

REPORT NUMBER: NCAP-KAR-18-006

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

AUDI AG

2018 AUDI Q5 2.0T QUATTRO 5-DOOR MPV

NHTSA NUMBER: M20185800

PREPARED BY:

KARCO ENGINEERING, LLC.

9270 HOLLY ROAD

ADELANTO, CA 92301



DECEMBER 11, 2017

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**

TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No. NCAP-KAR-18-006	2. Government Accession No.	3. Recipient's Catalog No.																																																					
4. Title and Subtitle Final Report of New Car Assessment Program Testing of a 2018 Audi Q5 2.0T Quattro 5-Door MPV NHTSA No. M20185800		5. Report Date December 11, 2017																																																					
		6. Performing Organization Code KAR																																																					
7. Authors Mr. Amjad A. Jadallah, Project Engineer, KARCO Mr. Steven D. Matsusaka, Engineering Manager, KARCO		8. Performing Organization Report No. TR-P37369-01-NC																																																					
9. Performing Organization Name and Address KARCO Engineering, LLC. 9270 Holly Rd. Adelanto, CA 92301		10. Work Unit No.																																																					
		11. Contract or Grant No. DTNH22-12-D-00259																																																					
12. Sponsoring Agency Name and Address U. S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards 1200 New Jersey Ave., SE, Room W43-410 Washington, D.C. 20590		13. Type of Report and Period Covered Final Test Report, November 27 - December 11, 2017																																																					
		14. Sponsoring Agency Code NRM-110																																																					
15. Supplementary Notes																																																							
16. Abstract A 56.3 km/h NCAP Frontal Impact Test was conducted on a 2018 Audi Q5 2.0T Quattro 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 November 27, 2017. The impact velocity of the vehicle was 55.83 km/h and the ambient temperature at the barrier face at the time of impact was 18.3°C. The target vehicle's post-test maximum crush was 425 mm at DPD 5 on the right of the vehicle's centerline. The test vehicle's performance is as follows: <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th rowspan="2">Units</th> <th colspan="2">Driver ATD</th> <th colspan="2">Passenger ATD</th> </tr> <tr> <th>Threshold</th> <th>Result</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₁₅)</td> <td>N/A</td> <td>700</td> <td>310.5</td> <td>700</td> <td>166.9</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>-26</td> <td>52</td> <td>-18</td> </tr> <tr> <td>Nij</td> <td>N/A</td> <td>1</td> <td>0.25</td> <td>1</td> <td>0.39</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>4170</td> <td>876.7</td> <td>2620</td> <td>543.2</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>4000</td> <td>-250.7</td> <td>2520</td> <td>-363.0</td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>10000</td> <td>-208.3</td> <td>6800</td> <td>-169.0</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>10000</td> <td>-196.7</td> <td>6800</td> <td>-204.5</td> </tr> </tbody> </table>				Measurement Description	Units	Driver ATD		Passenger ATD		Threshold	Result	Threshold	Result	Head Injury Criteria (HIC ₁₅)	N/A	700	310.5	700	166.9	Maximum Chest Compression	mm	63	-26	52	-18	Nij	N/A	1	0.25	1	0.39	Neck Tension	N	4170	876.7	2620	543.2	Neck Compression	N	4000	-250.7	2520	-363.0	Left Femur Force	N	10000	-208.3	6800	-169.0	Right Femur Force	N	10000	-196.7	6800	-204.5
Measurement Description	Units	Driver ATD				Passenger ATD																																																	
		Threshold	Result	Threshold	Result																																																		
Head Injury Criteria (HIC ₁₅)	N/A	700	310.5	700	166.9																																																		
Maximum Chest Compression	mm	63	-26	52	-18																																																		
Nij	N/A	1	0.25	1	0.39																																																		
Neck Tension	N	4170	876.7	2620	543.2																																																		
Neck Compression	N	4000	-250.7	2520	-363.0																																																		
Left Femur Force	N	10000	-208.3	6800	-169.0																																																		
Right Femur Force	N	10000	-196.7	6800	-204.5																																																		
17. Key Words 35 mph Frontal Barrier Impact Test New Car Assessment Program (NCAP)		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division, NPO-411 1200 New Jersey Ave., SE Washington, DC 20590 e-mail: tis@nhtsa.dot.gov FAX: 202-493-2833																																																					
19. Security Classification of this report UNCLASSIFIED	20. Security Classification of this page UNCLASSIFIED	21. No. of Pages 133	22. Price																																																				

TABLE OF CONTENTS

<u>Section</u>		<u>Page No.</u>
1	Purpose and Summary of Test	1
2	Occupant and Vehicle Information / Data Sheets	3
<u>Data Sheet No.</u>		<u>Page No.</u>
1	General Test and Vehicle Parameter Data	4
2	Seat Adjustment, Fuel System, and Steering Wheel Data	8
3	Dummy Longitudinal Clearance Dimensions	10
4	Dummy Lateral Clearance Dimensions	11
5	Seat Belt Positioning Data	12
6	High-Speed Camera Locations and Data	13
7	Vehicle Accelerometer Locations	15
8	Photographic Reference Target Locations	16
9	Load Cell Locations on Fixed Barrier	17
10	Test Vehicle Camera and Instrumentation Summary	18
11	Post-Test Observations	19
12	Vehicle Profile Measurements	20
13	Accident Investigation Division Data	22
14	Vehicle Intrusion Measurements	23
15	Summary of FMVSS 212, 219 (Partial), and 301 Data	25
16	FMVSS 301 Static Rollover Results	27
17	Dummy / Vehicle Temperature Stabilization Chart	28
<u>Appendix</u>		<u>Page No.</u>
A	Photographs	A
B	Dummy Response Data Traces	B
C	ATD Calibration and Performance Verification Data	C

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 Audi Q5 2.0T Quattro 5-door MPV at a velocity of 55.83 km/h. The test was performed at KARCO Engineering, LLC. on November 27, 2017. 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 242 mm at 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 steering column.

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.

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)	310.5	74.2	89.2	-26	0.25	876.7	-250.7	-208.3	-196.7
Passenger (5th)	166.9	56.0	71.0	-18	0.39	543.2	-363.0	-169.0	-204.5

SECTION 2

OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV NHTSA No.: M20185800
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 11/27/17

CONVERSION FACTORS

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

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV NHTSA No.: M20185800
 Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 11/27/17

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	M20185800
Model Year	2018
Make	Audi
Model	Q5 2.0T Quattro
Body Style	5-Door MPV
VIN	WA1ANAFY6J2033013
Body Color	Matador Red Metallic
Odometer Reading (km / mi)	34 / 21
Engine Displacement (L)	2.0
Type / No. of Cylinders	Inline 4
Engine Placement	Longitudinal
Transmission Type	Automatic
Transmission Speeds	7-Speed
Overdrive	Yes
Final Drive	AWD
Roof Rack	Yes
Sunroof / T-Top	Yes
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	Yes
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	No
Front Pass. Frontal Airbag	Yes
Front Pass. Curtain Airbag	Yes
Front Pass. Head/Torso Airbag	No
Front Pass. Torso Airbag	No
Front Pass. Torso/Pelvis Airbag	Yes
Front Pass. Pelvis Airbag	No
Front Pass. Knee Airbag	No
Driver Seat Belt Pretensioner	Yes
Driver Load Limiter	Yes
Front Pass. Seat Belt Pretensioner	Yes
Front Pass. Load Limiter	Yes
Other Safety Restraint	No

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

Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Audi AG
Date of Manufacture	Jul-17

GVWR (kg)	2475
GAWR Front (kg)	1215
GAWR Rear (kg)	1380

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

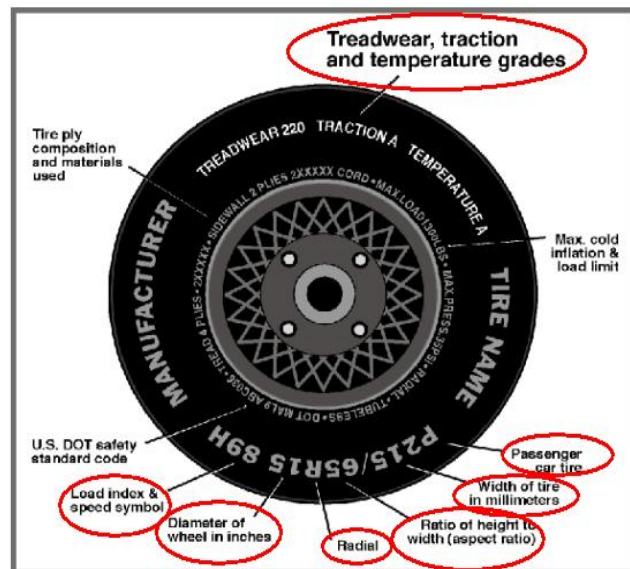
Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench		
Designated Seating Capacity	2	3		5
Capacity Weight (VCW) (kg)				480.0
DSC x 68.04 (kg)				340.2
Cargo Weight (RCLW) (kg)				136.0*

*A RCLW of 136.0 kg is used if the RCLW is greater than 136.0 kg for MPVs and trucks

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle:	2018 Audi Q5 2.0T Quattro 5-Door MPV	NHTSA No.:	M20185800
Test Program:	56.3 km/h Frontal Impact NCAP Test	Test Date:	11/27/17



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	240	260
Recommended Tire Size	P235/60/R18	P235/60/R18
Tire Size on Vehicle	P235/60/R18	P235/60/R18
Tire Manufacturer	Michelin	Michelin
Tire Model	Premier LTX	Premier LTX
Treadwear	620	620
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 1 Polyamide, 2 Steel	2 Polyester, 1 Polyamide, 2 Steel
Load Index / Speed Symbol	103H	103H
Tire Material	Polyester, Polyamide, Steel	Polyester, Polyamide, Steel
DOT Safety Code Left	M3XF OBFX 1017	M3XF OBFX 1017
DOT Safety Code Right	M3XF OBFX 1017	M3XF OBFX 1017

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

Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV NHTSA No.: M20185800
 Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 11/27/17

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	489.0	439.5		518.5	559.5	
Right	kg	498.0	438.5		511.0	547.5	
Ratio	%	52.9%	47.1%	100.0%	48.2%	51.8%	100.0%
Total	kg	987.0	878.0	1865.0	1029.5	1107.0	2136.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1865.0	A
Weight of 1 P572E ATD & 1 P572O ATD	kg	141.0	B
Rated Cargo/Luggage Weight (RCLW)	kg	136.0	C
Calculated Vehicle Target Weight (TVTW)	kg	2142.0	A+B+C

TEST VEHICLE ATTITUDES

Condition	Units	LF	RF	LR	RR	CG Aft of Front Axle
As Delivered	mm	835	832	834	836	1328
As Tested	mm	824	824	807	809	1461
Post-Test	mm	905	830	799	801	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2820
Total Vehicle Length at Left Side	mm	4003
Total Vehicle Length at Centerline	mm	4673
Total Vehicle Length at Right Side	mm	4005
Weight of Ballast in Cargo Area	kg	172.5
Weight of Vehicle Components Removed	kg	30.5
Amount of Stoddard Solvent in Fuel Tank	L	65.14

VEHICLE COMPONENTS REMOVED TO MEET TEST WEIGHT:

Trunk Trim (6.0kg), Spare Tire (19.5 kg), Speaker (5.0 kg)

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

Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV NHTSA No.: M20185800
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 11/27/17

TARGET VEHICLE STRUCTURAL MEASUREMENTS

No.	Description	Pre-Test
1	Total Length	4673
2	Total Width	1880
3	Bumper Top Height	658
4	Bumper Bottom Height	398
5	Longitudinal Member Top Height	618
6	Distance Between Longitudinal Members	810
7	Longitudinal Member Width	75
8	Engine Top Height	935
9	Engine Bottom Height	266
10	Engine and Gearbox Width	540
11	Front Bumper to Engine Distance	460
12	Front Shock Absorber Fixing Height	945
13	Bonnet Leading Edge Height	886
14	Front Shock Absorber Fixing Width	890
15	Front Bumper to Front Axle Distance	905
16	Front Axle to A-Pillar Distance	573
17	A-Pillar to B-Pillar Distance	976
18	B-Pillar to Rear Axle Distance	1165
19	B-Pillar to C-Pillar Distance	856
20	Roof Sill Bottom Height	1500
21	Roof Sill Top Height	1603
22	Floor Sill Bottom Height	310
23	Floor Sill Top Height	440

All measurements in millimeters.

DATA SHEET NO. 2

SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV

NHTSA No.: M20185800

Test Program: 56.3 km/h Frontal Impact NCAP Test

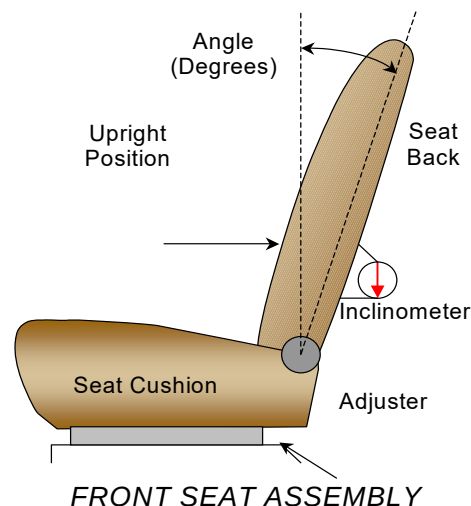
Test Date: 11/27/17

NOMINAL DESIGN RIDING POSITION

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

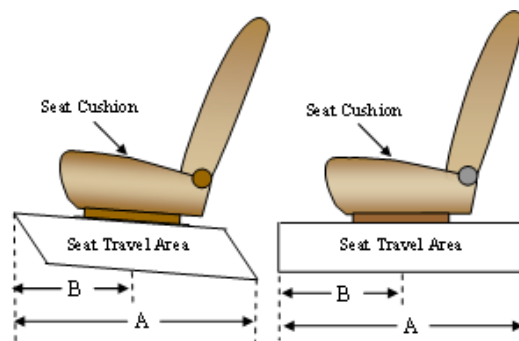
SEAT BACK ANGLE

Seating Position	Degrees
Driver Seat Back Angle	18.7
Passenger Seat Back Angle	21.4



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	314 mm	157 mm
Passenger Seat	250 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	4	H
Passenger Seat	4	M2

DATA SHEET NO. 2 ... (CONTINUED)

SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

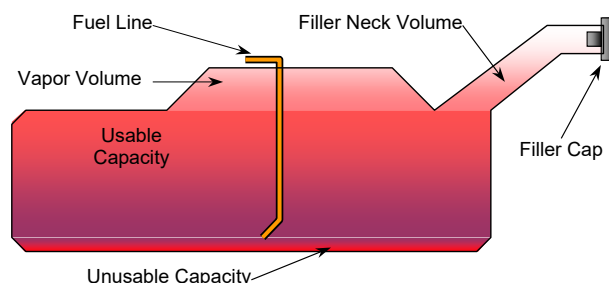
Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV NHTSA No.: M20185800
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 11/27/17

FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank"	70.02
Usable Capacity of "Optional Tank"	N/A
92 - 94% of Usable Capacity	64.42 to 65.82
Actual Amount of Stoddard Solvent Used	65.14
1/3 of Usable Capacity	23.34

FUEL PUMP

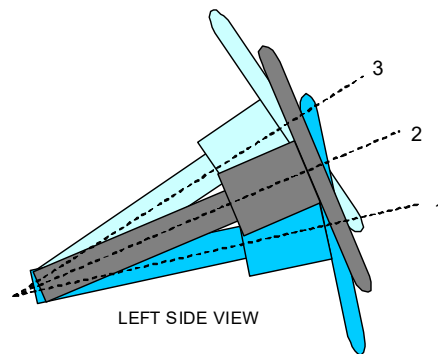
The vehicle is equipped with an electric fuel pump. The fuel pump operates when the starter or engine is activated. The pump operates for a short time after the ignition switch is turned ON. After that the pump operates normally while the engine is running.



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	21.3	71
Geometric Center Position, No. 2	23.3	105
Uppermost Position, No. 3	25.3	139
Telescoping Steering Wheel Travel		68
Test Position	23.3	105

DATA SHEET NO. 3

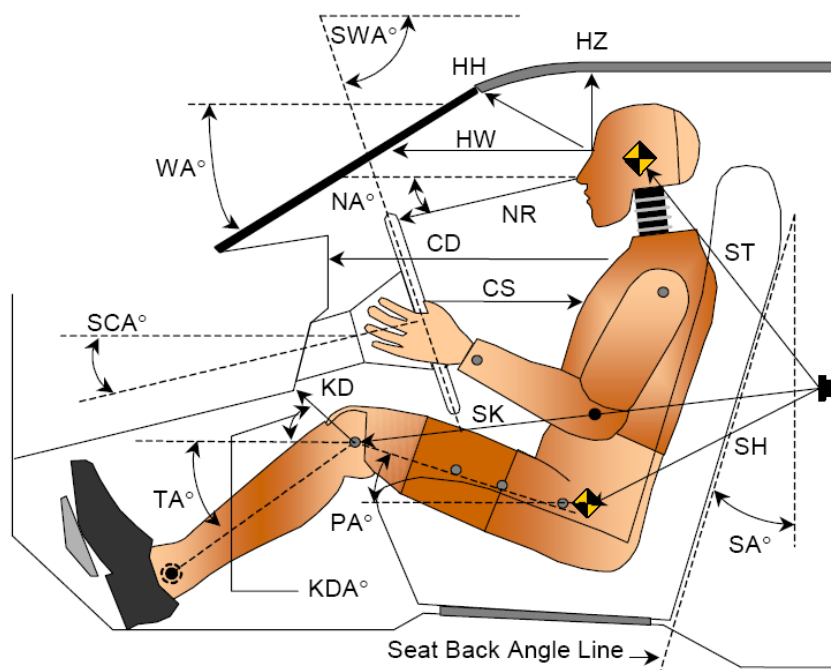
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV

NHTSA No.: M20185800

Test Program: 56.3 km/h Frontal Impact NCAP Test

Test Date: 11/27/17



LEFT SIDE VIEW

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		28.9		
SWA°	Steering Wheel Angle		67.2		
SCA°	Steering Column Angle		22.8		
SA°	Seat Back Angle (On Headrest Post)		18.7		21.4
HZ	Head to Roof	286	90.0	239	90.0
HH	Head to Header	365	27.4	332	43.7
HW	Head to Windshield	697	0.0	676	0.0
NR	Nose to Rim	379	2.3	422	29.0
CD	Chest to Dash	520		358	
CS	Chest to Steering Hub	302	0.0		
RA	Rim to Abdomen	182	0.0		
KDL	Left Knee to Dash	201	24.7	112	37.0
KDR	Right Knee to Dash	183	24.3	125	43.3
PA°	Pelvic Angle		24.3		18.9
TA°	Tibia Angle		38.1		45.2
SK	Striker to Knee	539	3.9	616	-2.8
ST	Striker to Head	502	84.0	467	73.9
SH	Striker to H-Point	216	46.6	310	-22.0

DATA SHEET NO. 4

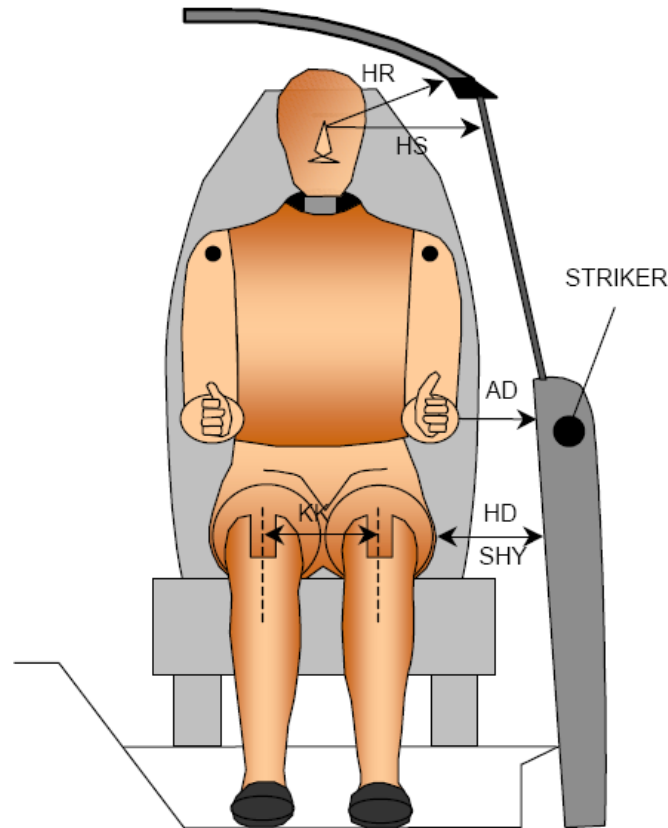
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV

NHTSA No.: M20185800

Test Program: 56.3 km/h Frontal Impact NCAP Test

Test Date: 11/27/17



Code	Description	Driver (mm)	Passenger (mm)
AD	Arm to Door	126	115
HD	H-Point to Door	173	200
HR	Head to Side Header	239	250
HS	Head to Side Window	355	365
KK	Knee to Knee	315	215
SHY	Striker to H-Point (Y-Direction)	285	315
AA	Ankle to Ankle	345	170

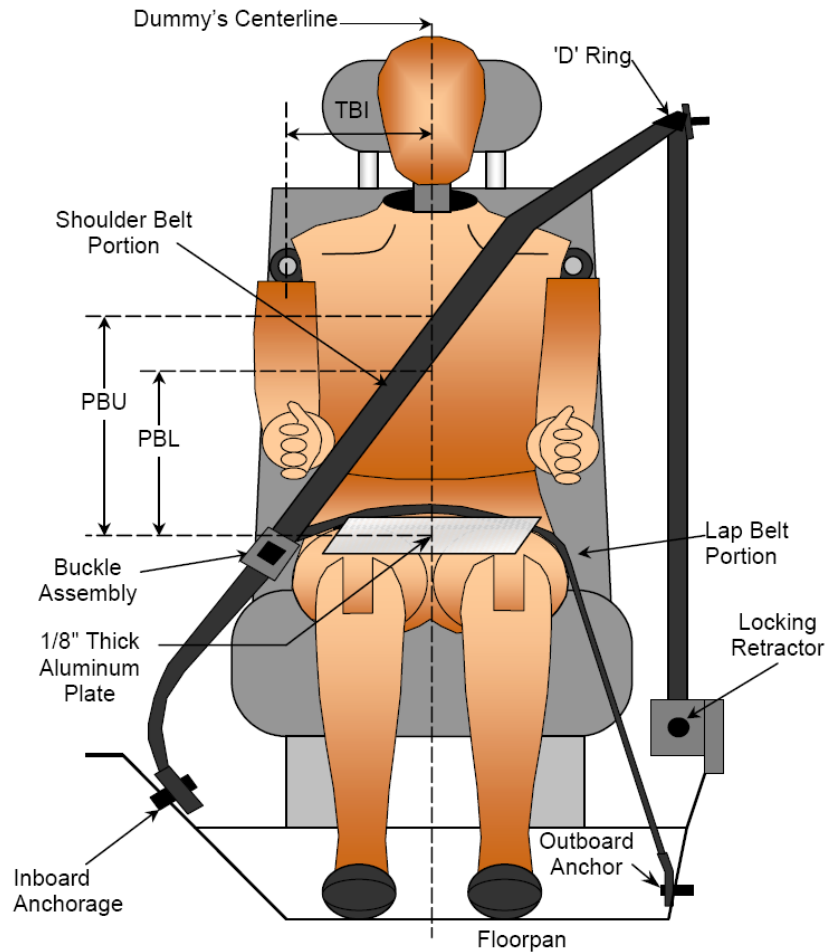
DATA SHEET NO. 5
SEAT BELT POSITIONING DATA

Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV

NHTSA No.: M20185800

Test Program: 56.3 km/h Frontal Impact NCAP Test

Test Date: 11/27/17



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	305	290
PBL	Top Surface of Aluminum Plate to Belt Lower Edge	mm	225	190

BELT LENGTH DATA

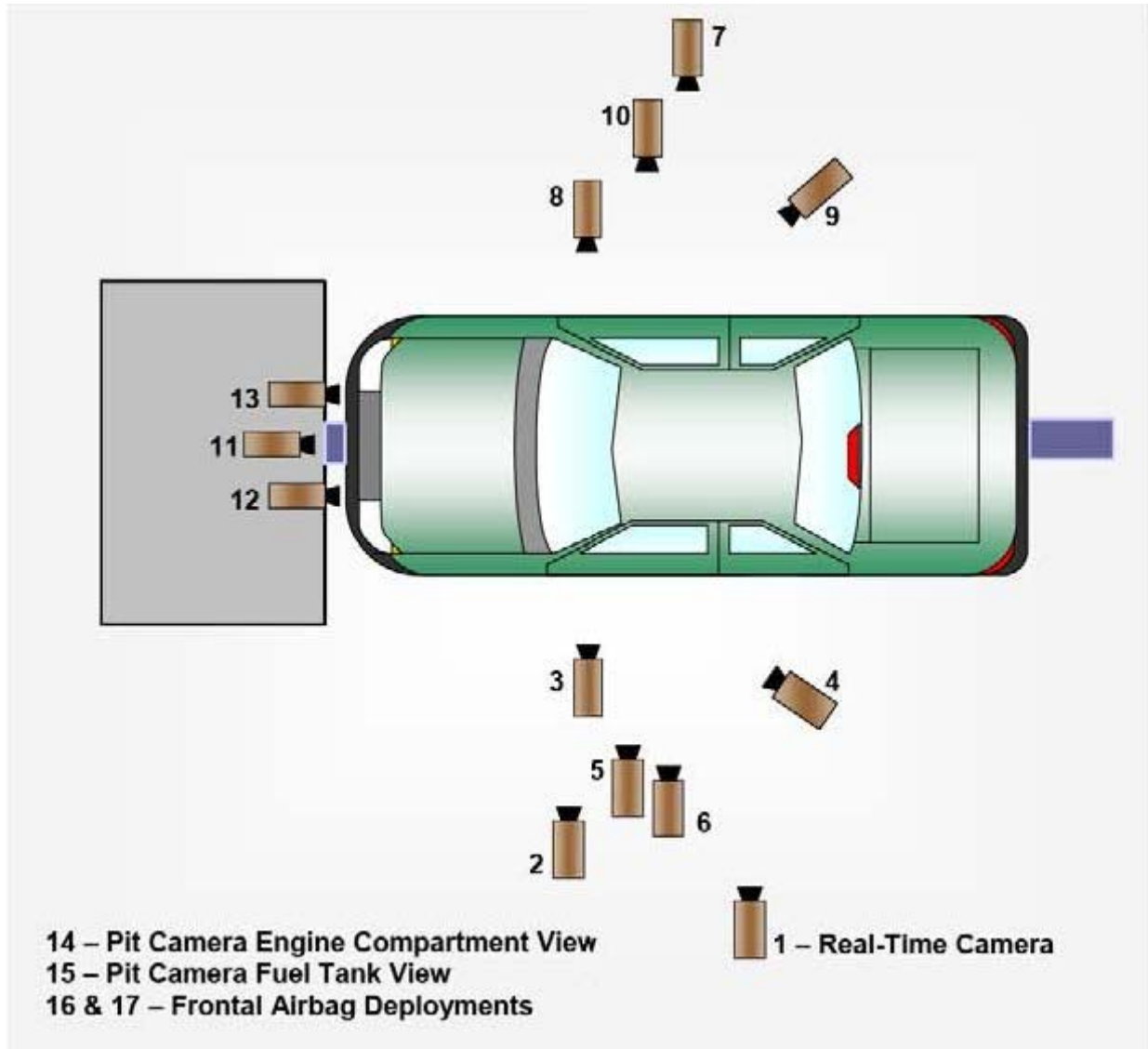
Measurement Description	Units	Driver	Passenger
Shoulder Belt Length as Measured on ATD	mm	865	903
Lap Belt Length as Measured on ATD	mm	774	801
Remainder of Belt on Reel	mm	952	889
Total Belt Length for Continuous Webbing Systems	mm	2591	2593

DATA SHEET NO. 6

HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV NHTSA No.: M20185800
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 11/27/17

CAMERA POSITIONS FOR FRONTAL IMPACTS



DATA SHEET NO. 6 ... (CONTINUED)

HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV NHTSA No.: M20185800
 Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 11/27/17

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	24	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	24	1000
12	Driver Windshield	297	-366	-2460	20	1000
13	Passenger Windshield	297	366	-2460	20	1000
14	Pit Front	-756	0	1495	20	1000
15	Pit Rear	-3398	0	1495	14	1000
16	Onboard Driver Airbag (Optional)	-1440	280	-1300	8	1000
17	Onboard Passenger Airbag (Optional)	-1440	-280	-1300	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

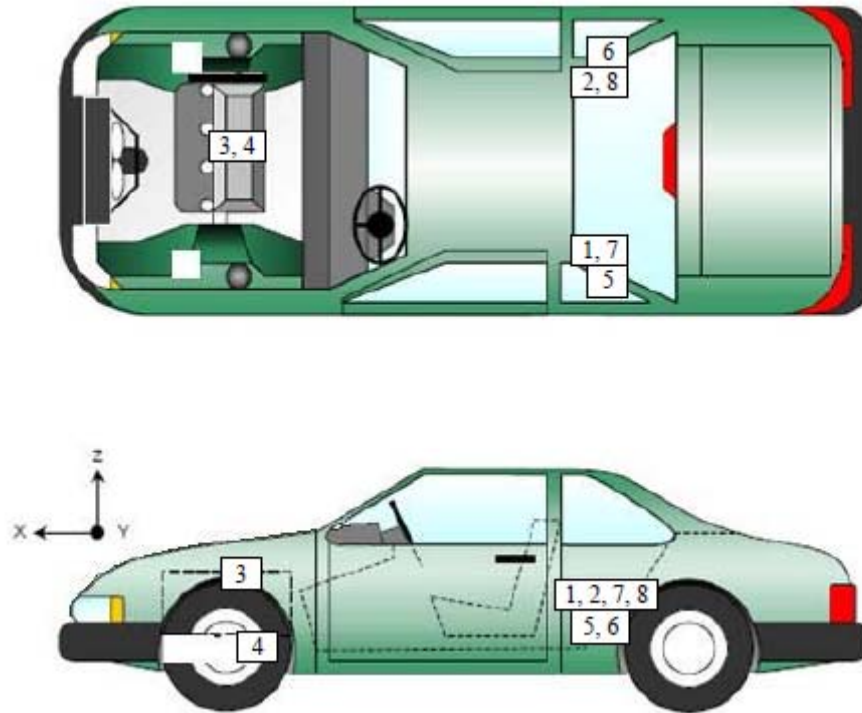
VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV

NHTSA No.: M20185800

Test Program: 56.3 km/h Frontal Impact NCAP Test

Test Date: 11/27/17



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Description	Location		
		X	Y	Z
1	Left Rear Accelerometer X-Direction	1942	-736	-397
2	Right Rear Accelerometer X-Direction	1942	736	-397
3	Engine Top X	4135	-183	-803
4	Engine Bottom X	3305	75	-217
5	Left Rear Accelerometer Z-Direction	N/A	N/A	N/A
6	Right Rear Accelerometer Z-Direction	N/A	N/A	N/A
7	Left Rear Accelerometer X-Direction Redundant	1942	-736	-397
8	Right Rear Accelerometer X-Direction Redundant	1942	736	-397

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

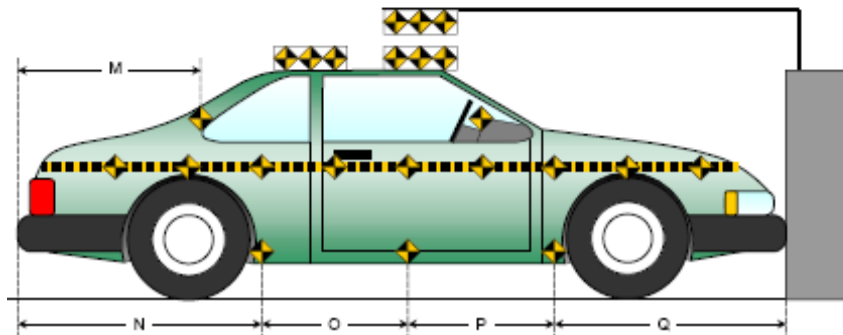
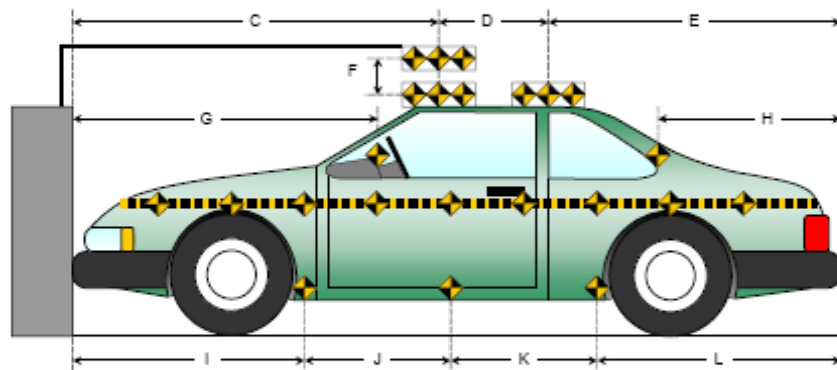
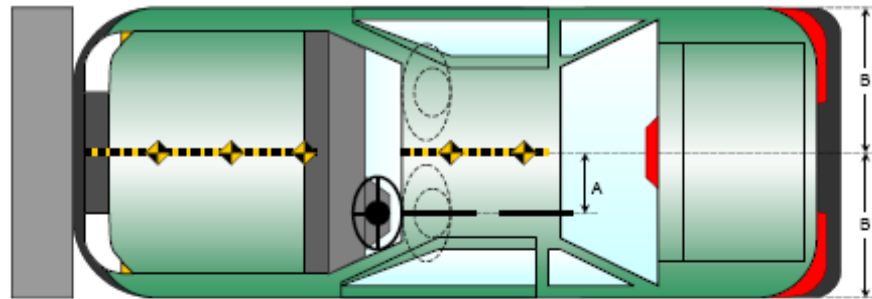
Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV

NHTSA No.: M20185800

Test Program: 56.3 km/h Frontal Impact NCAP Test

Test Date: 11/27/17

Item	Value
A	N/A
B	940
C	2275
D	610
E	1774
F	305
G	1875
H	815
I	1424
J	903
K	903
L	1440
M	814
N	1442
O	903
P	903
Q	1423



All measurements in millimeters.

DATA SHEET NO. 9

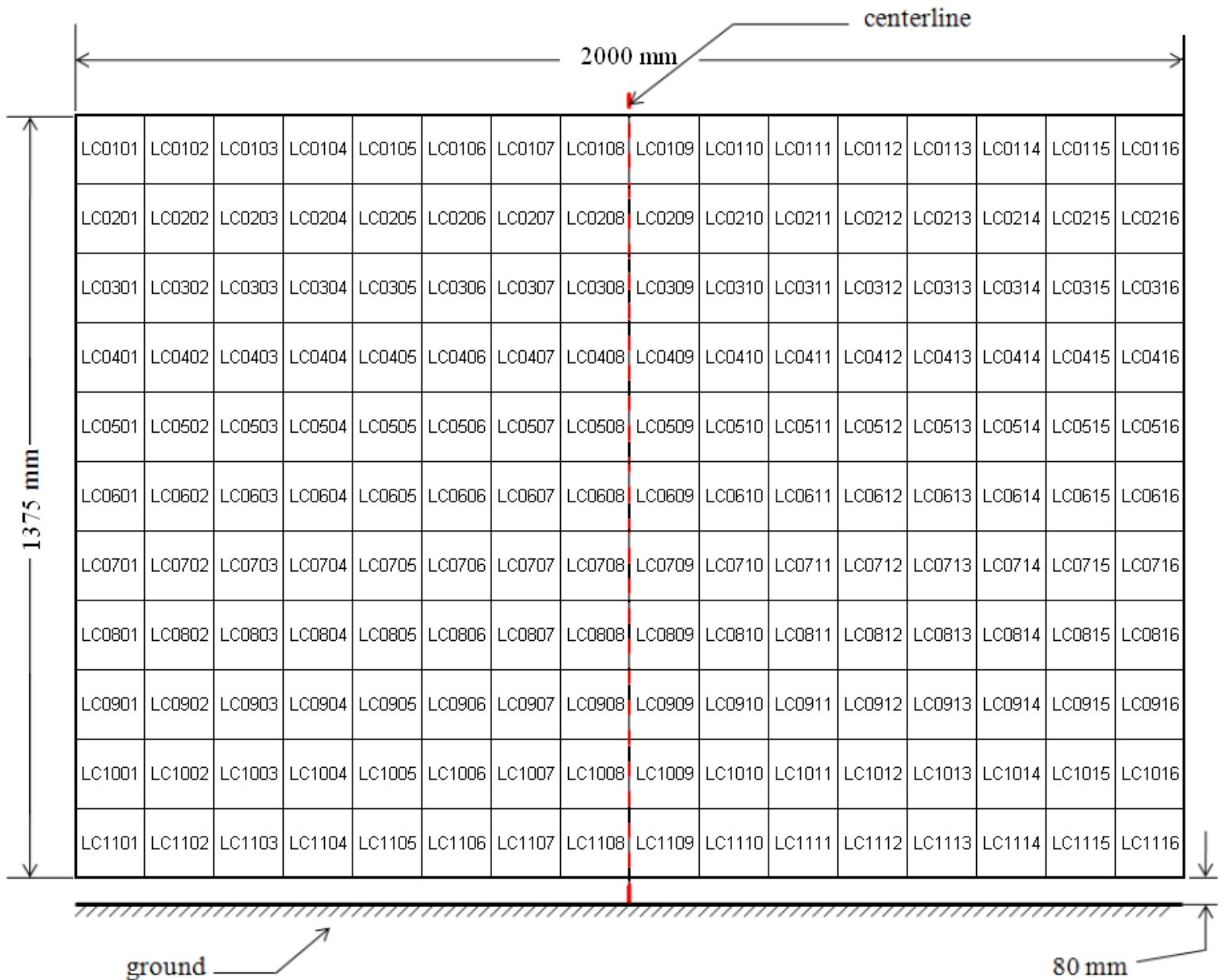
LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV

NHTSA No.: M20185800

Test Program: 56.3 km/h Frontal Impact NCAP Test

Test Date: 11/27/17



DATA SHEET NO. 10

TEST VEHICLE CAMERA AND INSTRUMENTATION SUMMARY

Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV NHTSA No.: M20185800
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 11/27/17

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 Audi Q5 2.0T Quattro 5-Door MPV NHTSA No.: M20185800
 Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 11/27/17

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	Steering Column	None
Right Knee Contact	Steering Column	None

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	Yes	Yes

POST TEST STRUCTURAL OBSERVATIONS

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

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	11,640
Center	mm	11,710
Right Side	mm	12,300
Average	mm	11,883

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

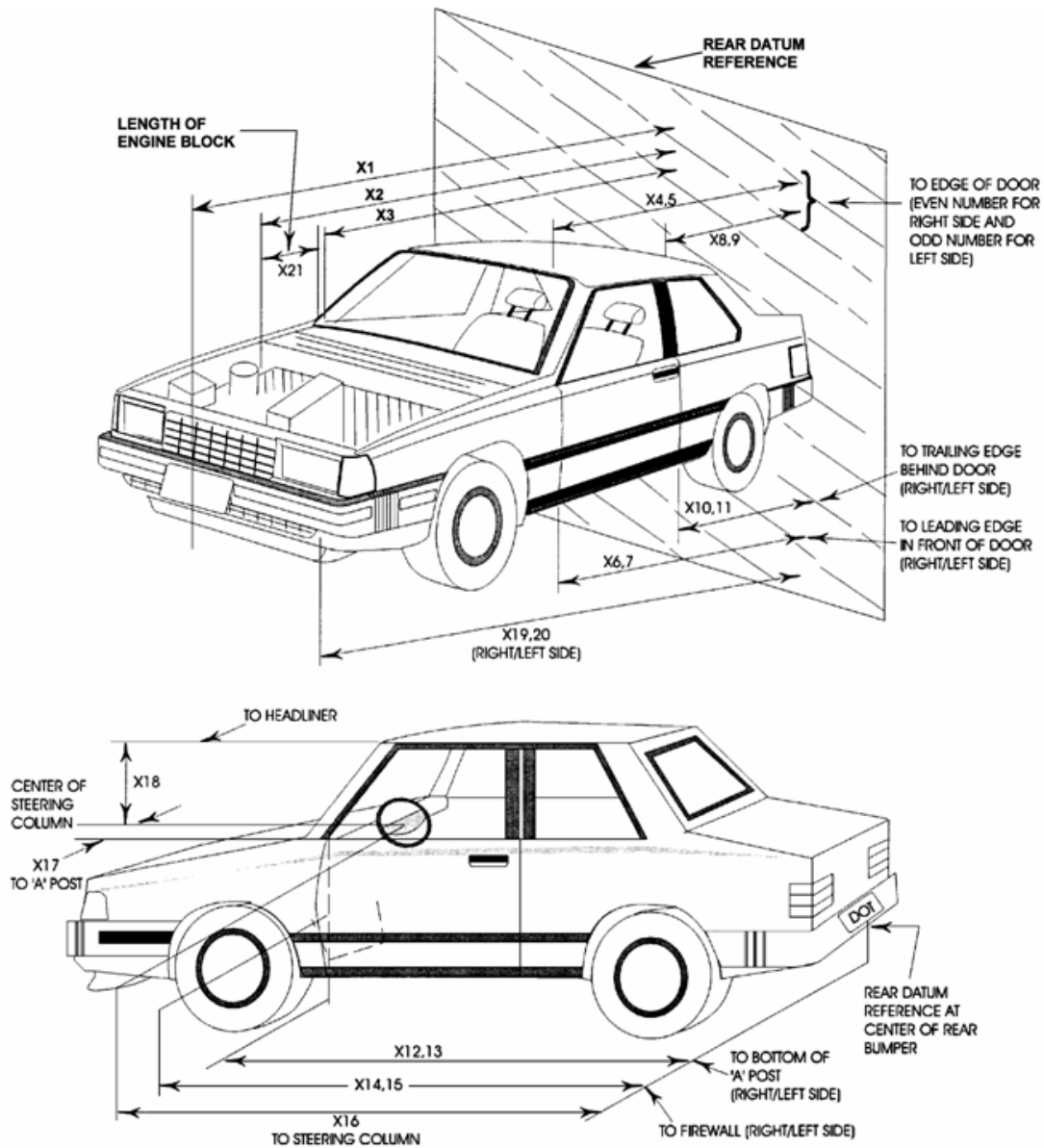
DATA SHEET NO. 12
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV

NHTSA No.: M20185800

Test Program: 56.3 km/h Frontal Impact NCAP Test

Test Date: 11/27/17



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

Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV NHTSA No.: M20185800
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 11/27/17

No.	Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	4673	4280	-393
2	Rear Surface of Vehicle to Front of Engine	4213	4066	-147
3	RSOV to Firewall	3623	3603	-20
4	RSOV to Upper Leading Edge of Right Door	3190	3194	4
5	RSOV to Upper Leading Edge of Left Door	3195	3202	7
6	RSOV to Lower Leading Edge of Right Door	3200	3192	-8
7	RSOV to Lower Leading Edge of Left Door	3195	3210	15
8	RSOV to Upper Trailing Edge of Right Door	2050	2052	2
9	RSOV to Upper Trailing Edge of Left Door	2040	2052	12
10	RSOV to Lower Trailing Edge of Right Door	2123	2112	-11
11	RSOV to Lower Trailing Edge of Left Door	2120	2125	5
12	RSOV to Bottom of A-Pillar, Right Side	3071	3069	-2
13	RSOV to Bottom of A-Pillar, Left Side	3071	3087	16
14	RSOV to Firewall, Right Side	3593	3599	6
15	RSOV to Firewall, Left Side	3603	3538	-65
16	RSOV to Steering Column	2600	2739	139
17	Center of Steering Column to A-Pillar	420	460	40
18	Center of Steering Column to Headliner	545	450	-95
19	RSOV to Right Side of Front Bumper	4005	4015	10
20	RSOV to Left Side of Front Bumper	4003	4020	17
21	Length of Engine Block	530	530	0
RD	RSOV to Right Side of Dash Panel	2825	2851	26
CD	RSOV to Center of Dash Panel	2730	2790	60
LD	RSOV to Left Side of Dash Panel	2790	2641	-149

All measurements in millimeters.

