Total Fore-Aft Travel	Placed in Position
Driver Seat	305	155
Passenger Seat	260	0

SEAT BELT UPPER ANCHORAGE

The seat belt upper anchorage is positioned to the manufacturer's design position for a 50th percentile adult male ATD for the driver, and a 5th percentile adult female ATD for the passenger. Position "L" is the lowermost position, followed by position "M1". Position "H" is the uppermost position.

SEAT BELT UPPER ANCHORAGES

Seating Position	Total No. of Positions	Placed in Position
Driver Seat	4	M2
Passenger Seat	4	H

DATA SHEET NO. 2 ... (CONTINUED)

SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

Test Vehicle: 2024 Subaru Crosstrek 5-Door SW

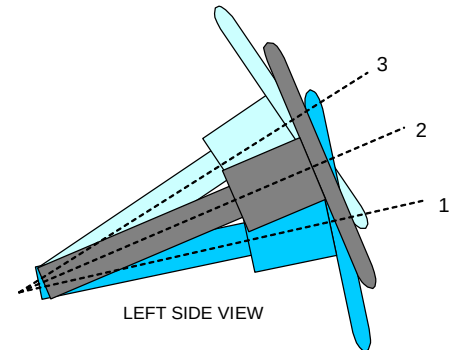
NHTSA No.: O20245500

Test Program: 56.3 km/h Frontal Impact NCAP Test

Test Date: 08/08/2023

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. A digital inclinometer is used to measure a plate which is placed across the rim of the steering wheel for angular measurements.



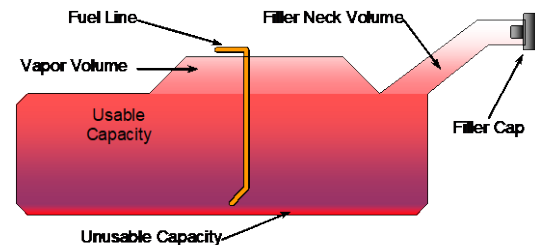
STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONING

	Degrees	Fore-Aft Position (mm)
Lowermost Position, No. 1	0.2	180
Geometric Center Position, No. 2	1.9	155
Uppermost Position, No. 3	3.6	130
Telescoping Steering Wheel Travel		-50
Test Position	1.9	155

FUEL PUMP

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



VEHICLE FUEL TANK ASSEMBLY

FUEL TANK CAPACITY

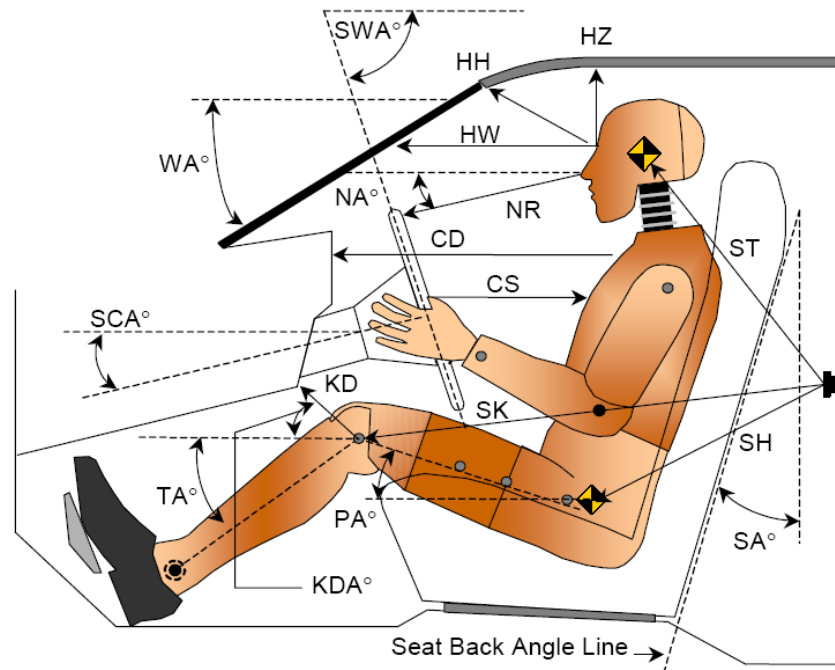
Description	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	62.80
Usable Capacity of "Optional Tank" (see Form No. 1)	
Usable Capacity of "Standard Tank" (see Owner's Manual)	62.80
Usable Capacity of "Optional Tank" (see Owner's Manual)	
93% of Usable Capacity	58.40
Actual amount of Solvent Used in Test	58.40
1/3 of Usable Capacity	20.93

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

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2024 Subaru Crosstrek 5-Door SW NHTSA No.: O20245500
 Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/08/2023



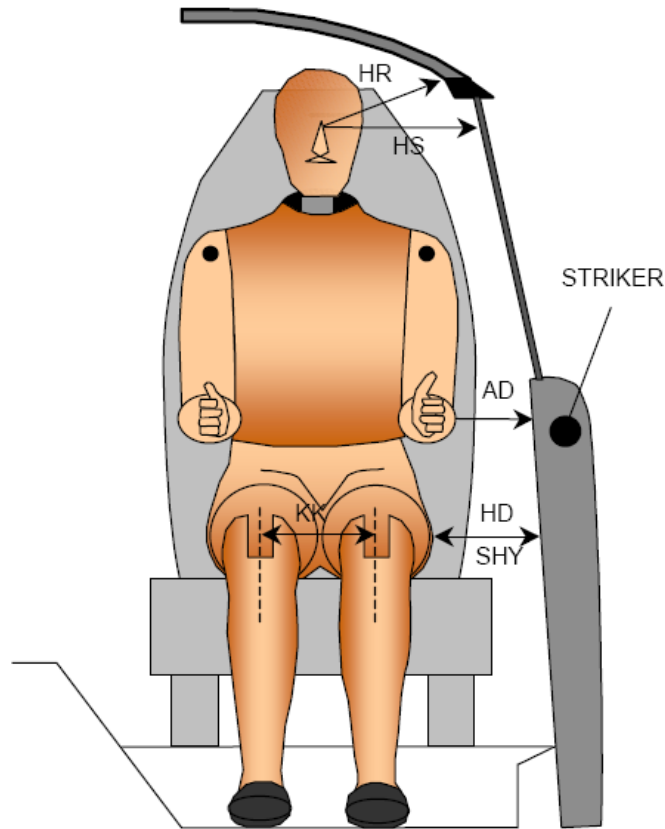
LEFT SIDE VIEW

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		27.0		
SWA°	Steering Wheel Angle		66.4		
SCA°	Steering Column Angle		23.6		
SA°	Seat Back Angle (On Seatback Post)		3.5		4.8
HZ	Head to Roof	224	90.0	237	90.0
HH	Head to Header	269	40.0	300	
HW	Head to Windshield	640	0.0	611	0.0
NR	Nose to Rim	366	4.7	465	
CD	Chest to Dash	535	24.3	414	
CS	Chest to Steering Hub	280	0.0		
RA	Rim to Abdomen	196	0.0		
KDL	Left Knee to Dash	188	22.3	102	40.9
KDR	Right Knee to Dash	142	27.6	93	40.8
PA°	Pelvic Angle		24.5		19.3
TA°	Tibia Angle		14.2		
SK	Striker to Knee	690	10	790	9
ST	Striker to Head	570	36	564	57
SH	Striker to H-Point	359	45	462	28

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2024 Subaru Crosstrek 5-Door SW NHTSA No.: O20245500
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/08/2023

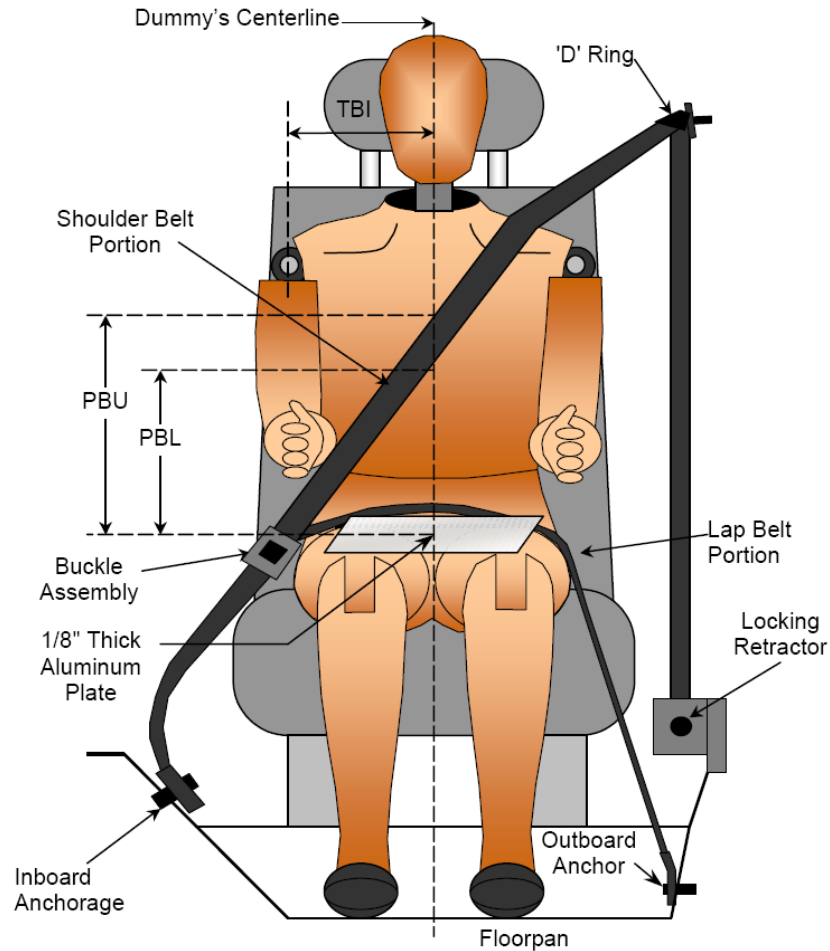


Code	Description	Driver (mm)	Passenger (mm)
AD	Arm to Door	150	196
HD	H-Point to Door	160	200
HR	Head to Side Header	266	310
HS	Head to Side Window	386	375
KK	Knee to Knee	308	165
SHY	Striker to H-Point (Y-Direction)		
AA	Ankle to Ankle	269	170

DATA SHEET NO. 5

SEAT BELT POSITIONING DATA

Test Vehicle: 2024 Subaru Crosstrek 5-Door SW NHTSA No.: O20245500
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/08/2023



FRONT VIEW OF DUMMY

SEAT BELT POSITIONING MEASUREMENTS

Code	Measurement Description	Units	Driver	Passenger
PBU	Top Surface of Aluminum Plate to Belt Upper Edge	mm	310	295
PBL	Top Surface of Aluminum Plate to Belt Lower Edge	mm	237	201

BELT LENGTH DATA

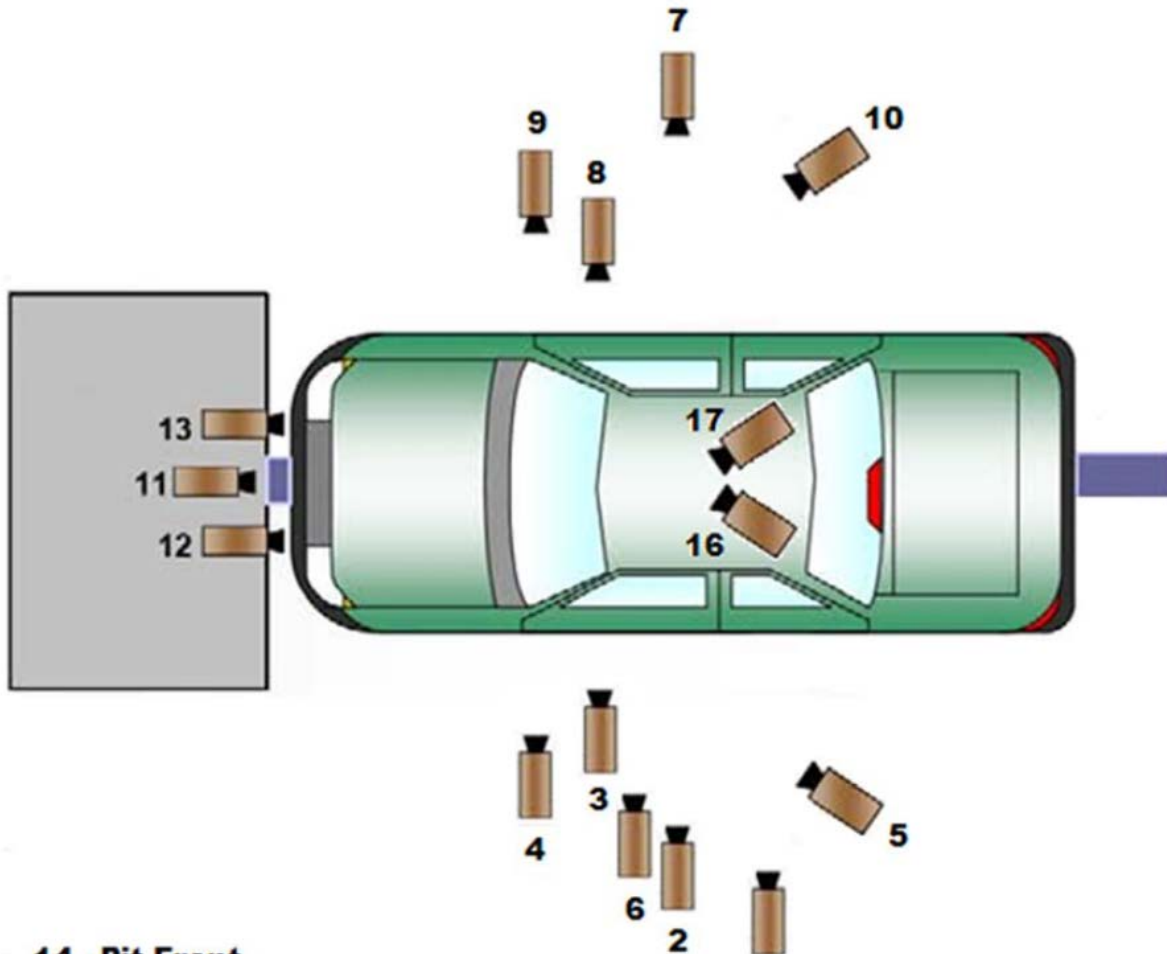
Measurement Description	Units	Driver	Passenger
Shoulder Belt Length as Measured on ATD	mm	850	972
Lap Belt Length as Measured on ATD	mm	661	845
Remainder of Belt on Reel	mm		734
Total Belt Length for Continuous Webbing Systems	mm		2551

DATA SHEET NO. 6

HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2024 Subaru Crosstrek 5-Door SW NHTSA No.: O20245500
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/08/2023

CAMERA POSITIONS FOR FRONTAL IMPACTS



14 - Pit Front

15 - Pit Rear

16 & 17 - Driver and Passenger Onboard

1- Real Time Camera

*****Camera locations are approximate and not to scale***

DATA SHEET NO. 6 ... (CONTINUED)

HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2024 Subaru Crosstrek 5-Door SW NHTSA No.: O20245500

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/08/2023

CAMERA LOCATIONS

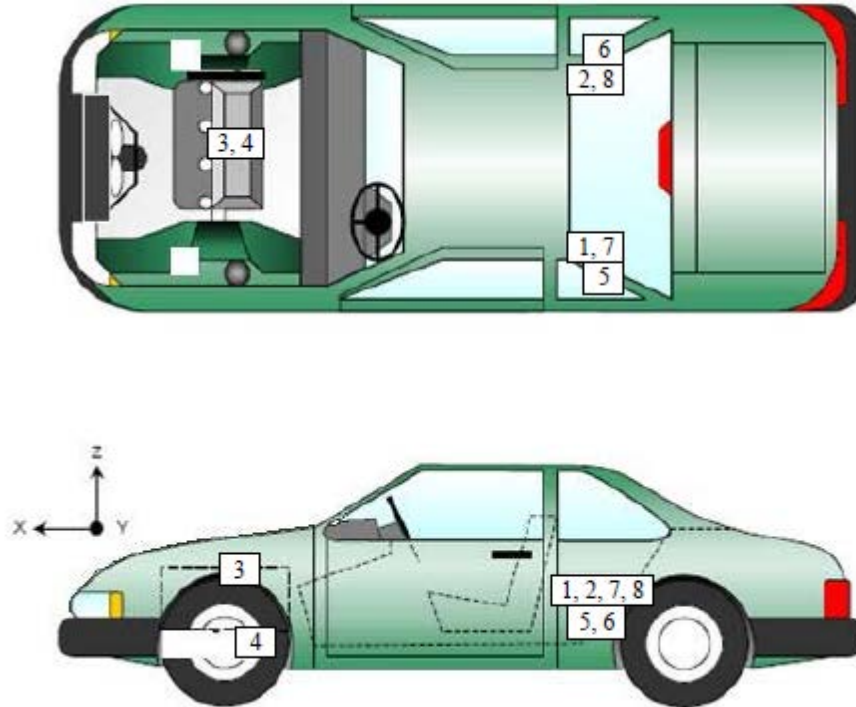
No.	Description	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall	-11412	-8150	-1484		30
2	Left Overall	-2456	-7975	-1025	20	1000
3	Driver Close-Up	-2590	-7950	-1371	50	1000
4	Left Front Half	-1701	-6197	-1701	35	1000
5	Left Angle	-6696	-10308	-3211	105	1000
6	Steering Column	-1966	-10412	-3688	35	1000
7	Right Overall	-2336	7569	-1012	20	1000
8	Passenger Close-Up	-1733	7581	-1408	50	1000
9	Right Front Half	-1600	8214	-1811	35	1000
10	Right Angle	-6217	9516	-4830	85	1000
11	Windshield	-354	0	-5749	28	1000
12	Driver Windshield	297	-366	-2460	24	1000
13	Passenger Windshield	297	366	-2460	24	1000
14	Pit Front	-756	0	1495	21	1000
15	Pit Rear	-3398	0	1495	15	1000
16	Driver Onboard	-2796	-247	-1721	8	1000
17	Passenger Onboard	-2796	247	-1721	8	1000

Coordinates: +X = forward impact plane
 +Y = right of monorail center
 +Z = into ground

DATA SHEET NO. 7

VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2024 Subaru Crosstrek 5-Door SW NHTSA No.: O20245500
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/08/2023



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Description	Location		
		X	Y	Z
1	Left Rear Accelerometer X-Direction			
2	Right Rear Accelerometer X-Direction			
3	Engine Top X			
4	Engine Bottom X			
5	Left Rear Accelerometer Z-Direction			
6	Right Rear Accelerometer Z-Direction			
7	Left Rear Accelerometer X-Direction Redundant			
8	Right Rear Accelerometer X-Direction Redundant			

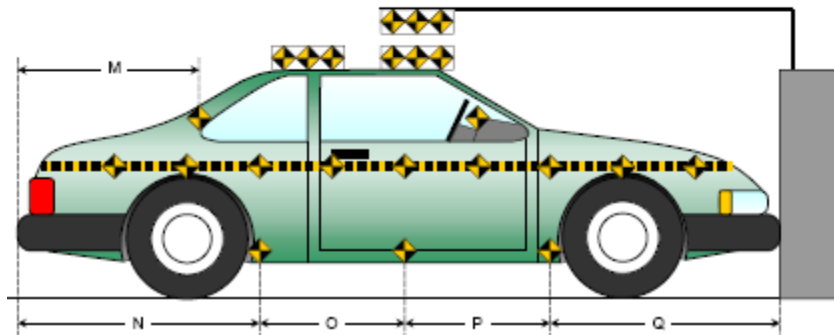
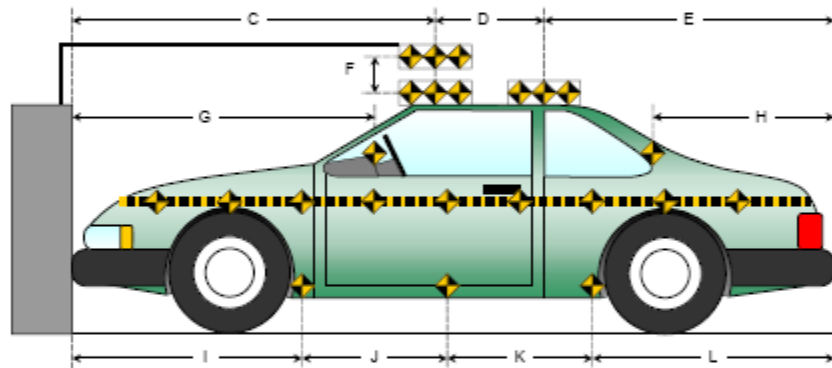
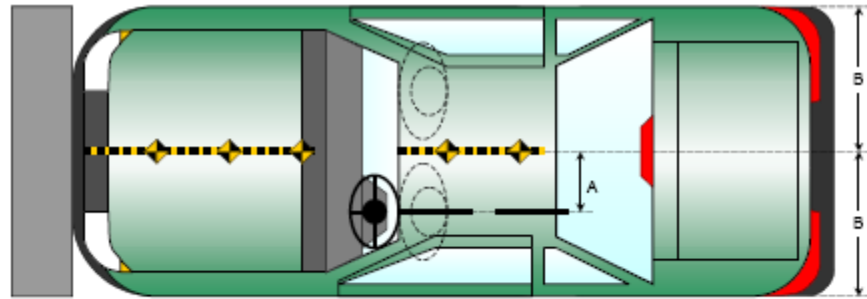
Reference Points: X – Rear Surface of Vehicle (+ forward)
Y – Vehicle Centerline (+ to right)
Z – Ground Plane (+ down)

DATA SHEET NO. 8

PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2024 Subaru Crosstrek 5-Door SW NHTSA No.: O20245500
 Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/08/2023

Item	Value
A	351
B	900
C	2251
D	733
E	1952
F	413
G	1752
H	1645
I	1440
J	797
K	964
L	1275
M	1645
N	1275
O	964
P	797
Q	1440

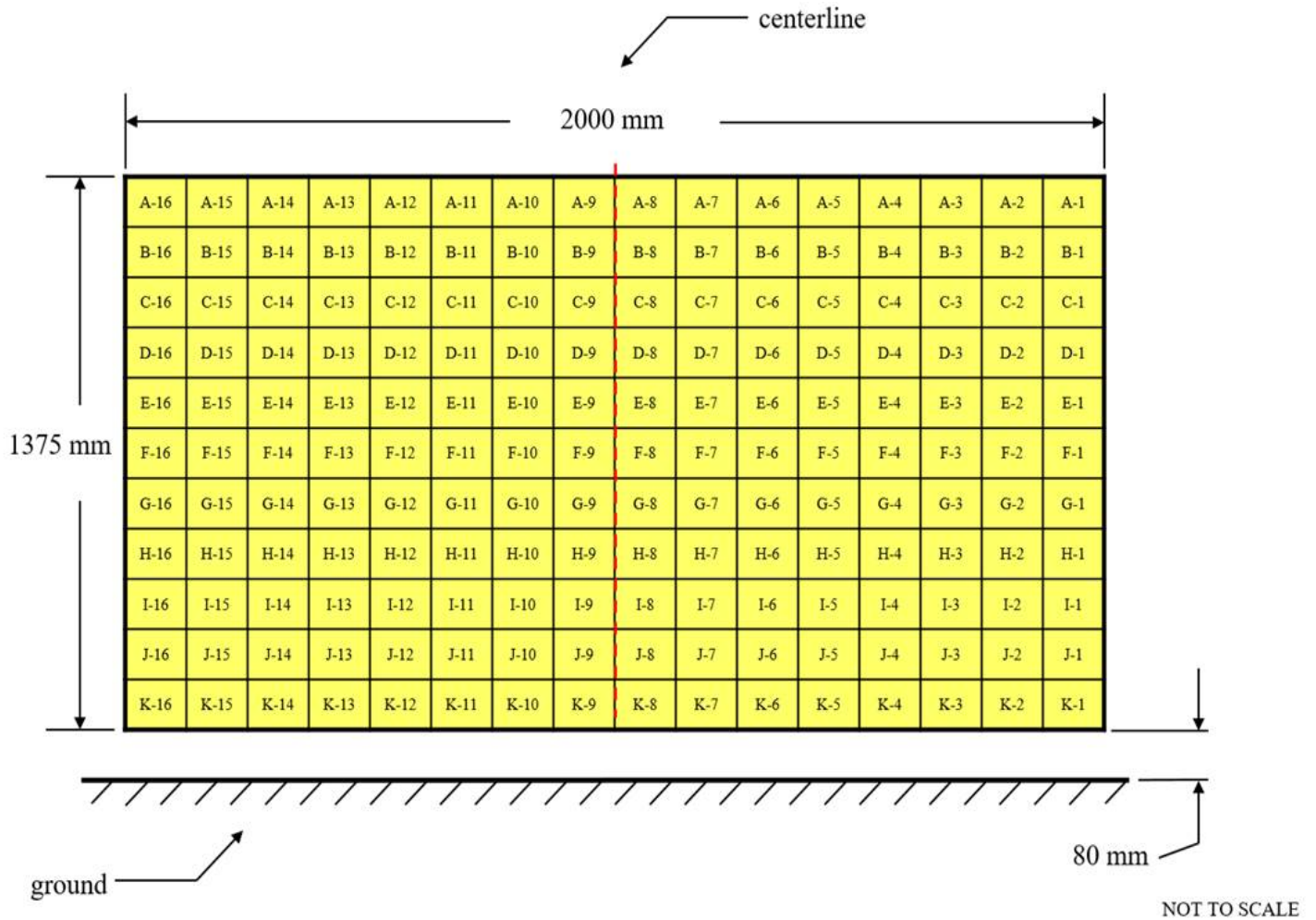


All measurements in millimeters.

DATA SHEET NO. 9

LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2024 Subaru Crosstrek 5-Door SW NHTSA No.: O20245500
 Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/08/2023



DATA SHEET NO. 10**TEST VEHICLE SUMMARY OF RESULTS**

Test Vehicle: 2024 Subaru Crosstrek 5-Door SW NHTSA No.: O20245500
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/08/2023

INSTRUMENTATION

Driver Dummy Sensors	47
Passenger Dummy Sensors	47
Vehicle Structure Accelerometers	8
Seat Belt Load Cells	0
Load Cell Barrier	528
Total	630

CAMERA COVERAGE

High-Speed Vehicle On Board	2
High-Speed Off Board	14
Real Time	1
Total	17

DATA SHEET NO. 11
POST-TEST OBSERVATIONS

Test Vehicle: 2024 Subaru Crosstrek 5-Door SW NHTSA No.: O20245500
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/08/2023

TEST DUMMY INFORMATION AND CONTACT LOCATIONS

Description	Driver	Passenger
Dummy Type/Serial No.	HIII 50th Percentile Male ATD / 360	HIII 5th Percentile Female ATD / DH1644
Head Contact	Frontal Airbag, Headrest	Frontal Airbag, Headrest
Upper Torso Contact	Frontal Airbag	Frontal Airbag
Lower Torso Contact	Frontal Airbag	Frontal Airbag
Left Knee Contact	Knee Airbag	Knee Bolster
Right Knee Contact	Knee Airbag	Knee Bolster

DOOR OPENING, TRUNK OPENING, AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Locked / Unlocked Doors	Unlocked	Unlocked
Front Door Opening	Remained closed, latched, and operational	Remained closed, latched, and operational
Rear Door Opening	Remained closed, latched, and operational	Remained closed, latched, and operational
Trunk/Hatch/Tailgate Opening	None	
Seat Track Shift (mm)	0	0
Seat Back Movement from Initial Position	None	None

OTHER VEHICLE POST-TEST OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Windshield Damage	None
Window Damage	None
Other Notable Effects	None

VEHICLE REBOUND FROM BARRIER

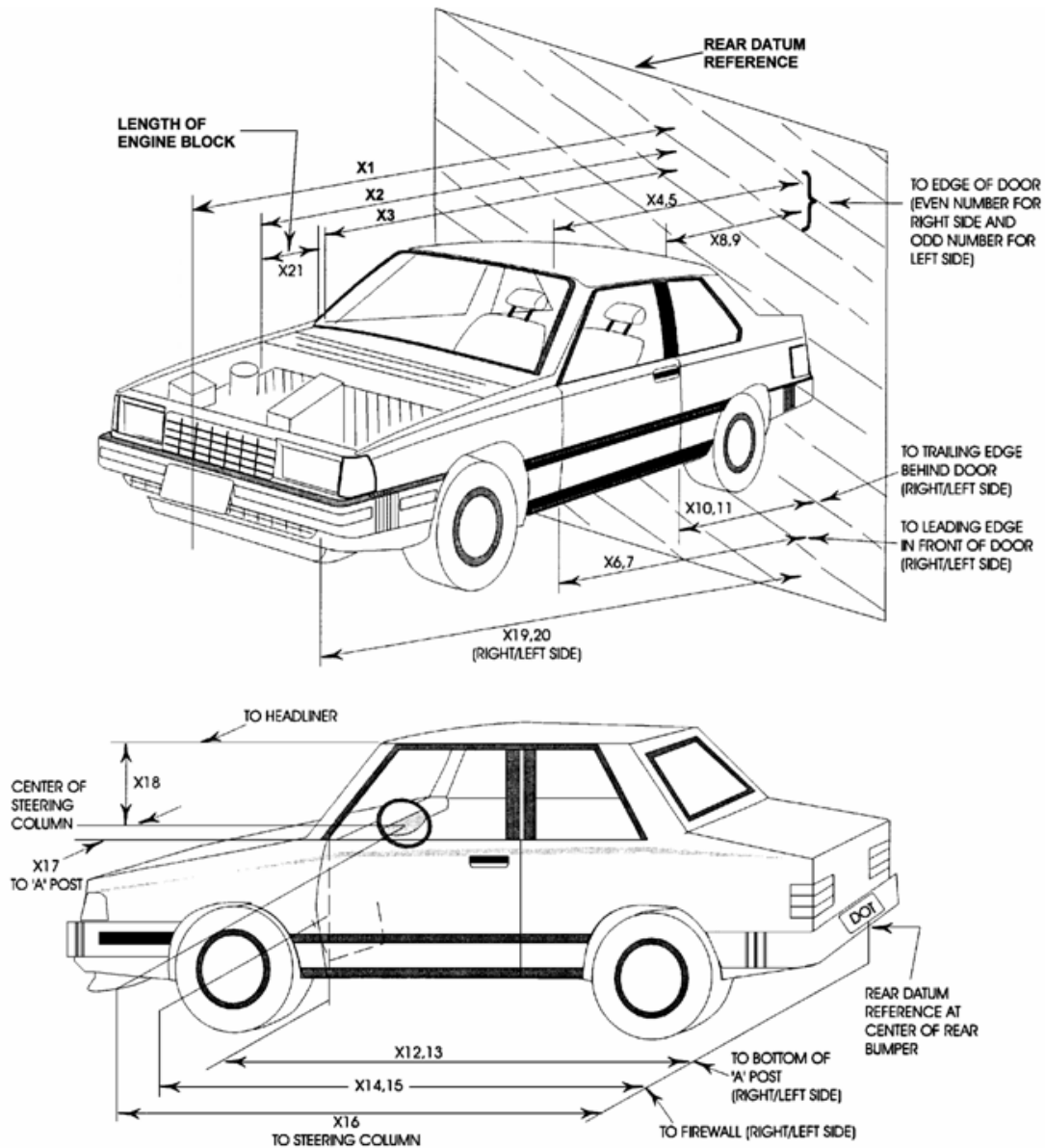
Measured Parameter	Units	Value
Left Side	mm	2505
Center	mm	1844
Right Side	mm	2498
Average	mm	2282

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Driver		Passenger	
	Installed	Operated	Installed	Operated
Front Airbag	Yes	Yes	Yes	Yes
Side Airbag 1 (Curtain)	Yes	No	Yes	No
Side Airbag 2 (Torso/Pelvis)	Yes	No	Yes	No
Knee Airbag	Yes	Yes	No	
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes

DATA SHEET NO. 12
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2024 Subaru Crosstrek 5-Door SW NHTSA No.: O20245500
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/08/2023



DATA SHEET NO. 12 ... (CONTINUED)**VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2024 Subaru Crosstrek 5-Door SW NHTSA No.: O20245500
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/08/2023

No.	Description	Pre-Test	Post-Test	Change
1	Total Length of Vehicle at Centerline	4475	4158	-317
2	Rear Surface of Vehicle to Front of Engine	3955	3707	-248
3	RSOV to Firewall	3339	3316	-23
4	RSOV to Upper Leading Edge of Right Door	3033	3035	2
5	RSOV to Upper Leading Edge of Left Door	3034	3035	1
6	RSOV to Lower Leading Edge of Right Door	2998	3000	2
7	RSOV to Lower Leading Edge of Left Door	3002	3003	1
8	RSOV to Upper Trailing Edge of Right Door	1884	1886	2
9	RSOV to Upper Trailing Edge of Left Door	1884	1884	0
10	RSOV to Lower Trailing Edge of Right Door	1914	1914	0
11	RSOV to Lower Trailing Edge of Left Door	1915	1916	1
12	RSOV to Bottom of A-Pillar, Right Side	2970	2972	2
13	RSOV to Bottom of A-Pillar, Left Side	2977	2976	-1
14	RSOV to Firewall, Right Side	3339	3316	-23
15	RSOV to Firewall, Left Side	3343	3329	-14
16	RSOV to Steering Column	2526	2588	62
17	Center of Steering Column to A-Pillar	444	389	-55
18	Center of Steering Column to Headliner	511	538	27
19	RSOV to Right Side of Front Bumper	3879	3749	-130
20	RSOV to Left Side of Front Bumper	3880	3621	-259
21	Length of Engine Block	489	393	-96
RD	RSOV to Right Side of Dash Panel	2796	2798	2
CD	RSOV to Center of Dash Panel	2642	2766	124
LD	RSOV to Left Side of Dash Panel	2796	2797	1

All measurements in millimeters.

DATA SHEET NO. 13**ACCIDENT INVESTIGATION DIVISION DATA**

Test Vehicle: 2024 Subaru Crosstrek 5-Door SW NHTSA No.: O20245500
 Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/08/2023

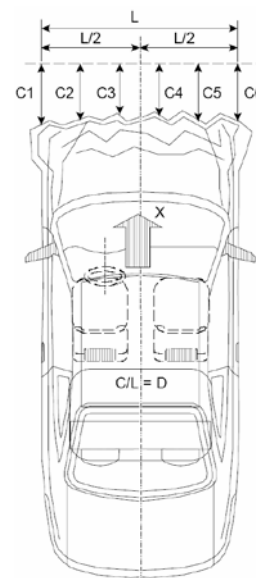
VEHICLE INFORMATION

VIN: JF2GUADC3RH227924 Wheelbase (mm): 2671
 Vehicle Size Category: SW Test Weight (kg): 1712.0

ACCELEROMETER DATA

Accelerometer Locations: Left Rear Crossmember
 Cal. Procedure/Interval: Vibration Test / 6 months
 Integration Algorithm: NHTSA Standard
 Impact Velocity (km/h): 56.04
 Velocity Change (km/h): 66.18
 Time of Separation (msec): 66.5

Linearity: Good

**CRUSH PROFILE**

Collision Deformation Classification: 12FDEW3
 Midpoint of Damage: Vehicle Centerline
 Damage Region Length (mm): 1192
 Impact Mode: Full Frontal

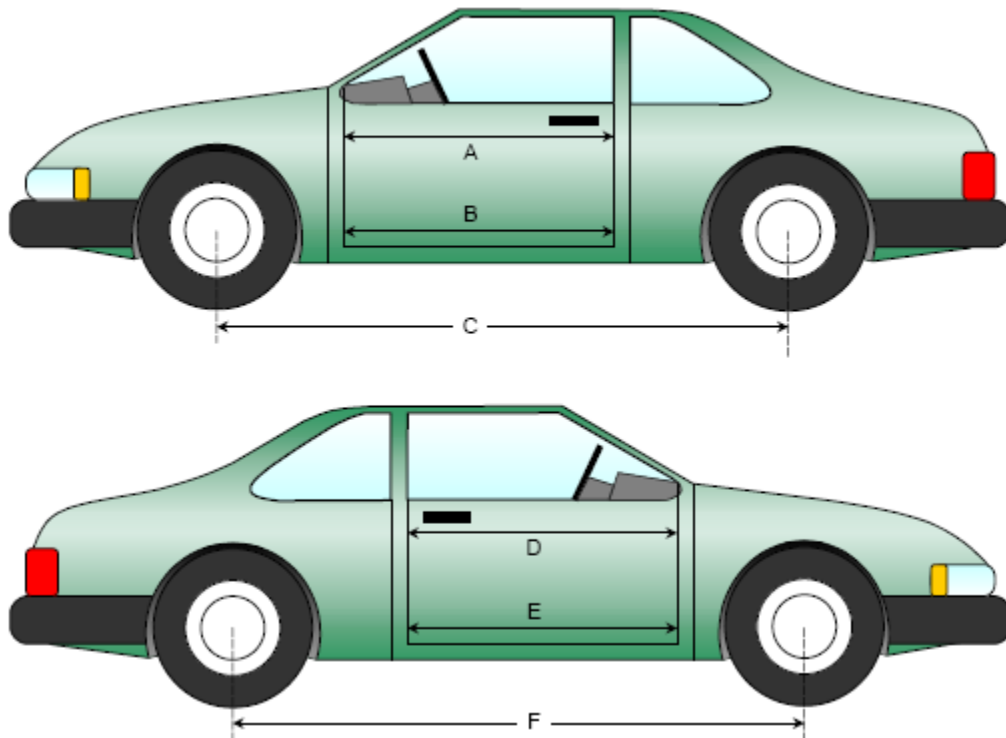
No.	Measurement Description	Units	Pre-Test	Post-Test	Crush
C1	Crush Zone 1 at Left Side	mm	117	459	342
C2	Crush Zone 2 at Left Side	mm	10	383	373
C3	Crush Zone 3 at Left Side	mm	2	372	370
C4	Crush Zone 4 at Right Side	mm	1	363	362
C5	Crush Zone 5 at Right Side	mm	11	359	348
C6	Crush Zone 6 at Right Side	mm	112	365	253
L	C1 to C6	mm	1192		

DATA SHEET NO. 14**VEHICLE INTRUSION MEASUREMENTS**Test Vehicle: 2024 Subaru Crosstrek 5-Door SW NHTSA No.: O20245500Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/08/2023**DOOR OPENING WIDTH**

Item	Description	Units	Pre-Test	Post-Test	Change
A	Left Side Upper	mm	1150	1151	1
B	Left Side Lower	mm	1087	1087	0
D	Right Side Upper	mm	1149	1149	0
E	Right Side Lower	mm	1084	1085	1

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Change
C	Left Side Wheelbase	mm	2671	2659	-12
F	Right Side Wheelbase	mm	2671	2687	16



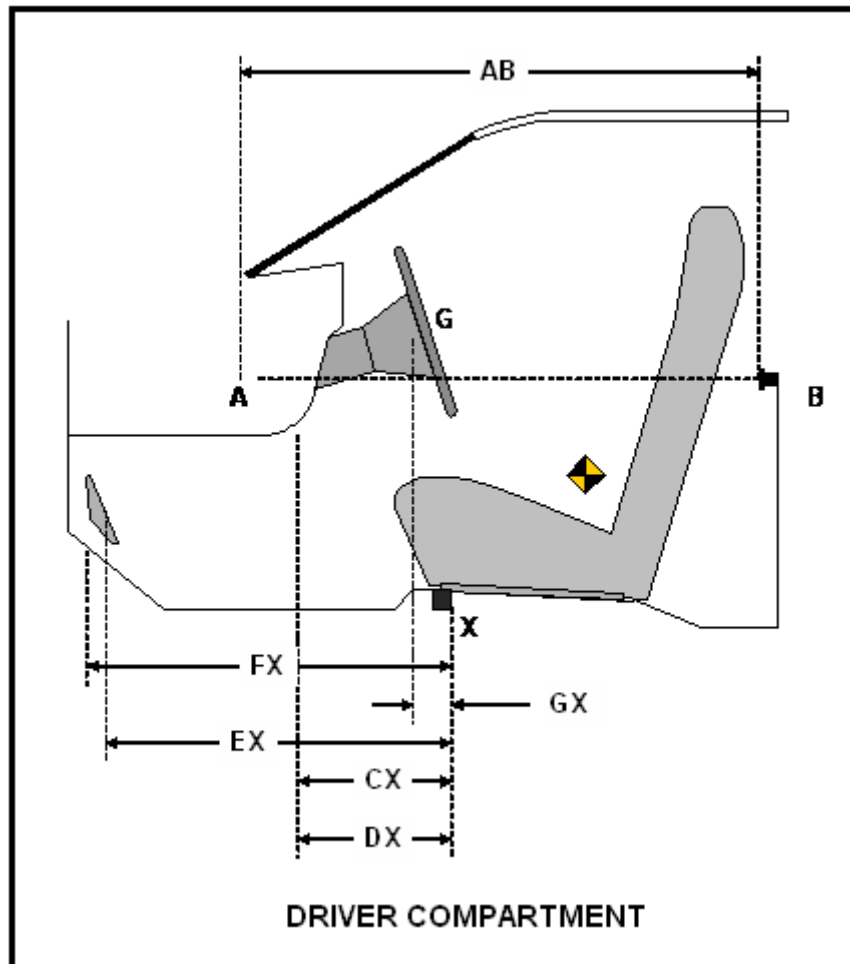
DATA SHEET NO. 14 ... (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2024 Subaru Crosstrek 5-Door SW NHTSA No.: O20245500
 Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/08/2023

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Change
AB	Door Opening (Inside Window Jam)	mm	1038	1037	-1
CX	Left Knee Bolster to X	mm	249	250	1
DX	Right Knee Bolster to X	mm	252	244	-8
EX	Brake Pedal to X	mm	547	559	12
FX	Foot Rest to X	mm	554	541	-13
GX	Center of Steering Wheel Hub to X	mm	20	80	60

X = Front of Seat Track (Stationary)



DATA SHEET NO. 15

SUMMARY OF INDICANT FMVSS 212 AND 219 (PARTIAL) DATA

Test Vehicle: 2024 Subaru Crosstrek 5-Door SW NHTSA No.: O20245500
 Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/08/2023

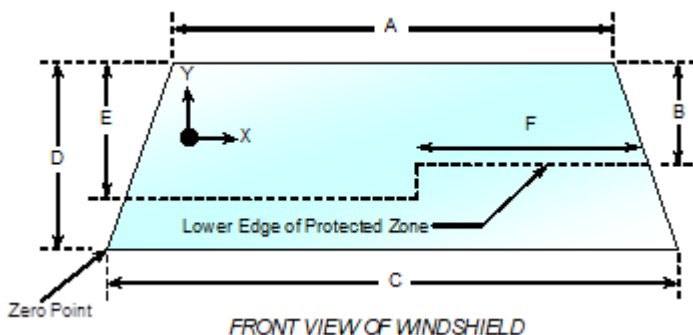
Windshield Mounting Details: Windshield glass is secured to the vehicle frame with rubber molding and rubber cement.

The standard requires that the post-test retention measurement be a minimum of 75% of the pre-test total periphery measurement for vehicles not equipped with occupant passive restraints and 50% for each side of the windshield for vehicles which are equipped with occupant passive restraints.

Temperature of windshield molding during test: 21.5°C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2294	2294	100.0%
Right Side	2294	2294	100.0%
Total	4588	4588	100.0%



Item	Units	Value
A	mm	1225
B	mm	645
C	mm	1440
D	mm	860
E	mm	572
F	mm	339

AREAS OF PROTECTED ZONE FAILURES

- A. Provide Coordinates of the area that the protected zone was penetrated more than 0.25 inches by a vehicle component other than one that is normally in contact with the windshield.

