

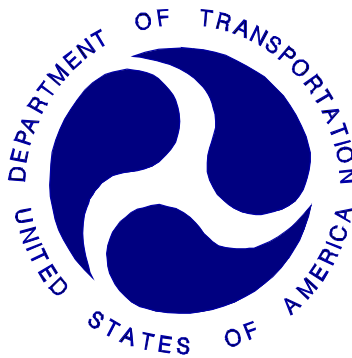
REPORT NUMBER: NCAP-CAL-12-013

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

**AUTO ALLIANCE INTERNATIONAL, INC
2012 Mazda Mazda6 Sport
Four Door Sedan**

NHTSA No: MC5400

**CALSPAN CORPORATION
TRANSPORTATION SCIENCES CENTER
P.O. BOX 400
BUFFALO, NEW YORK 14225**



January 24, 2012

FINAL REPORT

PREPARED FOR:

**U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Rulemaking
Office of Crashworthiness Standards
1200 New Jersey Ave SE, Room W43-410
Washington, DC 20590**

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Prepared by: _____ Date: _____
Vanessa Walsh, Project Engineer

Approved by: _____ Date: _____
David Travale, Technical Director,
Transportation Operations

FINAL REPORT ACCEPTANCE BY OCWS:

Division Chief, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards
Date: _____

COTR, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards
Date: _____

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7. Author(s) David J. Travale, Technical Director Vanessa Walsh, Project Engineer		8. Performing Organization Report No. CAL-DOT-2012-013																																																							
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15. Supplementary Notes																																																									
16. Abstract A 56.3 km/h NCAP Frontal Impact Test was conducted on a 2012 Mazda Mazda6 Sport four 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 Calspan Corporation's crash test facility in Buffalo, New York on 11/30/2011. The impact velocity of the vehicle was 56.44 km/h, and the ambient temperature at the barrier face at the time of impact was 2°C. The target vehicle post-test maximum crush was 454 mm of Vehicle. 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">Pass. ATD</th> </tr> <tr> <th>Threshold</th> <th>Result</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₁₅)</td> <td>N/A</td> <td>700</td> <td>207.53</td> <td>700</td> <td>217.34</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>-23.30</td> <td>52</td> <td>-28.90</td> </tr> <tr> <td>Nij</td> <td>N/A</td> <td>1</td> <td>0.38</td> <td>1</td> <td>0.46</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>4,170</td> <td>1,593.89</td> <td>2,620</td> <td>1,120.78</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>4,000</td> <td>-671.23</td> <td>2,520</td> <td>-427.45</td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>10,008</td> <td>-1,227.80</td> <td>6,805</td> <td>-2,966.65</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>10,008</td> <td>-4062.48</td> <td>6,805</td> <td>-2939.55</td> </tr> </tbody> </table>						Measurement Description	Units	Driver ATD		Pass. ATD		Threshold	Result	Threshold	Result	Head Injury Criteria (HIC ₁₅)	N/A	700	207.53	700	217.34	Maximum Chest Compression	mm	63	-23.30	52	-28.90	Nij	N/A	1	0.38	1	0.46	Neck Tension	N	4,170	1,593.89	2,620	1,120.78	Neck Compression	N	4,000	-671.23	2,520	-427.45	Left Femur Force	N	10,008	-1,227.80	6,805	-2,966.65	Right Femur Force	N	10,008	-4062.48	6,805	-2939.55
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SECTION 1

PURPOSE AND SUMMARY OF TEST

1.1 PURPOSE

This 56.3 kph frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-06-D-00024. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for consumer information purposes.

The 56.3 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standard Frontal NCAP Laboratory Test procedure.

1.2 TEST PROCEDURE

A load cell barrier consisting of 36 load cells was impacted by a 2012 Mazda Mazda6 Sport four door sedan at a velocity of 56.44 kph. The test was performed at Calspan on 11/30/2011. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

One real-time camera and 14 high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in this report.

One Part 572E, 50th percentile male anthropomorphic test device (ATDs), was placed in the driver seating position and one Part 572O 5th percentile female ATD was placed in the right-front passenger 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 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 dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 064) and the right-front passenger (position 2) ATD (Serial No. 273) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C of this report.

The 129 channels of data were recorded on an on-board data acquisition system. Appendix B contains the dummy response data traces.

There was 100 percent 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 vehicle was 454 mm and 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: Face and Upper Torso with Frontal airbag with the back of head with the head restraint; both knees contacted the lower dash panel.

The passenger's visible contact points were as follows: Face and Upper Torso with Frontal airbag with the back of head with the head restraint; both knees contacted the lower glovebox door.

The occupant data is summarized below.

ATD Position	HIC ₁₅	Nij	Neck Tension (N)	Neck Compression (N)	3ms Chest Clip (Gs)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver (50th)	207.53	0.38	1,593.89	-671.23	40.25	-23.30	-1,227.80	-4,062.48
Passenger (5 th)	217.34	0.47	1,120.78	-427.45	39.39	-28.904	-2,966.65	-2,939.55

DATA ANOMALIES:

- V1P1 Left Lower Tibia My is questionable data after 26ms
- V1P2 Right Upper Tibia Mx is questionable after 28 ms
- V1 Left Front Brake Caliper is questionable after 48 ms
- V1 Right Front Brake Caliper is questionable after 39 ms

**SECTION 2
DATA SHEETS**

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

Test Vehicle: 2012 Mazda Mazda6 Sport Four Door Sedan NHTSA No: MC5400
 Test Program: NCAP Frontal Barrier Impact Test Test Date 11/30/2011

NHTSA No.	MC5400
Model Year	2012
Make	Mazda
Model	Mazda6 Sport
Body Style	Four Door Sedan
VIN	1YVHZ8BH3C5M03563
Body Color	Light gray/silver
Odometer Reading (km/mi)	24.1/15
Engine Displacement. (L)	2.5
Type/No. Cylinders	I4
Engine Placement	Lateral
Transmission Type	Automatic
Transmission Speeds	5-Speed
Overdrive	Yes
Final Drive	Front Wheel Drive
Roof Rack	No
Sunroof/T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes
All-Wheel Drive (AWD)	No
Traction Control System (TCS)	Yes

Auto-Leveling System	No
Automatic Door Locks (ADL)	Yes
Power Window Auto-Reverse	Yes
Other Optional Feature	--
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
Driver Seat Belt Pretensioner	Yes
Pass. Seat Belt Pretensioner	Yes
Driver Load Limiter	Yes
Pass. Load Limiter	Yes
Other Safety Restraint	No

Does owner's manual provide instructions to turn off automatic door locks?

No

DATA FROM CERTIFICATION LABEL

Manufactured By	Auto Alliance International, Inc
Date of Manufacture	8/11

GVWR (kg)	1,996
GAWR Front (kg)	1,066
GAWR Rear (kg)	934

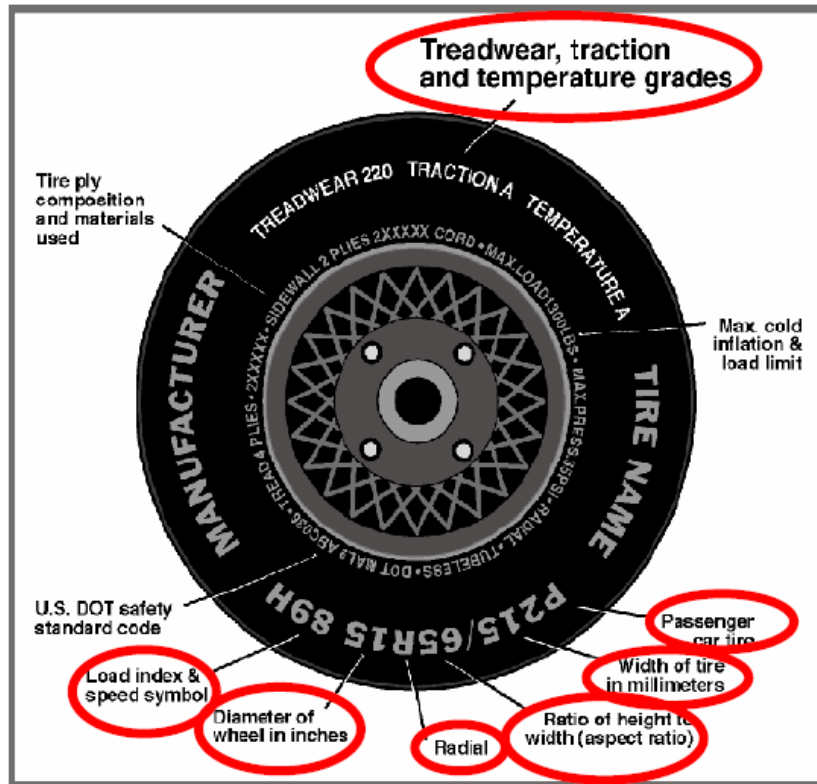
VEHICLE SEATING AND WEIGHT CAPACITY

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench	NA	
Number of Occupants	2	3		5
Capacity Wt. (VCW) (kg)				385.0
Cargo Wt. (RCLW) (kg)				44.8

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

Test Vehicle: 2012 Mazda Mazda6 Sport Four Door Sedan NHTSA No: MC5400
 Test Program: NCAP Frontal Barrier Impact Test Test Date: 11/30/2011

Collect items circled in red, tire manufacturer, and tire name.



Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	220	220
Recommended Tire Size	P205/65R16	P205/65R16
Tire Size on Vehicle	P205/65R16	P205/65R16
Tire Manufacturer	Michelin	Michelin
Tire Model	ENERGY MXV4S8	ENERGY MXV4S8
Treadwear	440	440
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	1 Polyester	1 Polyester
Tire Plies Body	1 Polyester, 1 Polyamide, 2 Steel	1 Polyester, 1 Polyamide, 2 Steel
Load Index/Speed Symbol	94H	94H
Tire Material	Rubber	Rubber
DOT Safety Code Right	B9EV5NXX0511	B9EV5NXX0511
DOT Safety Code Left	B9EV5NXX0511	B9EV5NXX0511

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

Test Vehicle: 2012 Mazda Mazda6 Sport Four Door Sedan NHTSA No: MC5400
 Test Program: NCAP Frontal Barrier Impact Test Test Date 11/30/2011

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	448.5	302		493	358	
Right	kg	446.5	294		460	358	
Ratio	%	60	40		57	43	
Totals	kg	895	596	1,491	953	716	1,669

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1,491.0
Weight of 1 P572E ATD & 1 P572O ATD	kg	140.6
Rated Cargo/Luggage Weight (RCLW)	kg	44.8
Calculated Vehicle Target Weight (TVTW)	kg	1,676.4

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	748	749	759	757	1114
As Tested	mm	751	734	747	732	1196
Post Test	mm	772	785	750	724	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2,787
Total Vehicle Length at Left Side	mm	4,810
Total Vehicle Length at Centerline	mm	4,921
Total Vehicle Length at Right Side	mm	4,815
Weight of Ballast in Cargo Area	kg	0
Weight of Vehicle Components Removed	kg	0
Amount of Stoddard Solvent in Fuel Tank	L	65.1

LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT:

No components were removed to meet the test weight.

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

Test Vehicle: 2012 Mazda Mazda6 Sport Four Door Sedan NHTSA No: MC5400
 Test Program: NCAP Frontal Barrier Impact Test Test Date 11/30/2011

TARGET VEHICLE STRUCTURAL MEASUREMENT

	Elements	Pre-Test (mm)
1	Total Length	4921
2	Total Width	1827
3	Bumper Top Height	521
4	Bumper Bottom Height	438
5	Longitudinal Member Top Height	590
6	Distance Between Longitudinal Members	1232
7	Longitudinal Member Width	152
8	Engine Top Height	814
9	Engine Bottom Height	231
10	Engine and Gearbox Width	536
11	Front Bumper-Engine Distance	487
12	Front Shock Absorber Fixing Height	912
13	Bonnet Leading Edge Height	762
14	Front Shock Absorber Fixing Width	998
15	Front Bumper – Front Axle Distance	994
16	Front Axle – A Pillar Distance	502
17	A-Pillar – B-Pillar Distance	1169
18	B-Pillar – Rear Axle Distance	1119
19	B-Pillar – C-Pillar Distance	997
20	Roof Sill Bottom Height	1404
21	Roof Sill Top Height	1449
22	Floor Sill Bottom Height	272
23	Floor Sill Top Height	389

DATA SHEET NO. 2
SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL

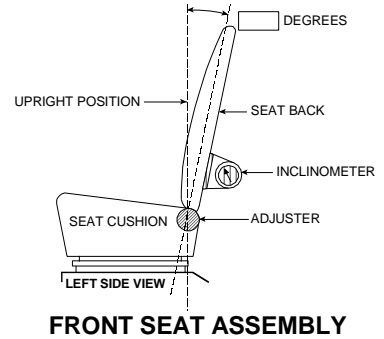
Test Vehicle: 2012 Mazda Mazda6 Sport Four Door Sedan NHTSA No: MC5400
 Test Program: NCAP Frontal Barrier Impact Test Test Date 11/30/2011

NORMAL DESIGN RIDING POSITION

For adjustable driver and passenger seat backs. Please describe how to position the inclinometer to measure the seat back angle. Include description of the location of the adjustment latch detent, if applicable.

Driver seat: The driver seat back was positioned according to the Nominal Design Riding position listed in FORM 1

Passenger Seat: The passenger seat back as positioned to allow for a zero head angle of the passenger SID-IIs dummy



	Deg.
Driver Seat Back Angle	10.3
Passenger Seat Back Angle	7.3

SEAT FORE/AFT POSITIONS

Describe the method used of determining seat fore/aft positions. _____

The driver's seat was positioned at the mid-point of fore/aft travel.

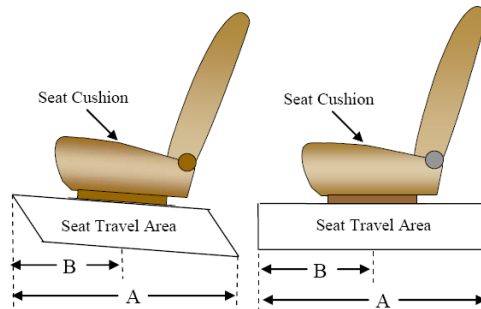
The passenger's seat was positioned at the most forward position of fore/aft travel.

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	264	11
Passenger Seat	240	0

SEAT BELT UPPER ANCHORAGES

Describe the method of positioning seat belt upper anchorages. _____

	Total # of Positions	Placed in Position #
Driver Seat	4	0
Passenger Seat	4	0



DATA SHEET NO. 2 (CONTINUED)
SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

Test Vehicle: 2012 Mazda Mazda6 Sport Four Door Sedan NHTSA No: MC5400
 Test Program: NCAP Frontal Barrier Impact Test Test Date: 11/30/2011

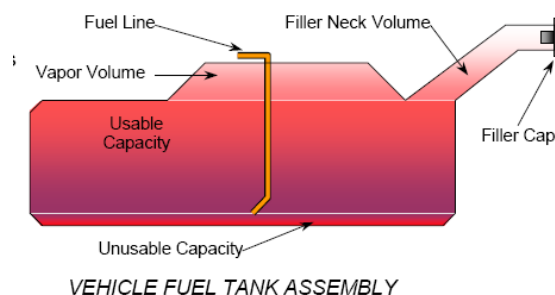
FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	70.0
Usable Capacity of "Optional Tank"	
92%-94% of Usable Capacity	64.4 - 65.8
Actual Amount of Solvent Used	65.1
1/3 of Usable Capacity	23.3

FUEL PUMP

Describe the fuel system - what type of fuel pump, details about how it operates, etc.

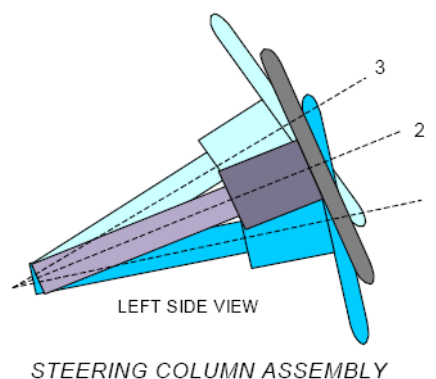
Electric fuel pump operates when in the 'on' position with the engine running. The fuel filler neck is located above the left rear wheel well.



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. Describe how this measurement was taken.

The steering wheel was adjusted to the midpoint of Tilt angle range and the midpoint of the telescoping Travel (if applicable)

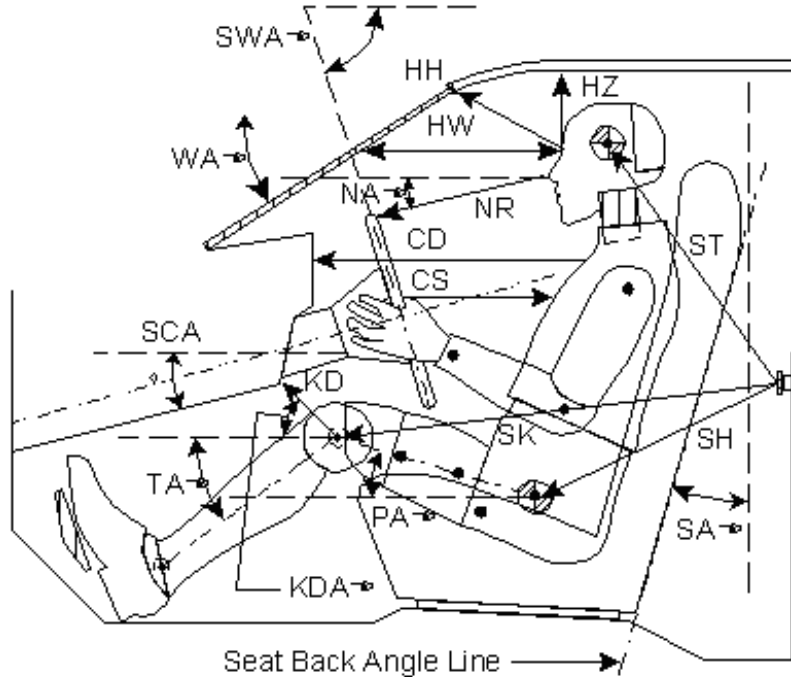


STEERING COLUMN POSITIONS

	Degrees	Fore/Aft Position (mm)
Lowermost position No. 1	70.0	
Geometric center position No. 2	67.3	
Uppermost position No. 3	64.6	
Telescoping Steering Wheel Travel		44
Test Position	67.3	22

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

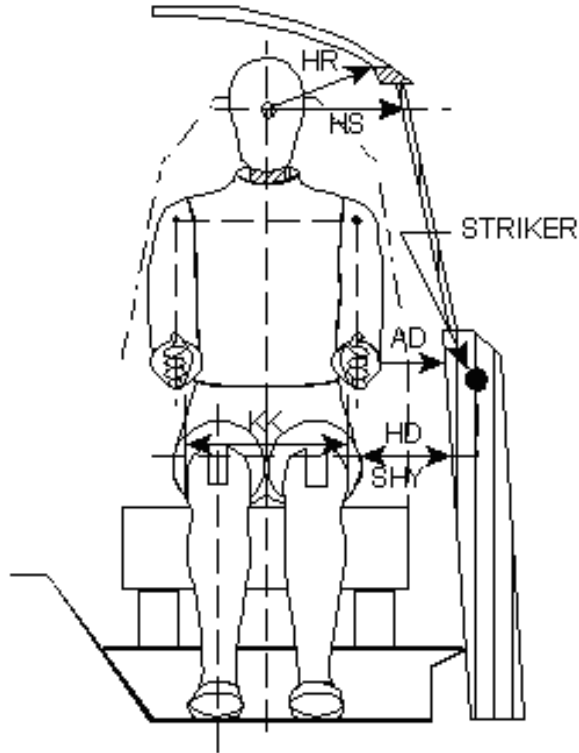
Test Vehicle: 2012 Mazda Mazda6 Sport Four Door Sedan NHTSA No: MC5400
 Test Program: NCAP Frontal Barrier Impact Test Test Date: 11/30/2011



Code	Measurement Description	Driver: 064		Passenger: 273	
		Length (mm)	Angle(°)	Length (mm)	Angle (°)
WA ⁰	Windshield Angle		-24.7		
SWA ⁰	Steering Wheel Angle		67.5		
SCA ⁰	Steering Column Angle		22.5		
SA ⁰	Seat Back Angle (on headrest post)		11.1		3.8
HZ	Head to Roof (Z)	175	90.0	172	
HH	Head to Header	294	35.8	236	62.1
HW	Head to Windshield	667	0.0	528	0.0
NR	Nose to Rim	370	-7.9		
CD	Chest to Dash	505		394	
CS	Chest to Steering Hub	295	-2.0		
RA	Rim to Abdomen	188	0.0		
KDL	Left Knee to Dash	163	25.7	84	42.1
KDR	Right Knee to Dash	135	27.8	88	35.8
PA ⁰	Pelvic Angle		24.0		20.1
TA ⁰	Tibia Angle		-27.6		-39.5
SK	Striker to Knee	637	-9.0	745	-8.3
ST	Striker to Head	472	69.9	527	48.2
SH	Striker to H-Point	324	-44.4	474	-26.5

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle:	2012 Mazda Mazda6 Sport Four Door Sedan	NHTSA No:	MC5400
Test Program:	NCAP Frontal Barrier Impact Test	Test Date	11/30/2011

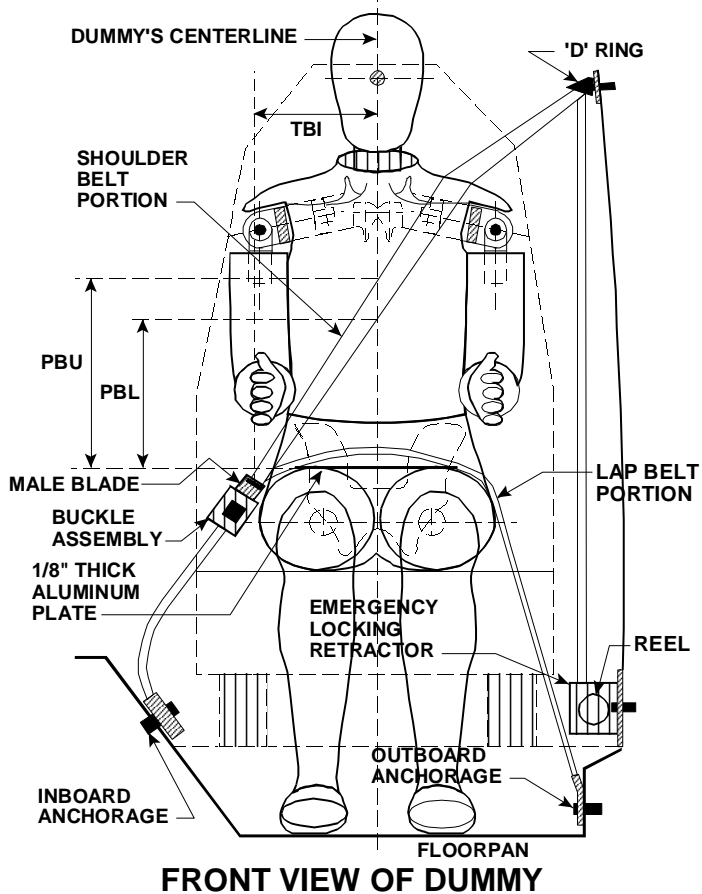


Code	Description	Driver	Passenger
AD	Arm to Door	113	70
HD	H-Point to Door	145	266
HR	Head to Side Header	216	231
HS	Head to Side Window	352	380
KK	Knee to Knee	300	166
SHY	Striker to H-Point (Y Direction)	290	285
AA	Ankle to Ankle	328	172

**DATA SHEET NO. 5
SEAT BELT POSITIONING DATA**

Test Vehicle: 2012 Mazda Mazda6 Sport Four Door Sedan NHTSA No: MC5400
 Test Program: NCAP Frontal Barrier Impact Test Test Date 11/30/2011

SEAT BELT POSITIONING DATA



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU — Top surface of reference to belt upper edge	mm	345	290
PBL — Top surface of reference to belt lower edge	mm	275	210

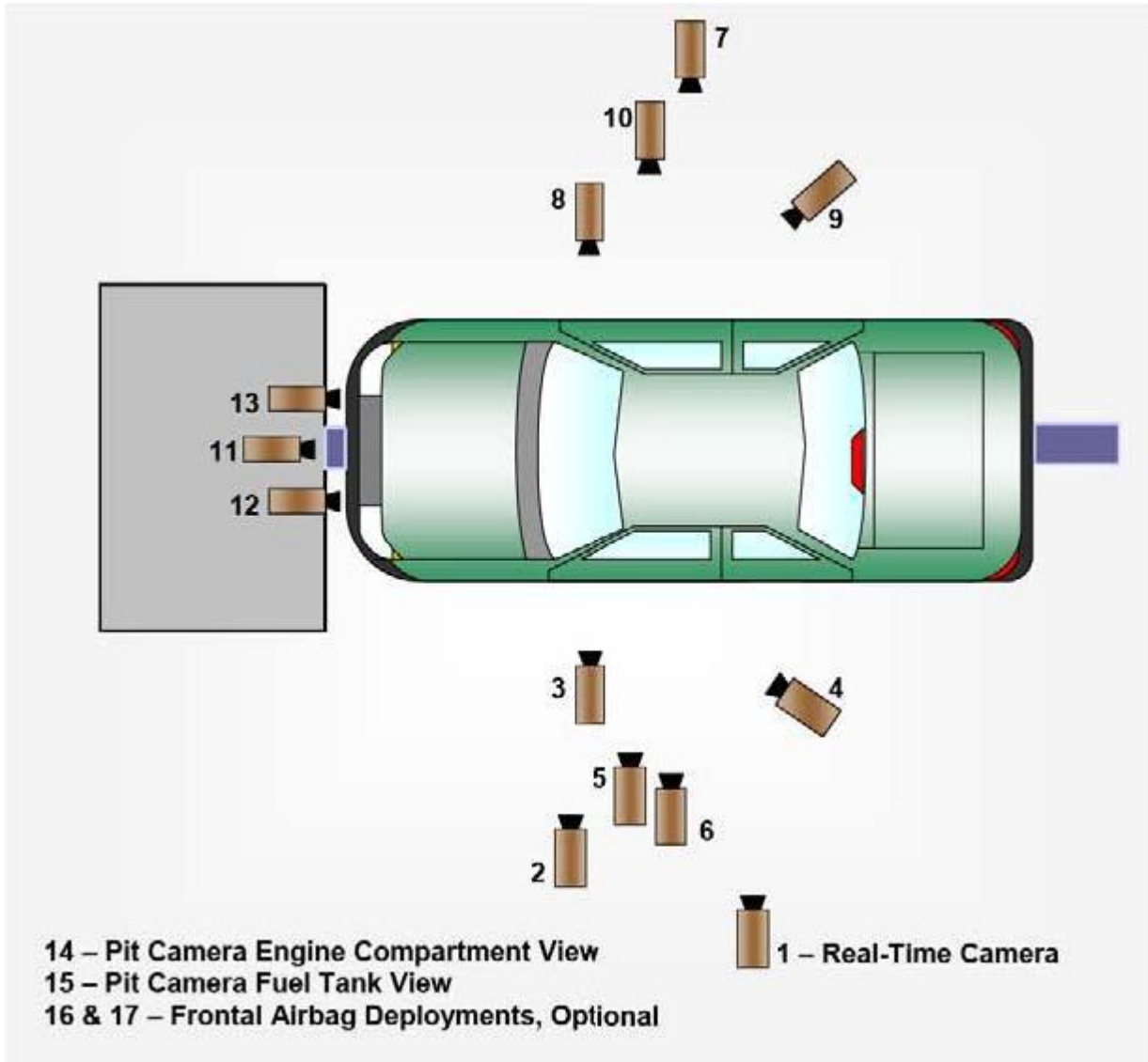
BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	910	1,040
Lap Belt Length as measured on ATD	mm	855	653
Remainder of belt on reel	mm	835	807
Total belt length for continuous webbing systems	mm	2,600	2,500

**DATA SHEET NO. 6
HIGH-SPEED CAMERA LOCATIONS AND DATA**

Test Vehicle:	<u>2012 Mazda Mazda6 Sport Four Door Sedan</u>	NHTSA No:	<u>MC5400</u>
Test Program:	<u>NCAP Frontal Barrier Impact Test</u>	Test Date	<u>11/30/2011</u>

CAMERA POSITIONS FOR FRONTAL IMPACTS



**DATA SHEET NO. 6 (CONTINUED)
HIGH-SPEED CAMERA LOCATIONS AND DATA**

Test Vehicle: 2012 Mazda Mazda6 Sport Four Door Sedan NHTSA No: MC5400
 Test Program: NCAP Frontal Barrier Impact Test Test Date 11/30/2011

CAMERA LOCATIONS

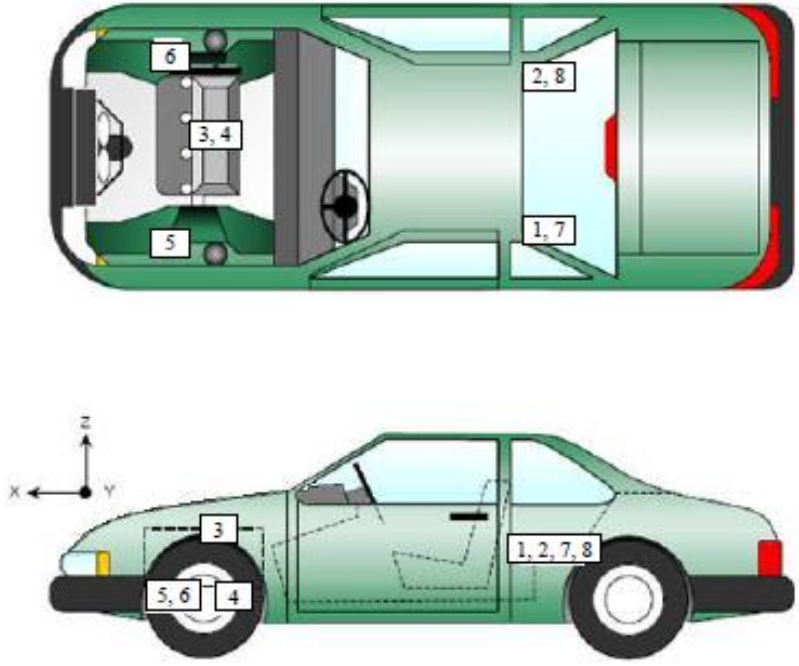
No.	Camera View	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall	-	-	-	-	24
2	Driver Close-Up	1615	8306	1034	50	1000
3	Left Front Half	1260	9650	961	50	1000
4	Left Angle	2830	3060	2200	24	1000
5	Steering Column - Top	2130	9100	1780	50	1000
6	Steering Column - Bottom	2130	9100	1150	50	1000
7	Right Overall	2000	7010	960	24	1000
8	Passenger Close-Up	1815	7681	1178	50	1000
9	Right Front Half	1300	9215	1056	50	1000
10	Right Angle	2985	2900	2140	28	1000
11	Windshield	-670	0	2930	28	500
12	Driver Windshield	0	500	1950	24	500
13	Passenger Windshield	0	500	1950	24	500
14	Pit Front	730	0	-3200	12.5	1000
15	Pit Rear	2200	0	-3200	12.5	1000
16	Onboard Driver Airbag (Optional)					
17	Onboard Passenger Airbag (Optional)					

* COORDINATES:

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

**DATA SHEET NO. 7
VEHICLE ACCELEROMETER DATA**

Test Vehicle: 2012 Mazda Mazda6 Sport Four Door Sedan NHTSA No: MC5400
 Test Program: NCAP Frontal Barrier Impact Test Test Date: 11/30/2011



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Accelerometer – X Direction	2049	-648	306
2	Right Rear Accelerometer – X Direction	2093	676	284
3	Engine Top X	4201	153	814
4	Engine Bottom X	4414	-145	242
5	Left Brake Caliper X	4065	-859	371
6	Right Brake Caliper X	4061	863	396
7	Left Rear Accelerometer – Z Direction	2049	-648	306
8	Right Rear Accelerometer – Z Direction	2093	676	284

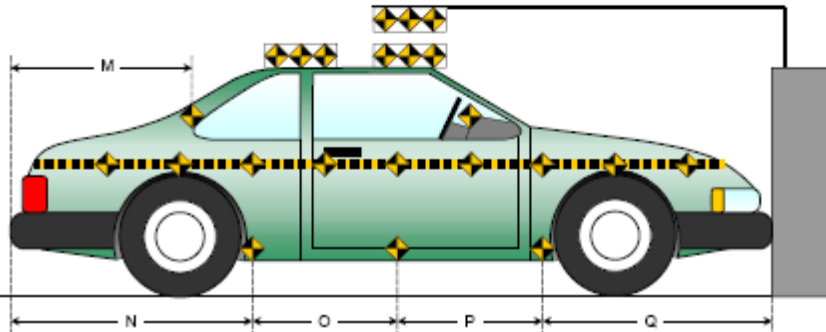
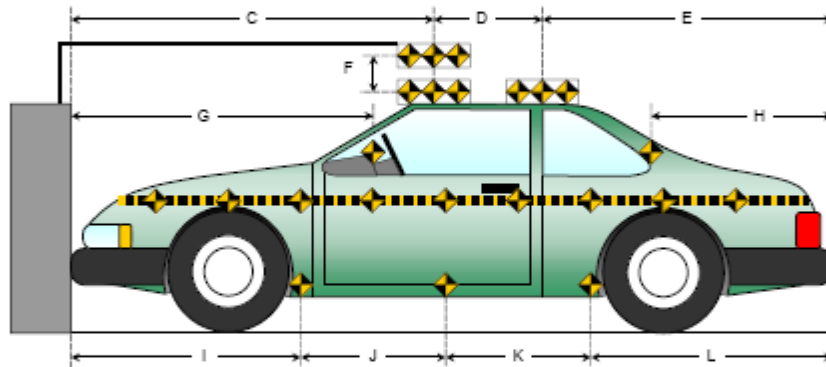
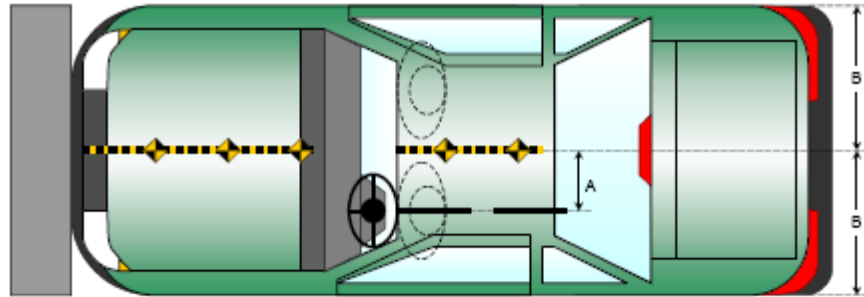
Reference Points: X – Rear Surface of Vehicle (+ forward)
 Y – Vehicle Centerline (+ to right)
 Z – Ground Plane (+ down)

DATA SHEET NO. 8
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2012 Mazda Mazda6 Sport Four Door Sedan NHTSA No: MC5400
 Test Program: NCAP Frontal Barrier Impact Test Test Date 11/30/2011

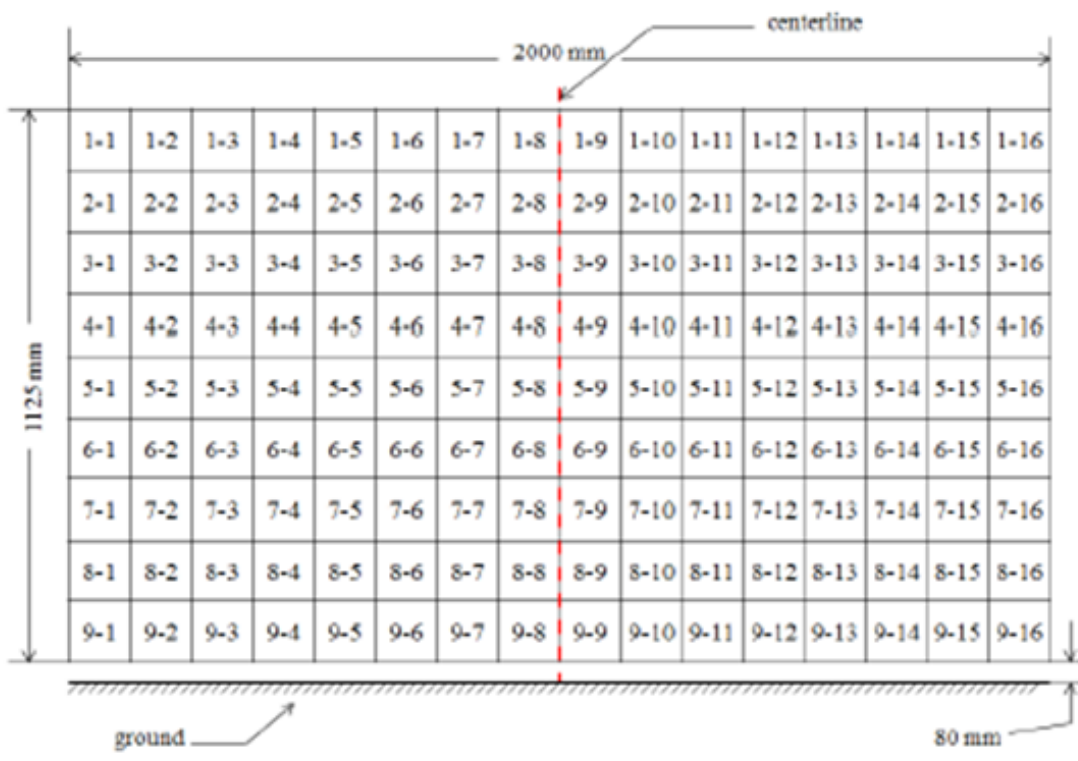
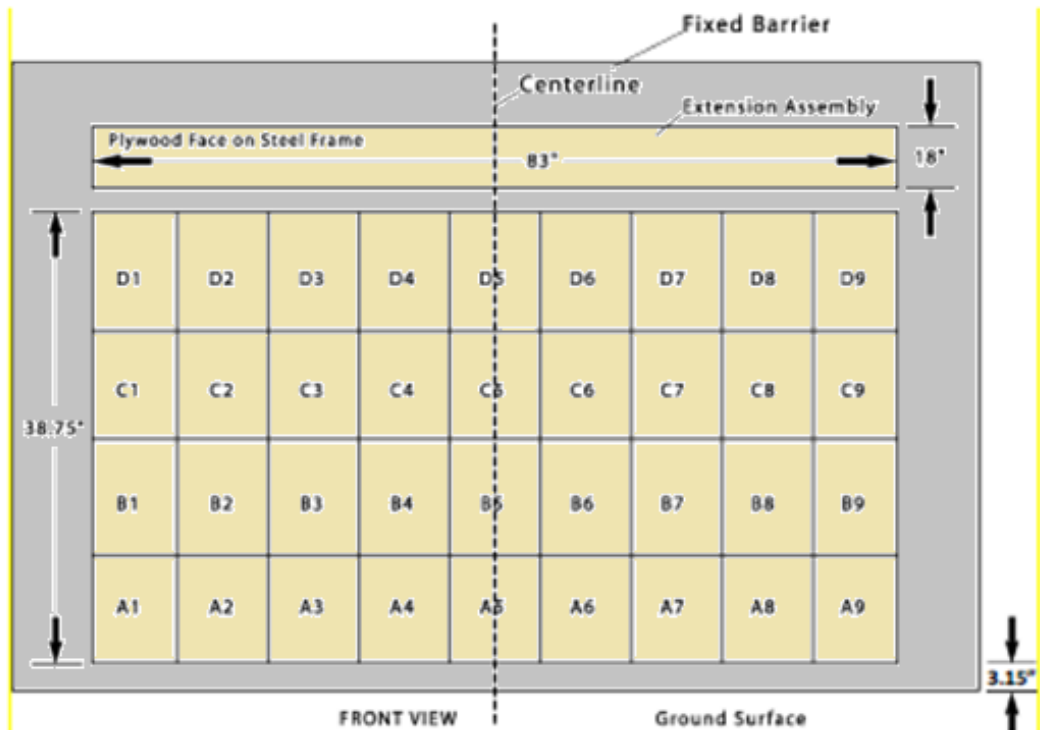
Item	Value
A	352
B	914
C	2,322
D	1,222
E	1,377
F	--
G	1,803
H	1,064
I	1,437
J	951
K	951
L	1,582
M	1,093
N	1,585
O	946
P	956
Q	1,433

All units in millimeters



DATA SHEET NO. 9 LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2012 Mazda Mazda6 Sport Four Door Sedan NHTSA No: MC5400
 Test Program: NCAP Frontal Barrier Impact Test Test Date: 11/30/2011



DATA SHEET NO. 10
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2012 Mazda Mazda6 Sport Four Door Sedan NHTSA No: MC5400
Test Program: NCAP Frontal Barrier Impact Test Test Date 11/30/2011

INSTRUMENTATION

Instrumentation	Number of Channels Collected
Driver Dummy Accelerometers	42
Passenger Dummy Accelerometers	42
Vehicle Structure Accelerometers	8
Total	132

CAMERA COVERAGE

Type of Camera	Number Used in this Test
High-Speed Vehicle Onboard	0
High-Speed Offboard	14
Real-Time Panning	1
Total	15

DATA SHEET NO. 11 - POST TEST OBSERVATIONS

Test Vehicle: 2012 Mazda Mazda6 Sport Four Door Sedan NHTSA No: MC5400
 Test Program: NCAP Frontal Barrier Impact Test Test Date 11/30/2011

TEST DUMMY INFORMATION AND CONTACT LOCATIONS

Description	Driver	Passenger
Dummy Type/Serial No.	064	273
Head Contact	Frontal Airbag and Headrest	Frontal Airbag and Headrest
Upper Torso Contact	Frontal Airbag	Frontal Airbag
Lower Torso Contact	None	None
Left Knee Contact	Knee Bolster	Glovebox
Right Knee Contact	Knee Bolster	Glovebox

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Locked/Unlocked Doors	Locked	Locked
Front Door Opening	Closed & Operational	Closed & Operational
Rear Door Opening	Closed & Operational	Closed & Operational
Seat Track Shift (mm)	No Shift	No Shift
Seat Back Failure	No Failure	No Failure
Glazing Damage	Window Shattered During Impact	None

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Windshield Damage	Minor Cracks along Passenger's A-Pillar
Window Damage	Driver's side window shattered while in the door during impact.
Other Notable Effects	None

VEHICLE REBOUND FROM BARRIER

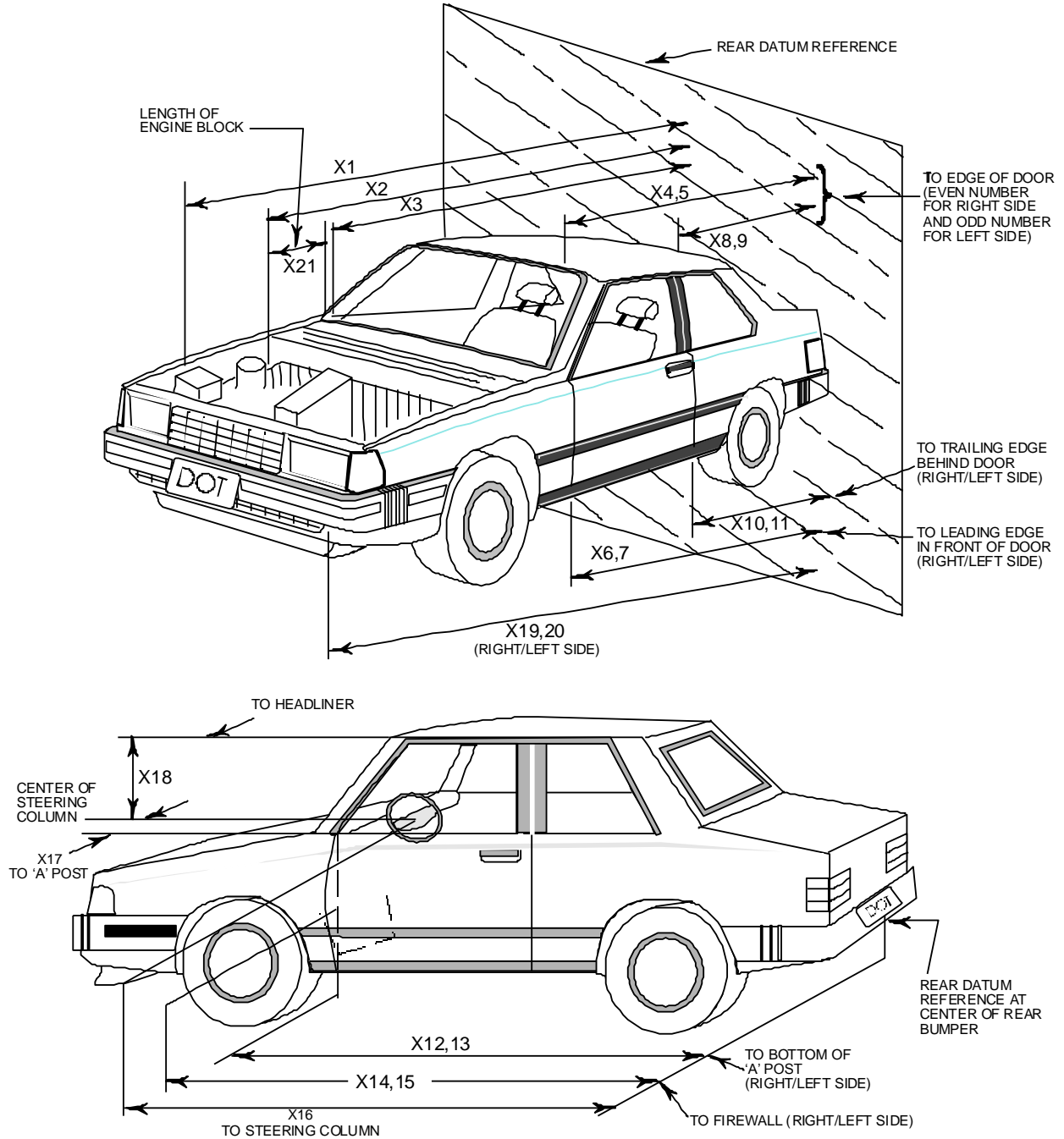
Measured Parameter	Units	Value
Left Side	mm	635
Center	mm	580
Right Side	mm	630
Average	mm	615

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

DATA SHEET NO. 12 VEHICLE PROFILE MEASUREMENTS

Test Vehicle:	2012 Mazda Mazda6 Sport Four Door Sedan	NHTSA No:	MC5400
Test Program:	NCAP Frontal Barrier Impact Test	Test Date	11/30/2011



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

Test Vehicle: 2012 Mazda Mazda6 Sport Four Door Sedan NHTSA No: MC5400
 Test Program: NCAP Frontal Barrier Impact Test Test Date 11/30/2011

No.	Measurement Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	4,921	4,494	-427
2	Rear Surface of Vehicle (RSOV) to Front of Engine	4,433	4,102	-331
3	RSOV to Firewall	3,800	3,751	-49
4	RSOV to Upper Leading Edge of Right Door	3,454	3,452	-2
5	RSOV to Upper Leading Edge of Left Door	3,451	3,461	10
6	RSOV to Lower Leading Edge of Right Door	3,453	3,452	-1
7	RSOV to Lower Leading Edge of Left Door	3,448	3,460	12
8	RSOV to Upper Trailing Edge of Right Door	2,270	2,265	-5
9	RSOV to Upper Trailing Edge of Left Door	2,266	2,272	6
10	RSOV to Lower Trailing Edge of Right Door	2,331	2,328	-3
11	RSOV to Lower Trailing Edge of Left Door	2,326	2,336	10
12	RSOV to Bottom of "A" Post of Right Side	3,430	3,427	-3
13	RSOV to Bottom of "A" Post of Left Side	3,426	3,429	3
14	RSOV to Firewall, Right Side	3,872	3,777	-95
15	RSOV to Firewall, Left Side	3,868	3,825	-43
16	RSOV to Steering Column	2,934	2,970	36
17	Center of Steering Column to "A" Post	287	267	20
18	Center of Steering Column to Headliner	408	383	-25
19	RSOV to Right Side of Front Bumper	4,815	4,486	329
20	RSOV to Left Side of Front Bumper	4,810	4,387	423
21	Length of Engine Block	374	380	6
RD	RSOV to Right Side of Dash Panel	3,173	3,173	0
CD	RSOV to Center of Dash Panel	3,198	3,180	-18
LD	RSOV to Left Side of Dash Panel	3,178	3,180	2

