

REPORT NUMBER: NCAP-KAR-11-015

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

AUDI AG

2011 AUDI A4 2.0 TFSI QUATTRO TIPTRONIC 4-DOOR SEDAN

NHTSA NUMBER: MB5802

PREPARED BY:

KARCO ENGINEERING, LLC.

9270 HOLLY ROAD

ADELANTO, CA 92301



SEPTEMBER 7, 2010

FINAL REPORT

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

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15. Supplementary Notes																																																									
16. Abstract A 56.3 km/h NCAP Frontal Impact Test was conducted on a 2011 Audi A4 2.0 TFSI Quattro Tiptronic 4-Door Sedan 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 foot well intrusion performance. The test was conducted at the KARCO Engineering, LLC. facility in Adelanto, California on September 7, 2010. The impact velocity of the vehicle was 56.57 km/h and the ambient temperature at the barrier face at the time of impact was 31.1 deg. C. The target vehicle's post-test maximum crush was 514 mm at DPD 3 to the left of the centerline. The test vehicle's performance is as follows: <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th rowspan="2">Units</th> <th colspan="2">Driver ATD</th> <th colspan="2">Passenger ATD</th> </tr> <tr> <th>Threshold</th> <th>Result</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₁₅)</td> <td>N/A</td> <td>700.0</td> <td>121.8</td> <td>700.0</td> <td>141.8</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>37</td> <td>52</td> <td>21</td> </tr> <tr> <td>Nij</td> <td>N/A</td> <td>1</td> <td>0.34</td> <td>1</td> <td>0.42</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>4170</td> <td>932.7</td> <td>2620</td> <td>910.9</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>4000</td> <td>200.9</td> <td>2520</td> <td>309.5</td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>10008</td> <td>559.4</td> <td>6805</td> <td>2166.8</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>10008</td> <td>572.6</td> <td>6805</td> <td>927.4</td> </tr> </tbody> </table>						Measurement Description	Units	Driver ATD		Passenger ATD		Threshold	Result	Threshold	Result	Head Injury Criteria (HIC ₁₅)	N/A	700.0	121.8	700.0	141.8	Maximum Chest Compression	mm	63	37	52	21	Nij	N/A	1	0.34	1	0.42	Neck Tension	N	4170	932.7	2620	910.9	Neck Compression	N	4000	200.9	2520	309.5	Left Femur Force	N	10008	559.4	6805	2166.8	Right Femur Force	N	10008	572.6	6805	927.4
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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 DTNH22-06-D-00027. 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 January, 2010.

SUMMARY

A load cell barrier consisting of 36 load cells was impacted by a 2011 Audi A4 2.0 TFSI Quattro Tiptronic 4-Door Sedan at a velocity of 56.57 km/h. The test was performed at KARCO Engineering, LLC. on September 7, 2010. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A of this report.

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

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

Both ATDs were fully instrumented with head, chest and pelvis tri-axial accelerometers, chest displacement potentiometers, upper neck force transducers, right / left femur load cells, and lower leg instrumentation. Seat belt load cells were also on the driver's and passenger's lap and shoulder belts to measure the dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 035) and the right-front passenger (position 2) ATD (Serial No. 635) were calibrated prior to this test. Certification details, along with instrumentation calibration data, are found in Appendix C of this report.

The 128 channels of 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. There was no Stoddard solvent leakage after the event or during any phase of the static rollover.

The maximum static crush of the test vehicle was 514 mm located at DPD 3 to the left of the vehicle 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 airbag, headrest and headliner. The upper torso contacted the airbag. Both the left and right knees contacted the knee bolster. The left knee also contacted the steering column.

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

The occupant data is summarized below:

ATD Position	HIC ₁₅	T ¹	T ²	Chest Disp. (mm)	Nij	Neck Tension (N)	Neck Comp. (N)	Left Femur (N)	Right Femur (N)
Driver (50th)	121.8	85.6	100.6	-37	0.34	932.7	-200.9	-559.4	-572.6
Passenger (5th)	141.8	59.4	74.4	-21	0.42	910.9	-309.5	-2166.8	-927.4

SECTION 2
DATA SHEETS

Test Vehicle: 2011 Audi A4 2.0 4-Door Sedan NHTSA No.: MB5802
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 09/07/10

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	29.573
Pressure	Tire Pressures	lbf/in ²	kPa	7.0
Volume	Liquid	gal	liter	3.785
Temperature	General Use	°F	°C	=(tf -32)/1.8
Force	Dynamic Forces	lbf	N	4.448
Moment	Torque	lbf•ft	N•m	1.355

DATA SHEET NO. 1**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2011 Audi A4 2.0 4-Door Sedan NHTSA No.: MB5802
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 09/07/10

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	MB5802
Make	Audi
Model	A4 2.0 TFSI Quattro Tiptronic
Body Style	4-Door Sedan
VIN	WAUFFBFL8BN004130
Body Color	Quartz Gray Metallic
Delivery Date	8/10/2010
Odometer Reading (mi)	18
Odometer Reading (km)	29
Dealer	Rusnak Audi
Transmission	8-Speed Automatic
Final Drive	AWD
Type / No. of Cylinders	Inline 4 Turbo
Engine Displacement (L)	2.0
Engine Placement	Longitudinal
Roof Rack	No
Sunroof / T-Top	Yes
Tinted Glass	No
Traction Control	Yes
Power Brakes	Yes
Front Disc	Yes
Rear Disc	Yes

Anti-Lock Brakes	Yes
All Wheel Drive	Yes
Power Steering	Yes
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	No
Pass. Front Airbag	Yes
Pass. Curtain Airbag	Yes
Pass. Head/Torso Airbag	No
Pass. Torso Airbag	No
Pass. Torso/Pelvis Airbag	Yes
Pass. Pelvis Airbag	No
Pass. Knee Airbag	No
Pre-Tensioners	Yes
Load Limiters	Yes
Automatic Door Locks	Yes
Tilt Steering	Yes
Other	Rear side bags

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

Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Audi AG
Date of Manufacture	Jun-10

GVWR (kg)	2234
GAWR Front (kg)	1130
GAWR Rear (kg)	1155

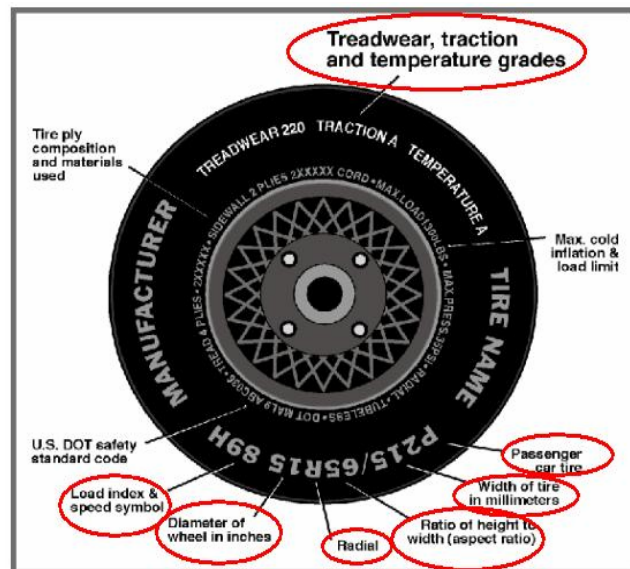
VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench		
Number of Occupants	2	3		5
Capacity Weight (VCW) (kg)				480.0
Cargo Weight (RCLW) (kg)				139.8

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle:	2011 Audi A4 2.0 4-Door Sedan	NHTSA No.:	MB5802
Test Program:	56 km/h Frontal Impact NCAP Test	Test Date:	09/07/10



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	230	240
Recommended Tire Size	245/45/R17	245/45/R17
Tire Size on Vehicle	245/45/R17	245/45/R17
Tire Manufacturer	Pirelli	Pirelli
Tire Model	P6	P6
Treadwear	400	400
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2 Rayon	2 Rayon
Tire Plies Body	2 Rayon, 2 Steel, 2 Nylon	2 Rayon, 2 Steel, 2 Nylon
Load Index / Speed Symbol	95H	95H
Tire Material	Rayon, Steel, Nylon	Rayon, Steel, Nylon
DOT Safety Code Left	XTCB J887 2110	XTCB J887 2110
DOT Safety Code Right	XTCB J887 2110	XTCB J887 2110

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

Test Vehicle: 2011 Audi A4 2.0 4-Door Sedan NHTSA No.: MB5802
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 09/07/10

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	467.0	368.0		493.5	499.5	
Right	kg	453.0	384.5		468.0	486.0	
Ratio	%	55.0%	45.0%	100.0%	49.4%	50.6%	100.0%
Total	kg	920.0	752.5	1672.5	961.5	985.5	1947.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1672.5	A
Weight of 1 P572E ATD & 1 P572O ATD	kg	141.0	B
Rated Cargo/Luggage Weight (RCLW)	kg	139.8	C
Calculated Vehicle Target Weightt (TVTW)	kg	1953.3	A+B+C

TEST VEHICLE ATTITUDES

Condition	Units	LF	RF	LR	RR	CG Aft of Front Axle
As Delivered	mm	713	708	708	712	1261
As Tested	mm	705	704	674	678	1418
Post-Test	mm	736	712	685	660	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2802
Total Vehicle Length at Left Side	mm	4153
Total Vehicle Length at Centerline	mm	4710
Total Vehicle Length at Right Side	mm	4151
Weight of Ballast in Cargo Area	kg	75
Weight of Vehicle Components Removed	kg	22.5
Amount of Stoddard Solvent in Fuel Tank	L	58.57

VEHICLE COMPONENTS REMOVED TO MEET TEST WEIGHT:

Spare tire (15.5 kg), Spare tire tools (3.0 kg), Trunk lining (4.0 kg)

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

Test Vehicle: 2011 Audi A4 2.0 4-Door Sedan NHTSA No.: MB5802
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 09/07/10

TARGET VEHICLE STRUCTURAL MEASUREMENTS

No.	Description	Pre-Test	Post-Test	Difference
1	Total Length	4710	4215	-495
2	Total Width	1800	1853	53
3	Bumper Top Height	536	790	254
4	Bumper Bottom Height	417	665	248
5	Longitudinal Member Top Height	536	500	-36
6	Distance Between Longitudinal Members	836	945	109
7	Longitudinal Member Width	77	77	0
8	Engine Top Height	834	840	6
9	Engine Bottom Height	226	213	-13
10	Engine and Gearbox Width	512	512	0
11	Front Bumper to Engine Distance	416	250	-166
12	Front Shock Absorber Fixing Height	862	877	15
13	Bonnet Leading Edge Height	764	927	163
14	Front Shock Absorber Fixing Width	844	820	-24
15	Front Bumper to Front Axle Distance	872	423	-449
16	Front Axle to A-Pillar Distance	587	531	-56
17	A-Pillar to B-Pillar Distance	925	924	-1
18	B-Pillar to Rear Axle Distance	1172	1170	-2
19	B-Pillar to C-Pillar Distance	802	800	-2
20	Roof Sill Bottom Height	1266	1290	24
21	Roof Sill Top Height	1371	1376	5
22	Floor Sill Bottom Height	183	196	13
23	Floor Sill Top Height	350	361	11

All measurements in millimeters.

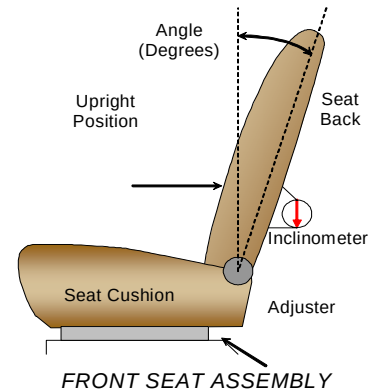
DATA SHEET NO. 2

SEAT ADJUSTMENT, FUEL SYSTEMS, AND STEERING WHEEL DATA

Test Vehicle:	2011 Audi A4 2.0 4-Door Sedan	NHTSA No.:	MB5802
Test Program:	56 km/h Frontal Impact NCAP Test	Test Date:	09/07/10

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 with a straight edge along the seat back using a digital inclinometer.

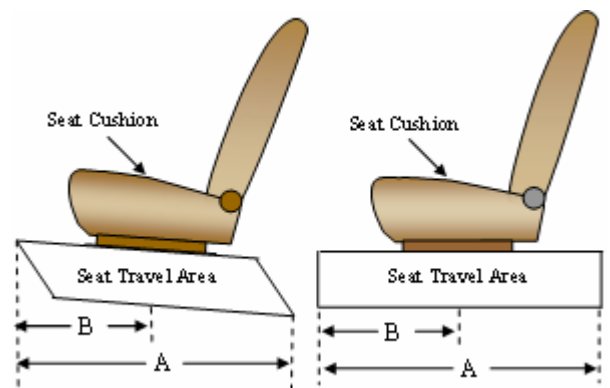


SEAT BACK ANGLE

Seating Position	Degrees
Driver Seat Back Angle	19.0
Passenger Seat Back Angle	15.0

SEAT FORE / AFT POSITIONING

The total seat travel is measured from the forward most possible position to the rearmost possible position. The driver's seat is set to the mid travel longitudinal position with the seat in the full down height position at the manufacturer's designated cushion angle, mid angle for this test. The passenger's seat is set to the forward most position where the ATD will not contact any interior panels. The passenger seat height and cushion angle are both set to the mid positions for this test.



SEAT FORE/AFT POSITIONS

Seating Position	Total Fore-Aft Travel	Placed in Position
Driver Seat	314 mm	157 mm
Passenger Seat	245 mm	0 mm

SEAT BELT UPPER ANCHORAGE

The seat belt upper anchorage is positioned to the manufacturer's design position for a 50th percentile adult male ATD for the driver, and a 5th percentile adult female ATD for the passenger. Position one (1) is the uppermost position.

SEAT BELT UPPER ANCHORAGES

Seating Position	Total No. of Positions	Placed in Position
Driver Seat	4	1
Passenger Seat	4	2

DATA SHEET NO. 2 ... (CONTINUED)

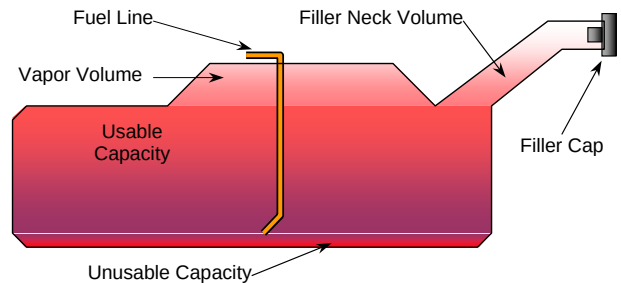
SEAT ADJUSTMENT, FUEL SYSTEMS, AND STEERING WHEEL DATA

Test Vehicle: 2011 Audi A4 2.0 4-Door Sedan NHTSA No.: MB5802
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 09/07/10

FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank"	62.98
Usable Capacity of "Optional Tank"	
92 - 94% of Usable Capacity	57.94 to 59.2
Actual Amount of Stoddard Solvent Used	58.57
1/3 of Usable Capacity	20.99

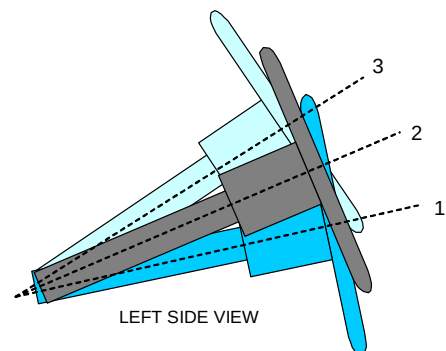
The test vehicle is equipped with an electric fuel pump. At ignition "on" the pump will work for a short time to put pressure to the system. If the engine is started the pump works normally. The fuel filler door is located on the right rear fender. The standard fuel tank occupies the area under the rear seat.



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. A tape measure is used with a reference mark on the steering column to measure telescoping travel.



STEERING COLUMN ASSEMBLY

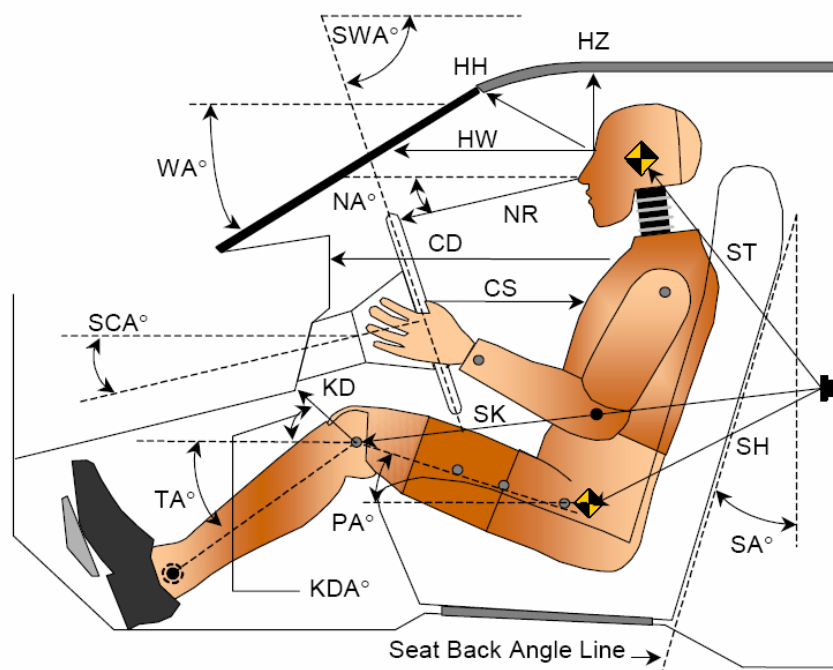
STEERING COLUMN POSITIONING

	Degrees	Fore-Aft Position (mm)
Lowermost Position, No. 1	20.1	63
Geometric Center Position, No. 2	22.6	88
Uppermost Position, No. 3	25.0	113
Telescoping Steering Wheel Travel		50
Test Position	22.4	88

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Audi A4 2.0 4-Door Sedan NHTSA No.: MB5802
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 09/07/10

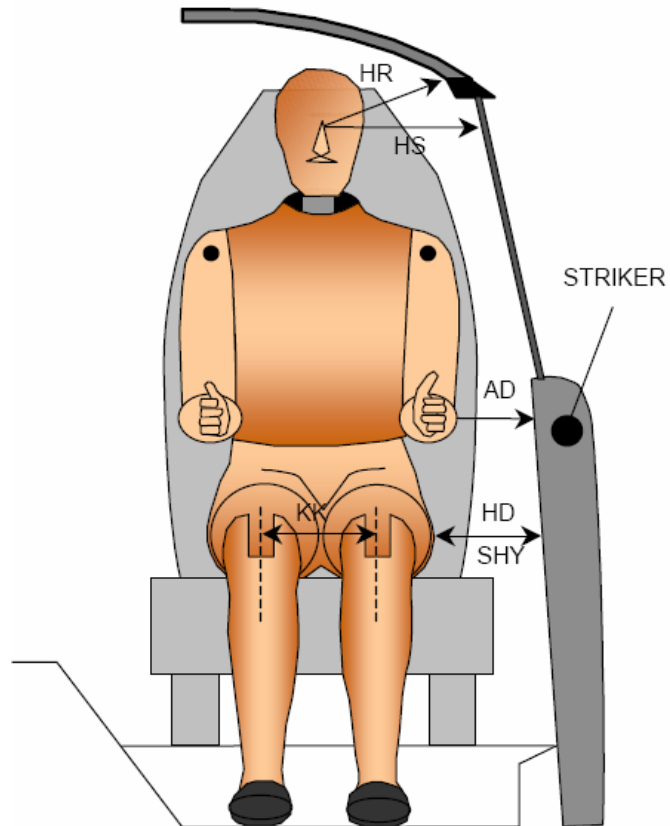


Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		22.8		
SWA°	Steering Wheel Angle		22.4		
SCA°	Steering Column Angle		67.6		
SA°	Seat Back Angle (On Headrest Post)		19.0		15.0
HZ	Head to Roof	187	90.0	229	90.0
HH	Head to Header	325	28.5	323	42.7
HW	Head to Windshield	590	0.0	670	0.0
HR	Head to Side Header	215	39.5	275	35.3
NR	Nose to Rim	382	5.0	453	25.0
CD	Chest to Dash	532	14.8	395	0.0
CS	Chest to Steering Hub	392	0.0		
RA	Rim to Abdomen	211	0.0		
KDL	Left Knee to Dash	222	39.5	122	40.5
KDR	Right Knee to Dash	219	35.1	122	38.6
PA°	Pelvic Angle		24.1		28.6
TA°	Tibia Angle		38.2		46.2
SK	Striker to Knee	519	8.9	600	8.3
ST	Striker to Head	438	87.8	381	7.5
SH	Striker to H-Point	242	60.4	324	26.5

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Audi A4 2.0 4-Door Sedan NHTSA No.: MB5802
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 09/07/10



Code	Description	Driver (mm)	Passenger (mm)
AD	Arm to Door	116	79
HD	H-Point to Door	131	236
HR	Head to Side Header	215	275
HS	Head to Side Window	321	360
KK	Knee to Knee	308	190
SHY	Striker to H-Point (Y-Direction)	230	265
AA	Ankle to Ankle	303	165

DATA SHEET NO. 5

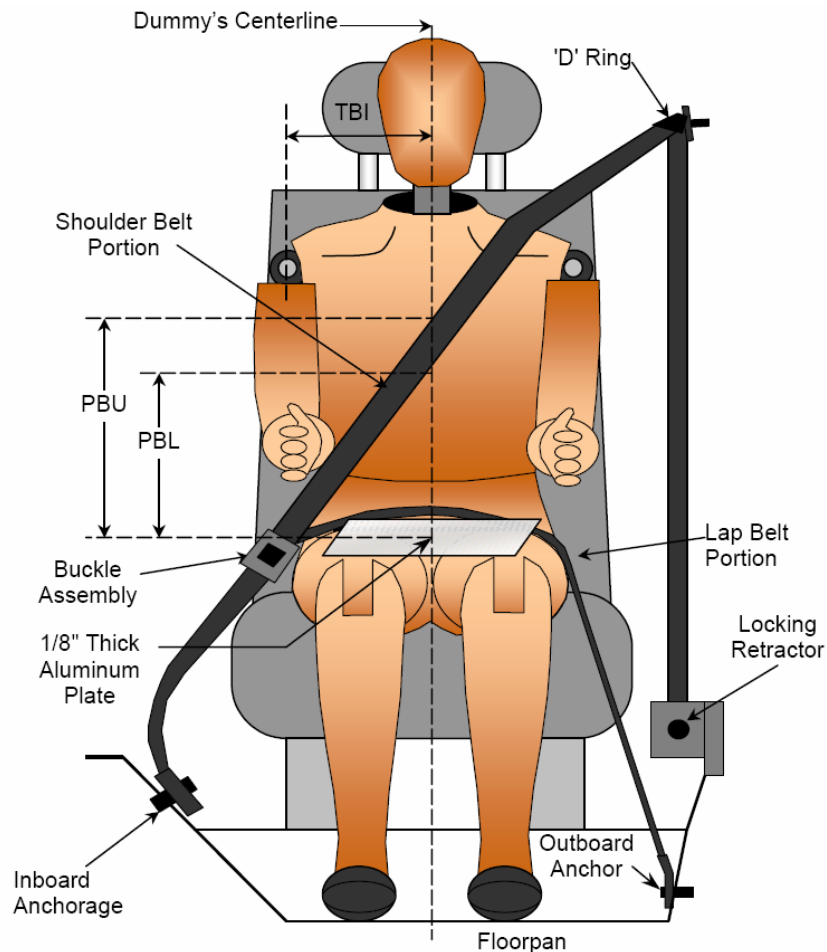
SEAT BELT POSITIONING DATA

Test Vehicle: 2011 Audi A4 2.0 4-Door Sedan

NHTSA No.: MB5802

Test Program: 56 km/h Frontal Impact NCAP Test

Test Date: 09/07/10



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	355	280
PBL	Top Surface of Aluminum Plate to Belt Lower Edge	mm	283	192

BELT LENGTH DATA

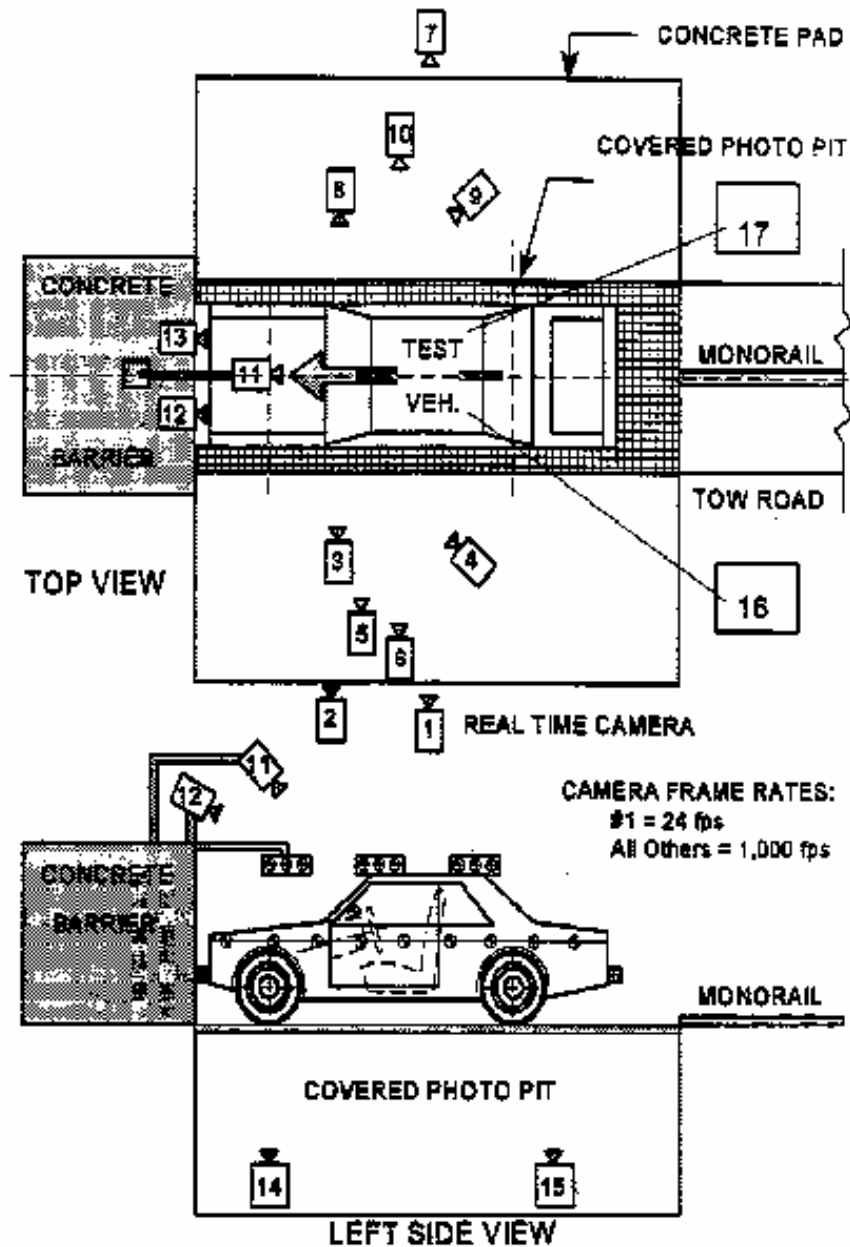
Measurement Description	Units	Driver	Passenger
Shoulder Belt Length as Measured on ATD	mm	823	840
Lap Belt Length as Measured on ATD	mm	623	655
Remainder of Belt on Reel	mm	1195	1184
Total Belt Length for Continuous Webbing Systems	mm	2641	2679

