

REPORT NUMBER: SINCAP-CAL-12-007

**NEW CAR ASSESSMENT PROGRAM (NCAP)
Moving Deformable Barrier Side Impact Test**

**HYUNDAI MOTOR MANUFACTURING ALABAMA, LLC
2012 Hyundai Elantra PZEV
Four Door Sedan**

NHTSA No: MC0501

**PREPARED BY:
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December 22, 2011

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
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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

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Technical Report Documentation Page

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15. Supplementary Notes

16. Abstract

A 55/28 kph 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2012 Hyundai Elantra PZEV Four Door Sedan in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for the generation of consumer information on vehicle side crash protection. This test was conducted at the Calspan Corporation Crash Test Facility in Buffalo, New York, on 11/8/2011.

The impact velocity of the Moving Deformable Barrier (MDB) was 62.28 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 19°C. The target vehicle post-test maximum crush was 178 mm at level 2. The test vehicle's performance was as follows:

Measurement Description	Driver ATD (ES-2re)		
	Units	IARV	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	387.93
Maximum Thoracic Rib Deflection	mm	44	24.65
Total Abdominal Force	N	2500	1508.41
Pubic Symphysis Force	N	6000	-2020.88

Measurement Description	Passenger ATD (SID-IIs)		
	Units	IARV	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	424.47
Lower Spine Resultant Acceleration	G	82	69.88
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	1824.75
Maximum Thoracic Rib Deflection	mm	38*	30.66
Maximum Abdominal Rib Deflection	mm	45*	25.27

* Proposed IARV

The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.

17. Key Words New Car Assessment Program (NCAP) Side Impact MDB ES-2re SID-IIs		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Adm. Technical Information Services Division, NPO-411 1200 New Jersey Ave. SE Room E12-100 Washington, D.C. 20590 e-mail: tis@nhtsa.dot.gov FAX: 202-493-2833	
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TABLE OF CONTENTS

<u>Section</u>		<u>Page</u>
1	Test Purpose and Procedure	1-1
2	Summary of Test Results	2-1
3	Occupant and Vehicle Information	3-1
<u>Data Sheet</u>		<u>Page</u>
1	General Test and Vehicle Parameter Data	3-2
2	Seat, Seat Belt, Steering Wheel Adjustment and Fuel System Data	3-6
3	Dummy Longitudinal Clearance Dimensions	3-11
4	Dummy Lateral Clearance Dimensions	3-12
5	Camera and Instrumentation Data	3-13
6	Test Vehicle Accelerometer Locations	3-14
7	MDB Accelerometer Locations	3-15
8	Post-Test Observations	3-16
9	MDB Summary of Results	3-18
10	Test Vehicle Profile Measurements	3-19
11	Test Vehicle Exterior Crush Measurements	3-20
12	MDB Exterior Static Crush Measurements	3-23
13	FMVSS No. 301 Static Rollover Results	3-24
14	Dummy/Vehicle Temperature and Humidity Stabilization Data	3-25
<u>Appendix</u>		<u>Page</u>
A	Photographs	A-1
B	Vehicle and Dummy Response Data Plots	B-1
C	Dummy Configuration and Performance Verification Data	C-1
D	Test Equipment and Instrumentation Calibration Data	D-1

SECTION 1

TEST PURPOSE AND PROCEDURE

PURPOSE

This moving deformable barrier side impact test is part of the MY 2012 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract number DTNH22-09-D-00126. The purpose of this test is to generate comparative side impact performance in a 2012 Hyundai Elantra PZEV Four Door Sedan.

The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated August 2011.

SECTION 2

SUMMARY OF TEST RESULTS

SUMMARY

A 2012 Hyundai Elantra PZEV Four Door Sedan was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 62.28 km/h (38.70 mph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by the Calspan Corporation Transportation Sciences Center in Buffalo, New York on November 08, 2011. Pretest and post- test photographs of the test vehicle, the MDB and the dummies (ES-2re and SID-IIs) are included in this report.

Dummies were placed in the driver and left rear designated seating positions according to instructions specified in the OCWS Side Impact Laboratory Test Procedure, dated August 2011. The side impact event was documented by 9 high-speed and 2 real-time cameras. Camera locations are included in this report.

The Dummies were instrumented in the following manner:

DRIVER ATD (ES-2re)

- Primary and redundant head CG tri-axial accelerometers
- Chest upper rib, middle rib, and lower rib y-axis displacement potentiometers
- Abdomen forward, middle, and rear y-axis load cells
- Lower spine (T12) tri-axial accelerometers
- Public symphysis y-axis load cell

PASSENGER ATD (SID-IIs)

- Primary and redundant head CG tri-axial accelerometers
- Chest upper rib, middle rib, and lower rib y-axis displacement potentiometers
- Abdomen upper rib and lower rib y-axis displacement potentiometers
- Lower spine (T12) tri-axial accelerometers
- Acetabulum and iliac wing y-axis load cells

Appendix B contains the vehicle and dummy response data. Dummy configuration and performance verification data can be found in Appendix C of this report.

DUMMY INJURY VALUES

Measurement Description	Driver ATD (ES-2re F034)		
	Units	Threshold	Result
Head Injury Criteria (HIC36)		1000	387.93
Maximum Thorax Rib Deflection	mm	44	24.65
Combined Abdominal Force	N	2500	1508.41
Pubic Symphysis Force	N	6000	-2020.88

Measurement Description	Passenger ATD (SID-IIs 8012)		
	Units	Threshold	Result
Head Injury Criteria (HIC36)		1000	424.47
Lower Spine (T12) Resultant Acceleration	G	82	69.88
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	1824.75
Maximum Thoracic Rib Deflection	mm	38*	30.66
Maximum Abdominal Rib Deflection	mm	45*	25.27

*Proposed IARV

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	No	No		
Side Curtain Airbag	Yes	Yes	Yes	Yes
Torso/Pelvis Airbag	Yes	Yes	No	No
Seat Belt Pretensioner	Yes	Yes	No	No
Seat Belt Load Limiter	Yes	Yes	No	No

GENERAL COMMENTS:

1. P1 serial number - F034
2. P2 serial number - DG8012
3. Camera No.1 does not have a time stamp due to an internal malfunction and needs to be sent back to the manufacturer after NCAP testing to be repaired.

DAQTA ANOMALIES:

- Passenger Lower Abdominal Rib DY is questionable between 42-54 ms

SECTION 3

Occupant and Vehicle Information

This section contains information reporting for the following Data Sheets:

Data Sheet No. 1 - General Test and Vehicle Parameter Data

Data Sheet No. 2 – Seat, Seat Belt, Steering Wheel Adjustment and Fuel System Data

Data Sheet No. 3 – Dummy Longitudinal Clearance Dimensions

Data Sheet No. 4 – Dummy Lateral Clearance Dimensions

Data Sheet No. 5 – Camera and Instrumentation Data

Data Sheet No. 6 – Test Vehicle Accelerometer Locations

Data Sheet No. 7 – MDB Accelerometer Locations

Data Sheet No. 8 – Post-Test Observations

Data Sheet No. 9 – MDB Summary of Results

Data Sheet No. 10 – Test Vehicle Profile Measurements

Data Sheet No. 11 – Test Vehicle Exterior Crush Measurements

Data Sheet No. 12 – MDB Exterior Static Crush Measurements

Data Sheet No. 13 – FMVSS No. 301 Static Rollover Results

Data Sheet No. 14 – Dummy/Vehicle Temperature and Humidity Stabilization Data

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2012 Hyundai ELANTRA PZEV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0501
 Test Date: 11/8/2011

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	MC0501	Traction Control System (TCS)	Yes
Model Year	2012	Auto-Leveling System	No
Make	Hyundai	Automatic Door Locks (ADL)	Yes
Model	Elantra PZEV	Power Window Auto-Reverse	Yes
Body Style	Four Door Sedan	Other Optional Feature	--
VIN	5NPDH4AE5CH097389	Driver Front Airbag	Yes
Body Color	Gold/Tan/Copper	Driver Curtain Airbag	Yes
Odometer Reading	175 / 109	Driver Head/Torso Airbag	No
Engine Displacement (L)	1.8	Driver Torso Airbag	No
Type/No. Cylinders	I4	Driver Torso/Pelvis Airbag	Yes
Engine Placement	Lateral	Driver Pelvis Airbag	No
Transmission Type	Automatic	Driver Knee Airbag	No
Transmission Speeds	6-Speed	Rear Pass. Curtain Airbag	Yes
Overdrive	Yes	Rear Pass. Head/Torso Airbag	No
Final Drive	Front Wheel Drive	Rear Pass. Torso Airbag	No
Roof Rack	No	Rear Pass. Torso/Pelvis Airbag	No
Sunroof/T-Top	Yes	Rear Pass. Pelvis Airbag	No
Running Boards	No	Driver Seat Belt Pretensioners	Yes
Tilt Steering Wheel	Yes	Rear Pass. Seat Belt Pretensioners	No
Power Seats	No	Driver Load Limiter	Yes
Anti-Lock Brakes (ABS)	Yes	Rear Pass. Load Limiter	No
All-Wheel Drive (AWD)	No	Other Safety Restraint	--

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

No

DATA FROM CERTIFICATION LABEL

Manufactured By	Hyundai Motor Manufacturing Alabama, LLC	GVWR (kg)	1,720
Date of Manufacture	8/2011	GAWR Front (kg)	940
Vehicle Type	Four Door Sedan	GAWR Rear (kg)	800

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3	-	5	
Capacity Weight (VCW) (kg)					385.0 (A)
DSC X 68.04 kg					340.2 (B)
Cargo Weight (RCLW) (kg)					44.8 (A-B)

VEHICLE SEAT TYPE

Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						W/ Lever	W/ Knob
Front Seat	X					X	
Rear or Second Row Seat		X			X		
Third Row seat							

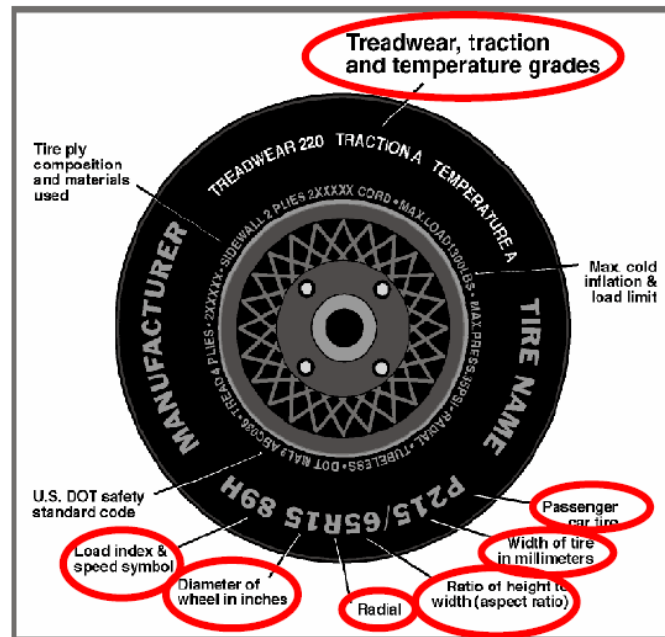
DATA SHEET NO. 1 ... (CONTINUED)
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2012 Hyundai ELANTRA PZEV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0501
 Test Date: 11/8/2011

VEHICLE TIRE INFORMATION

Collect year, make, model, VIN, items circled in red, and tire manufacturer and tire name.



TIRE PLACARD INFORMATION

Measured Parameter	Front	Rear
Recommended Cold Tire Pressure (kPa)	220	220
Recommended Tire Size	P215/45R17	P215/45R17

TIRE SIDEWALL INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	350	350
Tire Size on Vehicle	P215/45R17	P215/45R17
Tire Manufacturer	Continental	Continental
Tire Name	ContiProContact	ContiProContact
Tire Type	Passenger	Passenger
Tire Width	215	215
Aspect Ratio	45	45
Radial	Yes	Yes
Wheel Diameter (mm)	528	528
Load Index/Speed	87H	87H
Treadwear	500	500
Traction Grade	AA	AA
Temperature Grade	A	A
Tire Material	Rubber	Rubber

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

Test Vehicle: 2012 Hyundai ELANTRA PZEV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0501
 Test Date: 11/8/2011

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	220	220	220	220
Tire Placard	kPa	220	220	220	220
Owner's Manual	kPa	220	220	220	220
As Tested	kPa	220	220	220	220

MDB TIRE SPECIFICATIONS

	Units	Requirement	LF	RF	LR	RR
Tire Size		P205/75R15	P205/75R15	P205/75R15	P205/75R15	P205/75R15
Tire Pressure	kPa	200 ± 21	215	205	200	210

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	407	251		442	332		454.5	326	
Right	kg	385.5	245		401	289		399	292.5	
Ratio	%	62	38		58	42		58	42	
Totals	kg	792.5	496	1,288.5	843	621	1,464	853.5	618.5	1,472

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1,288.5	(A)
Sum of Actual Weight of 2 P572 ATDS Used	kg	136.8	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	44.8	(C)
Calculated Target Vehicle Test Weight (TVTW)	kg	1,470.1	(A+B+C)

Does the measured As Test Vehicle Weight lie within the required weight range (i.e. Calculated Test Vehicle Target Weight – 4.5 kg to – 9 kg)? ☒ Yes ☐ No

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Balast / Equipment Removed	None

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

Test Vehicle: 2012 Hyundai ELANTRA PZEV
Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0501
Test Date: 11/8/2011

TEST VEHICLE ATTITUDE AND CG

Measurement Description	Units	Fully Loaded	As Tested	Meets Requirement**
LF	mm	675	677	Yes
RF	mm	683	686	Yes
RR	mm	667	662	Yes
LR	mm	657	655	Yes
Vehicle CG (Aft of Front Axle)	mm	1,133	1,144	
Vehicle CG (Left+)/Right(-) from Longitudinal Centerline)	mm	47	44	

*** The "As Tested" vehicle attitude measurements must be equal to or within ± 10 mm of the "Fully Loaded" vehicle attitude measurements at each wheel well. Indicate "Yes" or "No" for "Meets Requirements".

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

Test Vehicle: 2012 Hyundai ELANTRA PZEV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0501
 Test Date: 11/8/2011

SEAT POSITIONING

The driver's seat, front center seat (if applicable), and right front passenger's seat should be set to the mid-track, lowest, mid-angle position. The struck-side rear passenger's seat, rear center seat, and non-struck side rear passengers' seats should be set to the rear-most, lowest, mid-angle position.

SCRL ANGLE RANGE

Seat	SCRL (°)		
	Max	Min	Mid
Driver Seat	14.5	11.8	13.15
Front Passenger Seat	-	No Angle Adjustment	-
Front Center Seat*			
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat*	Fixed	Fixed	Fixed

**if applicable*

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid- Fore/Aft	Forward- Most
Driver Seat	13.15	14	Max	37	43	52
			Mid	19	26	33
			Min	0	5	14
Front Passenger Seat	No Height or Angle Adjustment		Max			
			Mid			
			Min			
Front Center Seat*			Max			
			Mid			
			Min			
Struck Side Rear Seat	Fixed	Fixed	Max			
			Mid			
			Min			
Non-Struck Side Rear Seat	Fixed	Fixed	Max			
			Mid			
			Min			
Rear Center Seat*	Fixed	Fixed	Max			
			Mid			
			Min			

**if applicable*

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

Test Vehicle: 2012 Hyundai ELANTRA PZEV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0501
 Test Date: 11/8/2011

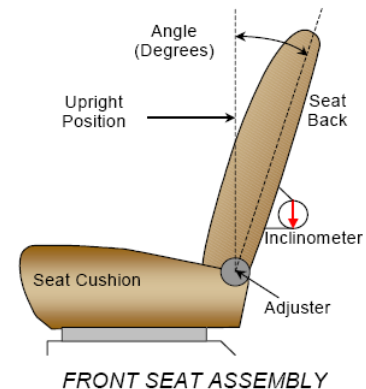
SEAT FORE / AFT POSITION

Seat	Total Fore / Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	220	23 (0-22)	110	11
Front Passenger Seat	220	23 (0-22)	110	11
Front Center Seat*				
Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat*	Fixed	Fixed	Fixed	Fixed

*if applicable

SEAT BACK ANGLE ADJUSTMENT

The driver's seat back is positioned to the manufacturer's designated design angle. The front center and front passenger's seat backs are positioned in a similar manner as the driver's seat back. The struck side rear seat back is positioned such that the dummy's head is level. The rear center and non-struck side rear outboard seat backs are positioned in a similar manner as the struck-side rear seat back.



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detents*
Driver Seat w/ Seated Dummy	-7.5		4.5	
Front Passenger Seat	-7.4		4.6	
Front Center Seat*				
Struck Side Rear Seat w/ Seated Dummy	Fixed	Fixed	9.5	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	9.5	Fixed
Rear Center Seat*	Fixed	Fixed	Fixed	Fixed

*if applicable

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

Test Vehicle: 2012 Hyundai ELANTRA PZEV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0501
 Test Date: 11/8/2011

SEAT BELT ANCHORAGE ADJUSTMENT

Seat belt anchorages are adjusted in accordance with the information provided by the manufacturer on Form No. 1. (The Uppermost position is defined as zero for this test.)

	Total No. of Positions	Placed in Position
Driver Seat	4	0
Rear Seat		

HEAD RESTRAINT ADJUSTMENT

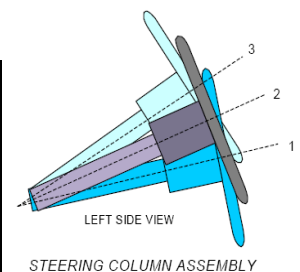
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position. (The uppermost position is defined as zero for this test.)

	Total No. of Positions	Placed in Position
Driver Seat	4	0
Rear Seat		

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the center of its geometric locus it describes when it moves through its full range of motion.

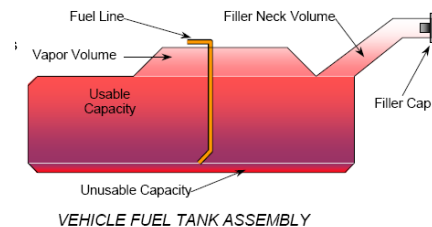
	Degrees	Fore/Aft Position (mm)
Lowermost - Position 1	69.5	
Geometric Center – Position 2	67.2	
Uppermost – Position 3	64.9	
Telescoping Steering Wheel Travel		
Test Position	67.2	



FUEL PUMP

Describe the fuel pump type, details about how it operates, and the location of the fuel filler neck.

Vehicle uses an electric fuel pump that operates with the ignition in the on position. The fuel filler neck is located above the left rear wheel well.



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

Test Vehicle: 2012 Hyundai ELANTRA PZEV
Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0501
Test Date: 11/8/2011

FUEL TANK CAPACITY

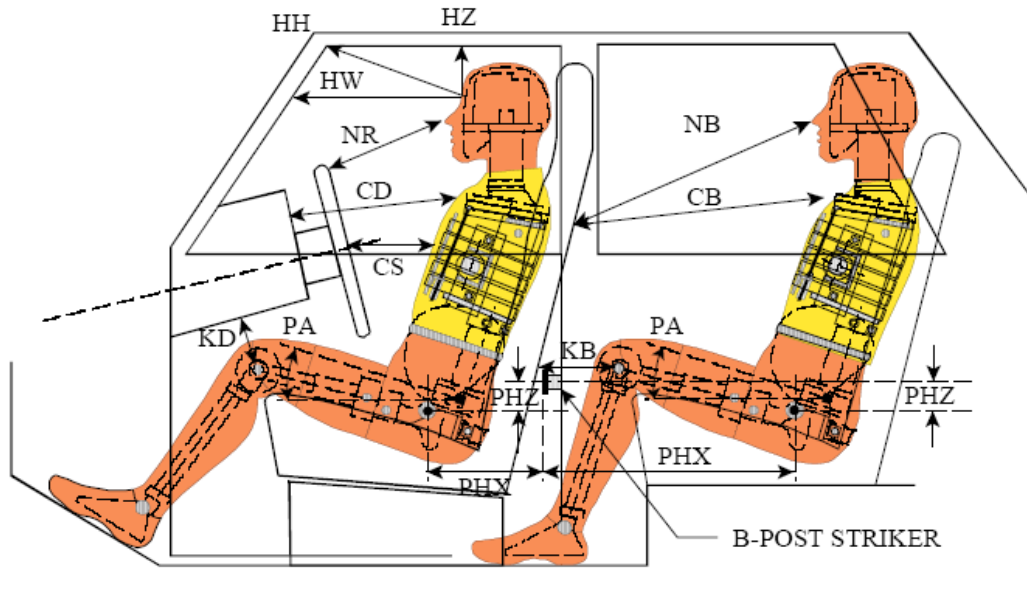
	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	48.1
Usable Capacity of "Optional Tank" (see Form No. 1)	
Usable Capacity of Standard Tank (see Owner's Manual)	48.1
Usable Capacity of Optional Tank (see Owner's Manual)	
93% of Usable Capacity	44.7
Actual Amount of Solvent Used in Test	44.7
1/3 of Usable Capacity	16.0

Is the Actual Amount of Solvent Used in the test equal to 93% $\pm$ 1% of the Usable Capacity stated in Form No. 1? ☒ Yes ☐ No

**DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS**

Test Vehicle: 2012 Hyundai ELANTRA PZEV
Test Program: Side MDB NCAP

NHTSA No.: MC0501
Test Date: 11/8/2011



LEFT SIDE VIEW

NOTE: 2-DOOR VEHICLE SHOWN.
REAR DUMMY PHX & PHZ
MEASUREMENTS FOR A 4-DOOR
VEHICLE WOULD USE THE C-POST
STRIKER AS A REFERENCE POINT

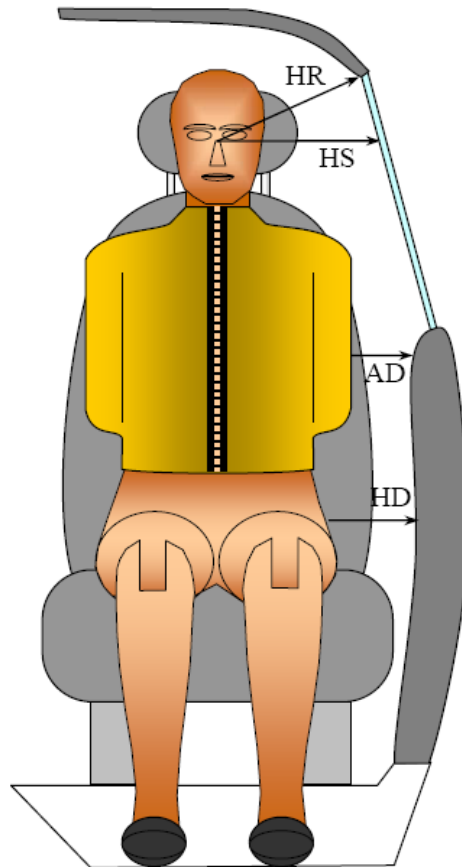
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	386			
HW		Header to Windshield	652			
HZ	HZ	Head to Roof Liner	157		245	
NR	NB	Nose to Rim/Seat Back	473		536	
CD	CB	Chest to Dash/Seat Back	587		524	
CS		Chest to Steering Wheel	414			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	178	28.5	278	18.0
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	155	30.2	272	18.7
PAX°	PAX°	Pelvic Tilt Angle X		22.9		20.8
	PAY°	Pelvic Tilt Angle Y				0.2
PHX	PHX	Hip Point to Striker (X-Axis)	210		314	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	235		265	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2012 Hyundai ELANTRA PZEV
 Test Program: Side MDB NCAP

NHTSA No.: MC0501
 Test Date: 11/8/2011



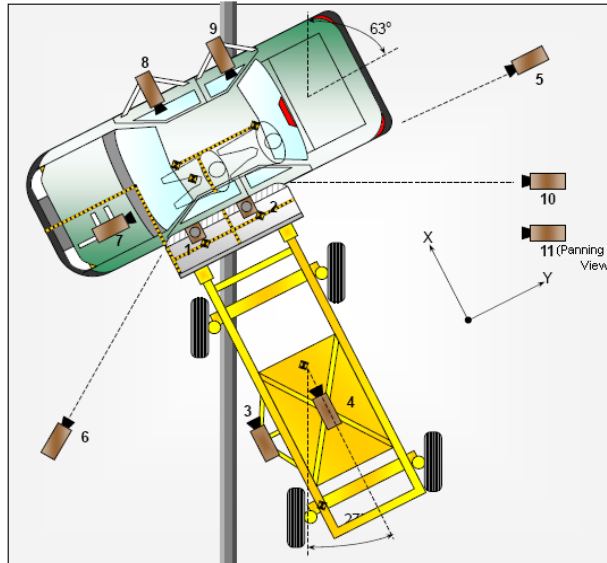
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Description	Units	Driver	Passenger
HR	Head to Side Header	mm	199	256
HS	Head to Side Window	mm	347	360
AD	Arm to Door	mm	108	161
HD	Hip Point to Door	mm	151	183

DATA SHEET NO. 5 CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2012 Hyundai ELANTRA PZEV
Test Program: Side MDB NCAP

NHTSA No.: MC0501
Test Date: 11/8/2011



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	0	0	5150	14	1000
2	Overhead Close-up	273	0	5150	28	1000
3	Left Impact Point (MDB)	-1470	0	-847	25	1000
4	Side Overall (MDB)	-1140	838	-1587	12.5	1000
5	Rear	4800	8436	970	50	1000
6	Left Front	2550	1560	996	24	1000
7	Driver Front (OB)				25	500
8	Driver Side (OB)				12.5	500
9	Passenger Side (OB)				12.5	500
10	Real-time Left Rear				-	30
11	Real-time Inrun				-	30

Reference: Impact Point projected to Ground; +X = To Front of MDB, +Y = To Right of MDB, +Z = Down
*All measurements accurate to ± 6 mm.

If applicable, explain why camera(s) did not operate as intended: _____

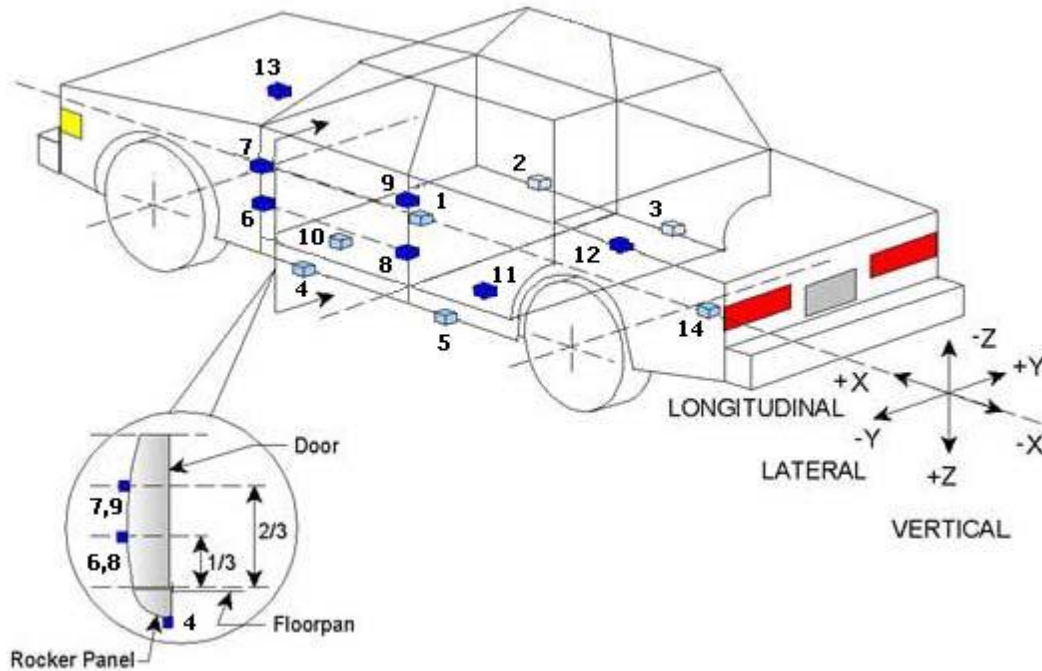
INSTRUMENTATION

Driver Dummy Channels	16
Passenger Dummy Channels	16
Vehicle Structure Accelerometers	23
MDB Accelerometers	7
Total	62

DATA SHEET NO. 6
TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2012 Hyundai ELANTRA PZEV
 Test Program: Side MDB NCAP

NHTSA No.: MC0501
 Test Date: 11/8/2011



TEST VEHICLE ACCELEROMETER LOCATIONS

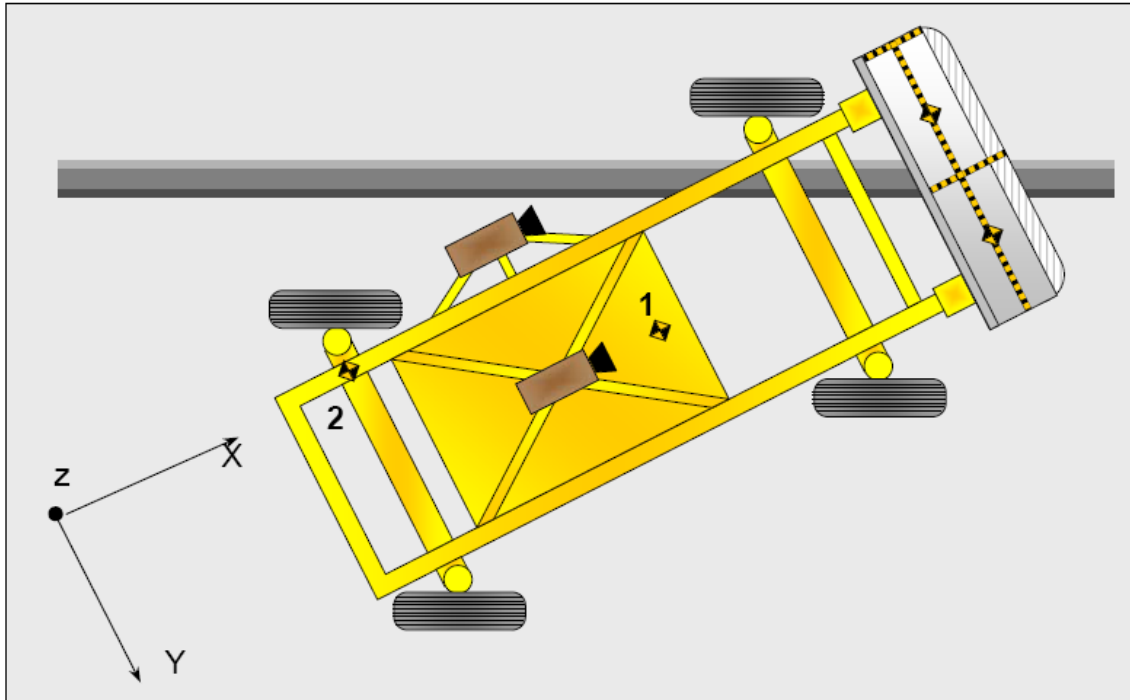
Loc. No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2395	43	422
2	Right Sill at Front Seat	2847	675	251
3	Right Sill at Rear Seat	1905	621	202
4	Left Sill at Front Door	2853	-656	242
5	Left Sill at Rear Door	1862	-666	279
6	A-Post Lower	3165	-657	369
7	A-Post Middle	3200	-629	974
8	B-Post Lower	2077	-672	336
9	B-Post Middle	2025	-660	885
10	Front Seat Track	2256	-551	259
11	Rear Seat Structure	904	-496	647
12	Rt. Rear Occ. Compartment	2107	420	197
13	Engine Block	3841	120	799
14	Rear Above Axle	682	-9	479

Reference: X – Rear surface of vehicle (+ forward)
 Y – Vehicle centerline (+ to right)
 Z – Ground plane (+ down)

DATA SHEET NO. 7
MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2012 Hyundai ELANTRA PZEV
 Test Program: Side MDB NCAP

NHTSA No.: MC0501
 Test Date: 11/8/2011



MDB ACCELEROMETER LOCATIONS

Loc No.	Accelerometer Locations	Coordinates (mm)		
		X	Y	Z
1	MDB CG	1859	0	-330
2	MDB Rear	386	-660	-660

Reference: X – Face of MDB (+ forward)
 Y – MDB centerline (+ to right)
 Z – Ground plane (+ down)

DATA SHEET NO. 8
POST-TEST OBSERVATIONS

Test Vehicle: 2012 Hyundai ELANTRA PZEV
Test Program: Side MDB NCAP

NHTSA No.: MC0501
Test Date: 11/8/2011

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Front Seat Dummy (ES-2re)	Rear Seat Dummy (SID-IIs)
Face	Curtain Airbag, Interior of A-Pillar	Curtain Airbag, Interior of C-Pillar
Top of Head	Interior of the A-Pillar	Interior of C-Pillar
Left Side of Head	Curtain Airbag, Interior A-Pillar	Curtain Airbag, Interior of C-Pillar
Back of Head	Headrest, Interior A-Pillar	Rear Center Seats Headrest
Left Shoulder	Driver's Side Door	P4 Side Door
Upper Torso Contact	Curtain Airbag	Seat Back and P4 Side Door
Lower Torso Contact	Driver's Side Door, Seat Back	P4 Side Door
Left Hip	Torso/Pelvic Airbag, Seat Back	Passengers Seat Pan and Door
Left Knee Contact	Driver's Side Door	P4 Side Door

POST-TEST DOOR PERFORMANCE

Description	Struck Side		Non-Struck Side		Rear Hatch/ Other Door
	Front	Rear	Front	Rear	
Remained Closed and Operational	Closed	Closed	Yes	Yes	Yes
Total Separation from Vehicle at Hinges or Latches	None	None	None	None	None
Latch or Hinge Systems Pulled Out of Their Anchorages	No	No	No	No	
Disengaged from Latched Position	No	No	No	No	
Latch Separated from Striker	No	No	No	No	
Jammed Shut	Yes	Yes	No	No	
If Door Opened at Striker, Record Width of Opening at Striker (mm)					

** Note: Indicate "Yes", "No", or "N/A".

POST-TEST SEAT PERFORMANCE

Description	Struck Side		Non-Struck Side	
	Front	Rear	Front	Rear
Seat Movement Along Seat Track	N/R	N/R	No	No
Seat Disengagement from Floor pan	No	No	No	No
Seat Back Movement from Initial Position	N/R	N/R	No	No
Seat Back Collapse	No	No	No	No

** Note: Indicate "Yes", "No", or "N/A", N/R = Not Recoverable

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	All Pillars Remained in Good Condition
Sill Separation	None
Windshield Damage	None
Window Damage	Driver's Window shattered on impact
Other Notable Effects	

DATA SHEET NO. 8 (CONTINUED)
POST-TEST OBSERVATIONS

Test Vehicle: 2012 Hyundai ELANTRA PZEV
 Test Program: Side MDB NCAP

NHTSA No.: MC0501
 Test Date: 11/8/2011

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Driver		Struck Side Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	No	No		
Curtain Airbag	Yes	Yes	Yes	Yes
Torso/Pelvis Airbag	Yes	Yes	No	No
Seat Belt Pretensioner	Yes	Yes	No	No
Seat Belt Load Limiter	Yes	Yes	No	No

MDB LEFT EDGE IMPACT POINT DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		2697.5
Vertical Impact Reference Line (Aft of Front Axle)(Intended Impact Point)	mm		408
Actual Impact Point (Aft of Frontal Axle)	mm		417
Horizontal Offset(+ forward / - rearward)	mm	+/- 50 of Intended Impact Point	-9
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact Point	12

DATA SHEET NO. 9
MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS

Test Vehicle:	2012 Hyundai ELANTRA PZEV	NHTSA No.:	MC0501
Test Program:	Side MDB NCAP	Test Date:	11/8/2011

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1,250
Overall Length Including Honeycomb Frame	4,120
Wheel Base of Framework Carriage	2,600
CG Location of Front Axle	1,120

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	392.5	297.5	690.0
Right	kg	386.0	291.5	677.5
Ratio	%	57.4	42.6	100
Totals	kg	778.5.0	589.0	1367.5

SPEED AND ANGLE AT IMPACT DATA

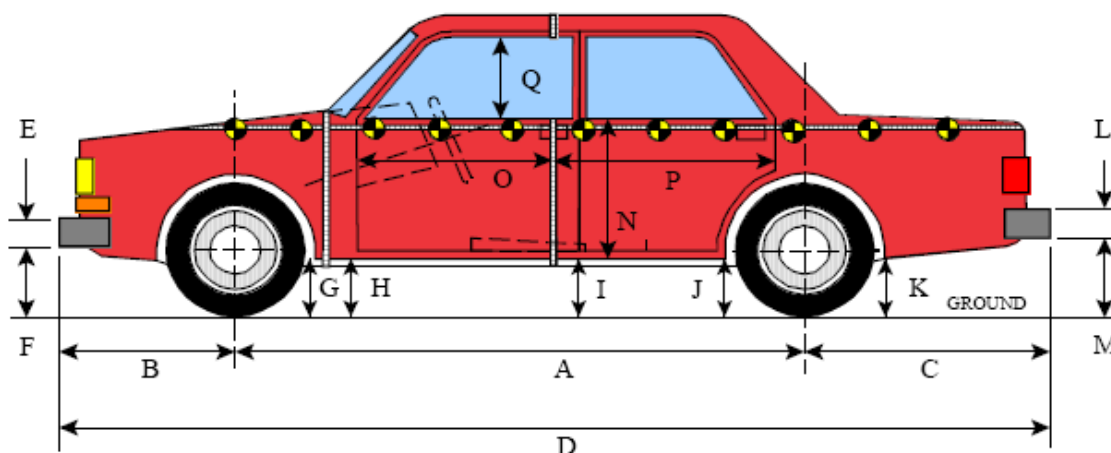
Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.3
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.1
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	89.5
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	63
MDB Crabbed angle to MDB Forward Line of Motion	degrees	26 to 28	27

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	800	Right	178
B	Top of Bumper	533	700	Right	119
C	Mid-Level	686	800	Left	103
D	Top of Stack	813	800	Left	123

DATA SHEET NO. 10
VEHICLE PROFILE MEASUREMENTS

Test Vehicle:	2012 Hyundai ELANTRA PZEV	NHTSA No.:	MC0501
Test Program:	Side MDB NCAP	Test Date:	11/8/2011



LEFT SIDE VIEW

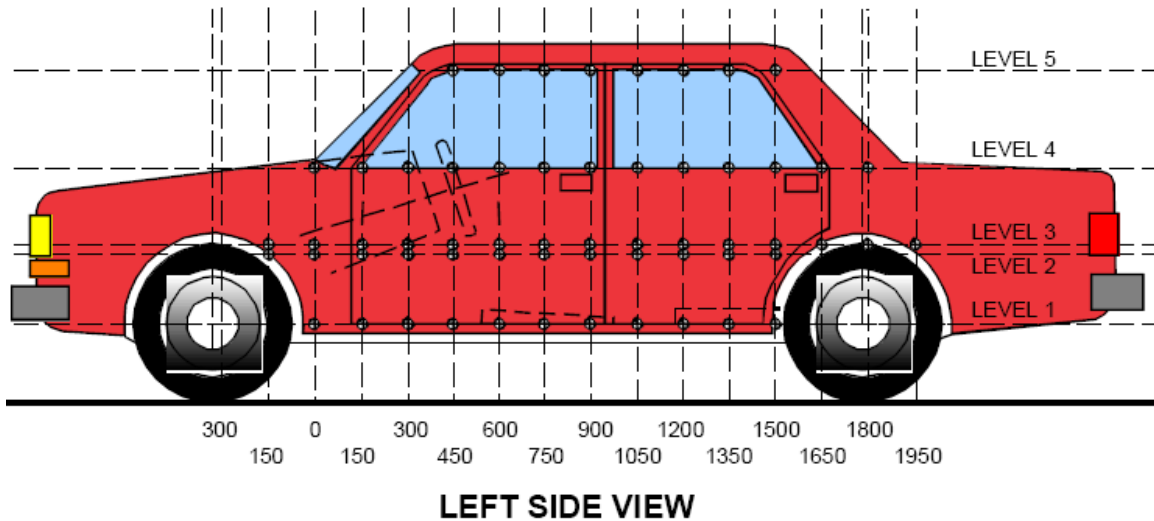
All MEASUREMENTS IN (mm) WITH TOLERANCE OF ± 3 mm

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2,697.5	2,710	-12.5
B	Front Axle to FSOV	856	857	-1
C	Rear Axle to RSOV	973	957	16
D	Total Length at Centerline	4526	4524	2
E	Front Bumper Thickness	140	140	0
F	Front Bumper Bottom to Ground	430	445	-15
G	Sill Height at Front Wheel Well	165	202	-37
H	Sill Height at Front Door Leading Edge	178	222	-44
I	Sill Height at B Pillar	181	224	-43
J1	Sill Height at Rear Wheel Well	175	227	-52
J2	Pinch Weld Height at Rear Wheel Well	150	186	-36
K	Sill Height Aft of Rear Wheel Well	189	224	-35
L	Rear Bumper Thickness	165	165	0
M	Rear Bumper Bottom to Ground	458	490	-32
N	Sill Height to Window Bottom of Front Window Sill	722	646	76
O	Front Door Leading Edge to Impact CL	823	780	43
P	Rear Door Trailing Edge to Impact CL	1206	1169	37
Q	Front Window Opening	402	395	7
R	Right Side Length	4378	4378	-1
S	Left Side Length	4370	4372	-2
T	Vehicle Width at B-Pillar	1767	1594	173

DATA SHEET NO. 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle:	2012 Hyundai ELANTRA PZEV	NHTSA No.:	MC0501
Test Program:	Side MDB NCAP	Test Date:	11/8/2011



Level	Measurement Description	Height Above Ground (mm)	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	225	35	1650
2	Driver Hip Point	491	178	1350
3	Mid-Door	635	177	1200
4	Window Sill	864	157	1650
5	Window Top	1,354	47	1350

NOTE: The above measurements should be taken along the vertical impact reference line.
Vehicle measurements forward of the vertical impact reference line are negative.

DATA SHEET NO. 11 (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2012 Hyundai ELANTRA PZEV
 Test Program: Side MDB NCAP

NHTSA No.: MC0501
 Test Date: 11/8/2011

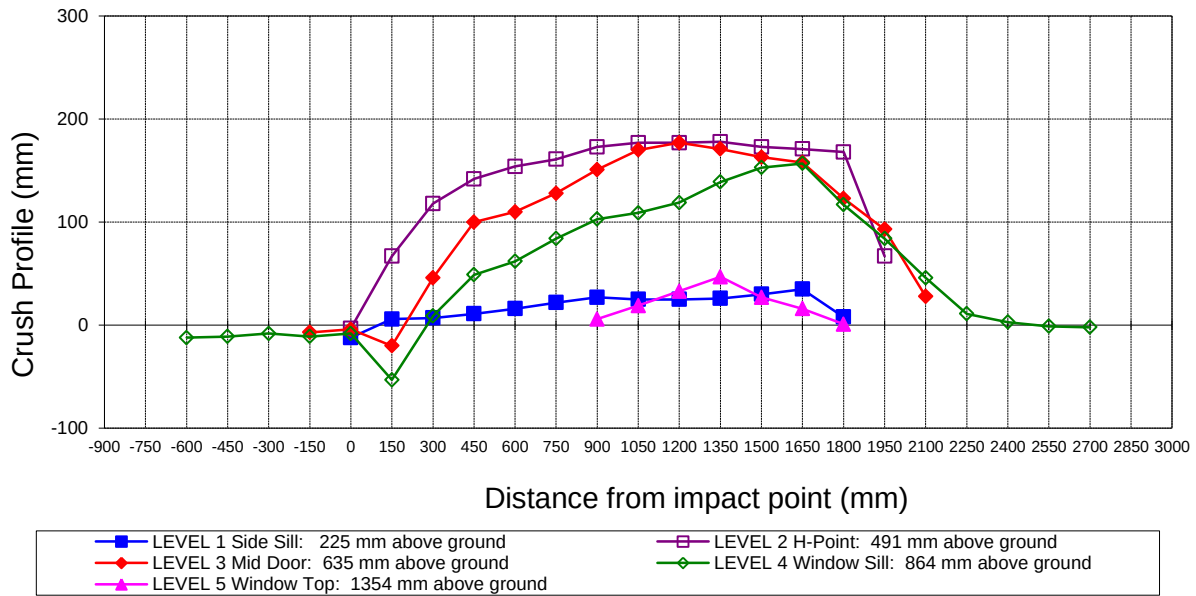
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750															
-600				654					666					-12	
-450				729					740					-11	
-300				777					785					-8	
-150			883	810				890	821				-7	-11	
0	861	881	881	826		873	884	873	834		-12	-3	8	-8	
150	855	870	864	829		849	803	884	882		6	67	-20	-53	
300	852	870	868	831		845	752	822	822		7	118	46	9	
450	850	871	871	831		839	729	771	782		11	142	100	49	
600	849	871	874	832		833	717	764	770		16	154	110	62	
750	849	872	876	833		827	711	748	749		22	161	128	84	
900	848	873	878	834	594	821	700	727	731	588	27	173	151	103	6
1050	848	871	879	838	614	823	694	709	729	595	25	177	170	109	19
1200	848	871	878	847	615	823	694	701	728	582	25	177	177	119	33
1350	849	870	878	855	613	823	692	707	716	566	26	178	171	139	47
1500	852	871	877	863	610	822	698	714	710	583	30	173	163	153	27
1650	854	871	875	859	602	819	700	717	702	586	35	171	158	157	16
1800	860	876	874	855	565	852	708	751	738	564	8	168	123	117	1
1950		882	876	850			815	783	766			67	93	84	
2100			881	844				853	798				28	46	
2250				836					825					11	
2400				831					828					3	
2550				824					825					-1	
2700				814					816					-2	
2850															
3000															

NOTE: Pre-test measurements are taken when the vehicle is in the "As Tested" weight condition. Vehicle measurements forward of the vertical impact reference line are negative. The crush profile grid is established prior to test based on an estimated impact point.

DATA SHEET NO. 11 (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2012 Hyundai ELANTRA PZEV
 Test Program: Side MDB NCAP

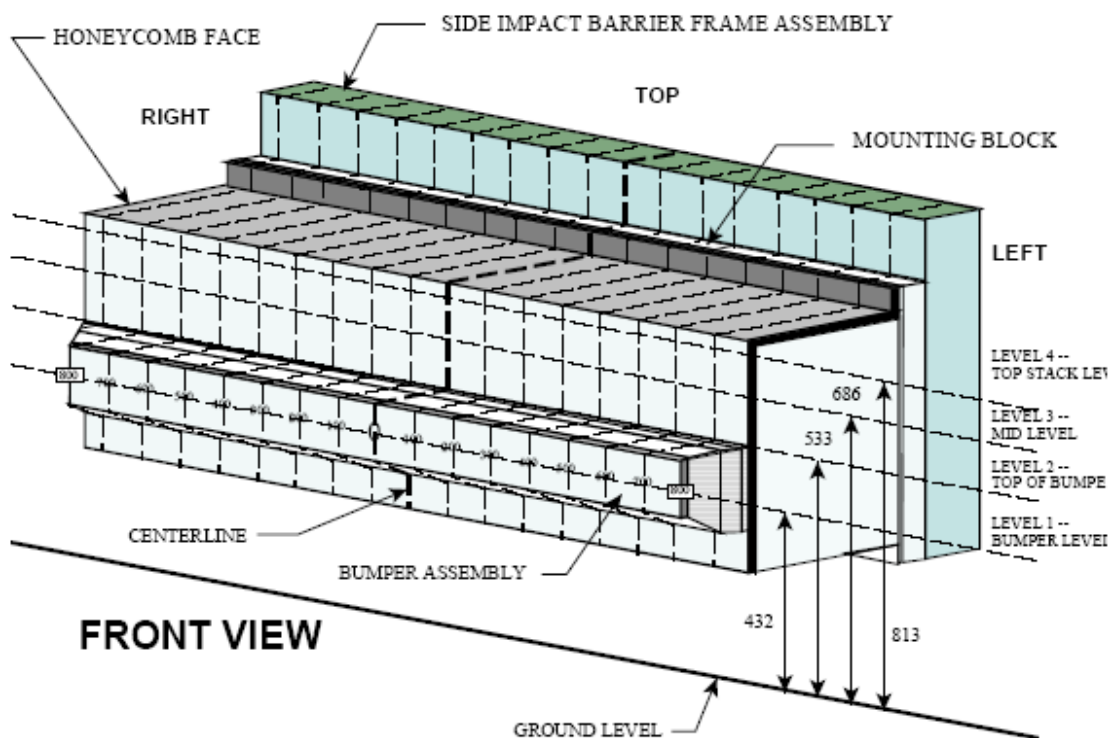
NHTSA No.: MC0501
 Test Date: 11/8/2011



DATA SHEET NO. 12
EXTERIOR STATIC CRUSH FOR IMPACTOR FACE

Test Vehicle: 2012 Hyundai ELANTRA PZEV
 Test Program: Side MDB NCAP

NHTSA No.: MC0501
 Test Date: 11/8/2011



NOTE: Dimensions are shown in millimeters, mm

DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
1	178	177	172	168	165	164	159	155	149	143	136	132	126	122	118	122	137
2	118	114	102	106	104	102	97	97	89	89	84	80	76	73	70	72	104
3	93	54	38	29	25	27	44	53	35	24	34	33	21	27	39	61	102
4	61	36	16	11	16	31	64	81	76	52	30	34	40	51	49	83	122

FMVSS NO. 301 STATIC ROLLOVER RESULTS

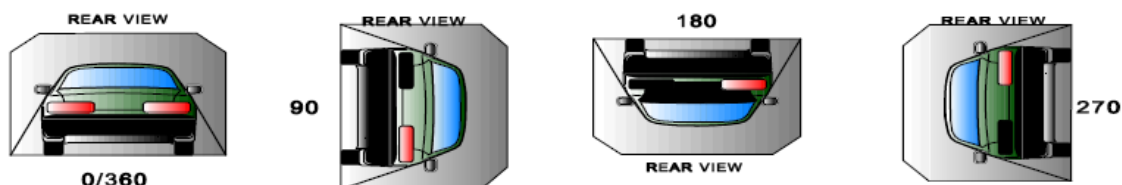
Test Vehicle: 2012 Hyundai ELANTRA PZEV
 Test Program: Side MDB NCAP

NHTSA No.: MC0501
 Test Date: 11/8/2011

Test Time: 2:45 PM Temperature: 19° C

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

FMVSS NO. 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0 to 90	75	300	375
90 to 180	64	300	364
180 to 270	63	300	363
270 to 360	70	300	370

FMVSS NO. 301 ROLLOVER 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		

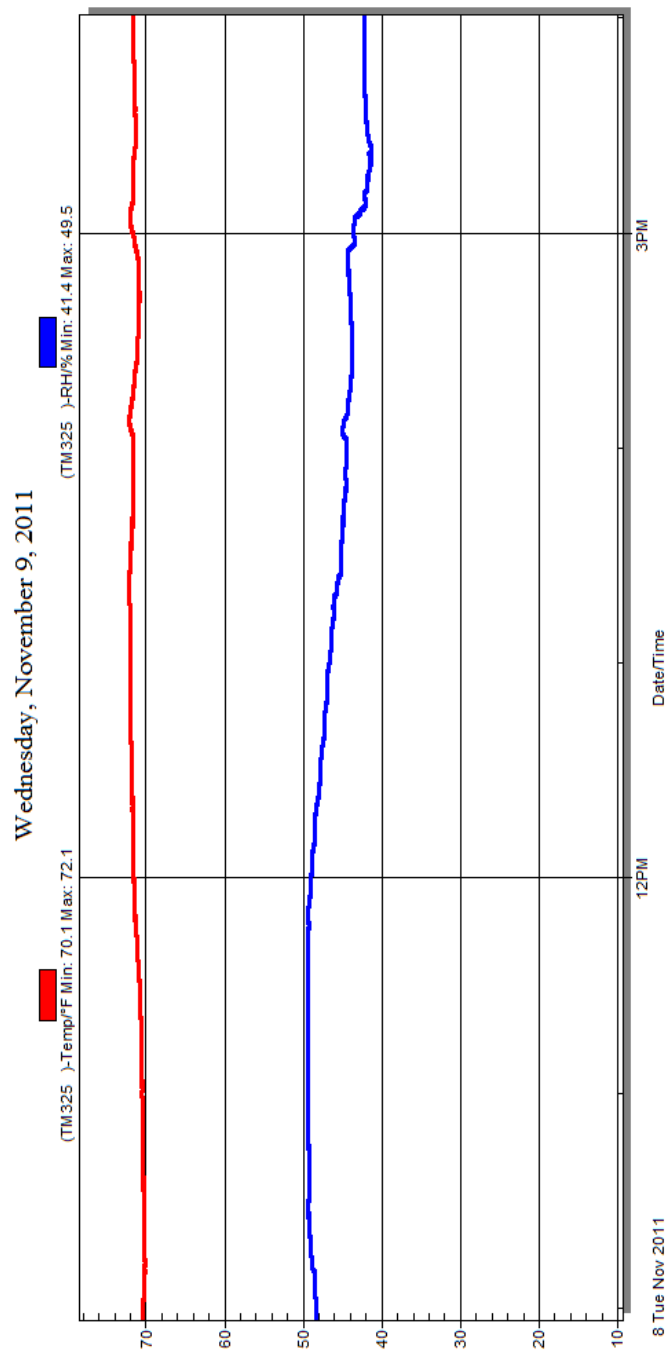
ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0 to 90	
90 to 180	
180 to 270	
270 to 360	

DATA SHEET NO. 14
DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle: 2012 Hyundai ELANTRA PZEV
 Test Program: Side MDB NCAP

NHTSA No.: MC0501
 Test Date: 11/8/2011



APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

No.	Description	Page
001	As-Delivered Right Front $\frac{3}{4}$ View of Test Vehicle	A-5
002	As-Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle	A-5
003	Pre-Test Frontal View of Test Vehicle	A-6
004	Post-Test Frontal View of Test Vehicle	A-6
005	Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle	A-7
006	Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle	A-7
007	Pre-Test Left Side View of Test Vehicle	A-8
008	Post-Test Left Side View of Test Vehicle	A-8
009	Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle	A-9
010	Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle	A-9
011	Pre-Test Rear View of Test Vehicle	A-10
012	Post-Test Rear Side View of Test Vehicle	A-10
013	Pre-Test Right Side View of Test Vehicle	A-11
014	Post-Test Right Side View of Test Vehicle	A-11
015	Pre-Test Overhead View of Test Area	A-12
016	Post-Test Overhead View of Test Area	A-12
017	Pre-Test Left Side View of MDB Positioned Against Side of Test Vehicle	A-13
018	Pre-Test Right Side View of MDB Positioned Against Side of Test Vehicle	A-13
019	Pre-Test Close-Up View of Impact Point Target	A-14
020	Post-Test Close-up View of Impact Point Target	A-14
021	Pre-Test Left Front Door Latch Close-Up	A-15
022	Post-Test Left Front Door Latch Close-Up	A-15
023	Pre-Test Left Rear Door Latch Close-Up	A-16
024	Post-Test Left Rear Door Latch Close-Up	A-16
025	Pre-Test Front Close-up View of Driver Dummy	A-17
026	Post-Test Front Close-up View of Driver Dummy	A-17
027	Pre-Test Left Side View of Driver Dummy Showing Belt and Chalking	A-18
028	Pre-Test Left Side View of Driver Dummy Shoulder and Door Top View	A-18
029	Post-Test Left Side View of Driver Dummy Shoulder and Door Top View	A-19
030	Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning	A-19
031	Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint	A-20
032	Pre-Test Frontal View of Driver Seat Pan Prior to Dummy Positioning	A-20
033	Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan	A-21
034	Pre-Test Placement of Driver Dummy's Feet	A-21
035	Pre-Test View of Belt Anchorage for Driver Dummy	A-22
036	Pre-Test Left Side View of Steering Wheel	A-22
037	View of Disengaged Parking Brake	A-23
038	Pre-Test View of Parking Brake	A-23
039	Pre-Test Close-Up Left Side View of Driver Seat Track	A-24
040	Pre-Test Close-Up Left Side View of Driver Seat Back	A-24
041	Pre-Test Close-Up View of Driver Seat Back or Head Restraint	A-25
042	Pre-Test Driver Dummy and Door Clearance View	A-25
043	Post-Test Driver Dummy and Door Clearance View	A-26
044	Pre-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment	A-26

045	Post-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment	A-27
046	Pre-Test Driver Inner Door Panel View	A-27
047	Post-Test Driver Inner Door Panel View	A-28
048	Post-Test Driver Dummy Close-Up Head Contact with Vehicle View	A-28
049	Post-Test Driver Dummy Close-Up Head Contact with Side Airbag View	A-29
050	Post-Test Driver Dummy Close-Up Torso Contact with Vehicle Interior View	A-29
051	Post-Test Driver Dummy Close-Up Torso Contact with Side Airbag View	A-30
052	Post-Test Driver Dummy Close-Up Pelvis Contact View	A-30
053	Post-Test Driver Dummy Close-Up Pelvis Contact with Side Airbag View	A-31
054	Pre-Test Left Side View of Passenger Dummy Showing Belt and Chalking	A-31
055	Pre-Test Left Side View of Passenger Dummy Shoulder and Door Top View	A-32
056	Post-Test Left Side View of Passenger Dummy Shoulder and Door Top View	A-32
057	Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning	A-33
058	Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint	A-33
059	Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning	A-34
060	Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan	A-34
061	Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket	A-35
062	Pre-Test View of Rear Passenger Dummy's Head Showing Dummy's Head is Level	A-35
063	Pre-Test Placement of Rear Passenger Dummy's Feet	A-36
064	Pre-Test View of Belt Anchorage for Rear Passenger Dummy	A-36
065	Pre-Test Close-Up Left Side View of Rear Passenger Seat Track	A-37
066	Pre-test Close-Up Left Side View of Rear Passenger Seat Back	A-37
067	Pre-Test Close-Up View of Rear Passenger Seat Back or Head Restraint	A-38
068	Pre-Test Passenger Dummy and Door Clearance View	A-38
069	Post-Test Passenger Dummy and Door Clearance View	A-39
070	Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment	A-39
071	Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment	A-40
072	Pre-Test Passenger Inner Door Panel View	A-40
073	Post-Test Passenger Inner Door Panel View	A-41
074	Post-Test Rear Passenger Dummy Close-Up Head Contact with Vehicle View	A-41
075	Post-Test Rear Passenger Dummy Close-Up Head Contact with Side Airbag View	A-42
076	Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Interior View	A-42
077	Post-Test Rear Passenger Dummy Close-Up Torso Contact with Side Airbag View	A-43
078	Post-Test Rear Passenger Dummy Close-Up Pelvis Contact View	A-43
079	Post-Test Rear Passenger Dummy Close-Up Pelvis Contact with Side Airbag View	A-44
080	Pre-Test View of Fuel Filler Cap or Fuel Filler Neck	A-44
081	Post-Test View of Fuel Filler Cap or Fuel Filler Neck	A-45
082	Pre-Test Front View of MDB Impactor Face	A-45
083	Post-Test Front View of MDB Impactor Face	A-46
084	Pre-Test Top View of MDB Impactor Face	A-46
085	Post-Test Top View of MDB Impactor Face	A-47
086	Pre-Test Left Side View of MDB Impactor Face	A-47
087	Post-Test Left Side View of MDB Impactor Face	A-48
088	Pre-Test Right Side View of MDB Impactor Face	A-48
089	Post-Test Right Side View of MDB Impactor Face	A-49

090	Close-Up View of Vehicle's Certification Label	A-49
091	Close-Up View of Vehicle's Tire Information Placard or Label	A-50
092	Pre-Test Ballast View	A-50
093	Post-Test Primary and Redundant Speed Trap Read-Out	A-51
094	FMVSS No. 301 Static Rollover 0 Degrees	A-51
095	FMVSS No. 301 Static Rollover 90 Degrees	A-52
096	FMVSS No. 301 Static Rollover 180 Degrees	A-52
097	FMVSS No. 301 Static Rollover 270 Degrees	A-53
098	FMVSS No. 301 Static Rollover 360 Degrees	A-53
099	Impact Event	A-54
100	Monroney Label	A-54
101	Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual	A-55
102	Left Rear Passenger Head Restraint Use and Adjustment Information from Vehicle Owner's Manual	A-55

NOTES:

- Both Driver and Passenger Dummy's Faces were not correctly chalked. Contact points were verified through still photos and video analysis.



