

**REPORT NUMBER: NCAP-KAR-18-013**

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

**FCA US LLC**

**2018 JEEP GRAND CHEROKEE LAREDO 4X4 5-DOOR MPV**

**NHTSA NUMBER: M20180309**

**PREPARED BY:**

**KARCO ENGINEERING, LLC.**

**9270 HOLLY ROAD**

**ADELANTO, CA 92301**





**APRIL 23, 2018**


**FINAL REPORT**

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

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Approval Date: April 23, 2018

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NHTSA, Office of Crashworthiness Standards

Date: \_\_\_\_\_

\_\_\_\_\_  
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NHTSA, Office of Crashworthiness Standards

Date: \_\_\_\_\_

## TECHNICAL REPORT DOCUMENTATION PAGE

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		<b>15. Supplementary Notes</b>																																																					
<b>16. Abstract</b> <p>A 56.3 km/h NCAP Frontal Impact Test was conducted on a 2018 Jeep Grand Cherokee Laredo 4x4 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 April 9, 2018.</p> <p>The impact velocity of the vehicle was 56.65 km/h and the ambient temperature at the barrier face at the time of impact was 30.0°C. The target vehicle's post-test maximum crush was 601 mm at DPD3 to the left of the vehicle's centerline. The test vehicle's performance is as follows:</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th rowspan="2">Units</th> <th colspan="2">Driver ATD</th> <th colspan="2">Passenger ATD</th> </tr> <tr> <th>Threshold</th> <th>Result</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC<sub>15</sub>)</td> <td>N/A</td> <td>700</td> <td>86.3</td> <td>700</td> <td>251.6</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>-28</td> <td>52</td> <td>-21</td> </tr> <tr> <td>Nij</td> <td>N/A</td> <td>1</td> <td>0.30</td> <td>1</td> <td>0.23</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>4170</td> <td>691.2</td> <td>2620</td> <td>736.2</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>4000</td> <td>-93.5</td> <td>2520</td> <td>-587.2</td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>10000</td> <td>-1855.6</td> <td>6800</td> <td>-1570.8</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>10000</td> <td>-1791.0</td> <td>6800</td> <td>-626.7</td> </tr> </tbody> </table>				Measurement Description	Units	Driver ATD		Passenger ATD		Threshold	Result	Threshold	Result	Head Injury Criteria (HIC <sub>15</sub> )	N/A	700	86.3	700	251.6	Maximum Chest Compression	mm	63	-28	52	-21	Nij	N/A	1	0.30	1	0.23	Neck Tension	N	4170	691.2	2620	736.2	Neck Compression	N	4000	-93.5	2520	-587.2	Left Femur Force	N	10000	-1855.6	6800	-1570.8	Right Femur Force	N	10000	-1791.0	6800	-626.7
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## **SECTION 1**

### **PURPOSE AND SUMMARY OF TEST**

#### **PURPOSE**

This 56.3 km/h frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program, sponsored by the National Highway Traffic Safety Administration (NHTSA) under contract number DTNH22-12-D-00259. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for consumer information purposes.

The 56.3 km/h frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Frontal NCAP Laboratory Test Procedure, dated October 2015.

#### **SUMMARY**

A load cell barrier consisting of 176 load cells was impacted by a 2018 Jeep Grand Cherokee Laredo 4x4 5-door MPV at a velocity of 56.65 km/h. The test was performed at KARCO Engineering, LLC. on April 9, 2018. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A of this report.

Three (3) real-time cameras and sixteen (16) high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in Data Sheet 6 of this report.

One Part 572E 50<sup>th</sup> percentile male anthropomorphic test device (ATD) was placed in the driver seating position and one Part 572O 5<sup>th</sup> 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. 630) 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.

After impact, fluid spillage from the vehicle's underbody was observed. The fluid was found to be transmission fluid, gear oil, and Stoddard solvent spillage. No Stoddard solvent was measured during the time of impact to when the vehicle motion ceased. The Stoddard solvent spillage measured during the five (5) minute period after vehicle motion ceased was 0.42 oz. The Stoddard solvent spillage amount collected was too small to be measured for the next 25 minutes of vehicle observation. Stoddard spillage did not exceed the limits specified in FMVSS 301 during any phase of the test.

The maximum static crush was 601 mm at DPD3 to the left of the vehicle's centerline. Both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

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

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

The occupant data is summarized below:

ATD Position	HIC <sub>15</sub>	T <sup>1</sup> (ms)	T <sup>2</sup> (ms)	Chest Disp. (mm)	Nij	Neck Tension (N)	Neck Comp. (N)	Left Femur (N)	Right Femur (N)
Driver (50th)	86.3	85.5	100.5	-28	0.30	691.2	-93.5	-1855.6	-1791.0
Passenger (5th)	251.6	71.2	86.2	-21	0.23	736.2	-587.2	-1570.8	-626.7

## SECTION 2

### OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4x4 5-Door MPV NHTSA No.: M20180309

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 04/09/18

#### CONVERSION FACTORS

Quantity	Typical Application	Std Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	miles/hr	km/hr	1.609344
Length or Distance	Measurements	in	mm	25.4
Volume	Fuel Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.574
Pressure	Tire Pressures	lbf/in <sup>2</sup>	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 Jeep Grand Cherokee Laredo 4x4 5-Door MPV      NHTSA No.: M20180309  
 Test Program: 56.3 km/h Frontal Impact NCAP Test      Test Date: 04/09/18

### TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	M20180309
Model Year	2018
Make	Jeep
Model	Grand Cherokee Laredo 4x4
Body Style	5-Door MPV
VIN	1C4RJFAG8JC108479
Body Color	Billet Silver Metallic
Odometer Reading (km / mi)	187 / 116
Engine Displacement (L)	3.6
Type / No. of Cylinders	V6
Engine Placement	Longitudinal
Transmission Type	Automatic
Transmission Speeds	8
Overdrive	Yes
Final Drive	4x4
Roof Rack	Yes
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes
Automatic Door Locks (ADLs)	Yes

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

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

### DATA FROM CERTIFICATION LABEL

Manufactured By	FCA US LLC
Date of Manufacture	Jul-17

GVWR (kg)	2949
GAWR Front (kg)	1452
GAWR Rear (kg)	1679

### 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)				476.0
DSC x 68.04 (kg)				340.2
Cargo Weight (RCLW) (kg)				135.8

## DATA SHEET NO. 1 ... (CONTINUED)

### GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4x4 5-Door MPV      NHTSA No.: M20180309  
 Test Program: 56.3 km/h Frontal Impact NCAP Test      Test Date: 04/09/18



### VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	230	230
Recommended Tire Size	P245/70R17	P245/70R17
Tire Size on Vehicle	P245/70R17	P245/70R17
Tire Manufacturer	Goodyear	Goodyear
Tire Model	Fortera HL	Fortera HL
Treadwear	540	540
Traction	A	A
Temperature Grades	B	B
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel	2 Polyester, 2 Steel
Load Index / Speed Symbol	108T	108T
Tire Material	Polyester, Steel	Polyester, Steel
DOT Safety Code Left	4B83 JD1R 2717	4B83 JD1R 2717
DOT Safety Code Right	4B83 JD1R 2717	4B83 JD1R 2717

**DATA SHEET NO. 1 ... (CONTINUED)**

**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4x4 5-Door MPV      NHTSA No.: M20180309  
 Test Program: 56.3 km/h Frontal Impact NCAP Test      Test Date: 04/09/18

**TEST VEHICLE WEIGHTS**

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	547.0	496.0		574.0	617.5	
Right	kg	559.5	487.5		567.0	602.0	
Ratio	%	52.9%	47.1%	100.0%	48.3%	51.7%	100.0%
Total	kg	1106.5	983.5	2090.0	1141.0	1219.5	2360.5

**TARGET TEST WEIGHT CALCULATION**

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	2090.0	A
Weight of 1 P572E ATD & 1 P572O ATD	kg	141.0	B
Rated Cargo/Luggage Weight (RCLW)	kg	135.8	C
Calculated Vehicle Target Weight (TVTW)	kg	2366.8	A+B+C

**TEST VEHICLE ATTITUDES**

Condition	Units	LF	RF	LR	RR	CG Aft of Front Axle
As Delivered	mm	947	950	1002	992	1376
As Tested	mm	918	919	941	958	1511
Post-Test	mm	959	964	958	955	

**GENERAL TEST VEHICLE DATA**

Measurement Description	Units	Value
Total Vehicle Wheelbase	mm	2925
Total Vehicle Length at Left Side	mm	4235
Total Vehicle Length at Centerline	mm	4855
Total Vehicle Length at Right Side	mm	4235
Weight of Ballast in Cargo Area	kg	102.0
Weight of Vehicle Components Removed	kg	24.5
Amount of Stoddard Solvent in Fuel Tank	L	86.94

**VEHICLE COMPONENTS REMOVED TO MEET TEST WEIGHT:**

Spare Tire and Tools (22.0 kg), Rear Trim (2.5 kg)

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**DATA SHEET NO. 1 ... (CONTINUED)**

**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4x4 5-Door MPV      NHTSA No.: M20180309  
Test Program: 56.3 km/h Frontal Impact NCAP Test      Test Date: 04/09/18

**TARGET VEHICLE STRUCTURAL MEASUREMENTS**

No.	Description	Pre-Test
1	Total Length	4855
2	Total Width	1925
3	Bumper Top Height	763
4	Bumper Bottom Height	565
5	Longitudinal Member Top Height	600
6	Distance Between Longitudinal Members	790
7	Longitudinal Member Width	75
8	Engine Top Height	1115
9	Engine Bottom Height	273
10	Engine and Gearbox Width	640
11	Front Bumper to Engine Distance	510
12	Front Shock Absorber Fixing Height	1047
13	Bonnet Leading Edge Height	1015
14	Front Shock Absorber Fixing Width	960
15	Front Bumper to Front Axle Distance	900
16	Front Axle to A-Pillar Distance	660
17	A-Pillar to B-Pillar Distance	973
18	B-Pillar to Rear Axle Distance	1180
19	B-Pillar to C-Pillar Distance	853
20	Roof Sill Bottom Height	1605
21	Roof Sill Top Height	1720
22	Floor Sill Bottom Height	435
23	Floor Sill Top Height	530

All measurements in millimeters.

## DATA SHEET NO. 2

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

Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4x4 5-Door MPV

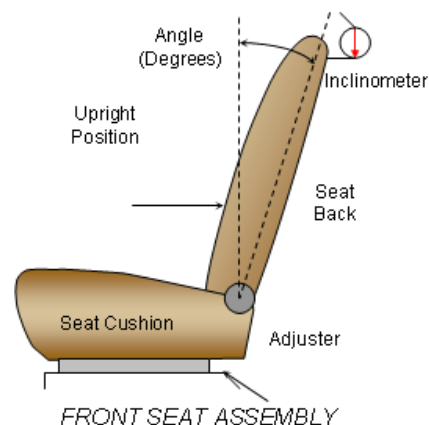
NHTSA No.: M20180309

Test Program: 56.3 km/h Frontal Impact NCAP Test

Test Date: 04/09/18

#### NOMINAL DESIGN RIDING POSITION

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

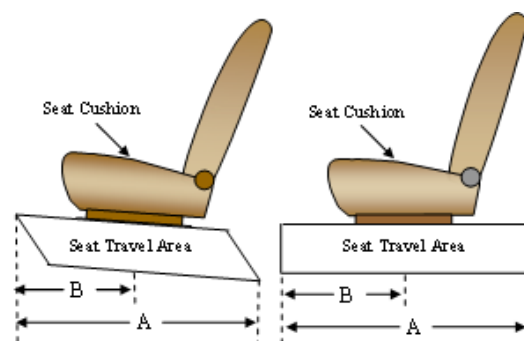


#### SEAT BACK ANGLE

Seating Position	Degrees
Driver Seat Back Angle	13.7
Passenger Seat Back Angle	9.1

#### 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	281 mm	144 mm
Passenger Seat	235 mm	0 mm

#### SEAT BELT UPPER ANCHORAGE

The seat belt upper anchorage is positioned to the manufacturer's design position for a 50<sup>th</sup> percentile adult male ATD for the driver, and a 5<sup>th</sup> percentile adult female ATD for the passenger. Position "H" is the uppermost position, followed by position "M3," 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	5	H
Passenger Seat	5	H

**DATA SHEET NO. 2 ... (CONTINUED)**

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

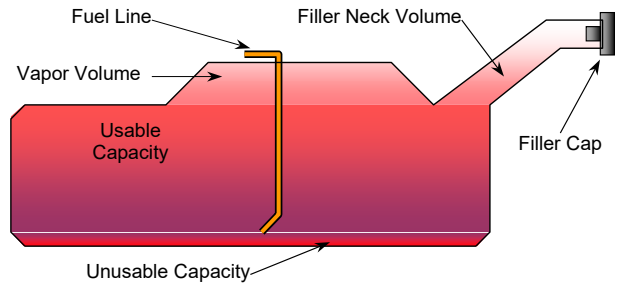
Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4x4 5-Door MPV      NHTSA No.: M20180309  
 Test Program: 56.3 km/h Frontal Impact NCAP Test      Test Date: 04/09/18

**FUEL TANK CAPACITY**

Description	Liters
Usable Capacity of "Standard Tank"	93.49
Usable Capacity of "Optional Tank"	N/A
92 - 94% of Usable Capacity	86.01 to 87.88
Actual Amount of Stoddard Solvent Used	86.94
1/3 of Usable Capacity	31.16

**FUEL PUMP**

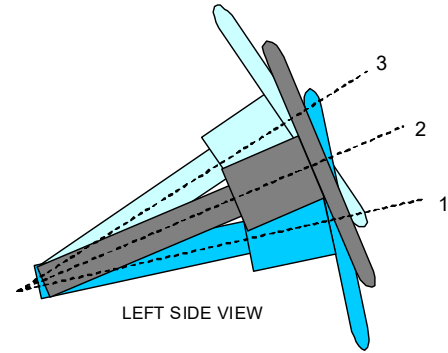
The vehicle is equipped with an electric fuel pump. The fuel pump starts pumping fuel when the key is "ON" position.



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	19.5	103
Geometric Center Position, No. 2	21.8	131
Uppermost Position, No. 3	24.1	159
Telescoping Steering Wheel Travel		56
Test Position	21.8	131

### DATA SHEET NO. 3

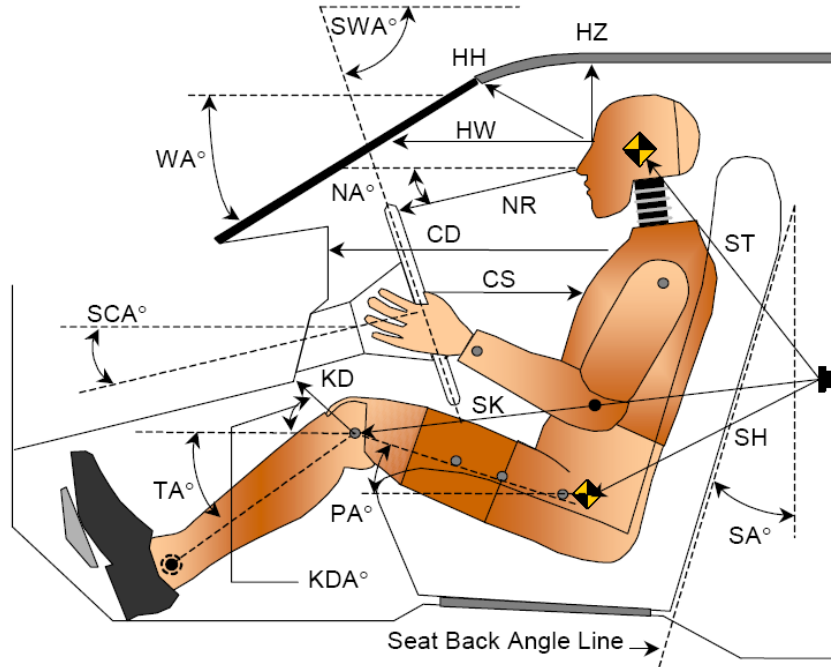
### DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4x4 5-Door MPV

NHTSA No.: M20180309

Test Program: 56.3 km/h Frontal Impact NCAP Test

Test Date: 04/09/18



**LEFT SIDE VIEW**

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		28.3		
SWA°	Steering Wheel Angle		66.6		
SCA°	Steering Column Angle		23.4		
SA°	Seat Back Angle (On Headrest Post)		13.7		9.1
HZ	Head to Roof	220	90.0	243	90.0
HH	Head to Header	418	18.8	375	38.4
HW	Head to Windshield	648	0.0	680	0.0
NR	Nose to Rim	388	7.2	494	31.1
CD	Chest to Dash	542	17.2	495	9.9
CS	Chest to Steering Hub	306	0.5		
RA	Rim to Abdomen	193	0.0		
KDL	Left Knee to Dash	176	28.9	112	35.6
KDR	Right Knee to Dash	128	28.4	146	34.0
PA°	Pelvic Angle		24.8		22.4
TA°	Tibia Angle		41.9		59.4
SK	Striker to Knee	575	2.1	634	0.5
ST	Striker to Head	569	82.5	516	71.1
SH	Striker to H-Point	198	24.5	302	11.1

## DATA SHEET NO. 4

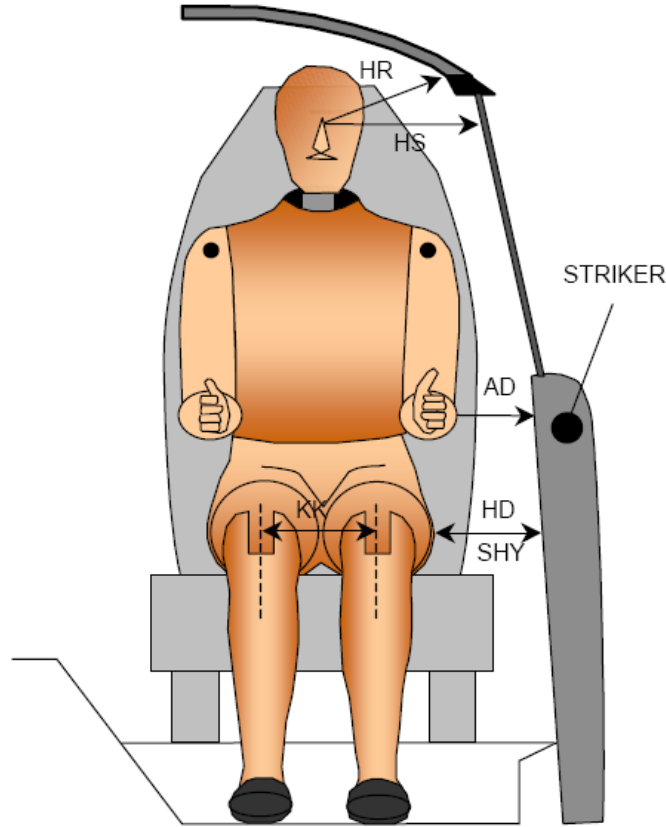
### DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4x4 5-Door MPV

NHTSA No.: M20180309

Test Program: 56.3 km/h Frontal Impact NCAP Test

Test Date: 04/09/18



Code	Description	Driver (mm)	Passenger (mm)
AD	Arm to Door	124	112
HD	H-Point to Door	155	192
HR	Head to Side Header	243	292
HS	Head to Side Window	365	384
KK	Knee to Knee	292	226
SHY	Striker to H-Point (Y-Direction)	246	275
AA	Ankle to Ankle	300	150

**DATA SHEET NO. 5**

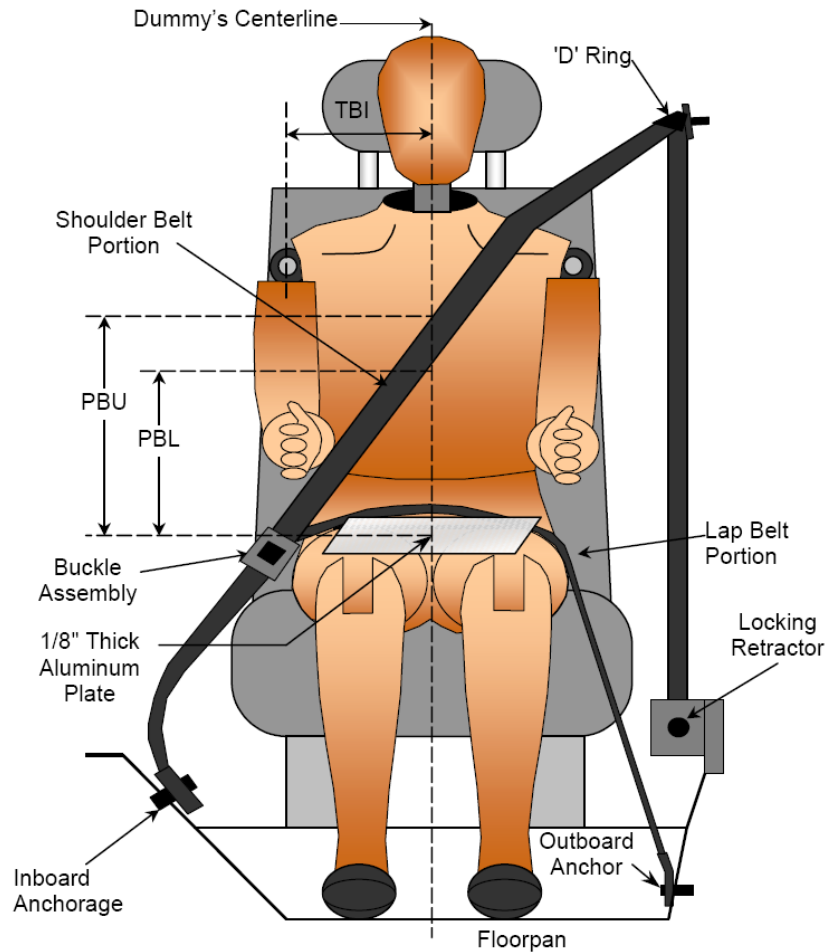
**SEAT BELT POSITIONING DATA**

Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4x4 5-Door MPV

NHTSA No.: M20180309

Test Program: 56.3 km/h Frontal Impact NCAP Test

Test Date: 04/09/18



**FRONT VIEW OF DUMMY**

**SEAT BELT POSITIONING MEASUREMENTS**

Code	Measurement Description	Units	Driver	Passenger
PBU	Top Surface of Aluminum Plate to Belt Upper Edge	mm	350	390
PBL	Top Surface of Aluminum Plate to Belt Lower Edge	mm	280	335

**BELT LENGTH DATA**

Measurement Description	Units	Driver	Passenger
Shoulder Belt Length as Measured on ATD	mm	910	947
Lap Belt Length as Measured on ATD	mm	605	559
Remainder of Belt on Reel	mm	890	947
Total Belt Length for Continuous Webbing Systems	mm	2405	2453

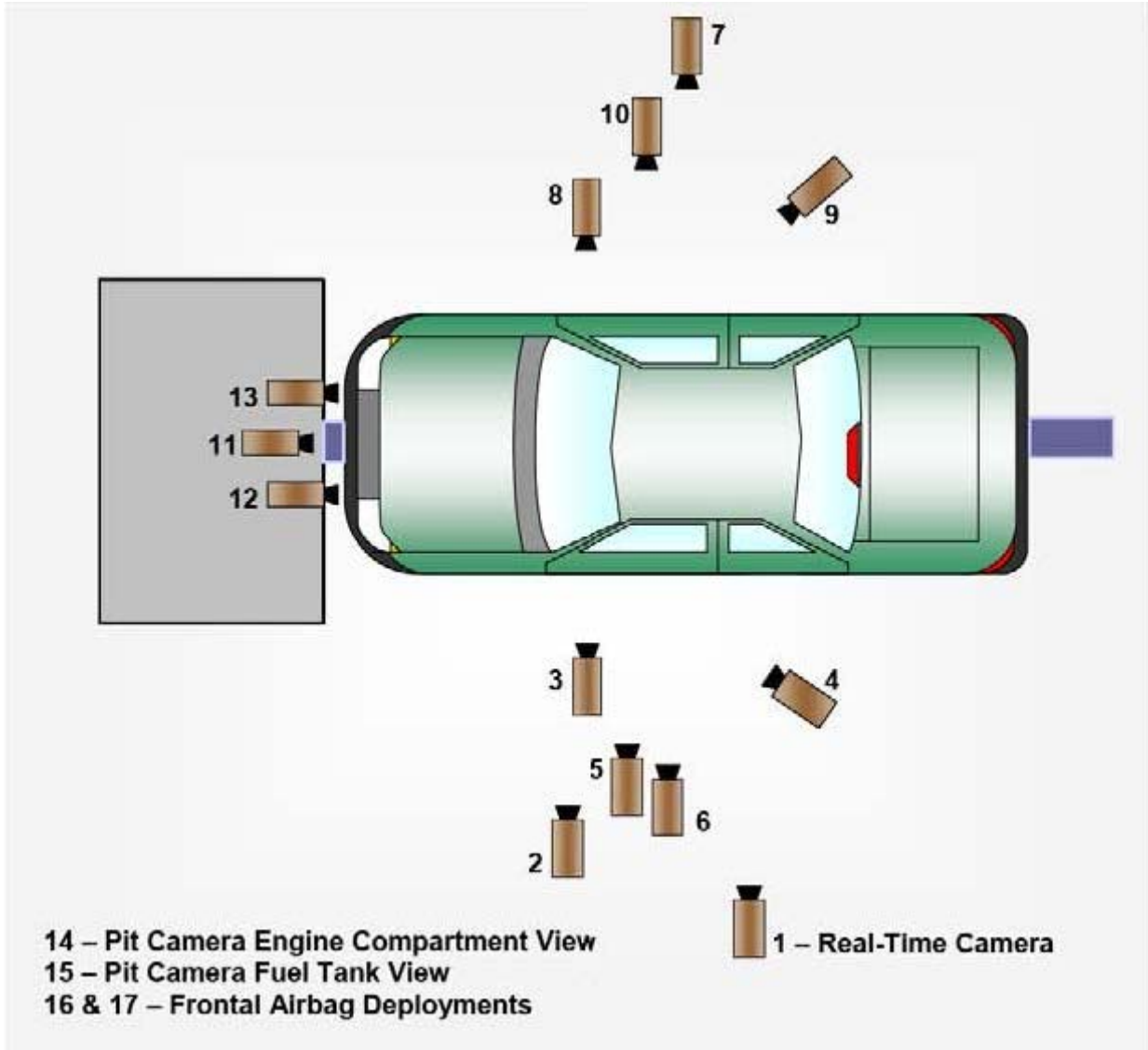
**DATA SHEET NO. 6**

**HIGH-SPEED CAMERA LOCATIONS AND DATA**

Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4x4 5-Door MPV NHTSA No.: M20180309

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 04/09/18

**CAMERA POSITIONS FOR FRONTAL IMPACTS**



**DATA SHEET NO. 6 ... (CONTINUED)**

**HIGH-SPEED CAMERA LOCATIONS AND DATA**

Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4x4 5-Door MPV      NHTSA No.: M20180309  
 Test Program: 56.3 km/h Frontal Impact NCAP Test      Test Date: 04/09/18

**CAMERA LOCATIONS**

No.	Description	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall	-11412	-8150	-1484		30
2	Driver Close-Up	-2590	-7950	-1371	50	1000
3	Left Front Half	-1701	-6197	-1701	35	1000
4	Left Angle	-6696	-10308	-3211	105	1000
5	Steering Column - Top	-1966	-10412	-3688	35	1000
6	Steering Column - Bottom	-1972	-10412	-3379	35	1000
7	Right Overall	-2336	7569	-1012	20	1000
8	Passenger Close-Up	-1733	7581	-1408	50	1000
9	Right Front Half	-1600	8214	-1811	35	1000
10	Right Angle	-6217	9516	-4830	85	1000
11	Windshield	-354	0	-5749	28	1000
12	Driver Windshield	297	-366	-2460	24	1000
13	Passenger Windshield	297	366	-2460	24	1000
14	Pit Front	-756	0	1495	20	1000
15	Pit Rear	-3398	0	1495	20	1000
16	Onboard Driver Airbag (Optional)	-1400	400	-1600	8	1000
17	Onboard Passenger Airbag (Optional)	-1400	-400	-1150	8	1000
18	Real-Time Left View of Impact					
19	Real-Time Right View of Impact					

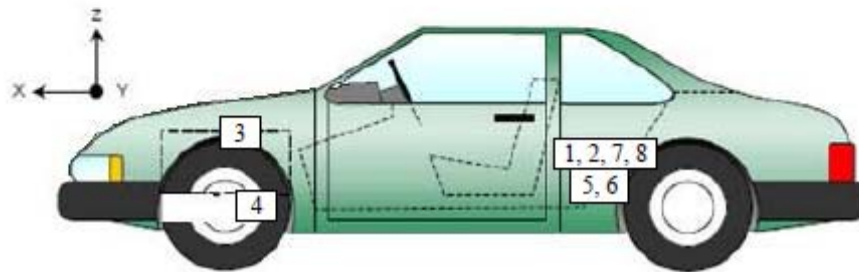
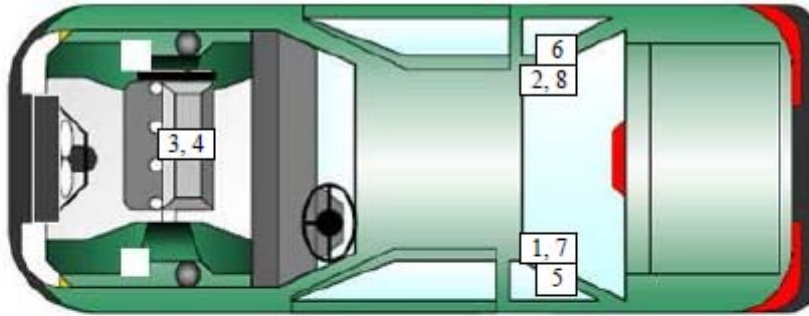
Coordinates:      +X = forward impact plane  
                          +Y = right of monorail center  
                          +Z = into ground

**DATA SHEET NO. 7**

**VEHICLE ACCELEROMETER LOCATIONS**

Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4x4 5-Door MPV NHTSA No.: M20180309

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 04/09/18



**VEHICLE ACCELEROMETER PRE-TEST LOCATIONS**

No.	Description	Location		
		X	Y	Z
1	Left Rear Accelerometer X-Direction	1800	-725	-490
2	Right Rear Accelerometer X-Direction	1800	725	-490
3	Engine Top X	3910	104	-340
4	Engine Bottom X	3800	-60	-1110
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	1800	-725	-490
8	Right Rear Accelerometer X-Direction Redundant	1800	725	-490

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**

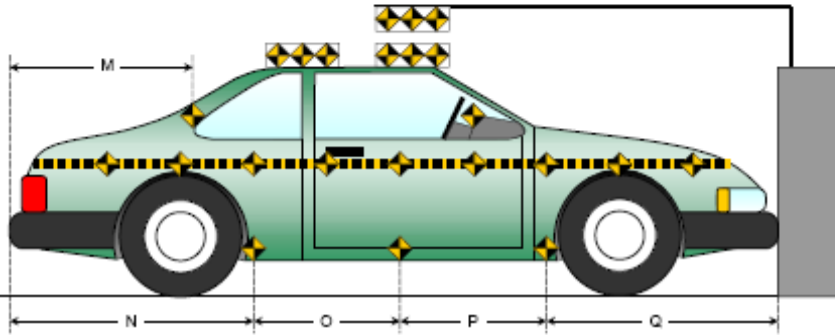
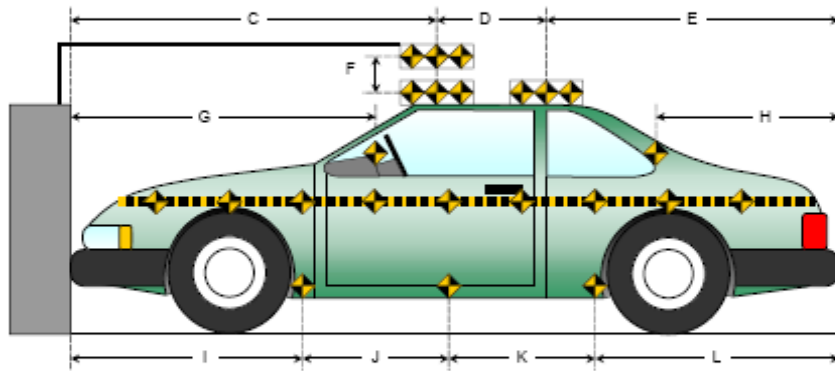
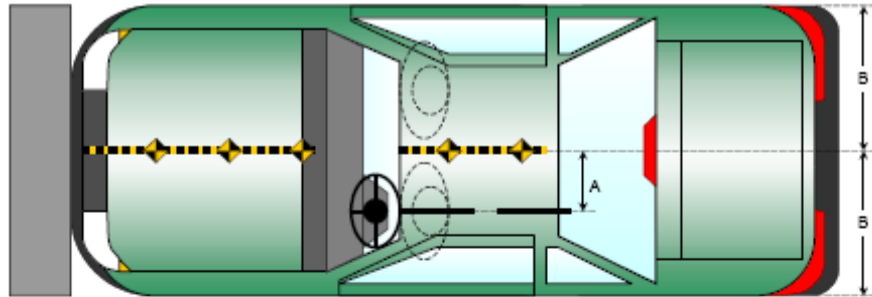
Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4x4 5-Door MPV

NHTSA No.: M20180309

Test Program: 56.3 km/h Frontal Impact NCAP Test

Test Date: 04/09/18

Item	Value
A	407
B	963
C	2335
D	610
E	1905
F	305
G	1905
H	540
I	1487
J	883
K	883
L	1593
M	540
N	1592
O	882
P	882
Q	1487



All measurements in millimeters.

**DATA SHEET NO. 9**

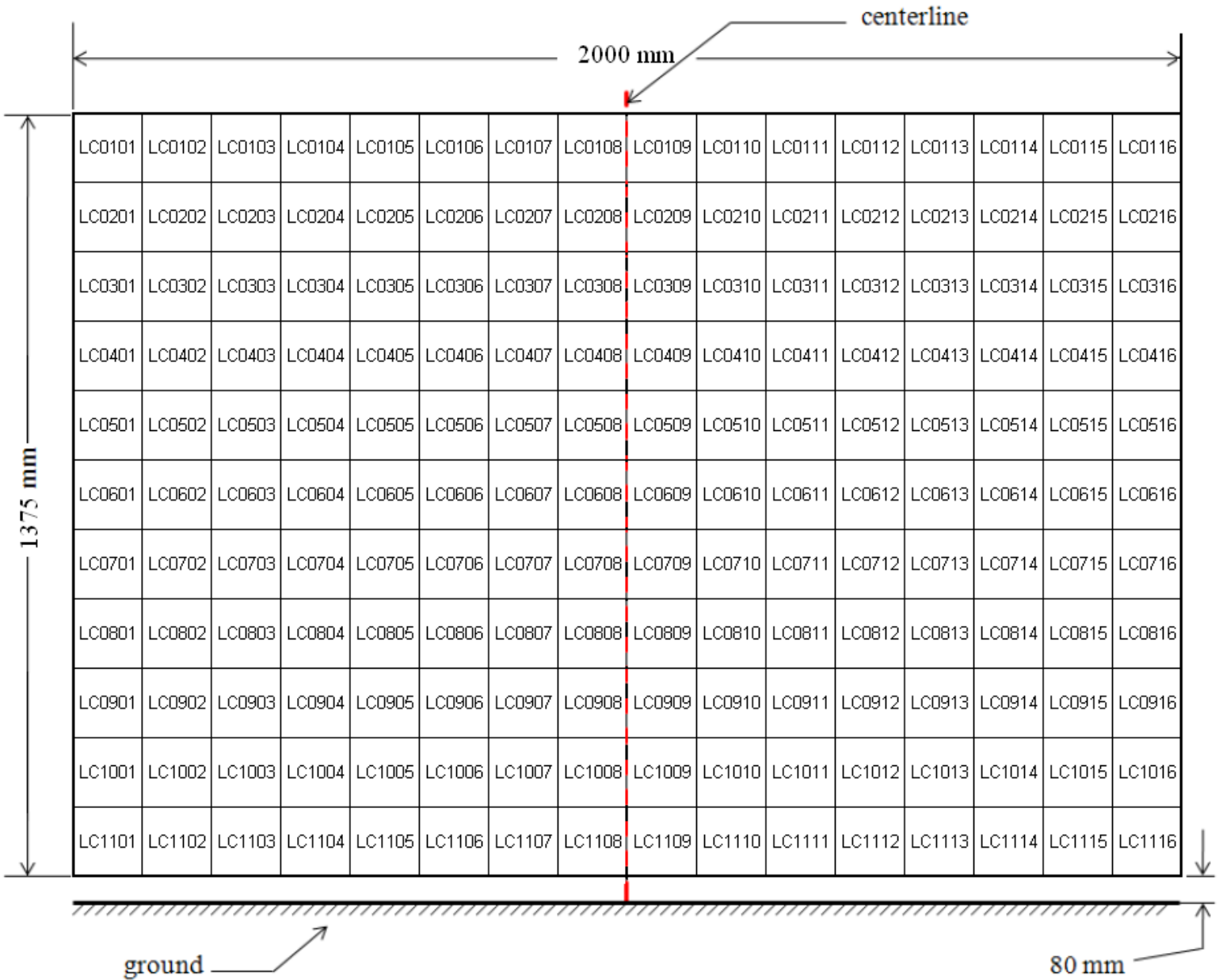
**LOAD CELL LOCATIONS ON FIXED BARRIER**

Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4x4 5-Door MPV

NHTSA No.: M20180309

Test Program: 56.3 km/h Frontal Impact NCAP Test

Test Date: 04/09/18



**DATA SHEET NO. 10**

**TEST VEHICLE CAMERA AND INSTRUMENTATION SUMMARY**

Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4x4 5-Door MPV      NHTSA No.: M20180309

Test Program: 56.3 km/h Frontal Impact NCAP Test      Test Date: 04/09/18

**INSTRUMENTATION**

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

**CAMERA COVERAGE**

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

**DATA SHEET NO. 11**  
**POST-TEST OBSERVATIONS**

Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4x4 5-Door MPV NHTSA No.: M20180309  
 Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 04/09/18

**TEST DUMMY INFORMATION AND CONTACT**

Description	Driver	Passenger
Dummy Type/Serial No.	P572E 50th Percentile Male ATD / 360	P572O 5th Percentile Female ATD / 630
Head Contact	Frontal Airbag, Headrest	Frontal Airbag, Headrest
Upper Torso Contact	Frontal Airbag	Frontal Airbag
Lower Torso Contact	None	None
Left Knee Contact	Knee Airbag	Knee Bolster
Right Knee Contact	Knee Airbag	Knee Bolster

**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)	8	11
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	Spillage of transmission fluid, gear oil, and Stoddard solvent.