DATA SHEET NO. 6

HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2011 Audi A4 2.0 4-Door Sedan NHTSA No.: MB5802
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 09/07/10

CAMERA POSITIONS FOR FRONTAL IMPACTS



DATA SHEET NO. 6 ... (CONTINUED)

HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2011 Audi A4 2.0 4-Door Sedan NHTSA No.: MB5802
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 09/07/10

CAMERA LOCATIONS

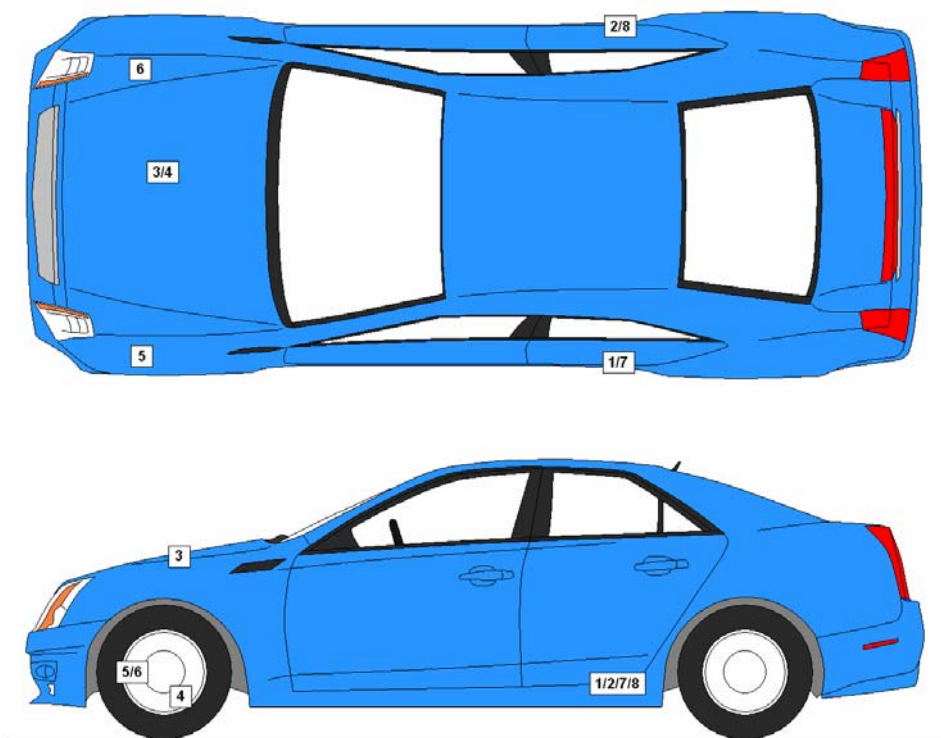
No.	Description	Location			Angle (°)	Film Plane to Head Target	Lens (mm)	Speed (fps)
		X	Y	Z				
1	Real-Time Camera	-11412	-8150	-1484				30
2	Overall Left Side	-2590	-7950	-1371	0	9881	24	1000
3	Left Side A-Pillar	-1701	-6197	-1701	0	7921	85	1000
4	Left Side B-Pillar	-6696	-10308	-3211	-17	11281	ZOOM	1000
5	Steering Column Upper	-1966	-10412	-3688	-13	9887	35	1000
6	Steering Column Lower	-1972	-10412	-3379	-13	9870	35	1000
7	Overall Right Side	-2336	7569	-1012	0	9417	24	1000
8	Right Side A-Pillar	-1733	7581	-1408	0	7789	70	1000
9	Passenger IP View	-1600	8214	-1811	0	7795	ZOOM	1000
10	Right Side B-Pillar	-6217	9516	-4830	-10	12626	ZOOM	1000
11	Overhead Windshield View	297	366	-2460	-34		12	1000
12	Overhead Driver View	297	-366	-2460	-34		12	1000
13	Overhead Passenger View	-354	0	-5749	-90		24	1000
14	Pit View of Engine Compartment	-756	0	1495	90		12	1000
15	Pit View of Fuel Tank	-3398	0	1495	90		8	1000
16	Driver's On Board View	-2948	190	-1272	-22		12	1000
17	Passenger's On Board View	-2946	-194	-1276	-22		12	1000

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

DATA SHEET NO. 7

VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2011 Audi A4 2.0 4-Door Sedan NHTSA No.: MB5802
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 09/07/10



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Description	Location		
		X	Y	Z
1	Left Rear Cross Member X	1923	-713	-348
2	Right Rear Cross Member X	1937	718	-362
3	Engine Top X	4168	130	-797
4	Engine Bottom X	4137	-203	-196
5	Left Brake Caliper X	3708	-792	-304
6	Right Brake Caliper X	3708	792	-303
7	Left Rear Cross Member Z	1923	-713	-348
8	Right Rear Cross Member Z	1937	718	-362

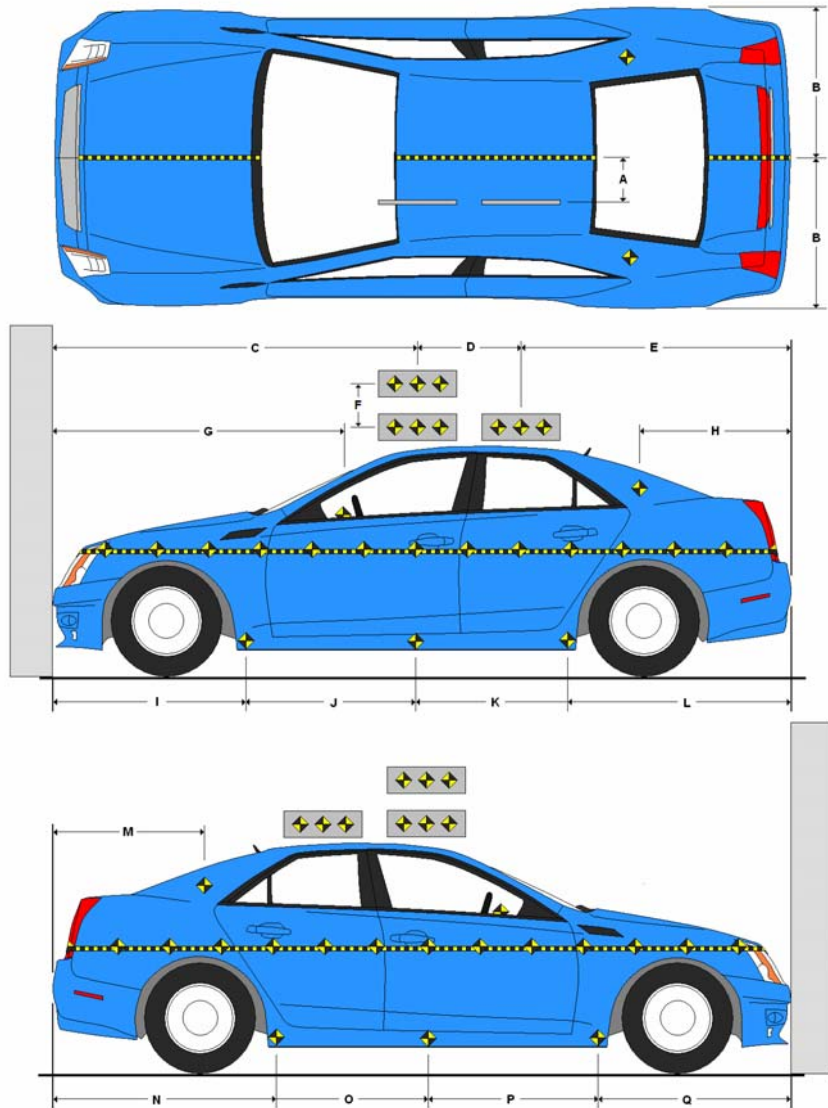
Reference Points: X – Rear Surface of Vehicle (+ forward)
Y – Vehicle Centerline (+ to right)
Z – Ground Plane (+ down)

DATA SHEET NO. 8

PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2011 Audi A4 2.0 4-Door Sedan NHTSA No.: MB5802
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 09/07/10

Item	Value
A	
B	900
C	
D	
E	
F	
G	1837
H	832
I	1307
J	964
K	964
L	1474
M	808
N	1467
O	964
P	964
Q	1306



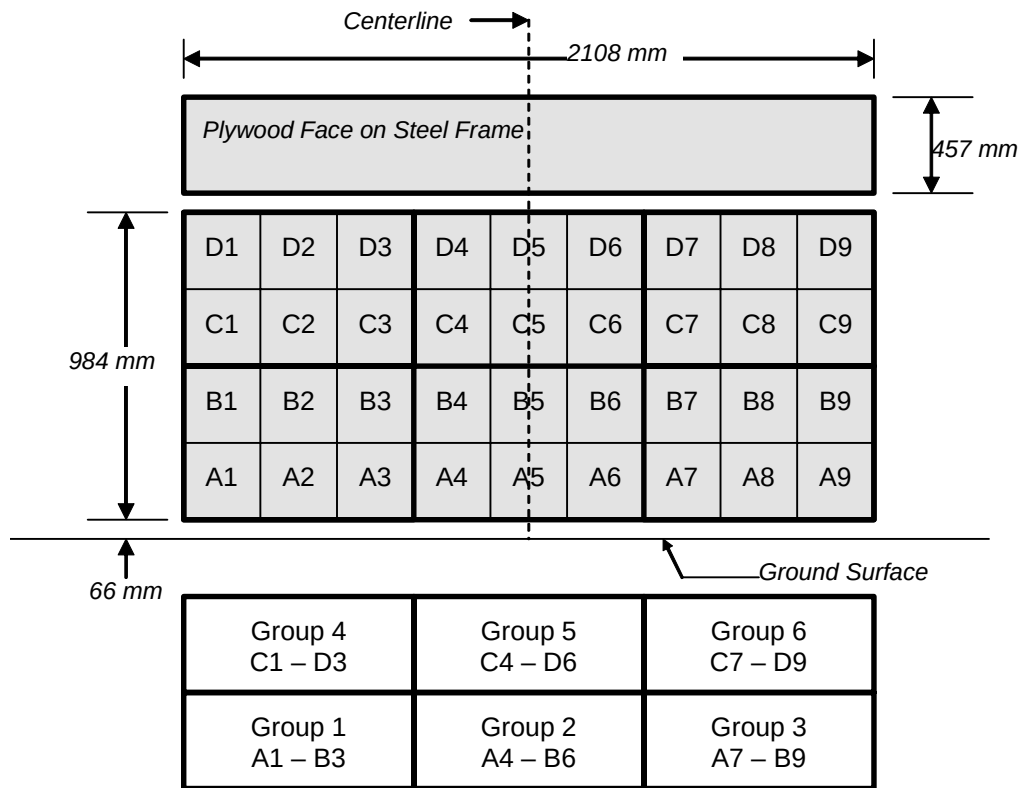
All measurements in millimeters.

DATA SHEET NO. 9

LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2011 Audi A4 2.0 4-Door Sedan NHTSA No.: MB5802
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 09/07/10

36 Load Cell Rigid Barrier (NHTSA Standard) Load Cell Locations on Fixed Barrier



6 Groups of 6 Load Cells Each

DATA SHEET NO. 10

TEST VEHICLE CAMERA AND INSTRUMENTATION SUMMARY

Test Vehicle: 2011 Audi A4 2.0 4-Door Sedan NHTSA No.: MB5802
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 09/07/10

INSTRUMENTATION

Driver Dummy Accelerometers	44
Passenger Dummy Accelerometers	44
Vehicle Structure Accelerometers	8
Load Cell Barrier	36
Total	132

CAMERA COVERAGE

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

DATA SHEET NO. 11

POST-TEST OBSERVATIONS

Test Vehicle:	2011 Audi A4 2.0 4-Door Sedan	NHTSA No.:	MB5802
Test Program:	56 km/h Frontal Impact NCAP Test	Test Date:	09/07/10

TEST DUMMY INFORMATION AND CONTACT

Description	Driver	Passenger
Dummy Type/Serial No.	P572E 50th Percentile Male ATD / 035	P572O 5th Percentile Female ATD / 635
Head Contact	Airbag, Headrest, Headliner	Airbag, Headrest
Upper Torso Contact	Airbag	Airbag
Lower Torso Contact	None	None
Left Knee Contact	Knee Bolster, Steering Column	Glovebox
Right Knee Contact	Knee Bolster	Glovebox

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)	21 mm	27 mm
Seat Back Failure	None	None
Glazing Damage	None	None

POST TEST STRUCTURAL OBSERVATIONS

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

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	3720
Center	mm	3655
Right Side	mm	3670
Average	mm	3682

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Driver		Passenger	
	Installed	Operated	Installed	Operated
Front Airbag	Yes	Yes	Yes	Yes
Curtain Airbag	Yes	No	Yes	No
Torso/Pelvis Airbag	Yes	No	Yes	No
Knee Airbag	No		No	
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Other				

DATA SHEET NO. 12

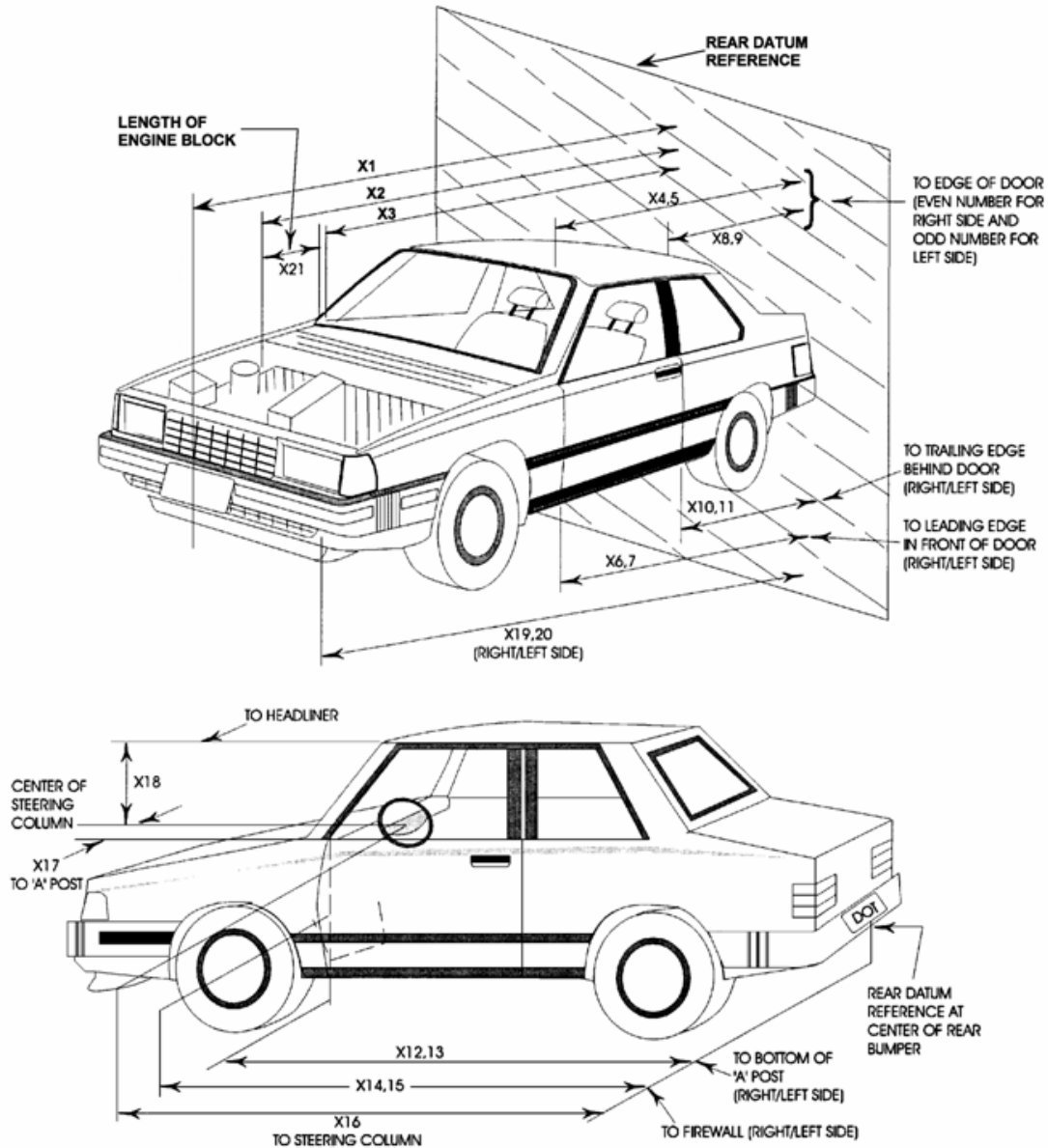
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2011 Audi A4 2.0 4-Door Sedan

NHTSA No.: MB5802

Test Program: 56 km/h Frontal Impact NCAP Test

Test Date: 09/07/10

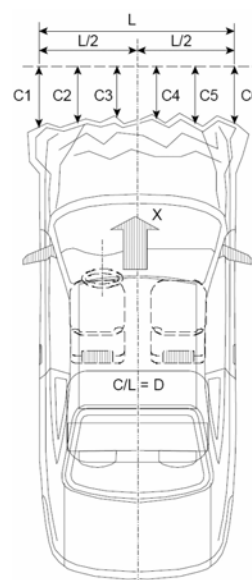


DATA SHEET NO. 12 ... (CONTINUED)**VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2011 Audi A4 2.0 4-Door Sedan NHTSA No.: MB5802
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 09/07/10

No.	Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	4710	4215	-495
2	Rear Surface of Vehicle to Front of Engine	4294	3990	-304
3	RSOV to Firewall	3725	3656	-69
4	RSOV to Upper Leading Edge of Right Door	3244	3242	-2
5	RSOV to Upper Leading Edge of Left Door	3237	3245	8
6	RSOV to Lower Leading Edge of Right Door	3252	3236	-16
7	RSOV to Lower Leading Edge of Left Door	3253	3233	-20
8	RSOV to Upper Trailing Edge of Right Door	2132	2136	4
9	RSOV to Upper Trailing Edge of Left Door	2128	2135	7
10	RSOV to Lower Trailing Edge of Right Door	2197	2187	-10
11	RSOV to Lower Trailing Edge of Left Door	2203	2180	-23
12	RSOV to Bottom of A-Pillar of Right Side	4148	4145	-3
13	RSOV to Bottom of A-Pillar Left Side	3143	3139	-4
14	RSOV to Firewall, Right Side	3718	3646	-72
15	RSOV to Firewall, Left Side	3717	3667	-50
16	RSOV to Steering Column	2687	2760	73
17	Center of Steering Column to A-Pillar	420	378	-42
18	Center of Steering Column to Headliner	395	472	77
19	RSOV to Right Side of Front Bumper	4151	3920	-231
20	RSOV to Left Side of Front Bumper	4153	4010	-143
21	Length of Engine Block	558	558	0
RD	RSOV to Right Side of Dash Panel	2868	2876	8
CD	RSOV to Center of Dash Panel	2775	2872	97
LD	RSOV to Left Side of Dash Panel	2869	2881	12

All measurements in millimeters.

DATA SHEET NO. 13**ACCIDENT INVESTIGATION DATA**Test Vehicle: 2011 Audi A4 2.0 4-Door SedanNHTSA No.: MB5802Test Program: 56 km/h Frontal Impact NCAP TestTest Date: 09/07/10**VEHICLE INFORMATION**VIN: WAUFFBFL8BN004130Wheelbase (mm): 2802Vehicle Size Category: 4-Door SedanTest Weight (kg): 1947.0**ACCELEROMETER DATA**Accelerometer Locations: Left Rear CrossmemberCal. Procedure/Interval: Drop Test / 6 monthsIntegration Algorithm: NHTSA StandardImpact Velocity (km/h): 56.57Velocity Change (km/h): 66.3Time of Separation (msec): 74.5Linearity: Good**CRUSH PROFILE**Collision Deformation Classification: 12FCEW2Midpoint of Damage: Vehicle CenterlineDamage Region Length (mm): 1765Impact Mode: Full Frontal

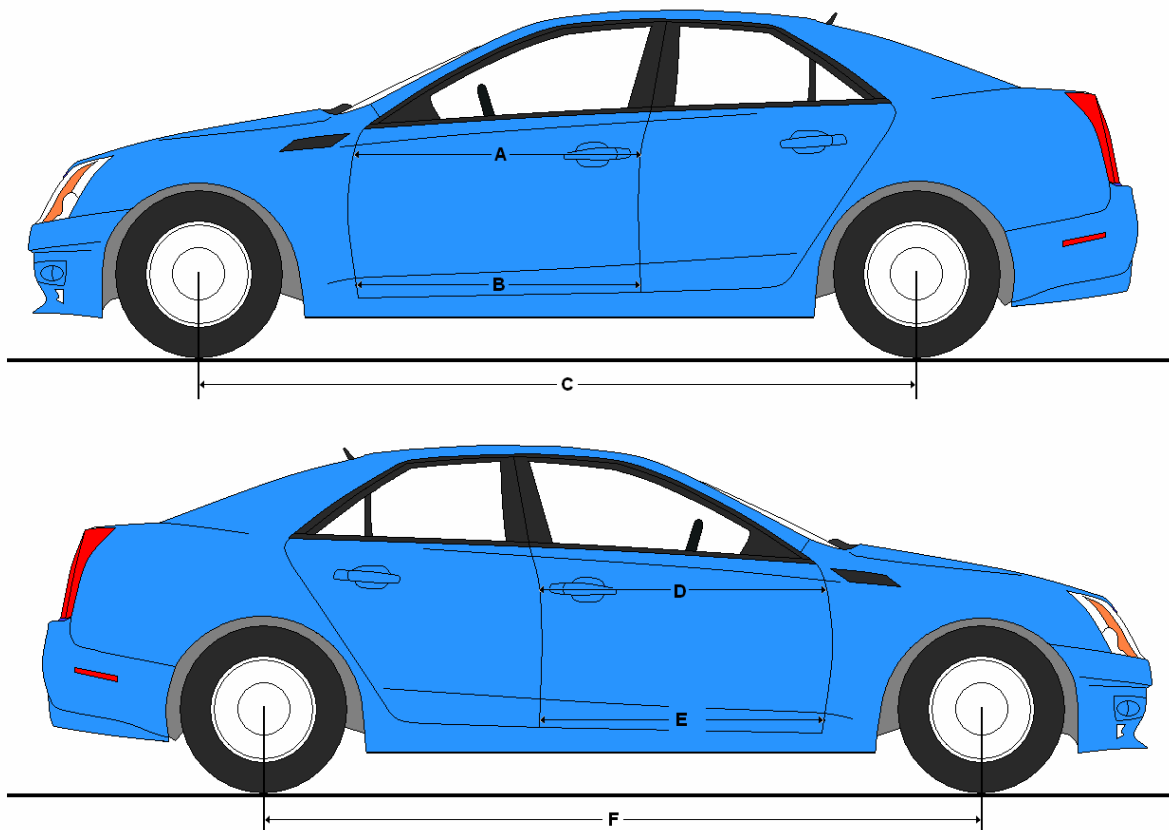
No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush Zone 1 at Left Side	mm	560	700	-140
C2	Crush Zone 2 at Left Side	mm	102	530	-428
C3	Crush Zone 3 at Left Side	mm	20	534	-514
C4	Crush Zone 4 at Right Side	mm	20	532	-512
C5	Crush Zone 5 at Right Side	mm	102	565	-463
C6	Crush Zone 6 at Right Side	mm	560	790	-230
L	C1 to C6	mm	1765		

DATA SHEET NO. 14**VEHICLE INTRUSION MEASUREMENTS**Test Vehicle: 2011 Audi A4 2.0 4-Door SedanNHTSA No.: MB5802Test Program: 56 km/h Frontal Impact NCAP TestTest Date: 09/07/10**DOOR OPENING WIDTH**

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	925	924	-1
B	Left Side Lower	mm	768	758	-10
D	Right Side Upper	mm	928	923	-5
E	Right Side Lower	mm	775	773	-2

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2802	2735	-67
F	Right Side Wheelbase	mm	2803	2757	-46