All Dimensions in mm

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

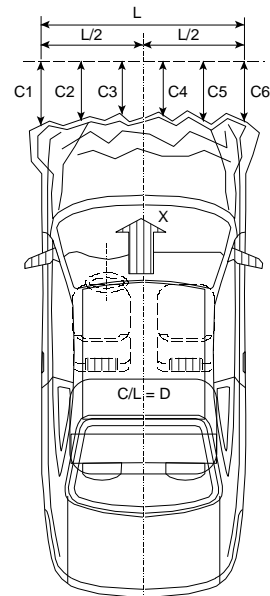
Test Vehicle: 2012 Mazda Mazda6 Sport Four Door Sedan NHTSA No: MC5400
 Test Program: NCAP Frontal Barrier Impact Test Test Date: 11/30/2011

VEHICLE INFORMATION

VIN: 1YVHZ8BH3C5M03563 Wheelbase (mm): 2,787
 Vehicle Size Category: Passenger – 4 Door Sedan Test Weight (kg): 1,669

ACCELEROMETER DATA

Accelerometer Locations: As Described in Data Sheet No. 7
 Cal. Procedure/Interval: Calspan Procedure / 6 month
 Integration Algorithm: Trapezoidal
 Linearity: >99%
 Impact Velocity (km/h): 56.4
 Velocity Change (km/h): 56.4
 Time of Separation (ms): 150



CRUSH PROFILE

Collision Deformation Classification: 12FDEW4
 Midpoint of Damage: Vehicle Centerline
 Damage Region Length (mm): 1385
 Impact Mode: Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	4,673	4,470	203
C2	Crush zone 2 at left side	mm	4,832	4,378	454
C3	Crush zone 3 at left side	mm	4,907	4,455	452
C4	Crush zone 4 at right side	mm	4,909	4,508	401
C5	Crush zone 5 at right side	mm	4,835	4,518	317
C6	Crush zone 6 at right side	mm	4,675	4,445	230
L	C1 to C6	mm	1,385	1,434	-49

**DATA SHEET NO. 14
VEHICLE INTRUSION MEASUREMENTS**

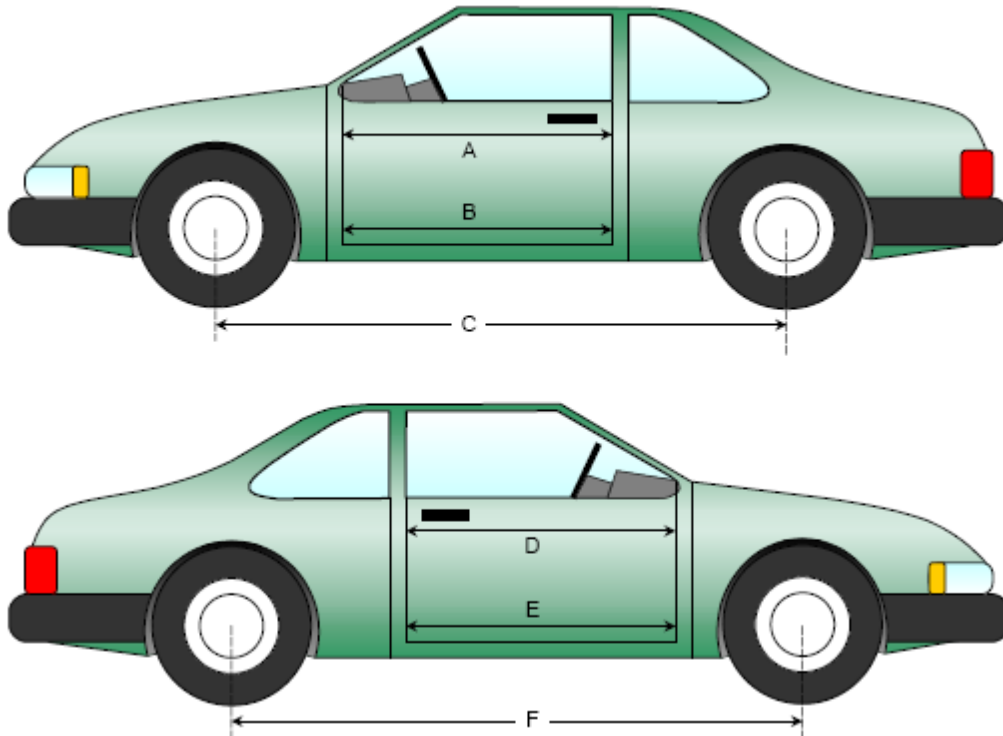
Test Vehicle: 2012 Mazda Mazda6 Sport Four Door Sedan NHTSA No: MC5400
 Test Program: NCAP Frontal Barrier Impact Test Test Date 11/30/2011

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	1,091	1,091	0
B	Left Side Lower	mm	955	955	0
D	Right Side Upper	mm	1,093	1,092	-1
E	Right Side Lower	mm	935	934	-1

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2,787	2,725	-65
F	Right Side Wheelbase	mm	2,787	2,723	-62



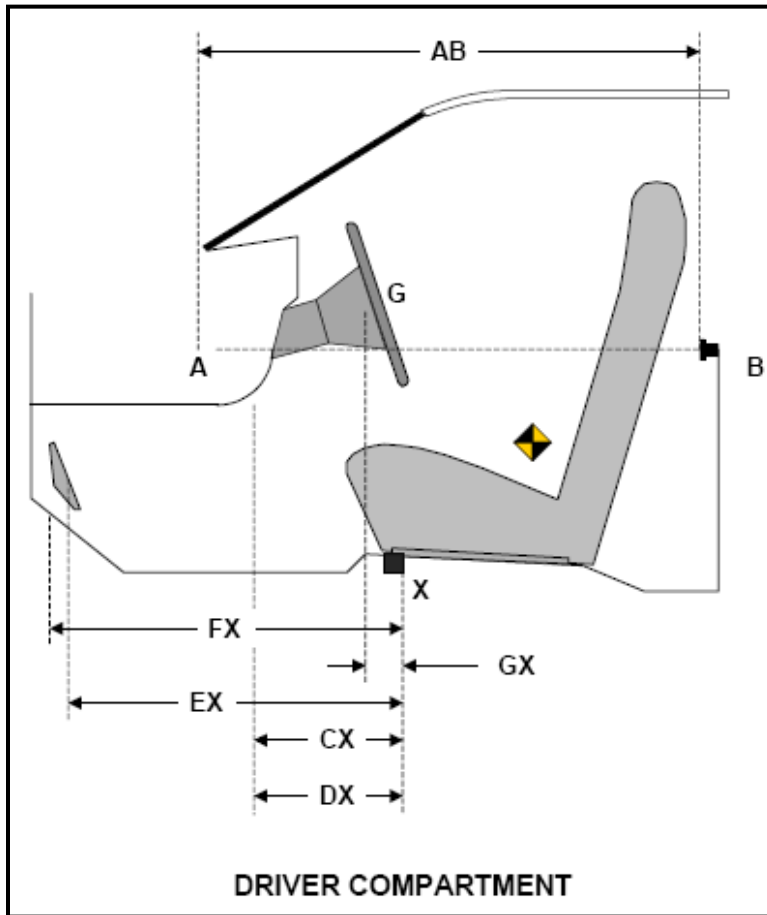
**DATA SHEET NO.14 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS**

Test Vehicle: 2012 Mazda Mazda6 Sport Four Door Sedan NHTSA No: MC5400
 Test Program: NCAP Frontal Barrier Impact Test Test Date: 11/30/2011

DRIVER COMPARTMENT INTRUSION

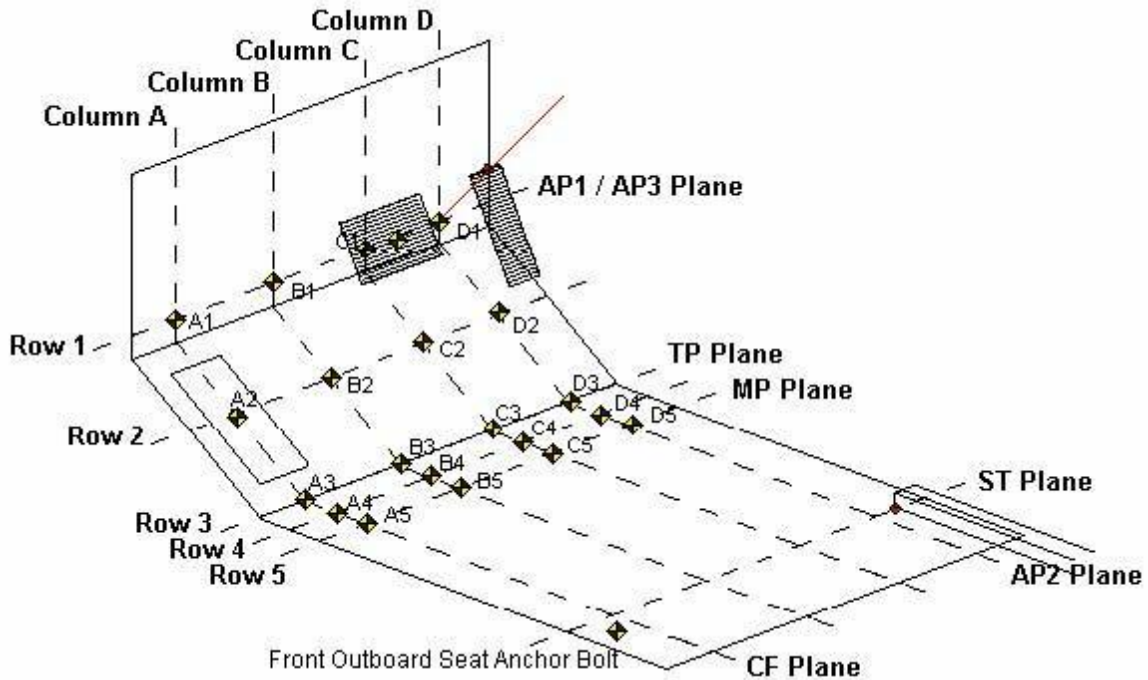
Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	814	814	0
CX	Left Knee Bolster to X	mm	293	286	-7
DX	Right Knee Bolster to X	mm	270	254	-16
EX	Brake Pedal to X	mm	588	530	-58
FX	Foot Rest to X	mm	664	614	-50
GX	Center of Steering Column Wheel Hub to X	mm	53	84	31

X = Front of Seat Track (Stationary)



DATA SHEET NO.14 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle:	2012 Mazda Mazda6 Sport Four Door Sedan	NHTSA No:	MC5400
Test Program:	NCAP Frontal Barrier Impact Test	Test Date	11/30/2011



- 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. 15
SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA

Test Vehicle: 2012 Mazda Mazda6 Sport Four Door Sedan NHTSA No: MC5400
 Test Program: NCAP Frontal Barrier Impact Test Test Date: 11/30/2011

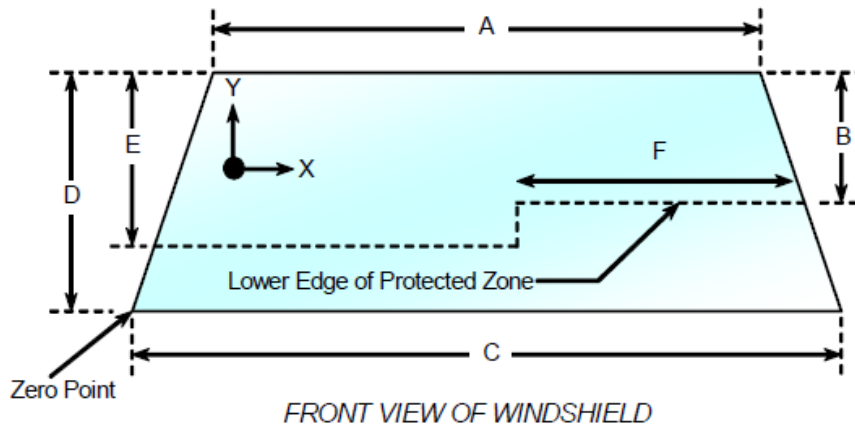
Please provide windshield mounting details. A 0.8 mm trim surrounds the top and side of windshield while a plastic shroud is on the bottom.

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	2,108	2108	100%
Right Side	2,108	2108	100%
Total	4,215	4215	100%



Item	Units	Value
A	mm	1,155
B	mm	475
C	mm	1,420
D	mm	820
E	mm	537
F	mm	490

AREAS OF PROTECTED ZONE FAILURES

A. Provide coordinates of the area that the protected zone was penetrated more than .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:	<u>2012 Mazda Mazda6 Sport Four Door Sedan</u>	NHTSA No:	<u>MC5400</u>
Test Program:	<u>NCAP Frontal Barrier Impact Test</u>	Test Date	<u>11/30/2011</u>

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

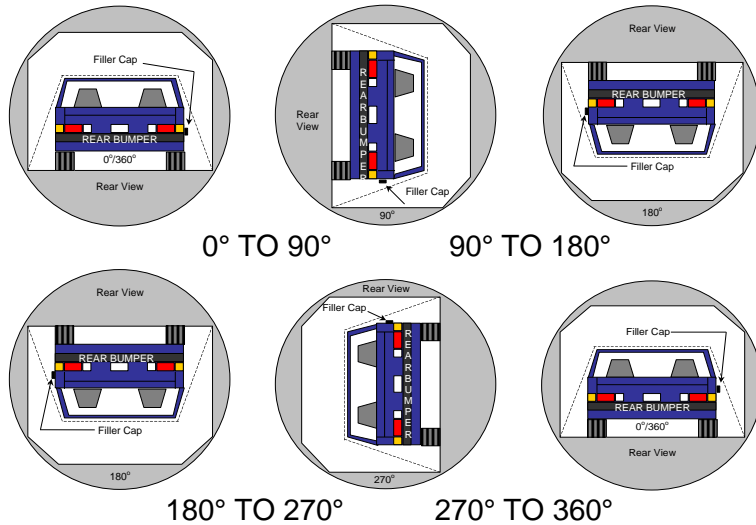
Temperature at Time of Impact: 2.2° C Test Time: 3:50PM

Stoddard Solvent Spillage Measurements

A.	From impact until vehicle motion ceases: (Maximum allowable = 1 oz.)	<u>0</u>	oz
B.	For the 5-minute period after motion ceases: (Maximum allowable = 5 oz.)	<u>0</u>	oz
C.	For the following 25 minutes: (Maximum allowable = 1 oz./minute)	<u>0</u>	oz
D.	Spillage	<u>None</u>	oz

**DATA SHEET NO. 16
FMVSS 301 STATIC ROLLOVER RESULTS**

Test Vehicle: 2012 Mazda Mazda6 Sport Four Door Sedan NHTSA No: MC5400
 Test Program: NCAP Frontal Barrier Impact Test Test Date 11/30/2011



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: None

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	71	300	371
90° to 180°	65	300	365
180° to 270°	62	300	362
270° to 360°	72	300	372

FMVSS 301 SPILLAGE TABLE

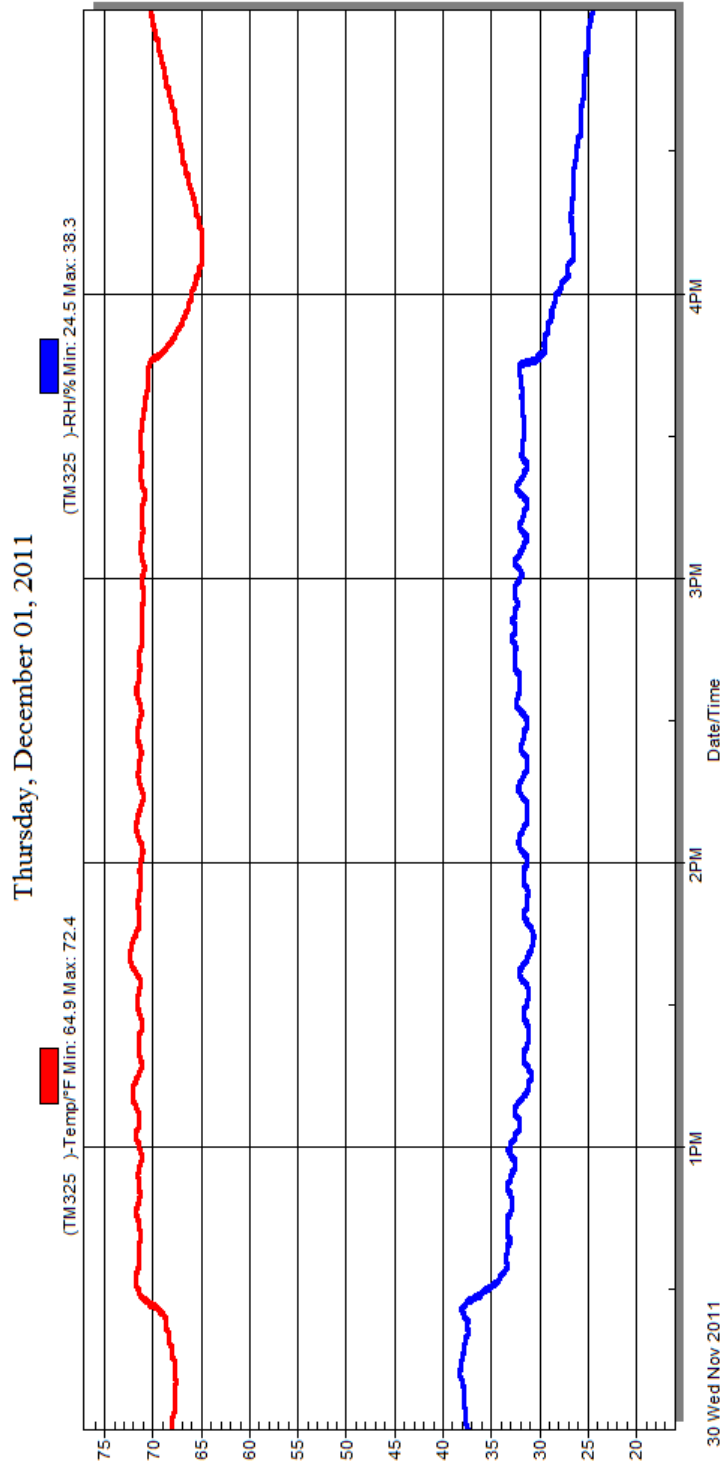
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° to 90°	0	0		
90° to 180°	0	0		
180° to 270°	0	0		
270° to 360°	0	0		

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**

Test Vehicle:	<u>2012 Mazda Mazda6 Sport Four Door Sedan</u>	NHTSA No:	<u>MC5400</u>
Test Program:	<u>NCAP Frontal Barrier Impact Test</u>	Test Date	<u>11/30/2011</u>



Temperature Stabilization Chart/Data

**APPENDIX A
PHOTOGRAPHS**

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2	Load Cell Wall	A-5
3	Manufacturer's Label	A-6
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5	Right Front 3-4 View, as Received	A-7
6	Left Rear 3-4 View, as Received	A-7
7	Pre-test Front View of Test Vehicle	A-8
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37	Pre-test Driver Dummy Feet	A-23
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39	Pre-test Driver's Side Knee Bolster	A-24
40	Post-test Driver's Side Knee Bolster	A-24
41	Pre-test Driver's Side Floorpan	A-25
42	Post-test Driver's Side Floorpan	A-25
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45	Post-test Driver Dummy Contact With Headrest	A-27
46	Pre-test View of the Steering Wheel	A-27
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52	Pre-test Passenger Dummy and Vehicle Interior View	A-30
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57	Post-test Passenger Dummy Feet	A-33
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60	Pre-test Passenger's Side Floorpan	A-34
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62a	Post-test Passenger Dummy Contact With Headrest	A-36
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71	2012 Mazda Mazda6 Sport Frontal Impact Event	A-40
72	Monroney Label Photograph	A-41

¹**NOTE:** *The underbody views should include the following vehicle components: fuel pump, fuel lines, sender unit, fuel tank filler pipe and any other visible system components.*



