REPORT NUMBER: NCAP-KAR-18-017

NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

FORD MOTOR CO.

2018 FORD ECOSPORT S 4WD 5-DOOR MPV

NHTSA NUMBER: M20180200

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

MAY 25, 2018

FINAL REPORT

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
1200 NEW JERSEY AVE, SE
ROOM W43-410
WASHINGTON, DC 20590

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Approval Date: May 25, 2018

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NHTSA, Office of Crashworthiness Standards

Date: _____

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

Date: _____

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9. Performing Organization Name and Address KARCO Engineering, LLC. 9270 Holly Rd. Adelanto, CA 92301	**10. Work Unit No.**
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15. Supplementary Notes

16. Abstract

A 56.3 km/h NCAP Frontal Impact Test was conducted on a 2018 Ford EcoSport S 4WD 5-door MPV in accordance with the specifications of the Office of Crashworthiness Standards Frontal NCAP Laboratory Test Procedure. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and footwell intrusion performance. The test was conducted at the KARCO Engineering, LLC. facility in Adelanto, California on May 11, 2018.

The impact velocity of the vehicle was 56.71 km/h and the ambient temperature at the barrier face at the time of impact was 23.9°C. The target vehicle's post-test maximum crush was 386 mm at DPD5 to the right of the vehicle's centerline. The test vehicle's performance is as follows:

Measurement Description	Units	Driver ATD		Passenger ATD	
		Threshold	Result	Threshold	Result
Head Injury Criteria (HIC_{15})	N/A	700	250.1	700	325.2
Maximum Chest Compression	mm	63	-27	52	-13
Nij	N/A	1	0.36	1	0.38
Neck Tension	N	4170	1794.8	2620	889.7
Neck Compression	N	4000	-268.7	2520	-328.0
Left Femur Force	N	10000	-2200.3	6800	-1463.9
Right Femur Force	N	10000	-1963.3	6800	-1050.1

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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 DTNH22-12-D-00259. 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 Frontal NCAP Laboratory Test Procedure, dated October 2015.

SUMMARY

A load cell barrier consisting of 176 load cells was impacted by a 2018 Ford EcoSport S 4WD 5-door MPV at a velocity of 56.71 km/h. The test was performed at KARCO Engineering, LLC. on May 11, 2018. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A of this report.

Three (3) 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 572E 50th percentile male anthropomorphic test device (ATD) was placed in the driver seating position and one Part 572O 5th percentile female ATD was placed in the right-front passenger seating position according to dummy placement instructions specified in the Frontal NCAP Laboratory Test Procedure.

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. 141) were calibrated prior to this test. Certification details, along with instrumentation calibration data, are found in Appendix C of this report.

The 106 channels of dummy and vehicle response data were recorded on an on-board data acquisition system. Appendix B contains the dummy response data traces.

There was 100% windshield retention and no intrusion into the protected zone of the windshield during the event.

The maximum static crush was 386 mm at DPD5 to the right 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. The upper torso contacted the frontal airbag. Both the 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 torso contacted the frontal airbag. Both left and right knees contacted the knee airbag.

The occupant data is summarized below:

ATD Position	HIC_{15}	T^1 (ms)	T^2 (ms)	Chest Disp. (mm)	Nij	Neck Tension (N)	Neck Comp. (N)	Left Femur (N)	Right Femur (N)
Driver (50th)	250.1	67.6	82.6	-27	0.36	1794.8	-268.7	-2200.3	-1963.3
Passenger (5th)	325.2	66.0	81.0	-13	0.38	889.7	-328.0	-1463.9	-1050.1

SECTION 2

OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

Test Vehicle: 2018 Ford EcoSport S 4WD 5-Door MPV NHTSA No.: M20180200

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/11/18

CONVERSION FACTORS

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

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2018 Ford EcoSport S 4WD 5-Door MPV NHTSA No.: M20180200

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/11/18

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	M20180200
Model Year	2018
Make	Ford
Model	EcoSport S 4WD
Body Style	5-Door MPV
VIN	MAJ6P1SL6JC168606
Body Color	Silver Metallic
Odometer Reading (km / mi)	159 / 99
Engine Displacement (L)	2.0
Type / No. of Cylinders	4 Cylinder
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	6
Overdrive	Yes
Final Drive	4WD
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	Yes
Driver Seat Belt Pretensioner	Yes
Driver Load Limiter	Yes
Front Pass. Seat Belt Pretensioner	Yes
Front Pass. Load Limiter	Yes
Other Safety Restraint	No

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Ford Motor Co.
Date of Manufacture	Nov-17

GVWR (kg)	1929
GAWR Front (kg)	995
GAWR Rear (kg)	940

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

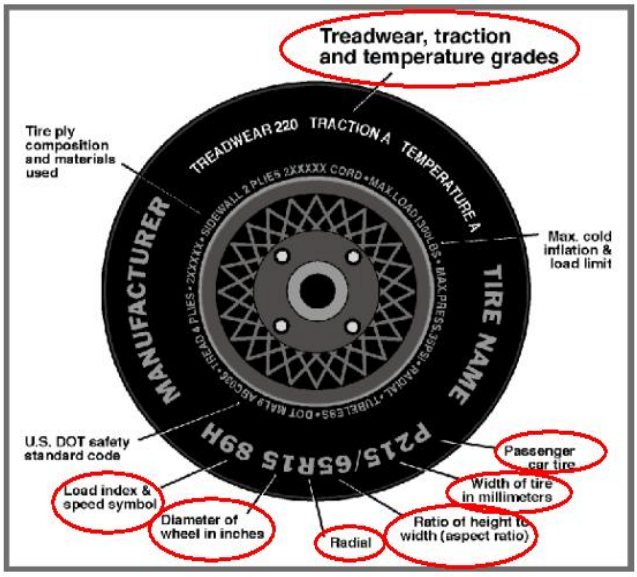
Measured Parameter	Front	Rear	Third	Total	
Type of Seats	Bucket	Bench			
Designated Seating Capacity	2	3		5	
Capacity Weight (VCW) (kg)				375.0	*A*
DSC x 68.04 (kg)				340.2	*B*
Cargo Weight (RCLW) (kg)				34.8	*A-B*

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2018 Ford EcoSport S 4WD 5-Door MPV NHTSA No.: M20180200

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/11/18



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	240	240
Recommended Tire Size	P205/60R16	P205/60R16
Tire Size on Vehicle	P205/60R16	P205/60R16
Tire Manufacturer	Bridgestone	Bridgestone
Tire Model	Ecopia EP422 Plus	Ecopia EP422 Plus
Treadwear	600	600
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	1 Polyester	1 Polyester
Tire Plies Body	1 Polyester, 2 Steel, 1 Nylon	1 Polyester, 2 Steel, 1 Nylon
Load Index / Speed Symbol	92H	92H
Tire Material	Polyester, Steel, Nylon	Polyester, Steel, Nylon
DOT Safety Code Left	1V 20 JNL 3817	1V 20 JNL 3817
DOT Safety Code Right	1V 20 JNL 3817	1V 20 JNL 3817

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2018 Ford EcoSport S 4WD 5-Door MPV NHTSA No.: M20180200

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/11/18

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	454.5	324.0		491.5	374.5	
Right	kg	433.0	298.0		465.0	346.0	
Ratio	%	58.8%	41.2%	100.0%	57.0%	43.0%	100.0%
Total	kg	887.5	622.0	1509.5	956.5	720.5	1677.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1509.5	A
Weight of 1 P572E ATD & 1 P572O ATD	kg	141.0	B
Rated Cargo/Luggage Weight (RCLW)	kg	34.8	C
Calculated Vehicle Target Weight (TVTW)	kg	1685.3	A+B+C

TEST VEHICLE ATTITUDES

Condition	Units	LF	RF	LR	RR	CG Aft of Front Axle
As Delivered	mm	750	754	773	786	1038
As Tested	mm	713	721	729	740	1083
Post-Test	mm	724	742	746	734	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheelbase	mm	2520
Total Vehicle Length at Left Side	mm	3462
Total Vehicle Length at Centerline	mm	4120
Total Vehicle Length at Right Side	mm	3455
Weight of Ballast in Cargo Area	kg	87.5
Weight of Vehicle Components Removed	kg	21.0
Amount of Stoddard Solvent in Fuel Tank	L	47.88

VEHICLE COMPONENTS REMOVED TO MEET TEST WEIGHT:

Trunk Trim (6.0 kg), Rear Seat Assembly (15.0 kg)

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2018 Ford EcoSport S 4WD 5-Door MPV NHTSA No.: M20180200

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/11/18

TARGET VEHICLE STRUCTURAL MEASUREMENTS

No.	Description	Pre-Test
1	Total Length	4120
2	Total Width	1765
3	Bumper Top Height	622
4	Bumper Bottom Height	482
5	Longitudinal Member Top Height	613
6	Distance Between Longitudinal Members	974
7	Longitudinal Member Width	63
8	Engine Top Height	850
9	Engine Bottom Height	251
10	Engine and Gearbox Width	480
11	Front Bumper to Engine Distance	395
12	Front Shock Absorber Fixing Height	920
13	Bonnet Leading Edge Height	910
14	Front Shock Absorber Fixing Width	1085
15	Front Bumper to Front Axle Distance	855
16	Front Axle to A-Pillar Distance	470
17	A-Pillar to B-Pillar Distance	889
18	B-Pillar to Rear Axle Distance	1035
19	B-Pillar to C-Pillar Distance	807
20	Roof Sill Bottom Height	1507
21	Roof Sill Top Height	1610
22	Floor Sill Bottom Height	302
23	Floor Sill Top Height	420

All measurements in millimeters.

DATA SHEET NO. 2

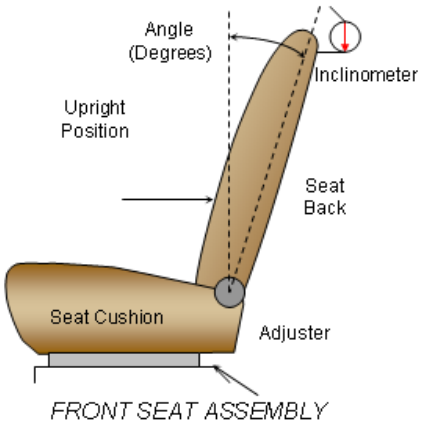
SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

Test Vehicle: 2018 Ford EcoSport S 4WD 5-Door MPV NHTSA No.: M20180200

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/11/18

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° ± 0.5°. Seat back angle is measured at the headrest post.

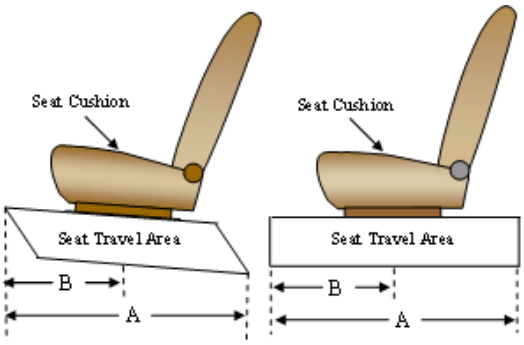


SEAT BACK ANGLE

Seating Position	Degrees
Driver Seat Back Angle	4.6
Passenger Seat Back Angle	0.4

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	280 mm	141 mm
Passenger Seat	227 mm	0 mm

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 "H" is the uppermost position, followed by position "M2," and position "M1." Position "L" is the lowermost position.

SEAT BELT UPPER ANCHORAGES

Seating Position	Total No. of Positions	Placed in Position
Driver Seat	3	H
Passenger Seat	3	H

DATA SHEET NO. 2 … (CONTINUED)

SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

Test Vehicle: 2018 Ford EcoSport S 4WD 5-Door MPV NHTSA No.: M20180200

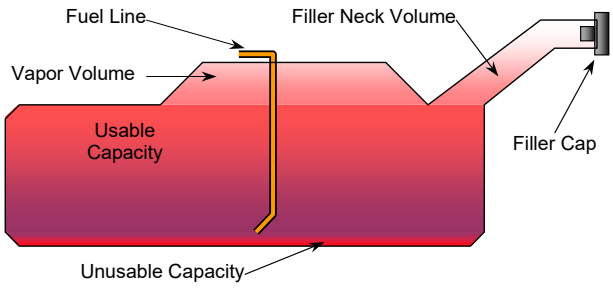
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/11/18

FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank"	51.48
Usable Capacity of "Optional Tank"	N/A
92 - 94% of Usable Capacity	47.36 to 48.39
Actual Amount of Stoddard Solvent Used	47.88
1/3 of Usable Capacity	17.16

FUEL PUMP

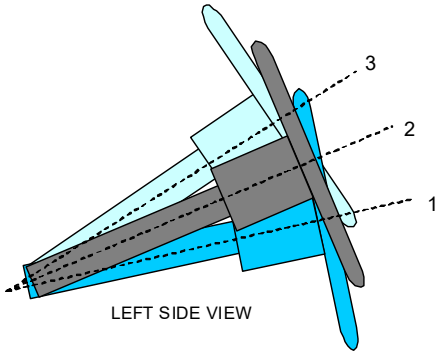
The vehicle is equipped with an electric fuel pump. The electric fuel pump operates for 2 seconds to pressurize the fuel system following the actuation of the ignition. If no attempt has been made to start the engine within 2 seconds following the ignition operation the fuel pump will shut off. The fuel pump operates continuously while the engine is running.



VEHICLE FUEL TANK ASSEMBLY

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

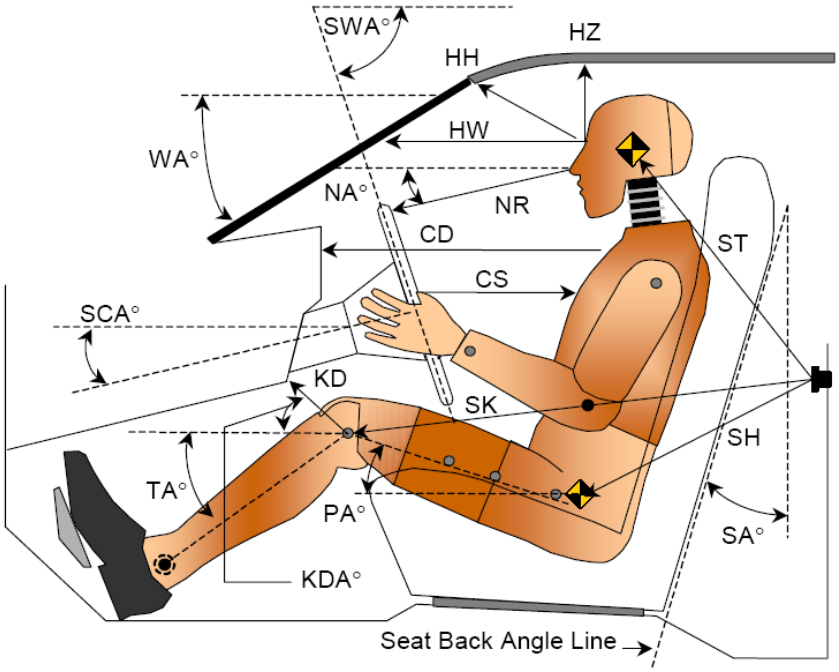
	Degrees	Fore-Aft Position (mm)
Lowermost Position, No. 1	24.8	110
Geometric Center Position, No. 2	27.0	135
Uppermost Position, No. 3	29.2	160
Telescoping Steering Wheel Travel		50
Test Position	27.0	135

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2018 Ford EcoSport S 4WD 5-Door MPV NHTSA No.: M20180200

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/11/18



LEFT SIDE VIEW

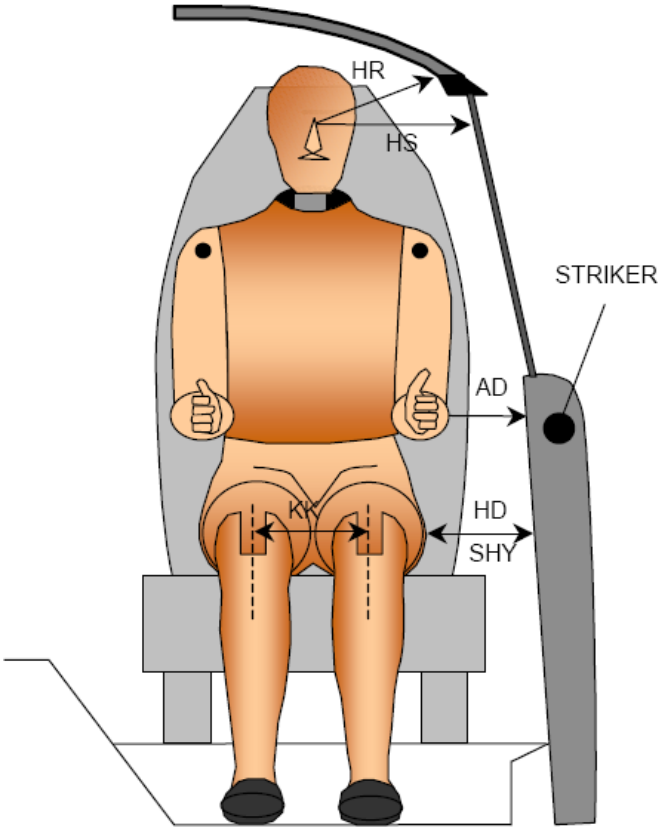
Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		23.5		
SWA°	Steering Wheel Angle		63.0		
SCA°	Steering Column Angle		27.0		
SA°	Seat Back Angle (On Headrest Post)		4.6		0.4
HZ	Head to Roof	249	90.0	278	40.0
HH	Head to Header	453	18.1	397	33.4
HW	Head to Windshield	788	0.0	739	0.0
NR	Nose to Rim	404	9.1	502	27.5
CD	Chest to Dash	545	9.6	467	10.1
CS	Chest to Steering Hub	308	1.6		
RA	Rim to Abdomen	169	0.0		
KDL	Left Knee to Dash	181	21.6	139	28.2
KDR	Right Knee to Dash	152	17.2	143	26.2
PA°	Pelvic Angle		24.7		21.9
TA°	Tibia Angle		51.3		47.9
SK	Striker to Knee	562	3.4	626	0.5
ST	Striker to Head	563	84.9	520	73.4
SH	Striker to H-Point	192	24.4	300	11.1

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2018 Ford EcoSport S 4WD 5-Door MPV NHTSA No.: M20180200

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/11/18



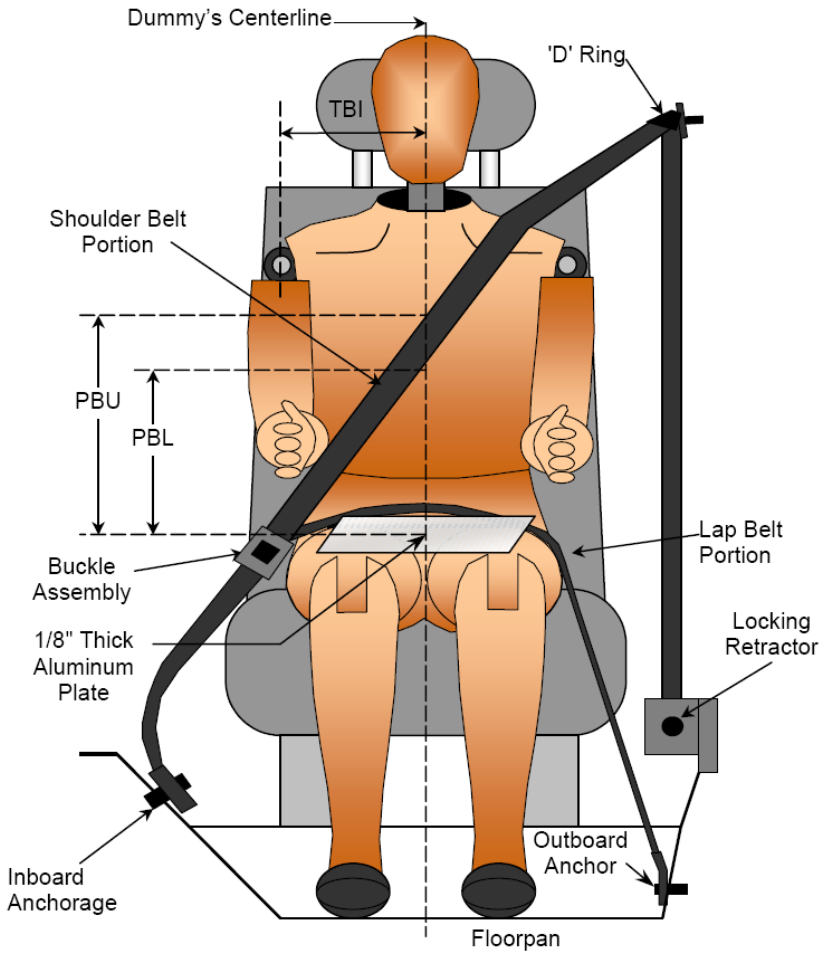
Code	Description	Driver (mm)	Passenger (mm)
AD	Arm to Door	107	83
HD	H-Point to Door	143	147
HR	Head to Side Header	245	351
HS	Head to Side Window	345	374
KK	Knee to Knee	303	202
SHY	Striker to H-Point (Y-Direction)	213	268
AA	Ankle to Ankle	295	156

DATA SHEET NO. 5

SEAT BELT POSITIONING DATA

Test Vehicle: 2018 Ford EcoSport S 4WD 5-Door MPV NHTSA No.: M20180200

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/11/18



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	345	289
PBL	Top Surface of Aluminum Plate to Belt Lower Edge	mm	265	198

BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder Belt Length as Measured on ATD	mm	910	918
Lap Belt Length as Measured on ATD	mm	790	921
Remainder of Belt on Reel	mm	650	511
Total Belt Length for Continuous Webbing Systems	mm	2350	2350

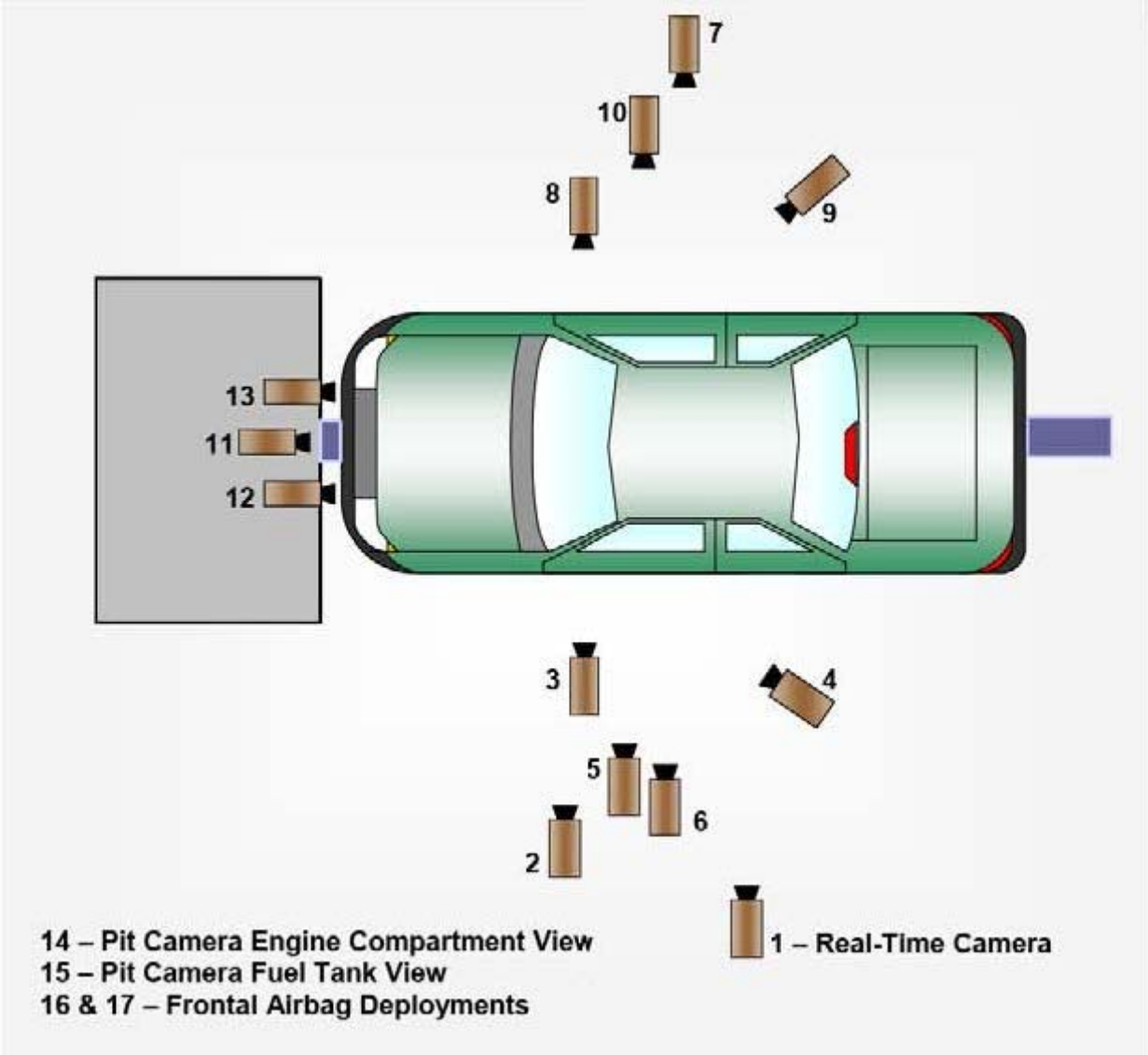
DATA SHEET NO. 6

HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2018 Ford EcoSport S 4WD 5-Door MPV NHTSA No.: M20180200

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/11/18

CAMERA POSITIONS FOR FRONTAL IMPACTS



DATA SHEET NO. 6 … (CONTINUED)

HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2018 Ford EcoSport S 4WD 5-Door MPV NHTSA No.: M20180200

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/11/18

CAMERA LOCATIONS

No.	Description	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall	-11412	-8150	-1484		30
2	Driver Close-Up	-2590	-7950	-1371	50	1000
3	Left Front Half	-1701	-6197	-1701	35	1000
4	Left Angle	-6696	-10308	-3211	105	1000
5	Steering Column - Top	-1966	-10412	-3688	35	1000
6	Steering Column - Bottom	-1972	-10412	-3379	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	20	1000
15	Pit Rear	-3398	0	1495	20	1000
16	Onboard Driver Airbag (Optional)	-2860	300	-1530	8	1000
17	Onboard Passenger Airbag (Optional)	-2860	-300	-1530	8	1000
18	Real-Time Left View of Impact					
19	Real-Time Right View of Impact					

Coordinates: +X = forward impact plane

+Y = right of monorail center

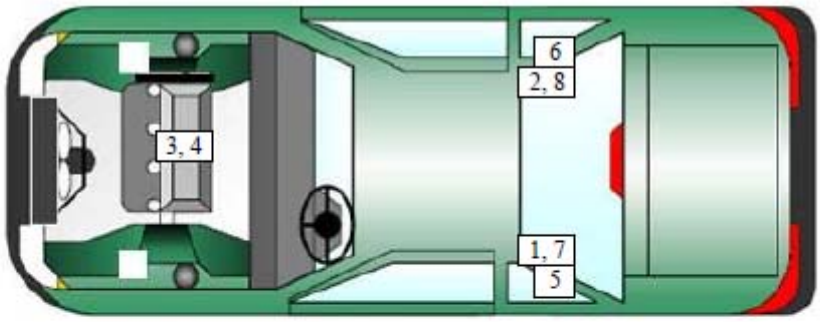
+Z = into ground

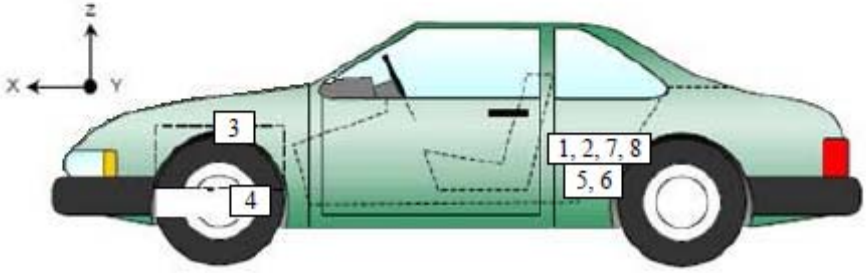
DATA SHEET NO. 7

VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2018 Ford EcoSport S 4WD 5-Door MPV NHTSA No.: M20180200

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/11/18





VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Description	Location		
		X	Y	Z
1	Left Rear Accelerometer X-Direction	1500	-600	-400
2	Right Rear Accelerometer X-Direction	1500	600	-400
3	Engine Top X	3600	140	-900
4	Engine Bottom X	3550	300	-300
5	Left Rear Accelerometer Z-Direction	1500	-600	-400
6	Right Rear Accelerometer Z-Direction	1500	600	-400
7	Left Rear Accelerometer X-Direction Redundant	1500	-600	-400
8	Right Rear Accelerometer X-Direction Redundant	1500	600	-400

Reference Points: X – Rear Surface of Vehicle (+ forward)

Y – Vehicle Centerline (+ to right)

Z – Ground Plane (+ down)

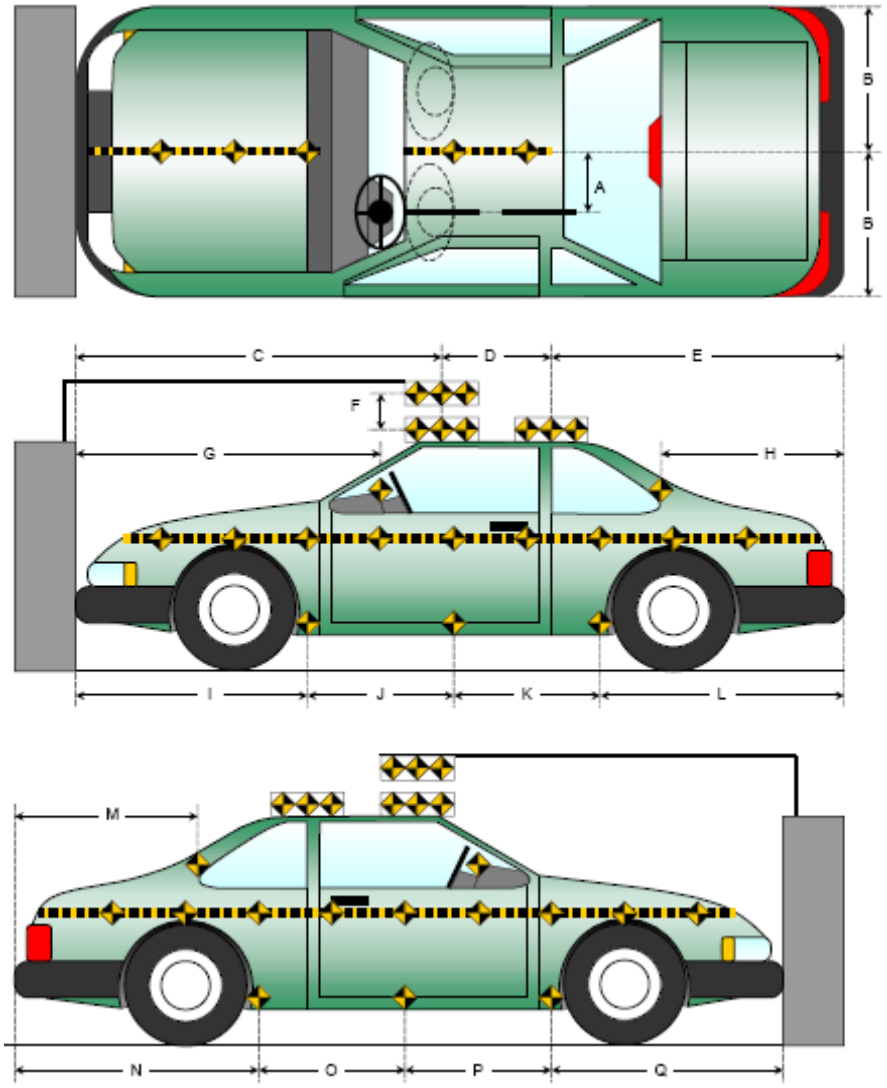
DATA SHEET NO. 8

PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2018 Ford EcoSport S 4WD 5-Door MPV NHTSA No.: M20180200

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/11/18

Item	Value
A	390
B	883
C	1990
D	610
E	1530
F	305
G	1640
H	757
I	1289
J	816
K	816
L	1212
M	754
N	1210
O	819
P	819
Q	1280



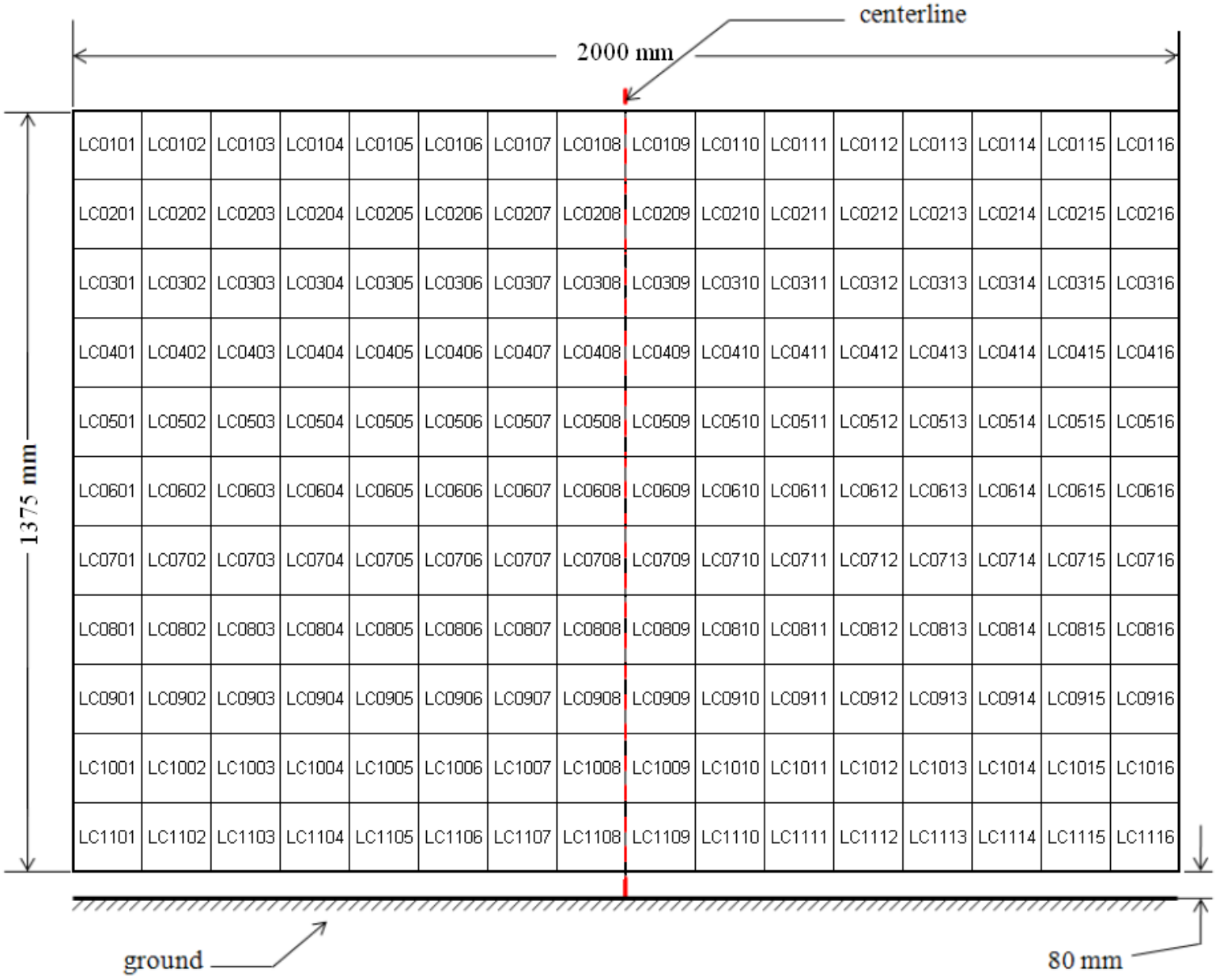
All measurements in millimeters.

DATA SHEET NO. 9

LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2018 Ford EcoSport S 4WD 5-Door MPV NHTSA No.: M20180200

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/11/18



DATA SHEET NO. 10

TEST VEHICLE CAMERA AND INSTRUMENTATION SUMMARY

Test Vehicle: 2018 Ford EcoSport S 4WD 5-Door MPV NHTSA No.: M20180200

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/11/18

INSTRUMENTATION

Driver Dummy Accelerometers	47
Passenger Dummy Accelerometers	47
Vehicle Structure Accelerometers	8
Seat Belt Load Cells	4
Load Cell Barrier	528
Total	634

CAMERA COVERAGE

High-Speed Vehicle On Board	2
High-Speed Off Board	14
Real Time	3
Total	19

DATA SHEET NO. 11

POST-TEST OBSERVATIONS

Test Vehicle: 2018 Ford EcoSport S 4WD 5-Door MPV NHTSA No.: M20180200

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/11/18

TEST DUMMY INFORMATION AND CONTACT

Description	Driver	Passenger
Dummy Type/Serial No.	P572E 50th Percentile Male ATD / 360	P572O 5th Percentile Female ATD / 141
Head Contact	Frontal Airbag, Headrest	Frontal Airbag, Headrest
Upper Torso Contact	Frontal Airbag	Frontal Airbag
Lower Torso Contact	None	None
Left Knee Contact	Knee Airbag	Knee Airbag
Right Knee Contact	Knee Airbag	Knee Airbag

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Locked / Unlocked Doors	Unlocked	Unlocked
Front Door Opening	Remained closed and latched, operational	Remained closed and latched, operational
Rear Door Opening	Remained closed and latched, operational	Remained closed and latched, operational
Seat Track Shift (mm)	0	0
Seat Back Failure	None	None
Glazing Damage	Broken	Broken

POST-TEST STRUCTURAL OBSERVATIONS

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

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	1221
Center	mm	1197
Right Side	mm	1306
Average	mm	1241

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

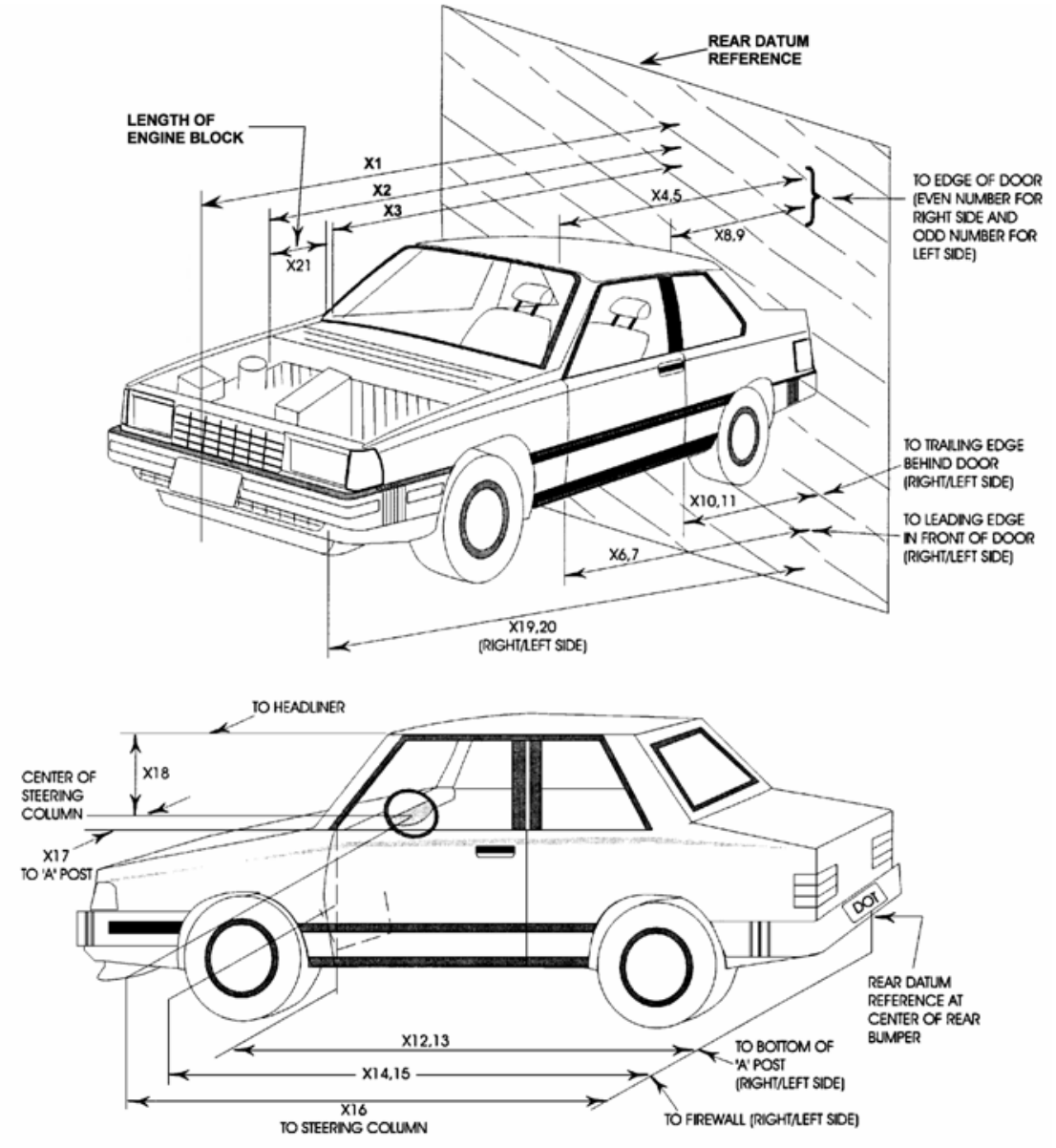
Restraint Type	Driver		Passenger	
	Installed	Operated	Installed	Operated
Front Airbag	Yes	Yes	Yes	Yes
Side Airbag 1 (Curtain)	Yes	No	Yes	No
Side Airbag 2 (Torso/Pelvis)	Yes	No	Yes	No
Knee Airbag	Yes	Yes	Yes	Yes
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes

DATA SHEET NO. 12

VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2018 Ford EcoSport S 4WD 5-Door MPV NHTSA No.: M20180200

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/11/18



DATA SHEET NO. 12 … (CONTINUED)

VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2018 Ford EcoSport S 4WD 5-Door MPV NHTSA No.: M20180200

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/11/18

No.	Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	4120	3750	-370
2	Rear Surface of Vehicle to Front of Engine	3725	3490	-235
3	RSOV to Firewall	3235	3100	-135
4	RSOV to Upper Leading Edge of Right Door	2840	2837	-3
5	RSOV to Upper Leading Edge of Left Door	2830	2845	15
6	RSOV to Lower Leading Edge of Right Door	2810	2803	-7
7	RSOV to Lower Leading Edge of Left Door	2810	2810	0
8	RSOV to Upper Trailing Edge of Right Door	1725	1740	15
9	RSOV to Upper Trailing Edge of Left Door	1725	1745	20
10	RSOV to Lower Trailing Edge of Right Door	1777	1773	-4
11	RSOV to Lower Trailing Edge of Left Door	1780	1783	3
12	RSOV to Bottom of A-Pillar, Right Side	2679	2615	-64
13	RSOV to Bottom of A-Pillar, Left Side	2679	2706	27
14	RSOV to Firewall, Right Side	3210	3137	-73
15	RSOV to Firewall, Left Side	3215	3190	-25
16	RSOV to Steering Column	2290	2385	95
17	Center of Steering Column to A-Pillar	415	435	20
18	Center of Steering Column to Headliner	400	400	0
19	RSOV to Right Side of Front Bumper	3455	3452	-3
20	RSOV to Left Side of Front Bumper	3462	3370	-92
21	Length of Engine Block	600	600	0
RD	RSOV to Right Side of Dash Panel	2510	2500	-10
CD	RSOV to Center of Dash Panel	2560	2495	-65
LD	RSOV to Left Side of Dash Panel	2515	2515	0

All measurements in millimeters.