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

Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV NHTSA No.: M20185800
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 11/27/17

VEHICLE INFORMATION

VIN: WA1ANAFY6J2033013 Wheelbase (mm): 2820
Vehicle Size Category: MPV Test Weight (kg): 2136.5

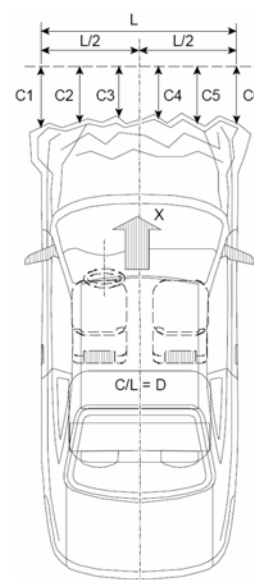
ACCELEROMETER DATA

Accelerometer Locations: Left Rear Crossmember
Cal. Procedure/Interval: Vibration Test / 6 months
Integration Algorithm: NHTSA Standard
Impact Velocity (km/h): 55.83
Velocity Change (km/h): 65.4
Time of Separation (msec): 73.5

Linearity: Good

CRUSH PROFILE

Collision Deformation Classification: 12FDEW2
Midpoint of Damage: Vehicle Centerline
Damage Region Length (mm): 1606
Impact Mode: Full Frontal



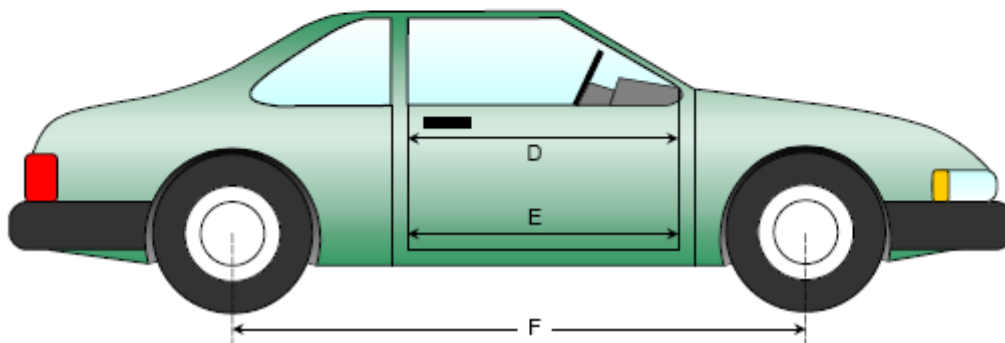
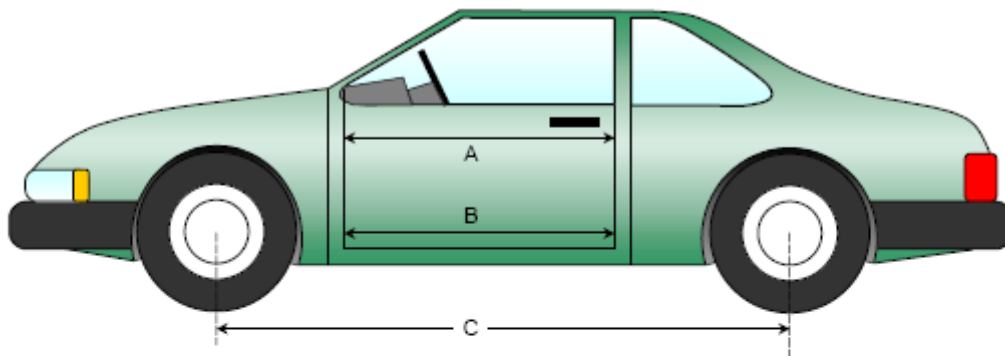
No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush Zone 1 at Left Side	mm	250	470	220
C2	Crush Zone 2 at Left Side	mm	65	393	328
C3	Crush Zone 3 at Left Side	mm	10	390	380
C4	Crush Zone 4 at Right Side	mm	10	422	412
C5	Crush Zone 5 at Right Side	mm	65	490	425
C6	Crush Zone 6 at Right Side	mm	250	415	165
L	C1 to C6	mm	1606		

DATA SHEET NO. 14**VEHICLE INTRUSION MEASUREMENTS**Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPVNHTSA No.: M20185800Test Program: 56.3 km/h Frontal Impact NCAP TestTest Date: 11/27/17**DOOR OPENING WIDTH**

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	976	976	0
B	Left Side Lower	mm	881	881	0
D	Right Side Upper	mm	976	975	1
E	Right Side Lower	mm	871	866	5

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2820	2775	45
F	Right Side Wheelbase	mm	2820	2805	15



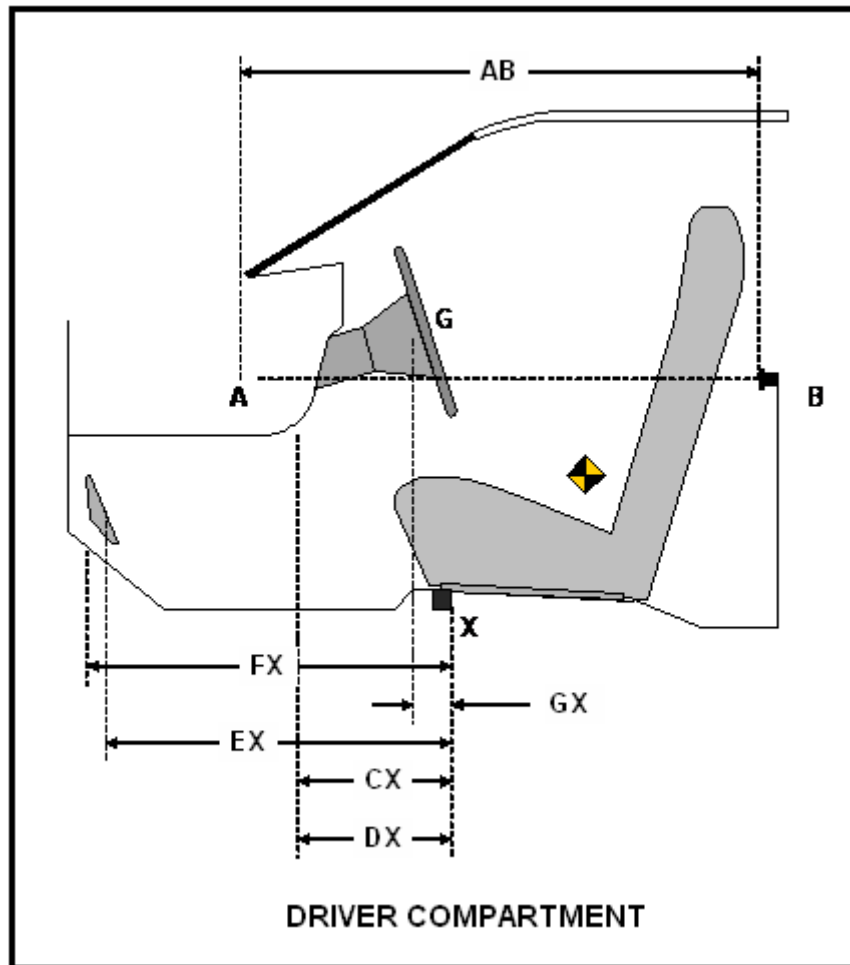
DATA SHEET NO. 14 ... (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV NHTSA No.: M20185800
 Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 11/27/17

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	851	845	6
CX	Left Knee Bolster to X	mm	310	310	0
DX	Right Knee Bolster to X	mm	310	312	-2
EX	Brake Pedal to X	mm	570	535	35
FX	Foot Rest to X	mm	590	600	-10
GX	Center of Steering Wheel Hub to X	mm	55	120	-65

X = Front of Seat Track (Stationary)



DATA SHEET NO. 15

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

Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV NHTSA No.: M20185800

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 11/27/17

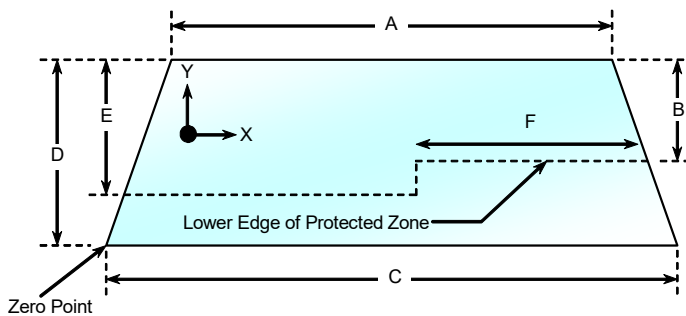
Windshield Mounting Details: Windshield glass is secured to the vehicle frame with plastic molding and rubber cement.

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: 21.2° C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2227.5	2227.5	100.0%
Right Side	2227.5	2227.5	100.0%
Total	4455	4455	100.0%



Item	Units	Value
A	mm	1215
B	mm	354
C	mm	1480
D	mm	880
E	mm	500
F	mm	520

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 Audi Q5 2.0T Quattro 5-Door MPV NHTSA No.: M20185800
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 11/27/17

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 18.3° C Test Time: 1:44 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

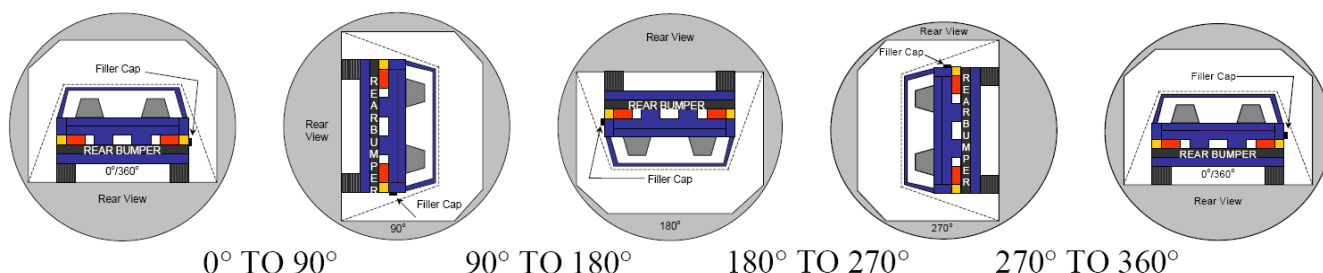
FMVSS 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV

NHTSA No.: M20185800

Test Program: 56.3 km/h Frontal Impact NCAP Test

Test Date: 11/27/17



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°	82	300	382
90° To 180°	84	300	384
180° To 270°	84	300	384
270° To 360°	77	300	377

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

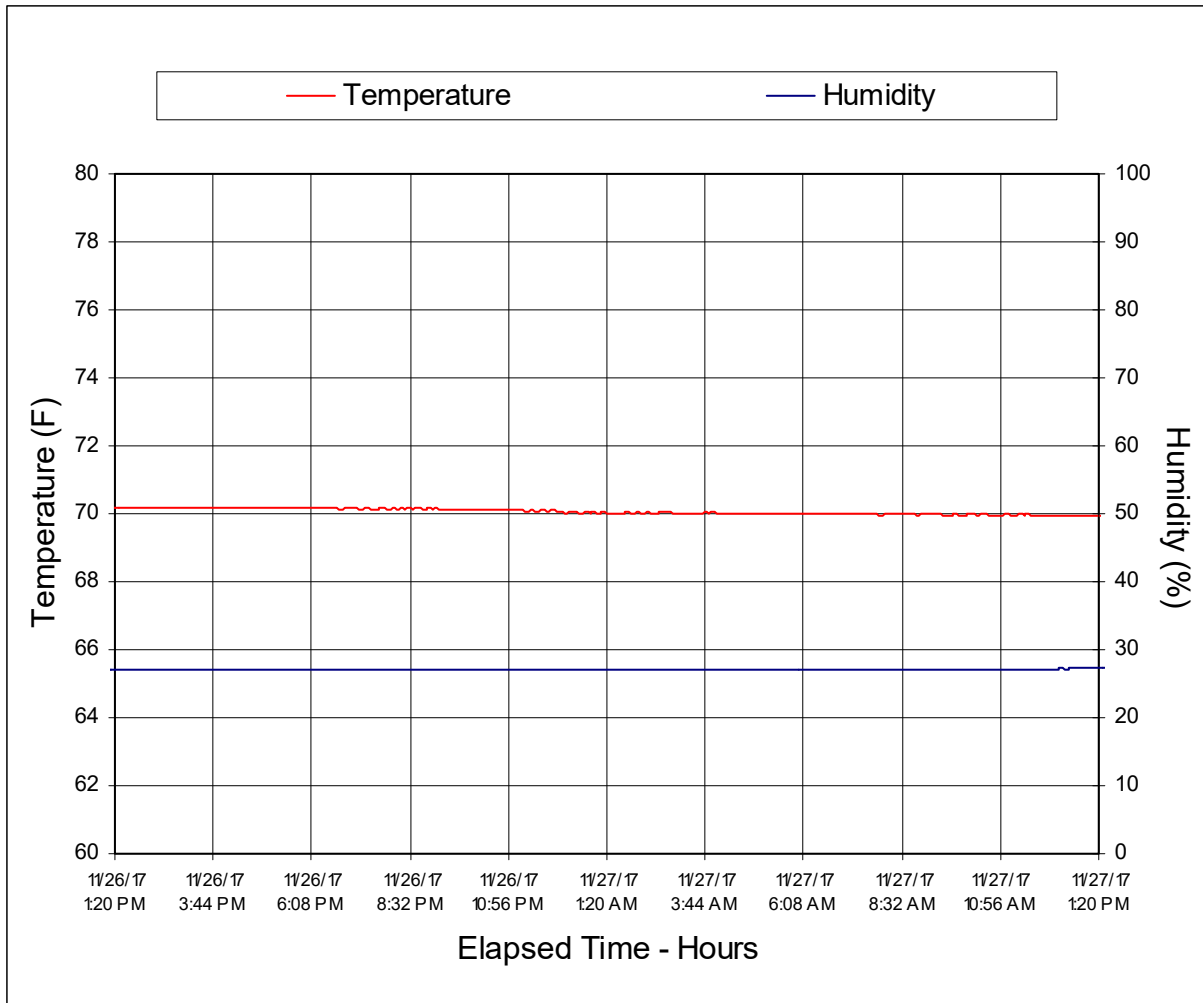
DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART

Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV

NHTSA No.: M20185800

Test Program: 56.3 km/h Frontal Impact NCAP Test

Test Date: 11/27/17



APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

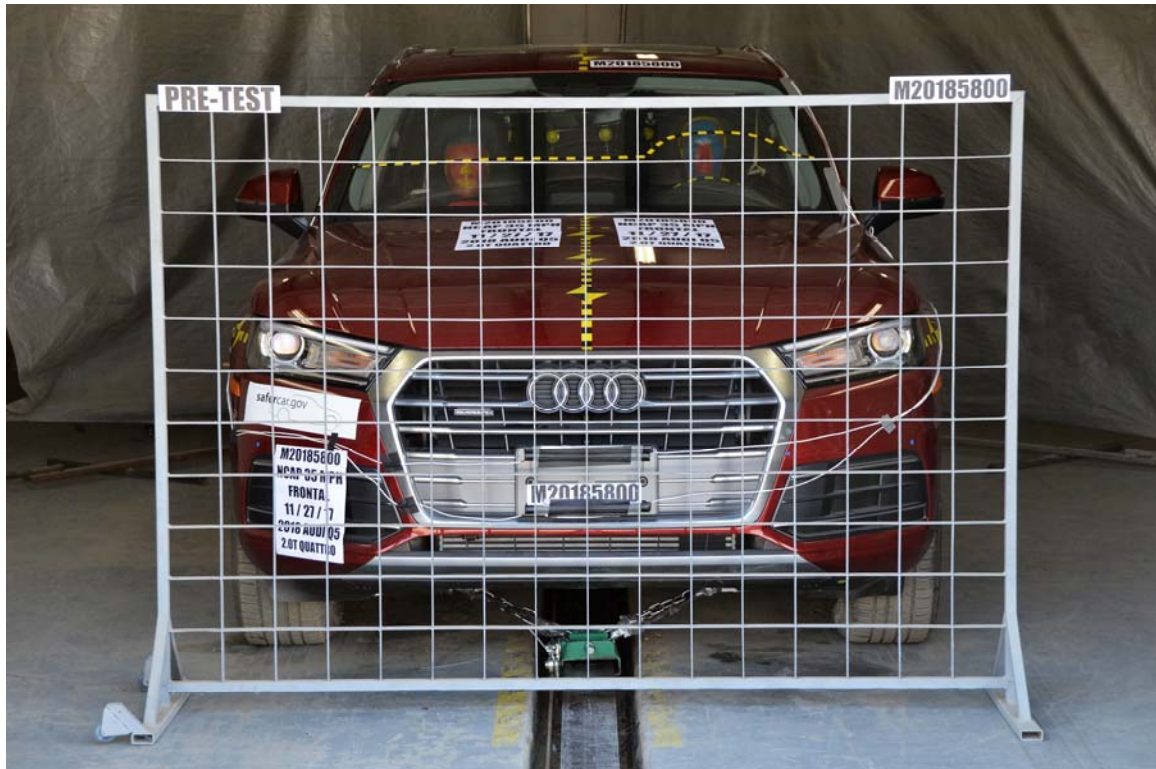
Figure		Page
1	Load Cell Location	A-1
2	Pre-Test Load Cell Wall	A-1
3	Post-Test Load Cell Wall	A-2
4	Manufacturer's Label	A-2
5	Tire Placard	A-3
6	2018 Audi Q5 2.0T Quattro Frontal as Delivered	A-3
7	Left Rear $\frac{3}{4}$ View, as Received	A-4
8	Pre-Test Front View of Test Vehicle	A-4
9	Post-Test Front View of Test Vehicle	A-5
10	Pre-Test Left View of Test Vehicle	A-5
11	Post-Test Left View of Test Vehicle	A-6
12	Pre-Test Right View of Test Vehicle	A-6
13	Post-Test Right View of Test Vehicle	A-7
14	Pre-Test Right Front $\frac{3}{4}$ View	A-7
15	Post-Test Right Front $\frac{3}{4}$ View	A-8
16	Pre-Test Left Rear $\frac{3}{4}$ View	A-8
17	Post-Test Left Rear $\frac{3}{4}$ View	A-9
18	Pre-Test Windshield View	A-9
19	Post-Test Windshield View	A-10
20	Pre-Test Engine Compartment View	A-10
21	Post-Test Engine Compartment View	A-11
22	Pre-Test Fuel Filler Cap View	A-11
23	Post-Test Fuel Filler Cap View	A-12
24	Pre-Test Front Underbody View	A-12
25	Post-Test Front Underbody View	A-13
26	Pre-Test Rear Underbody View	A-13
27	Post-Test Rear Underbody View	A-14
28	Pre-Test Dummy Cable Routing	A-14
29	Post-Test Dummy Cable Routing	A-15
30	Pre-Test Driver Dummy Front View	A-15
31	Post-Test Driver Dummy Front View	A-16
32	Pre-Test Driver Dummy Window View	A-16
33	Post-Test Driver Dummy Window View	A-17
34	Pre-Test Driver Dummy and Vehicle Interior View	A-17
35	Post-Test Driver Dummy and Vehicle Interior View	A-18
36	Pre-Test Driver's Seat Fore-Aft Markings	A-18

TABLE OF PHOTOGRAPHS ... (CONTINUED)

Figure		Page
37	Post-Test Driver's Seat Fore-Aft Markings	A-19
38	Pre-Test View of Belt Anchorage for Driver Dummy	A-19
39	Post-Test View of Belt Anchorage for Driver Dummy	A-20
40	Pre-Test Driver Dummy Feet	A-20
41	Post-Test Driver Dummy Feet	A-21
42	Pre-Test Driver's Side Knee Bolster	A-21
43	Post-Test Driver's Side Knee Bolster	A-22
44	Pre-Test Driver's Side Floorpan	A-22
45	Post-Test Driver's Side Floorpan	A-23
46	Post-Test Driver Dummy Face	A-23
47	Post-Test Driver Dummy Contact with Airbag	A-24
48	Post-Test Driver Dummy Contact with Headrest	A-24
48a	Post-Test Driver Dummy Contact with Steering Column	A-25
49	Pre-Test View of the Steering Wheel	A-25
50	Post-Test View of the Steering Wheel	A-26
51	Pre-Test Passenger Dummy Front View	A-26
52	Post-Test Passenger Dummy Front View	A-27
53	Pre-Test Passenger Dummy Window View	A-27
54	Post-Test Passenger Dummy Window View	A-28
55	Pre-Test Passenger Dummy and Vehicle Interior View	A-28
56	Post-Test Passenger Dummy and Vehicle Interior View	A-29
57	Pre-Test Passenger's Seat Fore-Aft Markings	A-29
58	Post-Test Passenger's Seat Fore-Aft Markings	A-30
59	Pre-Test View of Belt Anchorage for Passenger Dummy	A-30
60	Post-Test View of Belt Anchorage for Passenger Dummy	A-31
61	Pre-Test Passenger Dummy Feet	A-31
62	Post-Test Passenger Dummy Feet	A-32
63	Pre-Test Passenger's Side Knee Bolster	A-32
64	Post-Test Passenger's Side Knee Bolster	A-33
65	Pre-Test Passenger's Side Floorpan	A-33
66	Post-Test Passenger's Side Floorpan	A-34
67	Post-Test Passenger Dummy Face	A-34
68	Post-Test Passenger Dummy Contact with Airbag	A-35
69	Post-Test Passenger Dummy Contact with Headrest	A-35
70	Photograph of Ballast Installed in Vehicle	A-36

TABLE OF PHOTOGRAPHS ... (CONTINUED)

Figure		Page
71	Post-Test Stoddard Solvent Spillage Location View	A-36
72	Post-Test Speed Trap Read-Out	A-37
73	Vehicle at 0° on Static Rollover Device	A-37
74	Vehicle at 90° on Static Rollover Device	A-38
75	Vehicle at 180° on Static Rollover Device	A-38
76	Vehicle at 270° on Static Rollover Device	A-39
77	Vehicle at 360° on Static Rollover Device	A-39
78	2018 Audi Q5 2.0T Quattro Frontal Impact Event	A-40
79	Monroney Label Photograph	A-40