Figure A-1: As-Delivered Right Front $\frac{3}{4}$ View of Test Vehicle



Figure A-2: As-Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle



Figure A-3: Pre-Test Frontal View of Test Vehicle

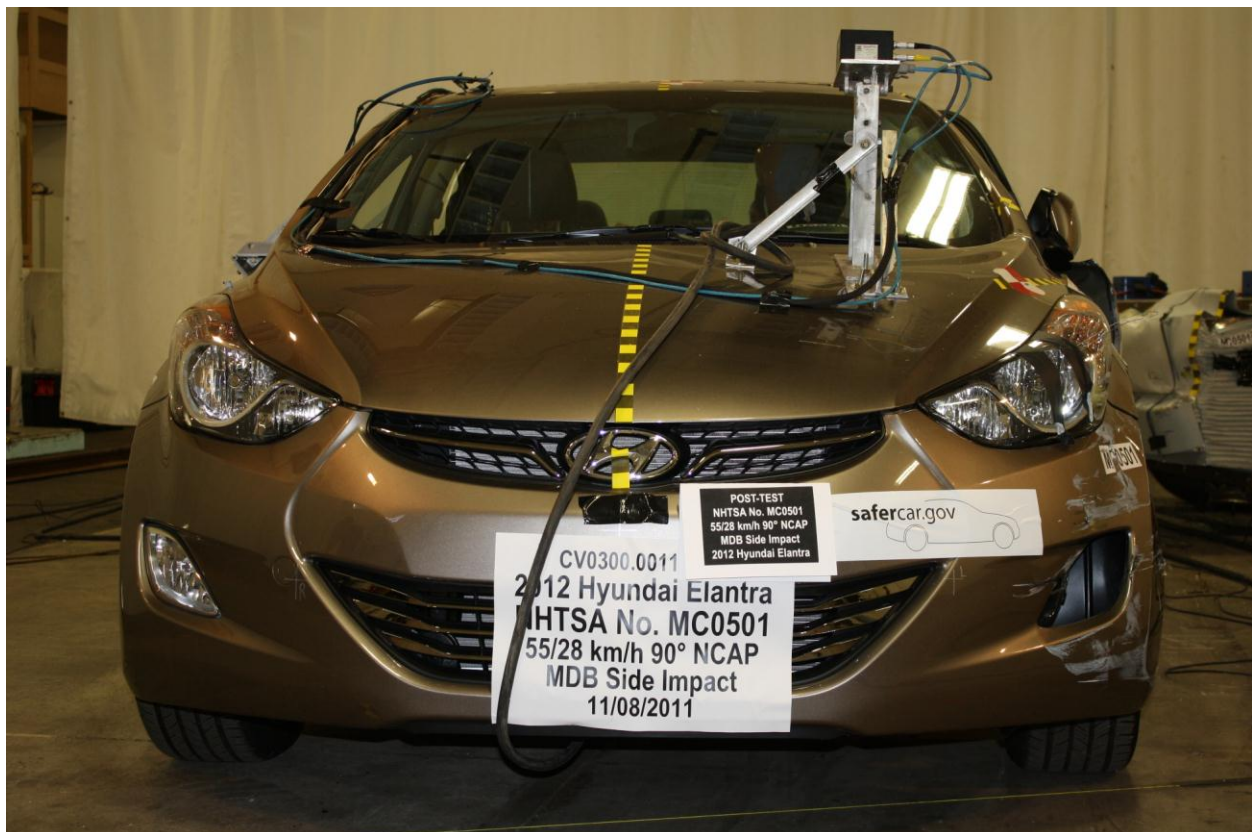


Figure A-4: Post-Test Frontal View of Test Vehicle



Figure A-5: Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle

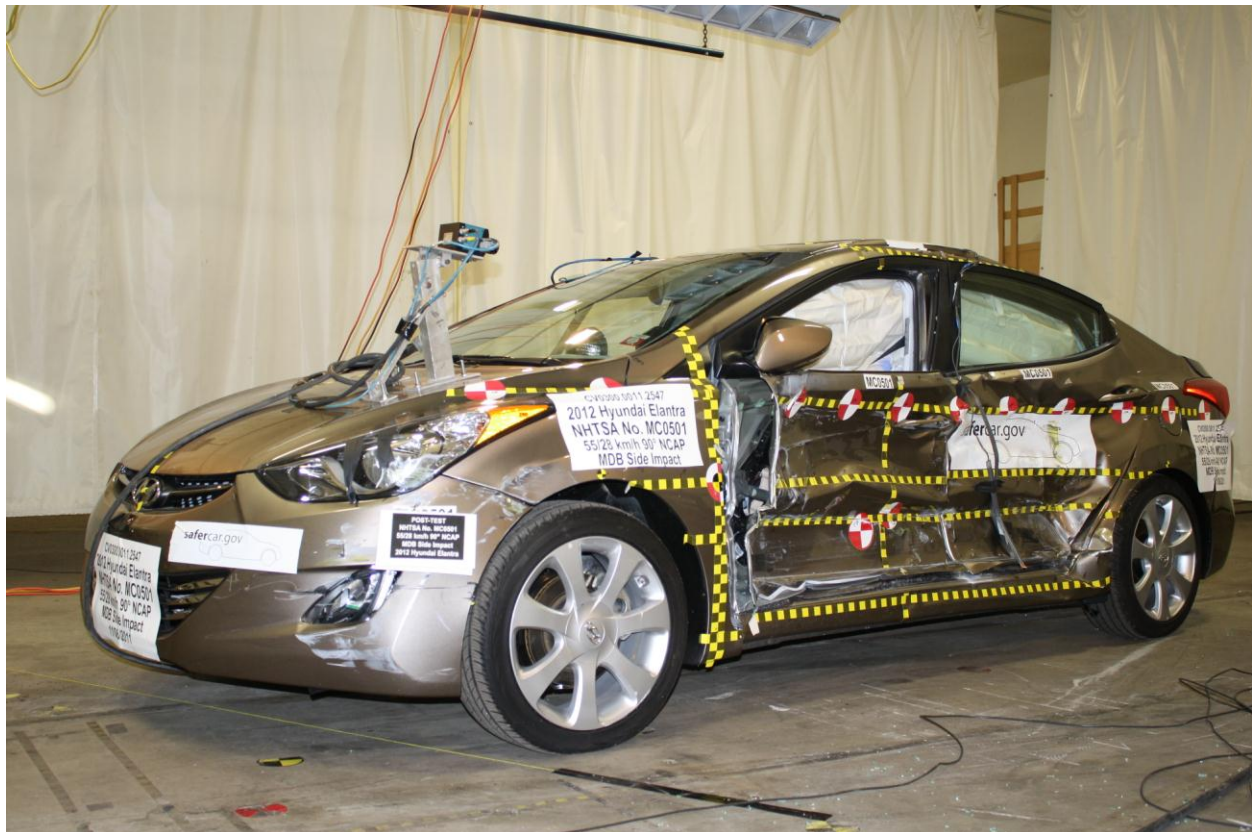


Figure A-6: Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle



Figure A-7: Pre-Test Left Side View of Test Vehicle



Figure A-8: Post-Test Left Side View of Test Vehicle



Figure A-9: Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



Figure A-10: Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



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



Figure A-12: Post-Test Rear Side View of Test Vehicle



Figure A-13: Pre-Test Right Side View of Test Vehicle

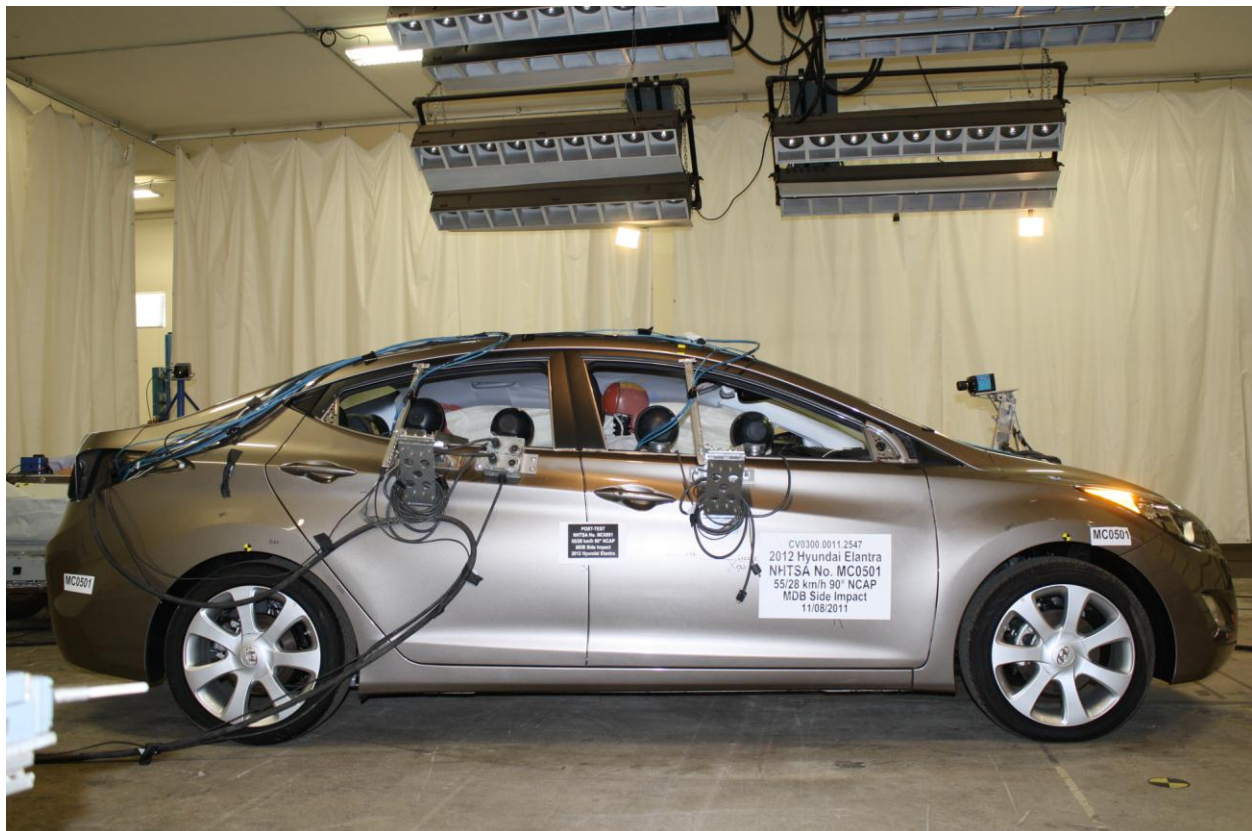


Figure A-14: Post-Test Right Side View of Test Vehicle

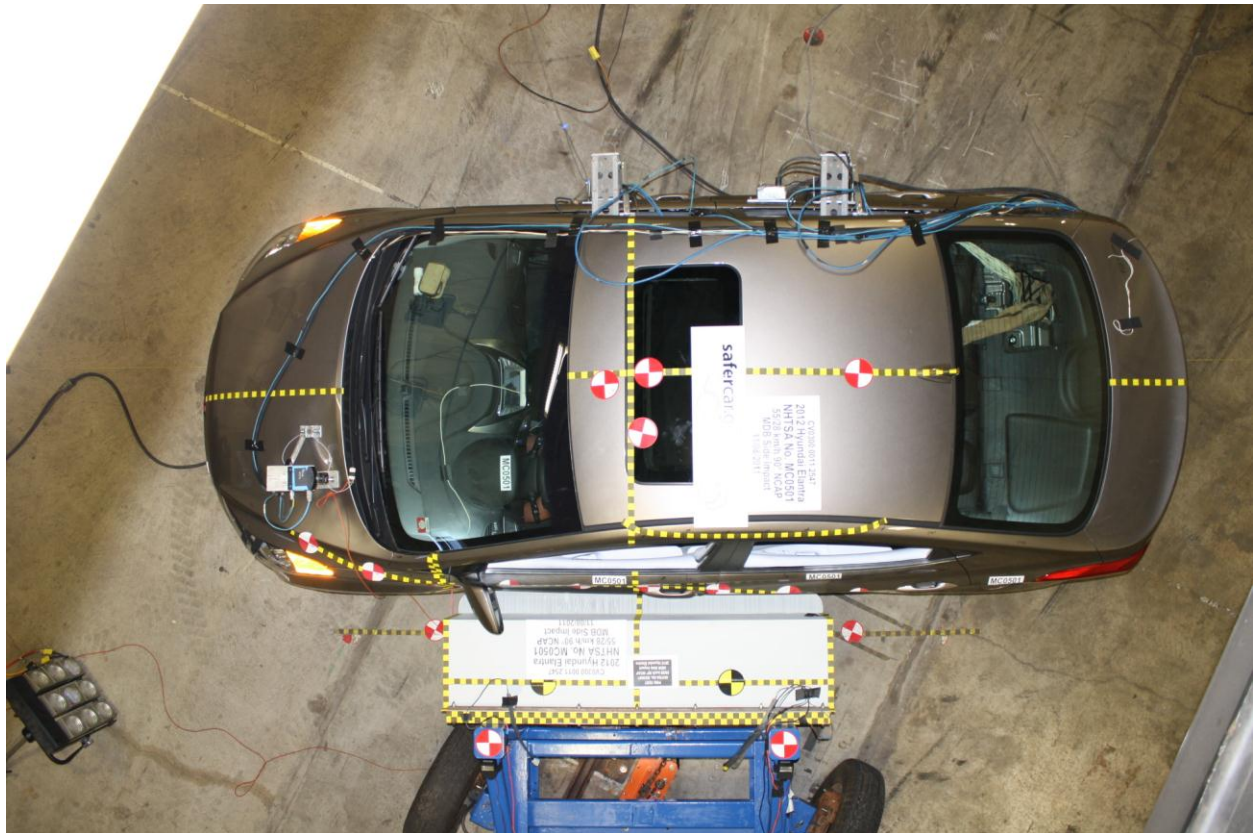


Figure A-15: Pre-Test Overhead View of the Test Area



Figure A-16: Post-Test Overhead View of Test Area



Figure A-17: Pre-Test Left Side View of MDB Positioned Against Side of Test Vehicle

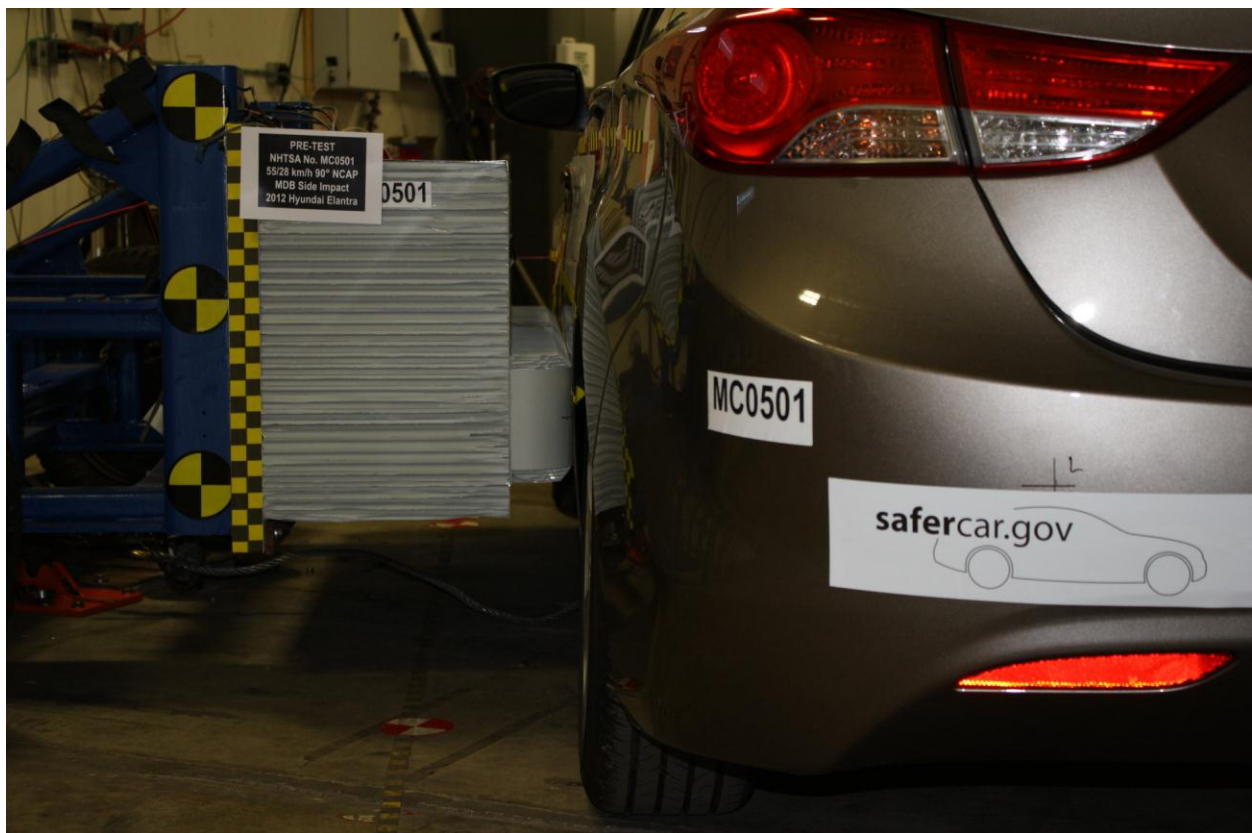


Figure A-18: Pre-Test Right Side View of MDB Positioned Against Side of Test Vehicle



Figure A-19: Pre-Test Close-Up View of Impact Point Target



Figure A-20: Post-Test Close-Up View of Impact Point Target

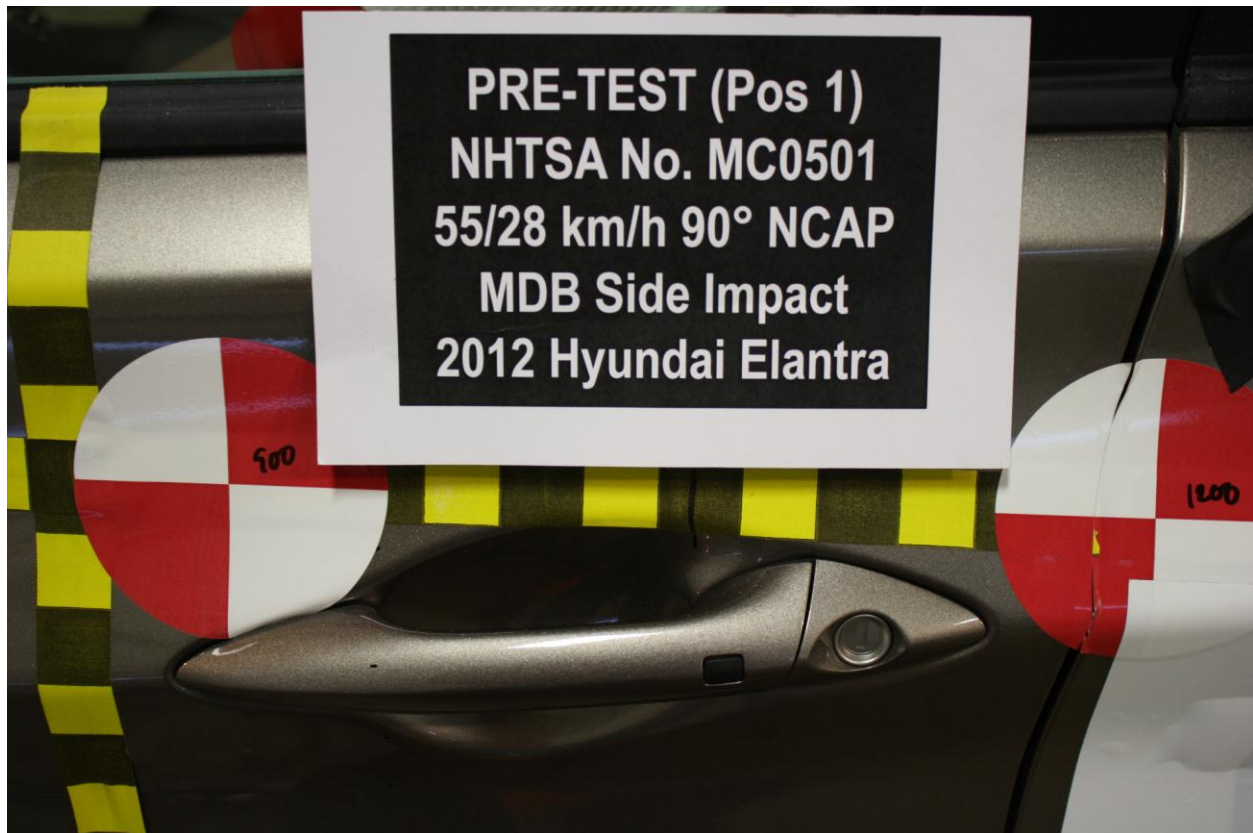


Figure A-21: Pre-Test Left Front Door Latch Close-Up

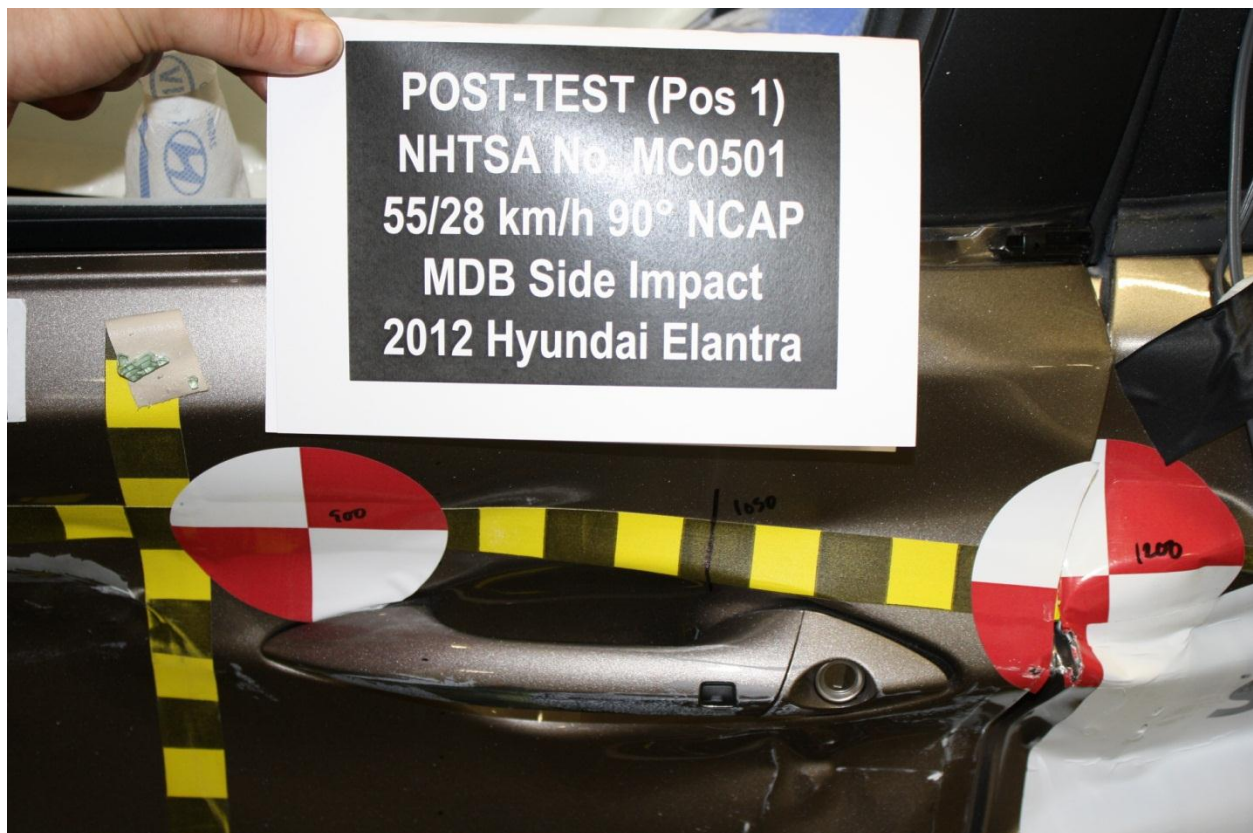


Figure A-22: Post-Test Left Front Door Latch Close-Up

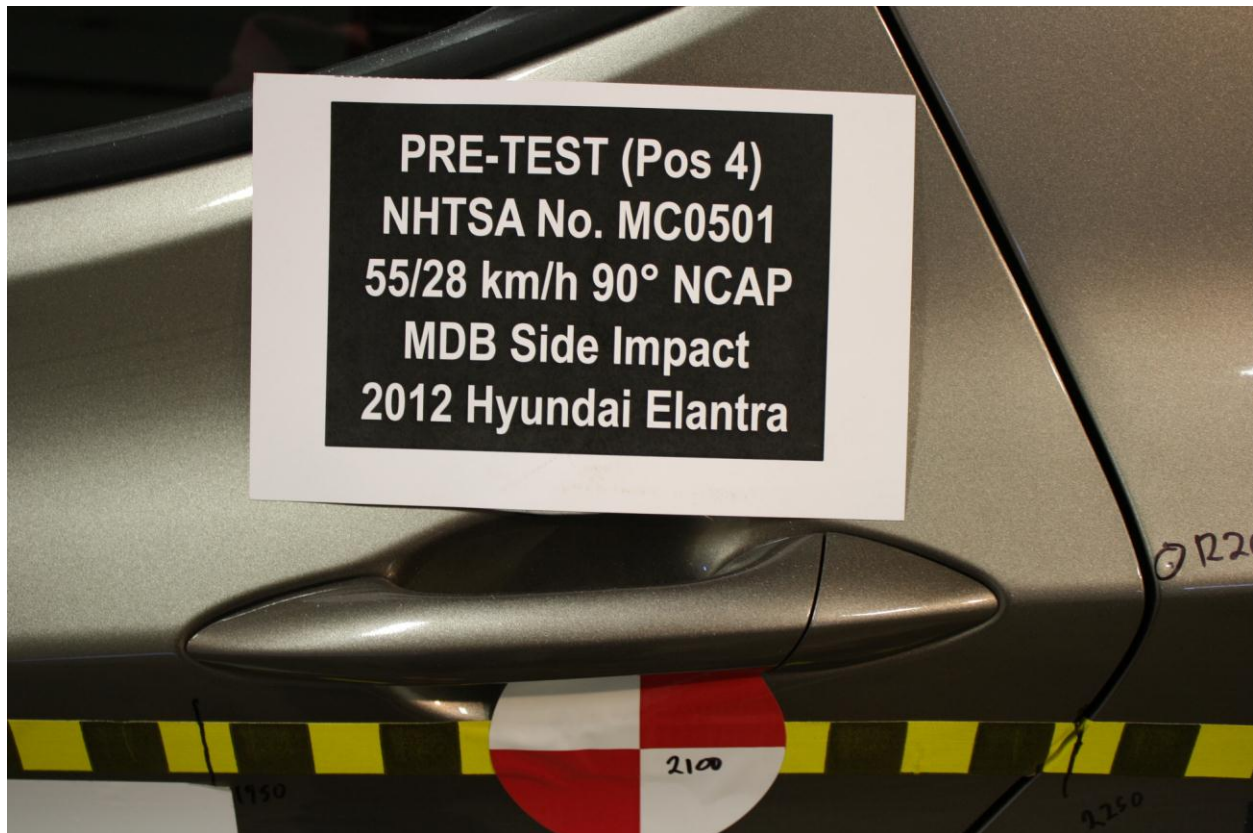


Figure A-23: Pre-Test Left Rear Door Latch Close-Up

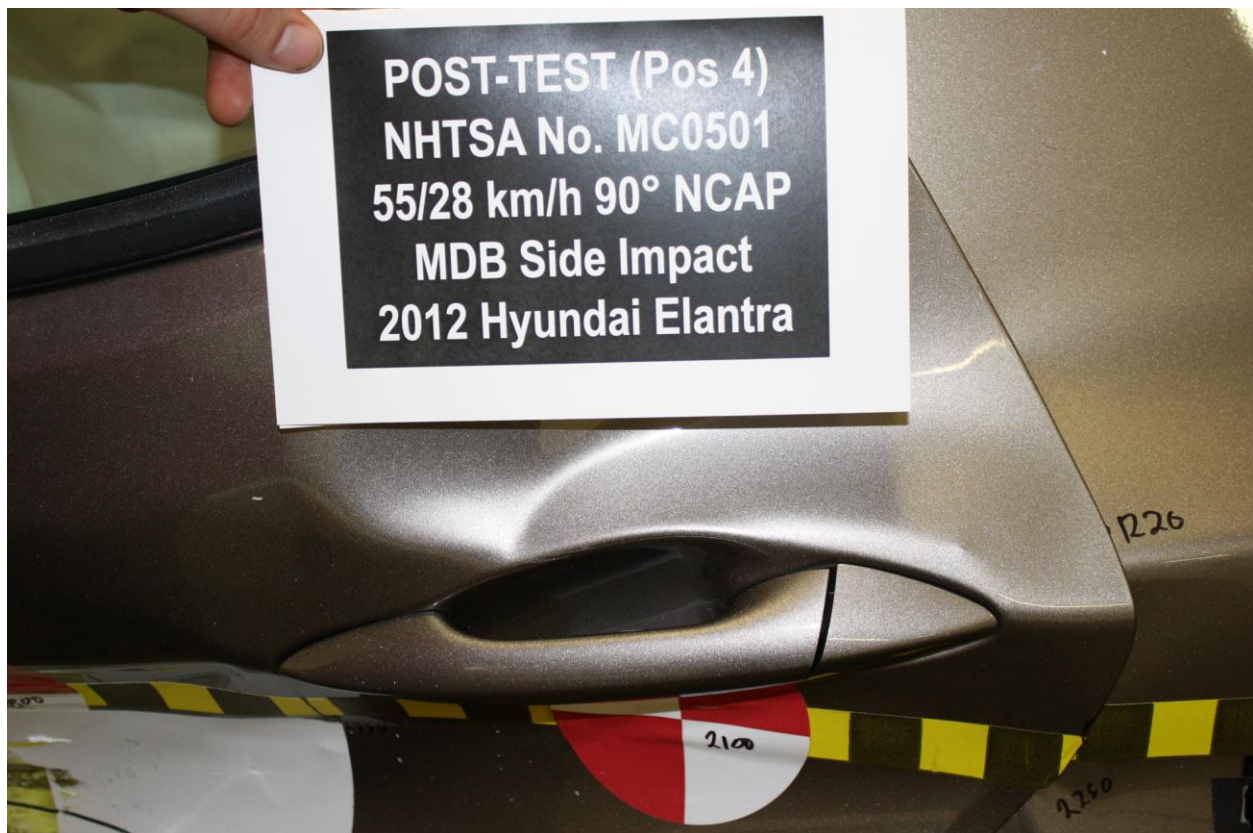


Figure A-24: Post-Test Left Rear Door Latch Close-Up



Figure A-25: Pre-Test Front Close-up View of Driver Dummy

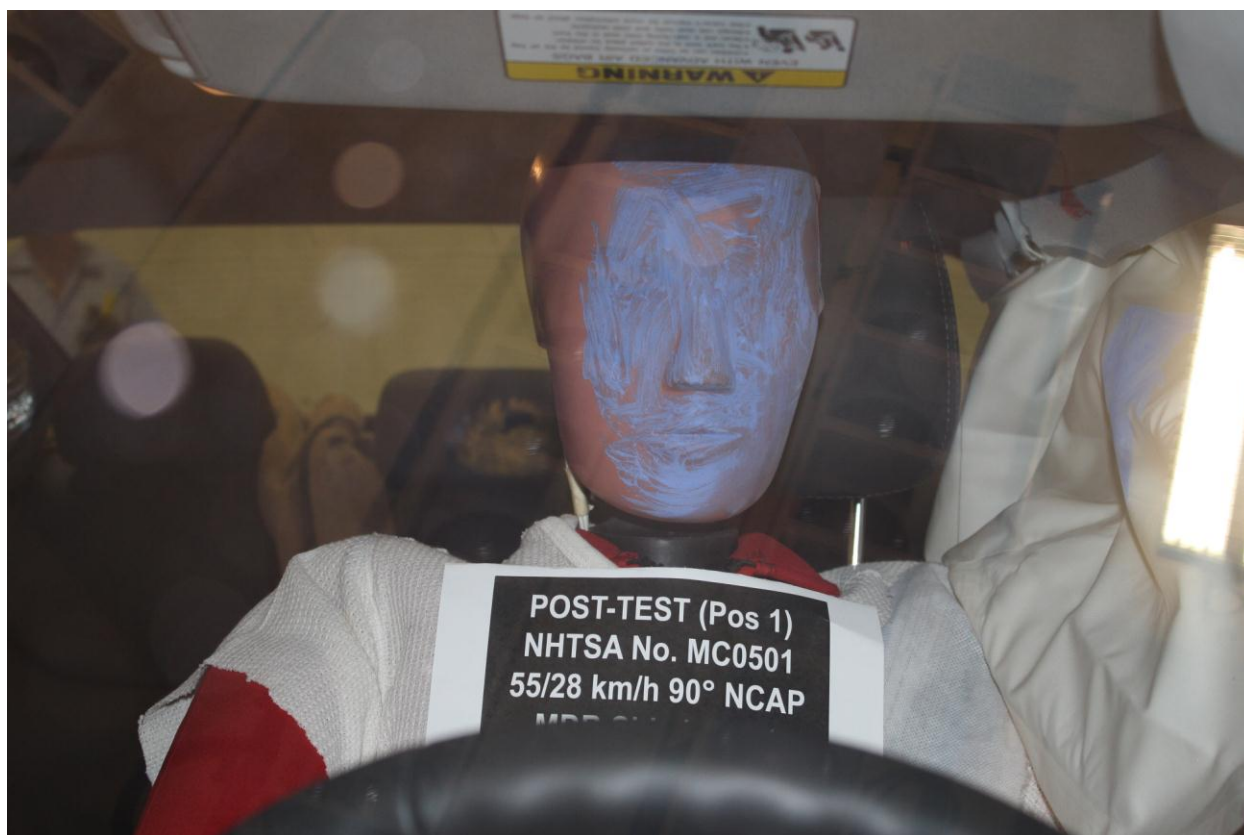


Figure A-26: Post-Test Front Close-up View of Driver Dummy



Figure A-27: Pre-Test Left Side View of Driver Dummy Showing Belt and Chalking



Figure A-28: Pre-Test Left Side View of Driver Dummy Shoulder and Door Top View



Figure A-29: Post-Test Left Side View of Driver Dummy Shoulder and Door Top View



Figure A-30: Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning

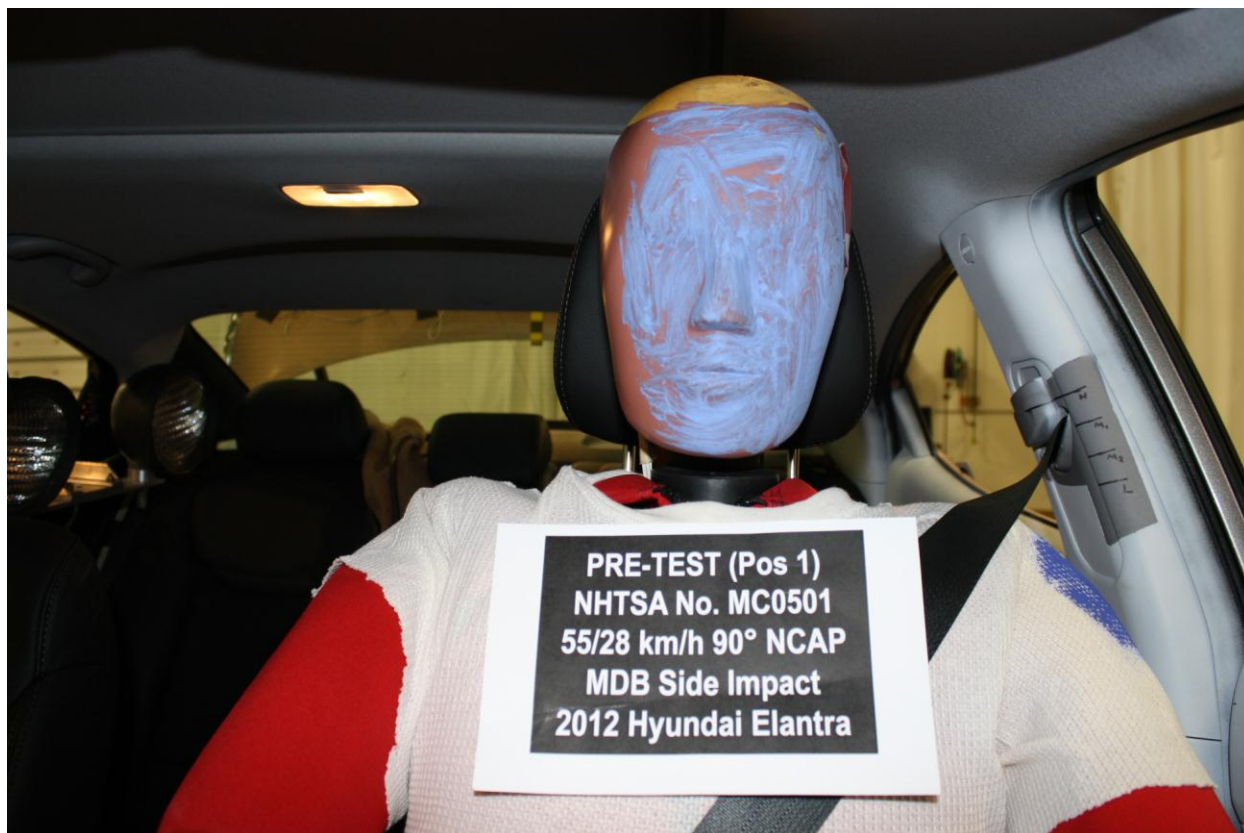


Figure A-31: Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint



Figure A-32: Pre-Test Frontal View of Driver Seat Pan Prior to Dummy Positioning



Figure A-33: Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan



Figure A-34: Pre-Test Placement of Driver Dummy's Feet



Figure A-35: Pre-Test View of Belt Anchorage for Driver Dummy



Figure A-36: Pre-Test Left Side View of Steering Wheel



Figure A-37: View of Disengaged Parking Brake

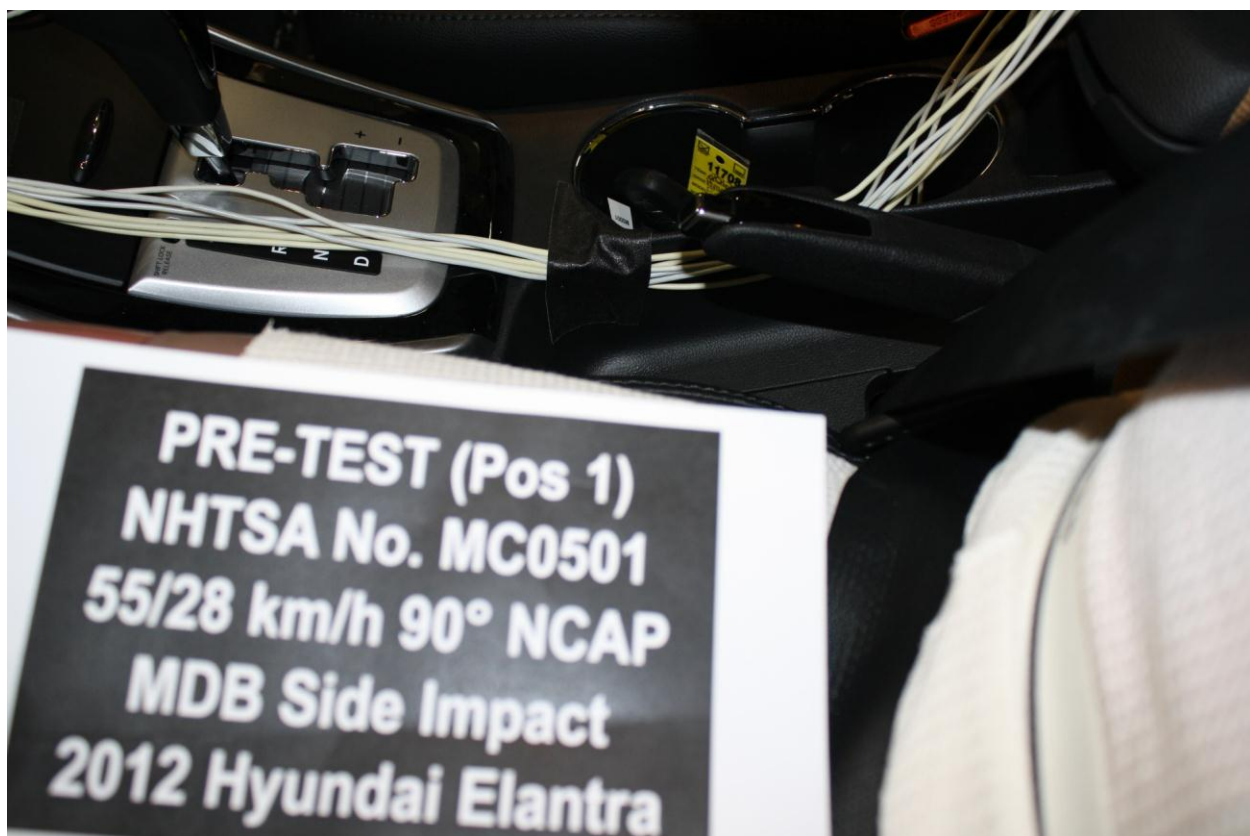


Figure A-38: Pre-Test View of Parking Brake



Figure A-39: Pre-test Close-Up Left Side View of Driver Seat Track



Figure A-40: Pre-Test Close-Up Left Side View of Driver Seat Back



Figure A-41: Pre-Test Close-Up View of Driver Seat Back or Head Restraint



Figure A-42: Pre-Test Driver Dummy and Door Clearance View



Figure A-43: Post-Test Driver Dummy and Door Clearance View



Figure A-44: Pre-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment



Figure A-45: Post-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment



Figure A-46: Pre-Test Driver Inner Door Panel View



Figure A-47: Post-Test Driver Inner Door Panel View



Figure A-48: Post-Test Driver Dummy Close-Up Head Contact with Vehicle View



Figure A-49: Post-Test Driver Dummy Close-Up Head Contact with Side Airbag View



Figure A-50: Post-Test Driver Dummy Close-Up Torso Contact with Vehicle Interior View



Figure A-51: Post-Test Driver Dummy Close-Up Torso Contact with Side Airbag View



Figure A-52: Post-Test Driver Dummy Close-Up Pelvis Contact View



Figure A-53: Post-Test Driver Dummy Close-Up Pelvis Contact with Side Airbag View



Figure A-54: Pre-Test Left Side View of Passenger Dummy Showing Belt and Chalking



Figure A-55: Pre-Test Left Side View of Passenger Dummy Shoulder and Door Top View



Figure A-56: Post-Test Left Side View of Passenger Dummy Shoulder and Door Top View



Figure A-57: Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning



Figure A-58: Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint



Figure A-59: Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning



Figure A-60: Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan



Figure A-61: Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket

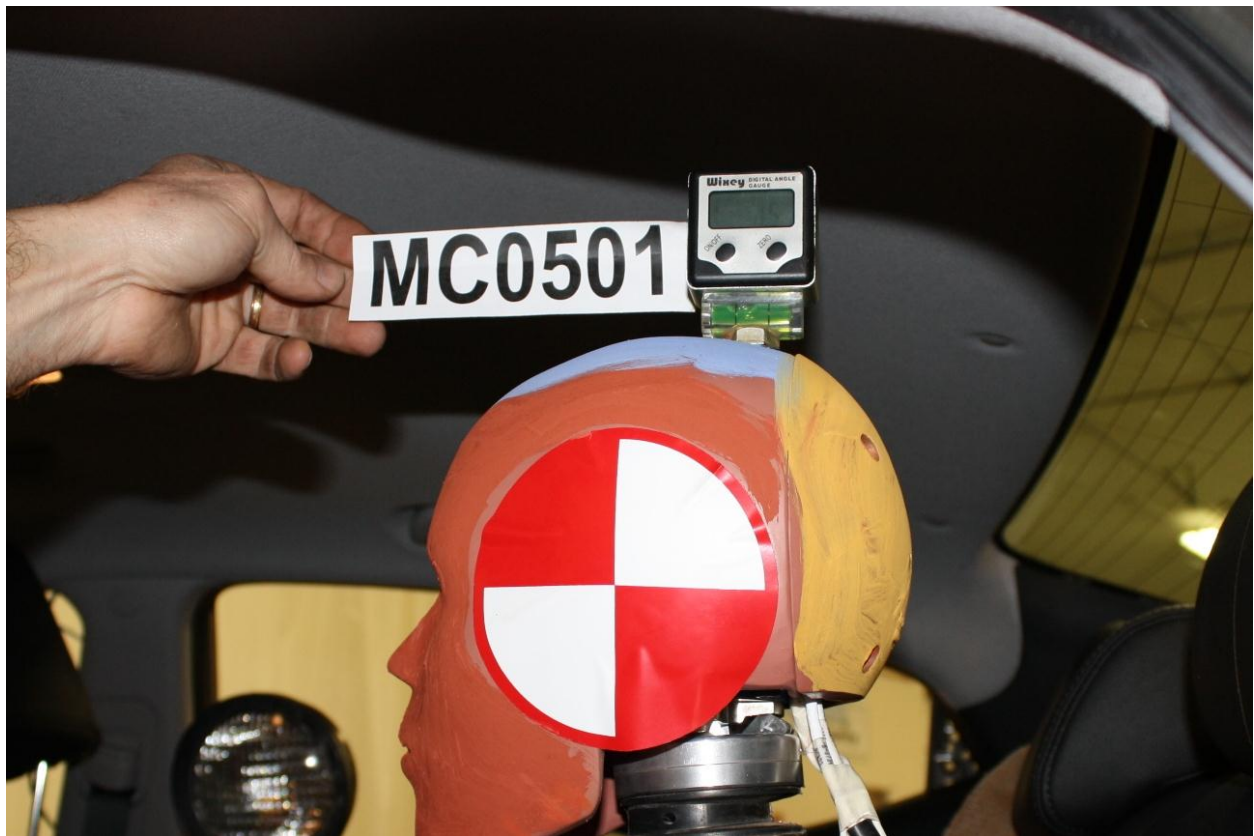


Figure A-62: Pre-Test View of Rear Passenger Dummy's Head Showing Dummy's Head is Level



Figure A-63: Pre-Test Placement of Rear Passenger Dummy's Feet



Figure A-64: Pre-Test View of Belt Anchorage for Rear Passenger Dummy

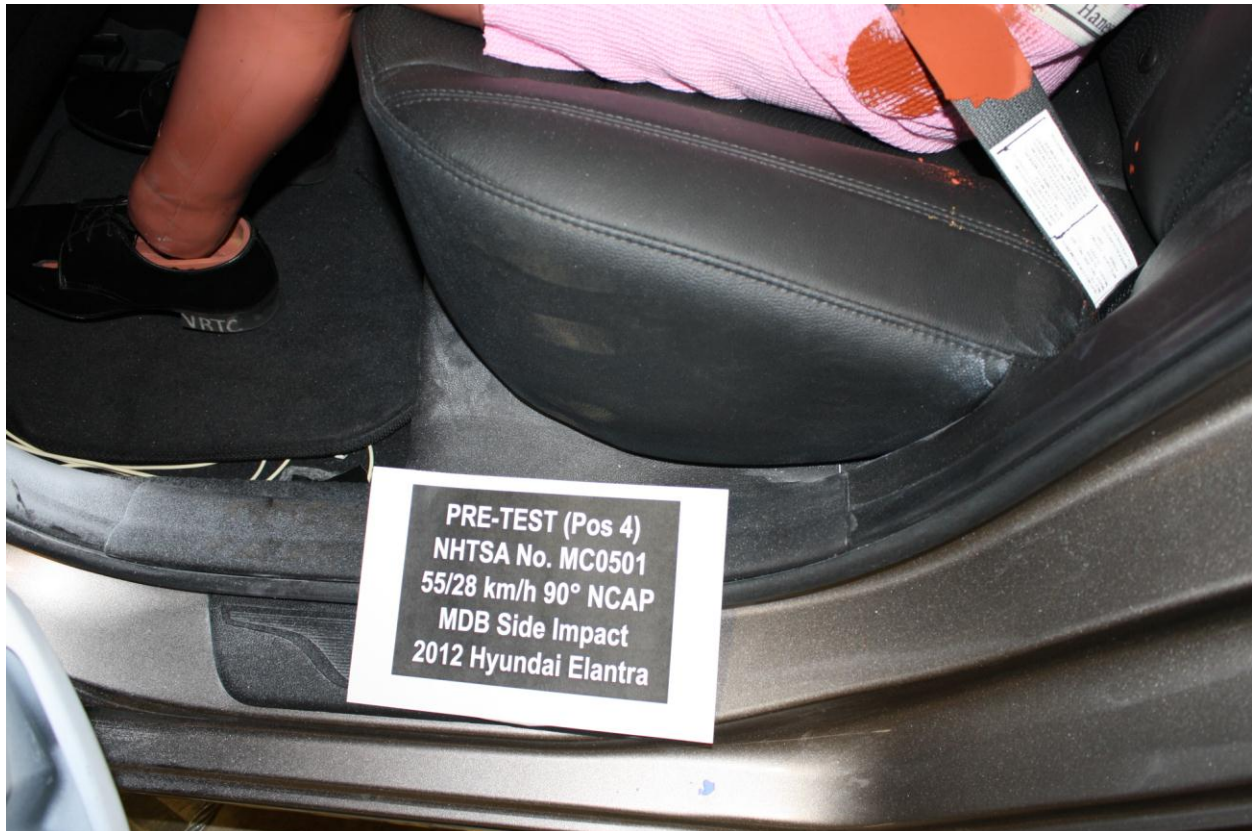


Figure A-65: Pre-Test Close-Up Left Side View of Rear Passenger Seat Track

Photo Not Applicable

Rear seat back is in a fixed position

Figure A-66: Pre-Test Close-Up Left Side View of Rear Passenger Seat Back

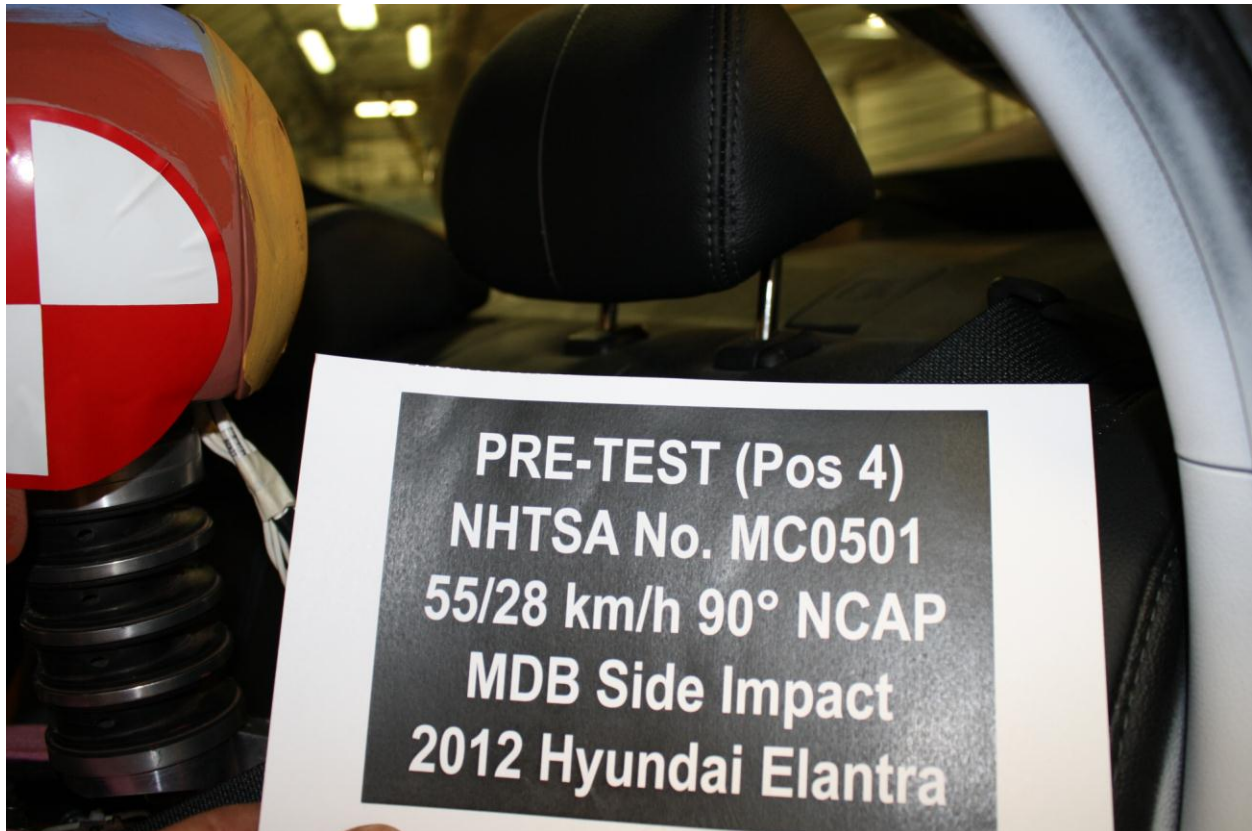


Figure A-67: Pre-Test Close-Up View of Rear Passenger Seat Back or Head Restraint



Figure A-68: Pre-Test Passenger Dummy and Door Clearance View



Figure A-69: Post-Test Passenger Dummy and Door Clearance View



Figure A-70: Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



Figure A-71: Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



Figure A-72: Pre-Test Passenger Inner Door Panel View



Figure A-73: Post-test Passenger Inner Door Panel View

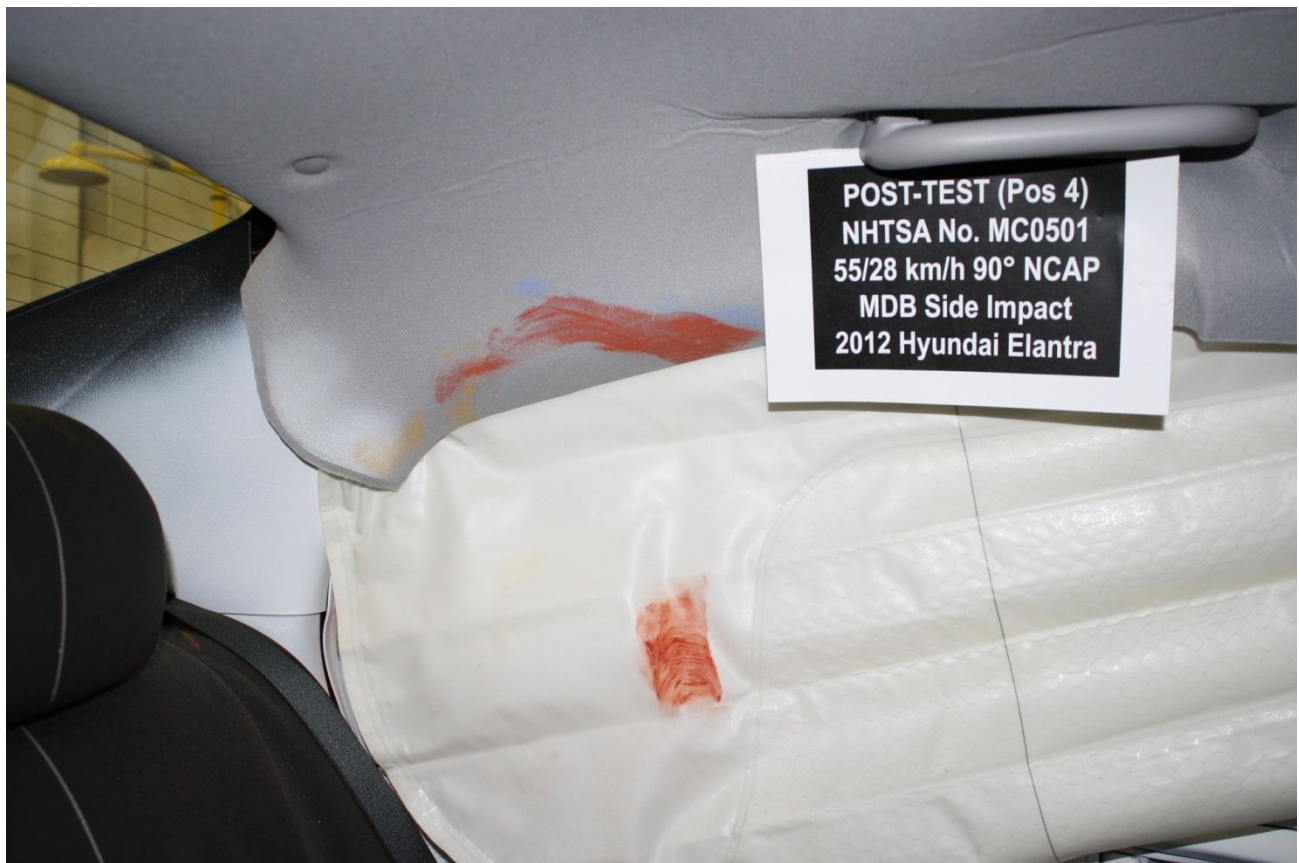


Figure A-74: Post-Test Rear Passenger Dummy Close-Up Head Contact with Vehicle View

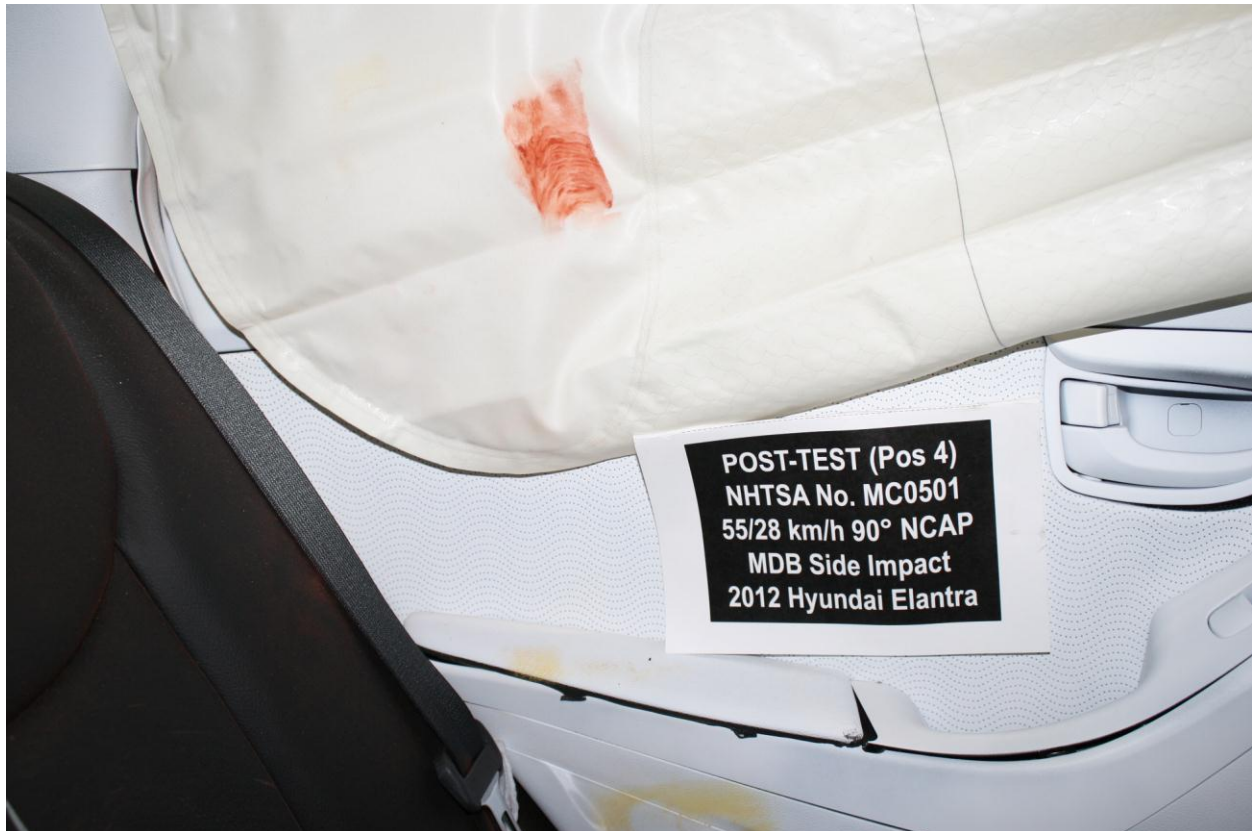


Figure A-75: Post-Test Rear Passenger Dummy Close-Up Head Contact with Side Airbag View



Figure A-76: Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Interior View

Photo Not Applicable

No Torso Airbag

Figure A-77: Post-Test Rear Passenger Dummy Close-Up Torso Contact with Side Airbag View

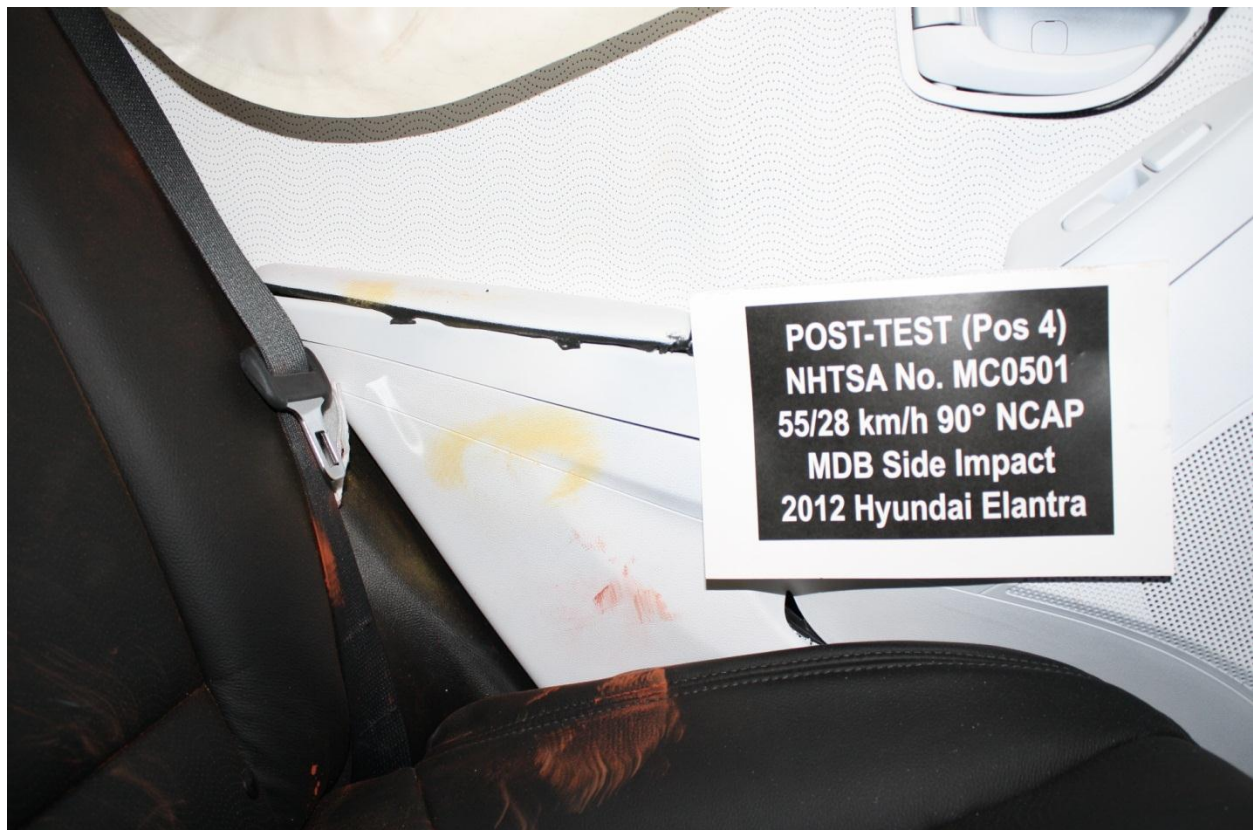


Figure A-78: Post-Test Rear Passenger Dummy Close-Up Pelvis Contact View

Photo Not Applicable

No Torso Airbag

Figure A-79: Post-Test Rear Passenger Dummy Close-Up Pelvis Contact with Side Airbag View