DATA SHEET NO. 13

ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2018 Ford EcoSport S 4WD 5-Door MPV NHTSA No.: M20180200

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/11/18

VEHICLE INFORMATION

VIN: MAJ6P1SL6JC168606 Wheelbase (mm): 2520

Vehicle Size Category: MPV Test Weight (kg): 1677.0

ACCELEROMETER DATA

Accelerometer Locations: Left Rear Crossmember

Cal. Procedure/Interval: Vibration Test / 6 months

Integration Algorithm: NHTSA Standard Linearity: Good

Impact Velocity (km/h): 56.71

Velocity Change (km/h): 64.3

Time of Separation (msec): 65.1

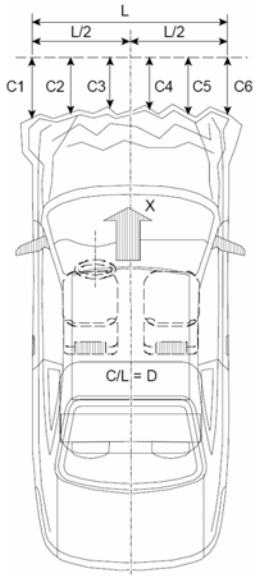
CRUSH PROFILE

Collision Deformation Classification: 12FDEW2

Midpoint of Damage: Vehicle Centerline

Damage Region Length (mm): 1367

Impact Mode: Full Frontal



No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush Zone 1 at Left Side	mm	238	476	238
C2	Crush Zone 2 at Left Side	mm	52	376	324
C3	Crush Zone 3 at Left Side	mm	3	350	347
C4	Crush Zone 4 at Right Side	mm	3	371	368
C5	Crush Zone 5 at Right Side	mm	53	439	386
C6	Crush Zone 6 at Right Side	mm	240	553	313
L	C1 to C6	mm	1367		

DATA SHEET NO. 14

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2018 Ford EcoSport S 4WD 5-Door MPV NHTSA No.: M20180200

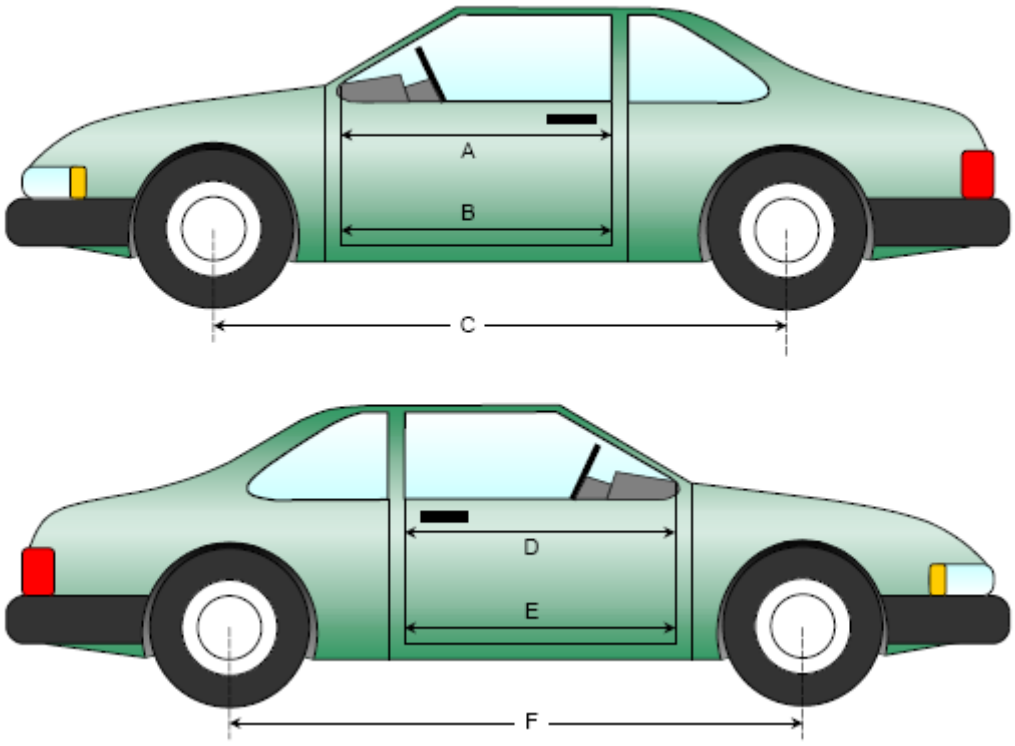
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/11/18

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	891	891	0
B	Left Side Lower	mm	873	874	-1
D	Right Side Upper	mm	898	900	-2
E	Right Side Lower	mm	851	851	0

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2520	2395	125
F	Right Side Wheelbase	mm	2521	2440	81



DATA SHEET NO. 14 … (CONTINUED)

VEHICLE INTRUSION MEASUREMENTS

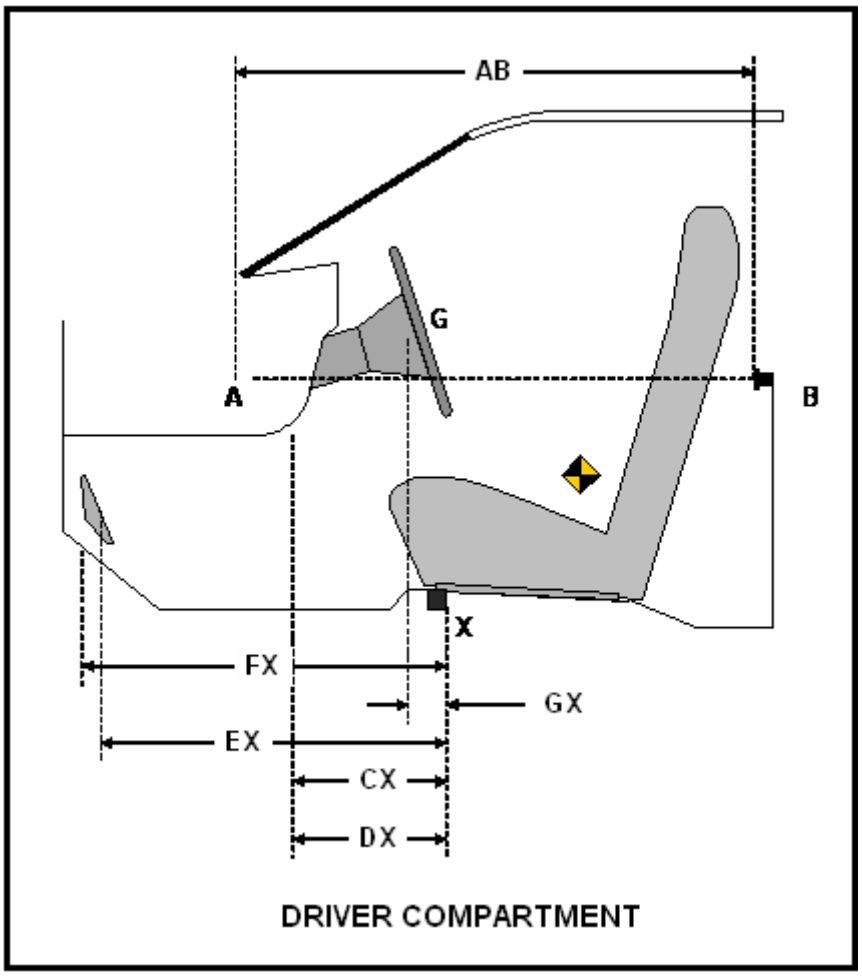
Test Vehicle: 2018 Ford EcoSport S 4WD 5-Door MPV NHTSA No.: M20180200

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/11/18

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	837	839	-2
CX	Left Knee Bolster to X	mm	340	335	5
DX	Right Knee Bolster to X	mm	310	325	-15
EX	Brake Pedal to X	mm	500	490	10
FX	Foot Rest to X	mm	530	510	20
GX	Center of Steering Wheel Hub to X	mm	70	115	-45

X = Front of Seat Track (Stationary)



DRIVER COMPARTMENT

DATA SHEET NO. 15

SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA

Test Vehicle: 2018 Ford EcoSport S 4WD 5-Door MPV NHTSA No.: M20180200

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/11/18

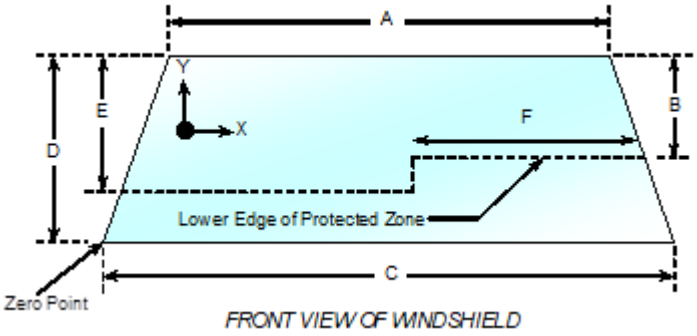
Windshield Mounting Details: Windshield glass is secured to the vehicle frame with plastic molding and rubber cement.

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: 21.3° C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2157.5	2157.5	100.0%
Right Side	2157.5	2157.5	100.0%
Total	4315	4315	100.0%



FRONT VIEW OF WINDSHIELD

Item	Units	Value
A	mm	1170
B	mm	508
C	mm	1325
D	mm	910
E	mm	530
F	mm	455

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. 15 … (CONTINUED)

SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA

Test Vehicle: 2018 Ford EcoSport S 4WD 5-Door MPV NHTSA No.: M20180200

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/11/18

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 23.9° C Test Time: 1:30 PM

Stoddard Solvent Spillage Measurements

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

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

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

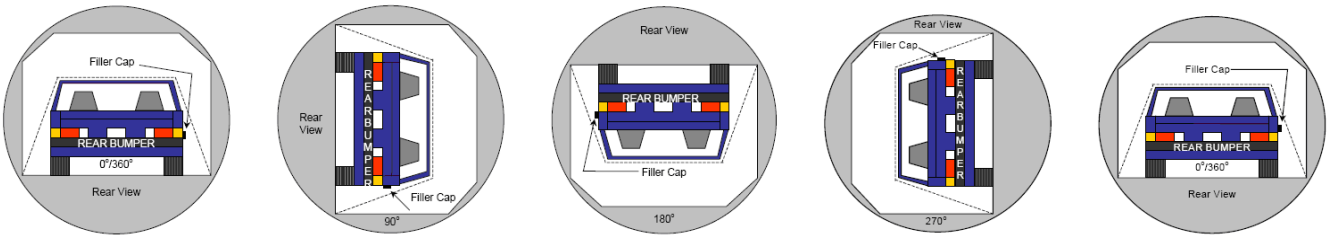
D. Spillage: There was no Stoddard solvent spillage.

DATA SHEET NO. 16

FMVSS 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2018 Ford EcoSport S 4WD 5-Door MPV NHTSA No.: M20180200

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/11/18



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: There was no Stoddard solvent spillage.

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° To 90°	80	300	380
90° To 180°	80	300	380
180° To 270°	79	300	379
270° To 360°	82	300	382

FMVSS 301 SPILLAGE TABLE

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

SOLVENT SPILLAGE LOCATION TABLE

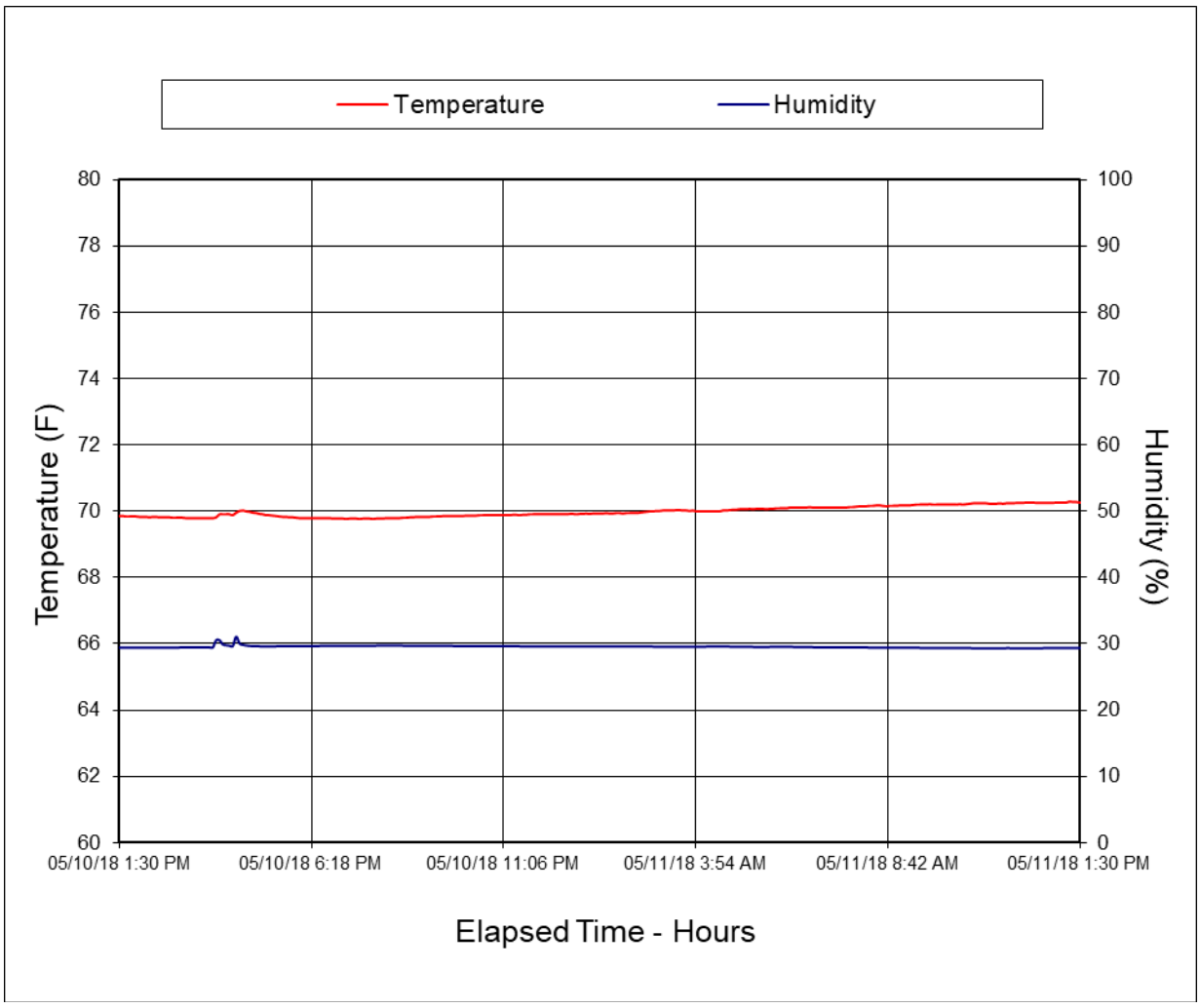
Test Phase	Spillage Location
0° To 90°	
90° To 180°	
180° To 270°	
270° To 360°	

DATA SHEET NO. 17

DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART

Test Vehicle: 2018 Ford EcoSport S 4WD 5-Door MPV NHTSA No.: M20180200

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/11/18



APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

TABLE OF PHOTOGRAPHS … (CONTINUED)

TABLE OF PHOTOGRAPHS … (CONTINUED)