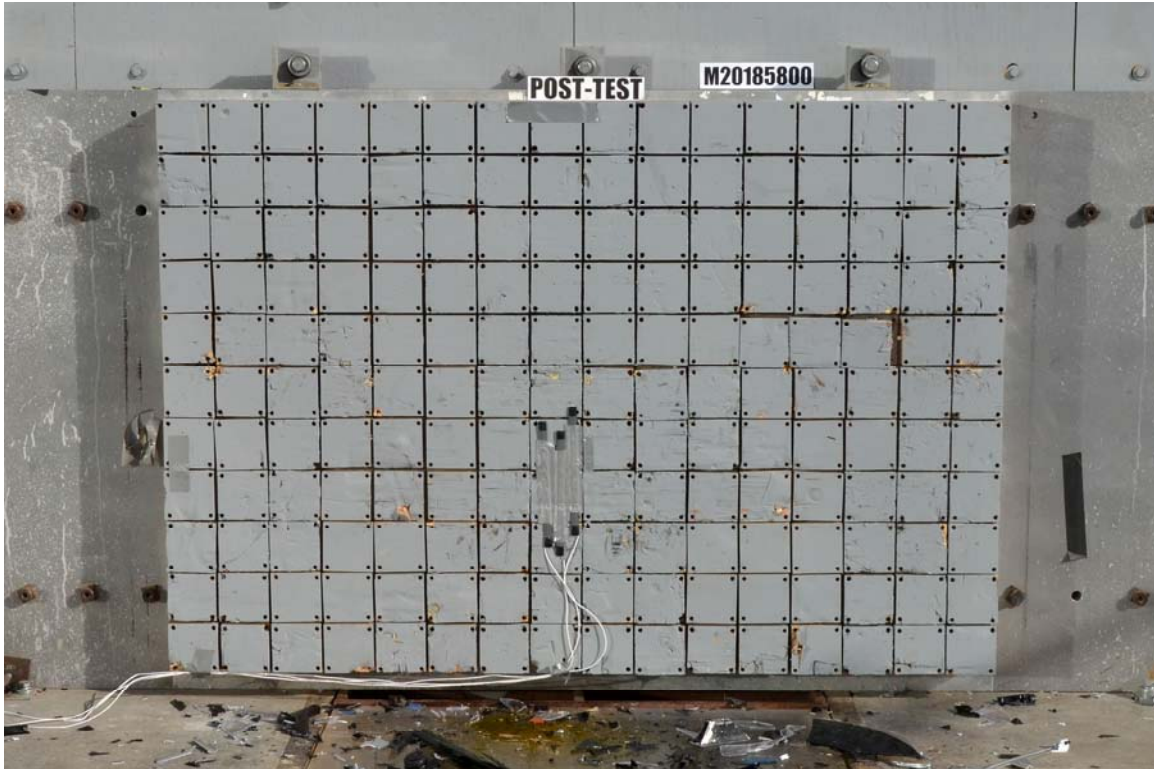


FIGURE 3. Post-Test Load Cell Wall



FIGURE 4. Manufacturer's Label

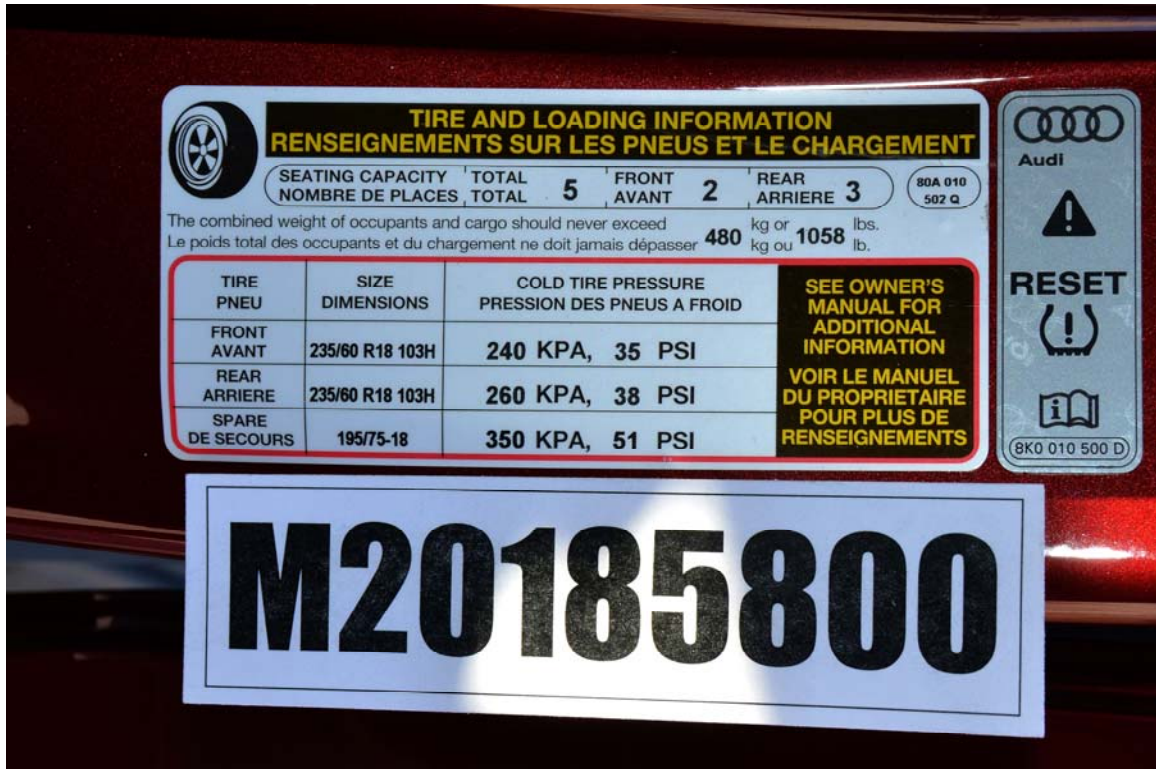


FIGURE 5. Tire Placard



FIGURE 6. 2018 Audi Q5 2.0T Quattro Frontal as Delivered



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



FIGURE 8. Pre-Test Front View of Test Vehicle

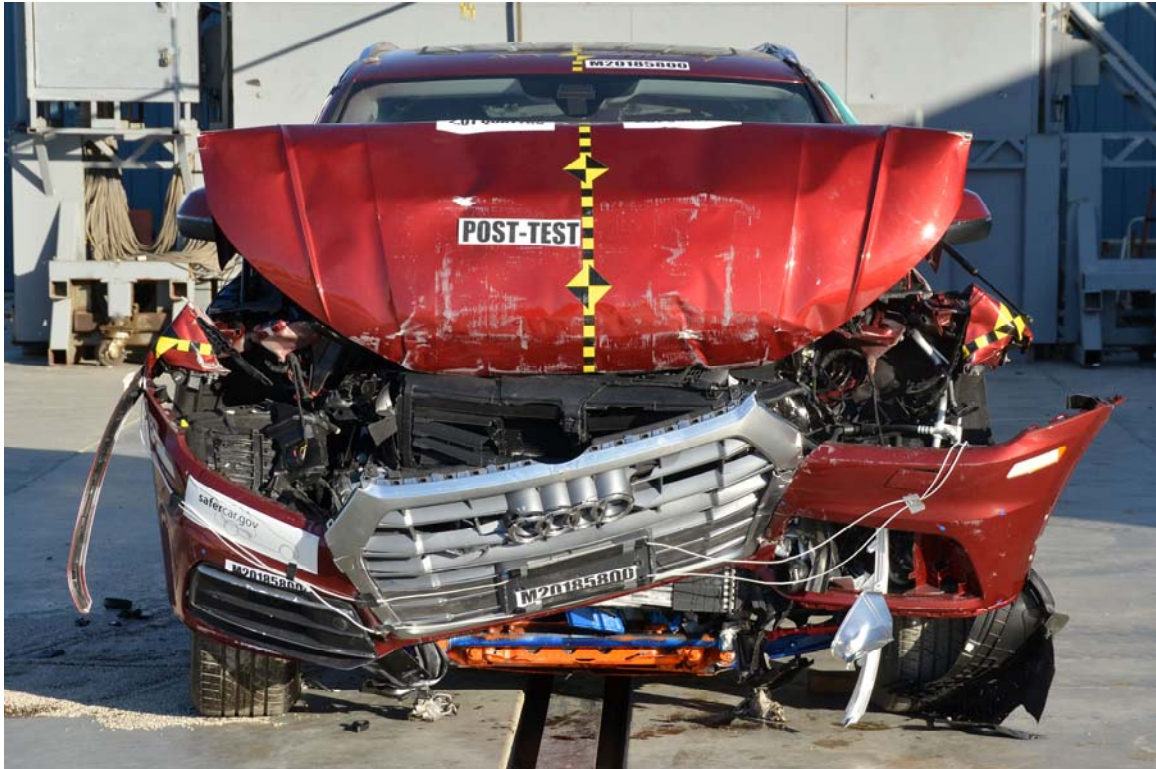


FIGURE 9. Post-Test Front View of Test Vehicle



FIGURE 10. Pre-Test Left View of Test Vehicle



FIGURE 11. Post-Test Left View of Test Vehicle



FIGURE 12. Pre-Test Right View of Test Vehicle



FIGURE 13. Post-Test Right View of Test Vehicle



FIGURE 14. Pre-Test Right Front ¾ View

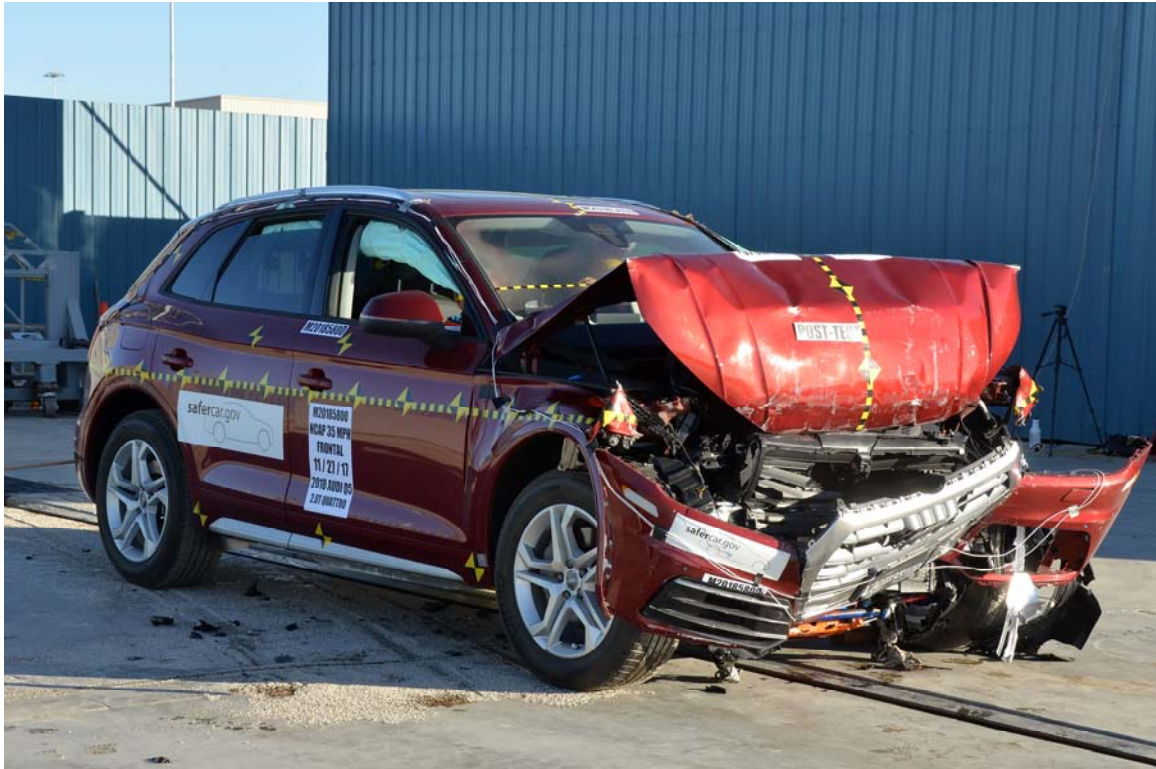


FIGURE 15. Post-Test Right Front $\frac{3}{4}$ View



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



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



FIGURE 18. Pre-Test Windshield View



FIGURE 19. Post-Test Windshield View

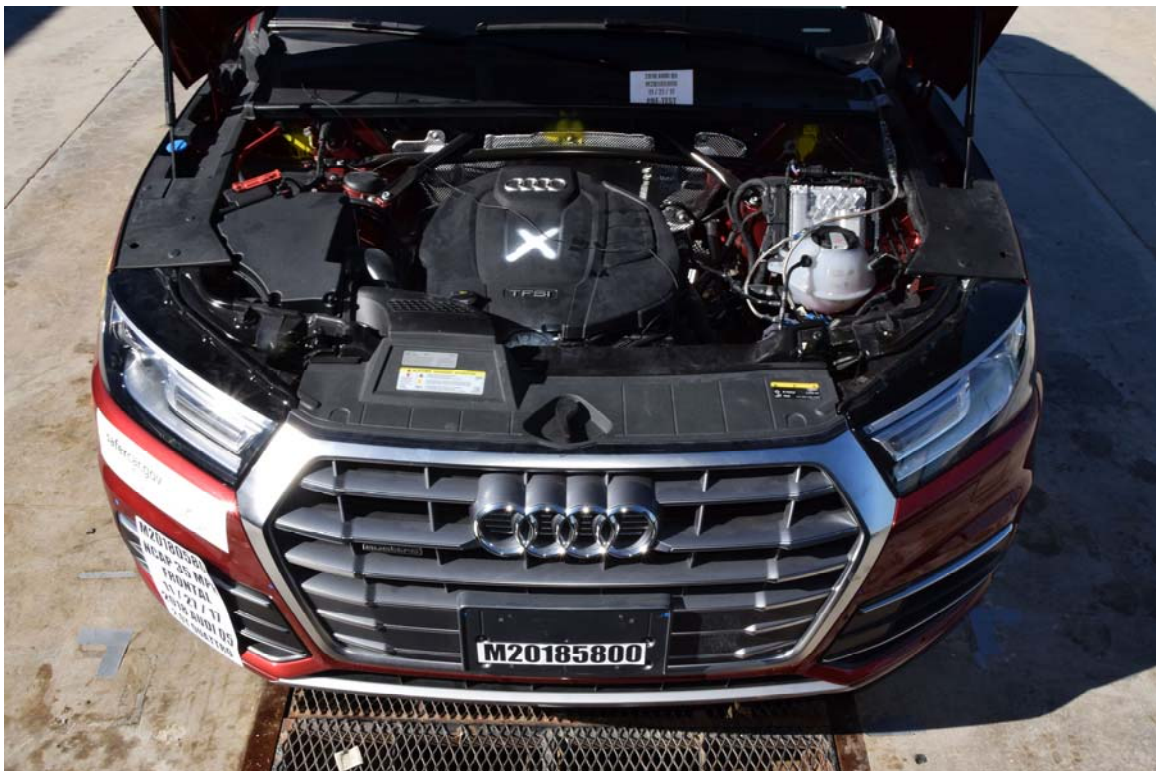


FIGURE 20. Pre-Test Engine Compartment View





FIGURE 23. Post-Test Fuel Filler Cap View

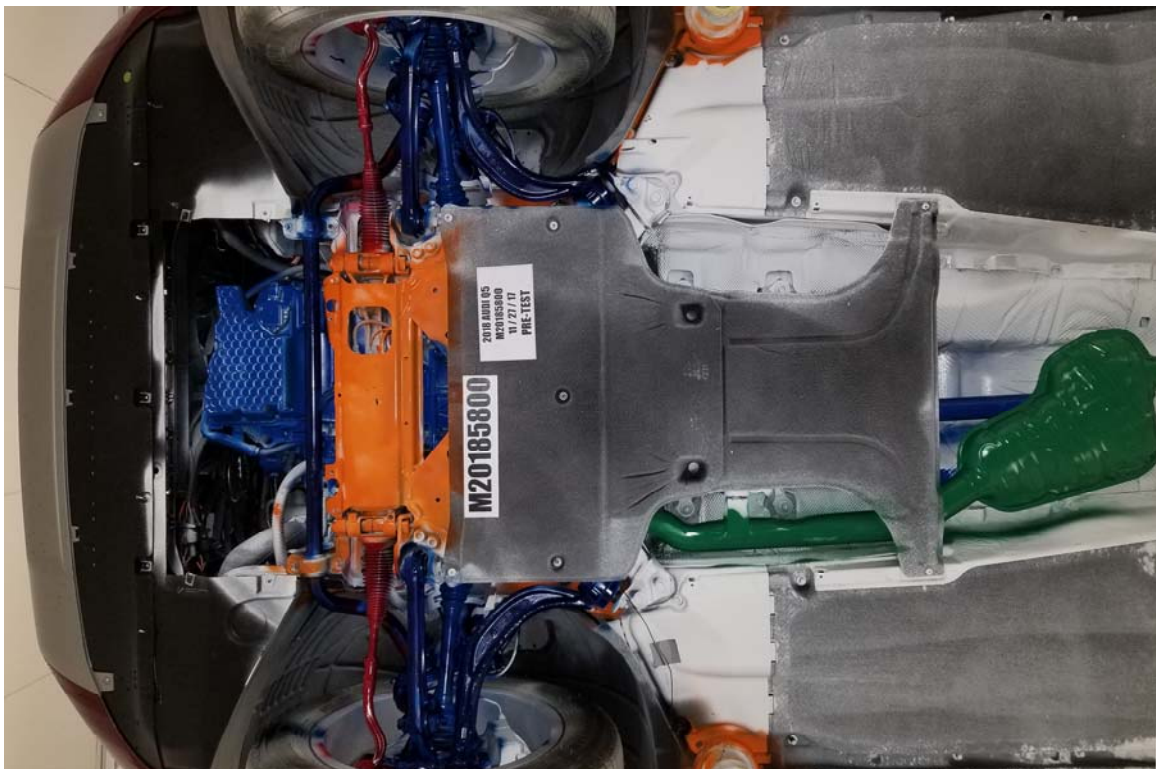


FIGURE 24. Pre-Test Front Underbody View



FIGURE 25. Post-Test Front Underbody View

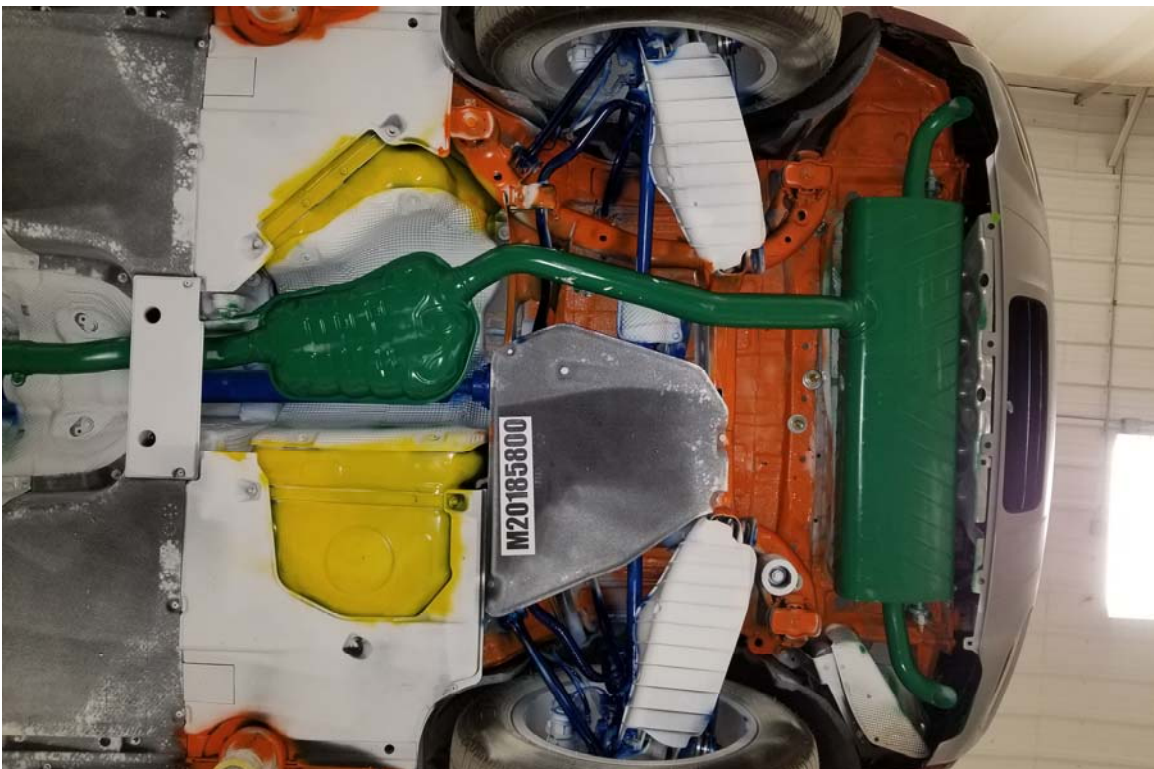


FIGURE 26. Pre-Test Rear Underbody View



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

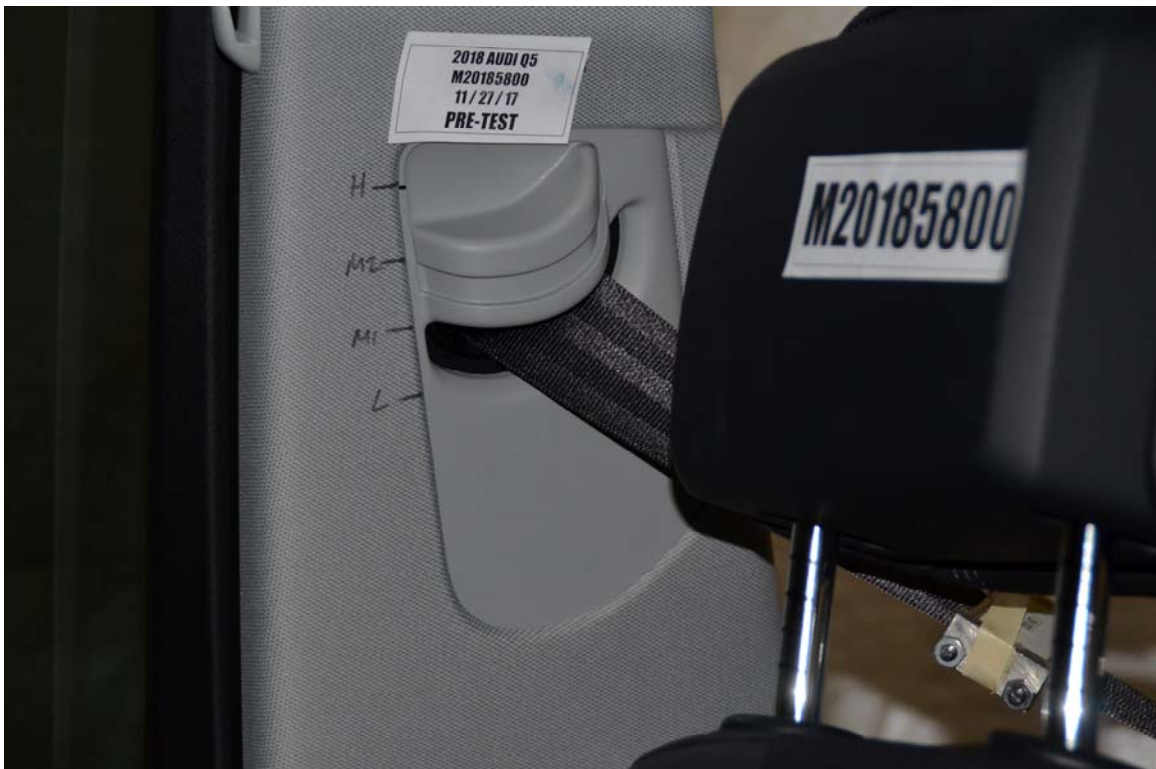


FIGURE 38. Pre-Test View of Belt Anchorage for Driver Dummy

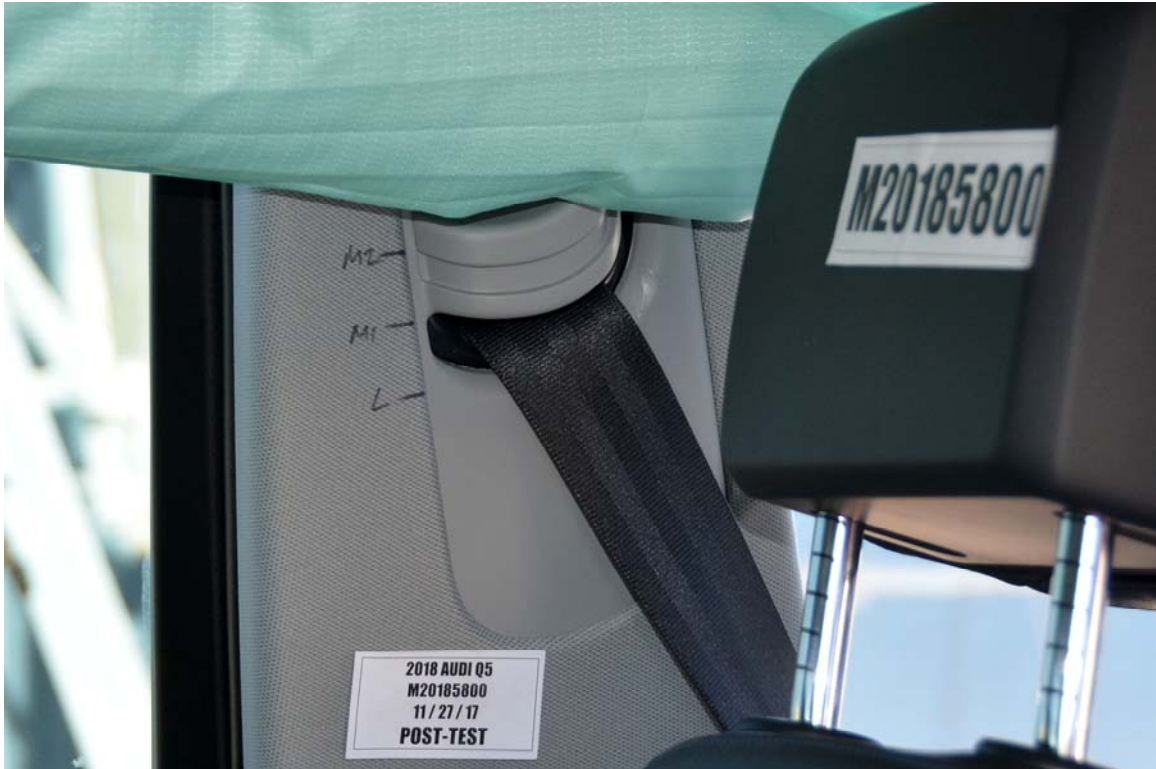


FIGURE 39. Post-Test View of Belt Anchorage for Driver Dummy



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

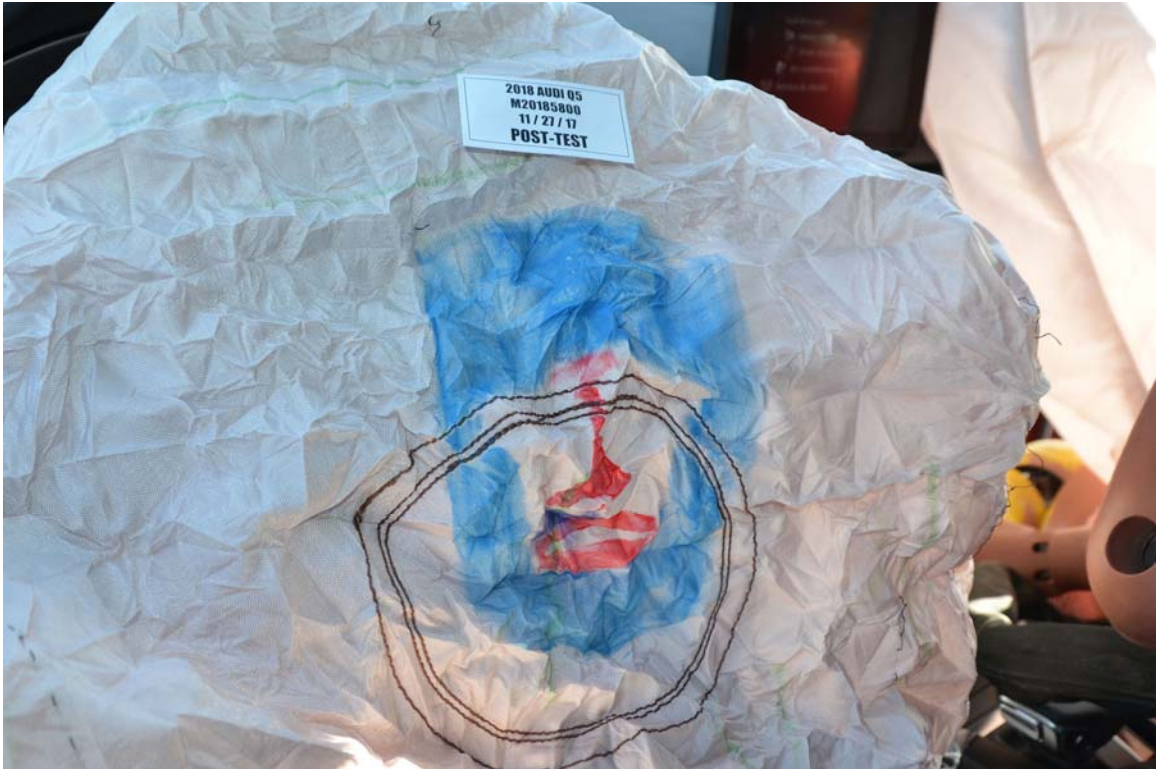


FIGURE 47. Post-Test Driver Dummy Contact with Airbag



FIGURE 48. Post-Test Driver Dummy Contact with Headrest



FIGURE 48a. Post-Test Driver Dummy Contact with Steering Column

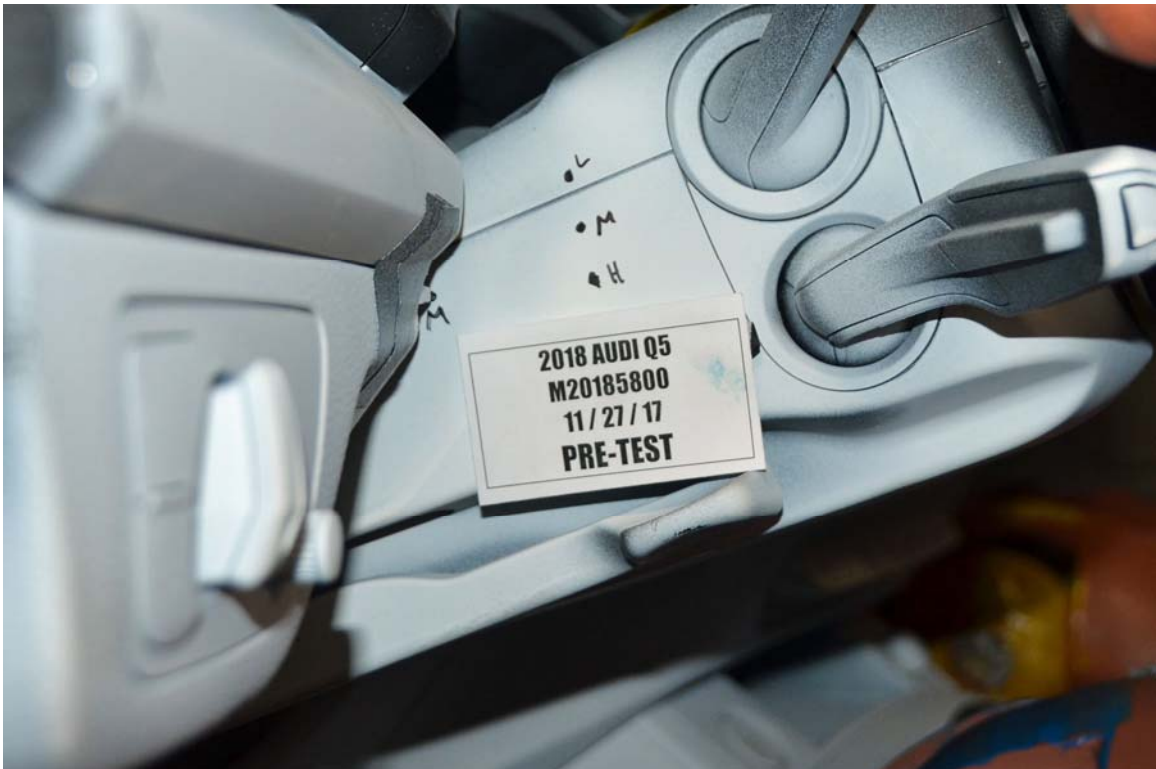


FIGURE 49. Pre-Test View of the Steering Wheel



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

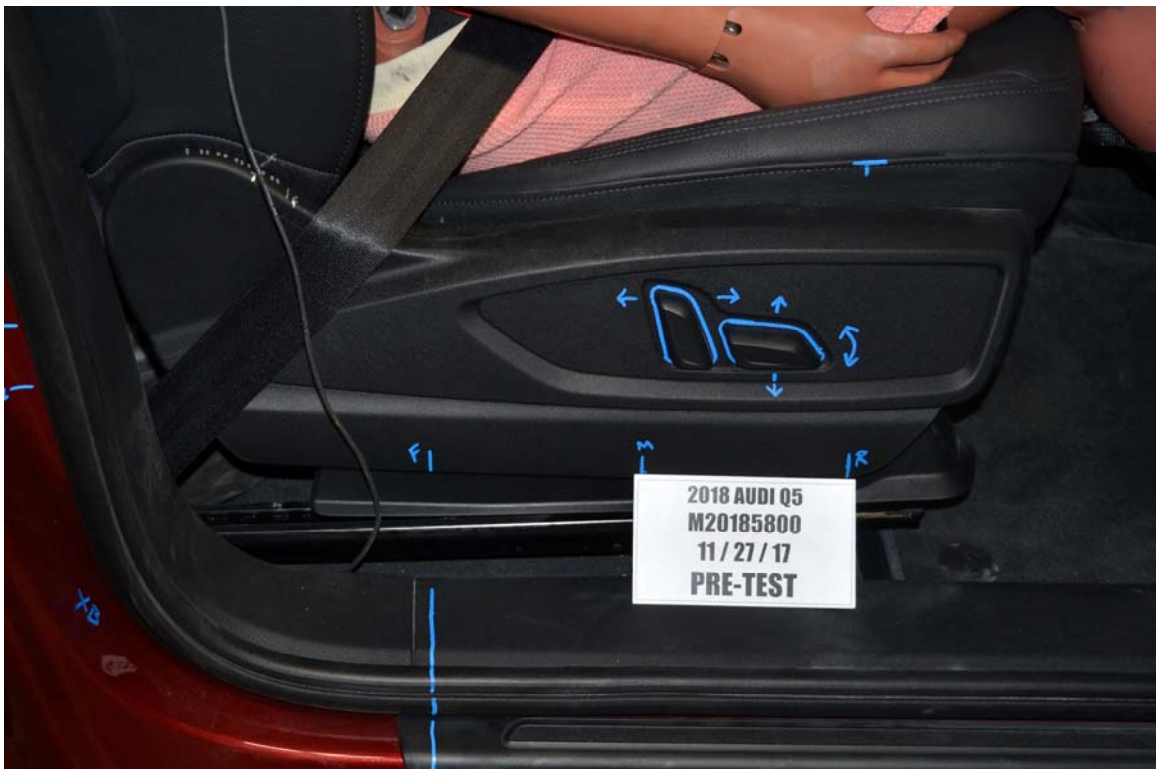


FIGURE 57. Pre-Test Passenger's Seat Fore-Aft Markings



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

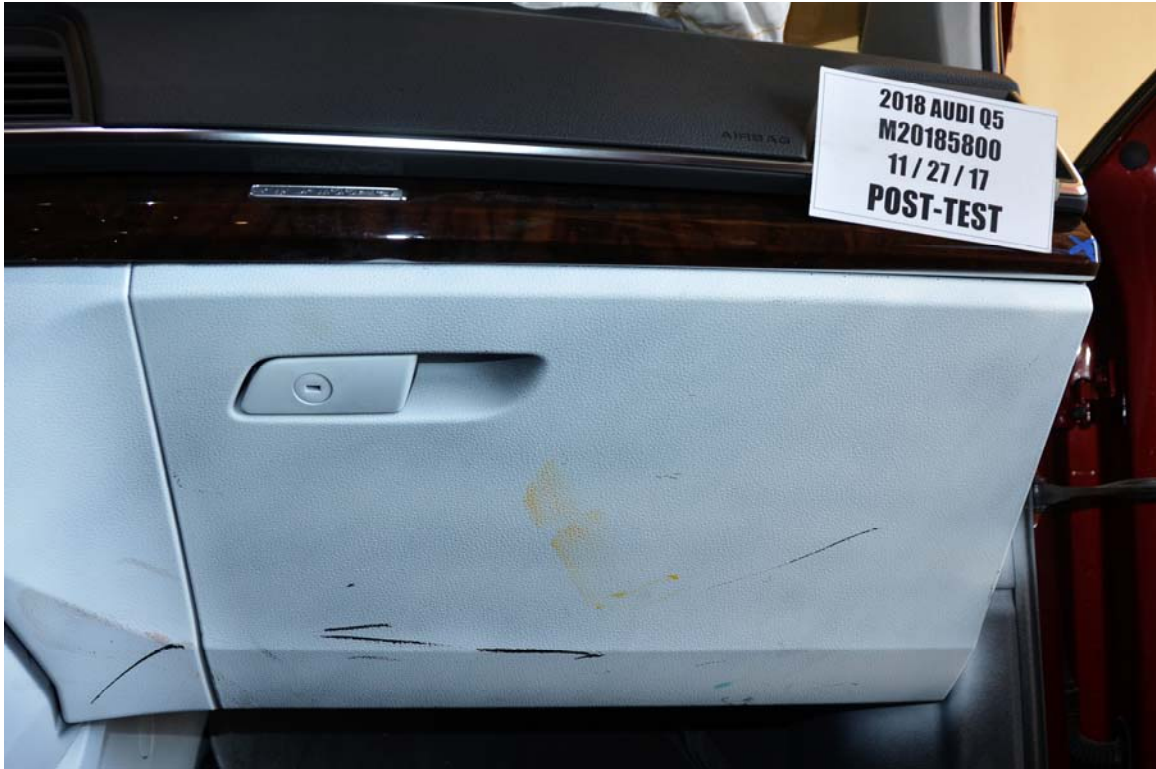


FIGURE 64. Post-Test Passenger's Side Knee Bolster



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 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 Audi Q5 2.0T Quattro Frontal Impact Event

2018 Audi Q5 2.0T quattro S tronic

STANDARD EQUIPMENT (unless replaced by options)

TECHNICAL

- 2.0 TFSI 252hp / 273hp-4 14 engine
- quattro all-wheel drive system
- 7-speed S tronic transmission
- 18" full-LED multi-lens lighting design with 255/50 all-season tires
- Energy recuperation w/ start-stop
- Space-saving spare tire

COMFORT/TECHNOLOGY

- Audi drive select
- Audi sound system
- Audi seven plus headlights
- Autostopping interior mirror w/ compass
- Aluminum roof rails
- Garage door opener (HomeLink)
- Driver information system w/ top computer, monochrome
- Hill descent control
- Leather seating surfaces
- Power exterior mirrors, heated
- Power tailgate
- Preparation for mobile phone (Bluetooth®) with audio streaming
- Rain & light sensor
- Rear privacy glass
- Sliding 4000W split-folding 2nd row with adjustable recline
- Three-zone automatic climate control with digital rear display
- USB Audi music interface w/ Audi smartphone interface
- 3-spoke multi-function steering wheel w/ shift paddles
- 8-way power front seats, 4-way power lumbar for driver

SAFETY/CONVENIENCE

- Advanced Airbag Protection System with 6 airbags
- Antilock Braking System (ABS) w/ Brake Assist
- Audi pre sense basic (preventative occupant protection)
- Audi pre sense city (pre-emptive collision avoidance)
- Child safety locks in rear doors, manual
- Electronic Vehicle Immobilization (EVC) w/ Offroad mode
- LED Daytime Running Lights (DRL)
- LED taillights with dynamic turn signals
- Lower Anchors and Tethers for Children (LATCH)
- Reverser camera
- Tire Pressure Monitoring System (TPMS)

WARRANTY/MAINTENANCE

- 4 Year/50,000 mile (whichever occurs first) New Vehicle Limited Warranty*
- 12 Year Limited Powertrain Against Corrosion Protection
- 1 Year/10,000 mile (whichever occurs first) First Scheduled Maintenance Service
- FREE OF CHARGE
- 4 Years Roadside Assistance coverage provided by a third party supplier
- *Please refer to the 2018 Audi Warranty and Maintenance Booklet for complete coverage information.

MANUFACTURER'S SUGGESTED RETAIL PRICE

2018 Audi Q5 2.0T quattro S tronic **\$41,500.00**

PACKAGES / OPTIONS

- Matador Red metallic \$575.00
- Black interior \$1,450.00
- Panoramic sunroof \$900.00
- 8-way power front seats with driver memory
- Audi advanced key
- Heated, auto-dim, power folding exterior mirrors w/memory
- SiriusXM® All Access service w/3-month trial subscription
- Heated front seats \$500.00
- Audi Guard Protection Kit \$305.00
- Audi Beam - Rings \$250.00
- Cargo cover \$225.00
- Destination Charge \$975.00

MODEL: FYBSNY
VIN: WA1ANAFY8J2033013
DEALER: 408914
JACK DANIEL'S AUDI OF USR
243 ROUTE 17 SOUTH
UPPER SADDLE RIVER, NJ 07458
Port of Entry: DAVISVILLE
SHIP TO: 408914
JACK DANIEL'S AUDI OF USR
243 ROUTE 17 SOUTH
UPPER SADDLE RIVER, NJ 07458
COMM NUM: NW670
Transportation Method: TRUCK

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score		Not Rated
Frontal Crash	Driver Passenger	Not Rated
Side Crash	Front Seat Rear Seat	Not Rated
Rollover		Not Rated

Star ratings range from 1 to 5 stars (★★★★★) with 5 being the highest. Source: National Highway Traffic Safety Administration (NHTSA).
www.safercar.gov or 1-888-327-4236

EPA DOT Fuel Economy and Environment

Fuel Economy

25 MPG combined city/hwy
23 city
27 highway
4 gallons per 100 miles

Annual fuel cost \$1,700

Fuel Economy & Greenhouse Gas Rating (multiple only) Smog Rating (multiple only)

1 **5** **10** **1** **3** **10**

Parts Content Information

FOR VEHICLES IN THIS CARLINE: U.S./CANADIAN PARTS CONTENT: 2% FINAL ASSEMBLY POINT: SAN JOSE CHIAPA, MEXICO
MAJOR SOURCES OF FOREIGN PARTS CONTENT: MEXICO: 75% COUNTRY OF ORIGIN: ENGINE: MEXICO TRANSMISSION: GERMANY

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

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 27 MPG and costs \$5,750 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$2.80 per gallon. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fuel economy.gov
Calculate personalized estimates and compare vehicles

Smartphone QR Code

FIGURE 79. Monroney Label Photograph

APPENDIX B
DUMMY RESPONSE DATA TRACES

TABLE OF DATA PLOTS

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

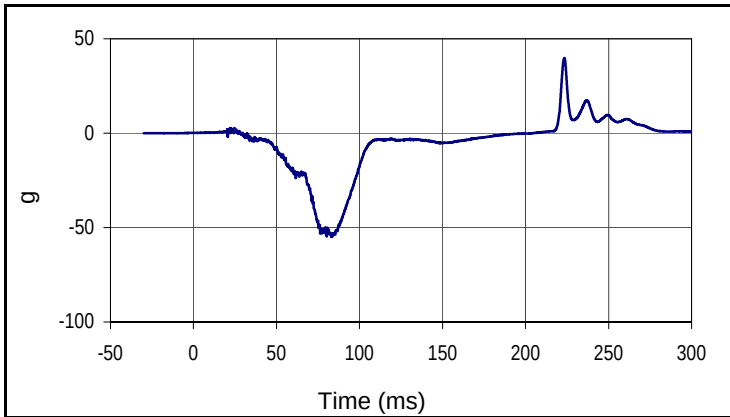
The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at www.nhtsa.dot.gov

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

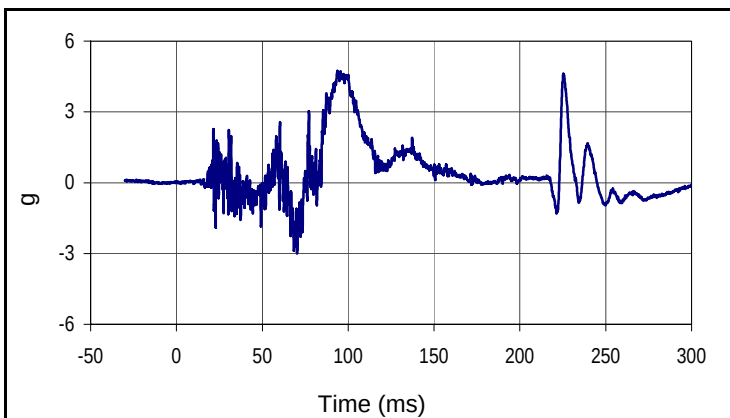
Passenger Pelvis X
Passenger Pelvis Y
Passenger Pelvis Z
Passenger Left Femur Force Redundant
Passenger Right Femur Force Redundant
Passenger Left Upper Tibia Moment X
Passenger Left Upper Tibia Moment Y
Passenger Left Upper Tibia Force Z
Passenger Left Lower Tibia Moment X
Passenger Left Lower Tibia 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 Audi Q5 2.0T Quattro 5-Door MPV
 Test Program: 56 km/h Frontal Impact NCAP Test

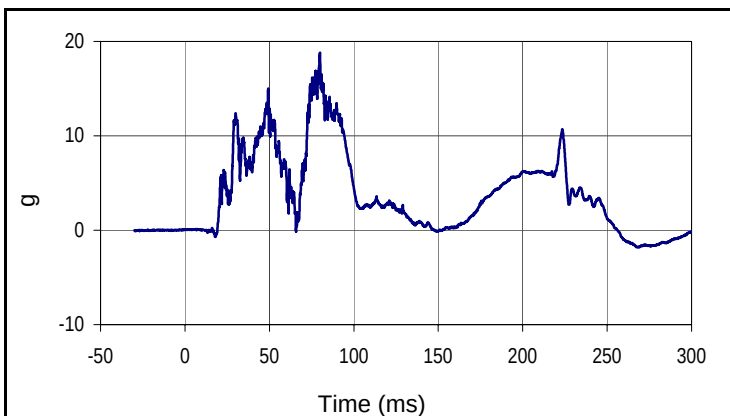
NHTSA No.: M20185800
 Test Date: 11/27/17



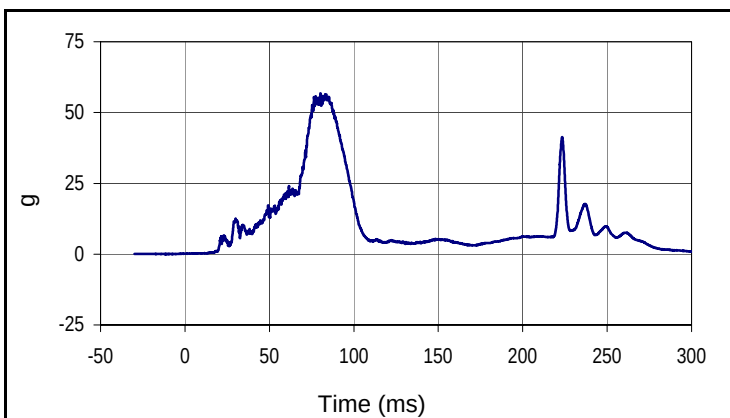
Curve Description			
Driver Head Acceleration X Primary			
Plot No.		SAE Class	Units
001		1000	g
Max	Time	Min	Time
39.9	223.4	-55.0	83.0



Curve Description			
Driver Head Acceleration Y Primary			
Plot No.		SAE Class	Units
002		1000	g
Max	Time	Min	Time
4.7	93.6	-3.0	70.3



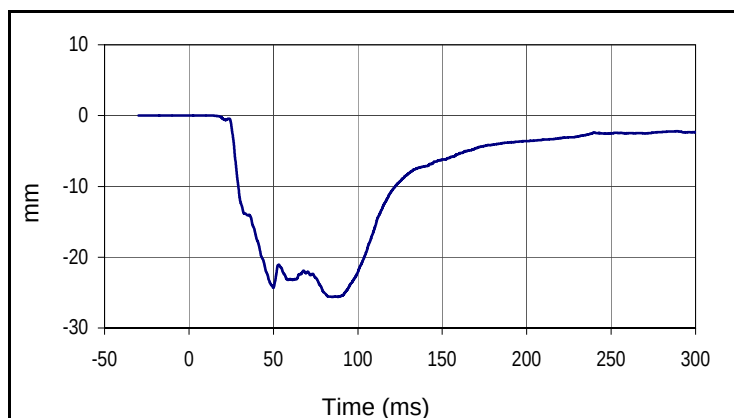
Curve Description			
Driver Head Acceleration Z Primary			
Plot No.		SAE Class	Units
003		1000	g
Max	Time	Min	Time
18.8	79.9	-1.8	268.6



Curve Description			
Driver Head Resultant Acceleration Primary			
Plot No.		SAE Class	Units
004		1000	g
Max	Time	Min	Time
56.8	80.2	0.1	1.2

Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV
 Test Program: 56 km/h Frontal Impact NCAP Test

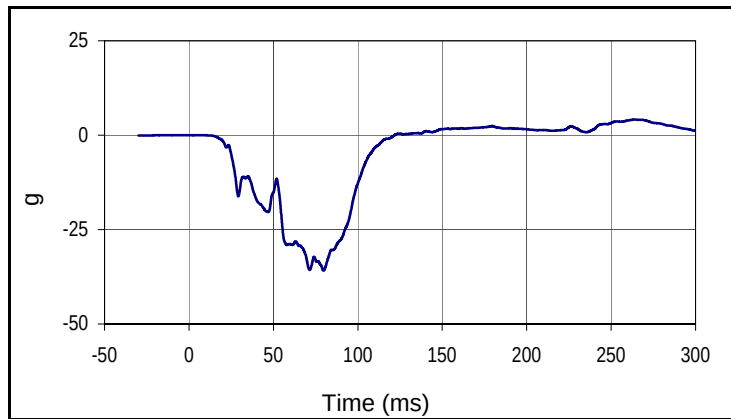
NHTSA No.: M20185800
 Test Date: 11/27/17



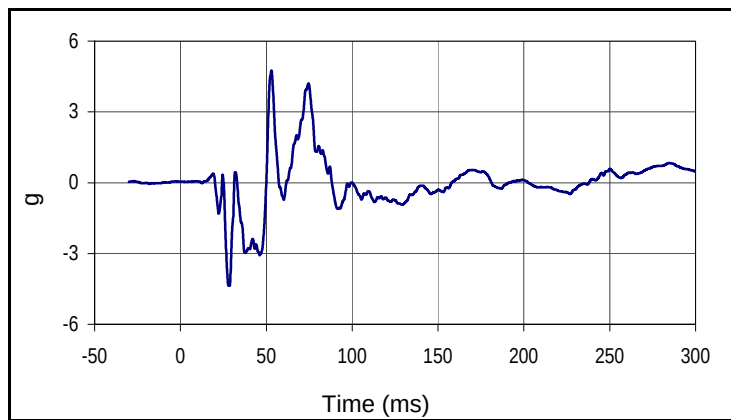
Curve Description			
Driver Chest Deflection			
Plot No.		SAE Class	Units
005		600	mm
Max	Time	Min	Time
0.0	14.3	-25.6	85.0

Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV
 Test Program: 56 km/h Frontal Impact NCAP Test

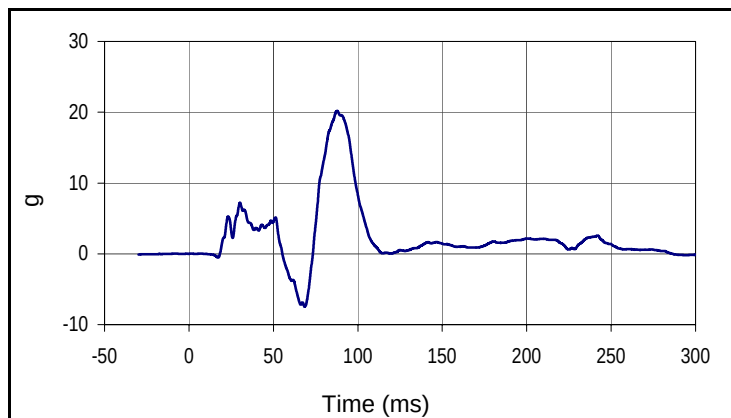
NHTSA No.: M20185800
 Test Date: 11/27/17



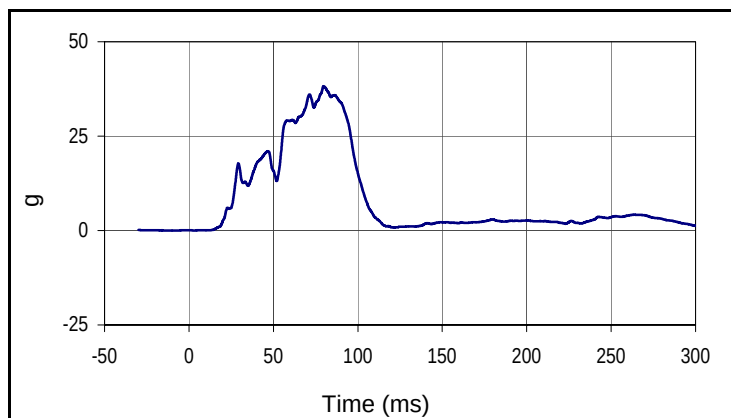
Curve Description			
Driver Chest Acceleration X Primary			
Plot No.		SAE Class	Units
006		180	g
Max	Time	Min	Time
4.1	263.7	-35.8	79.7



Curve Description			
Driver Chest Acceleration Y Primary			
Plot No.		SAE Class	Units
007		180	g
Max	Time	Min	Time
4.8	53.0	-4.4	28.7