X	Y

- B. Provide coordinates of the area beneath the protected zone that the inner surface of the windshield was penetrated by a vehicle component.

X	Y

DATA SHEET NO. 16

FMVSS 301 BARRIER IMPACT AND STATIC ROLLOVER RESULTS

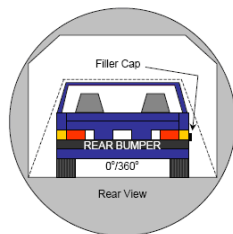
Test Vehicle: 2024 Subaru Crosstrek 5-Door SW NHTSA No.: O20245500
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/08/2023

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

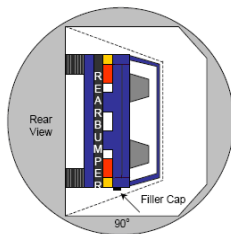
Temperature at Time of Impact: 32.8 °C Test Time: 4:22 PM

Stoddard Solvent Spillage Measurements

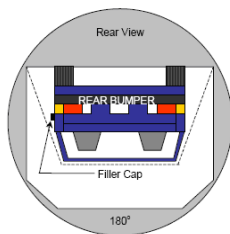
- A. From impact until vehicle motion ceases: N/A oz.
(Maximum allowable = 1 oz.)
- B. For the 5 minute period after motion ceases: N/A oz.
(Maximum allowable = 5 oz.)
- C. For the following 25 minutes: N/A oz.
(Maximum allowable = 1 oz./minute)
- D. Spillage: _____



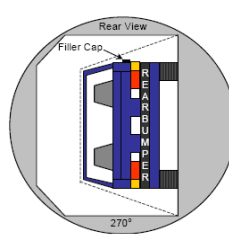
0° TO 90°



90° TO 180°



180° TO 270°



270° TO 360°

1. The specified fixture rollover rate for each 90° of rotation is 60 to 180 seconds.
2. The position hold time at each position is 300 seconds (minimum).
3. Details of Stoddard solvent spillage: N/A

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° To 90°	82	300	382
90° To 180°	80	300	380
180° To 270°	80	300	380
270° To 360°	80	300	380

DATA SHEET NO. 16 ... (CONTINUED)**FMVSS 301 BARRIER IMPACT AND STATIC ROLLOVER RESULTS**Test Vehicle: 2024 Subaru Crosstrek 5-Door SW NHTSA No.: O20245500Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/08/2023**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°				

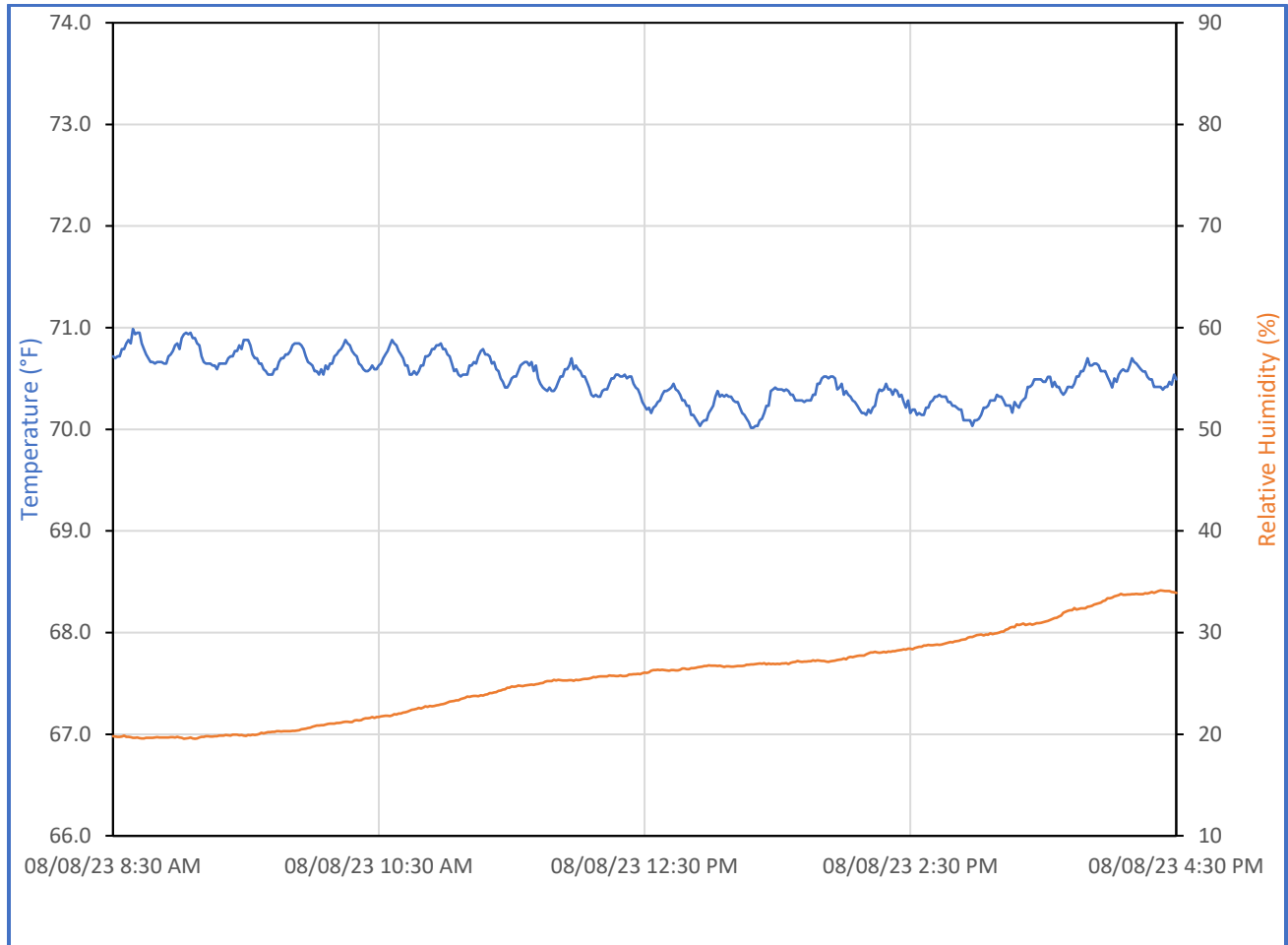
SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 17

DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART

Test Vehicle: 2024 Subaru Crosstrek 5-Door SW NHTSA No.: O20245500
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/08/2023



APPENDIX A
PHOTOGRAPHIC DOCUMENTATION

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FIGURE 1. Load Cell Location



FIGURE 2. Pre-Test Load Cell Wall

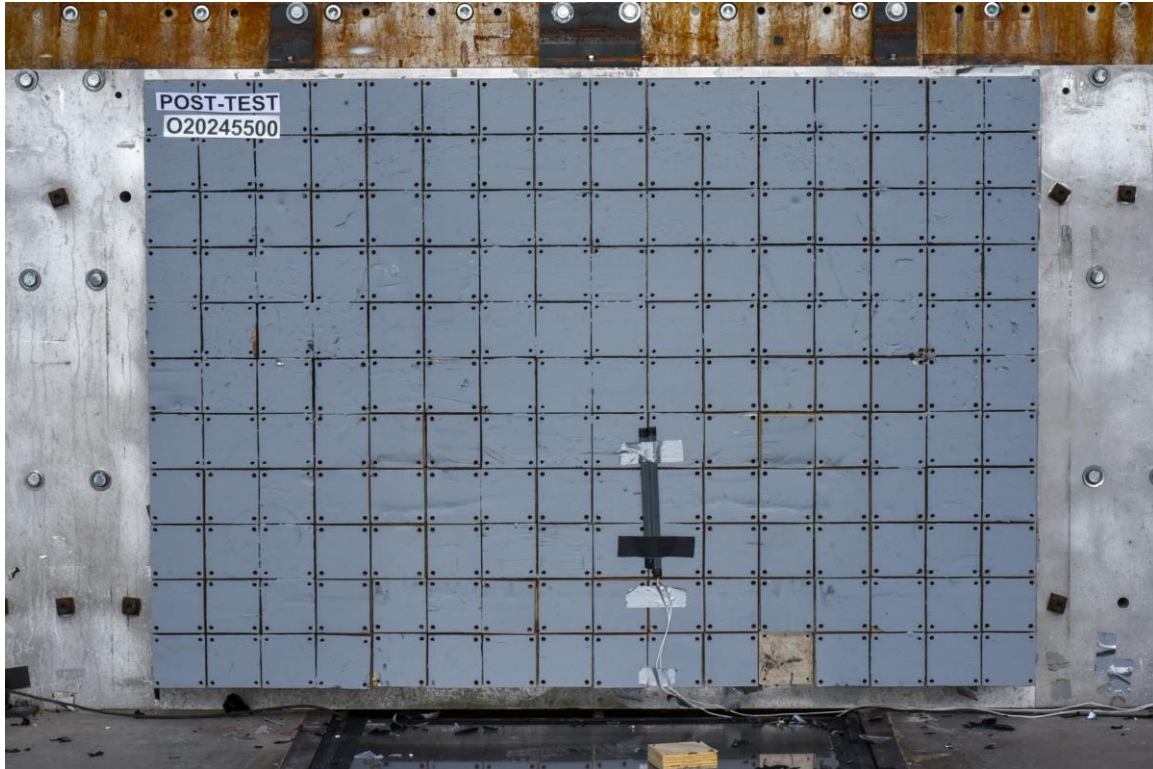


FIGURE 3. Post-Test Load Cell Wall



FIGURE 4. Manufacturer's Label



FIGURE 5. Tire Placard



FIGURE 6. 2024 Subaru Crosstrek Frontal as Delivered



FIGURE 7. Left Rear $\frac{3}{4}$ View, as Received

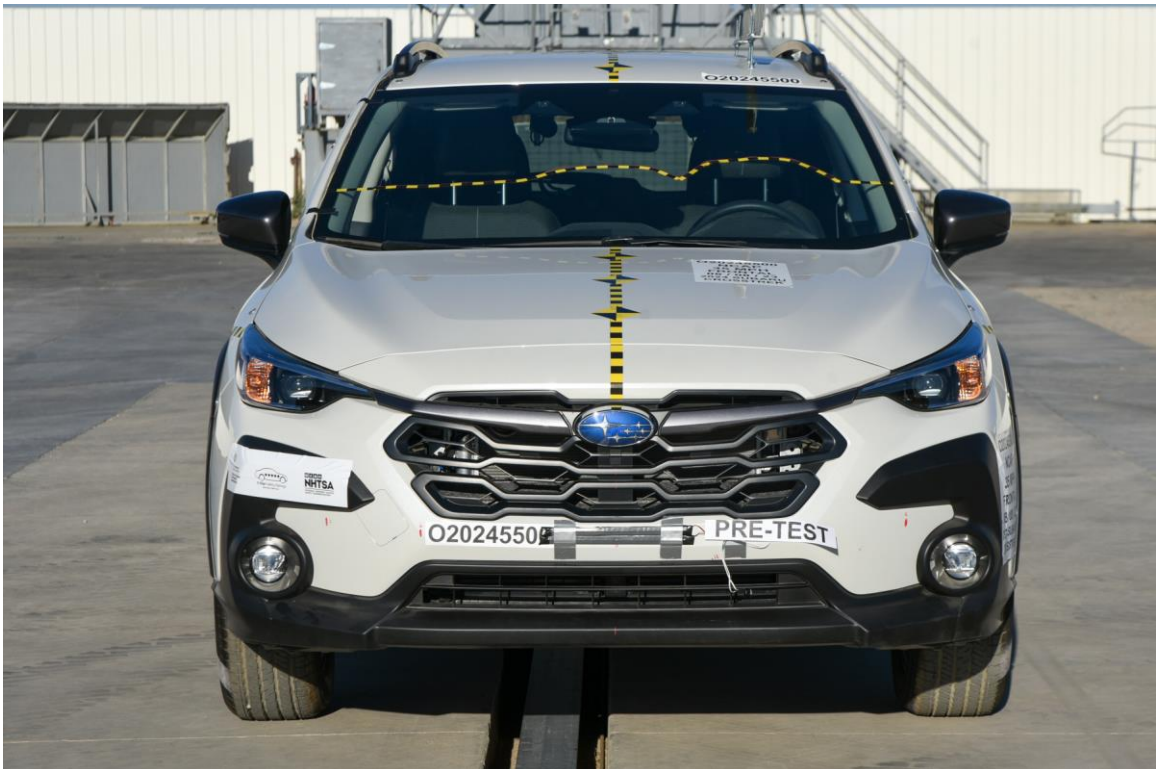


FIGURE 8. Pre-Test Front View of Test Vehicle

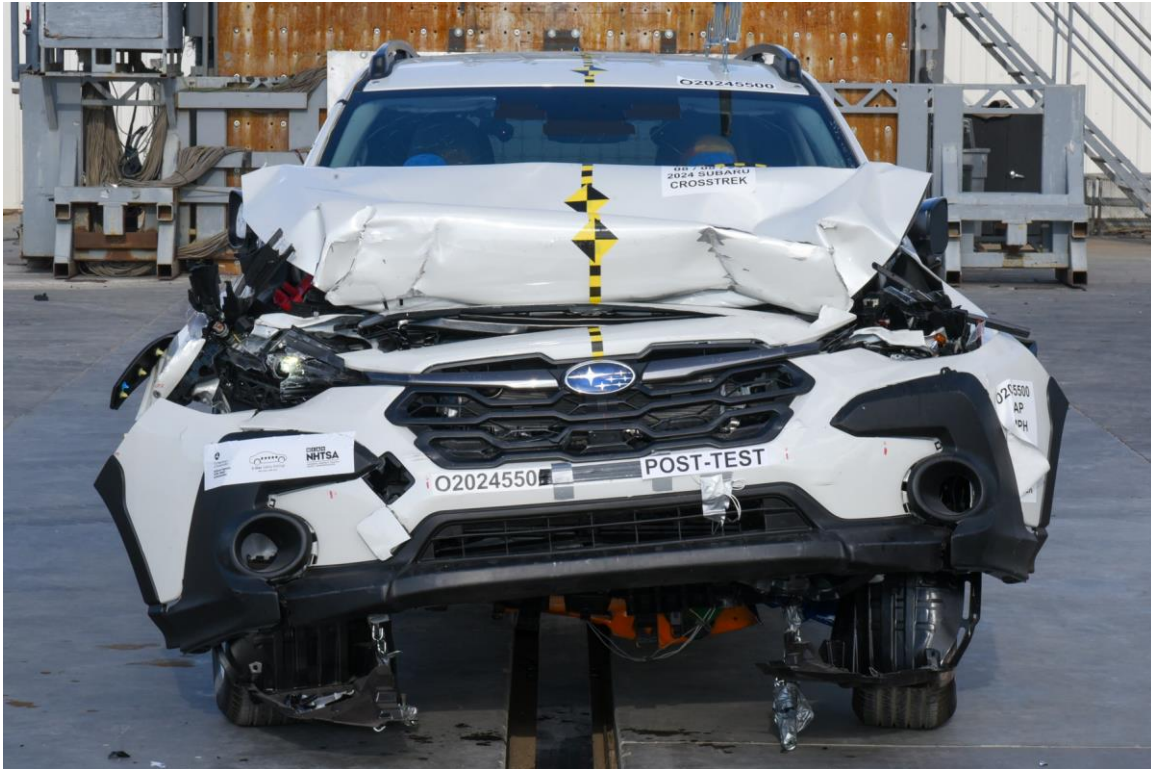


FIGURE 9. Post-Test Front View of Test Vehicle



FIGURE 10. Pre-Test Left View of Test Vehicle



FIGURE 11. Post-Test Left View of Test Vehicle



FIGURE 12. Pre-Test Right View of Test Vehicle



FIGURE 13. Post-Test Right View of Test Vehicle



FIGURE 14. Pre-Test Right Front $\frac{3}{4}$ View



FIGURE 15. Post-Test Right Front $\frac{3}{4}$ View



FIGURE 16. Pre-Test Left Rear $\frac{3}{4}$ View



FIGURE 17. Post-Test Left Rear $\frac{3}{4}$ View



FIGURE 18. Pre-Test Windshield View



FIGURE 19. Post-Test Windshield View

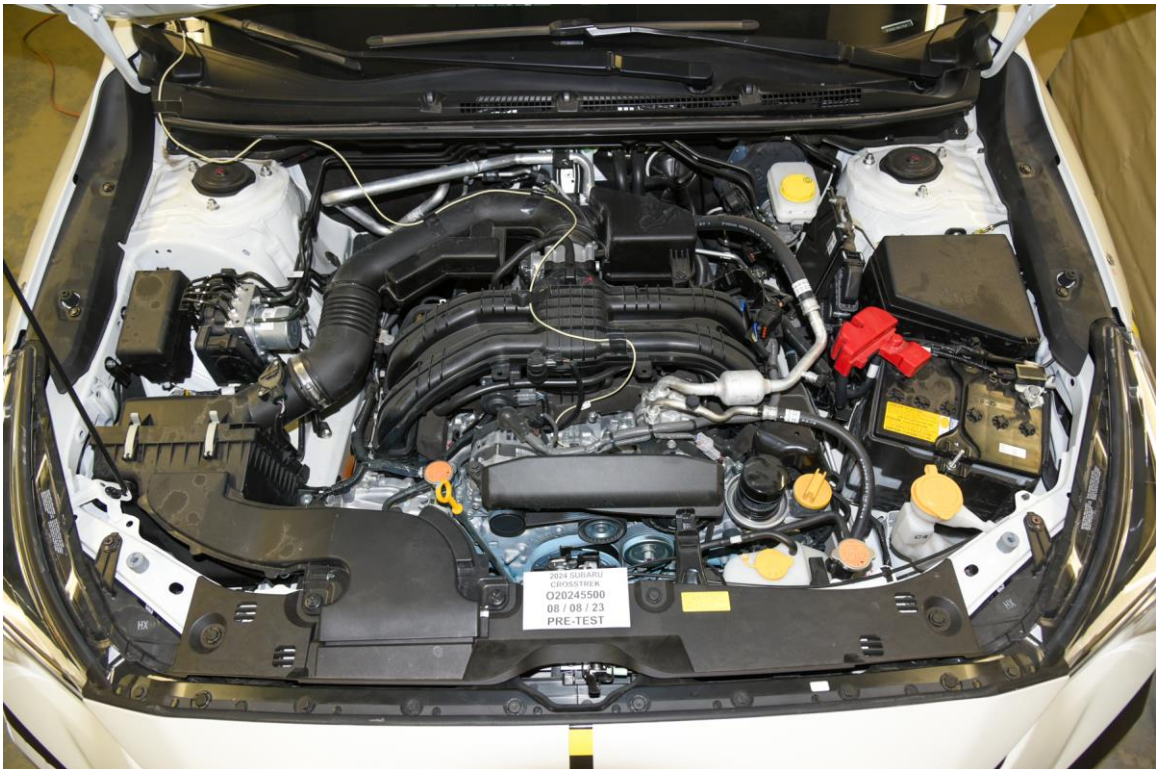


FIGURE 20. Pre-Test Engine Compartment View



FIGURE 21. Post-Test Engine Compartment View



FIGURE 22. Pre-Test Fuel Filler Cap View



FIGURE 23. Post-Test Fuel Filler Cap View

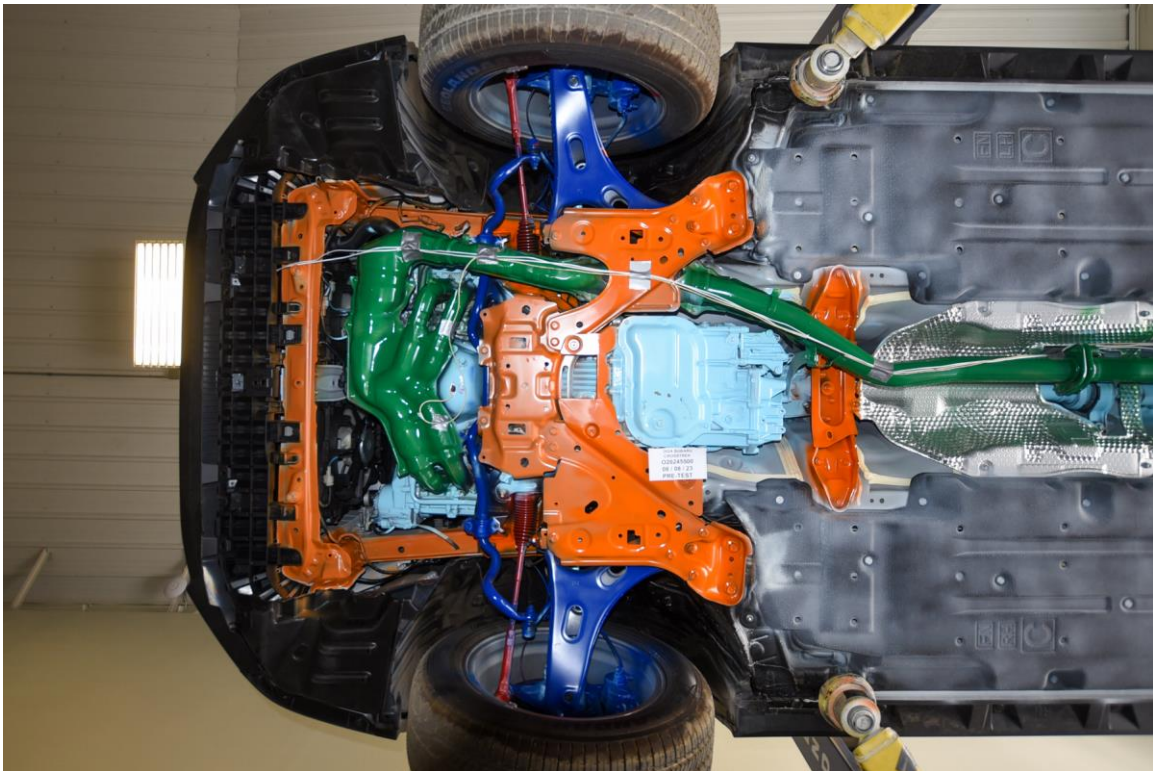


FIGURE 24. Pre-Test Front Underbody View



FIGURE 25. Post-Test Front Underbody View

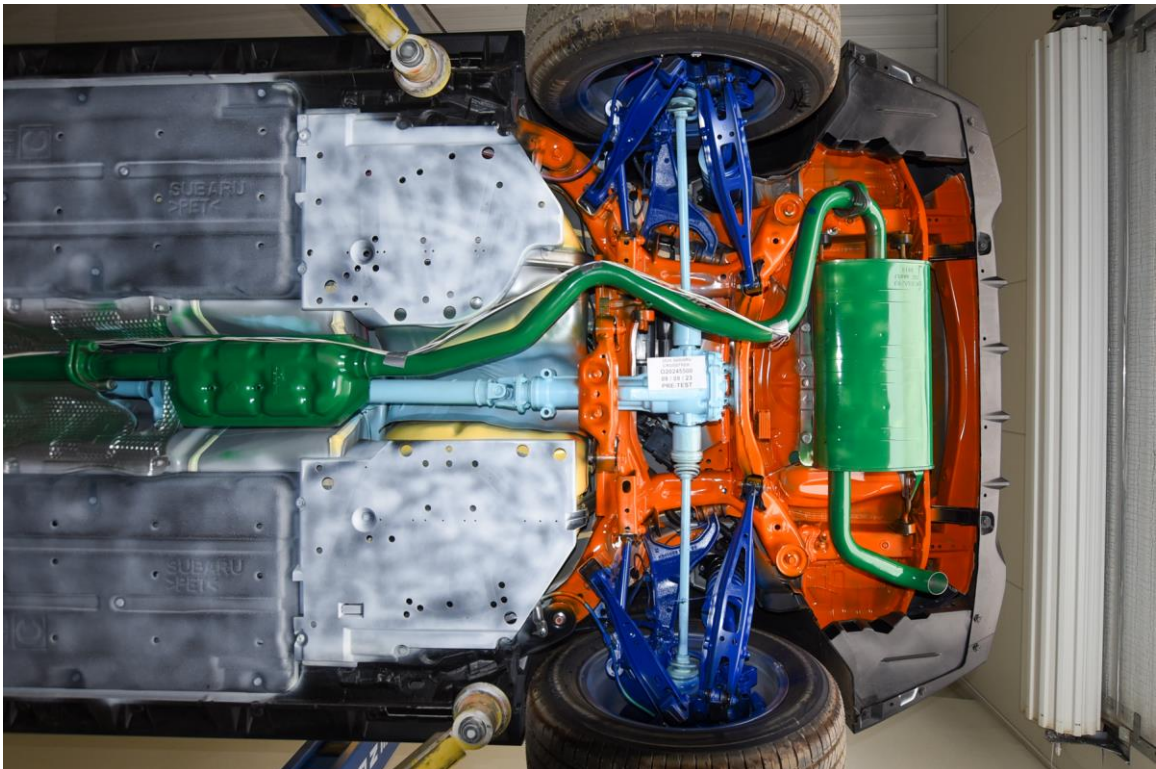


FIGURE 26. Pre-Test Rear Underbody View

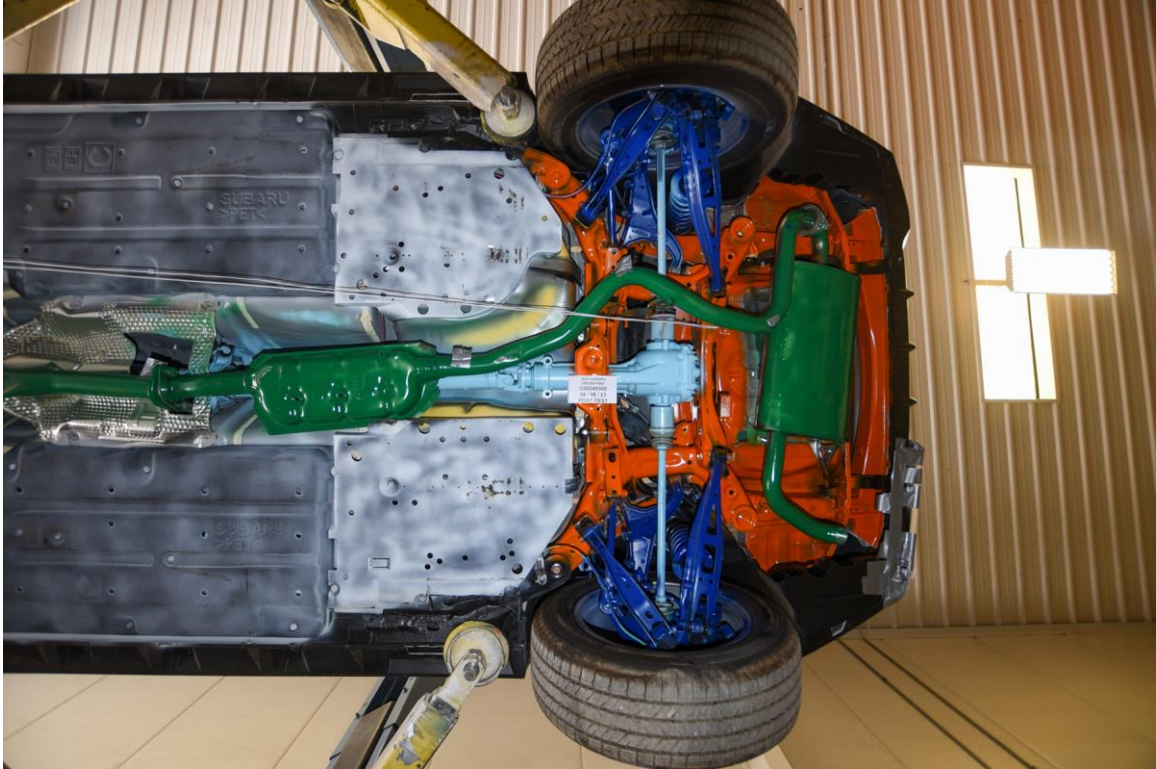


FIGURE 27. Post-Test Rear Underbody View



FIGURE 28. Pre-Test Dummy Cable Routing



FIGURE 29. Post-Test Dummy Cable Routing



FIGURE 30. Pre-Test Driver Dummy Front View



FIGURE 31. Post-Test Driver Dummy Front View



FIGURE 32. Pre-Test Driver Dummy Window View



FIGURE 33. Post-Test Driver Dummy Window View



FIGURE 34. Pre-Test Driver Dummy and Vehicle Interior View



FIGURE 35. Post-Test Driver Dummy and Vehicle Interior View



FIGURE 36. Pre-Test Driver's Seat Fore-Aft Markings



FIGURE 37. Post-Test Driver's Seat Fore-Aft Markings

Photograph Not Available

FIGURE 38. Pre-Test View of Belt Anchorage for Driver Dummy



FIGURE 39. Post-Test View of Belt Anchorage for Driver Dummy



FIGURE 40. Pre-Test View of Belt Buckle and Latch Plate for Driver Dummy



FIGURE 41. Post-Test View of Belt Buckle and Latch Plate for Driver Dummy



FIGURE 42. Pre-Test Driver Dummy Feet



FIGURE 43. Post-Test Driver Dummy Feet



FIGURE 44. Pre-Test Driver's Side Knee Bolster



FIGURE 45. Post-Test Driver's Side Knee Bolster



FIGURE 46. Pre-Test Driver's Side Floorpan



FIGURE 47. Post-Test Driver's Side Floorpan



FIGURE 48. Post-Test Driver Dummy Face



FIGURE 49. Post-Test Driver Dummy Contact with Airbag



FIGURE 50. Post-Test Driver Dummy Contact with Headrest



FIGURE 51. Pre-Test View of the Steering Wheel



FIGURE 52. Post-Test View of the Steering Wheel



FIGURE 53. Pre-Test Passenger Dummy Front View



FIGURE 54. Post-Test Passenger Dummy Front View



FIGURE 55. Pre-Test Passenger Dummy Window View



FIGURE 56. Post-Test Passenger Dummy Window View



FIGURE 57. Pre-Test Passenger Dummy and Vehicle Interior View



FIGURE 58. Post-Test Passenger Dummy and Vehicle Interior View



FIGURE 59. Pre-Test Passenger's Seat Fore-Aft Markings



FIGURE 60. Post-Test Passenger's Seat Fore-Aft Markings



FIGURE 61. Pre-Test View of Belt Anchorage for Passenger Dummy



FIGURE 62. Post-Test View of Belt Anchorage for Passenger Dummy



FIGURE 63. Pre-Test View of Belt Buckle and Latch Plate for Passenger Dummy



FIGURE 64. Post-Test View of Belt Buckle and Latch Plate for Passenger Dummy



FIGURE 65. Pre-Test Passenger Dummy Feet



FIGURE 66. Post-Test Passenger Dummy Feet



FIGURE 67. Pre-Test Passenger's Side Knee Bolster



FIGURE 68. Post-Test Passenger's Side Knee Bolster



FIGURE 69. Pre-Test Passenger's Side Floorpan



FIGURE 70. Post-Test Passenger's Side Floorpan



FIGURE 71. Post-Test Passenger Dummy Face



FIGURE 72. Post-Test Passenger Dummy Contact with Airbag



FIGURE 73. Post-Test Passenger Dummy Contact with Headrest

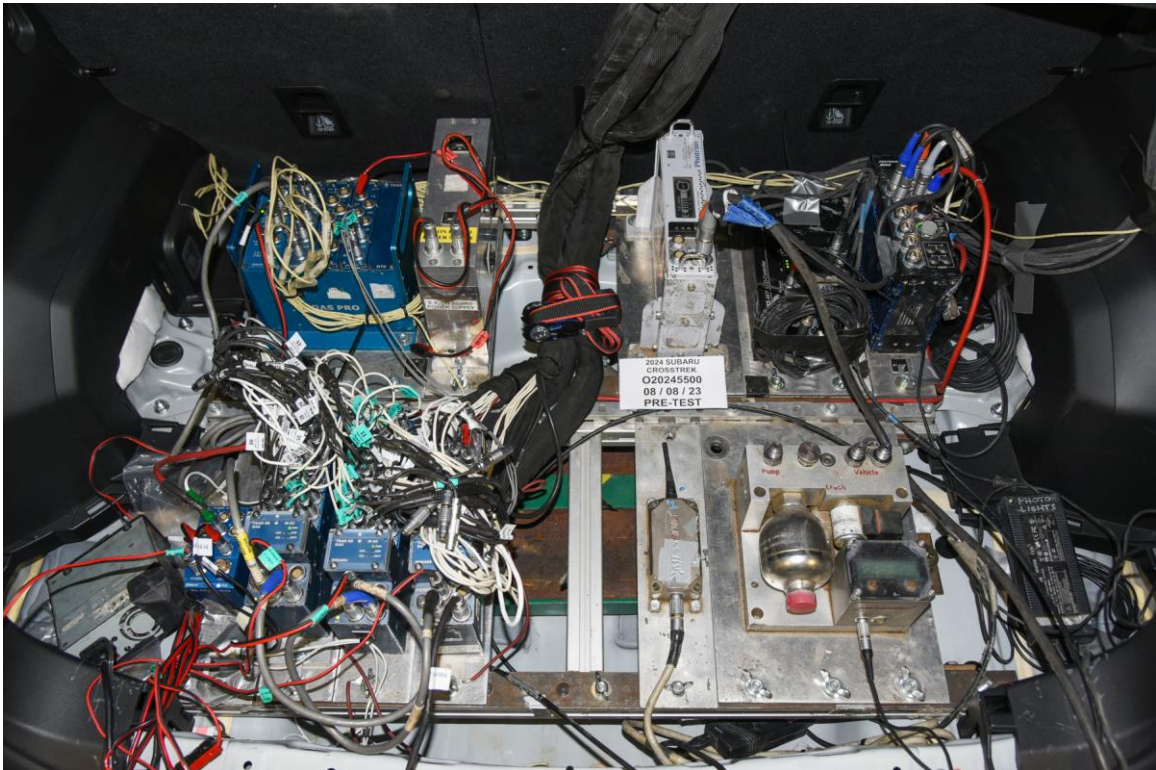


FIGURE 74. Photograph of Ballast Installed in Vehicle

Photograph Not Applicable

No Stoddard Solvent Spillage

FIGURE 75. Post-Test Stoddard Solvent Spillage Location View



FIGURE 76. Post-Test Speed Trap Read-Out

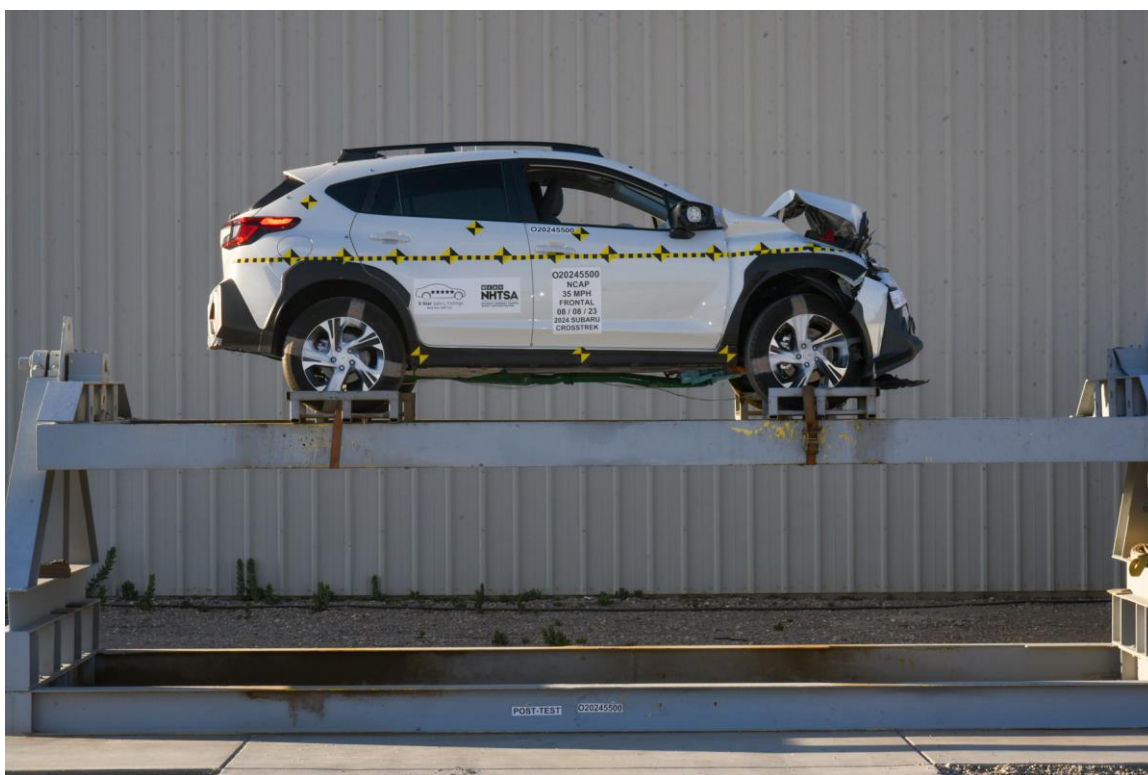


FIGURE 77. Vehicle at 0° on Static Rollover Device



FIGURE 78. Vehicle at 90° on Static Rollover Device

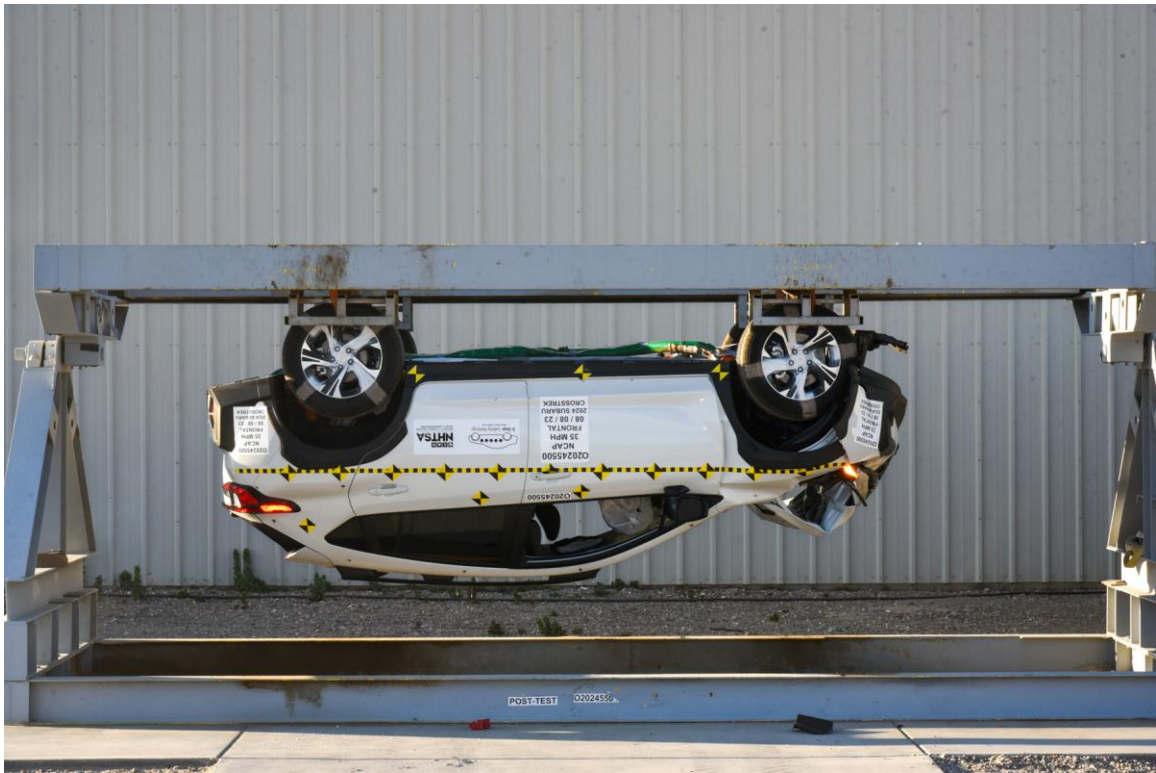


FIGURE 79. Vehicle at 180° on Static Rollover Device

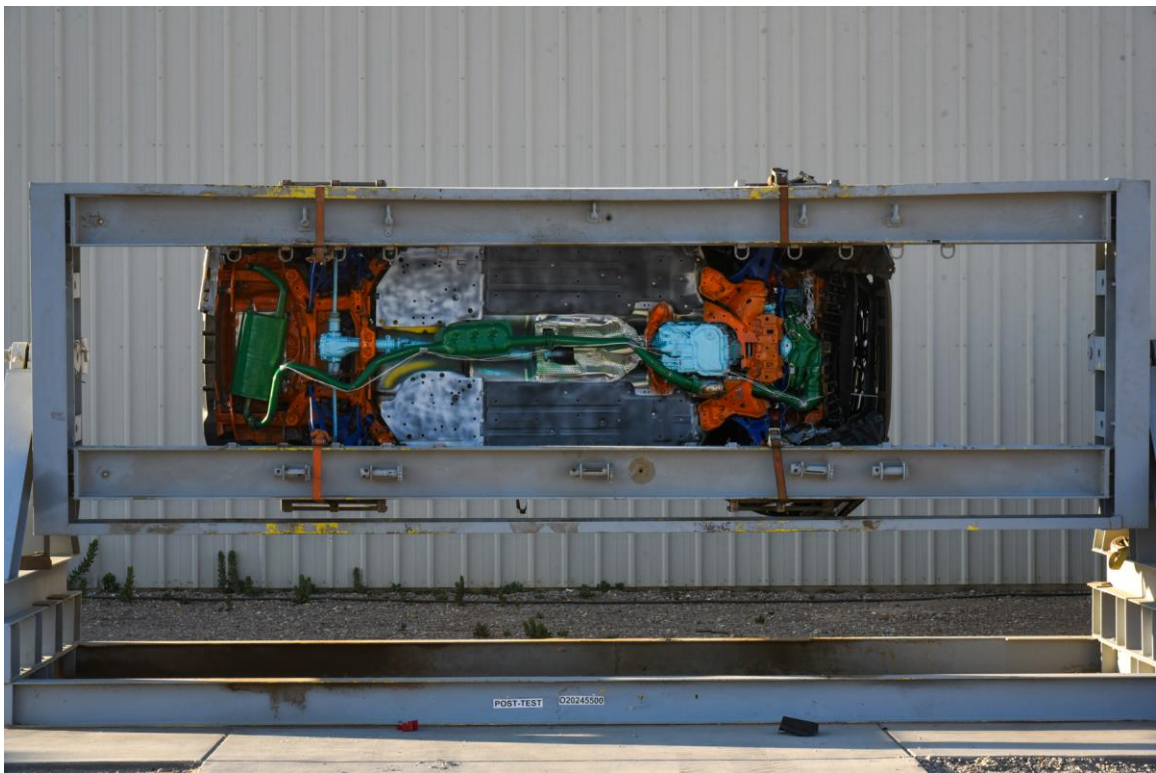


FIGURE 80. Vehicle at 270° on Static Rollover Device

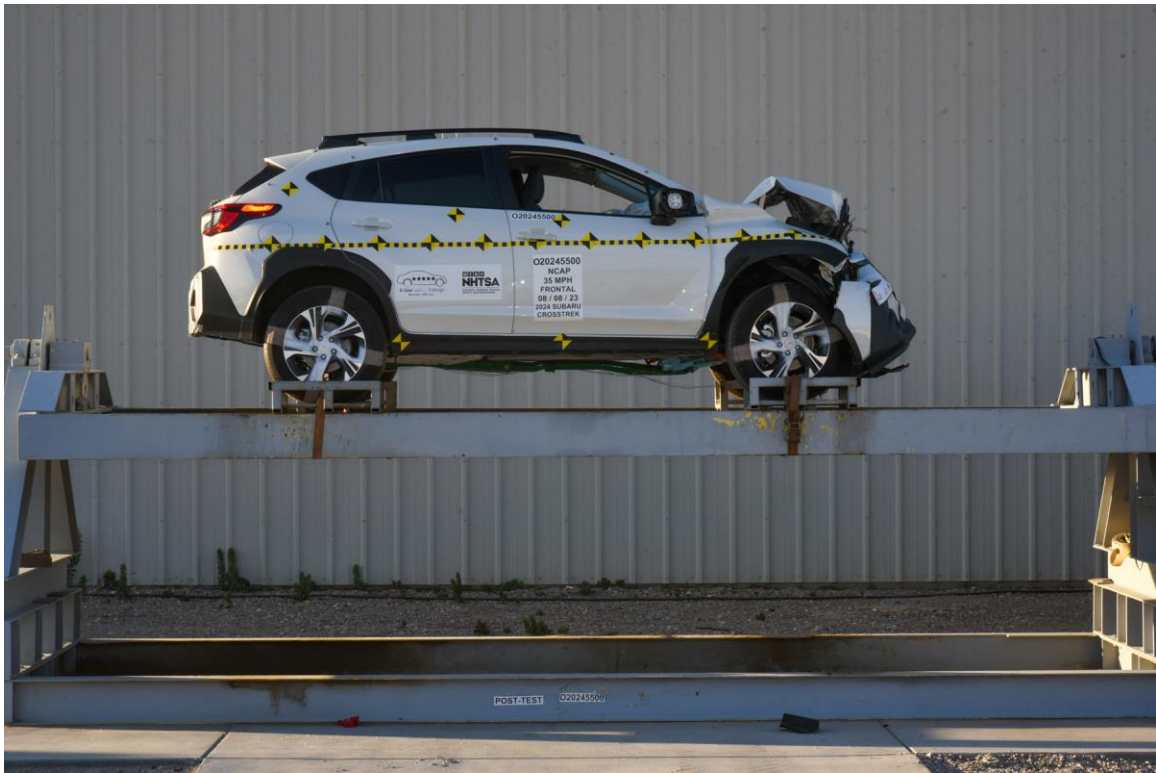


FIGURE 81. Vehicle at 360° on Static Rollover Device



FIGURE 82. 2022 Subaru WRX Frontal Impact Event

CROSSTREK

VIN
Model/Code
Port/Assembly
Delivery by/Carrier

JF2GUADC3RH227924
2016 SUBARU CROSSTREK PREMIUM /P/B
HJENWSE
TRUCK / 456

SHIP TO: 090796
SUBARU OF GLENDALE
1308 S BRAND BLVD
GLENDALE CA 91204

SOLD TO: 090796
SUBARU OF GLENDALE
1308 S BRAND BLVD
GLENDALE CA 91204

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score

Not Rated

Based on the combined ratings of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight.