FIGURE 1. Load Cell Location

FIGURE 2. Pre-Test Load Cell Wall

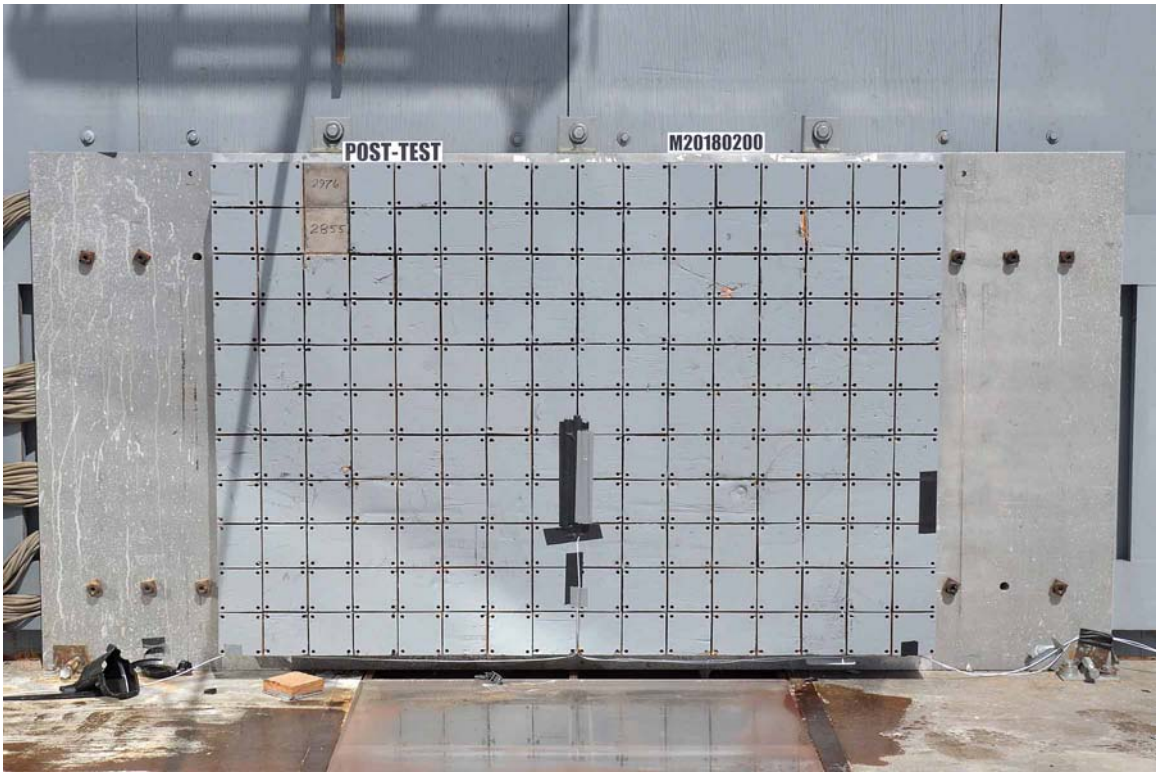


FIGURE 3. Post-Test Load Cell Wall

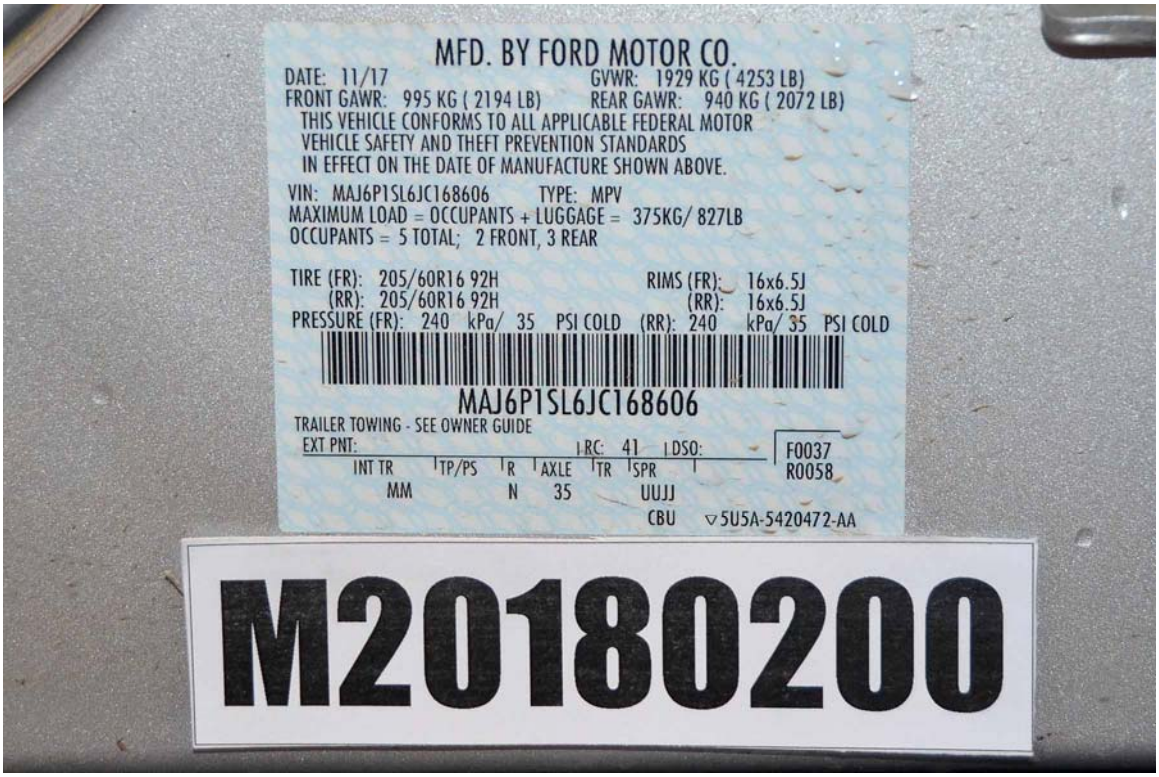


FIGURE 4. Manufacturer's Label

FIGURE 5. Tire Placard

FIGURE 6. 2018 Ford EcoSport S 4WD Frontal as Delivered

FIGURE 7. Left Rear ¾ View, as Received

FIGURE 8. Pre-Test Front View of Test Vehicle

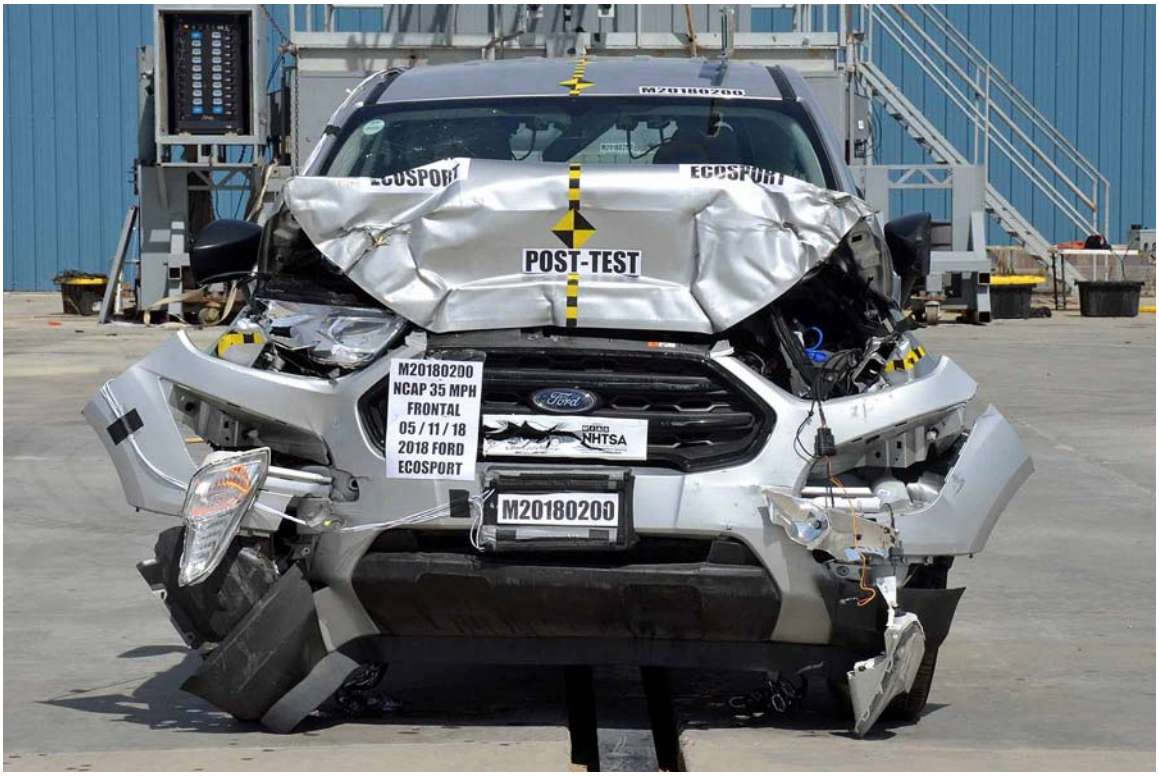


FIGURE 9. Post-Test Front View of Test Vehicle

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 ¾ View

FIGURE 15. Post-Test Right Front ¾ View

FIGURE 16. Pre-Test Left Rear ¾ View

FIGURE 17. Post-Test Left Rear ¾ View

FIGURE 18. Pre-Test Windshield View

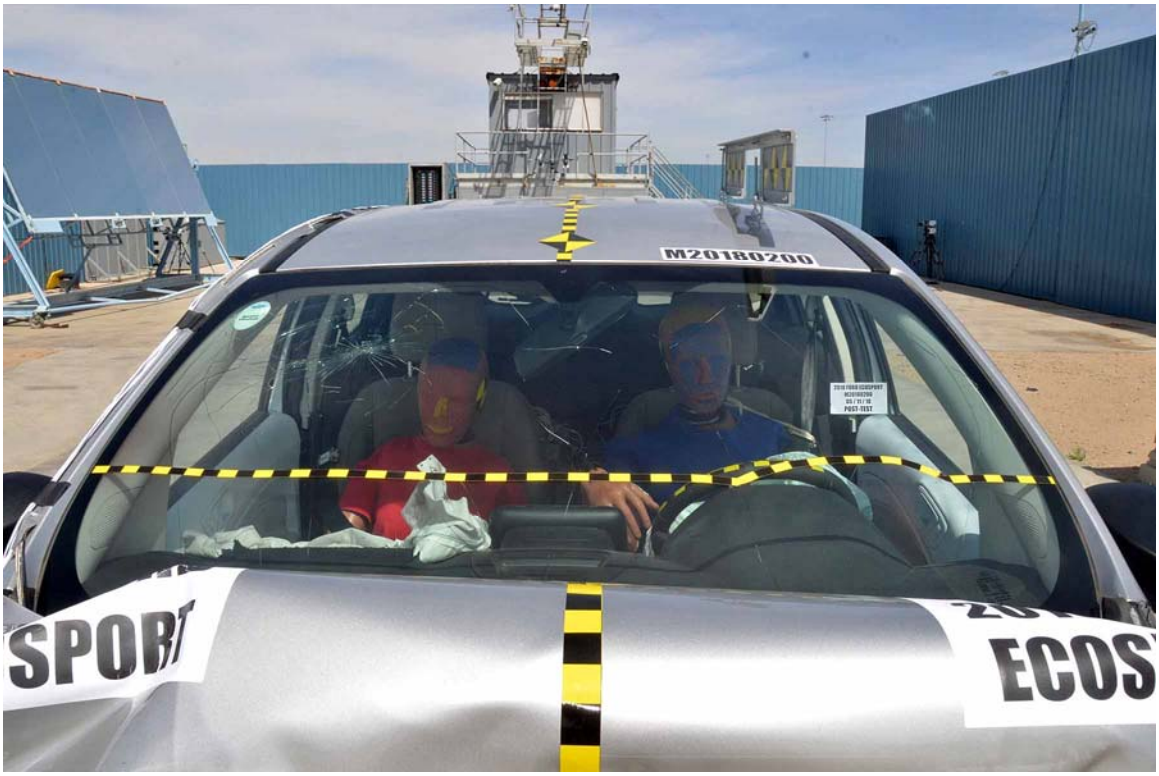


FIGURE 19. Post-Test Windshield View

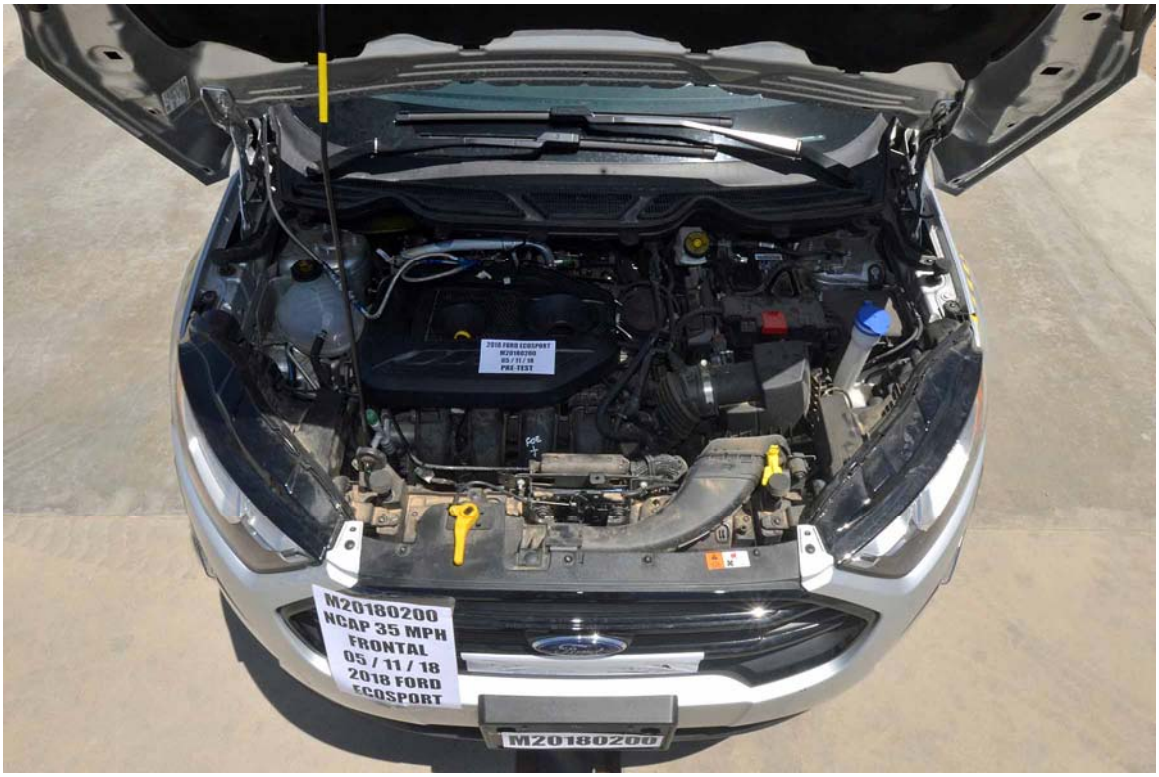


FIGURE 20. Pre-Test Engine Compartment View

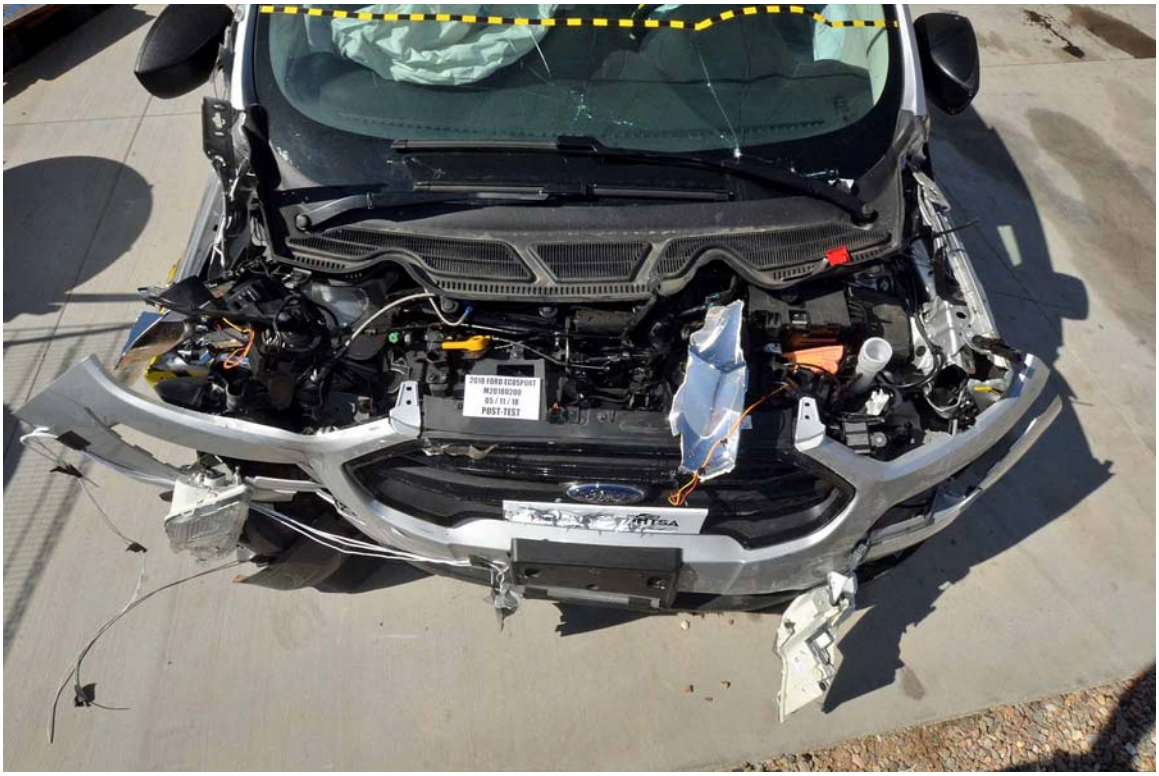


FIGURE 21. Post-Test Engine Compartment View

FIGURE 22. Pre-Test Fuel Filler Cap View

FIGURE 23. Post-Test Fuel Filler Cap View

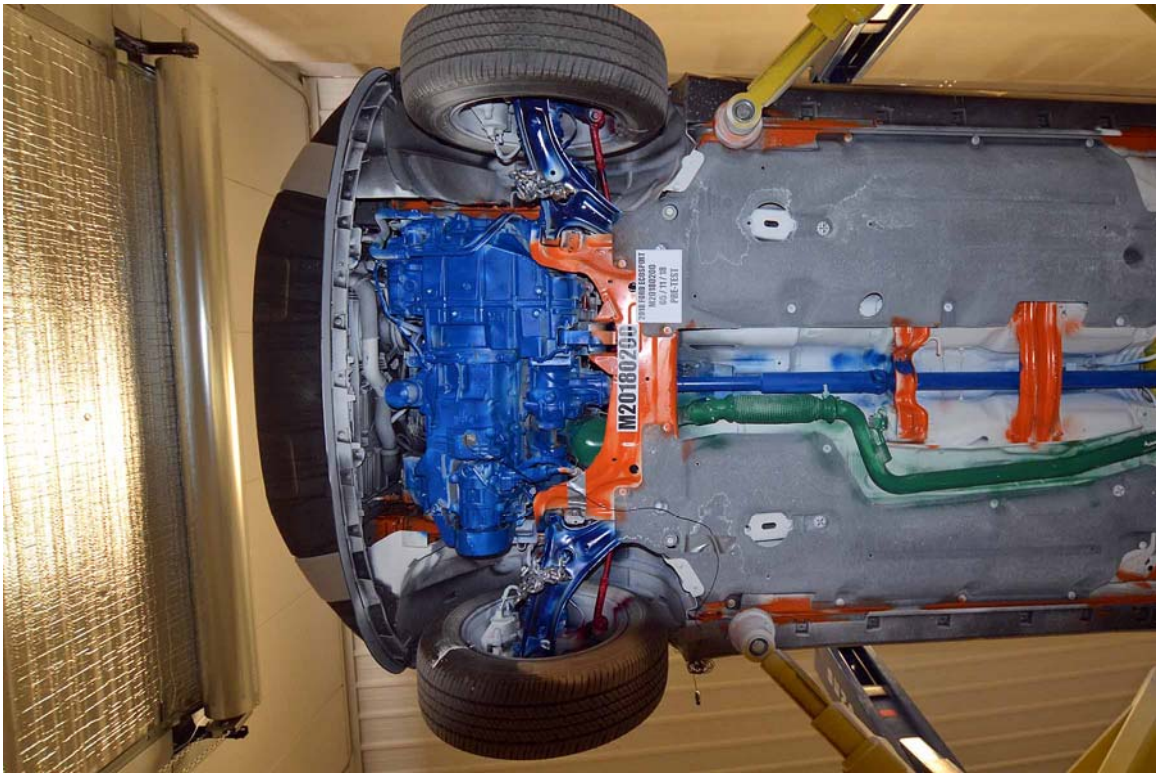


FIGURE 24. Pre-Test Front Underbody View

FIGURE 25. Post-Test Front Underbody View

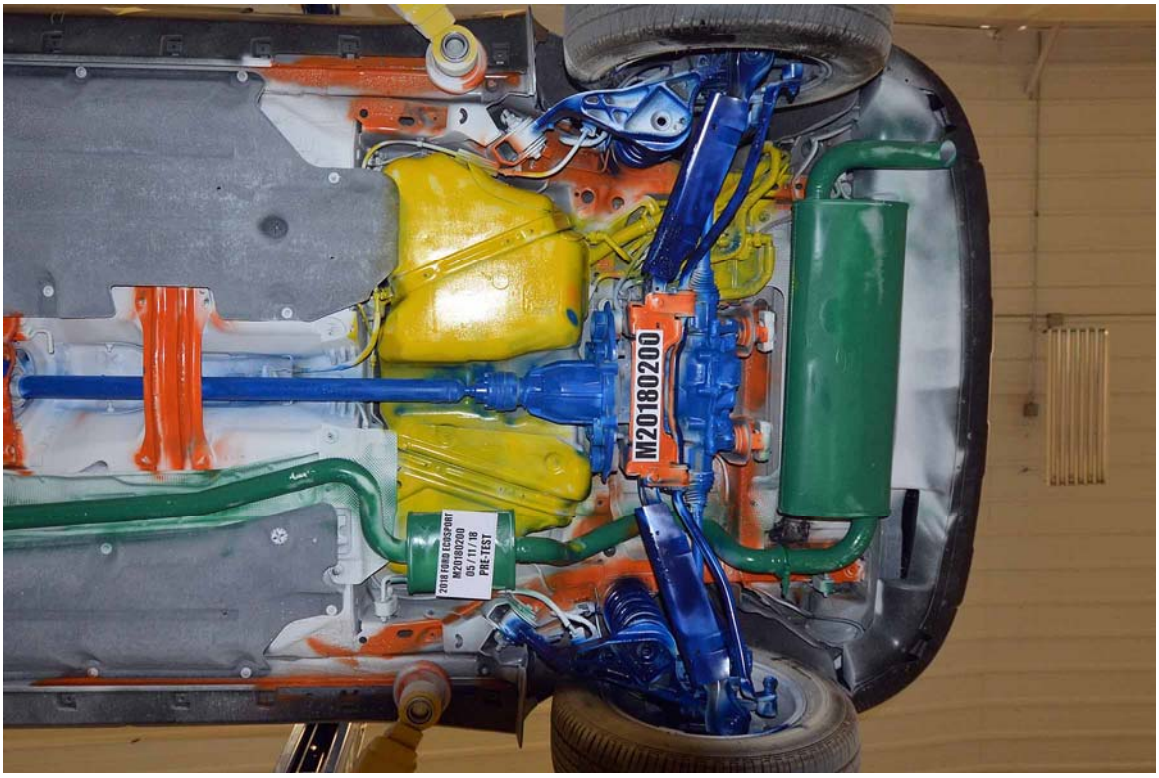


FIGURE 26. Pre-Test Rear Underbody View

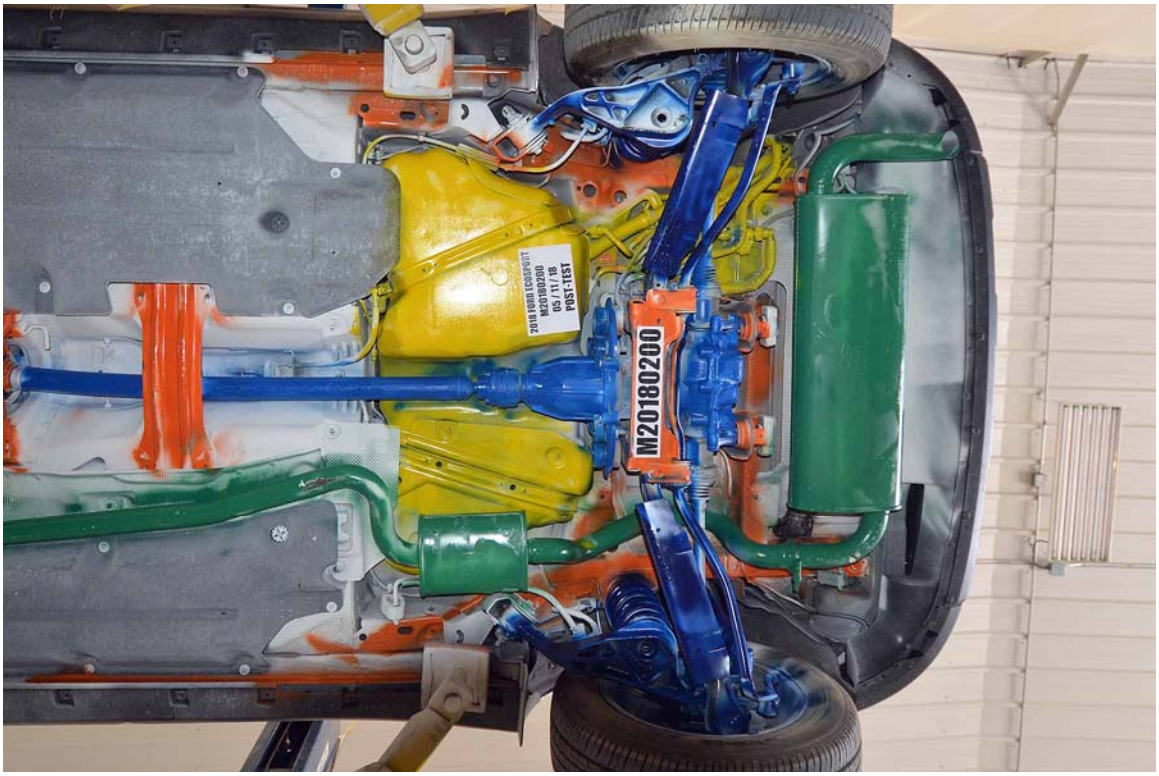


FIGURE 27. Post-Test Rear Underbody View

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

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 Driver Dummy Feet

FIGURE 41. Post-Test Driver Dummy Feet

FIGURE 42. Pre-Test Driver's Side Knee Bolster

FIGURE 43. Post-Test Driver's Side Knee Bolster

FIGURE 44. Pre-Test Driver's Side Floorpan

FIGURE 45. Post-Test Driver's Side Floorpan

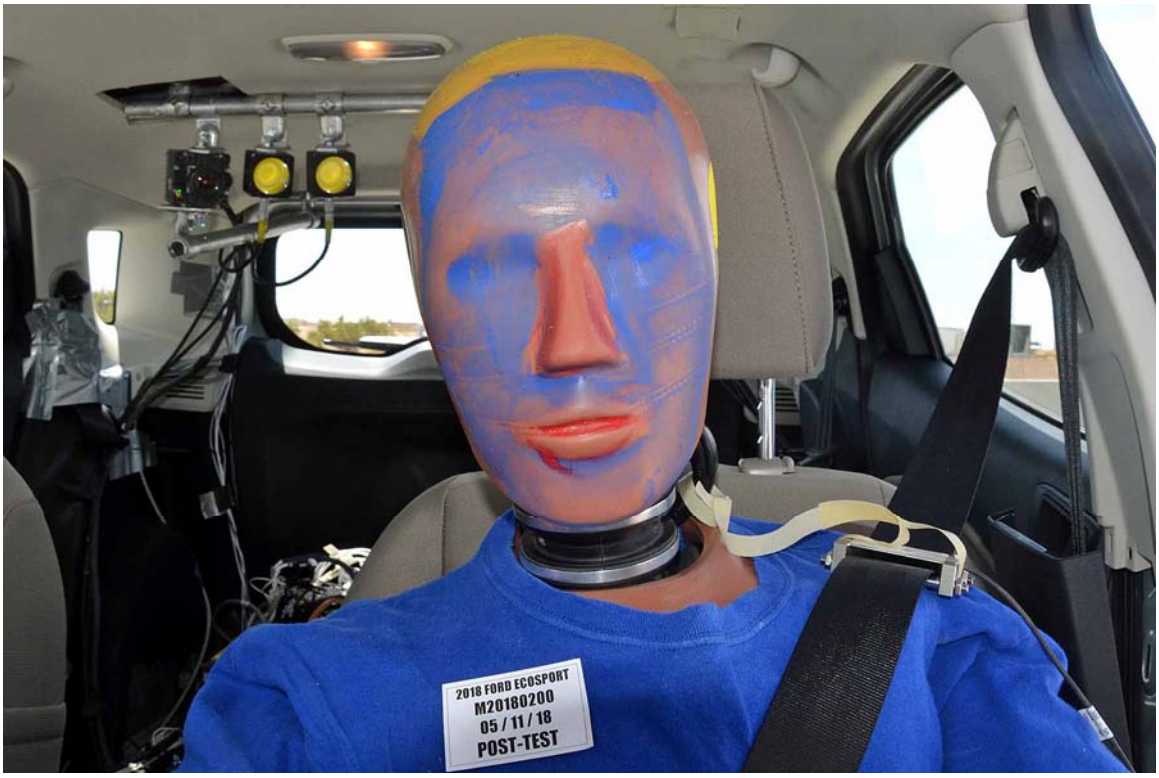


FIGURE 46. Post-Test Driver Dummy Face

FIGURE 47. Post-Test Driver Dummy Contact with Airbag

FIGURE 48. Post-Test Driver Dummy Contact with Headrest

FIGURE 48a. Post-Test Driver Dummy Contact with Knee Airbag

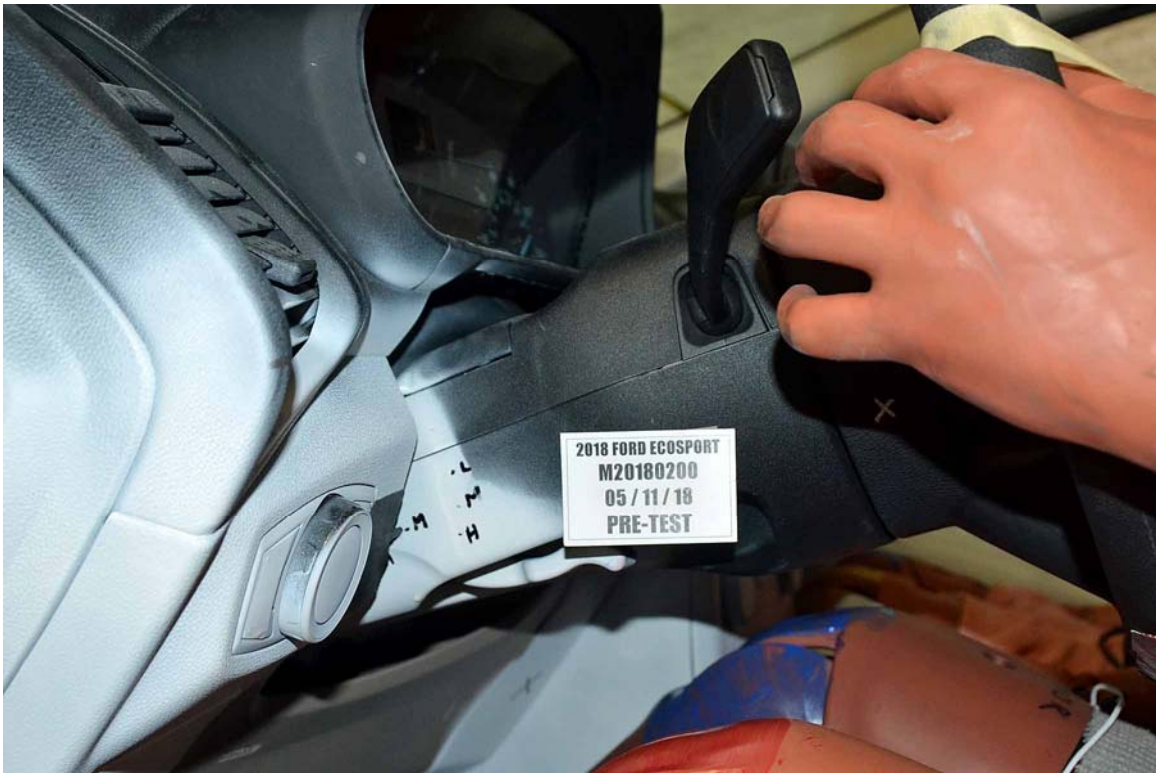


FIGURE 49. Pre-Test View of the Steering Wheel

FIGURE 50. Post-Test View of the Steering Wheel

FIGURE 51. Pre-Test Passenger Dummy Front View

FIGURE 52. Post-Test Passenger Dummy Front View

FIGURE 53. Pre-Test Passenger Dummy Window View

FIGURE 54. Post-Test Passenger Dummy Window View

FIGURE 55. Pre-Test Passenger Dummy and Vehicle Interior View

FIGURE 56. Post-Test Passenger Dummy and Vehicle Interior View

FIGURE 57. Pre-Test Passenger's Seat Fore-Aft Markings

FIGURE 58. Post-Test Passenger's Seat Fore-Aft Markings

FIGURE 59. Pre-Test View of Belt Anchorage for Passenger Dummy

FIGURE 60. Post-Test View of Belt Anchorage for Passenger Dummy

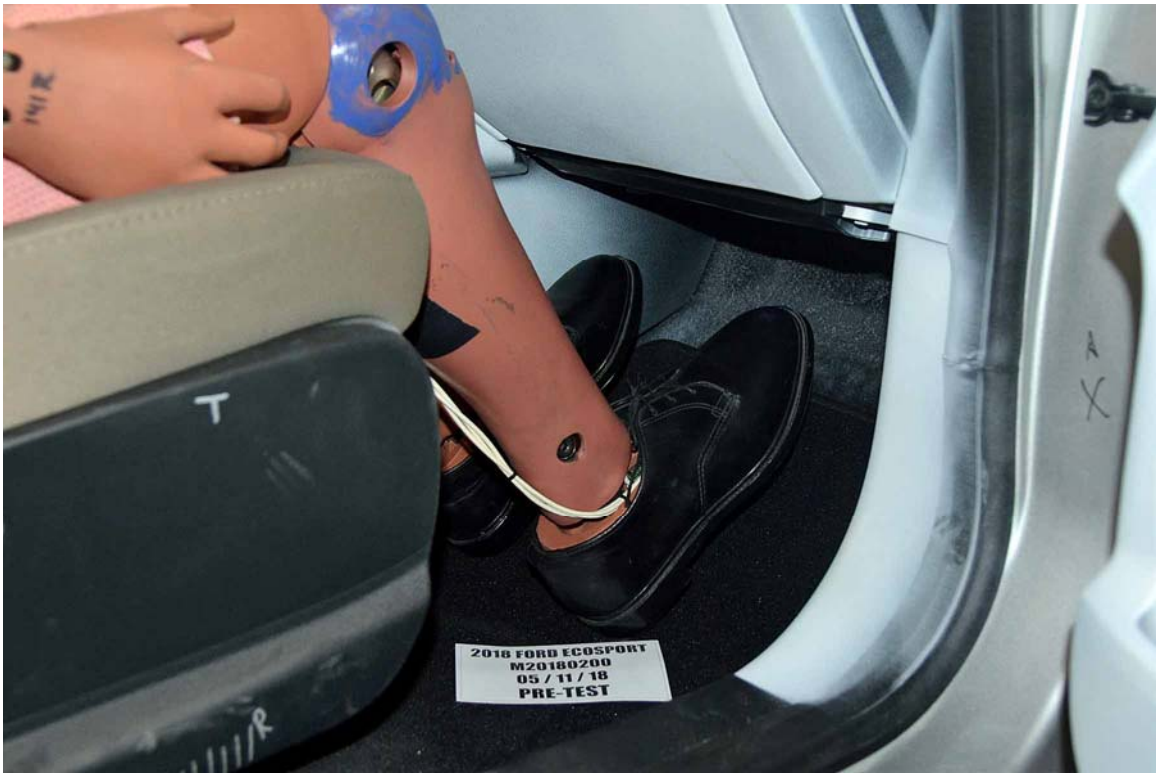


FIGURE 61. Pre-Test Passenger Dummy Feet

FIGURE 62. Post-Test Passenger Dummy Feet

FIGURE 63. Pre-Test Passenger's Side Knee Bolster

FIGURE 64. Post-Test Passenger's Side Knee Bolster

FIGURE 65. Pre-Test Passenger's Side Floorpan

FIGURE 66. Post-Test Passenger's Side Floorpan

FIGURE 67. Post-Test Passenger Dummy Face

FIGURE 68. Post-Test Passenger Dummy Contact with Airbag

FIGURE 69. Post-Test Passenger Dummy Contact with Headrest

FIGURE 69a. Post-Test Passenger Dummy Contact with Knee Airbag

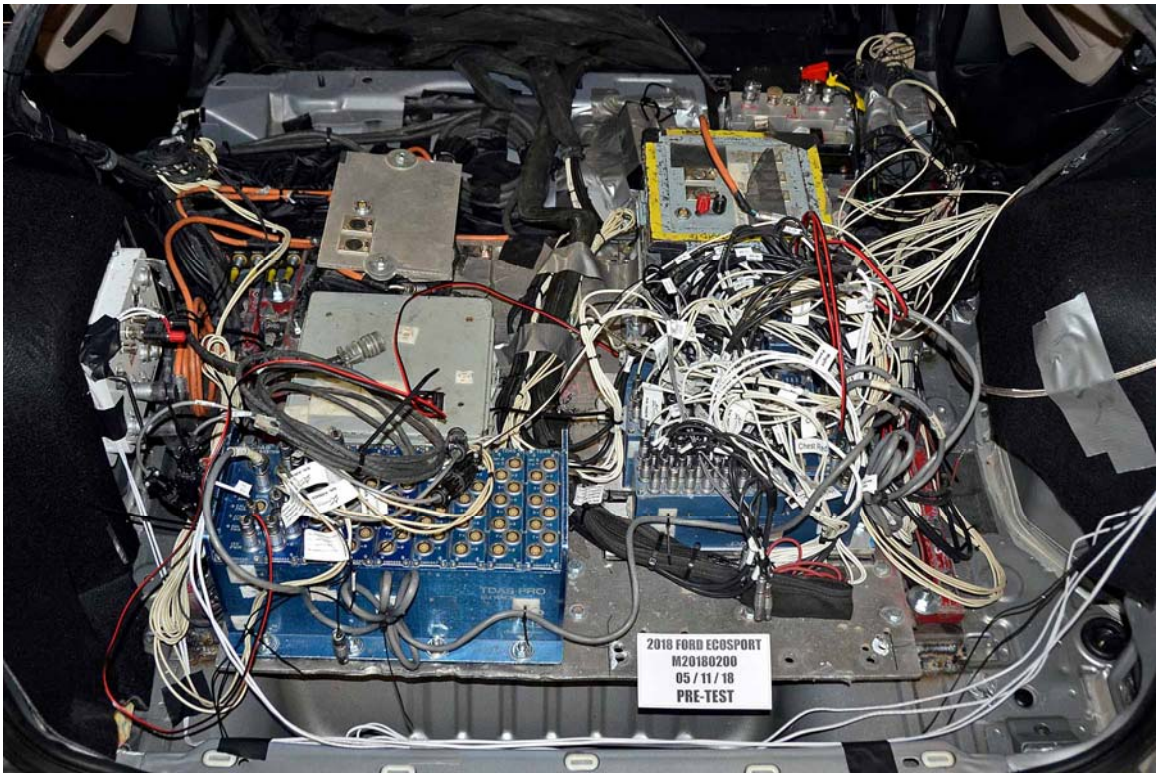


FIGURE 70. Photograph of Ballast Installed in Vehicle

Photograph Not Applicable

No Stoddard
Solvent Spillage

FIGURE 71. Post-Test Stoddard Solvent Spillage Location View

FIGURE 72. Post-Test Speed Trap Read-Out

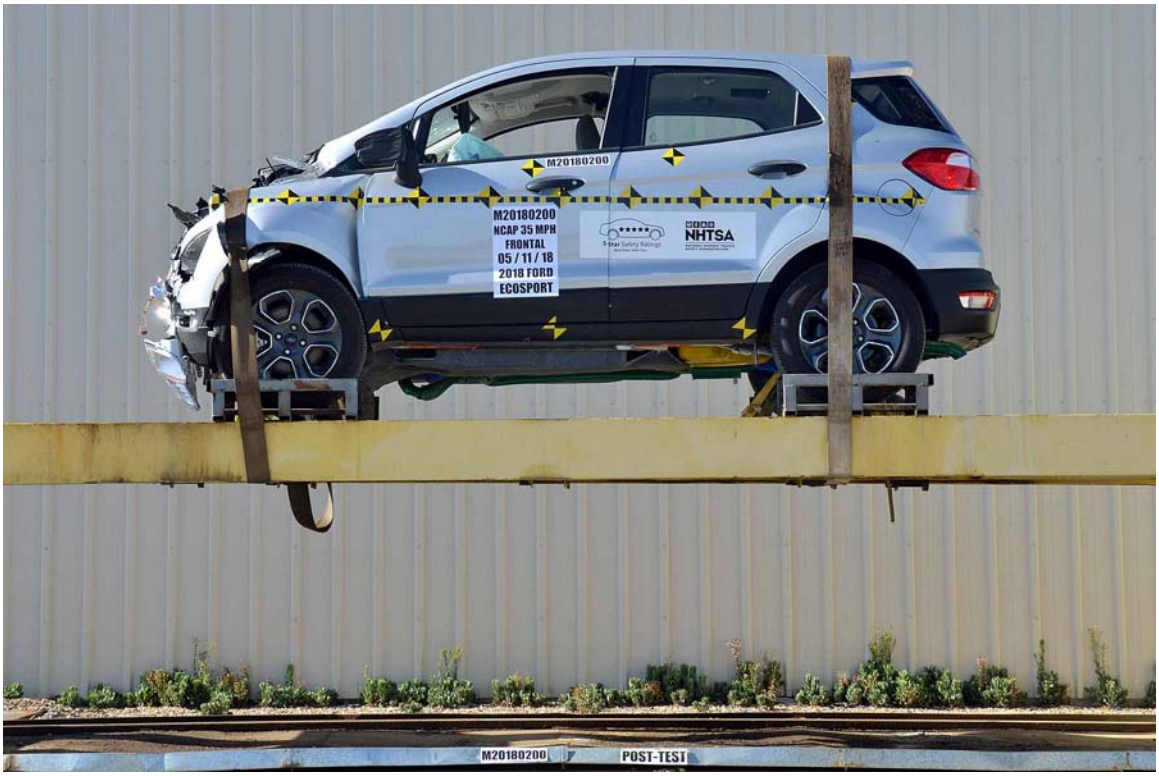


FIGURE 73. Vehicle at 0° on Static Rollover Device

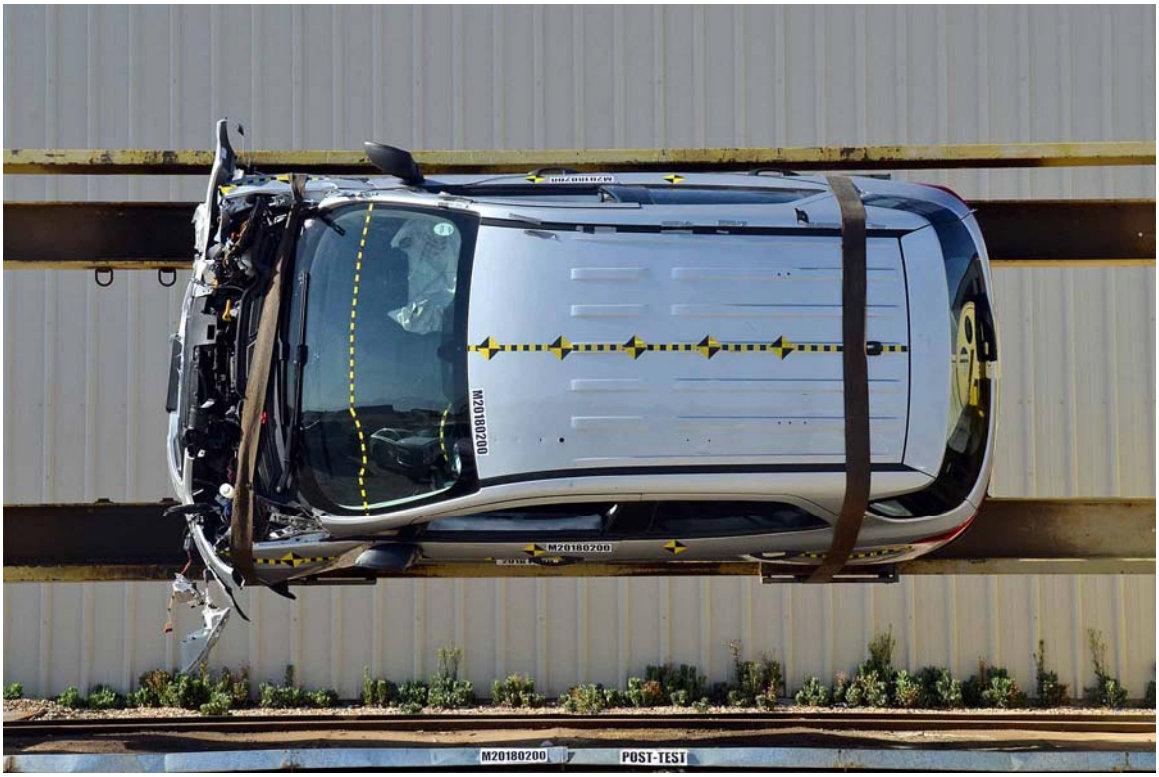


FIGURE 74. Vehicle at 90° on Static Rollover Device

FIGURE 75. Vehicle at 180° on Static Rollover Device

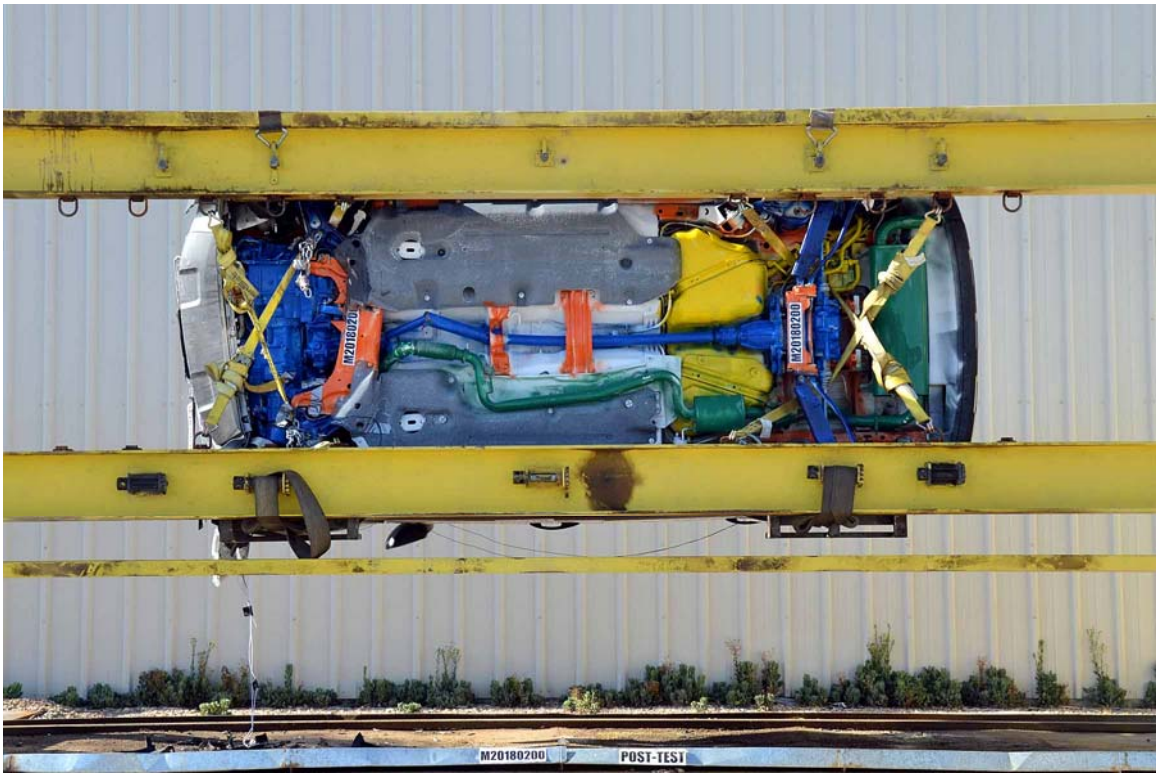


FIGURE 76. Vehicle at 270° on Static Rollover Device

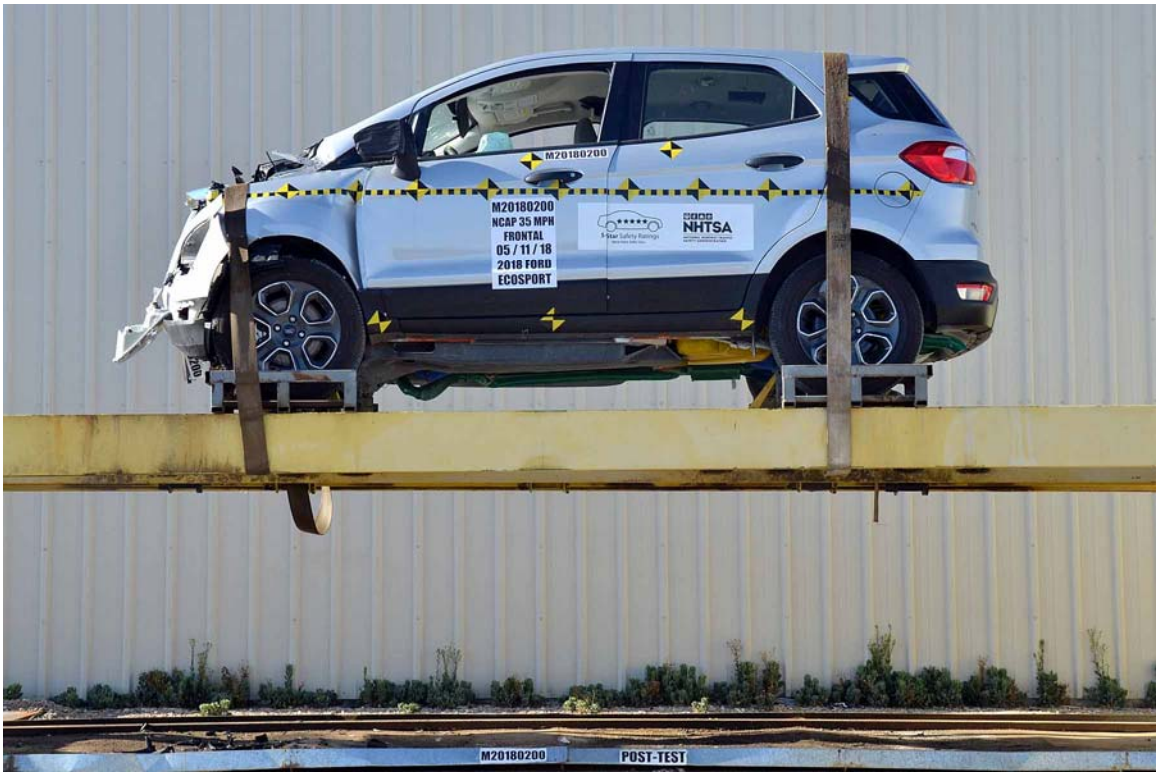


FIGURE 77. Vehicle at 360° on Static Rollover Device

FIGURE 78. 2018 Ford EcoSport S 4WD Frontal Impact Event

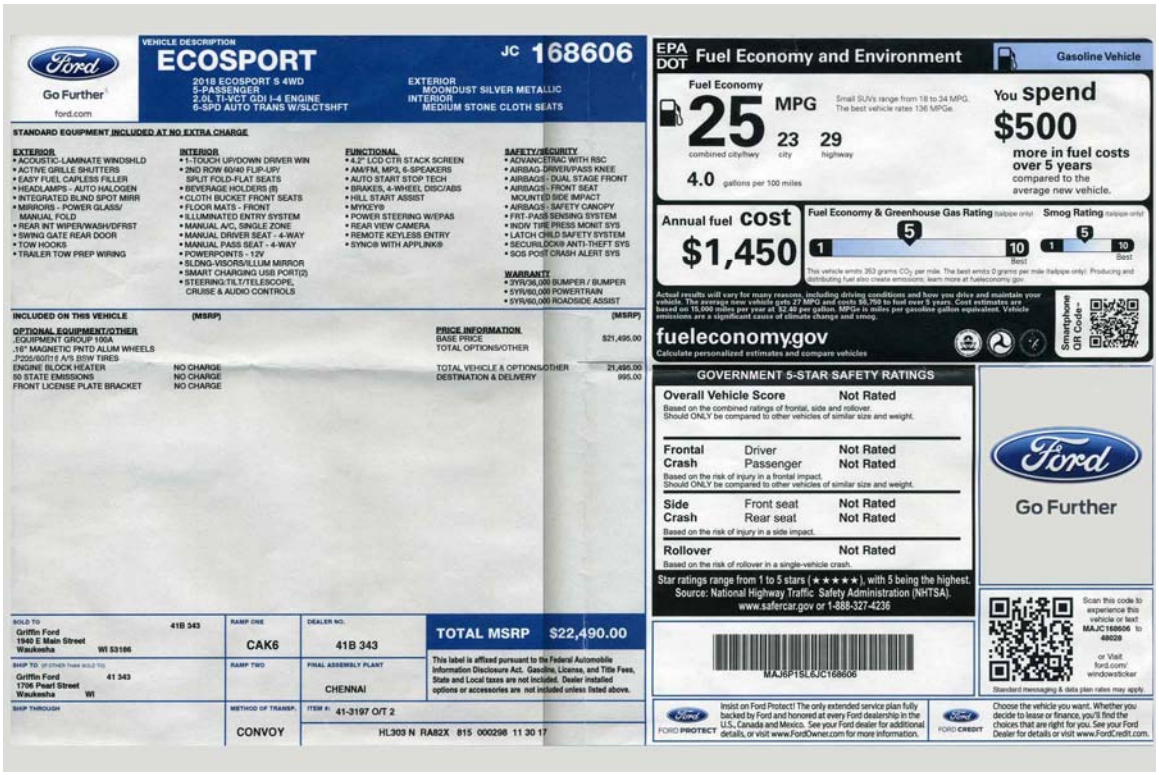


FIGURE 79. Monroney Label Photograph

APPENDIX B
DUMMY RESPONSE DATA TRACES

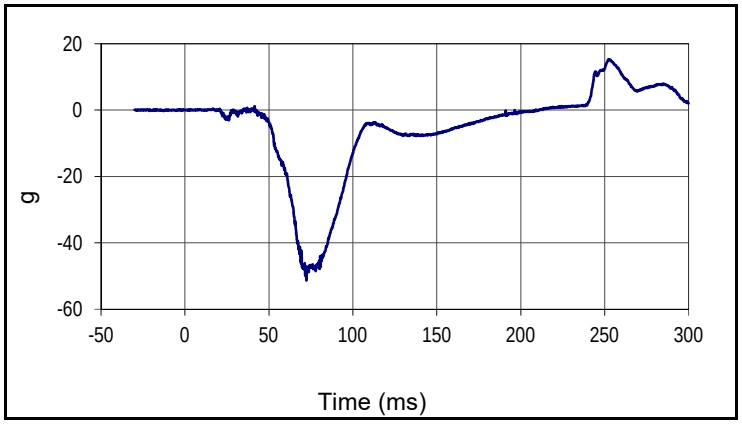
TABLE OF DATA PLOTS

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

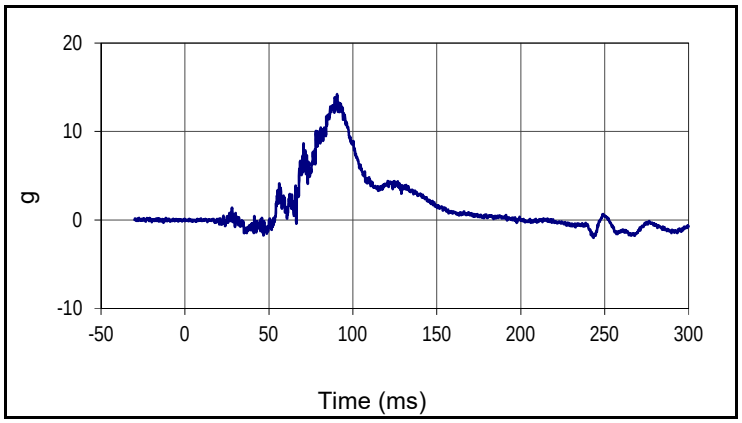
Driver Head X Acceleration Redundant
Driver Head Y Acceleration Redundant
Driver Head Z Acceleration Redundant
Driver Upper Neck Force Y
Driver Upper Neck Moment X
Driver Upper Neck Moment Z
Driver Chest X Acceleration Redundant
Driver Chest Y Acceleration Redundant
Driver Chest Z Acceleration Redundant
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
Passenger Head X Acceleration Redundant
Passenger Head Y Acceleration Redundant
Passenger Head Z Acceleration Redundant
Passenger Upper Neck Force X
Passenger Upper Neck Force Z
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
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

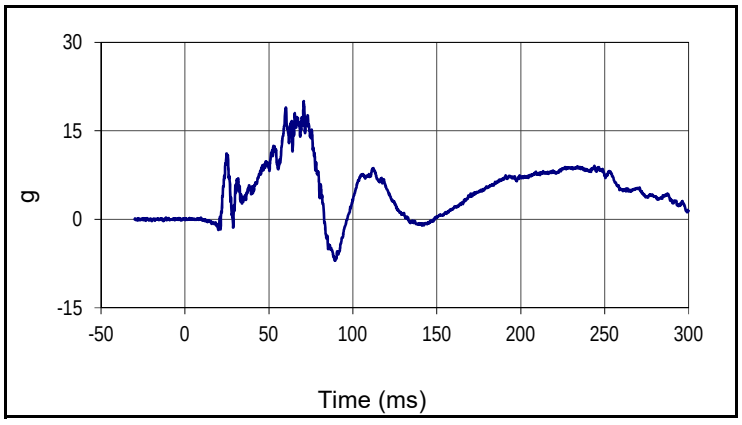
Test Vehicle:	2018 Ford EcoSport S 4WD 5-Door MPV	NHTSA No.:	M20180200
Test Program:	56.3 km/h Frontal Impact NCAP Test	Test Date:	05/11/18



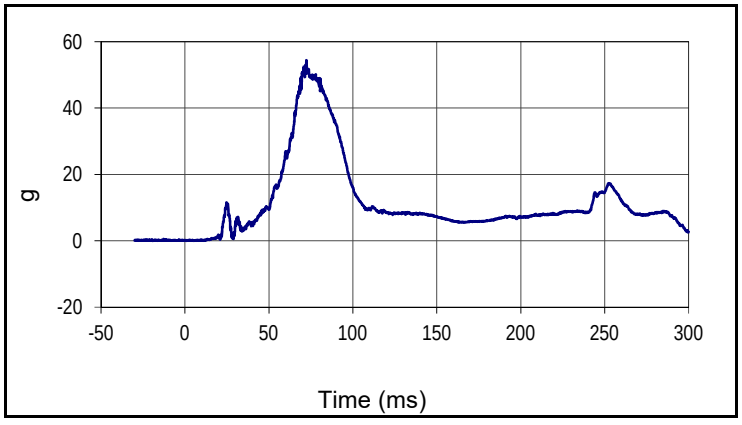
Curve Description			
Driver Head Acceleration X Primary			
Plot No.		SAE Class	Units
001		1000	g
Max	Time	Min	Time
15.3	252.5	-51.3	72.3



Curve Description			
Driver Head Acceleration Y Primary			
Plot No.		SAE Class	Units
002		1000	g
Max	Time	Min	Time
14.2	90.6	-2.0	243.3

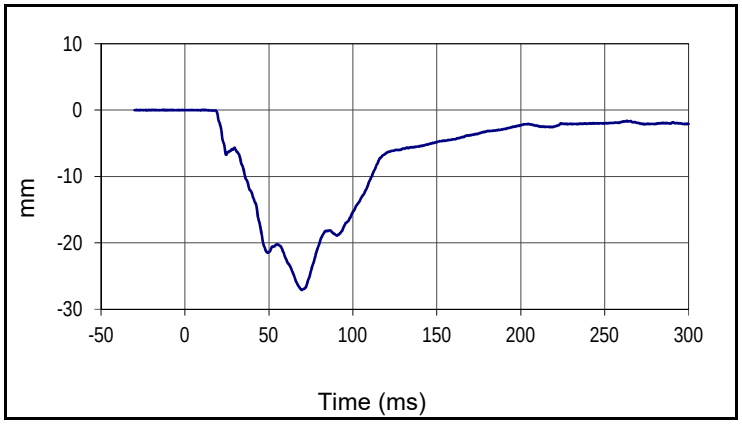


Curve Description			
Driver Head Acceleration Z Primary			
Plot No.		SAE Class	Units
003		1000	g
Max	Time	Min	Time
20.0	70.7	-7.0	89.5



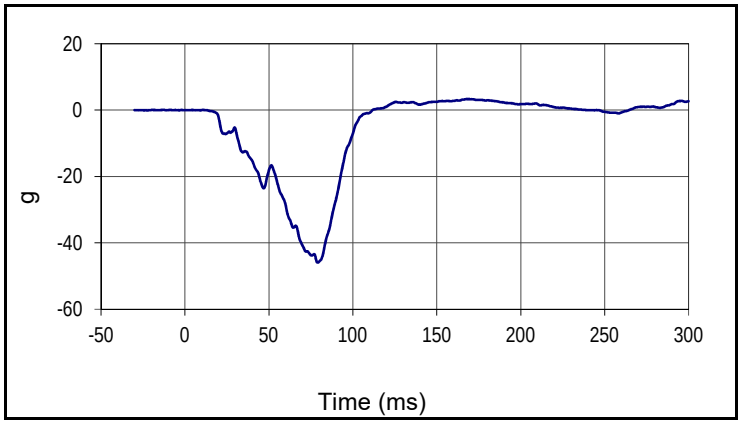
Curve Description			
Driver Head Resultant Acceleration Primary			
Plot No.		SAE Class	Units
004		1000	g
Max	Time	Min	Time
54.4	72.3	0.0	0.4

Test Vehicle:	2018 Ford EcoSport S 4WD 5-Door MPV	NHTSA No.:	M20180200
Test Program:	56.3 km/h Frontal Impact NCAP Test	Test Date:	05/11/18

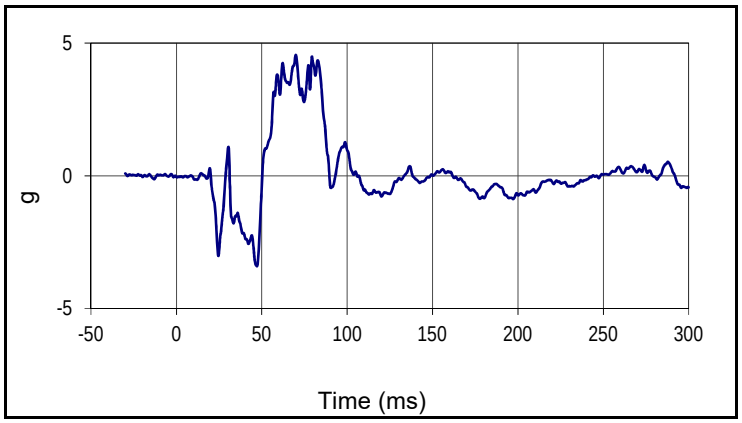


Curve Description			
Driver Chest Deflection			
Plot No.		SAE Class	Units
005		600	mm
Max	Time	Min	Time
0.0	10.4	-27.1	69.5

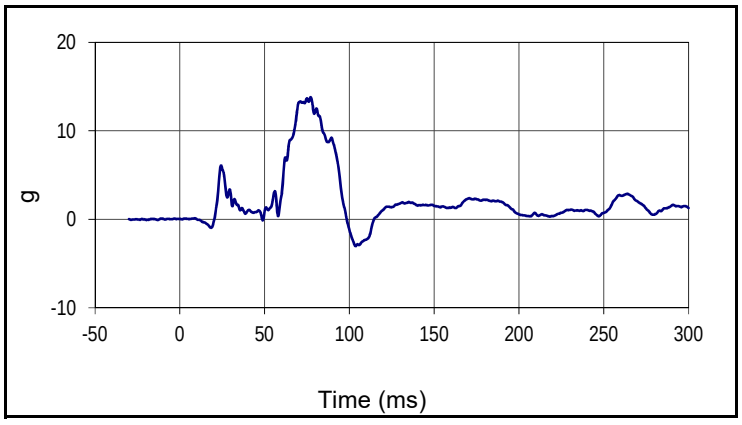
Test Vehicle:	2018 Ford EcoSport S 4WD 5-Door MPV	NHTSA No.:	M20180200
Test Program:	56.3 km/h Frontal Impact NCAP Test	Test Date:	05/11/18



