

REPORT NUMBER: SINCAP-CAL-12-022

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

**Kia MOTOR CORPORATION
2012 Kia Sportage
Utility Vehicle**

NHTSA No: MC0510

**PREPARED BY:
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March 7, 2012

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
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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 Kia Sportage Utility Vehicle 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 1/6/2012.

The impact velocity of the Moving Deformable Barrier (MDB) was 62.02 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 9°C. The target vehicle post-test maximum crush was 223 mm at level 3. 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	150.73
Maximum Thoracic Rib Deflection	mm	44	26.87
Total Abdominal Force	N	2500	1089.54
Pubic Symphysis Force	N	6000	-1840.12

Measurement Description	Passenger ATD (SID-IIs)		
	Units	IARV	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	227.62
Resultant Lower Spine Acceleration	G	82	55.42
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3065.98
Maximum Thoracic Rib Deflection	mm	38*	16.19
Maximum Abdominal Rib Deflection	mm	45*	19.18

* 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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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 Kia Sportage Utility Vehicle.

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 Kia Sportage Utility Vehicle 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 62.02 km/h (38.54 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 January 6, 2012. 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)		
	Units	Threshold	Result
Head Injury Criteria (HIC36)		1000	150.73
Maximum Thorax Rib Deflection	mm	44	26.87
Combined Abdominal Force	N	2500	1089.54
Pubic Symphysis Force	N	6000	-1840.12

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC36)		1000	227.62
Lower Spine (T12) Resultant Acceleration	G	82	55.42
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3065.98
Maximum Thoracic Rib Deflection	mm	38*	16.19
Maximum Abdominal Rib Deflection	mm	45*	19.18

*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		
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, P2 serial number – 300
2. Left front tire went flat during impact event.
3. Camera No.2 does not have a time stamp due to an internal malfunction and needs to be sent back to the manufacturer for repair.

DATA ANOMALIES:

- Driver Front Abdomen FY has negative spike at 14 and 22 ms
- Driver Pubic Symphysis FY has a questionable spike at 22 ms
- Passenger Head AXR has a questionable spike at 67ms

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 Kia Sportage
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0510
 Test Date: 1/6/2012

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	MC0510	Traction Control System (TCS)	Yes
Model Year	2012	Auto-Leveling System	No
Make	Kia	Automatic Door Locks (ADL)	Yes
Model	Sportage	Power Window Auto-Reverse	No
Body Style	Utility Vehicle	Other Optional Feature	--
VIN	KNDPB3A22C7217023	Driver Front Airbag	Yes
Body Color	Gold/tan/copper	Driver Curtain Airbag	Yes
Odometer Reading (km/mi)	117 / 73	Driver Head/Torso Airbag	No
Engine Displacement (L)	2.4	Driver Torso Airbag	No
Type/No. Cylinders	CVT 4	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	No	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	Kia Motor Corporation	GVWR (kg)	2,040
Date of Manufacture	8/11	GAWR Front (kg)	1,075
Vehicle Type	Utility Vehicle	GAWR Rear (kg)	1,125

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3		5	
Capacity Weight (VCW) (kg)				420.0	(A)
DSC X 68.04 kg				340.2	(B)
Cargo Weight (RCLW) (kg)				79.8	(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							

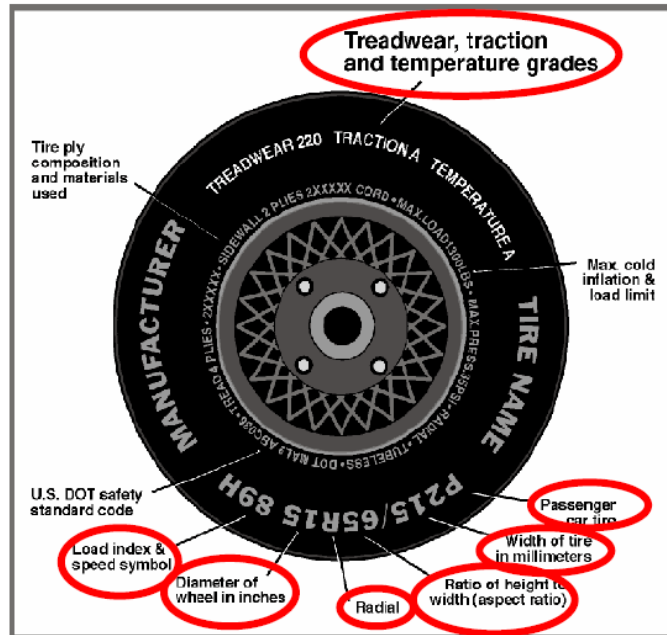
DATA SHEET NO. 1 ... (CONTINUED)
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2012 Kia Sportage
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0510
 Test Date: 1/6/2012

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)	230	230
Recommended Tire Size	P225/60R17	P225/60R17

TIRE SIDEWALL INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Tire Size on Vehicle	P225/60R17	P225/60R17
Tire Manufacturer	Kumho	Kumho
Tire Name	SOLUS KL21	SOLUS KL21
Tire Type	All Weather	All Weather
Tire Width	225	225
Aspect Ratio	60	60
Radial	Yes	Yes
Wheel Diameter	665	665
Load Index/Speed	99H	99H
Treadwear	500	500
Traction Grade	A	A
Temperature Grade	A	A
Tire Material	Rubber	Rubber

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

Test Vehicle: 2012 Kia Sportage
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0510
 Test Date: 1/6/2012

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	230	230	230	230
Tire Placard	kPa	230	230	230	230
Owner's Manual	kPa	230	230	230	230
As Tested	kPa	230	230	230	230

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	214	214	214	214

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	446.5	302.0		486.0	395.0		492.0	392.0	
Right	kg	431.0	288.0		425.0	369.5		441.0	353.5	
Ratio	%	60	40		54	46		56	44	
Totals	kg	877.5	590.0	1,467.5	911.0	764.5	1,675.5	933.0	745.5	1,678.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1,467.5	(A)
Sum of Actual Weight of 2 P572 ATDS Used	kg	136.8	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	79.8	(C)
Calculated Target Vehicle Test Weight (TVTW)	kg	1,683.4	(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)
None	0
Ballast / Equipment Added	83.5

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

Test Vehicle: 2012 Kia Sportage
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0510
 Test Date: 1/6/2012

TEST VEHICLE ATTITUDE AND CG

Measurement Description	Units	Fully Loaded	As Tested	Meets Requirement**
LF	mm	753	755	Yes
RF	mm	759	764	Yes
RR	mm	743	736	Yes
LR	mm	733	728	Yes
Vehicle CG (Aft of Front Axle)	mm	1,173	1,205	
Vehicle CG (Left+)/Right(-) from Longitudinal Centerline)	mm	43	42	

*** The "As Tested" vehicle attitude measurements must be equal to or within $\pm 10\text{mm}$ 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 Kia Sportage
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0510
 Test Date: 1/6/2012

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	12.9	9.9	11.4
Front Passenger Seat	-	Not Adjustable	-
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 SCRП Height (mm)	SCRП Height Position	SCRП Height (mm)		
				Rearmost	Mid- Fore/Aft	Forward- Most
Driver Seat	11.4	24	Max	54	27	74
			Mid	27	34	47
			Min	0	7	18
Front Passenger Seat	Not Adjustable		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 Kia Sportage
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0510
 Test Date: 1/6/2012

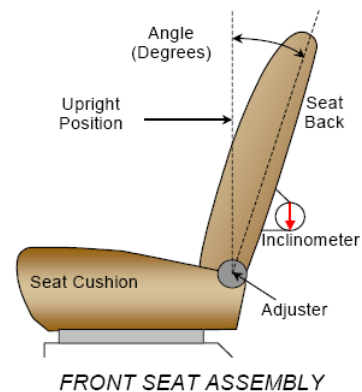
SEAT FORE / AFT POSITION

Seat	Total Fore / Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	240	0-24	120	12
Front Passenger Seat	240	0-24	120	12
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	-13.8 to 49.5	-	8.2	-
Front Passenger Seat	-13.8 to 49.5	-	8.2	-
Front Center Seat*				
Struck Side Rear Seat w/ Seated Dummy	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	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 Kia Sportage
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0510
 Test Date: 1/6/2012

SEAT BELT ANCHORAGE ADJUSTMENT

Seat belt anchorages are adjusted in accordance with the information provided by the manufacturer on Form No. 1. For this test zero is defined as the uppermost position.

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

HEAD RESTRAINT ADJUSTMENT

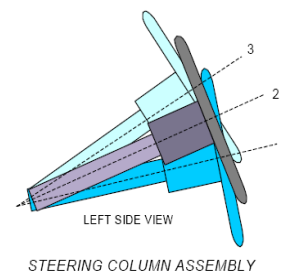
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

	Total No. of Positions	Placed in Position
Driver Seat	6	0
Rear Seat	3	2

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.

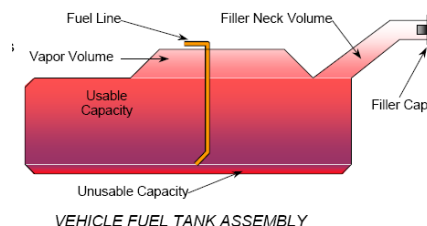
	Degrees	Fore/Aft Position (mm)
Lowermost - Position 1	64.1	
Geometric Center – Position 2	60.1	
Uppermost – Position 3	62.1	
Telescoping Steering Wheel Travel		40
Test Position	62.1	20



FUEL PUMP

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

The electric fuel pump operates when the ignition is in the 'on' position and the engine is running. The fuel filler neck is located above the left rear wheel.



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

Test Vehicle: 2012 Kia Sportage
Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0510
Test Date: 1/6/2012

FUEL TANK CAPACITY

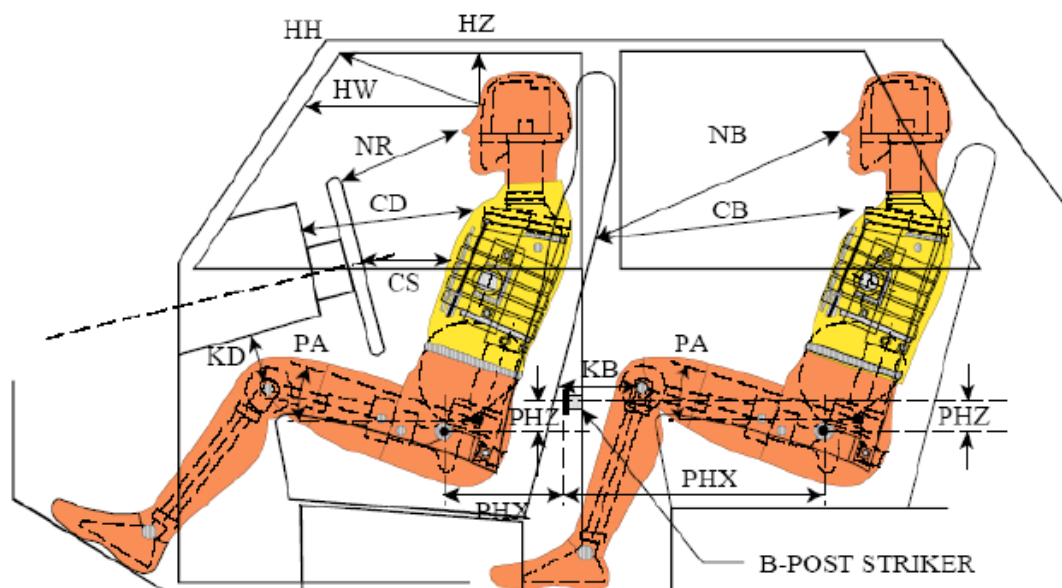
	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	57.9
Usable Capacity of "Optional Tank" (see Form No. 1)	
Usable Capacity of Standard Tank (see Owner's Manual)	57.9
Usable Capacity of Optional Tank (see Owner's Manual)	
93% of Usable Capacity	53.9
Actual Amount of Solvent Used in Test	53.9
1/3 of Usable Capacity	19.3

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 Kia Sportage
Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0510
Test Date: 1/6/2012



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

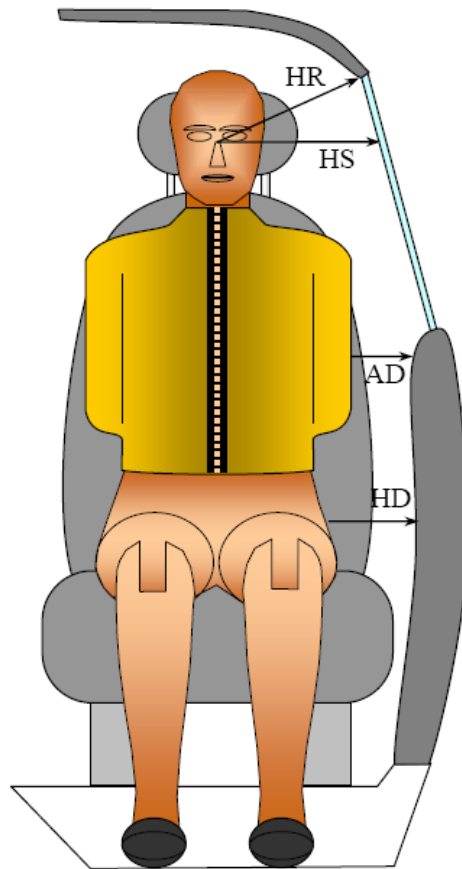
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver (Serial No. F034)		Passenger (Serial No. 300)	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	437			
HW		Header to Windshield	657			
HZ	HZ	Head to Roof Liner	166		287	
NR	NB	Nose to Rim/Seat Back	508		544	
CD	CB	Chest to Dash/Seat Back	655		534	
CS		Chest to Steering Wheel	354			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	188	26.2	290	21.8
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	180	26.7	293	21.0
PAX°	PAX°	Pelvic Tilt Angle X		23.9		21.0
	PAY°	Pelvic Tilt Angle Y				0.3
PHX	PHX	Hip Point to Striker (X-Axis)	187		248	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	244		241	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2012 Kia Sportage
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0510
 Test Date: 1/6/2012



FRONT VIEW OF DUMMY

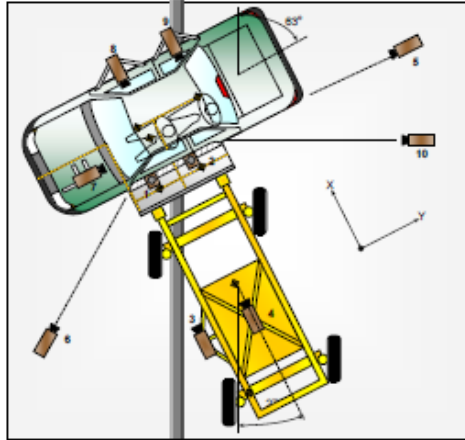
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver (Serial No. F034)	Passenger (Serial No. 300)
HR	Head to Side Header	Mm	203	248
HS	Head to Side Window	Mm	340	362
AD	Arm to Door	Mm	104	158
HD	Hip Point to Door	Mm	151	166

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2012 Kia Sportage
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0510
 Test Date: 1/6/2012



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	205	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	5140	9060	973	50	1000
6	Left Front	2370	1417	930	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: Camera No.2 does not have a time stamp due to an internal malfunction and the camera needs to be sent back to the manufacturer to be repaired.

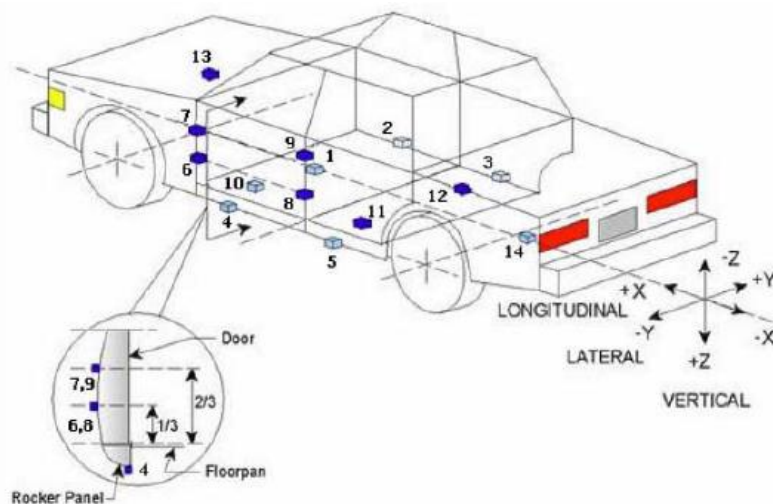
INSTRUMENTATION

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 Kia Sportage
Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0510
Test Date: 1/6/2012



TEST VEHICLE ACCELEROMETER LOCATIONS

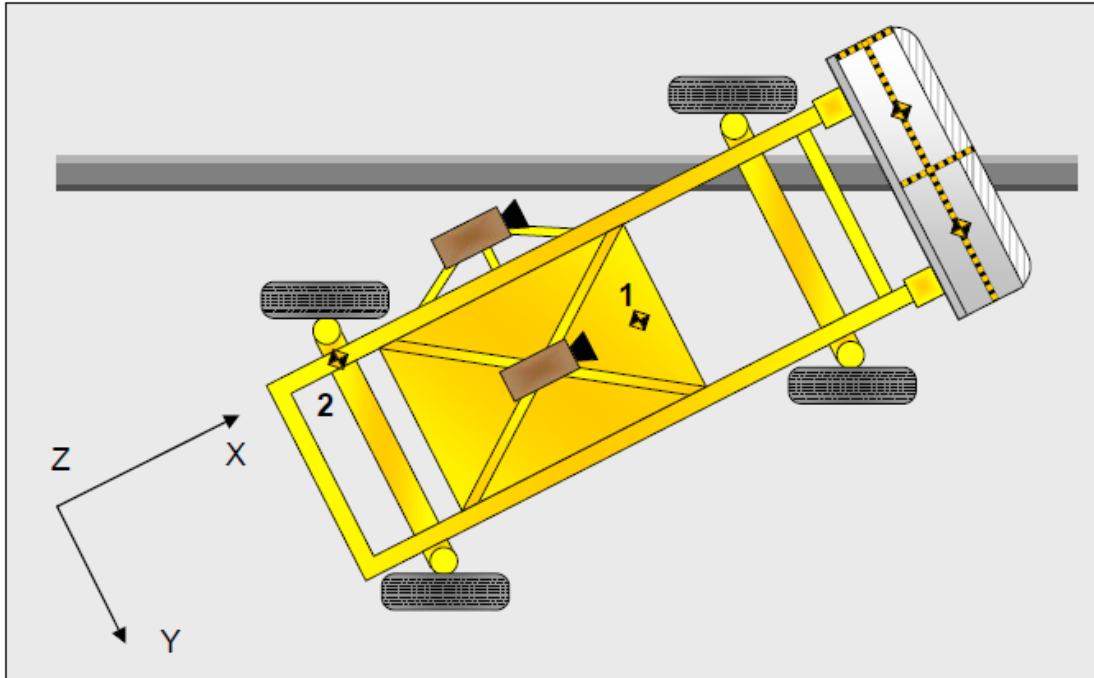
No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2,399	49	-664
2	Right Sill at Front Seat	2,722	662	-380
3	Right Sill at Rear Seat	1,752	649	-362
4	Left Sill at Front Door	2722	-662	380
5	Left Sill at Rear Door	1,817	-646	-363
6	A-Post Lower	2,927	-664	-455
7	A-Post Middle	3,011	-659	-1,149
8	B-Post Lower	1,942	-662	-473
9	B-Post Middle	1,931	-678	-1,048
10	Front Seat Track	2,123	-551	-447
11	Rear Seat Structure	856	-655	-1,015
12	Rt. Rear Occ. Compartment	1,845	401	-363
13	Engine Block	3,715	93	-891
14	Rear Above Axle	809	8	-723

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 Kia Sportage
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0510
 Test Date: 1/6/2012



MDB ACCELEROMETER LOCATIONS

No.	Accelerometer Location	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 Kia Sportage
Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0510
Test Date: 1/6/2012

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Front Seat Dummy (ES-2re)	Rear Seat Dummy (SID-IIs)
Face	Curtain Airbag	Curtain Airbag
Top of Head	Curtain Airbag	Curtain Airbag
Left Side of Head	Curtain Airbag	Curtain Airbag
Back of Head	HeadRest	HeadRest
Left Shoulder	Torso/Pelvis Airbag	Door
Upper Torso	Torso/Pelvis Airbag	Door
Lower Torso	Torso/Pelvis Airbag	Door
Left Hip	Door	Door
Left Knee	Door	Door

POST-TEST DOOR PERFORMANCE

Description	Struck Side		Non-Struck Side		Rear Hatch/ Other
	Front	Rear	Front	Rear	
Remained Closed and Operational	No	No	Yes	Yes	Yes
Total Separation from Vehicle at Hinges or Latches	No	No	No	No	
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, Width of Opening at Striker (mm)	NA	NA	NA	NA	

POST-TEST SEAT PERFORMANCE

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

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	The left side B-Pillar deformed
Sill Separation	None
Windshield Damage	None
Side Window Damage	None
Other Notable Effects	None

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

Test Vehicle: 2012 Kia Sportage
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0510
 Test Date: 1/6/2012

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

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		2642
Vertical Impact Reference Line (Aft of Front Axle - Intended Impact Point)	mm		385
Actual Impact Point (Aft of Frontal Axle)	mm		396
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact Point	-11
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact Point	6

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2012 Kia Sportage
Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0510
Test Date: 1/6/2012

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1,250
Overall Length Including Honeycomb Frame	4,120
Wheelbase 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%	100.0%
Totals	kg	778.5	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	62.0
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.9
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	63.0
MDB Crabbed angle to MDB Forward Line of Motion	Degrees	26.0 to 28.0	27.0

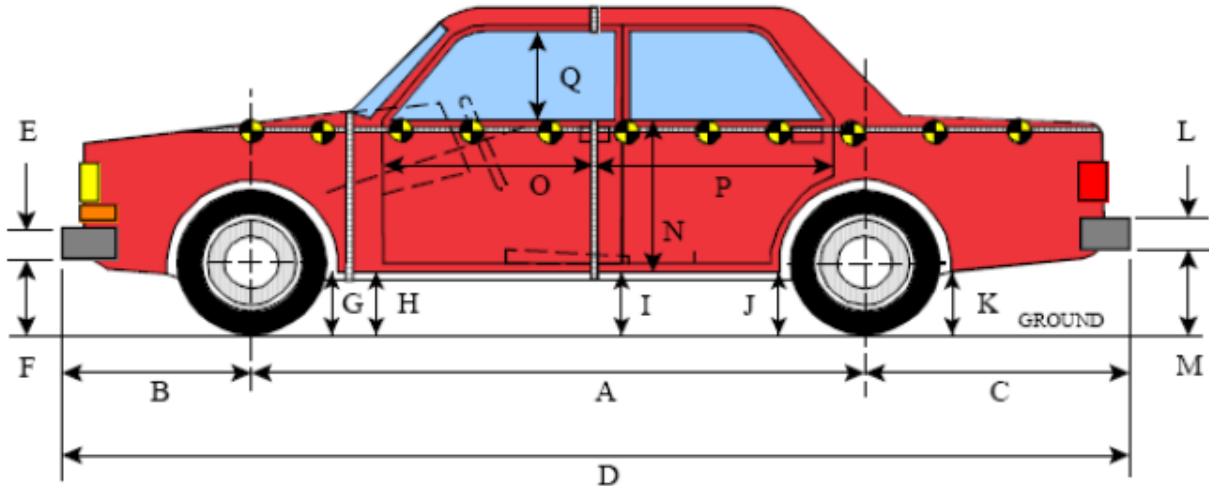
MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush (mm)
Row	Description	Height (mm)	Distance (mm)	Direction	
A	Center of Bumper	432	800	Left	201
B	Top of Bumper	533	700	Left	119
C	Mid-Level	686	800	Left	108
D	Top of Stack	813	800	Left	170

DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2012 Kia Sportage
Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0510
Test Date: 1/6/2012



LEFT SIDE VIEW

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

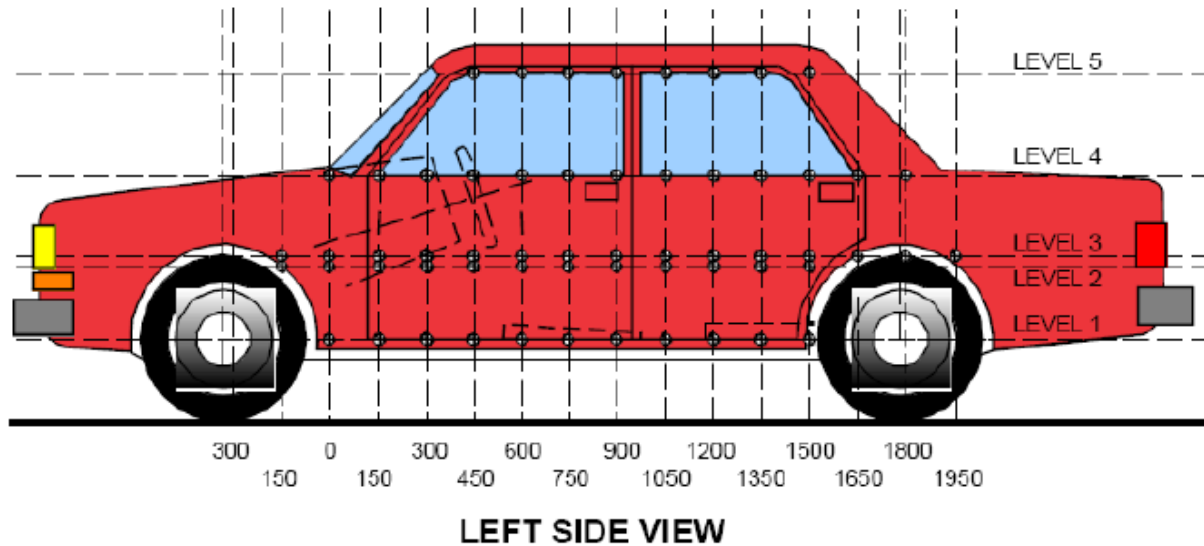
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2,642	2,643	1
B	Front Axle to FSOV	891	882	-9
C	Rear Axle to RSOV	912	906	-6
D	Total Length at Centerline	4,444	4,432	-12
E	Front Bumper Thickness	90	90	0
F	Front Bumper Bottom to Ground	446	503	57
G	Sill Height at Front Wheel Well	249	203	-46
H	Sill Height at Front Door Leading Edge	253	206	-47
I	Sill Height at B Pillar	257	227	-30
J1	Sill Height at Rear Wheel Well	257	258	1
J2	Pinch Weld Height at Rear Wheel Well	244	242	-2
K	Sill Height Aft of Rear Wheel Well	306	314	8
L	Rear Bumper Thickness	160	160	0
M	Rear Bumper Bottom to Ground	341	542	201
N	Sill Height to Window Bottom of Front Window Sill	766	729	-37
O	Front Door Leading Edge to Impact CL	738	724	-14
P	Rear Door Trailing Edge to Impact CL	1,252	1,197	-55
Q	Front Window Opening	378	406	28
R	Right Side Length	4,332	4,330	-2
S	Left Side Length	4,331	4,313	-18
T	Vehicle Width at B-Pillar	1,797	1,602	-195

DATA SHEET NO. 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2012 Kia Sportage
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0510
 Test Date: 1/6/2012



MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground (mm)	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	402	153	1650
2	Driver Hip Point	672	199	1350
3	Mid-Door	789	223	1500
4	Window Sill	1,034	133	1350
5	Window Top	1,534	8	1950

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 Kia Sportage
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0510
 Test Date: 1/6/2012

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750			-842	-640				-879	-674				-37	-34	
-600			-901	-711				-931	-744				-30	-33	
-450			-915	-757				-935	-788				-20	-31	
-300			-919	-785				-929	-810				-10	-25	
-150		-920	-917	-815			-909	-914	-833			11	3	-18	
0		-917	-901	-833			-886	-892	-845			31	9	-12	
150	-880	-897	-890	-842		-785	-771	-821	-860		95	126	69	-18	
300	-873	-893	-892	-850		-760	-736	-792	-854		113	157	100	-4	
450	-872	-895	-894	-856		-754	-718	-775	-847		118	177	119	9	
600	-871	-897	-896	-860		-750	-704	-761	-840		121	193	135	20	
750	-870	-894	-897	-863	-604	-745	-700	-751	-831	-613	125	194	146	32	-9
900	-868	-893	-898	-866	-630	-743	-696	-737	-813	-637	125	197	161	53	-7
1050	-867	-890	-898	-864	-636	-739	-694	-734	-795	-635	128	196	164	69	1
1200	-865	-888	-896	-865	-634	-735	-703	-710	-768	-632	130	185	186	97	2
1350	-864	-885	-894	-862	-632	-730	-686	-677	-729	-628	134	199	217	133	4
1500	-865	-882	-890	-858	-630	-722	-702	-667	-733	-623	143	180	223	125	7
1650	-872	-882	-885	-854	-624	-719	-721	-679	-755	-617	153	161	206	99	7
1800	-887	-895	-885	-849	-616	-763	-744	-718	-763	-610	124	151	167	86	6
1950		-913	-901	-864	-606		-807	-791	-811	-598		106	110	53	8
2100			-914	-854	-590			-855	-835	-582			59	19	8
2250			-915	-825	-545			-872	-791	-538			43	34	7
2400			-912	-813				-882	-789				30	24	
2550			-890	-800				-870	-785				20	15	
2700			-826	-780				-819	-771				7	9	
2850															
3000															

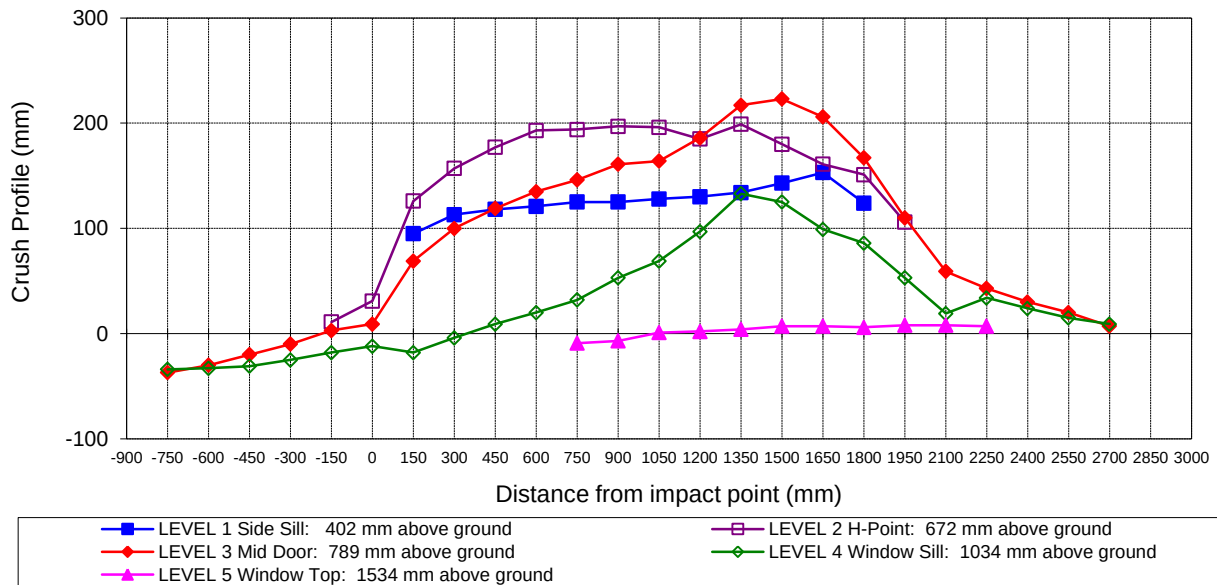
NOTE: Pre-test measurements are taken when the vehicle is in the "As Tested" weight condition. Vehicle measurements forward of the vertical impact reference line are negative.
 The crush profile grid is established prior to test based on an estimated impact point.

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

Test Vehicle: 2012 Kia Sportage
 Test Program: NCAP Side MDB Impact Test

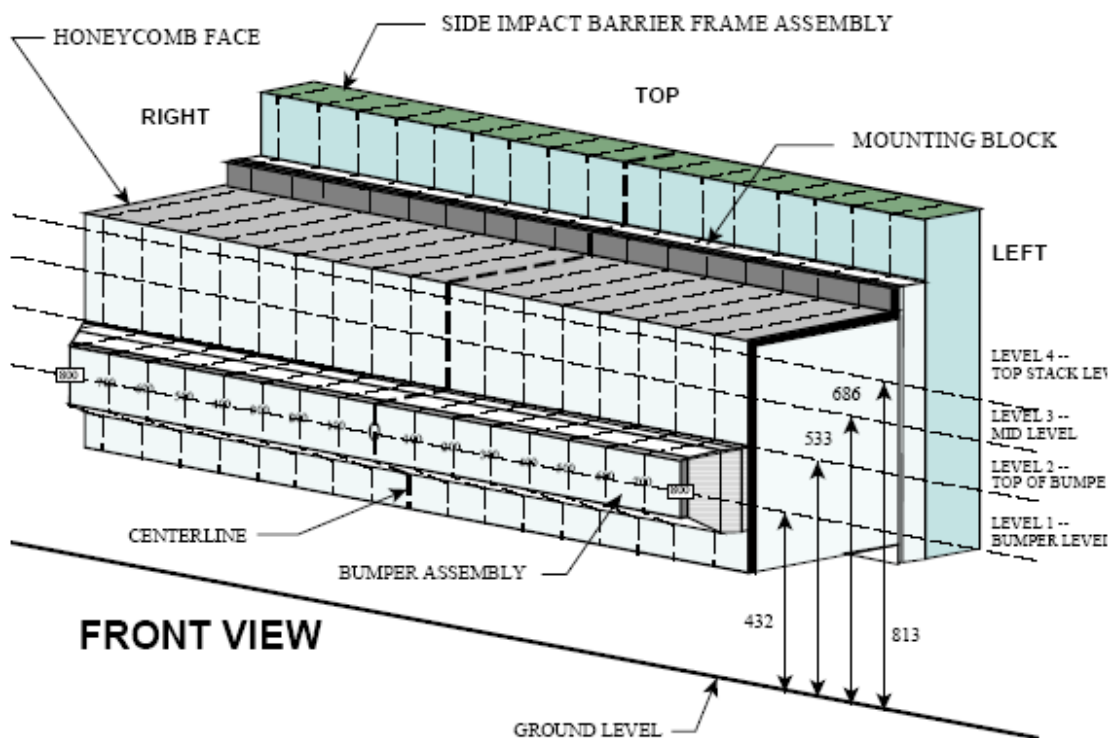
NHTSA No.: MC0510
 Test Date: 1/6/2012

Vehicle Exterior Crush Measurements - Visual Representation



DATA SHEET NO. 12
EXTERIOR STATIC CRUSH FOR IMPACTOR FACE

Test Vehicle:	<u>2012 Kia Sportage</u>	NHTSA No.:	<u>MC0510</u>
Test Program:	<u>Side MDB NCAP</u>	Test Date:	<u>1/6/2012</u>



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	186	180	179	181	184	184	186	187	190	189	191	193	193	195	196	199	201
2	95	88	84	91	90	85	79	84	89	91	97	98	99	98	100	107	119
3	106	83	61	44	33	29	51	37	29	30	29	32	39	49	61	75	108
4	84	54	37	29	38	59	85	81	73	68	68	74	81	93	115	140	170

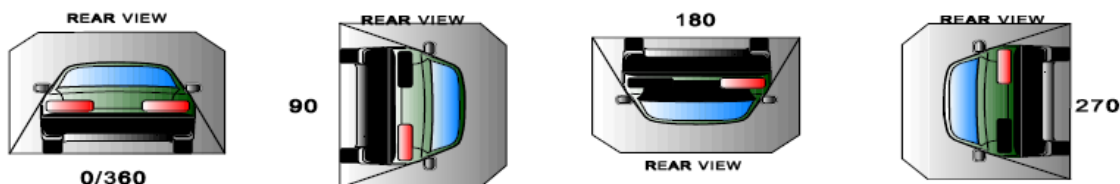
FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2012 Kia Sportage NHTSA No.: MC0510
 Test Program: Side MDB NCAP Test Date: 1/6/2012

Test Time: 2:40 PM Temperature: 9° C

- A. From impact until vehicle motion ceases: 0 oz.
 (Maximum allowable is 1 oz.)
- B. For the 5-minute period after motion ceases: 0 oz.
 (Maximum allowable is 5 oz.)
- C. For the following 25 minutes: 0 oz.
 (Maximum allowable is 1 oz./minute)
- 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	73	300	373
90 to 180	64	300	364
180 to 270	63	300	363
270 to 360	66	300	366

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE

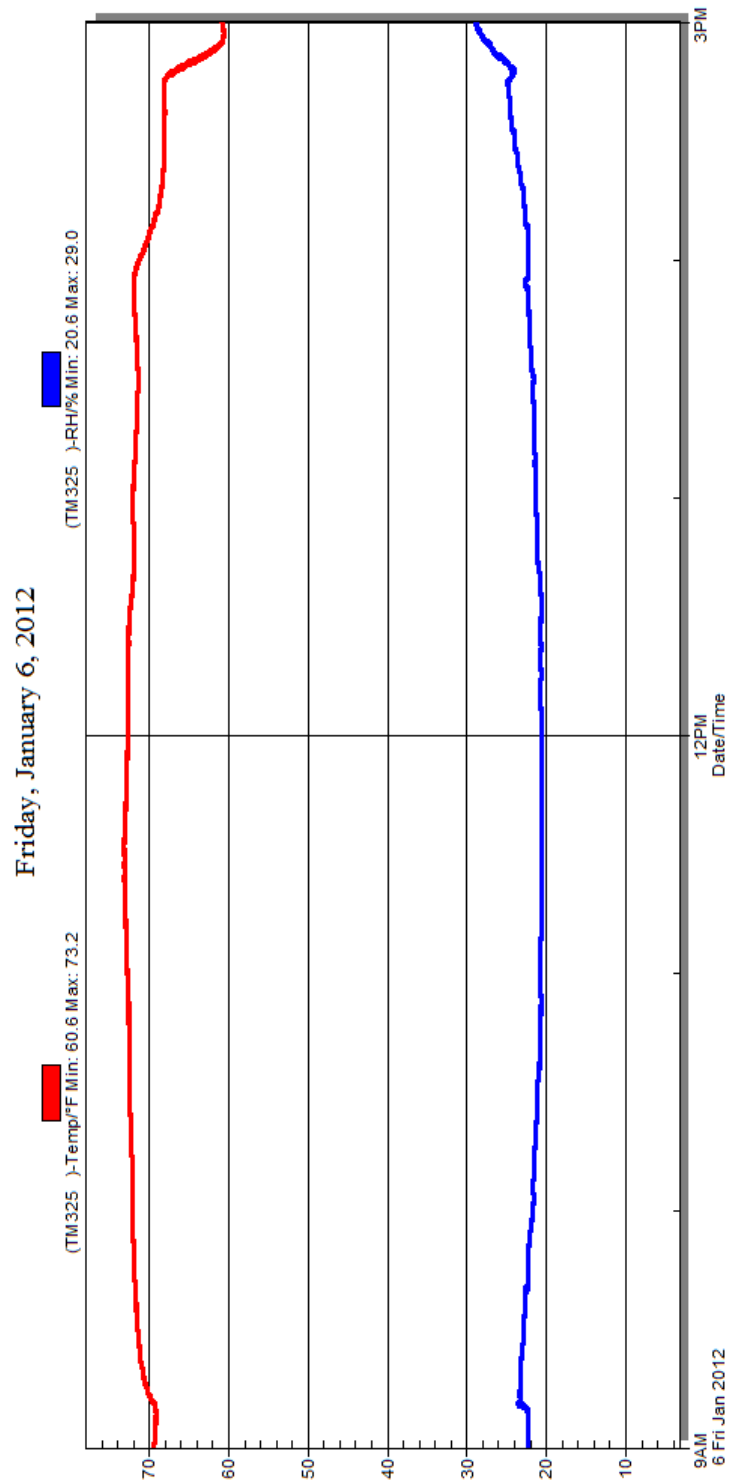
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0 to 90	0	0		
90 to 180	0	0		
180 to 270	0	0		
270 to 360	0	0		

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: <u>2012 Kia Sportage</u>	NHTSA No.: <u>MC0510</u>
Test Program: <u>Side MDB NCAP</u>	Test Date: <u>1/6/2012</u>



APPENDIX A
PHOTOGRAPHS

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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