Figure A-80: Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



Figure A-81: Post-Test View of Fuel Filler Cap or Fuel Filler Neck



Figure A-82: Pre-Test Front View of MDB Impactor Face

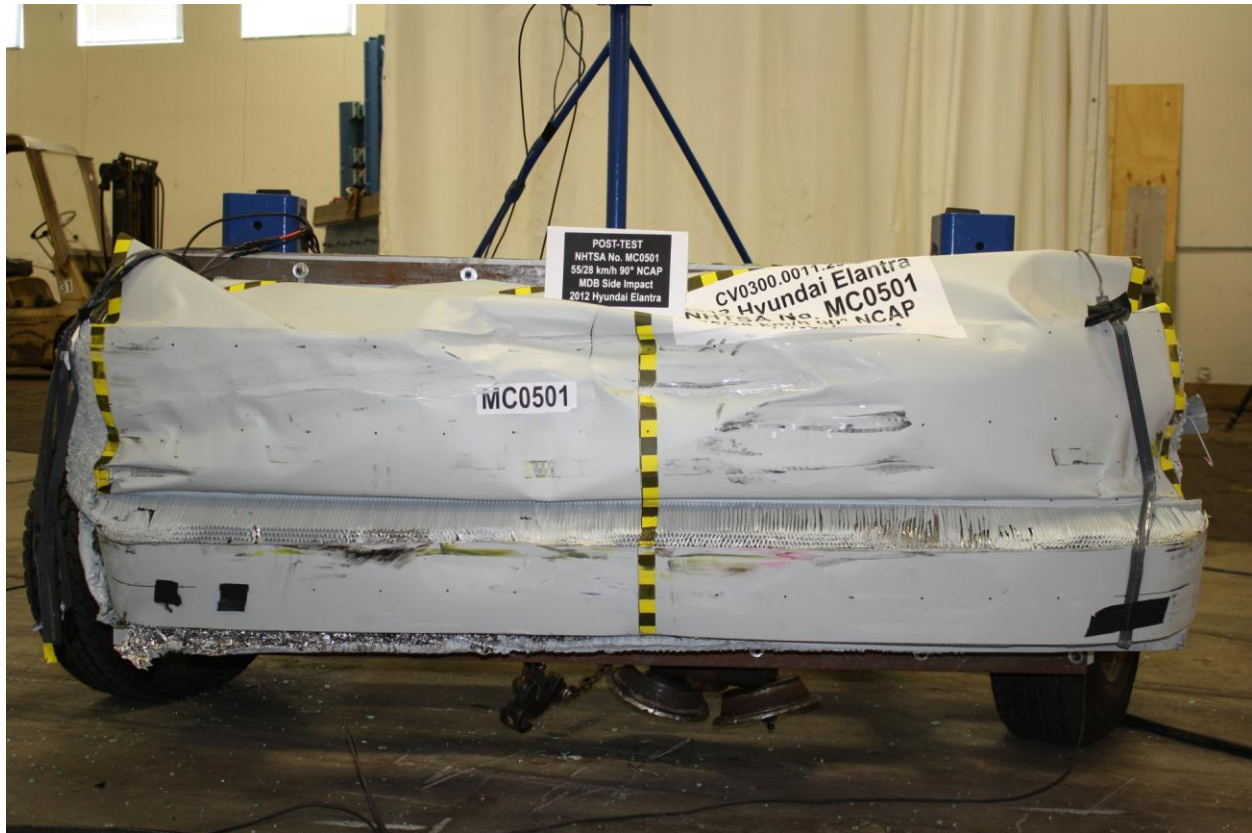


Figure A-83: Post-Test Front View of MDB Impactor Face



Figure A-84: Pre-Test Top View of MDB Impactor Face

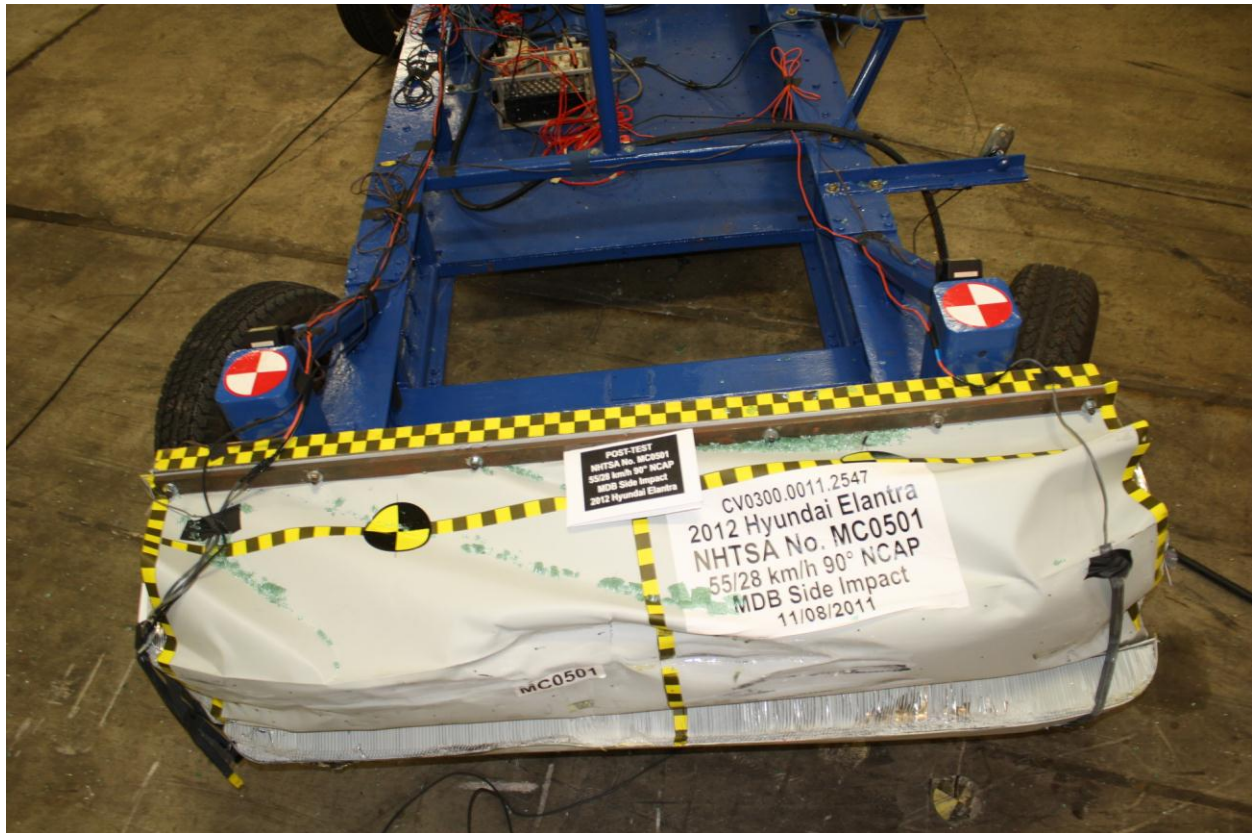


Figure A-85: Post-Test Top View of MDB Impactor Face



Figure A-86: Pre-Test Left Side View of MDB Impactor Face



Figure A-87: Post-Test Left Side View of MDB Impactor Face



Figure A-88: Pre-Test Right Side View of MDB Impactor Face



Figure A-89: Post-Test Right Side View of MDB Impactor Face



Figure A-90: Close-Up View of Vehicle's Certification Label



Figure A-91: Close-Up View of Vehicle's Tire Information Placard or Label



Figure A-92: Pre-Test Ballast View



Figure A-93: Post-Test Primary and Redundant Speed Trap Read-Out



Figure A-94: FMVSS No. 301 Static Rollover 0 Degrees

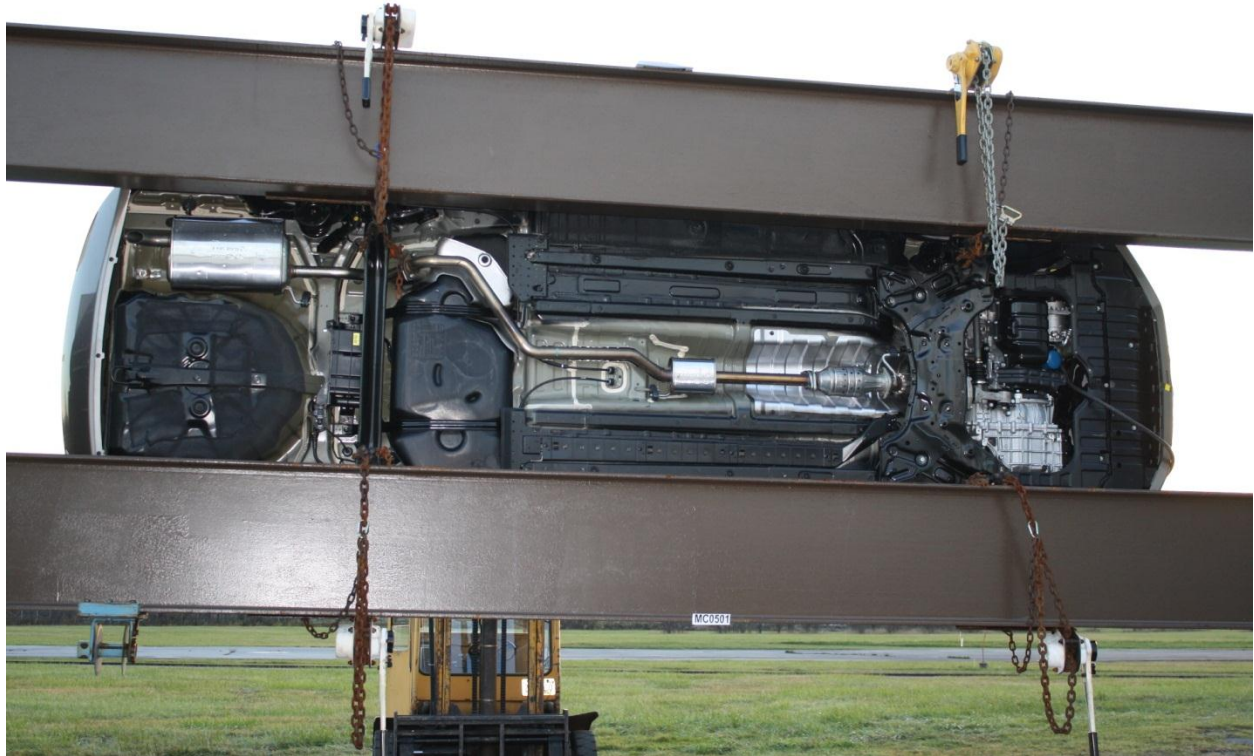


Figure A-95: FMVSS No. 301 Static Rollover 90 Degrees



Figure A-96: FMVSS No. 301 Static Rollover 180 Degrees



Figure A-97: FMVSS No. 301 Static Rollover 270 Degrees



Figure A-98: FMVSS No. 301 Static Rollover 360 Degrees

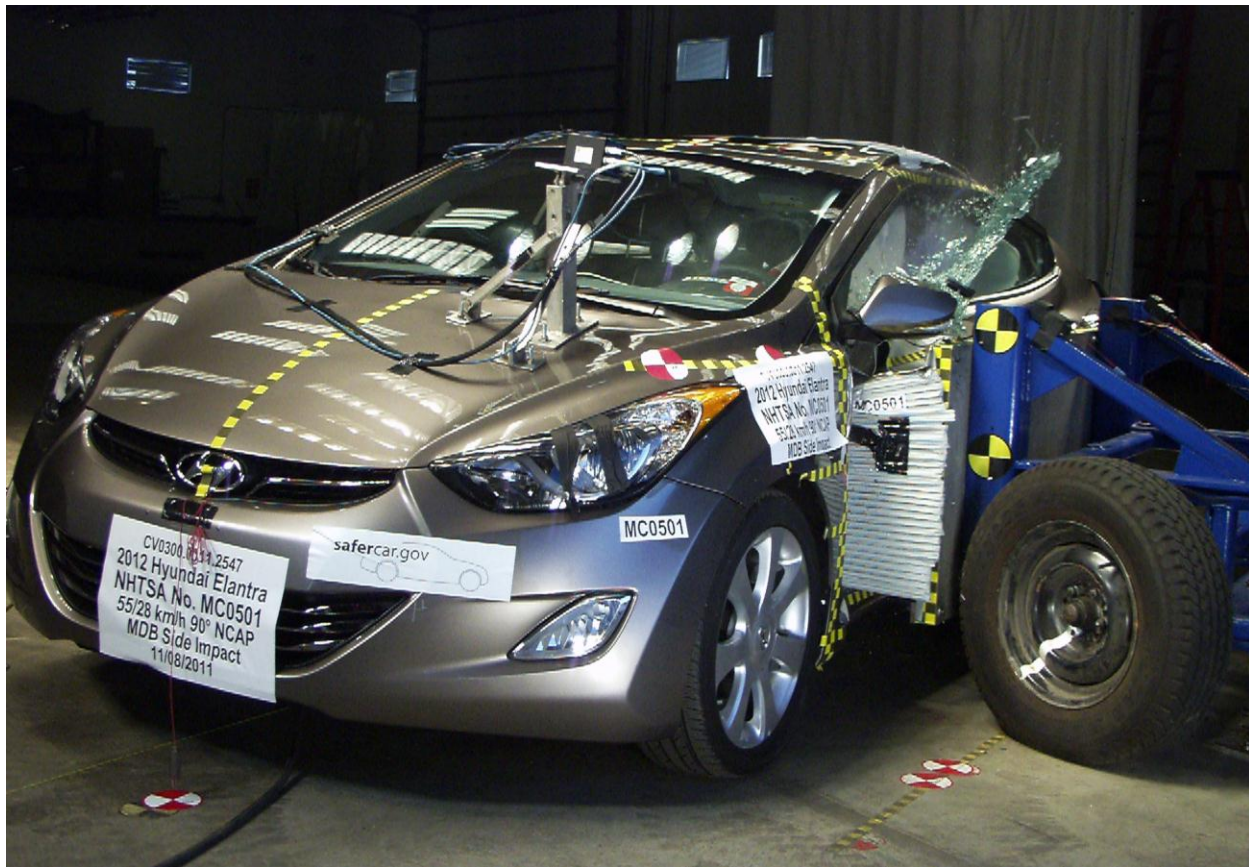


Figure A-99: Impact Event

HYUNDAI 2012 ELANTRA LIMITED PZEV		2011 IIHS Top Safety Pick	
SOLD TO: NY105 FUCILLO HYUNDAI OF GREECE 3975 RIDGE ROAD WEST ROCHESTER NY 14626 SHIPPED TO: NY105		VIN: SNPDHAECH097389 MODEL: 45442F4P ENGINE: G4NBBW001827 PORT OF ENTRY: MA EXTERIOR COLOR: DESERT BRONZE INTERIOR COLOR: BLACK MODE OF TRANSPORT: TRUCK ACCESSORY WEIGHT: 11 lbs. EMISSIONS: This vehicle meets California Emissions regulations and is Certified as a Partial Zero Emission Vehicle (PZEV)	
Manufacturer's suggested retail price includes manufacturer's recommended pre-delivery service, Gasoline license and title fees, state and local taxes and dealer installed options and accessories are not included in the manufacturer's suggested retail price.		This label has been affixed to this vehicle by Hyundai Motor America, pursuant to the requirements of 15 U.S.C. 1231 et seq, which prohibits its removal or alteration prior to delivery to the ultimate purchaser.	
PART CONTENT INFORMATION FOR VEHICLES IN THIS COUNTRY: U.S./CANADIAN PARTS CONTENT: 34% MAJOR SOURCES OF FOREIGN PARTS CONTENT: Korea 65% Note: Parts content does not include final assembly, distribution, or other non-parts costs. FOR THIS VEHICLE: FINAL ASSEMBLY POINT: Montgomery, Alabama U.S. COUNTRY OF ORIGIN: ENGINE: Korea TRANSPORTATION: U.S.A.		STANDARD FEATURES: AMERICA'S BEST WARRANTY *5-year/100,000-mile New Vehicle Warranty* *10-year/100,000-mile Powertrain Warranty* *7-year/Unlimited-mile Anti-perforation Warranty* *5-year/Unlimited-mile Roadside Assistance* ADVANCED SAFETY TECHNOLOGY *Electronic Stability Control (ESC) w/ Traction Control* *ABS w/ Electronic Brake Force Distribution & Brake Assist* *4-Wheel Disc Brakes* *Front, Front Side Impact & Side Curtain Airbags* *Front Seatbelt Pre-tensioners* *Tire Pressure Monitoring System* *Daytime Running Lights* POWERTRAIN TECHNOLOGY *1.8L 145 HP 150-hp Torque, DOHC 4-Cylinder* *Dual Continuous Variable Valve Timing* *5-Speed Automatic Transmission w/ SHIFTRONIC®* COMFORT & CONVENIENCE *17-inch Alloy Wheels and P215/45R17 Tires* *Power Sunroof w/ Tilt & Slide* *Side Mirror-Mounted Turn Signal Indicators* *Front Fog Lights* *Air Conditioning w/ Cabin Air Filter* *AM/FM/MP3/CD/DAB+ Audio System w/ 8 Speakers* *XM® Satellite Radio w/90 Day Trial; Not Available in AK & HI* *USB & Auxiliary Input Jacks* *Power Windows, Locks & Heated Mirrors* *One Touch Up Drivers Window* *Remote Keyless Entry w/ Alarm* *Steering Wheel Mounted Cruise, Audio & Phone Controls* *Bluetooth® Hands-free w/ 2.4 GHz FHSS System* *Tilt-and Telescopic Steering Column* *Illuminated Vanity Mirrors with Extensions* *Trip Computer* *Leather-Wrapped Steering Wheel & Shift Knob* *Leather Seating Surfaces w/ Heated Front and Rear Seats* *Stowing Front Center Armrest w/ Storage Box* *Divide & Conquer Rear Seat* *Rear Center Armrest w/ Cupholders* *Full Tank of Gas*	
EPA Fuel Economy Estimates CITY MPG 29 Highway MPG 40 Combined Fuel Economy 33 Estimated Annual Fuel Cost \$1364.00 based on 15,000 miles at \$3.00 per gallon Your actual mileage will vary depending on how you drive and maintain your vehicle.		Environmental Performance Protect the Environment, choose vehicles with higher scores: Global Warming Score 9 Smog Score 9 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.CaliforniaEmissions.com or www.DriveClean.ca for more information. AIR RESOURCES BOARD	
GOVERNMENT SAFETY RATINGS Frontal Crash Not Rated Driver Passenger Not Rated Side Crash Not Rated Front seat Rear seat Not Rated Rollover Not Rated		Inland Freight & Handling: \$760.00 Total Price: \$23,650.00	

Figure A-100: Monroney Label

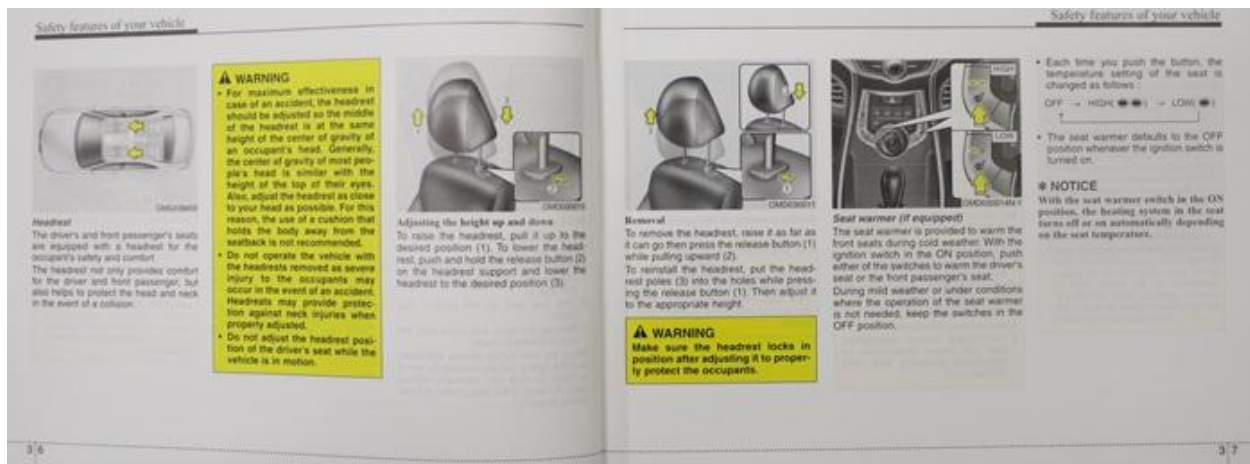


Figure A-101: Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

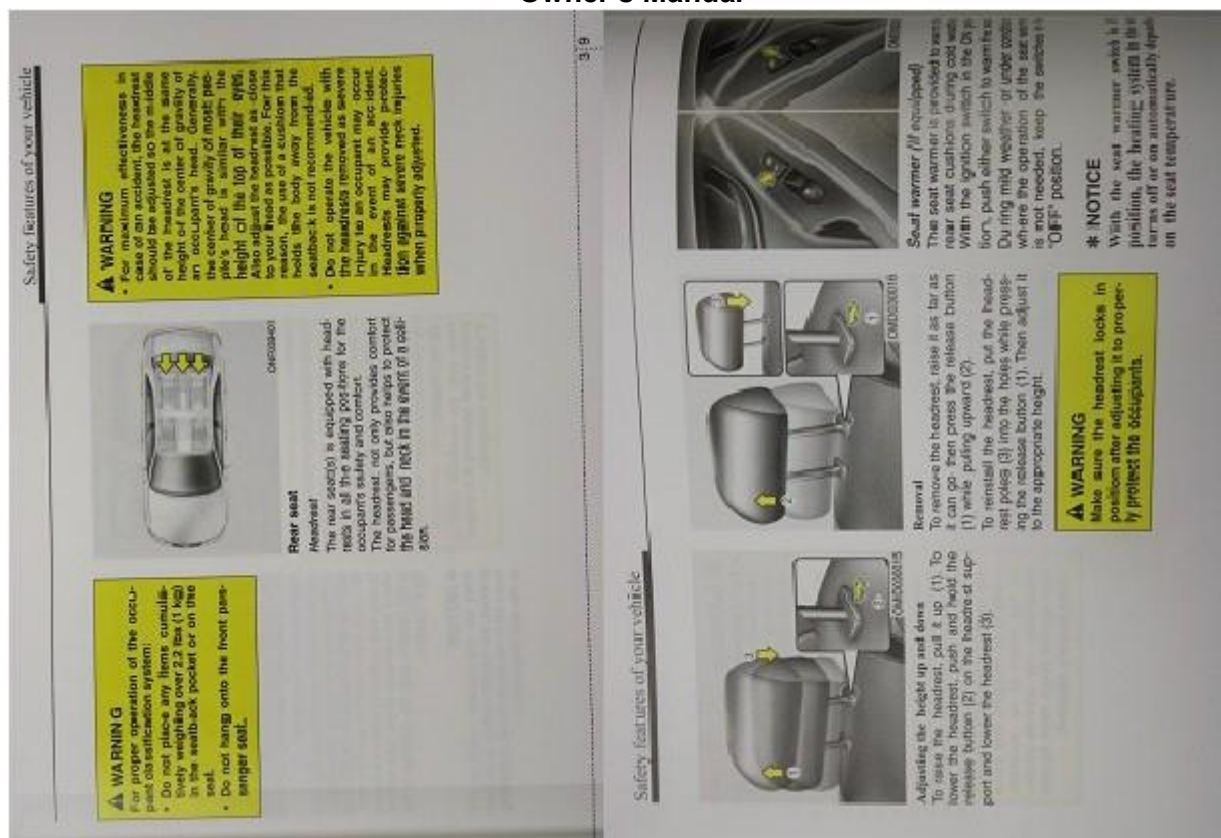


Figure A-102: Left Rear Passenger Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA PLOTS

The following table and respective vehicle and dummy (filtered) data plots shall be included in this appendix:

TABLE OF DATA PLOTS

Driver & Passenger Dummy Instrumentation Plots

No.	Description	Page
1	Driver Head Acceleration (X) Primary vs. Time	B-4
2	Driver Head Acceleration (Y) Primary vs. Time	B-4
3	Driver Head Acceleration (Z) Primary vs. Time	B-5
4	Driver Head Resultant Acceleration Primary vs. Time	B-5
5	Driver Upper Thorax Rib Deflection (Y) vs. Time	B-6
6	Driver Middle Thorax Rib Deflection (Y) vs. Time	B-6
7	Driver Lower Thorax Rib Deflection (Y) vs. Time	B-7
8	Driver Thorax Rib Deflection Maximum vs. Time	B-7
9	Driver Anterior Abdominal Force (Y) vs. Time	B-8
10	Driver Middle Abdominal Force (Y) vs. Time	B-8
11	Driver Posterior Abdominal Force (Y) vs. Time	B-9
12	Driver Total Abdominal Force (Y) vs. Time	B-9
13	Driver Pubic Symphysis Force (Y) vs. Time	B-10
14	Passenger Head Acceleration (X) vs. Time Primary	B-10
15	Passenger Head Acceleration (Y) vs. Time Primary	B-11
16	Passenger Head Acceleration (Z) vs. Time Primary	B-11
17	Passenger Head Resultant Acceleration Primary vs. Time	B-12
18	Passenger Lower Spine T12 Acceleration (X) vs. Time	B-12
19	Passenger Lower Spine T12 Acceleration (Y) vs. Time	B-13
20	Passenger Lower Spine T12 Acceleration (Z) vs. Time	B-13
21	Passenger Lower Spine T12 Resultant Acceleration vs. Time	B-14
22	Passenger Iliac Force on Impact Side (Y) vs. Time	B-14
23	Passenger Acetabulum Force on Impact Side (Y) vs. Time	B-15
24	Passenger Total Pelvic Force on Impact Side (Y) vs. Time	B-15

The following additional data for this test can be obtained from the Research and Development section of the NHTSA website. The website can be found at www.NHTSA.dot.gov.

Additional Driver & Passenger Dummy Instrumentation Data

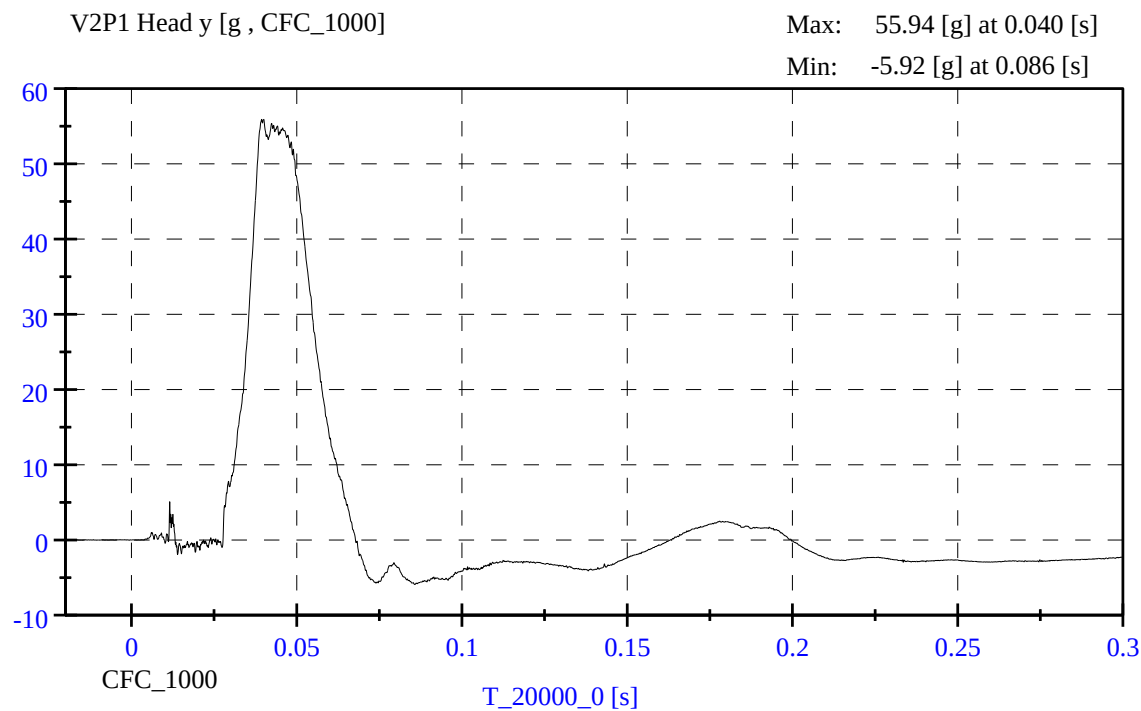
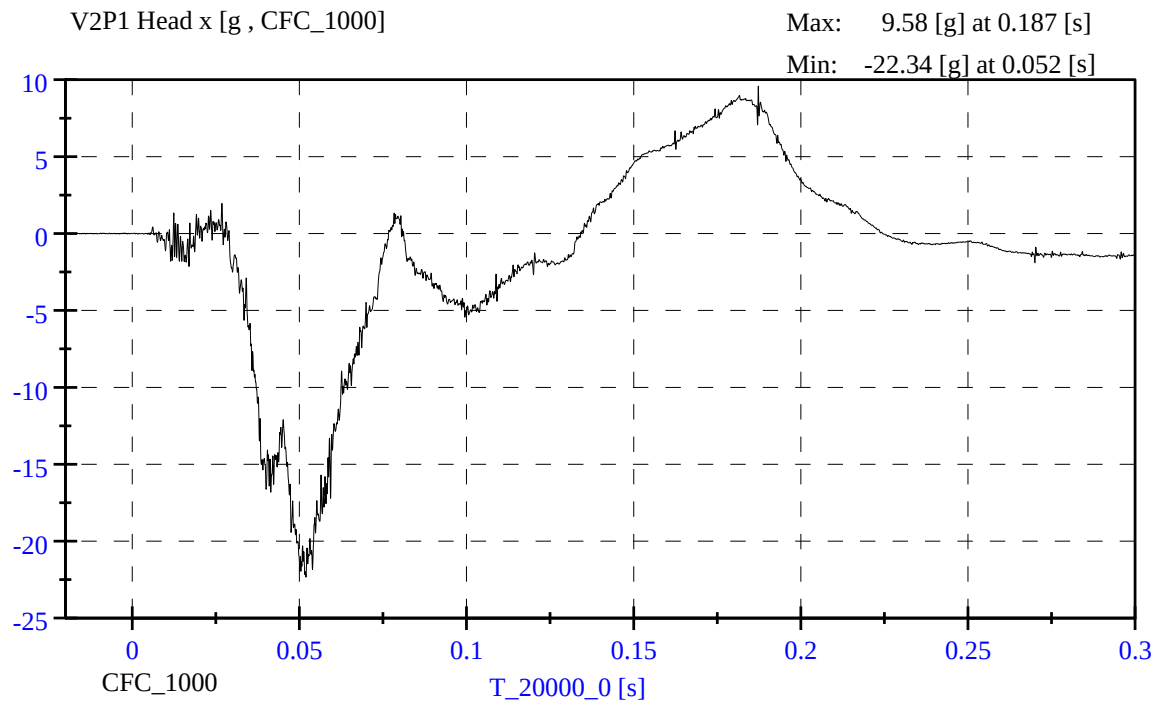
Driver Lower Spine T12 Acceleration (X)
Driver Lower Spine T12 Acceleration (Y)
Driver Lower Spine T12 Acceleration (Z)
Passenger Upper Thorax Rib Deflection (Y)
Passenger Middle Thorax Rib Deflection (Y)
Passenger Lower Thorax Rib Deflection (Y)
Passenger Upper Abdomen Rib Deflection (Y)
Passenger Lower Abdomen Rib Deflection (Y)
Driver Head Acceleration Redundant (X)
Driver Head Acceleration Redundant (Y)
Driver Head Acceleration Redundant (Z)
Passenger Head Acceleration Redundant (X)
Passenger Head Acceleration Redundant (Y)
Passenger Head Acceleration Redundant (Z)

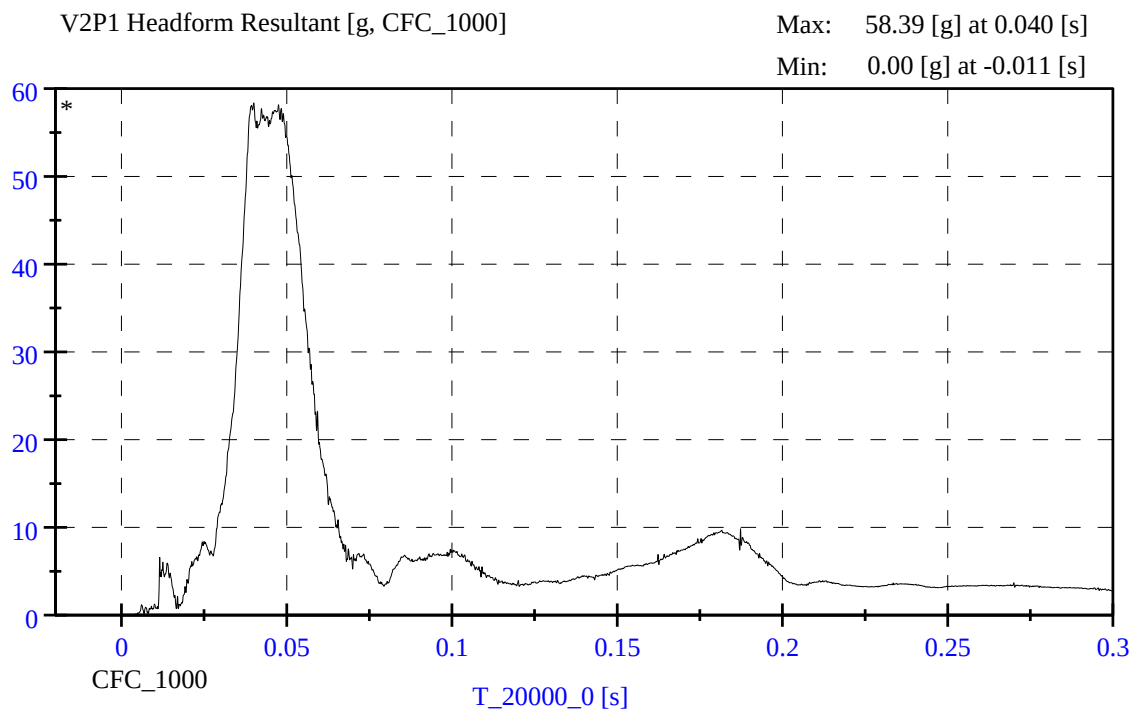
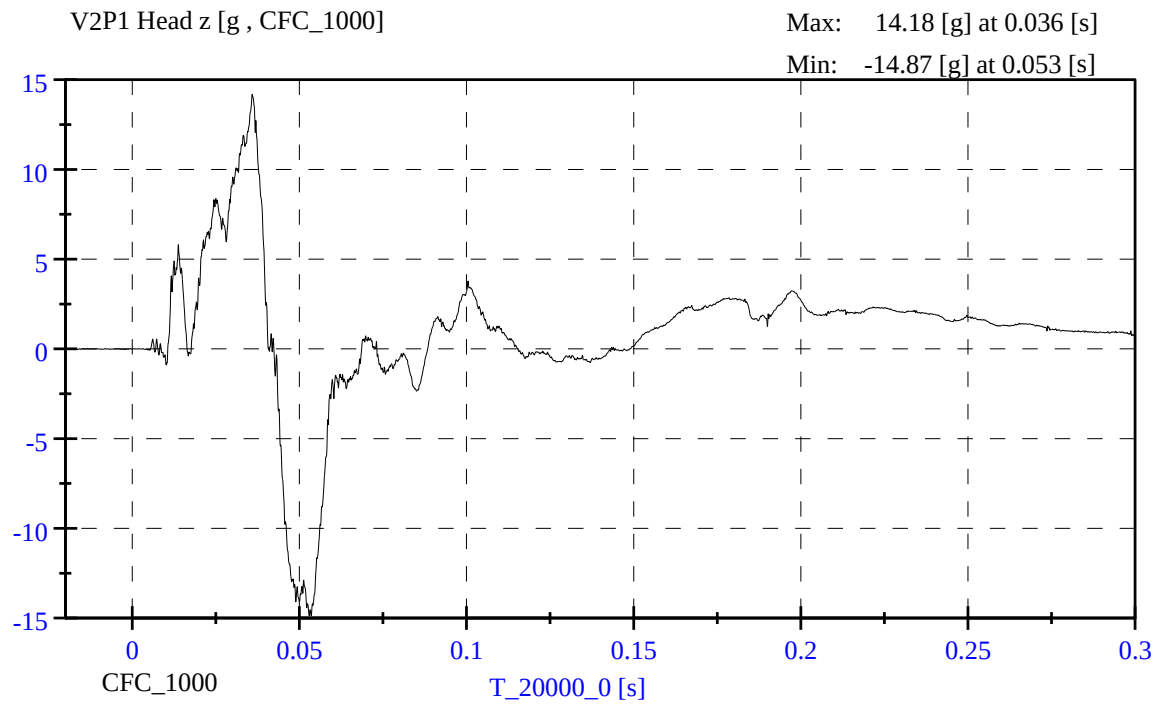
Vehicle Instrumentation Data

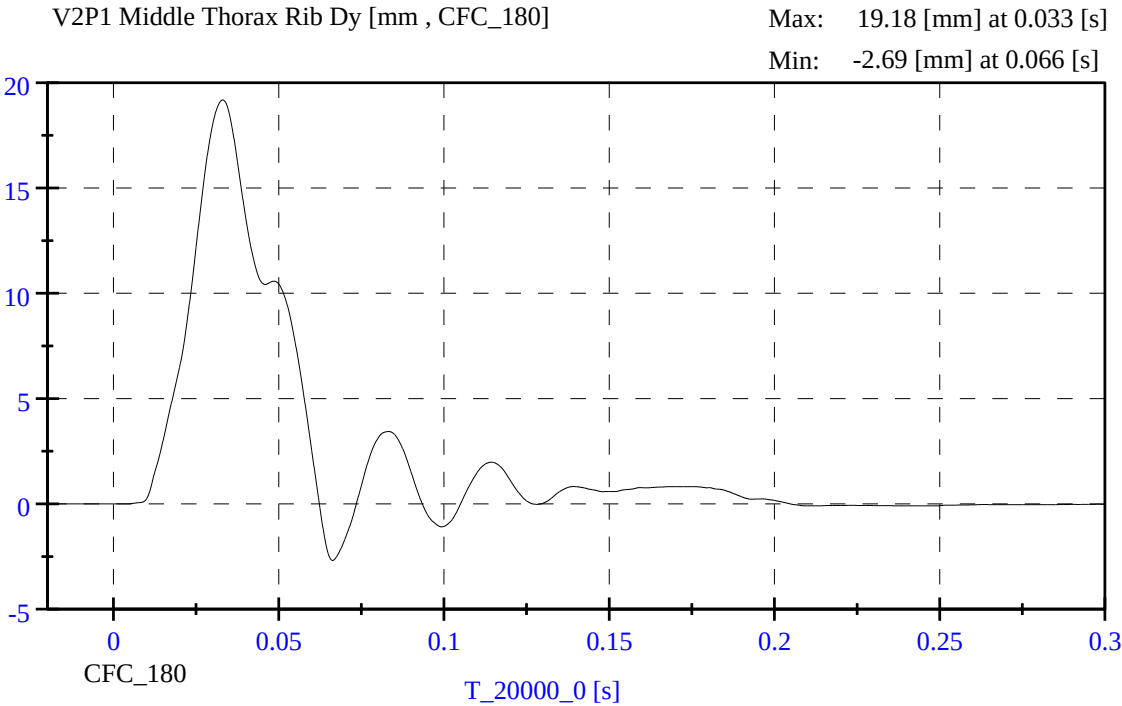
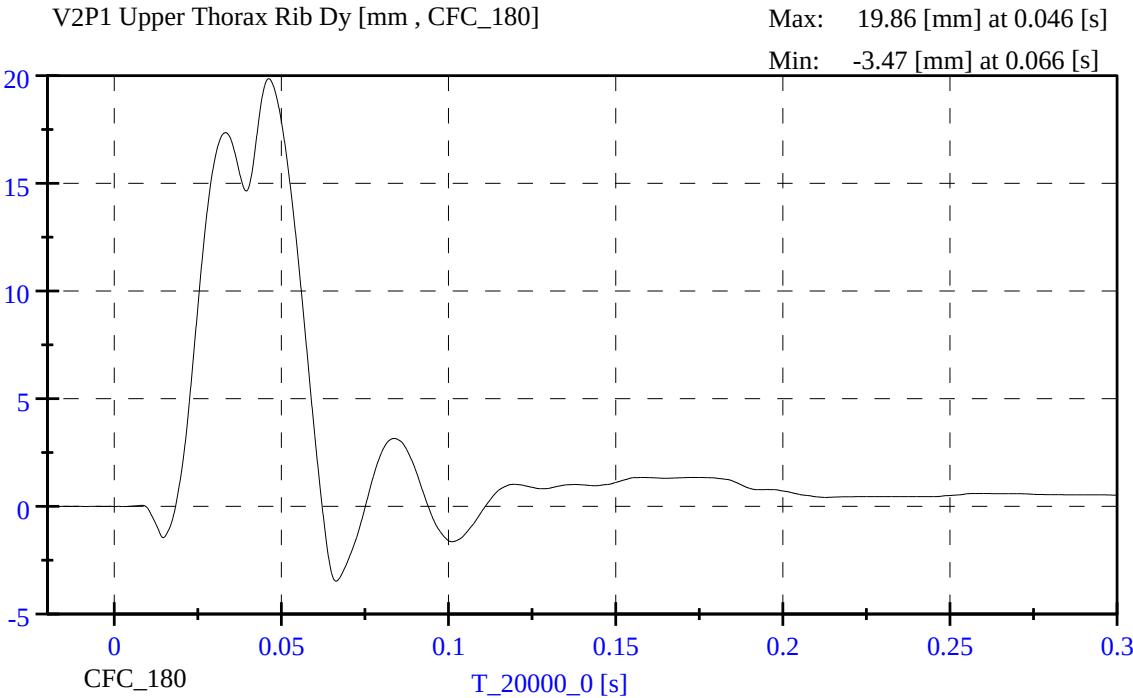
Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Right Side Sill at Front Seat Acceleration (X)
Right Side Sill at Front Seat Acceleration (Y)
Right Side Sill at Front Seat Acceleration (Z)
Right Side Sill at Rear Seat Acceleration (X)
Right Side Sill at Rear Seat Acceleration (Y)
Right Side Sill at Rear Seat Acceleration (Z)
Left Side Sill at Front Seat Acceleration (Y)
Left Side Sill at Rear Seat Acceleration (Y)
Lower A-Post Acceleration (Y)
Upper A-Post Acceleration (Y)
Lower B-Post Acceleration (Y)
Upper B-Post Acceleration (Y)
Front Seat Track Acceleration (Y)
Rear Seat Track Acceleration (Y)
Right Rear Occupant Compartment Acceleration (Y)
Engine Block (X)
Engine Block (Y)
Rear Floorpan Above Axle Acceleration (X)
Rear Floorpan Above Axle Acceleration (Y)
Rear Floorpan Above Axle Acceleration (Z)

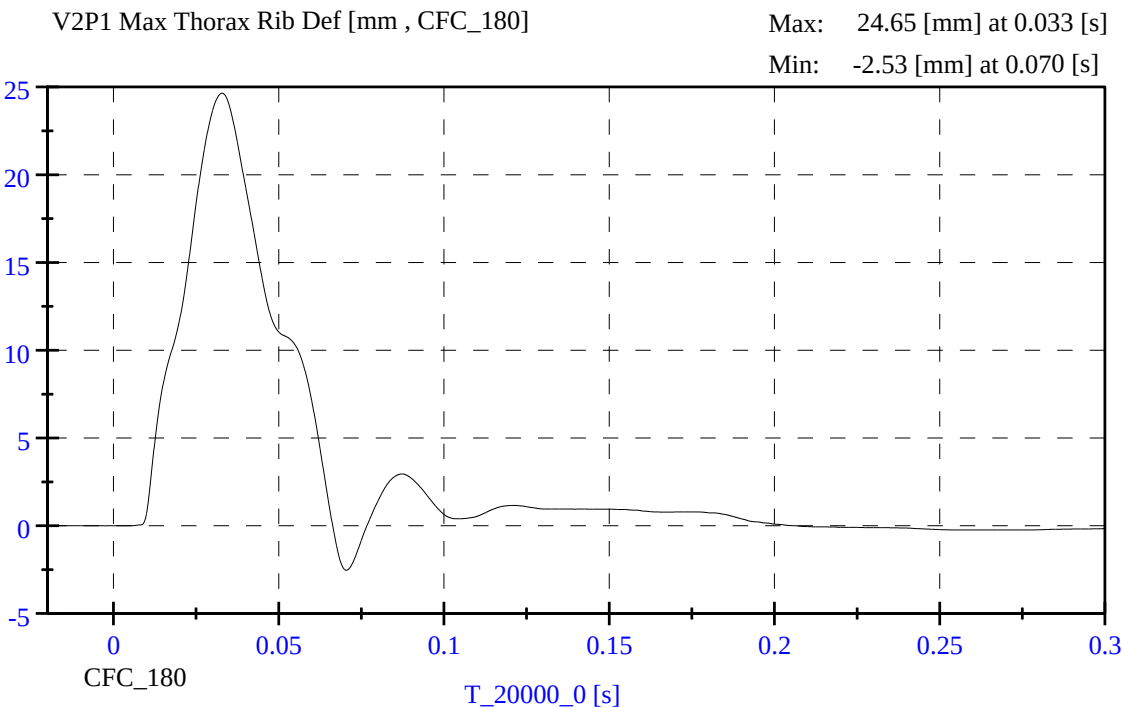
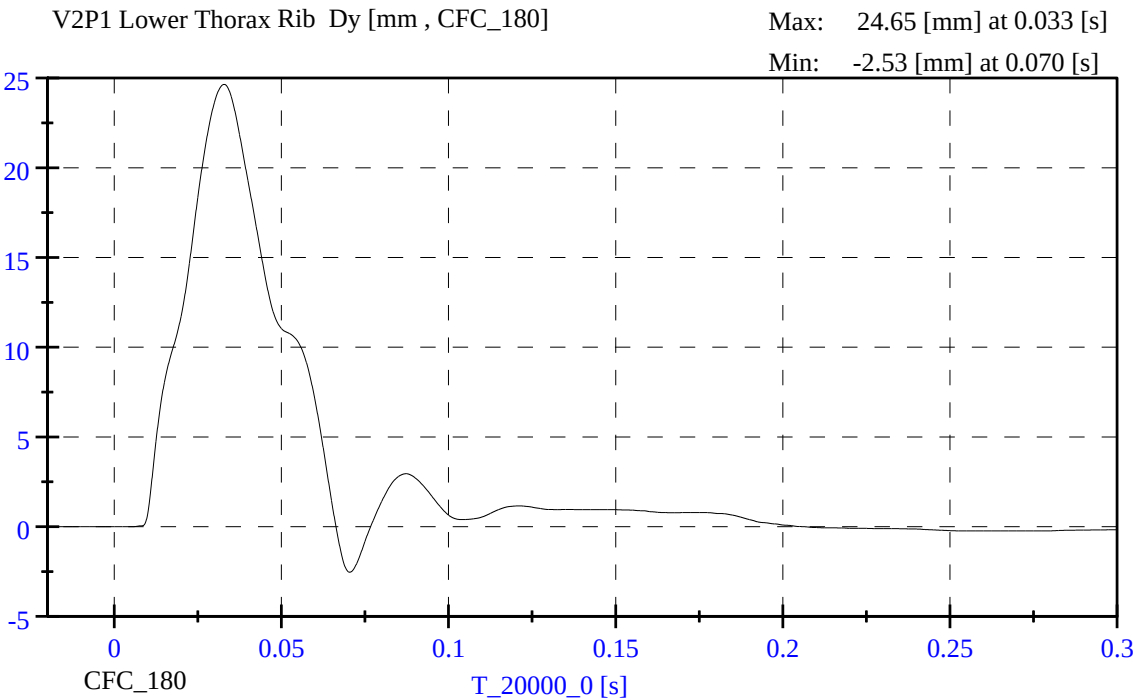
MDB Instrumentation Data

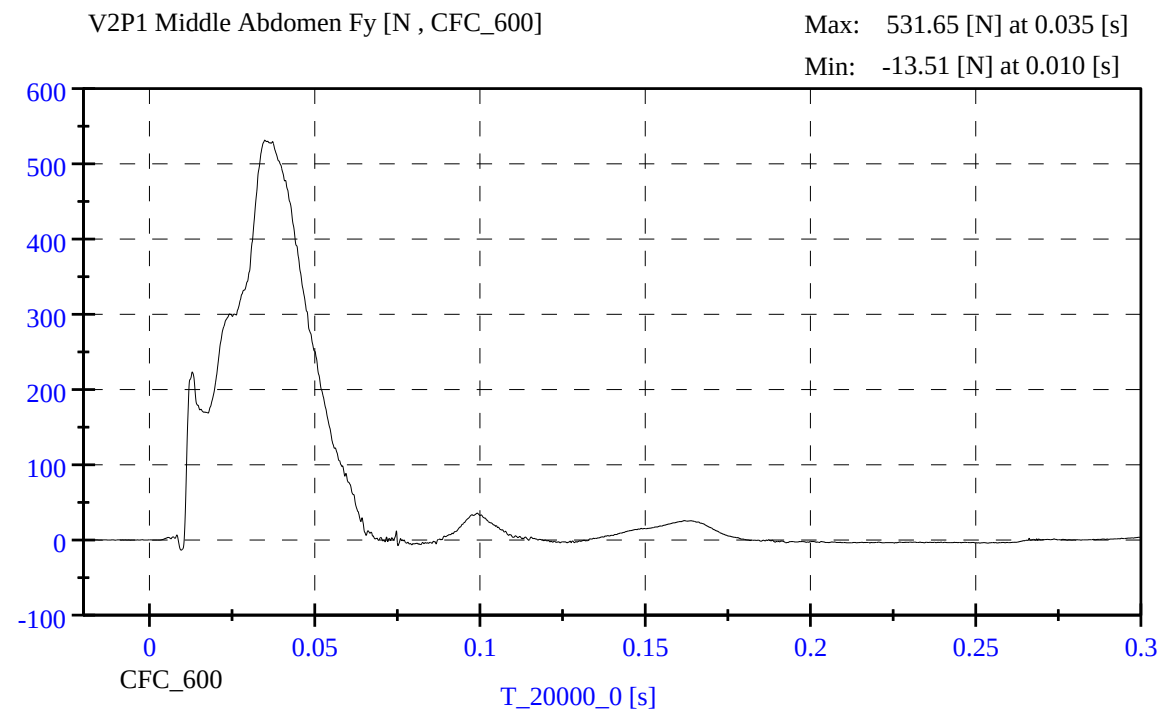
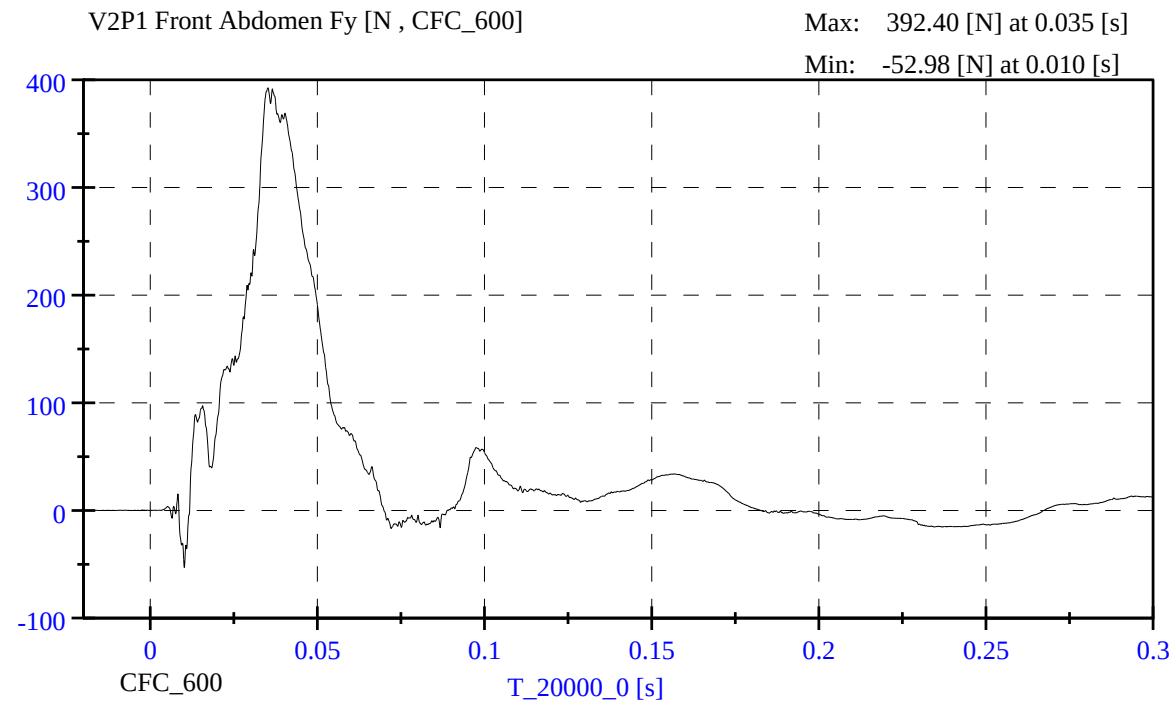
MDB Center of Gravity Acceleration (X)
MDB Center of Gravity Acceleration (Y)
MDB Center of Gravity Acceleration (Z)
MDB Rear Acceleration (X)
MDB Rear Acceleration (Y)
Left MDB Contact Switch
Right MDB Contact Switch

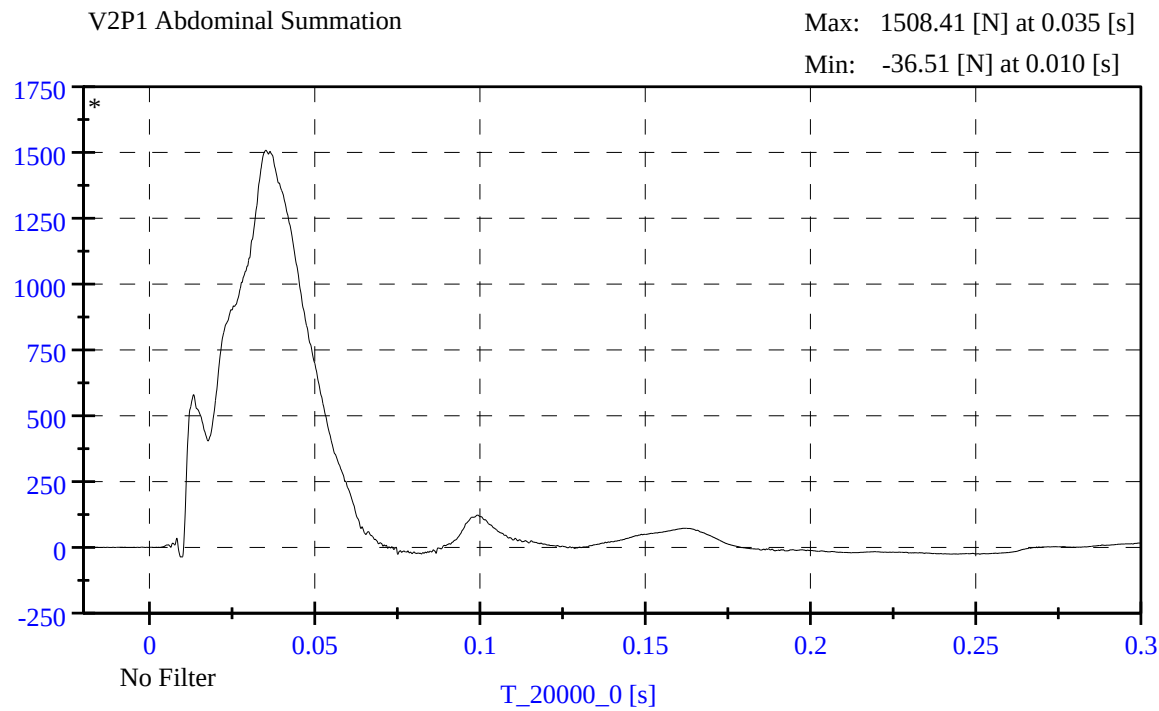
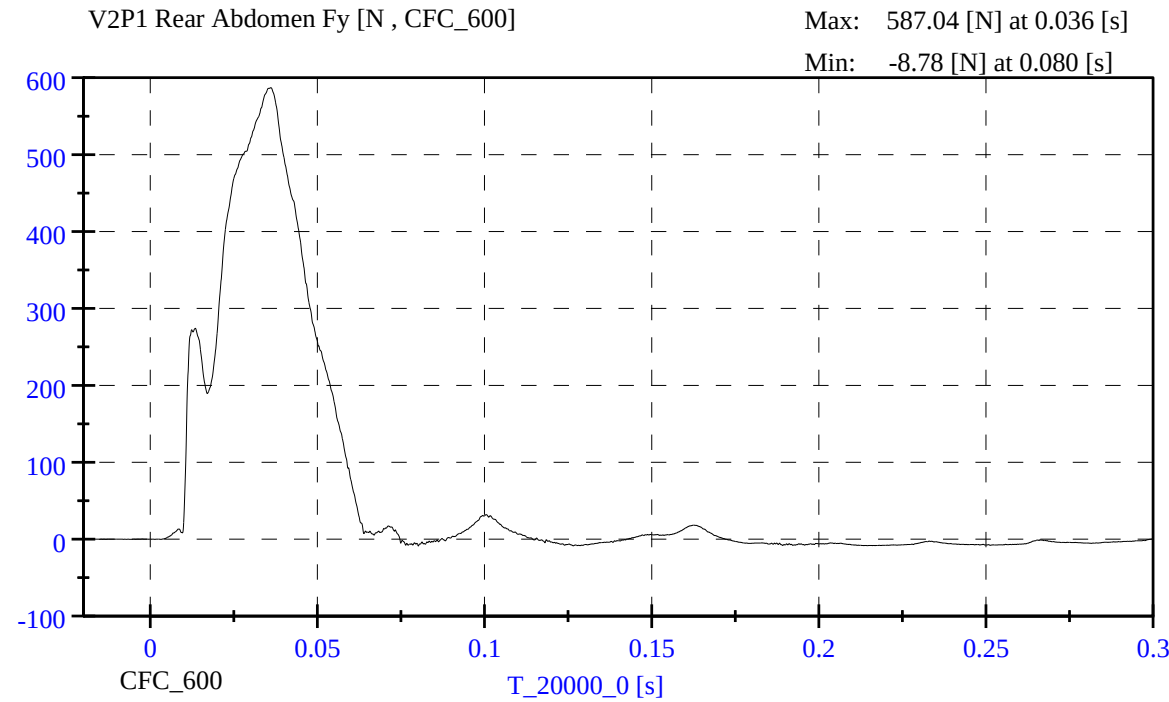


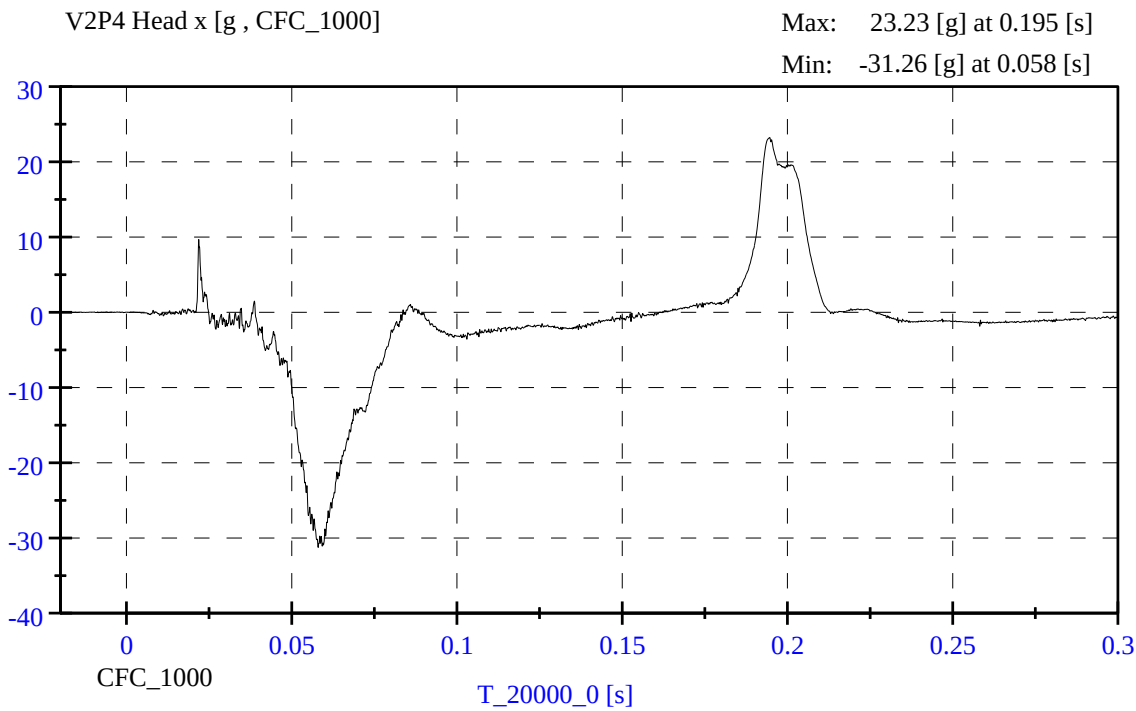
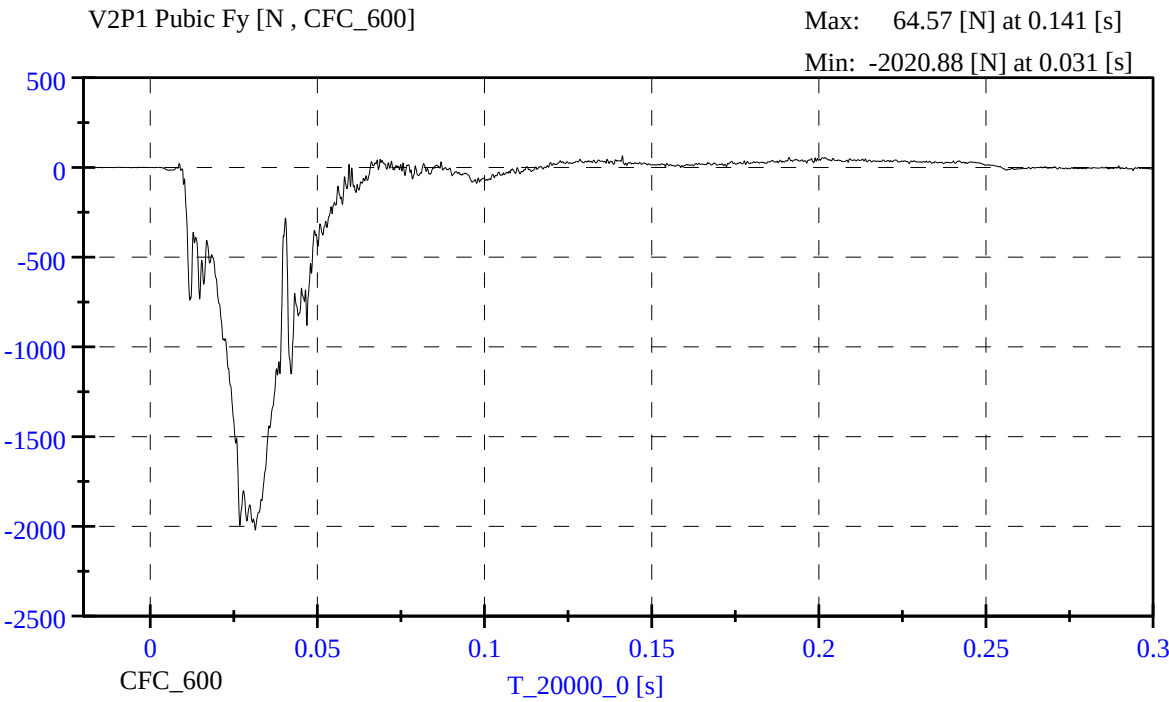