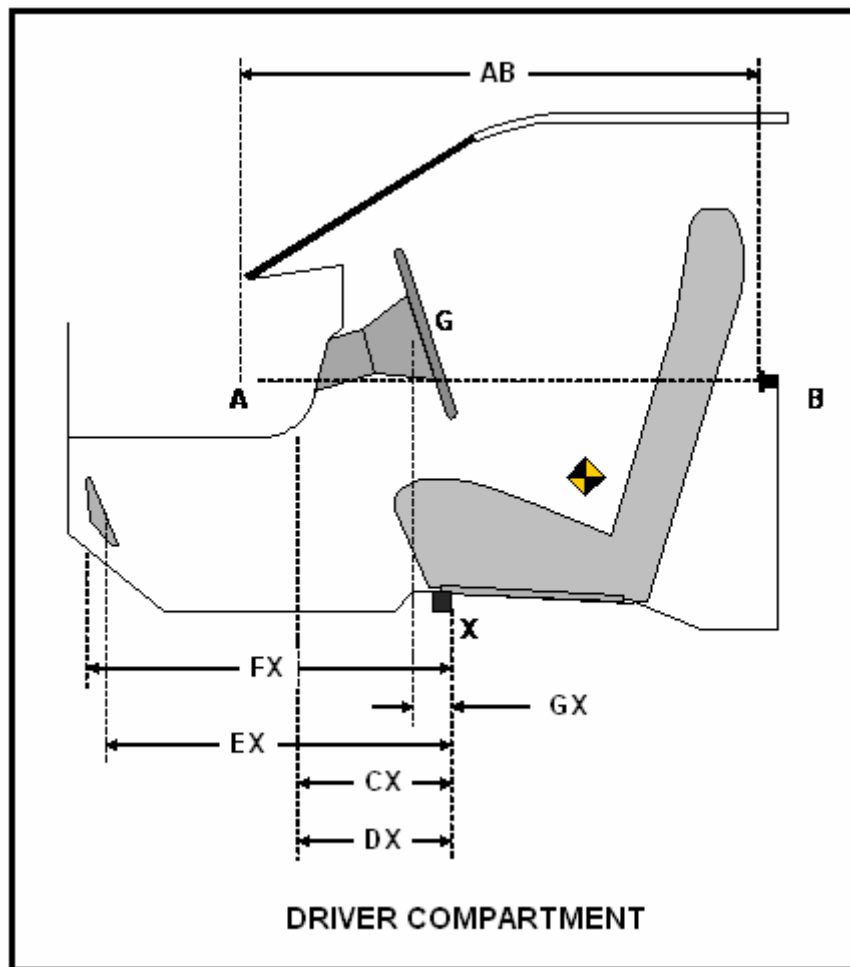
VEHICLE INTRUSION MEASUREMENTS

Test Date: 09/07/10

DRIVER COMPARTMENT INTRUSION

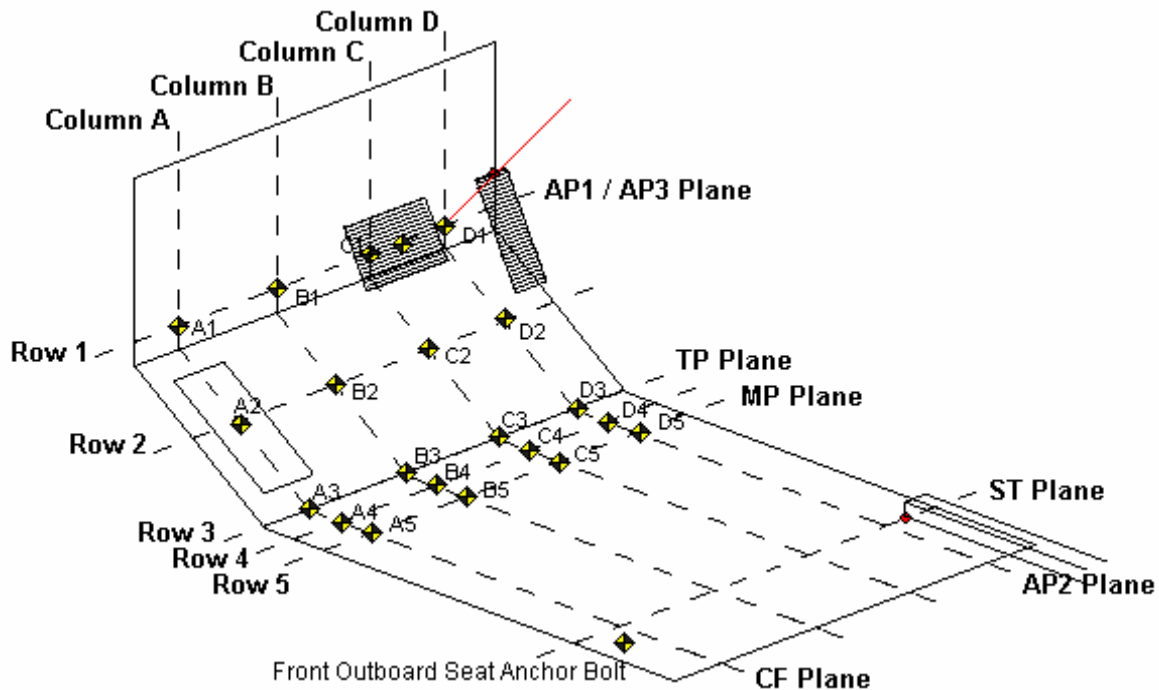
Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	925	924	-1
CX	Left Knee Bolster to X	mm	250	247	-3
DX	Right Knee Bolster to X	mm	248	245	-3
EX	Brake Pedal to X	mm	562	581	19
FX	Foot Rest to X	mm	590	567	-23
GX	Center of Steering Wheel Hub to X	mm	26	10	-16

X = Front of Seat Track (Stationary)



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

Test Vehicle:	2011 Audi A4 2.0 4-Door Sedan	NHTSA No.:	MB5802
Test Program:	56 km/h Frontal Impact NCAP Test	Test Date:	09/07/10



AP1: Y-Z Plane passing through D1

AP2: X-Z Plane passing through D1

AP3: X-Y plane passing through D1

MP: Y-Z plane, halfway between the ST plane and AP1 plane

CF Plane: X-Z plane passes through center of footrest.

BP Plane: X-Z plane passes through center of brake pedal

TP Plane: Y-Z plane, intersection of BP Plane and the intersection of the toe pan and floorboard

Column A: intersection of vehicle and CF plane

Column D: Intersection of vehicle and AP2 plane

Row 1: intersection of the vehicle and the AP3 Plane

Row 3: intersection of the vehicle and TP plane

Row 5: intersection of the vehicle and MP plane

Row 2: evenly spaced between row 1 and 3

Row 4: evenly spaced between row 3 and 5

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

Test Vehicle: 2011 Audi A4 2.0 4-Door Sedan NHTSA No.: MB5802
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 09/07/10

DRIVER FLOORPAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	734	732	731	711	720	717	712	695	-14	-15	-19	-16
2	679	674	672	659	670	660	658	642	-9	-14	-14	-17
3	605	602	598	591	597	589	585	576	-8	-13	-13	-15
4	480	479	472	464	469	469	459	450	-11	-10	-13	-14
5	352	348	349	346	342	337	337	334	-10	-11	-12	-12

DRIVER FLOORPAN Y-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	-37	-137	-235	-430	-32	-132	-230	-426	5	5	5	4
2	-37	-136	-232	-431	-33	-131	-227	-425	4	5	5	6
3	-32	-134	-231	-431	-31	-130	-227	-425	1	4	4	6
4	-29	-131	-231	-420	-26	-128	-226	-415	3	3	5	5
5	-25	-126	-232	-411	-20	-123	-225	-407	5	3	7	4

DRIVER FLOORPAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	66	65	60	70	68	68	66	73	2	3	6	3
2	7	4	1	10	5	7	4	14	-2	3	3	4
3	-50	-47	-44	-39	-50	-46	-44	-37	0	1	0	2
4	-105	-102	-80	-81	-102	-107	-82	-83	3	-5	-2	-2
5	-135	-129	-88	-88	-135	-135	-96	-93	0	-6	-8	-5

All measurements in millimeters

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

Test Vehicle: 2011 Audi A4 2.0 4-Door Sedan NHTSA No.: MB5802
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 09/07/10

PASSENGER FLOORPAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	720	732	733	730	636	689	706	709	-84	-43	-27	-21
2	632	660	663	671	613	636	643	659	-19	-24	-20	-12
3	559	588	593	602	545	574	583	595	-14	-14	-10	-7
4	442	466	479	484	428	456	469	476	-14	-10	-10	-8
5	332	347	358	357	317	338	350	350	-15	-9	-8	-7

PASSENGER FLOORPAN Y-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	386	226	147	45	365	218	141	37	-21	-8	-6	-8
2	397	226	144	42	390	217	136	36	-7	-9	-8	-6
3	391	223	140	32	377	214	131	30	-14	-9	-9	-2
4	385	225	136	31	374	213	129	27	-11	-12	-7	-4
5	397	221	131	30	380	208	124	24	-17	-13	-7	-6

PASSENGER FLOORPAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	64	56	58	53	97	81	76	67	33	25	18	14
2	3	-9	-8	-2	1	1	3	1	-2	10	11	3
3	-15	-50	-54	-58	-17	-54	-54	-47	-2	-4	0	11
4	-32	-82	-99	-101	-36	-93	-94	-88	-4	-11	5	13
5	-53	-90	-127	-137	-56	-108	-129	-135	-3	-18	-2	2

All measurements in millimeters

DATA SHEET NO. 15

SUMMARY OF FMVSS 212 AND 219 (PARTIAL) DATA

Test Vehicle: 2011 Audi A4 2.0 4-Door Sedan NHTSA No.: MB5802

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 09/07/10

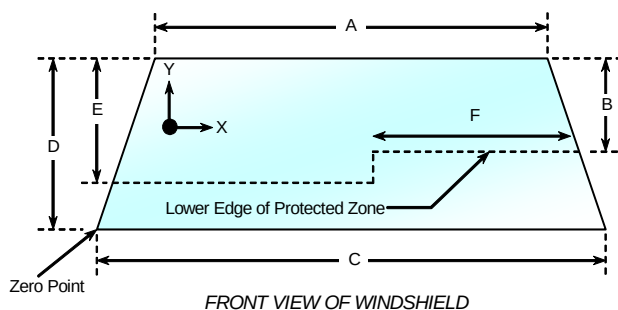
Windshield Mounting Details: Windshield glass is secured to the vehicle frame with rubber plastic and rubber molding sealed with rubber cement.

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

Temperature of windshield molding during test: 21.3° C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2097.5	2097.5	
Right Side	2097.5	2097.5	
Total	4195	4195	100%



Item	Units	Value
A	mm	1165
B	mm	354
C	mm	1470
D	mm	780
E	mm	483
F	mm	472

AREAS OF PROTECTED ZONE FAILURES

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

X	Y

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

X	Y

DATA SHEET NO. 16

FMVSS 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2011 Audi A4 2.0 4-Door Sedan NHTSA No.: MB5802
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 09/07/10

FMVSS 301 FUEL SYSTEM INTEGRITY DATA

Temperature at Time of Impact: 31.1° Test Time: 4:33 PM

Stoddard Solvent Spillage Measurements

- A. From impact until vehicle motion ceases: 0 oz.
(Maximum allowable = 1 oz.)
- B. For the 5 minute period after motion ceases: 0 oz.
(Maximum allowable = 5 oz.)
- C. For the following 25 minutes: 0 oz.
(Maximum allowable = 1 oz./minute)
- D. Spillage: No spillage occurred

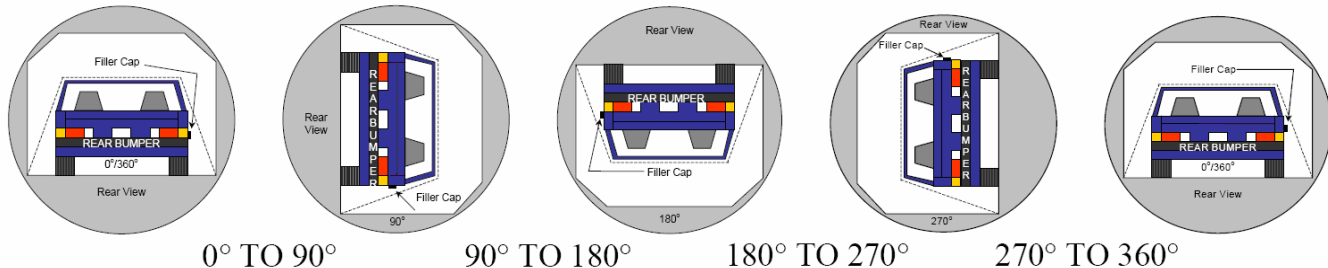
DATA SHEET NO. 17
FMVSS 301 STATIC ROLLOVER

Test Vehicle: 2011 Audi A4 2.0 4-Door Sedan

NHTSA No.: MB5802

Test Program: 56 km/h Frontal Impact NCAP Test

Test Date: 09/07/10



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: No spillage occurred

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° To 90°	84	320	404
90° To 180°	83	305	388
180° To 270°	79	321	400
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	0		
90° To 180°	0	0		
180° To 270°	0	0		
270° To 360°	0			

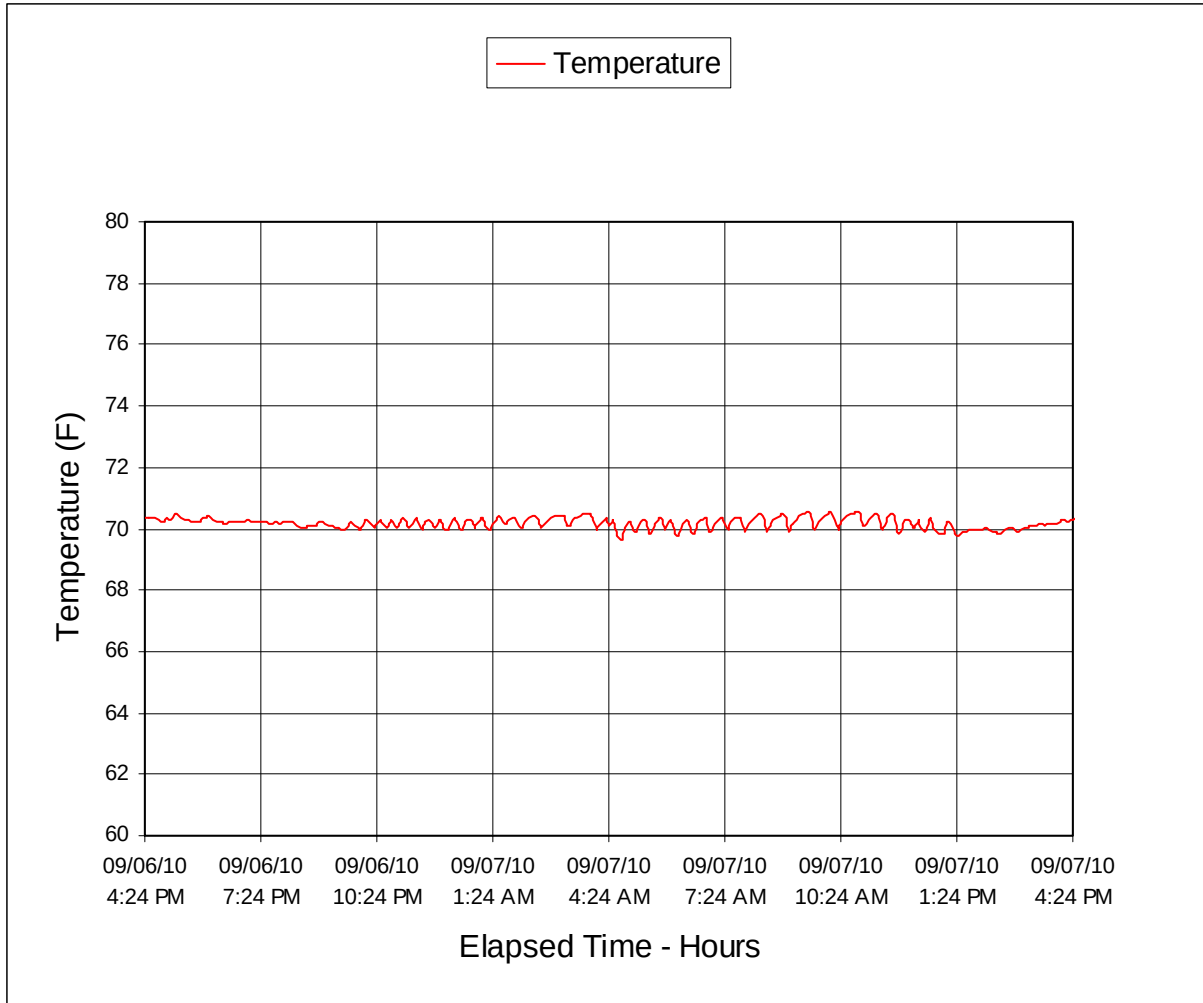
SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0° To 90°	None
90° To 180°	None
180° To 270°	None
270° To 360°	None

DATA SHEET NO. 18

DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART

Test Vehicle: 2011 Audi A4 2.0 4-Door Sedan NHTSA No.: MB5802
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 09/07/10



APPENDIX A
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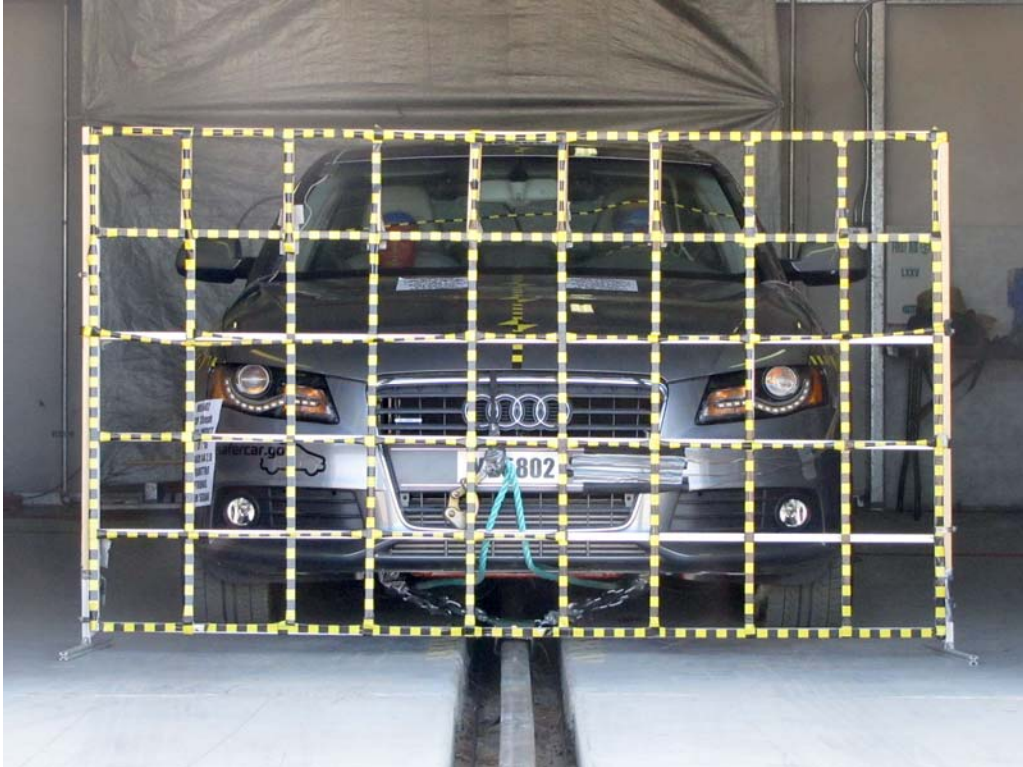