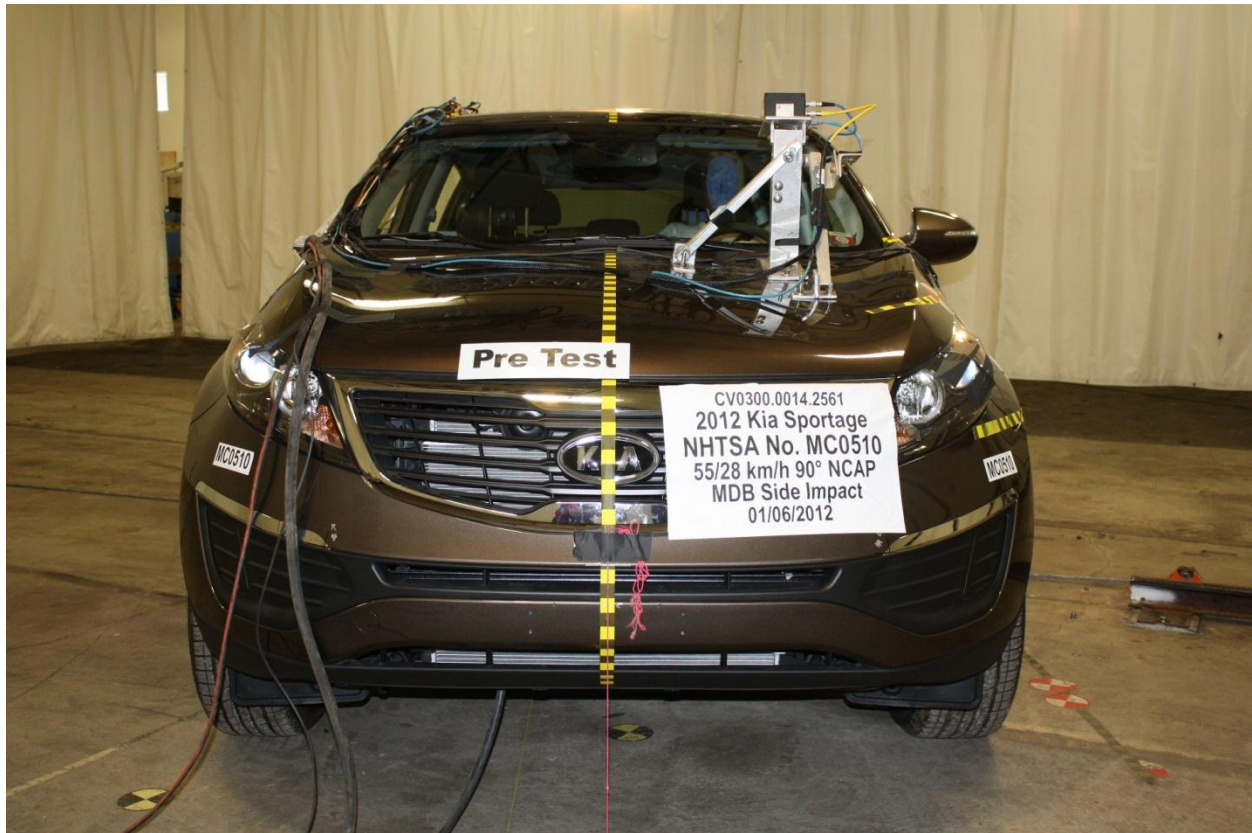


Figure A-3: Pre-Test Frontal View of Test Vehicle



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

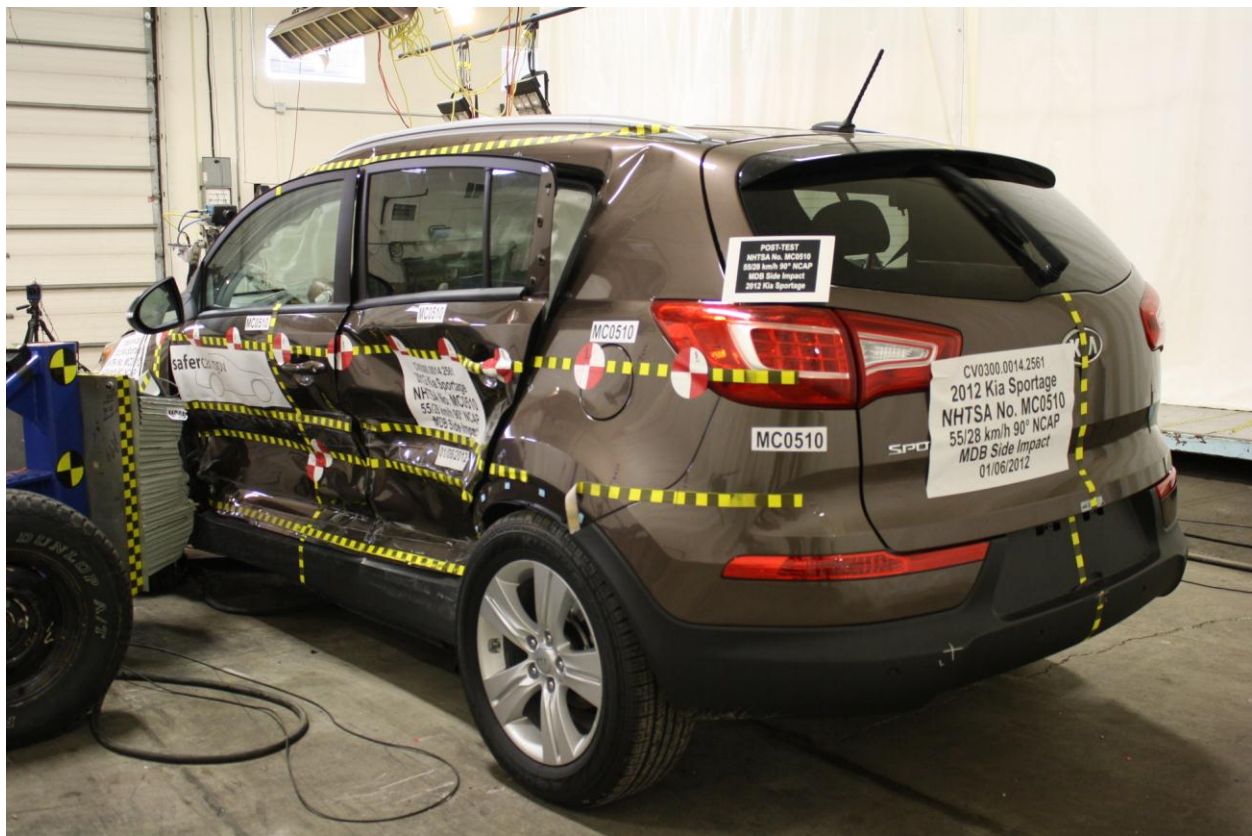


Figure A-10: Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



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

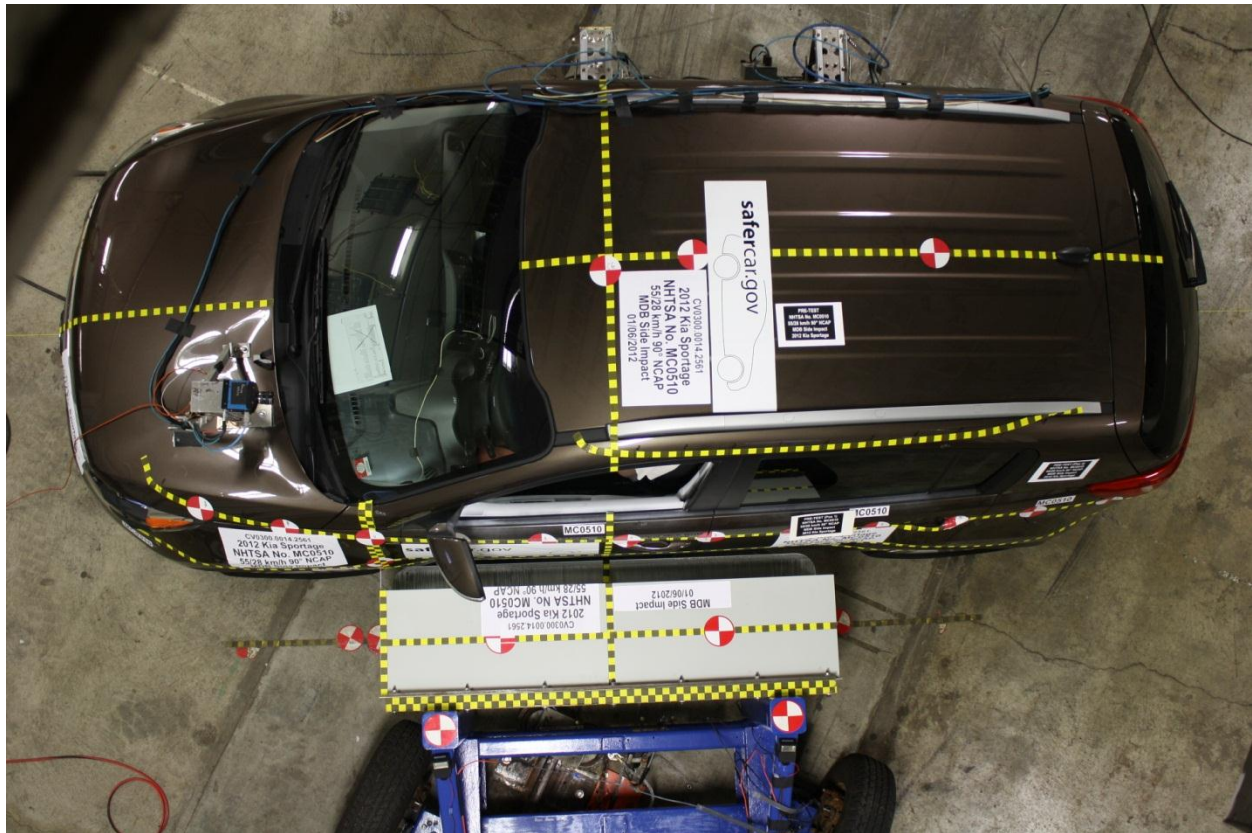


Figure A-15: Pre-Test Overhead View of the Test Area



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

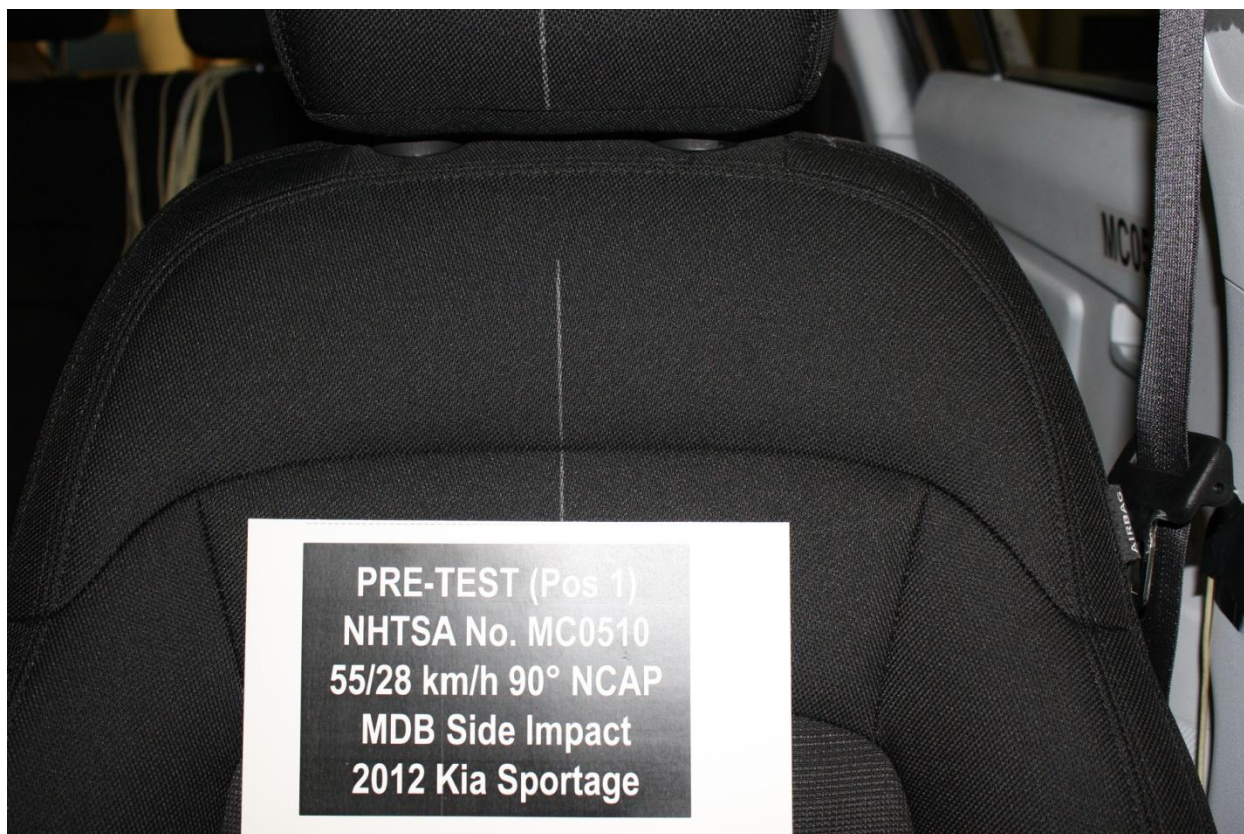


Figure A-30: Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning



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

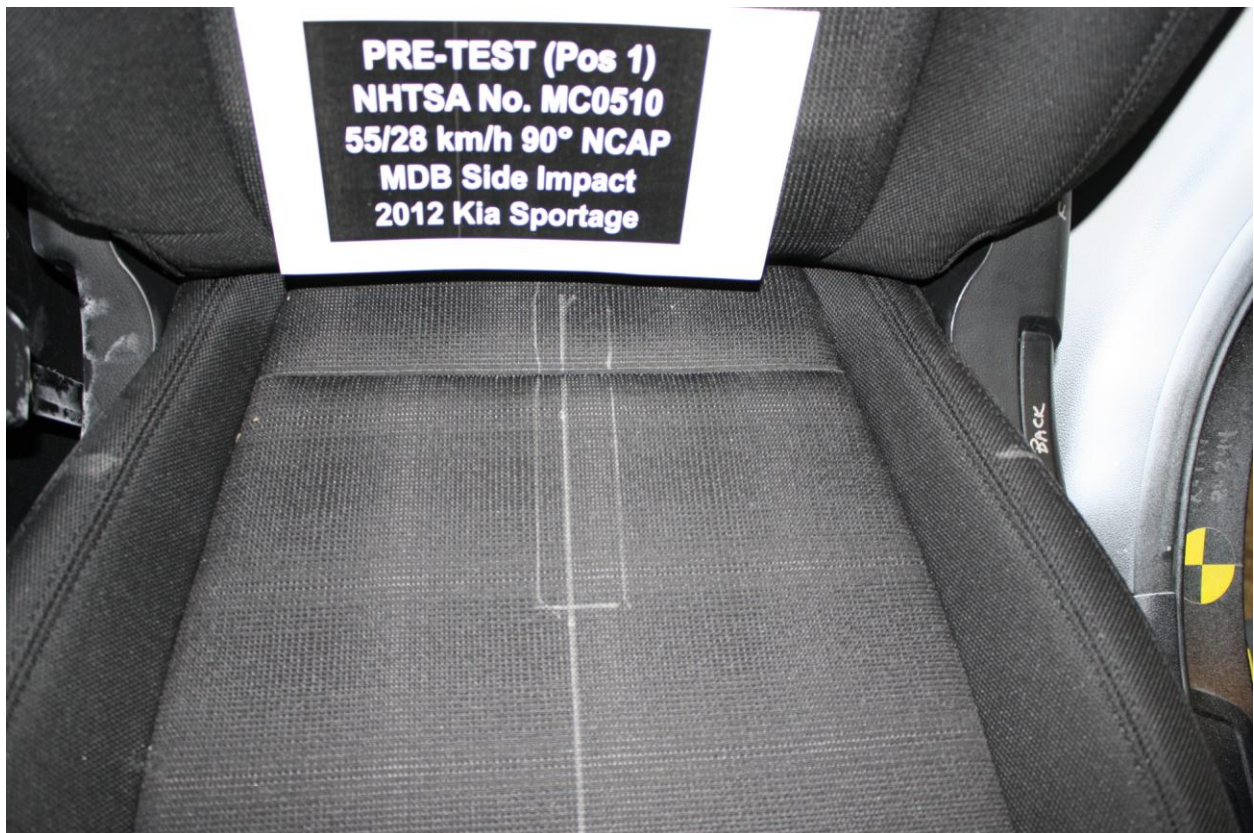


Figure A-32: Pre-Test Frontal View of Driver Seat Pan Prior to Dummy Positioning



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

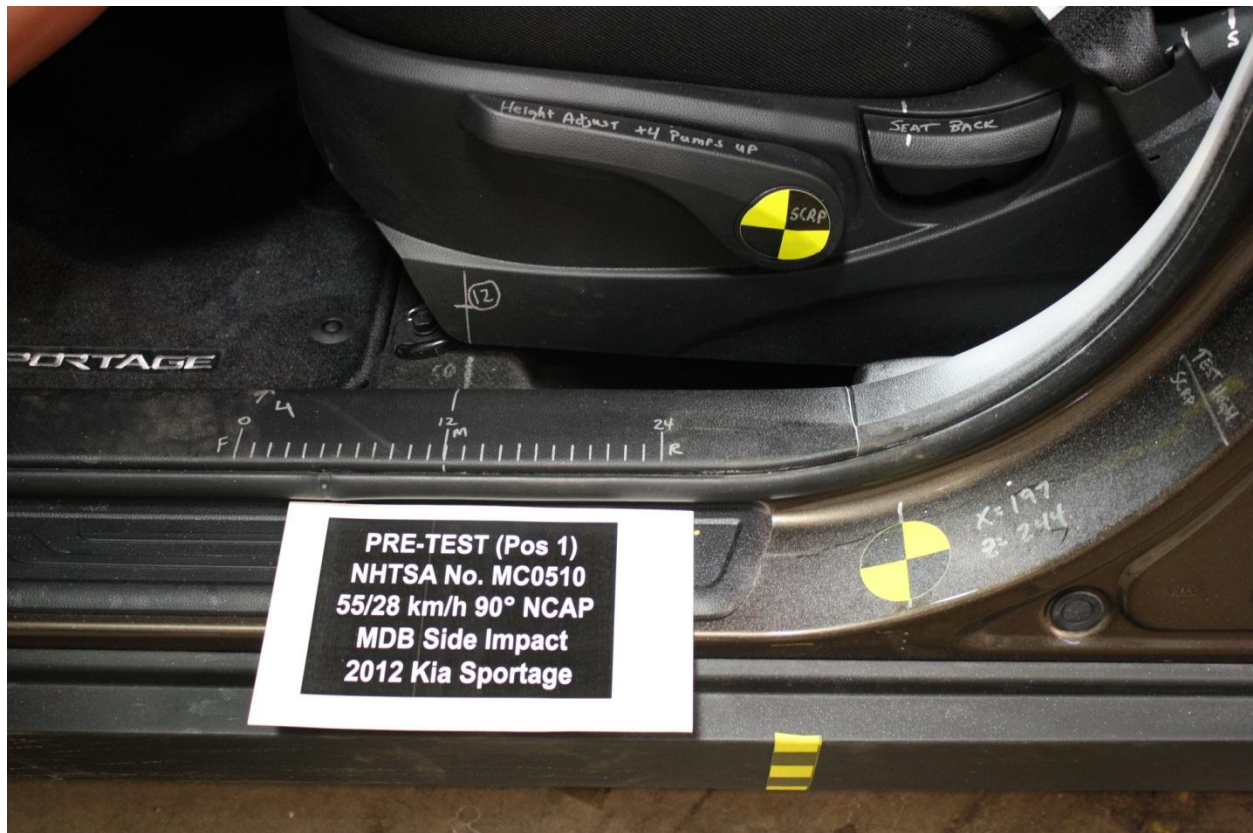


Figure A-39: Pre-test Close-Up Left Side View of Driver Seat Track



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

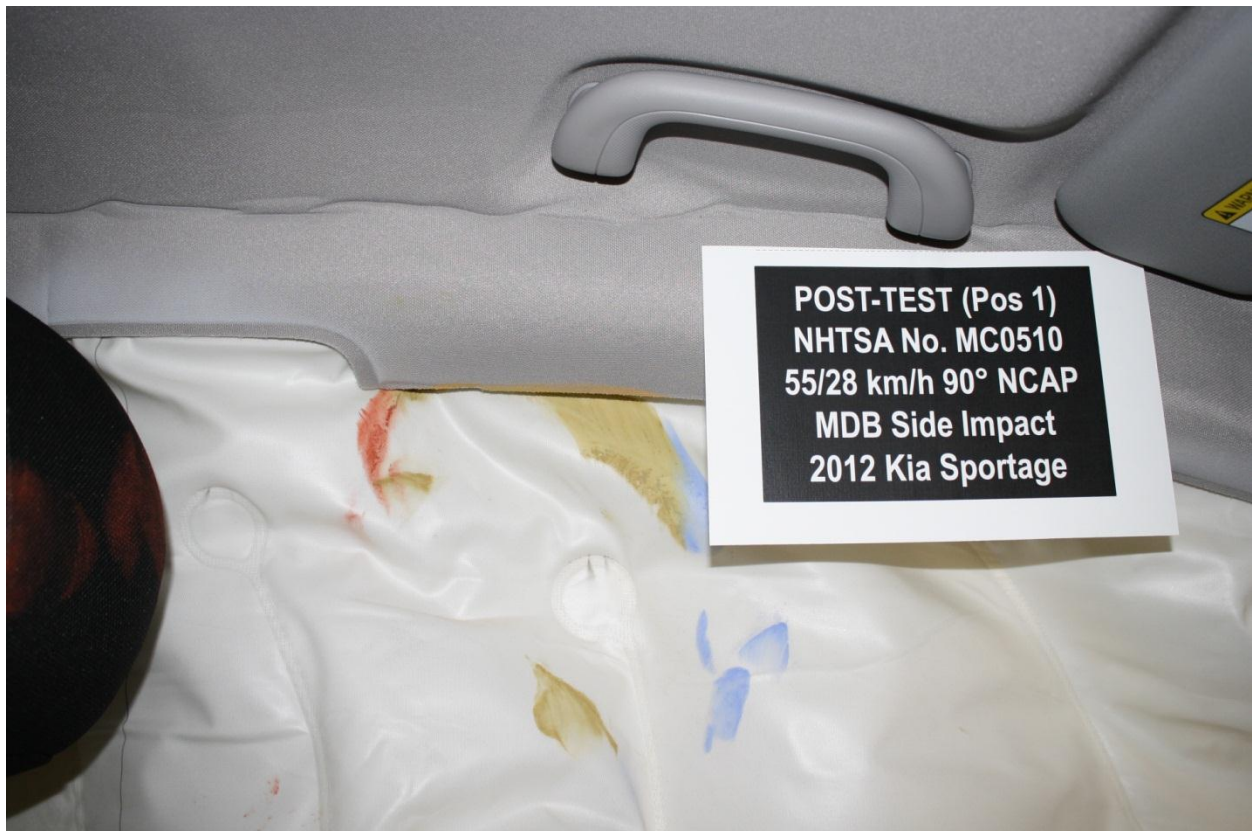


Figure A-48: Post-Test Driver Dummy Close-Up Head Contact with Vehicle View



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

Photo Not Applicable

Pelvis contacted Airbag

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

Passenger's Seat Back is Fixed

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

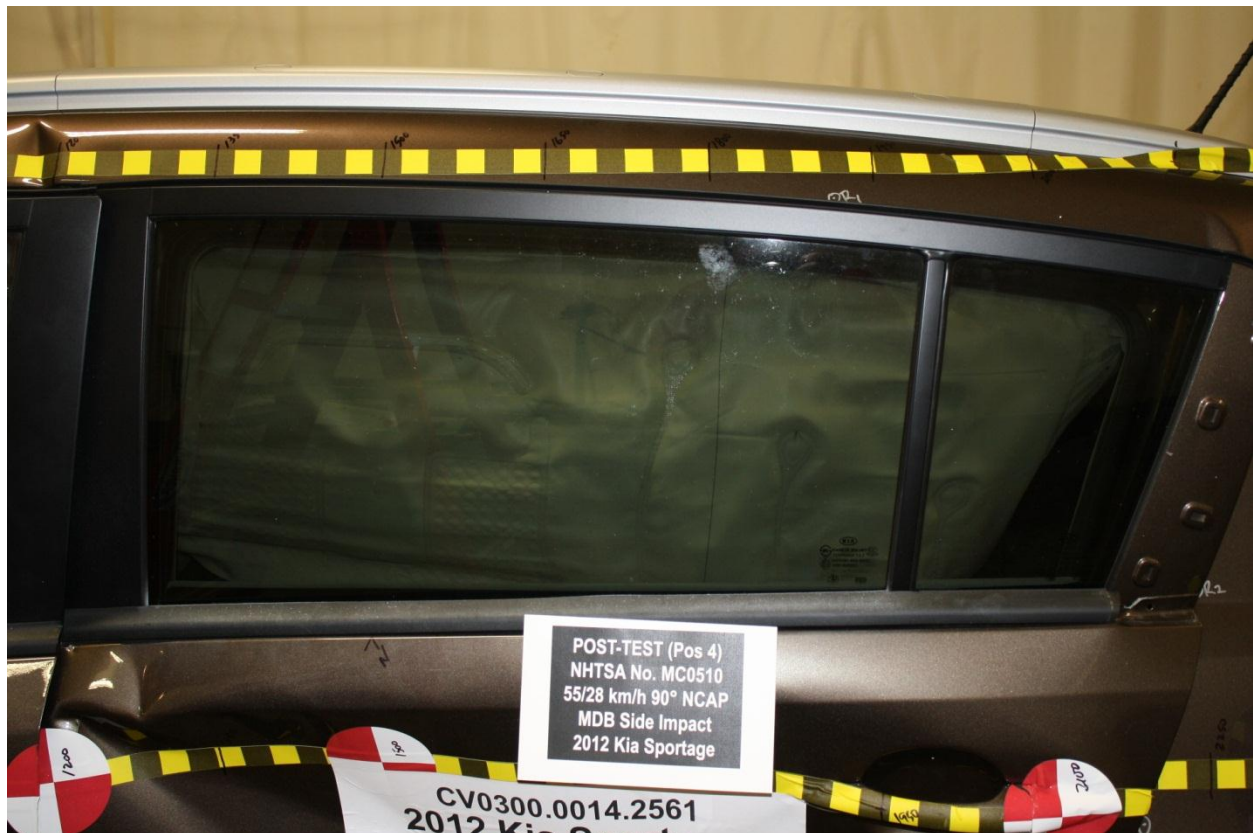


Figure A-69: Post-Test Passenger Dummy and Door Clearance View



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

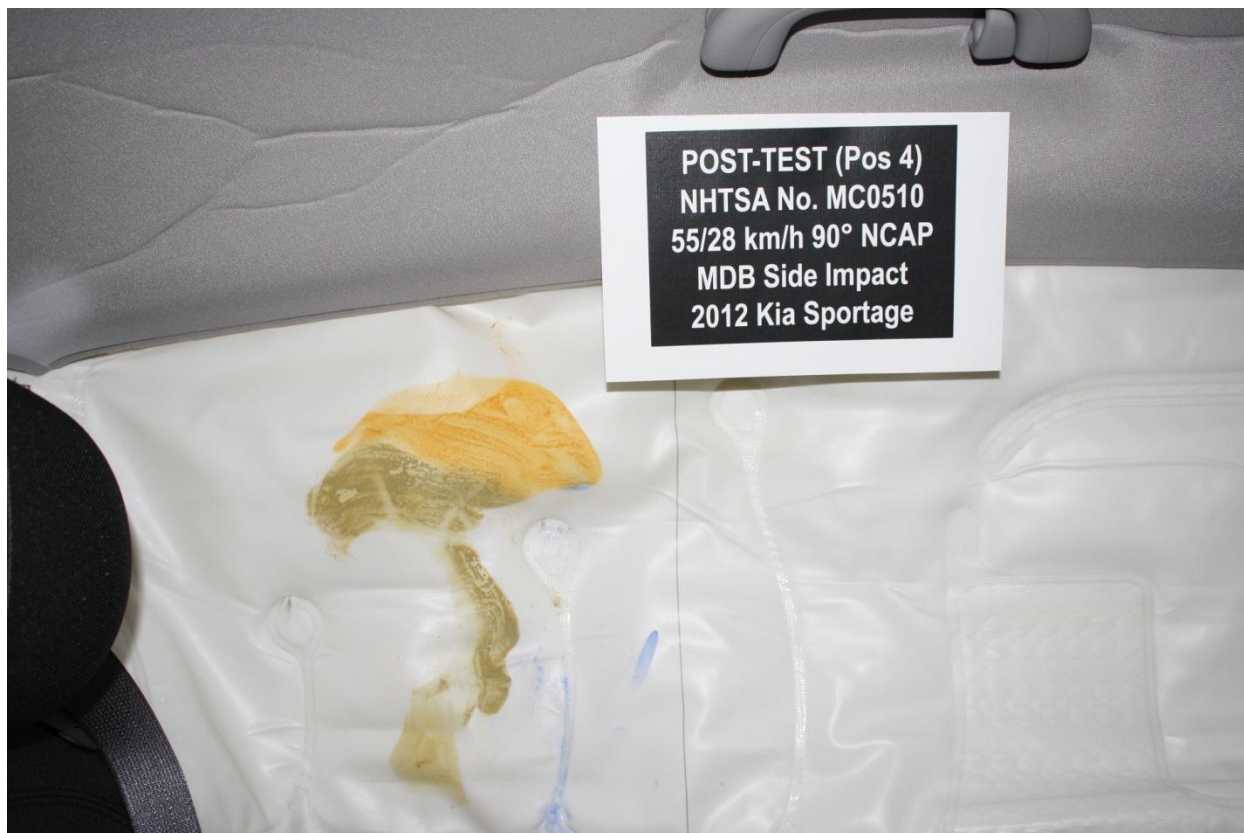


Figure A-75: Post-Test Rear Passenger Dummy Close-Up Head Contact with Side Airbag View



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

Photo Not Applicable

No Side 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 Side 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

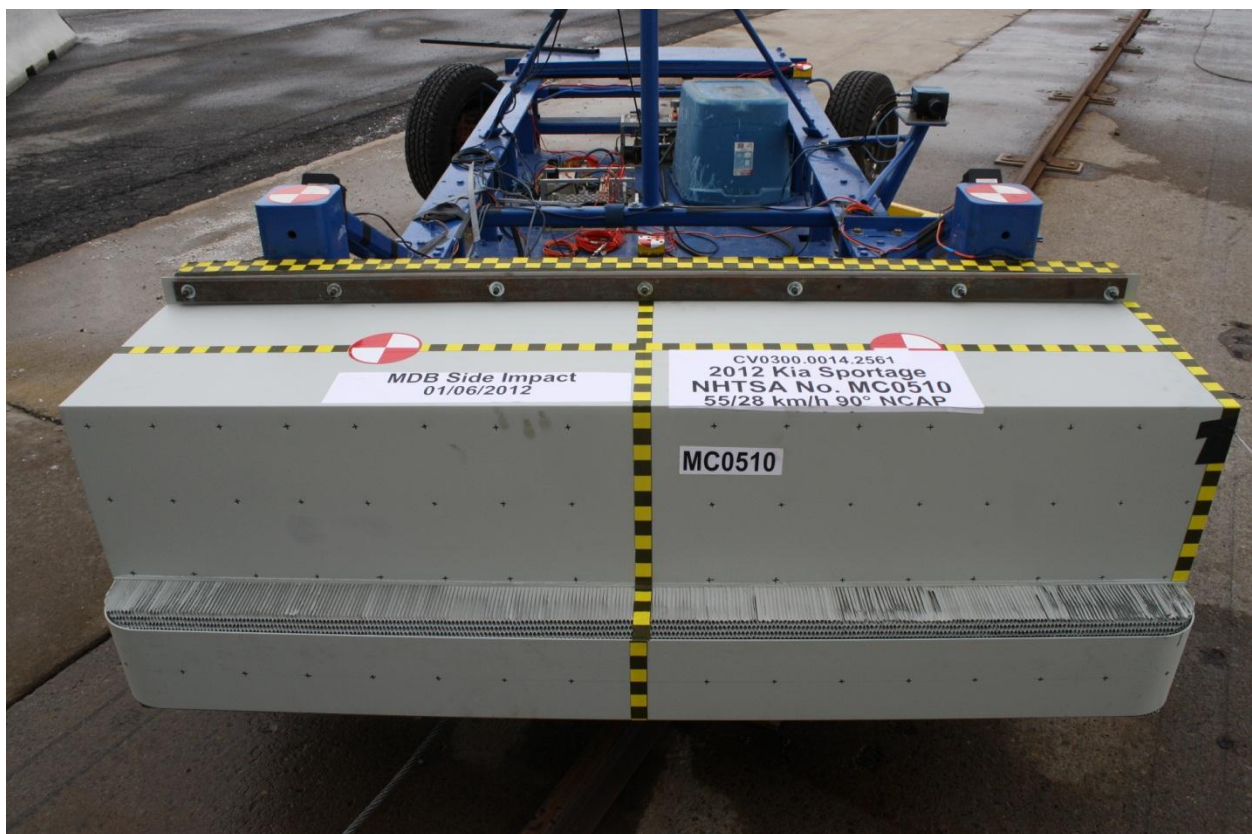


Figure A-84: Pre-Test Top View of MDB Impactor Face



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

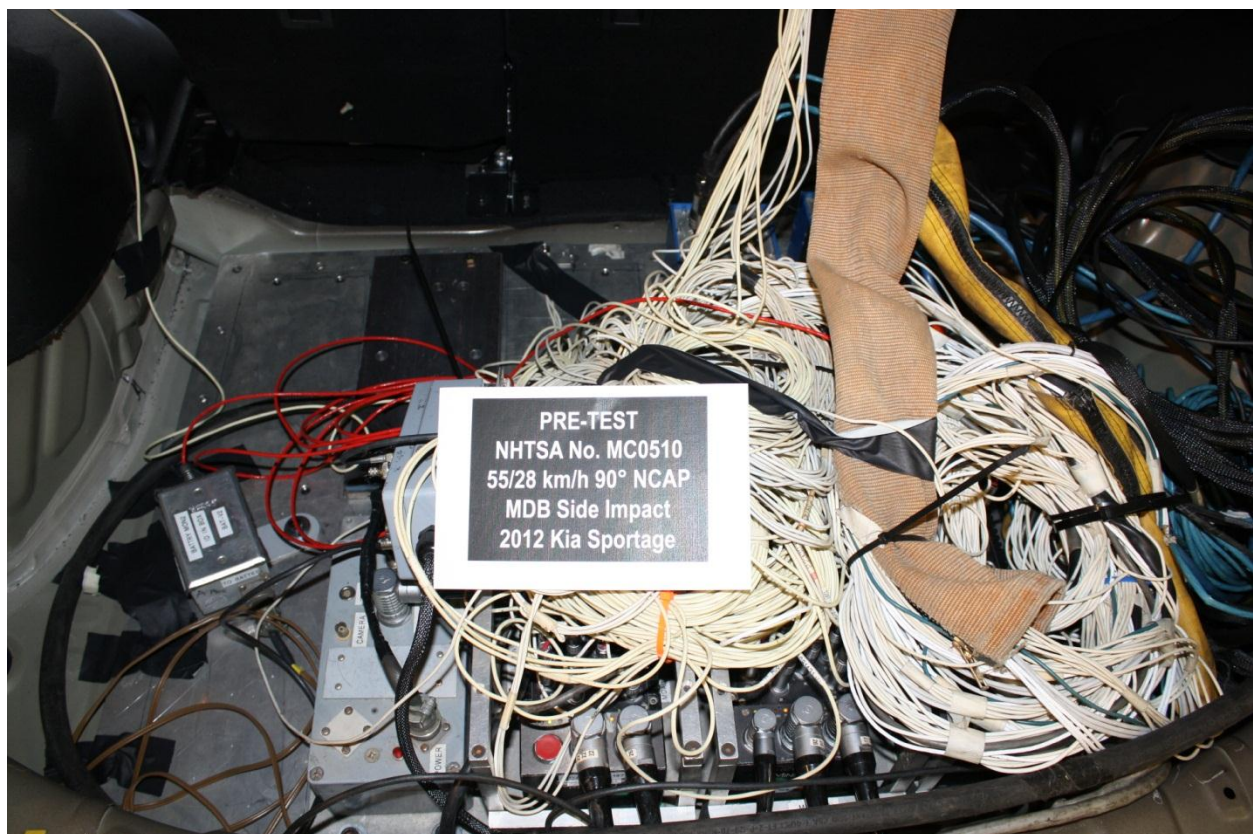


Figure A-92: Pre-Test Ballast View



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

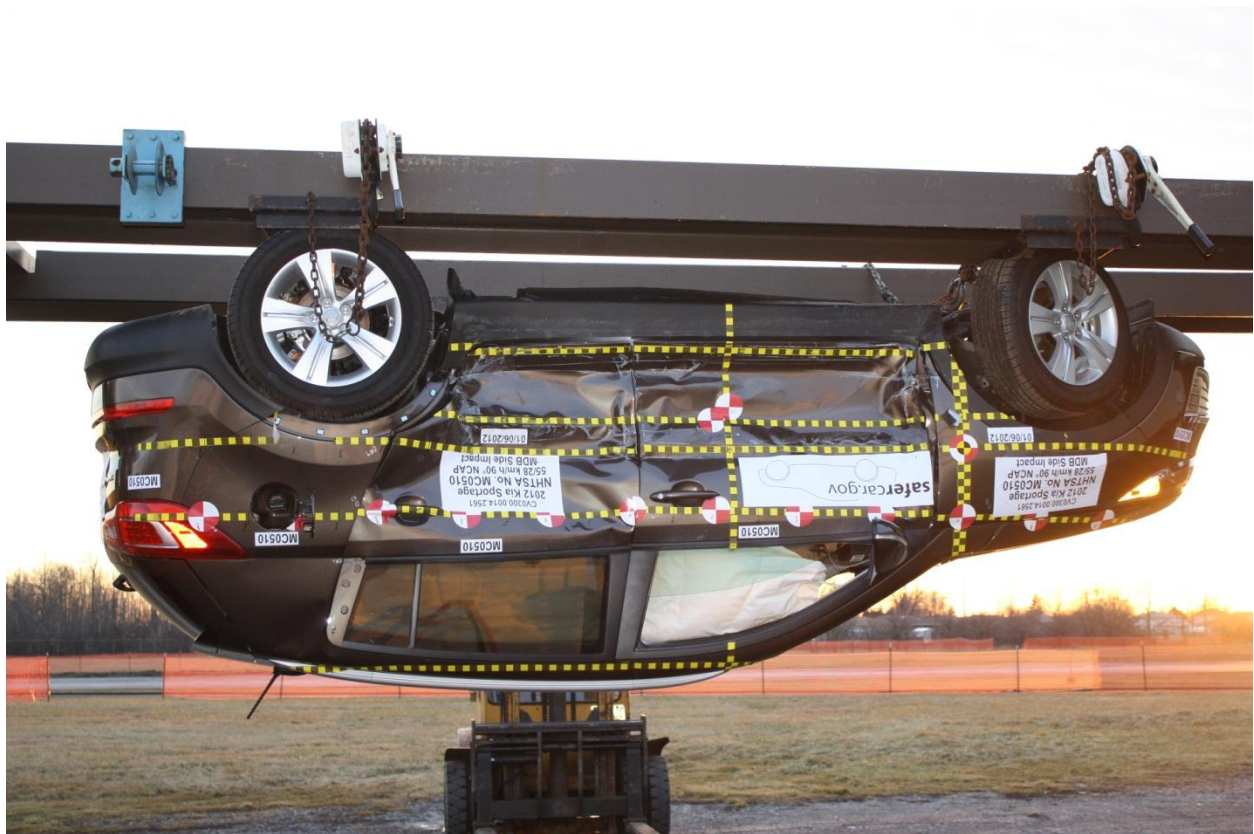


Figure A-96: FMVSS No. 301 Static Rollover 180 Degrees



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

		2012 42272 KIA SPORTAGE LX FWD MODEL YEAR MODEL MODEL DESCRIPTION SAND TRACK/BLK EXTERIOR / INTERIOR COLOR KNDFB3A22C7217023 G4KEBU49 VEHICLE NUMBER ENGINE NUMBER PHILADELPHIA TRUCK PORT OF ENTRY MODE OF TRANSPORTATION		SOLD TO: NY082 FUCILLO KIA 3950 RIDGE ROAD WEST ROCHESTER NY 14626 SHIP TO: NY082	
STANDARD FEATURES MECHANICAL 2.4L DOHC CVT 4-Cylinder Engine 6-Speed Automatic Transmission Motor Driven Power Steering 17" Tires with Alloy Wheels SAFETY Dual Front Advanced Airbags Front Seat Mounted Side Airbags Full-Length Side Curtain Airbags 3-Point Seatbelts for All Seating Positions Front Active Headrests Lower Anchors and Tethers for Children (LATCH) Anti-Lock Brake System (ABS) Traction Control System (TCS) Electronic Stability Control (ESC) Downhill Brake/Hill-start Assist Control (DBC/HAC) Rollover Protection System (ROPS) Tire Pressure Monitoring System (TPMS) INTERIOR Air Conditioning Power Windows, Door Locks & Outside Mirrors Keyless Entry and Alarm System AM/FM/CD/MP3 Audio System SIRIUS Satellite Radio w/ free 3-mo. subscription** USB & Auxiliary Input Jacks Multi-Adjustable Front Seats 60/40 Split Folding Rear Seats Cruise Control, Trip Computer Bluetooth (Phone and Streaming Audio) Tilt Steering Wheel Steering Wheel Controls (Bluetooth/Audio/Cruise) Front Cup Holders, 2nd Row Armrest w/Cupholders EXTERIOR Outside Mirrors w/ Turn Signal Indicators Body Color Door Handles Privacy and Solar Glass WARRANTY 10 Year/100,000 Mile Limited Powertrain Warranty 5 Year/60,000 Mile Limited Basic Warranty 5 Year/60,000 Mile Roadside Assistance **Ask dealer for details		MANUFACTURER'S SUGGESTED RETAIL PRICE \$20,800.00 ADDITIONAL INSTALLED EQUIPMENT: (In addition to or in place of standard features) Convenience Package \$1,300.00 * Back-up Warning System * Rear Spoiler * Roof Rails * Heated Outside Mirrors * Telescopic Steering Wheel * Cooling Glove Box * Cargo Cover * Sunvisor Extender w/Mirror Illumination * Carpeted Floor Mats (5 Seats) Cargo Mat \$75.00 Cargo Net \$95.00 EC Mirror w/ Compass & Homelink \$350.00		EPA Fuel Economy Estimates These estimates reflect new EPA methods beginning with 2006 models. CITY MPG 22 Expected range for most drivers 18 to 26 MPG Estimated Annual Fuel Cost \$1800.00 based on 15,000 miles at \$3.00 per gallon Combined Fuel Economy This Vehicle 25 ALL SUVS 10 to 32 HIGHWAY MPG 32 Expected range for most drivers 26 to 38 MPG Your actual mileage will vary depending on how you drive and maintain your vehicle.	
MSRP INCLUDING OPTIONS \$22,575.00 INLAND FREIGHT AND HANDLING \$800.00 TOTAL MANUFACTURER'S SUGGESTED RETAIL PRICE \$23,375.00 Manufacturer's suggested retail price includes manufacturer's recommended pre-delivery service. License and title fees, state and local taxes and other dealer installed options and accessories are not included in the manufacturer's suggested retail price.		GOVERNMENT SAFETY RATINGS This vehicle has not been rated by the government for frontal crash, side crash or rollover risk. Source: National Highway Traffic Safety Administration (NHTSA). www.safercar.gov or 1-888-327-4236			
Environmental Performance Protect the environment, choose vehicles with higher scores: Global Warming Score 7 Smog Score 9 Using alternative fuels may improve scores. See www.DriveClean.ca.gov 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 California Government Website www.DriveClean.ca.gov for more information. AIR RESOURCES BOARD		PARTS CONTENT INFORMATION FOR VEHICLES IN THIS CAR LINE U.S./CANADIAN PARTS CONTENT: 1% MAJOR SOURCES OF FOREIGN PARTS: KOREA: 98% NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS. FOR THIS VEHICLE FINAL ASSEMBLY POINT: KOREA COUNTRY OF ORIGIN ENGINE: KOREA TRANSMISSION: KOREA			
TOTAL ADDITIONAL WEIGHT: 14.1 					

Figure A-100: Monroney Label

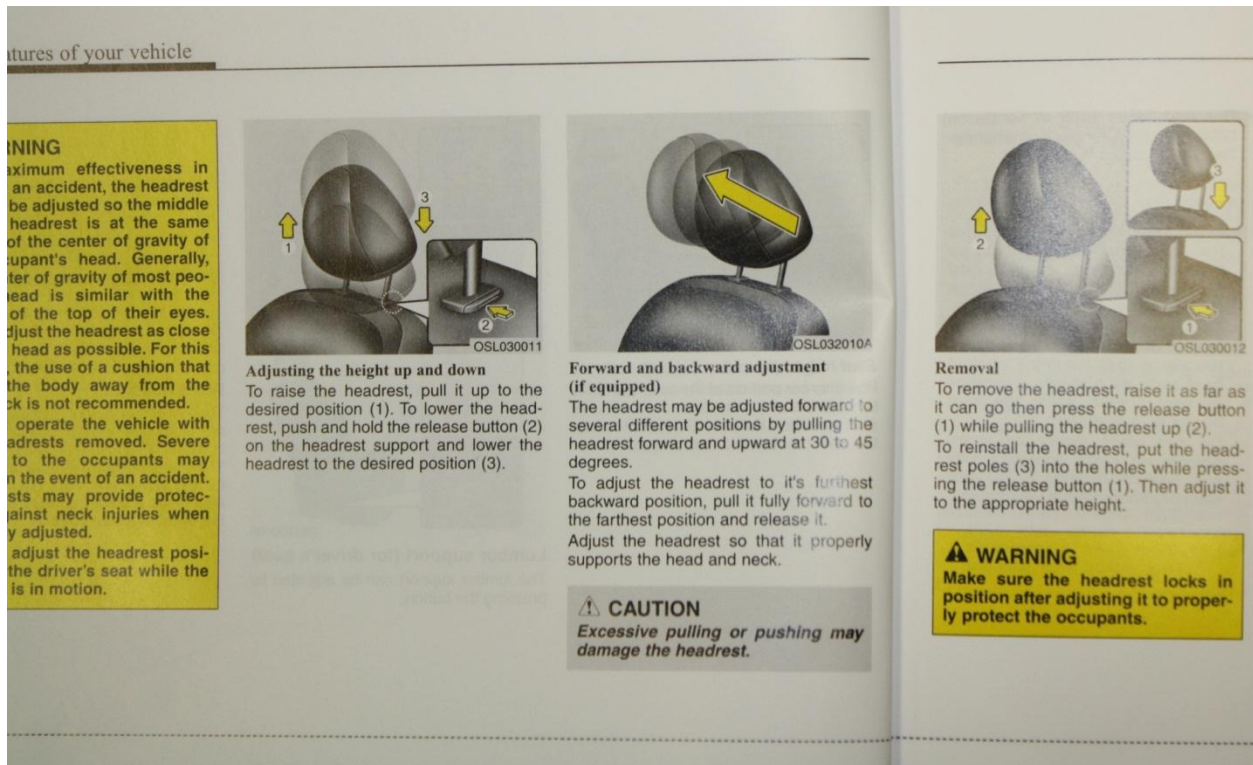


Figure A-101: Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

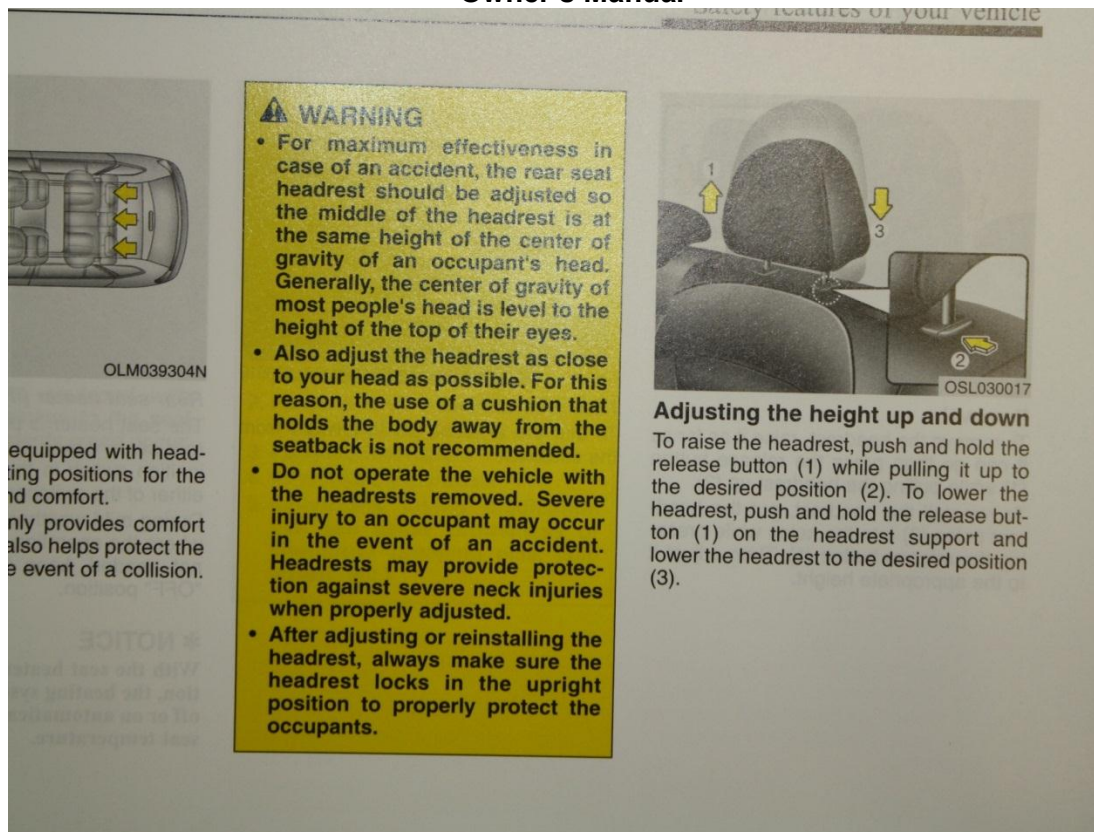


Figure A-102: Left Rear Passenger Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

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

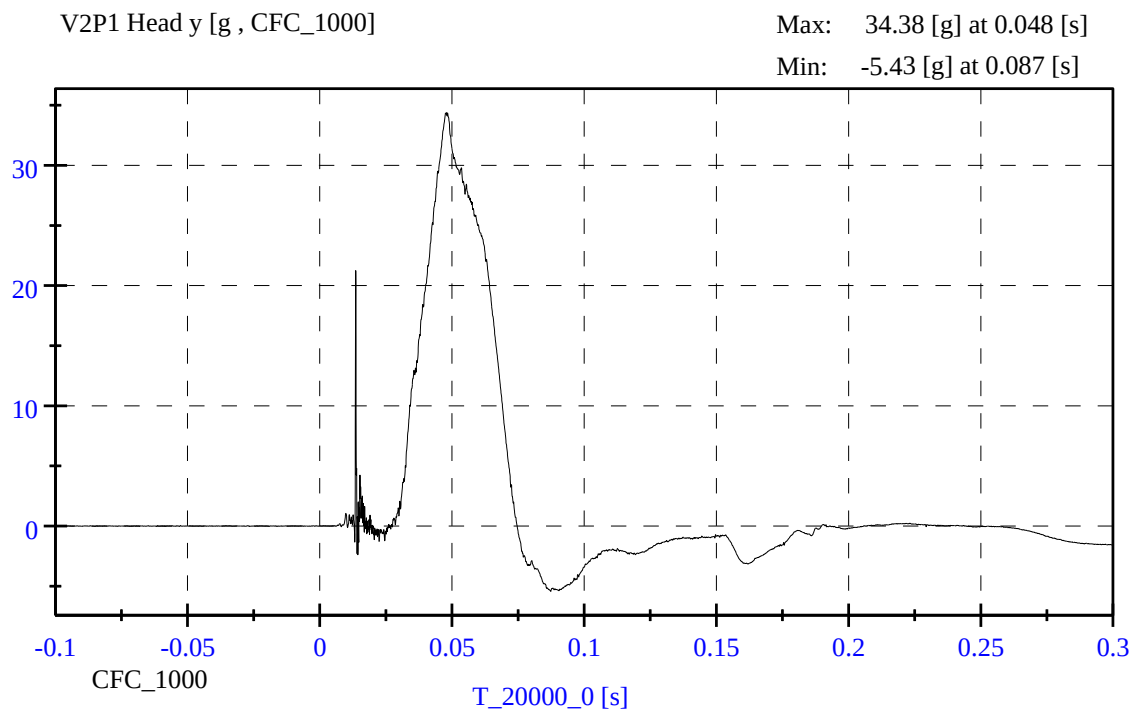
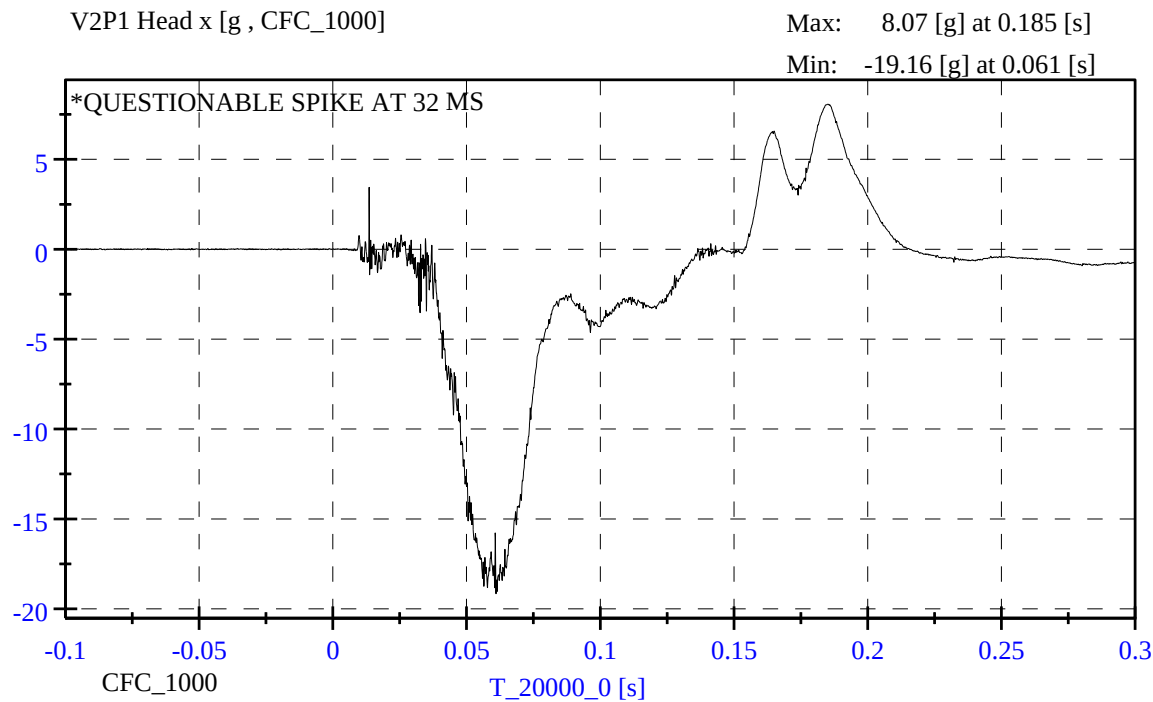
Driver Lower Spine T12 Acceleration (X)
Driver Lower Spine T12 Acceleration (Y)
Driver Lower Spine T12 Acceleration (Z)
Passenger Upper Thorax Rib Deflection (Y)
Passenger Middle Thorax Rib Deflection (Y)
Passenger Lower Thorax Rib Deflection (Y)
Passenger Upper Abdomen Rib Deflection (Y)
Passenger Lower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

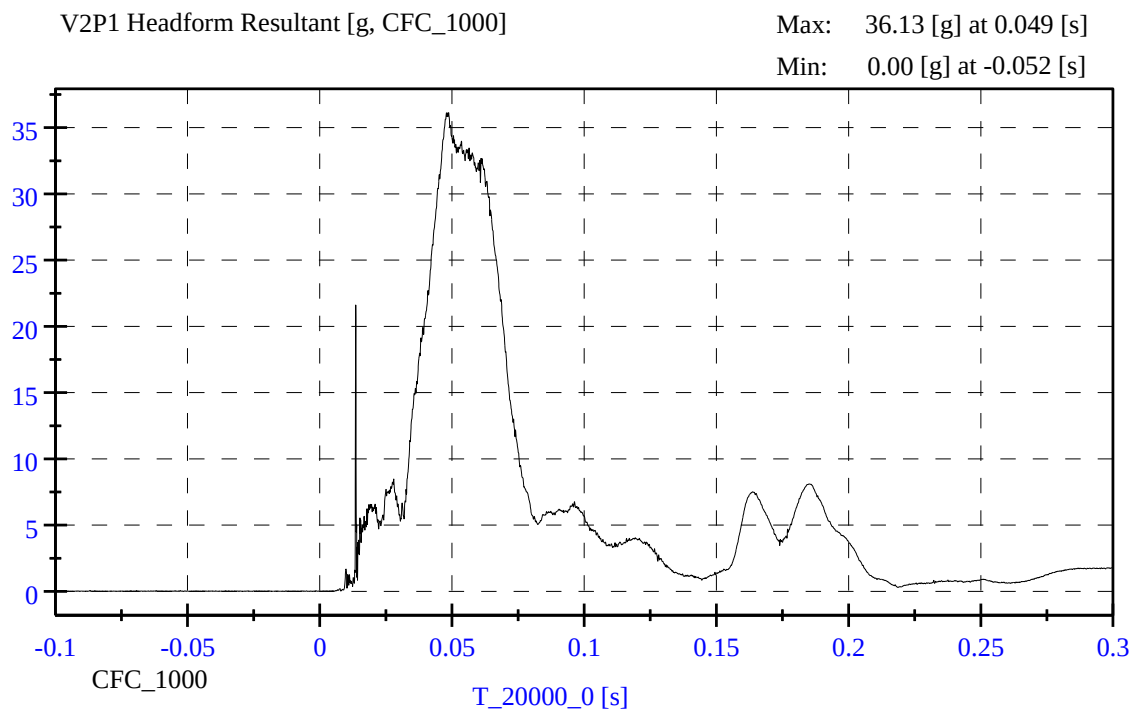
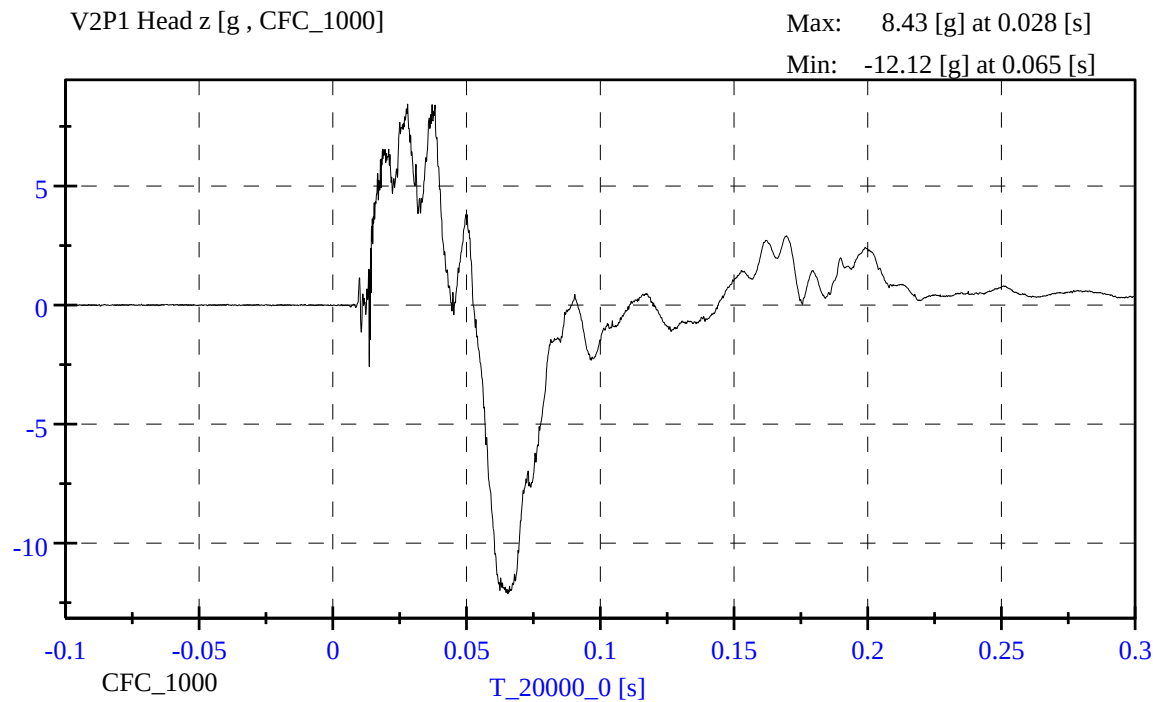
Vehicle Instrumentation Data

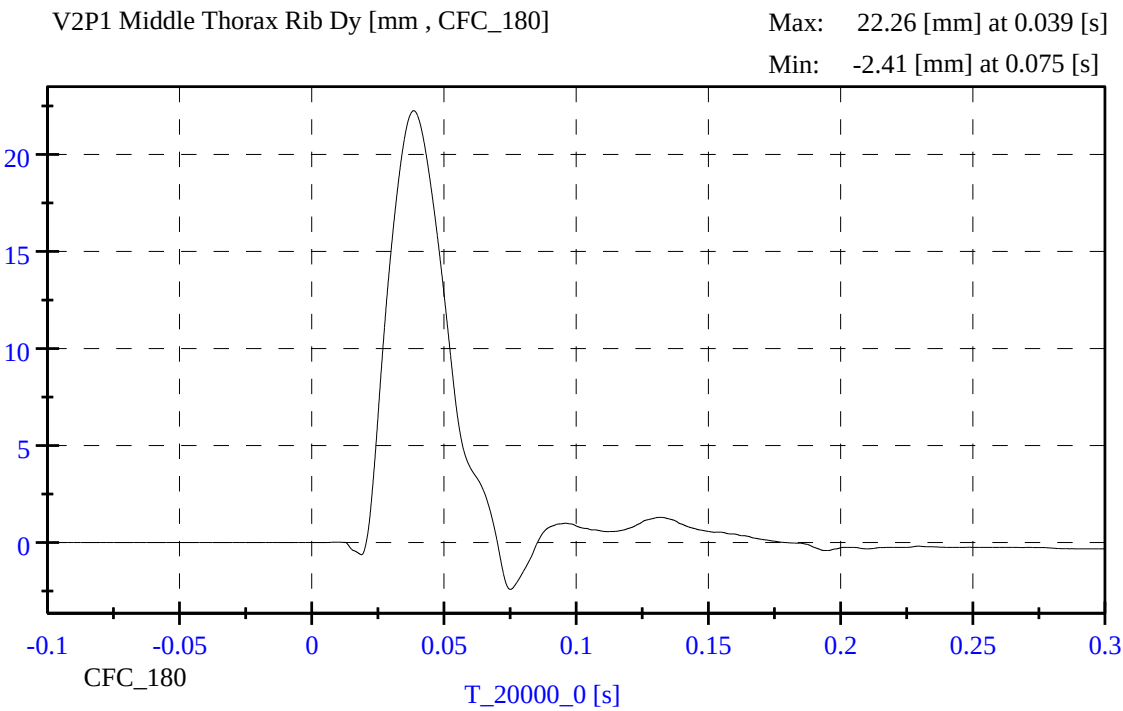
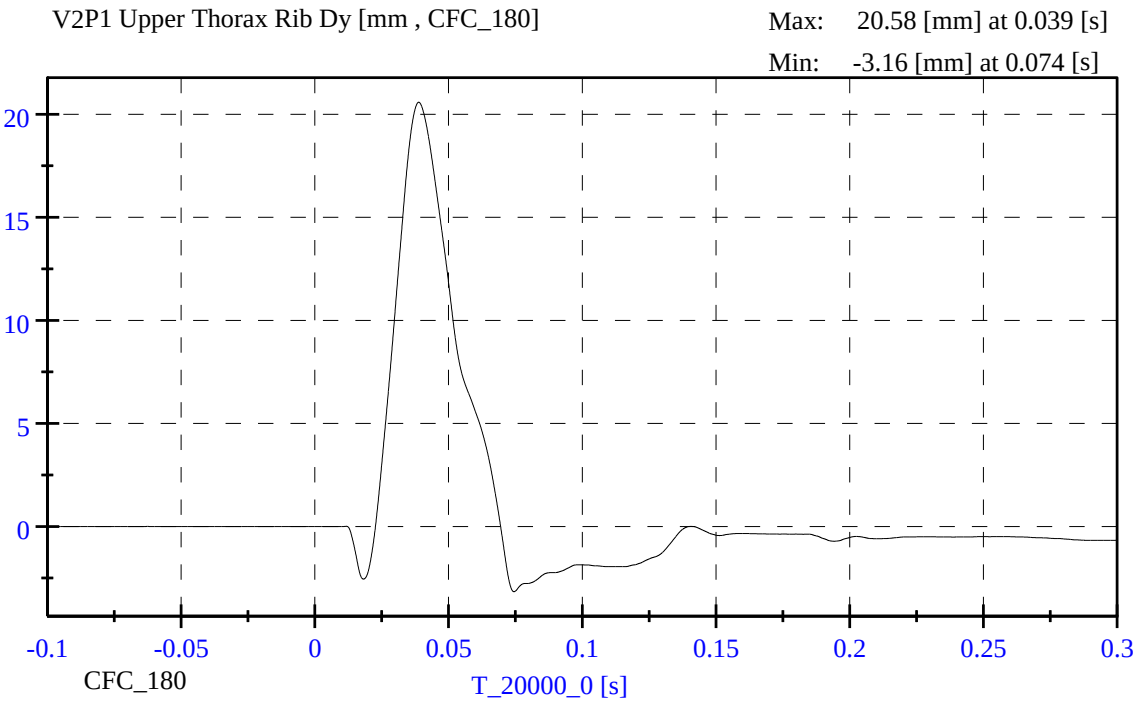
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Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Right Side Sill at Front Seat Acceleration (X)
Right Side Sill at Front Seat Acceleration (Y)
Right Side Sill at Front Seat Acceleration (Z)
Right Side Sill at Rear 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)