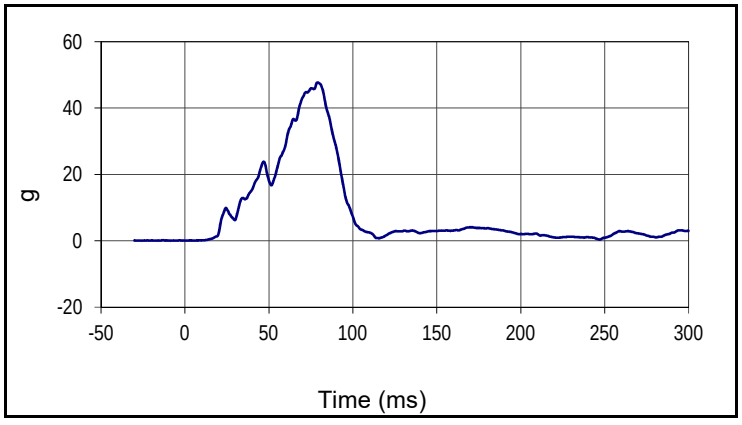
Curve Description			
Driver Chest Acceleration X Primary			
Plot No.		SAE Class	Units
006		180	g
Max	Time	Min	Time
3.3	167.8	-46.0	79.2



Curve Description			
Driver Chest Acceleration Y Primary			
Plot No.		SAE Class	Units
007		180	g
Max	Time	Min	Time
4.6	69.9	-3.4	47.1

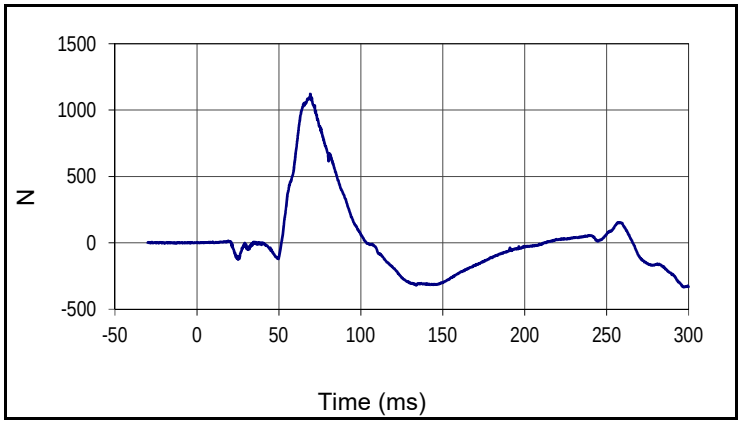


Curve Description			
Driver Chest Acceleration Z Primary			
Plot No.		SAE Class	Units
008		180	g
Max	Time	Min	Time
13.8	77.1	-3.0	103.6

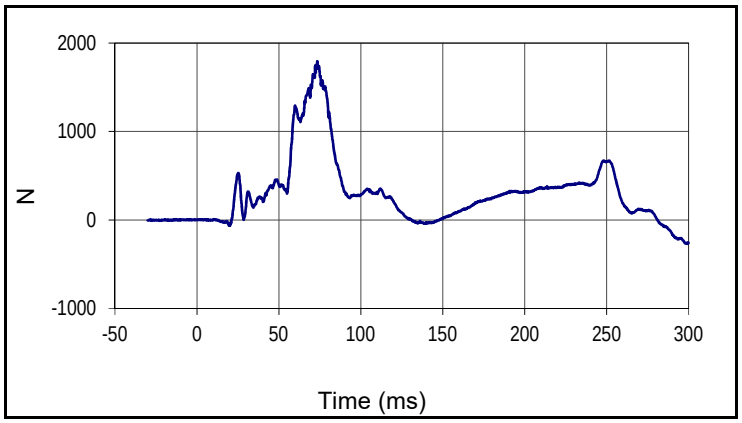


Curve Description			
Driver Chest Resultant Acceleration Primary			
Plot No.		SAE Class	Units
009		180	g
Max	Time	Min	Time
47.7	79.2	0.0	5.2

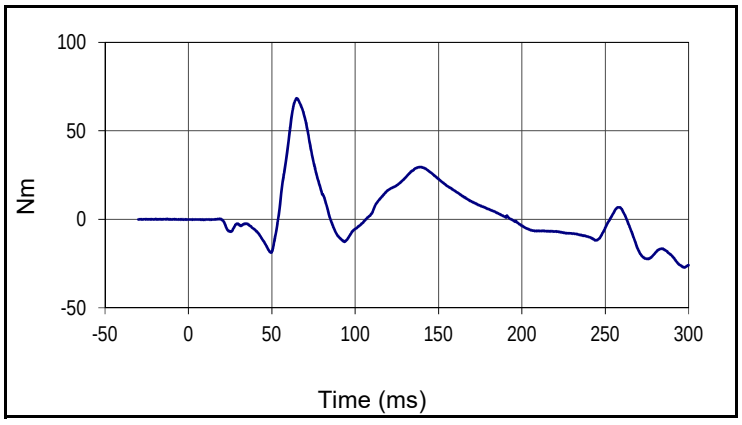
Test Vehicle:	2018 Ford EcoSport S 4WD 5-Door MPV	NHTSA No.:	M20180200
Test Program:	56.3 km/h Frontal Impact NCAP Test	Test Date:	05/11/18



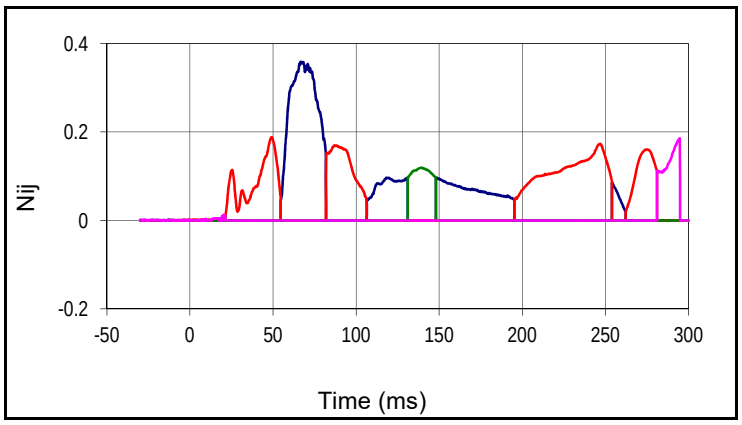
Curve Description			
Driver Upper Neck Force X			
Plot No.		SAE Class	Units
010		1000	N
Max	Time	Min	Time
1121.7	69.2	-334.4	297.2



Curve Description			
Driver Upper Neck Force Z			
Plot No.		SAE Class	Units
011		1000	N
Max	Time	Min	Time
1794.8	73.4	-268.7	299.4

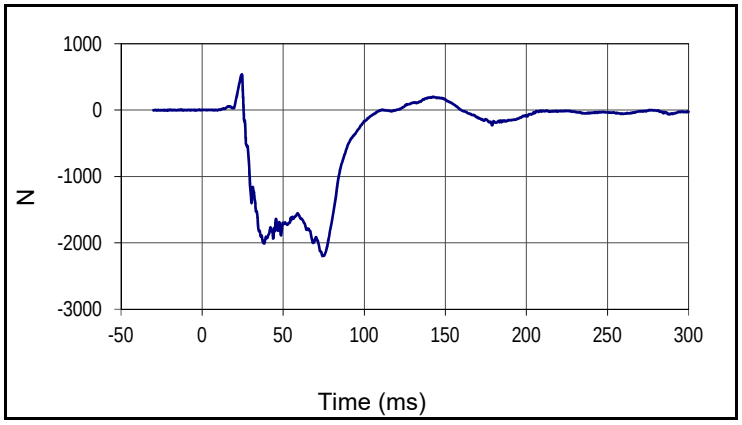


Curve Description			
Driver Upper Neck Moment Y			
Plot No.		SAE Class	Units
012		600	Nm
Max	Time	Min	Time
68.4	64.9	-27.2	297.4

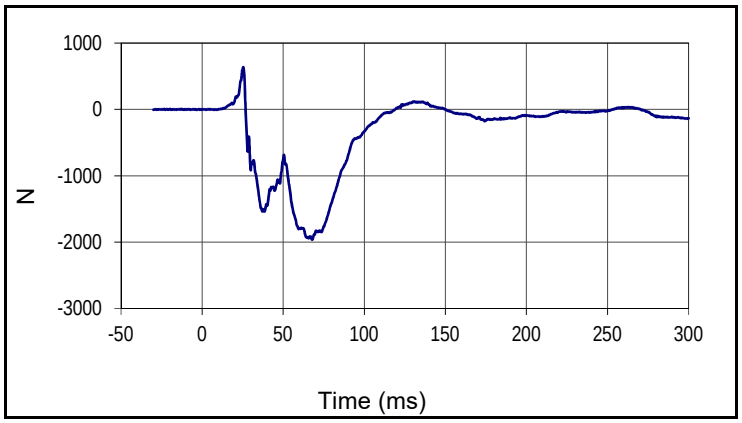


Curve Description		
Driver Nij		
Units	Max	Time
Ntf	0.36	66.7
Units	Max	Time
Nte	0.19	49.1
Units	Max	Time
Ncf	0.12	139.1
Units	Max	Time
Nce	0.19	294.8

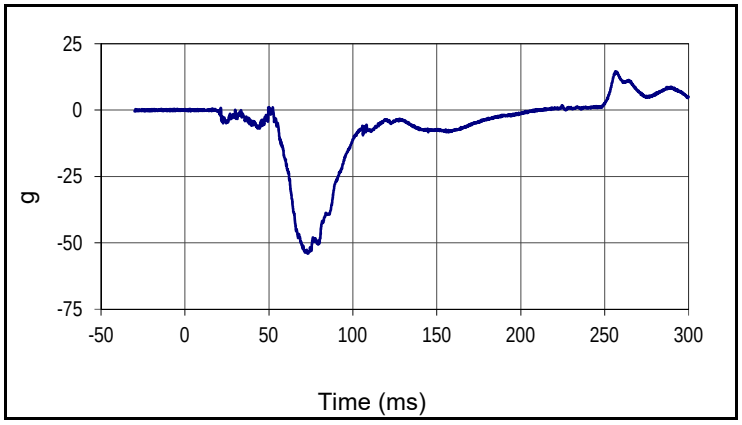
Test Vehicle:	2018 Ford EcoSport S 4WD 5-Door MPV	NHTSA No.:	M20180200
Test Program:	56.3 km/h Frontal Impact NCAP Test	Test Date:	05/11/18



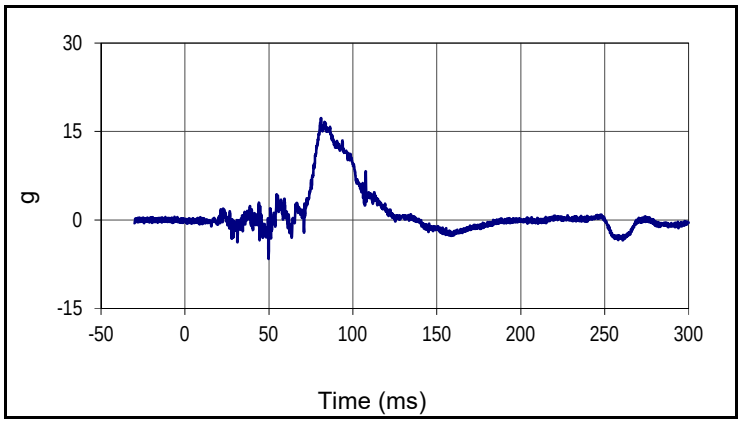
Curve Description			
Driver Left Femur Force Z			
Plot No.		SAE Class	Units
014		600	N
Max	Time	Min	Time
539.4	24.6	-2200.3	74.3



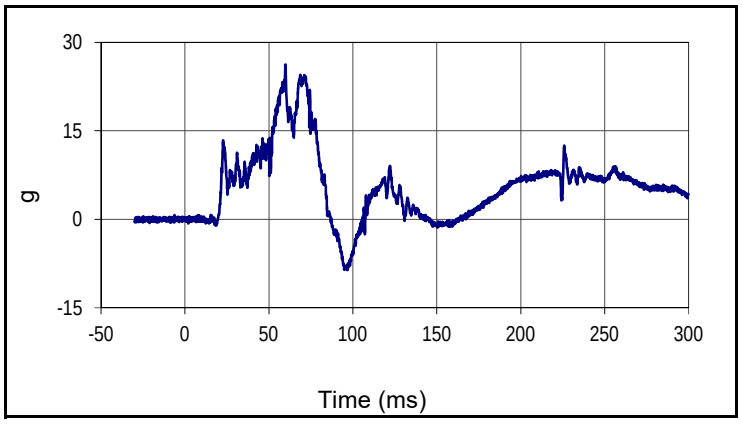
Curve Description			
Driver Right Femur Force Z			
Plot No.		SAE Class	Units
015		600	N
Max	Time	Min	Time
637.9	25.4	-1963.3	67.9



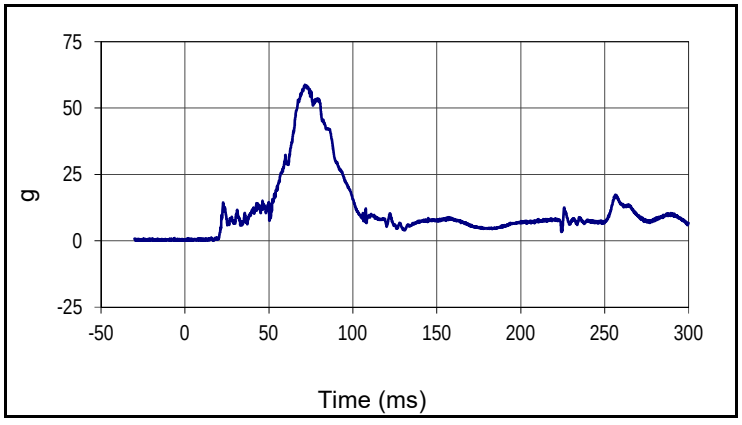
Curve Description			
Passenger Head Acceleration X Primary			
Plot No.		SAE Class	Units
016		1000	g
Max	Time	Min	Time
14.5	256.3	-54.0	73.5



Curve Description			
Passenger Head Acceleration Y Primary			
Plot No.		SAE Class	Units
017		1000	g
Max	Time	Min	Time
17.3	81.0	-6.6	49.8

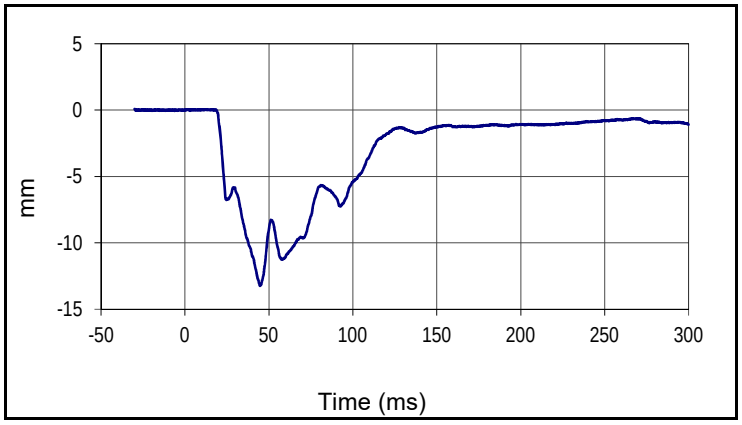


Curve Description			
Passenger Head Acceleration Z Primary			
Plot No.		SAE Class	Units
018		1000	g
Max	Time	Min	Time
26.2	59.8	-8.6	96.7

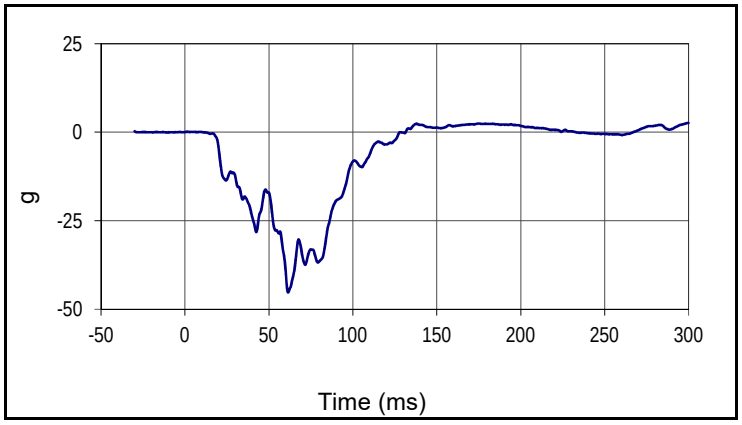


Curve Description			
Passenger Head Resultant Acceleration Primary			
Plot No.		SAE Class	Units
019		1000	g
Max	Time	Min	Time
58.7	71.4	0.1	17.2

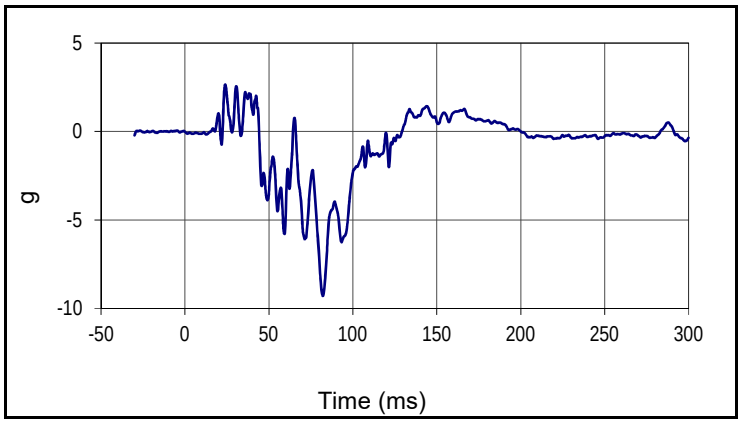
Test Vehicle:	2018 Ford EcoSport S 4WD 5-Door MPV	NHTSA No.:	M20180200
Test Program:	56.3 km/h Frontal Impact NCAP Test	Test Date:	05/11/18



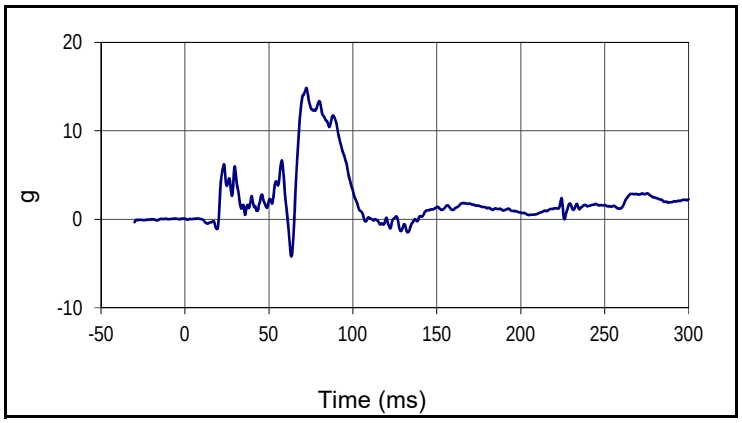
Curve Description			
Passenger Chest Deflection			
Plot No.		SAE Class	Units
020		600	mm
Max	Time	Min	Time
0.1	8.7	-13.3	44.7



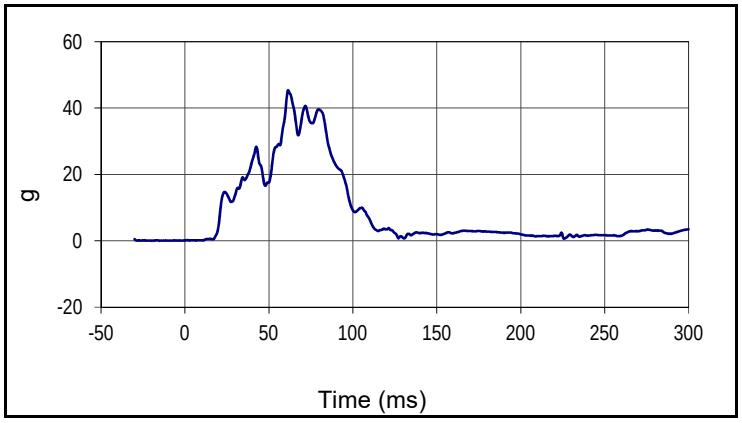
Curve Description			
Passenger Chest Acceleration X Primary			
Plot No.		SAE Class	Units
021		180	g
Max	Time	Min	Time
2.6	299.5	-45.3	61.4



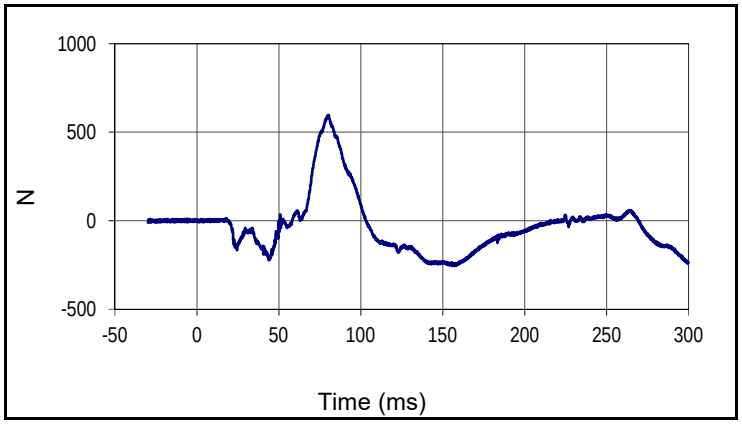
Curve Description			
Passenger Chest Acceleration Y Primary			
Plot No.		SAE Class	Units
022		180	g
Max	Time	Min	Time
2.7	23.9	-9.3	82.1



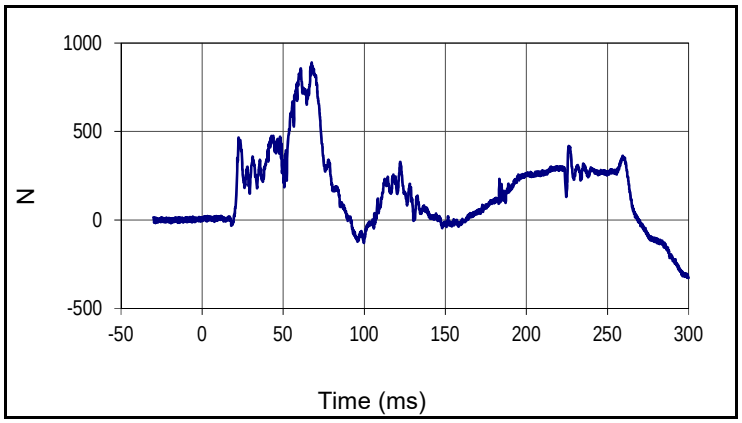
Curve Description			
Passenger Chest Acceleration Z Primary			
Plot No.		SAE Class	Units
023		180	g
Max	Time	Min	Time
14.8	72.3	-4.2	63.3



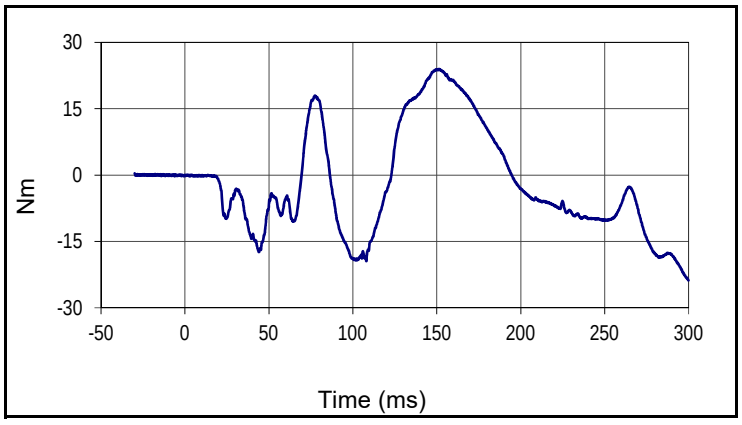
Curve Description			
Passenger Chest Resultant Acceleration Primary			
Plot No.		SAE Class	Units
024		180	g
Max	Time	Min	Time
45.3	61.4	0.1	0.0



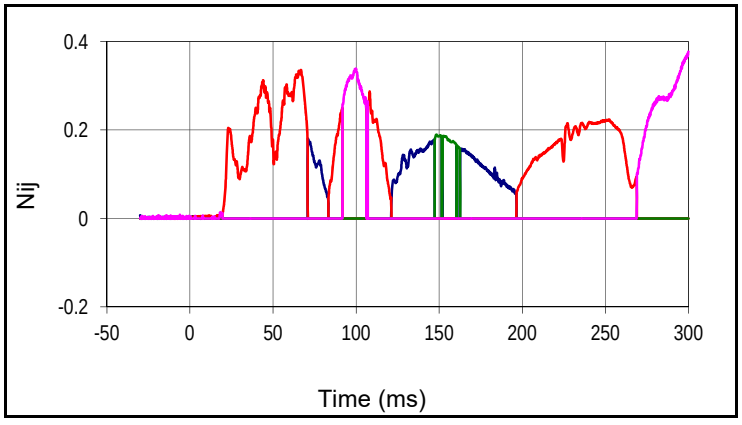
Curve Description			
Passenger Upper Neck Force X			
Plot No.		SAE Class	Units
025		1000	N
Max	Time	Min	Time
596.8	80.4	-256.1	157.1



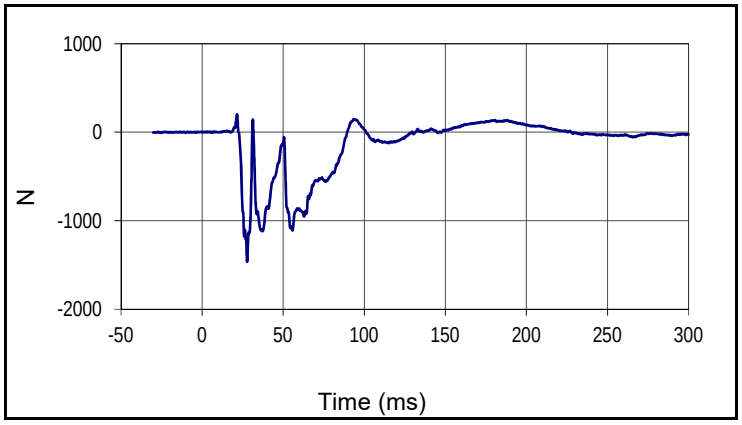
Curve Description			
Passenger Upper Neck Force Z			
Plot No.		SAE Class	Units
026		1000	N
Max	Time	Min	Time
889.7	67.6	-328.0	299.8



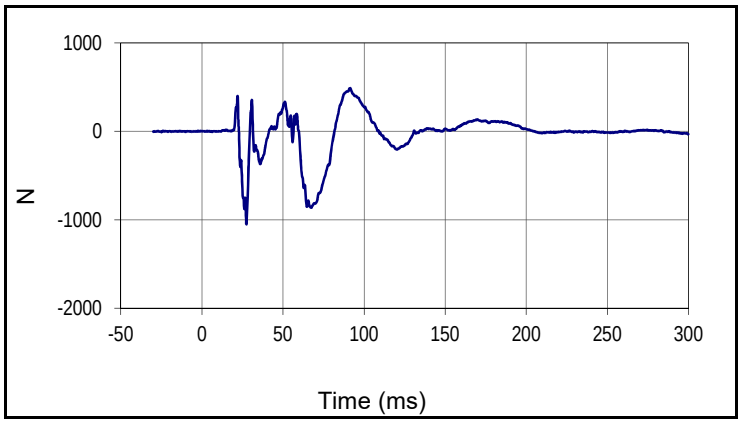
Curve Description			
Passenger Upper Neck Moment Y			
Plot No.		SAE Class	Units
027		600	Nm
Max	Time	Min	Time
24.0	151.1	-23.8	299.9



Curve Description		
Passenger Nij		
Units	Max	Time
Ntf	0.19	151.7
Units	Max	Time
Nte	0.34	66.8
Units	Max	Time
Ncf	0.19	148.3
Units	Max	Time
Nce	0.38	299.9



Curve Description			
Passenger Left Femur Force Z			
Plot No.		SAE Class	Units
029		600	N
Max	Time	Min	Time
202.9	21.6	-1463.9	27.8



Curve Description			
Passenger Right Femur Force Z			
Plot No.		SAE Class	Units
030		600	N
Max	Time	Min	Time
488.4	91.4	-1050.1	27.5

APPENDIX C
ATD CALIBRATION AND PERFORMANCE VERIFICATION DATA

APPENDIX C
PRE-TEST ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA

KARCO Engineering
9270 Holly Road, Adelanto, CA 92301
Tel: +1 760 246 1672 Fax: +1 760 246 8112
Info@karco.com www.karco.com

Hybrid III 50th Percentile Male
ATD Damage Checklist

ATD Serial No.: 360 Test Date: 2018-05-05

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.	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:

Technician: J. Hernandez

Approved By: P. Puzzuto

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Hybrid III 50th Percentile Male
External Measurements

ATD Serial No.: 360 Test Date: 2018-05-05

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	26	Pass
A - Total sitting height	mm	879	889	887	Pass
B - Shoulder pivot height	mm	505	521	517	Pass
C - 'H' point height	mm	84	89	87	Pass
D - 'H' point location from backline	mm	135	140	139	Pass
E - Shoulder pivot from backline	mm	84	94	91	Pass
F - Thigh clearance	mm	140	155	151	Pass
G - Back of elbow to wrist pivot	mm	290	305	297	Pass
H - Head back to backline	mm	41	46	46	Pass
I - Shoulder to elbow length	mm	330	345	343	Pass
J - Elbow rest height	mm	190	211	204	Pass
K - Buttock to knee length	mm	579	604	589	Pass
L - Popliteal length	mm	429	455	440	Pass
M - Knee pivot height	mm	485	500	495	Pass
N - Buttock popliteal length	mm	452	477	464	Pass
O - Chest depth without jacket	mm	213	229	220	Pass
P - Foot length	mm	251	267	258	Pass
V - Shoulder breadth	mm	422	437	431	Pass
W - Foot breadth	mm	91	107	103	Pass
Y - Chest circum. (w/chest jacket)	mm	970	1001	980	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	228	Pass
			Overall Test Results		Pass

Technician: J. Hernandez

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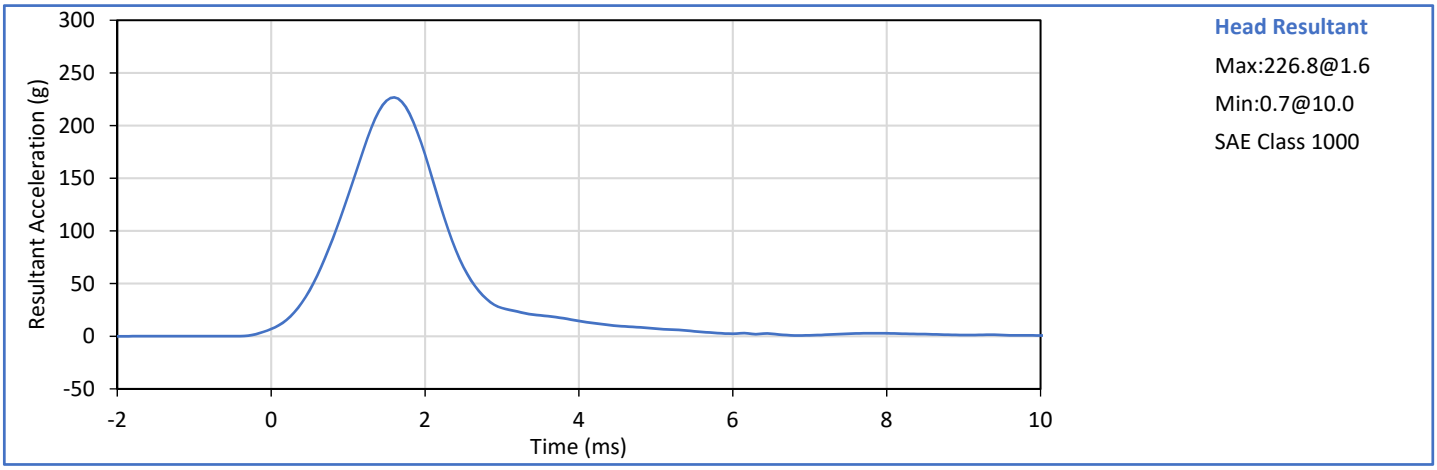
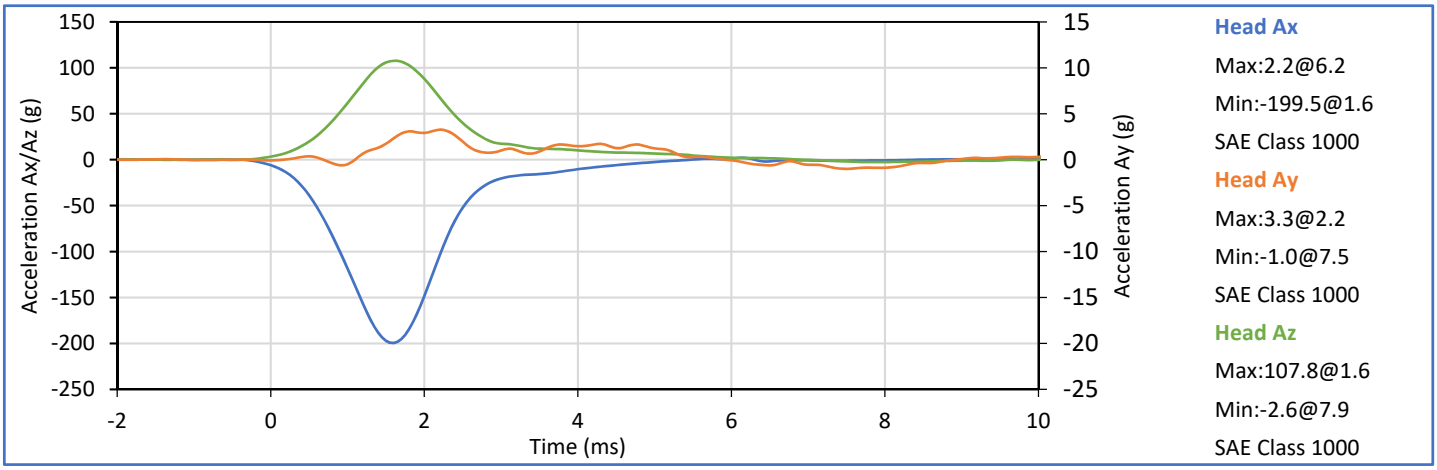
Hybrid III 50th Percentile Male
Head Drop

ATD Serial No.: 360 Test Date: 2018-05-07

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	20.8	Pass
Laboratory Humidity	%	10	70	26	Pass
Peak Resultant Acceleration	g	225.0	275.0	226.8	Pass
Peak Lateral Acceleration	g	-15.0	15.0	3.3	Pass
Oscillations After Main Pulse	%	0.0	10.0	1.8	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
			Overall Test Results		Pass





Technician: T. Lowman

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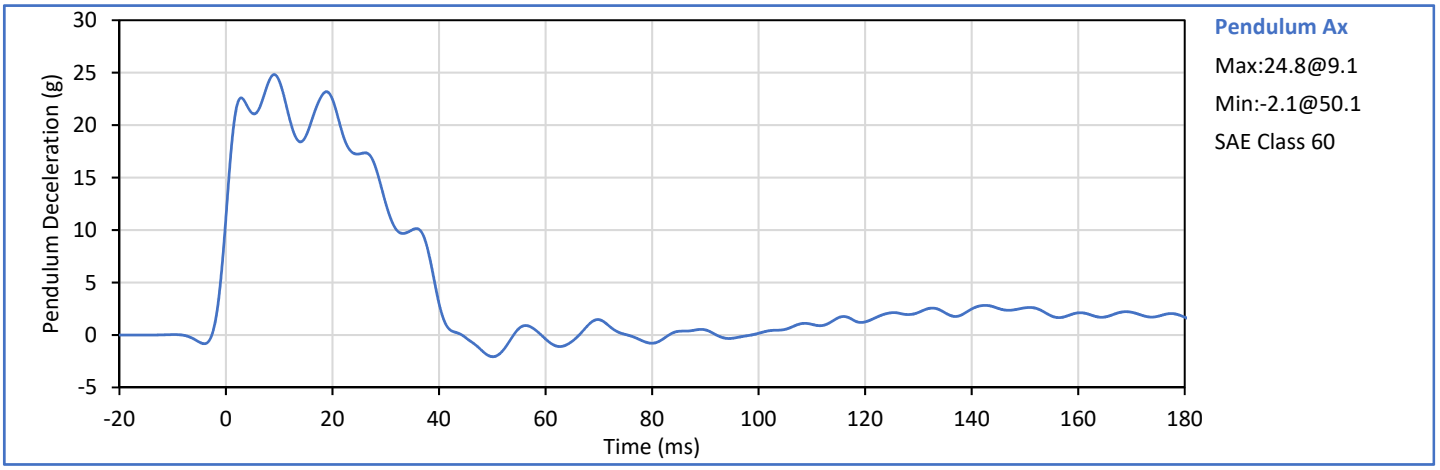
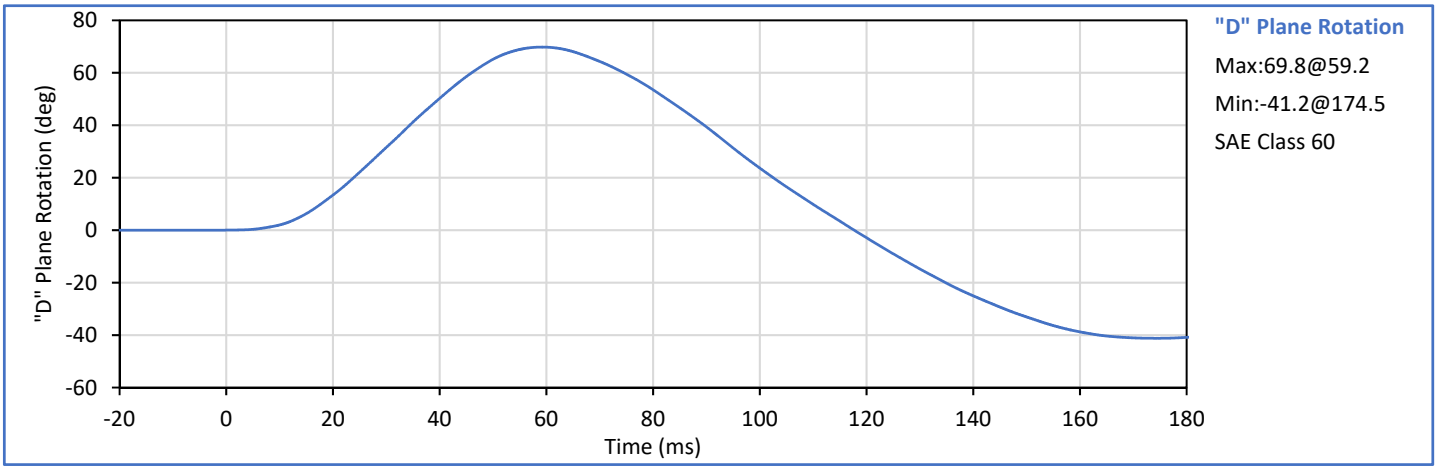
Hybrid III 50th Percentile Male
Neck Flexion Test

ATD Serial No.: 360 Test Date: 2018-05-07

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.6	Pass
Laboratory Humidity	%	10	70	23	Pass
Pendulum Velocity	m/s	6.89	7.13	6.94	Pass
Pendulum Deceleration at 10 ms	g	22.5	27.5	24.2	Pass
Pendulum Deceleration at 20 ms	g	17.6	22.6	22.4	Pass
Pendulum Deceleration at 30 ms	g	12.5	18.5	12.5	Pass
Peak Pendulum Decel. after 30 ms	g	0.0	29.0	12.5	Pass
Deceleration Decay to Cross 5 g	ms	34.0	42.0	39.2	Pass
"D" Plane Rotation peak	deg	64.0	78.0	69.8	Pass
	ms	57.0	64.0	59.2	Pass
"D" Plane Rotation Decay To Zero	ms	113.0	128.0	117.7	Pass
Moment About Occipital Condyle	Nm	88.1	108.5	93.1	Pass
	ms	47.0	58.0	54.9	Pass
Moment Decay, Peak to Zero	deg	97.0	107.0	98.3	Pass
			Overall Test Results		Pass