FIGURE 1. Load Cell Location



FIGURE 2. Load Cell Wall



FIGURE 3. Manufacturer's Label

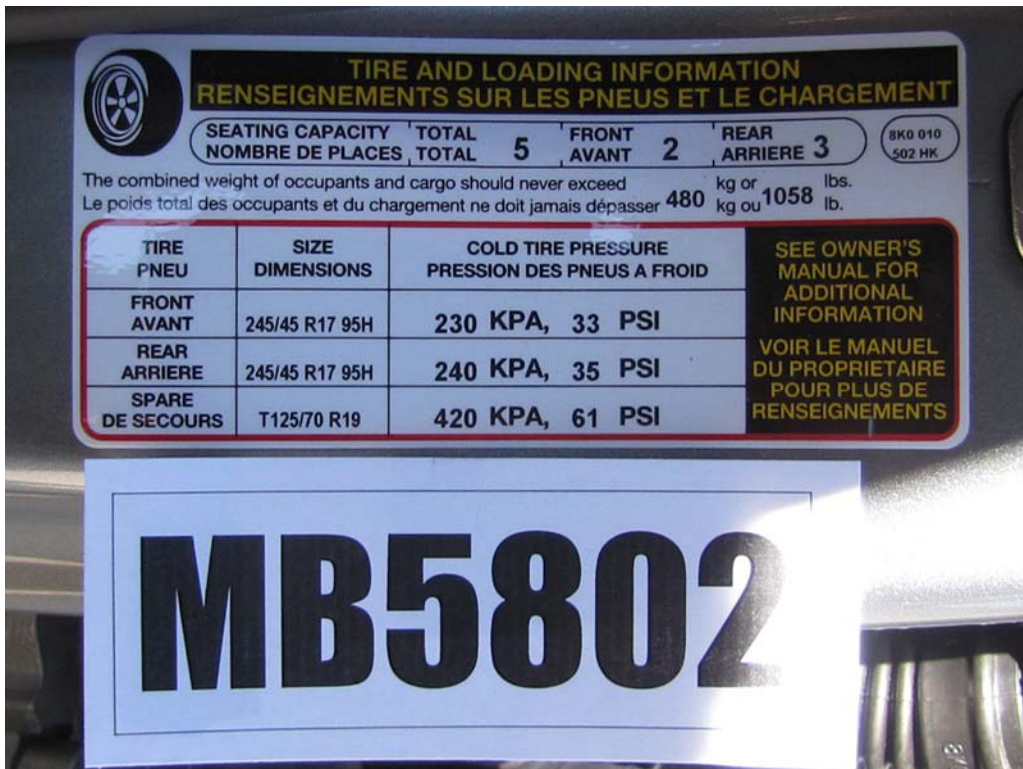


FIGURE 4. Tire Placard



FIGURE 5. 2011 Audi A4 2.0 Frontal As Delivered



FIGURE 6. 2011 Audi A4 2.0 Frontal As Delivered



FIGURE 7. Pre-Test Front View of Test Vehicle



FIGURE 8. Post-Test Front View of Test Vehicle



FIGURE 9. Pre-Test Left View of Test Vehicle



FIGURE 10. Post-Test Left View of Test Vehicle



FIGURE 11. Pre-Test Right View of Test Vehicle



FIGURE 12. Post-Test Right View of Test Vehicle



FIGURE 13. Pre-Test Right Front ¾ View



FIGURE 14. Post-Test Right Front ¾ View



FIGURE 15. Pre-Test Left Rear $\frac{3}{4}$ View



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



FIGURE 17. Pre-Test Windshield View



FIGURE 18. Post-Test Windshield View



FIGURE 19. Pre-Test Engine Compartment View



FIGURE 20. Post-Test Engine Compartment View

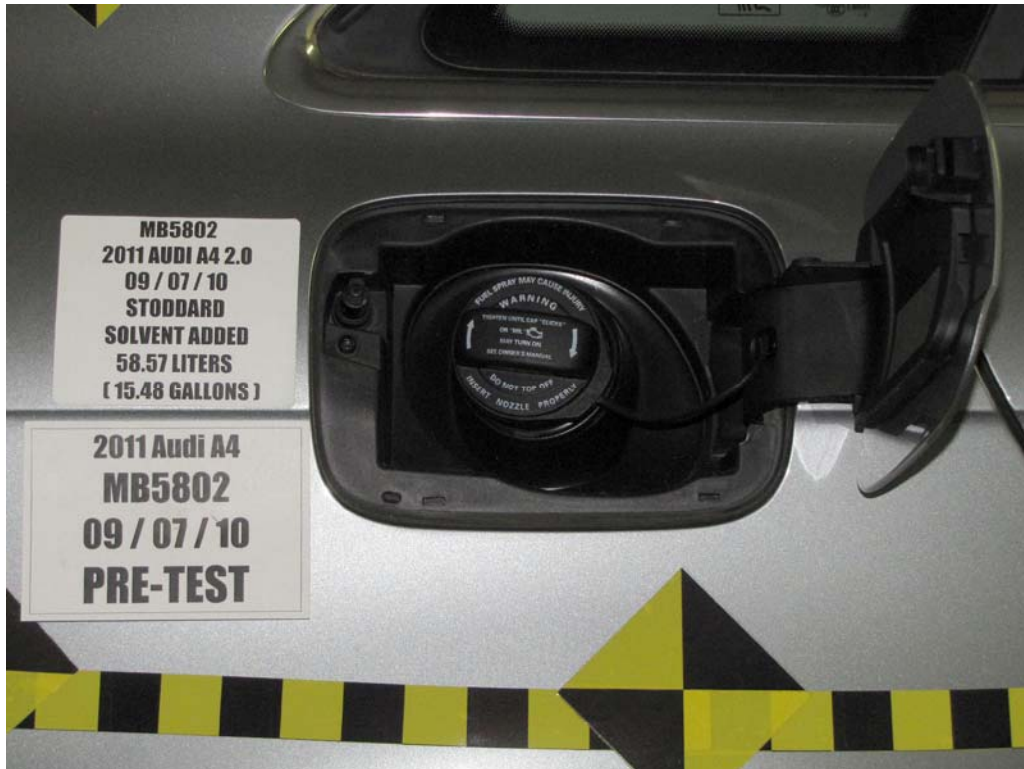


FIGURE 21. Pre-Test Fuel Filler Cap View



FIGURE 22. Post-Test Fuel Filler Cap View

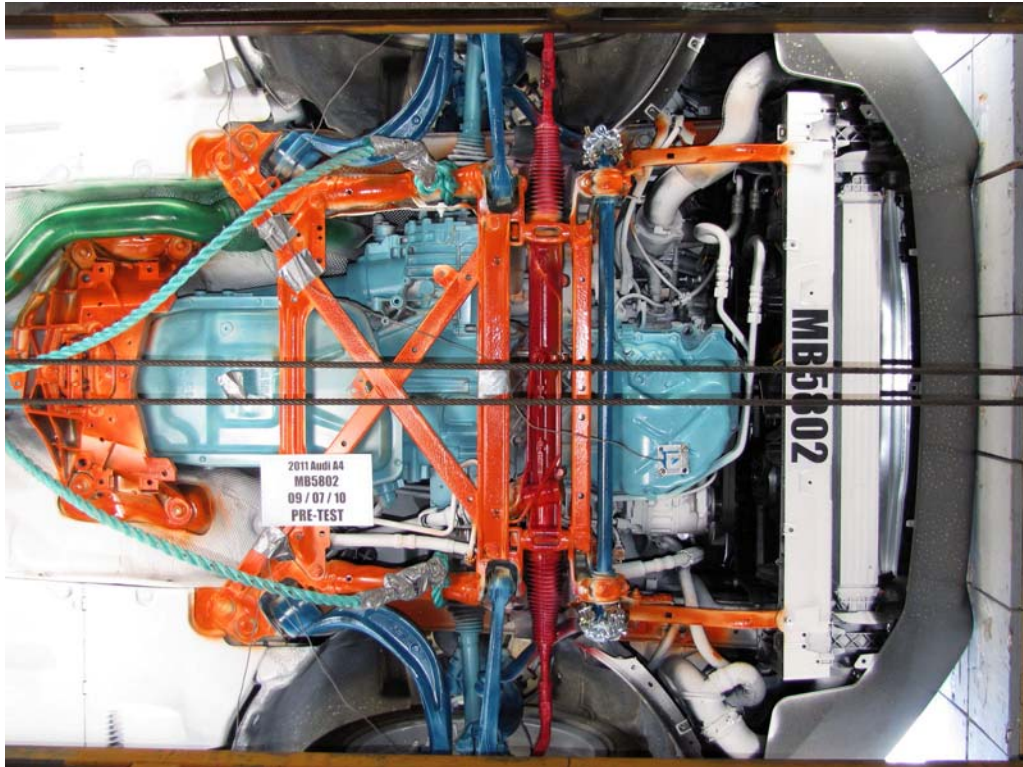


FIGURE 23. Pre-Test Front Underbody View

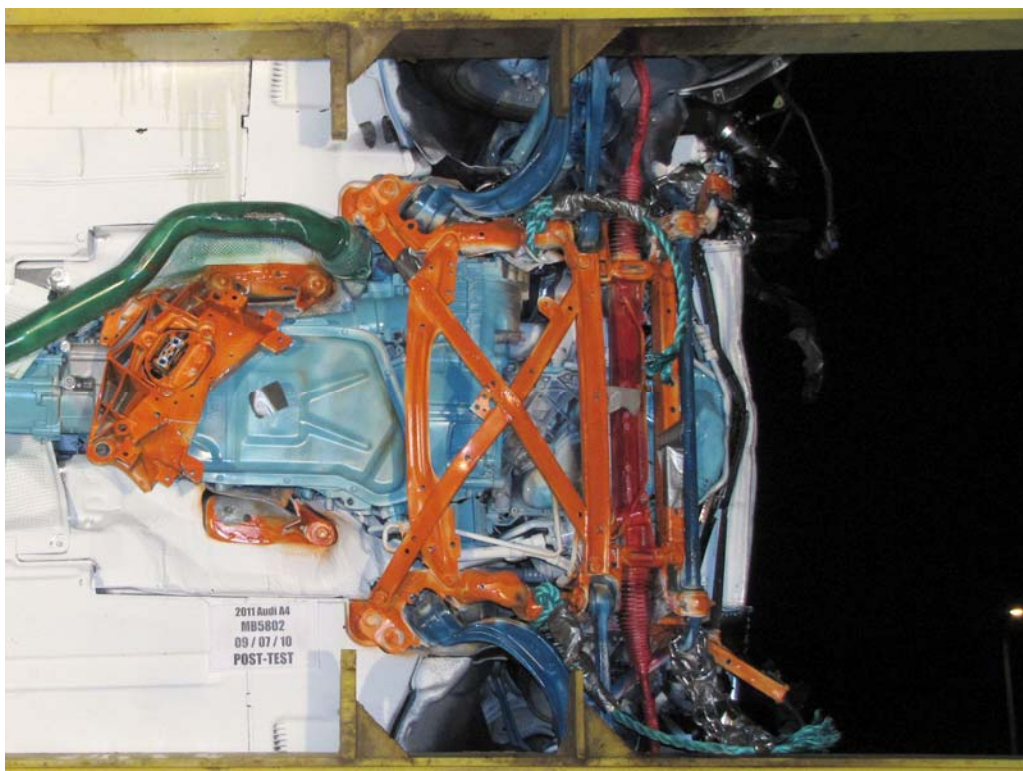


FIGURE 24. Post-Test Front Underbody View

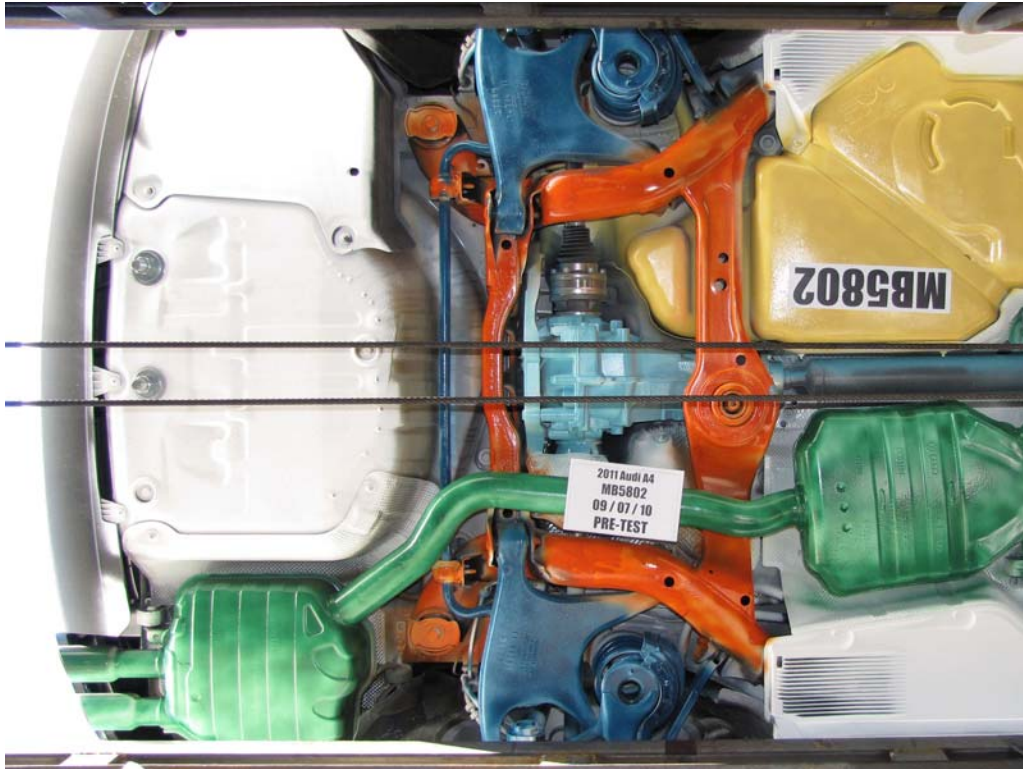


FIGURE 25. Pre-Test Rear Underbody View

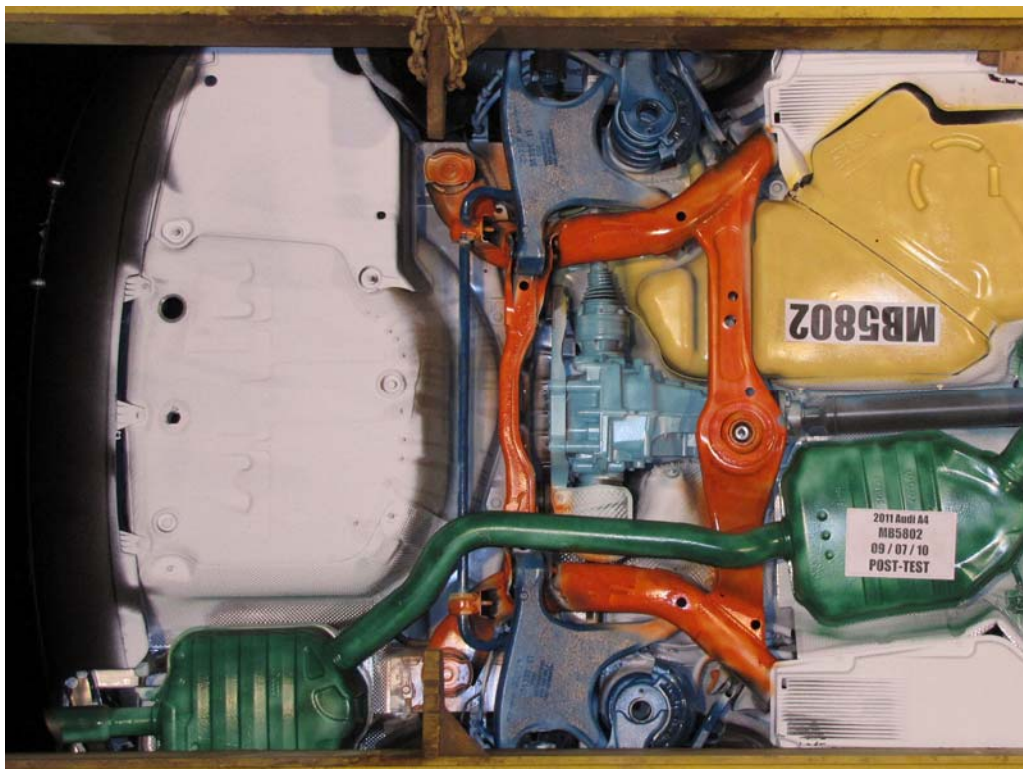


FIGURE 26. Post-Test Rear Underbody View



FIGURE 27. Pre-Test Dummy Cable Routing



FIGURE 28. Post-Test Dummy Cable Routing



FIGURE 29. Pre-Test Driver Dummy Front View



FIGURE 30. Post-Test Driver Dummy Front View



FIGURE 31. Pre-Test Driver Dummy Window View



FIGURE 32. Post-Test Driver Dummy Window View



FIGURE 33. Pre-Test Driver Dummy and Vehicle Interior View



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

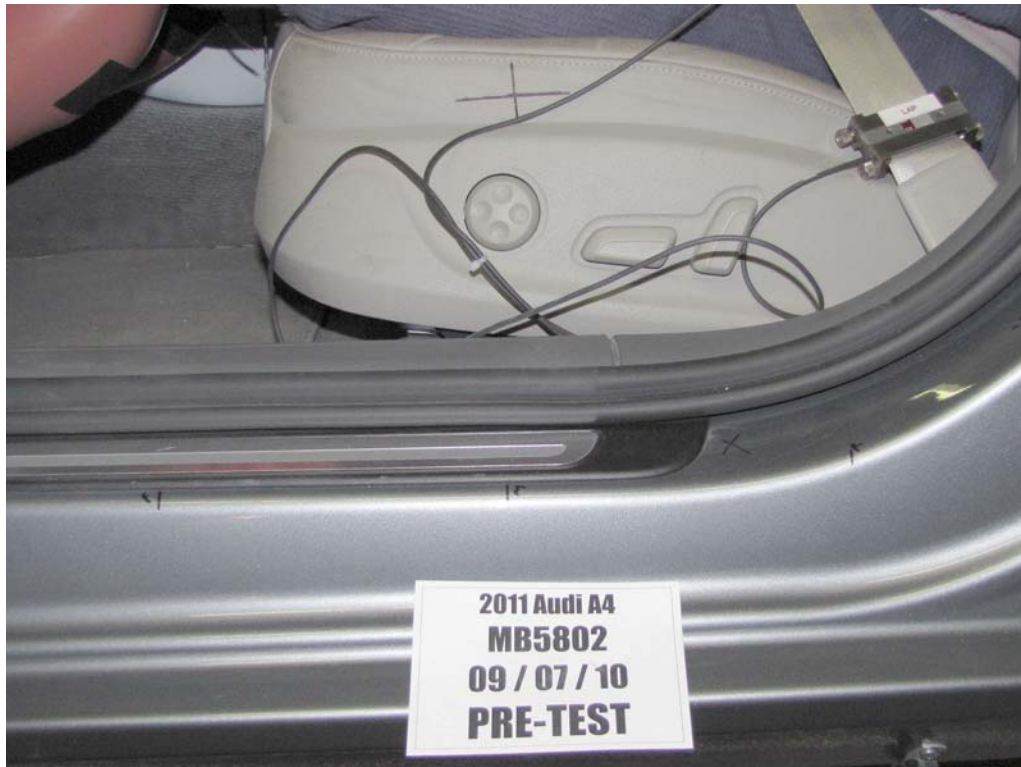


FIGURE 35. Pre-Test Driver's Seat Fore-Aft Markings



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



FIGURE 37. Pre-Test Driver Dummy Feet



FIGURE 38. Post-Test Driver Dummy Feet



FIGURE 39. Pre-Test Driver's Side Knee Bolster



FIGURE 40. Post-Test Driver's Side Knee Bolster



FIGURE 41. Pre-Test Driver's Side Floorpan



FIGURE 42. Post-Test Driver's Side Floorpan



FIGURE 43. Post-Test Driver Dummy Contact With Airbag



FIGURE 43a. Post-Test Driver Dummy Contact With Headrest

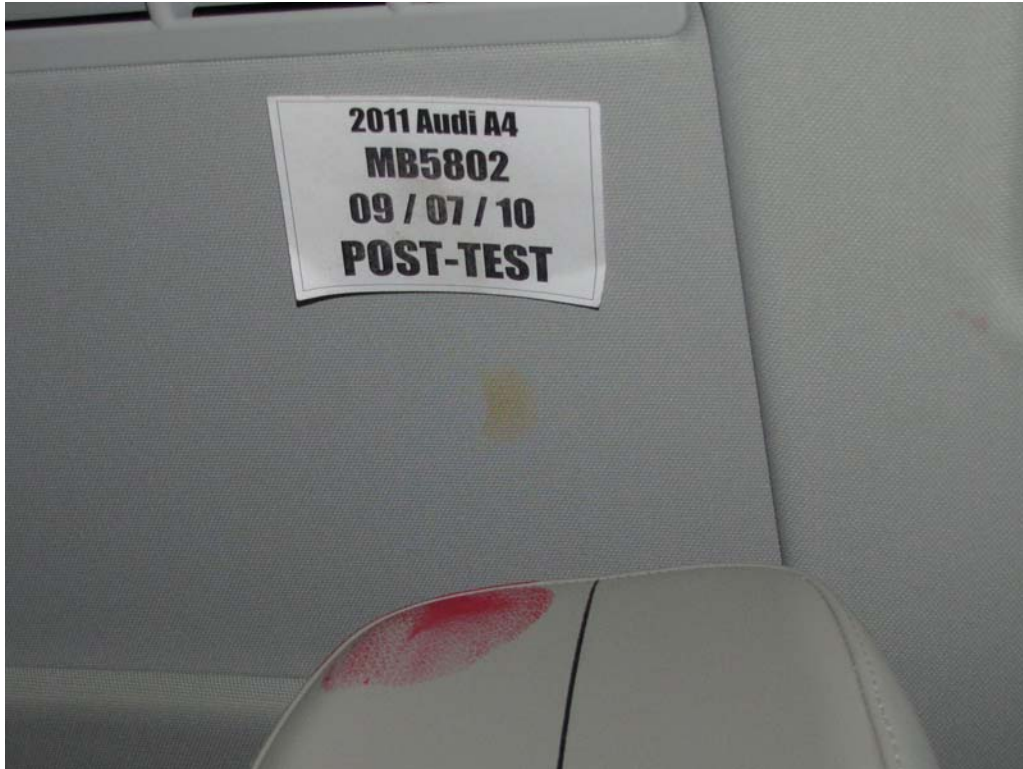


FIGURE 43b. Post-Test Driver Dummy Contact With Headliner



FIGURE 43c. Post-Test Driver Dummy Contact With Steering Column



FIGURE 44. Pre-Test View of Steering Column Shear Capsule



FIGURE 45. Post-Test View of Steering Column Shear Capsule



FIGURE 46. Pre-Test Passenger Dummy Front View



FIGURE 47. Post-Test Passenger Dummy Front View



FIGURE 48. Pre-Test Passenger Dummy Window View



FIGURE 49. Post-Test Passenger Dummy Window View



FIGURE 50. Pre-Test Passenger Dummy and Vehicle Interior View



FIGURE 51. Post-Test Passenger Dummy and Vehicle Interior View



FIGURE 52. Pre-Test Passenger's Seat Fore-Aft Markings



FIGURE 53. Post-Test Passenger's Seat Fore-Aft Markings



FIGURE 54. Pre-Test Passenger Dummy Feet



FIGURE 55. Post-Test Passenger Dummy Feet



FIGURE 56. Pre-Test Passenger's Side Knee Bolster



FIGURE 57. Post-Test Passenger's Side Knee Bolster



FIGURE 58. Pre-Test Passenger's Side Floorpan



FIGURE 59. Post-Test Passenger's Side Floorpan



FIGURE 60. Post-Test Passenger Dummy Contact With Airbag



FIGURE 60a. Post-Test Passenger Dummy Contact With Headrest



FIGURE 61. Pre-Test of Ballast Installed in Vehicle

Photograph Not Applicable
No Stoddard
Solvent Spillage

FIGURE 62. Post-Test Stoddard Solvent Spillage Location View



FIGURE 63. Post-Test Speed Trap Read Out

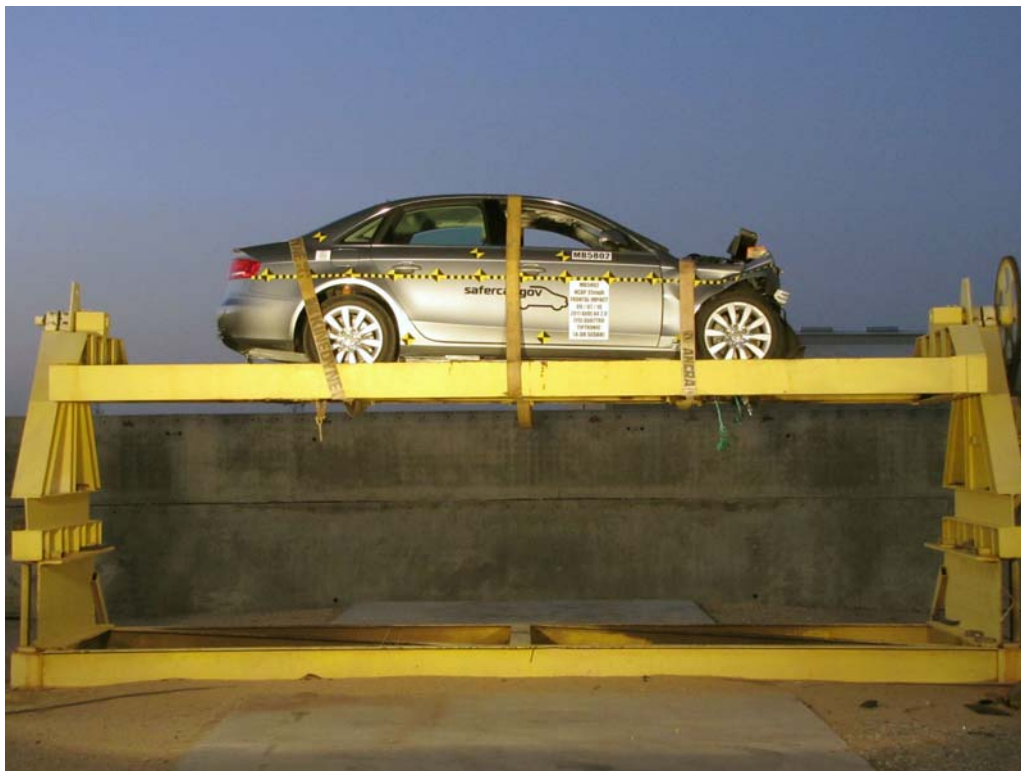


FIGURE 64. Vehicle at 0 Degrees on Static Rollover Device



FIGURE 65. Vehicle at 90 Degrees on Static Rollover Device

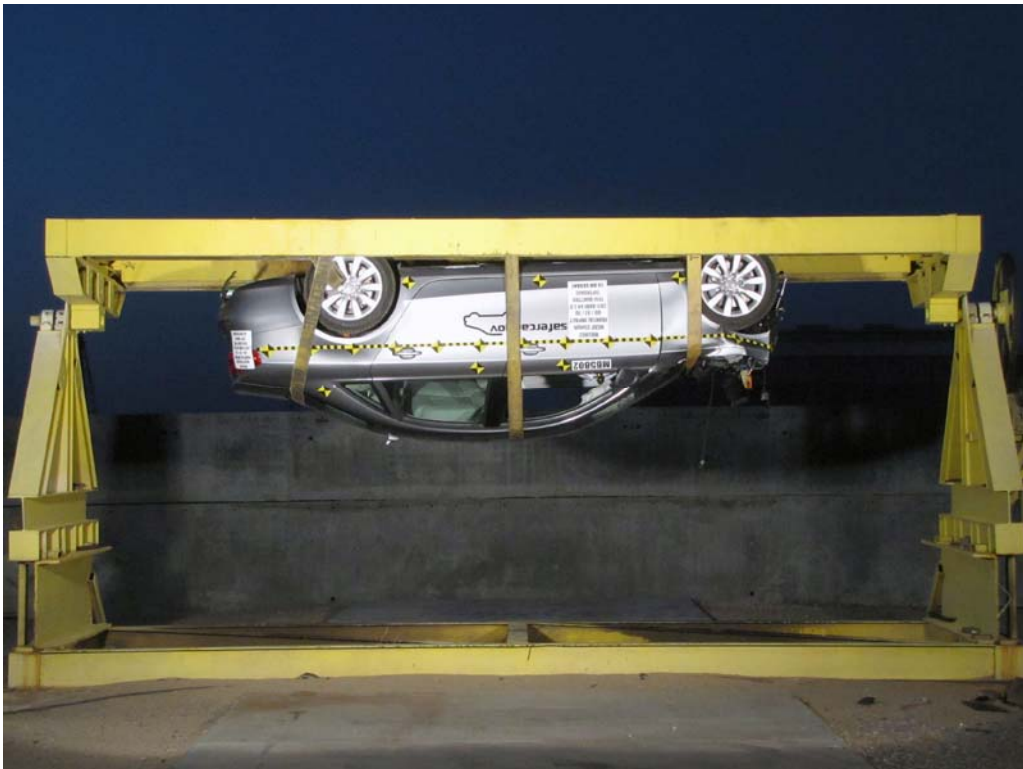


FIGURE 66. Vehicle at 180 Degrees on Static Rollover Device



FIGURE 67. Vehicle at 270 Degrees on Static Rollover Device

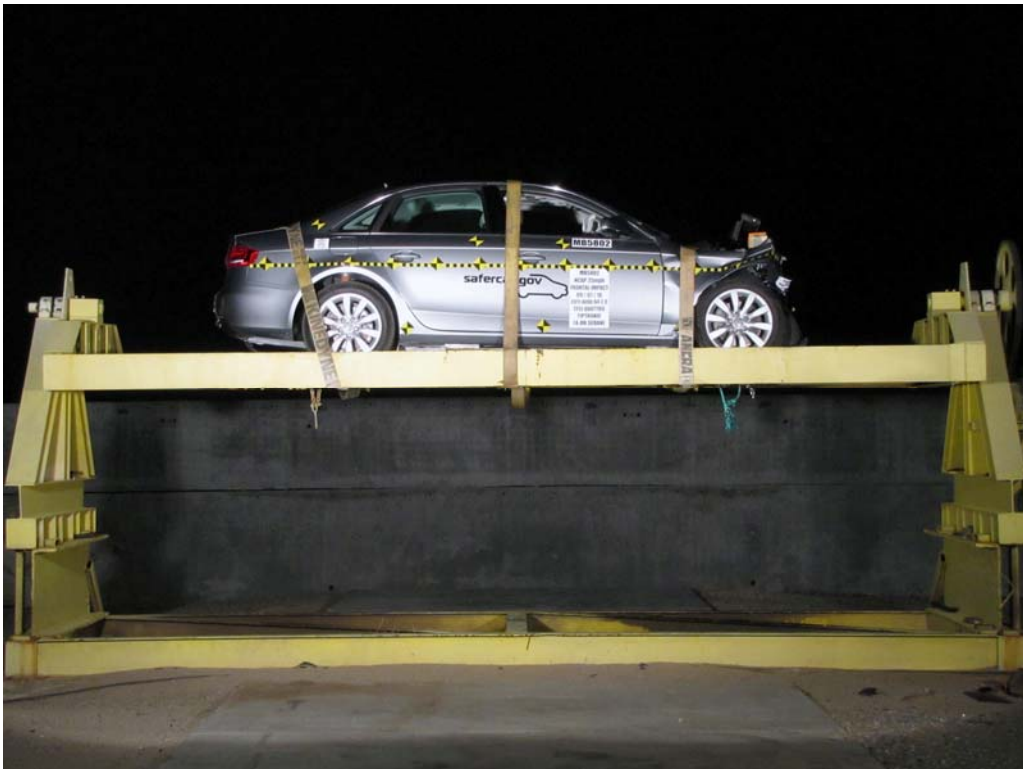


FIGURE 68. Vehicle at 360 Degrees on Static Rollover Device



FIGURE 69. 2011 Audi A4 2.0 Frontal Impact Event

[illegible]