Frontal

Driver

Not Rated

Crash

Passenger

Not Rated

Side

Front seat

Not Rated

Crash

Rear seat

Not Rated

Rollover

Not Rated

Star ratings range from 1 to 5 stars (★★★★★) with 5 being the highest. Source: National Highway Traffic Safety Administration (NHTSA) www.safercar.gov or 1-888-327-4235

CR Consumer Reports RECOMMENDED

Subaru Added Security

See Only Extended Service Agreement Based By Subaru

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

STANDARD EQUIPMENT

SAFETY

EyeSight Driver-Assist System

Advanced Adaptive Cruise Control w/ Lane Centering Assist

Driver's Side Knee Airbag

Subaru Advanced Frontal Airbag System

Side Curtain Airbags w/ Roll Over Sensor

Front Seat Side (Pelvis/Torso) Airbags

Front Passenger Seat Cushion Airbag

Collision Detection Power Door Unlock Function

Engine Immobilizer

Vehicle Dynamics Control (VDC)

4-Wheel Disc Brakes

Brake Assist

Brake Override System

Rear Seat Reminder

PERFORMANCE & EXTERIOR

2.0L DOHC SUBARU BOXER Engine w/ Auto Start Stop

Lineartronic CVT w/ 8-Speed Manual Shift Mode

Steering Wheel Paddle Shifters

X-MODE w/ Hill Descent Control

SI-DRIVE Engine Performance Management

17" Dark Gray w/ Machined Finish Alloy Wheels

225/60 R17 99H All-Season Tires

Road Rails

LED Steering Responsive Headlights (SRH)

Automatic On/Off Headlights

Automatic High Beam

LED Fog Lights

COMFORT, CONVENIENCE & INTERIOR

SUBARU STARLINK Connected Services. See retailer for details.

SUBARU STARLINK 11.6" Multimedia Plus System

6 Speakers

Illuminated USB A & USB C Ports

Rear Seat Illuminated USB A & USB C Charging Ports

Dual Zone Automatic Climate Control System w/ Dynamic Ventilation & Air Filtration

4.2" Color LCD Instrument Panel Display

Electronic Parking Brake

Keyless Access w/ Push-Button Start

Cargo Area Grocery Bag Hooks

Dual Center Console Cup Holders

Front & Rear Door Bottle Holders

Welcome Lighting

LIMITED WARRANTY/ROADSIDE ASSISTANCE

3 Years / 36,000 Miles Basic

5 Years / 60,000 Miles Powertrain

5 Years / Unlimited Mileage Rust Perforation

3 Years / 36,000 24/7 Roadside Assistance

See Owner Info Kit/Warranty For Details

OPTIONAL EQUIPMENT AND OTHER ITEMS

Manufacturer's Suggested Retail Price

\$26,145.00

Exterior Color: Crystal White Pearl

Full Tank of Gas

INCLD

Standard Option: 13

Rear Bumper Cover

\$164.00

Rear Seatback Protector

\$155.00

LED Upgrade

\$150.00

Sunshade - Windshield

\$75.00

Fuel Economy and Environment

Fuel Economy

29 MPG

Small SUVs range from 14 to 123 MPG. The best vehicle rates 140 MPG.

combined city/hwy

27 city

34 highway

3.4 gallons per 100 miles

You save \$500 in fuel costs over 5 years compared to the average new vehicle.

Annual fuel Cost

\$1,850

Fuel Economy & Greenhouse Gas Rating (tailpipe only)

1

6

10

Best

Smog Rating (tailpipe only)

1

7

10

Best

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 29 MPG and costs \$9,750 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$3.00 per gallon. MPG is miles per gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fuel economy.gov

Calculate personalized estimates and compare vehicles

PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS CARLINE:

U.S./CANADIAN PARTS CONTENT: 5%

MAJOR SOURCES OF FOREIGN PARTS CONTENT: JAPAN: 85%

FOR THIS VEHICLE:

FINAL ASSEMBLY POINT: OTA, GUNMA, JAPAN

COUNTRY OF ORIGIN: ENGINE: JAPAN

TRANSMISSION: JAPAN

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

Destination and Delivery

\$1,295.00

Total Suggested Retail Price

\$27,985.00

FIGURE 83. Monroney Label Photograph

A-42

TR-P43170-01-NC

APPENDIX B
DUMMY RESPONSE DATA TRACES

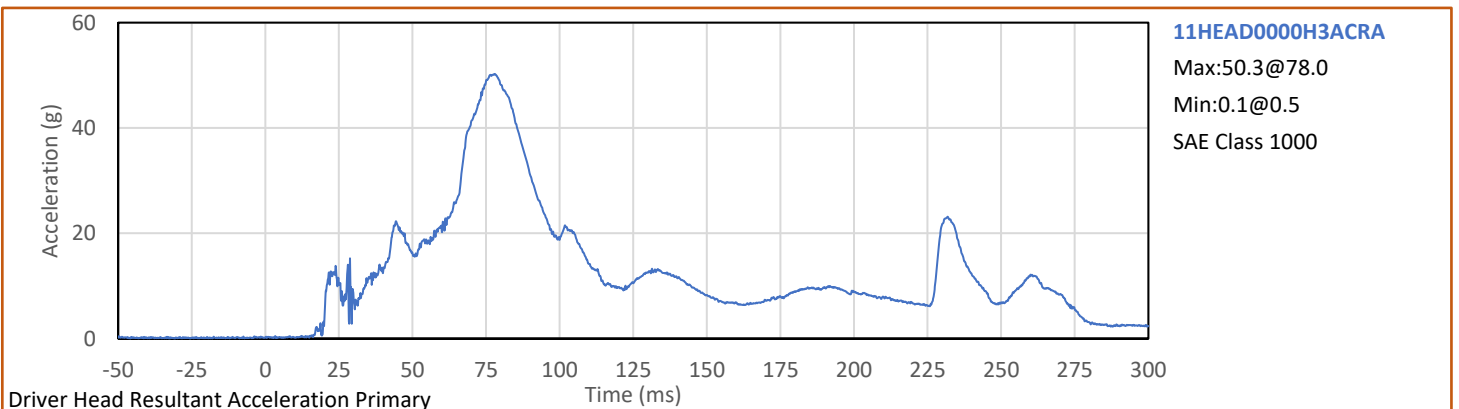
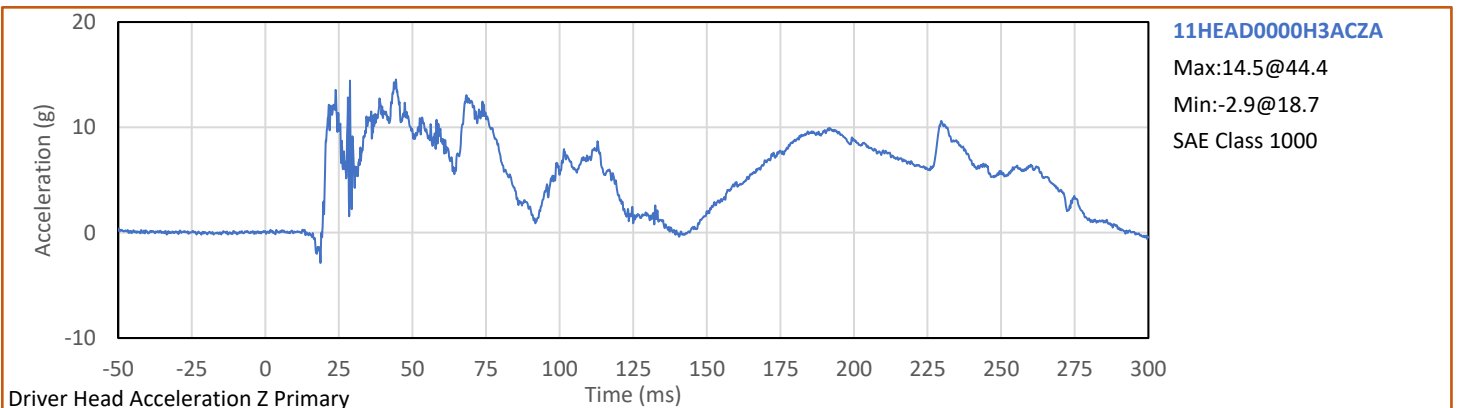
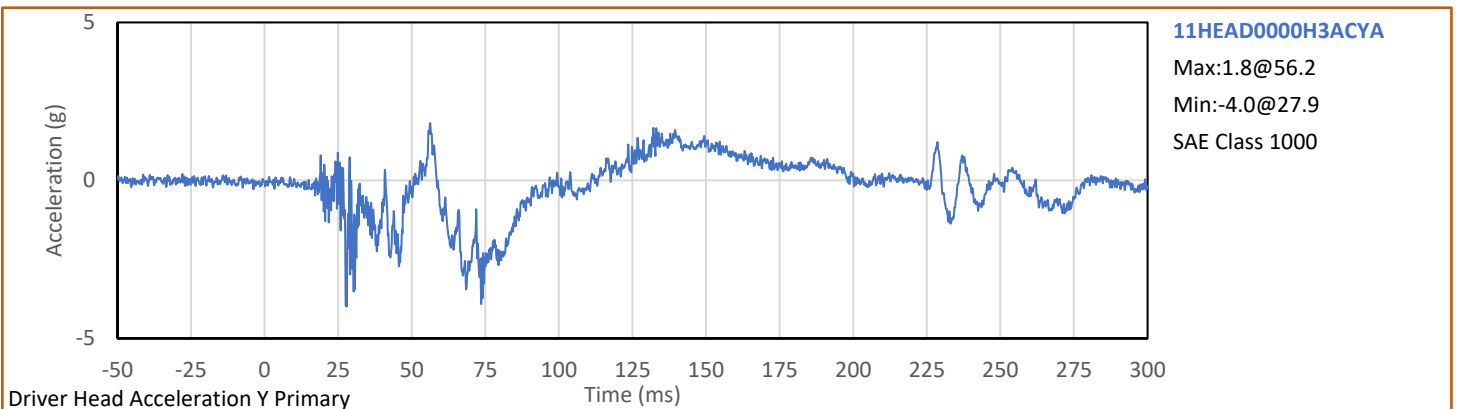
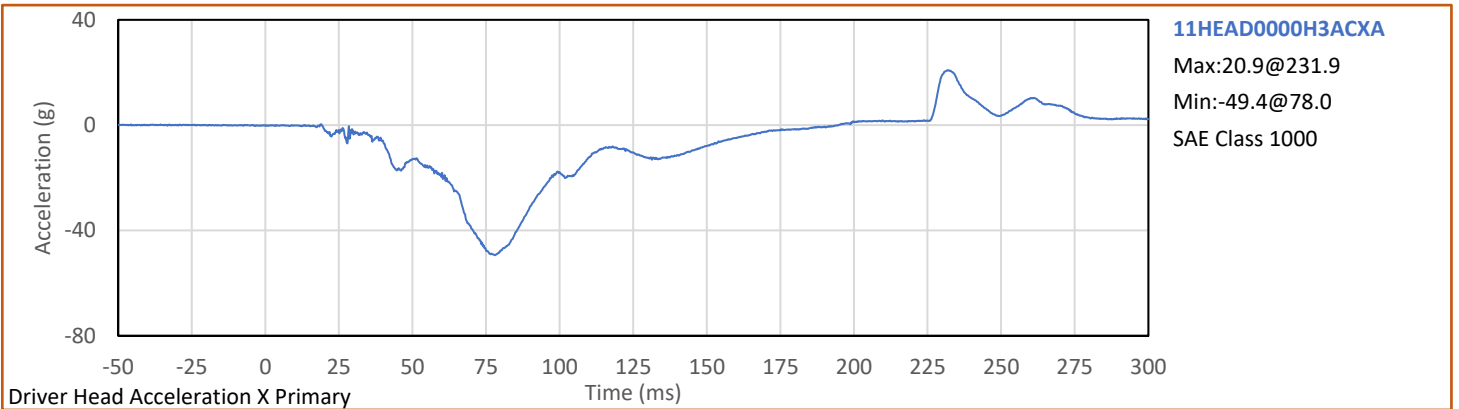
TABLE OF DATA PLOTS

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 Resultant Acceleration Primary	B-1
5	Driver Chest X Deflection	B-2
6	Driver Upper Neck Force X	B-3
7	Driver Upper Neck Force Z	B-3
8	Driver Upper Neck Moment Y	B-3
9	Driver Nij	B-3
10	Driver Chest Acceleration X Primary	B-4
11	Driver Chest Acceleration Y Primary	B-4
12	Driver Chest Acceleration Z Primary	B-4
13	Driver Chest Resultant Acceleration Primary	B-4
14	Driver Left Femur Force Z	B-5
15	Driver Right Femur Force Z	B-5
16	Passenger Head Acceleration X Primary	B-6
17	Passenger Head Acceleration Y Primary	B-6
18	Passenger Head Acceleration Z Primary	B-6
19	Passenger Head Resultant Acceleration Primary	B-6
20	Passenger Chest X Deflection	B-7
21	Passenger Upper Neck Force X	B-8
22	Passenger Upper Neck Force Z	B-8
23	Passenger Upper Neck Moment Y	B-8
24	Passenger Nij	B-8
25	Passenger Chest Acceleration X Primary	B-9
26	Passenger Chest Acceleration Y Primary	B-9
27	Passenger Chest Acceleration Z Primary	B-9
28	Passenger Chest Resultant Acceleration Primary	B-9
29	Passenger Left Femur Force Z	B-10
30	Passenger Right Femur Force Z	B-10

The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at www.nhtsa.gov

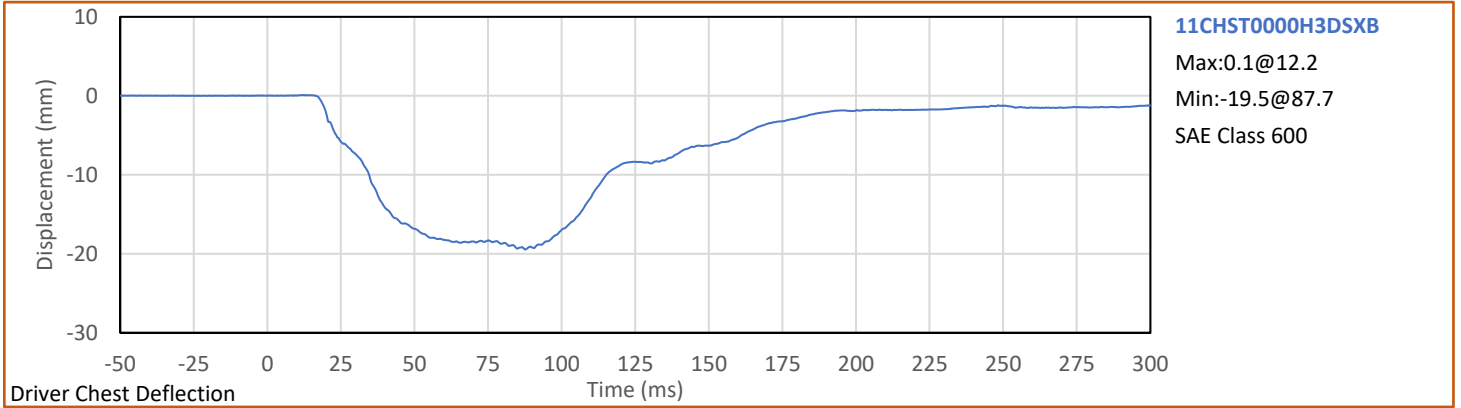
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Driver Head Y Acceleration Redundant
Driver Head Z Acceleration Redundant
Driver Upper Neck Force Y
Driver Upper Neck Moment X
Driver Upper Neck Moment Z
Driver Chest X Acceleration Redundant
Driver Chest Y Acceleration Redundant
Driver Chest Z Acceleration Redundant
Driver Pelvis X
Driver Pelvis Y
Driver Pelvis Z
Driver Left Femur Force Z Redundant
Driver Right Femur Force Z Redundant
Driver Left Upper Tibia Moment X
Driver Left Upper Tibia Moment Y
Driver Left Upper Tibia Force Z
Driver Left Lower Tibia Moment X
Driver Left Lower Tibia Moment Y
Driver Left Lower Tibia Force Z
Driver Right Upper Tibia Moment X
Driver Right Upper Tibia Moment Y
Driver Right Upper Tibia Force Z
Driver Right Lower Tibia Moment X
Driver Right Lower Tibia Moment Y
Driver Right Lower Tibia Force Z
Driver Left Foot Fore Z
Driver Left Foot Aft X
Driver Left Foot Aft Z
Driver Right Foot Fore Z
Driver Right Foot Aft X
Driver Right Foot Aft Z
Driver Shoulder Belt Force
Driver Lap Belt Force
Driver Head Angular Velocity X
Driver Head Angular Velocity Y
Driver Head Angular Velocity Z
Passenger Head X Acceleration Redundant
Passenger Head Y Acceleration Redundant
Passenger Head Z Acceleration Redundant
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Passenger Upper Neck Moment Y

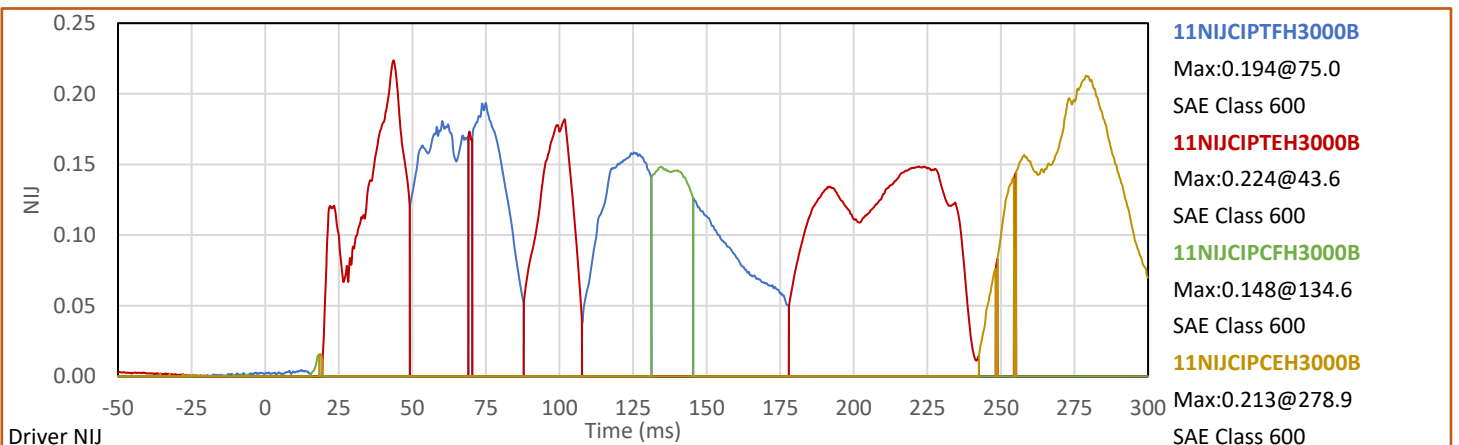
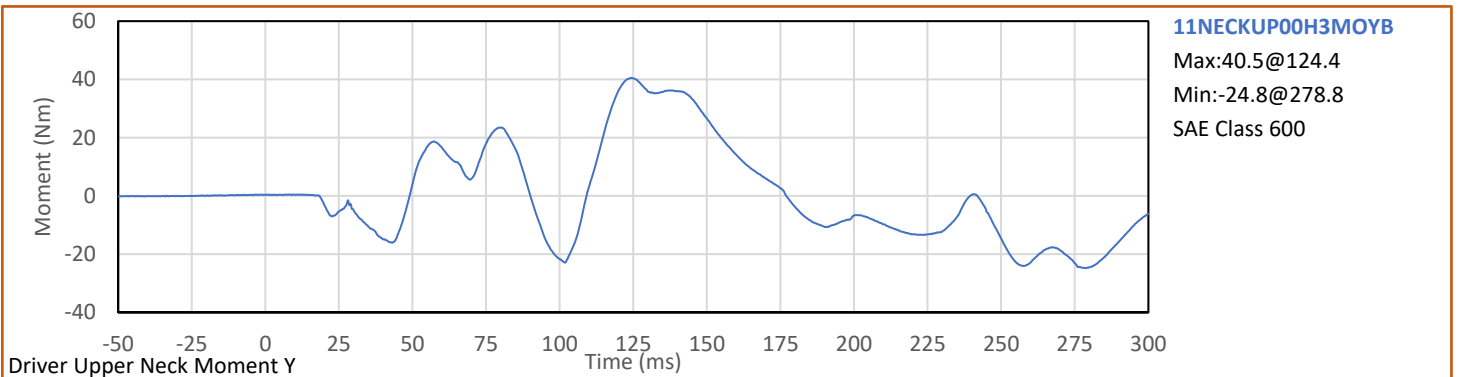
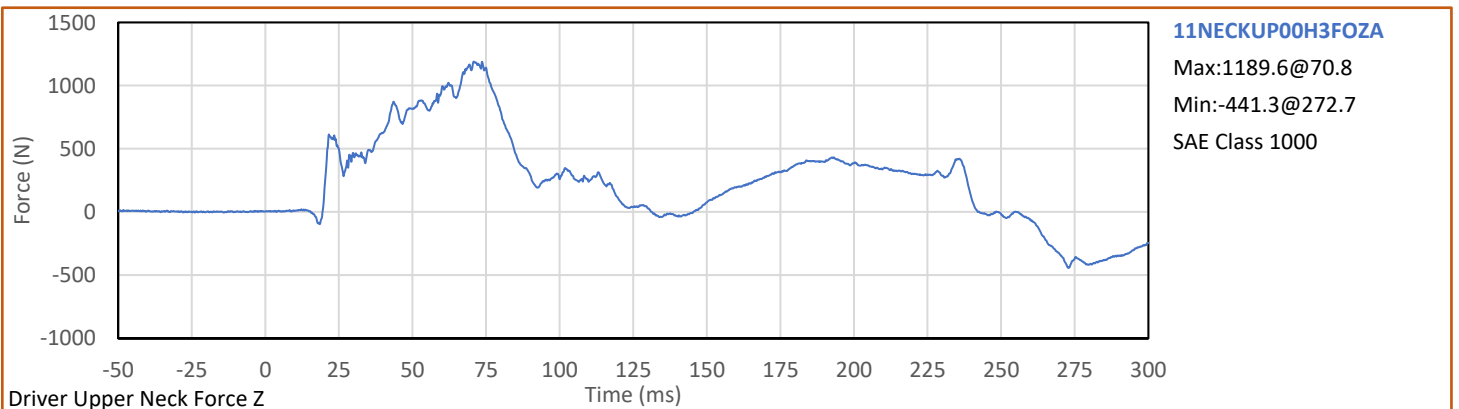
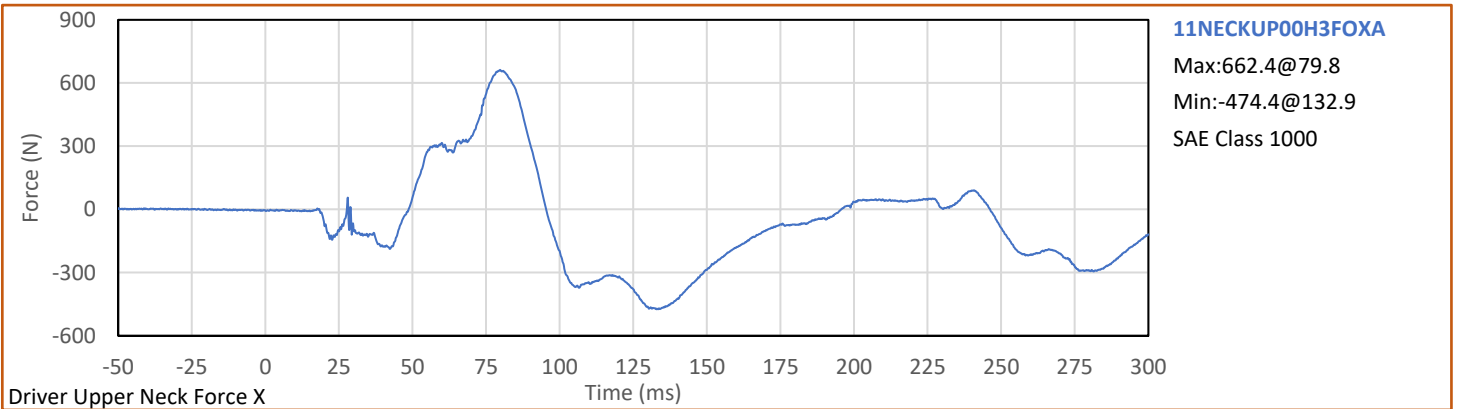
Passenger Chest X Acceleration Redundant
Passenger Chest Y Acceleration Redundant
Passenger Chest Z Acceleration Redundant
Passenger Pelvis X
Passenger Pelvis Y
Passenger Pelvis Z
Passenger Left Femur Force Redundant
Passenger Right Femur Force Redundant
Passenger Left Upper Tibia Moment X
Passenger Left Upper Tibia Moment Y
Passenger Left Upper Tibia Force Z
Passenger Left Lower Tibia Moment X
Passenger Left Lower Tibia Moment Y
Passenger Left Lower Tibia Force Z
Passenger Right Upper Tibia Moment X
Passenger Right Upper Tibia Moment Y
Passenger Right Upper Tibia Force Z
Passenger Right Lower Tibia Moment X
Passenger Right Lower Tibia Moment Y
Passenger Right Lower Tibia Force Z
Passenger Left Foot Fore Z
Passenger Left Foot Aft X
Passenger Left Foot Aft Z
Passenger Right Foot Fore Z
Passenger Right Foot Aft X
Passenger Right Foot Aft Z
Passenger Shoulder Belt Force
Passenger Lap Belt Force
Passenger Head Angular Velocity X
Passenger Head Angular Velocity Y
Passenger Head Angular Velocity Z
Left Rear Seat Crossmember X
Left Rear Seat Crossmember Z
Right Rear Seat Crossmember X
Right Rear Seat Crossmember Z
Left Rear Seat Crossmember X Redundant
Right Rear Seat Crossmember X Redundant
Vehicle Engine Top X
Vehicle Engine Bottom X
Load Cell Barrier Forces and Moments

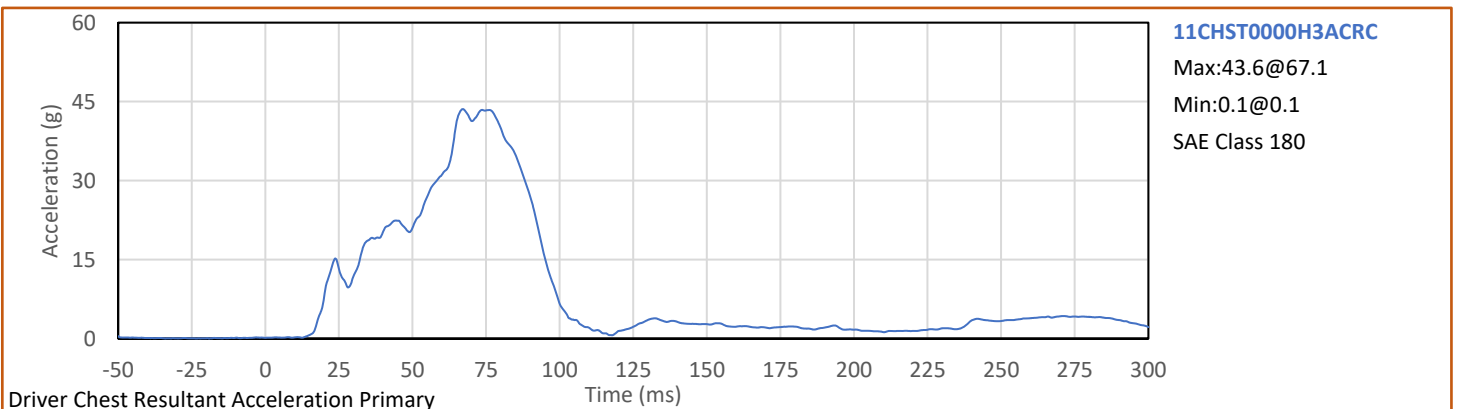
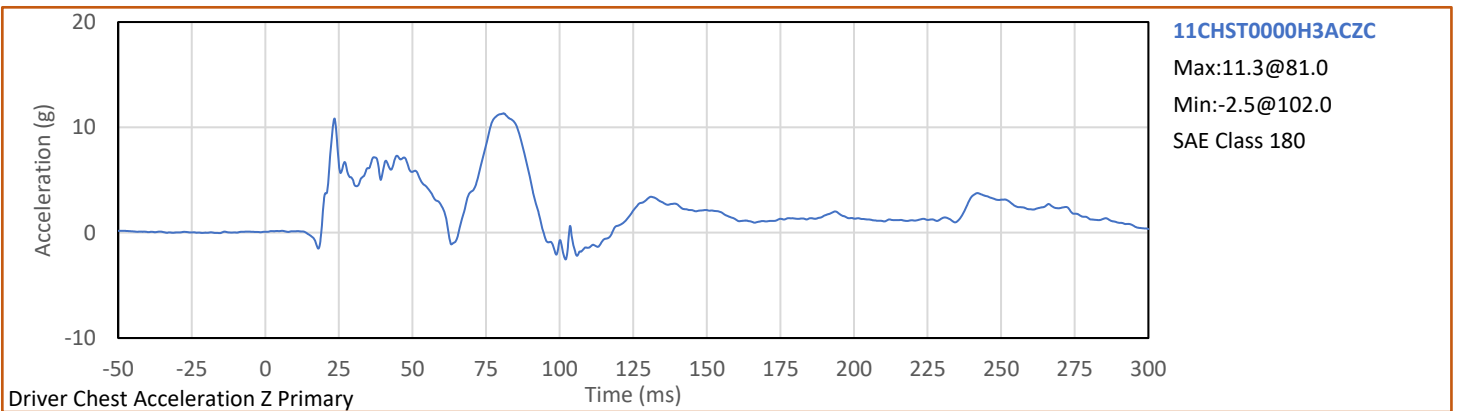
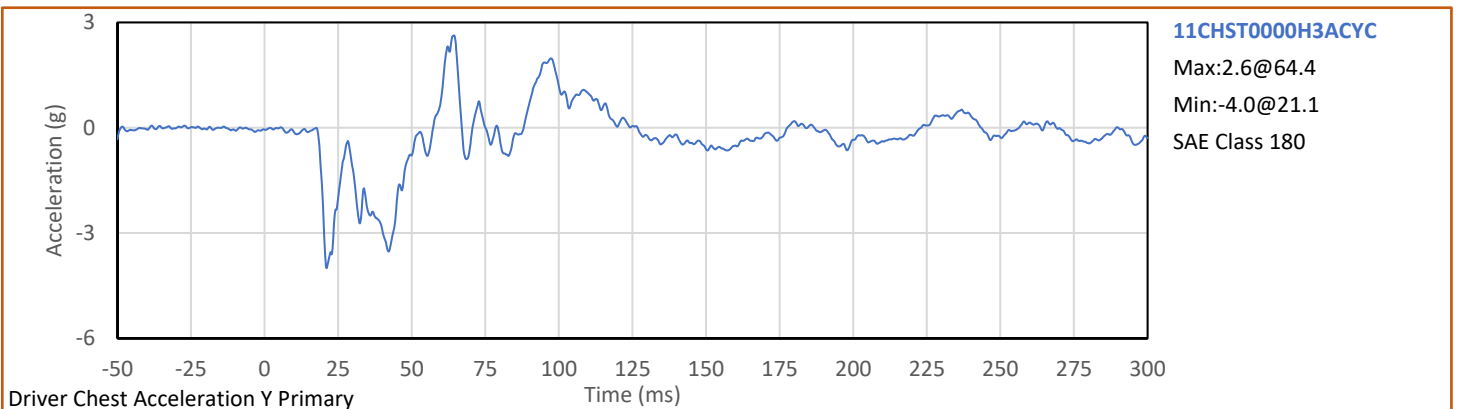
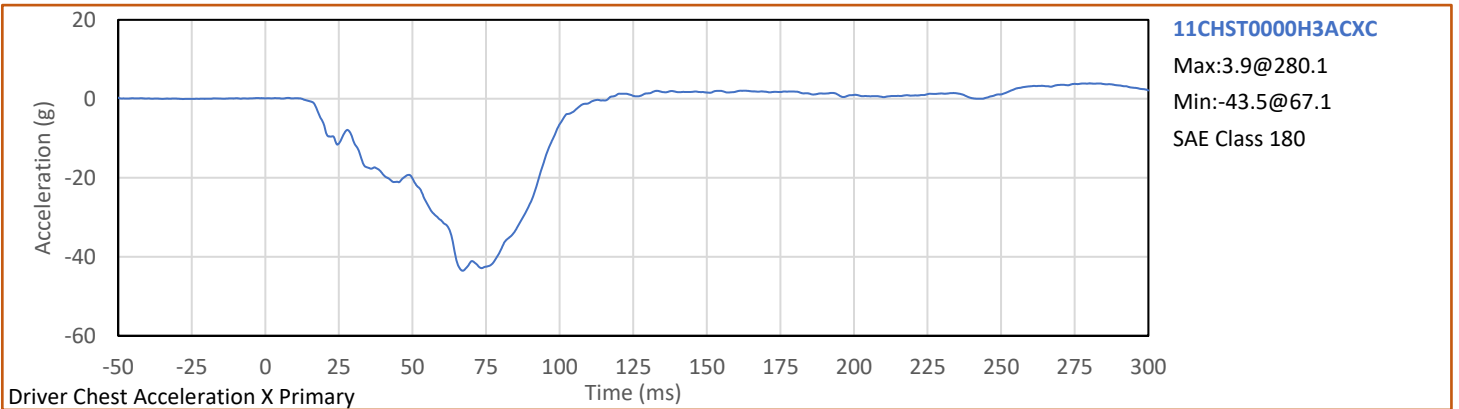


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Test Program: 56.3 km/h Frontal Impact NCAP Test

NHTSA No.: O20245500
Test Date: 8/8/2023

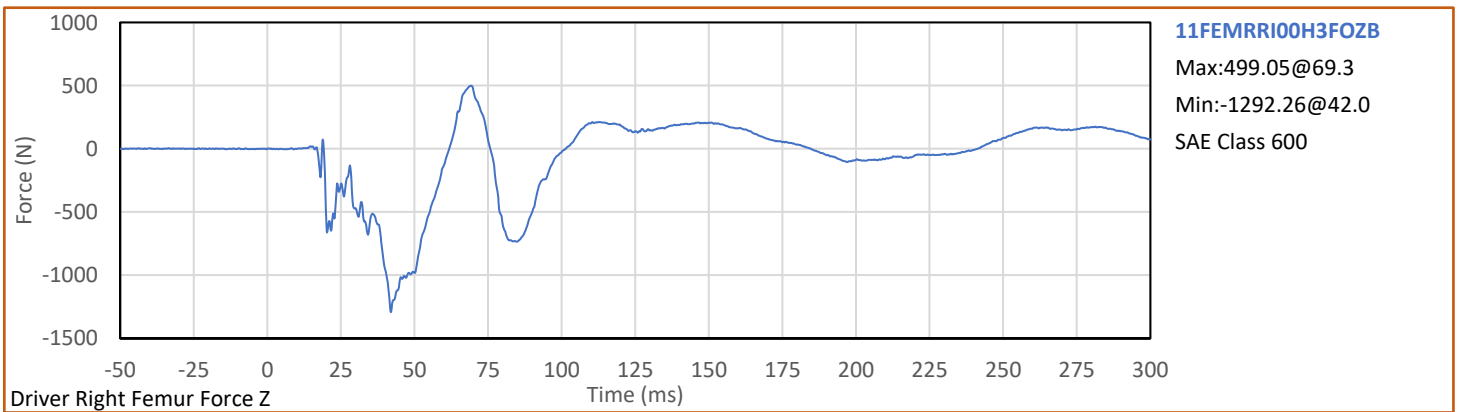
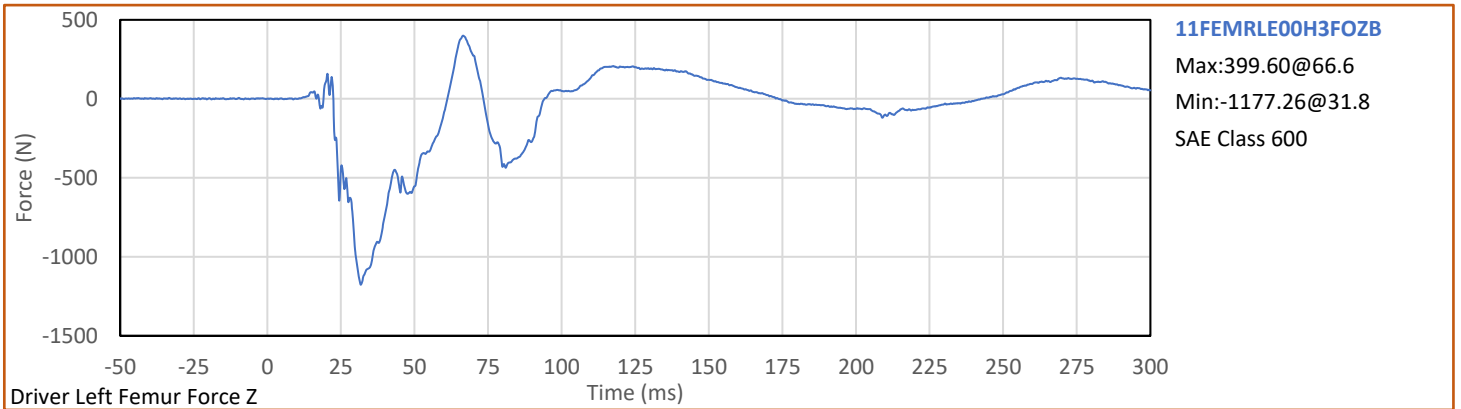