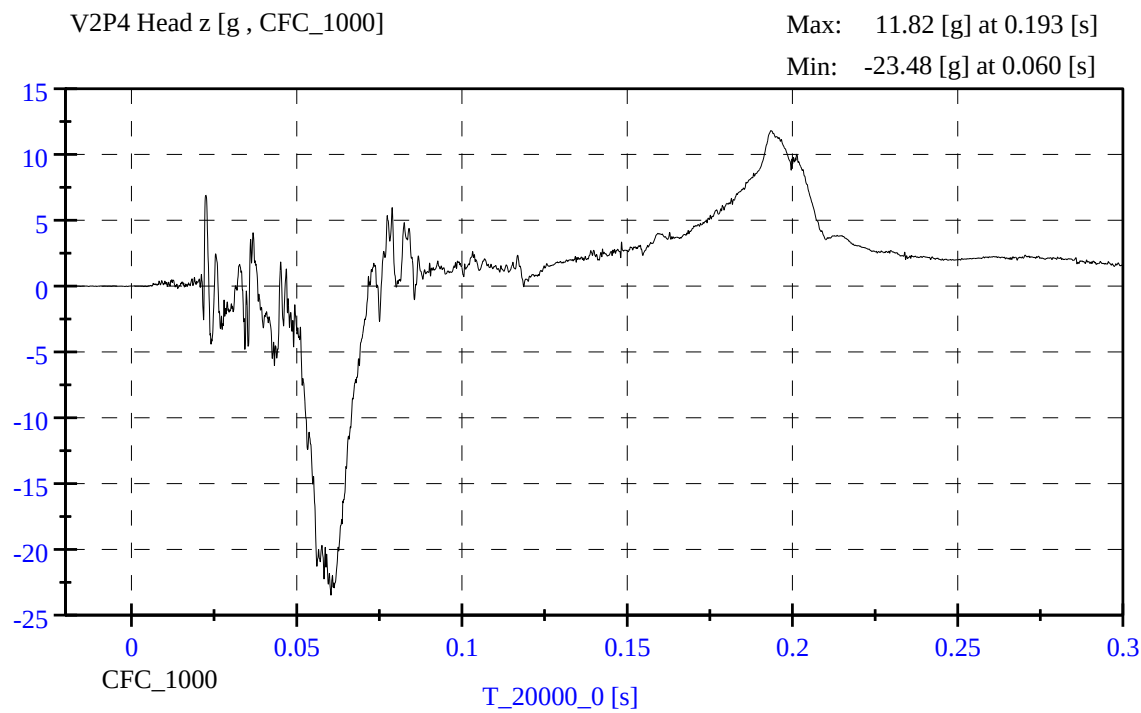
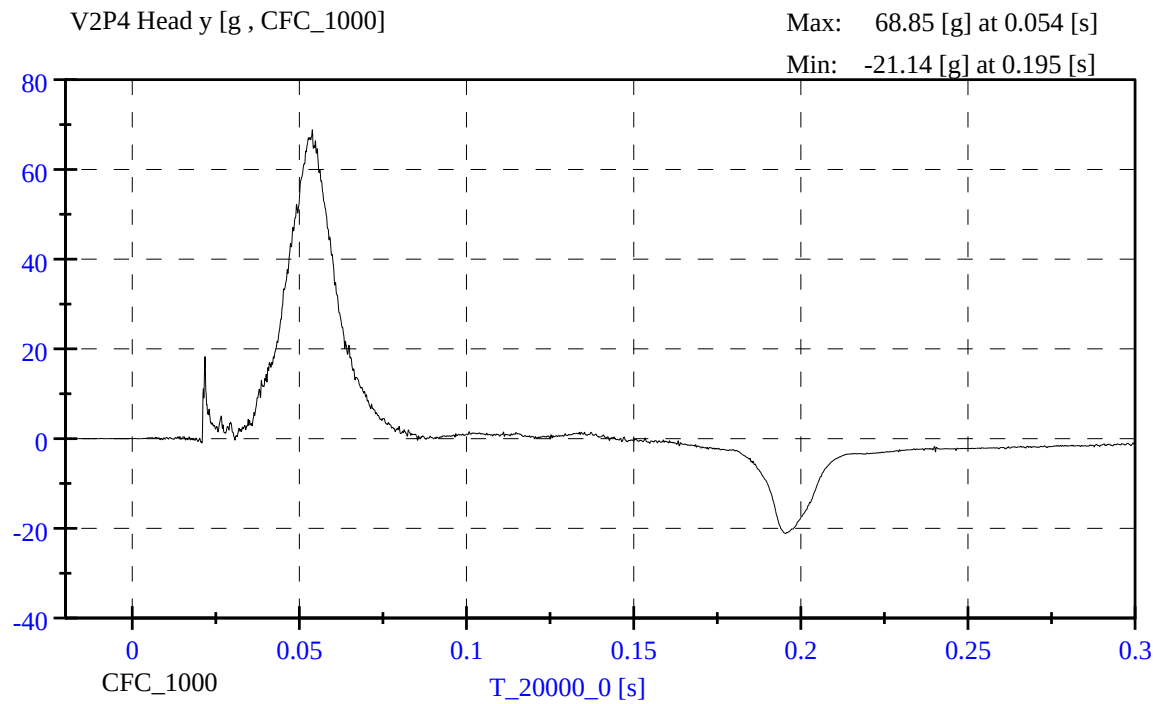


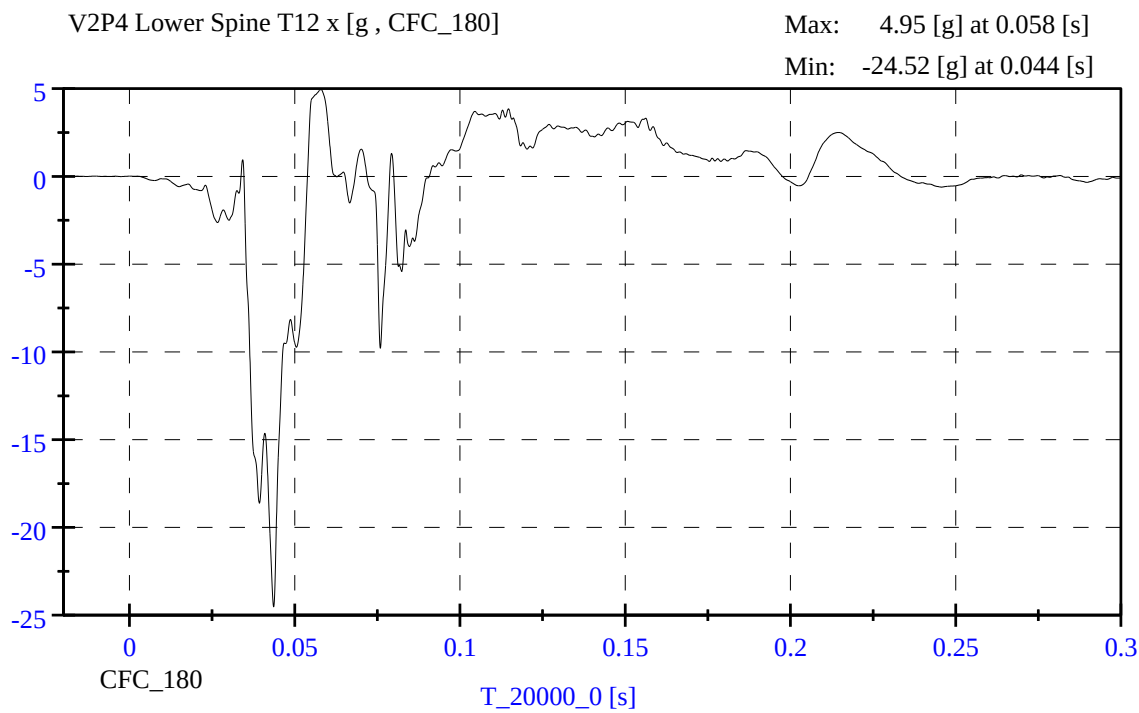
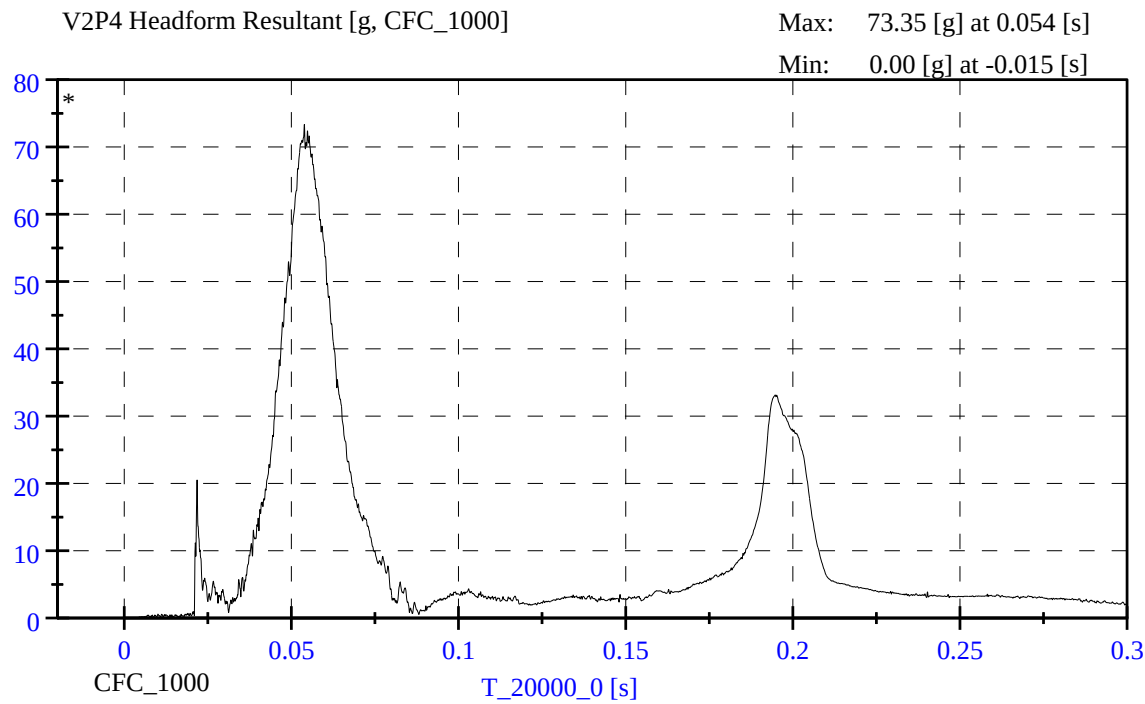


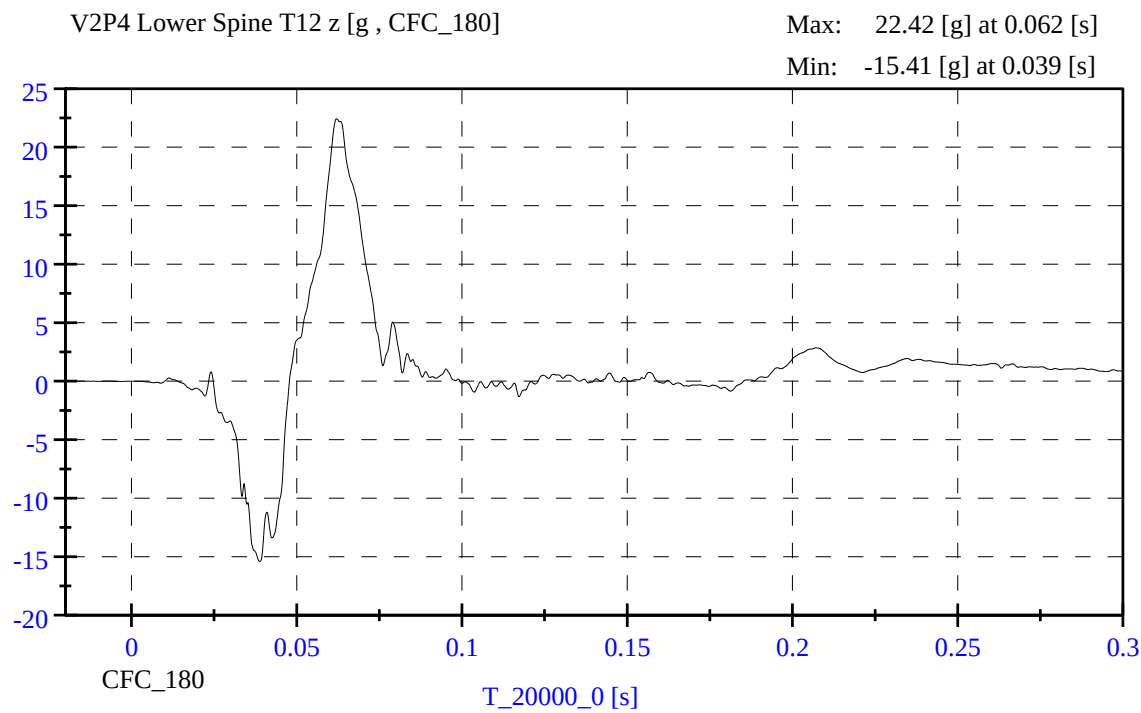
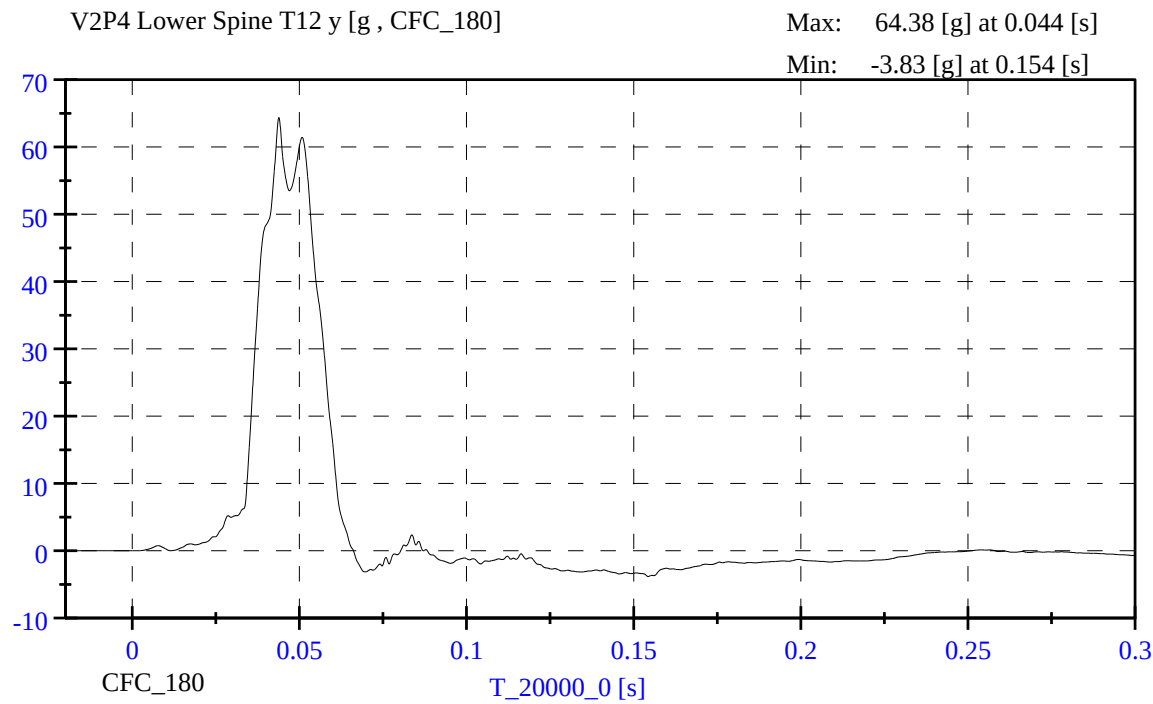


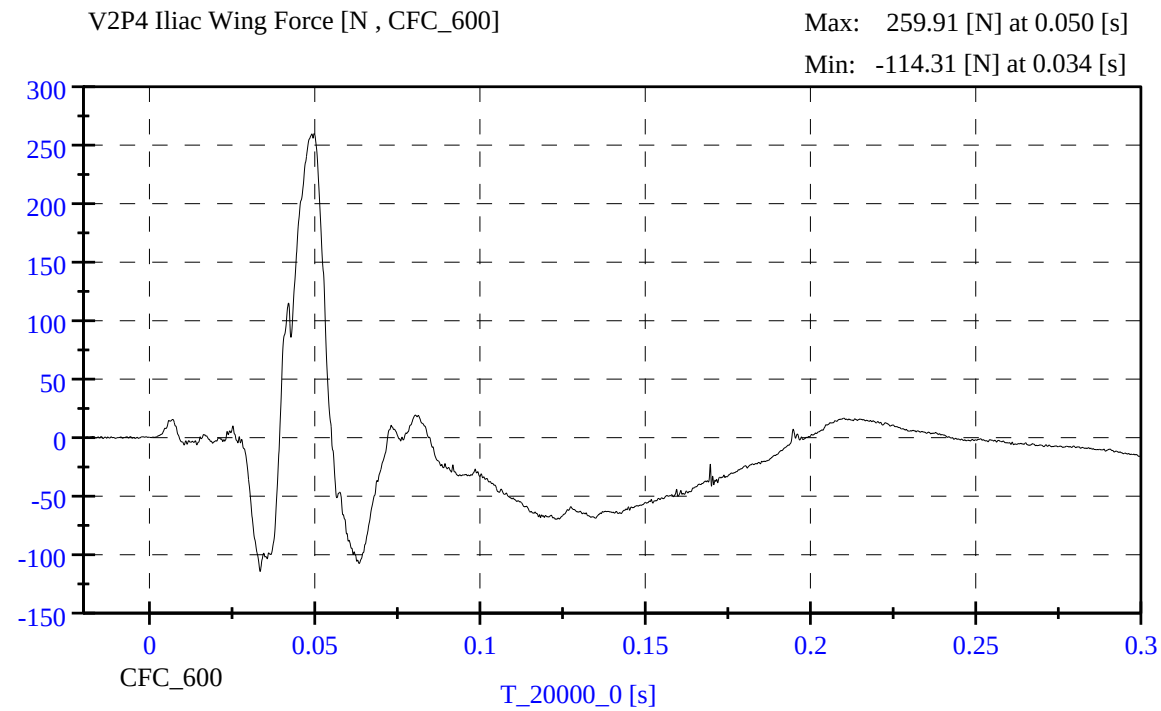
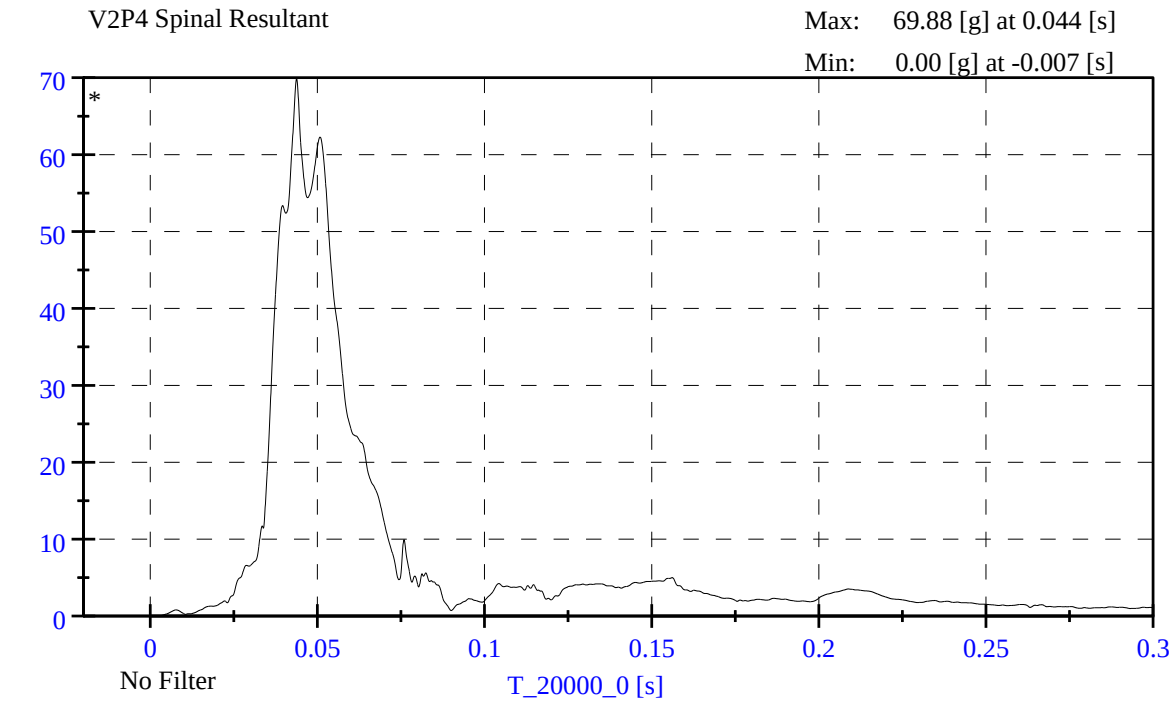


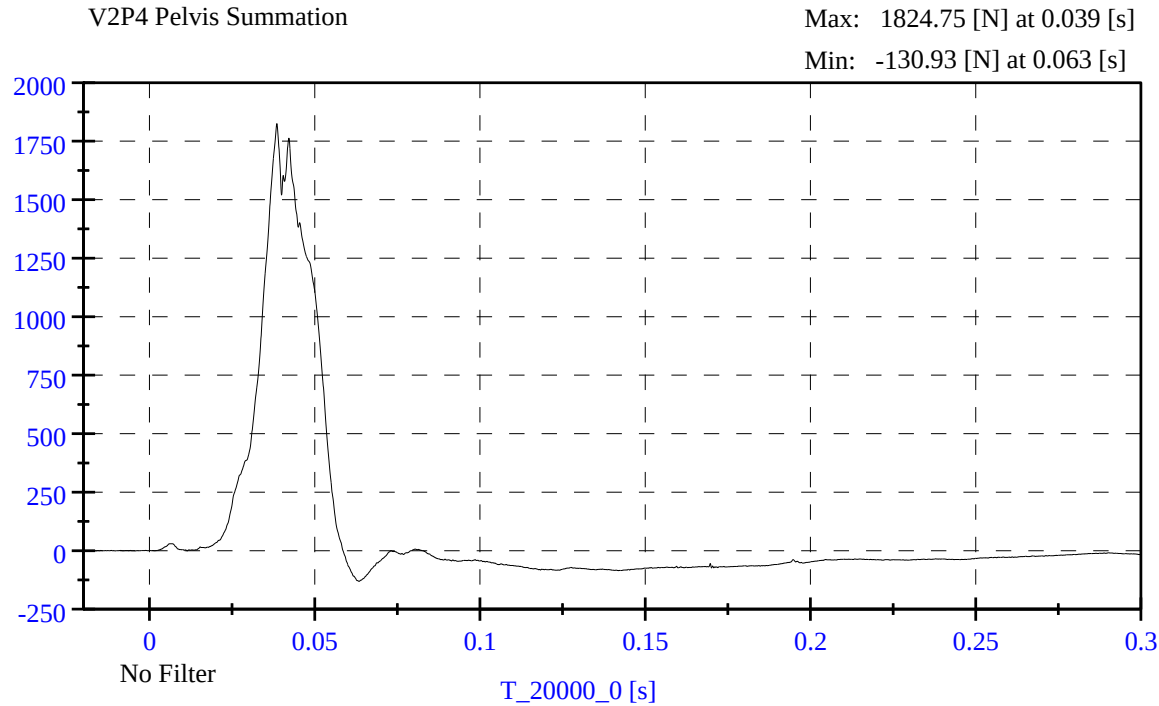
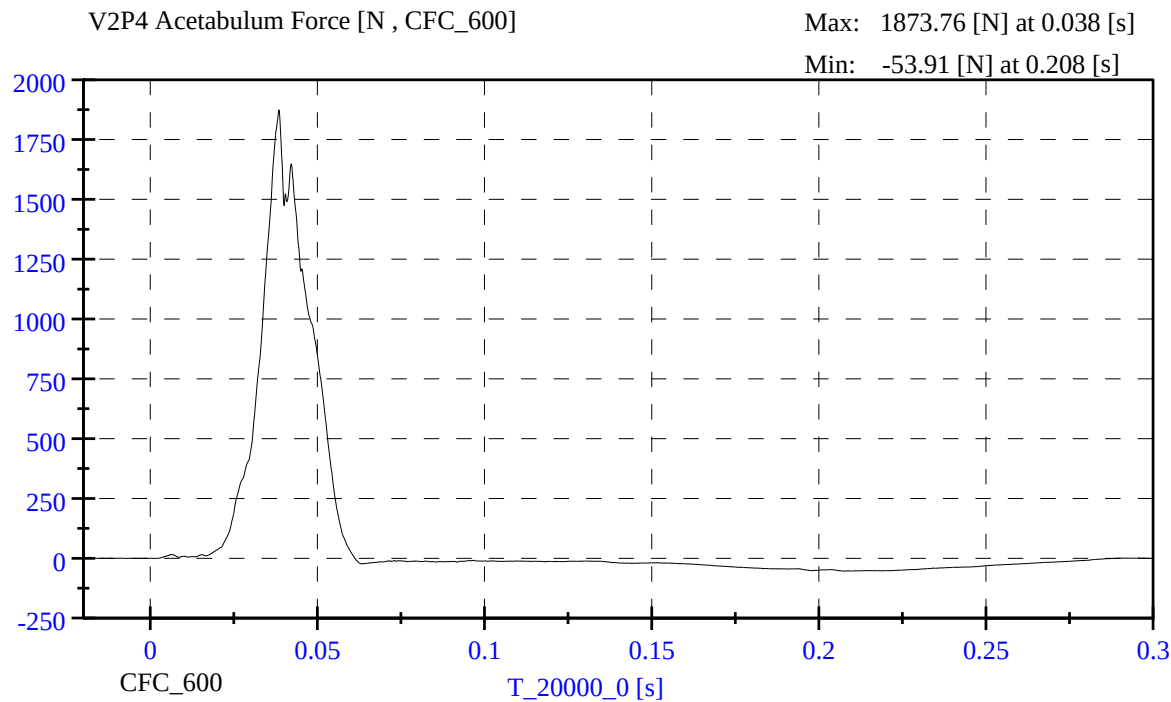












APPENDIX C

DUMMY PERFORMANCE CALIBRATION TEST DATA

TABLE OF CALIBRATION TEST RESULTS

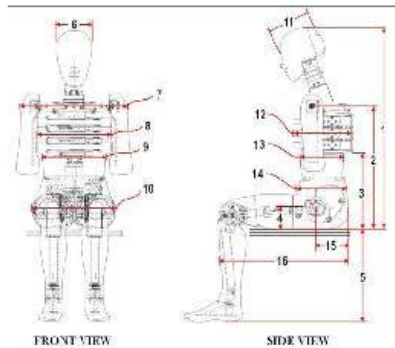
PRE-TEST

Es-2re No: F034

CONFIGURED FOR LEFT SIDE IMPACT

ES-2re External Measurements

NHTSA S/N F034



Dim. No.	Description	Specification (mm)	Result (mm)	Pass/Fail
1	Sitting Height	900-918	914	Pass
2	Seat to Shoulder Joint	558-572	565	Pass
3	Seat to Lower Face of Thoracic Spine Box	346-356	354	Pass
4	Seat to Hip Joint (center of bolt)	97-103	101	Pass
5	Sole to Seat, Sitting	433-451	445	Pass
6	Head Width	152-158	155	Pass
7	Shoulder/Arm Width	461-479	464	Pass
8	Thorax Width	322-332	324	Pass
9	Abdomen Width	273-287	283	Pass
10	Pelvis/Lap Width	359-373	370	Pass
11	Head Depth	196-206	201	Pass
12	Thorax Depth	262-272	268	Pass
13	Abdomen Depth	194-204	199	Pass
14	Pelvis Depth	235-245	237	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150-160	155	Pass
16	Back of Buttocks to Front Knee	597-615	604	Pass

Technician: DS

Date: 10/28/2011

VERIFICATION REPORT

Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	10/28/2011
Test Number:	1	Test Time:	1:49:46 PM

Component Part Number	Component Serial Number
455-1007	8468

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.0 deg C P
Humidity	10 -- 70	30 %RH P
Resultant Acceleration	125 -- 155	150 g P
Oscillation	0.0 -- 15.0	4.7 % P
Fore-Aft Acceleration	-15.00 -- 15.00	3.00 g P

All test parameters are within specifications

Technician: **Don Schenk**

Supervisor: **D. Travale**

Test ID:

Test Time: **1:49:46 PM**

Test Date: **10/28/2011**

VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P58737	9/29/2011
Endevco	7264-2000	P52022	9/29/2011
Endevco	7264-2000	P52040	9/29/2011

Test ID:

Test Time: **1:49:46 PM**Test Date: **10/28/2011**

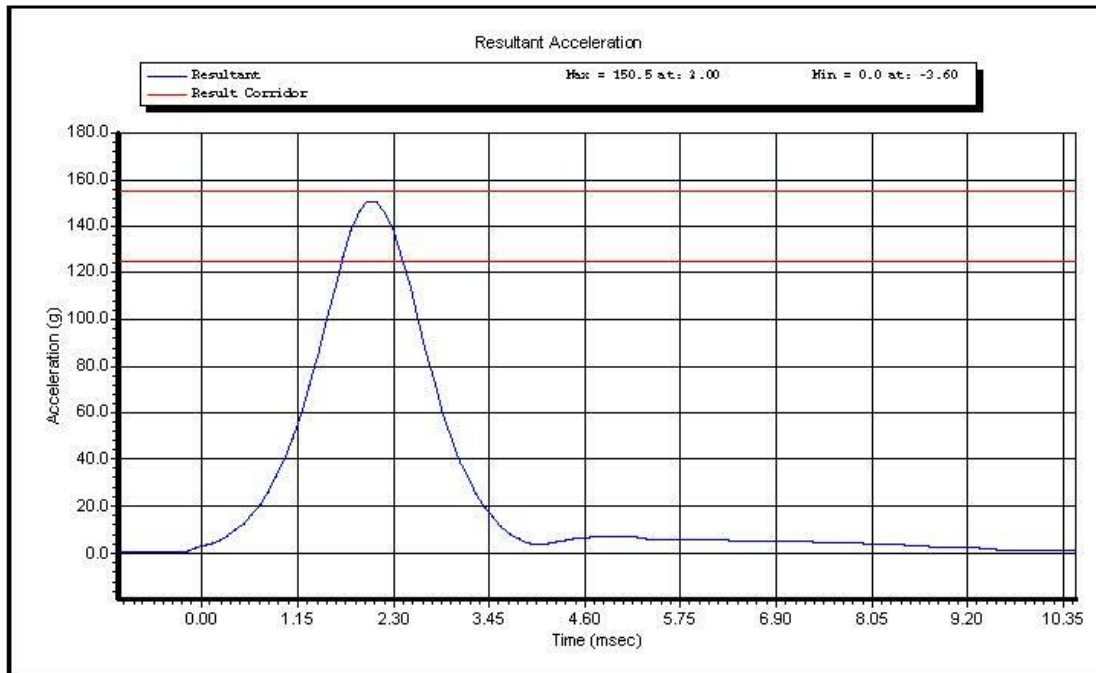


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Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	10/28/2011
Test Number:	1	Test Time:	1:49:46 PM



Test ID:

Test Time: 1:49:46 PM

Test Date: 10/28/2011

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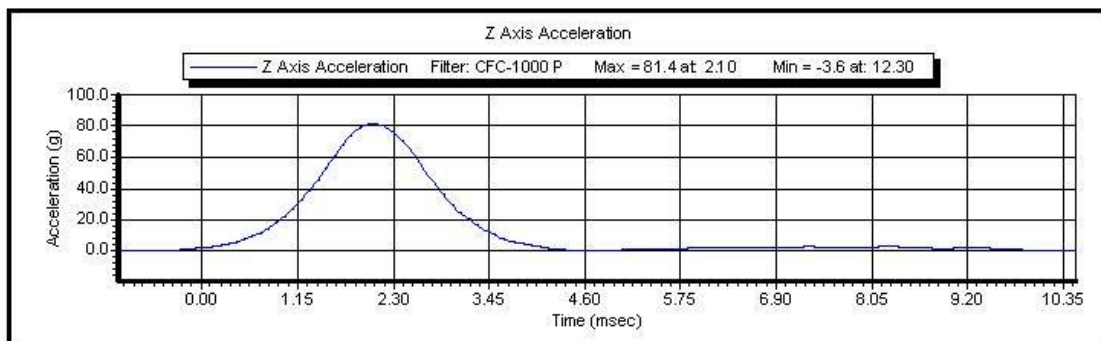
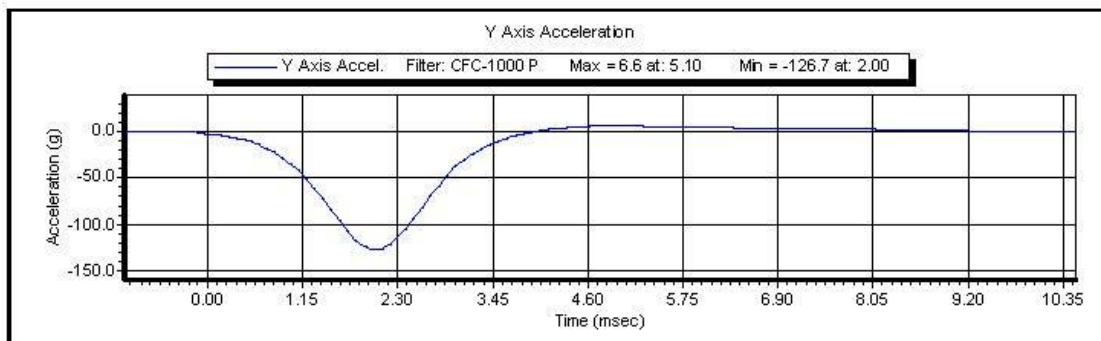
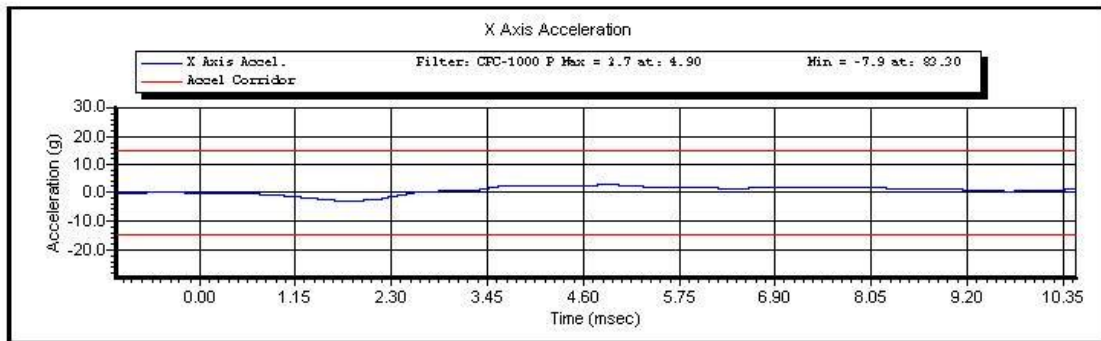
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Test ID:

Test Time: 1:49:46 PM

Test Date: 10/28/2011

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2 of 2



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VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	10/28/2011
Test Number:	1	Test Time:	3:34:53 PM

Component Part Number	Component Serial Number
455-2002	07066

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.8 deg C P
Humidity	10 -- 70	32 %RH P
Velocity	3.30 -- 3.50	3.45 m/s P
Maximum Neck Flexion Angle	49.0 -- 59.0	51.6 degrees P
Time At Maximum Neck Flexion	54.0 -- 66.0	61.0 ms P
Decay to Zero Degrees	53.0 -- 88.0	58.3 ms P
Velocity Corridor	--	P

All test parameters are within specifications

Technician: **Don Schenk**
Supervisor: **D.Travale**

Test ID:

Test Time: **3:34:53 PM**

Test Date: **10/28/2011**



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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	7000428	094	4/25/2011
DentonATD	7000428	095	4/25/2011
DentonATD	7000428	093	4/25/2011

Test ID:

Test Time: 3:34:53 PM

Test Date: 10/28/2011

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2 of 2

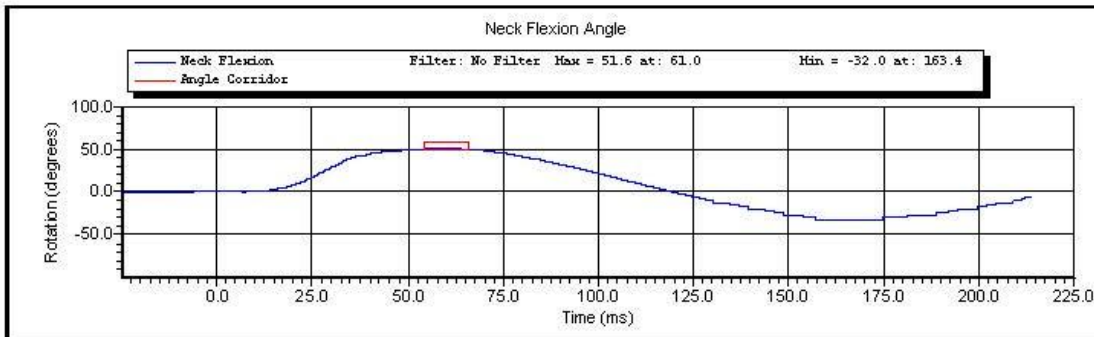
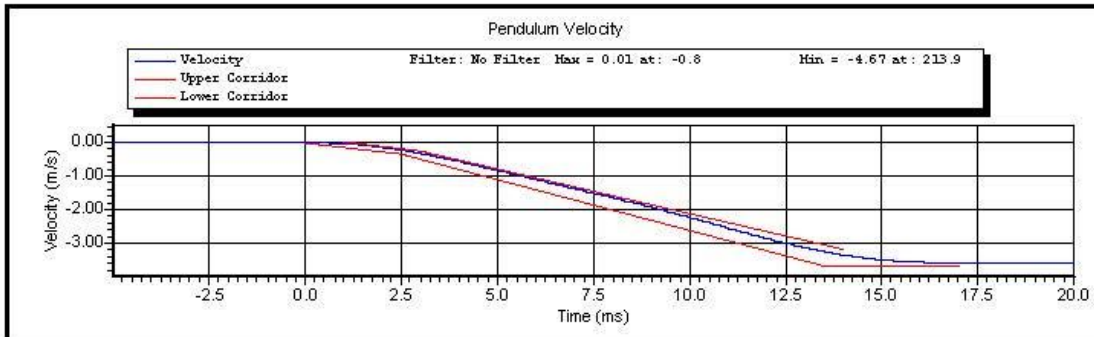


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Test Name:	Neck Flexion	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	10/28/2011
Test Number:	1	Test Time:	3:34:53 PM



Test ID:

Test Time: 3:34:53 PM

Test Date: 10/28/2011

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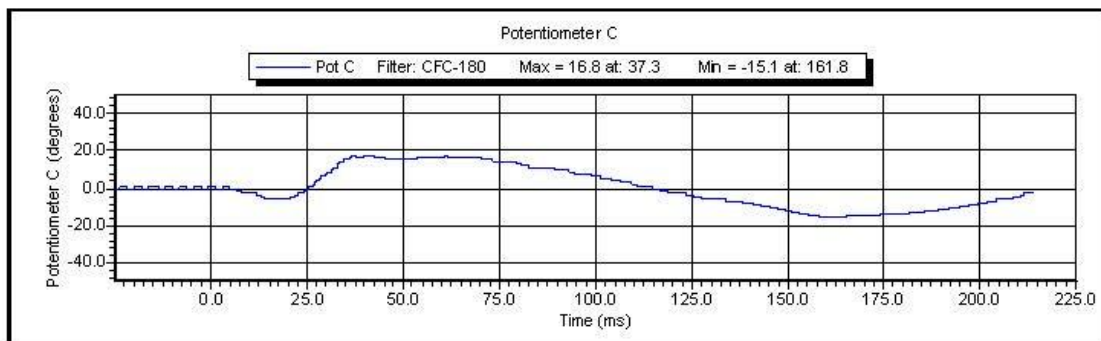
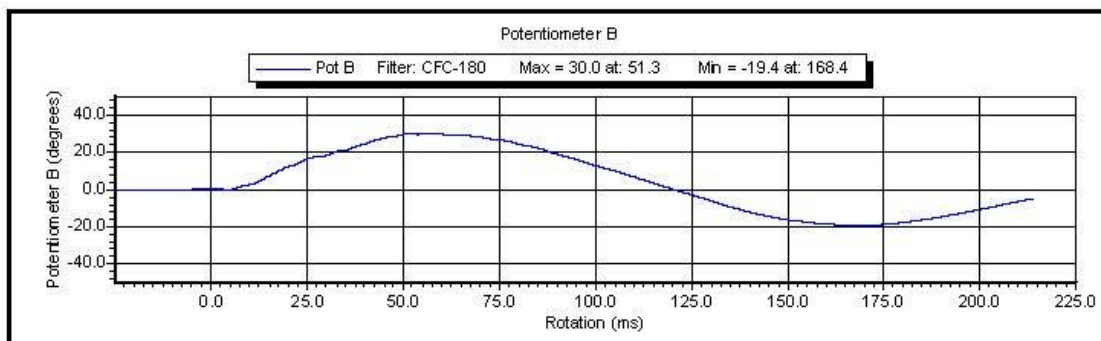
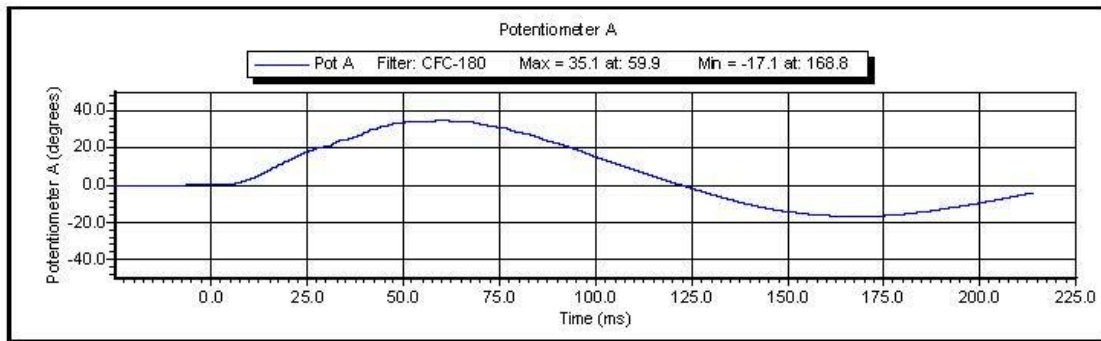
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Test ID:

Test Time: 3:34:53 PM

Test Date: 10/28/2011

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VERIFICATION REPORT

Test Name:	Shoulder Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	10/31/2011
Test Number:	1	Test Time:	11:43:47 AM

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.8 deg C P
Humidity	10.0 -- 70.0	28.0 %RH P
Velocity	4.20 -- 4.40	4.30 m/s P
Pendulum Acceleration	-10.50 -- -7.50	-10.25 g P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID:

Test Time: **11:43:47 AM**

Test Date: **10/31/2011**



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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	P71273	10/24/2011

Test ID:

Test Time: 11:43:47 AM

Test Date: 10/31/2011

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2 of 2

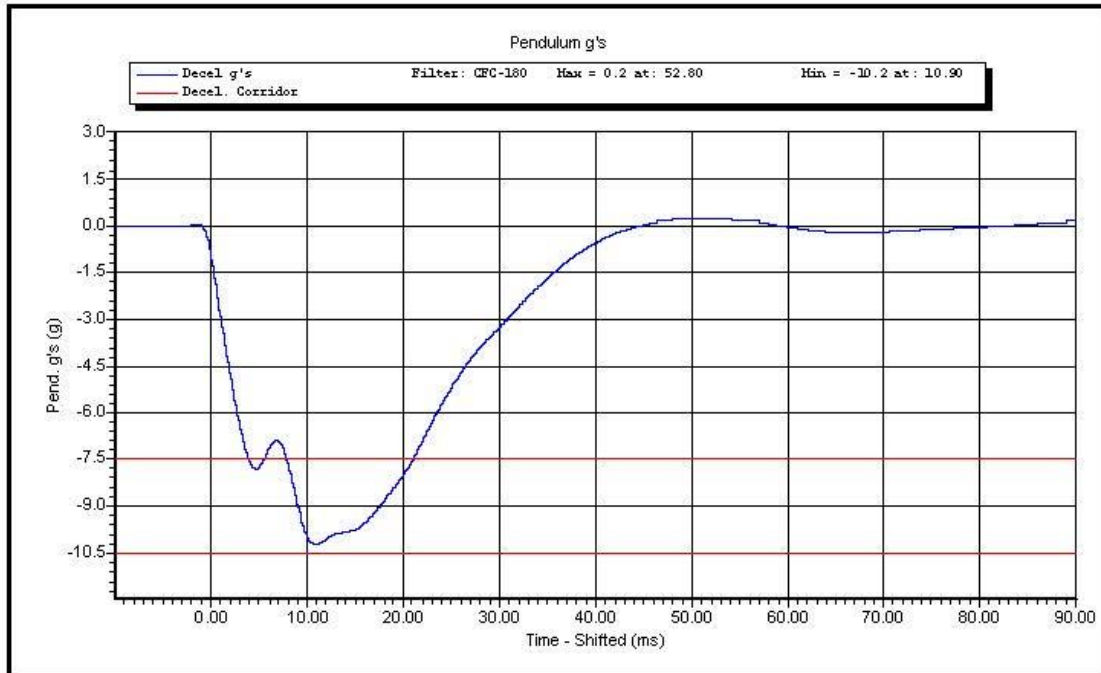


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Test Name:	Shoulder Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	10/31/2011
Test Number:	1	Test Time:	11:43:47 AM



Test ID:

Test Time: 11:43:47 AM

Test Date: 10/31/2011

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VERIFICATION REPORT

Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Upper Rib 4 m/s	Test Date:	10/29/2011
Test Number:	1	Test Time:	2:55:36 PM

Component Part Number	Component Serial Number
455-3100	UPPER - 07203

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.6 deg C P
Humidity	10.0 -- 70.0	32.0 %RH P
Velocity	3.90 -- 4.10	3.96 m/s P
Rib Displacement	-51.00 -- -46.00	-49.16 mm P
Drop Height	807.0 -- 823.0	815.0 mm P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID: **Upper Rib 4 m/s**

Test Time: **2:55:36 PM**

Test Date: **10/29/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-183	8/31/2011
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7264-2000	P32222	10/14/2011

Test ID: **Upper Rib 4 m/s**

Test Time: **2:55:36 PM**

Test Date: **10/29/2011**

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2 of 2

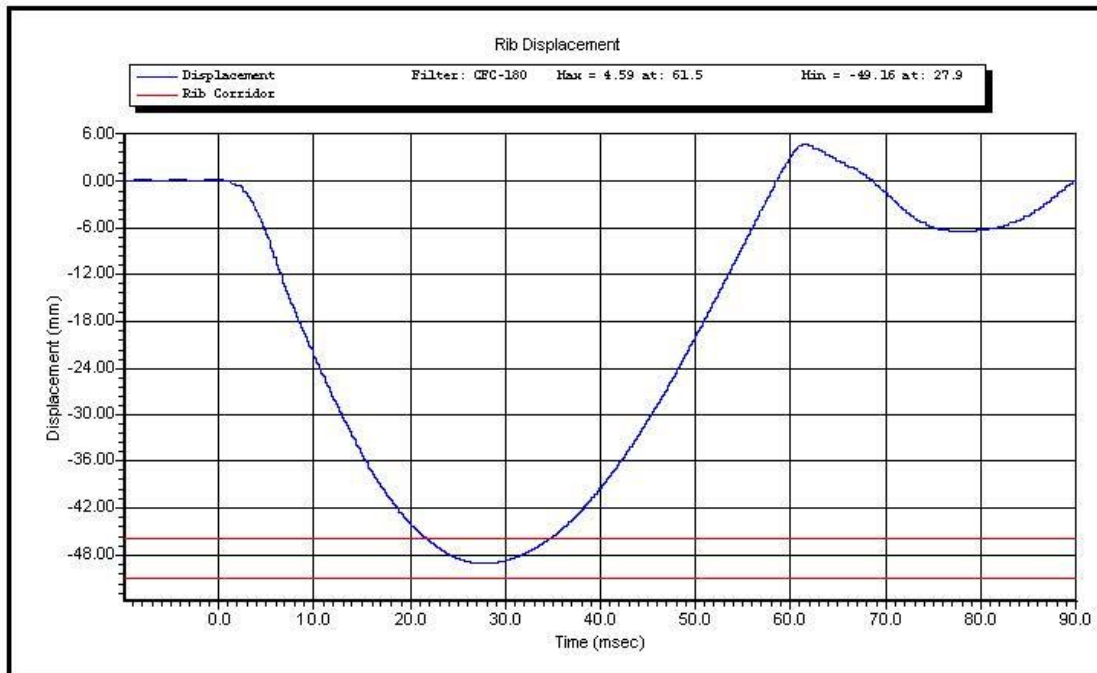


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Upper Rib 4 m/s	Test Date:	10/29/2011
Test Number:	1	Test Time:	2:55:36 PM



Test ID: Upper Rib 4 m/s Test Time: 2:55:36 PM

Test Date: 10/29/2011

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VERIFICATION REPORT

Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Upper Rib 4 m/s	Test Date:	10/29/2011
Test Number:	1	Test Time:	3:03:08 PM

Component Part Number	Component Serial Number
455-3100	UPPER - 07203

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.6 deg C P
Humidity	10.0 -- 70.0	32.0 %RH P
Velocity	2.90 -- 3.10	2.97 m/s P
Rib Displacement	-40.00 -- -36.00	-38.08 mm P
Drop Height	454 -- 464	459 mm P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID: **Upper Rib 4 m/s**

Test Time: **3:03:08 PM**

Test Date: **10/29/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-183	8/31/2011
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7264-2000	P32222	10/14/2011

Test ID: **Upper Rib 4 m/s**

Test Time: **3:03:08 PM**

Test Date: **10/29/2011**

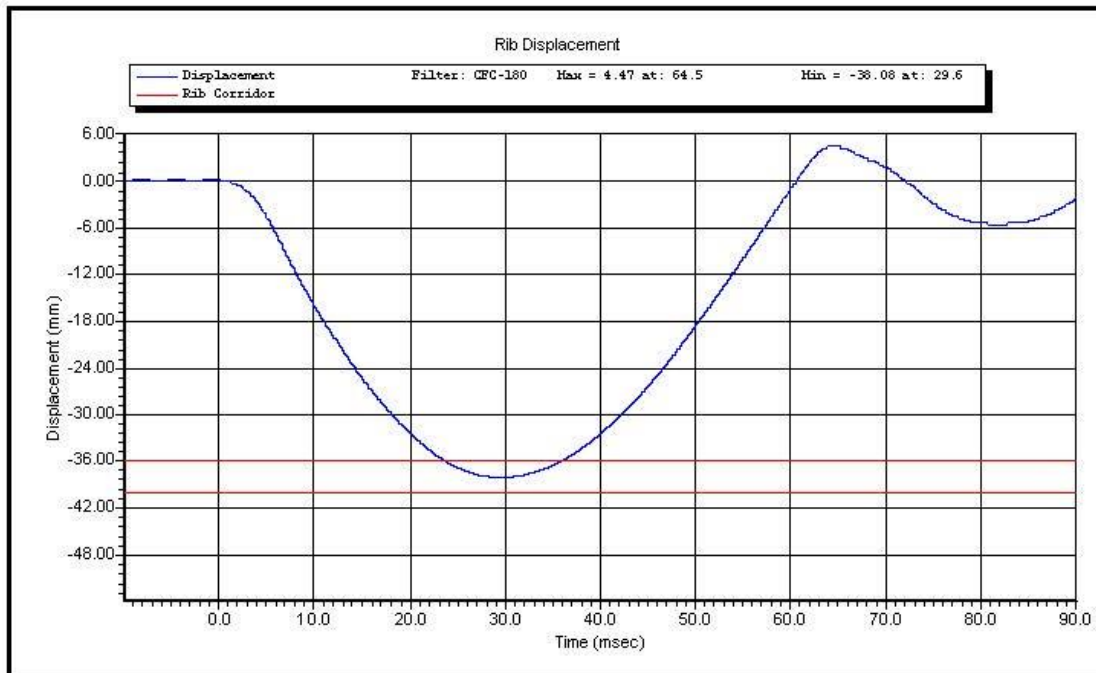


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Upper Rib 4 m/s	Test Date:	10/29/2011
Test Number:	1	Test Time:	3:03:08 PM



Test ID: **Upper Rib 4 m/s** Test Time: **3:03:08 PM**

Test Date: **10/29/2011**

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1 of 1



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VERIFICATION REPORT

Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Middle Rib 4 m/s	Test Date:	10/29/2011
Test Number:	1	Test Time:	3:20:35 PM

Component Part Number	Component Serial Number
455-3100	MIDDLE - 07205

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.6 deg C P
Humidity	10.0 -- 70.0	32.0 %RH P
Velocity	3.90 -- 4.10	3.96 m/s P
Rib Displacement	-51.00 -- -46.00	-48.25 mm P
Drop Height	807.0 -- 823.0	815.0 mm P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID: **Middle Rib 4 m/s**

Test Time: **3:20:35 PM**

Test Date: **10/29/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-184	8/31/2011
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7264-2000	P32222	10/14/2011

Test ID: **Middle Rib 4 m/s**

Test Time: **3:20:35 PM**

Test Date: **10/29/2011**

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2 of 2

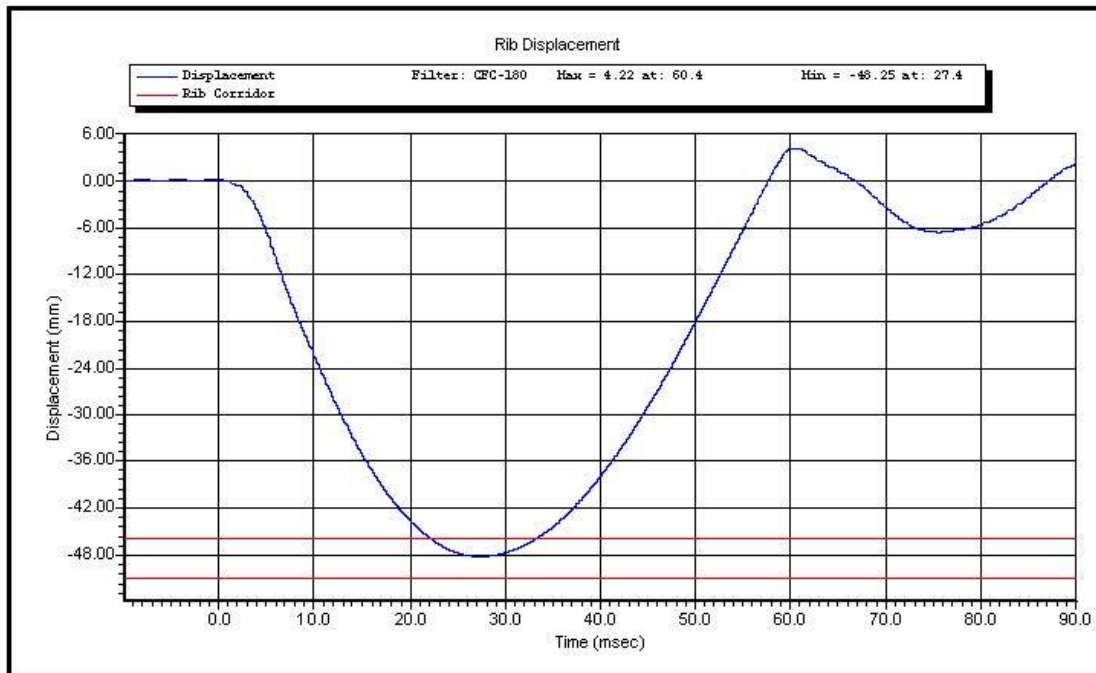


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Middle Rib 4 m/s	Test Date:	10/29/2011
Test Number:	1	Test Time:	3:20:35 PM



Test ID: **Middle Rib 4 m/s** Test Time: **3:20:35 PM**
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Test Date: **10/29/2011**

1 of 1



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VERIFICATION REPORT

Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Middle Rib 3 m/s	Test Date:	10/29/2011
Test Number:	1	Test Time:	3:27:51 PM

Component Part Number	Component Serial Number
455-3100	MIDDLE - 07205

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.6 deg C P
Humidity	10.0 -- 70.0	32.0 %RH P
Velocity	2.90 -- 3.10	2.98 m/s P
Rib Displacement	-40.00 -- -36.00	-37.46 mm P
Drop Height	454 -- 464	459 mm P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID: **Middle Rib 3 m/s**

Test Time: **3:27:51 PM**

Test Date: **10/29/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-184	8/31/2011
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7264-2000	P32222	10/14/2011

Test ID: **Middle Rib 3 m/s**

Test Time: **3:27:51 PM**

Test Date: **10/29/2011**

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2 of 2

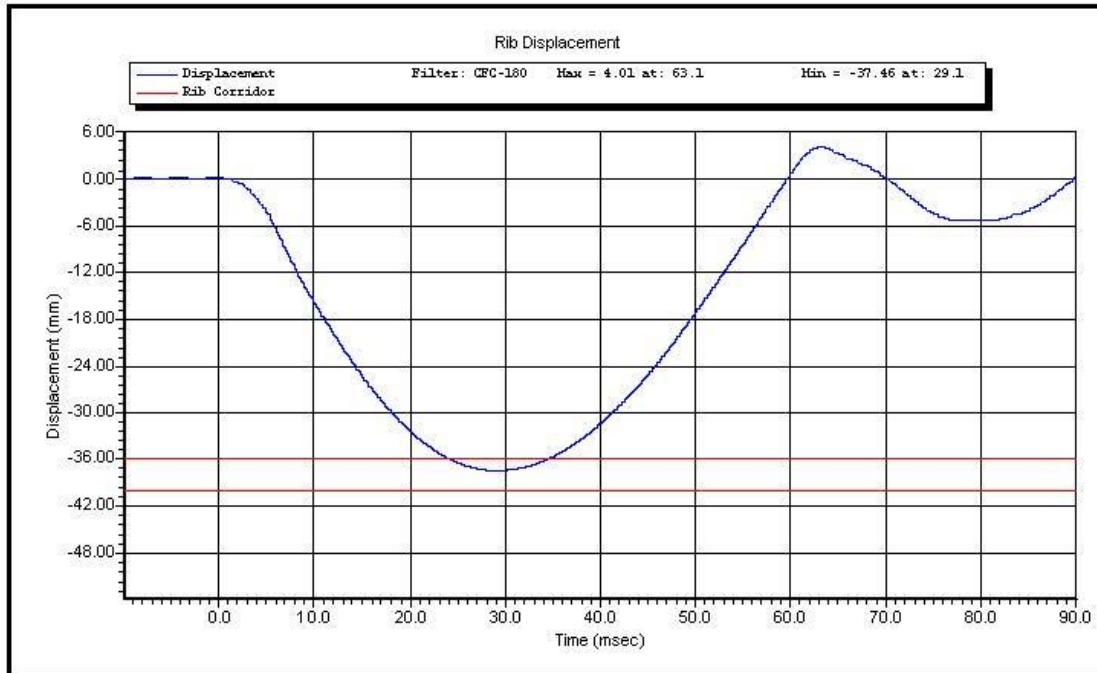


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Middle Rib 3 m/s	Test Date:	10/29/2011
Test Number:	1	Test Time:	3:27:51 PM



Test ID: **Middle Rib 3 m/s** Test Time: **3:27:51 PM**

Test Date: **10/29/2011**

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VERIFICATION REPORT

Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Lower Rib 4 m/s	Test Date:	10/29/2011
Test Number:	1	Test Time:	3:33:01 PM

Component Part Number	Component Serial Number
455-3100	LOWER - 07209

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.6 deg C P
Humidity	10.0 -- 70.0	32.0 %RH P
Velocity	3.90 -- 4.10	3.97 m/s P
Rib Displacement	-51.00 -- -46.00	-48.56 mm P
Drop Height	807.0 -- 823.0	815.0 mm P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID: **Lower Rib 4 m/s**

Test Time: **3:33:01 PM**

Test Date: **10/29/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-182	8/31/2011
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7264-2000	P32222	10/14/2011

Test ID: **Lower Rib 4 m/s**

Test Time: **3:33:01 PM**

Test Date: **10/29/2011**

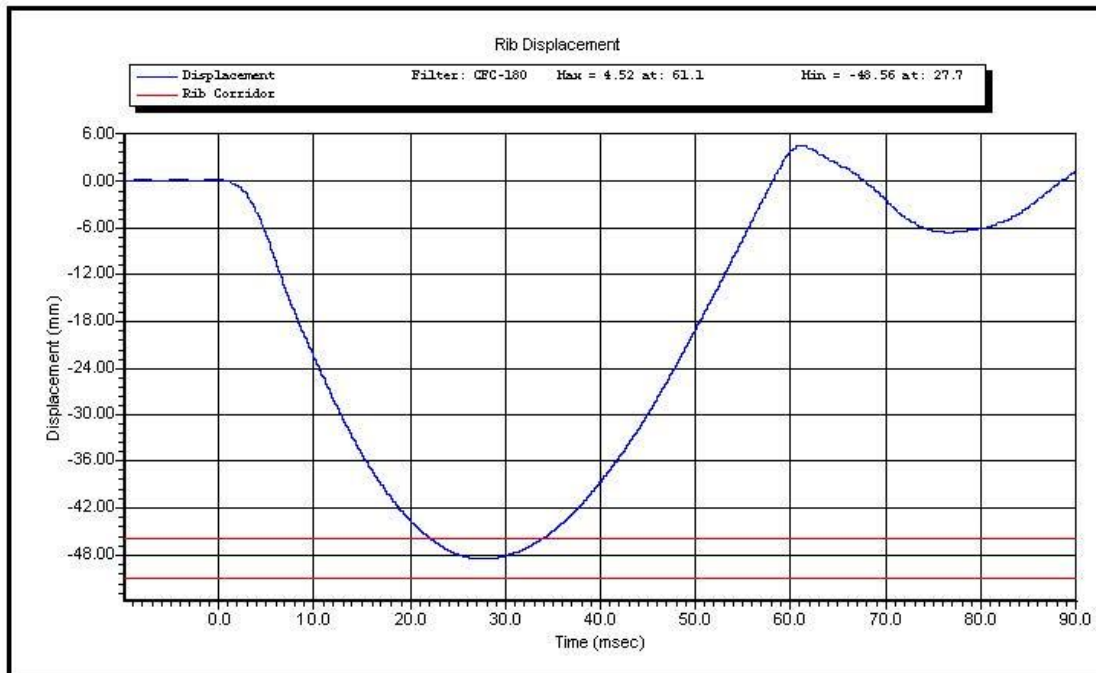


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Lower Rib 4 m/s	Test Date:	10/29/2011
Test Number:	1	Test Time:	3:33:01 PM



Test ID: Lower Rib 4 m/s Test Time: 3:33:01 PM
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Test Date: 10/29/2011

1 of 1



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VERIFICATION REPORT

Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Lower Rib 3 m/s	Test Date:	10/29/2011
Test Number:	1	Test Time:	3:40:14 PM

Component Part Number	Component Serial Number
455-3100	LOWER - 07209

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.6 deg C P
Humidity	10.0 -- 70.0	32.0 %RH P
Velocity	2.90 -- 3.10	2.97 m/s P
Rib Displacement	-40.00 -- -36.00	-37.75 mm P
Drop Height	454 -- 464	459 mm P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID: **Lower Rib 3 m/s**

Test Time: **3:40:14 PM**

Test Date: **10/29/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-182	8/31/2011
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7264-2000	P32222	10/14/2011

Test ID: **Lower Rib 3 m/s**

Test Time: **3:40:14 PM**

Test Date: **10/29/2011**

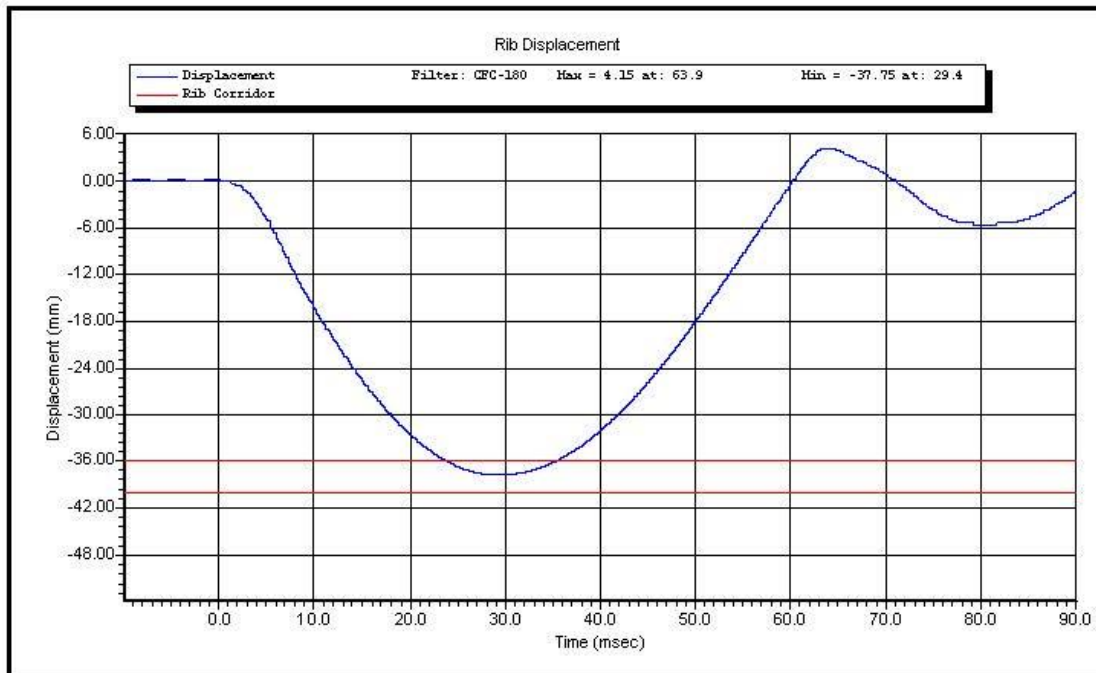


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Lower Rib 3 m/s	Test Date:	10/29/2011
Test Number:	1	Test Time:	3:40:14 PM