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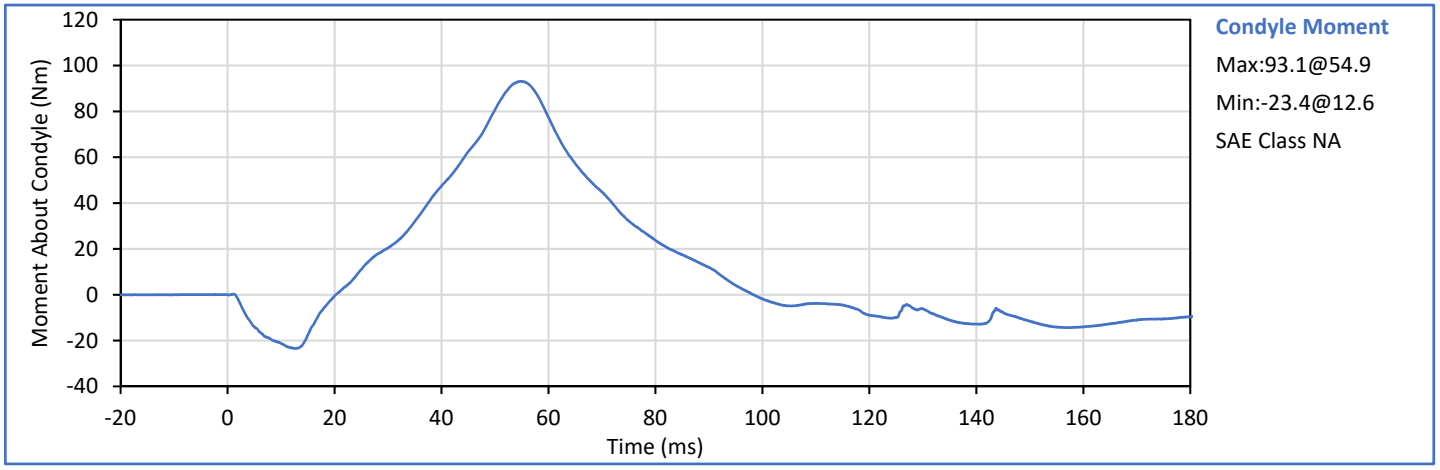
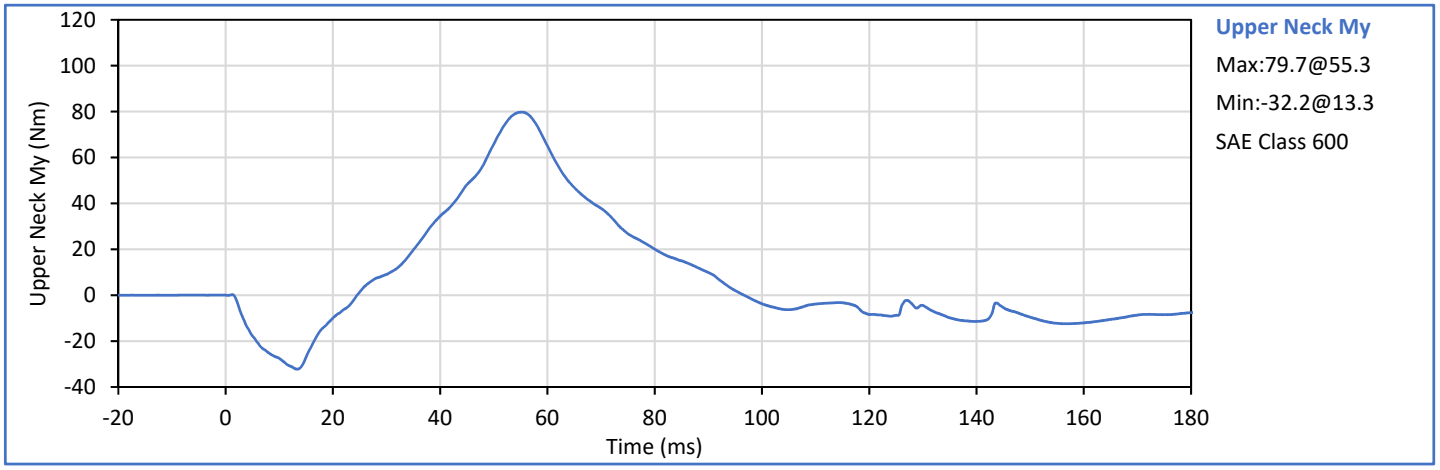
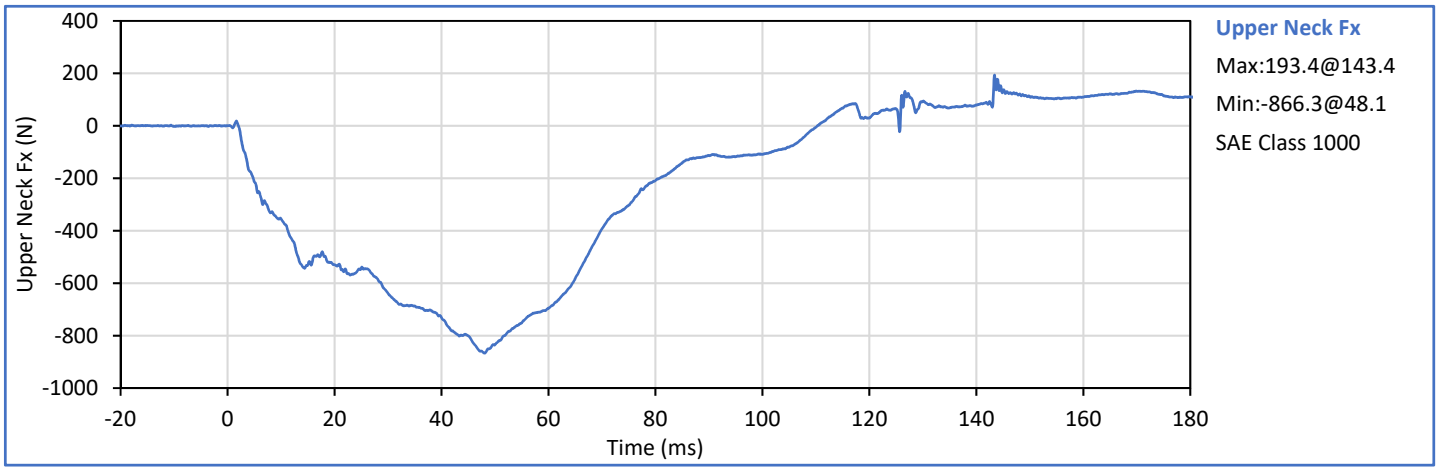
Hybrid III 50th Percentile Male
Neck Flexion Test

ATD Serial No.: 360 Test Date: 2018-05-07







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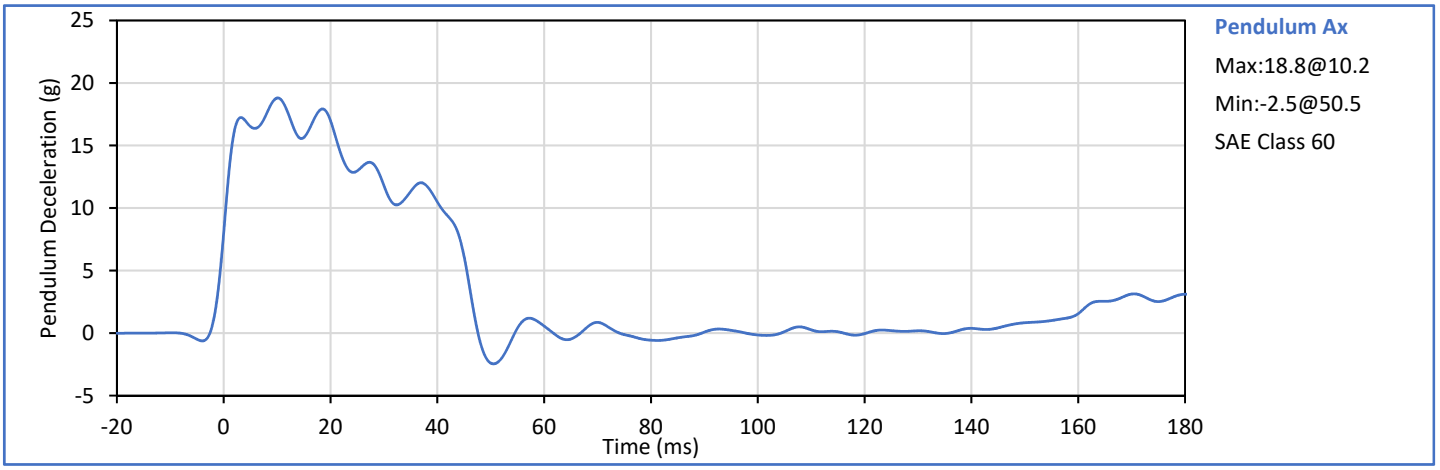
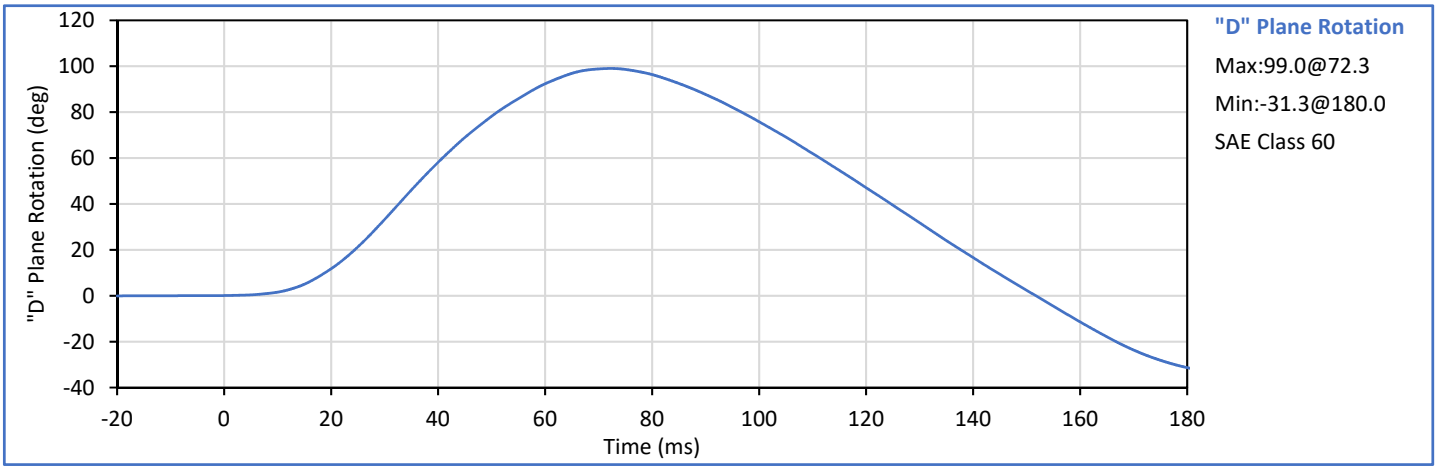
Hybrid III 50th Percentile Male
Neck Extension Test

ATD Serial No.: 360 Test Date: 2018-05-07

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.4	Pass
Laboratory Humidity	%	10	70	23	Pass
Pendulum Velocity	m/s	5.94	6.19	5.99	Pass
Pendulum Deceleration at 10 ms	g	17.2	21.2	18.8	Pass
Pendulum Deceleration at 20 ms	g	14.0	19.0	17.0	Pass
Pendulum Deceleration at 30 ms	g	11.0	16.0	11.8	Pass
Peak Pendulum Decel. after 30 ms	g	0.0	22.0	12.0	Pass
Deceleration Decay to Cross 5 g	ms	38.0	46.0	45.5	Pass
"D" Plane Rotation peak	deg	81.0	106.0	99.0	Pass
	ms	72.0	82.0	72.3	Pass
"D" Plane Rotation Decay To Zero	ms	147.0	174.0	151.8	Pass
Moment About Occipital Condyle	Nm	-79.9	-52.9	-74.2	Pass
	ms	65.0	79.0	65.9	Pass
Moment Decay, Peak to Zero	deg	120.0	148.0	132.9	Pass
			Overall Test Results		Pass





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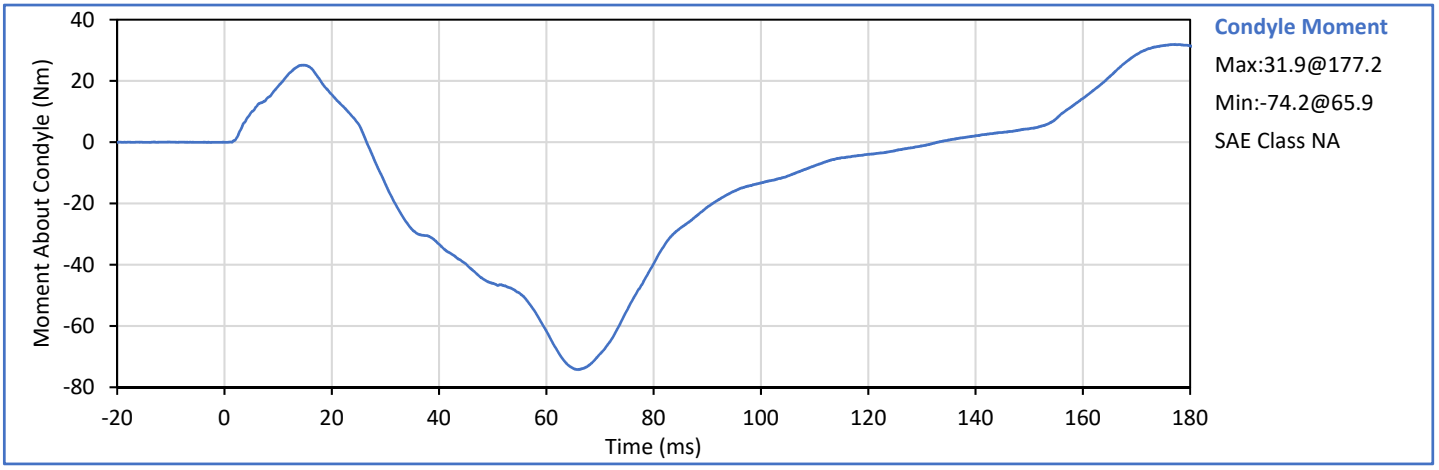
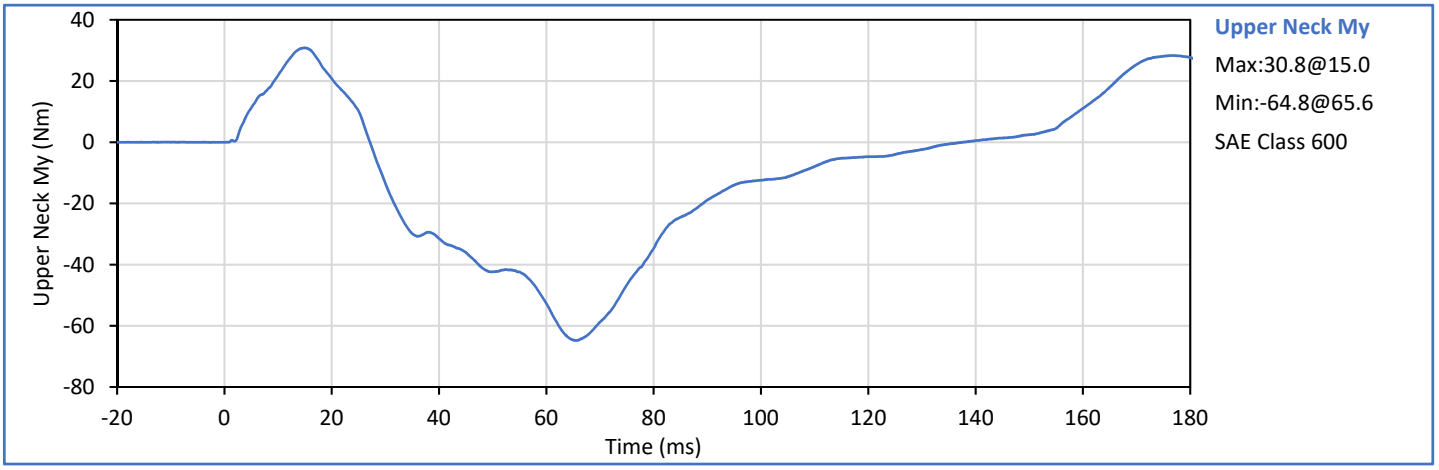
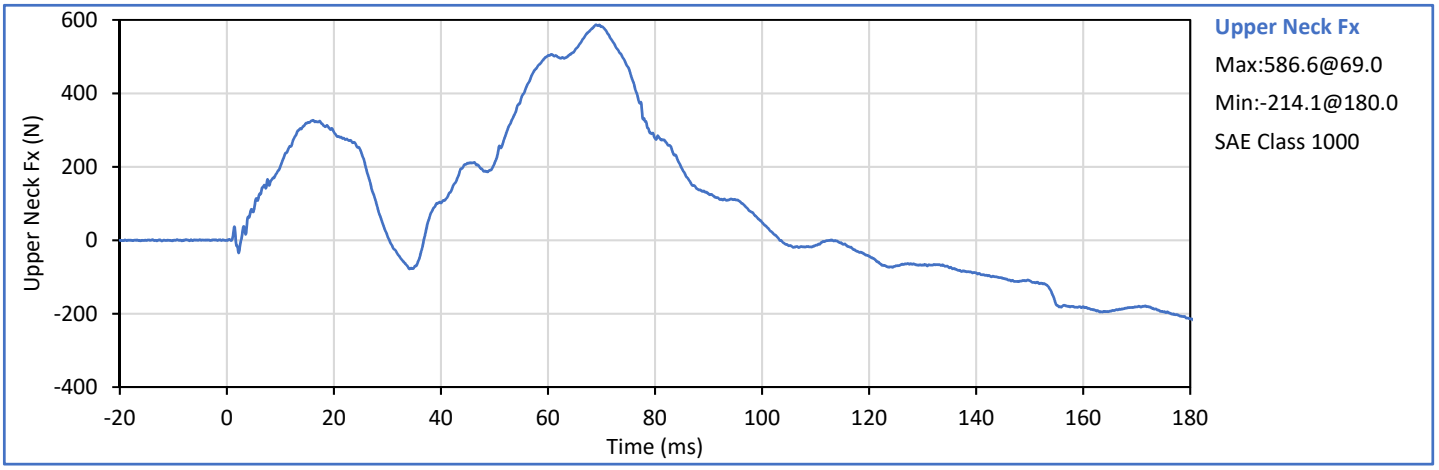
Hybrid III 50th Percentile Male
Neck Extension Test

ATD Serial No.: 360 Test Date: 2018-05-07







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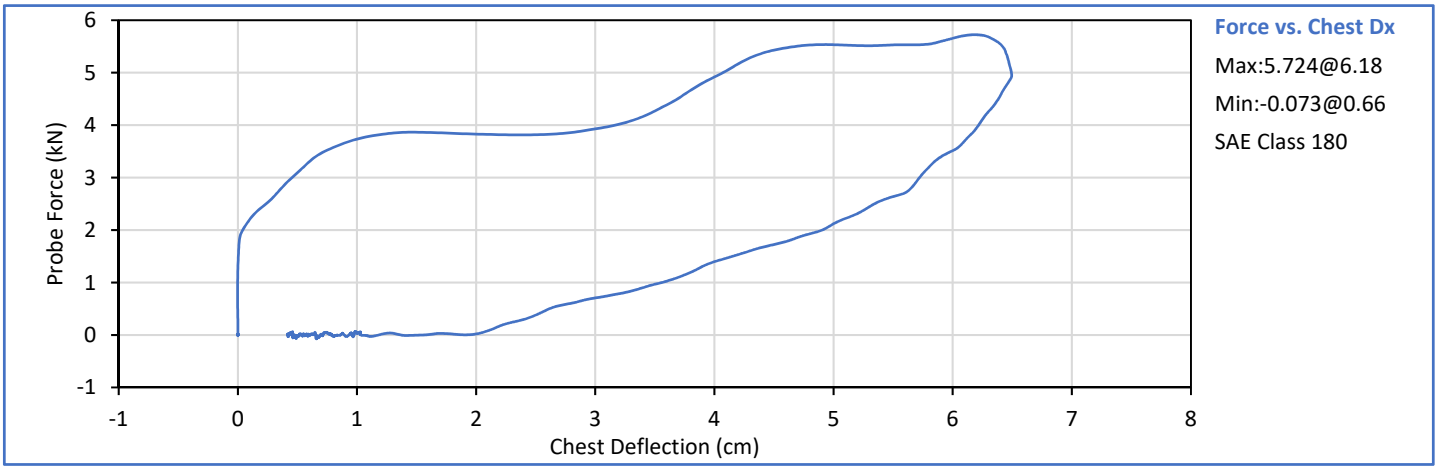
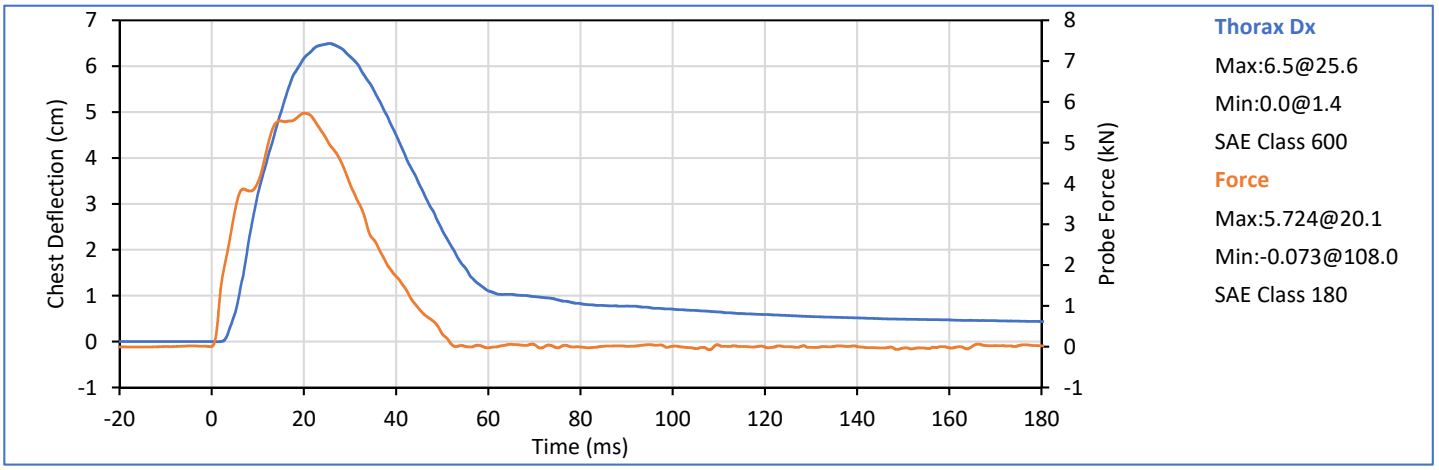
Hybrid III 50th Percentile Male
Thorax Impact

ATD Serial No.: 360 Test Date: 2018-05-05

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.4	Pass
Laboratory Humidity	%	10	70	23	Pass
Probe Velocity	m/s	6.58	6.82	6.62	Pass
Peak Chest Deflection	cm	6.35	7.26	6.50	Pass
Peak Probe Force	kN	5.159	5.893	5.724	Pass
Internal Hysterisis	%	69.0	85.0	72.5	Pass
			Overall Test Results		Pass





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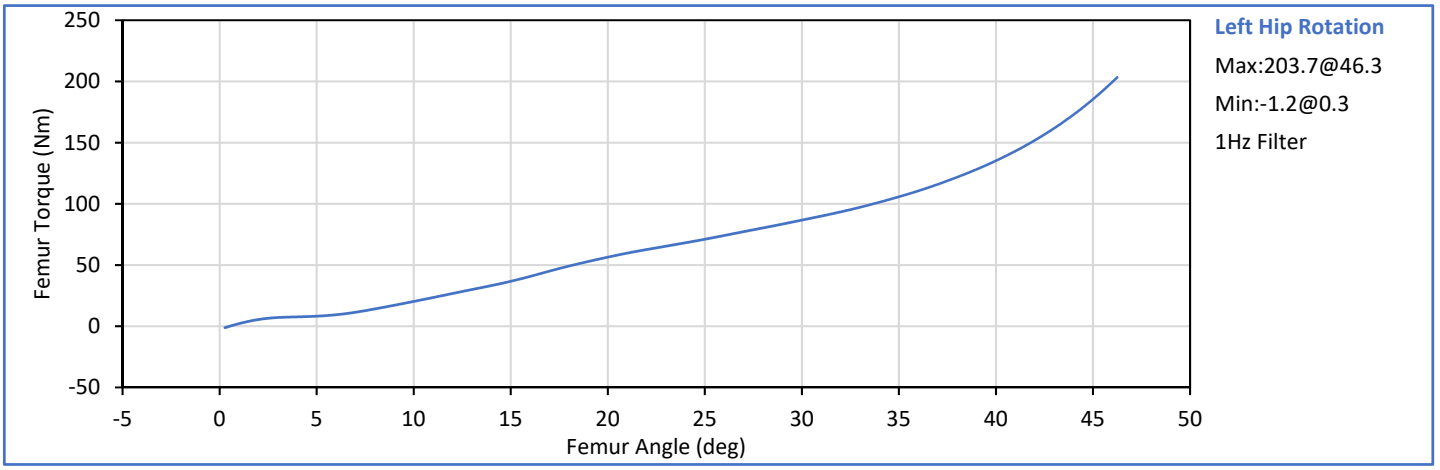
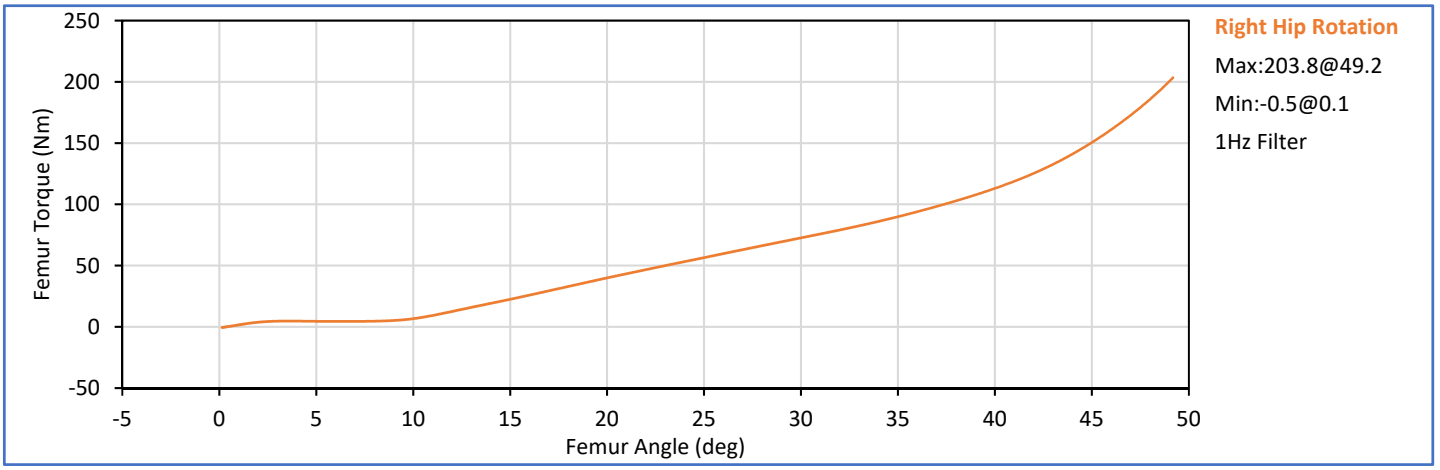
Hybrid III 50th Percentile Male
Hip Flexion (Left/Right)

ATD Serial No.: 360 Test Date: 2018-05-08

	Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
	Laboratory Temperature	°C	18.9	25.6	21.1	Pass
	Laboratory Humidity	%	10	70	25	Pass
Left Hip	Left Hip Rotation Rate	deg/s	5.0	10.0	5.7	Pass
	Left Femur Torque at 30°	Nm	0.0	95.0	86.8	Pass
	Left Hip Rotation at 203 Nm	deg	40.0	50.0	46.2	Pass
Right Hip	Right Hip Rotation Rate	deg/s	5.0	10.0	5.8	Pass
	Right Femur Torque at 30°	Nm	0.0	95.0	72.7	Pass
	Right Hip Rotation at 203 Nm	deg	40.0	50.0	49.2	Pass
				Overall Test Results		Pass





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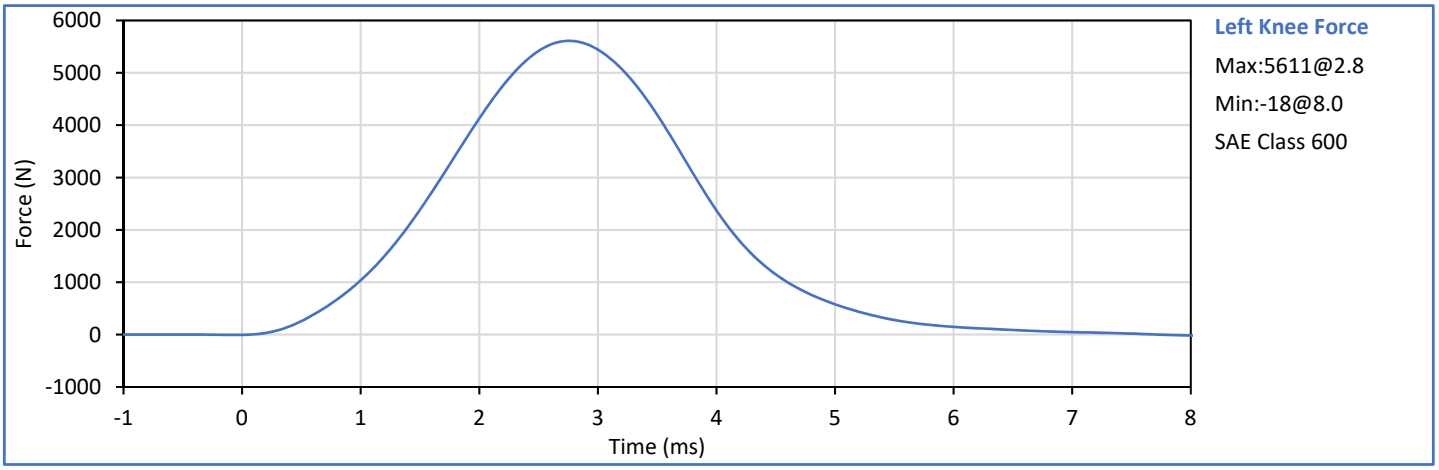
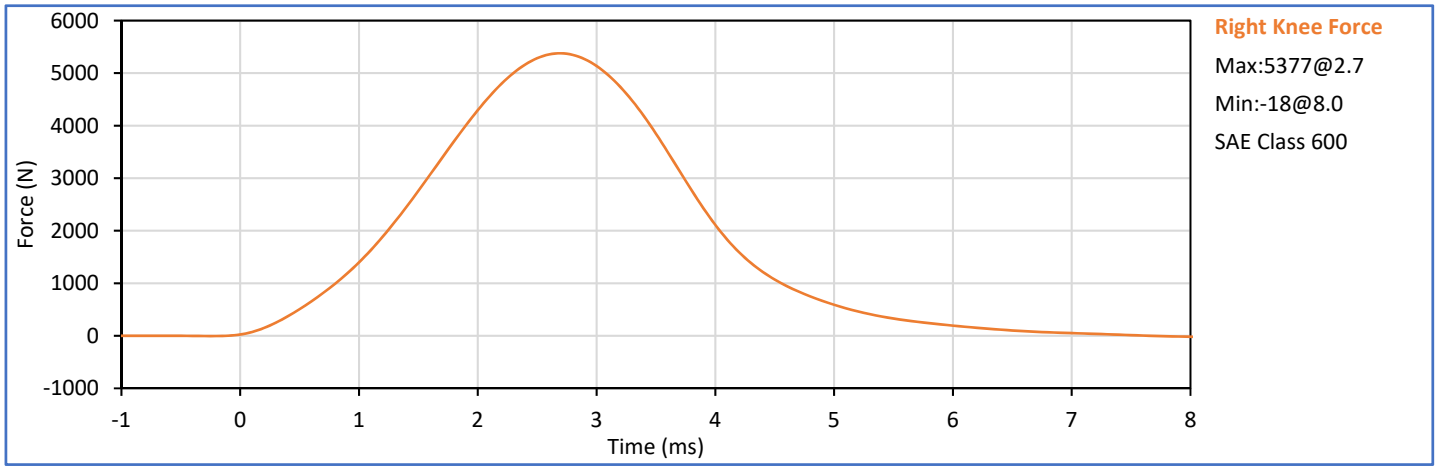
Hybrid III 50th Percentile Male
Knee Impact (Left/Right)

ATD Serial No.: 360 Test Date: 2018-05-07

	Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
	Laboratory Temperature	°C	18.9	25.6	20.7	Pass
	Laboratory Humidity	%	10	70	26	Pass
Left Knee	Probe Velocity	m/s	2.070	2.130	2.109	Pass
	Peak Resistive Force	N	4715	5782	5611	Pass
Right Knee	Probe Velocity	m/s	2.070	2.130	2.112	Pass
	Peak Resistive Force	N	4715	5782	5377	Pass
				Overall Test Results		Pass





Technician: T. Lowman

Approved By: P. Puzzuto

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Hybrid III 5th Percentile Female
Damage Checklist

ATD Serial No.: 141 Test Date: 2018-05-04

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:

Technician: J. Hernandez

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Hybrid III 5th Percentile Female
External Measurements

ATD Serial No.: 141 Test Date: 2018-05-04

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	22	Pass
A - Total sitting height	mm	775	800	787	Pass
B - Shoulder pivot height	mm	432	457	455	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	75	Pass
F - Thigh clearance	mm	119	135	129	Pass
G - Back of elbow to wrist pivot	mm	244	259	254	Pass
H - Head back to backline	mm	41	46	42	Pass
I - Shoulder to elbow length	mm	277	297	292	Pass
J - Elbow rest height	mm	183	203	191	Pass
K - Buttock to knee length	mm	521	546	529	Pass
L - Popliteal length	mm	356	376	368	Pass
M - Knee pivot height	mm	394	419	412	Pass
N - Buttock popliteal length	mm	414	439	432	Pass
O - Chest depth without jacket	mm	175	191	185	Pass
P - Foot length	mm	219	234	228	Pass
R - Buttock to Knee Pivot Length	mm	457	483	472	Pass
S - Head Breadth	mm	137	147	144	Pass
T - Head Depth	mm	178	188	186	Pass
U - Hip Breadth	mm	300	315	307	Pass
V - Shoulder breadth	mm	351	366	362	Pass
W - Foot breadth	mm	79	94	86	Pass
X - Head circum.	mm	528	549	534	Pass
Y - Chest circum. (w/chest jacket)	mm	851	881	859	Pass
Z - Waist circum.	mm	760	790	782	Pass
AA - Location for chest circum.	mm	333	358	341	Pass
BB - Location for waist circum.	mm	160	170	169	Pass
			Overall Test Results		Pass

Technician: J. Hernandez

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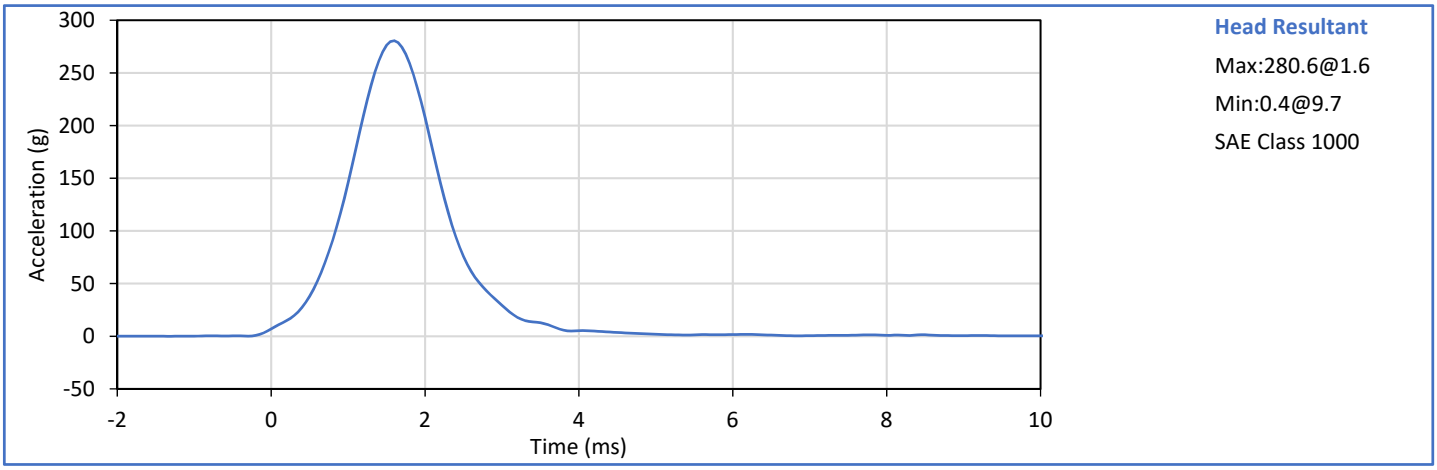
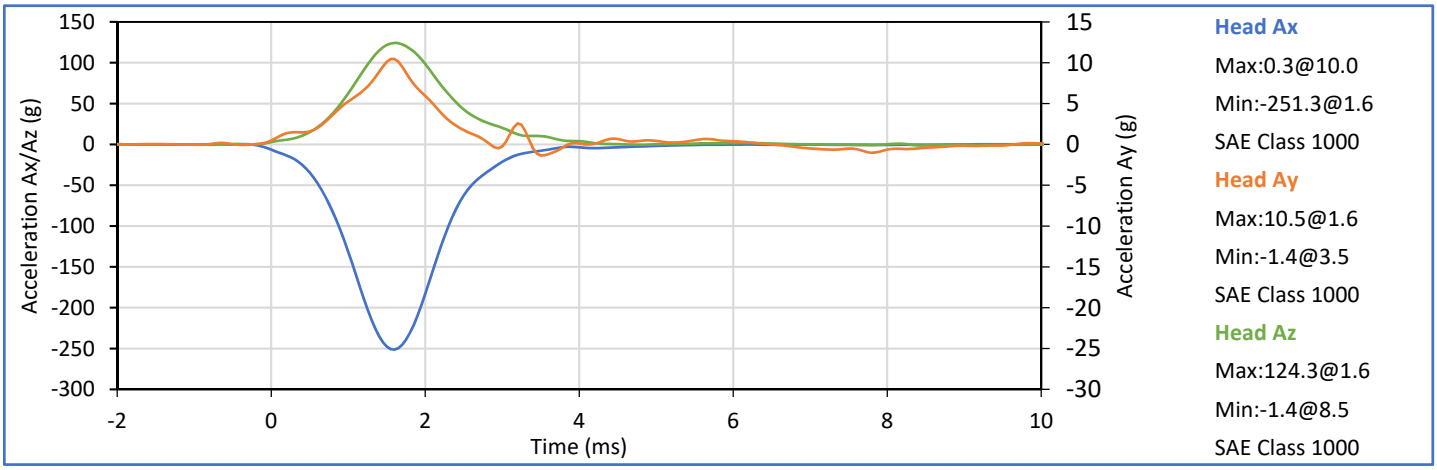
Hybrid III 5th Percentile Female
Head Drop

ATD Serial No.: 141 Test Date: 2018-05-07

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	20.8	Pass
Laboratory Humidity	%	10	70	26	Pass
Peak Resultant Acceleration	g	250.0	300.0	280.6	Pass
Peak Lateral Acceleration	g	-15.0	15.0	10.5	Pass
Oscillations After Main Pulse	%	0.0	10.0	0.6	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
			Overall Test Results		Pass





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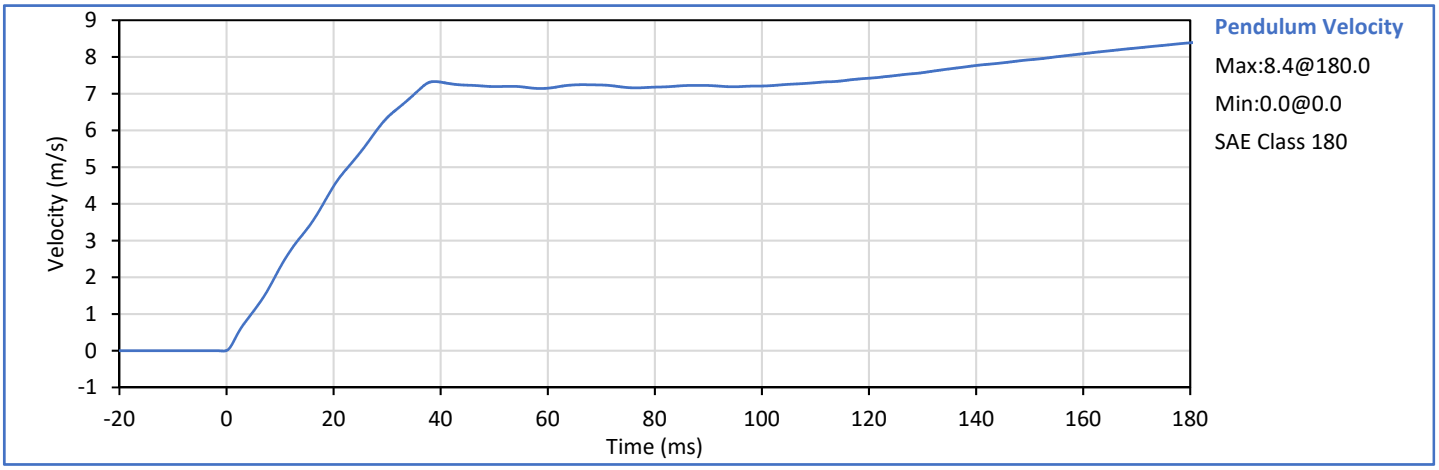
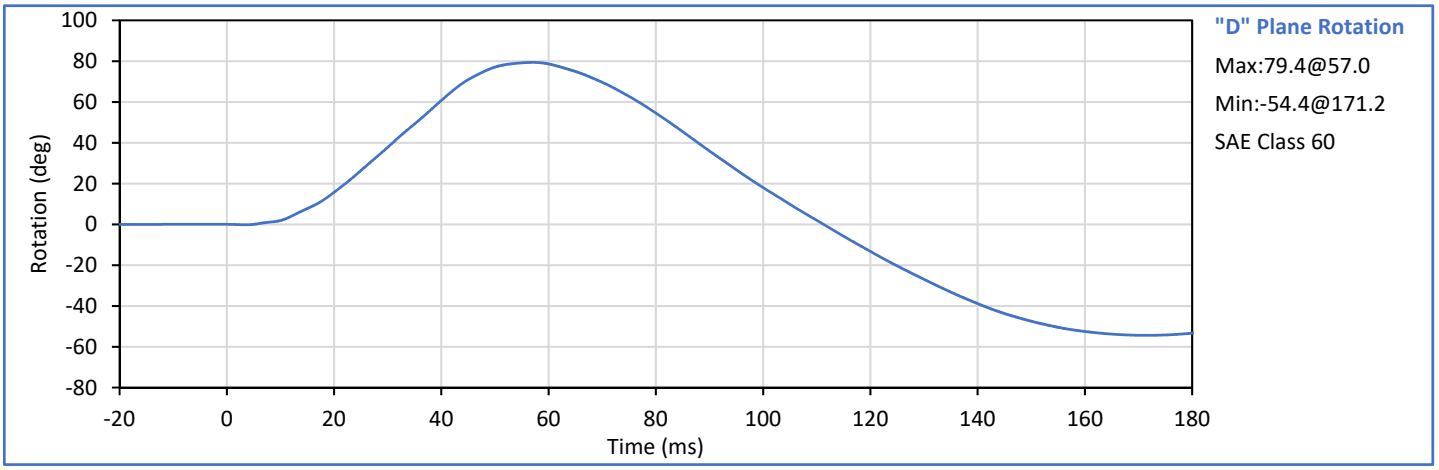
Hybrid III 5th Percentile Female
Neck Flexion Test