FIGURE 70. Monroney Label Photograph

APPENDIX B
DUMMY RESPONSE DATA TRACES

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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

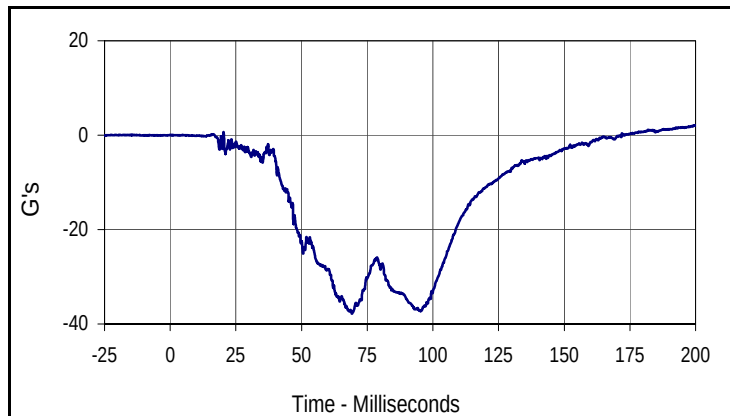
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Driver Head Y Acceleration Redundant
Driver Head Z Acceleration Redundant
Driver Upper Neck Force Y
Driver Upper Neck Moment X
Driver Upper Neck Moment Z
Driver Chest X Acceleration Redundant
Driver Chest Y Acceleration Redundant
Driver Chest Z Acceleration Redundant
Driver Pelvis X
Driver Pelvis Y
Driver Pelvis Z
Driver Shoulder Belt Force
Driver Lap Belt Force
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
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 Shoulder Belt Force
Passenger Lap Belt Force
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
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Left Rear Seat Crossmember Z
Right Rear Seat Crossmember X
Right Rear Seat Crossmember Z
Vehicle Engine Top X

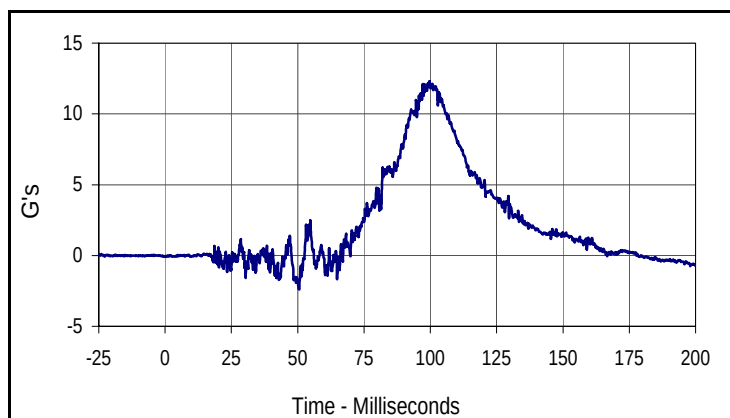
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Vehicle Left Brake Caliper X
Vehicle Right Brake Caliper X
Load Cell Barrier A1-A9
Load Cell Barrier B1-A9
Load Cell Barrier C1-A9
Load Cell Barrier D1-A9

Test Vehicle: 2011 Audi A4 2.0 TFSI Quattro Tiptronic 4-Door Sedan
 Test Program: 56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test

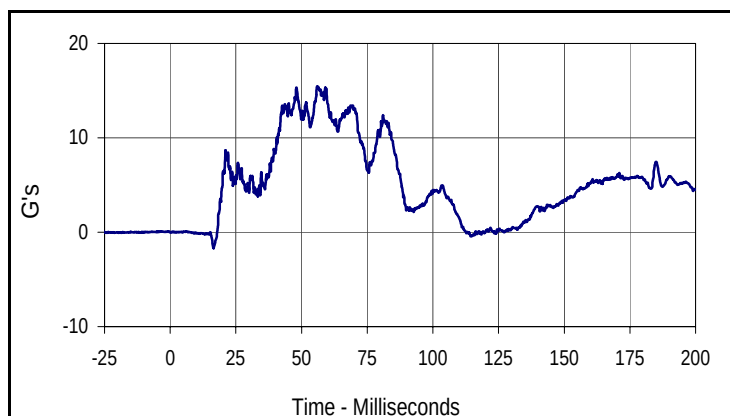
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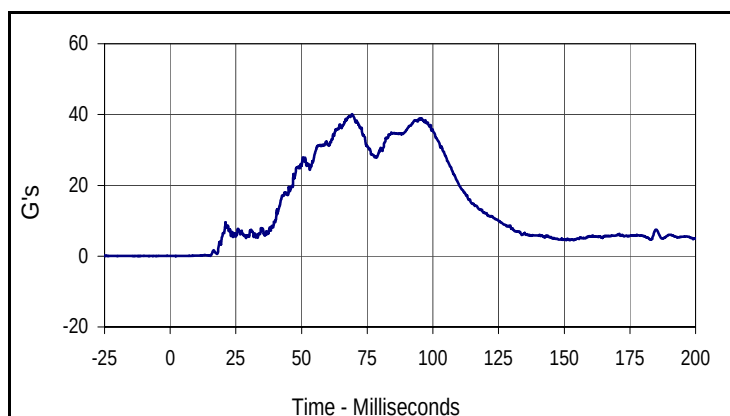
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Curve Description			
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12.3	99.7	-2.4	50.5



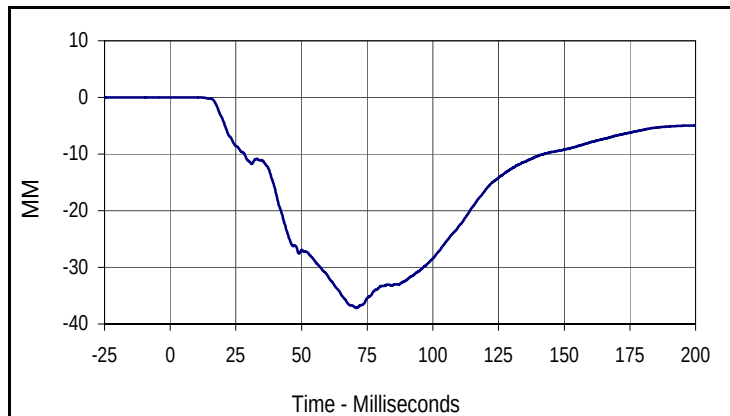
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Curve Description			
Driver Head Resultant Acceleration Primary			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
40.1	69.2	0.0	2.3

Test Vehicle: 2011 Audi A4 2.0 TFSI Quattro Tiptronic 4-Door Sedan
 Test Program: 56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test

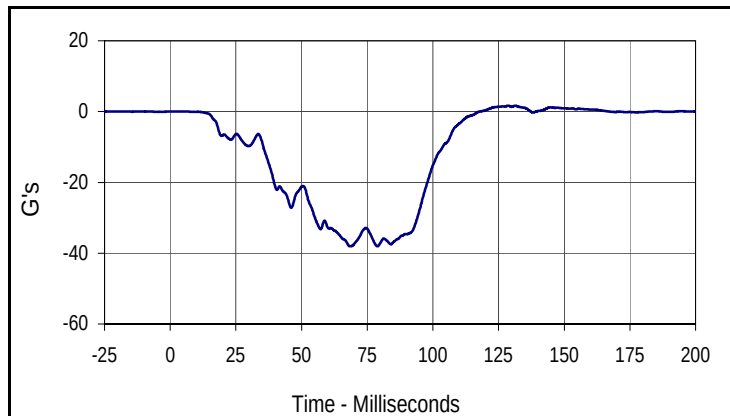
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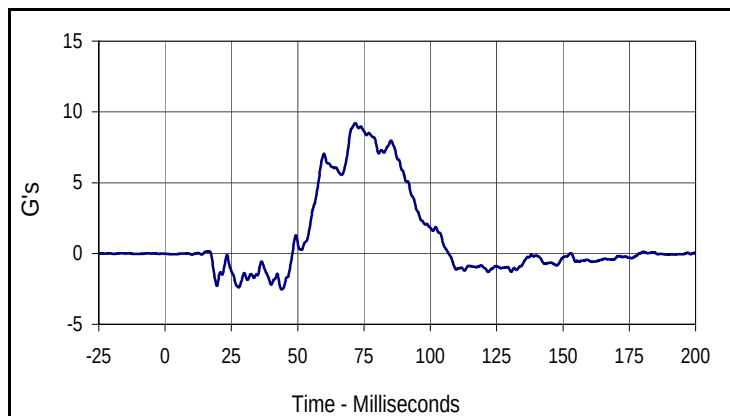
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Test Vehicle: 2011 Audi A4 2.0 TFSI Quattro Tiptronic 4-Door Sedan
 Test Program: 56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test

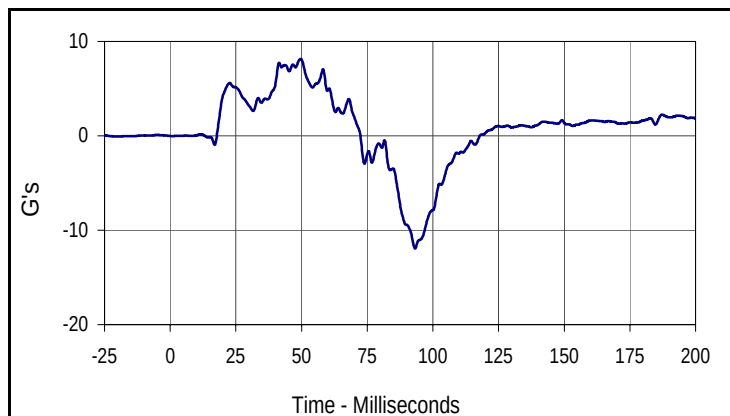
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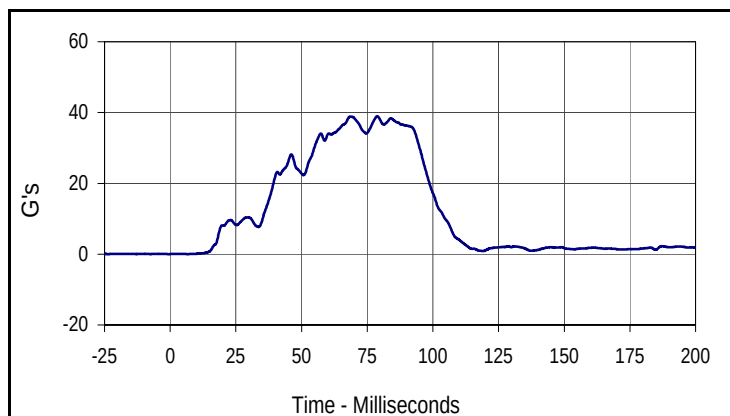
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Max	Time	Min	Time
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Curve Description			
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Max	Time	Min	Time
9.2	71.7	-2.5	43.9



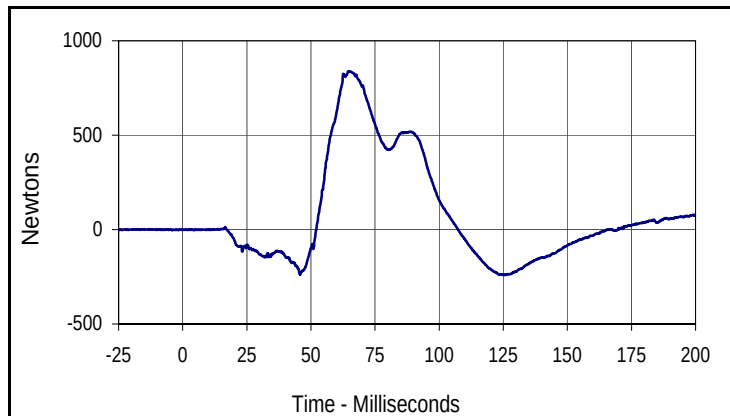
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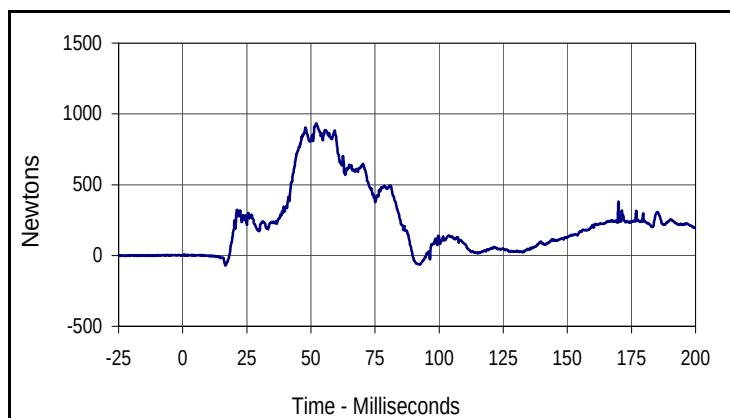
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CURNO	Type	SAE Class	Units
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Max	Time	Min	Time
38.9	78.8	0.0	6.6

Test Vehicle: 2011 Audi A4 2.0 TFSI Quattro Tiptronic 4-Door Sedan
 Test Program: 56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test

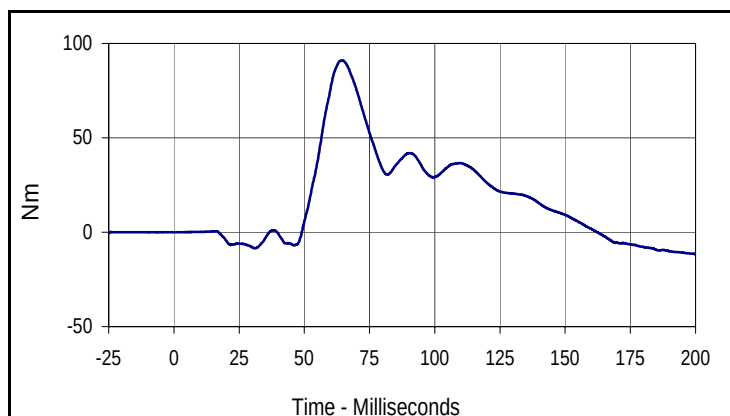
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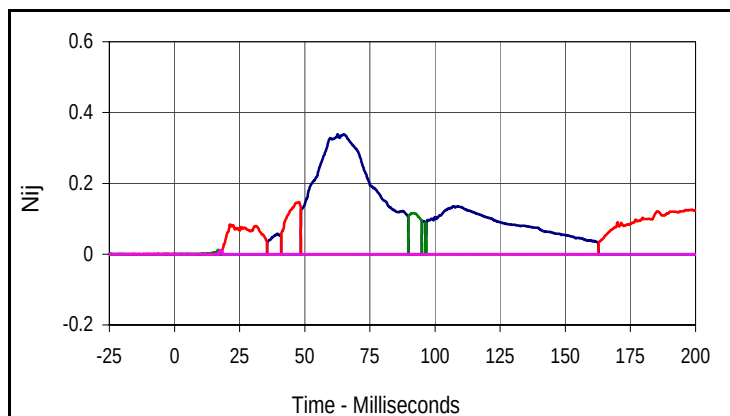
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Curve Description			
Driver Upper Neck Force Z			
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009	FIL	1000	Newtons
Max	Time	Min	Time
932.7	52.1	-71.5	16.7



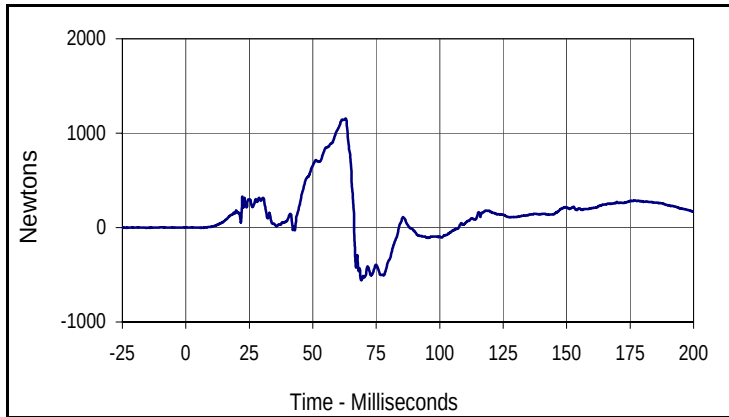
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Driver Upper Neck Moment Y			
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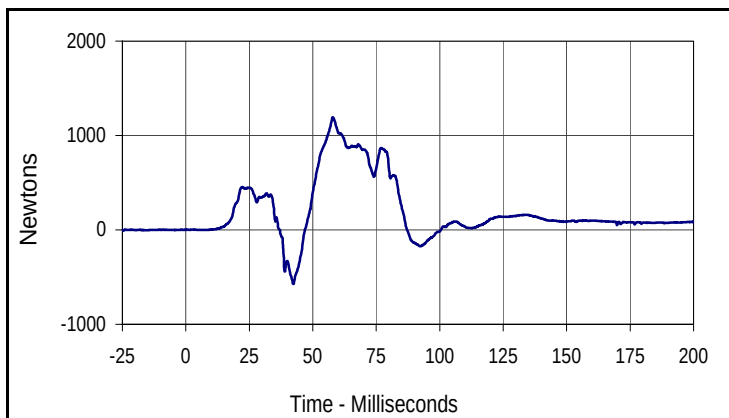
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Driver Nij			
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Units	Type	Max	Time
Nte	FIL	0.16	232.0
Units	Type	Max	Time
Ncf	FIL	0.12	91.5
Units	Type	Max	Time
Nce	FIL	0.26	249.2

Test Vehicle: 2011 Audi A4 2.0 TFSI Quattro Tiptronic 4-Door Sedan
 Test Program: 56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test

Test Date: 9/7/10
 NHTSA No.: MB5802



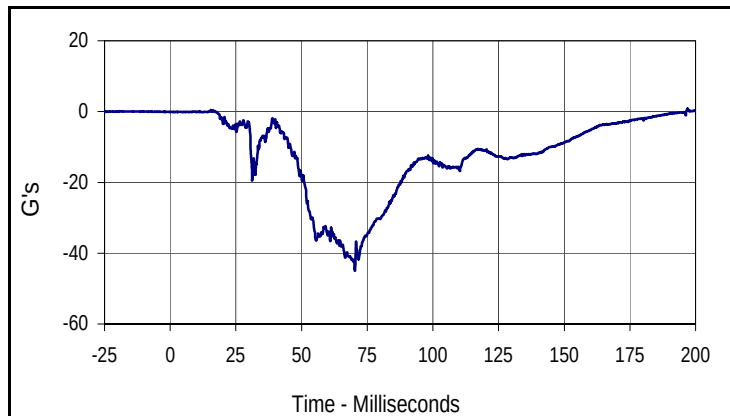
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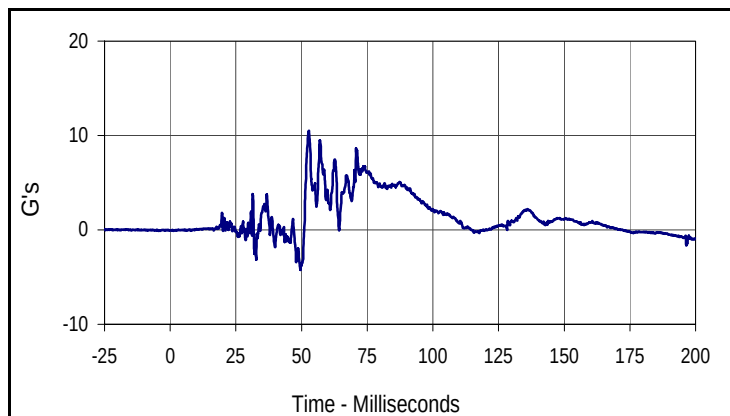
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Driver Right Femur Force Z			
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Max	Time	Min	Time
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Test Vehicle: 2011 Audi A4 2.0 TFSI Quattro Tiptronic 4-Door Sedan
 Test Program: 56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test

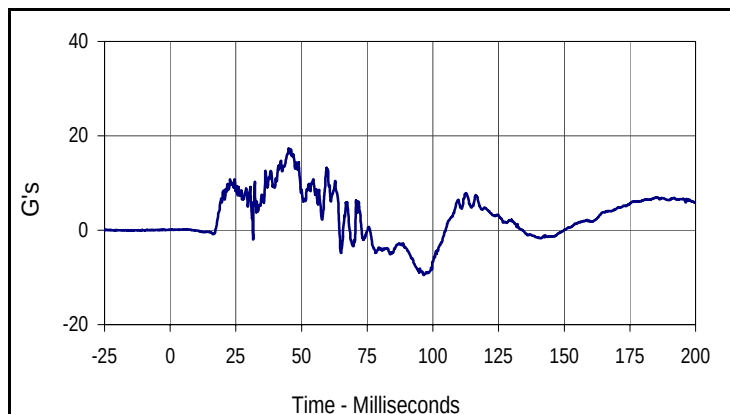
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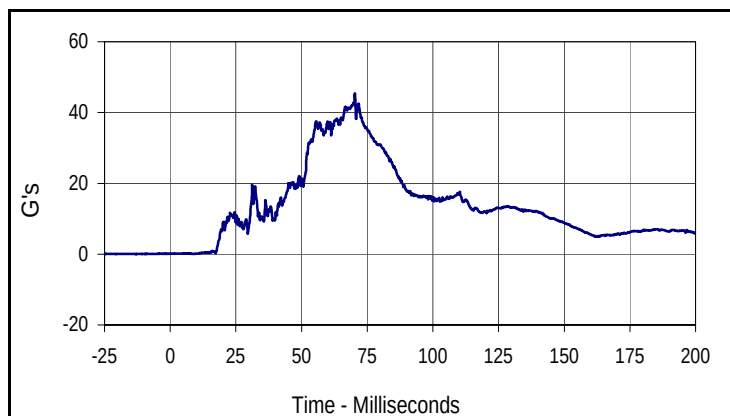
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Max	Time	Min	Time
0.8	196.9	-45.0	70.3



Curve Description			
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046	FIL	1000	G's
Max	Time	Min	Time
10.5	52.8	-4.2	49.5



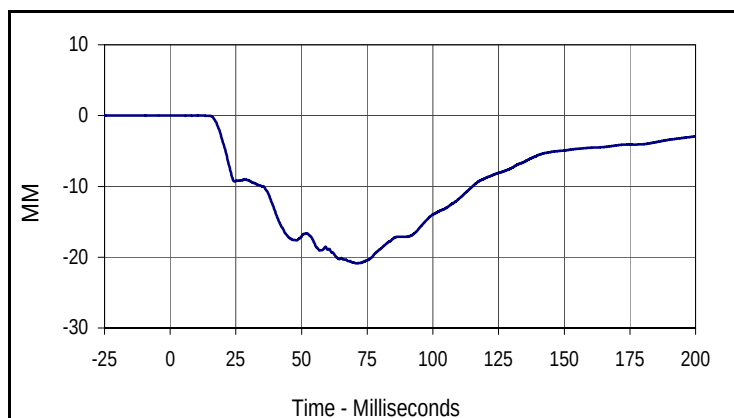
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CURNO	Type	SAE Class	Units
047	FIL	1000	G's
Max	Time	Min	Time
17.4	45.2	-9.5	96.6



Curve Description			
Passenger Head Resultant Acceleration Primary			
CURNO	Type	SAE Class	Units
045	RES	1000	G's
Max	Time	Min	Time
45.4	70.3	0.0	9.0

Test Vehicle: 2011 Audi A4 2.0 TFSI Quattro Tiptronic 4-Door Sedan
 Test Program: 56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test

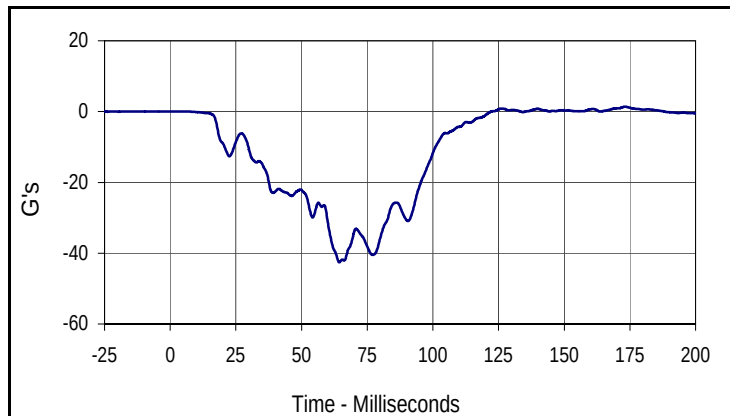
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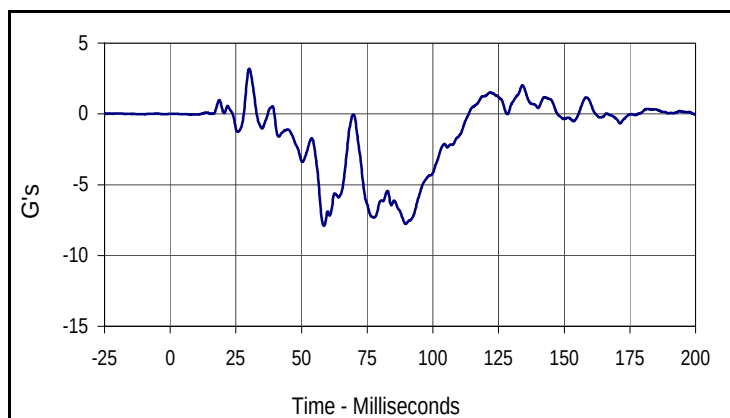
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063	FIL	600	MM
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0.0	11.1	-20.9	70.9

Test Vehicle: 2011 Audi A4 2.0 TFSI Quattro Tiptronic 4-Door Sedan
 Test Program: 56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test