Test ID: Lower Rib 3 m/s Test Time: 3:40:14 PM
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Test Date: 10/29/2011

1 of 1



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VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	8/15/2008
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	10/31/2011
Test Number:	1	Test Time:	11:01:01 AM

Component Part Number	Component Serial Number
Upper Rib - 175-4002	UPPER - 07203
Middle Rib - 175-4002	MIDDLE - 07205
Lower Rib - 175-4002	LOWER - 07209

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.9 deg C P
Humidity	10.0 -- 70.0	28.0 %RH P
Velocity	5.40 -- 5.60	5.50 m/s P
Upper Rib Displacement	34.0 -- 41.0	36.8 mm P
Middle Rib Displacement	37.0 -- 45.0	41.5 mm P
Lower Rib Displacement	37.0 -- 44.0	41.1 mm P
Impactor Force	5100 -- 6200	5707 N P

All test parameters are within specifications

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

Test ID:

Test Time: **11:01:01 AM**

Test Date: **10/31/2011**



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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	P71273	10/24/2011
Honeywell	MLT 38000	DS-183	8/31/2011
Honeywell	MLT 38000	DS-184	8/31/2011
Honeywell	MLT 38000	DS-182	8/31/2011

Test ID:

Test Time: 11:01:01 AM

Test Date: 10/31/2011

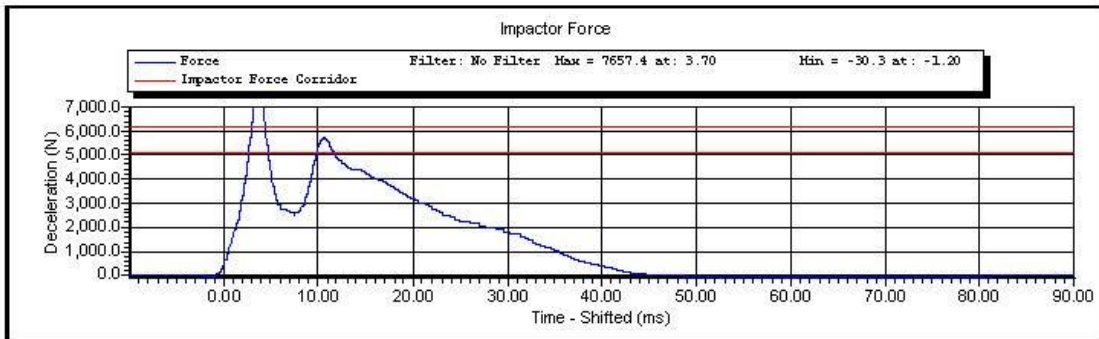
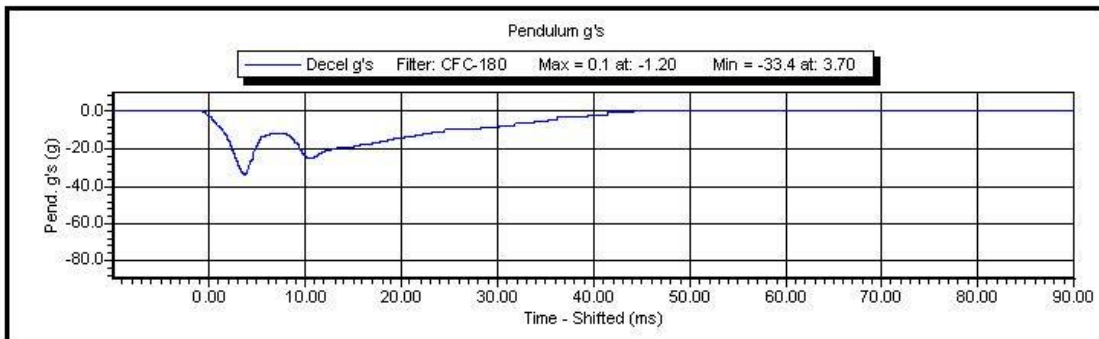


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Test Name:	Thorax Impact	Revision:	8/15/2008
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	10/31/2011
Test Number:	1	Test Time:	11:01:01 AM



Test ID:

Test Time: 11:01:01 AM

Test Date: 10/31/2011

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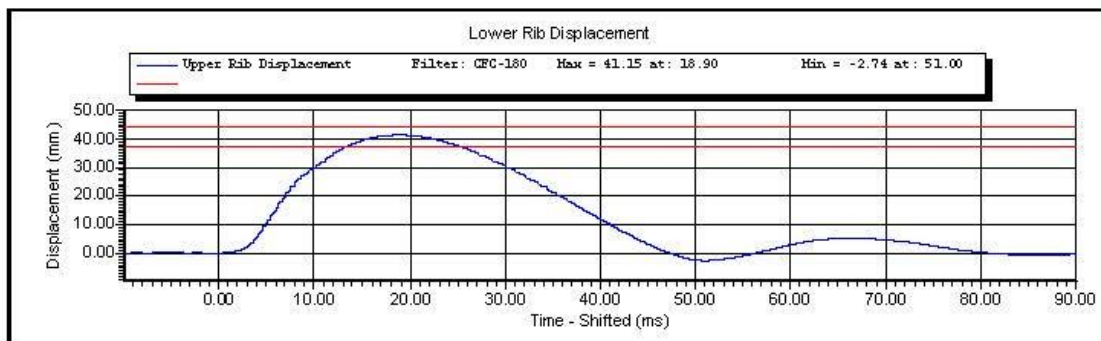
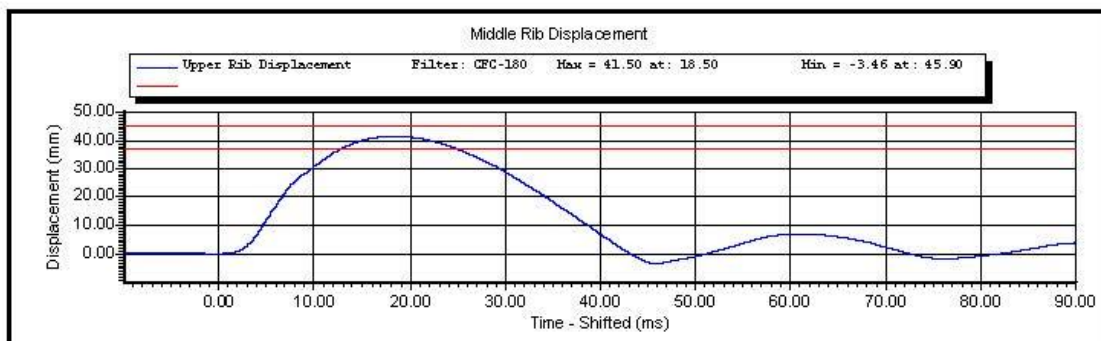
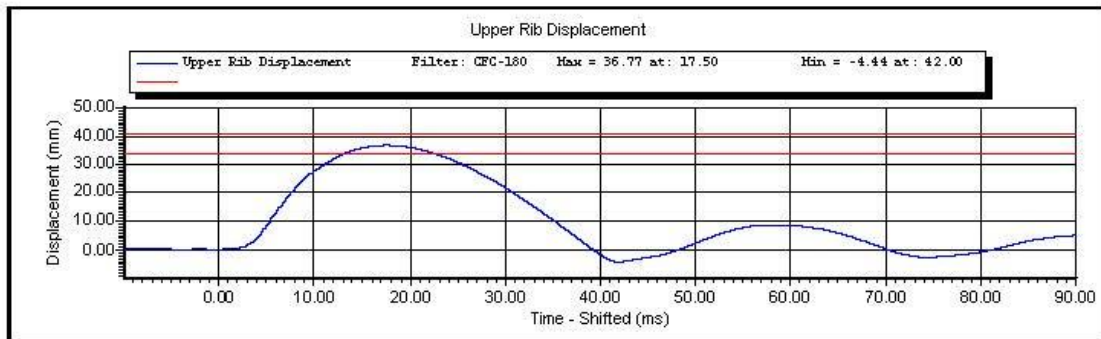
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Test ID:

Test Time: 11:01:01 AM

Test Date: 10/31/2011

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2 of 2



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VERIFICATION REPORT

Test Name:	Abdominal Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	10/29/2011
Test Number:	1	Test Time:	6:12:52 PM

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.8 deg C P
Humidity	10 -- 70	32 %RH P
Velocity	3.90 -- 4.10	4.02 m/s P
Peak Abdominal Force	-2.70 -- -2.20	-2.48 kN P
Time At Peak Abdominal Force	10.0 -- 12.3	10.6 ms P
Maximum Pendulum Force	-4.80 -- -4.00	-4.39 kN P
Time at Peak Pendulum Force	10.6 -- 13.0	11.0 ms P

All test parameters are within specifications

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

Test ID:

Test Time: **6:12:52 PM**

Test Date: **10/29/2011**



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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	P71273	10/24/2011
Denton	2631	LC-1512	3/25/2011
Denton	2631	LC-1526	3/25/2011
Denton	2631	LC-1516	3/25/2011

Test ID:

Test Time: 6:12:52 PM

Test Date: 10/29/2011

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2 of 2

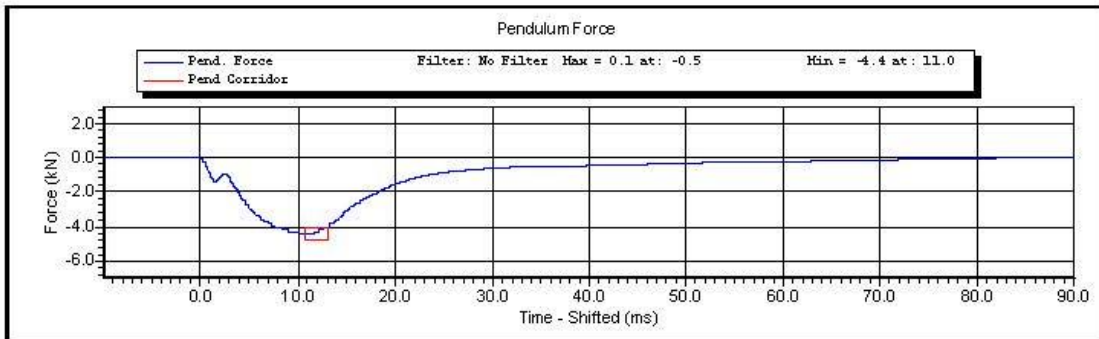
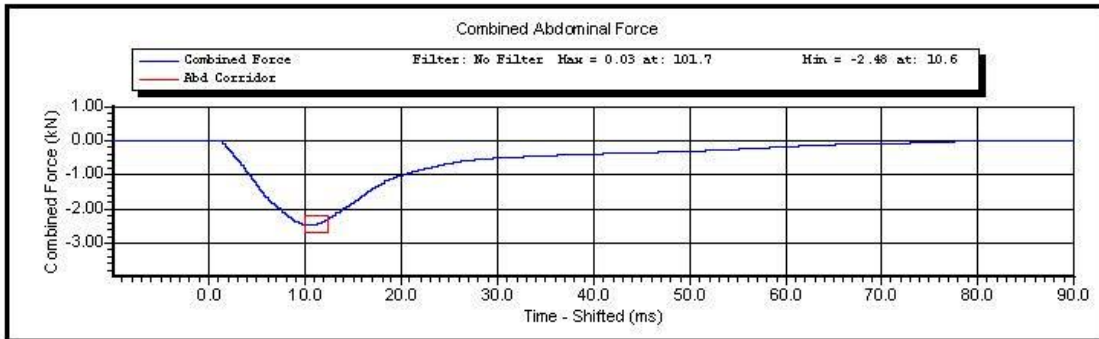


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Test Name:	Abdominal Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	10/29/2011
Test Number:	1	Test Time:	6:12:52 PM



Test ID:

Test Time: **6:12:52 PM**

Test Date: **10/29/2011**

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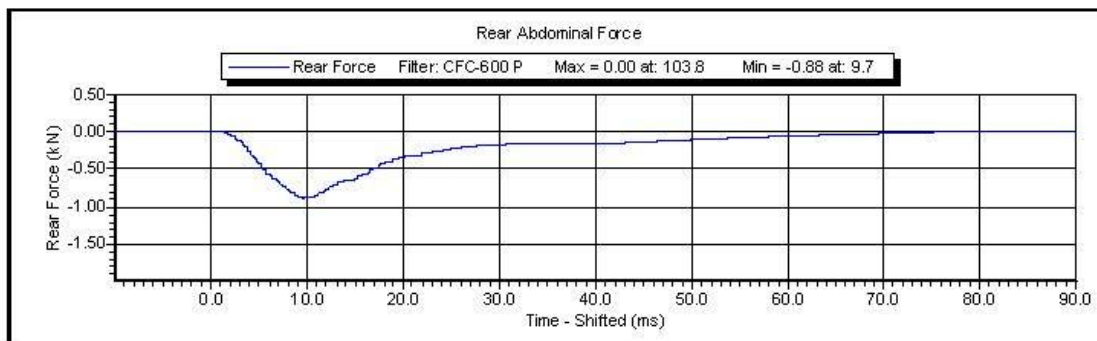
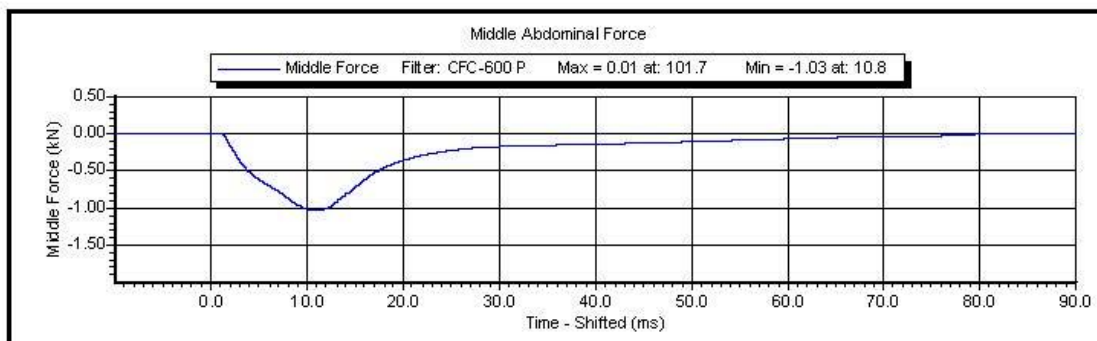
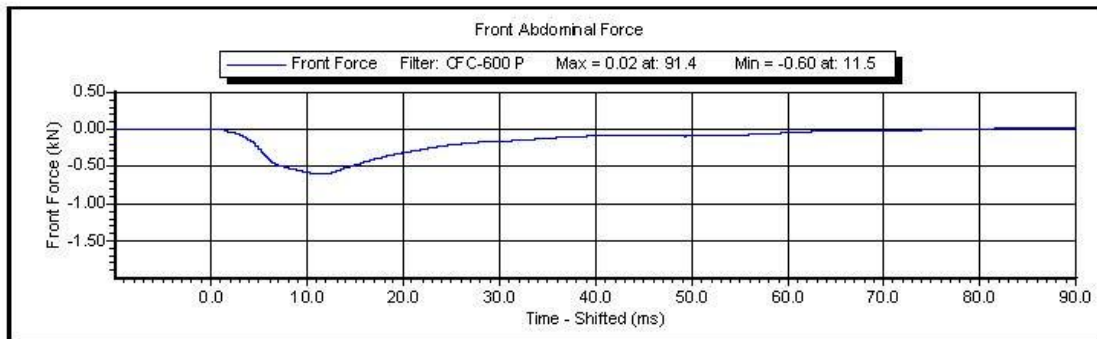
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Test ID:

Test Time: 6:12:52 PM

Test Date: 10/29/2011

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2 of 2



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VERIFICATION REPORT

Test Name:	Lumbar Spine	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	10/29/2011
Test Number:	3	Test Time:	3:53:21 PM

Component Part Number	Component Serial Number
175-5501 Lumbar Spine	15050329A

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.9 deg C P
Humidity	10 -- 70	32 %RH P
Velocity	5.95 -- 6.15	6.15 m/s P
Maximum Headform Flexion Angle	45.0 -- 55.0	48.4 degrees P
Time at Maximum Headform Flexion Angle	39.0 -- 53.0	44.1 ms P
Decay to Zero Degrees	37.0 -- 57.0	38.5 ms P
Velocity Corridor	--	P

All test parameters are within specifications

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

Test ID:

Test Time: **3:53:21 PM**

Test Date: **10/29/2011**



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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	7000428	094	4/25/2011
DentonATD	7000428	095	4/25/2011
DentonATD	7000428	093	4/25/2011

Test ID:

Test Time: 3:53:21 PM

Test Date: 10/29/2011

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2 of 2

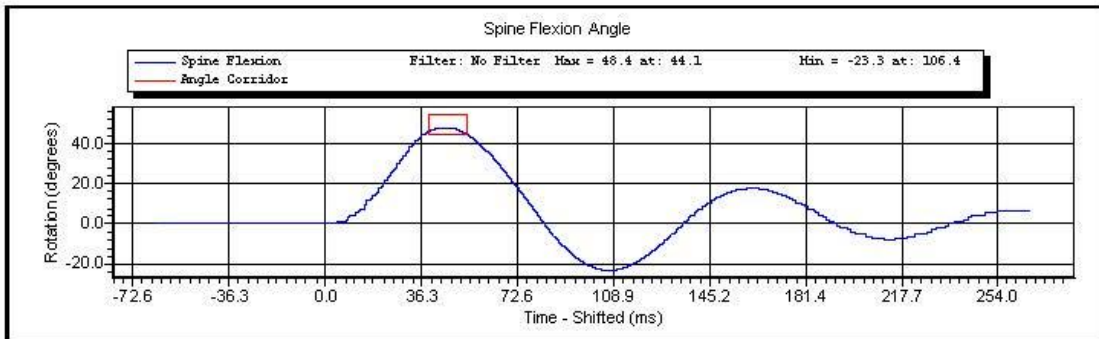
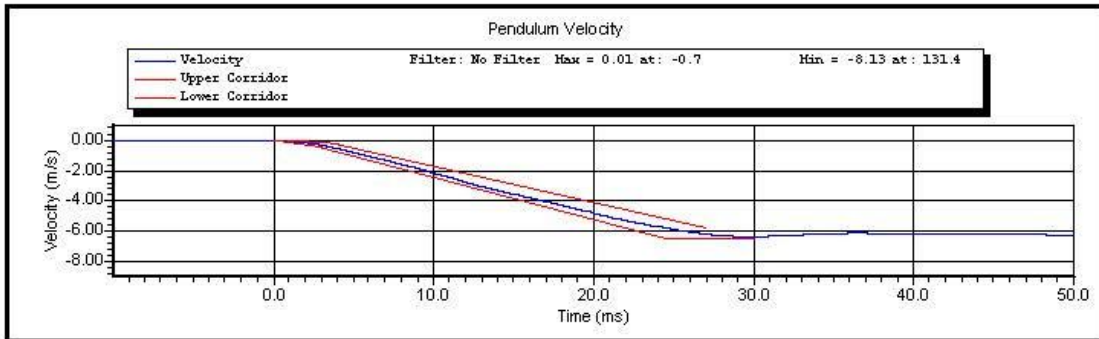


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Test Name:	Lumbar Spine	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	10/29/2011
Test Number:	3	Test Time:	3:53:21 PM



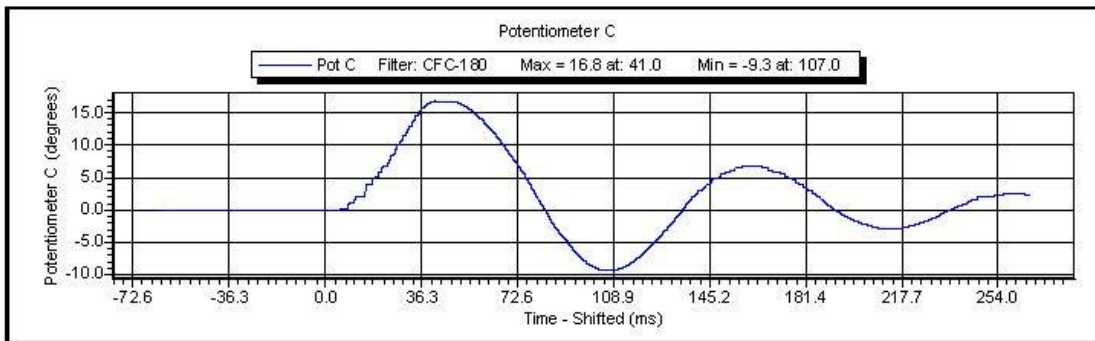
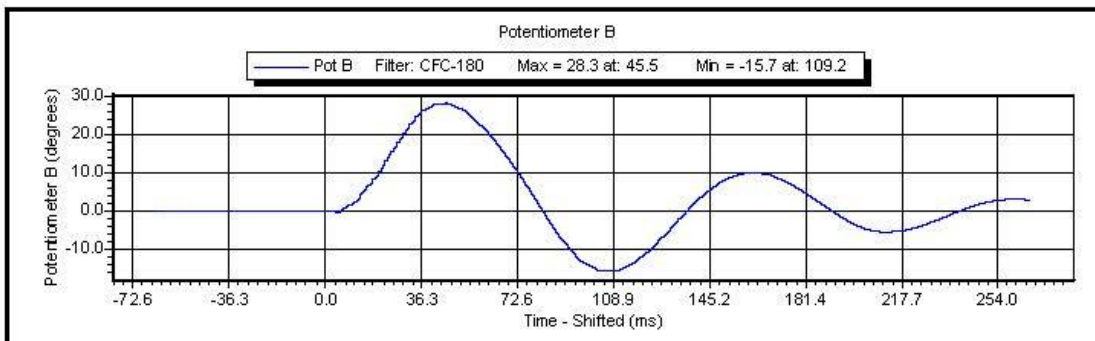
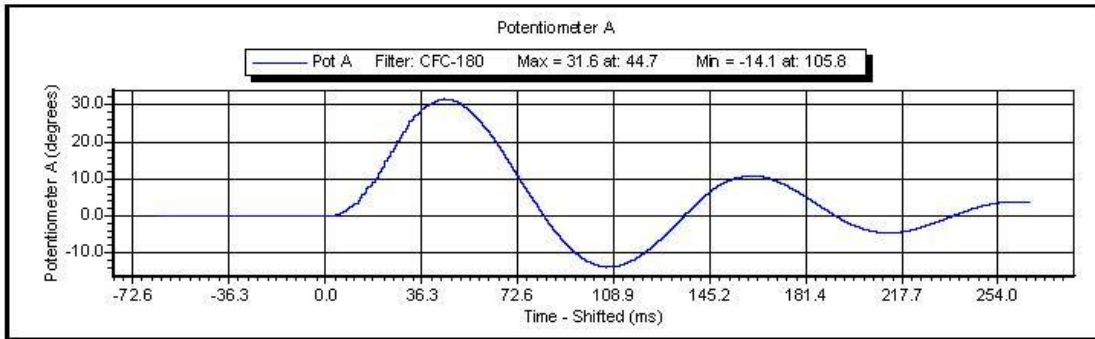
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Test Date: **10/29/2011**

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1 of 2



Test ID:

Test Time: 3:53:21 PM

Test Date: 10/29/2011

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VERIFICATION REPORT

Test Name:	Pelvis Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	10/29/2011
Test Number:	1	Test Time:	5:26:06 PM

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.9 deg C P
Humidity	10 -- 70	31 %RH P
Velocity	4.20 -- 4.40	4.32 m/s P
Peak Pendulum Force	-5.40 -- -4.70	-4.91 kN P
Time at Peak Pendulum Force	11.80 -- 16.10	13.61 ms P
Peak Pubic Symphysis Force	-1.59 -- -1.23	-1.38 kN P
Time at Peak Pubic Symphysis Force	12.20 -- 17.00	14.41 ms P

All test parameters are within specifications

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

Test ID:

Test Time: **5:26:06 PM**

Test Date: **10/29/2011**



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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	P71273	10/24/2011
Denton	3096	LC-465Fy	8/31/2011

Test ID:

Test Time: 5:26:06 PM

Test Date: 10/29/2011

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2 of 2

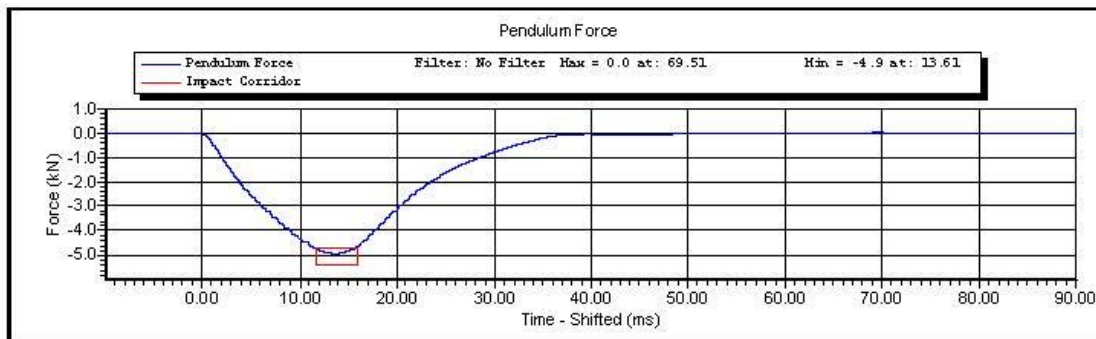
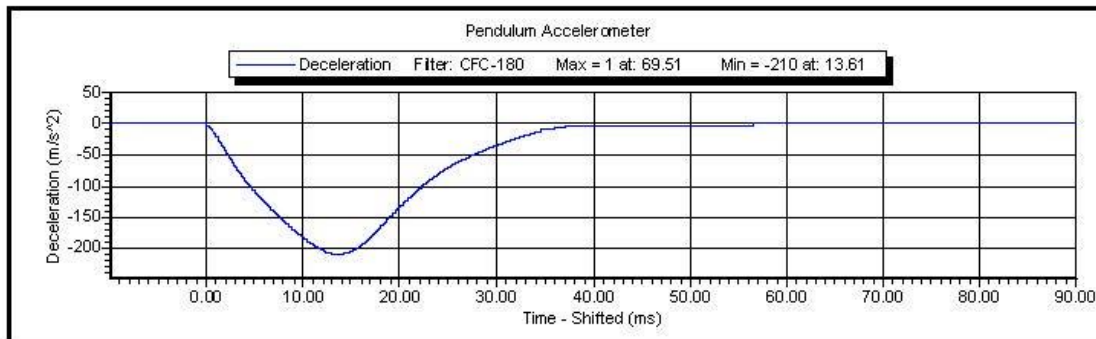


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Test Name:	Pelvis Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	10/29/2011
Test Number:	1	Test Time:	5:26:06 PM



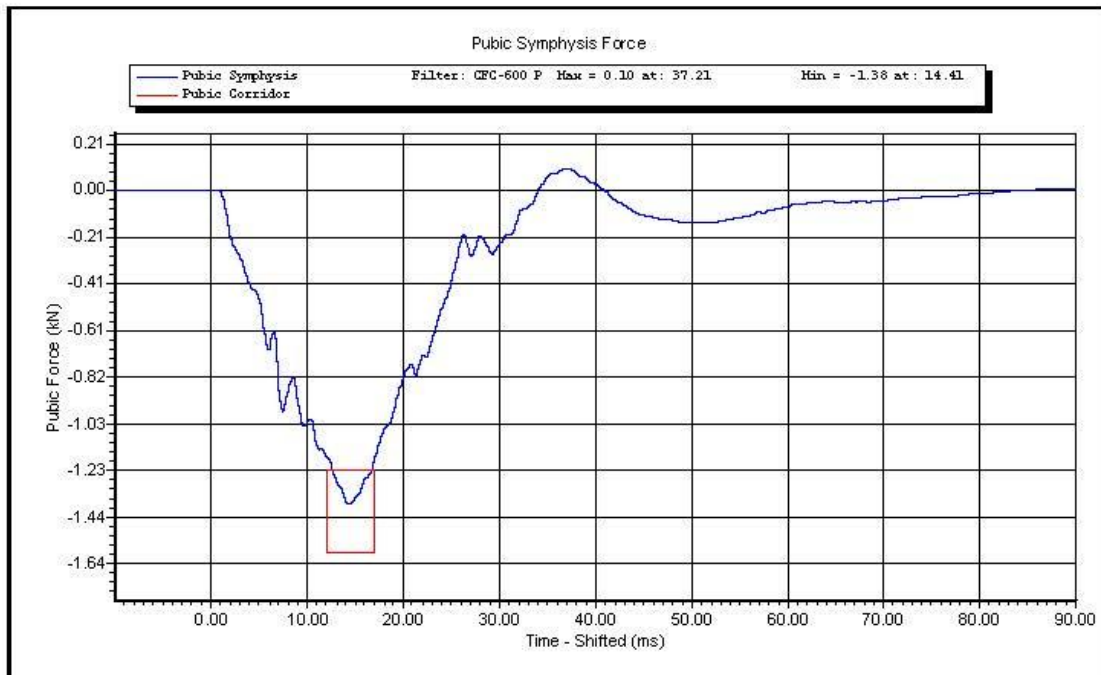
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Test Time: **5:26:06 PM**

Test Date: **10/29/2011**

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1 of 2



Test ID:

Test Time: 5:26:06 PM

Test Date: 10/29/2011

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2 of 2

CALIBRATION TEST RESULTS

PRE-TEST

SID-IIs No: 8012

CONFIGURED FOR LEFT SIDE IMPACT



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SID-IIsD External Measurements

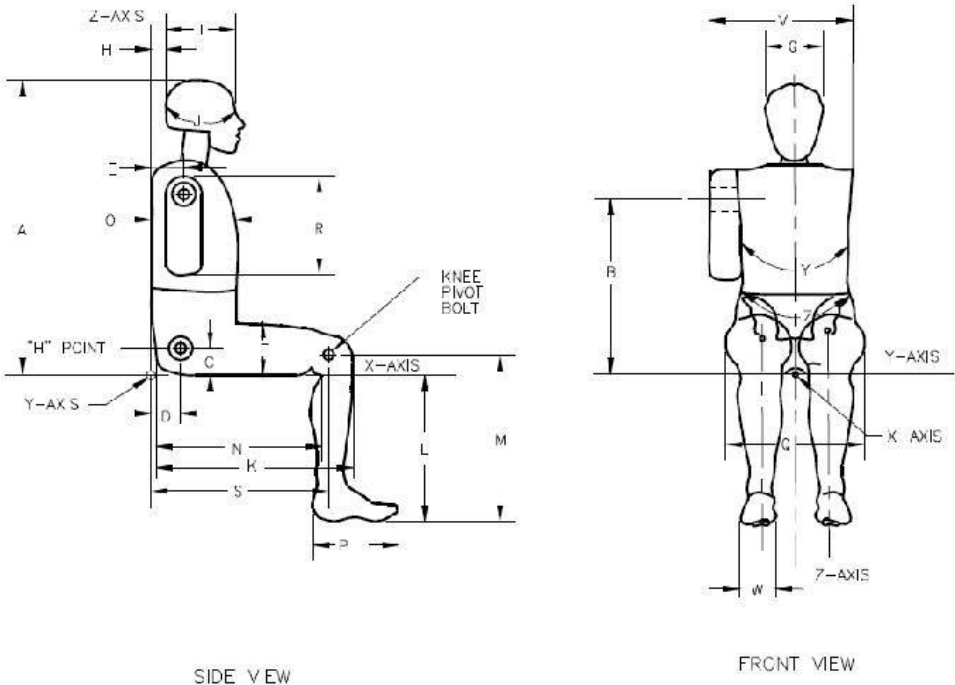
NHTSA ATD S/N DG8012

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	783	Yes
B	Shoulder Pivot Height	437.0 - 453.0	444	Yes
C	H-Point Height	79.0 - 89.0	85	Yes
D	H-Point from Seat Back	141.0 - 151.0	148	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	99	Yes
F	Thigh Clearance	119.0 - 135.0	132	Yes
G	Head Breadth	140.0 - 148.0	145	Yes
H	Head Back from Backline	40.0 - 46.0	43	Yes
I	Head Depth	178.0 - 188.0	187	Yes
J	Head Circumference	541.0 - 551.0	548	Yes
K	Buttock to Knee Length	514.0 - 540.0	530	Yes
L	Popliteal Height	343.0 - 369.0	359	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	402	Yes
N	Buttock Popliteal Length	416.0 - 442.0	434	Yes
O	Chest Depth without Jacket	195.0 - 211.0	204	Yes
P	Foot Length (right)	216.0 - 232.0	223	Yes
Q	Hip Breadth	313.0 - 323.0	315	Yes
R	Arm Length	249.0 - 259.0	257	Yes
S	Knee Joint to Seat back	478.0 - 493.0	490	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	351	Yes
W	Foot Width (right)	78.0 - 94.0	84	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	871	Yes
Z	Waist Circumference	761.0 - 791.0	782	Yes

Technician : AR

Date: 11/3/2011

SID-IIIsD External Dimension Reference Diagram





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VERIFICATION REPORT

Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/3/2011
Test Number:	1	Test Time:	4:49:33 PM

Component Part Number	Component Serial Number
Head Skin - 180-1002	1362

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.0 deg C P
Humidity	10 -- 70	38 %RH P
Resultant Acceleration	115.0 -- 137.0	122.2 g P
Oscillation	0.0 -- 15.0	5.5 % P
Fore-Aft Acceleration	-15.0 -- 15.0	4.3 g P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID:

Test Time: **4:49:33 PM**

Test Date: **11/3/2011**



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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	P49185	11/3/2011
Endevco	7264-2000	P58839	10/17/2011
Endevco	7264-2000	P51991	10/17/2011

Test ID:

Test Time: 4:49:33 PM

Test Date: 11/3/2011

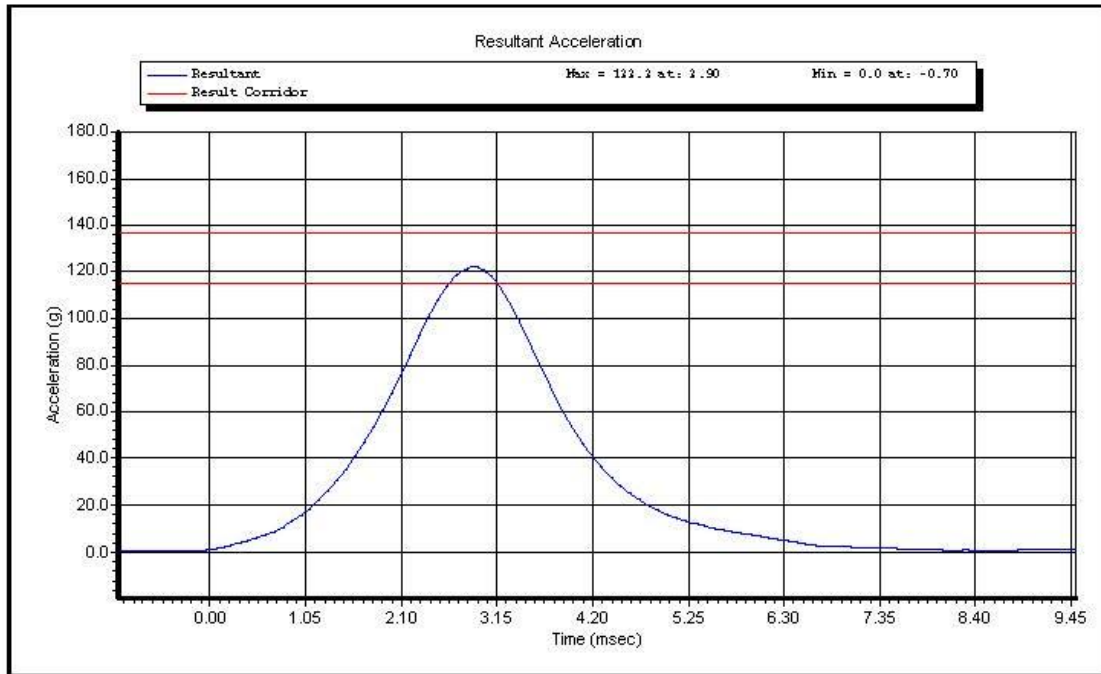


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Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/3/2011
Test Number:	1	Test Time:	4:49:33 PM



Test ID:

Test Time: 4:49:33 PM

Test Date: 11/3/2011

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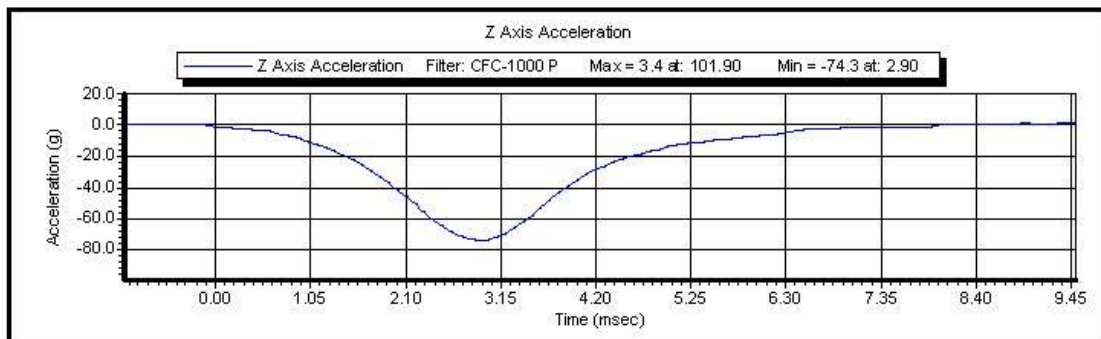
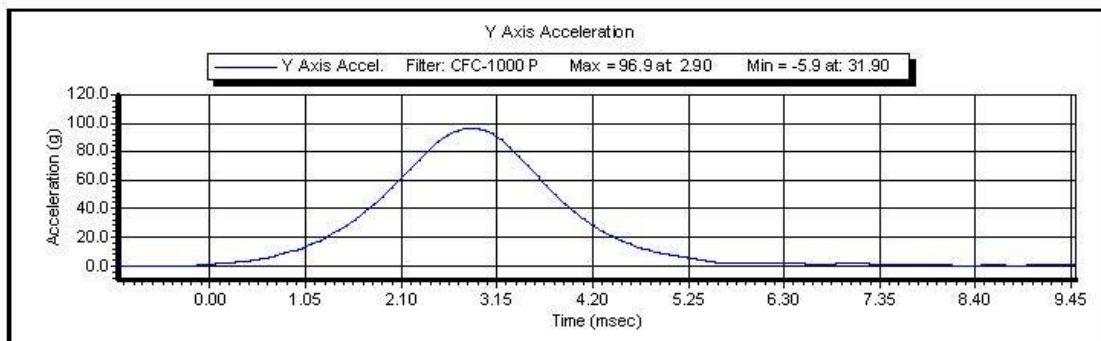
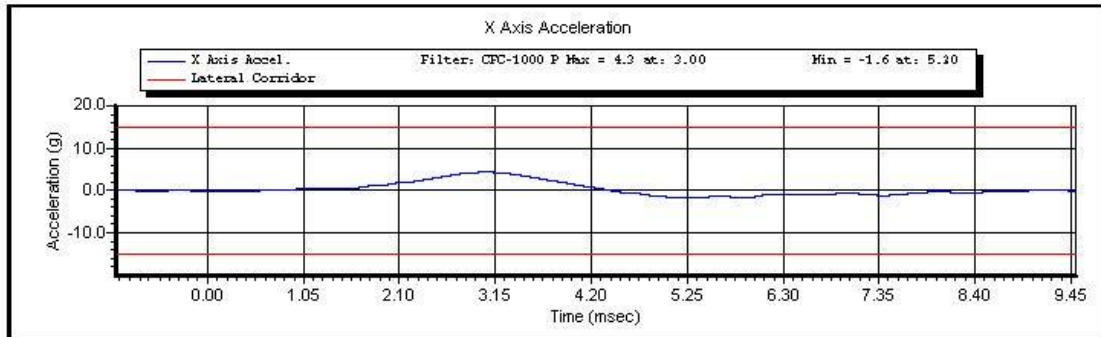
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Test ID:

Test Time: 4:49:33 PM

Test Date: 11/3/2011

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VERIFICATION REPORT

Test Name:	Neck Pendulum	Revision:	8/24/2009
Sub Test Name:	Left Side	Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/4/2011
Test Number:	2	Test Time:	8:14:49 AM

Component Part Number	Component Serial Number
Neck - 180-2000	DG7061

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.0 deg C P
Humidity	10 -- 70	30 %RH P
Velocity	5.51 -- 5.63	5.55 m/s P
Pendulum Impulse at 10 ms	2.20 -- 2.80	2.33 m/s P
Pendulum Impulse at 15 ms	3.30 -- 4.10	3.38 m/s P
Pendulum Impulse at 20 ms	4.40 -- 5.40	4.55 m/s P
Pendulum Impulse at 25 ms	5.40 -- 6.10	5.43 m/s P
Pendulum Impulse between 25 and 100 ms	5.50 -- 6.20	5.77 m/s P
Max D Plane Rotation	71.0 -- 81.0	74.3 degrees P
Time at Max Rotation	50.0 -- 70.0	63.1 ms P
Moment about OC	-44.0 -- -36.0	-37.2 Nm P
Moment Decay to Zero	102.0 -- 126.0	116.5 ms P

All test parameters are within specifications

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

Test ID:

Test Time: **8:14:49 AM**

Test Date: **11/4/2011**



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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
Denton	1716A	LC-2192Fy	8/31/2011
Denton	1716A	LC-2192Mx	8/31/2011
DentonATD	78051-342	184	5/8/2011
DentonATD	78051-342	174	5/8/2011
DentonATD	78051-342	185	5/8/2011

Test ID:

Test Time: 8:14:49 AM

Test Date: 11/4/2011

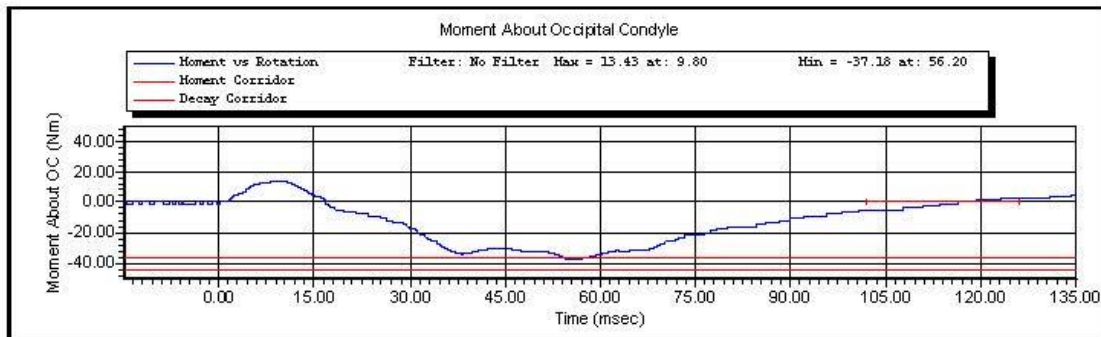
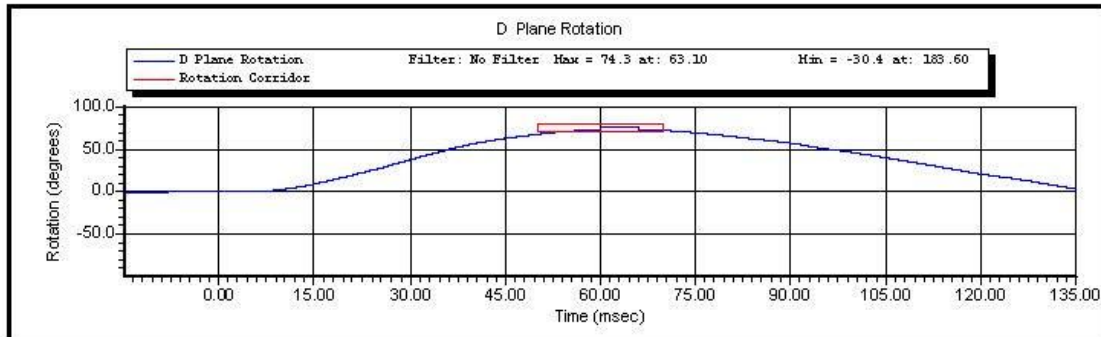


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Test Name:	Neck Pendulum	Revision:	8/24/2009
Sub Test Name:	Left Side	Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/4/2011
Test Number:	2	Test Time:	8:14:49 AM



Test ID:

Test Time: 8:14:49 AM

Test Date: 11/4/2011

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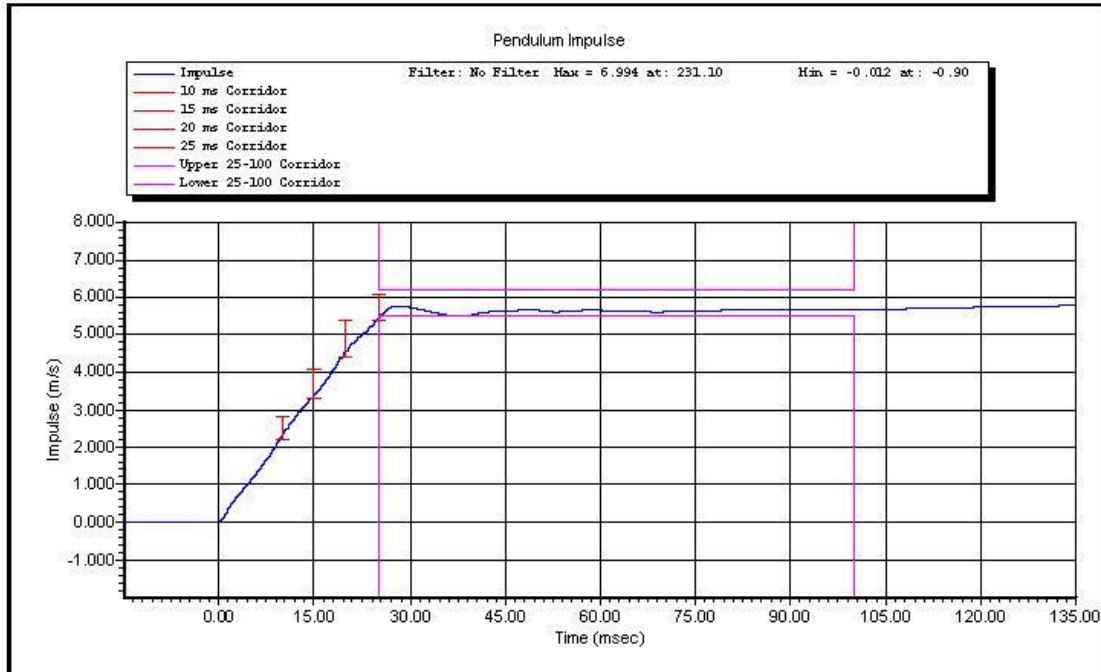
1 of 2



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Test ID:

Test Time: **8:14:49 AM**

Test Date: **11/4/2011**

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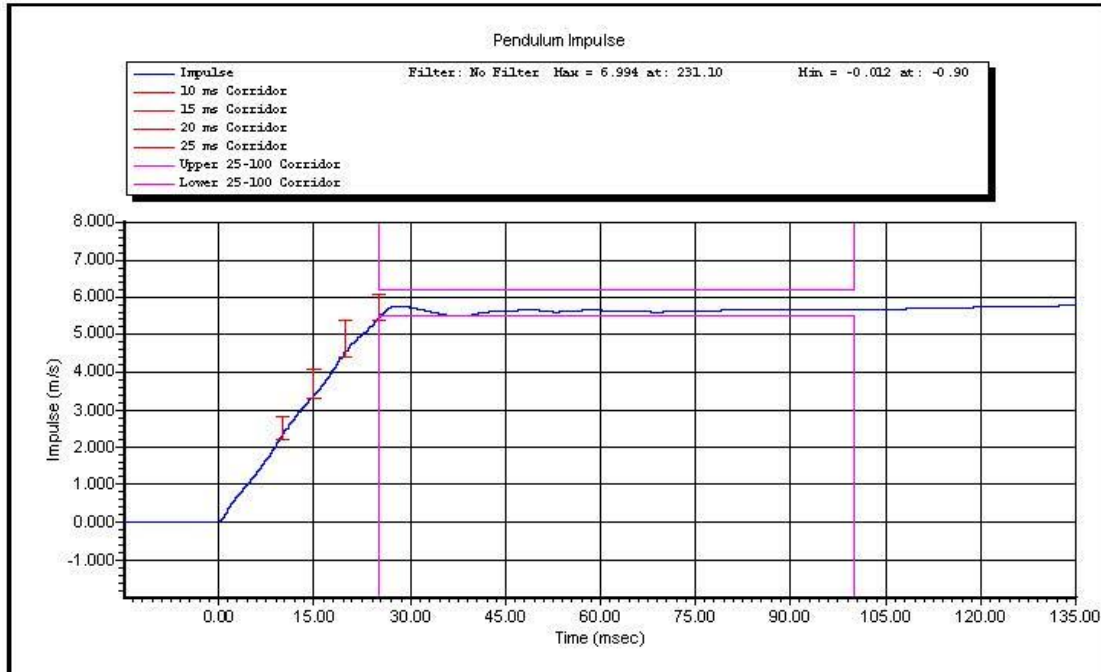
2 of 2



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Test ID:

Test Time: **8:14:49 AM**

Test Date: **11/4/2011**

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2 of 2



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VERIFICATION REPORT

Test Name:	Shoulder Impact	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/4/2011
Test Number:	1	Test Time:	11:32:41 AM

Component Part Number	Component Serial Number
Left Arm 180-6011-1	DG3210
Shoulder Rib 180-3355	DG6997

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.90 deg C P
Humidity	10.0 -- 70.0	30.0 %RH P
Velocity	4.20 -- 4.40	4.33 m/s P
Probe Acceleration	13.0 -- 18.0	14.9 g P
Shoulder Deflection	28.0 -- 37.0	29.6 mm P
T1 Acceleration	17.0 -- 22.0	19.3 g P

All test parameters are within specifications

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

Test ID:

Test Time: **11:32:41 AM**

Test Date: **11/4/2011**



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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
FTSS	180-3881-1	DS-1845	9/1/2011
Endevco	7264-2000	P63561	10/3/2011

Test ID:

Test Time: 11:32:41 AM

Test Date: 11/4/2011

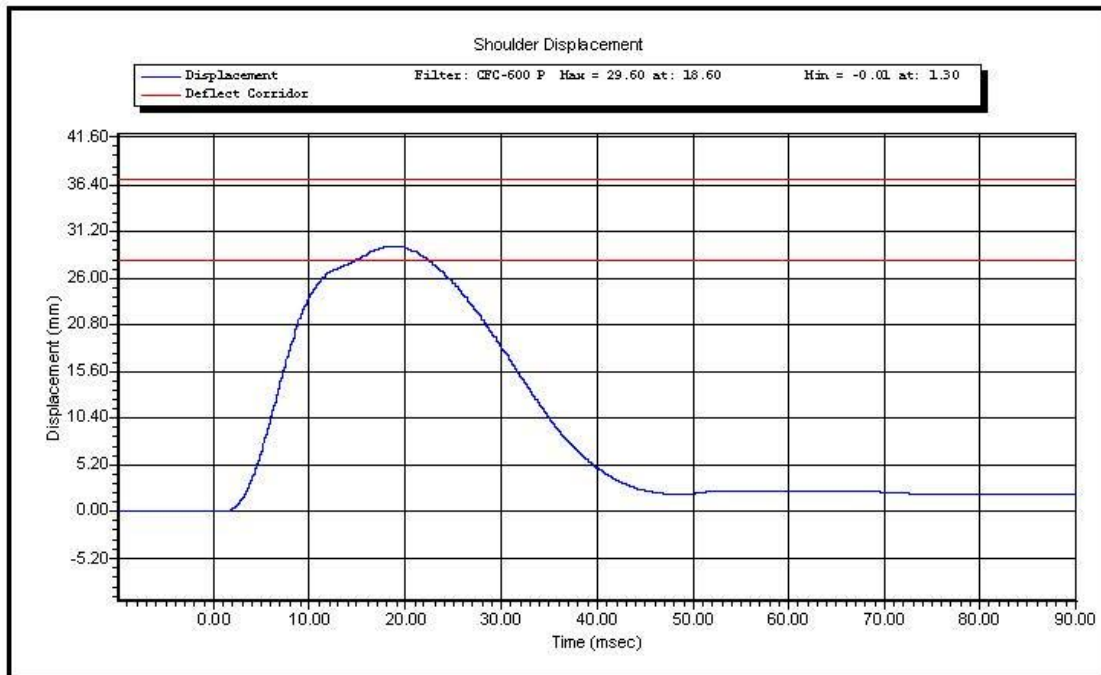


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Test Name:	Shoulder Impact	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/4/2011
Test Number:	1	Test Time:	11:32:41 AM



Test ID:

Test Time: 11:32:41 AM

Test Date: 11/4/2011

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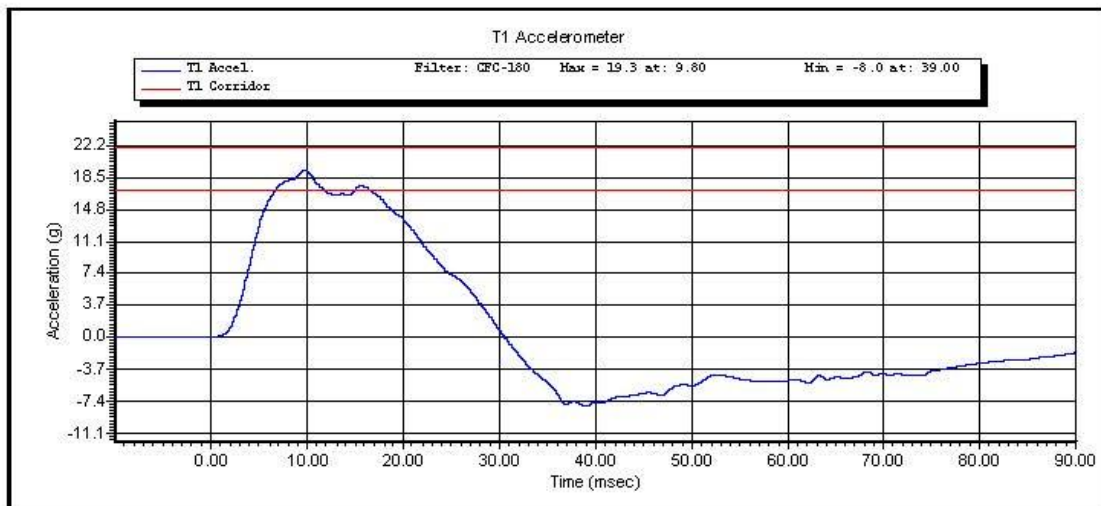
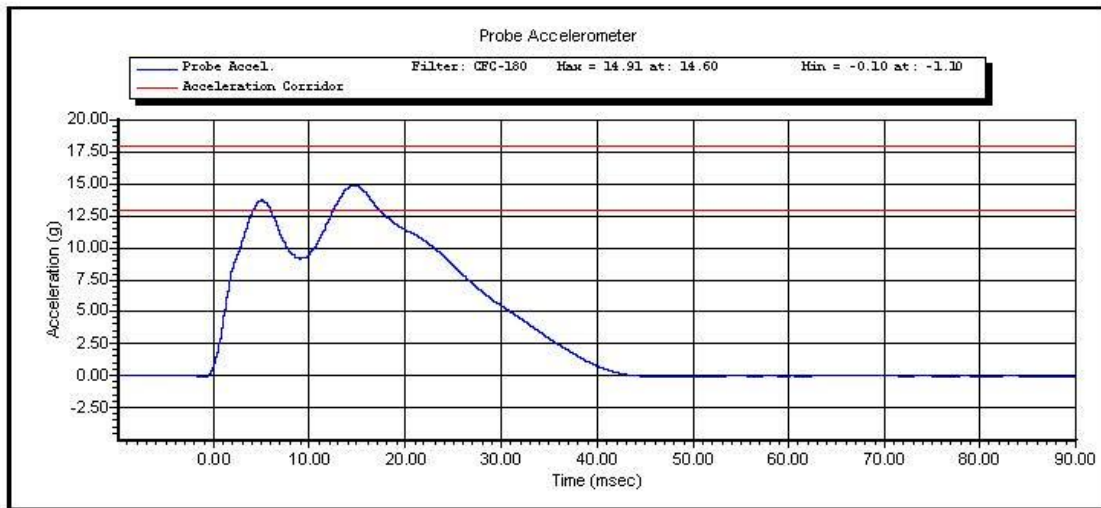
1 of 2



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Test ID:

Test Time: 11:32:41 AM

Test Date: 11/4/2011

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VERIFICATION REPORT

Test Name:	Thorax Impact with Arm	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/4/2011
Test Number:	2	Test Time:	2:39:08 PM

Component Part Number	Component Serial Number
Thorax Ribs 1, 2, 3 180-3362	DG6080, DG6081, DG7543
Shoulder Rib 180-3355	DG6997
Left Arm 180-6011-1	DG3210

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.1 deg C P
Humidity	10 -- 70	30 %RH P
Velocity	6.60 -- 6.80	6.70 m/s P
Probe Acceleration after 5ms	30.0 -- 36.0	34.7 g P
Upper Thorax Rib Deflection	25.0 -- 32.0	28.8 mm P
Mid Thorax Rib Deflection	30.0 -- 36.0	33.1 mm P
Lower Thorax Rib Deflection	32.0 -- 38.0	35.5 mm P
Upper Spine Acceleration ("y")	34.0 -- 43.0	40.5 g P
Lower Spine Acceleration ("y")	29.0 -- 37.0	35.9 g P
Shoulder Deflection	31.0 -- 40.0	36.6 mm P

All test parameters are within specifications

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

Test ID:

Test Time: **2:39:08 PM**

Test Date: **11/4/2011**



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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
FTSS	180-3881-1	DS-1849	9/1/2011
FTSS	180-3881-1	DS-1857	9/1/2011
FTSS	180-3881-1	DS-1859	9/1/2011
Endevco	7264-2000	P63561	10/3/2011
Endevco	7264-2000	P58796	10/5/2011
FTSS	180-3881-1	DS-1845	9/1/2011

Test ID:

Test Time: 2:39:08 PM

Test Date: 11/4/2011

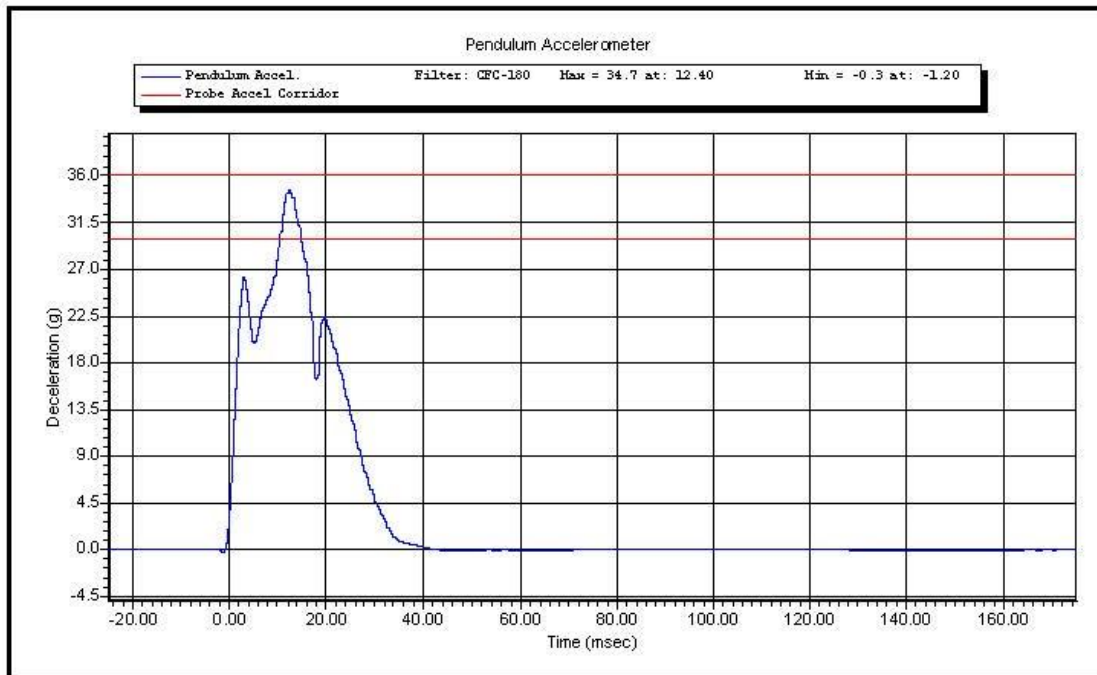


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Test Name:	Thorax Impact with Arm	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/4/2011
Test Number:	2	Test Time:	2:39:08 PM



Test ID:

Test Time: 2:39:08 PM

Test Date: 11/4/2011

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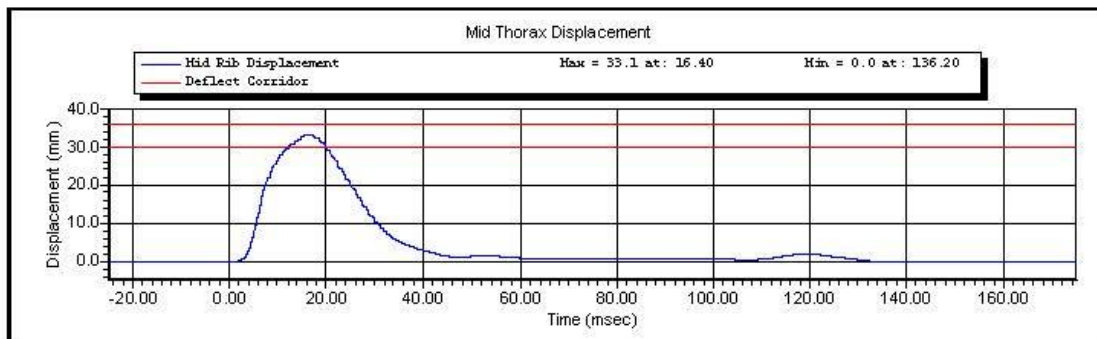
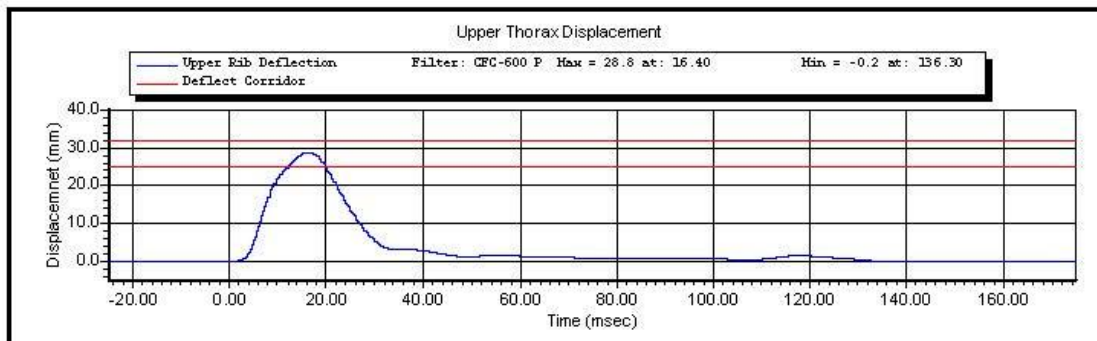
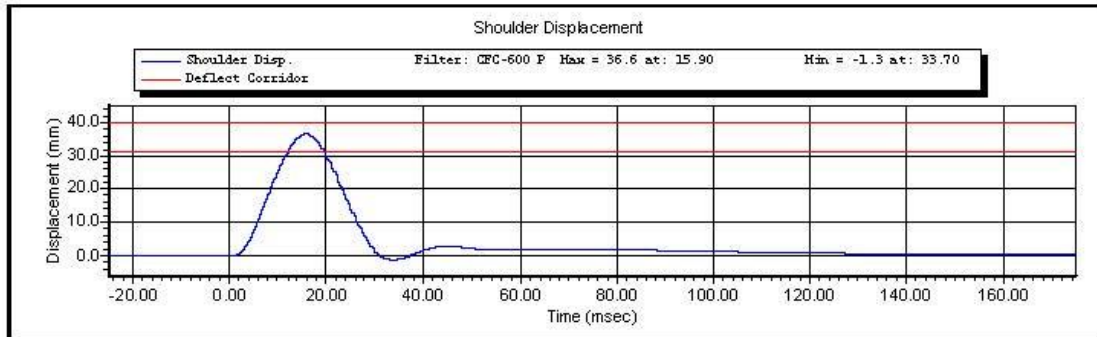
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Test ID:

Test Time: 2:39:08 PM

Test Date: 11/4/2011

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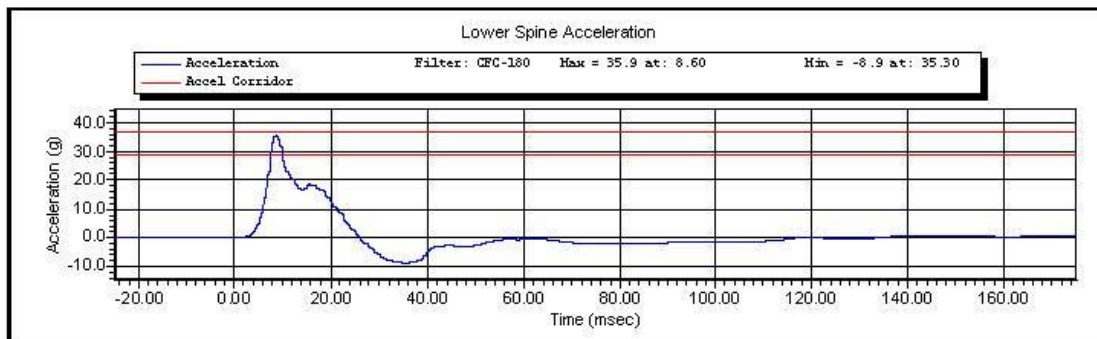
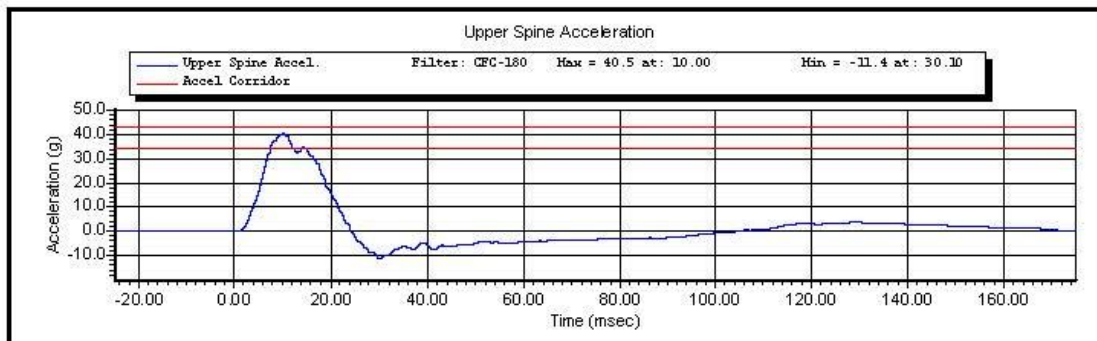
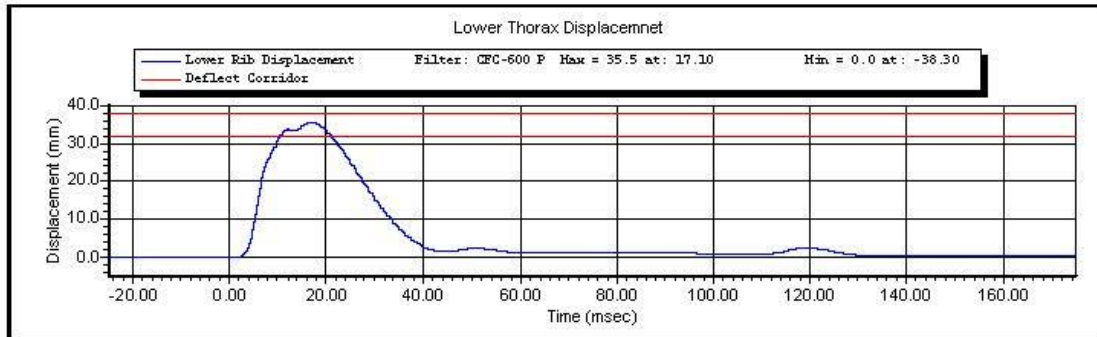
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Test ID:

Test Time: 2:39:08 PM

Test Date: 11/4/2011

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3 of 3



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VERIFICATION REPORT

Test Name:	Thorax Impact without Arm	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/4/2011
Test Number:	1	Test Time:	12:06:29 PM

Component Part Number	Component Serial Number
Left Arm 180-6011-1	DG3210
Shoulder Rib 180-3355	DG6997

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.0 deg C P
Humidity	10 -- 70	29 %RH P
Velocity	4.20 -- 4.40	4.33 m/s P
Probe Acceleration	14.0 -- 18.0	16.7 g P
Upper Thorax Rib Deflection	32.0 -- 40.0	37.3 mm P
Mid Thorax Rib Deflection	39.0 -- 45.0	42.6 mm P
Lower Thorax Rib Deflection	35.0 -- 43.0	39.9 mm P
Upper Spine Acceleration T1	13.0 -- 17.0	15.4 g P
Lower Spine Acceleration T12	7.0 -- 11.0	10.1 g P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID:

Test Time: **12:06:29 PM**

Test Date: **11/4/2011**



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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
FTSS	180-3881-1	DS-1849	9/1/2011
FTSS	180-3881-1	DS-1857	9/1/2011
FTSS	180-3881-1	DS-1859	9/1/2011
Endevco	7264-2000	P63561	10/3/2011
Endevco	7264-2000	P58796	10/5/2011

Test ID:

Test Time: 12:06:29 PM

Test Date: 11/4/2011

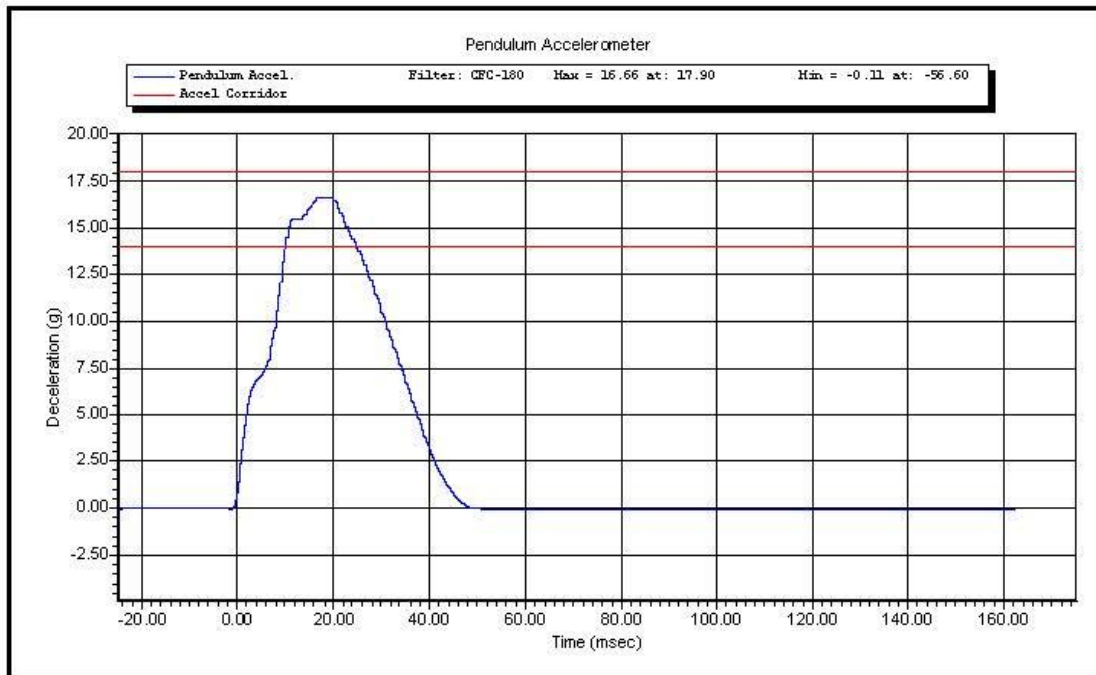


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Test Name:	Thorax Impact without Arm	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/4/2011
Test Number:	1	Test Time:	12:06:29 PM



Test ID:

Test Time: 12:06:29 PM

Test Date: 11/4/2011

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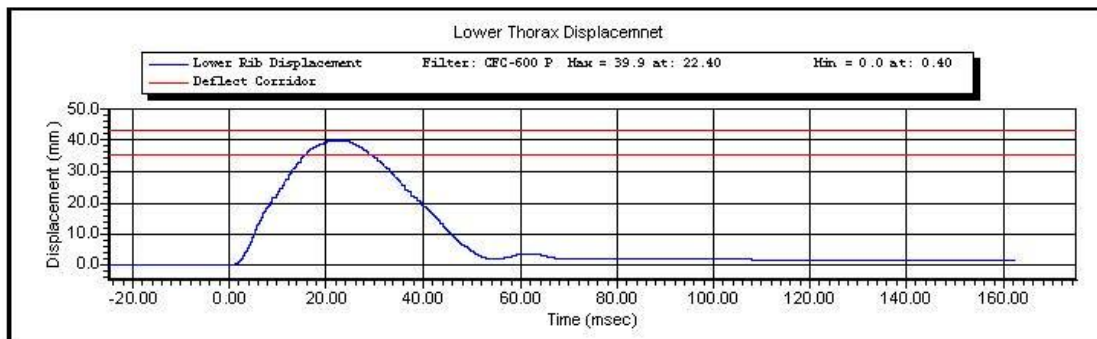
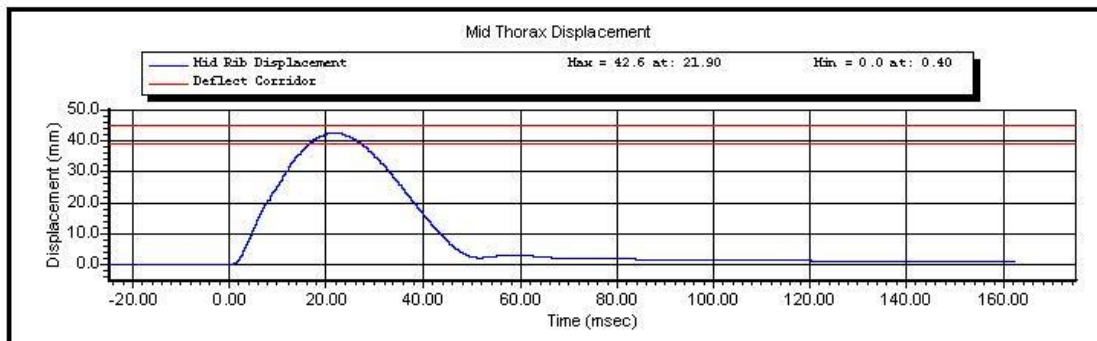
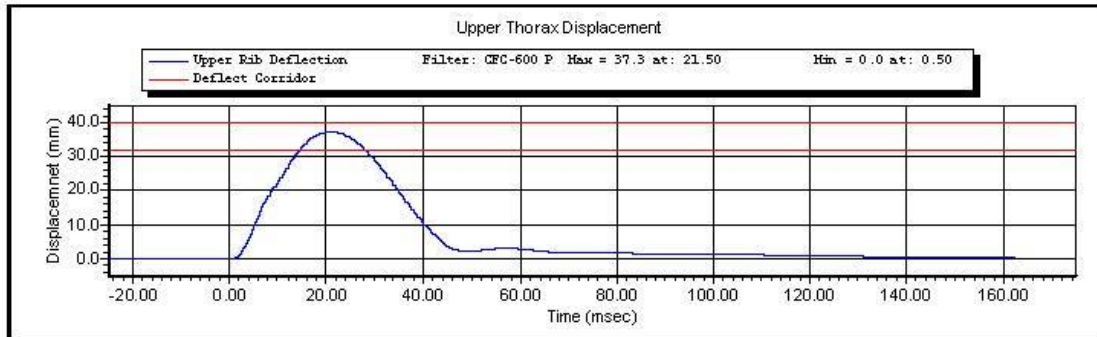
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Test ID:

Test Time: 12:06:29 PM

Test Date: 11/4/2011

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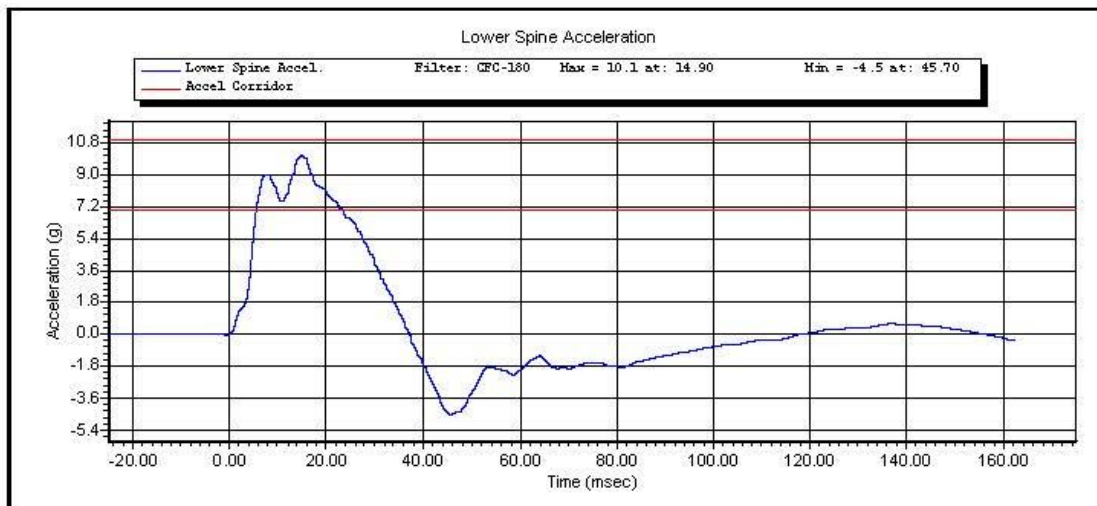
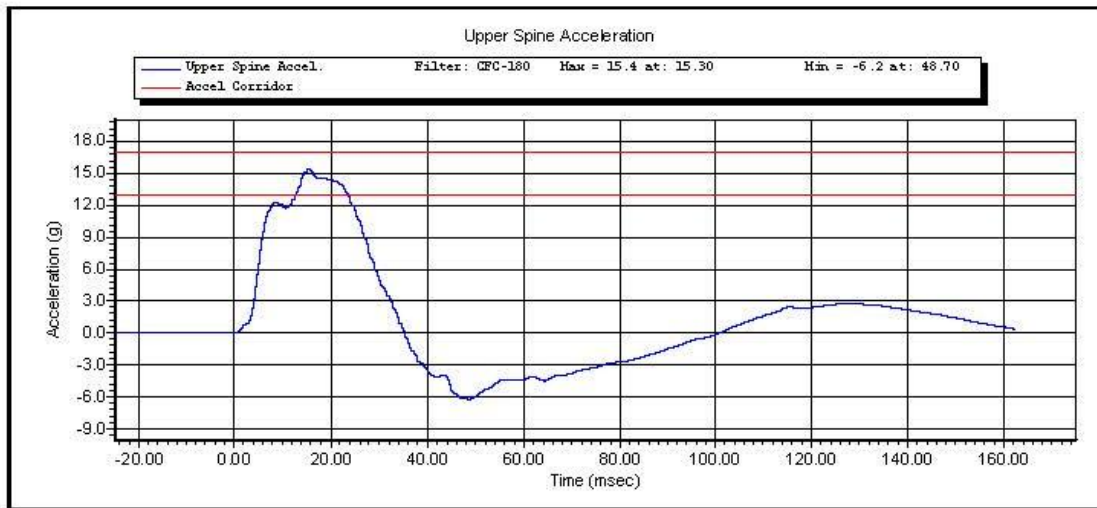
2 of 3



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Test ID:

Test Time: 12:06:29 PM

Test Date: 11/4/2011

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3 of 3



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VERIFICATION REPORT

Test Name:	Abdominal Impact	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/4/2011
Test Number:	1	Test Time:	11:02:56 AM

Component Part Number	Component Serial Number
Thorax Ribs 4, 5	1761, DG7012

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.0 deg C P
Humidity	10 -- 70	29 %RH P
Velocity	4.20 -- 4.40	4.33 m/s P
Probe Acceleration	12.0 -- 16.0	15.2 g P
Upper Abdominal Rib Deflection	36.0 -- 47.0	40.3 mm P
Lower Abdominal Rib Deflection	33.0 -- 44.0	38.5 mm P
Lower Spine Acceleration - T12	9.0 -- 14.0	11.6 g P

All test parameters are within specifications

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

Test ID:

Test Time: **11:02:56 AM**

Test Date: **11/4/2011**



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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
FTSS	180-3881-1	DS-1860	9/1/2011
FTSS	180-3881-1	DS-1861	9/1/2011
Endevco	7264-2000	P58796	10/5/2011

Test ID:

Test Time: 11:02:56 AM

Test Date: 11/4/2011

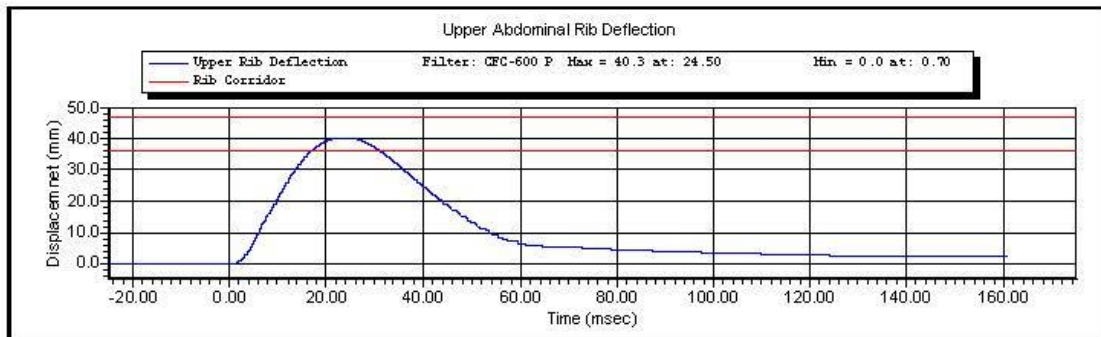
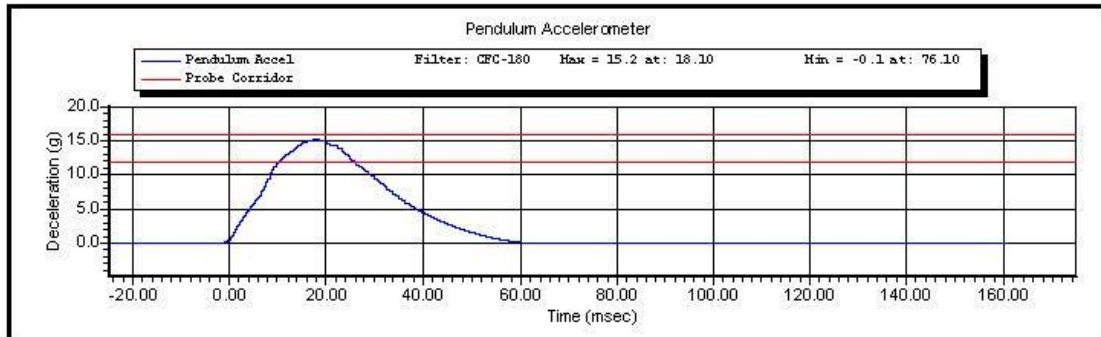


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Test Name:	Abdominal Impact	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/4/2011
Test Number:	1	Test Time:	11:02:56 AM



Test ID:

Test Time: 11:02:56 AM

Test Date: 11/4/2011

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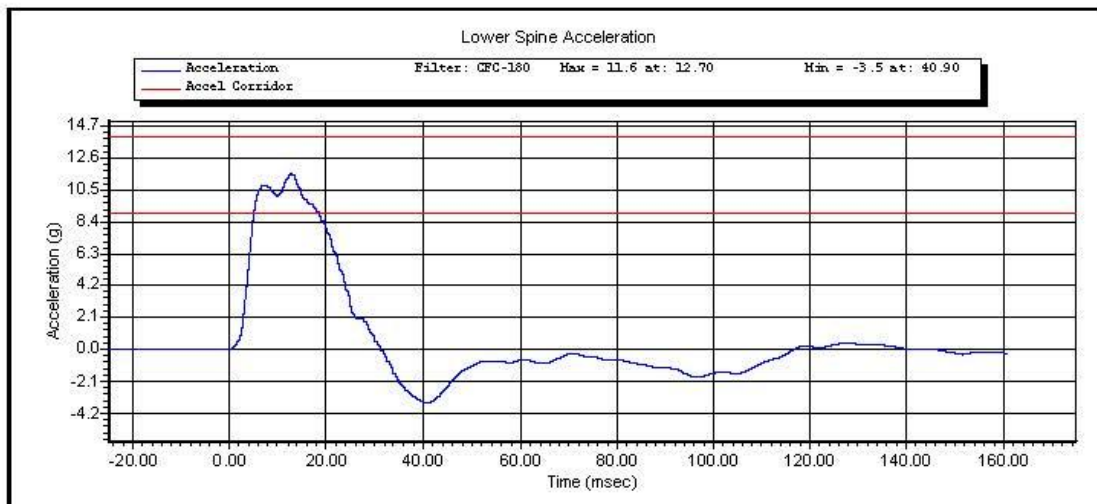
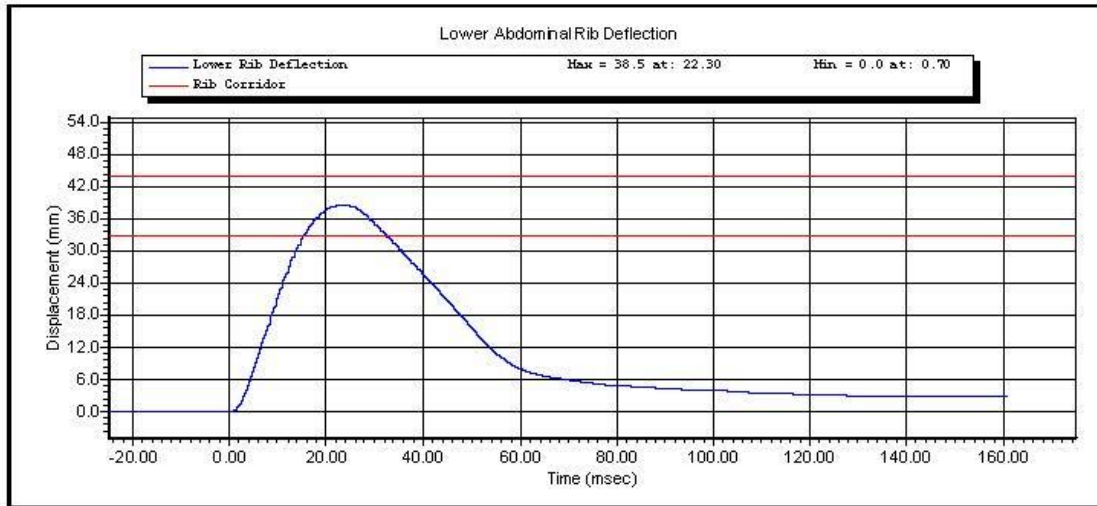
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Test ID:

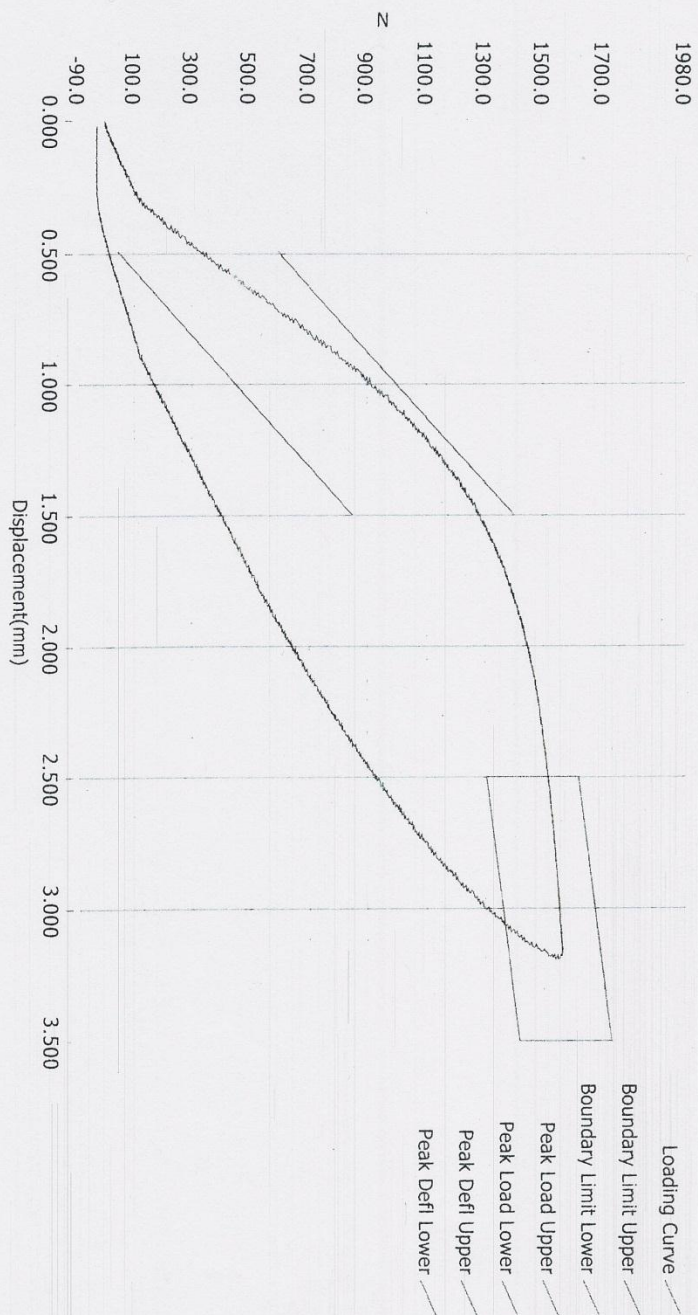
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Test Date: 11/4/2011

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2 of 2

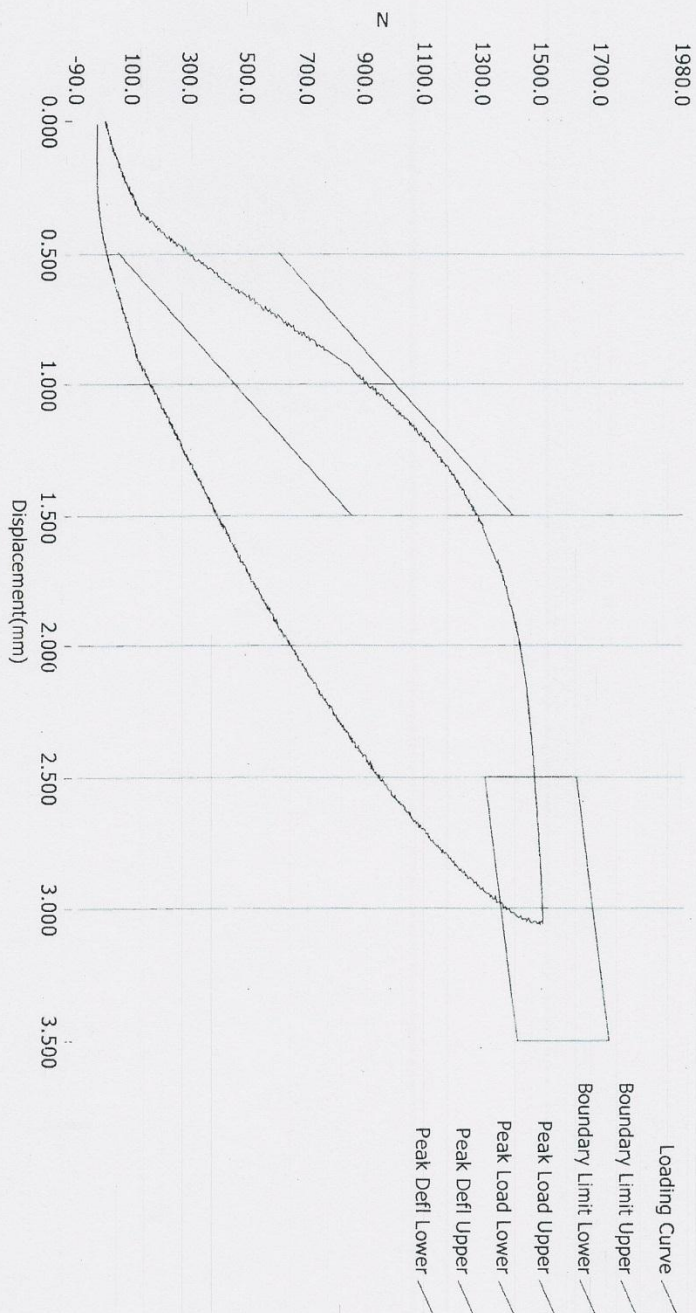
Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
Cert ID	ATD Serial Number	ATD Type	
	36737	SIDIIs	
Current Date : 10/5/2010		Current Time : 16:21:53	

Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

Test ID

Part Serial Number

Test Date

Test Time

Cert ID

ATD Serial Number

ATD Type

36329

SIDIIs

9/22/2010

2:43 PM

Current Date : 9/22/2010

Current Time : 14:44:38



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VERIFICATION REPORT

Test Name:	Pelvis	Revision:	8/24/2009
Sub Test Name:	Acetabulum Impact	Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/4/2011
Test Number:	1	Test Time:	10:35:31 AM

Component Part Number	Component Serial Number
180-4343 Pelvis Flesh	DG3207
FTSS Certification Plug - 1552N	36737
FTSS Full Scale Test Plug - 1501N	36329

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.9 deg C P
Humidity	10 -- 70	30 %RH P
Velocity	6.60 -- 6.80	6.60 m/s P
Peak Probe Acceleration	38.0 -- 47.0	46.1 g P
Peak Pelvis Acceleration	34.0 -- 42.0	41.5 g P
Peak Acetabulum Force	3.60 -- 4.30	3.86 kN P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID:

Test Time: **10:35:31 AM**

Test Date: **11/4/2011**



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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
Endevco	7264-2000	P51875	9/29/2011
FTSS	IF-520	LC-102Fy	3/25/2011

Test ID:

Test Time: 10:35:31 AM

Test Date: 11/4/2011

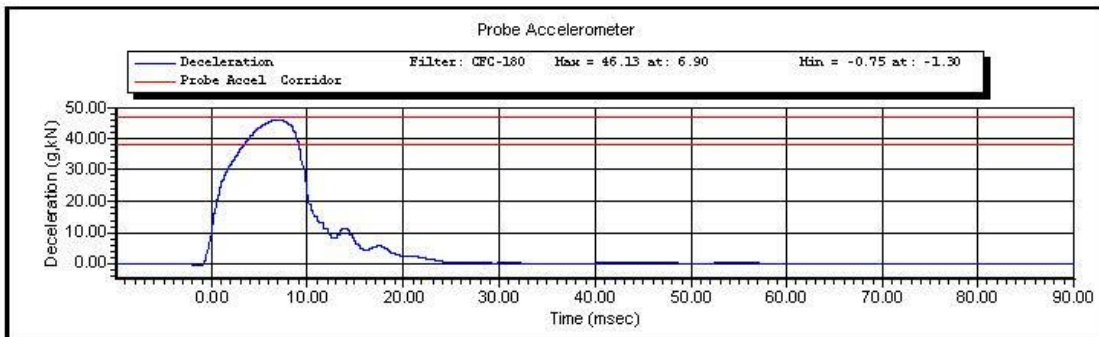
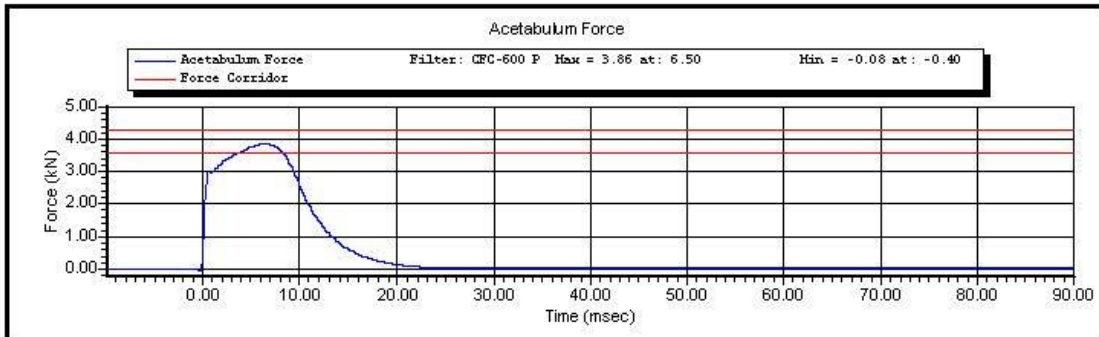


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Test Name:	Pelvis	Revision:	8/24/2009
Sub Test Name:	Acetabulum Impact	Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/4/2011
Test Number:	1	Test Time:	10:35:31 AM



Test ID:

Test Time: **10:35:31 AM**

Test Date: **11/4/2011**

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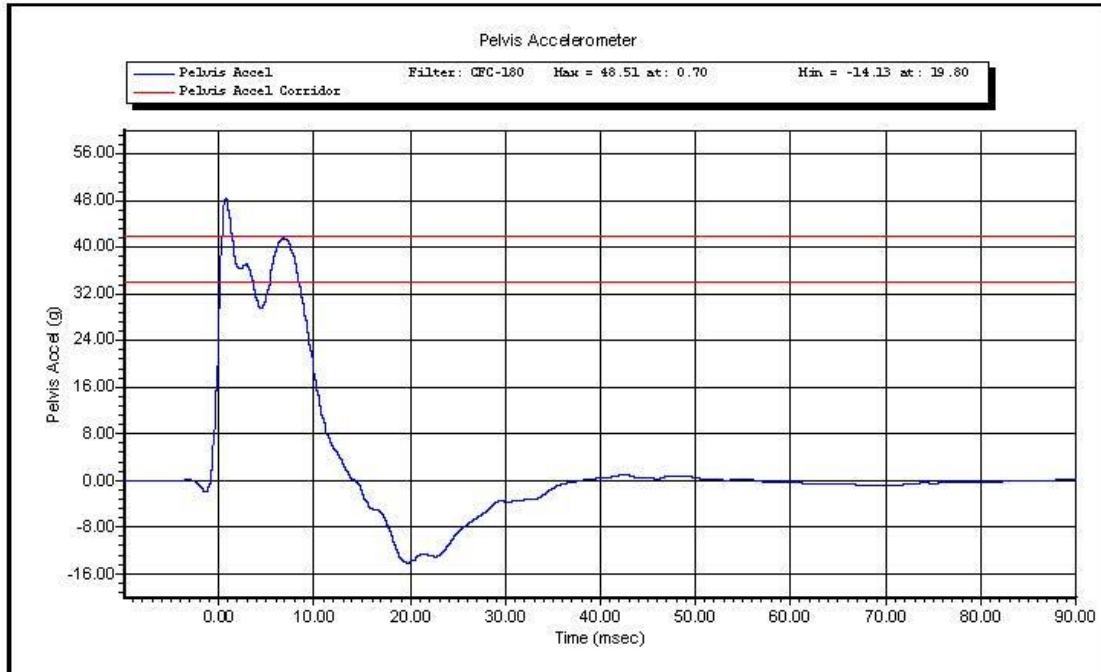
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Test ID:

Test Time: 10:35:31 AM

Test Date: 11/4/2011

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VERIFICATION REPORT

Test Name:	Pelvis	Revision:	8/24/2009
Sub Test Name:	Iliac Impact	Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/4/2011
Test Number:	1	Test Time:	4:55:57 PM

Component Part Number	Component Serial Number
180-4343 Pelvis Flesh	DG3207

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.1 deg C P
Humidity	10 -- 70	29 %RH P
Velocity	4.20 -- 4.40	4.33 m/s P
Peak Probe Acceleration	36.0 -- 45.0	43.2 g P
Peak Pelvis Acceleration	28.0 -- 39.0	33.4 g P
Peak Iliac Force	4.10 -- 5.10	4.78 kN P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID:

Test Time: **4:55:57 PM**

Test Date: **11/4/2011**



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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
Endevco	7264-2000	P51875	9/29/2011
DentonATD	3228J	LC-281Fy	8/31/2011

Test ID:

Test Time: 4:55:57 PM

Test Date: 11/4/2011

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2 of 2

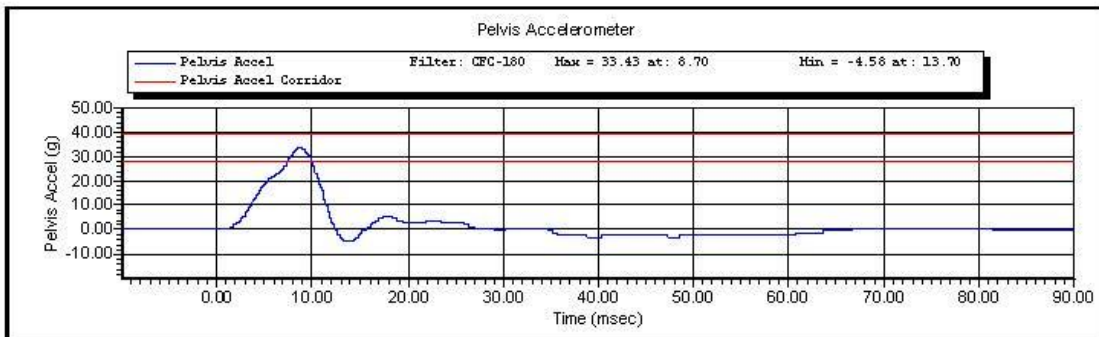
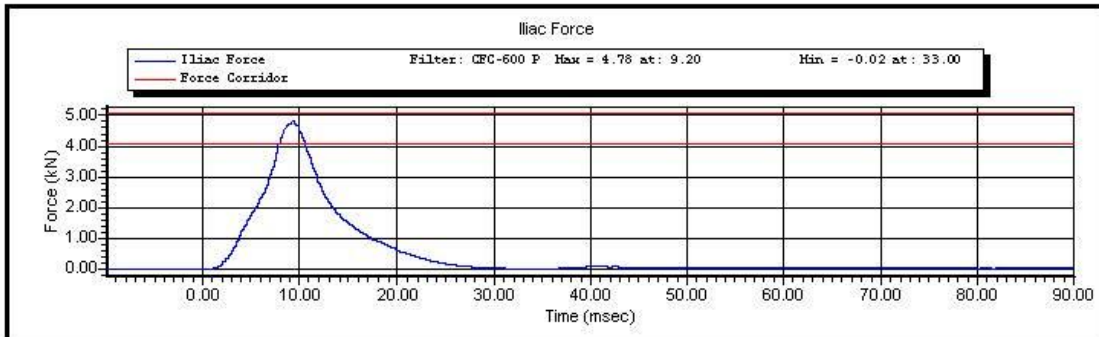


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Test Name:	Pelvis	Revision:	8/24/2009
Sub Test Name:	Iliac Impact	Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/4/2011
Test Number:	1	Test Time:	4:55:57 PM



Test ID:

Test Time: **4:55:57 PM**

Test Date: **11/4/2011**

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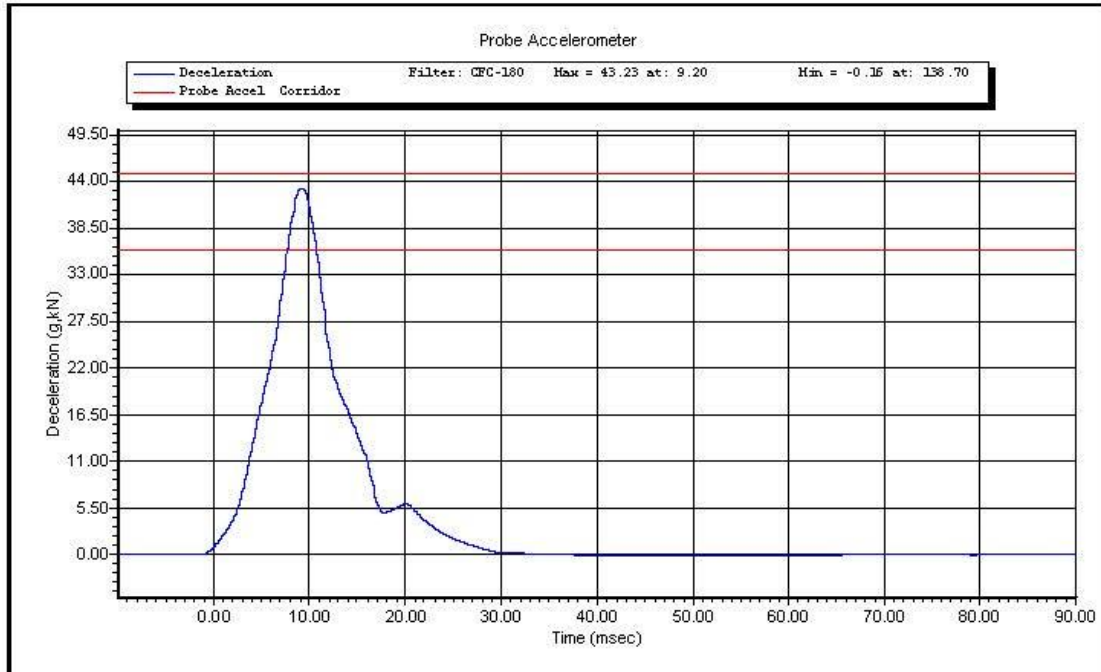
1 of 2



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Test ID:

Test Time: 4:55:57 PM

Test Date: 11/4/2011

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2 of 2

CALIBRATION TEST RESULTS

POST-TEST

ES2-re No: F034

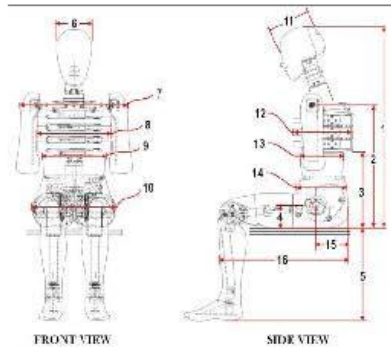
CONFIGURED FOR LEFT SIDE IMPACT

Please Note that the following Dummy Calibration Plots are out of calibration - replacement part is needed:

- External Measurements
- Lumbar Spine

ES-2re External Measurements

NHTSA S/N F034



Dim. No.	Description	Specification (mm)	Result (mm)	Pass/Fail
1	Sitting Height	900-918	914	Pass
2	Seat to Shoulder Joint	558-572	565	Pass
3	Seat to Lower Face of Thoracic Spine Box	346-356	354	Pass
4	Seat to Hip Joint (center of bolt)	97-103	101	Pass
5	Sole to Seat, Sitting	433-451	445	Pass
6	Head Width	152-158	155	Pass
7	Shoulder/Arm Width	461-479	464	Pass
8	Thorax Width	322-332	324	Pass
9	Abdomen Width	273-287	283	Pass
10	Pelvis/Lap Width	359-373	370	Pass
11	Head Depth	196-206	201	Pass
12	Thorax Depth	262-272	268	Pass
13	Abdomen Depth	194-204	199	Pass
14	Pelvis Depth	235-245	237	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150-160	155	Pass
16	Back of Buttocks to Front Knee	597-615	604	Pass

Technician: AR

Date: 11/9/2011



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VERIFICATION REPORT

Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	11/11/2011
Test Number:	4	Test Time:	1:11:19 PM

Component Part Number	Component Serial Number
455-1007	1916409

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.8 deg C P
Humidity	10 -- 70	29 %RH P
Resultant Acceleration	125 -- 155	129 g P
Oscillation	0.0 -- 15.0	2.7 % P
Fore-Aft Acceleration	-15.00 -- 15.00	4.25 g P

All test parameters are within specifications

Technician: S. Zito

Supervisor: D. Travale

Test ID:

Test Time: **1:11:19 PM**

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



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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	P58737	9/29/2011
Endevco	7264-2000	P52022	9/29/2011
Endevco	7264-2000	P52040	9/29/2011

Test ID:

Test Time: **1:11:19 PM**

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

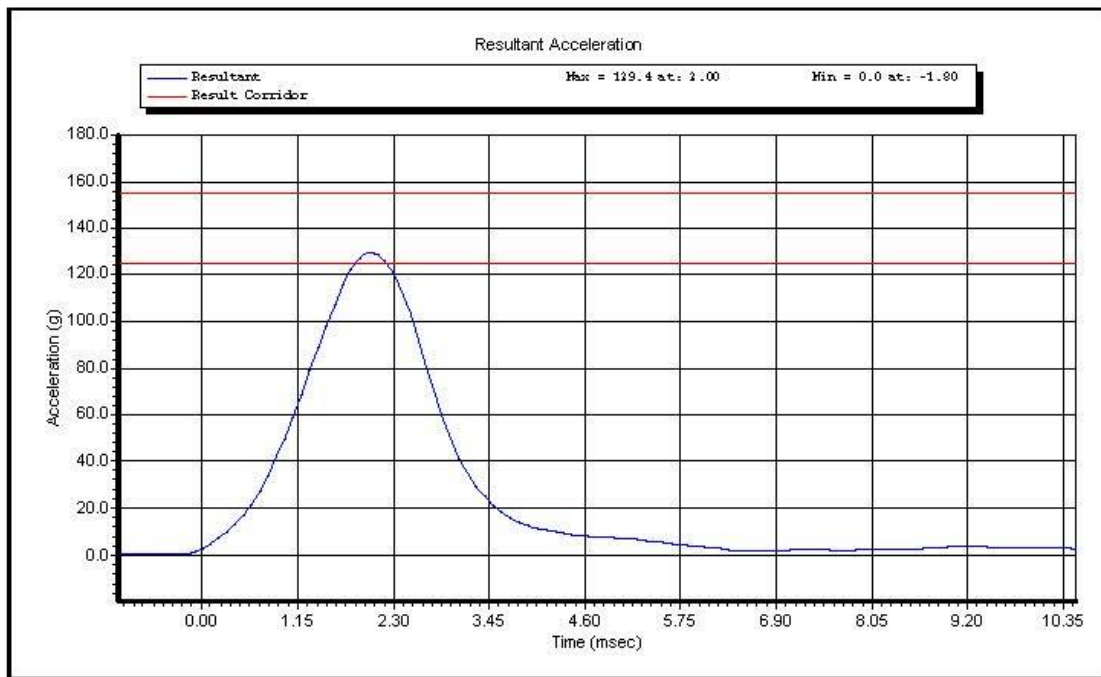


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Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	11/11/2011
Test Number:	4	Test Time:	1:11:19 PM



Test ID:

Test Time: 1:11:19 PM

Test Date: 11/11/2011

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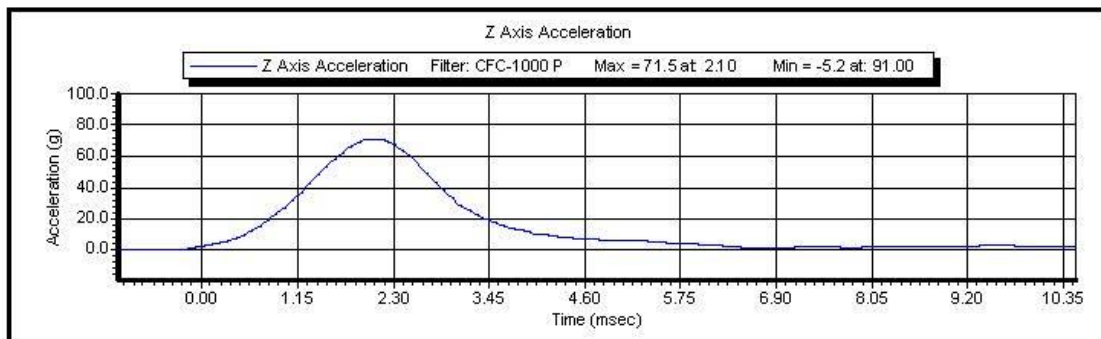
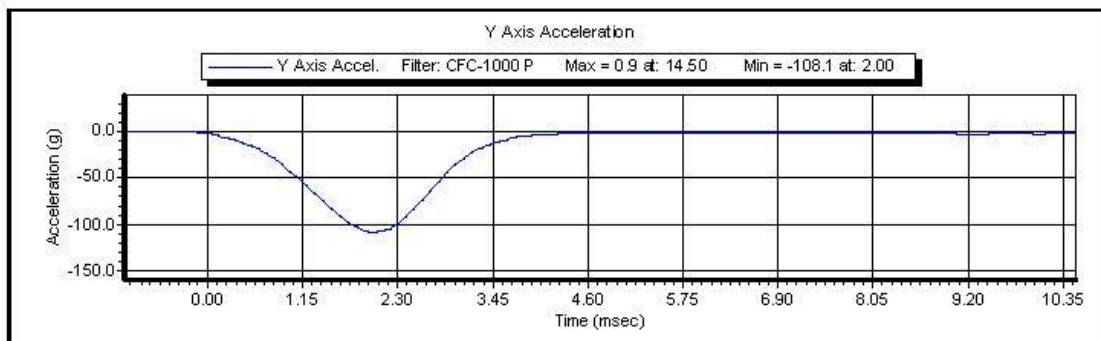
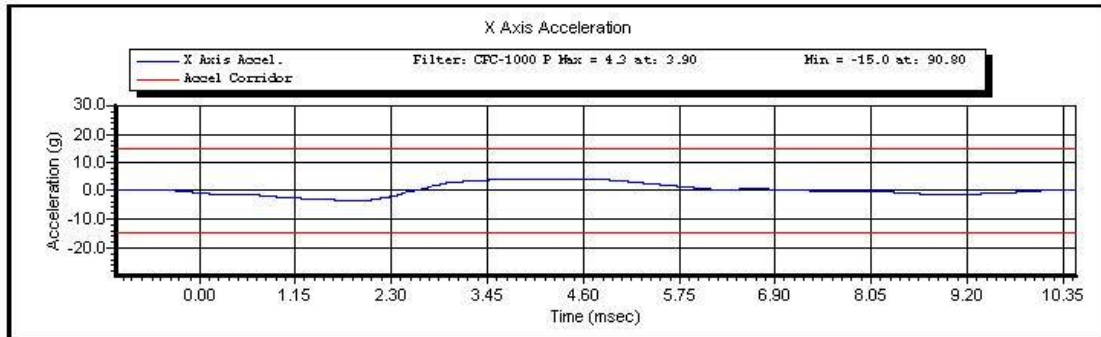
1 of 2



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Test ID:

Test Time: 1:11:19 PM

Test Date: 11/11/2011

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2 of 2



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VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	11/11/2011
Test Number:	1	Test Time:	6:15:33 PM

Component Part Number	Component Serial Number
455-2002	07066

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.4 deg C P
Humidity	10 -- 70	29 %RH P
Velocity	3.30 -- 3.50	3.42 m/s P
Maximum Neck Flexion Angle	49.0 -- 59.0	53.6 degrees P
Time At Maximum Neck Flexion	54.0 -- 66.0	60.7 ms P
Decay to Zero Degrees	53.0 -- 88.0	60.6 ms P
Velocity Corridor	--	P

All test parameters are within specifications

Technician: **Don Schenk**
Supervisor: **D. travale**

Test ID:

Test Time: **6:15:33 PM**

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



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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	7000428	094	4/25/2011
DentonATD	7000428	095	4/25/2011
DentonATD	7000428	093	4/25/2011

Test ID:

Test Time: **6:15:33 PM**

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

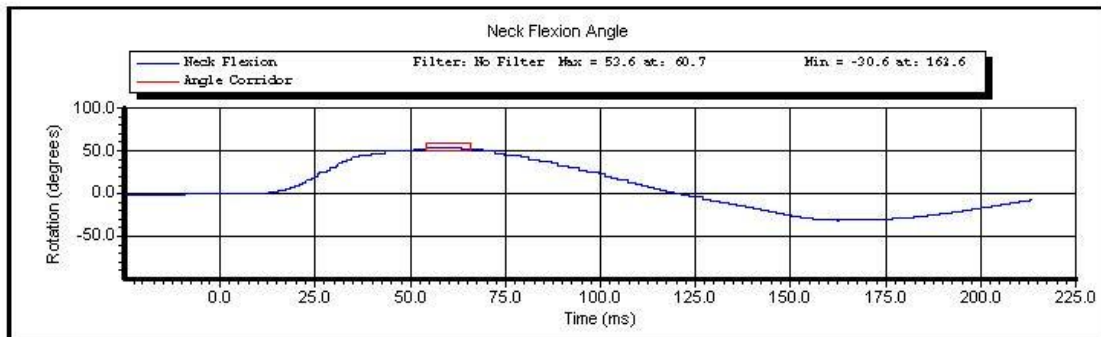
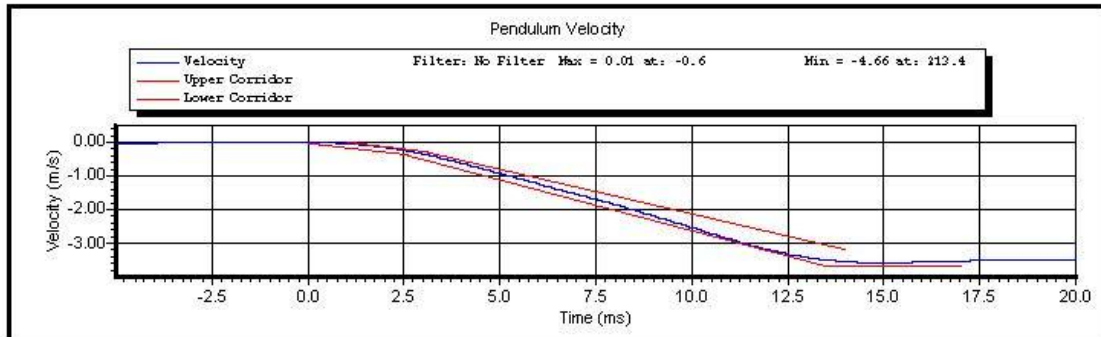


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Test Name:	Neck Flexion	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	11/11/2011
Test Number:	1	Test Time:	6:15:33 PM



Test ID:

Test Time: 6:15:33 PM

Test Date: 11/11/2011

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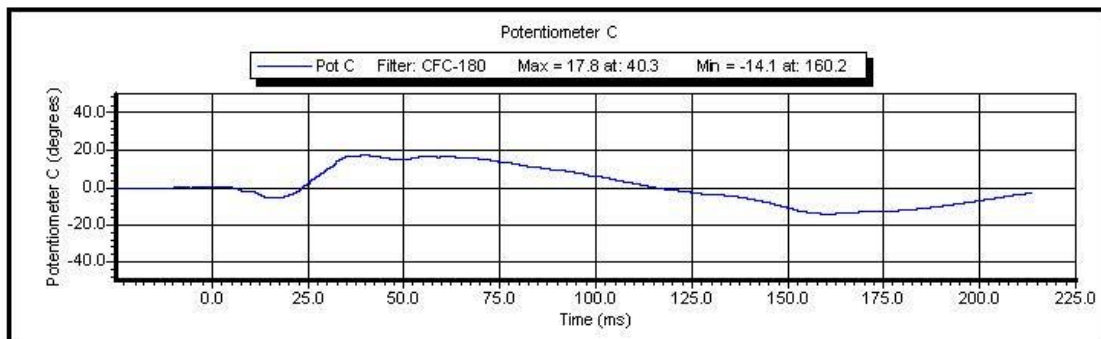
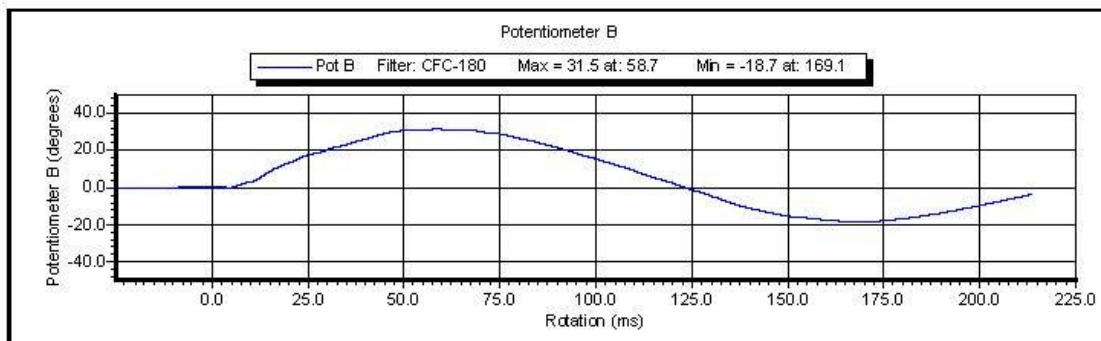
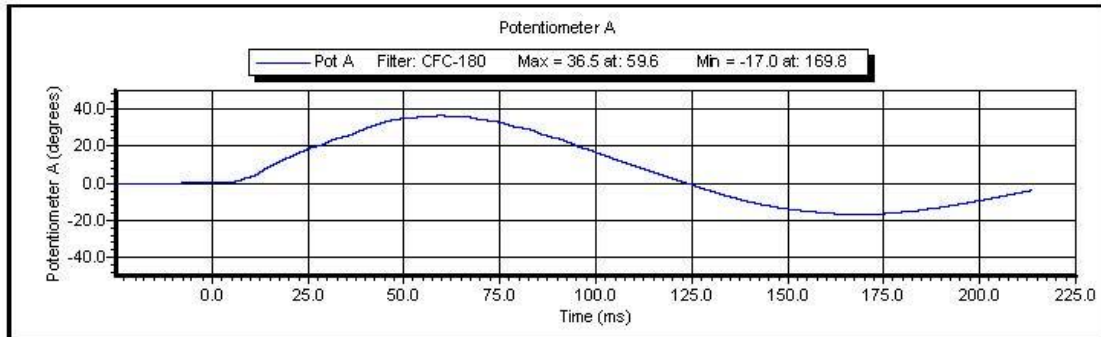
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Test ID:

Test Time: 6:15:33 PM

Test Date: 11/11/2011

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VERIFICATION REPORT

Test Name:	Shoulder Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	11/10/2011
Test Number:	3	Test Time:	10:19:16 AM

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.3 deg C P
Humidity	10.0 -- 70.0	36.0 %RH P
Velocity	4.20 -- 4.40	4.26 m/s P
Pendulum Acceleration	-10.50 -- -7.50	-10.11 g P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID:

Test Time: **10:19:16 AM**

Test Date: **11/10/2011**



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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

Test ID:

Test Time: 10:19:16 AM

Test Date: 11/10/2011

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2 of 2

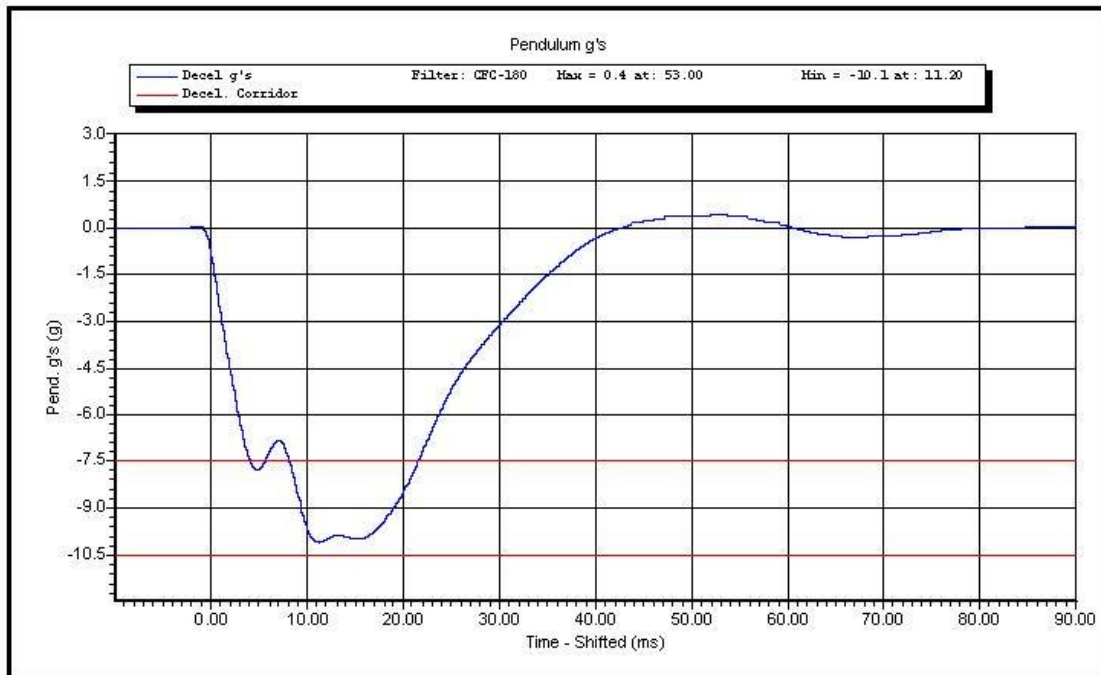


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Test Name:	Shoulder Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	11/10/2011
Test Number:	3	Test Time:	10:19:16 AM



Test ID:

Test Time: 10:19:16 AM

Test Date: 11/10/2011

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1 of 1



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VERIFICATION REPORT

Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Lower Rib 4 m/s	Test Date:	11/10/2011
Test Number:	1	Test Time:	12:23:46 PM

Component Part Number	Component Serial Number
455-3100	07209

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.6 deg C P
Humidity	10.0 -- 70.0	36.1 %RH P
Velocity	3.90 -- 4.10	3.96 m/s P
Rib Displacement	-51.00 -- -46.00	-48.73 mm P
Drop Height	807.0 -- 823.0	815.0 mm P

All test parameters are within specifications

Technician: S. Zito

Supervisor: D. Travale

Test ID: **Lower Rib 4 m/s** Test Time: **12:23:46 PM**

Test Date: **11/10/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-182	8/31/2011
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7264-2000	P32222	10/14/2011