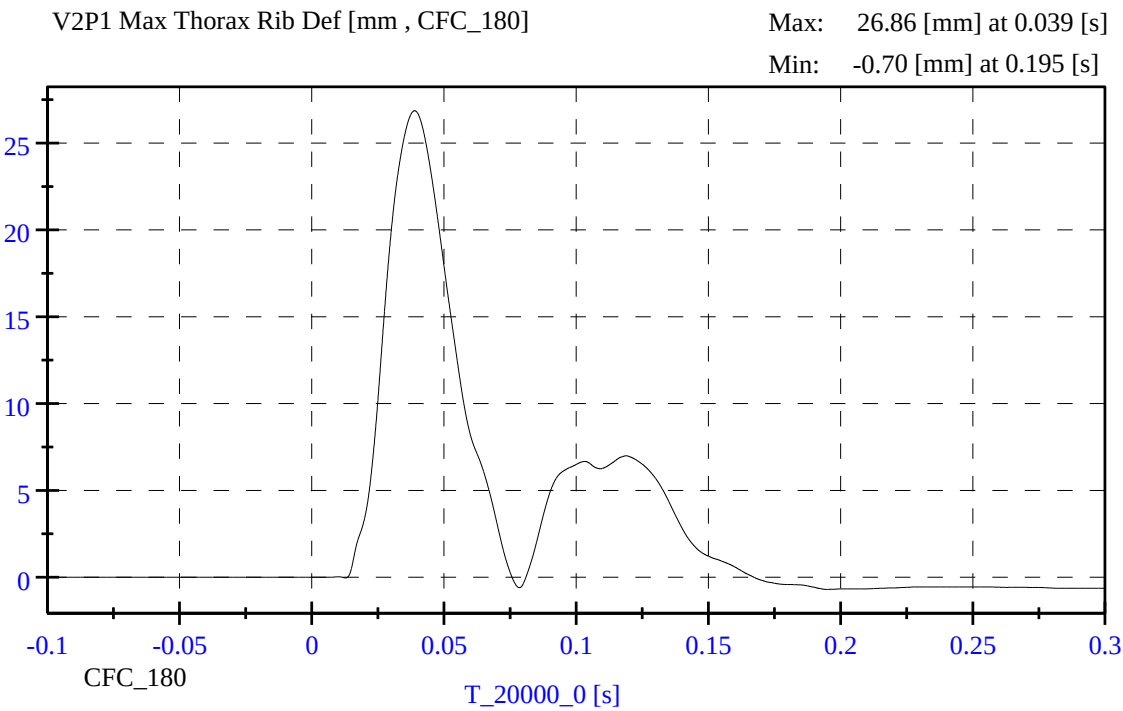
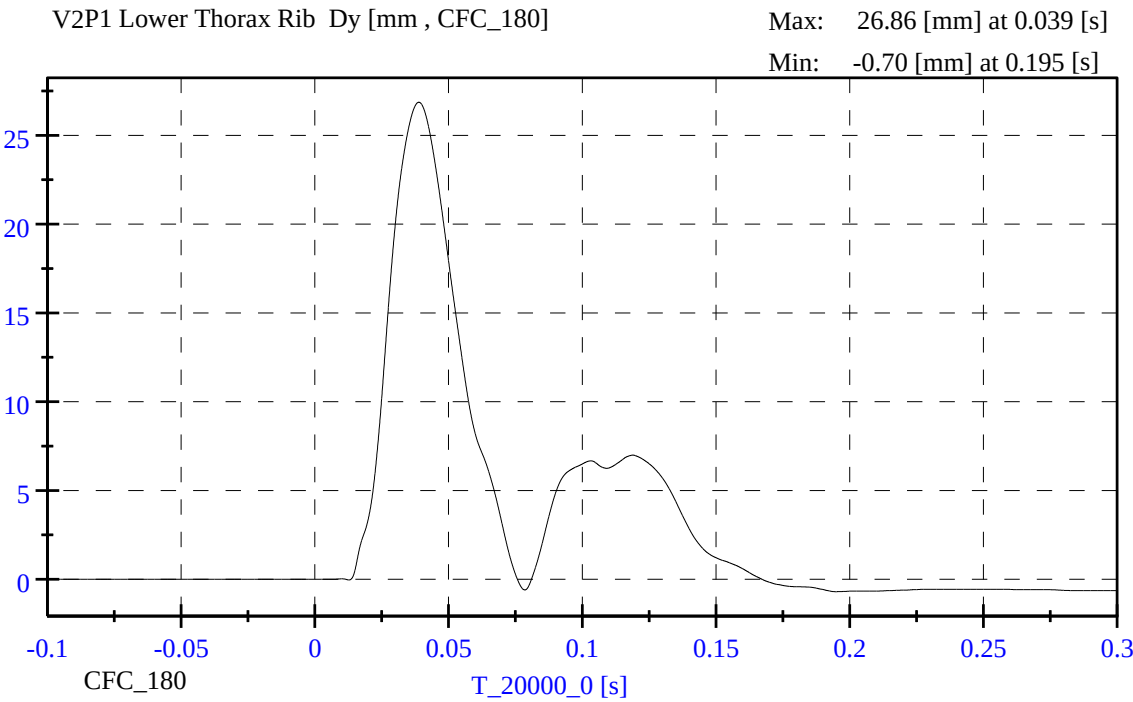
MDB Instrumentation Data

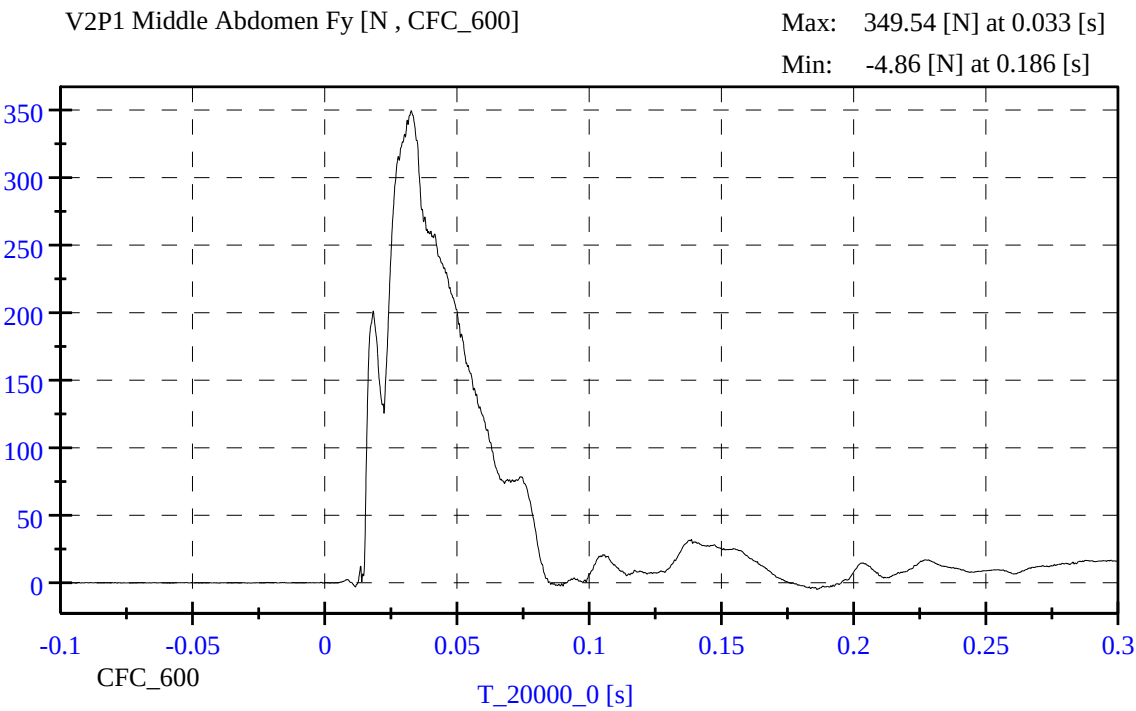
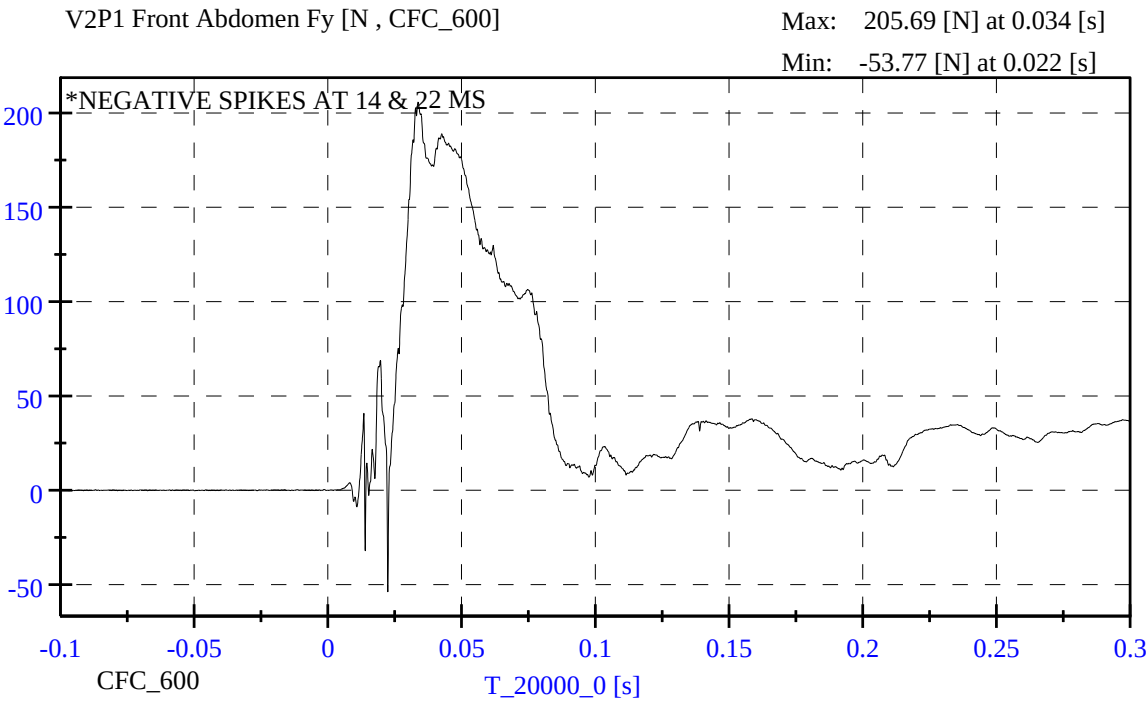
MDB Center of Gravity Acceleration (X)
MDB Center of Gravity Acceleration (Y)
MDB Center of Gravity Acceleration (Z)
MDB Rear Acceleration (X)
MDB Rear Acceleration (Y)
Left MDB Contact Switch
Right MDB Contact Switch

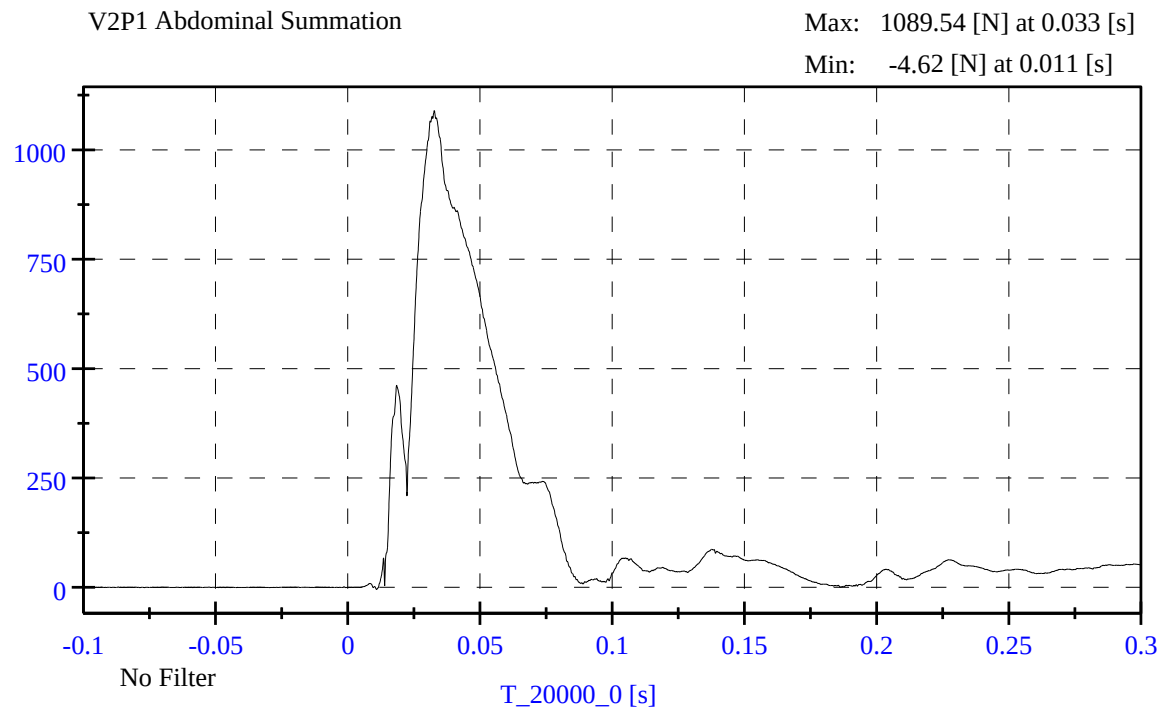
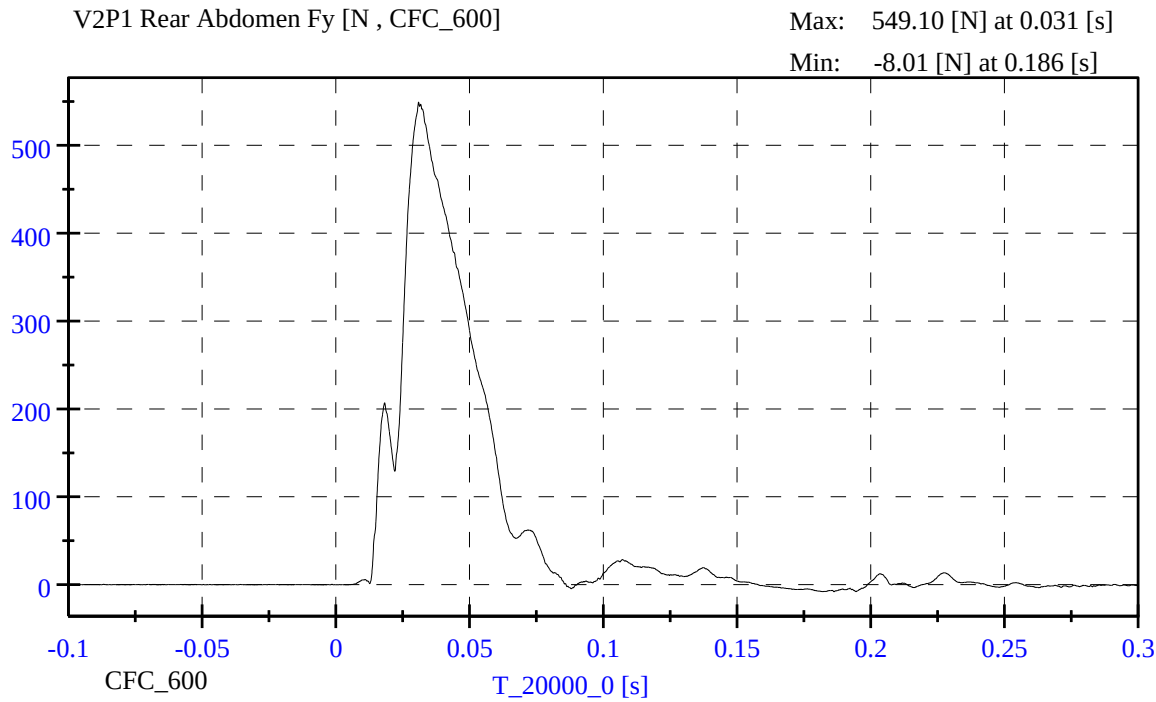


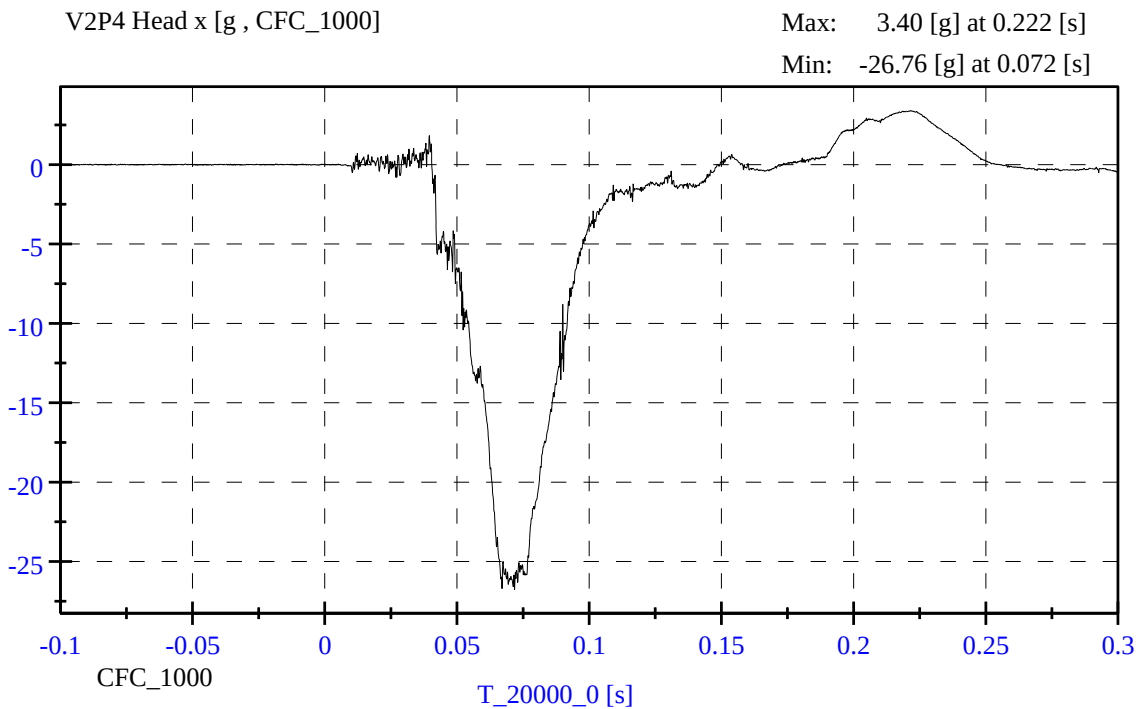
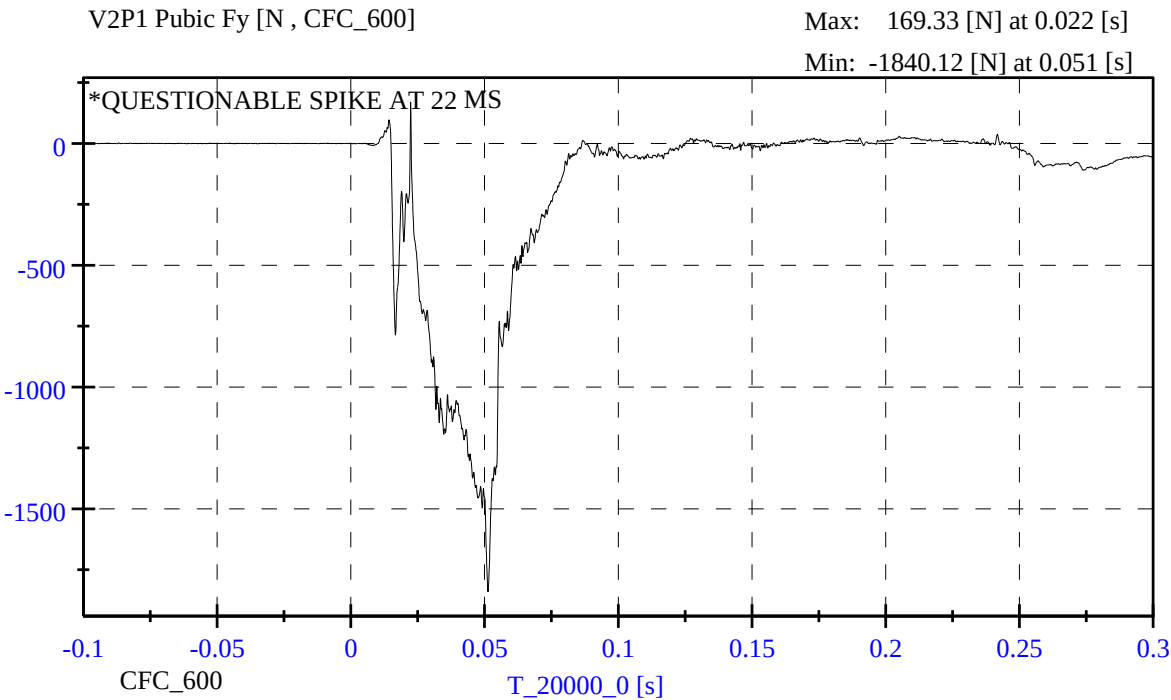


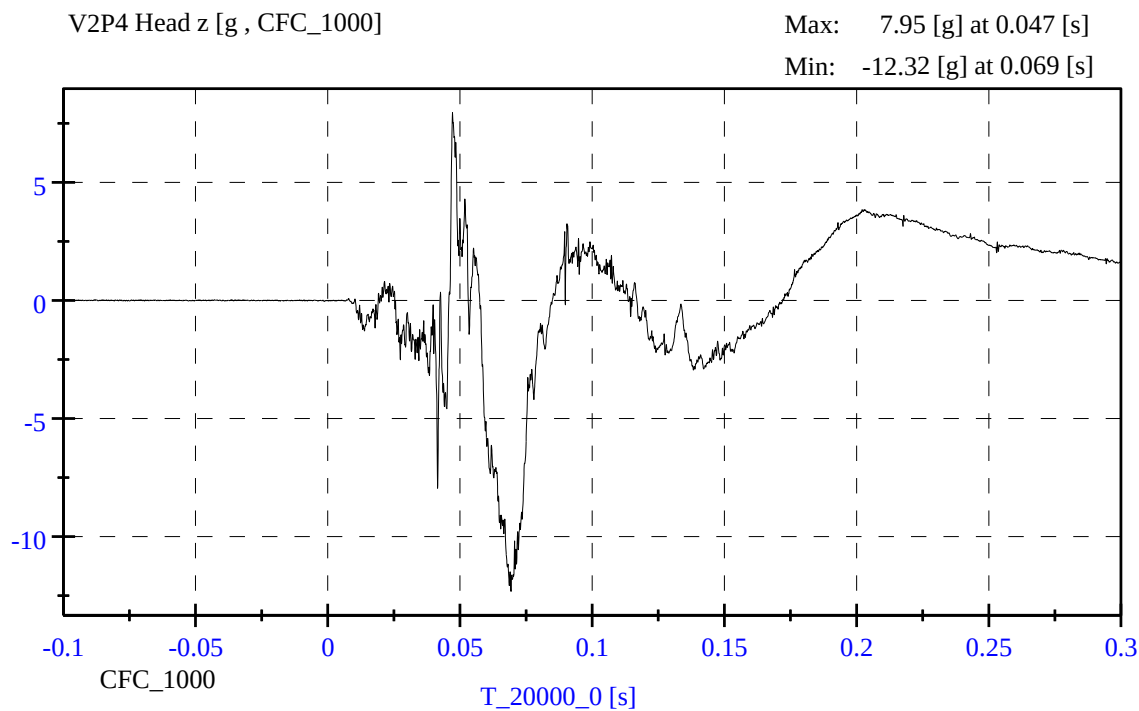
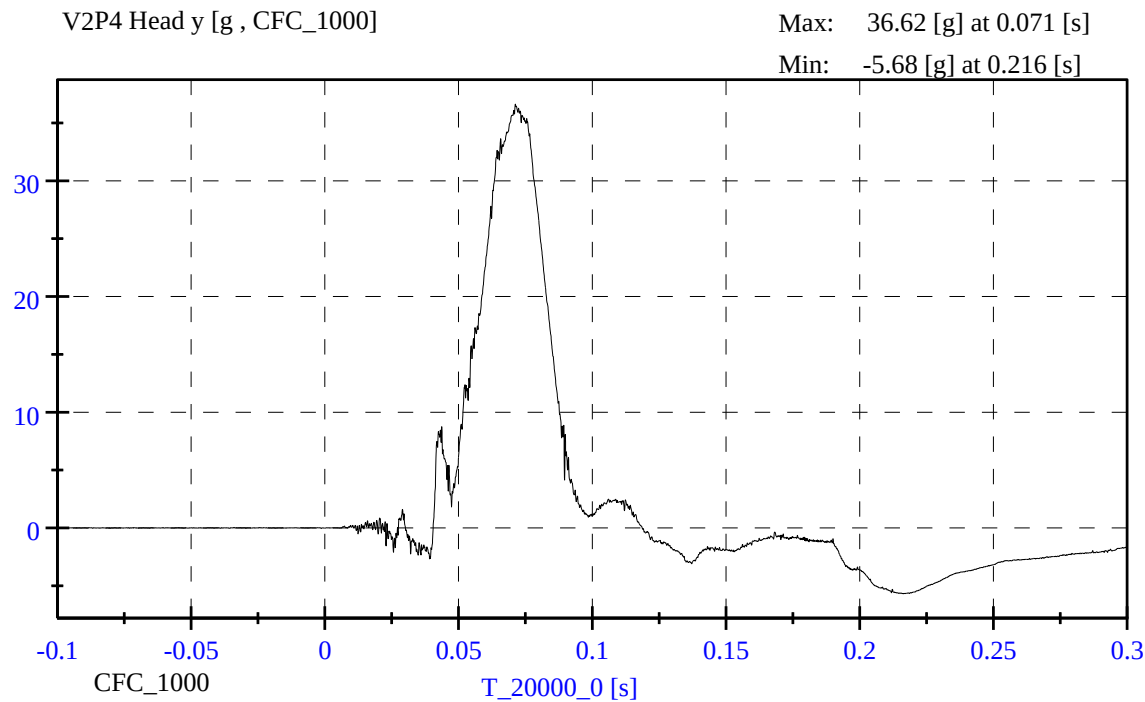


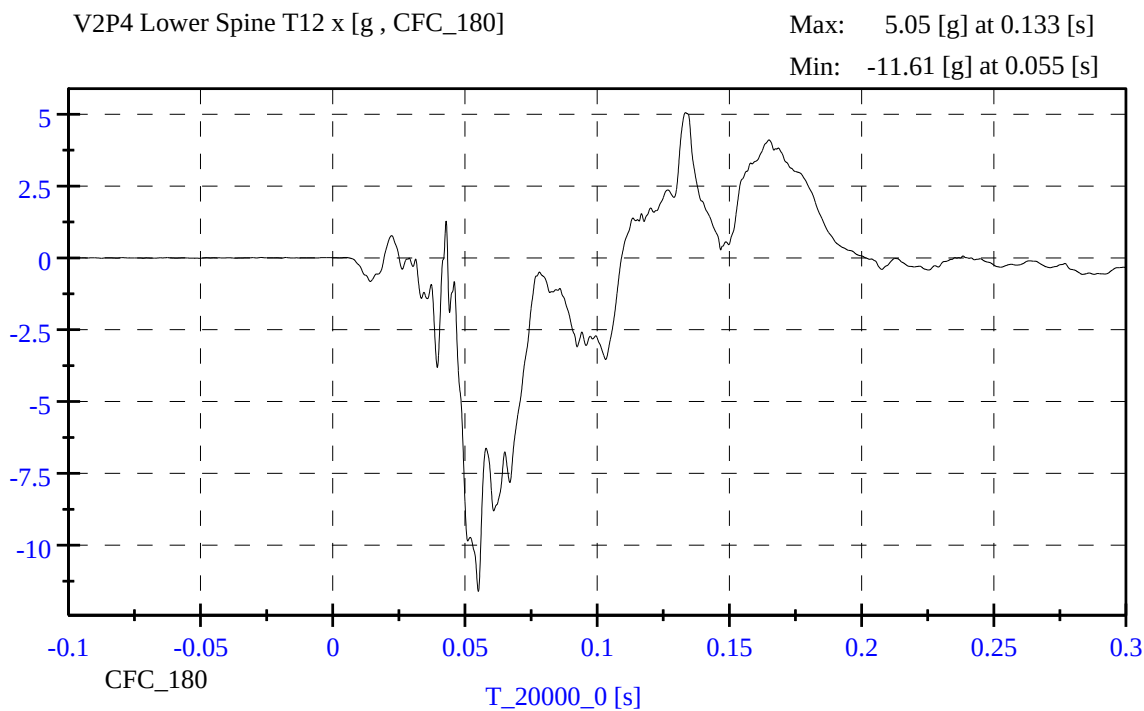
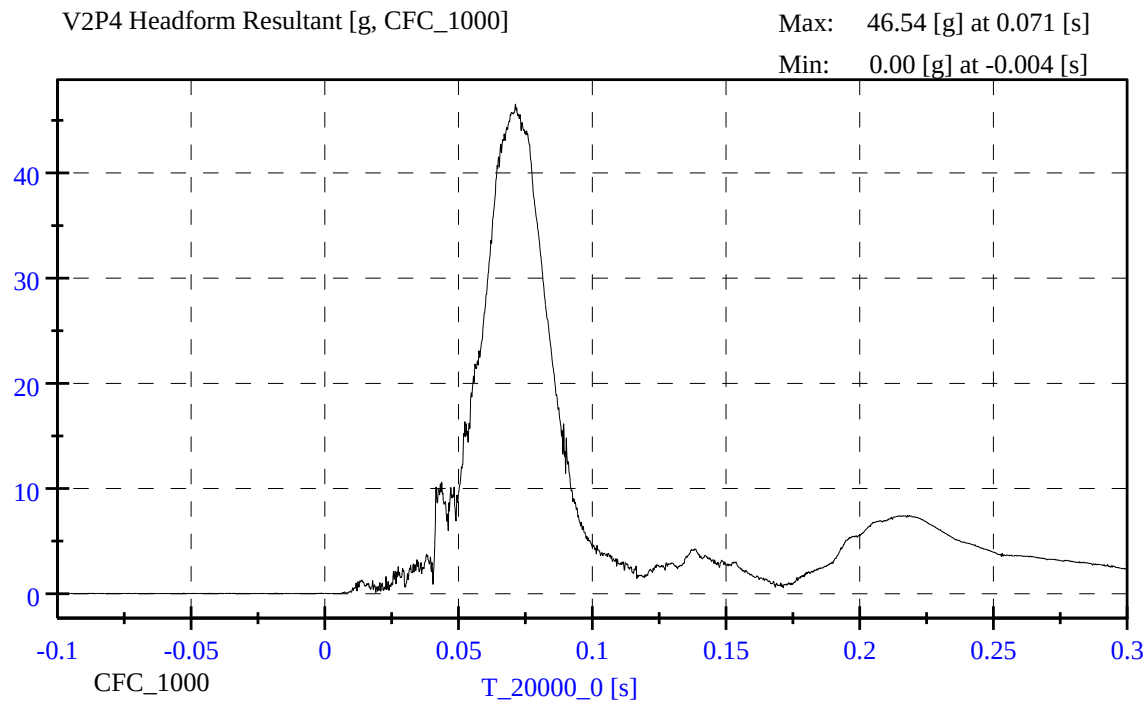


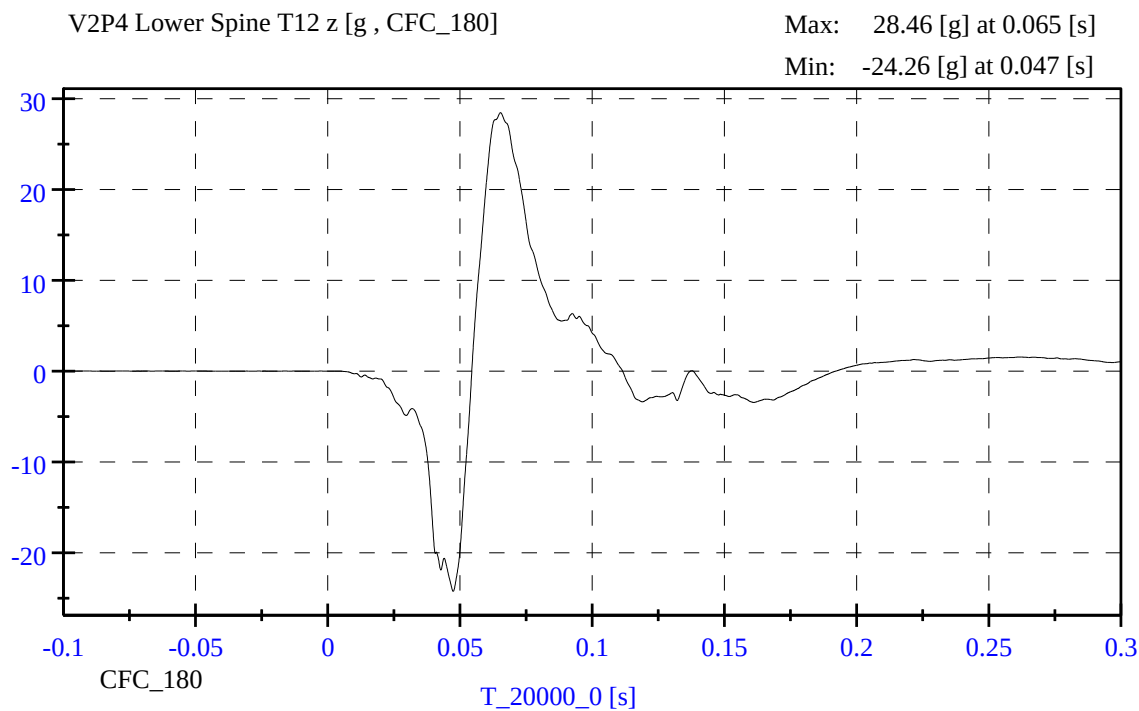
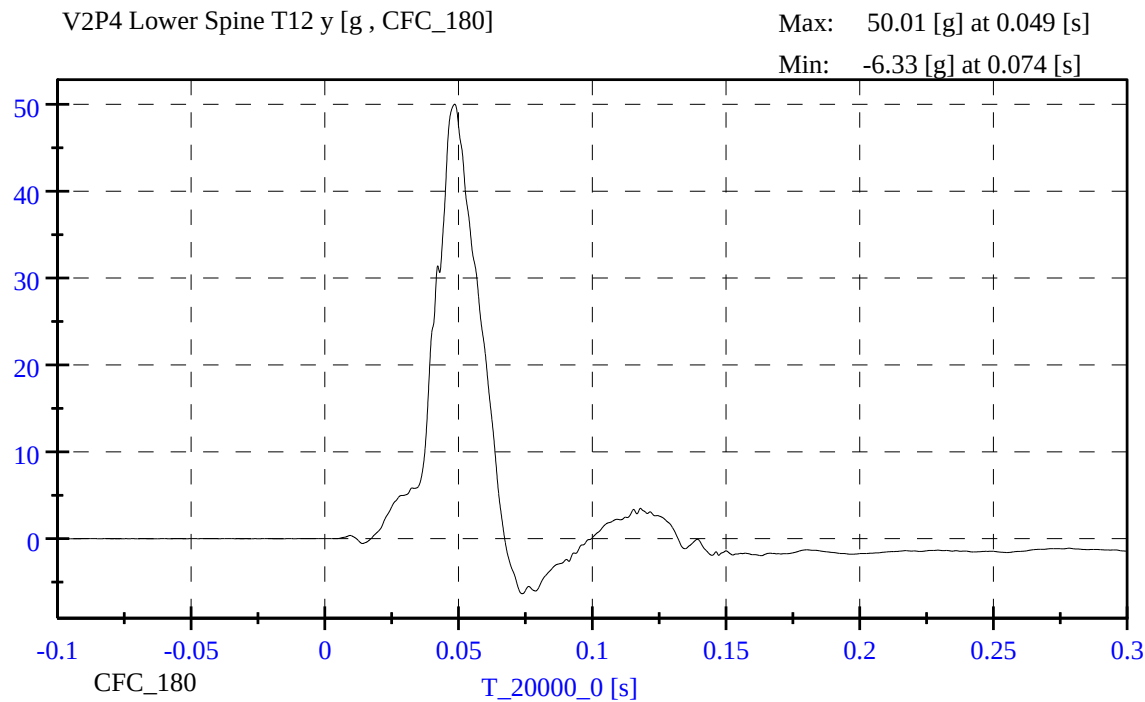


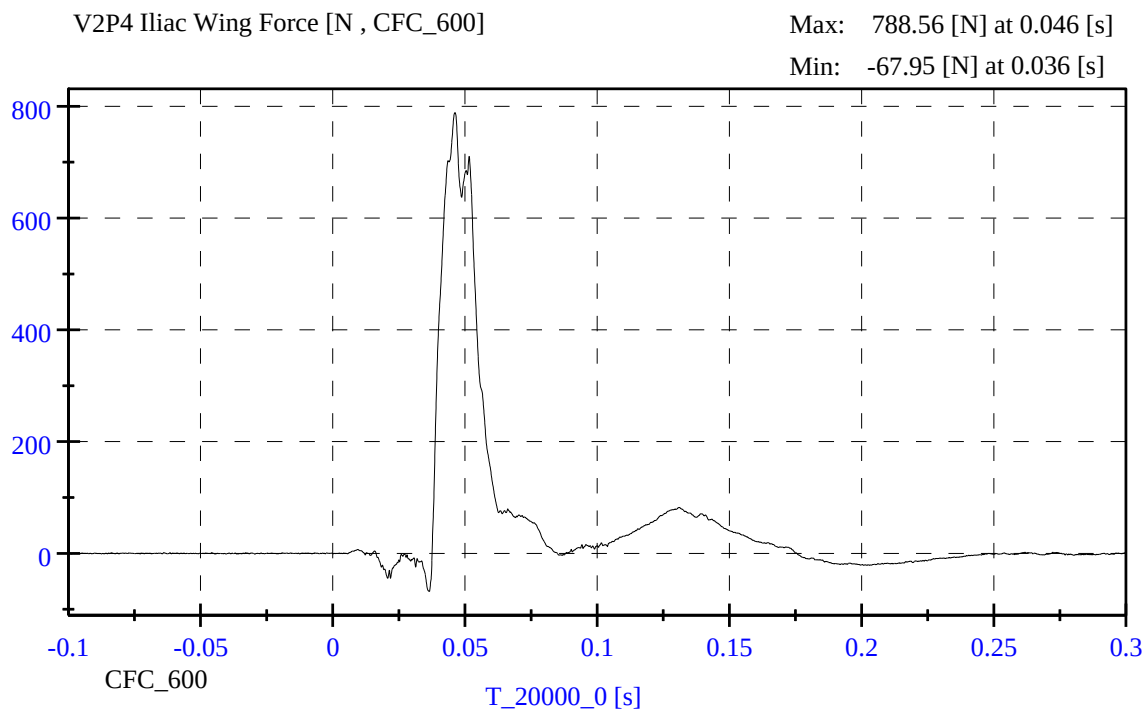
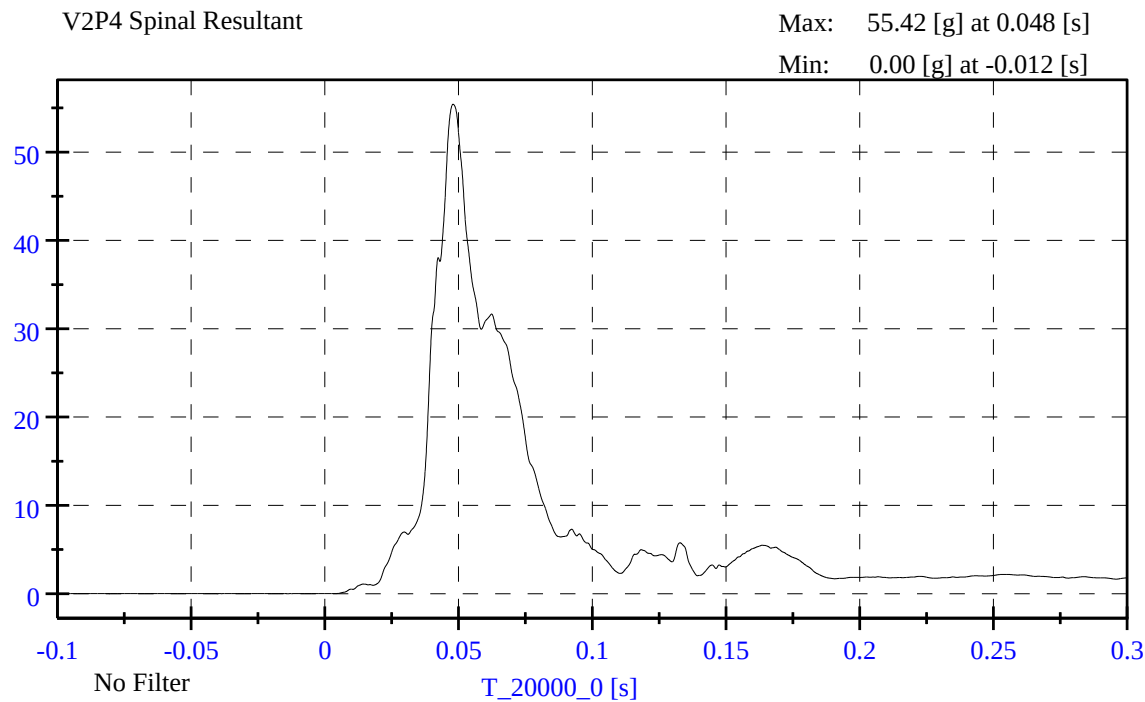


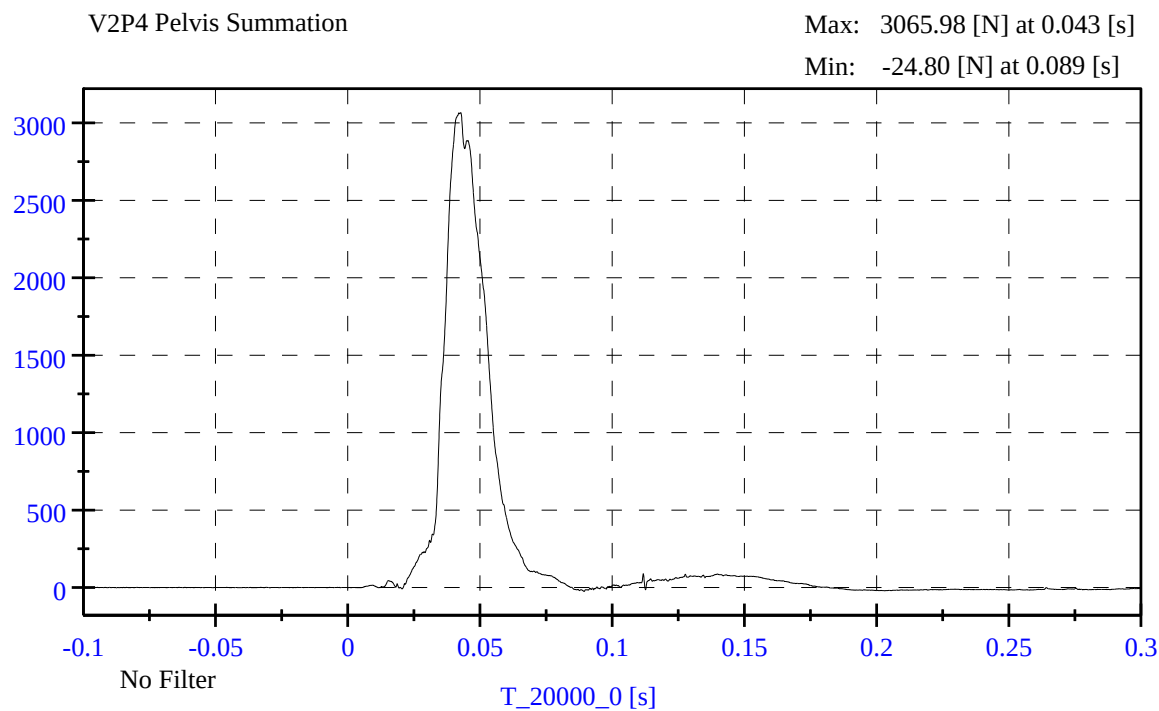
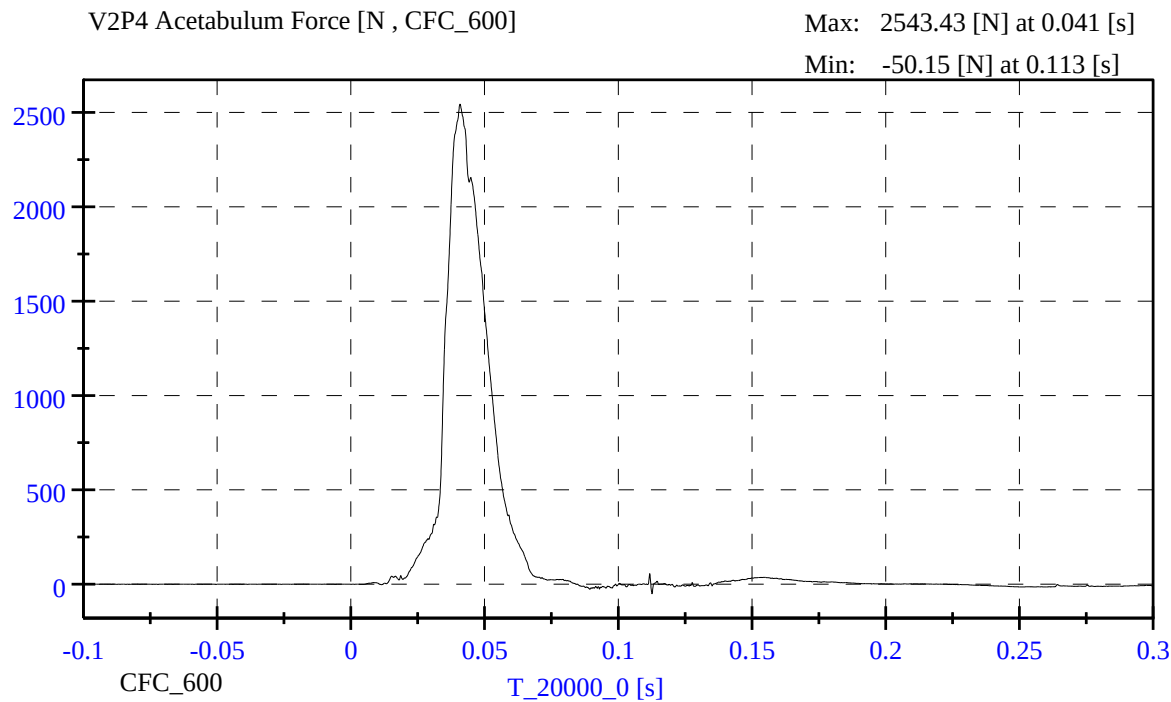












APPENDIX C

DUMMY PERFORMANCE CALIBRATION TEST DATA

TABLE OF CALIBRATION TEST RESULTS

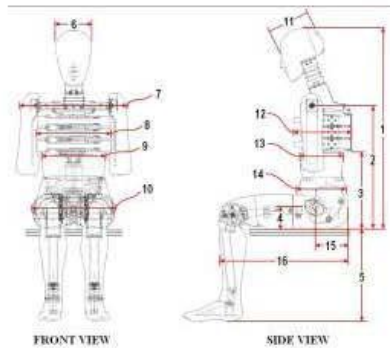
PRE-TEST

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	912	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	285	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	202	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: 12/22/2011

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:	12/21/2011
Test Number:	1	Test Time:	3:13:06 PM

Component Part Number	Component Serial Number
455-1007	1916409

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.0 deg C P
Humidity	10 -- 70	44 %RH P
Resultant Acceleration	125 -- 155	136 g P
Oscillation	0.0 -- 15.0	0.0 % P
Fore-Aft Acceleration	-15.00 -- 15.00	5.86 g P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test ID:

Test Time: **3:13:06 PM**

Test Date: **12/21/2011**

VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P71271	8/12/2011
Endevco	7264-2000	P71281	8/12/2011
Endevco	7264-2000	P71298	8/12/2011

Test ID:

Test Time: **3:13:06 PM**Test Date: **12/21/2011**

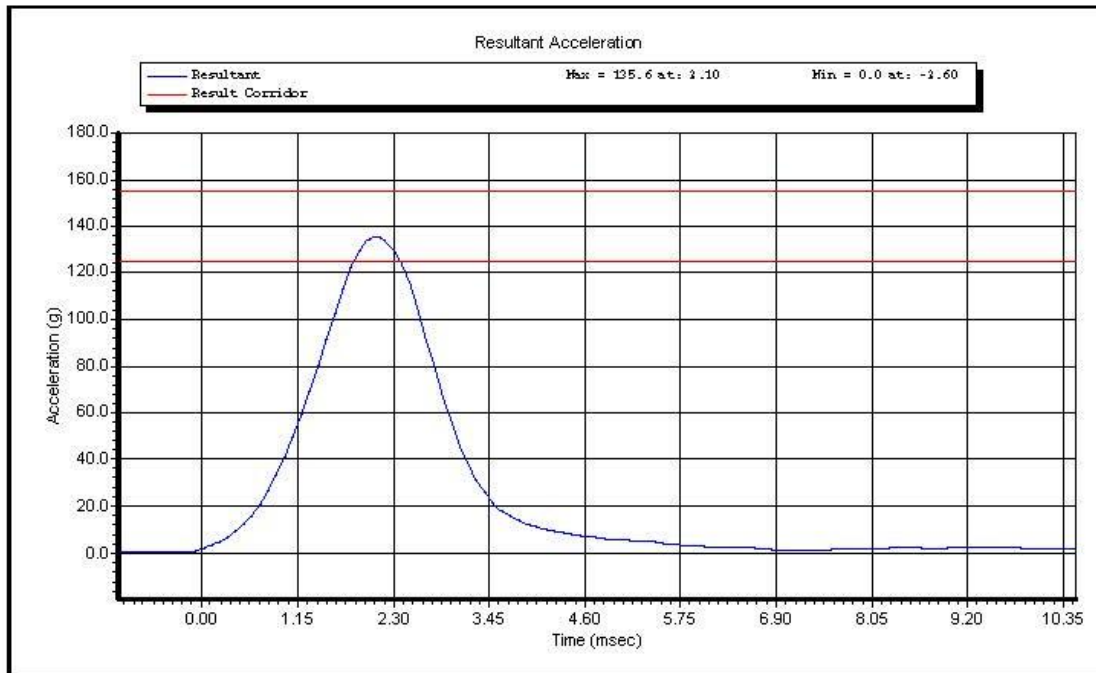


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Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	12/21/2011
Test Number:	1	Test Time:	3:13:06 PM



Test ID:

Test Time: 3:13:06 PM

Test Date: 12/21/2011

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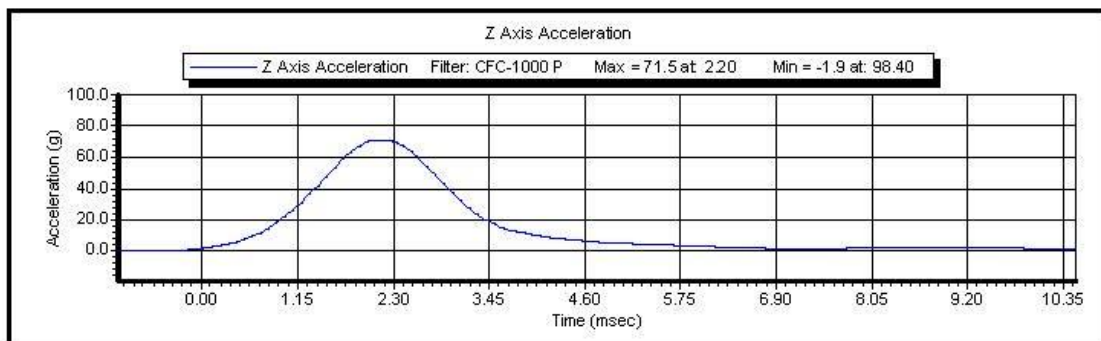
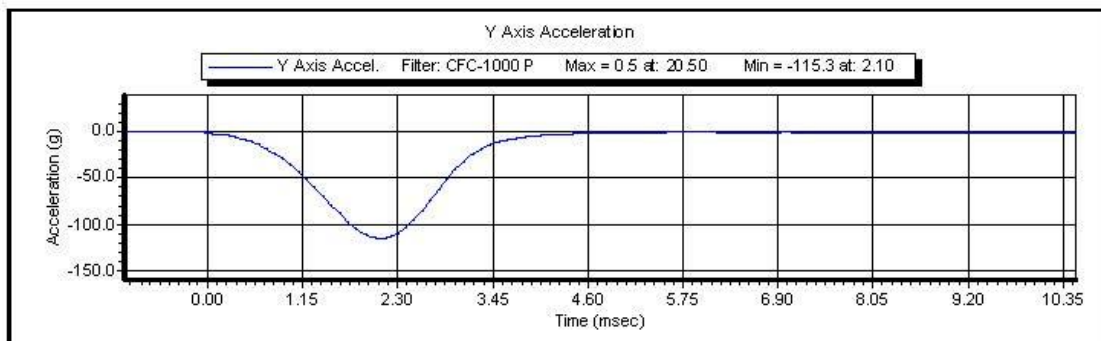
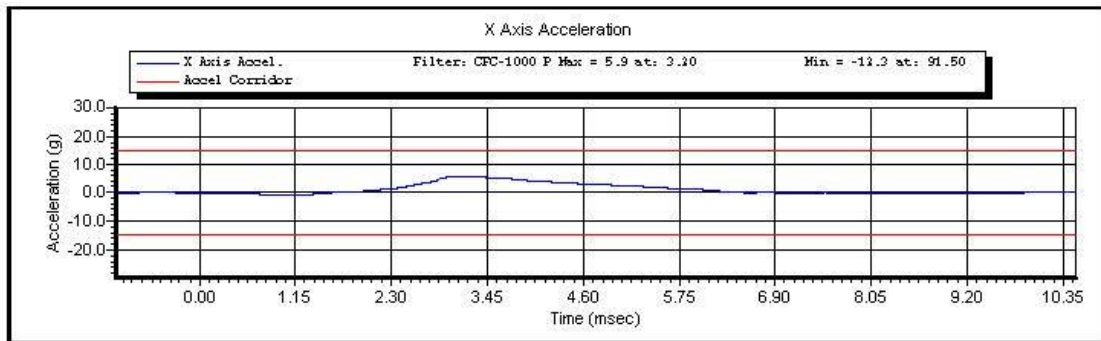
1 of 2



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Test ID:

Test Time: 3:13:06 PM

Test Date: 12/21/2011

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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:	12/22/2011
Test Number:	3	Test Time:	10:59:08 AM

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	34 %RH P
Velocity	3.30 -- 3.50	3.46 m/s P
Maximum Neck Flexion Angle	49.0 -- 59.0	50.9 degrees P
Time At Maximum Neck Flexion	54.0 -- 66.0	61.2 ms P
Decay to Zero Degrees	53.0 -- 88.0	63.0 ms P
Velocity Corridor	--	P

All test parameters are within specifications

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

Test ID: Test Time: **10:59:08 AM** Test Date: **12/22/2011**

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: **10:59:08 AM**Test Date: **12/22/2011**

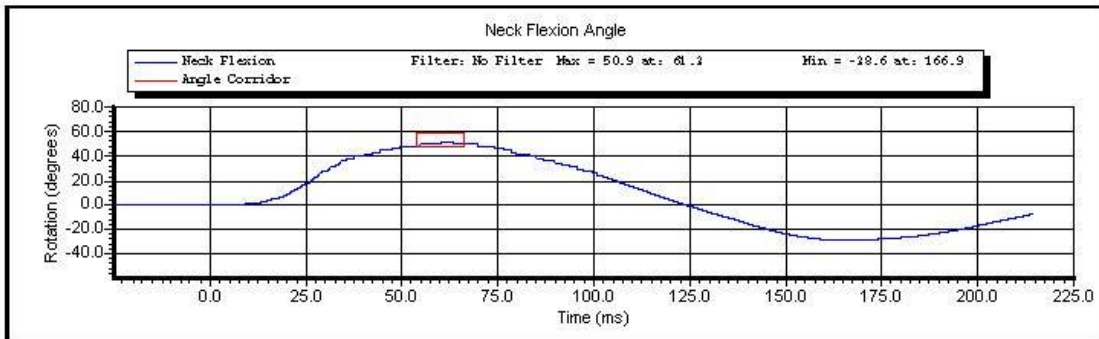
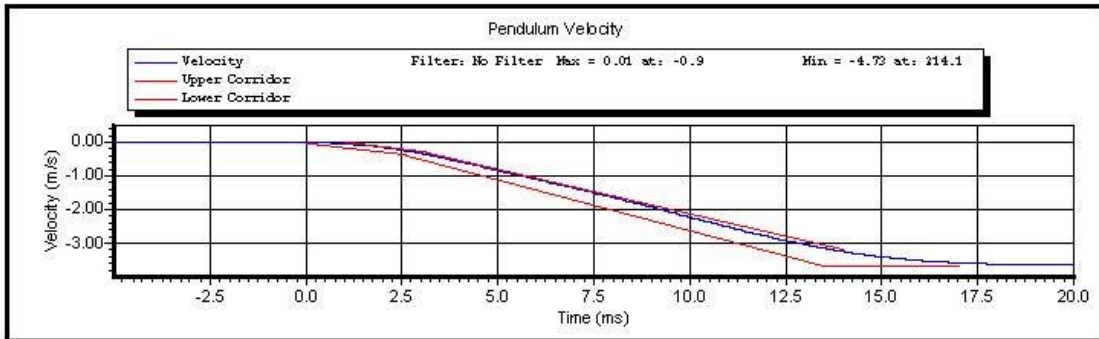


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Test Name:	Neck Flexion	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	12/22/2011
Test Number:	3	Test Time:	10:59:08 AM



Test ID:

Test Time: 10:59:08 AM

Test Date: 12/22/2011

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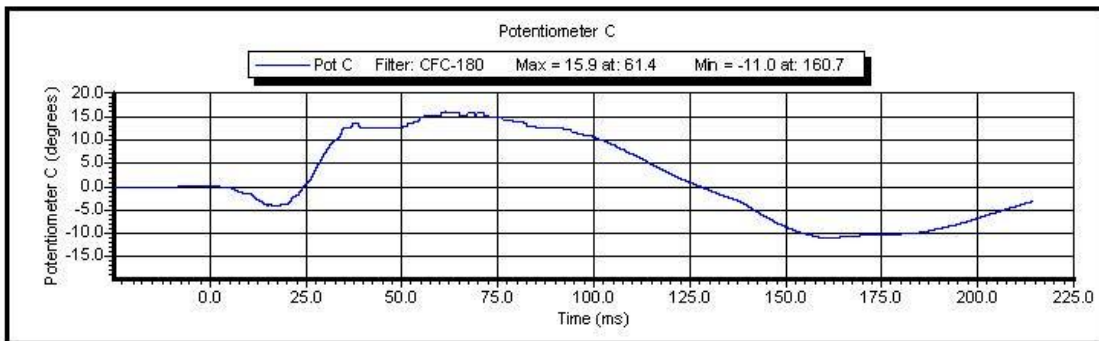
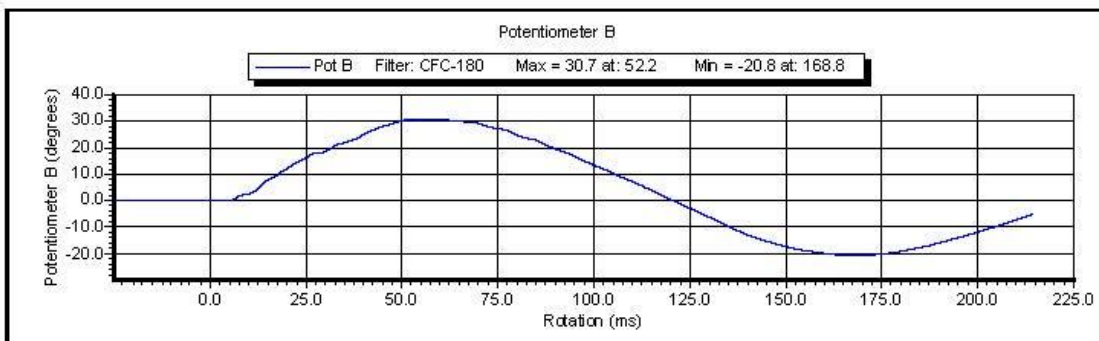
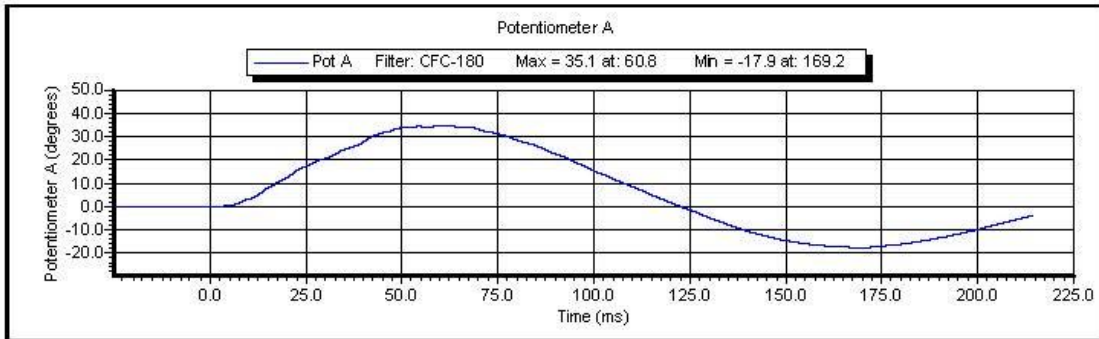
1 of 2



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Test ID:

Test Time: 10:59:08 AM

Test Date: 12/22/2011

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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:	1/4/2012
Test Number:	1	Test Time:	11:18:44 AM

Component Part Number	Component Serial Number
960715-313	

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.2 deg C P
Humidity	10.0 -- 70.0	17.0 %RH P
Velocity	4.20 -- 4.40	4.22 m/s P
Pendulum Acceleration	-10.50 -- -7.50	-10.30 g P

All test parameters are within specifications

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

Test ID:

Test Time: **11:18:44 AM**

Test Date: **1/4/2012**



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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	AGHF5	1/3/2012

Test ID:

Test Time: 11:18:44 AM

Test Date: 1/4/2012

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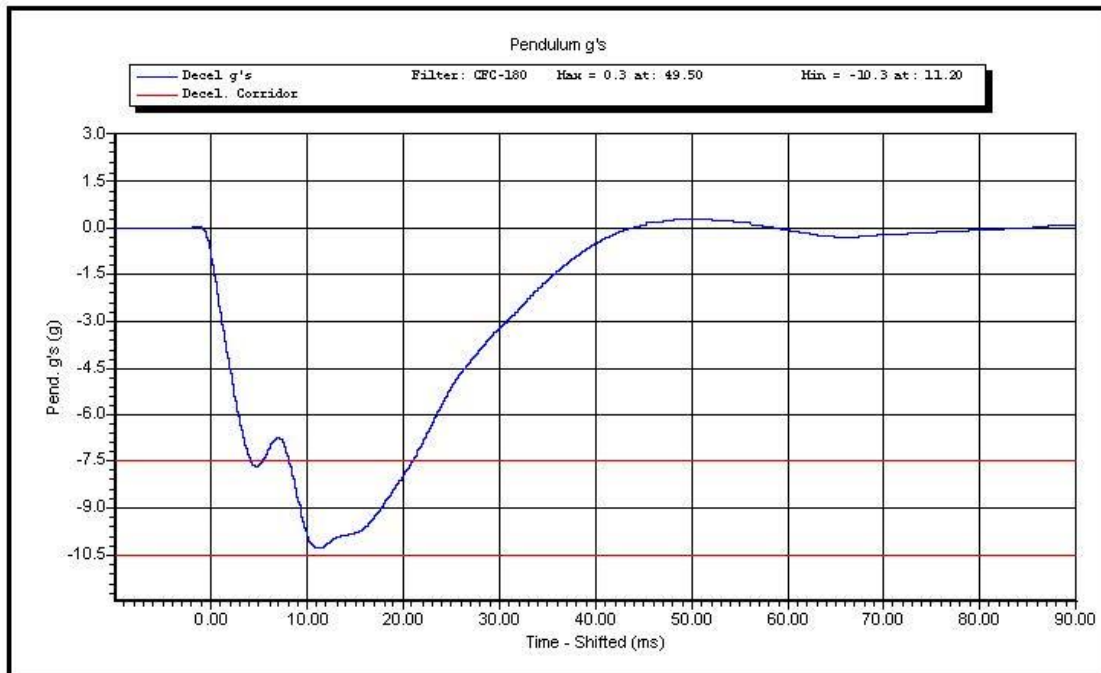


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Test Name:	Shoulder Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	1/4/2012
Test Number:	1	Test Time:	11:18:44 AM



Test ID:

Test Time: 11:18:44 AM

Test Date: 1/4/2012

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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:	1/3/2012
Test Number:	1	Test Time:	10:56:37 AM

Component Part Number	Component Serial Number
455-3100	07203

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.5 deg C P
Humidity	10.0 -- 70.0	17.0 %RH P
Velocity	3.90 -- 4.10	3.96 m/s P
Rib Displacement	-51.00 -- -46.00	-48.24 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: **10:56:37 AM**

Test Date: **1/3/2012**

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: **10:56:37 AM**Test Date: **1/3/2012**

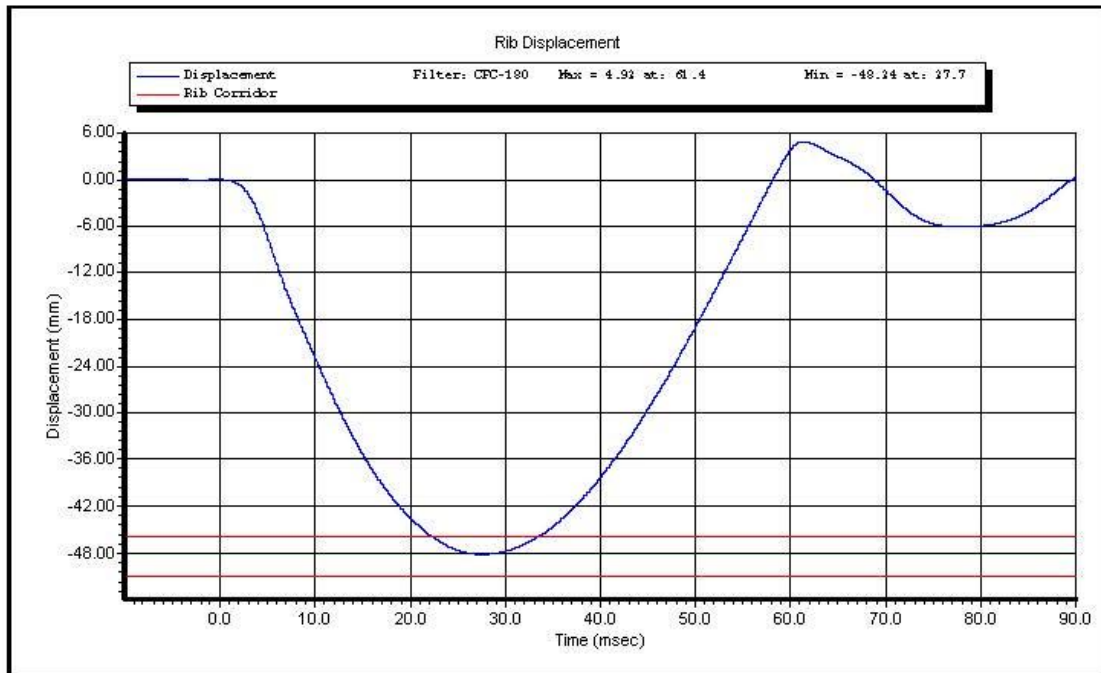


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Upper Rib 4 m/s	Test Date:	1/3/2012
Test Number:	1	Test Time:	10:56:37 AM



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

Test Time: **10:56:37 AM**

Test Date: **1/3/2012**

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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:	1/3/2012
Test Number:	1	Test Time:	11:06:55 AM

Component Part Number	Component Serial Number
455-3100	07203

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.5 deg C P
Humidity	10.0 -- 70.0	17.0 %RH P
Velocity	2.90 -- 3.10	2.97 m/s P
Rib Displacement	-40.00 -- -36.00	-37.62 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 3 m/s**

Test Time: **11:06:55 AM**

Test Date: **1/3/2012**



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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: **11:06:55 AM**

Test Date: **1/3/2012**

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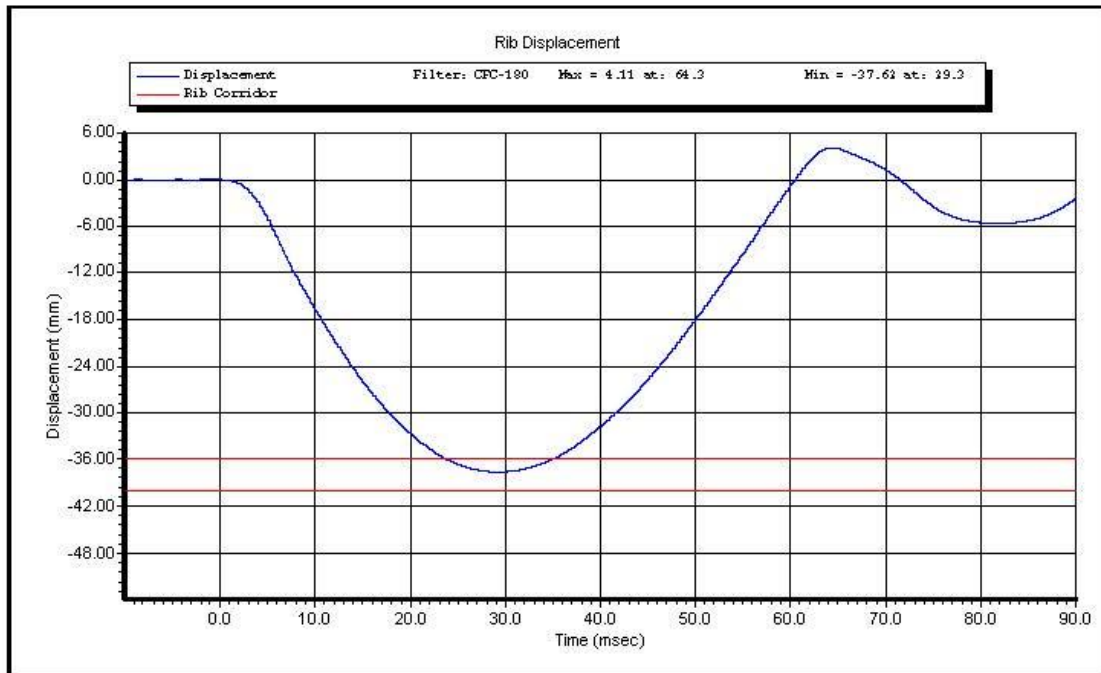


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Upper Rib 3 m/s	Test Date:	1/3/2012
Test Number:	1	Test Time:	11:06:55 AM



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

Test Time: **11:06:55 AM**

Test Date: **1/3/2012**

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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:	1/3/2012
Test Number:	1	Test Time:	11:17:54 AM

Component Part Number	Component Serial Number
455-3100	07205

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.5 deg C P
Humidity	10.0 -- 70.0	17.0 %RH P
Velocity	3.90 -- 4.10	3.97 m/s P
Rib Displacement	-51.00 -- -46.00	-48.09 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: **11:17:54 AM**

Test Date: **1/3/2012**



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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: **11:17:54 AM**

Test Date: **1/3/2012**

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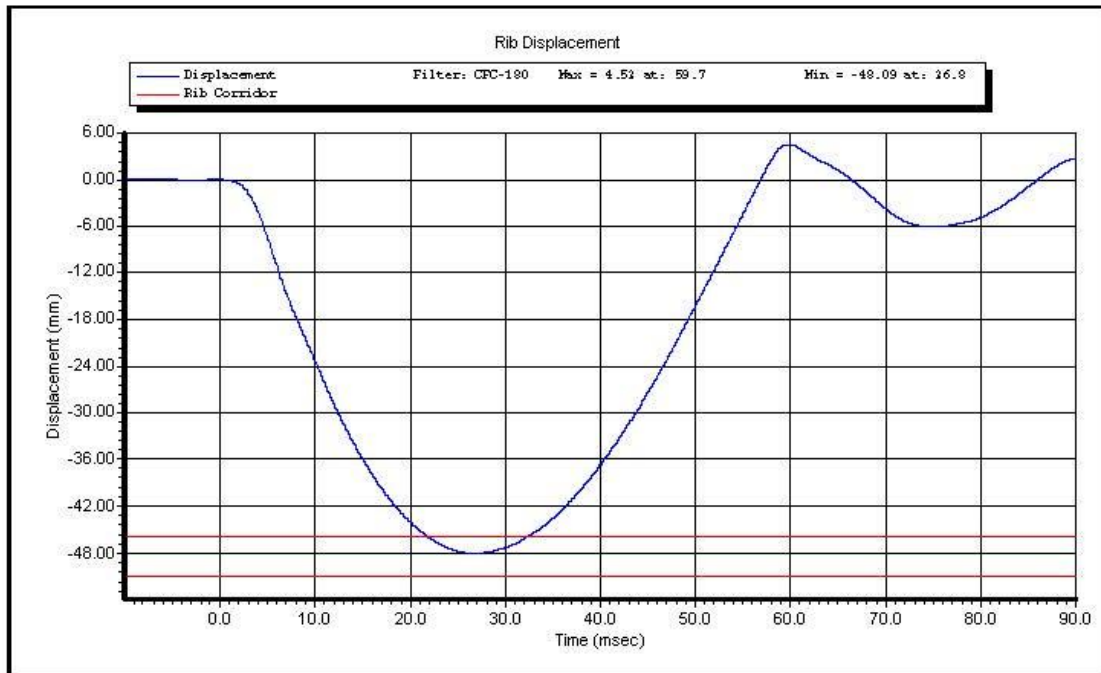


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Middle Rib 4 m/s	Test Date:	1/3/2012
Test Number:	1	Test Time:	11:17:54 AM



Test ID: Middle Rib 4 m/s Test Time: 11:17:54 AM

Test Date: 1/3/2012

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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:	1/3/2012
Test Number:	1	Test Time:	11:29:37 AM

Component Part Number	Component Serial Number
455-3100	07205

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.5 deg C P
Humidity	10.0 -- 70.0	17.0 %RH P
Velocity	2.90 -- 3.10	2.98 m/s P
Rib Displacement	-40.00 -- -36.00	-37.61 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: **11:29:37 AM**

Test Date: **1/3/2012**

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: **11:29:37 AM**Test Date: **1/3/2012**

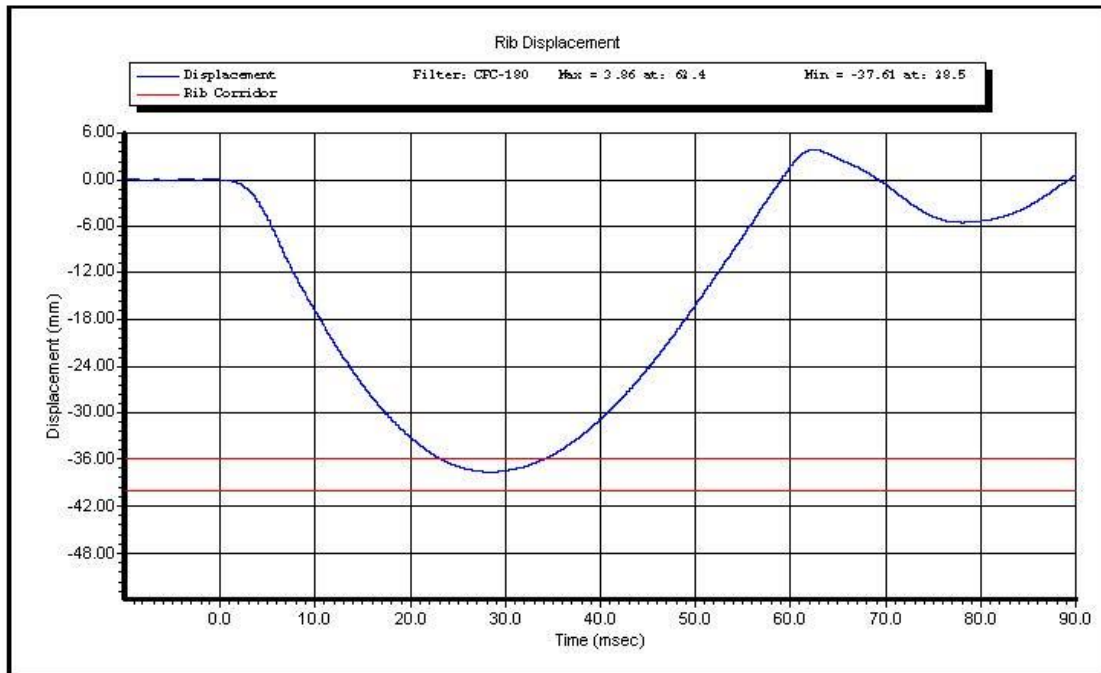


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Middle Rib 3 m/s	Test Date:	1/3/2012
Test Number:	1	Test Time:	11:29:37 AM



Test ID: **Middle Rib 3 m/s** Test Time: **11:29:37 AM**

Test Date: **1/3/2012**

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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:	1/3/2012
Test Number:	1	Test Time:	11:44:40 AM

Component Part Number	Component Serial Number
455-3100	07209

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.5 deg C P
Humidity	10.0 -- 70.0	17.0 %RH P
Velocity	3.90 -- 4.10	3.96 m/s P
Rib Displacement	-51.00 -- -46.00	-48.77 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: **11:44:40 AM**

Test Date: **1/3/2012**

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: **11:44:40 AM**Test Date: **1/3/2012**

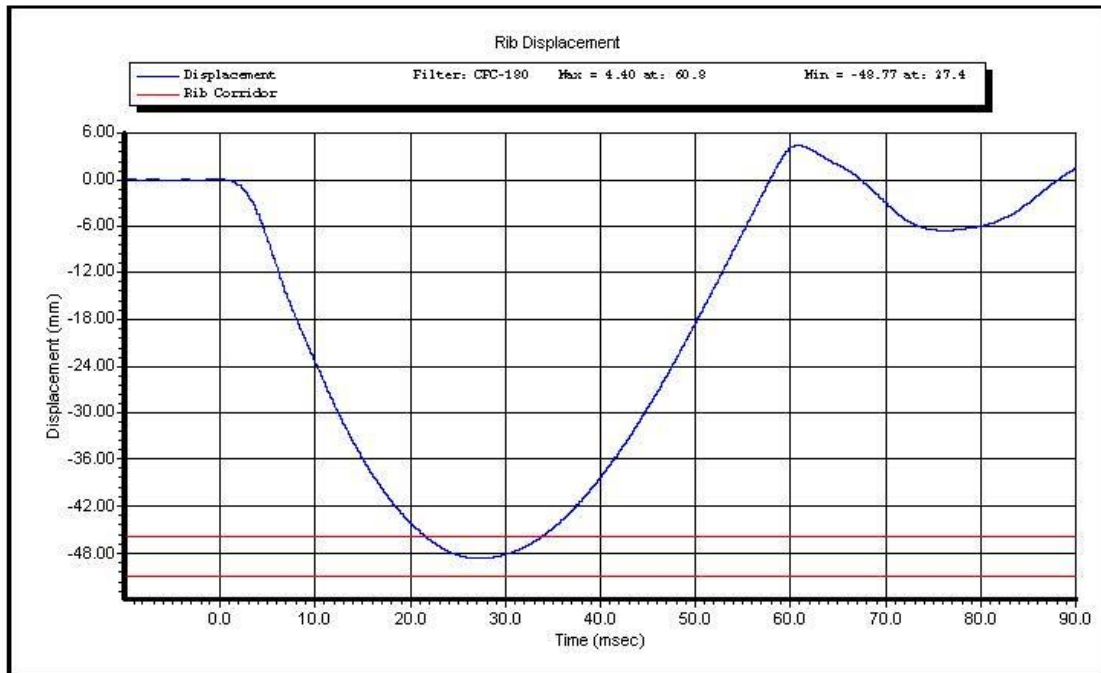


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Lower Rib 4 m/s	Test Date:	1/3/2012
Test Number:	1	Test Time:	11:44:40 AM



Test ID: Lower Rib 4 m/s

Test Time: 11:44:40 AM

Test Date: 1/3/2012

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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:	1/3/2012
Test Number:	1	Test Time:	11:59:14 AM

Component Part Number	Component Serial Number
455-3100	07209

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.5 deg C P
Humidity	10.0 -- 70.0	17.0 %RH P
Velocity	2.90 -- 3.10	2.96 m/s P
Rib Displacement	-40.00 -- -36.00	-37.92 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: **11:59:14 AM** Test Date: **1/3/2012**

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: **11:59:14 AM**Test Date: **1/3/2012**

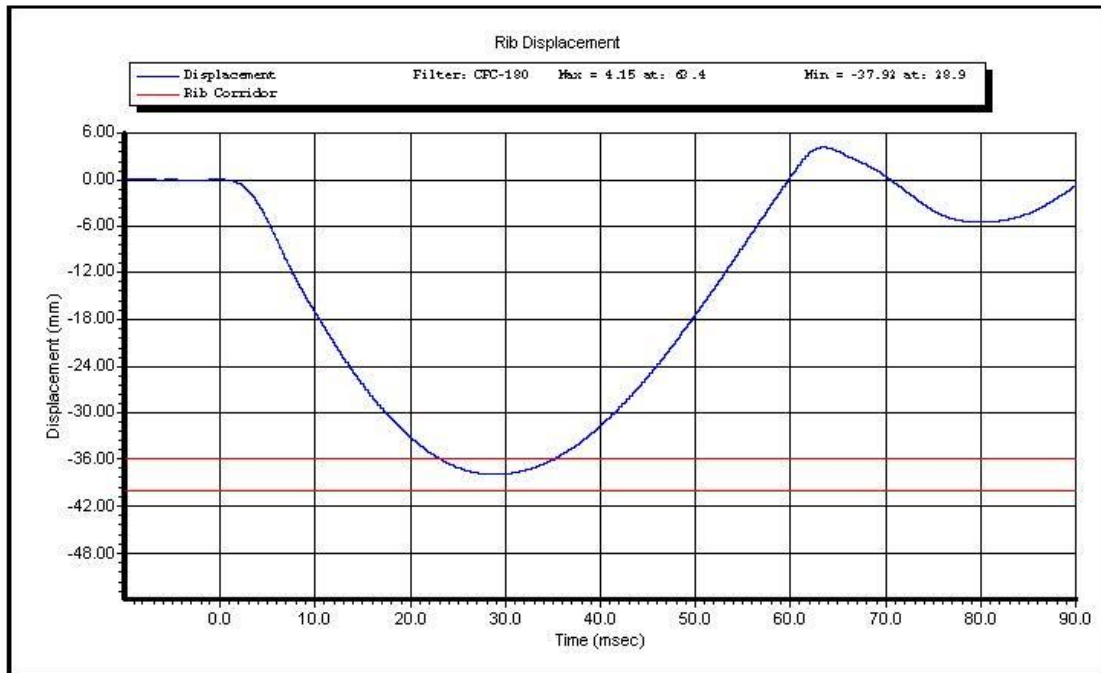


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Lower Rib 3 m/s	Test Date:	1/3/2012
Test Number:	1	Test Time:	11:59:14 AM



Test ID: Lower Rib 3 m/s

Test Time: 11:59:14 AM

Test Date: 1/3/2012

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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:	1/3/2012
Test Number:	1	Test Time:	4:24:52 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	21.4 deg C P
Humidity	10.0 -- 70.0	16.4 %RH P
Velocity	5.40 -- 5.60	5.48 m/s P
Upper Rib Displacement	34.0 -- 41.0	37.6 mm P
Middle Rib Displacement	37.0 -- 45.0	41.9 mm P
Lower Rib Displacement	37.0 -- 44.0	41.6 mm P
Impactor Force	5100 -- 6200	5694 N P

All test parameters are within specifications

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

Test ID:

Test Time: **4:24:52 PM**

Test Date: **1/3/2012**



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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	AGHF5	1/3/2012
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: 4:24:52 PM

Test Date: 1/3/2012

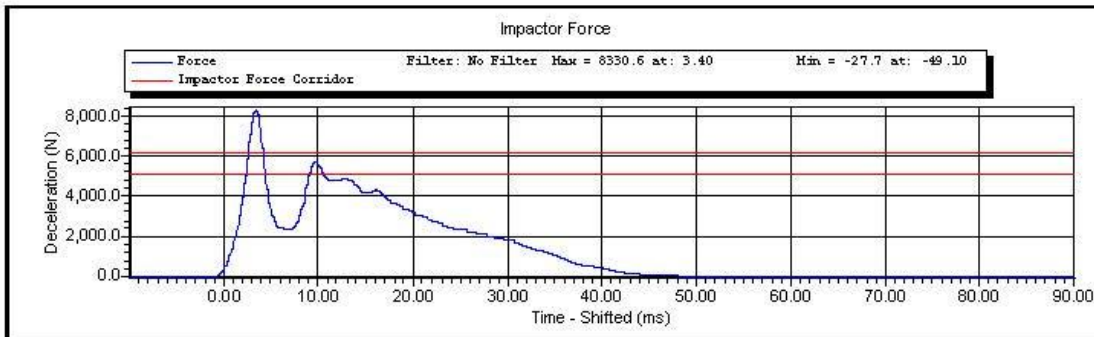
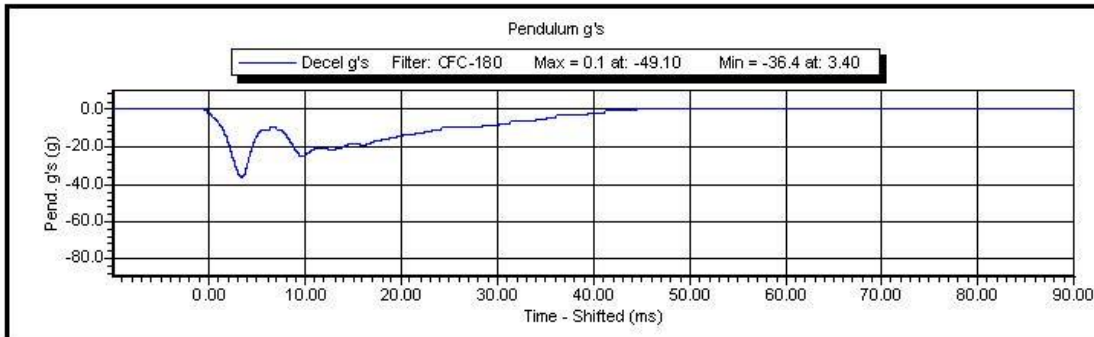


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Test Name:	Thorax Impact	Revision:	8/15/2008
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	1/3/2012
Test Number:	1	Test Time:	4:24:52 PM



Test ID:

Test Time: 4:24:52 PM

Test Date: 1/3/2012

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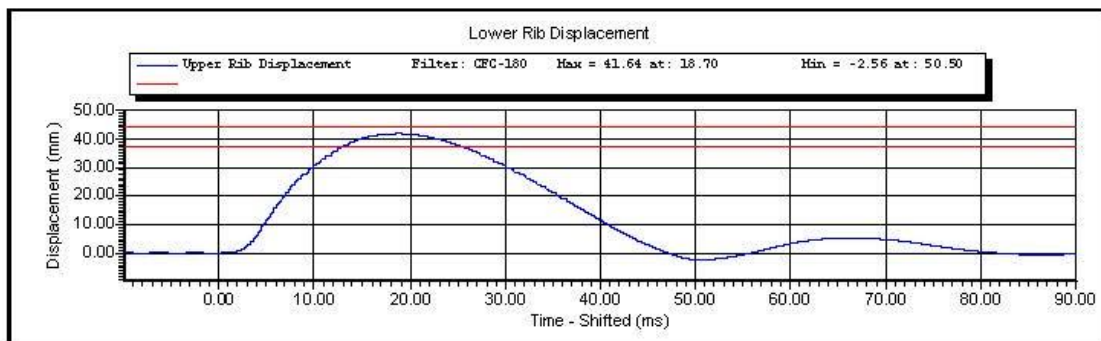
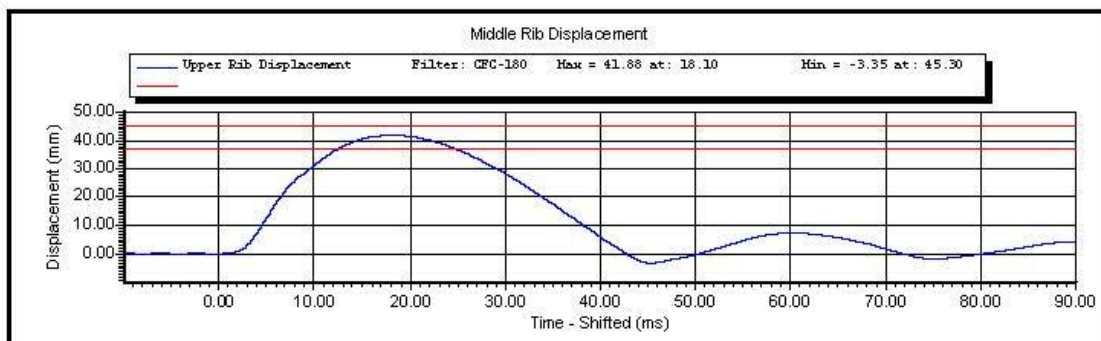
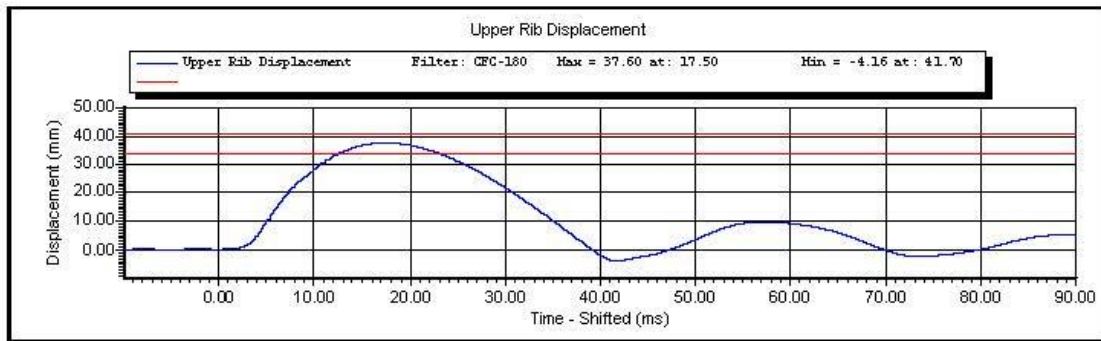
1 of 2



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Test ID:

Test Time: 4:24:52 PM

Test Date: 1/3/2012

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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:	1/5/2012
Test Number:	2	Test Time:	1:17:51 PM

Component Part Number	Component Serial Number
455-4001	0483

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10 -- 70	23 %RH P
Velocity	3.90 -- 4.10	4.02 m/s P
Peak Abdominal Force	-2.70 -- -2.20	-2.57 kN P
Time At Peak Abdominal Force	10.0 -- 12.3	10.5 ms P
Maximum Pendulum Force	-4.80 -- -4.00	-4.75 kN P
Time at Peak Pendulum Force	10.6 -- 13.0	10.7 ms P

All test parameters are within specifications

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

Test ID:

Test Time: **1:17:51 PM**

Test Date: **1/5/2012**



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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	AGHF5	1/3/2012
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: **1:17:51 PM**

Test Date: **1/5/2012**

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2 of 2

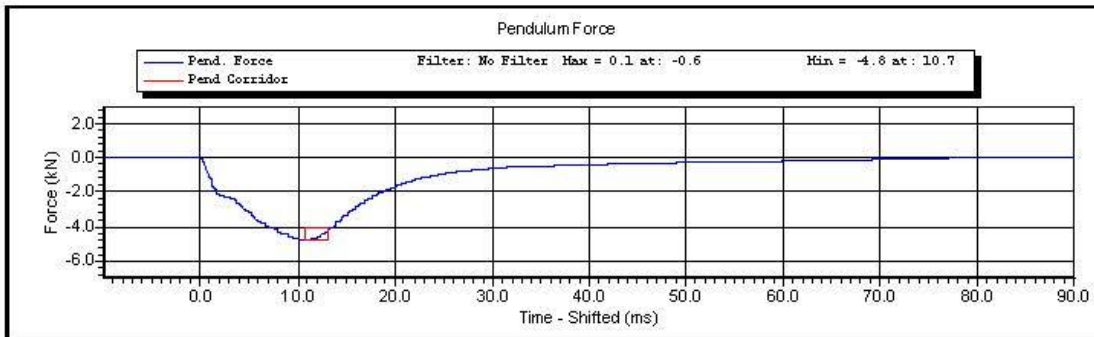
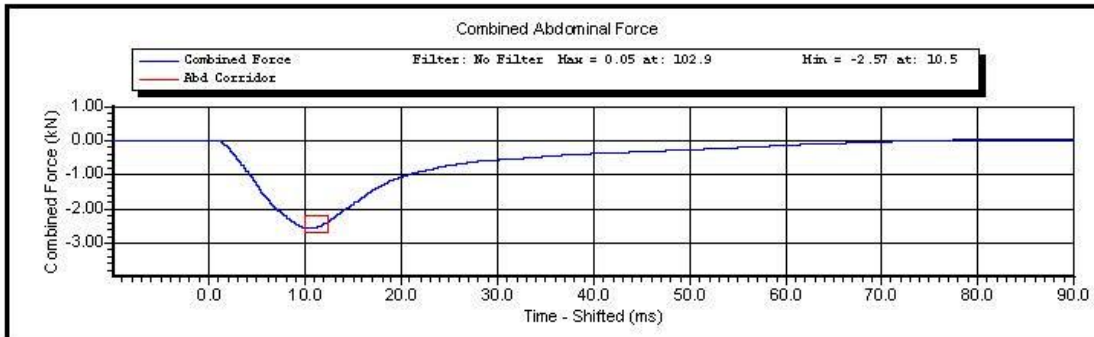


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Test Name:	Abdominal Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	1/5/2012
Test Number:	2	Test Time:	1:17:51 PM



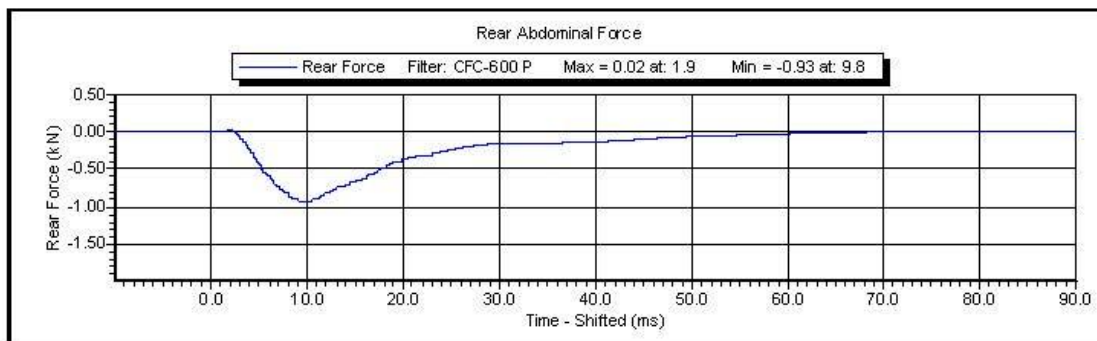
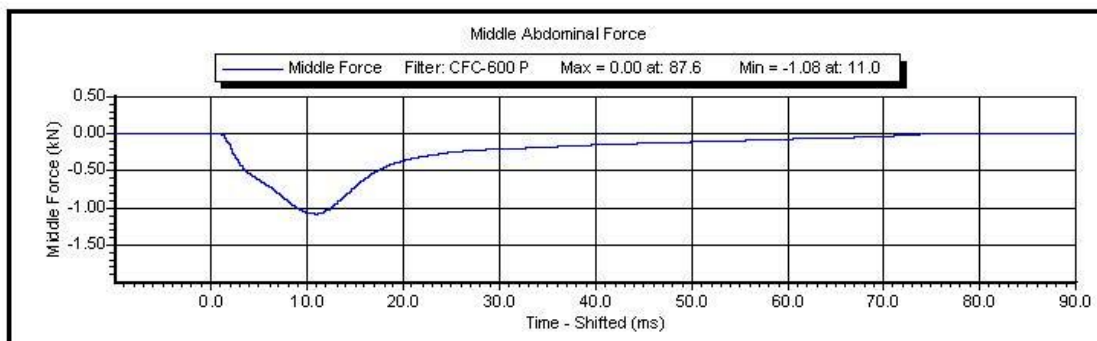
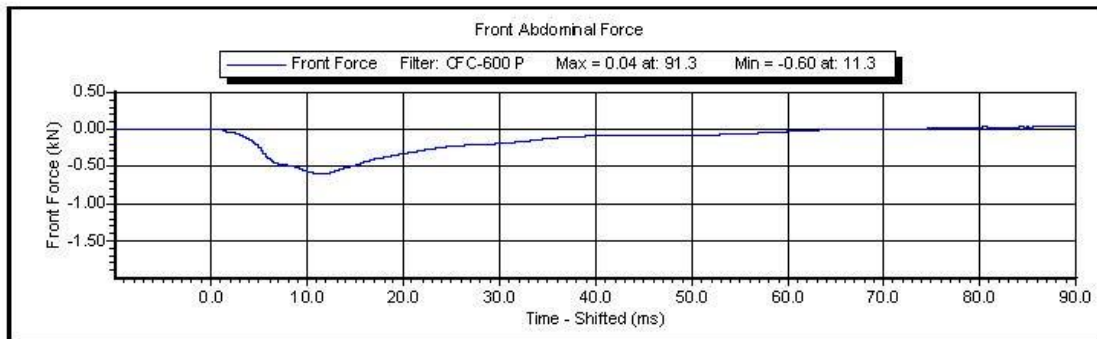
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Test Time: **1:17:51 PM**

Test Date: **1/5/2012**

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1 of 2



Test ID:

Test Time: **1:17:51 PM**

Test Date: **1/5/2012**

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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:	1/3/2012
Test Number:	1	Test Time:	9:19:48 AM

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	17 %RH P
Velocity	5.95 -- 6.15	6.15 m/s P
Maximum Headform Flexion Angle	45.0 -- 55.0	45.5 degrees P
Time at Maximum Headform Flexion Angle	39.0 -- 53.0	42.2 ms P
Decay to Zero Degrees	37.0 -- 57.0	40.3 ms P
Velocity Corridor	--	P

All test parameters are within specifications

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

Test ID:

Test Time: **9:19:48 AM**Test Date: **1/3/2012**



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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: **9:19:48 AM**

Test Date: **1/3/2012**

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2 of 2

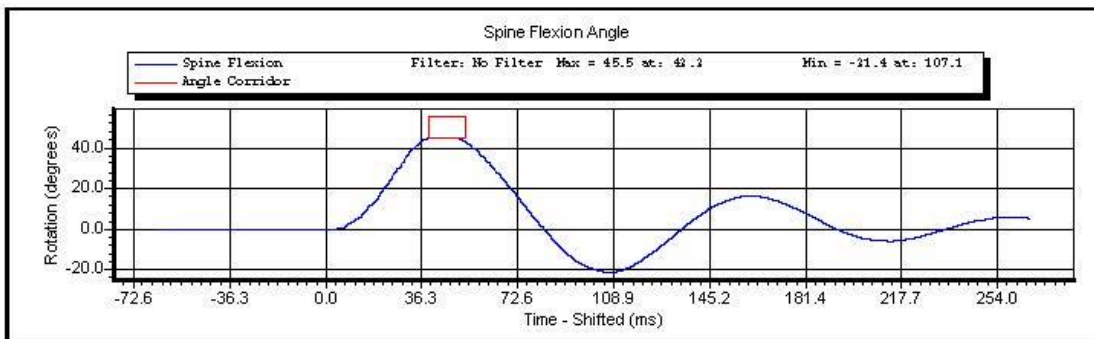
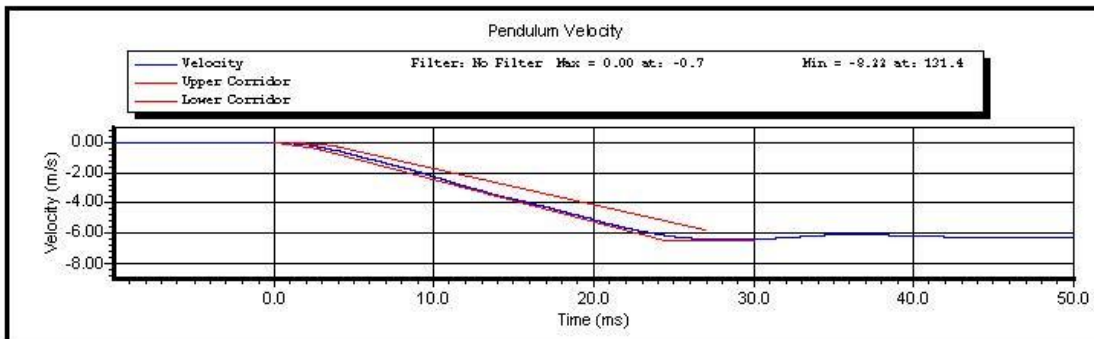


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Test Name:	Lumbar Spine	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	1/3/2012
Test Number:	1	Test Time:	9:19:48 AM



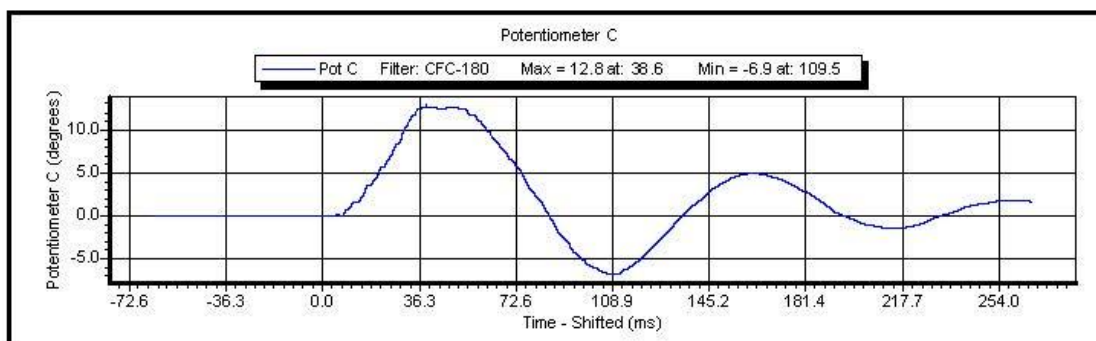
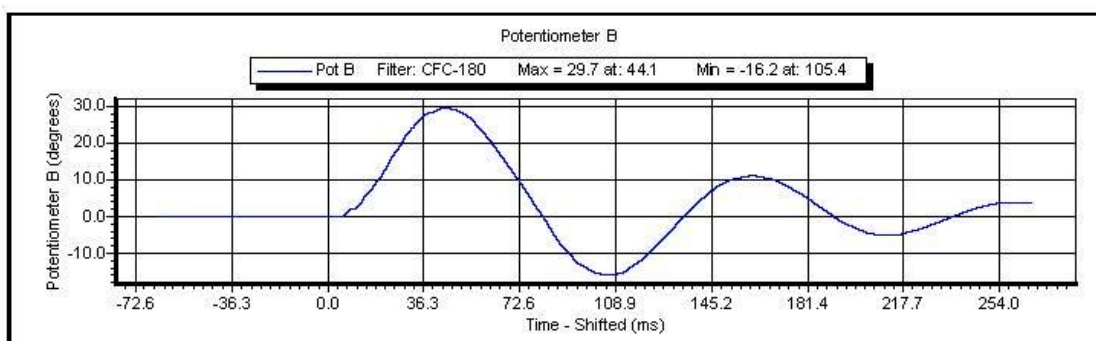
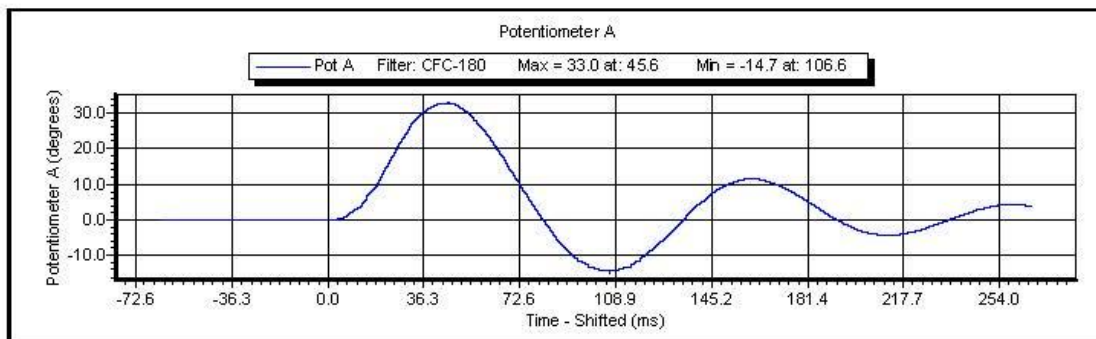
Test ID:

Test Time: **9:19:48 AM**

Test Date: **1/3/2012**

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1 of 2



Test ID:

Test Time: 9:19:48 AM

Test Date: 1/3/2012

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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:	1/4/2012
Test Number:	2	Test Time:	11:52:25 AM

Component Part Number	Component Serial Number
455-4003	

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.3 deg C P
Humidity	10 -- 70	17 %RH P
Velocity	4.20 -- 4.40	4.31 m/s P
Peak Pendulum Force	-5.40 -- -4.70	-5.01 kN P
Time at Peak Pendulum Force	11.80 -- 16.10	13.39 ms P
Peak Pubic Symphysis Force	-1.59 -- -1.23	-1.36 kN P
Time at Peak Pubic Symphysis Force	12.20 -- 17.00	15.09 ms P

All test parameters are within specifications

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

Test ID: Test Time: **11:52:25 AM** Test Date: **1/4/2012**



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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	AGHF5	1/3/2012
Denton	3096	LC 465Fy	8/31/2011

Test ID:

Test Time: 11:52:25 AM

Test Date: 1/4/2012

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2 of 2

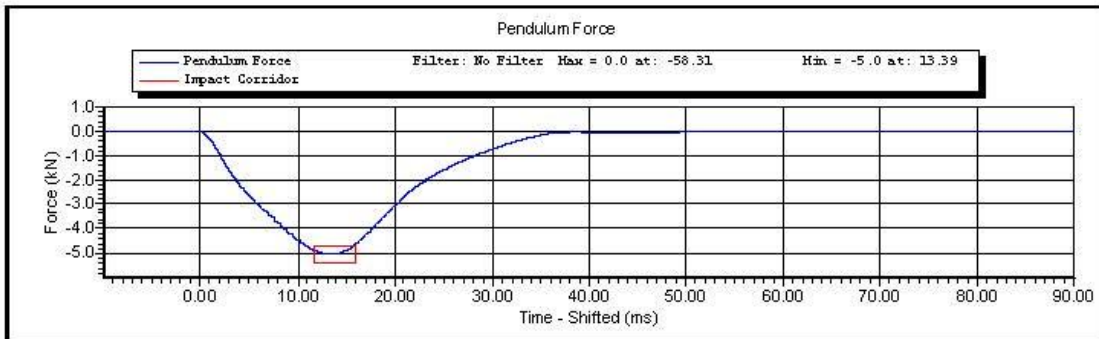
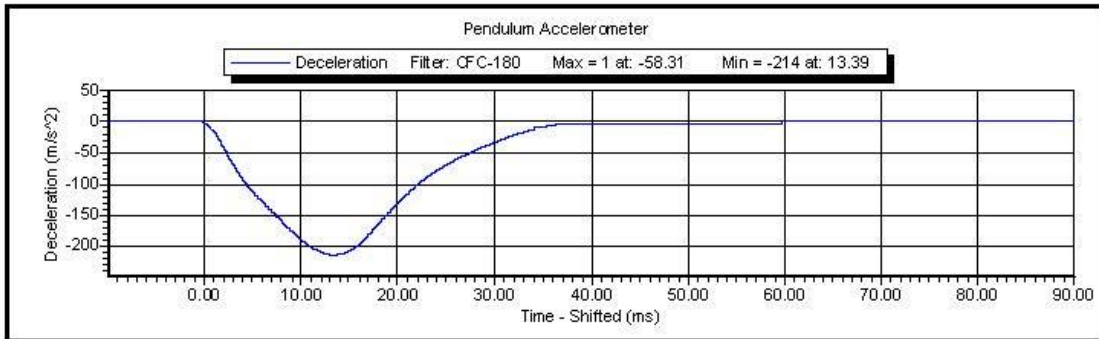


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Test Name:	Pelvis Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	1/4/2012
Test Number:	2	Test Time:	11:52:25 AM



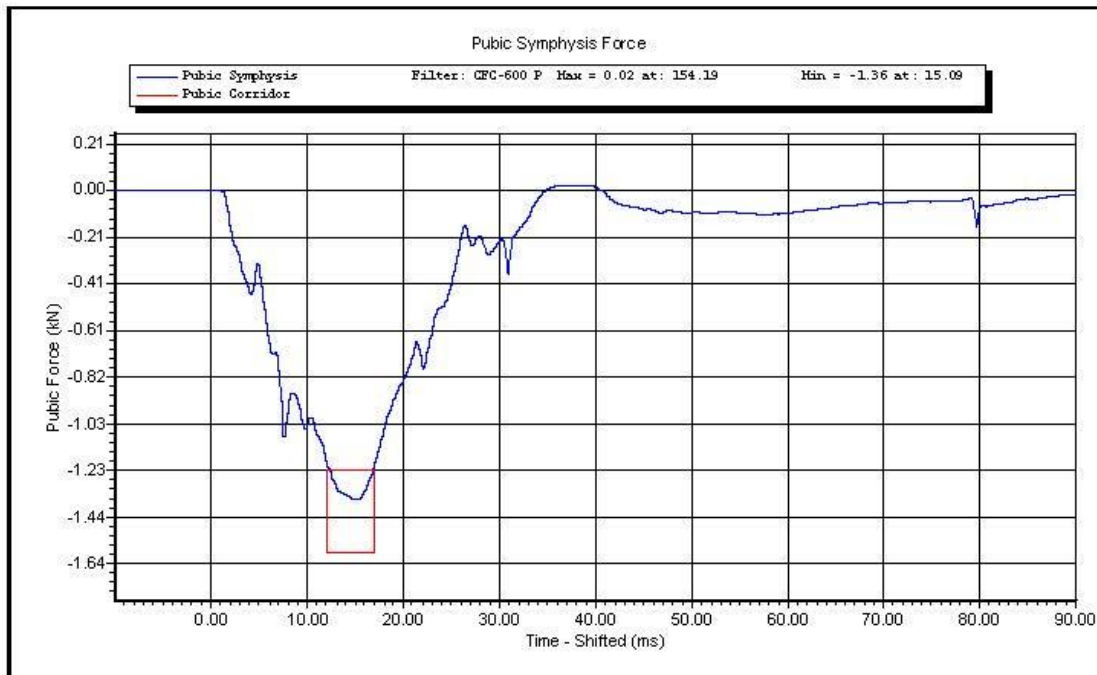
Test ID:

Test Time: **11:52:25 AM**

Test Date: **1/4/2012**

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1 of 2



Test ID:

Test Time: **11:52:25 AM**

Test Date: **1/4/2012**

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CALIBRATION TEST RESULTS

PRE-TEST

SID-IIs No: 300

CONFIGURED FOR LEFT SIDE IMPACT



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SID-IIsD External Measurements

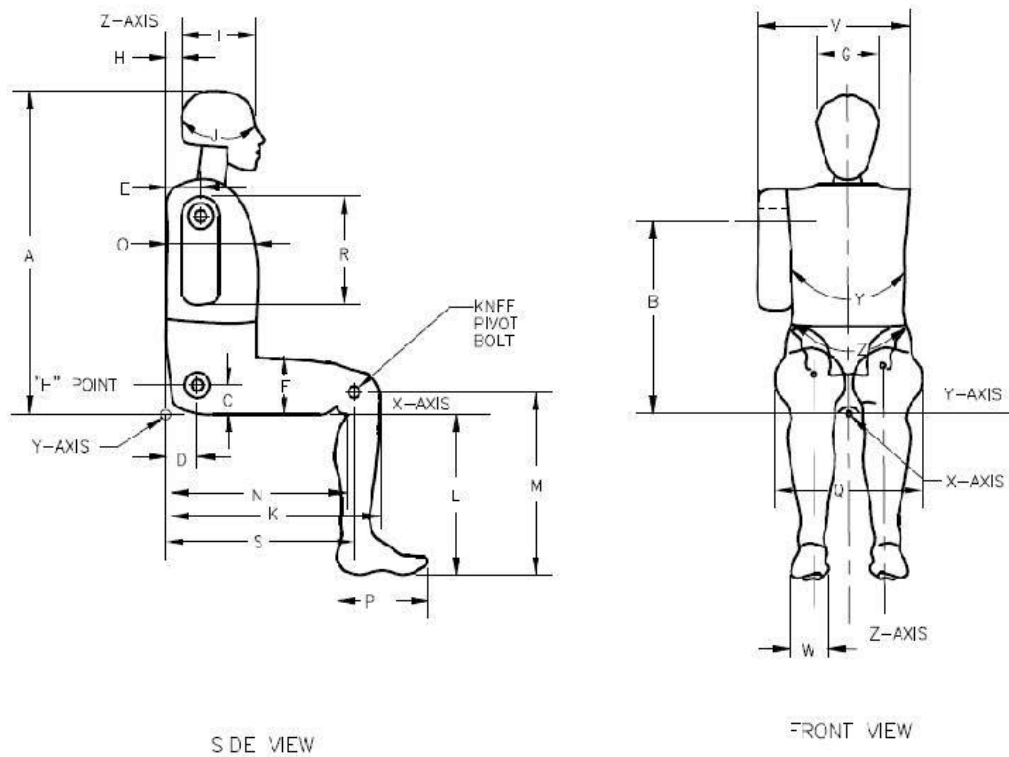
NHTSA ATD S/N 300

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	782	Yes
B	Shoulder Pivot Height	437.0 - 453.0	440	Yes
C	H-Point Height	79.0 - 89.0	83	Yes
D	H-Point from Seat Back	141.0 - 151.0	143	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	98	Yes
F	Thigh Clearance	119.0 - 135.0	122	Yes
G	Head Breadth	140.0 - 148.0	143	Yes
H	Head Back from Backline	40.0 - 46.0	43	Yes
I	Head Depth	178.0 - 188.0	181	Yes
J	Head Circumference	541.0 - 551.0	545	Yes
K	Buttock to Knee Length	514.0 - 540.0	525	Yes
L	Popliteal Height	343.0 - 369.0	352	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	397	Yes
N	Buttock Popliteal Length	416.0 - 442.0	433	Yes
O	Chest Depth without Jacket	195.0 - 211.0	204	Yes
P	Foot Length (right)	216.0 - 232.0	220	Yes
P	Foot Length (left)	216.0 - 232.0	220	Yes
Q	Hip Breadth	313.0 - 323.0	316	Yes
R	Arm Length	249.0 - 259.0	253	Yes
S	Knee Joint to Seat back	478.0 - 493.0	483	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	345	Yes
W	Foot Width (right)	78.0 - 94.0	85	Yes
W	Foot Width (left)	78.0 - 94.0	85	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	866	Yes
Z	Waist Circumference	761.0 - 791.0	776	Yes

Technician: AR

Date: 12/21/2011

SID-IIsD 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-IIs		
ATD Serial Number:	300		
Test ID:		Test Date:	12/21/2011
Test Number:	1	Test Time:	1:54:13 PM

Component Part Number	Component Serial Number
Head Skin - 180-1002	1355

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.0 deg C P
Humidity	10 -- 70	41 %RH P
Resultant Acceleration	115.0 -- 137.0	129.3 g P
Oscillation	0.0 -- 15.0	6.9 % P
Fore-Aft Acceleration	-15.0 -- 15.0	-2.9 g P

All test parameters are within specifications

Technician: S. Zito

Supervisor: D. Travale

Test ID:

Test Time: **1:54:13 PM**

Test Date: **12/21/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P71271	8/12/2011
Endevco	7264-2000	P71281	8/12/2011
Endevco	7264-2000	P71298	8/12/2011

Test ID:

Test Time: **1:54:13 PM**

Test Date: **12/21/2011**

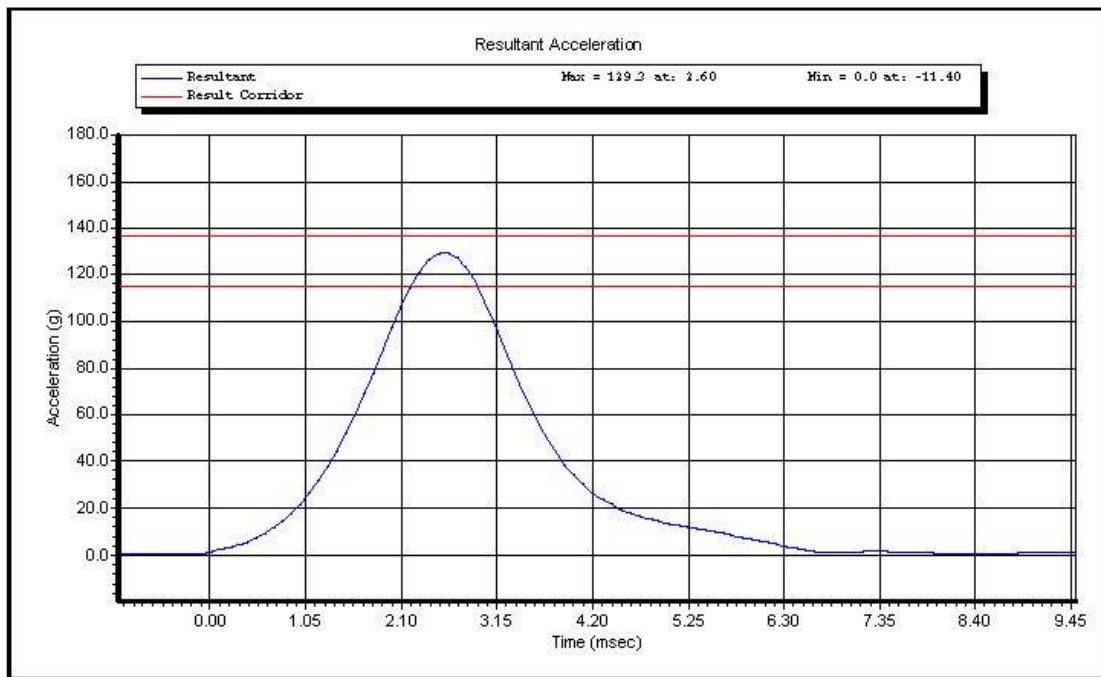


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Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	300		
Test ID:		Test Date:	12/21/2011
Test Number:	1	Test Time:	1:54:13 PM



Test ID:

Test Time: 1:54:13 PM

Test Date: 12/21/2011

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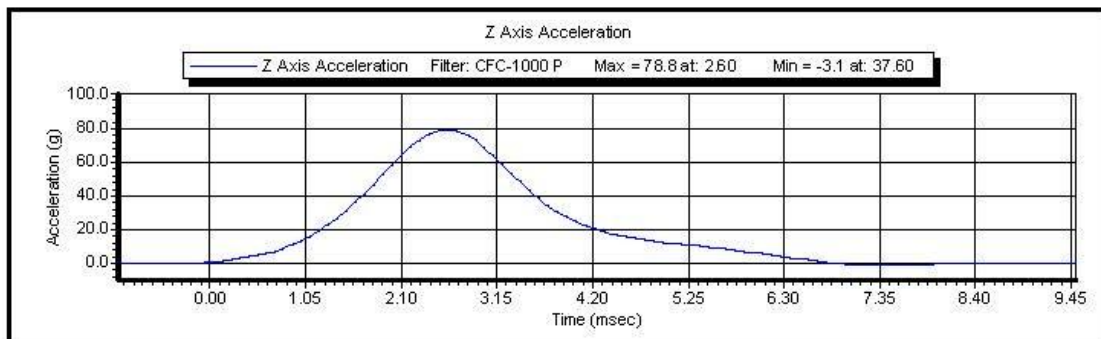
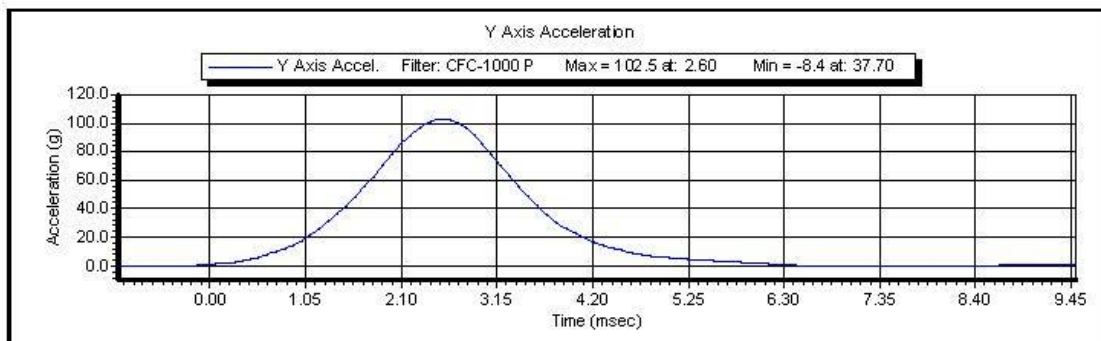
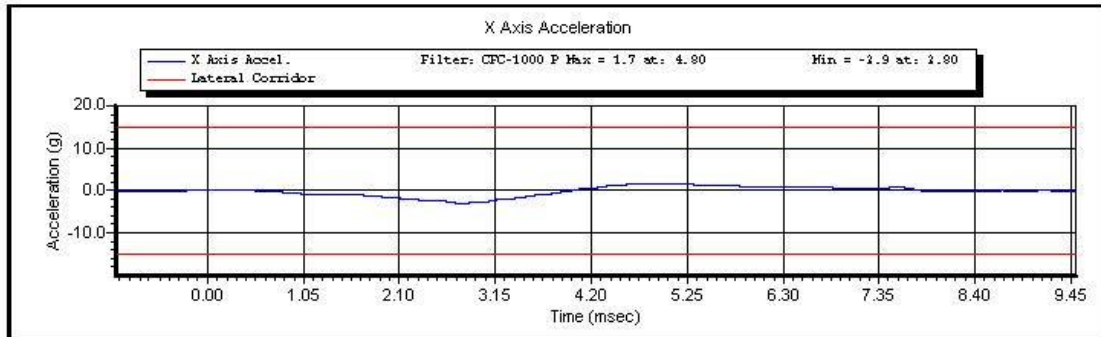
1 of 2



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Test ID:

Test Time: 1:54:13 PM

Test Date: 12/21/2011

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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:	300		
Test ID:		Test Date:	12/21/2011
Test Number:	1	Test Time:	4:02:11 PM

Component Part Number	Component Serial Number
Neck - 180-2000	787

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.0 deg C P
Humidity	10 -- 70	45 %RH P
Velocity	5.51 -- 5.63	5.59 m/s P
Pendulum Impulse at 10 ms	2.20 -- 2.80	2.22 m/s P
Pendulum Impulse at 15 ms	3.30 -- 4.10	3.32 m/s P
Pendulum Impulse at 20 ms	4.40 -- 5.40	4.52 m/s P
Pendulum Impulse at 25 ms	5.40 -- 6.10	5.45 m/s P
Pendulum Impulse between 25 and 100 ms	5.50 -- 6.20	5.76 m/s P
Max D Plane Rotation	71.0 -- 81.0	73.5 degrees P
Time at Max Rotation	50.0 -- 70.0	61.9 ms P
Moment about OC	-44.0 -- -36.0	-40.9 Nm P
Moment Decay to Zero	102.0 -- 126.0	114.6 ms P

All test parameters are within specifications

Technician: S. Zito
Supervisor: D. Travale

Test ID:

Test Time: **4:02:11 PM**

Test Date: **12/21/2011**



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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: 4:02:11 PM

Test Date: 12/21/2011

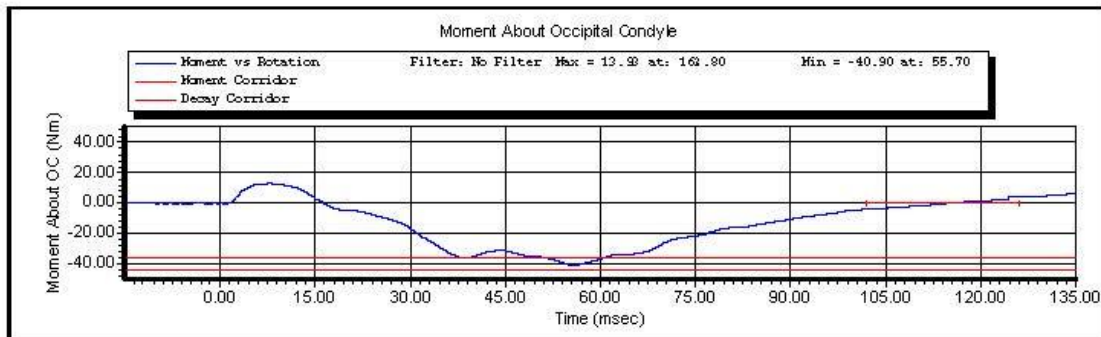
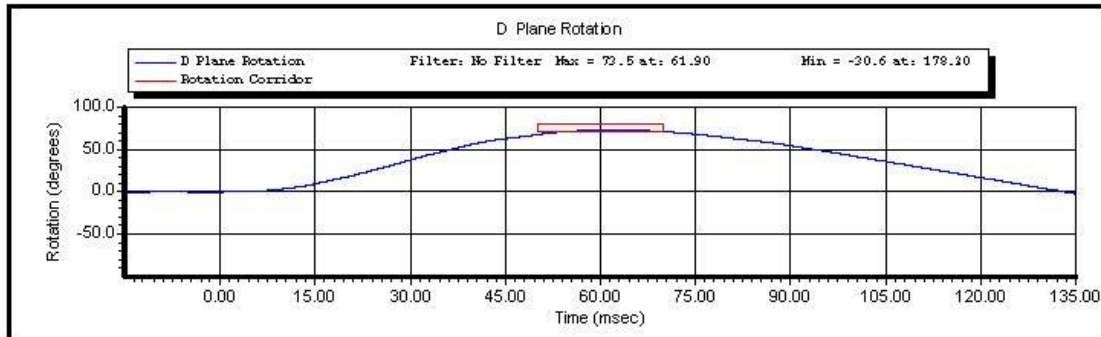


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Test Name:	Neck Pendulum	Revision:	8/24/2009
Sub Test Name:	Left Side	Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	300		
Test ID:		Test Date:	12/21/2011
Test Number:	1	Test Time:	4:02:11 PM



Test ID:

Test Time: 4:02:11 PM

Test Date: 12/21/2011

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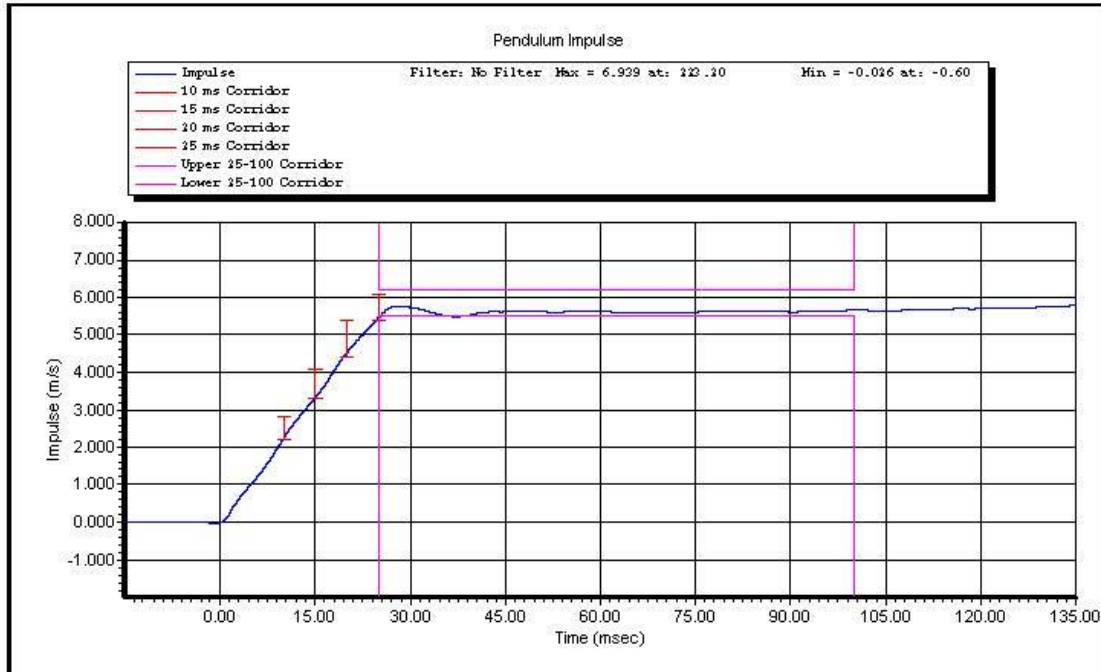
1 of 2



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Test ID:

Test Time: 4:02:11 PM

Test Date: 12/21/2011

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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:	300		
Test ID:		Test Date:	12/22/2011
Test Number:	1	Test Time:	2:51:32 PM

Component Part Number	Component Serial Number
Shoulder Rib 180-3355	168
Left Arm 180-6011-1	822

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.00 deg C P
Humidity	10.0 -- 70.0	32.8 %RH P
Velocity	4.20 -- 4.40	4.24 m/s P
Probe Acceleration	13.0 -- 18.0	16.2 g P
Shoulder Deflection	28.0 -- 37.0	29.5 mm P
T1 Acceleration	17.0 -- 22.0	20.5 g P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test ID:

Test Time: **2:51:32 PM**

Test Date: **12/22/2011**



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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	AGHF5	12/14/2011
Servo	180-3885	DS-1063	10/31/2011
Endevco	7264-2000	P58806	11/3/2011

Test ID:

Test Time: **2:51:32 PM**

Test Date: **12/22/2011**

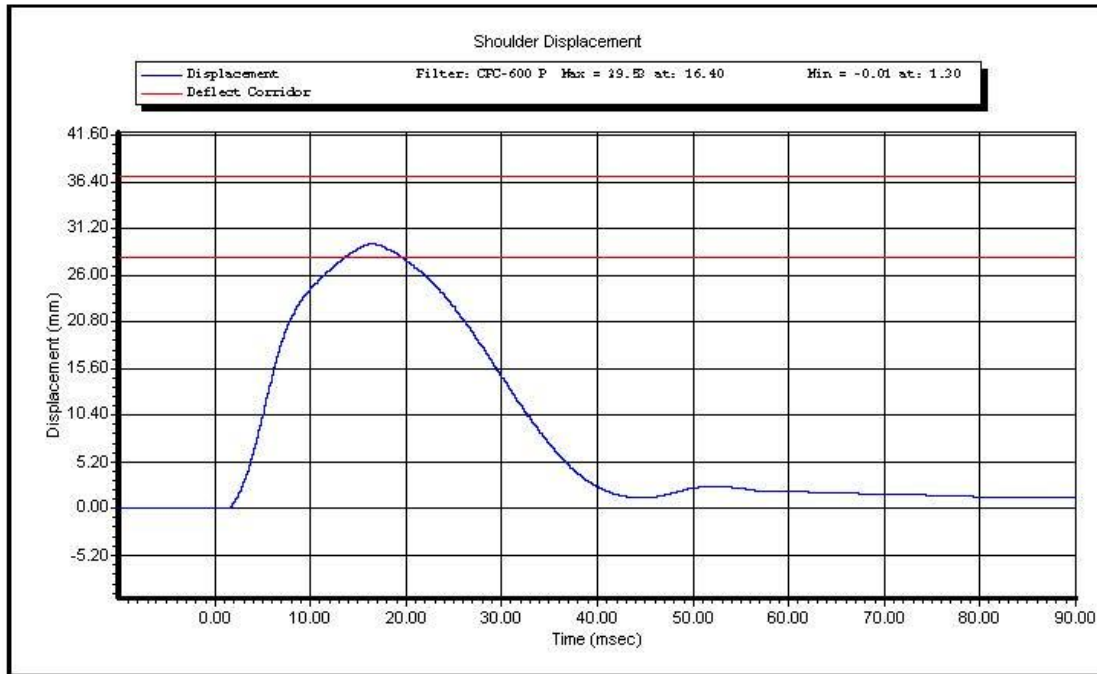


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4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

Test Name:	Shoulder Impact	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	300		
Test ID:		Test Date:	12/22/2011
Test Number:	1	Test Time:	2:51:32 PM



Test ID:

Test Time: **2:51:32 PM**

Test Date: **12/22/2011**

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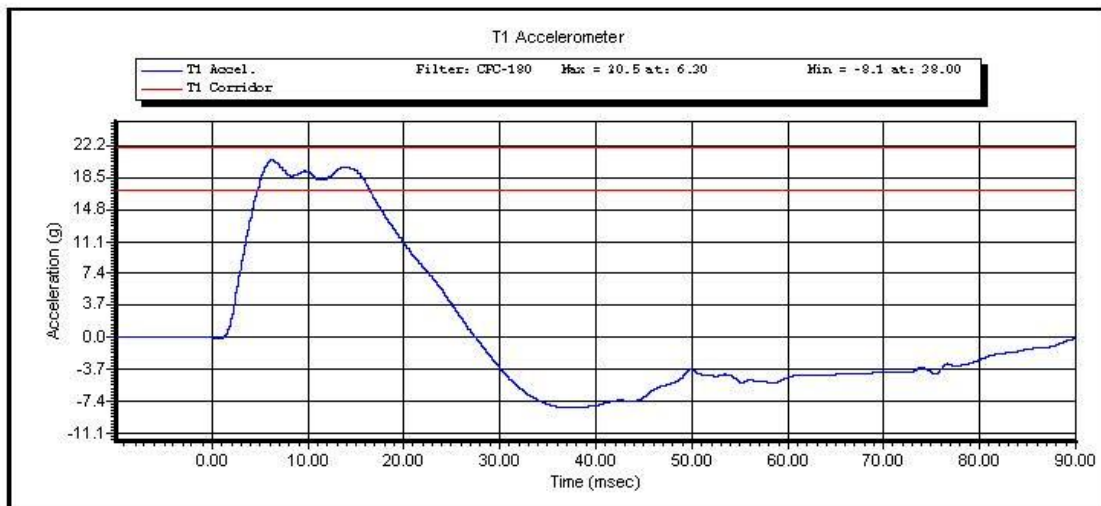
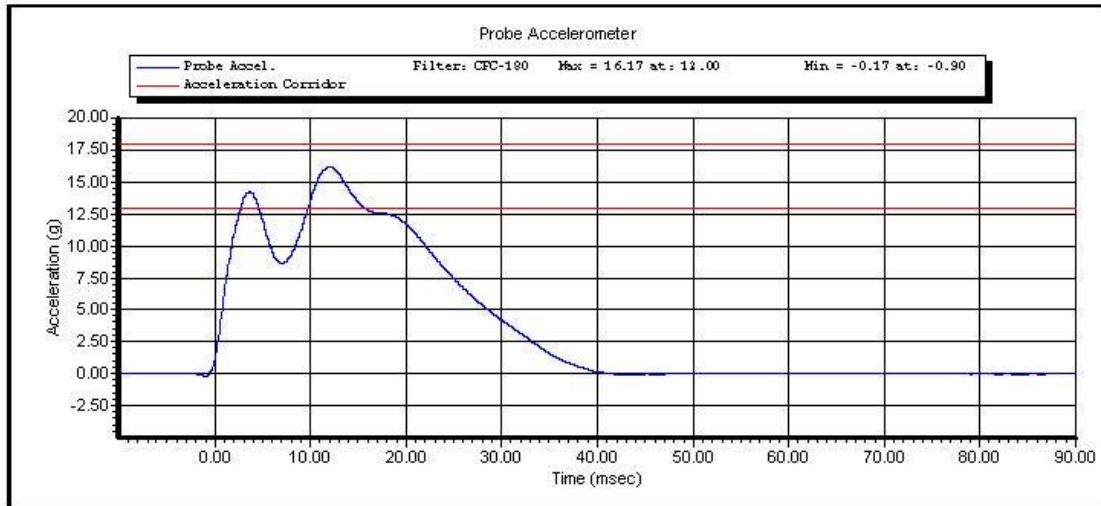
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Test ID:

Test Time: 2:51:32 PM

Test Date: 12/22/2011

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2 of 2



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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:	300		
Test ID:		Test Date:	1/3/2012
Test Number:	3	Test Time:	11:07:24 AM

Component Part Number	Component Serial Number
Thorax Ribs 1, 2, 3 180-3362	2024, 2061, 2062
Shoulder Rib 180-3355	168
Left Arm 180-6011-1	822

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.4 deg C P
Humidity	10 -- 70	17 %RH P
Velocity	6.60 -- 6.80	6.75 m/s P
Probe Acceleration after 5ms	30.0 -- 36.0	36.0 g P
Upper Thorax Rib Deflection	25.0 -- 32.0	27.0 mm P
Mid Thorax Rib Deflection	30.0 -- 36.0	32.9 mm P
Lower Thorax Rib Deflection	32.0 -- 38.0	34.4 mm P
Upper Spine Acceleration ("y")	34.0 -- 43.0	39.7 g P
Lower Spine Acceleration ("y")	29.0 -- 37.0	33.3 g P
Shoulder Deflection	31.0 -- 40.0	33.2 mm P

All test parameters are within specifications

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

Test ID:

Test Time: **11:07:24 AM**

Test Date: **1/3/2012**



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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	AGHF5	1/3/2012
Servo	180-3885	DS-1121	10/29/2011
Servo	180-3885	DS-1151	10/31/2011
Servo	180-3885	DS-1156	10/31/2011
Endevco	7264-2000	P58806	11/3/2011
Endevco	7264-2000	P64147	11/1/2011
Servo	180-3885	DS-1063	10/31/2011

Test ID:

Test Time: 11:07:24 AM

Test Date: 1/3/2012

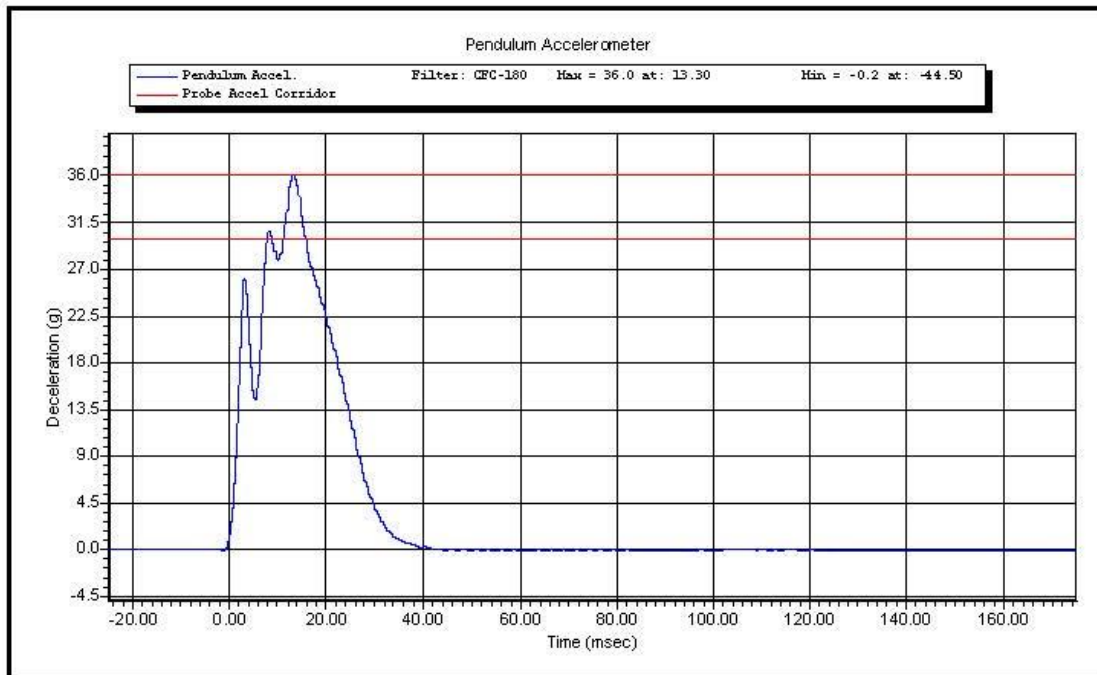


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Test Name:	Thorax Impact with Arm	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	300		
Test ID:		Test Date:	1/3/2012
Test Number:	3	Test Time:	11:07:24 AM



Test ID:

Test Time: 11:07:24 AM

Test Date: 1/3/2012

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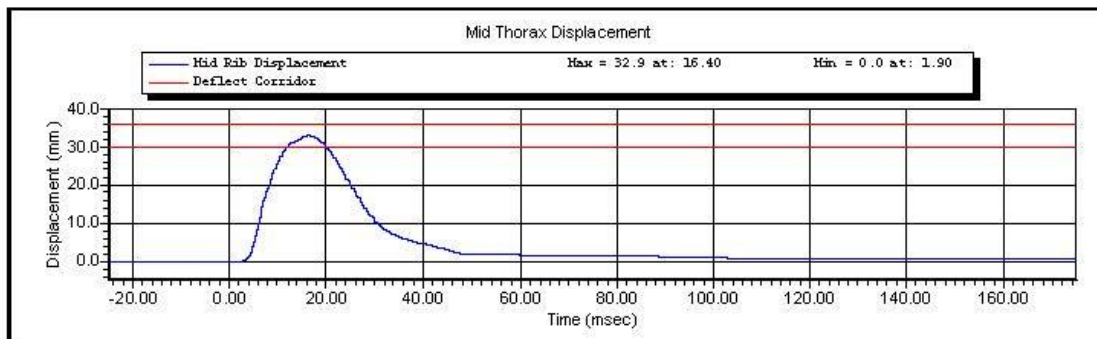
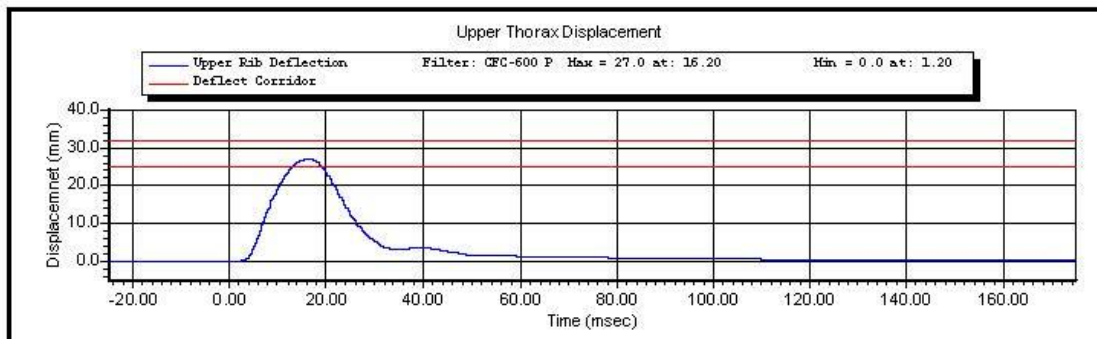
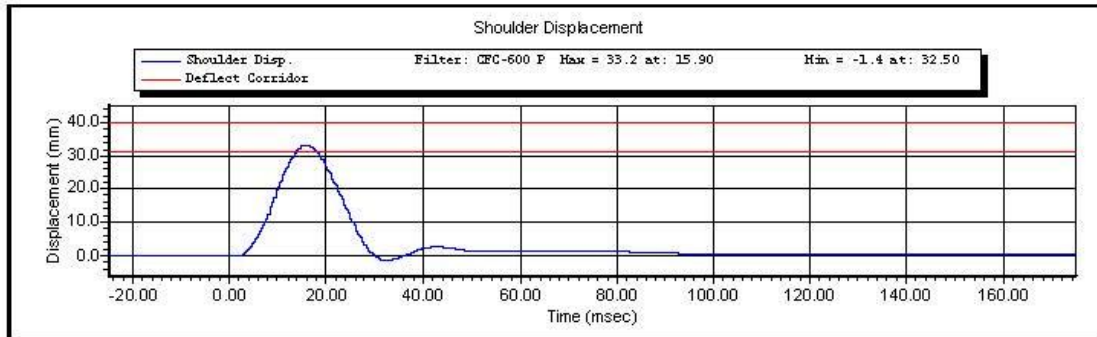
1 of 3



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Test ID:

Test Time: 11:07:24 AM

Test Date: 1/3/2012

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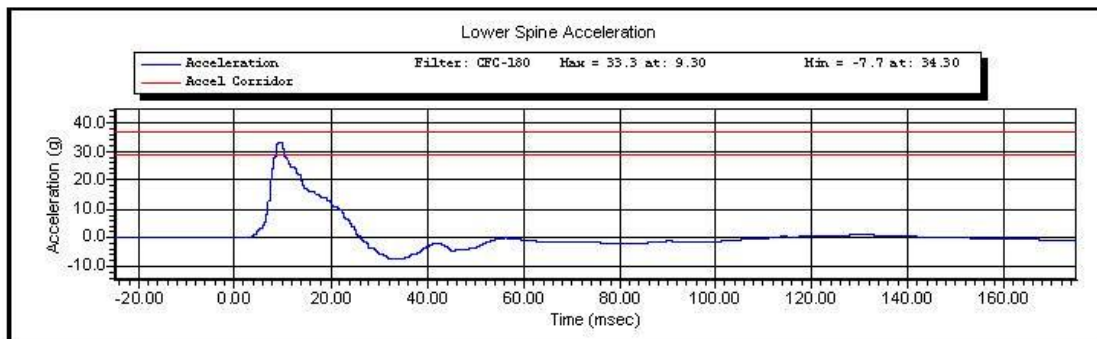
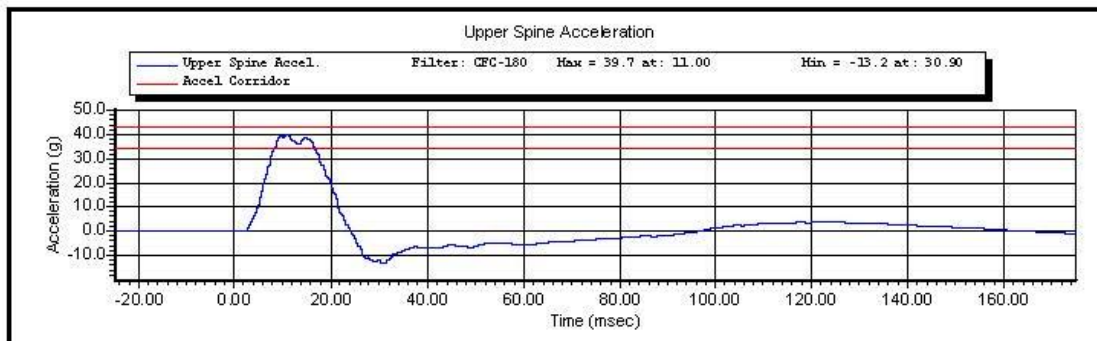
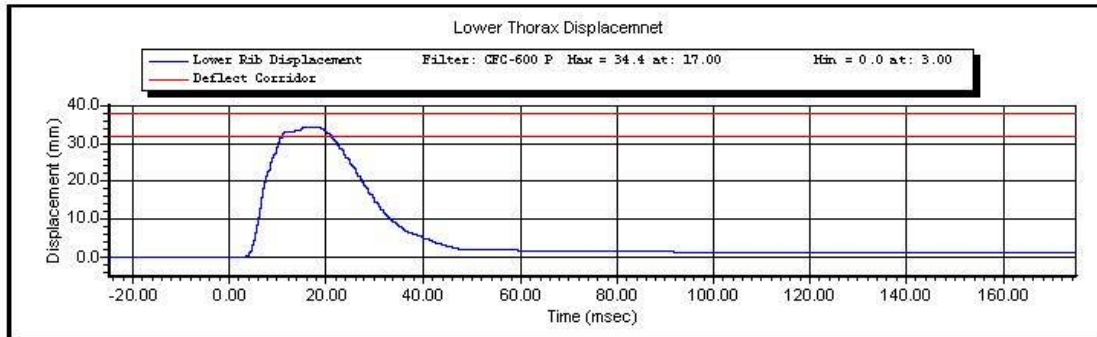
2 of 3



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Test ID:

Test Time: 11:07:24 AM

Test Date: 1/3/2012

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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:	300		
Test ID:		Test Date:	12/22/2011
Test Number:	1	Test Time:	3:18:50 PM

Component Part Number	Component Serial Number
Thorax Ribs 1, 2, 3	2024, 2061, 2062

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.1 deg C P
Humidity	10 -- 70	33 %RH P
Velocity	4.20 -- 4.40	4.37 m/s P
Probe Acceleration	14.0 -- 18.0	16.4 g P
Upper Thorax Rib Deflection	32.0 -- 40.0	37.4 mm P
Mid Thorax Rib Deflection	39.0 -- 45.0	43.1 mm P
Lower Thorax Rib Deflection	35.0 -- 43.0	38.8 mm P
Upper Spine Acceleration T1	13.0 -- 17.0	16.1 g P
Lower Spine Acceleration T12	7.0 -- 11.0	8.7 g P

All test parameters are within specifications

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

Test ID:

Test Time: **3:18:50 PM**

Test Date: **12/22/2011**



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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	AGHF5	12/14/2011
Servo	180-3885	DS-1121	10/29/2011
Servo	180-3885	DS-1151	10/31/2011
Servo	180-3885	DS-1156	10/31/2011
Endevco	7264-2000	P58806	11/3/2011
Endevco	7264-2000	P64147	11/1/2011

Test ID:

Test Time: **3:18:50 PM**

Test Date: **12/22/2011**

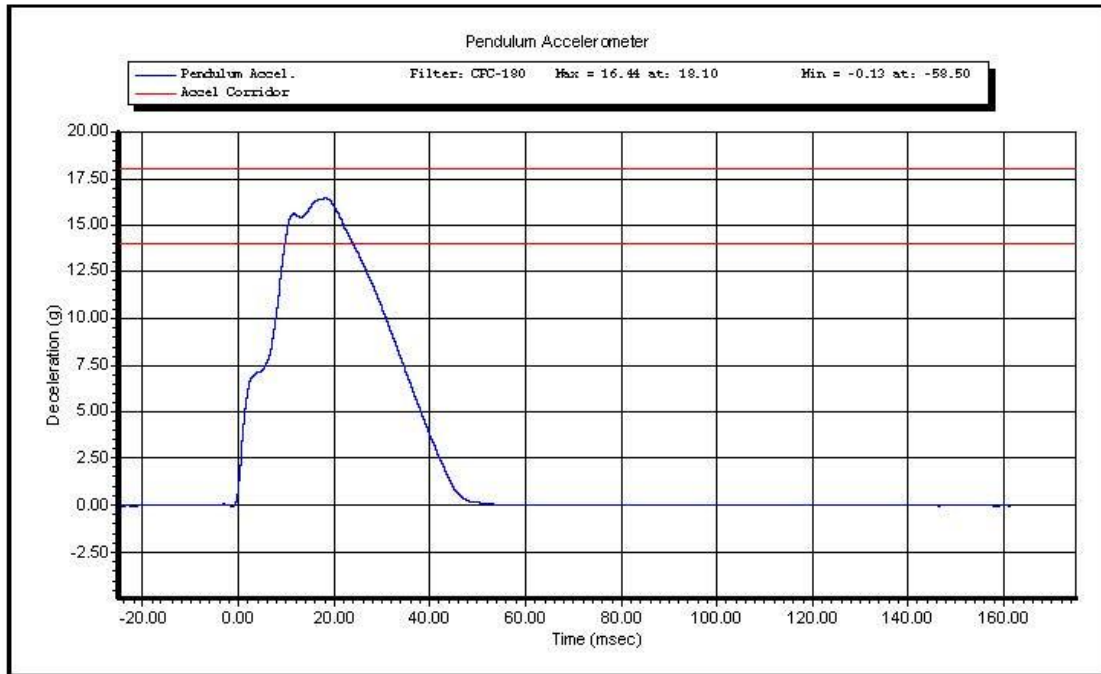


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Test Name:	Thorax Impact without Arm	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	300		
Test ID:		Test Date:	12/22/2011
Test Number:	1	Test Time:	3:18:50 PM



Test ID:

Test Time: 3:18:50 PM

Test Date: 12/22/2011

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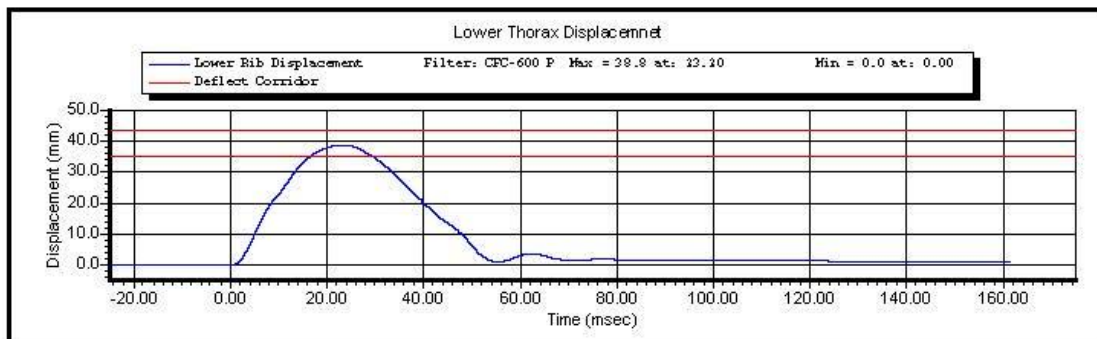
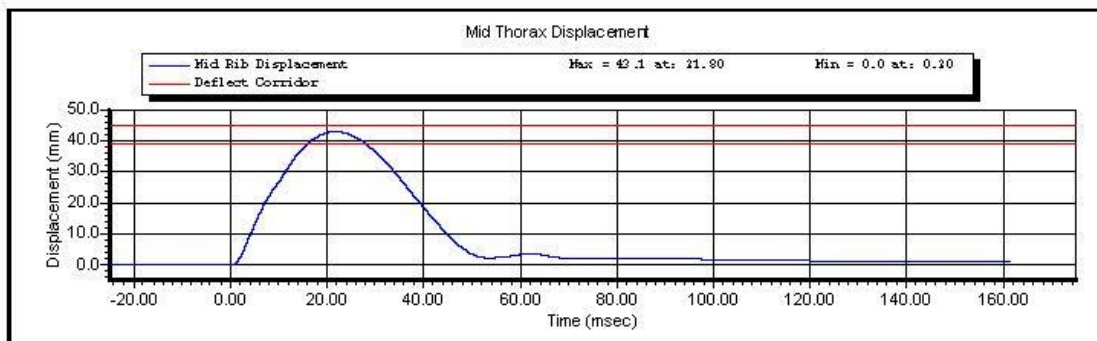
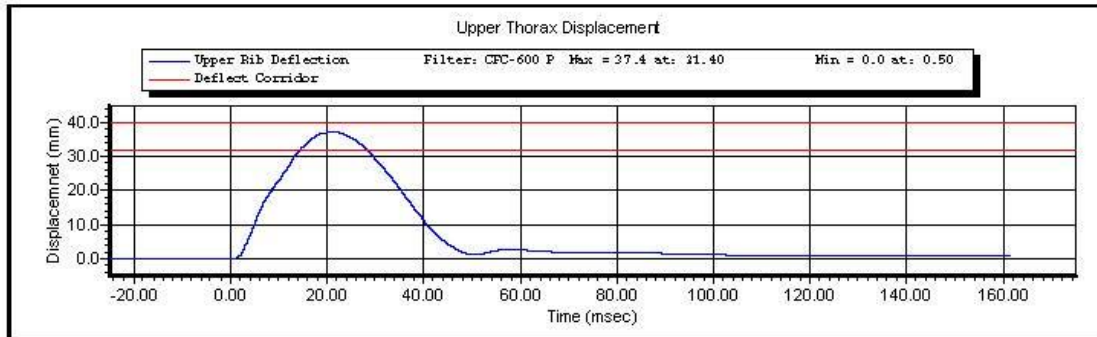
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Test ID:

Test Time: 3:18:50 PM

Test Date: 12/22/2011

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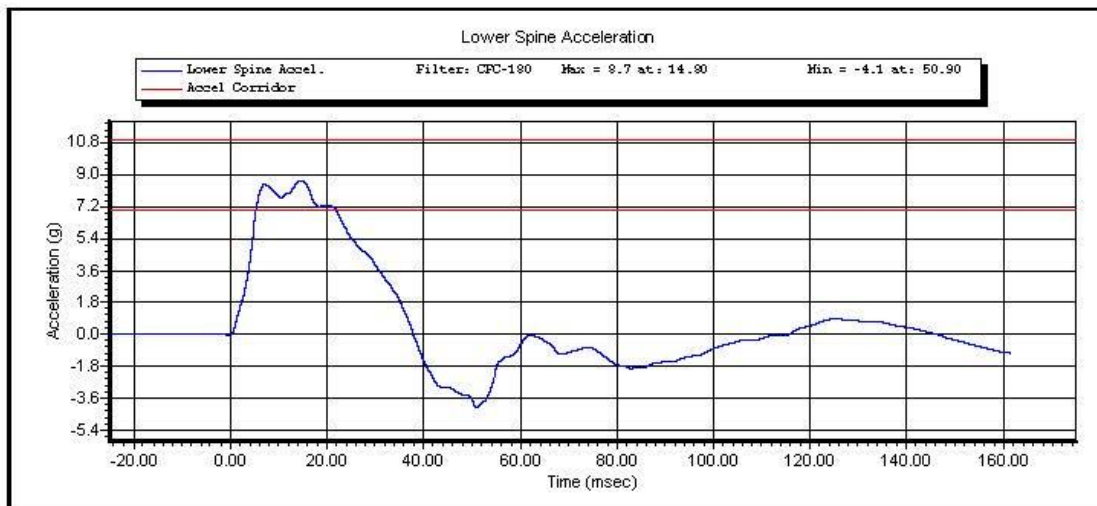
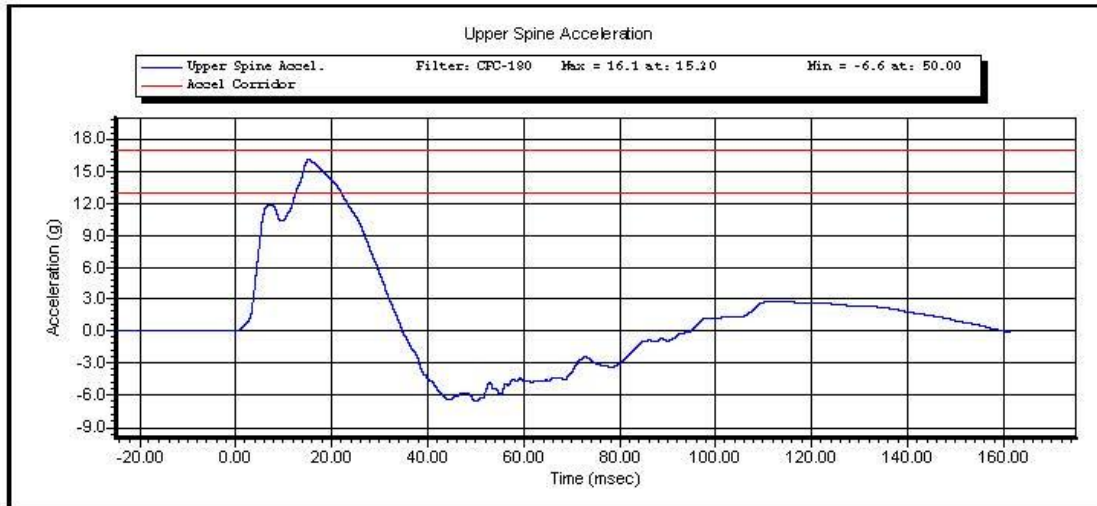
2 of 3



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Test ID:

Test Time: 3:18:50 PM

Test Date: 12/22/2011

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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:	300		
Test ID:		Test Date:	12/22/2011
Test Number:	1	Test Time:	3:42:17 PM

Component Part Number	Component Serial Number
Abdomen Ribs 4, 5	2024, 2061

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.1 deg C P
Humidity	10 -- 70	33 %RH P
Velocity	4.20 -- 4.40	4.38 m/s P
Probe Acceleration	12.0 -- 16.0	15.5 g P
Upper Abdominal Rib Deflection	36.0 -- 47.0	39.6 mm P
Lower Abdominal Rib Deflection	33.0 -- 44.0	37.7 mm P
Lower Spine Acceleration - T12	9.0 -- 14.0	12.3 g P

All test parameters are within specifications

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

Test ID:

Test Time: **3:42:17 PM**

Test Date: **12/22/2011**



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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	AGHF5	12/14/2011
Servo	180-3885	DS-1162	11/3/2011
Servo	180-3885	DS-1622	11/3/2011
Endevco	7264-2000	P64147	11/1/2011

Test ID:

Test Time: **3:42:17 PM**

Test Date: **12/22/2011**

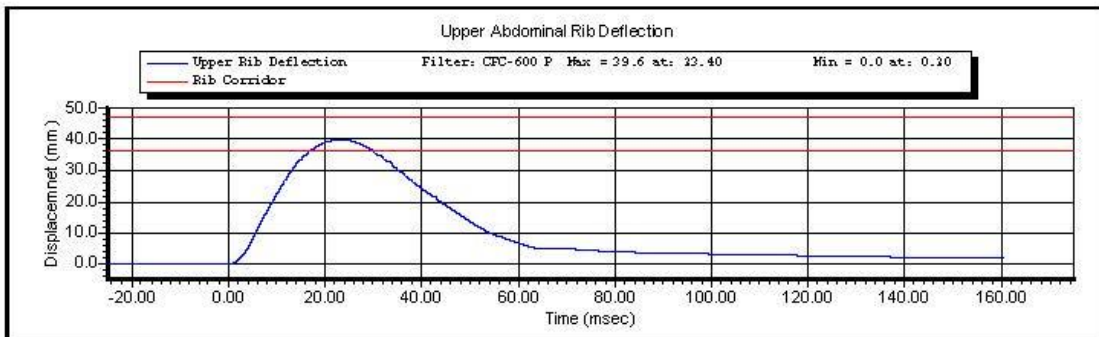
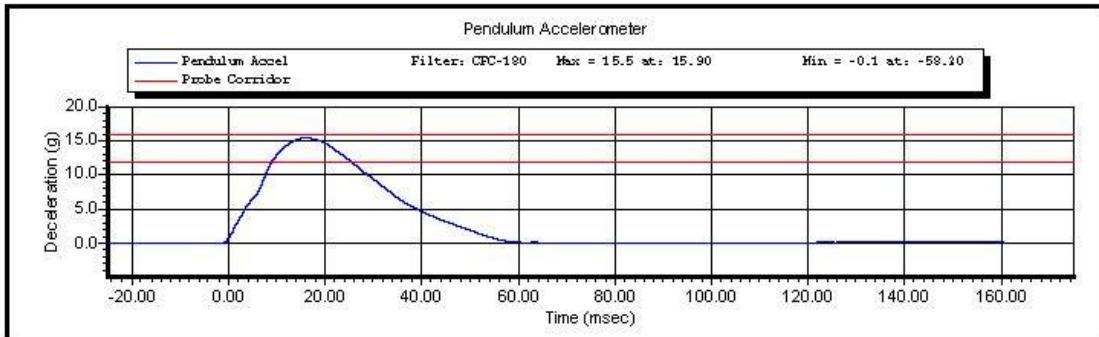


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Test Name:	Abdominal Impact	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	300		
Test ID:		Test Date:	12/22/2011
Test Number:	1	Test Time:	3:42:17 PM



Test ID:

Test Time: 3:42:17 PM

Test Date: 12/22/2011

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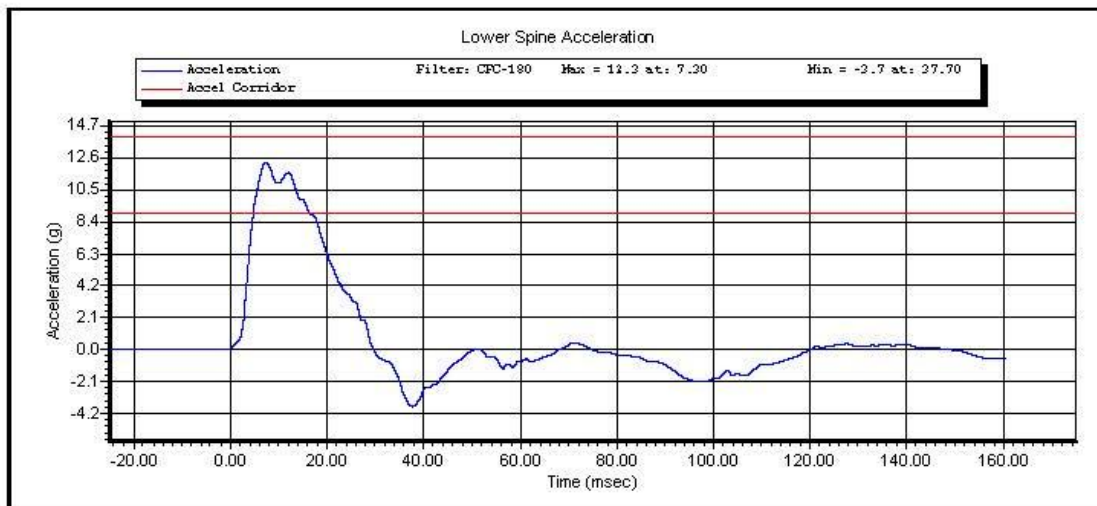
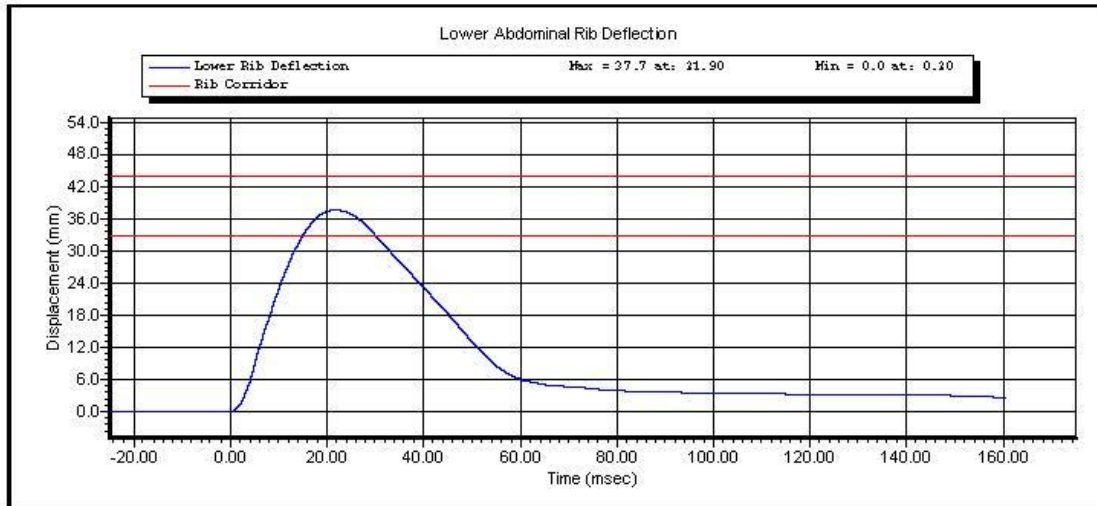
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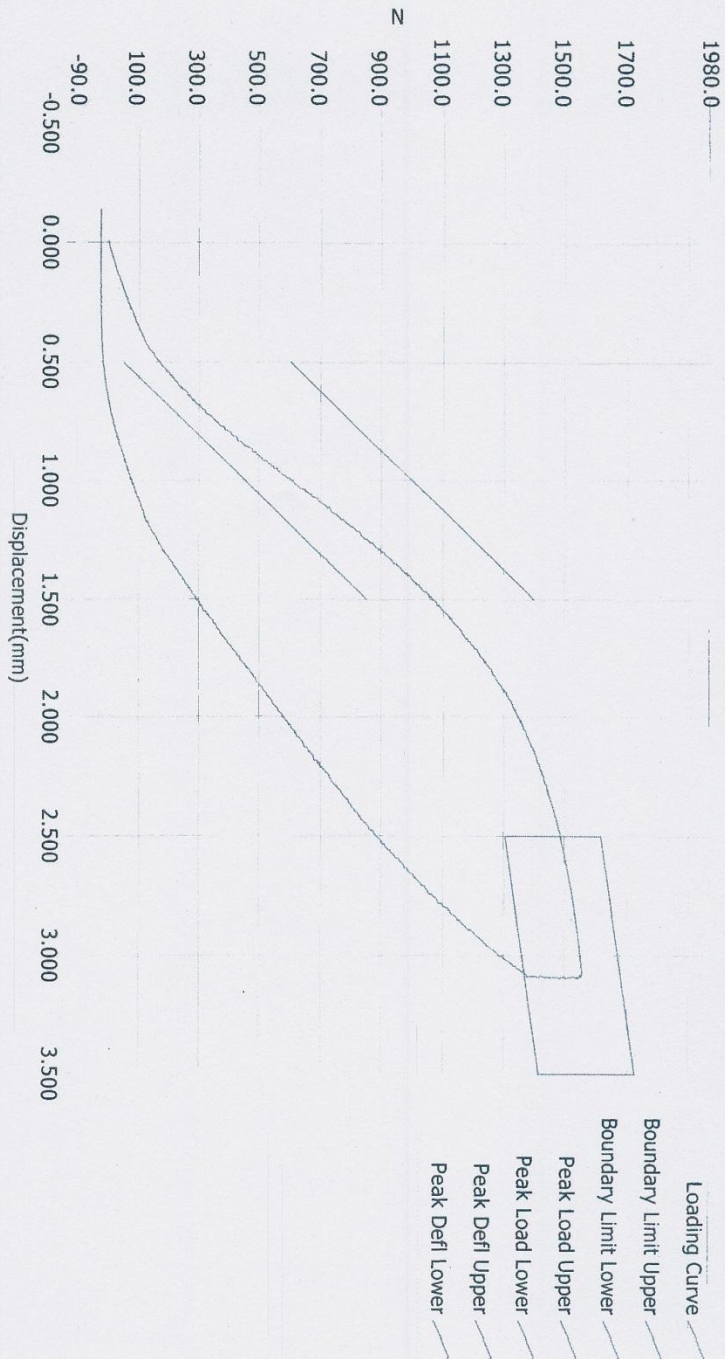
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Test Date: 12/22/2011

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2 of 2

Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

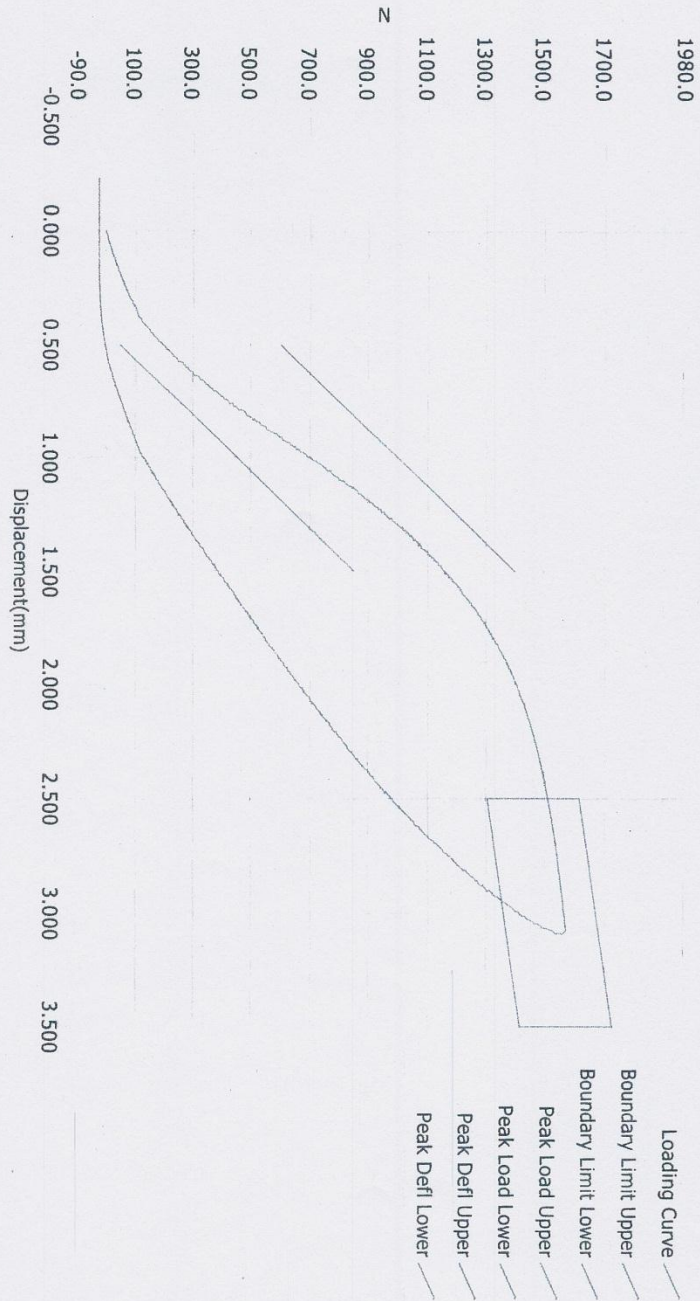
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	N/A	SIDIIs	

Current Date : 9/22/2011

Current Time : 20:59:25

CRASH

Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

<u>Test ID</u>	<u>Part Serial Number</u>	<u>Test Date</u>	<u>Test Time</u>
46017	9/20/2011	10:15 PM	
<u>Cert ID</u>	<u>ATD Serial Number</u>	<u>ATD Type</u>	
N/A	SIDIIs		

Current Date : 9/20/2011

Current Time : 22:15:48



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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:	300		
Test ID:		Test Date:	1/3/2012
Test Number:	1	Test Time:	11:54:57 AM

Component Part Number	Component Serial Number
180-4343 Pelvis Flesh	D13396
Humanetics Cert Plug	46469
Humanetics Test Plug	46017

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10 -- 70	17 %RH P
Velocity	6.60 -- 6.80	6.61 m/s P
Peak Probe Acceleration	38.0 -- 47.0	46.5 g P
Peak Pelvis Acceleration	34.0 -- 42.0	41.3 g P
Peak Acetabulum Force	3.60 -- 4.30	3.88 kN P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test ID:

Test Time: **11:54:57 AM**

Test Date: **1/3/2012**



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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	AGHF5	1/3/2012
Endevco	7264-2000	P15526	10/31/2011
DentonATD	3249J	LC-275a	11/3/2011

Test ID:

Test Time: 11:54:57 AM

Test Date: 1/3/2012

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2 of 2

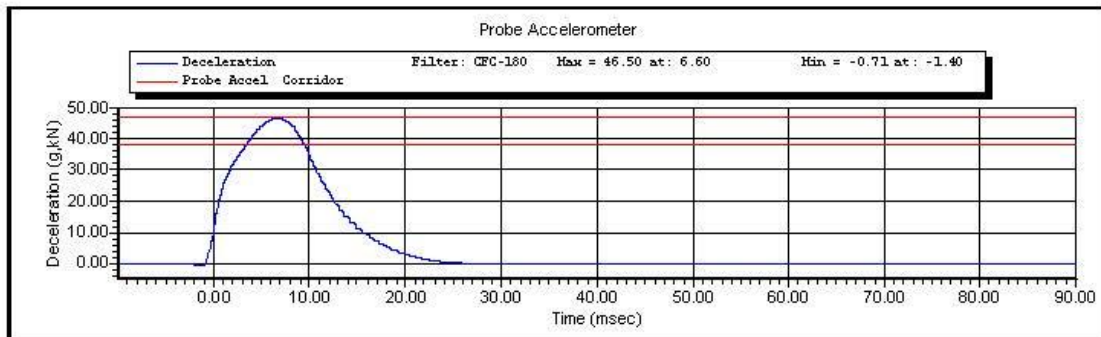
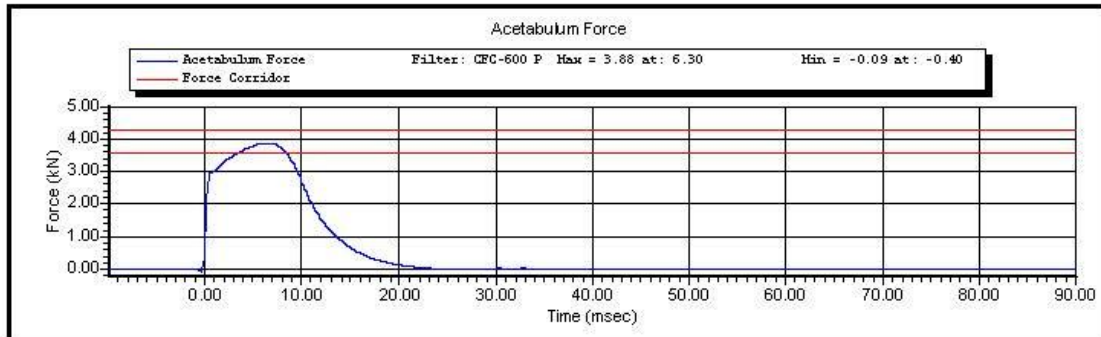


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Test Name:	Pelvis	Revision:	8/24/2009
Sub Test Name:	Acetabulum Impact	Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	300		
Test ID:		Test Date:	1/3/2012
Test Number:	1	Test Time:	11:54:57 AM



Test ID:

Test Time: **11:54:57 AM**

Test Date: **1/3/2012**

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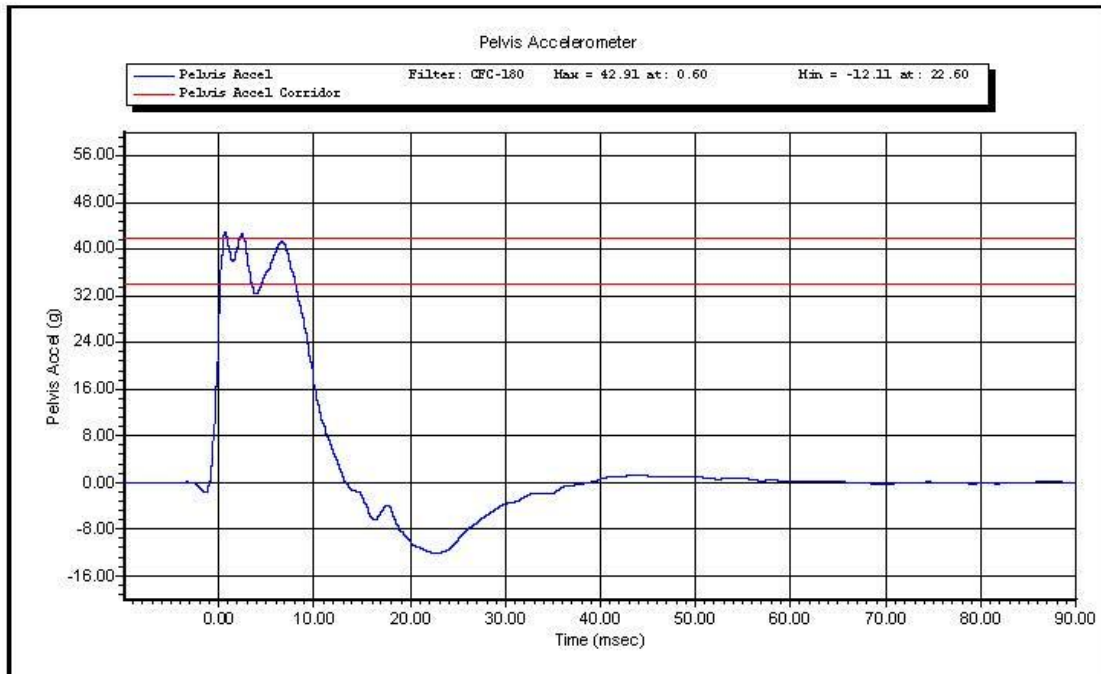
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Test ID:

Test Time: 11:54:57 AM

Test Date: 1/3/2012

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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:	300		
Test ID:		Test Date:	12/22/2011
Test Number:	1	Test Time:	10:23:06 AM

Component Part Number	Component Serial Number
180-4343 Pelvis Flesh	DB396

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10 -- 70	35 %RH P
Velocity	4.20 -- 4.40	4.31 m/s P
Peak Probe Acceleration	36.0 -- 45.0	42.2 g P
Peak Pelvis Acceleration	28.0 -- 39.0	33.7 g P
Peak Iliac Force	4.10 -- 5.10	4.66 kN P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID:

Test Time: **10:23:06 AM**

Test Date: **12/22/2011**



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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	AGHF5	12/14/2011
Endevco	7264-2000	P15526	10/31/2011
DentonATD	3228J	LC-279 Fy	11/3/2011

Test ID:

Test Time: **10:23:06 AM**

Test Date: **12/22/2011**

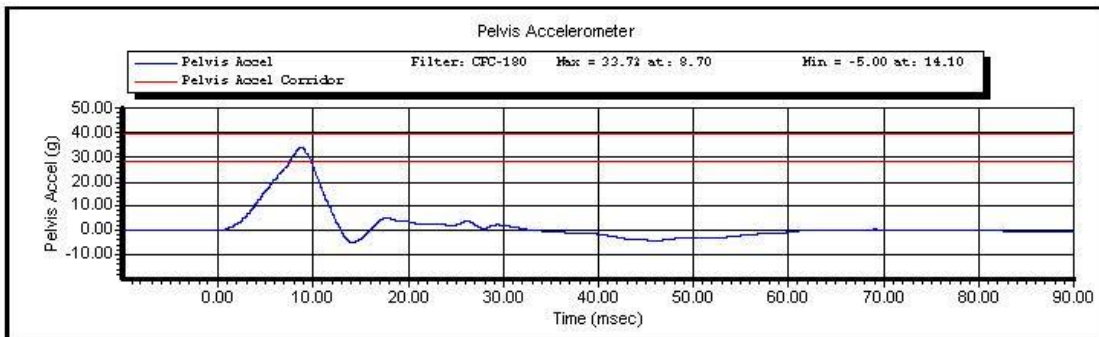
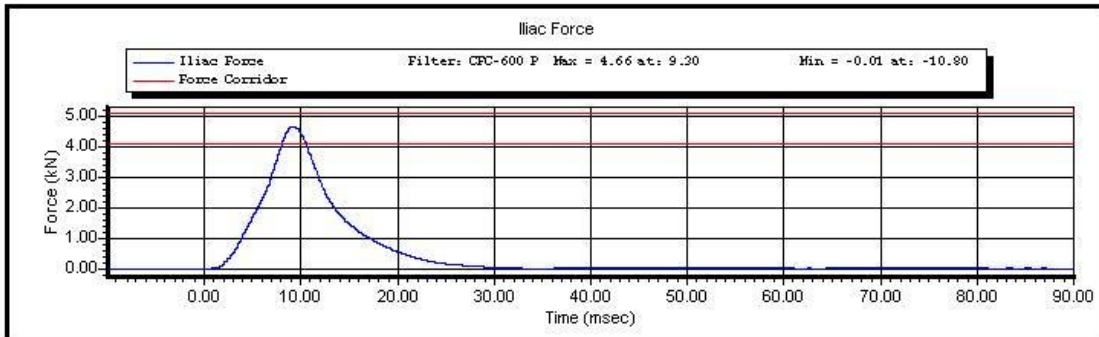


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Test Name:	Pelvis	Revision:	8/24/2009
Sub Test Name:	Iliac Impact	Spec Type:	NHTSA
ATD Type:	SID-Ils		
ATD Serial Number:	300		
Test ID:		Test Date:	12/22/2011
Test Number:	1	Test Time:	10:23:06 AM



Test ID:

Test Time: **10:23:06 AM**

Test Date: **12/22/2011**

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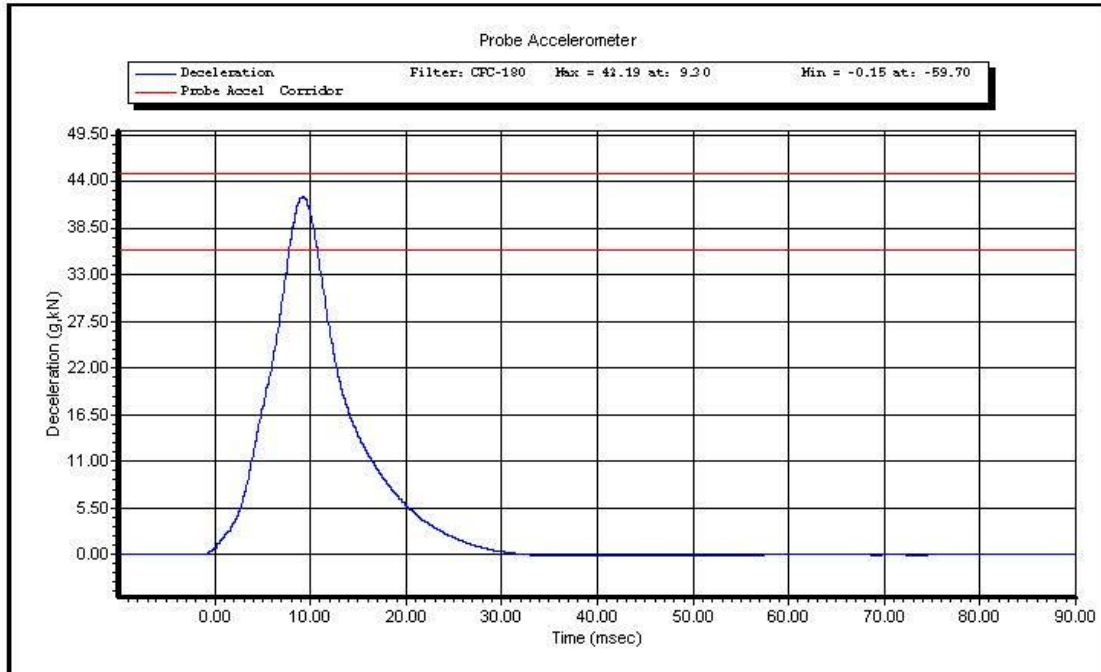
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Test ID:

Test Time: 10:23:06 AM

Test Date: 12/22/2011

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CALIBRATION TEST RESULTS

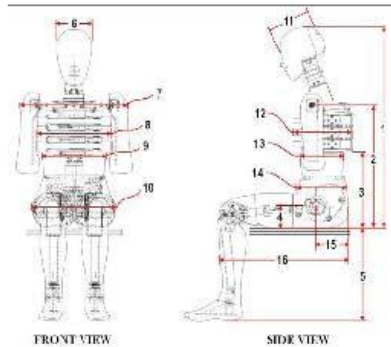
POST-TEST

ES2-re 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	915	Pass
2	Seat to Shoulder Joint	558-572	560	Pass
3	Seat to Lower Face of Thoracic Spine Box	346-356	355	Pass
4	Seat to Hip Joint (center of bolt)	97-103	98	Pass
5	Sole to Seat, Sitting	433-451	440	Pass
6	Head Width	152-158	154	Pass
7	Shoulder/Arm Width	461-479	465	Pass
8	Thorax Width	322-332	327	Pass
9	Abdomen Width	273-287	285	Pass
10	Pelvis/Lap Width	359-373	369	Pass
11	Head Depth	196-206	199	Pass
12	Thorax Depth	262-272	268	Pass
13	Abdomen Depth	194-204	203	Pass
14	Pelvis Depth	235-245	239	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150-160	159	Pass
16	Back of Buttocks to Front Knee	597-615	605	Pass

Technician: MG

Date: 1/31/2012



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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:	1/24/2012
Test Number:	1	Test Time:	9:06:16 AM

Component Part Number	Component Serial Number
455-1007	1916409

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.2 deg C P
Humidity	10 -- 70	26 %RH P
Resultant Acceleration	125 -- 155	145 g P
Oscillation	0.0 -- 15.0	10.6 % P
Fore-Aft Acceleration	-15.00 -- 15.00	-7.35 g P

All test parameters are within specifications

Technician: S. Zito

Supervisor: D. Travale

Test ID:

Test Time: **9:06:16 AM**

Test Date: **1/24/2012**



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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: **9:06:16 AM**

Test Date: **1/24/2012**

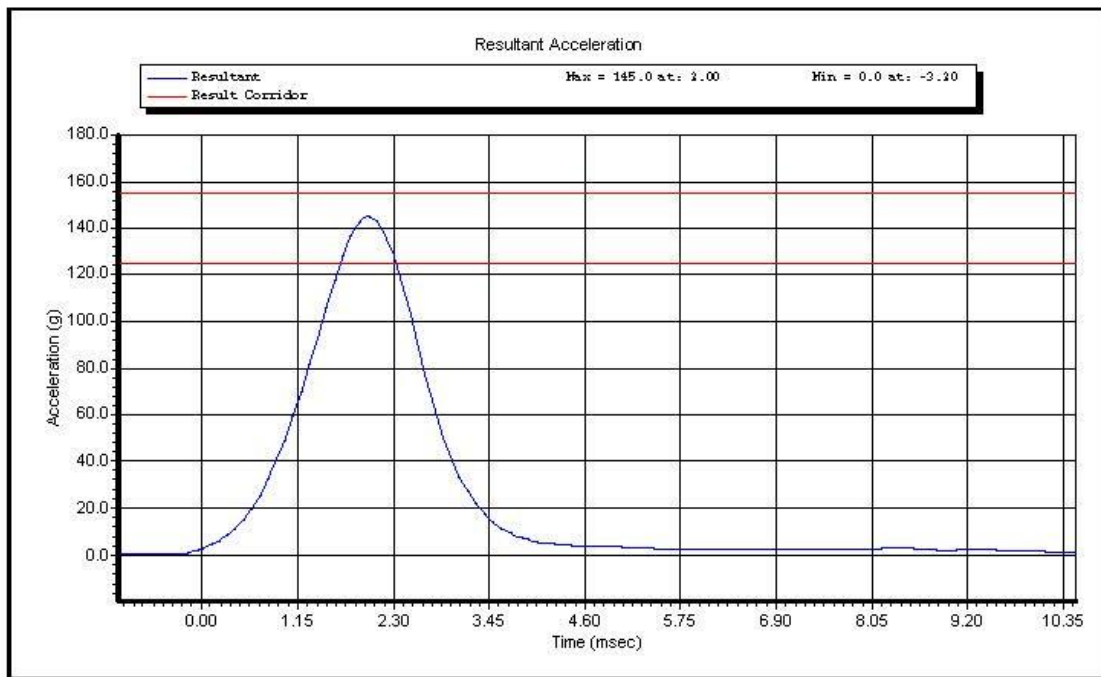


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Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	1/24/2012
Test Number:	1	Test Time:	9:06:16 AM



Test ID:

Test Time: 9:06:16 AM

Test Date: 1/24/2012

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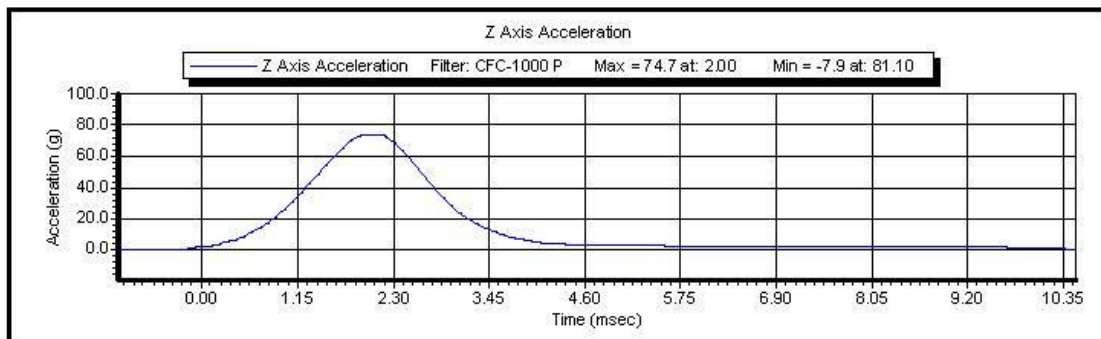
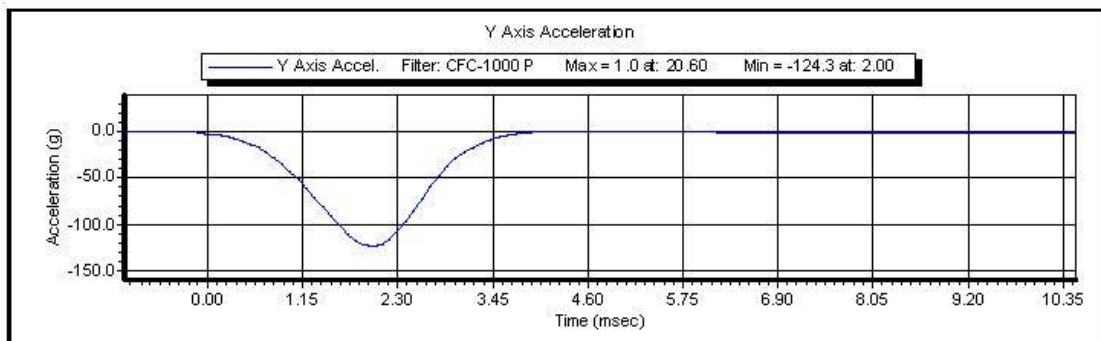
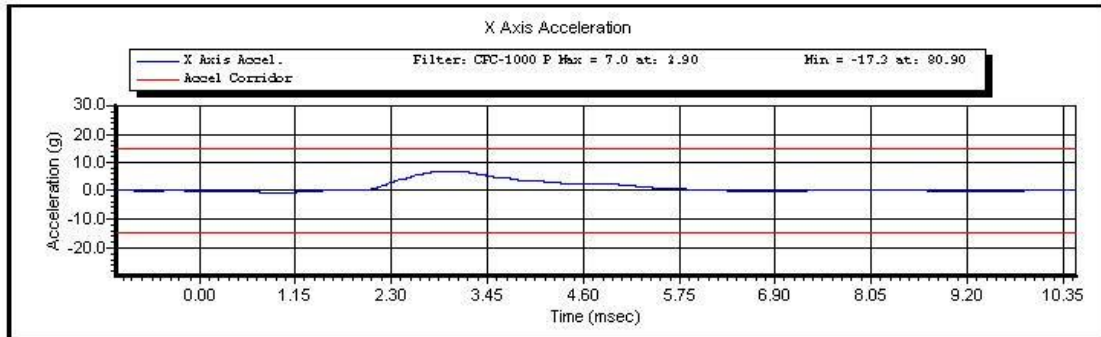
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Test ID:

Test Time: 9:06:16 AM

Test Date: 1/24/2012

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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:	1/23/2012
Test Number:	1	Test Time:	9:53:29 AM

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	27 %RH P
Velocity	3.30 -- 3.50	3.46 m/s P
Maximum Neck Flexion Angle	49.0 -- 59.0	52.6 degrees P
Time At Maximum Neck Flexion	54.0 -- 66.0	59.3 ms P
Decay to Zero Degrees	53.0 -- 88.0	63.5 ms P
Velocity Corridor	--	P

All test parameters are within specifications

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

Test ID:

Test Time: **9:53:29 AM**

Test Date: **1/23/2012**

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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	1/11/2012
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: 9:53:29 AM

Test Date: 1/23/2012

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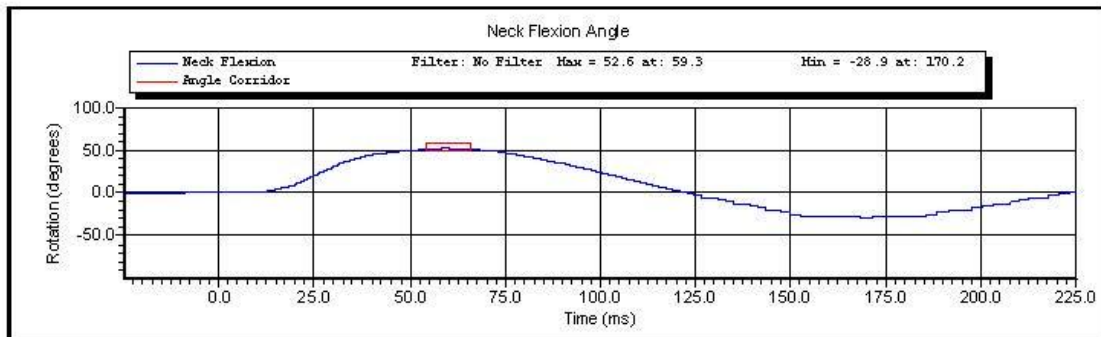
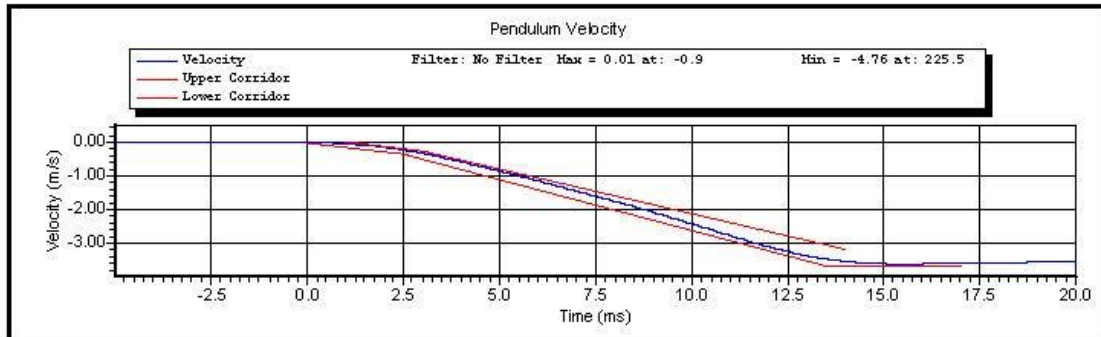


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Test Name:	Neck Flexion	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	1/23/2012
Test Number:	1	Test Time:	9:53:29 AM



Test ID:

Test Time: 9:53:29 AM

Test Date: 1/23/2012

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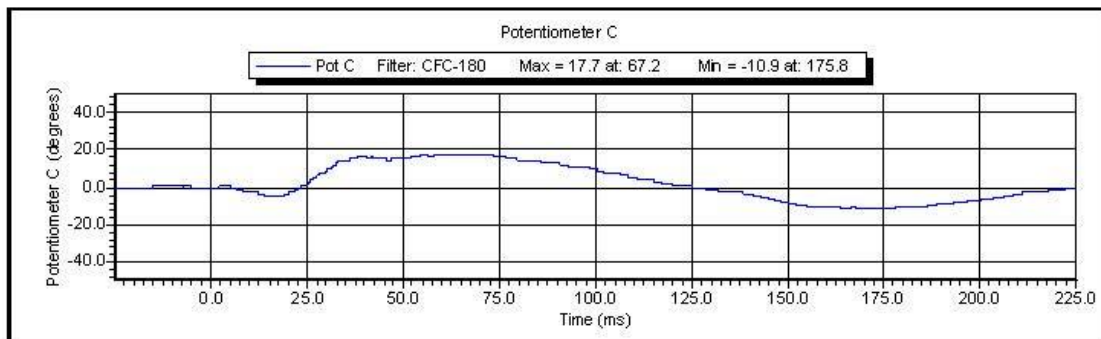
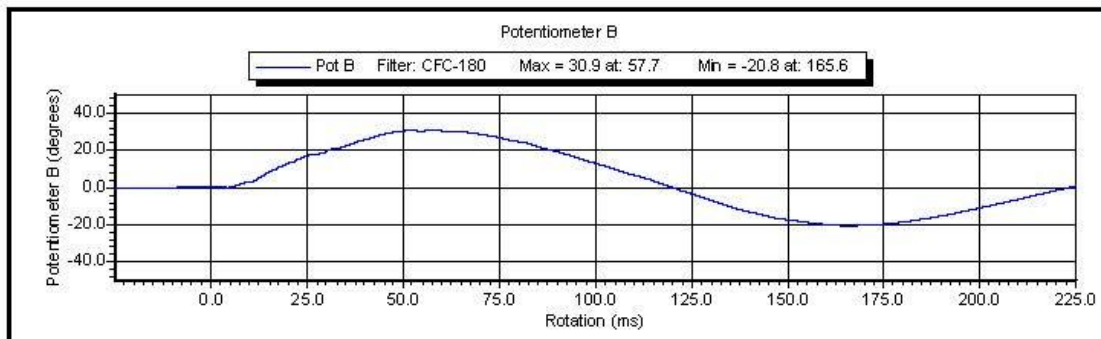
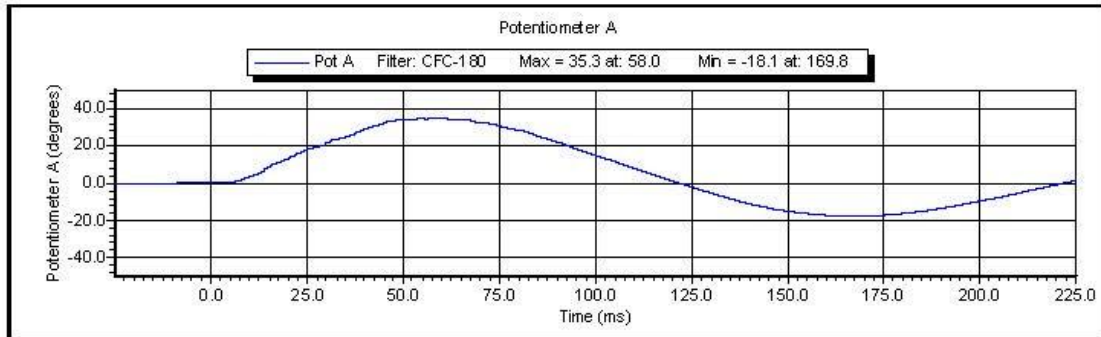
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Test Time: 9:53:29 AM

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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:	1/26/2012
Test Number:	1	Test Time:	2:27:21 PM

Component Part Number	Component Serial Number
960715-313 Arm	07018

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10.0 -- 70.0	25.0 %RH P
Velocity	4.20 -- 4.40	4.23 m/s P
Pendulum Acceleration	-10.50 -- -7.50	-9.96 g P

All test parameters are within specifications

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

Test ID:

Test Time: **2:27:21 PM**

Test Date: **1/26/2012**



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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	1/11/2012
Endevco	7231CT	AGHF5	1/24/2012

Test ID:

Test Time: 2:27:21 PM

Test Date: 1/26/2012

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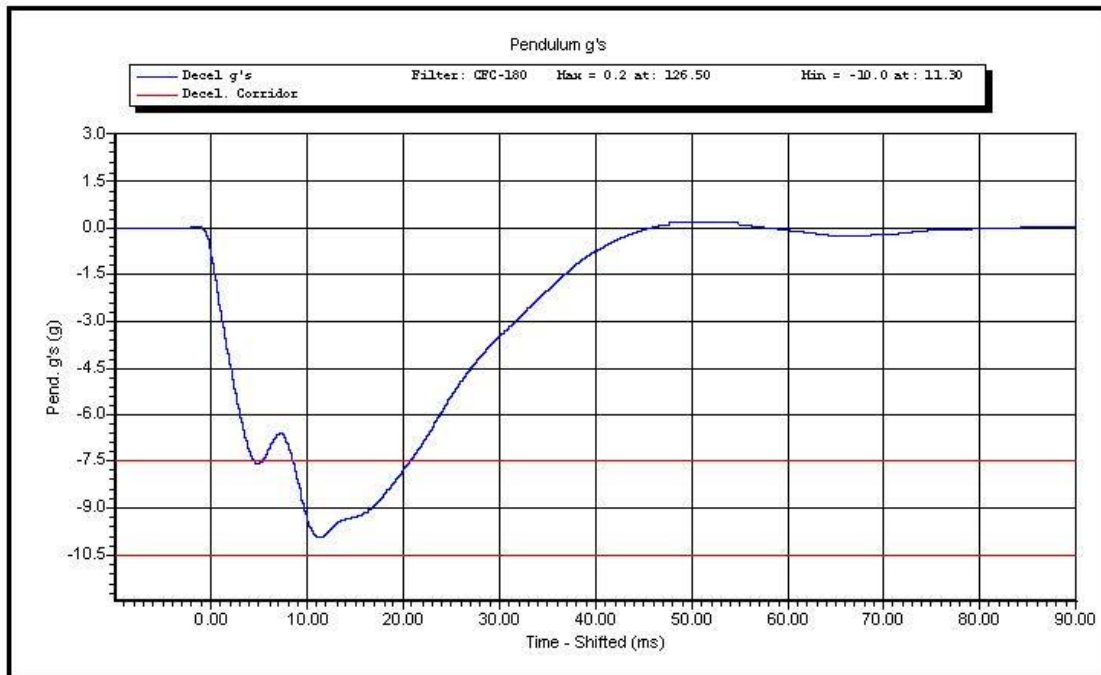


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Test Name:	Shoulder Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	1/26/2012
Test Number:	1	Test Time:	2:27:21 PM



Test ID:

Test Time: 2:27:21 PM

Test Date: 1/26/2012

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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:	1/26/2012
Test Number:	1	Test Time:	2:00:06 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	22.2 deg C P
Humidity	10.0 -- 70.0	25.0 %RH P
Velocity	5.40 -- 5.60	5.48 m/s P
Upper Rib Displacement	34.0 -- 41.0	37.9 mm P
Middle Rib Displacement	37.0 -- 45.0	41.7 mm P
Lower Rib Displacement	37.0 -- 44.0	41.7 mm P
Impactor Force	5100 -- 6200	5576 N P

All test parameters are within specifications

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

Test ID:

Test Time: **2:00:06 PM**

Test Date: **1/26/2012**



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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	1/11/2012
Endevco	7231CT	AGHF5	1/24/2012
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: 2:00:06 PM

Test Date: 1/26/2012

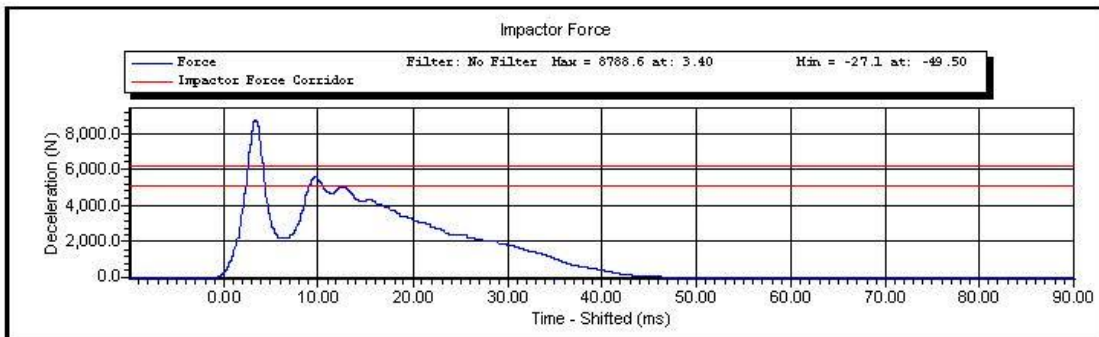
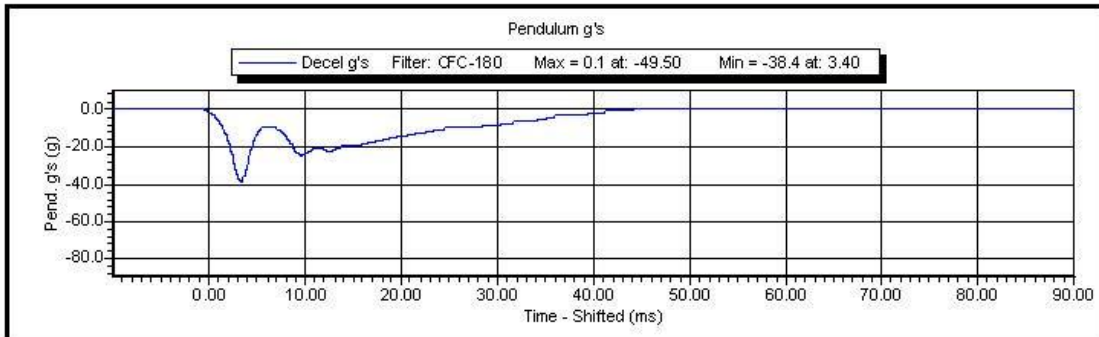


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Test Name:	Thorax Impact	Revision:	8/15/2008
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	1/26/2012
Test Number:	1	Test Time:	2:00:06 PM



Test ID:

Test Time: 2:00:06 PM

Test Date: 1/26/2012

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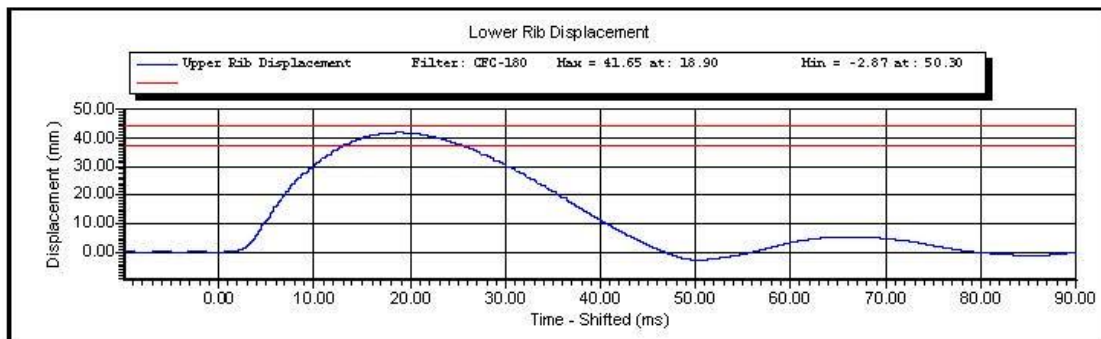
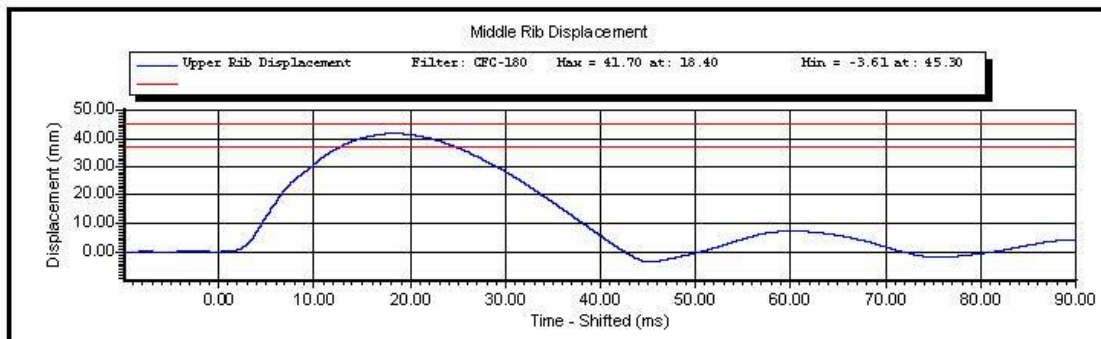
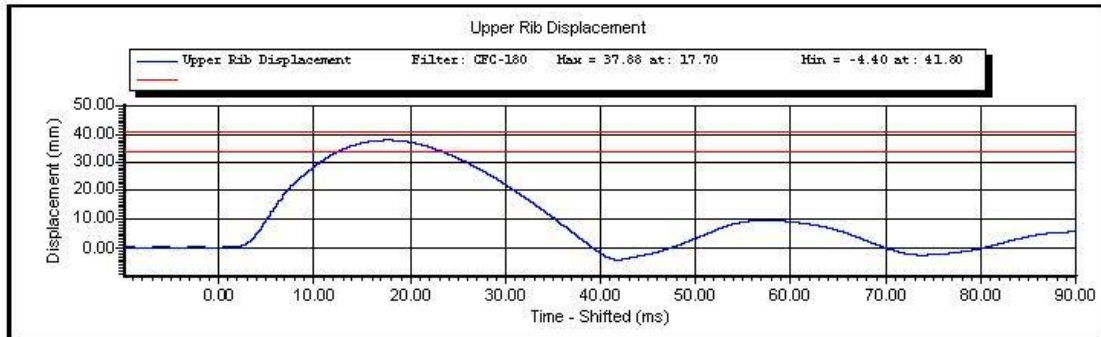
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Test ID:

Test Time: 2:00:06 PM

Test Date: 1/26/2012

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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 4.0 m/s	Test Date:	1/23/2012
Test Number:	1	Test Time:	10:59:55 AM

Component Part Number	Component Serial Number
455-3100	07203

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10.0 -- 70.0	29.0 %RH P
Velocity	3.90 -- 4.10	3.97 m/s P
Rib Displacement	-51.00 -- -46.00	-48.23 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 4.0 m/s** Test Time: **10:59:55 AM**

Test Date: **1/23/2012**

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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	1/11/2012
Endevco	7264-2000	P32222	10/14/2011

Test ID: **Upper Rib 4.0 m/s**

Test Time: **10:59:55 AM**

Test Date: **1/23/2012**

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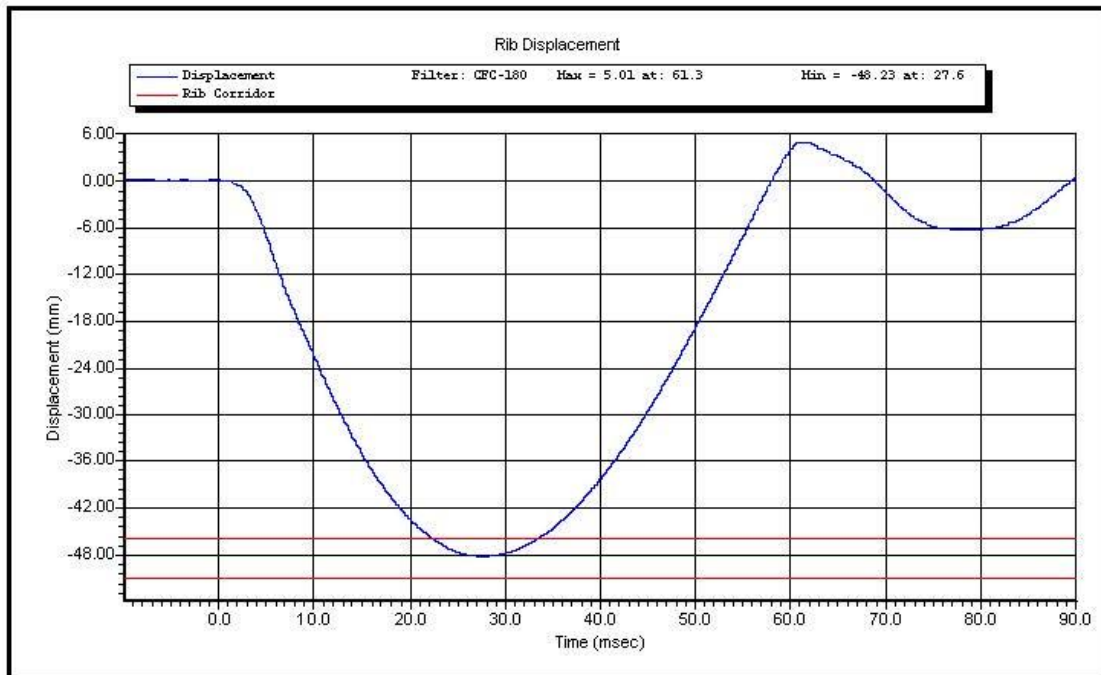


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Upper Rib 4.0 m/s	Test Date:	1/23/2012
Test Number:	1	Test Time:	10:59:55 AM



Test ID: **Upper Rib 4.0 m/s** Test Time: **10:59:55 AM**

Test Date: **1/23/2012**

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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 3.0 m/s	Test Date:	1/23/2012
Test Number:	1	Test Time:	11:10:19 AM

Component Part Number	Component Serial Number
455-3100	07203

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10.0 -- 70.0	29.0 %RH P
Velocity	2.90 -- 3.10	2.91 m/s P
Rib Displacement	-40.00 -- -36.00	-36.96 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 3.0 m/s** Test Time: **11:10:19 AM**

Test Date: **1/23/2012**

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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	1/11/2012
Endevco	7264-2000	P32222	10/14/2011

Test ID: **Upper Rib 3.0 m/s**

Test Time: **11:10:19 AM**

Test Date: **1/23/2012**

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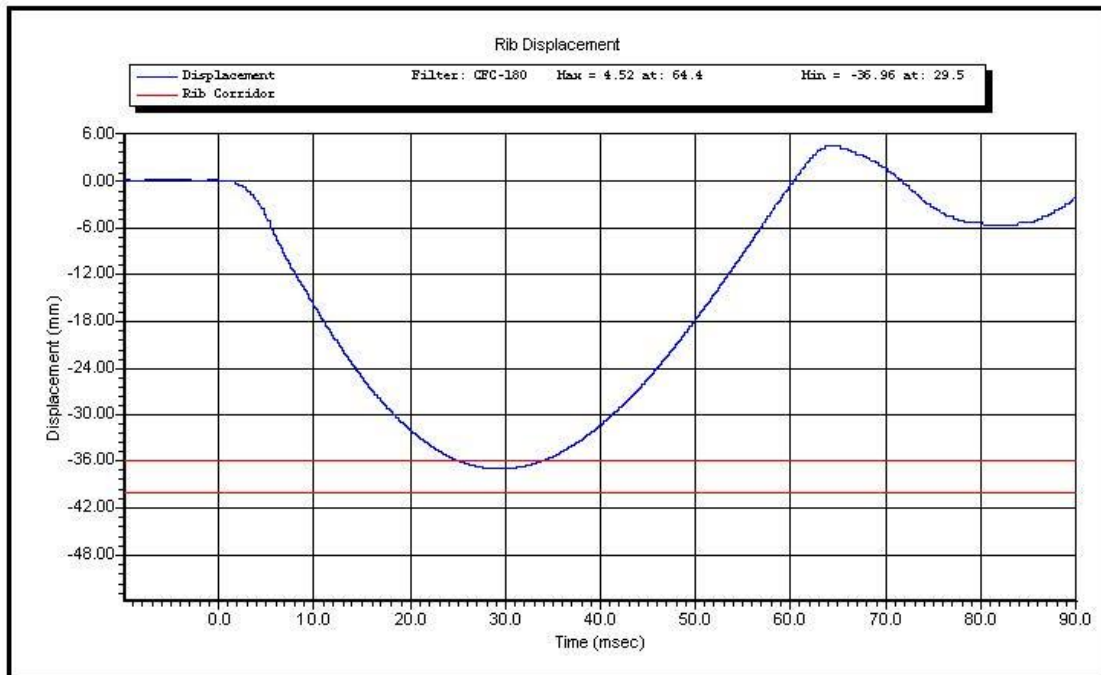