Figure A-1: Load Cell Location



Figure A-2: Load Cell Wall

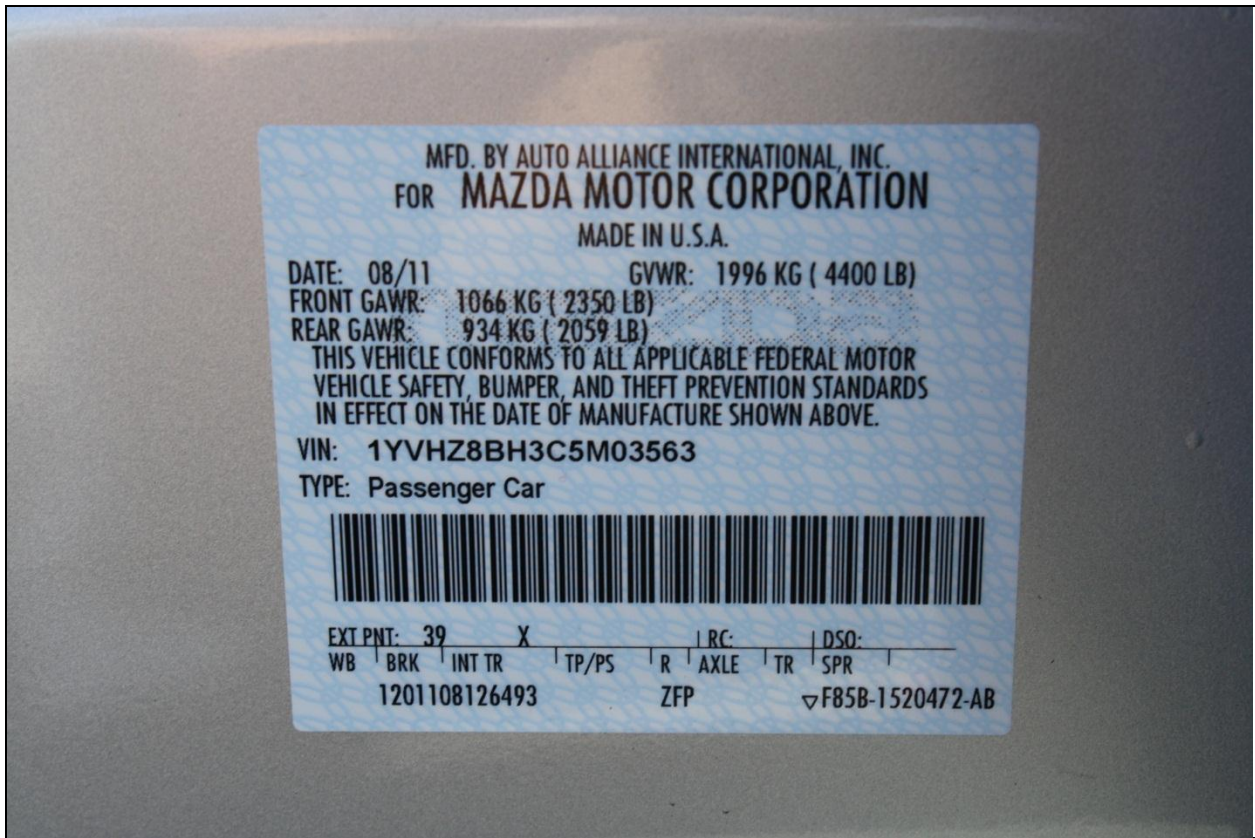


Figure A-3: Manufacturer's Label

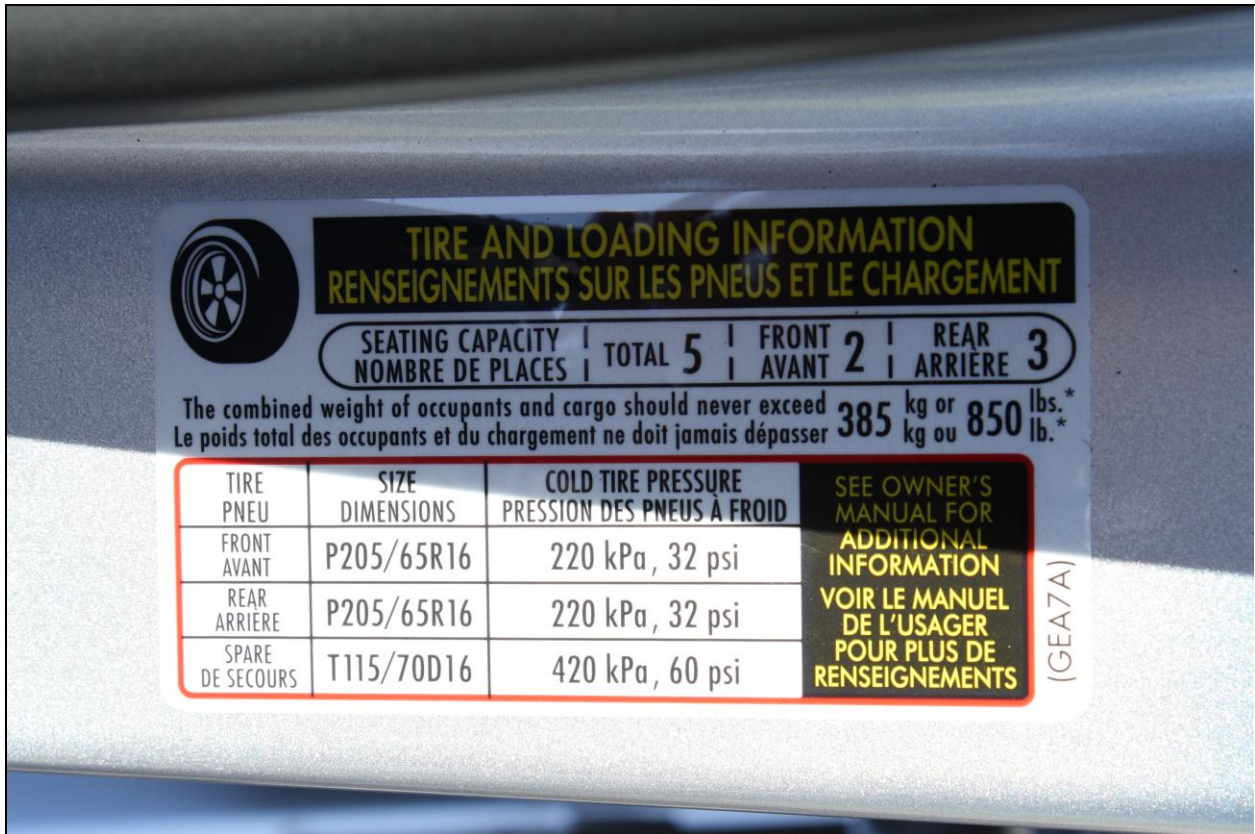


Figure A-4: Tire Placard



Figure A-5: Right Front 3-4 View, as Received



Figure A-6: Left Rear 3-4 View, as Received



Figure A-7: Pre-Test Front View of Test Vehicle



Figure A-8: Post-Test Front View of Test Vehicle



Figure A-9: Pre-Test Left View of Test Vehicle



Figure A-10: Post-Test Left View of Test Vehicle



Figure A-11: Pre-Test Right View of Test Vehicle



Figure A-12: Post-Test Right View of Test Vehicle



Figure A-13: Pre-Test Right Front 3-4 View



Figure A-14: Post-Test Right Front 3-4 View



Figure A-15: Pre-Test Left Rear 3/4 View



Figure A-16: Post-Test Left Rear 3/4 View



Figure A-17: Pre-Test Windshield View



Figure A-18: Post-Test Windshield View

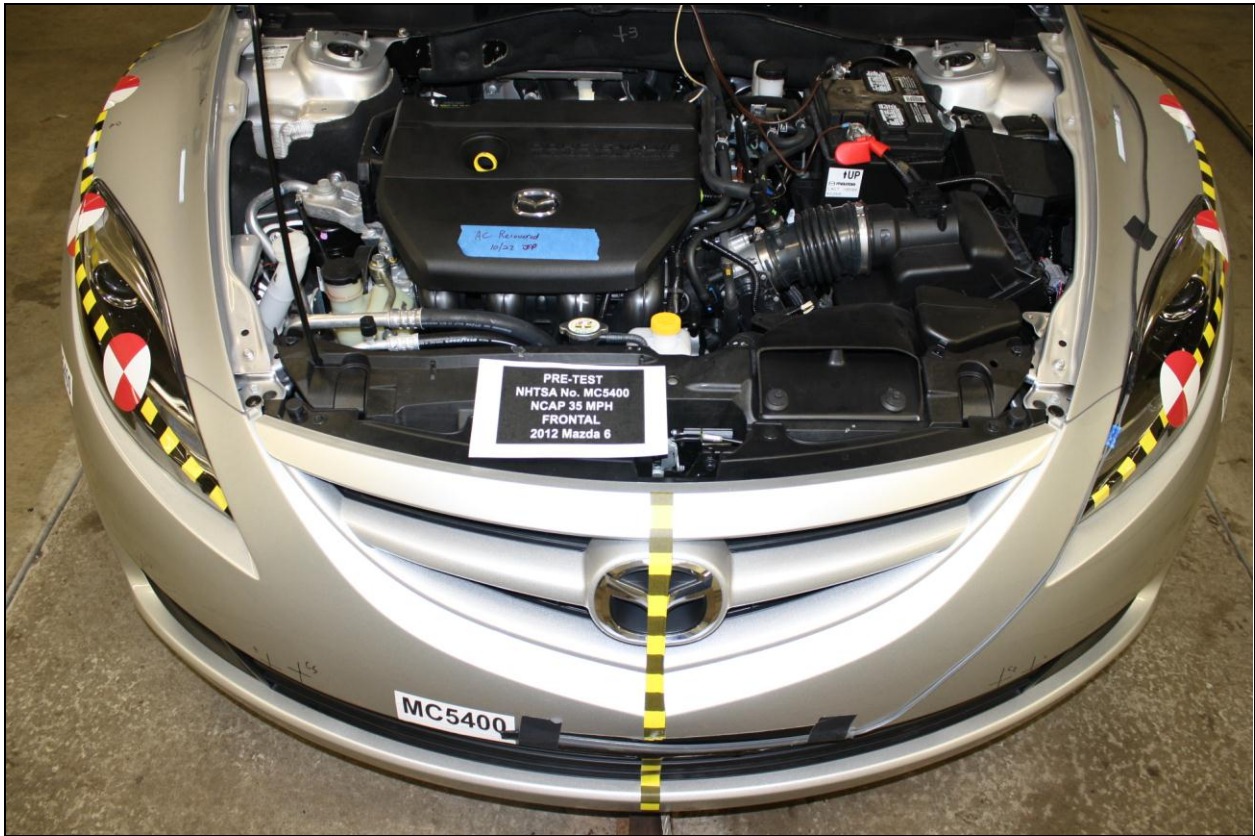


Figure A-19: Pre-Test Engine Compartment View



Figure A-20: Post-Test Engine Compartment View



Figure A-21: Pre-Test Fuel Filler Cap View



Figure A-22: Post-Test Fuel Filler Cap View

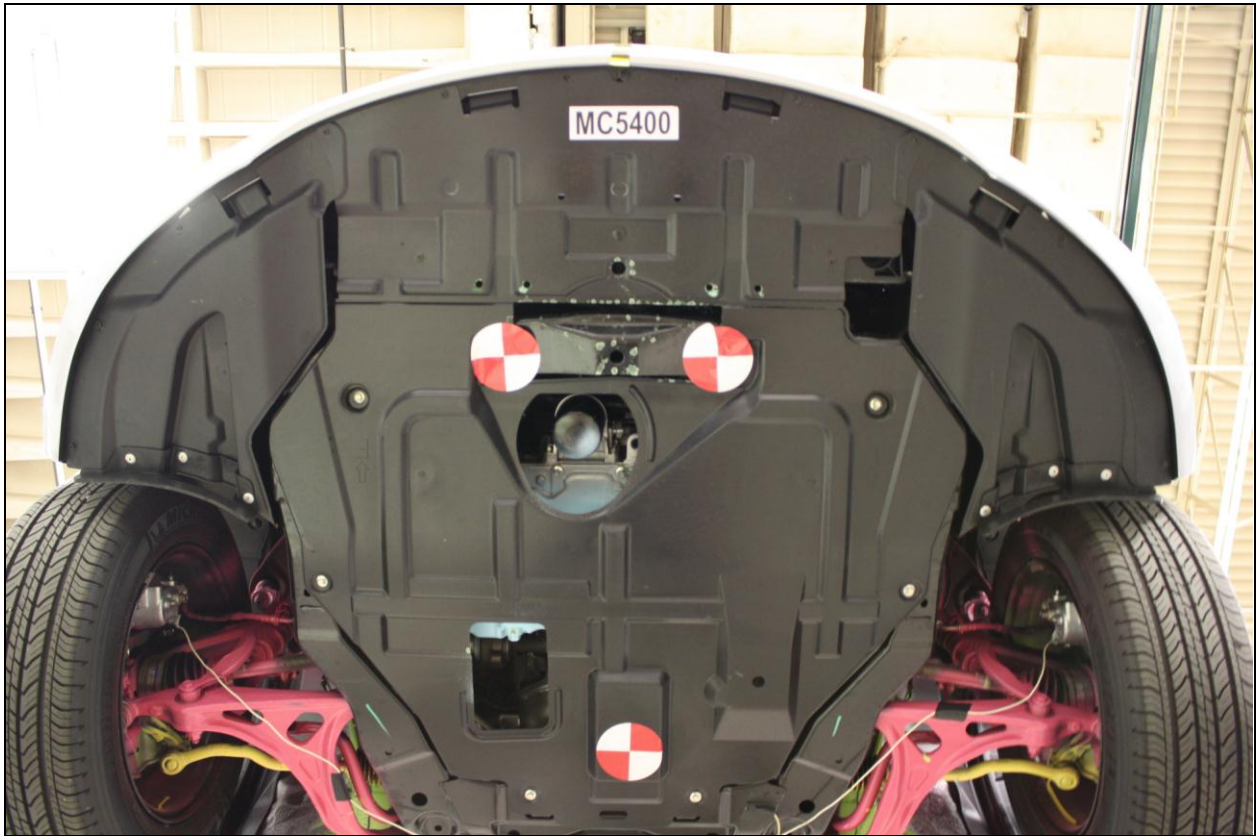


Figure A-23: Pre-Test Front Underbody View



Figure A-24: Post-Test Front Underbody View



Figure A-25: Pre-Test Rear Underbody View

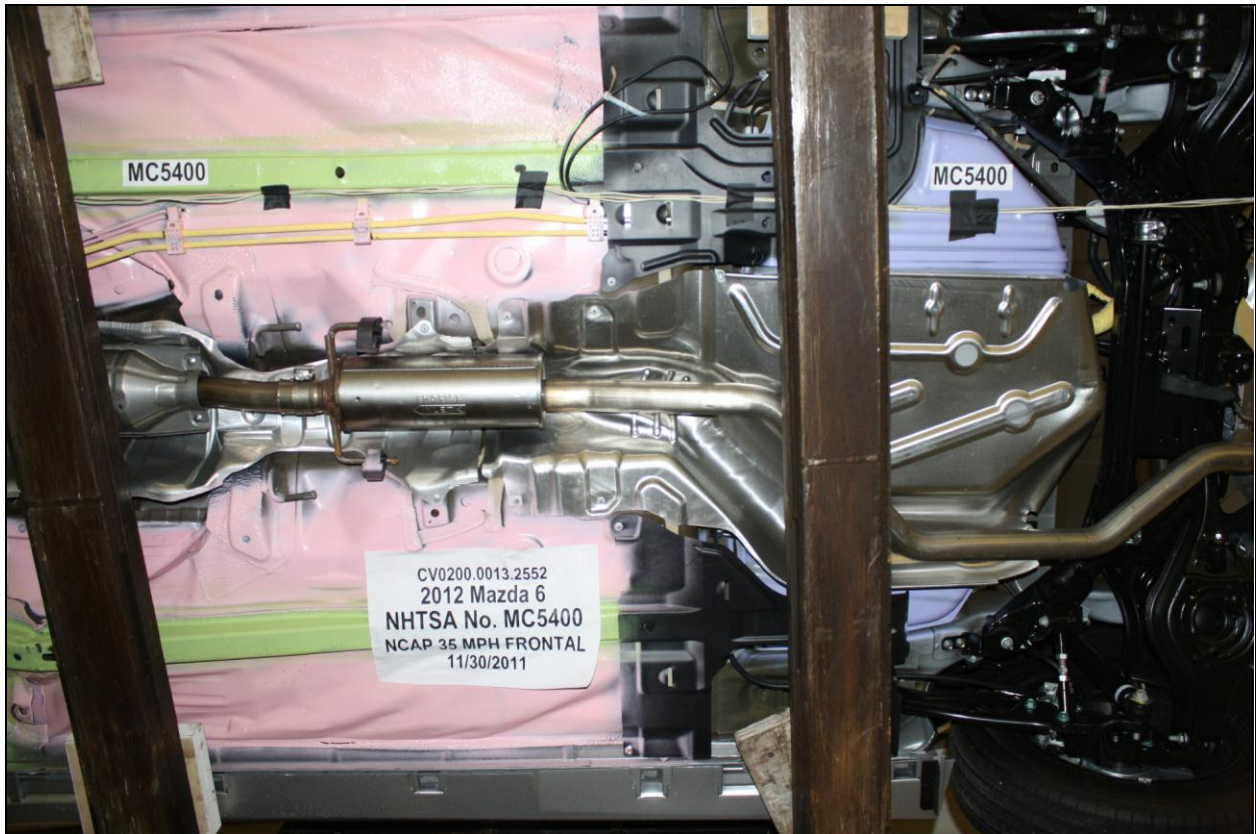


Figure A-26: Post-Test Rear Underbody View



Figure A-27: Pre-Test Dummy Cable Routing

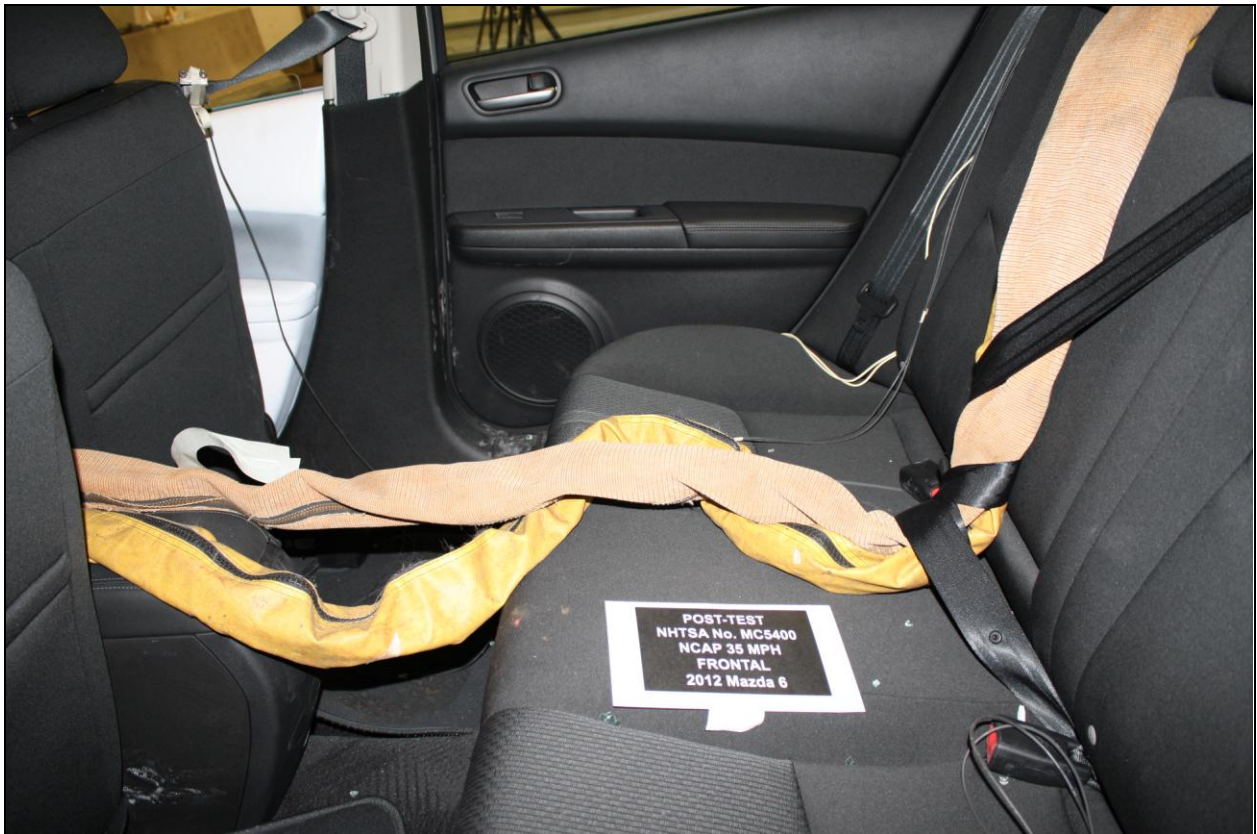


Figure A-28: Post-Test Dummy Cable Routing



Figure A-29: Pre-Test Driver Dummy Front View

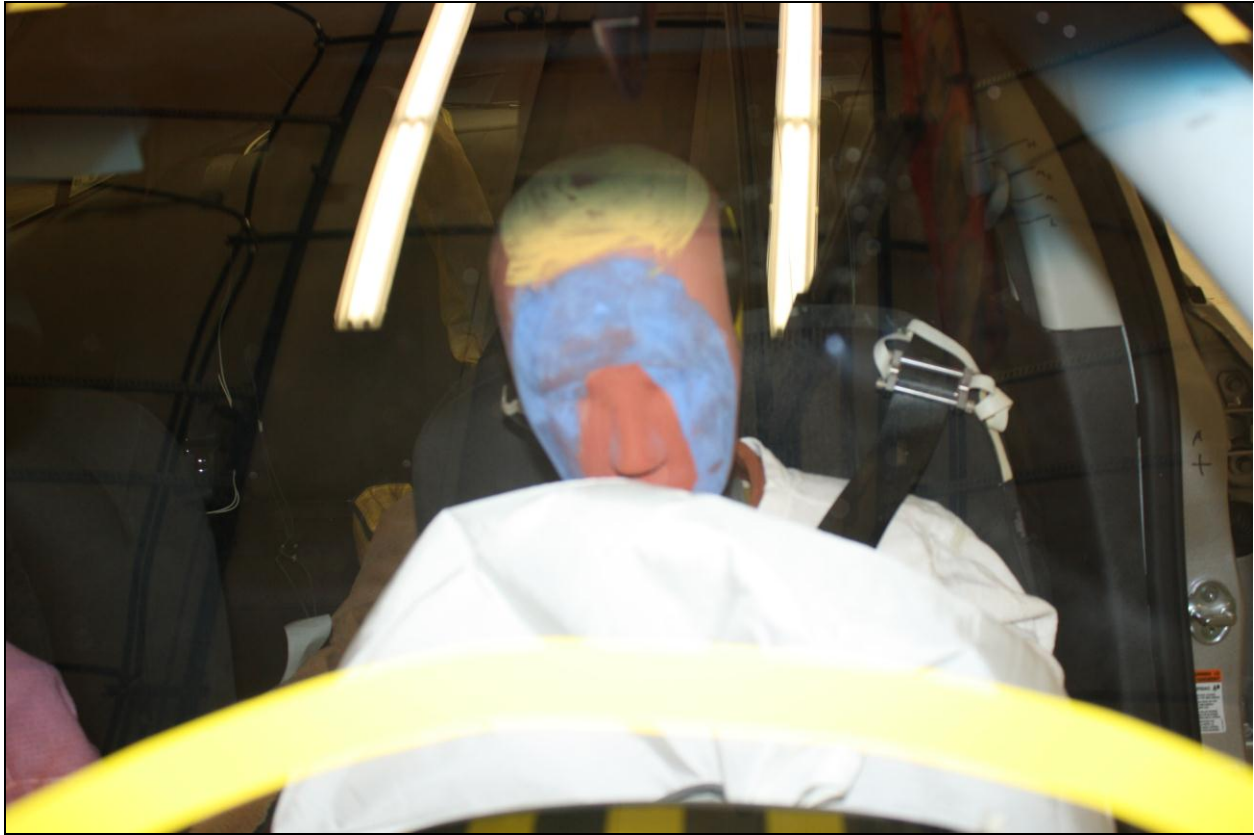


Figure A-30: Post-Test Driver Dummy Front View



Figure A-31: Pre-Test Driver Dummy Window View



Figure A-32: Post-Test Driver Dummy Window View



Figure A-33: Pre-Test Driver Dummy and Vehicle Interior View



Figure A-34: Post-Test Driver Dummy and Vehicle Interior View



Figure A-35: Pre-Test Driver's Seat Fore-Aft Markings

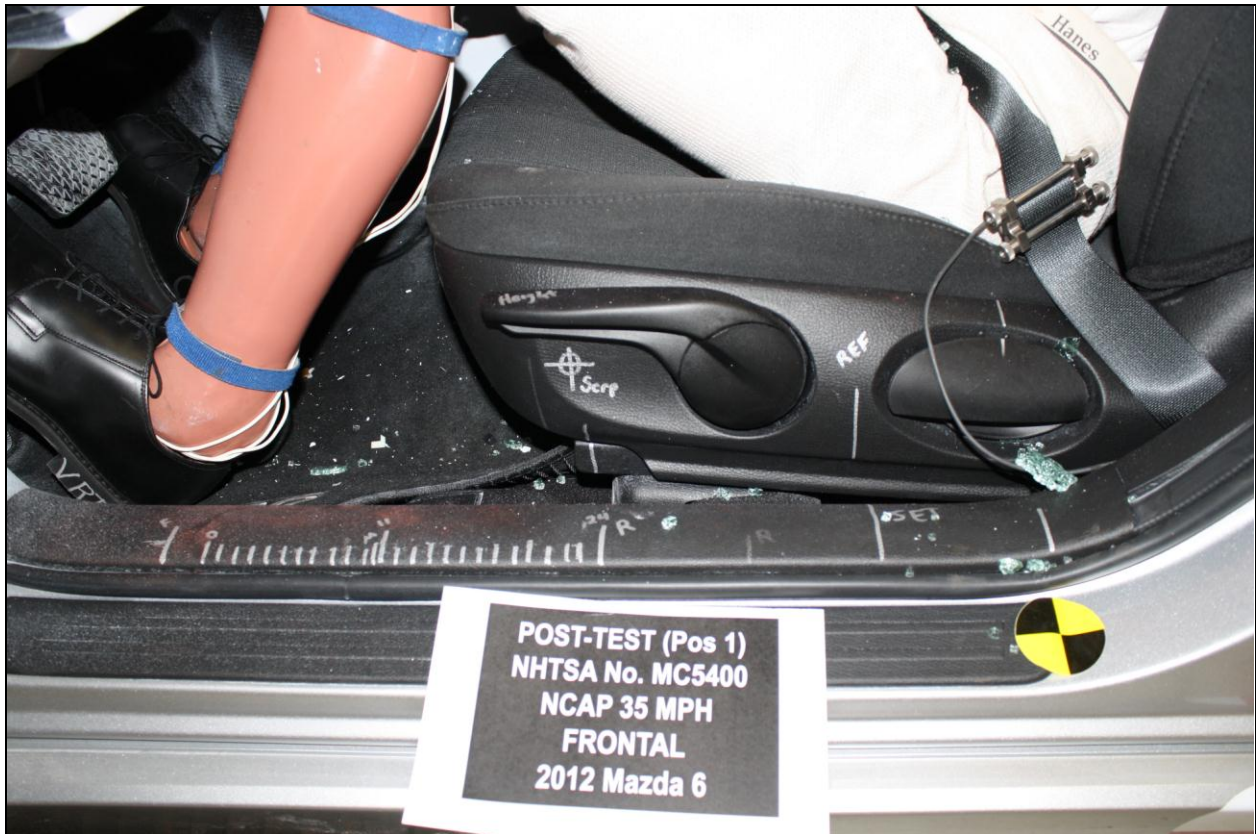


Figure A-36: Post-Test Driver's Seat Fore-Aft Markings

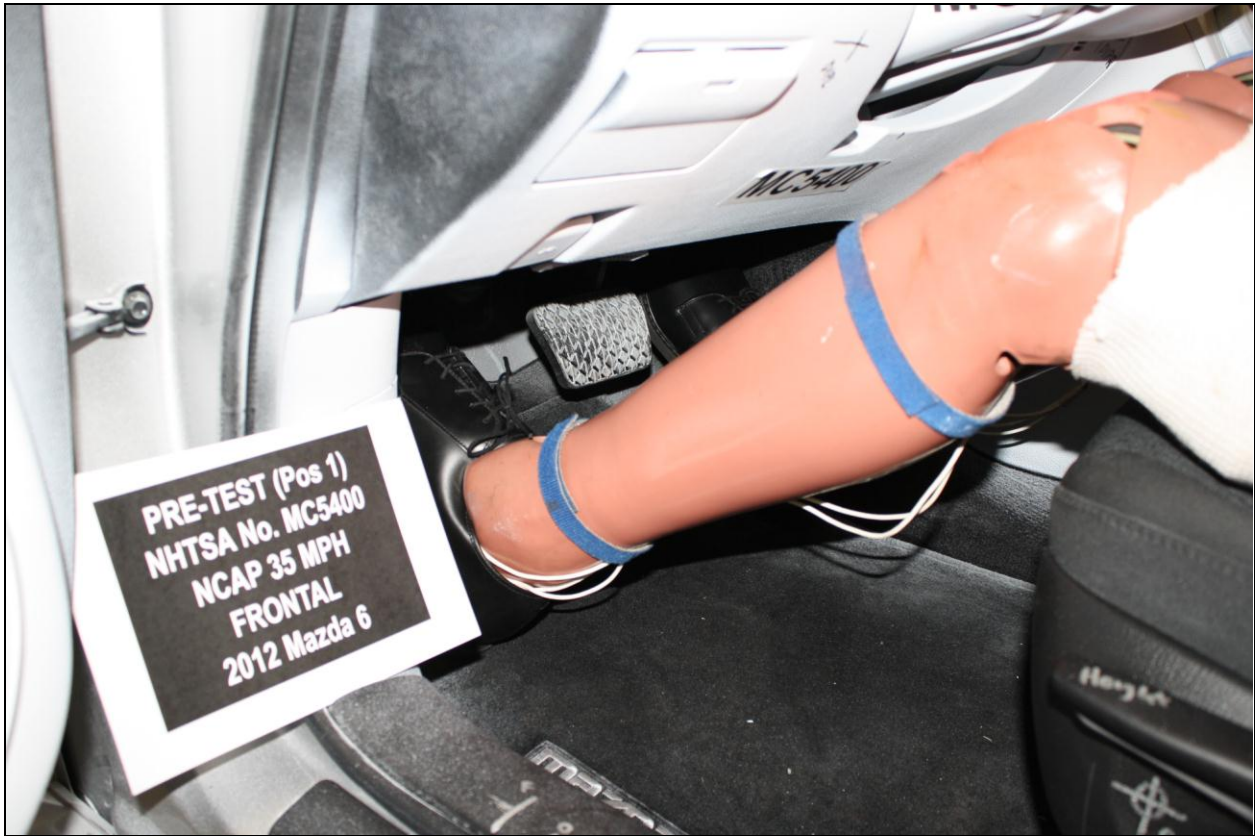


Figure A-37: Pre-Test Driver Dummy Feet



Figure A-38: Post-Test Driver Dummy Feet



Figure A-39: Pre-Test Driver's Side Knee Bolster

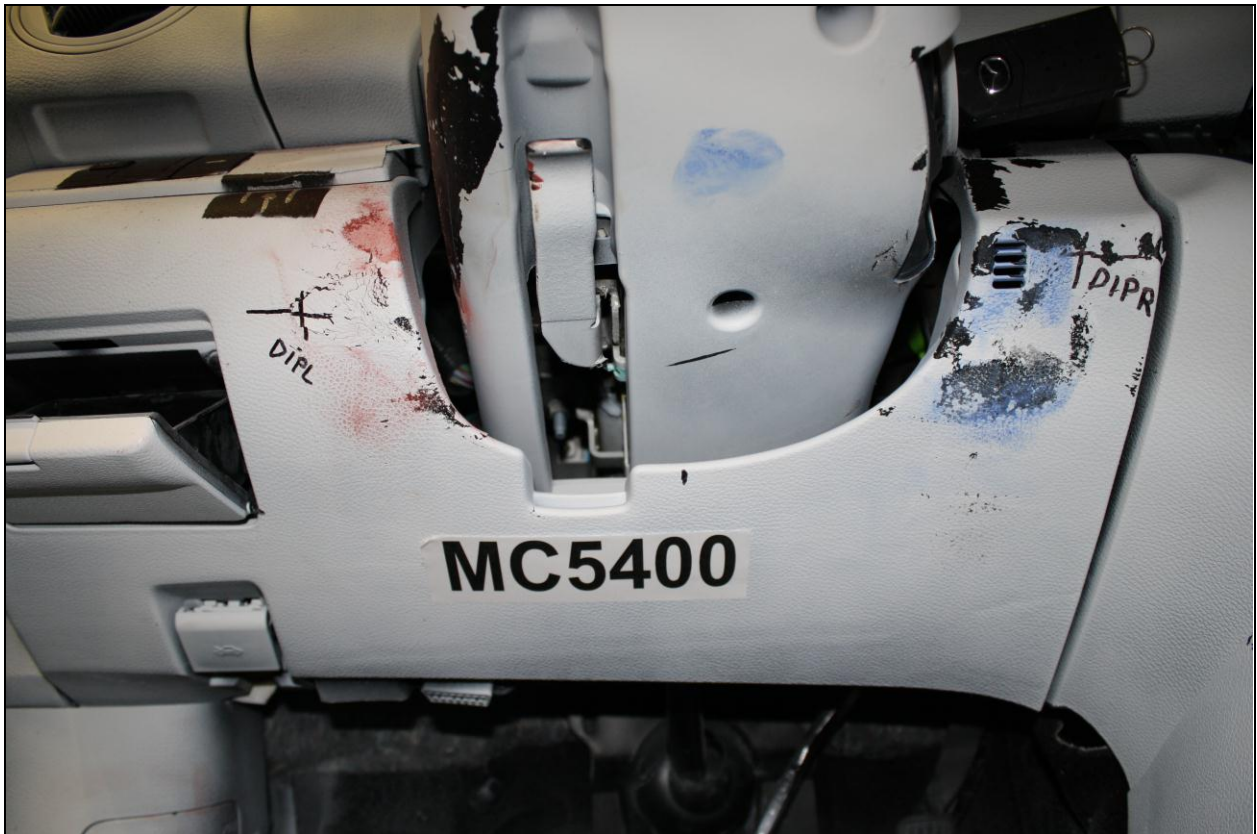


Figure A-40: Post-Test Driver's Side Knee Bolster



Figure A-41: Pre-Test Driver's Side Floorpan



Figure A-42: Post-Test Driver's Side Floorpan

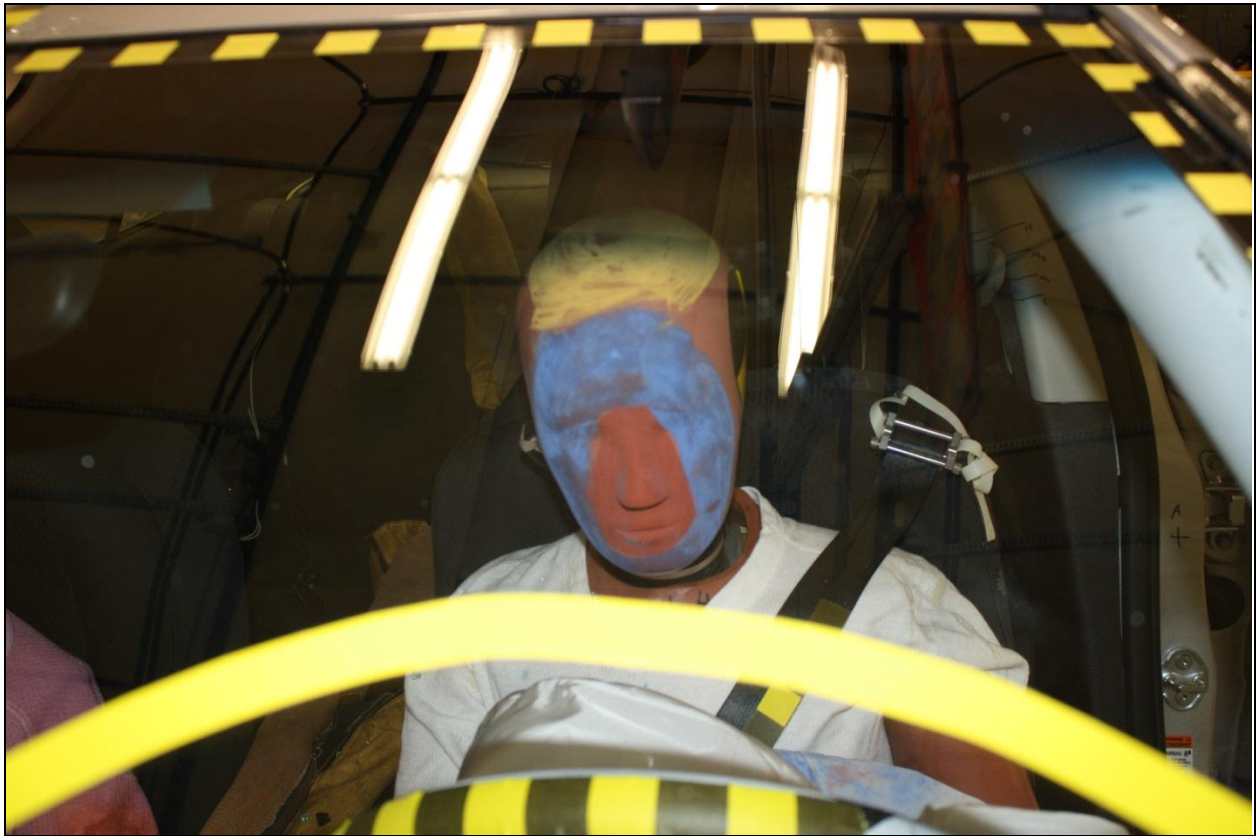


Figure A-43: Post-Test Driver Dummy Face



Figure A-44: Post-Test Driver Dummy Contact With Airbag



Figure A-45: Post-Test Driver Dummy Contact with Headrest



Figure A-46: Pre-Test View of the Steering Wheel

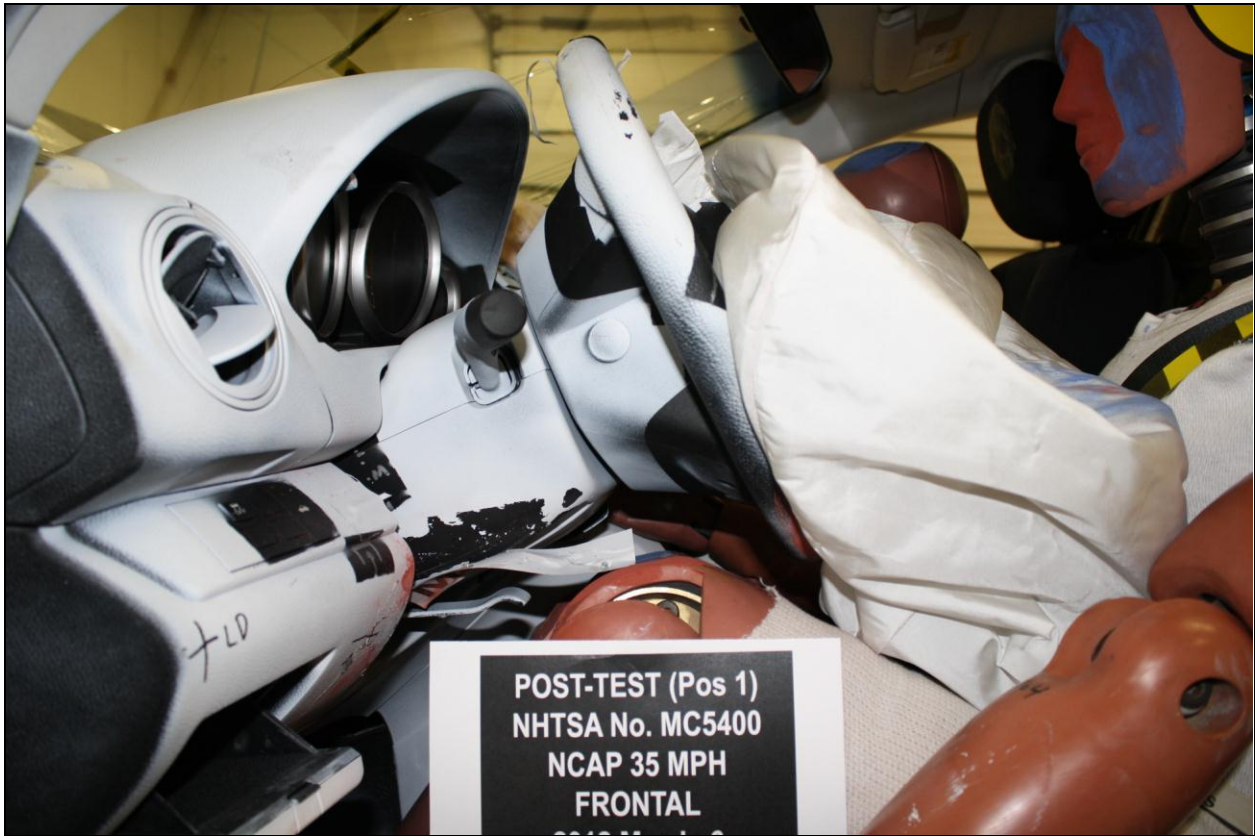


Figure A-47: Post-Test View of the Steering Wheel



Figure A-48: Pre-Test Passenger Dummy Front View



Figure A-49: Post-Test Passenger Dummy Front View



Figure A-50: Pre-Test Passenger Dummy Window View



Figure A-51: Post-Test Passenger Dummy Window View



Figure A-52: Pre-Test Passenger Dummy and Vehicle Interior View



Figure A-53: Post-Test Passenger Dummy and Vehicle Interior View

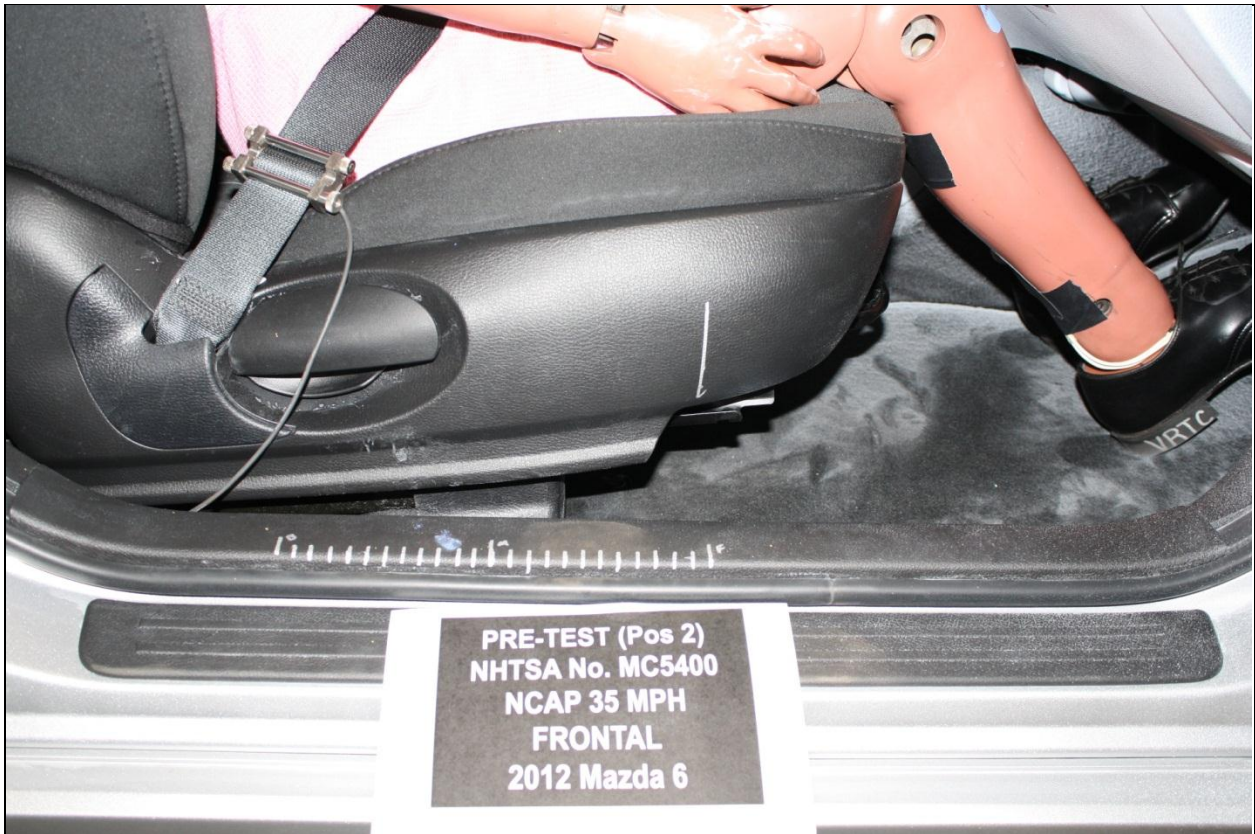


Figure A-54: Pre-Test Passenger's Seat Fore-Aft Markings



Figure A-55: Post-Test Passenger's Seat Fore-Aft Markings



Figure A-56: Pre-Test Passenger Dummy Feet

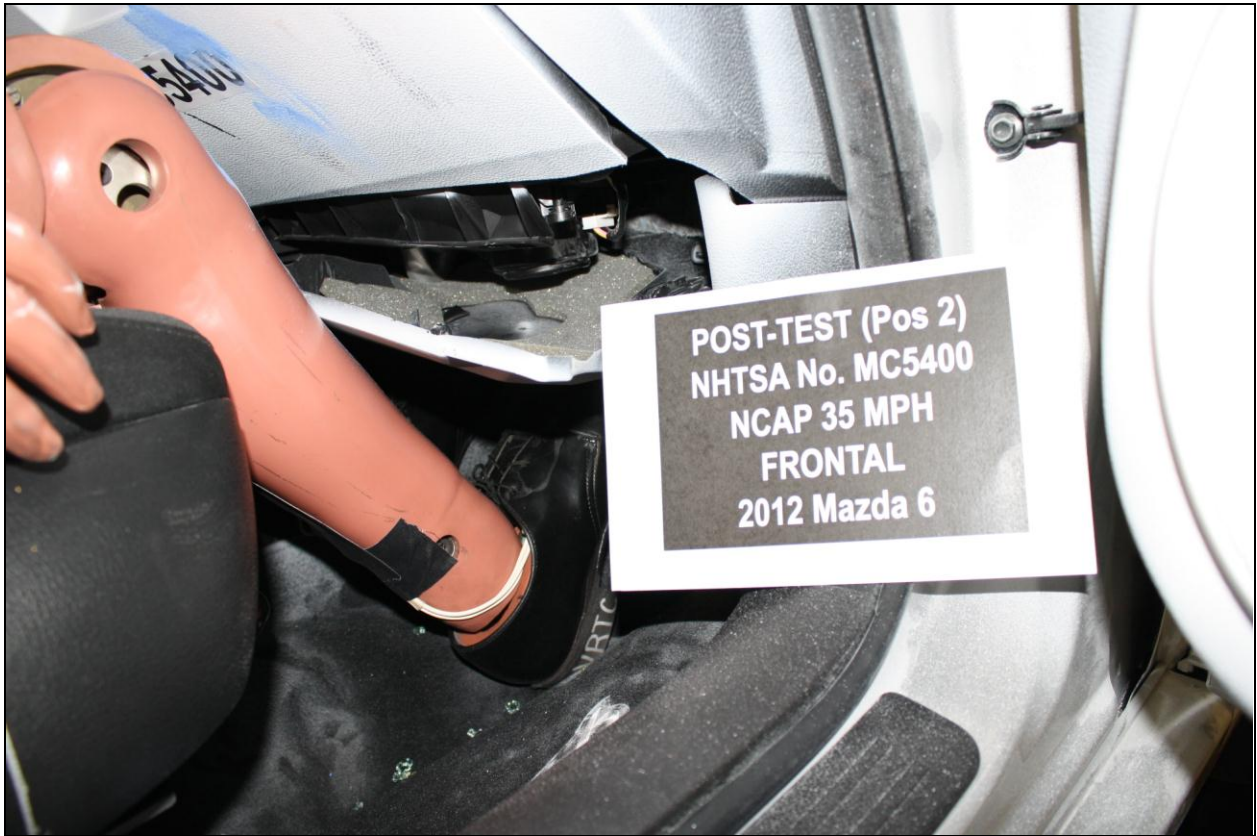


Figure A-57: Post-Test Passenger Dummy Feet



Figure A-58: Pre-Test Passenger's Side Knee Bolster



Figure A-59: Post-Test Passenger's Side Knee Bolster



Figure A-60: Pre-Test Passenger's Side Floorpan



Figure A-61: Post-Test Passenger's Side Floorpan

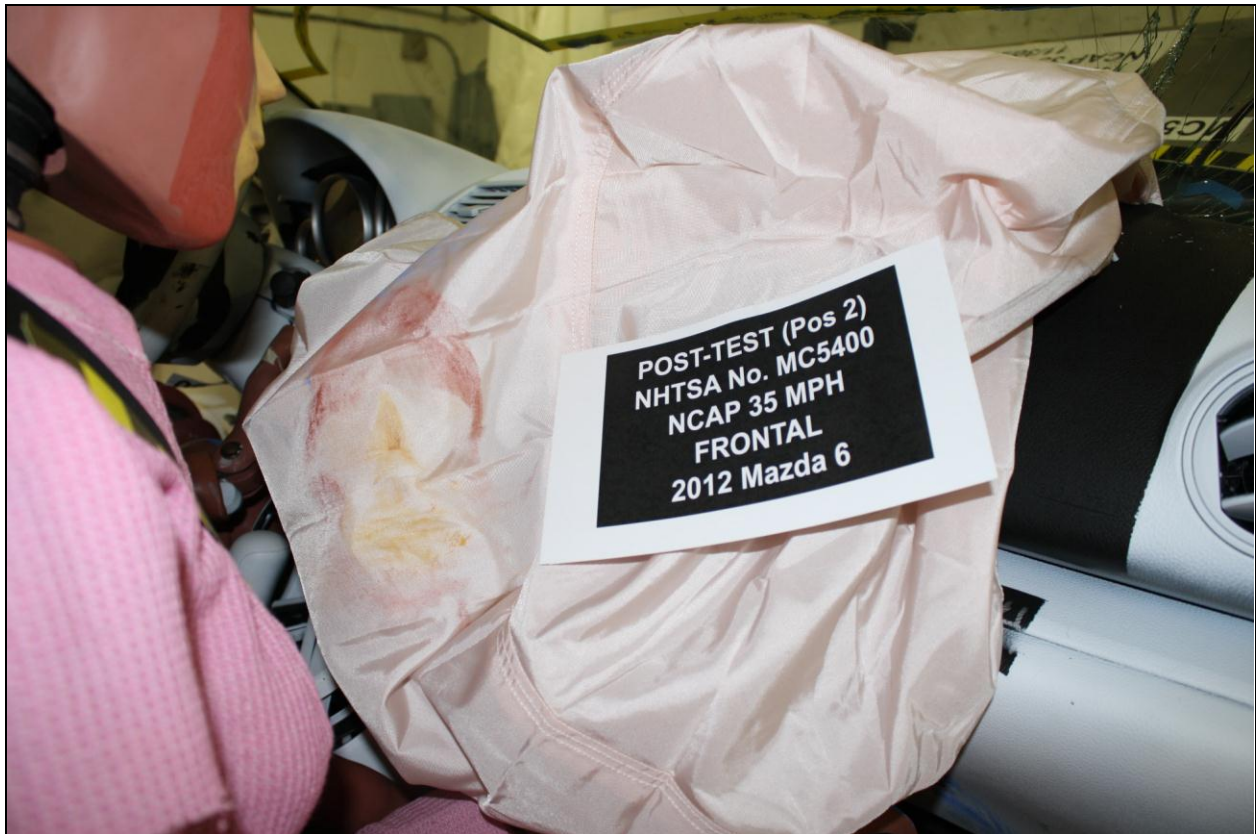


Figure A-62: Post-Test Passenger Dummy Contact with Airbag

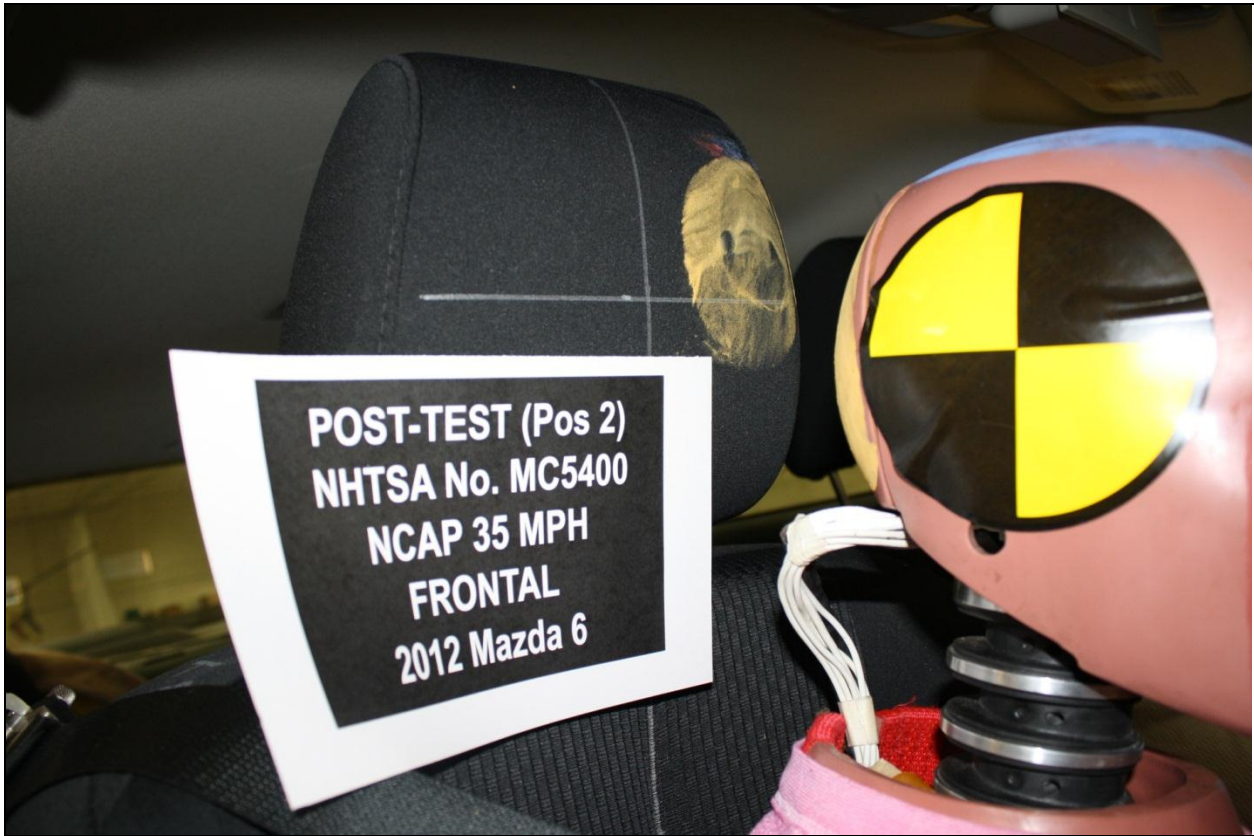


Figure A-62a: Post-Test Passenger Dummy Contact with Headrest



Figure A-63: Photograph of Ballast Installed in Vehicle

Photo Not Applicable

Figure A-64: Post-Test Stoddard Solvent Spillage Location View, if required



Figure A-65: Post-Test Speed Trap Read-Out



Figure A-66: Vehicle at 0° on Static Rollover Device



Figure A-67: Vehicle at 90° on Static Rollover Device



Figure A-68: Vehicle at 180° on Static Rollover Device

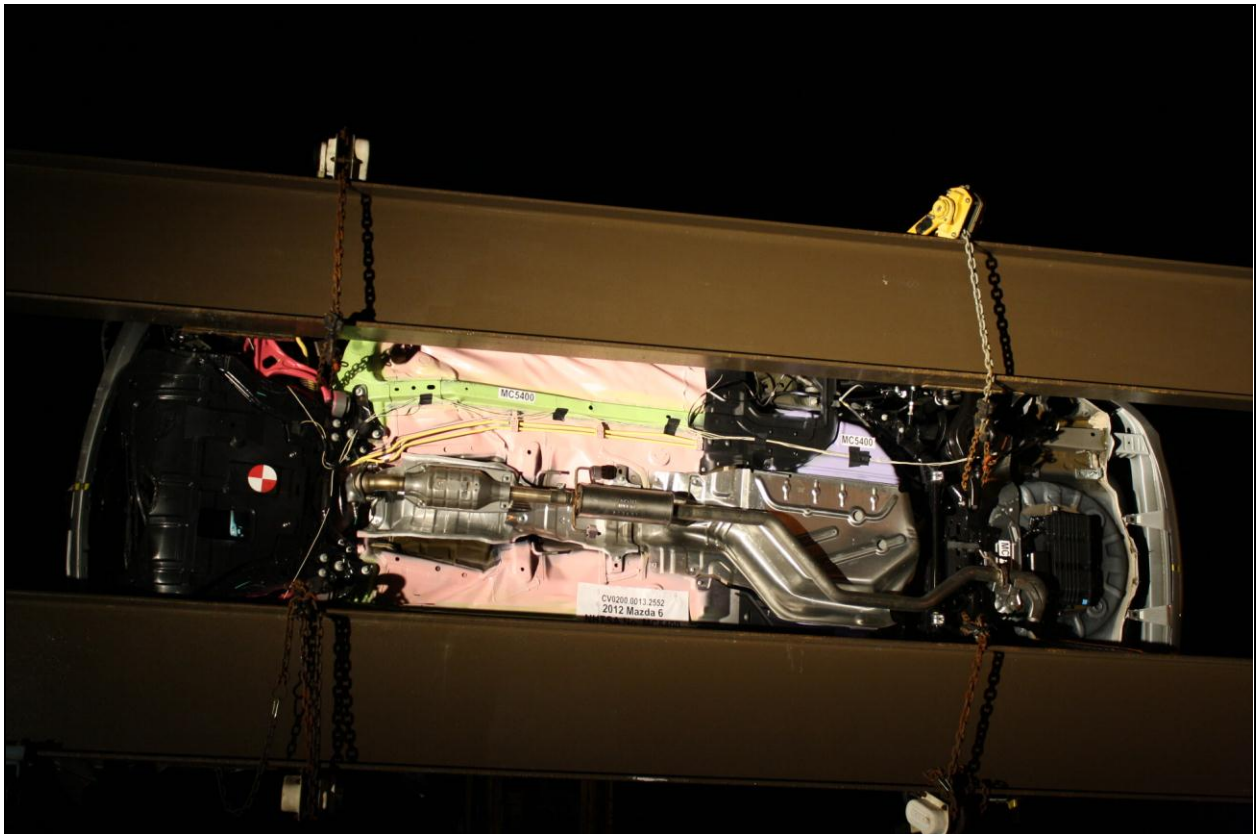



Figure A-69: Vehicle at 270° on Static Rollover Device



Figure A-70: Vehicle at 360° on Static Rollover Device



Figure A-71: 2012 Mazda Mazda6 Sport Sedan Frontal Impact Event



EPA Fuel Economy Estimates

CITY MPG

22

Expected range for most drivers
18 to 26 MPG

Estimated Annual Fuel Cost

\$2,220

based on 15,000 miles at \$3.70 per gallon

HIGHWAY MPG

31

Expected range for most drivers
25 to 37 MPG

Combined Fuel Economy

This Vehicle **25**

10 ————— 39
All Midsize cars

See the FREE Fuel Economy Guide at dealers or www.fueleconomy.gov

ENGINE/MECHANICAL FEATURES

- 2.5L DOHC 16-VALVE V4 ENGINE
- 170 HP/167 LB FT TORQUE
- PZEV EMISSIONS REFER TO OPT CE2
- 5-SPEED AUTOMATIC TRANSMISSION WITH MANUAL SHIFT MODE

EXTERIOR FEATURES

- 16" STEEL WHEELS W/WHEEL COVERS
- 17" WHEEL ARCH MOLDINGS
- VARIABLE INTERMITTENT WIPERS

INTERIOR FEATURES

- CLOTH TRIMMED SEATS
- AIR CONDITIONING W/POLLEN FILTER
- 60/40 SPLIT FOLD-DOWN REAR SEATS
- TILT & TELESCOPIC STEERING WHEEL
- 6-SPEAKER PREMIUM AUDIO SYSTEM
- AUXILIARY-AUDIO INPUT JACK
- SIRIUS SATELLITE RADIO-COMPATIBLE AUDIO SYSTEM
- REMOTE KEYLESS ENTRY
- CARPETED FLOOR MATS & CARGO MAT

SAFETY AND SECURITY FEATURES

- 3-POINT SEATBELT W/ENERGY-ABSORBING BUMPER WARRANTY
- 60 MONTH / 60,000 MILE POWERTRAIN WARRANTY
- 24-HOUR ROADSIDE ASSISTANCE
- 5-PASSENGER 3-PT SAFETY BELTS

STANDARD EQUIPMENT

- FRONT & REAR STABILIZER BARS
- 4-WHEEL DISC BRAKES
- ABS W/EBD & TRACTION CONTROL
- DYNAMIC STABILITY CONTROL
- INDEPENDENT FRONT/REAR SUSPENSION
- DUAL REMOTE POWER MIRRORS
- CHROME EXHAUST FINISHERS
- STEERING WHEEL MOUNTED CONTROLS
- CRUISE CONTROL
- FRONT DUAL MAP LIGHTS
- CENTER CONSOLE ARMREST W/DUAL STORAGE
- 3-POINT SEATBELT W/ARMREST W/OUPHOLDERS
- POWER WINDOWS
- POWER AUTOMATIC DOOR LOCKS
- SLIDING SUNVISOR EXTENSIONS
- ILLUMINATED VANITY MIRRORS
- DUAL FRONT AIR BAGS
- SIDE AIR BAGS & SIDE AIR CURTAINS
- LATCH CHILD SAFETY SEAT ANCHORS
- "TRIPLE-H" BODY CONSTRUCTION
- ANTI-THEFT ENGINE IMMOBILIZER
- TIRE PRESSURE MONITORING SYSTEM

MSRP \$21,240

OPTIONAL EQUIPMENT

CE2 PZEV EMISSIONS-168 HP/166 LB FT TORQUE

Total Vehicle and Options \$21,240

Delivery, Processing and Handling Fee \$795

Total MSRP \$22,035

NO CHARGE

PARTS CONTENT INFORMATION:

FOR VEHICLES IN THIS CARLINE: U.S./CANADIAN PARTS CONTENT: 55%
MAJOR SOURCES OF FOREIGN PARTS CONTENT: JAPAN 35%

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

FOR THIS VEHICLE: FINAL ASSEMBLY POINT: FLAT ROCK, MI, USA
COUNTRY OF ORIGIN: ENGINE: JAPAN
TRANSMISSION: JAPAN

This label is affixed pursuant to the Federal Motor Vehicle Theft, Anti-Tampering, and Title Fees, State and Local Taxes, and Dealer Installed options are not included.

GOVERNMENT SAFETY RATINGS

Frontal Crash	Driver Not Rated	Passenger Not Rated
Side Crash	Front seat Not Rated	Rear seat Not Rated
Rollover	★★★★★	

Star ratings based on the risk of injury in a frontal impact. Frontal rating should ONLY be compared to other vehicles of similar size and weight.

Star ratings based on the risk of injury in a side impact.

Star ratings 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 or 1-888-327-4236

Environmental Performance

Protect the environment, choose vehicles with higher scores:

Global Warming Score

8

Average new vehicle

Smog Score

9

Average new vehicle

Vehicle emissions are a primary contributor to global warming and smog. Scores are determined by the California Air Resources Board based on this vehicle's measured emissions. Please visit www.DriveClean.ca.gov for more information. AIR RESOURCES BOARD

SOLD TO: 50153
NORTHTOWN MAZDA
3800 SHERIDAN DR
AMHERST, NY 14226

SHIP TO: 50153
NORTHTOWN MAZDA
3800 SHERIDAN DR
AMHERST, NY 14226

1YVH28BHC5M03563



MazdaUSA.com

Figure A-72: Monroney Label Photograph

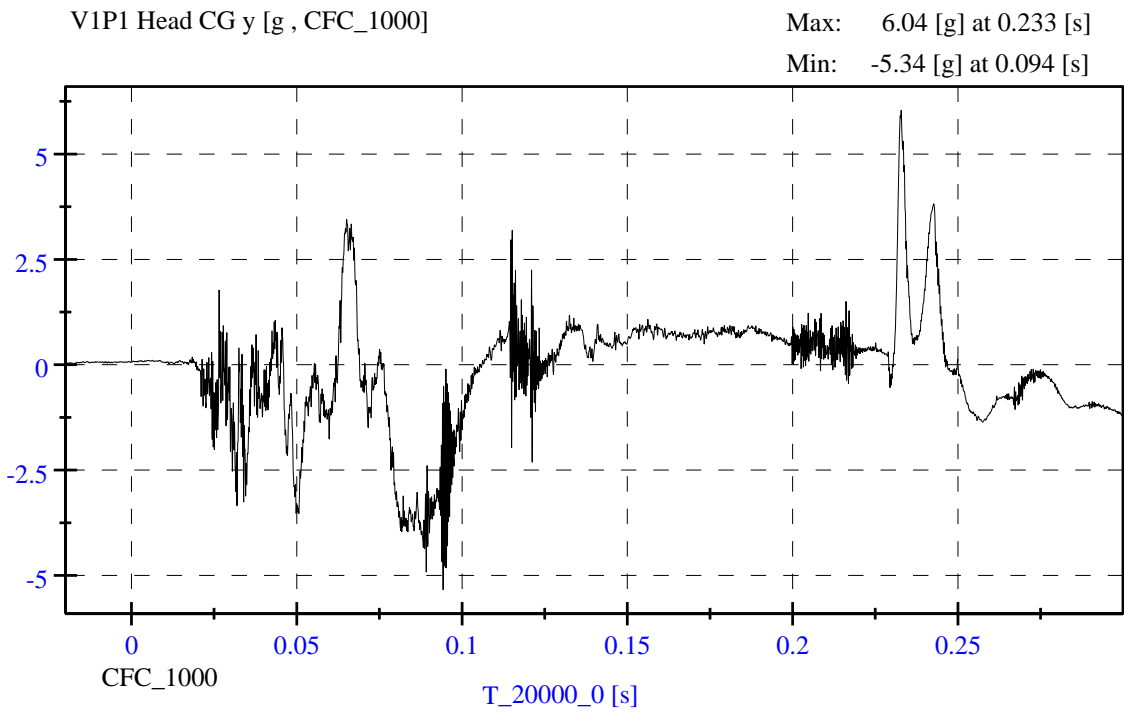
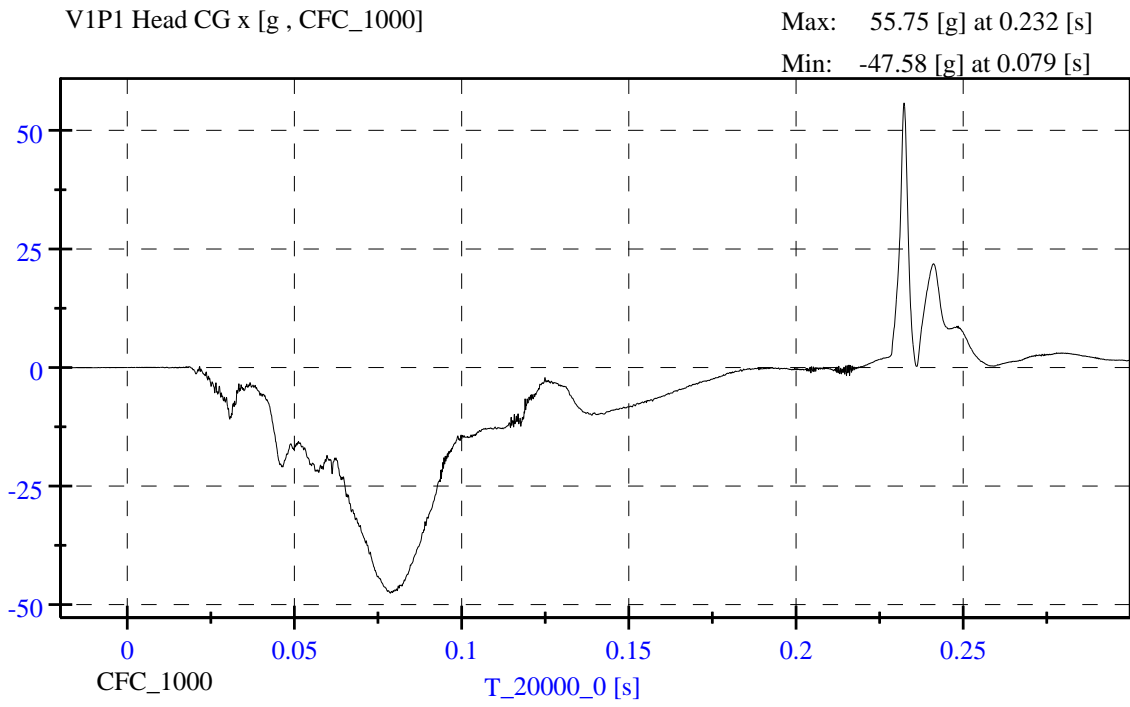
APPENDIX B
DUMMY RESPONSE DATA TRACES

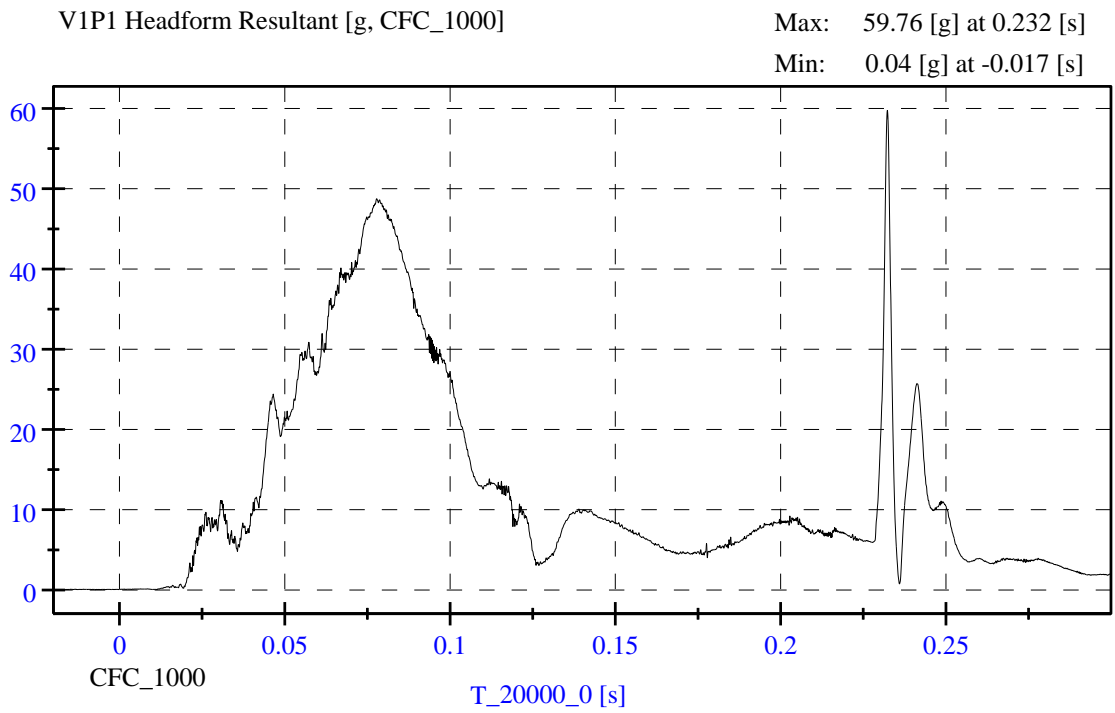
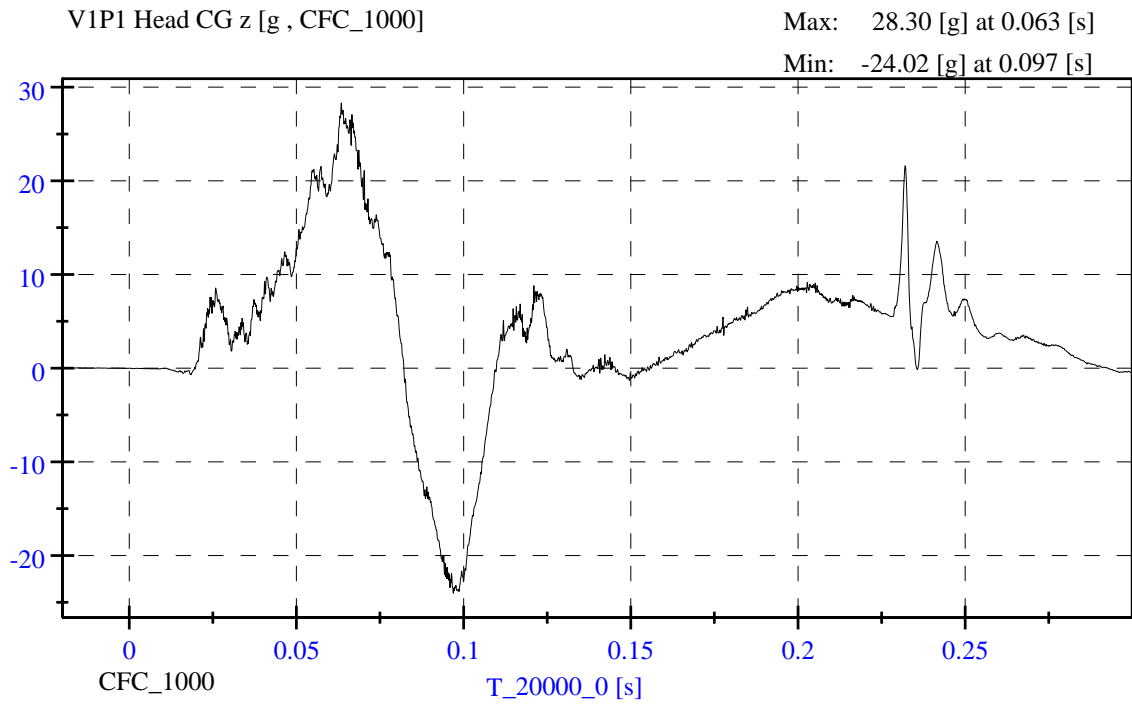
Fig. No.	List of Data Plots Provided In The Test Report	Page No.
1	Driver Head X Acceleration vs. Time Primary	B-5
2	Driver Head Y Acceleration vs. Time Primary	B-5
3	Driver Head Z Acceleration vs. Time Primary	B-6
4	Driver Head Resultant Acceleration vs. Time Primary	B-6
5	Driver Chest X Deflection vs. Time	B-7
6	Driver Chest X Acceleration vs. Time Primary	B-7
7	Driver Chest Y Acceleration vs. Time Primary	B-8
8	Driver Chest Z Acceleration vs. Time Primary	B-8
9	Driver Chest Resultant Acceleration vs. Time Primary	B-9
10	Driver Upper Neck Force X vs. Time Primary	B-9
11	Driver Upper Neck Force Z vs. Time Primary	B-10
12	Driver Upper Neck Moment Y vs. Time Primary	B-10
13	Driver Nij vs. Time Primary	B-11
14	Driver Left Femur Force vs. Time	B-11
15	Driver Right Femur Force vs. Time	B-12
16	Passenger Head X Acceleration vs. Time Primary	B-12
17	Passenger Head Y Acceleration vs. Time Primary	B-13
18	Passenger Head Z Acceleration vs. Time Primary	B-13
19	Passenger Head Resultant Acceleration vs. Time Primary	B-14
20	Passenger Chest X Deflection vs. Time	B-14
21	Passenger Chest X Acceleration vs. Time Primary	B-15
22	Passenger Chest Y Acceleration vs. Time Primary	B-15
23	Passenger Chest Z Acceleration vs. Time Primary	B-16
24	Passenger Chest Resultant Acceleration vs. Time Primary	B-16
25	Passenger Upper Neck Force X vs. Time Primary	B-17
26	Passenger Upper Neck Force Z vs. Time Primary	B-17
27	Passenger Upper Neck Moment Y vs. Time Primary	B-18
28	Passenger Nij vs. Time Primary	B-18
29	Passenger Left Femur Force vs. Time	B-19
30	Passenger Right Femur Force vs. Time	B-19