**VEHICLE REBOUND FROM BARRIER**

Measured Parameter	Units	Value
Left Side	mm	645
Center	mm	904
Right Side	mm	865
Average	mm	886

**SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION**

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

# DATA SHEET NO. 12

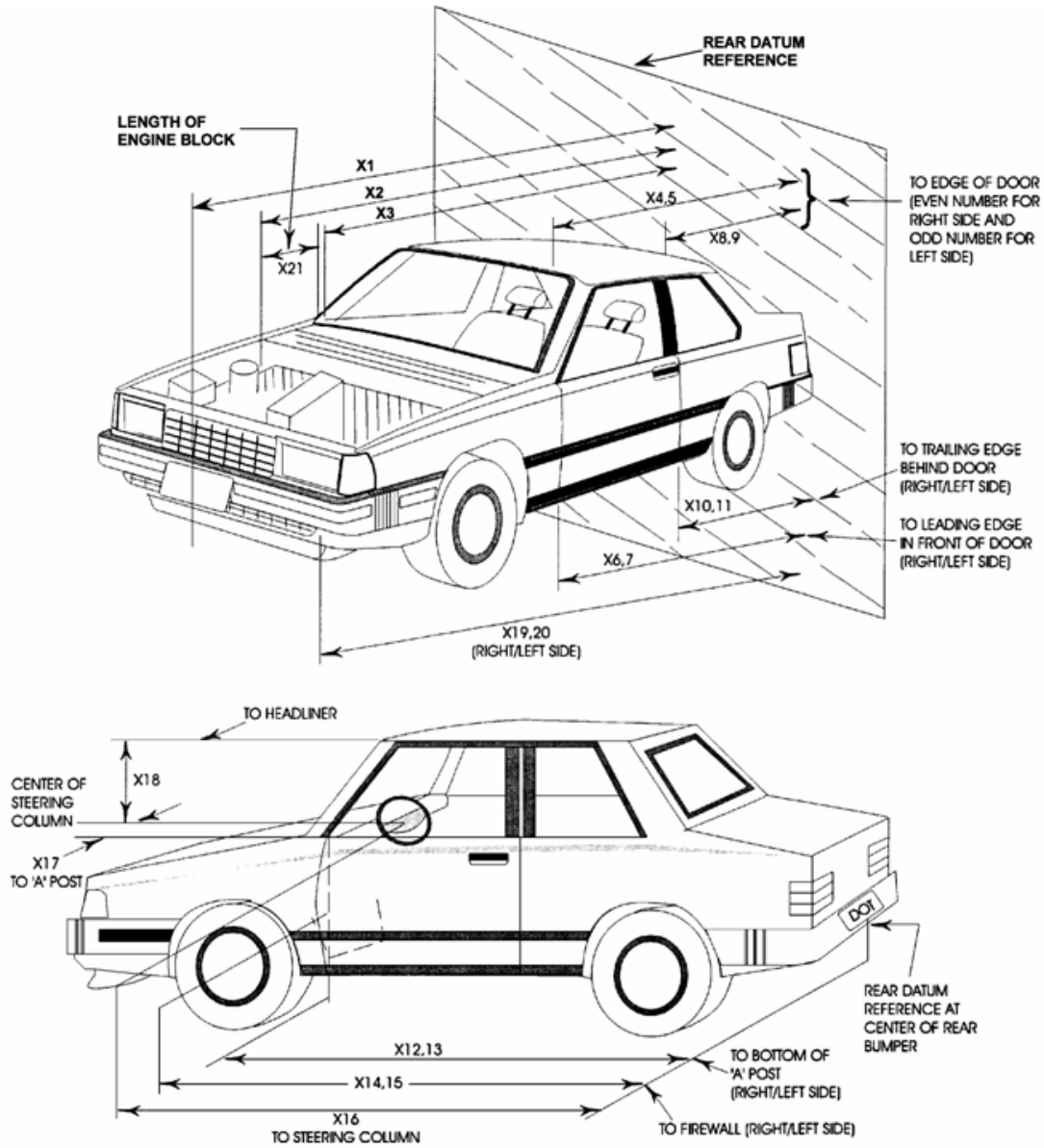
## VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4x4 5-Door MPV

NHTSA No.: M20180309

Test Program: 56.3 km/h Frontal Impact NCAP Test

Test Date: 04/09/18



**DATA SHEET NO. 12 ... (CONTINUED)**

**VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4x4 5-Door MPV      NHTSA No.: M20180309  
 Test Program: 56.3 km/h Frontal Impact NCAP Test      Test Date: 04/09/18

No.	Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	4855	4255	-600
2	Rear Surface of Vehicle to Front of Engine	4345	4040	-305
3	RSOV to Firewall	3710	3711	1
4	RSOV to Upper Leading Edge of Right Door	3320	3325	5
5	RSOV to Upper Leading Edge of Left Door	3317	3340	23
6	RSOV to Lower Leading Edge of Right Door	3285	3268	-17
7	RSOV to Lower Leading Edge of Left Door	3285	3275	-10
8	RSOV to Upper Trailing Edge of Right Door	2201	2200	-1
9	RSOV to Upper Trailing Edge of Left Door	2180	2205	25
10	RSOV to Lower Trailing Edge of Right Door	2205	2186	-19
11	RSOV to Lower Trailing Edge of Left Door	2205	2194	-11
12	RSOV to Bottom of A-Pillar, Right Side	3213	3226	13
13	RSOV to Bottom of A-Pillar, Left Side	3216	3236	20
14	RSOV to Firewall, Right Side	3725	3729	4
15	RSOV to Firewall, Left Side	3715	3721	6
16	RSOV to Steering Column	2735	2880	145
17	Center of Steering Column to A-Pillar	430	435	5
18	Center of Steering Column to Headliner	415	450	35
19	RSOV to Right Side of Front Bumper	4235	4435	200
20	RSOV to Left Side of Front Bumper	4235	4578	343
21	Length of Engine Block	580	580	0
RD	RSOV to Right Side of Dash Panel	3005	2975	-30
CD	RSOV to Center of Dash Panel	2895	2840	-55
LD	RSOV to Left Side of Dash Panel	3005	2990	-15

All measurements in millimeters.

**DATA SHEET NO. 13**

**ACCIDENT INVESTIGATION DIVISION DATA**

Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4x4 5-Door MPV      NHTSA No.: M20180309  
 Test Program: 56.3 km/h Frontal Impact NCAP Test      Test Date: 04/09/18

**VEHICLE INFORMATION**

VIN: 1C4RJFAG8JC108479      Wheelbase (mm): 2925  
 Vehicle Size Category: MPV      Test Weight (kg): 2360.5

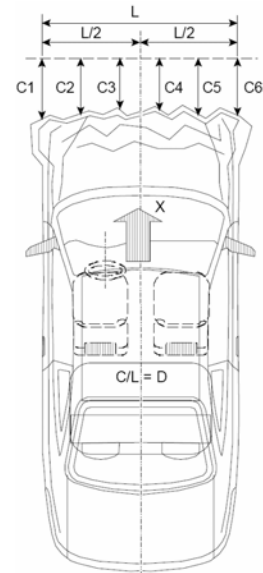
**ACCELEROMETER DATA**

Accelerometer Locations: Left Rear Crossmember  
 Cal. Procedure/Interval: Vibration Test / 6 months  
 Integration Algorithm: NHTSA Standard  
 Impact Velocity (km/h): 56.65  
 Velocity Change (km/h): 63.5  
 Time of Separation (msec): 78.5

Linearity: Good

**CRUSH PROFILE**

Collision Deformation Classification: 12FDEW2  
 Midpoint of Damage: DPD3  
 Damage Region Length (mm): 1470  
 Impact Mode: Full Frontal



No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush Zone 1 at Left Side	mm	220	475	255
C2	Crush Zone 2 at Left Side	mm	75	620	545
C3	Crush Zone 3 at Left Side	mm	30	631	601
C4	Crush Zone 4 at Right Side	mm	30	630	600
C5	Crush Zone 5 at Right Side	mm	75	618	543
C6	Crush Zone 6 at Right Side	mm	220	566	346
L	C1 to C6	mm	1470		

**DATA SHEET NO. 14**

**VEHICLE INTRUSION MEASUREMENTS**

Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4x4 5-Door MPV NHTSA No.: M20180309

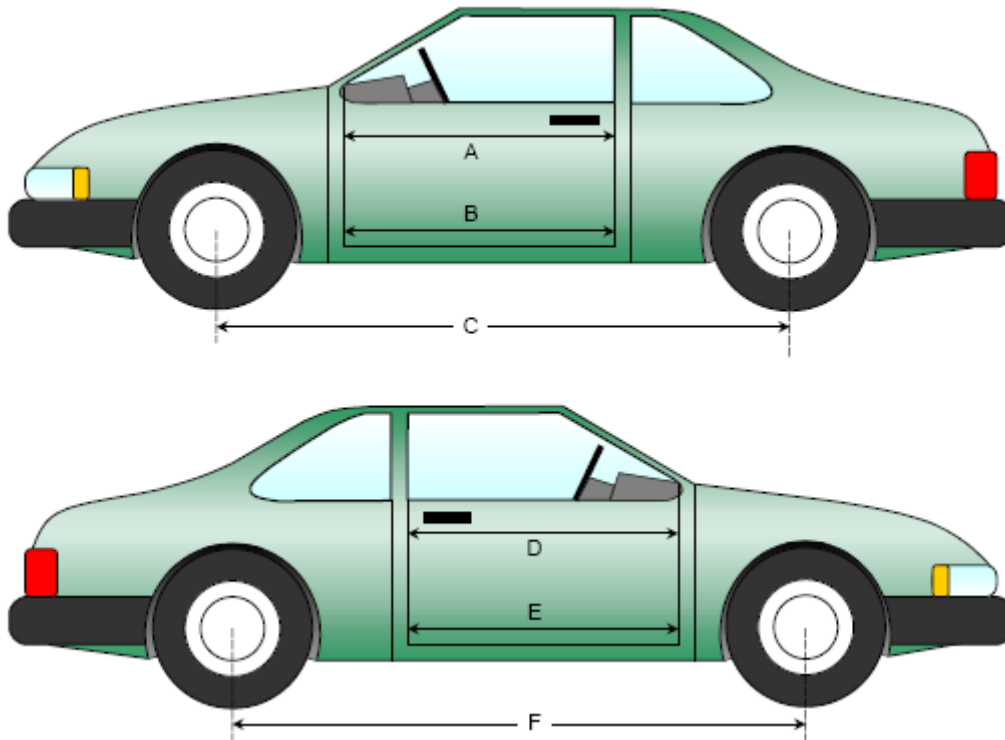
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 04/09/18

**DOOR OPENING WIDTH**

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	973	968	5
B	Left Side Lower	mm	848	849	-1
D	Right Side Upper	mm	971	967	4
E	Right Side Lower	mm	839	831	8

**WHEELBASE MEASUREMENTS**

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2925	2785	140
F	Right Side Wheelbase	mm	2925	2785	140



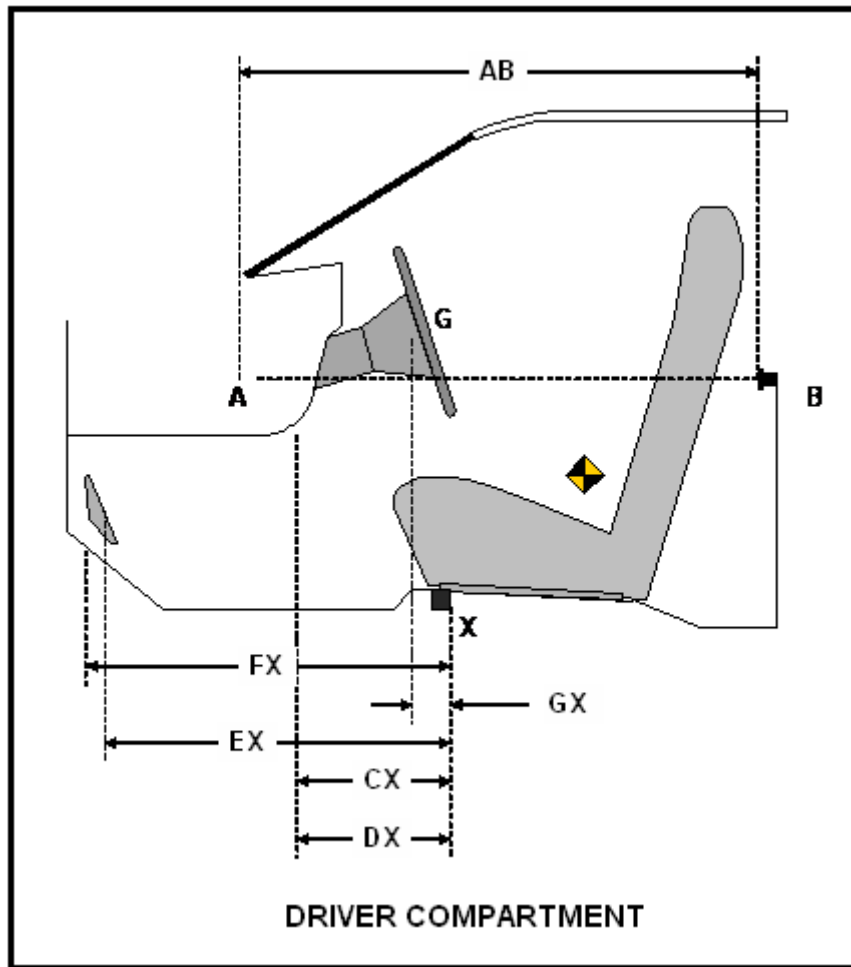
**DATA SHEET NO. 14 ... (CONTINUED)**  
**VEHICLE INTRUSION MEASUREMENTS**

Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4x4 5-Door MPV      NHTSA No.: M20180309  
 Test Program: 56.3 km/h Frontal Impact NCAP Test      Test Date: 04/09/18

**DRIVER COMPARTMENT INTRUSION**

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	891	883	8
CX	Left Knee Bolster to X	mm	320	260	60
DX	Right Knee Bolster to X	mm	320	260	60
EX	Brake Pedal to X	mm	545	465	80
FX	Foot Rest to X	mm	620	540	80
GX	Center of Steering Wheel Hub to X	mm	30	80	-50

X = Front of Seat Track (Stationary)



**DATA SHEET NO. 15**

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

Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4x4 5-Door MPV      NHTSA No.: M20180309  
 Test Program: 56.3 km/h Frontal Impact NCAP Test      Test Date: 04/09/18

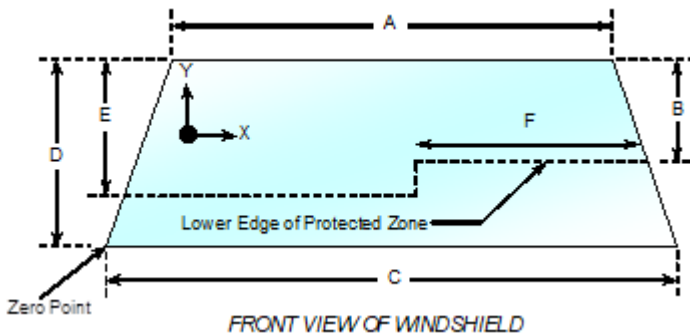
Windshield Mounting Details: Windshield glass is secured to the vehicle frame with plastic molding and rubber cement.

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

Temperature of windshield molding during test: 21.1° C

**WINDSHIELD PERIPHERY MEASUREMENTS**

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2271	2271	100.0%
Right Side	2271	2271	100.0%
Total	4542	4542	100.0%



Item	Units	Value
A	mm	1322
B	mm	330
C	mm	1510
D	mm	855
E	mm	485
F	mm	530

**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 Jeep Grand Cherokee Laredo 4x4 5-Door MPV      NHTSA No.: M20180309  
Test Program: 56.3 km/h Frontal Impact NCAP Test      Test Date: 04/09/18

**FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA**

Temperature at Time of Impact: 30.0° C      Test Time: 1:56 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: 0.42 oz.  
(Maximum allowable = 5 oz.)
- C. For the following 25 minutes: 0 oz.  
(Maximum allowable = 1 oz./minute)
- D. Spillage: The Stoddard solvent spillage measured during the five (5) minute period after vehicle motion ceased was 0.42 oz. Spillage was seen coming from the front engine compartment on the left side of the vehicle.

**DATA SHEET NO. 16**

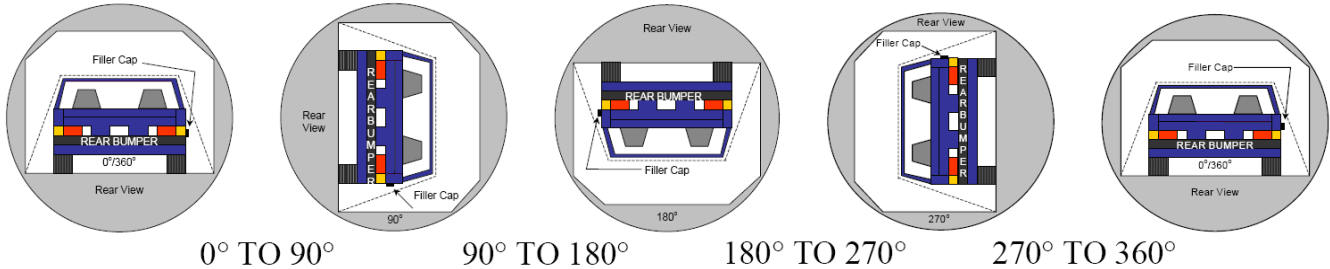
**FMVSS 301 STATIC ROLLOVER RESULTS**

Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4x4 5-Door MPV

NHTSA No.: M20180309

Test Program: 56.3 km/h Frontal Impact NCAP Test

Test Date: 04/09/18



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°	81	300	381
90° To 180°	80	300	380
180° To 270°	79	300	379
270° To 360°	81	300	381

**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**

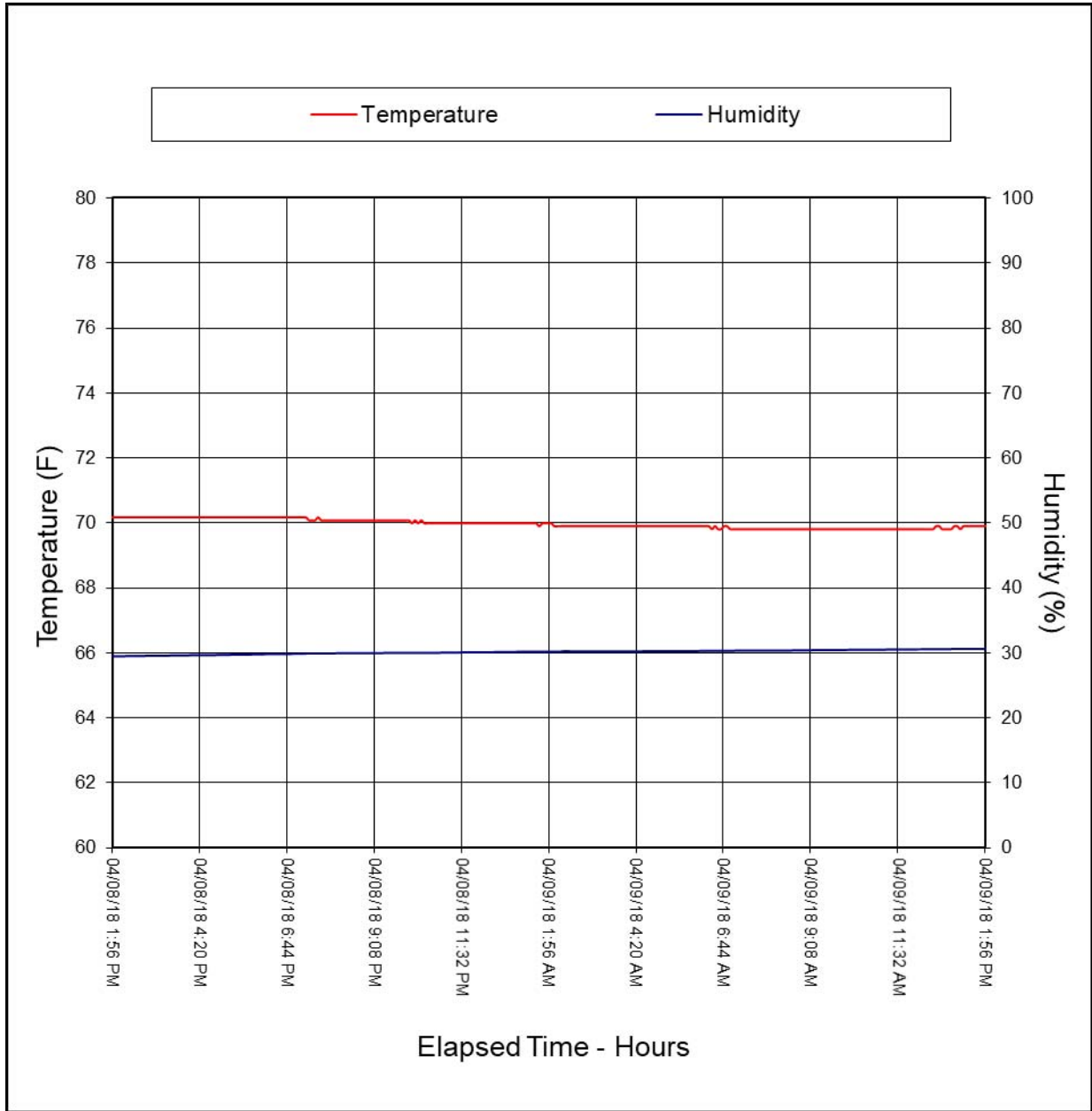
**DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART**

Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4x4 5-Door MPV

NHTSA No.: M20180309

Test Program: 56.3 km/h Frontal Impact NCAP Test

Test Date: 04/09/18



**APPENDIX A  
PHOTOGRAPHS**

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FIGURE 1. Load Cell Location

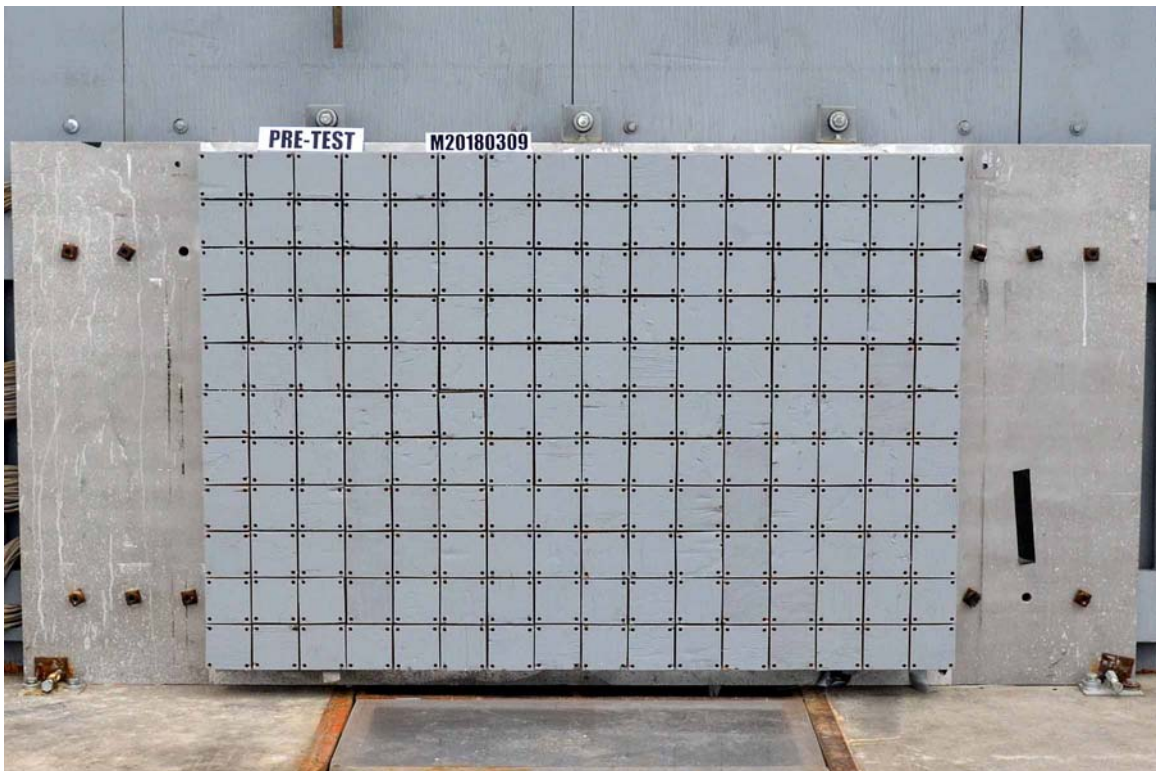


FIGURE 2. Pre-Test Load Cell Wall

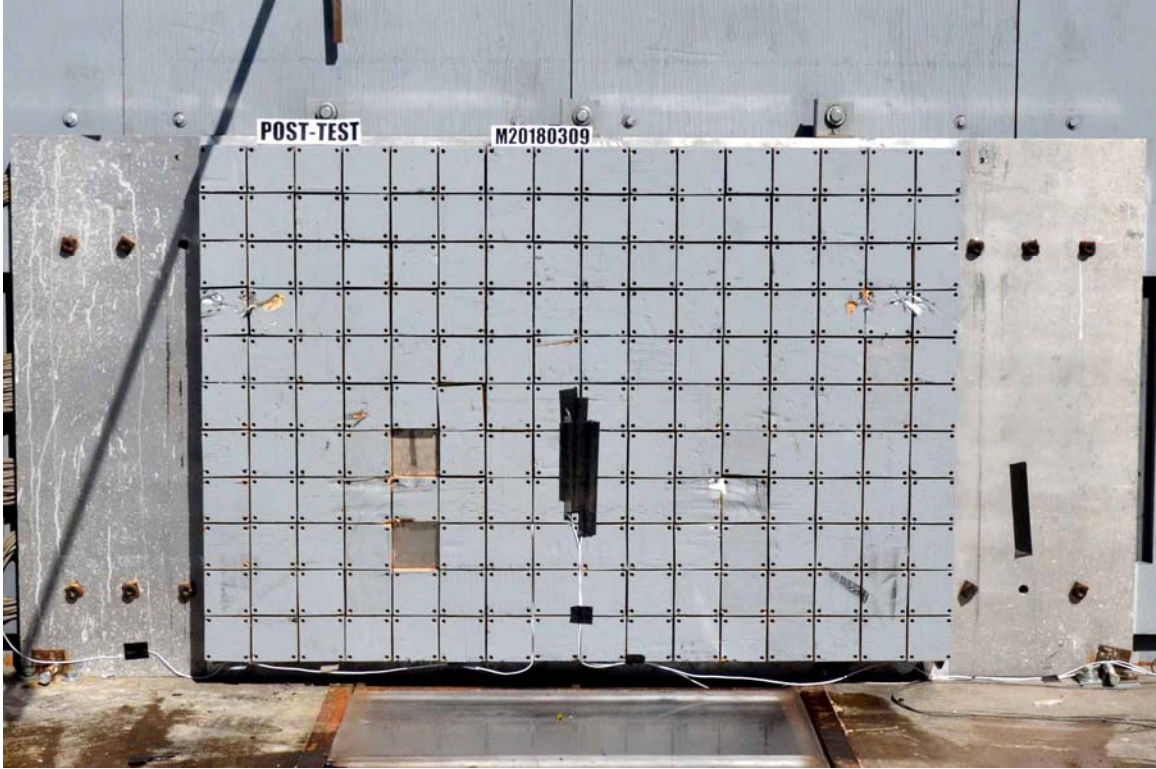


FIGURE 3. Post-Test Load Cell Wall



FIGURE 4. Manufacturer's Label

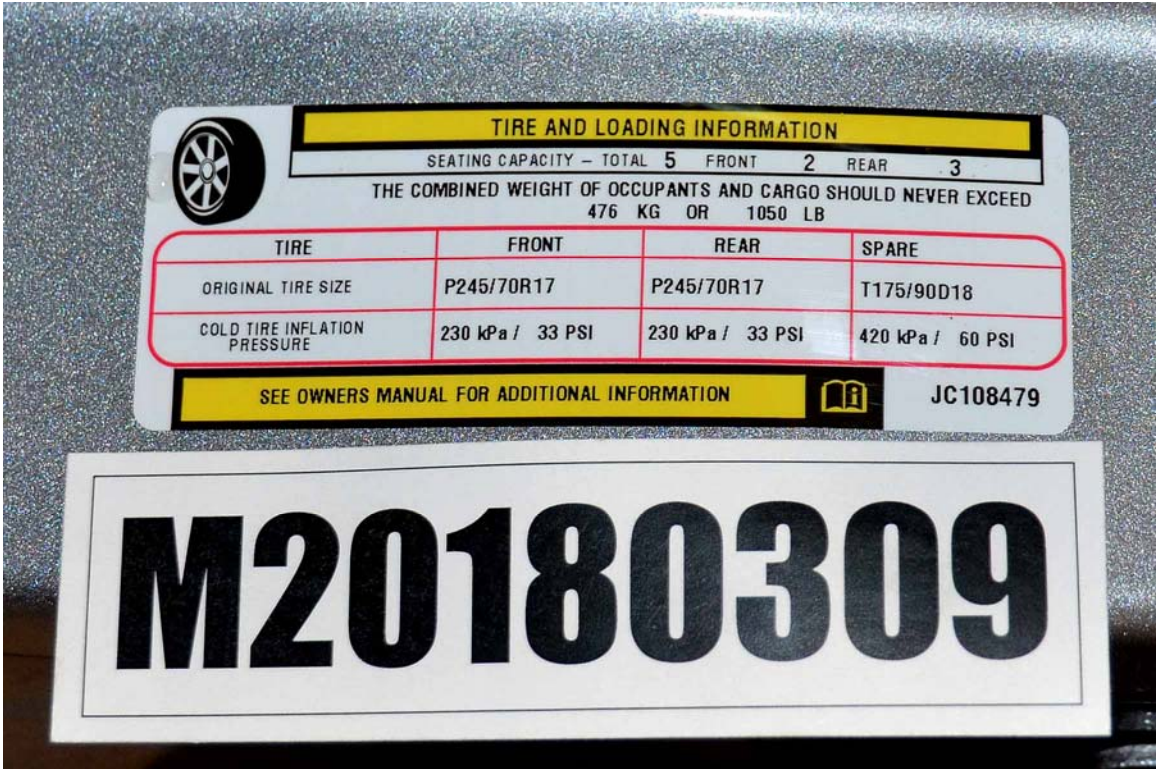


FIGURE 5. Tire Placard



FIGURE 6. 2018 Jeep Grand Cherokee Laredo 4X4 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 3/4 View