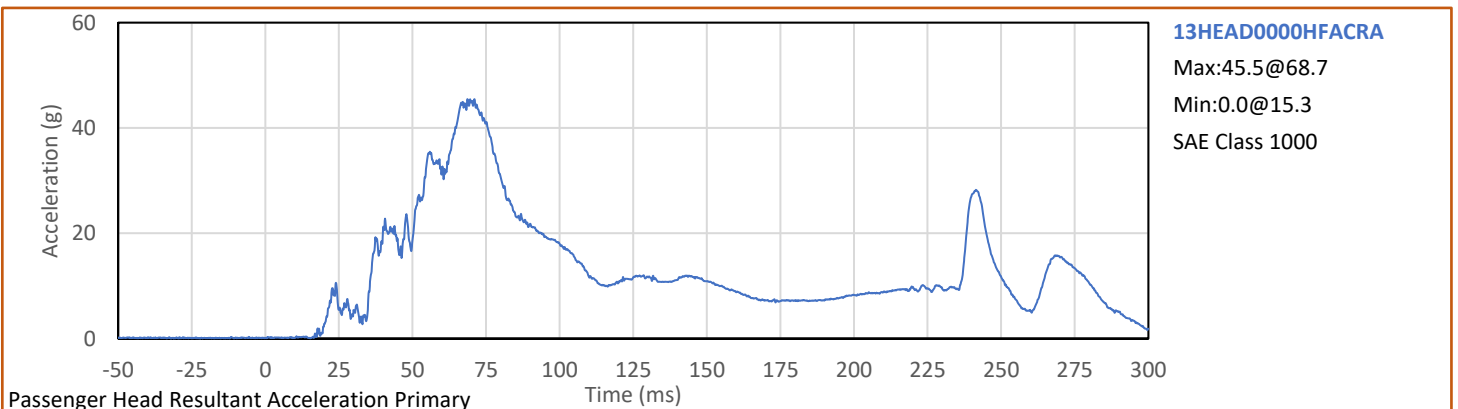
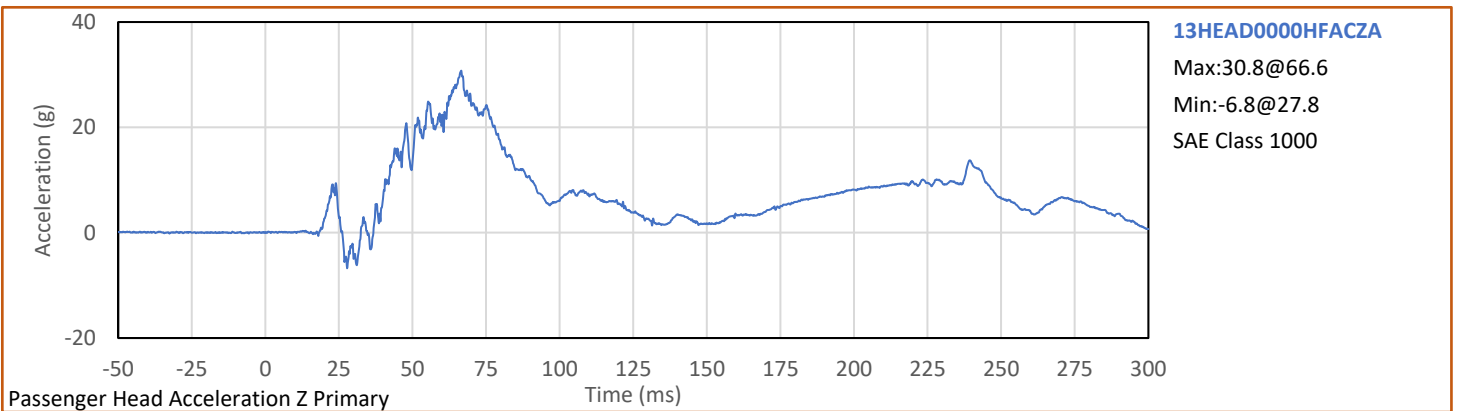
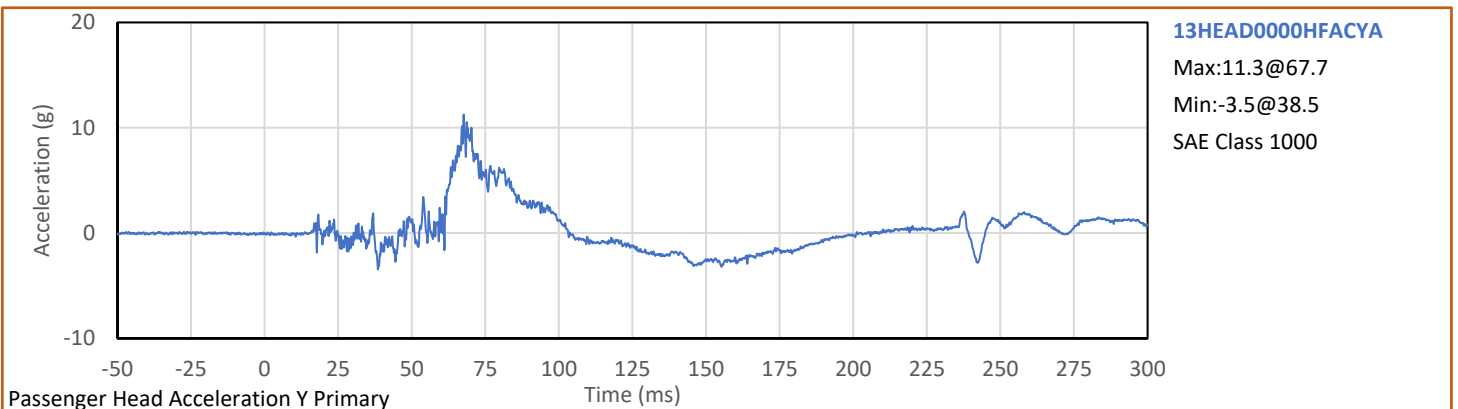
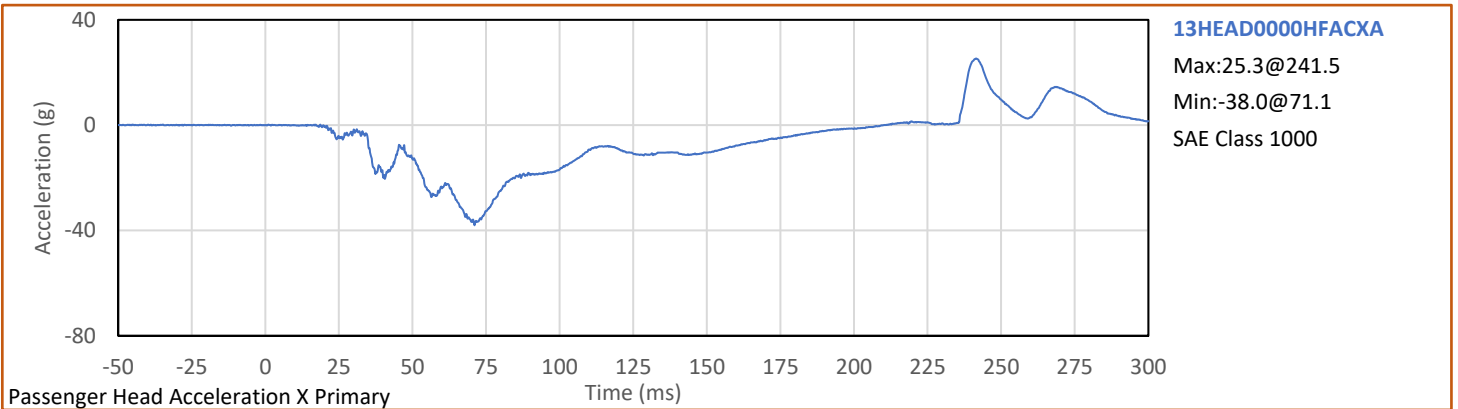
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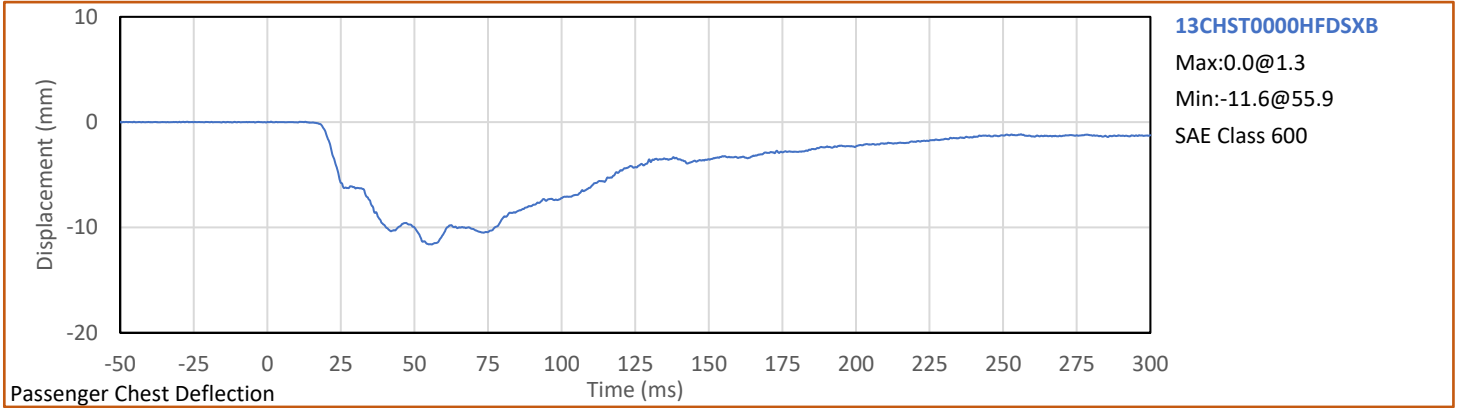
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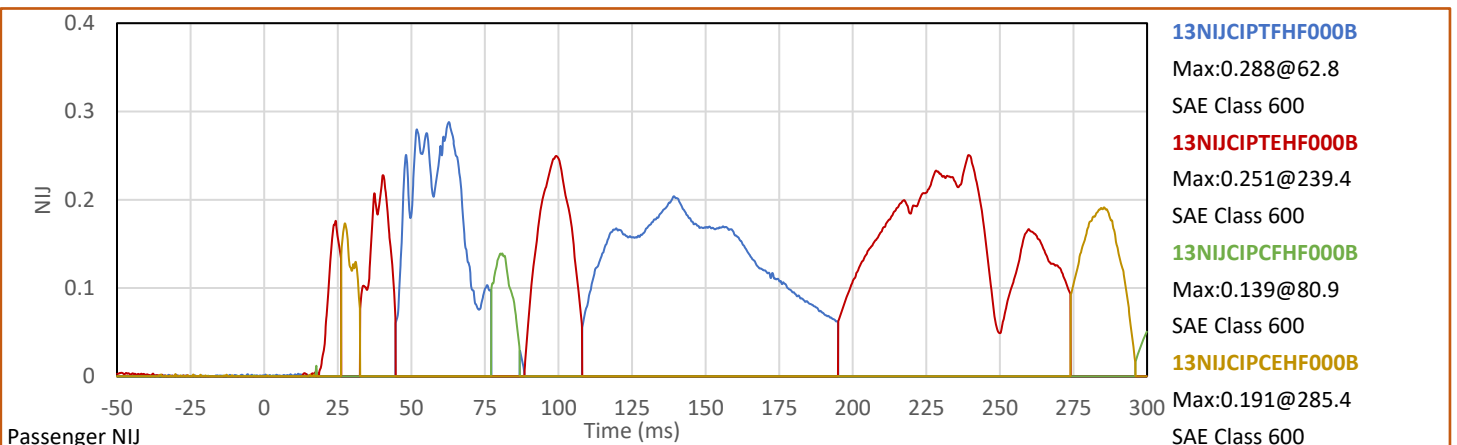
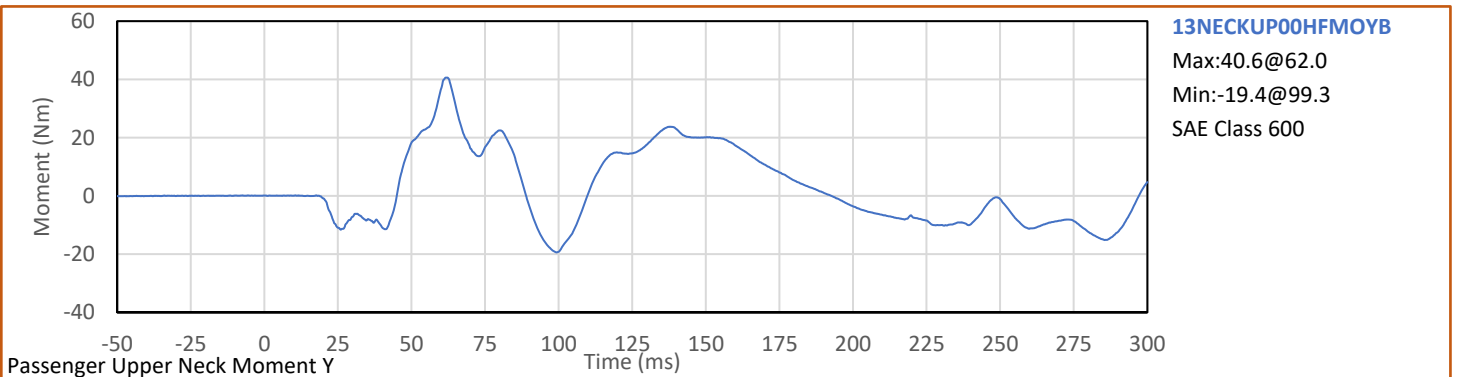
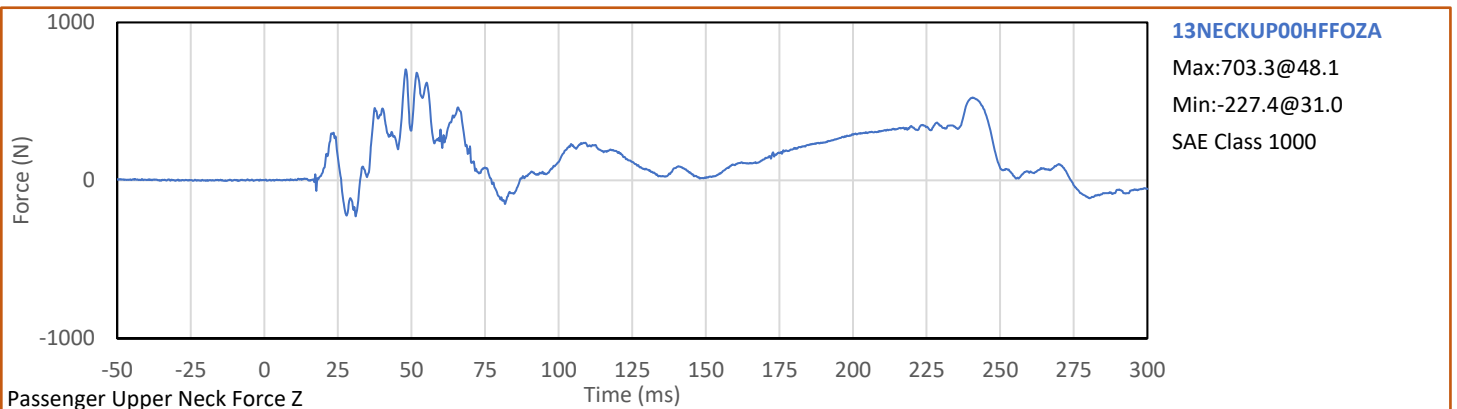
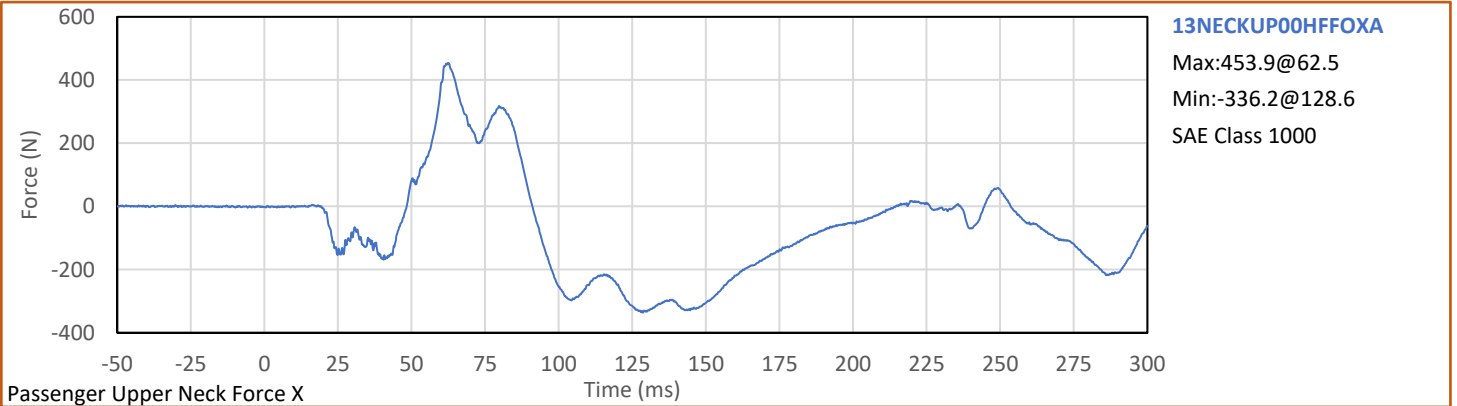
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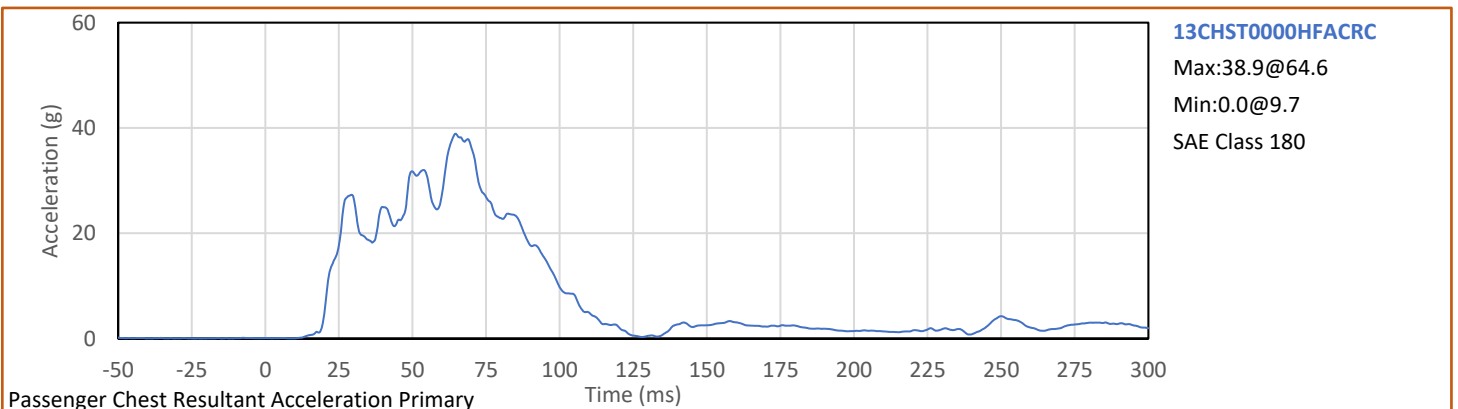
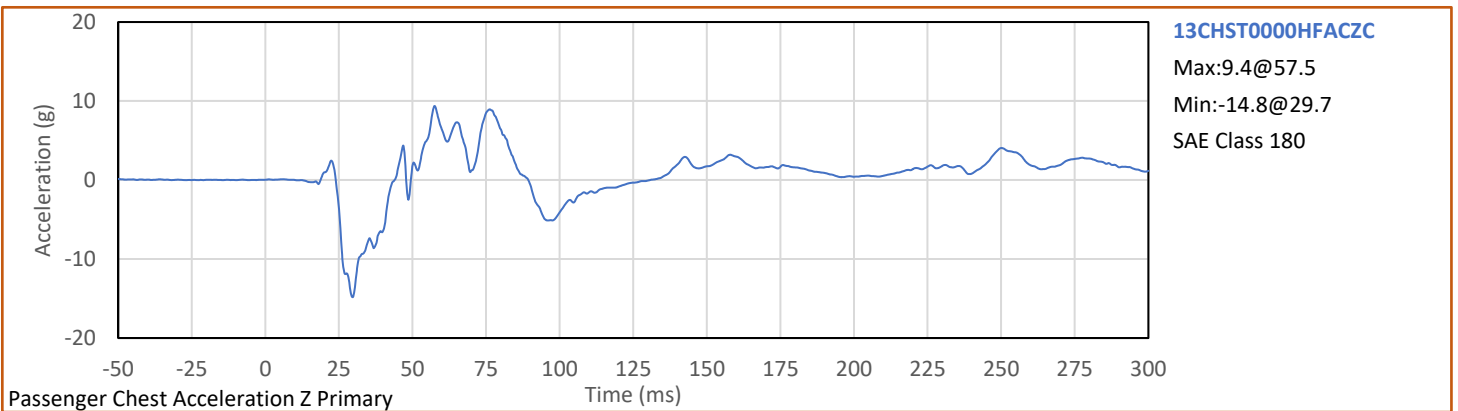
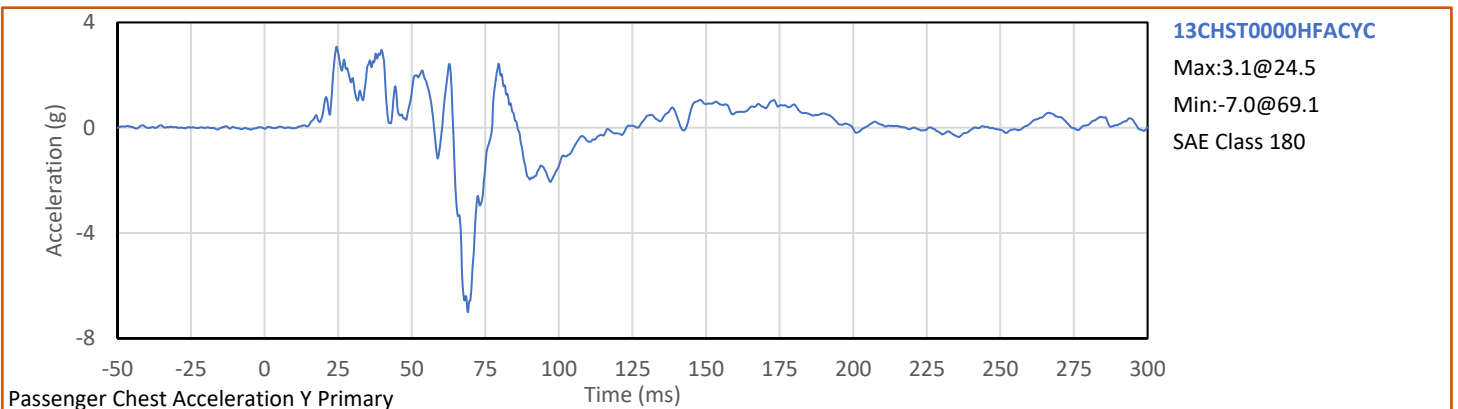
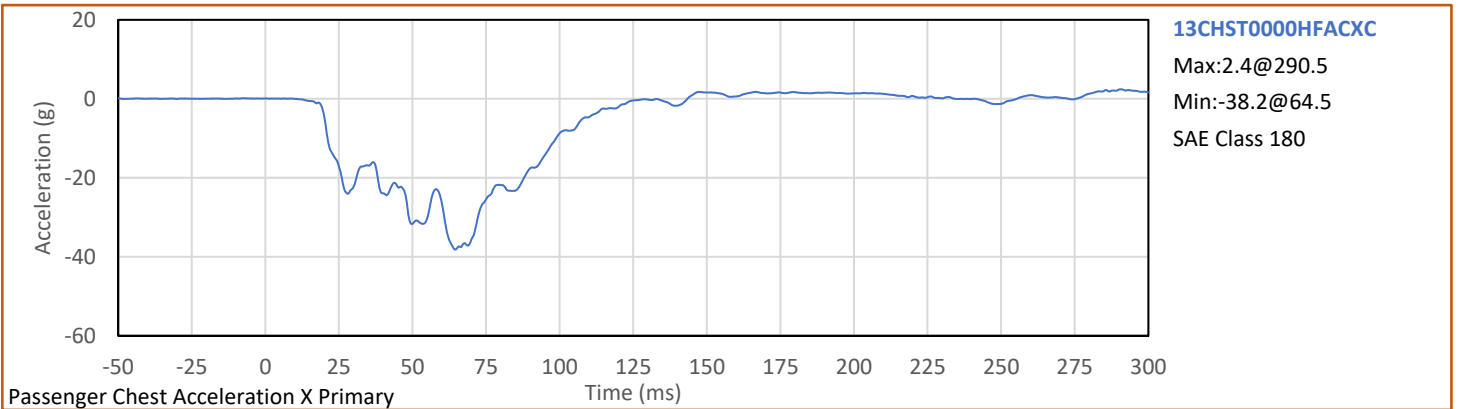
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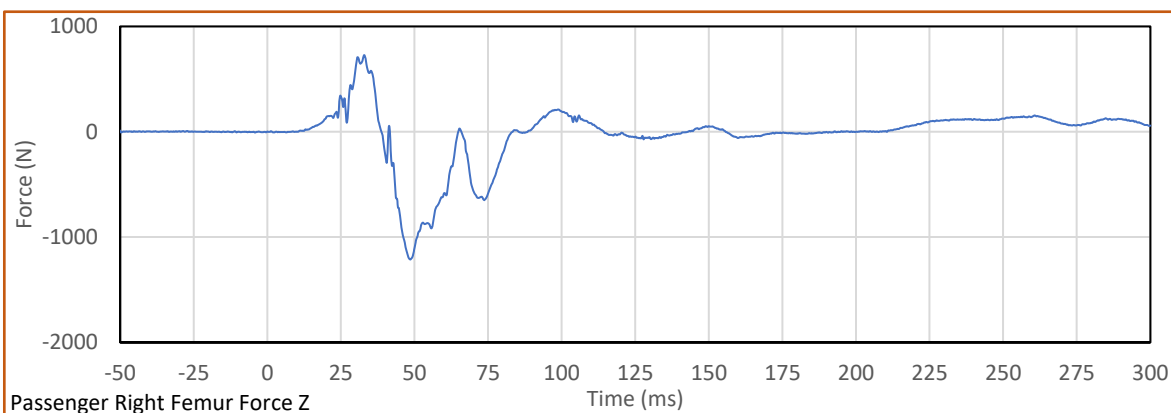
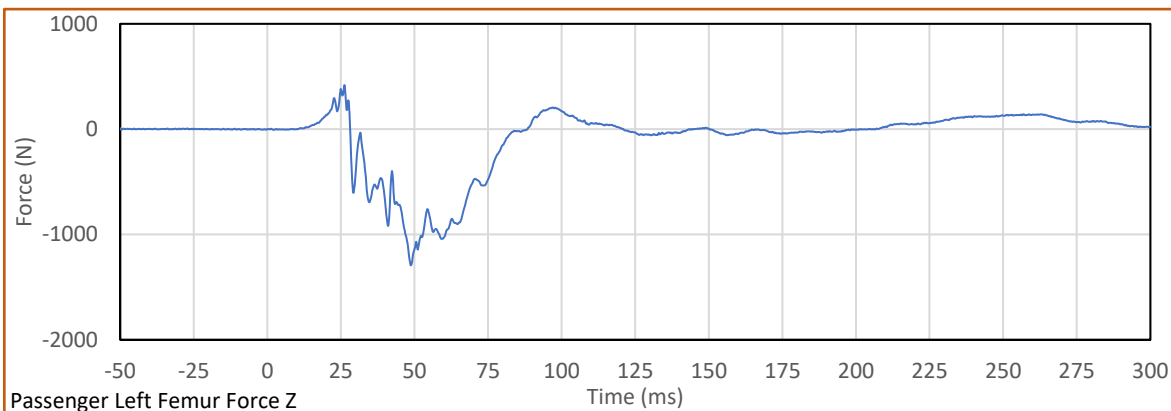
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Test Program: 56.3 km/h Frontal Impact NCAP Test

NHTSA No.: O20245500
Test Date: 8/8/2023



Test Vehicle: 2024 Subaru Crosstrek 5-Door SW
Test Program: 56.3 km/h Frontal Impact NCAP Test

NHTSA No.: O20245500
Test Date: 8/8/2023



APPENDIX C
DUMMY QUALIFICATION AND PERFORMANCE VERIFICATION DATA

APPENDIX C
Pre-Test ATD Qualification and Performance Verification
Hybrid III 50th Percentile Male ATD
S/N: 360

ATD Serial No.: 360

Test Date: 2023-07-10

Dummy Item	Inspect for	Comments	Damage	OK
Entire ATD	Perform general cleaning			✓
Outer Skin	Gashes, rips, cracks			✓
Head	Ballast secure			✓
	General appearance			✓
Neck bracket	Upper neck firmly attached to lower bracket			✓
Neck	Broken or cracked rubber			✓
	Looseness at the condyle joint			✓
Nodding block	Cracked or out of position			✓
Lumbar Spine	Broken or cracked rubber			✓
Ribs	Broken or bent ribs			✓
	Broken or bent rib supports			✓
	Damping material separated or cracked			✓
	Rubber bumpers in place			✓
Chest Displ. Assembly	Bent shaft			✓
	Slider arm riding in track			✓
Sensors	Check cables for cuts, tears			✓
	Check for damaged insulation			✓
Accelerometer Mounting	Head mounting secure			✓
	Chest mounting secure			✓
Knees	Skin condition			✓
	Insert (do not remove)			✓
	Casting			✓
Limbs	Normal movement and adjustment			✓
Knee Sliders	Wires intact			✓
	Rubber returned to "resting" position			✓
Pelvis	Broken			✓
Other	Describe below as needed			✓

Describe any repairs or replacement of parts or other findings:

No Problems Found

Technician: 
G. Fuentes

Approved By: 
J. Hernandez

ATD Serial No.: 360

Test Date: 2023-07-10

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	31	Pass
A - Total sitting height	mm	879	889	887	Pass
B - Shoulder pivot height	mm	505	521	518	Pass
C - 'H' point height	mm	84	89	86	Pass
D - 'H' point location from backline	mm	135	140	139	Pass
E - Shoulder pivot from backline	mm	84	94	92	Pass
F - Thigh clearance	mm	140	155	147	Pass
G - Back of elbow to wrist pivot	mm	290	305	301	Pass
H - Head back to backline	mm	41	46	45	Pass
I - Shoulder to elbow length	mm	330	345	334	Pass
J - Elbow rest height	mm	190	211	199	Pass
K - Buttock to knee length	mm	579	604	595	Pass
L - Popliteal length	mm	429	455	443	Pass
M - Knee pivot height	mm	485	500	495	Pass
N - Buttock popliteal length	mm	452	477	468	Pass
O - Chest depth without jacket	mm	213	229	219	Pass
P - Foot length	mm	251	267	257	Pass
V - Shoulder breadth	mm	422	437	430	Pass
W - Foot breadth	mm	91	107	98	Pass
Y - Chest circum. (w/chest jacket)	mm	970	1001	992	Pass
Z - Waist circum.	mm	836	866	851	Pass
AA - Location for chest circum.	mm	429	434	432	Pass
BB - Location for waist circum.	mm	226	231	229	Pass
			Overall Test Results		Pass

Technician:



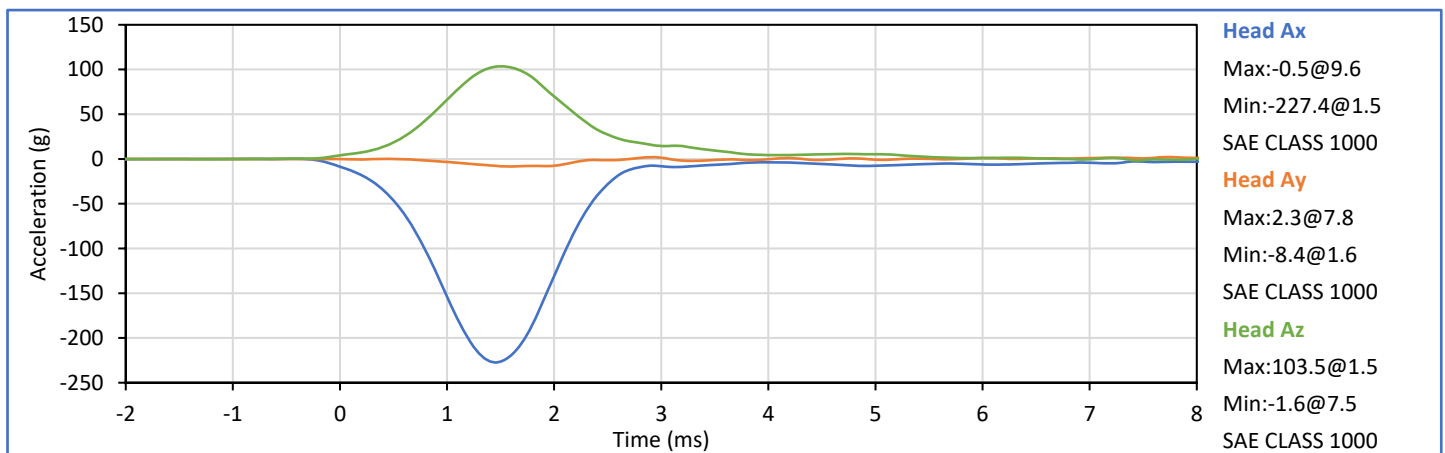
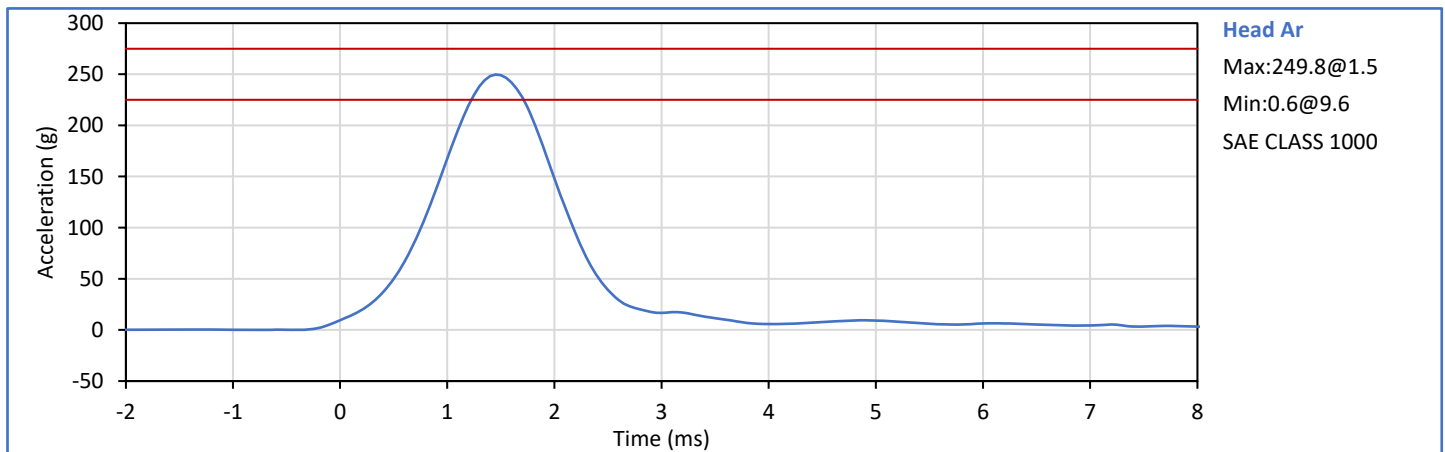
G. Fuentes

Approved By:



J. Hernandez

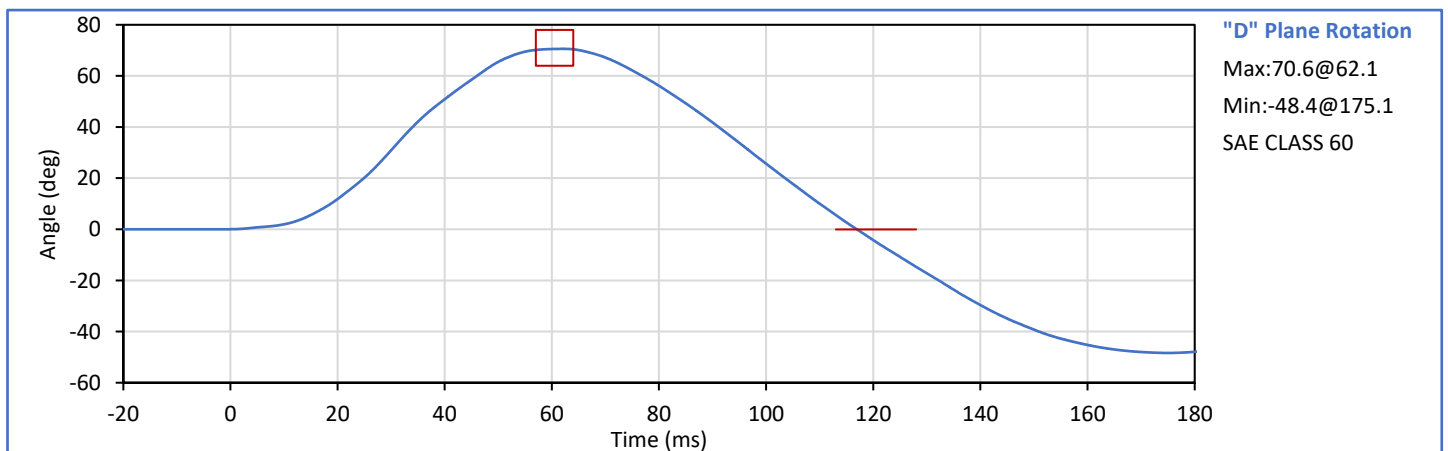
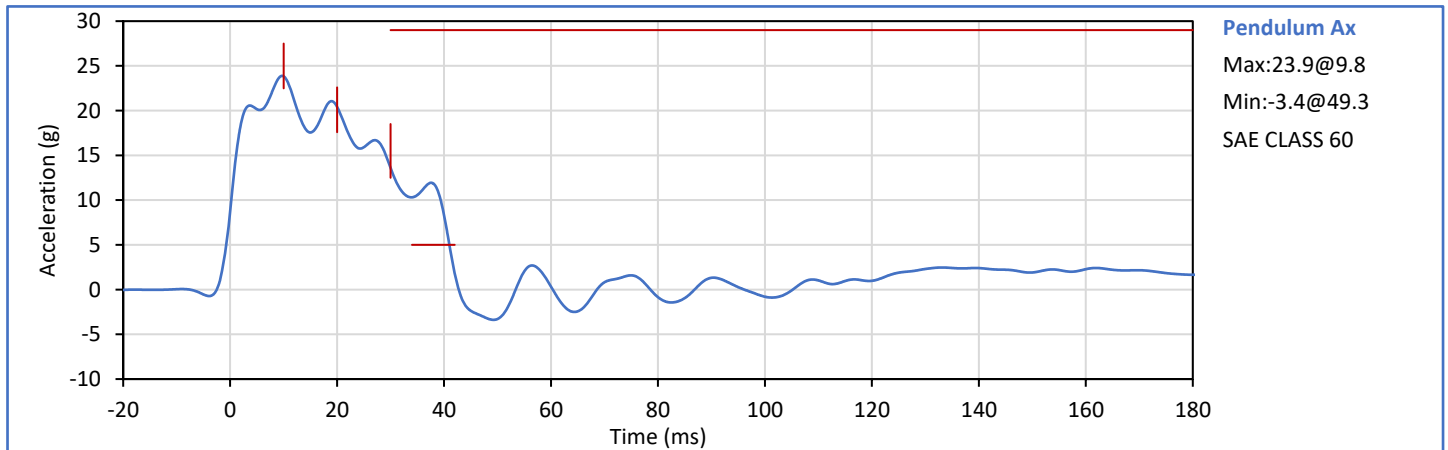
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Laboratory Temperature	°C	18.9	25.6	21.2	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
Peak Resultant Acceleration	g	225.0	275.0	249.8	Pass
Peak Lateral Acceleration	g	-15.0	15.0	-8.4	Pass
Oscillations After Main Pulse	%	0.0	10.0	0.0	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
			Overall Test Results	Pass	



Technician: G. Fuentes

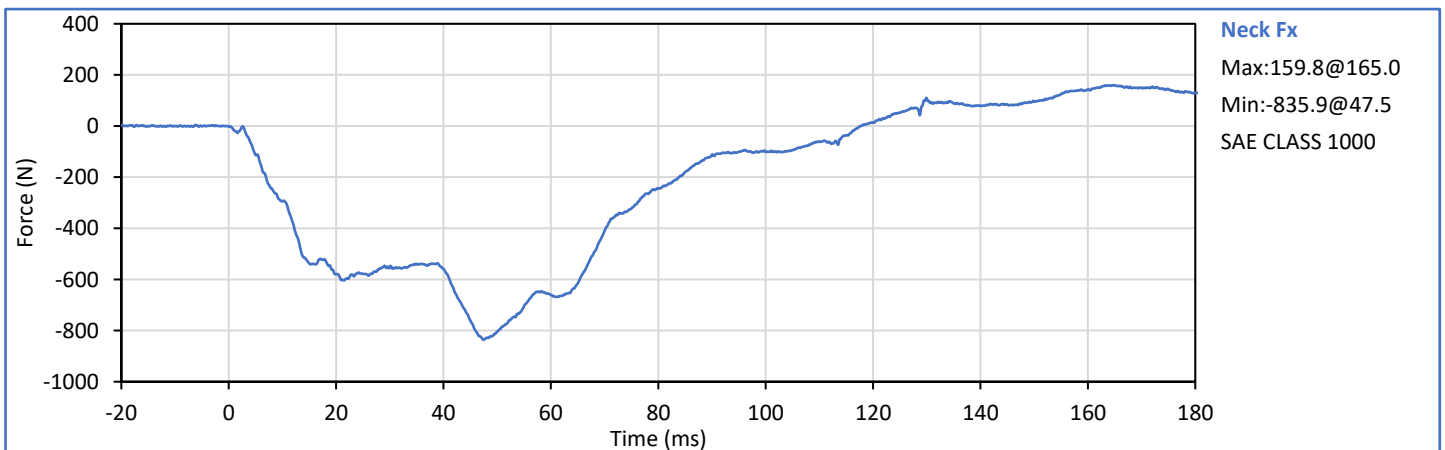
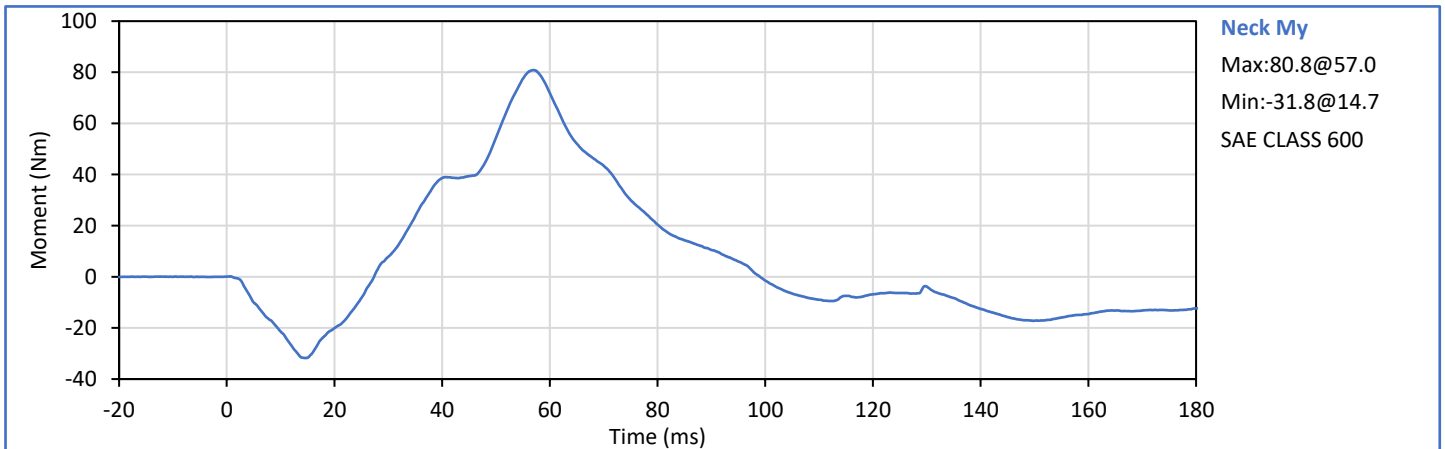
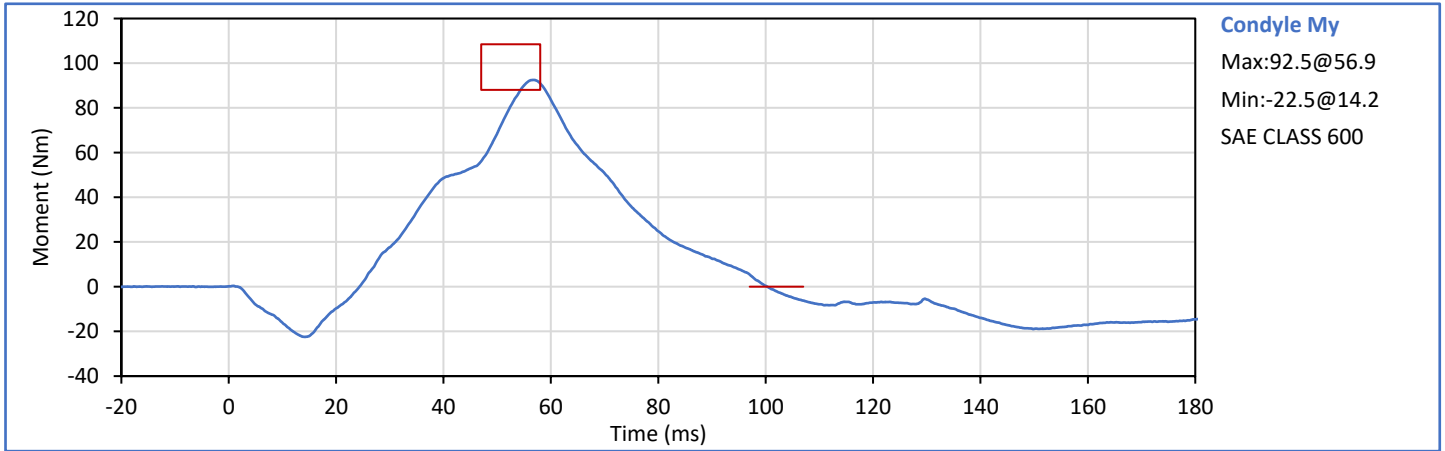
Approved By: J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.6	Pass
Laboratory Relative Humidity	%	10	70	31	Pass
Pendulum Velocity	m/s	6.89	7.13	7.00	Pass
Pendulum Deceleration at 10 ms	g	22.5	27.5	23.8	Pass
Pendulum Deceleration at 20 ms	g	17.6	22.6	20.4	Pass
Pendulum Deceleration at 30 ms	g	12.5	18.5	13.6	Pass
Peak Pendulum Decel After 30 ms	g	0.0	29.0	13.6	Pass
Deceleration Decay to Cross 5g	ms	34.0	42.0	41.0	Pass
"D" Plane Rotation peak	deg	64.0	78.0	70.6	Pass
	ms	57.0	64.0	62.1	Pass
"D" Plane Rotation Decay to Zero	ms	113.0	128.0	117.0	Pass
Moment About Occipital Condyle	Nm	88.1	108.5	92.5	Pass
	ms	47.0	58.0	56.9	Pass
Moment Decay, Peak to Zero	ms	97.0	107.0	100.3	Pass
Overall Test Results				Pass	