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Upper Rib 3.0 m/s	Test Date:	1/23/2012
Test Number:	1	Test Time:	11:10:19 AM



Test ID: **Upper Rib 3.0 m/s** Test Time: **11:10:19 AM**

Test Date: **1/23/2012**

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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 4.0 m/s	Test Date:	1/23/2012
Test Number:	1	Test Time:	11:20:14 AM

Component Part Number	Component Serial Number
455-3100	07205

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10.0 -- 70.0	29.0 %RH P
Velocity	3.90 -- 4.10	3.96 m/s P
Rib Displacement	-51.00 -- -46.00	-47.99 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 4.0 m/s** Test Time: **11:20:14 AM**

Test Date: **1/23/2012**

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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	1/11/2012
Endevco	7264-2000	P32222	10/14/2011

Test ID: **Middle Rib 4.0 m/s** Test Time: **11:20:14 AM**

Test Date: **1/23/2012**

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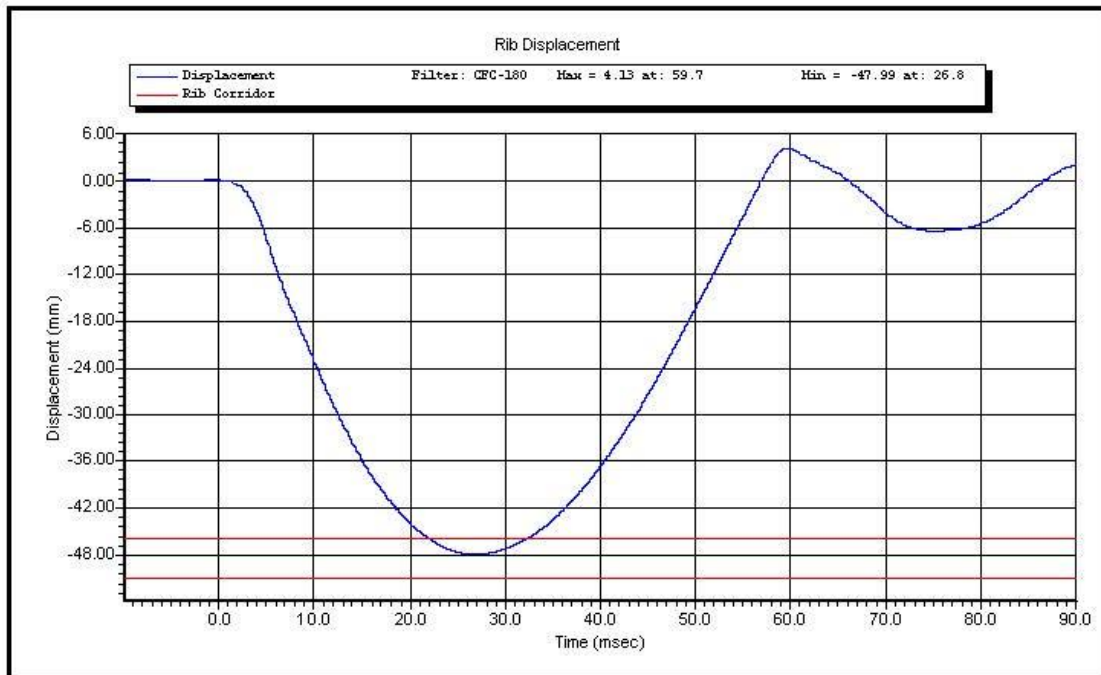


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Middle Rib 4.0 m/s	Test Date:	1/23/2012
Test Number:	1	Test Time:	11:20:14 AM



Test ID: **Middle Rib 4.0 m/s** Test Time: **11:20:14 AM**

Test Date: **1/23/2012**

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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 3.0 m/s	Test Date:	1/23/2012
Test Number:	1	Test Time:	11:38:41 AM

Component Part Number	Component Serial Number
455-3100	07205

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10.0 -- 70.0	29.0 %RH P
Velocity	2.90 -- 3.10	2.96 m/s P
Rib Displacement	-40.00 -- -36.00	-37.24 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 3.0 m/s** Test Time: **11:38:41 AM**

Test Date: **1/23/2012**

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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	1/11/2012
Endevco	7264-2000	P32222	10/14/2011

Test ID: **Middle Rib 3.0 m/s** Test Time: **11:38:41 AM**

Test Date: **1/23/2012**

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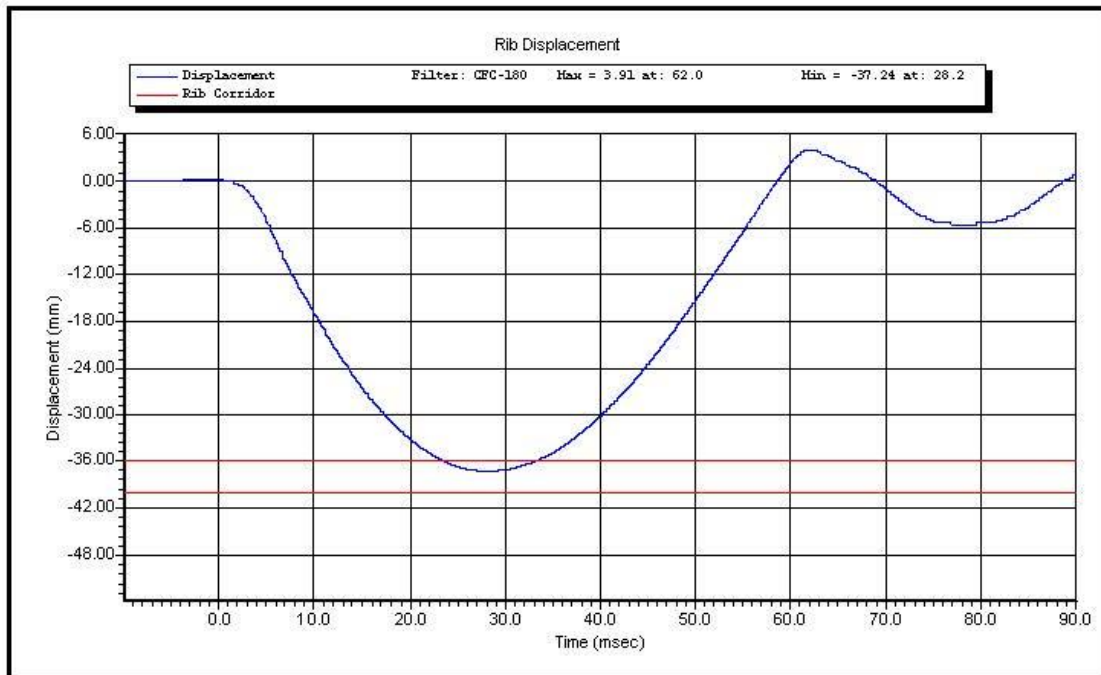


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Middle Rib 3.0 m/s	Test Date:	1/23/2012
Test Number:	1	Test Time:	11:38:41 AM



Test ID: **Middle Rib 3.0 m/s** Test Time: **11:38:41 AM**

Test Date: **1/23/2012**

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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 4.0 m/s	Test Date:	1/23/2012
Test Number:	1	Test Time:	1:12:33 PM

Component Part Number	Component Serial Number
455-3100	07209

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.5 deg C P
Humidity	10.0 -- 70.0	31.0 %RH P
Velocity	3.90 -- 4.10	3.96 m/s P
Rib Displacement	-51.00 -- -46.00	-49.05 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 4.0 m/s** Test Time: **1:12:33 PM**

Test Date: **1/23/2012**

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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	1/11/2012
Endevco	7264-2000	P32222	10/14/2011

Test ID: **Lower Rib 4.0 m/s** Test Time: **1:12:33 PM**

Test Date: **1/23/2012**

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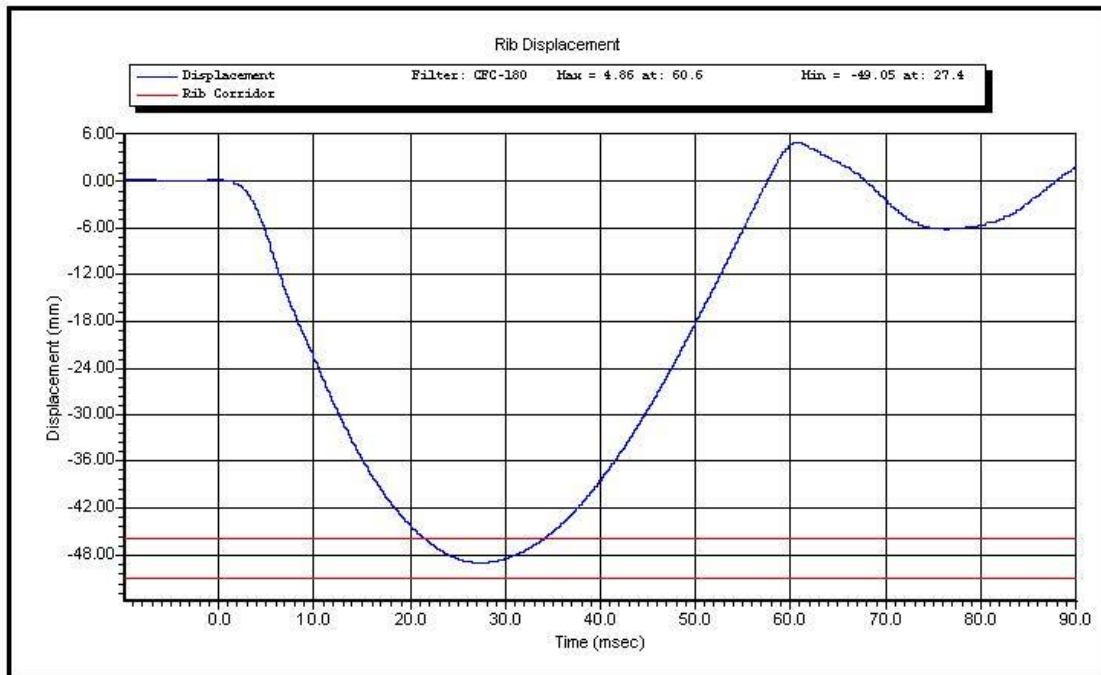


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Lower Rib 4.0 m/s	Test Date:	1/23/2012
Test Number:	1	Test Time:	1:12:33 PM



Test ID: Lower Rib 4.0 m/s Test Time: 1:12:33 PM

Test Date: 1/23/2012

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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 3.0 m/s	Test Date:	1/23/2012
Test Number:	1	Test Time:	1:26:13 PM

Component Part Number	Component Serial Number
455-3100	07209

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.5 deg C P
Humidity	10.0 -- 70.0	31.0 %RH P
Velocity	2.90 -- 3.10	2.97 m/s P
Rib Displacement	-40.00 -- -36.00	-38.38 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 3.0 m/s** Test Time: **1:26:13 PM**

Test Date: **1/23/2012**

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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	1/11/2012
Endevco	7264-2000	P32222	10/14/2011

Test ID: **Lower Rib 3.0 m/s**

Test Time: **1:26:13 PM**

Test Date: **1/23/2012**

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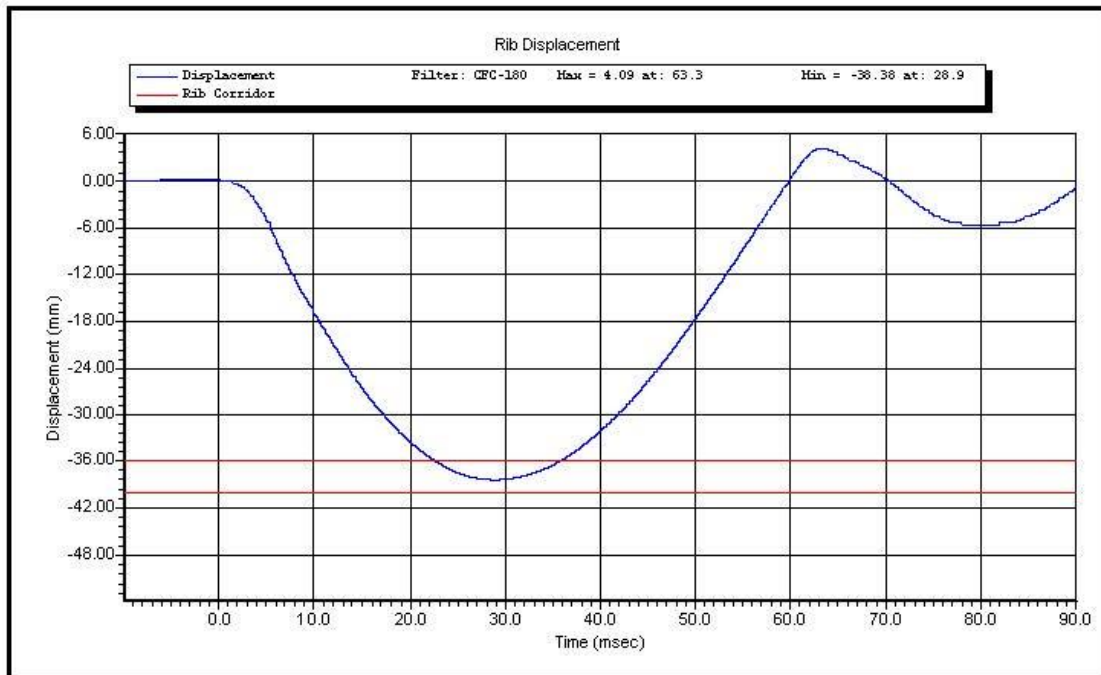


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:	Lower Rib 3.0 m/s	Test Date:	1/23/2012
Test Number:	1	Test Time:	1:26:13 PM



Test ID: Lower Rib 3.0 m/s Test Time: 1:26:13 PM

Test Date: 1/23/2012

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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:	1/26/2012
Test Number:	1	Test Time:	1:32:39 PM

Component Part Number	Component Serial Number
455-4001 Abdomen Insert	0483

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.1 deg C P
Humidity	10 -- 70	25 %RH P
Velocity	3.90 -- 4.10	4.01 m/s P
Peak Abdominal Force	-2.70 -- -2.20	-2.58 kN P
Time At Peak Abdominal Force	10.0 -- 12.3	10.5 ms P
Maximum Pendulum Force	-4.80 -- -4.00	-4.66 kN P
Time at Peak Pendulum Force	10.6 -- 13.0	10.6 ms P

All test parameters are within specifications

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

Test ID:

Test Time: **1:32:39 PM**

Test Date: **1/26/2012**



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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	1/11/2012
Endevco	7231CT	AGHF5	1/24/2012
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: 1:32:39 PM

Test Date: 1/26/2012

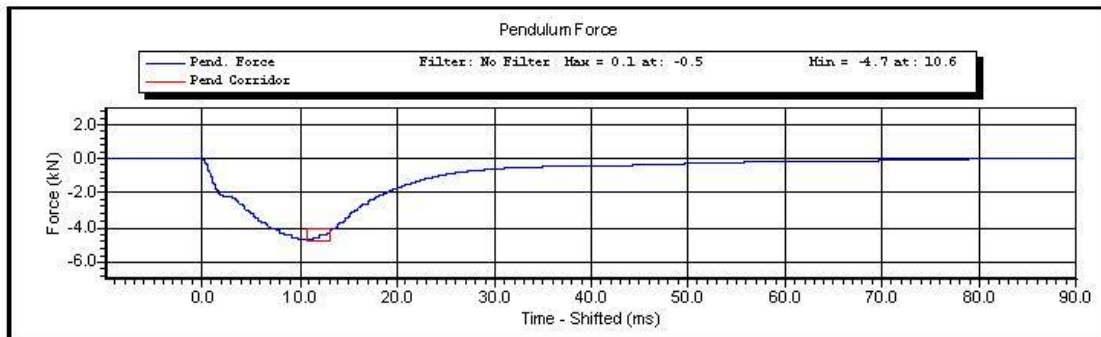
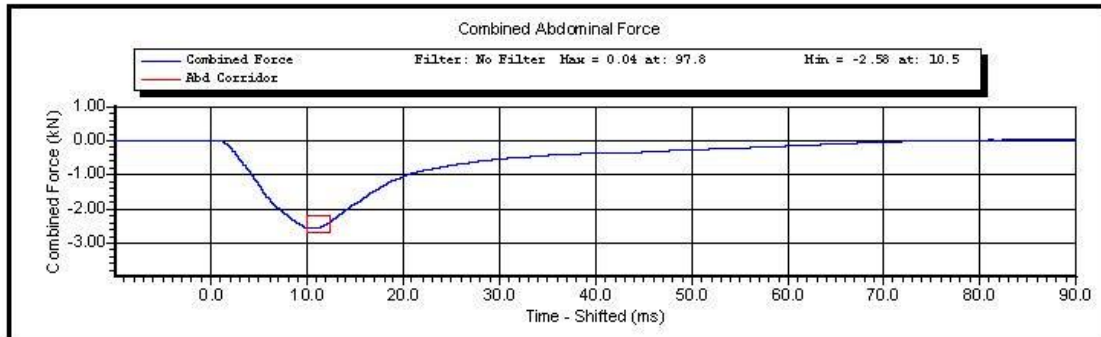


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Test Name:	Abdominal Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	1/26/2012
Test Number:	1	Test Time:	1:32:39 PM



Test ID:

Test Time: 1:32:39 PM

Test Date: 1/26/2012

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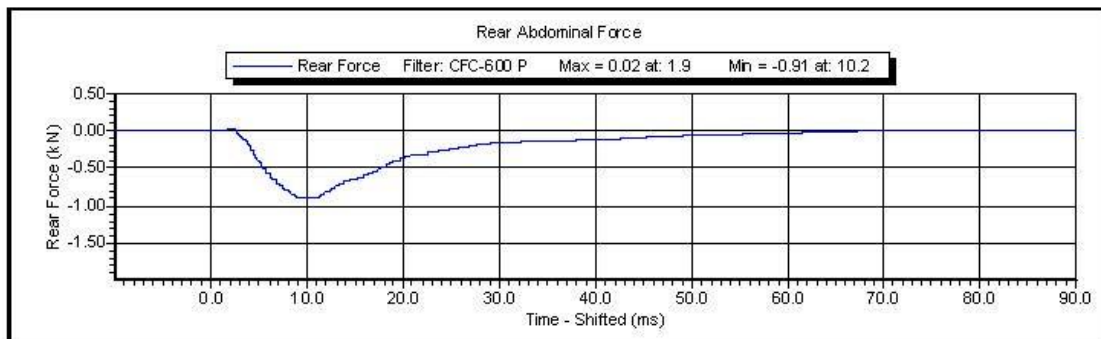
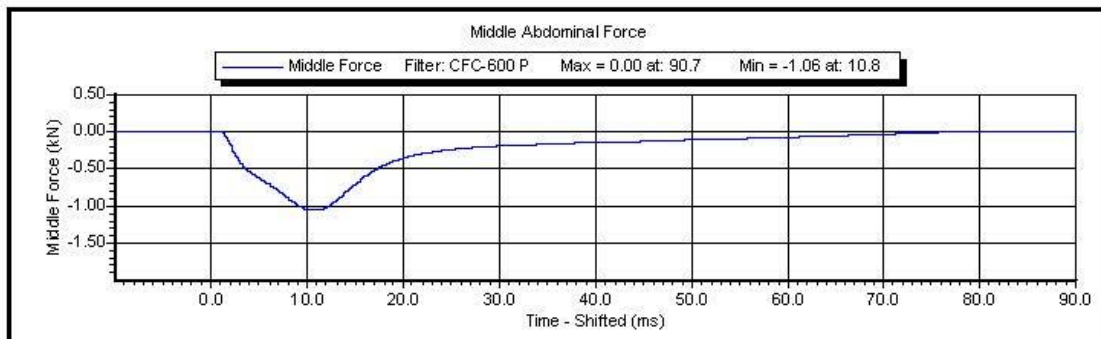
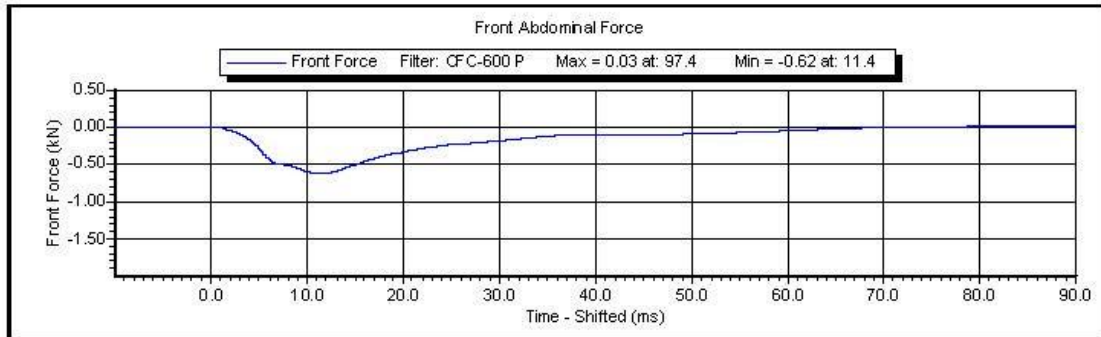
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Test Date: 1/26/2012

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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:	1/30/2012
Test Number:	1	Test Time:	10:46:01 AM

Component Part Number	Component Serial Number
175-5501	15050329A

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.4 deg C P
Humidity	10 -- 70	19 %RH P
Velocity	5.95 -- 6.15	6.14 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	46.5 ms P
Decay to Zero Degrees	37.0 -- 57.0	38.9 ms P
Velocity Corridor	--	P

All test parameters are within specifications

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

Test ID:

Test Time: **10:46:01 AM**

Test Date: **1/30/2012**

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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	1/11/2012
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: 10:46:01 AM

Test Date: 1/30/2012

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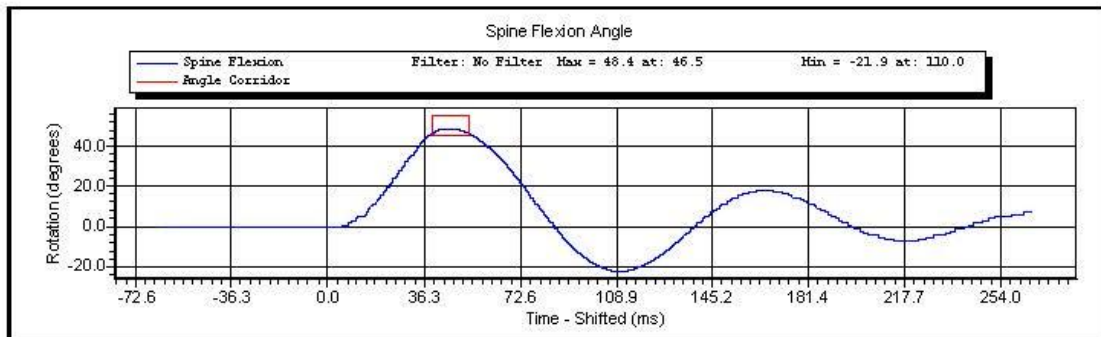
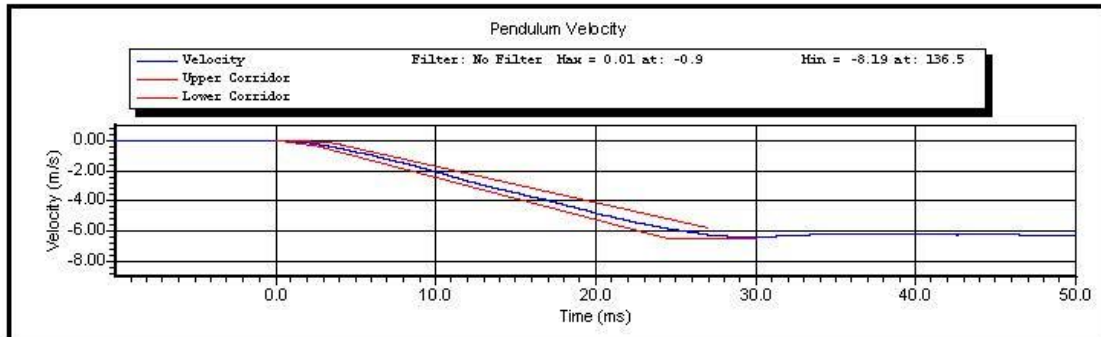


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Test Name:	Lumbar Spine	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	1/30/2012
Test Number:	1	Test Time:	10:46:01 AM



Test ID:

Test Time: **10:46:01 AM**

Test Date: **1/30/2012**

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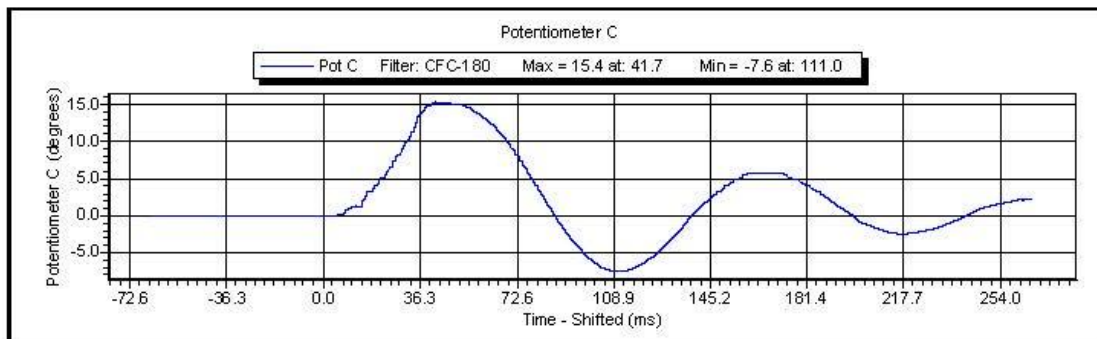
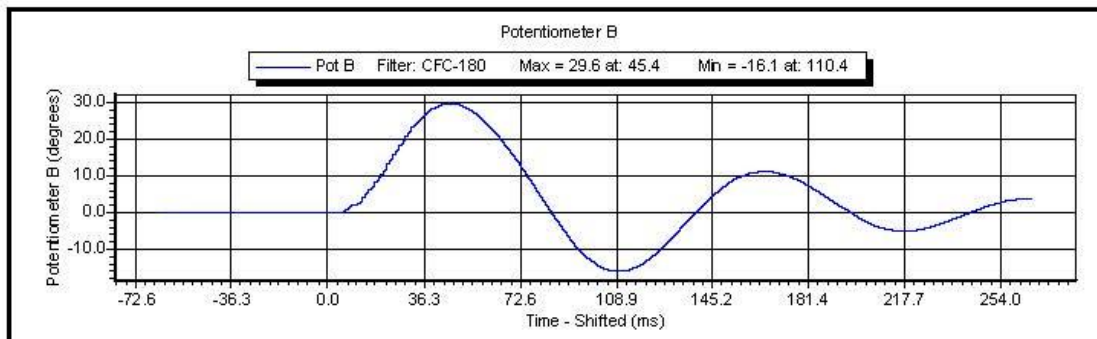
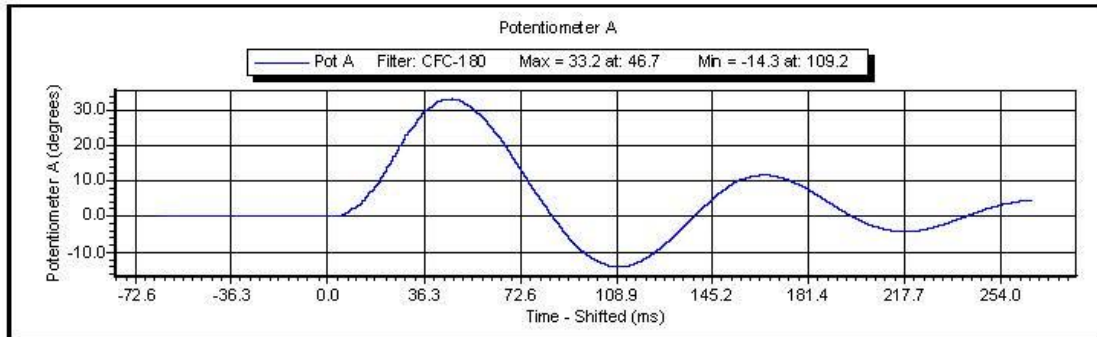
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Test Date: 1/30/2012

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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:	1/26/2012
Test Number:	1	Test Time:	12:55:10 PM

Component Part Number	Component Serial Number
455-4003 Pelvis	0703L

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.9 deg C P
Humidity	10 -- 70	25 %RH P
Velocity	4.20 -- 4.40	4.33 m/s P
Peak Pendulum Force	-5.40 -- -4.70	-5.06 kN P
Time at Peak Pendulum Force	11.80 -- 16.10	13.53 ms P
Peak Pubic Symphysis Force	-1.59 -- -1.23	-1.39 kN P
Time at Peak Pubic Symphysis Force	12.20 -- 17.00	14.53 ms P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID:

Test Time: **12:55:10 PM**

Test Date: **1/26/2012**



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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	1/11/2012
Endevco	7231CT	AGHF5	1/24/2012
Denton	3096	LC-465Fy	8/31/2011

Test ID:

Test Time: 12:55:10 PM

Test Date: 1/26/2012

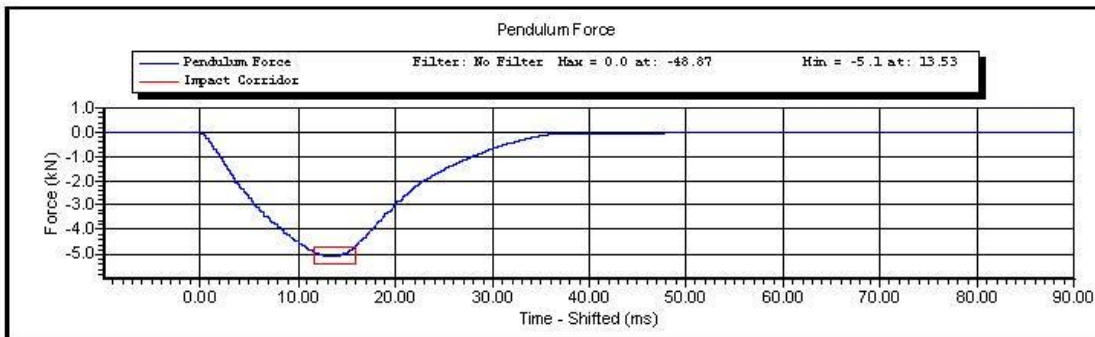
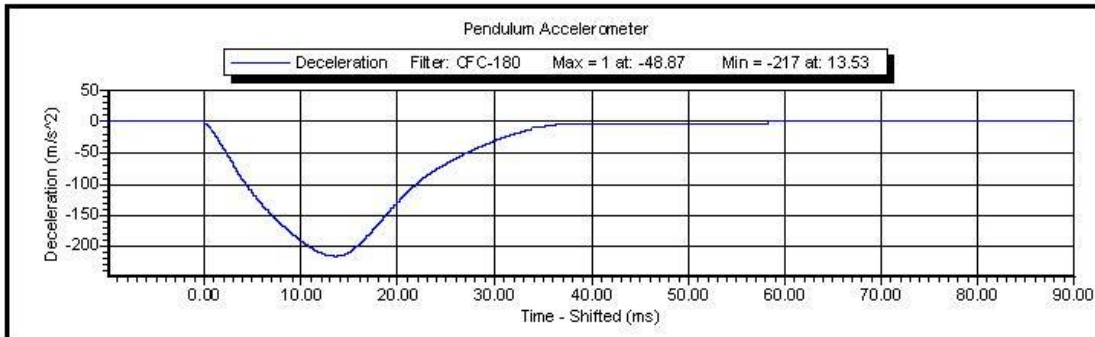


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Test Name:	Pelvis Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F034		
Test ID:		Test Date:	1/26/2012
Test Number:	1	Test Time:	12:55:10 PM



Test ID:

Test Time: **12:55:10 PM**

Test Date: **1/26/2012**

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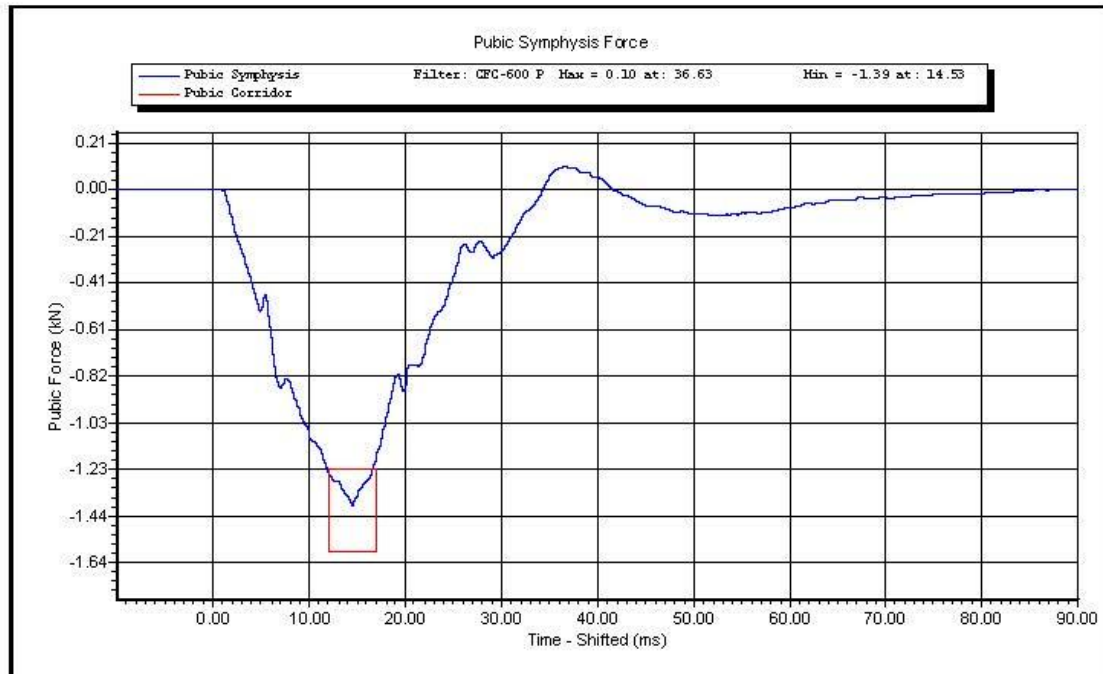
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Test ID:

Test Time: 12:55:10 PM

Test Date: 1/26/2012

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CALIBRATION TEST RESULTS

POST-TEST

SID-IIs No: 300

CONFIGURED FOR LEFT SIDE IMPACT



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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:	300		
Test ID:		Test Date:	1/20/2012
Test Number:	1	Test Time:	9:08:54 AM

Component Part Number	Component Serial Number
Head Skin - 180-1002	1355

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10 -- 70	15 %RH P
Resultant Acceleration	115.0 -- 137.0	134.9 g P
Oscillation	0.0 -- 15.0	0.0 % P
Fore-Aft Acceleration	-15.0 -- 15.0	7.6 g P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID:

Test Time: **9:08:54 AM**

Test Date: **1/20/2012**



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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	P51685	10/31/2011
Endevco	7264-2000	P51682	10/31/2011
Endevco	7264-2000	P51699	10/31/2011

Test ID:

Test Time: 9:08:54 AM

Test Date: 1/20/2012

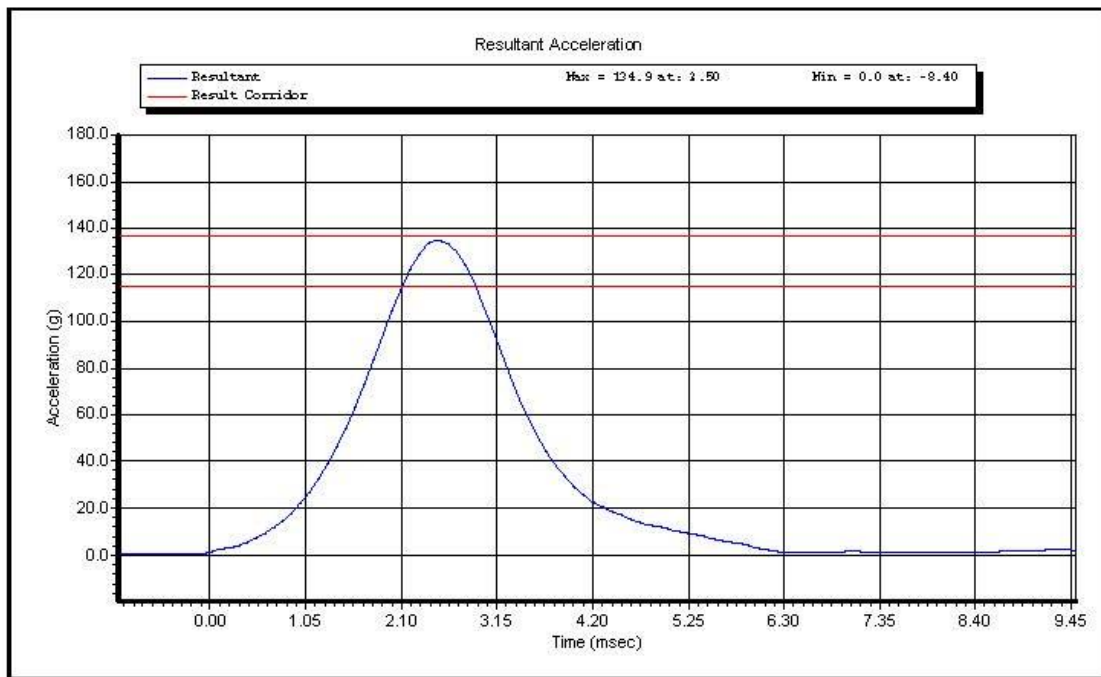


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Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	300		
Test ID:		Test Date:	1/20/2012
Test Number:	1	Test Time:	9:08:54 AM



Test ID:

Test Time: 9:08:54 AM

Test Date: 1/20/2012

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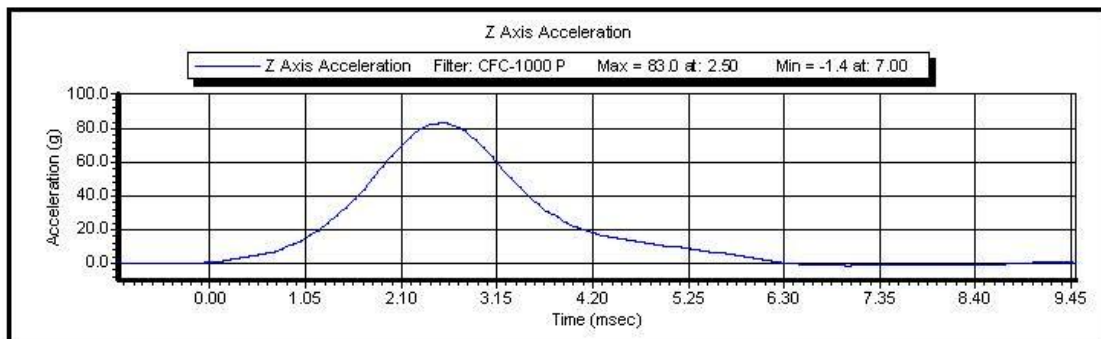
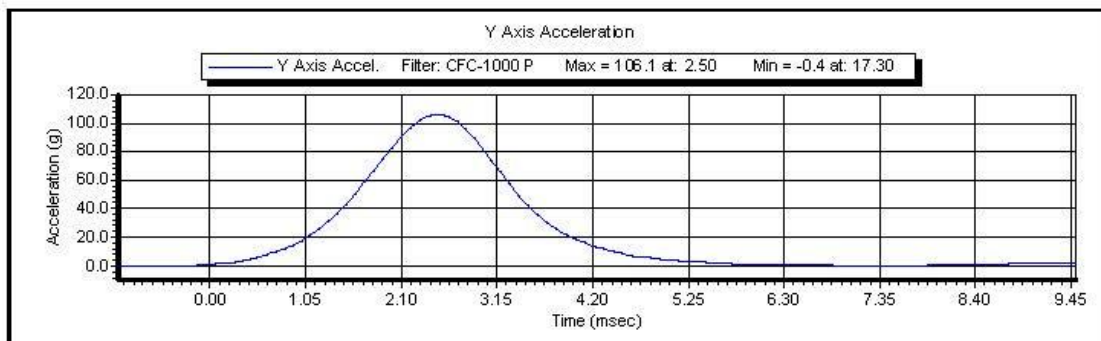
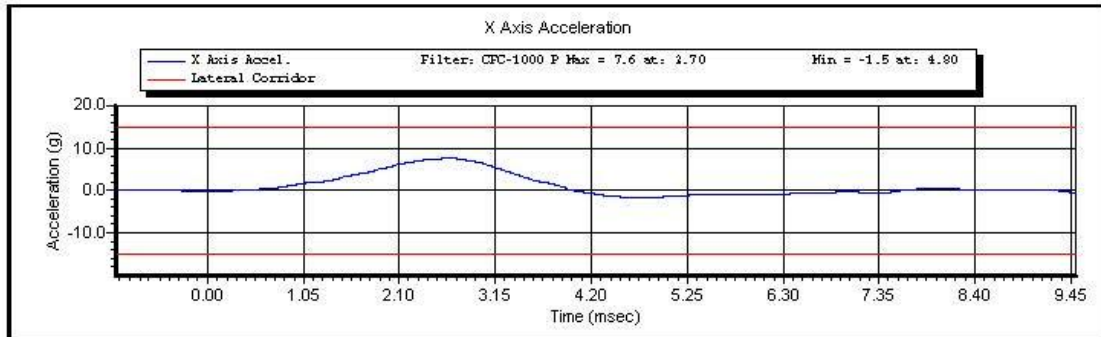
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Test ID:

Test Time: 9:08:54 AM

Test Date: 1/20/2012

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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:	300		
Test ID:		Test Date:	1/20/2012
Test Number:	1	Test Time:	2:19:19 PM

Component Part Number	Component Serial Number
Neck - 180-2000	787

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	15 %RH P
Velocity	5.51 -- 5.63	5.58 m/s P
Pendulum Impulse at 10 ms	2.20 -- 2.80	2.50 m/s P
Pendulum Impulse at 15 ms	3.30 -- 4.10	3.59 m/s P
Pendulum Impulse at 20 ms	4.40 -- 5.40	4.79 m/s P
Pendulum Impulse at 25 ms	5.40 -- 6.10	5.69 m/s P
Pendulum Impulse between 25 and 100 ms	5.50 -- 6.20	5.76 m/s P
Max D Plane Rotation	71.0 -- 81.0	72.0 degrees P
Time at Max Rotation	50.0 -- 70.0	59.5 ms P
Moment about OC	-44.0 -- -36.0	-43.2 Nm P
Moment Decay to Zero	102.0 -- 126.0	110.6 ms P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID:

Test Time: **2:19:19 PM**

Test Date: **1/20/2012**



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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	1/11/2012
Endevco	7231CT	C16510	10/3/2011
Denton	1716A	LC-1591 Fy	6/20/2011
Denton	1716A	LC-1591 Mx	6/20/2011
DentonATD	78051-342	184	5/8/2011
DentonATD	78051-342	174	5/8/2011
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Test ID:

Test Time: 2:19:19 PM

Test Date: 1/20/2012

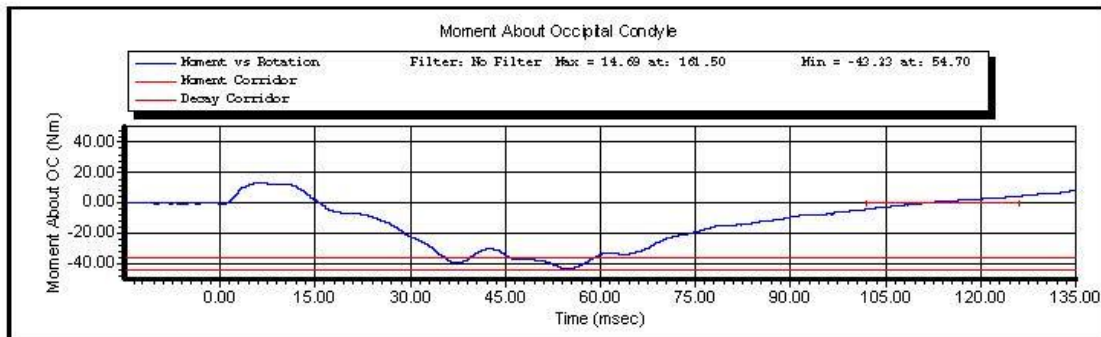
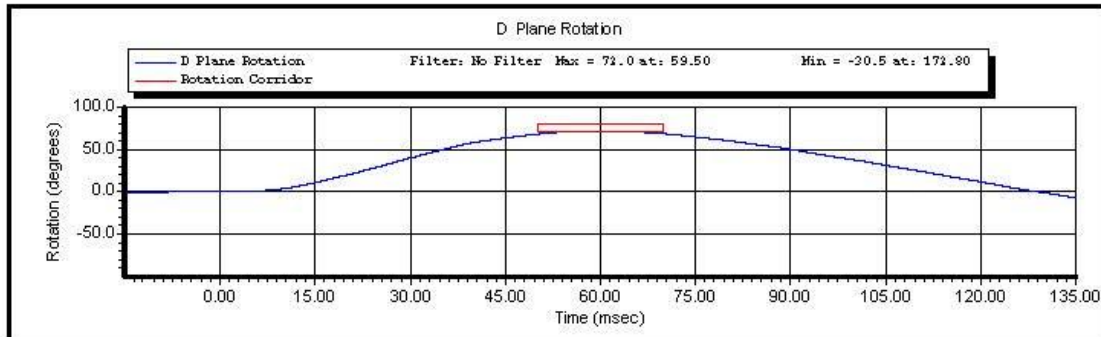


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Test Name:	Neck Pendulum	Revision:	8/24/2009
Sub Test Name:	Left Side	Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	300		
Test ID:		Test Date:	1/20/2012
Test Number:	1	Test Time:	2:19:19 PM



Test ID:

Test Time: 2:19:19 PM

Test Date: 1/20/2012

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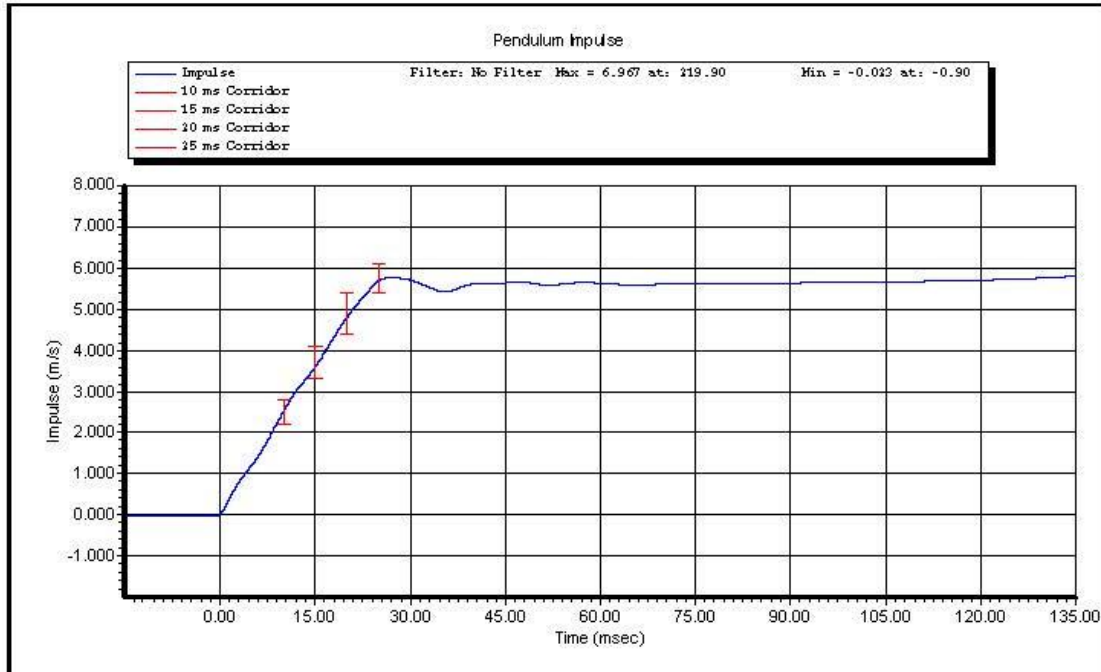
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Test ID:

Test Time: 2:19:19 PM

Test Date: 1/20/2012

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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-1Is		
ATD Serial Number:	300		
Test ID:		Test Date:	1/23/2012
Test Number:	1	Test Time:	10:41:45 AM

Component Part Number	Component Serial Number
Shoulder Rib 180-3355	168
Left Arm 180-6011-1	822

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.10 deg C P
Humidity	10.0 -- 70.0	29.0 %RH P
Velocity	4.20 -- 4.40	4.36 m/s P
Probe Acceleration	13.0 -- 18.0	16.5 g P
Shoulder Deflection	28.0 -- 37.0	30.0 mm P
T1 Acceleration	17.0 -- 22.0	22.0 g P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID:

Test Time: **10:41:45 AM**

Test Date: **1/23/2012**



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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	1/11/2012
Endevco	7231CT	AGHF5	1/3/2012
Servo	180-3885	DS-1063	10/31/2011
Endevco	7264-2000	P58806	11/3/2011

Test ID:

Test Time: 10:41:45 AM

Test Date: 1/23/2012

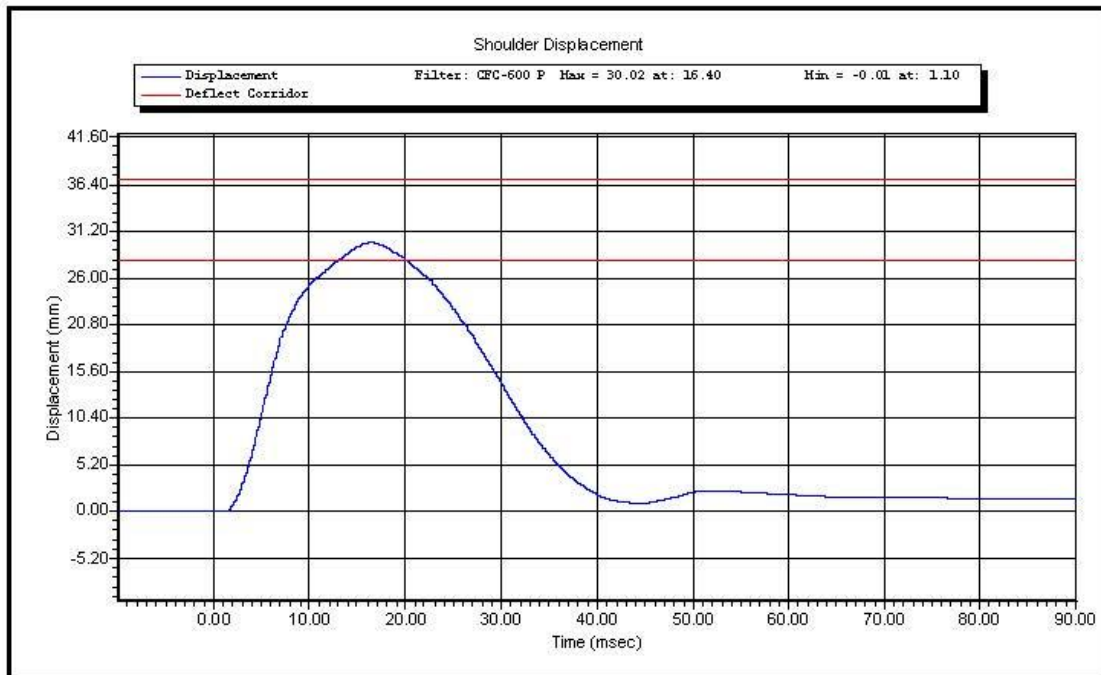


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Test Name:	Shoulder Impact	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	300		
Test ID:		Test Date:	1/23/2012
Test Number:	1	Test Time:	10:41:45 AM



Test ID:

Test Time: **10:41:45 AM**

Test Date: **1/23/2012**

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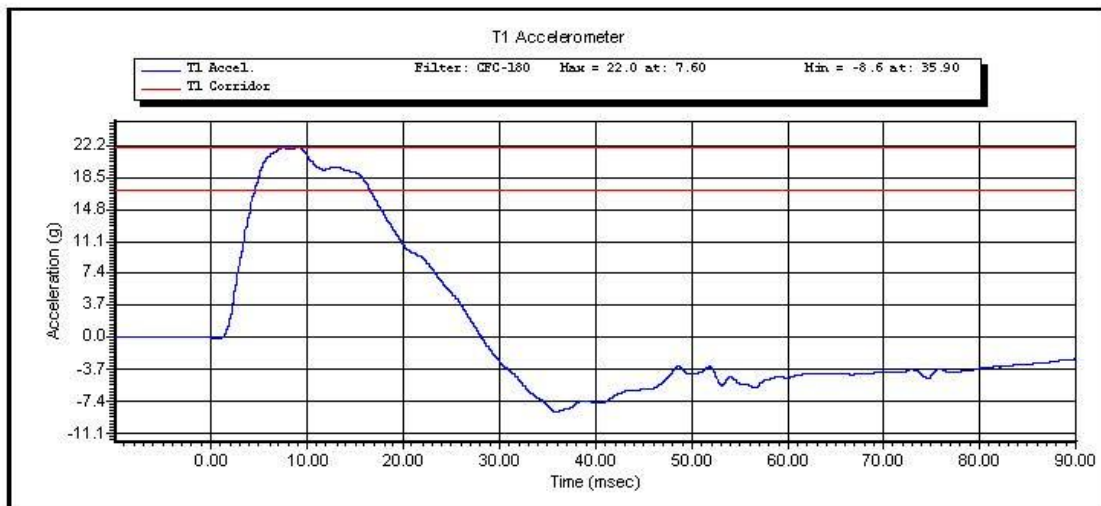
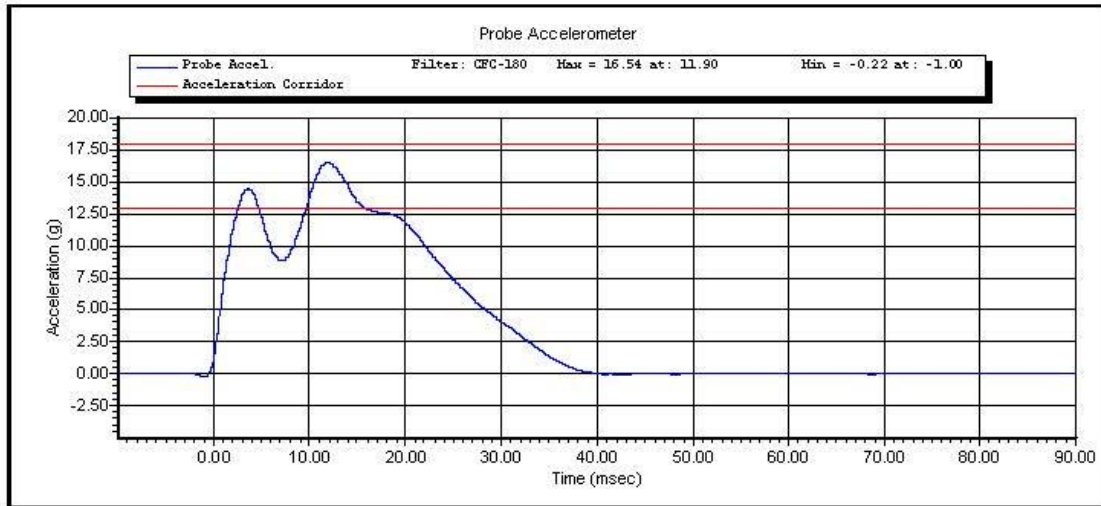
1 of 2



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Test ID:

Test Time: 10:41:45 AM

Test Date: 1/23/2012

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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:	300		
Test ID:		Test Date:	1/23/2012
Test Number:	1	Test Time:	11:19:24 AM

Component Part Number	Component Serial Number
Thorax Ribs 1, 2, 3 180-3362	2024, 2061, 2062
Shoulder Rib 180-3355	168
Left Arm 180-6011-1	822

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.0 deg C P
Humidity	10 -- 70	28 %RH P
Velocity	6.60 -- 6.80	6.75 m/s P
Probe Acceleration after 5ms	30.0 -- 36.0	35.1 g P
Upper Thorax Rib Deflection	25.0 -- 32.0	26.9 mm P
Mid Thorax Rib Deflection	30.0 -- 36.0	32.6 mm P
Lower Thorax Rib Deflection	32.0 -- 38.0	33.6 mm P
Upper Spine Acceleration ("y")	34.0 -- 43.0	41.9 g P
Lower Spine Acceleration ("y")	29.0 -- 37.0	35.0 g P
Shoulder Deflection	31.0 -- 40.0	33.8 mm P

All test parameters are within specifications

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

Test ID:

Test Time: **11:19:24 AM**

Test Date: **1/23/2012**



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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	1/11/2012
Endevco	7231CT	AGHF5	1/3/2012
Servo	180-3885	DS-1121	10/29/2011
Servo	180-3885	DS-1151	10/31/2011
Servo	180-3885	DS-1156	10/31/2011
Endevco	7264-2000	P58806	11/3/2011
Endevco	7264-2000	P64147	11/1/2011
Servo	180-3885	DS-1063	10/31/2011

Test ID:

Test Time: 11:19:24 AM

Test Date: 1/23/2012

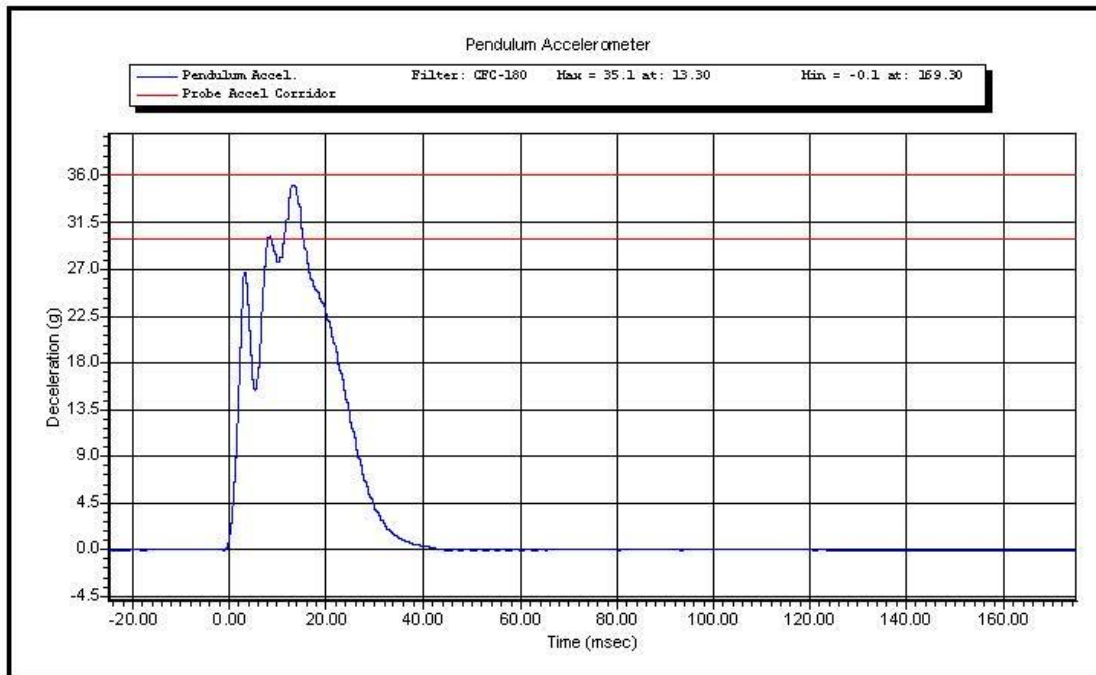


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Test Name:	Thorax Impact with Arm	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	300		
Test ID:		Test Date:	1/23/2012
Test Number:	1	Test Time:	11:19:24 AM



Test ID:

Test Time: 11:19:24 AM

Test Date: 1/23/2012

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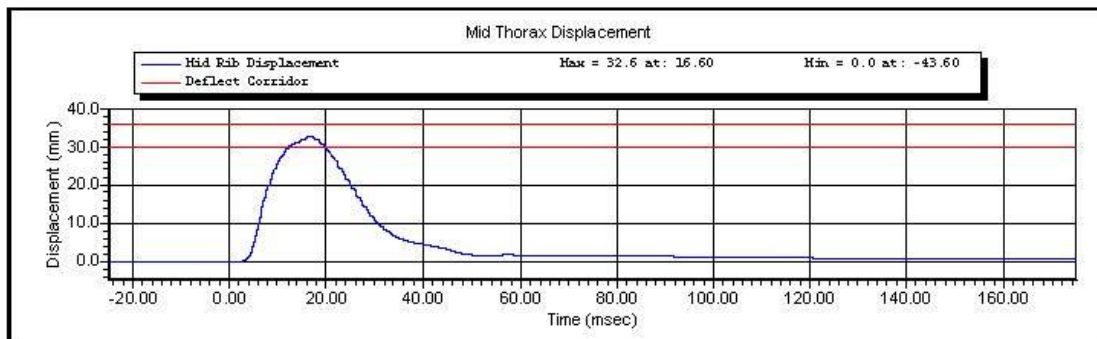
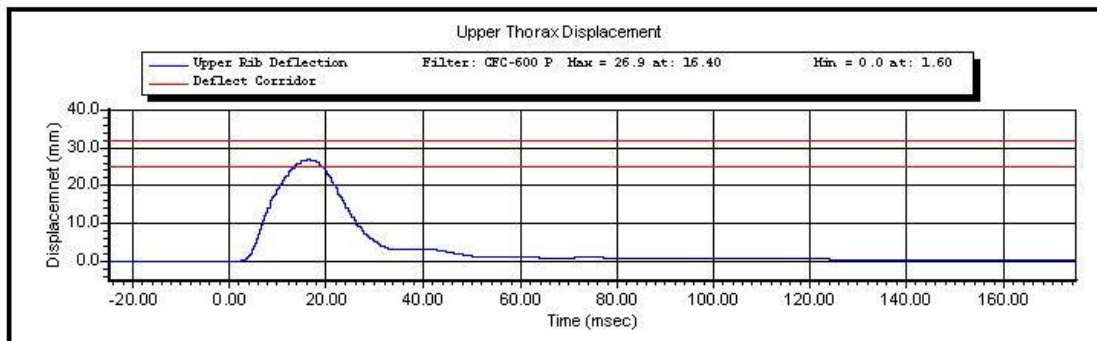
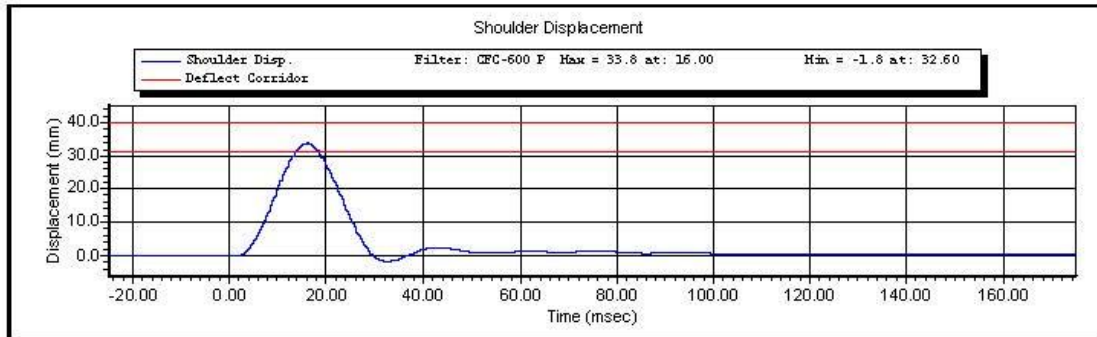
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Test ID:

Test Time: 11:19:24 AM

Test Date: 1/23/2012

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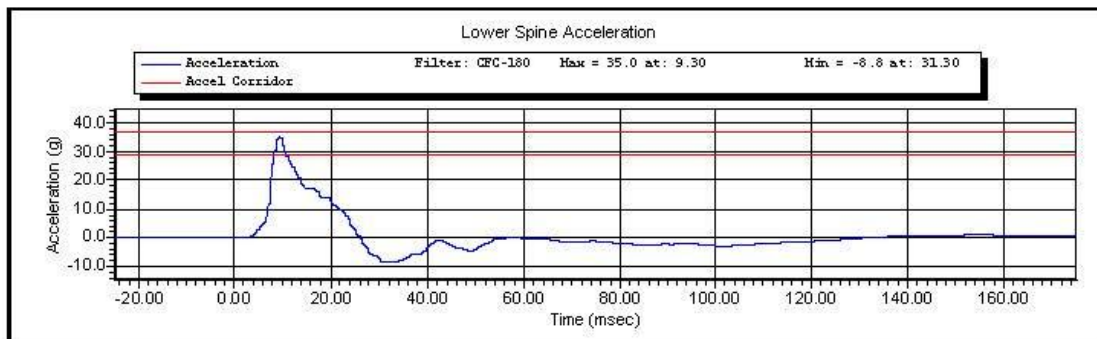
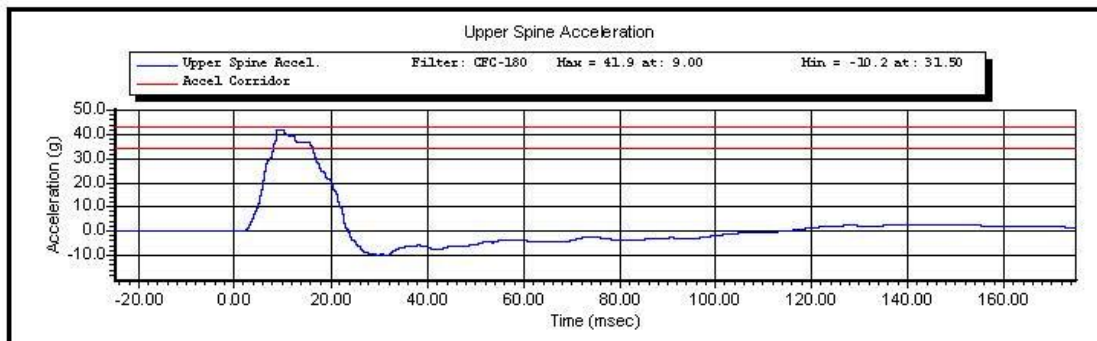
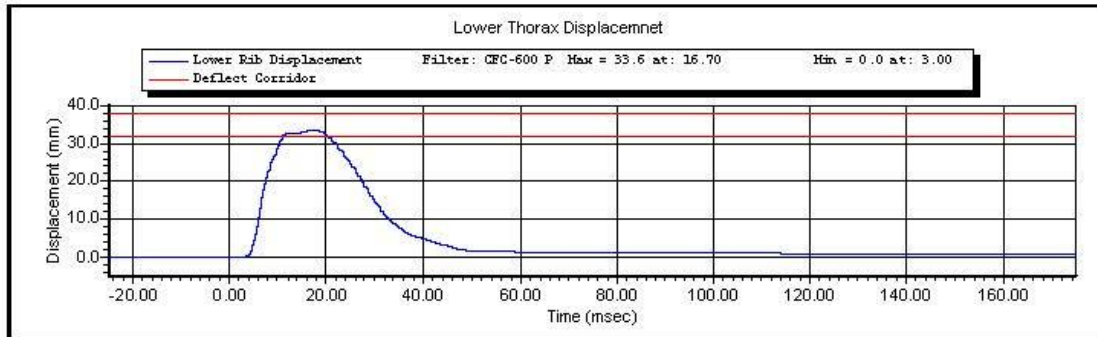
2 of 3



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Test Time: 11:19:24 AM

Test Date: 1/23/2012

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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:	300		
Test ID:		Test Date:	1/23/2012
Test Number:	1	Test Time:	10:19:29 AM

Component Part Number	Component Serial Number
Thorax Ribs 1, 2, 3	2024, 2061, 2062

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.1 deg C P
Humidity	10 -- 70	28 %RH P
Velocity	4.20 -- 4.40	4.35 m/s P
Probe Acceleration	14.0 -- 18.0	16.7 g P
Upper Thorax Rib Deflection	32.0 -- 40.0	34.9 mm P
Mid Thorax Rib Deflection	39.0 -- 45.0	41.6 mm P
Lower Thorax Rib Deflection	35.0 -- 43.0	38.5 mm P
Upper Spine Acceleration T1	13.0 -- 17.0	16.0 g P
Lower Spine Acceleration T12	7.0 -- 11.0	9.5 g P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID:

Test Time: **10:19:29 AM**

Test Date: **1/23/2012**



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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	1/11/2012
Endevco	7231CT	AGHF5	1/3/2012
Servo	180-3885	DS-1121	10/29/2011
Servo	180-3885	DS-1151	10/31/2011
Servo	180-3885	DS-1156	10/31/2011
Endevco	7264-2000	P58806	11/3/2011
Endevco	7264-2000	P64147	11/1/2011

Test ID:

Test Time: 10:19:29 AM

Test Date: 1/23/2012

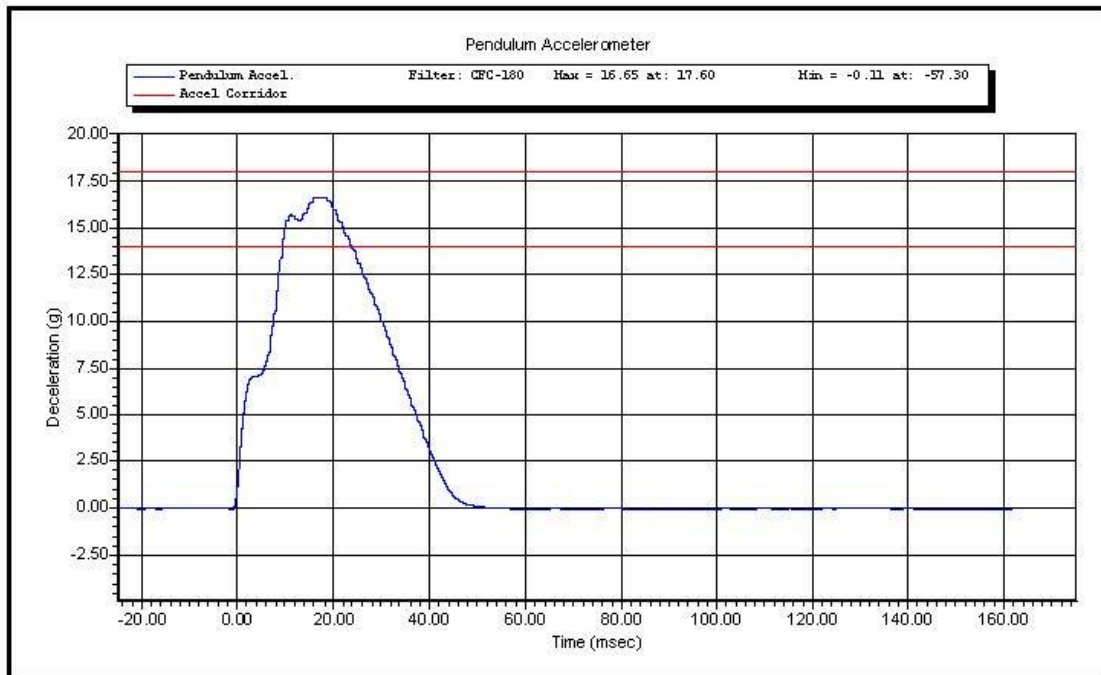


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Test Name:	Thorax Impact without Arm	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	300		
Test ID:		Test Date:	1/23/2012
Test Number:	1	Test Time:	10:19:29 AM



Test ID:

Test Time: 10:19:29 AM

Test Date: 1/23/2012

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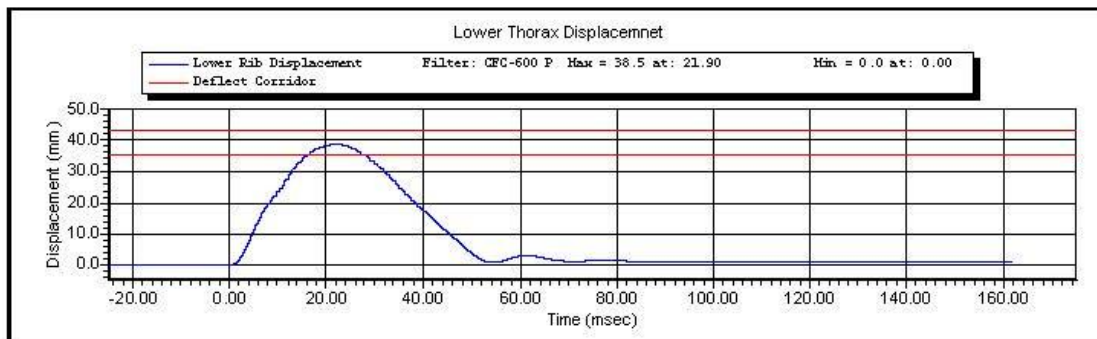
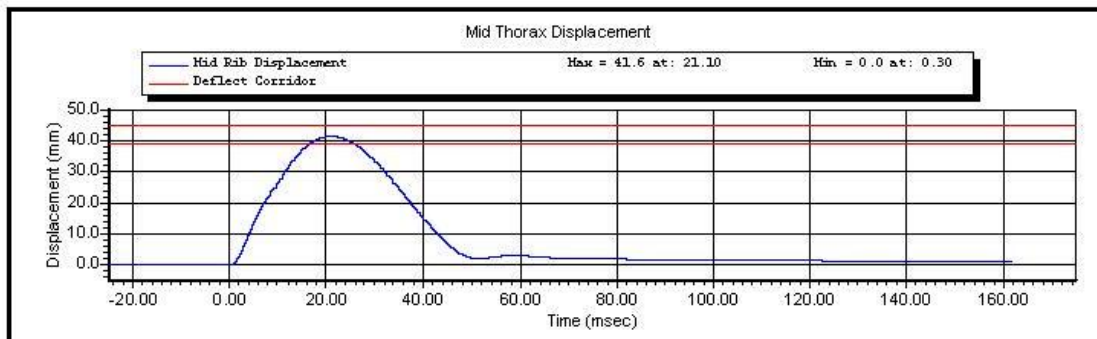
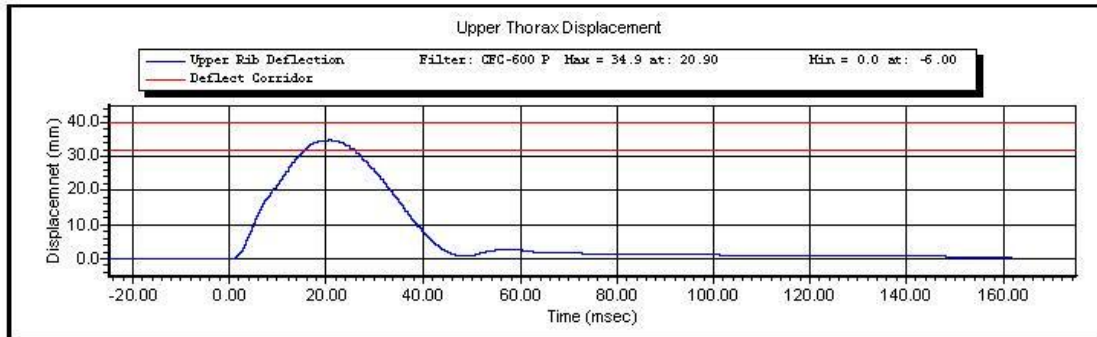
1 of 3



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Test ID:

Test Time: 10:19:29 AM

Test Date: 1/23/2012

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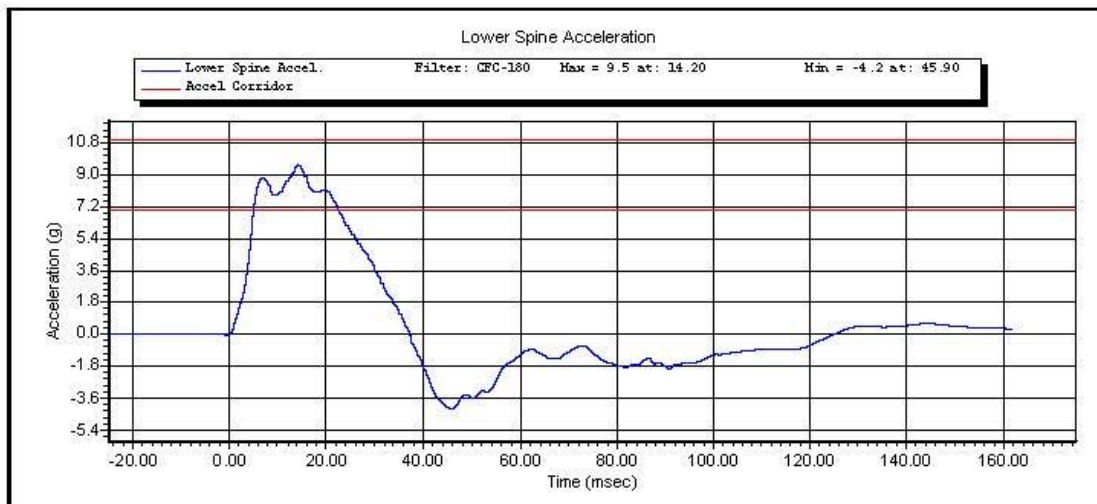
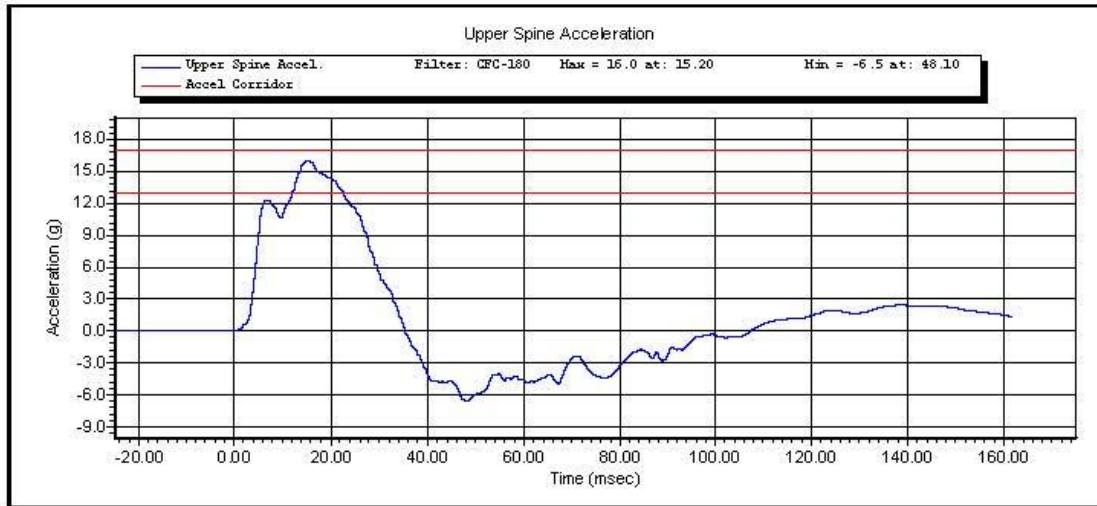
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Test Time: 10:19:29 AM

Test Date: 1/23/2012

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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:	300		
Test ID:		Test Date:	1/23/2012
Test Number:	1	Test Time:	9:49:23 AM

Component Part Number	Component Serial Number
Abdomen Ribs 4, 5	2024, 2061

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.8 deg C P
Humidity	10 -- 70	27 %RH P
Velocity	4.20 -- 4.40	4.36 m/s P
Probe Acceleration	12.0 -- 16.0	16.0 g P
Upper Abdominal Rib Deflection	36.0 -- 47.0	39.3 mm P
Lower Abdominal Rib Deflection	33.0 -- 44.0	35.8 mm P
Lower Spine Acceleration - T12	9.0 -- 14.0	12.4 g P

All test parameters are within specifications

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

Test ID:

Test Time: **9:49:23 AM**

Test Date: **1/23/2012**



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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	1/11/2012
Endevco	7231CT	AGHF5	1/3/2012
Servo	180-3885	DS-1162	11/3/2011
Servo	180-3885	DS-1622	11/3/2011
Endevco	7264-2000	P64147	11/1/2011

Test ID:

Test Time: 9:49:23 AM

Test Date: 1/23/2012

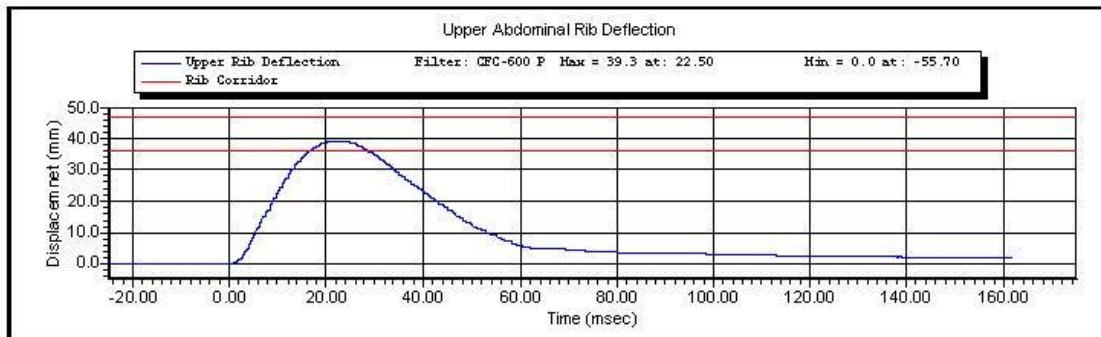
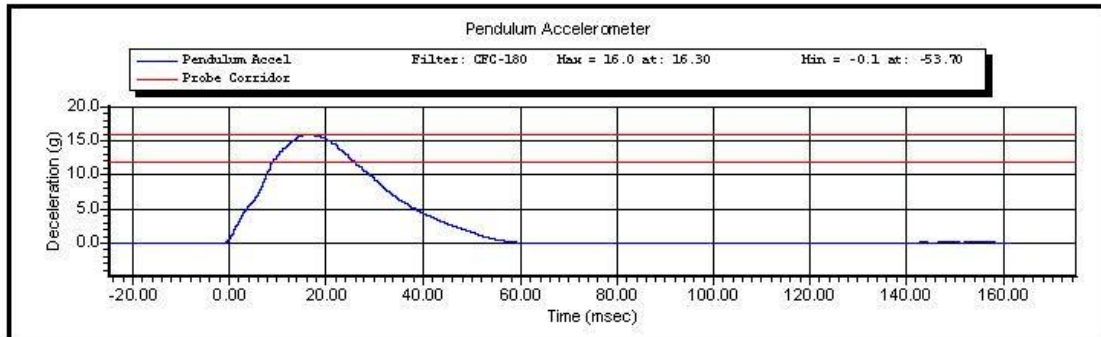


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Test Name:	Abdominal Impact	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	300		
Test ID:		Test Date:	1/23/2012
Test Number:	1	Test Time:	9:49:23 AM



Test ID:

Test Time: **9:49:23 AM**

Test Date: **1/23/2012**

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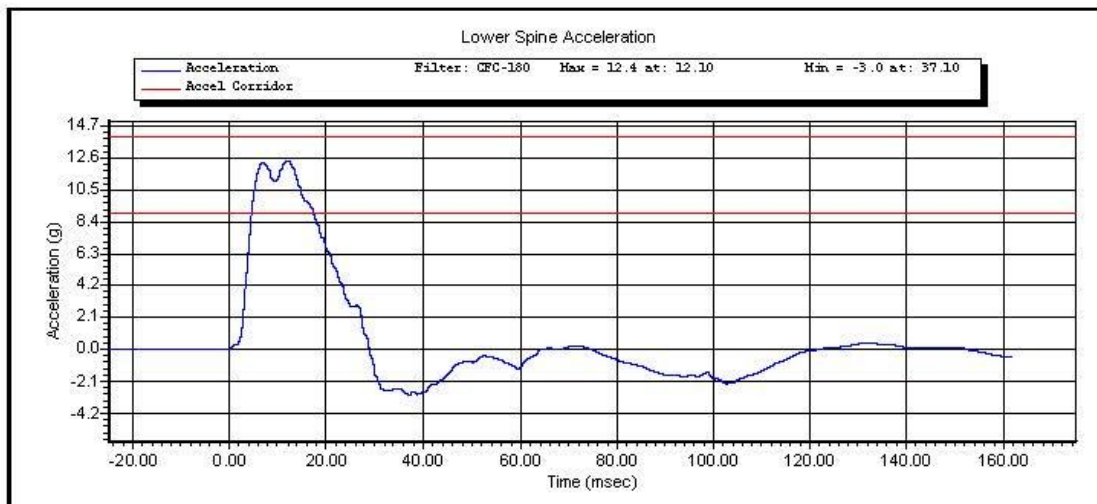
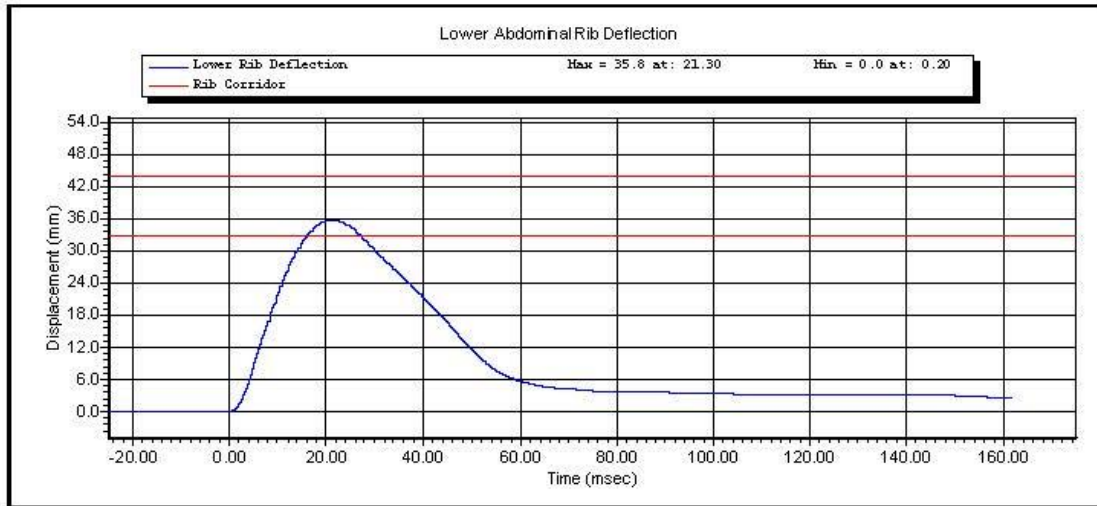
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Test ID:

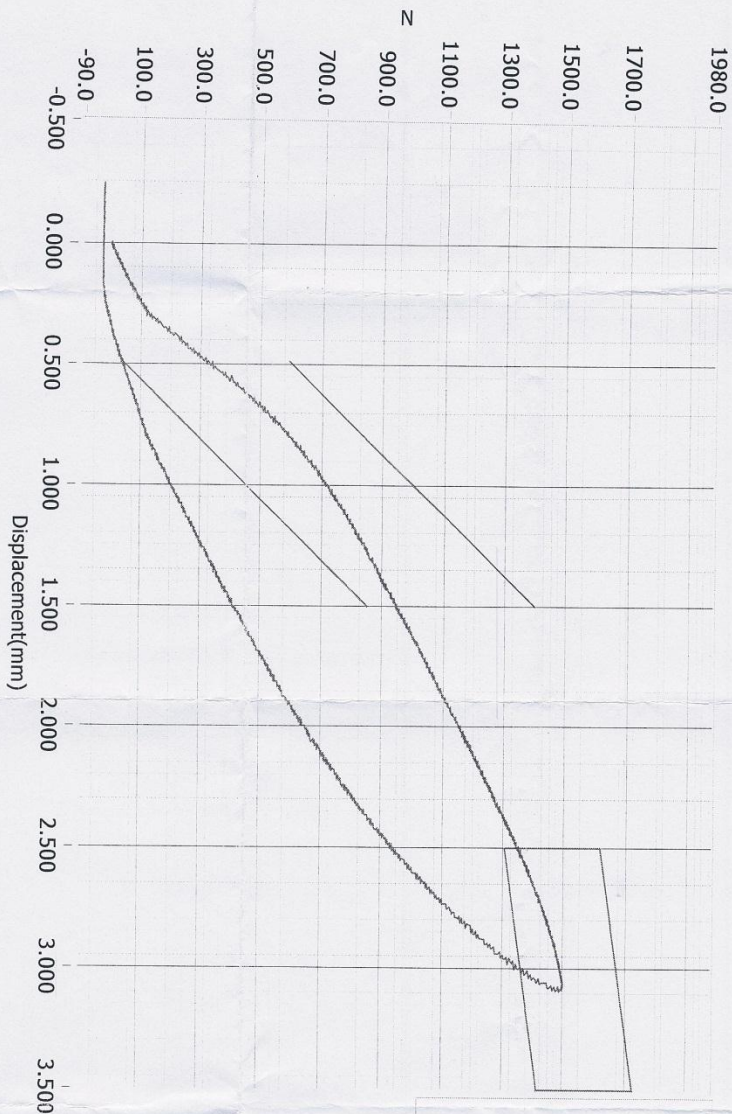
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Test Date: 1/23/2012

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Resultant Data - SIDIIS Plug Compression



Loading Curve
 Boundary Limit Upper
 Boundary Limit Lower
 Peak Load Upper
 Peak Load Lower
 Peak Defl Upper
 Peak Defl Lower

ATD Calibration Lab

37075 Cent

Test ID

Part Serial Number

Test Date

Test Time

37075

10/8/2010

9:53 PM

Cert ID

ATD Serial Number

ATD Type

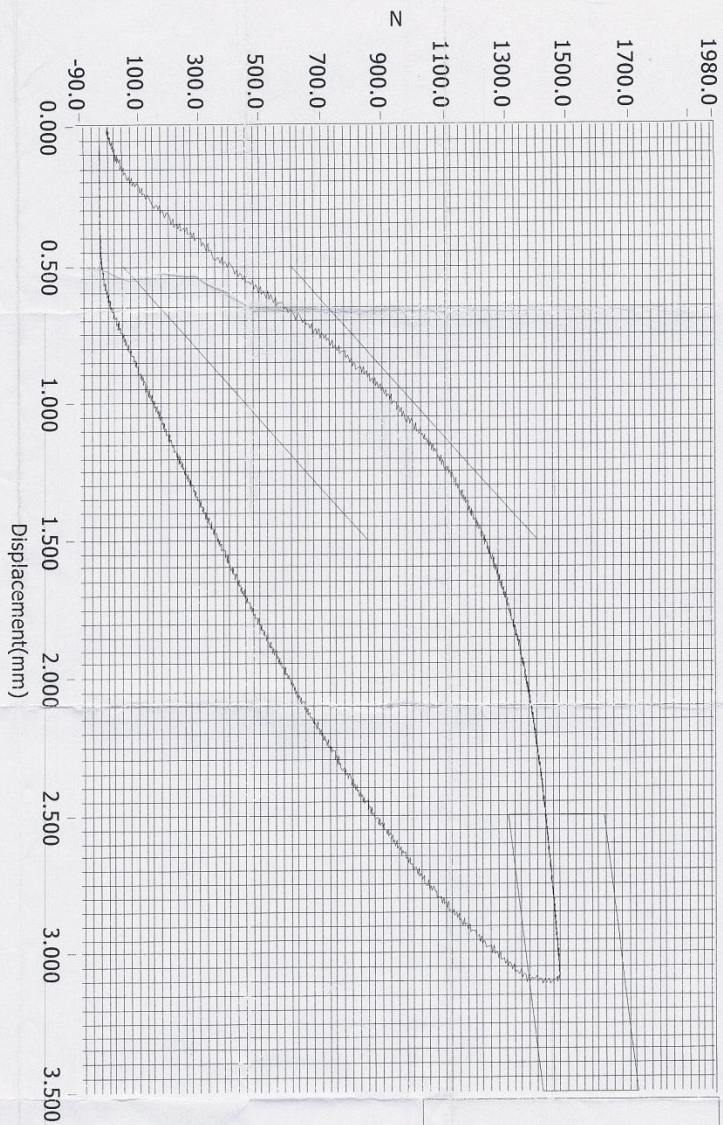
SIDIIS

N/A

Current Date : 10/8/2010

Current Time : 21:54:01

Resultant Data - SIDIIs Plug Compression



Loading Curve
 Boundary Limit Upper
 Boundary Limit Lower
 Peak Load Upper
 Peak Load Lower
 Peak Defl Upper
 Peak Defl Lower

ATD Calibration Lab

CLASH

Test ID

Part Serial Number

Test Date

Test Time

Cert ID

ATD Serial Number

ATD Type

8143

SIDIIs

Current Date : 2/19/2007

Current Time : 05:47:17



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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:	300		
Test ID:		Test Date:	2/1/2012
Test Number:	1	Test Time:	3:54:47 PM

Component Part Number	Component Serial Number
180-4343 Pelvis Flesh	DJ0890
Humanetics Cert Plug - 1488N	37075
Humanetics Crash Plug - 1466N	8143

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	39 %RH P
Velocity	6.60 -- 6.80	6.63 m/s P
Peak Probe Acceleration	38.0 -- 47.0	43.8 g P
Peak Pelvis Acceleration	34.0 -- 42.0	38.8 g P
Peak Acetabulum Force	3.60 -- 4.30	3.77 kN P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID:

Test Time: **3:54:47 PM**

Test Date: **2/1/2012**



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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	1/11/2012
Endevco	7231CT	AGHF5	1/24/2012
Endevco	7264-2000	P66941	1/25/2012
DentonATD	3249J	LC-275a	11/3/2011

Test ID:

Test Time: **3:54:47 PM**

Test Date: **2/1/2012**

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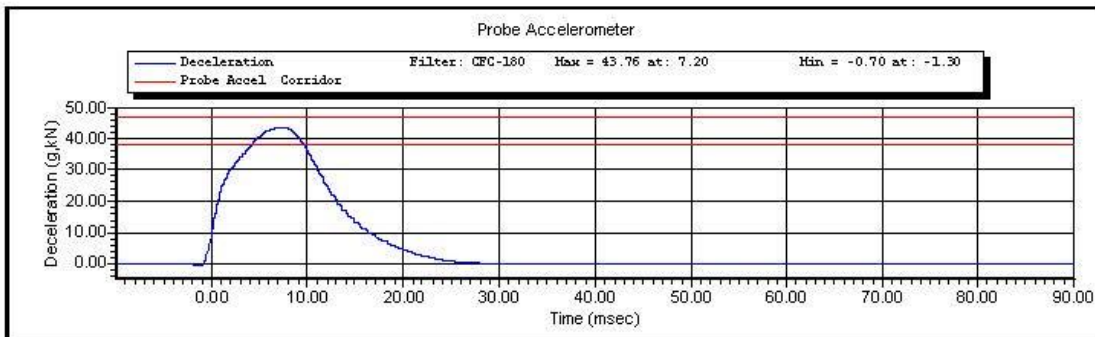
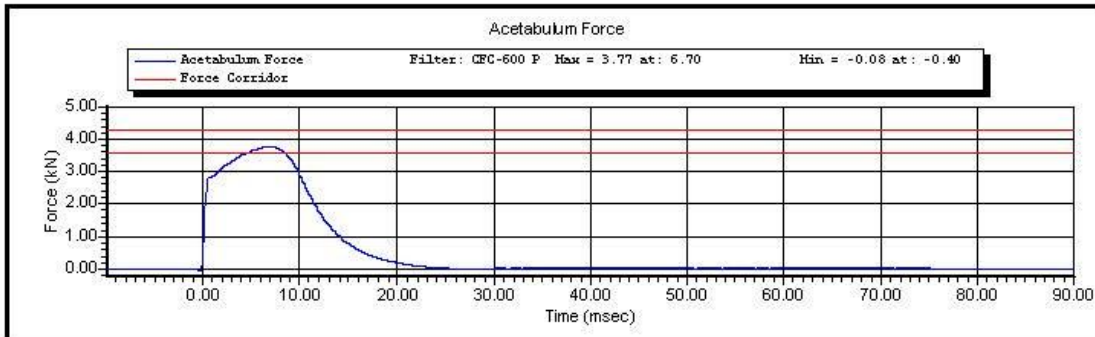


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Test Name:	Pelvis	Revision:	8/24/2009
Sub Test Name:	Acetabulum Impact	Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	300		
Test ID:		Test Date:	2/1/2012
Test Number:	1	Test Time:	3:54:47 PM



Test ID:

Test Time: **3:54:47 PM**

Test Date: **2/1/2012**

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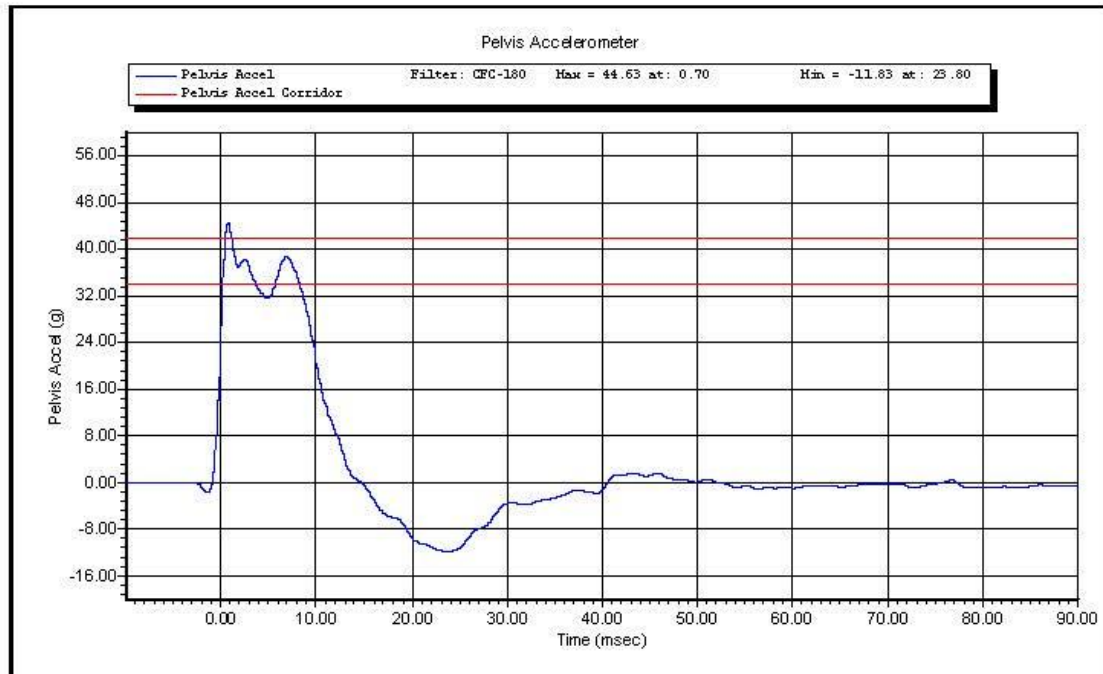
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Test Time: 3:54:47 PM

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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:	300		
Test ID:		Test Date:	2/2/2012
Test Number:	1	Test Time:	8:37:52 AM

Component Part Number	Component Serial Number
180-4343 Pelvis Flesh	DJ0890

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.2 deg C P
Humidity	10 -- 70	36 %RH P
Velocity	4.20 -- 4.40	4.33 m/s P
Peak Probe Acceleration	36.0 -- 45.0	41.3 g P
Peak Pelvis Acceleration	28.0 -- 39.0	33.3 g P
Peak Iliac Force	4.10 -- 5.10	4.51 kN P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test ID:

Test Time: **8:37:52 AM**

Test Date: **2/2/2012**



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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	1/11/2012
Endevco	7231CT	AGHF5	1/24/2012
Endevco	7264-2000	P66941	1/25/2012
DentonATD	3228J	LC-279 Fy	11/3/2011

Test ID:

Test Time: **8:37:52 AM**

Test Date: **2/2/2012**

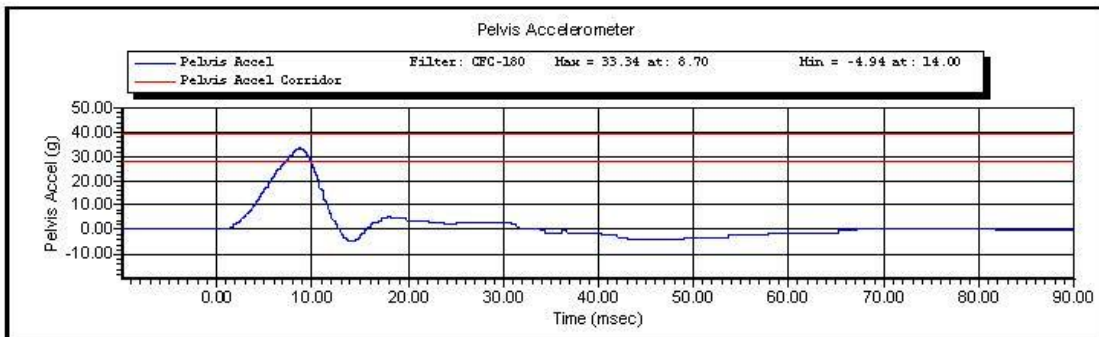
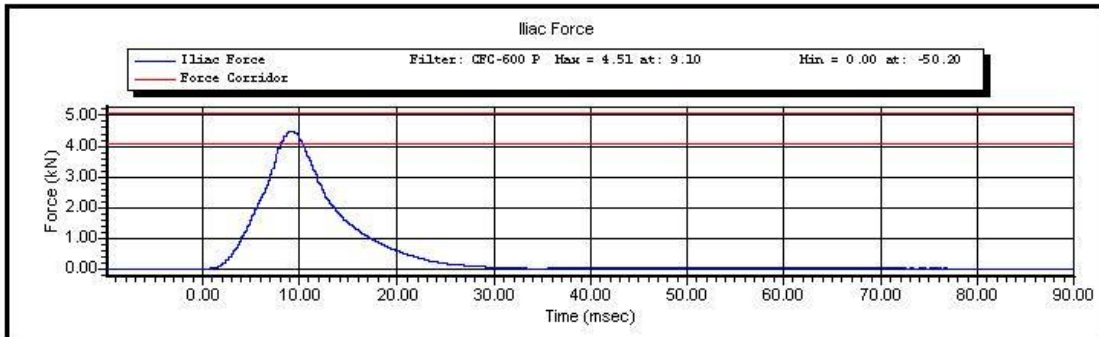


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Test Name:	Pelvis	Revision:	8/24/2009
Sub Test Name:	Iliac Impact	Spec Type:	NHTSA
ATD Type:	SID-11s		
ATD Serial Number:	300		
Test ID:		Test Date:	2/2/2012
Test Number:	1	Test Time:	8:37:52 AM



Test ID:

Test Time: **8:37:52 AM**

Test Date: **2/2/2012**

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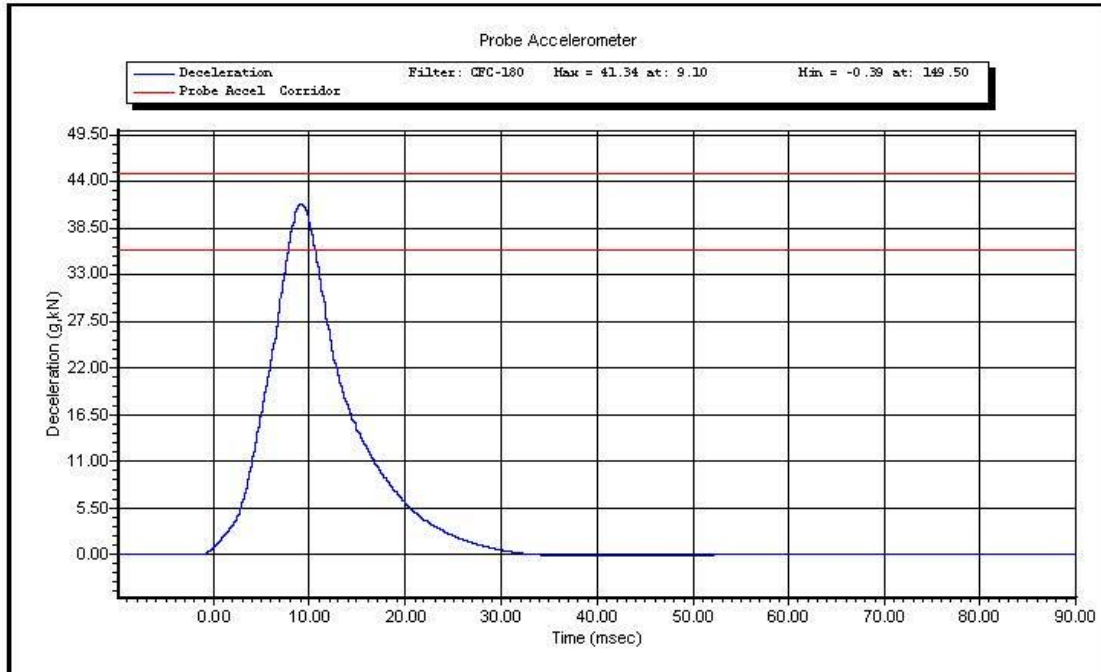
1 of 2



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Test ID:

Test Time: **8:37:52 AM**

Test Date: **2/2/2012**

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Appendix D
Test Equipment and Instrumentation Calibration Data

Table 1 – Dummy Instrumentation (ES-2re)

			ES-2re S/N: F034		
			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 Rub 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		1526	DENTON	6/3/11
	Lower	Y	1516	DENTON	6/3/11
Lower Spine Accelerometers (T12)		X	P51979	ENDEVCO	1/5/12
		Y	P51873	ENDEVCO	8/17/11
		Z	P52152	ENDEVCO	8/17/11
Public Symphysis Load Cell		Y	465	DENTON	8/31/11

Table 2 – Dummy Instrumentation (SID-IIs)

			SID-IIs S/N: 300			
			Serial Number	Manufacturer	Calibration Date	
Head Accelerometers			X	P51685	ENDEVCO	10/31/11
			Y	P51682	ENDEVCO	10/31/11
			Z	P51699	ENDEVCO	10/31/11
Head Accelerometers Redundant			RX	P51701	ENDEVCO	10/31/11
			RY	P45019	ENDEVCO	10/31/11
			RZ	P51690	ENDEVCO	10/31/11
Displacement Potentiometer	Thoracic Rib	Upper	Y	1121	FTSS	10/29/11
		Middle	Y	1151	FTSS	10/31/11
		Lower	Y	1156	FTSS	10/31/11
	Abdominal Rib	Upper	Y	1162	FTSS	10/29/11
		Lower	Y	1622	DENTON	10/31/11
Lower Spine Accelerometers (T12)			X	P58883	ENDEVCO	10/31/11
			Y	P64147	ENDEVCO	10/31/11
			Z	P58786	ENDEVCO	10/31/11
Acetabulum Load Cell			Y	275	DENTON	11/3/11
Lilac Wing Load Cell			Y	279Fy	DENTON	11/3/11

Table 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	P69809	ENDEVCO	8/10/11
	Vehicle Center of Gravity	Y	P71294	ENDEVCO	10/4/11
	Vehicle Center of Gravity	Z	P69798	ENDEVCO	8/10/11
2	Right Side Sill at Front Seat	X	A081436	MS	10/4/11
	Right Side Sill at Front Seat	Y	A081453	MS	10/4/11
	Right Side Sill at Front Seat	Z	A081456	MS	10/4/11
3	Right Side Sill at Rear Seat	X	P39743	ENDEVCO	10/4/11
	Right Side Sill at Rear Seat	Y	P23303	ENDEVCO	10/4/11
	Right Side Sill at Rear Seat	Z	P18532	ENDEVCO	10/4/11
4	Left Side Sill at Front Door	Y	A081431	MS	10/4/11
5	Left Side Sill at Rear Door	Y	A081447	MS	10/4/11
6	Left A-Post Lower	Y	A081414	MS	10/4/11
7	Left A-Post Middle	Y	A081410	MS	10/4/11
8	Left B-Post Lower	Y	A081457	MS	10/4/11
9	Left B-Post Middle	X	A081443	MS	10/4/11
10	Front Seat Track	Y	A081413	MS	10/4/11
11	Rear Seat Track or Structure	Y	A081424	MS	10/4/11
12	Right Rear Occ. Compartment	Y	A081412	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	9/15/11
	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	C14901	ENDEVCO	10/4/11
MDB Center of Gravity	Y	C16680	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