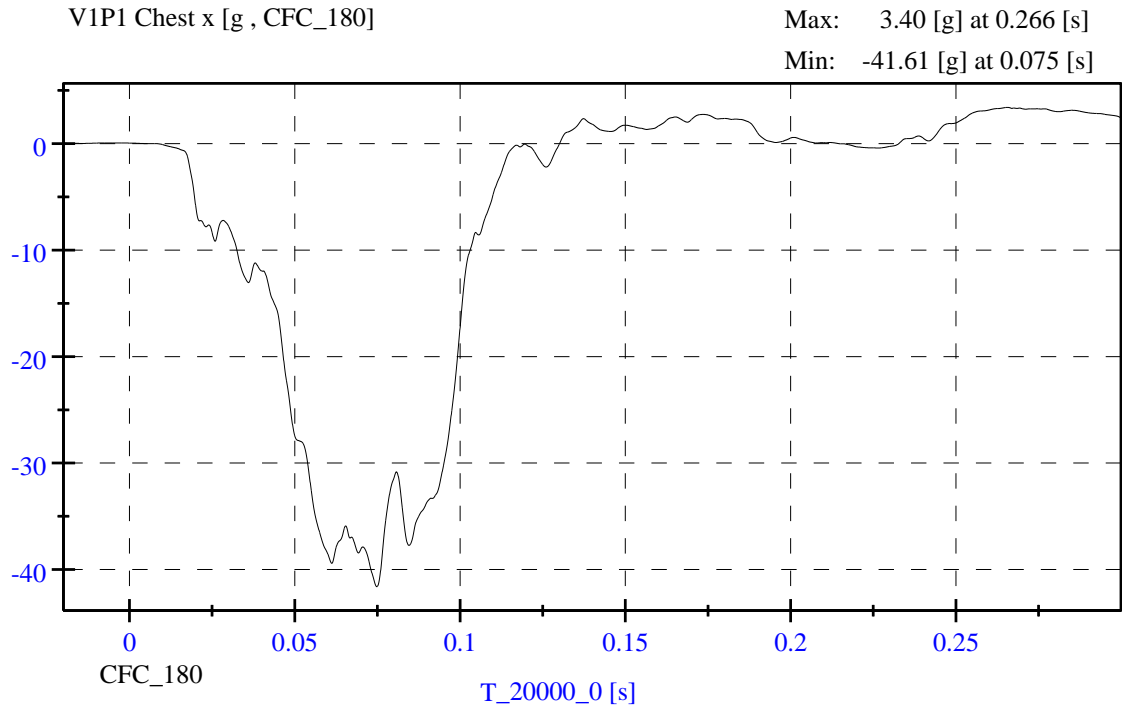
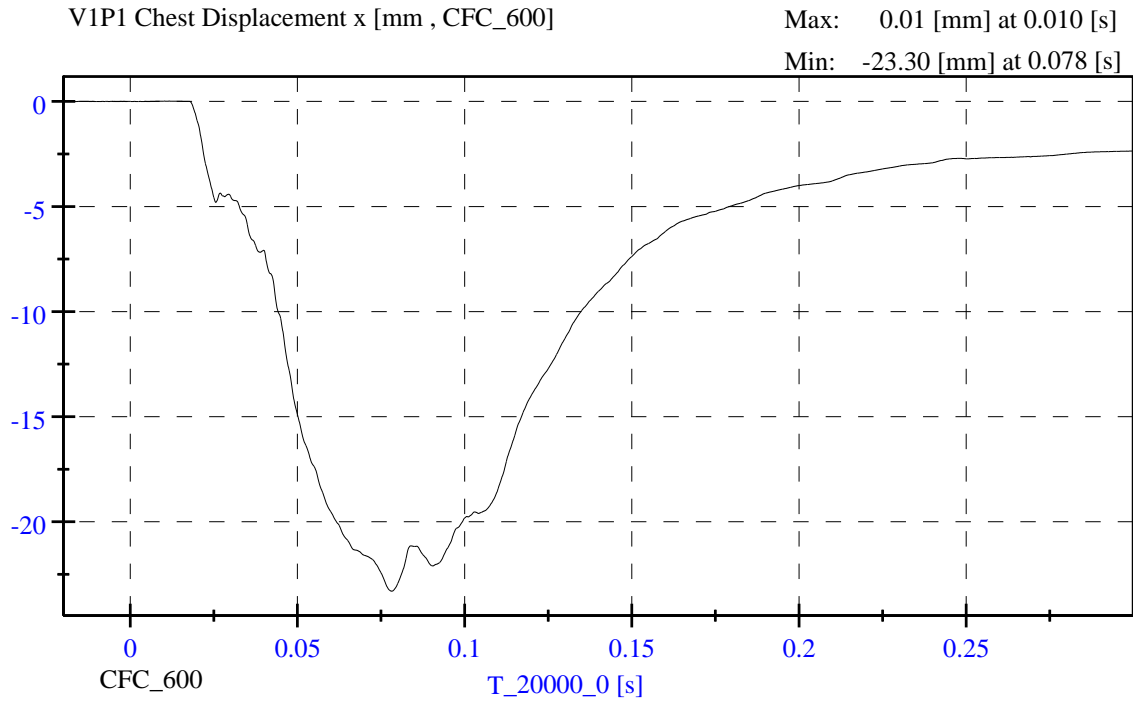
The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at www.nhtsa.dot.gov

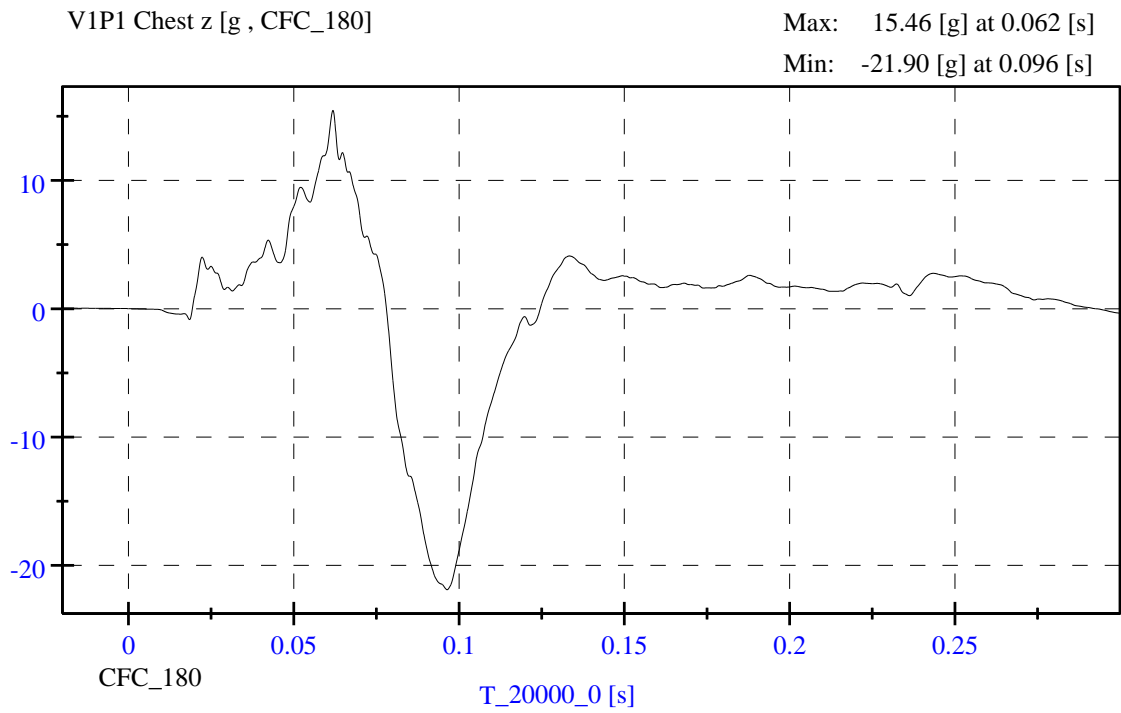
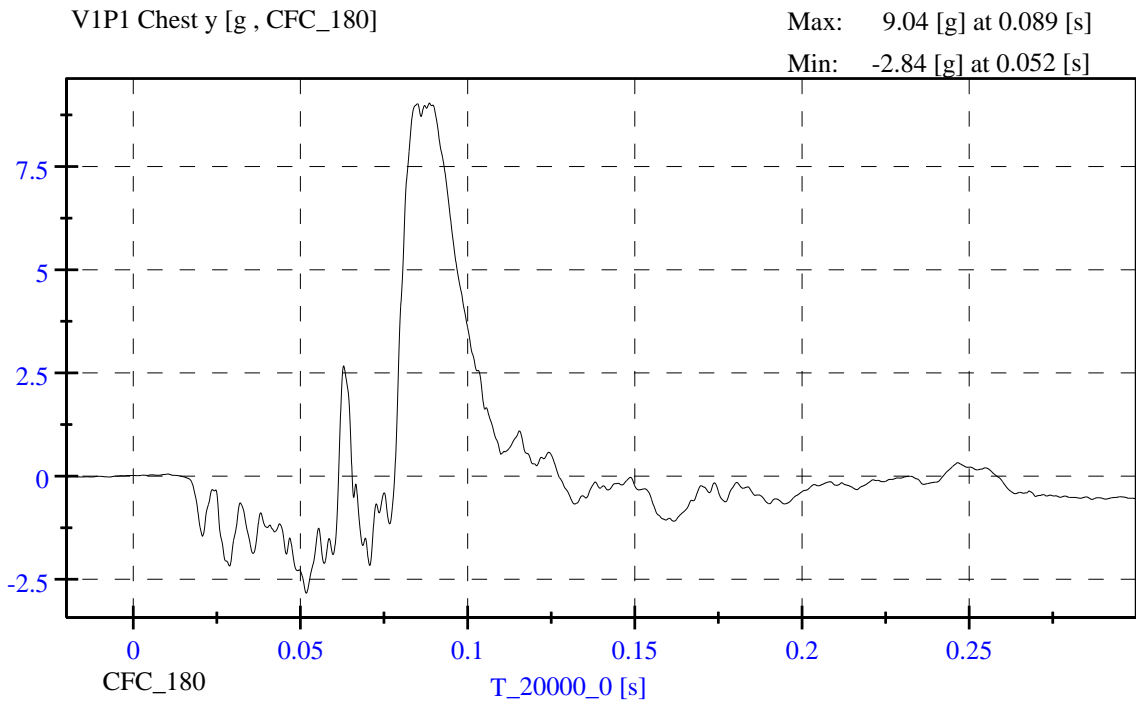
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Driver Head Y Acceleration Redundant
Driver Head Z Acceleration Redundant
Driver Upper Neck Force Y
Driver Upper Neck Moment X
Driver Upper Neck Moment Z
Driver Chest X Acceleration Redundant
Driver Chest Y Acceleration Redundant
Driver Chest Z Acceleration Redundant
Driver Pelvis X
Driver Pelvis Y
Driver Pelvis Z
Driver Left Femur Redundant
Driver Right Femur 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 Redundant
Passenger Right Femur Redundant
Passenger Left Upper Tibia Moment X
Passenger Left Upper Tibia Moment Y
Passenger Left Upper Tibia Force Z

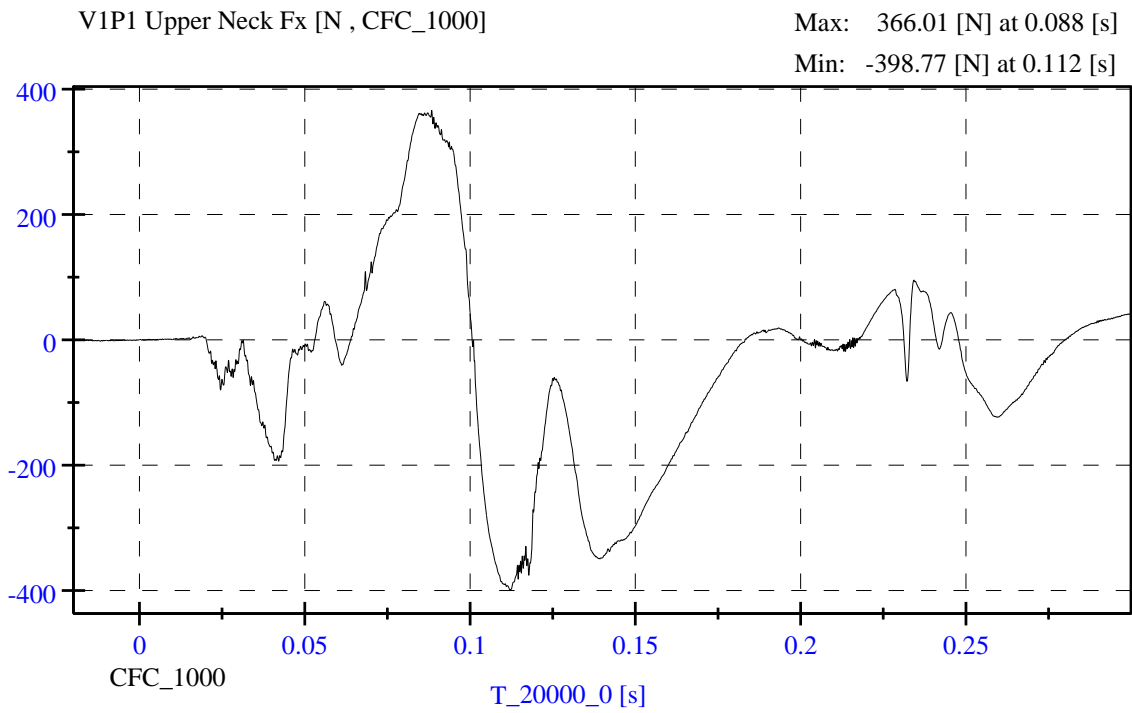
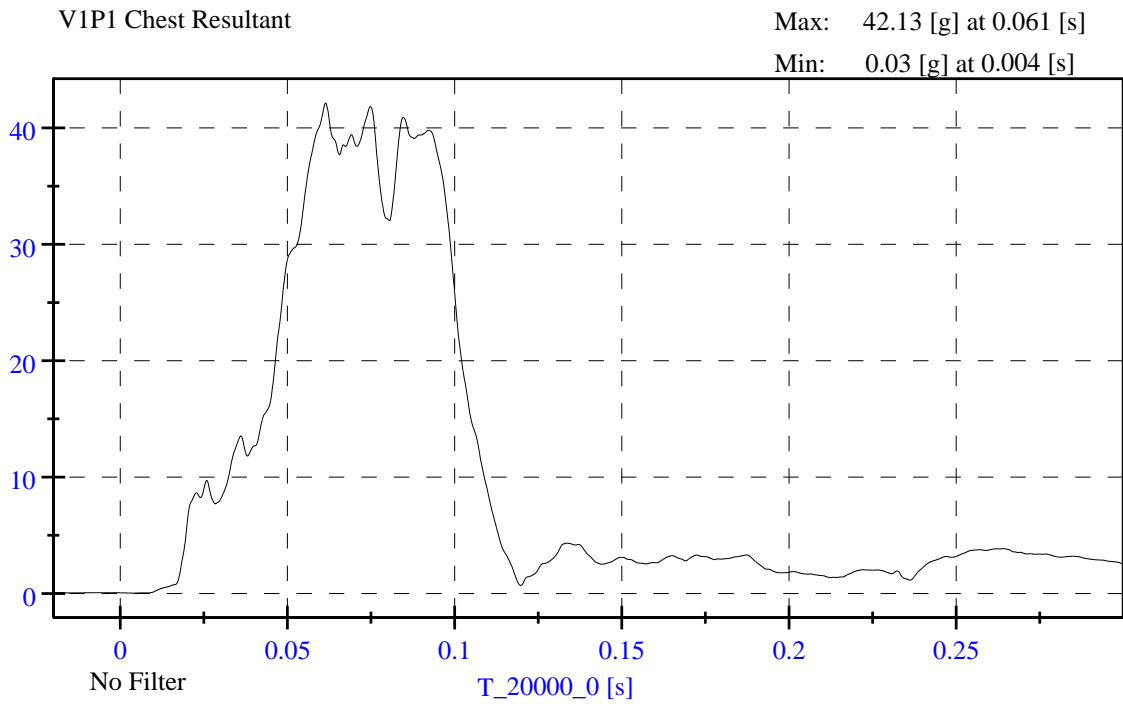
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Passenger Left Lower Tibia Force Z
Passenger Right Upper Tibia Moment X
Passenger Right Upper Tibia Moment Y
Passenger Right Upper Tibia Force Z
Passenger Right Lower Tibia Moment X
Passenger Right Lower Tibia Moment Y
Passenger Right Lower Tibia Force 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
Vehicle Engine Top X
Vehicle Engine Bottom X
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

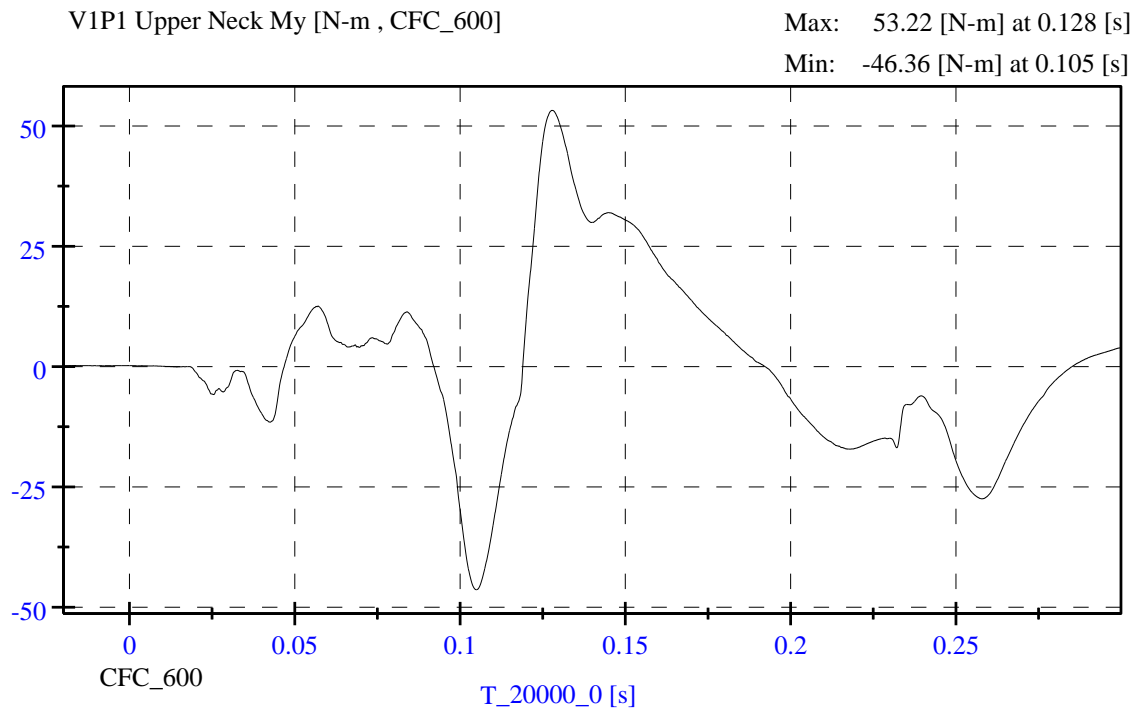
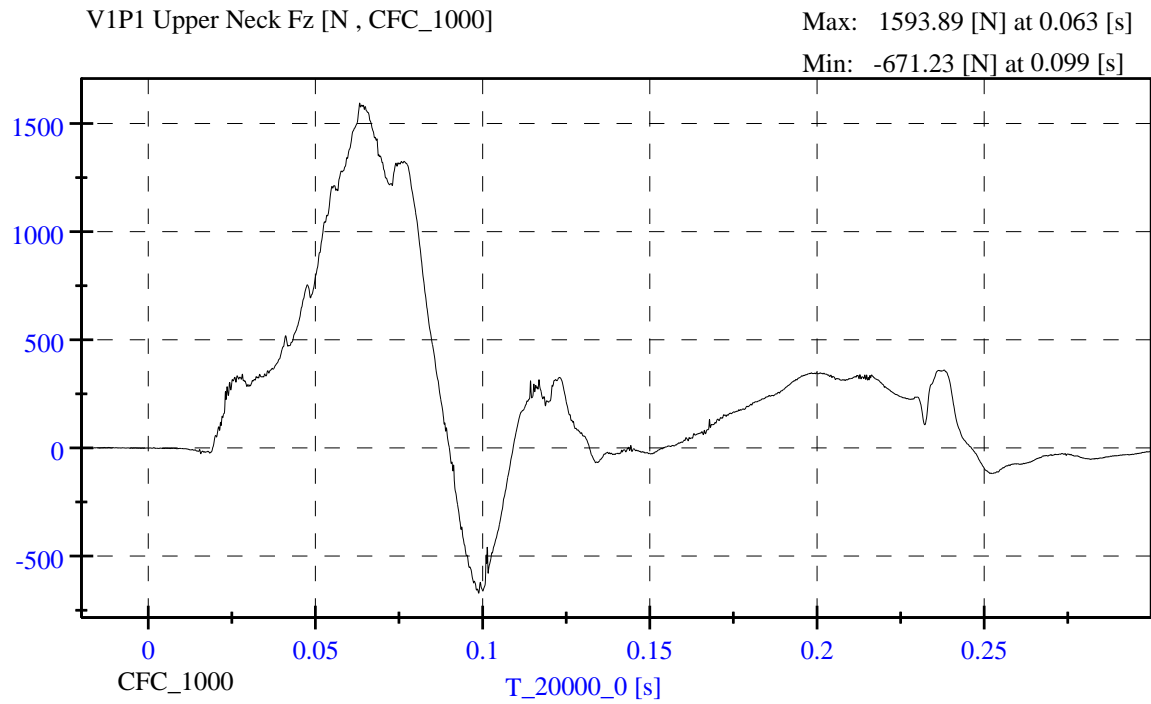








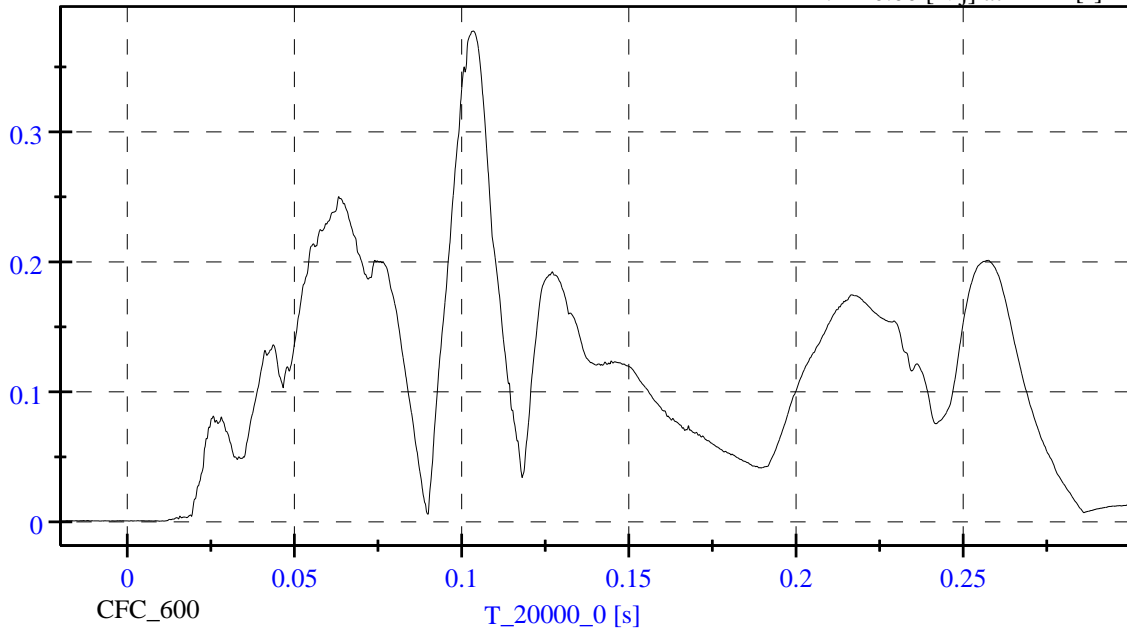




VIP1 Upper Neck Nij [Nij, CFC_600]

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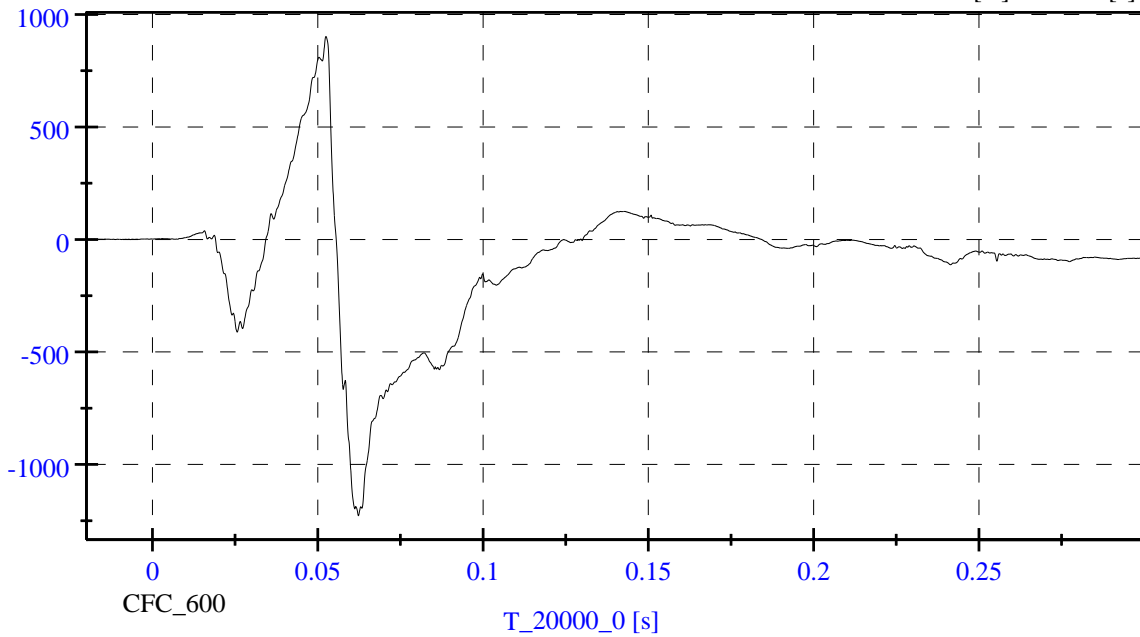
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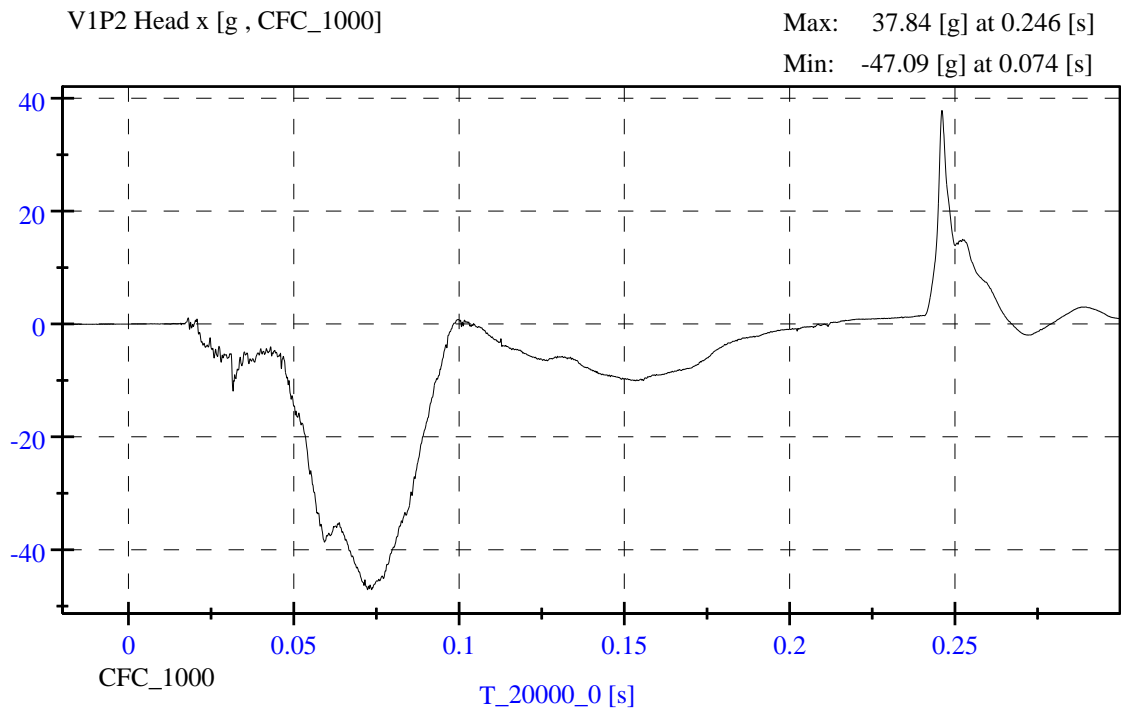
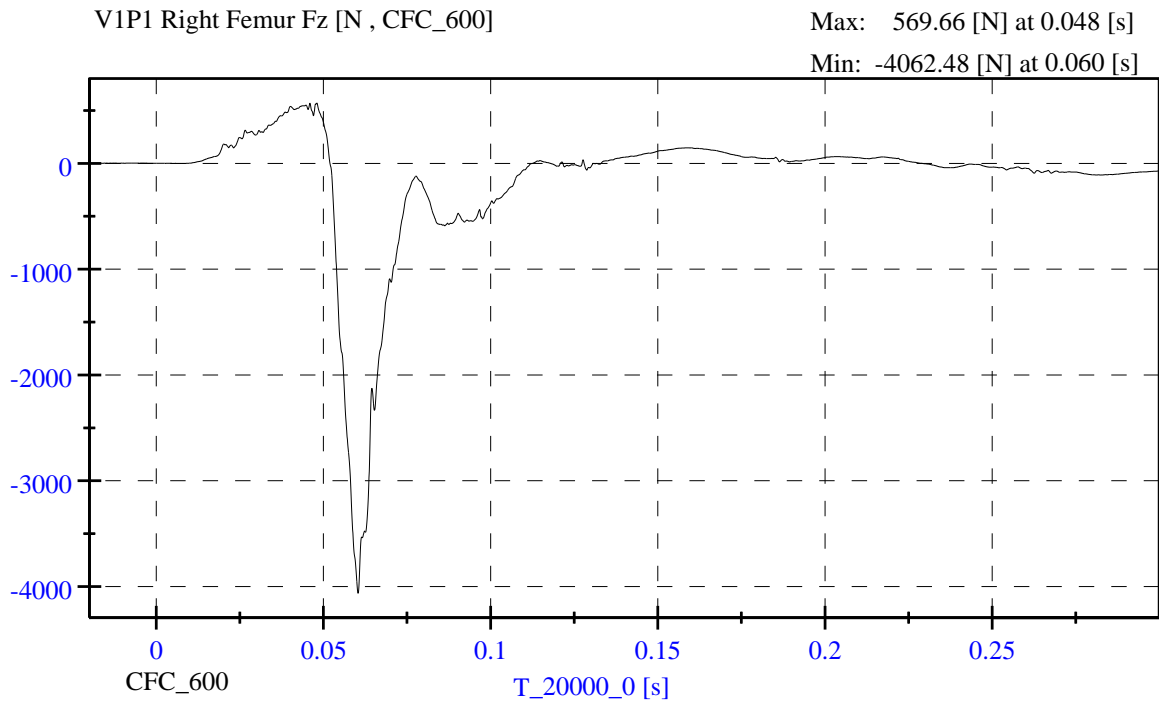


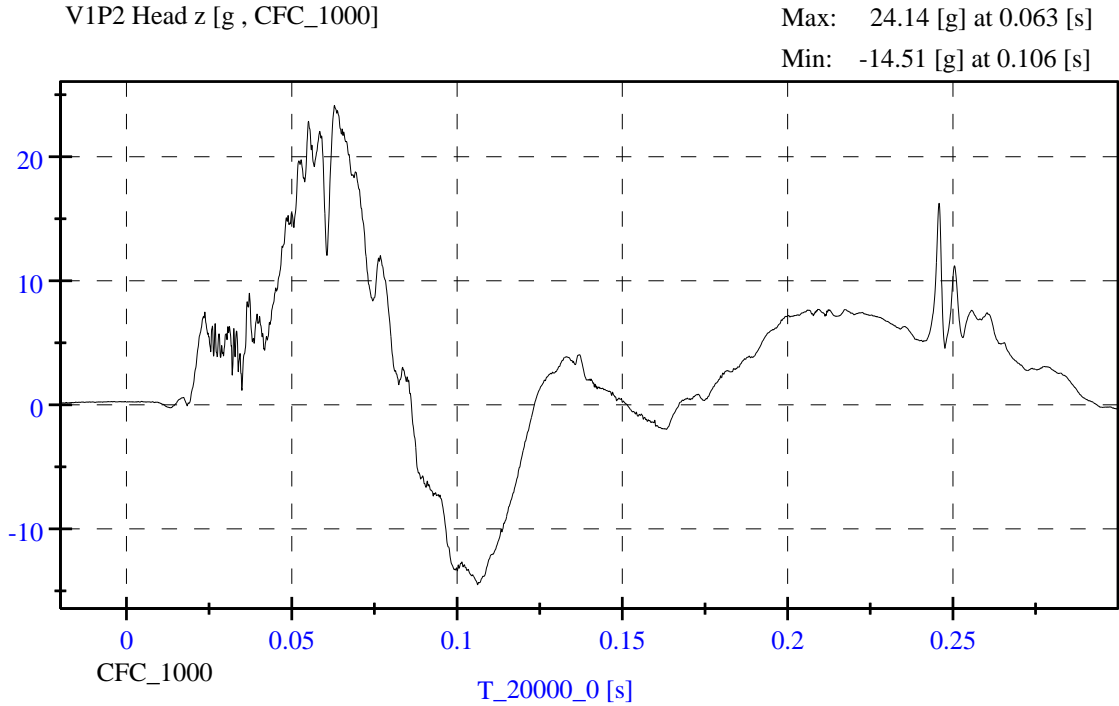
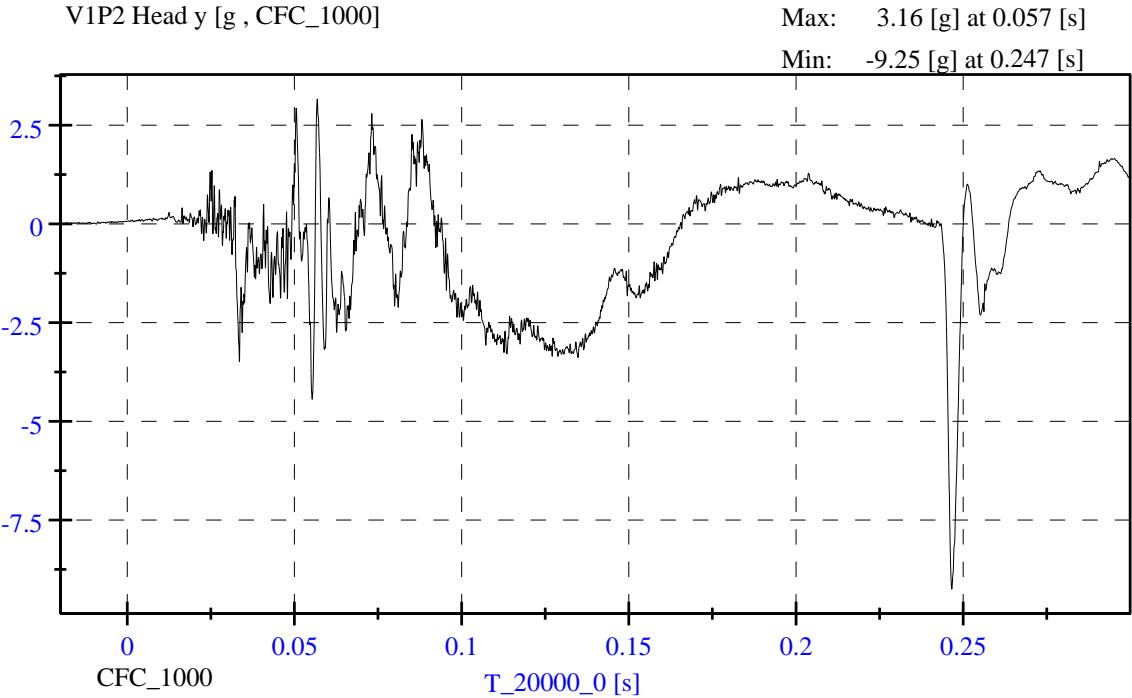
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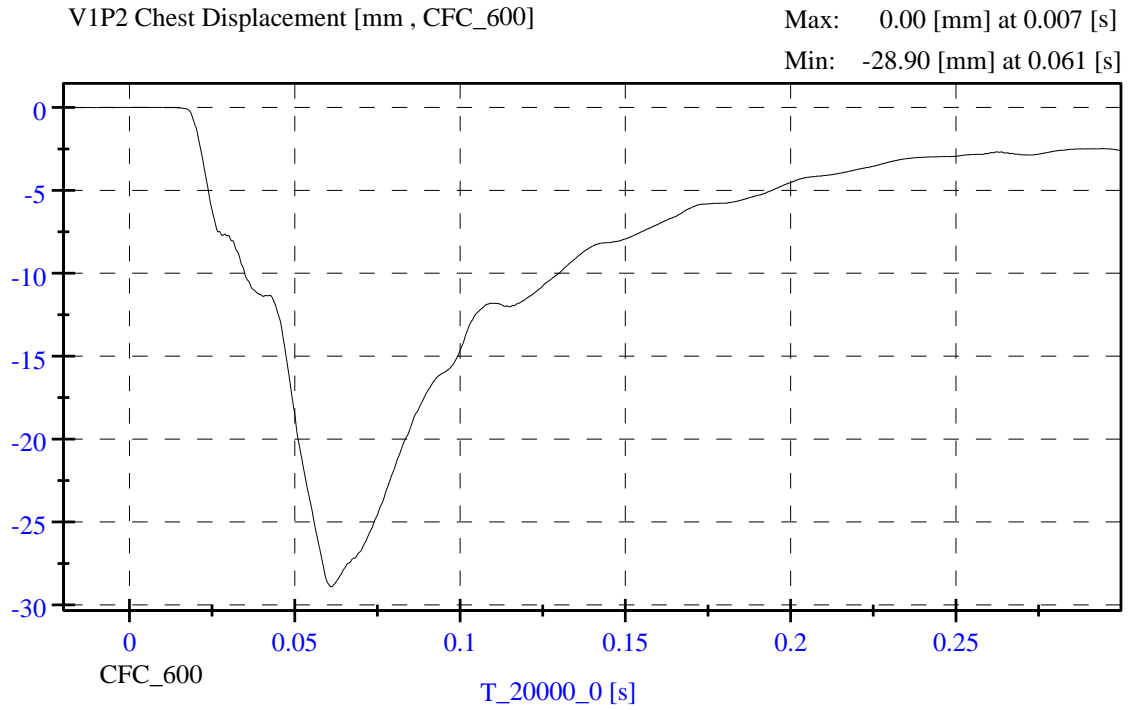
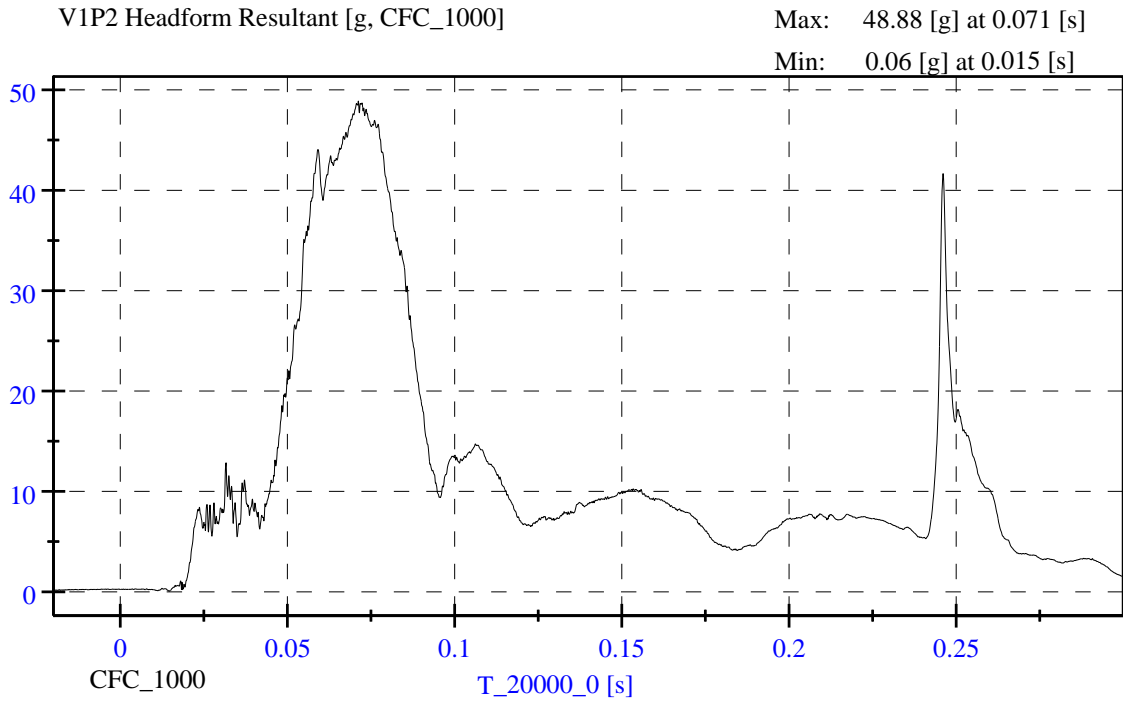
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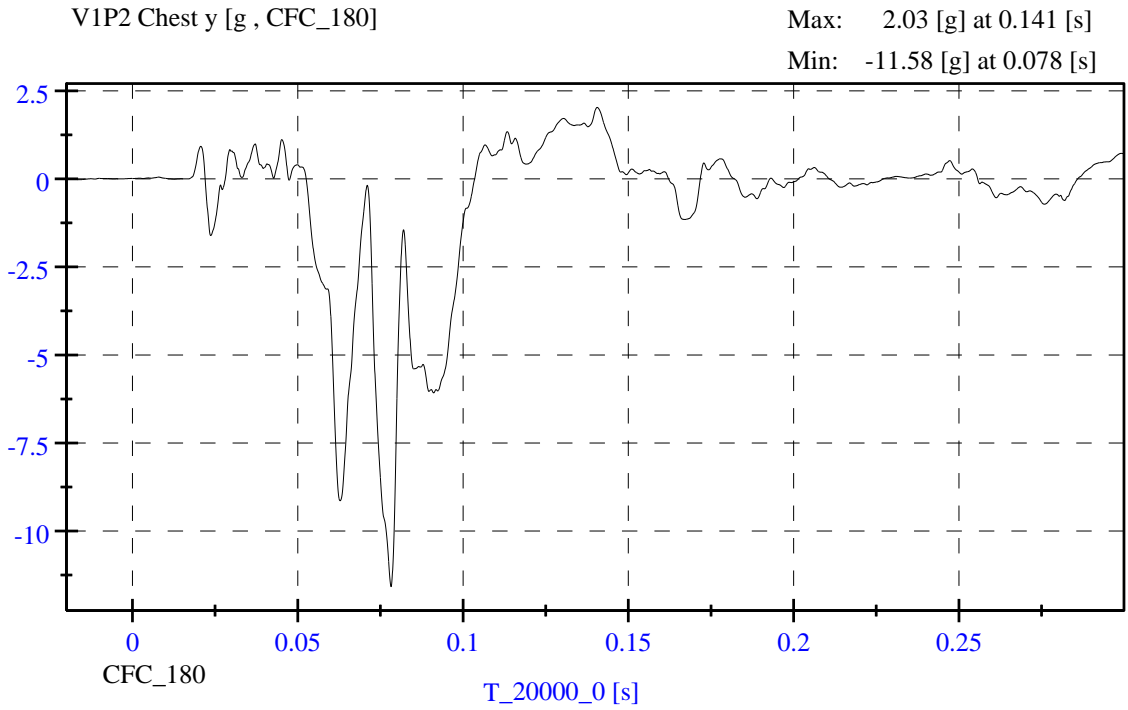
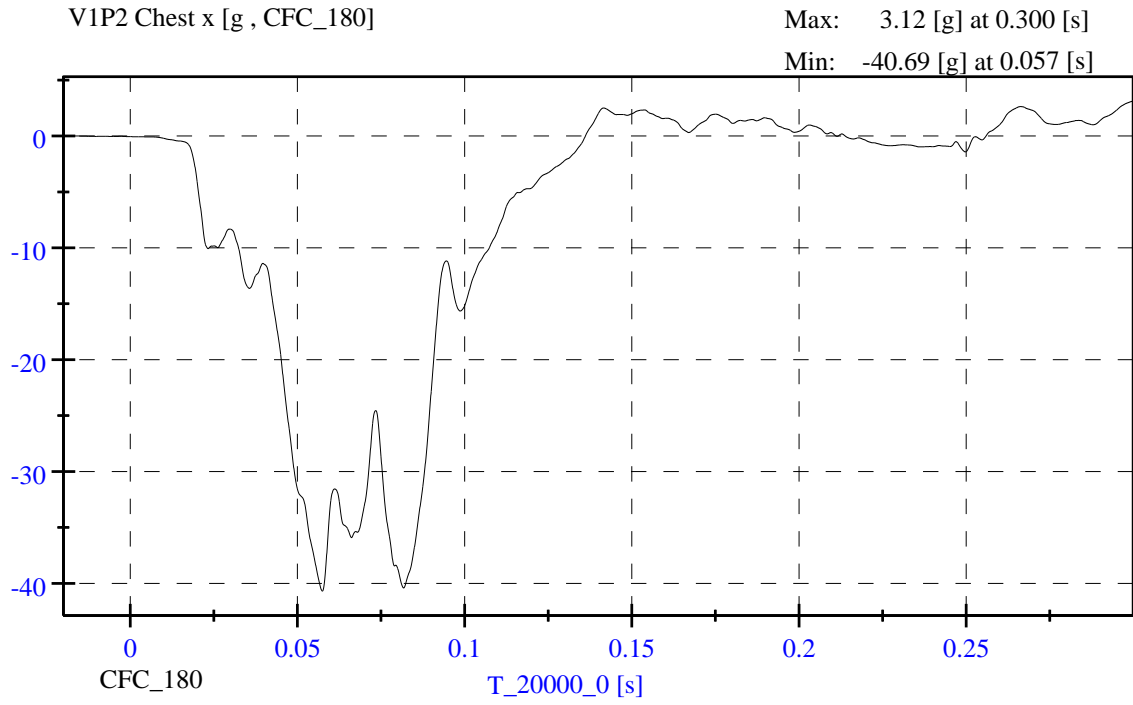
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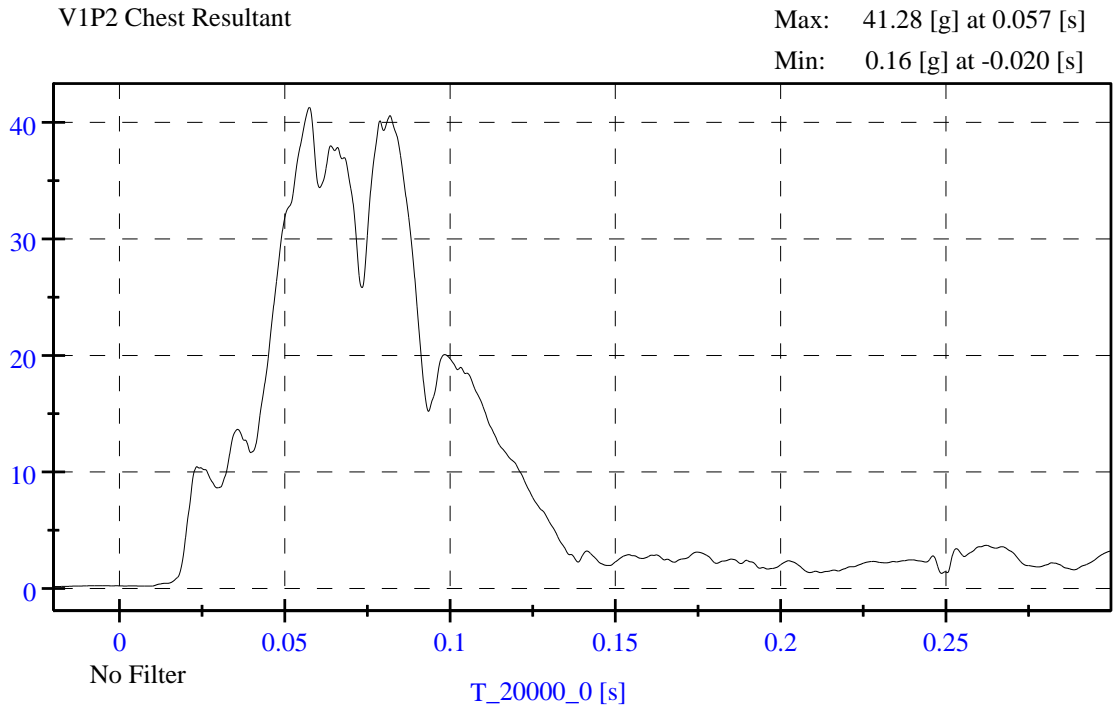
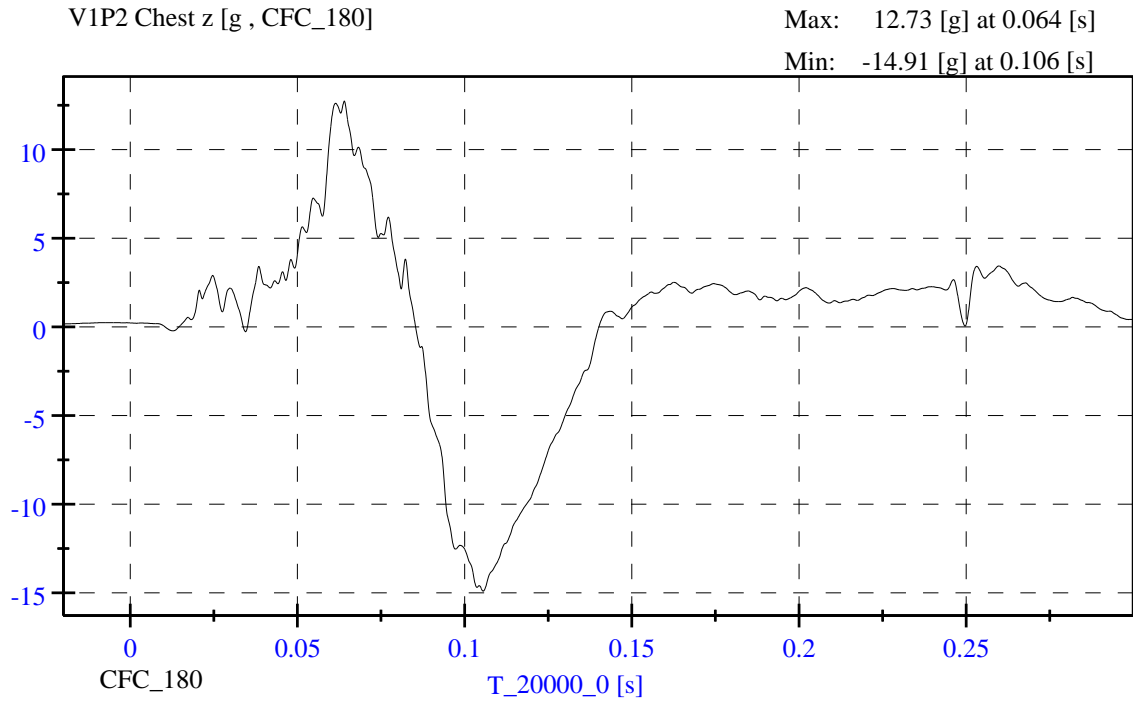