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



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



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

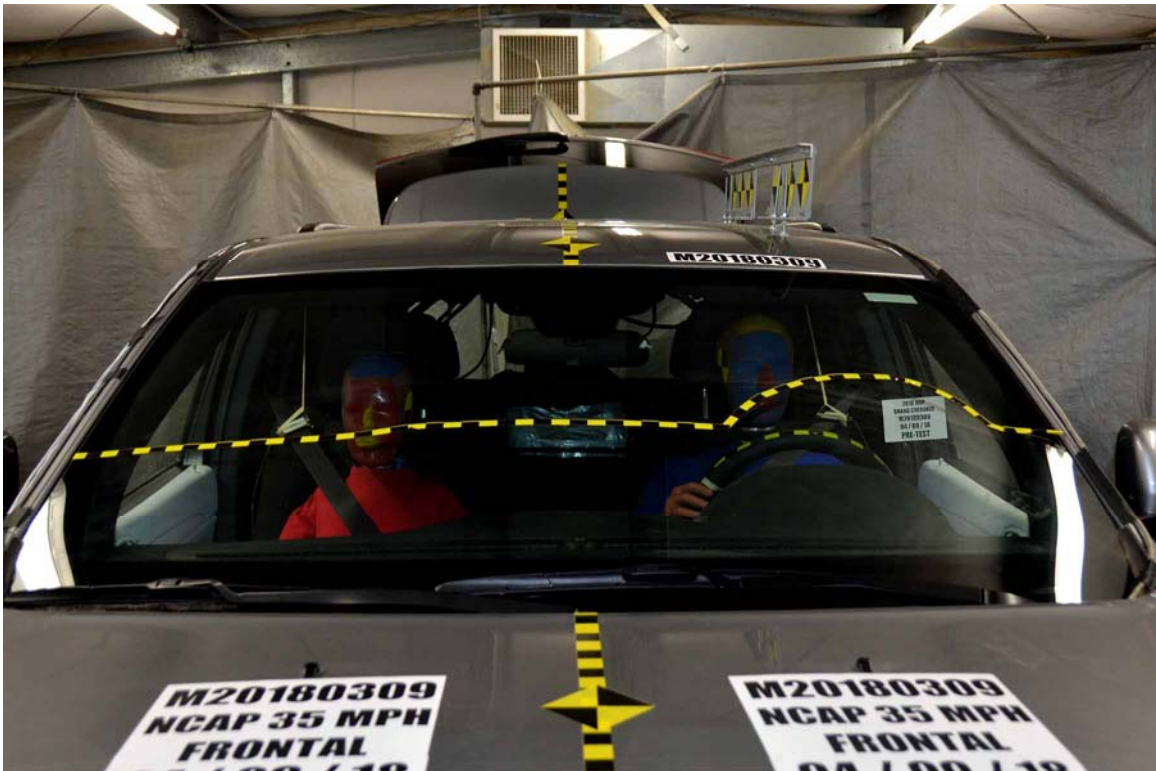


FIGURE 18. Pre-Test Windshield View



FIGURE 19. Post-Test Windshield View



FIGURE 20. Pre-Test Engine Compartment View



FIGURE 21. Post-Test Engine Compartment View



FIGURE 22. Pre-Test Fuel Filler Cap View



FIGURE 23. Post-Test Fuel Filler Cap View

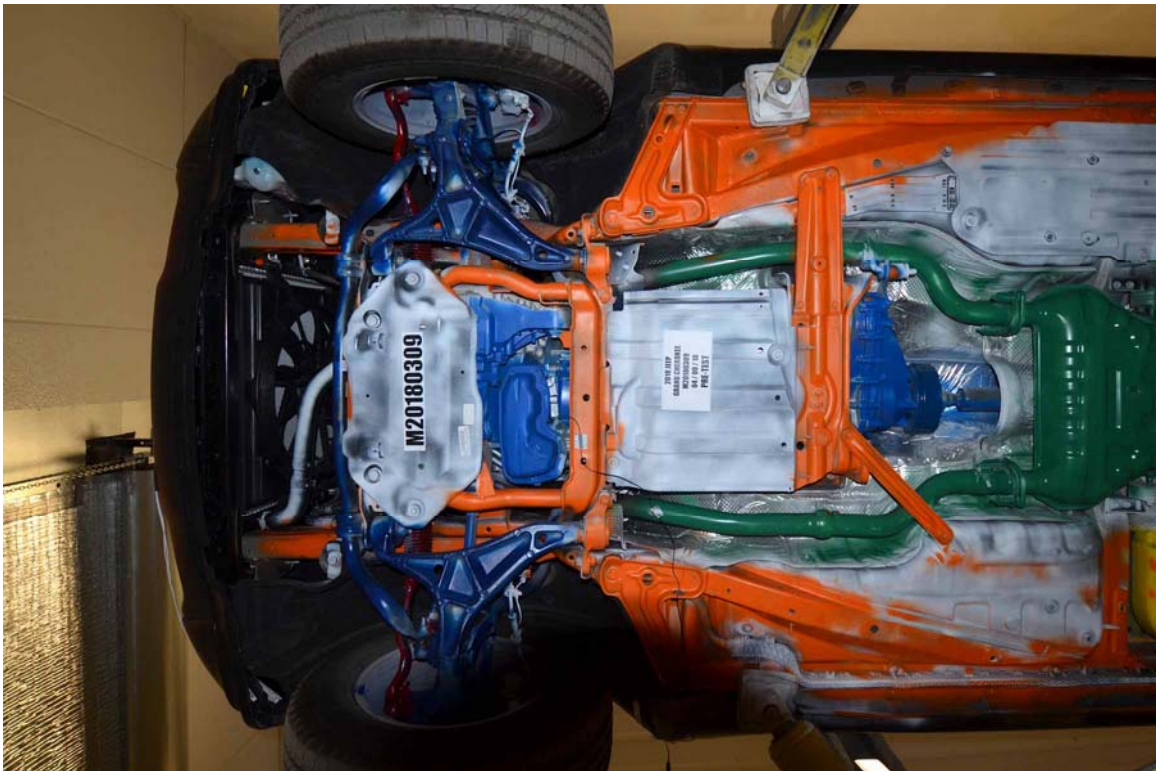


FIGURE 24. Pre-Test Front Underbody View



FIGURE 25. Post-Test Front Underbody View

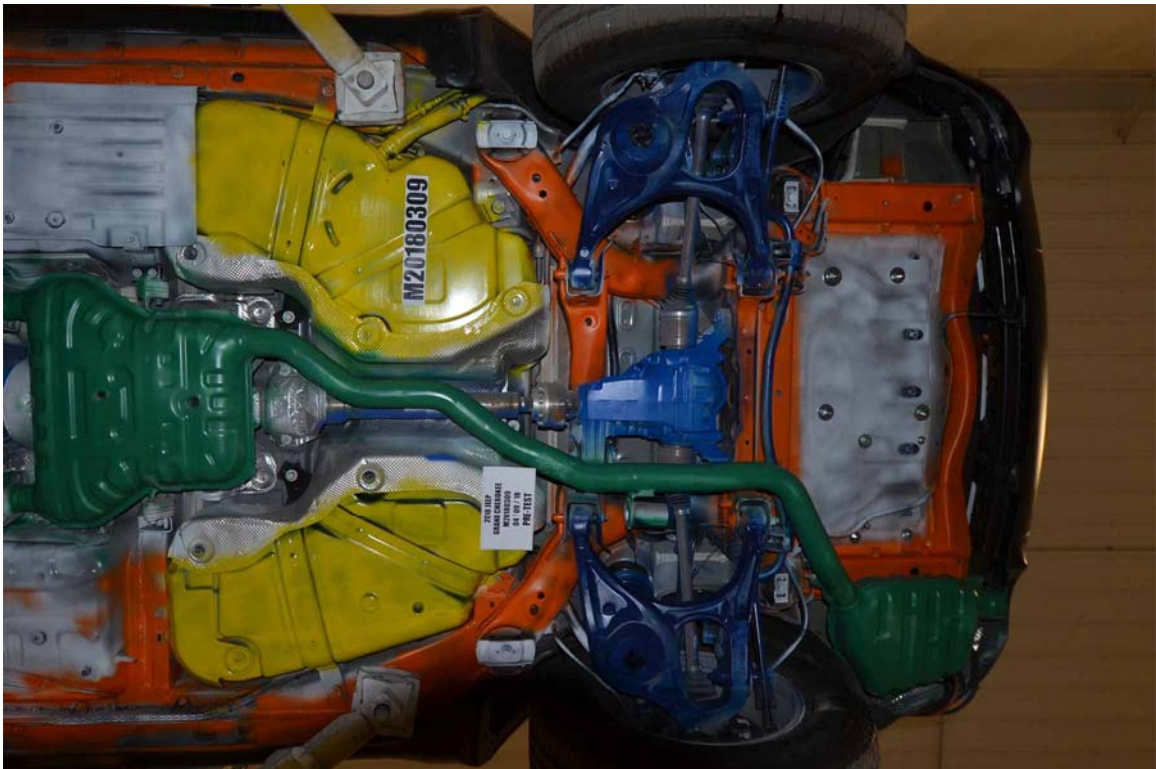


FIGURE 26. Pre-Test Rear Underbody View

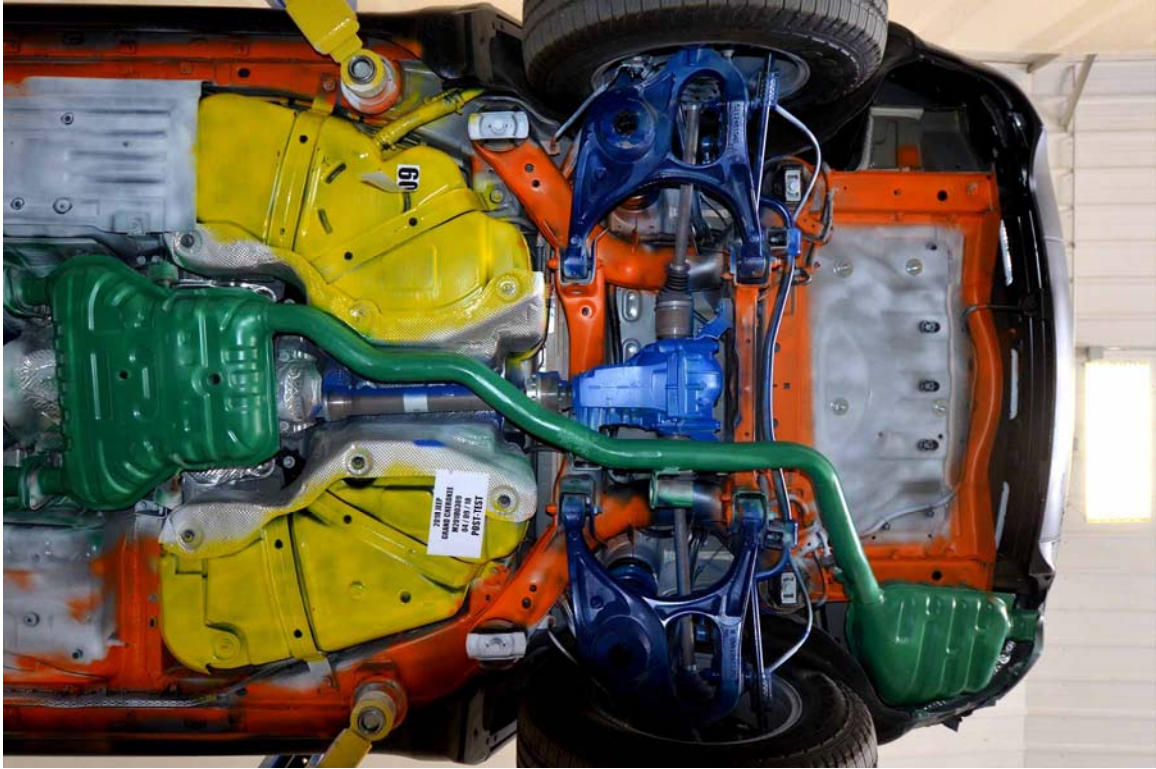


FIGURE 27. Post-Test Rear Underbody View



FIGURE 28. Pre-Test Dummy Cable Routing



FIGURE 29. Post-Test Dummy Cable Routing

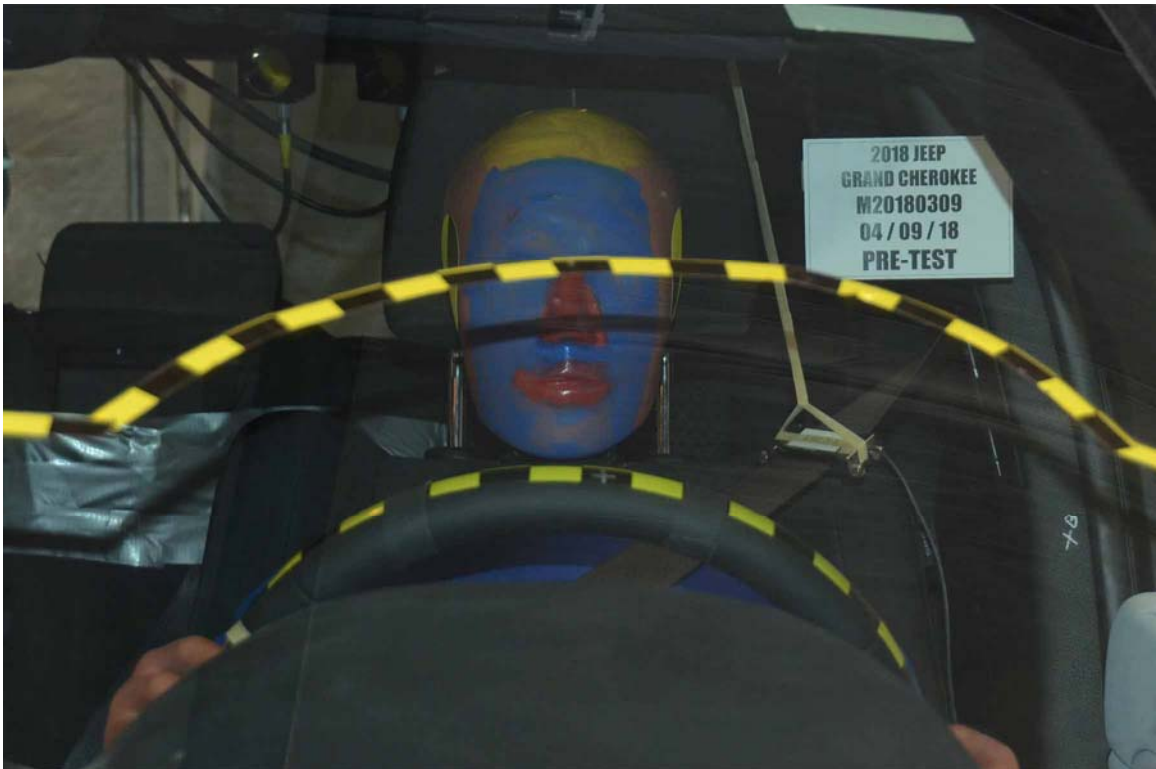


FIGURE 30. Pre-Test Driver Dummy Front View



FIGURE 31. Post-Test Driver Dummy Front View



FIGURE 32. Pre-Test Driver Dummy Window View



FIGURE 33. Post-Test Driver Dummy Window View



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



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



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



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



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



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



FIGURE 40. Pre-Test Driver Dummy Feet



FIGURE 41. Post-Test Driver Dummy Feet



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



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



FIGURE 44. Pre-Test Driver's Side Floorpan



FIGURE 45. Post-Test Driver's Side Floorpan



FIGURE 46. Post-Test Driver Dummy Face



FIGURE 47. Post-Test Driver Dummy Contact with Airbag



FIGURE 48. Post-Test Driver Dummy Contact with Headrest



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



FIGURE 49. Pre-Test View of the Steering Wheel



FIGURE 50. Post-Test View of the Steering Wheel



FIGURE 51. Pre-Test Passenger Dummy Front View



FIGURE 52. Post-Test Passenger Dummy Front View



FIGURE 53. Pre-Test Passenger Dummy Window View



FIGURE 54. Post-Test Passenger Dummy Window View.



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



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



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



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



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



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



FIGURE 61. Pre-Test Passenger Dummy Feet



FIGURE 62. Post-Test Passenger Dummy Feet



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



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



FIGURE 65. Pre-Test Passenger's Side Floorpan



FIGURE 66. Post-Test Passenger's Side Floorpan



FIGURE 67. Post-Test Passenger Dummy Face



FIGURE 68. Post-Test Passenger Dummy Contact with Airbag



FIGURE 69. Post-Test Passenger Dummy Contact with Headrest



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



FIGURE 70. Photograph of Ballast Installed in Vehicle



FIGURE 71. Post-Test Stoddard Solvent Spillage Location View



FIGURE 71a. Post-Test Stoddard Solvent Spillage Location View



FIGURE 71b. Post-Test Stoddard Solvent Spillage Location View



FIGURE 72. Post-Test Speed Trap Read-Out

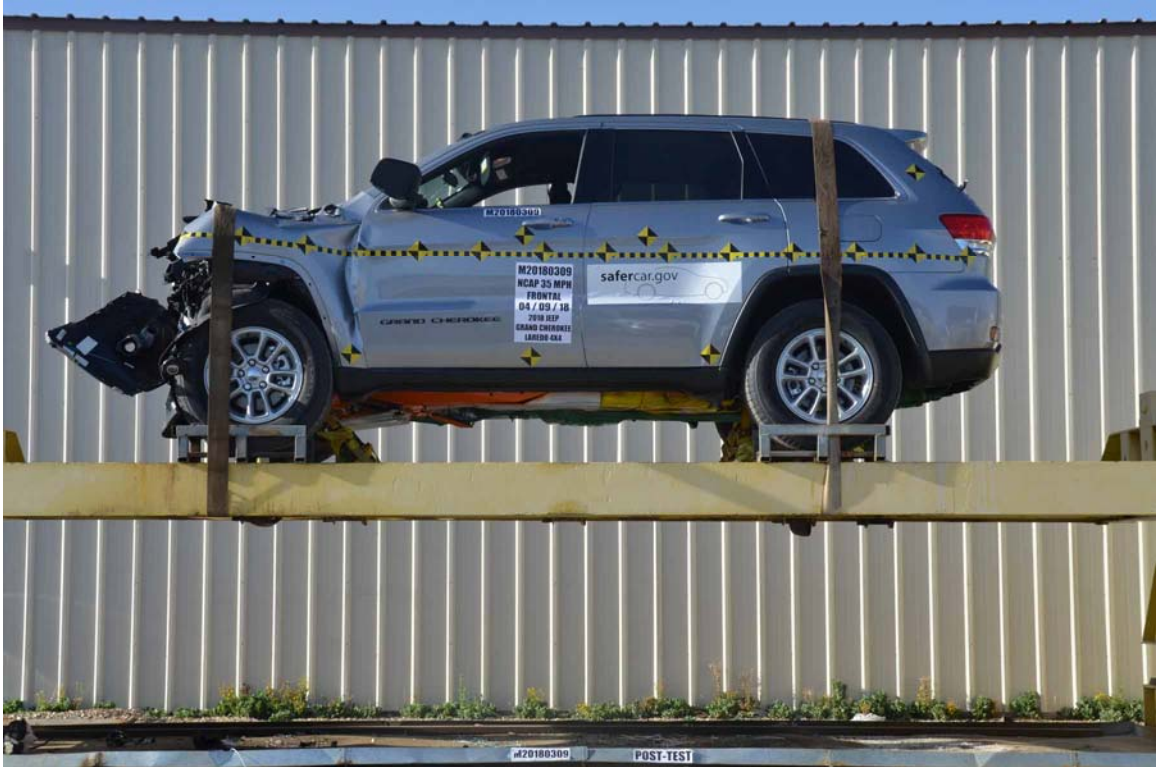


FIGURE 73. Vehicle at 0° on Static Rollover Device



FIGURE 74. Vehicle at 90° on Static Rollover Device



FIGURE 75. Vehicle at 180° on Static Rollover Device

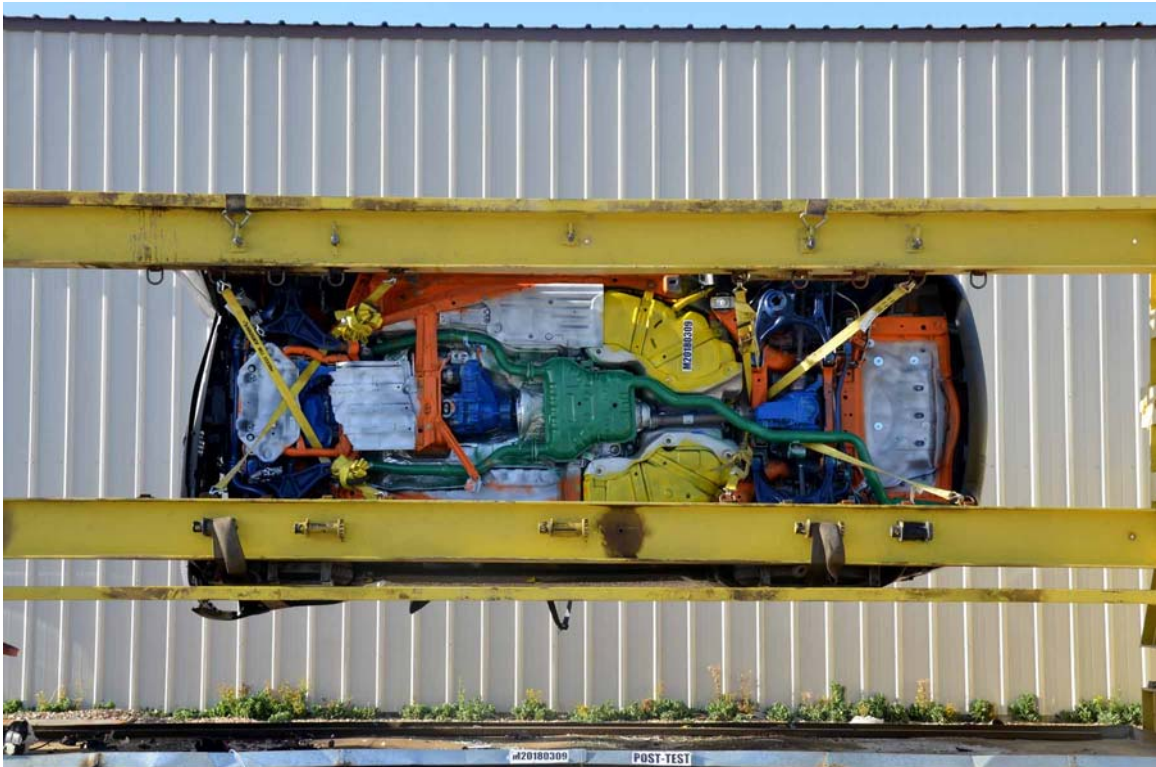


FIGURE 76. Vehicle at 270° on Static Rollover Device



FIGURE 77. Vehicle at 360° on Static Rollover Device



FIGURE 78. 2018 Jeep Grand Cherokee Laredo 4X4 Frontal Impact Event

**Jeep** 2018 MODEL YEAR  
**GRAND CHEROKEE LAREDO 4X4**

THIS VEHICLE IS MANUFACTURED TO MEET SPECIFIC UNITED STATES REQUIREMENTS. THIS VEHICLE IS NOT MANUFACTURED FOR SALE OR REGISTRATION OUTSIDE OF THE UNITED STATES.

**MANUFACTURER'S SUGGESTED RETAIL PRICE OF THIS MODEL, INCLUDING DEALER PREPARATION**

**Base Price: \$32,895**

**JEEP GRAND CHEROKEE LAREDO 4X4**  
Exterior Color: Silver Metallic Clear Coat Exterior Paint  
Interior Color: Black Interior Color  
Interior: Cloth Bucket Seats

Engine: 3.6-Liter V6 24-Valve VVT Engine with ESS  
Transmission: 8-Speed Automatic Transmission

**STANDARD EQUIPMENT (UNLESS REPLACED BY OPTIONAL EQUIPMENT)**

**FUNCTIONAL/SAFETY FEATURES**

- Advanced Multistage Front Airbags
- Supplemental Side-Curtain Front and Rear Airbags
- Supplemental Front Seat-Mounted Side Airbags
- Driver Inflatable Knee-Bolster Airbag
- LATCH Ready Child Seat Anchor System
- Quadra-Trac I8 4WD System
- ParkView® Rear Back-Up Camera
- ParkSense® Rear Park Assist with Stop
- Keyless Enter-N-Go™
- Rear View Day / Night Mirror
- Sentry Key® Theft Deterrent System
- Cruise Control
- Ready Alert Braking
- Electronic Stability Control
- Anti-Lock 4-Wheel Disc Brakes
- Hill Start Assist
- Traction Sway Damping
- Tire Pressure Monitoring Display
- Compact Spare Tire

**INTERIOR FEATURES**

- Uconnect® 4 with 7-inch Display
- Apple CarPlay® Capable
- Google Android Auto™ Capable
- Media Hub (2 USB, Aux)
- Integrated Voice Command with Bluetooth®
- 8 Speakers
- Dual-Zone Automatic Temperature Control
- Leather-Wrapped Steering Wheel
- Leather-Wrapped Shift Knob
- Front and Rear Interior LED Lamps
- Illuminated Cup Holders

- Deep Tint Sunscreen Glass
  - 7.0-inch LCD Instrument Cluster with Tachometer Illuminated Entry
  - 12-Volt Auxiliary Power Outlet
  - Steering Wheel Mounted Audio Controls
  - Exterior Temperature and Compass Display
- EXTERIOR FEATURES**
- 17-inch x 8-inch Silver Aluminum Wheels
  - P245/70R17 BSW On/Off-Road Tires
  - Gummetal Headlamp Shells
  - Halogen Quad Headlamps
  - Low Beam Daytime Running Headlamps
  - Premium Fog Lamps
  - LED Tail Lamps
  - Capless Fuel Fill
  - Power Heated Exterior Mirrors w/ Manual Fold-Away

**OPTIONAL EQUIPMENT (May Replace Standard Equipment)**

Customer Preferred Package Z8A

**DESTINATION CHARGE \$1,095**

**TOTAL PRICE: \* \$33,990**

**WARRANTY COVERAGE**

5-year or 60,000-mile Powertrain Limited Warranty, 3-year or 36,000-mile Basic Limited Warranty. Ask Dealer for a copy of the limited warranties or see your owner's manual for details.

**5 YEAR / 60,000 MILE POWERTRAIN WARRANTY**

Assembly Point/Port of Entry: DETROIT, MICHIGAN, U.S.A.

104-RJ-PAGSJD-108179 140000 1108

ST CHARLES CHRYSLER DOODGE JEEP ST CHARLES CHRYSLER DOODGE JEEP  
ST CHARLES ST CHARLES  
6 80174-2343 IL 60174-2343

THIS LABEL IS ADDED TO THIS VEHICLE TO COMPLY WITH FEDERAL LAW. THE LABEL CANNOT BE REMOVED OR ALTERED PRIOR TO DELIVERY TO THE ULTIMATE PURCHASER.

\* EXcludes freight, taxes, title, license, and dealer supplies and fees. Dealer price may vary. Dealer price is based on price of options if purchased separately.

For more information visit: [www.jeep.com](http://www.jeep.com)  
or call 1-877-IAM-JEEP

FCA US LLC

**EPA DOT Fuel Economy and Environment Gasoline Vehicle**

**Fuel Economy**

**21** MPG  
combined city/hwy

18 25  
city highway

4.8 gallons per 100 miles

Standard SUV 4WD range from 12 to 63 MPG. The best vehicle rates 136 MPG.

**You spend \$1,750 more in fuel costs over 5 years compared to the average new vehicle.**

**Annual fuel Cost \$1,700**

**Fuel Economy & Greenhouse Gas Rating (tailpipe only)**

1 4 10 Best

**Smog Rating (tailpipe only)**

1 5 10 Best

This vehicle emits 427 grams CO2 per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also creates emissions. Learn more at [fuel-economy.gov](http://fuel-economy.gov)

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 27 MPG and costs \$6,700 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$2.40 per gallon. MPG is miles per gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

**fuel-economy.gov**  
Calculate personalized estimates and compare vehicles.

SEARCH OUR CAR CODE

**GOVERNMENT 5-STAR SAFETY RATINGS**

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

Frontal Crash	Driver Passenger	Not Rated
Not Rated	Not Rated	Not Rated

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

Side Crash	Front seat	★★★★★
Rear seat	★★★★★	

Based on the risk of injury in a side impact.

Rollover	★★★★★
----------	-------

Based on the risk of rollover in a single-vehicle crash.

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

The safety ratings above are based on Federal Government tests of particular vehicles equipped with certain features and options. The performance of this vehicle may differ.

**PARTS CONTENT INFORMATION**

**FOR VEHICLES IN THIS CARLINE:**  
U.S./CANADIAN PARTS CONTENT: 61%  
MAJOR SOURCES OF FOREIGN PARTS CONTENT:

**MEXICO: 27%**  
NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.

**FOR THIS VEHICLE:**  
FINAL ASSEMBLY POINT:  
DETROIT, MICHIGAN, U.S.A.  
COUNTRY OF ORIGIN:  
ENGINE: MEXICO  
TRANSMISSION: UNITED STATES

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

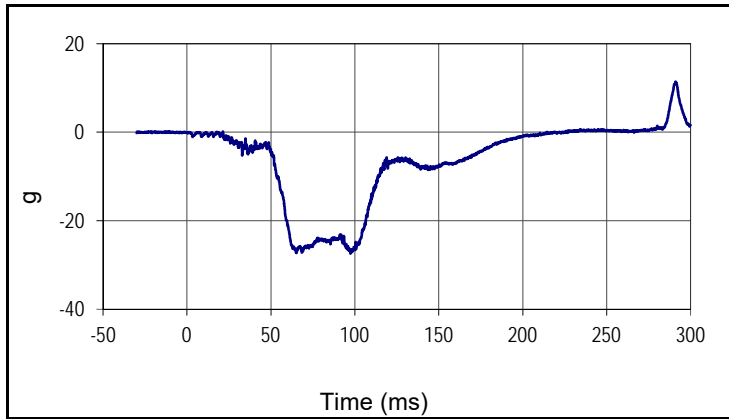
The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at [www.nhtsa.dot.gov](http://www.nhtsa.dot.gov)

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

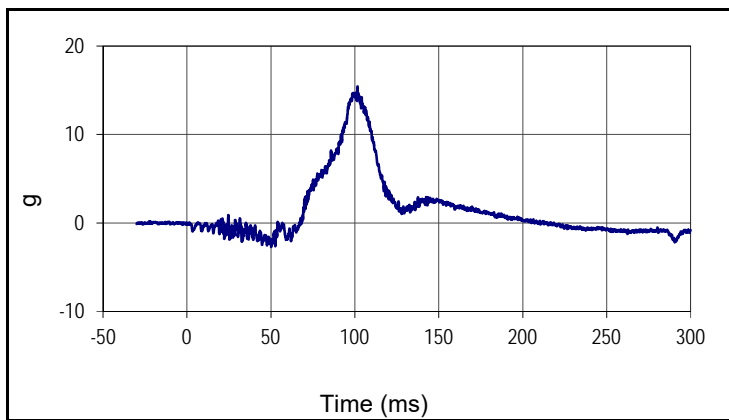
Passenger Pelvis X  
Passenger Pelvis Y  
Passenger Pelvis Z  
Passenger Left Femur Force Redundant  
Passenger Right Femur Force Redundant  
Passenger Left Upper Tibia Moment X  
Passenger Left Upper Tibia Moment Y  
Passenger Left Upper Tibia Force Z  
Passenger Left Lower Tibia Moment X  
Passenger 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 Jeep Grand Cherokee Laredo 4X4 5-Door MPV  
 Test Program: 56.3 km/h Frontal Impact NCAP Test

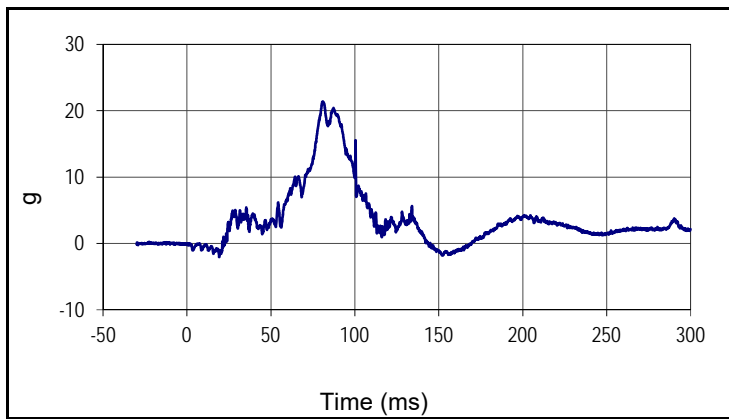
NHTSA No.: M20180309  
 Test Date: 4/9/2018



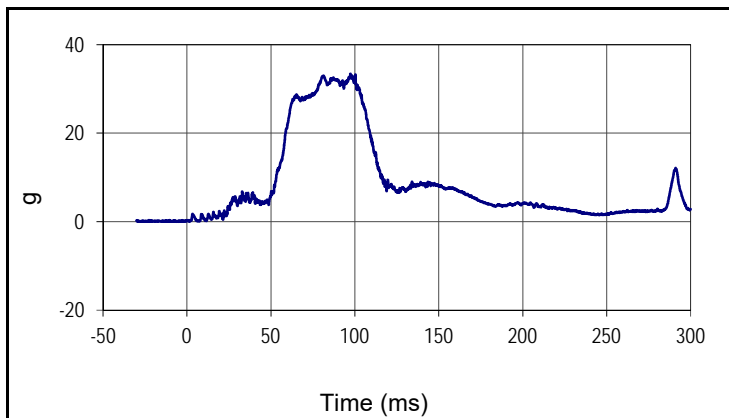
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Driver Head Acceleration X Primary			
Plot No.		SAE Class	Units
001		1000	g
Max	Time	Min	Time
11.4	291.0	-27.4	97.3



Curve Description			
Driver Head Acceleration Y Primary			
Plot No.		SAE Class	Units
002		1000	g
Max	Time	Min	Time
15.4	101.6	-2.7	50.2



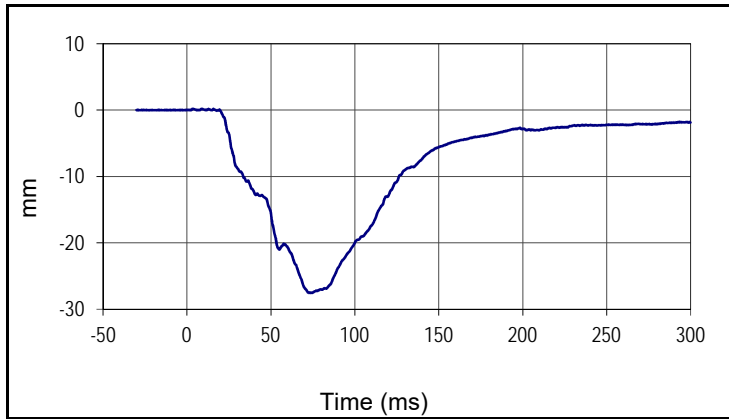
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Plot No.		SAE Class	Units
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Max	Time	Min	Time
21.4	80.9	-2.0	19.2



Curve Description			
Driver Head Resultant Acceleration Primary			
Plot No.		SAE Class	Units
004		1000	g
Max	Time	Min	Time
33.4	97.3	0.0	1.5

Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4X4 5-Door MPV  
 Test Program: 56.3 km/h Frontal Impact NCAP Test

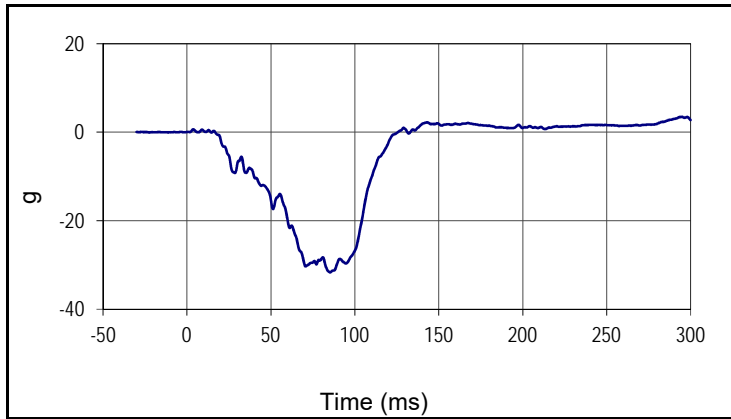
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 Test Date: 4/9/2018



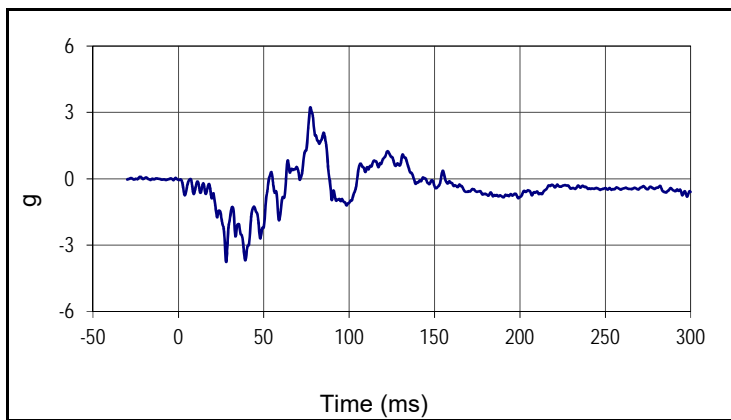
Curve Description			
Driver Chest Deflection			
Plot No.		SAE Class	Units
005		600	mm
Max	Time	Min	Time
0.2	3.3	-27.5	73.0

Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4X4 5-Door MPV  
 Test Program: 56.3 km/h Frontal Impact NCAP Test

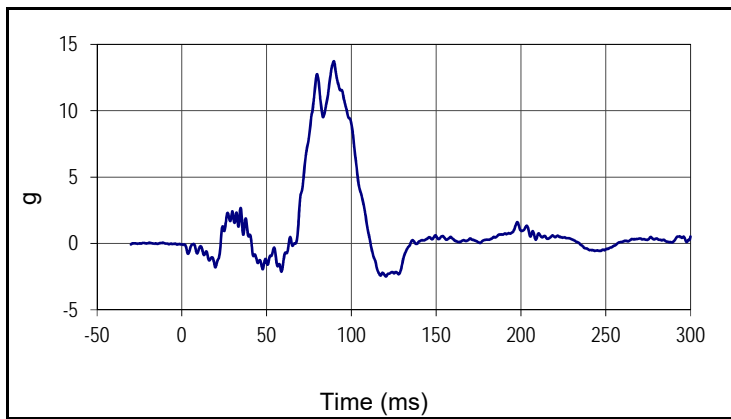
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 Test Date: 4/9/2018



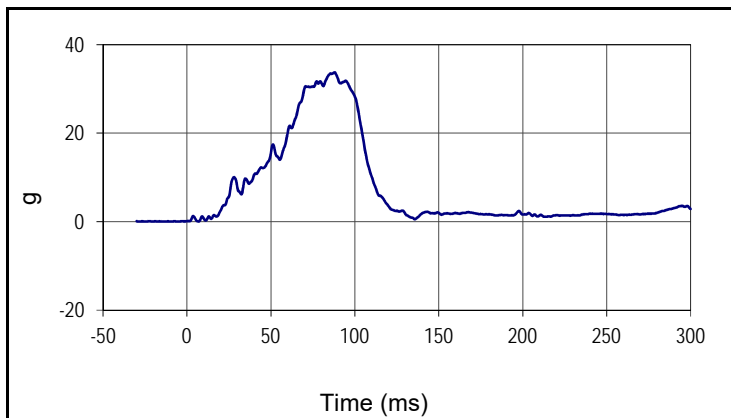
Curve Description			
Driver Chest Acceleration X Primary			
Plot No.		SAE Class	Units
006		180	g
Max	Time	Min	Time
3.5	294.8	-31.7	85.2



Curve Description			
Driver Chest Acceleration Y Primary			
Plot No.		SAE Class	Units
007		180	g
Max	Time	Min	Time
3.2	77.3	-3.8	27.9



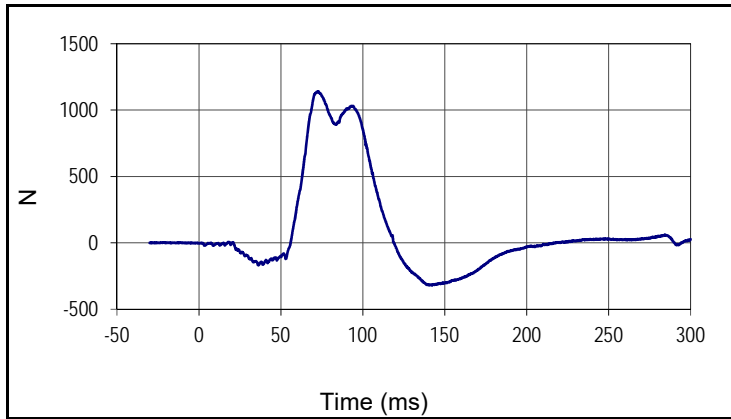
Curve Description			
Driver Chest Acceleration Z Primary			
Plot No.		SAE Class	Units
008		180	g
Max	Time	Min	Time
13.7	89.6	-2.5	120.3



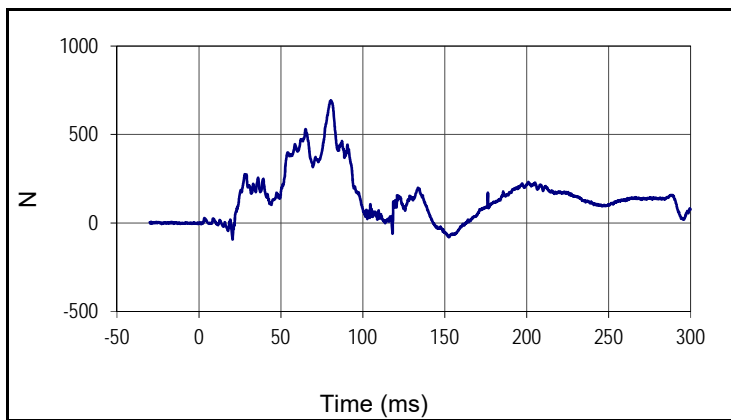
Curve Description			
Driver Chest Resultant Acceleration Primary			
Plot No.		SAE Class	Units
009		180	g
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Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4X4 5-Door MPV  
 Test Program: 56.3 km/h Frontal Impact NCAP Test

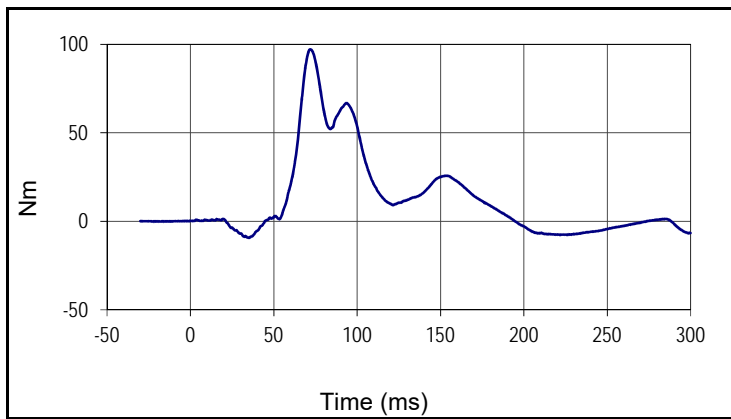
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 Test Date: 4/9/2018



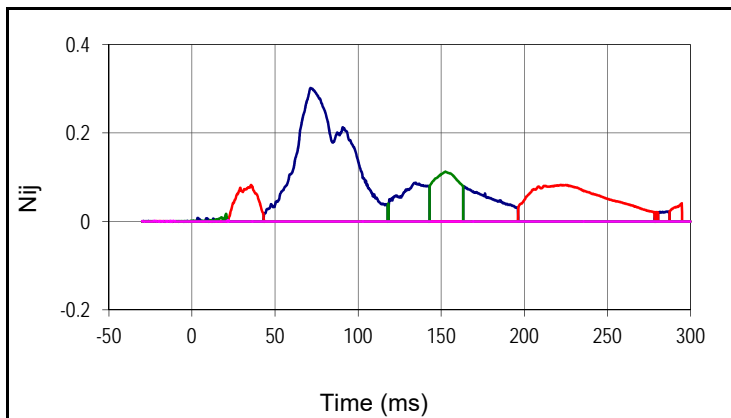
Curve Description			
Driver Upper Neck Force X			
Plot No.		SAE Class	Units
010		1000	N
Max	Time	Min	Time
1140.7	72.9	-319.7	140.7



Curve Description			
Driver Upper Neck Force Z			
Plot No.		SAE Class	Units
011		1000	N
Max	Time	Min	Time
691.2	80.3	-93.5	20.5



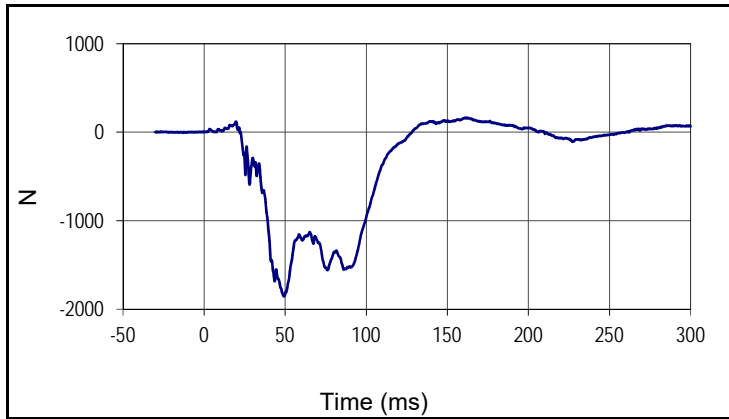
Curve Description			
Driver Upper Neck Moment Y			
Plot No.		SAE Class	Units
012		600	Nm
Max	Time	Min	Time
97.2	71.8	-9.3	34.7



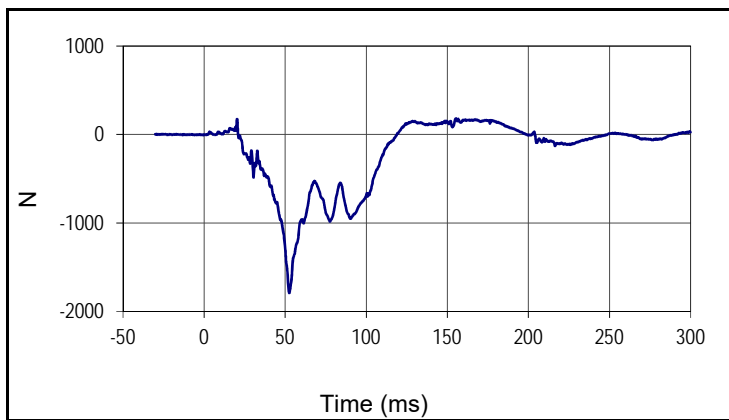
Curve Description		
Driver Nij		
Units	Max	Time
Ntf	0.30	71.4
Units	Max	Time
Nte	0.08	222.1
Units	Max	Time
Ncf	0.11	152.6
Units	Max	Time
Nce	0.00	21.8

Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4X4 5-Door MPV  
 Test Program: 56.3 km/h Frontal Impact NCAP Test

NHTSA No.: M20180309  
 Test Date: 4/9/2018



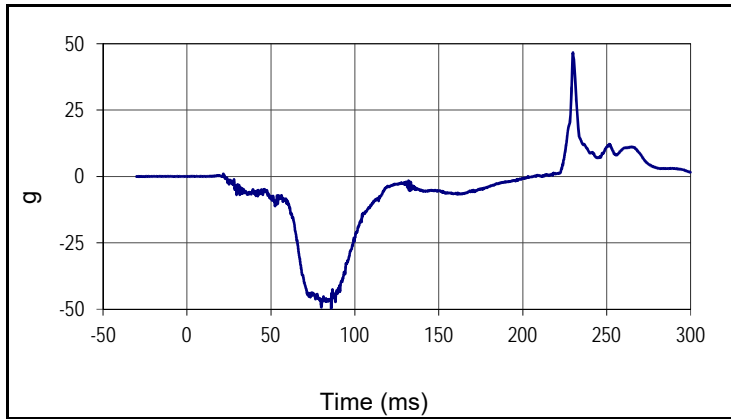
Curve Description			
Driver Left Femur Force Z			
Plot No.		SAE Class	Units
014		600	N
Max	Time	Min	Time
163.9	162.3	-1855.6	49.4