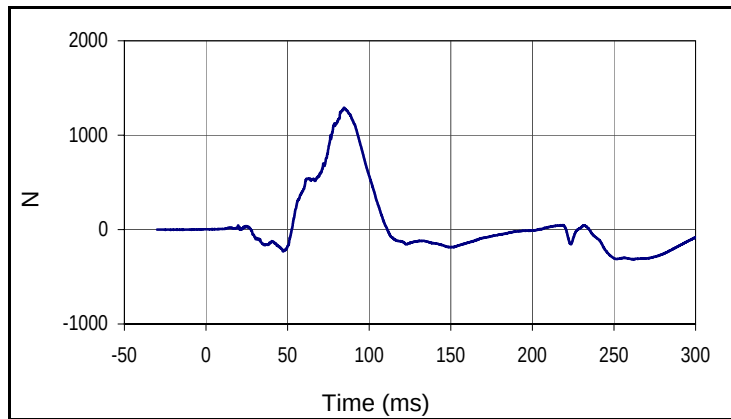
Curve Description			
Driver Chest Acceleration Z Primary			
Plot No.		SAE Class	Units
008		180	g
Max	Time	Min	Time
20.2	87.8	-7.4	68.6



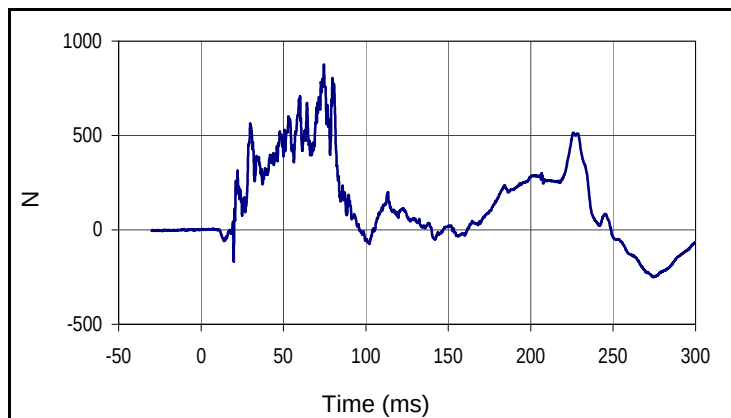
Curve Description			
Driver Chest Resultant Acceleration Primary			
Plot No.		SAE Class	Units
009		180	g
Max	Time	Min	Time
38.2	79.9	0.0	3.5

Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV
 Test Program: 56 km/h Frontal Impact NCAP Test

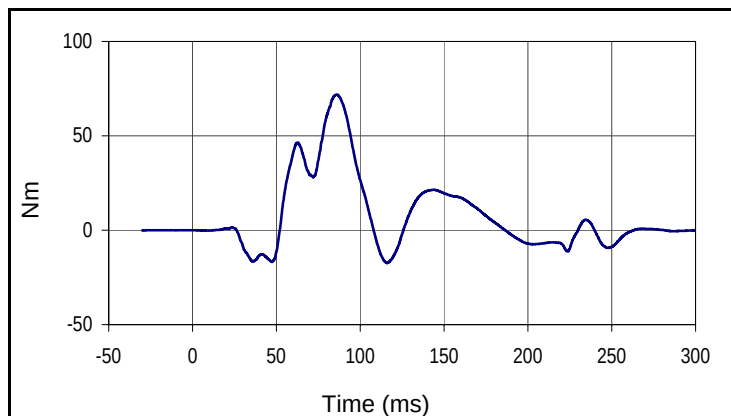
NHTSA No.: M20185800
 Test Date: 11/27/17



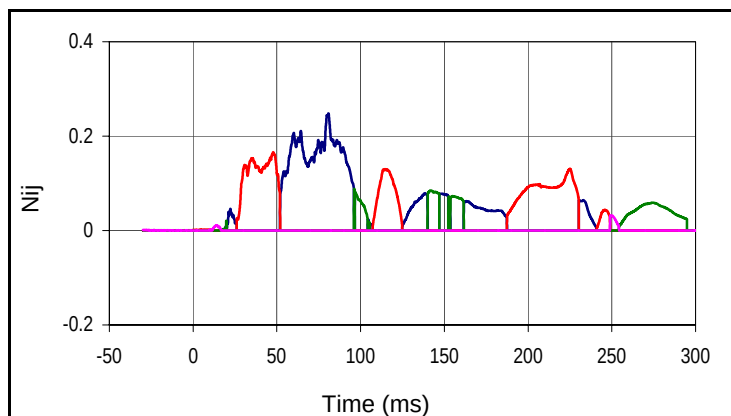
Curve Description			
Driver Upper Neck Force X			
Plot No.		SAE Class	Units
010		1000	N
Max	Time	Min	Time
1291.0	84.6	-314.3	261.9



Curve Description			
Driver Upper Neck Force Z			
Plot No.		SAE Class	Units
011		1000	N
Max	Time	Min	Time
876.7	74.6	-250.7	274.3



Curve Description			
Driver Upper Neck Moment Y			
Plot No.		SAE Class	Units
012		600	Nm
Max	Time	Min	Time
71.8	86.2	-17.4	115.9

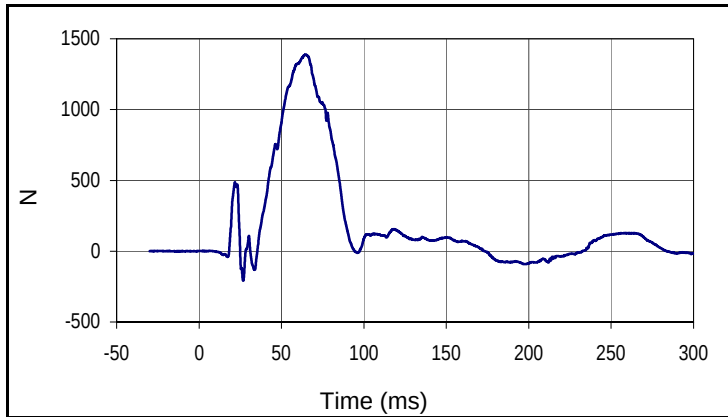


Curve Description		
Driver Nij		
Units	Max	Time
Ntf	0.25	80.8
Units	Max	Time
Nte	0.17	47.9
Units	Max	Time
Ncf	0.09	96.1
Units	Max	Time
Nce	0.03	249.5

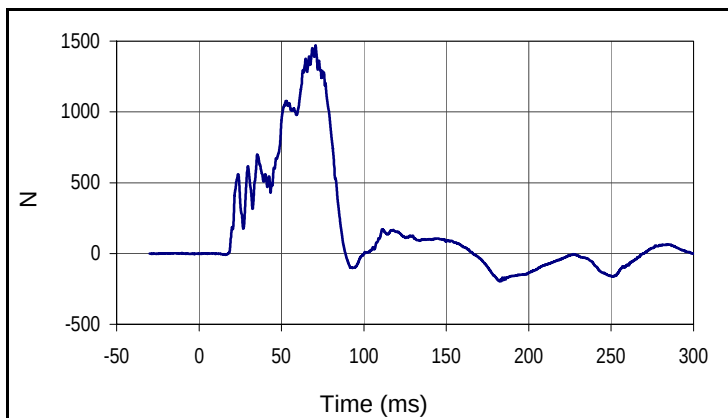
Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV
Test Program: 56 km/h Frontal Impact NCAP Test

NHTSA No.: M20185800

Test Date: 11/27/17



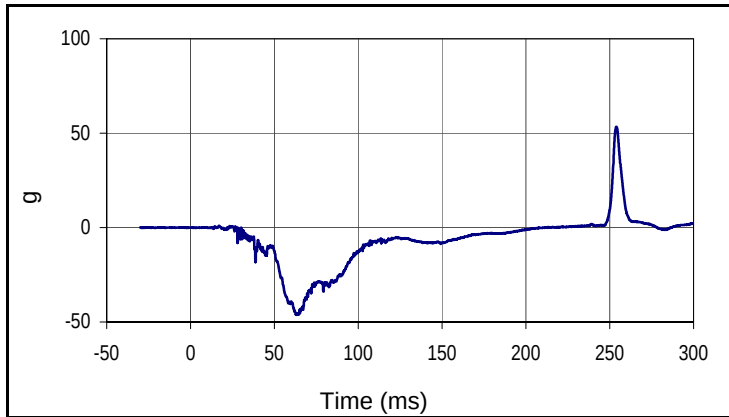
Curve Description			
Driver Left Femur Force Z			
Plot No.		SAE Class	Units
014		600	N
Max	Time	Min	Time
1390.1	64.8	-208.3	26.8



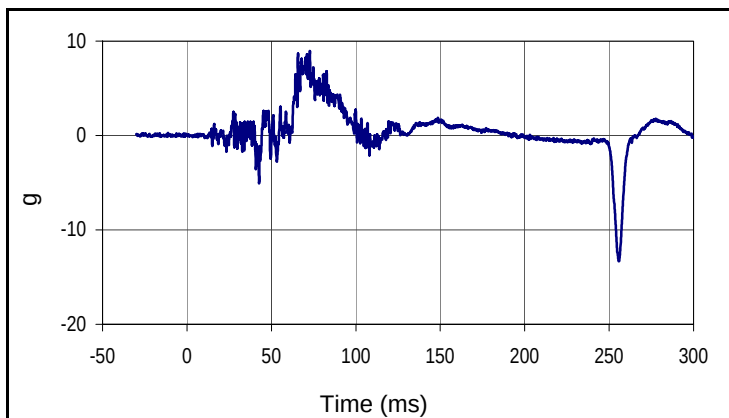
Curve Description			
Driver Right Femur Force Z			
Plot No.		SAE Class	Units
015		600	N
Max	Time	Min	Time
1471.1	70.7	-196.7	182.3

Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV
 Test Program: 56 km/h Frontal Impact NCAP Test

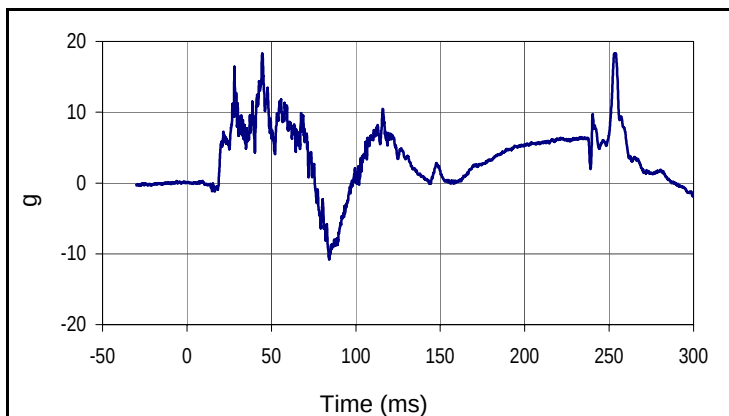
NHTSA No.: M20185800
 Test Date: 11/27/17



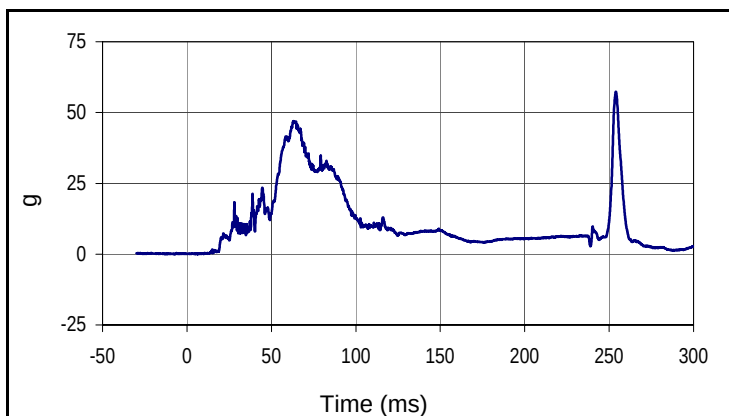
Curve Description			
Passenger Head Acceleration X Primary			
Plot No.		SAE Class	Units
016		1000	g
Max	Time	Min	Time
53.5	254.0	-46.2	63.0



Curve Description			
Passenger Head Acceleration Y Primary			
Plot No.		SAE Class	Units
017		1000	g
Max	Time	Min	Time
8.9	72.7	-13.3	255.9



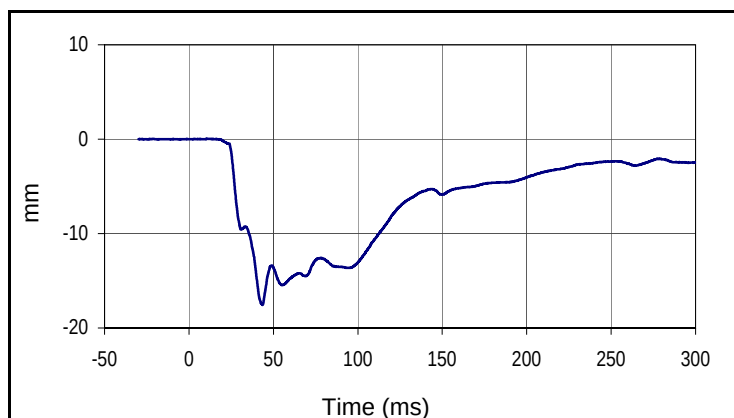
Curve Description			
Passenger Head Acceleration Z Primary			
Plot No.		SAE Class	Units
018		1000	g
Max	Time	Min	Time
18.3	253.1	-10.8	84.2



Curve Description			
Passenger Head Resultant Acceleration Primary			
Plot No.		SAE Class	Units
019		1000	g
Max	Time	Min	Time
57.3	254.0	0.0	5.0

Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV
 Test Program: 56 km/h Frontal Impact NCAP Test

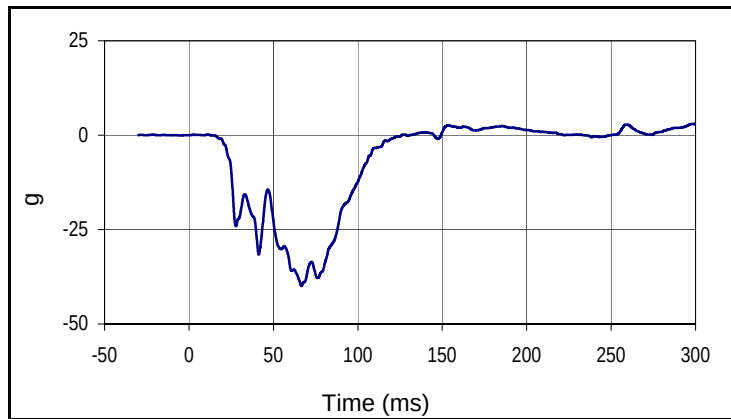
NHTSA No.: M20185800
 Test Date: 11/27/17



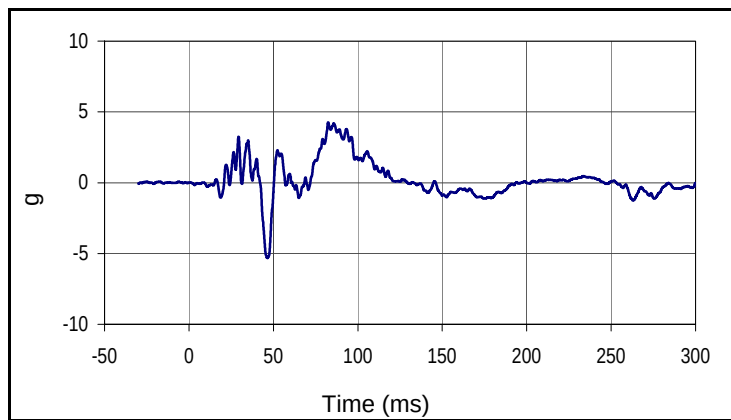
Curve Description			
Passenger Chest Deflection			
Plot No.		SAE Class	Units
020		600	mm
Max	Time	Min	Time
0.1	10.7	-17.5	43.6

Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV
 Test Program: 56 km/h Frontal Impact NCAP Test

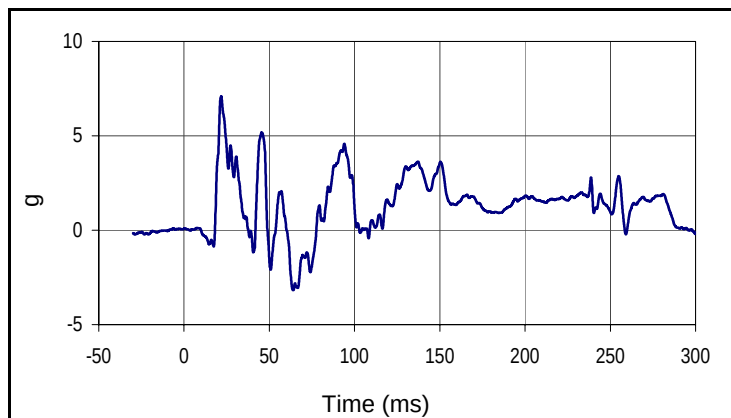
NHTSA No.: M20185800
 Test Date: 11/27/17



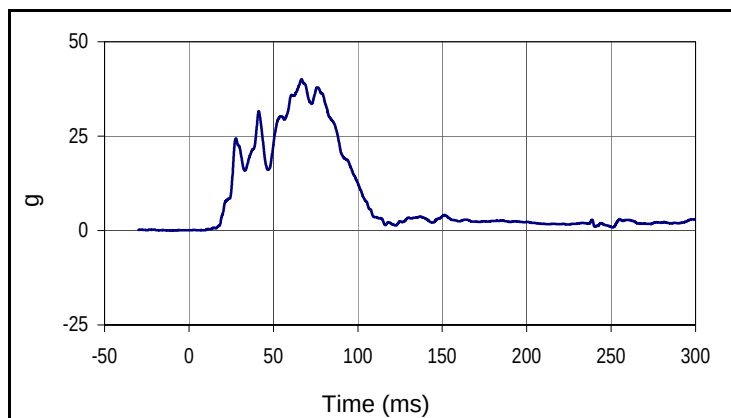
Curve Description			
Passenger Chest Acceleration X Primary			
Plot No.		SAE Class	Units
021		180	g
Max	Time	Min	Time
3.0	299.0	-39.9	66.7



Curve Description			
Passenger Chest Acceleration Y Primary			
Plot No.		SAE Class	Units
022		180	g
Max	Time	Min	Time
4.3	82.4	-5.3	46.5



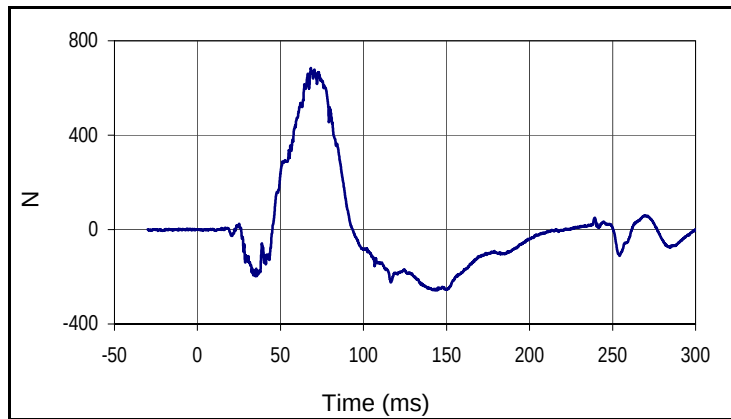
Curve Description			
Passenger Chest Acceleration Z Primary			
Plot No.		SAE Class	Units
023		180	g
Max	Time	Min	Time
7.1	21.7	-3.2	64.1



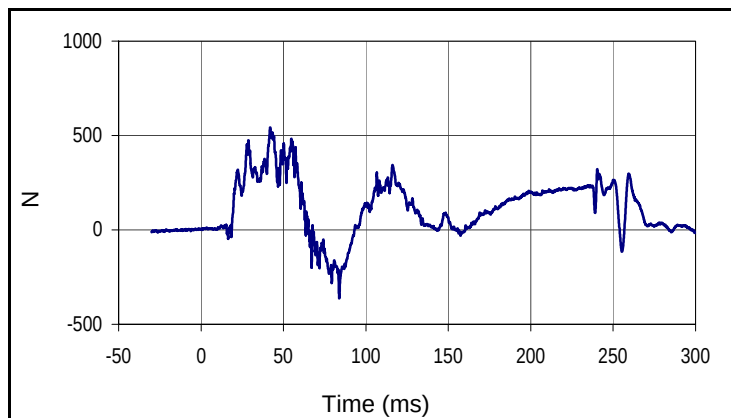
Curve Description			
Passenger Chest Resultant Acceleration Primary			
Plot No.		SAE Class	Units
024		180	g
Max	Time	Min	Time
40.1	66.7	0.1	1.4

Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV
 Test Program: 56 km/h Frontal Impact NCAP Test

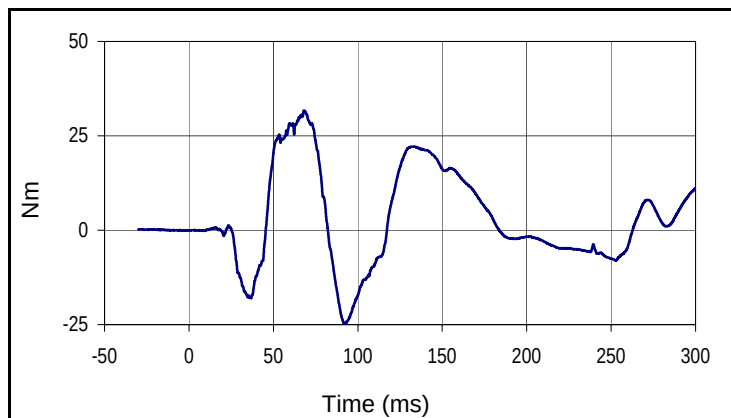
NHTSA No.: M20185800
 Test Date: 11/27/17



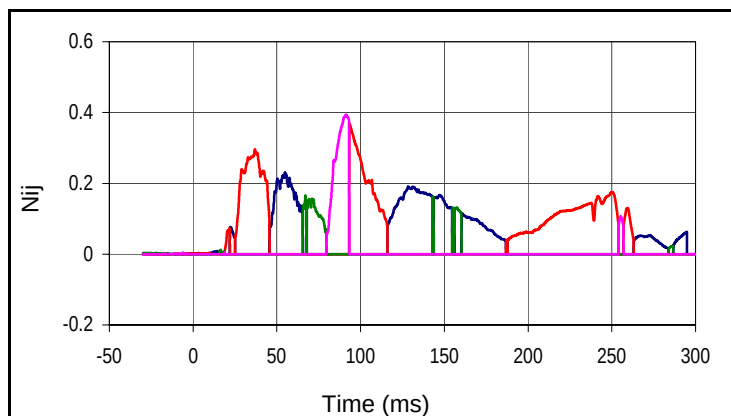
Curve Description			
Passenger Upper Neck Force X			
Plot No.		SAE Class	Units
025		1000	N
Max	Time	Min	Time
685.0	68.3	-257.3	144.4



Curve Description			
Passenger Upper Neck Force Z			
Plot No.		SAE Class	Units
026		1000	N
Max	Time	Min	Time
543.2	41.9	-363.0	83.8



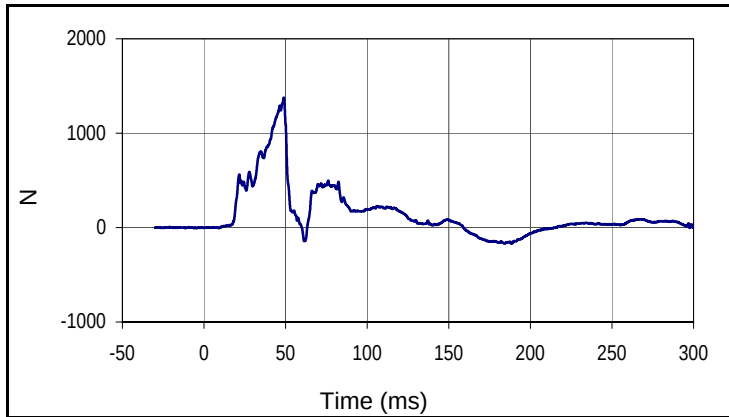
Curve Description			
Passenger Upper Neck Moment Y			
Plot No.		SAE Class	Units
027		600	Nm
Max	Time	Min	Time
31.7	68.0	-25.1	92.6



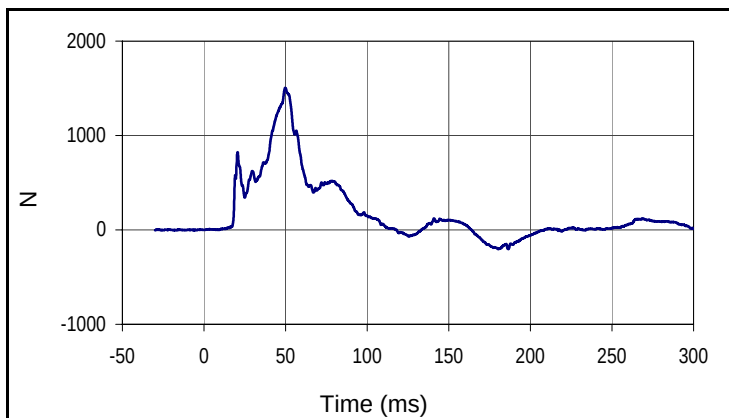
Curve Description		
Passenger Nij		
Units	Max	Time
Ntf	0.23	54.9
Units	Max	Time
Nte	0.37	93.2
Units	Max	Time
Ncf	0.17	67.1
Units	Max	Time
Nce	0.39	91.4

Test Vehicle: 2018 Audi Q5 2.0T Quattro 5-Door MPV
 Test Program: 56 km/h Frontal Impact NCAP Test

NHTSA No.: M20185800
 Test Date: 11/27/17



Curve Description			
Passenger Left Femur Force Z			
Plot No.		SAE Class	Units
029		600	N
Max	Time	Min	Time
1376.9	49.0	-169.0	184.0



Curve Description			
Passenger Right Femur Force Z			
Plot No.		SAE Class	Units
030		600	N
Max	Time	Min	Time
1504.1	49.8	-204.5	180.3

APPENDIX C
ATD CALIBRATION AND PERFORMANCE VERIFICATION DATA

APPENDIX C
PRE-TEST ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA



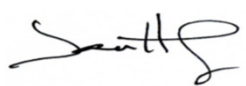
**Hybrid III 50th Percentile Male
ATD Damage Checklist**

ATD Serial No.: 360

Test Date: 2017-11-22

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: 

Approved By: 

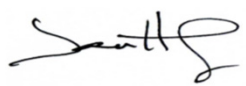


Hybrid III 50th Percentile Male
External Measurements

ATD Serial No.: 360

Test Date: 2017-11-26

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	29	Pass
A - Total sitting height	mm	879	889	886	Pass
B - Shoulder pivot height	mm	505	521	514	Pass
C - 'H' point height	mm	84	89	86	Pass
D - 'H' point location from backline	mm	135	140	138	Pass
E - Shoulder pivot from backline	mm	84	94	88	Pass
F - Thigh clearance	mm	140	155	153	Pass
G - Back of elbow to wrist pivot	mm	290	305	298	Pass
H - Head back to backline	mm	41	46	45	Pass
I - Shoulder to elbow length	mm	330	345	336	Pass
J - Elbow rest height	mm	190	211	204	Pass
K - Buttock to knee length	mm	579	604	596	Pass
L - Popliteal length	mm	429	455	444	Pass
M - Knee pivot height	mm	485	500	494	Pass
N - Buttock popliteal length	mm	452	477	470	Pass
O - Chest depth without jacket	mm	213	229	223	Pass
P - Foot length	mm	251	267	259	Pass
V - Shoulder breadth	mm	422	437	431	Pass
W - Foot breadth	mm	91	107	97	Pass
Y - Chest circum. (w/chest jacket)	mm	970	1001	977	Pass
Z - Waist circum.	mm	836	866	853	Pass
AA - Location for chest circum.	mm	429	434	430	Pass
BB - Location for waist circum.	mm	226	231	230	Pass
Overall Test Results				Pass	

Technician: 

Approved By: 



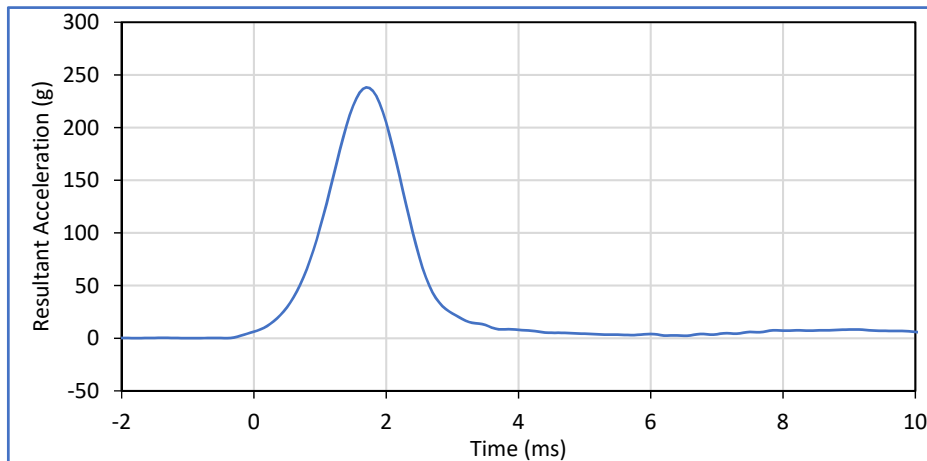
9270 Holly Road, Adelanto, CA 92301
Tel: +1 760 246 1672 Fax: +1 760 246 8112
Info@karco.com www.karco.com

Hybrid III 50th Percentile Male Head Drop

ATD Serial No.: 360

Test Date: 2017-11-22

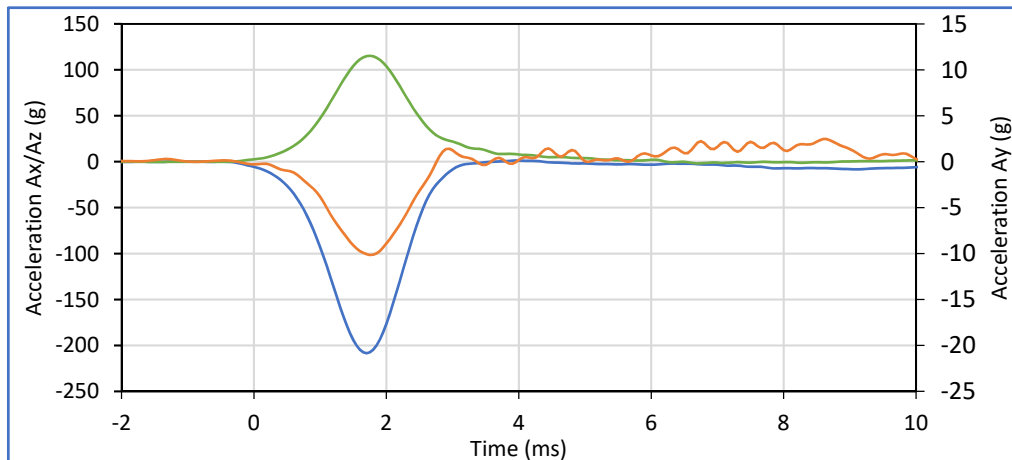
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	20.7	Pass
Laboratory Humidity	%	10	70	26	Pass
Peak Resultant Acceleration	g	225.0	275.0	238.2	Pass
Peak Lateral Acceleration	g	-15.0	15.0	-10.1	Pass
Oscillations After Main Pulse	%	0.0	10.0	3.5	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
			Overall Test Results	Pass	



Head Acceleration Resultant

Max:238.2@1.7 / Min:2.4@6.6

SAE Class 1000



Head Acceleration X

Max:1.2@4 / Min:-208.4@1.7

SAE Class 1000

Head Acceleration Y

Max:2.5@8.6 / Min:-10.1@1.8

SAE Class 1000

Head Acceleration Z

Max:115.4@1.8 / Min:-1.8@6.7

SAE Class 1000

Technician: Smith

Approved By: Wep

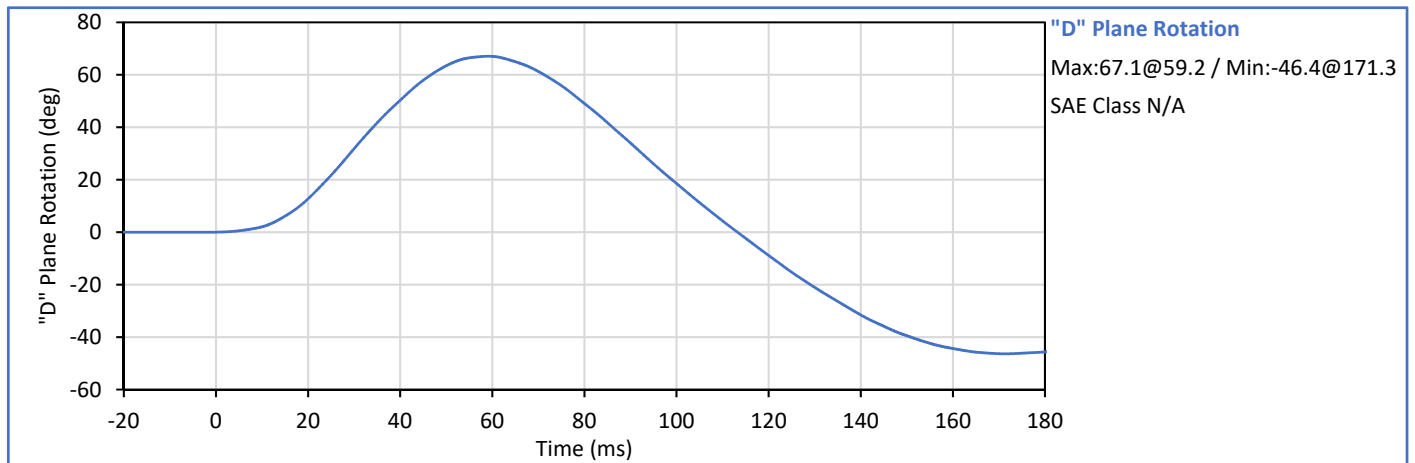
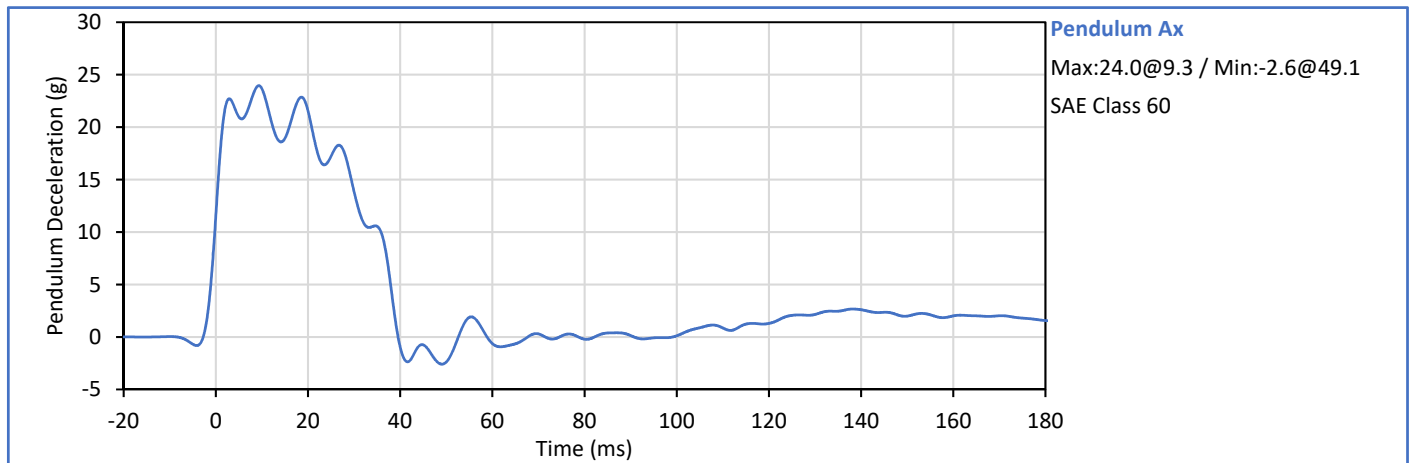


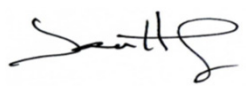
Hybrid III 50th Percentile Male
Neck Flexion Test

ATD Serial No.: 360

Test Date: 2017-11-22

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Humidity	%	10	70	26	Pass
Pendulum Velocity	m/s	6.89	7.13	7.00	Pass
Pendulum Deceleration at 10 ms	g	22.5	27.5	23.6	Pass
Pendulum Deceleration at 20 ms	g	17.6	22.6	21.5	Pass
Pendulum Deceleration at 30 ms	g	12.5	18.5	13.8	Pass
Peak Pendulum Decel. after 30 ms	g	0.0	29.0	13.8	Pass
Deceleration Decay to Cross 5 g	ms	34.0	42.0	38.0	Pass
"D" Plane Rotation peak	deg	64.0	78.0	67.1	Pass
	ms	57.0	64.0	59.2	Pass
"D" Plane Rotation Decay To Zero	ms	113.0	128.0	113.3	Pass
Moment About Occipital Condyle	Nm	88.1	108.5	93.6	Pass
	ms	47.0	58.0	54.1	Pass
Moment Decay, Peak to Zero	deg	97.0	107.0	98.9	Pass
Overall Test Results					Pass



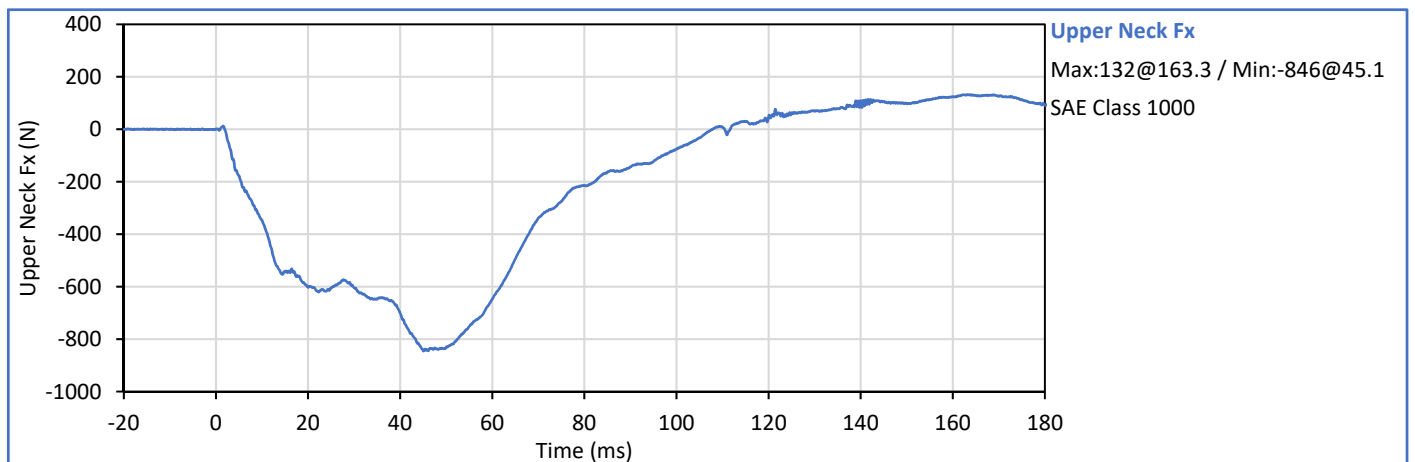
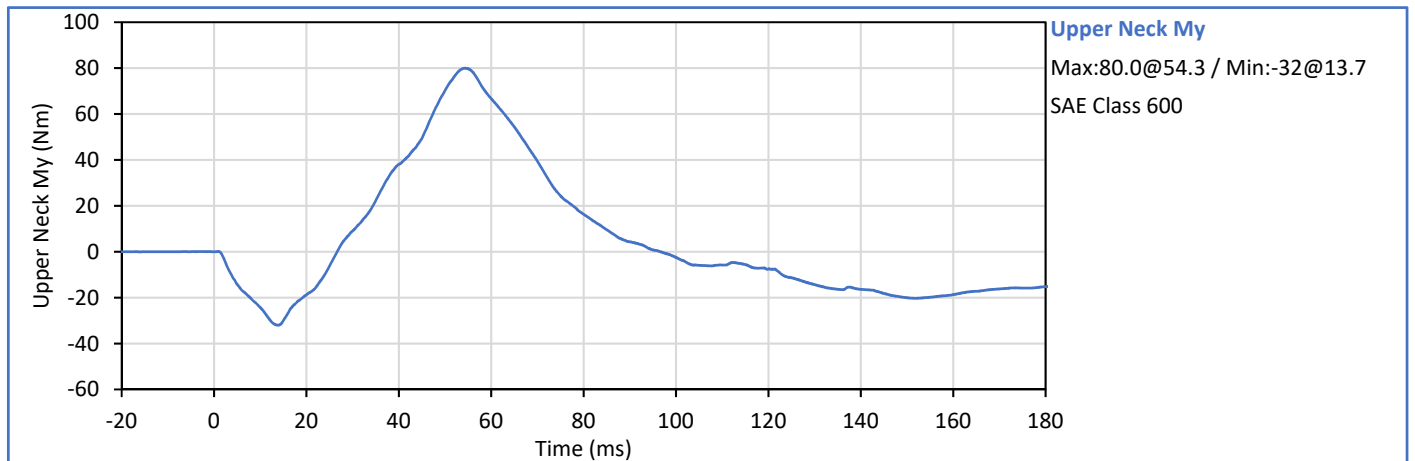
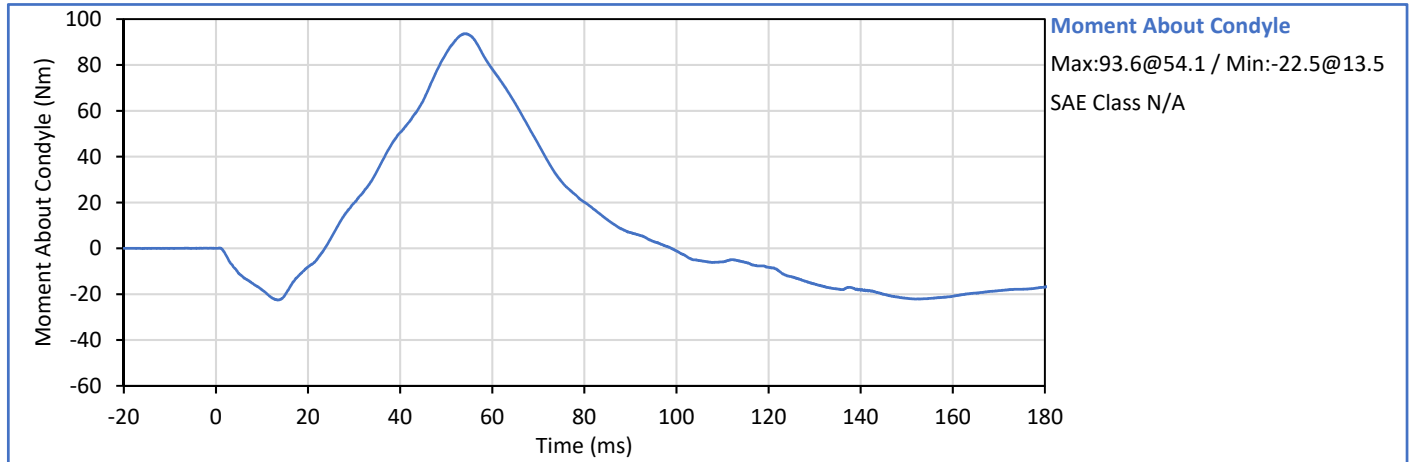
Technician: 