ATD Serial No.: 141 Test Date: 2018-05-07

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Humidity	%	10	70	23	Pass
Pendulum Velocity	m/s	6.89	7.13	7.06	Pass
Pendulum Velocity at 10 ms	m/s	2.10	2.50	2.27	Pass
Pendulum Velocity at 20 ms	m/s	4.00	5.00	4.48	Pass
Pendulum Velocity at 30 ms	m/s	5.80	7.00	6.34	Pass
Peak "D" Plane Rotation	deg	77.0	91.0	79.4	Pass
Peak Moment in Rotation	Nm	69.0	83.0	80.6	Pass
Positive Moment Decay to 10 Nm	ms	80.0	100.0	83.5	Pass
			Overall Test Results		Pass





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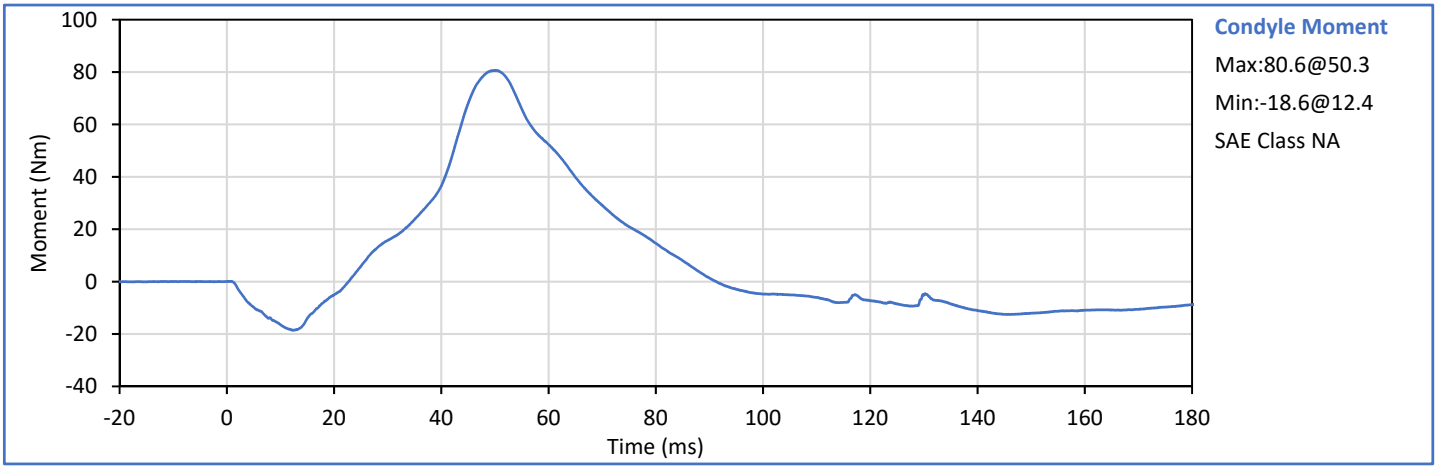
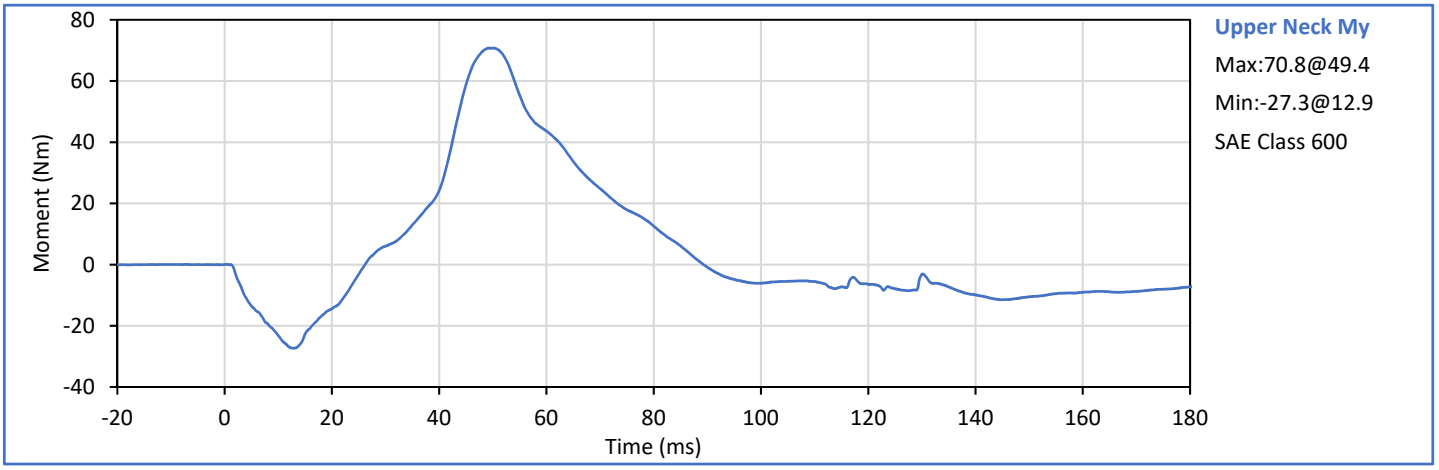
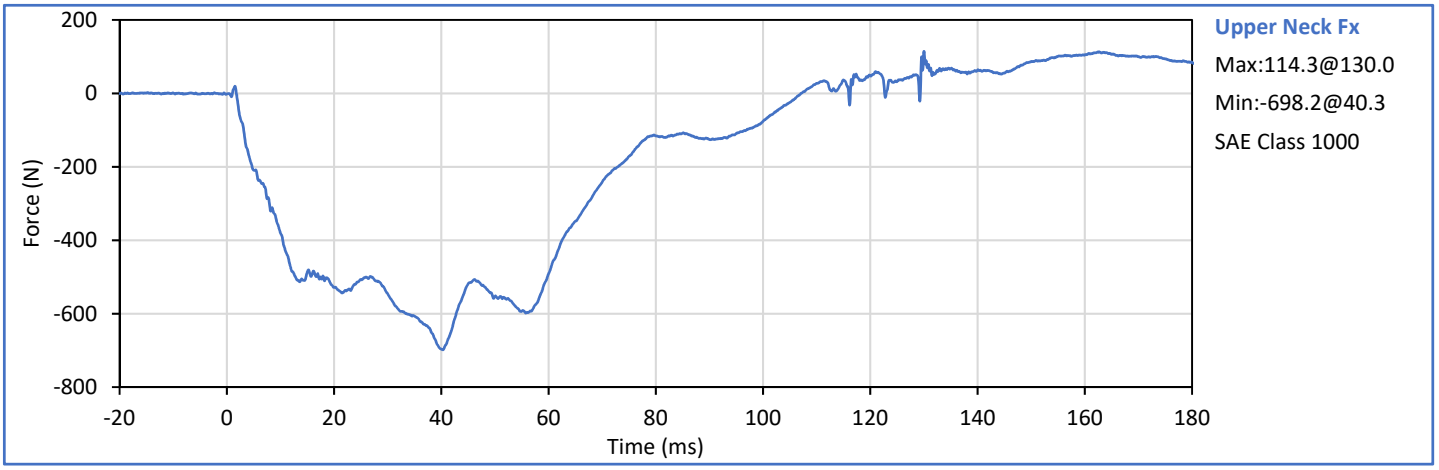
Hybrid III 5th Percentile Female
Neck Flexion Test

ATD Serial No.: 141 Test Date: 2018-05-07







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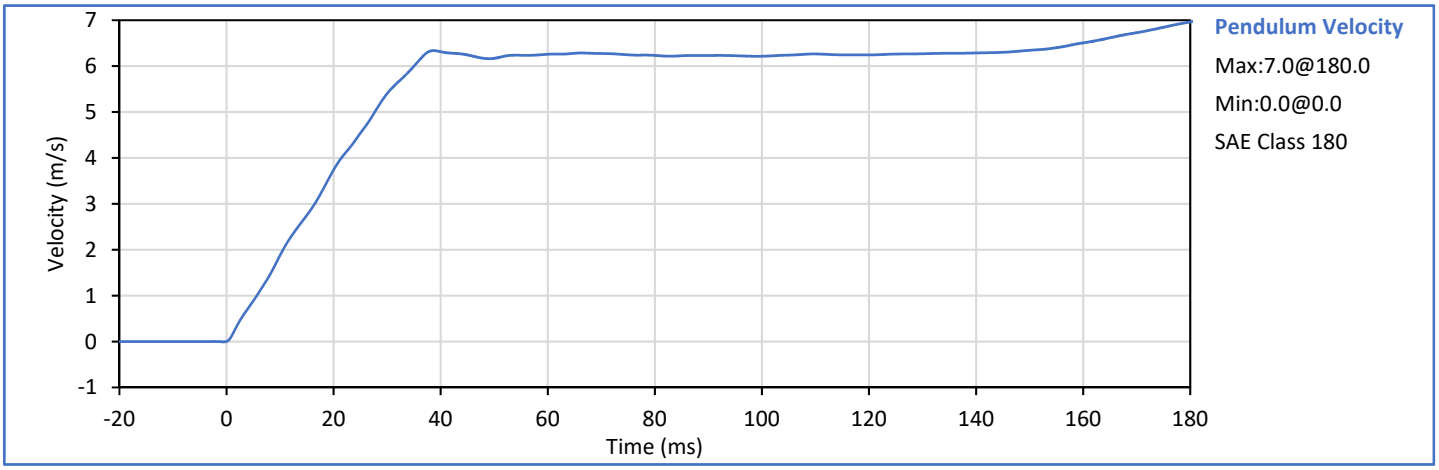
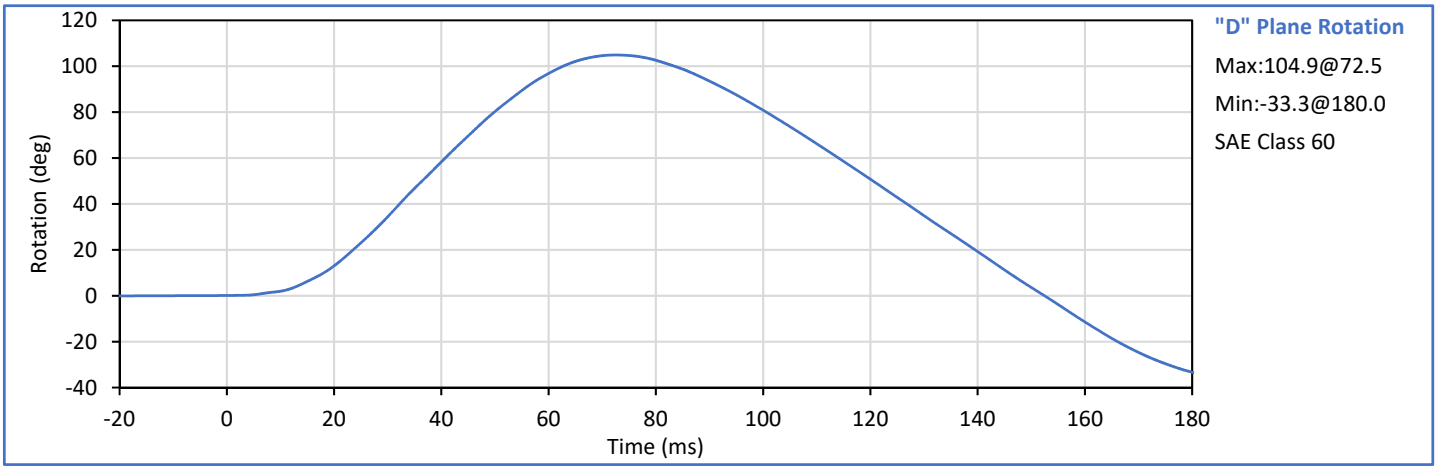
Hybrid III 5th Percentile Female
Neck Extension Test

ATD Serial No.: 141 Test Date: 2018-05-07

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Humidity	%	10	70	23	Pass
Pendulum Velocity	m/s	5.95	6.19	6.15	Pass
Pendulum Velocity at 10 ms	m/s	1.50	1.90	1.88	Pass
Pendulum Velocity at 20 ms	m/s	3.10	3.90	3.74	Pass
Pendulum Velocity at 30 ms	m/s	4.60	5.60	5.40	Pass
Peak "D" Plane Rotation	deg	99.0	114.0	104.9	Pass
Peak Moment in Rotation	Nm	-65.0	-53.0	-54.7	Pass
Negative Moment Decay to -10 Nm	ms	94.0	114.0	99.9	Pass
			Overall Test Results		Pass





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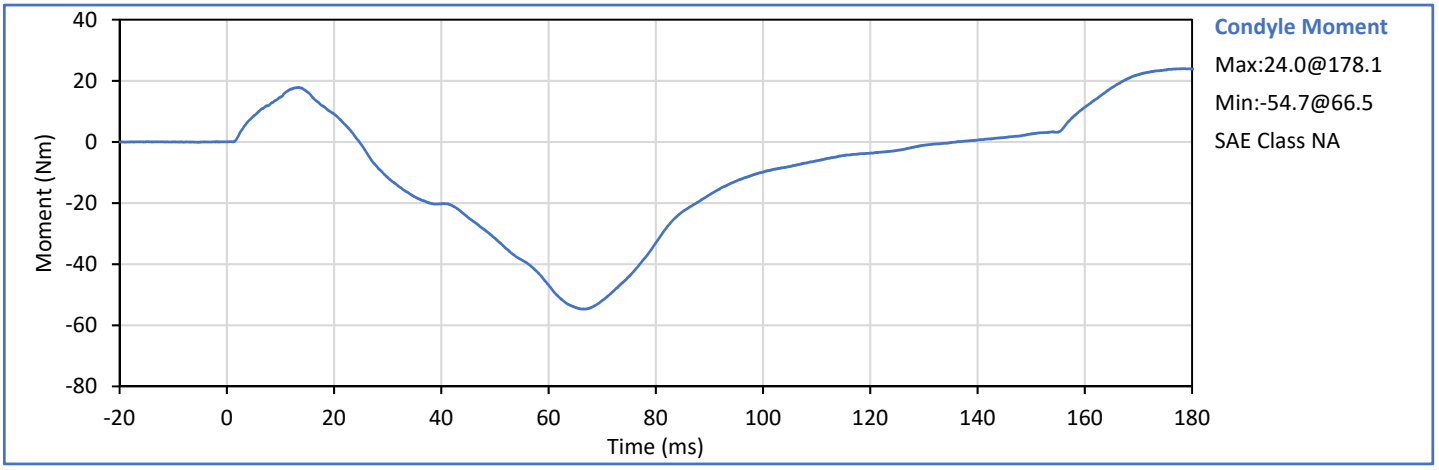
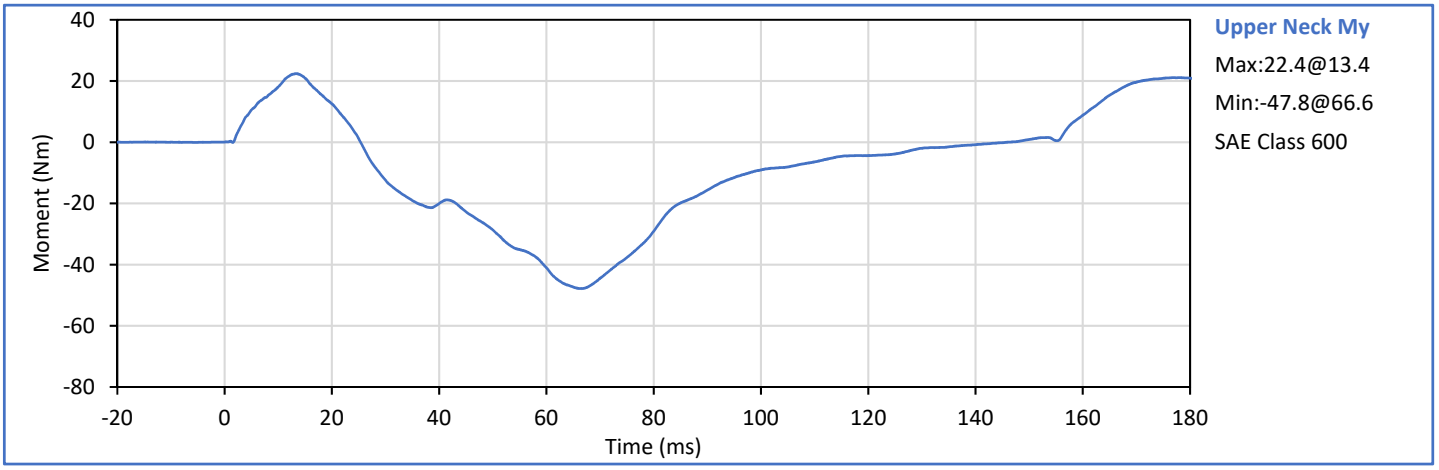
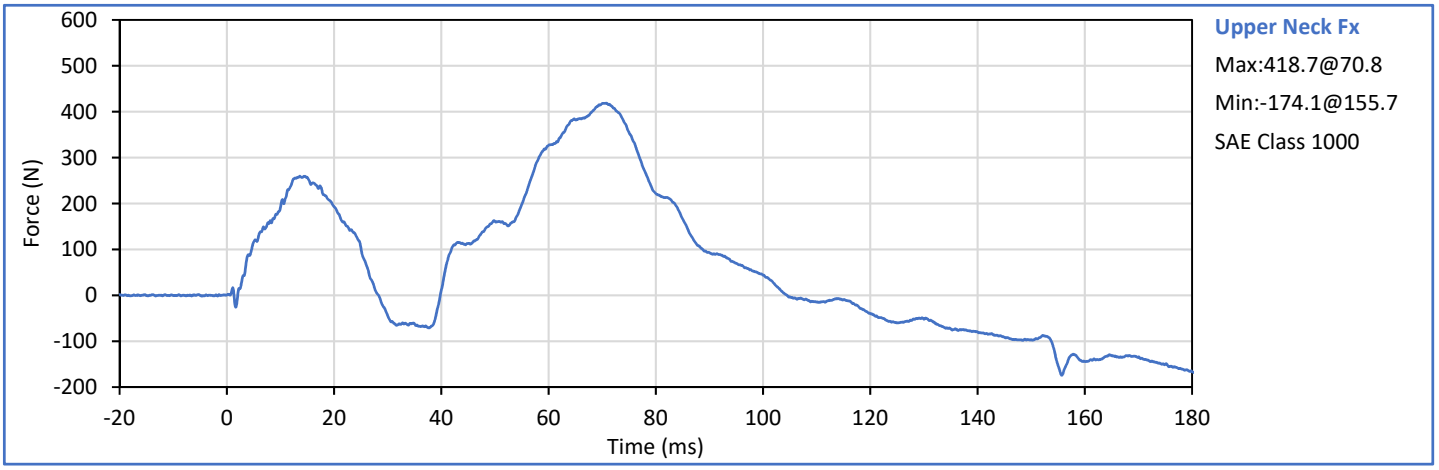
Hybrid III 5th Percentile Female
Neck Extension Test

ATD Serial No.: 141 Test Date: 2018-05-07







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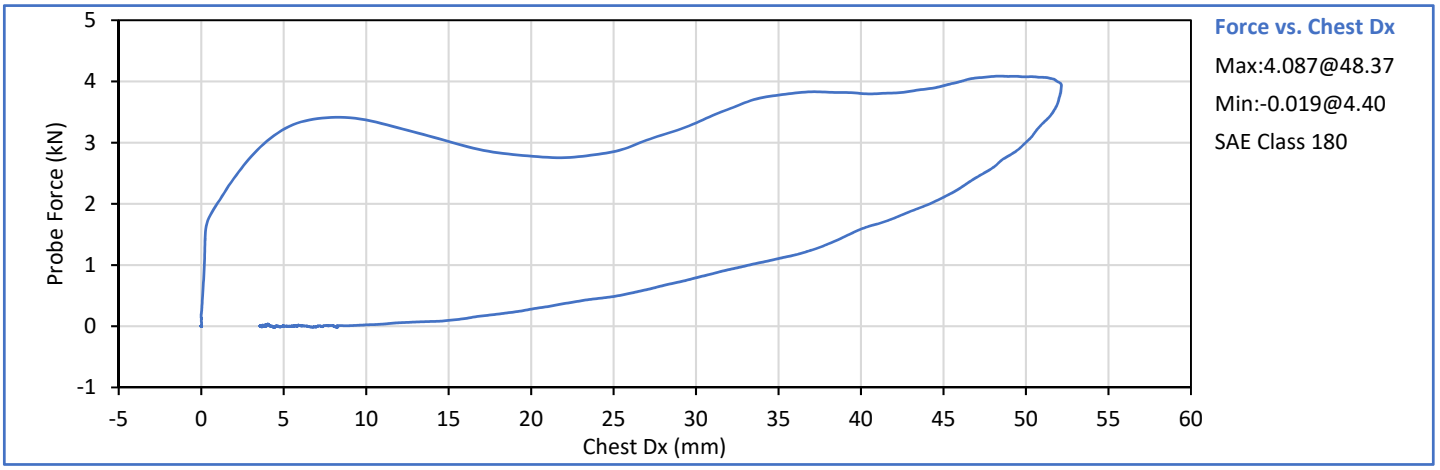
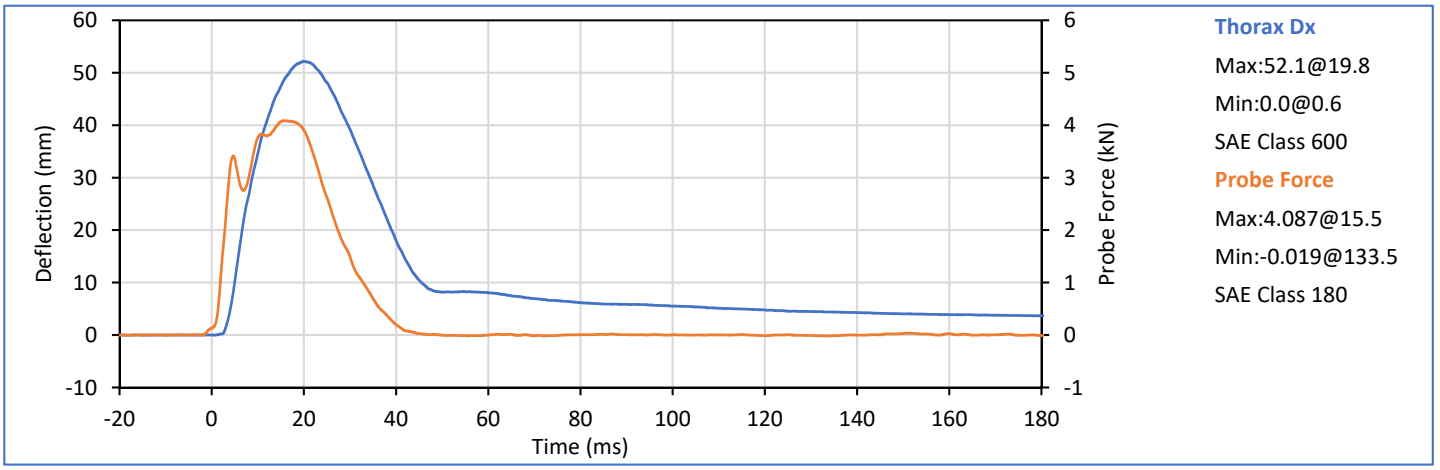
Hybrid III 5th Percentile Female
Thorax Impact

ATD Serial No.: 141 Test Date: 2018-05-06

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Humidity	%	10	70	20	Pass
Probe Velocity	m/s	6.59	6.83	6.65	Pass
Peak Chest Deflection	mm	50.0	58.0	52.1	Pass
Peak Probe Force, 50 and 58 mm	kN	3.900	4.400	4.087	Pass
Peak Probe Force, 18 and 50 mm	kN	0.000	4.600	4.087	Pass
Internal Hysterisis	%	69.0	85.0	73.2	Pass
			Overall Test Results		Pass





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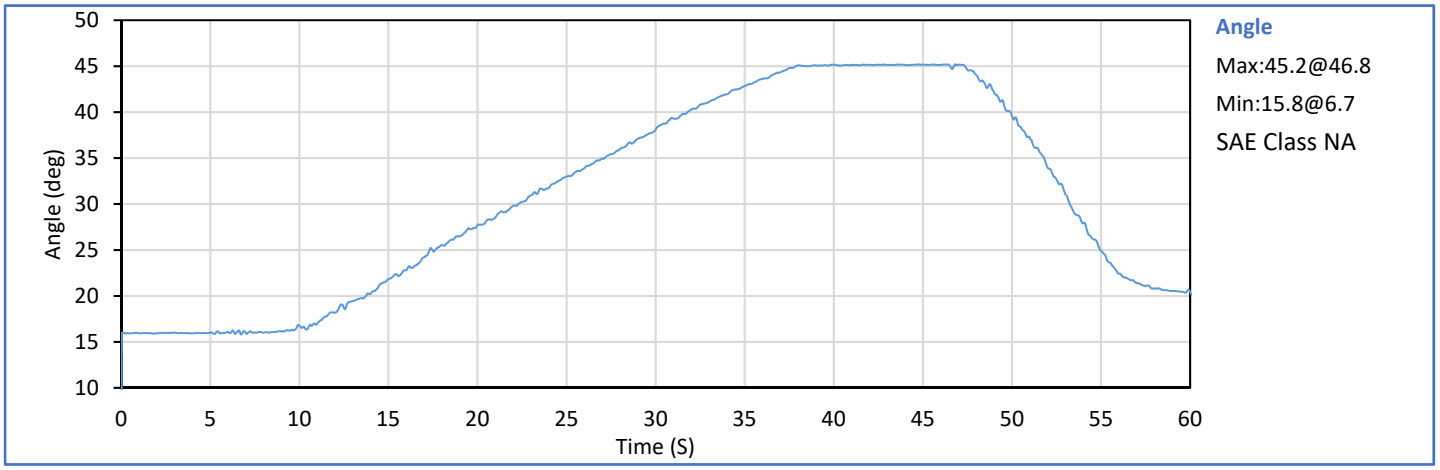
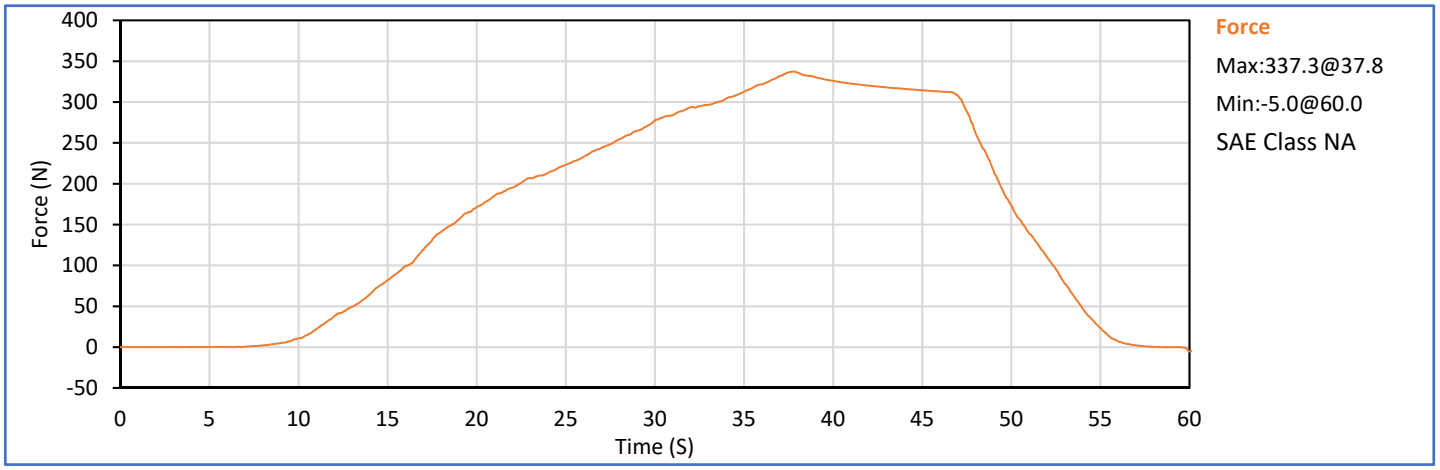
Hybrid III 5th Percentile Female
Torso Flexion Test

ATD Serial No.: 141 Test Date: 2018-05-08

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.1	Pass
Laboratory Humidity	%	10	70	25	Pass
Orientation Angle	deg	0.0	20.0	14.5	Pass
Test Initial Angle	deg	11.0	19.0	16.0	Pass
Peak Force at 45° (+/-0.5°)	N	320.0	390.0	337.3	Pass
Torso Flexion Rate	deg/s	0.50	1.50	1.03	Pass
Final Reference Plane Angle	deg	-8.0	8.0	2.5	Pass
			Overall Test Results		Pass





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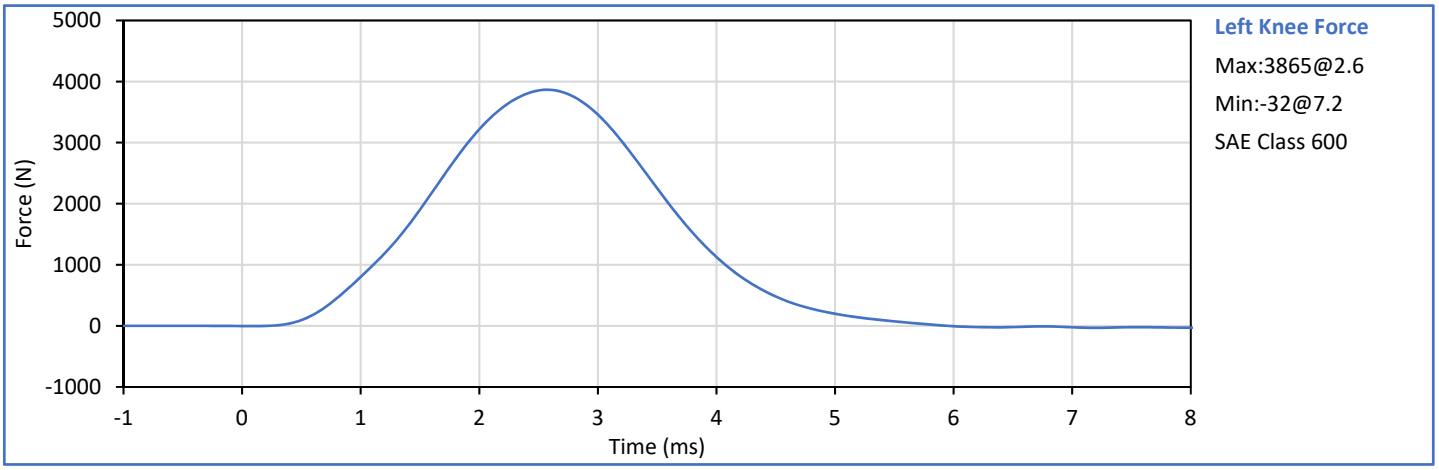
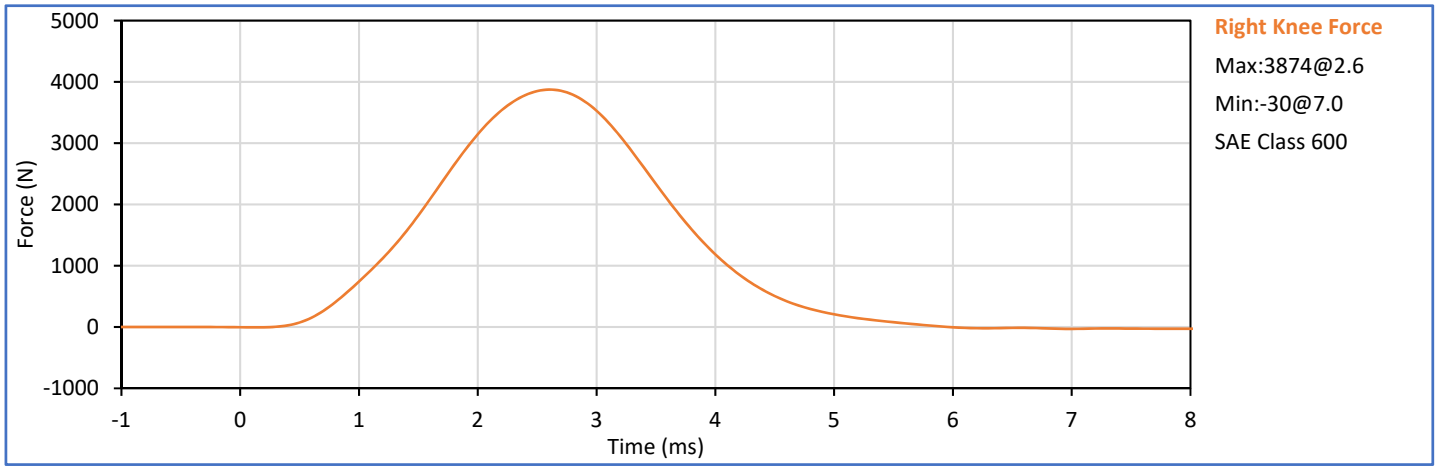
Hybrid III 5th Percentile Female
Knee Impact (Left/Right)

ATD Serial No.: 141 Test Date: 2018-05-04

	Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
	Laboratory Temperature	°C	18.9	25.6	21.1	Pass
	Laboratory Humidity	%	10	70	30	Pass
Left Knee	Probe Velocity	m/s	2.070	2.130	2.120	Pass
	Peak Resistive Force	N	3450	4060	3865	Pass
Right Knee	Probe Velocity	m/s	2.070	2.130	2.122	Pass
	Peak Resistive Force	N	3450	4060	3874	Pass
				Overall Test Results		Pass





Technician: T. Lowman

Approved By: P. Puzzuto

APPENDIX C
POST-TEST ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA

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Hybrid III 50th Percentile Male
ATD Damage Checklist

ATD Serial No.: 360 Test Date: 2018-05-14

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.	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:

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Hybrid III 50th Percentile Male
External Measurements

ATD Serial No.: 360 Test Date: 2018-05-14

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	26	Pass
A - Total sitting height	mm	879	889	887	Pass
B - Shoulder pivot height	mm	505	521	517	Pass
C - 'H' point height	mm	84	89	87	Pass
D - 'H' point location from backline	mm	135	140	139	Pass
E - Shoulder pivot from backline	mm	84	94	91	Pass
F - Thigh clearance	mm	140	155	151	Pass
G - Back of elbow to wrist pivot	mm	290	305	297	Pass
H - Head back to backline	mm	41	46	46	Pass
I - Shoulder to elbow length	mm	330	345	343	Pass
J - Elbow rest height	mm	190	211	204	Pass
K - Buttock to knee length	mm	579	604	589	Pass
L - Popliteal length	mm	429	455	440	Pass
M - Knee pivot height	mm	485	500	495	Pass
N - Buttock popliteal length	mm	452	477	464	Pass
O - Chest depth without jacket	mm	213	229	220	Pass
P - Foot length	mm	251	267	258	Pass
V - Shoulder breadth	mm	422	437	431	Pass
W - Foot breadth	mm	91	107	103	Pass
Y - Chest circum. (w/chest jacket)	mm	970	1001	980	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	228	Pass
			Overall Test Results		Pass

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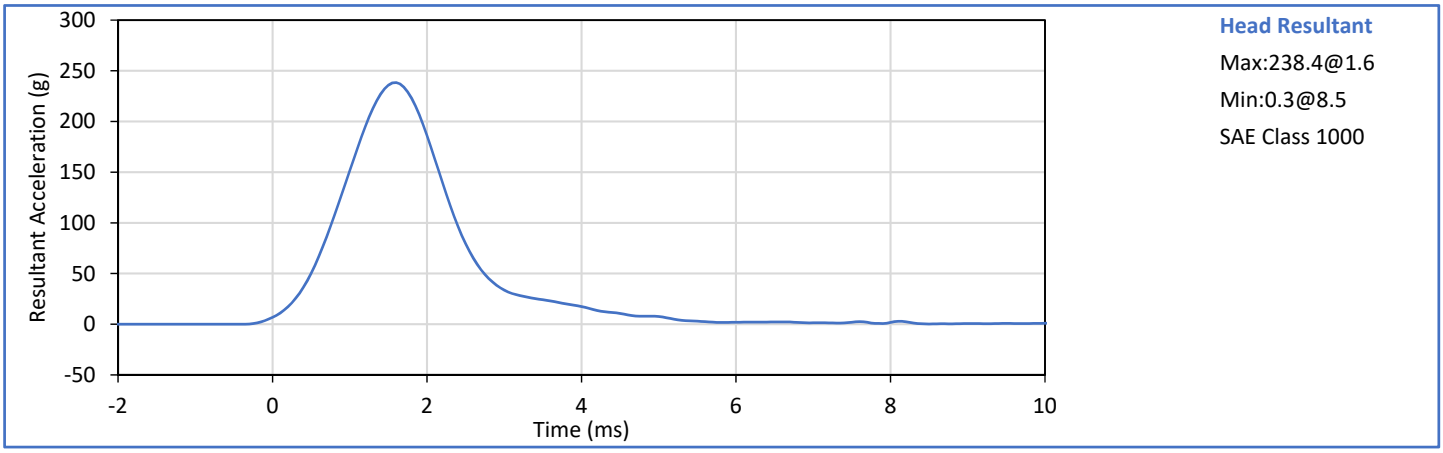
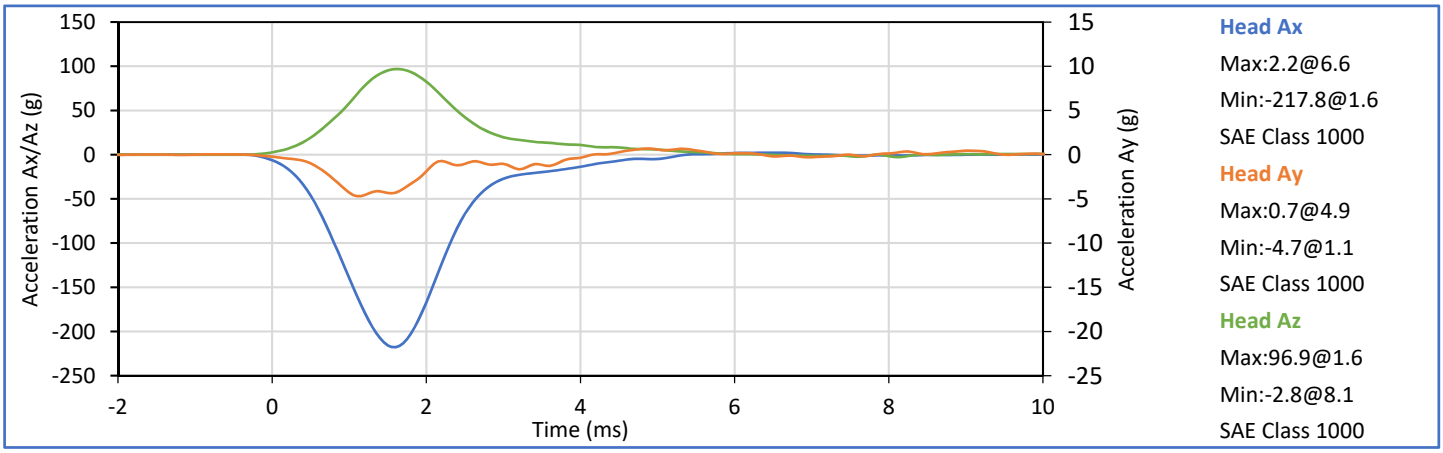
Hybrid III 50th Percentile Male
Head Drop

ATD Serial No.: 360 Test Date: 2018-05-16

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.1	Pass
Laboratory Humidity	%	10	70	35	Pass
Peak Resultant Acceleration	g	225.0	275.0	238.4	Pass
Peak Lateral Acceleration	g	-15.0	15.0	-4.7	Pass
Oscillations After Main Pulse	%	0.0	10.0	1.2	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
			Overall Test Results		Pass





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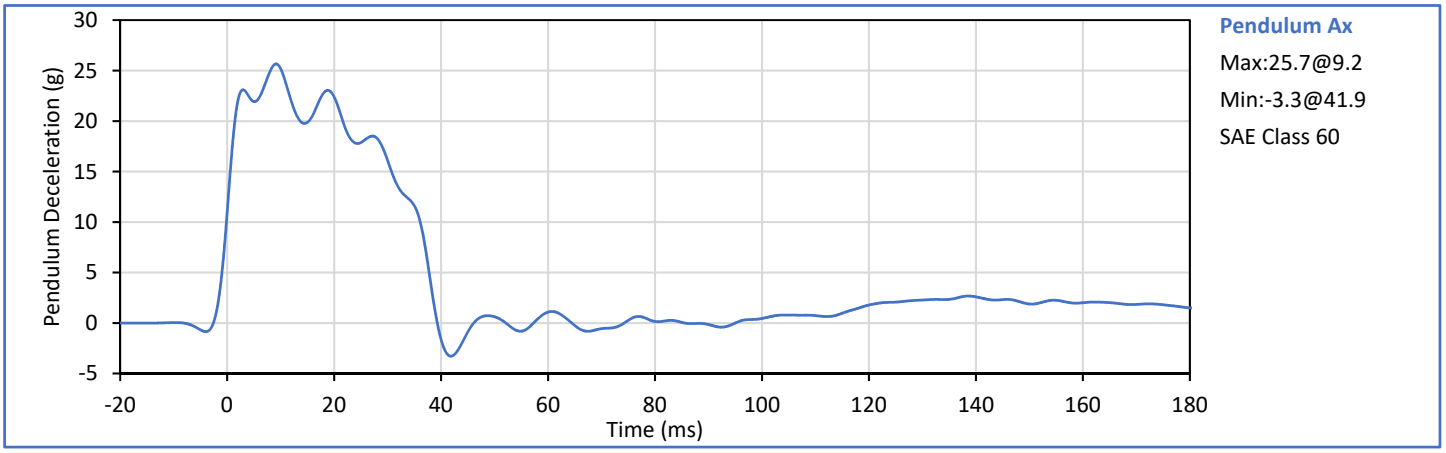
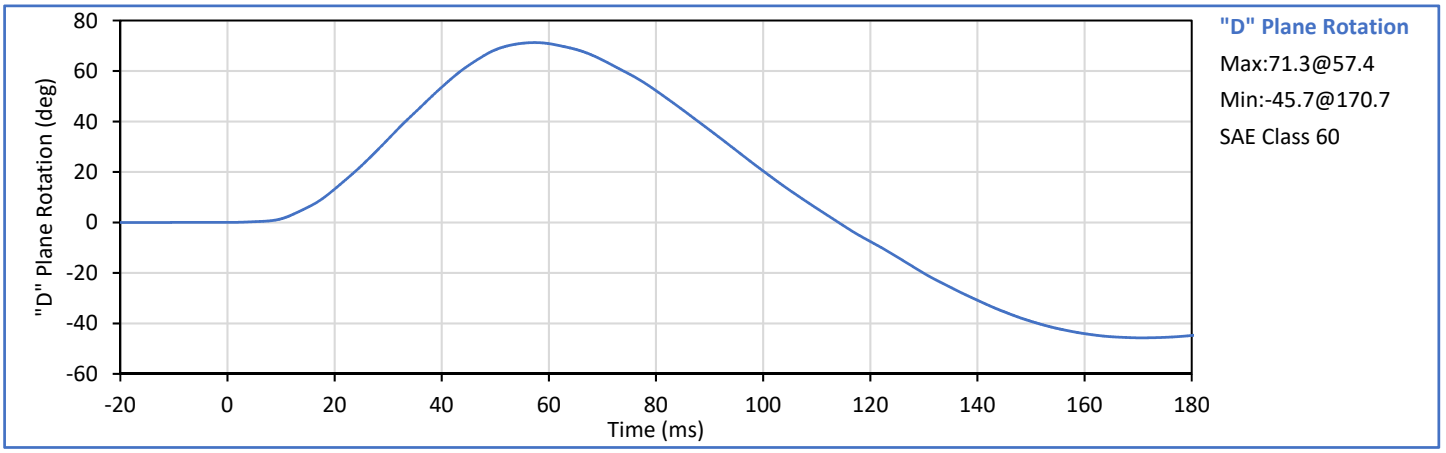
Hybrid III 50th Percentile Male
Neck Flexion Test

ATD Serial No.: 360 Test Date: 2018-05-15

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.4	Pass
Laboratory Humidity	%	10	70	26	Pass
Pendulum Velocity	m/s	6.89	7.13	6.93	Pass
Pendulum Deceleration at 10 ms	g	22.5	27.5	25.2	Pass
Pendulum Deceleration at 20 ms	g	17.6	22.6	22.4	Pass
Pendulum Deceleration at 30 ms	g	12.5	18.5	16.1	Pass
Peak Pendulum Decel. after 30 ms	g	0.0	29.0	16.1	Pass
Deceleration Decay to Cross 5 g	ms	34.0	42.0	37.8	Pass
"D" Plane Rotation peak	deg	64.0	78.0	71.3	Pass
	ms	57.0	64.0	57.4	Pass
"D" Plane Rotation Decay To Zero	ms	113.0	128.0	114.1	Pass
Moment About Occipital Condyle	Nm	88.1	108.5	99.4	Pass
	ms	47.0	58.0	50.0	Pass
Moment Decay, Peak to Zero	deg	97.0	107.0	98.6	Pass
			Overall Test Results		Pass





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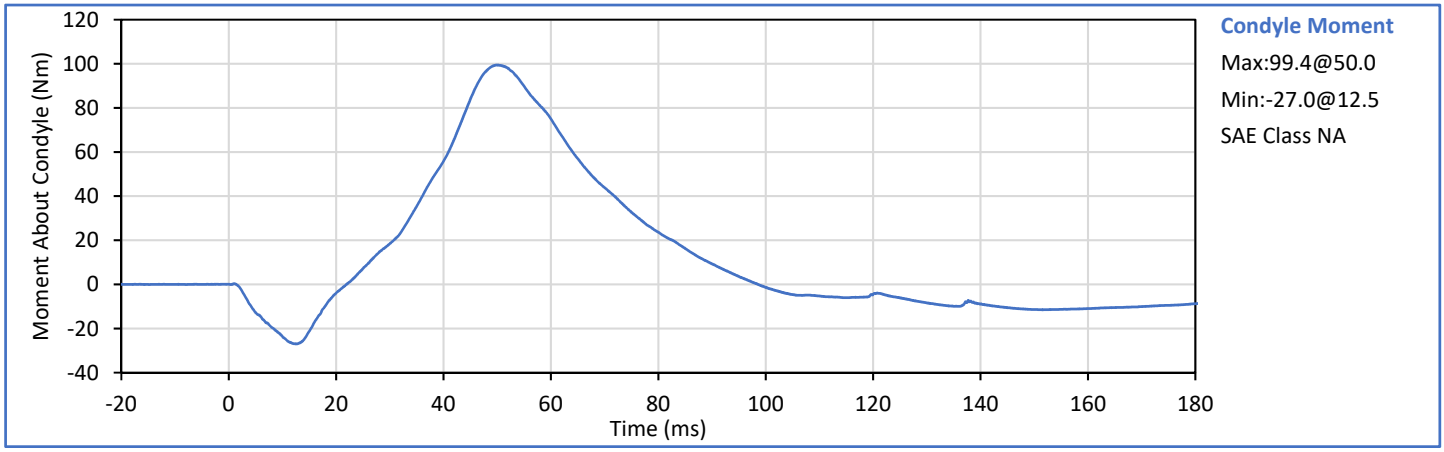
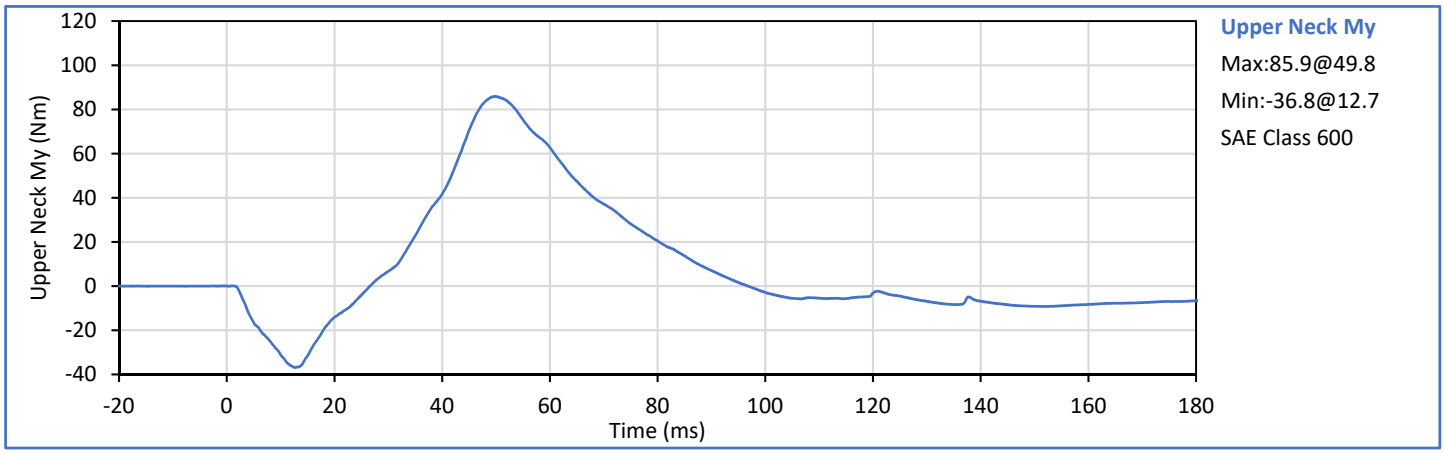
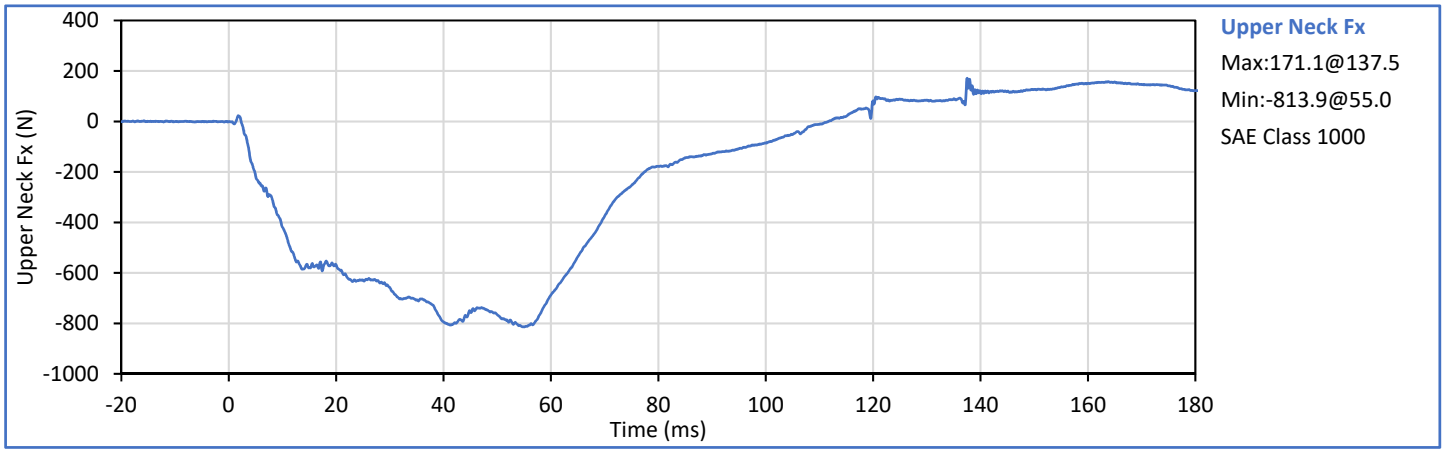
Hybrid III 50th Percentile Male
Neck Flexion Test

ATD Serial No.: 360 Test Date: 2018-05-15







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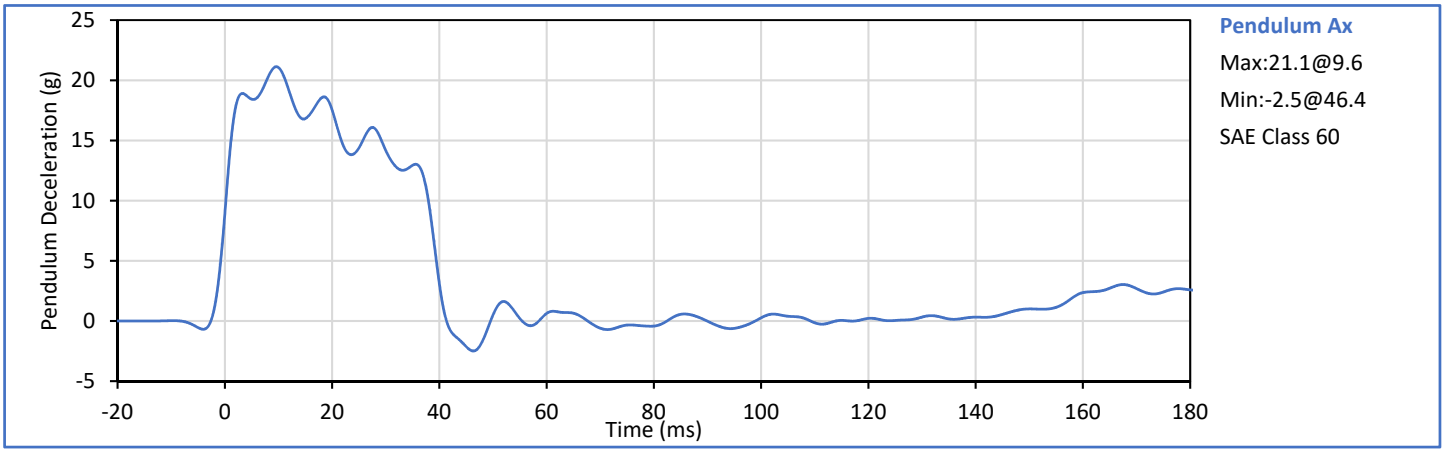
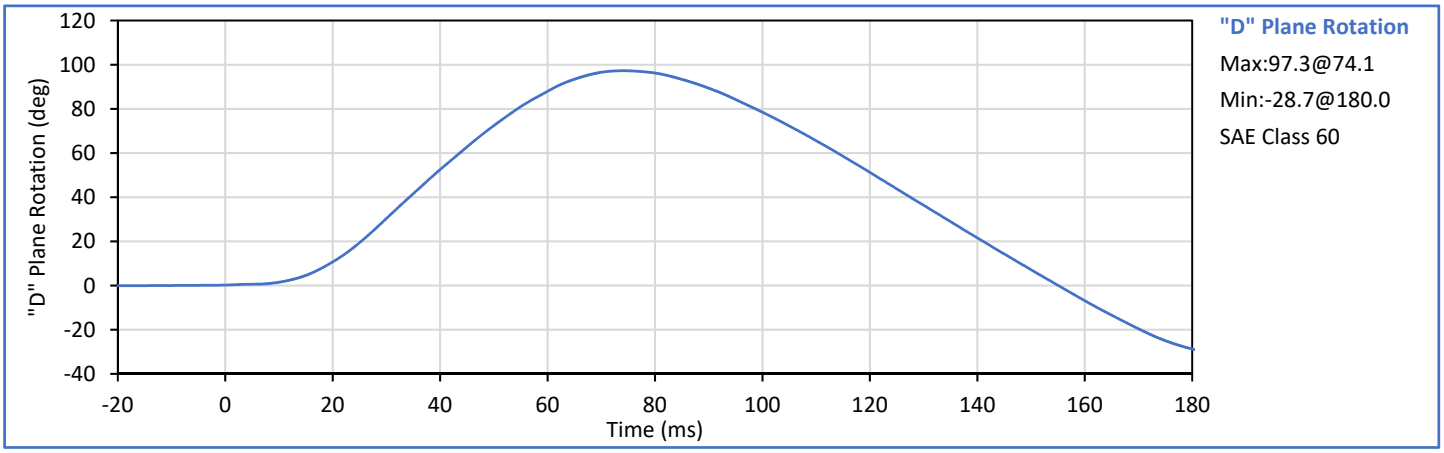
Hybrid III 50th Percentile Male
Neck Extension Test

ATD Serial No.: 360 Test Date: 2018-05-15

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.4	Pass
Laboratory Humidity	%	10	70	26	Pass
Pendulum Velocity	m/s	5.94	6.19	6.06	Pass
Pendulum Deceleration at 10 ms	g	17.2	21.2	21.1	Pass
Pendulum Deceleration at 20 ms	g	14.0	19.0	17.5	Pass
Pendulum Deceleration at 30 ms	g	11.0	16.0	14.2	Pass
Peak Pendulum Decel. after 30 ms	g	0.0	22.0	14.2	Pass
Deceleration Decay to Cross 5 g	ms	38.0	46.0	39.4	Pass
"D" Plane Rotation peak	deg	81.0	106.0	97.3	Pass
	ms	72.0	82.0	74.1	Pass
"D" Plane Rotation Decay To Zero	ms	147.0	174.0	155.1	Pass
Moment About Occipital Condyle	Nm	-79.9	-52.9	-69.7	Pass
	ms	65.0	79.0	68.4	Pass
Moment Decay, Peak to Zero	deg	120.0	148.0	137.4	Pass
			Overall Test Results		Pass





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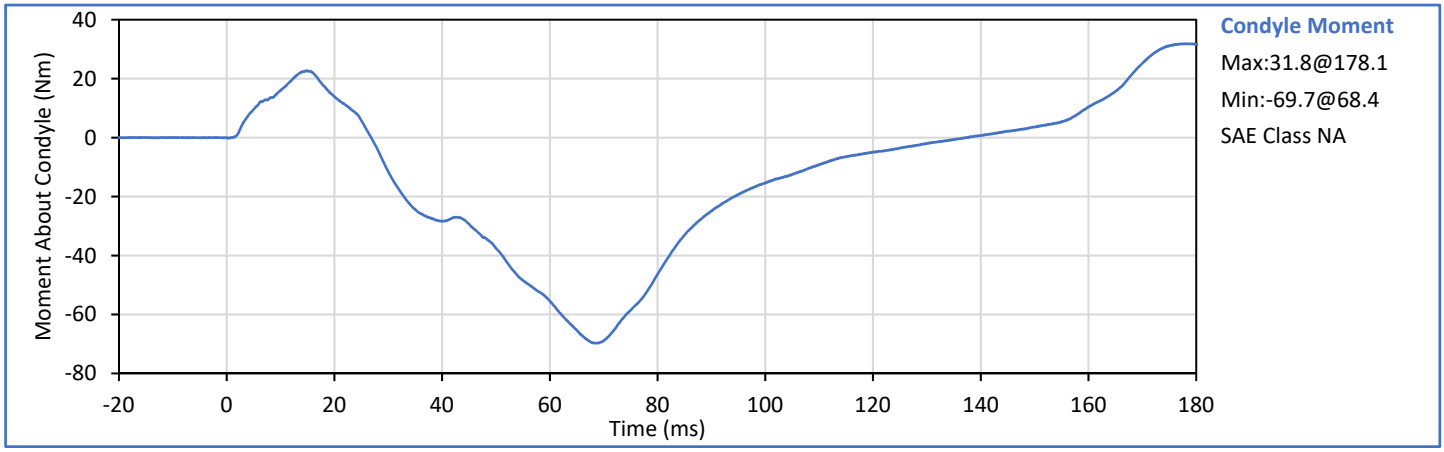
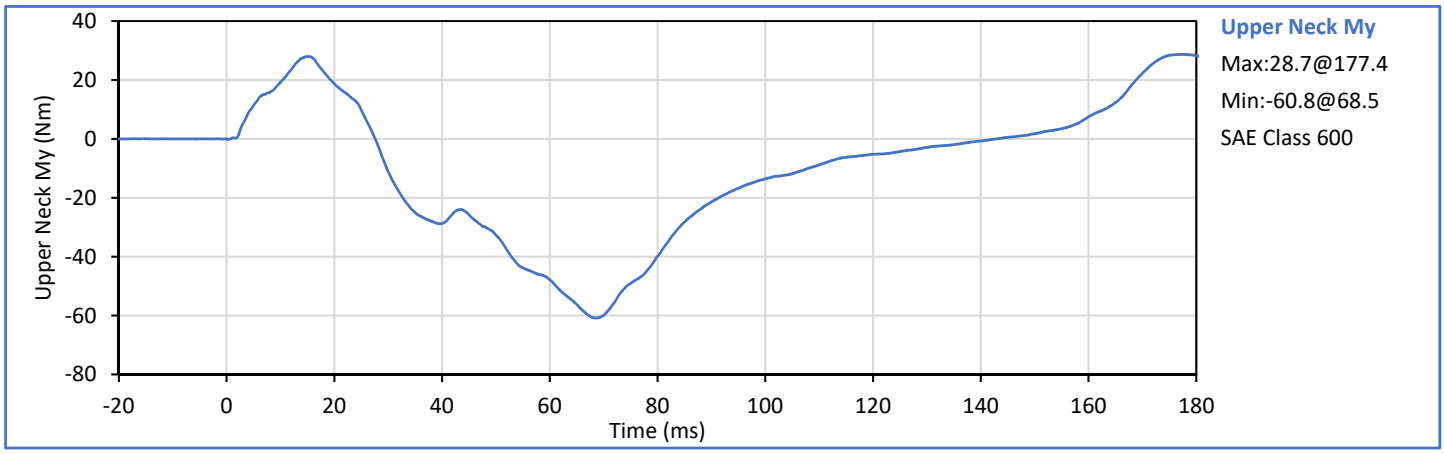
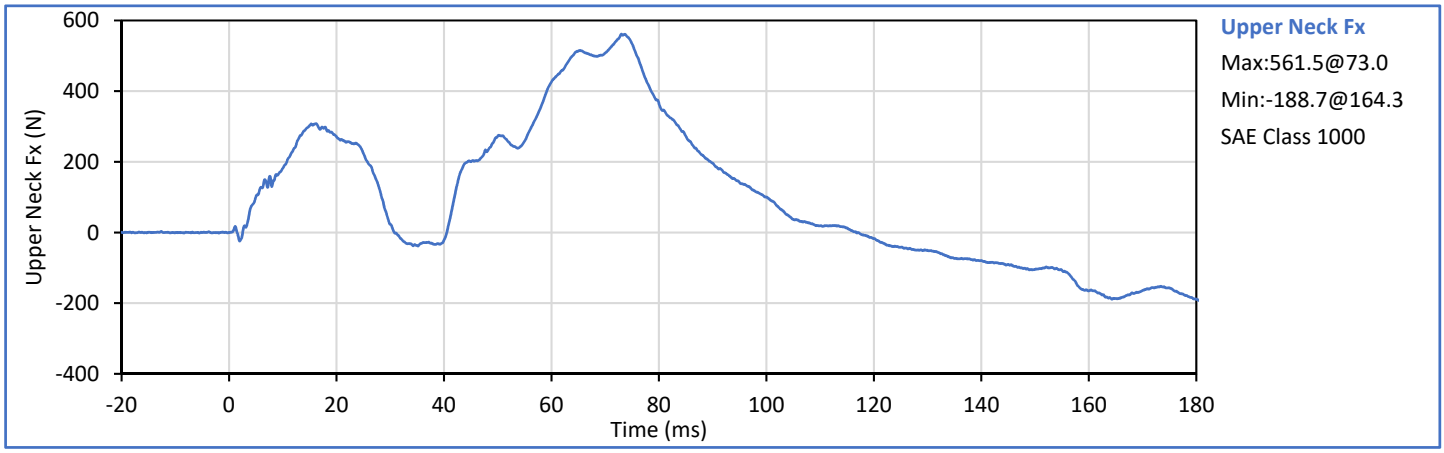
Hybrid III 50th Percentile Male
Neck Extension Test

ATD Serial No.: 360 Test Date: 2018-05-15







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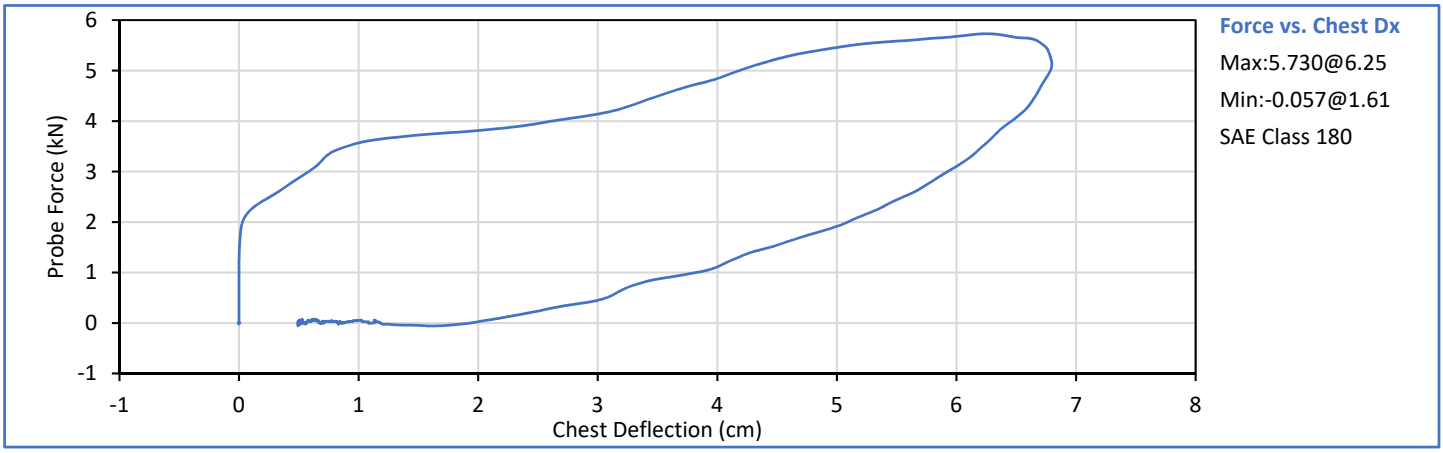
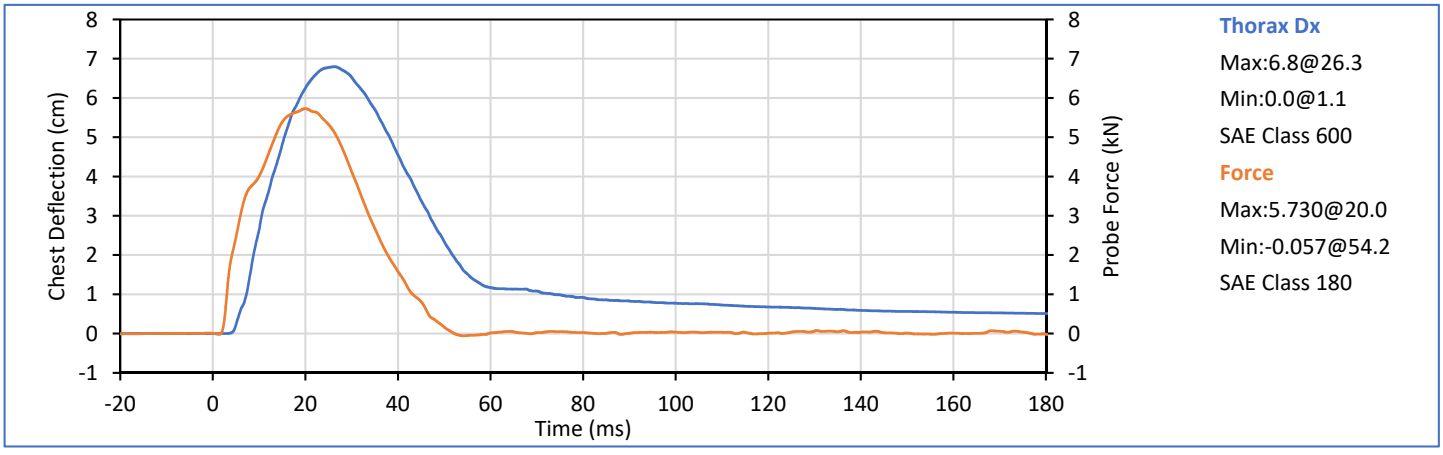
Hybrid III 50th Percentile Male
Thorax Impact

ATD Serial No.: 360 Test Date: 2018-05-14

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.4	Pass
Laboratory Humidity	%	10	70	38	Pass
Probe Velocity	m/s	6.58	6.82	6.69	Pass
Peak Chest Deflection	cm	6.35	7.26	6.80	Pass
Peak Probe Force	kN	5.159	5.893	5.730	Pass
Internal Hysterisis	%	69.0	85.0	73.0	Pass
			Overall Test Results		Pass





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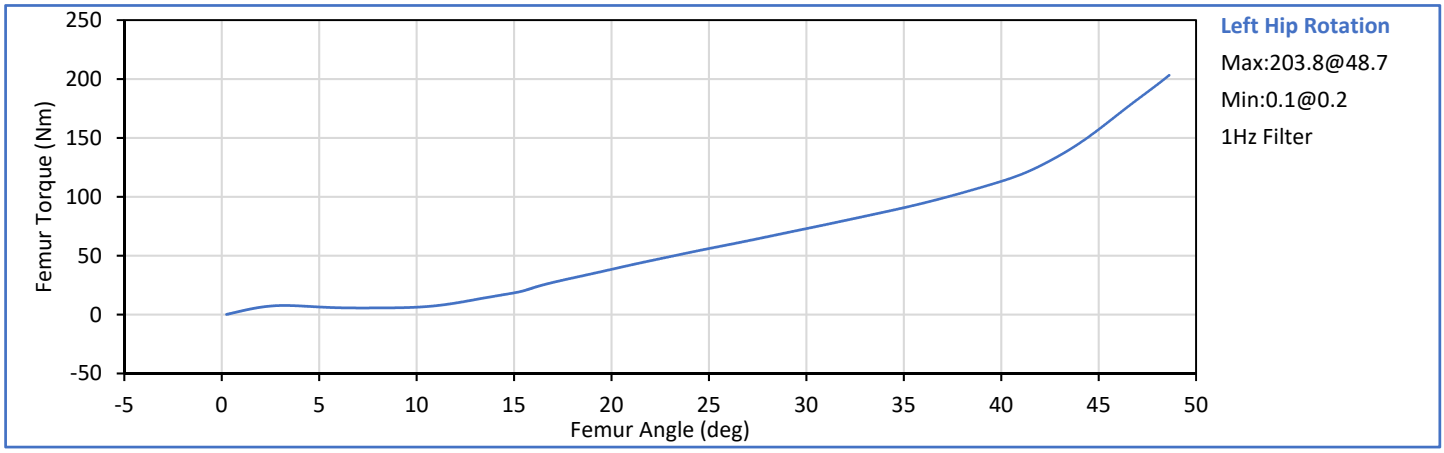
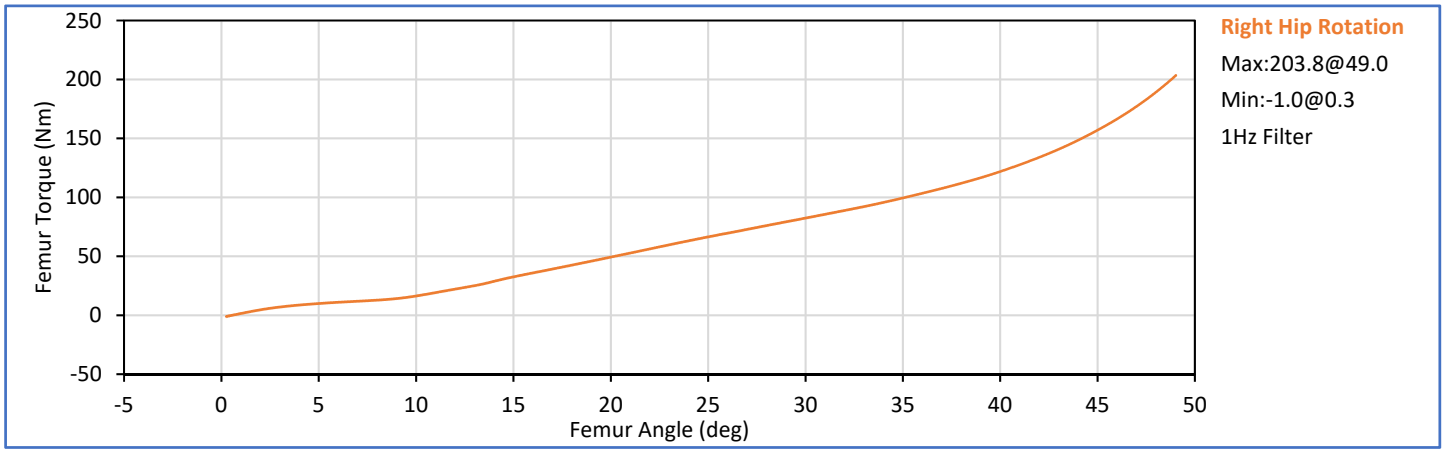
Hybrid III 50th Percentile Male
Hip Flexion (Left/Right)

ATD Serial No.: 360 Test Date: 2018-05-16

	Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
	Laboratory Temperature	°C	18.9	25.6	21.2	Pass
	Laboratory Humidity	%	10	70	21	Pass
Left Hip	Left Hip Rotation Rate	deg/s	5.0	10.0	5.7	Pass
	Left Femur Torque at 30°	Nm	0.0	95.0	73.0	Pass
	Left Hip Rotation at 203 Nm	deg	40.0	50.0	48.6	Pass
Right Hip	Right Hip Rotation Rate	deg/s	5.0	10.0	5.7	Pass
	Right Femur Torque at 30°	Nm	0.0	95.0	82.5	Pass
	Right Hip Rotation at 203 Nm	deg	40.0	50.0	49.0	Pass
				Overall Test Results		Pass





Technician: J. Hernandez

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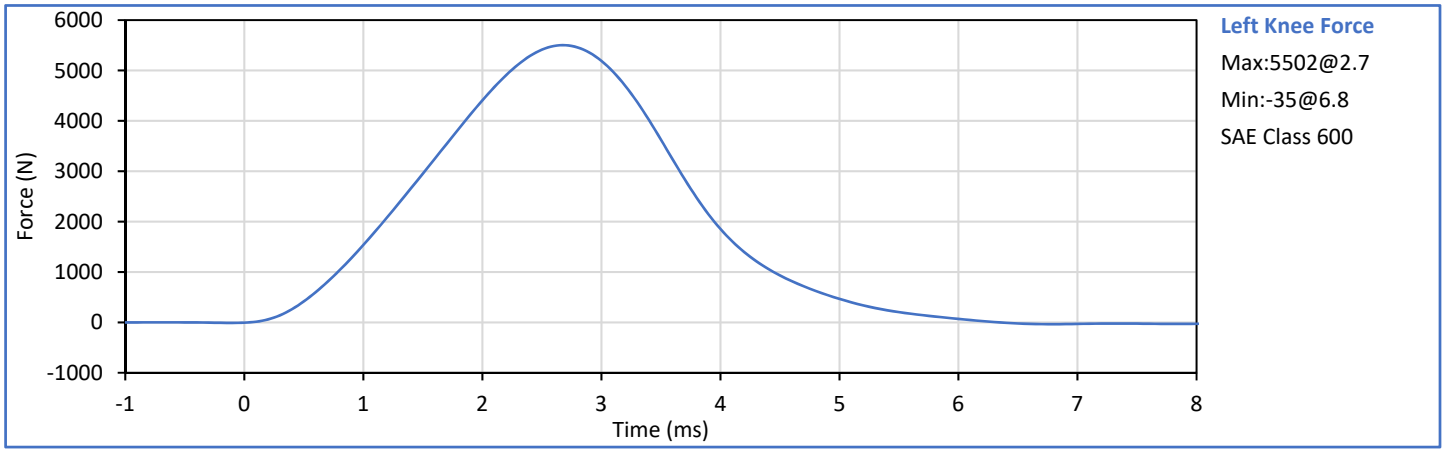
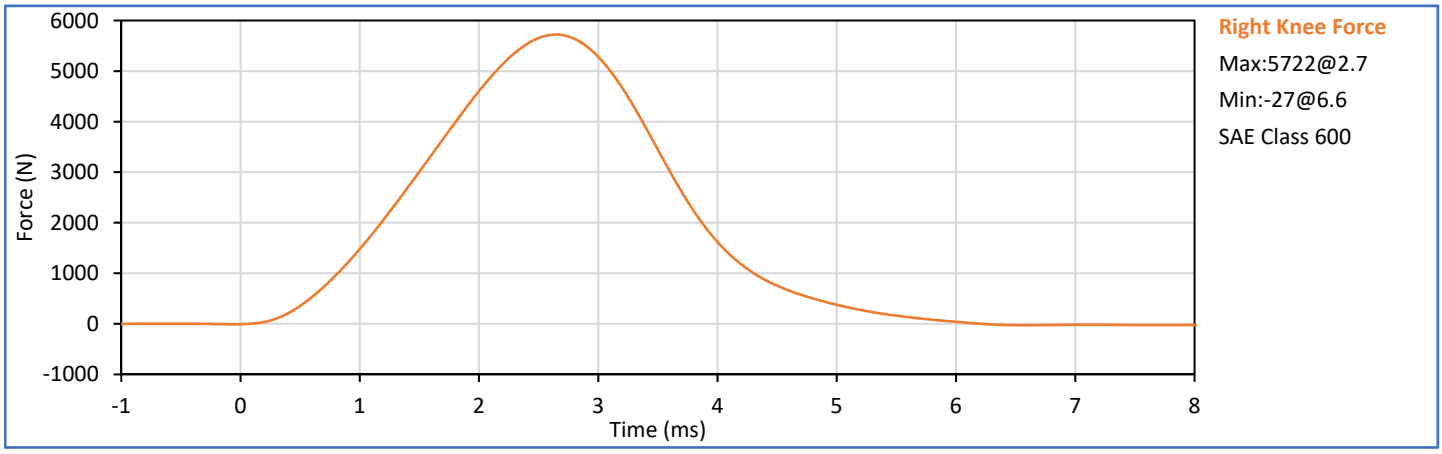
Hybrid III 50th Percentile Male
Knee Impact (Left/Right)

ATD Serial No.: 360 Test Date: 2018-05-14

	Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
	Laboratory Temperature	°C	18.9	25.6	21.2	Pass
	Laboratory Humidity	%	10	70	40	Pass
Left Knee	Probe Velocity	m/s	2.070	2.130	2.076	Pass
	Peak Resistive Force	N	4715	5782	5502	Pass
Right Knee	Probe Velocity	m/s	2.070	2.130	2.075	Pass
	Peak Resistive Force	N	4715	5782	5722	Pass
				Overall Test Results		Pass





Technician: T. Lowman

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Hybrid III 5th Percentile Female
Damage Checklist

ATD Serial No.: 141 Test Date: 2018-05-15

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:

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Hybrid III 5th Percentile Female
External Measurements

ATD Serial No.: 141 Test Date: 2018-05-15

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	22	Pass
A - Total sitting height	mm	775	800	790	Pass
B - Shoulder pivot height	mm	432	457	445	Pass
C - 'H' point height	mm	81	86	86	Pass
D - 'H' point location from backline	mm	145	150	148	Pass
E - Shoulder pivot from backline	mm	69	84	79	Pass
F - Thigh clearance	mm	119	135	131	Pass
G - Back of elbow to wrist pivot	mm	244	259	254	Pass
H - Head back to backline	mm	41	46	42	Pass
I - Shoulder to elbow length	mm	277	297	291	Pass
J - Elbow rest height	mm	183	203	191	Pass
K - Buttock to knee length	mm	521	546	531	Pass
L - Popliteal length	mm	356	376	370	Pass
M - Knee pivot height	mm	394	419	404	Pass
N - Buttock popliteal length	mm	414	439	427	Pass
O - Chest depth without jacket	mm	175	191	184	Pass
P - Foot length	mm	219	234	225	Pass
R - Buttock to Knee Pivot Length	mm	457	483	469	Pass
S - Head Breadth	mm	137	147	141	Pass
T - Head Depth	mm	178	188	184	Pass
U - Hip Breadth	mm	300	315	308	Pass
V - Shoulder breadth	mm	351	366	363	Pass
W - Foot breadth	mm	79	94	87	Pass
X - Head circum.	mm	528	549	538	Pass
Y - Chest circum. (w/chest jacket)	mm	851	881	869	Pass
Z - Waist circum.	mm	760	790	779	Pass
AA - Location for chest circum.	mm	333	358	337	Pass
BB - Location for waist circum.	mm	160	170	168	Pass
			Overall Test Results		Pass

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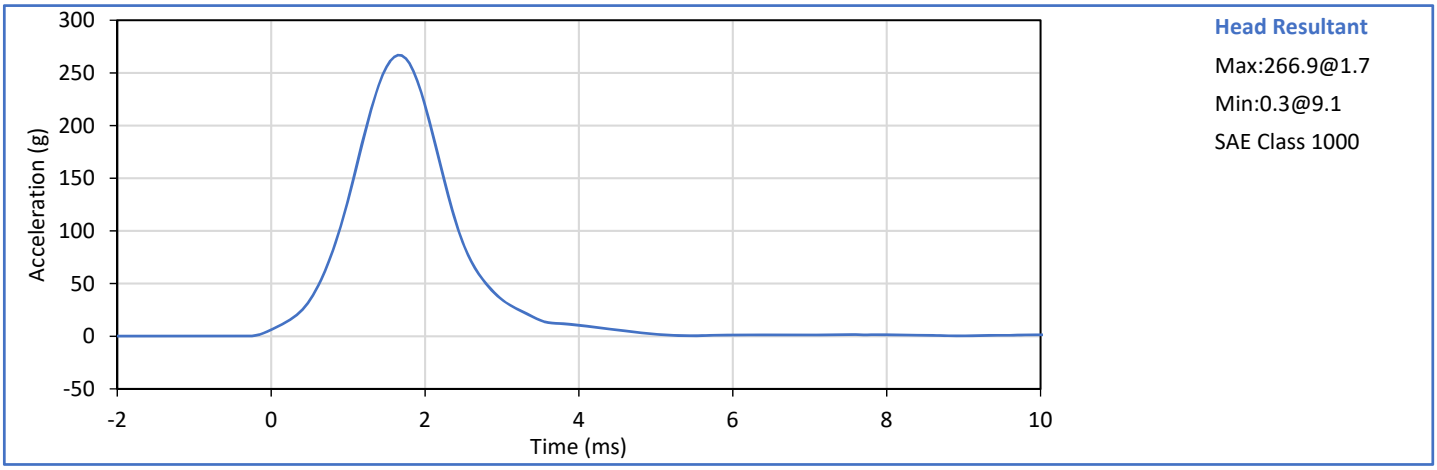
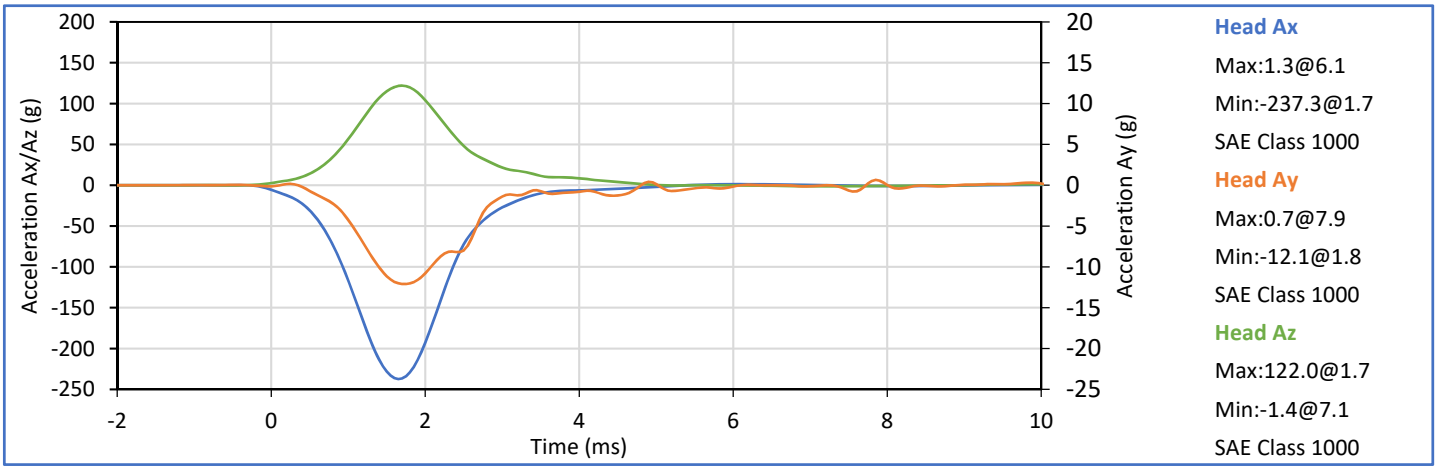
Hybrid III 5th Percentile Female
Head Drop

ATD Serial No.: 141 Test Date: 2018-05-16

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.1	Pass
Laboratory Humidity	%	10	70	31	Pass
Peak Resultant Acceleration	g	250.0	300.0	266.9	Pass
Peak Lateral Acceleration	g	-15.0	15.0	-12.1	Pass
Oscillations After Main Pulse	%	0.0	10.0	0.6	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
			Overall Test Results		Pass





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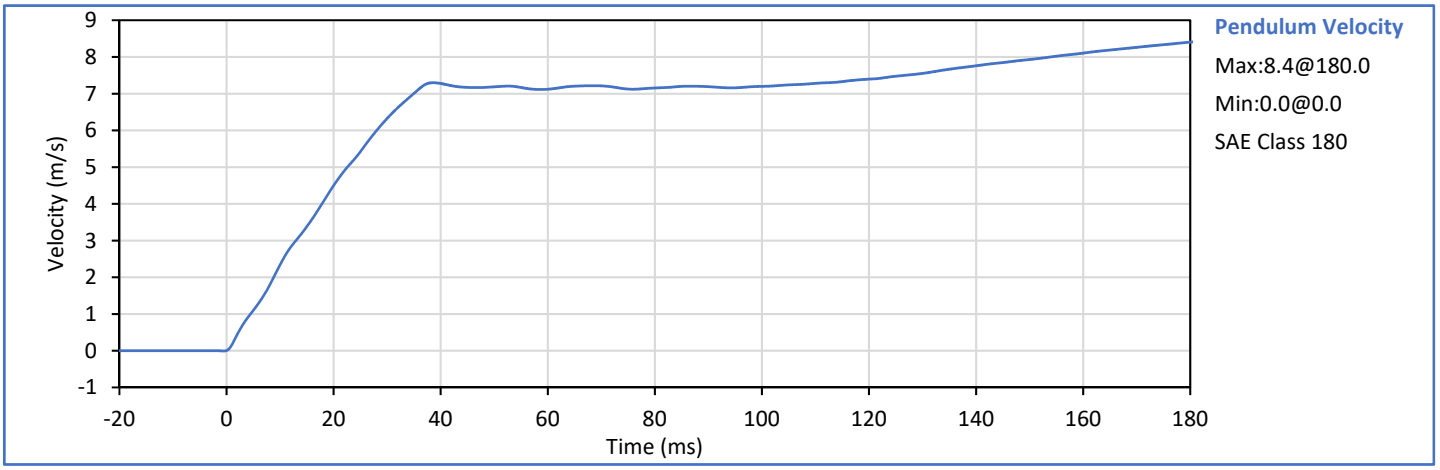
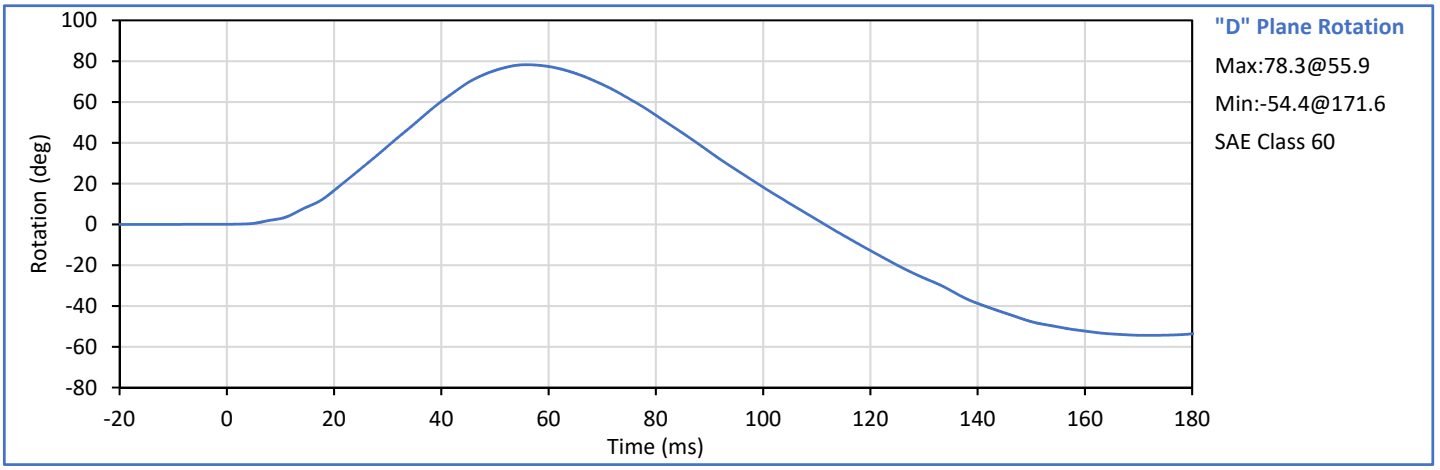
Hybrid III 5th Percentile Female
Neck Flexion Test

ATD Serial No.: 141 Test Date: 2018-05-15

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.4	Pass
Laboratory Humidity	%	10	70	25	Pass
Pendulum Velocity	m/s	6.89	7.13	6.98	Pass
Pendulum Velocity at 10 ms	m/s	2.10	2.50	2.34	Pass
Pendulum Velocity at 20 ms	m/s	4.00	5.00	4.50	Pass
Pendulum Velocity at 30 ms	m/s	5.80	7.00	6.33	Pass
Peak "D" Plane Rotation	deg	77.0	91.0	78.3	Pass
Peak Moment in Rotation	Nm	69.0	83.0	82.7	Pass
Positive Moment Decay to 10 Nm	ms	80.0	100.0	82.8	Pass
			Overall Test Results		Pass





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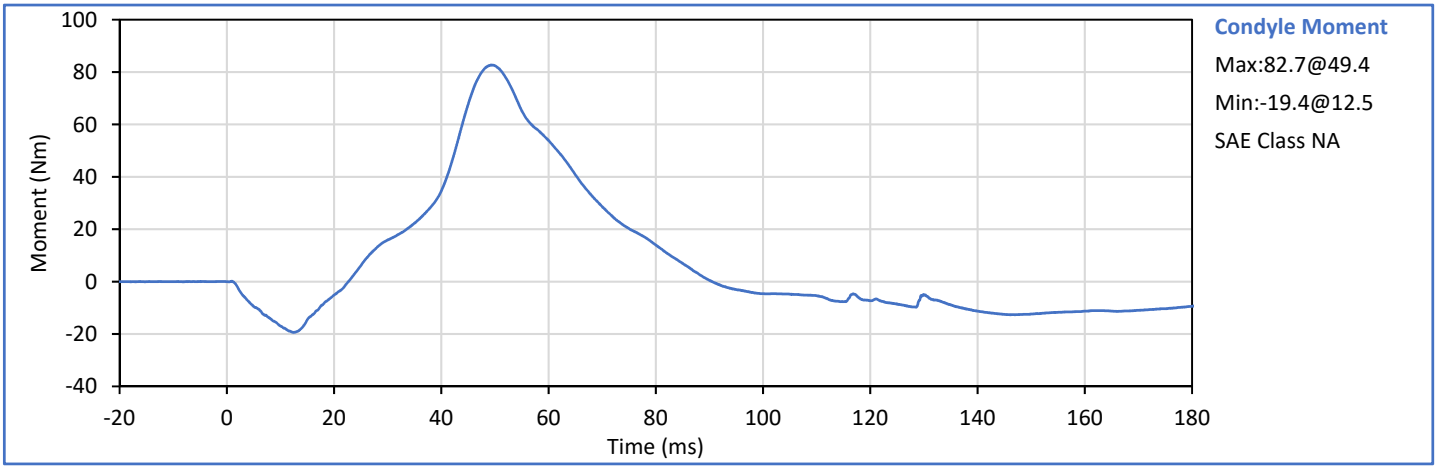
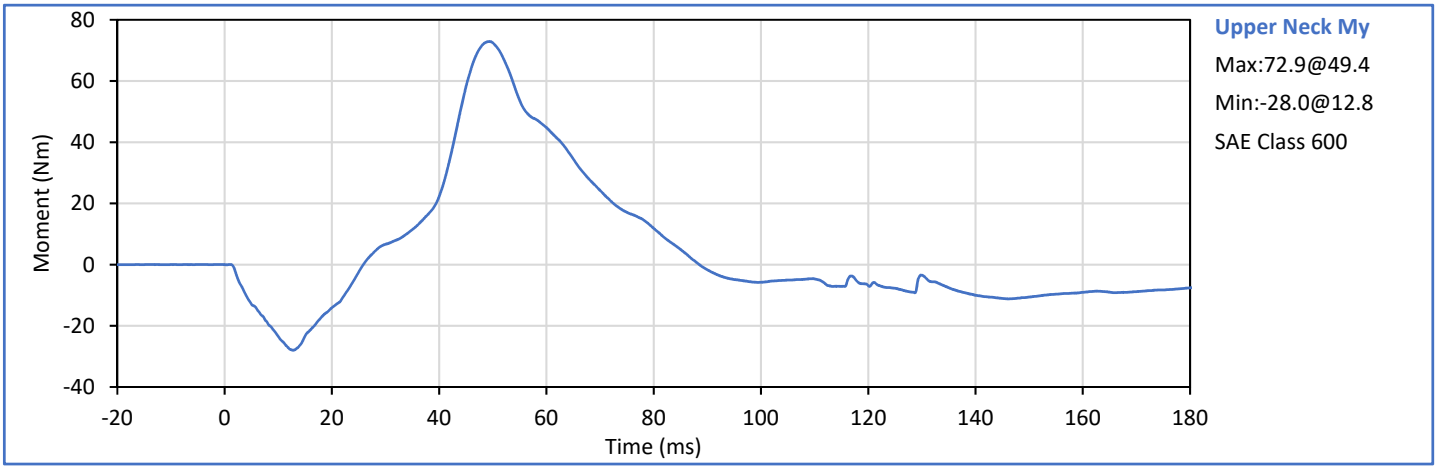
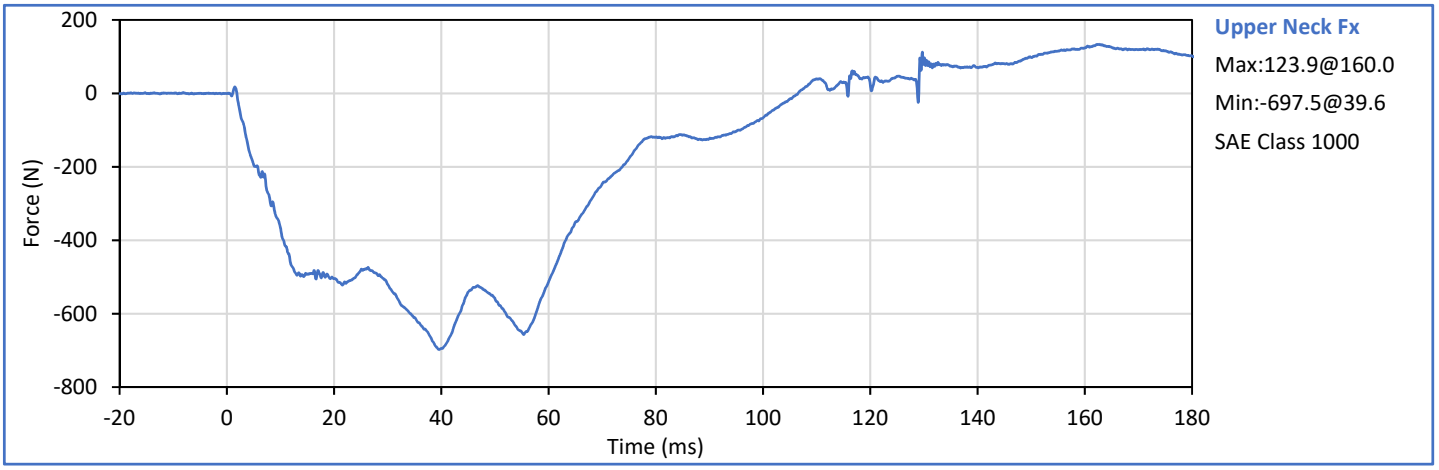
Hybrid III 5th Percentile Female
Neck Flexion Test

ATD Serial No.: 141 Test Date: 2018-05-15







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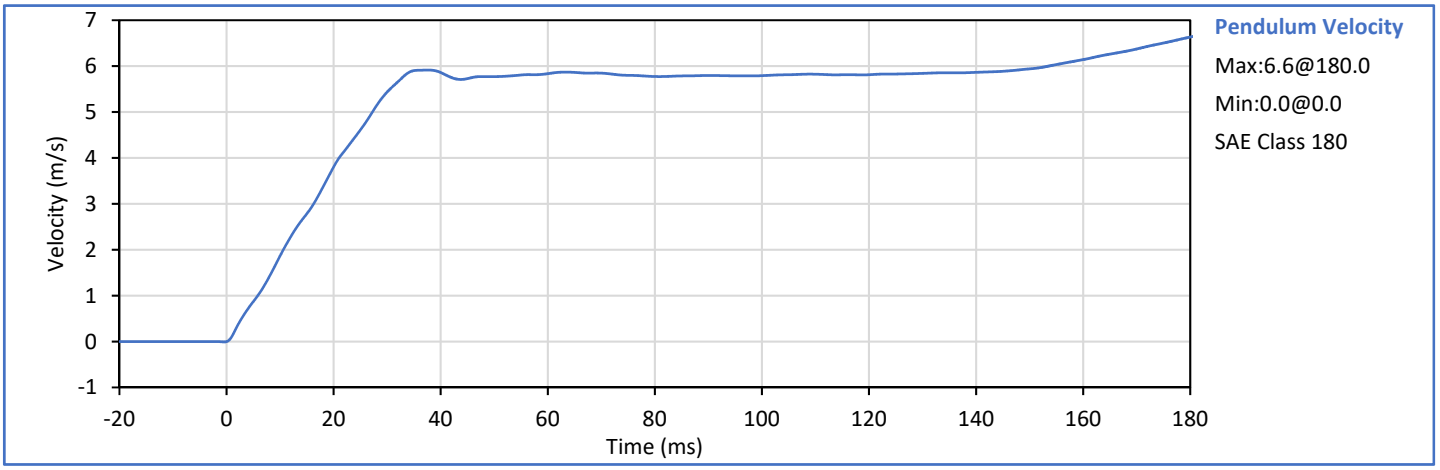
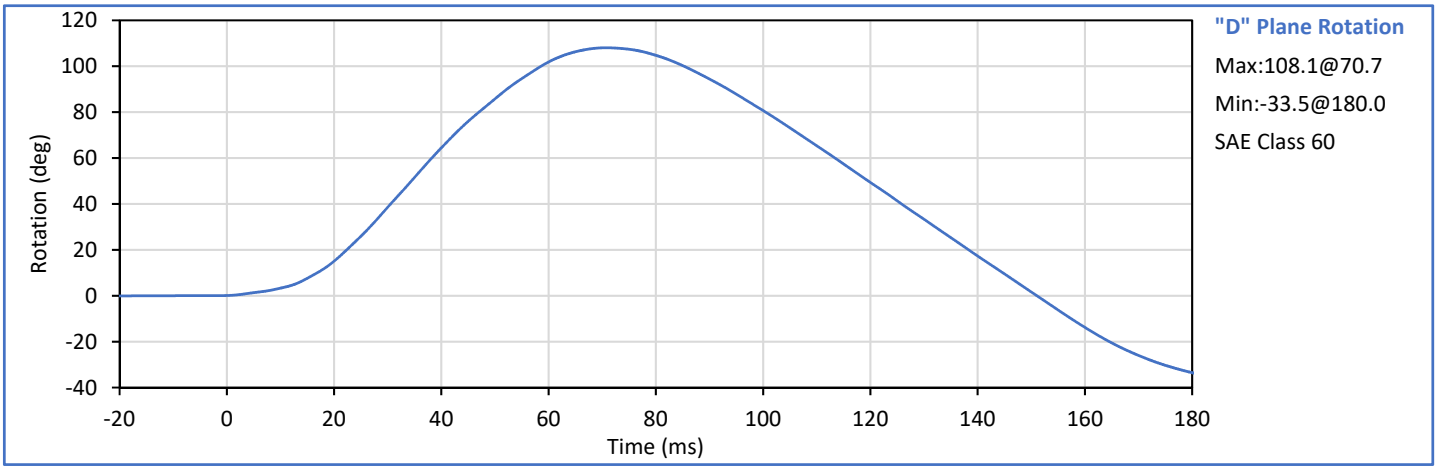
Hybrid III 5th Percentile Female
Neck Extension Test

ATD Serial No.: 141 Test Date: 2018-05-15

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.4	Pass
Laboratory Humidity	%	10	70	25	Pass
Pendulum Velocity	m/s	5.95	6.19	6.15	Pass
Pendulum Velocity at 10 ms	m/s	1.50	1.90	1.87	Pass
Pendulum Velocity at 20 ms	m/s	3.10	3.90	3.80	Pass
Pendulum Velocity at 30 ms	m/s	4.60	5.60	5.44	Pass
Peak "D" Plane Rotation	deg	99.0	114.0	108.1	Pass
Peak Moment in Rotation	Nm	-65.0	-53.0	-59.6	Pass
Negative Moment Decay to -10 Nm	ms	94.0	114.0	96.1	Pass
			Overall Test Results		Pass





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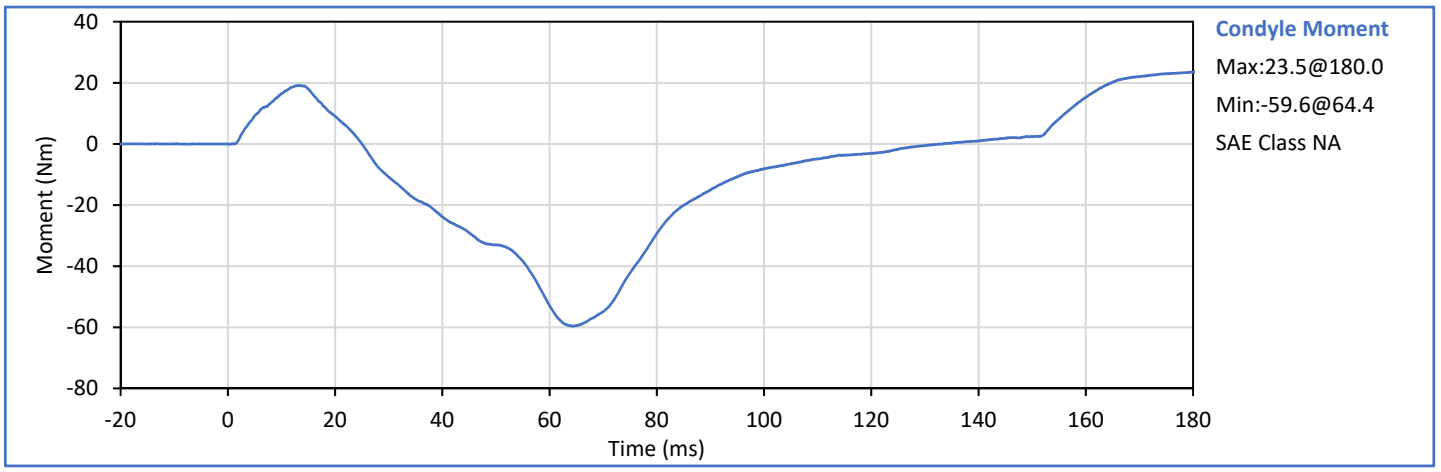
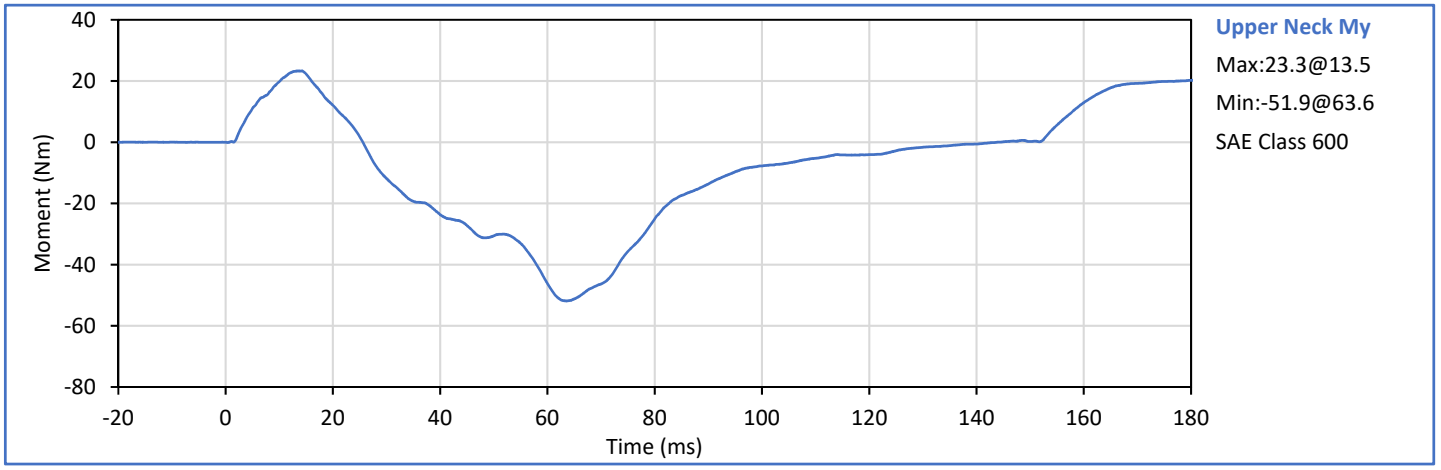
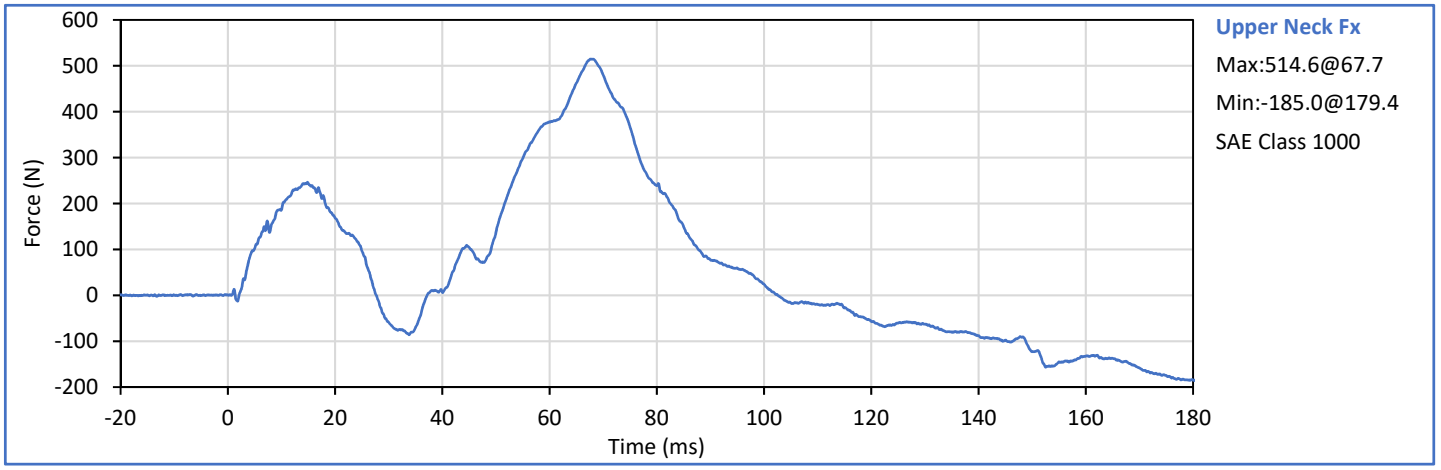
Hybrid III 5th Percentile Female
Neck Extension Test

ATD Serial No.: 141 Test Date: 2018-05-15







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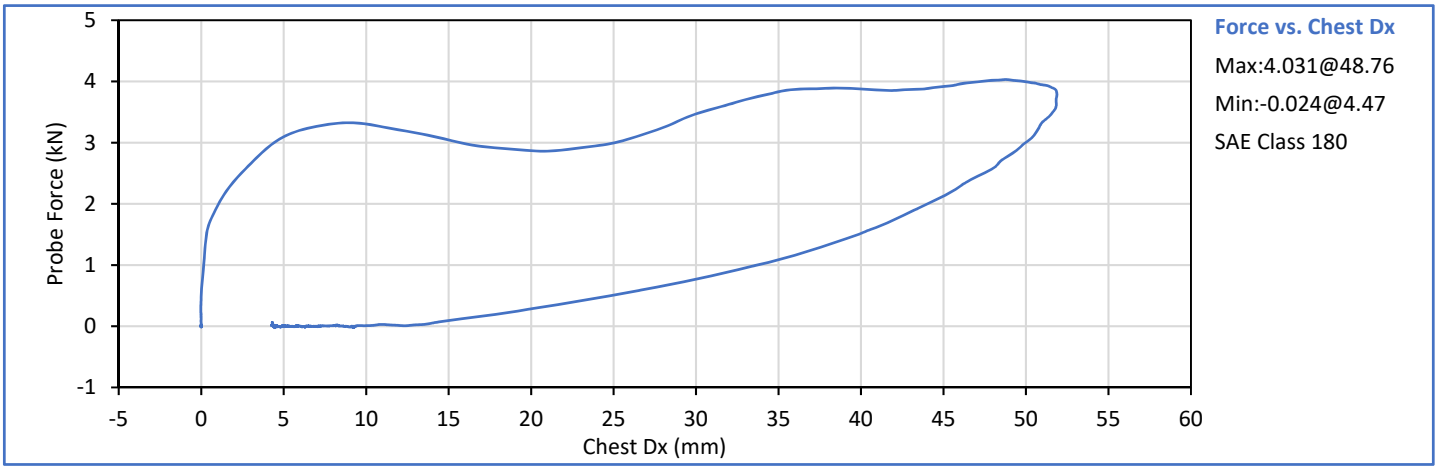
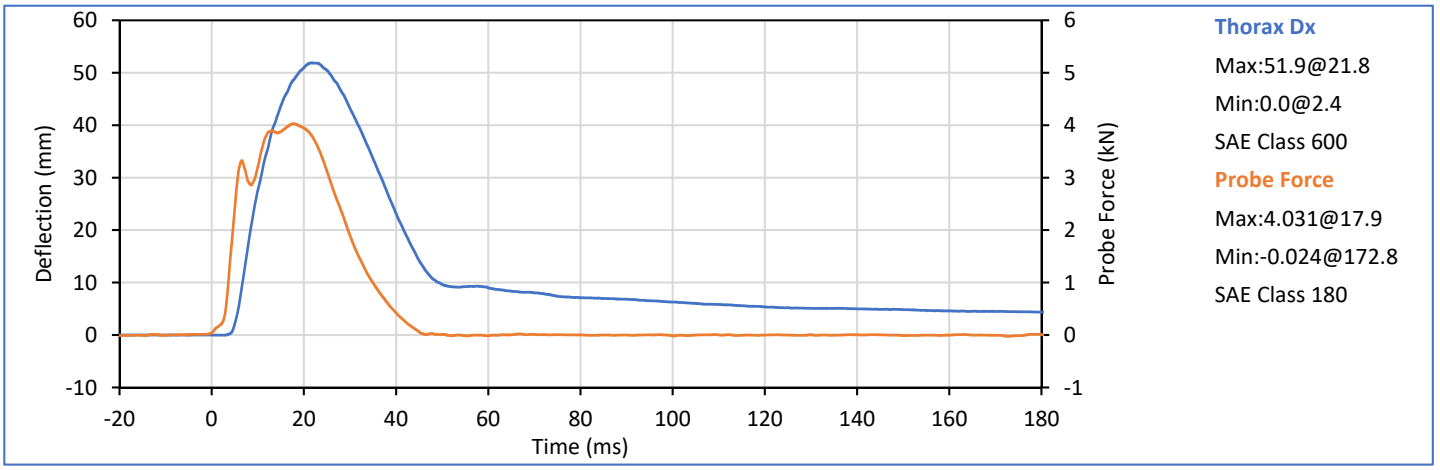
Hybrid III 5th Percentile Female
Thorax Impact

ATD Serial No.: 141 Test Date: 2018-05-16

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Humidity	%	10	70	34	Pass
Probe Velocity	m/s	6.59	6.83	6.61	Pass
Peak Chest Deflection	mm	50.0	58.0	51.9	Pass
Peak Probe Force, 50 and 58 mm	kN	3.900	4.400	4.031	Pass
Peak Probe Force, 18 and 50 mm	kN	0.000	4.600	4.031	Pass
Internal Hysterisis	%	69.0	85.0	74.0	Pass
			Overall Test Results		Pass





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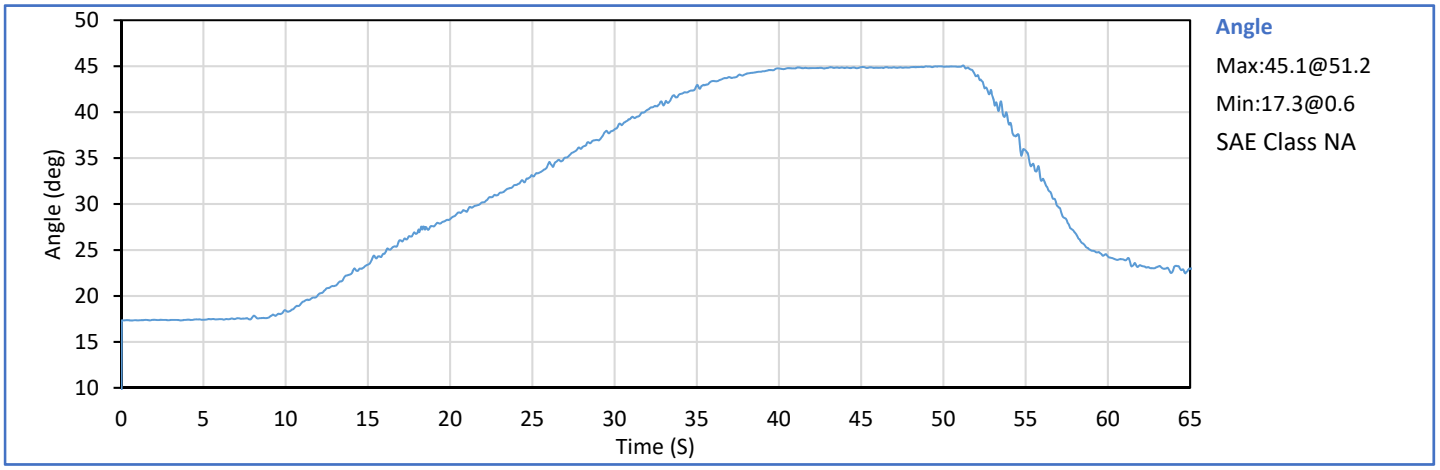
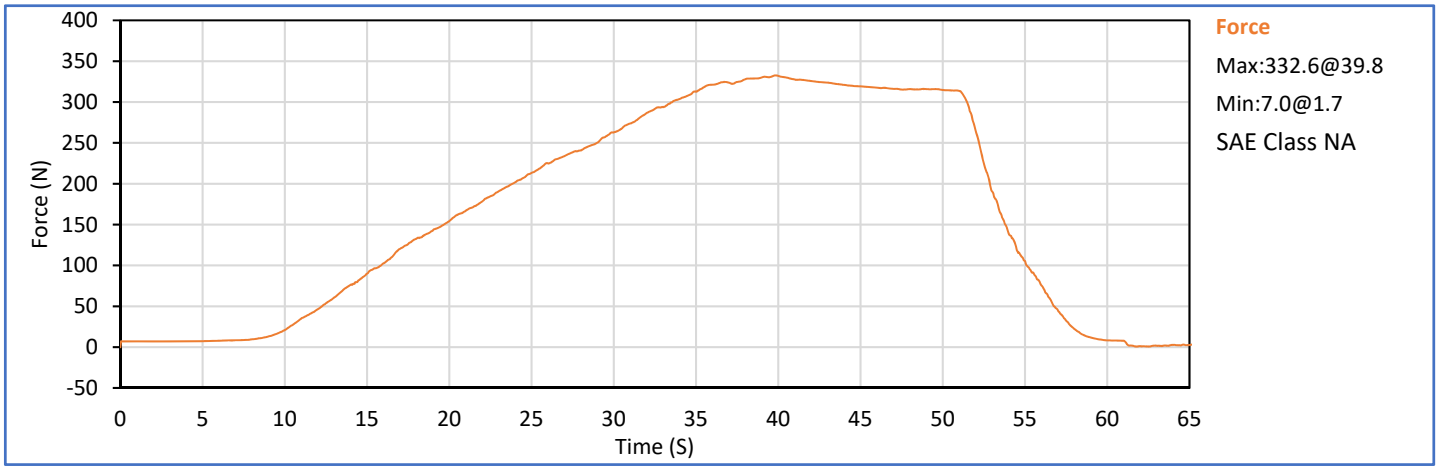
Hybrid III 5th Percentile Female
Torso Flexion Test

ATD Serial No.: 141 Test Date: 2018-01-10

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.6	Pass
Laboratory Humidity	%	10	70	34	Pass
Orientation Angle	deg	0.0	20.0	15.1	Pass
Test Initial Angle	deg	11.0	19.0	17.3	Pass
Peak Force at 45° (+/-0.5°)	N	320.0	390.0	332.6	Pass
Torso Flexion Rate	deg/s	0.50	1.50	0.88	Pass
Final Reference Plane Angle	deg	-8.0	8.0	4.2	Pass
			Overall Test Results		Pass





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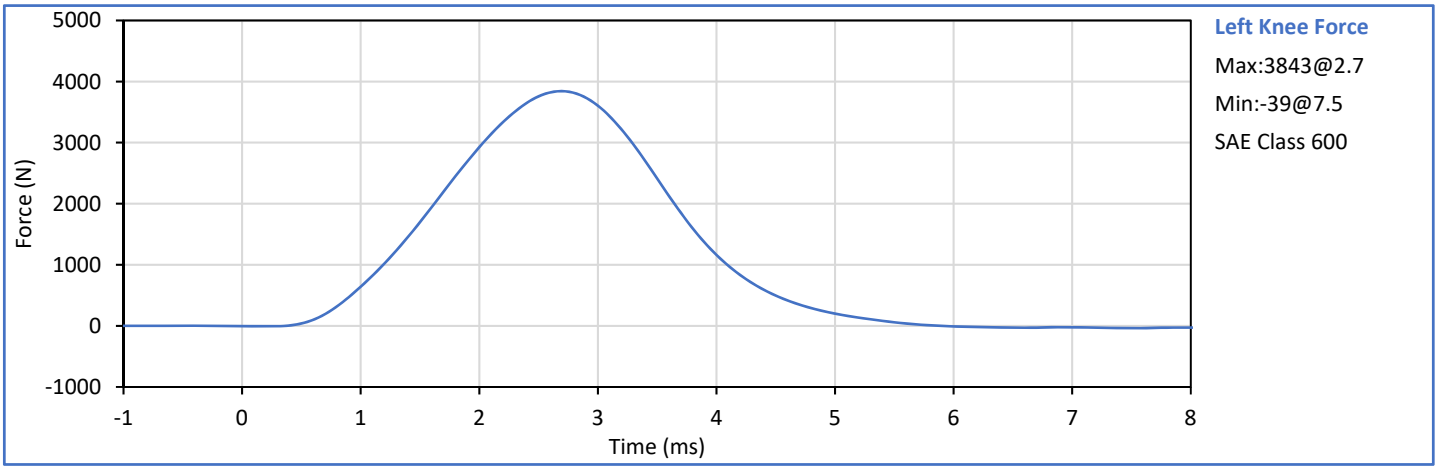
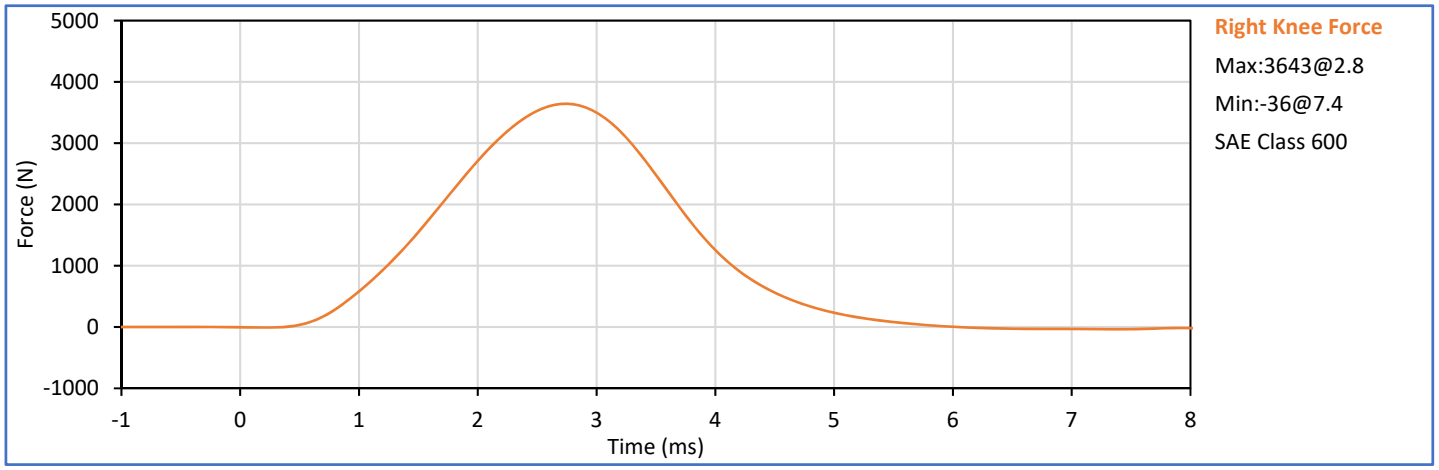
Hybrid III 5th Percentile Female
Knee Impact (Left/Right)

ATD Serial No.: 141 Test Date: 2018-05-16

	Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
	Laboratory Temperature	°C	18.9	25.6	21.1	Pass
	Laboratory Humidity	%	10	70	31	Pass
Left Knee	Probe Velocity	m/s	2.070	2.130	2.127	Pass
	Peak Resistive Force	N	3450	4060	3843	Pass
Right Knee	Probe Velocity	m/s	2.070	2.130	2.090	Pass
	Peak Resistive Force	N	3450	4060	3643	Pass
				Overall Test Results		Pass





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