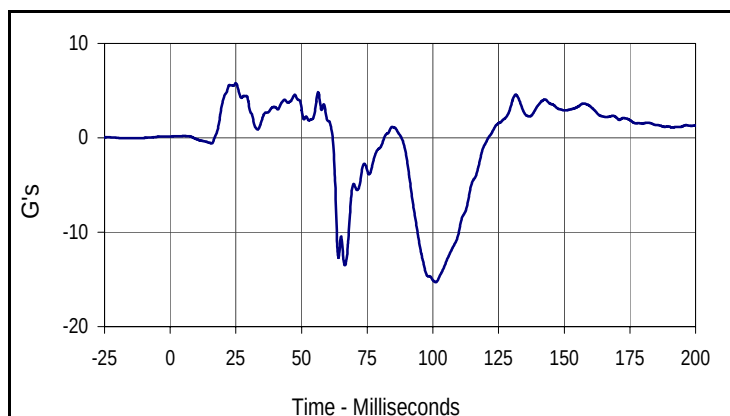
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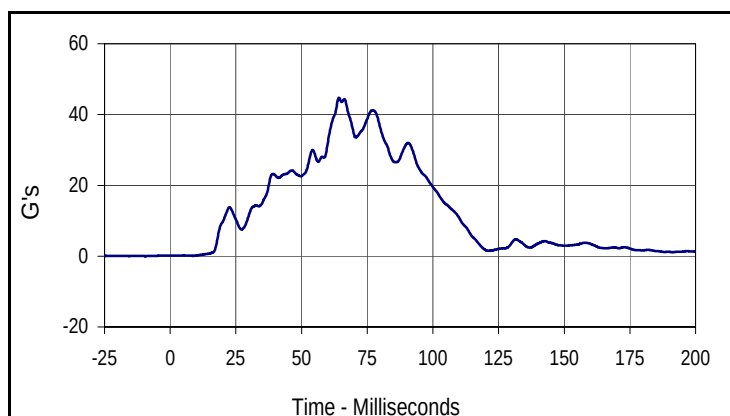
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057	FIL	180	G's
Max	Time	Min	Time
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Curve Description			
Passenger Chest Acceleration Y Primary			
CURNO	Type	SAE Class	Units
058	FIL	180	G's
Max	Time	Min	Time
3.2	30.1	-7.9	58.5



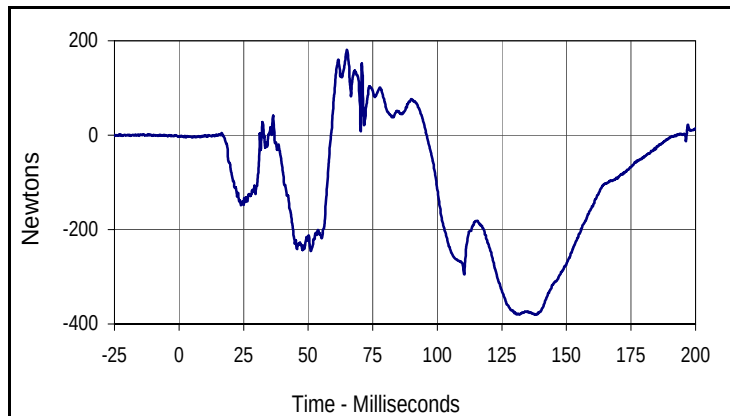
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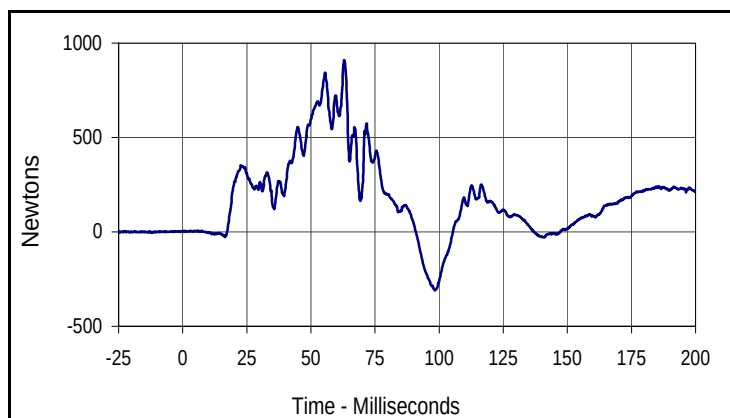
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CURNO	Type	SAE Class	Units
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Max	Time	Min	Time
44.7	64.2	0.1	8.7

Test Vehicle: 2011 Audi A4 2.0 TFSI Quattro Tiptronic 4-Door Sedan
 Test Program: 56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test

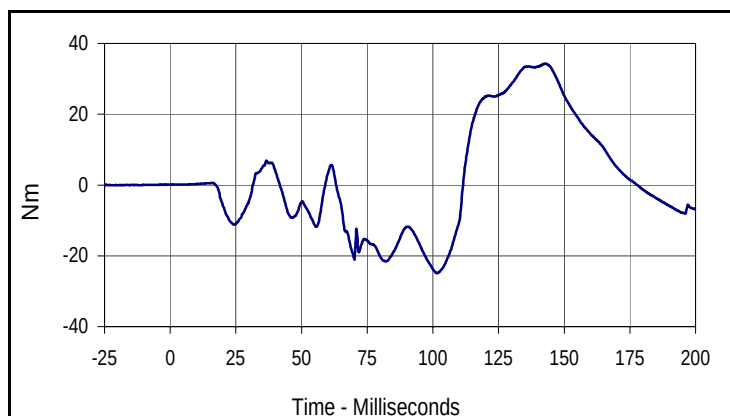
Test Date: 9/7/10
 NHTSA No.: MB5802



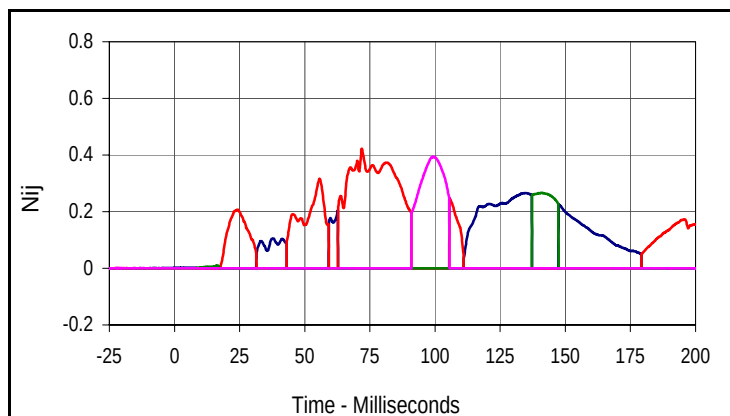
Curve Description			
Passenger Upper Neck Force X			
CURNO	Type	SAE Class	Units
051	FIL	1000	Newtons
Max	Time	Min	Time
181.3	65.0	-380.2	131.8



Curve Description			
Passenger Upper Neck Force Z			
CURNO	Type	SAE Class	Units
053	FIL	1000	Newtons
Max	Time	Min	Time
910.9	63.0	-309.5	98.3



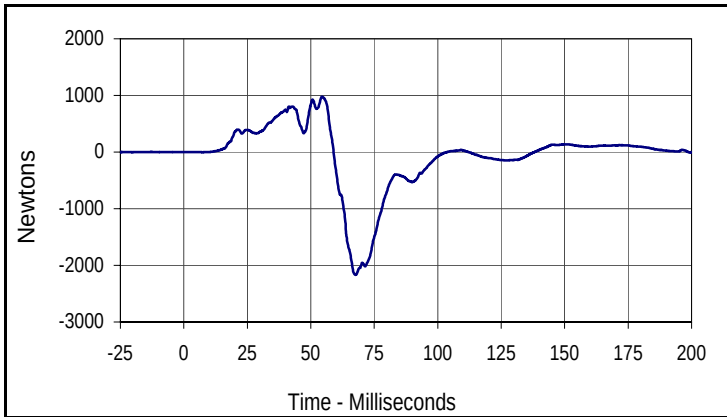
Curve Description			
Passenger Upper Neck Moment Y			
CURNO	Type	SAE Class	Units
055	FIL	600	Nm
Max	Time	Min	Time
34.3	143.0	-24.9	101.6



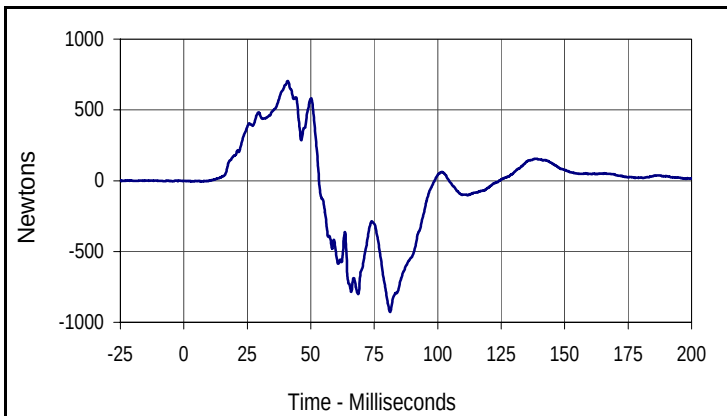
Curve Description			
Passenger Nij			
Units	Type	Max	Time
Ntf	FIL	0.27	134.7
Units	Type	Max	Time
Nte	FIL	0.42	71.9
Units	Type	Max	Time
Ncf	FIL	0.27	141.1
Units	Type	Max	Time
Nce	FIL	0.39	99.3

Test Vehicle: 2011 Audi A4 2.0 TFSI Quattro Tiptronic 4-Door Sedan
 Test Program: 56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test

Test Date: 9/7/10
 NHTSA No.: MB5802



Curve Description			
Passenger Left Femur Force Z			
CURNO	Type	SAE Class	Units
067	FIL	600	Newtons
Max	Time	Min	Time
978.9	54.4	-2166.8	67.6



Curve Description			
Passenger Right Femur Force Z			
CURNO	Type	SAE Class	Units
068	FIL	600	Newtons
Max	Time	Min	Time
704.5	40.9	-927.4	81.2

APPENDIX C
DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA

APPENDIX C
PRE-TEST / HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program: Hybrid III 50th Percentile Male Head Drop Test

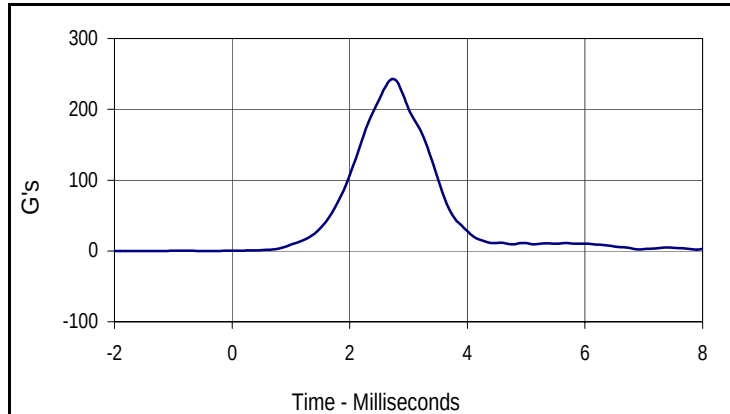
Test Date: 9/4/10

ATD Serial No.: 035

Test I.D.: HDM09



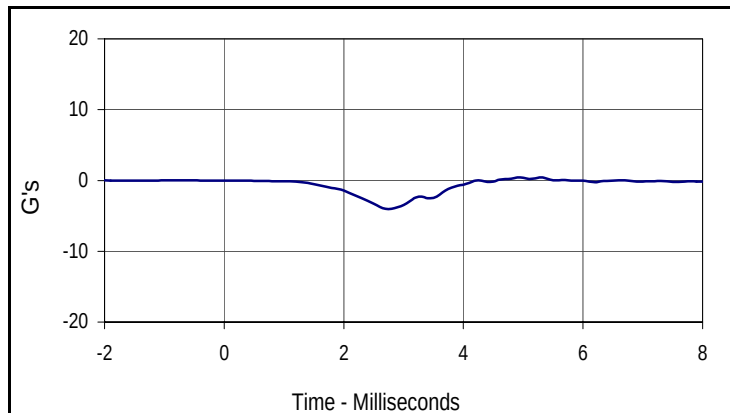
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	242.2	Pass
Peak Lateral Acceleration	G's	≤15.0	4.0	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass



Curve Description

Head Resultant

CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
242.2	2.7	0.0	-1.6



Curve Description

Head Y

CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.4	5.3	-4.0	2.7

Test Program: Hybrid III 50th Percentile Male Thorax Impact Test

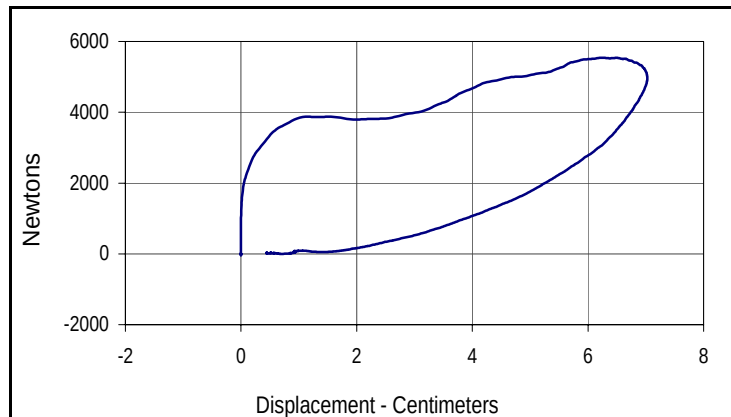
Test Date: 9/4/10

ATD Serial No.: 035

Test I.D.: CHM09A



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	6.58 to 6.82	6.63	Pass
Peak Probe Force	Newtons	5159 to 5893	5537	Pass
Peak Sternum Deflection	CM	6.35 to 7.26	7.03	Pass
Internal Hysteresis	%	69 to 85	72.3	Pass
Overall Test Results				Pass



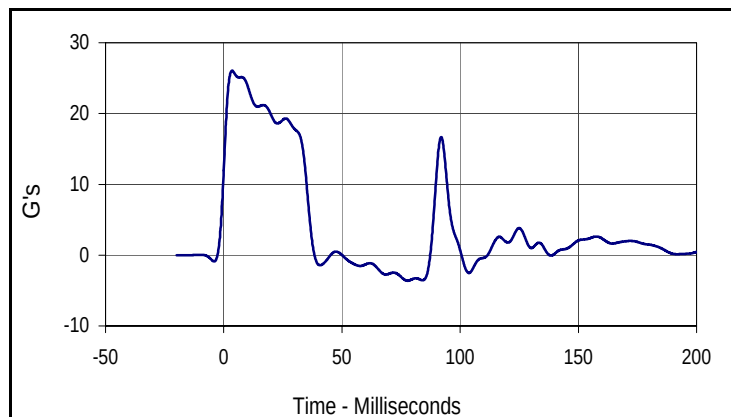
Curve Description			
Probe Force vs. Chest Deflection			
CURNO	Type	SAE Class	Hysteresis
001	FIL	180	72.3
Peak Probe Force		Peak Chest Deflection	
5537		7.03	

Test Program: Hybrid III 50th Percentile Male Neck Flexion Test
 ATD Serial No.: 035

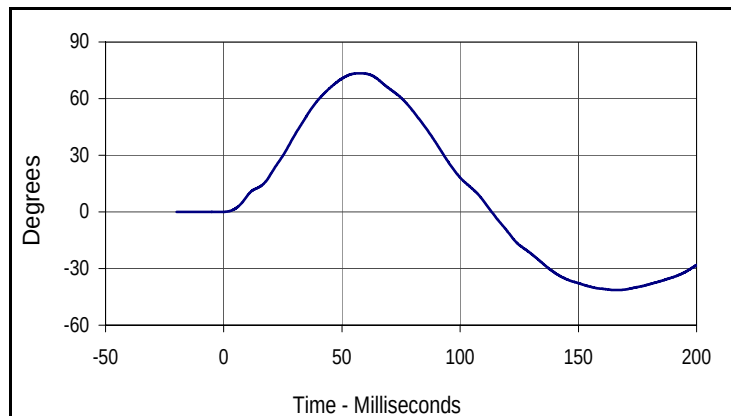
Test Date: 9/4/10
 Test I.D.: NFM09A



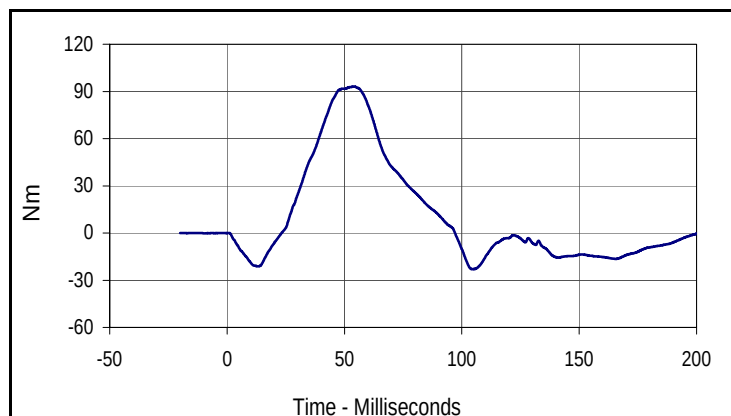
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.98	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	24.0	Pass
	20 Msec.	G's	17.6 to 22.6	19.8	Pass
	30 Msec.	G's	12.5 to 18.5	17.8	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 29.0	17.8	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	36.4	Pass
Maximum "D" Plane Rotation	Max	Degrees	64.0 to 78.0	73.5	Pass
	Time	Msec.	57.0 to 64.0	57.5	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	113.0 to 128.0	113.4	Pass
Moment About Occ. Condyle	Max	Nm	84.1 to 108.5	93.1	Pass
	Time	Msec.	47.0 to 58.0	54.1	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	97.1	Pass
Overall Test Results					Pass



Curve Description			
Pendulum Deceleration			
CURNO	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
26.1	3.5	-3.6	77.8



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
73.5	57.5	-41.4	166.1



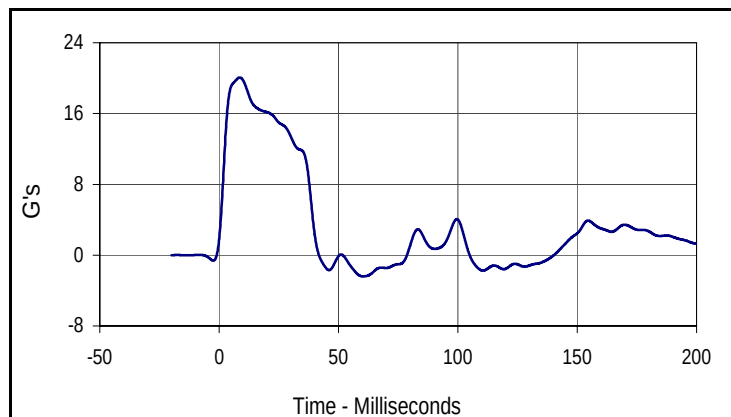
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
93.1	54.1	-23.0	104.6

Test Program: Hybrid III 50th Percentile Male Neck Extension Test
 ATD Serial No.: 035

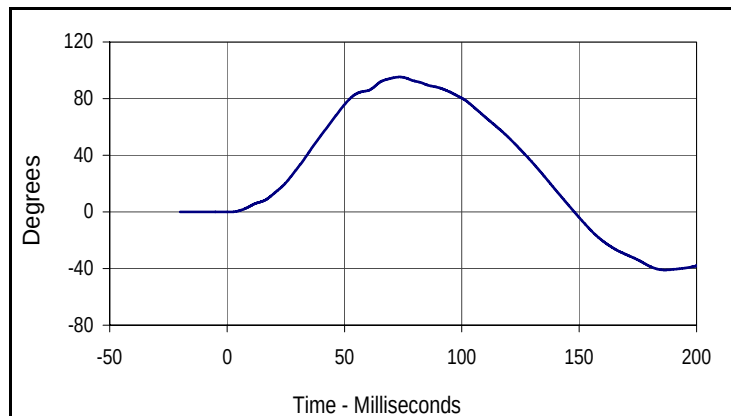
Test Date: 9/4/10
 Test I.D.: NEM09A



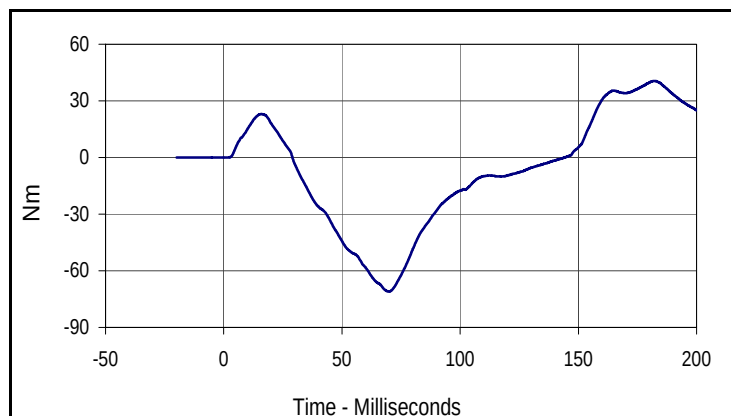
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.94 to 6.19	5.98	Pass
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	19.8	Pass
	20 Msec.	G's	14.0 to 19.0	16.2	Pass
	30 Msec.	G's	11.0 to 16.0	13.4	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 22.0	13.4	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	39.0	Pass
Maximum "D" Plane Rotation	Max	Degrees	81.0 to 106.0	95.3	Pass
	Time	Msec.	72.0 to 82.0	73.5	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	147.0 to 174.0	148	Pass
Moment About Occ. Condyle	Max	Nm	-52.9 to- 79.9	-71.0	Pass
	Time	Msec.	65.0 to 79.0	69.9	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	144.2	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Deceleration			
CURNO	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
20.1	8.6	-2.4	60.1



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
95.3	73.5	-41.0	186.5



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
40.5	182.6	-71.0	69.9

Test Program: Hybrid III 50th Percentile Male Knee Impact Test
 ATD Serial No.: 035

Test Date: 9/4/10
 Test I.D.: LKM09A , RKM09A

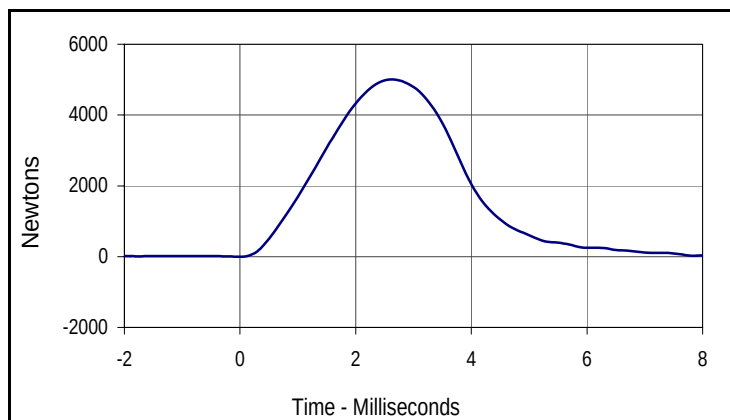


Left Knee

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.12	Pass
Peak Probe Force	Newtons	4715 to 5782	5008	Pass
Overall Test Results				Pass

Right Knee

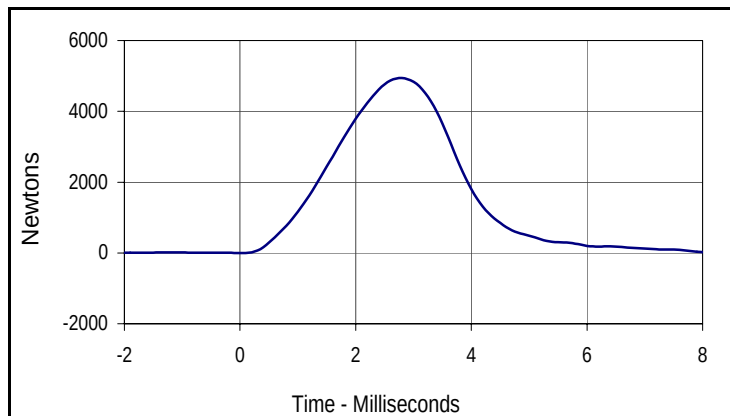
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.11	Pass
Peak Probe Force	Newtons	4715 to 5782	4941	Pass
Overall Test Results				Pass



Curve Description

Left Knee Probe Force

CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
5008.0	2.6	-53.7	9.6



Curve Description

Right Knee Probe Force

CURNO	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
4940.8	2.8	-44.0	10.0

Test Program: Hybrid III 50th Percentile Male External Measurements

Test Date: 9/4/10

ATD Serial No.: 035

Test I.D.: N/A



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
A - Total sitting height	mm	879 to 889	881	Pass
B - Shoulder pivot height	mm	505 to 521	518	Pass
C - "H" point height	mm	84 to 89	86	Pass
D - "H" point from seat back	mm	135 to 140	139	Pass
E - Shoulder pivot from back	mm	84 to 94	85	Pass
F - Thigh clearance	mm	140 to 155	149	Pass
G - Elbow back to wrist pivot	mm	290 to 305	300	Pass
H - Skull cap to back line	mm	41 to 46	43	Pass
I - Shoulder to elbow length	mm	330 to 345	335	Pass
J - Elbow rest height	mm	190 to 211	206	Pass
K - Buttock to knee length	mm	579 to 604	590	Pass
L - Popliteal length	mm	429 to 455	432	Pass
M - Knee pivot height	mm	485 to 500	487	Pass
N - Buttock popliteal length	mm	452 to 477	470	Pass
O - Chest depth	mm	213 to 229	215	Pass
P - Foot length	mm	251 to 267	259	Pass
V - Shoulder breadth	mm	422 to 437	432	Pass
W - Foot breadth	mm	91 to 107	99	Pass
Y - Chest circumference	mm	970 to 1001	987	Pass
Z - Waist circumference	mm	836 to 866	863	Pass
AA - Location for chest circumference	mm	429 to 434	432	Pass
BB - Location for waist circumference	mm	226 to 231	230	Pass
Overall Test Results				Pass