Test ID: **Lower Rib 4 m/s**

Test Time: **12:23:46 PM**

Test Date: **11/10/2011**

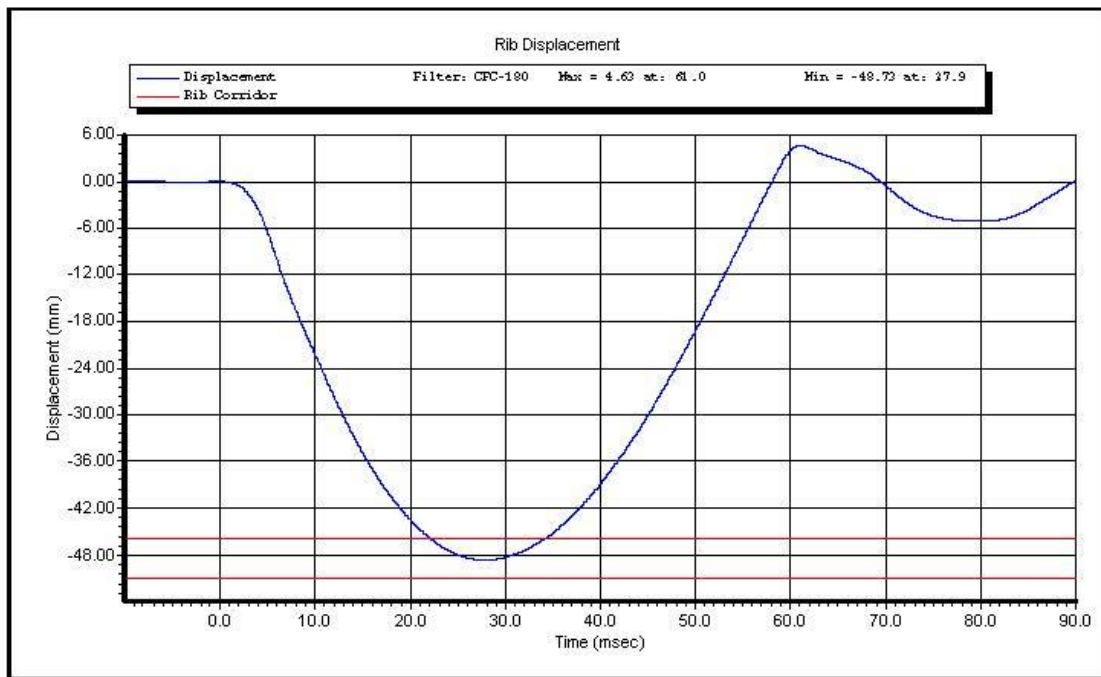


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Lower Rib 4 m/s	Test Date:	11/10/2011
Test Number:	1	Test Time:	12:23:46 PM



Test ID: **Lower Rib 4 m/s** Test Time: **12:23:46 PM**

Test Date: **11/10/2011**

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VERIFICATION REPORT

Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Lower Rib 3 m/s	Test Date:	11/10/2011
Test Number:	1	Test Time:	12:31:20 PM

Component Part Number	Component Serial Number
455-3100	07209

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.6 deg C P
Humidity	10.0 -- 70.0	36.7 %RH P
Velocity	2.90 -- 3.10	2.97 m/s P
Rib Displacement	-40.00 -- -36.00	-37.68 mm P
Drop Height	454 -- 464	459 mm P

All test parameters are within specifications

Technician: S. Zito

Supervisor: D. Travale

Test ID: **Lower Rib 3 m/s**

Test Time: **12:31:20 PM**

Test Date: **11/10/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-182	8/31/2011
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7264-2000	P32222	10/14/2011

Test ID: **Lower Rib 3 m/s**

Test Time: **12:31:20 PM**

Test Date: **11/10/2011**

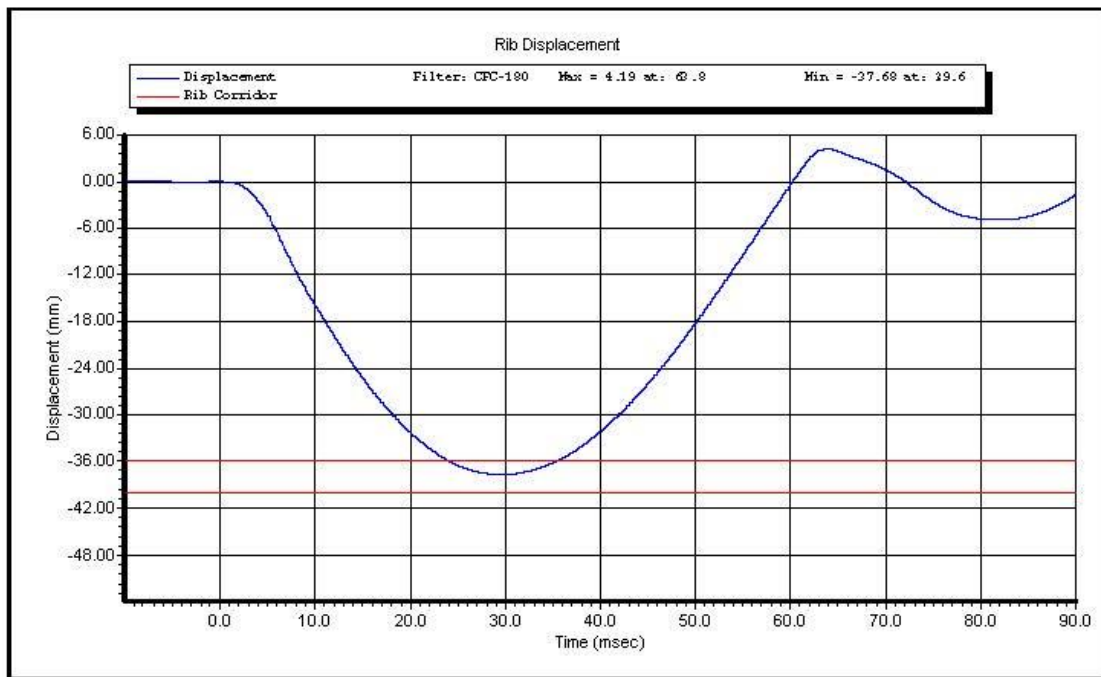


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Lower Rib 3 m/s	Test Date:	11/10/2011
Test Number:	1	Test Time:	12:31:20 PM



Test ID: Lower Rib 3 m/s Test Time: 12:31:20 PM

Test Date: 11/10/2011

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VERIFICATION REPORT

Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Middle Rib 4 m/s	Test Date:	11/10/2011
Test Number:	1	Test Time:	11:55:09 AM

Component Part Number	Component Serial Number
455-3100	07205

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.6 deg C P
Humidity	10.0 -- 70.0	35.7 %RH P
Velocity	3.90 -- 4.10	3.97 m/s P
Rib Displacement	-51.00 -- -46.00	-48.35 mm P
Drop Height	807.0 -- 823.0	815.0 mm P

All test parameters are within specifications

Technician: **S.Zito**

Supervisor: **D.Travale**

Test ID: **Middle Rib 4 m/s**

Test Time: **11:55:09 AM**

Test Date: **11/10/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-184	8/31/2011
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7264-2000	P32222	10/14/2011

Test ID: **Middle Rib 4 m/s**

Test Time: **11:55:09 AM**

Test Date: **11/10/2011**

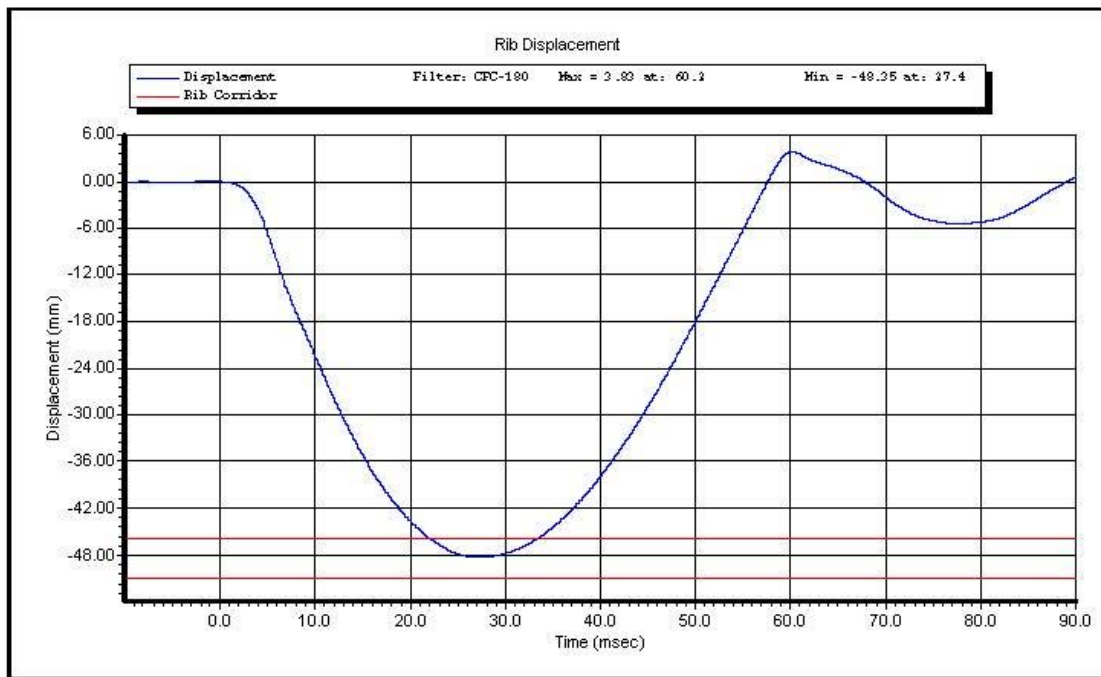


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Middle Rib 4 m/s	Test Date:	11/10/2011
Test Number:	1	Test Time:	11:55:09 AM



Test ID: Middle Rib 4 m/s Test Time: 11:55:09 AM

Test Date: 11/10/2011

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VERIFICATION REPORT

Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Middle Rib 3 m/s	Test Date:	11/10/2011
Test Number:	1	Test Time:	12:05:25 PM

Component Part Number	Component Serial Number
455-3100	07205

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10.0 -- 70.0	35.6 %RH P
Velocity	2.90 -- 3.10	2.95 m/s P
Rib Displacement	-40.00 -- -36.00	-37.36 mm P
Drop Height	454 -- 464	459 mm P

All test parameters are within specifications

Technician: S. Zito

Supervisor: D. Travale

Test ID: **Middle Rib 3 m/s**

Test Time: **12:05:25 PM**

Test Date: **11/10/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-184	8/31/2011
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7264-2000	P32222	10/14/2011

Test ID: **Middle Rib 3 m/s**

Test Time: **12:05:25 PM**

Test Date: **11/10/2011**

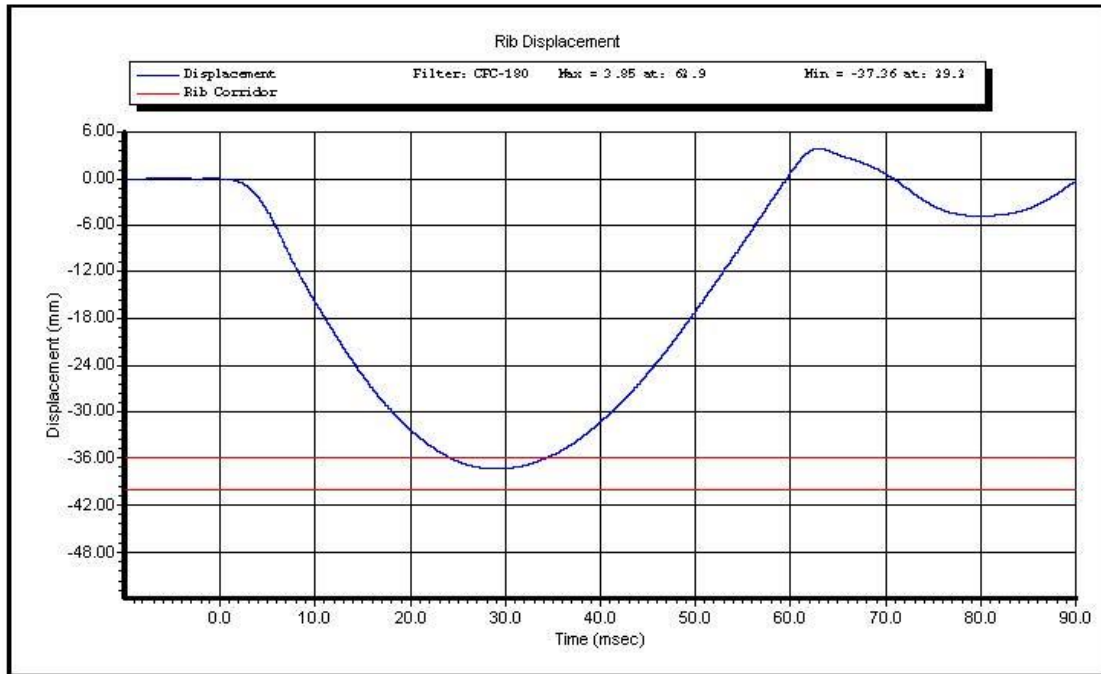


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Middle Rib 3 m/s	Test Date:	11/10/2011
Test Number:	1	Test Time:	12:05:25 PM



Test ID: Middle Rib 3 m/s Test Time: 12:05:25 PM

Test Date: 11/10/2011

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VERIFICATION REPORT

Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	UPPER RIB 4 m/s	Test Date:	11/10/2011
Test Number:	1	Test Time:	11:24:46 AM

Component Part Number	Component Serial Number
455-3100	07203

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.6 deg C P
Humidity	10.0 -- 70.0	35.7 %RH P
Velocity	3.90 -- 4.10	3.91 m/s P
Rib Displacement	-51.00 -- -46.00	-49.27 mm P
Drop Height	807.0 -- 823.0	815.0 mm P

All test parameters are within specifications

Technician: **S.Zito**

Supervisor: **D.Travale**

Test ID: **UPPER RIB 4 m/s** Test Time: **11:24:46 AM**

Test Date: **11/10/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-183	8/31/2011
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7264-2000	P32222	10/14/2011

Test ID: **UPPER RIB 4 m/s**

Test Time: **11:24:46 AM**

Test Date: **11/10/2011**

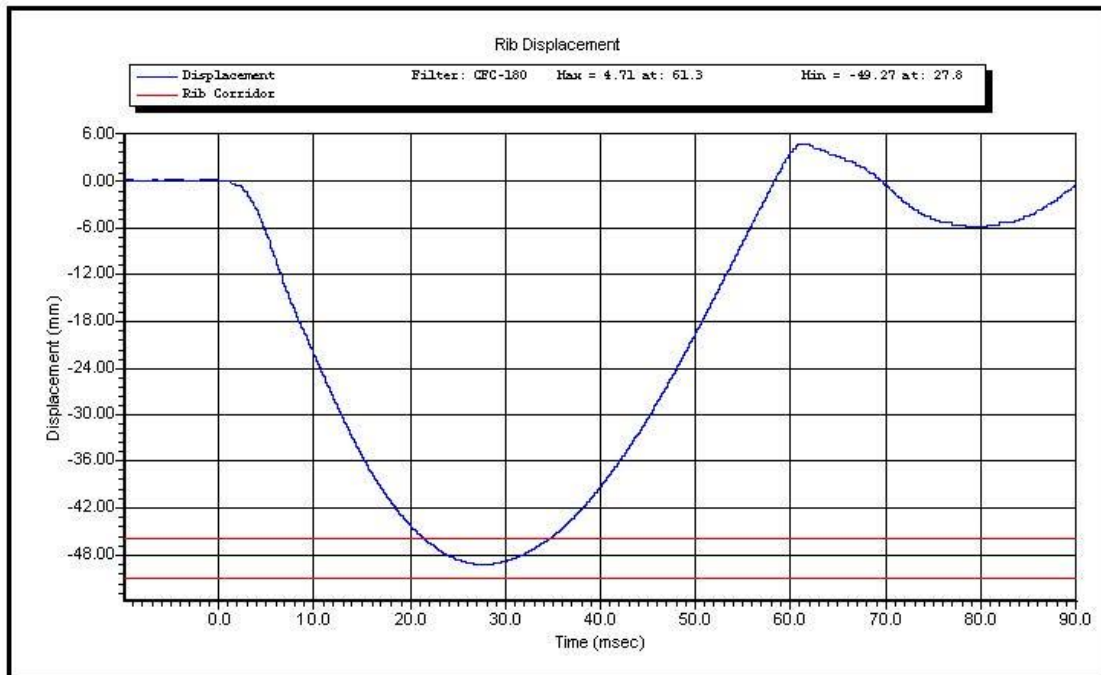


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	UPPER RIB 4 m/s	Test Date:	11/10/2011
Test Number:	1	Test Time:	11:24:46 AM



Test ID: UPPER RIB 4 m/s Test Time: 11:24:46 AM

Test Date: 11/10/2011

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1 of 1



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VERIFICATION REPORT

Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Upper Rib 3 m/s	Test Date:	11/10/2011
Test Number:	1	Test Time:	11:32:43 AM

Component Part Number	Component Serial Number
455-3100	07203

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.6 deg C P
Humidity	10.0 -- 70.0	35.9 %RH P
Velocity	2.90 -- 3.10	2.94 m/s P
Rib Displacement	-40.00 -- -36.00	-38.45 mm P
Drop Height	454 -- 464	459 mm P

All test parameters are within specifications

Technician: **S.Zito**

Supervisor: **D.Travale**

Test ID: **Upper Rib 3 m/s**

Test Time: **11:32:43 AM**

Test Date: **11/10/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-183	8/31/2011
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7264-2000	P32222	10/14/2011

Test ID: **Upper Rib 3 m/s**

Test Time: **11:32:43 AM**

Test Date: **11/10/2011**

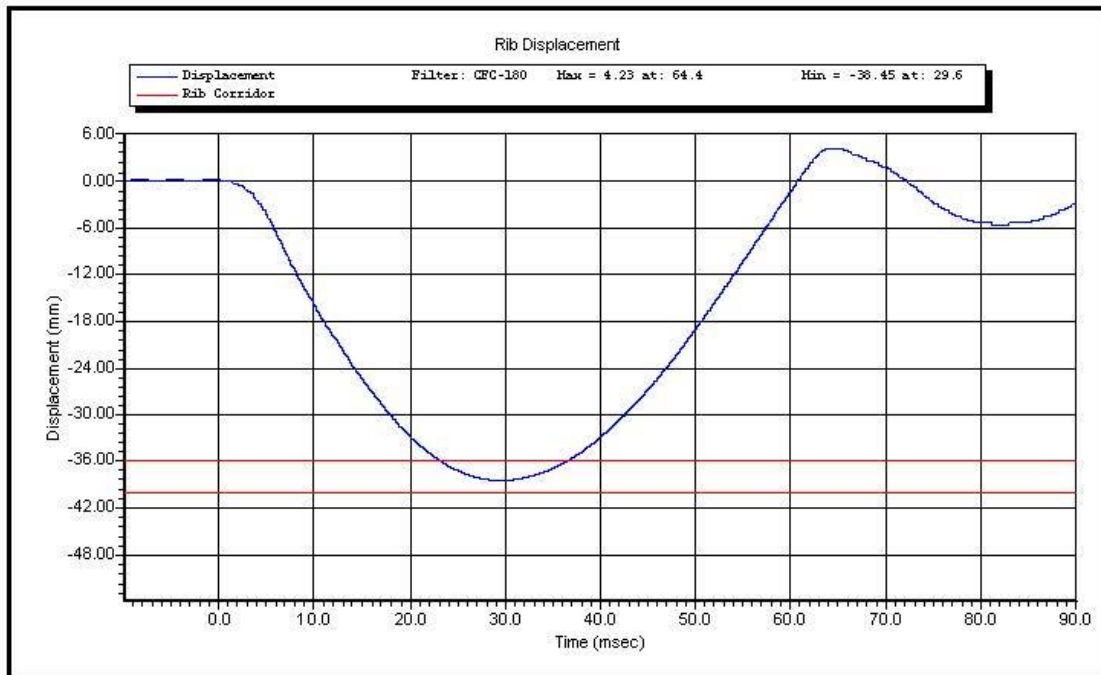


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Upper Rib 3 m/s	Test Date:	11/10/2011
Test Number:	1	Test Time:	11:32:43 AM



Test ID: **Upper Rib 3 m/s** Test Time: **11:32:43 AM**

Test Date: **11/10/2011**

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VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	8/15/2008
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	11/10/2011
Test Number:	1	Test Time:	5:02:43 PM

Component Part Number	Component Serial Number
Upper Rib - 175-4002	7203
Middle Rib - 175-4002	7205
Lower Rib - 175-4002	7209

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.2 deg C P
Humidity	10.0 -- 70.0	37.0 %RH P
Velocity	5.40 -- 5.60	5.49 m/s P
Upper Rib Displacement	34.0 -- 41.0	38.4 mm P
Middle Rib Displacement	37.0 -- 45.0	42.0 mm P
Lower Rib Displacement	37.0 -- 44.0	41.3 mm P
Impactor Force	5100 -- 6200	5749 N P

All test parameters are within specifications

Technician: **SZito**
Supervisor: **D.Travale**

Test ID:

Test Time: **5:02:43 PM**

Test Date: **11/10/2011**



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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
Honeywell	MLT 38000	DS-183	8/31/2011
Honeywell	MLT 38000	DS-184	8/31/2011
Honeywell	MLT 38000	DS-182	8/31/2011

Test ID:

Test Time: 5:02:43 PM

Test Date: 11/10/2011

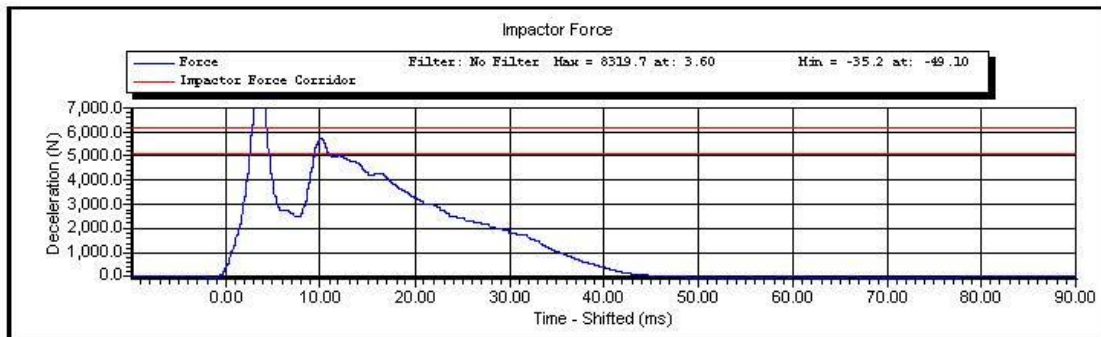
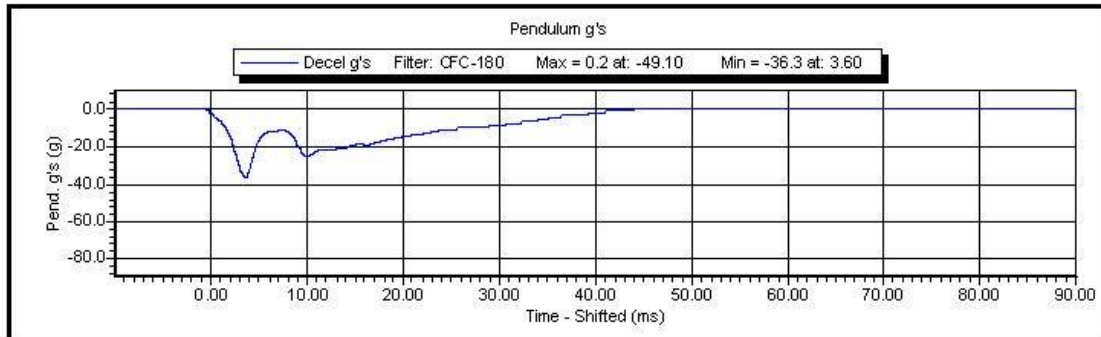


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Test Name:	Thorax Impact	Revision:	8/15/2008
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	11/10/2011
Test Number:	1	Test Time:	5:02:43 PM



Test ID:

Test Time: 5:02:43 PM

Test Date: 11/10/2011

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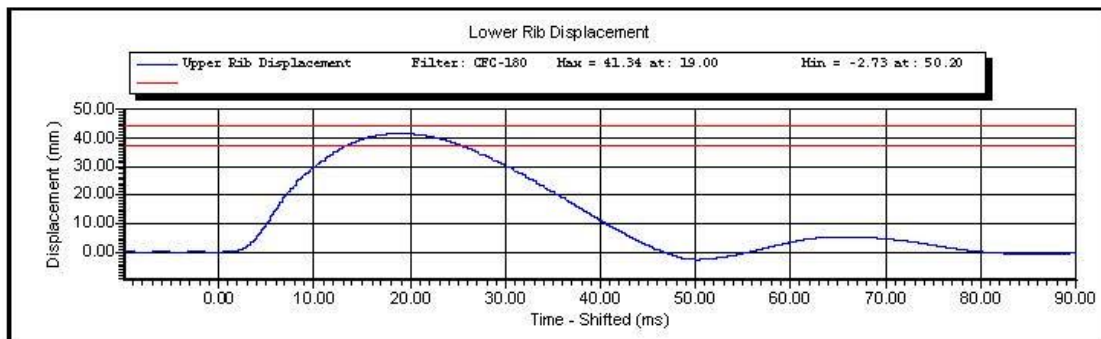
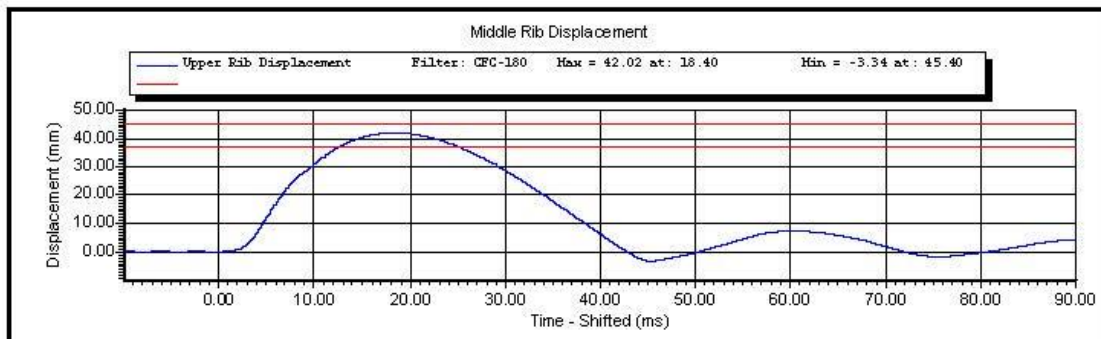
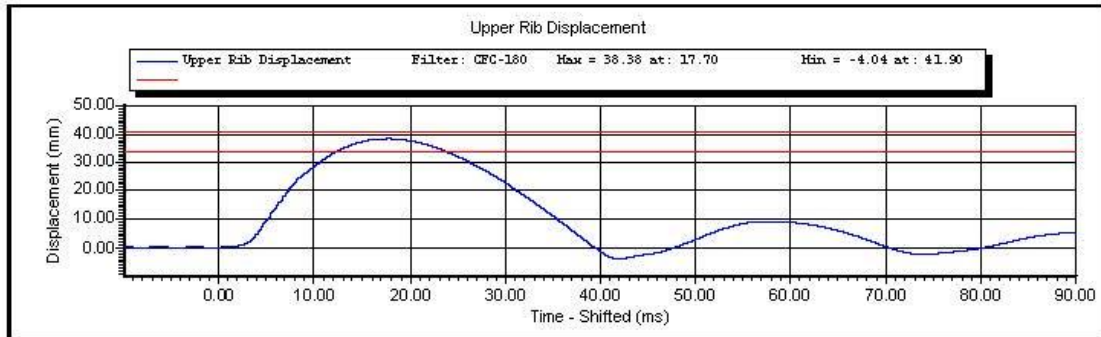
1 of 2



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Test ID:

Test Time: 5:02:43 PM

Test Date: 11/10/2011

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VERIFICATION REPORT

Test Name:	Abdominal Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	11/10/2011
Test Number:	2	Test Time:	10:43:05 AM

Component Part Number	Component Serial Number
455-4001	07/91

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.4 deg C P
Humidity	10 -- 70	36 %RH P
Velocity	3.90 -- 4.10	4.06 m/s P
Peak Abdominal Force	-2.70 -- -2.20	-2.52 kN P
Time At Peak Abdominal Force	10.0 -- 12.3	10.1 ms P
Maximum Pendulum Force	-4.80 -- -4.00	-4.67 kN P
Time at Peak Pendulum Force	10.6 -- 13.0	11.0 ms P

All test parameters are within specifications

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

Test ID:

Test Time: **10:43:05 AM**

Test Date: **11/10/2011**



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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
Denton	2631	LC-1512	3/25/2011
Denton	2631	LC-1526	3/25/2011
Denton	2631	LC-1516	3/25/2011

Test ID:

Test Time: 10:43:05 AM

Test Date: 11/10/2011

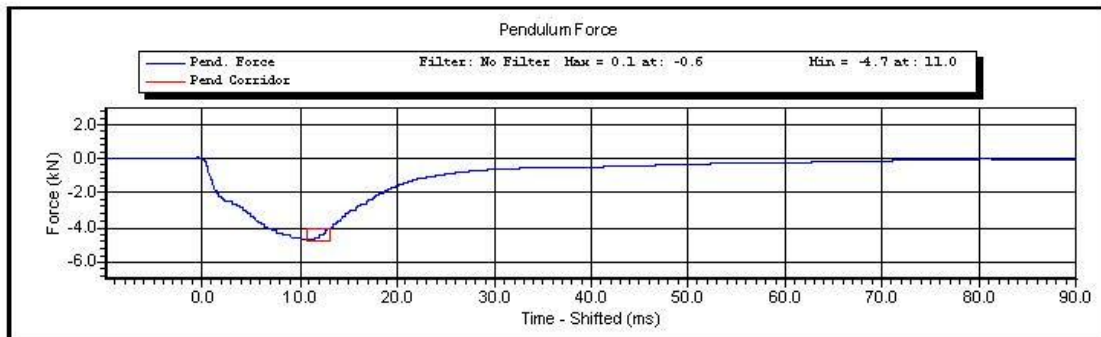
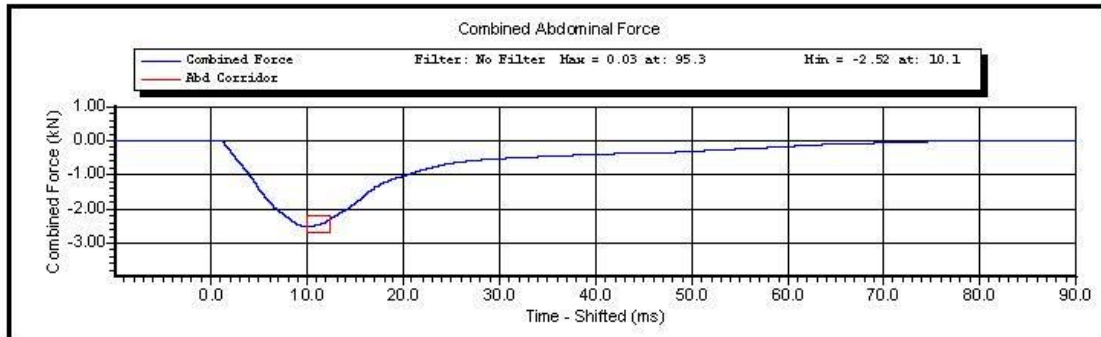


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Test Name:	Abdominal Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	11/10/2011
Test Number:	2	Test Time:	10:43:05 AM



Test ID:

Test Time: 10:43:05 AM

Test Date: 11/10/2011

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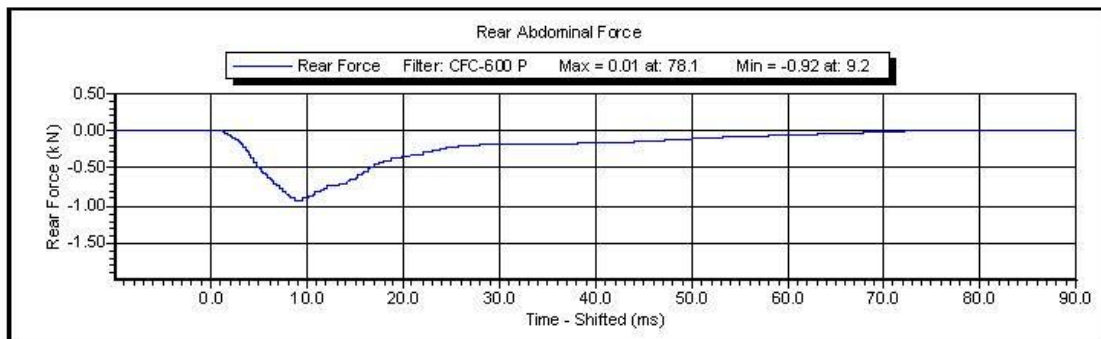
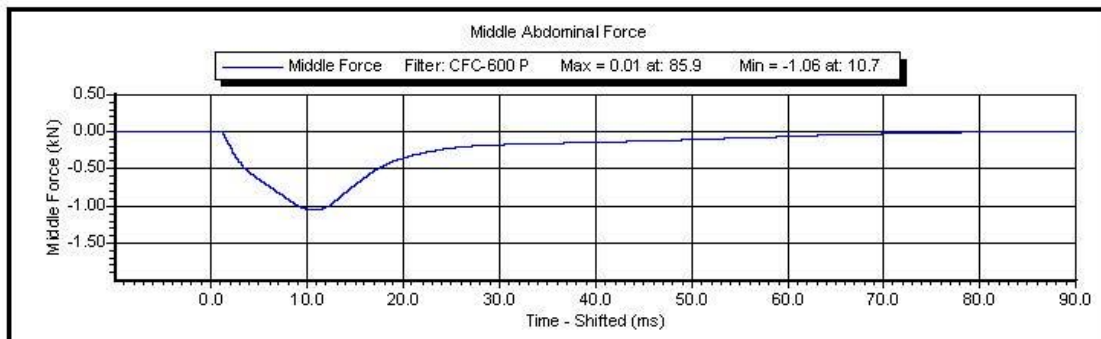
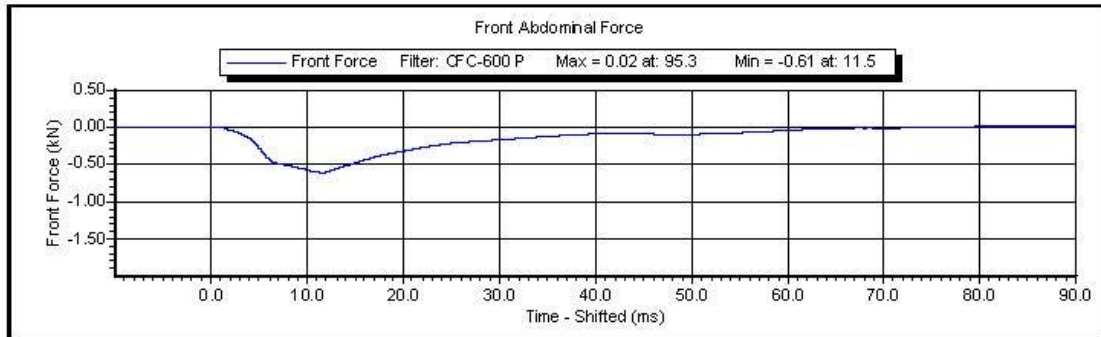
1 of 2



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Test ID:

Test Time: 10:43:05 AM

Test Date: 11/10/2011

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2 of 2



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VERIFICATION REPORT

Test Name:	Lumbar Spine	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	11/17/2011
Test Number:	4	Test Time:	1:18:18 PM

Component Part Number	Component Serial Number
175-5501	15050329A

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.0 deg C P
Humidity	10 -- 70	27 %RH P
Velocity	5.95 -- 6.15	6.14 m/s P
Maximum Headform Flexion Angle	45.0 -- 55.0	43.4 degrees F
Time at Maximum Headform Flexion Angle	39.0 -- 53.0	44.3 ms P
Decay to Zero Degrees	37.0 -- 57.0	33.9 ms F
Velocity Corridor	--	P

All test parameters are NOT within specifications

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

Test ID:

Test Time: **1:18:18 PM**

Test Date: **11/17/2011**



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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	7000428	094	4/25/2011
DentonATD	7000428	095	4/25/2011
DentonATD	7000428	093	4/25/2011

Test ID:

Test Time: 1:18:18 PM

Test Date: 11/17/2011

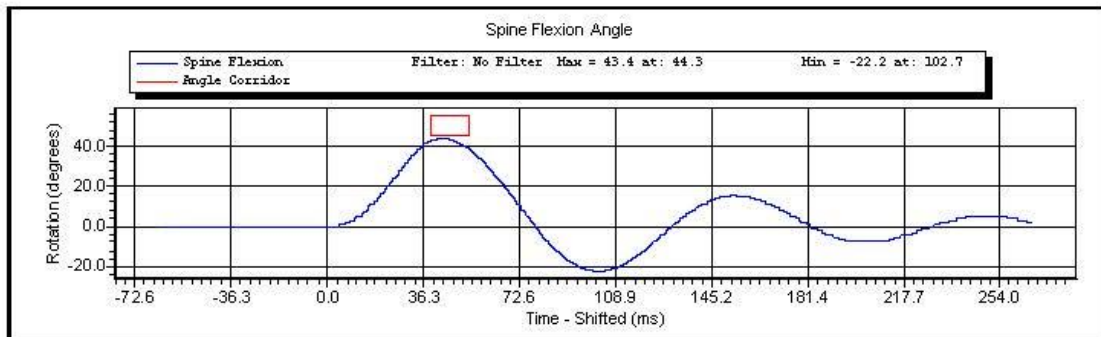
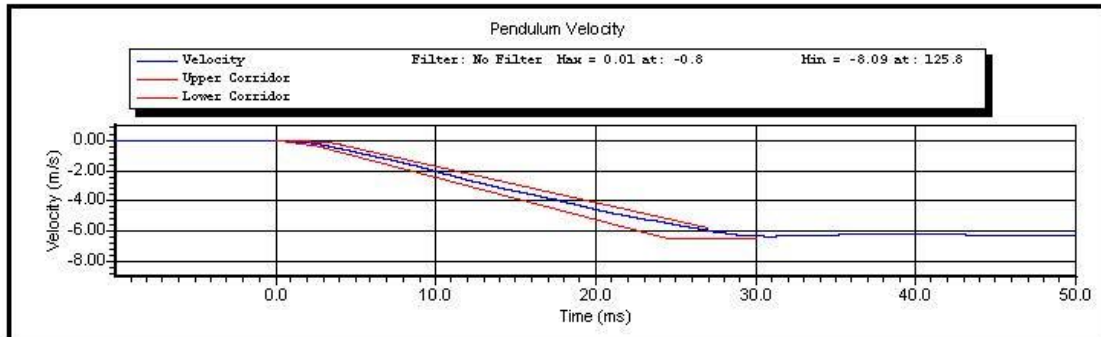


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Test Name:	Lumbar Spine	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	11/17/2011
Test Number:	4	Test Time:	1:18:18 PM



Test ID:

Test Time: **1:18:18 PM**

Test Date: **11/17/2011**

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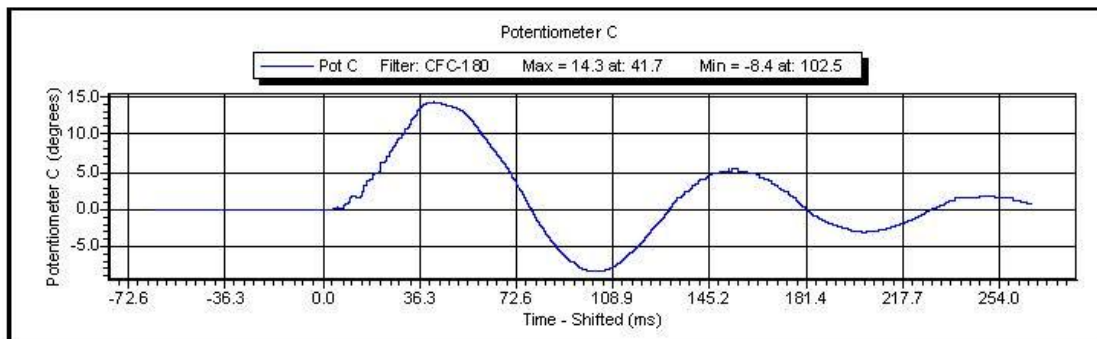
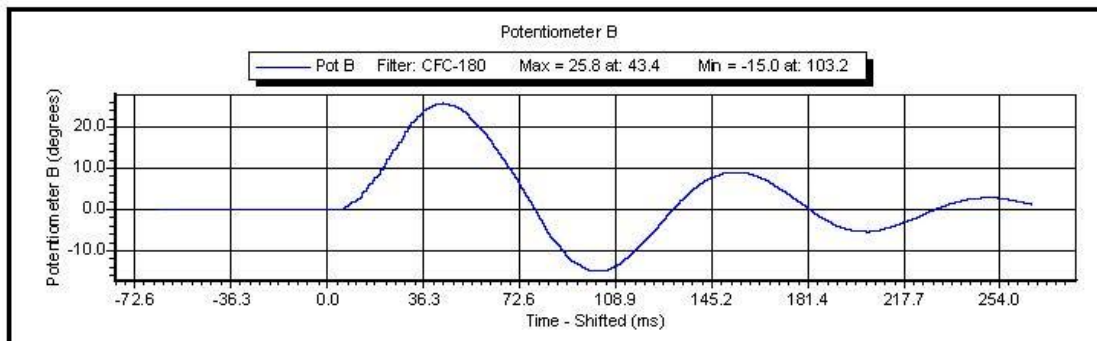
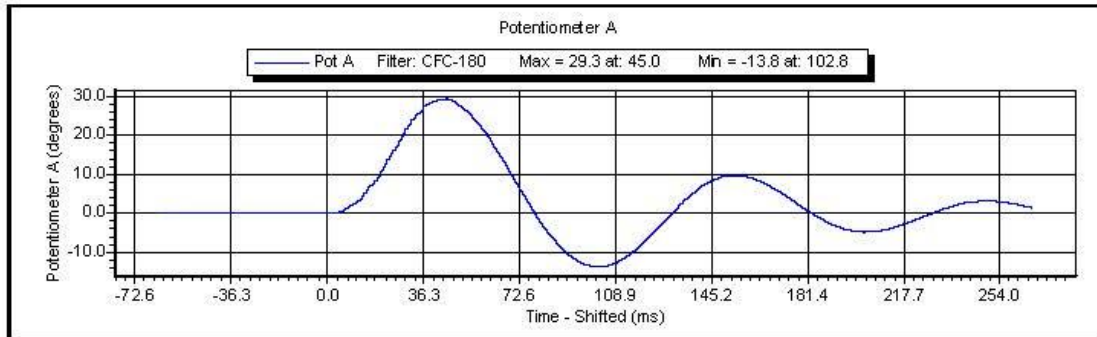
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Test ID:

Test Time: 1:18:18 PM

Test Date: 11/17/2011

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2 of 2



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VERIFICATION REPORT

Test Name:	Pelvis Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:			
Test ID:	F034	Test Date:	11/9/2011
Test Number:	1	Test Time:	3:54:14 PM

Component Part Number	Component Serial Number
455-4003	

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	34 %RH P
Velocity	4.20 -- 4.40	4.34 m/s P
Peak Pendulum Force	-5.40 -- -4.70	-5.15 kN P
Time at Peak Pendulum Force	11.80 -- 16.10	13.80 ms P
Peak Pubic Symphysis Force	-1.59 -- -1.23	-1.36 kN P
Time at Peak Pubic Symphysis Force	12.20 -- 17.00	14.60 ms P

All test parameters are within specifications

Technician: **R Weil**
Supervisor: **D Travale**

Test ID: **F034**

Test Time: **3:54:14 PM**

Test Date: **11/9/2011**



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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
Denton	3096	LC-465Fy	8/31/2011

Test ID: **F034**

Test Time: **3:54:14 PM**

Test Date: **11/9/2011**

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2 of 2

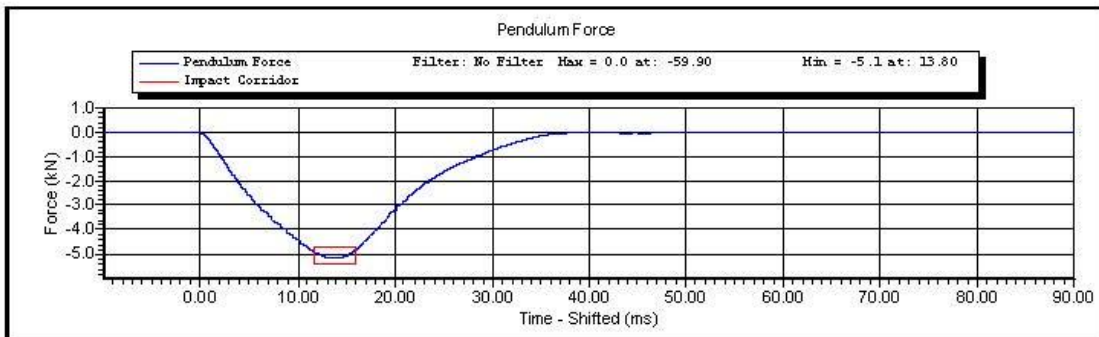
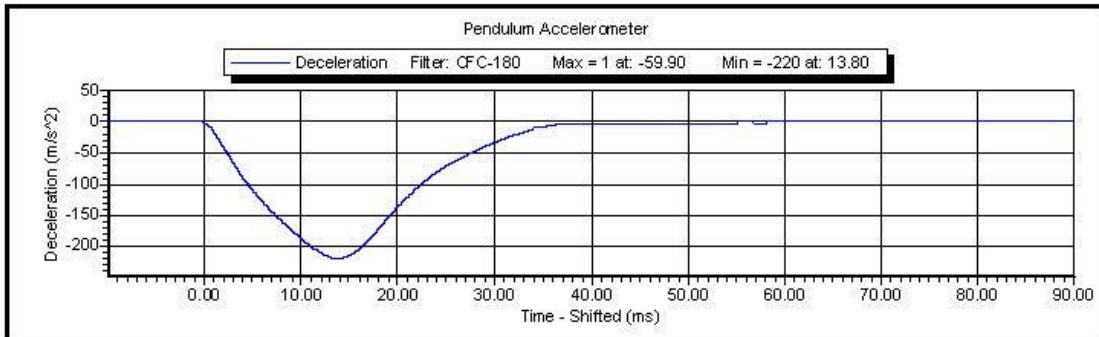


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Test Name:	Pelvis Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:			
Test ID:	F034	Test Date:	11/9/2011
Test Number:	1	Test Time:	3:54:14 PM



Test ID: **F034**

Test Time: **3:54:14 PM**

Test Date: **11/9/2011**

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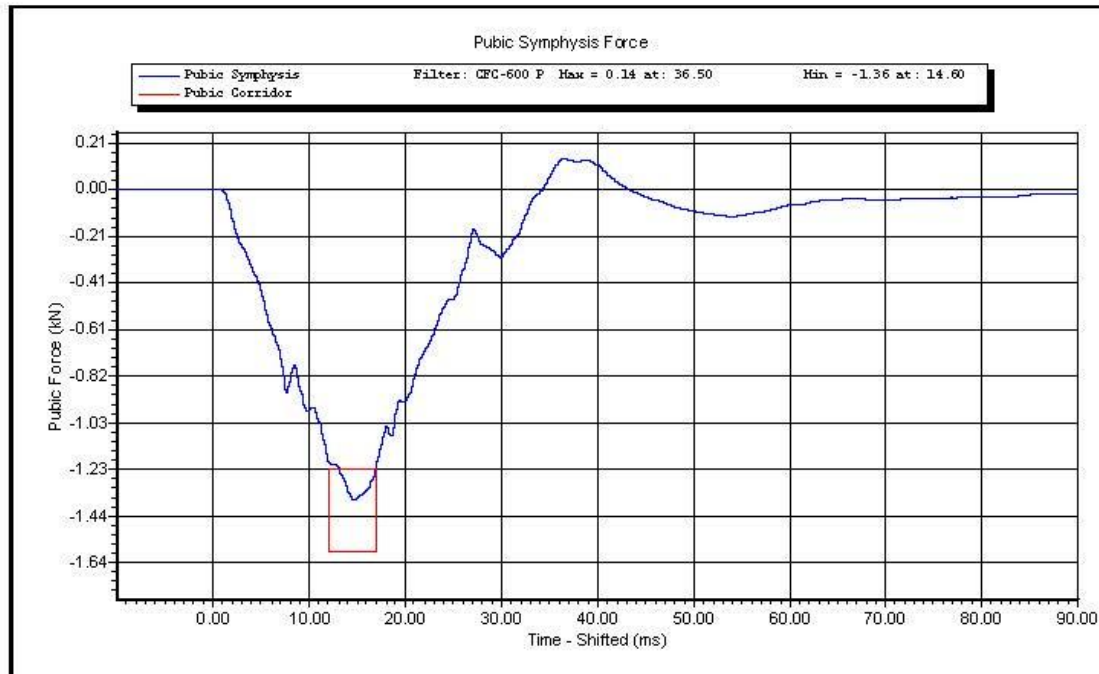
1 of 2



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Test ID: **F034**

Test Time: **3:54:14 PM**

Test Date: **11/9/2011**

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2 of 2

CALIBRATION TEST RESULTS

POST-TEST

SID-IIs No: 8012

CONFIGURED FOR LEFT SIDE IMPACT



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SID-IIsD External Measurements

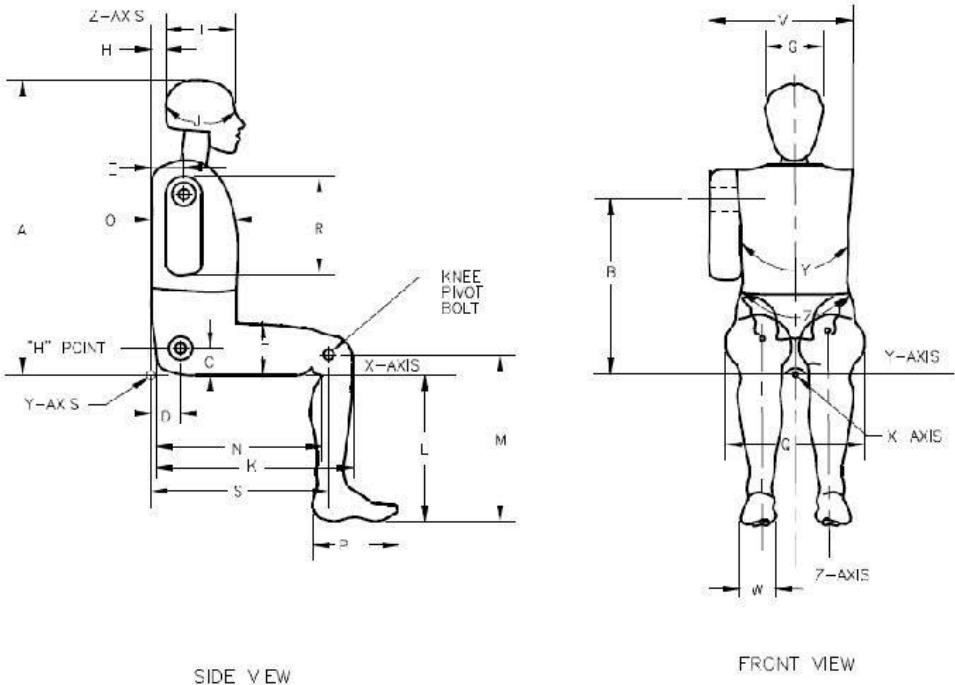
NHTSA ATD S/N DG8012

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	782	Yes
B	Shoulder Pivot Height	437.0 - 453.0	444	Yes
C	H-Point Height	79.0 - 89.0	85	Yes
D	H-Point from Seat Back	141.0 - 151.0	148	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	98	Yes
F	Thigh Clearance	119.0 - 135.0	132	Yes
G	Head Breadth	140.0 - 148.0	145	Yes
H	Head Back from Backline	40.0 - 46.0	43	Yes
I	Head Depth	178.0 - 188.0	187	Yes
J	Head Circumference	541.0 - 551.0	548	Yes
K	Buttock to Knee Length	514.0 - 540.0	530	Yes
L	Popliteal Height	343.0 - 369.0	359	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	402	Yes
N	Buttock Popliteal Length	416.0 - 442.0	434	Yes
O	Chest Depth without Jacket	195.0 - 211.0	204	Yes
P	Foot Length (right)	216.0 - 232.0	223	Yes
Q	Hip Breadth	313.0 - 323.0	315	Yes
R	Arm Length	249.0 - 259.0	257	Yes
S	Knee Joint to Seat back	478.0 - 493.0	490	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	351	Yes
W	Foot Width (right)	78.0 - 94.0	84	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	872	Yes
Z	Waist Circumference	761.0 - 791.0	782	Yes

Technician : AR

Date: 11/11/2011

SID-IIIsD External Dimension Reference Diagram





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VERIFICATION REPORT

Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/12/2011
Test Number:	1	Test Time:	10:38:33 AM

Component Part Number	Component Serial Number
Head Skin - 180-1002	1362

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.1 deg C P
Humidity	10 -- 70	25 %RH P
Resultant Acceleration	115.0 -- 137.0	118.1 g P
Oscillation	0.0 -- 15.0	1.8 % P
Fore-Aft Acceleration	-15.0 -- 15.0	4.4 g P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID:

Test Time: **10:38:33 AM**

Test Date: **11/12/2011**



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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	P49185	11/3/2011
Endevco	7264-2000	P58839	10/17/2011
Endevco	7264-2000	P51991	10/17/2011

Test ID:

Test Time: 10:38:33 AM

Test Date: 11/12/2011

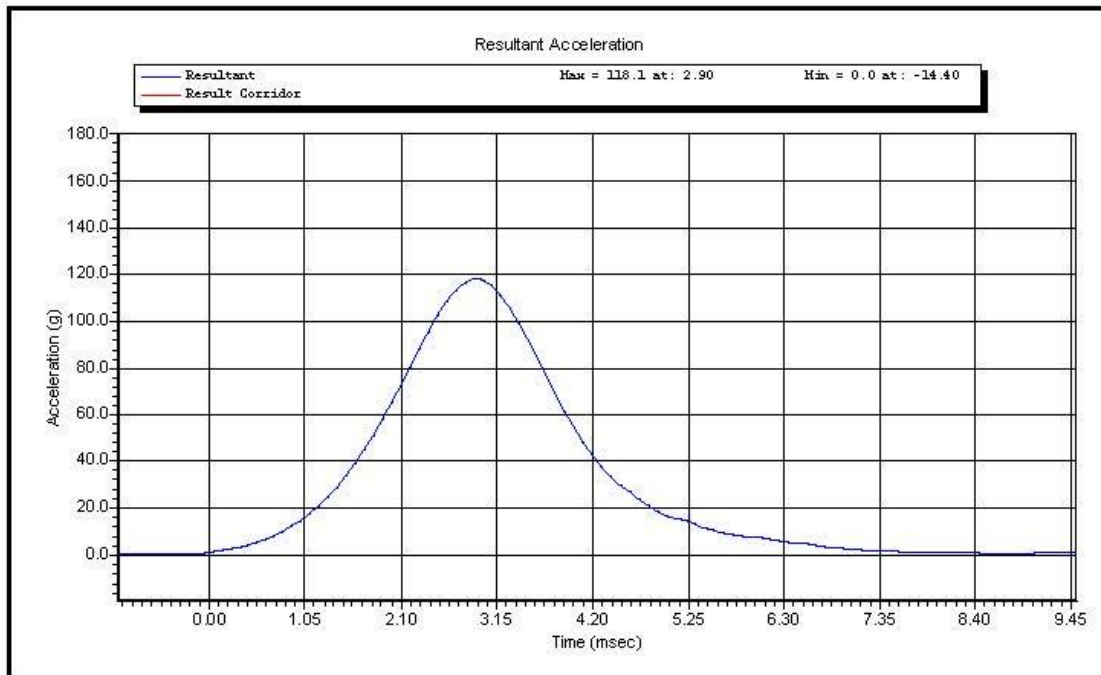


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Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/12/2011
Test Number:	1	Test Time:	10:38:33 AM



Test ID:

Test Time: 10:38:33 AM

Test Date: 11/12/2011

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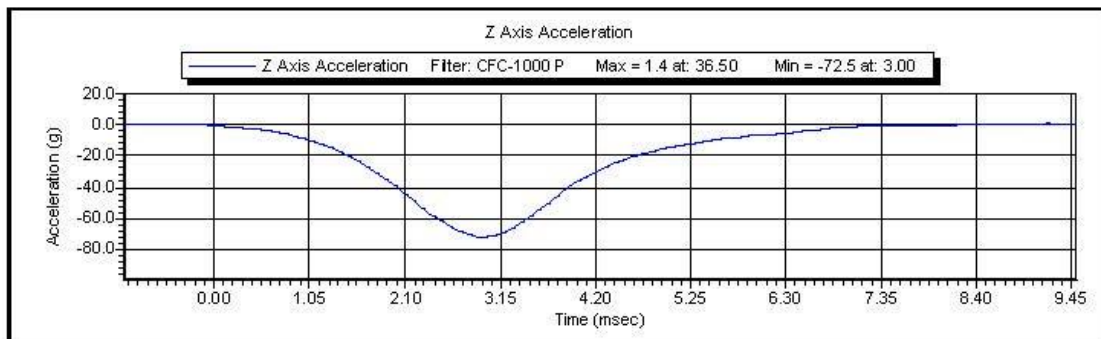
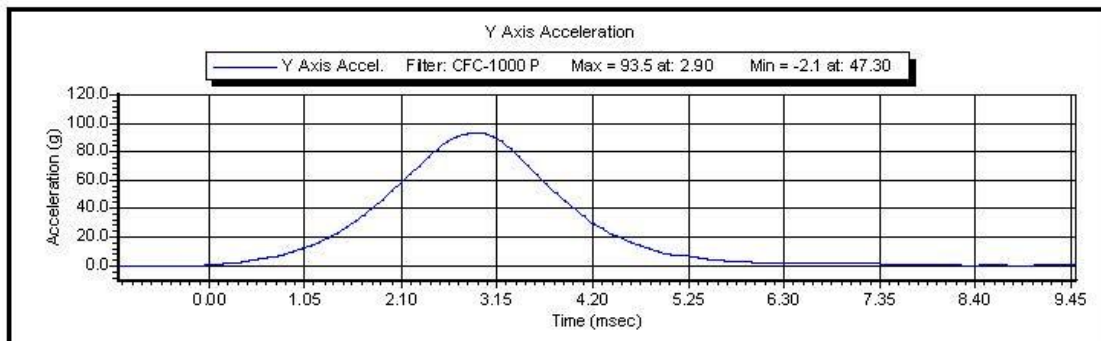
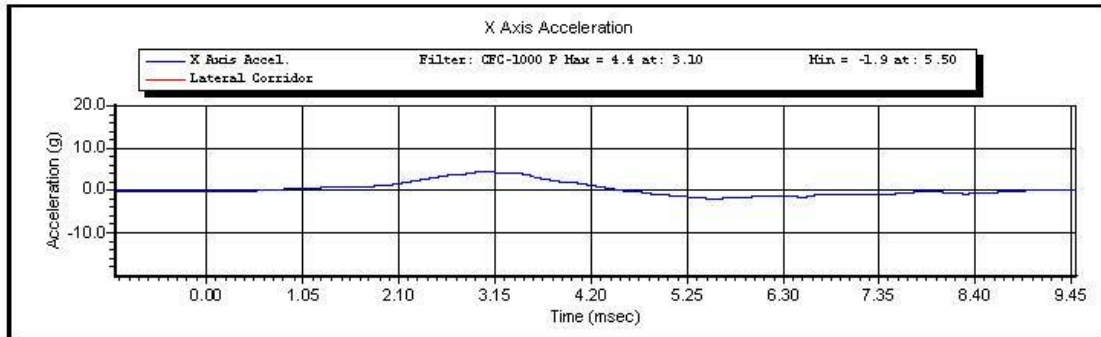
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Test ID:

Test Time: 10:38:33 AM

Test Date: 11/12/2011

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VERIFICATION REPORT

Test Name:	Neck Pendulum	Revision:	8/24/2009
Sub Test Name:	Left Side	Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/12/2011
Test Number:	1	Test Time:	9:37:48 AM

Component Part Number	Component Serial Number
Neck - 180-2000	DG7061

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.8 deg C P
Humidity	10 -- 70	25 %RH P
Velocity	5.51 -- 5.63	5.57 m/s P
Pendulum Impulse at 10 ms	2.20 -- 2.80	2.43 m/s P
Pendulum Impulse at 15 ms	3.30 -- 4.10	3.44 m/s P
Pendulum Impulse at 20 ms	4.40 -- 5.40	4.61 m/s P
Pendulum Impulse at 25 ms	5.40 -- 6.10	5.50 m/s P
Pendulum Impulse between 25 and 100 ms	5.50 -- 6.20	5.77 m/s P
Max D Plane Rotation	71.0 -- 81.0	75.0 degrees P
Time at Max Rotation	50.0 -- 70.0	62.8 ms P
Moment about OC	-44.0 -- -36.0	-38.7 Nm P
Moment Decay to Zero	102.0 -- 126.0	114.7 ms P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID:

Test Time: **9:37:48 AM**

Test Date: **11/12/2011**



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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
Denton	1716A	LC-2192Fy	8/31/2011
Denton	1716A	LC-2192Mx	8/31/2011
DentonATD	78051-342	184	5/8/2011
DentonATD	78051-342	174	5/8/2011
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Test ID:

Test Time: **9:37:48 AM**

Test Date: **11/12/2011**

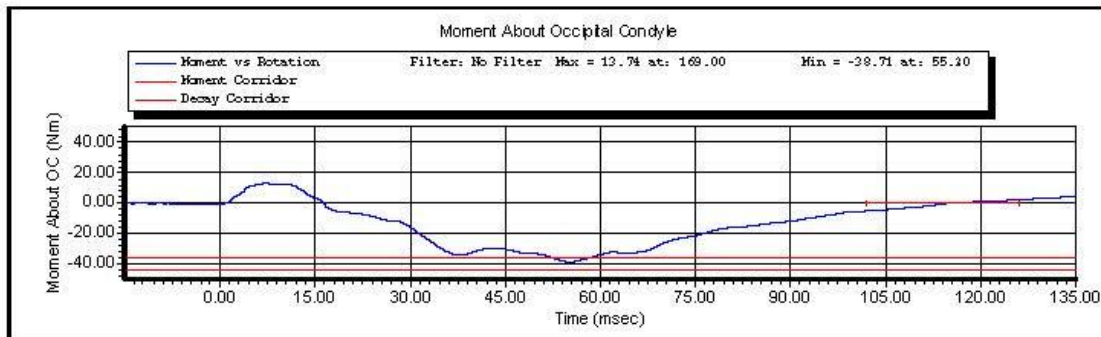
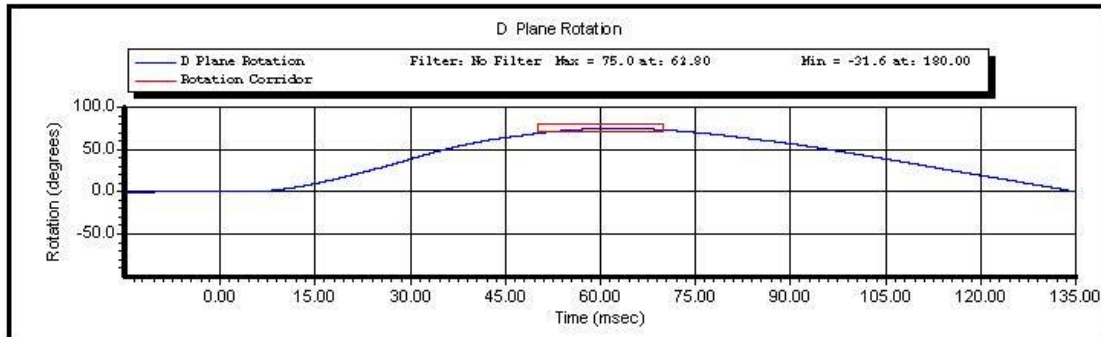


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Test Name:	Neck Pendulum	Revision:	8/24/2009
Sub Test Name:	Left Side	Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/12/2011
Test Number:	1	Test Time:	9:37:48 AM