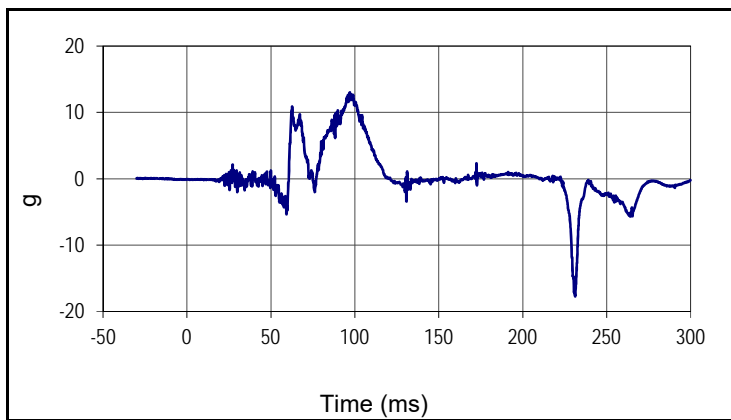
Curve Description			
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Plot No.		SAE Class	Units
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181.7	155.3	-1791.0	52.6

Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4X4 5-Door MPV  
 Test Program: 56.3 km/h Frontal Impact NCAP Test

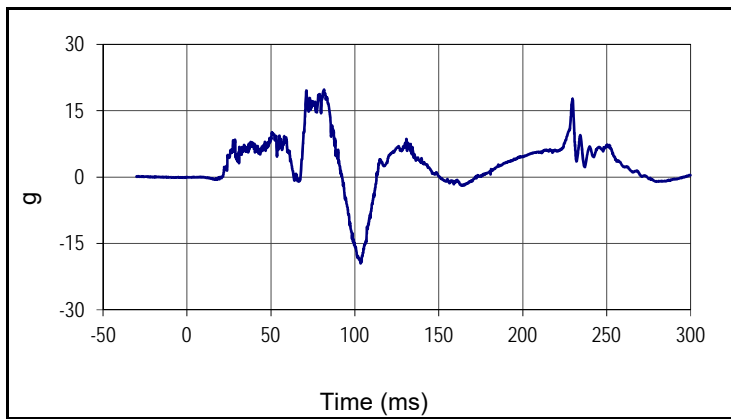
NHTSA No.: M20180309  
 Test Date: 4/9/2018



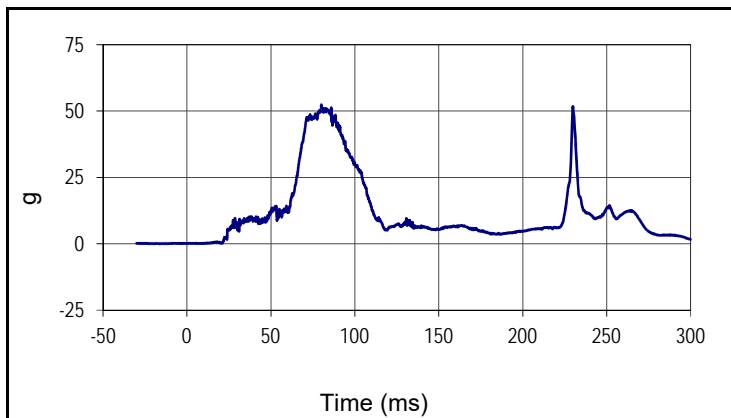
Curve Description			
Passenger Head Acceleration X Primary			
Plot No.		SAE Class	Units
016		1000	g
Max	Time	Min	Time
46.7	229.9	-49.7	85.9



Curve Description			
Passenger Head Acceleration Y Primary			
Plot No.		SAE Class	Units
017		1000	g
Max	Time	Min	Time
13.0	97.0	-17.7	231.2



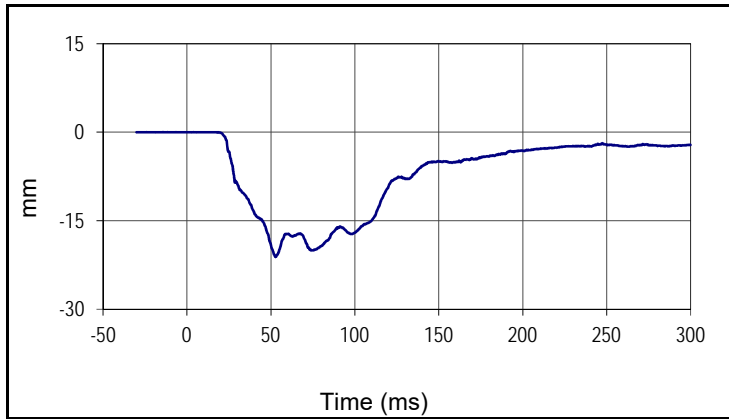
Curve Description			
Passenger Head Acceleration Z Primary			
Plot No.		SAE Class	Units
018		1000	g
Max	Time	Min	Time
19.8	81.6	-19.5	103.4



Curve Description			
Passenger Head Resultant Acceleration Primary			
Plot No.		SAE Class	Units
019		1000	g
Max	Time	Min	Time
52.4	80.1	0.0	0.0

Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4X4 5-Door MPV  
 Test Program: 56.3 km/h Frontal Impact NCAP Test

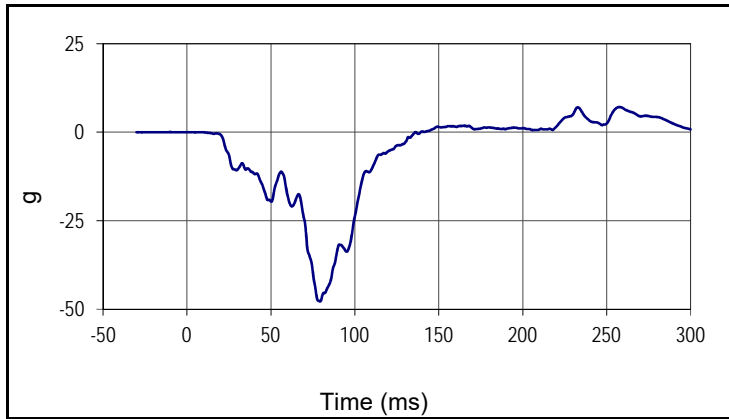
NHTSA No.: M20180309  
 Test Date: 4/9/2018



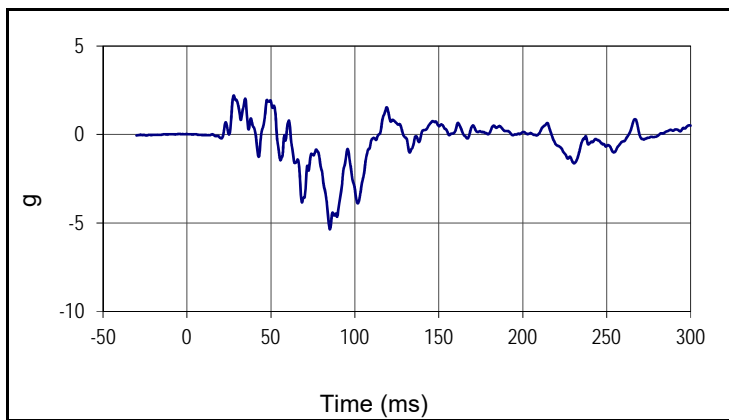
Curve Description			
Passenger Chest Deflection			
Plot No.		SAE Class	Units
020		600	mm
Max	Time	Min	Time
0.0	12.1	-21.1	52.8

Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4X4 5-Door MPV  
 Test Program: 56.3 km/h Frontal Impact NCAP Test

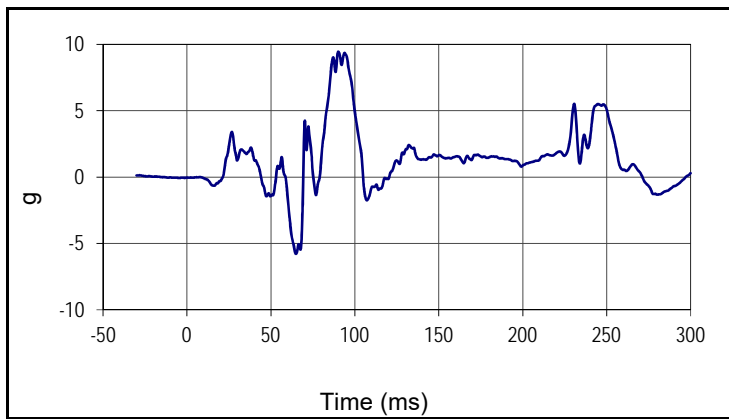
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 Test Date: 4/9/2018



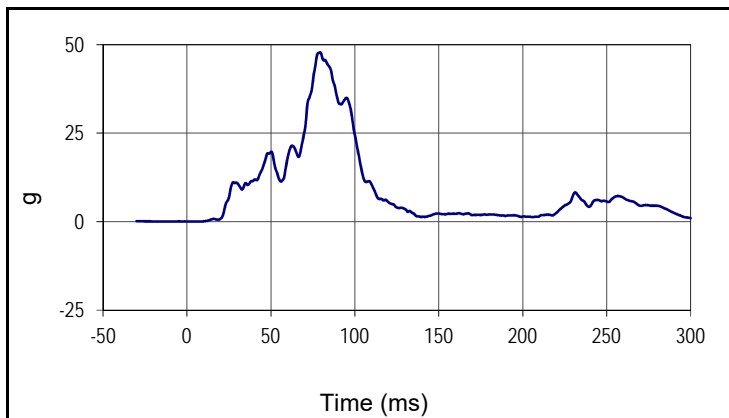
Curve Description			
Passenger Chest Acceleration X Primary			
Plot No.		SAE Class	Units
021		180	g
Max	Time	Min	Time
7.1	257.5	-47.8	79.3



Curve Description			
Passenger Chest Acceleration Y Primary			
Plot No.		SAE Class	Units
022		180	g
Max	Time	Min	Time
2.2	27.9	-5.4	85.1



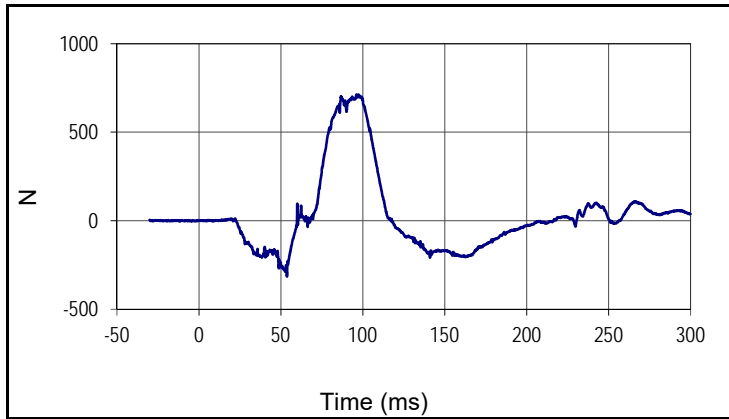
Curve Description			
Passenger Chest Acceleration Z Primary			
Plot No.		SAE Class	Units
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Max	Time	Min	Time
9.4	90.1	-5.8	64.9



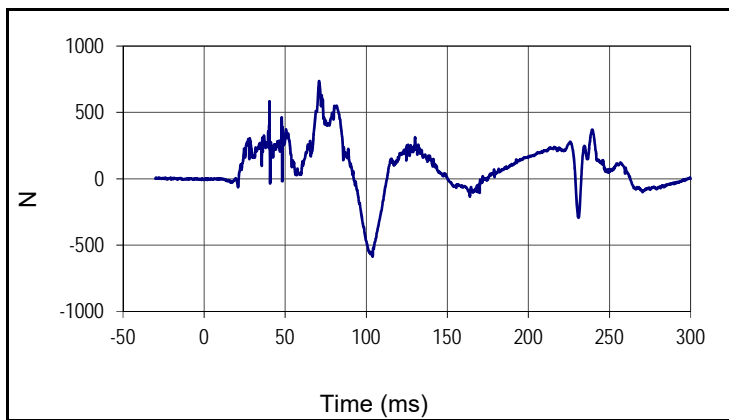
Curve Description			
Passenger Chest Resultant Acceleration Primary			
Plot No.		SAE Class	Units
024		180	g
Max	Time	Min	Time
47.8	79.3	0.0	6.1

Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4X4 5-Door MPV  
 Test Program: 56.3 km/h Frontal Impact NCAP Test

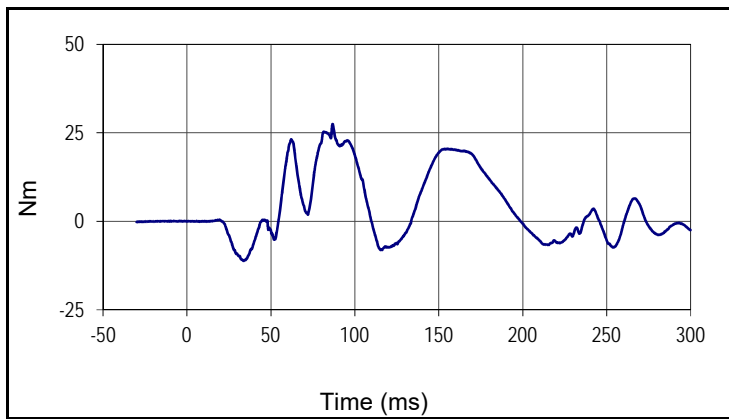
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 Test Date: 4/9/2018



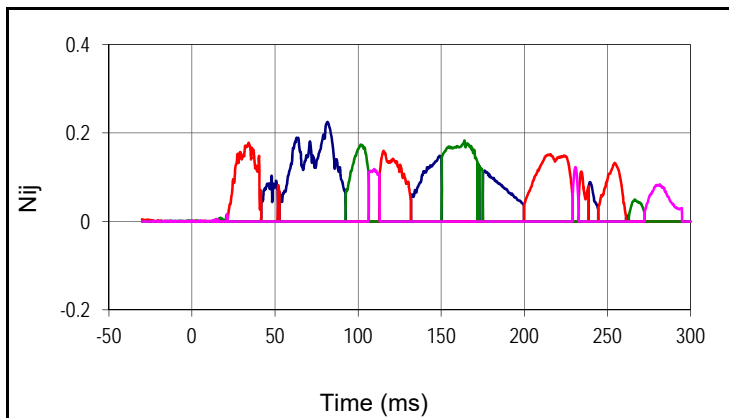
Curve Description			
Passenger Upper Neck Force X			
Plot No.		SAE Class	Units
025		1000	N
Max	Time	Min	Time
712.8	96.1	-315.5	53.7



Curve Description			
Passenger Upper Neck Force Z			
Plot No.		SAE Class	Units
026		1000	N
Max	Time	Min	Time
736.2	70.9	-587.2	103.9



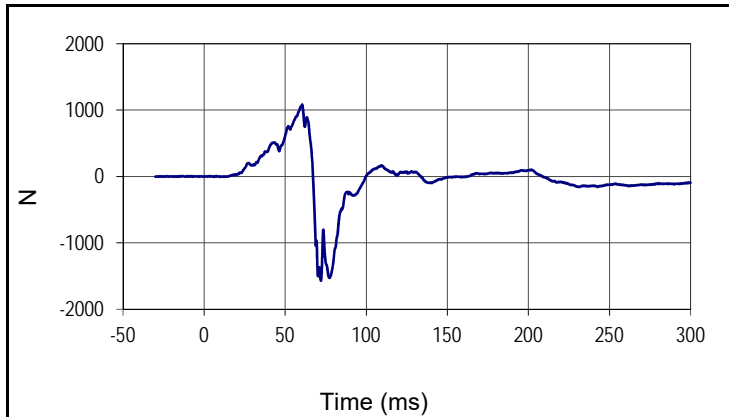
Curve Description			
Passenger Upper Neck Moment Y			
Plot No.		SAE Class	Units
027		600	Nm
Max	Time	Min	Time
27.5	86.7	-11.2	33.7



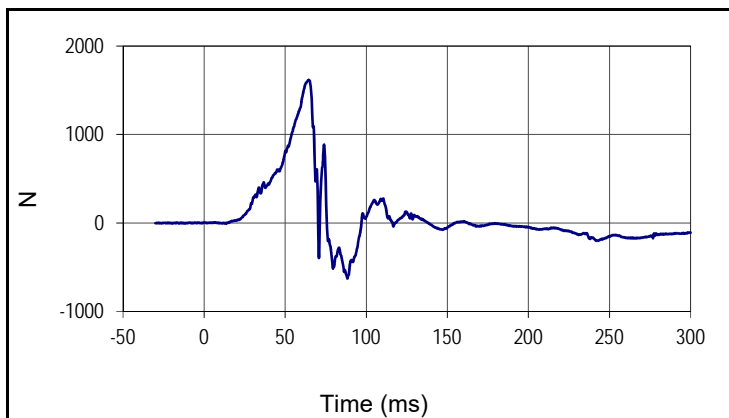
Curve Description		
Passenger Nij		
Units	Max	Time
Ntf	0.22	81.6
Nte	0.18	34.1
Ncf	0.18	164.0
Nce	0.12	230.8

Test Vehicle: 2018 Jeep Grand Cherokee Laredo 4X4 5-Door MPV  
 Test Program: 56.3 km/h Frontal Impact NCAP Test

NHTSA No.: M20180309  
 Test Date: 4/9/2018



Curve Description			
Passenger Left Femur Force Z			
Plot No.		SAE Class	Units
029		600	N
Max	Time	Min	Time
1082.8	60.5	-1570.8	72.0



Curve Description			
Passenger Right Femur Force Z			
Plot No.		SAE Class	Units
030		600	N
Max	Time	Min	Time
1616.9	64.5	-626.7	88.4

**APPENDIX C**  
**ATD CALIBRATION AND PERFORMANCE VERIFICATION DATA**

**APPENDIX C**  
**PRE-TEST ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA**



ATD Serial No.: 360

Test Date: 2018-04-06

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. Assembly	Bent shaft			✓
	Slider arm riding in track			✓
Sensors	Check cables for cuts, tears			✓
	Check for damaged insulation			✓
Accelerometer Mounting	Head mounting secure			✓
	Chest mounting secure			✓
Knees	Skin condition			✓
	Insert (do not remove)			✓
	Casting			✓
Limbs	Normal movement and adjustment			✓
Knee Sliders	Wires intact			✓
	Rubber returned to "resting" position			✓
Pelvis	Broken			✓
Other	Describe below as needed			✓

Describe any repairs or replacement of parts or other findings:

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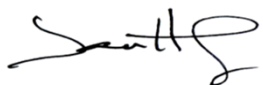
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Technician:   
 J. Hernandez

Approved By:   
 P. Puzzuto

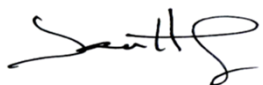



**Hybrid III 50th Percentile Male  
 External Measurements**

ATD Serial No.: 360

Test Date: 2018-04-06

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Relative Humidity	%	10	70	32	Pass
A - Total sitting height	mm	879	889	886	Pass
B - Shoulder pivot height	mm	505	521	510	Pass
C - 'H' point height	mm	84	89	86	Pass
D - 'H' point location from backline	mm	135	140	139	Pass
E - Shoulder pivot from backline	mm	84	94	88	Pass
F - Thigh clearance	mm	140	155	150	Pass
G - Back of elbow to wrist pivot	mm	290	305	293	Pass
H - Head back to backline	mm	41	46	44	Pass
I - Shoulder to elbow length	mm	330	345	336	Pass
J - Elbow rest height	mm	190	211	199	Pass
K - Buttock to knee length	mm	579	604	600	Pass
L - Popliteal length	mm	429	455	442	Pass
M - Knee pivot height	mm	485	500	491	Pass
N - Buttock popliteal length	mm	452	477	464	Pass
O - Chest depth without jacket	mm	213	229	221	Pass
P - Foot length	mm	251	267	258	Pass
V - Shoulder breadth	mm	422	437	429	Pass
W - Foot breadth	mm	91	107	99	Pass
Y - Chest circum. (w/chest jacket)	mm	970	1001	992	Pass
Z - Waist circum.	mm	836	866	850	Pass
AA - Location for chest circum.	mm	429	434	432	Pass
BB - Location for waist circum.	mm	226	231	230	Pass
<b>Overall Test Results</b>					<b>Pass</b>

Technician:   
 J. Hernandez

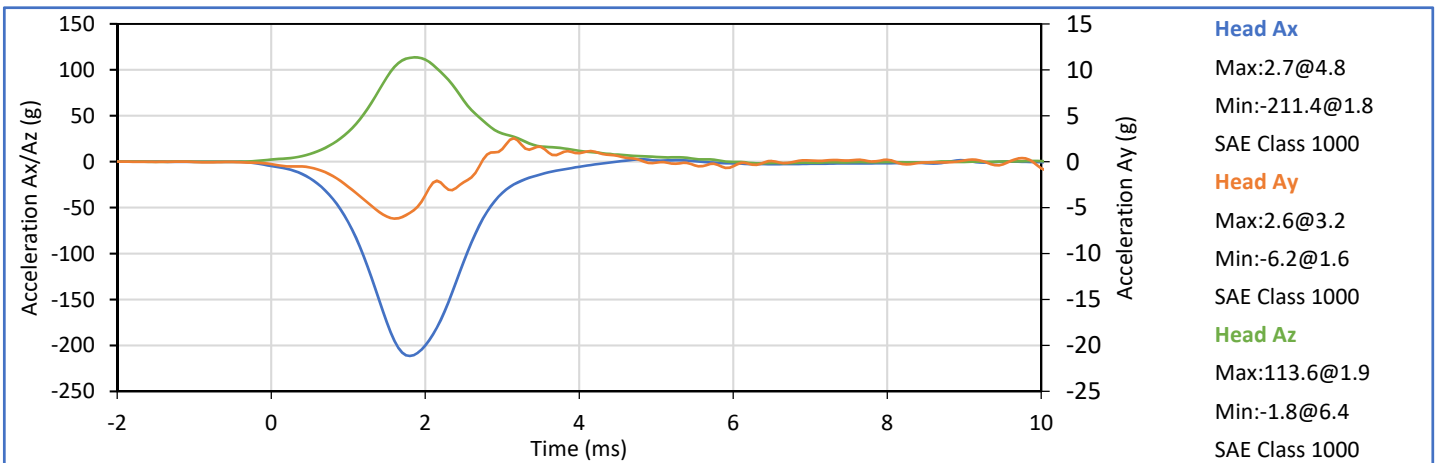
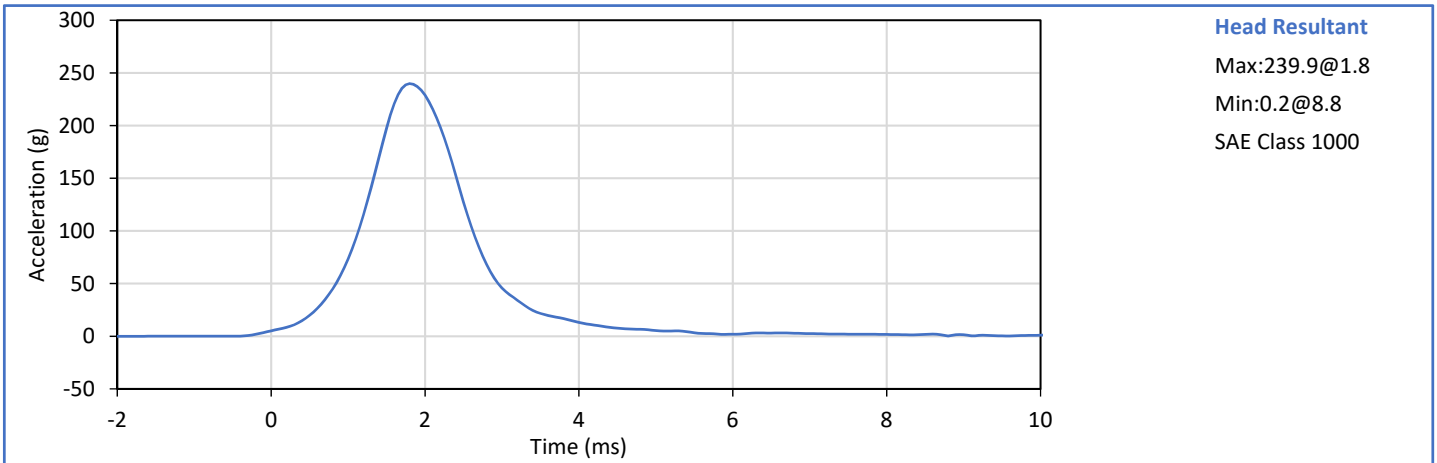
Approved By:   
 P. Puzzuto



ATD Serial No.: 360

Test Date: 2018-04-05

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.1	Pass
Laboratory Humidity	%	10	70	33	Pass
Peak Resultant Acceleration	g	225.0	275.0	239.9	Pass
Peak Lateral Acceleration	g	-15.0	15.0	-6.2	Pass
Oscillations After Main Pulse	%	0.0	10.0	1.3	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
<b>Overall Test Results</b>					<b>Pass</b>



Technician:   
 T. Lowman

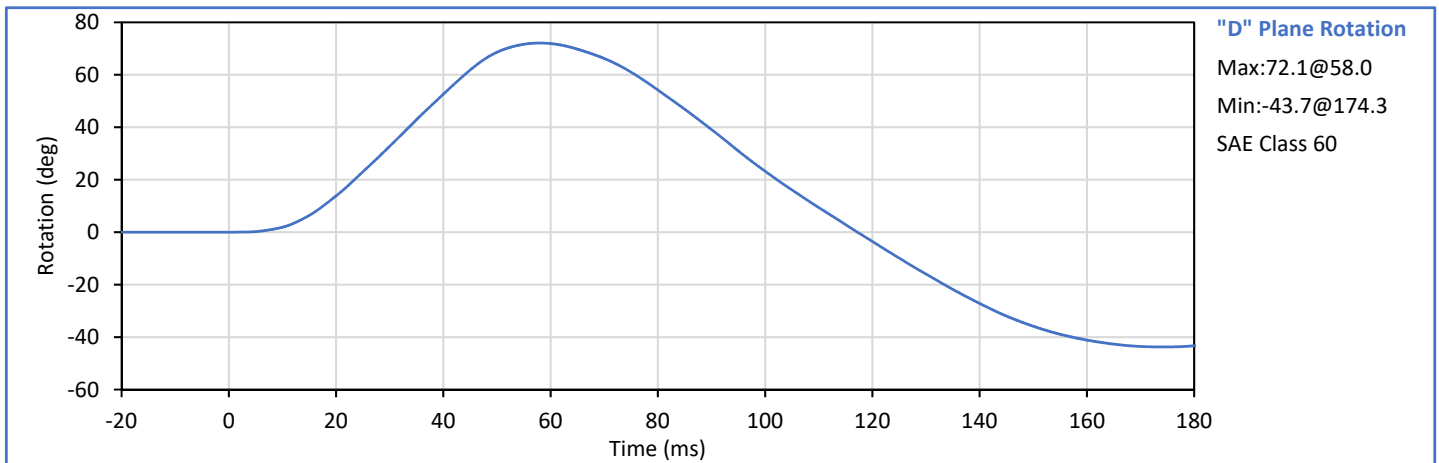
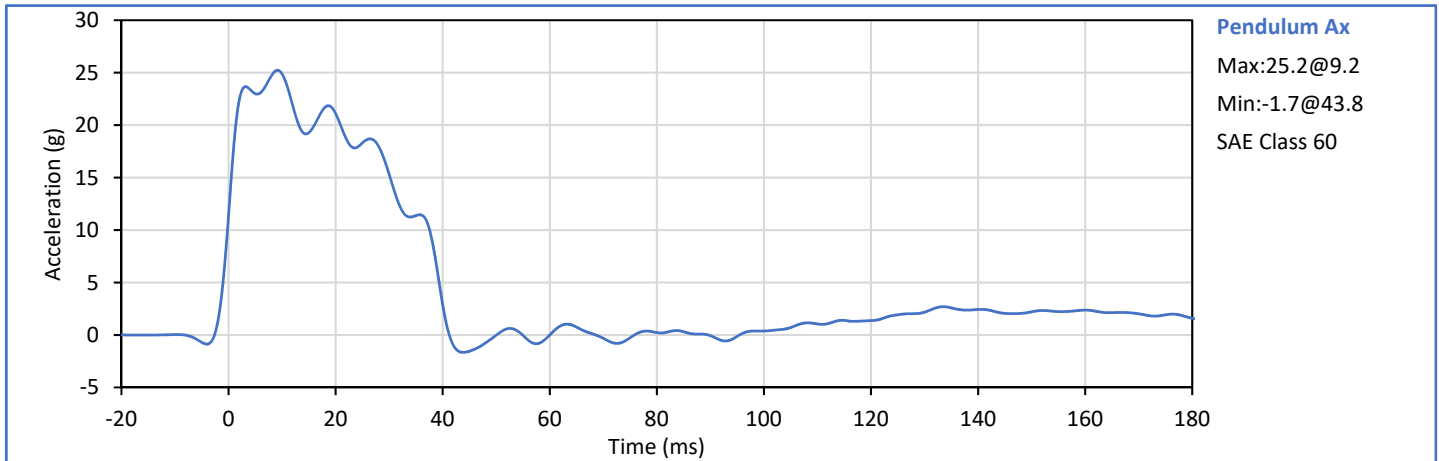
Approved By:   
 P. Puzzuto



ATD Serial No.: 360

Test Date: 2018-04-04

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.0	Pass
Laboratory Humidity	%	10	70	34	Pass
Pendulum Velocity	m/s	6.89	7.13	7.04	Pass
Pendulum Deceleration at 10 ms	g	22.5	27.5	24.9	Pass
Pendulum Deceleration at 20 ms	g	17.6	22.6	21.1	Pass
Pendulum Deceleration at 30 ms	g	12.5	18.5	15.3	Pass
Peak Pendulum Decel. after 30 ms	g	0.0	29.0	15.3	Pass
Deceleration Decay to Cross 5 g	ms	34.0	42.0	39.3	Pass
"D" Plane Rotation peak	deg	64.0	78.0	72.1	Pass
	ms	57.0	64.0	58.0	Pass
"D" Plane Rotation Decay To Zero	ms	113.0	128.0	117.3	Pass
Moment About Occipital Condyle	Nm	88.1	108.5	96.1	Pass
	ms	47.0	58.0	51.2	Pass
Moment Decay, Peak to Zero	deg	97.0	107.0	98.6	Pass
<b>Overall Test Results</b>					<b>Pass</b>



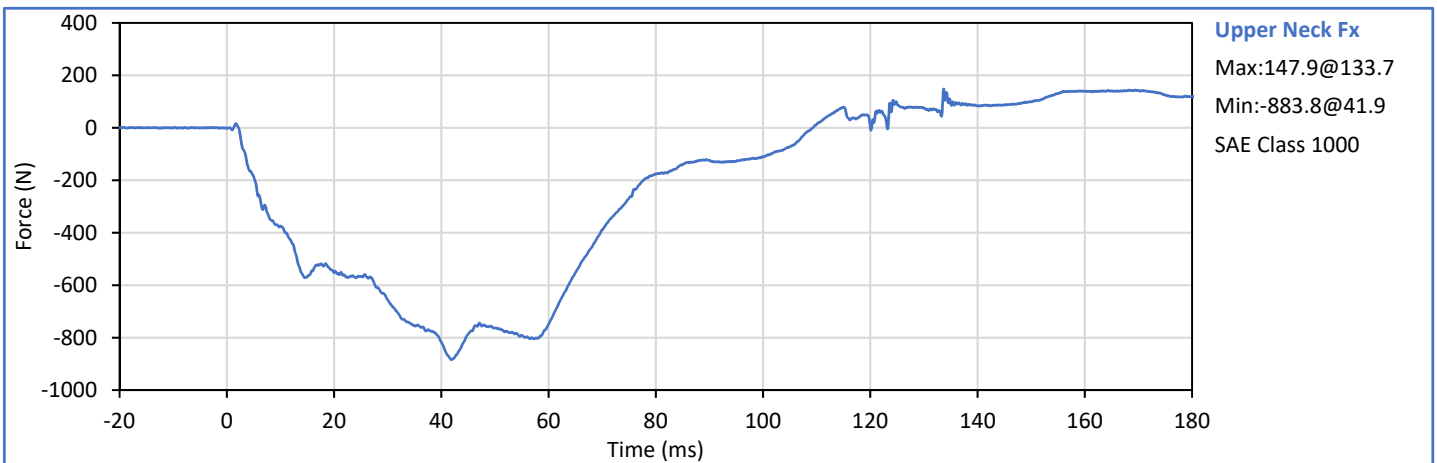
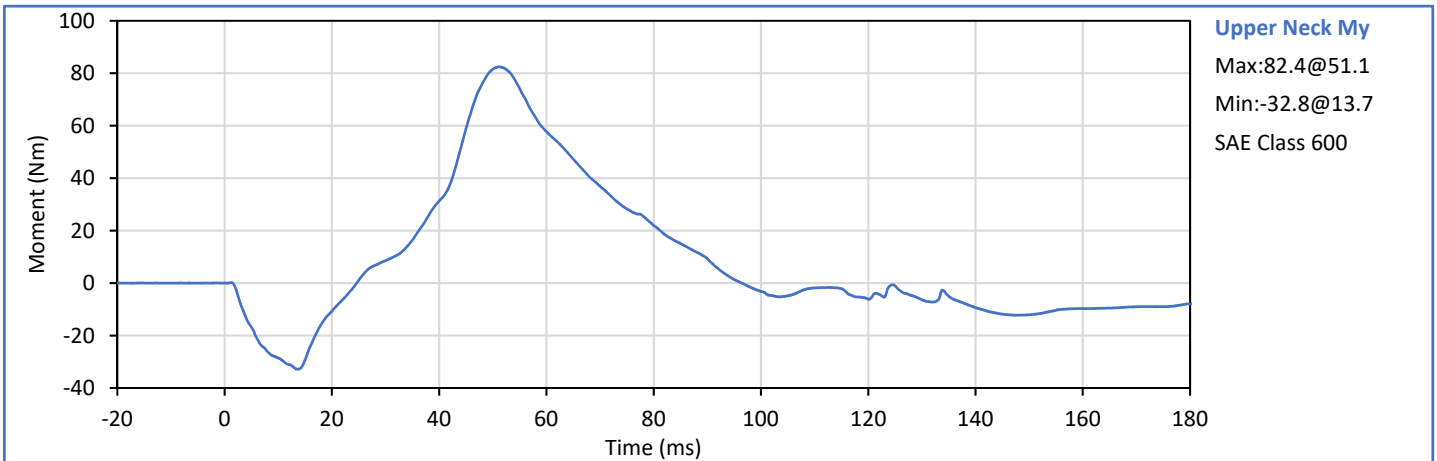
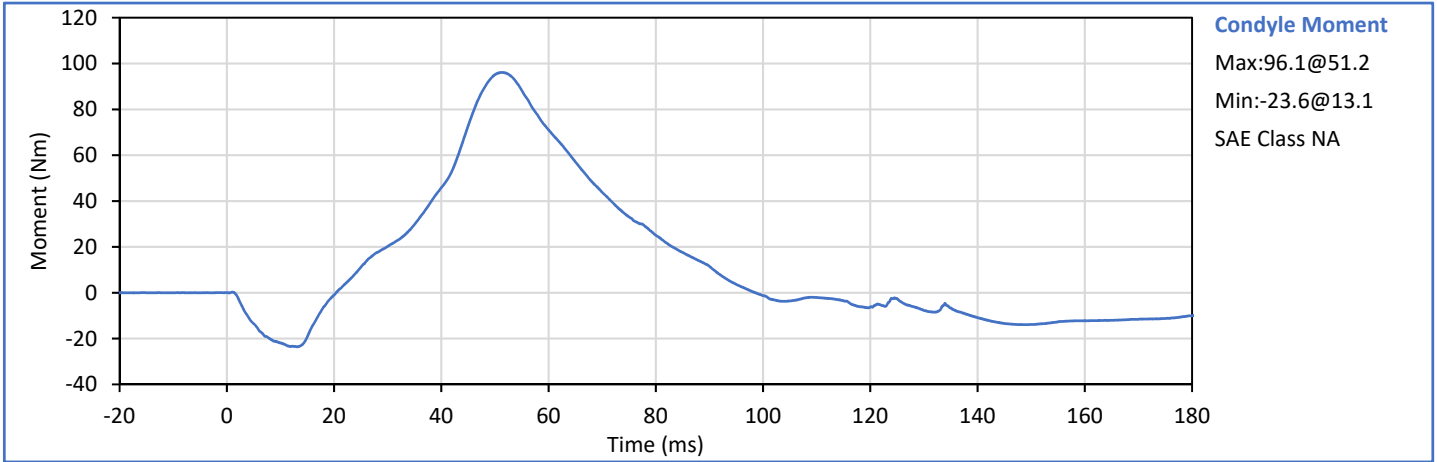
Technician: J. Hernandez