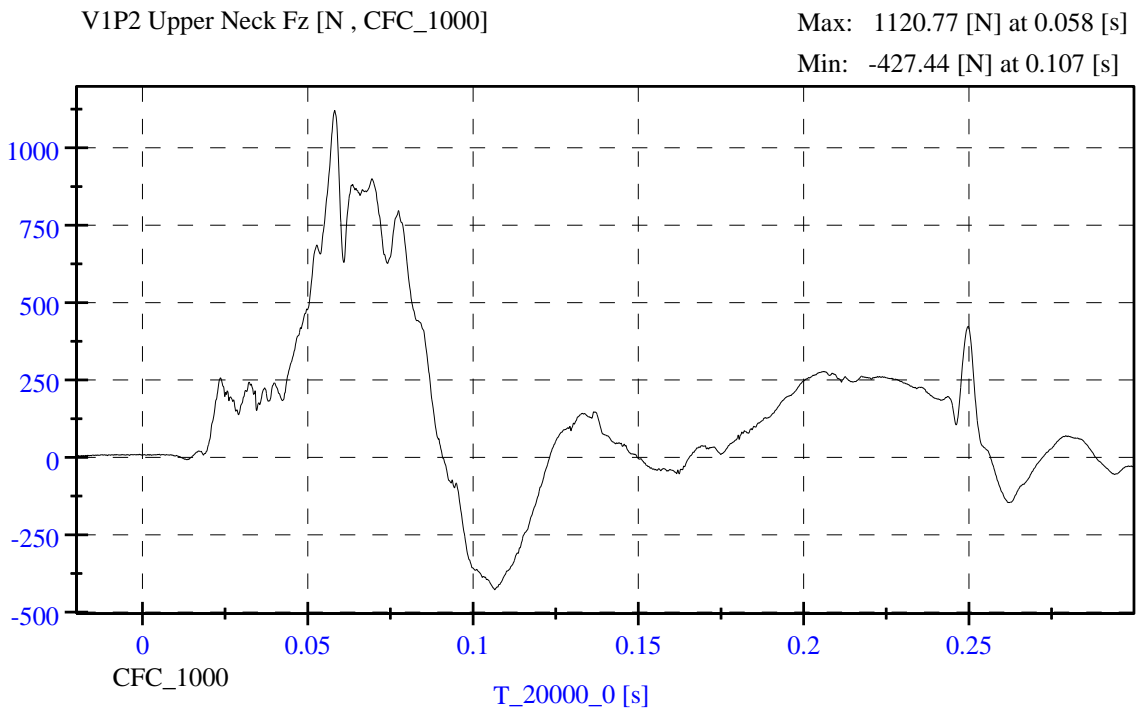
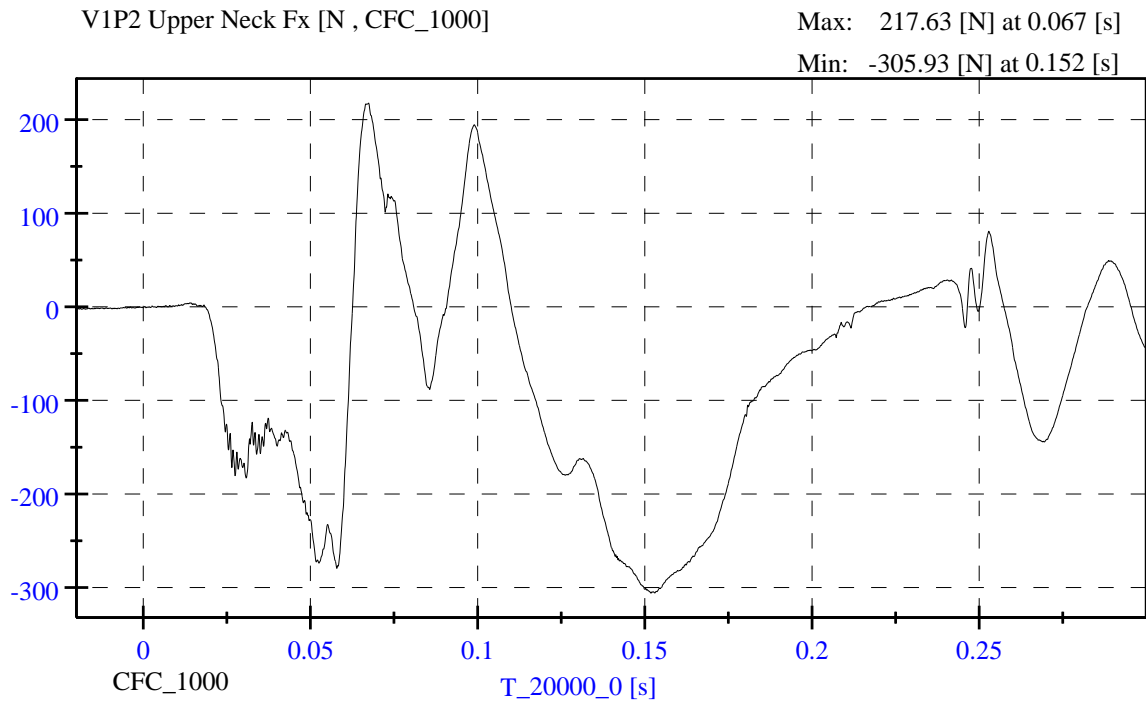


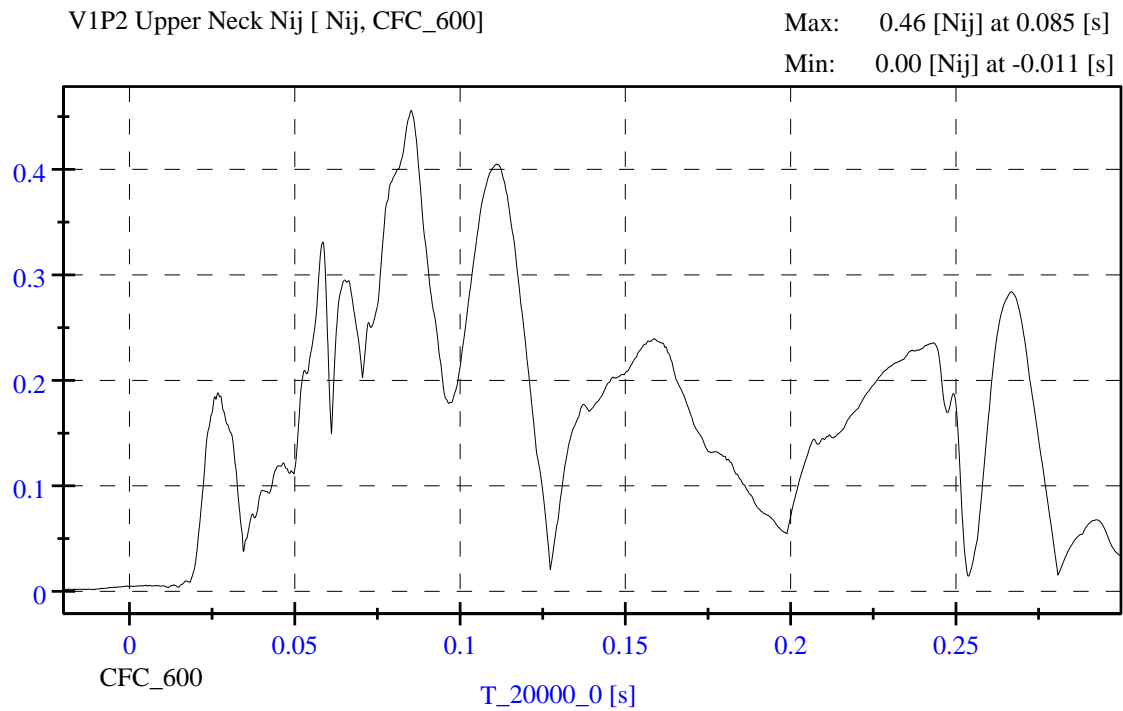
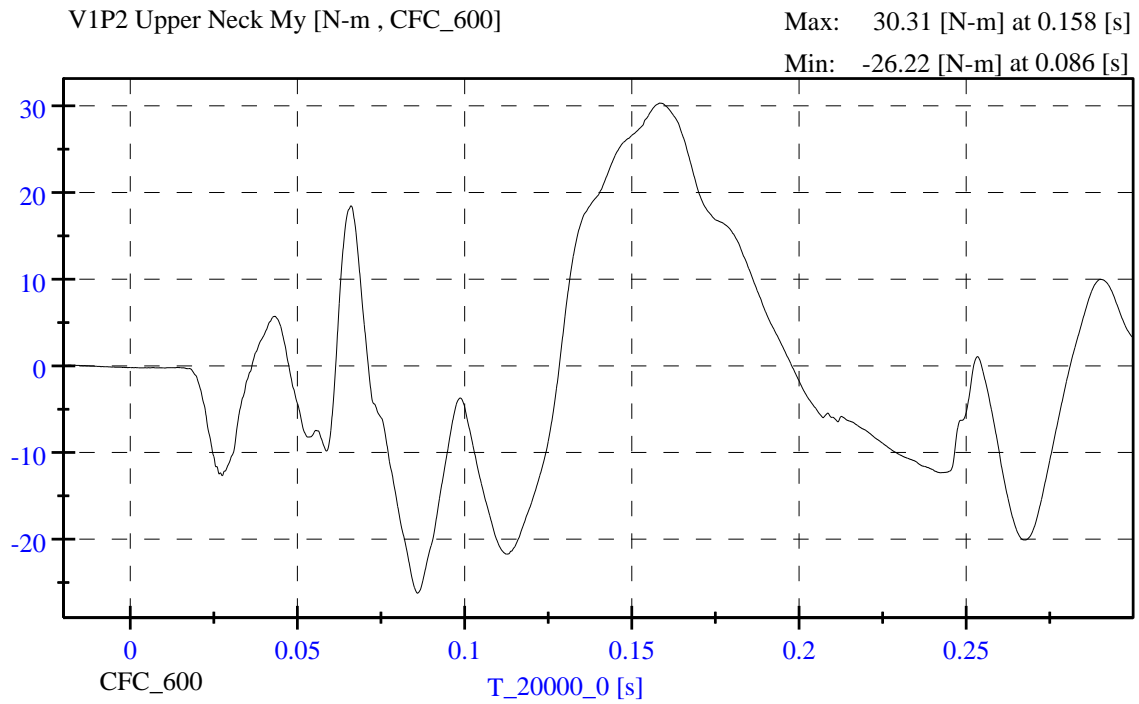


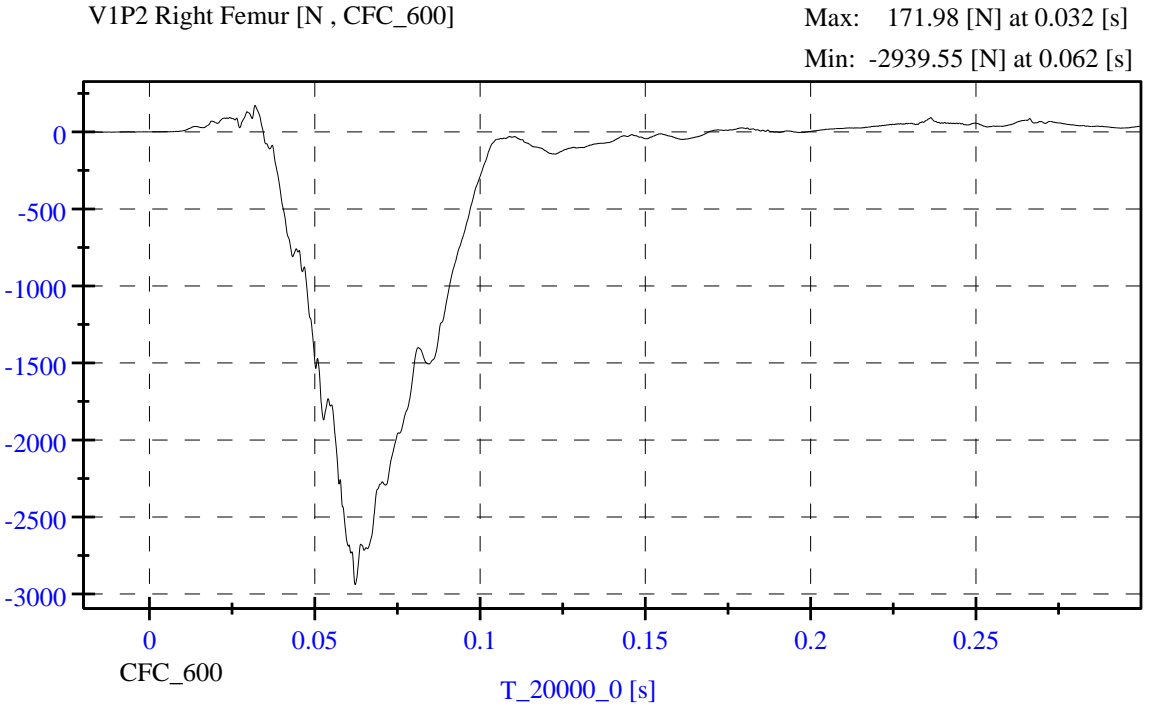
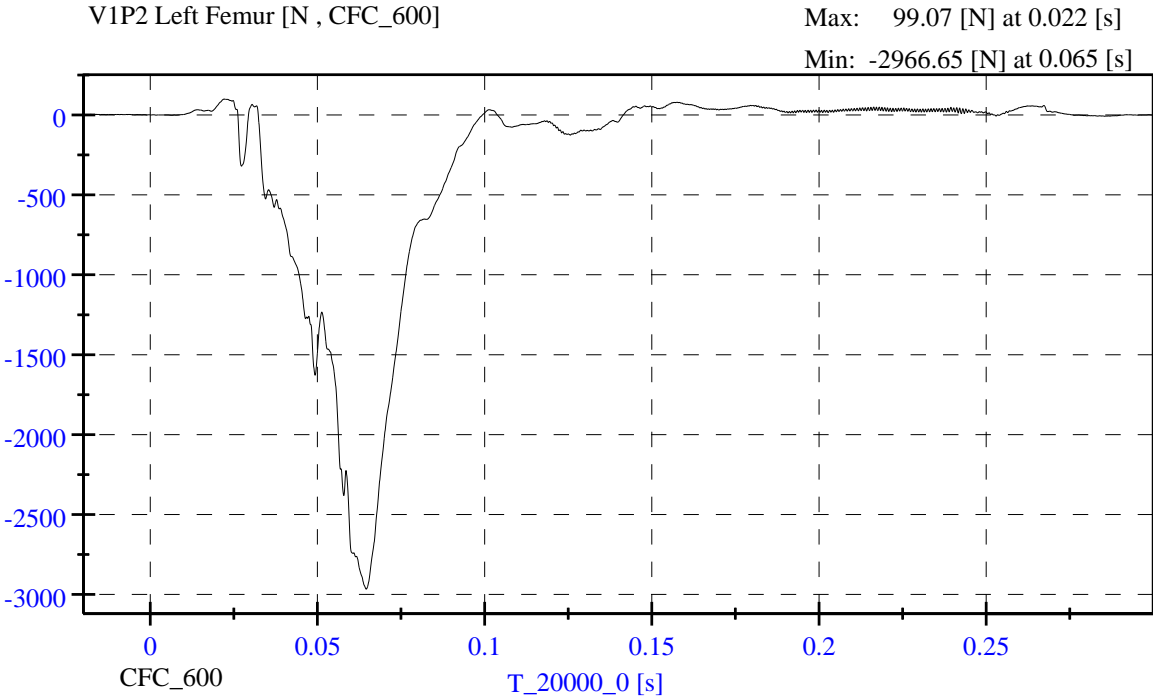












APPENDIX C

PART 572 E/O DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA SHEETS

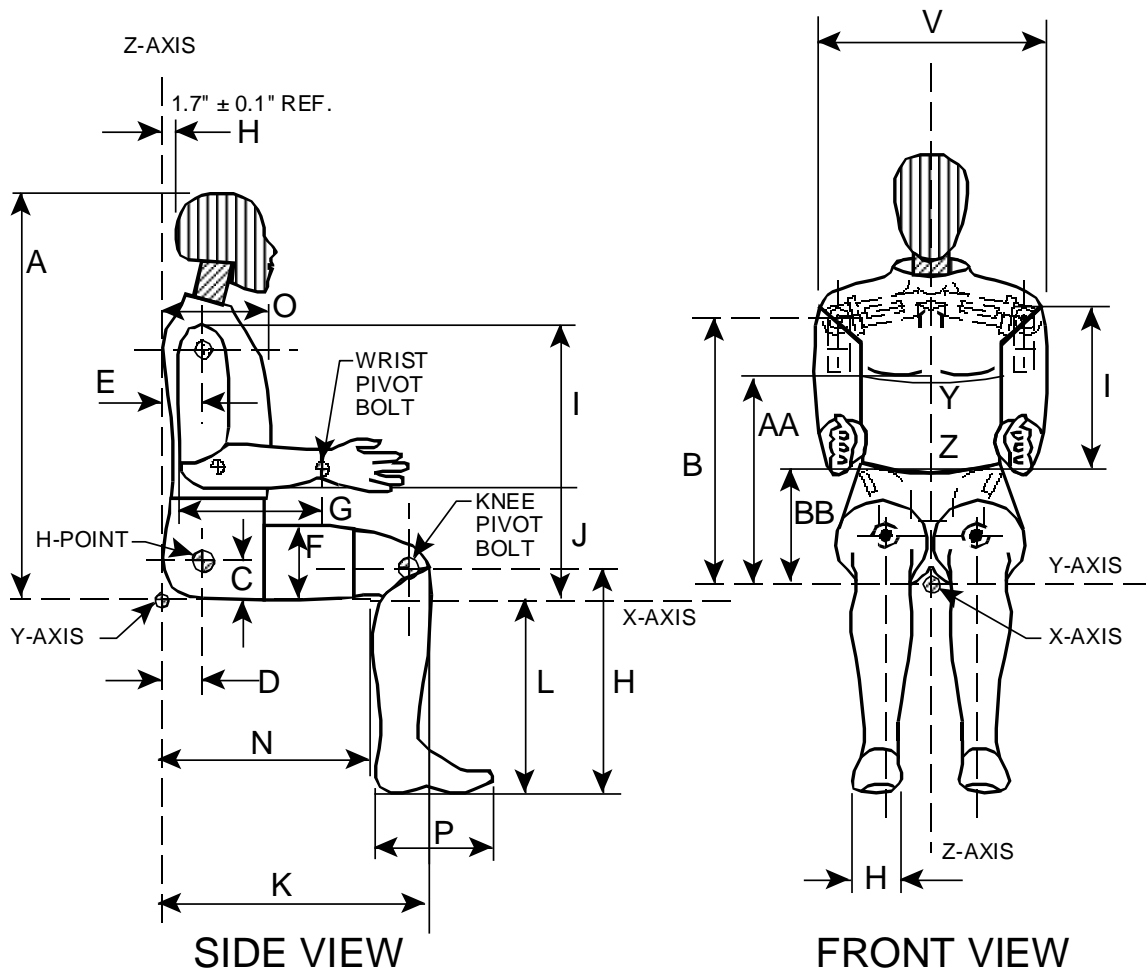
The tests were conducted at the Dummy Certification Test Facility of Calspan. A summary of the test results, and Part 572 specifications are included in this Appendix.

Dummy serial numbers and certification dates are:

<u>Position No./Location</u>	<u>Serial No.</u>	<u>Completion Date</u>
#1/Driver	064	
#2/Right Front Passenger	273	

DUMMY CONFIGURATION DIMENSIONS

EXTERNAL DIMENSIONS SPECIFICATIONS



NOTE: Figure is referenced to the erect seated position. The curved lumbar does not allow the Hybrid III to be positioned in a perfect erect attitude. (REF: S572.31(A)(6))

CALIBRATION TEST RESULTS

PRE-TEST

DRIVER DUMMY

S/N: 064



www.calspan.com

Calspan - Transportation Research Group

4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

50th Male External Measurements

S/N 064

Symbol	Description	Specification	Results	Pass
		in	in	
A	Sitting Height	34.6 – 35.0	35.0	Yes
B	Shoulder Pivot Height	19.9 - 20.5	20.4	Yes
C	H-Point Height	3.3 – 3.5	3.5	Yes
D	H-Point from Backline	5.3 – 5.5	5.5	Yes
E	Shoulder Pivot from Backline	3.3 – 3.7	3.5	Yes
F	Thigh Clearance	5.5 – 6.1	6.0	Yes
G	Back of Elbow to Wrist Pivot	11.4 – 12.0	11.5	Yes
H	Head Back to Backline	1.6 – 1.8	1.7	Yes
I	Shoulder to Elbow Length	13.0 – 13.6	13.3	Yes
J	Elbow Rest Height	7.5 – 8.3	7.9	Yes
K	Buttock to Knee Length	22.8 – 23.8	23.5	Yes
L	Popliteal Height	16.9 – 17.9	17.2	Yes
M	Knee Pivot Height	19.1 – 19.7	19.1	Yes
N	Buttock Popliteal Length	17.8 – 18.8	18.5	Yes
O	Chest Depth without Jacket	8.4 – 9.0	8.5	Yes
P	Foot Length (right)	9.9 – 10.5	10.2	Yes
V	Shoulder Breadth	16.3 – 17.2	16.7	Yes
W	Foot Breadth	3.6 – 4.2	3.9	Yes
Y	Chest Circumference with Jacket	38.2 – 39.4	38.8	Yes
Z	Waist Circumference	32.9 – 34.1	33.4	Yes
AA	Reference Location (Chest Circumference)	16.9 – 17.1	17.0	Yes
BB	Reference Location (Waist Circumference)	8.9 – 9.1	9.0	Yes

Technician: AR

Date: 11/23/2011



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VERIFICATION REPORT

Test Name:	Head Drop	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	064		
Test ID:		Test Date:	11/23/2011
Test Number:	1	Test Time:	10:11:40 AM

Component Part Number	Component Serial Number
Head Skin - 78051-228	7997

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.9 deg C P
Humidity	10 -- 70	32 %RH P
Resultant Acceleration	225 -- 275	234 g P
Oscillation	0.0 -- 10.0	3.0 % P
Lateral Acceleration	-15.00 -- 15.00	-6.83 g P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test ID:

Test Time: **10:11:40 AM**

Test Date: **11/23/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P66931	6/13/2011
Endevco	7264-2000	P66926	6/13/2011
Endevco	7264-2000	P66943	6/13/2011

Test ID:

Test Time: **10:11:40 AM**

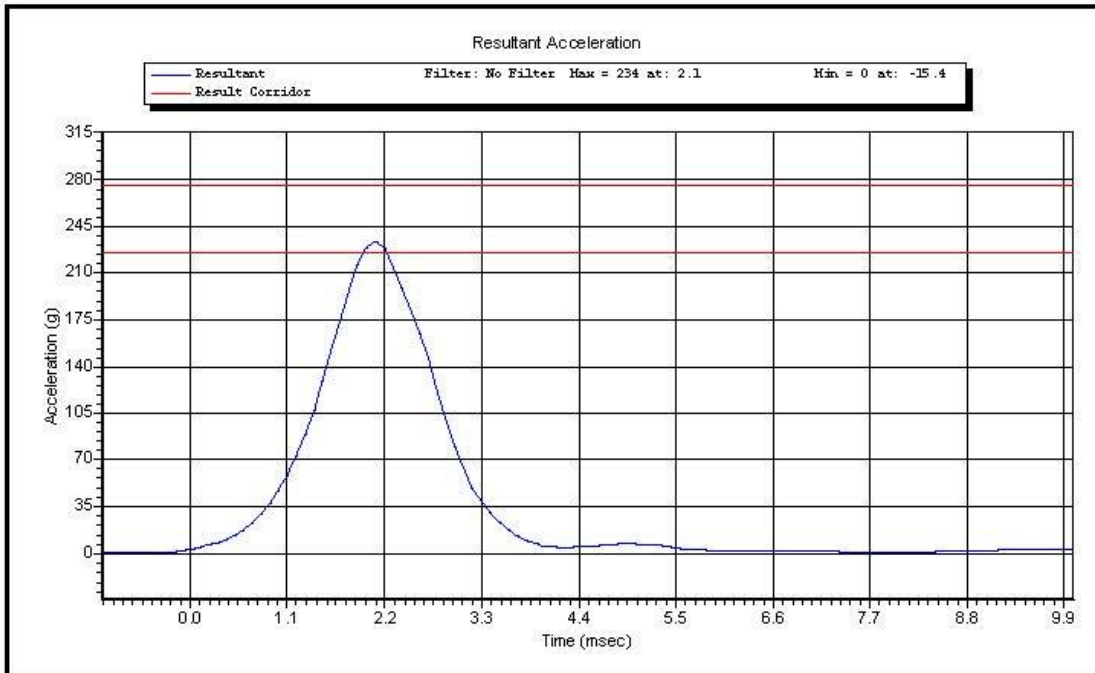
Test Date: **11/23/2011**

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2 of 2



Test Name:	Head Drop	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	064		
Test ID:		Test Date:	11/23/2011
Test Number:	1	Test Time:	10:11:40 AM



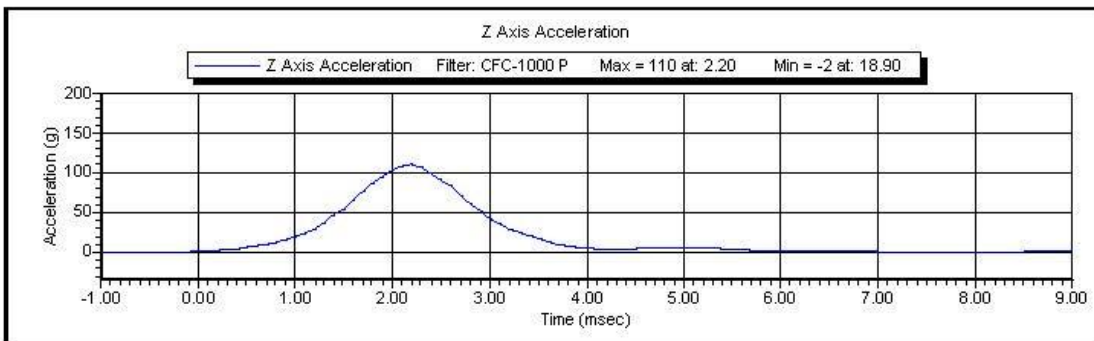
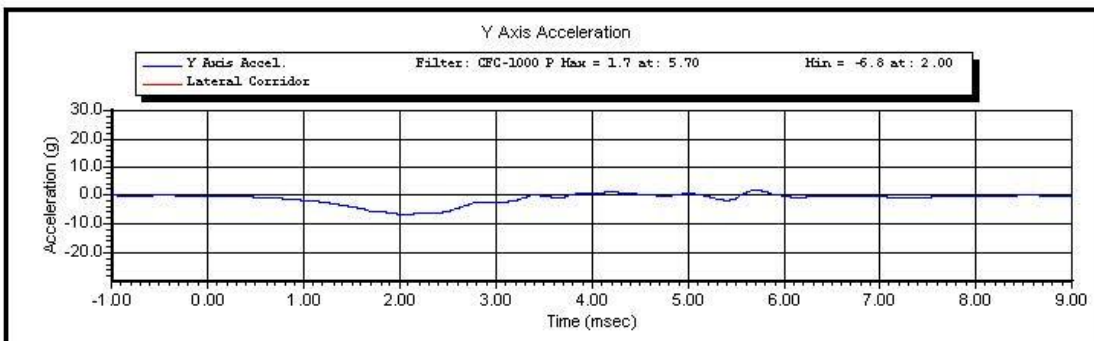
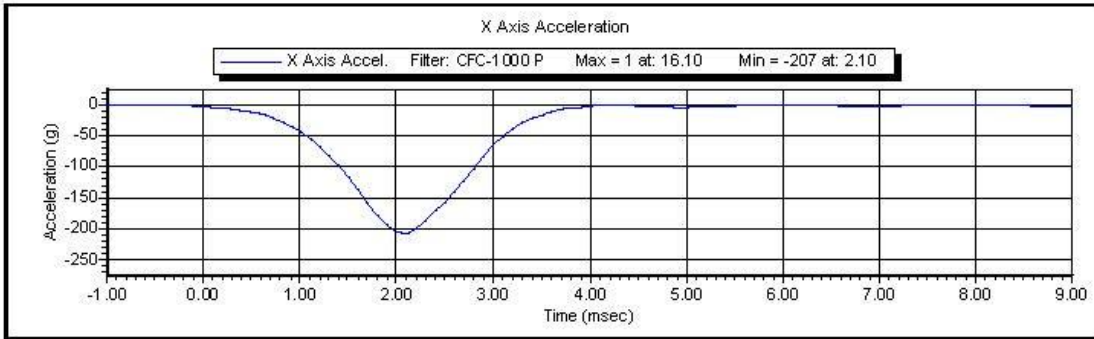
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Test Time: **10:11:40 AM**

Test Date: **11/23/2011**

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1 of 2



Test ID:

Test Time: 10:11:40 AM

Test Date: 11/23/2011

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VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	064		
Test ID:		Test Date:	11/23/2011
Test Number:	1	Test Time:	2:04:45 PM

Component Part Number	Component Serial Number
Neck - 78051-336	02-1692

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.0 deg C P
Humidity	10 -- 70	32 %RH P
Velocity	6.89 -- 7.13	7.10 m/s P
Pendulum Deceleration at 10 ms	22.5 -- 27.5	26.0 g P
Pendulum Deceleration at 20 ms	17.6 -- 22.6	21.0 g P
Pendulum Deceleration at 30 ms	12.5 -- 18.5	15.2 g P
Max Pendulum Deceleration After 30 ms	0.0 -- 29.0	15.2 g P
Deceleration time to 5 g	34.0 -- 42.0	37.5 ms P
D Plane Rotation	-78.0 -- -64.0	-69.8 degrees P
Time at max rotation	57.0 -- 64.0	58.9 ms P
Rotation Decay to Zero	113.0 -- 128.0	113.1 ms P
Moment about OC	88.1 -- 108.4	90.5 Nm P
Time at Max Moment	47.0 -- 58.0	49.2 ms P
Moment Decay to Zero	97.0 -- 107.0	101.3 ms P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test ID:

Test Time: **2:04:45 PM**

Test Date: **11/23/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	C16510	10/3/2011
DentonATD	78051-342	PENDULUM POT	2/7/2011
DentonATD	78051-342	CONDYLE POT	2/7/2011
Denton	1716A	LC-2186 My	6/3/2011
Denton	1716A	LC-2186 Fx	6/3/2011

Test ID:

Test Time: **2:04:45 PM**

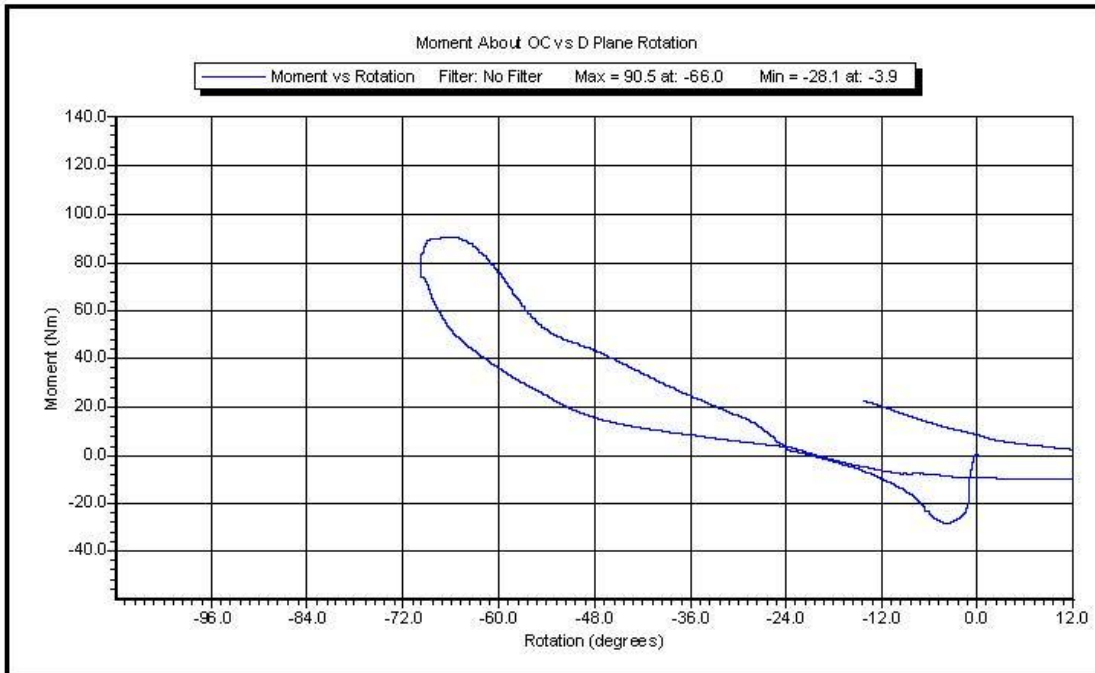
Test Date: **11/23/2011**

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2 of 2



Name of Test:	Neck Flexion	REVISION:	10/1/2001
Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50'th		
ATD Serial Number:	064		
ID of Test:		Date:	11/23/2011
Number of Test:	1	Time of Test:	2:04:45 PM



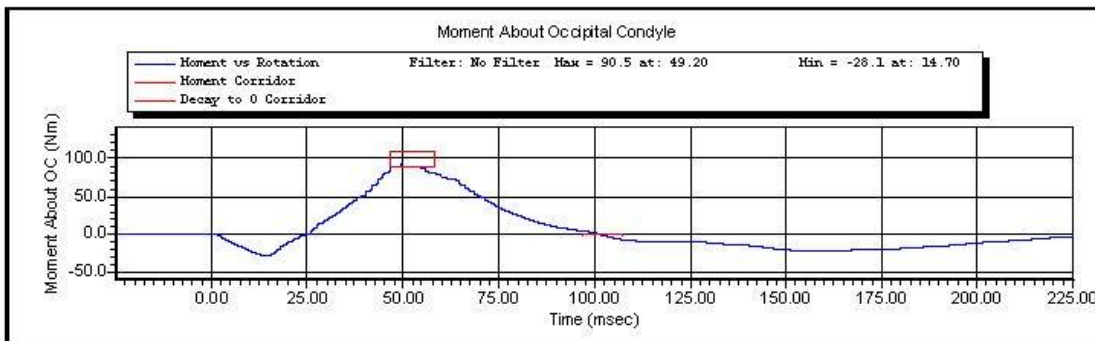
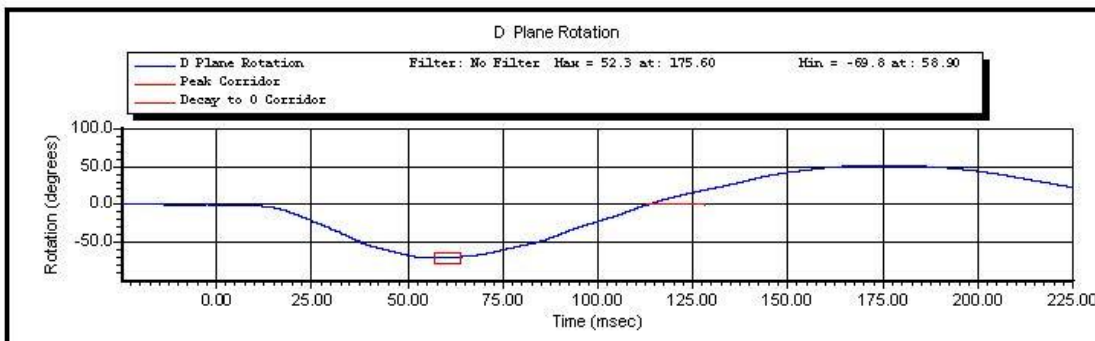
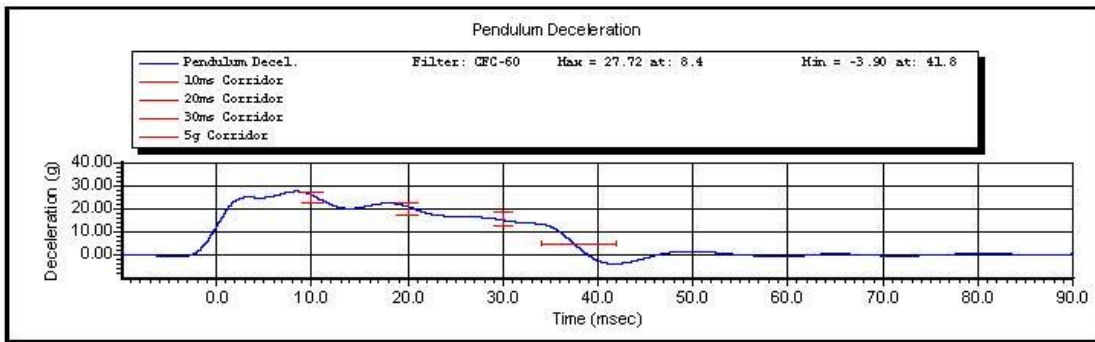
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Time of Test: **2:04:45 PM**

Date of Test: **11/23/2011**

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ID of Test:

Time of Test: 2:04:45 PM

Date of Test: 11/23/2011

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VERIFICATION REPORT

Test Name:	Neck Extension	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:			
Test ID:	064	Test Date:	11/23/2011
Test Number:	1	Test Time:	3:25:58 PM

Component Part Number	Component Serial Number
Neck - 78051-336	02-1692

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	30 %RH P
Velocity	5.94 -- 6.19	6.12 m/s P
Pendulum Deceleration at 10 ms	17.2 -- 21.2	19.1 g P
Pendulum Deceleration at 20 ms	14.0 -- 19.0	17.0 g P
Pendulum Deceleration at 30 ms	11.0 -- 16.0	13.8 g P
Max Pendulum Deceleration after 30 ms	0.0 -- 22.0	14.5 g P
Decel Time to 5 g	38.0 -- 46.0	40.9 ms P
D Plane Rotation	81.0 -- 106.0	96.2 degrees P
Time at Max Rotation	72.0 -- 82.0	77.7 ms P
Rotation Decay to Zero	147.0 -- 174.0	155.6 ms P
Moment About Occipital Condyle	-80.0 -- -52.9	-66.3 Nm P
Time at Max Moment	65.0 -- 79.0	74.1 ms P
Moment Decay to Zero	120.0 -- 148.0	143.4 ms P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test ID: **064**

Test Time: **3:25:58 PM**

Test Date: **11/23/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	C16510	10/3/2011
DentonATD	78051-342	PENDULUM POT	2/7/2011
DentonATD	78051-342	CONDYLE POT	2/7/2011
Denton	1716A	LC-2186 My	6/3/2011
Denton	1716A	LC-2186 Fx	6/3/2011

Test ID: **064**

Test Time: **3:25:58 PM**

Test Date: **11/23/2011**

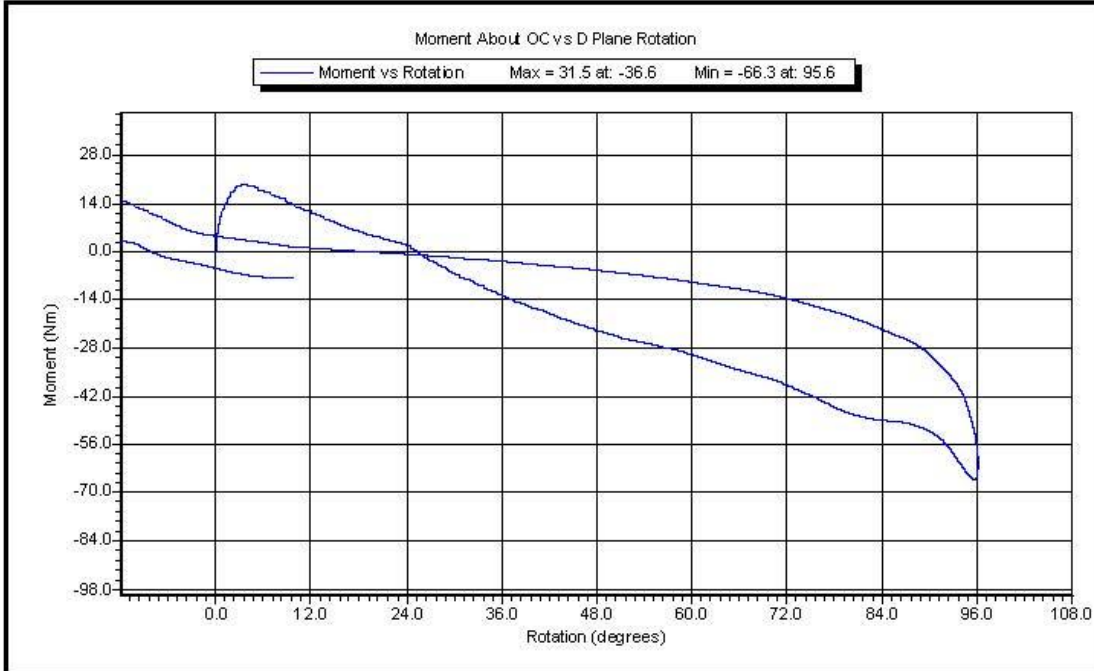


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Name of Test:	Neck Extension	REVISION:	10/1/2001
Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50'th		
ATD Serial Number:			
ID of Test:	064	Date:	11/23/2011
Number of Test:	1	Time of Test:	3:25:58 PM



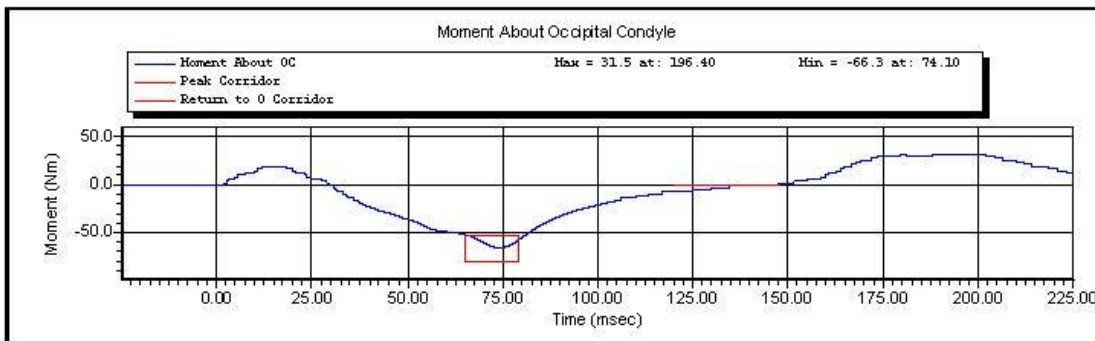
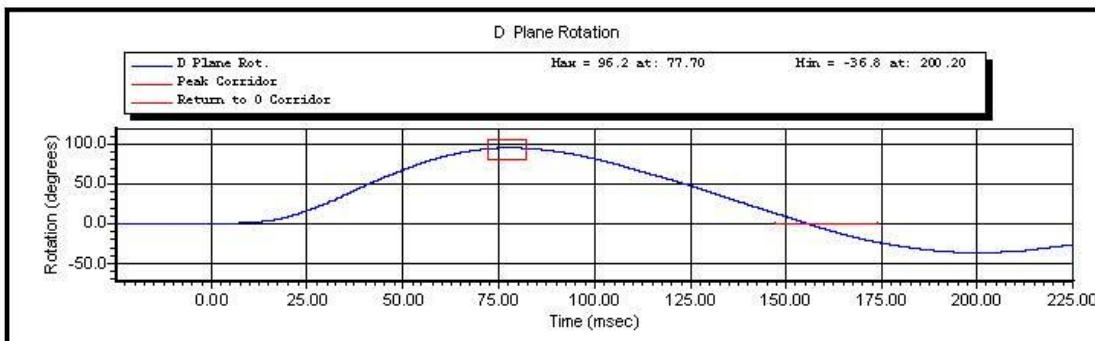
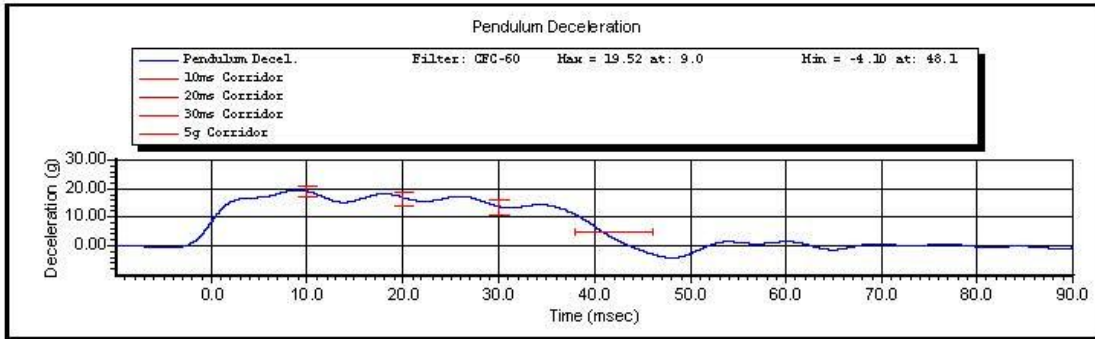
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Time of Test: **3:25:58 PM**