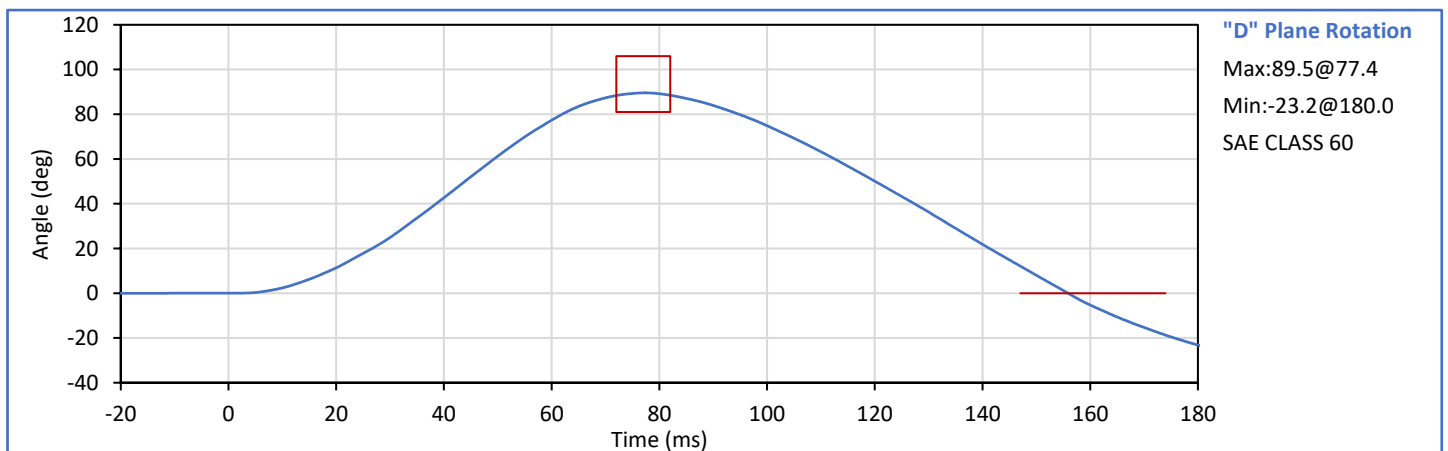
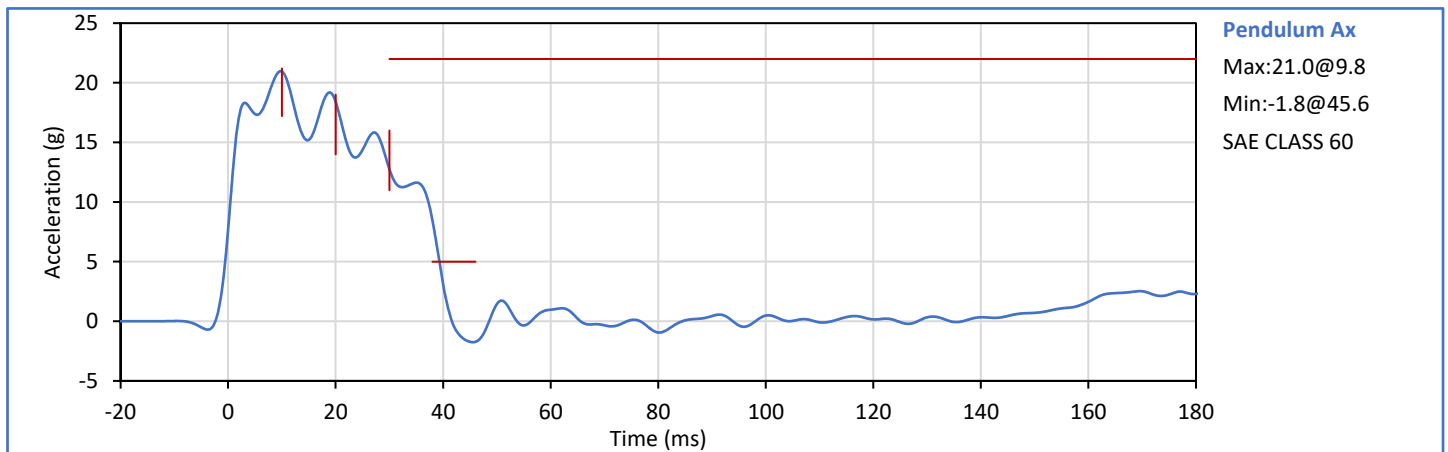


Technician: G. Fuentes

Approved By: J. Hernandez

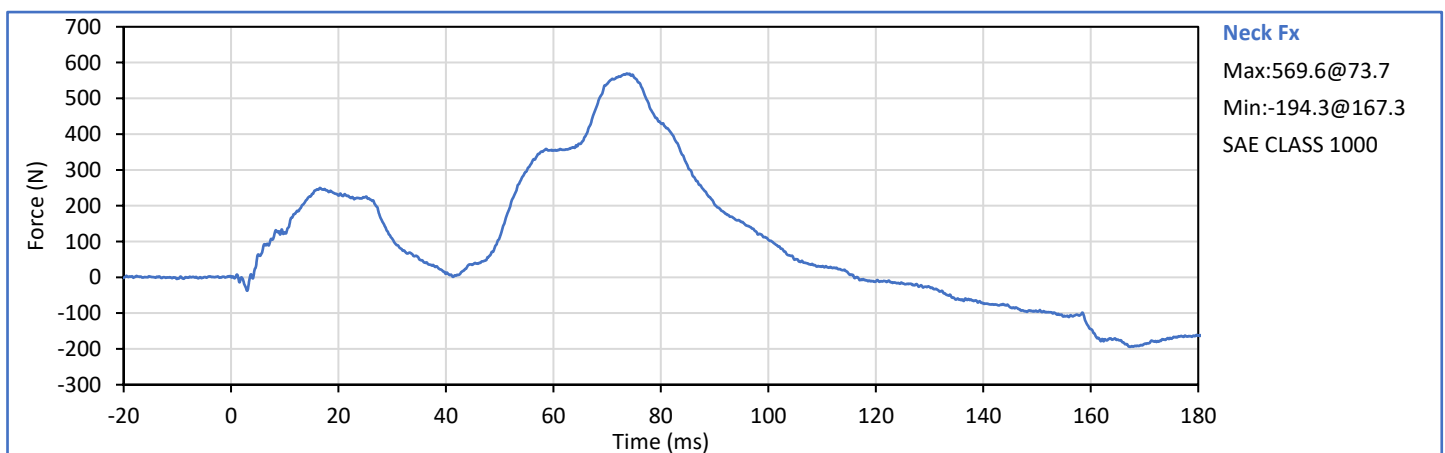
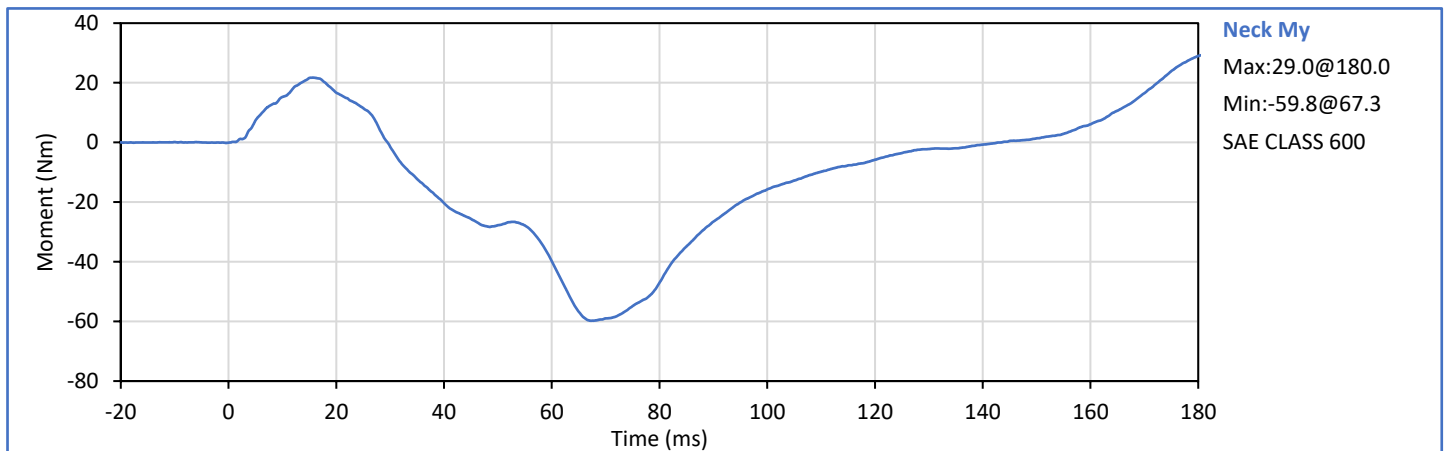
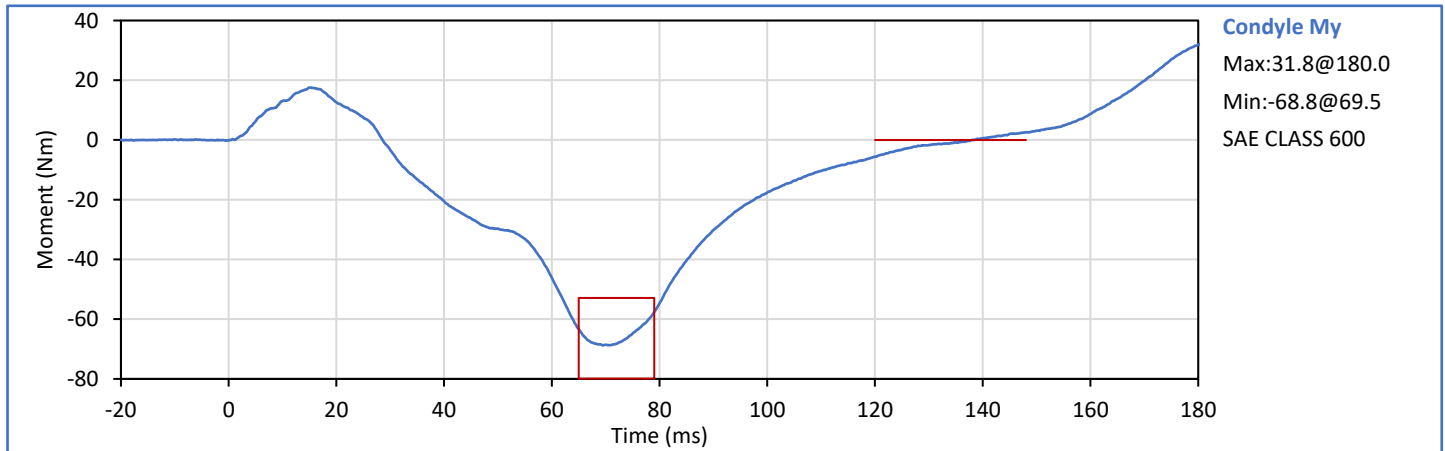


Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.6	Pass
Laboratory Relative Humidity	%	10	70	31	Pass
Pendulum Velocity	m/s	5.94	6.19	6.15	Pass
Pendulum Deceleration at 10 ms	g	17.2	21.2	20.9	Pass
Pendulum Deceleration at 20 ms	g	14.0	19.0	18.4	Pass
Pendulum Deceleration at 30 ms	g	11.0	16.0	12.8	Pass
Peak Pendulum Decel After 30 ms	g	0.0	22.0	12.8	Pass
Deceleration Decay to Cross 5g	ms	38.0	46.0	39.3	Pass
"D" Plane Rotation peak	deg	81.0	106.0	89.5	Pass
	ms	72.0	82.0	77.4	Pass
"D" Plane Rotation Decay to Zero	ms	147.0	174.0	155.9	Pass
Moment About Occipital Condyle	Nm	-79.9	-52.9	-68.8	Pass
	ms	65.0	79.0	69.5	Pass
Moment Decay, Peak to Zero	ms	120.0	148.0	138.1	Pass
Overall Test Results				Pass	

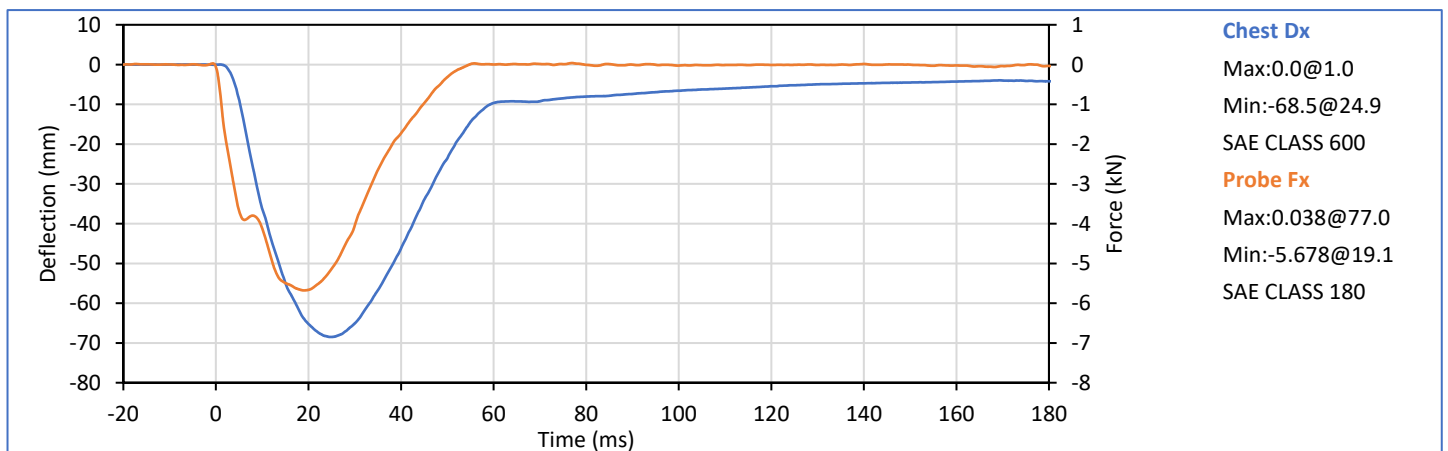
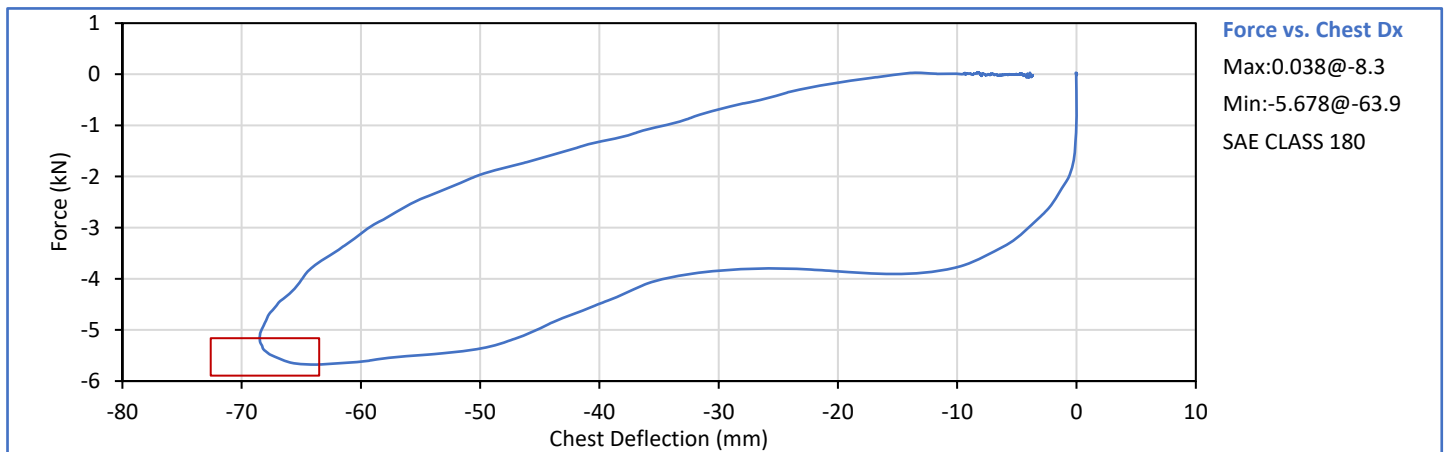


Technician: G. Fuentes

Approved By: J. Hernandez



Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.4	Pass
Laboratory Relative Humidity	%	10	70	35	Pass
Probe Velocity	m/s	6.58	6.82	6.72	Pass
Peak Chest Deflection	mm	-72.6	-63.5	-68.5	Pass
Peak Probe Force	kN	-5.893	-5.159	-5.678	Pass
Internal Hysteresis	%	69.0	85.0	70.3	Pass
Overall Test Results				Pass	Pass



Technician:

G. Fuentes

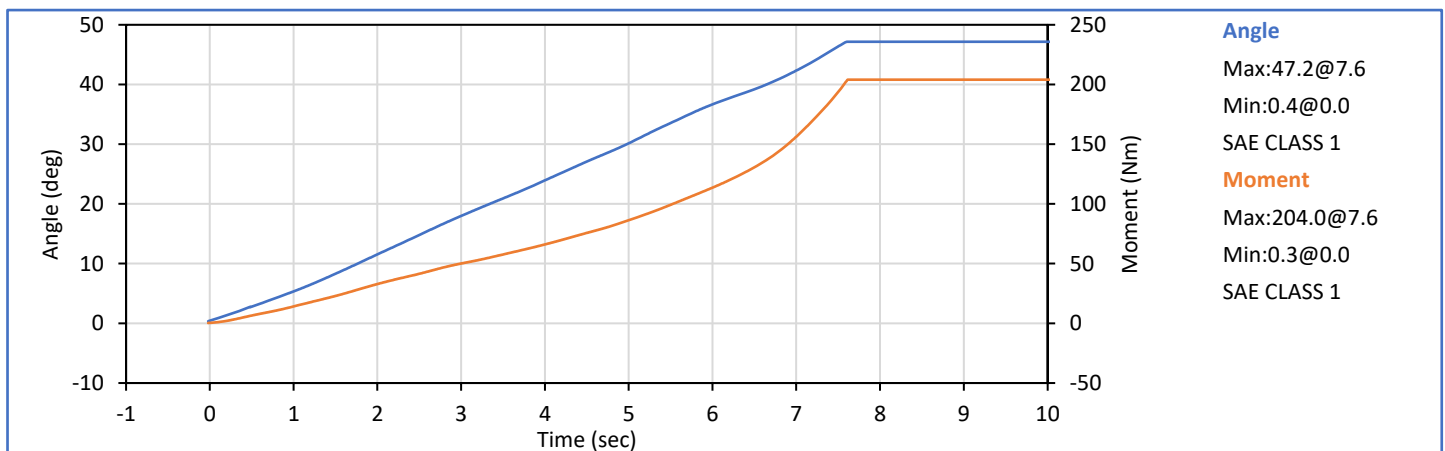
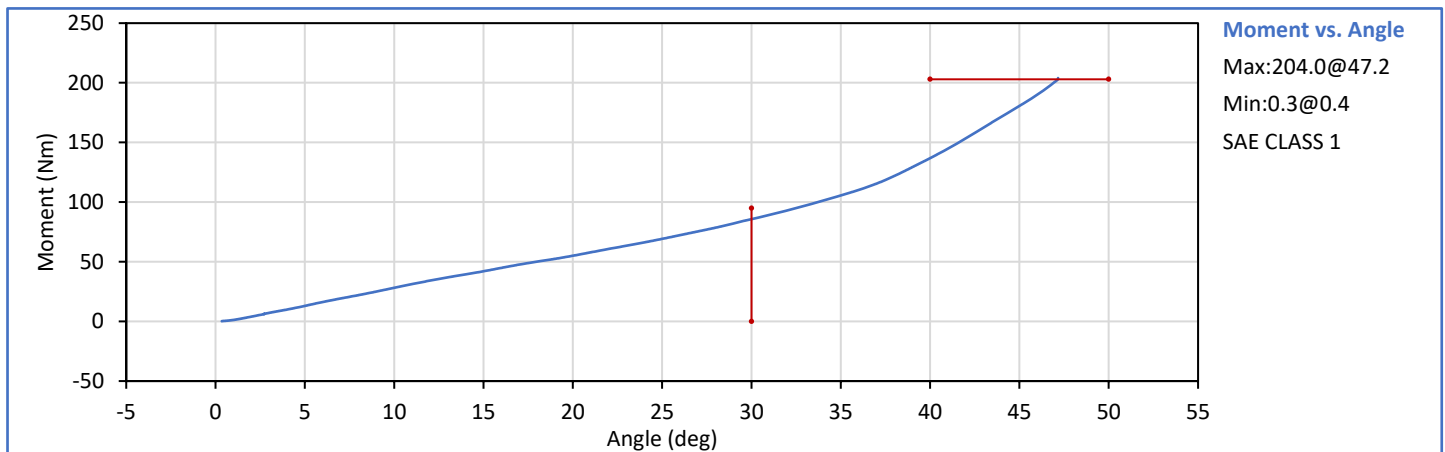
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.3	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
Left Hip Rotation Rate	deg/s	5.0	10.0	6.0	Pass
Left Femur Torque at 30°	Nm	0.0	95.0	85.7	Pass
Left Hip Rotation at 203 Nm	deg	40.0	50.0	47.2	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

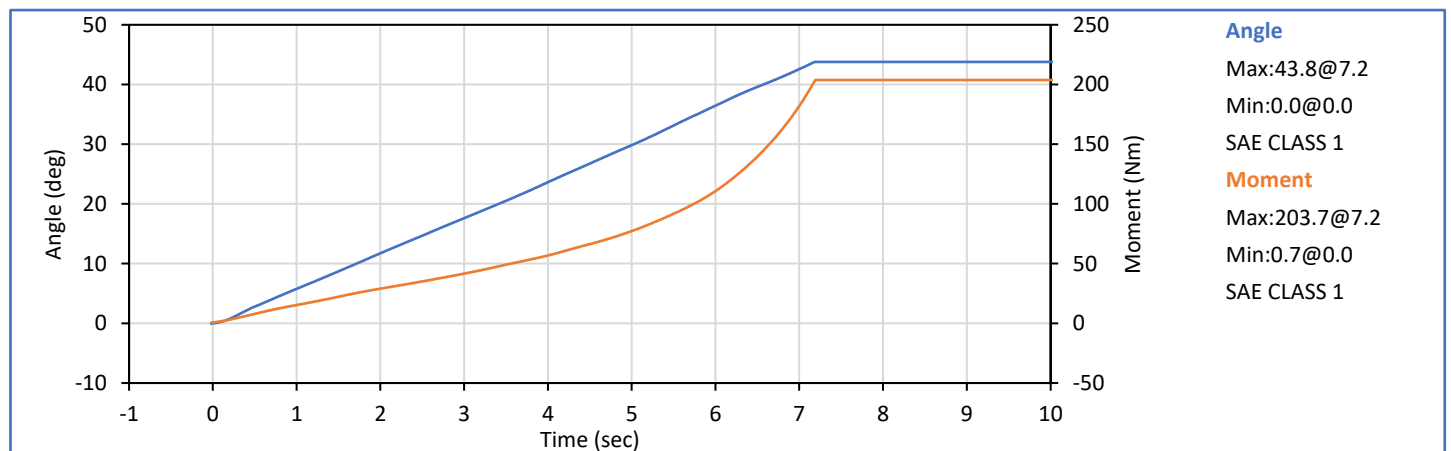
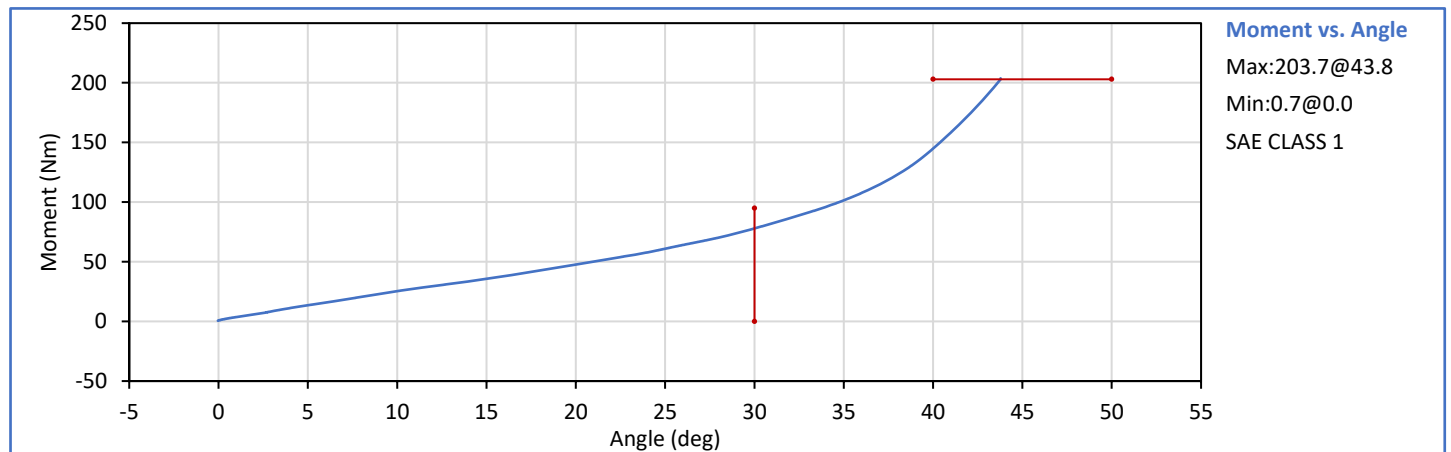
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.3	Pass
Laboratory Relative Humidity	%	10	70	35	Pass
Right Hip Rotation Rate	deg/s	5.0	10.0	6.2	Pass
Right Femur Torque at 30°	Nm	0.0	95.0	77.8	Pass
Right Hip Rotation at 203 Nm	deg	40.0	50.0	43.8	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

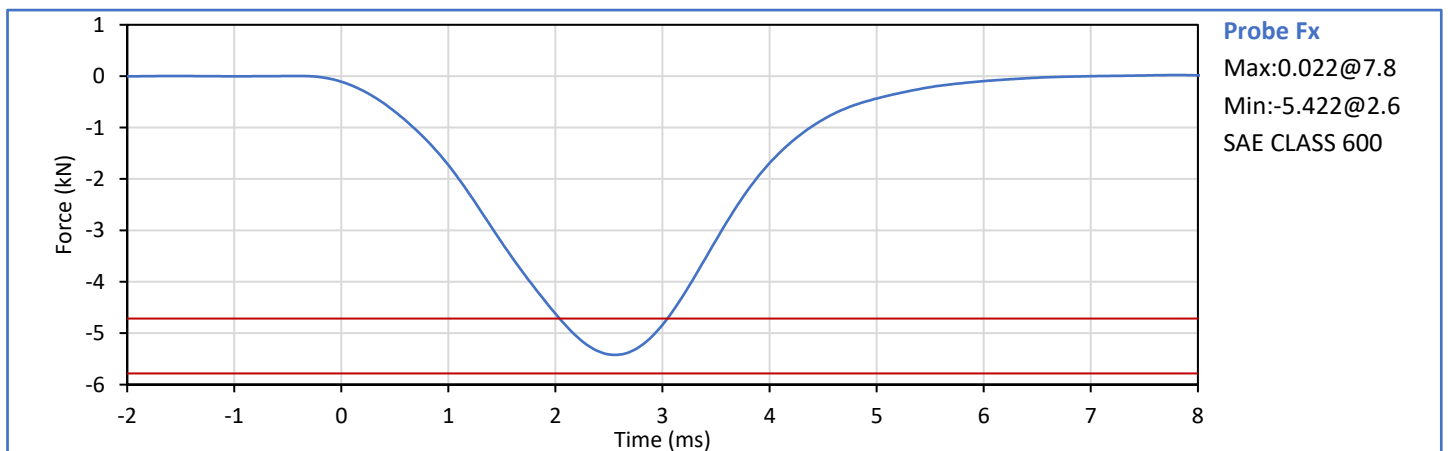
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.4	Pass
Laboratory Relative Humidity	%	10	70	32	Pass
Probe Velocity	m/s	2.070	2.130	2.105	Pass
Peak Resistive Force	kN	-5.782	-4.715	-5.422	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

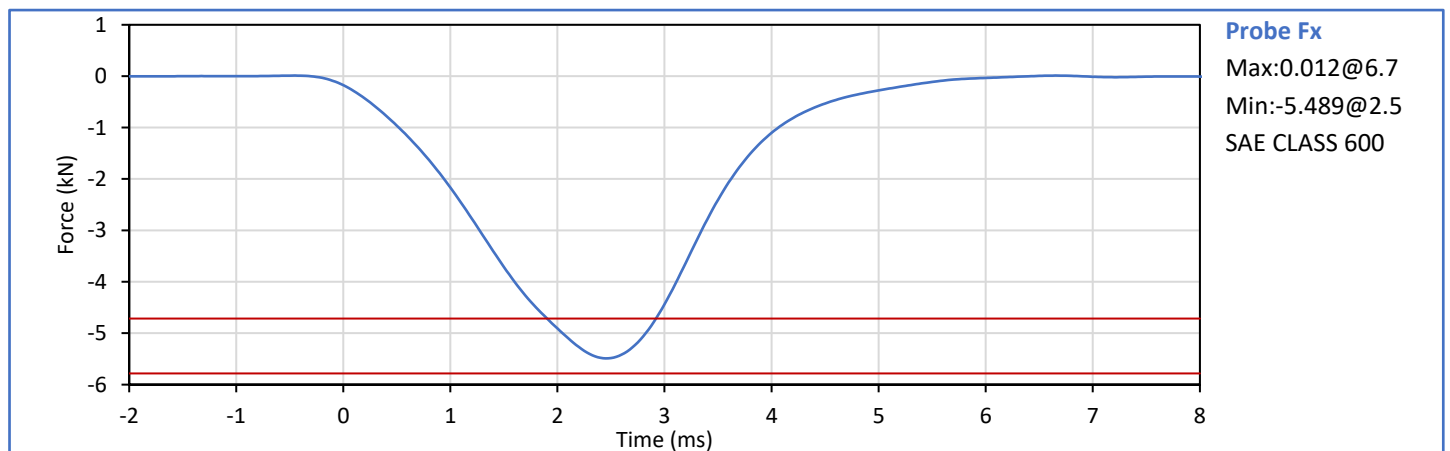
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.4	Pass
Laboratory Relative Humidity	%	10	70	32	Pass
Probe Velocity	m/s	2.070	2.130	2.103	Pass
Peak Resistive Force	kN	-5.782	-4.715	-5.489	Pass
Overall Test Results					Pass



Technician: G. Fuentes

Approved By: J. Hernandez

APPENDIX C
Pre-Test ATD Qualification and Performance Verification
Hybrid III 5th Percentile Female ATD
S/N: DH1644

ATD Serial No.: DH1644

Test Date: 2023-07-12

Dummy Item	Inspect for	Comments	Damage	Okay
Entire ATD	Perform general cleaning			✓
Outer Skin	Gashes, rips, cracks			✓
Head	Ballast secure			✓
	General appearance			✓
Neck bracket	Upper neck firmly attached to lower bracket			✓
Neck	Broken or cracked rubber			✓
	Looseness at the condyle joint			✓
Nodding block	Cracked or out of position			✓
Lumbar Spine	Broken or cracked rubber			✓
Ribs	Broken or bent ribs			✓
	Broken or bent rib supports			✓
	Damping material separated or cracked			✓
	Rubber bumpers in place			✓
Chest Displ.	Bent shaft			✓
Assembly	Slider arm riding in track			✓
Sensors	Check cables for cuts, tears			✓
	Check for damaged insulation			✓
Accelerometer	Head mounting secure			✓
Mounting	Chest mounting secure			✓
Knees	Skin condition			✓
	Insert (do not remove)			✓
	Casting			✓
Limbs	Normal movement and adjustment			✓
Knee Sliders	Wires intact			✓
	Rubber returned to "resting" position			✓
Pelvis	Broken			✓
Other	Describe below as needed			✓

Describe any repairs or replacement of parts or other findings:

No Problems Found

Technician:

Bill LGS III

G. Fuentes

Approved By:

Seuth

J. Hernandez

ATD Serial No.: DH1644

Test Date: 2023-07-12

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	31	Pass
A - Total sitting height	mm	775	800	787	Pass
B - Shoulder pivot height	mm	432	457	447	Pass
C - 'H' point height	mm	81	86	84	Pass
D - 'H' point location from backline	mm	145	150	148	Pass
E - Shoulder pivot from backline	mm	69	84	76	Pass
F - Thigh clearance	mm	119	135	128	Pass
G - Back of elbow to wrist pivot	mm	244	259	249	Pass
H - Head back to backline	mm	41	46	45	Pass
I - Shoulder to elbow length	mm	277	297	294	Pass
J - Elbow rest height	mm	183	203	189	Pass
K - Buttock to knee length	mm	521	546	538	Pass
L - Popliteal length	mm	356	376	370	Pass
M - Knee pivot height	mm	394	419	412	Pass
N - Buttock popliteal length	mm	414	439	419	Pass
O - Chest depth without jacket	mm	175	191	179	Pass
P - Foot length	mm	219	234	227	Pass
R - Buttock to Knee Pivot Length	mm	457	483	471	Pass
S - Head Breadth	mm	137	147	142	Pass
T - Head Depth	mm	178	188	182	Pass
U - Hip Breadth	mm	300	315	308	Pass
V - Shoulder breadth	mm	351	366	356	Pass
W - Foot breadth	mm	79	94	91	Pass
X - Head circum.	mm	528	549	543	Pass
Y - Chest circum. (w/chest jacket)	mm	851	881	866	Pass
Z - Waist circum.	mm	760	790	771	Pass
AA - Location for chest circum.	mm	333	358	346	Pass
BB - Location for waist circum.	mm	160	170	167	Pass
			Overall Test Results		Pass

Technician:



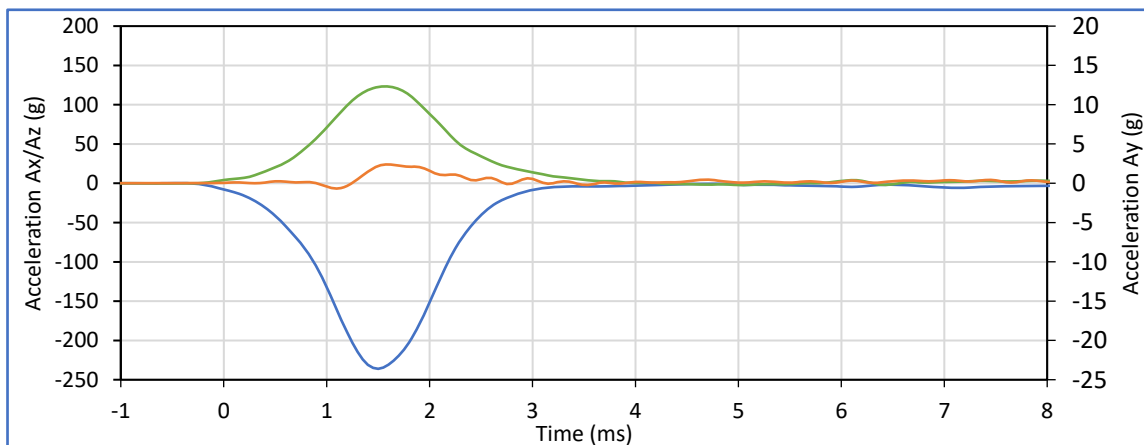
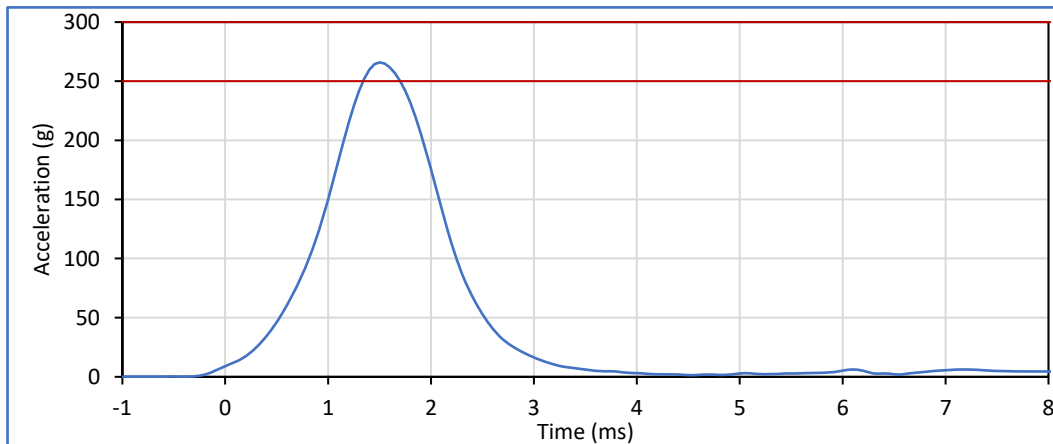
G. Fuentes

Approved By:



J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.4	Pass
Laboratory Humidity	%	10	70	32	Pass
Peak Resultant Acceleration	g	250.0	300.0	266.0	Pass
Peak Lateral Acceleration	g	-15.0	15.0	2.4	Pass
Oscillations After Main Pulse	%	0.0	10.0	2.3	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
			Overall Test Results	Pass	



Technician:

G. Fuentes

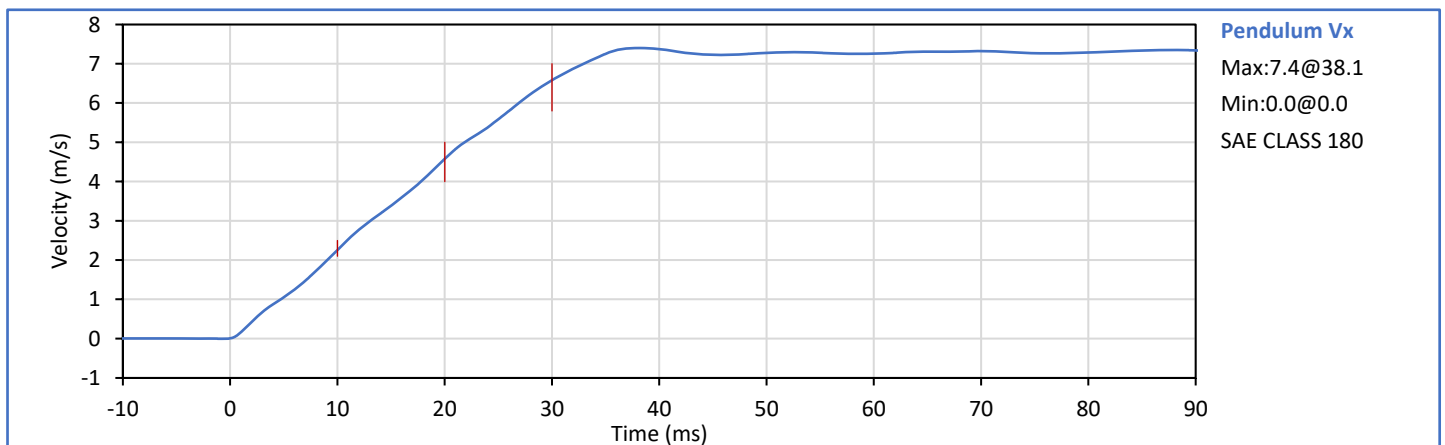
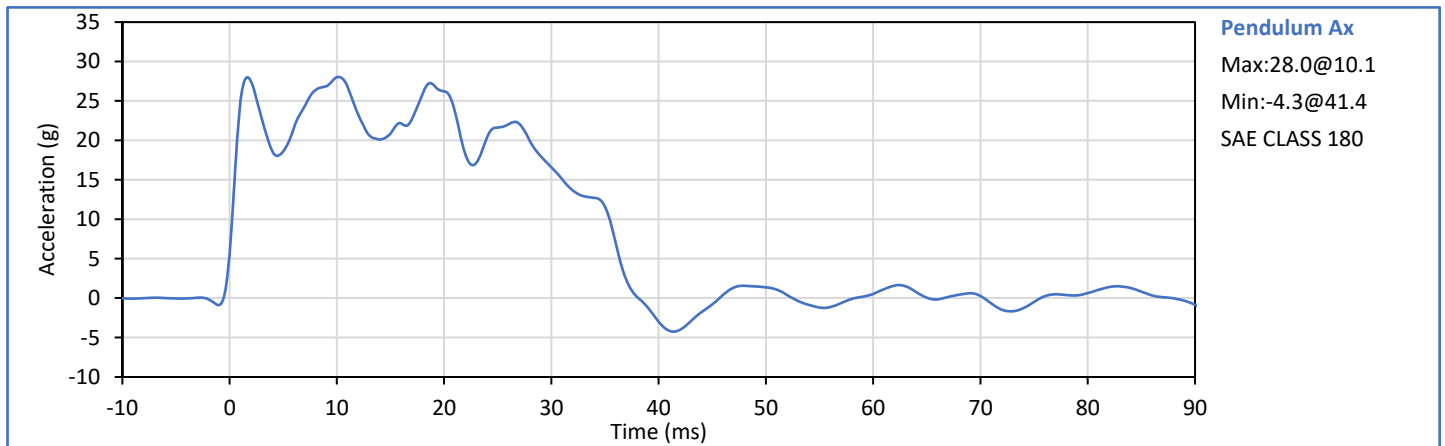
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Humidity	%	10	70	30	Pass
Pendulum Velocity	m/s	6.89	7.13	7.00	Pass
Pendulum Velocity at 10 ms	m/s	2.10	2.50	2.25	Pass
Pendulum Velocity at 20 ms	m/s	4.00	5.00	4.57	Pass
Pendulum Velocity at 30 ms	m/s	5.80	7.00	6.58	Pass
Peak "D" Plane Rotation	deg	77.0	91.0	81.9	Pass
Peak Moment in Rotation	Nm	69.0	83.0	77.8	Pass
Positive Moment Decay to 10 Nm	ms	80.0	100.0	84.9	Pass
Overall Test Results					Pass



Technician:

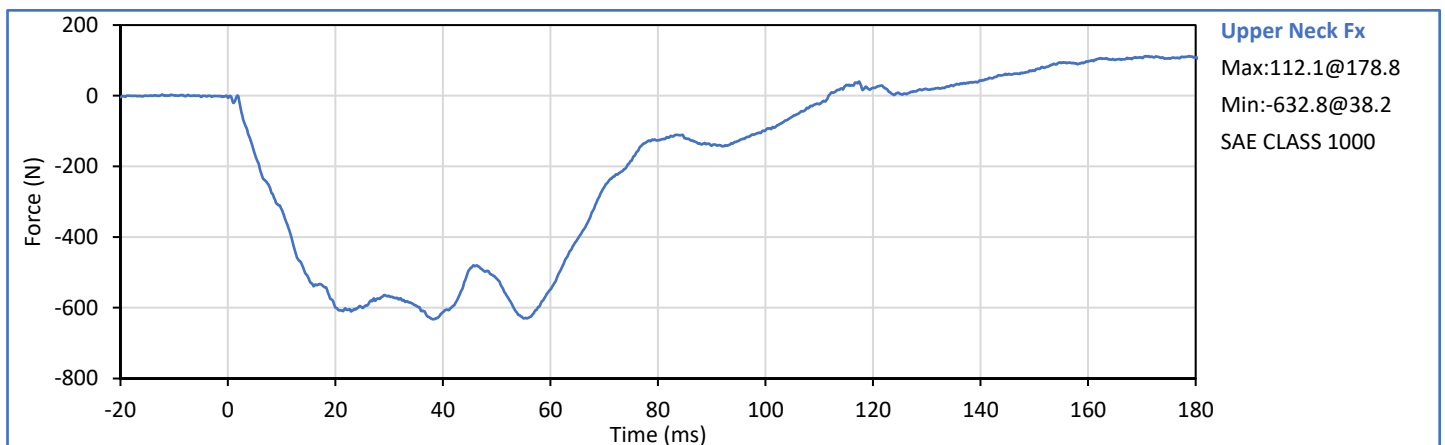
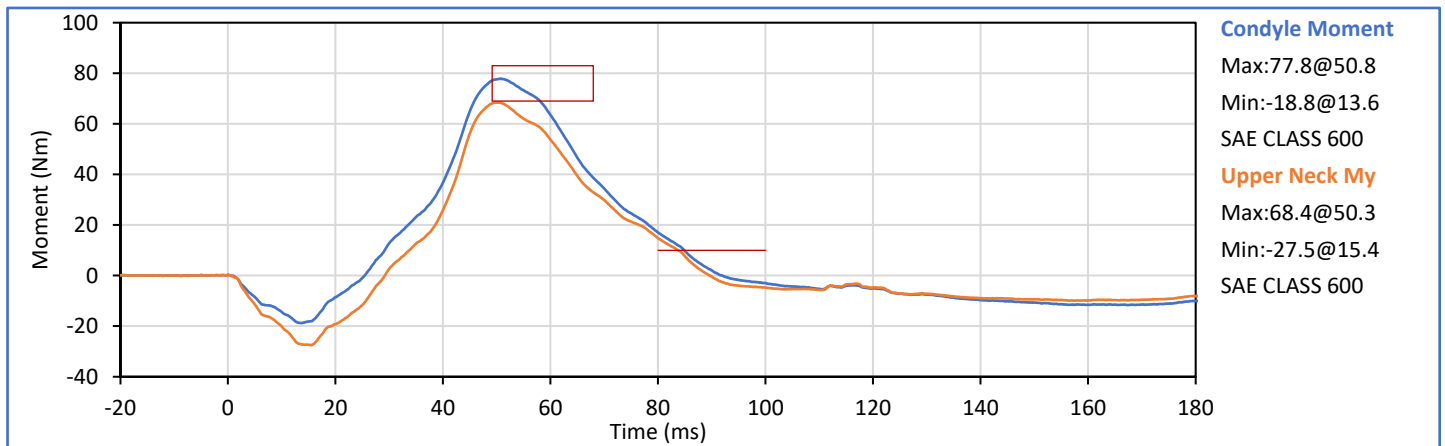
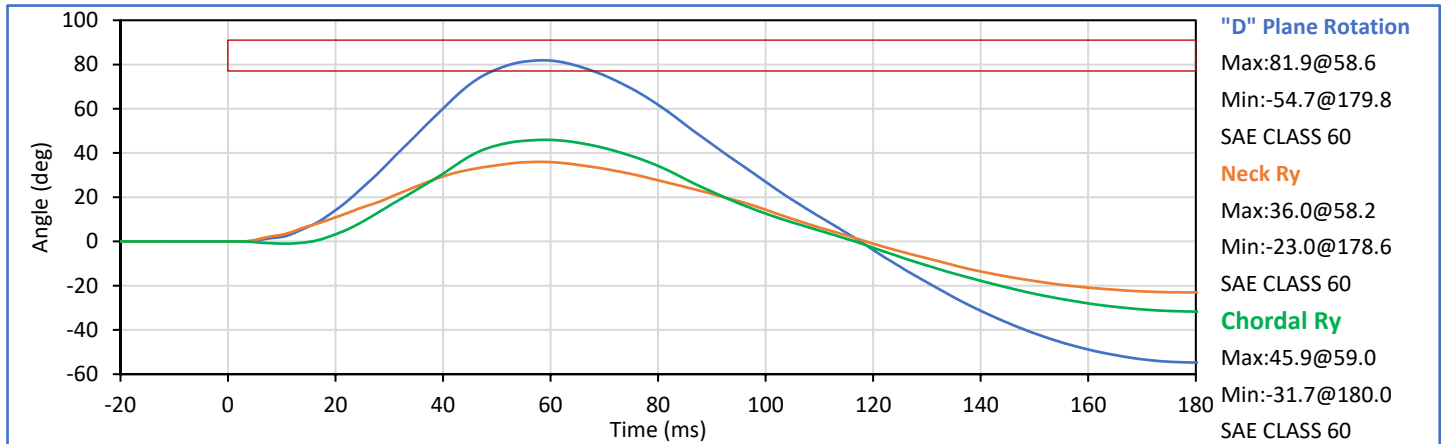
G. Fuentes

G. Fuentes

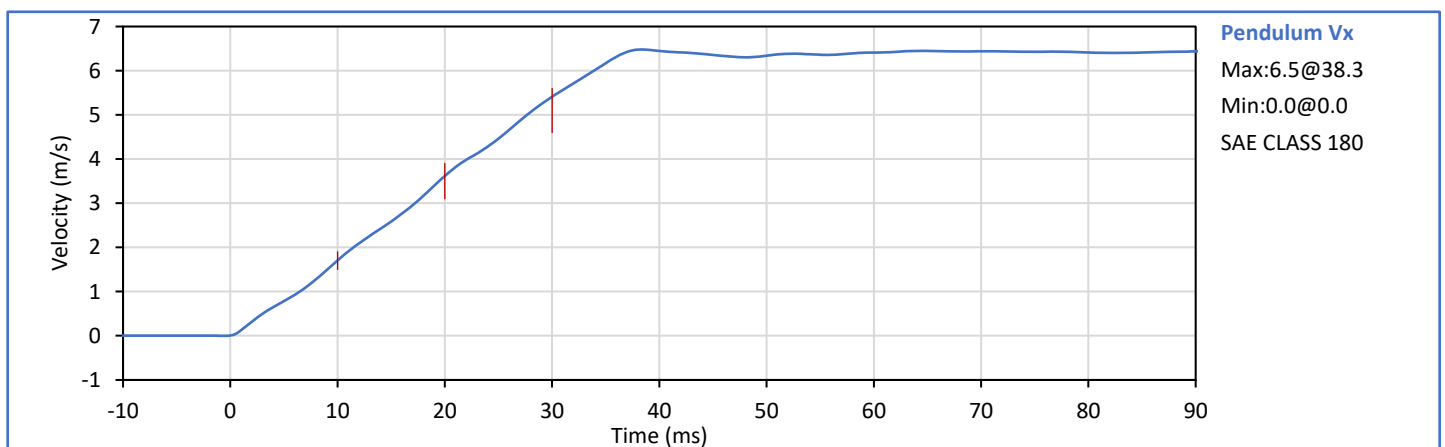
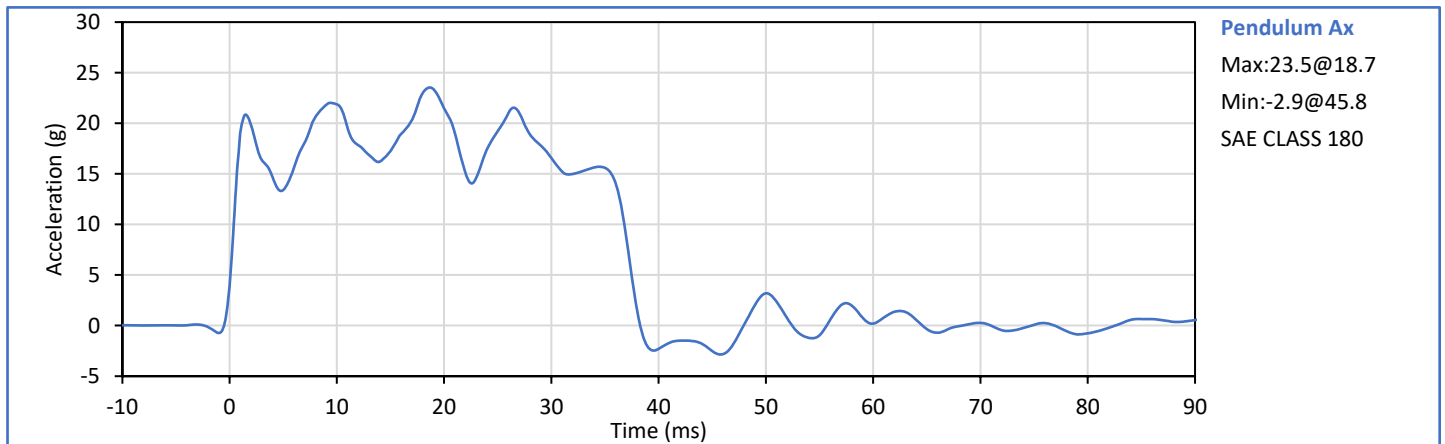
Approved By:

J. Hernandez

J. Hernandez



Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
Pendulum Velocity	m/s	5.95	6.19	6.04	Pass
Pendulum Velocity at 10 ms	m/s	1.50	1.90	1.70	Pass
Pendulum Velocity at 20 ms	m/s	3.10	3.90	3.62	Pass
Pendulum Velocity at 30 ms	m/s	4.60	5.60	5.41	Pass
Peak "D" Plane Rotation	deg	99.0	114.0	105.2	Pass
Peak Moment in Rotation	Nm	-65.0	-53.0	-59.2	Pass
Negative Moment Decay to -10 Nm	ms	94.0	114.0	101.2	Pass
Overall Test Results					Pass



Technician:

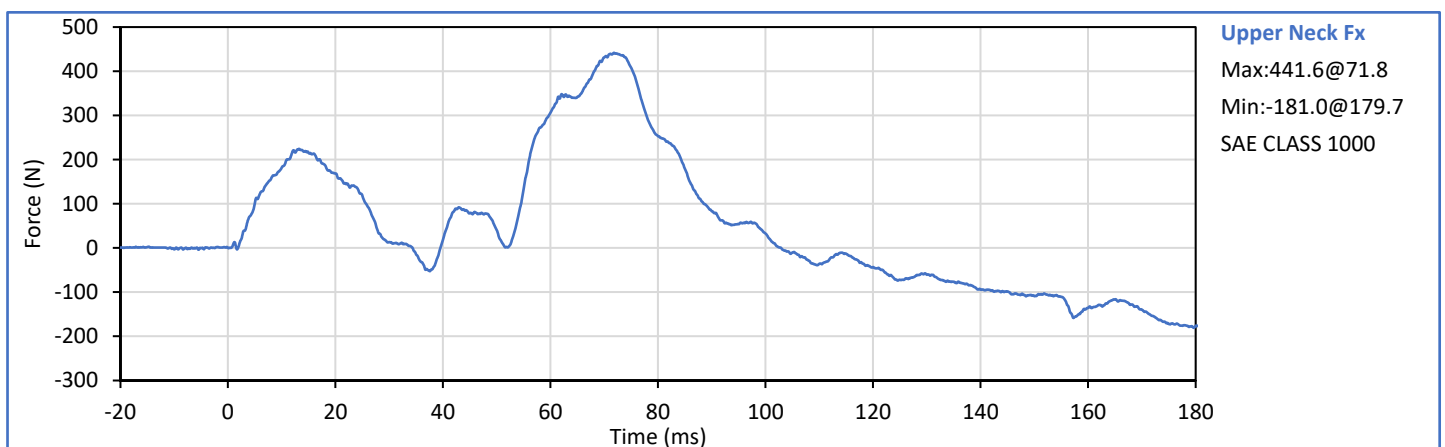
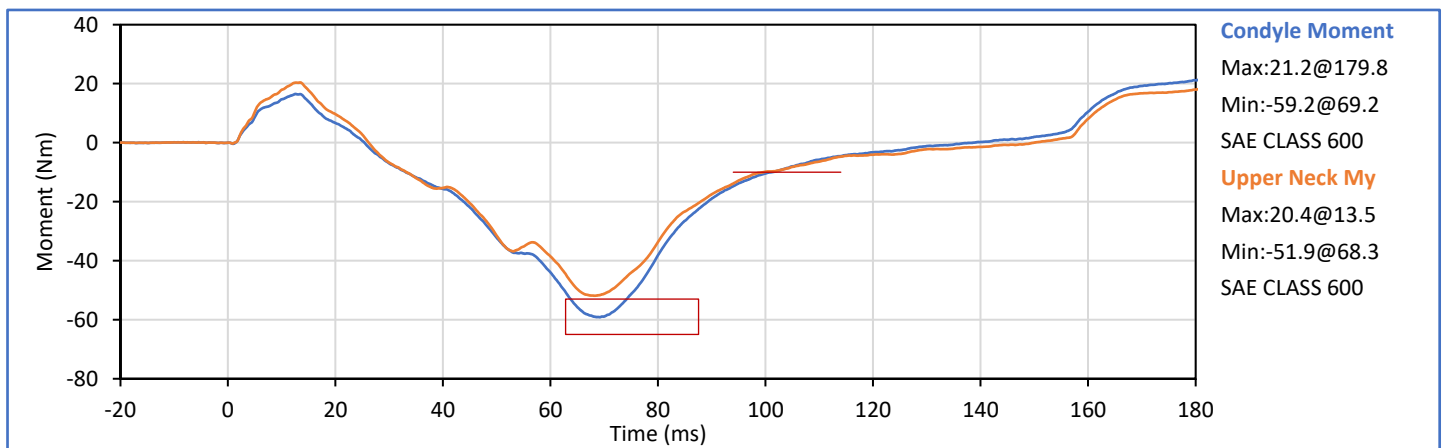
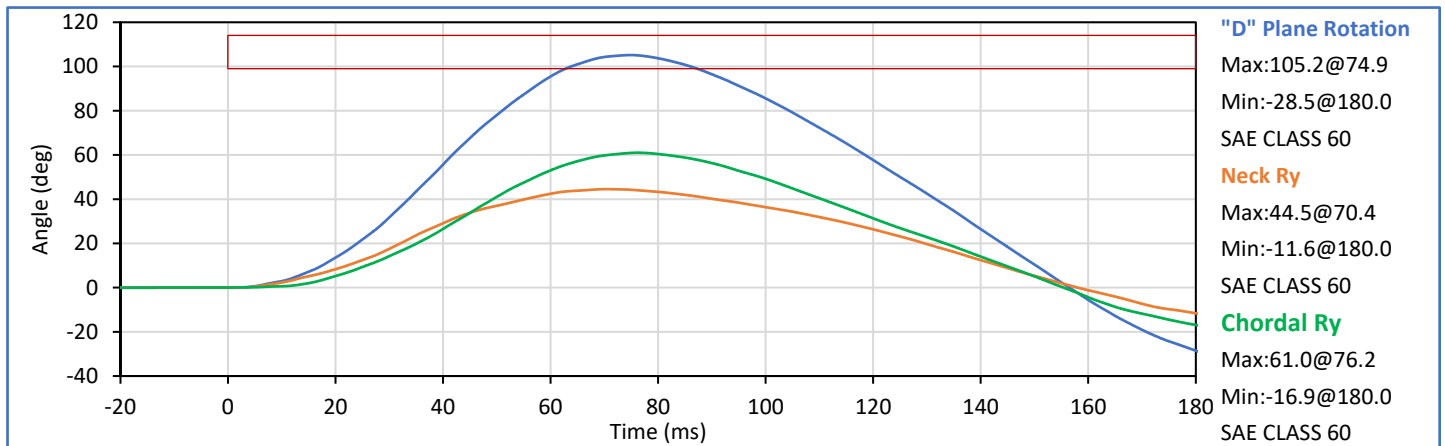
G. Fuentes

G. Fuentes

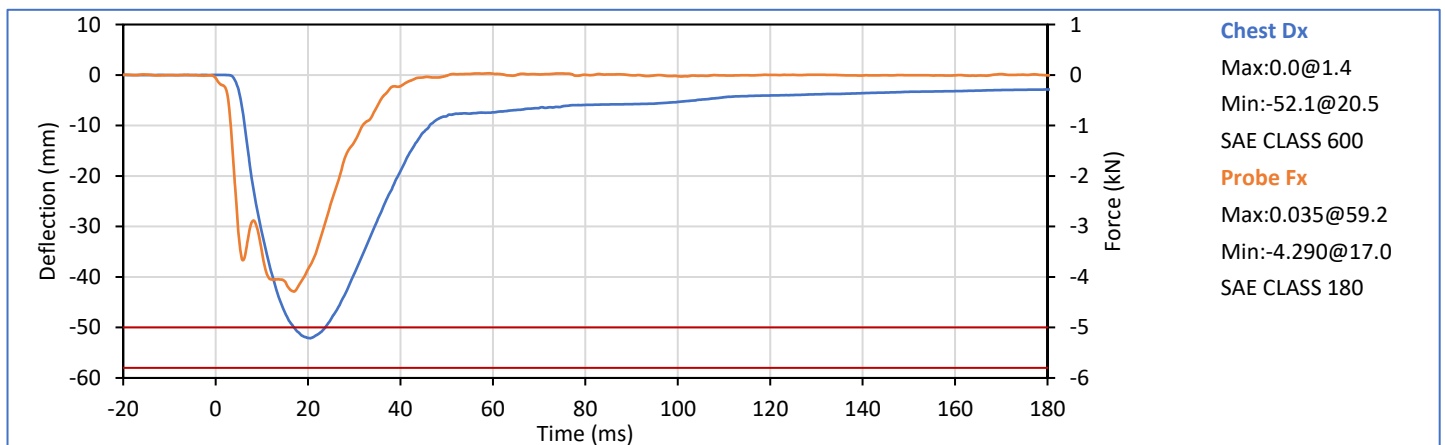
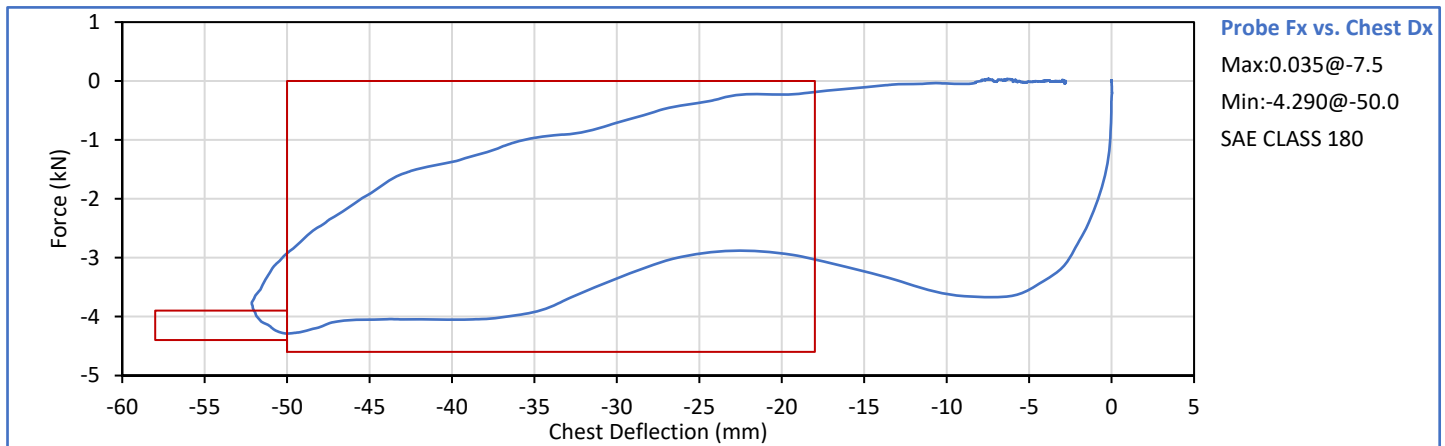
Approved By:

J. Hernandez

J. Hernandez



Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.4	Pass
Laboratory RelativeHumidity	%	10	70	31	Pass
Probe Velocity	m/s	6.59	6.83	6.68	Pass
Peak Chest Deflection	mm	-58.0	-50.0	-52.1	Pass
Peak Probe Force, 50 and 58 mm	kN	-4.400	-3.900	-4.290	Pass
Peak Probe Force, 18 and 50 mm	kN	-4.600	0.000	-4.290	Pass
Internal Hysteresis	%	69.0	85.0	76.9	Pass
Overall Test Results				Pass	Pass



Technician:

G. Fuentes

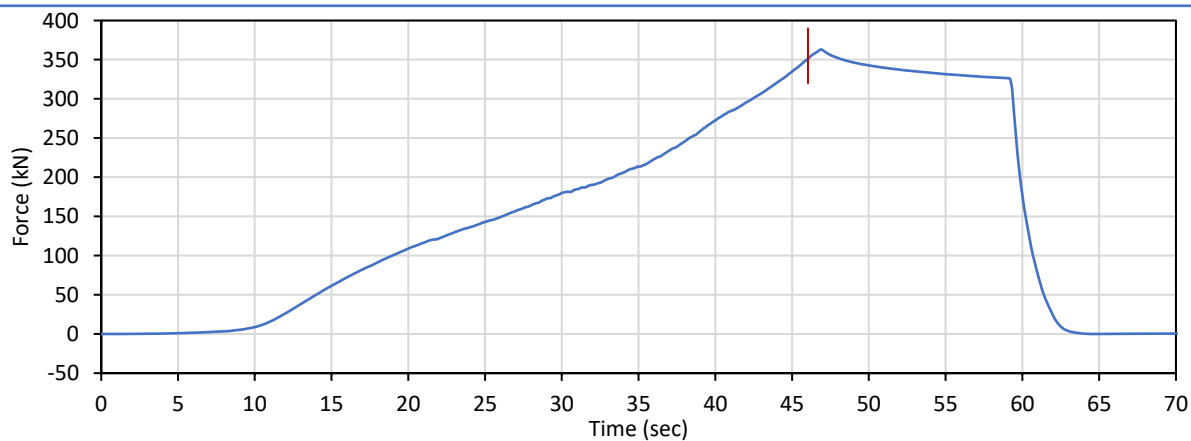
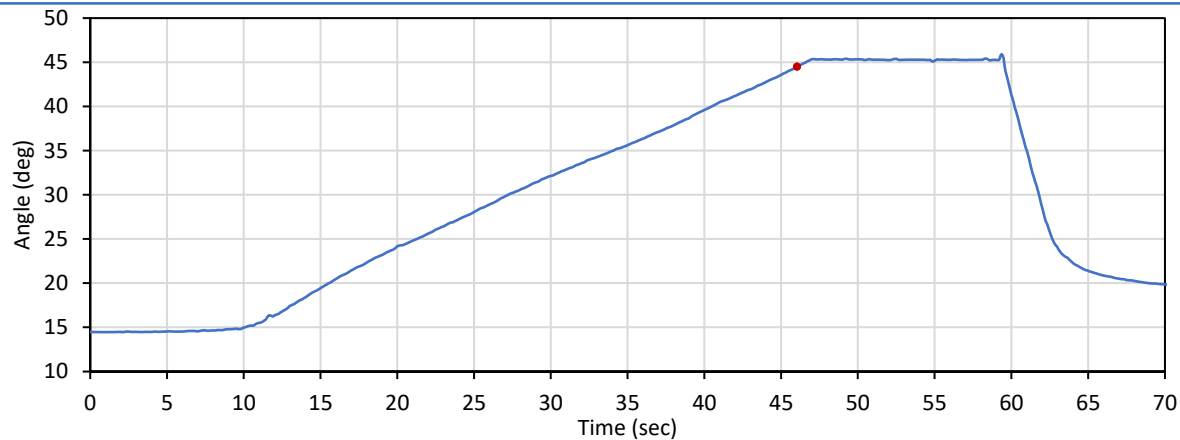
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.3	Pass
Laboratory Humidity	%	10	70	30	Pass
Orientation Angle	deg	0.0	20.0	14.5	Pass
Test Initial Angle	deg	11.0	19.0	14.5	Pass
Peak Force at 45° (+/-0.5°)	N	320.0	390.0	351.2	Pass
Torso Flexion Rate	deg/s	0.50	1.50	0.82	Pass
Final Reference Plane Angle	deg	-8.0	8.0	2.8	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

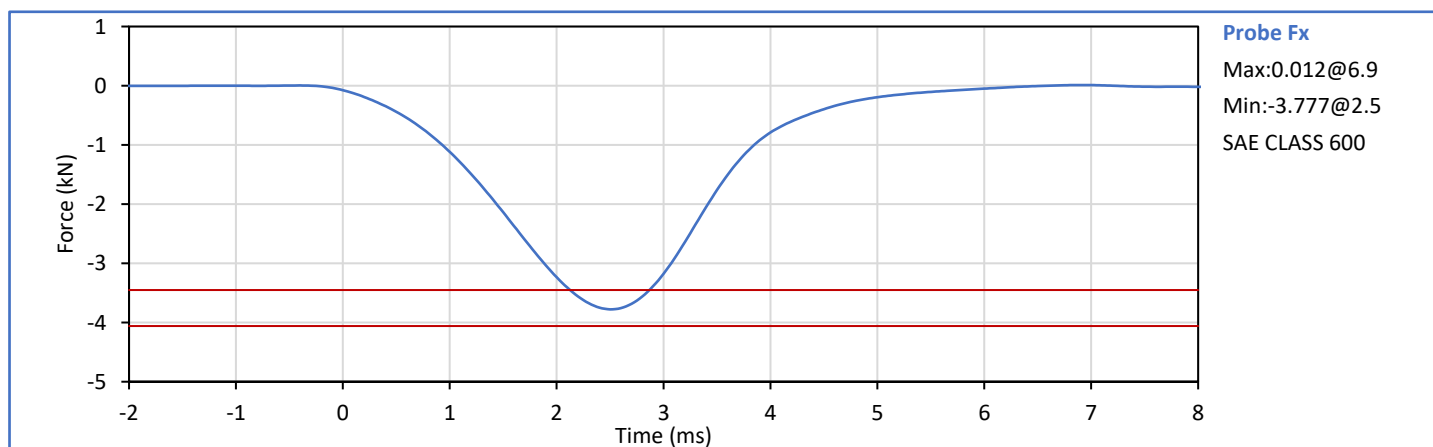
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.2	Pass
Laboratory Relative Humidity	%	10	70	33	Pass
Probe Velocity	m/s	2.070	2.130	2.104	Pass
Peak Resistive Force	kN	-4.060	-3.450	-3.777	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

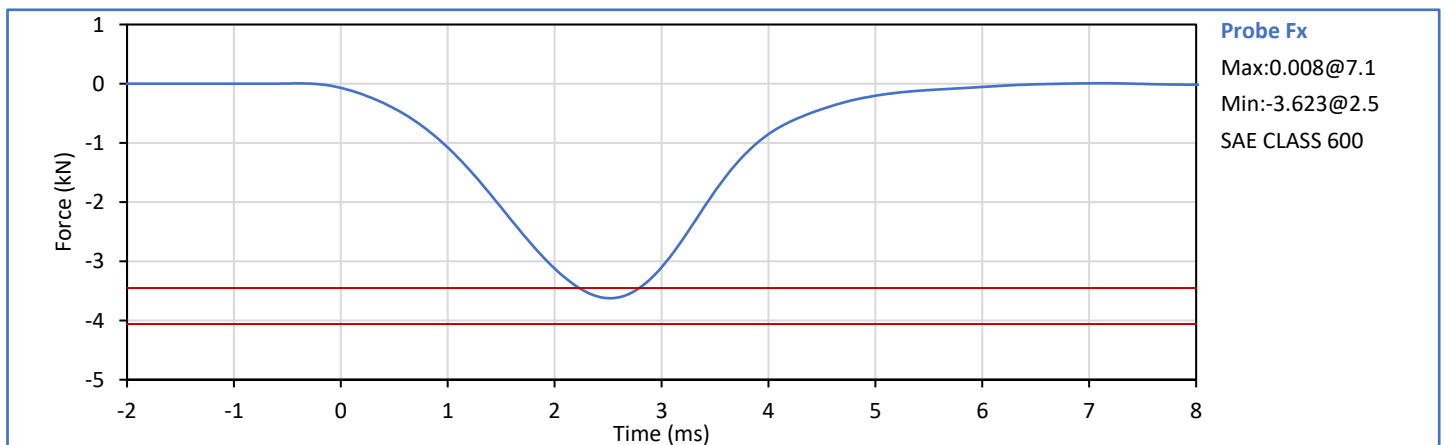
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.2	Pass
Laboratory Relative Humidity	%	10	70	33	Pass
Probe Velocity	m/s	2.070	2.130	2.100	Pass
Peak Resistive Force	kN	-4.060	-3.450	-3.623	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

APPENDIX C
Post-Test ATD Qualification and Performance Verification
Hybrid III 50th Percentile Male ATD
S/N: 360

ATD Serial No.: 360

Test Date: 2023-08-10

Dummy Item	Inspect for	Comments	Damage	OK
Entire ATD	Perform general cleaning			✓
Outer Skin	Gashes, rips, cracks			✓
Head	Ballast secure			✓
	General appearance			✓
Neck bracket	Upper neck firmly attached to lower bracket			✓
Neck	Broken or cracked rubber			✓
	Looseness at the condyle joint			✓
Nodding block	Cracked or out of position			✓
Lumbar Spine	Broken or cracked rubber			✓
Ribs	Broken or bent ribs			✓
	Broken or bent rib supports			✓
	Damping material separated or cracked			✓
	Rubber bumpers in place			✓
Chest Displ. Assembly	Bent shaft			✓
	Slider arm riding in track			✓
Sensors	Check cables for cuts, tears			✓
	Check for damaged insulation			✓
Accelerometer Mounting	Head mounting secure			✓
	Chest mounting secure			✓
Knees	Skin condition			✓
	Insert (do not remove)			✓
	Casting			✓
Limbs	Normal movement and adjustment			✓
Knee Sliders	Wires intact			✓
	Rubber returned to "resting" position			✓
Pelvis	Broken			✓
Other	Describe below as needed			✓

Describe any repairs or replacement of parts or other findings:

No Problems Found

Technician: 
G. Fuentes

Approved By: 
J. Hernandez

ATD Serial No.: 360

Test Date: 2023-08-09

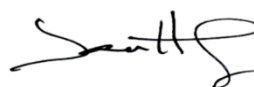
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.3	Pass
Laboratory Relative Humidity	%	10	70	34	Pass
A - Total sitting height	mm	879	889	886	Pass
B - Shoulder pivot height	mm	505	521	511	Pass
C - 'H' point height	mm	84	89	88	Pass
D - 'H' point location from backline	mm	135	140	139	Pass
E - Shoulder pivot from backline	mm	84	94	93	Pass
F - Thigh clearance	mm	140	155	150	Pass
G - Back of elbow to wrist pivot	mm	290	305	300	Pass
H - Head back to backline	mm	41	46	44	Pass
I - Shoulder to elbow length	mm	330	345	335	Pass
J - Elbow rest height	mm	190	211	203	Pass
K - Buttock to knee length	mm	579	604	592	Pass
L - Popliteal length	mm	429	455	443	Pass
M - Knee pivot height	mm	485	500	494	Pass
N - Buttock popliteal length	mm	452	477	470	Pass
O - Chest depth without jacket	mm	213	229	222	Pass
P - Foot length	mm	251	267	262	Pass
V - Shoulder breadth	mm	422	437	428	Pass
W - Foot breadth	mm	91	107	102	Pass
Y - Chest circum. (w/chest jacket)	mm	970	1001	986	Pass
Z - Waist circum.	mm	836	866	840	Pass
AA - Location for chest circum.	mm	429	434	433	Pass
BB - Location for waist circum.	mm	226	231	229	Pass
			Overall Test Results		Pass

Technician:



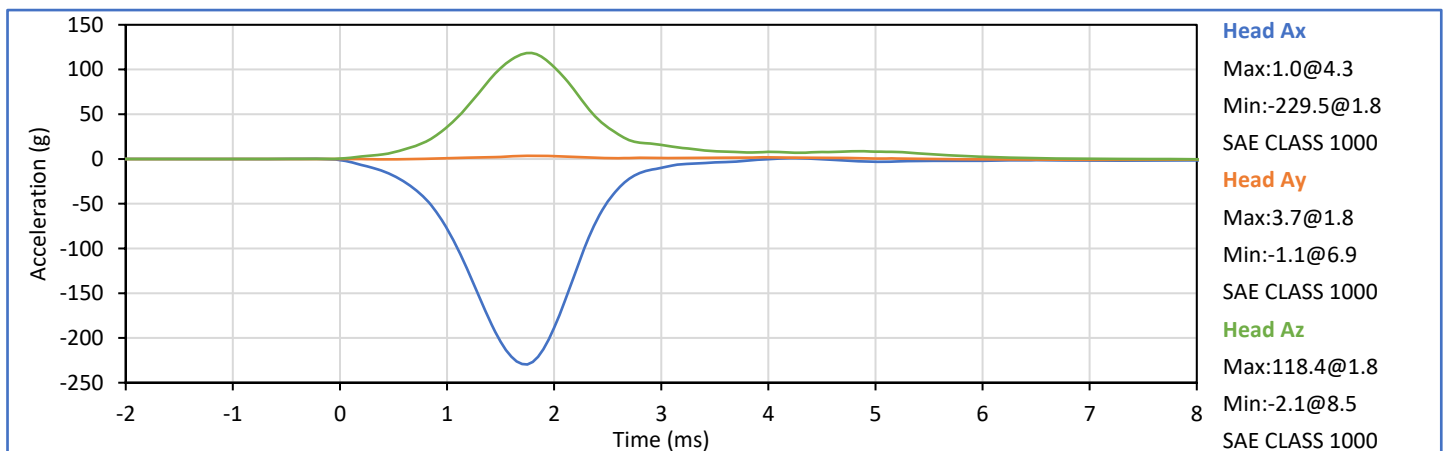
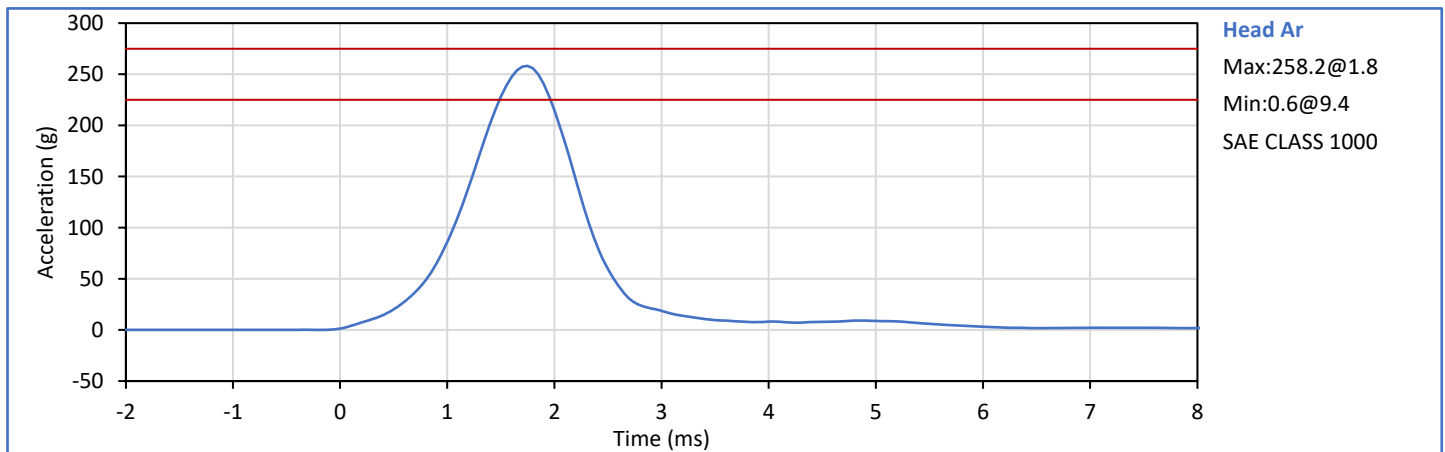
G. Fuentes

Approved By:



J. Hernandez

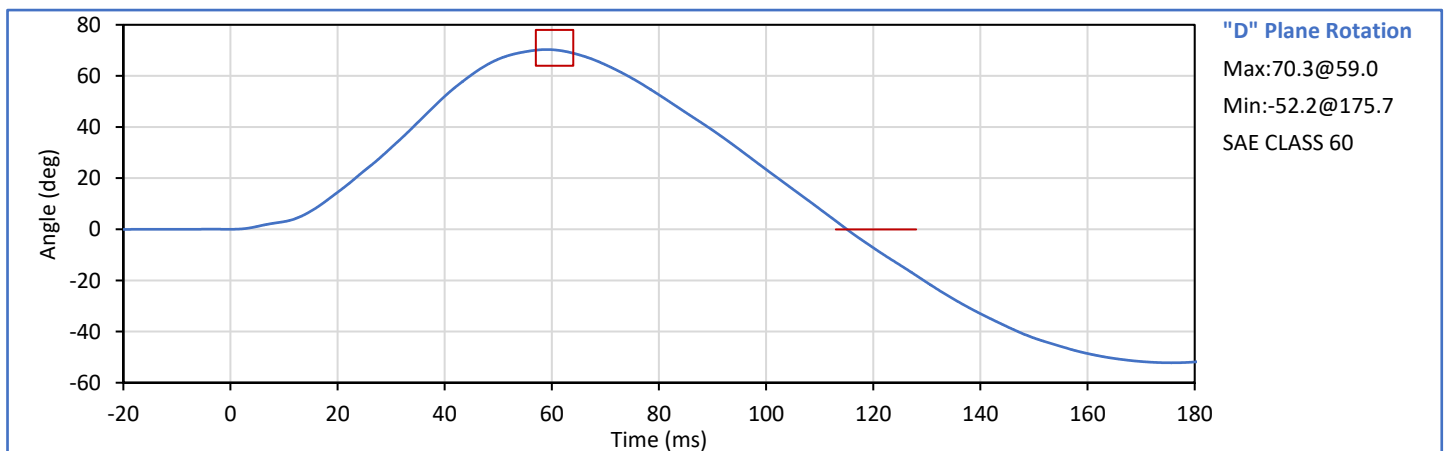
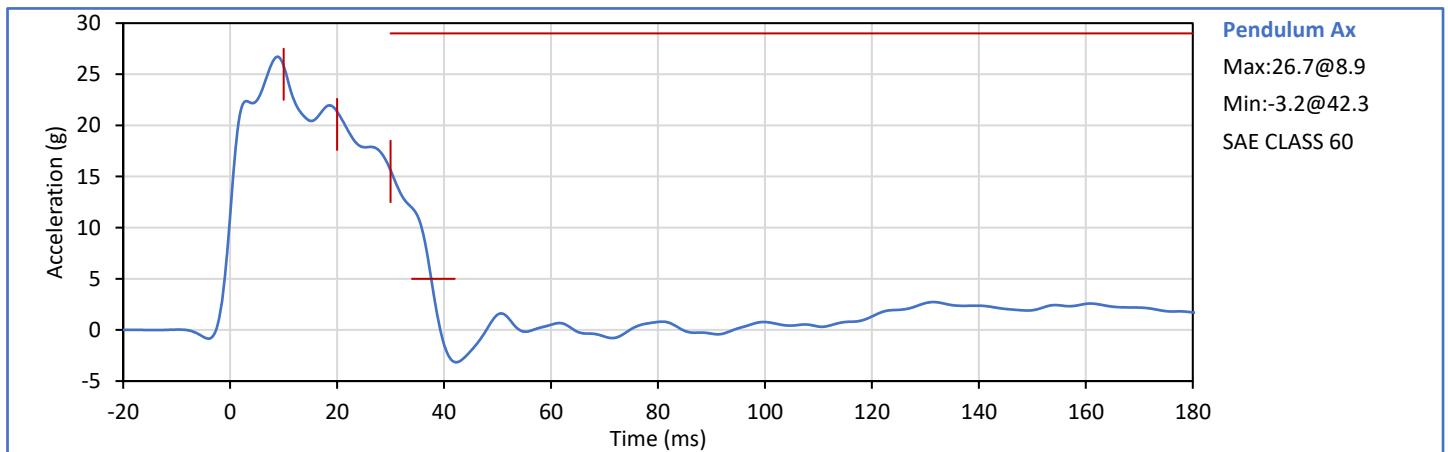
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.2	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
Peak Resultant Acceleration	g	225.0	275.0	258.2	Pass
Peak Lateral Acceleration	g	-15.0	15.0	3.7	Pass
Oscillations After Main Pulse	%	0.0	10.0	0.0	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
			Overall Test Results		Pass