Approved By: P. Puzzuto



ATD Serial No.: 360

Test Date: 2018-04-04

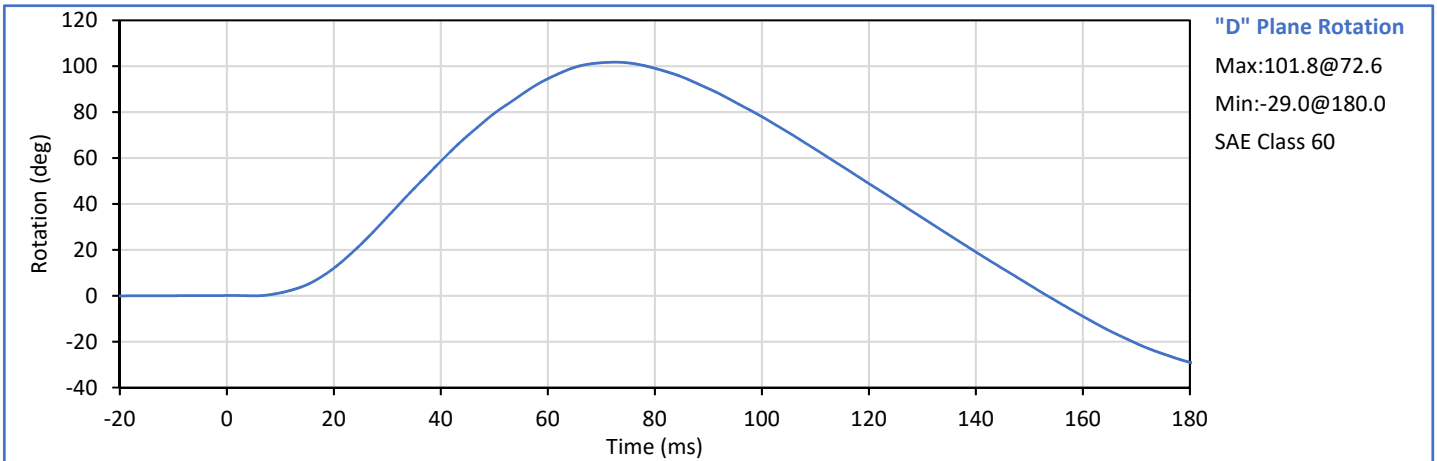
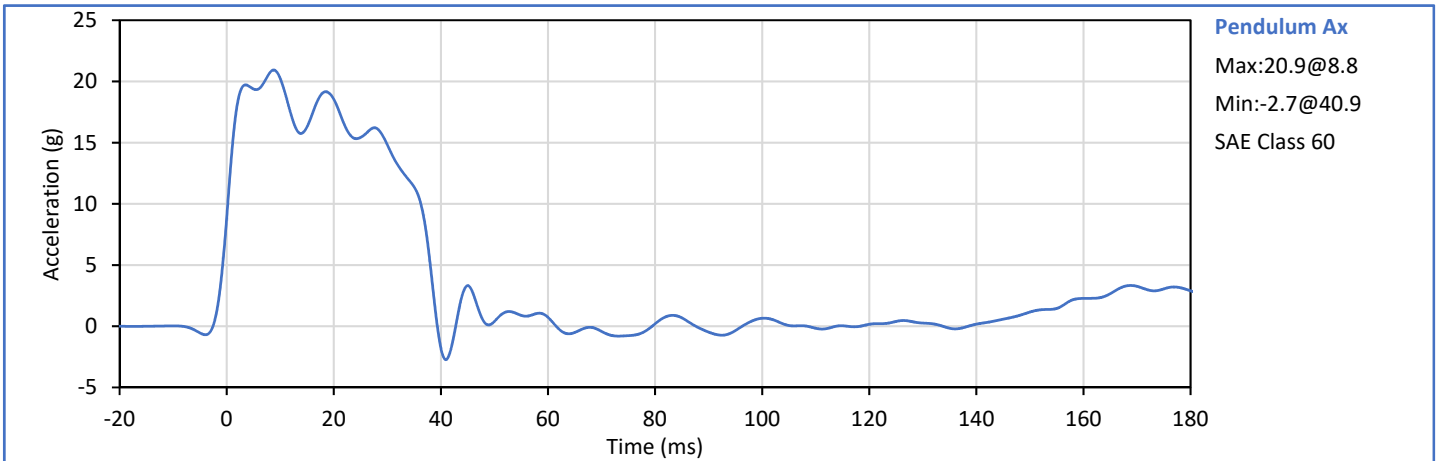


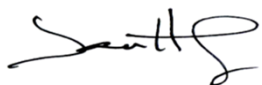



ATD Serial No.: 360

Test Date: 2018-04-04

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Humidity	%	10	70	34	Pass
Pendulum Velocity	m/s	5.94	6.19	6.06	Pass
Pendulum Deceleration at 10 ms	g	17.2	21.2	20.2	Pass
Pendulum Deceleration at 20 ms	g	14.0	19.0	18.5	Pass
Pendulum Deceleration at 30 ms	g	11.0	16.0	14.8	Pass
Peak Pendulum Decel. after 30 ms	g	0.0	22.0	14.8	Pass
Deceleration Decay to Cross 5 g	ms	38.0	46.0	38.0	Pass
"D" Plane Rotation peak	deg	81.0	106.0	101.8	Pass
	ms	72.0	82.0	72.6	Pass
"D" Plane Rotation Decay To Zero	ms	147.0	174.0	153.4	Pass
Moment About Occipital Condyle	Nm	-79.9	-52.9	-75.8	Pass
	ms	65.0	79.0	65.5	Pass
Moment Decay, Peak to Zero	deg	120.0	148.0	132.4	Pass
<b>Overall Test Results</b>					<b>Pass</b>



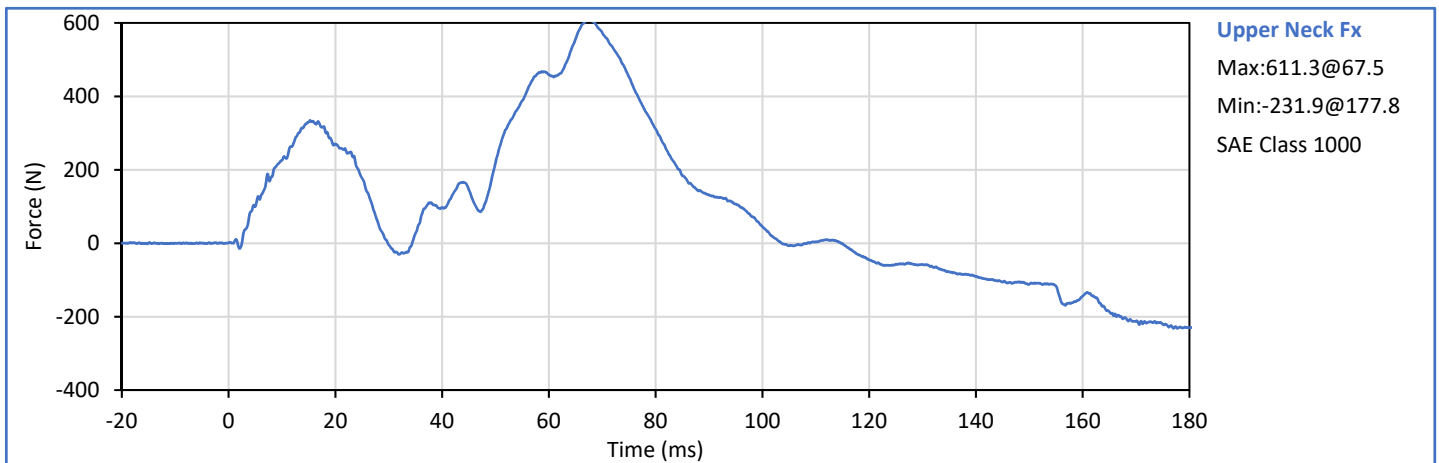
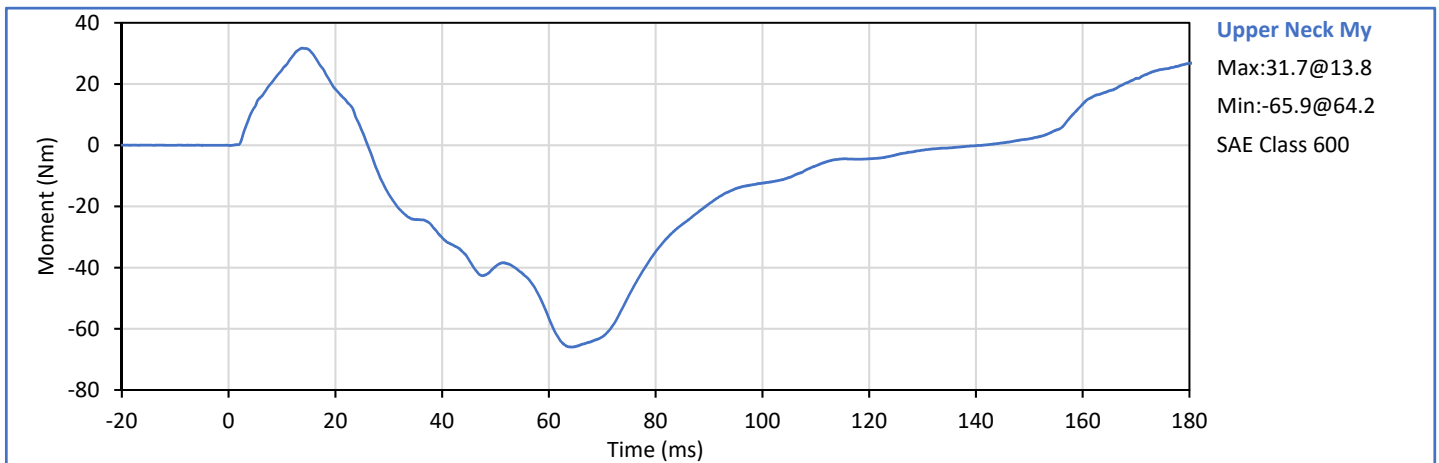
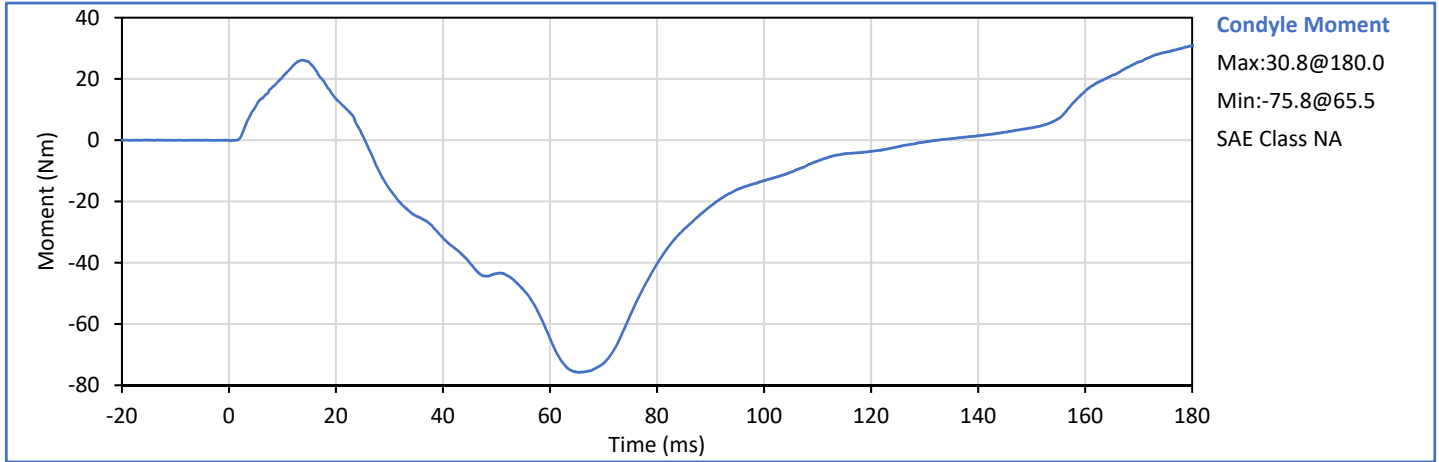
Technician:   
 J. Hernandez

Approved By:   
 P. Puzzuto



ATD Serial No.: 360

Test Date: 2018-04-04

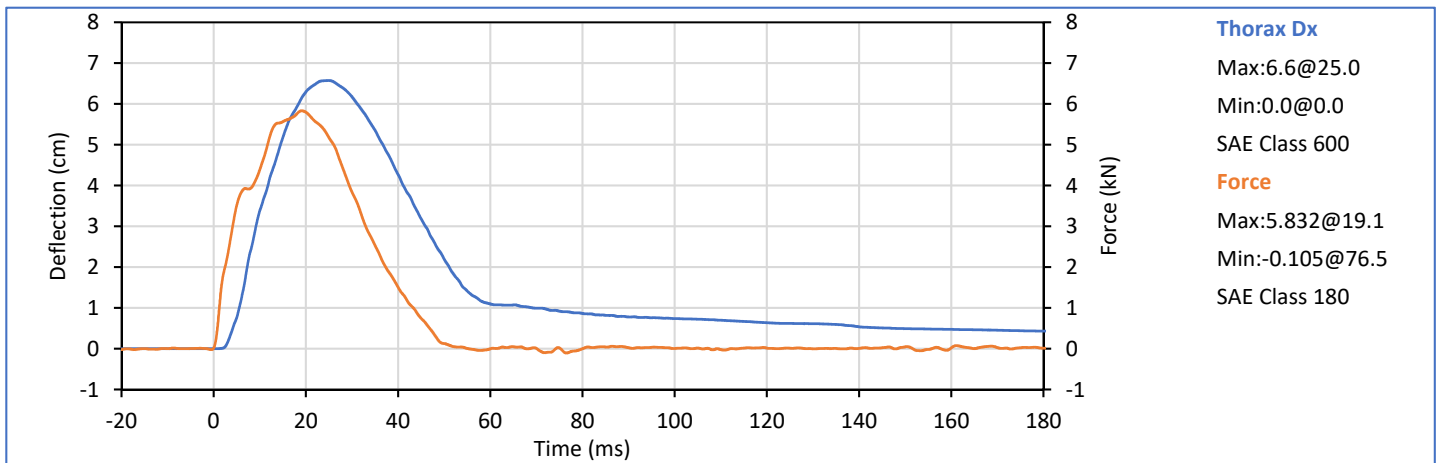
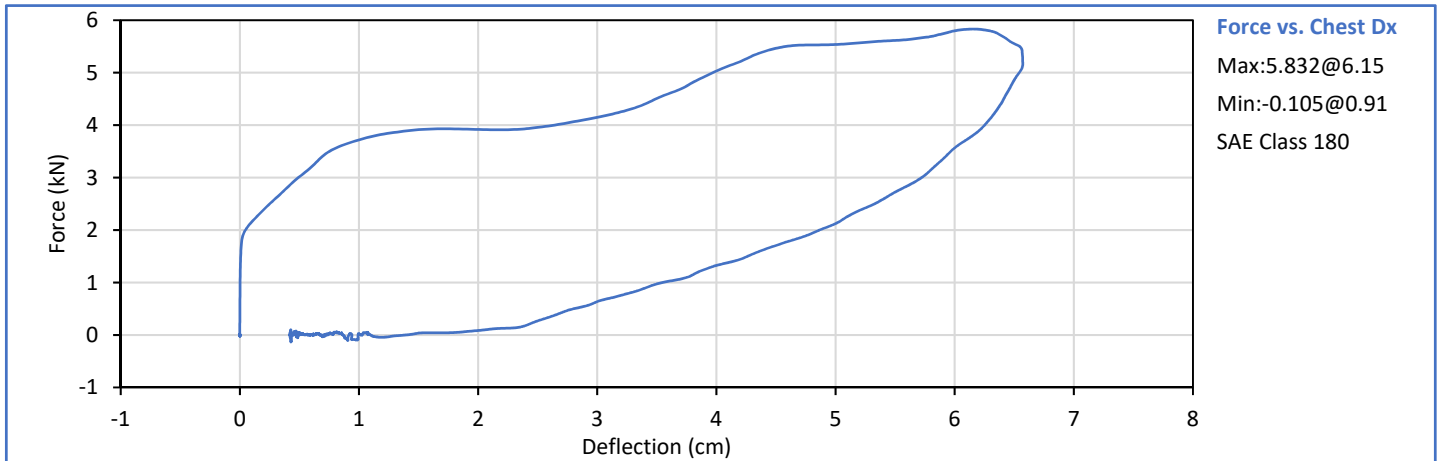




ATD Serial No.: 360

Test Date: 2018-04-06

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.4	Pass
Laboratory Humidity	%	10	70	32	Pass
Probe Velocity	m/s	6.58	6.82	6.71	Pass
Peak Chest Deflection	cm	6.35	7.26	6.57	Pass
Peak Probe Force	kN	5.159	5.893	5.832	Pass
Internal Hysterisis	%	69.0	85.0	72.5	Pass
<b>Overall Test Results</b>					<b>Pass</b>



Technician:   
 J. Hernandez

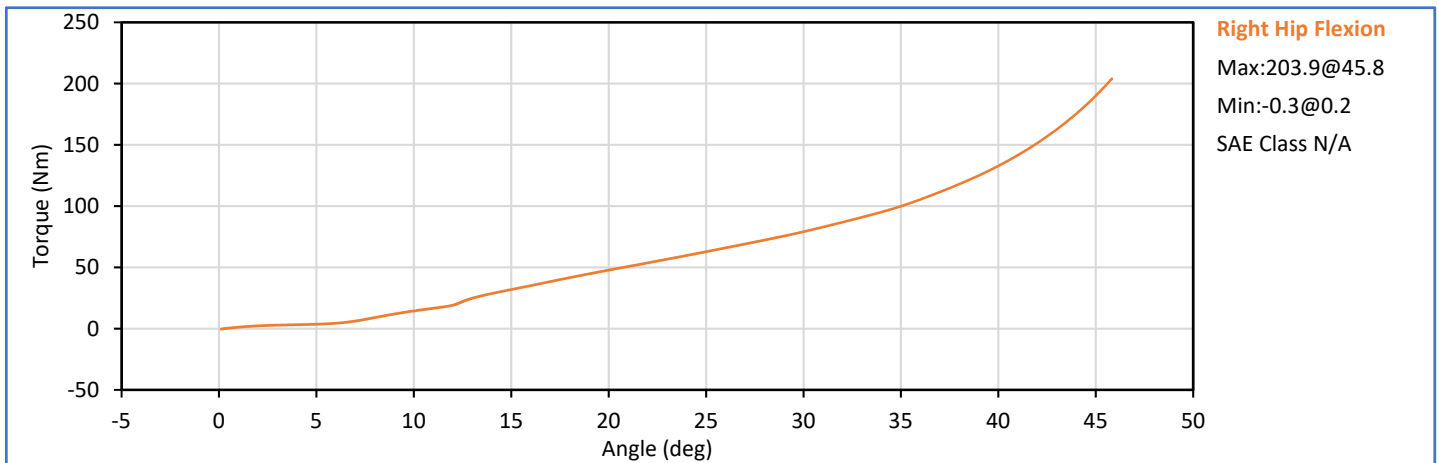
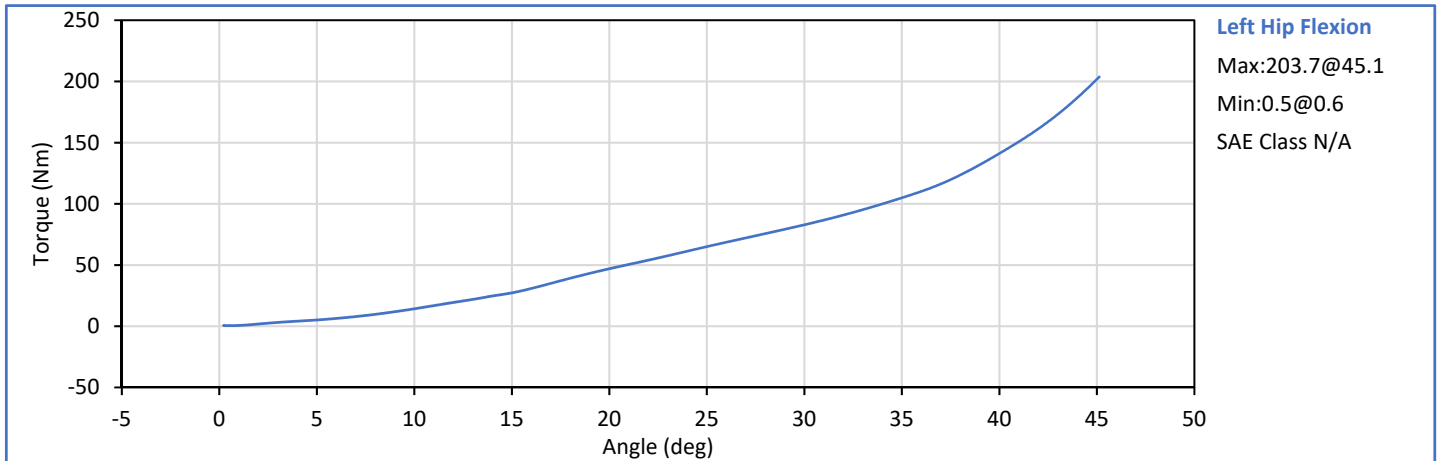
Approved By:   
 P. Puzzuto



ATD Serial No.: 360

Test Date: 2018-04-04

	Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
	Laboratory Temperature	°C	18.9	25.6	21.8	Pass
	Laboratory Humidity	%	10	70	32	Pass
Left Hip	Left Hip Rotation Rate	deg/s	5.0	10.0	5.8	Pass
	Left Femur Torque at 30°	Nm	0.0	95.0	82.9	Pass
	Left Hip Rotation at 203 Nm	deg	40.0	50.0	45.1	Pass
Right Hip	Right Hip Rotation Rate	deg/s	5.0	10.0	5.9	Pass
	Right Femur Torque at 30°	Nm	0.0	95.0	79.2	Pass
	Right Hip Rotation at 203 Nm	deg	40.0	50.0	45.7	Pass
Overall Test Results						Pass



Technician: *J. Hernandez*  
 J. Hernandez

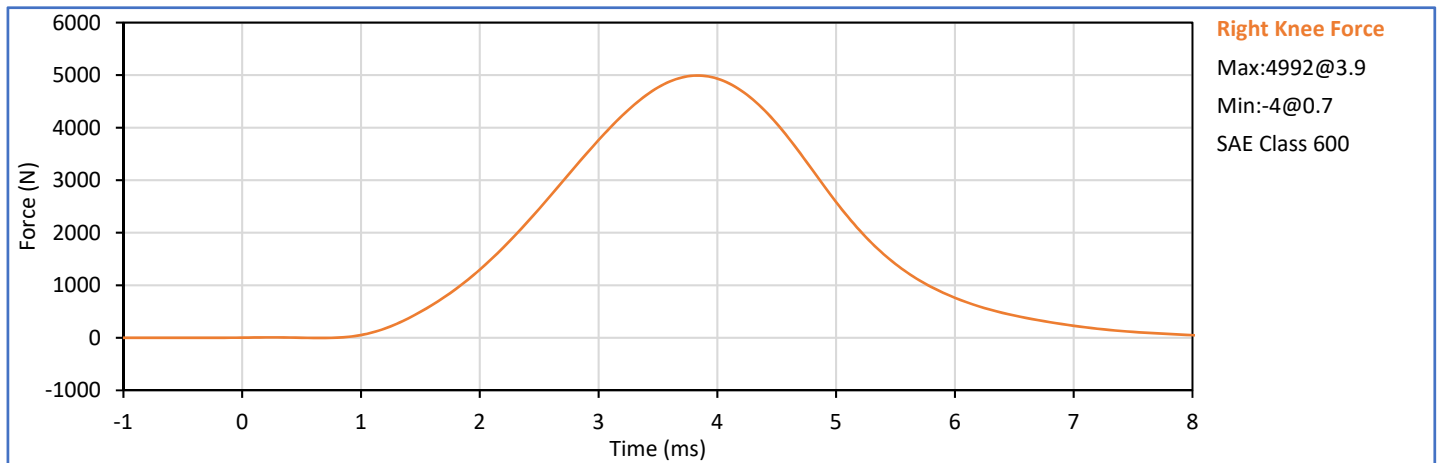
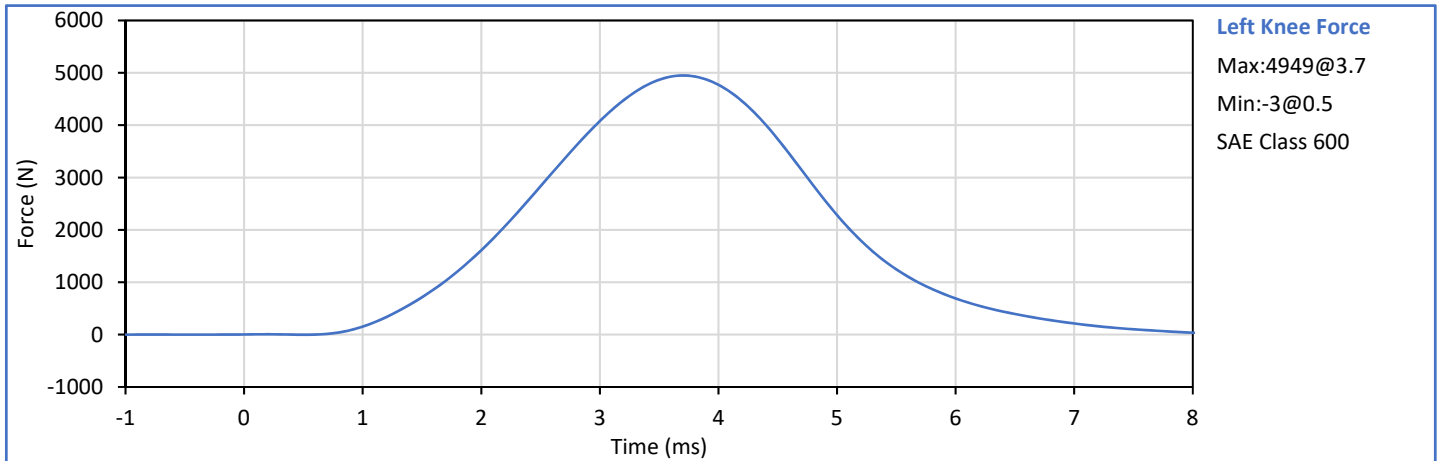
Approved By: *P. Puzzuto*  
 P. Puzzuto



ATD Serial No.: 360

Test Date: 2018-04-06

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.1	Pass
Laboratory Humidity	%	10	70	32	Pass
Left Knee Probe Velocity	m/s	2.070	2.130	2.110	Pass
Left Knee Peak Resistive Force	N	4715	5782	4949	Pass
Right Knee Probe Velocity	m/s	2.070	2.130	2.109	Pass
Right Knee Peak Resistive Force	N	4715	5782	4992	Pass
<b>Overall Test Results</b>					Pass



Technician:   
 T. Lowman

Approved By:   
 P. Puzzuto



ATD Serial No.: 630

Test Date: 2018-04-05

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. Assembly	Bent shaft			✓
	Slider arm riding in track			✓
Sensors	Check cables for cuts, tears			✓
	Check for damaged insulation			✓
Accelerometer Mounting	Head mounting secure			✓
	Chest mounting secure			✓
Knees	Skin condition			✓
	Insert (do not remove)			✓
	Casting			✓
Limbs	Normal movement and adjustment			✓
Knee Sliders	Wires intact			✓
	Rubber returned to "resting" position			✓
Pelvis	Broken			✓
Other	Describe below as needed			✓

Describe any repairs or replacement of parts or other findings:

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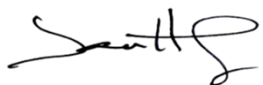
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Technician:   
 J. Hernandez

Approved By:   
 P. Puzzuto

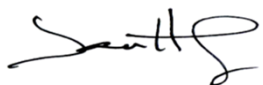



**Hybrid III 5th Percentile Female  
 External Measurements**

ATD Serial No.: 630

Test Date: 2018-04-05

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	22	Pass
A - Total sitting height	mm	775	800	788	Pass
B - Shoulder pivot height	mm	432	457	453	Pass
C - 'H' point height	mm	81	86	86	Pass
D - 'H' point location from backline	mm	145	150	148	Pass
E - Shoulder pivot from backline	mm	69	84	78	Pass
F - Thigh clearance	mm	119	135	128	Pass
G - Back of elbow to wrist pivot	mm	244	259	254	Pass
H - Head back to backline	mm	41	46	43	Pass
I - Shoulder to elbow length	mm	277	297	287	Pass
J - Elbow rest height	mm	183	203	197	Pass
K - Buttock to knee length	mm	521	546	531	Pass
L - Popliteal length	mm	356	376	367	Pass
M - Knee pivot height	mm	394	419	407	Pass
N - Buttock popliteal length	mm	414	439	428	Pass
O - Chest depth without jacket	mm	175	191	183	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	144	Pass
T - Head Depth	mm	178	188	184	Pass
U - Hip Breadth	mm	300	315	308	Pass
V - Shoulder breadth	mm	351	366	360	Pass
W - Foot breadth	mm	79	94	88	Pass
X - Head circum.	mm	528	549	535	Pass
Y - Chest circum. (w/chest jacket)	mm	851	881	868	Pass
Z - Waist circum.	mm	760	790	776	Pass
AA - Location for chest circum.	mm	333	358	339	Pass
BB - Location for waist circum.	mm	160	170	168	Pass
<b>Overall Test Results</b>					<b>Pass</b>

Technician:   
 J. Hernandez

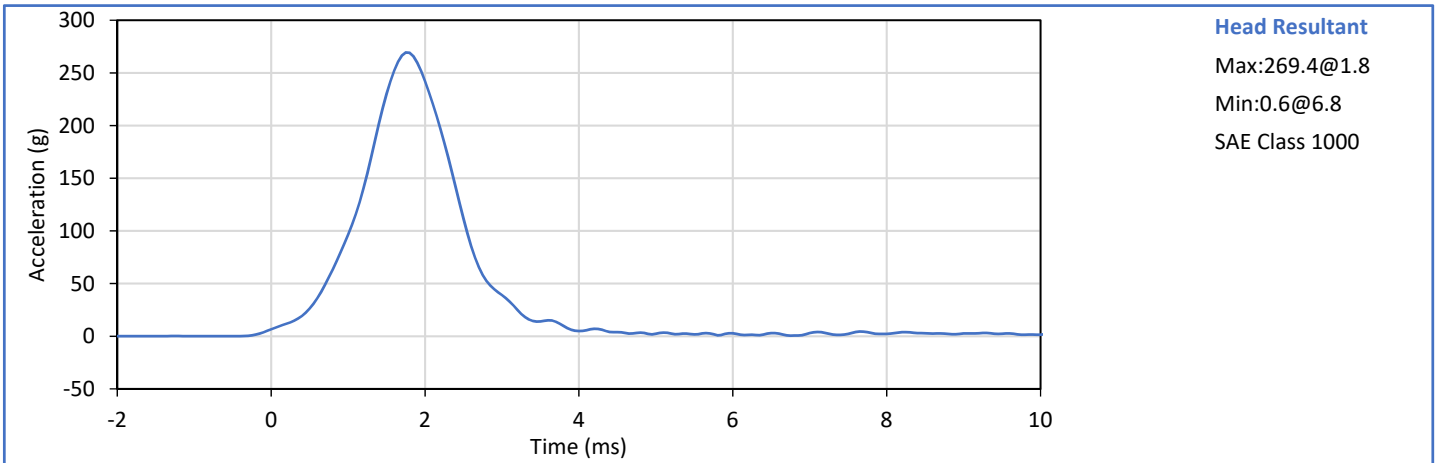
Approved By:   
 P. Puzzuto



ATD Serial No.: 630

Test Date: 2018-04-04

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.1	Pass
Laboratory Humidity	%	10	70	22	Pass
Peak Resultant Acceleration	g	250.0	300.0	269.4	Pass
Peak Lateral Acceleration	g	-15.0	15.0	9.1	Pass
Oscillations After Main Pulse	%	0.0	10.0	1.6	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
<b>Overall Test Results</b>					<b>Pass</b>



Technician:   
 T. Lowman

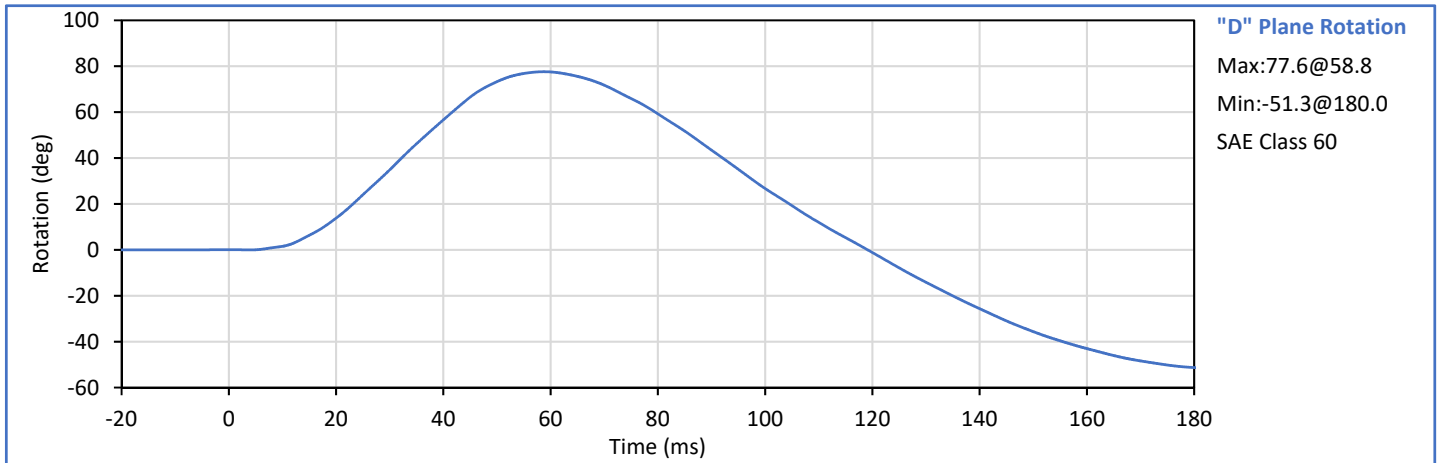
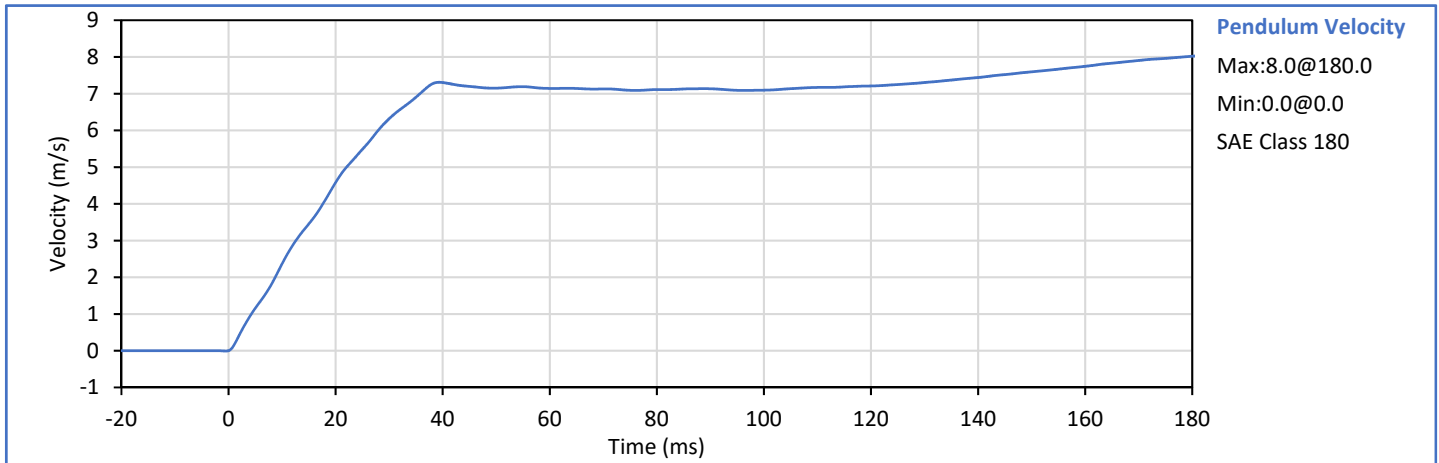
Approved By:   
 P. Puzzuto



ATD Serial No.: 630

Test Date: 2018-04-03

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	6.92	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	4.58	Pass
Pendulum Velocity at 30 ms	m/s	5.80	7.00	6.32	Pass
Peak "D" Plane Rotation	deg	77.0	91.0	77.6	Pass
Peak Moment in Rotation	Nm	69.0	83.0	80.2	Pass
Positive Moment Decay to 10 Nm	ms	80.0	100.0	86.2	Pass
<b>Overall Test Results</b>					<b>Pass</b>



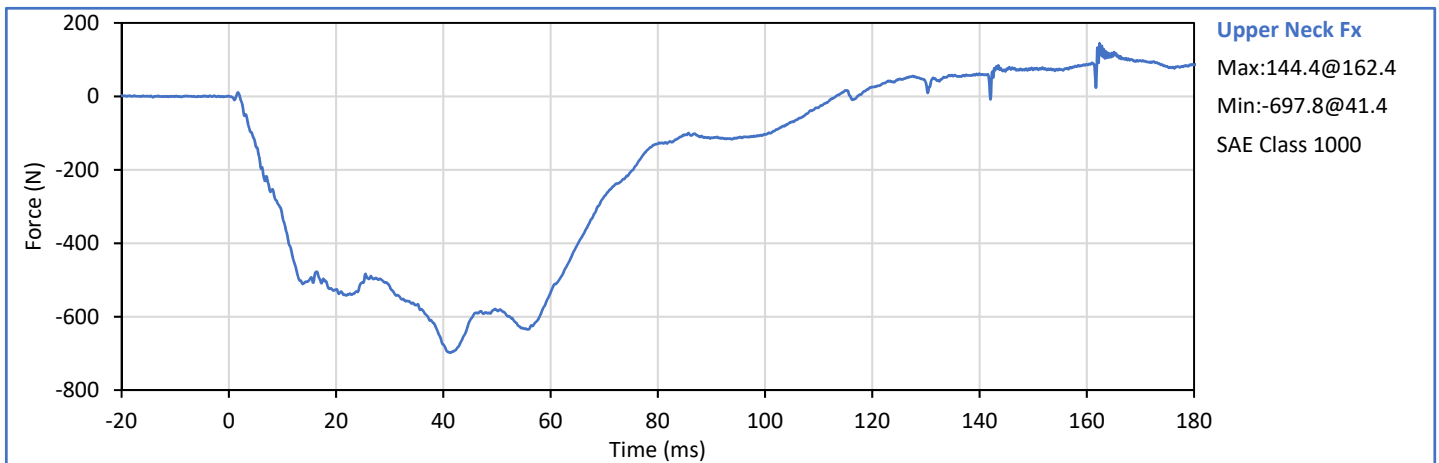
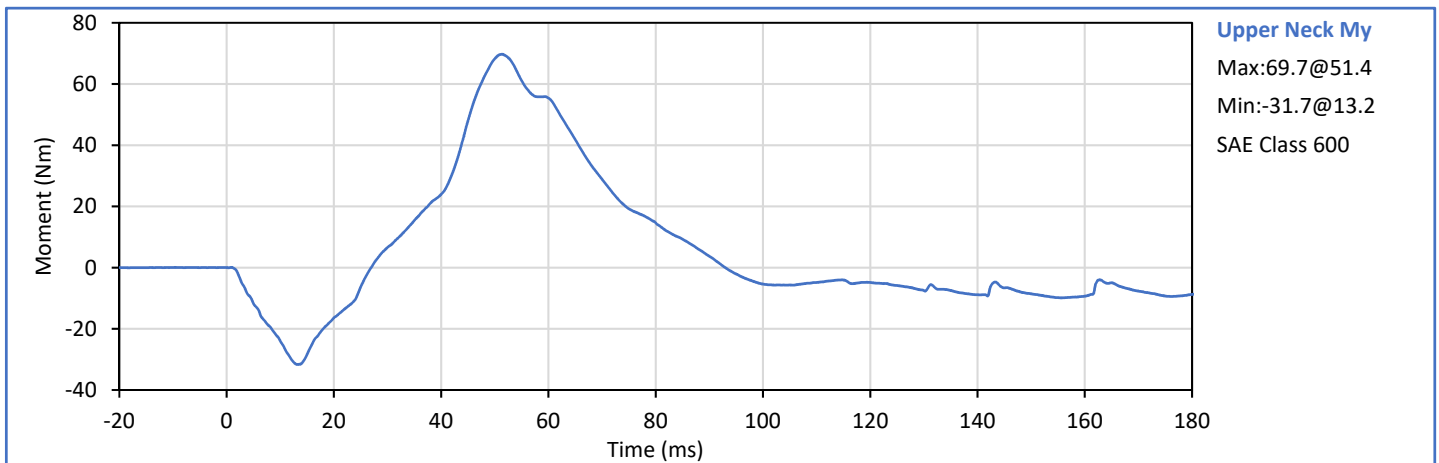
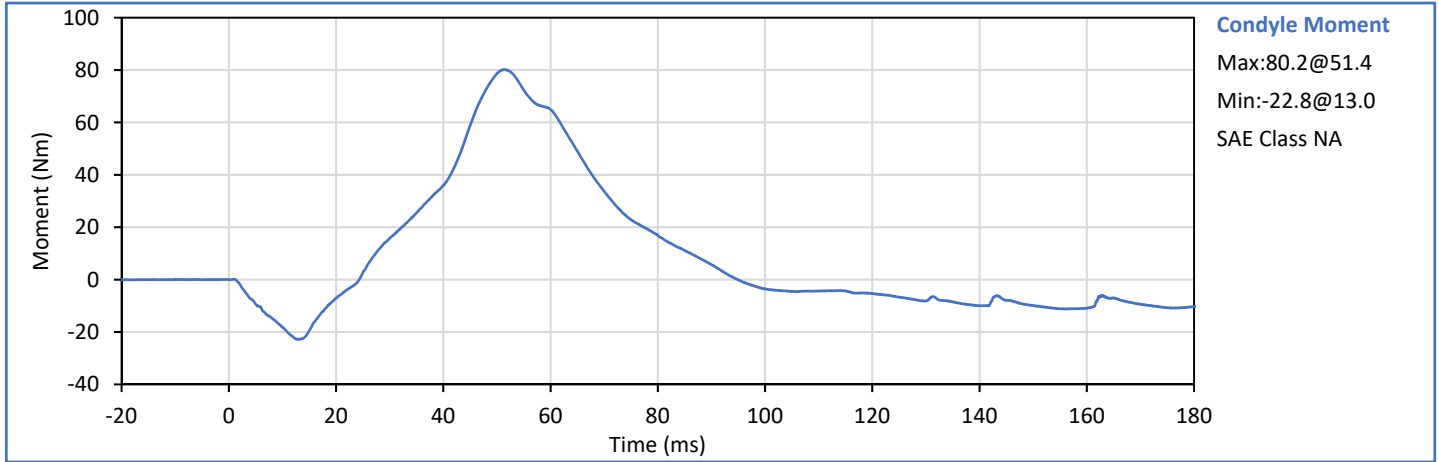
Technician:   
 J. Hernandez