Date of Test: **11/23/2011**

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ID of Test: 064

Time of Test: 3:25:58 PM

Date of Test: 11/23/2011

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VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	064		
Test ID:		Test Date:	11/28/2011
Test Number:	1	Test Time:	12:54:53 PM

Component Part Number	Component Serial Number
Ribs 78051-RS	3964

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10.0 -- 70.0	36.0 %RH P
Velocity	6.59 -- 6.83	6.78 m/s P
Resistive Force	-5.894 -- -5.160	-5.459 kN P
Sternum Displacement	-72.6 -- -63.5	-65.8 mm P
Hysteresis	69 -- 85	76 % P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID:

Test Time: **12:54:53 PM**

Test Date: **11/28/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	AH5M8	11/8/2011
DentonATD	78051-342	DS-064	10/13/2011

Test ID:

Test Time: 12:54:53 PM

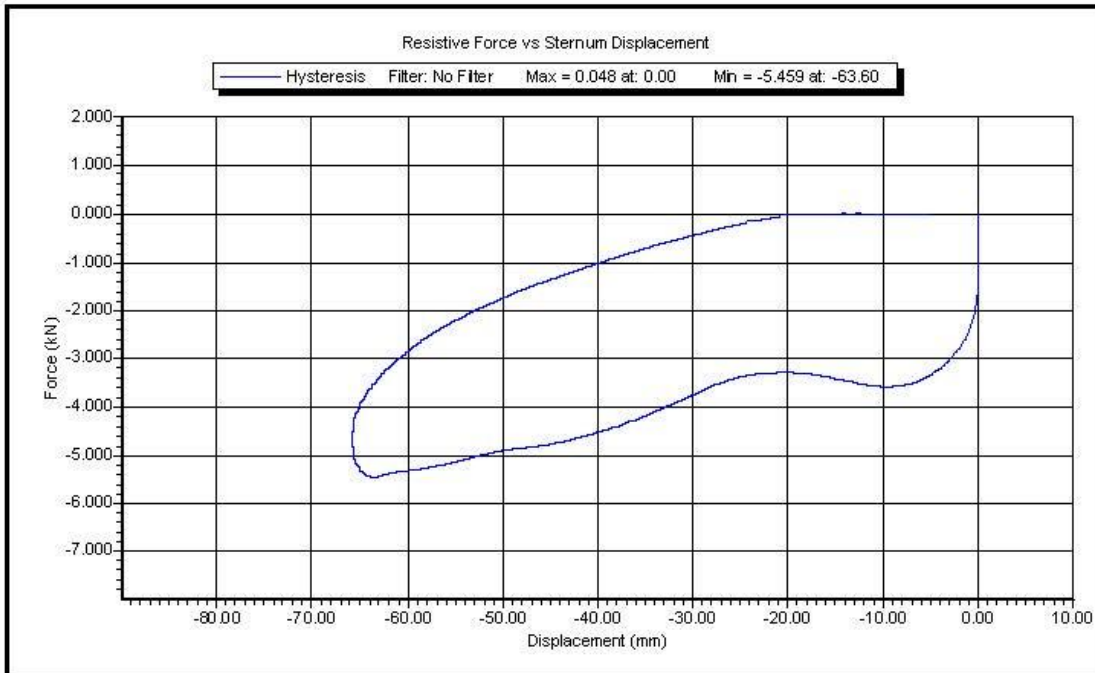
Test Date: 11/28/2011

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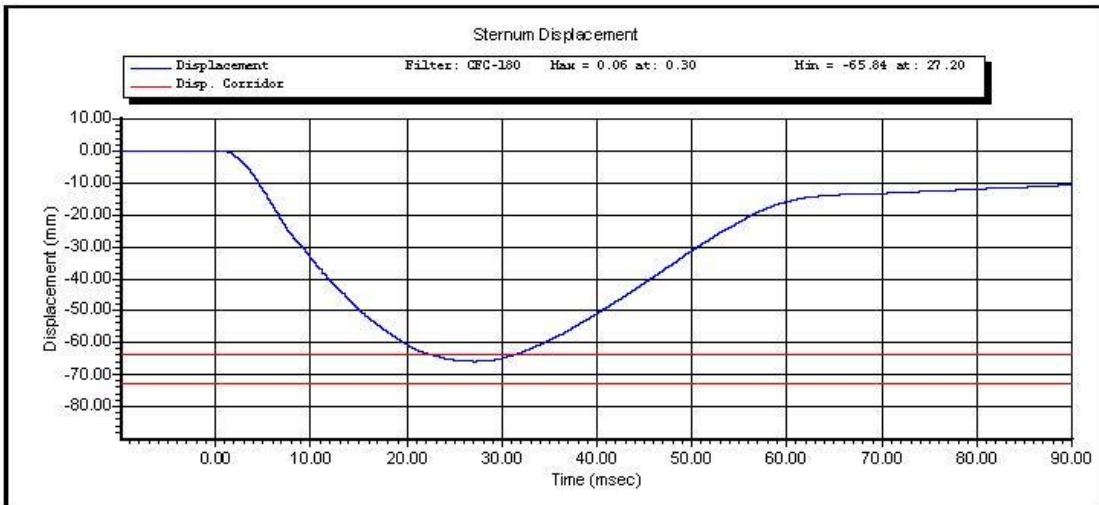
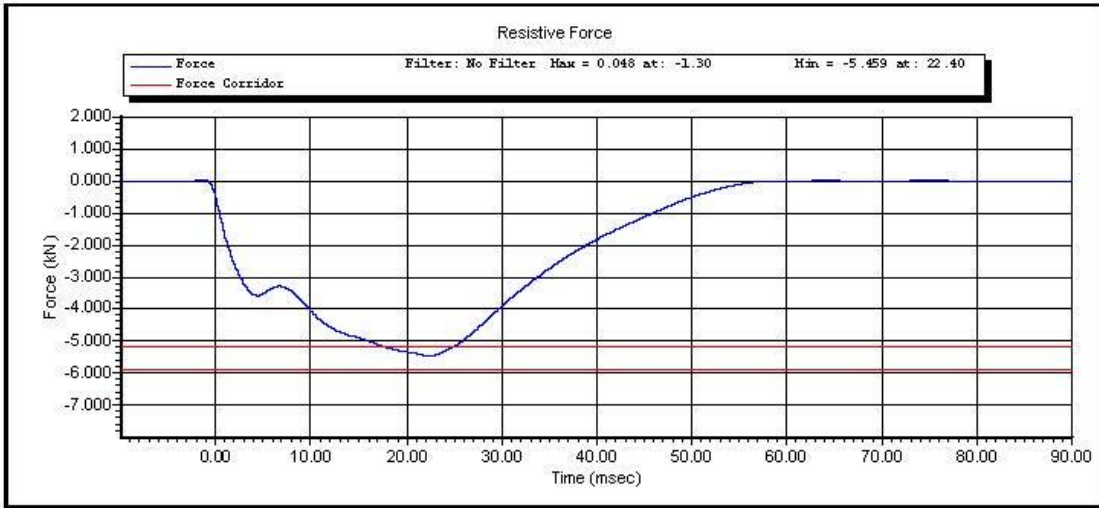
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	064		
Test ID:		Test Date:	11/28/2011
Test Number:	1	Test Time:	12:54:53 PM



Test ID:

Test Time: **12:54:53 PM**

Test Date: **11/28/2011**



Test ID:

Test Time: 12:54:53 PM

Test Date: 11/28/2011

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2 of 2

CALSPAN

Hybrid III Hip Range of Motion: Hybrid III 50th Male

Serial Number:

Date: 11/28/2011

Version: 1.6.3

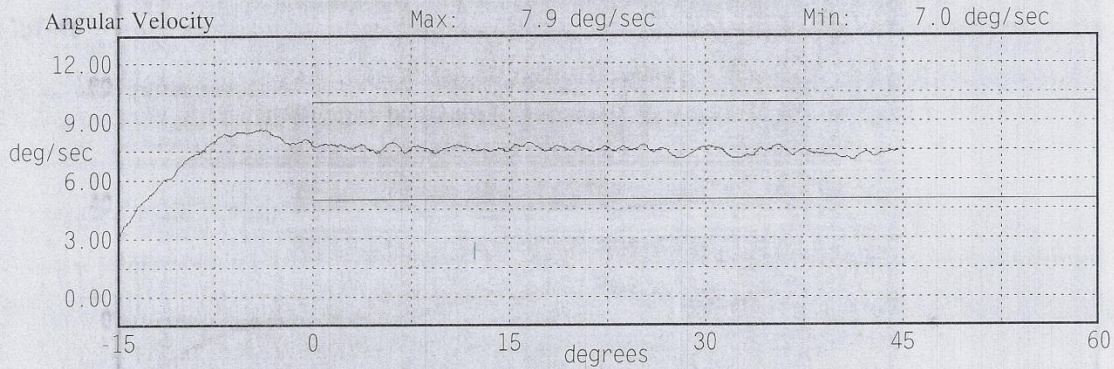
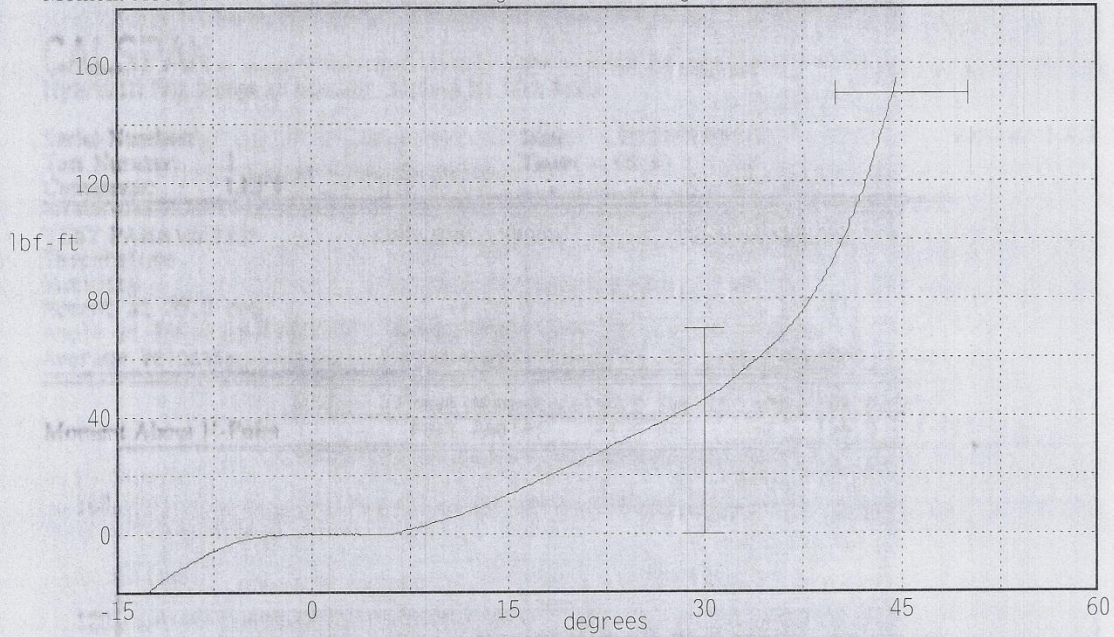
Test Number: 1

Time: 08:43

Comments: LEFT

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
Temperature	66.0 - 78.0	72.0 °F	Pass
Humidity	10 - 70	41 %	Pass
Moment at 30.0 deg	<= 70.0	45.9 lbf-ft	Pass
Angle at 150.0 lbf-ft	40.0 - 50.0	44.4 deg	Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec	Pass

Moment About H-Point
Peak Moment: 155.0 lbf-ft at 44.6 deg
Peak Angle: 44.6 deg at 155.0 lbf-ft



CALSPAN

Hybrid III Hip Range of Motion: Hybrid III 50th Male

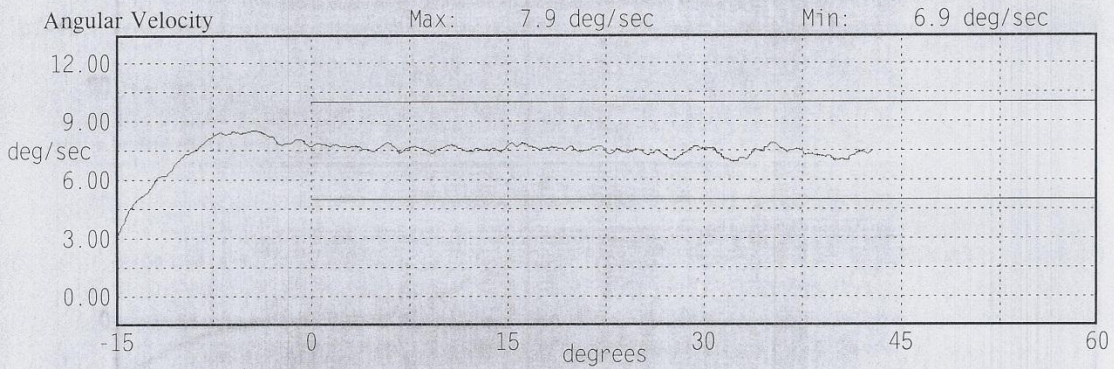
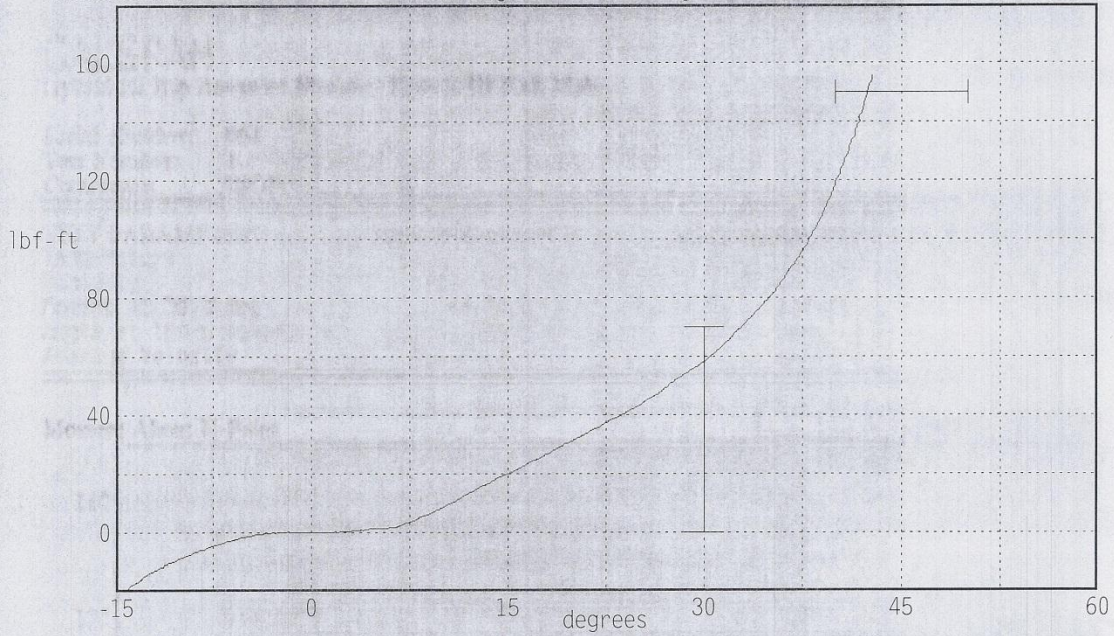
Serial Number: 064
Test Number: 1
Comments: RIGHT

Date: 11/28/2011
Time: 08:36

Version: 1.6.3

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
Temperature	66.0 - 78.0	72.0 °F	Pass
Humidity	10 - 70	41 %	Pass
Moment at 30.0 deg	<= 70.0	58.4 lbf-ft	Pass
Angle at 150.0 lbf-ft	40.0 - 50.0	42.5 deg	Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec	Pass

Moment About H-Point
Peak Moment: 155.5 lbf-ft at 42.8 deg
Peak Angle: 42.8 deg at 155.5 lbf-ft





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VERIFICATION REPORT

Test Name:	Knee Impact PENDULUM	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	064		
Test ID:	Left Knee	Test Date:	11/28/2011
Test Number:	1	Test Time:	1:52:16 PM

Component Part Number	Component Serial Number
Knee Skin - 78051	2792

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.1 deg C P
Humidity	10.0 -- 70.0	36.0 %RH P
Velocity	2.07 -- 2.13	2.08 m/s P
Resistive Force	-5.78 -- -4.72	-5.12 kN P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test ID: **Left Knee**

Test Time: **1:52:16 PM**

Test Date: **11/28/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7264-2000	P71267	11/2/2011

Test ID: **Left Knee**

Test Time: **1:52:16 PM**

Test Date: **11/28/2011**



Test Name:	Knee Impact PENDULUM	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	064		
Test ID:	Left Knee	Test Date:	11/28/2011
Test Number:	1	Test Time:	1:52:16 PM



Test ID: **Left Knee**

Test Time: **1:52:16 PM**

Test Date: **11/28/2011**



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VERIFICATION REPORT

Test Name:	Knee Impact PENDULUM	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	064		
Test ID:	Right Knee	Test Date:	11/28/2011
Test Number:	1	Test Time:	2:09:01 PM

Component Part Number	Component Serial Number
Knee Skin - 78056	2792

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.1 deg C P
Humidity	10.0 -- 70.0	36.0 %RH P
Velocity	2.07 -- 2.13	2.12 m/s P
Resistive Force	-5.78 -- -4.72	-5.53 kN P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID: **Right Knee**

Test Time: **2:09:01 PM**

Test Date: **11/28/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7264-2000	P71267	11/2/2011

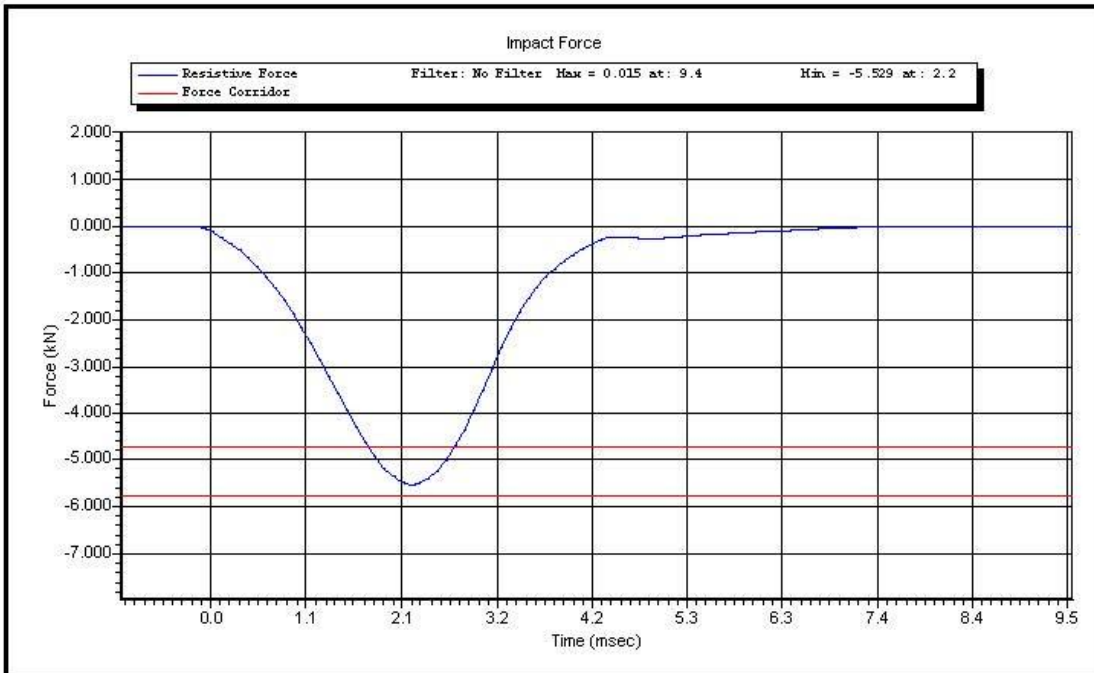
Test ID: **Right Knee**

Test Time: **2:09:01 PM**

Test Date: **11/28/2011**



Test Name:	Knee Impact PENDULUM	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	064		
Test ID:	Right Knee	Test Date:	11/28/2011
Test Number:	1	Test Time:	2:09:01 PM



Test ID: **Right Knee**

Test Time: **2:09:01 PM**

Test Date: **11/28/2011**

CALIBRATION TEST RESULTS

PRE-TEST

RIGHT-FRONT PASSENGER DUMMY

S/N: 273



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External Measurements

5th Female SN 273

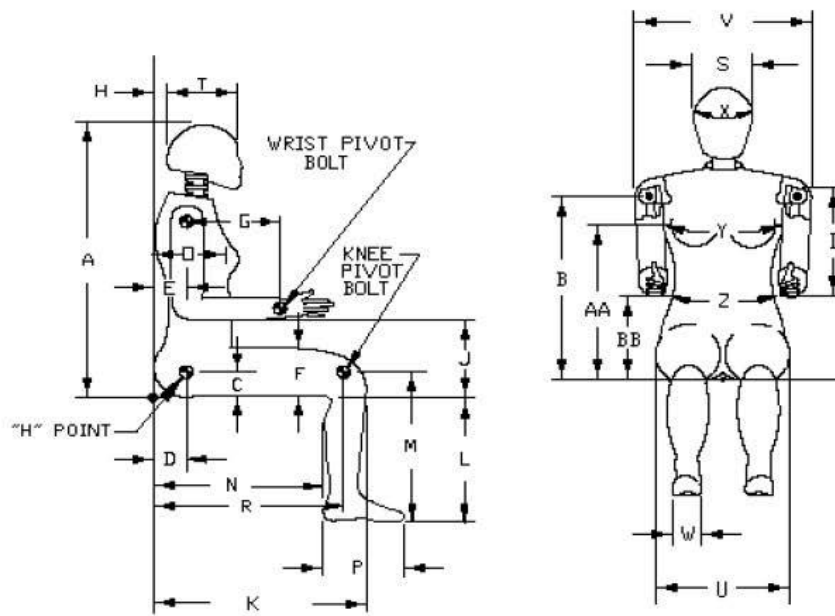
Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	774.7 – 800.1	785	Yes
B	Shoulder Pivot Height	431.8 – 457.2	450	Yes
C	H-Point Height	81.3 – 86.3	84	Yes
D	H-Point from Backline	144.8 – 149.8	147	Yes
E	Shoulder Pivot from Backline	68.6,83.8	77	Yes
F	Thigh Clearance	119.4 – 134.6	132	Yes
G	Back of Elbow to Wrist Pivot	243.9 – 259.1	249	Yes
H	Head Back to Backline	43.2 – 48.2	46	Yes
I	Shoulder to Elbow Length	276.8 – 297.2	285	Yes
J	Elbow Rest Height	182.8 – 203.2	192	Yes
K	Buttock to Knee Length	520.7 – 546.1	530	Yes
L	Popliteal Height	355.6 - 376	360	Yes
M	Knee Pivot Height	393.7 – 419.1	397	Yes
N	Buttock Popliteal Length	414 – 439.4	422	Yes
O	Chest Depth without Jacket	175.3 – 190.5	184	Yes
P	Foot Length (right)	218.5 – 233.7	220	Yes
R	Buttock To Knee Pivot Length	457.2 – 482.6	465	Yes
S	Head Breadth	137.1 – 147.3	143	Yes
T	Head Depth	177.8 - 188	183	Yes
U	Hip Breadth	299.7 – 314.9	310	Yes
V	Shoulder Breadth	350.5 – 365.7	357	Yes
W	Foot Breadth	78.8 - 94	82	Yes
X	Head Circumference	528.3 – 548.7	539	Yes
Y	Chest Circumference with Jacket	850.9 – 881.3	861	Yes
Z	Waist Circumference	759.5 – 789.9	770	Yes
AA	Reference Location (Chest Circumference)	332.7 – 358.1	345	Yes
BB	Reference Location (Waist Circumference)	160.1 – 170.2	165	Yes

Technician: AR

Date: 11/21/2011

Hybrid III 5th Female External Measurements

Reference Diagram





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VERIFICATION REPORT

Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:		Test Date:	11/21/2011
Test Number:	1	Test Time:	11:57:22 AM

Component Part Number	Component Serial Number
Head Skin - 78051-228	780

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.8 deg C P
Humidity	10 -- 70	25 %RH P
Resultant Acceleration	250 -- 300	271 g P
Oscillation	0.0 -- 10.0	1.4 % P
Lateral Acceleration	-15.00 -- 15.00	-8.72 g P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test ID:

Test Time: **11:57:22 AM**

Test Date: **11/21/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P66931	6/13/2011
Endevco	7264-2000	P66926	6/13/2011
Endevco	7264-2000	P66943	6/13/2011

Test ID:

Test Time: **11:57:22 AM**

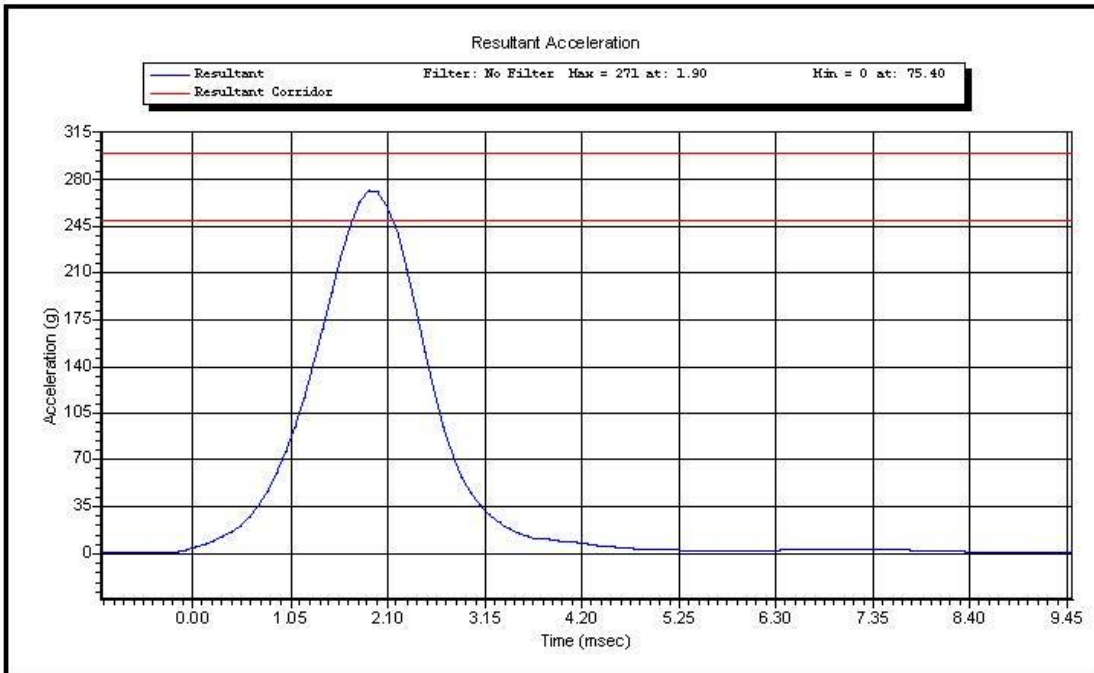
Test Date: **11/21/2011**

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2 of 2



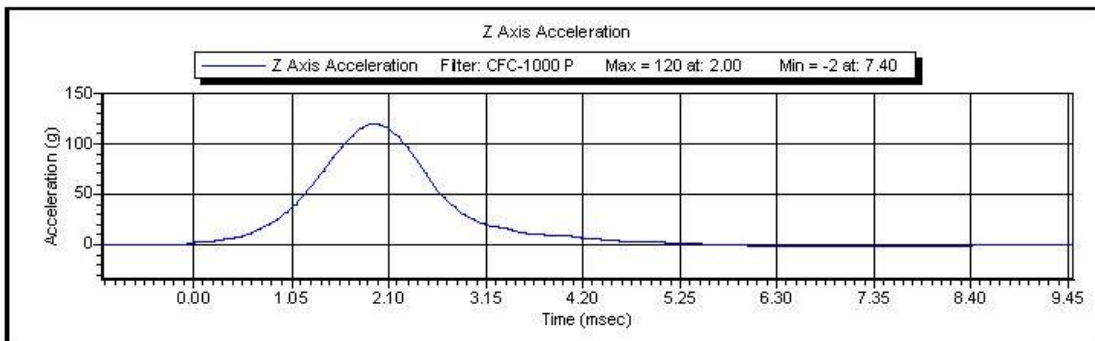
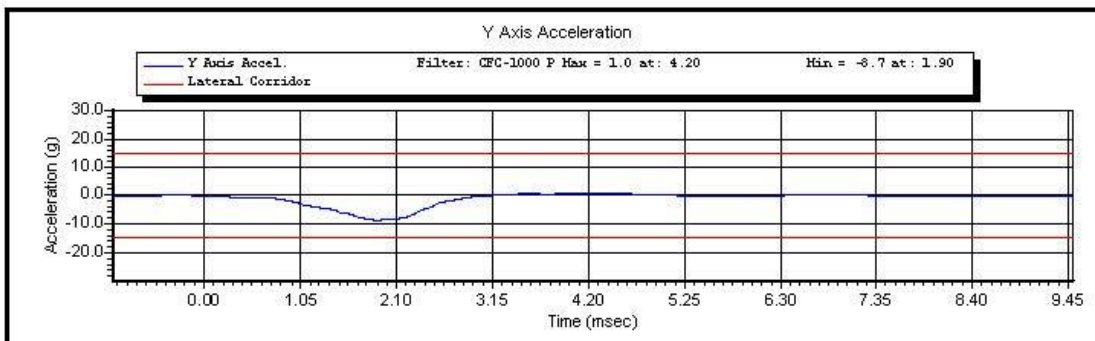
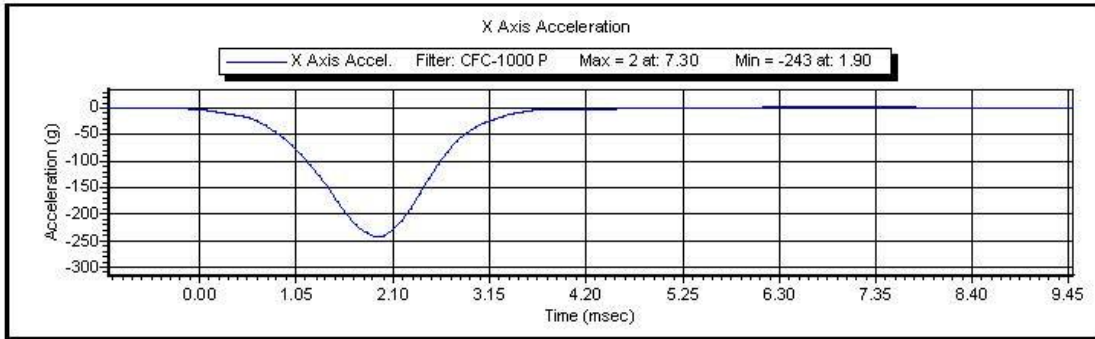
Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:		Test Date:	11/21/2011
Test Number:	1	Test Time:	11:57:22 AM



Test ID:

Test Time: **11:57:22 AM**

Test Date: **11/21/2011**



Test ID:

Test Time: 11:57:22 AM

Test Date: 11/21/2011

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VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:		Test Date:	11/28/2011
Test Number:	3	Test Time:	10:02:54 AM

Component Part Number	Component Serial Number
Neck - 880105-255	660

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.0 deg C P
Humidity	10 -- 70	37 %RH P
Velocity	6.89 -- 7.13	7.11 m/s P
Pendulum Impulse at 10 ms	2.10 -- 2.50	2.46 m/s P
Pendulum Impulse at 20 ms	4.00 -- 5.00	4.81 m/s P
Pendulum Impulse at 30 ms	5.80 -- 7.00	6.72 m/s P
D Plane Rotation	-91.0 -- -77.0	-78.0 degrees P
Moment During Rotation Interval	69.0 -- 83.0	69.4 Nm P
Moment Decay to 10.0 Nm	80.0 -- 100.0	84.9 ms P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID:

Test Time: **10:02:54 AM**

Test Date: **11/28/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	C16510	10/3/2011
DentonATD	78051-342	PENDULUM POT	2/7/2011
DentonATD	78051-342	CONDYLE POT	2/7/2011
Denton	1716A	LC-1629My	6/3/2011
Denton	1716A	LC-1629Fx	6/3/2011

Test ID:

Test Time: **10:02:54 AM**

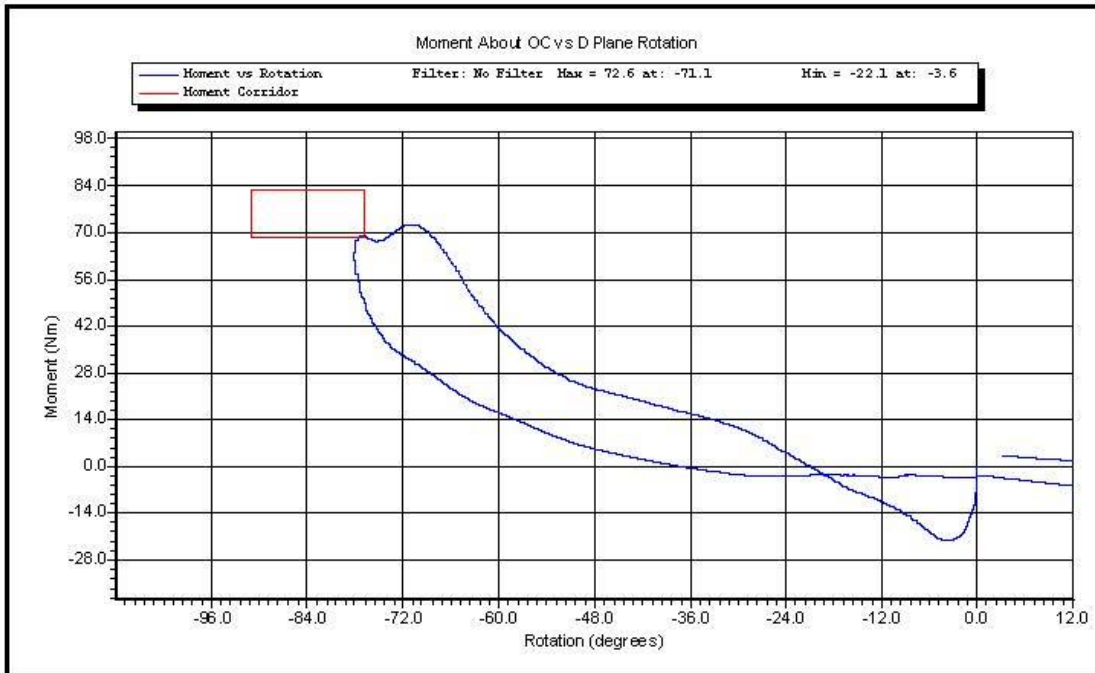
Test Date: **11/28/2011**

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2 of 2



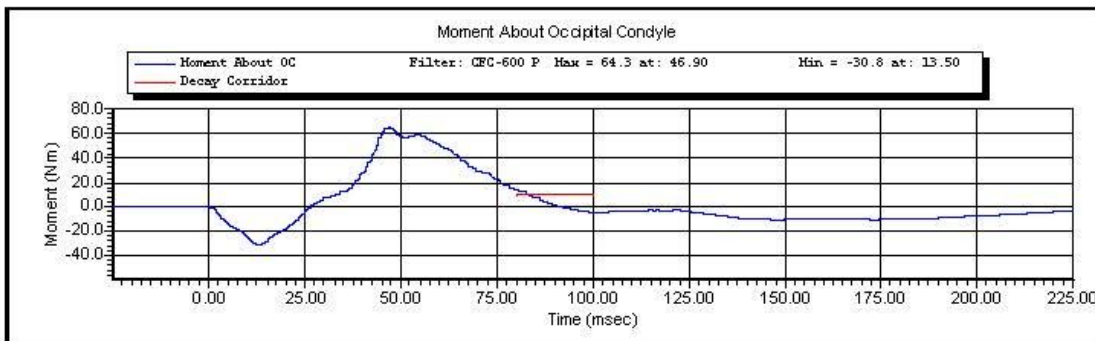
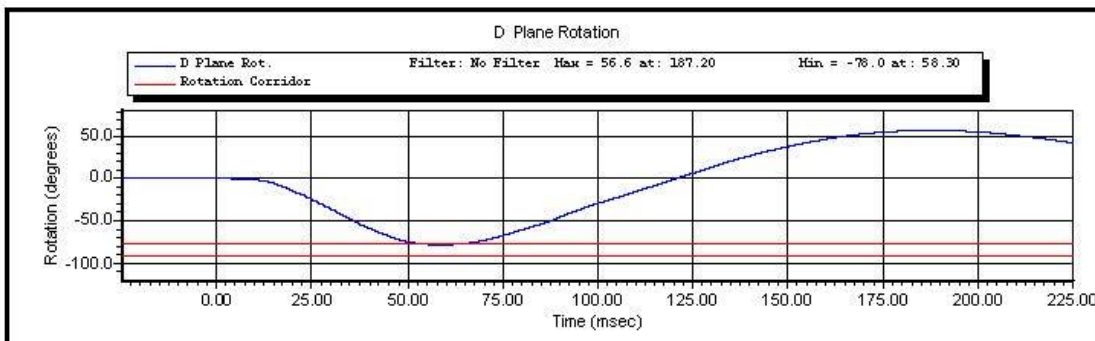
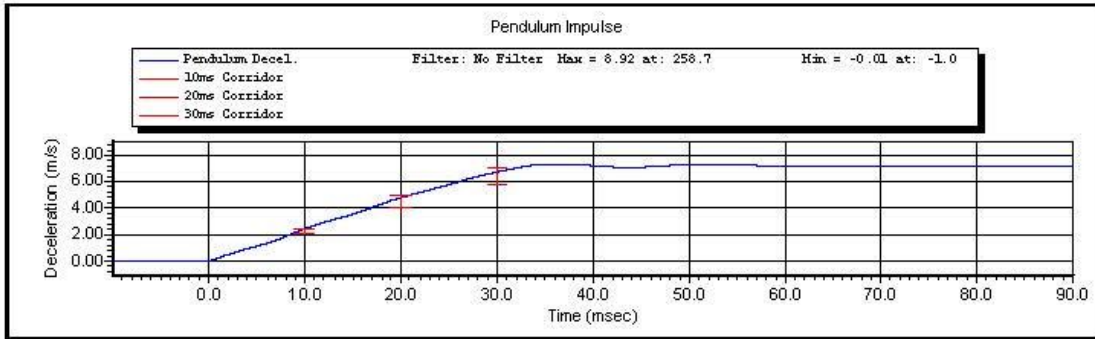
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:		Test Date:	11/28/2011
Test Number:	3	Test Time:	10:02:54 AM



Test ID:

Test Time: **10:02:54 AM**

Test Date: **11/28/2011**



Test ID:

Test Time: 10:02:54 AM

Test Date: 11/28/2011

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VERIFICATION REPORT

Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:		Test Date:	11/28/2011
Test Number:	1	Test Time:	9:31:15 AM

Component Part Number	Component Serial Number
Neck - 880105-255	660

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.1 deg C P
Humidity	10 -- 70	37 %RH P
Velocity	5.95 -- 6.19	6.07 m/s P
Pendulum Impulse at 10 ms	1.50 -- 1.90	1.90 m/s P
Pendulum Impulse at 20 ms	3.10 -- 3.90	3.73 m/s P
Pendulum Impulse at 30 ms	4.60 -- 5.60	5.37 m/s P
D Plane Rotation	99.0 -- 114.0	107.1 degrees P
Moment During Rotation Interval	-65.0 -- -53.0	-54.8 Nm P
Moment Decay to -10.0 Nm	94.0 -- 114.0	102.6 ms P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID:

Test Time: **9:31:15 AM**

Test Date: **11/28/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	C16510	10/3/2011
DentonATD	78051-342	PENDULUM POT	2/7/2011
DentonATD	78051-342	CONDYLE POT	2/7/2011
Denton	1716A	LC-1629My	6/3/2011
Denton	1716A	LC-1629Fx	6/3/2011

Test ID:

Test Time: **9:31:15 AM**

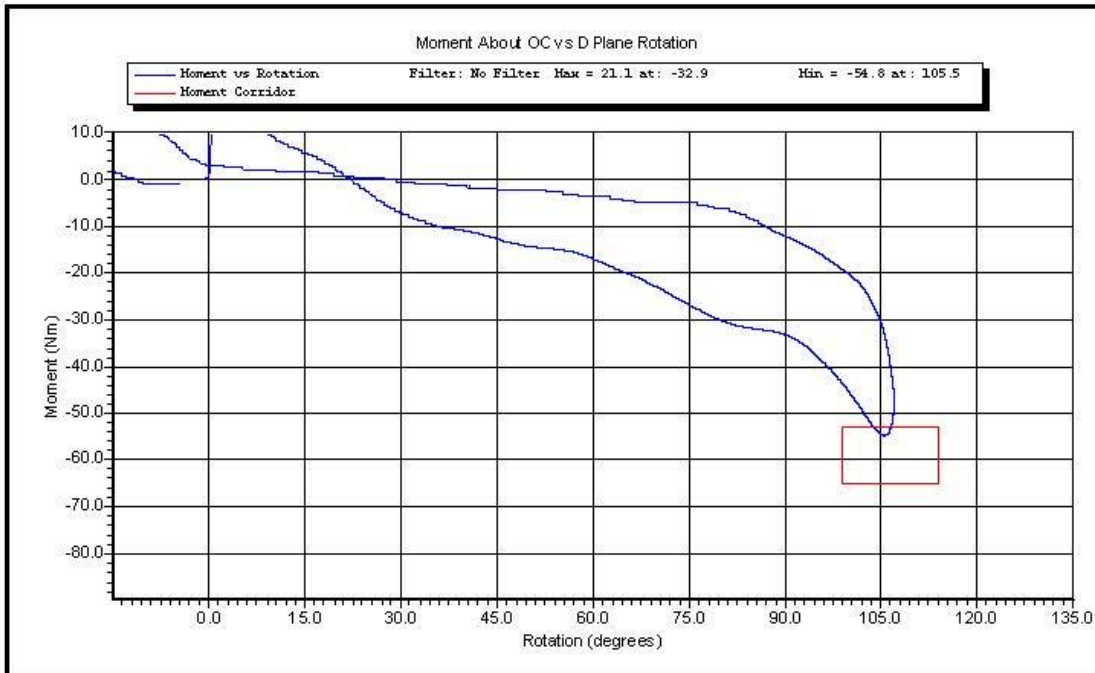
Test Date: **11/28/2011**

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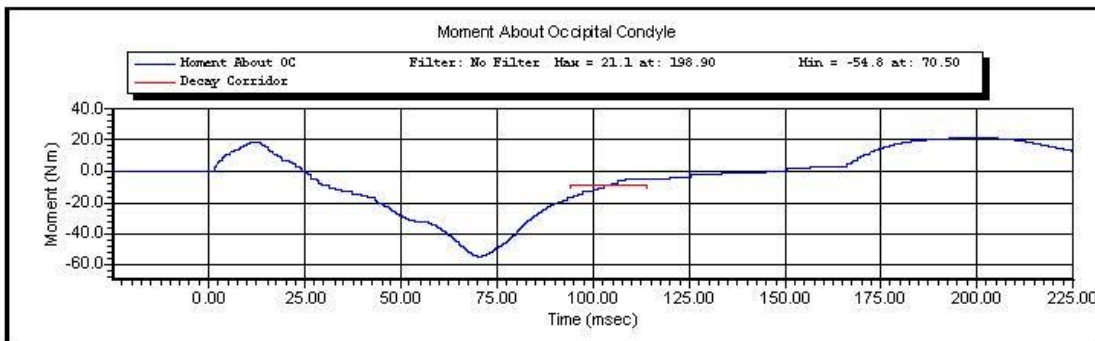
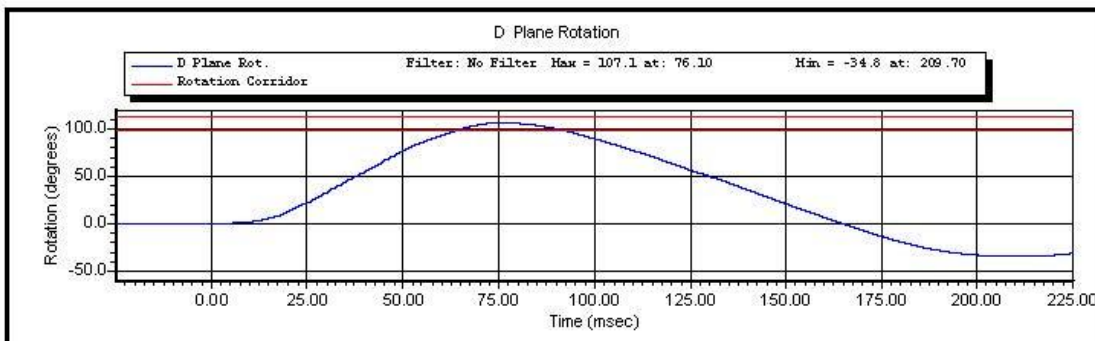
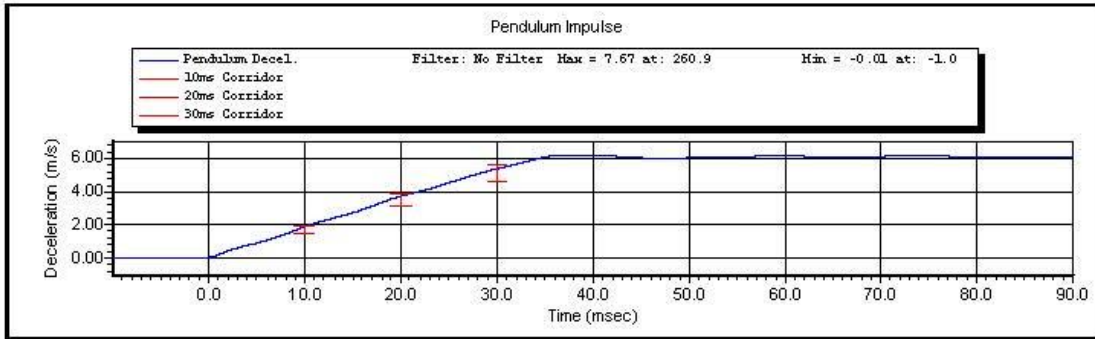
Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:		Test Date:	11/28/2011
Test Number:	1	Test Time:	9:31:15 AM



Test ID:

Test Time: **9:31:15 AM**

Test Date: **11/28/2011**



Test ID:

Test Time: 9:31:15 AM

Test Date: 11/28/2011

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VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:		Test Date:	11/28/2011
Test Number:	1	Test Time:	11:31:22 AM

Component Part Number	Component Serial Number
Ribs 880105-RS	670
Chest Jacket - 880105-355-E	DH0069

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.1 deg C P
Humidity	10.0 -- 70.0	36.0 %RH P
Velocity	6.59 -- 6.83	6.64 m/s P
Sternum Displacement	-58.0 -- -50.0	-54.7 mm P
Force During Displacement Interval	-4400 -- -3900	-4116 N P
Force -18.0 to -50.0 Displacement	-4600 -- 0	-3943 N P
Hysteresis	69 -- 85	69 % P

All test parameters are within specifications

Technician: **S. Zito**
Supervisor: **D. Travale**

Test ID:

Test Time: **11:31:22 AM**

Test Date: **11/28/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	AH5M8	11/8/2011
DentonATD	78051-342	DS-273	10/10/2011
Endevco	7264-2000	P58884	10/31/2011

Test ID:

Test Time: **11:31:22 AM**

Test Date: **11/28/2011**

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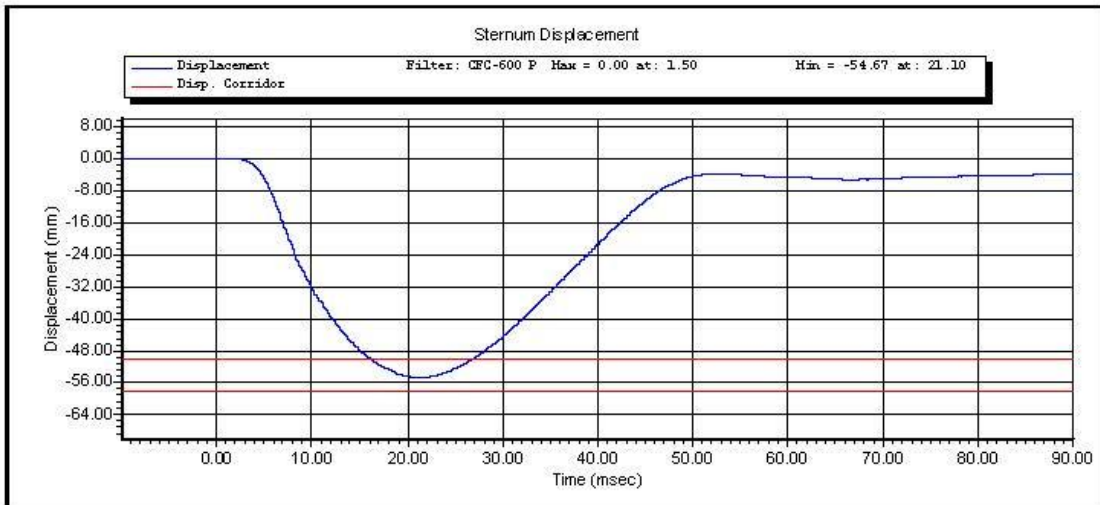
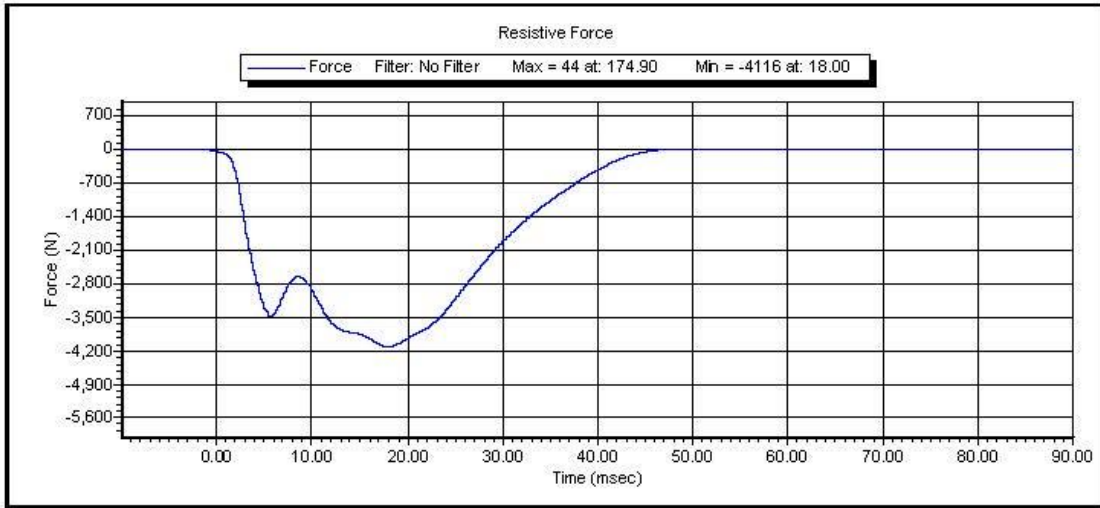
Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:		Test Date:	11/28/2011
Test Number:	1	Test Time:	11:31:22 AM



Test ID:

Test Time: **11:31:22 AM**

Test Date: **11/28/2011**



Test ID:

Test Time: 11:31:22 AM

Test Date: 11/28/2011

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Torso Flexion Test

Technician: SZ

Calibration Date: 11/29/2011

ATD Serial Number: NHTSA 5th Female 273

Test Results			
Test Condition	Parameters	Results	Status
Temperature	18.9-25.6° C	21.7° C	P
Lab Humidity	10-70%	44%	P
Max Force @ 45 deg	320 – 390N	370N	P
Torso Rotation Rate	0.5 °/s ≤ rate ≤ 1.5 °/s	1.0 °/s	P
Initial reference angle	≤20 deg	15°	P
Final ref plan angle	Initial ref plane ± 8 deg	22°	P

P = Pass

F= Fail



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VERIFICATION REPORT

Test Name:	Knee Impact PENDULUM	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Left Knee	Test Date:	11/28/2011
Test Number:	2	Test Time:	2:57:34 PM

Component Part Number	Component Serial Number
Knee Skin - 880105-508	1726
Knee Insert - 880105-511	1039

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.1 deg C P
Humidity	10.0 -- 70.0	36.0 %RH P
Velocity	2.07 -- 2.13	2.09 m/s P
Resistive Force	-4060 -- -3450	-3894 N P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID: **Left Knee**

Test Time: **2:57:34 PM**

Test Date: **11/28/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7264-2000	P71267	11/2/2011

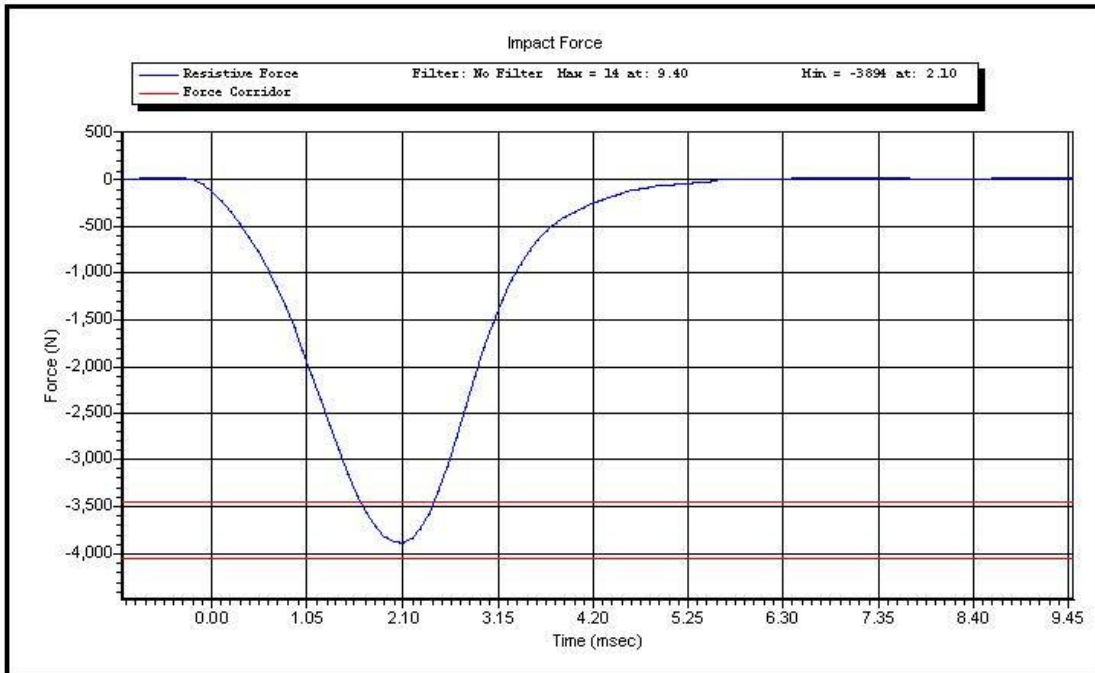
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Test Time: **2:57:34 PM**

Test Date: **11/28/2011**



Test Name:	Knee Impact PENDULUM	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Left Knee	Test Date:	11/28/2011
Test Number:	2	Test Time:	2:57:34 PM



Test ID: **Left Knee**

Test Time: **2:57:34 PM**

Test Date: **11/28/2011**



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VERIFICATION REPORT

Test Name:	Knee Impact PENDULUM	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Right Knee	Test Date:	11/28/2011
Test Number:	2	Test Time:	3:05:20 PM

Component Part Number	Component Serial Number
Knee Skin - 880105-508	1051
Knee Insert - 880105-511	1038

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.1 deg C P
Humidity	10.0 -- 70.0	36.0 %RH P
Velocity	2.07 -- 2.13	2.09 m/s P
Resistive Force	-4060 -- -3450	-3775 N P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID: **Right Knee**

Test Time: **3:05:20 PM**

Test Date: **11/28/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7264-2000	P71267	11/2/2011

Test ID: **Right Knee**

Test Time: **3:05:20 PM**

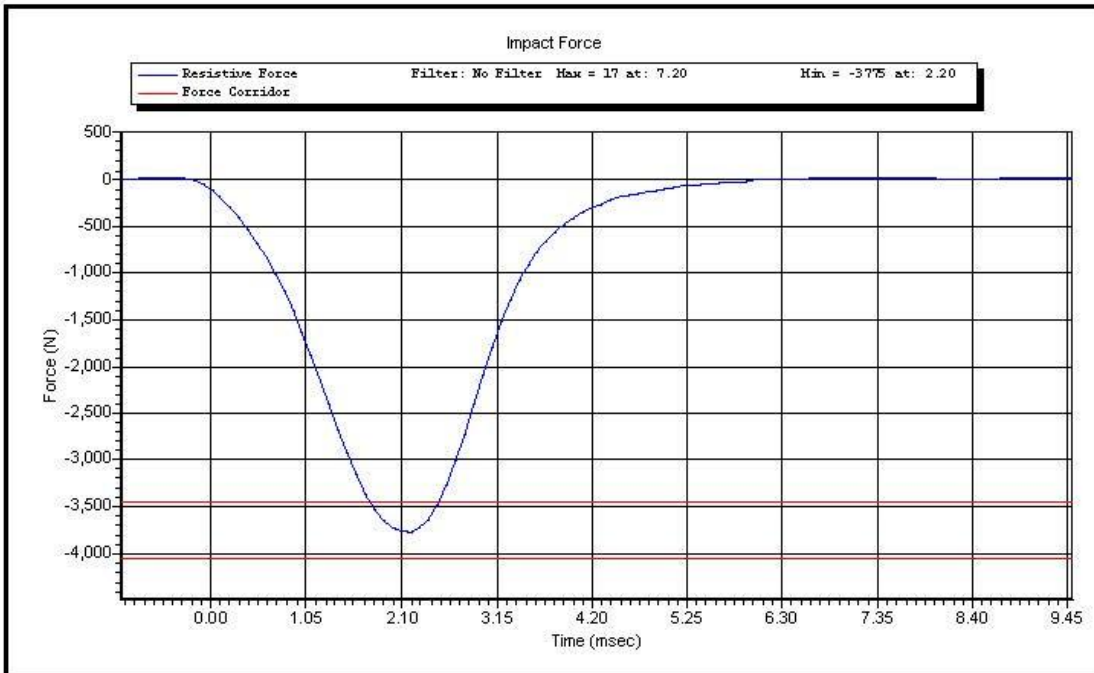
Test Date: **11/28/2011**

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2 of 2



Test Name:	Knee Impact PENDULUM	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Right Knee	Test Date:	11/28/2011
Test Number:	2	Test Time:	3:05:20 PM



Test ID: **Right Knee**

Test Time: **3:05:20 PM**

Test Date: **11/28/2011**

CALIBRATION TEST RESULTS

POST-TEST

DRIVER DUMMY

S/N: 064



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50th Male External Measurements

S/N 064

Symbol	Description	Specification	Results	Pass
		in	in	
A	Sitting Height	34.6 – 35.0	35.0	Yes
B	Shoulder Pivot Height	19.9 - 20.5	20.4	Yes
C	H-Point Height	3.3 – 3.5	3.5	Yes
D	H-Point from Backline	5.3 – 5.5	5.5	Yes
E	Shoulder Pivot from Backline	3.3 – 3.7	3.5	Yes
F	Thigh Clearance	5.5 – 6.1	6.0	Yes
G	Back of Elbow to Wrist Pivot	11.4 – 12.0	11.5	Yes
H	Head Back to Backline	1.6 – 1.8	1.7	Yes
I	Shoulder to Elbow Length	13.0 – 13.6	13.3	Yes
J	Elbow Rest Height	7.5 – 8.3	7.9	Yes
K	Buttock to Knee Length	22.8 – 23.8	23.5	Yes
L	Popliteal Height	16.9 – 17.9	17.2	Yes
M	Knee Pivot Height	19.1 – 19.7	19.1	Yes
N	Buttock Popliteal Length	17.8 – 18.8	18.5	Yes
O	Chest Depth without Jacket	8.4 – 9.0	8.5	Yes
P	Foot Length (right)	9.9 – 10.5	10.2	Yes
V	Shoulder Breadth	16.3 – 17.2	16.7	Yes
W	Foot Breadth	3.6 – 4.2	3.9	Yes
Y	Chest Circumference with Jacket	38.2 – 39.4	38.8	Yes
Z	Waist Circumference	32.9 – 34.1	33.4	Yes
AA	Reference Location (Chest Circumference)	16.9 – 17.1	17.0	Yes
BB	Reference Location (Waist Circumference)	8.9 – 9.1	9.0	Yes

Technician: AR

Date: 12/2/2011



VERIFICATION REPORT

Test Name:	Head Drop	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	064		
Test ID:		Test Date:	12/2/2011
Test Number:	2	Test Time:	1:09:17 PM

Component Part Number	Component Serial Number
Head Skin - 78051-228	7997

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.9 deg C P
Humidity	10 -- 70	30 %RH P
Resultant Acceleration	225 -- 275	248 g P
Oscillation	0.0 -- 10.0	2.4 % P
Lateral Acceleration	-15.00 -- 15.00	3.56 g P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test ID:

Test Time: **1:09:17 PM**

Test Date: **12/2/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P66931	6/13/2011
Endevco	7264-2000	P66926	6/13/2011
Endevco	7264-2000	P66943	6/13/2011

Test ID:

Test Time: **1:09:17 PM**

Test Date: **12/2/2011**

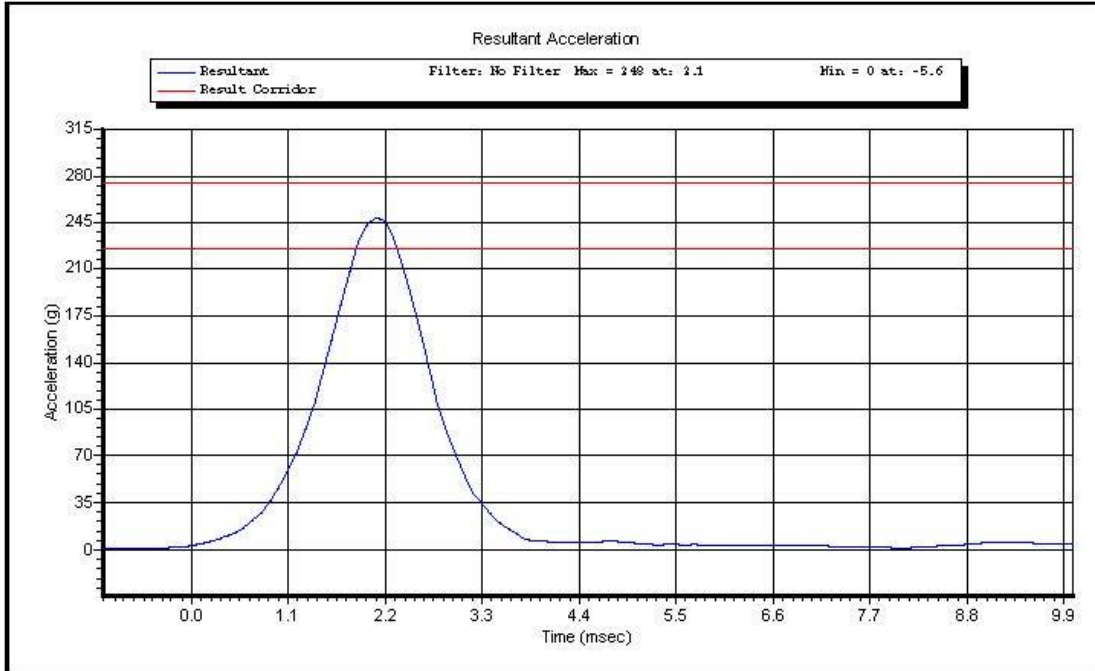


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Test Name:	Head Drop	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50th		
ATD Serial Number:	064		
Test ID:		Test Date:	12/2/2011
Test Number:	2	Test Time:	1:09:17 PM



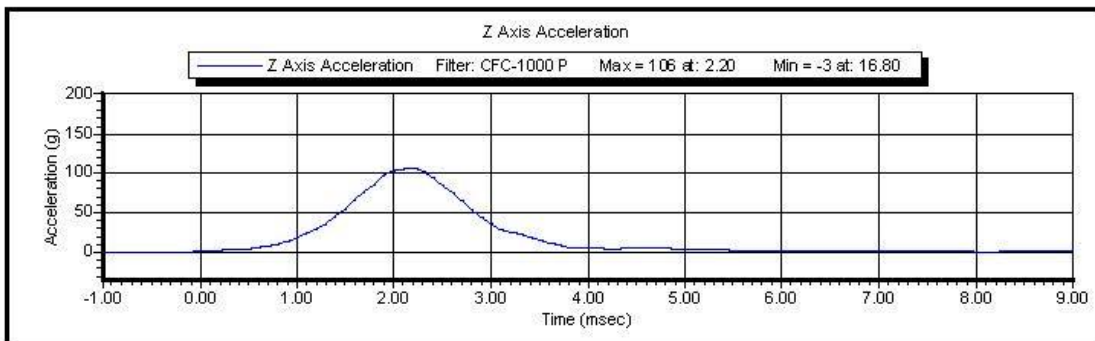
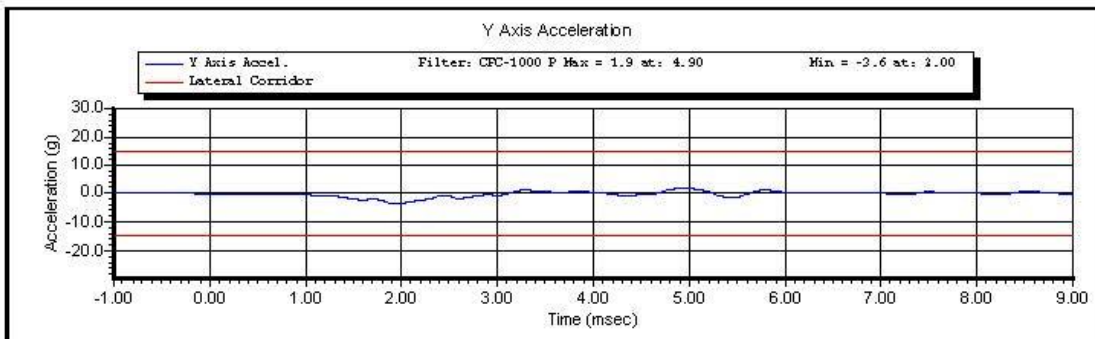
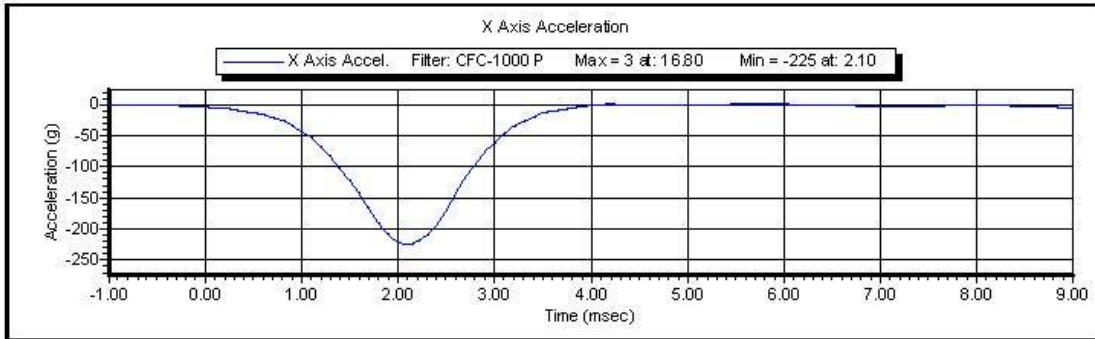
Test ID:

Test Time: **1:09:17 PM**

Test Date: **12/2/2011**

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1 of 2



Test ID:

Test Time: 1:09:17 PM

Test Date: 12/2/2011

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VERIFICATION REPORT

Test Name:	Neck Extension	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	064		
Test ID:		Test Date:	12.6/2011
Test Number:	2	Test Time:	11:21:22 AM

Component Part Number	Component Serial Number
Neck - 78051-336	02-1692

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.8 deg C P
Humidity	10 -- 70	35 %RH P
Velocity	5.94 -- 6.19	6.13 m/s P
Pendulum Deceleration at 10 ms	17.2 -- 21.2	20.9 g P
Pendulum Deceleration at 20 ms	14.0 -- 19.0	17.7 g P
Pendulum Deceleration at 30 ms	11.0 -- 16.0	14.0 g P
Max Pendulum Deceleration after 30 ms	0.0 -- 22.0	14.3 g P
Decel Time to 5 g	38.0 -- 46.0	38.6 ms P
D Plane Rotation	81.0 -- 106.0	98.4 degrees P
Time at Max Rotation	72.0 -- 82.0	77.4 ms P
Rotation Decay to Zero	147.0 -- 174.0	155.3 ms P
Moment About Occipital Condyle	-80.0 -- -52.9	-67.3 Nm P
Time at Max Moment	65.0 -- 79.0	72.4 ms P
Moment Decay to Zero	120.0 -- 148.0	143.1 ms P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. travale**

Test ID:

Test Time: **11:21:22 AM**

Test Date: **12.6/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	C16510	10/3/2011
DentonATD	78051-342	PENDULUM POT	2/7/2011
DentonATD	78051-342	CONDYLE POT	2/7/2011
Denton	1716A	LC-2186 My	6/3/2011
Denton	1716A	LC-2186 Fx	6/3/2011

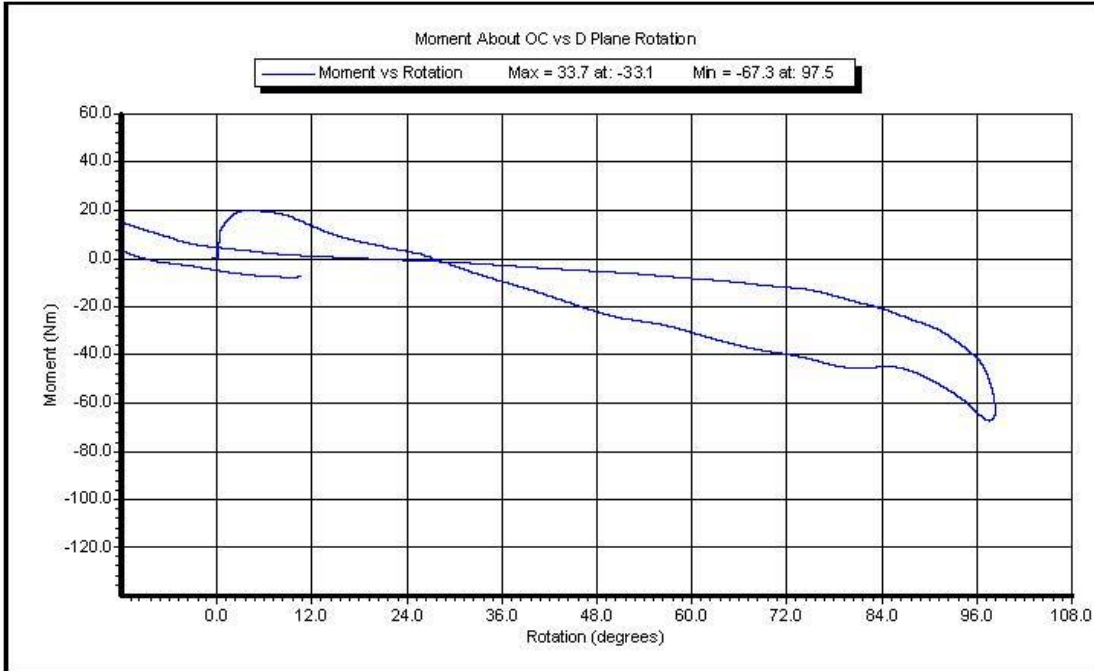
Test ID:

Test Time: **11:21:22 AM**

Test Date: **12/6/2011**



Name of Test:	Neck Extension	REVISION:	10/1/2001
Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50th		
ATD Serial Number:	064		
ID of Test:		Date:	12/6/2011
Number of Test:	2	Time of Test:	11:21:22 AM



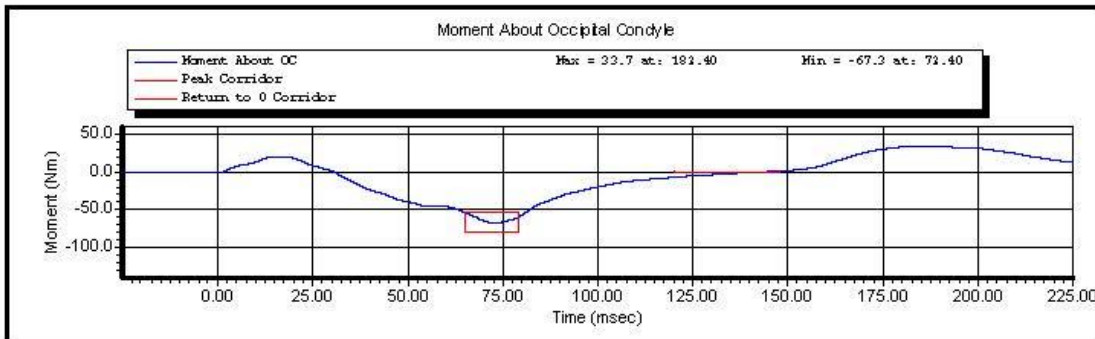
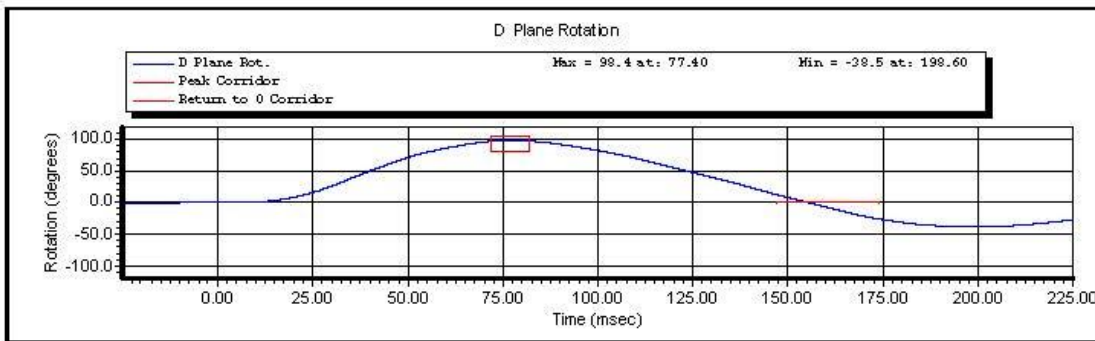
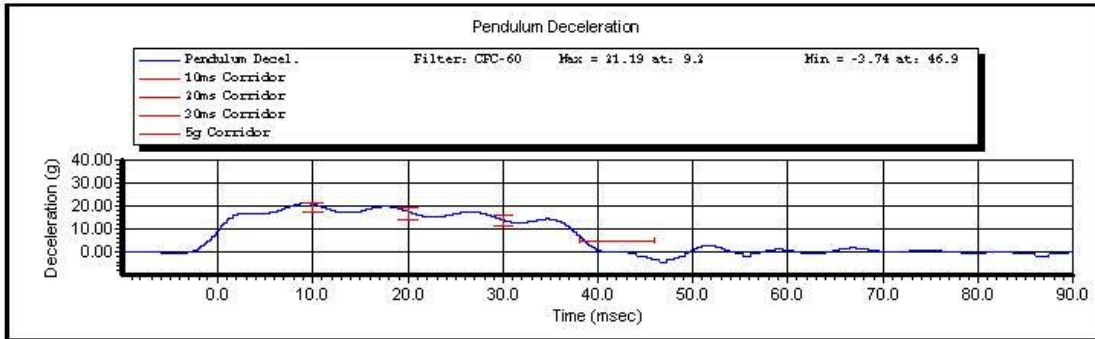
ID of Test:

Time of Test: **11:21:22 AM**

Date of Test: **12/6/2011**

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1 of 2



ID of Test:

Time of Test: 11:21:22 AM

Date of Test: 12/6/2011

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VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	064		
Test ID:		Test Date:	12/2/2011
Test Number:	1	Test Time:	3:26:57 PM

Component Part Number	Component Serial Number
Neck - 78051-336	02-1692

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.1 deg C P
Humidity	10 -- 70	29 %RH P
Velocity	6.89 -- 7.13	7.10 m/s P
Pendulum Deceleration at 10 ms	22.5 -- 27.5	26.8 g P
Pendulum Deceleration at 20 ms	17.6 -- 22.6	21.0 g P
Pendulum Deceleration at 30 ms	12.5 -- 18.5	17.2 g P
Max Pendulum Deceleration After 30 ms	0.0 -- 29.0	17.2 g P
Deceleration time to 5 g	34.0 -- 42.0	35.8 ms P
D Plane Rotation	-78.0 -- -64.0	-72.7 degrees P
Time at max rotation	57.0 -- 64.0	58.2 ms P
Rotation Decay to Zero	113.0 -- 128.0	113.2 ms P
Moment about OC	88.1 -- 108.4	97.3 Nm P
Time at Max Moment	47.0 -- 58.0	48.0 ms P
Moment Decay to Zero	97.0 -- 107.0	100.4 ms P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test ID:

Test Time: **3:26:57 PM**

Test Date: **12/2/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	C16510	10/3/2011
DentonATD	78051-342	PENDULUM POT	2/7/2011
DentonATD	78051-342	CONDYLE POT	2/7/2011
Denton	1716A	LC-2186 My	6/3/2011
Denton	1716A	LC-2186 Fx	6/3/2011

Test ID:

Test Time: 3:26:57 PM

Test Date: 12/2/2011

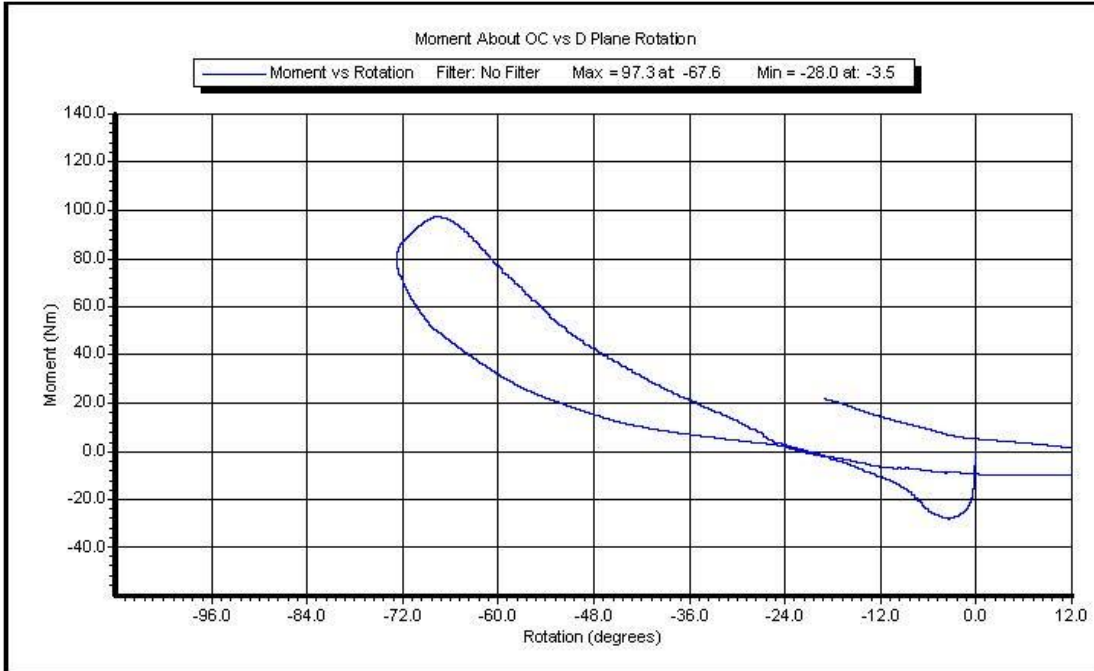


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Name of Test:	Neck Flexion	REVISION:	10/1/2001
Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50th		
ATD Serial Number:	064		
ID of Test:		Date:	12/2/2011
Number of Test:	1	Time of Test:	3:26:57 PM



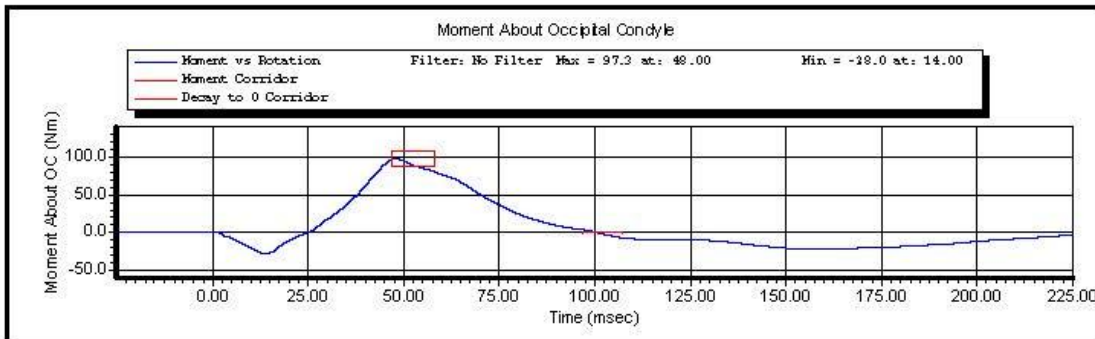
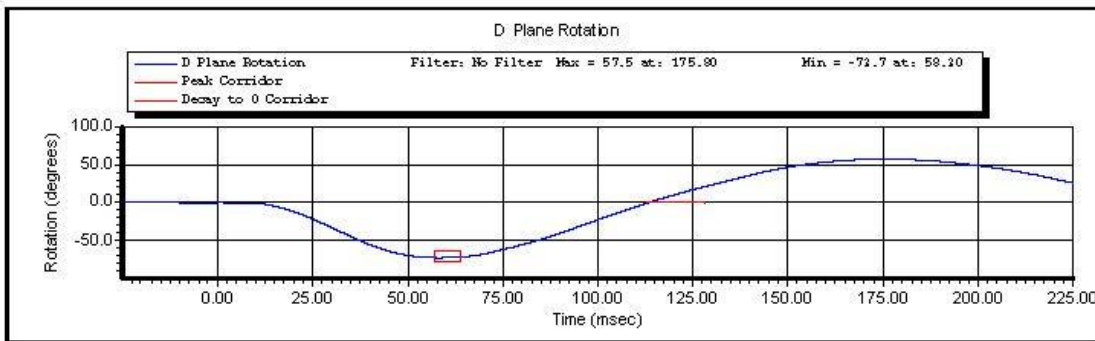
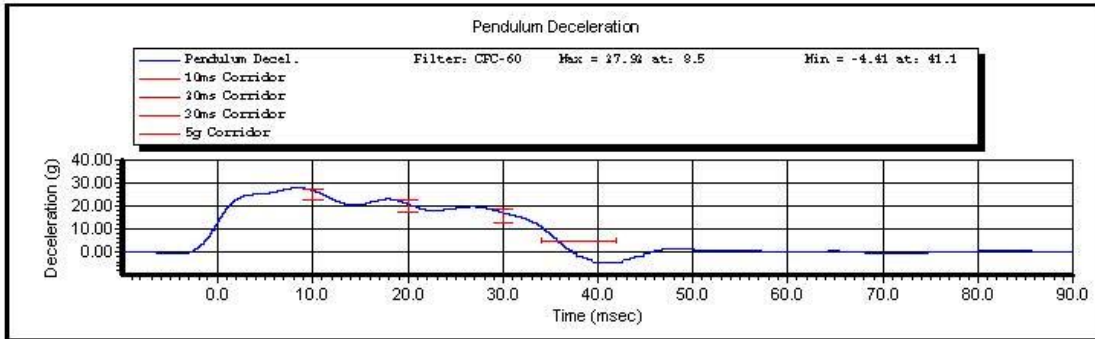
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Time of Test: **3:26:57 PM**

Date of Test: **12/2/2011**

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ID of Test:

Time of Test: 3:26:57 PM

Date of Test: 12/2/2011

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VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	064		
Test ID:		Test Date:	12/7/2011
Test Number:	3	Test Time:	8:11:35 AM

Component Part Number	Component Serial Number
Ribs 78051-RS	3964

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.0 deg C P
Humidity	10.0 -- 70.0	31.0 %RH P
Velocity	6.59 -- 6.83	6.80 m/s P
Resistive Force	-5.894 -- -5.160	-5.565 kN P
Sternum Displacement	-72.6 -- -63.5	-66.1 mm P
Hysteresis	69 -- 85	75 % P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID:

Test Time: **8:11:35 AM**

Test Date: **12/7/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	AH5M8	11/8/2011
DentonATD	78051-342	DS-064	10/13/2011

Test ID:

Test Time: **8:11:35 AM**

Test Date: **12/7/2011**

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2 of 2



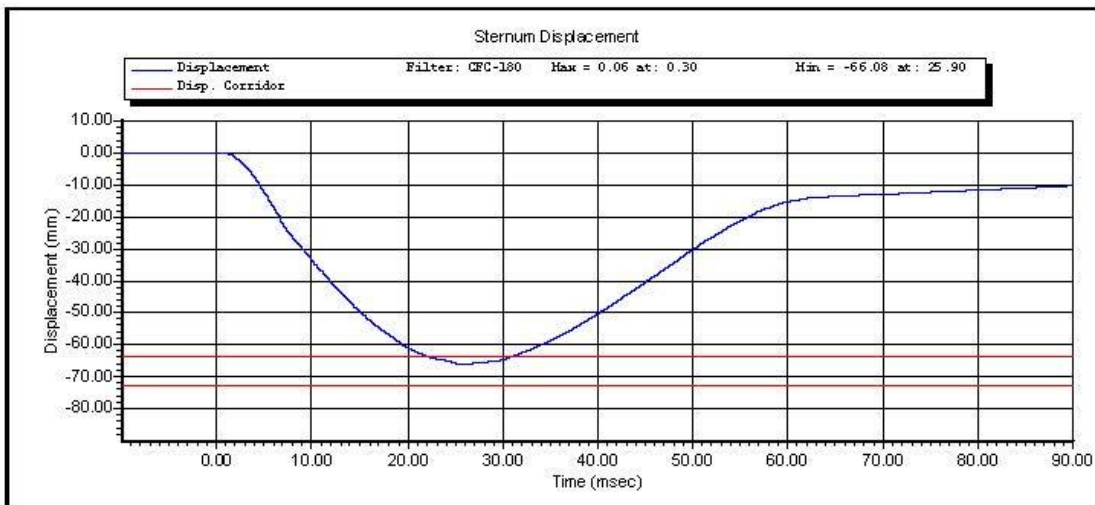
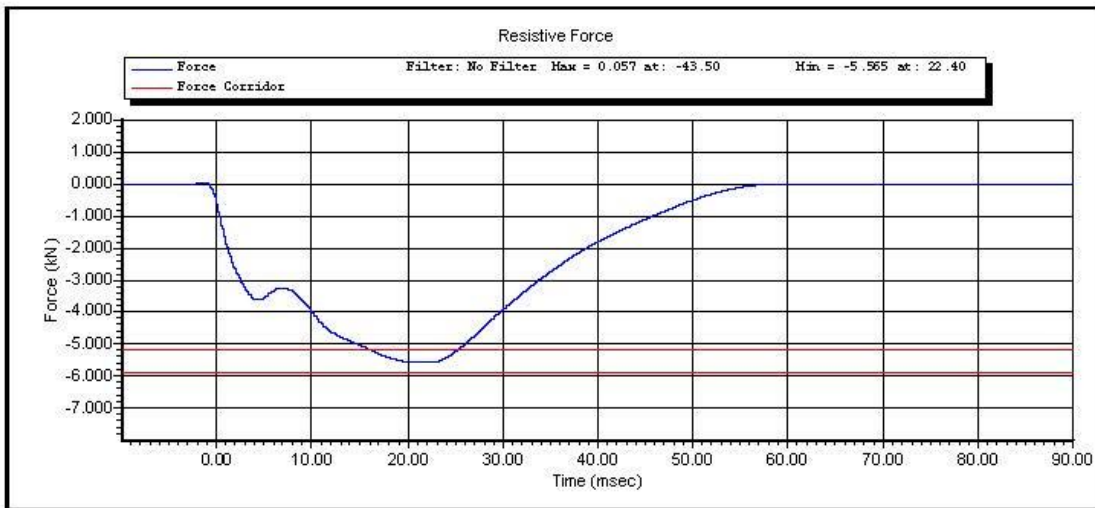
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	064		
Test ID:		Test Date:	12/7/2011
Test Number:	3	Test Time:	8:11:35 AM



Test ID:

Test Time: **8:11:35 AM**

Test Date: **12/7/2011**



Test ID:

Test Time: 8:11:35 AM

Test Date: 12/7/2011

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2 of 2

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Hybrid III Hip Range of Motion: Hybrid III 50th Male

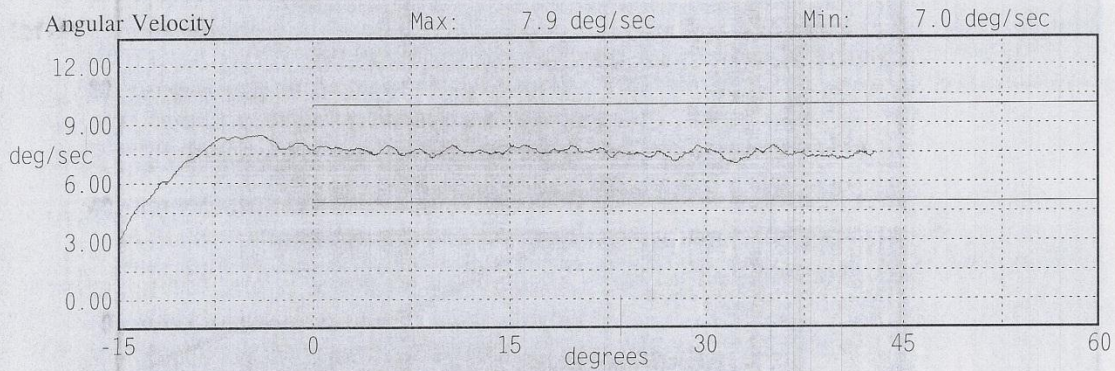
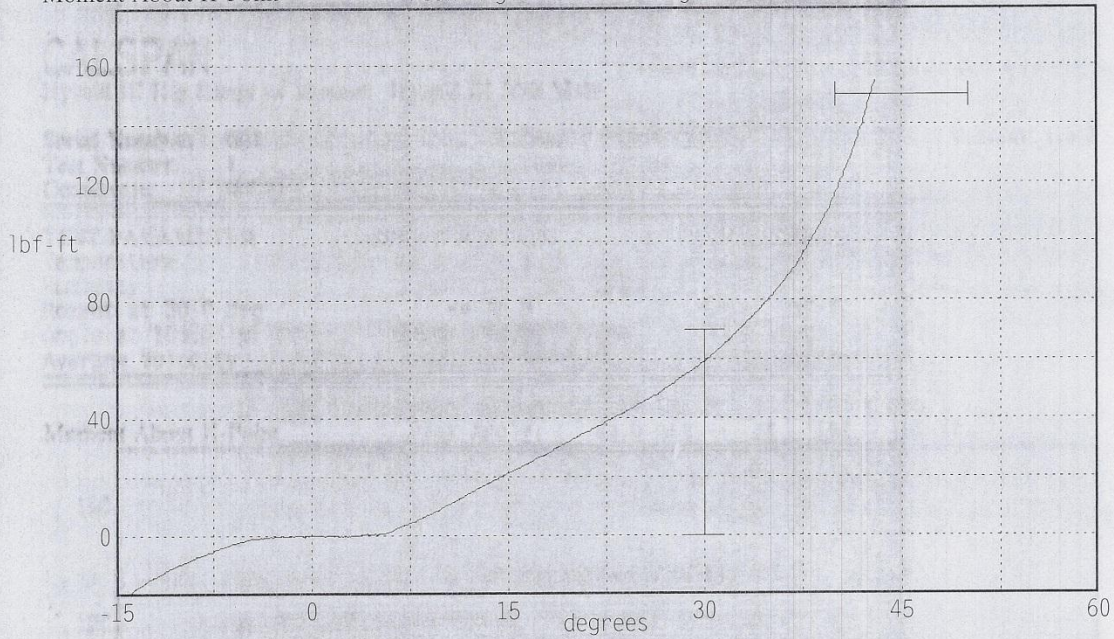
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Test Number: 1
Comments: RIGHT

Date: 12/05/2011
Time: 13:43

Version: 1.6.3

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
Temperature	66.0 - 78.0	71.0 °F	Pass
Humidity	10 - 70	44 %	Pass
Moment at 30.0 deg	<= 70.0	59.4 lbf-ft	Pass
Angle at 150.0 lbf-ft	40.0 - 50.0	42.8 deg	Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec	Pass

Moment About H-Point
Peak Moment: 154.8 lbf-ft at 43.0 deg
Peak Angle: 43.0 deg at 154.8 lbf-ft



CALSPAN

Hybrid III Hip Range of Motion: Hybrid III 50th Male

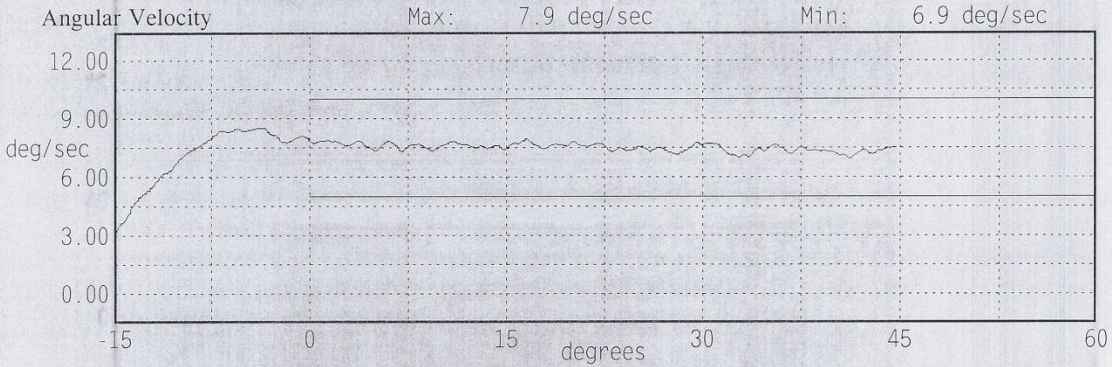
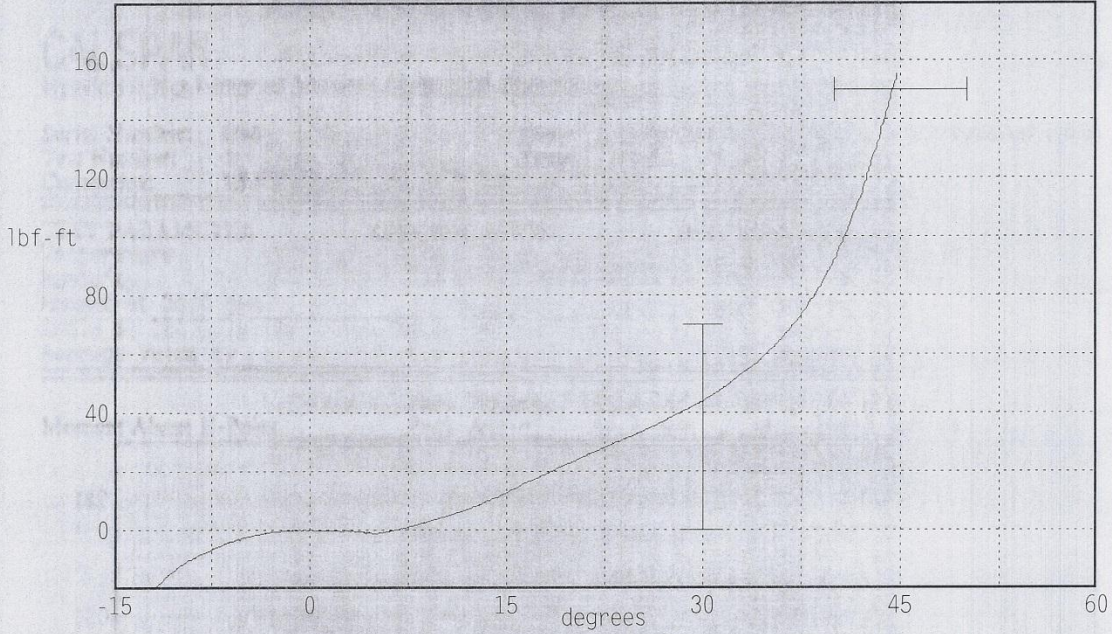
Serial Number: 064
Test Number: 1
Comments: LEFT

Date: 12/05/2011
Time: 13:27

Version: 1.6.3

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
Temperature	66.0 - 78.0	71.0 °F	Pass
Humidity	10 - 70	44 %	Pass
Moment at 30.0 deg	<= 70.0	44.2 lbf-ft	Pass
Angle at 150.0 lbf-ft	40.0 - 50.0	44.4 deg	Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec	Pass

Moment About H-Point
Peak Moment: 155.4 lbf-ft at 44.7 deg
Peak Angle: 44.7 deg at 154.3 lbf-ft





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VERIFICATION REPORT

Test Name:	Knee Impact PENDULUM	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	064		
Test ID:	Left Knee	Test Date:	12/7/2011
Test Number:	1	Test Time:	9:38:27 AM

Component Part Number	Component Serial Number
Knee Skin - 78051	2792

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.0 deg C P
Humidity	10.0 -- 70.0	31.0 %RH P
Velocity	2.07 -- 2.13	2.09 m/s P
Resistive Force	-5.78 -- -4.72	-4.88 kN P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID: **Left Knee**

Test Time: **9:38:27 AM**

Test Date: **12/7/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7264-2000	P71267	11/2/2011

Test ID: **Left Knee**

Test Time: **9:38:27 AM**

Test Date: **12/7/2011**

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2 of 2



Test Name:	Knee Impact PENDULUM	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	064		
Test ID:	Left Knee	Test Date:	12/7/2011
Test Number:	1	Test Time:	9:38:27 AM



Test ID: **Left Knee**

Test Time: **9:38:27 AM**

Test Date: **12/7/2011**



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VERIFICATION REPORT

Test Name:	Knee Impact PENDULUM	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	064		
Test ID:	Right Knee	Test Date:	12/7/2011
Test Number:	1	Test Time:	9:10:55 AM

Component Part Number	Component Serial Number
Knee Skin - 78056	2880

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.0 deg C P
Humidity	10.0 -- 70.0	31.0 %RH P
Velocity	2.07 -- 2.13	2.09 m/s P
Resistive Force	-5.78 -- -4.72	-5.25 kN P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID: **Right Knee**

Test Time: **9:10:55 AM**

Test Date: **12/7/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7264-2000	P71267	11/2/2011

Test ID: **Right Knee**

Test Time: **9:10:55 AM**

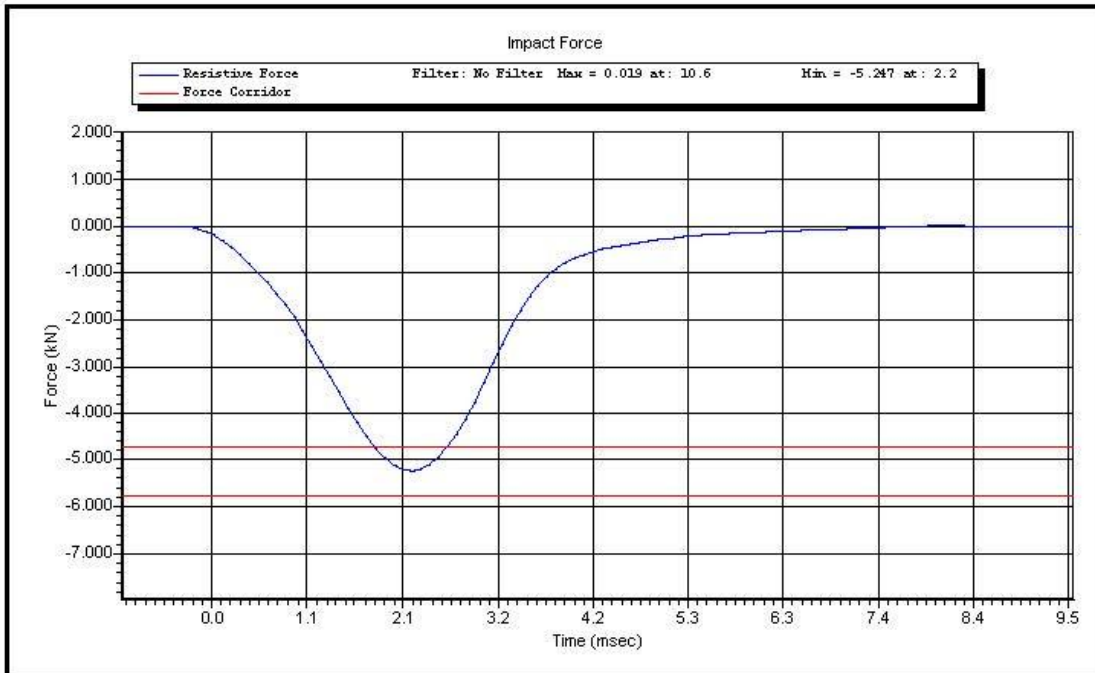
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2 of 2



Test Name:	Knee Impact PENDULUM	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	064		
Test ID:	Right Knee	Test Date:	12/7/2011
Test Number:	1	Test Time:	9:10:55 AM



Test ID: **Right Knee**

Test Time: **9:10:55 AM**

Test Date: **12/7/2011**

CALIBRATION TEST RESULTS

POST-TEST

RIGHT-FRONT PASSENGER DUMMY

S/N: 273



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External Measurements

5th Female SN 273

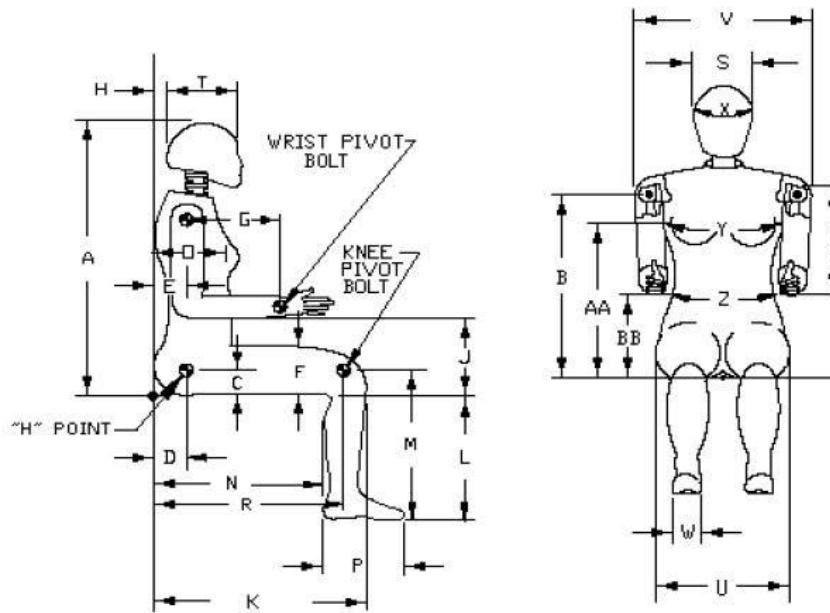
Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	774.7 – 800.1	785	Yes
B	Shoulder Pivot Height	431.8 – 457.2	450	Yes
C	H-Point Height	81.3 – 86.3	84	Yes
D	H-Point from Backline	144.8 – 149.8	147	Yes
E	Shoulder Pivot from Backline	68.6 - 83.8	76	Yes
F	Thigh Clearance	119.4 – 134.6	132	Yes
G	Back of Elbow to Wrist Pivot	243.9 – 259.1	249	Yes
H	Head Back to Backline	43.2 – 48.2	46	Yes
I	Shoulder to Elbow Length	276.8 – 297.2	285	Yes
J	Elbow Rest Height	182.8 – 203.2	192	Yes
K	Buttock to Knee Length	520.7 – 546.1	530	Yes
L	Popliteal Height	355.6 - 376	360	Yes
M	Knee Pivot Height	393.7 – 419.1	397	Yes
N	Buttock Popliteal Length	414 – 439.4	422	Yes
O	Chest Depth without Jacket	175.3 – 190.5	184	Yes
P	Foot Length (right)	218.5 – 233.7	220	Yes
R	Buttock To Knee Pivot Length	457.2 – 482.6	465	Yes
S	Head Breadth	137.1 – 147.3	143	Yes
T	Head Depth	177.8 - 188	183	Yes
U	Hip Breadth	299.7 – 314.9	310	Yes
V	Shoulder Breadth	350.5 – 365.7	357	Yes
W	Foot Breadth	78.8 - 94	82	Yes
X	Head Circumference	528.3 – 548.7	539	Yes
Y	Chest Circumference with Jacket	850.9 – 881.3	860	Yes
Z	Waist Circumference	759.5 – 789.9	770	Yes
AA	Reference Location (Chest Circumference)	332.7 – 358.1	345	Yes
BB	Reference Location (Waist Circumference)	160.1 – 170.2	165	Yes

Technician: AR

Date: 12/2/2011

Hybrid III 5th Female External Measurements

Reference Diagram





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VERIFICATION REPORT

Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:		Test Date:	12/2/2011
Test Number:	1	Test Time:	9:52:37 AM

Component Part Number	Component Serial Number
Head Skin - 78051-228	780

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.9 deg C P
Humidity	10 -- 70	29 %RH P
Resultant Acceleration	250 -- 300	294 g P
Oscillation	0.0 -- 10.0	1.6 % P
Lateral Acceleration	-15.00 -- 15.00	-2.08 g P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test ID:

Test Time: **9:52:37 AM**

Test Date: **12/2/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P66931	6/13/2011
Endevco	7264-2000	P66926	6/13/2011
Endevco	7264-2000	P66943	6/13/2011

Test ID:

Test Time: 9:52:37 AM

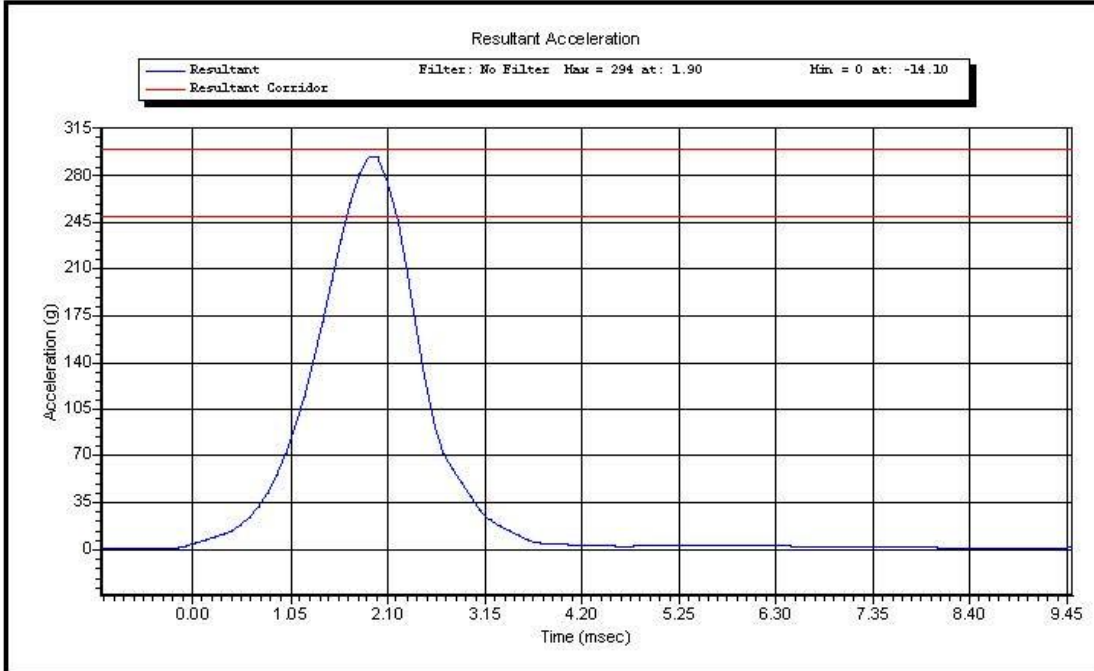
Test Date: 12/2/2011

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2 of 2



Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:		Test Date:	12/2/2011
Test Number:	1	Test Time:	9:52:37 AM



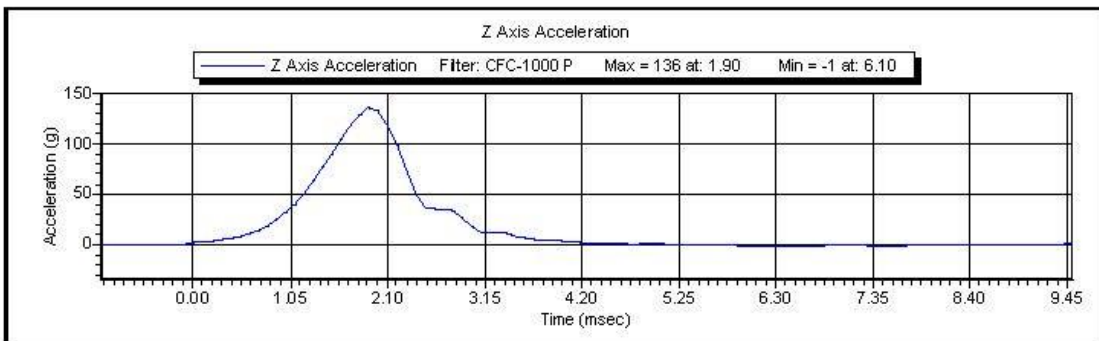
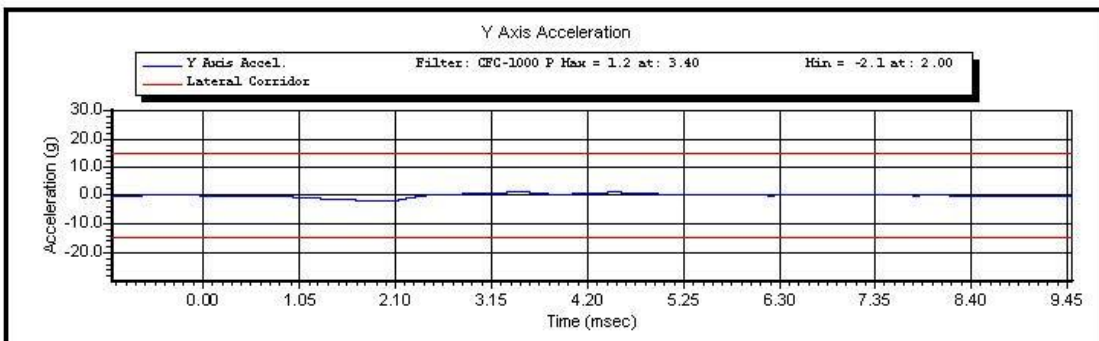
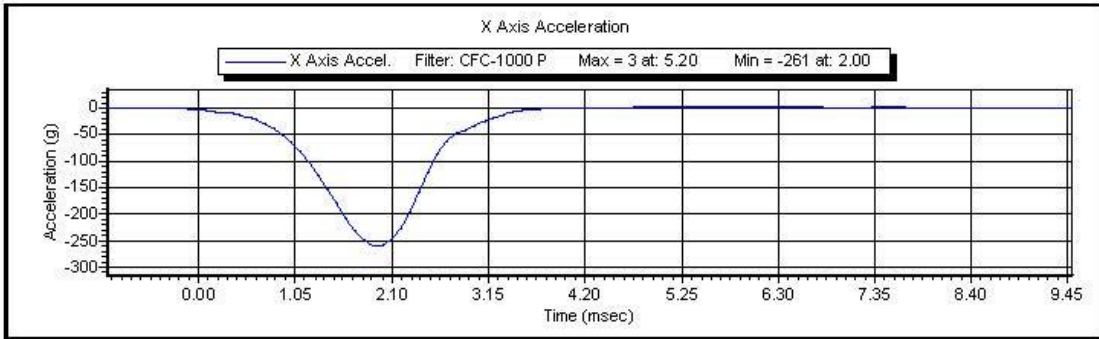
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Test Time: **9:52:37 AM**

Test Date: **12/2/2011**

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1 of 2



Test ID:

Test Time: 9:52:37 AM

Test Date: 12/2/2011

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VERIFICATION REPORT

Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:		Test Date:	12.6/2011
Test Number:	3	Test Time:	8:33:31 AM

Component Part Number	Component Serial Number
Neck - 880105-255	660

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.4 deg C P
Humidity	10 -- 70	36 %RH P
Velocity	5.95 -- 6.19	6.15 m/s P
Pendulum Impulse at 10 ms	1.50 -- 1.90	1.87 m/s P
Pendulum Impulse at 20 ms	3.10 -- 3.90	3.68 m/s P
Pendulum Impulse at 30 ms	4.60 -- 5.60	5.37 m/s P
D Plane Rotation	99.0 -- 114.0	104.6 degrees P
Moment During Rotation Interval	-65.0 -- -53.0	-56.2 Nm P
Moment Decay to -10.0 Nm	94.0 -- 114.0	101.7 ms P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID:

Test Time: **8:33:31 AM**

Test Date: **12.6/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	C16510	10/3/2011
DentonATD	78051-342	PENDULUM POT	2/7/2011
DentonATD	78051-342	CONDYLE POT	2/7/2011
Denton	1716A	LC-1629My	6/3/2011
Denton	1716A	LC-1629Fx	6/3/2011

Test ID:

Test Time: **8:33:31 AM**

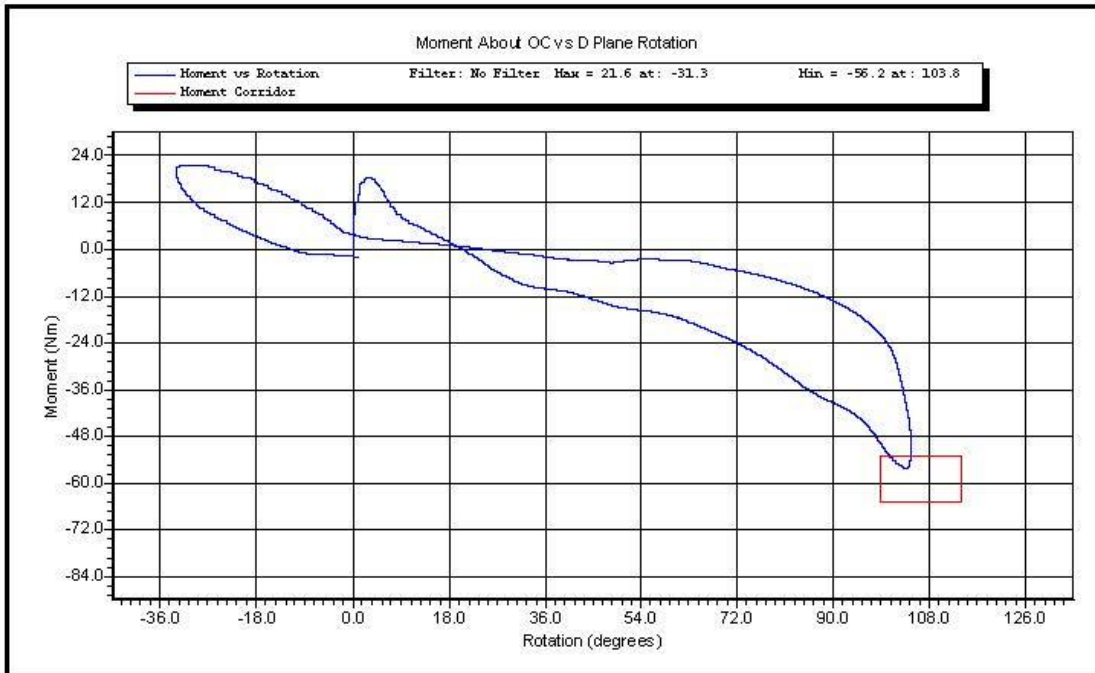
Test Date: **12/6/2011**

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2 of 2



Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:		Test Date:	12/6/2011
Test Number:	3	Test Time:	8:33:31 AM



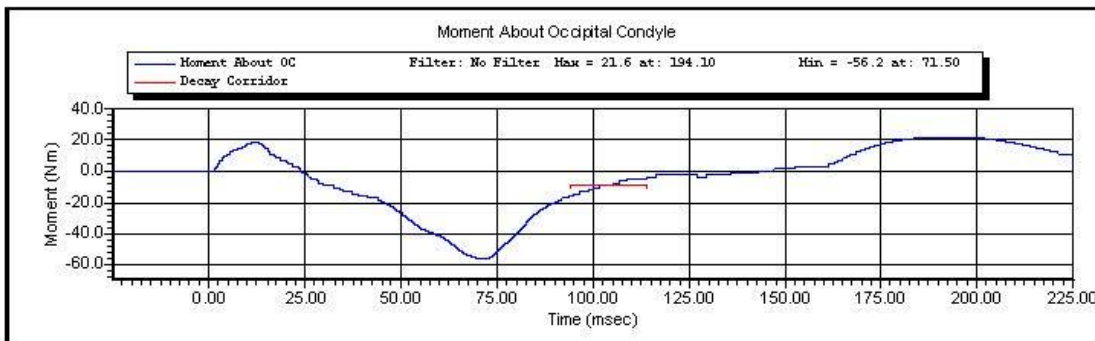
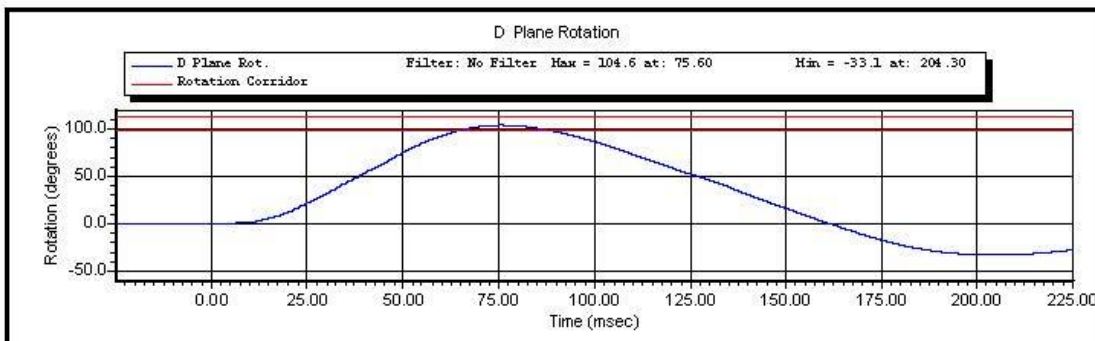
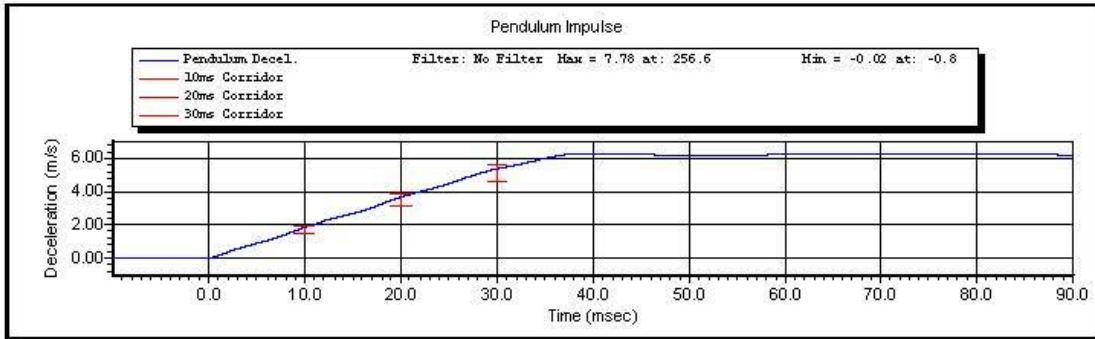
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Test Date: **12/6/2011**

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Test ID:

Test Time: 8:33:31 AM

Test Date: 12/6/2011

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VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:		Test Date:	12/5/2011
Test Number:	3	Test Time:	12:00:51 PM

Component Part Number	Component Serial Number
Neck - 880105-255	660

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.4 deg C P
Humidity	10 -- 70	44 %RH P
Velocity	6.89 -- 7.13	7.11 m/s P
Pendulum Impulse at 10 ms	2.10 -- 2.50	2.41 m/s P
Pendulum Impulse at 20 ms	4.00 -- 5.00	4.48 m/s P
Pendulum Impulse at 30 ms	5.80 -- 7.00	6.16 m/s P
D Plane Rotation	-91.0 -- -77.0	-78.7 degrees P
Moment During Rotation Interval	69.0 -- 83.0	70.2 Nm P
Moment Decay to 10.0 Nm	80.0 -- 100.0	87.1 ms P

All test parameters are within specifications

Technician: **A. Rudniski**
Supervisor: **D. Travale**

Test ID:

Test Time: **12:00:51 PM**

Test Date: **12/5/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	C16510	10/3/2011
DentonATD	78051-342	PENDULUM POT	2/7/2011
DentonATD	78051-342	CONDYLE POT	2/7/2011
Denton	1716A	LC-1629My	6/3/2011
Denton	1716A	LC-1629Fx	6/3/2011

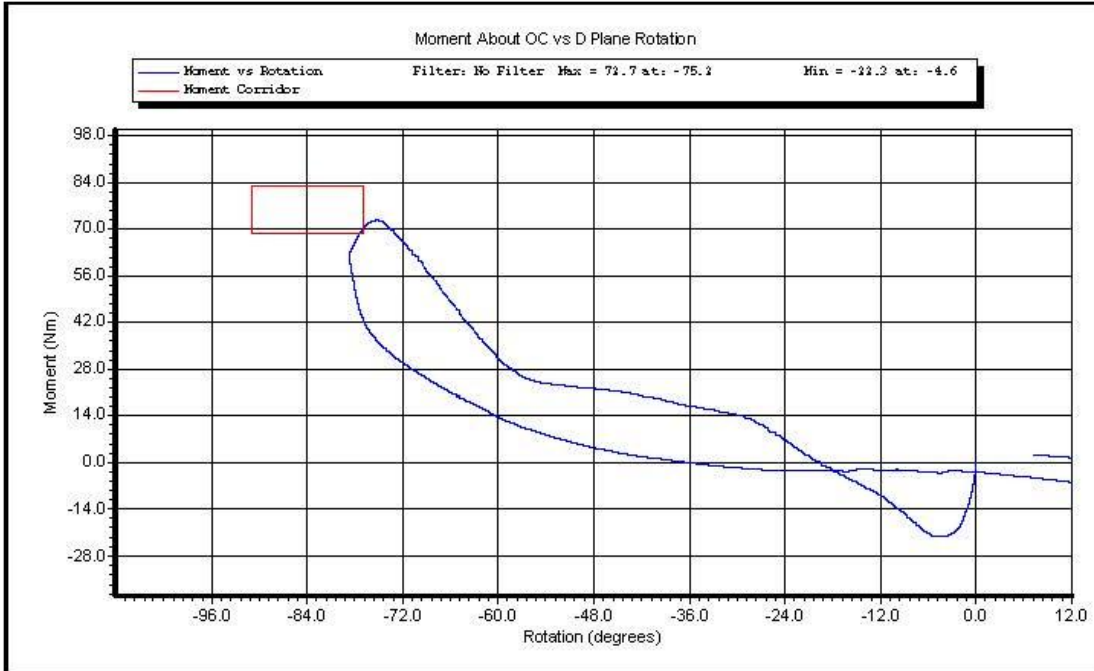
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Test Time: 12:00:51 PM

Test Date: 12/5/2011



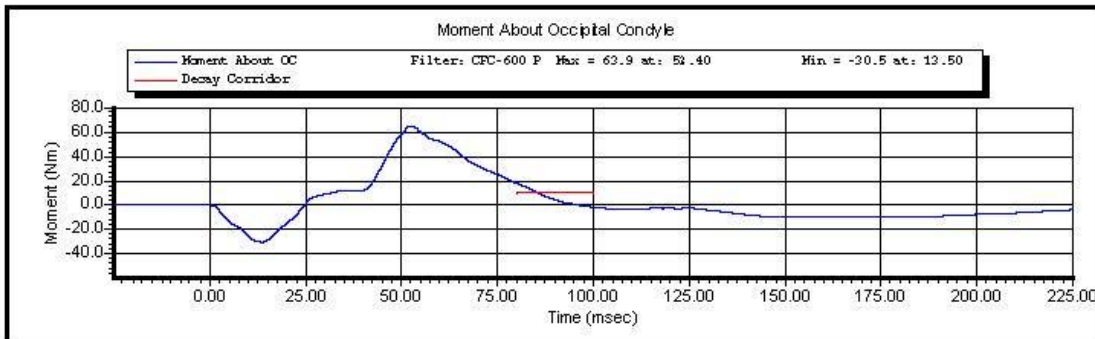
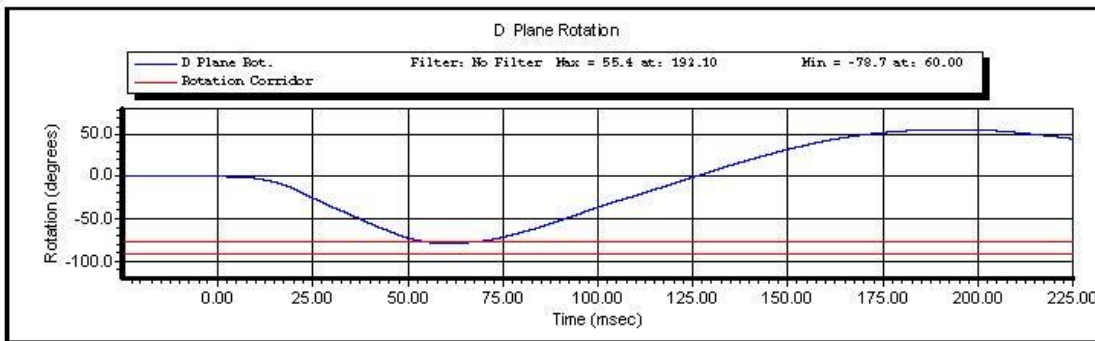
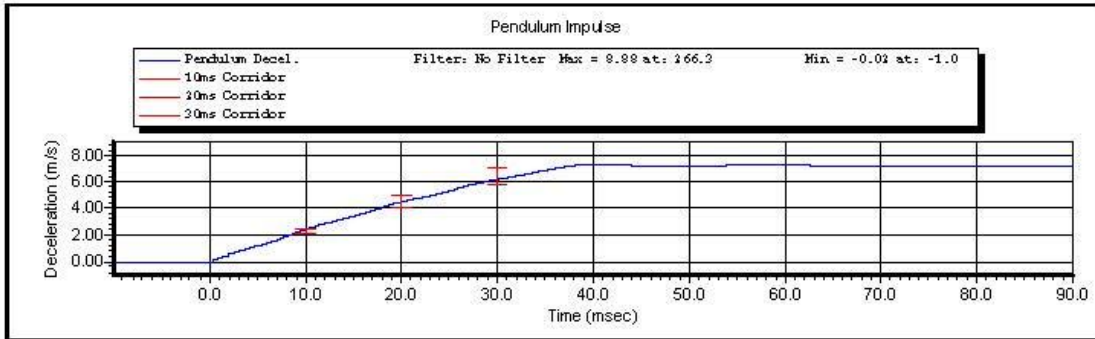
Test Name:	Neck Flexion	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:		Test Date:	12/5/2011
Test Number:	3	Test Time:	12:00:51 PM



Test ID:

Test Time: **12:00:51 PM**

Test Date: **12/5/2011**



Test ID:

Test Time: 12:00:51 PM

Test Date: 12/5/2011

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VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:		Test Date:	12.6/2011
Test Number:	1	Test Time:	10:27:07 AM

Component Part Number	Component Serial Number
Ribs 880 105-RS	670
Chest Jacket - 880105-355-E	DH0069

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.8 deg C P
Humidity	10.0 -- 70.0	36.0 %RH P
Velocity	6.59 -- 6.83	6.65 m/s P
Sternum Displacement	-58.0 -- -50.0	-55.2 mm P
Force During Displacement Interval	-4400 -- -3900	-4087 N P
Force -18.0 to -50.0 Displacement	-4600 -- 0	-3838 N P
Hysteresis	69 -- 85	70 % P

All test parameters are within specifications

Technician: **A. Rudniski**
Supervisor: **D. Travale**

Test ID:

Test Time: **10:27:07 AM**

Test Date: **12.6/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	AH5M8	11/8/2011
DentonATD	78051-342	DS-273	10/10/2011

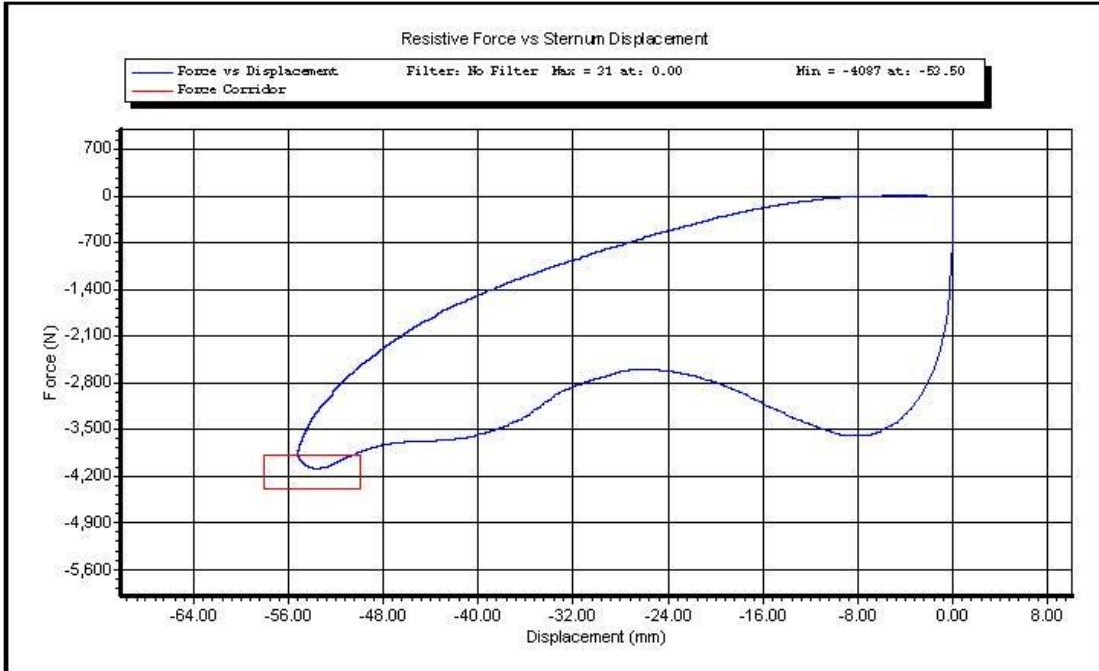
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Test Time: **10:27:07 AM**

Test Date: **12/6/2011**



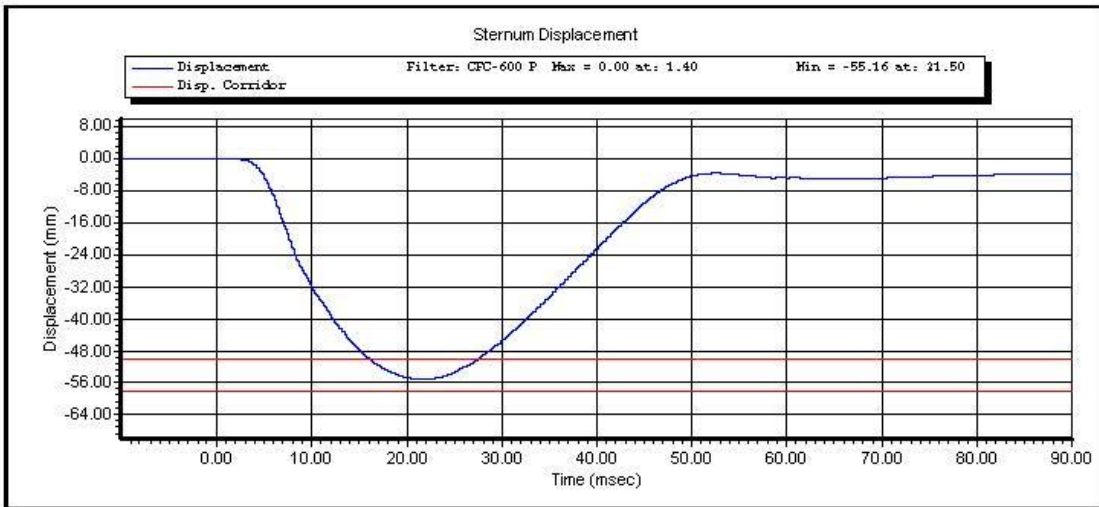
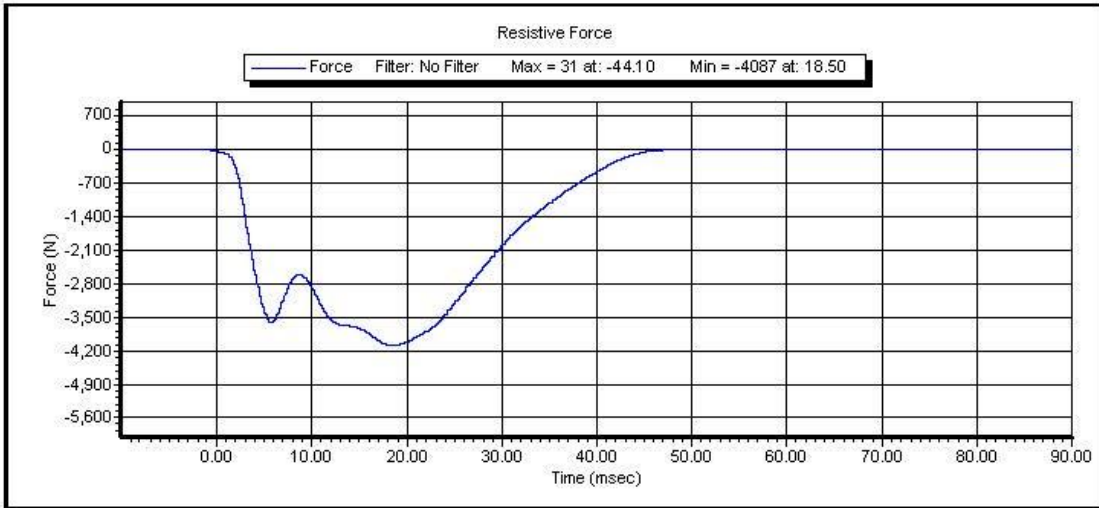
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:		Test Date:	12/6/2011
Test Number:	1	Test Time:	10:27:07 AM



Test ID:

Test Time: **10:27:07 AM**

Test Date: **12/6/2011**



Test ID:

Test Time: 10:27:07 AM

Test Date: 12/6/2011

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Torso Flexion Test

Technician: SZ

Calibration Date: 12/6/2011

ATD Serial Number: NHTSA 5th Female 273

Test Results			
Test Condition	Parameters	Results	Status
Temperature	18.9-25.6° C	21.8° C	P
Lab Humidity	10-70%	35%	P
Max Force @ 45 deg	320 – 390N	372N	P
Torso Rotation Rate	0.5 °/s ≤ rate ≤ 1.5 °/s	1.0 °/s	P
Initial reference angle	≤20 deg	11°	P
Final ref plan angle	Initial ref plane ± 8 deg	19°	P

P = Pass

F= Fail



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VERIFICATION REPORT

Test Name:	Knee Impact PENDULUM	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Left Knee	Test Date:	12/7/2011
Test Number:	1	Test Time:	11:06:40 AM

Component Part Number	Component Serial Number
Knee Skin - 880105-508	1726
Knee Insert - 880105-511	1039

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	30.0 %RH P
Velocity	2.07 -- 2.13	2.10 m/s P
Resistive Force	-4060 -- -3450	-3629 N P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID: **Left Knee**

Test Time: **11:06:40 AM**

Test Date: **12/7/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7264-2000	P71267	11/2/2011

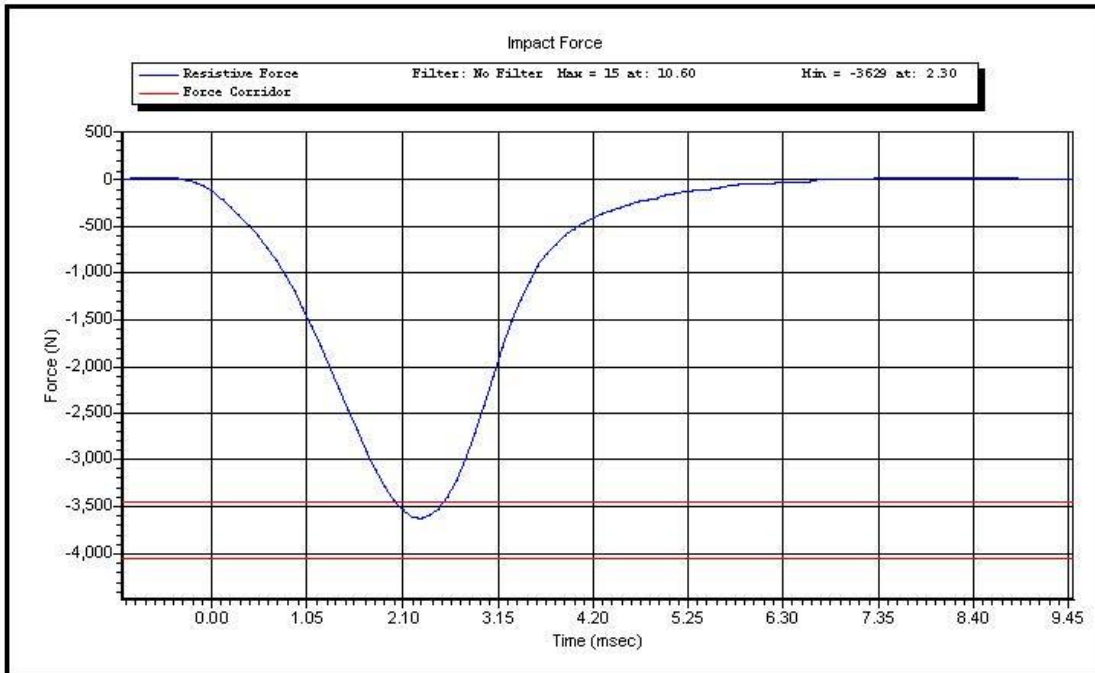
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Test Time: **11:06:40 AM**

Test Date: **12/7/2011**



Test Name:	Knee Impact PENDULUM	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Left Knee	Test Date:	12/7/2011
Test Number:	1	Test Time:	11:06:40 AM



Test ID: **Left Knee**

Test Time: **11:06:40 AM**

Test Date: **12/7/2011**



VERIFICATION REPORT

Test Name:	Knee Impact PENDULUM	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Right Knee	Test Date:	12/7/2011
Test Number:	1	Test Time:	10:24:17 AM

Component Part Number	Component Serial Number
Knee Skin - 880105-508	1051
Knee Insert - 880105-511	1039

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.0 deg C P
Humidity	10.0 -- 70.0	30.0 %RH P
Velocity	2.07 -- 2.13	2.07 m/s P
Resistive Force	-4060 -- -3450	-3614 N P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID: **Right Knee**

Test Time: **10:24:17 AM**

Test Date: **12/7/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7264-2000	P71267	11/2/2011

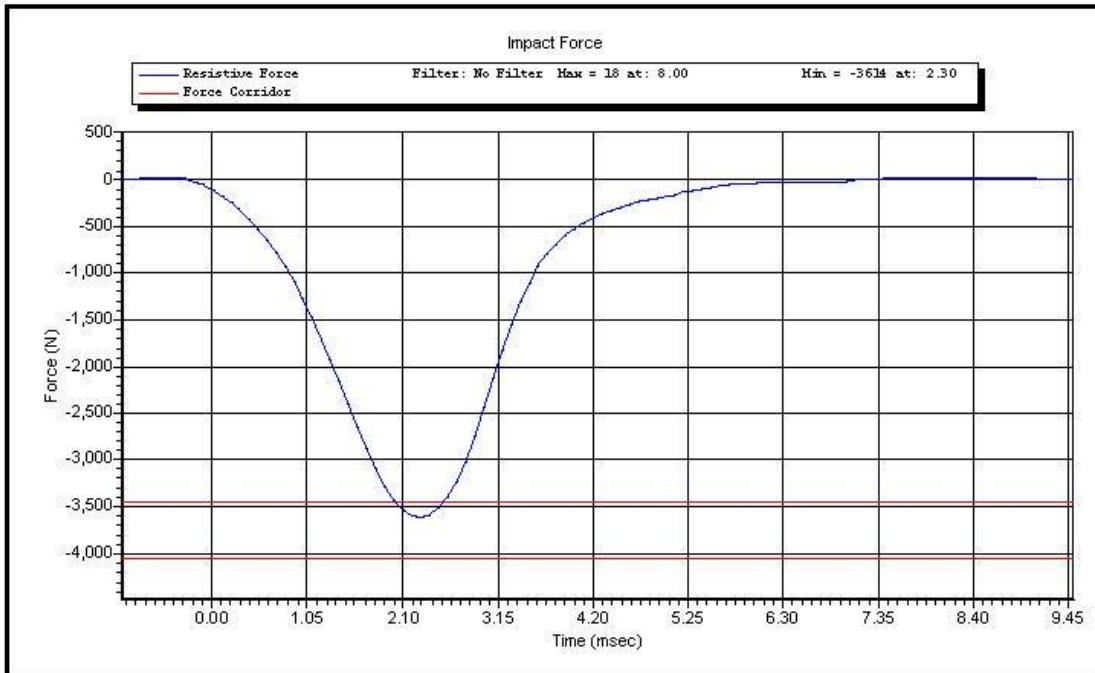
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Test Time: **10:24:17 AM**

Test Date: **12/7/2011**



Test Name:	Knee Impact PENDULUM	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Right Knee	Test Date:	12/7/2011
Test Number:	1	Test Time:	10:24:17 AM



Test ID: **Right Knee**

Test Time: **10:24:17 AM**

Test Date: **12/7/2011**