Test ID:

Test Time: 9:37:48 AM

Test Date: 11/12/2011

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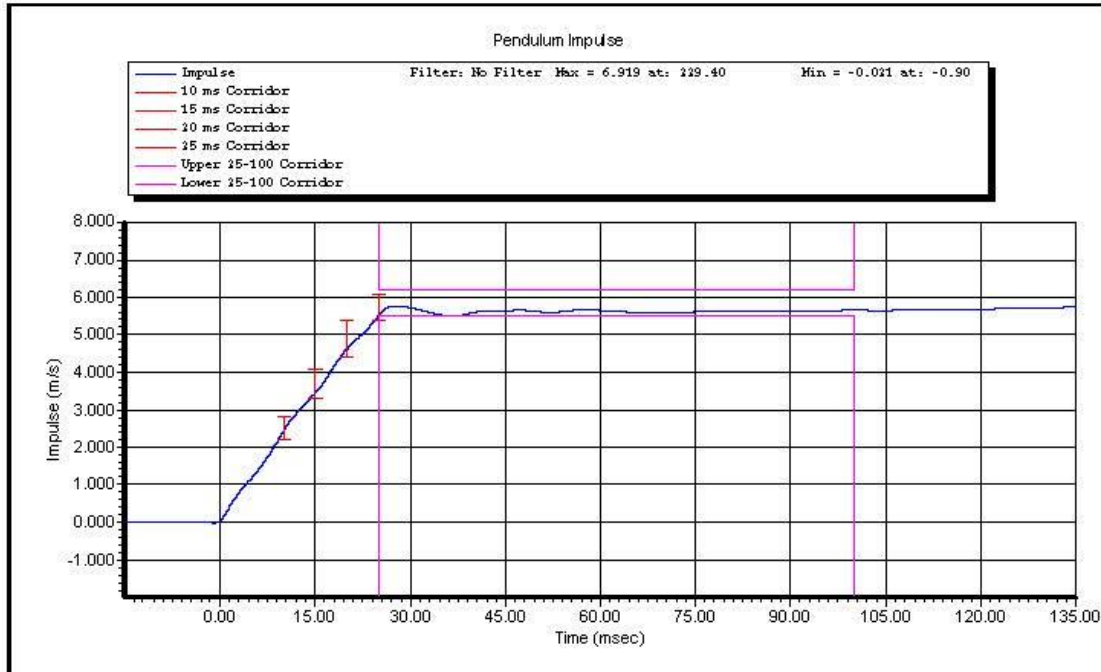
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Test ID:

Test Time: 9:37:48 AM

Test Date: 11/12/2011

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VERIFICATION REPORT

Test Name:	Shoulder Impact	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/11/2011
Test Number:	1	Test Time:	5:48:27 PM

Component Part Number	Component Serial Number
Left Arm 180-6011-1	DG3210
Shoulder Rib 180-3355	DG6997

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.50 deg C P
Humidity	10.0 -- 70.0	29.0 %RH P
Velocity	4.20 -- 4.40	4.32 m/s P
Probe Acceleration	13.0 -- 18.0	15.2 g P
Shoulder Deflection	28.0 -- 37.0	29.0 mm P
T1 Acceleration	17.0 -- 22.0	18.7 g P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID:

Test Time: **5:48:27 PM**

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



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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
FTSS	180-3881-1	DS-1845	9/1/2011
Endevco	7264-2000	P63561	10/3/2011

Test ID:

Test Time: **5:48:27 PM**

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

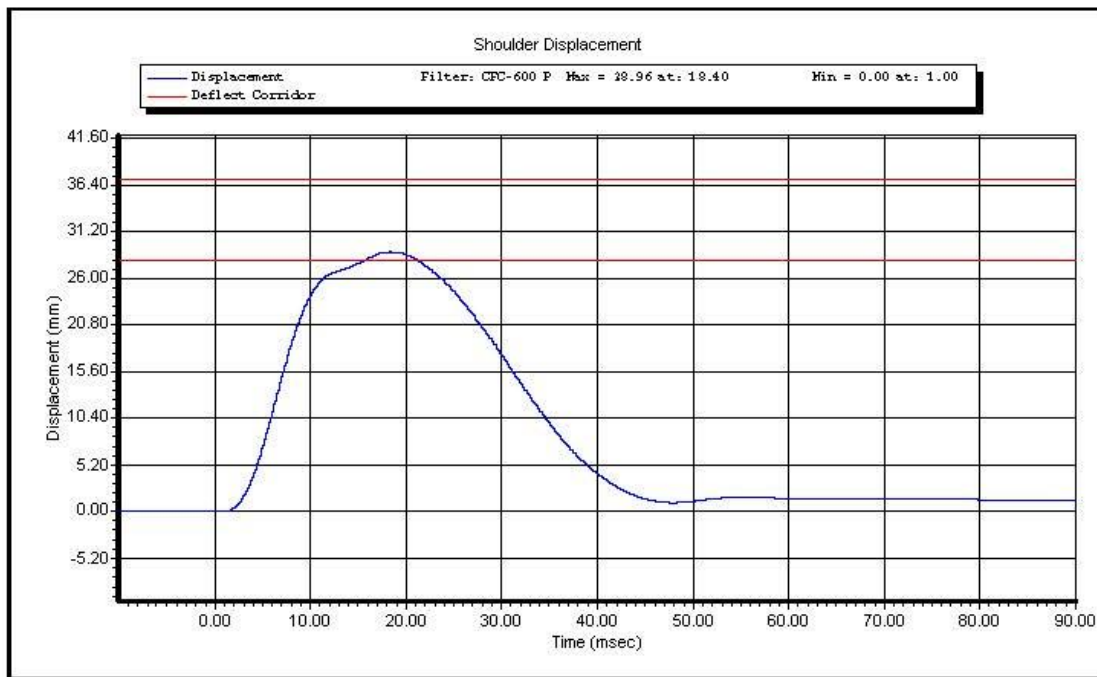


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Test Name:	Shoulder Impact	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/11/2011
Test Number:	1	Test Time:	5:48:27 PM



Test ID:

Test Time: 5:48:27 PM

Test Date: 11/11/2011

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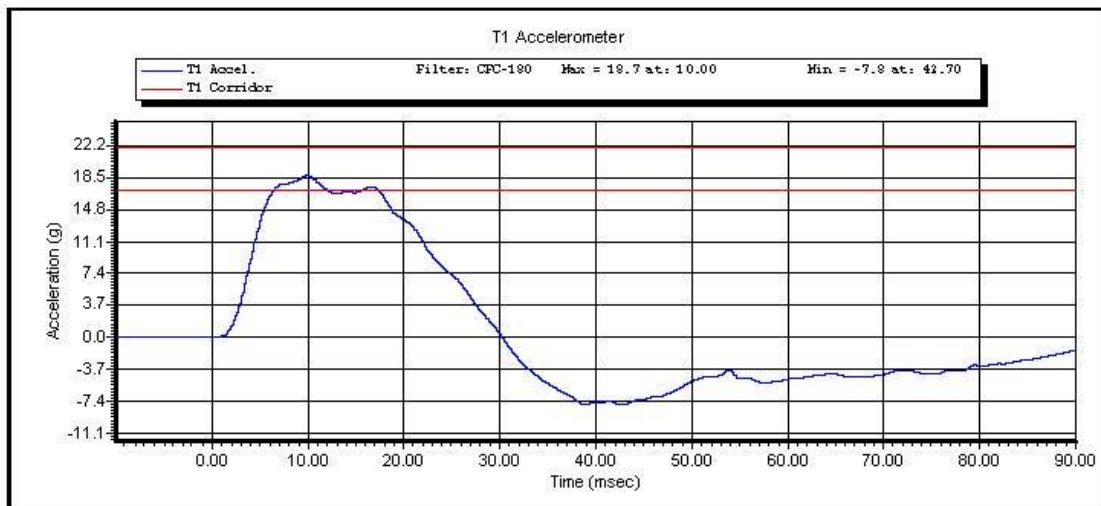
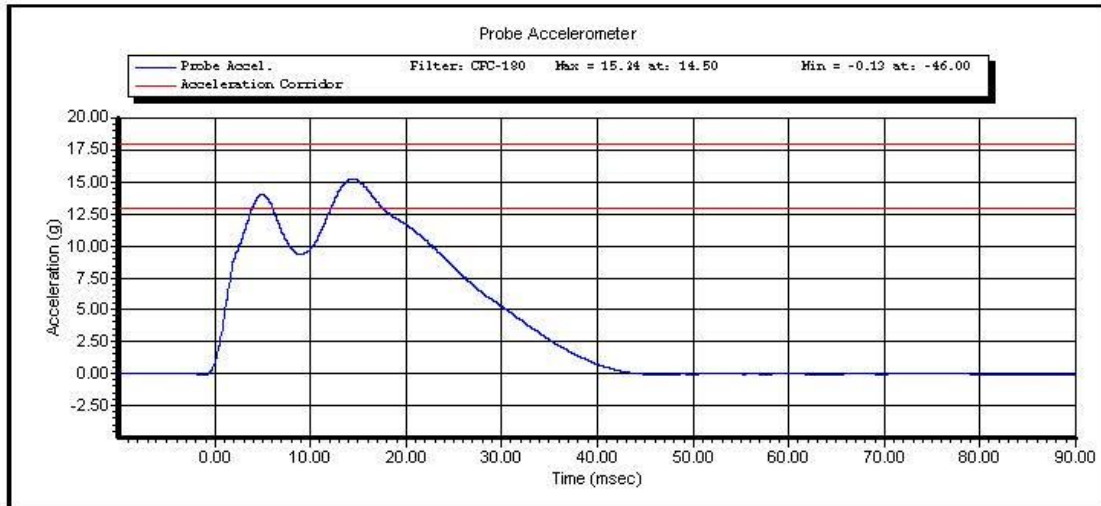
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Test ID:

Test Time: 5:48:27 PM

Test Date: 11/11/2011

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VERIFICATION REPORT

Test Name:	Thorax Impact with Arm	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/11/2011
Test Number:	1	Test Time:	7:16:05 PM

Component Part Number	Component Serial Number
Thorax Ribs 1, 2, 3 180-3362	DG6080, DG6081, DG7543
Shoulder Rib 180-3355	DG6997
Left Arm 180-6011-1	DG3210

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.5 deg C P
Humidity	10 -- 70	29 %RH P
Velocity	6.60 -- 6.80	6.68 m/s P
Probe Acceleration after 5ms	30.0 -- 36.0	34.6 g P
Upper Thorax Rib Deflection	25.0 -- 32.0	28.3 mm P
Mid Thorax Rib Deflection	30.0 -- 36.0	32.5 mm P
Lower Thorax Rib Deflection	32.0 -- 38.0	35.0 mm P
Upper Spine Acceleration ("y")	34.0 -- 43.0	40.6 g P
Lower Spine Acceleration ("y")	29.0 -- 37.0	34.2 g P
Shoulder Deflection	31.0 -- 40.0	35.0 mm P

All test parameters are within specifications

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

Test ID:

Test Time: **7:16:05 PM**

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



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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
FTSS	180-3881-1	DS-1849	9/1/2011
FTSS	180-3881-1	DS-1857	9/1/2011
FTSS	180-3881-1	DS-1859	9/1/2011
Endevco	7264-2000	P63561	10/3/2011
Endevco	7264-2000	P58796	10/5/2011
FTSS	180-3881-1	DS-1845	9/1/2011

Test ID:

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

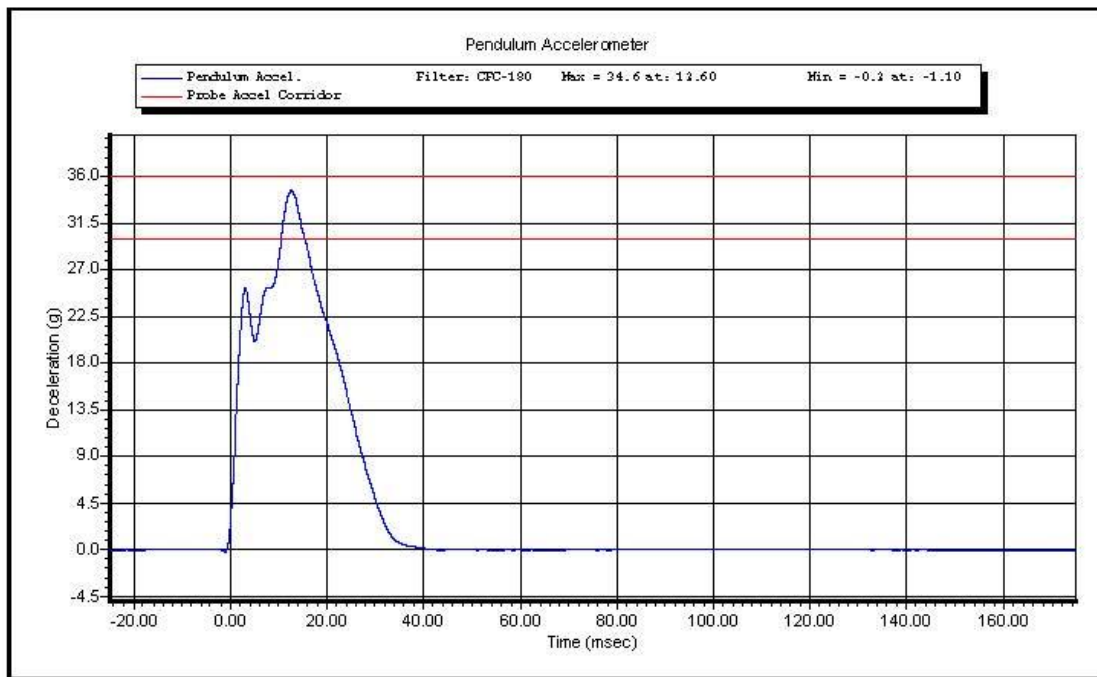


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Test Name:	Thorax Impact with Arm	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/11/2011
Test Number:	1	Test Time:	7:16:05 PM



Test ID:

Test Time: 7:16:05 PM

Test Date: 11/11/2011

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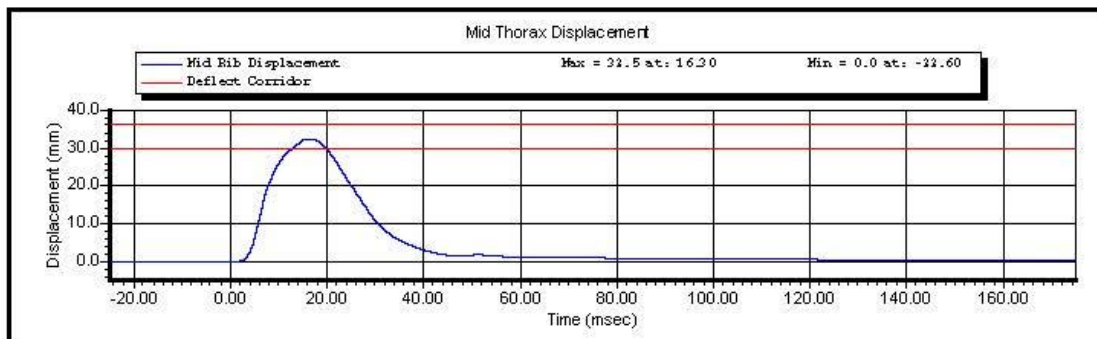
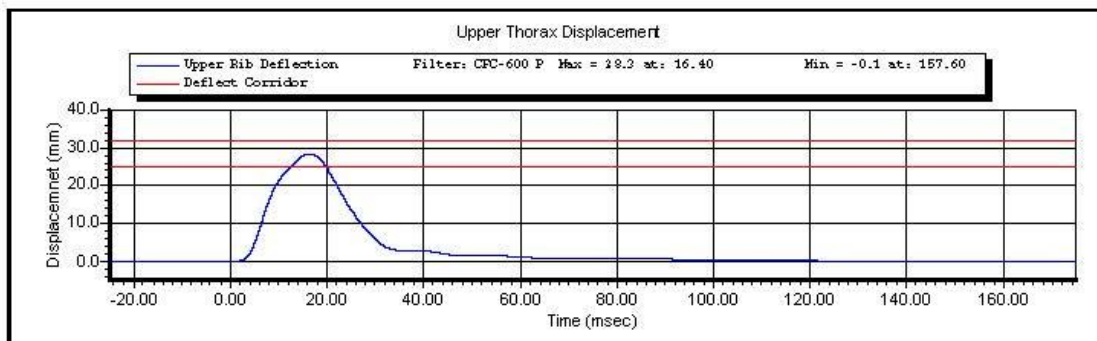
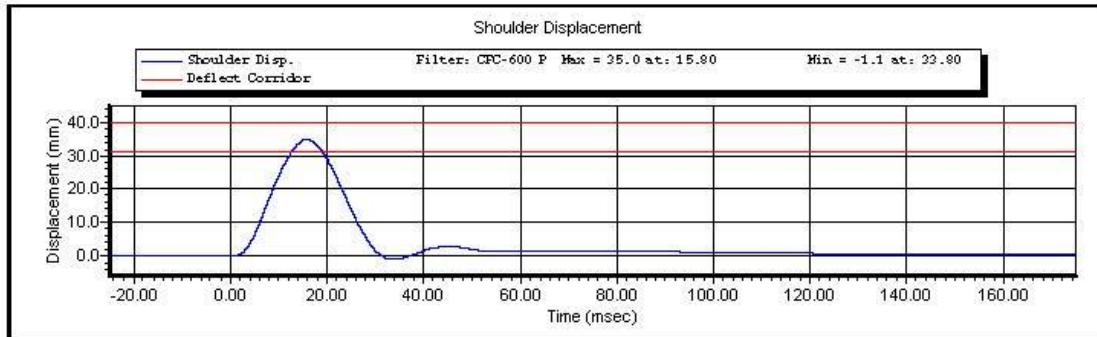
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Test Time: 7:16:05 PM

Test Date: 11/11/2011

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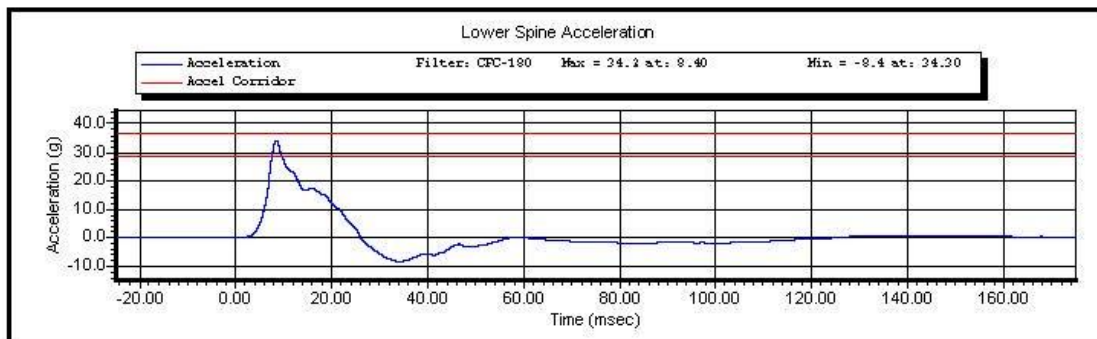
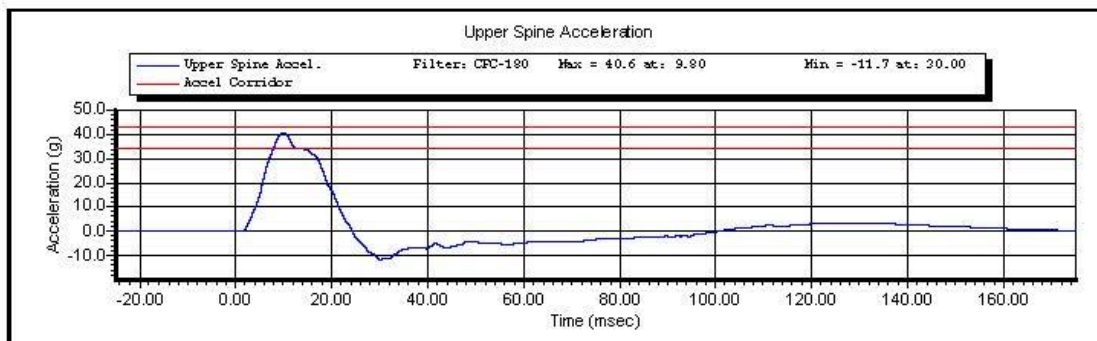
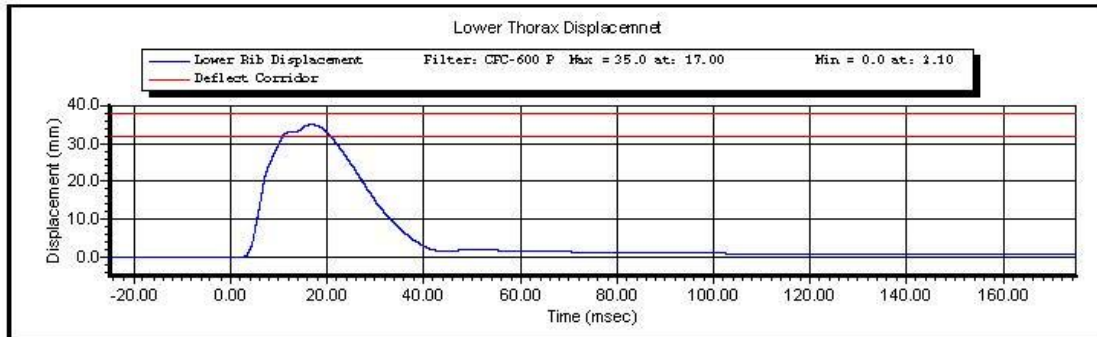
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3 of 3



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VERIFICATION REPORT

Test Name:	Thorax Impact without Arm	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/11/2011
Test Number:	1	Test Time:	6:37:53 PM

Component Part Number	Component Serial Number
Left Arm 180-6011-1	DG3210
Shoulder Rib 180-3355	DG6997

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.5 deg C P
Humidity	10 -- 70	29 %RH P
Velocity	4.20 -- 4.40	4.31 m/s P
Probe Acceleration	14.0 -- 18.0	16.7 g P
Upper Thorax Rib Deflection	32.0 -- 40.0	36.2 mm P
Mid Thorax Rib Deflection	39.0 -- 45.0	42.4 mm P
Lower Thorax Rib Deflection	35.0 -- 43.0	40.3 mm P
Upper Spine Acceleration T1	13.0 -- 17.0	15.9 g P
Lower Spine Acceleration T12	7.0 -- 11.0	9.7 g P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID:

Test Time: **6:37:53 PM**

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



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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
FTSS	180-3881-1	DS-1849	9/1/2011
FTSS	180-3881-1	DS-1857	9/1/2011
FTSS	180-3881-1	DS-1859	9/1/2011
Endevco	7264-2000	P63561	10/3/2011
Endevco	7264-2000	P58796	10/5/2011

Test ID:

Test Time: **6:37:53 PM**

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

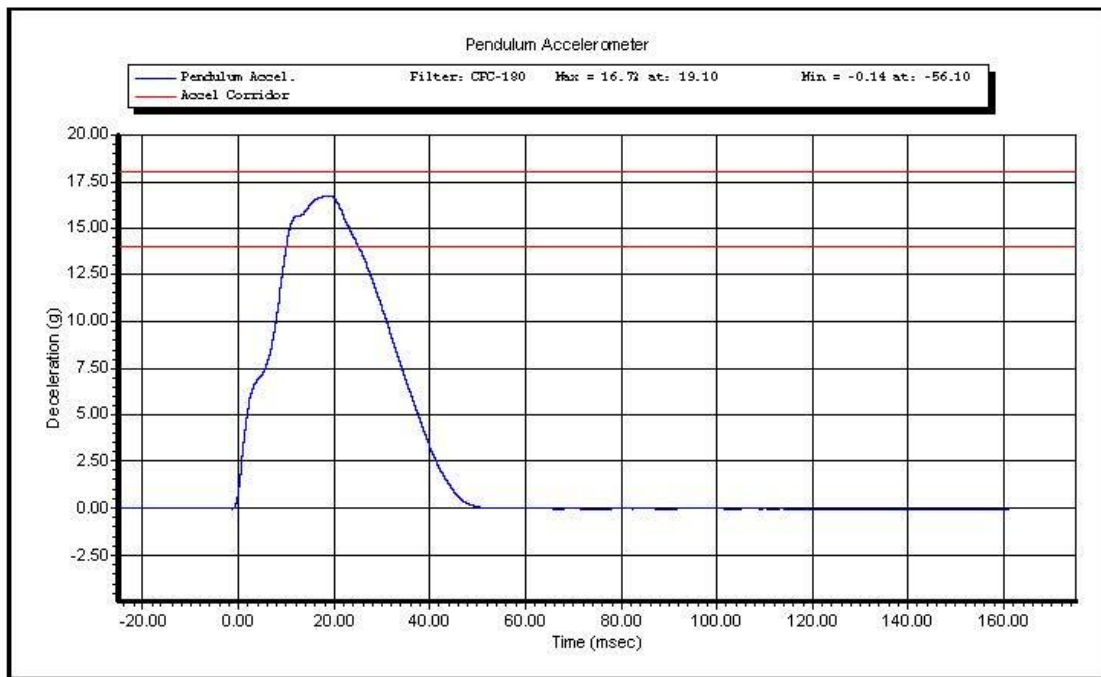


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Test Name:	Thorax Impact without Arm	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/11/2011
Test Number:	1	Test Time:	6:37:53 PM



Test ID:

Test Time: 6:37:53 PM

Test Date: 11/11/2011

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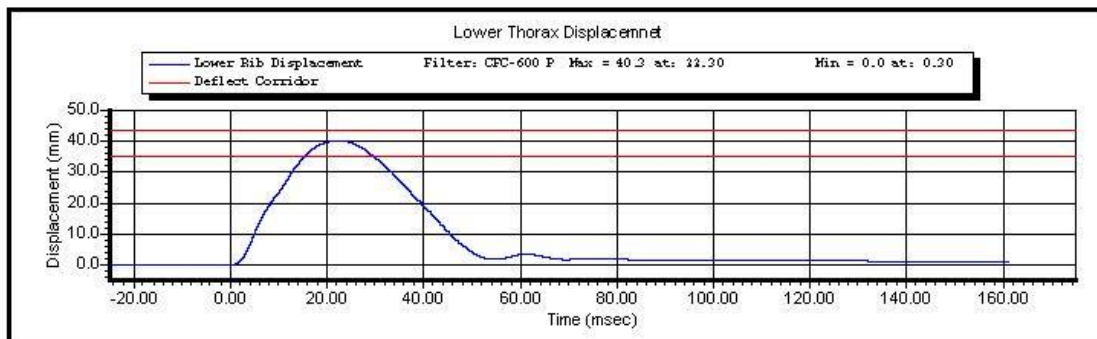
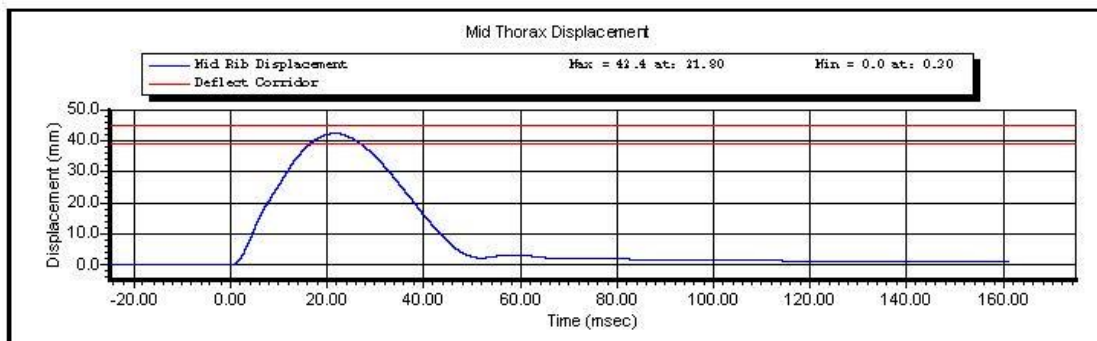
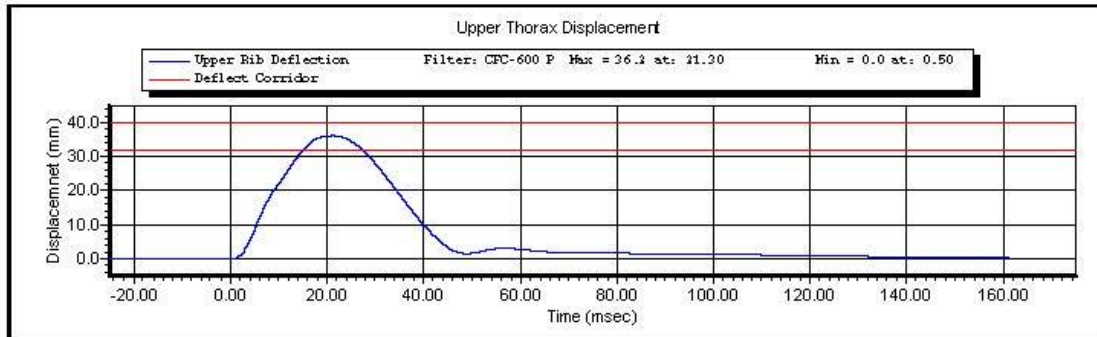
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Test Time: 6:37:53 PM

Test Date: 11/11/2011

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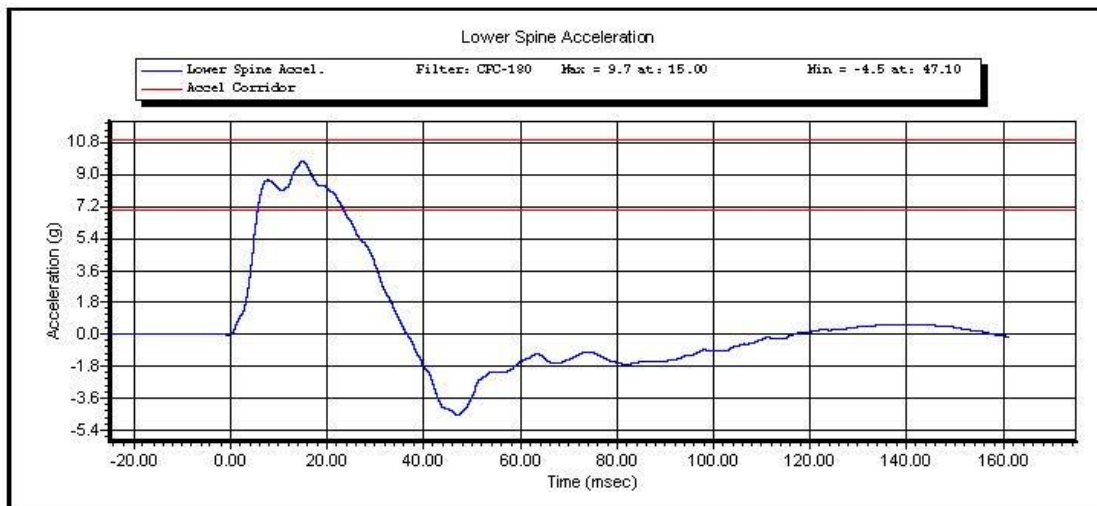
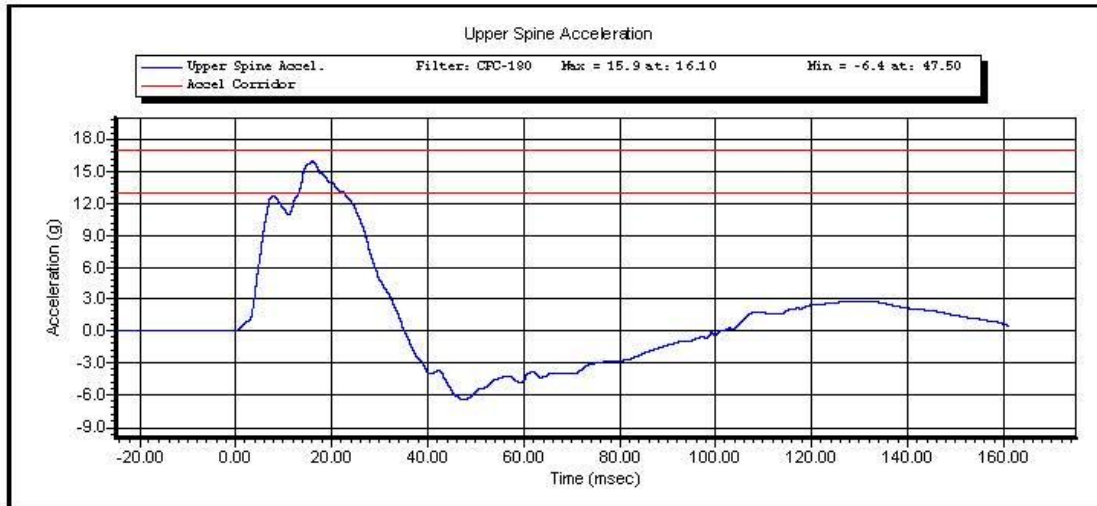
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Test ID:

Test Time: 6:37:53 PM

Test Date: 11/11/2011

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3 of 3



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VERIFICATION REPORT

Test Name:	Abdominal Impact	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/11/2011
Test Number:	1	Test Time:	6:19:00 PM

Component Part Number	Component Serial Number
Thorax Ribs 4, 5	1761, DG7012

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.4 deg C P
Humidity	10 -- 70	29 %RH P
Velocity	4.20 -- 4.40	4.32 m/s P
Probe Acceleration	12.0 -- 16.0	15.2 g P
Upper Abdominal Rib Deflection	36.0 -- 47.0	40.2 mm P
Lower Abdominal Rib Deflection	33.0 -- 44.0	38.7 mm P
Lower Spine Acceleration - T12	9.0 -- 14.0	11.4 g P

All test parameters are within specifications

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

Test ID:

Test Time: **6:19:00 PM**

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



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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
FTSS	180-3881-1	DS-1860	9/1/2011
FTSS	180-3881-1	DS-1861	9/1/2011
Endevco	7264-2000	P58796	10/5/2011

Test ID:

Test Time: **6:19:00 PM**

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

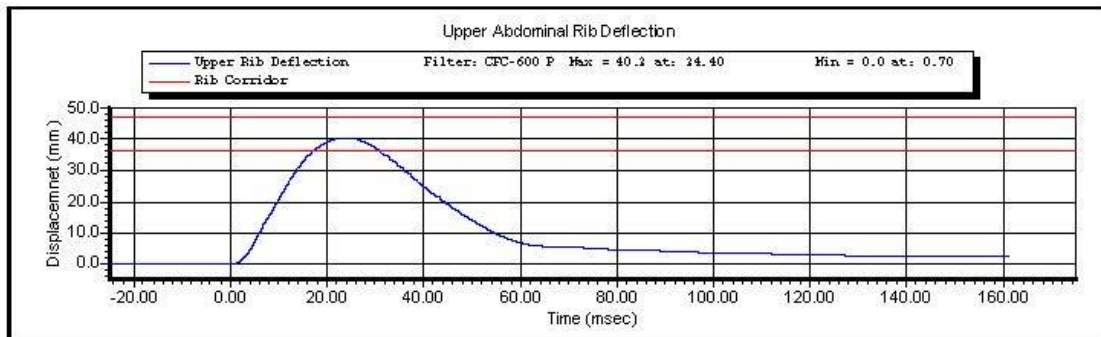
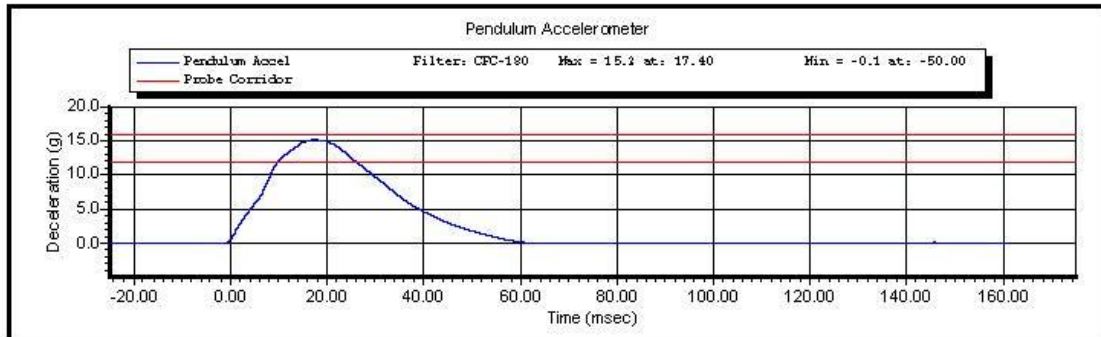


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Test Name:	Abdominal Impact	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/11/2011
Test Number:	1	Test Time:	6:19:00 PM



Test ID:

Test Time: 6:19:00 PM

Test Date: 11/11/2011

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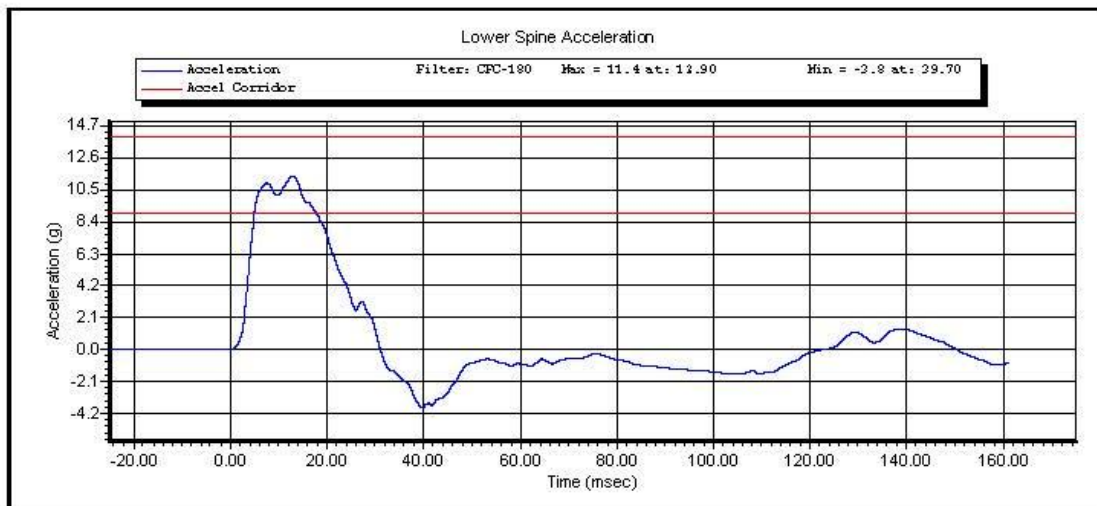
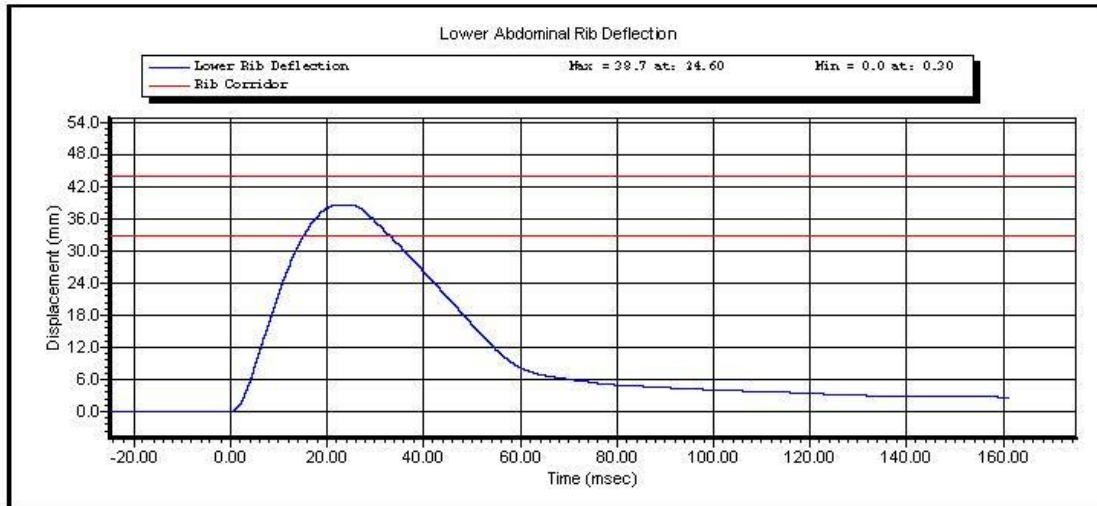
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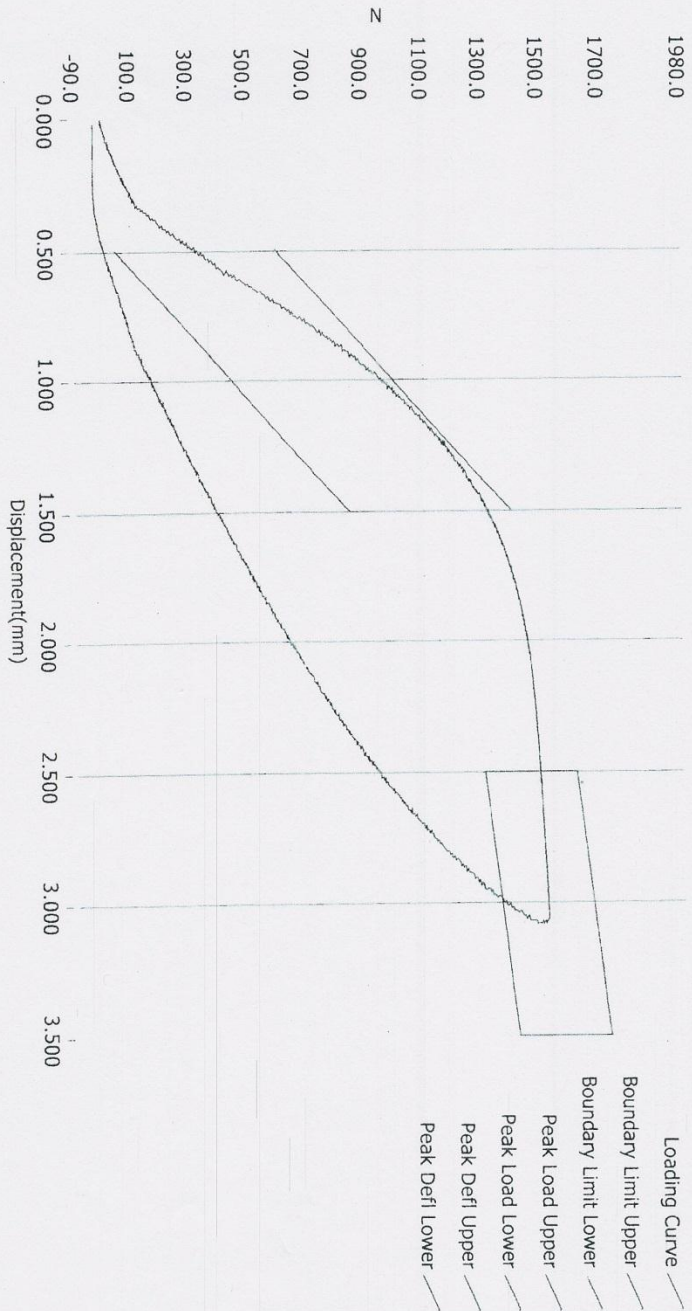
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Test Date: 11/11/2011

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2 of 2

Resultant Data - SIDIIs Plug Compression



ATTD Calibration Lab

Test ID

Part Serial Number

Test Date

Test Time

Cert ID

ATTD Serial Number

ATTD Type

36330

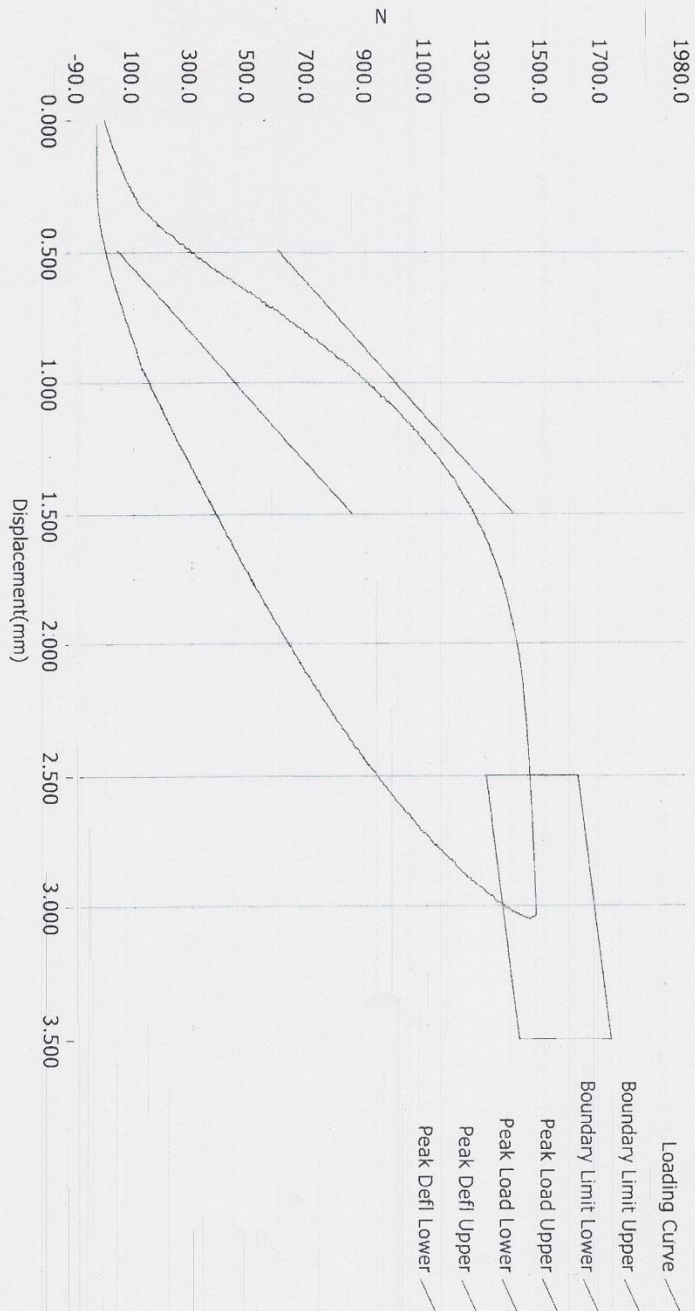
SIDIIs

Current Date : 9/22/2010

Current Time : 14:47:25

DS8012 cert

Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
Cert ID	ATD Serial Number	ATD Type	
36519	SIDIIs		

Current Date : 9/24/2010

Current Time : 02:17:44

11/11 Full



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VERIFICATION REPORT

Test Name:	Pelvis	Revision:	8/24/2009
Sub Test Name:	Acetabulum Impact	Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/12/2011
Test Number:	2	Test Time:	11:32:02 AM

Component Part Number	Component Serial Number
180-4343 Pelvis Flesh	DG3207
FTSS Certification Plug - 1517N	36330
FTSS Full Scale Test Plug - 1474N	36519

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.0 deg C P
Humidity	10 -- 70	27 %RH P
Velocity	6.60 -- 6.80	6.62 m/s P
Peak Probe Acceleration	38.0 -- 47.0	46.2 g P
Peak Pelvis Acceleration	34.0 -- 42.0	39.8 g P
Peak Acetabulum Force	3.60 -- 4.30	3.76 kN P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID:

Test Time: **11:32:02 AM**

Test Date: **11/12/2011**



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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
Endevco	7264-2000	P51875	9/29/2011
FTSS	IF-520	LC-102Fy	3/25/2011

Test ID:

Test Time: 11:32:02 AM

Test Date: 11/12/2011

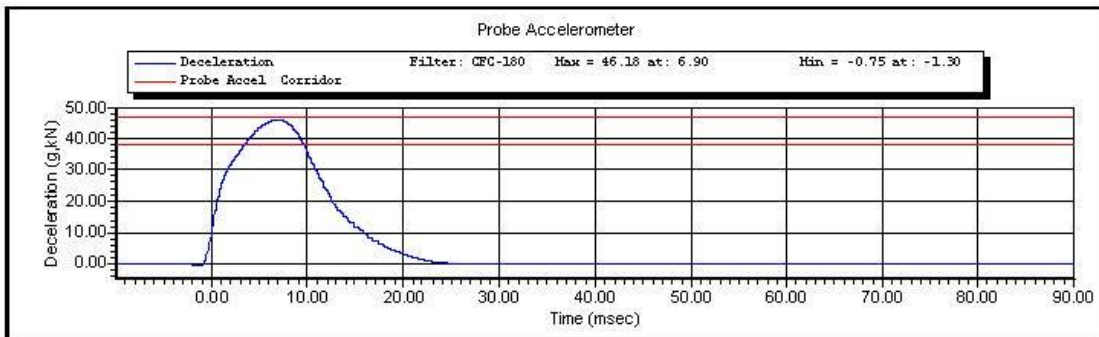
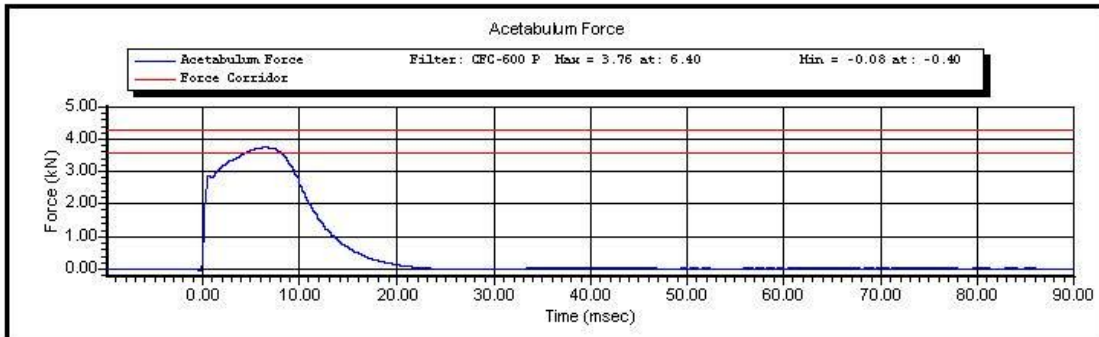


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Test Name:	Pelvis	Revision:	8/24/2009
Sub Test Name:	Acetabulum Impact	Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/12/2011
Test Number:	2	Test Time:	11:32:02 AM



Test ID:

Test Time: **11:32:02 AM**

Test Date: **11/12/2011**

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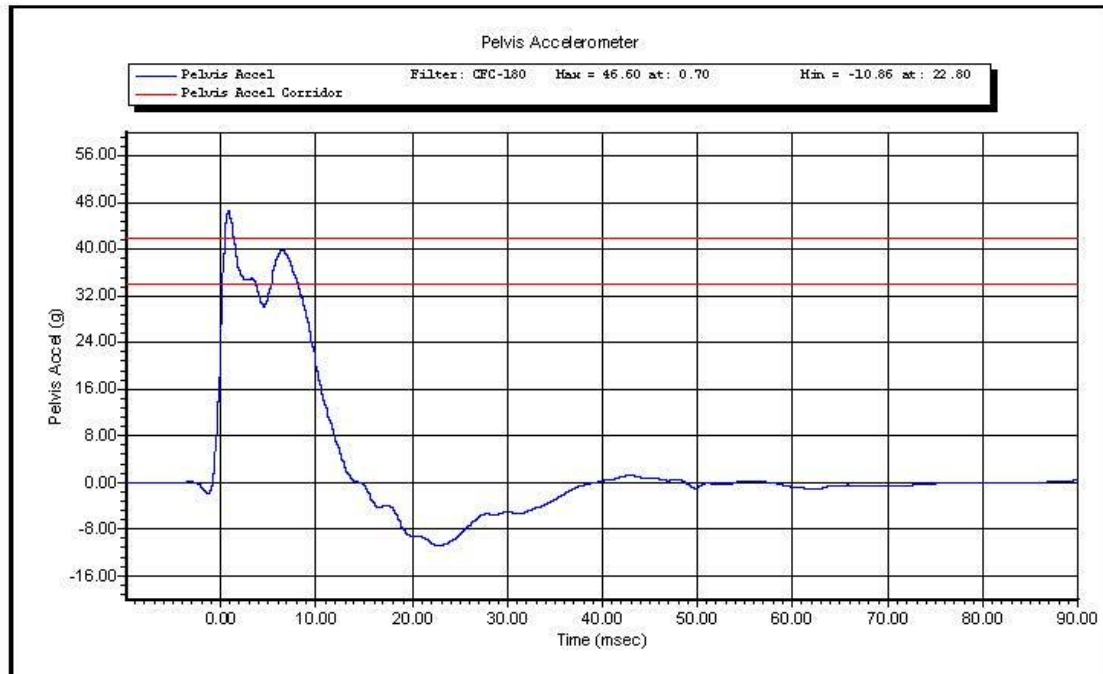
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Test ID:

Test Time: 11:32:02 AM

Test Date: 11/12/2011

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2 of 2



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VERIFICATION REPORT

Test Name:	Pelvis	Revision:	8/24/2009
Sub Test Name:	Iliac Impact	Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/11/2011
Test Number:	1	Test Time:	4:10:27 PM

Component Part Number	Component Serial Number
180-4343 Pelvis Flesh	DG3207

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.5 deg C P
Humidity	10 -- 70	29 %RH P
Velocity	4.20 -- 4.40	4.31 m/s P
Peak Probe Acceleration	36.0 -- 45.0	44.2 g P
Peak Pelvis Acceleration	28.0 -- 39.0	34.9 g P
Peak Iliac Force	4.10 -- 5.10	4.89 kN P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID:

Test Time: **4:10:27 PM**

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



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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
Endevco	7264-2000	P51875	9/29/2011
DentonATD	3228J	LC-281Fy	8/31/2011

Test ID:

Test Time: **4:10:27 PM**

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

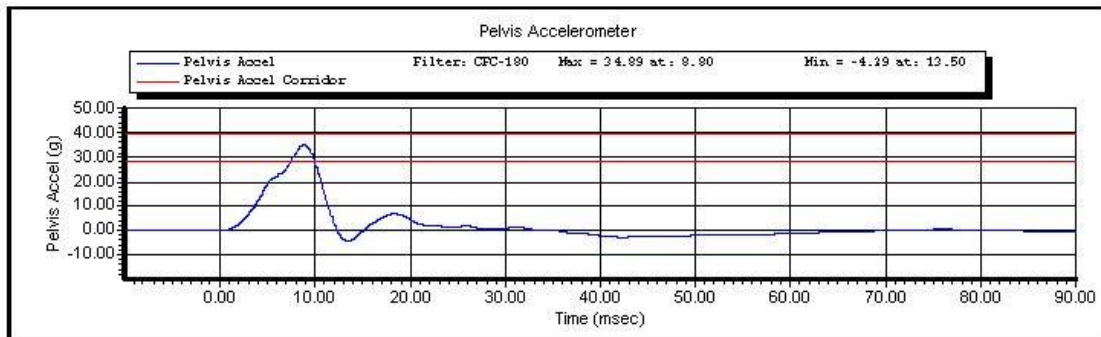
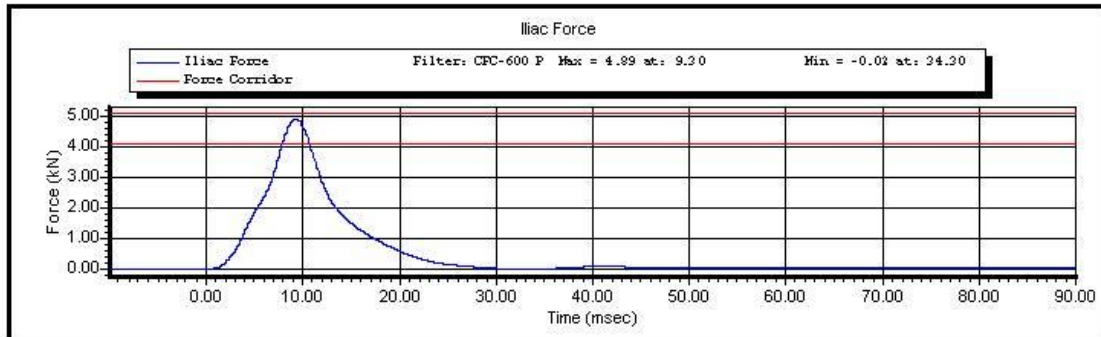


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Test Name:	Pelvis	Revision:	8/24/2009
Sub Test Name:	Iliac Impact	Spec Type:	NHTSA
ATD Type:	SID-Ils		
ATD Serial Number:	DG8012		
Test ID:		Test Date:	11/11/2011
Test Number:	1	Test Time:	4:10:27 PM



Test ID:

Test Time: **4:10:27 PM**

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

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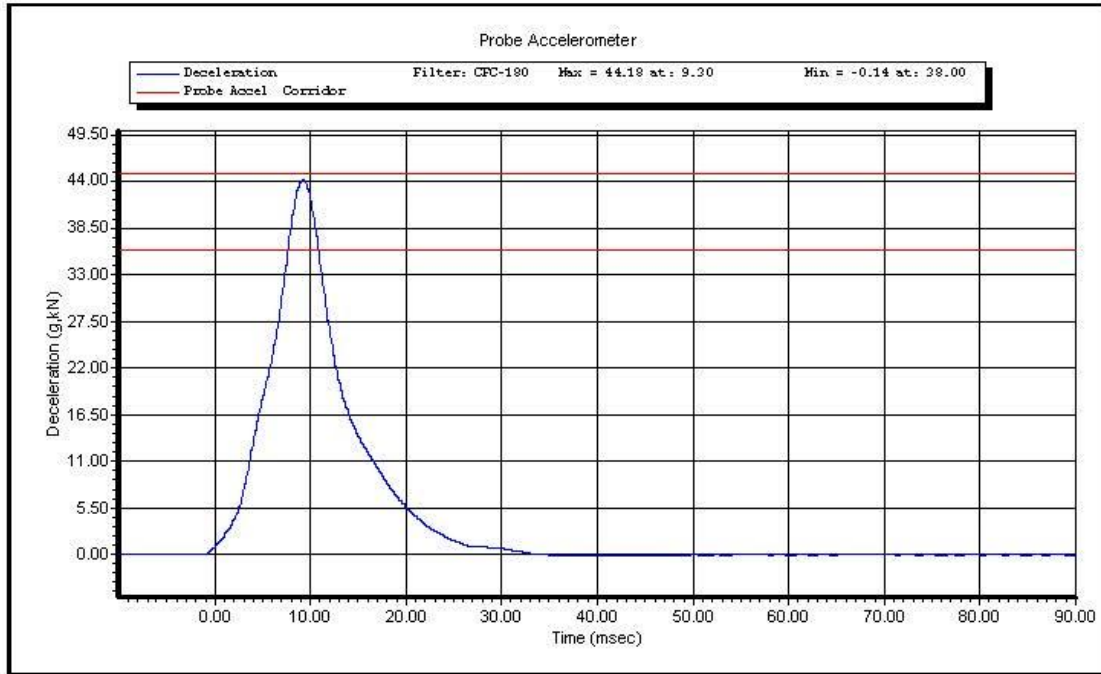
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Test ID:

Test Time: 4:10:27 PM

Test Date: 11/11/2011

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2 of 2

Appendix D
Test Equipment and Instrumentation Calibration Data

Table 1 – Dummy Instrumentation (ES-2re)

			ES-2re S/N 034		
			Serial Number	Manufacturer	Calibration Date
Head Accelerometers		X	P58737	ENDEVCO	9/29/11
		Y	P52022	ENDEVCO	9/29/11
		Z	P52040	ENDEVCO	9/29/11
Head Accelerometers Redundant		RX	P58843	ENDEVCO	9/29/11
		RY	P51668	ENDEVCO	9/29/11
		RZ	P51327	ENDEVCO	9/29/11
Thorax Rib Displacement Potentiometers	Upper	Y	183	HONEYWELL	8/31/11
	Middle	Y	184	HONEYWELL	8/31/11
	Lower	Y	182	HONEYWELL	8/31/11
Abdominal Load Cells	Upper	Y	1512	DENTON	6/3/11
	Middle	Y	1526	DENTON	6/3/11
	Lower	Y	1516	DENTON	6/3/11
Lower Spine Accelerometers (T12)		X	P58830	ENDEVCO	9/29/11
		Y	P52084	ENDEVCO	9/29/11
		Z	P51288	ENDEVCO	9/29/11
Public Symphysis Load Cell		Y	465	DENTON	8/31/11

Table 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N 8012			
				Serial Number	Manufacturer	Calibration Date	
Heat Accelerometers				X	P49185	ENDEVCO	11/3/11
				Y	P58839	ENDEVCO	10/17/11
				Z	P51991	ENDEVCO	10/17/11
Head Accelerometers Redundant				RX	P68058	ENDEVCO	10/17/11
				RY	P51885	ENDEVCO	10/17/11
				RZ	P68059	ENDEVCO	10/17/11
Displacement Potentiometer	Shoulder			Y			
	Thoracic Rib	Upper	Y	1849	DENTON	9/1/11	
		Middle	Y	1857	DENTON	9/1/11	
		Lower	Y	1859	DENTON	9/1/11	
	Abdominal Rib	Upper	Y	1860	DENTON	9/1/11	
		Lower	Y	1861	DENTON	9/1/11	
Lower Spine Accelerometers (T12)				X	P52100	ENDEVCO	10/5/11
				Y	P58796	ENDEVCO	10/5/11
				Z	P50098	ENDEVCO	10/5/11
Acetabulum Load Cell				Y	102	DENTON	8/31/11
Lilac Wing Load Cell				Y	281Fy	DENTON	8/31/11

Table 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	P35786	ENDEVCO	10/4/11
	Vehicle Center of Gravity	Y	P18532	ENDEVCO	9/15/11
	Vehicle Center of Gravity	Z	P2330	ENDEVCO	10/4/11
2	Right Side Sill at Front Seat	X	P69809	ENDEVCO	10/4/11
	Right Side Sill at Front Seat	Y	P71294	ENDEVCO	10/4/11
	Right Side Sill at Front Seat	Z	P69802	ENDEVCO	10/4/11
3	Right Side Sill at Rear Seat	X	A081436	MS	10/4/11
	Right Side Sill at Rear Seat	Y	A081456	MS	10/4/11
	Right Side Sill at Rear Seat	Z	A081453	MS	10/4/11
4	Left Side Sill at Front Door	Y	A081414	MS	10/4/11
5	Left Side Sill at Rear Door	Y	A081457	MS	10/4/11
6	Left A-Post Lower	Y	A081424	MS	10/4/11
7	Left A-Post Middle	Y	A081431	MS	10/4/11
8	Left B-Post Lower	Y	A081443	MS	10/4/11
9	Left B-Post Middle	X	A081410	MS	10/4/11
10	Front Seat Track	Y	A081412	MS	10/4/11
11	Rear Seat Track or Structure	Y	A081413	MS	10/4/11
12	Right Rear Occ. Compartment	Y	A081447	MS	10/4/11
13	Engine Block	X	A034971	MS	10/4/11
	Engine Block	Y	A027662	MS	10/4/11
14	Rear Floorpan Above Axle	X	P35786	ENDEVCO	10/4/11
	Rear Floorpan Above Axle	Y	P16289	ENDEVCO	10/4/11
	Rear Floorpan Above Axle	Z	P32219	ENDEVCO	10/4/11

TABLE 4 – MDB Instrumentation

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	C16680	ENDEVCO	10/4/11
MDB Center of Gravity	Y	C14901	ENDEVCO	10/4/11
MDB Center of Gravity	Z	CP30	ENDEVCO	10/4/11
Left Frame at Rear Axle Centerline	X	C16507	ENDEVCO	10/4/11
Left Frame at Rear Axle Centerline	Y	C16499	ENDEVCO	10/4/11