Approved By:   
 P. Puzzuto



ATD Serial No.: 630

Test Date: 2018-04-03

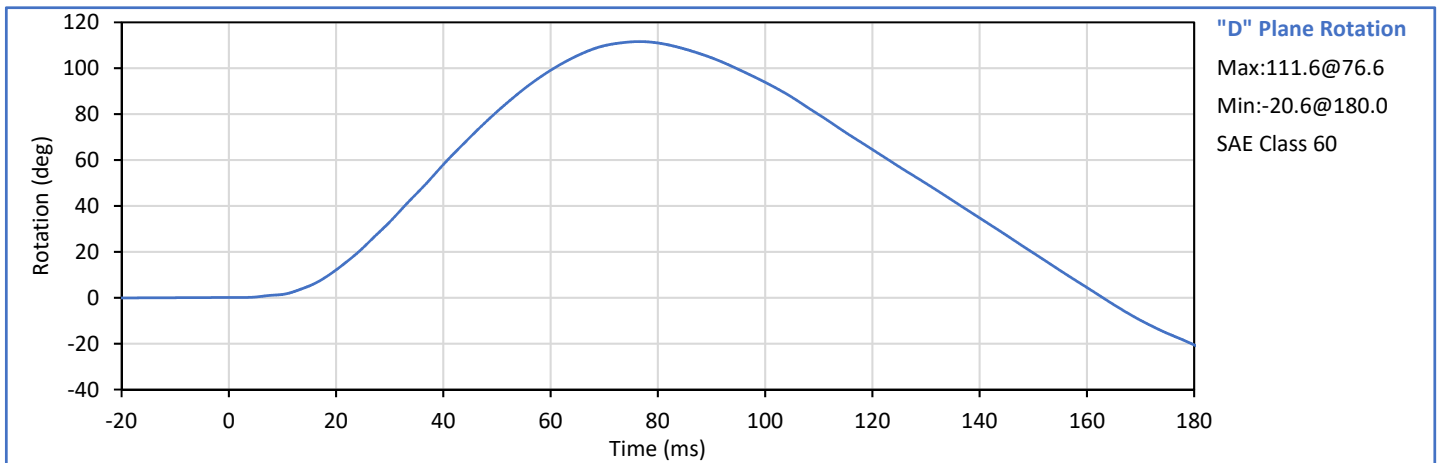
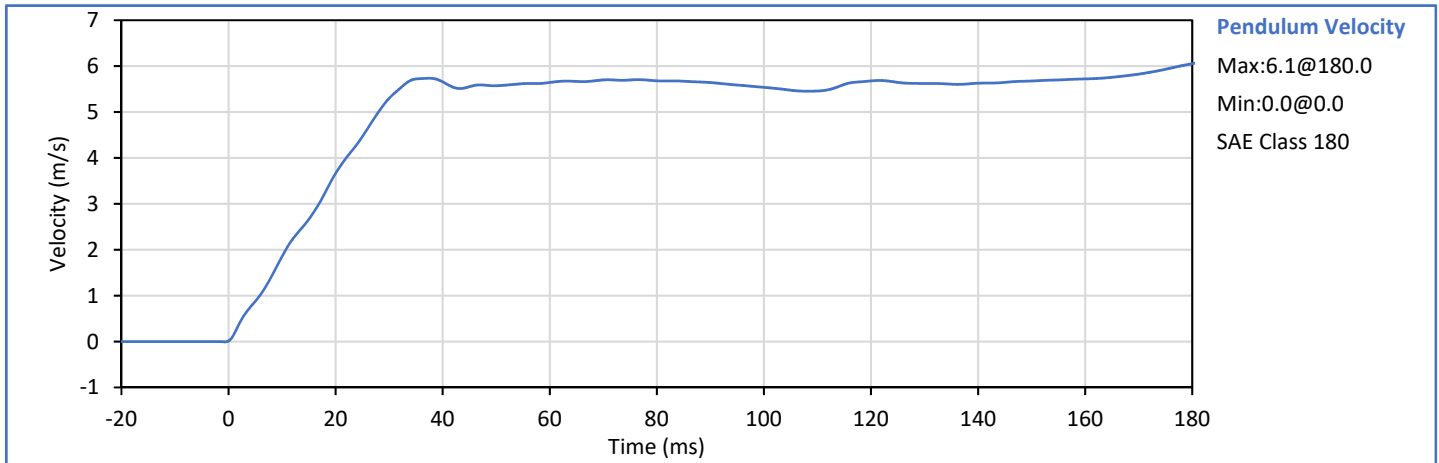




ATD Serial No.: 630

Test Date: 2018-04-03

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	5.95	6.19	6.16	Pass
Pendulum Velocity at 10 ms	m/s	1.50	1.90	1.85	Pass
Pendulum Velocity at 20 ms	m/s	3.10	3.90	3.66	Pass
Pendulum Velocity at 30 ms	m/s	4.60	5.60	5.30	Pass
Peak "D" Plane Rotation	deg	99.0	114.0	111.6	Pass
Peak Moment in Rotation	Nm	-65.0	-53.0	-57.9	Pass
Negative Moment Decay to -10 Nm	ms	94.0	114.0	101.6	Pass
<b>Overall Test Results</b>					<b>Pass</b>



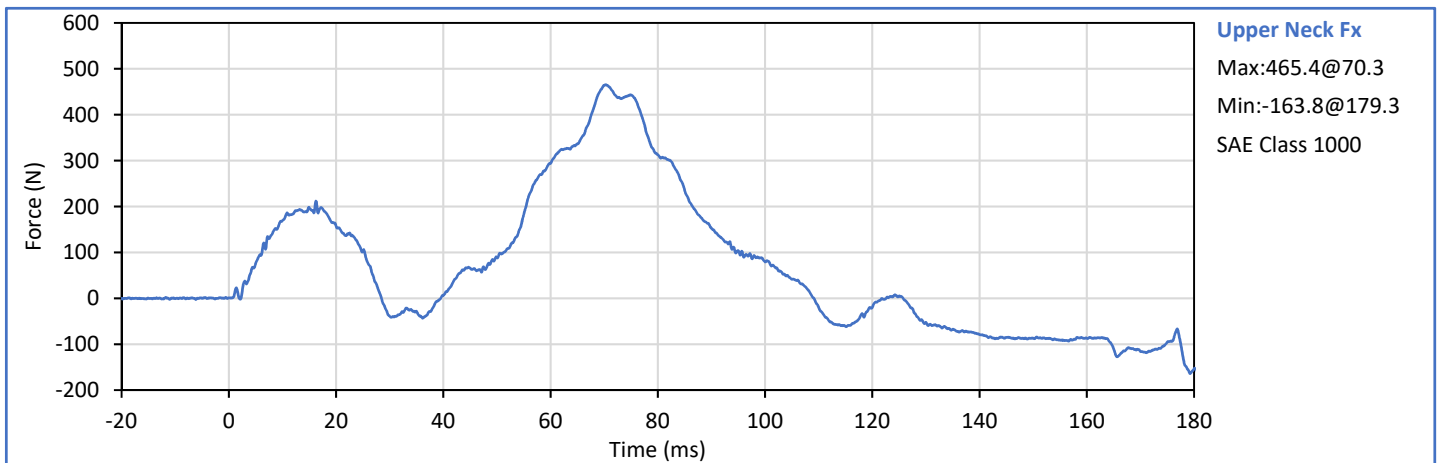
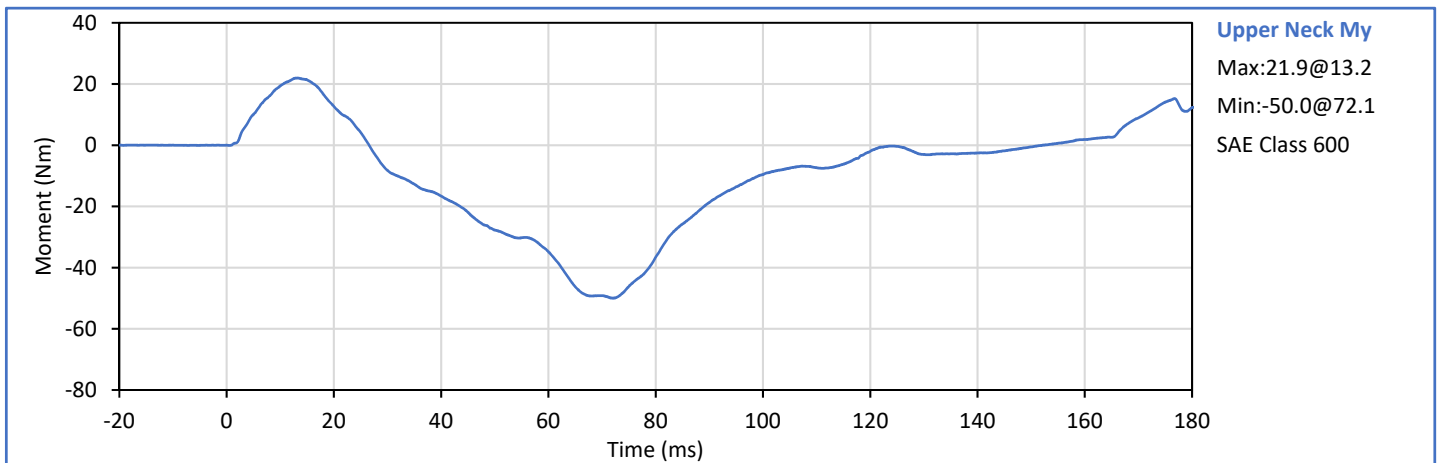
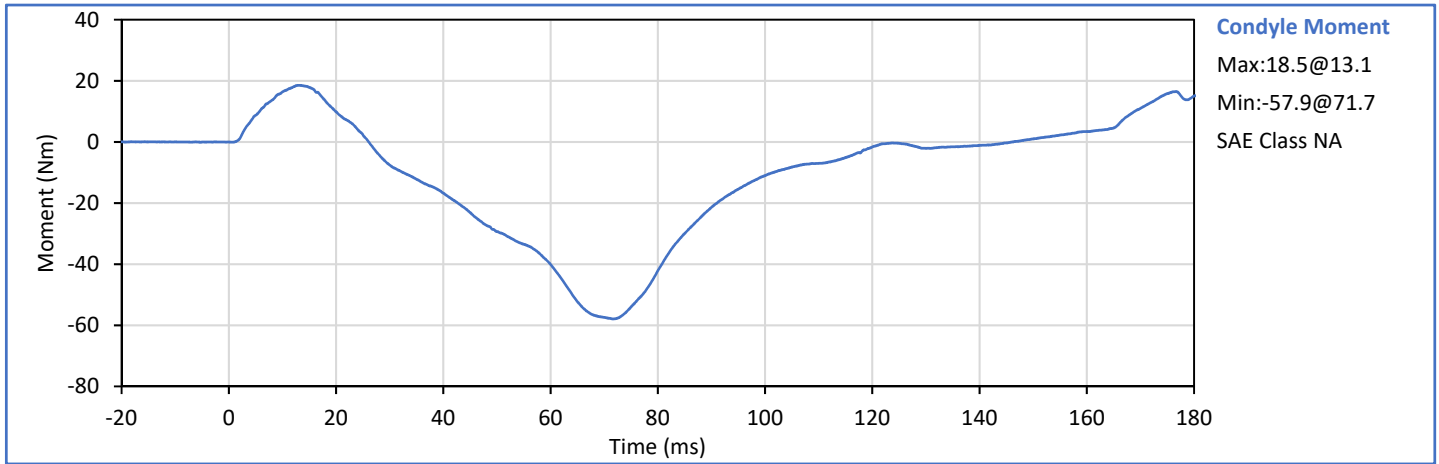
Technician: *J. Hernandez*  
 J. Hernandez

Approved By: *P. Puzzuto*  
 P. Puzzuto



ATD Serial No.: 630

Test Date: 2018-04-03

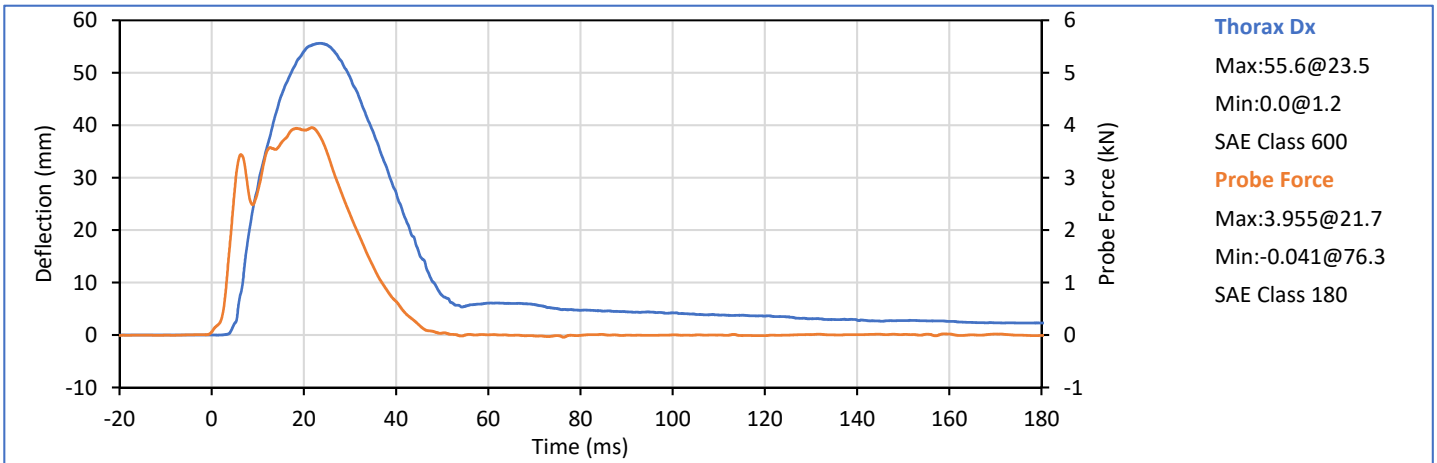
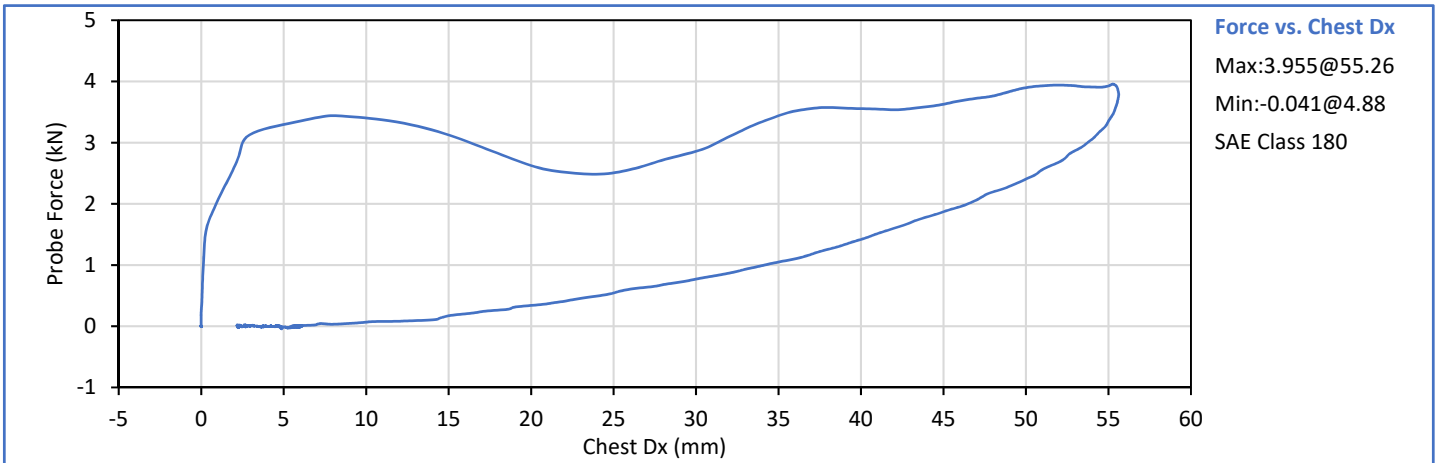




ATD Serial No.: 630

Test Date: 2018-04-05

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Humidity	%	10	70	32	Pass
Probe Velocity	m/s	6.59	6.83	6.61	Pass
Peak Chest Deflection	mm	50.0	58.0	55.6	Pass
Peak Probe Force, 50 and 58 mm	kN	3.900	4.400	3.955	Pass
Peak Probe Force, 18 and 50 mm	kN	0.000	4.600	3.901	Pass
Internal Hysterisis	%	69.0	85.0	70.4	Pass
<b>Overall Test Results</b>					<b>Pass</b>



Technician:   
 J. Hernandez

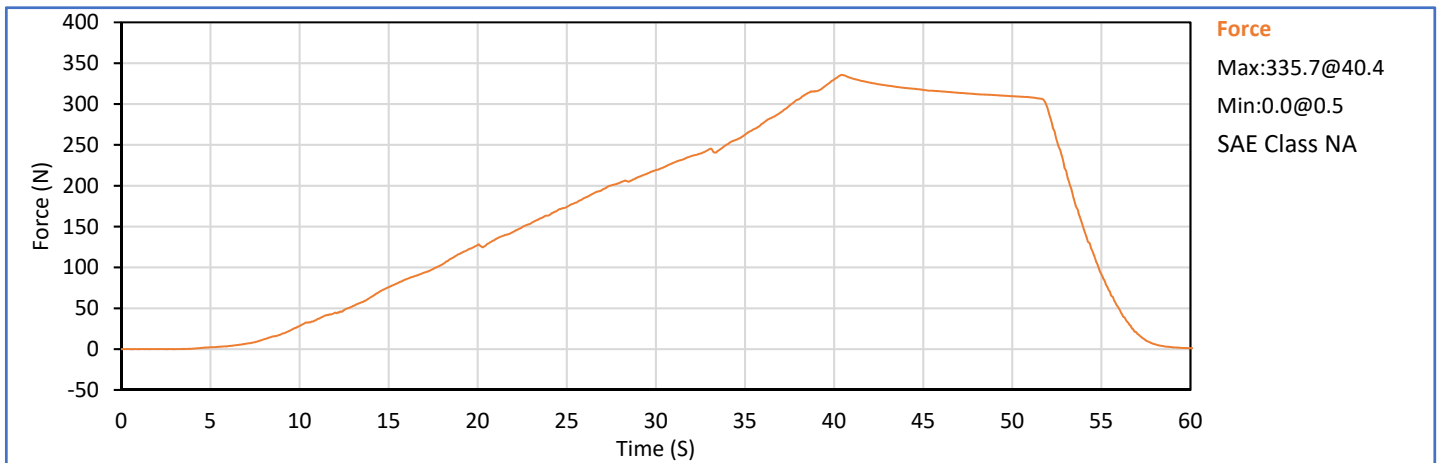
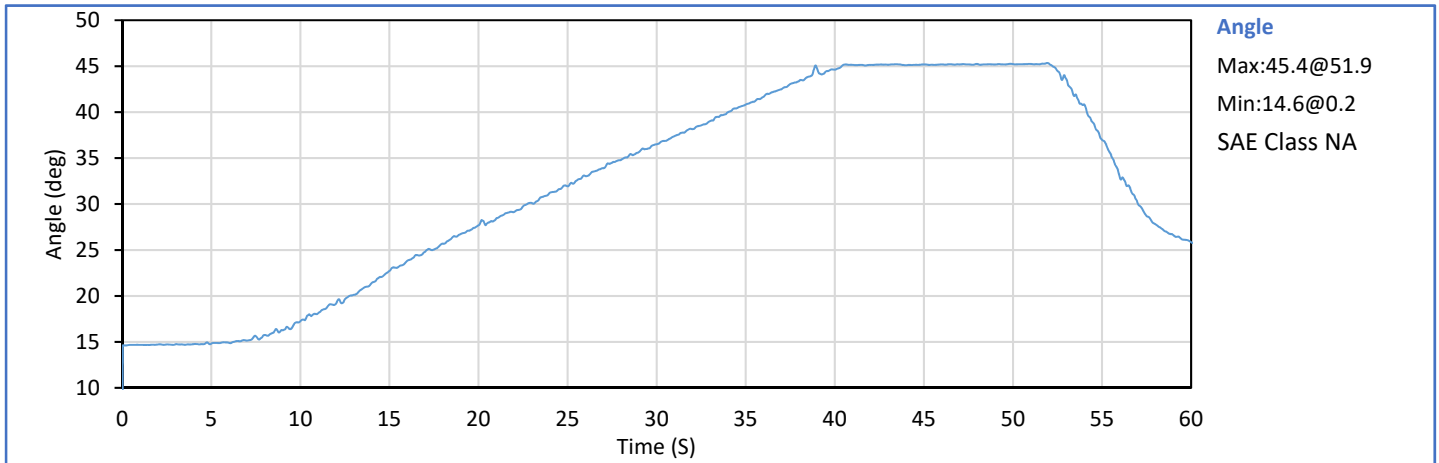
Approved By:   
 P. Puzzuto



ATD Serial No.: 630

Test Date: 2018-04-04

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.6	Pass
Laboratory Humidity	%	10	70	34	Pass
Orientation Angle	deg	0.0	20.0	12.5	Pass
Test Initial Angle	deg	11.0	19.0	14.6	Pass
Peak Force at 45° (+/-0.5°)	N	320.0	390.0	335.2	Pass
Torso Flexion Rate	deg/s	0.50	1.50	0.89	Pass
Final Reference Plane Angle	deg	-8.0	8.0	6.9	Pass
<b>Overall Test Results</b>					<b>Pass</b>



Technician:   
 J. Hernandez

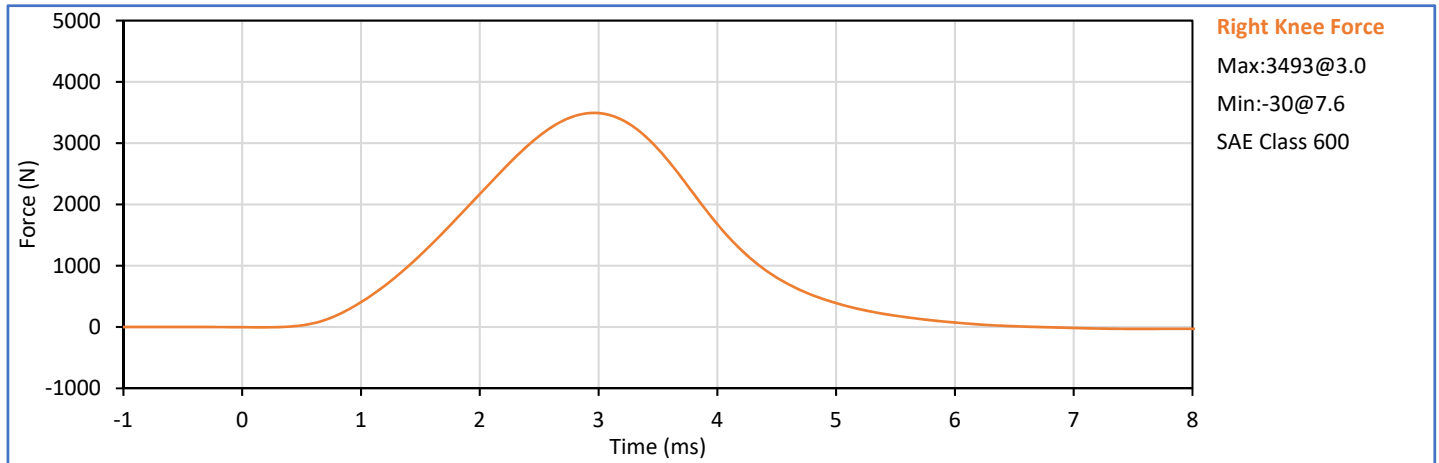
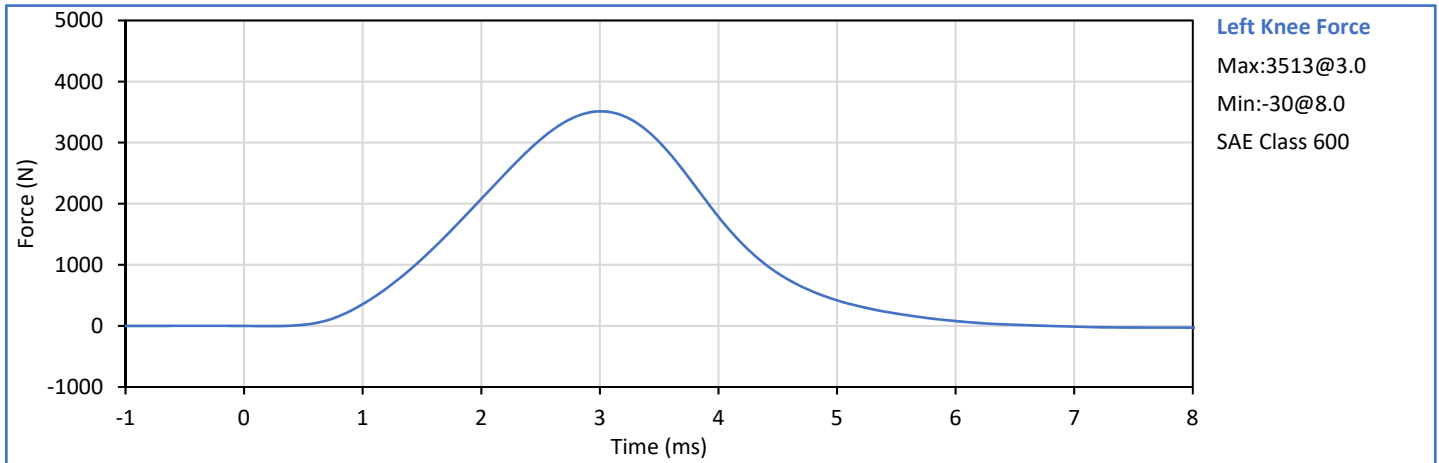
Approved By:   
 P. Puzzuto



ATD Serial No.: 630

Test Date: 2018-04-02

	Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
	Laboratory Temperature	°C	18.9	25.6	23.2	Pass
	Laboratory Humidity	%	10	70	24	Pass
Left	Probe Velocity	m/s	2.070	2.130	2.078	Pass
Knee	Peak Resistive Force	N	3450	4060	3513	Pass
Right	Probe Velocity	m/s	2.070	2.130	2.081	Pass
Knee	Peak Resistive Force	N	3450	4060	3493	Pass
<b>Overall Test Results</b>						Pass



Technician:   
 T. Lowman

Approved By:   
 P. Puzzuto

**APPENDIX C**  
**POST-TEST ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA**



ATD Serial No.: 360

Test Date: 2018-04-11

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

Describe any repairs or replacement of parts or other findings:

1.) Damaged wires at left lower tibia breakout boot. Add heatshrink to create an improved grip of connector collet

2.) Failing head drop due to skull apparently seperating at casting seam or possible lead weight delamination

Replacement of skull with the same skin resolves the issue

Technician:

Approved By:



**Hybrid III 50th Percentile Male  
 External Measurements**

ATD Serial No.: 360

Test Date: 2018-04-16

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	885	Pass
B - Shoulder pivot height	mm	505	521	516	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	150	Pass
G - Back of elbow to wrist pivot	mm	290	305	296	Pass
H - Head back to backline	mm	41	46	43	Pass
I - Shoulder to elbow length	mm	330	345	337	Pass
J - Elbow rest height	mm	190	211	205	Pass
K - Buttock to knee length	mm	579	604	596	Pass
L - Popliteal length	mm	429	455	436	Pass
M - Knee pivot height	mm	485	500	494	Pass
N - Buttock popliteal length	mm	452	477	474	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	427	Pass
W - Foot breadth	mm	91	107	99	Pass
Y - Chest circum. (w/chest jacket)	mm	970	1001	991	Pass
Z - Waist circum.	mm	836	866	853	Pass
AA - Location for chest circum.	mm	429	434	433	Pass
BB - Location for waist circum.	mm	226	231	231	Pass
				Overall Test Results	Pass

Technician:

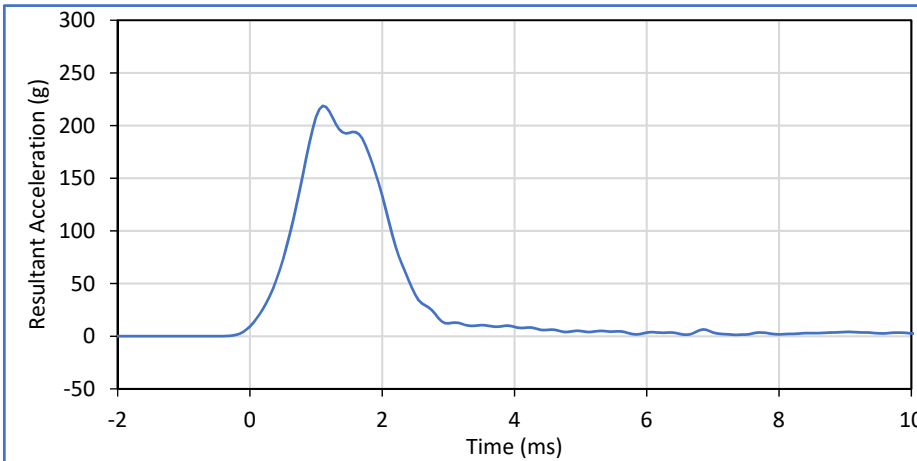
Approved By:



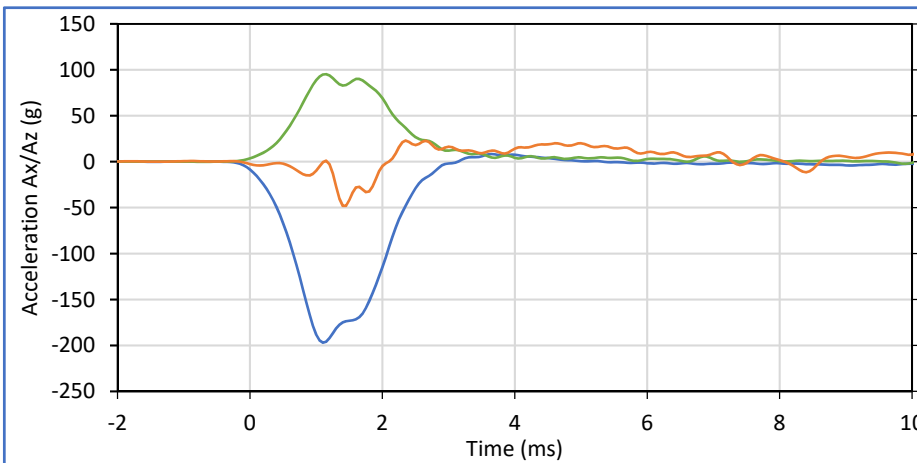
ATD Serial No.: 360

Test Date: 2018-04-12

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	225.0	275.0	218.7	Fail
Peak Lateral Acceleration	g	-15.0	15.0	-4.8	Pass
Oscillations After Main Pulse	%	0.0	10.0	2.9	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
<b>Overall Test Results</b>					<b>Fail</b>



**Head Acceleration Resultant**  
 Max:218.7@1.1 / Min:1.3@7.4  
 SAE Class 1000



**Head Ax**  
 Max:8.3@3.7 / Min:-197.0@1.1  
 SAE Class 1000

**Head Ay**  
 Max:2.3@2.4 / Min:-4.8@1.4  
 SAE Class 1000

**Head Az**  
 Max:95.3@1.2 / Min:-2.2@9.9  
 SAE Class 1000

Technician:

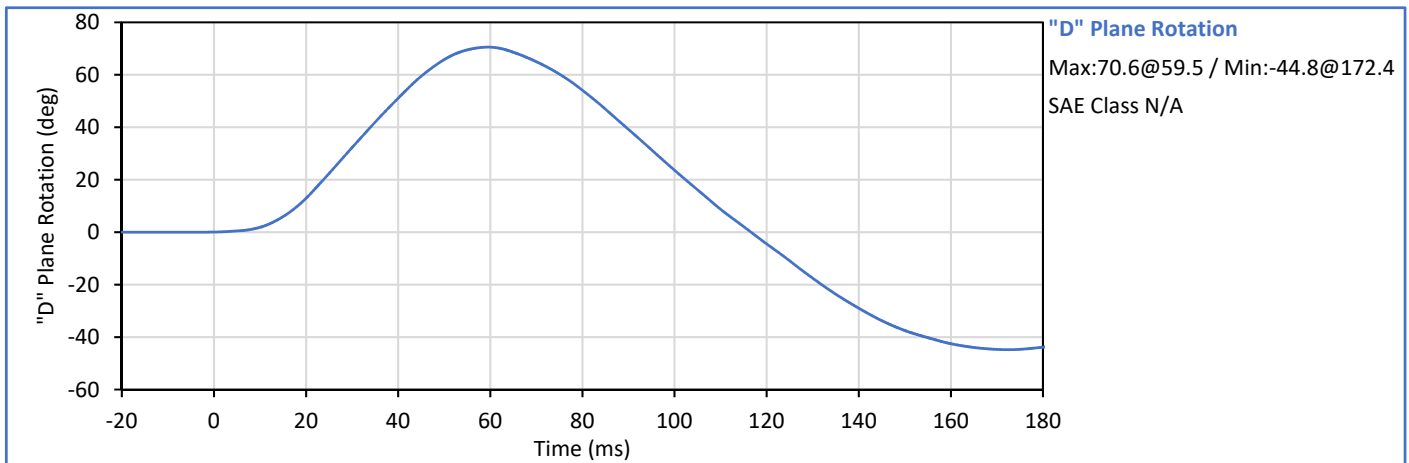
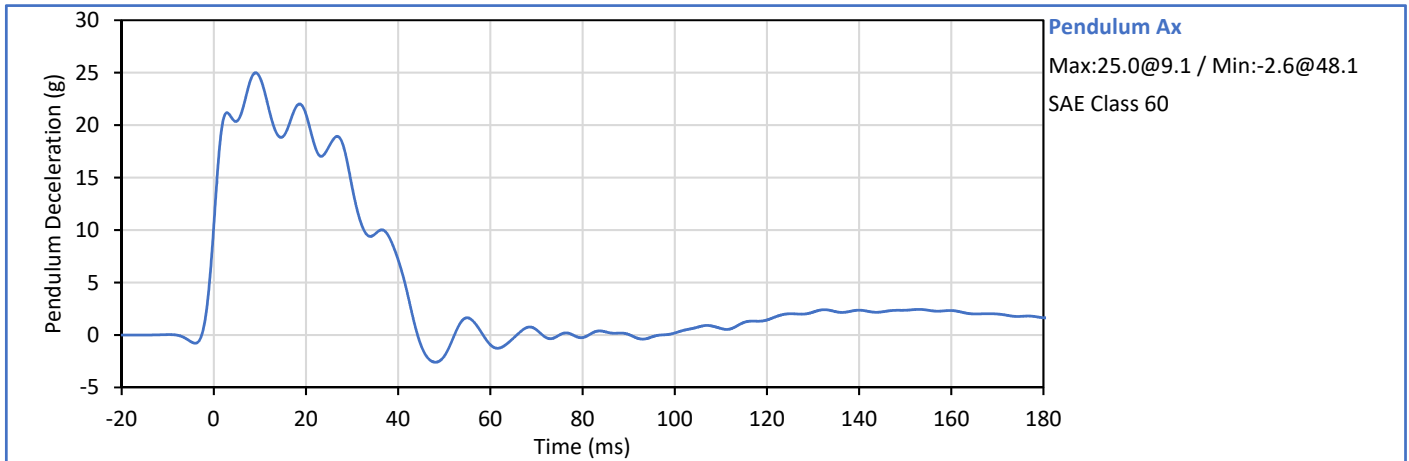
Approved By:



ATD Serial No.: 360

Test Date: 2018-04-13

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Humidity	%	10	70	22	Pass
Pendulum Velocity	m/s	6.89	7.13	7.00	Pass
Pendulum Deceleration at 10 ms	g	22.5	27.5	24.5	Pass
Pendulum Deceleration at 20 ms	g	17.6	22.6	21.0	Pass
Pendulum Deceleration at 30 ms	g	12.5	18.5	14.1	Pass
Peak Pendulum Decel. after 30 ms	g	0.0	29.0	14.1	Pass
Deceleration Decay to Cross 5 g	ms	34.0	42.0	41.5	Pass
"D" Plane Rotation peak	deg	64.0	78.0	70.6	Pass
	ms	57.0	64.0	59.5	Pass
"D" Plane Rotation Decay To Zero	ms	113.0	128.0	116.7	Pass
Moment About Occipital Condyle	Nm	88.1	108.5	94.9	Pass
	ms	47.0	58.0	54.4	Pass
Moment Decay, Peak to Zero	deg	97.0	107.0	97.2	Pass
<b>Overall Test Results</b>					<b>Pass</b>