Test Program: Hybrid III 5th Percentile Female Head Drop TestTest Date: 9/2/10ATD Serial No.: 635Test I.D.: HDF09A

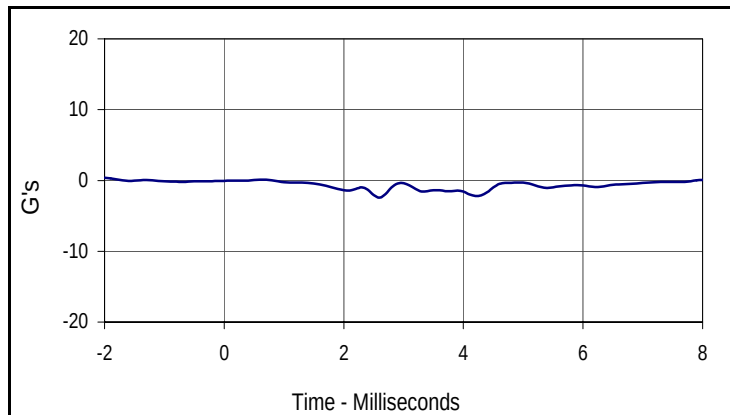
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	250.0 to 300.0	275.3	Pass
Peak Lateral Acceleration	G's	≤15.0	2.4	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass



Curve Description

Head Resultant

CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
275.3	2.6	0.4	-1.7



Curve Description

Head Y

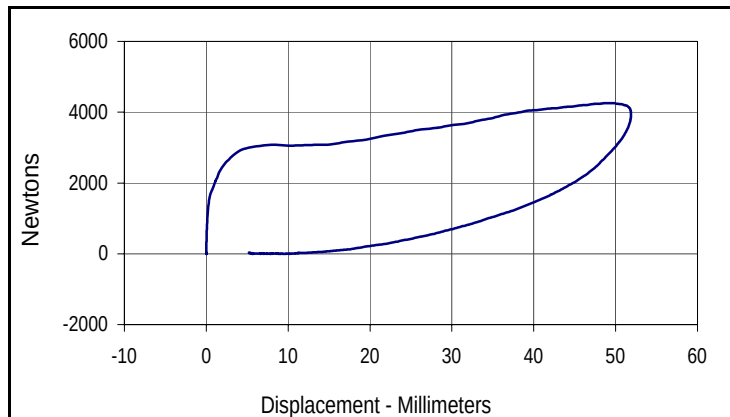
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.4	-2.0	-2.4	2.6

Test Program: Hybrid III 5th Percentile Female Thorax Impact Test
 ATD Serial No.: 635

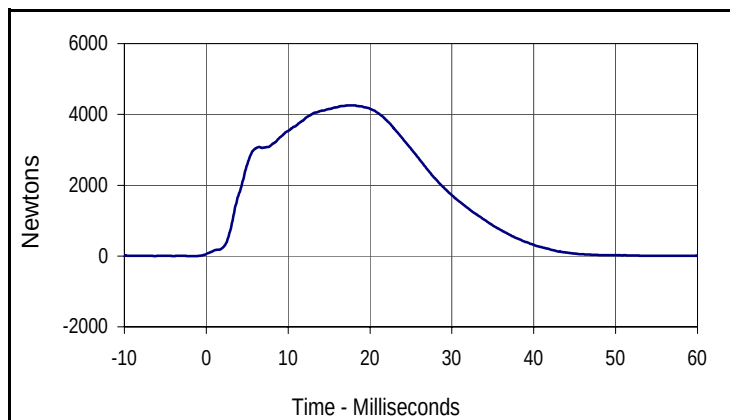
Test Date: 9/2/10
 Test I.D.: CHF09A



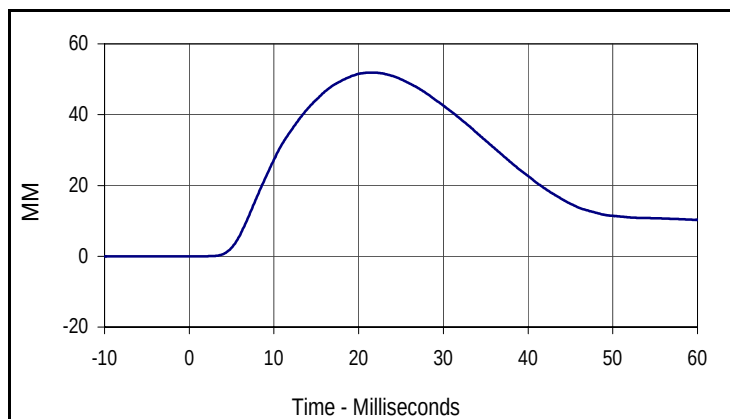
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	6.59 to 6.83	6.60	Pass
Peak Chest Deflection	MM	50.0 to 58.0	51.9	Pass
Peak Force Between 50 and 58 MM	Newtons	3900 to 4400	4258	Pass
Peak Force Between 18 and 50 MM	Newtons	≤4600	4241	Pass
Internal Hysteresis	%	69 to 85	76.3	Pass
Overall Test Results			Pass	



Curve Description			
Probe Force vs. Chest Deflection			
CURNO	Type	SAE Class	Hysteresis
003	FIL	180	76.3
Peak Probe Force		Peak Chest Displ.	
4257.6		51.9	



Curve Description			
Probe Force			
CURNO	Type	SAE Class	Units
002	FIL	180	Newtons
Max	Time	Min	Time
4257.6	17.3	-5.8	155.4



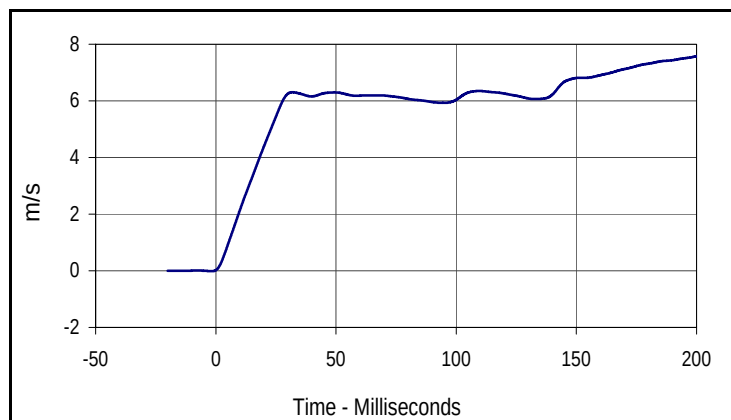
Curve Description			
Chest Deflection			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
51.9	21.6	0.0	-10.0

Test Program: Hybrid III 5th Percentile Female Neck Flexion Test
 ATD Serial No.: 635

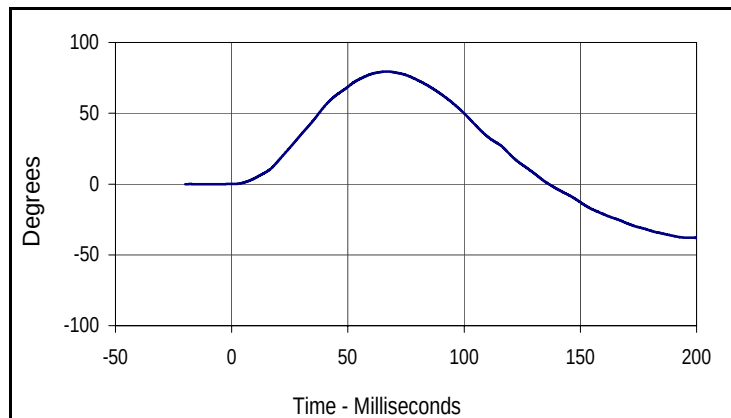
Test Date: 9/2/10
 Test I.D.: NF09A



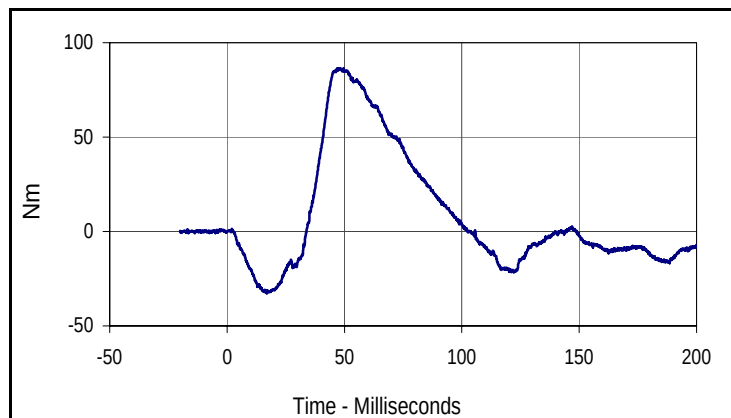
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.02	Pass
Pendulum Deceleration	10 Msec.	m/s	2.1 to 2.5	2.1	Pass
	20 Msec.	m/s	4.0 to 5.0	4.4	Pass
	30 Msec.	m/s	5.8 to 7.0	6.3	Pass
"D" Plane Rotation	Max	Degrees	77.0 to 91.0	79.5	Pass
Peak Moment in Rotation	Max	Nm	69.0 to 83.0	73.6	Pass
Positive Moment Decay, Time To 10 Nm		Msec.	80.0 to 100.0	94.9	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
7.6	200.0	0.0	-1.8



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
79.5	66.8	-38.0	200.0



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
86.4	48.0	-32.8	16.9

Test Program: Hybrid III 5th Percentile Female Neck Extension Test

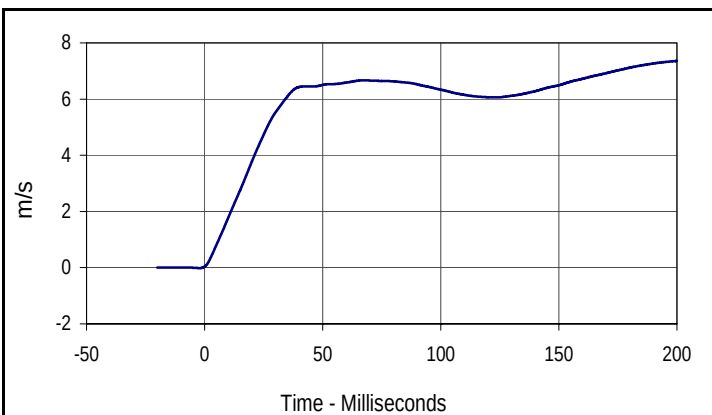
Test Date: 9/2/10



ATD Serial No.: 635

Test I.D.: NE09A

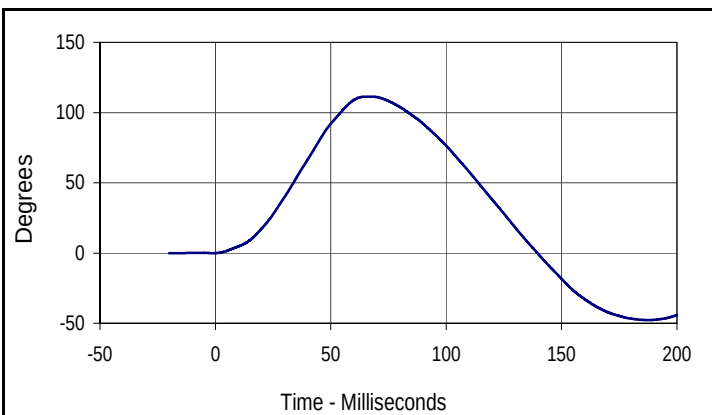
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.11	Pass
Pendulum Deceleration	10 Msec.	m/s	1.5 to 1.9	1.8	Pass
	20 Msec.	m/s	3.1 to 3.9	3.8	Pass
	30 Msec.	m/s	4.6 to 5.6	5.5	Pass
"D" Plane Rotation	Max	Degrees	99.0 to 114.0	111.4	Pass
Peak Moment in Rotation	Max	Nm	-53.0 to -65.0	-62.3	Pass
Positive Moment Decay, Time To -10 Nm		Msec.	94.0 to 114.0	97.2	Pass
			Overall Test Results		Pass



Curve Description

Pendulum Velocity

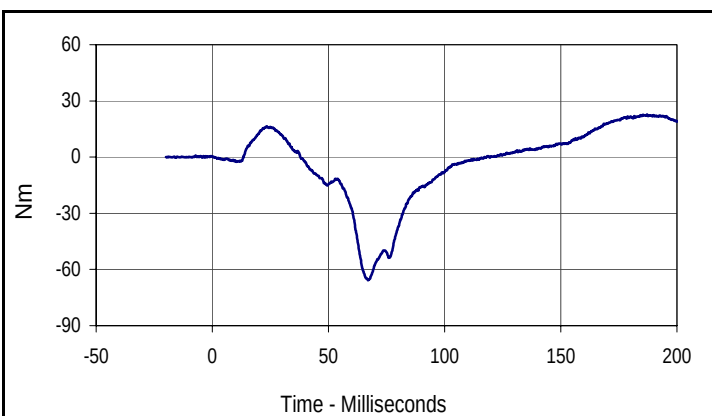
CURNO	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
7.4	200.0	0.0	-2.1



Curve Description

"D" Plane Rotation

CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
111.4	65.3	-47.7	187.8



Curve Description

Moment About Occipital Condyle

CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
22.8	187.1	-65.7	67.1

Test Program: Hybrid III 5th Percentile Female Knee Impact Test

Test Date: 9/2/10

ATD Serial No.: 635

Test I.D.: LKF09A , RKB09A

**Left Knee**

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force	Newtons	3450 to 4060	3686	Pass
Overall Test Results				Pass

Right Knee

Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force	Newtons	3450 to 4060	3769	Pass
Overall Test Results				Pass

**Curve Description****Left Knee Probe Force**

CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
3686.1	4.3	4.1	-0.4

**Curve Description****Right Knee Probe Force**

CURNO	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
3769.2	4.3	-2.2	-0.4

Test Program: Hybrid III 5th Percentile Female Torso Flexion Test

Test Date: 9/2/10

ATD Serial No.: 635

Test I.D.: TF09A



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Initial reference plane angle	Degrees	≤20.0	0.5	Pass
Peak Force at 45 +/-0.5 degrees	Newtons	320.0 to 390.0	335.0	Pass
Torso rotation rate	deg/sec	0.5 to 1.5	1.5	Pass
Final reference plane angle	Degrees	+/-8	3.4	Pass
Overall Test Results				Pass

Test Program: Hybrid III 5th Percentile Female External Measurements

Test Date: 9/2/10

ATD Serial No.: 635

Test I.D.: N/A



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory relative humidity	%	10 to 70	30	Pass
A - Total sitting height	mm	774.7 to 800.1	780	Pass
B - Shoulder pivot height	mm	431.8 to 457.2	445	Pass
C - "H" point height (Reference)	mm	81.3 to 86.3	85	Pass
D - "H" point from seat back (Ref.)	mm	144.8 to 149.8	147	Pass
E - Shoulder pivot from backline	mm	68.6 to 83.8	80	Pass
F - Thigh clearance	mm	119.4 to 134.6	130	Pass
G - Back of elbow to wrist pivot	mm	243.9 to 259.1	254	Pass
H - Head to back line	mm	40.7 to 45.7	45	Pass
I - Shoulder to elbow length	mm	276.8 to 297.2	287	Pass
J - Elbow rest height	mm	182.8 to 203.2	200	Pass
K - Buttock to knee length	mm	520.7 to 546.1	535	Pass
L - Popliteal height	mm	355.6 to 376.0	365	Pass
M - Knee pivot height	mm	393.7 to 419.1	417	Pass
N - Buttock popliteal length	mm	414.0 to 439.4	420	Pass
O - Chest depth without jacket	mm	175.3 to 190.5	186	Pass
P - Foot length	mm	218.5 to 233.7	225	Pass
R - Buttock to knee pivot length	mm	457.2 to 482.6	465	Pass
S - Head breadth	mm	137.1 to 147.3	145	Pass
T - Head depth	mm	177.8 to 188.0	180	Pass
U - Hip breadth	mm	299.7 to 314.9	312	Pass
V - Shoulder breadth	mm	350.5 to 365.7	365	Pass
W - Foot breadth	mm	78.8 to 94.0	89	Pass
X - Head circumference	mm	528.3 to 548.7	540	Pass
Y - Chest circumference with jacket	mm	850.8 to 881.3	860	Pass
Z - Waist circumference	mm	759.5 to 789.9	785	Pass
AA - Location for chest circumference	mm	299.7 to 309.9	300	Pass
BB - Location for waist circumference	mm	160.1 to 170.2	165	Pass
Overall Test Results				Pass

Test Program: Dummy Damage Checklist
 ATD Serial No.: 035

Test Date: 9/4/10
 Test I.D.: N/A



GENERAL	DAMAGED	OK
Outer skin on entire dummy		X
Head ballast secure		X
Gashes, rips, general appearance, etc.		X
Neck-Broken or cracks in rubber		X
Check that upper neck bracket is firmly attached to lwr neck bracket		X
Three rubber bumpers in place		X
Spine- Broken or cracks in rubber		X
Check for looseness at the condyle joint		X
Nodding blocks- cracked or out of position		X
Ribs- Check all ribs and rib supports for damage (bent or broken)		X
Check damping material or separation or cracks		X
OTHER		
CHEST DISPLACEMENT ASSEMBLY		
Bent shaft		X
Slider arm riding correctly, in track		X
TRANSDUCER LEADS		
Torn cables		X
ACCELEROMETER MOUNTINGS		
Check for secure mounting		X
KNEES		
Check outer skin, insert and casting (without removing insert)		X
Knee sliders - Wires intact		X
Knee sliders- Rubber returned to "at rest position"		X
LIMBS		
Check for normal movement and adjustment		X
PELVIS		
Inspect for breakage, especially at iliac crest		X

Comments on repair or replacement parts:

Test Program: Dummy Damage Checklist
 ATD Serial No.: 635

Test Date: 9/2/10
 Test I.D.: N/A



GENERAL	DAMAGED	OK
Outer skin on entire dummy		X
Head ballast secure		X
Gashes, rips, general appearance, etc.		X
Neck-Broken or cracks in rubber		X
Check that upper neck bracket is firmly attached to lwr neck bracket		X
Three rubber bumpers in place		X
Spine- Broken or cracks in rubber		X
Check for looseness at the condyle joint		X
Nodding blocks- cracked or out of position		X
Ribs- Check all ribs and rib supports for damage (bent or broken)		X
Check damping material or separation or cracks		X
OTHER		
CHEST DISPLACEMENT ASSEMBLY		
Bent shaft		X
Slider arm riding correctly, in track		X
TRANSDUCER LEADS		
Torn cables		X
ACCELEROMETER MOUNTINGS		
Check for secure mounting		X
KNEES		
Check outer skin, insert and casting (without removing insert)		X
Knee sliders - Wires intact		X
Knee sliders- Rubber returned to "at rest position"		X
LIMBS		
Check for normal movement and adjustment		X
PELVIS		
Inspect for breakage, especially at iliac crest		X

Comments on repair or replacement parts:

APPENDIX C
POST-TEST / HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program: Hybrid III 50th Percentile Male Head Drop Test

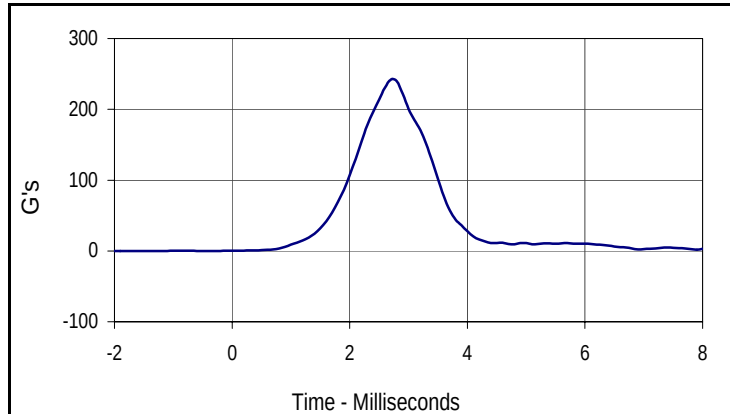
Test Date: 9/11/10

ATD Serial No.: 035

Test I.D.: HDM09B



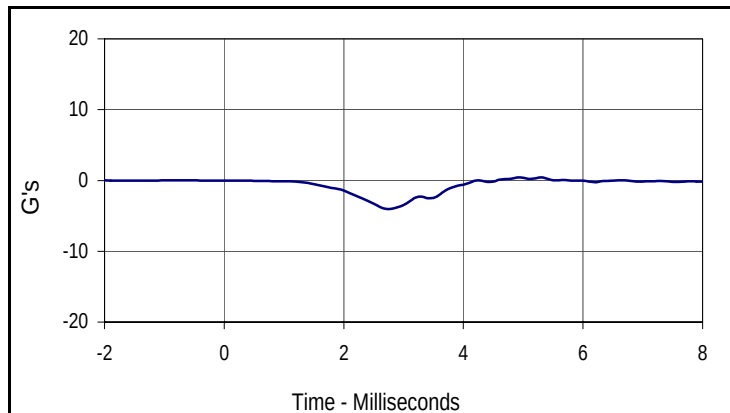
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	242.2	Pass
Peak Lateral Acceleration	G's	≤15.0	4.0	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass



Curve Description

Head Resultant

CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
242.2	2.7	0.0	-1.6



Curve Description

Head Y

CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.4	5.3	-4.0	2.7

Test Program: Hybrid III 50th Percentile Male Thorax Impact Test

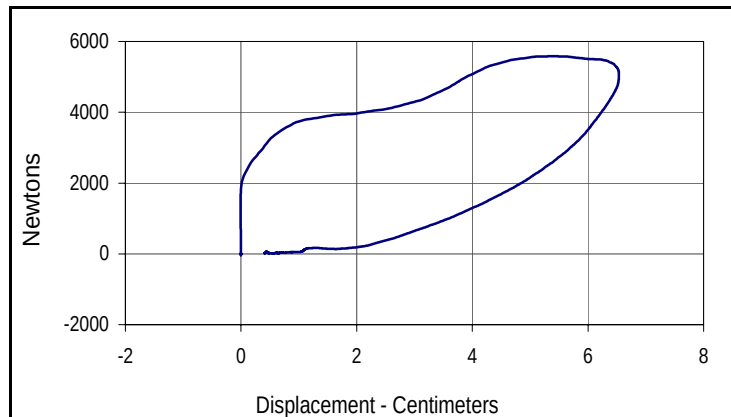
Test Date: 9/11/10

ATD Serial No.: 035

Test I.D.: CHM09B



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	6.58 to 6.82	6.64	Pass
Peak Probe Force	Newtons	5159 to 5893	5585	Pass
Peak Sternum Deflection	CM	6.35 to 7.26	6.53	Pass
Internal Hysteresis	%	69 to 85	72.4	Pass
Overall Test Results			Pass	



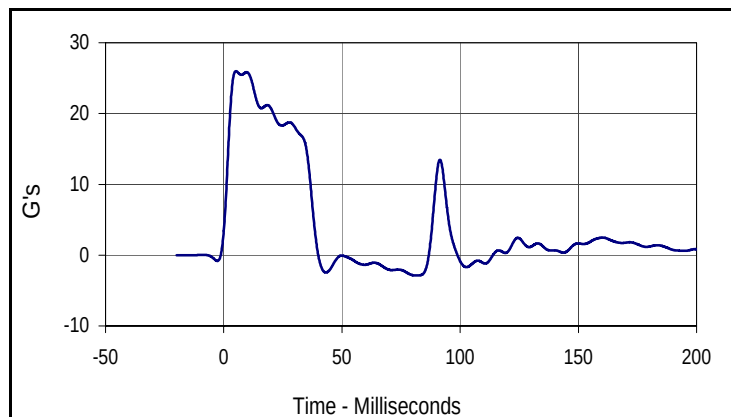
Curve Description			
Probe Force vs. Chest Deflection			
CURNO	Type	SAE Class	Hysteresis
001	FIL	180	72.4
Peak Probe Force		Peak Chest Deflection	
5585		6.53	

Test Program: Hybrid III 50th Percentile Male Neck Flexion Test
 ATD Serial No.: 035

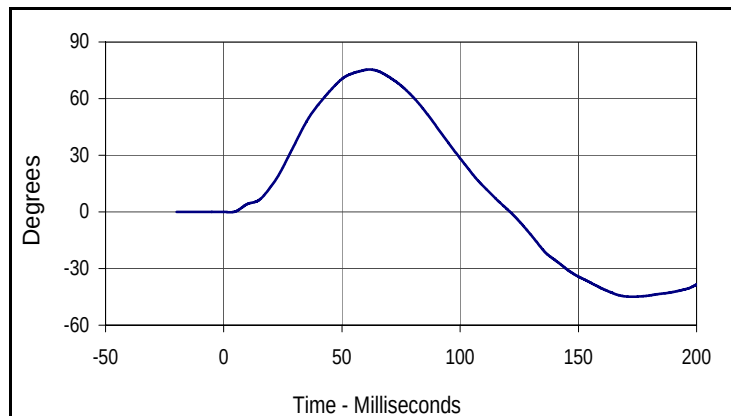
Test Date: 9/11/10
 Test I.D.: NFM09B



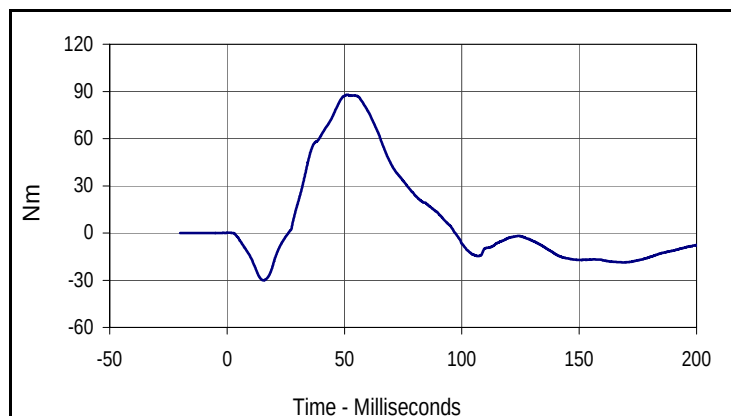
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.02	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	25.8	Pass
	20 Msec.	G's	17.6 to 22.6	20.7	Pass
	30 Msec.	G's	12.5 to 18.5	18.1	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 29.0	18.1	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	38.1	Pass
Maximum "D" Plane Rotation	Max	Degrees	64.0 to 78.0	75.4	Pass
	Time	Msec.	57.0 to 64.0	61.6	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	113.0 to 128.0	121.2	Pass
Moment About Occ. Condyle	Max	Nm	84.1 to 108.5	87.9	Pass
	Time	Msec.	47.0 to 58.0	51.1	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	97.2	Pass
Overall Test Results					Pass