Approved By: 



ATD Serial No.: 360

Test Date: 2017-11-22



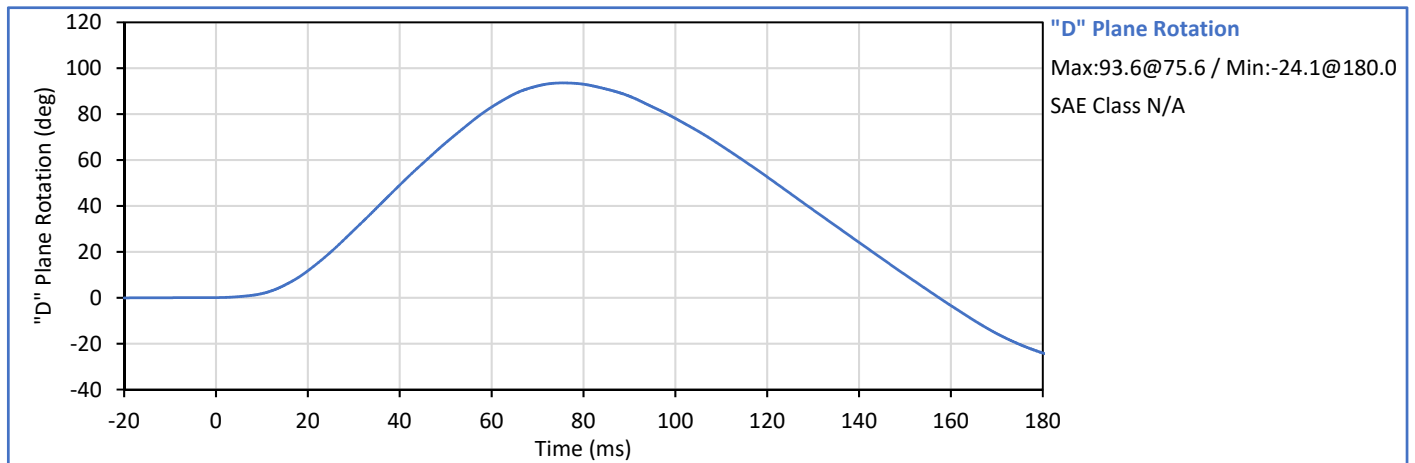
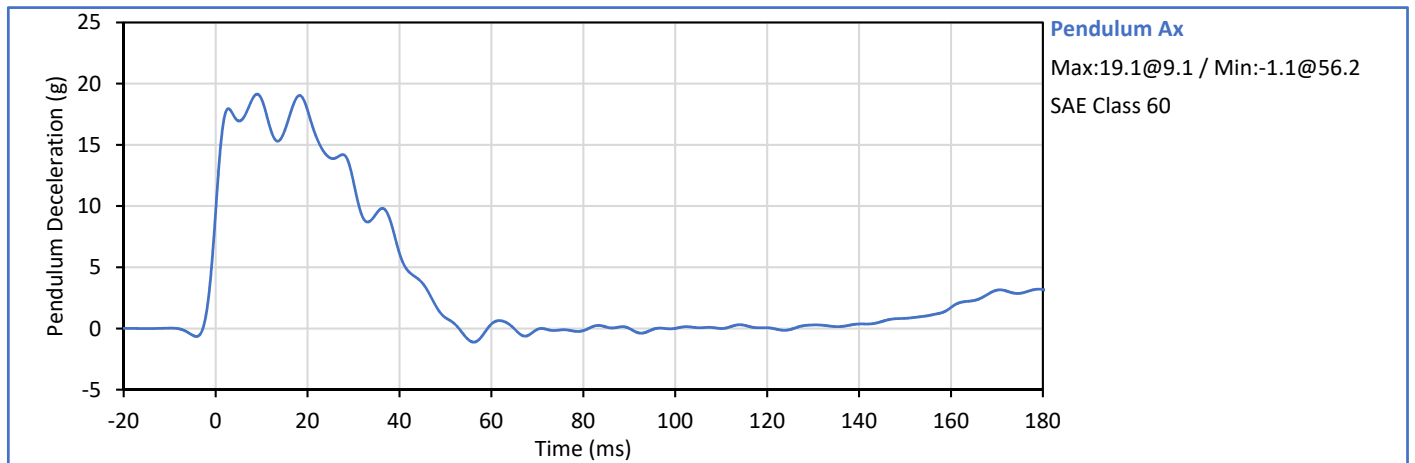


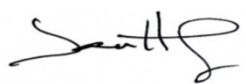
Hybrid III 50th Percentile Male
Neck Extension Test

ATD Serial No.: 360

Test Date: 2017-11-15

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.6	Pass
Laboratory Humidity	%	10	70	35	Pass
Pendulum Velocity	m/s	5.94	6.19	6.04	Pass
Pendulum Deceleration at 10 ms	g	17.2	21.2	18.7	Pass
Pendulum Deceleration at 20 ms	g	14.0	19.0	17.8	Pass
Pendulum Deceleration at 30 ms	g	11.0	16.0	12.0	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	41.5	Pass
"D" Plane Rotation peak	deg	81.0	106.0	93.6	Pass
	ms	72.0	82.0	75.6	Pass
"D" Plane Rotation Decay To Zero	ms	147.0	174.0	157.5	Pass
Moment About Occipital Condyle	Nm	-79.9	-52.9	-61.3	Pass
	ms	65.0	79.0	67.2	Pass
Moment Decay, Peak to Zero	deg	120.0	148.0	138.7	Pass
Overall Test Results					Pass



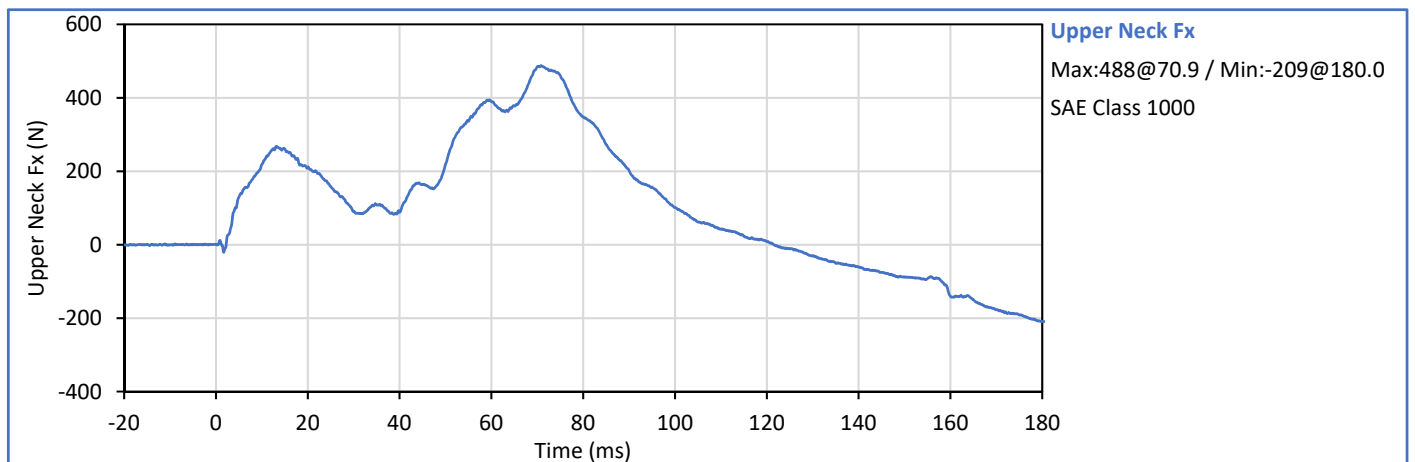
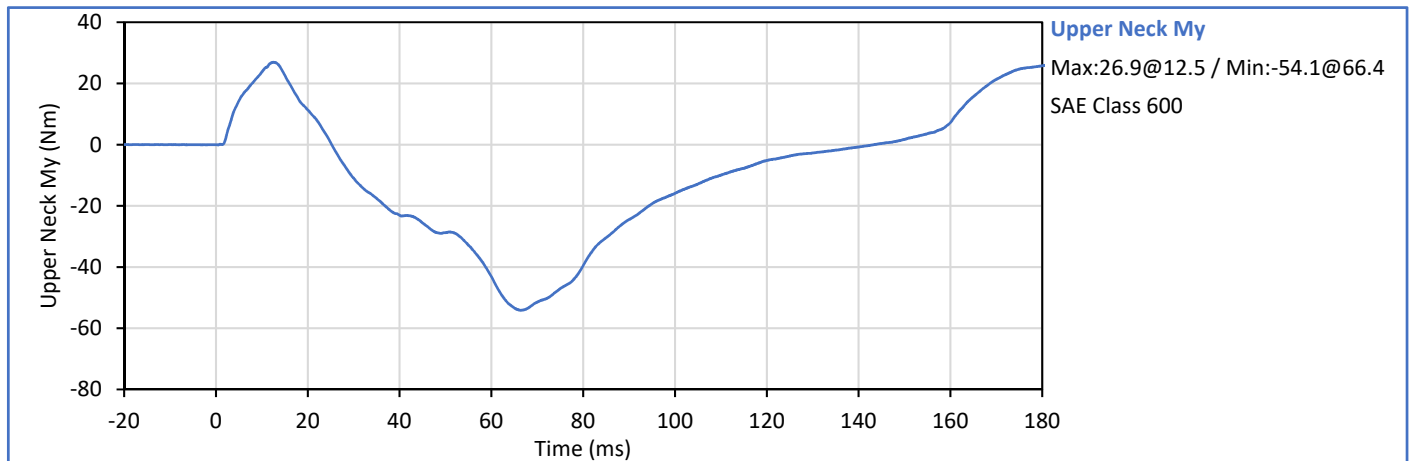
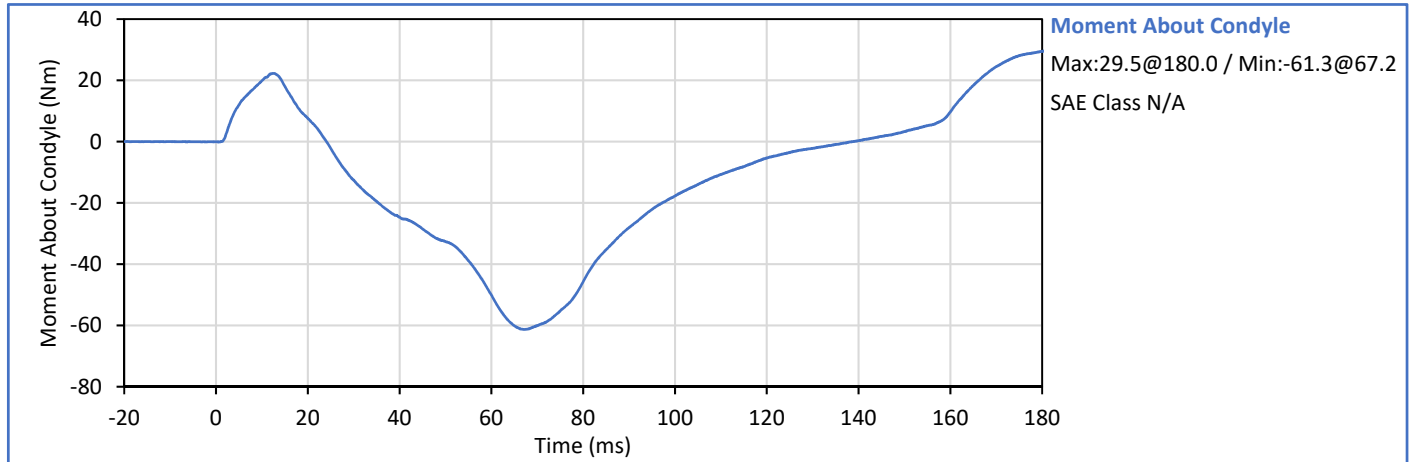
Technician: 

Approved By: 



ATD Serial No.: 360

Test Date: 2017-11-15





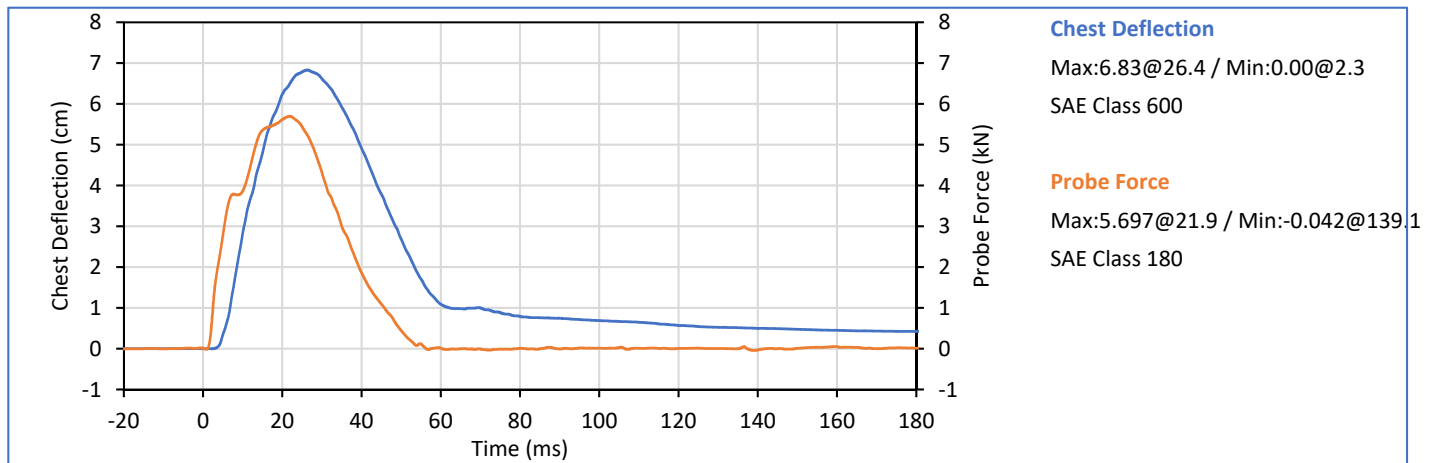
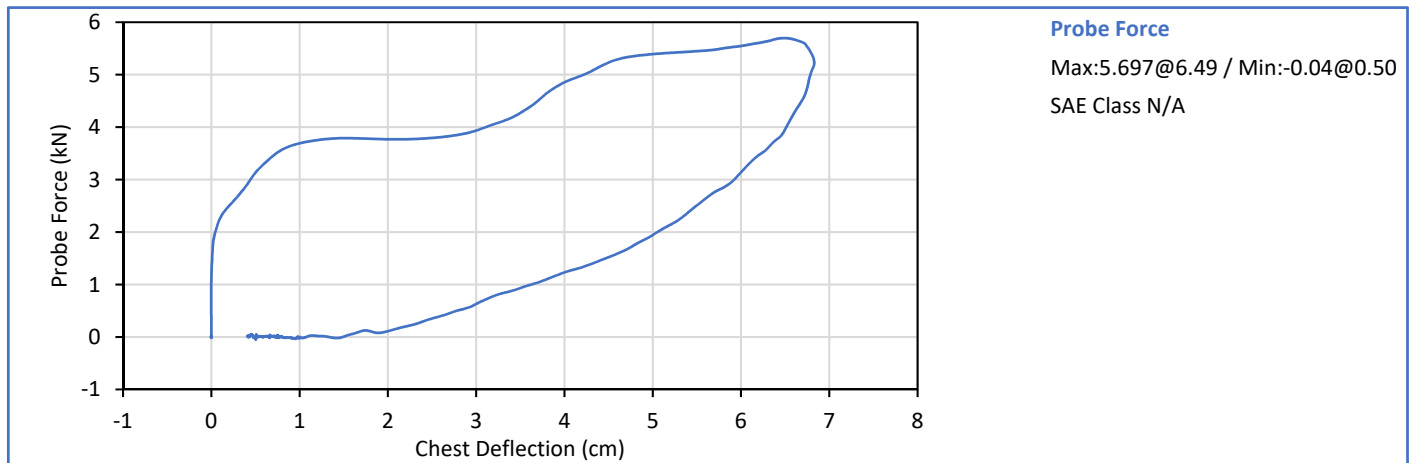
9270 Holly Road, Adelanto, CA 92301
 Tel: +1 760 246 1672 Fax: +1 760 246 8112
 Info@karco.com www.karco.com

Hybrid III 50th Percentile Male Thorax Impact

ATD Serial No.: 360

Test Date: 2017-11-25

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.9	Pass
Laboratory Humidity	%	10	70	22	Pass
Probe Velocity	m/s	6.58	6.82	6.75	Pass
Peak Chest Deflection	cm	6.35	7.26	6.83	Pass
Peak Probe Force	kN	5.159	5.893	5.697	Pass
Internal Hysteresis	%	69.0	85.0	71.4	Pass
Overall Test Results					Pass



Technician: *Smith*

Approved By: *Wep*



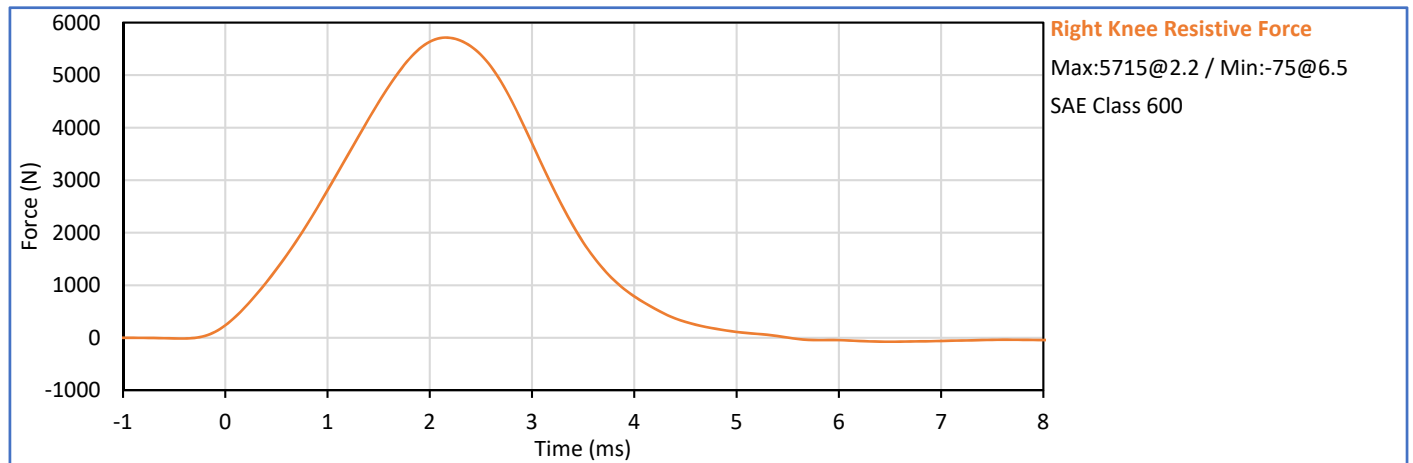
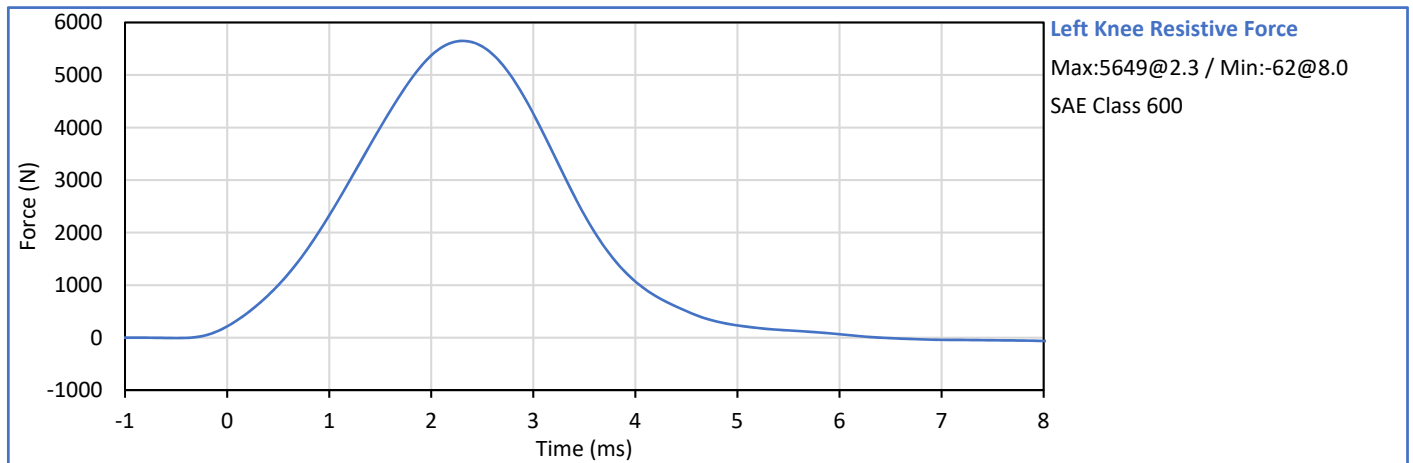
9270 Holly Road, Adelanto, CA 92301
Tel: +1 760 246 1672 Fax: +1 760 246 8112
Info@karco.com www.karco.com

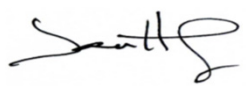
Hybrid III 50th Percentile Male Knee Impact (Left/Right)

ATD Serial No.: 360

Test Date: 2017-11-22

Tested Parameter		Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature		°C	18.9	25.6	21.1	Pass
Laboratory Humidity		%	10	70	26	Pass
Left Knee	Probe Velocity	m/s	2.070	2.130	2.086	Pass
	Peak Resistive Force	N	4715	5782	5649	Pass
Right Knee	Probe Velocity	m/s	2.070	2.130	2.081	Pass
	Peak Resistive Force	N	4715	5782	5715	Pass
Overall Test Results						Pass



Technician: 

Approved By: 

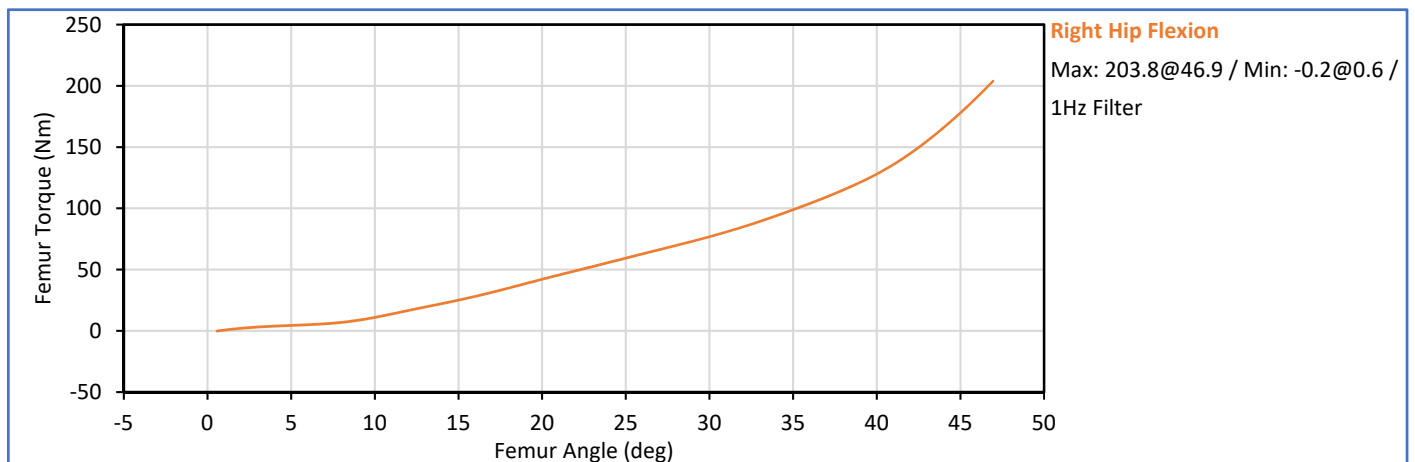
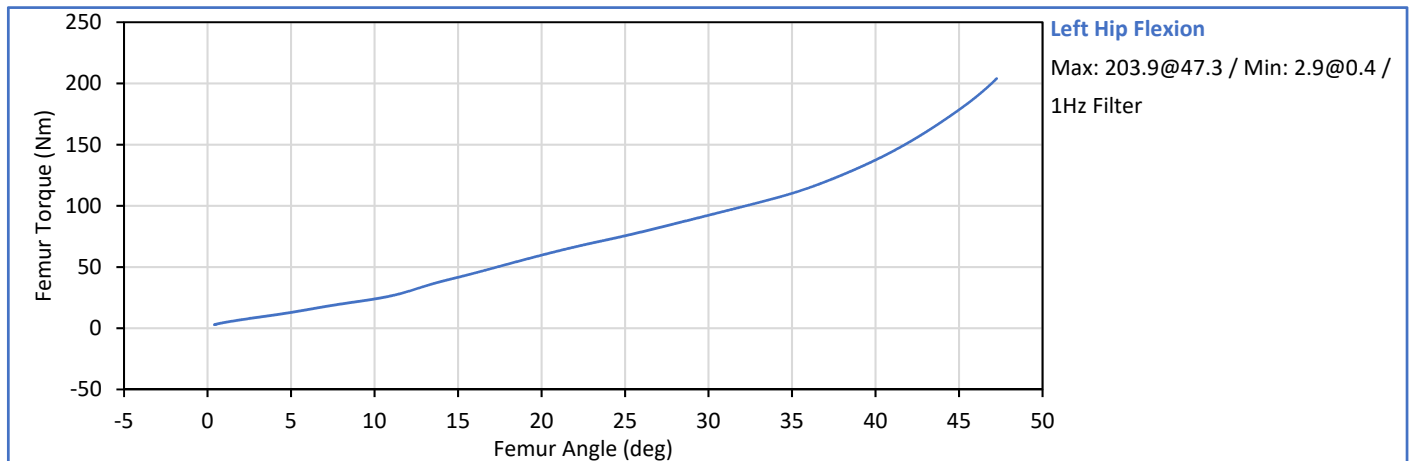


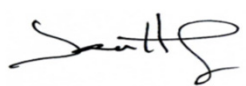
Hybrid III 50th Percentile Male
Hip Flexion (Left/Right)

ATD Serial No.: 360

Test Date: 2017-11-26

	Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
	Laboratory Temperature	°C	18.9	25.6	21.1	Pass
	Laboratory Humidity	%	10	70	27	Pass
Left Hip	Left Hip Rotation Rate	deg/s	5.0	10.0	8.3	Pass
	Left Femur Torque at 30°	Nm	0.0	95.0	92.3	Pass
	Left Hip Rotation at 203 Nm	deg	40.0	50.0	47.2	Pass
Right Hip	Right Hip Rotation Rate	deg/s	5.0	10.0	8.4	Pass
	Right Femur Torque at 30°	Nm	0.0	95.0	76.9	Pass
	Right Hip Rotation at 203 Nm	deg	40.0	50.0	46.9	Pass
Overall Test Results						Pass



Technician: 

Approved By: 



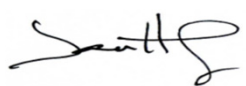
**Hybrid III 5th Percentile Female
ATD Damage Checklist**

ATD Serial No.: 141

Test Date: 2017-11-21

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	Redundant Femur Cable LEMO	✗	
	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: 

Approved By: 

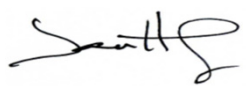


**Hybrid III 5th Percentile Female
External Measurements**

ATD Serial No.: 141

Test Date: 2017-11-25

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.3	Pass
Laboratory Relative Humidity	%	10	70	33	Pass
A - Total sitting height	mm	775	800	785	Pass
B - Shoulder pivot height	mm	432	457	442	Pass
C - 'H' point height	mm	81	86	85	Pass
D - 'H' point location from backline	mm	145	150	147	Pass
E - Shoulder pivot from backline	mm	69	84	77	Pass
F - Thigh clearance	mm	119	135	127	Pass
G - Back of elbow to wrist pivot	mm	244	259	253	Pass
H - Head back to backline	mm	41	46	43	Pass
I - Shoulder to elbow length	mm	277	297	282	Pass
J - Elbow rest height	mm	183	203	199	Pass
K - Buttock to knee length	mm	521	546	529	Pass
L - Popliteal length	mm	356	376	369	Pass
M - Knee pivot height	mm	394	419	402	Pass
N - Buttock popliteal length	mm	414	439	425	Pass
O - Chest depth without jacket	mm	175	191	182	Pass
P - Foot length	mm	219	234	227	Pass
R - Buttock to Knee Pivot Length	mm	457	483	475	Pass
S - Head Breadth	mm	137	147	142	Pass
T - Head Depth	mm	178	188	182	Pass
U - Hip Breadth	mm	300	315	303	Pass
V - Shoulder breadth	mm	351	366	361	Pass
W - Foot breadth	mm	79	94	88	Pass
X - Head circum.	mm	528	549	542	Pass
Y - Chest circum. (w/chest jacket)	mm	851	881	869	Pass
Z - Waist circum.	mm	760	790	764	Pass
AA - Location for chest circum.	mm	300	310	304	Pass
BB - Location for waist circum.	mm	160	170	164	Pass
			Overall Test Results		Pass

Technician: 

Approved By: 

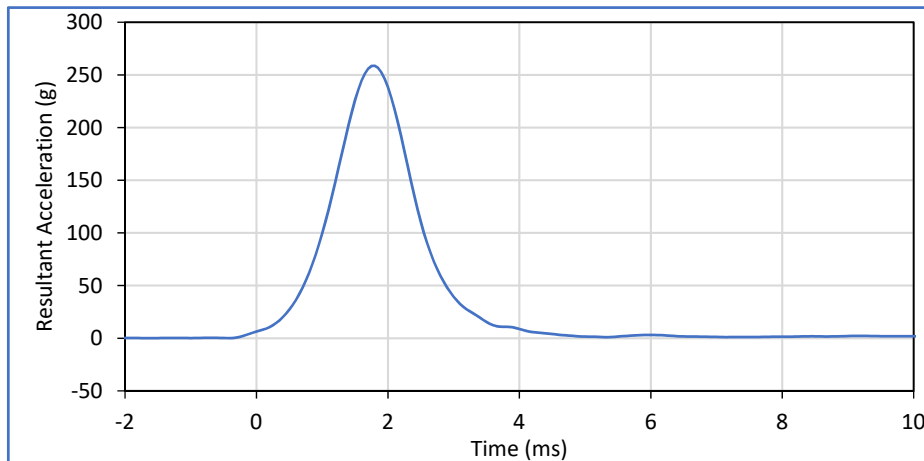


Hybrid III 5th Percentile Female Head Drop

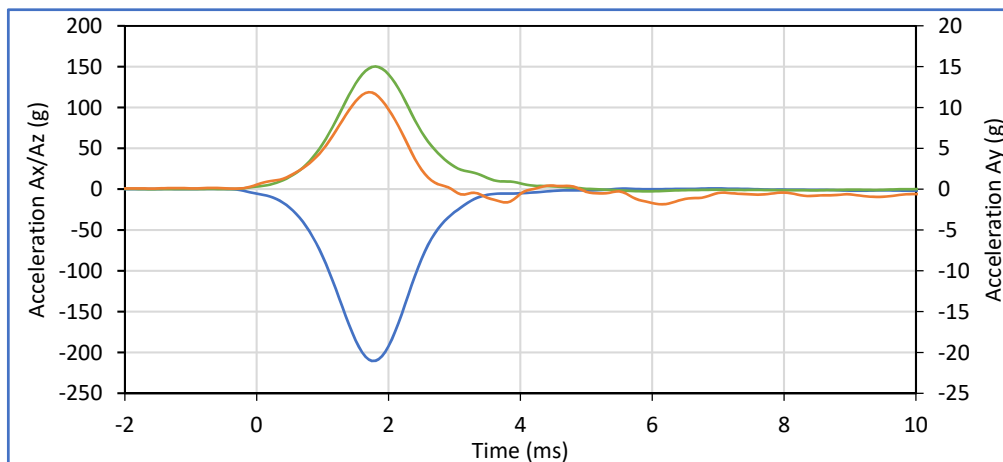
ATD Serial No.: 141

Test Date: 2017-11-21

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.7	Pass
Laboratory Humidity	%	10	70	35	Pass
Peak Resultant Acceleration	g	250.0	300.0	258.7	Pass
Peak Lateral Acceleration	g	-15.0	15.0	11.9	Pass
Oscillations After Main Pulse	%	0.0	10.0	1.2	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
			Overall Test Results	Pass	



Head Acceleration Resultant
Max:258.7@1.8 / Min:1.0@5.4
SAE Class 1000



Head Ax
Max:0.9@7 / Min:-210.3@1.8
SAE Class 1000

Head Ay
Max:11.9@1.7 / Min:-1.9@6.2
SAE Class 1000

Head Az
Max:150.3@1.8 / Min:-2.7@5.9
SAE Class 1000

Technician: Smith

Approved By: Wep

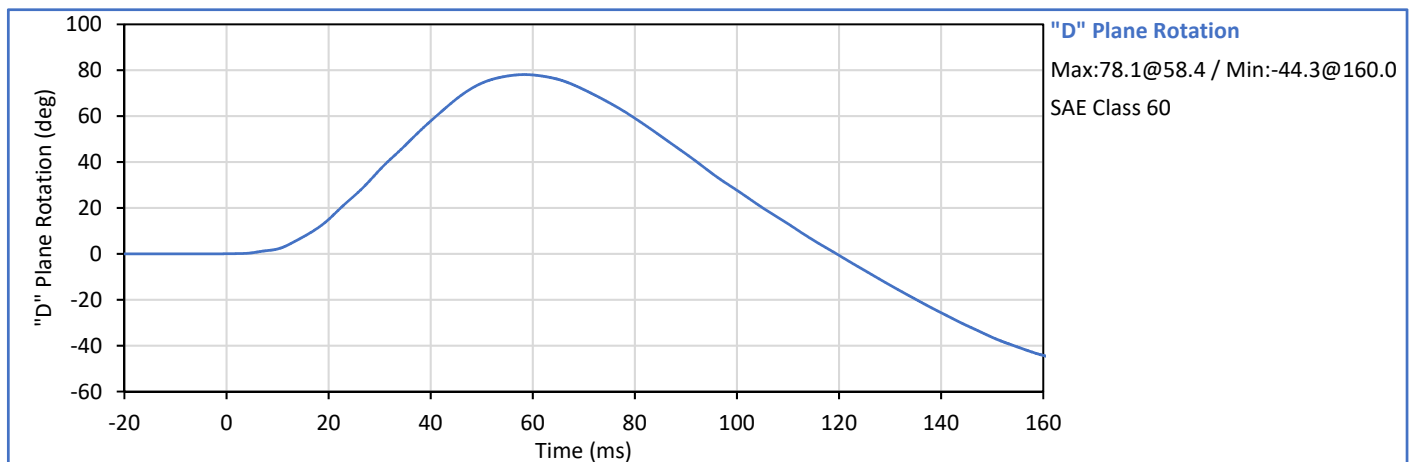
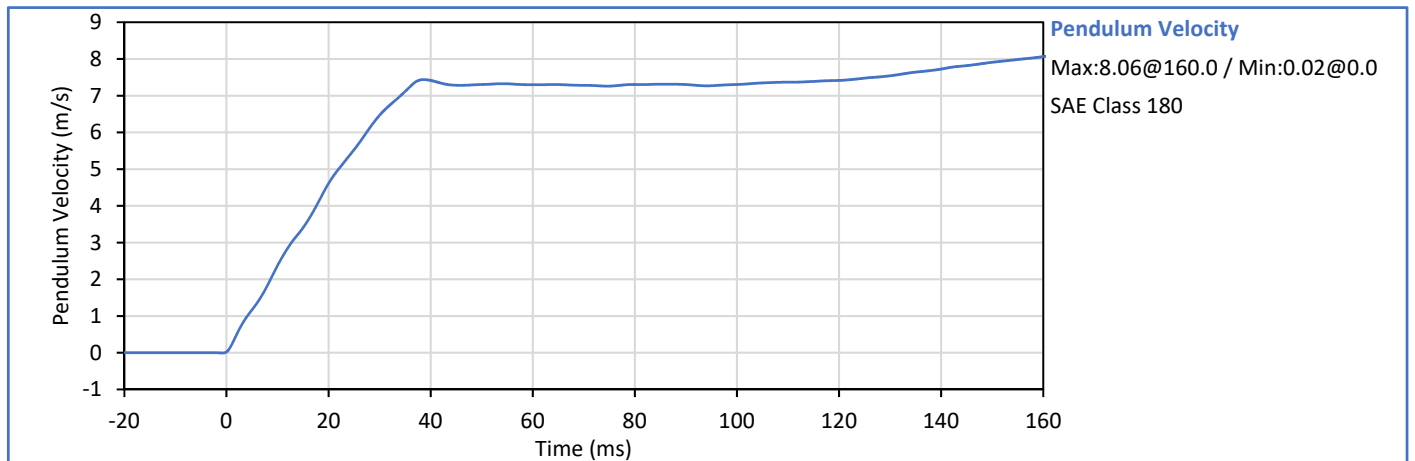


**Hybrid III 5th Percentile Female
Neck Flexion Test**

ATD Serial No.: 141

Test Date: 2017-11-21

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.8	Pass
Laboratory Humidity	%	10	70	34	Pass
Pendulum Velocity	m/s	6.89	7.13	7.12	Pass
Pendulum Velocity at 10 ms	m/s	2.10	2.50	2.37	Pass
Pendulum Velocity at 20 ms	m/s	4.00	5.00	4.61	Pass
Pendulum Velocity at 30 ms	m/s	5.80	7.00	6.47	Pass
Peak "D" Plane Rotation	deg	77.0	91.0	78.1	Pass
Peak Moment in Rotation	Nm	69.0	83.0	76.9	Pass
Positive Moment Decay to 10 Nm	ms	80.0	100.0	84.9	Pass
Overall Test Results					Pass



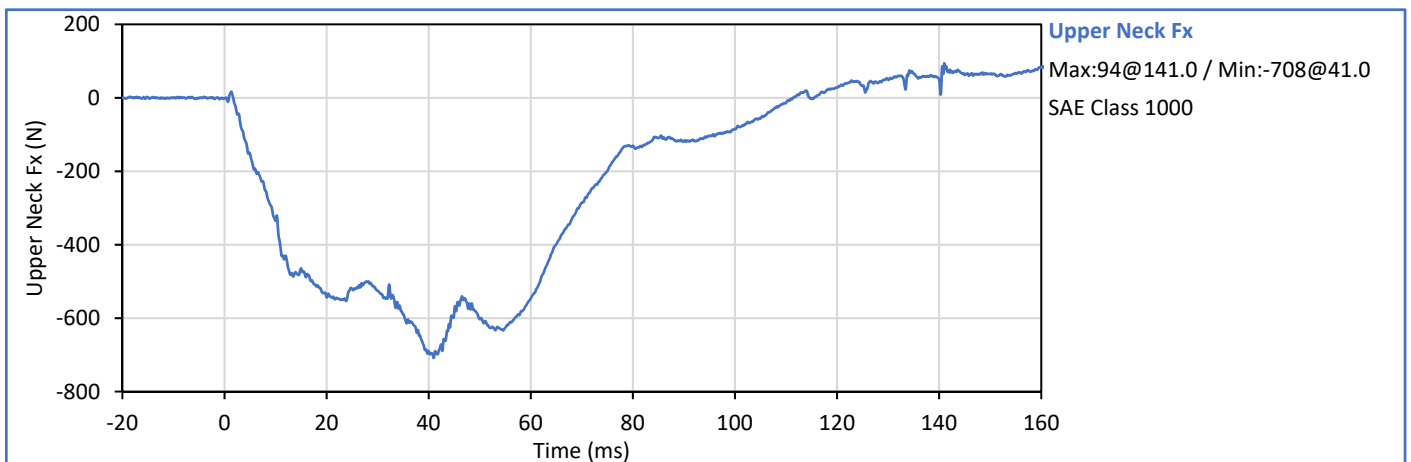
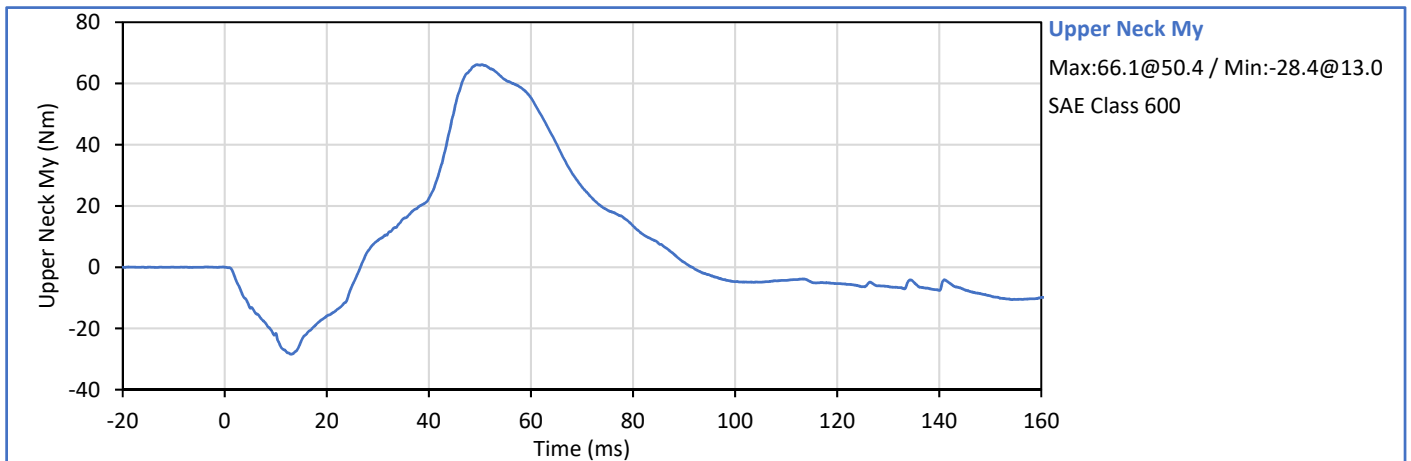
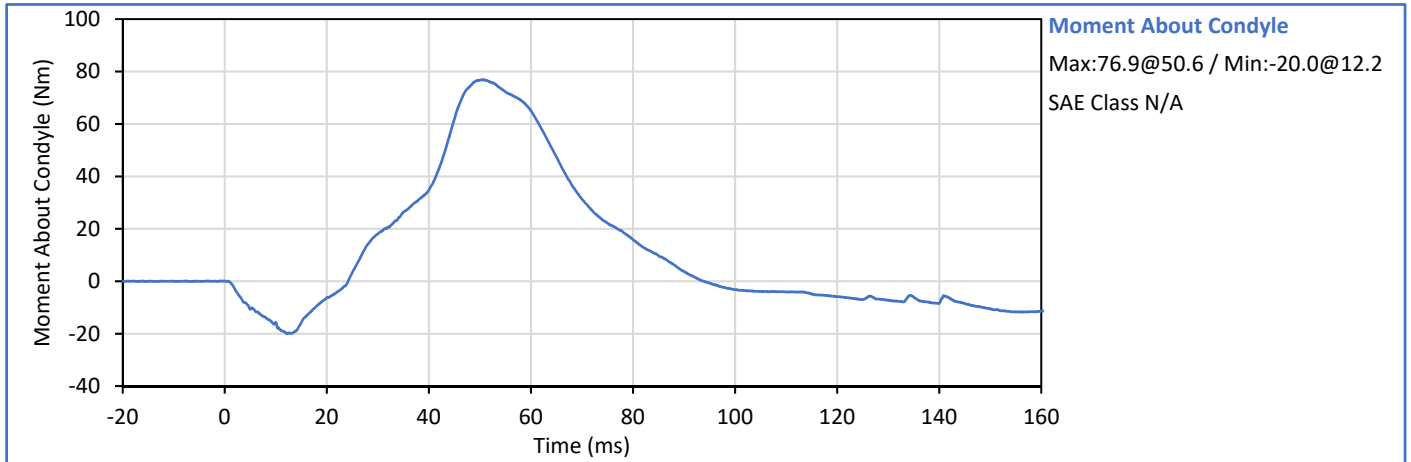
Technician: Smith

Approved By: Wep



ATD Serial No.: 141

Test Date: 2017-11-21



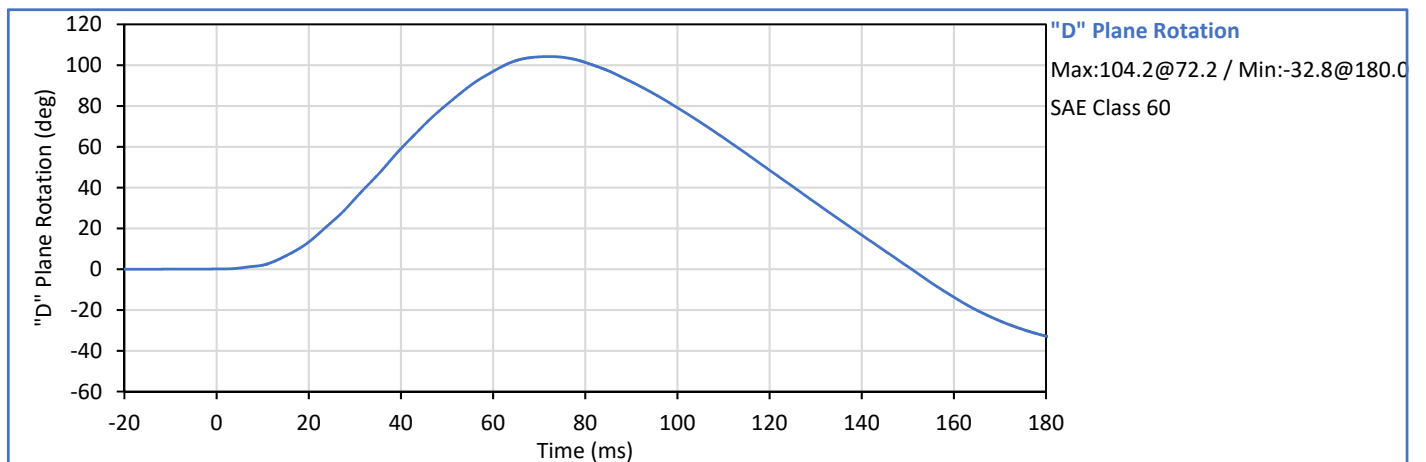
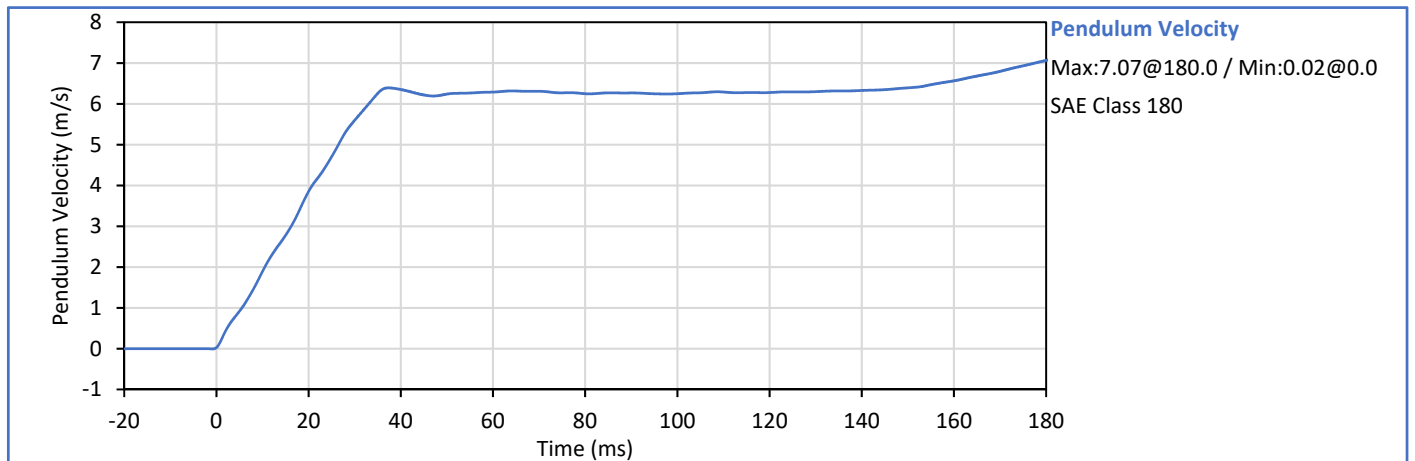


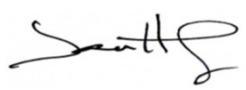
Hybrid III 5th Percentile Female
Neck Extension Test

ATD Serial No.: 141

Test Date: 2017-11-21

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.7	Pass
Laboratory Humidity	%	10	70	28	Pass
Pendulum Velocity	m/s	5.95	6.19	6.11	Pass
Pendulum Velocity at 10 ms	m/s	1.50	1.90	1.89	Pass
Pendulum Velocity at 20 ms	m/s	3.10	3.90	3.85	Pass
Pendulum Velocity at 30 ms	m/s	4.60	5.60	5.60	Pass
Peak "D" Plane Rotation	deg	99.0	114.0	104.2	Pass
Peak Moment in Rotation	Nm	-65.0	-53.0	-56.1	Pass
Negative Moment Decay to -10 Nm	ms	94.0	114.0	99.1	Pass
Overall Test Results					Pass



Technician: 

Approved By: 

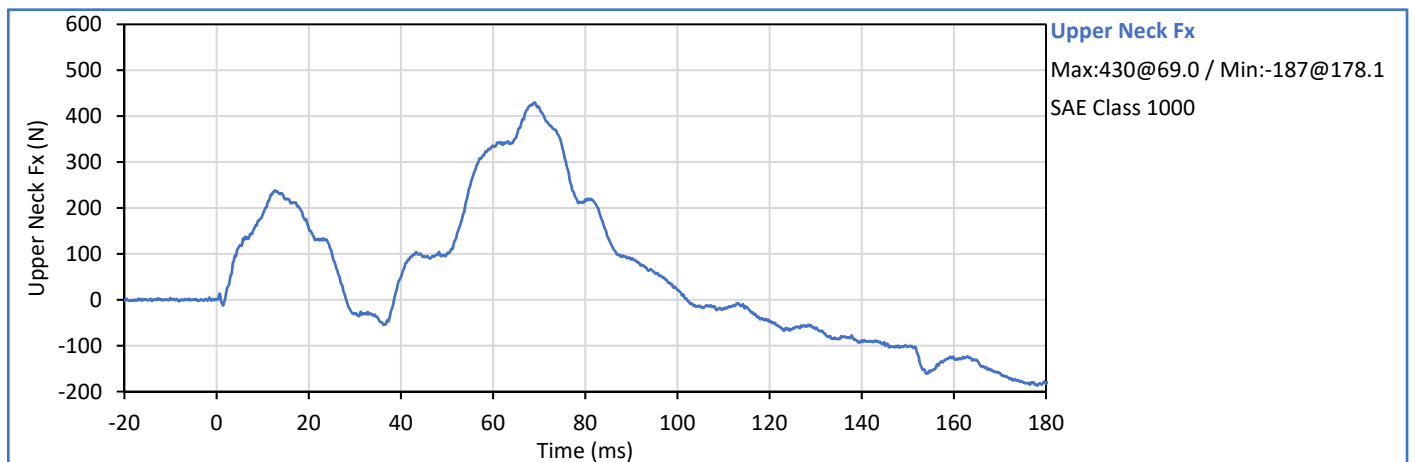
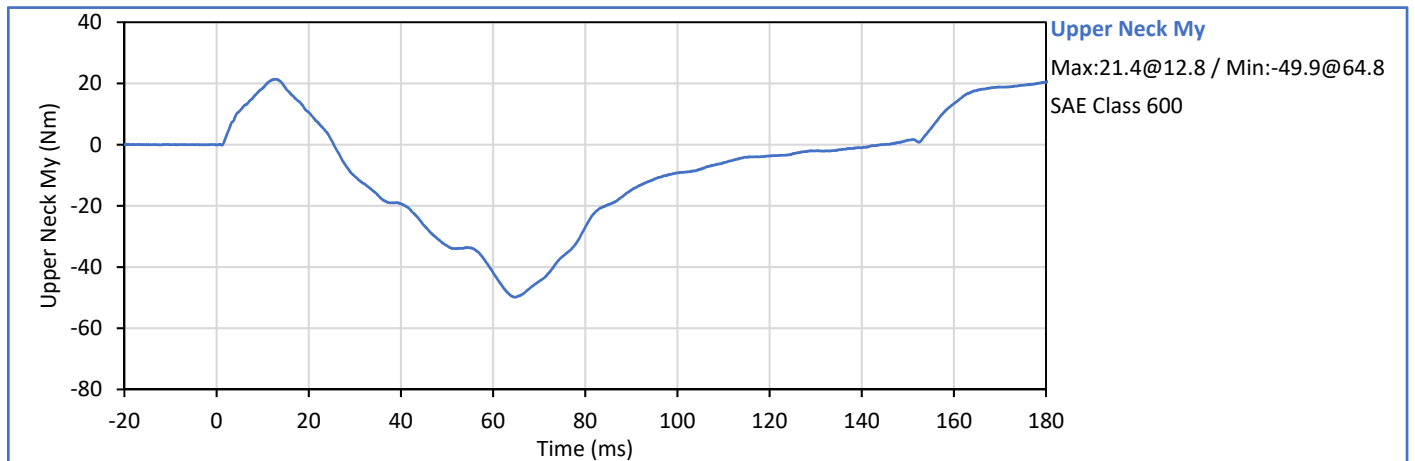
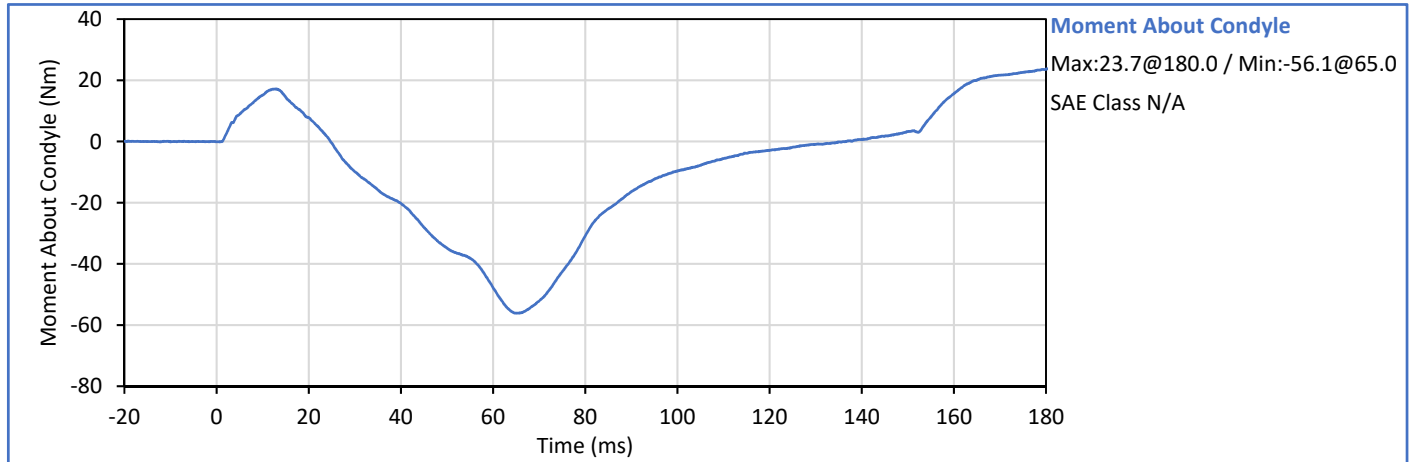


9270 Holly Road, Adelanto, CA 92301
Tel: +1 760 246 1672 Fax: +1 760 246 8112
Info@karco.com www.karco.com

Hybrid III 5th Percentile Female Neck Extension Test

ATD Serial No.: 141

Test Date: 2017-11-21



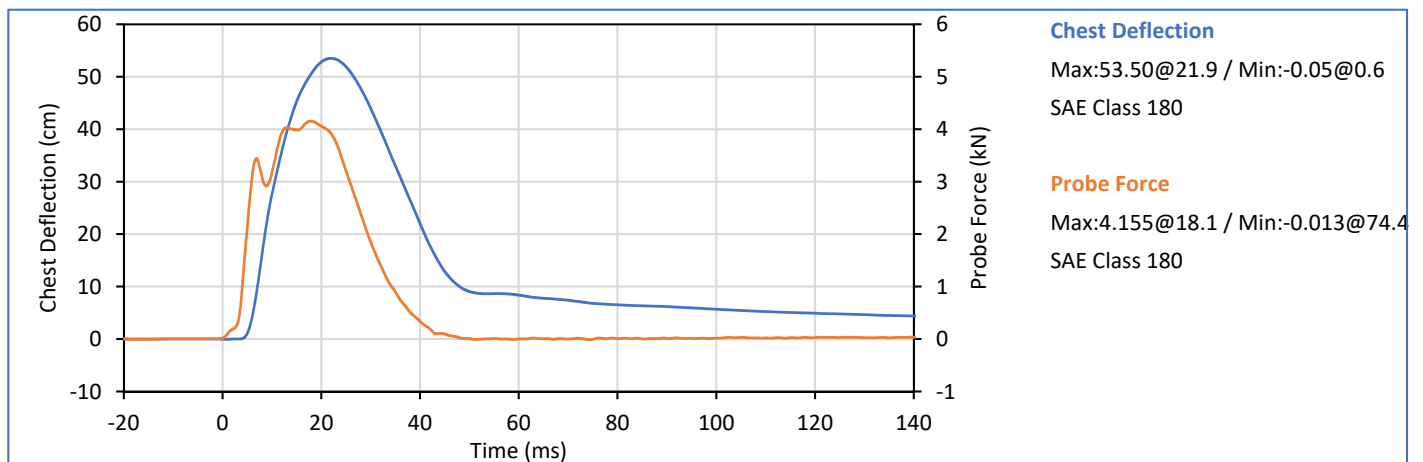
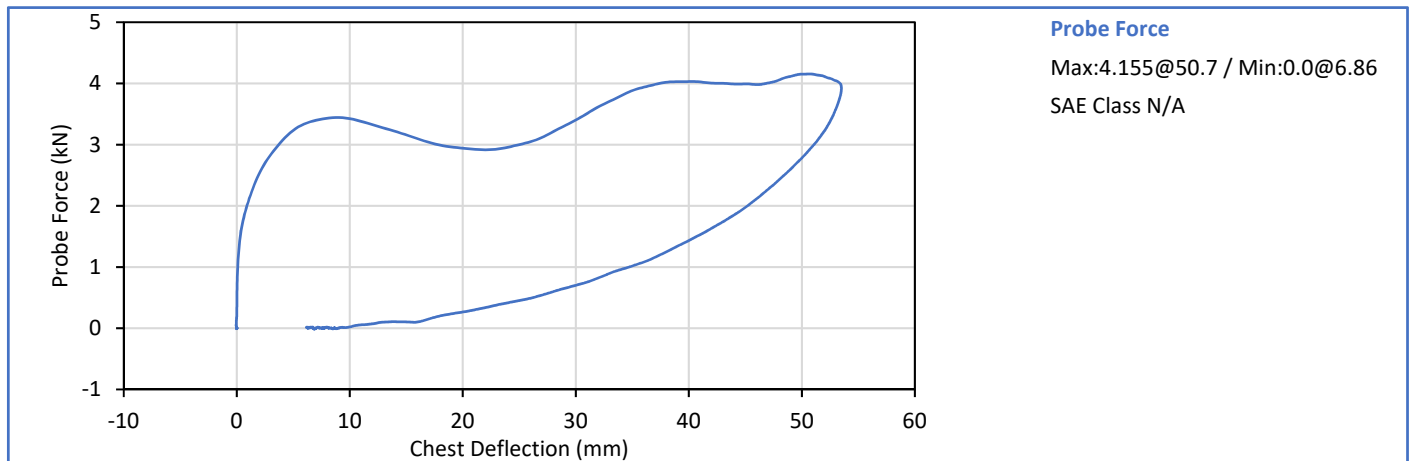


Hybrid III 5th Percentile Female
Thorax Impact

ATD Serial No.: 141

Test Date: 2017-11-25

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.0	Pass
Laboratory Humidity	%	10	70	21	Pass
Probe Velocity	m/s	6.59	6.83	6.69	Pass
Peak Chest Deflection	mm	50.0	58.0	53.5	Pass
Peak Probe Force, 50 and 58 mm	kN	3.900	4.400	4.155	Pass
Peak Probe Force, 18 and 50 mm	kN	0.000	4.600	4.151	Pass
Internal Hysteresis	%	69.0	85.0	74.2	Pass
Overall Test Results				Pass	Pass



Technician: Smith

Approved By: Wep



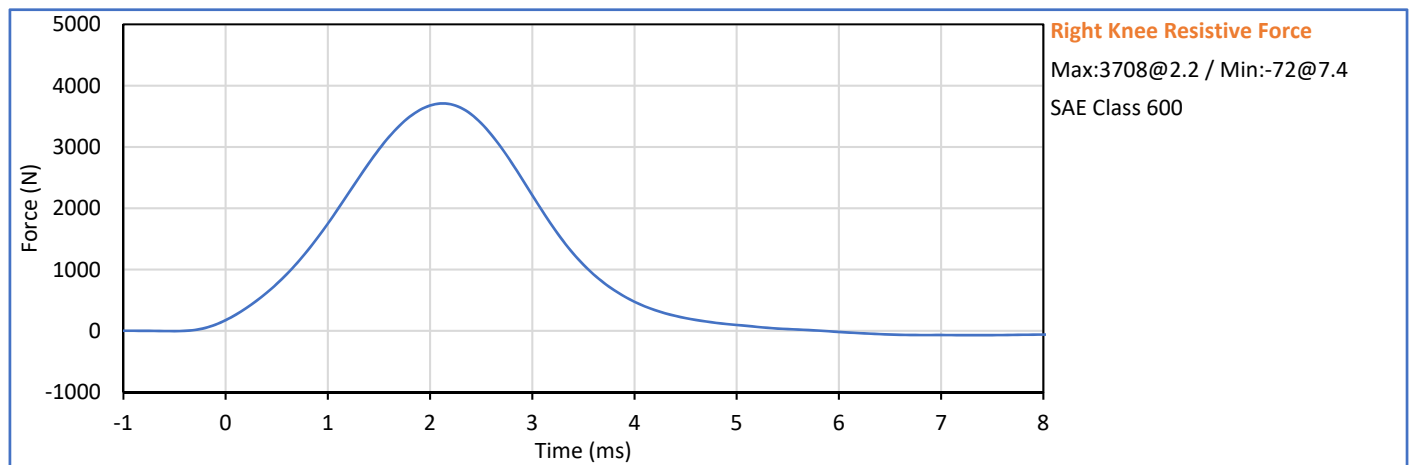
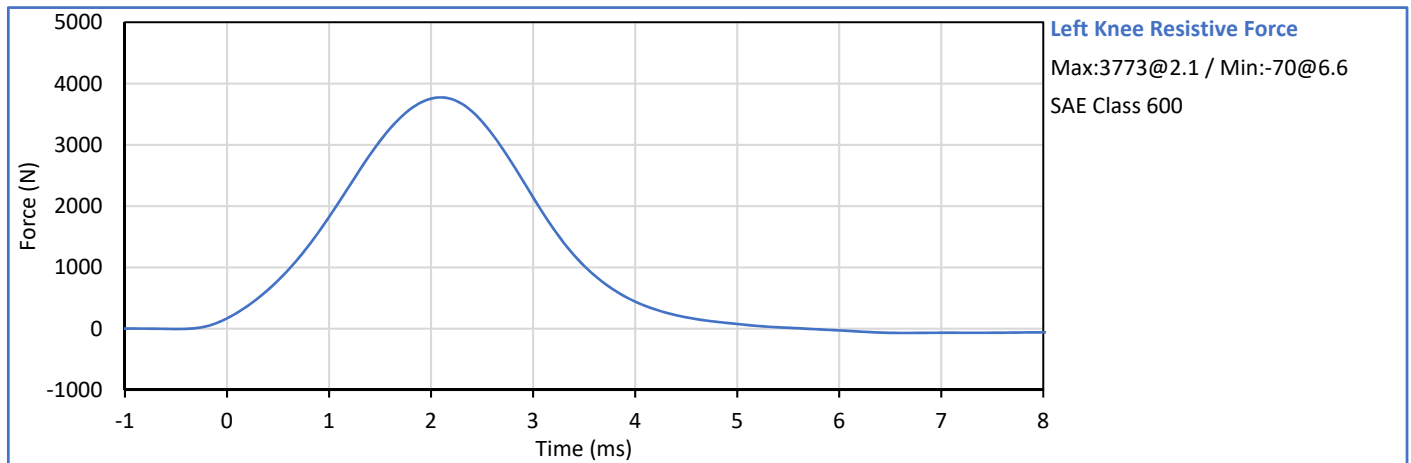
9270 Holly Road, Adelanto, CA 92301
Tel: +1 760 246 1672 Fax: +1 760 246 8112
Info@karco.com www.karco.com

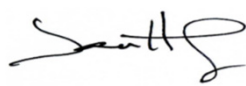
Hybrid III 5th Percentile Female Knee Impact (Left/Right)

ATD Serial No.: 141

Test Date: 2017-11-25

Tested Parameter		Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature		°C	18.9	25.6	21.2	Pass
Laboratory Humidity		%	10	70	26	Pass
Left Knee	Probe Velocity	m/s	2.070	2.130	2.120	Pass
	Peak Resistive Force	N	3450	4060	3773	Pass
Right Knee	Probe Velocity	m/s	2.070	2.130	2.114	Pass
	Peak Resistive Force	N	3450	4060	3708	Pass
Overall Test Results						Pass



Technician: 

Approved By: 

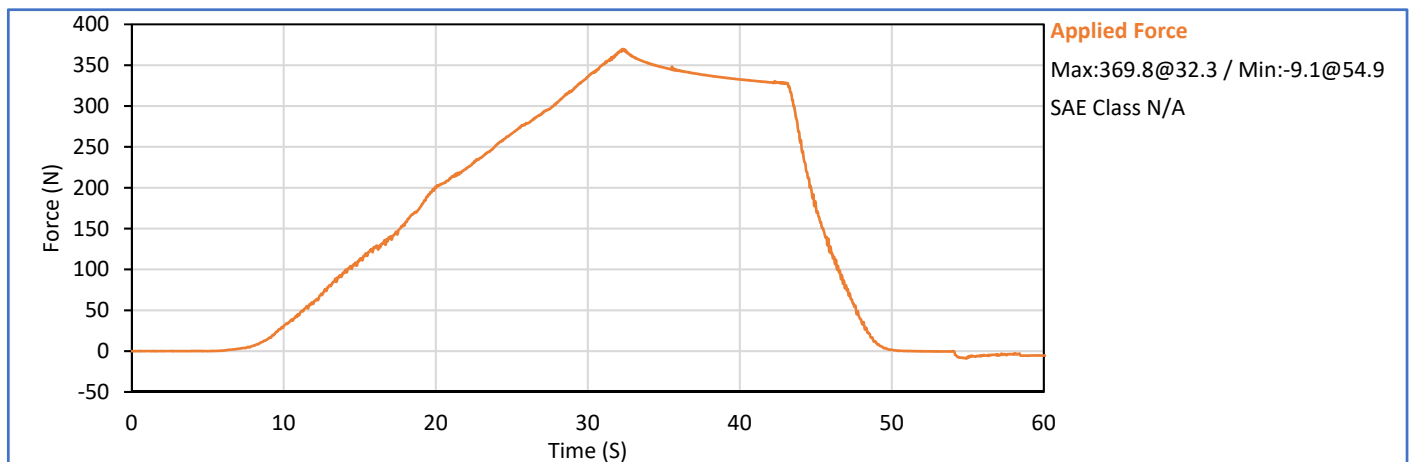
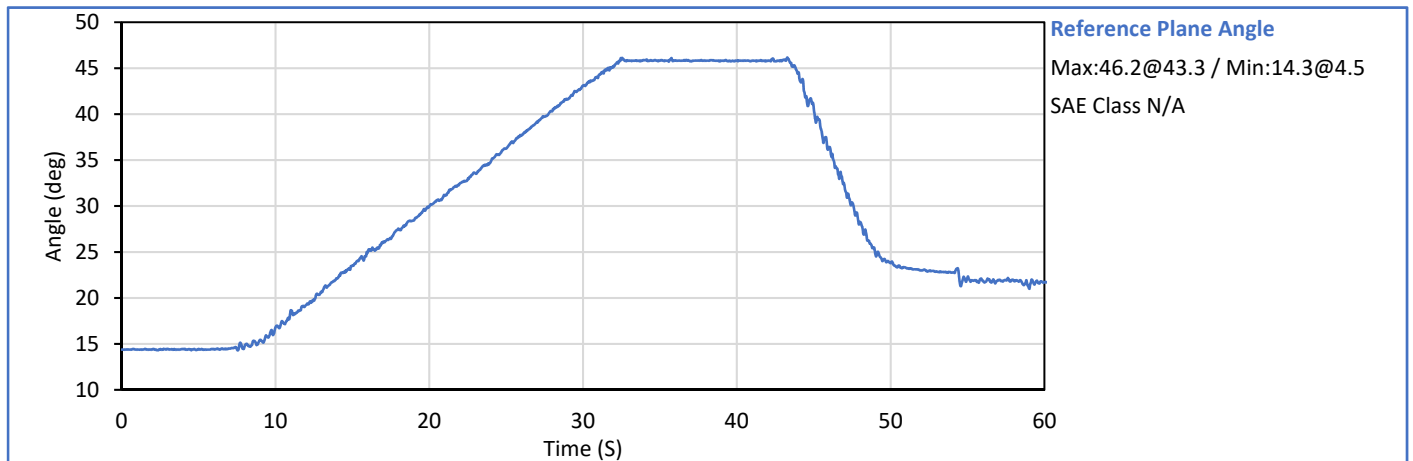


**Hybrid III 5th Percentile Female
Torso Flexion Test**

ATD Serial No.: 141

Test Date: 2017-11-25

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.3	Pass
Laboratory Humidity	%	10	70	23	Pass
Orientation Angle	deg	0.0	20.0	13.8	Pass
Test Initial Angle	deg	11.0	19.0	14.4	Pass
Peak Force at 45° (+/-0.5°)	N	320.0	390.0	355.5	Pass
Torso Flexion Rate	deg/s	0.50	1.50	1.32	Pass
Final Reference Plane Angle	deg	-8.0	8.0	6.9	Pass
Overall Test Results				Pass	Pass



Technician: Smith

Approved By: Wep

APPENDIX C
POST-TEST ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA



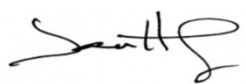
**Hybrid III 50th Percentile Male
ATD Damage Checklist**

ATD Serial No.: 360

Test Date: 2017-12-01

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: 

Approved By: 

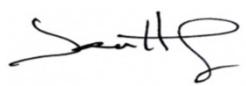


Hybrid III 50th Percentile Male
External Measurements

ATD Serial No.: 360

Test Date: 2017-12-01

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	29	Pass
A - Total sitting height	mm	879	889	883	Pass
B - Shoulder pivot height	mm	505	521	512	Pass
C - 'H' point height	mm	84	89	87	Pass
D - 'H' point location from backline	mm	135	140	140	Pass
E - Shoulder pivot from backline	mm	84	94	90	Pass
F - Thigh clearance	mm	140	155	152	Pass
G - Back of elbow to wrist pivot	mm	290	305	298	Pass
H - Head back to backline	mm	41	46	46	Pass
I - Shoulder to elbow length	mm	330	345	341	Pass
J - Elbow rest height	mm	190	211	202	Pass
K - Buttock to knee length	mm	579	604	589	Pass
L - Popliteal length	mm	429	455	435	Pass
M - Knee pivot height	mm	485	500	496	Pass
N - Buttock popliteal length	mm	452	477	472	Pass
O - Chest depth without jacket	mm	213	229	223	Pass
P - Foot length	mm	251	267	262	Pass
V - Shoulder breadth	mm	422	437	433	Pass
W - Foot breadth	mm	91	107	101	Pass
Y - Chest circum. (w/chest jacket)	mm	970	1001	981	Pass
Z - Waist circum.	mm	836	866	849	Pass
AA - Location for chest circum.	mm	429	434	432	Pass
BB - Location for waist circum.	mm	226	231	230	Pass
Overall Test Results				Pass	

Technician: 

Approved By: 

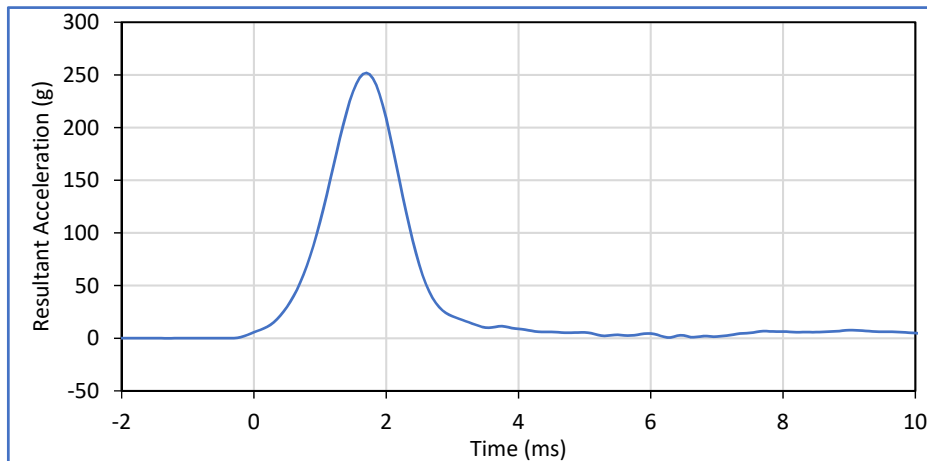


Hybrid III 50th Percentile Male
Head Drop

ATD Serial No.: 360

Test Date: 2017-11-29

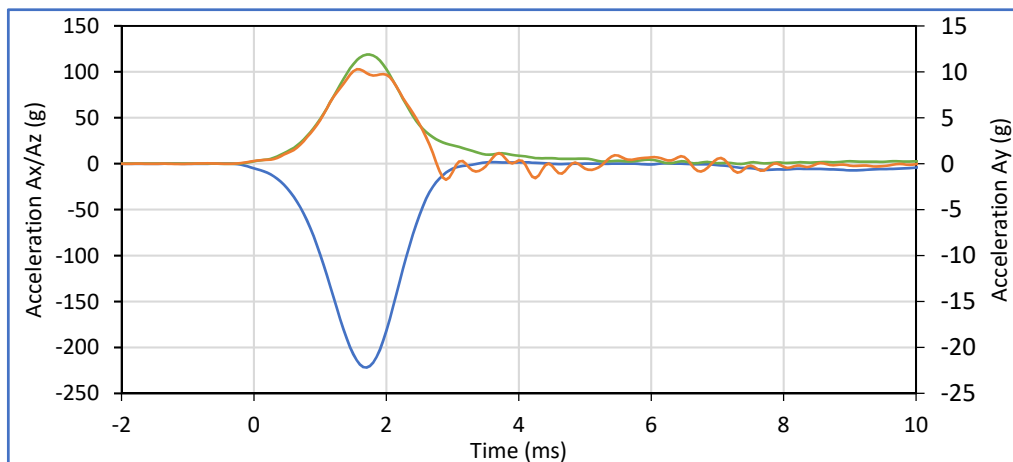
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	20.7	Pass
Laboratory Humidity	%	10	70	26	Pass
Peak Resultant Acceleration	g	225.0	275.0	251.9	Pass
Peak Lateral Acceleration	g	-15.0	15.0	10.3	Pass
Oscillations After Main Pulse	%	0.0	10.0	3.0	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
			Overall Test Results	Pass	



Head Acceleration Resultant

Max:251.9@1.7 / Min:0.7@6.3

SAE Class 1000



Head Ax

Max:1.7@3.6 / Min:-221.9@1.7

SAE Class 1000

Head Ay

Max:10.3@1.6 / Min:-1.7@2.9

SAE Class 1000

Head Az

Max:118.9@1.8 / Min:-0.3@7.4

SAE Class 1000

Technician: Smith

Approved By: Wep

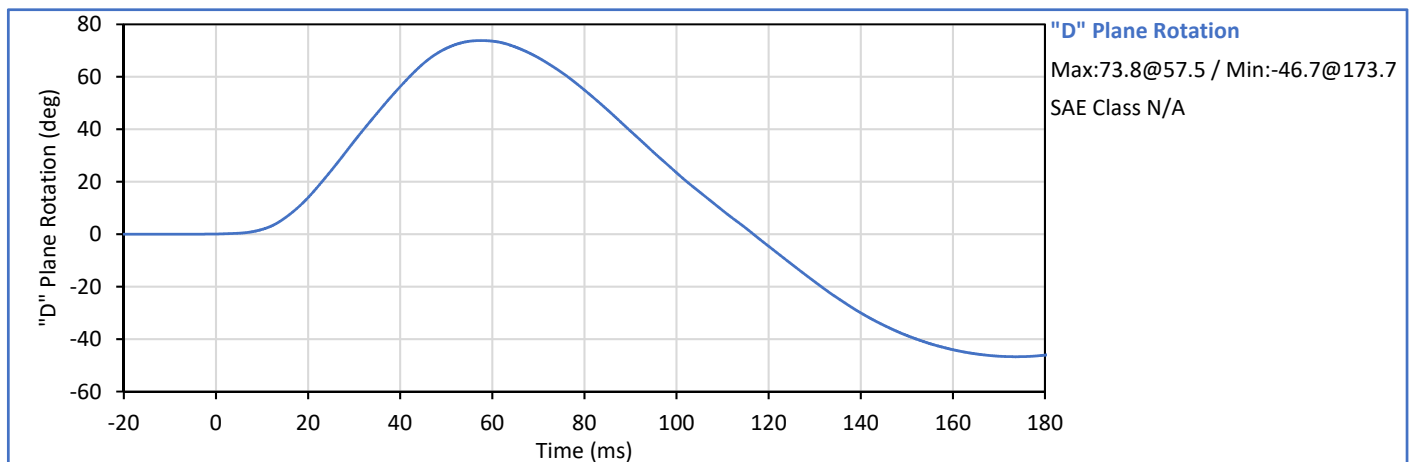
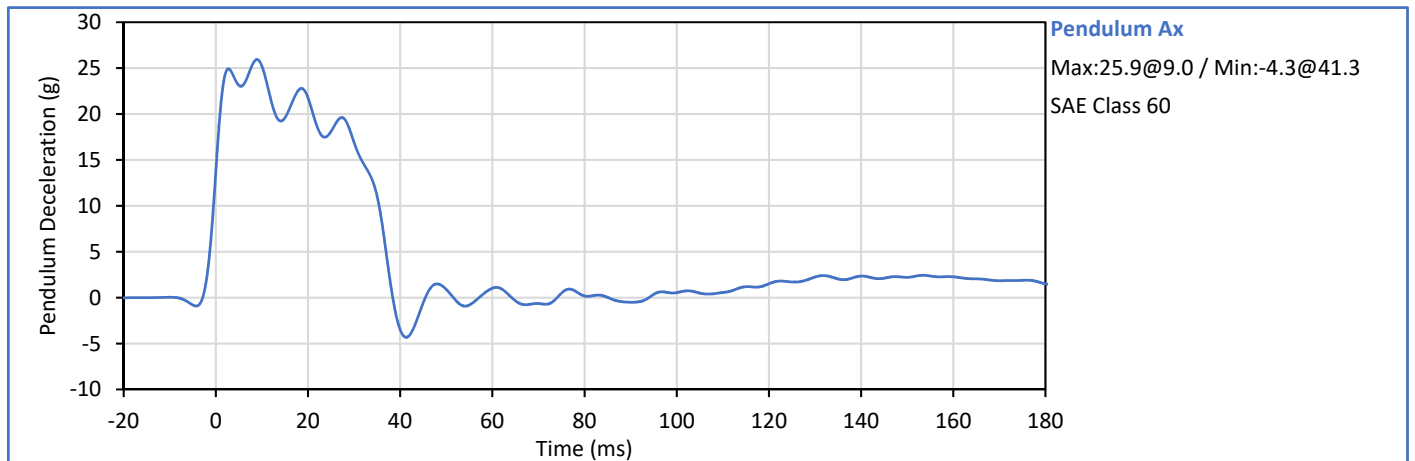


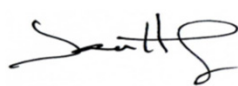
Hybrid III 50th Percentile Male
Neck Flexion Test

ATD Serial No.: 360

Test Date: 2017-11-29

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	20.7	Pass
Laboratory Humidity	%	10	70	22	Pass
Pendulum Velocity	m/s	6.89	7.13	7.02	Pass
Pendulum Deceleration at 10 ms	g	22.5	27.5	25.2	Pass
Pendulum Deceleration at 20 ms	g	17.6	22.6	21.8	Pass
Pendulum Deceleration at 30 ms	g	12.5	18.5	16.9	Pass
Peak Pendulum Decel. after 30 ms	g	0.0	29.0	16.9	Pass
Deceleration Decay to Cross 5 g	ms	34.0	42.0	37.0	Pass
"D" Plane Rotation peak	deg	64.0	78.0	73.8	Pass
	ms	57.0	64.0	57.5	Pass
"D" Plane Rotation Decay To Zero	ms	113.0	128.0	116.8	Pass
Moment About Occipital Condyle	Nm	88.1	108.5	93.1	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	



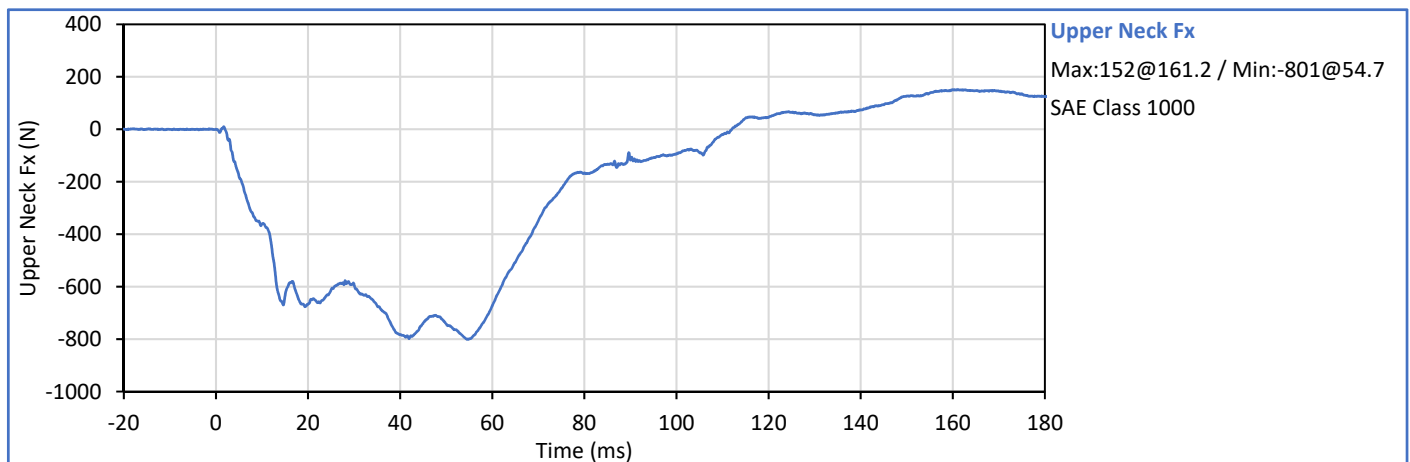
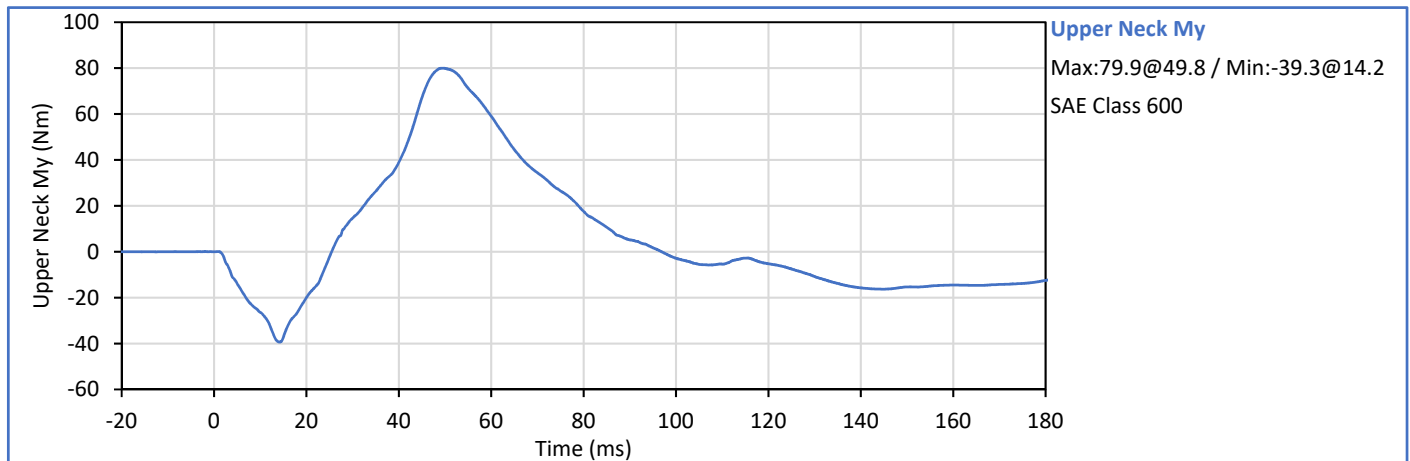
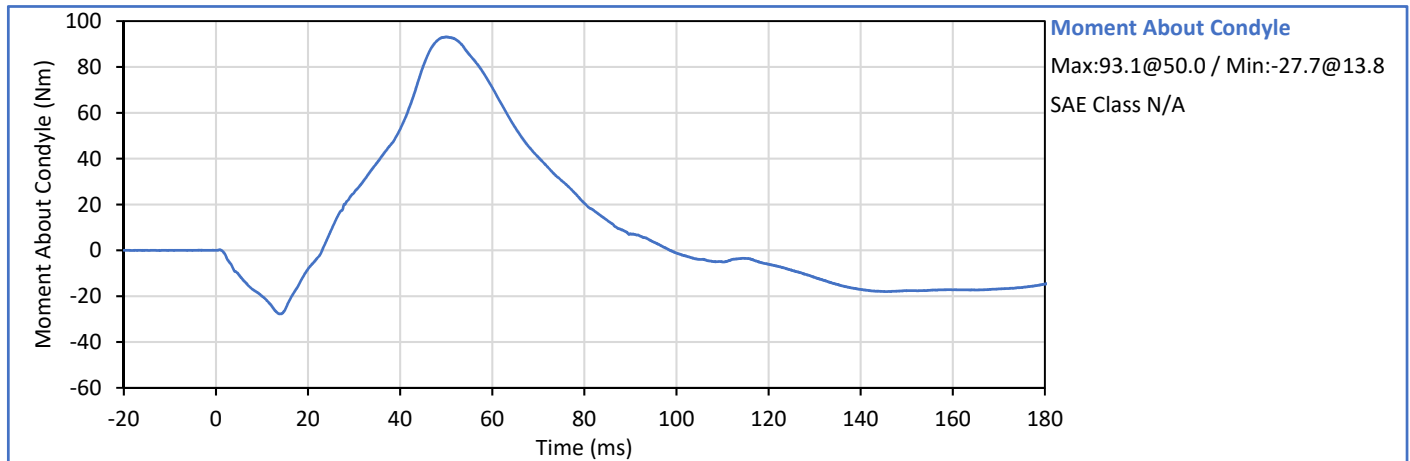
Technician: 

Approved By: 



ATD Serial No.: 360

Test Date: 2017-11-29



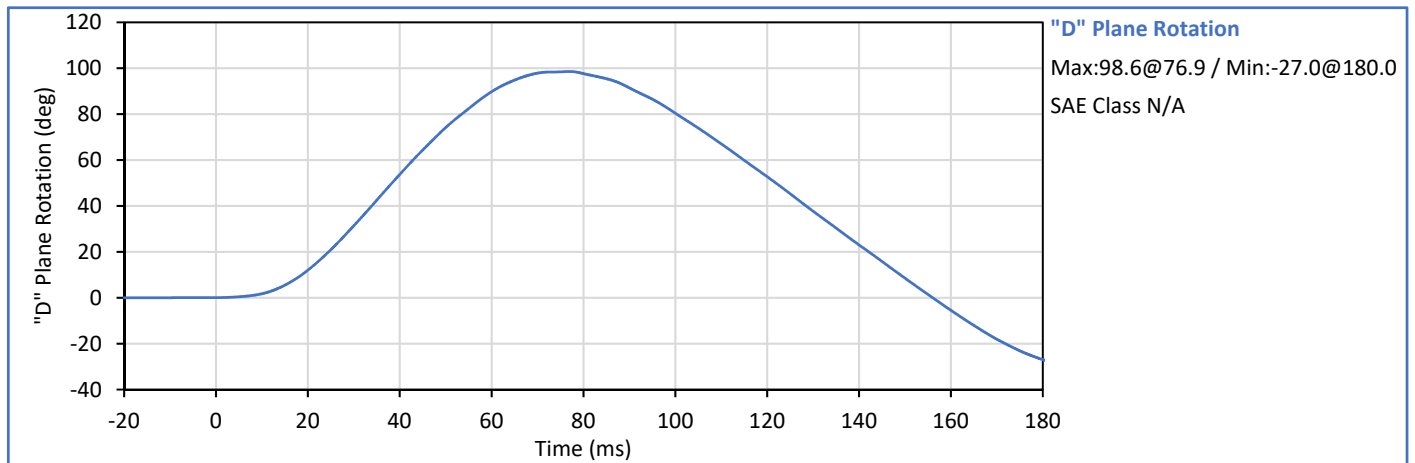
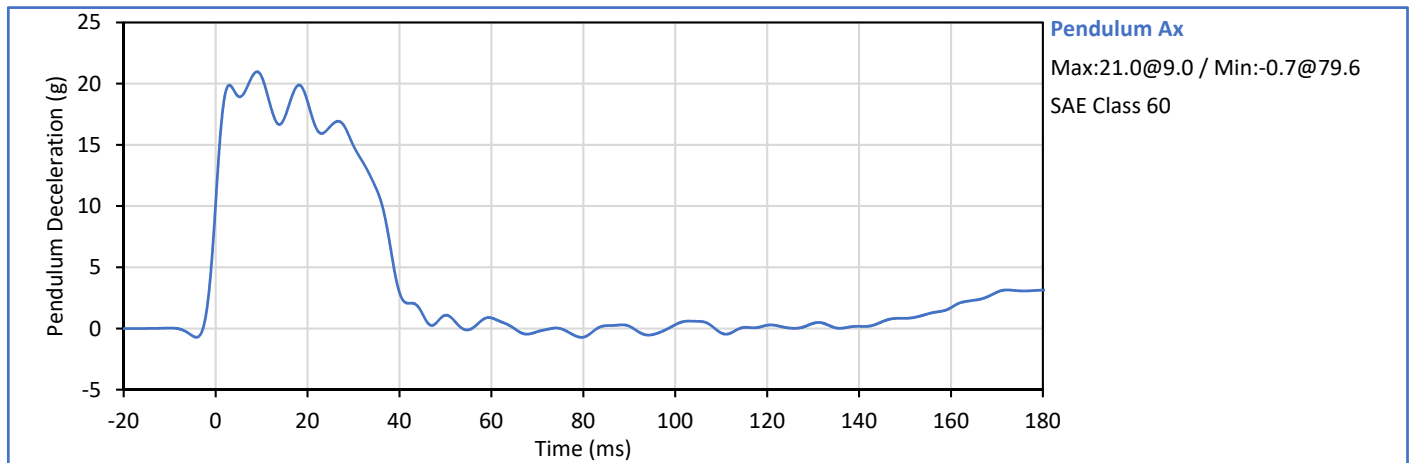


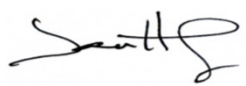
Hybrid III 50th Percentile Male
Neck Extension Test

ATD Serial No.: 360

Test Date: 2017-11-29

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	20.8	Pass
Laboratory Humidity	%	10	70	23	Pass
Pendulum Velocity	m/s	5.94	6.19	6.00	Pass
Pendulum Deceleration at 10 ms	g	17.2	21.2	20.6	Pass
Pendulum Deceleration at 20 ms	g	14.0	19.0	18.5	Pass
Pendulum Deceleration at 30 ms	g	11.0	16.0	14.9	Pass
Peak Pendulum Decel. after 30 ms	g	0.0	22.0	14.9	Pass
Deceleration Decay to Cross 5 g	ms	38.0	46.0	38.8	Pass
"D" Plane Rotation peak	deg	81.0	106.0	98.6	Pass
	ms	72.0	82.0	76.9	Pass
"D" Plane Rotation Decay To Zero	ms	147.0	174.0	156.1	Pass
Moment About Occipital Condyle	Nm	-79.9	-52.9	-66.4	Pass
	ms	65.0	79.0	68.5	Pass
Moment Decay, Peak to Zero	deg	120.0	148.0	135.0	Pass
Overall Test Results					Pass



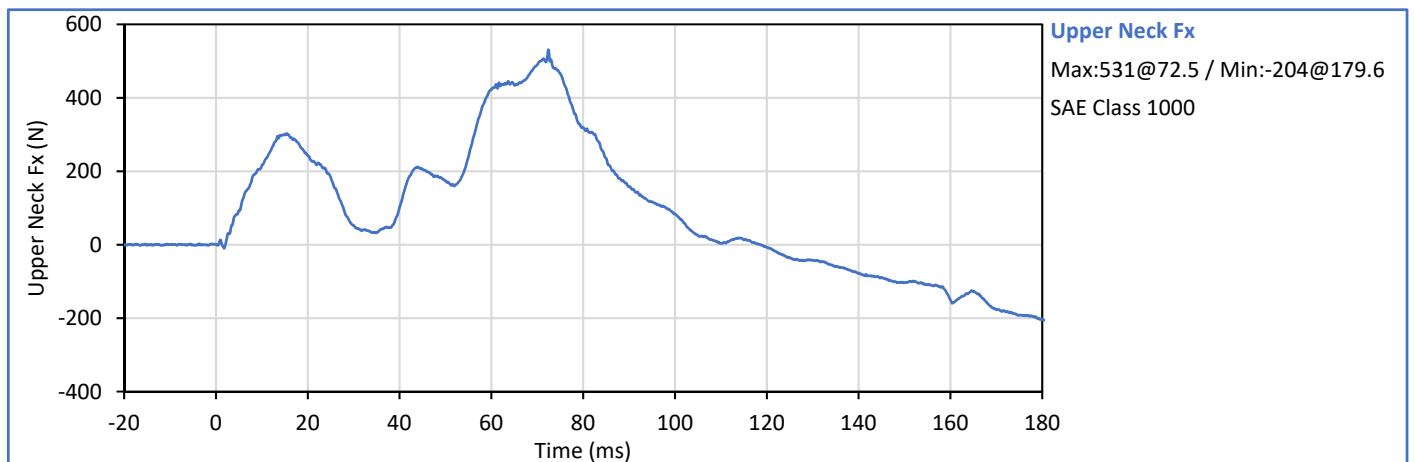
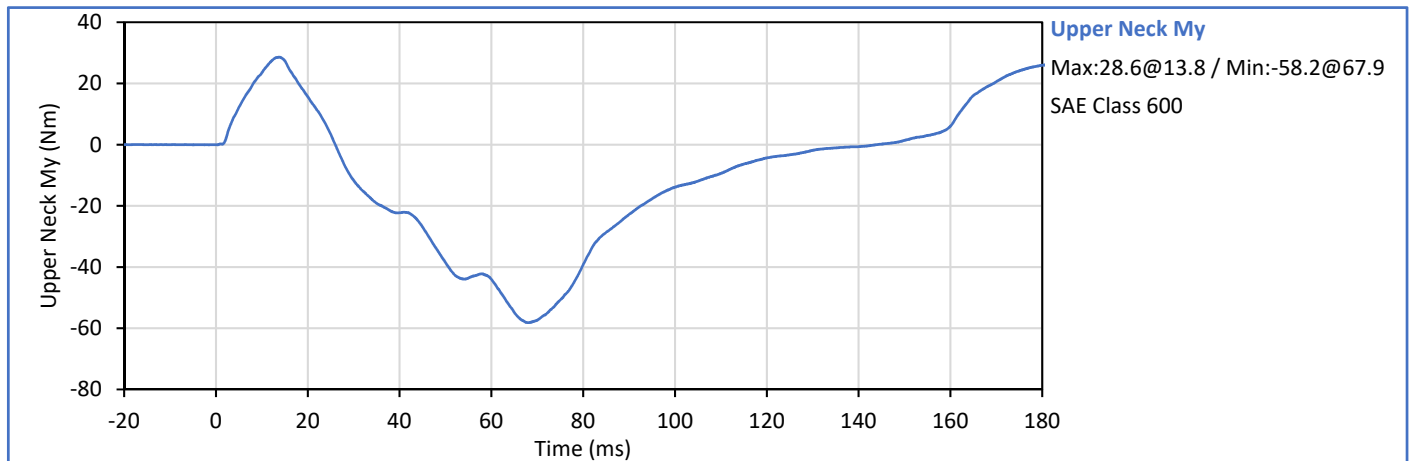
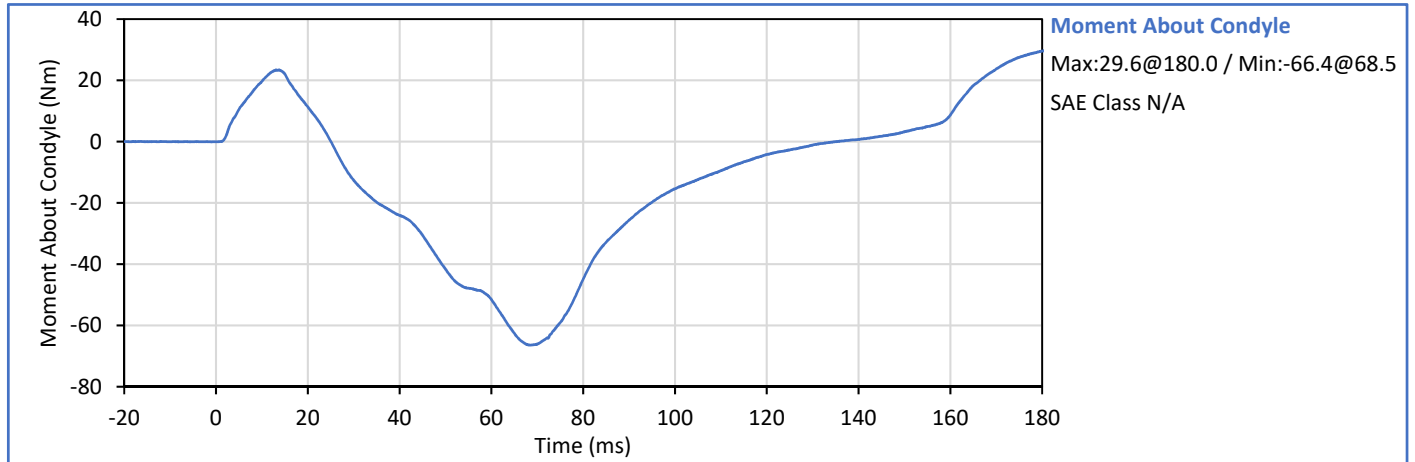
Technician: 

Approved By: 



ATD Serial No.: 360

Test Date: 2017-11-29





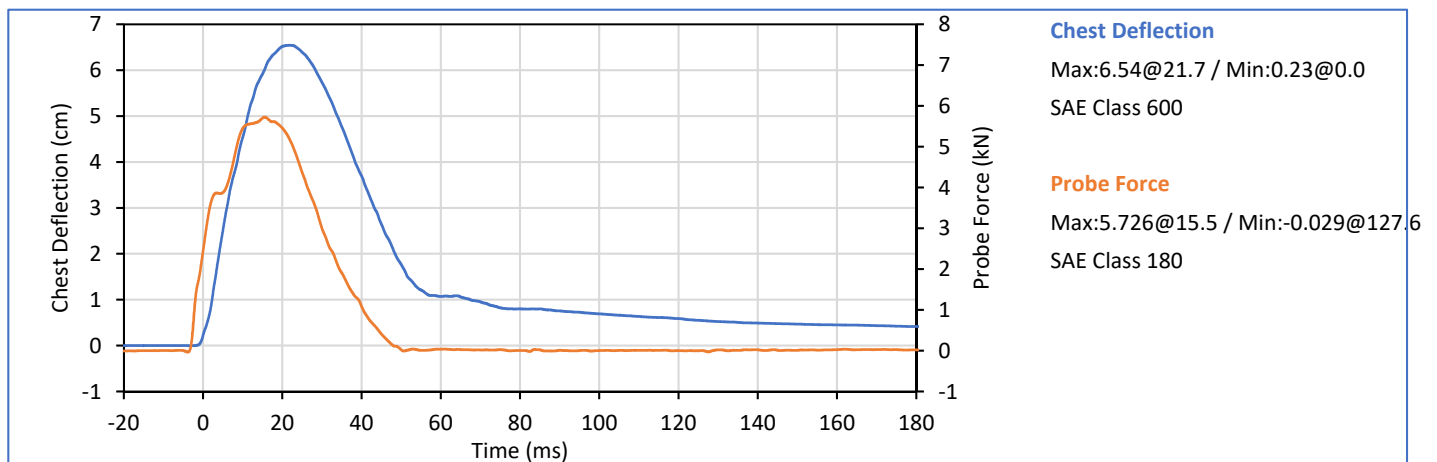
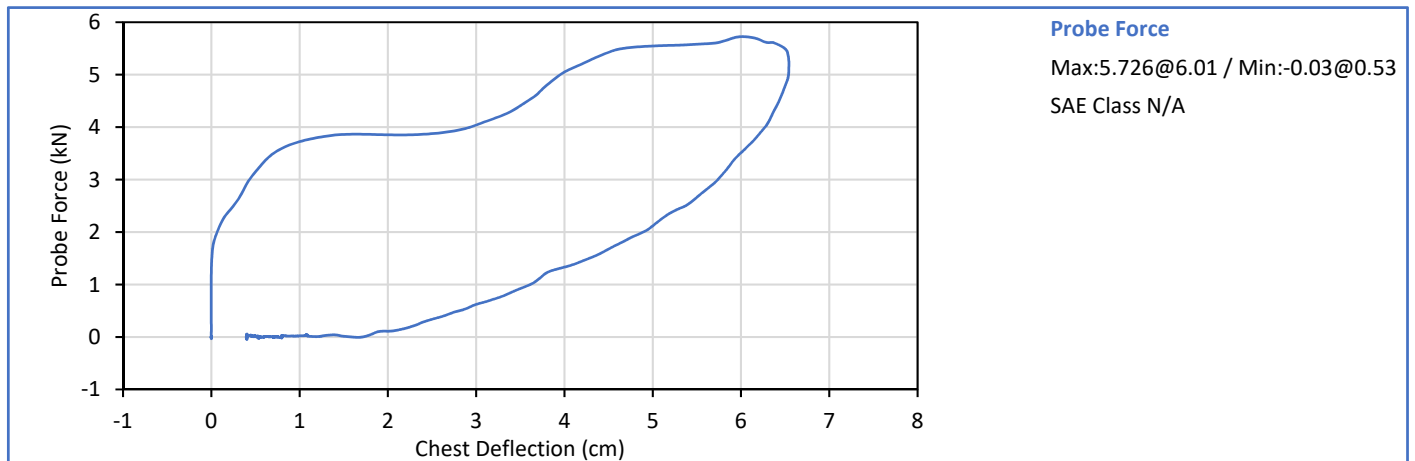
9270 Holly Road, Adelanto, CA 92301
Tel: +1 760 246 1672 Fax: +1 760 246 8112
Info@karco.com www.karco.com

Hybrid III 50th Percentile Male Thorax Impact

ATD Serial No.: 360

Test Date: 2017-12-01

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.9	Pass
Laboratory Humidity	%	10	70	22	Pass
Probe Velocity	m/s	6.58	6.82	6.66	Pass
Peak Chest Deflection	cm	6.35	7.26	6.54	Pass
Peak Probe Force	kN	5.159	5.893	5.726	Pass
Internal Hysteresis	%	69.0	85.0	72.8	Pass
Overall Test Results					Pass



Technician: Smith

Approved By: Wep



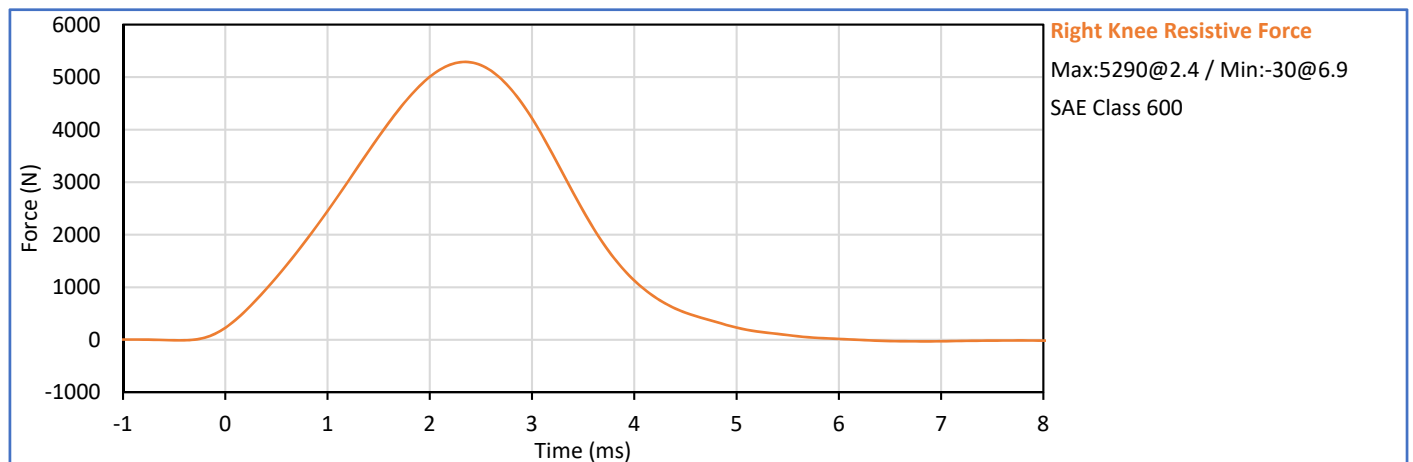
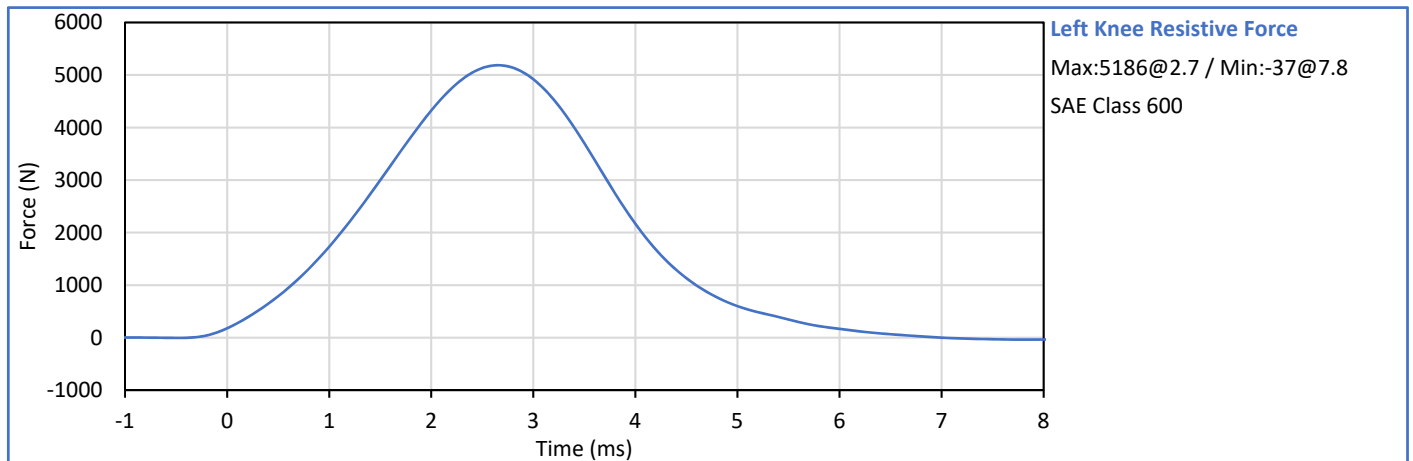
9270 Holly Road, Adelanto, CA 92301
Tel: +1 760 246 1672 Fax: +1 760 246 8112
Info@karco.com www.karco.com

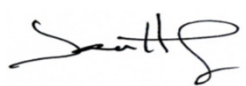
Hybrid III 50th Percentile Male Knee Impact (Left/Right)

ATD Serial No.: 360

Test Date: 2017-11-28

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 Knee	Probe Velocity	m/s	2.070	2.130	2.095	Pass
	Peak Resistive Force	N	4715	5782	5186	Pass
Right Knee	Probe Velocity	m/s	2.070	2.130	2.092	Pass
	Peak Resistive Force	N	4715	5782	5290	Pass
Overall Test Results					Pass	



Technician: 

Approved By: 

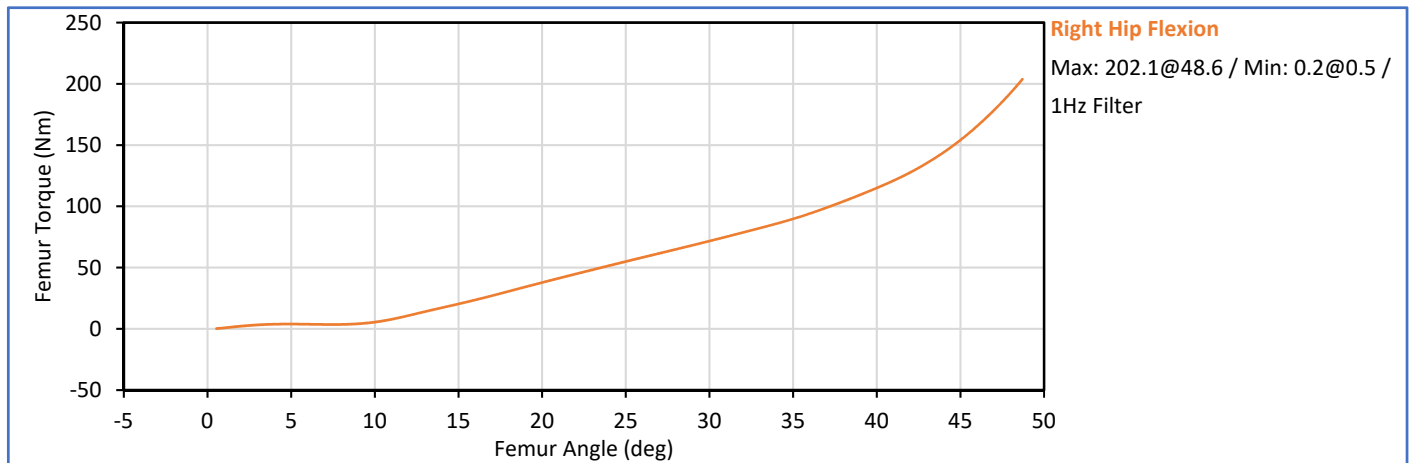
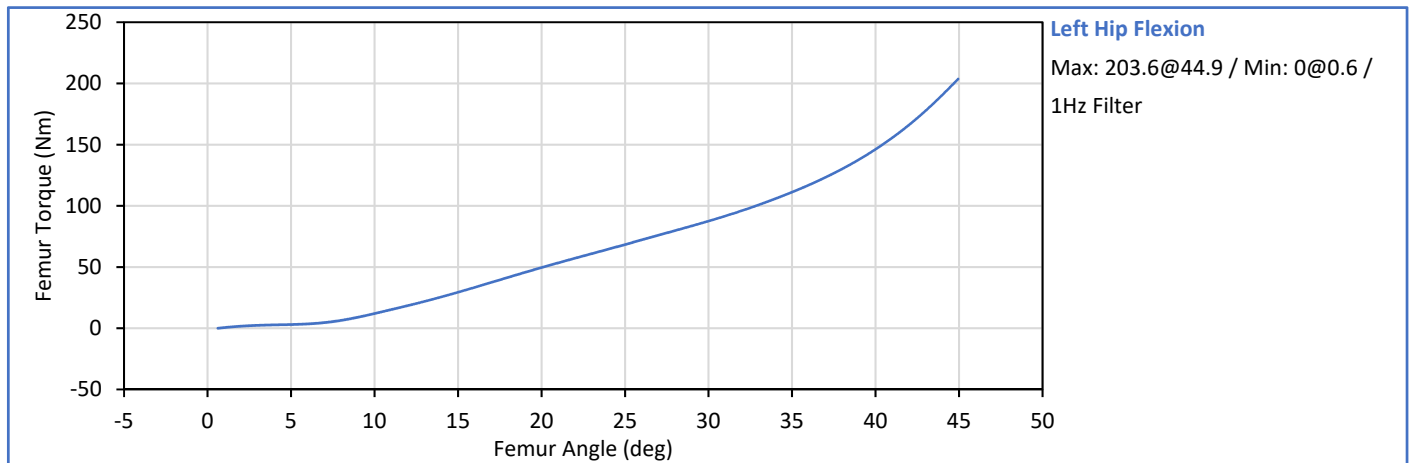


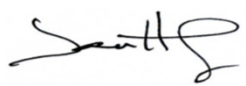
Hybrid III 50th Percentile Male
Hip Flexion (Left/Right)

ATD Serial No.: 360

Test Date: 2017-11-29

	Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
	Laboratory Temperature	°C	18.9	25.6	21.1	Pass
	Laboratory Humidity	%	10	70	27	Pass
Left Hip	Left Hip Rotation Rate	deg/s	5.0	10.0	8.0	Pass
	Left Femur Torque at 30°	Nm	0.0	95.0	87.6	Pass
	Left Hip Rotation at 203 Nm	deg	40.0	50.0	44.9	Pass
Right Hip	Right Hip Rotation Rate	deg/s	5.0	10.0	8.0	Pass
	Right Femur Torque at 30°	Nm	0.0	95.0	71.7	Pass
	Right Hip Rotation at 203 Nm	deg	40.0	50.0	48.6	Pass
Overall Test Results						Pass



Technician: 

Approved By: 



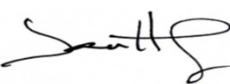
**Hybrid III 5th Percentile Female
ATD Damage Checklist**

ATD Serial No.: 141

Test Date: 2017-11-30

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: 

Approved By: 

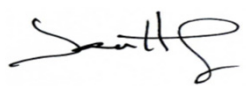


**Hybrid III 5th Percentile Female
External Measurements**

ATD Serial No.: 141

Test Date: 2017-11-30

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	22	Pass
A - Total sitting height	mm	775	800	784	Pass
B - Shoulder pivot height	mm	432	457	454	Pass
C - 'H' point height	mm	81	86	84	Pass
D - 'H' point location from backline	mm	145	150	148	Pass
E - Shoulder pivot from backline	mm	69	84	80	Pass
F - Thigh clearance	mm	119	135	126	Pass
G - Back of elbow to wrist pivot	mm	244	259	248	Pass
H - Head back to backline	mm	41	46	43	Pass
I - Shoulder to elbow length	mm	277	297	281	Pass
J - Elbow rest height	mm	183	203	190	Pass
K - Buttock to knee length	mm	521	546	533	Pass
L - Popliteal length	mm	356	376	366	Pass
M - Knee pivot height	mm	394	419	401	Pass
N - Buttock popliteal length	mm	414	439	426	Pass
O - Chest depth without jacket	mm	175	191	185	Pass
P - Foot length	mm	219	234	231	Pass
R - Buttock to Knee Pivot Length	mm	457	483	473	Pass
S - Head Breadth	mm	137	147	145	Pass
T - Head Depth	mm	178	188	185	Pass
U - Hip Breadth	mm	300	315	305	Pass
V - Shoulder breadth	mm	351	366	358	Pass
W - Foot breadth	mm	79	94	84	Pass
X - Head circum.	mm	528	549	542	Pass
Y - Chest circum. (w/chest jacket)	mm	851	881	872	Pass
Z - Waist circum.	mm	760	790	769	Pass
AA - Location for chest circum.	mm	300	310	304	Pass
BB - Location for waist circum.	mm	160	170	164	Pass
Overall Test Results				Pass	

Technician: 

Approved By: 

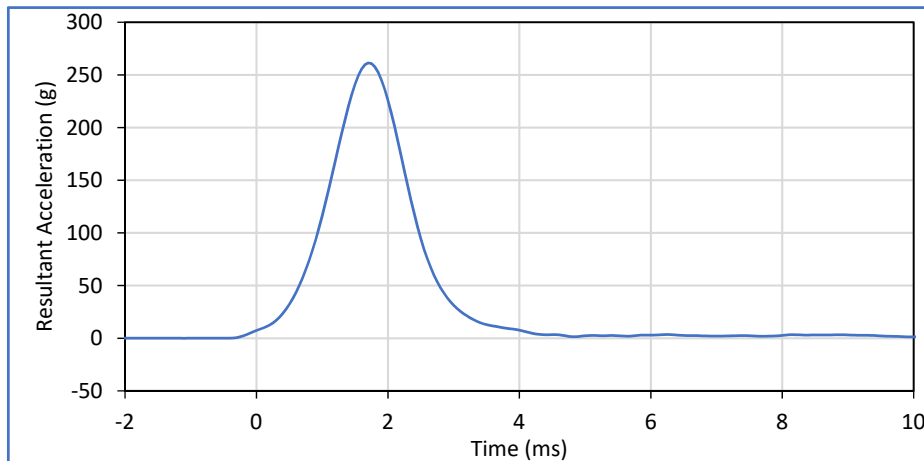


Hybrid III 5th Percentile Female Head Drop

ATD Serial No.: 141

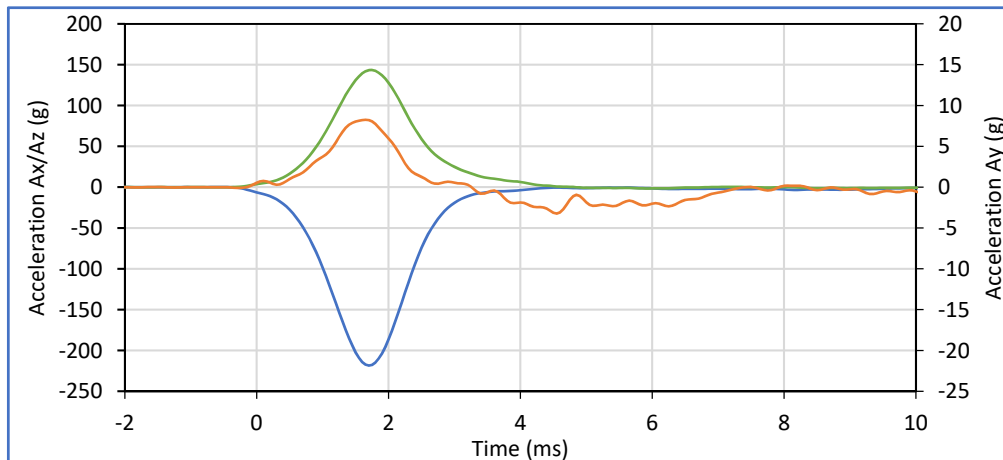
Test Date: 2017-11-27

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
Peak Resultant Acceleration	g	250.0	300.0	261.4	Pass
Peak Lateral Acceleration	g	-15.0	15.0	8.3	Pass
Oscillations After Main Pulse	%	0.0	10.0	1.4	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
			Overall Test Results	Pass	



Head Acceleration Resultant

Max:261.4@1.7 / Min:1.3@10.0
SAE Class 1000



Head Ax

Max:-0.5@4.6 / Min:-218.4@1.7
SAE Class 1000

Head Ay

Max:8.3@1.7 / Min:-3.2@4.6
SAE Class 1000

Head Az

Max:143.6@1.8 / Min:-1.6@5.9
SAE Class 1000

Technician: Smith

Approved By: Wep

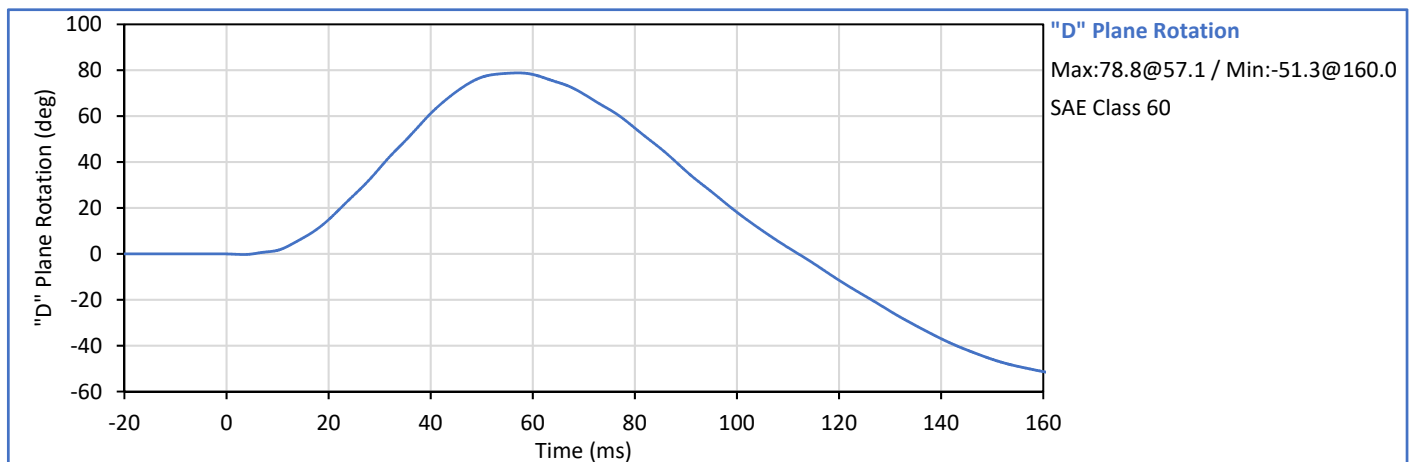
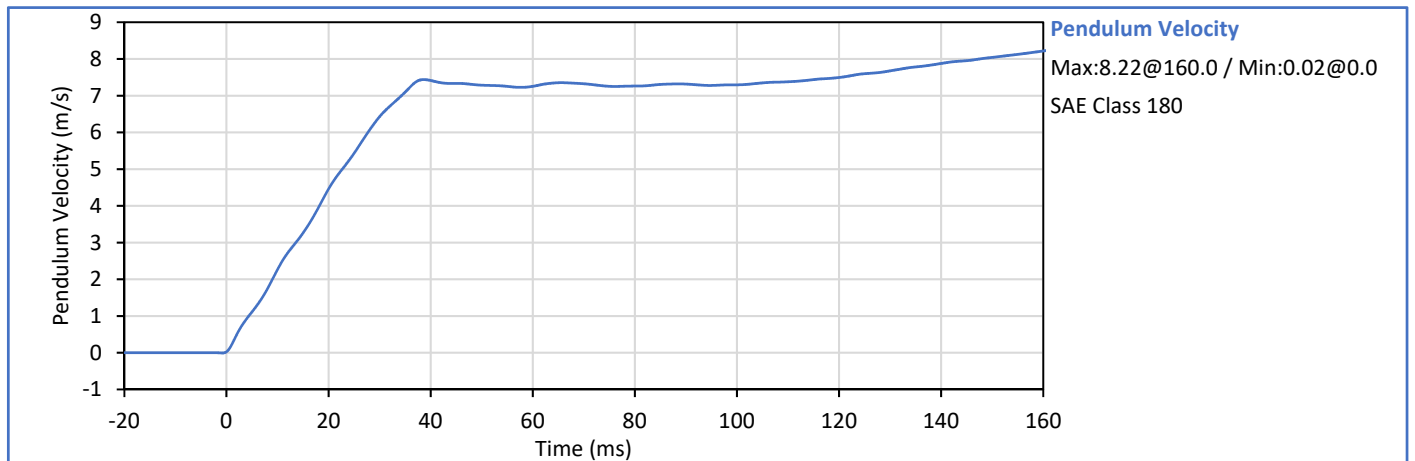


**Hybrid III 5th Percentile Female
Neck Flexion Test**

ATD Serial No.: 141

Test Date: 2017-12-01

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.4	Pass
Laboratory Humidity	%	10	70	22	Pass
Pendulum Velocity	m/s	6.89	7.13	7.10	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	4.46	Pass
Pendulum Velocity at 30 ms	m/s	5.80	7.00	6.43	Pass
Peak "D" Plane Rotation	deg	77.0	91.0	78.8	Pass
Peak Moment in Rotation	Nm	69.0	83.0	81.2	Pass
Positive Moment Decay to 10 Nm	ms	80.0	100.0	83.6	Pass
Overall Test Results					Pass



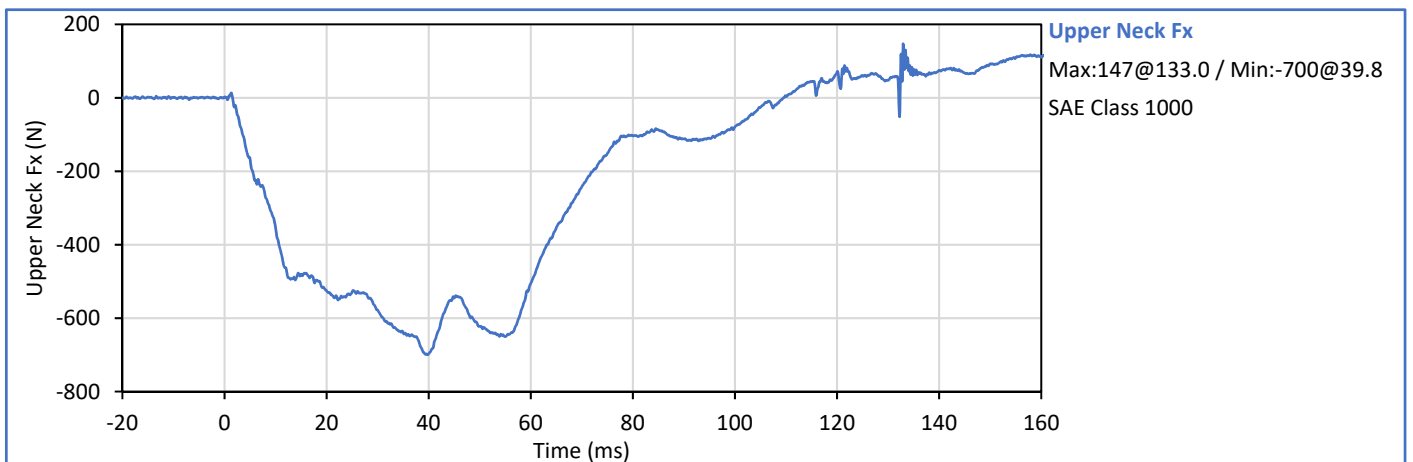
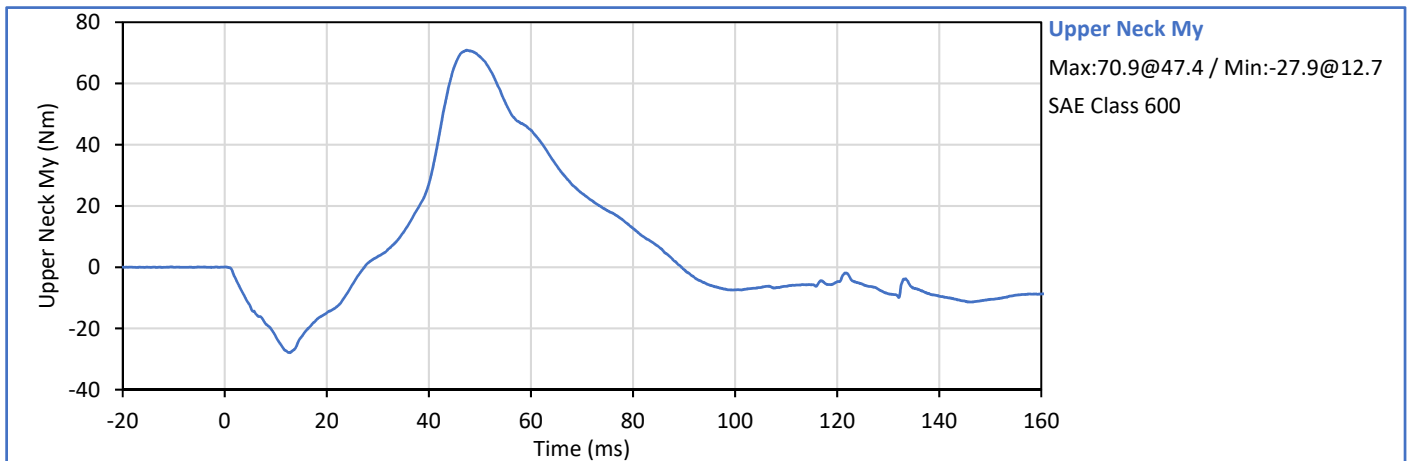
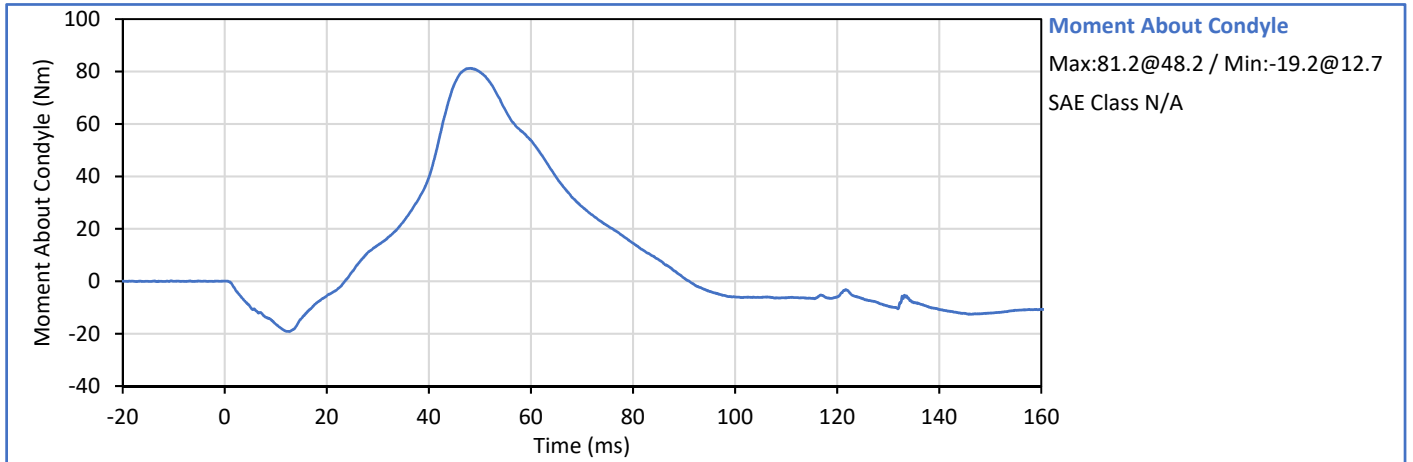
Technician: Smith

Approved By: Wep



ATD Serial No.: 141

Test Date: 2017-12-01





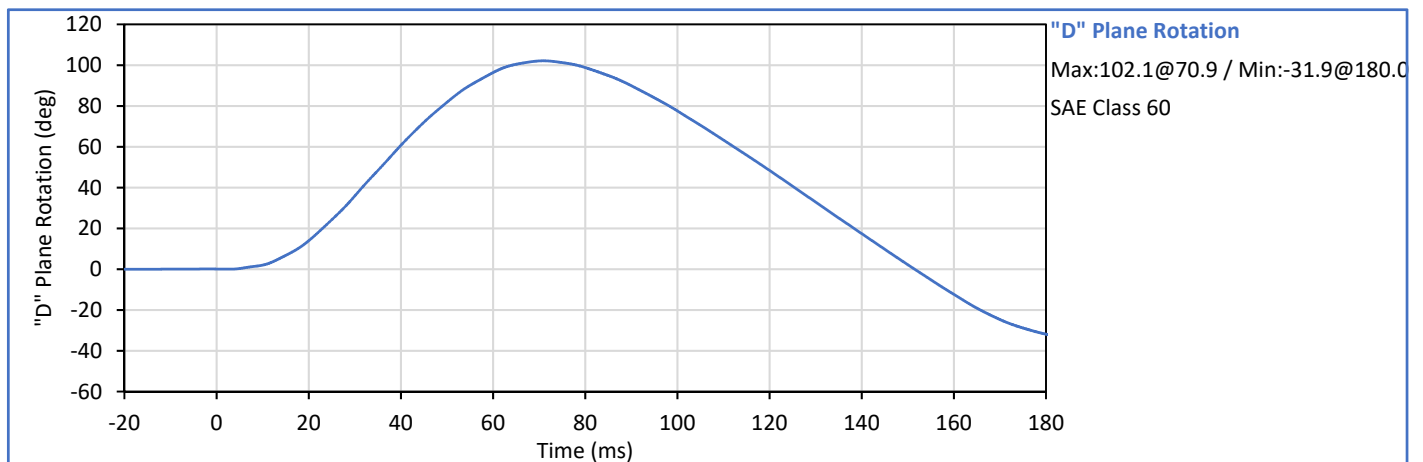
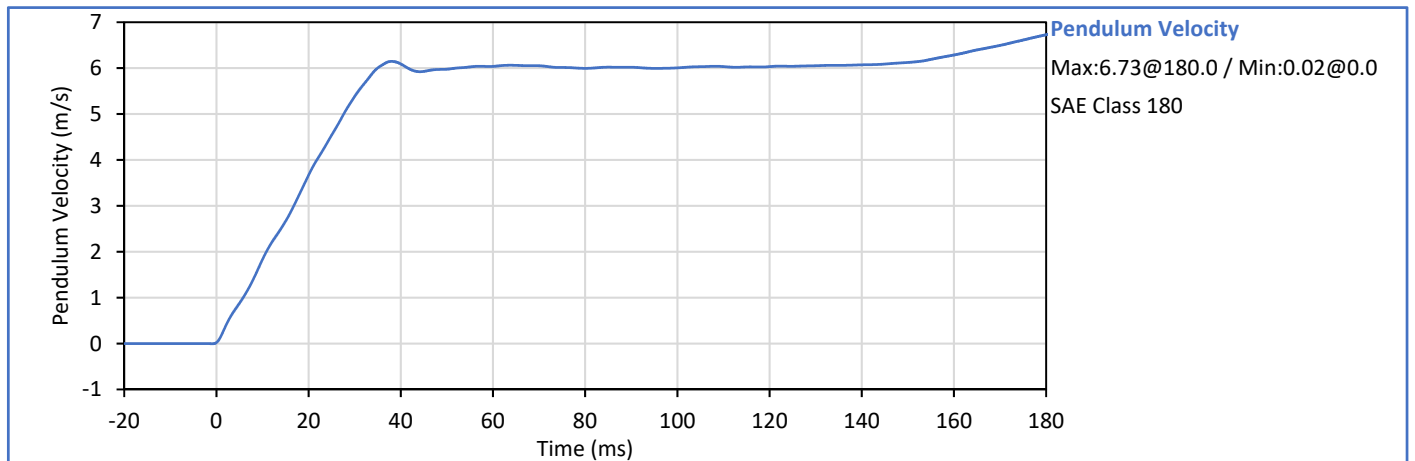
9270 Holly Road, Adelanto, CA 92301
 Tel: +1 760 246 1672 Fax: +1 760 246 8112
 Info@karco.com www.karco.com

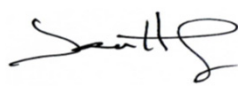
Hybrid III 5th Percentile Female Neck Extension Test

ATD Serial No.: 141

Test Date: 2017-11-30

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
Pendulum Velocity	m/s	5.95	6.19	6.10	Pass
Pendulum Velocity at 10 ms	m/s	1.50	1.90	1.83	Pass
Pendulum Velocity at 20 ms	m/s	3.10	3.90	3.67	Pass
Pendulum Velocity at 30 ms	m/s	4.60	5.60	5.38	Pass
Peak "D" Plane Rotation	deg	99.0	114.0	102.1	Pass
Peak Moment in Rotation	Nm	-65.0	-53.0	-55.1	Pass
Negative Moment Decay to -10 Nm	ms	94.0	114.0	97.7	Pass
Overall Test Results					Pass



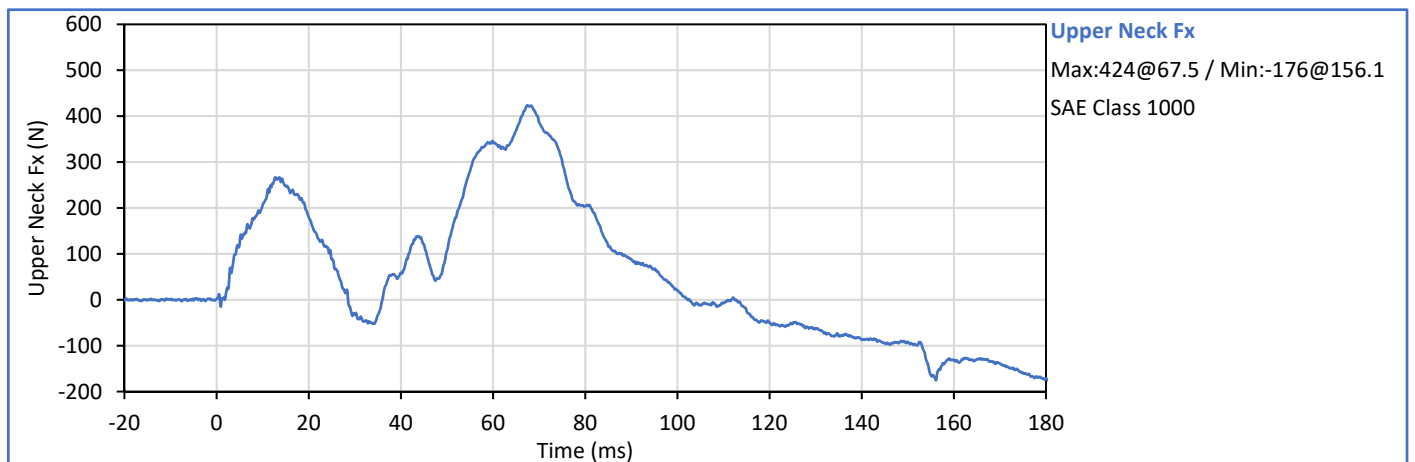
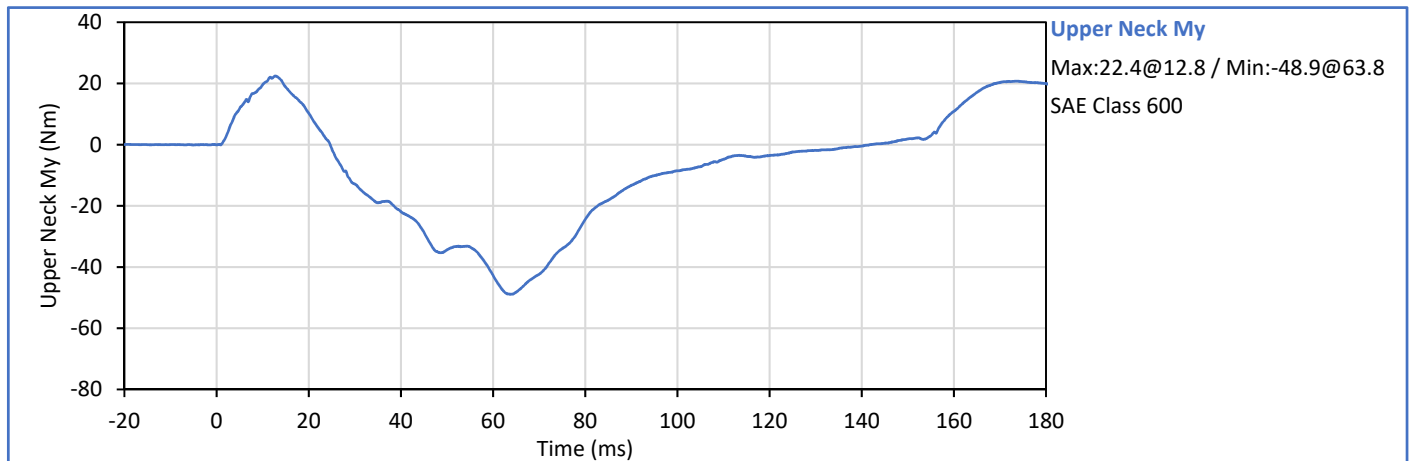
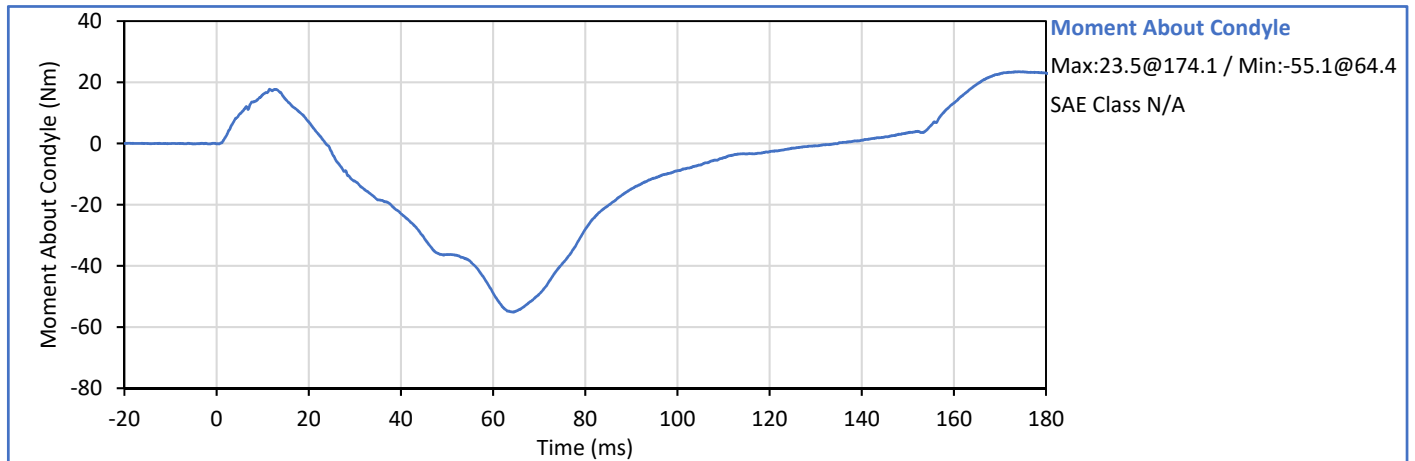
Technician: 

Approved By: 



ATD Serial No.: 141

Test Date: 2017-11-30

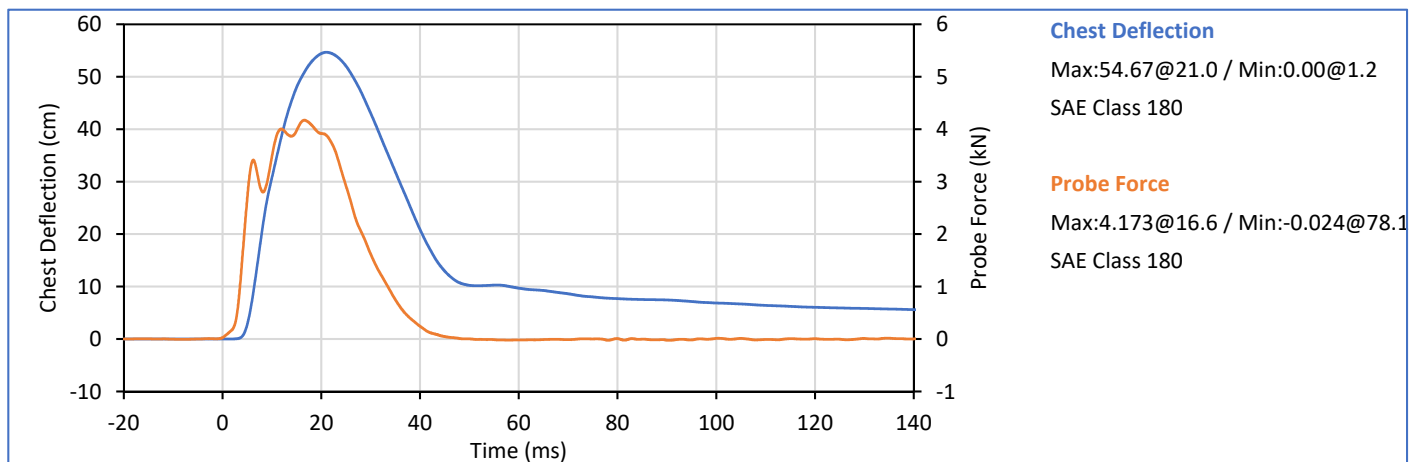
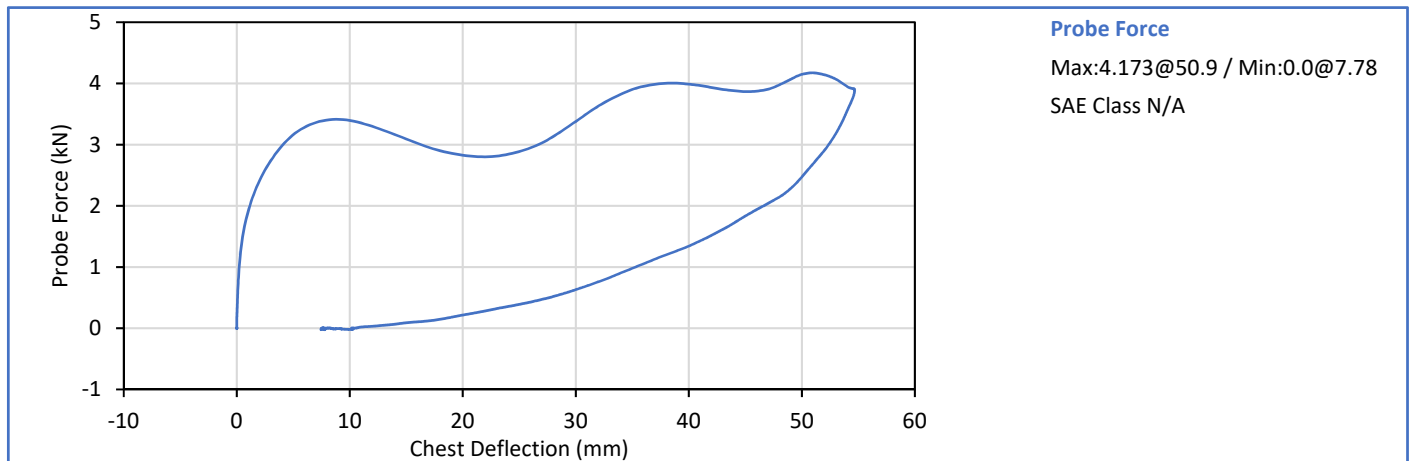


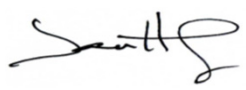


ATD Serial No.: 141

Test Date: 2017-11-30

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.0	Pass
Laboratory Humidity	%	10	70	21	Pass
Probe Velocity	m/s	6.59	6.83	6.67	Pass
Peak Chest Deflection	mm	50.0	58.0	54.7	Pass
Peak Probe Force, 50 and 58 mm	kN	3.900	4.400	4.173	Pass
Peak Probe Force, 18 and 50 mm	kN	0.000	4.600	4.150	Pass
Internal Hysteresis	%	69.0	85.0	74.6	Pass
Overall Test Results				Pass	Pass



Technician: 

Approved By: 



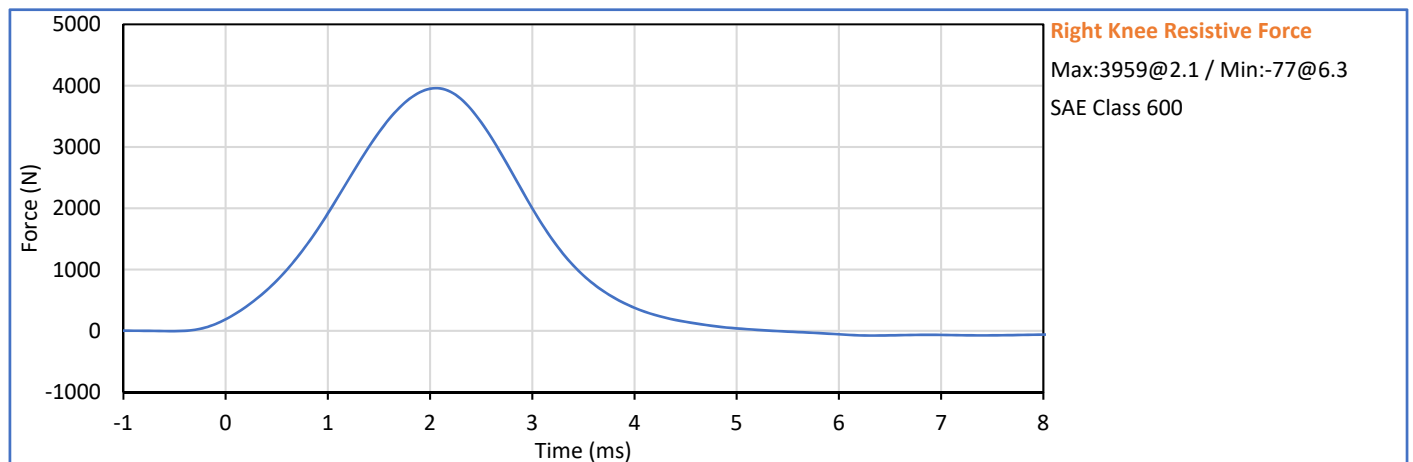
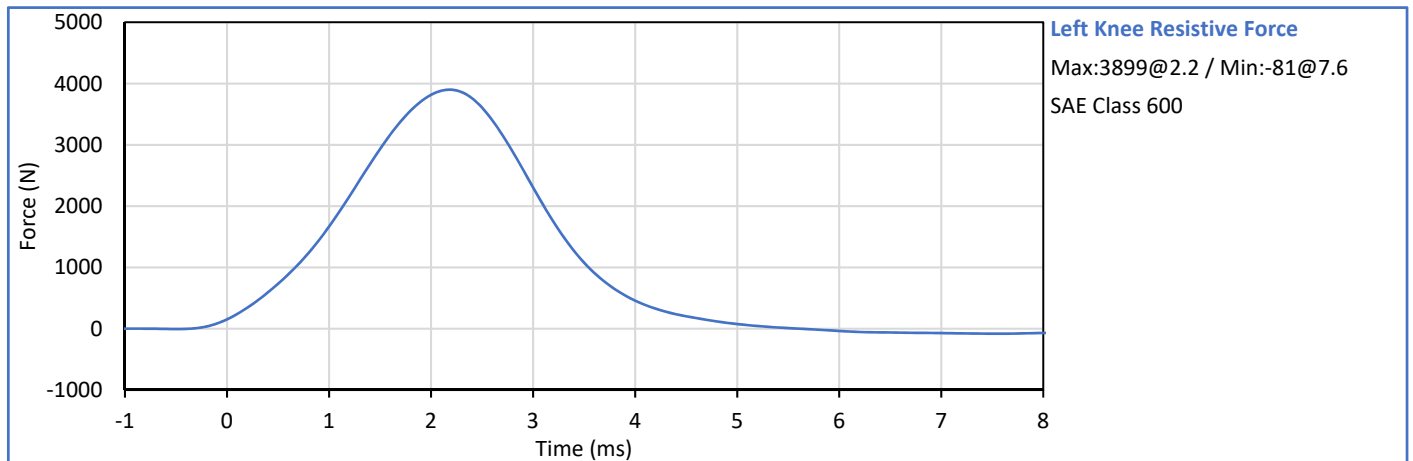
9270 Holly Road, Adelanto, CA 92301
Tel: +1 760 246 1672 Fax: +1 760 246 8112
Info@karco.com www.karco.com

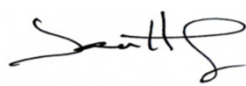
Hybrid III 5th Percentile Female Knee Impact (Left/Right)

ATD Serial No.: 141

Test Date: 2017-11-28

Tested Parameter		Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature		°C	18.9	25.6	21.1	Pass
Laboratory Humidity		%	10	70	22	Pass
Left Knee	Probe Velocity	m/s	2.070	2.130	2.113	Pass
	Peak Resistive Force	N	3450	4060	3899	Pass
Right Knee	Probe Velocity	m/s	2.070	2.130	2.121	Pass
	Peak Resistive Force	N	3450	4060	3959	Pass
Overall Test Results						Pass



Technician: 

Approved By: 

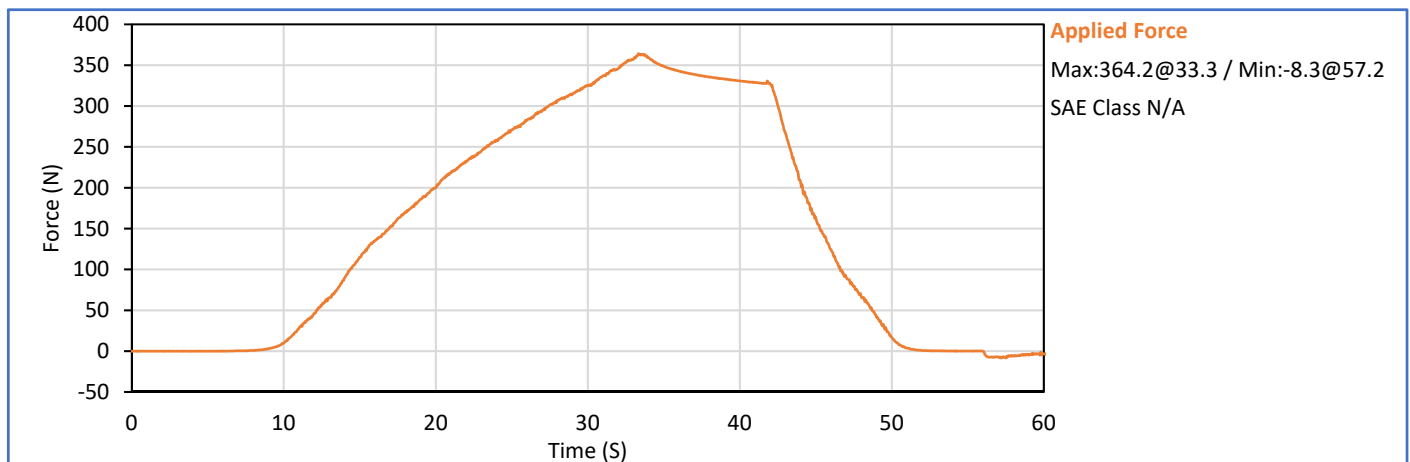
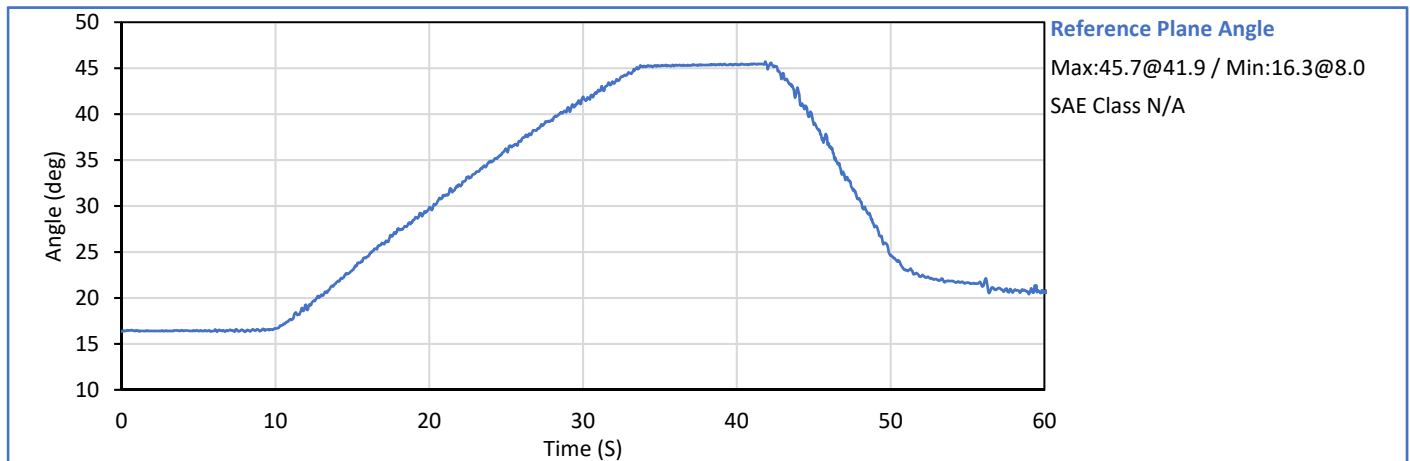


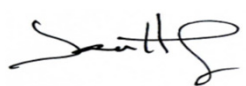
**Hybrid III 5th Percentile Female
Torso Flexion Test**

ATD Serial No.: 141

Test Date: 2017-11-30

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.4	Pass
Laboratory Humidity	%	10	70	20	Pass
Orientation Angle	deg	0.0	20.0	14.5	Pass
Test Initial Angle	deg	11.0	19.0	16.4	Pass
Peak Force at 45° (+/-0.5°)	N	320.0	390.0	363.0	Pass
Torso Flexion Rate	deg/s	0.50	1.50	1.23	Pass
Final Reference Plane Angle	deg	-8.0	8.0	4.1	Pass
Overall Test Results				Pass	



Technician: 

Approved By: 