Technician: G. Fuentes

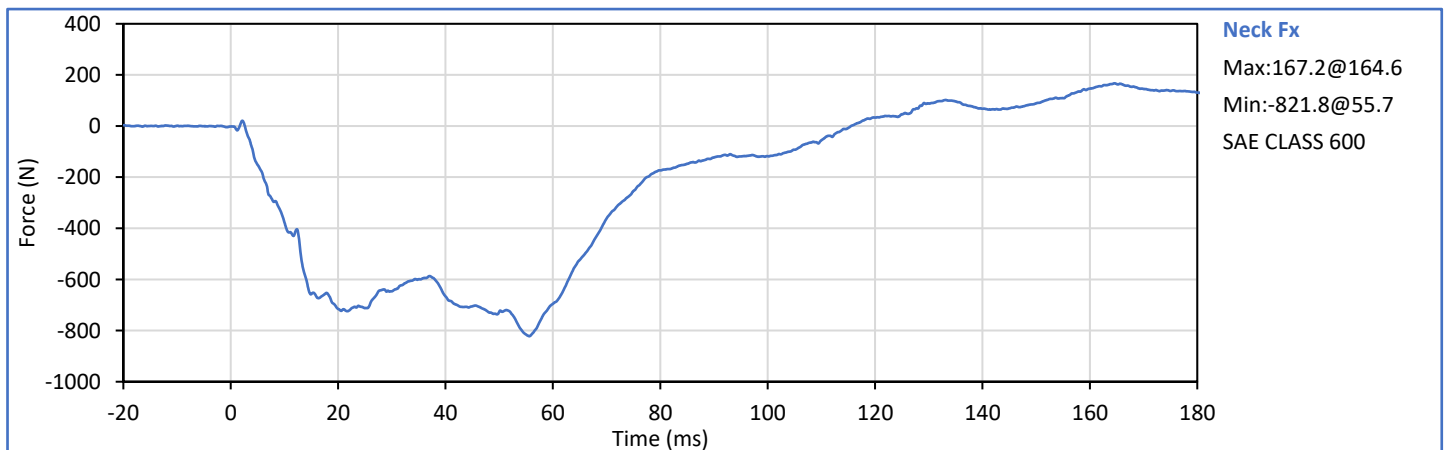
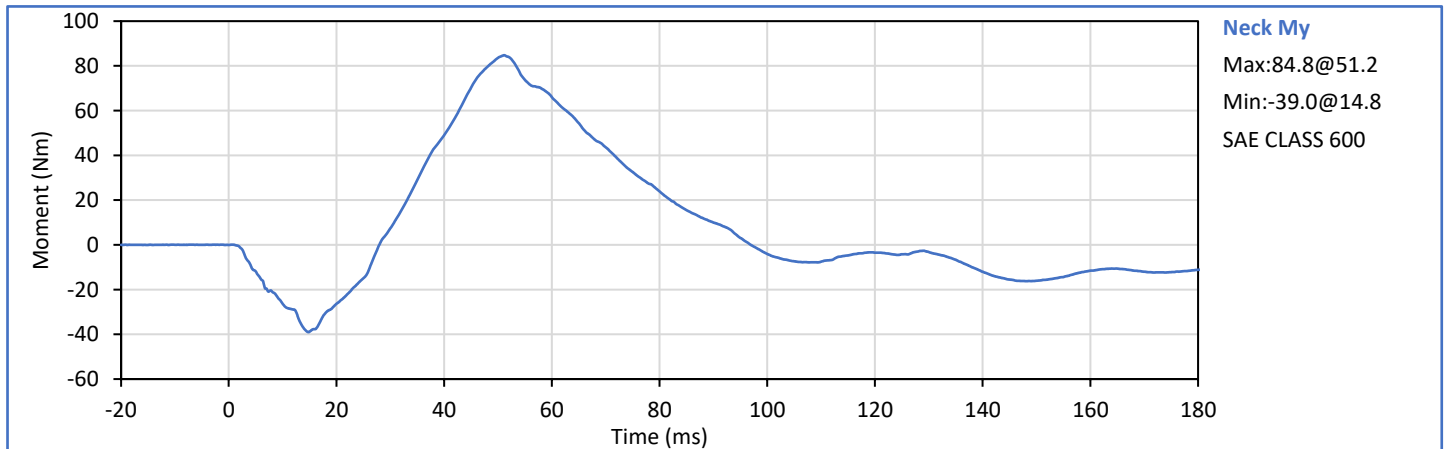
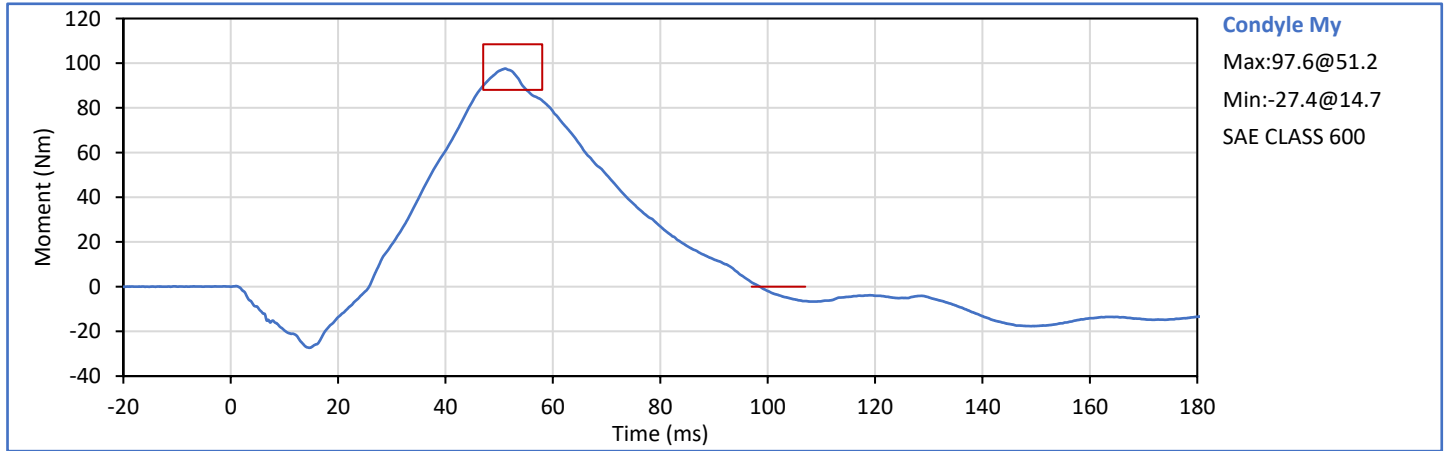
Approved By: J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.0	Pass
Laboratory Relative Humidity	%	10	70	35	Pass
Pendulum Velocity	m/s	6.89	7.13	7.01	Pass
Pendulum Deceleration at 10 ms	g	22.5	27.5	25.8	Pass
Pendulum Deceleration at 20 ms	g	17.6	22.6	21.3	Pass
Pendulum Deceleration at 30 ms	g	12.5	18.5	15.6	Pass
Peak Pendulum Decel After 30 ms	g	0.0	29.0	15.6	Pass
Deceleration Decay to Cross 5g	ms	34.0	42.0	37.6	Pass
"D" Plane Rotation peak	deg	64.0	78.0	70.3	Pass
	ms	57.0	64.0	59.0	Pass
"D" Plane Rotation Decay to Zero	ms	113.0	128.0	115.1	Pass
Moment About Occipital Condyle	Nm	88.1	108.5	97.6	Pass
	ms	47.0	58.0	51.2	Pass
Moment Decay, Peak to Zero	ms	97.0	107.0	98.6	Pass
Overall Test Results				Pass	

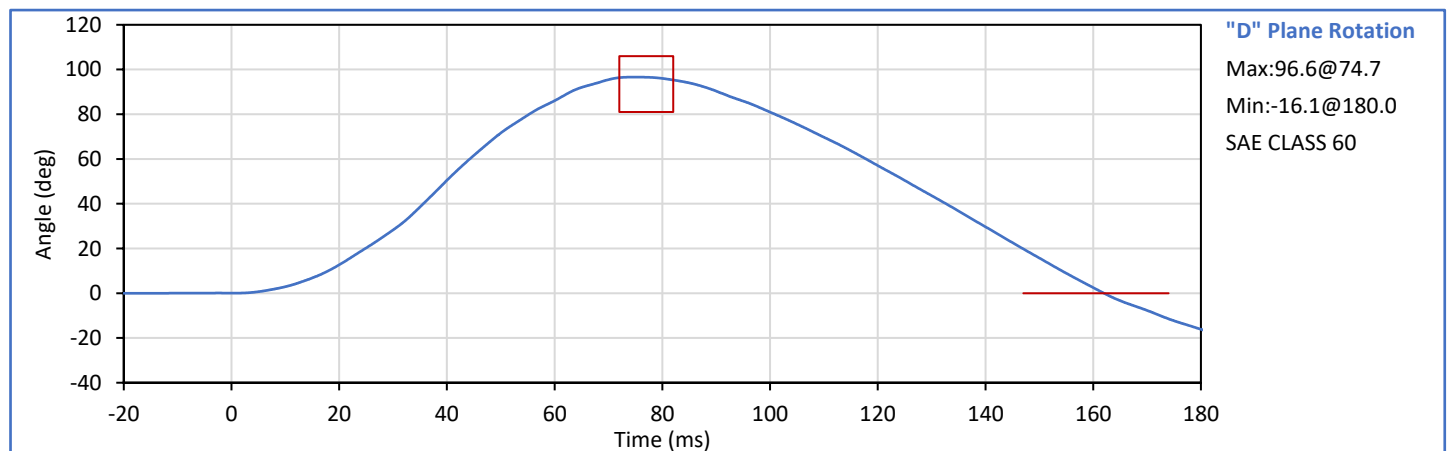
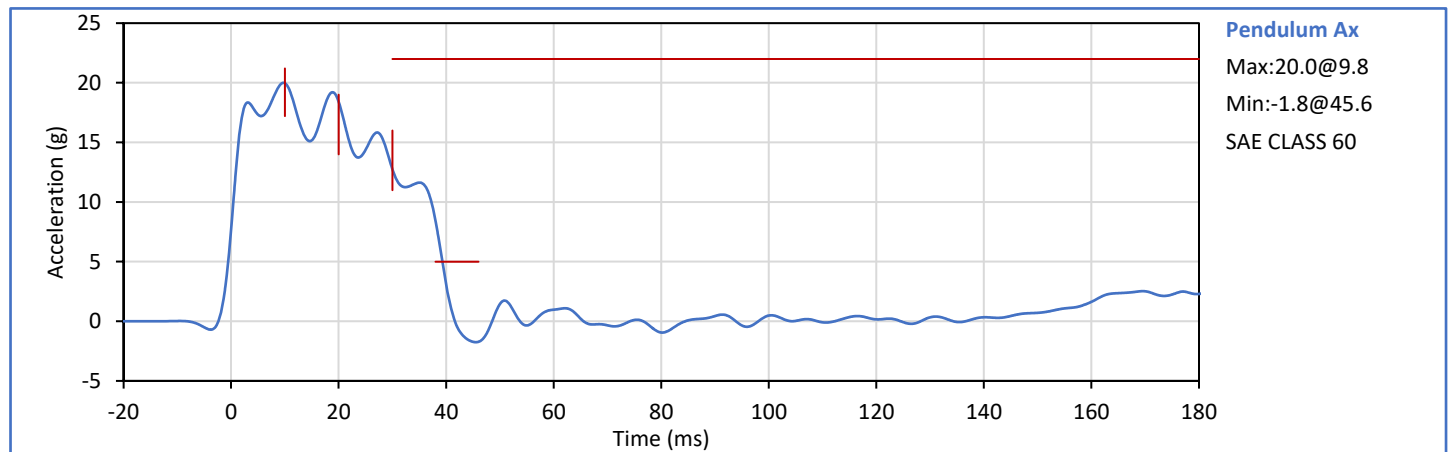


Technician: G. Fuentes

Approved By: J. Hernandez

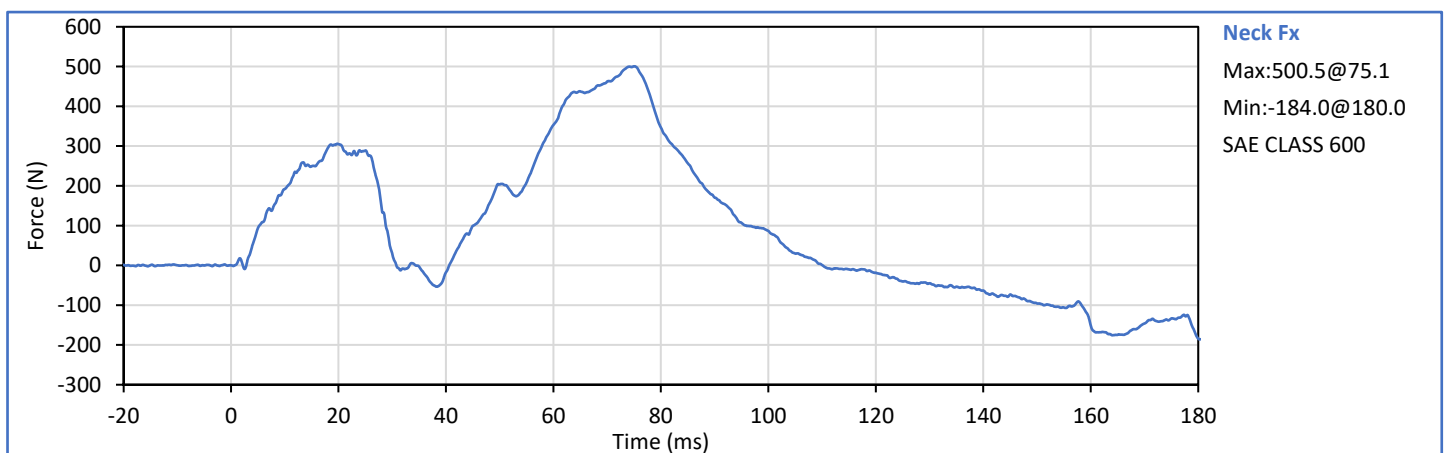
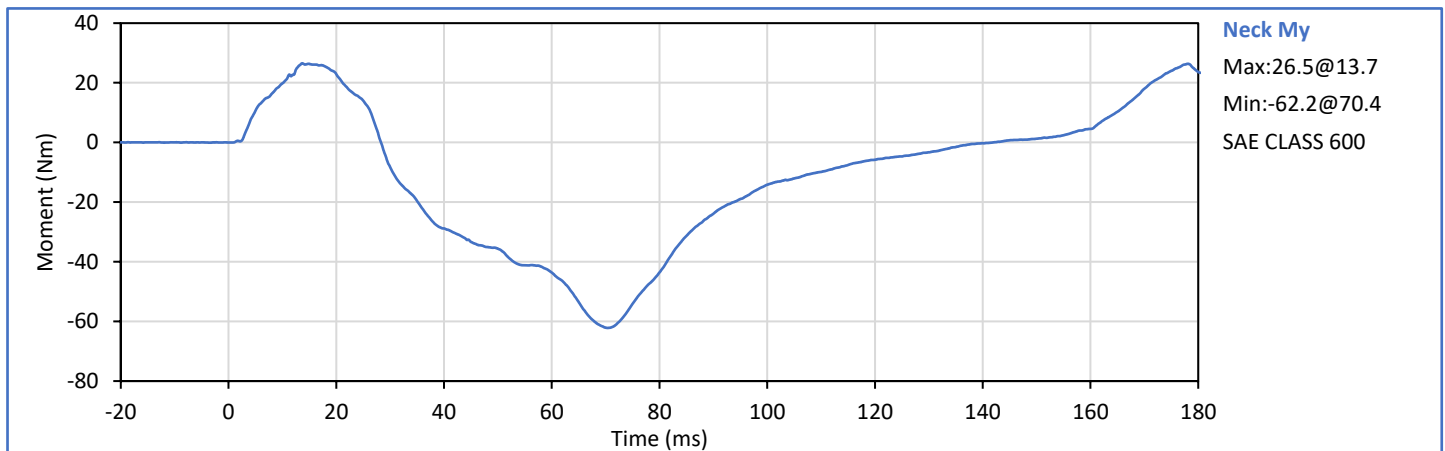
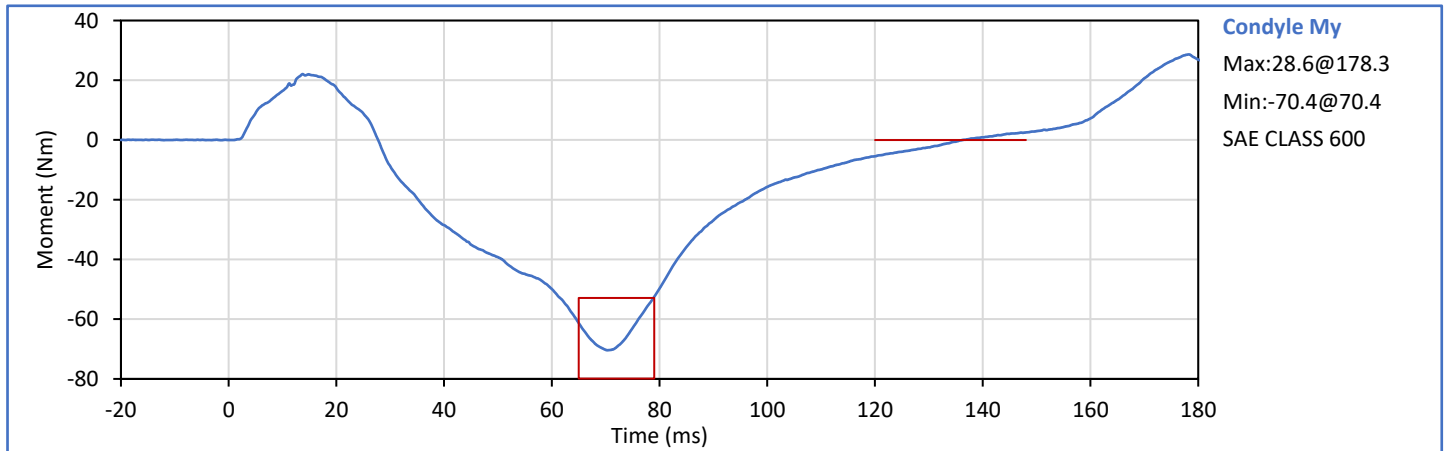


Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.6	Pass
Laboratory Relative Humidity	%	10	70	31	Pass
Pendulum Velocity	m/s	5.94	6.19	6.14	Pass
Pendulum Deceleration at 10 ms	g	17.2	21.2	20.0	Pass
Pendulum Deceleration at 20 ms	g	14.0	19.0	18.4	Pass
Pendulum Deceleration at 30 ms	g	11.0	16.0	12.8	Pass
Peak Pendulum Decel After 30 ms	g	0.0	22.0	12.8	Pass
Deceleration Decay to Cross 5g	ms	38.0	46.0	39.3	Pass
"D" Plane Rotation peak	deg	81.0	106.0	96.6	Pass
	ms	72.0	82.0	74.7	Pass
"D" Plane Rotation Decay to Zero	ms	147.0	174.0	162.1	Pass
Moment About Occipital Condyle	Nm	-79.9	-52.9	-70.4	Pass
	ms	65.0	79.0	70.4	Pass
Moment Decay, Peak to Zero	ms	120.0	148.0	136.4	Pass
Overall Test Results				Pass	

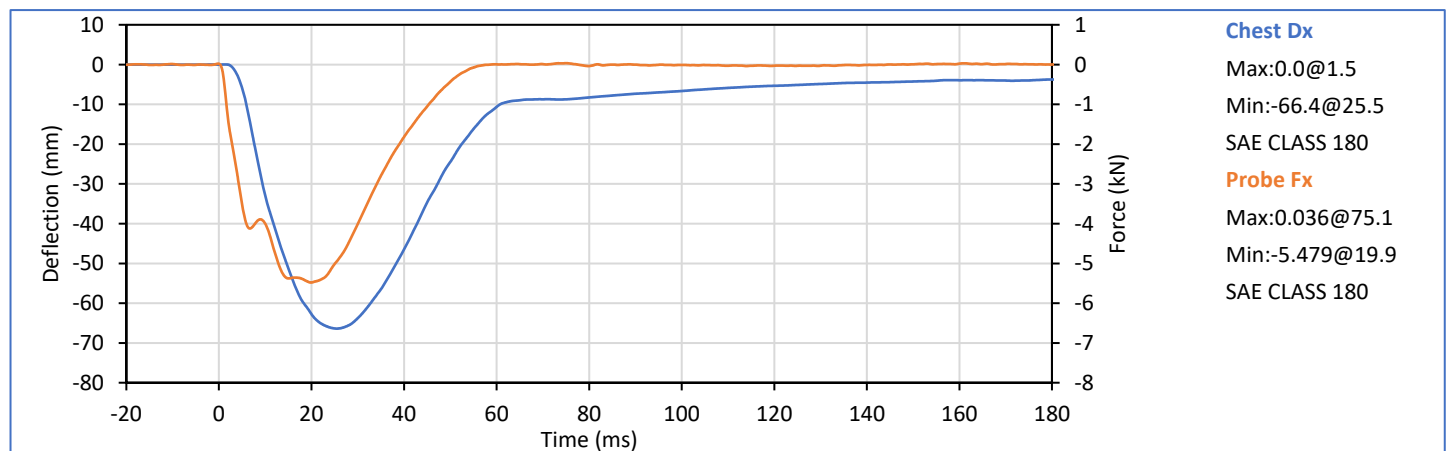
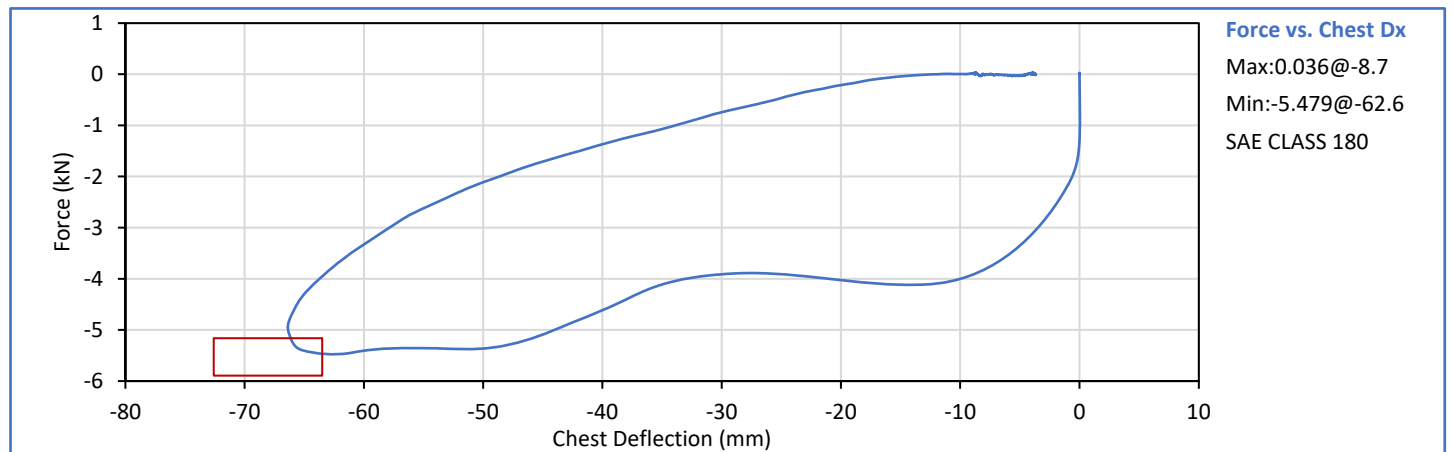


Technician: G. Fuentes

Approved By: J. Hernandez



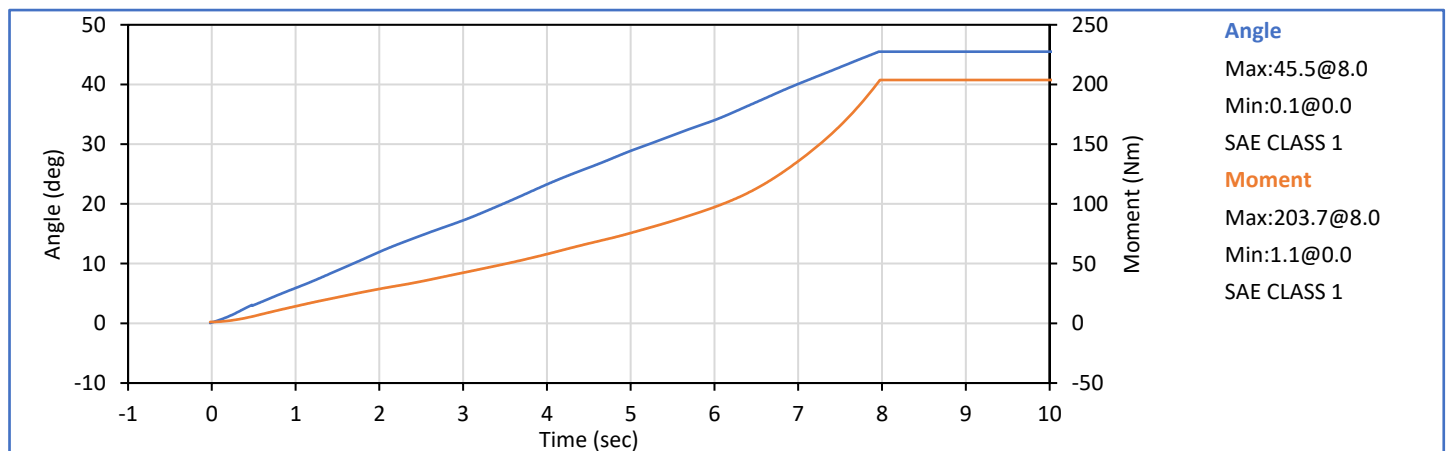
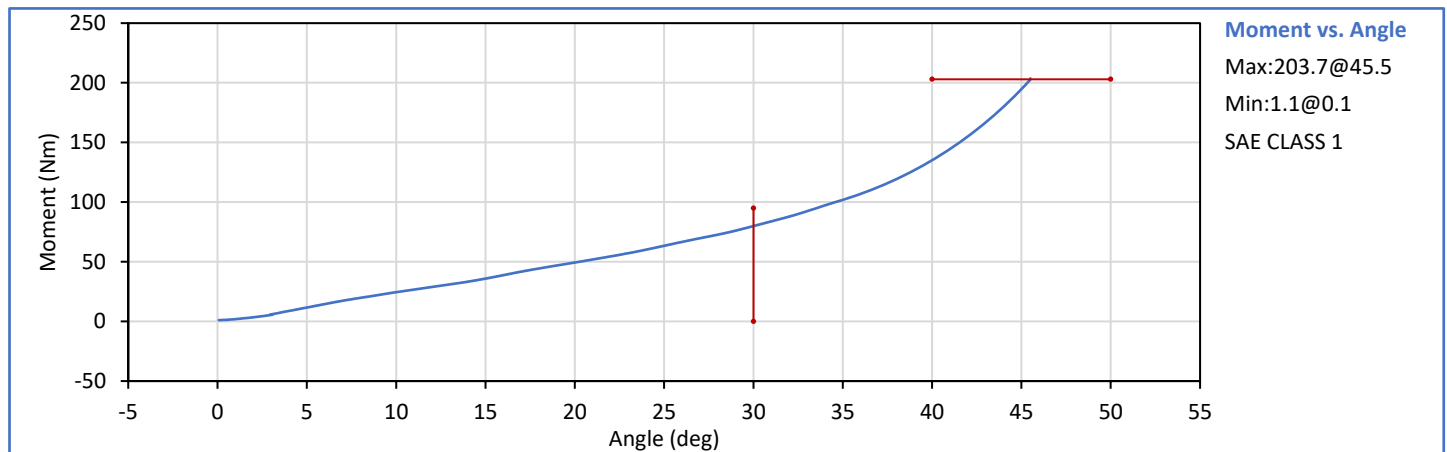
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.4	Pass
Laboratory Relative Humidity	%	10	70	35	Pass
Probe Velocity	m/s	6.58	6.82	6.72	Pass
Peak Chest Deflection	mm	-72.6	-63.5	-66.4	Pass
Peak Probe Force	kN	-5.893	-5.159	-5.479	Pass
Internal Hysteresis	%	69.0	85.0	71.0	Pass
Overall Test Results				Pass	Pass



Technician: G. Fuentes

Approved By: J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	20.9	Pass
Laboratory Relative Humidity	%	10	70	35	Pass
Left Hip Rotation Rate	deg/s	5.0	10.0	5.7	Pass
Left Femur Torque at 30°	Nm	0.0	95.0	79.9	Pass
Left Hip Rotation at 203 Nm	deg	40.0	50.0	45.5	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

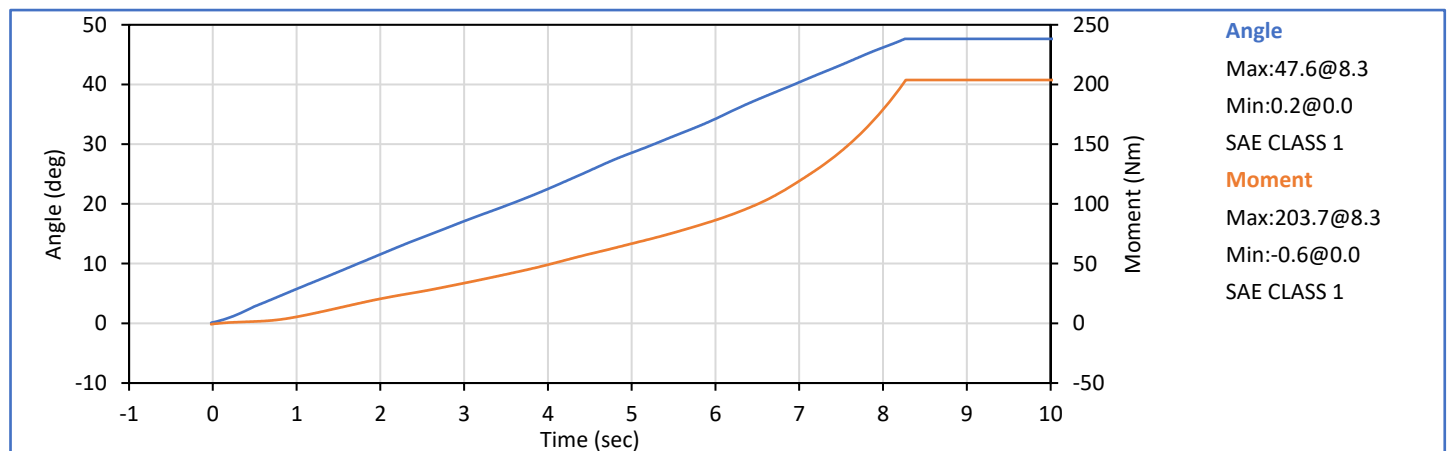
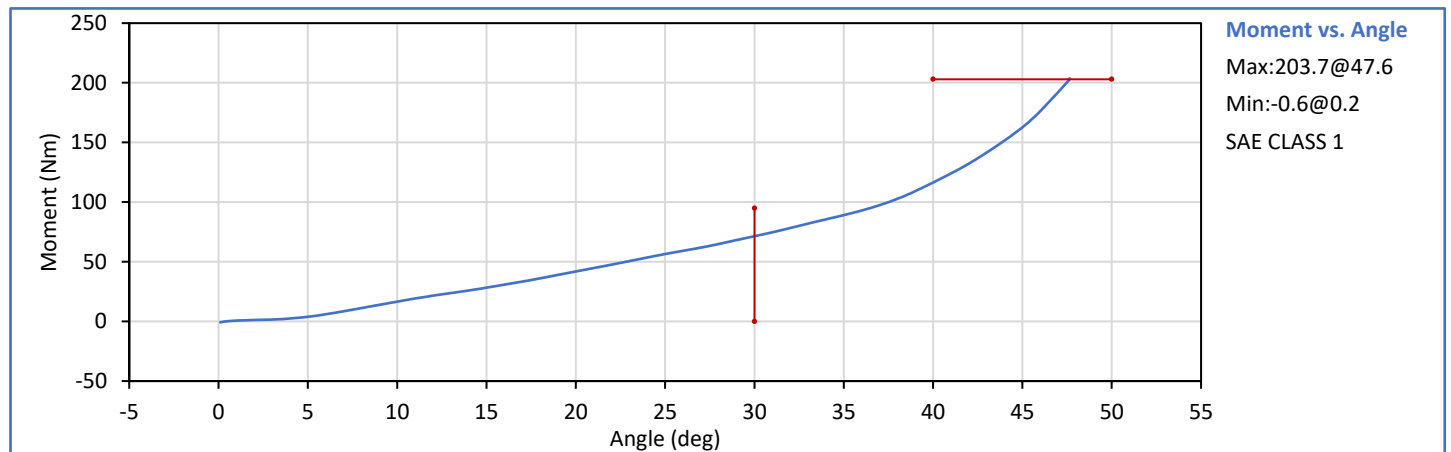
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	20.9	Pass
Laboratory Relative Humidity	%	10	70	35	Pass
Right Hip Rotation Rate	deg/s	5.0	10.0	5.8	Pass
Right Femur Torque at 30°	Nm	0.0	95.0	71.3	Pass
Right Hip Rotation at 203 Nm	deg	40.0	50.0	47.6	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

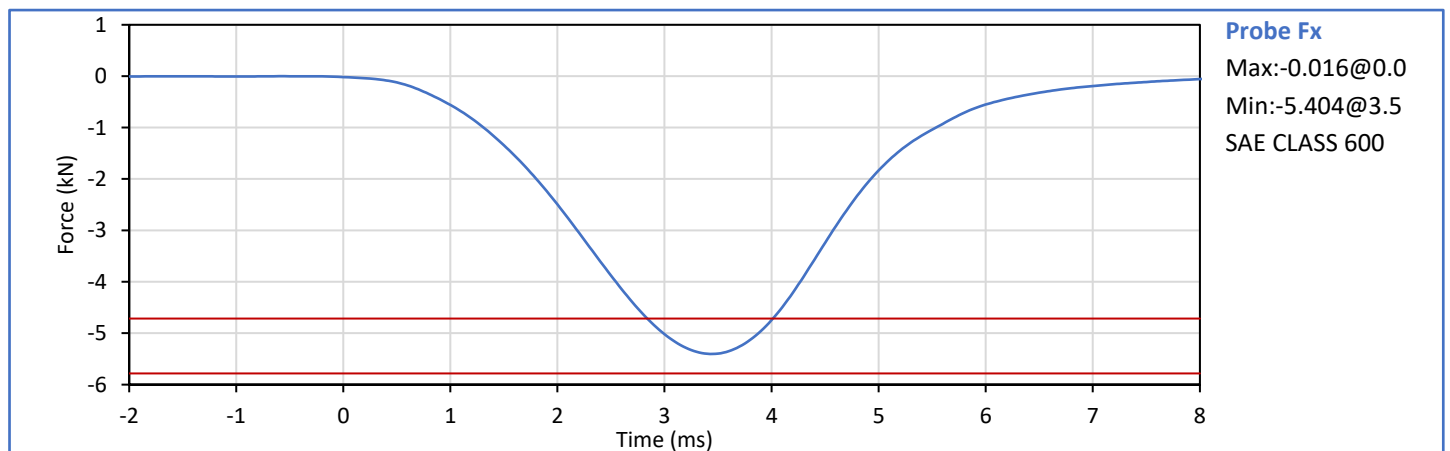
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

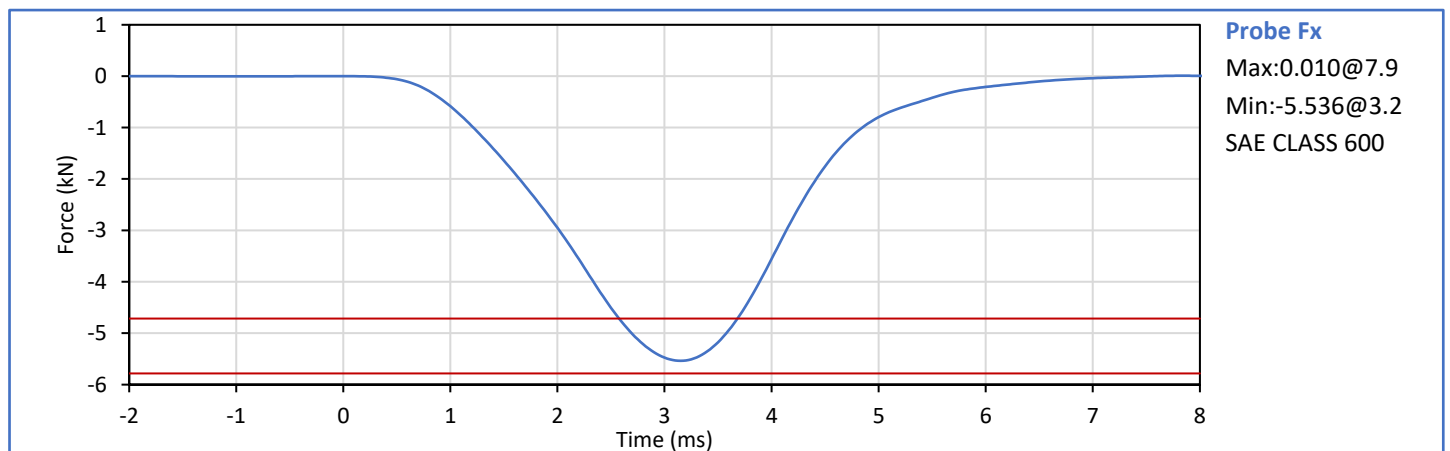
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.2	Pass
Laboratory Relative Humidity	%	10	70	34	Pass
Probe Velocity	m/s	2.070	2.130	2.103	Pass
Peak Resistive Force	kN	-5.782	-4.715	-5.404	Pass
Overall Test Results					Pass



Technician: G. Fuentes

Approved By: J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.4	Pass
Laboratory Relative Humidity	%	10	70	32	Pass
Probe Velocity	m/s	2.070	2.130	2.103	Pass
Peak Resistive Force	kN	-5.782	-4.715	-5.536	Pass
Overall Test Results					Pass



Technician: G. Fuentes

Approved By: J. Hernandez

APPENDIX C
Post-Test ATD Qualification and Performance Verification
Hybrid III 5th Percentile Female ATD
S/N: DH1644

ATD Serial No.: DH1644

Test Date: 2023-08-09

Dummy Item	Inspect for	Comments	Damage	Okay
Entire ATD	Perform general cleaning			✓
Outer Skin	Gashes, rips, cracks			✓
Head	Ballast secure			✓
	General appearance			✓
Neck bracket	Upper neck firmly attached to lower bracket			✓
Neck	Broken or cracked rubber			✓
	Looseness at the condyle joint			✓
Nodding block	Cracked or out of position			✓
Lumbar Spine	Broken or cracked rubber			✓
Ribs	Broken or bent ribs			✓
	Broken or bent rib supports			✓
	Damping material separated or cracked			✓
	Rubber bumpers in place			✓
Chest Displ.	Bent shaft			✓
Assembly	Slider arm riding in track			✓
Sensors	Check cables for cuts, tears			✓
	Check for damaged insulation			✓
Accelerometer	Head mounting secure			✓
Mounting	Chest mounting secure			✓
Knees	Skin condition			✓
	Insert (do not remove)			✓
	Casting			✓
Limbs	Normal movement and adjustment			✓
Knee Sliders	Wires intact			✓
	Rubber returned to "resting" position			✓
Pelvis	Broken			✓
Other	Describe below as needed			✓

Describe any repairs or replacement of parts or other findings:

No Problems Found

Technician:

Bill LGS III

G. Fuentes

Approved By:

Scott

J. Hernandez

ATD Serial No.: DH1644

Test Date: 2023-08-09

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	20.9	Pass
Laboratory Relative Humidity	%	10	70	35	Pass
A - Total sitting height	mm	775	800	781	Pass
B - Shoulder pivot height	mm	432	457	450	Pass
C - 'H' point height	mm	81	86	85	Pass
D - 'H' point location from backline	mm	145	150	147	Pass
E - Shoulder pivot from backline	mm	69	84	77	Pass
F - Thigh clearance	mm	119	135	125	Pass
G - Back of elbow to wrist pivot	mm	244	259	254	Pass
H - Head back to backline	mm	41	46	44	Pass
I - Shoulder to elbow length	mm	277	297	293	Pass
J - Elbow rest height	mm	183	203	191	Pass
K - Buttock to knee length	mm	521	546	532	Pass
L - Popliteal length	mm	356	376	372	Pass
M - Knee pivot height	mm	394	419	406	Pass
N - Buttock popliteal length	mm	414	439	425	Pass
O - Chest depth without jacket	mm	175	191	179	Pass
P - Foot length	mm	219	234	223	Pass
R - Buttock to Knee Pivot Length	mm	457	483	472	Pass
S - Head Breadth	mm	137	147	142	Pass
T - Head Depth	mm	178	188	185	Pass
U - Hip Breadth	mm	300	315	311	Pass
V - Shoulder breadth	mm	351	366	354	Pass
W - Foot breadth	mm	79	94	87	Pass
X - Head circum.	mm	528	549	542	Pass
Y - Chest circum. (w/chest jacket)	mm	851	881	871	Pass
Z - Waist circum.	mm	760	790	781	Pass
AA - Location for chest circum.	mm	333	358	341	Pass
BB - Location for waist circum.	mm	160	170	165	Pass
			Overall Test Results		Pass

Technician:



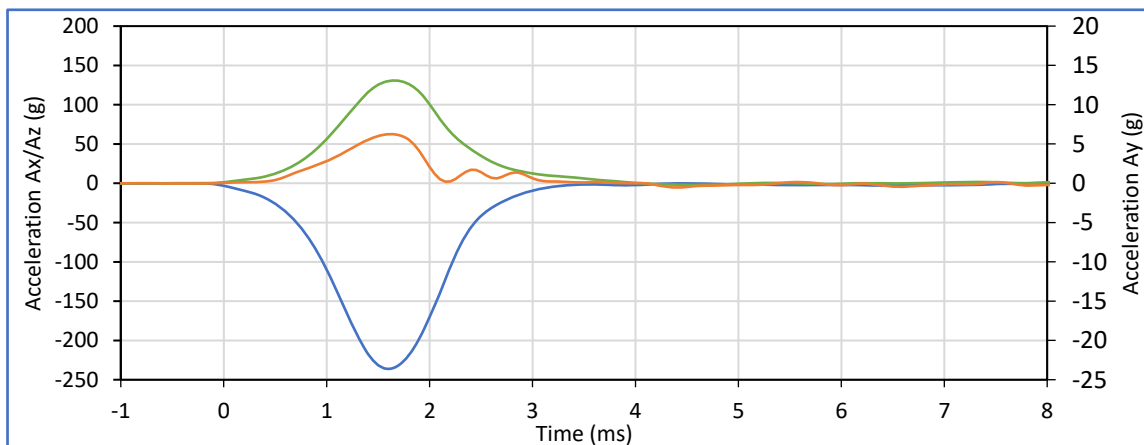
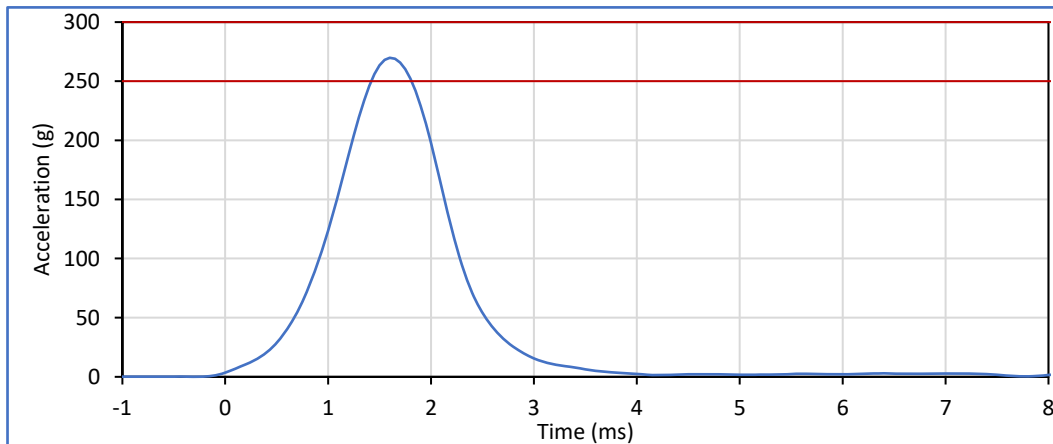
G. Fuentes

Approved By:



J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.0	Pass
Laboratory Humidity	%	10	70	35	Pass
Peak Resultant Acceleration	g	250.0	300.0	269.8	Pass
Peak Lateral Acceleration	g	-15.0	15.0	6.2	Pass
Oscillations After Main Pulse	%	0.0	10.0	1.1	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
			Overall Test Results	Pass	



Technician:

G. Fuentes

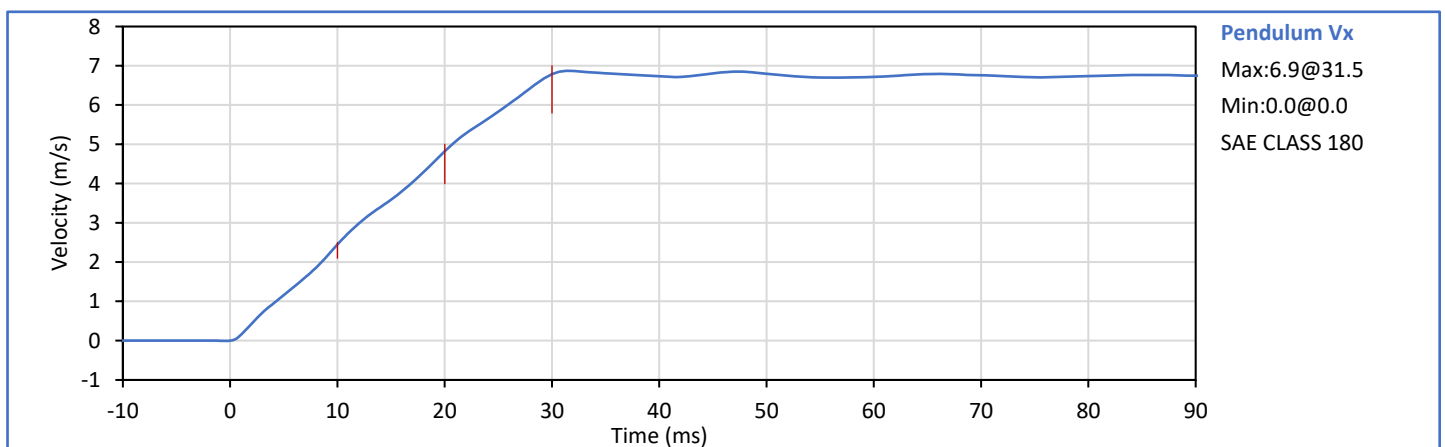
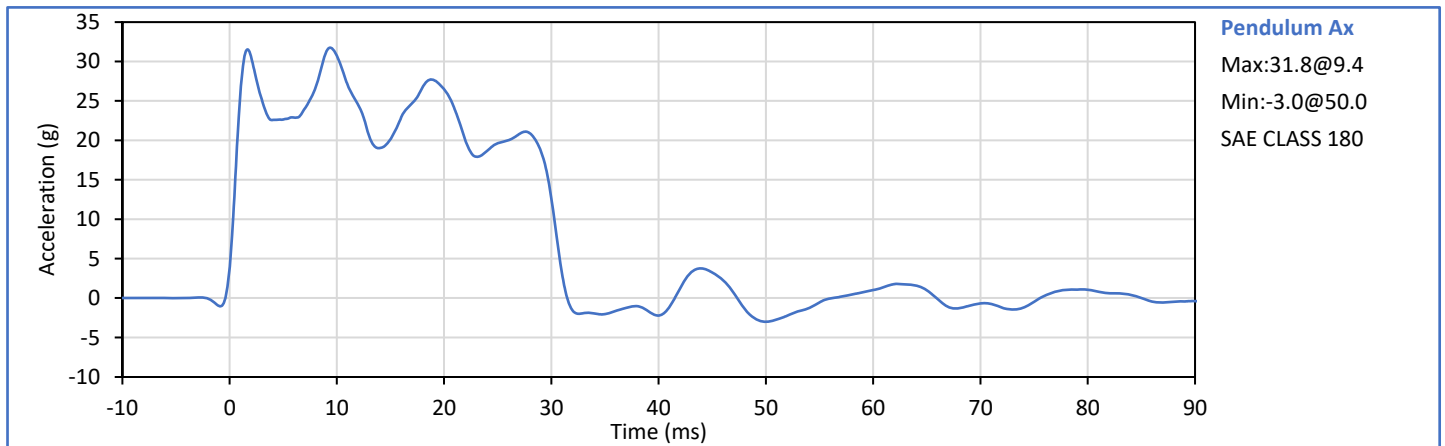
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.0	Pass
Laboratory Humidity	%	10	70	35	Pass
Pendulum Velocity	m/s	6.89	7.13	6.99	Pass
Pendulum Velocity at 10 ms	m/s	2.10	2.50	2.45	Pass
Pendulum Velocity at 20 ms	m/s	4.00	5.00	4.82	Pass
Pendulum Velocity at 30 ms	m/s	5.80	7.00	6.79	Pass
Peak "D" Plane Rotation	deg	77.0	91.0	83.7	Pass
Peak Moment in Rotation	Nm	69.0	83.0	79.2	Pass
Positive Moment Decay to 10 Nm	ms	80.0	100.0	83.3	Pass
Overall Test Results					Pass



Technician:

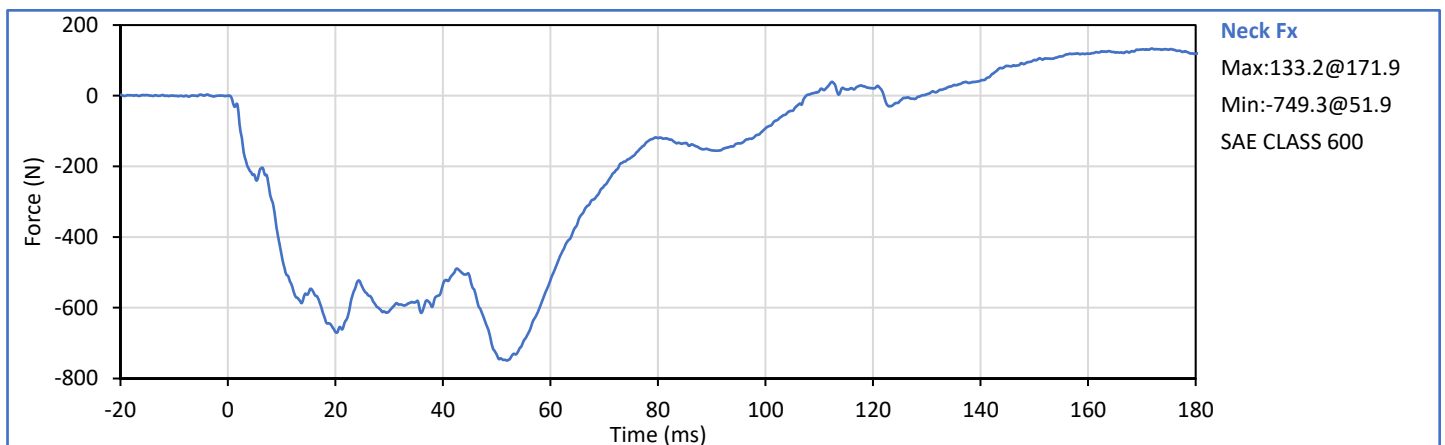
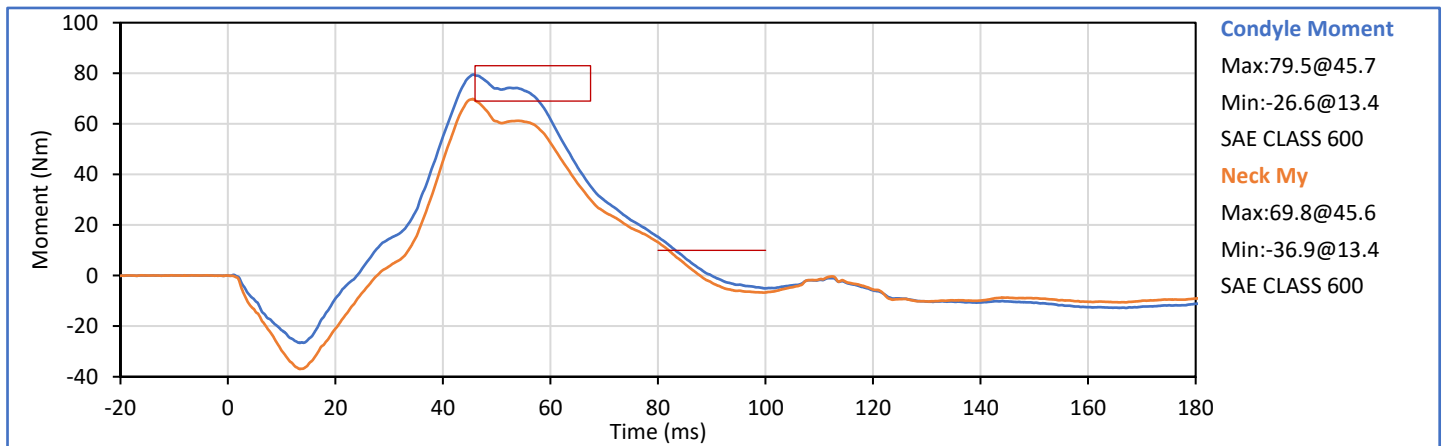
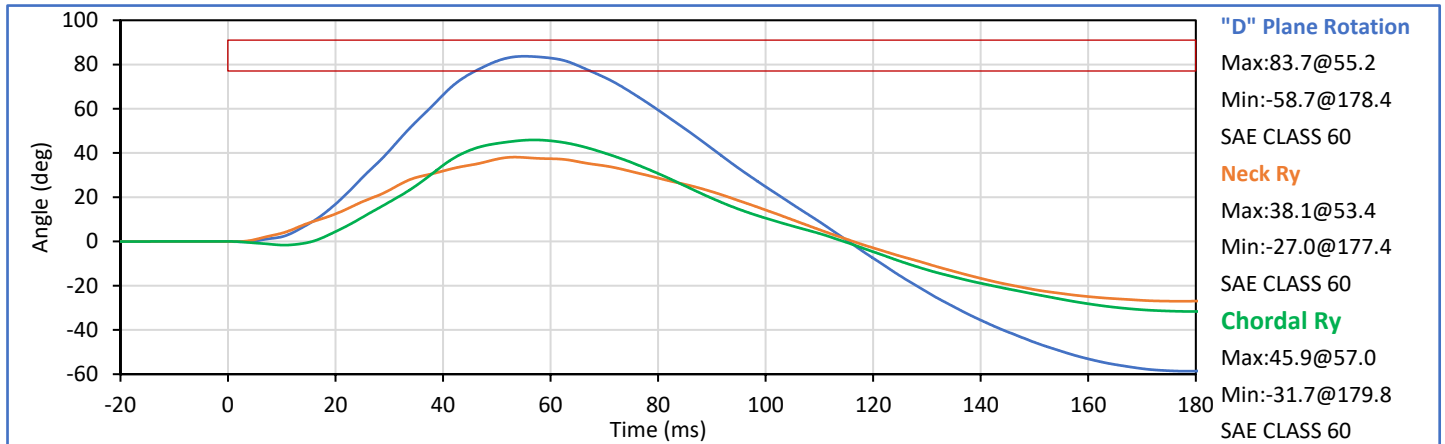
G. Fuentes

G. Fuentes

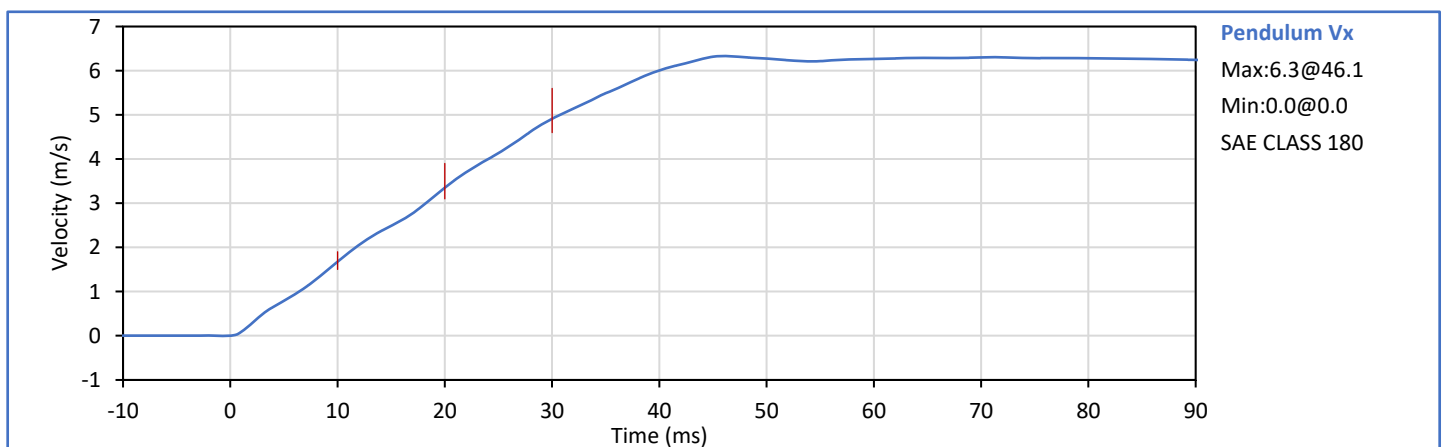
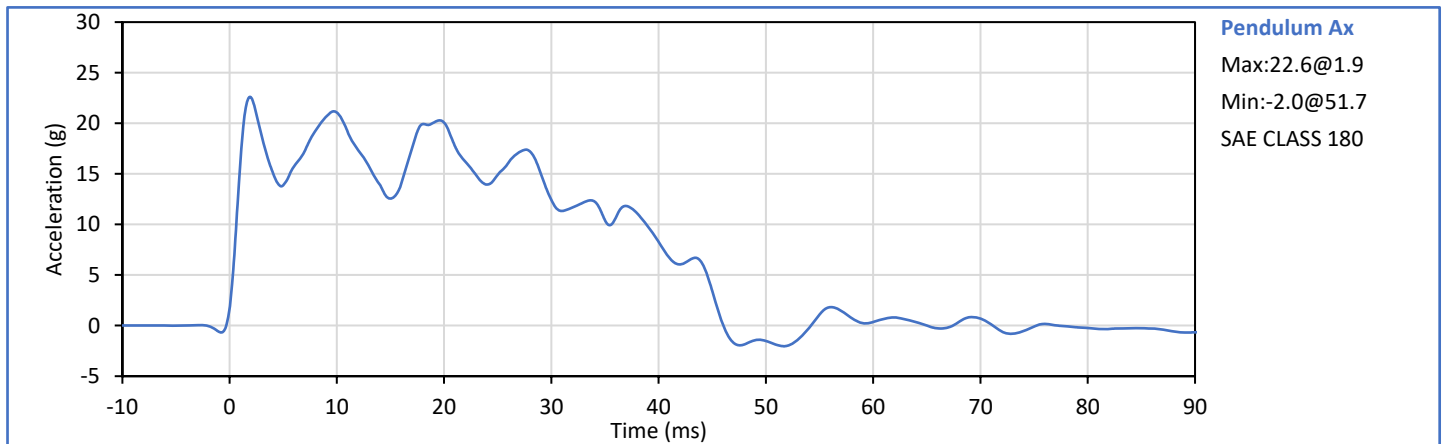
Approved By:

J. Hernandez

J. Hernandez



Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.0	Pass
Laboratory Relative Humidity	%	10	70	35	Pass
Pendulum Velocity	m/s	5.95	6.19	6.07	Pass
Pendulum Velocity at 10 ms	m/s	1.50	1.90	1.67	Pass
Pendulum Velocity at 20 ms	m/s	3.10	3.90	3.35	Pass
Pendulum Velocity at 30 ms	m/s	4.60	5.60	4.91	Pass
Peak "D" Plane Rotation	deg	99.0	114.0	105.5	Pass
Peak Moment in Rotation	Nm	-65.0	-53.0	-56.6	Pass
Negative Moment Decay to -10 Nm	ms	94.0	114.0	105.1	Pass
Overall Test Results					Pass



Technician:

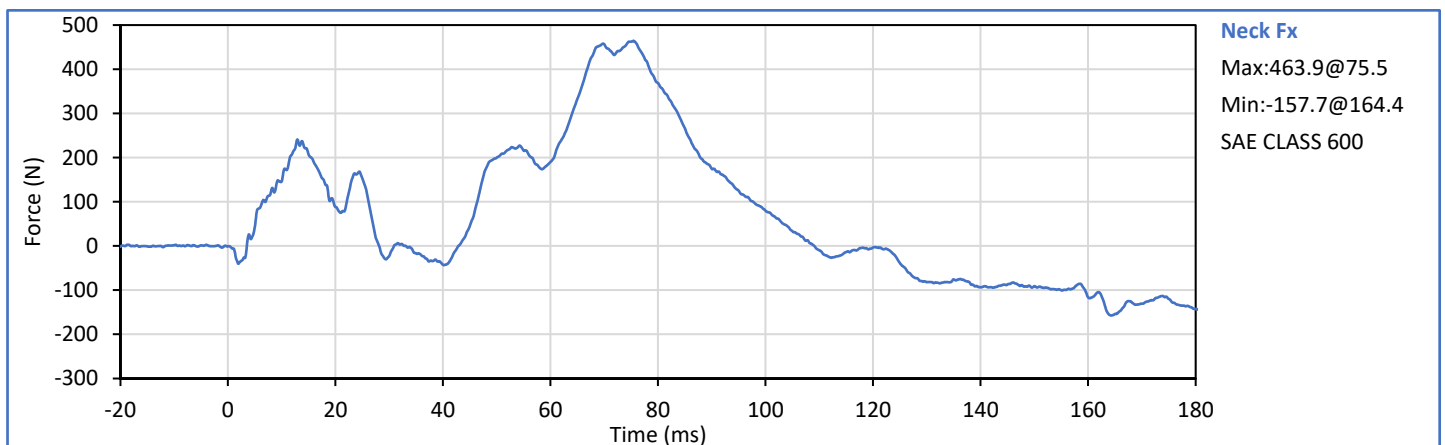
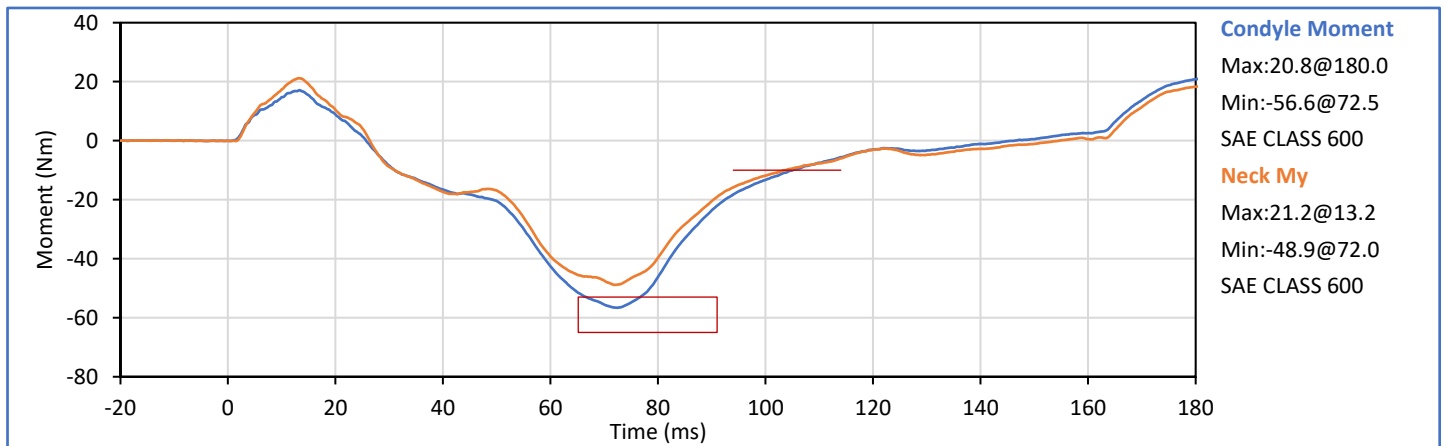
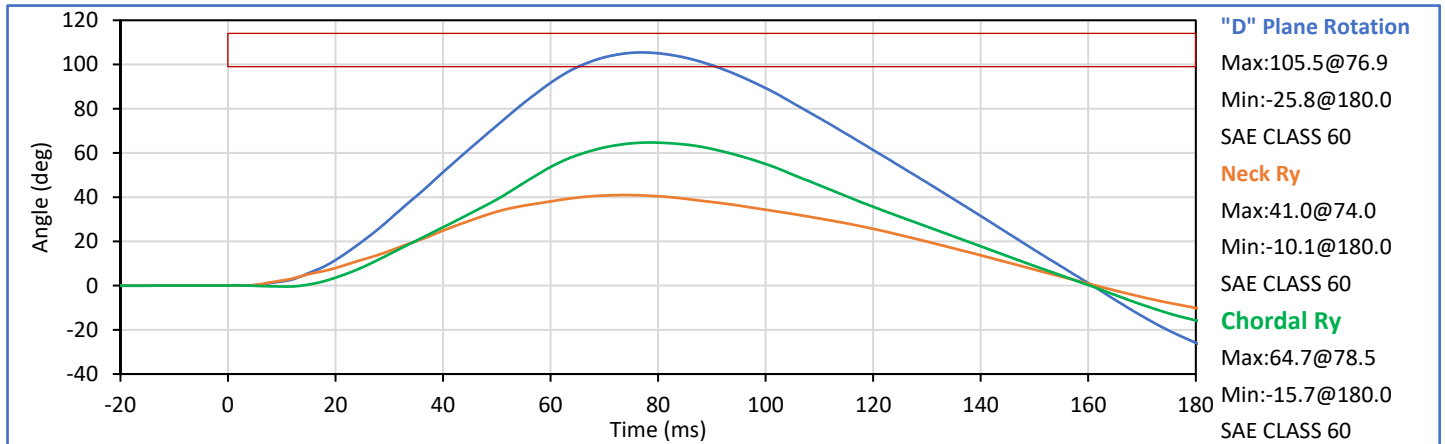
G. Fuentes

G. Fuentes

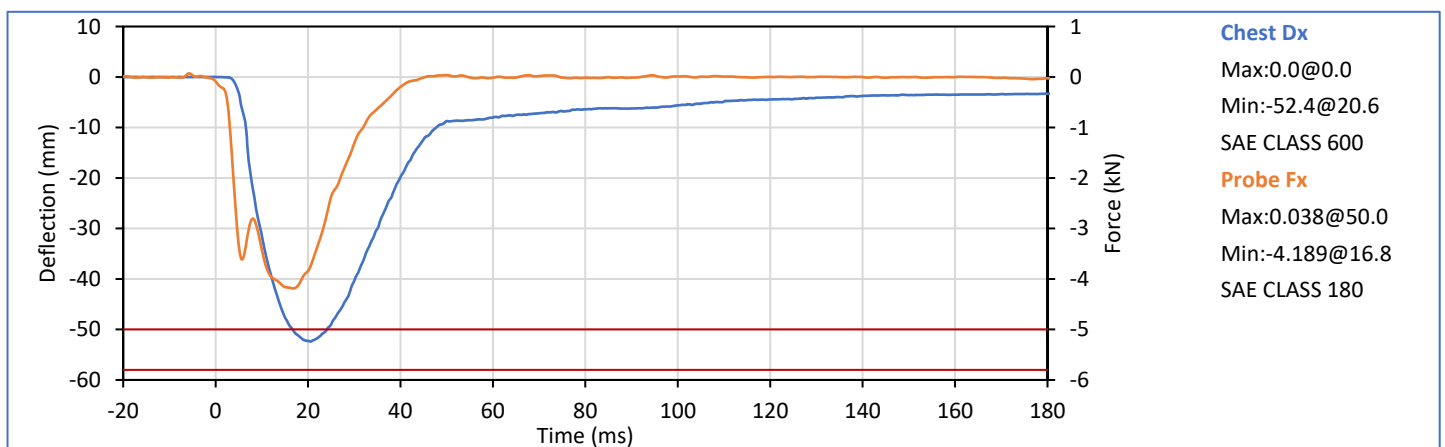
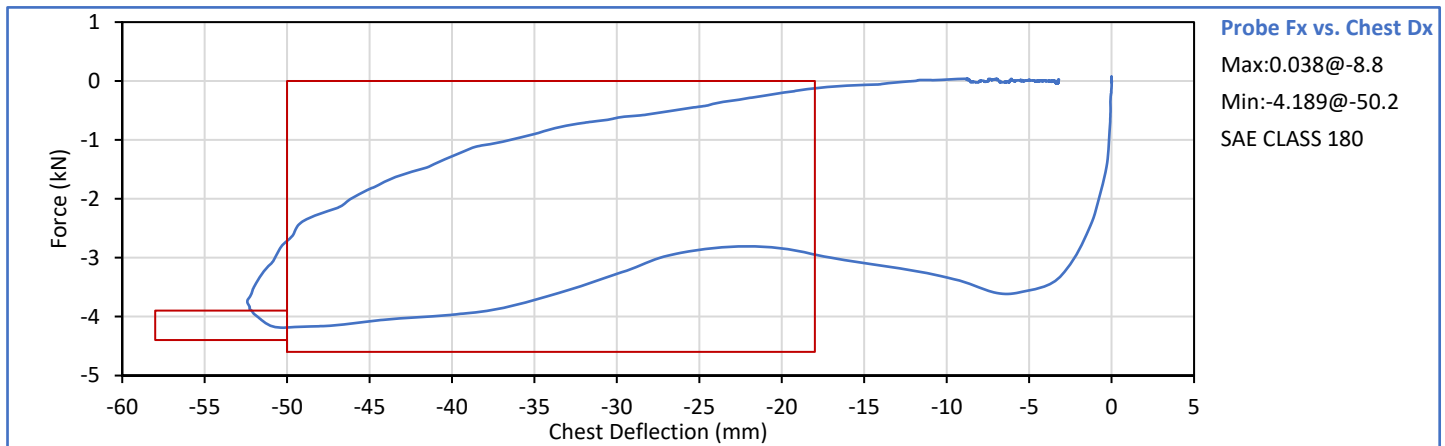
Approved By:

J. Hernandez

J. Hernandez



Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.0	Pass
Laboratory RelativeHumidity	%	10	70	35	Pass
Probe Velocity	m/s	6.59	6.83	6.68	Pass
Peak Chest Deflection	mm	-58.0	-50.0	-52.4	Pass
Peak Probe Force, 50 and 58 mm	kN	-4.400	-3.900	-4.188	Pass
Peak Probe Force, 18 and 50 mm	kN	-4.600	0.000	-4.188	Pass
Internal Hysteresis	%	69.0	85.0	77.4	Pass
Overall Test Results				Pass	Pass



Technician:

G. Fuentes

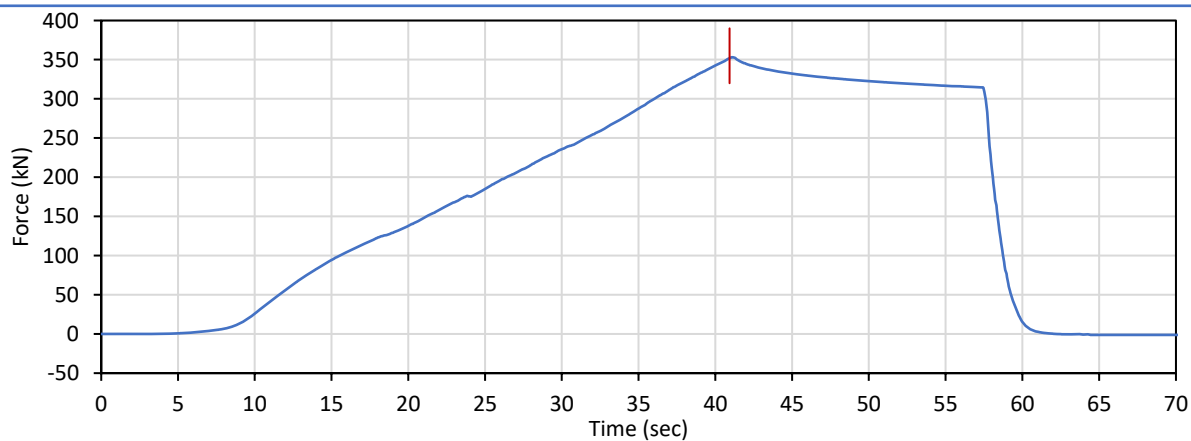
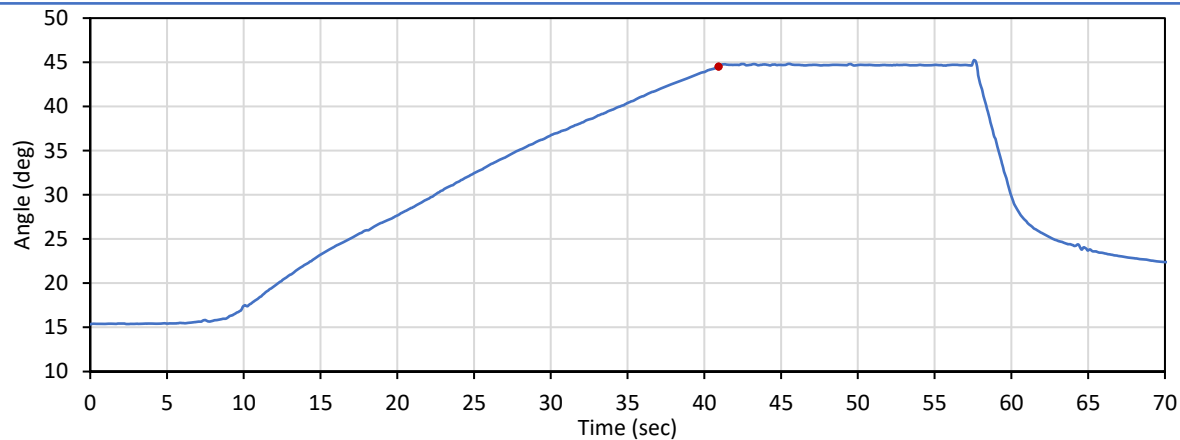
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	20.9	Pass
Laboratory Humidity	%	10	70	35	Pass
Orientation Angle	deg	0.0	20.0	15.1	Pass
Test Initial Angle	deg	11.0	19.0	15.4	Pass
Peak Force at 45° (+/-0.5°)	N	320.0	390.0	351.8	Pass
Torso Flexion Rate	deg/s	0.50	1.50	0.90	Pass
Final Reference Plane Angle	deg	-8.0	8.0	4.3	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

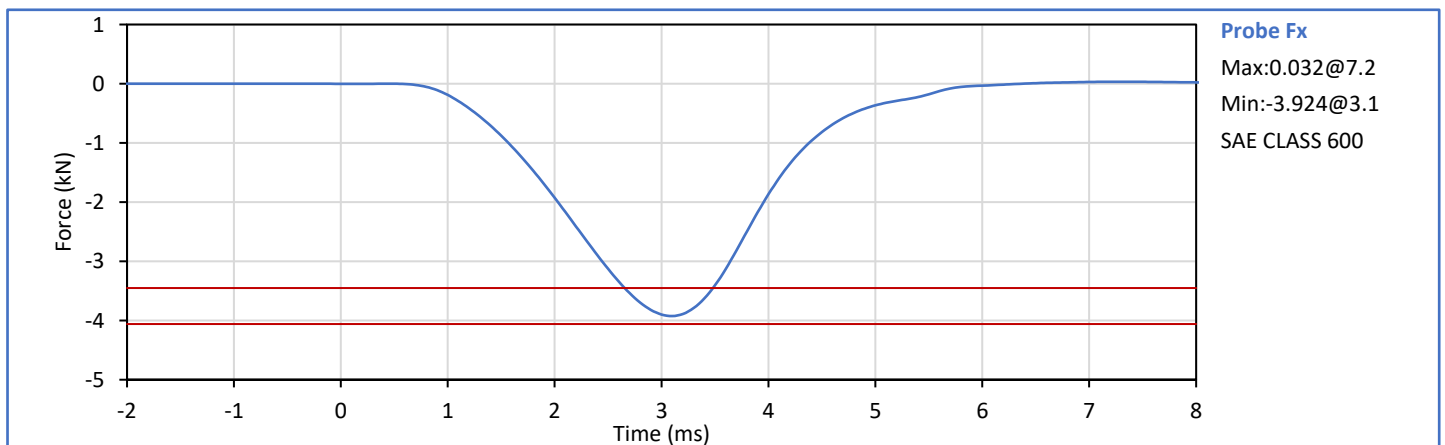
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.1	Pass
Laboratory Relative Humidity	%	10	70	35	Pass
Probe Velocity	m/s	2.070	2.130	2.109	Pass
Peak Resistive Force	kN	-4.060	-3.450	-3.924	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

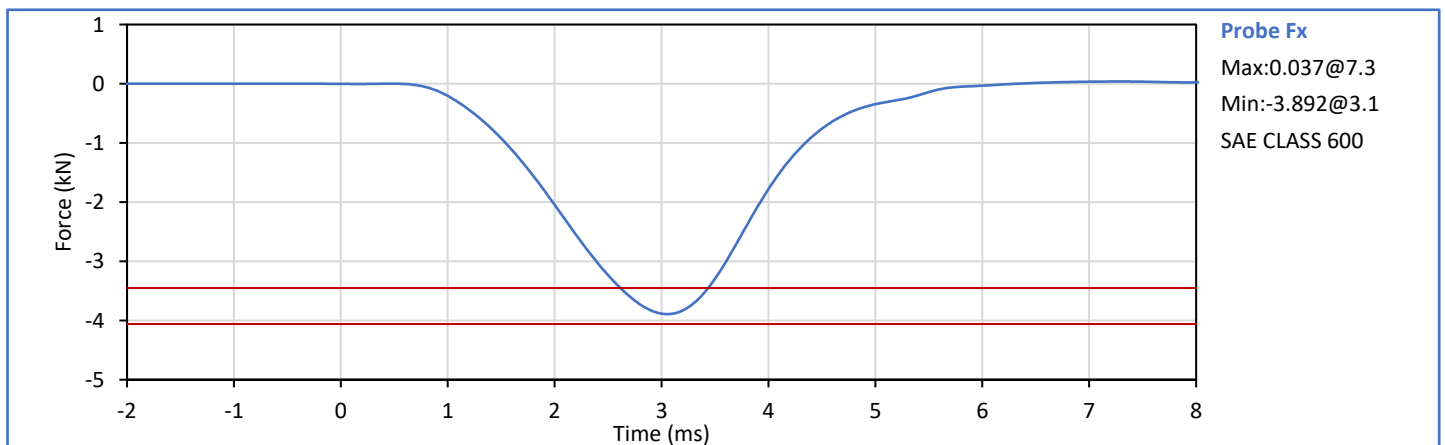
G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.1	Pass
Laboratory Relative Humidity	%	10	70	35	Pass
Probe Velocity	m/s	2.070	2.130	2.105	Pass
Peak Resistive Force	kN	-4.060	-3.450	-3.892	Pass
Overall Test Results					Pass



Technician:

G. Fuentes

G. Fuentes

Approved By:

J. Hernandez

J. Hernandez

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION

Table 1 - Driver ATD Instrumentation

Sensor Location	Sensor S\N	Mfr	Model	Cal Date
Head Acceleration X Primary	P49209	Endevco	7264C-2k	2023-05-25
Head Acceleration Y Primary	P49228	Endevco	7264C-2k	2023-05-25
Head Acceleration Z Primary	P50101	Endevco	7264C-2k	2023-05-25
Head Acceleration X Redundant	P50103	Endevco	7264C-2k	2023-05-25
Head Acceleration Y Redundant	P49210	Endevco	7264C-2k	2023-05-25
Head Acceleration Z Redundant	P58713	Endevco	7264C-2k	2023-05-25
Head Rotation Rate X	ARS7426	DTS	ARS PRO-8k (2kHz)	2023-04-07
Head Rotation Rate Y	ARS7587	DTS	ARS PRO-8k (2kHz)	2023-04-07
Head Rotation Rate Z	ARS7480	DTS	ARS PRO-8k (2kHz)	2023-04-07
Upper Neck Force X	2190 Fx	R.A. Denton	1716ATF	2023-02-15
Upper Neck Force Y	2190 Fy	R.A. Denton	1716ATF	2023-02-15
Upper Neck Force Z	2190 Fz	R.A. Denton	1716ATF	2023-02-15
Upper Neck Moment X	2190 Mx	R.A. Denton	1716ATF	2023-02-15
Upper Neck Moment Y	2190 My	R.A. Denton	1716ATF	2023-02-15
Upper Neck Moment Z	2190 Mz	R.A. Denton	1716ATF	2023-02-15
Chest Acceleration X Primary	P52112	Endevco	7264C-2k	2023-05-26
Chest Acceleration Y Primary	P49208	Endevco	7264C-2k	2023-05-25
Chest Acceleration Z Primary	P51264	Endevco	7264C-2k	2023-05-26
Chest Acceleration X Redundant	P49461	Endevco	7264C-2k	2023-05-26
Chest Acceleration Y Redundant	P58774	Endevco	7264C-2k	2023-05-26
Chest Acceleration Z Redundant	P49168	Endevco	7264C-2k	2023-05-26
Chest Deflection	0606 (H3)	Servo	14CBI-3615	2023-05-29
Pelvis Acceleration X	P49238	Endevco	7264C-2k	2023-05-29
Pelvis Acceleration Y	P58877	Endevco	7264C-2k	2023-05-29
Pelvis Acceleration Z	P50087	Endevco	7264C-2k	2023-05-29
Left Femur Force Z	DS4138 (pri)	Humanetics	3821JLN2	2022-09-12
Right Femur Force Z	DS4136 (pri)	Humanetics	3821JLN2	2022-09-12
Left Femur Force Z Redundant	DS4138 (red)	Humanetics	3821JLN2	2022-09-12
Right Femur Force Z Redundant	DS4136 (red)	Humanetics	3821JLN2	2022-09-12
Left Upper Tibia Moment X	DH3054 Mx	FTSS	IF-857	2023-05-17
Left Upper Tibia Moment Y	DH3054 My	FTSS	IF-857	2023-05-17
Left Upper Tibia Force Z	DH3054 Fz	FTSS	IF-857	2023-05-17
Left Lower Tibia Moment X	405 Mx	R.A. Denton	3644	2023-02-16
Left Lower Tibia Moment Y	405 My	R.A. Denton	3644	2023-02-16
Left Lower Tibia Force Z	405 Fz	R.A. Denton	3644	2023-02-16
Right Upper Tibia Moment X	DH3284 Mx	FTSS	IF-857	2023-02-16
Right Upper Tibia Moment Y	DH3284 My	FTSS	IF-857	2023-02-16
Right Upper Tibia Force Z	DH3284 Fz	FTSS	IF-857	2023-02-16
Right Lower Tibia Moment X	91 Mx	R.A. Denton	3644	2023-02-16
Right Lower Tibia Moment Y	91 My	R.A. Denton	3644	2023-02-16
Right Lower Tibia Force Z	91 Fz	R.A. Denton	3644	2023-02-16
Left Ankle Acceleration X	03E20-N09	Entran	EGEB6Q-2k	2023-05-29
Left Ankle Acceleration Z	P68074	Endevco	7264C-2k	2023-05-29
Left Toe Acceleration Z	03H07-Z10	Entran	EGEB6Q-2k	2023-05-29
Right Ankle Acceleration X	03E29-N20	Entran	EGEB6Q-2k	2023-05-29
Right Ankle Acceleration Z	P68602	Endevco	7264C-2k	2023-05-29
Right Toe Acceleration Z	03D09-N01	Entran	EGEB6Q-2k	2023-05-29
Seat Belt Outside Lap Force	313	FTSS	IF-964	2023-04-04
Seat Belt Upper Diagonal Force	315	FTSS	IF-964	2023-04-04

Table 2 - Right Front Passenger ATD Instrumentation

Sensor Location	Sensor S\N	Mfr	Model	Cal Date
Head Acceleration X Primary	P51889	Endevco	7264C-2k	2023-05-22
Head Acceleration Y Primary	P51861	Endevco	7264C-2k	2023-05-22
Head Acceleration Z Primary	P52077	Endevco	7264C-2k	2023-05-22
Head Acceleration X Redundant	P58835	Endevco	7264C-2k	2023-05-22
Head Acceleration Y Redundant	P51703	Endevco	7264C-2k	2023-05-22
Head Acceleration Z Redundant	P52096	Endevco	7264C-2k	2023-05-23
Head Rotation Rate X	ARS7367	DTS	ARS PRO-8k (2kHz)	2023-04-07
Head Rotation Rate Y	ARS7377	DTS	ARS PRO-8k (2kHz)	2023-04-07
Head Rotation Rate Z	ARS7498	DTS	ARS PRO-8k (2kHz)	2023-04-07
Upper Neck Force X	1643 Fx	R.A. Denton	1716A	2023-02-15
Upper Neck Force Y	1643 Fy	R.A. Denton	1716A	2023-02-15
Upper Neck Force Z	1643 Fz	R.A. Denton	1716A	2023-02-15
Upper Neck Moment X	1643 Mx	R.A. Denton	1716A	2023-02-15
Upper Neck Moment Y	1643 My	R.A. Denton	1716A	2023-02-15
Upper Neck Moment Z	1643 Mz	R.A. Denton	1716A	2023-02-15
Chest Acceleration X Primary	P58860	Endevco	7264C-2k	2023-05-22
Chest Acceleration Y Primary	P51876	Endevco	7264C-2k	2023-05-23
Chest Acceleration Z Primary	P58711	Endevco	7264C-2k	2023-05-23
Chest Acceleration X Redundant	P52049	Endevco	7264C-2k	2023-05-23
Chest Acceleration Y Redundant	P51862	Endevco	7264C-2k	2023-05-23
Chest Acceleration Z Redundant	P52048	Endevco	7264C-2k	2023-05-23
Chest Deflection	0724 (HF)	Servo	14CBI-3615	2023-05-25
Pelvis Acceleration X	P52090	Endevco	7264C-2k	2023-05-23
Pelvis Acceleration Y	P58849	Endevco	7264C-2k	2023-05-23
Pelvis Acceleration Z	P58756	Endevco	7264C-2k	2023-05-23
Left Femur Force Z	132 (pri)	R.A. Denton	3821JTF	2023-02-15
Right Femur Force Z	112 (pri)	R.A. Denton	3821JTF	2023-02-15
Left Femur Force Z Redundant	132 (red)	R.A. Denton	3821JTF	2023-02-15
Right Femur Force Z Redundant	112 (red)	R.A. Denton	3821JTF	2023-02-15
Left Upper Tibia Moment X	474 Mx	R.A. Denton	3643	2023-02-16
Left Upper Tibia Moment Y	474 My	R.A. Denton	3643	2023-02-16
Left Upper Tibia Force Z	474 Fz	R.A. Denton	3643	2023-02-16
Left Lower Tibia Moment X	499 Mx	R.A. Denton	3644	2023-05-18
Left Lower Tibia Moment Y	499 My	R.A. Denton	3644	2023-05-18
Left Lower Tibia Force Z	499 Fz	R.A. Denton	3644	2023-05-18
Right Upper Tibia Moment X	468 Mx	R.A. Denton	3643	2023-05-17
Right Upper Tibia Moment Y	468 My	R.A. Denton	3643	2023-05-17
Right Upper Tibia Force Z	468 Fz	R.A. Denton	3643	2023-05-17
Right Lower Tibia Moment X	406 Mx	R.A. Denton	3644	2022-09-12
Right Lower Tibia Moment Y	406 My	R.A. Denton	3644	2022-09-12
Right Lower Tibia Force Z	406 Fz	R.A. Denton	3644	2022-09-12
Left Ankle Acceleration X	P52057	Endevco	7264C-2k	2023-05-24
Left Ankle Acceleration Z	03E18-F07	Entran	EGEB6Q-2k	2023-05-24
Left Toe Acceleration Z	P49224	Endevco	7264C-2k	2023-05-24
Right Ankle Acceleration X	P52019	Endevco	7264C-2k	2023-05-24
Right Ankle Acceleration Z	P58755	Endevco	7264C-2k	2023-05-24
Right Toe Acceleration Z	P52076	Endevco	7264C-2k	2023-05-24
Seat Belt Outside Lap Force	251	FTSS	IF-964	2023-04-04
Seat Belt Upper Diagonal Force	263	FTSS	IF-964	2023-04-04

Table 3 - Vehicle Instrumentation

Sensor Location	Sensor S\N	Mfr	Model	Cal Date
Left Rear Primary Ax	M11233	Endevco	758H-2k	2023-06-21
Right Rear Primary Ax	M11173	Endevco	758H-2k	2023-05-11
Engine Top Ax	M11102	Endevco	758H-2k	2023-06-26
Engine Bottom Ax	M11072	Endevco	758H-2k	2023-03-11
Left Rear Az	M11117	Endevco	758H-2k	2023-07-05
Right Rear Az	M11053	Endevco	758H-2k	2023-06-24
Left Rear Redundant Ax	M11085	Endevco	758H-2k	2023-06-23
Right Rear Redundant Ax	M11069	Endevco	758H-2k	2023-06-21