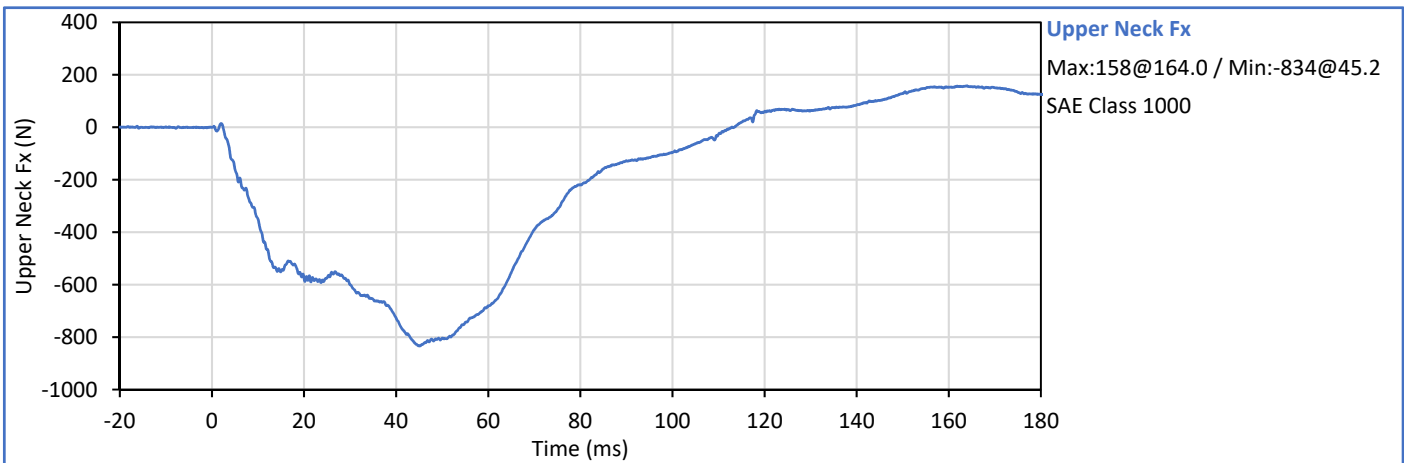
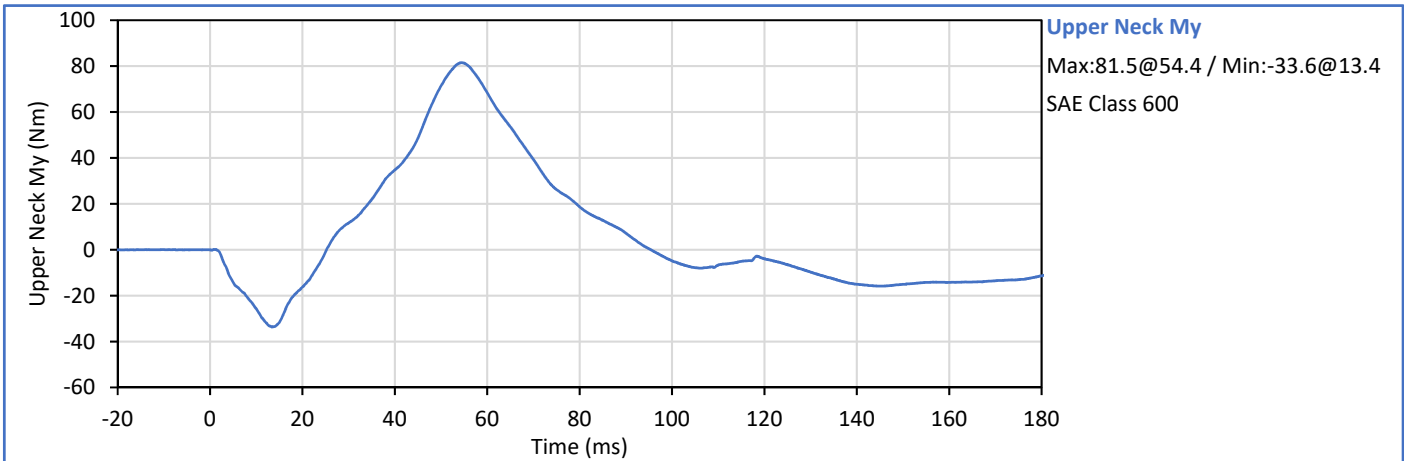
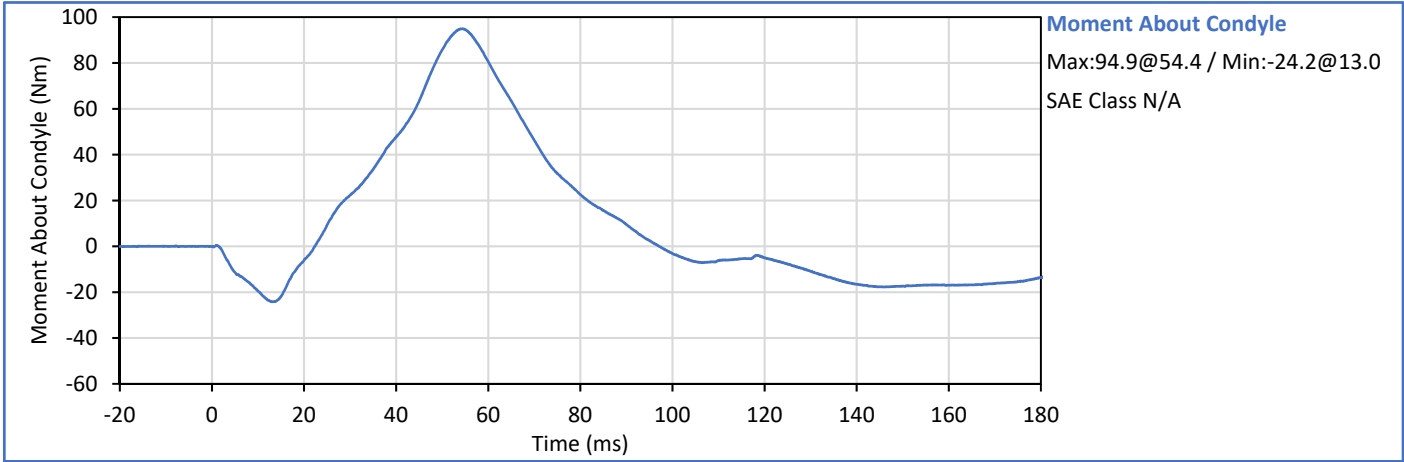
Technician: *Smith*

Approved By: *Pluggitt*



ATD Serial No.: 360

Test Date: 2018-04-13



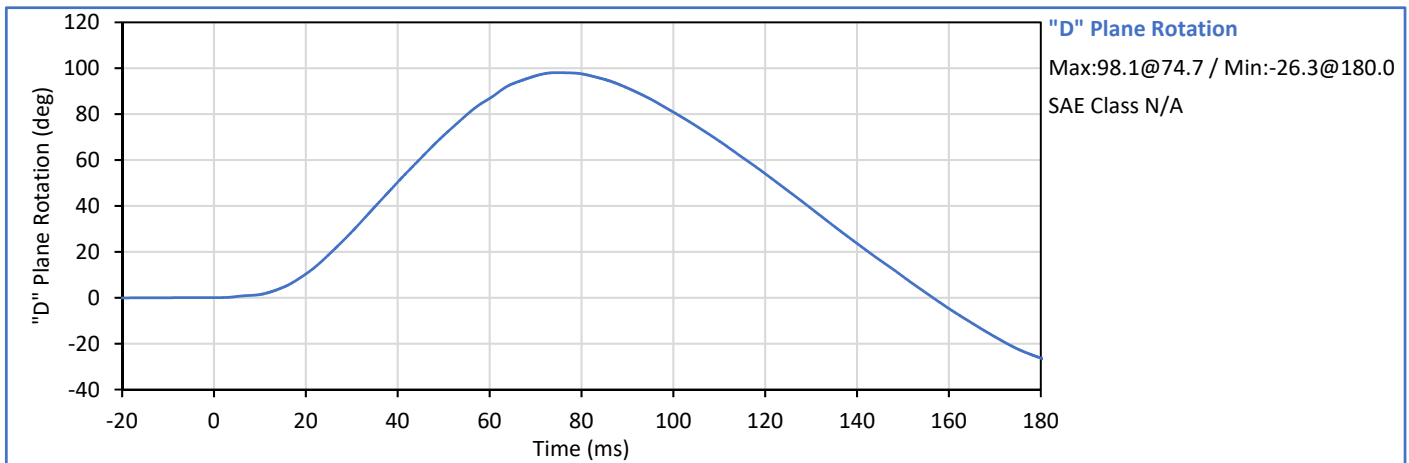
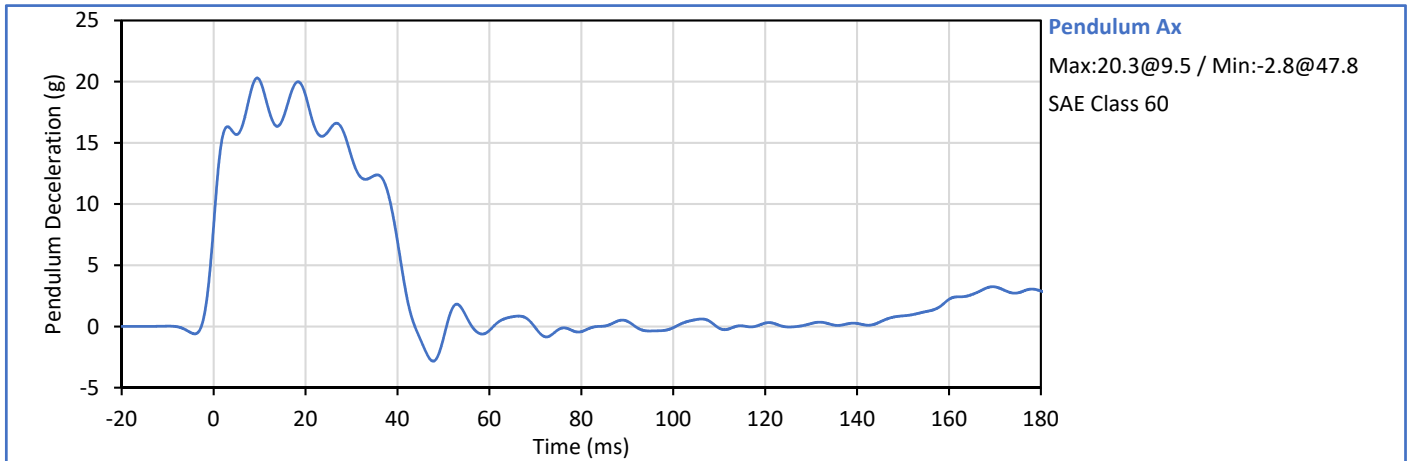


**Hybrid III 50th Percentile Male  
 Neck Extension Test**

ATD Serial No.: 360

Test Date: 2018-04-13

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Humidity	%	10	70	22	Pass
Pendulum Velocity	m/s	5.94	6.19	6.07	Pass
Pendulum Deceleration at 10 ms	g	17.2	21.2	20.1	Pass
Pendulum Deceleration at 20 ms	g	14.0	19.0	18.9	Pass
Pendulum Deceleration at 30 ms	g	11.0	16.0	13.9	Pass
Peak Pendulum Decel. after 30 ms	g	0.0	22.0	13.9	Pass
Deceleration Decay to Cross 5 g	ms	38.0	46.0	40.9	Pass
"D" Plane Rotation peak	deg	81.0	106.0	98.1	Pass
	ms	72.0	82.0	74.7	Pass
"D" Plane Rotation Decay To Zero	ms	147.0	174.0	156.7	Pass
Moment About Occipital Condyle	Nm	-79.9	-52.9	-66.0	Pass
	ms	65.0	79.0	70.2	Pass
Moment Decay, Peak to Zero	deg	120.0	148.0	135.9	Pass
<b>Overall Test Results</b>					<b>Pass</b>



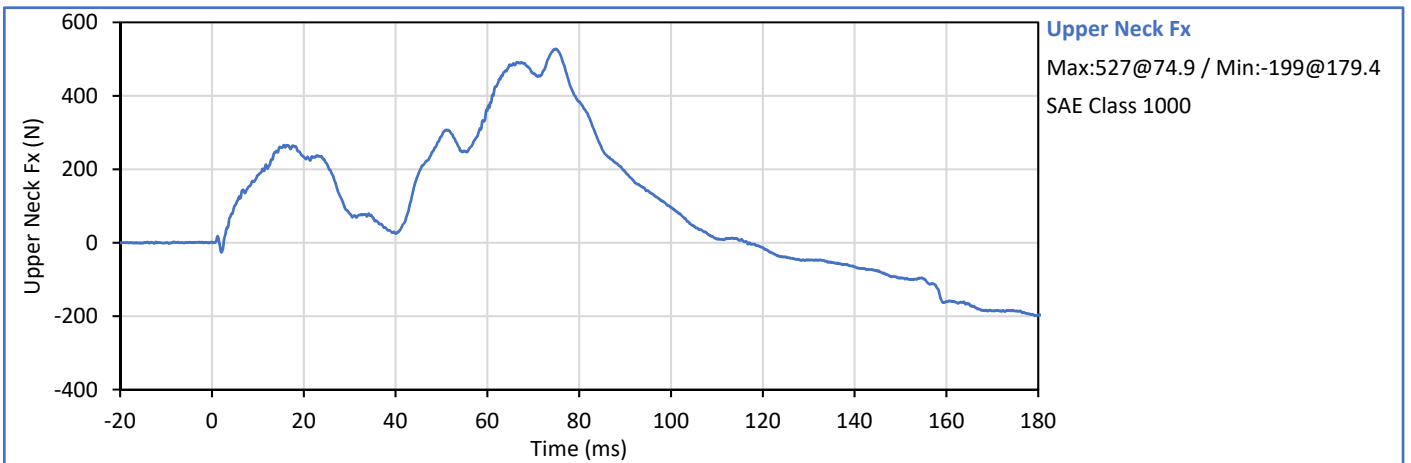
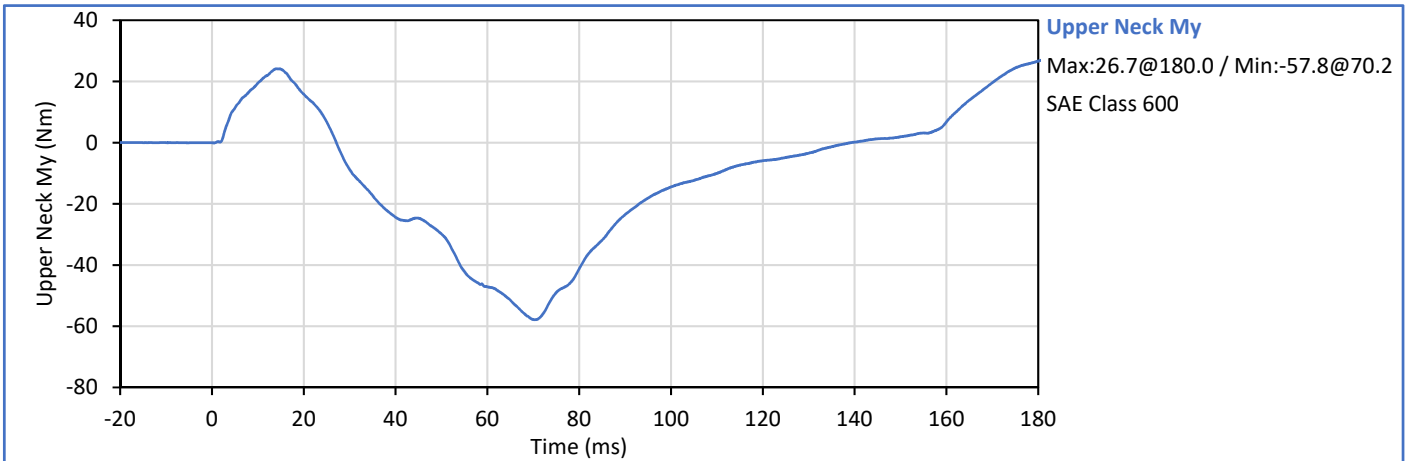
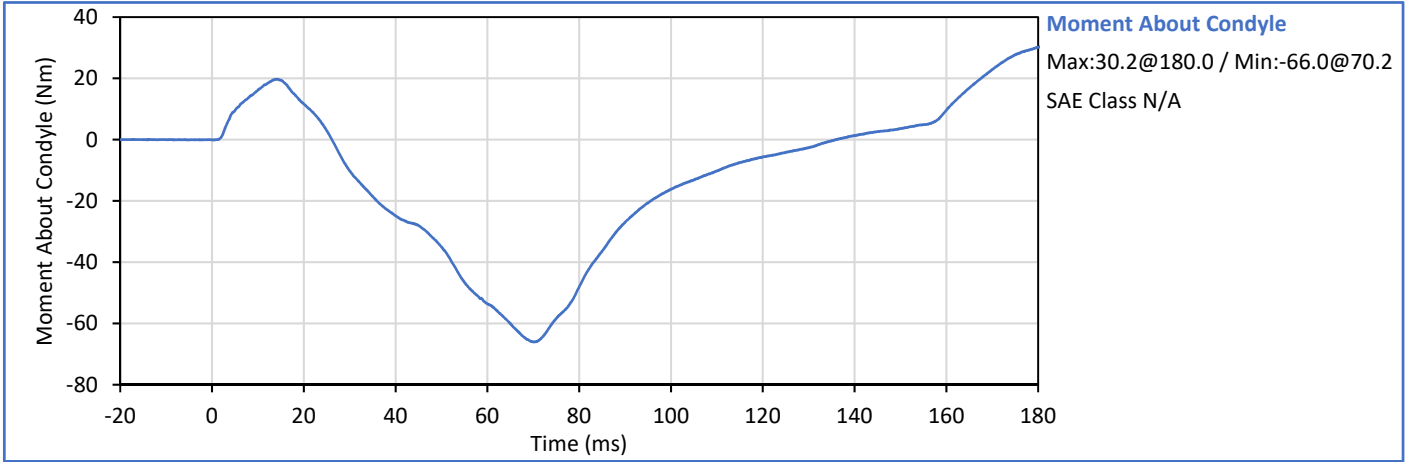
Technician: *Smith*

Approved By: *Pluggito*



ATD Serial No.: 360

Test Date: 2018-04-13

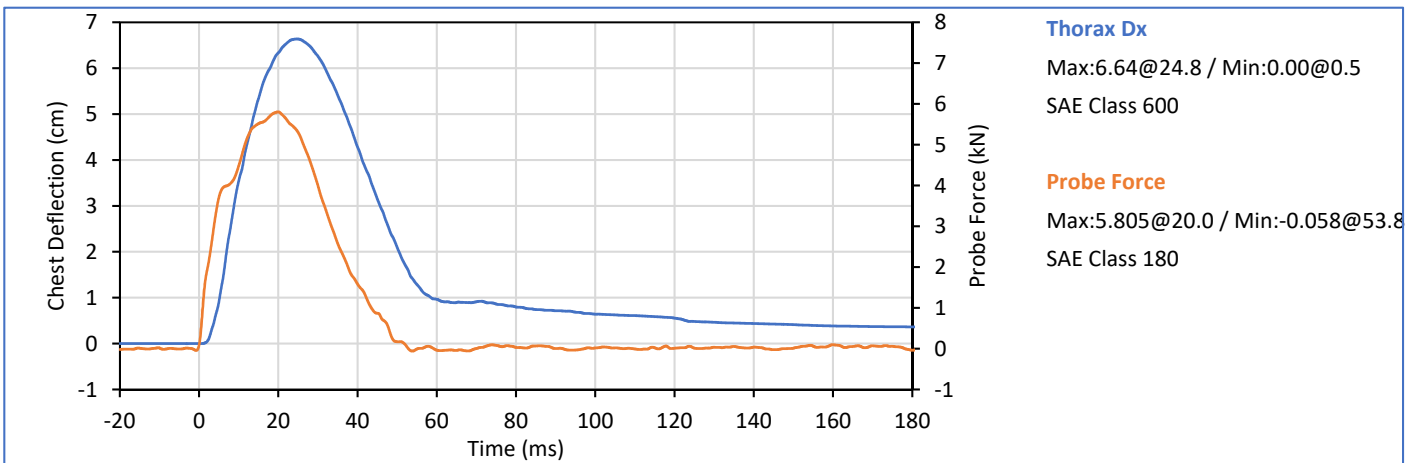
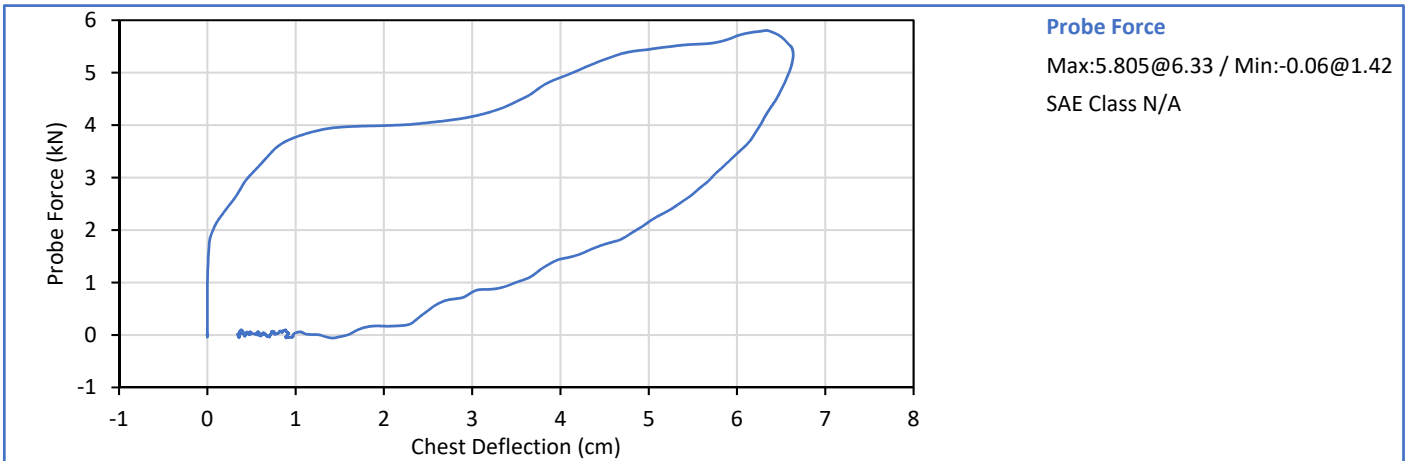




ATD Serial No.: 360

Test Date: 2018-04-16

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.9	Pass
Laboratory Humidity	%	10	70	25	Pass
Probe Velocity	m/s	6.58	6.82	6.72	Pass
Peak Chest Deflection	cm	6.35	7.26	6.64	Pass
Peak Probe Force	kN	5.159	5.893	5.805	Pass
Internal Hysterisis	%	69.0	85.0	70.8	Pass
				Overall Test Results	Pass



Technician: *Scott*

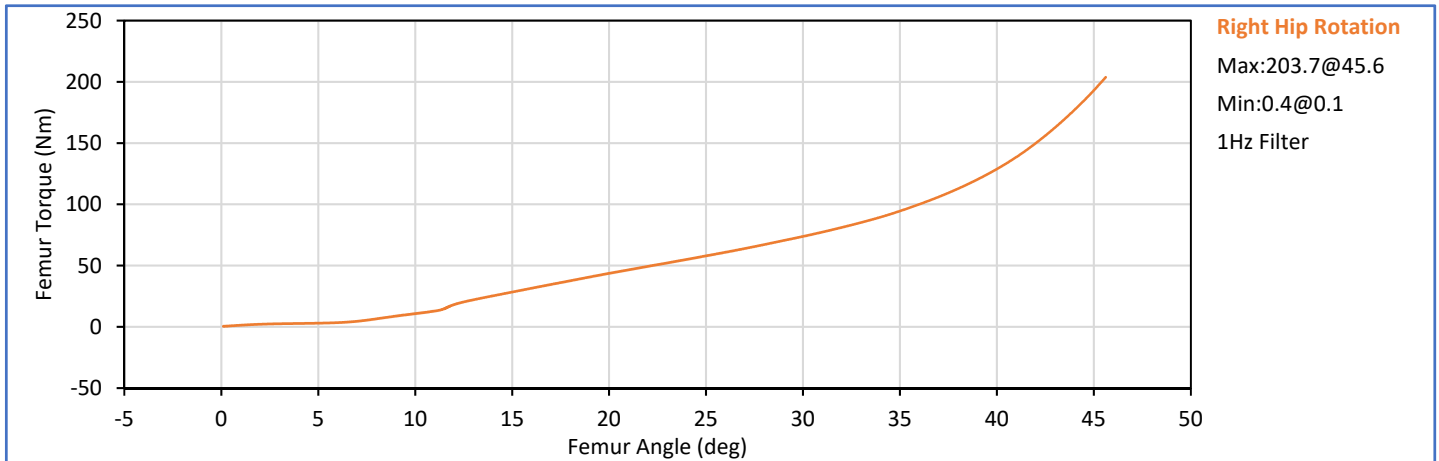
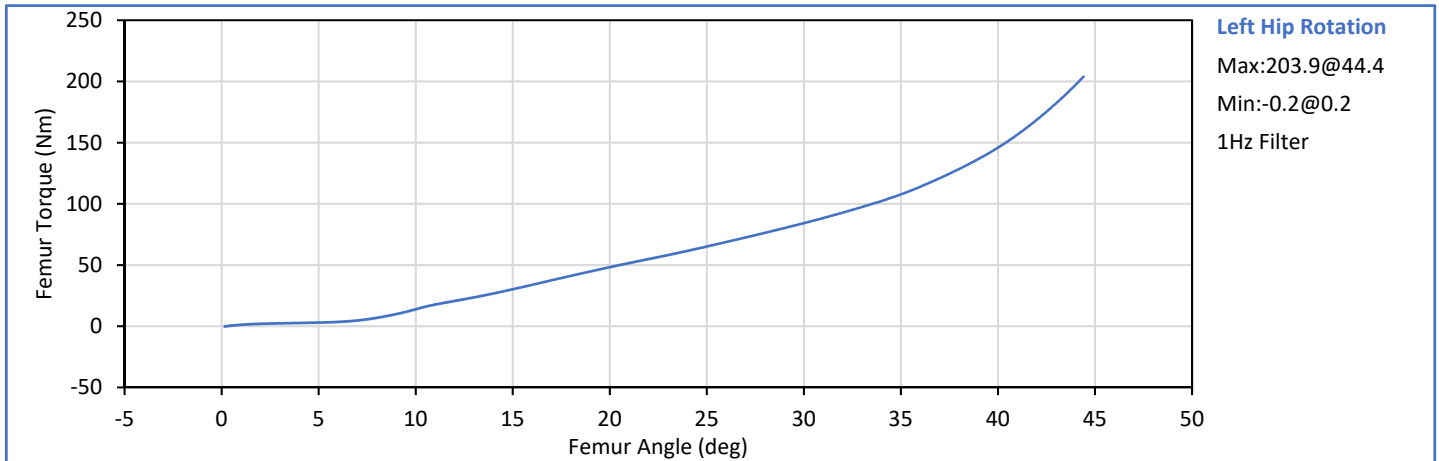
Approved By: *Plugg*



ATD Serial No.: 360

Test Date: 2018-04-16

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail	
Laboratory Temperature	°C	18.9	25.6	21.9	Pass	
Laboratory Humidity	%	10	70	25	Pass	
Left Hip	Left Hip Rotation Rate	deg/s	5.0	10.0	6.1	Pass
	Left Femur Torque at 30°	Nm	0.0	95.0	84.3	Pass
	Left Hip Rotation at 203 Nm	deg	40.0	50.0	44.3	Pass
Right Hip	Right Hip Rotation Rate	deg/s	5.0	10.0	5.8	Pass
	Right Femur Torque at 30°	Nm	0.0	95.0	73.9	Pass
	Right Hip Rotation at 203 Nm	deg	40.0	50.0	45.6	Pass
Overall Test Results					Pass	



Technician:   
 J. Hernandez

Approved By:   
 P. Puzzuto

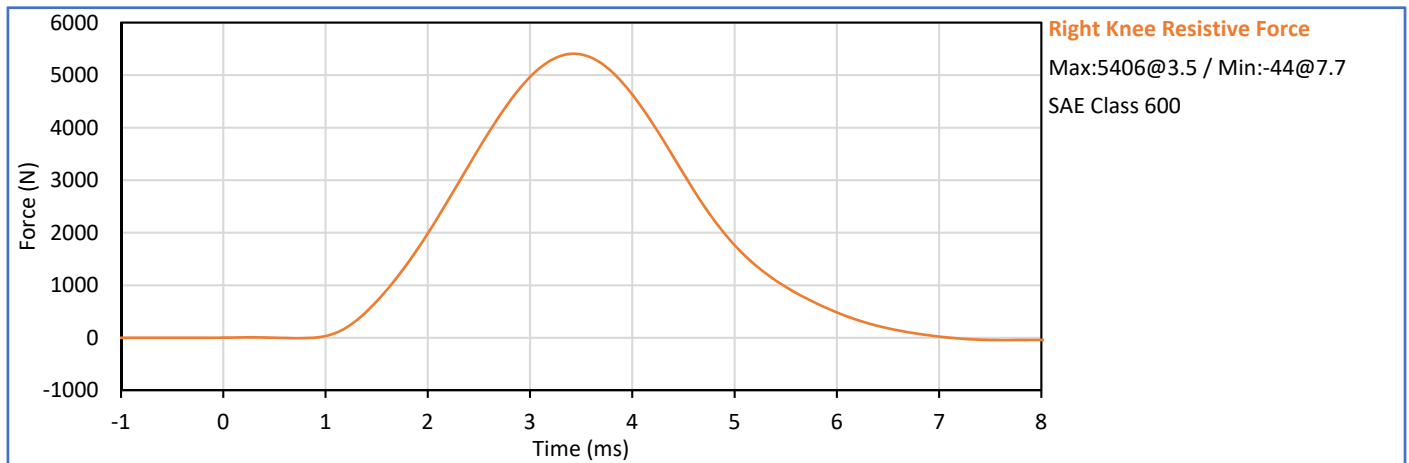
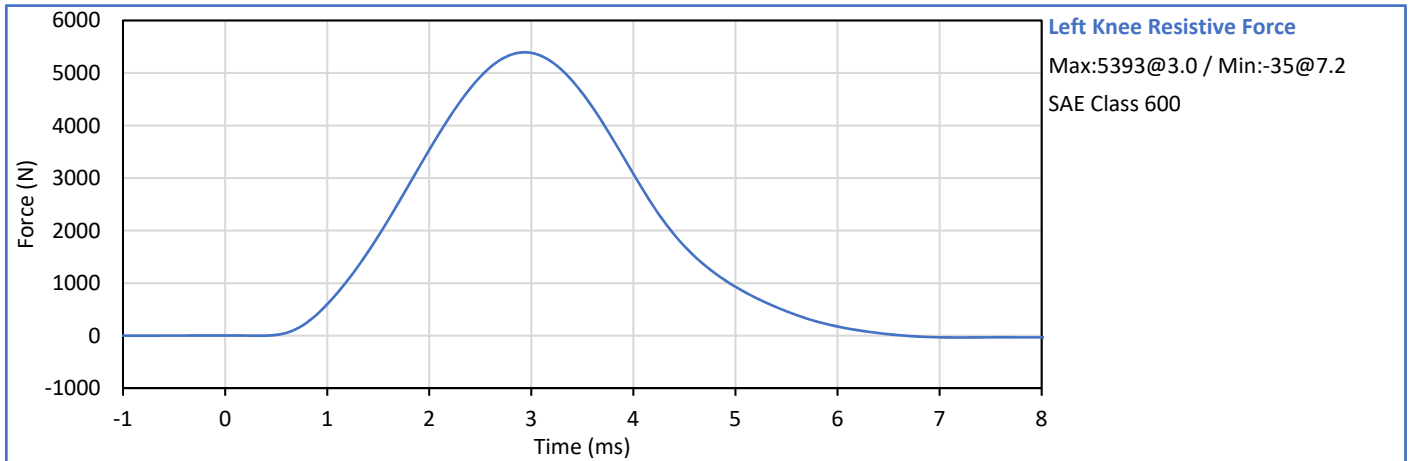


**Hybrid III 50th Percentile Male  
 Knee Impact (Left/Right)**

ATD Serial No.: 360

Test Date: 2018-04-11

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	22.3	Pass
Laboratory Humidity	%	10	70	27	Pass
Left Knee Probe Velocity	m/s	2.070	2.130	2.119	Pass
Left Knee Peak Resistive Force	N	4715	5782	5393	Pass
Right Knee Probe Velocity	m/s	2.070	2.130	2.120	Pass
Right Knee Peak Resistive Force	N	4715	5782	5406	Pass
Overall Test Results					Pass



Technician: *JJJ*

Approved By: *Plungito*



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

ATD Serial No.: 630

Test Date: 2018-04-10

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. Assembly	Bent shaft			✓
	Slider arm riding in track			✓
Sensors	Check cables for cuts, tears			✓
	Check for damaged insulation			✓
Accelerometer Mounting	Head mounting secure			✓
	Chest mounting secure			✓
Knees	Skin condition			✓
	Insert (do not remove)			✓
	Casting			✓
Limbs	Normal movement and adjustment			✓
Knee Sliders	Wires intact			✓
	Rubber returned to "resting" position			✓
Pelvis	Broken			✓
Other	Describe below as needed			✓

Describe any repairs or replacement of parts or other findings:

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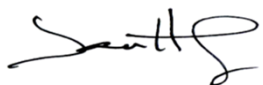
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Technician:   
 J. Hernandez

Approved By:   
 P. Puzzuto

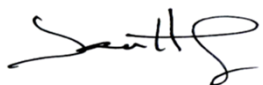



**Hybrid III 5th Percentile Female  
 External Measurements**

ATD Serial No.: 630

Test Date: 2018-04-16

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	23	Pass
A - Total sitting height	mm	775	800	783	Pass
B - Shoulder pivot height	mm	432	457	451	Pass
C - 'H' point height	mm	81	86	86	Pass
D - 'H' point location from backline	mm	145	150	148	Pass
E - Shoulder pivot from backline	mm	69	84	75	Pass
F - Thigh clearance	mm	119	135	129	Pass
G - Back of elbow to wrist pivot	mm	244	259	251	Pass
H - Head back to backline	mm	41	46	42	Pass
I - Shoulder to elbow length	mm	277	297	287	Pass
J - Elbow rest height	mm	183	203	196	Pass
K - Buttock to knee length	mm	521	546	527	Pass
L - Popliteal length	mm	356	376	362	Pass
M - Knee pivot height	mm	394	419	405	Pass
N - Buttock popliteal length	mm	414	439	424	Pass
O - Chest depth without jacket	mm	175	191	187	Pass
P - Foot length	mm	219	234	225	Pass
R - Buttock to Knee Pivot Length	mm	457	483	470	Pass
S - Head Breadth	mm	137	147	144	Pass
T - Head Depth	mm	178	188	186	Pass
U - Hip Breadth	mm	300	315	310	Pass
V - Shoulder breadth	mm	351	366	356	Pass
W - Foot breadth	mm	79	94	90	Pass
X - Head circum.	mm	528	549	537	Pass
Y - Chest circum. (w/chest jacket)	mm	851	881	866	Pass
Z - Waist circum.	mm	760	790	770	Pass
AA - Location for chest circum.	mm	333	358	337	Pass
BB - Location for waist circum.	mm	160	170	166	Pass
<b>Overall Test Results</b>					<b>Pass</b>

Technician:   
 J. Hernandez

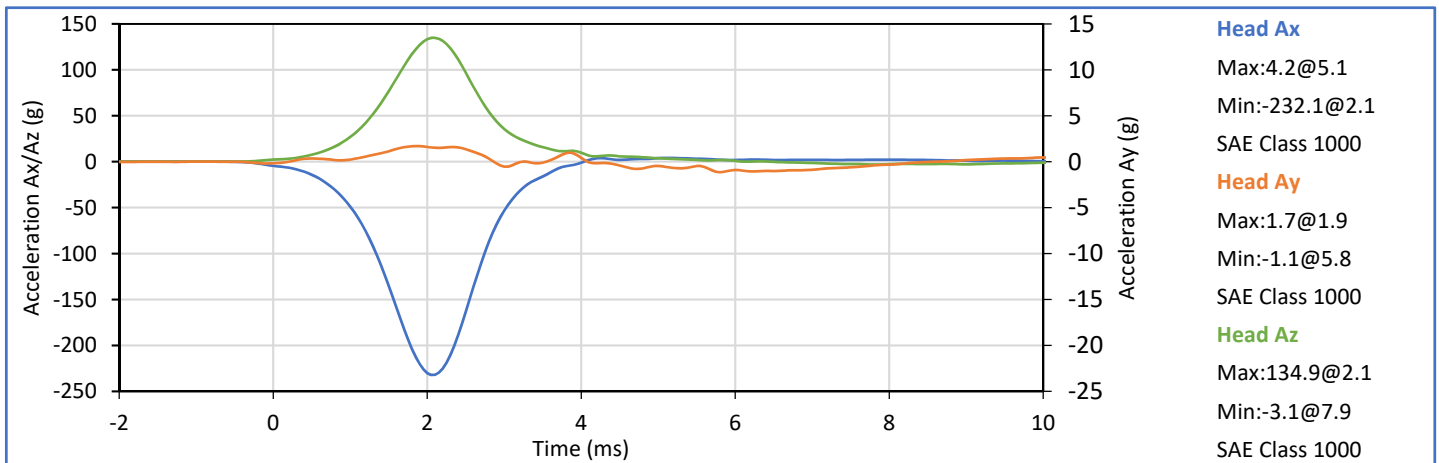
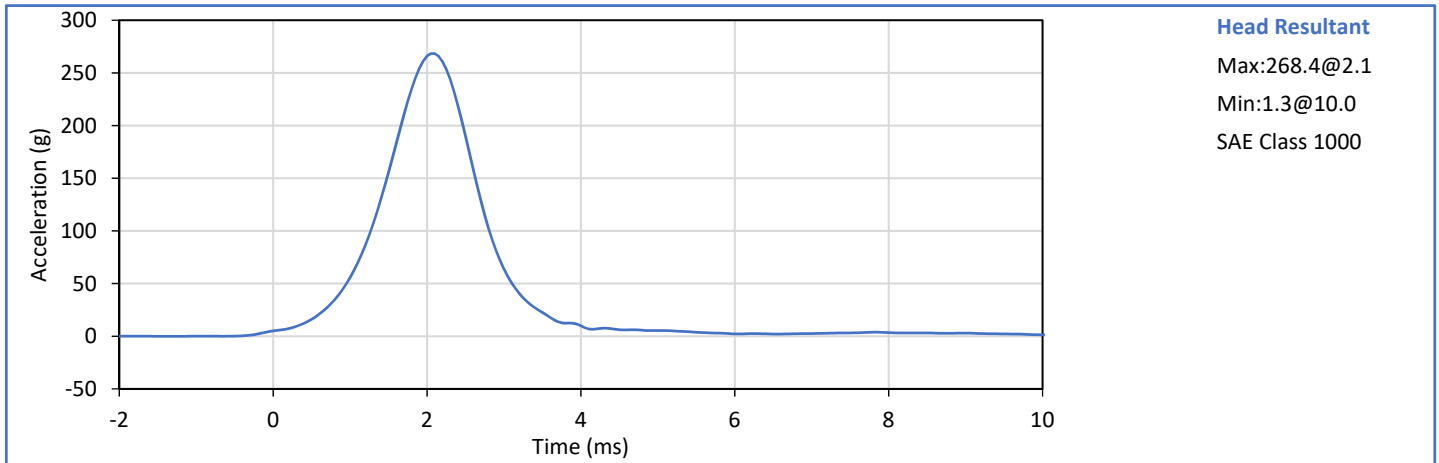
Approved By:   
 P. Puzzuto



ATD Serial No.: 630

Test Date: 2018-04-16

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	22.2	Pass
Laboratory Humidity	%	10	70	25	Pass
Peak Resultant Acceleration	g	250.0	300.0	268.4	Pass
Peak Lateral Acceleration	g	-15.0	15.0	1.7	Pass
Oscillations After Main Pulse	%	0.0	10.0	1.4	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
<b>Overall Test Results</b>					<b>Pass</b>



Technician:   
 T. Lowman

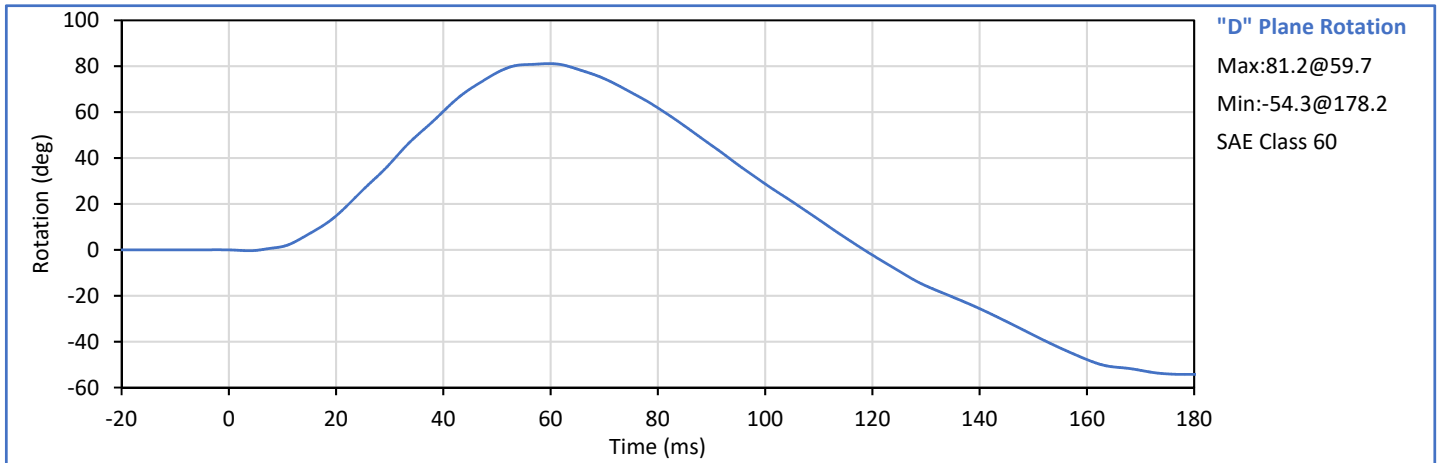
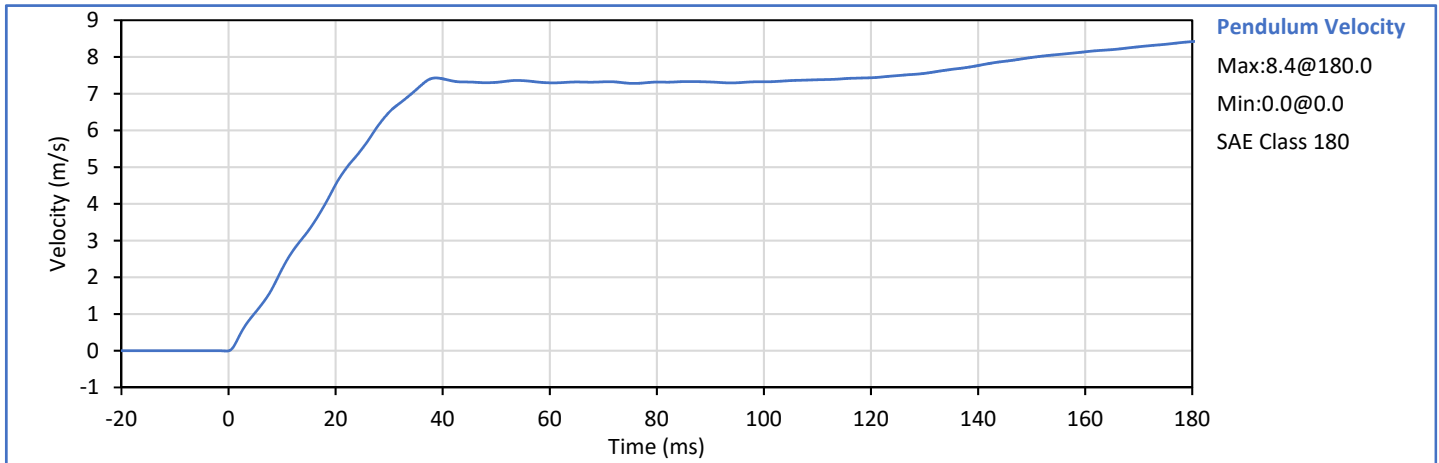
Approved By:   
 P. Puzzuto

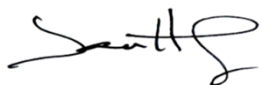



ATD Serial No.: 630

Test Date: 2018-04-16

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Humidity	%	10	70	22	Pass
Pendulum Velocity	m/s	6.89	7.13	7.08	Pass
Pendulum Velocity at 10 ms	m/s	2.10	2.50	2.22	Pass
Pendulum Velocity at 20 ms	m/s	4.00	5.00	4.53	Pass
Pendulum Velocity at 30 ms	m/s	5.80	7.00	6.50	Pass
Peak "D" Plane Rotation	deg	77.0	91.0	81.2	Pass
Peak Moment in Rotation	Nm	69.0	83.0	79.4	Pass
Positive Moment Decay to 10 Nm	ms	80.0	100.0	84.8	Pass
<b>Overall Test Results</b>					<b>Pass</b>



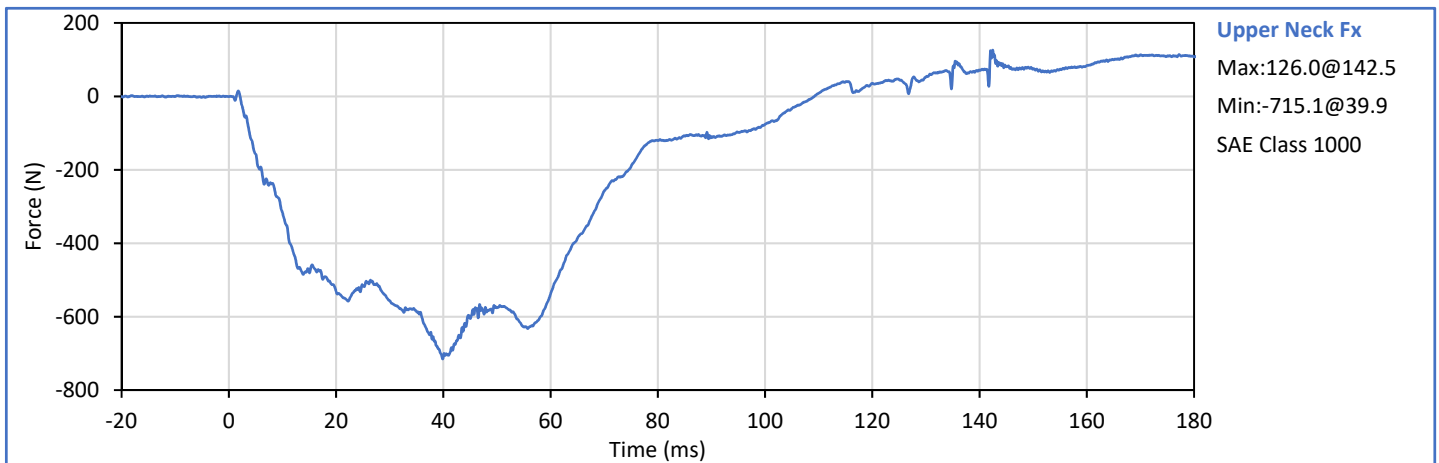
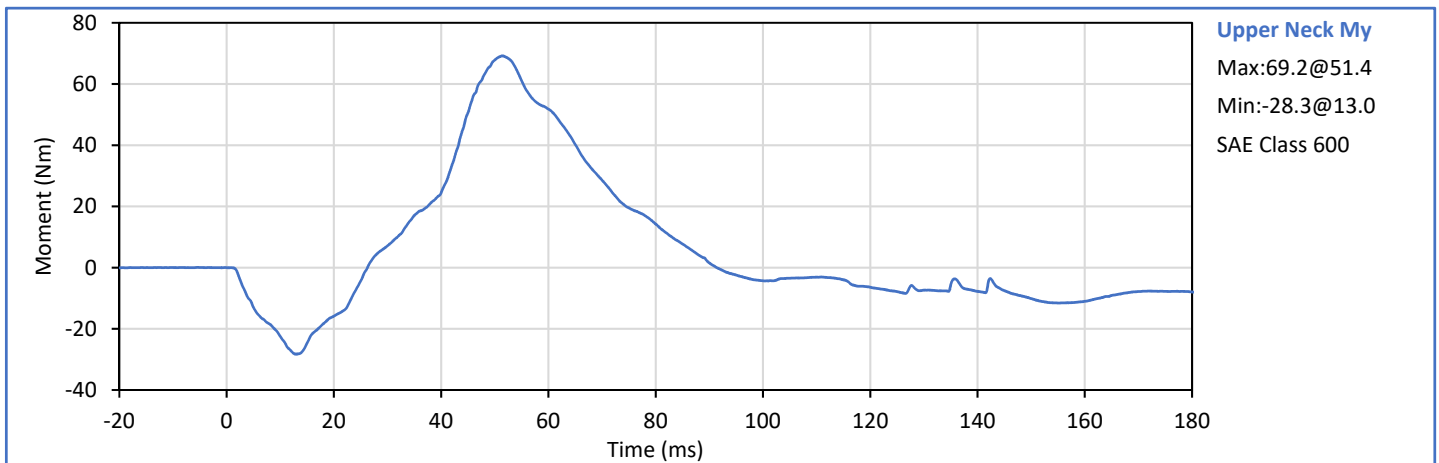
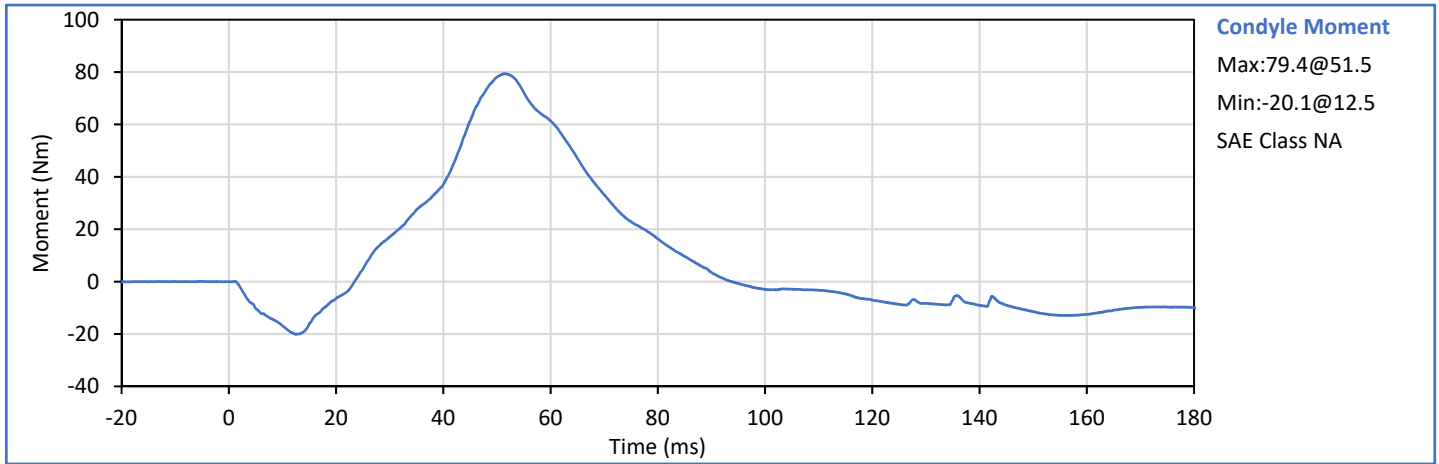
Technician:   
 J. Hernandez

Approved By:   
 P. Puzzuto



ATD Serial No.: 630

Test Date: 2018-04-16

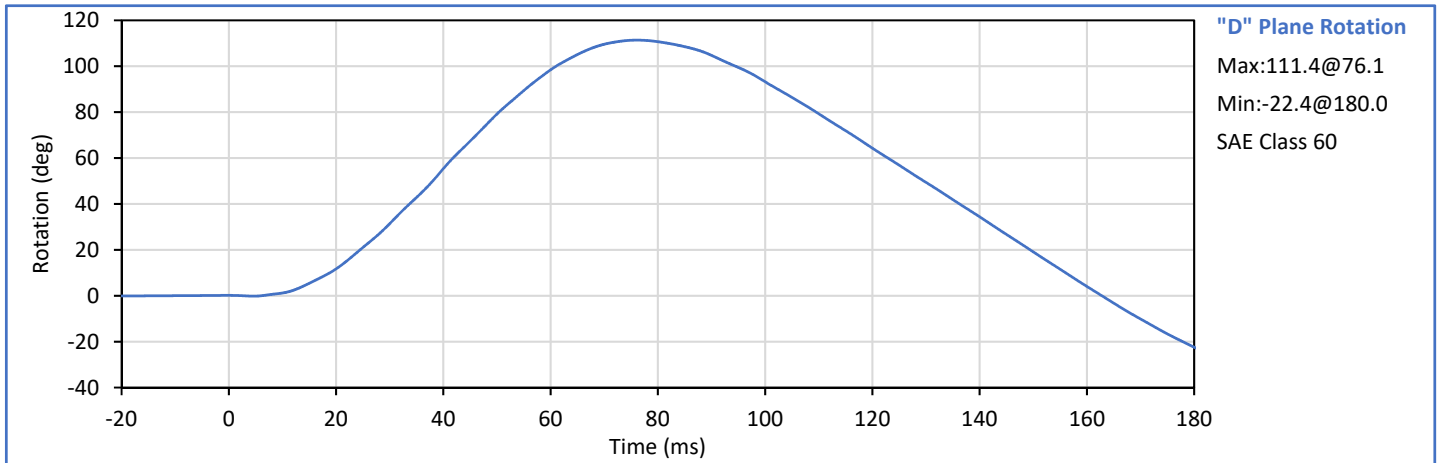
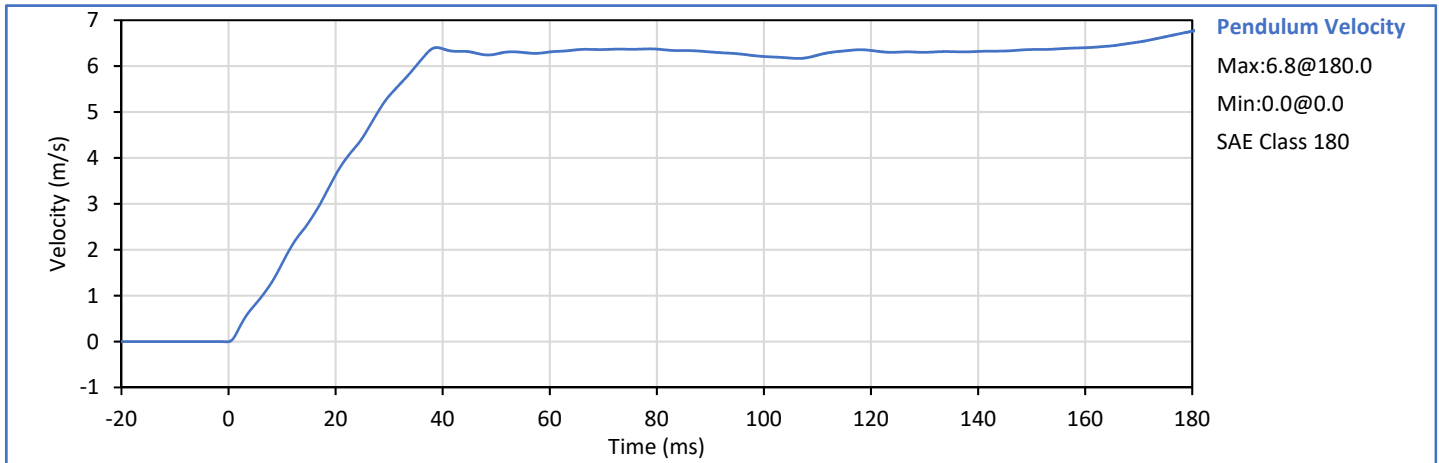




ATD Serial No.: 630

Test Date: 2018-04-16

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.0	Pass
Laboratory Humidity	%	10	70	22	Pass
Pendulum Velocity	m/s	5.95	6.19	6.17	Pass
Pendulum Velocity at 10 ms	m/s	1.50	1.90	1.70	Pass
Pendulum Velocity at 20 ms	m/s	3.10	3.90	3.63	Pass
Pendulum Velocity at 30 ms	m/s	4.60	5.60	5.35	Pass
Peak "D" Plane Rotation	deg	99.0	114.0	111.4	Pass
Peak Moment in Rotation	Nm	-65.0	-53.0	-57.6	Pass
Negative Moment Decay to -10 Nm	ms	94.0	114.0	102.5	Pass
<b>Overall Test Results</b>					<b>Pass</b>



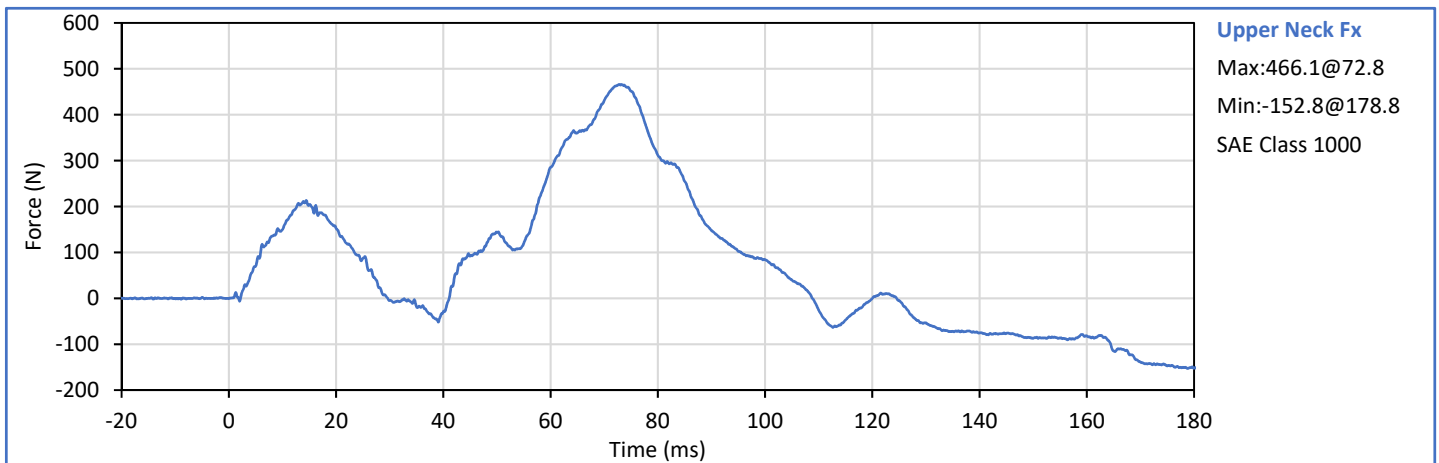
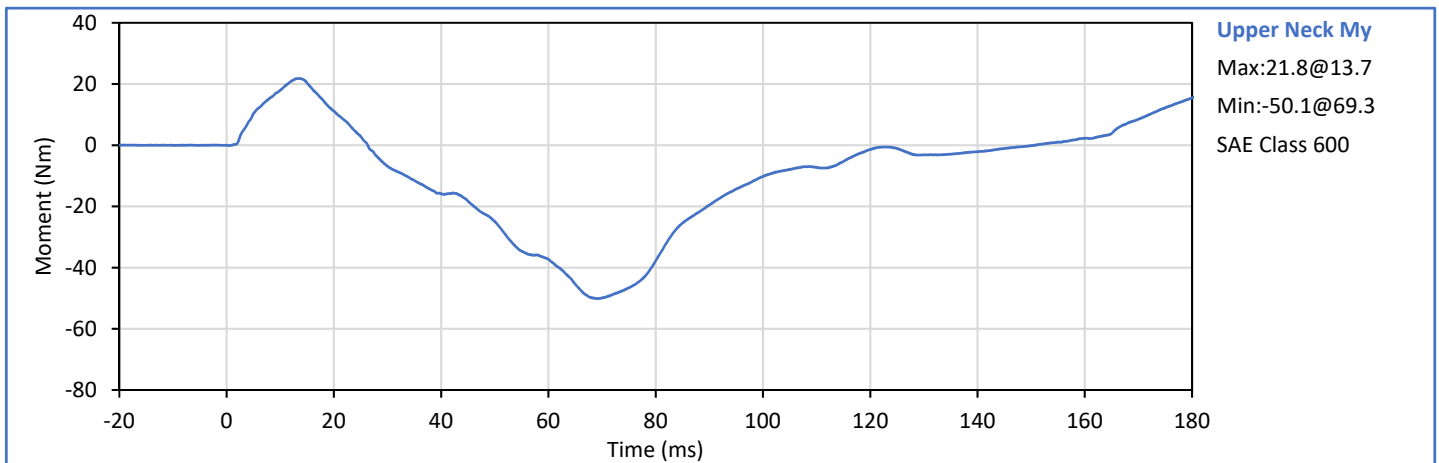
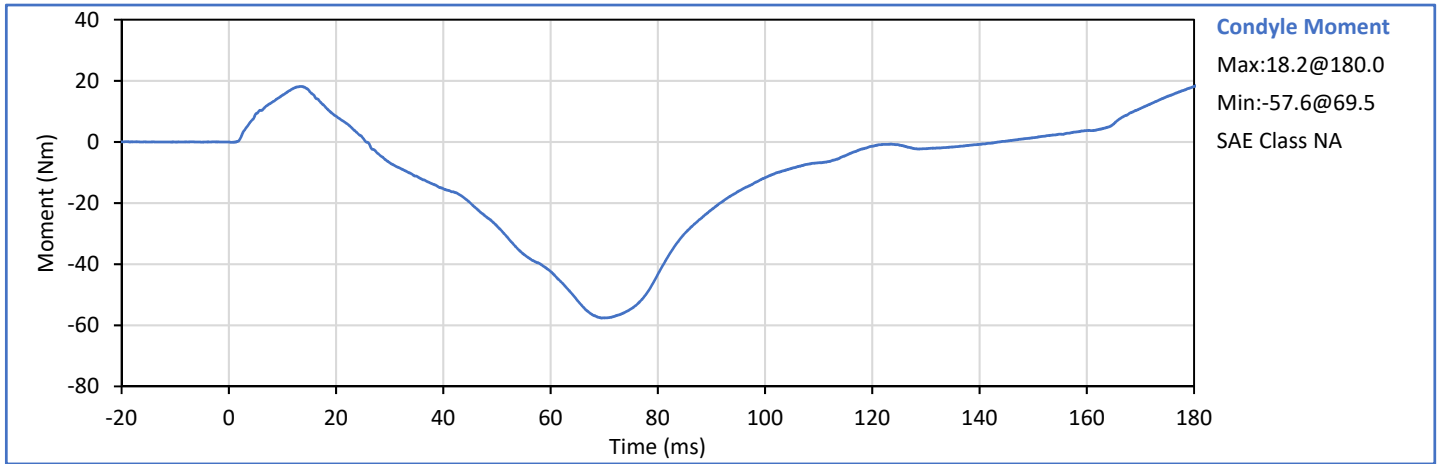
Technician:   
 J. Hernandez

Approved By:   
 P. Puzzuto



ATD Serial No.: 630

Test Date: 2018-04-16

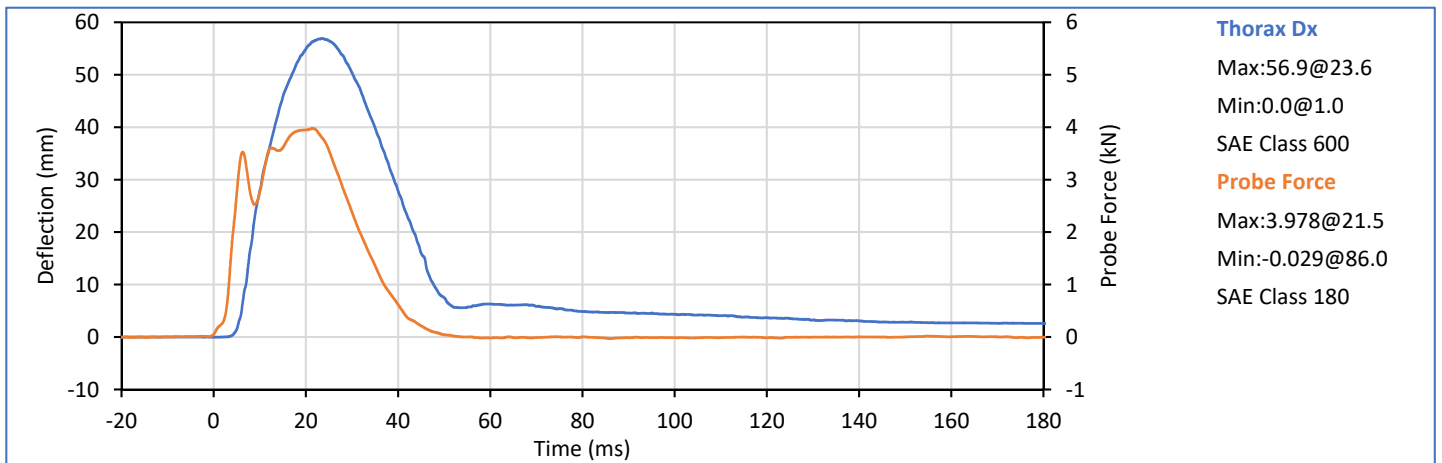
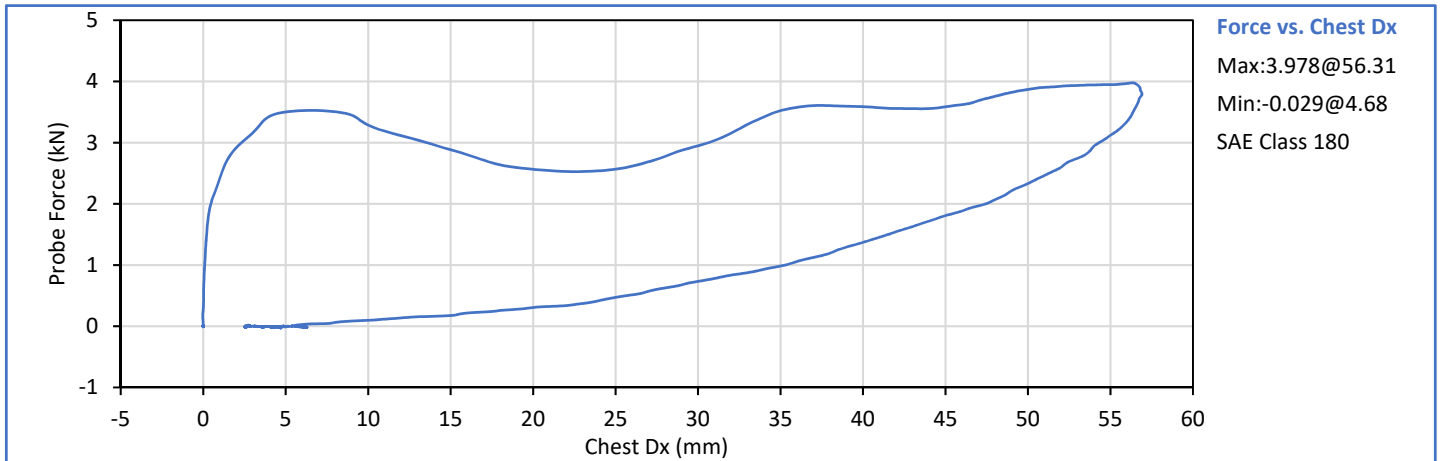




ATD Serial No.: 630

Test Date: 2018-04-11

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Humidity	%	10	70	27	Pass
Probe Velocity	m/s	6.59	6.83	6.67	Pass
Peak Chest Deflection	mm	50.0	58.0	56.9	Pass
Peak Probe Force, 50 and 58 mm	kN	3.900	4.400	3.978	Pass
Peak Probe Force, 18 and 50 mm	kN	0.000	4.600	3.870	Pass
Internal Hysterisis	%	69.0	85.0	70.1	Pass
<b>Overall Test Results</b>					<b>Pass</b>



Technician:   
 J. Hernandez

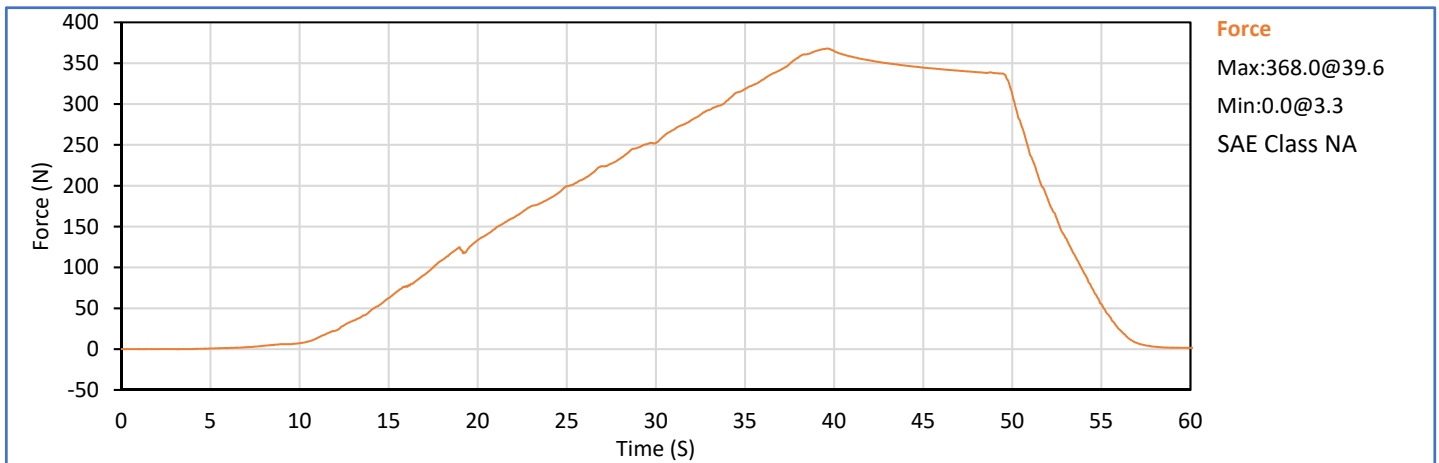
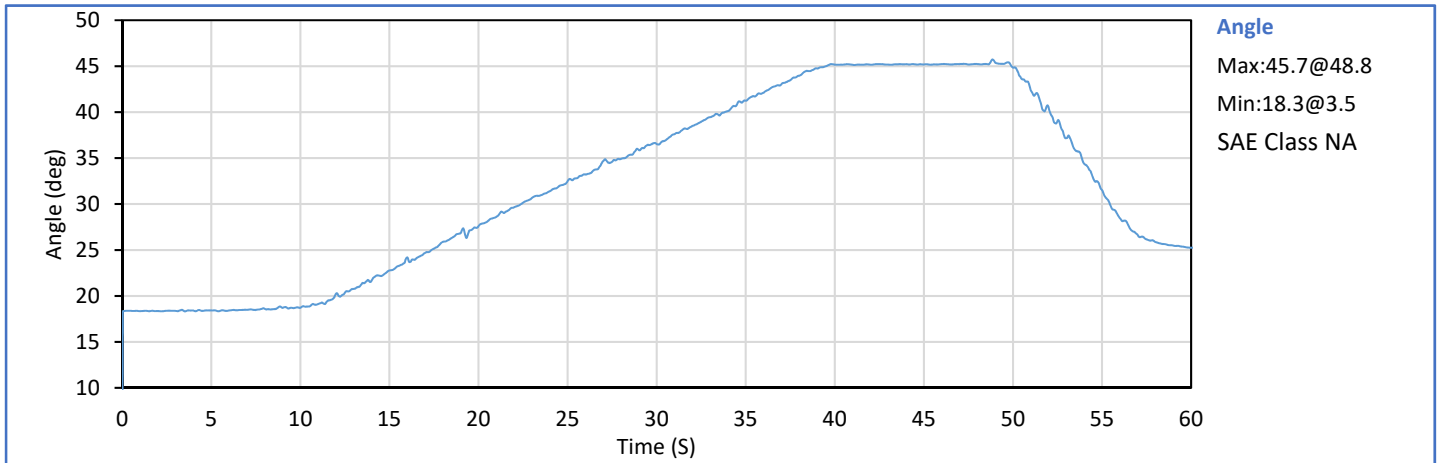
Approved By:   
 P. Puzzuto

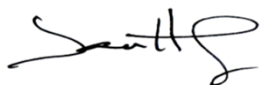



ATD Serial No.: 630

Test Date: 2018-04-11

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.2	Pass
Laboratory Humidity	%	10	70	27	Pass
Orientation Angle	deg	0.0	20.0	13.8	Pass
Test Initial Angle	deg	11.0	19.0	18.4	Pass
Peak Force at 45° (+/-0.5°)	N	320.0	390.0	367.5	Pass
Torso Flexion Rate	deg/s	0.50	1.50	0.92	Pass
Final Reference Plane Angle	deg	-8.0	8.0	4.9	Pass
<b>Overall Test Results</b>					<b>Pass</b>



Technician:   
 J. Hernandez

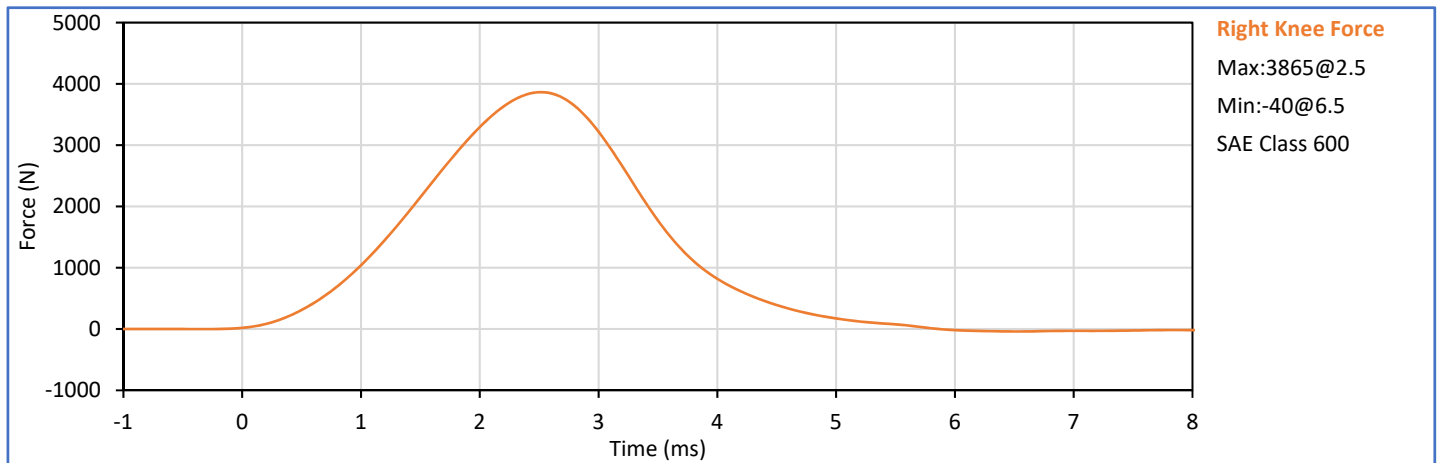
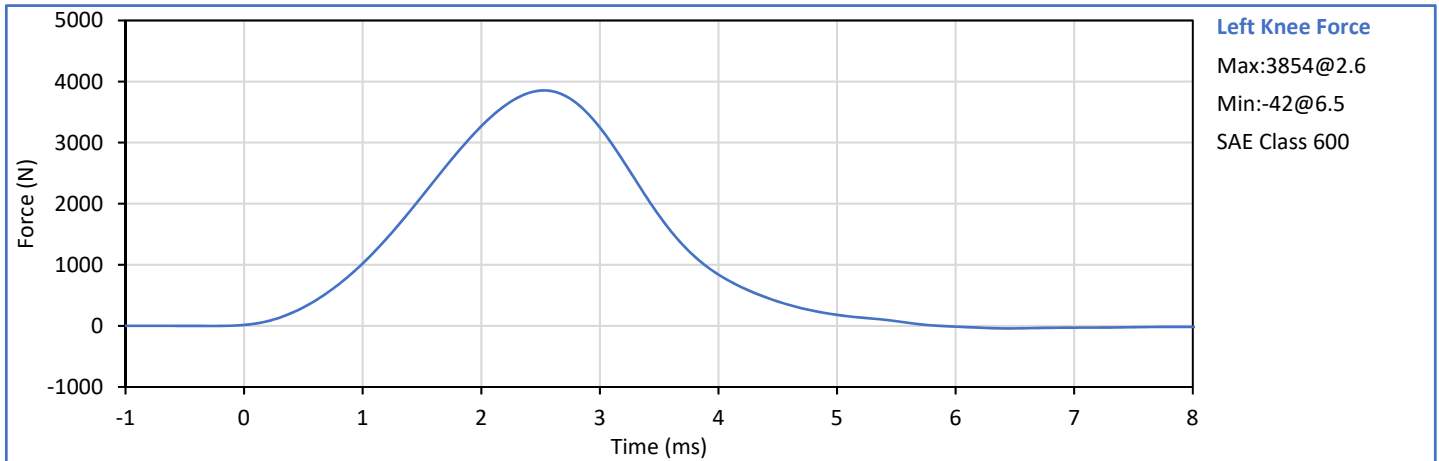
Approved By:   
 P. Puzzuto



ATD Serial No.: 630

Test Date: 2018-04-10

	Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
	Laboratory Temperature	°C	18.9	25.6	23.2	Pass
	Laboratory Humidity	%	10	70	24	Pass
Left	Probe Velocity	m/s	2.070	2.130	2.078	Pass
Knee	Peak Resistive Force	N	3450	4060	3854	Pass
Right	Probe Velocity	m/s	2.070	2.130	2.081	Pass
Knee	Peak Resistive Force	N	3450	4060	3865	Pass
<b>Overall Test Results</b>						<b>Pass</b>



Technician:   
 T. Lowman

Approved By:   
 P. Puzzuto