Curve Description			
Pendulum Deceleration			
CURNO	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
26.0	5.2	-2.9	81.6



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
75.4	61.6	-44.9	172.9



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
87.9	51.1	-30.1	15.7

Test Program: Hybrid III 50th Percentile Male Neck Extension Test

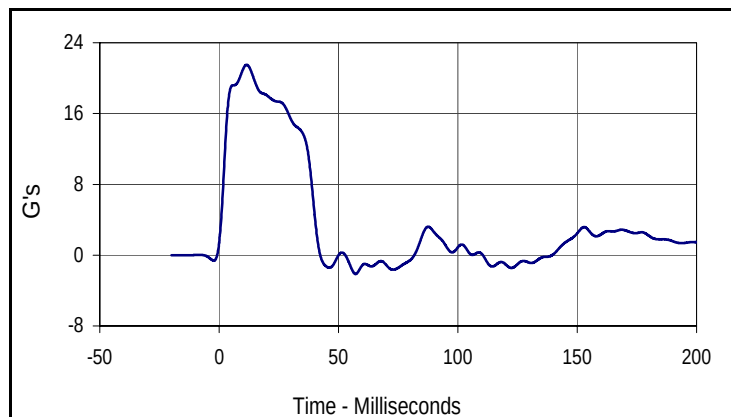
Test Date: 9/11/10

ATD Serial No.: 035

Test I.D.: NEM09B



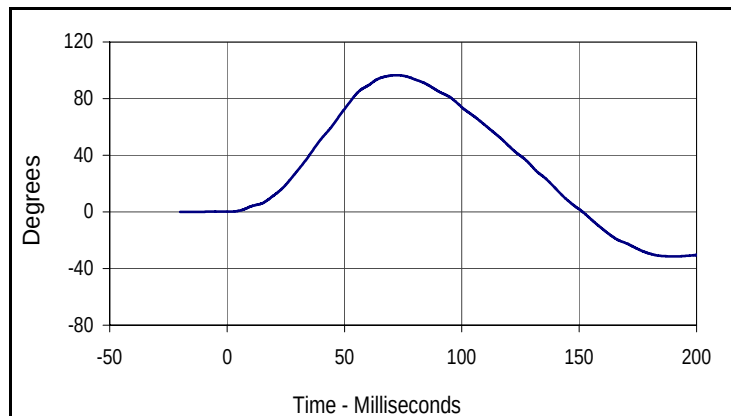
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.94 to 6.19	6.15	Pass
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	21.0	Pass
	20 Msec.	G's	14.0 to 19.0	18.1	Pass
	30 Msec.	G's	11.0 to 16.0	15.4	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 22.0	15.4	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	39.9	Pass
Maximum "D" Plane Rotation	Max	Degrees	81.0 to 106.0	96.6	Pass
	Time	Msec.	72.0 to 82.0	72.1	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	147.0 to 174.0	151.6	Pass
Moment About Occ. Condyle	Max	Nm	-52.9 to- 79.9	-73.0	Pass
	Time	Msec.	65.0 to 79.0	68.2	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	135.0	Pass
Overall Test Results					Pass



Curve Description

Pendulum Deceleration

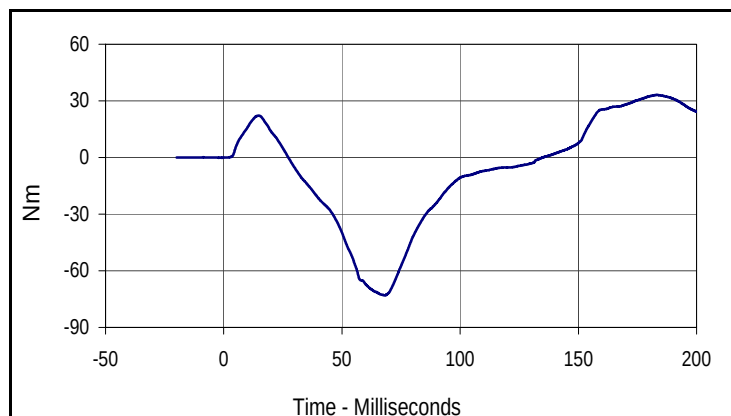
CURNO	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
21.5	11.5	-2.1	57.2



Curve Description

"D" Plane Rotation

CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
96.6	72.1	-31.5	190.4



Curve Description

Moment About Occipital Condyle

CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
33.2	183.3	-73.0	68.2

Test Program: Hybrid III 50th Percentile Male Knee Impact Test

Test Date: 9/11/10

ATD Serial No.: 035

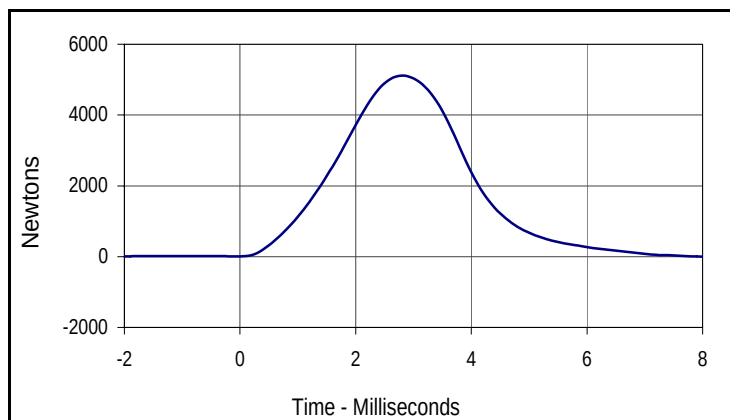
Test I.D.: LKM09A , RKM09A

**Left Knee**

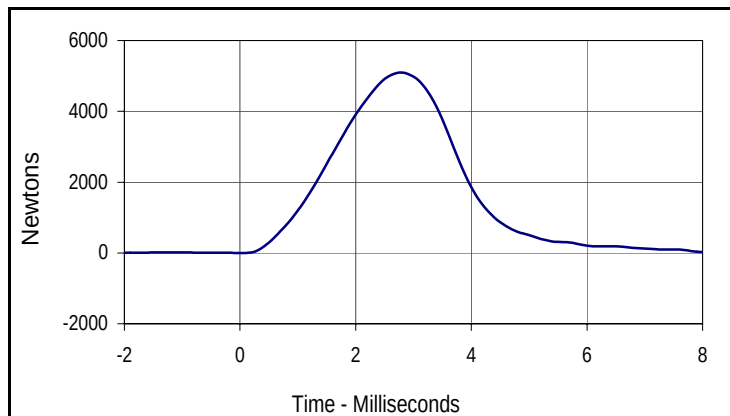
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.13	Pass
Peak Probe Force	Newtons	4715 to 5782	5115	Pass
Overall Test Results				Pass

Right Knee

Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.12	Pass
Peak Probe Force	Newtons	4715 to 5782	5093	Pass
Overall Test Results				Pass

**Curve Description****Left Knee Probe Force**

CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
5115.5	2.8	-13.4	8.7

**Curve Description****Right Knee Probe Force**

CURNO	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
5092.5	2.8	-44.5	10.0

Test Program: Hybrid III 50th Percentile Male External Measurements

Test Date: 9/11/10

ATD Serial No.: 035

Test I.D.: N/A



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
A - Total sitting height	mm	879 to 889	881	Pass
B - Shoulder pivot height	mm	505 to 521	518	Pass
C - "H" point height	mm	84 to 89	84	Pass
D - "H" point from seat back	mm	135 to 140	138	Pass
E - Shoulder pivot from back	mm	84 to 94	84	Pass
F - Thigh clearance	mm	140 to 155	148	Pass
G - Elbow back to wrist pivot	mm	290 to 305	298	Pass
H - Skull cap to back line	mm	41 to 46	43	Pass
I - Shoulder to elbow length	mm	330 to 345	334	Pass
J - Elbow rest height	mm	190 to 211	206	Pass
K - Buttock to knee length	mm	579 to 604	588	Pass
L - Popliteal length	mm	429 to 455	431	Pass
M - Knee pivot height	mm	485 to 500	486	Pass
N - Buttock popliteal length	mm	452 to 477	469	Pass
O - Chest depth	mm	213 to 229	214	Pass
P - Foot length	mm	251 to 267	259	Pass
V - Shoulder breadth	mm	422 to 437	431	Pass
W - Foot breadth	mm	91 to 107	99	Pass
Y - Chest circumference	mm	970 to 1001	986	Pass
Z - Waist circumference	mm	836 to 866	862	Pass
AA - Location for chest circumference	mm	429 to 434	431	Pass
BB - Location for waist circumference	mm	226 to 231	230	Pass
Overall Test Results				Pass

Test Program: Hybrid III 5th Percentile Female Head Drop TestTest Date: 9/11/10ATD Serial No.: 635Test I.D.: HDF09C

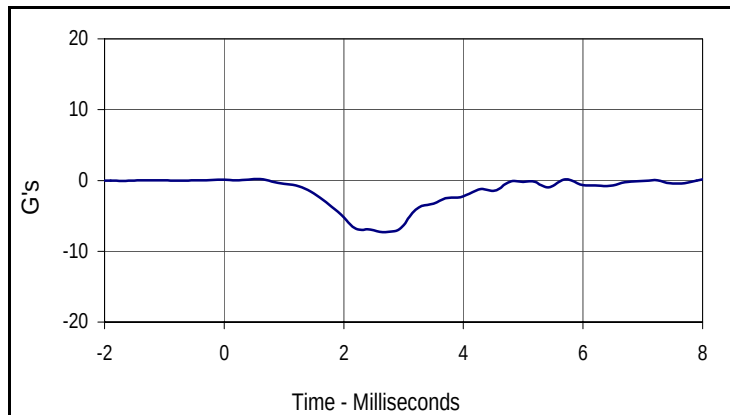
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	250.0 to 300.0	278.7	Pass
Peak Lateral Acceleration	G's	≤15.0	7.3	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass



Curve Description

Head Resultant

CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
278.7	2.5	0.0	-2.0



Curve Description

Head Y

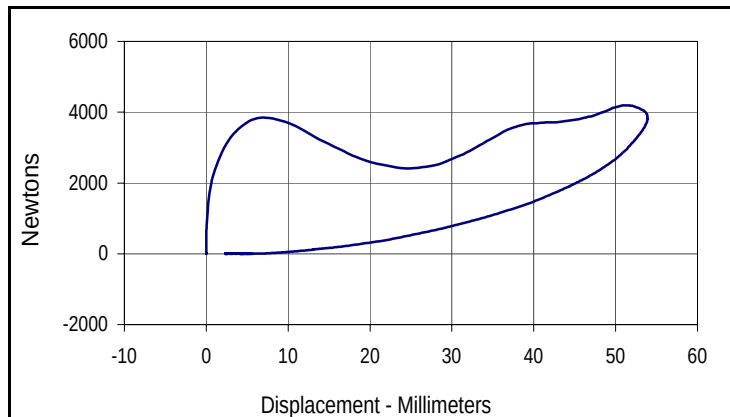
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.2	0.5	-7.3	2.7

Test Program: Hybrid III 5th Percentile Female Thorax Impact Test
 ATD Serial No.: 635

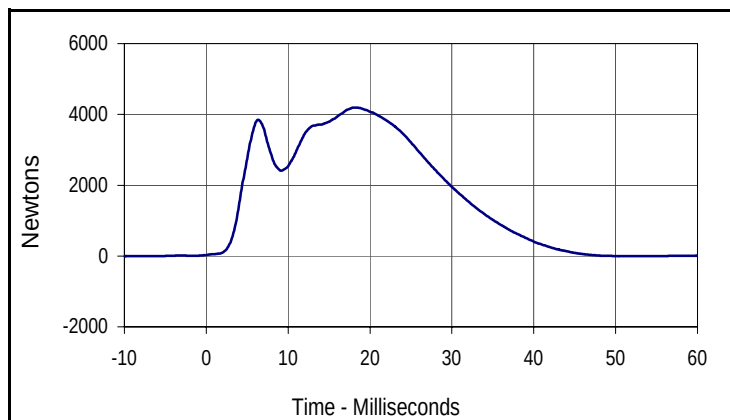
Test Date: 9/11/10
 Test I.D.: CHF09D



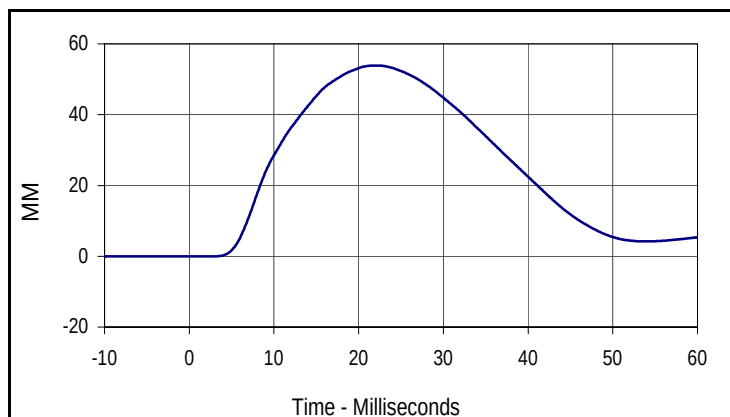
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	6.59 to 6.83	6.71	Pass
Peak Chest Deflection	MM	50.0 to 58.0	53.9	Pass
Peak Force Between 50 and 58 MM	Newtons	3900 to 4400	4149	Pass
Peak Force Between 18 and 50 MM	Newtons	≤4600	4196	Pass
Internal Hysteresis	%	69 to 85	71.4	Pass
Overall Test Results			Pass	



Curve Description			
Probe Force vs. Chest Deflection			
CURNO	Type	SAE Class	Hysteresis
003	FIL	180	71.4
Peak Probe Force		Peak Chest Displ.	
4195.7		53.9	



Curve Description			
Probe Force			
CURNO	Type	SAE Class	Units
002	FIL	180	Newtons
Max	Time	Min	Time
4195.7	18.0	-6.0	144.8



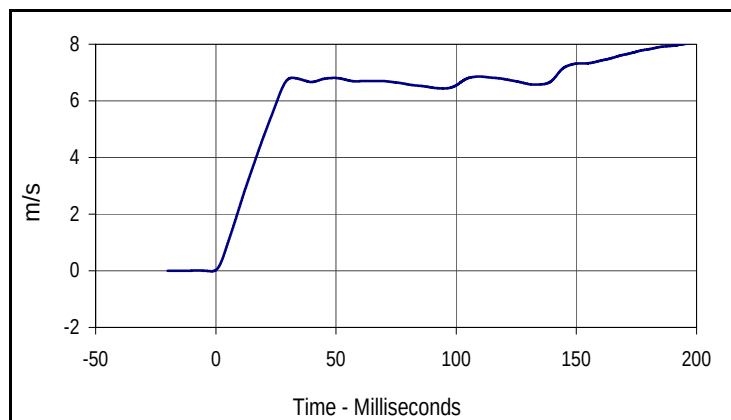
Curve Description			
Chest Deflection			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
53.9	22.0	0.0	2.7

Test Program: Hybrid III 5th Percentile Female Neck Flexion Test
 ATD Serial No.: 635

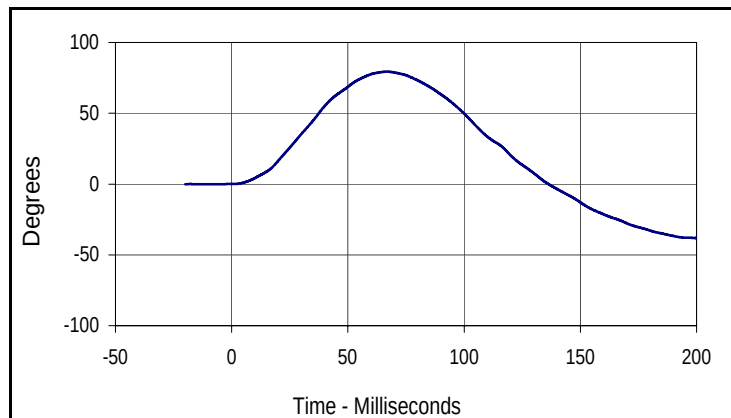
Test Date: 9/11/10
 Test I.D.: NF09C



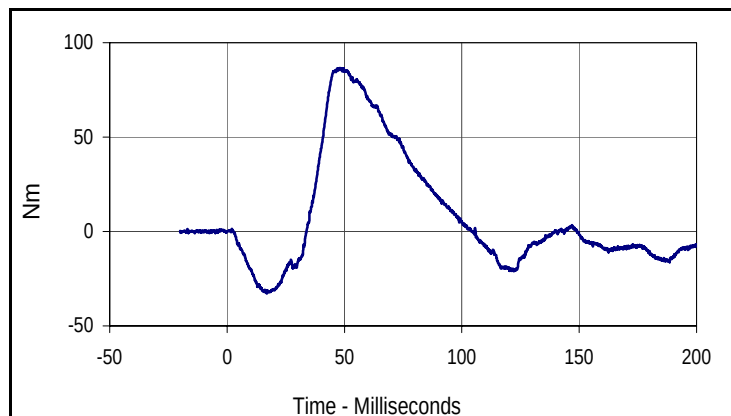
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.98	Pass
Pendulum Deceleration	10 Msec.	m/s	2.1 to 2.5	2.3	Pass
	20 Msec.	m/s	4.0 to 5.0	4.8	Pass
	30 Msec.	m/s	5.8 to 7.0	6.8	Pass
"D" Plane Rotation	Max	Degrees	77.0 to 91.0	79.4	Pass
Peak Moment in Rotation	Max	Nm	69.0 to 83.0	73.1	Pass
Positive Moment Decay, Time To 10 Nm		Msec.	80.0 to 100.0	95.9	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
8.1	200.0	0.0	-1.8



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
79.4	66.8	-38.0	200.0



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
86.5	48.0	-32.9	16.9

Test Program: Hybrid III 5th Percentile Female Neck Extension Test

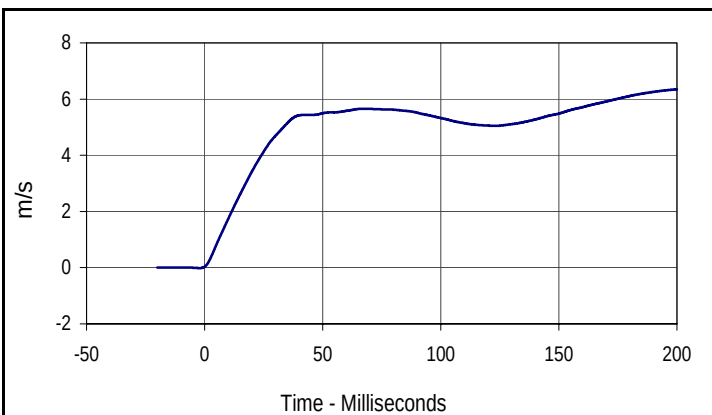
Test Date: 9/11/10



ATD Serial No.: 635

Test I.D.: NE09C

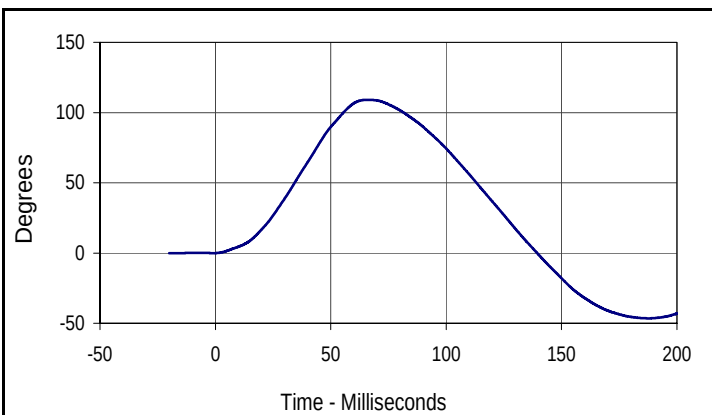
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.08	Pass
Pendulum Deceleration	10 Msec.	m/s	1.5 to 1.9	1.7	Pass
	20 Msec.	m/s	3.1 to 3.9	3.4	Pass
	30 Msec.	m/s	4.6 to 5.6	4.7	Pass
"D" Plane Rotation	Max	Degrees	99.0 to 114.0	109.0	Pass
Peak Moment in Rotation	Max	Nm	-53.0 to -65.0	-58.3	Pass
Positive Moment Decay, Time To -10 Nm		Msec.	94.0 to 114.0	96.2	Pass
			Overall Test Results		Pass



Curve Description

Pendulum Velocity

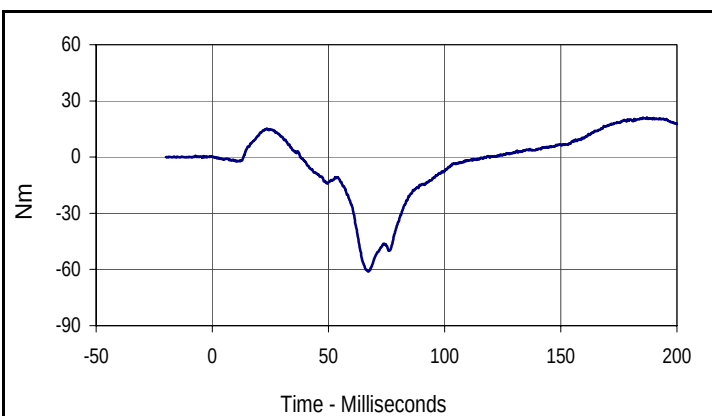
CURNO	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
6.3	200.0	0.0	-2.1



Curve Description

"D" Plane Rotation

CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
109.0	65.4	-46.5	187.9



Curve Description

Moment About Occipital Condyle

CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
21.2	187.1	-61.1	67.1

Test Program: Hybrid III 5th Percentile Female Knee Impact Test
 ATD Serial No.: 635

Test Date: 9/11/10
 Test I.D.: LKF09C , RKB09C



Left Knee

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.10	Pass
Peak Probe Force	Newtons	3450 to 4060	3797	Pass
Overall Test Results				Pass

Right Knee

Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.11	Pass
Peak Probe Force	Newtons	3450 to 4060	3845	Pass
Overall Test Results				Pass



Curve Description			
Left Knee Probe Force			
CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
3796.8	4.3	4.2	-0.4



Curve Description			
Right Knee Probe Force			
CURNO	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
3844.6	4.3	-2.4	-0.4

Test Program: Hybrid III 5th Percentile Female Torso Flexion Test

Test Date: 9/11/10

ATD Serial No.: 635

Test I.D.: TF09A



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Initial reference plane angle	Degrees	≤20.0	0.7	Pass
Peak Force at 45 +/-0.5 degrees	Newtons	320.0 to 390.0	340.0	Pass
Torso rotation rate	deg/sec	0.5 to 1.5	1.3	Pass
Final reference plane angle	Degrees	+/-8	2.9	Pass
Overall Test Results				Pass

Test Program: Dummy Damage Checklist
 ATD Serial No.: 035

Test Date: 9/11/10
 Test I.D.: N/A



GENERAL	DAMAGED	OK
Outer skin on entire dummy		X
Head ballast secure		X
Gashes, rips, general appearance, etc.		X
Neck-Broken or cracks in rubber		X
Check that upper neck bracket is firmly attached to lwr neck bracket		X
Three rubber bumpers in place		X
Spine- Broken or cracks in rubber		X
Check for looseness at the condyle joint		X
Nodding blocks- cracked or out of position		X
Ribs- Check all ribs and rib supports for damage (bent or broken)		X
Check damping material or separation or cracks		X
OTHER		
CHEST DISPLACEMENT ASSEMBLY		
Bent shaft		X
Slider arm riding correctly, in track		X
TRANSDUCER LEADS		
Torn cables		X
ACCELEROMETER MOUNTINGS		
Check for secure mounting		X
KNEES		
Check outer skin, insert and casting (without removing insert)		X
Knee sliders - Wires intact		X
Knee sliders- Rubber returned to "at rest position"		X
LIMBS		
Check for normal movement and adjustment		X
PELVIS		
Inspect for breakage, especially at iliac crest		X

Comments on repair or replacement parts:

Test Program: Dummy Damage Checklist
 ATD Serial No.: 635

Test Date: 9/11/10
 Test I.D.: N/A



GENERAL	DAMAGED	OK
Outer skin on entire dummy		X
Head ballast secure		X
Gashes, rips, general appearance, etc.		X
Neck-Broken or cracks in rubber		X
Check that upper neck bracket is firmly attached to lwr neck bracket		X
Three rubber bumpers in place		X
Spine- Broken or cracks in rubber		X
Check for looseness at the condyle joint		X
Nodding blocks- cracked or out of position		X
Ribs- Check all ribs and rib supports for damage (bent or broken)		X
Check damping material or separation or cracks		X
OTHER		
CHEST DISPLACEMENT ASSEMBLY		
Bent shaft		X
Slider arm riding correctly, in track		X
TRANSDUCER LEADS		
Torn cables		X
ACCELEROMETER MOUNTINGS		
Check for secure mounting		X
KNEES		
Check outer skin, insert and casting (without removing insert)		X
Knee sliders - Wires intact		X
Knee sliders- Rubber returned to "at rest position"		X
LIMBS		
Check for normal movement and adjustment		X
PELVIS		
Inspect for breakage, especially at iliac crest		X

Comments on repair or replacement parts:
