

REPORT NUMBER: SINCAP-CAL-12-018

**NEW CAR ASSESSMENT PROGRAM (NCAP)
MOVING DEFORMABLE BARRIER SIDE IMPACT TEST**

**General Motors LLC
2013 Chevrolet Traverse
Four Door SUV**

NHTSA No: MD0119

**PREPARED BY:
CALSPAN CORPORATION
P.O. BOX 400
BUFFALO, NEW YORK 14225**



March 12, 2013

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
MAIL CODE: NVS-111
1200 NEW JERSEY AVE SE, ROOM W43-410
WASHINGTON, D.C. 20590**

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Vanessa Walsh, Project Engineer

Date: March 12, 2013

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Transportation Test Operations

Date: March 12, 2013

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

COTR, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

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15. Supplementary Notes																																																					
16. Abstract A 55/28, (61.90 kph / 38.5 mph), 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2013 Chevrolet Traverse four door SUV 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 Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on February 1, 2013. The impact velocity of the Moving Deformable Barrier (MDB) was 62.10 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was -7°C. The target vehicle's maximum post-test static crush was 192 mm located at level 2. The test vehicle's occupant performance data is as follows: <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th colspan="3">Driver ATD (ES-2re)</th> </tr> <tr> <th>Units</th> <th>IARV</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td>N/A</td> <td>1000</td> <td>52.00</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>44</td> <td>9.29</td> </tr> <tr> <td>Total Abdominal Force</td> <td>N</td> <td>2500</td> <td>574.28</td> </tr> <tr> <td>Pubic Symphysis Force</td> <td>N</td> <td>6000</td> <td>1414.87</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th colspan="3">Passenger ATD (SID-IIs)</th> </tr> <tr> <th>Units</th> <th>IARV</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td>N/A</td> <td>1000</td> <td>110.14</td> </tr> <tr> <td>Lower Spine Resultant Acceleration</td> <td>G</td> <td>82</td> <td>34.17</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td>N</td> <td>5525</td> <td>3133.63</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38*</td> <td>6.08</td> </tr> <tr> <td>Maximum Abdominal Rib Deflection</td> <td>mm</td> <td>45*</td> <td>15.18</td> </tr> </tbody> </table> * 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.				Measurement Description	Driver ATD (ES-2re)			Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	52.00	Maximum Thoracic Rib Deflection	mm	44	9.29	Total Abdominal Force	N	2500	574.28	Pubic Symphysis Force	N	6000	1414.87	Measurement Description	Passenger ATD (SID-IIs)			Units	IARV	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	110.14	Lower Spine Resultant Acceleration	G	82	34.17	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3133.63	Maximum Thoracic Rib Deflection	mm	38*	6.08	Maximum Abdominal Rib Deflection	mm	45*	15.18
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SECTION 1

TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test is part of the MY 2013 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 2013 Chevrolet Traverse four door SUV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated September 2012.

SECTION 2

SUMMARY OF TEST RESULTS

A 2013 Chevrolet Traverse four door SUV 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 62.10 km/h (38.59 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's Transportation Test Operations Center in Buffalo, New York on February 01, 2013. 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 September 2012. 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	52.00
Maximum Thorax Rib Deflection	mm	44	9.29
Combined Abdominal Force	N	2500	574.28
Pubic Symphysis Force	N	6000	1414.87

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC36)		1000	110.14
Lower Spine (T12) Resultant Acceleration	G	82	34.17
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3133.63
Maximum Thoracic Rib Deflection	mm	38*	6.08
Maximum Abdominal Rib Deflection	mm	45*	15.18

*Proposed IARV

SUPPLEMENTAL RESTRAINT 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	NA		
Side Airbag 1 - Curtain	Yes	Yes	Yes	Yes
Side Airbag 2 – Torso/Pelvis	Yes	Yes	No	NA
Side Airbag 3 – Front Center	Yes	Yes	No	NA
Seat Belt Pretensioner	Yes	Yes	No	NA
Seat Belt Load Limiter	Yes	Yes	No	NA
Other				

GENERAL COMMENTS:

1. P1 serial number - F033
2. P4 serial number - 8012

Data Anomalies:

- V2P1 HEAD X Redundant is questionable between 13.8 & 16.7 ms
- V2P1 HEAD Y Redundant is questionable between 13.8 & 19.7 ms

SECTION 3

OCCUPANT AND VEHICLE INFORMATION

This section contains information reporting for the following Data Sheets:

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

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

Data Sheet No. 3 – Dummy Longitudinal Clearance Dimensions

Data Sheet No. 4 – Dummy Lateral Clearance Dimensions

Data Sheet No. 5 – Camera and Instrumentation Data

Data Sheet No. 6 – Test Vehicle Accelerometer Locations

Data Sheet No. 7 – MDB Accelerometer Locations

Data Sheet No. 8 – Post-Test Observations

Data Sheet No. 9 – MDB Summary of Results

Data Sheet No. 10 – Test Vehicle Profile Measurements

Data Sheet No. 11 – Test Vehicle Exterior Crush Measurements

Data Sheet No. 12 – MDB Exterior Static Crush Measurements

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

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

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No.: MD0119
Test Date: 2/1/2013

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	MD0119
Model Year	2013
Make	Chevrolet
Model	Traverse
Body Style	Four Door SUV
VIN	1GNKRGKD1DJ113809
Body Color	Dark blue
Odometer Reading (km/mi)	151 / 94
Engine Displacement (L)	3.6
Type/No. Cylinders	V6
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	6-Speed
Overdrive	Yes
Final Drive	Front Wheel Drive
Roof Rack	No
Sunroof/T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	Yes

Traction Control System (TCS)	Yes
Auto-Leveling System	No
Automatic Door Locks (ADL)	Yes
Power Window Auto-Reverse	No
Other Optional Feature	--
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	No
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head/Torso Airbag	No
Rear Pass. Torso Airbag	No
Rear Pass. Torso/Pelvis Airbag	No
Rear Pass. Pelvis Airbag	No
Driver Seat Belt Pretensioner	Yes
Rear Pass. Seat Belt Pretensioner	No
Driver Load Limiter	Yes
Rear Pass. Load Limiter	No
Front Center Airbag	Yes

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

No

DATA FROM CERTIFICATION LABEL

Manufactured By	General Motors LLC
Date of Manufacture	11/12
Vehicle Type	Four Door SUV

GVWR (kg)	2,908
GAWR Front (kg)	1,450
GAWR Rear (kg)	1,600

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3	3	8	
Capacity Weight (VCW) (kg)				748.0	(A)
DSC X 68.04 kg				544.3	(B)
Cargo Weight (RCLW) (kg)				136.0	(A-B)

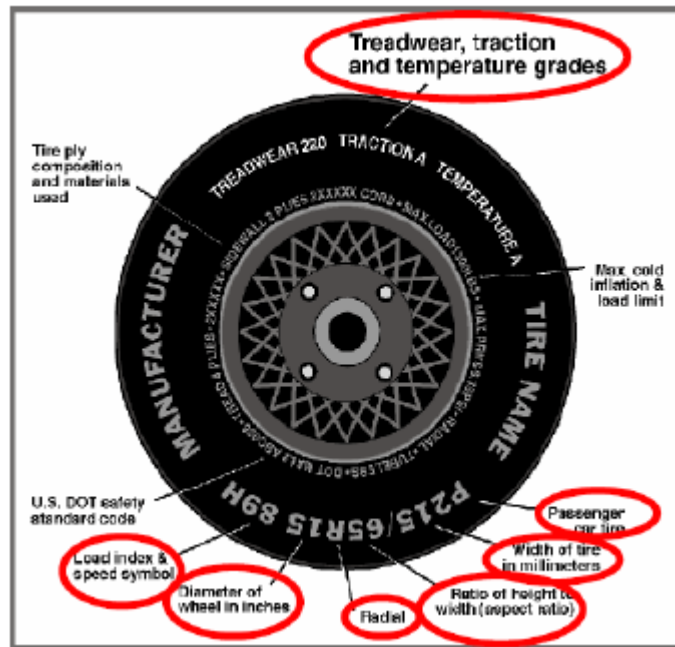
VEHICLE SEAT TYPE

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			X		X		

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

Test Vehicle:	<u>2013 Chevrolet Traverse Four Door SUV</u>	NHTSA No.:	<u>MD0119</u>
Test Program:	<u>NCAP Side MDB Impact Test</u>	Test Date:	<u>2/1/2013</u>

Collected for year, make, model, & VIN, all items circled in red, tire manufacturer and tire name.



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	240	240
Recommended Tire Size	P255/65R18	P255/65R18
Tire Size on Vehicle	P255/65R18	P255/65R18
Tire Manufacturer	Goodyear	Goodyear
Tire Model	Fortera	Fortera
Treadwear	540	540
Traction	A	A
Temperature Grades	B	B
Tire Plies Sidewall	2 Polyester Cord	2 Polyester Cord
Tire Plies Body	2 Polyester Cord, 2 Steel	2 Polyester Cord, 2 Steel
Load Index / Speed Symbol	109S	109S
Tire Material	RUBBER	RUBBER
DOT Safety Code Left	4BXMARDR4212	4BXMARDR4212
DOT Safety Code Right	4BXMARDR4212	4BXMARDR4212

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

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MD0119
 Test Date: 2/1/2013

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	248	248	248	248
Tire Placard	kPa	240	240	240	240
Owner's Manual	kPa	240	240	240	240
As Tested	kPa	240	240	240	240

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	207	207	207	207

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	598.5	471.5		641.0	594.5		644.0	595.0	
Right	kg	607.0	449.5		608.0	549.5		615.0	546.5	
Ratio	%	57	43		52	48		52	48	
Totals	kg	1,205.5	921.0	2,126.5	1,249.0	1,144.0	2,393.0	1,259.0	1,141.5	2,400.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	2,126.5	(A)
Sum of Actual Weight of 2 P572 ATDS Used	kg	136.8	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	136.0	(C)
Calculated Target Vehicle Test Weight (TVTW)	kg	2,399.3	(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

TEST VEHICLE ATTITUDES AND CG

Measurement Description	Units	Fully Loaded	As Tested	Meets Requirement***
LF	mm	868	867	Yes
RF	mm	873	874	Yes
RR	mm	866	868	Yes
LR	mm	877	873	Yes
Vehicle CG (Aft of Front Axle)	mm	1,438	1,445	
Vehicle CG (Left(+)/Right(-) from Longitudinal Centerline)	mm	-28	-28	

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

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

Test Vehicle:	<u>2013 Chevrolet Traverse Four Door SUV</u>	NHTSA No.:	<u>MD0119</u>
Test Program:	<u>NCAP Side MDB Impact Test</u>	Test Date:	<u>2/1/2013</u>

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Trunk carpeting	0.6
Third Row Seats	33.5
--	0.0
Ballast / Equipment Added	135.5

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

Test Vehicle: <u>2013 Chevrolet Traverse Four Door SUV</u>	NHTSA No.: <u>MD0119</u>	
Test Program: <u>NCAP Side MDB Impact Test</u>	Test Date: <u>2/1/2013</u>	

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	19.6	2.5	8.5
Front Passenger Seat	-	Not Adjustable	-
Front Center Seat*	N/A	N/A	N/A
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat*	Fixed	Fixed	Fixed

**if applicable*

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid-Fore/Aft	Forward-Most
Driver Seat	8.5	3	Max	32	35	38
			Mid	16	19	22
			Min	0	3	6
Front Passenger Seat	Not Adjustable	Not Adjustable	Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
Front Center Seat*	N/A	N/A	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: <u>2013 Chevrolet Traverse Four Door SUV</u>	NHTSA No.: <u>MD0119</u>	
Test Program: <u>NCAP Side MDB Impact Test</u>	Test Date: <u>2/1/2013</u>	

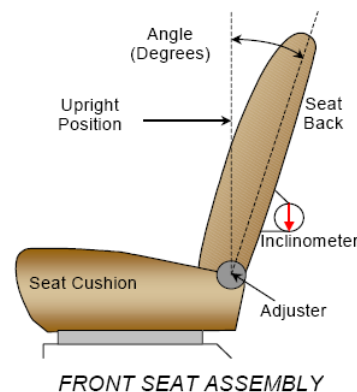
SEAT FORE / AFT POSITION

Seat	Total Fore / Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	240	N/A	120	N/A
Front Passenger Seat	240	25	120	12
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	90	(0-9)	90	9
Non-Struck Side Rear Seat	90	(0-9)	90	9
Rear Center Seat*	90	(0-9)	90	9

**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	-16.6 to 42.1	N/A	3.0	N/A
Front Passenger Seat	-14.2 to 40.2	N/A	3.0	N/A
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat w/ Seated Dummy	13.6 to 17.6	N/A	13.6	Most Forward
Non-Struck Side Rear Seat	13.6 to 17.6	N/A	13.6	Most Forward
Rear Center Seat*	13.6 to 17.6	N/A	13.6	Most Forward

**if applicable*

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

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV

NHTSA No.: MD0119

Test Program: NCAP Side MDB Impact Test

Test Date: 2/1/2013

SEAT BELT ANCHORAGE ADJUSTMENT

Seat belt anchorages are adjusted in accordance with the information provided by the manufacturer on Form No. 1.

	Total # of Positions	Placed in Position #
Driver Seat	5	0 - Uppermost
Rear Seat	Fixed	Fixed

HEAD RESTRAINT ADJUSTMENT

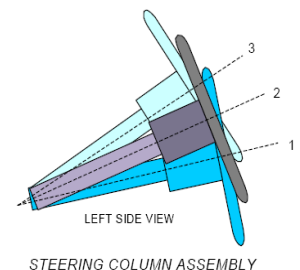
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

	Total # of Positions	Placed in Position #
Driver Seat	0-60mm – Vertical 0-40mm – Horizontal	60mm – Uppermost 40mm – Full Forward
Rear Seat	Fixed	Fixed

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.

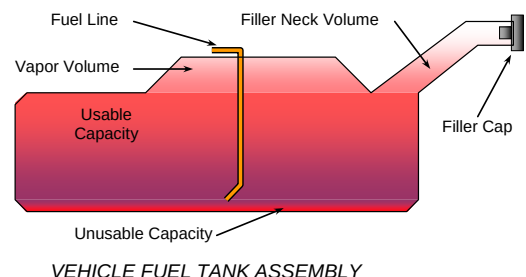
	Degrees	Fore/Aft Position (mm)
Lowermost – Position 1	17.8	0
Geometric Center – Position 2	20.7	27
Uppermost – Position 3	23.5	54
Telescoping Steering Wheel Travel		54
Test Position	20.7	27



FUEL PUMP

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

The vehicle is equipped with an electric fuel pump. The fuel filler neck is on the left side of the vehicle. The pump creates positive pressure in the fuel lines, pushing the gasoline to the engine. See form 1 for more information.



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

Test Vehicle: <u>2013 Chevrolet Traverse Four Door SUV</u>	NHTSA No.: <u>MD0119</u>	
Test Program: <u>NCAP Side MDB Impact Test</u>	Test Date: <u>2/1/2013</u>	

FUEL TANK CAPACITY

		Liters
Usable Capacity of "Standard Tank"	- see Form No. 1	82.1
Usable Capacity of "Optional Tank"	- see Form No. 1	N/A
Usable Capacity of Standard Tank	- see Owner's Manual	83.3
Usable Capacity of Optional Tank	- see Owner's Manual	N/A
93% of Usable Capacity		76.4
Actual Amount of Solvent Used in Test		76.5
1/3 of Usable Capacity		27.4

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: 2013 Chevrolet Traverse Four Door SUV

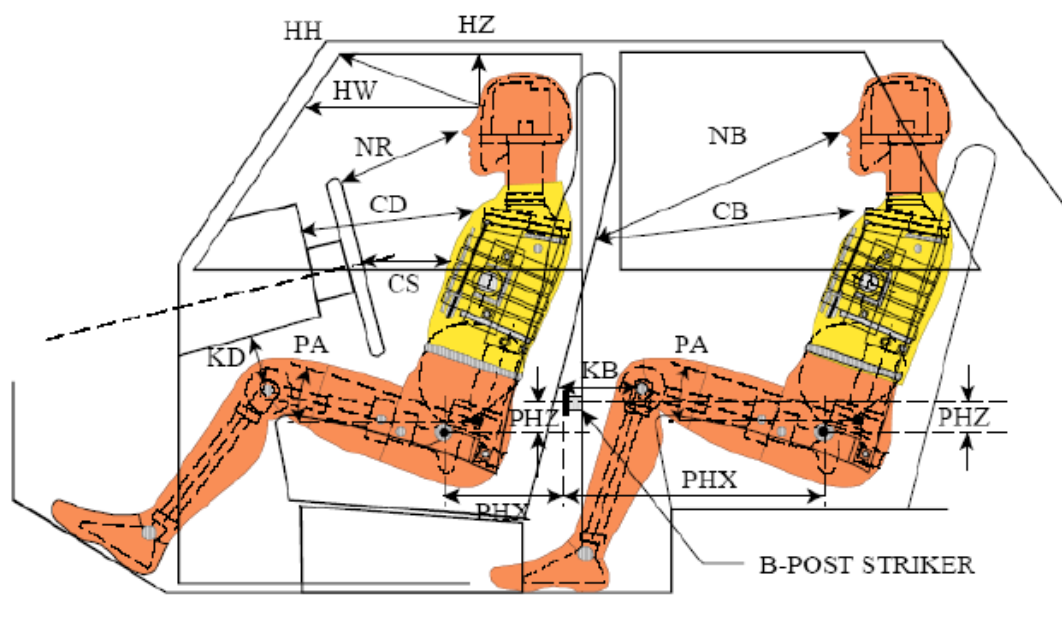
NHTSA No.:

MD0119

Test Program: NCAP Side MDB Impact Test

Test Date:

2/1/2013



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

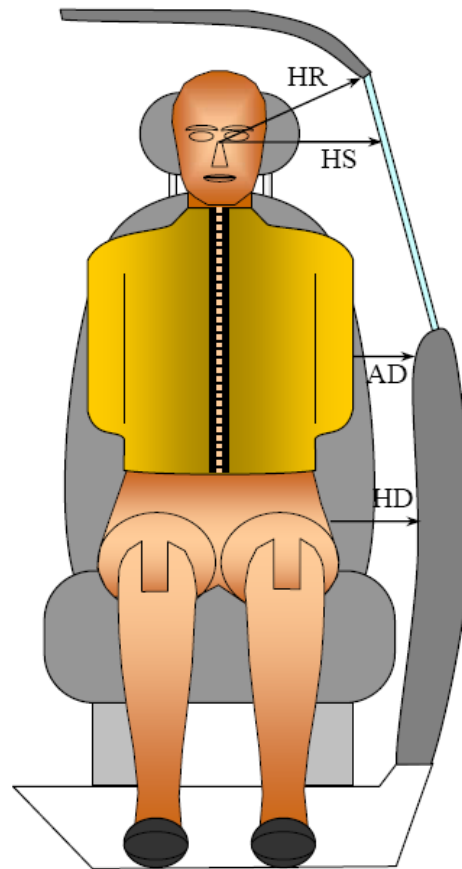
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Description	Driver (Serial No. F033)		Passenger (Serial No. 8012)	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	480			
HW		Header to Windshield	741			
HZ	HZ	Head to Roof Liner	220		299	
NR	NB	Nose to Rim/Seat Back	437		540	
CD	CB	Chest to Dash/Seat Back	632		552	
CS		Chest to Steering Wheel	412			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	163	38.1	337	18.8
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	195	33.2	336	18.5
PAX°	PAX°	Pelvic Tilt Angle X		22.1		18.2
	PAY°	Pelvic Tilt Angle Y				0.2
PHX	PHX	Hip Point to Striker (X-Axis)	207		191	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	36		90	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MD0119
 Test Date: 2/1/2013



FRONT VIEW OF DUMMY

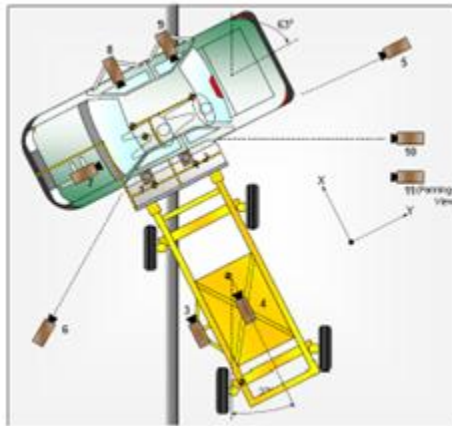
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver (Serial No. F033)	Passenger (Serial No. 8012)
HR	Head to Side Header	mm	199	272
HS	Head to Side Window	mm	337	374
AD	Arm to Door	mm	104	152
HD	Hip Point to Door	mm	164	153

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No.: MD0119
Test Date: 2/1/2013



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	806	-860	-4306	14.0	1000
2	Overhead Close-up	418	-860	-4306	20	1000
3	Left Impact Point (MDB)	-1470	0	-847	12.5	1000
4	Side Overall (MDB)	-1140	838	-1587	6.5	1000
5	Rear	-196	11285	-985	50	1000
6	Left Front	2730	-930	-1007	24	1000
7	Driver Front (OB)				12.5	1000
8	Driver Side (OB)				6.5	1000
9	Passenger Side (OB)				6.5	1000
10	Real-time Left Rear				Zoom	30
11	Real-time Inrun				Zoom	30

Notes: *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:

All cameras functioned as intended.

INSTRUMENTATION

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

DATA SHEET NO. 6 **TEST VEHICLE ACCELEROMETER LOCATIONS**

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV

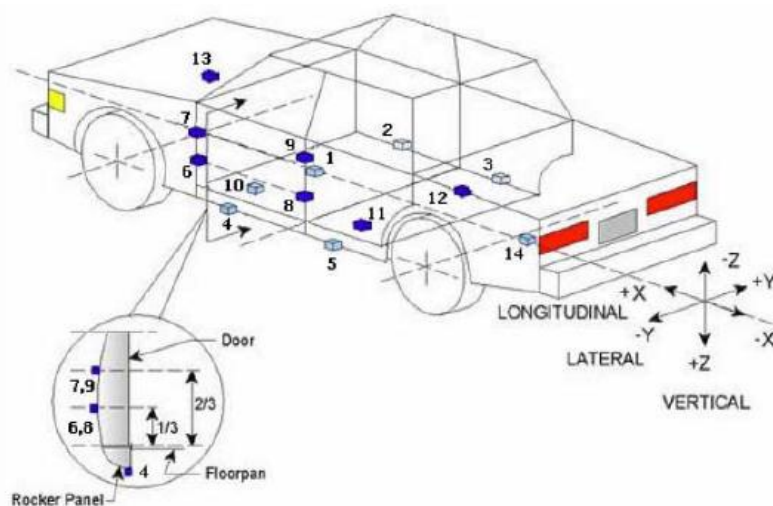
NHTSA No.:

MD0119

Test Program: NCAP Side MDB Impact Test

Test Date:

2/1/2013



TEST VEHICLE ACCELEROMETER LOCATIONS

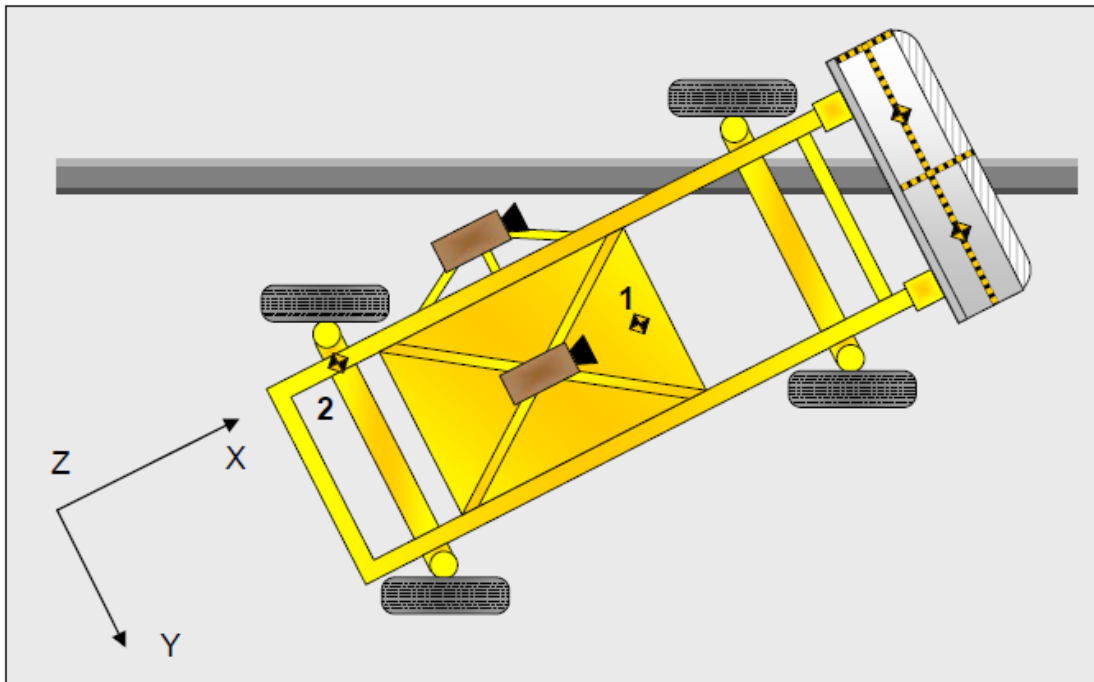
No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	3,014	37	-716
2	Right Sill at Front Seat	3,077	742	-463
3	Right Sill at Rear Seat	2,059	747	-490
4	Left Sill at Front Door	3,135	-741	-468
5	Left Sill at Rear Door	2,103	-741	-488
6	A-Post Lower	3,557	-704	-670
7	A-Post Middle	3,569	-702	-1,230
8	B-Post Lower	2,569	-728	-719
9	B-Post Middle	2,549	-731	-993
10	Front Seat Track	2,652	-591	-491
11	Rear Seat Structure	1,640	-682	-784
12	Rt. Rear Occ. Compartment	2,468	518	-498
13	Engine Block	4,439	142	-853
14	Rear Above Axle	1,328	2	-795

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: 2013 Chevrolet Traverse Four Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MD0119
 Test Date: 2/1/2013



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: 2013 Chevrolet Traverse Four Door SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No.: MD0119
Test Date: 2/1/2013

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Front Seat Dummy (ES-2re)	Rear Seat Dummy (SID-IIs)
Face	None	Curtain Airbag
Top of Head	Curtain Airbag & Side Head Liner	Curtain Airbag
Left Side of Head	Curtain Airbag	Curtain Airbag
Back of Head	Curtain Airbag, Side Head Liner & Headrest	Curtain Airbag
Left Shoulder	Curtain Airbag, Torso/Pelvis Airbag & Driver's Door	Passenger Door
Upper Torso	Torso/Pelvis Airbag	Passenger Door
Lower Torso	Torso/Pelvis Airbag & Seat Back	Passenger Door & Seat Back
Left Hip	Torso/Pelvis Airbag & Seat Pan	Passenger Door & Seat Pan
Left Knee	Driver's Door	Passenger's Door

POST-TEST DOOR PERFORMANCE

Description	Struck Side		Non-Struck Side		Rear Hatch/ Other
	Front	Rear	Front	Rear	
Remained Closed and Operational	No	No	No	Yes	No
Total Separation from Vehicle at Hinges or Latches	No	No	No	No	No
Latch or Hinge Systems Pulled Out of Their Anchorages	No	No	No	No	No
Disengaged from Latched Position	No	No	No	No	No
Latch Separated from Striker	No	No	No	No	No
Jammed Shut	Yes	Yes	Yes	No	No
If Door Opened at Striker, Width of Opening at Striker (mm)	N/A	N/A	N/A	N/A	N/A

POST-TEST SEAT PERFORMANCE

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

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	Remained in good condition
Sill Separation	None
Windshield Damage	None
Side Window Damage	None
Other Notable Effects	None

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

Test Vehicle:	<u>2013 Chevrolet Traverse Four Door SUV</u>	NHTSA No.:	<u>MD0119</u>
Test Program:	<u>NCAP Side MDB Impact Test</u>	Test Date:	<u>2/1/2013</u>

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	NA		
Side Airbag 1 - Curtain	Yes	Yes	Yes	Yes
Side Airbag 2 – Torso/Pelvis	Yes	Yes	No	NA
Side Airbag 3 – Front Center	Yes	Yes	No	NA
Seat Belt Pretensioner	Yes	Yes	No	NA
Seat Belt Load Limiter	Yes	Yes	No	NA
Other				

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		3023
Vertical Impact Reference Line (Aft of Front Axle - Intended Impact Point)	mm		508
Actual Impact Point (Aft of Frontal Axle)	mm		513
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact Point	-5
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact Point	12

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No.: MD0119
Test Date: 2/1/2013

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	62.10
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.05
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	Right	285
B	Top of Bumper	533	700	Right	213
C	Mid-Level	686	800	Left	160
D	Top of Stack	813	800	Left	156

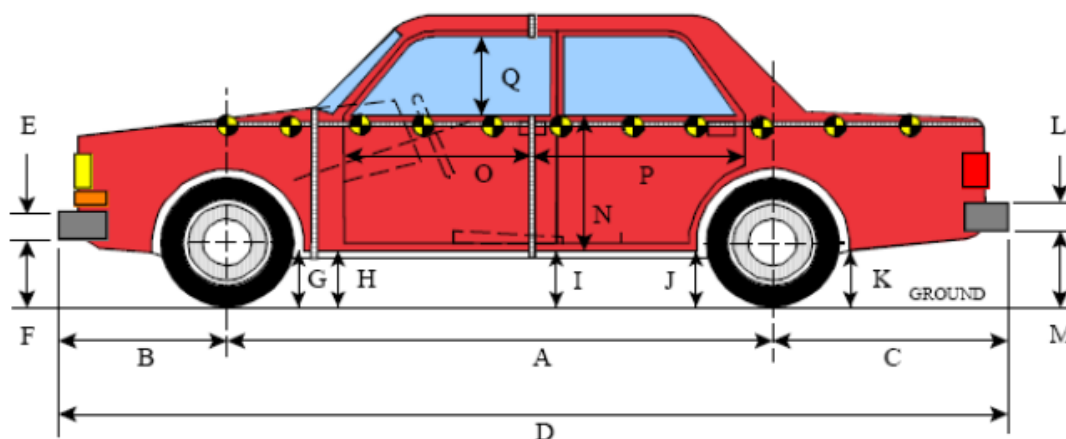
DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV

NHTSA No.: MD0119

Test Program: NCAP Side MDB Impact Test

Test Date: 2/1/2013



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	3,023	3,022	-1
B	Front Axle to FSOV	1,015	1,011	-4
C	Rear Axle to RSOV	1,133	1,139	6
D	Total Length at Centerline	5,172	5,173	1
E	Front Bumper Thickness	150	150	0
F	Front Bumper Bottom to Ground	551	552	1
G	Sill Height at Front Wheel Well	208	217	9
H	Sill Height at Front Door Leading Edge	282	290	8
I	Sill Height at B Pillar	303	305	2
J1	Sill Height at Rear Wheel Well	307	321	14
J2	Pinch Weld Height at Rear Wheel Well	306	315	9
K	Sill Height Aft of Rear Wheel Well	269	281	12
L	Rear Bumper Thickness	190	190	0
M	Rear Bumper Bottom to Ground	466	479	13
N	Sill Height to Window Bottom of Front Window Sill	813	764	-49
O	Front Door Leading Edge to Impact CL	851	811	-40
P	Rear Door Trailing Edge to Impact CL	1,227	1,190	-37
Q	Front Window Opening	464	480	16
R	Right Side Length	4,994	4,992	-2
S	Left Side Length	4,994	4,990	-4
T	Maximum Vehicle Width	1,957	1,825	-132

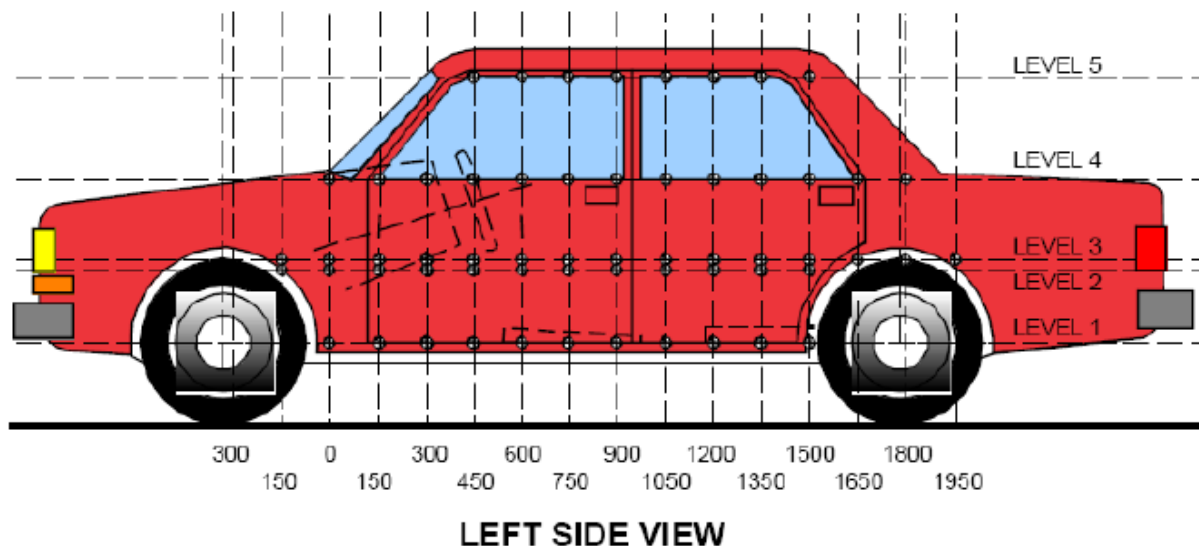
DATA SHEET NO. 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV

NHTSA No.: MD0119

Test Program: NCAP Side MDB Impact Test

Test Date: 2/1/2013



MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	543	132	1500
2	Driver Hip Point	mm	765	192	1350
3	Mid-Door	mm	834	161	1650
4	Window Sill	mm	1,081	50	1650
5	Window Top	mm	1,693	-1	750

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: 2013 Chevrolet Traverse Four Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MD0119
 Test Date: 2/1/2013

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															
-600				-847					-847					0	
-450				-879					-877					2	
-300			-995	-897				-992	-895				3	2	
-150		-984	-976	-907			-982	-974	-904			2	2	3	
0	-951	-963	-962	-915		-950	-971	-966	-912		1	-8	-4	3	
150	-948	-961	-963	-922		-858	-878	-885	-913		90	83	78	9	
300	-955	-963	-965	-928		-825	-820	-833	-905		130	143	132	23	
450	-959	-964	-967	-933		-839	-806	-828	-917		120	158	139	16	
600	-961	-965	-968	-938		-847	-800	-824	-922		114	165	144	16	
750	-962	-965	-969	-942	-603	-853	-796	-820	-921	-604	109	169	149	21	-1
900	-963	-965	-970	-946	-635	-862	-794	-821	-924	-636	101	171	149	22	-1
1050	-962	-964	-970	-948	-643	-861	-824	-857	-919	-645	101	140	113	29	-2
1200	-961	-964	-969	-949	-647	-864	-775	-824	-908	-649	97	189	145	41	-2
1350	-958	-963	-967	-949	-647	-839	-771	-813	-913	-649	119	192	154	36	-2
1500	-955	-961	-965	-949	-647	-823	-772	-805	-911	-648	132	189	160	38	-1
1650	-951	-959	-963	-949	-646	-842	-777	-802	-899	-648	109	182	161	50	-2
1800	-944	-956	-960	-949	-644	-870	-785	-812	-904	-647	74	171	148	45	-3
1950	-943	-957	-958	-970	-640	-906	-866	-852	-963	-642	37	91	106	7	-2
2100		-980	-979	-943	-635		-948	-953	-969	-638		32	26	-26	-3
2250			-995	-944	-627			-991	-928	-629			4	16	-2
2400				-944	-614				-933	-616				11	-2
2550				-941	-595				-933	-599				8	-4
2700				-934	-566				-929	-569				5	-3
2850				-920	-527				-918	-531				2	-4
3000				-904					-905					-1	

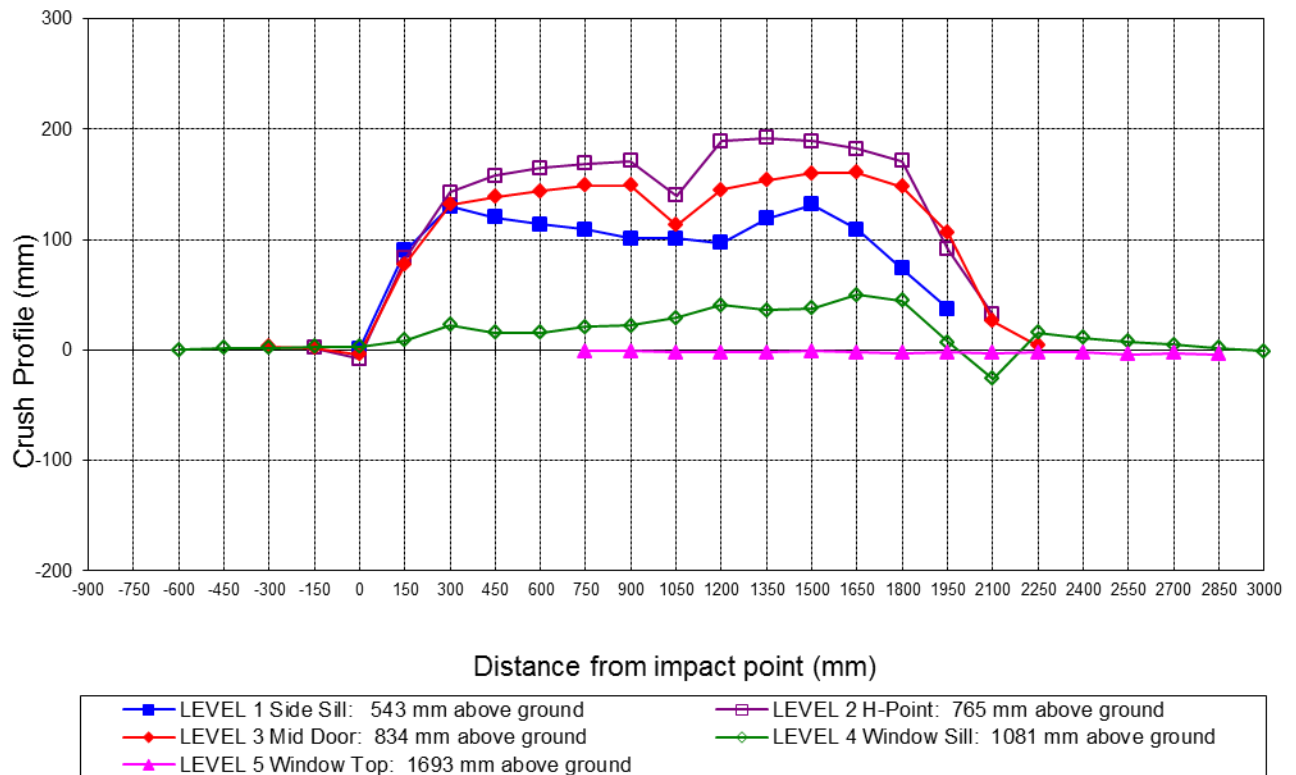
NOTE: Pre-test measurements are taken when the vehicle is in the "As Tested" weight condition.
 Vehicle measurements forward of the vertical impact reference line are negative.
 The crush profile grid is established prior to test based on an estimated impact point.

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

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MD0119
 Test Date: 2/1/2013

Vehicle Exterior Crush Measurements - Visual Representation



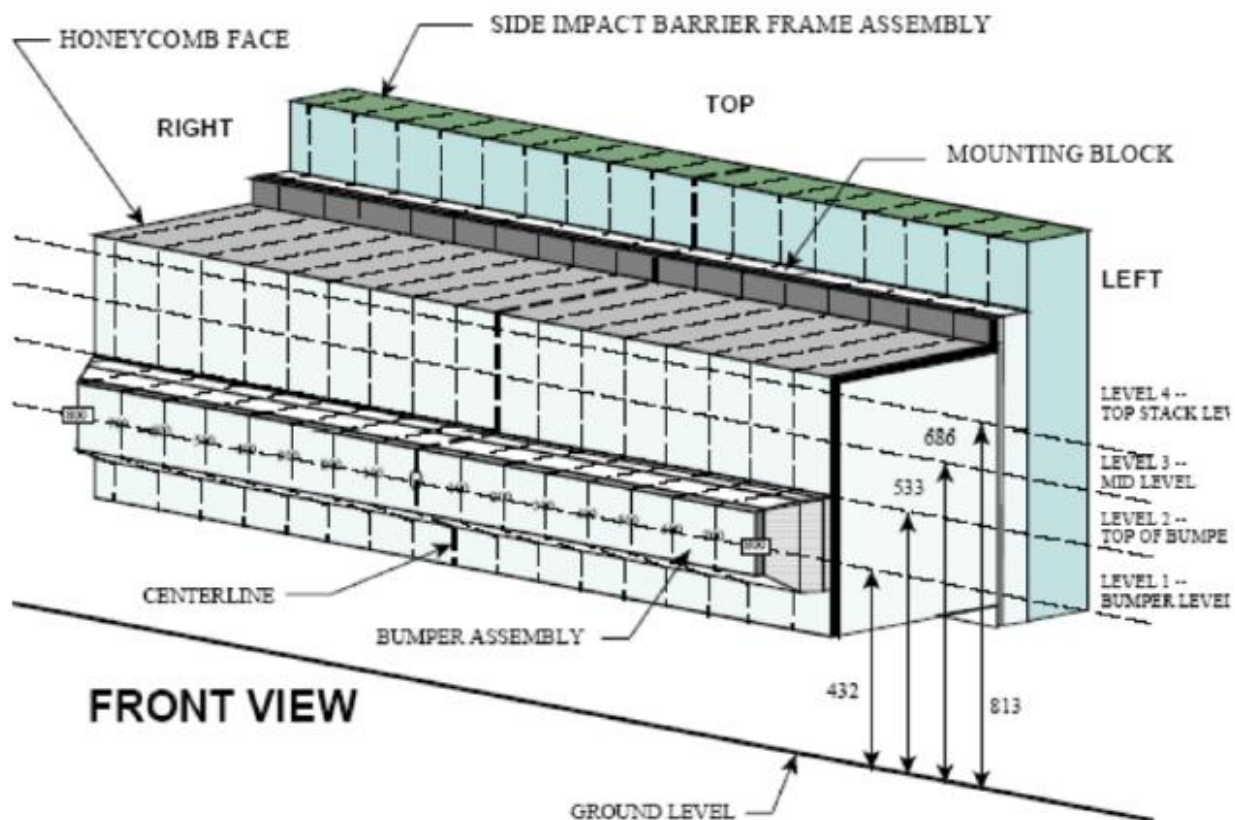
DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV

NHTSA No.: MD0119

Test Program: NCAP Side MDB Impact Test

Test Date: 2/1/2013



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	285	285	283	281	280	278	276	274	271	269	268	261	258	255	253	250	249
2	213	211	209	205	202	193	185	191	189	187	180	181	182	179	176	171	169
3	122	118	119	115	110	121	149	151	125	101	102	102	104	101	100	109	160
4	111	98	88	79	74	81	110	114	116	99	95	102	113	117	124	134	156

DATA SHEET NO. 13
FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV NHTSA No.: MD0119
 Test Program: NCAP Side MDB Impact Test Test Date: 2/1/2013

Test Time: 1:30 PM Temperature: -7 ° 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: No Spillage Occurred

FMVSS NO. 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	69	300	369
90° to 180°	68	300	368
180° to 270°	61	300	361
270° to 360°	67	300	367

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE

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

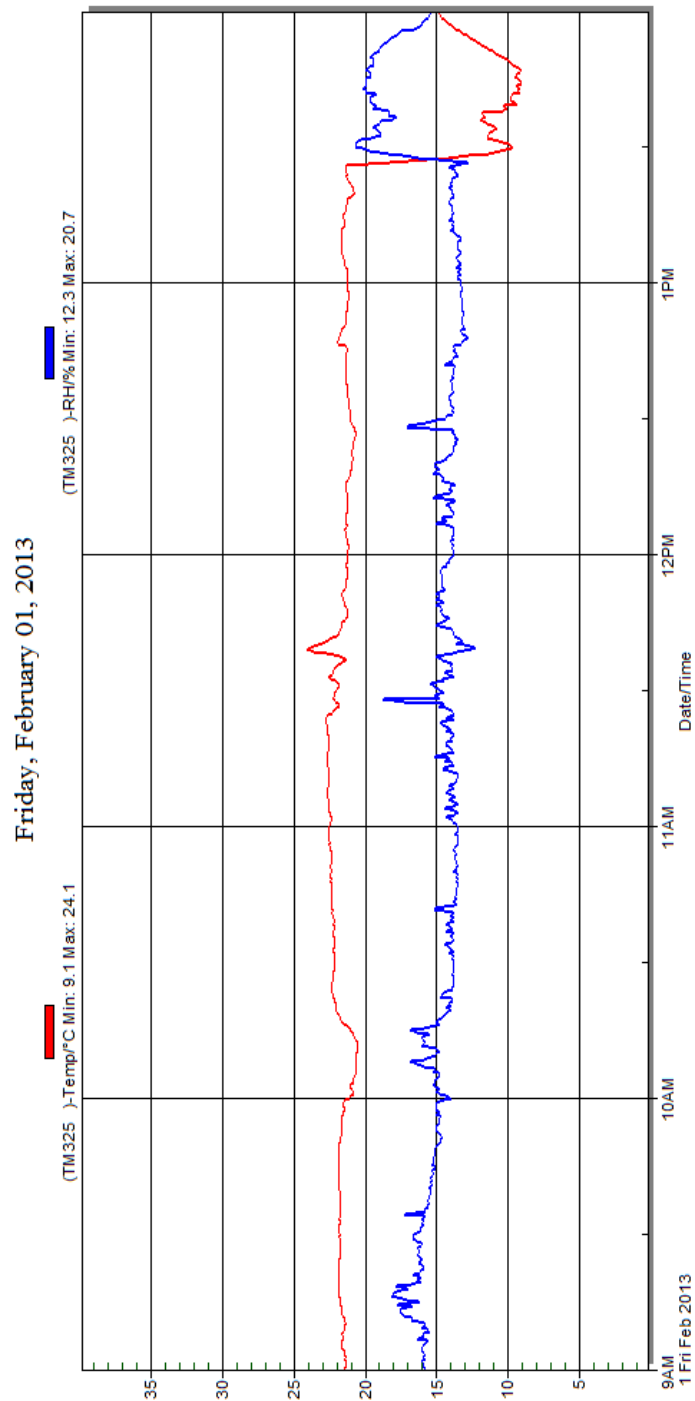
ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0° to 90°	No Spillage
90° to 180°	No Spillage
180° to 270°	No Spillage
270° to 360°	No Spillage

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

Test Vehicle: 2013 Chevrolet Traverse Four Door SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MD0119
 Test Date: 2/1/2013



Temperature and Humidity Stabilization Chart/Data for Dummies and Test Vehicle

APPENDIX A
PHOTOGRAPHS

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5	Pre-Test Left Front 3/4 View of Test Vehicle	A-7
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Figure A-1: As-Delivered Right Front 3/4 View of Test Vehicle



Figure A-2: As-Delivered Left Rear 3/4 View of Test Vehicle



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



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



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



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



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



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



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



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

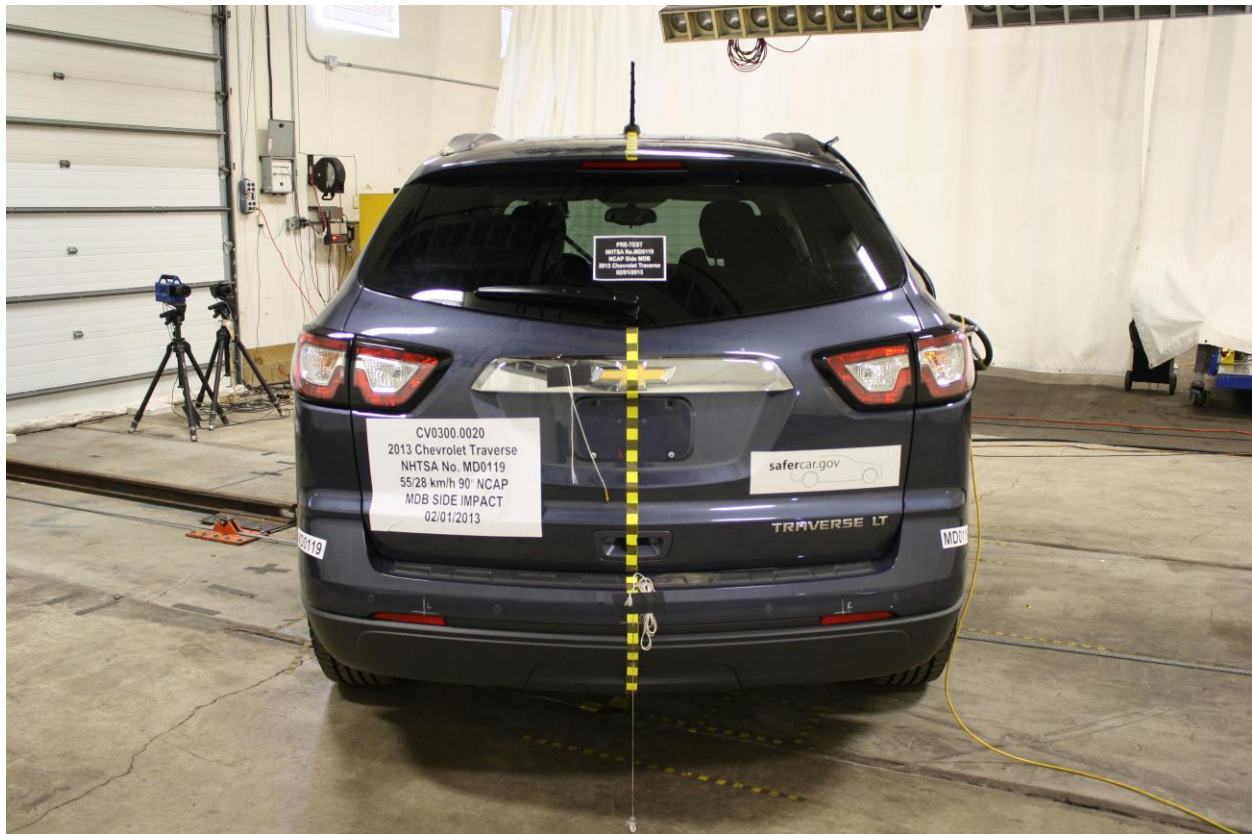


Figure A-11: Pre-Test Rear View of Test Vehicle

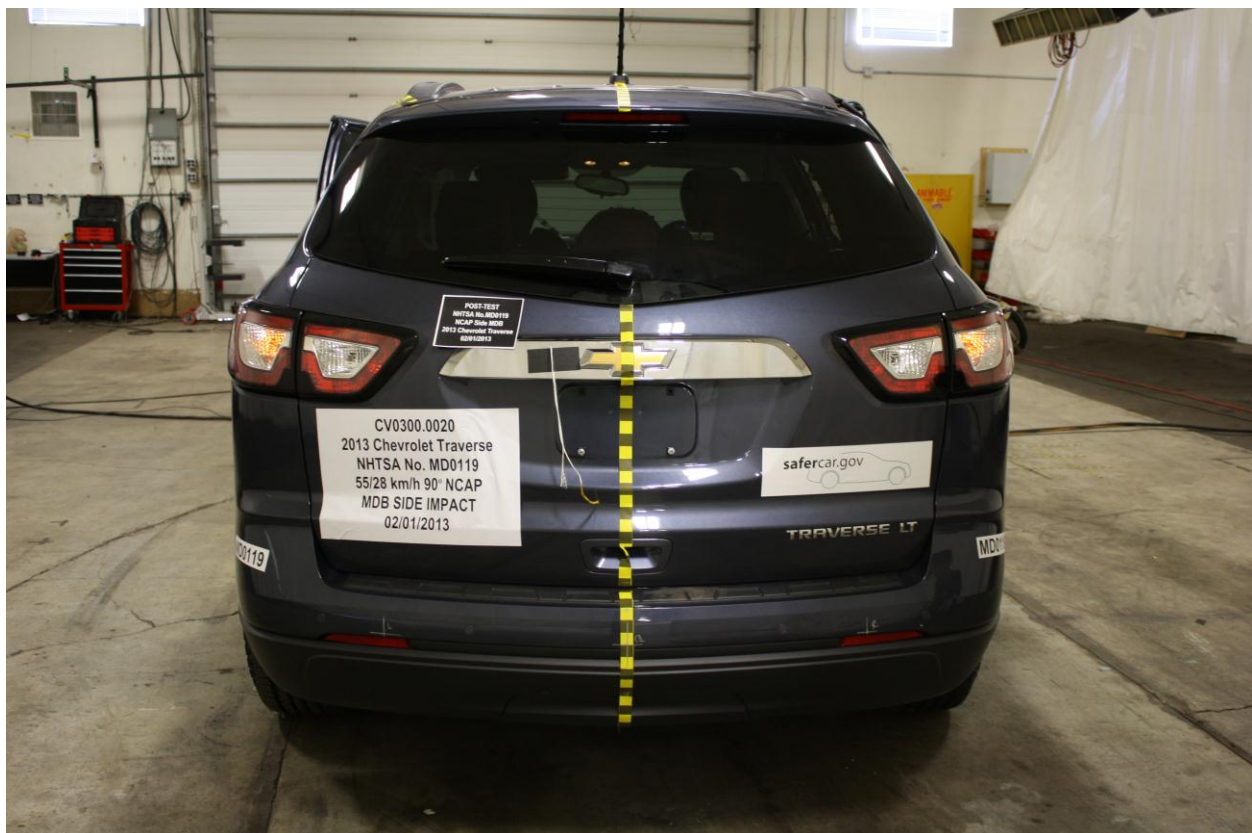


Figure A-12: Post-Test Rear Side View of Test Vehicle



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



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

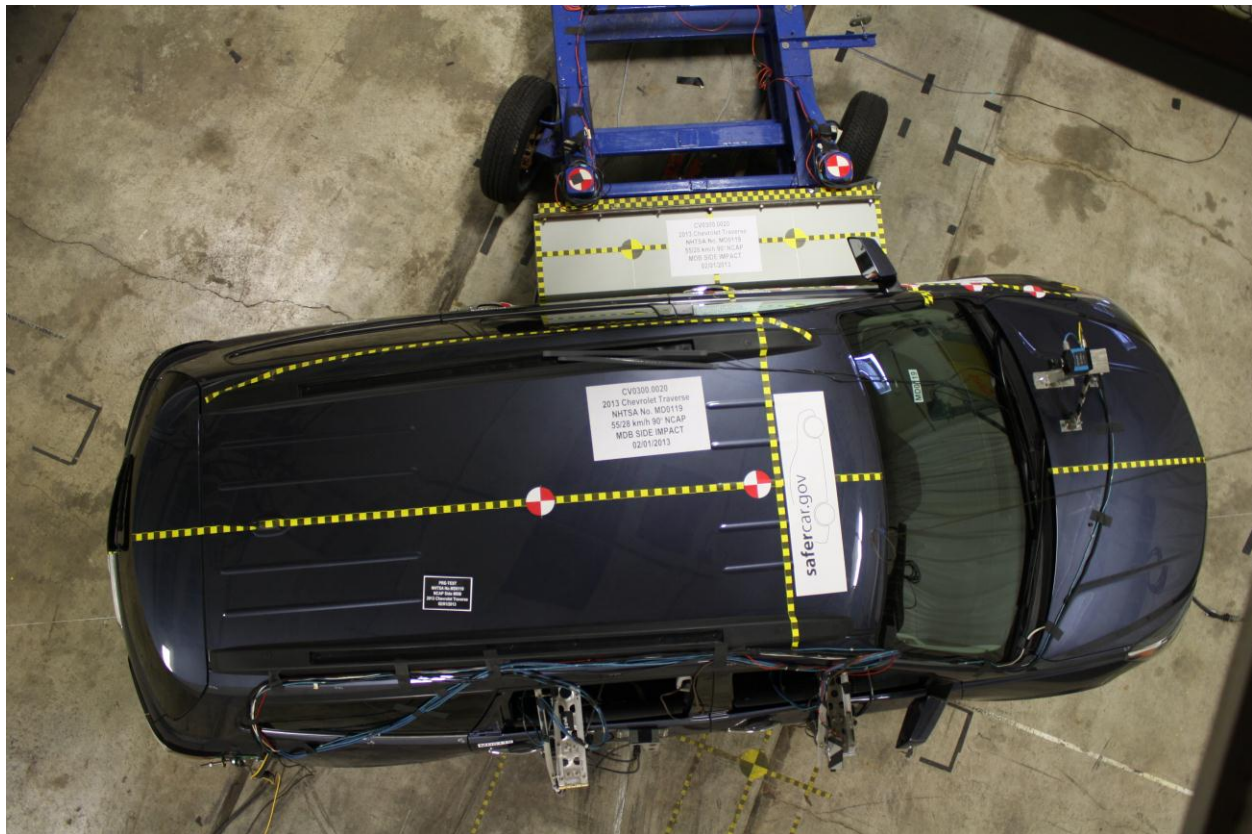


Figure A-15: Pre-Test Overhead View of the Test Area



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



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



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



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



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

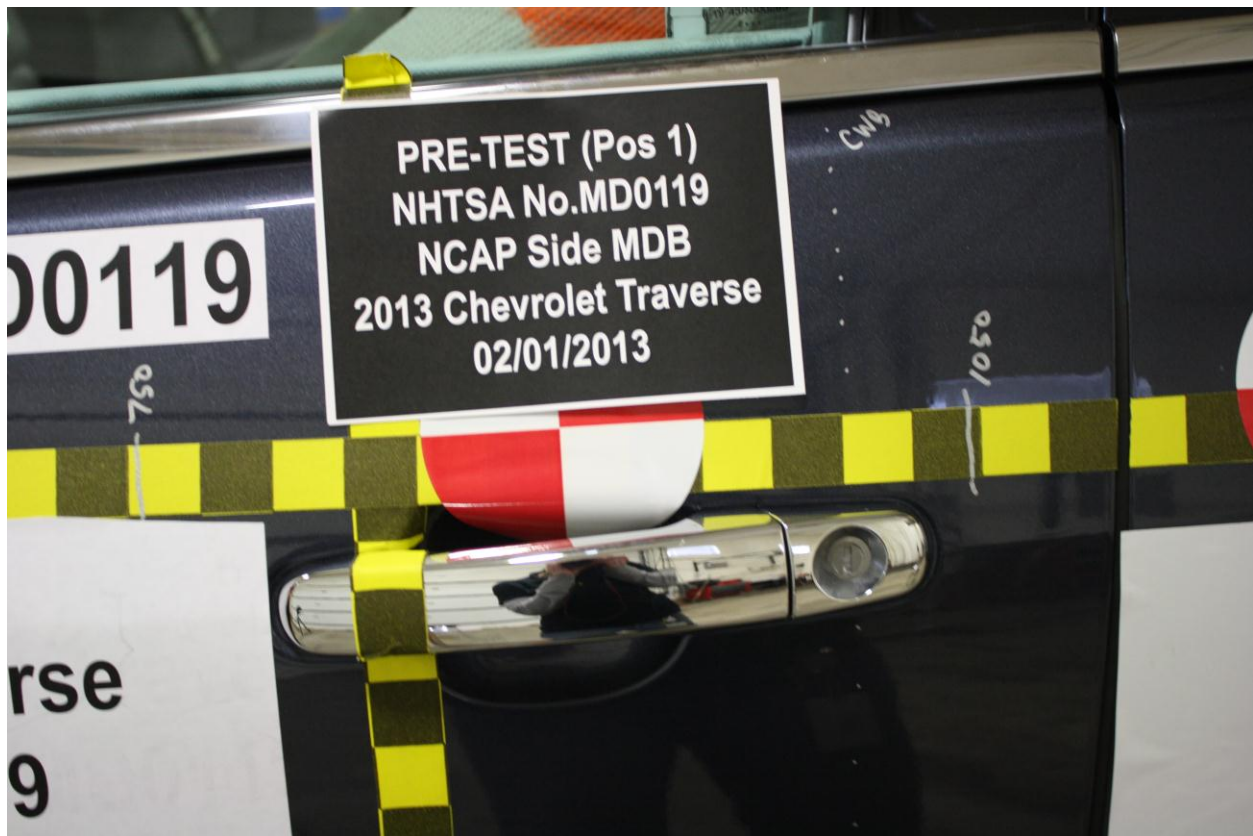


Figure A-21: Pre-Test Left Front Door Latch Close-Up



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



Figure A-37: View of Disengaged Parking Brake



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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

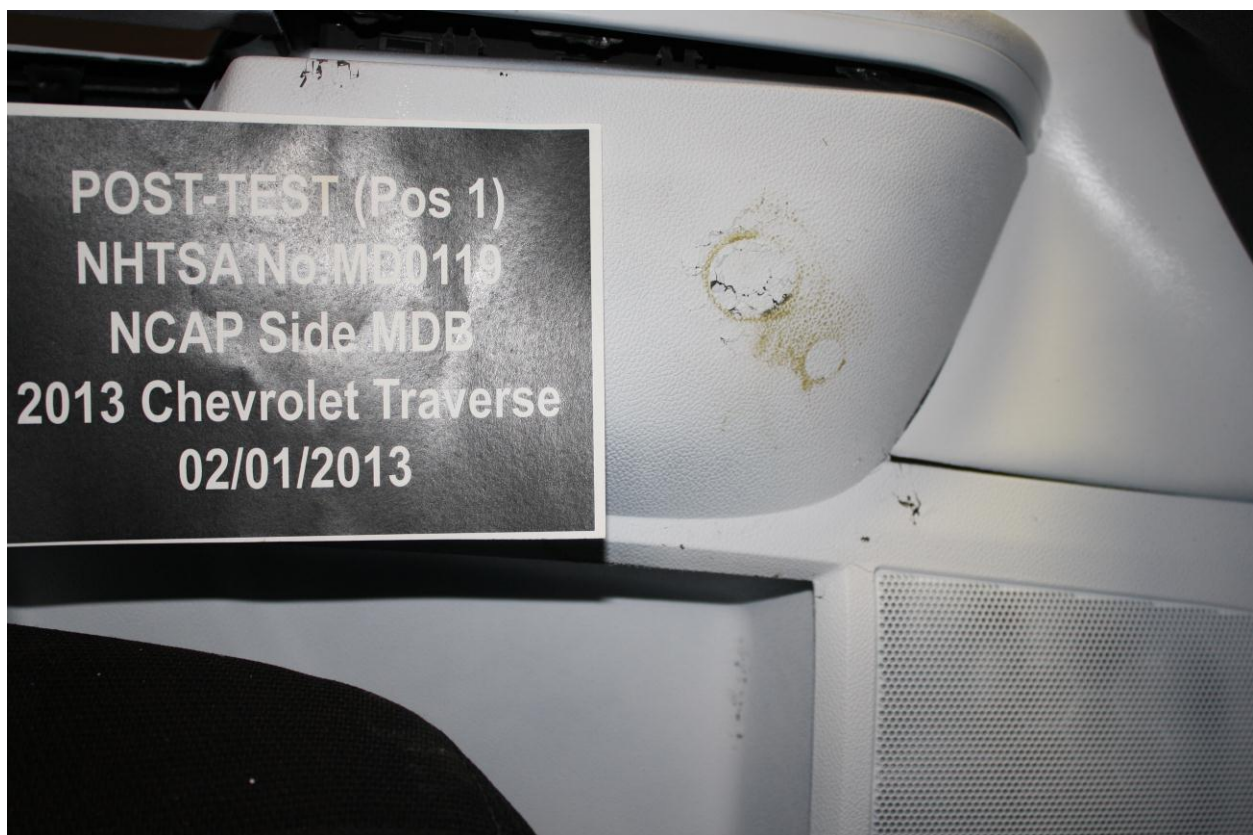


Figure A-54: Post-Test Driver Dummy Close-Up Knee Contact View



Figure A-55: Pre-Test Left Side View of Passenger Dummy Showing Belt and Chalking



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



Figure A-57: Post-Test Left Side View of Passenger Dummy Shoulder and Door Top View



Figure A-58: Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning

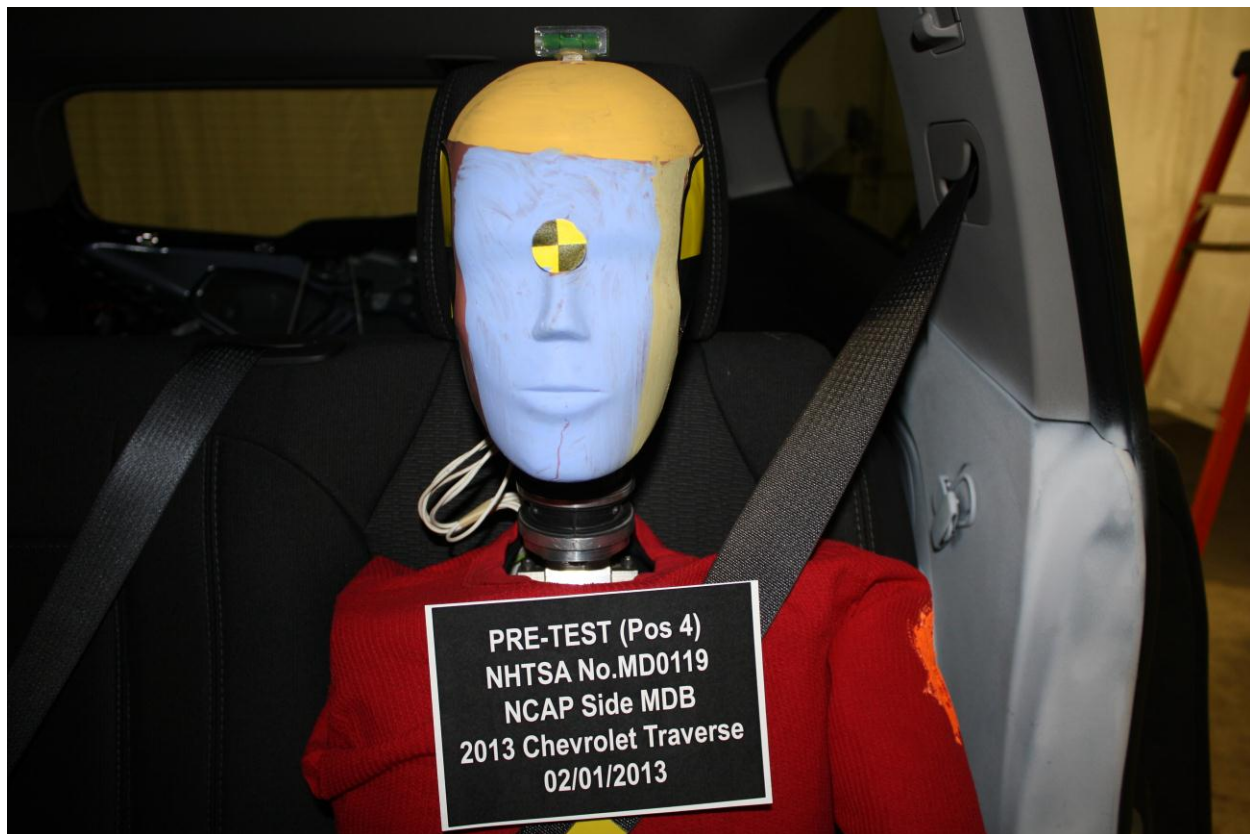


Figure A-59: Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint

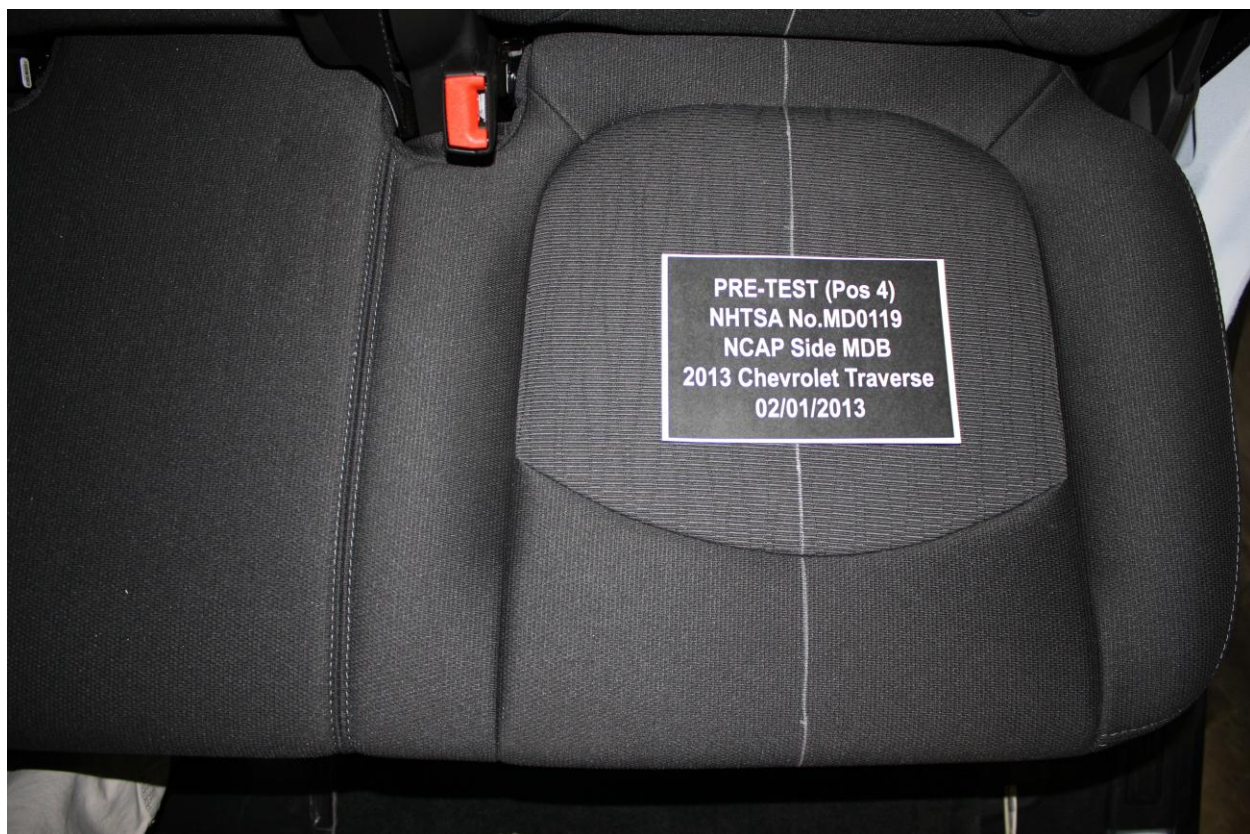


Figure A-60: Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning



Figure A-61: Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan



Figure A-62: Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket



Figure A-63: Pre-Test View of Rear Passenger Dummy's Head Showing Dummy's Head is Level



Figure A-64: Pre-Test Placement of Rear Passenger Dummy's Feet



Figure A-65: Pre-Test View of Belt Anchorage for Rear Passenger Dummy



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



Figure A-67: Pre-Test Close-Up Left Side View of Rear Passenger Seat Back



Figure A-68: Pre-Test Close-Up View of Rear Passenger Seat Back or Head Restraint



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



Figure A-70: Post-Test Passenger Dummy and Door Clearance View



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



Figure A-72: Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



Figure A-73: Pre-Test Passenger Inner Door Panel View



Figure A-74: Post-Test Passenger Inner Door Panel View

Photo Not Applicable



Figure A-76: Post-Test Rear Passenger Dummy Close-Up Head Contact with Side Airbag View

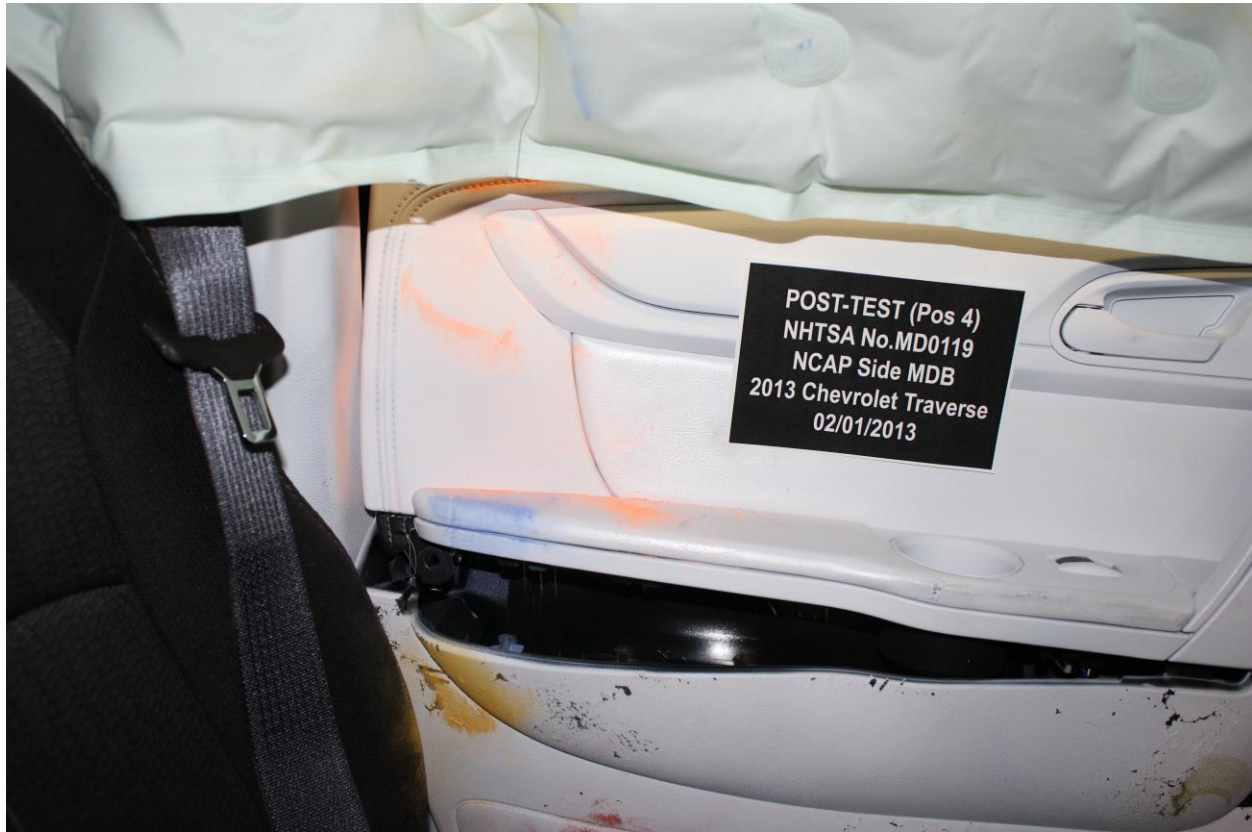


Figure A-77: Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Interior View

Photo Not Applicable

Figure A-78: Post-Test Rear Passenger Dummy Close-Up Torso Contact with Side Airbag View



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

Photo Not Applicable

Figure A-80: Post-Test Rear Passenger Dummy Close-Up Pelvis Contact with Side Airbag View



Figure A-81: Post-Test Rear Passenger Dummy Close-Up Knee Contact View



Figure A-82: Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



Figure A-83: Post-Test View of Fuel Filler Cap or Fuel Filler Neck



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



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



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

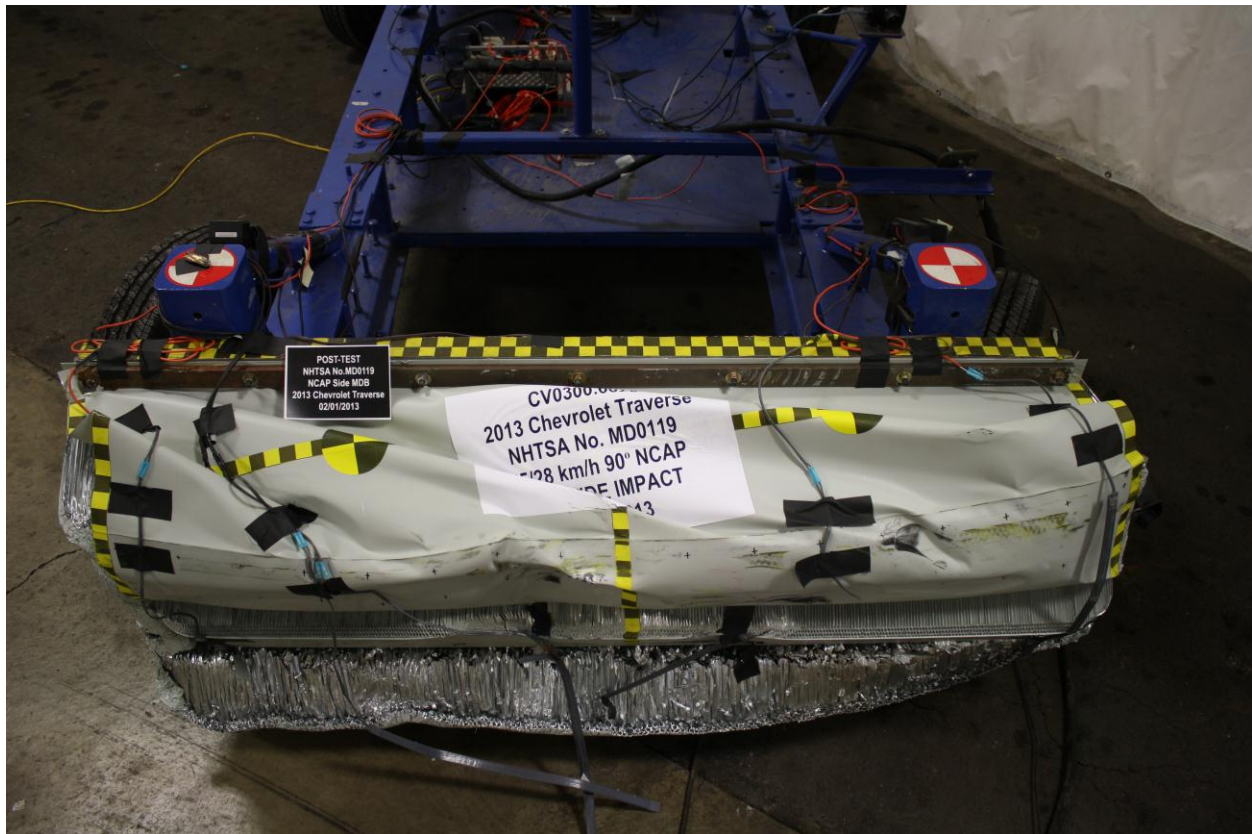


Figure A-87: Post-Test Top View of MDB Impactor Face



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



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



Figure A-90: Pre-Test Right Side View of MDB Impactor Face



Figure A-91: Post-Test Right Side View of MDB Impactor Face



Figure A-92: Close-Up View of Vehicle's Certification Label

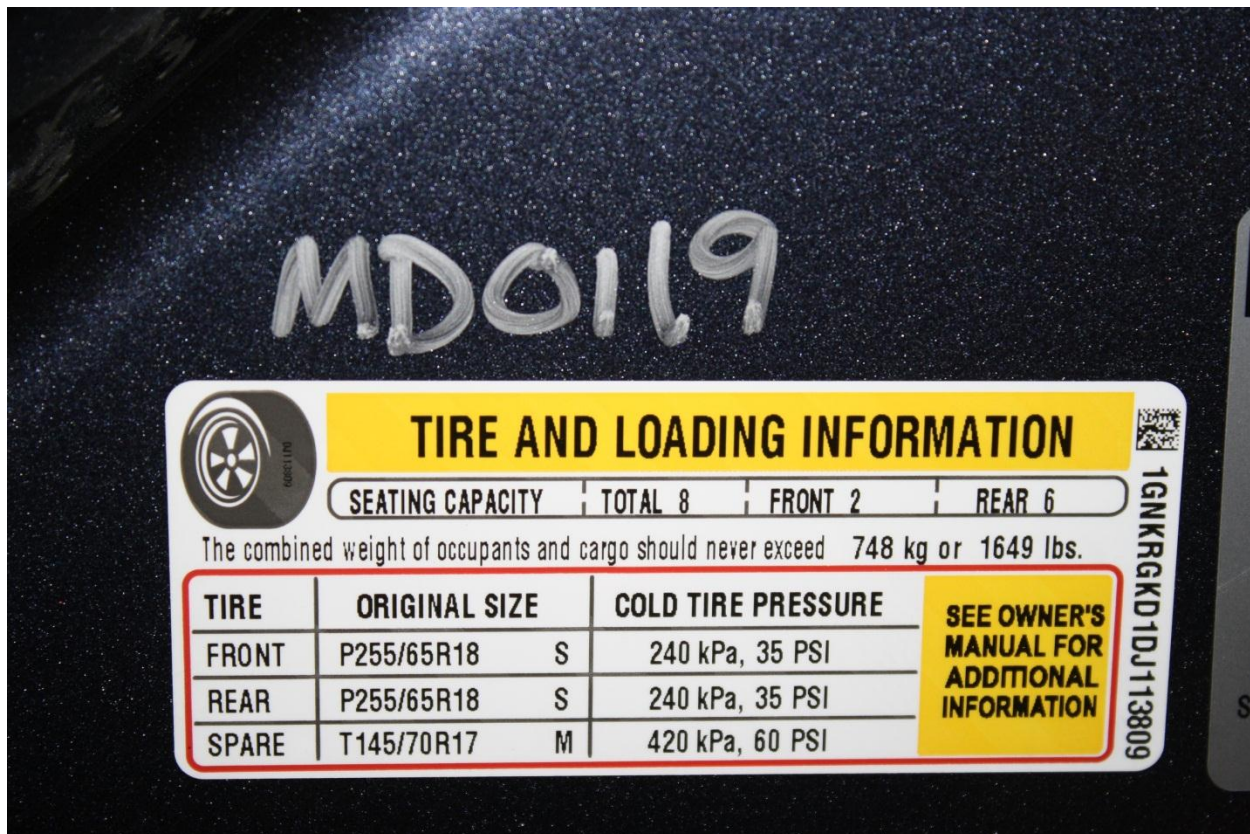


Figure A-93: Close-Up View of Vehicle's Tire Information Placard or Label

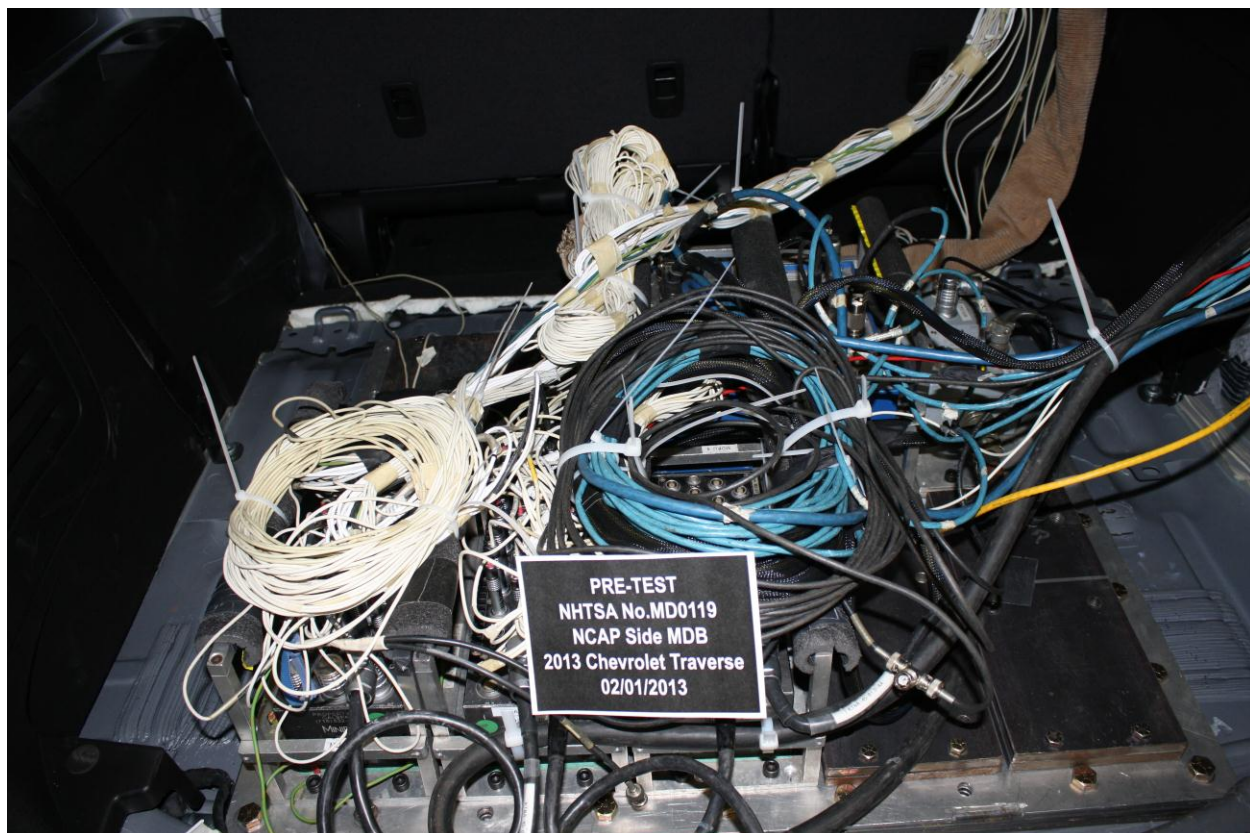


Figure A-94: Pre-Test Ballast View



Figure A-95: Post-Test Primary and Redundant Speed Trap Read-Out



Figure A-96: FMVSS No. 301 Static Rollover 0 Degrees

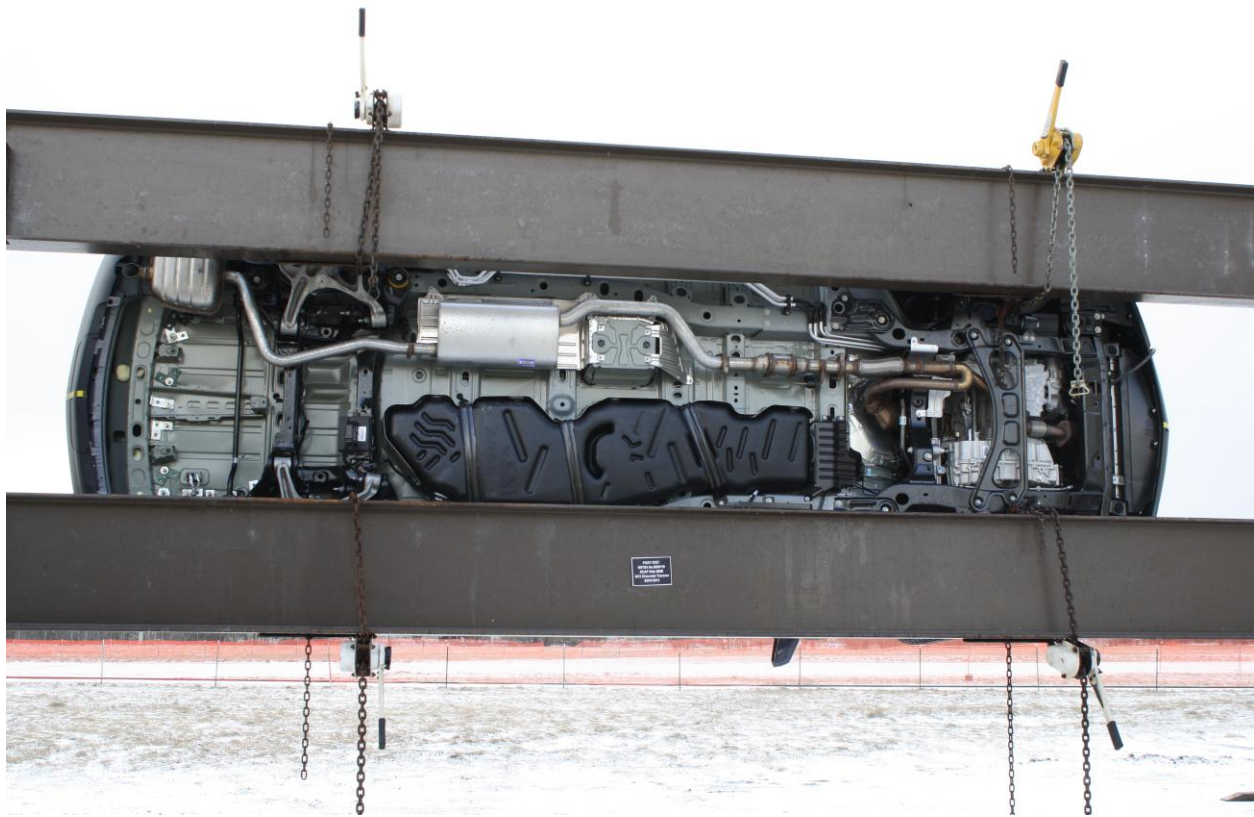


Figure A-97: FMVSS No. 301 Static Rollover 90 Degrees



Figure A-98: FMVSS No. 301 Static Rollover 180 Degrees



Figure A-99: FMVSS No. 301 Static Rollover 270 Degrees



Figure A-100: FMVSS No. 301 Static Rollover 360 Degrees



Figure A-101: Impact Event

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STANDARD VEHICLE PRICE	\$33,725.00																				
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Fuel Economy 19 17 24 combined city/hwy city highway Standard SUVs range from 12 to 28 MPG. The best vehicle rates 112 MPG. 5.3 gallons per 100 miles		You spend \$2,400 more in fuel costs over 5 years compared to the average new vehicle.		Overall Vehicle Score Based on the combined ratings of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight. <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <thead> <tr> <th colspan="2" style="text-align: left; padding: 2px;">Frontal Crash</th> <th style="text-align: right; padding: 2px;">To Be Rated</th> </tr> </thead> <tbody> <tr> <td colspan="2" style="padding: 2px;"> Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight. </td> <td style="text-align: right; padding: 2px;">To Be Rated</td> </tr> <tr> <td colspan="2" style="padding: 2px;"> Side Crash Based on the risk of injury in a side impact. </td> <td style="text-align: right; padding: 2px;">To Be Rated</td> </tr> <tr> <td colspan="2" style="padding: 2px;"> Rollover Based on the risk of rollover in a single-vehicle crash. </td> <td style="text-align: right; padding: 2px;">★★★★</td> </tr> </tbody> </table>		Frontal Crash		To Be Rated	Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.		To Be Rated	Side Crash Based on the risk of injury in a side impact.		To Be Rated	Rollover Based on the risk of rollover in a single-vehicle crash.		★★★★	FOR VEHICLES IN THIS CARLINE: U.S./CANADIAN PARTS CONTENT: 77% NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS. FOR THIS VEHICLE: FINAL ASSEMBLY POINT: LANSING, MI U.S.A. COUNTRY OF ORIGIN: ENGINE: UNITED STATES TRANSMISSION: UNITED STATES	
Frontal Crash		To Be Rated																	
Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.		To Be Rated																	
Side Crash Based on the risk of injury in a side impact.		To Be Rated																	
Rollover Based on the risk of rollover in a single-vehicle crash.		★★★★																	

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 23 MPG and costs \$11,600 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$3.55 per gallon. MPG is miles per gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

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 LANCASTER, PA 17604-4308

DV

1GA1233438

Figure A-102: Monroney Label

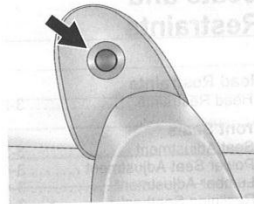
Head Restraints**Front Seats****WARNING**

With head restraints that are not installed and adjusted properly, there is a greater chance that occupants will suffer a neck/spinal injury in a crash. Do not drive until the head restraints for all occupants are installed and adjusted properly.

The vehicle's front seats have adjustable head restraints in the outboard seating positions.



Adjust the head restraint so that the top of the restraint is at the same height as the top of the occupant's head. This position reduces the chance of a neck injury in a crash.



To raise or lower the head restraint, press the button located on the side of the head restraint, and pull up or push the head restraint down, and release the button. Pull and push on the head restraint after the button is released to make sure that it is locked in place.

To adjust the head restraint forward, grasp the head restraint and pull forward until the desired locking position is reached.

To adjust the head restraint rearward, press the button located on the side of the head restraint, and push the head restraint rearward until the desired locking position is reached. Try to move the head restraint after the button is released to make sure that it is locked in place.

The front seat outboard head restraints are not designed to be removed.

Rear Seats

The vehicle's second-row seats have head restraints in the outboard seating positions that cannot be adjusted.

The vehicle's third-row seats have headrests in the outboard seating positions that cannot be adjusted.

The second-row head restraints and third-row headrests are not designed to be removed.

Figure A-103: Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

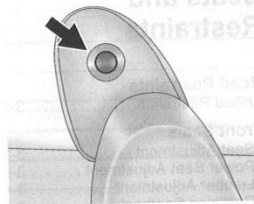
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The front seat outboard head restraints are not designed to be removed.

Rear Seats

The vehicle's second-row seats have head restraints in the outboard seating positions that cannot be adjusted.

The vehicle's third-row seats have headrests in the outboard seating positions that cannot be adjusted.

The second-row head restraints and third-row headrests are not designed to be removed.

Figure A-104: Left Rear Passenger Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

APPENDIX B

VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

Driver & Passenger Dummy Instrumentation Plots

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5	Driver Upper Thorax Rib Deflection (Y) vs. Time	B-7
6	Driver Middle Thorax Rib Deflection (Y) vs. Time	B-7
7	Driver Lower Thorax Rib Deflection (Y) vs. Time	B-8
8	Driver Thorax Rib Deflection Maximum vs. Time	B-8
9	Driver Anterior Abdominal Force (Y) vs. Time	B-9
10	Driver Middle Abdominal Force (Y) vs. Time	B-9
11	Driver Posterior Abdominal Force (Y) vs. Time	B-10
12	Driver Total Abdominal Force (Y) vs. Time	B-10
13	Driver Pubic Symphysis Force (Y) vs. Time	B-11
14	Passenger Head Acceleration (X) vs. Time Primary	B-11
15	Passenger Head Acceleration (Y) vs. Time Primary	B-12
16	Passenger Head Acceleration (Z) vs. Time Primary	B-12
17	Passenger Head Resultant Acceleration Primary vs. Time	B-13
18	Passenger Lower Spine T12 Acceleration (X) vs. Time	B-13
19	Passenger Lower Spine T12 Acceleration (Y) vs. Time	B-14
20	Passenger Lower Spine T12 Acceleration (Z) vs. Time	B-14
21	Passenger Lower Spine T12 Resultant Acceleration vs. Time	B-15
22	Passenger Iliac Force on Impact Side (Y) vs. Time	B-15
23	Passenger Acetabulum Force on Impact Side (Y) vs. Time	B-16
24	Passenger Total Pelvic Force on Impact Side (Y) vs. Time	B-16

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

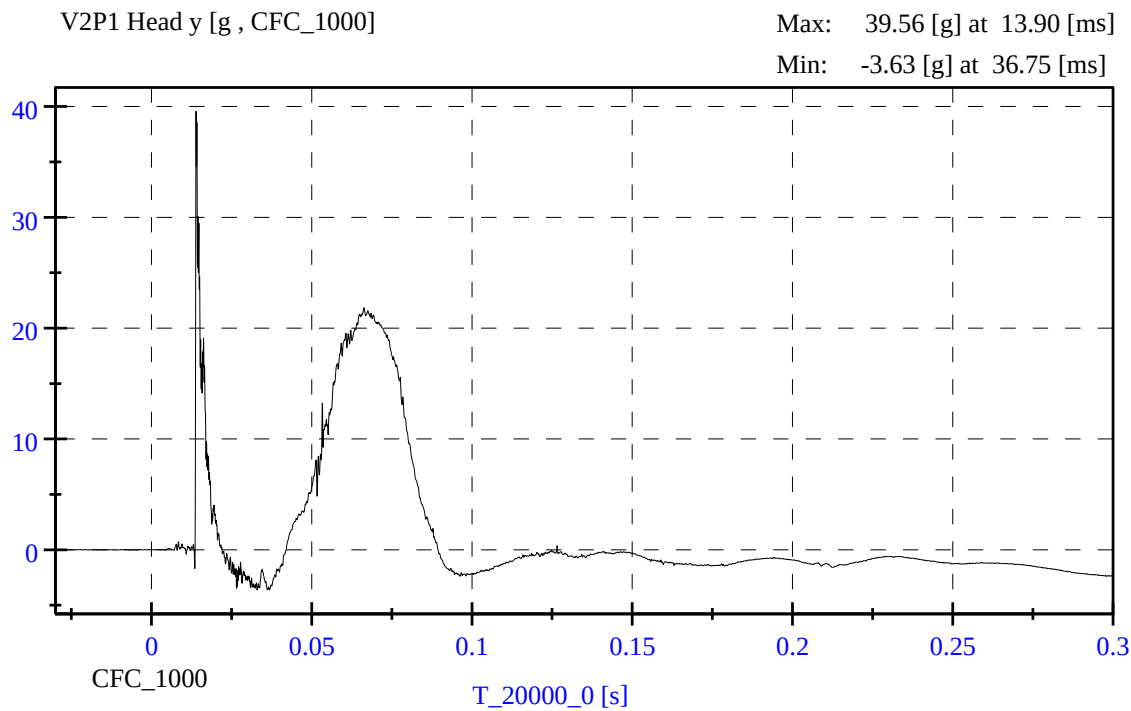
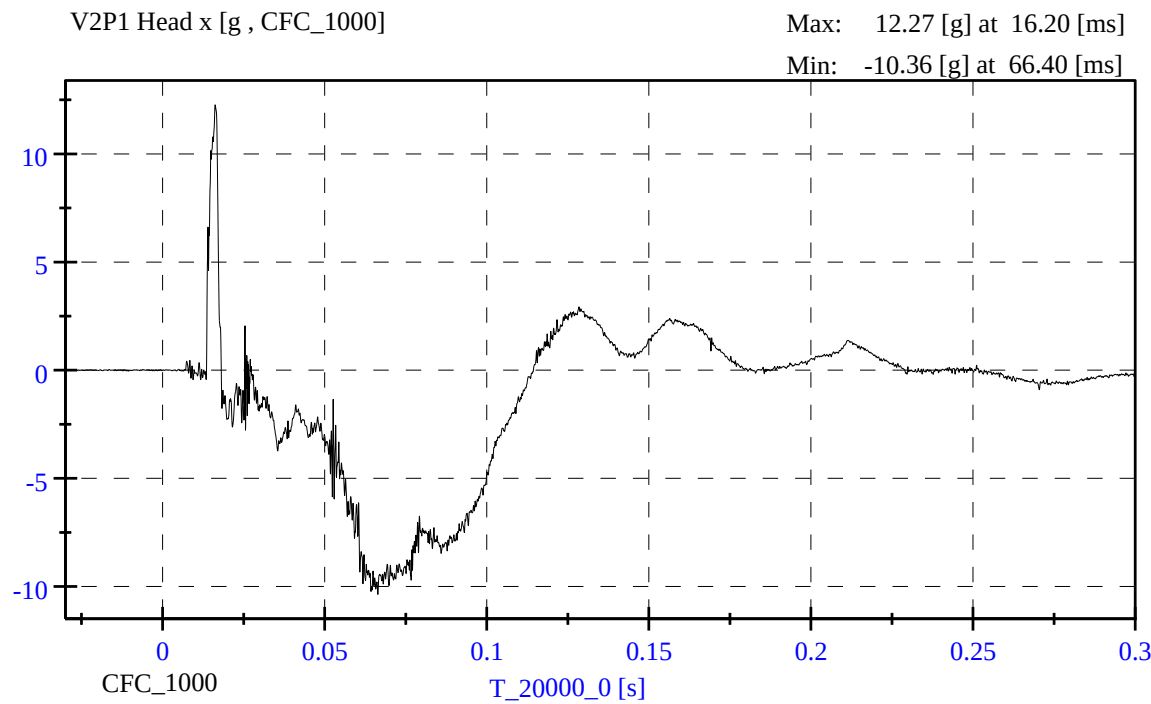
Driver Lower Spine T12 Acceleration (X)
Driver Lower Spine T12 Acceleration (Y)
Driver Lower Spine T12 Acceleration (Z)
Passenger Upper Thorax Rib Deflection (Y)
Passenger Middle Thorax Rib Deflection (Y)
Passenger Lower Thorax Rib Deflection (Y)
Passenger Upper Abdomen Rib Deflection (Y)
Passenger Lower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

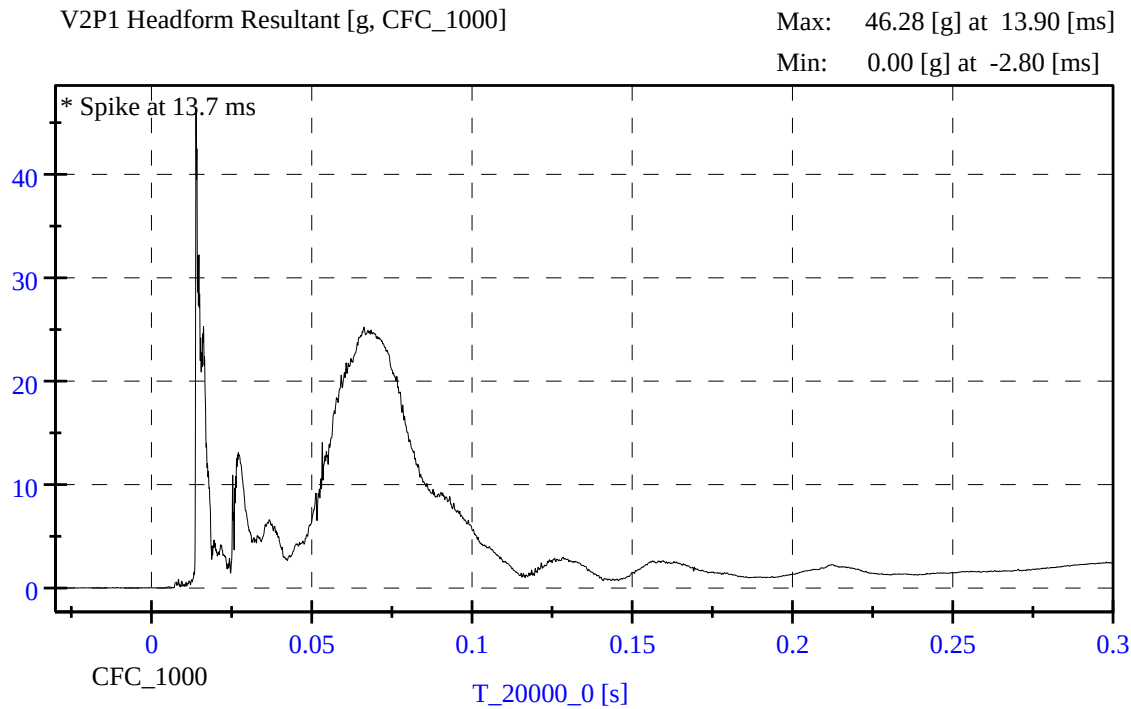
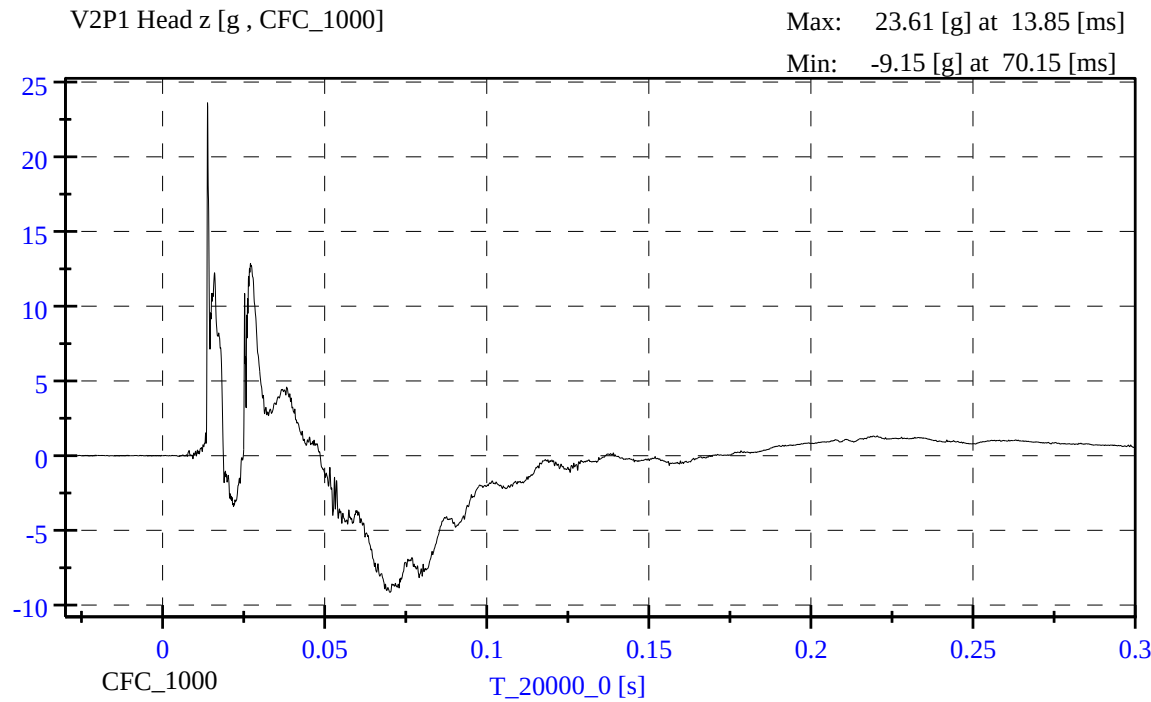
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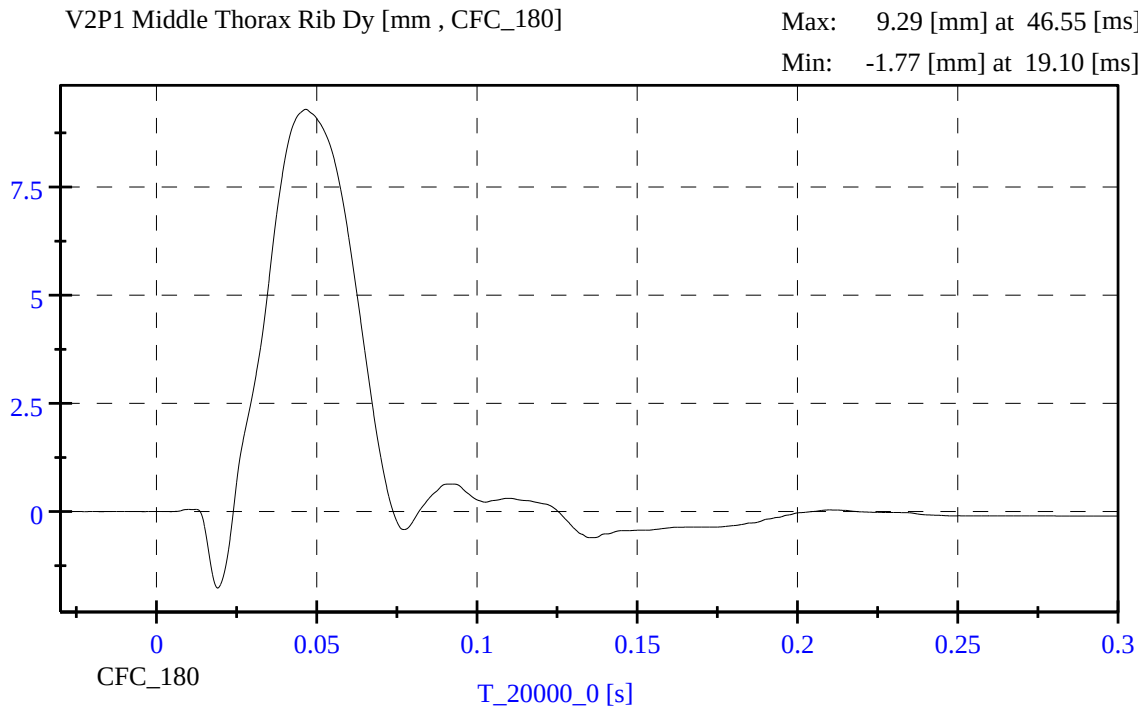
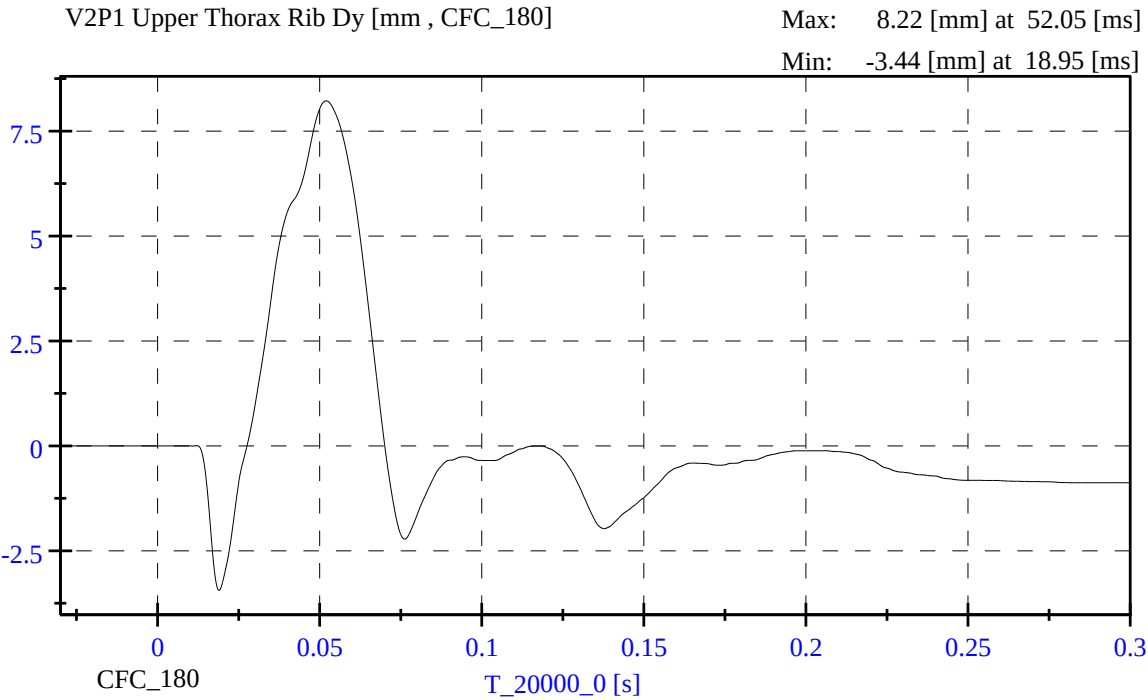
Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Right Side Sill at Front Seat Acceleration (X)
Right Side Sill at Front Seat Acceleration (Y)
Right Side Sill at Front Seat Acceleration (Z)
Right Side Sill at Rear Seat Acceleration (X)
Right Side Sill at Rear Seat Acceleration (Y)
Right Side Sill at Rear Seat Acceleration (Z)
Left Side Sill at Front Seat Acceleration (Y)
Left Side Sill at Rear Seat Acceleration (Y)
Lower A-Post Acceleration (Y)
Middle A-Post Acceleration (Y)
Lower B-Post Acceleration (Y)
Middle B-Post Acceleration (Y)
Front Seat Track Acceleration (Y)
Rear Seat Structure 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)

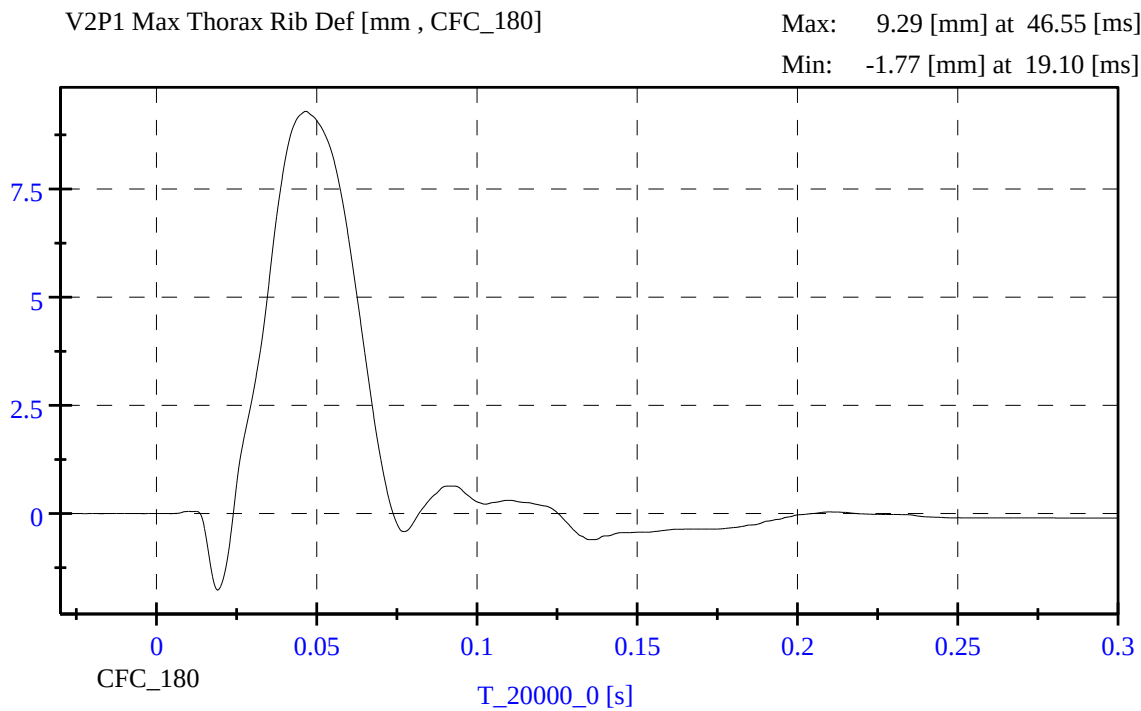
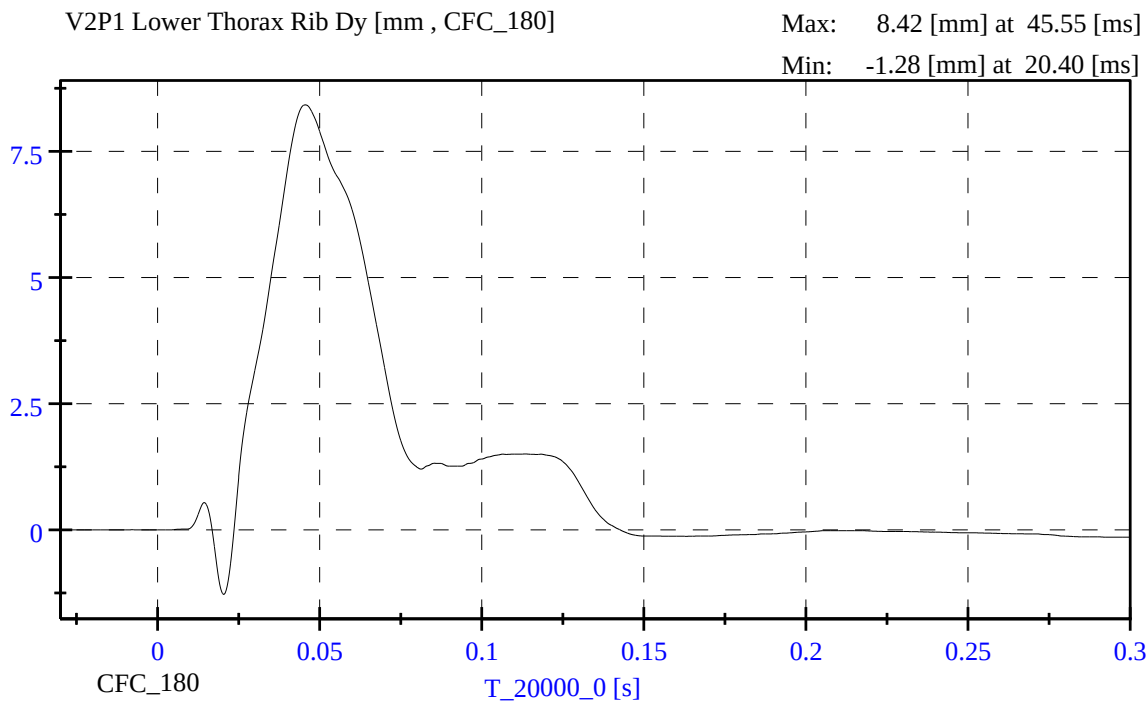
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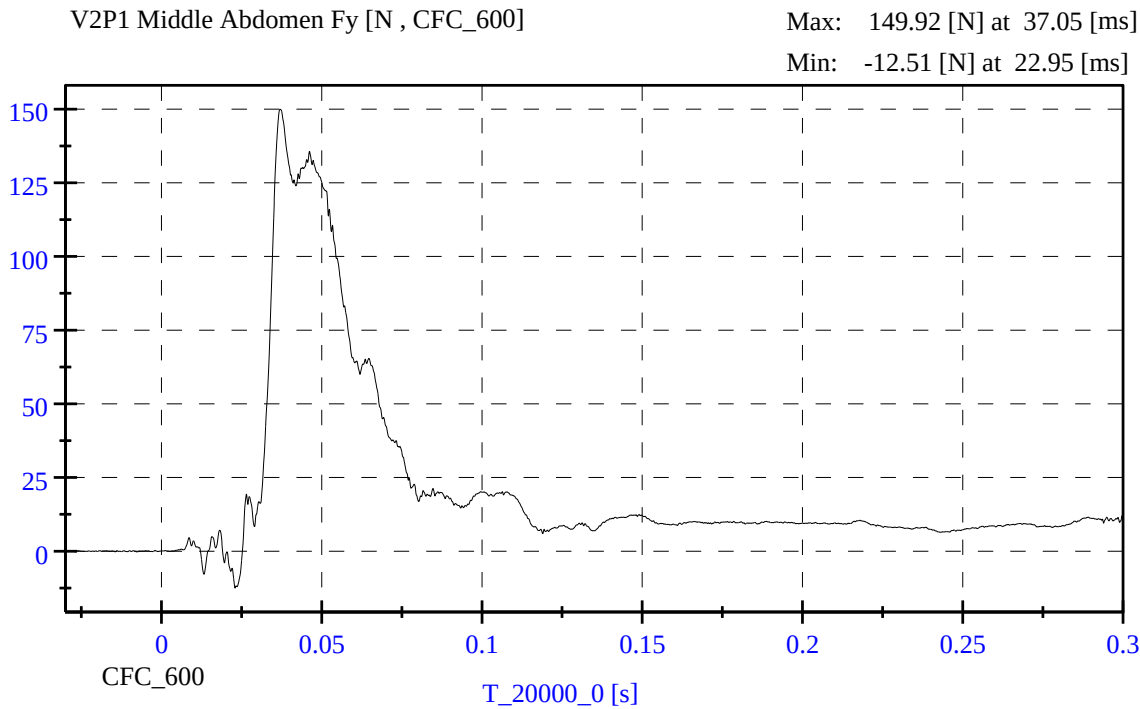
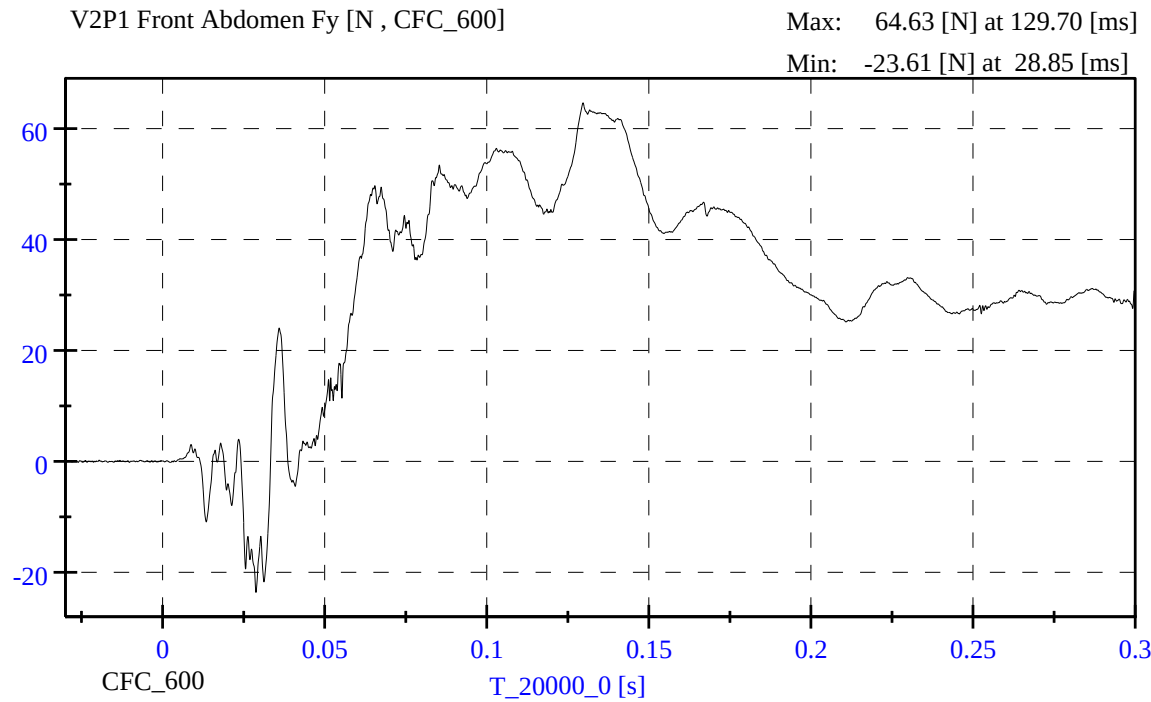
MDB Center of Gravity Acceleration (X)
MDB Center of Gravity Acceleration (Y)
MDB Center of Gravity Acceleration (Z)
MDB Rear Acceleration (X)
MDB Rear Acceleration (Y)
Left MDB Contact Switch
Right MDB Contact Switch

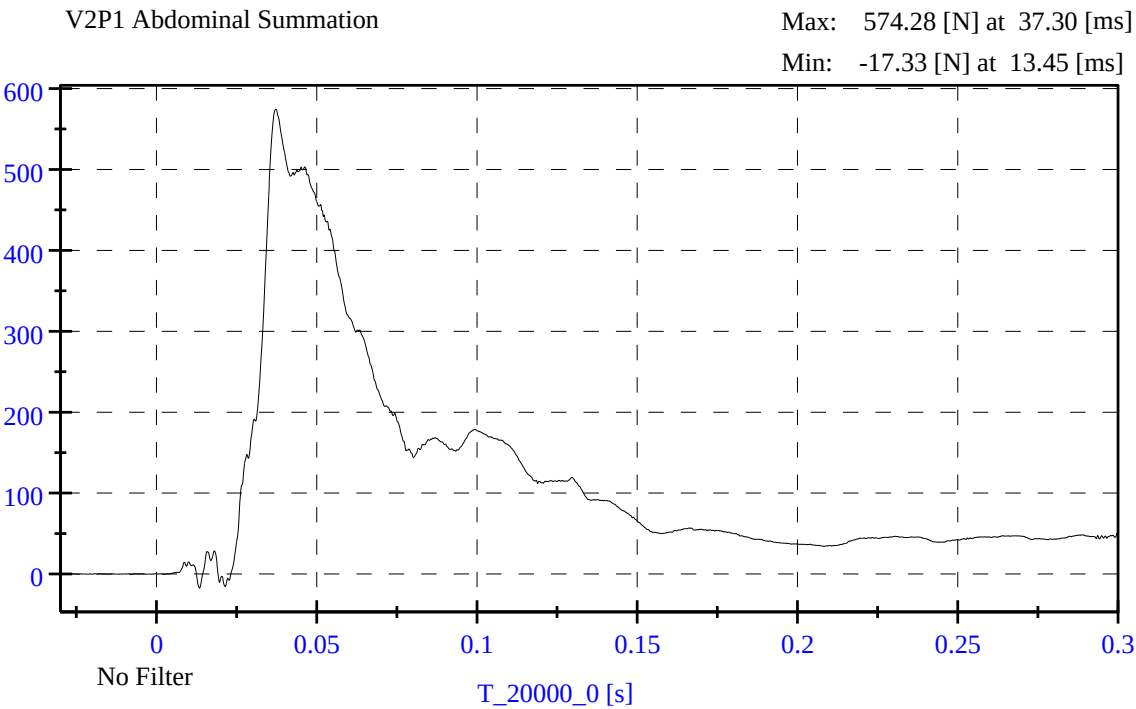
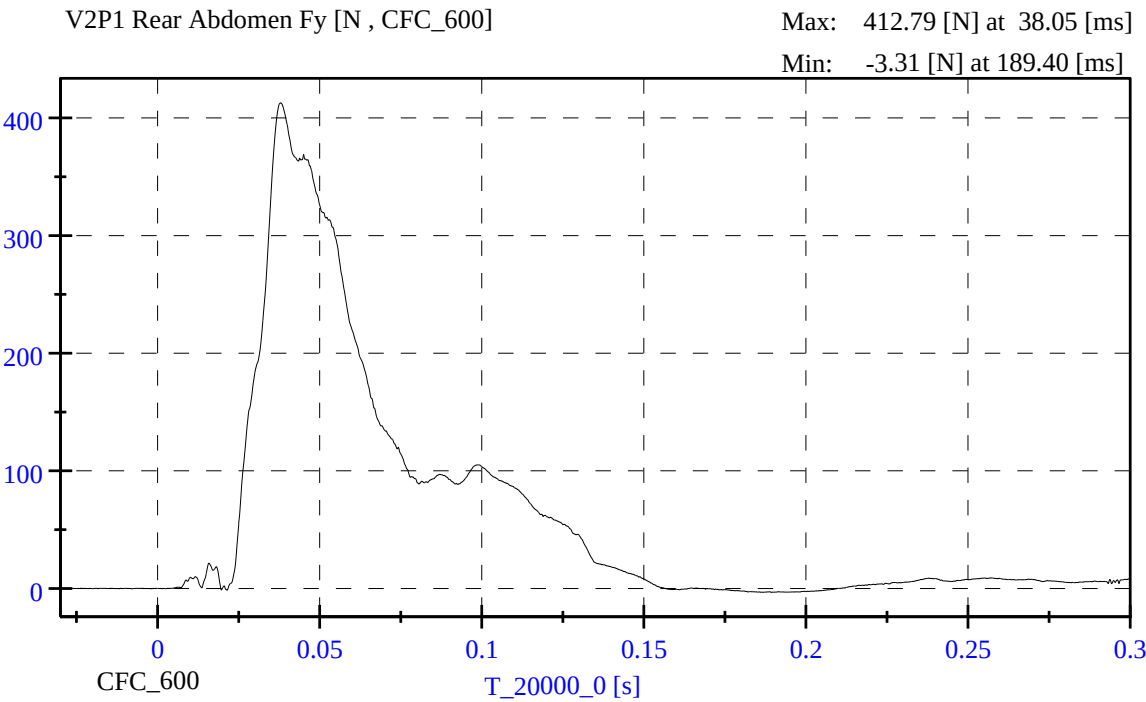


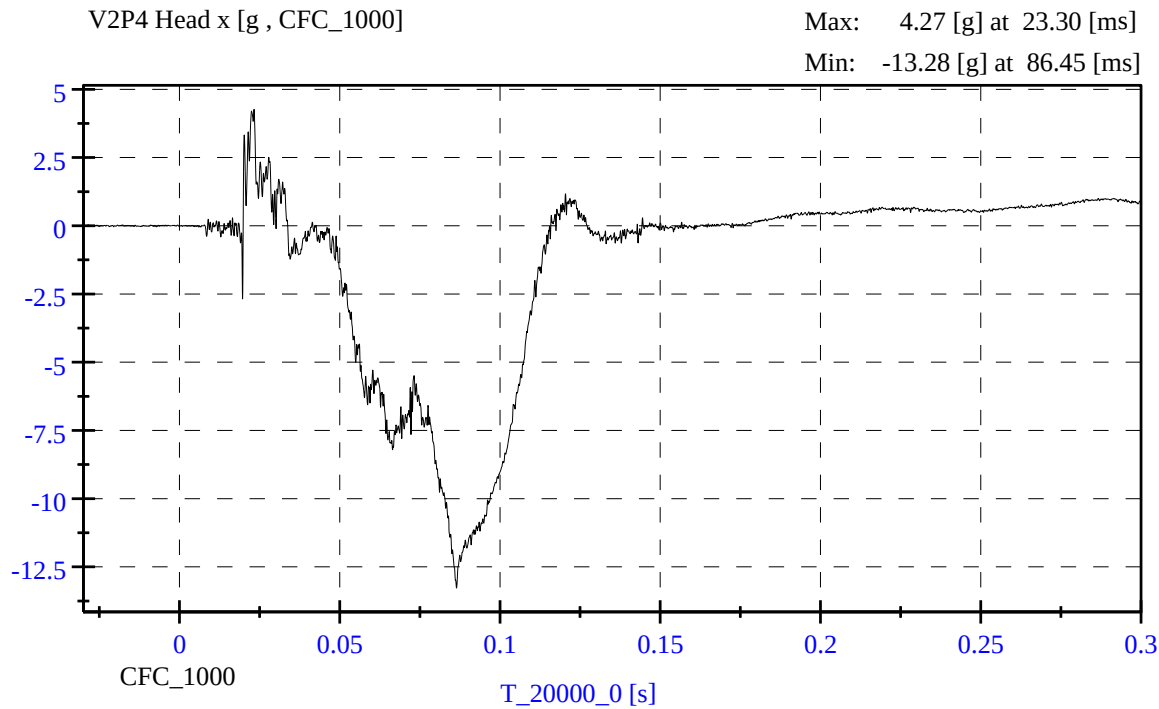
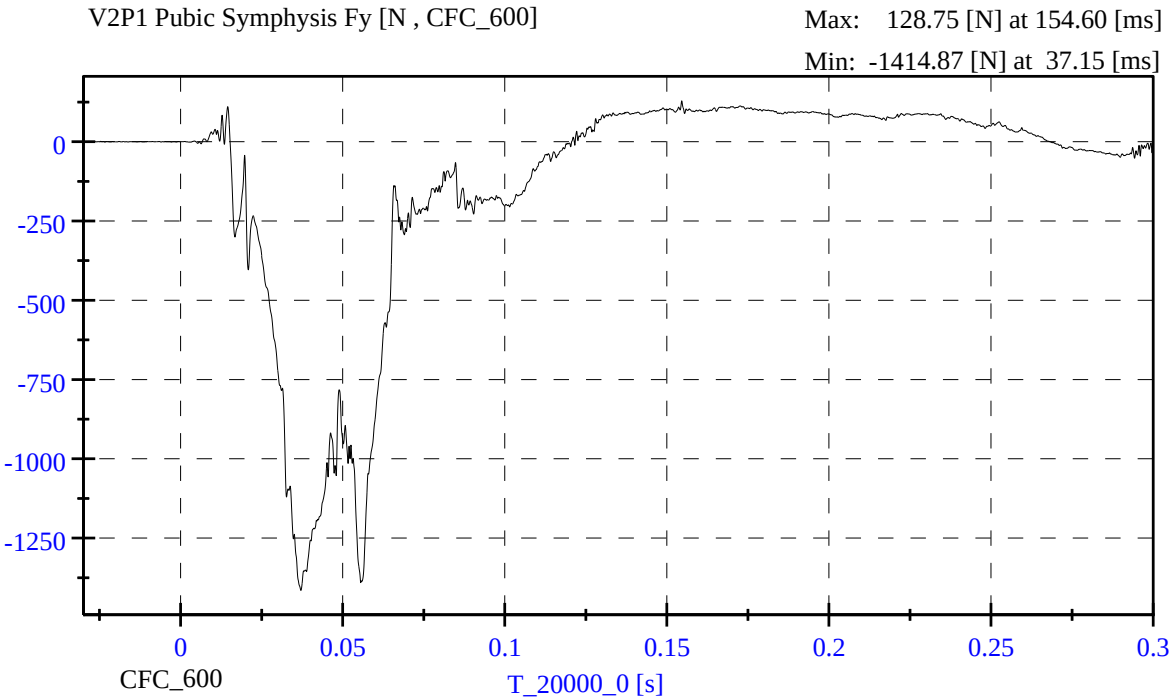


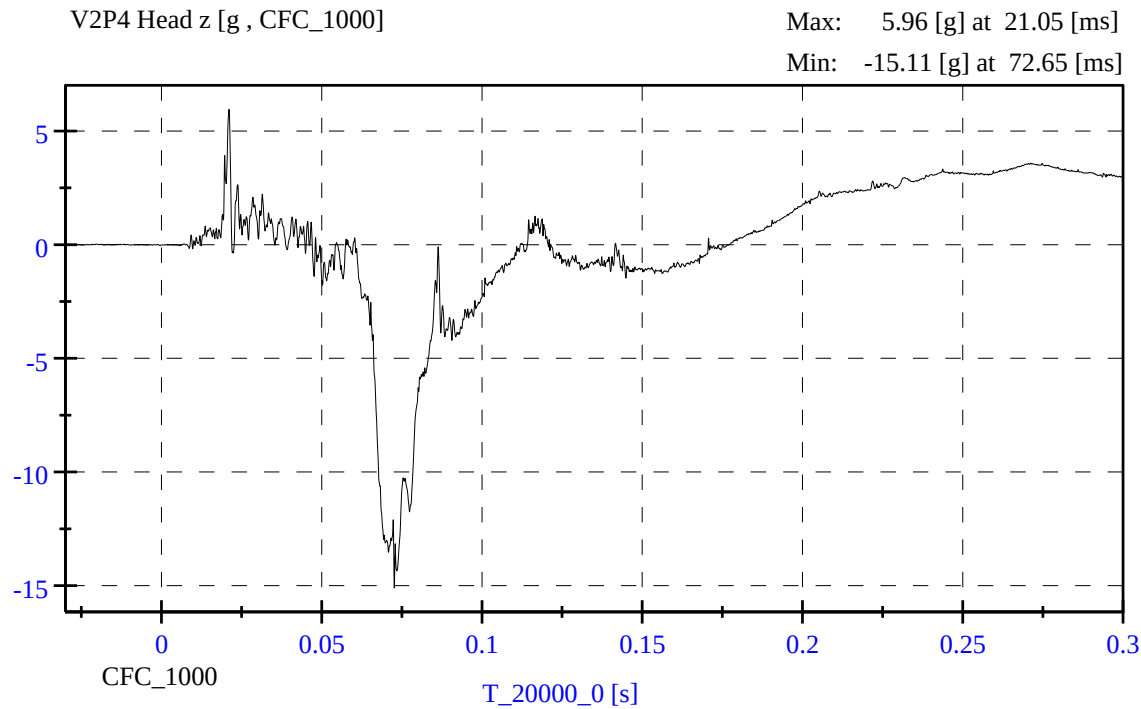
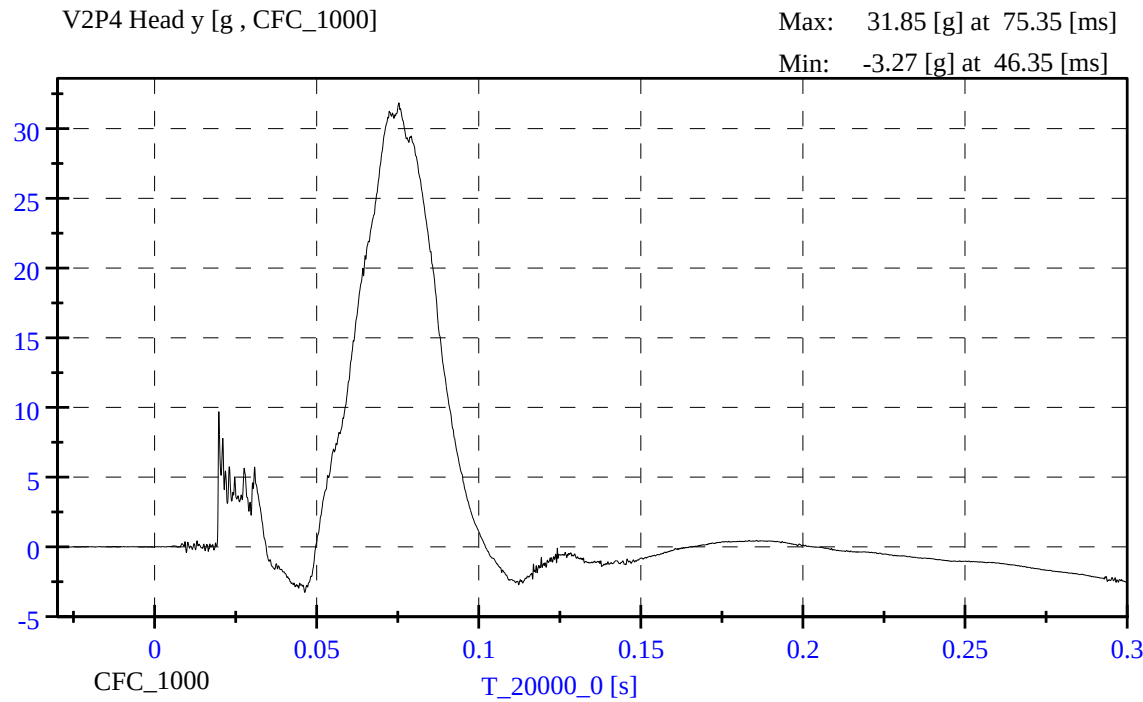


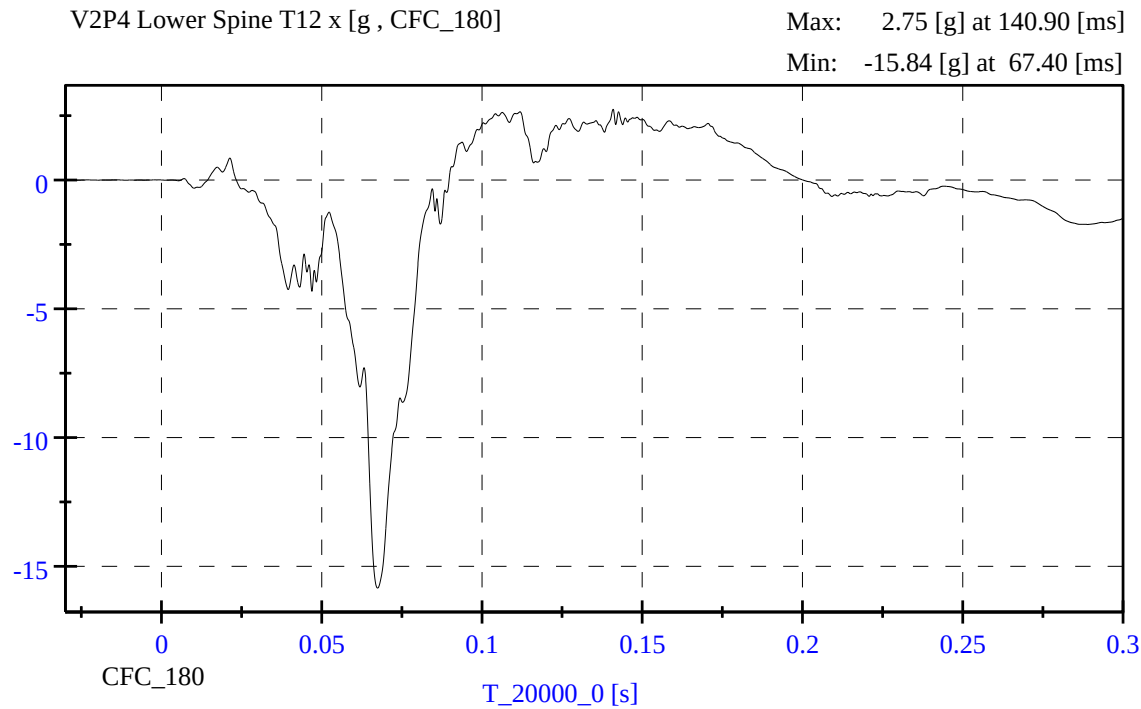
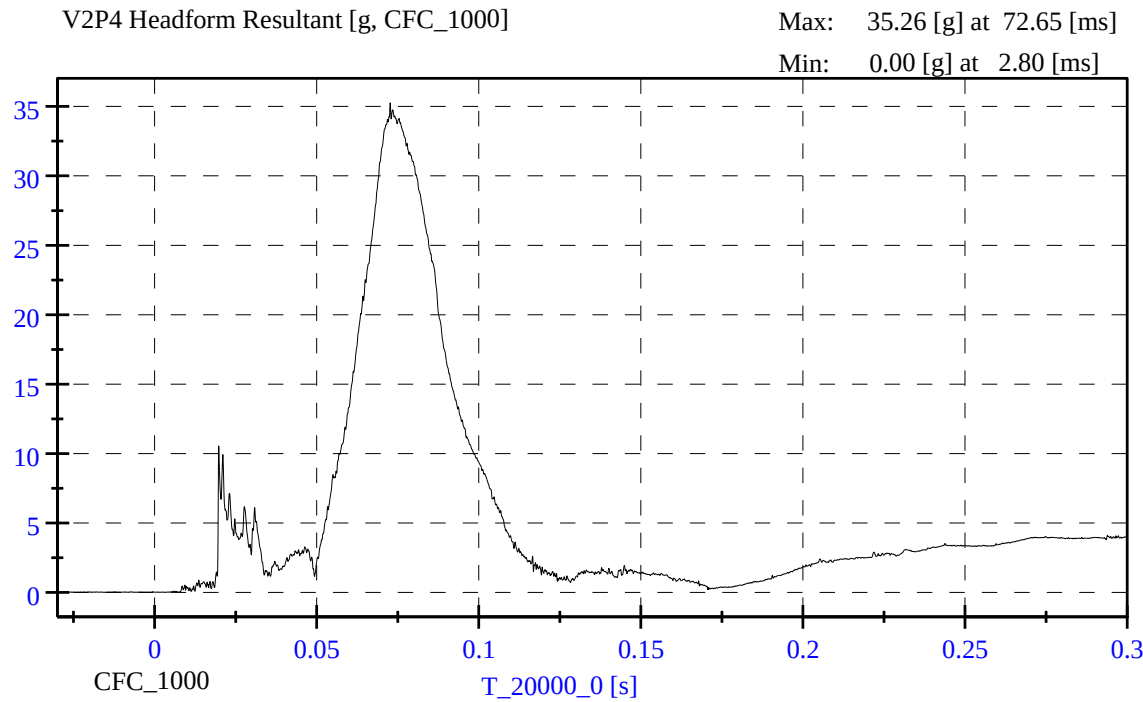


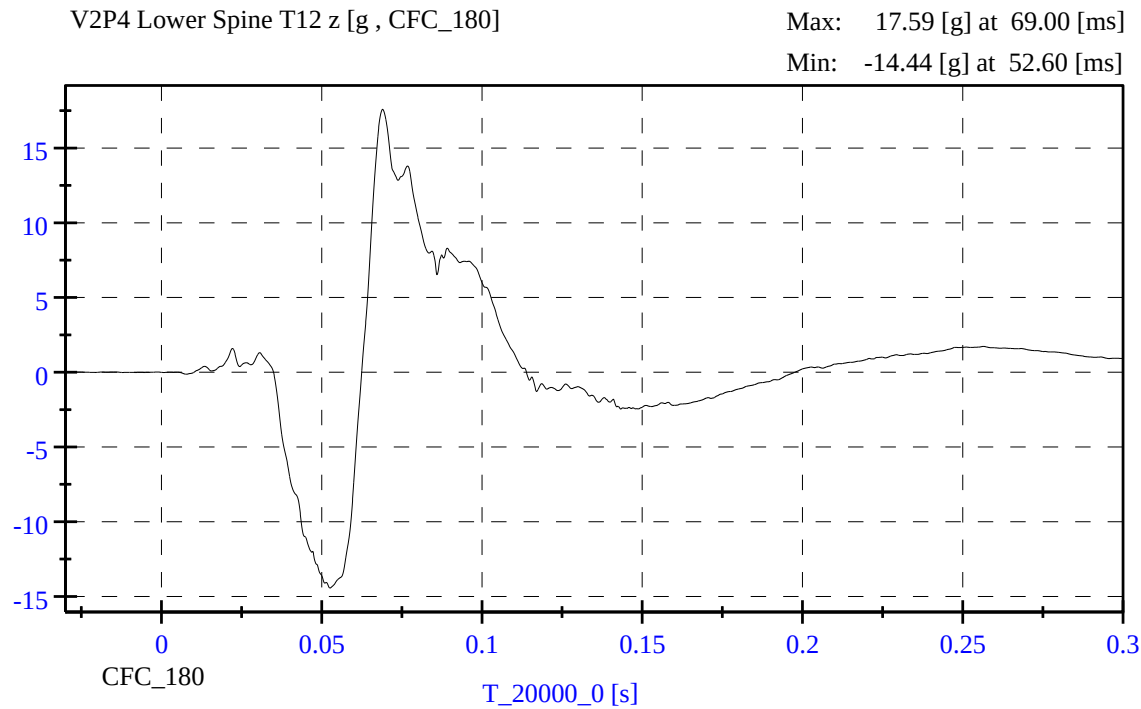
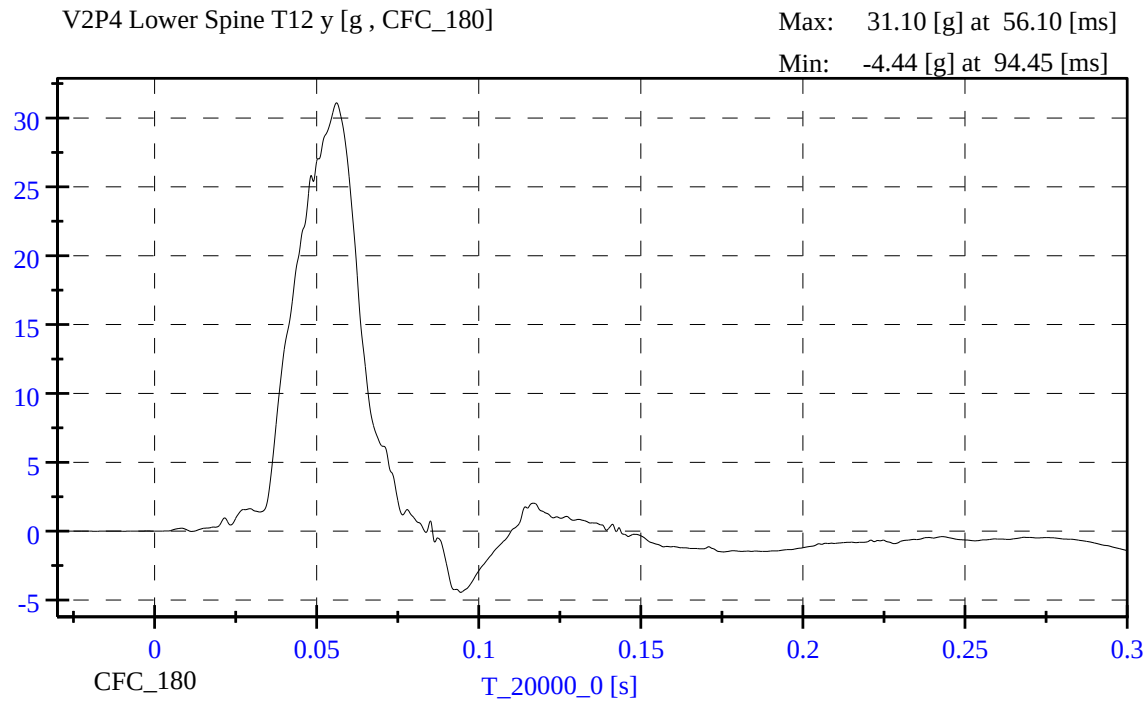


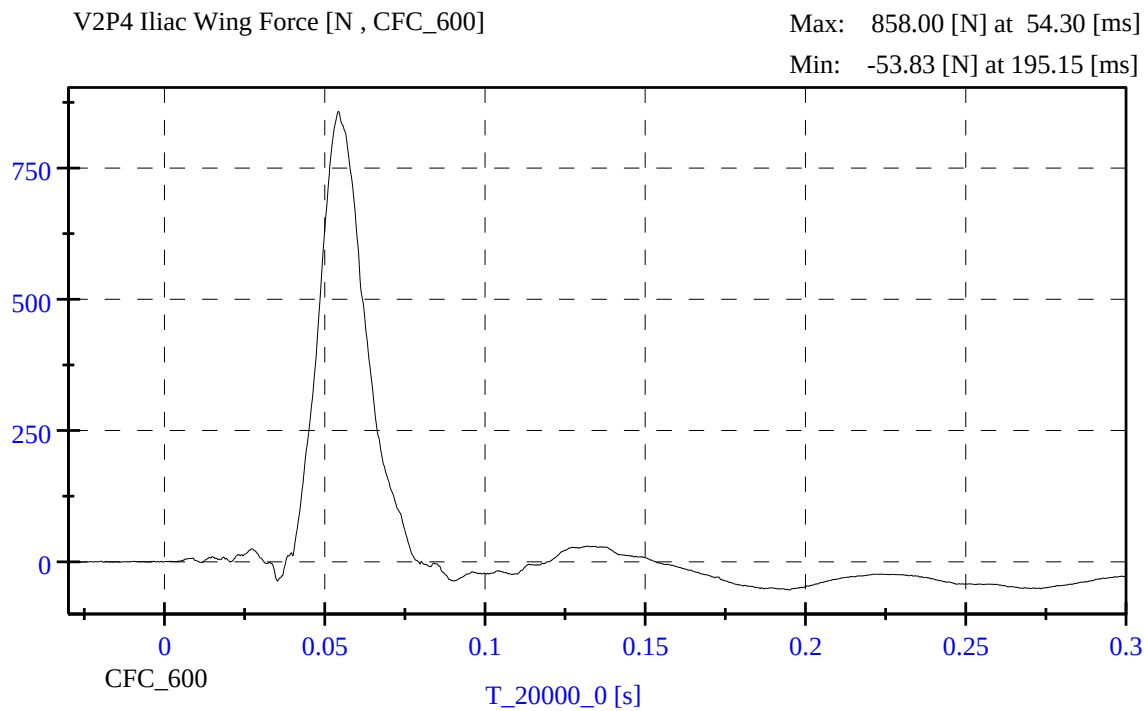
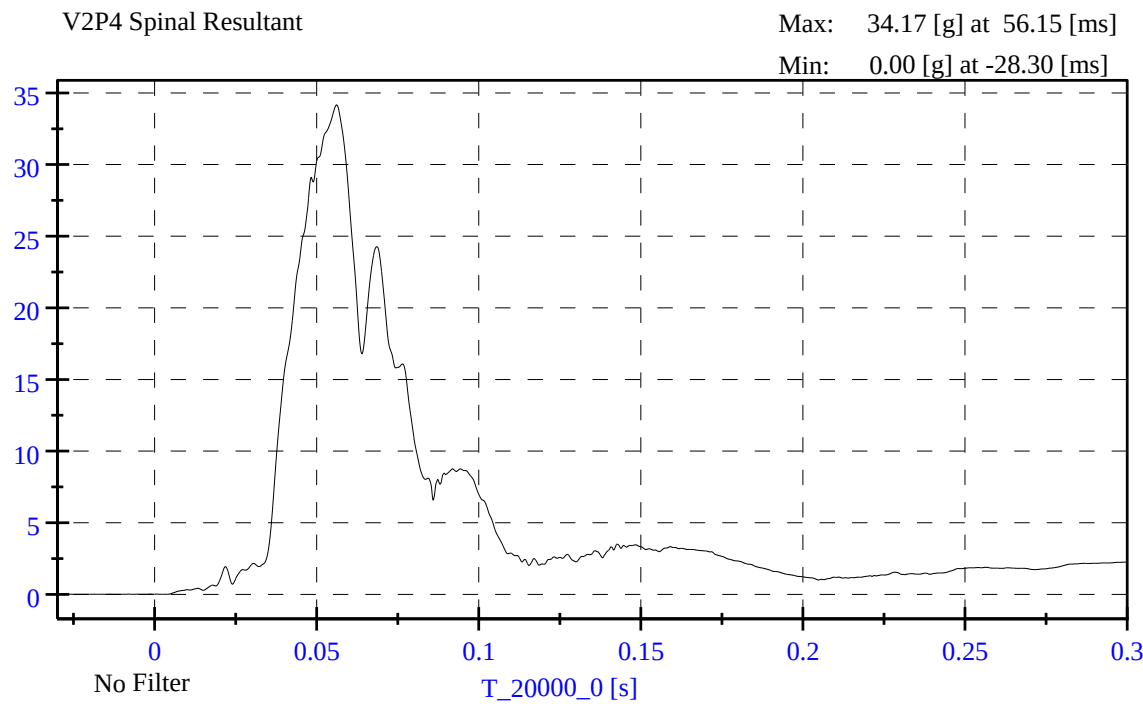


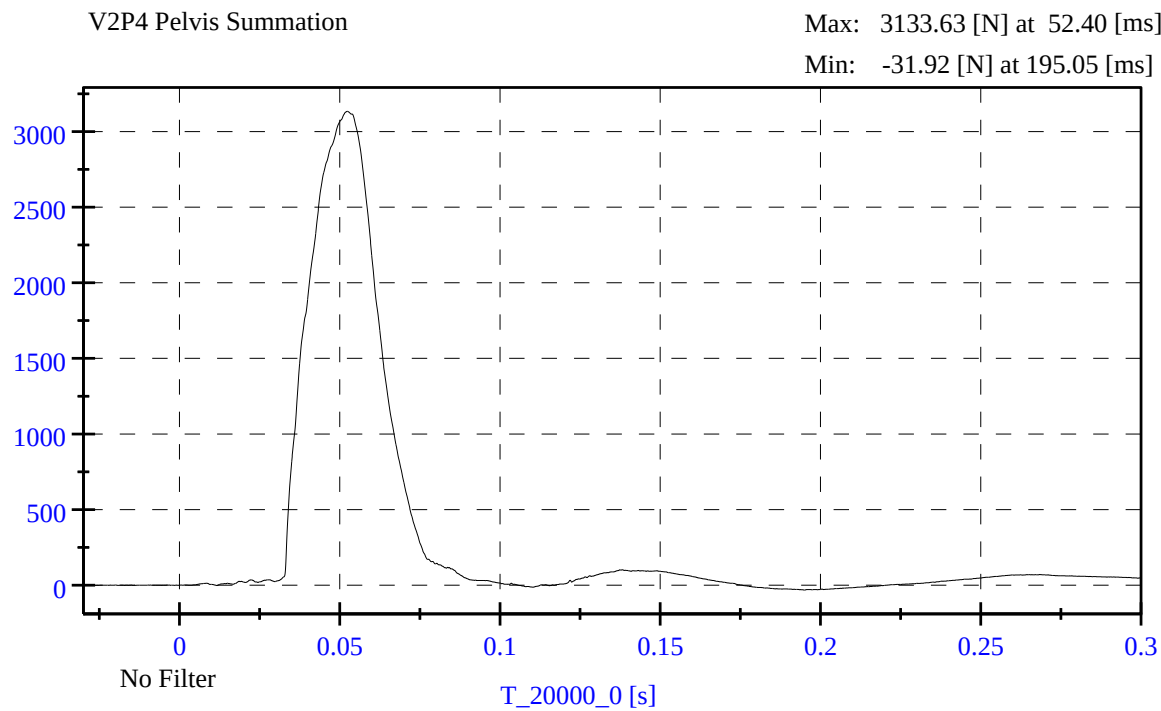
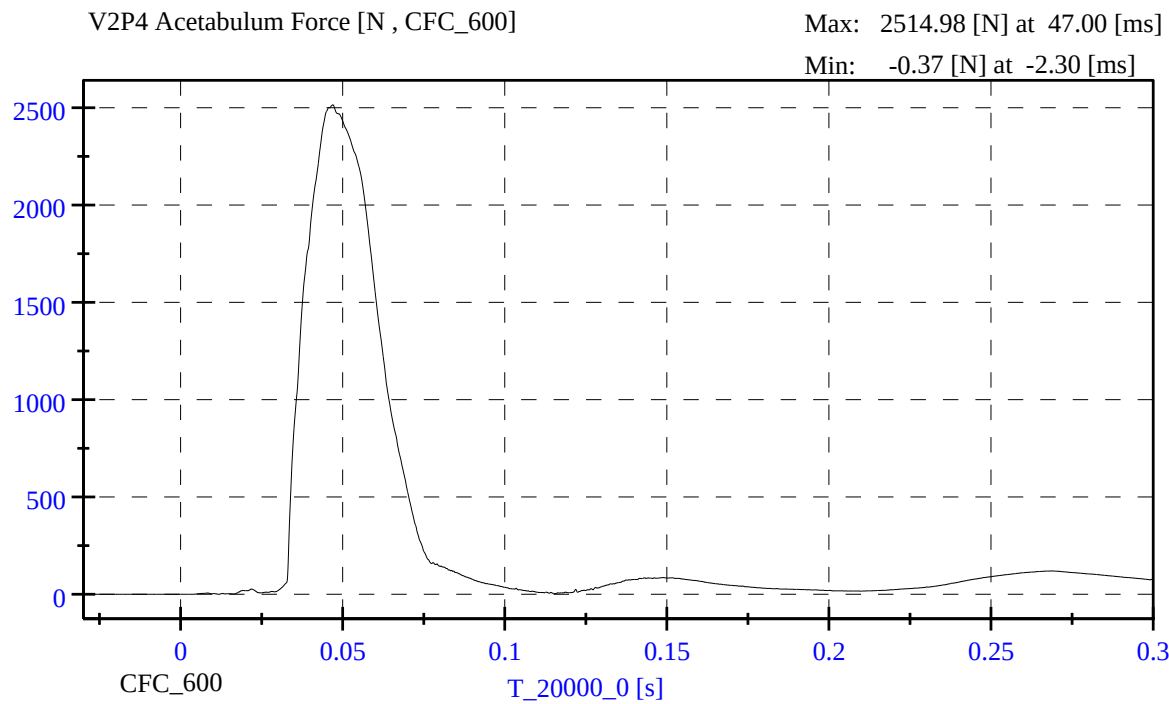












APPENDIX C

DUMMY PERFORMANCE CALIBRATION TEST DATA

CALIBRATION TEST RESULTS

PRE-TEST

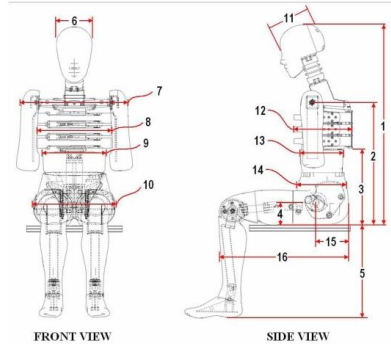
EUROSID 2 (ES-2RE) MALE – DRIVER ATD

SERIAL NO: F033

(CONFIGURED FOR LEFT SIDE IMPACT)

ES-2re External Measurements

NHTSA SN F033



Dim. No.	Description	Specification (mm)	Result (mm)	Pass/Fail
1	Sitting Height	900-918	913	Pass
2	Seat to Shoulder Joint	558-572	563	Pass
3	Seat to Lower Face of Thoracic Spine Box	346-356	354	Pass
4	Seat to Hip Joint (center of bolt)	97-103	100	Pass
5	Sole to Seat, Sitting	433-451	445	Pass
6	Head Width	152-158	155	Pass
7	Shoulder/Arm Width	461-479	465	Pass
8	Thorax Width	322-332	326	Pass
9	Abdomen Width	273-287	284	Pass
10	Pelvis Lap Width	359-373	367	Pass
11	Head Depth	196-206	200	Pass
12	Thorax Depth	262-272	269	Pass
13	Abdomen Depth	194-204	200	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	602	Pass

Technician: M. Goehle

Date: 11/30/12

VERIFICATION REPORT

Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:		Test Date:	11/30/2012
Test Number:	1	Test Time:	11:59:18 AM

Component Part Number	Component Serial Number
455-1007	1910934

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.8 deg C P
Humidity	10 -- 70	23 %RH P
Resultant Acceleration	125 -- 155	131 g P
Oscillation	0.0 -- 15.0	2.8 % P
Fore-Aft Acceleration	-15.00 -- 15.00	4.83 g P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test Time: **11:59:18 AM**

Test Date: **11/30/2012**

VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P49204	11/19/2012
Endevco	7264-2000	P63981	11/19/2012
Endevco	7264-2000	P64007	11/19/2012

Test Time: **11:59:18 AM**

Test Date: **11/30/2012**

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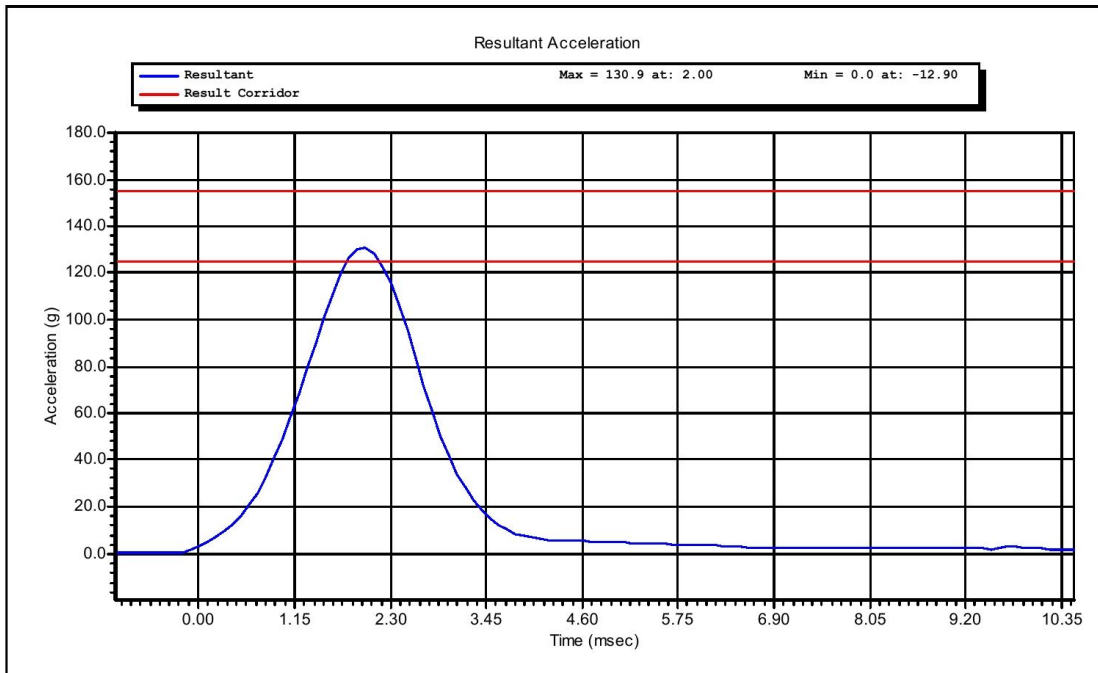


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Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:		Test Date:	11/30/2012
Test Number:	1	Test Time:	11:59:18 AM



Test Time: 11:59:18 AM

Test Date: 11/30/2012

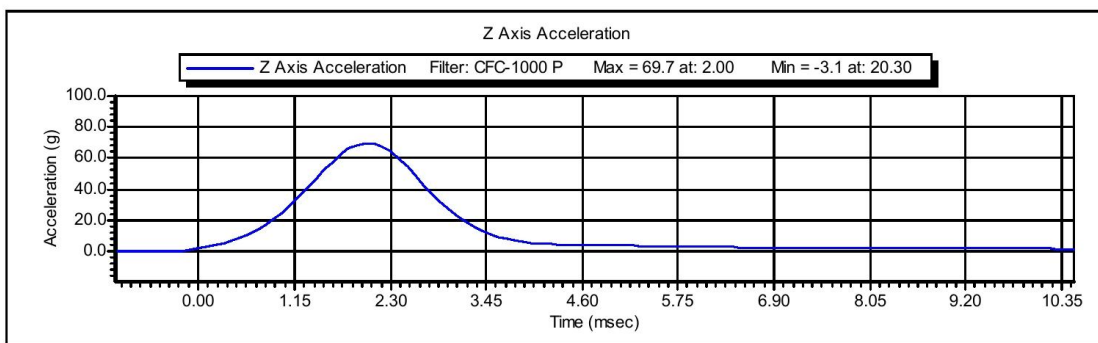
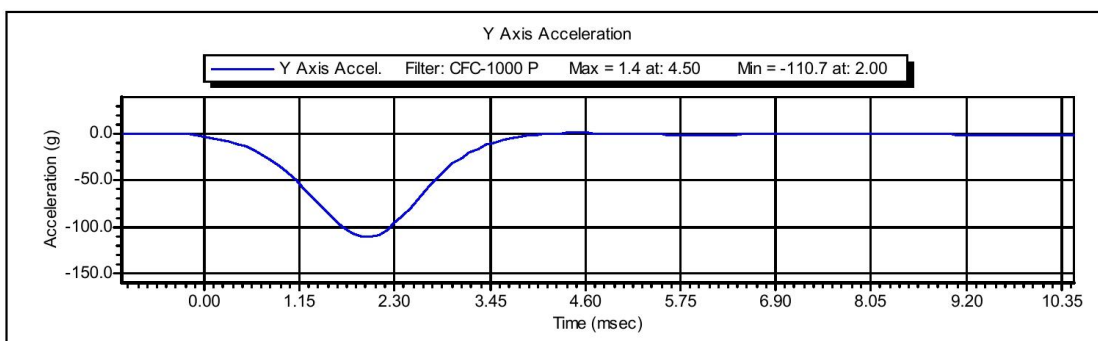
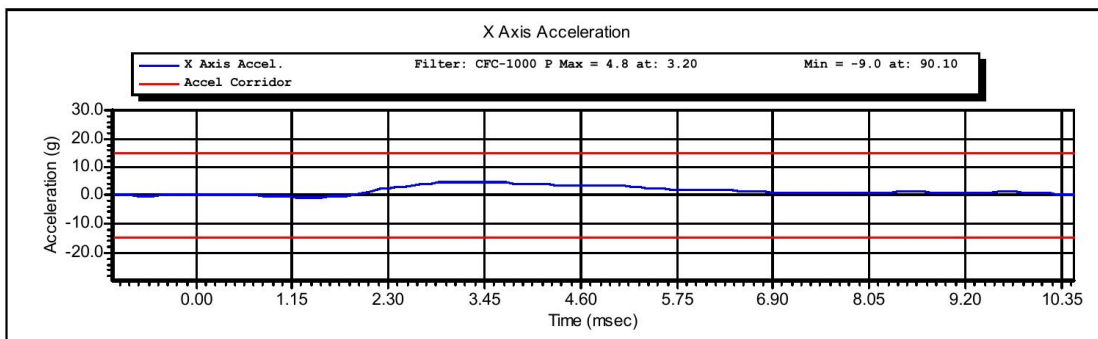
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Test Time: 11:59:18 AM

Test Date: 11/30/2012

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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:	F033		
Test ID:		Test Date:	11/30/2012
Test Number:	2	Test Time:	2:27:46 PM

Component Part Number	Component Serial Number
455-2002	175-200107085

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.9 deg C P
Humidity	10 -- 70	25 %RH P
Velocity	3.30 -- 3.50	3.45 m/s P
Maximum Neck Flexion Angle	49.0 -- 59.0	51.5 degrees P
Time At Maximum Neck Flexion	54.0 -- 66.0	60.3 ms P
Decay to Zero Degrees	53.0 -- 88.0	63.8 ms P
Velocity Corridor	--	P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test Time: **2:27:46 PM**

Test Date: **11/30/2012**



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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	C15016	8/15/2012
DentonATD	7000428	094	5/30/2012
DentonATD	7000428	095	5/30/2012
DentonATD	7000428	093	5/30/2012

Test Time: **2:27:46 PM**

Test Date: **11/30/2012**

Copyright 2006 Denton ATD, Inc. LabPac II Version: 1.8.5.0

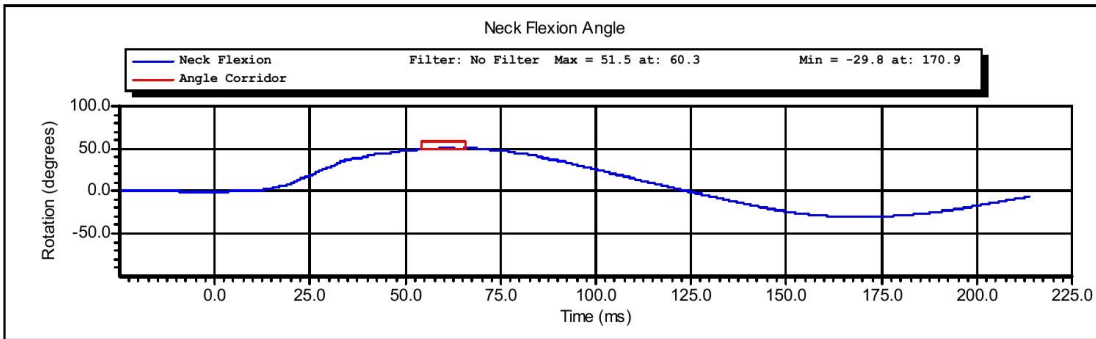
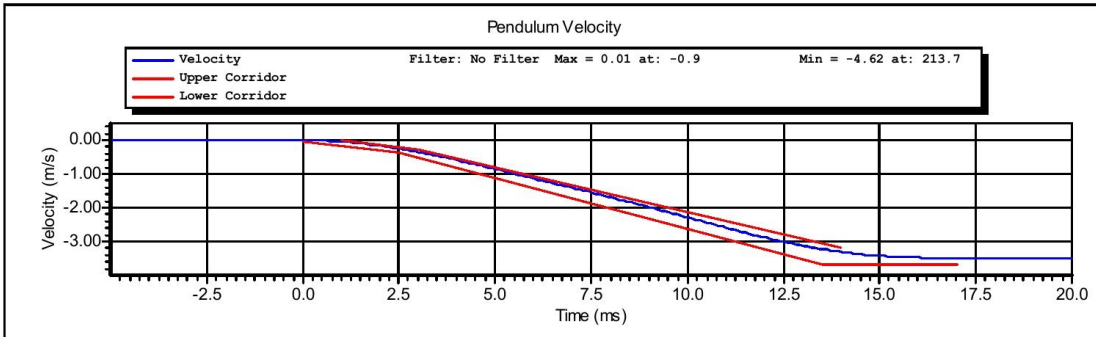


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Test Name:	Neck Flexion	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:		Test Date:	11/30/2012
Test Number:	2	Test Time:	2:27:46 PM



Test Time: 2:27:46 PM

Test Date: 11/30/2012

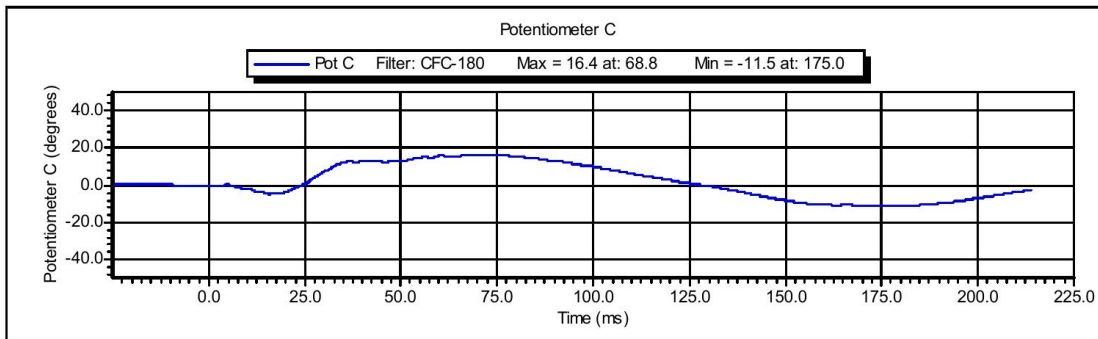
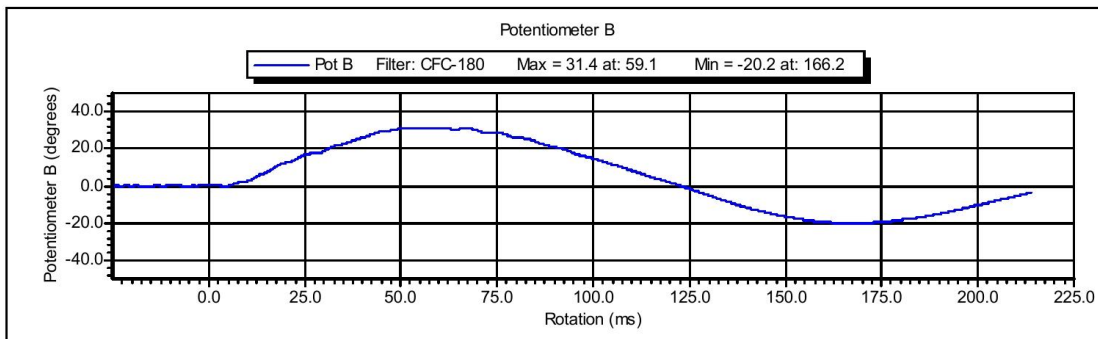
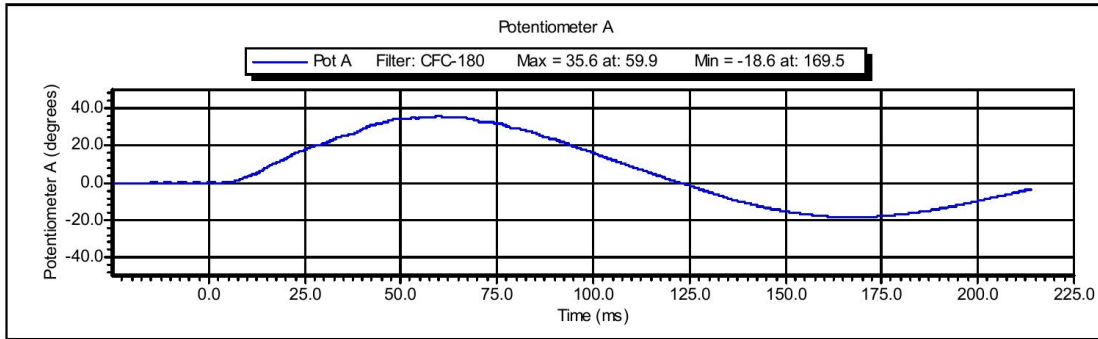
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



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Test Time: 2:27:46 PM

Test Date: 11/30/2012

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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:	F033		
Test ID:		Test Date:	11/28/2012
Test Number:	1	Test Time:	1:28:15 PM

Component Part Number	Component Serial Number
960715-313	07021

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	20.9 deg C P
Humidity	10.0 -- 70.0	20.1 %RH P
Velocity	4.20 -- 4.40	4.25 m/s P
Pendulum Acceleration	-10.50 -- -7.50	-9.32 g P

All test parameters are within specifications

Technician: **S. Zito**Supervisor: **D. Travale**Test Time: **1:28:15 PM**Test Date: **11/28/2012**



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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	C14953	11/28/2012

Test Time: 1:28:15 PM

Test Date: 11/28/2012

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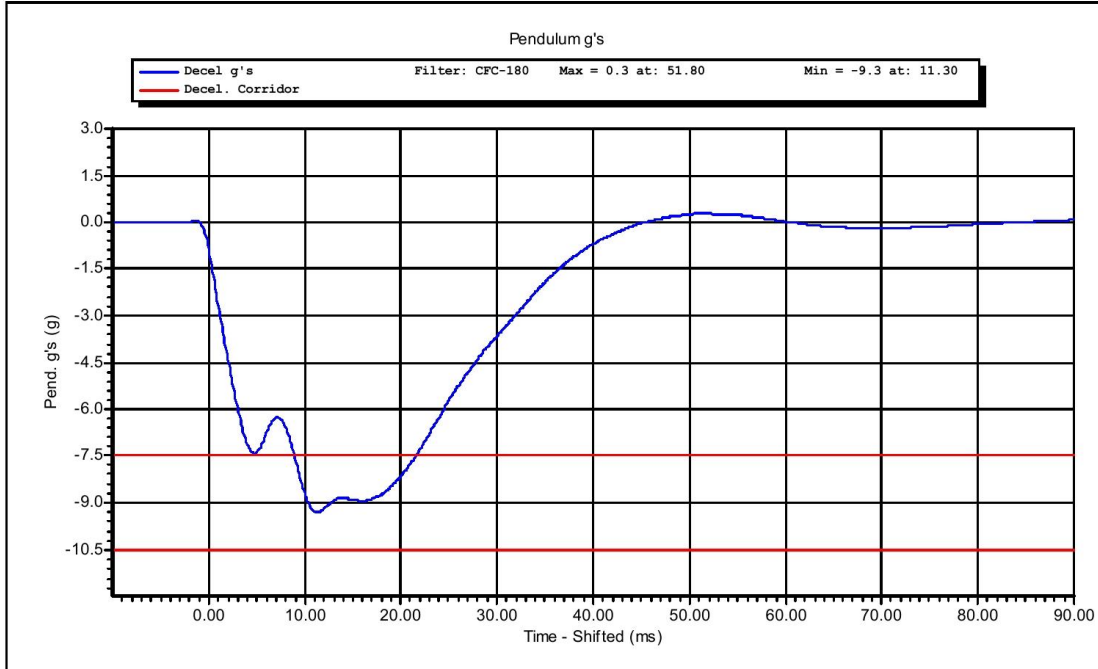


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Test Name:	Shoulder Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:		Test Date:	11/28/2012
Test Number:	1	Test Time:	1:28:15 PM



Test Time: 1:28:15 PM

Test Date: 11/28/2012

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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:	F033		
Test ID:	Upper Rib 4.0 m/s	Test Date:	11/30/2012
Test Number:	1	Test Time:	8:32:29 AM

Component Part Number	Component Serial Number
455-3100	07206

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.5 deg C P
Humidity	10.0 -- 70.0	20.4 %RH P
Velocity	3.90 -- 4.10	3.94 m/s P
Rib Displacement	-51.00 -- -46.00	-47.81 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 Time: **8:32:29 AM**

Test Date: **11/30/2012**



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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-179	5/17/2012
DentonATD	Velocity Trap	1	1/11/2012
Endevco	7264-2000	P32222	11/13/2012

Test Time: **8:32:29 AM**

Test Date: **11/30/2012**

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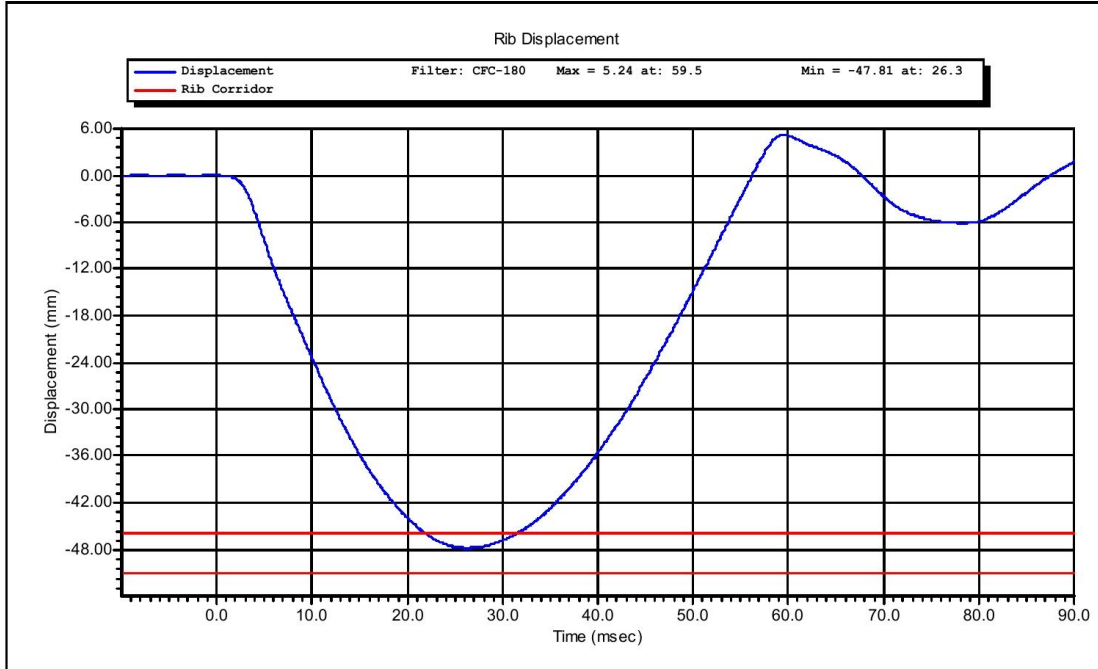


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Upper Rib 4.0 m/s	Test Date:	11/30/2012
Test Number:	1	Test Time:	8:32:29 AM



Test Time: 8:32:29 AM

Test Date: 11/30/2012

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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:	F033		
Test ID:	Upper Rib 3.0m/s	Test Date:	11/30/2012
Test Number:	1	Test Time:	8:51:26 AM

Component Part Number	Component Serial Number
455-3100	07206

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.5 deg C P
Humidity	10.0 -- 70.0	20.4 %RH P
Velocity	2.90 -- 3.10	2.98 m/s P
Rib Displacement	-40.00 -- -36.00	-37.44 mm P
Drop Height	454 -- 464	459 mm P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test Time: **8:51:26 AM**

Test Date: **11/30/2012**



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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-179	5/17/2012
DentonATD	Velocity Trap	1	1/11/2012
Endevco	7264-2000	P32222	11/13/2012

Test Time: 8:51:26 AM

Test Date: 11/30/2012

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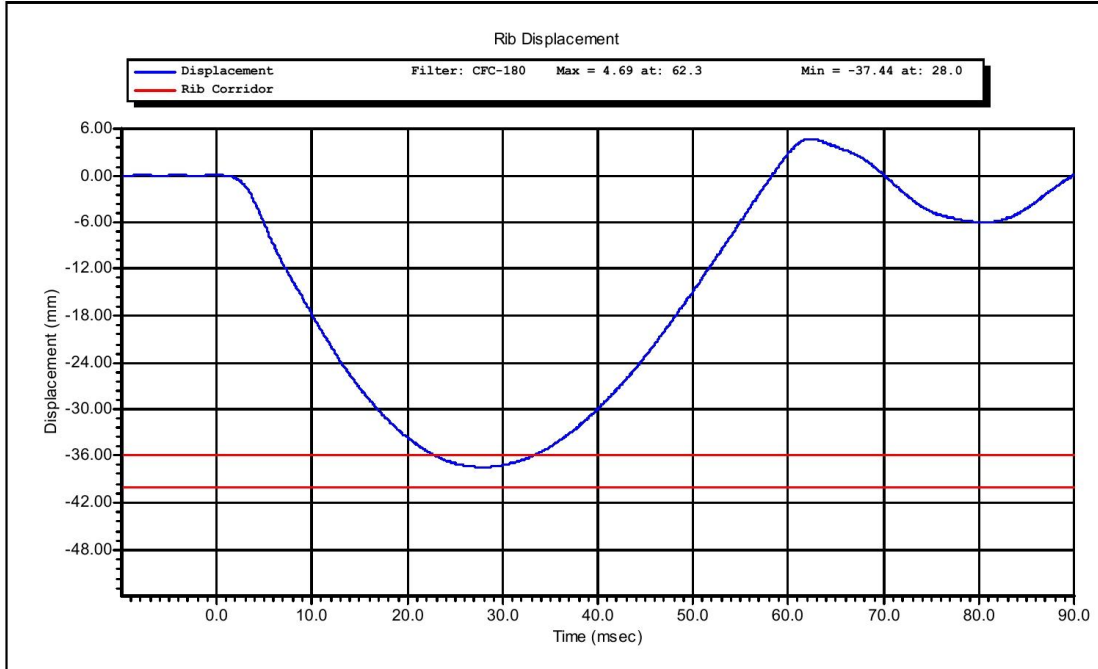


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Upper Rib 3.0m/s	Test Date:	11/30/2012
Test Number:	1	Test Time:	8:51:26 AM



Test Time: 8:51:26 AM

Test Date: 11/30/2012

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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:	F033		
Test ID:	Middle Rib 4.0 m/s	Test Date:	11/30/2012
Test Number:	1	Test Time:	9:19:52 AM

Component Part Number	Component Serial Number
455-3100	07207

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.5 deg C P
Humidity	10.0 -- 70.0	19.8 %RH P
Velocity	3.90 -- 4.10	3.90 m/s P
Rib Displacement	-51.00 -- -46.00	-47.69 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 Time: **9:19:52 AM**

Test Date: **11/30/2012**



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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-185	5/17/2012
DentonATD	Velocity Trap	1	1/11/2012
Endevco	7264-2000	P32222	11/13/2012

Test Time: 9:19:52 AM

Test Date: 11/30/2012

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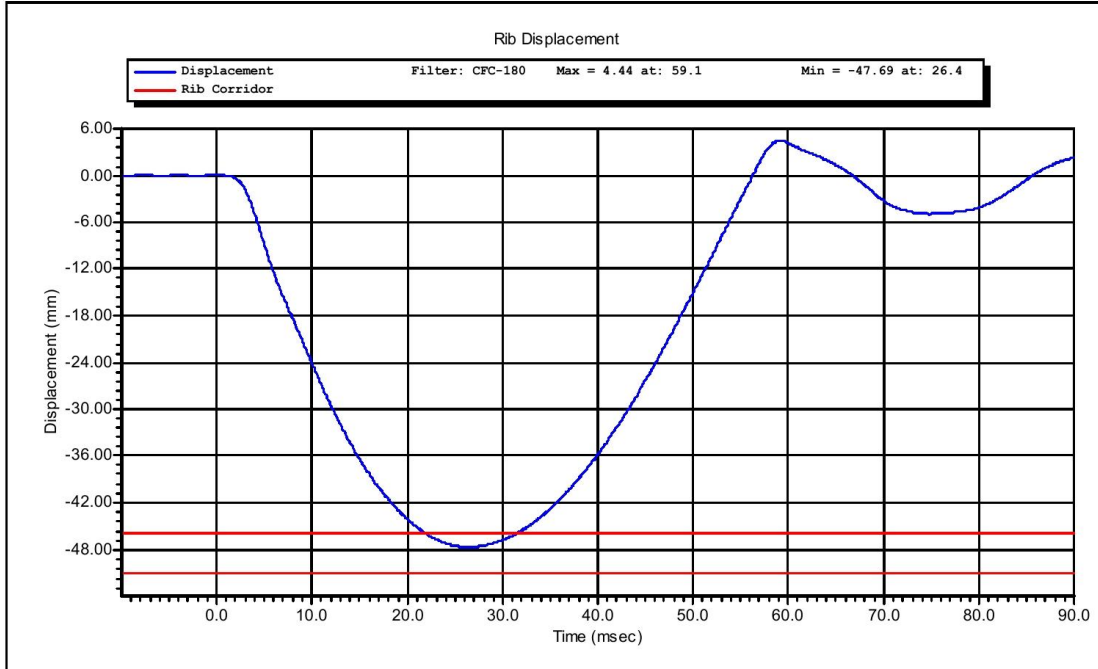


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Middle Rib 4.0 m/s	Test Date:	11/30/2012
Test Number:	1	Test Time:	9:19:52 AM



Test Time: 9:19:52 AM

Test Date: 11/30/2012

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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:	F033		
Test ID:	Middle 3.0 m/s	Test Date:	11/30/2012
Test Number:	1	Test Time:	9:41:18 AM

Component Part Number	Component Serial Number
455-3100	07207

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10.0 -- 70.0	19.6 %RH P
Velocity	2.90 -- 3.10	2.98 m/s P
Rib Displacement	-40.00 -- -36.00	-37.14 mm P
Drop Height	454 -- 464	459 mm P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test Time: **9:41:18 AM**

Test Date: **11/30/2012**



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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-185	5/17/2012
DentonATD	Velocity Trap	1	1/11/2012
Endevco	7264-2000	P32222	11/13/2012

Test Time: 9:41:18 AM

Test Date: 11/30/2012

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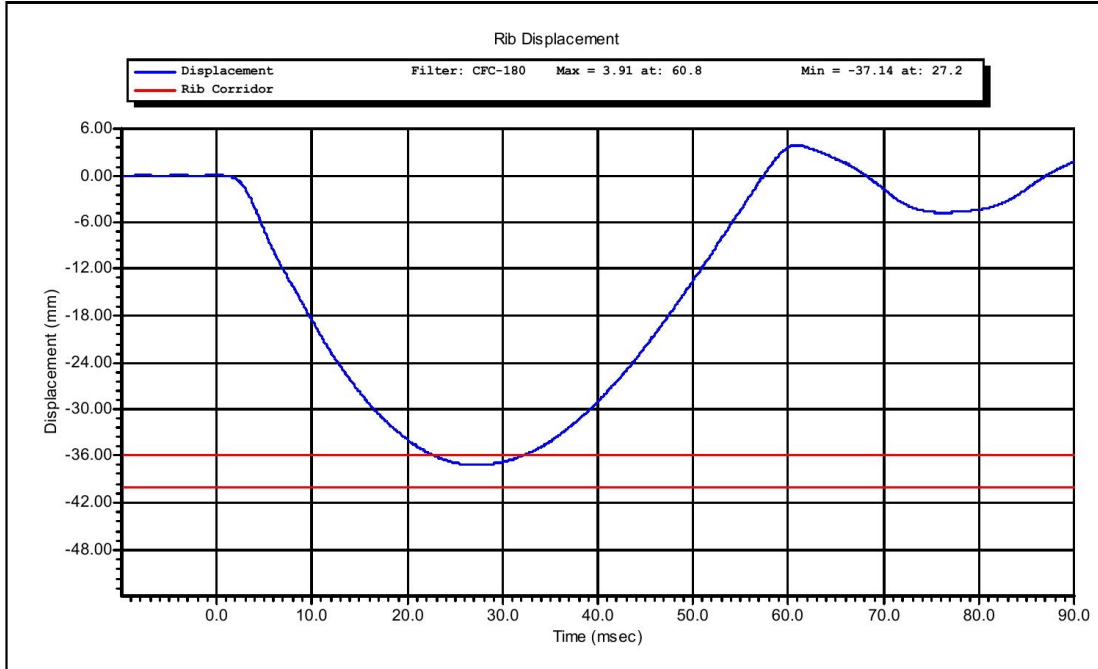


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Middle 3.0 m/s	Test Date:	11/30/2012
Test Number:	1	Test Time:	9:41:18 AM



Test Time: 9:41:18 AM

Test Date: 11/30/2012

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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:	F033		
Test ID:	Lower Rib 4.0 m/s	Test Date:	11/30/2012
Test Number:	1	Test Time:	9:58:02 AM

Component Part Number	Component Serial Number
455-3100	07208

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10.0 -- 70.0	19.3 %RH P
Velocity	3.90 -- 4.10	3.96 m/s P
Rib Displacement	-51.00 -- -46.00	-47.79 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 Time: **9:58:02 AM**

Test Date: **11/30/2012**

VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-178	5/17/2012
DentonATD	Velocity Trap	1	1/11/2012
Endevco	7264-2000	P32222	11/13/2012

Test Time: **9:58:02 AM**

Test Date: **11/30/2012**

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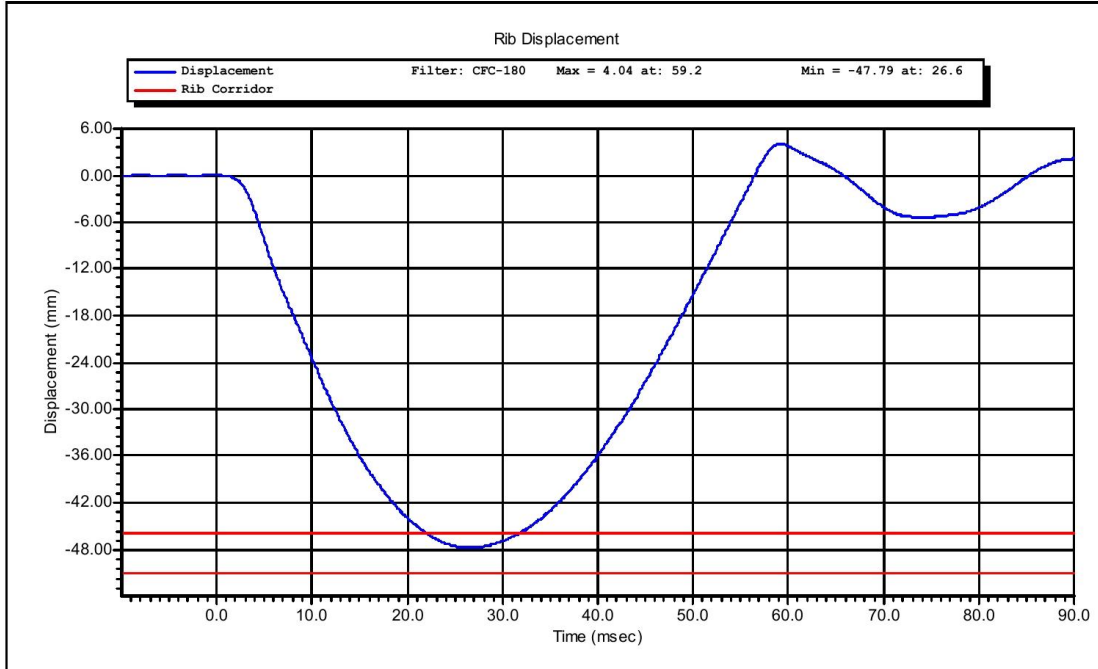


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Lower Rib 4.0 m/s	Test Date:	11/30/2012
Test Number:	1	Test Time:	9:58:02 AM



Test Time: 9:58:02 AM

Test Date: 11/30/2012

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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:	F033		
Test ID:	Lower 3.0 m/s	Test Date:	11/30/2012
Test Number:	1	Test Time:	10:15:43 AM

Component Part Number	Component Serial Number
455-3100	07208

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10.0 -- 70.0	19.2 %RH P
Velocity	2.90 -- 3.10	2.98 m/s P
Rib Displacement	-40.00 -- -36.00	-37.36 mm P
Drop Height	454 -- 464	459 mm P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test Time: **10:15:43 AM**

Test Date: **11/30/2012**



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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-178	5/17/2012
DentonATD	Velocity Trap	1	1/11/2012
Endevco	7264-2000	P32222	11/13/2012

Test Time: **10:15:43 AM**

Test Date: **11/30/2012**

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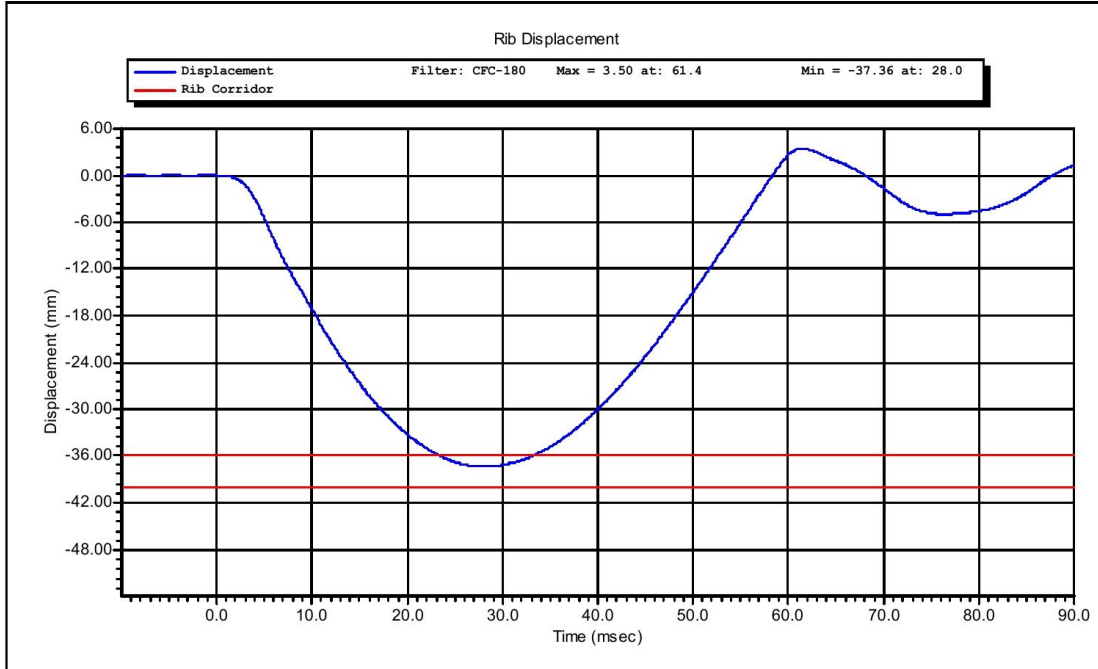


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Lower 3.0 m/s	Test Date:	11/30/2012
Test Number:	1	Test Time:	10:15:43 AM



Test Time: 10:15:43 AM

Test Date: 11/30/2012

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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:	F033		
Test ID:		Test Date:	11/28/2012
Test Number:	1	Test Time:	11:24:02 AM

Component Part Number	Component Serial Number
Upper Rib - 175-4002	07206
Middle Rib - 175-4002	07207
Lower Rib - 175-4002	07208

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.2 deg C P
Humidity	10.0 -- 70.0	19.9 %RH P
Velocity	5.40 -- 5.60	5.52 m/s P
Upper Rib Displacement	34.0 -- 41.0	37.1 mm P
Middle Rib Displacement	37.0 -- 45.0	41.6 mm P
Lower Rib Displacement	37.0 -- 44.0	40.8 mm P
Impactor Force	5100 -- 6200	5723 N P

All test parameters are within specifications

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

Test Time: **11:24:02 AM**

Test Date: **11/28/2012**



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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	C14953	11/28/2012
Honeywell	MLT-38000	DS-179	5/17/2012
Honeywell	MLT-38000	DS-185	5/17/2012
Honeywell	MLT-38000	DS-178	5/17/2012

Test Time: 11:24:02 AM

Test Date: 11/28/2012

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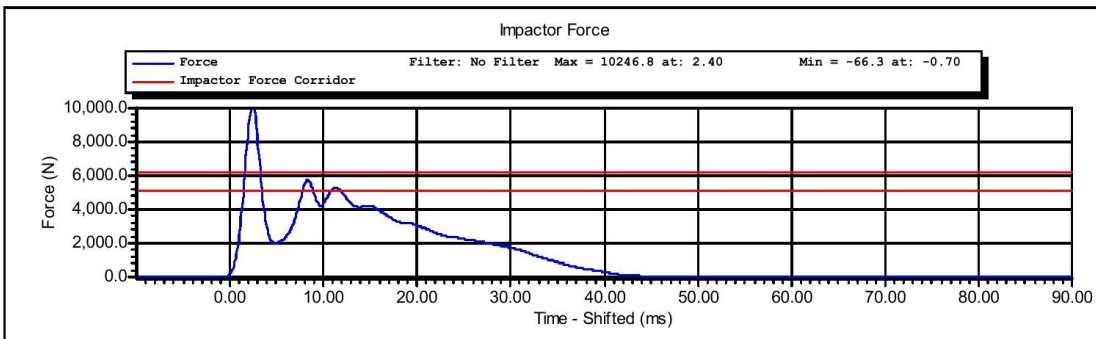
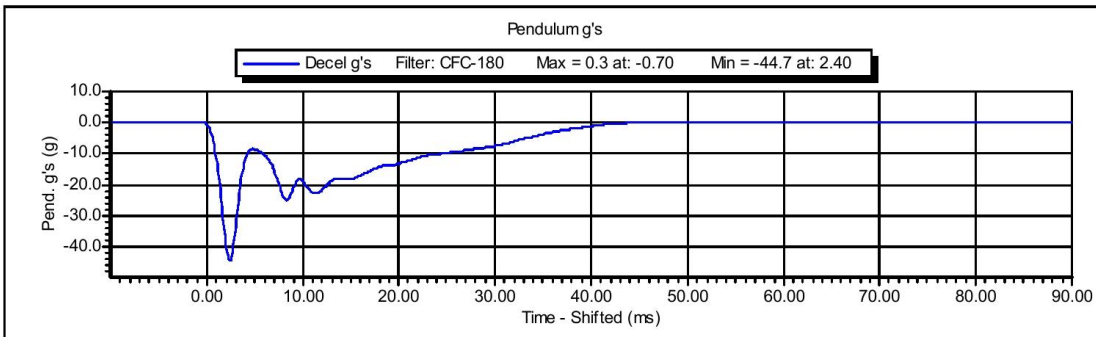


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Test Name:	Thorax Impact	Revision:	8/15/2008
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:		Test Date:	11/28/2012
Test Number:	1	Test Time:	11:24:02 AM



Test Time: 11:24:02 AM

Test Date: 11/28/2012

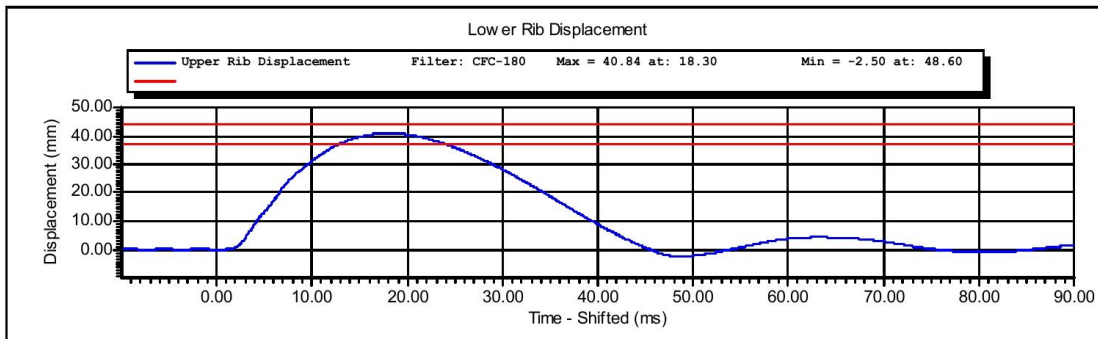
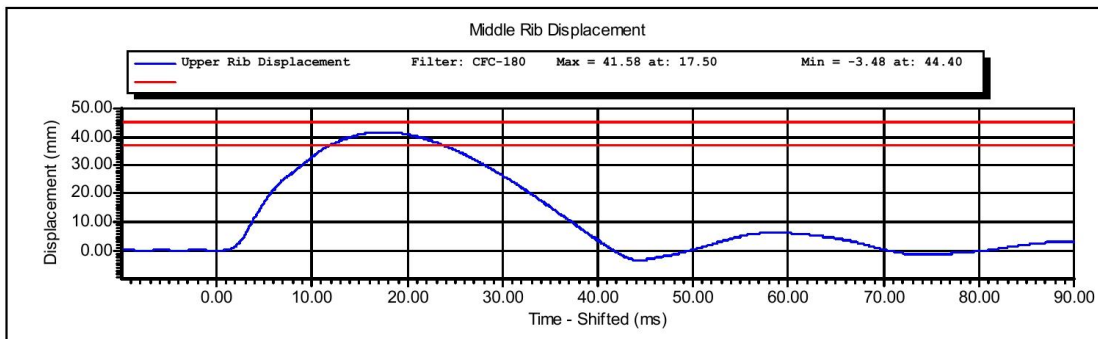
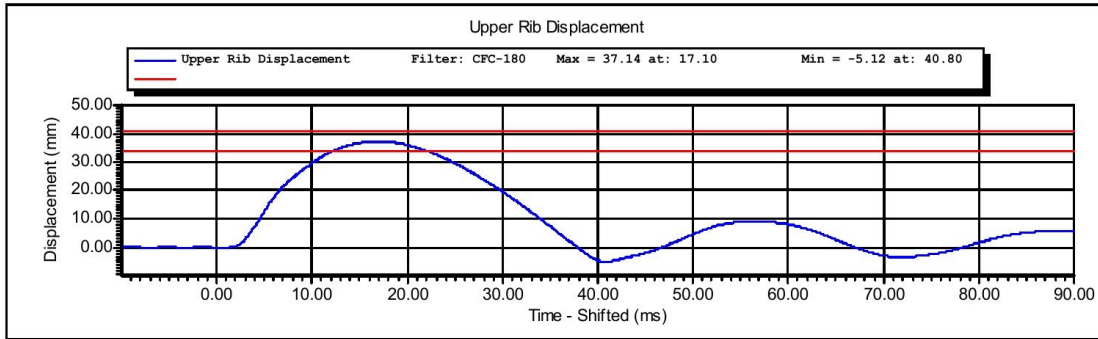
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Test Time: 11:24:02 AM

Test Date: 11/28/2012

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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:	F033		
Test ID:		Test Date:	11/28/2012
Test Number:	1	Test Time:	11:04:15 AM

Component Part Number	Component Serial Number
455-4001	07/136

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.0 deg C P
Humidity	10 -- 70	20 %RH P
Velocity	3.90 -- 4.10	4.05 m/s P
Peak Abdominal Force	-2.70 -- -2.20	-2.53 kN P
Time At Peak Abdominal Force	10.0 -- 12.3	10.8 ms P
Maximum Pendulum Force	-4.80 -- -4.00	-4.55 kN P
Time at Peak Pendulum Force	10.6 -- 13.0	10.6 ms P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test Time: **11:04:15 AM**

Test Date: **11/28/2012**



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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	C14953	11/28/2012
Denton	2631	LC-1524	5/24/2012
Denton	2631	LC-1523	5/24/2012
Denton	2631	LC-1530	5/24/2012

Test Time: 11:04:15 AM

Test Date: 11/28/2012

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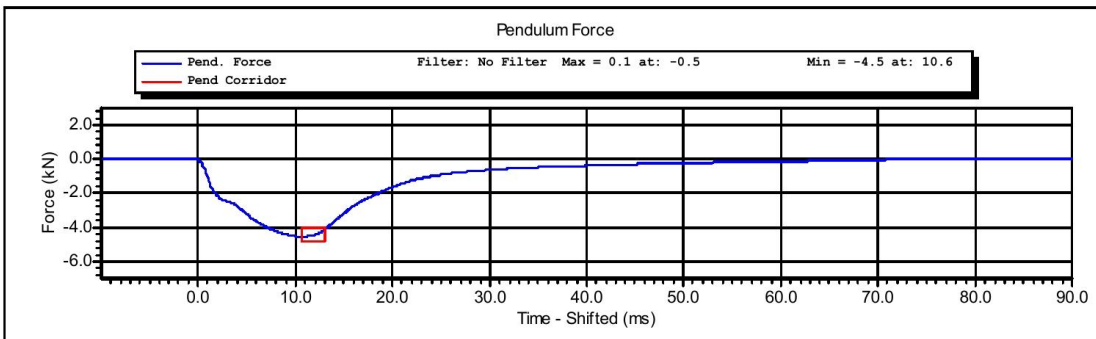
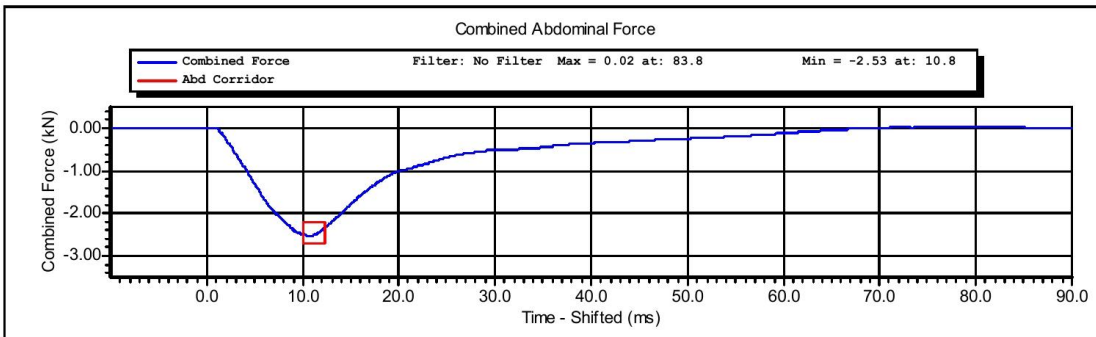


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Test Name:	Abdominal Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:		Test Date:	11/28/2012
Test Number:	1	Test Time:	11:04:15 AM



Test Time: 11:04:15 AM

Test Date: 11/28/2012

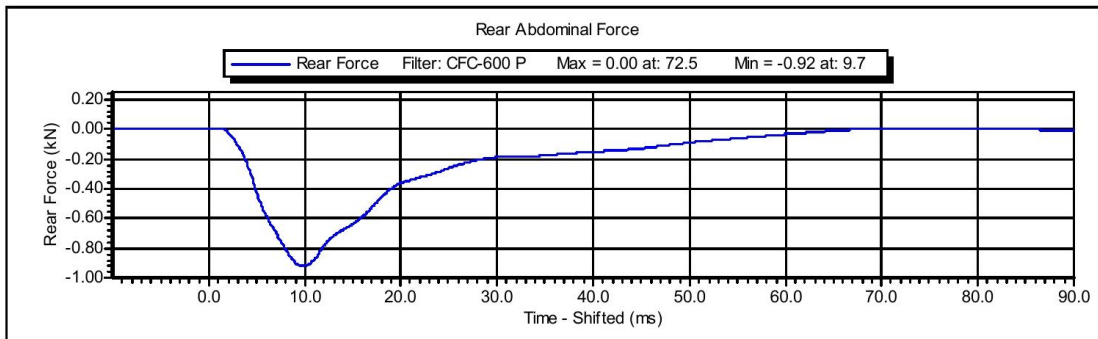
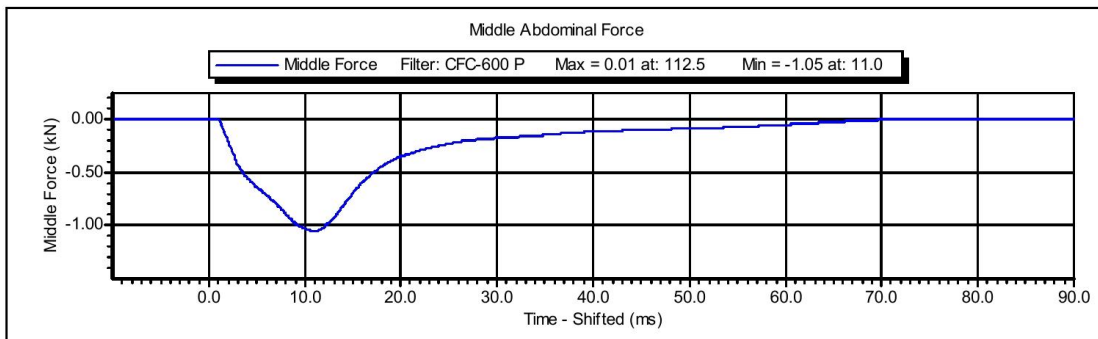
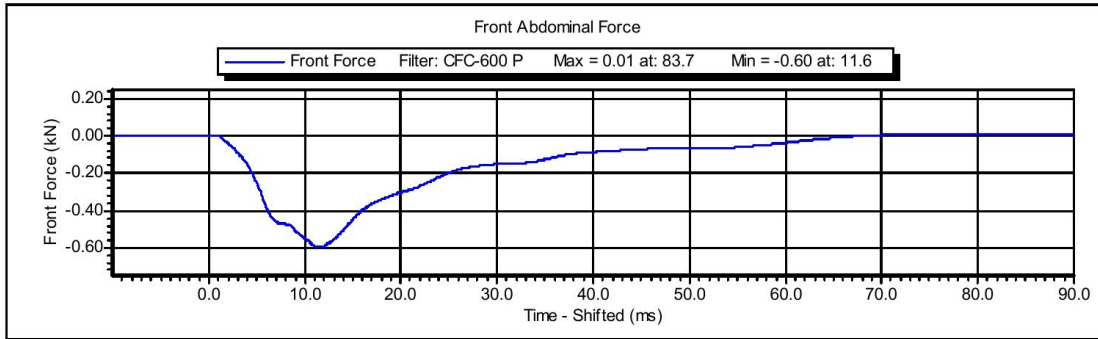
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Test Time: 11:04:15 AM

Test Date: 11/28/2012

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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:	F033		
Test ID:		Test Date:	11/30/2012
Test Number:	2	Test Time:	3:43:54 PM

Component Part Number	Component Serial Number
175-5501	D18374

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.9 deg C P
Humidity	10 -- 70	25 %RH P
Velocity	5.95 -- 6.15	6.14 m/s P
Maximum Headform Flexion Angle	45.0 -- 55.0	46.4 degrees P
Time at Maximum Headform Flexion Angle	39.0 -- 53.0	47.1 ms P
Decay to Zero Degrees	37.0 -- 57.0	38.6 ms P
Velocity Corridor	--	P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test Time: **3:43:54 PM**

Test Date: **11/30/2012**



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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	C15016	8/15/2012
DentonATD	7000428	094	5/30/2012
DentonATD	7000428	095	5/30/2012
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Test Time: 3:43:54 PM

Test Date: 11/30/2012

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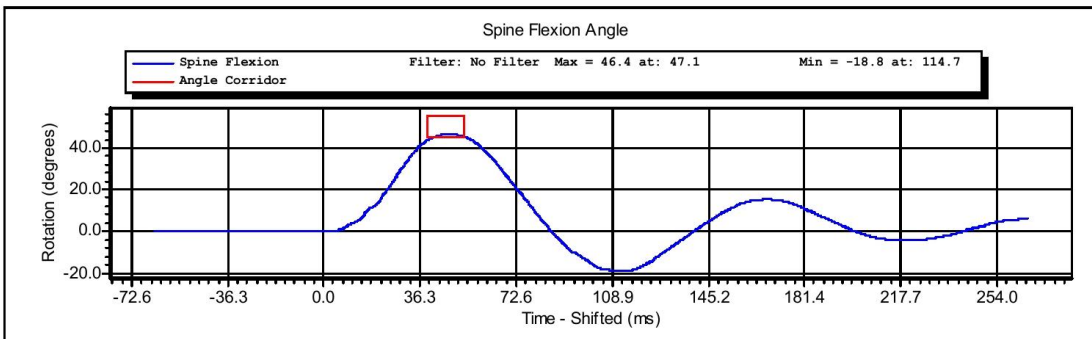
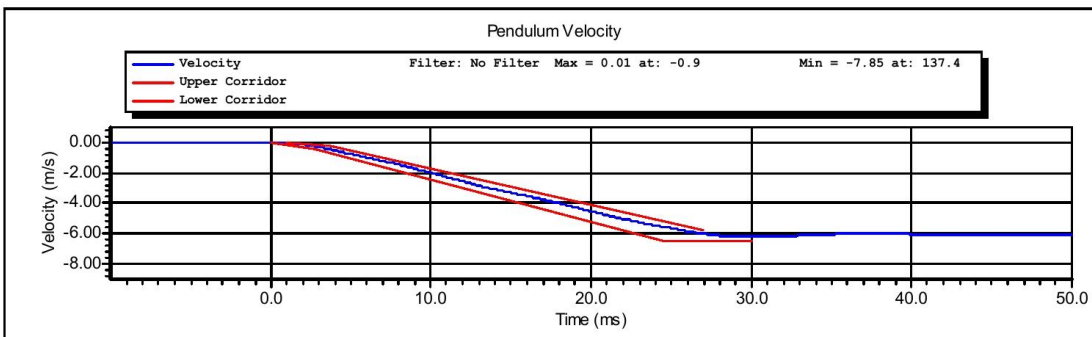


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Test Name:	Lumbar Spine	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:		Test Date:	11/30/2012
Test Number:	2	Test Time:	3:43:54 PM



Test Time: **3:43:54 PM**

Test Date: **11/30/2012**

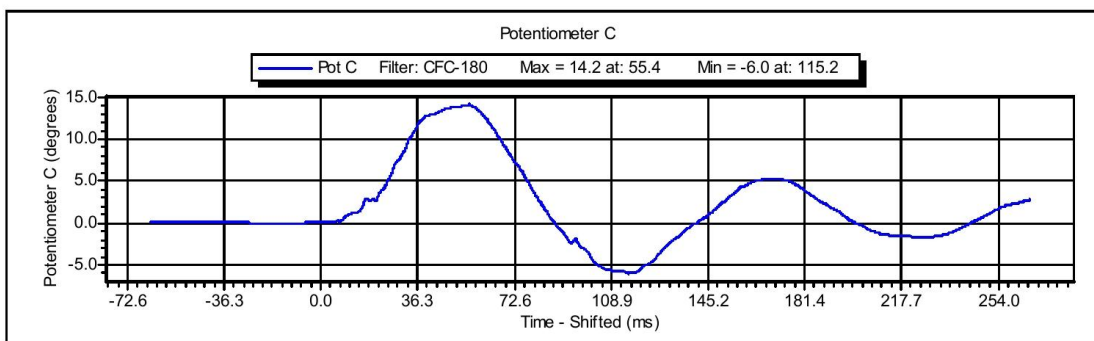
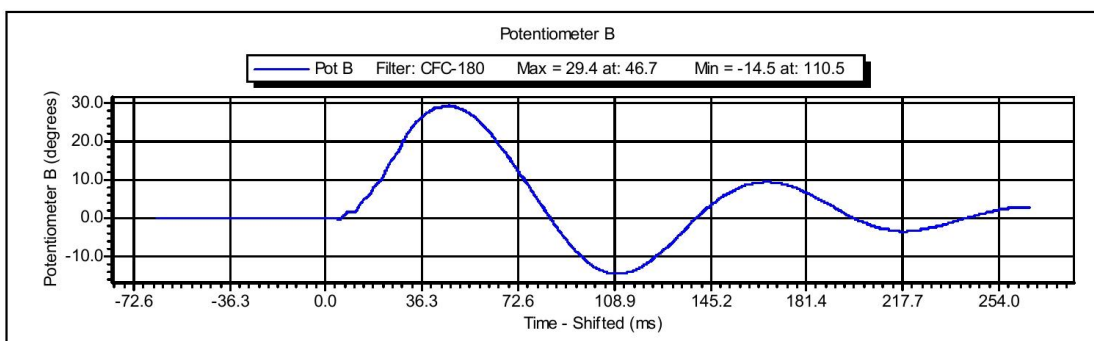
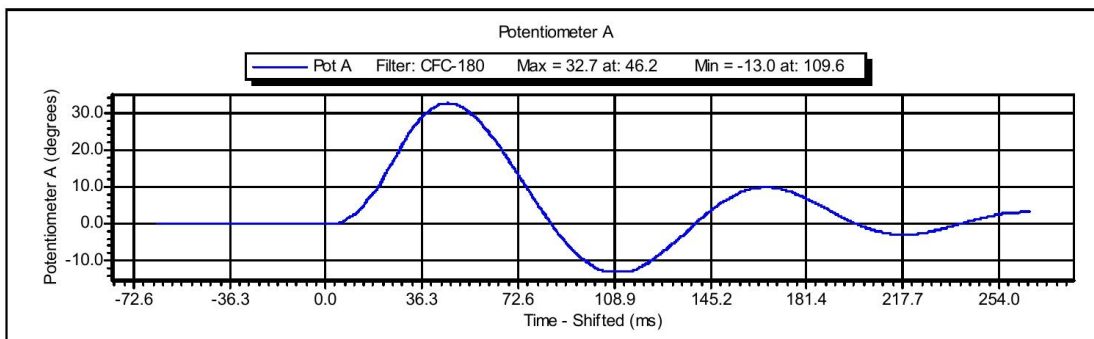
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Test Time: 3:43:54 PM

Test Date: 11/30/2012

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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:	F033		
Test ID:		Test Date:	11/28/2012
Test Number:	1	Test Time:	10:09:02 AM

Component Part Number	Component Serial Number
455-4003	07033

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	20.9 deg C	P
Humidity	10	--	70	21 %RH	P
Velocity	4.20	--	4.40	4.36 m/s	P
Peak Pendulum Force	-5.40	--	-4.70	-5.11 kN	P
Time at Peak Pendulum Force	11.80	--	16.10	13.10 ms	P
Peak Pubic Symphysis Force	-1.59	--	-1.23	-1.35 kN	P
Time at Peak Pubic Symphysis Force	12.20	--	17.00	13.60 ms	P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test Time: **10:09:02 AM**

Test Date: **11/28/2012**



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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	C14953	11/28/2012
Denton	3096	LC-456Fy	5/24/2012

Test Time: 10:09:02 AM

Test Date: 11/28/2012

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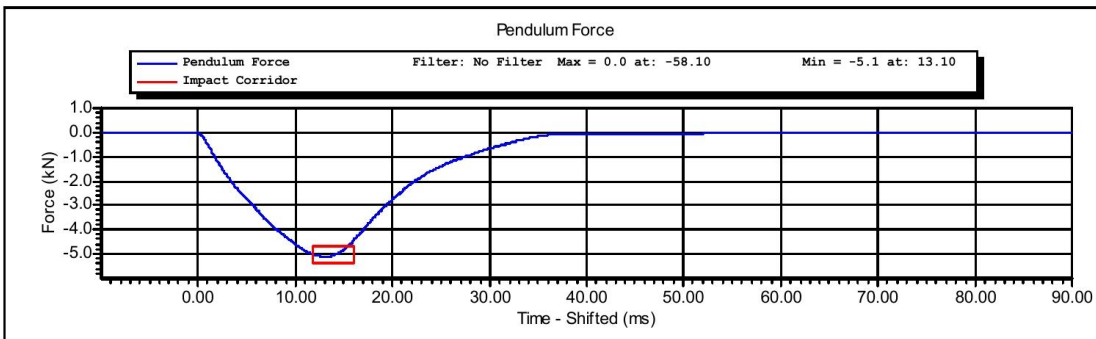
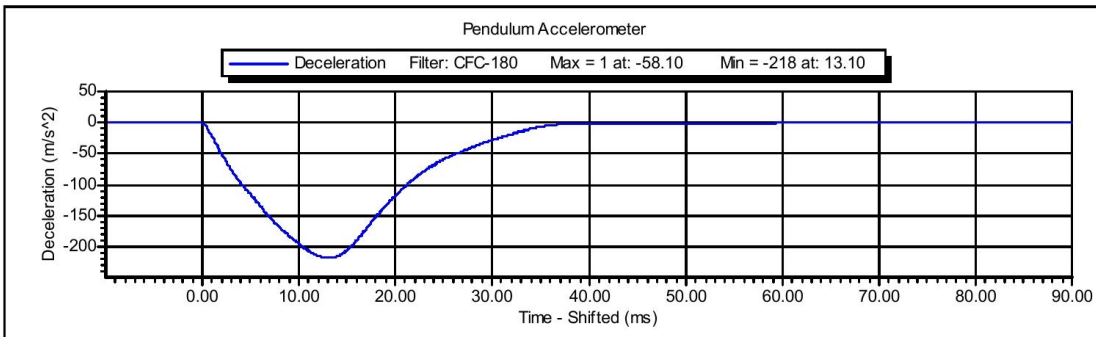


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Test Name:	Pelvis Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:		Test Date:	11/28/2012
Test Number:	1	Test Time:	10:09:02 AM



Test Time: **10:09:02 AM**

Test Date: **11/28/2012**

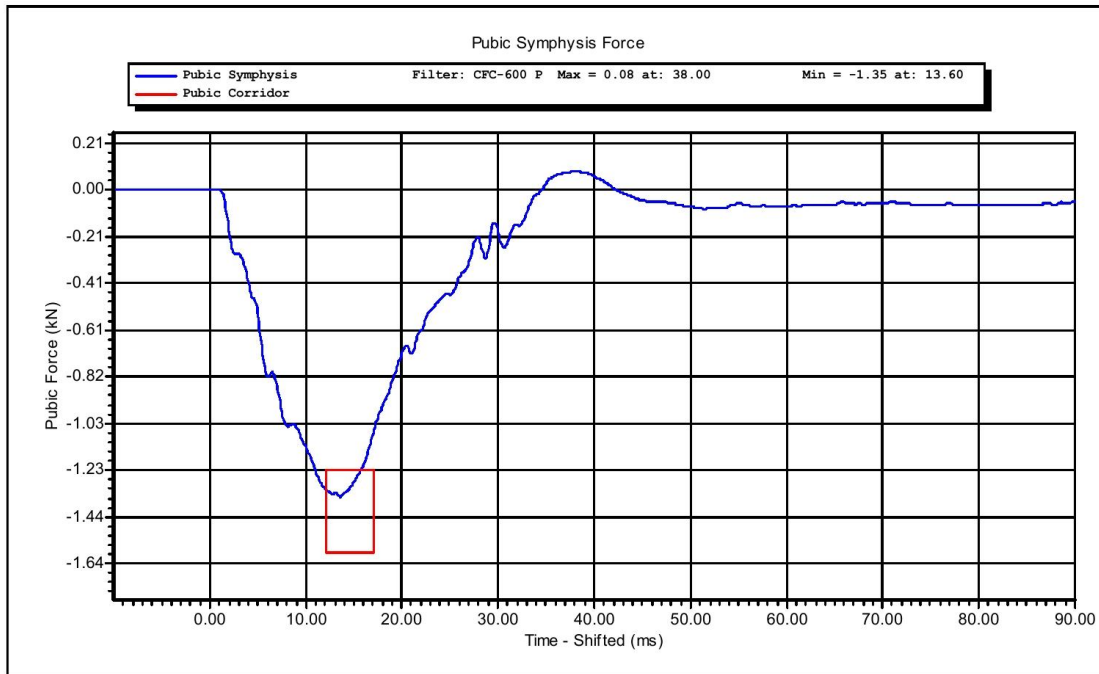
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Test Time: 10:09:02 AM

Test Date: 11/28/2012

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CALIBRATION TEST RESULTS

PRE-TEST

SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD

SERIAL No: 8012

(CONFIGURED FOR LEFT SIDE IMPACT)



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SID-IIsD External Measurements

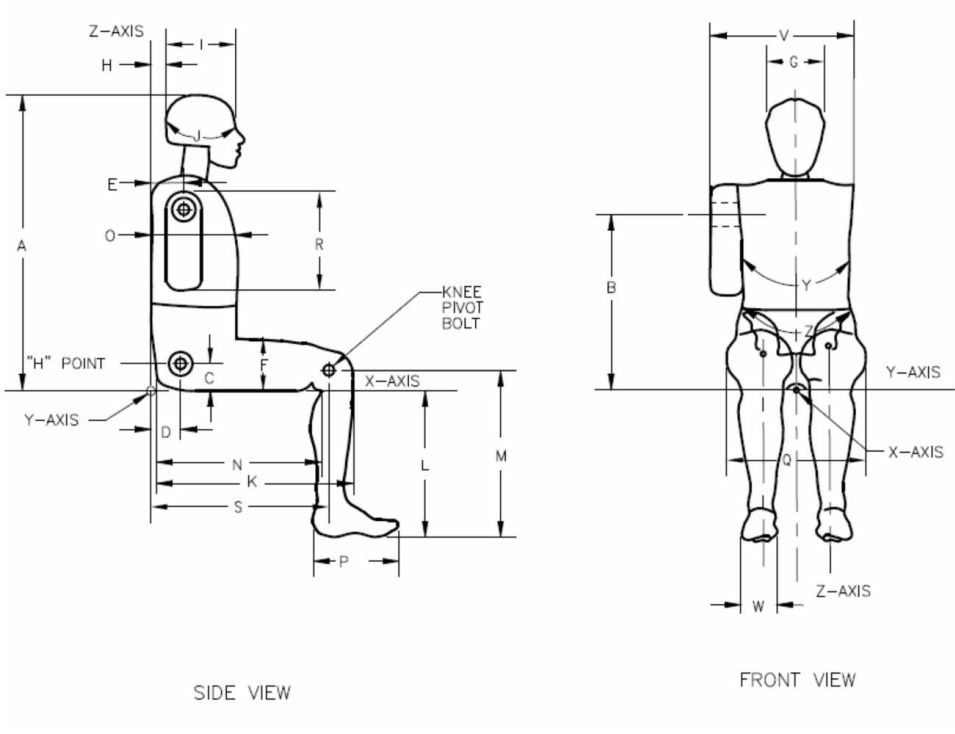
NHTSA ATD S/N DG8012

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	781	Yes
B	Shoulder Pivot Height	437.0 - 453.0	444	Yes
C	H-Point Height	79.0 - 89.0	85	Yes
D	H-Point from Seat Back	141.0 - 151.0	145	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	101	Yes
F	Thigh Clearance	119.0 - 135.0	128	Yes
G	Head Breadth	140.0 - 148.0	145	Yes
H	Head Back from Backline	40.0 - 46.0	43	Yes
I	Head Depth	178.0 - 188.0	183	Yes
J	Head Circumference	541.0 - 551.0	545	Yes
K	Buttock to Knee Length	514.0 - 540.0	529	Yes
L	Popliteal Height	343.0 - 369.0	348	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	398	Yes
N	Buttock Popliteal Length	416.0 - 442.0	431	Yes
O	Chest Depth without Jacket	195.0 - 211.0	205	Yes
P	Foot Length (right)	216.0 - 232.0	222	Yes
Q	Hip Breadth	313.0 - 323.0	320	Yes
R	Arm Length	249.0 - 259.0	251	Yes
S	Knee Joint to Seat back	478.0 - 493.0	481	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	350	Yes
W	Foot Width (right)	78.0 - 94.0	84	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	864	Yes
Z	Waist Circumference	761.0 - 791.0	767	Yes

Technician: M. Goehle

11/12/2012

SID-IIsD External Dimension Reference Diagram



VERIFICATION REPORT

Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	DG8012		
Test ID:	Head Drop	Test Date:	1/25/2013
Test Number:	1	Test Time:	1:54:52 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.6 deg C P
Humidity	10 -- 70	14 %RH P
Resultant Acceleration	115.0 -- 137.0	125.1 g P
Oscillation	0.0 -- 15.0	0.0 % P
Fore-Aft Acceleration	-15.0 -- 15.0	-3.3 g P

All test parameters are within specifications

Technician: **M. Goehle**Supervisor: **E. Dutton**Test Time: **1:54:52 PM**Test Date: **1/25/2013**

VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P49185	1/25/2013
Endevco	7264-2000	P64129	1/25/2013
Endevco	7264-2000	P51991	1/25/2013

Test Time: **1:54:52 PM**Test Date: **1/25/2013**

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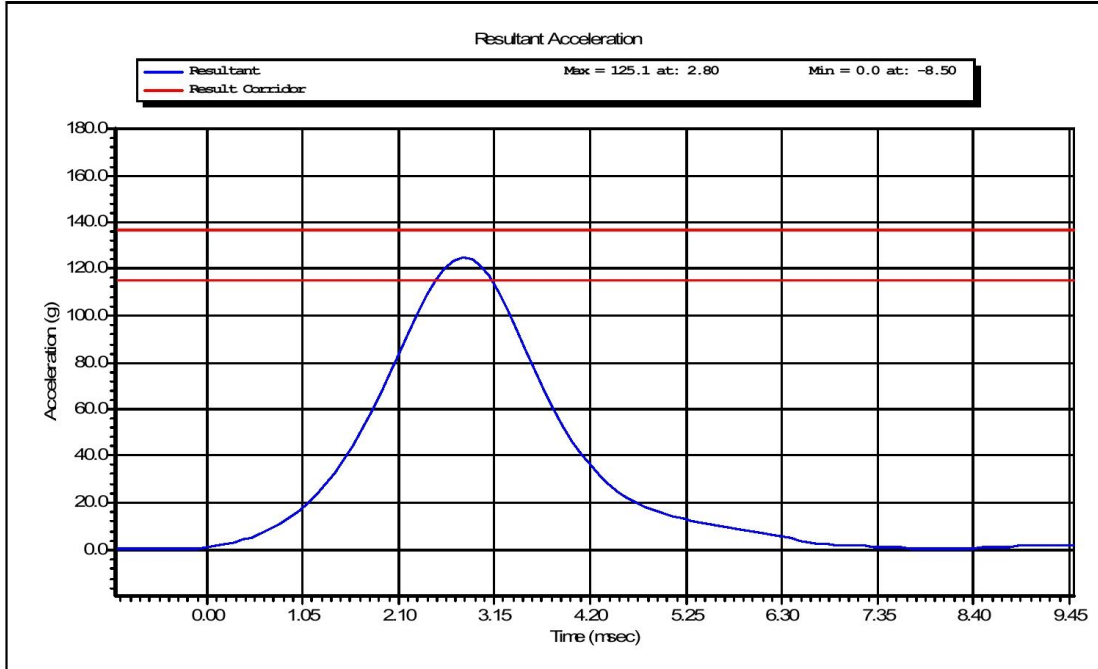


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Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	DG8012		
Test ID:	Head Drop	Test Date:	1/25/2013
Test Number:	1	Test Time:	1:54:52 PM



Test Time: 1:54:52 PM

Test Date: 1/25/2013

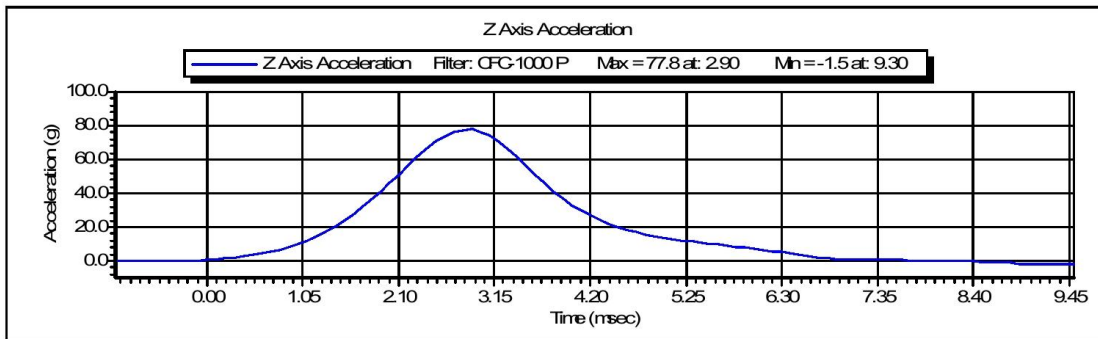
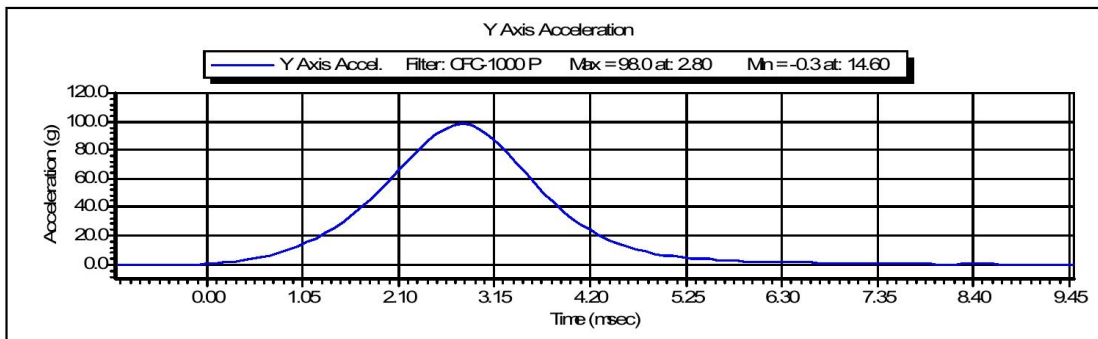
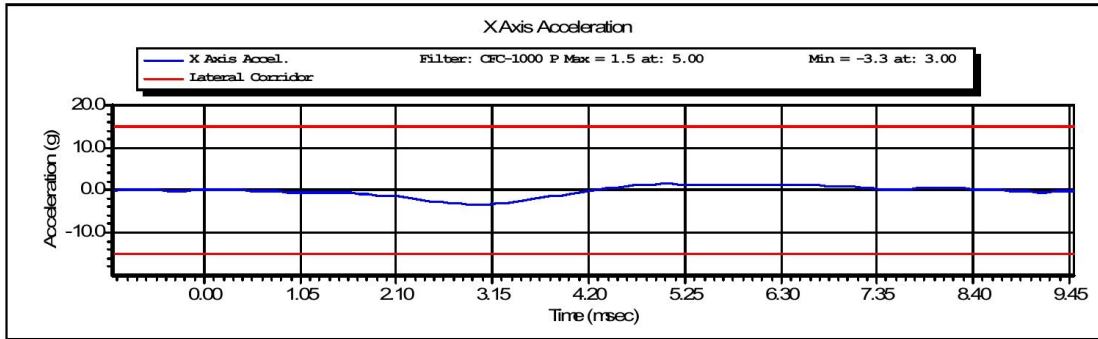
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Test Time: 1:54:52 PM

Test Date: 1/25/2013

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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-IIs		
ATD Serial Number:	DG8012		
Test ID:	Neck Flexion	Test Date:	1/25/2013
Test Number:	2	Test Time:	4:54:16 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.5 deg C P
Humidity	10 -- 70	20 %RH P
Velocity	5.51 -- 5.63	5.61 m/s P
Pendulum Impulse at 10 ms	2.20 -- 2.80	2.40 m/s P
Pendulum Impulse at 15 ms	3.30 -- 4.10	3.55 m/s P
Pendulum Impulse at 20 ms	4.40 -- 5.40	4.89 m/s P
Pendulum Impulse at 25 ms	5.40 -- 6.10	5.62 m/s P
Pendulum Impulse between 25 and 100 ms	5.50 -- 6.20	5.64 m/s P
Max D Plane Rotation	71.0 -- 81.0	75.2 degrees P
Time at Max Rotation	50.0 -- 70.0	60.3 ms P
Moment about OC	-44.0 -- -36.0	-42.2 Nm P
Moment Decay to Zero	102.0 -- 126.0	116.1 ms P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **E. Dutton**

Test Time: **4:54:16 PM**

Test Date: **1/25/2013**



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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	C15016	8/15/2012
Denton	1716A	LC-2192Fy	5/21/2012
Denton	1716A	LC-2192Mx	5/21/2012
DentonATD	78051-342	184	5/30/2012
DentonATD	78051-342	174	5/30/2012
DentonATD	78051-342	185	5/30/2012

Test Time: 4:54:16 PM

Test Date: 1/25/2013

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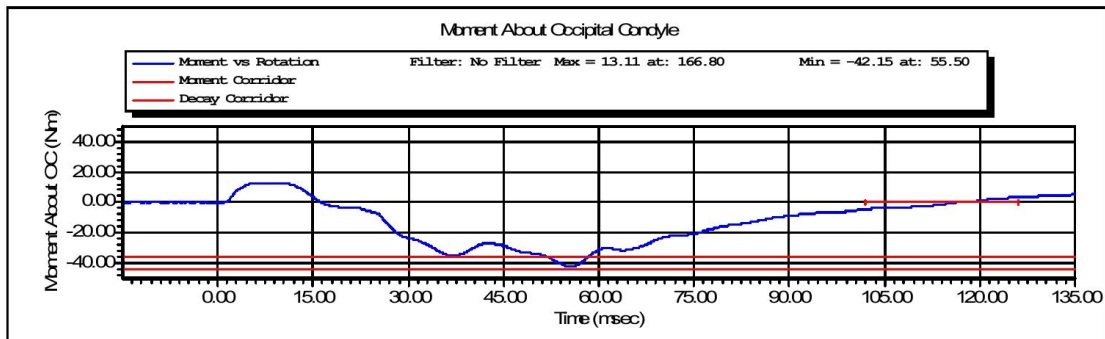
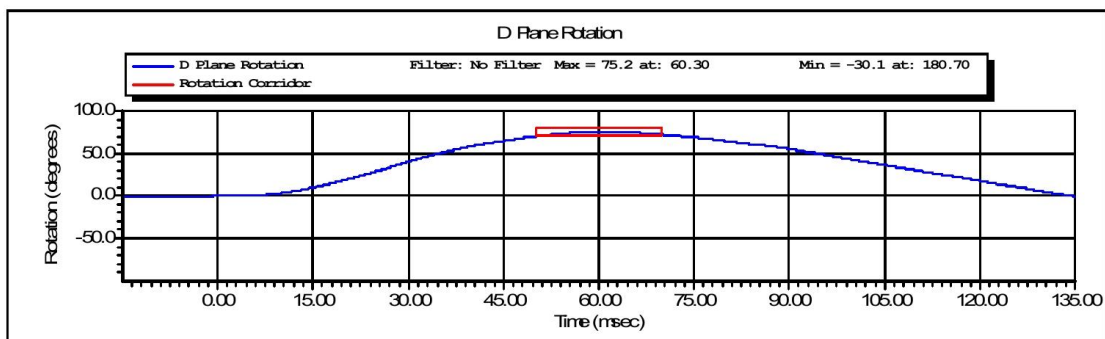


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Test Name:	Neck Pendulum	Revision:	8/24/2009
Sub Test Name:	Left Side	Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	DG8012		
Test ID:	Neck Flexion	Test Date:	1/25/2013
Test Number:	2	Test Time:	4:54:16 PM



Test Time: 4:54:16 PM

Test Date: 1/25/2013

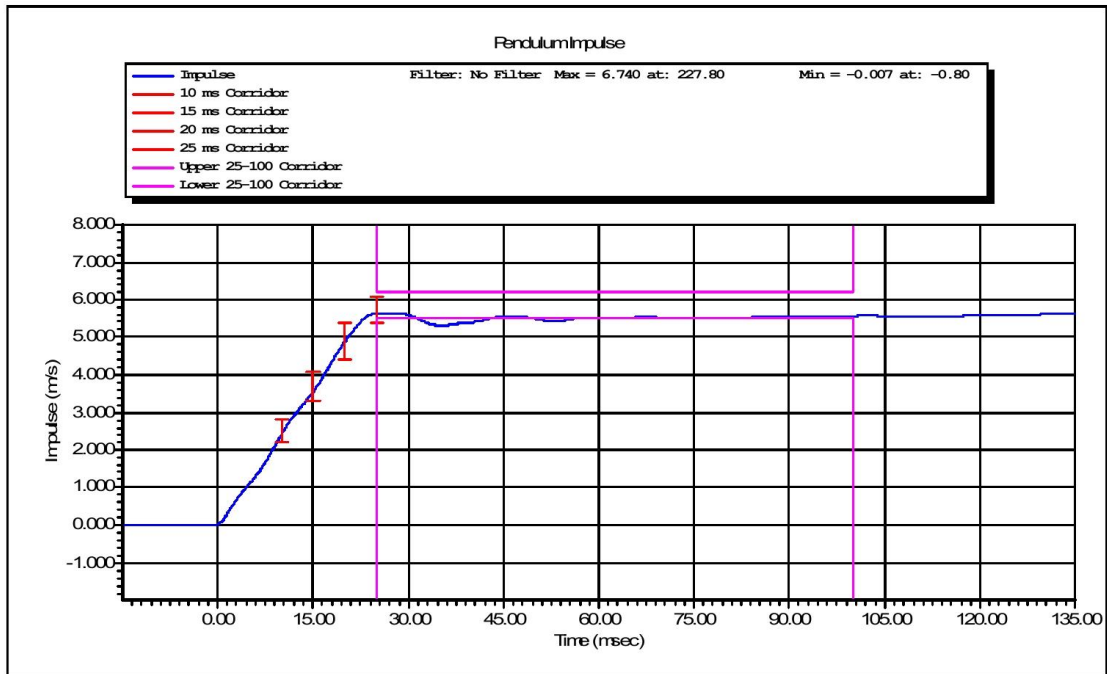
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Test Time: 4:54:16 PM

Test Date: 1/25/2013

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VERIFICATION REPORT

Test Name:	Shoulder Impact	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	DG8012		
Test ID:	Shoulder	Test Date:	11/9/2012
Test Number:	1	Test Time:	3:06:57 PM

Component Part Number	Component Serial Number
Left Arm 180-6011-1	1012
Shoulder Rib 180-3355	286

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.60 deg C P
Humidity	10.0 -- 70.0	31.1 %RH P
Velocity	4.20 -- 4.40	4.35 m/s P
Probe Acceleration	13.0 -- 18.0	15.3 g P
Shoulder Deflection	28.0 -- 37.0	28.86 mm P
T1 Acceleration	17.0 -- 22.0	19.9 g P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **D. Travale**

Test Time: **3:06:57 PM**

Test Date: **11/9/2012**



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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	C14953	5/25/2012
FTSS	180-3881-1	DS-1845	5/17/2012
Endevco	7264-2000	P51875	5/17/2012

Test Time: **3:06:57 PM**

Test Date: **11/9/2012**

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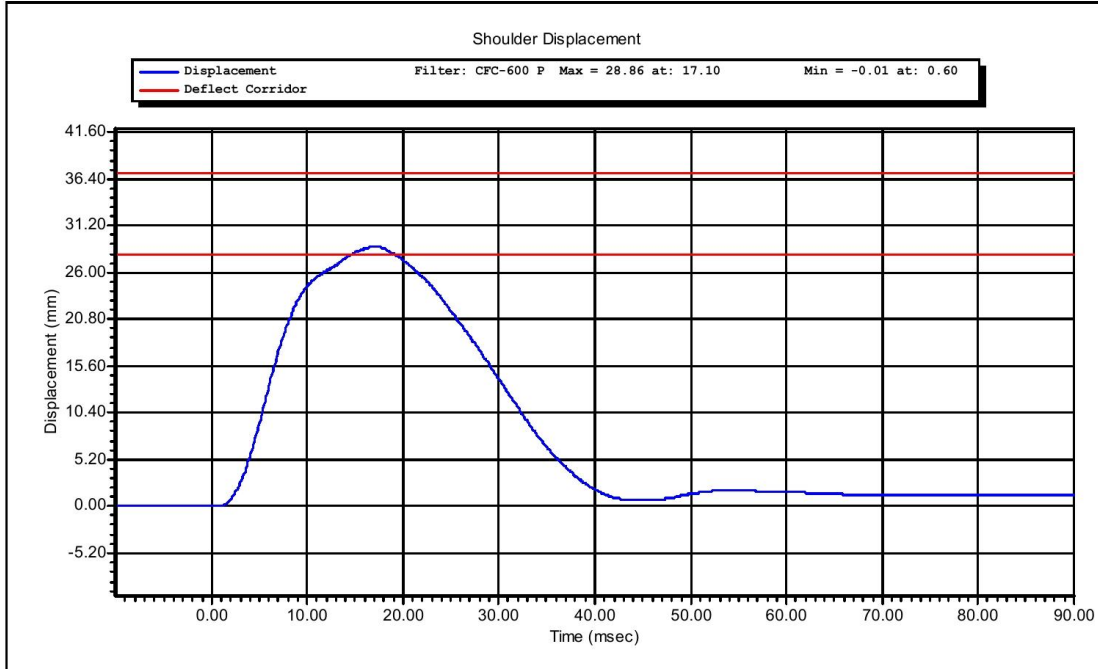


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Test Name:	Shoulder Impact	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	DG8012		
Test ID:	Shoulder	Test Date:	11/9/2012
Test Number:	1	Test Time:	3:06:57 PM



Test Time: 3:06:57 PM

Test Date: 11/9/2012

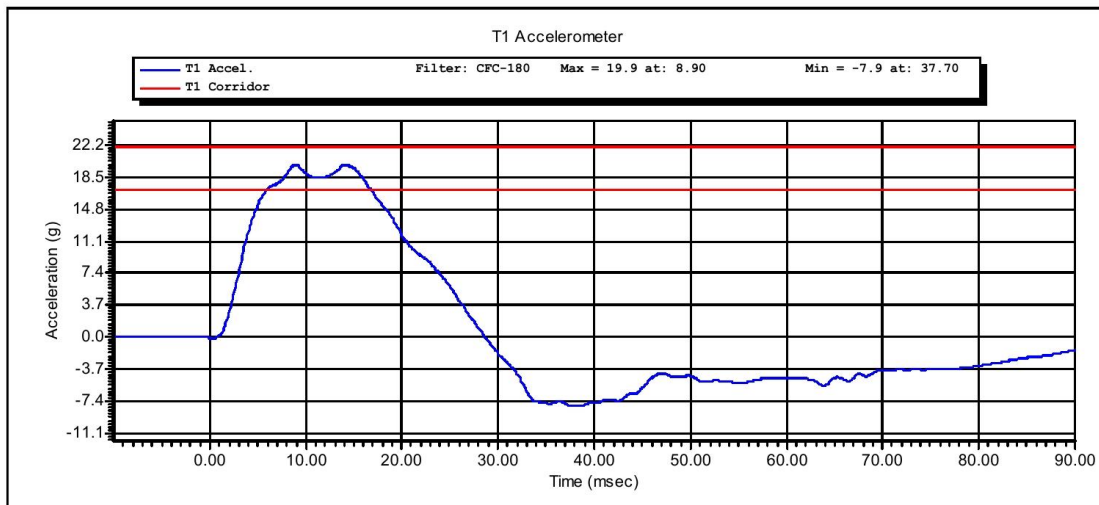
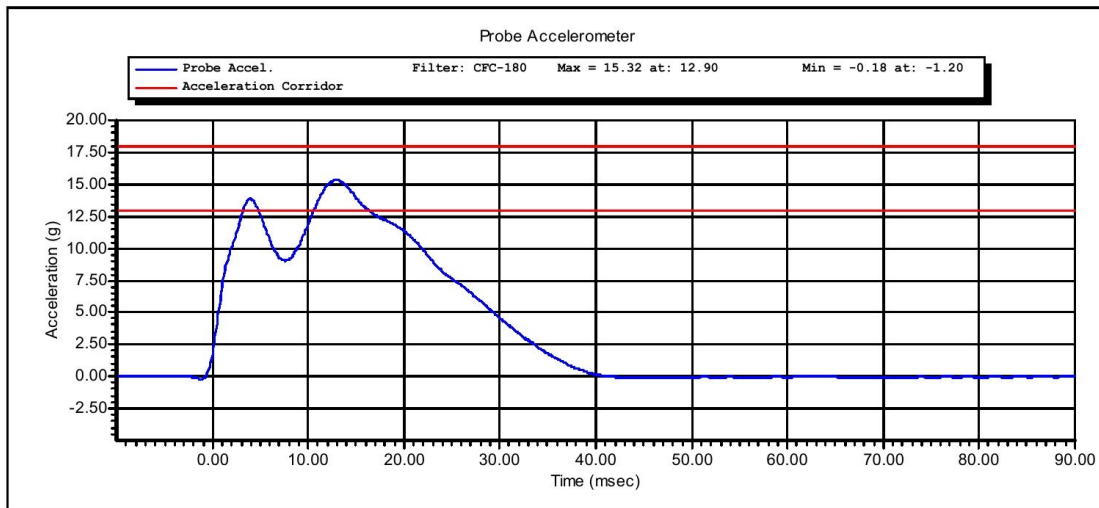
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Test Time: 3:06:57 PM

Test Date: 11/9/2012

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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-IIs		
ATD Serial Number:	DG8012		
Test ID:	Thorax Without Arm	Test Date:	11/9/2012
Test Number:	1	Test Time:	3:18:42 PM

Component Part Number	Component Serial Number
Thorax Ribs 1, 2, 3 180-3362	DG6080, DG6081, DG7543

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.6 deg C P
Humidity	10 -- 70	31 %RH P
Velocity	4.20 -- 4.40	4.36 m/s P
Probe Acceleration	14.0 -- 18.0	16.3 g P
Upper Thorax Rib Deflection	32.0 -- 40.0	36.9 mm P
Mid Thorax Rib Deflection	39.0 -- 45.0	42.5 mm P
Lower Thorax Rib Deflection	35.0 -- 43.0	39.8 mm P
Upper Spine Acceleration T1	13.0 -- 17.0	15.9 g P
Lower Spine Acceleration T12	7.0 -- 11.0	9.5 g P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **D. Travale**

Test Time: **3:18:42 PM**

Test Date: **11/9/2012**



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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	C14953	5/25/2012
Servo	180-3881-1	DS-808	10/23/2012
Servo	180-3881-1	DS-1514	5/16/2012
Servo	180-3881-1	DS-011	10/23/2012
Endevco	7264-2000	P51875	5/17/2012
Endevco	7264-2000	P58796	5/17/2012

Test Time: 3:18:42 PM

Test Date: 11/9/2012

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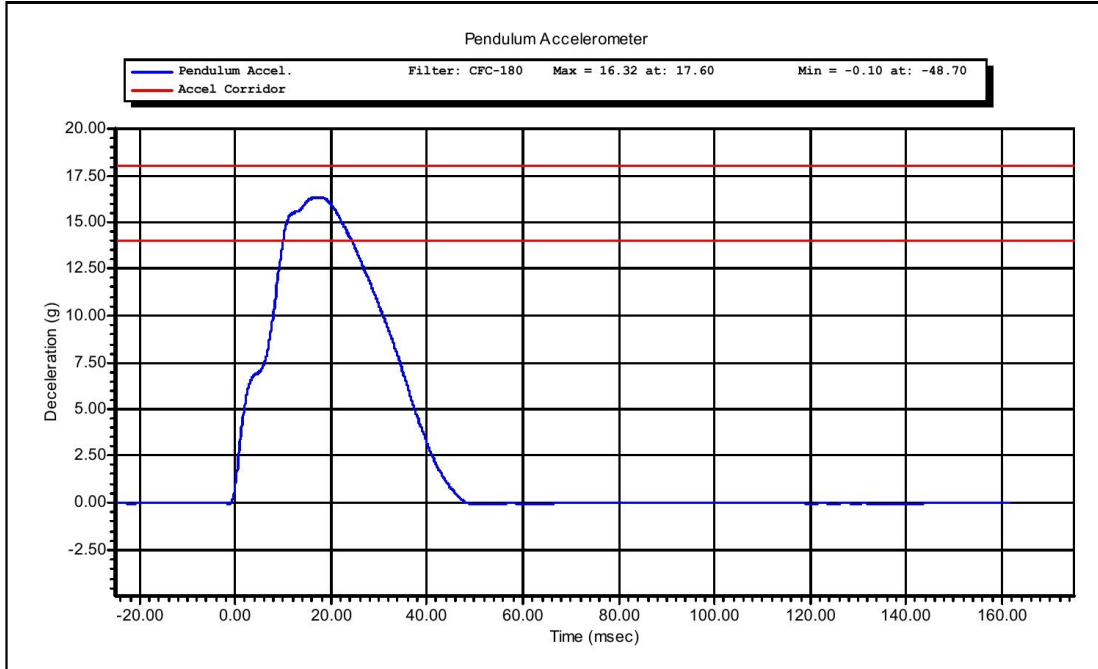


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Test Name:	Thorax Impact without Arm	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	DG8012		
Test ID:	Thorax Without Arm	Test Date:	11/9/2012
Test Number:	1	Test Time:	3:18:42 PM



Test Time: 3:18:42 PM

Test Date: 11/9/2012

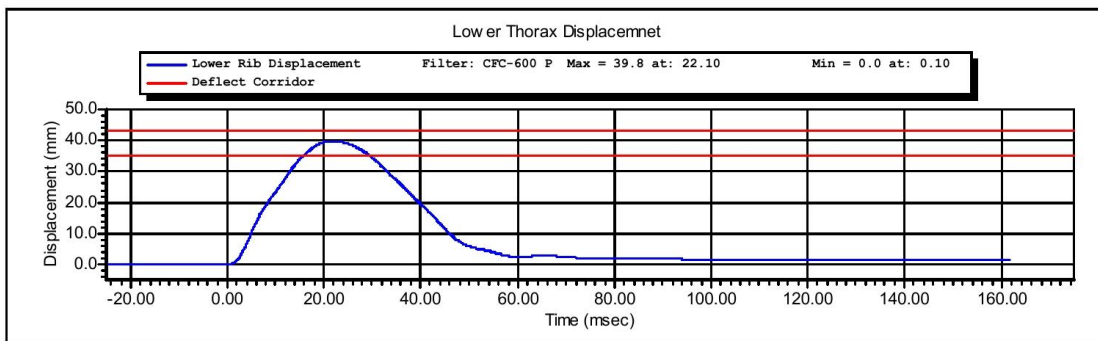
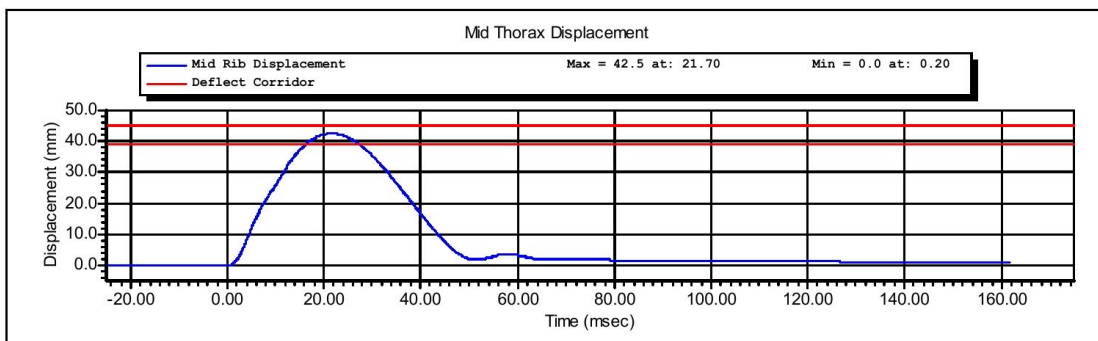
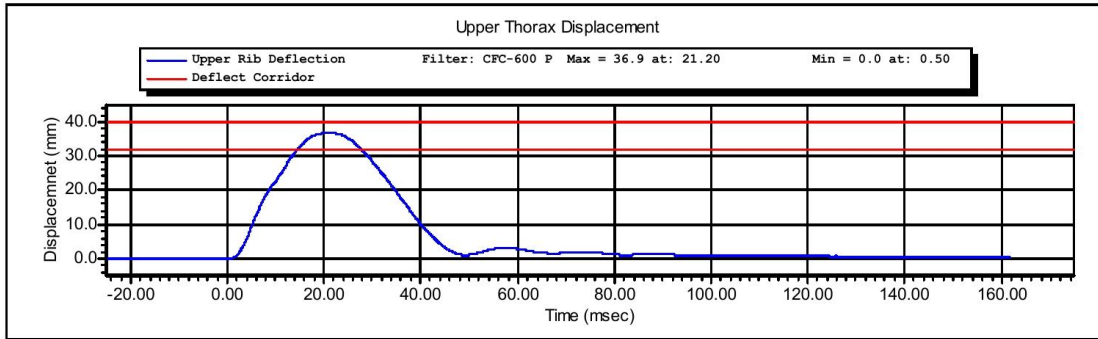
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Test Time: 3:18:42 PM

Test Date: 11/9/2012

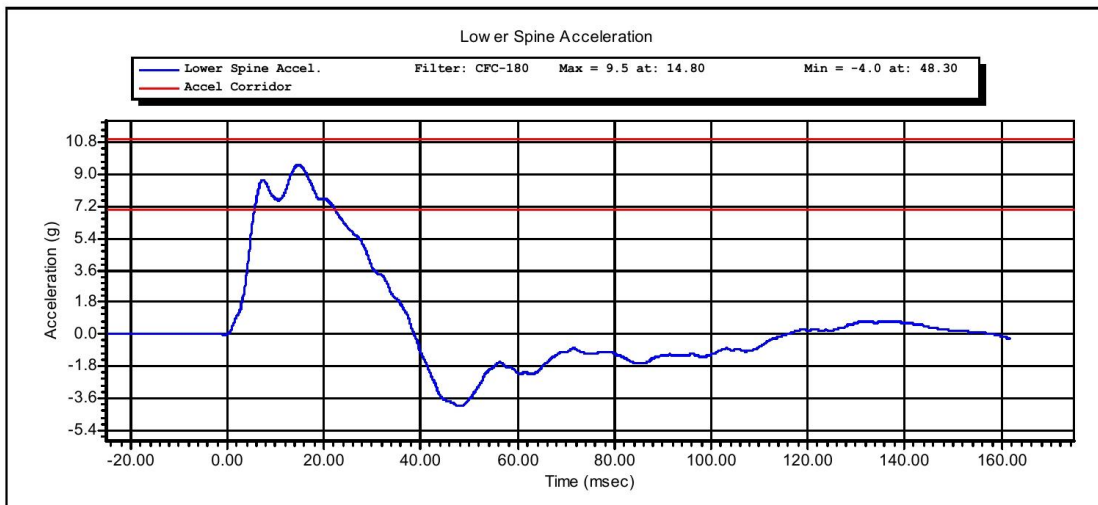
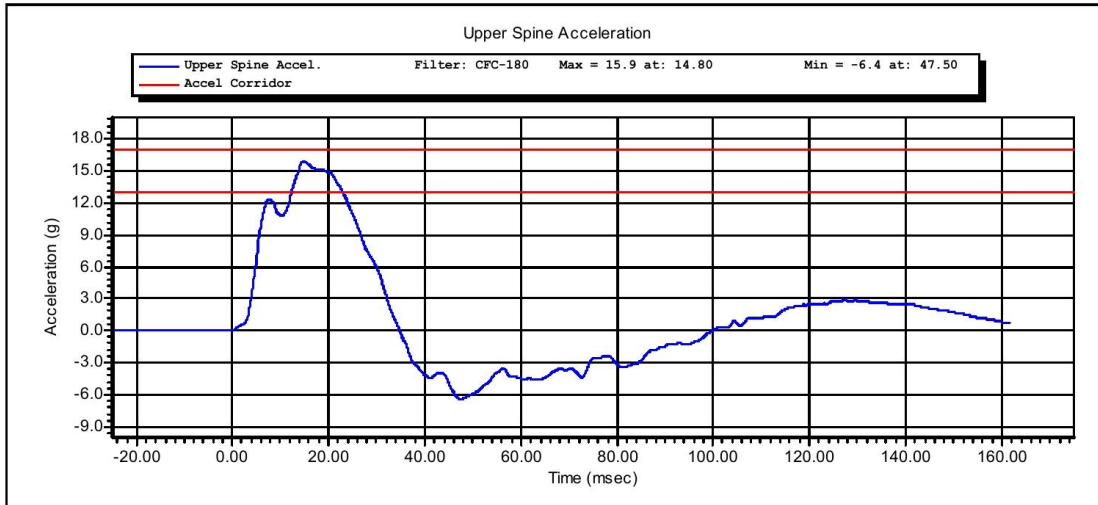
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Test Time: 3:18:42 PM

Test Date: 11/9/2012

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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-IIs		
ATD Serial Number:	DG8012		
Test ID:	Thorax With Arm	Test Date:	11/9/2012
Test Number:	1	Test Time:	2:32:53 PM

Component Part Number	Component Serial Number
Thorax Ribs 1, 2, 3 180-3362	DG6080, DG6081, DG7543
Shoulder Rib 180-3355	286
Left Arm 180-6011-1	1012

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.5 deg C P
Humidity	10 -- 70	31 %RH P
Velocity	6.60 -- 6.80	6.77 m/s P
Probe Acceleration after 5ms	30.0 -- 36.0	33.2 g P
Upper Thorax Rib Deflection	25.0 -- 32.0	27.5 mm P
Mid Thorax Rib Deflection	30.0 -- 36.0	32.5 mm P
Lower Thorax Rib Deflection	32.0 -- 38.0	35.2 mm P
Upper Spine Acceleration ("y")	34.0 -- 43.0	41.2 g P
Lower Spine Acceleration ("y")	29.0 -- 37.0	34.1 g P
Shoulder Deflection	31.0 -- 40.0	32.9 mm P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **D. Travale**

Test Time: **2:32:53 PM**

Test Date: **11/9/2012**



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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	C14953	5/25/2012
Servo	180-3881-1	DS-808	10/23/2012
Servo	180-3881-1	DS-1514	5/16/2012
Servo	180-3881-1	DS-011	10/23/2012
Endevco	7264-2000	P51875	5/17/2012
Endevco	7264-2000	P58796	5/17/2012
FTSS	180-3881-1	DS-1845	5/17/2012

Test Time: **2:32:53 PM**

Test Date: **11/9/2012**

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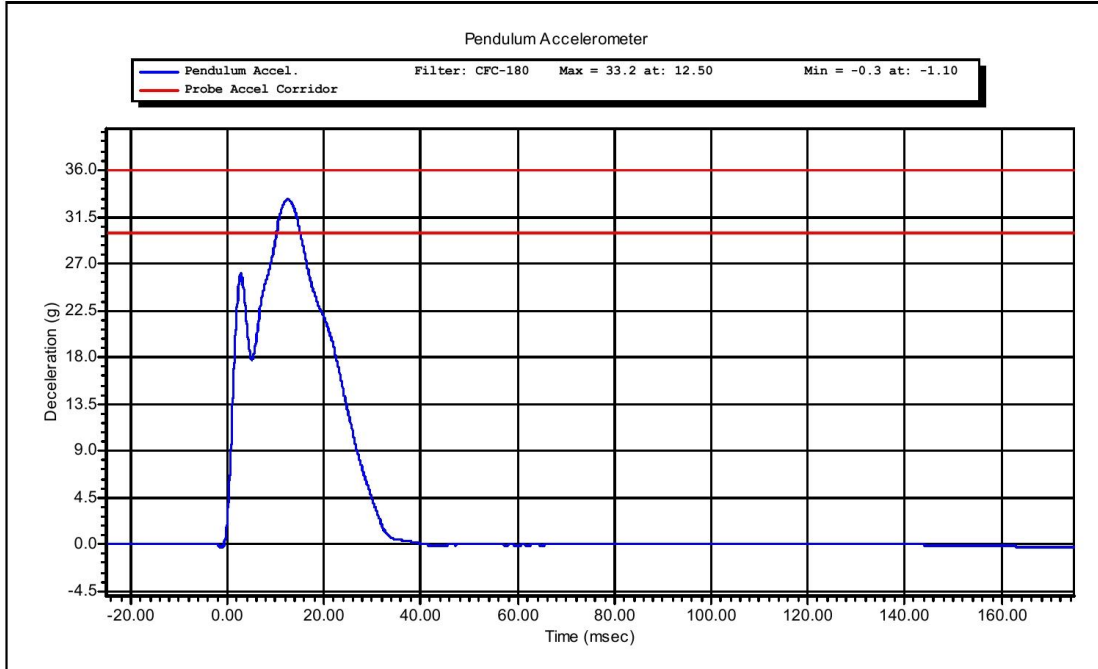


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Test Name:	Thorax Impact with Arm	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	DG8012		
Test ID:	Thorax With Arm	Test Date:	11/9/2012
Test Number:	1	Test Time:	2:32:53 PM



Test Time: 2:32:53 PM

Test Date: 11/9/2012

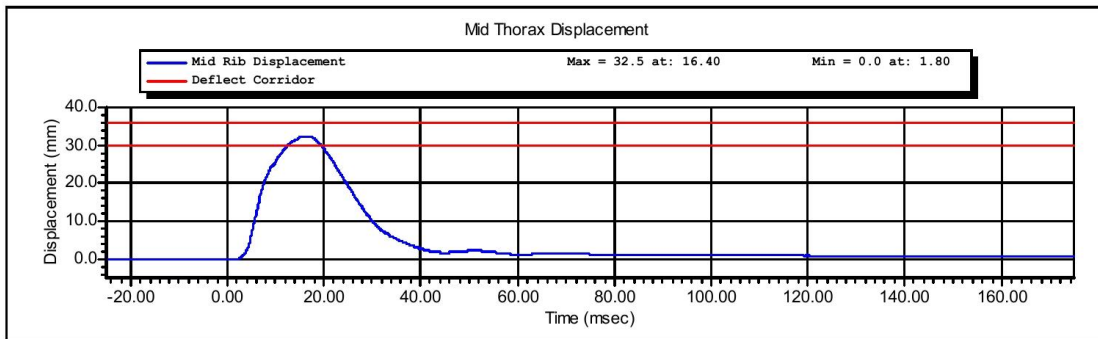
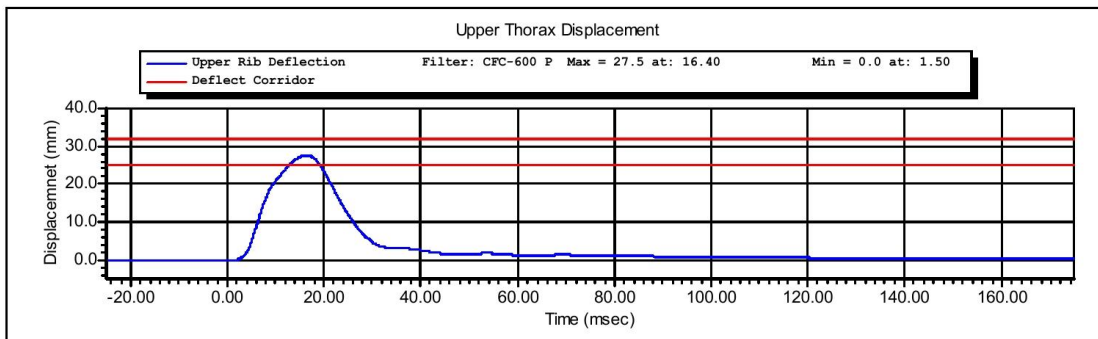
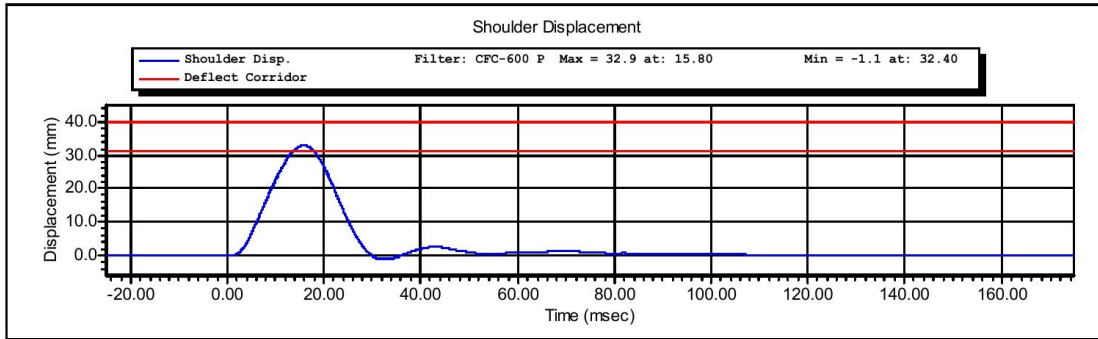
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Test Date: 11/9/2012

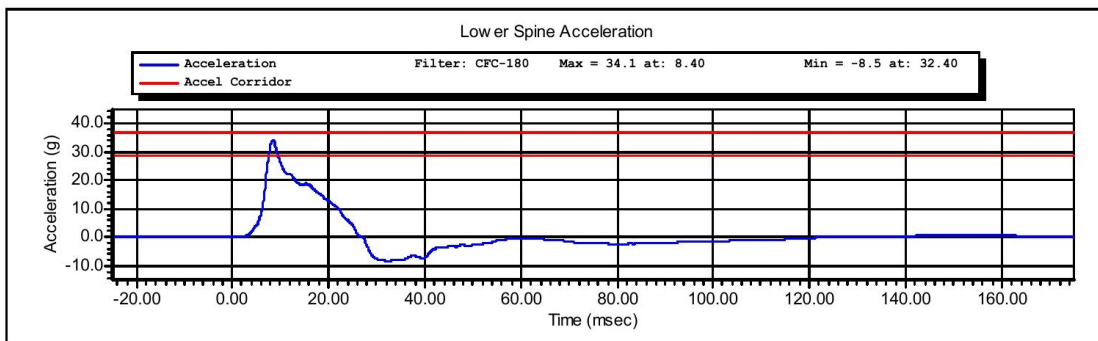
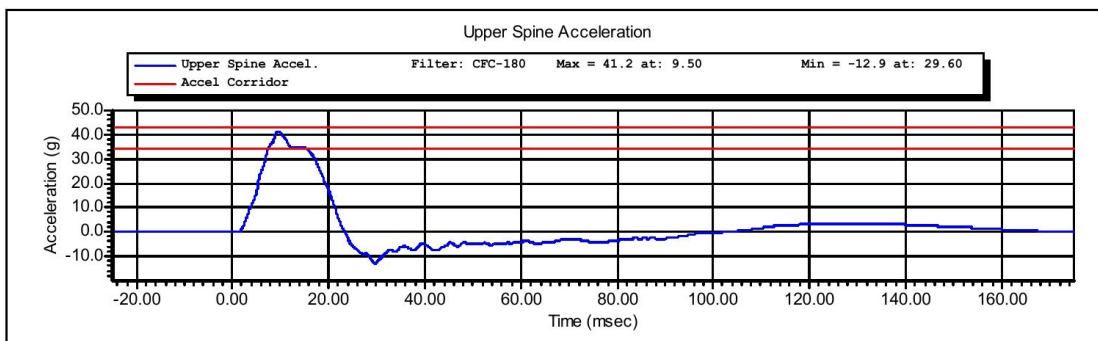
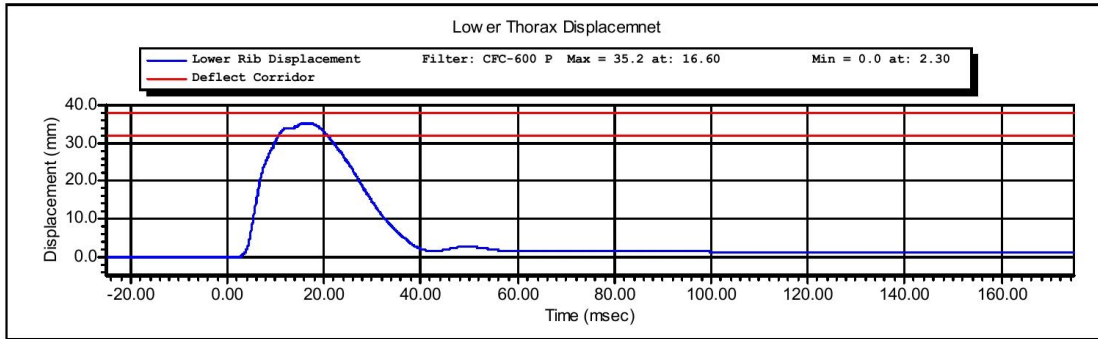
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Test Time: 2:32:53 PM

Test Date: 11/9/2012

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VERIFICATION REPORT

Test Name:	Abdominal Impact	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	DG8012		
Test ID:	Abdomen	Test Date:	11/9/2012
Test Number:	1	Test Time:	3:32:01 PM

Component Part Number	Component Serial Number
Upper Abdomen Rib	1581
Lower Abdomen Rib	1518

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10 -- 70	30 %RH P
Velocity	4.20 -- 4.40	4.36 m/s P
Probe Acceleration	12.0 -- 16.0	14.0 g P
Upper Abdominal Rib Deflection	36.0 -- 47.0	43.4 mm P
Lower Abdominal Rib Deflection	33.0 -- 44.0	42.7 mm P
Lower Spine Acceleration - T12	9.0 -- 14.0	10.7 g P

All test parameters are within specifications

Technician: **M. Goehle**
 Supervisor: **D. Travale**

Test Time: **3:32:01 PM**

Test Date: **11/9/2012**



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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	C14953	5/25/2012
Servo	180-3881-1	DS-015	10/23/2012
Servo	180-3881-1	DS-1774	10/23/2012
Endevco	7264-2000	P58796	5/17/2012

Test Time: 3:32:01 PM

Test Date: 11/9/2012

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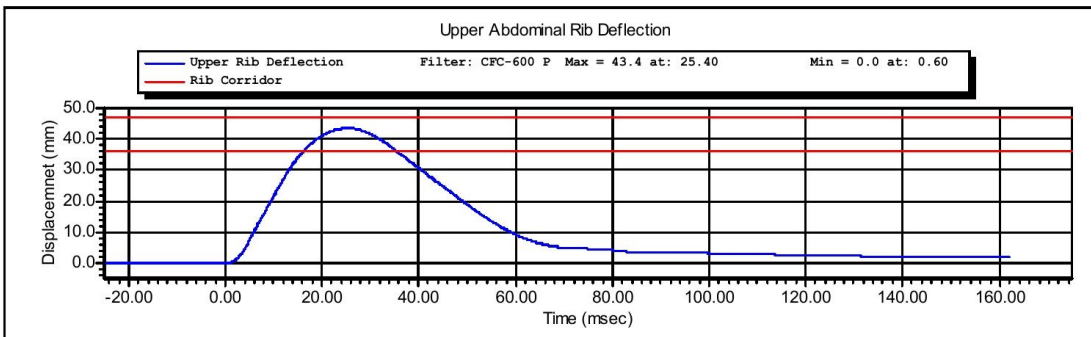
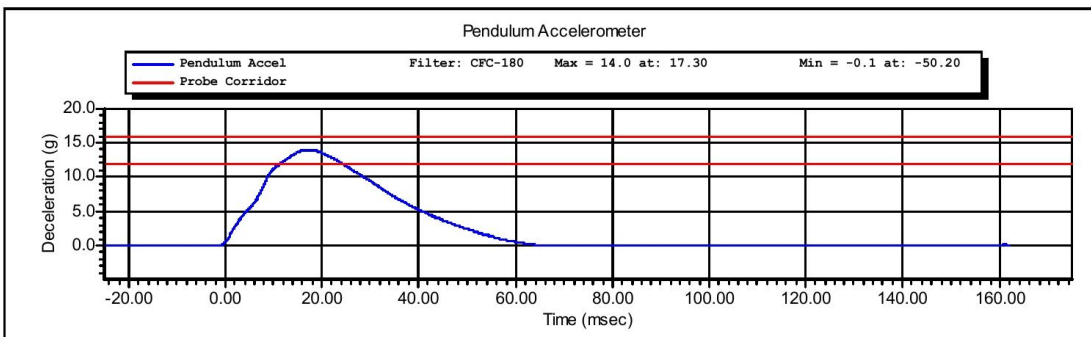


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Test Name:	Abdominal Impact	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	DG8012		
Test ID:	Abdomen	Test Date:	11/9/2012
Test Number:	1	Test Time:	3:32:01 PM



Test Time: 3:32:01 PM

Test Date: 11/9/2012

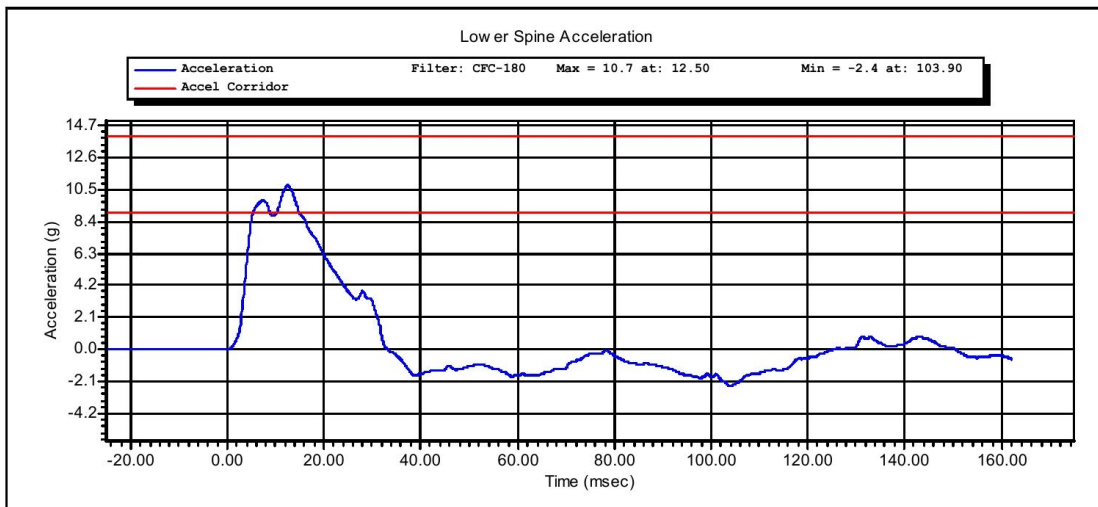
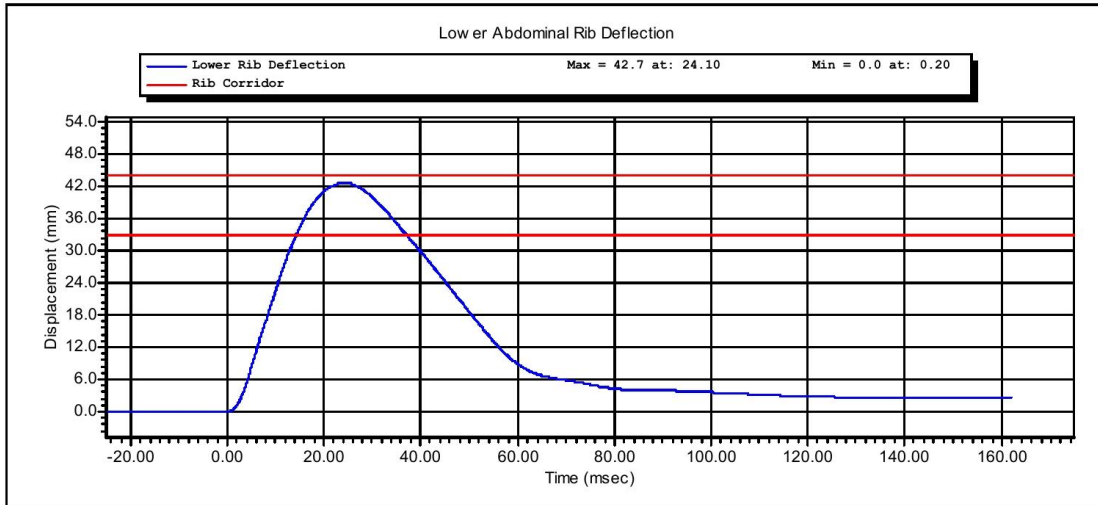
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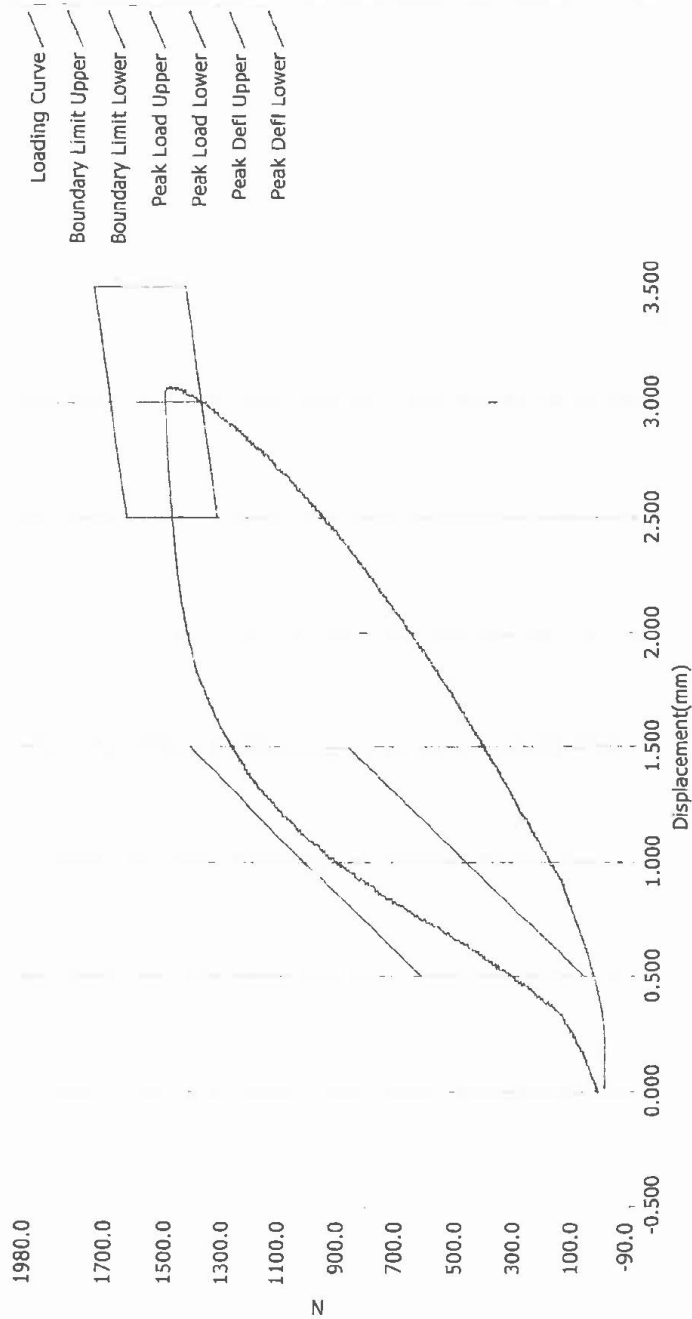


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Test Date: 11/9/2012

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Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

DG 8012 - Cert - Plug

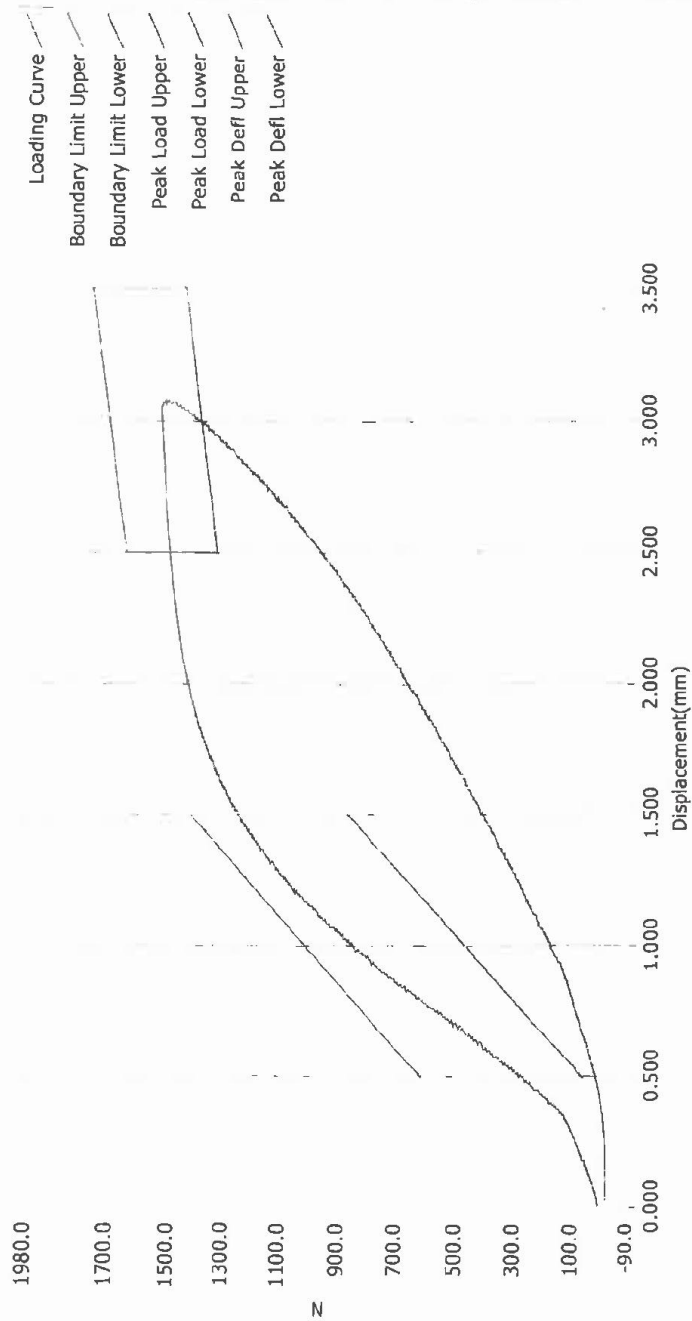
11/9/12

Pre-cert for 11/26/12

Test ID	Part Serial Number	Test Date	Test Time
Cert ID	ATD Serial Number	9/22/2010	2:49 PM
	36332	ATD Type	SIO11s

Current Date : 9/22/2010 Current Time : 14:50:40

Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

Crash- DG-8012
2/1/13

Test ID	Part Serial Number	Test Date	Test Time
Cert ID	ATD Serial Number	9/22/2010	2:48 PM
	36331	ATD Type	SIDIIs

Current Date : 9/22/2010 Current Time : 14:49:03

VERIFICATION REPORT

Test Name:	Pelvis	Revision:	8/24/2009
Sub Test Name:	Acetabulum Impact	Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	DG8012		
Test ID:	Acetabulum	Test Date:	11/9/2012
Test Number:	1	Test Time:	3:53:41 PM

Component Part Number	Component Serial Number
180-4343 Pelvis Flesh	DJ0959
Humanetics Cert Plug - 1492N	46452
FTSS Test Plug -1499N	36544

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.6 deg C P
Humidity	10 -- 70	31 %RH P
Velocity	6.60 -- 6.80	6.64 m/s P
Peak Probe Acceleration	38.0 -- 47.0	44.8 g P
Peak Pelvis Acceleration	34.0 -- 42.0	40.9 g P
Peak Acetabulum Force	3.60 -- 4.30	3.76 kN P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **D. Travale**

Test Time: **3:53:41 PM**

Test Date: **11/9/2012**



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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	C14953	5/25/2012
Endevco	7264-2000	P63561	5/17/2012
DentonATD	3249J	LC-267Fy	5/21/2012

Test Time: **3:53:41 PM**

Test Date: **11/9/2012**

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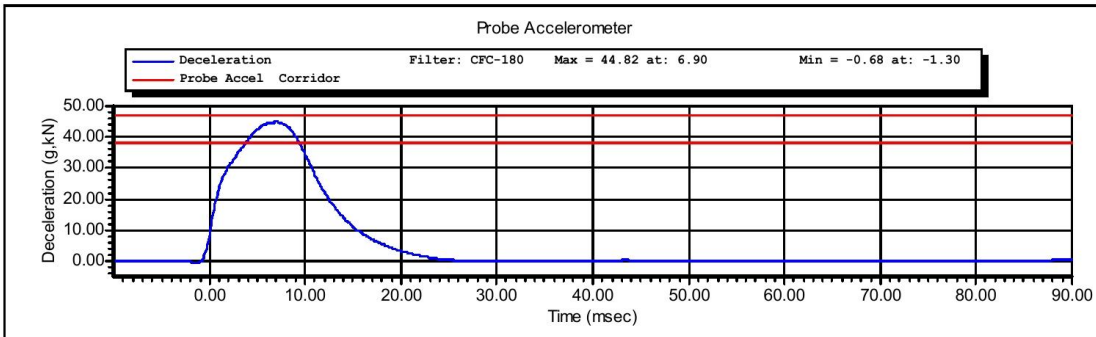
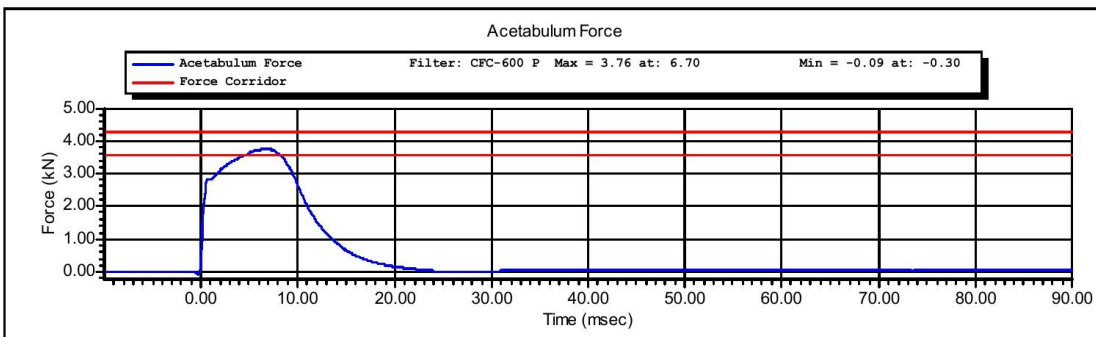


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Test Name:	Pelvis	Revision:	8/24/2009
Sub Test Name:	Acetabulum Impact	Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	DG8012		
Test ID:	Acetabulum	Test Date:	11/9/2012
Test Number:	1	Test Time:	3:53:41 PM



Test Time: **3:53:41 PM**

Test Date: **11/9/2012**

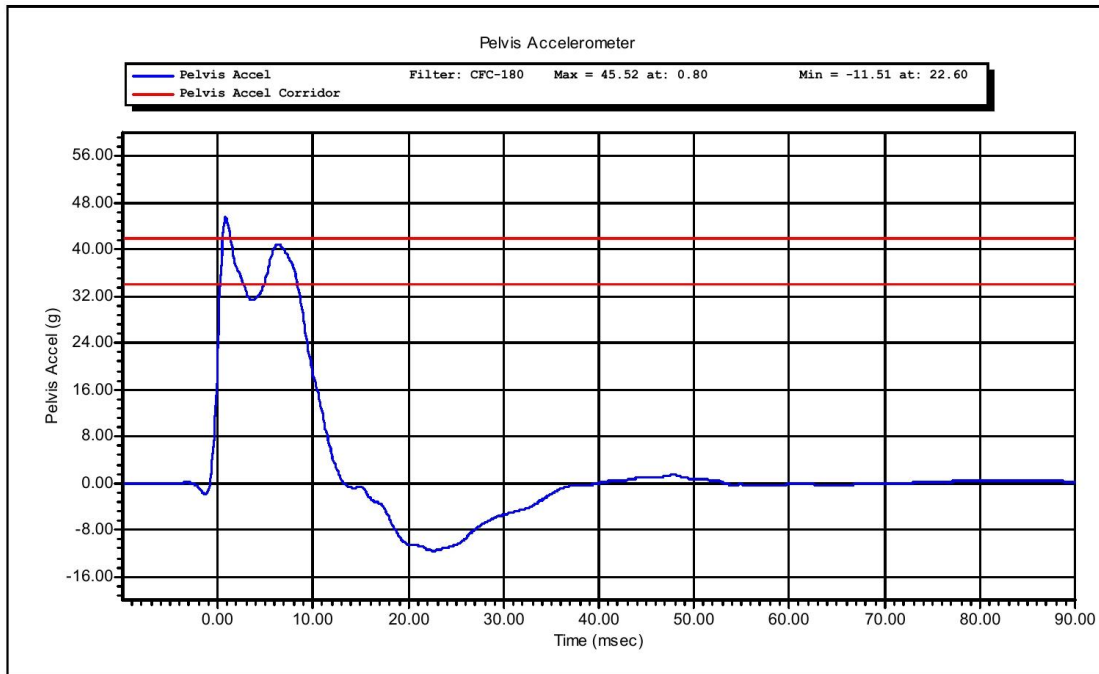
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Test Time: 3:53:41 PM

Test Date: 11/9/2012

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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:	DG8012		
Test ID:	Iliac	Test Date:	11/12/2012
Test Number:	1	Test Time:	8:49:59 AM

Component Part Number	Component Serial Number
180-4343 Pelvis Flesh	DJ0959

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.1 deg C P
Humidity	10 -- 70	29 %RH P
Velocity	4.20 -- 4.40	4.33 m/s P
Peak Probe Acceleration	36.0 -- 45.0	39.6 g P
Peak Pelvis Acceleration	28.0 -- 39.0	34.2 g P
Peak Iliac Force	4.10 -- 5.10	4.37 kN P

All test parameters are within specifications

Technician: **M. Goehle**
 Supervisor: **D. Travale**

Test Time: **8:49:59 AM**

Test Date: **11/12/2012**



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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	C14953	5/25/2012
Endevco	7264-2000	P63561	5/17/2012
DentonATD	3228J	LC-281Fy	5/21/2012

Test Time: **8:49:59 AM**

Test Date: **11/12/2012**

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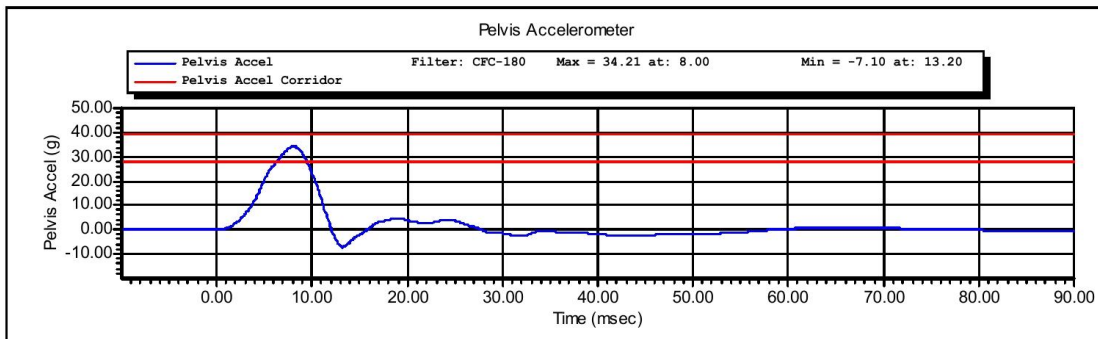
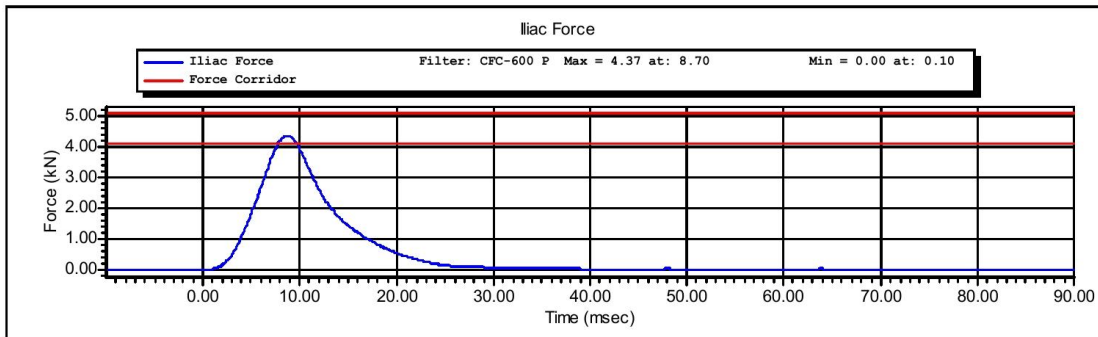


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Test Name:	Pelvis	Revision:	8/24/2009
Sub Test Name:	Iliac Impact	Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	DG8012		
Test ID:	Iliac	Test Date:	11/12/2012
Test Number:	1	Test Time:	8:49:59 AM



Test Time: **8:49:59 AM**

Test Date: **11/12/2012**

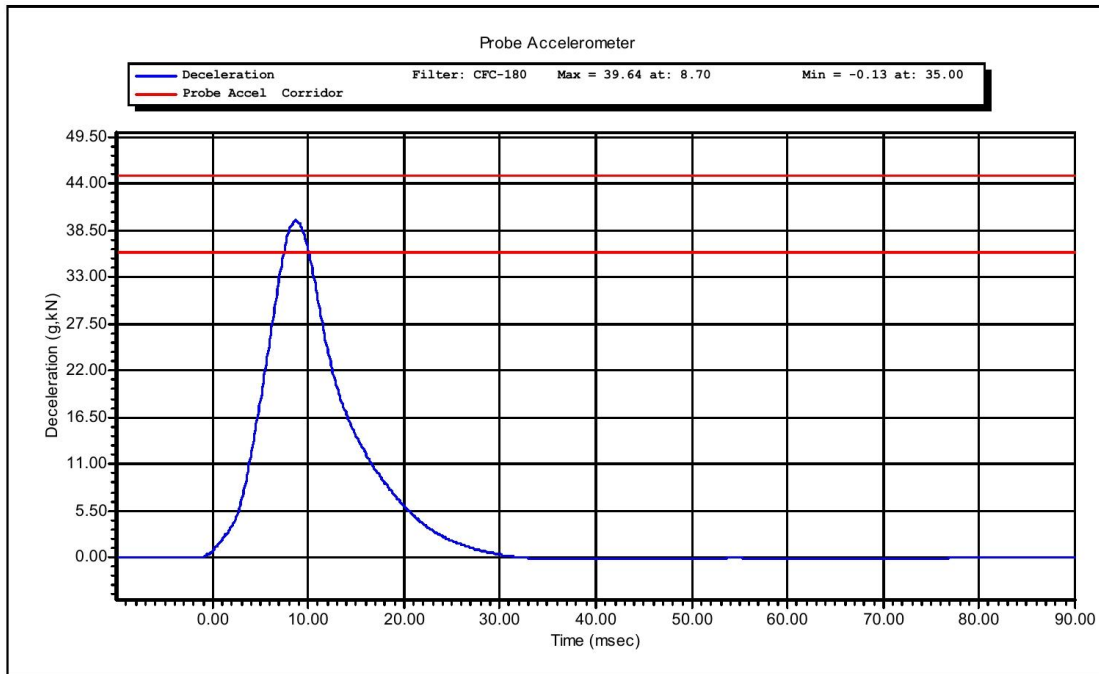
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Test Time: 8:49:59 AM

Test Date: 11/12/2012

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CALIBRATION TEST RESULTS

POST-TEST

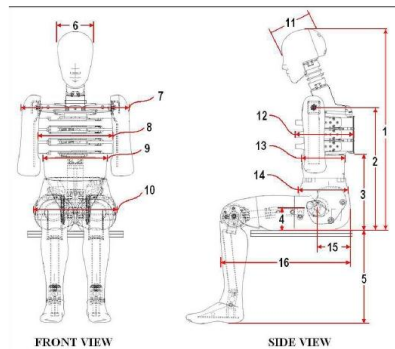
EUROSID 2 (ES-2RE) MALE – DRIVER ATD

SERIAL NO: F033

(CONFIGURED FOR LEFT SIDE IMPACT)

ES-2re External Measurements

NHTSA SN F033



Dim. No.	Description	Specification (mm)	Result (mm)	Pass/Fail
1	Sitting Height	900-918	912	Pass
2	Seat to Shoulder Joint	558-572	563	Pass
3	Seat to Lower Face of Thoracic Spine Box	346-356	353	Pass
4	Seat to Hip Joint (center of bolt)	97-103	100	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	326	Pass
9	Abdomen Width	273-287	284	Pass
10	Pelvis Lap Width	359-373	368	Pass
11	Head Depth	196-206	200	Pass
12	Thorax Depth	262-272	267	Pass
13	Abdomen Depth	194-204	200	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: M. Goehle

Date: 2/7/13

VERIFICATION REPORT

Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:		Test Date:	2/7/2013
Test Number:	1	Test Time:	10:59:58 AM

Component Part Number	Component Serial Number
455-1007	1910934

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.3 deg C P
Humidity	10 -- 70	20 %RH P
Resultant Acceleration	125 -- 155	148 g P
Oscillation	0.0 -- 15.0	2.5 % P
Fore-Aft Acceleration	-15.00 -- 15.00	5.31 g P

All test parameters are within specifications

Technician: **A. Rudniski**Supervisor: **E. Dutton**Test Time: **10:59:58 AM**Test Date: **2/7/2013**

VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P49204	2/7/2013
Endevco	7264-2000	P63981	2/7/2013
Endevco	7264-2000	P64007	2/7/2013

Test Time: **10:59:58 AM**Test Date: **2/7/2013**

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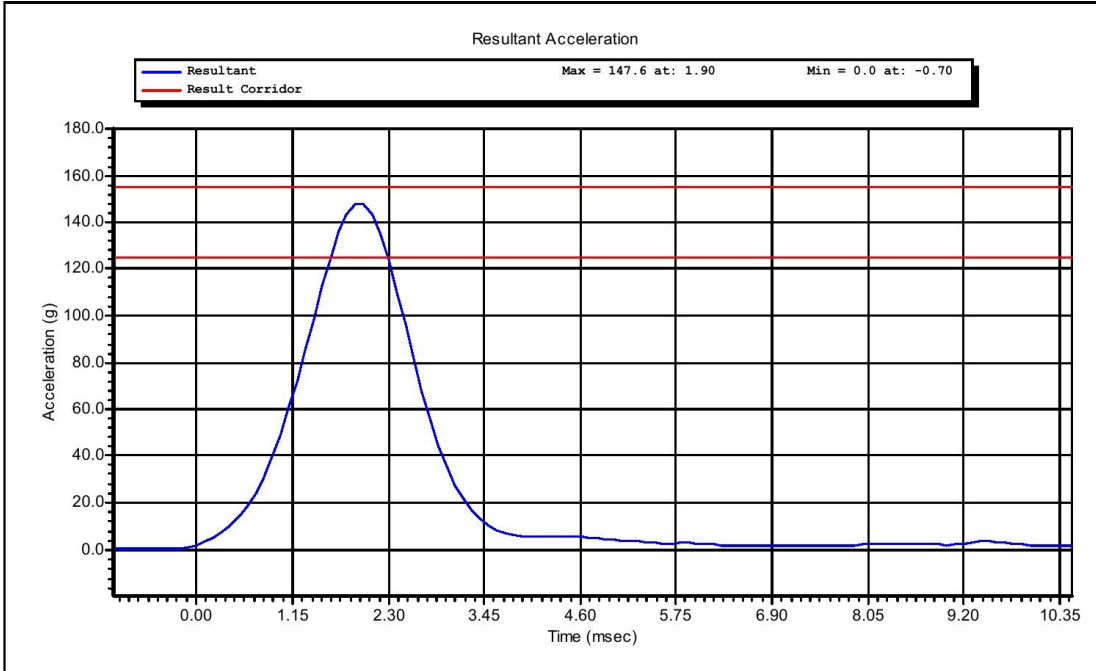


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Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:		Test Date:	2/7/2013
Test Number:	1	Test Time:	10:59:58 AM



Test Time: 10:59:58 AM

Test Date: 2/7/2013

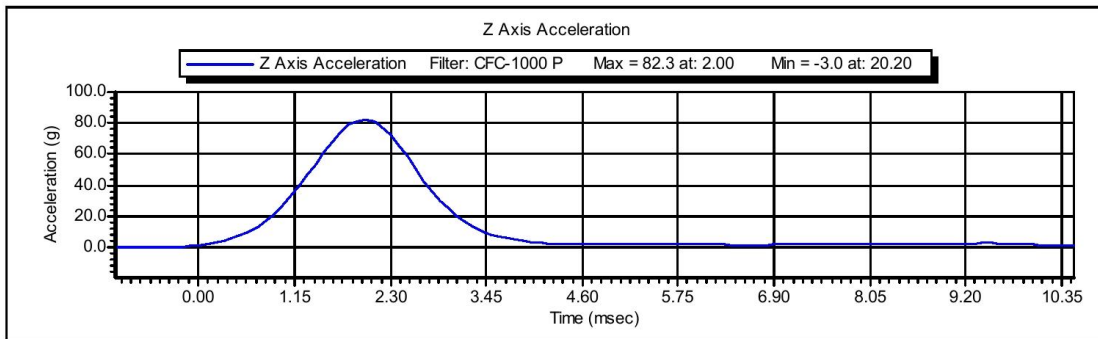
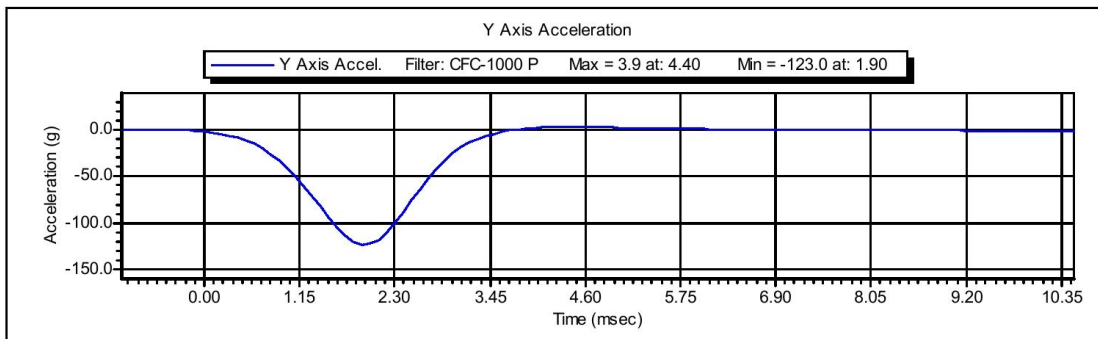
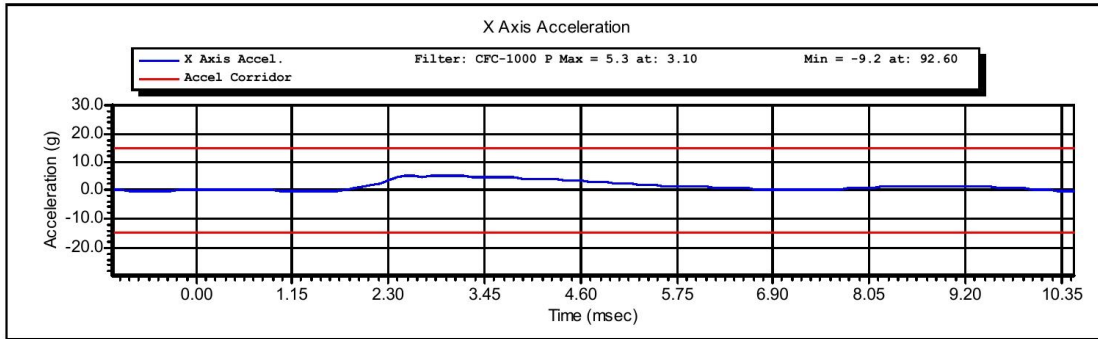
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Test Time: 10:59:58 AM

Test Date: 2/7/2013

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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:	F033		
Test ID:		Test Date:	2/7/2013
Test Number:	1	Test Time:	1:35:28 PM

Component Part Number	Component Serial Number
455-2002	175-200107085

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.5 deg C P
Humidity	10 -- 70	18 %RH P
Velocity	3.30 -- 3.50	3.44 m/s P
Maximum Neck Flexion Angle	49.0 -- 59.0	50.5 degrees P
Time At Maximum Neck Flexion	54.0 -- 66.0	58.5 ms P
Decay to Zero Degrees	53.0 -- 88.0	60.6 ms P
Velocity Corridor	--	P

All test parameters are within specifications

Technician: **A. Rudniski**
 Supervisor: **E. Dutton**

Test Time: **1:35:28 PM**

Test Date: **2/7/2013**



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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	1/11/2013
Endevco	7231CT	C15016	8/15/2012
DentonATD	7000428	094	5/30/2012
DentonATD	7000428	095	5/30/2012
DentonATD	7000428	093	5/30/2012

Test Time: 1:35:28 PM

Test Date: 2/7/2013

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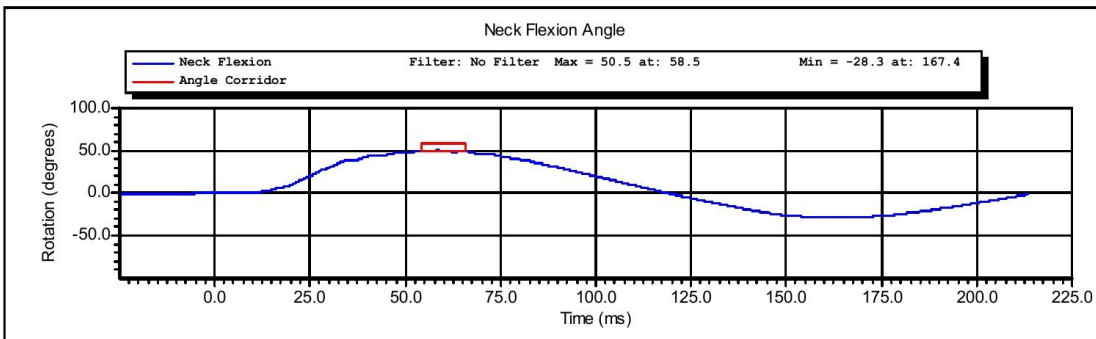
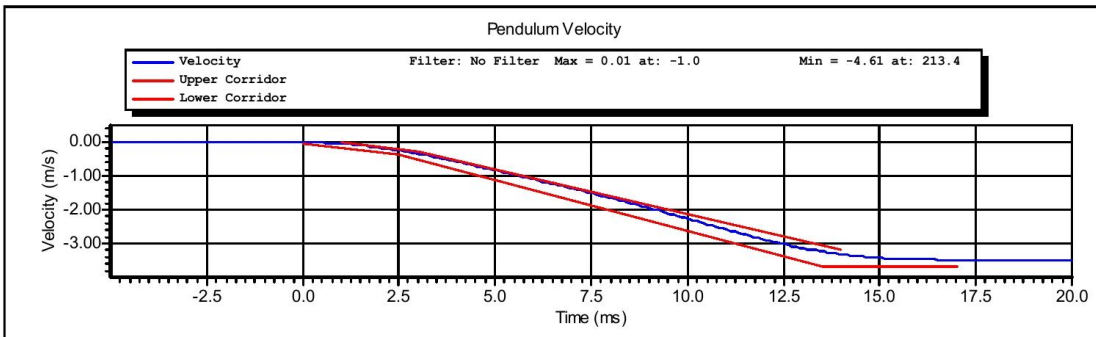


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Test Name:	Neck Flexion	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:		Test Date:	2/7/2013
Test Number:	1	Test Time:	1:35:28 PM



Test Time: 1:35:28 PM

Test Date: 2/7/2013

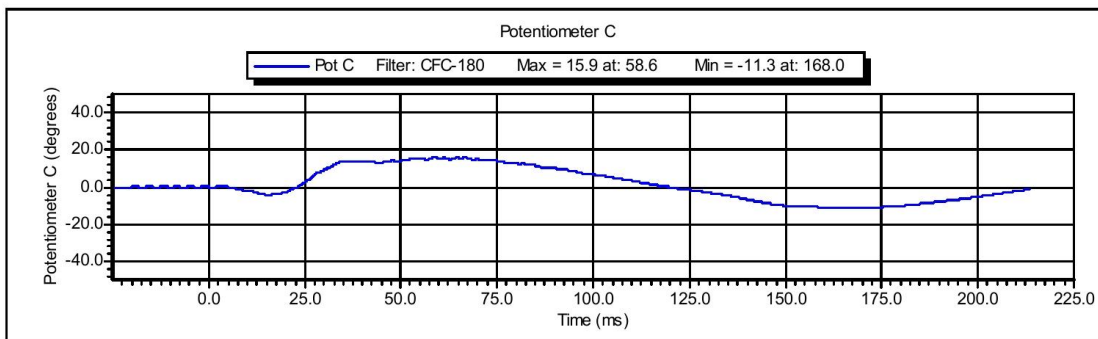
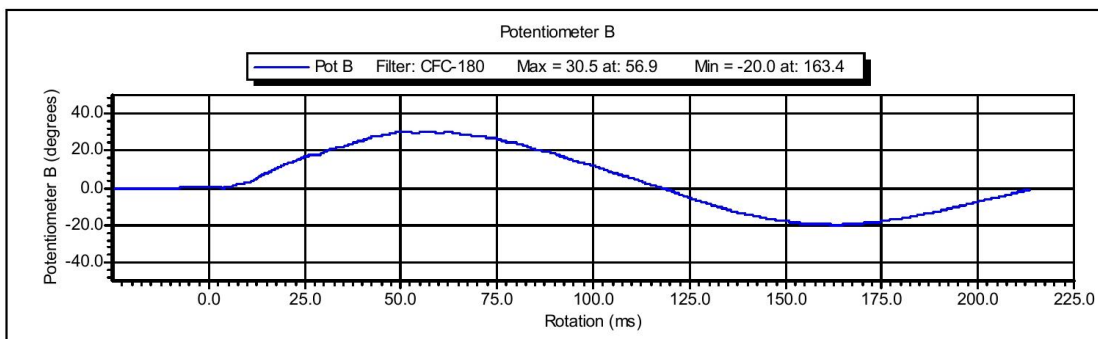
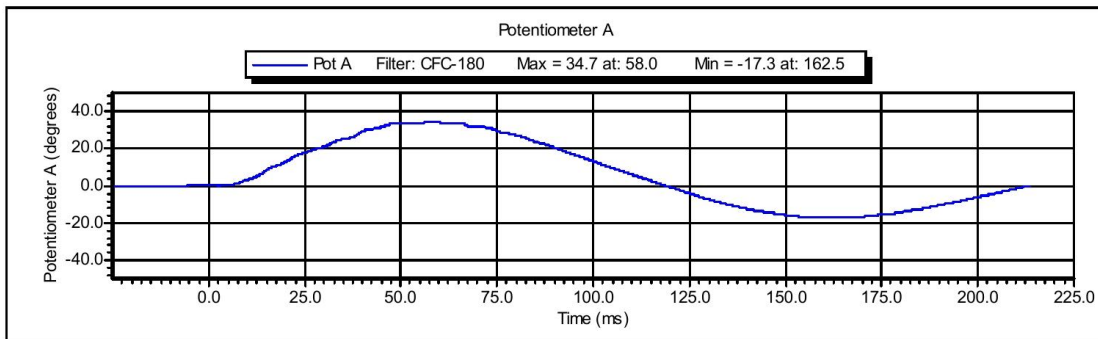
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Test Time: 1:35:28 PM

Test Date: 2/7/2013

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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:	F033		
Test ID:	Shoulder Impact	Test Date:	2/7/2013
Test Number:	1	Test Time:	4:05:22 PM

Component Part Number	Component Serial Number
960715-313	07021

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.3 deg C P
Humidity	10 -- 70	13.0 %RH P
Velocity	4.2 -- 4.4	4.24 m/s P
Pendulum Acceleration	-10.5 -- -7.5	-9.81 g P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **E. Dutton**

Test Time: **4:05:22 PM**

Test Date: **2/7/2013**



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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	1/11/2013
Endevco	7231CT	C14953	11/28/2012

Test Time: 4:05:22 PM

Test Date: 2/7/2013

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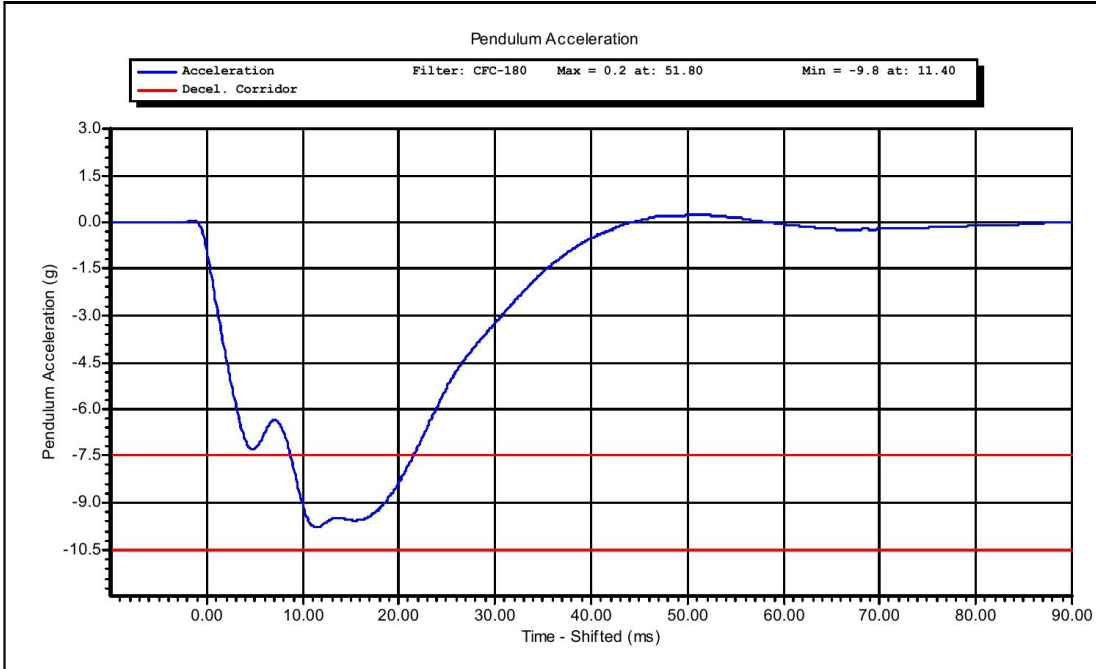


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Test Name:	Shoulder Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Shoulder Impact	Test Date:	2/7/2013
Test Number:	1	Test Time:	4:05:22 PM



Test Time: 4:05:22 PM

Test Date: 2/7/2013

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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:	F033		
Test ID:	Upper Rib Drop 4m/s	Test Date:	2/7/2013
Test Number:	1	Test Time:	11:34:17 AM

Component Part Number	Component Serial Number
455-3100	07206

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.6 deg C P
Humidity	10.0 -- 70.0	14.3 %RH P
Velocity	3.90 -- 4.10	3.96 m/s P
Rib Displacement	-51.00 -- -46.00	-48.14 mm P
Drop Height	807.0 -- 823.0	815.0 mm P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **E. Dutton**

Test Time: **11:34:17 AM**

Test Date: **2/7/2013**



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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	5/17/2012
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7264-2000	P32222	11/13/2012

Test Time: 11:34:17 AM

Test Date: 2/7/2013

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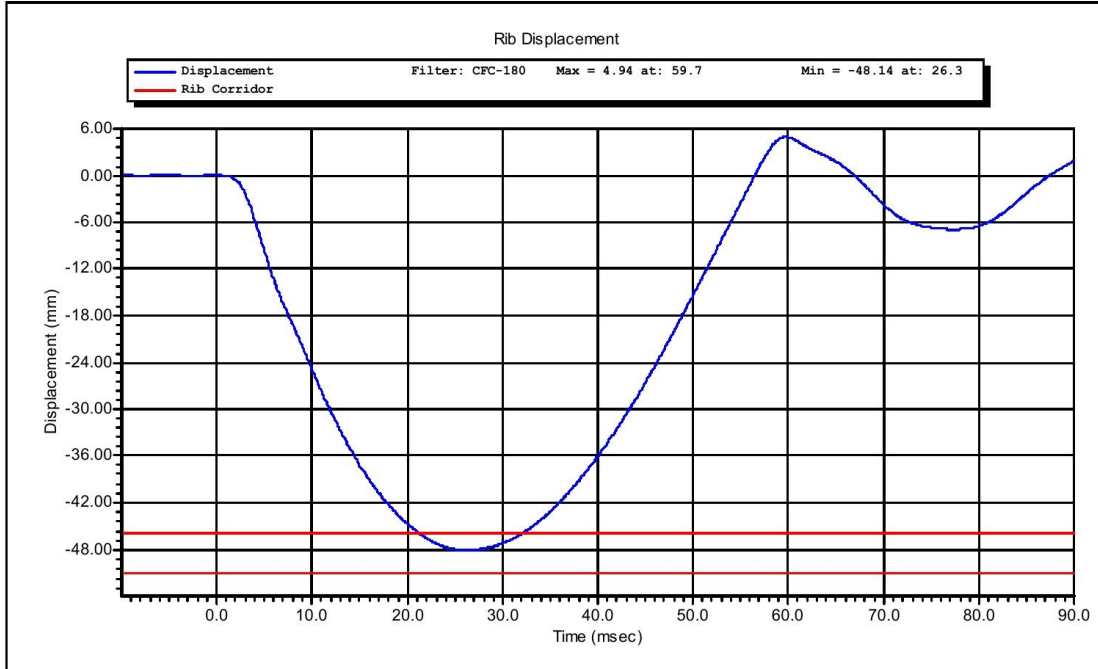


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Upper Rib Drop 4m/s	Test Date:	2/7/2013
Test Number:	1	Test Time:	11:34:17 AM



Test Time: 11:34:17 AM

Test Date: 2/7/2013

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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:	F033		
Test ID:	Upper Rib Drop 3m/s	Test Date:	2/7/2013
Test Number:	1	Test Time:	11:46:15 AM

Component Part Number	Component Serial Number
455-3100	07206

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10.0 -- 70.0	13.8 %RH P
Velocity	2.90 -- 3.10	2.98 m/s P
Rib Displacement	-40.00 -- -36.00	-37.66 mm P
Drop Height	454 -- 464	459 mm P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **E. Dutton**

Test Time: **11:46:15 AM**

Test Date: **2/7/2013**



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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	5/17/2012
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7264-2000	P32222	11/13/2012

Test Time: 11:46:15 AM

Test Date: 2/7/2013

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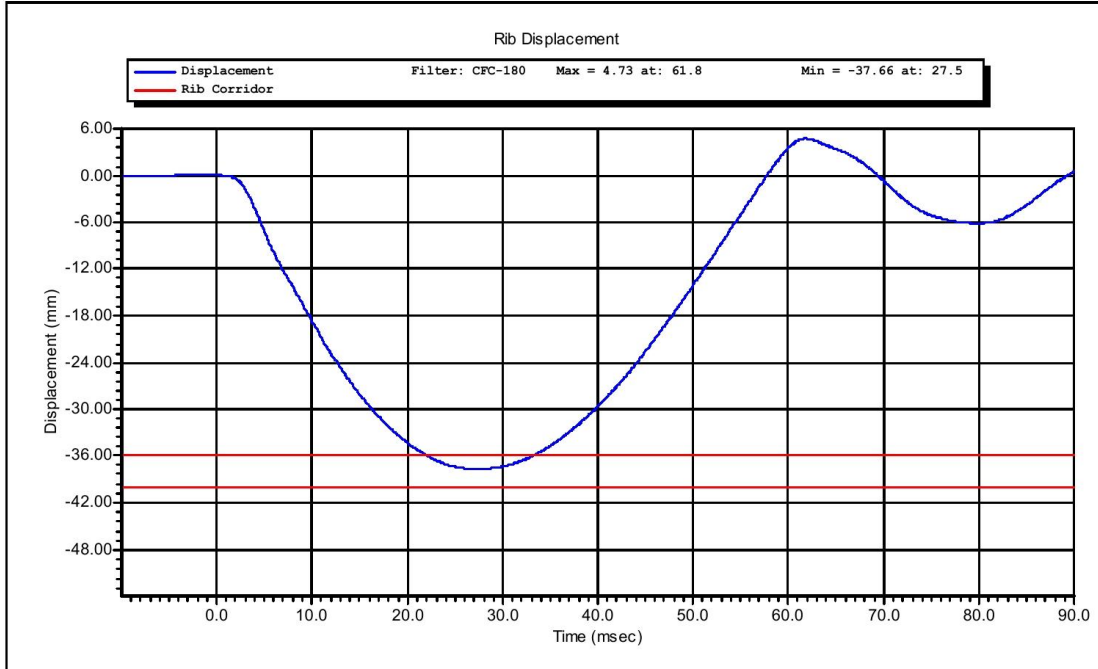


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Upper Rib Drop 3m/s	Test Date:	2/7/2013
Test Number:	1	Test Time:	11:46:15 AM



Test Time: 11:46:15 AM

Test Date: 2/7/2013

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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:	F033		
Test ID:	Middle Rib Drop 4m/s	Test Date:	2/7/2013
Test Number:	1	Test Time:	11:53:36 AM

Component Part Number	Component Serial Number
455-3100	07207

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.0 deg C P
Humidity	10.0 -- 70.0	13.8 %RH P
Velocity	3.90 -- 4.10	3.96 m/s P
Rib Displacement	-51.00 -- -46.00	-48.05 mm P
Drop Height	807.0 -- 823.0	815.0 mm P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **E. Dutton**

Test Time: **11:53:36 AM**

Test Date: **2/7/2013**



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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	5/17/2012
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7264-2000	P32222	11/13/2012

Test Time: 11:53:36 AM

Test Date: 2/7/2013

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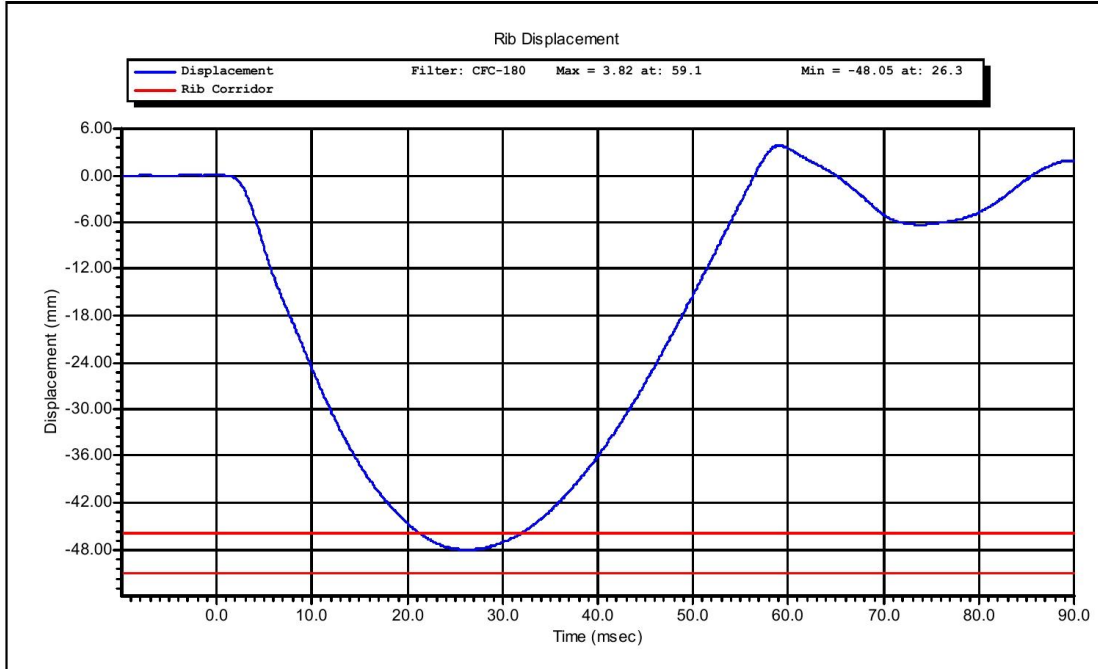


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Middle Rib Drop 4m/s	Test Date:	2/7/2013
Test Number:	1	Test Time:	11:53:36 AM



Test Time: 11:53:36 AM

Test Date: 2/7/2013

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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:	F033		
Test ID:	Middle Rib Drop 3m/s	Test Date:	2/7/2013
Test Number:	1	Test Time:	12:04:52 PM

Component Part Number	Component Serial Number
455-3100	07207

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.0 deg C P
Humidity	10.0 -- 70.0	13.5 %RH P
Velocity	2.90 -- 3.10	2.97 m/s P
Rib Displacement	-40.00 -- -36.00	-37.01 mm P
Drop Height	454 -- 464	459 mm P

All test parameters are within specifications

Technician: M. GoehleSupervisor: E. Dutton

Test Time: 12:04:52 PM

Test Date: 2/7/2013



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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	5/17/2012
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7264-2000	P32222	11/13/2012

Test Time: 12:04:52 PM

Test Date: 2/7/2013

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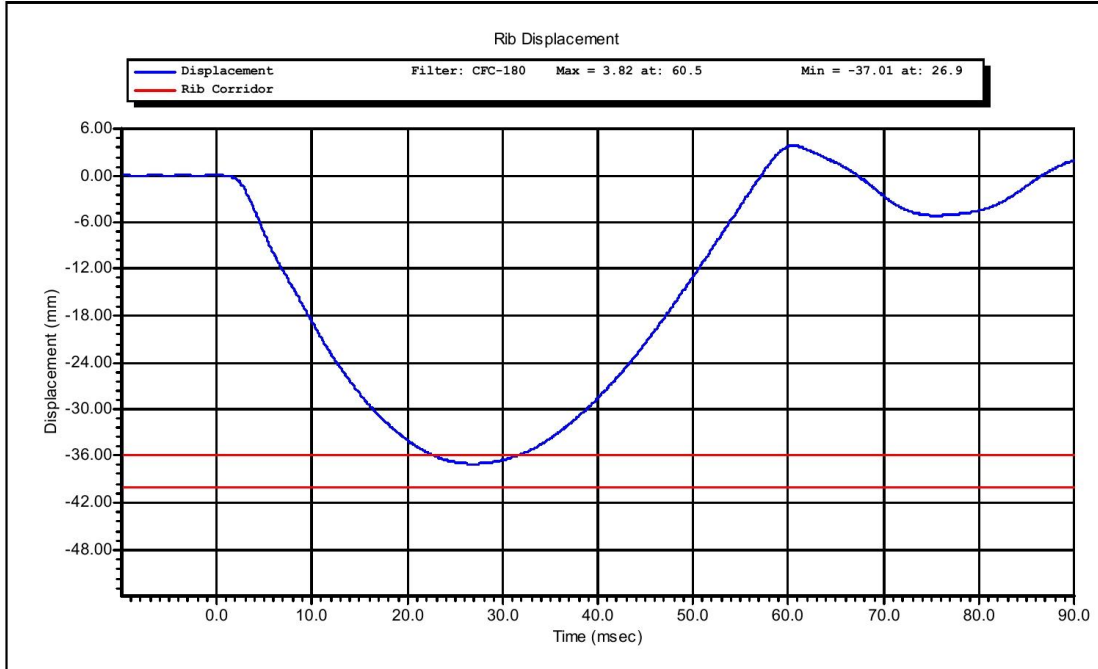


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Middle Rib Drop 3m/s	Test Date:	2/7/2013
Test Number:	1	Test Time:	12:04:52 PM



Test Time: 12:04:52 PM

Test Date: 2/7/2013

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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:	F033		
Test ID:	Lower Rib Drop 4m/s	Test Date:	2/7/2013
Test Number:	1	Test Time:	12:10:08 PM

Component Part Number	Component Serial Number
455-3100	07208

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.0 deg C P
Humidity	10.0 -- 70.0	13.2 %RH P
Velocity	3.90 -- 4.10	3.97 m/s P
Rib Displacement	-51.00 -- -46.00	-48.19 mm P
Drop Height	807.0 -- 823.0	815.0 mm P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **E. Dutton**

Test Time: **12:10:08 PM**

Test Date: **2/7/2013**



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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	5/17/2012
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7264-2000	P32222	11/13/2012

Test Time: 12:10:08 PM

Test Date: 2/7/2013

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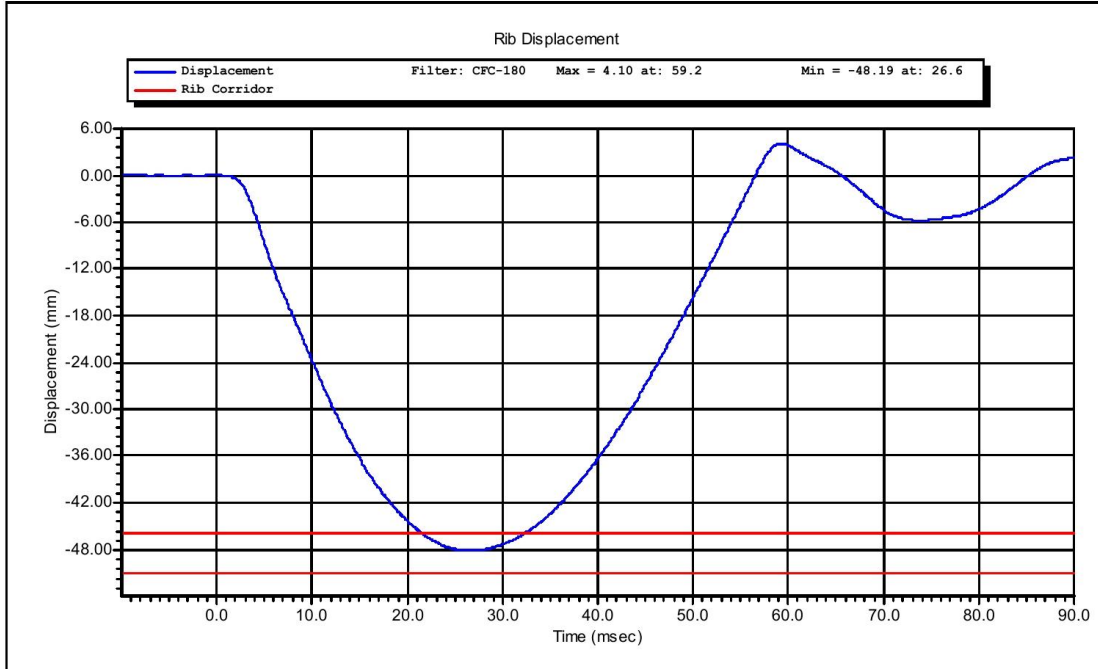


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Lower Rib Drop 4m/s	Test Date:	2/7/2013
Test Number:	1	Test Time:	12:10:08 PM



Test Time: 12:10:08 PM

Test Date: 2/7/2013

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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:	F033		
Test ID:	Lower Rib Drop 3m/s	Test Date:	2/7/2013
Test Number:	1	Test Time:	12:15:56 PM

Component Part Number	Component Serial Number
455-3100	07208

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.0 deg C P
Humidity	10.0 -- 70.0	13.2 %RH P
Velocity	2.90 -- 3.10	2.95 m/s P
Rib Displacement	-40.00 -- -36.00	-37.35 mm P
Drop Height	454 -- 464	459 mm P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **E. Dutton**

Test Time: **12:15:56 PM**

Test Date: **2/7/2013**



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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	5/17/2012
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7264-2000	P32222	11/13/2012

Test Time: 12:15:56 PM

Test Date: 2/7/2013

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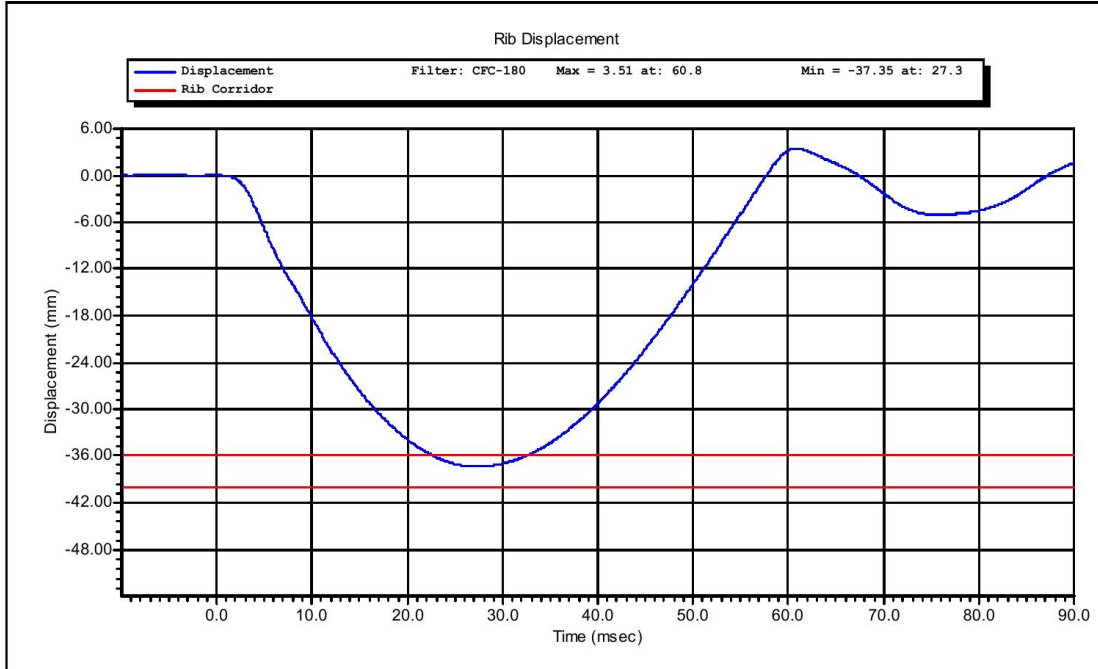


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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Lower Rib Drop 3m/s	Test Date:	2/7/2013
Test Number:	1	Test Time:	12:15:56 PM



Test Time: 12:15:56 PM

Test Date: 2/7/2013

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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:	F033		
Test ID:	Thorax Full Body	Test Date:	2/7/2013
Test Number:	1	Test Time:	3:54:32 PM

Component Part Number	Component Serial Number
Upper Rib - 175-4002	07206
Middle Rib - 175-4002	07207
Lower Rib - 175-4002	07208

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.3 deg C P
Humidity	10 -- 70	13.0 %RH P
Velocity	5.4 -- 5.6	5.51 m/s P
Upper Rib Displacement	34 -- 41	36.1 mm P
Middle Rib Displacement	37 -- 45	41.0 mm P
Lower Rib Displacement	37 -- 44	41.2 mm P
Impactor Force	5100 -- 6200	5716.3 N P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **E. Dutton**

Test Time: **3:54:32 PM**

Test Date: **2/7/2013**



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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	1/11/2013
Endevco	7231CT	C14953	11/28/2012
Honeywell	MLT-38000	DS-179	5/17/2012
Honeywell	MLT-38000	DS-185	5/17/2012
Honeywell	MLT-38000	DS-178	5/17/2012

Test Time: 3:54:32 PM

Test Date: 2/7/2013

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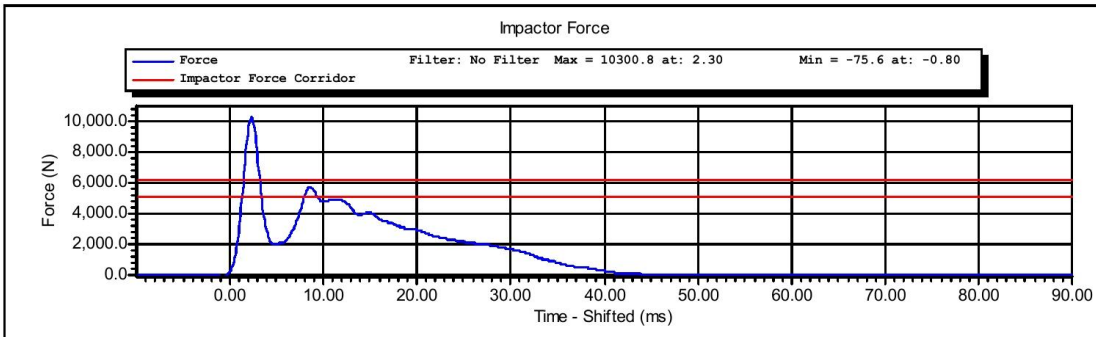
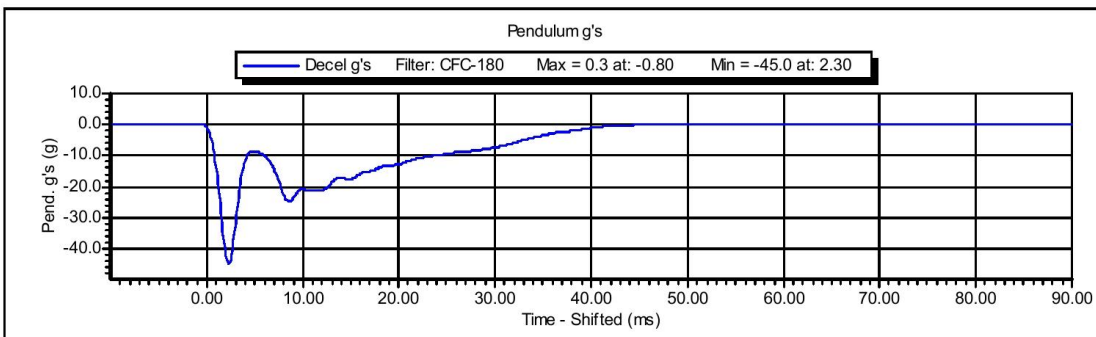


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Test Name:	Thorax Impact	Revision:	8/15/2008
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Thorax Full Body	Test Date:	2/7/2013
Test Number:	1	Test Time:	3:54:32 PM



Test Time: 3:54:32 PM

Test Date: 2/7/2013

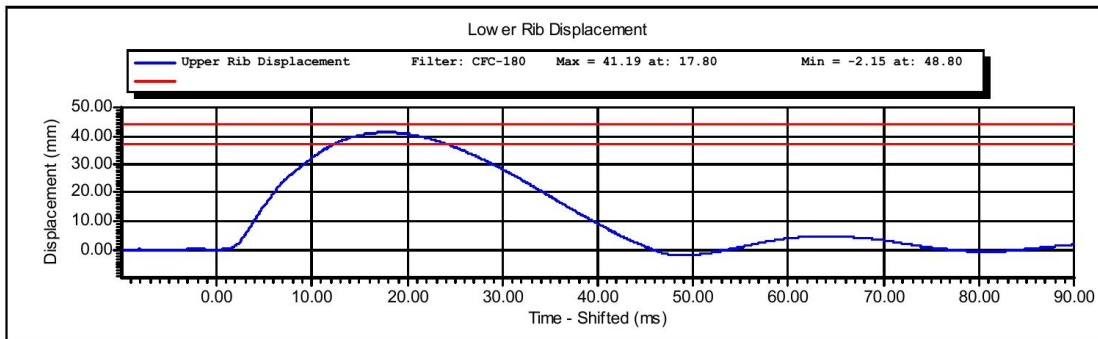
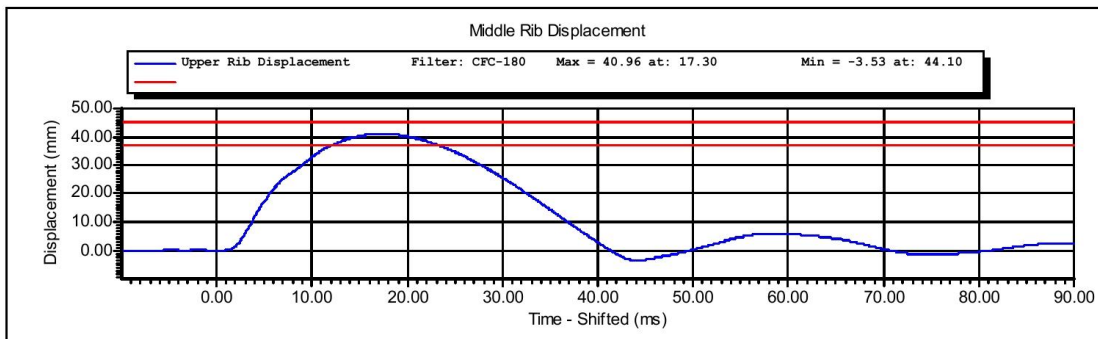
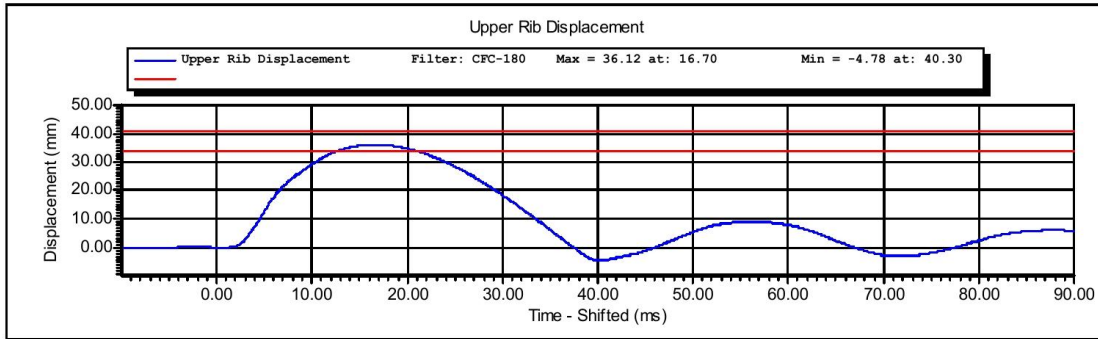
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Test Time: 3:54:32 PM

Test Date: 2/7/2013

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VERIFICATION REPORT

Test Name:	Abdomen Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Abdomen Impact	Test Date:	2/7/2013
Test Number:	2	Test Time:	4:15:36 PM

Component Part Number	Component Serial Number
455-4001	07/136

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.3 deg C P
Humidity	10 -- 70	13.0 %RH P
Velocity	3.9 -- 4.1	4.07 m/s P
Peak Abdominal Force	-2.7 -- -2.2	-2.61 kN P
Time At Peak Abdominal Force	10.0 -- 12.3	10.61 ms P
Maximum Pendulum Force	-4.8 -- -4.0	-4.62 kN P
Time at Peak Pendulum Force	10.6 -- 13.0	10.61 ms P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **E. Dutton**

Test Time: **4:15:36 PM**

Test Date: **2/7/2013**



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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	1/11/2013
Endevco	7231CT	C14953	11/28/2012
Denton	2631	LC-1524	5/24/2012
Denton	2631	LC-1523	5/24/2012
Denton	2631	LC-1530	5/24/2012

Test Time: **4:15:36 PM**

Test Date: **2/7/2013**

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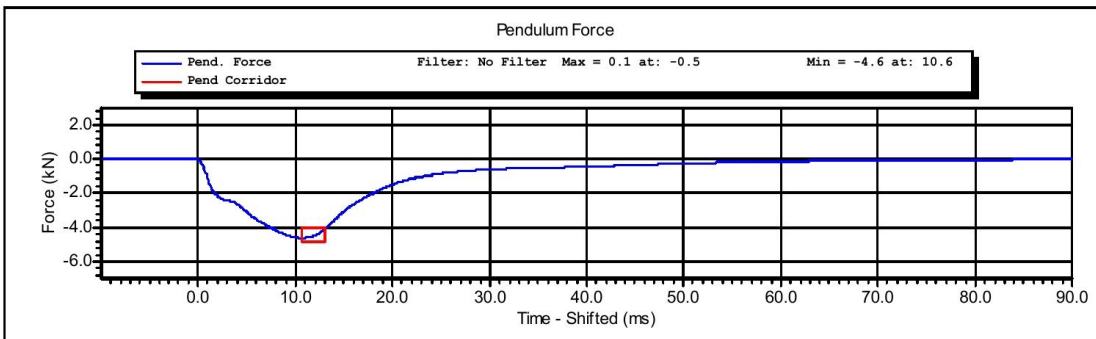
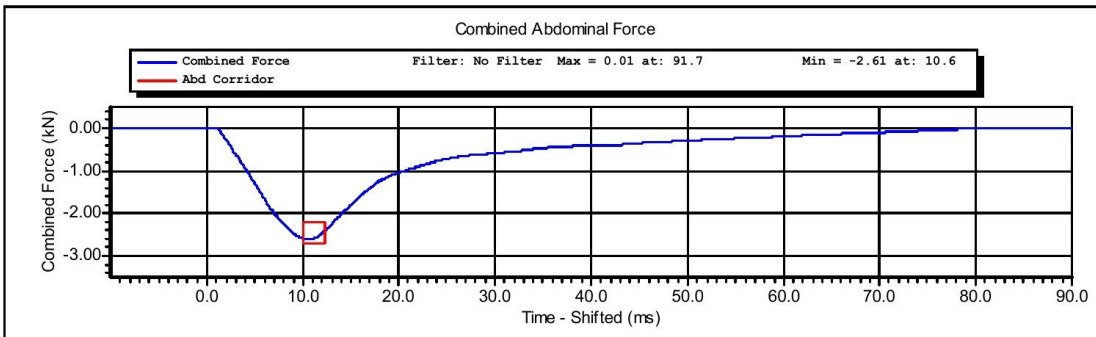


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Test Name:	Abdomen Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Abdomen Impact	Test Date:	2/7/2013
Test Number:	2	Test Time:	4:15:36 PM



Test Time: 4:15:36 PM

Test Date: 2/7/2013

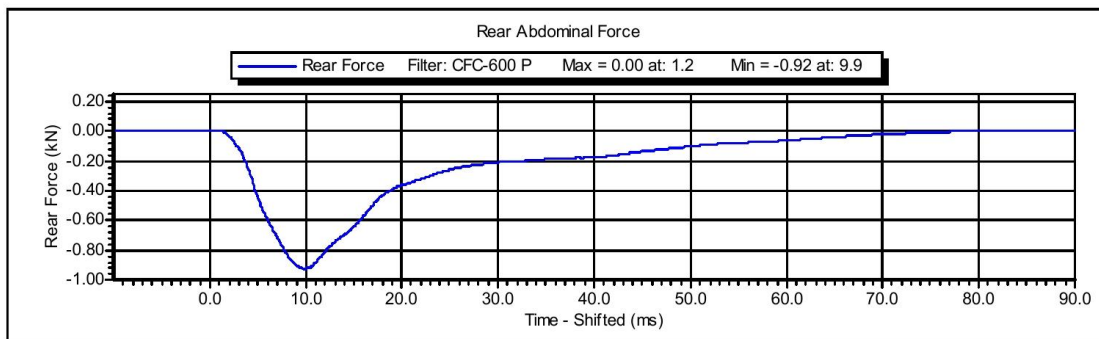
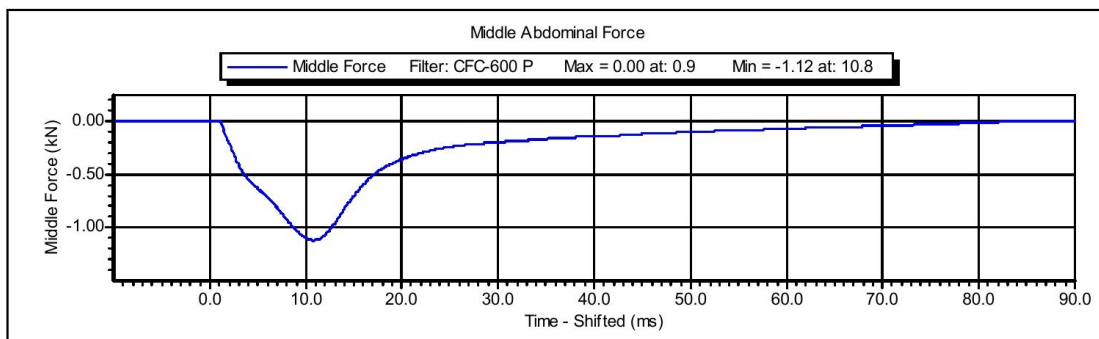
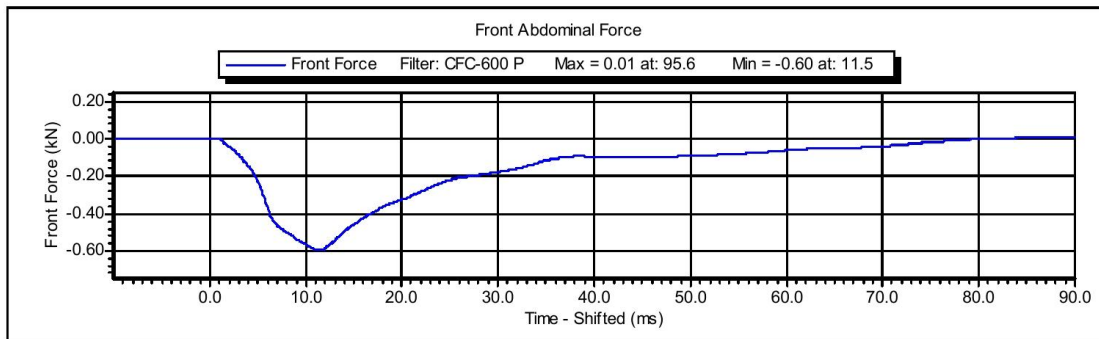
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Test Time: 4:15:36 PM

Test Date: 2/7/2013

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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:	F033		
Test ID:		Test Date:	2/7/2013
Test Number:	1	Test Time:	11:39:34 AM

Component Part Number	Component Serial Number
175-5501	DI8374

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.4 deg C P
Humidity	10 -- 70	18 %RH P
Velocity	5.95 -- 6.15	6.13 m/s P
Maximum Headform Flexion Angle	45.0 -- 55.0	47.0 degrees P
Time at Maximum Headform Flexion Angle	39.0 -- 53.0	45.3 ms P
Decay to Zero Degrees	37.0 -- 57.0	41.2 ms P
Velocity Corridor	--	P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **E. Dutton**

Test Time: **11:39:34 AM**

Test Date: **2/7/2013**



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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	1/11/2013
Endevco	7231CT	C15016	8/15/2012
DentonATD	7000428	094	5/30/2012
DentonATD	7000428	095	5/30/2012
DentonATD	7000428	093	5/30/2012

Test Time: 11:39:34 AM

Test Date: 2/7/2013

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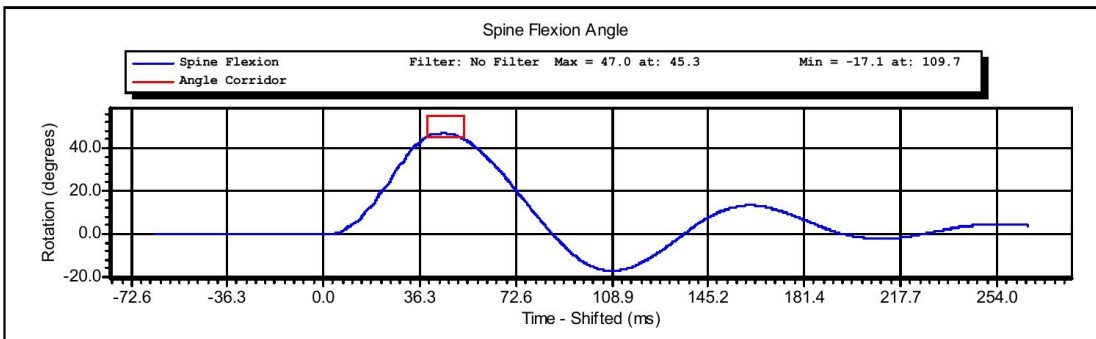
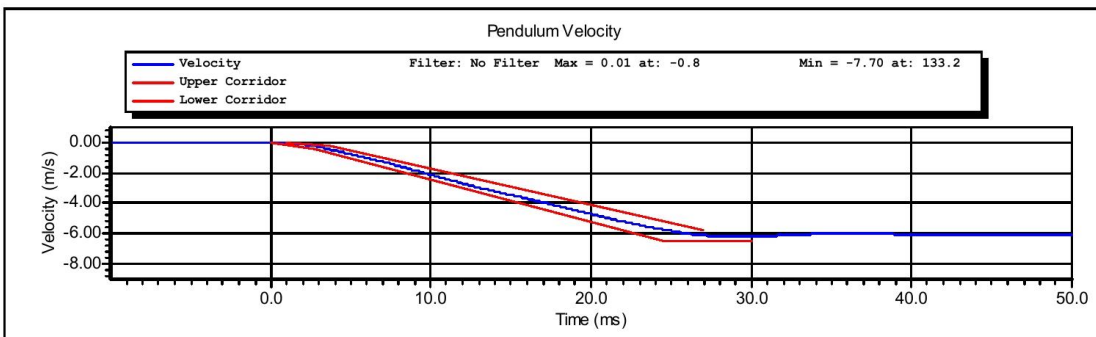


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Test Name:	Lumbar Spine	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:		Test Date:	2/7/2013
Test Number:	1	Test Time:	11:39:34 AM



Test Time: **11:39:34 AM**

Test Date: **2/7/2013**

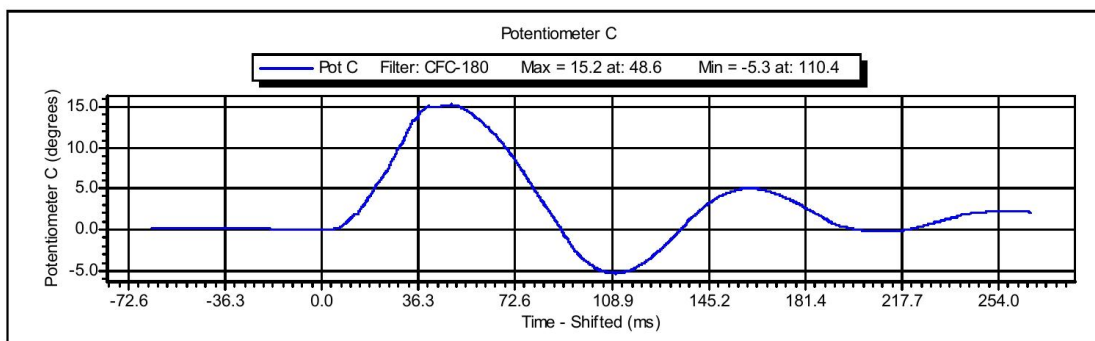
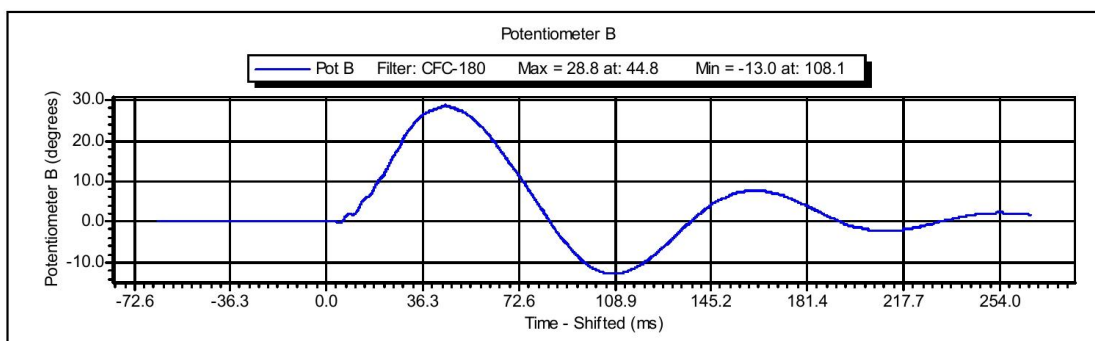
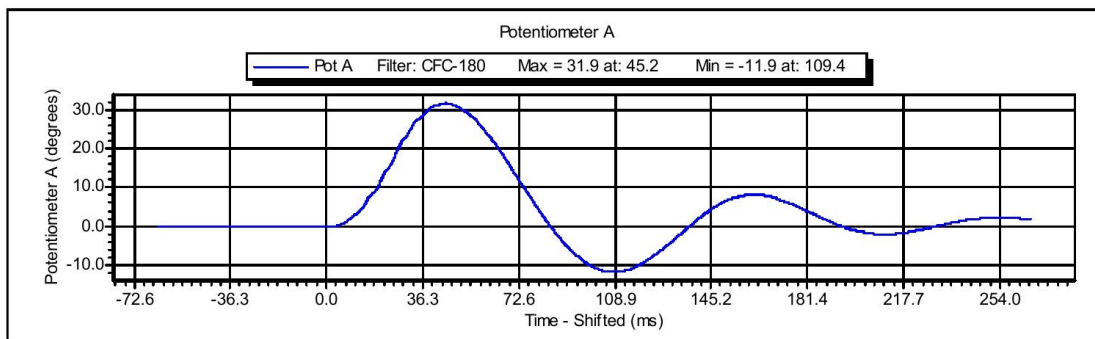
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Test Time: 11:39:34 AM

Test Date: 2/7/2013

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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:	F033		
Test ID:	Pelvis Impact	Test Date:	2/7/2013
Test Number:	1	Test Time:	3:01:56 PM

Component Part Number	Component Serial Number
455-4003	07033

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.5 deg C P
Humidity	10 -- 70	13 %RH P
Velocity	4.20 -- 4.40	4.34 m/s P
Peak Pendulum Force	-5.40 -- -4.70	-5.00 kN P
Time at Peak Pendulum Force	11.80 -- 16.10	13.05 ms P
Peak Pubic Symphysis Force	-1.59 -- -1.23	-1.42 kN P
Time at Peak Pubic Symphysis Force	12.20 -- 17.00	14.05 ms P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **E. Dutton**

Test Time: **3:01:56 PM**

Test Date: **2/7/2013**



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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	1/11/2013
Endevco	7231CT	C14953	11/28/2012
Denton	3096	LC-456Fy	5/24/2012

Test Time: 3:01:56 PM

Test Date: 2/7/2013

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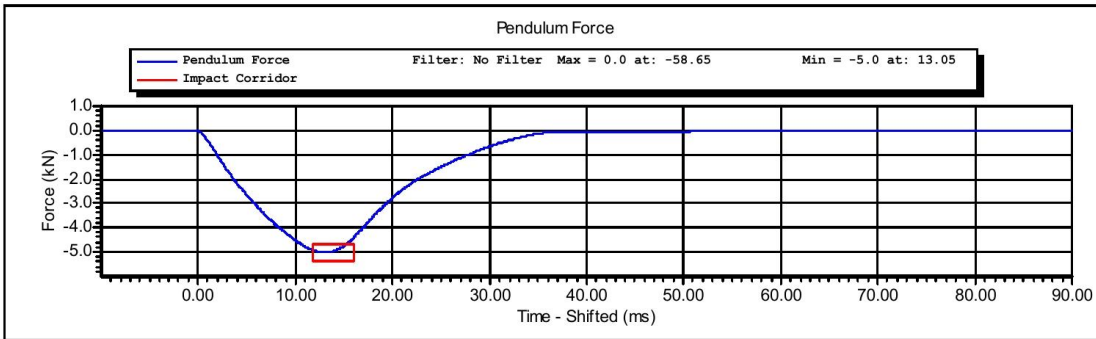
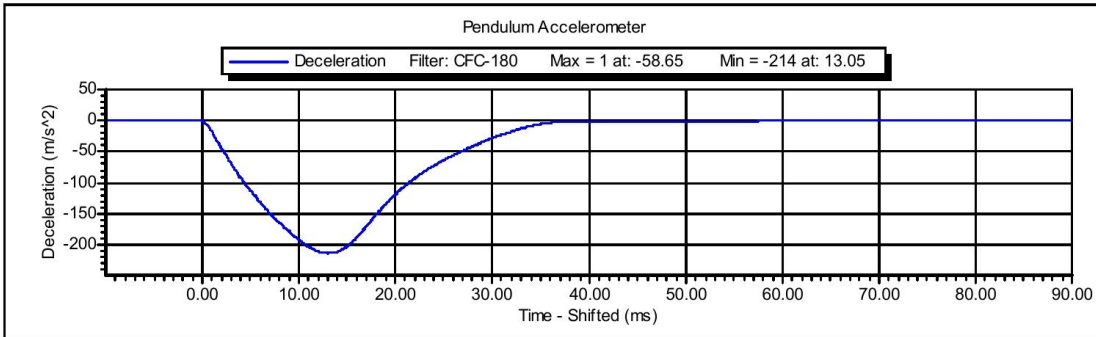


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Test Name:	Pelvis Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Pelvis Impact	Test Date:	2/7/2013
Test Number:	1	Test Time:	3:01:56 PM



Test Time: **3:01:56 PM**

Test Date: **2/7/2013**

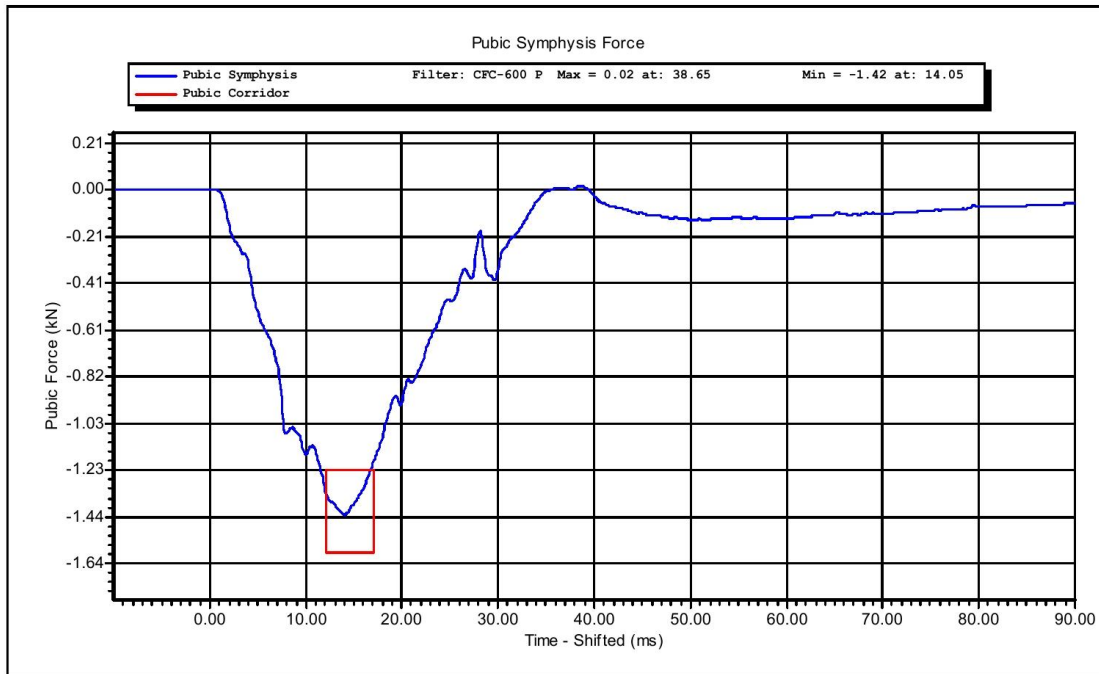
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Test Time: 3:01:56 PM

Test Date: 2/7/2013

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CALIBRATION TEST RESULTS

POST-TEST

SID-IIS 5TH PERCENTILE FEMALE - PASSENGER ATD

SERIAL No: 8012

(CONFIGURED FOR LEFT SIDE IMPACT)



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SID-IIsD External Measurements

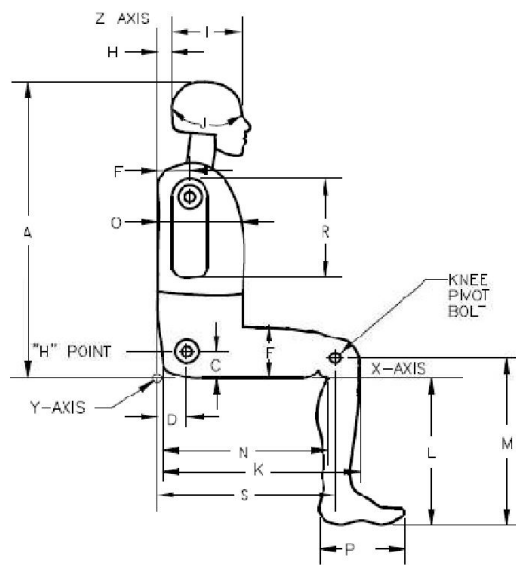
NHTSA ATD S/N DG8012

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	782	Yes
B	Shoulder Pivot Height	437.0 - 453.0	446	Yes
C	H-Point Height	79.0 - 89.0	85	Yes
D	H-Point from Seat Back	141.0 - 151.0	145	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	101	Yes
F	Thigh Clearance	119.0 - 135.0	127	Yes
G	Head Breadth	140.0 - 148.0	145	Yes
H	Head Back from Backline	40.0 - 46.0	43	Yes
I	Head Depth	178.0 - 188.0	183	Yes
J	Head Circumference	541.0 - 551.0	544	Yes
K	Buttock to Knee Length	514.0 - 540.0	529	Yes
L	Popliteal Height	343.0 - 369.0	348	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	398	Yes
N	Buttock Popliteal Length	416.0 - 442.0	431	Yes
O	Chest Depth without Jacket	195.0 - 211.0	205	Yes
P	Foot Length (right)	216.0 - 232.0	222	Yes
Q	Hip Breadth	313.0 - 323.0	320	Yes
R	Arm Length	249.0 - 259.0	251	Yes
S	Knee Joint to Seat back	478.0 - 493.0	480	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	350	Yes
W	Foot Width (right)	78.0 - 94.0	84	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	862	Yes
Z	Waist Circumference	761.0 - 791.0	768	Yes

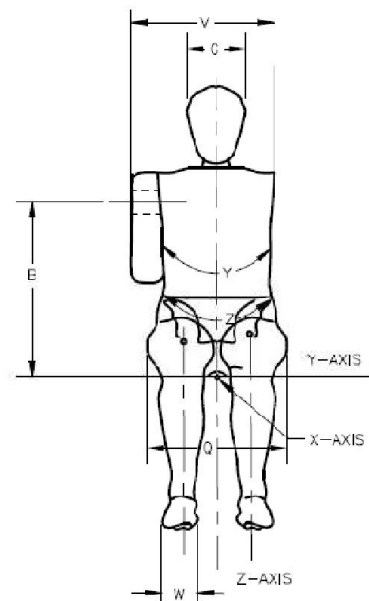
Technician: M. Goehle

2/7/2013

SID-IIsD External Dimension Reference Diagram



SIDE VIEW



FRONT VIEW

VERIFICATION REPORT

Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	DG8012		
Test ID:	Head Drop	Test Date:	2/6/2013
Test Number:	1	Test Time:	11:06:25 AM

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

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	22.1 deg C	P
Humidity	10	--	70	24 %RH	P
Resultant Acceleration	115.0	--	137.0	124.1 g	P
Oscillation	0.0	--	15.0	0.0 %	P
Fore-Aft Acceleration	-15.0	--	15.0	-4.4 g	P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **E. Dutton**

Test Time: **11:06:25 AM**

Test Date: **2/6/2013**

VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P49185	1/25/2013
Endevco	7264-2000	P64129	1/25/2013
Endevco	7264-2000	P51991	1/25/2013

Test Time: **11:06:25 AM**Test Date: **2/6/2013**

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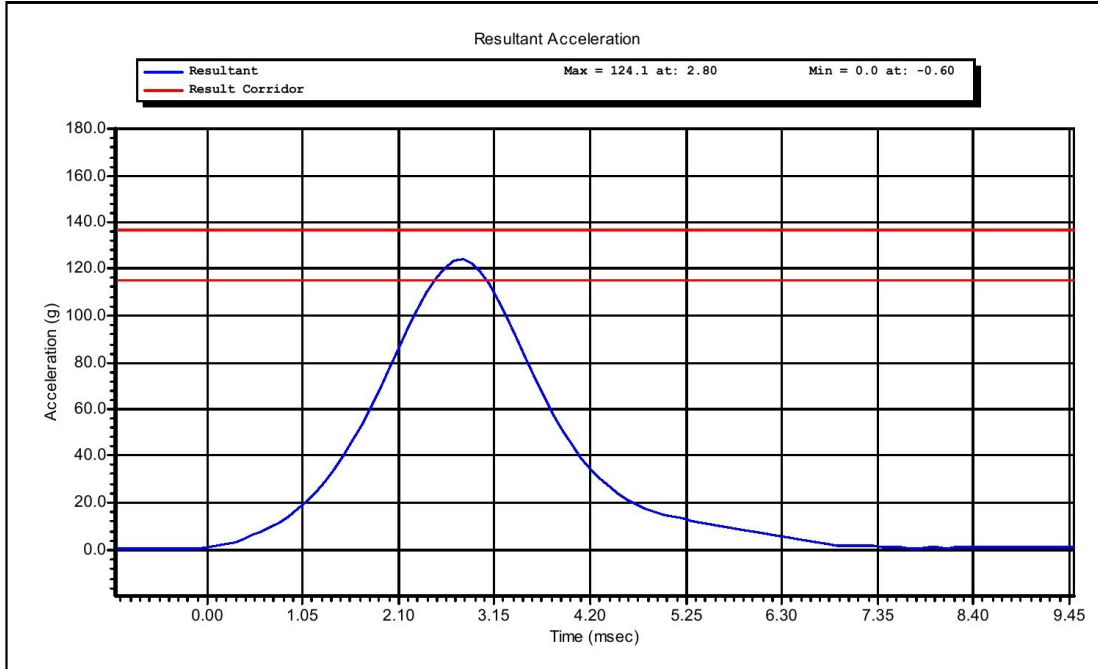


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Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	DG8012		
Test ID:	Head Drop	Test Date:	2/6/2013
Test Number:	1	Test Time:	11:06:25 AM



Test Time: 11:06:25 AM

Test Date: 2/6/2013

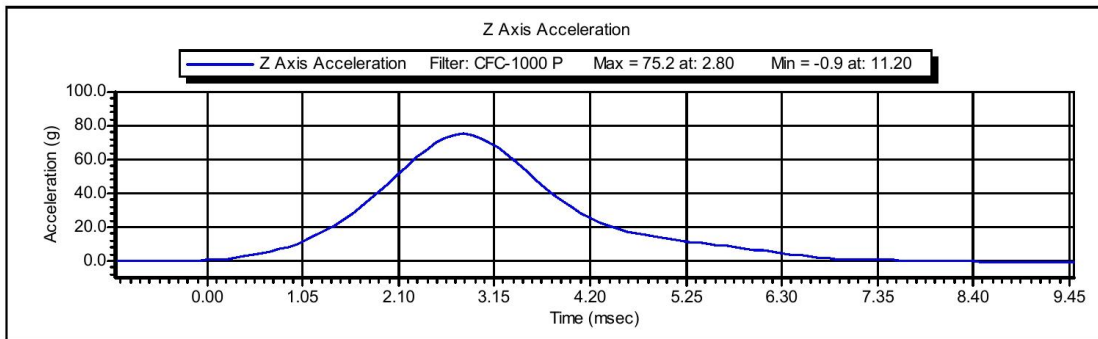
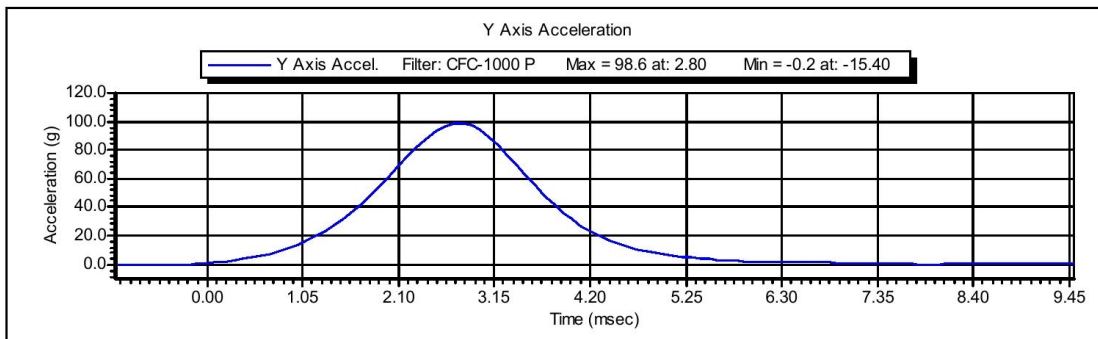
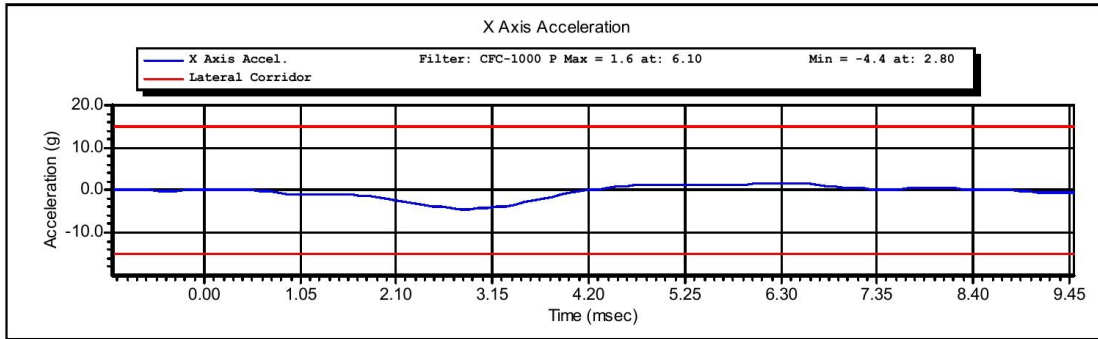
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Test Time: 11:06:25 AM

Test Date: 2/6/2013

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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-IIs		
ATD Serial Number:	DG8012		
Test ID:	Neck Flexion	Test Date:	2/6/2013
Test Number:	2	Test Time:	1:32:22 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10 -- 70	17 %RH P
Velocity	5.51 -- 5.63	5.60 m/s P
Pendulum Impulse at 10 ms	2.20 -- 2.80	2.72 m/s P
Pendulum Impulse at 15 ms	3.30 -- 4.10	3.96 m/s P
Pendulum Impulse at 20 ms	4.40 -- 5.40	5.29 m/s P
Pendulum Impulse at 25 ms	5.40 -- 6.10	5.61 m/s P
Pendulum Impulse between 25 and 100 ms	5.50 -- 6.20	5.68 m/s P
Max D Plane Rotation	71.0 -- 81.0	74.8 degrees P
Time at Max Rotation	50.0 -- 70.0	60.4 ms P
Moment about OC	-44.0 -- -36.0	-40.5 Nm P
Moment Decay to Zero	102.0 -- 126.0	114.3 ms P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **E. Dutton**

Test Time: **1:32:22 PM**

Test Date: **2/6/2013**



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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	1/11/2013
Endevco	7231CT	C15016	8/15/2012
Denton	1716A	LC-2192Fy	5/21/2012
Denton	1716A	LC-2192Mx	5/21/2012
DentonATD	78051-342	184	5/30/2012
DentonATD	78051-342	174	5/30/2012
DentonATD	78051-342	185	5/30/2012

Test Time: 1:32:22 PM

Test Date: 2/6/2013

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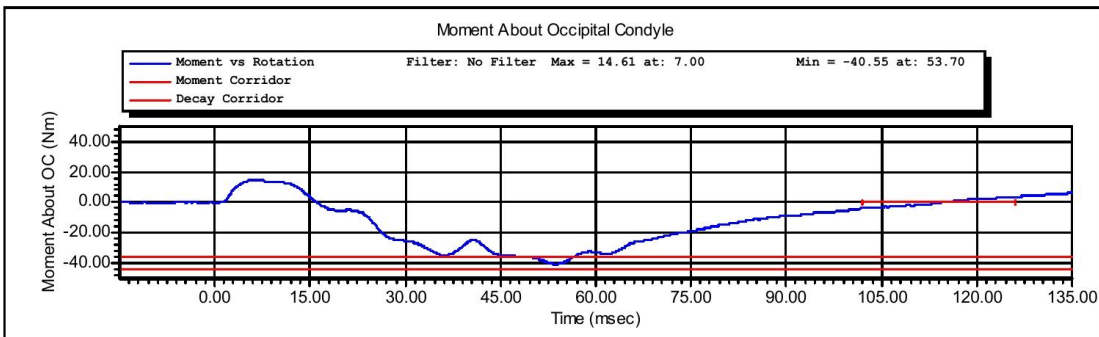
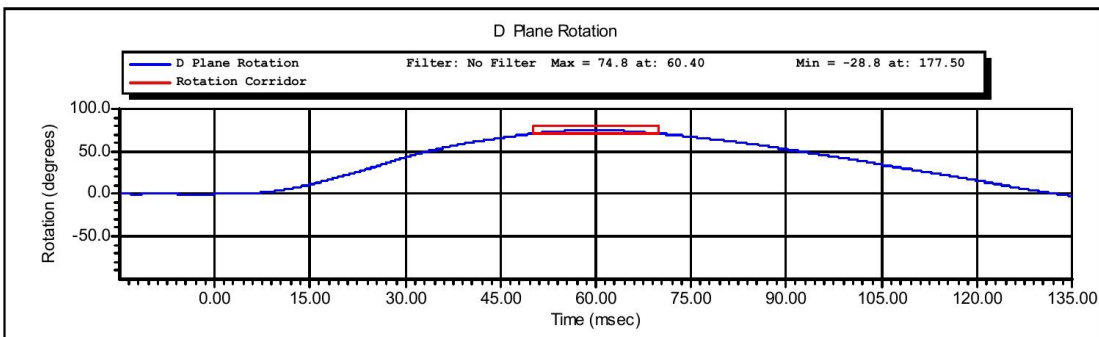


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Test Name:	Neck Pendulum	Revision:	8/24/2009
Sub Test Name:	Left Side	Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	DG8012		
Test ID:	Neck Flexion	Test Date:	2/6/2013
Test Number:	2	Test Time:	1:32:22 PM



Test Time: 1:32:22 PM

Test Date: 2/6/2013

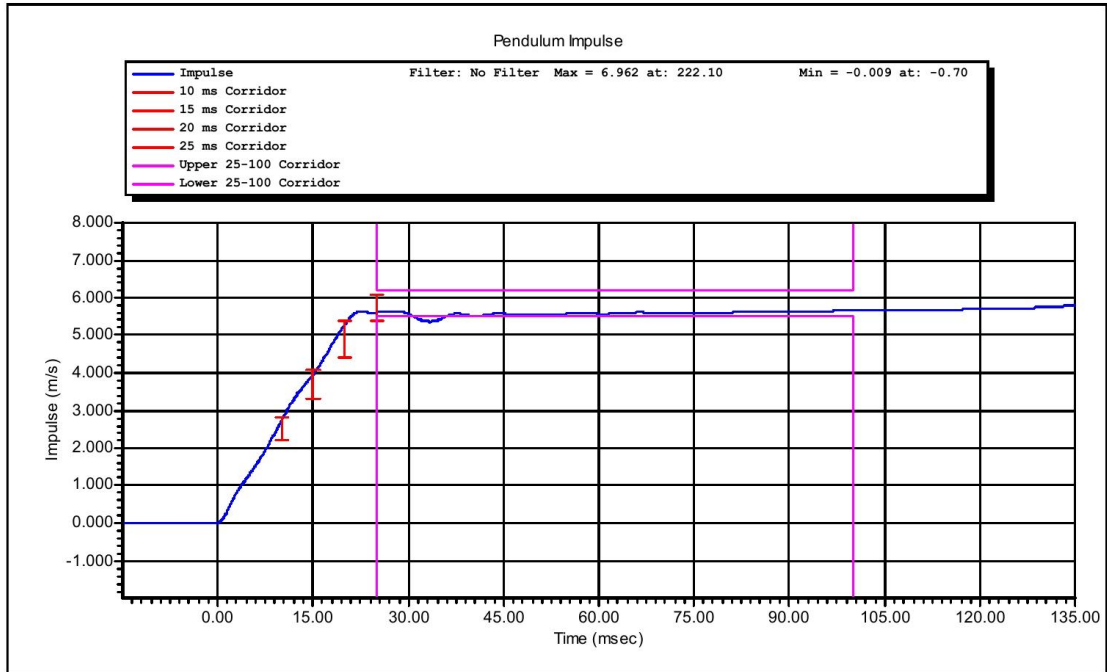
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Test Time: 1:32:22 PM

Test Date: 2/6/2013

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VERIFICATION REPORT

Test Name:	Shoulder Impact	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	DG8012		
Test ID:	Shoulder Impact	Test Date:	2/7/2013
Test Number:	1	Test Time:	9:21:46 AM

Component Part Number	Component Serial Number
Left Arm 180-6011-1	1012
Shoulder Rib 180-3355	286

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.90 deg C P
Humidity	10.0 -- 70.0	14.9 %RH P
Velocity	4.20 -- 4.40	4.37 m/s P
Probe Acceleration	13.0 -- 18.0	15.2 g P
Shoulder Deflection	28.0 -- 37.0	28.98 mm P
T1 Acceleration	17.0 -- 22.0	20.1 g P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **E. Dutton**

Test Time: **9:21:46 AM**

Test Date: **2/7/2013**



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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	1/11/2013
Endevco	7231CT	C14953	11/28/2012
FTSS	180-3881-1	DS-1845	5/17/2012
Endevco	7264-2000	P51875	12/3/2012

Test Time: 9:21:46 AM

Test Date: 2/7/2013

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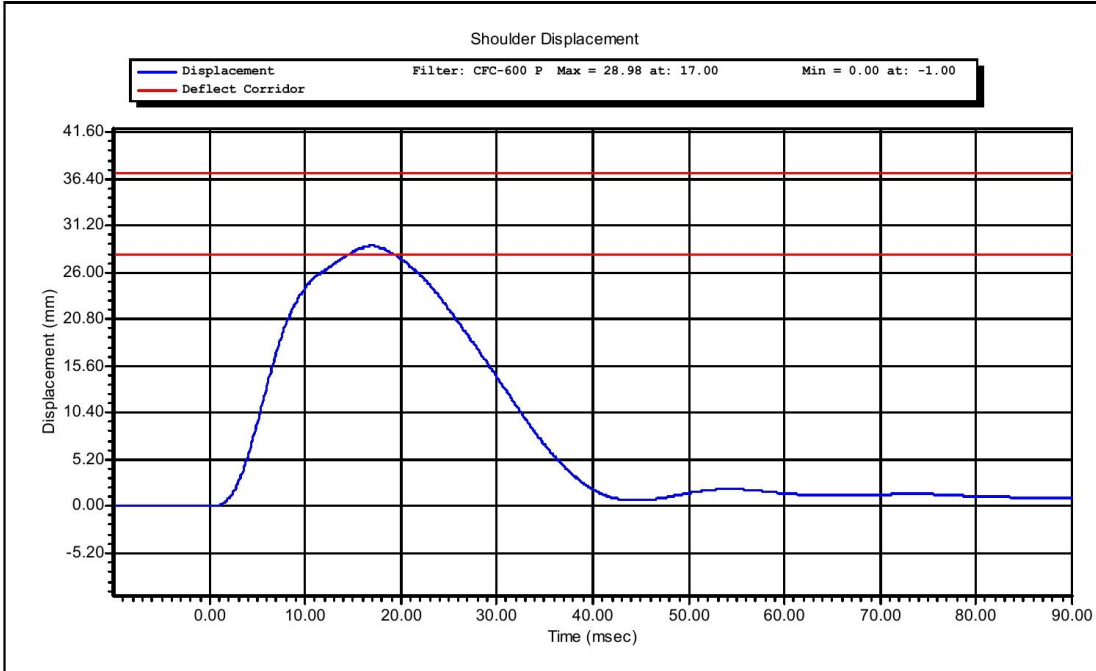


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Test Name:	Shoulder Impact	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	DG8012		
Test ID:	Shoulder Impact	Test Date:	2/7/2013
Test Number:	1	Test Time:	9:21:46 AM



Test Time: 9:21:46 AM

Test Date: 2/7/2013

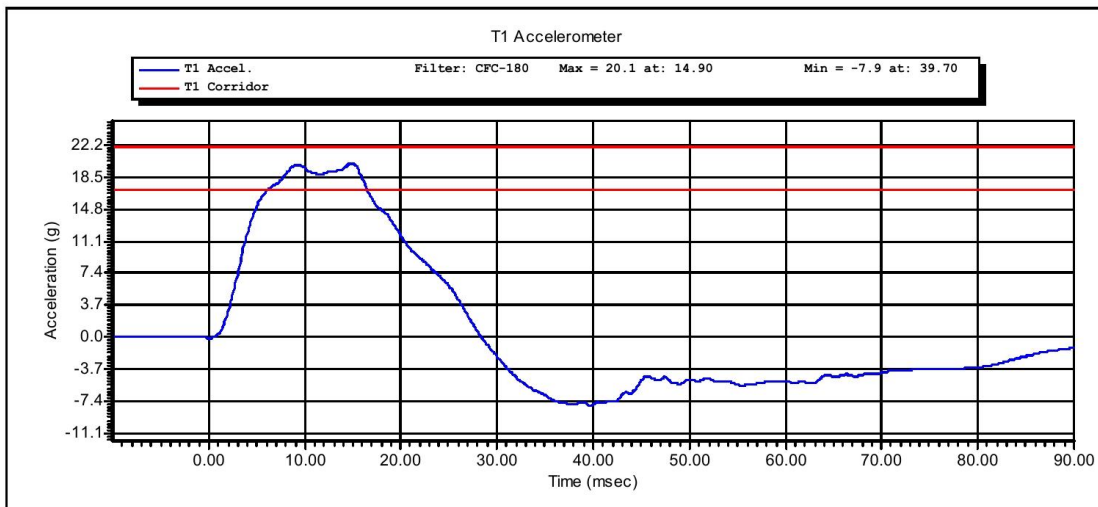
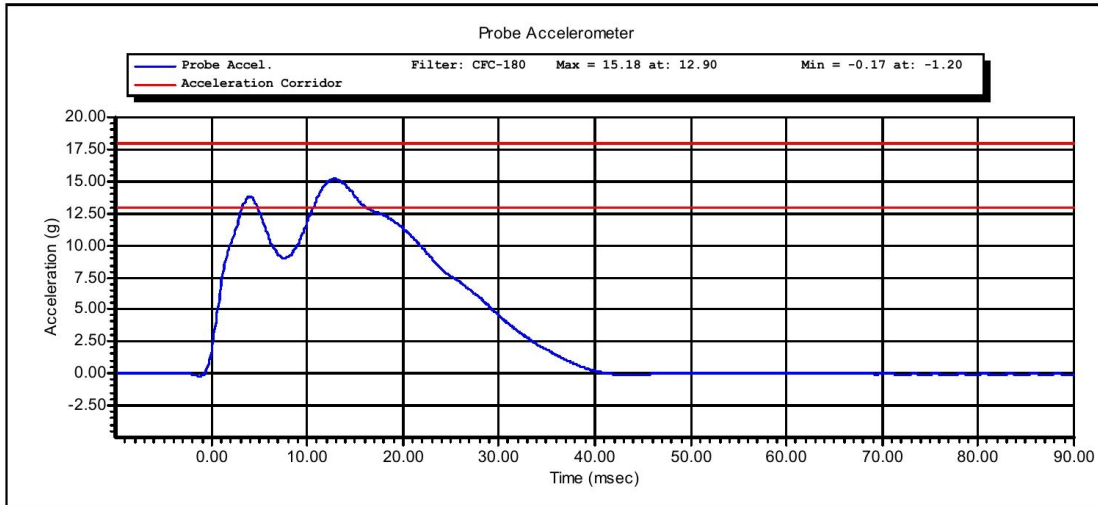
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Test Time: 9:21:46 AM

Test Date: 2/7/2013

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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-IIs		
ATD Serial Number:	DG8012		
Test ID:	Thorax Without Arm	Test Date:	2/7/2013
Test Number:	1	Test Time:	8:59:44 AM

Component Part Number	Component Serial Number
Thorax Ribs 1, 2, 3 180-3362	DG6080, DG6081, DG7543

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.6 deg C P
Humidity	10 -- 70	15 %RH P
Velocity	4.20 -- 4.40	4.33 m/s P
Probe Acceleration	14.0 -- 18.0	15.9 g P
Upper Thorax Rib Deflection	32.0 -- 40.0	38.0 mm P
Mid Thorax Rib Deflection	39.0 -- 45.0	42.3 mm P
Lower Thorax Rib Deflection	35.0 -- 43.0	38.5 mm P
Upper Spine Acceleration T1	13.0 -- 17.0	15.6 g P
Lower Spine Acceleration T12	7.0 -- 11.0	9.5 g P

All test parameters are within specifications

Technician: **M. Goehle**
 Supervisor: **E. Dutton**

Test Time: **8:59:44 AM**

Test Date: **2/7/2013**



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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	1/11/2013
Endevco	7231CT	C14953	11/28/2012
Servo	180-3881-1	DS-808	10/23/2012
Servo	180-3881-1	DS-1514	5/16/2012
Servo	180-3881-1	DS-011	10/23/2012
Endevco	7264-2000	P51875	12/3/2012
Endevco	7264-2000	P58796	1/28/2013

Test Time: **8:59:44 AM**

Test Date: **2/7/2013**

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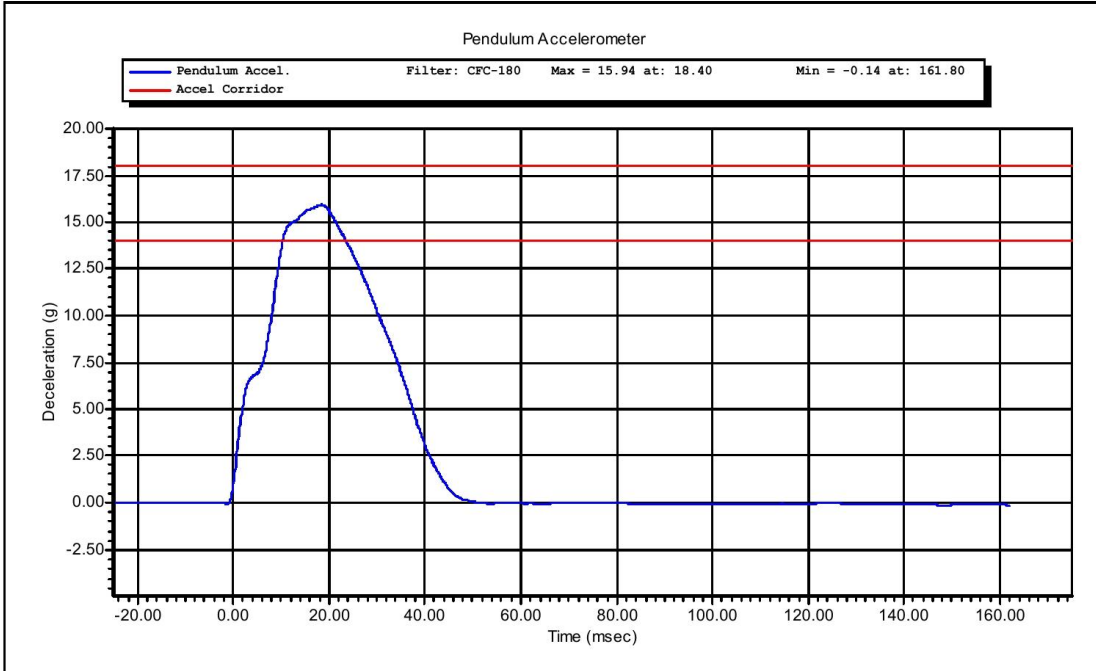


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Test Name:	Thorax Impact without Arm	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	DG8012		
Test ID:	Thorax Without Arm	Test Date:	2/7/2013
Test Number:	1	Test Time:	8:59:44 AM



Test Time: 8:59:44 AM

Test Date: 2/7/2013

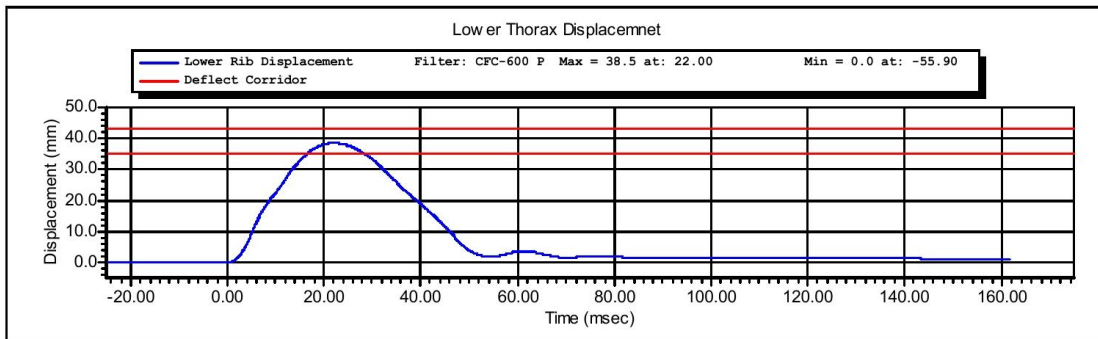
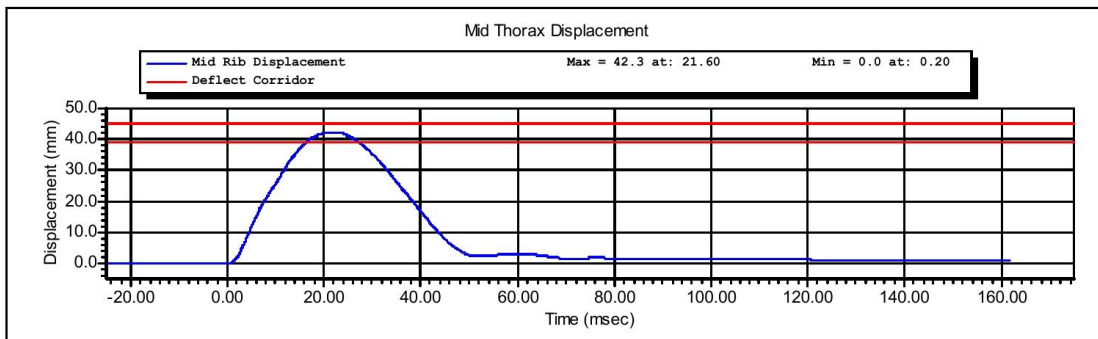
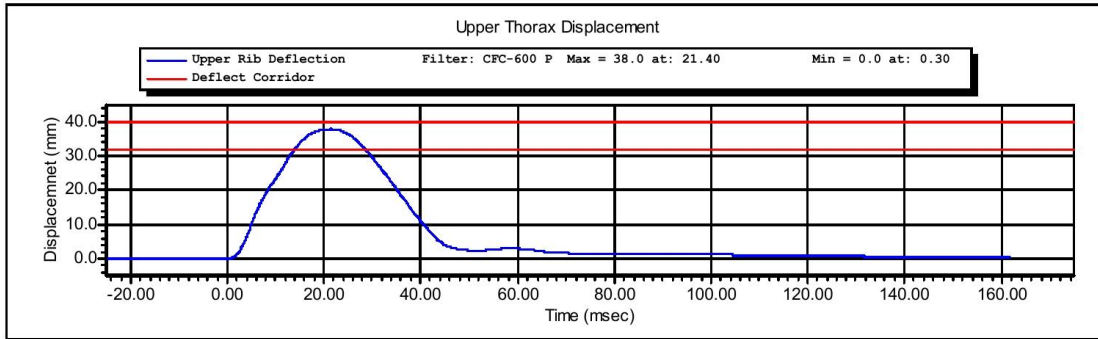
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Test Time: 8:59:44 AM

Test Date: 2/7/2013

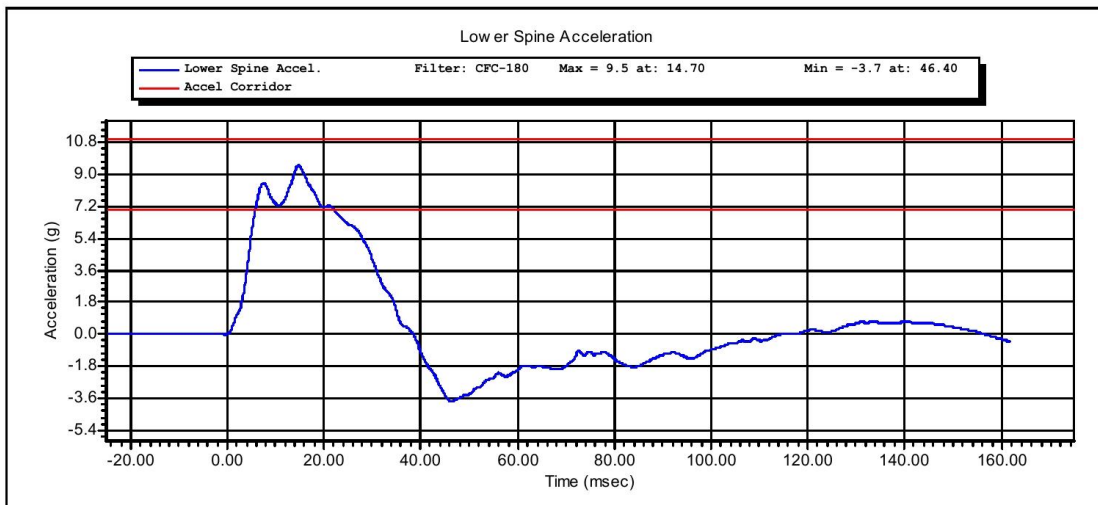
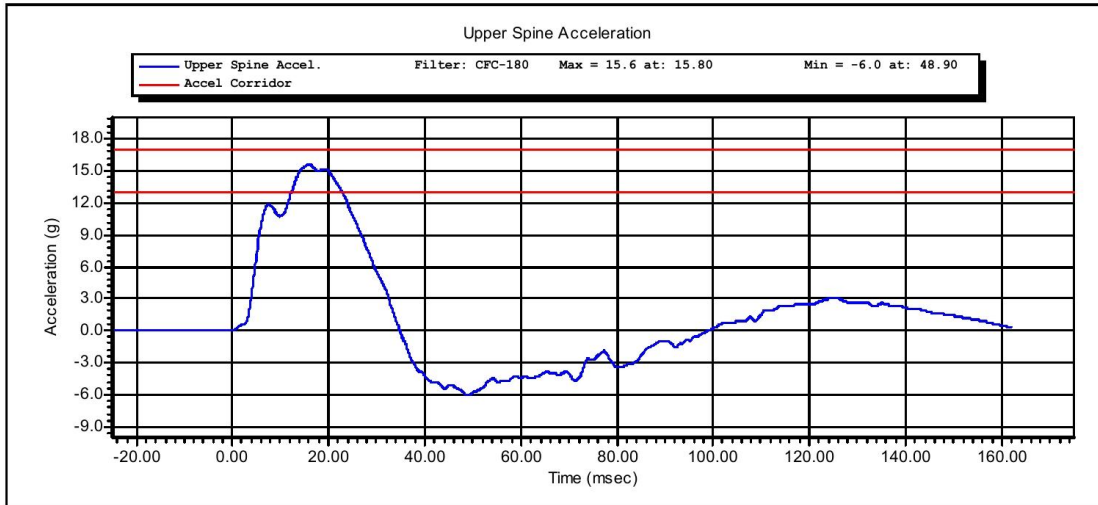
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Test Time: 8:59:44 AM

Test Date: 2/7/2013

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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-IIs		
ATD Serial Number:	DG8012		
Test ID:	Thorax With Arm	Test Date:	2/7/2013
Test Number:	1	Test Time:	9:43:13 AM

Component Part Number	Component Serial Number
Thorax Ribs 1, 2, 3 180-3362	DG6080, DG6081, DG7543
Shoulder Rib 180-3355	286
Left Arm 180-6011-1	1012

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10 -- 70	14 %RH P
Velocity	6.60 -- 6.80	6.77 m/s P
Probe Acceleration after 5ms	30.0 -- 36.0	32.8 g P
Upper Thorax Rib Deflection	25.0 -- 32.0	27.6 mm P
Mid Thorax Rib Deflection	30.0 -- 36.0	32.8 mm P
Lower Thorax Rib Deflection	32.0 -- 38.0	35.9 mm P
Upper Spine Acceleration ("y")	34.0 -- 43.0	41.0 g P
Lower Spine Acceleration ("y")	29.0 -- 37.0	33.2 g P
Shoulder Deflection	31.0 -- 40.0	33.0 mm P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **E. Dutton**

Test Time: **9:43:13 AM**

Test Date: **2/7/2013**



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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	1/11/2013
Endevco	7231CT	C14953	11/28/2012
Servo	180-3881-1	DS-808	10/23/2012
Servo	180-3881-1	DS-1514	5/16/2012
Servo	180-3881-1	DS-011	10/23/2012
Endevco	7264-2000	P51875	12/3/2012
Endevco	7264-2000	P58796	1/28/2013
FTSS	180-3881-1	DS-1845	5/17/2012

Test Time: 9:43:13 AM

Test Date: 2/7/2013

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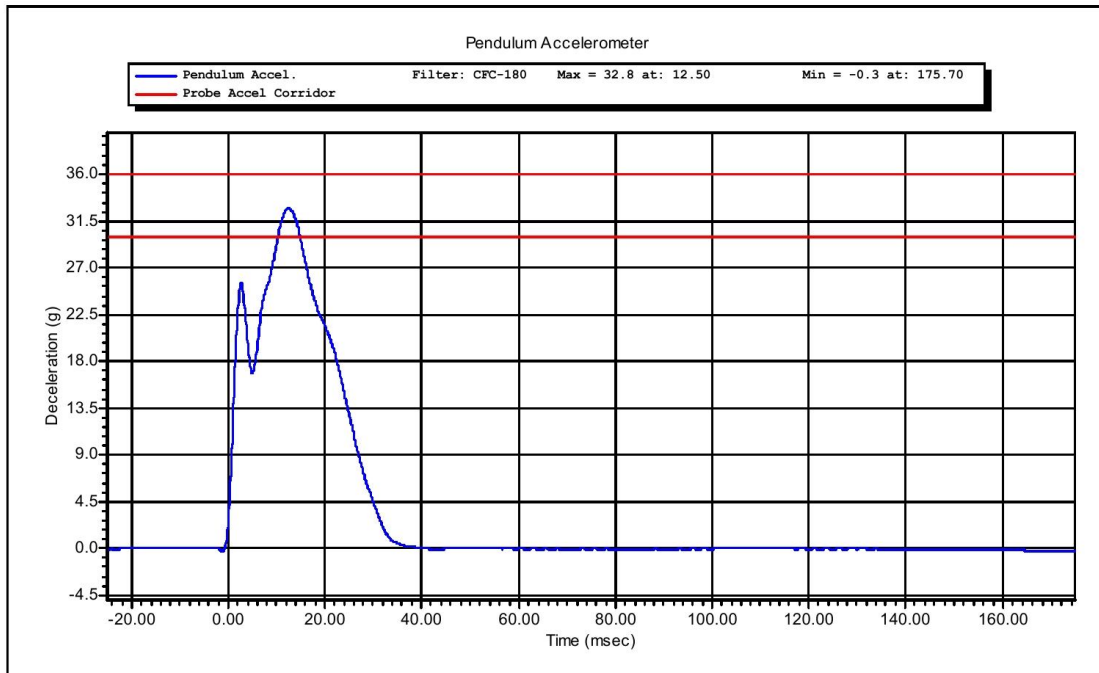


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Test Name:	Thorax Impact with Arm	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	DG8012		
Test ID:	Thorax With Arm	Test Date:	2/7/2013
Test Number:	1	Test Time:	9:43:13 AM



Test Time: 9:43:13 AM

Test Date: 2/7/2013

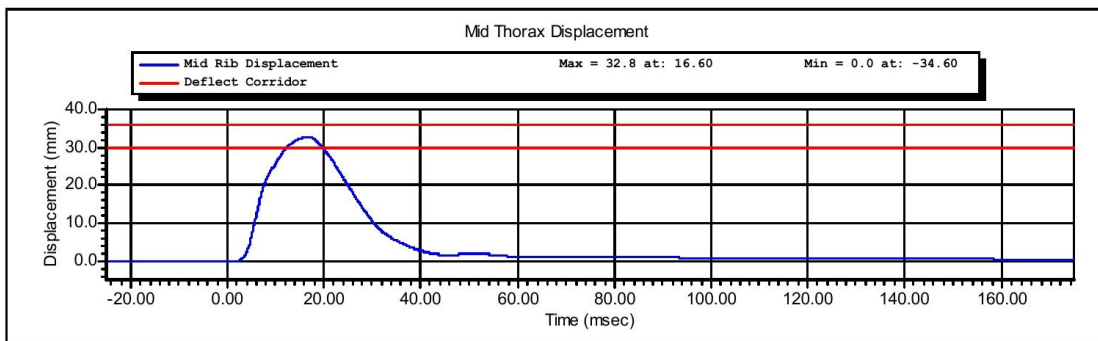
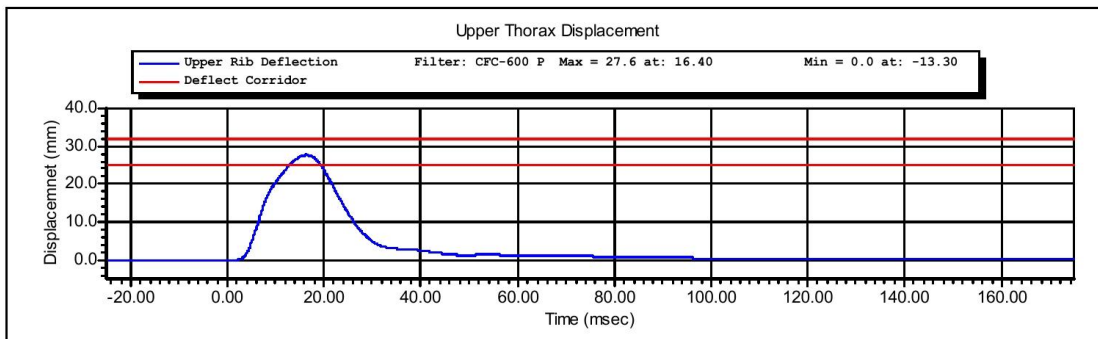
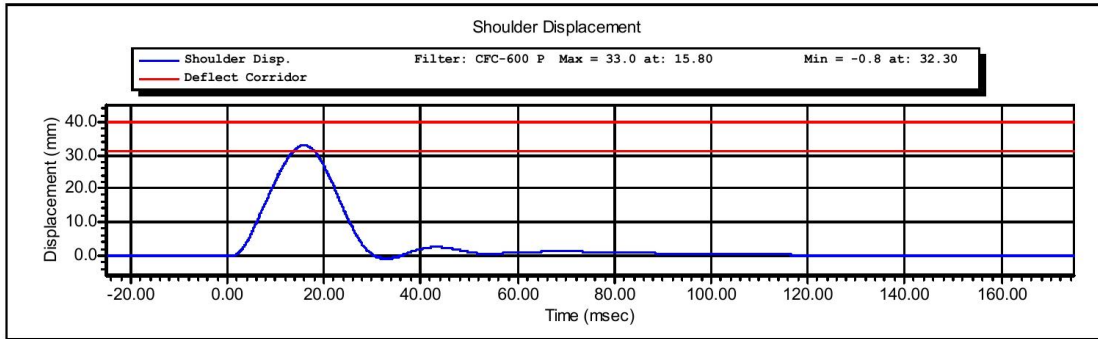
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Test Time: 9:43:13 AM

Test Date: 2/7/2013

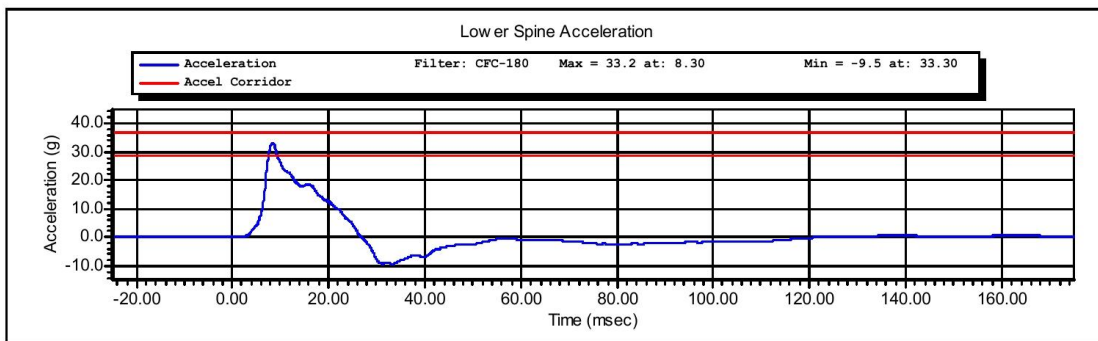
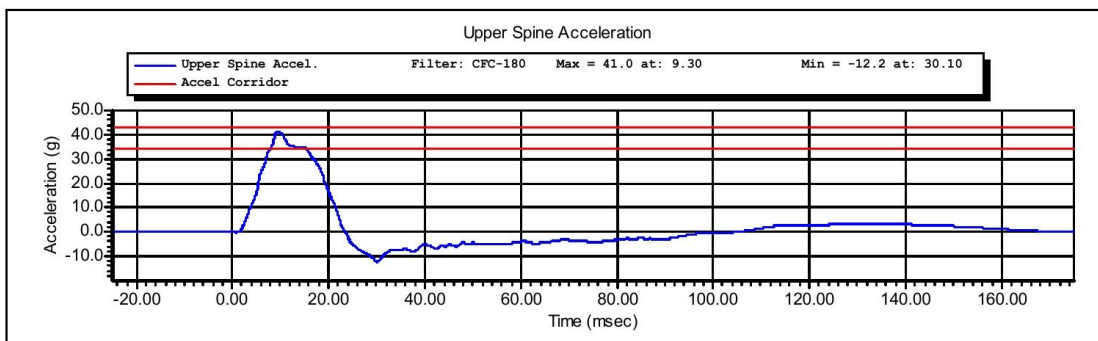
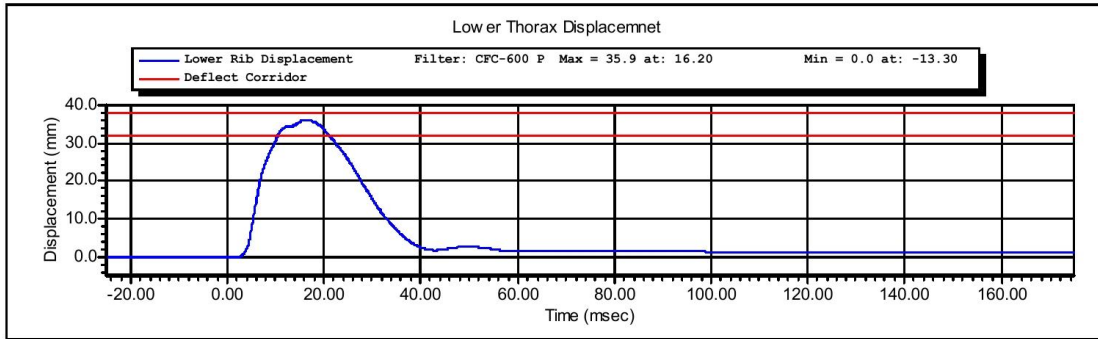
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Test Time: 9:43:13 AM

Test Date: 2/7/2013

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VERIFICATION REPORT

Test Name:	Abdominal Impact	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	DG8012		
Test ID:	Abdomen Impact	Test Date:	2/7/2013
Test Number:	1	Test Time:	8:20:42 AM

Component Part Number	Component Serial Number
Upper Abdomen Rib	1581
Lower Abdomen Rib	1518

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	20.9 deg C P
Humidity	10 -- 70	15 %RH P
Velocity	4.20 -- 4.40	4.33 m/s P
Probe Acceleration	12.0 -- 16.0	13.7 g P
Upper Abdominal Rib Deflection	36.0 -- 47.0	45.1 mm P
Lower Abdominal Rib Deflection	33.0 -- 44.0	39.9 mm P
Lower Spine Acceleration - T12	9.0 -- 14.0	10.3 g P

All test parameters are within specifications

Technician: **M. Goehle**
 Supervisor: **E. Dutton**

Test Time: **8:20:42 AM**

Test Date: **2/7/2013**



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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	1/11/2013
Endevco	7231CT	C14953	11/28/2012
Servo	180-3881-1	DS-015	10/23/2012
Servo	180-3881-1	DS-1774	10/23/2012
Endevco	7264-2000	P58796	5/17/2012

Test Time: 8:20:42 AM

Test Date: 2/7/2013

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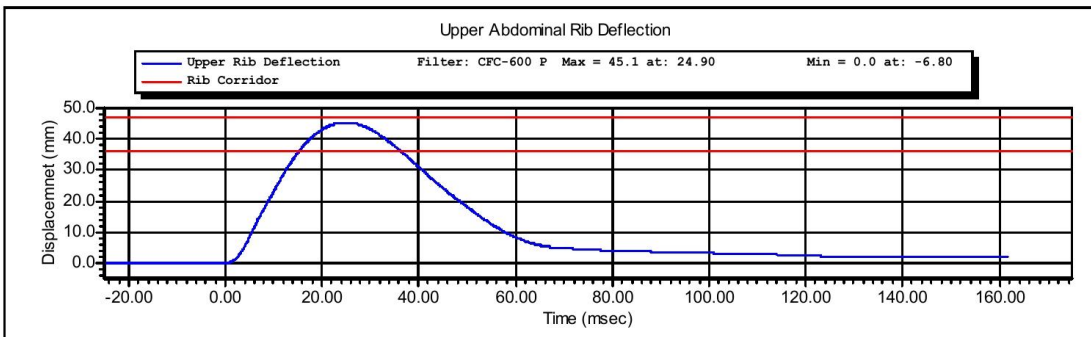
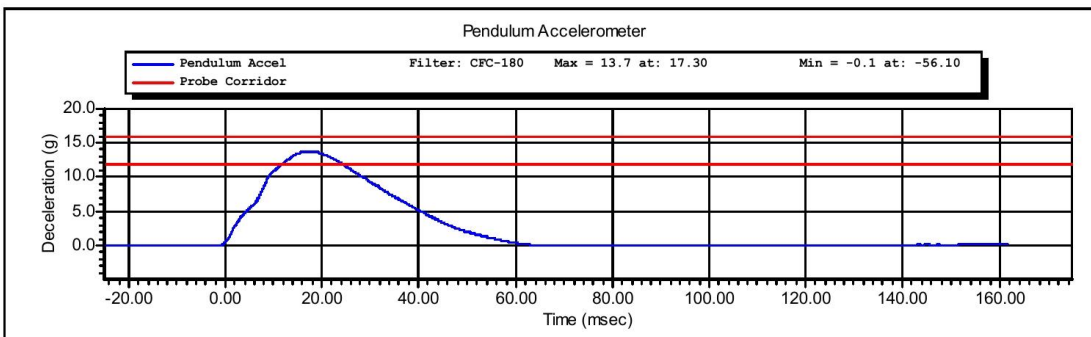


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Test Name:	Abdominal Impact	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	DG8012		
Test ID:	Abdomen Impact	Test Date:	2/7/2013
Test Number:	1	Test Time:	8:20:42 AM



Test Time: 8:20:42 AM

Test Date: 2/7/2013

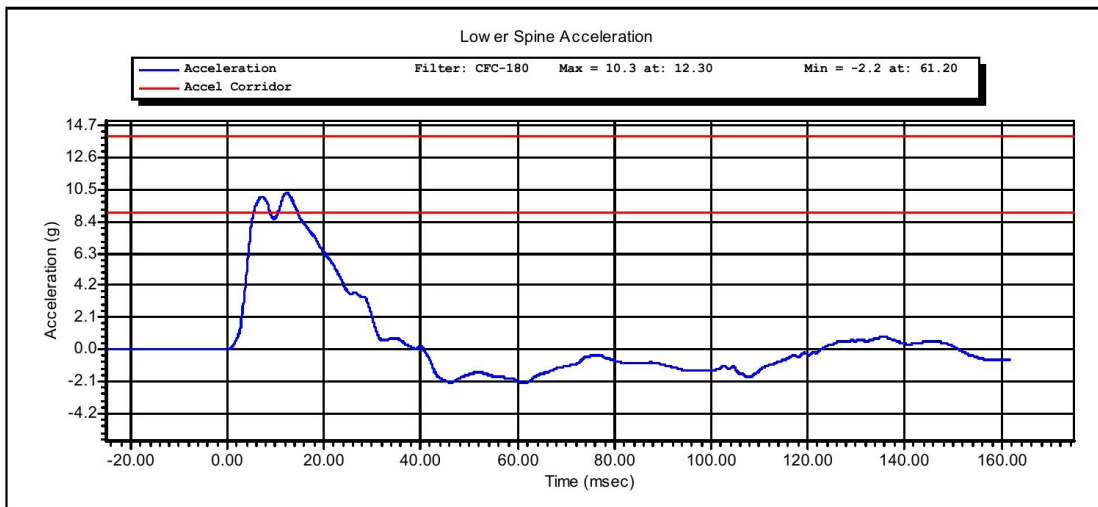
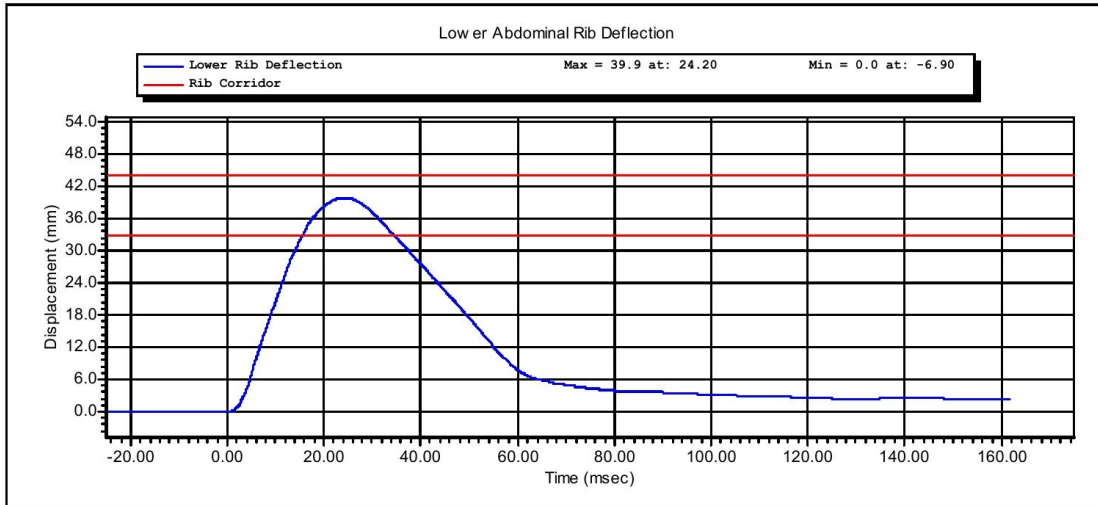
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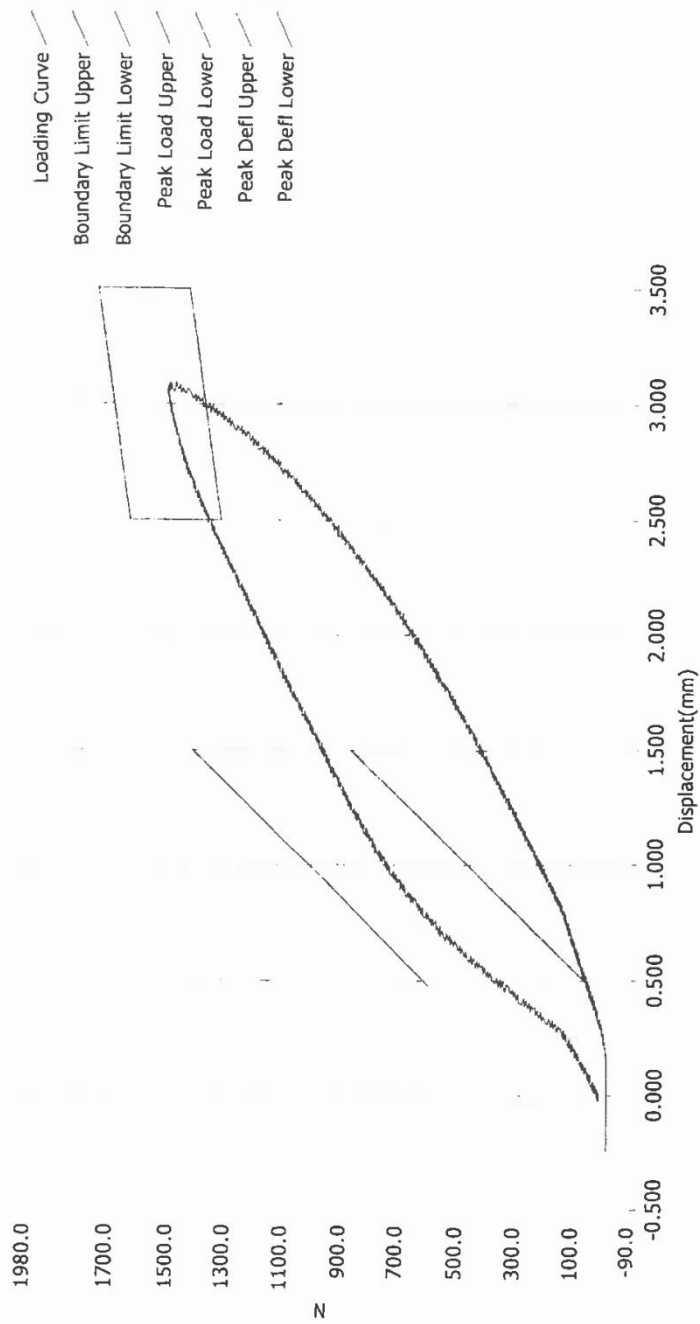


Test Time: 8:20:42 AM

Test Date: 2/7/2013

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Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

Cert-PG-8012

2/6/13

Test ID	Part Serial Number	Test Date	Test Time
		10/6/2010	4:38 PM
Cert ID	ATD Serial Number	ATD Type	
	36836	SIDIIs	

Current Date : 10/6/2010 Current Time : 16:39:40

VERIFICATION REPORT

Test Name:	Pelvis	Revision:	8/24/2009
Sub Test Name:	Acetabulum Impact	Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	DG8012		
Test ID:	Pelvis Acetabulum	Test Date:	2/6/2013
Test Number:	1	Test Time:	3:57:05 PM

Component Part Number	Component Serial Number
180-4343 Pelvis Flesh	DJ0959
FTSS Cert Plug - 1481N	36836

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.1 deg C P
Humidity	10 -- 70	20 %RH P
Velocity	6.60 -- 6.80	6.61 m/s P
Peak Probe Acceleration	38.0 -- 47.0	44.6 g P
Peak Pelvis Acceleration	34.0 -- 42.0	41.8 g P
Peak Acetabulum Force	3.60 -- 4.30	3.73 kN P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **E. Dutton**

Test Time: **3:57:05 PM**

Test Date: **2/6/2013**



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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	1/11/2013
Endevco	7231CT	C14953	11/28/2012
Endevco	7264-2000	P63561	12/3/2012
DentonATD	3249J	LC-267Fy	5/21/2012

Test Time: **3:57:05 PM**

Test Date: **2/6/2013**

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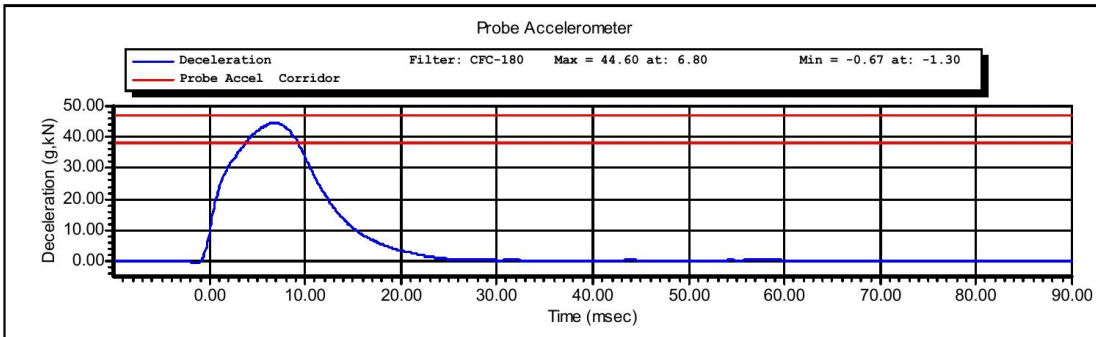
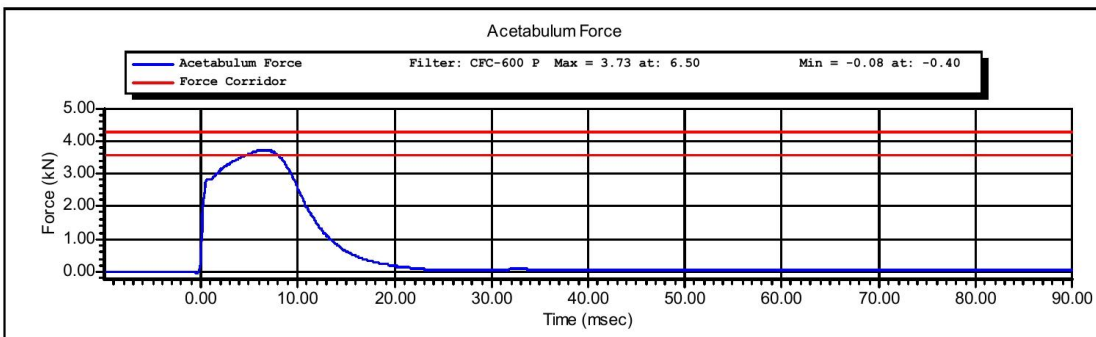


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Test Name:	Pelvis	Revision:	8/24/2009
Sub Test Name:	Acetabulum Impact	Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	DG8012		
Test ID:	Pelvis Acetabulum	Test Date:	2/6/2013
Test Number:	1	Test Time:	3:57:05 PM



Test Time: **3:57:05 PM**

Test Date: **2/6/2013**

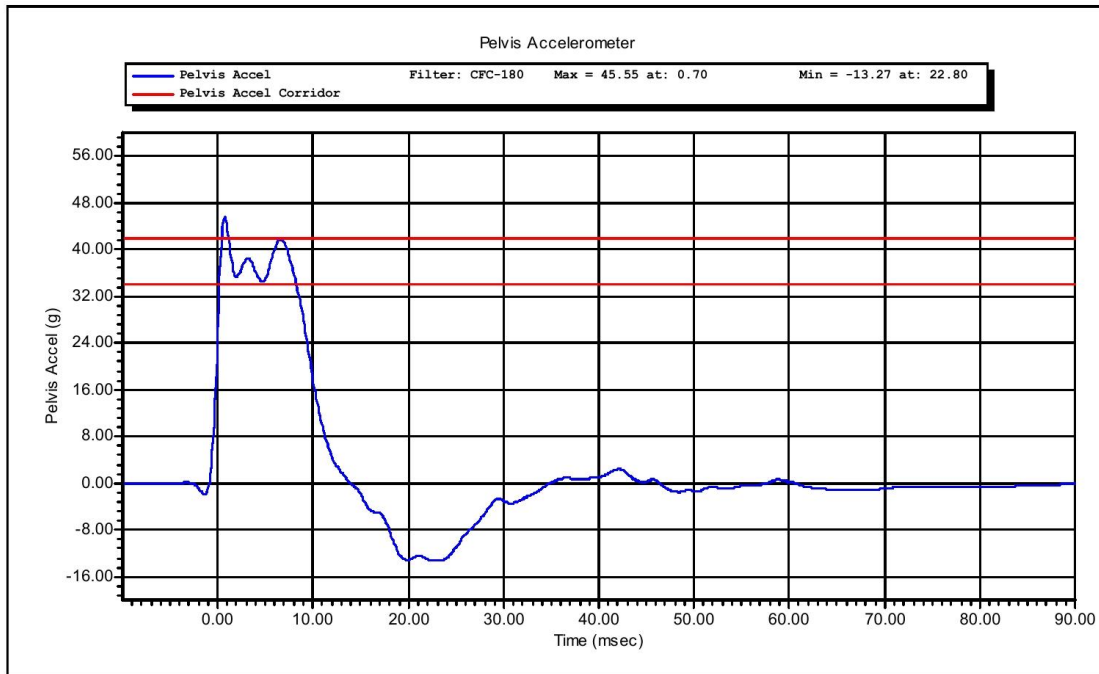
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Test Time: 3:57:05 PM

Test Date: 2/6/2013

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VERIFICATION REPORT

Test Name:	Pelvis	Revision:	8/24/2009
Sub Test Name:	Iliac Impact	Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	DG8012		
Test ID:	Pelvis Iliac Impact	Test Date:	2/6/2013
Test Number:	1	Test Time:	3:10:14 PM

Component Part Number	Component Serial Number
180-4343 Pelvis Flesh	DJ0959

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.1 deg C P
Humidity	10 -- 70	20 %RH P
Velocity	4.20 -- 4.40	4.33 m/s P
Peak Probe Acceleration	36.0 -- 45.0	39.5 g P
Peak Pelvis Acceleration	28.0 -- 39.0	31.5 g P
Peak Iliac Force	4.10 -- 5.10	4.31 kN P

All test parameters are within specifications

Technician: **M. Goehle**Supervisor: **E. Dutton**Test Time: **3:10:14 PM**Test Date: **2/6/2013**



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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	1/11/2013
Endevco	7231CT	C14953	11/28/2012
Endevco	7264-2000	P63561	12/3/2012
DentonATD	3228J	LC-281Fy	5/21/2012

Test Time: **3:10:14 PM**

Test Date: **2/6/2013**

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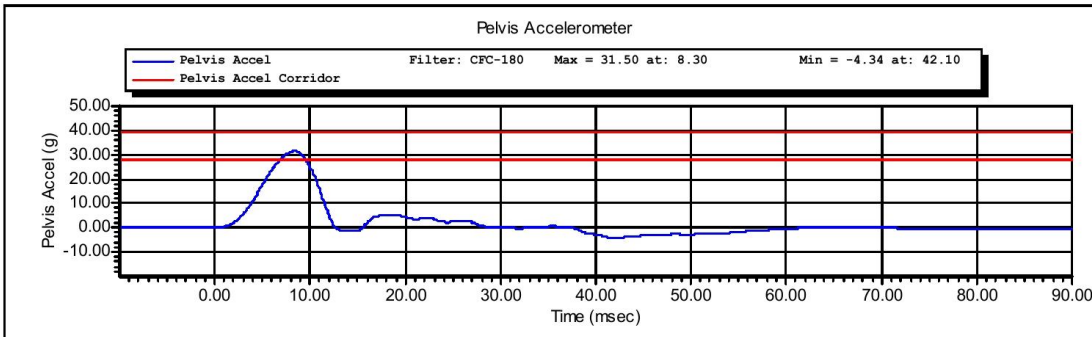
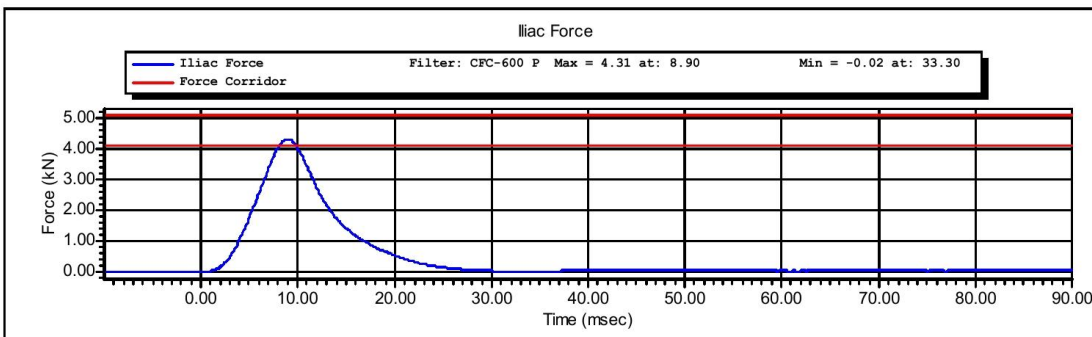


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Test Name:	Pelvis	Revision:	8/24/2009
Sub Test Name:	Iliac Impact	Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	DG8012		
Test ID:	Pelvis Iliac Impact	Test Date:	2/6/2013
Test Number:	1	Test Time:	3:10:14 PM



Test Time: **3:10:14 PM**

Test Date: **2/6/2013**

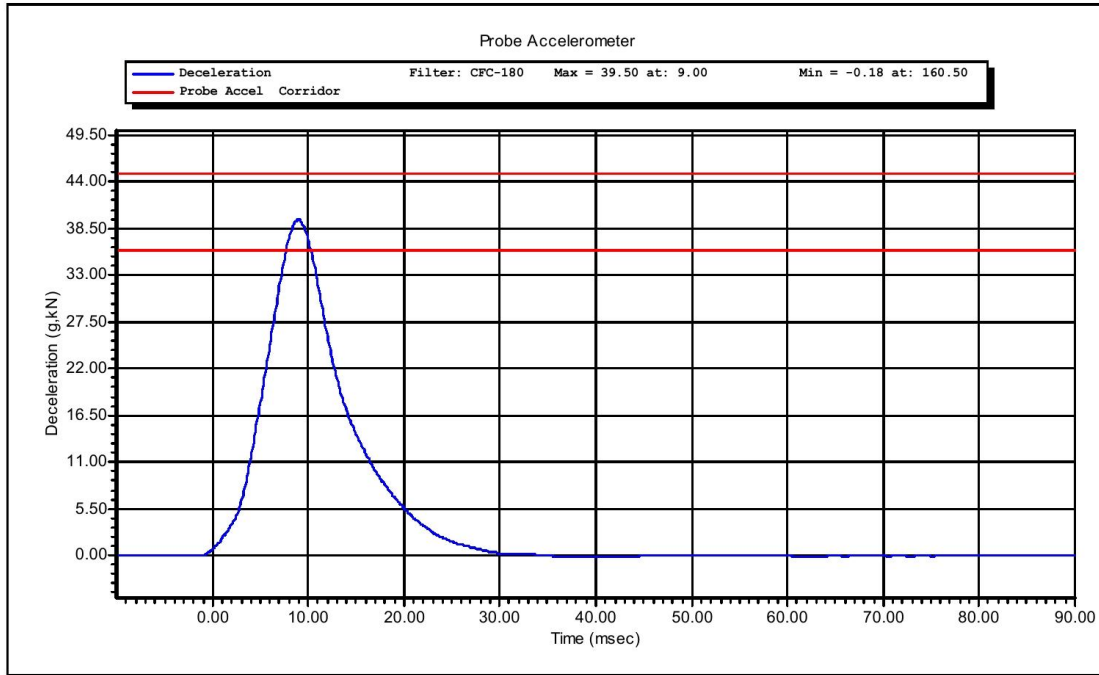
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Test Time: 3:10:14 PM

Test Date: 2/6/2013

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APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation (ES-2re)

			ES-2re S/N: F033		
			Serial Number	Manufacturer	Calibration Date
Head Accelerometers		X	P49204	ENDEVCO	11/19/2012
		Y	P63981	ENDEVCO	11/19/2012
		Z	P64007	ENDEVCO	11/19/2012
Thorax Rib Displacement Potentiometers	Upper	Y	179	HONEYWELL	5/17/2012
	Middle	Y	185	HONEYWELL	5/17/2012
	Lower	Y	178	HONEYWELL	5/17/2012
Abdomen Load Cells	Forward	Y	1524	DENTON	5/24/2012
	Middle	Y	1523	DENTON	5/24/2012
	Rear	Y	1530	DENTON	5/24/2012
Lower Spine Accelerometers (T12)		X	AAMD5	ENDEVCO	11/19/2012
		Y	J27457	ENDEVCO	11/19/2012
		Z	P52099	ENDEVCO	11/19/2012
Pubic Symphysis Load Cell		Y	456	DENTON	5/24/2012

Table 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N: 8012		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers			X	P49185	ENDEVCO	1/25/2013
			Y	P64129	ENDEVCO	1/10/2013
			Z	P51991	ENDEVCO	1/25/2013
Displacement Potentiometers	Shoulder		Y			
	Thoracic Rib	Upper	Y	808	DENTON	10/23/2012
		Middle	Y	1514	SERVO	5/16/2012
		Lower	Y	011	DENTON	10/23/2012
	Abdominal Rib	Upper	Y	015	DENTON	10/23/2012
		Lower	Y	1774	DENTON	10/23/2012
Lower Spine Accelerometers (T12)			X	P52100	ENDEVCO	1/26/2013
			Y	P58796	ENDEVCO	1/28/2013
			Z	P50098	ENDEVCO	1/26/2013
Acetabulum Load Cell			Y	267FY	DENTON	5/21/2012
Iliac Wing Load Cell			Y	281FY	DENTON	5/21/2012
Pelvis Plug (struck side)				36331	HUMANETICS	9/22/2010
Pelvis Plug (non-struck side)						

Table 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	A110459	MS	12/18/2012
	Vehicle Center of Gravity	Y	A112913	MS	12/19/2012
	Vehicle Center of Gravity	Z	A112920	MS	12/19/2012
2	Right Sill at Front Seat	X	A112918	MS	12/19/2012
	Right Sill at Front Seat	Y	A112912	MS	12/19/2012
	Right Sill at Front Seat	Z	A112909	MS	12/19/2012
3	Right Sill at Rear Seat	X	A112916	MS	12/19/2012
	Right Sill at Rear Seat	Y	A112910	MS	12/19/2012
	Right Sill at Rear Seat	Z	A110470	MS	12/18/2012
4	Left Sill at Front Door	Y	A081410	MS	9/5/2012
5	Left Sill at Rear Door	Y	A005825	MS	9/5/2012
6	Left A-Post Lower	Y	A081417	MS	8/10/2012
7	Left A-Post Middle	Y	A081413	MS	8/10/2012
8	Left B-Post Lower	Y	A002416	MS	10/18/2012
9	Left B-Post Middle	Y	A013068	MS	9/5/2012
10	Front Seat Track	Y	A112922	MS	12/19/2012
11	Rear Seat Track or Structure	Y	A081460	MS	8/13/2012
12	Right Rear Occ. Compartment	Y	A112919	MS	12/19/2012
13	Engine Block	X	A110451	MS	12/18/2012
	Engine Block	Y	A110479	MS	12/18/2012
14	Rear Floorpan Above Axle	X	A112921	MS	12/19/2012
	Rear Floorpan Above Axle	Y	A112911	MS	12/19/2012
	Rear Floorpan Above Axle	Z	A112908	MS	12/19/2012

TABLE 4 – MDB Instrumentation

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	C14901	ENDEVCO	9/14/2012
MDB Center of Gravity	Y	C16680	ENDEVCO	9/14/2012
MDB Center of Gravity	Z	CP30	ENDEVCO	9/14/2012
Left Frame at Rear Axle Centerline	X	C16507	ENDEVCO	9/14/2012
Left Frame at Rear Axle Centerline	Y	C16499	ENDEVCO	9/14/2012